TECHNICAL MANUAL

AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE MANUAL

CH-47D HELICOPTER

This manual together with TM 55-1520-240-23-1, TM 55-1520-240-23-2, TM 55-1520-240-23-3, TM 55-1520-240-23-4, TM 55-1520-240-23-5, TM 55-1520-240-23-6, TM 55-1520-240-23-7, TM 55-1520-240-23-8, TM 55-1520-240-23-10, TM 55-1520-240-23-11, supersedes TM 55-1520-240-23-1, TM 55-1520-240-23-2, TM 55-1520-240-23-3, TM 55-1520-240-23-4, TM 55-1520-240-23-5, TM 55-1520-240-23-7, TM 55-1520-240-23-8, TM 55-1520-240-23-9, TM 55-1520-240-23-10, 10 May 1983, and TM 55-1520-240-23-6, 6 May 1983, including all changes.

DISTRIBUTION STATEMENT A: **Approved for public release; distribution is unlimited.**

HEADQUARTERS, DEPARTMENT OF THE ARMY
19 SEPTEMBER 2002

WARNING AND FIRST AID DATA

For artificial respiration and other first aid data, refer to FM 21-11.

Personnel performing instructions involving operations, procedures, and practices which are included or implied in this technical manual shall observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury, illness, death, or an aborted mission.

WARNING

An operating procedure, practice, etc., which if not correctly followed, could result in personal injury or loss of life.

CAUTION

An operation procedure, practice, etc., which if not strictly observed, could result in damage to or destruction of equipment.

NOTE

An operating procedure, condition, etc., which is essential to highlight.

WARNING

Cleaning Solvents

Those areas of skin and clothing that come in contact with cleaning solvents should be thoroughly washed immediately.

Saturated clothing should be removed immediately.

Areas in which cleaning solvents are used should be adequately ventilated to keep vapors to a minimum.

If cleaning solvents contact the eyes, nose, or ears, flush them with generous quantities of water, and then seek medical attention immediately.

WARNING

Electrical and Electronic Equipment Maintenance

Do not wear rings, watches, or metal jewelry when working around electrical equipment. Serious burns can result.

Be careful when working on 150 and 300 vdc circuits and on ac generator 115 and 200 vac outputs. Serious burns can result.

WARNING

Dangerous Static Charges

Ground the helicopter during parking, fueling, or defueling. Sparks can cause fuel vapor to ignite.

WARNING

Dangerous Voltages at Antenna Terminals

Be careful when working near antenna or antenna terminals. Radio frequency (rf) voltages exist at these points when transmitters are operating. Contact with radiating antennas can cause serious rf burns.

WARNING

Poisonous Carbon Monoxide Fumes

Toxic carbon monoxide fumes may be present inside the helicopter whenever engines or APU are operating with cargo ramp open. Ventilate the cockpit.

WARNING

Corrosive Battery Electrolyte (Potassium Hydroxide)

The electrolyte used in nickel-cadmium batteries contains potassium hydroxide which is a caustic substance.

Contact with skin or eyes will cause burns.

Use rubber gloves, rubber apron, and protective eye covering or face shield when handling battery.

If personal contact with electrolyte occurs. Flush immediately with large amounts of only clean water. Get medical attention immediately.

WARNING

Explosive Battery Hazard

Before removing or installing battery, make sure battery switch is OFF and battery has cooled down if overheated.

Connecting or disconnecting battery connector while battery is under load may cause explosion or electrical arcing resulting in injury to personnel.

WARNING

Electrolyte Contamination

Separate nickel-cadmium batteries and lead-acid type batteries as far as possible from each other.

Do not let anything associated with a lead-acid battery, including air, come in contact with a nickel-cadmium battery or its electrolyte. Sulfuric acid fumes from a lead-acid battery could result in damage to a nickel-cadmium battery leading to battery failure and a hazard to personnel.

Do not use same tools or protective clothing for both types of batteries.

If sulfuric acid has been somehow mixed with electrolyte in the battery, the upper areas of the battery cells will appear green in color indicating battery failure or damage and potential danger to personnel unless replaced.

WARNING

Acids and Alkalines

Do not add water to acid. A violent action will result. Add acid to water in small quantities.

Rust stripper is an alkaline solution.

Avoid skin contact. Wear protective clothing. Wash thoroughly after using.

WARNING

Windshield Rain Repellent

Do not let windshield rain repellent contact open flame. Deadly hydrogen fluoride gas could be generated.

Wash hands with soap and water after handling repellent.

WARNING

Antiseize Compounds

Some antiseize compounds are irritants. Avoid inhaling fumes and contact with skin.

Wear protective clothing. Wash thoroughly after using.

WARNING

Paints, Varnishes, Dopes, Thinners, and Lubricants

These materials are generally highly flammable and may be irritants. Work in a well-ventilated area away from open flames.

Avoid inhaling fumes and prolonged contact with skin. Wash thoroughly after using.

WARNING

Epoxy Resins, Cements, and Adhesives

These materials may contain toxic or irritating substances. They may also be flammable. Work in a well-ventilated area away from open flames.

Wear protective clothing. Avoid contact with skin. Wash thoroughly after using.

WARNING

Radiation Hazard

Some instruments contain radioactive material. Do not try to disassemble these instruments. They present no radiation hazard unless seal is broken.

If you think seal is broken, do not remove instrument from helicopter before consulting Base Radioactive Protection Officer (AR 40-15).

Use a beta-gamma radiac meter AN/PDR-27 or equivalent to determine if instrument contains radioactive material (radium).

WARNING

Fire Extinguishing Agents

Monobromotrifluoromethane (CF_3Br) is highly volatile but is not easily detected by smell, it is not toxic, but reduces oxygen available for proper breathing.

If liquid CF_3Br contacts skin, it can cause frostbite or low temperature burns.

If agent touches eyes or skin, immediately flush affected area with running water. Get medical attention.

WARNING

Noise

Sound pressure levels in this helicopter during some operating conditions exceed the Surgeon General's hearing conservation criteria (TB MED 251).

Hearing protection devices, such as aviator helmet or ear plugs, shall be worn by all personnel in and around the helicopter during operation.

WARNING

FOD

Make sure area is clear of foreign objects before closing access doors, panels, and fairings.

If area is not clear, damage to components or systems could result in personal injury or death.

WARNING

JP-4/JP-5/JP-8 Fuel MIL-T-5624

Fuel is flammable. Do not use near welding areas, open flames, or on very hot surfaces.

Use only with adequate ventilation.

Avoid prolonged or repeated contact with skin. Prolonged contact may cause drying and irritation of skin.

Remove saturated clothing immediately.

Do not smoke when handling fuel.

Do not take internally.

Store in approved, metal safety containers.

WARNING

Lubricating Oils MIL-L-23699 or MIL-L-7808

If oil is decomposed by heat, toxic gases are released.

Prolonged contact with liquid or mist may cause dermatitis and irritation.

If there is prolonged contact with skin, wash affected area with soap and water. If oil contacts eyes, flush with water immediately. Remove saturated clothing.

If swallowed, do not try to vomit. Seek immediate medical attention.

When handling liquid oil, wear rubber gloves. If prolonged contact with mist is likely, wear approved respirator.

WARNING

Lifting Components With Hoist

Lifting or hoisting of components shall only be done by designated personnel.

The load capacity rating shall be clearly marked on hoist. Do not exceed load rating.

Inspection and testing for cracks or defects in hoist system shall be performed on a regular basis.

Before lifting, alert personnel in immediate areas.

Before lifting, balance the load.

Do not stand under load while it is being moved from one area to another on a hoist.

Do not stand under load to do maintenance work.

WARNING

Hydraulic Pressures

High pressures used in testing hydraulic components can cause line rupture or component failure.

Only qualified personnel shall operate, service, and maintain hydraulic test equipment.

Use heavy plastic shielding at least 5/8 inch thick when applying pressures over 250 psi to prevent injury to personnel.

WARNING

Hydraulic Fluid

Hydraulic fluid is toxic. It can irritate skin and eyes and cause burns. When fluid is decomposed by heating, it releases toxic gases.

Avoid inhaling. Use only with adequate ventilation. If prolonged contact with mist is likely, wear an appropriate respirator.

Avoid contact with skin, eyes, or clothing. Wear rubber gloves if handling liquid.

In case of contact with skin, immediately wash skin with soap and water. In case of contact with eyes, flush them immediately with clear water and get medical attention.

If liquid is swallowed, do not induce vomiting; get immediate medical attention.

WARNING

Compressed Air

Do not use more than 30 psi compressed air for cleaning purposes. Debris propelled under pressure can cause injury to eyes.

Use eye protection to prevent injury to personnel.

WARNING

Flare Dispenser

Flares can accidentally fire, sometimes from stray voltage. Injury or death can result.

Remove all electrical power from helicopter before installing loaded payload module on dispenser assembly.

Keep hands and face away from end of payload module during installation.

WARNING

Maintenance Platforms/Workstands

Use only authorized maintenance platforms/workstands, or other approved locally procured stands and restraint equipment, when working above 10 feet on helicopters in a nontactical environment; otherwise, personnel injury could result from accidental falls.

WARNING

Black Light Inspection Eyewear

Do not wear eyeglasses having light sensitive lenses while performing magnetic particle (black light) or fluorescent penetrant inspections.

Such lenses have a 16 to 45 percent light transmission loss.

Wearing them can result in failure to detect flaws and cracks under ultraviolet light.

WARNING

Cadmium-Plated Tools

Use only chrome-plated or unplated steel tools when working on the helicopter.

Cadmium or zinc-plated tools are not permitted, since these platings are prone to chipping and flaking. The chips and flakes could cause corrosion or fluid contamination.

All tools, regardless of plating type, shall be serviceable and free of chipping.

URGENT

CHANGE NO. 2

**HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 20 FEBRUARY 2004**

Aviation Unit and Aviation Intermediate Maintenance Manual

CH-47D HELICOPTER

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

TM 55-1520-240-23-9, 19 September 2002, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

Remove pages	**Insert Pages**
A/(B blank)	A/(B blank)
11-951 and 11-952	11-951 and 11-952
11-955 through 11-958	11-955 through 11-958

2. Retain this sheet in front of the manual for reference purposes.

By Order of the Secretary of the Army:

Official:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
0404905

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CHANGE
NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 SEPTEMBER 2003

Aviation Unit and Aviation Intermediate
Maintenance Manual

CH-47D HELICOPTER

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Remove pages	**Insert Pages**
A/(B blank)	A/(B blank)
i/(ii blank)	i/(ii blank)
11-53 and 11-54	11-53 and 11-54
11-59 and 11-60	11-59 and 11-60
11-95 and 11-96	11-95 and 11-96
11-213 and 11-214	11-213 and 11-214
11-235 and 11-236	11-235 and 11-236
11-591 and 11-592	11-591 and 11-592
11-673 and 11-674	11-673 and 11-674
11-917 and 11-918	11-917 and 11-918
11-937 and 11-938	11-937 and 11-938
11-961 and 11-962	11-961 and 11-962
11-1067 through 11-1070	11-1067 through 11-1070
11-1097 and 11-1098	11-1097 and 11-1098
11-1101 and 11-1102	11-1101 and 11-1102
11-1105 and 11-1106	11-1105 and 11-1106
----------	11-1126.1 and 11-1126.2
11-1139 and 11-1140	11-1139 and 11-1140
11-1181 and 11-1182	11-1181 and 11-1182

2. Retain this sheet in front of the manual for reference purposes.

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PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
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LIST OF EFFECTIVE PAGES

Insert latest changed pages; dispose of superseded pages in accordance with regulations.

N0TE: On a changed page, the portion of the text affected by the latest change is indicated by a vertical line, or other change symbol, in the outer margin of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original	19 September 2002
Change 1	30 September 2003
Change 2	20 February 2004

Page No.	*Change No.
Title	0
a through g	0
h blank	0
A	2
B blank	2
i	1
ii blank	1
11-1 through 11-52	0
11-53 and 11-54	1
11-55 through 11-58	0
11-59 and 11-60	1
11-61 through 11-94	0
11-95	1
11-96 through 11-212	0
11-213 and 11-214	1
11-215 through 11-235	0
11-236	1
11-237 through 11-273	0
11-274 blank	0
11-275 through 11-459	0
11-460 blank	0
11-461 through 11-590	0
11-591 and 11-592	1
11-593 through 11-672	0
11-673 and 11-674	1
11-675 through 11-727	0
11-728 blank	0
11-729 through 11-785	0
11-786 blank	0
11-787 through 11-916	0
11-917	1
11-918 through 11-937	0
11-938	1
11-939 through 11-947	0
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11-949 through 11-951	0
11-952	2
11-953 and 11-954	0
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11-962	1
11-963 through 1017	0
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11-1107 through 11-1126	0
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11-1126.2 added	1
11-1127 through 11-1138	0
11-1139	1
11-1140 through 11-1181	0
11-1182	1
11-1183 through 11-1207	0
11-1208 blank	0

*Zero in this column indicates an original page.

TECHNICAL MANUAL
NO. 55-1520-240-23-9

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 19 SEPTEMBER 2002

AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE MANUAL

CH-47D HELICOPTER

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual, directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our fax number is: DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028. For the World Wide Web use: https://amcom2028.redstone.army.mil.

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TABLE OF CONTENTS

			PAGE NO.
VOLUME	IX		
CHAPTER	11	FLIGHT CONTROLS SYSTEM	11-1
Section	I	Flight Controls System Description and Operation	11-1
Section	II	Flight Controls	11-7
Section	III	Cockpit Controls	11-275
Section	IV	Closet Controls	11-461
Section	V	Mixing Controls	11-729
Section	VI	Upper Controls	11-787
Section	VII	Tunnel Controls	11-911
Section	VIII	Aft Fuselage and Pylon Controls	11-949
Section	IX	Advanced Flight Control System Description and Operation	11-1011
Section	X	Advanced Flight Control System	11-1019
INDEX		See Volume XI	

*This manual together with TM 55-1520-240-23-1, TM 55-1520-240-23-2, TM 55-1520-240-23-3, TM 55-1520-240-23-4, TM 55-1520-240-23-5, TM 55-1520-240-23-6, TM 55-1520-240-23-7, TM 55-1520-240-23-8, TM 55-1520-240-23-10, TM 55-1520-240-23-11, supersedes TM 55-1520-240-23-1, TM 55-1520-240-23-2, TM 55-1520-240-23-3, TM 55-1520-240-23-4, TM 55-1520-240-23-5, TM 55-1520-240-23-7, TM 55-1520-240-23-8, TM 55-1520-240-23-9, TM 55-1520-240-23-10, 10 May 1983, and TM 55-1520-240-23-6, 6 May 1983, including all changes.

CHAPTER 11
FLIGHT CONTROLS SYSTEM

SECTION I
FLIGHT CONTROLS SYSTEM DESCRIPTION AND OPERATION

11-1 FLIGHT CONTROLS 11-1

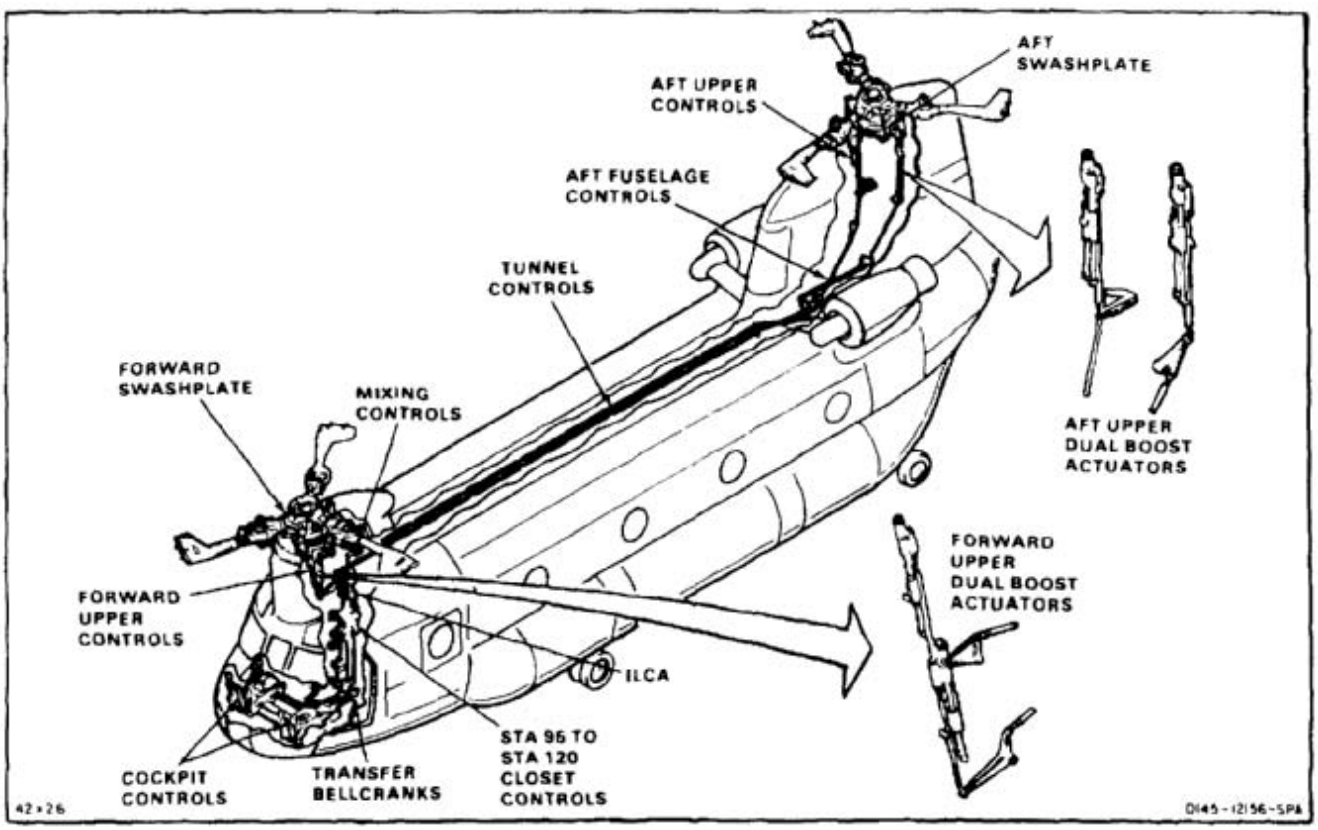
The flight control system is electrohydraulic operated and powered by two independent hydraulic boost systems. Control inputs from the cockpit are transmitted through mechanical linkage to the integrated lower control actuator (ILCA). The ILCA then transmits individual control motions to the first and second stage mixing units. The mixed outputs are then transmitted through a series of push-pull tubes to the upper dual-boost actuators attached to the forward and aft swashplates.

The helicopter is vertically controlled with the thrust control lever, through application of equal pitch to all blades. Directional control is obtained with the directional (yaw) pedals by imparting equal but opposite inputs to the forward and aft swashplates. Lateral control is obtained with cyclic (roll) stick by application of equal inputs left or right tilting the swashplates causing both rotor discs to tilt equally moving the helicopter either left or right.

The helicopter is longitudinally controlled with the cyclic (pitch and roll) stick through application of differential collective pitch. For forward motion, the pitch of the forward rotor blades is decreased while the pitch of the aft rotor blades is increased. The opposite action occurs with aft movement of the helicopter. The helicopter has an Advanced Flight Control System (AFCS) for stabilization and coupled flight control operations.

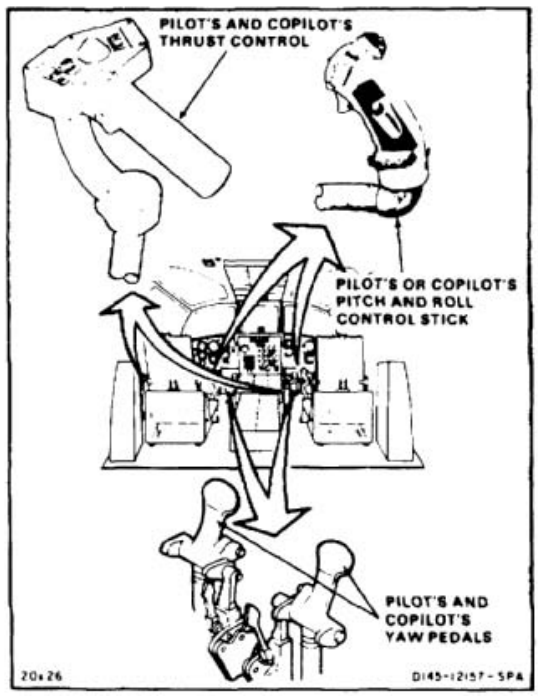
The flight control system is divided into seven main sections:

Cockpit controls
Closet controls between sta. 95 and 120
First and second stage mixing controls
Forward upper controls
Tunnel controls
Aft fuselage controls
Aft upper controls



COCKPIT CONTROLS

The pilot and copilot each have a set of controls. They are interconnected under the cockpit floor so that if one set is moved, the other set moves in the same direction. Each set of controls contains a pitch and roll control stick, a thrust control, and yaw pedals.

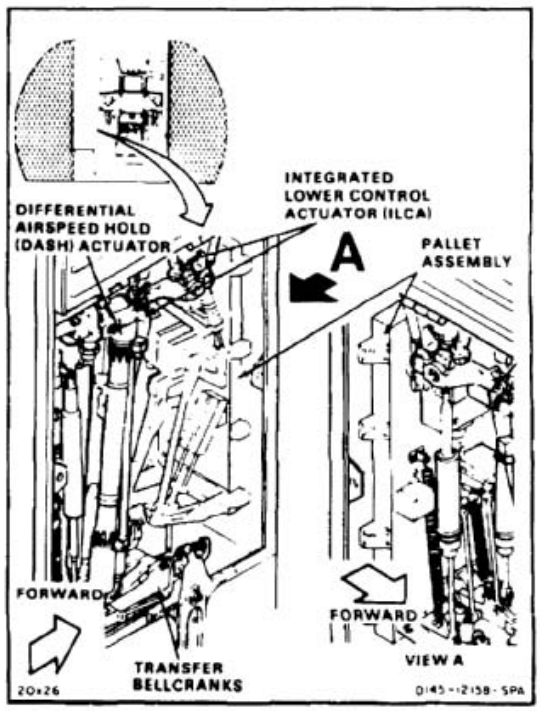


CLOSET CONTROLS

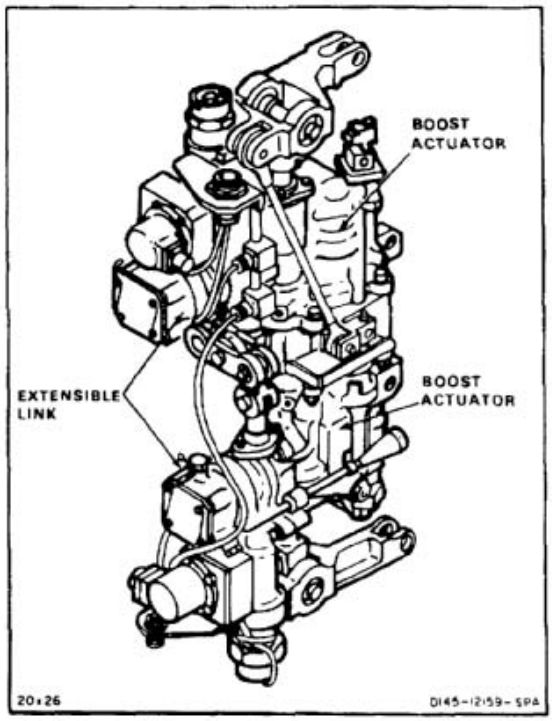
Cockpit control movements are transferred through linkage to the transfer bellcranks and vertical controls in the lower section of the controls closet.

Contained within this closet are the integrated lower control actuators (ILCA), differential airspeed hold actuator (DASH), and two pallet assemblies. The pallet assemblies contain spring assemblies, magnetic brakes, cockpit control drive actuators (CCDA) with integral magnetic brakes, viscous dampers, and control position transducers. The spring assemblies and magnetic brakes provide artificial feel to the cockpit controls, since normal feel is lost because of the hydraulic assist.

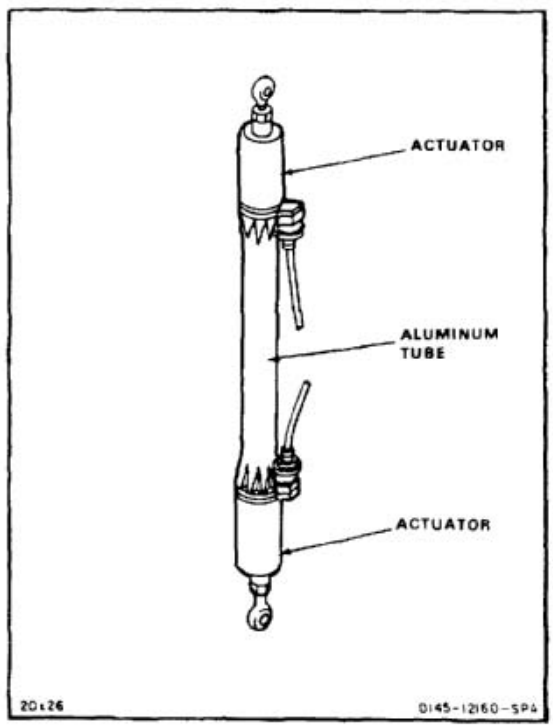
Connecting links in the upper closet with **26** have a special coating that increases their resistance to heat and fire.



There are four integrated lower control actuators. The actuators are similar but not interchangeable, once they are set up for a particular control. The pitch, roll, and yaw ILCA's have a dual boost actuator and two extensible link actuators. The thrust ILCA does not have the extensible links. The boost actuators provide hydraulic assist for cockpit control inputs. The extensible links are actuating cylinders, controlled by the AFCS, which provide inputs to the upper flight control servocylinders, without any corresponding motion of cockpit controls. If the AFCS is not in use, the extensible links act as rigid links.



The DASH actuator installed in the pitch control system consists of two electromechanical linear actuators mounted on an aluminum tube. Both actuators receive identical control signals from the AFCS, which extends or retracts the actuators, to position the helicopter as required by the control stick movement and to maintain the desired airspeed.

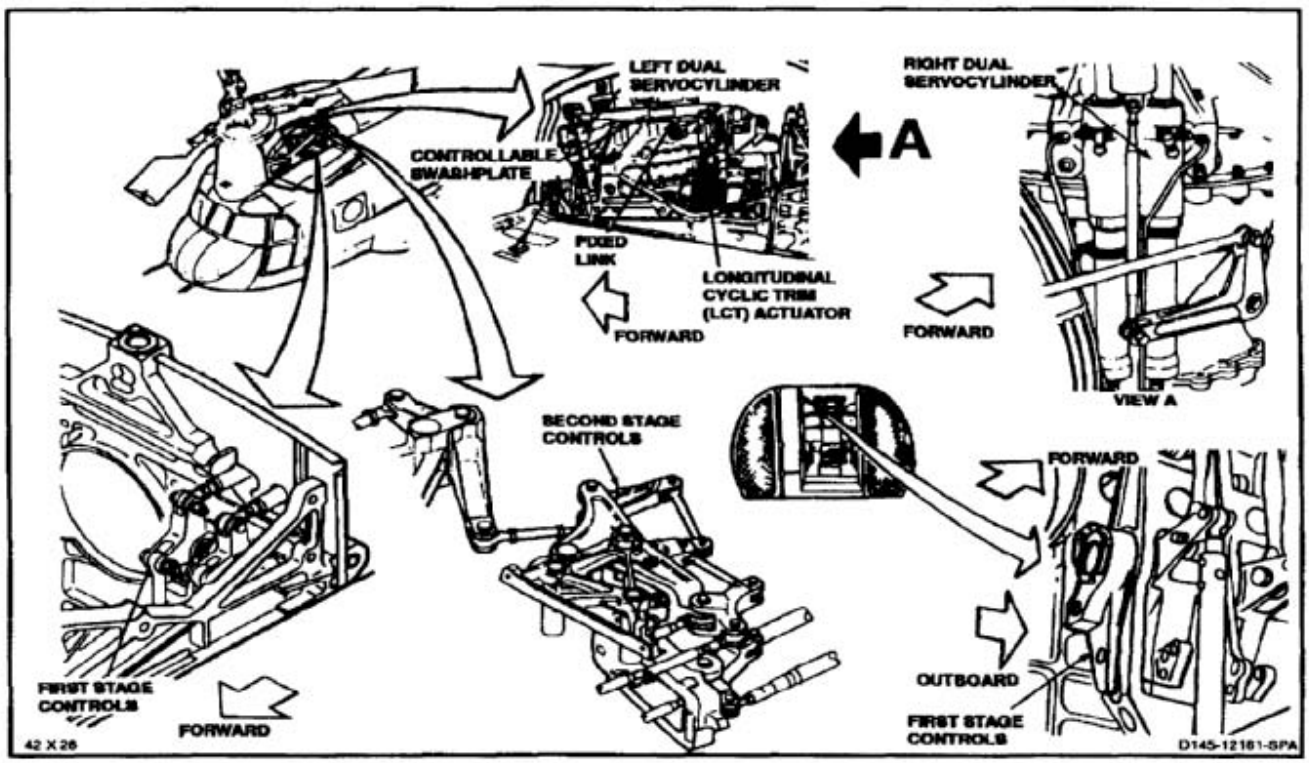


First and Second Stage Controls

The first stage controls are above the closet controls between sta. 95 and 120. The second stage controls are aft of the forward transmission mounting structure. The first and second stage controls are connected by four connecting links. The first and second stage controls consist of bellcranks and linkage which mix inputs from the thrust, pitch, roll, and yaw closet control motions into two motions. These two motions are transmitted directly to the forward and aft controls.

Forward Upper Controls

The forward upper controls are forward of the second stage controls on either side of the forward transmission. Links and bellcranks direct control motions to control valves located in two dual servocylinders. The servocylinders are connected to the forward transmission and the controllable swashplate. A longitudinal cyclic trim (LCT) actuator, yoke, and fixed link are part of the forward flight controls, and are located on the aft side and below the forward swashplate. The LCT actuator is controlled by manually applied electrical inputs from the cockpit or by the advanced flight control system (AFCS).

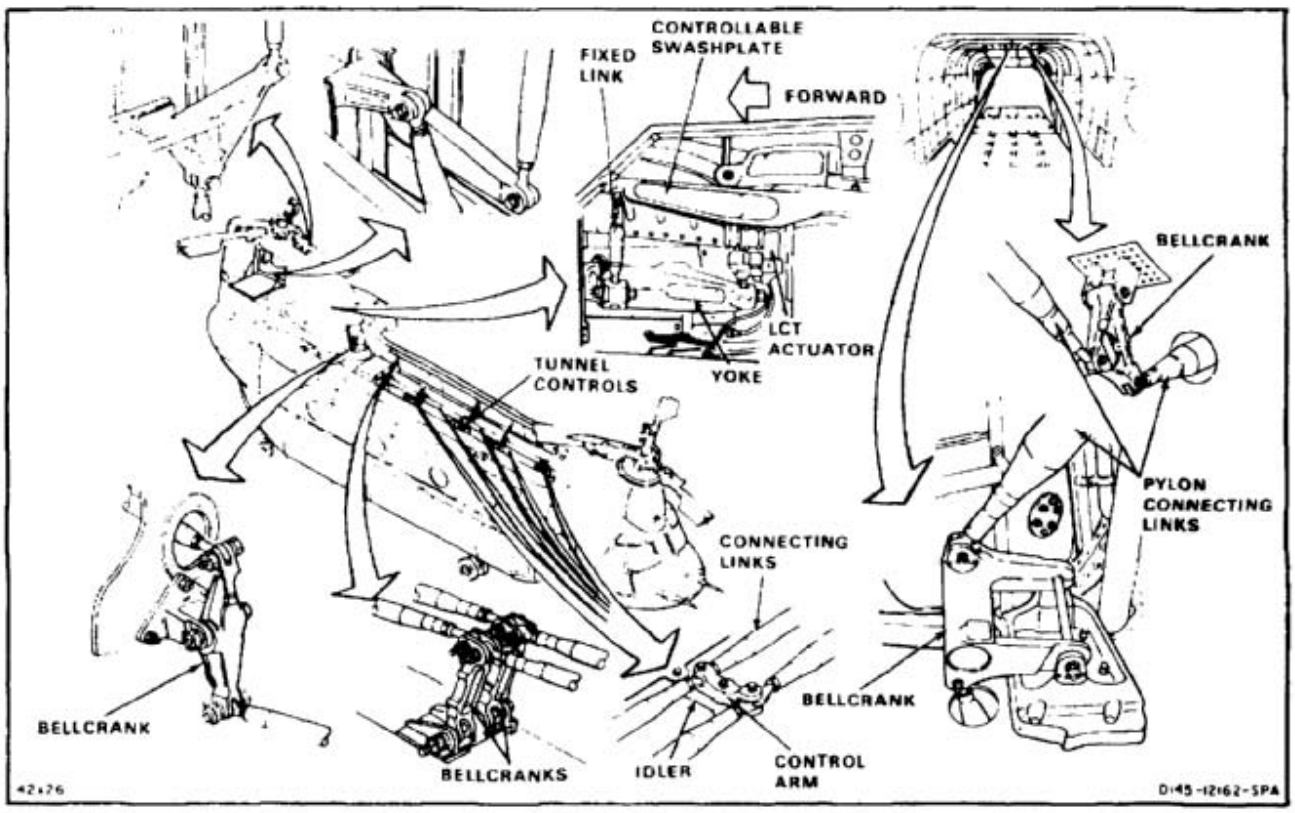


Tunnel Controls

The tunnel controls are a series of connecting links, idlers, and control arms mounted on top of the cabin section. The tunnel controls transmit second stage control motions aft to the aft flight controls. Connecting links with 26 have a special coating that increases their resistance to heat and fire.

Aft Controls

The aft controls are in the pylon. Connecting links and bellcranks transmit tunnel control motions to control valves located in two dual servocylinders. The servocylinders are connected to the structure and the controllable swashplate. An LCT actuator, yoke and forward fixed link are part of the aft flight controls and are located on the forward side and below the aft swashplate. The LCT actuator is controlled by manually applied electrical inputs from the cockpit or by the AFCS. Bellcranks and connecting links with 26 have a special coating that increases their resistance to heat and fire.



END OF TASK

SECTION II
FLIGHT CONTROLS

INITIAL SETUP

Applicable Configurations:

All

Tools:

Mechanical Finger
Vacuum Cleaner
Low Pressure Air Supply
Brush
Other Tools As Required

Materials:

Cloths (E120)
Dry Cleaning Solvent (E162)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

As Required

General Safety Instructions:

As Required

WARNING

Dry cleaning solvent (E162) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

Do not wash areas with solvent (E162). Dirt may be washed into bearings causing component damage.

CAUTION

Vibration during flight can move dirt or dust in bearings or bushings.

1. Remove dirt from components or structure as follows:
   a. Brush dust or dirt from large areas. Use dry bristle brush.
   b. Remove large dirt using mechanical finger.
   c. Vacuum or blow dust or dirt from close fitting component. Use low pressure air.
   d. Remove dust with cloth (E120) moistened with solvent (E162). Use gloves (E186).
2. Areas which may collect dirt or dust are as follows:
   a. Pivot points of idlers or bellcranks.
   b. Connecting points of links or bellcranks in upright positions.
   c. Small spaces between bellcranks.
3. Materials which are dangerous to flight system components:
   a. Loose nuts, bolts, rivets, lockwire, small stones, or pieces of wood.
   b. Fluids which can wash dirt in bearings or bushings.
   c. Fluids can wash lubricant out of bearings.
   d. Spilled hydraulic fluids collect dust or dirt.
   e. Spilled hydraulic fluid on DASH actuator can damage motor.
   f. Dust or dirt on electrical connectors or receptacles can cause electrical malfunctions.

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-3 LUBRICATE FLIGHT CONTROL SYSTEM ROD END (ANTIFRICTION) 11-3

INITIAL SETUP

Applicable Configurations:

All

Tools:

Grease Gun with Nozzle MS24203-1 or Alemite Nozzle 314150

Materials:

Grease (E190)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1500-204-23

Equipment Condition:

As Required

CAUTION

The following procedures shall be performed carefully due to the sensitivity of bearing seals.

NOTE

The rod end bearings that are located in the pedal box area, flight cockpit controls, pilot cockpit controls assembly, and copilot cockpit controls assembly are not exposed to the same severe conditions as the bearings located in the forward pylon, mixing complex, tunnel area, aft fuselage, and aft pylon. The pedal box bearings are in an enclosed protective area and would be difficult to lubricate the bearings without removing them from the aircraft; therefore, there's no need to lubricate these bearings at the same schedule as the other bearings.

1. Rod end bearings located in the pedal box area shall be lubricated only when the pedal boxes are removed from the aircraft for other reasons.
2. Rod end bearings located in the flight control closet area, forward pylon, mixing complex, tunnel area, aft fuselage, and aft pylon shall be lubricated every 1st and 3rd phase inspection.
3. Lubricate the flight control rod end rolling element as follows:
   a. Identify and locate bearings to be re-lubricated.
   b. Prior to lubrication, ensure that the grease gun and nozzle are clean and free of contamination.
   c. Fill the grease gun with grease (E190).
   d. It may be necessary to remove some flight control links in order to obtain access to the rod end bearing grease fitting.
   e. Clean the exterior of the bearing using a clean cloth.

NOTE

Cleanliness cannot be over emphasized with respect to prolonging bearing life.

   f. Do not remove bearing from rod end component.

CAUTION

During application of grease, take care in operating the grease gun so that you do not over pressurize and damage the bearing seals/shields. Operate the grease gun in a slow and smooth technique during application.

   g. Using grease (E190) and hand operated grease gun, attach gun and pressurize.
   h. Allow the grease to flow until grease that exudes out from around the bearing is clean. If possible, the bearing should be rotated **360º** during lubrication.

NOTE

The above procedure removes some dirty grease from the bearing cavity and tends to maximize the amount of grease left inside. The purpose of this type of re-lubrication is to maintain internal corrosion protection as much as to sustain low friction.

i. Using a clean cloth, wipe the excess grease off the bearing rod end.

j. Turn on the electrical and hydraulic power.

FOLLOW-ON MAINTNENACE:

None

END OF TASK

11-4 RIG FLIGHT CONTROLS SYSTEM (GENERAL INFORMATION) 11-4

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

As Required

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

Tasks 11-32 thru 11-58

Equipment Condition:

As Required

1. Rigging of flight controls system consists of adjusting various systems and components.
2. Flight controls system must be at neutral rig and control travel stops set before flight controls system checks are performed.
3. Refer to specific tasks for more detailed information.

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-5 CHECK CONTROLS CLEARANCE 11-5

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

As Required

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1500-204-23

Equipment Condition:

As Required

MINIMUM CLEARANCE CHECK

1. Check flight control system components for minimum clearances as follows:
   a. Check distance between moving bellcranks and structure, cables, piping, or mounted equipment. Minimum distance shall be **0.50 inch**.
   b. Check distance between moving links and bulkhead. Minimum distance shall be **0.20 inch**.
   c. Check distance between bellcrank hubs and support fittings mounted on same shaft. Minimum distance shall be **0.03 inch**.
   d. Check distance between any bellcrank arm and any other moving part. Minimum distance shall be **1 inch**.

SUBMINIMUM CLEARANCE CHECK

2. Check flight control system for subminimum clearances as follows:

	LOCATION	PARTS INVOLVED	SUBMINIMUM ALLOWABLE CLEARANCE (INCH)
STA WL BL	565.00 +100.00 8.00LH	Between MS27576-4-19 bolt inboard end and 114S4118 beam. (Bolt in aft clevis of 145C2514 bellcrank.)	**0.06**
STA WL BL	534.00 +63.00 7.00RH	Without **38** - Between 145S3308 frame doubler clearance hole and 145C2010-11 link assembly.	**0.120**
STA WL BL	534.00 +63.00 7.00RH	With **38** - Between 145S3308 frame doubler clearance hole and 145CS340-3 link assembly.	**0.120**
STA WL BL	552.00 +71.00 12.00RH	Between 114S4113-113 deck angle and 145C2513-1 or -3 bellcrank.	**0.120**
STA WL BL	554.00 +90.00 10.00LH	Without **38** - Between 145S4112-6 & 114S4115-103 angles and 145C2010-12 link assembly.	**0.120**
STA WL BL	554.00 +90.00 10.00LH	With **38** - Between 145S4112-6 & 114S4115-103 angles and 145CS340-5 link assembly.	**0.120**
STA WL BL	78.00 –20.00 12.00LH	Between 114C1103-157 angle and 114C1168 or 414C1168 roll bellcrank.	**0.120**
STA WL BL BL	41.00 –22.00 15 & 26RH 15 & 26LH	Between 114C1103-119 web and 114C1014-1 yaw links.	**0.08**
STA WL BL	92.44 +59.28 15.00LH	Between bolt/nut in fwd end of 145C3230 bellcrank and 145C1813-1 fitting. (Bolt head outboard.)	**0.10**
STA WL BL	95.35 +55.25 14.00RH	Between 145C3231 bellcrank and cylinder barrel of pivoting actuator 145H6600.	**0.18**
STA WL BL	53.0 +25.0 13.5	Between 114C1160-1 thrust bellcrank and 114C1012-2 pitch rod assy.	**0.12**
STA WL BL	70.62 –26.15 20.00LH	Between 114C1102-26 bracket and 114C1130-4 pitch horn.	**0.120**
Cockpit		Between 145C1306 cyclic stick and 114C1124 pedal adjustment lever.	**0.06** (See Note 2)
STA WL BL	61.38 –27.97 18.25LH	Between the 114C1014-2 roll link and 114C1103-77 angle of copilot control box assembly.	**0.06**

11-5 CHECK CONTROLS CLEARANCE (Continued) 11-5

	LOCATION	PARTS INVOLVED	SUBMINIMUM ALLOWABLE CLEARANCE (INCH)
STA WL BL	482.00 +56.60 12.009LH	Without 64 - Between 145C2510-1 or -3 bellcrank and bolt attaching 114S3882 bracket to former.	**0.12**
STA WL BL	482.00 +56.60 12.009LH	With 64 - Between 145C3510-1 or -5 bellcrank and bolt attaching 114S3882 bracket to former.	**0.12**
STA WL BL	163.00 and 400.00 +56.00 16.6LH	Without 38 and 64 - Between MS27576 bolt attaching 114C3010 connecting links to 114C3409 walking beam assembly and upper curved surface of 114C3411 idler.	**0.06**
STA WL BL	163.00 and 400.00 –56.00 16.6LH	With 38 and 64 - Between MS27578 bolt attaching 145CS340 connecting links to 414C3409 walking beam assembly and upper curved surface of 11403411 idler.	**0.06**
STA WL BL	95.0 –17.75 13.5	Between yaw control rod 145C1014-9 and sta. 95.0 cap angle 114S1403-162.	**0.12**
STA WL BL	85.6 +60.0 14.5LH	Between 145C3230 bellcrank and barrel nut on forward swiveling actuator 145H6700.	**0.25**
STA WL BL	163.0 and 400.0 400.0 +56.0 14.8LH	Between 145S2501-7 & -9 stiffeners and 114C3409 walking beam assy.	**0.12**
STA WL BL	120.00 +70.00 9.00LH	Between control yoke 145C3050 forward lug bottom surface and forward transmission upper case, conical surface when yoke is resting on the fixed stop. **NOTE** Solid contact is required at the fixed stop and may be point or line contact without full flush surface contact.	**0.12** (See Note 1) (Blades installed) **0.19** (Blades not installed)
STA WL BL	120.00 +70.00 9.00LH	Thrust control yoke 145C3050 forward lug and vertical surface of left rib on aft leg of forward transmission case when yoke is resting on the fixed stop. **NOTE** Solid contact is required at the fixed stop and may be point or line contact without full flush surface contact.	**.03** (See Note 1) (Blades installed) **0.06** (Blades not installed)
STA WL BL	120.0 –30.0 10.0LH	Between 145C1458-4 pitch bellcrank and 145S16116 support bracket.	**0.06**

11-5 CHECK CONTROLS CLEARANCE (Continued) 11-5

	LOCATION	PARTS INVOLVED	SUBMINIMUM ALLOWABLE CLEARANCE (INCH)
STA WL BL	64.78 –25.00 10.00LH	Between the 114C1165-1 bellcrank assembly and the 114C1013-7 link assembly.	**0.18**
STA WL BL	72.00 –25.00 10.00LH	Between the 114C1013-7 link assembly and the sta. 72 frame.	**0.10**
STA WL BL	72.00 –27.00 12.00LH	Between the 114C1161 or 414C1161 bellcrank assembly and the sta. 72 bulkhead	**0.12**
STA WL BL	110.00 –21.50 8.00	Between the lower attaching hardware for the 145CS100-5 DASH actuator and the 114S1610 aircraft structure.	**0.06**
NOTES:	1.	Position forward rotor such that any pitch link is directly over longitudinal cyclic trim actuator. All three rotor blades shall be in full lead position.	
	2.	In the cockpit, pilot/copilot pedal adjustment lever 114C1124 may contact cockpit floor structure 114S1551 when pedals are located in the rearmmost adjustment position and full pedal travel is made in either left or right direction. This contact is permissible provided yaw bellcrank 145C3110 in first stage mixing unit 145C3101 has already contacted its corresponding stop. Cyclic stick 145C1306 contact with pedal adjust lever 114C1124 is also possible. It is permissible with the above pedal conditions. If contact occurs between the cyclic stick (145C1306-1) and the pilots or copilots instrument panel edging (145E1101-6 & 145C1106-6), it is acceptable to trim the panel edging at **45°** angle to attain a minimum of **0.03 inch** clearance.	

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-5.1 FIRST AND SECOND STAGE BELLCRANKS AXIAL LOOSENESS CHECK 11-5.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

As Required

Personnel Required:

Medium Helicopter Repairer

References:

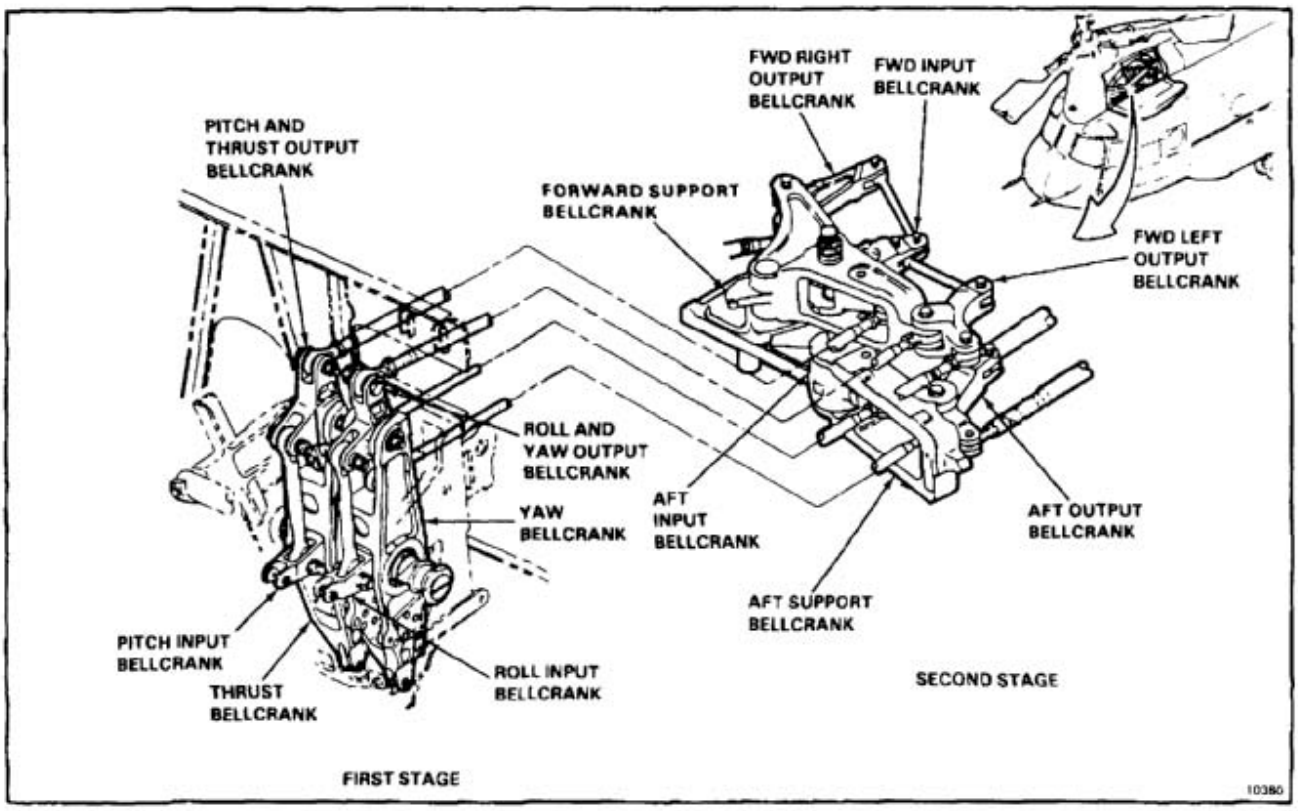
TM 1-1500-204-23
Task 11-9

Equipment Condition:

As Required

AXIAL LOOSENESS CHECK

1. Check first and second stage bellcranks for axial looseness. (Refer to Task 11-9.) Replace bearing, or repair or replace bellcrank as required for looseness exceeding limits.



2. Check first and second stage bellcranks for axial looseness as follows: (Refer to Task 11-9.)

First and Second Stage Bellcranks Allowable Axial Looseness

FIRST STAGE BELLCRANKS	PART NO	MAXIMUM ALLOWABLE LOOSENESS, ASSEMBLES WITH NEW BEARING (INCH)	MAXIMUM ALLOWABLE LOOSENESS ON INSERVICE ASSEMBLES (INCH)
Thrust	145C3122 Series	0.037	0.040
Pitch and Thrust Output	145C3152 Series	0.023	0.026
Pitch Input	145C3151 Series	0.018	0.021
Yaw	145C3110 Series	0.037	0.063
Roll and Yaw Output	145C3112 Series	0.023	0.026
Roll Input	145C3111 Series	0.018	0.021
SECOND STAGE BELLCRANKS	**PART NO**	**MAXIMUM ALLOWABLE LOOSENESS ASSEMBLES WITH NEW BEARING (INCH)**	**MAXIMUM ALLOWABLE LOOSENESS, ON INSERVICE ASSEMBLIES (INCH)**
Aft Input	114C3324 Series	0.018	0.021
Fwd Support	114C3316 Series	0.035	0.038
Fwd Input	114C3318 Series	0.018	0.021
Aft Output	114C3325 Series	0.057	0.060
Fwd Left Output	114C3320 Series	0.045	0.048
Fwd Right Output	114C3319 Series	0.023	0.026
Aft Support	145C3317 Series	0.007	0.010

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-6 CHECK SERVOCYLINDER CONTROL VALVE FOR FRICTION 11-6

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanics Tool Kit, NSN 5180-00-323-4692
Scale, Dial Indicating, 0 to 50 Pounds
Dial Indicator, 0 to 0.5 Inch

Materials:

Twine (E433)

Personnel Required:

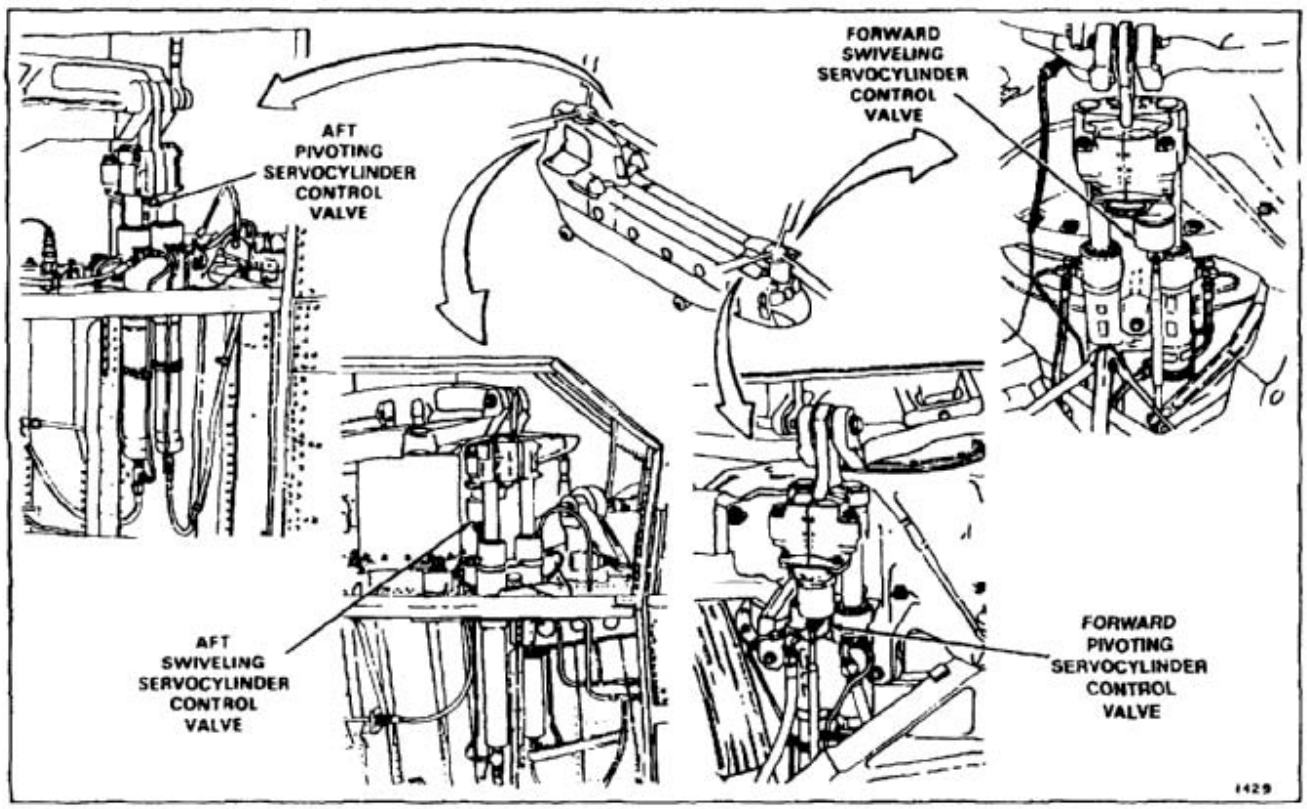
Medium Helicopter Repairer
Inspector

References:

Task 11-6.1

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Cockpit Controls at Neutral
Forward and Aft Work Platforms Open (Task 2-2)



CAUTION

Do not disconnect control valve connecting link. Damage to servocylinder support structure or swashplate can result.

NOTE

Procedure is same to check forward or aft servocylinder control valves for friction. Check of forward left servocylinder control valve is shown here.

1. Working from forward left work platform, attach scale (1) to nut (2) of bolt (3) of forward left bellcrank (4). Use twine (E433).
2. Mount support (5) on structure (6). Position dial indicator (7) on top surface (8) of bellcrank (4) above bolt (3). Set indicator at mid-stroke.
3. Pull scale (1) up until indicator (7) starts to read or scale indicates **10 pounds**. If indicator reads, perform step 4. If indicator does not read, check tunnel controls for binding (Task 11-6.1).

INSPECT

4. Pull scale (1) down until indicator (7) starts to read or scale indicates **10 pounds**. If indicator reads, perform step 5. If indicator does not read, check tunnel controls for binding (Task 11-6.1).

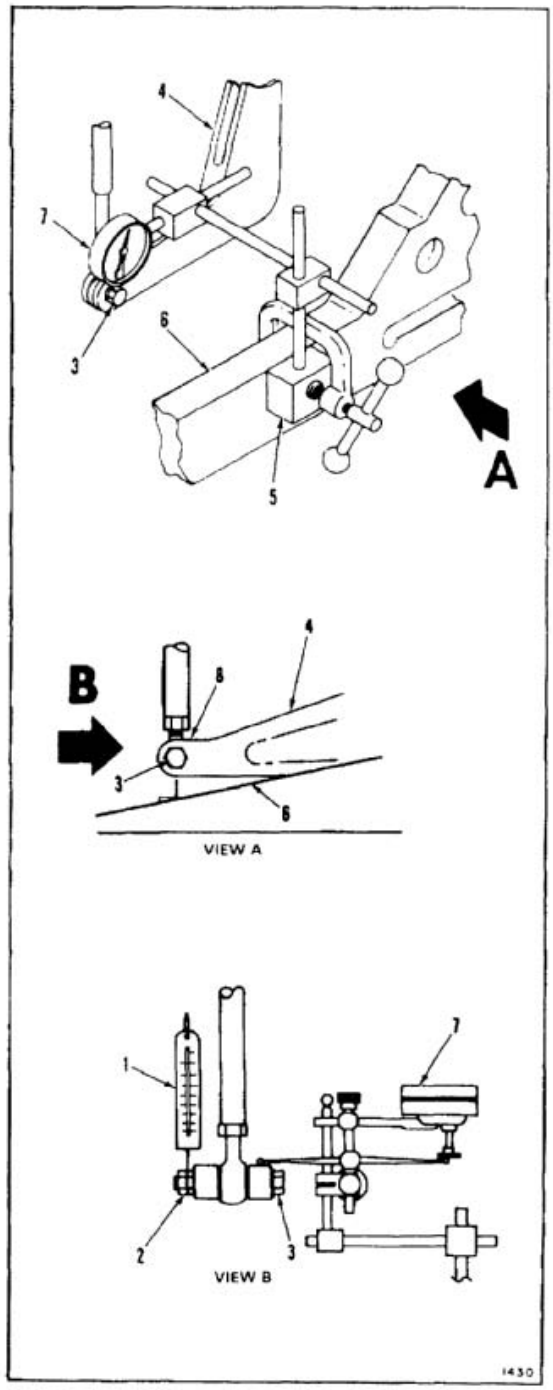
INSPECT

5. Perform control valve check on forward right and aft servocylinder valves.

INSPECT

FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.
Close forward and aft work platforms (Task 2-2).



END OF TASK

11-6.1 CHECK TUNNEL CONTROLS FOR BINDING 11-6.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

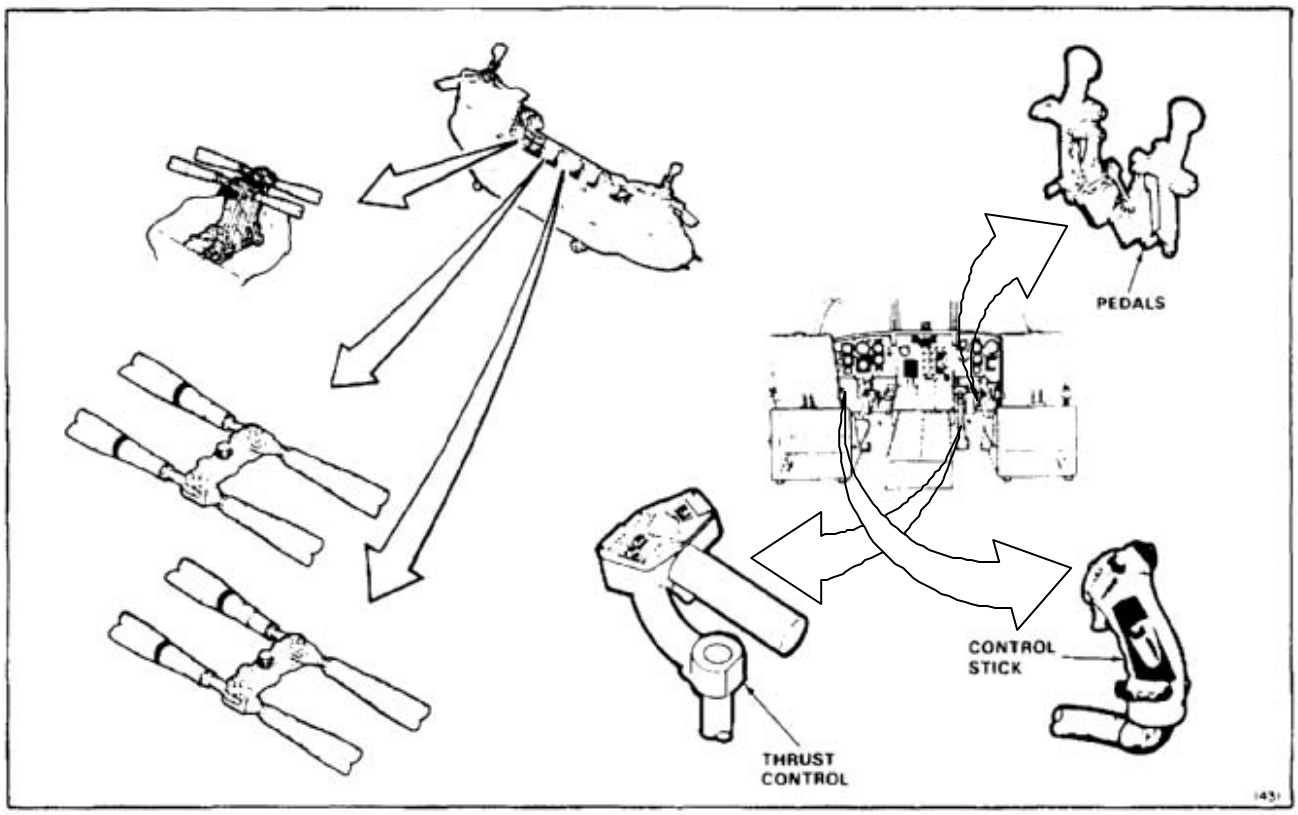
Medium Helicopter Repairer (2)
Inspector

References:

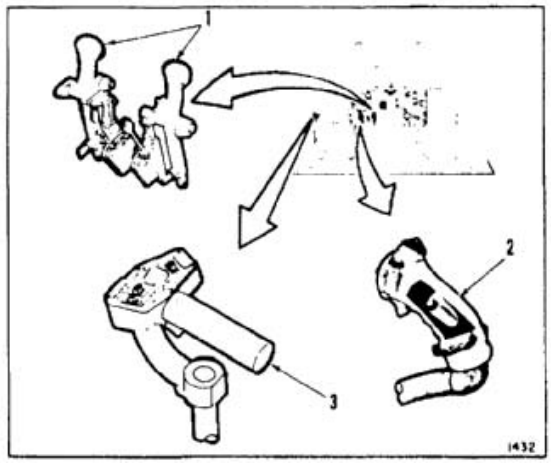
Task 11-2
Tasks 11-7 thru 11-9

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Tunnel Access Covers Open (Task 2-2)
Pylon Access Doors Open (Task 2-2)
Forward Transmission Aft Fairing Removed (Task 2-2)
Servocylinder Control Valve Checked for Friction (Task 11-6)



1. Have helper in cockpit slowly move pedals (1), control stick (2), and thrust control (3) through full range of travel.



WARNING

Use care when feeling components for vibration. Serious injury to personnel can result.

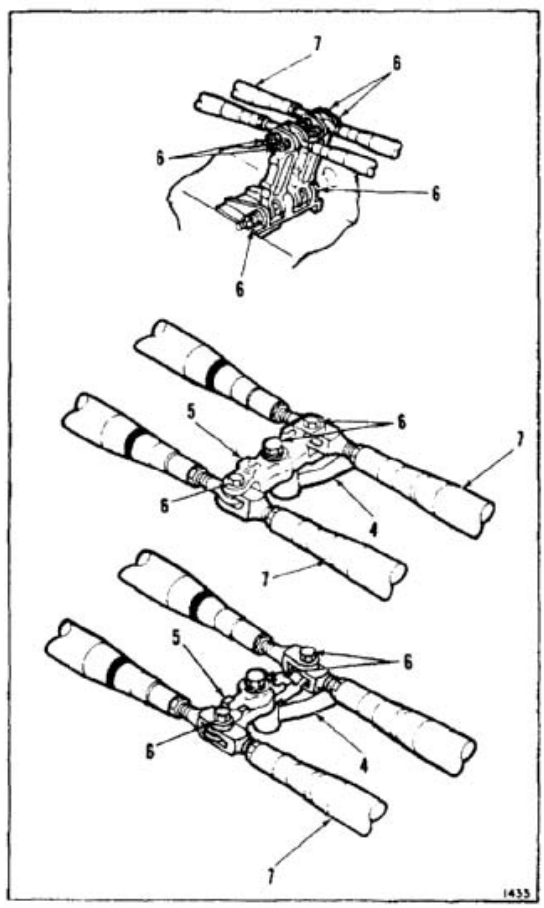
2. Working from tunnel walkway, check the following:

   a. Control arms (4) and idlers (5) for jerking movements. Feel for vibration. If binding or roughness is found, clean and lubricate bearings (Task 11-2).

   b. Check bolts (6) for jerky rotation and listen for cracking or squeaking sounds.

   c. Connecting links (7) for vibration and listen for cracking or squeaking sounds. If binding or roughness is found, inspect links (Tasks 11-7 thru 11-9).

3. Set cockpit controls to neutral.



FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.
Close tunnel access covers (Task 2-2).
Close pylon access doors (Task 2-2).
Install forward transmission aft fairing (Task 2-2).

END OF TASK

11-6.2 CHECK CONTROLS FOR OVERALL LOOSENESS 11-6.2

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Scale, 0 to 50 pounds

Materials:

None

Personnel Required:

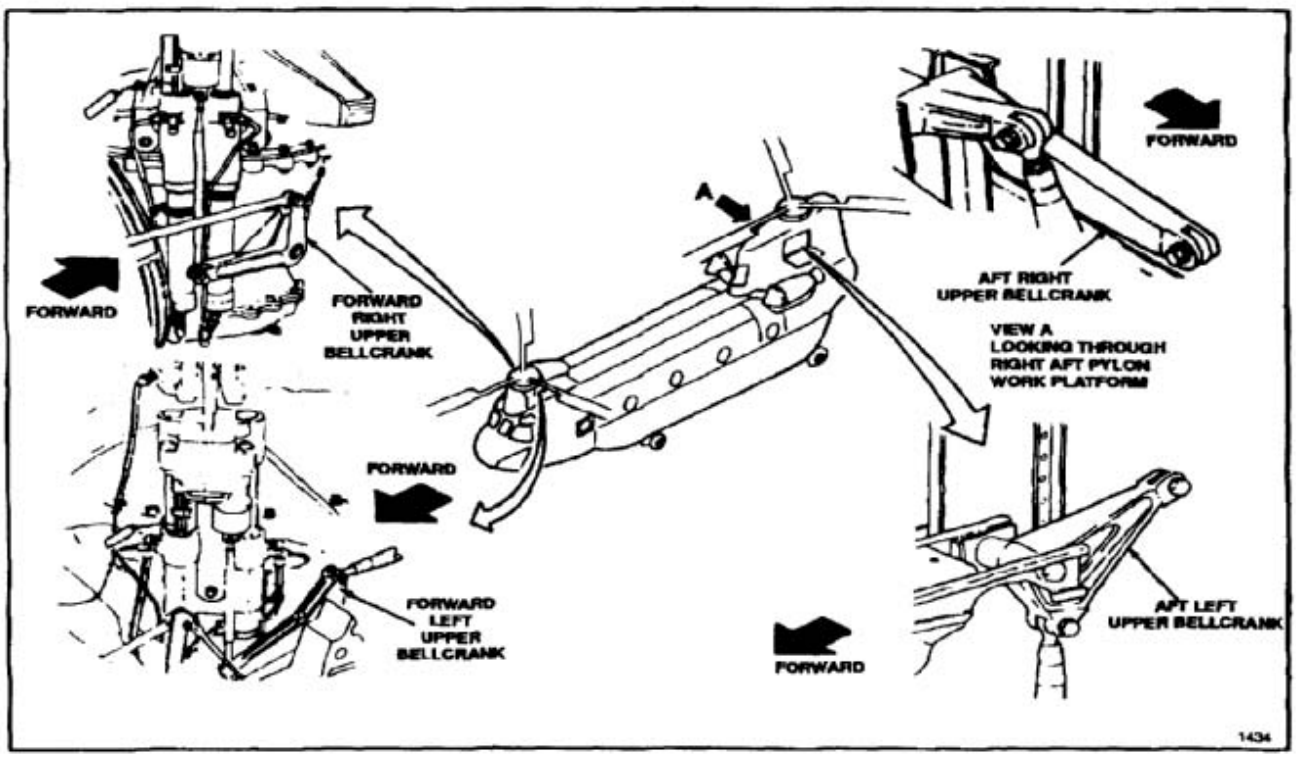
Medium Helicopter Repairer (2)
Inspector

References:

Task 11-6.3
Task 11-7
Task 11-7.1
Task 11-9

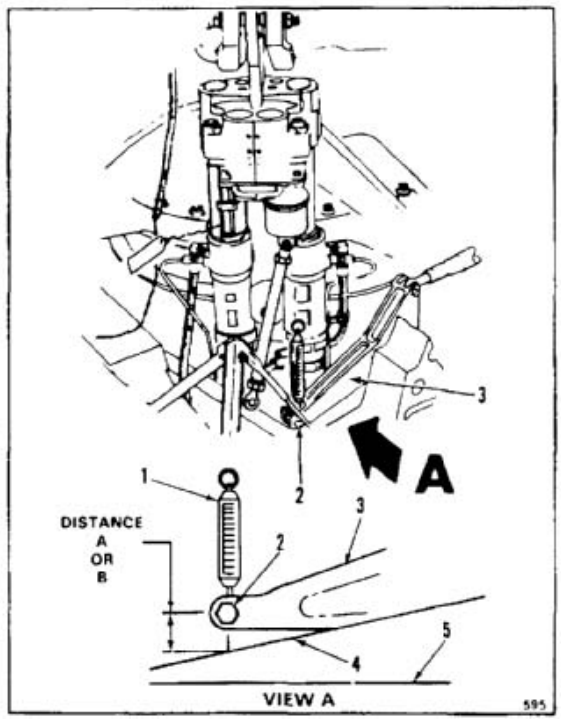
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward and Aft Servocylinder Connecting Links Disconnected (Task 11-192)
Cockpit Controls at Neutral (Task 11-33)
Forward and Aft Work Platforms Open (Task 2-2)
Servocylinder Control Valves Checked for Friction (Task 11-6)
Tunnel Controls Checked for Binding (Task 11-6.1)



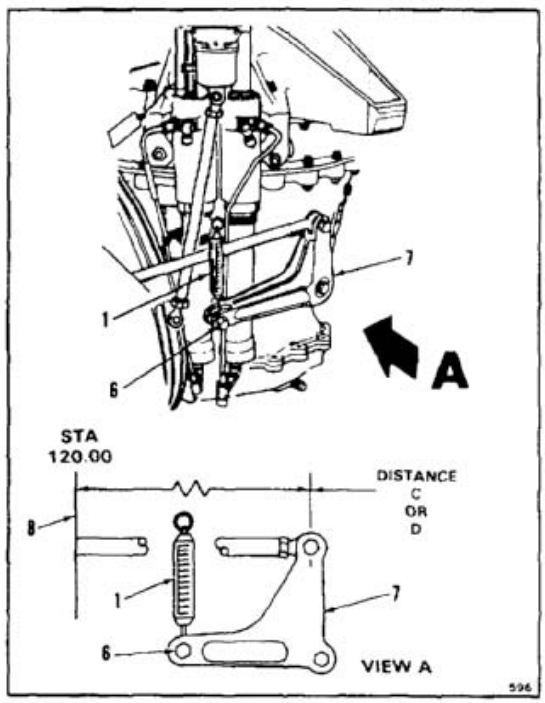
11-6.2 CHECK CONTROLS FOR OVERALL LOOSENESS (Continued) 11-6.2

1. Working from forward left work platform, attach scale (1) to bolt (2) of forward left bellcrank (3).
2. Have helper pull scale (1) down until scale indicates **10 pounds**. Measure distance 'A' between bolt (2) and top surface (4) of fitting (5).
3. Have helper pull scale (1) up until scale indicates **10 pounds**. Measure distance 'B' between bolt (2) and surface (4).
4. Subtract distance 'A' from distance 'B'. Result shall not be more than **0.375 inch**. If more, perform Tasks 11-7, 11-7.1, and 11-9, then 11-6.3.
5. Remove scale (1) from bolts (2).



6. Working from forward right work platform, attach scale (1) to bolt (6) of forward right bellcrank (7).
7. Have helper pull scale (1) down until scale indicates **10 pounds**. Measure distance 'C' between bolt (6) and forward surface (8) at sta. 120.00.
8. Have helper pull scale (1) up until scale indicates **10 pounds**. Measure distance 'D' between bolt (6) and surface (8).
9. Subtract distance 'D' from distance 'C'. Result shall not be more than **0.375 inch**. If more, perform Tasks 11-7, 11-7.1, and 11-9, then 11-6.3.
10. Remove scale (1) from bolt (6).

INSPECT

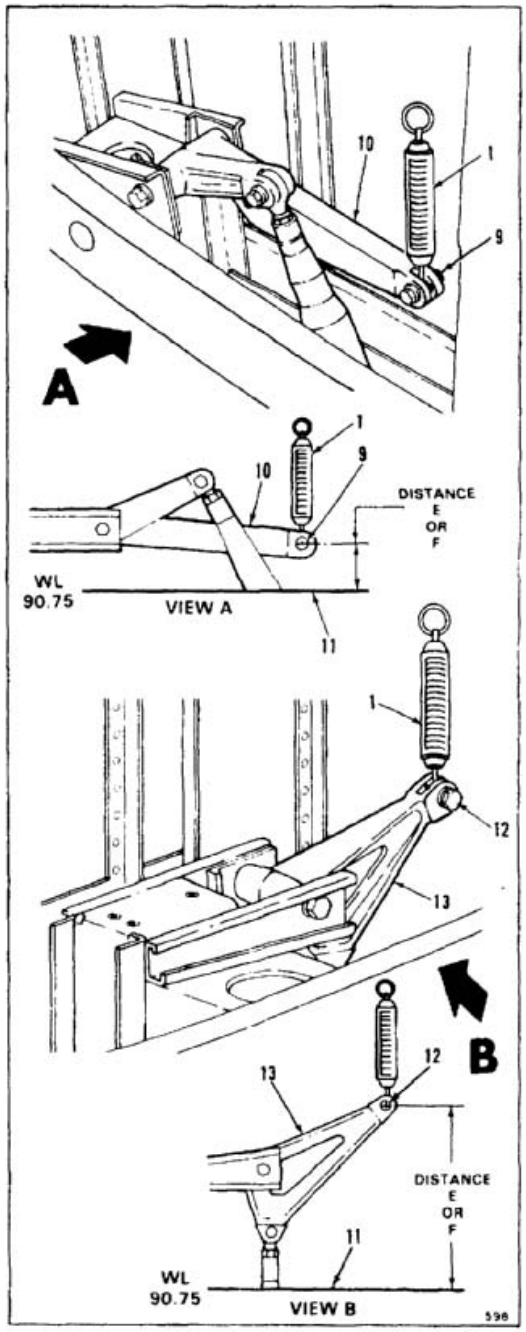


11. Working from aft right work platform, attach scale (1) to bolt (9) of aft right bellcrank (10).
12. Have helper pull scale (1) down until scale indicates **10 pounds**. Measure distance 'E' between bolt (9) and surface (11) at WL 90.75.
13. Have helper pull scale (1) up until scale indicates **10 pounds**. Measure distance 'F' between bolt (9) and surface (11).
14. Subtract distance 'E' from distance 'F'. Result shall be less than **0.375 inch**. If more, perform Tasks 11-7, 11-7.1, and 11-9, then 11-6.3.
15. Remove scale (1) from bolt (9).
16. Working from aft left work platform, repeat steps 11 thru 15 at bolt (12) of aft left bellcrank (13).

INSPECT

FOLLOW-ON MAINTENANCE:

Connect forward and aft servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Close forward and aft work platforms (Task 2-2).



END OF TASK

11-6.2.1 FLIGHT CONTROL POWER-ON LOOSENESS CHECK 11-6.2.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

Medium Helicopter Repairer (2)

References:

Task 11-6.2

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On

1. Check dry-type control system linkage bearings for excess looseness without removing the component as follows;

WARNING

Keep head, hands and other body parts clear of moving flight controls. Hydraulic forces are strong enough to cause severe injury.

a. Apply hydraulic boost pressure to the flight control hydraulic system.

b. Open all necessary covers for access to the flight controls.

c. Move cockpit controls as required to position the component being inspected so it can be moved axially between its supports.

d. Move the component in an axial direction as far as it will go, using strong hand pressure.

e. Measure the axial distance between the component and the support ear or bellcrank lug.

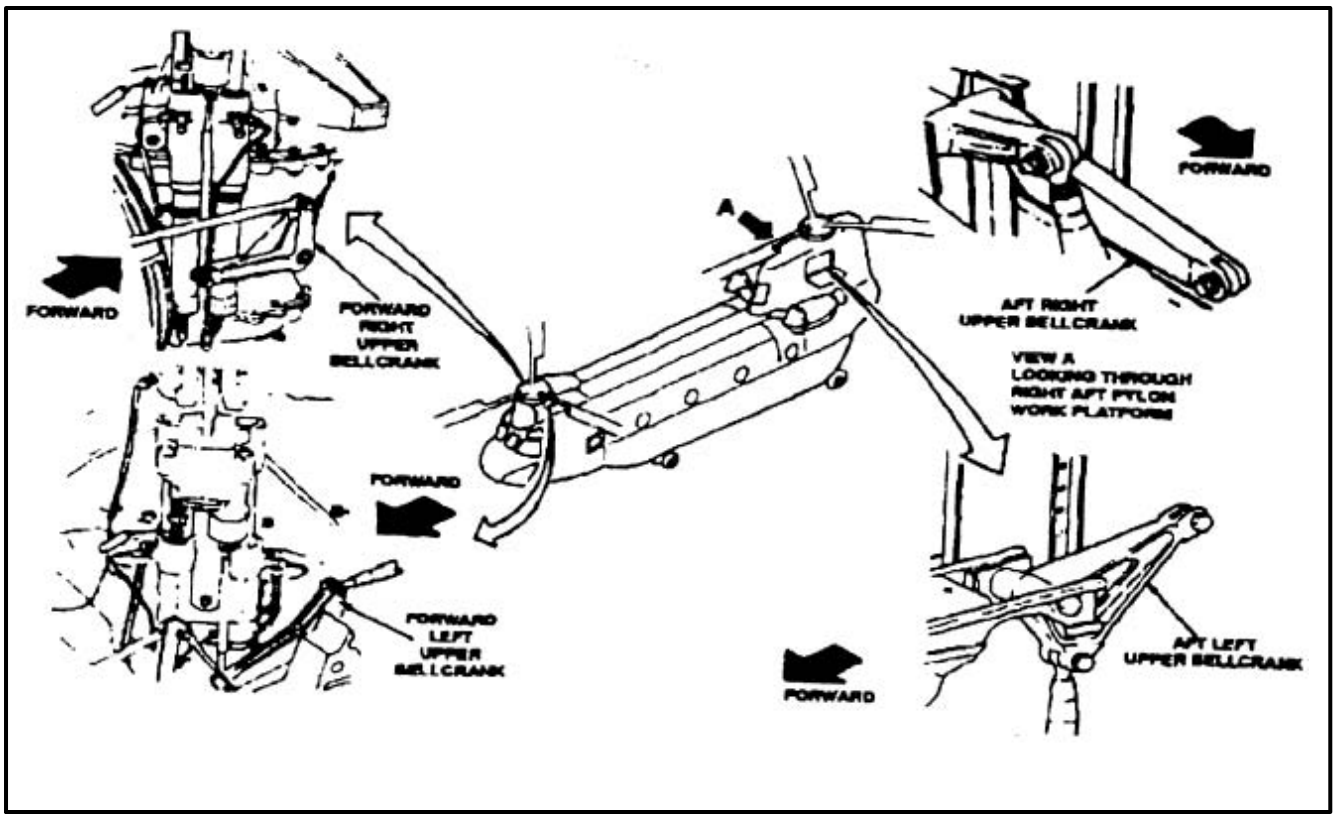
NOTE

A vernier caliper or multi-leaf feeler gage is a satisfactory tool for measuring this distance.

f. Move the component along its axis in the opposite direction, use strong hand pressure.

g. Measure the axial distance that the component moved from its position in step e.

h. If the component has moved in excess of **0.010 inch**, perform Task 11-6.2, Check Controls For Overall Looseness.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-6.3 ISOLATION PROCEDURES FOR CHECKING CONTROLS LOOSENESS 11-6.3

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Second Stage Rig Pin (T135)
Wood Blocks (2)
Scale, Dial Indicating, 0 to 50 Pounds
Dial Indicator, 0 to 0.5 Inch
Torque Wrench, 0 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Straps (E376)
Twine (E433)

Personnel Required:

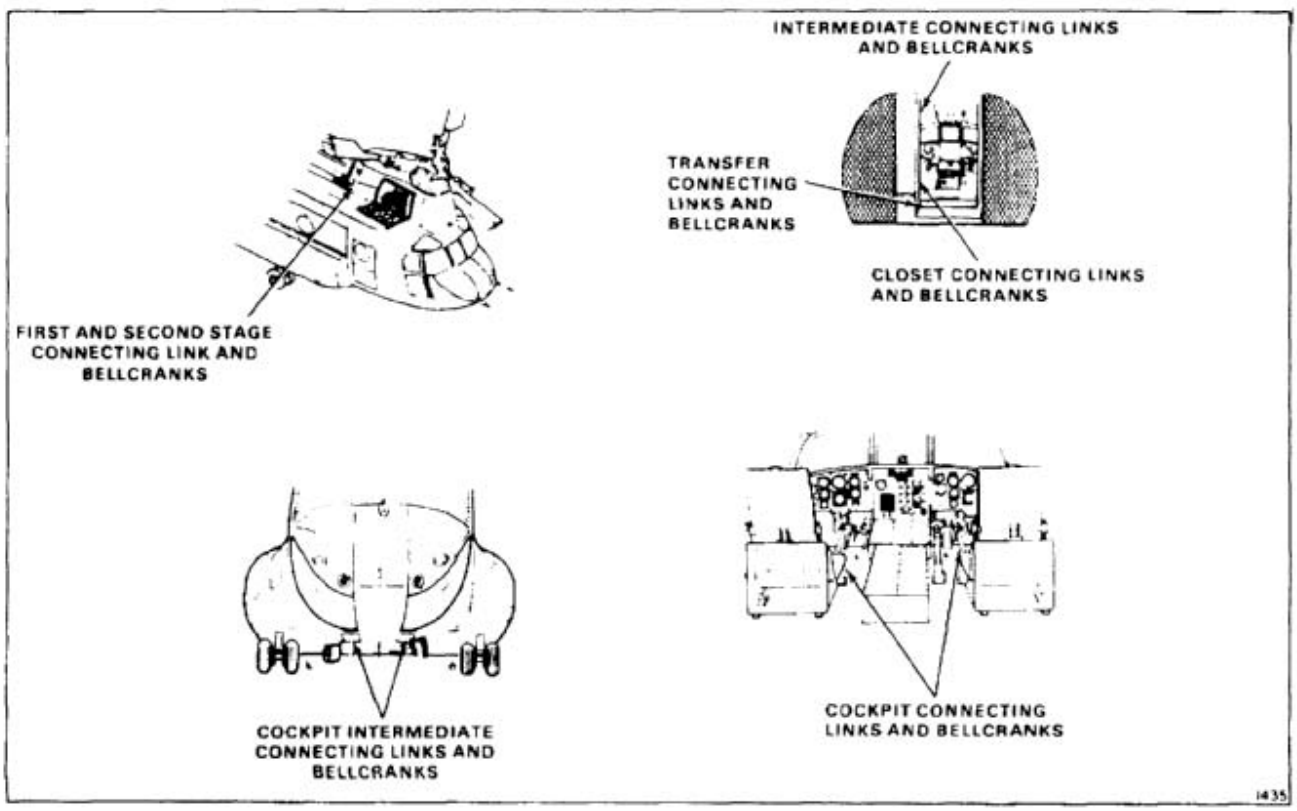
Medium Helicopter Repairer (2)
Inspector

References:

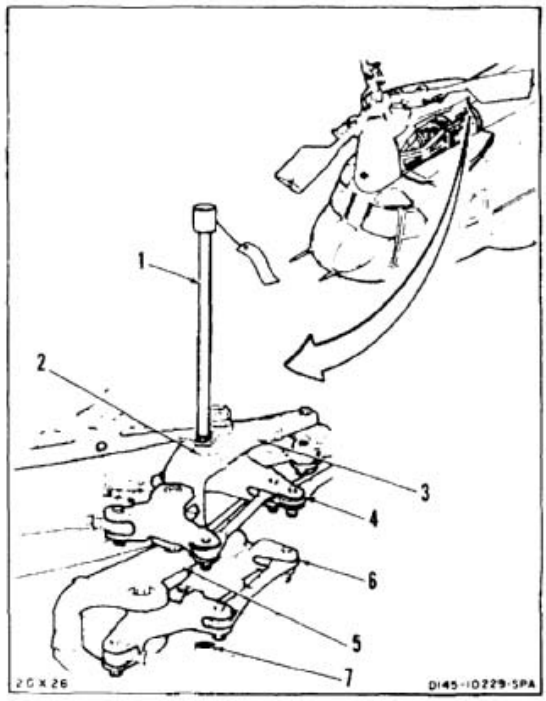
Task 2-2
Task 2-3
Task 2-81
Task 2-107
Task 9-69
Task 11-7
Task 11-7.1
Task 11-9

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward and Aft Servocylinders Connecting Links Disconnected (Task 11-192)
Cockpit Controls at Neutral (Task 11-33)
Forward and Aft Work Platforms Open (Task 2-2)
Servocylinder Control Valves Checked for Friction (Task 11-6)
Tunnel Controls Checked for Binding (Task 11-6.1)
Controls Checked for Overall Looseness (Task 11-6.2)

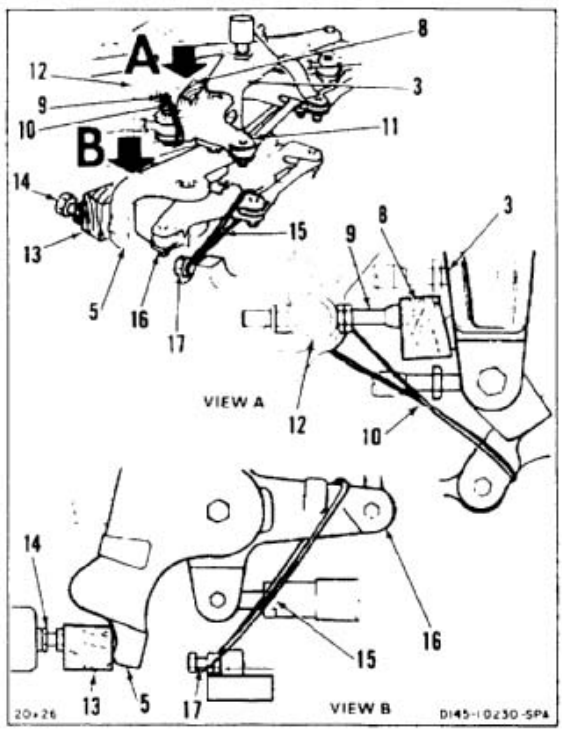


1. Working from forward left work platform, install second stage rig pin (T135) (1) through support (2), four bellcranks (3, 4, 5, and 6) and in fitting (7).



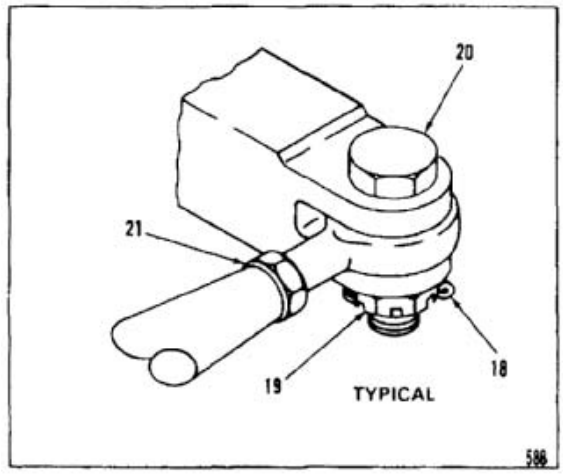
2. Position wood block (8) between stop bolt (9) and bellcrank (3). Hold bellcrank against block. Install strap (10) between bellcrank (11) and support tube (12). Use strap (E376).

3. Position wood block (13) between stop bolt (14) and bellcrank (5). Hold bellcrank against block. Install strap (15) between bellcrank (16) and stop bolt (17). Use strap (E376).



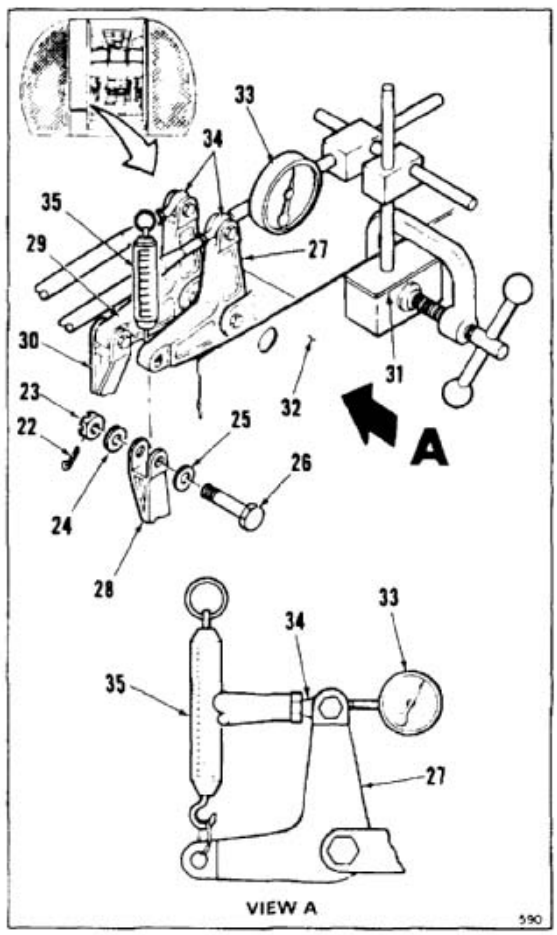
GENERAL CHECKS

4. Check for missing cotter pins (18).
5. Check for loose nuts (19) and bolts (20).
6. Check for loose rod end bearing nuts (21).

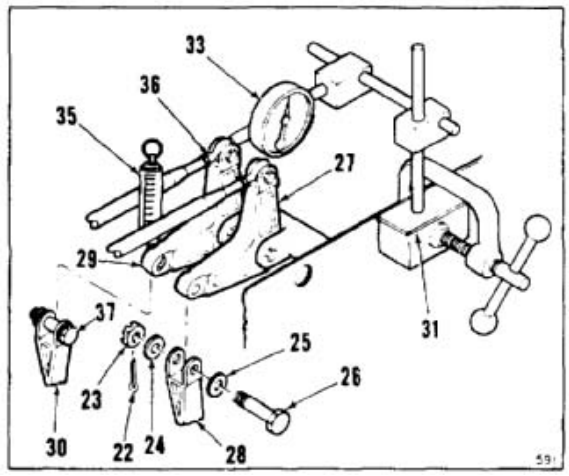


CHECK INTERMEDIATE AND FIRST STAGE CONNECTING LINKS

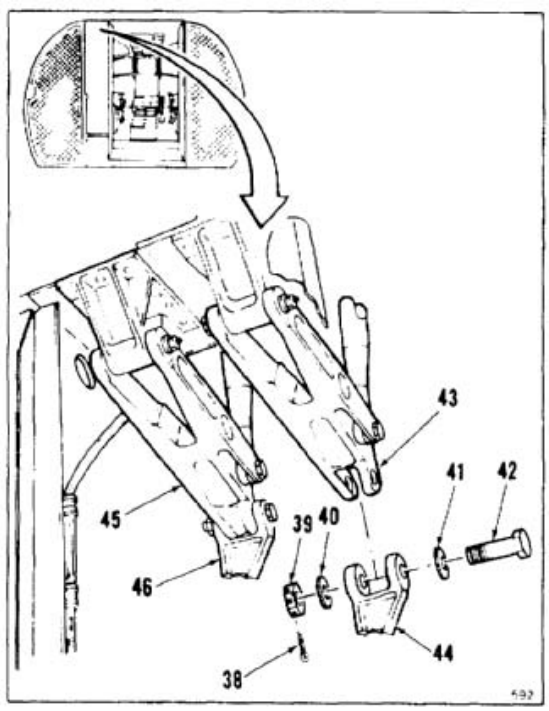
7. Remove closet acoustic blanket (Task 2-107).
8. Remove closet backup panel (Task 2-2).
9. Remove forward transmission drip pan (Task 2-3).
10. Working from passageway, remove cotter pin (22), nut (23), two washers (24 and 25), and bolt (26) from bellcrank (27). Disconnect connecting link (28) from bellcrank.
11. Install bolt (26), two washers (24 and 25), and nut (23) loosely in link (28).
12. Repeat steps 10 and 11 for bellcrank (29) and connecting link (30).
13. Mount support (31) on structure (32). Position dial indicator (33) against rod end bearing (34). Set indicator at mid-stroke.
14. Attach dial indicating scale (35) to bellcrank (27). Use twine (E433).
15. Have helper pull scale (35) up until scale indicates **10 pounds**. Record indicator (33) reading as 'A'.
16. Pull scale (35) down until scale indicates **10 pounds**. Record indicator (33) reading as 'B'.
17. Subtract reading 'B' from reading 'A'. Result shall not be more than **0.063 inch**. If more, perform Tasks 11-7 and 11-9.
18. Remove scale (35) from bellcrank (27).



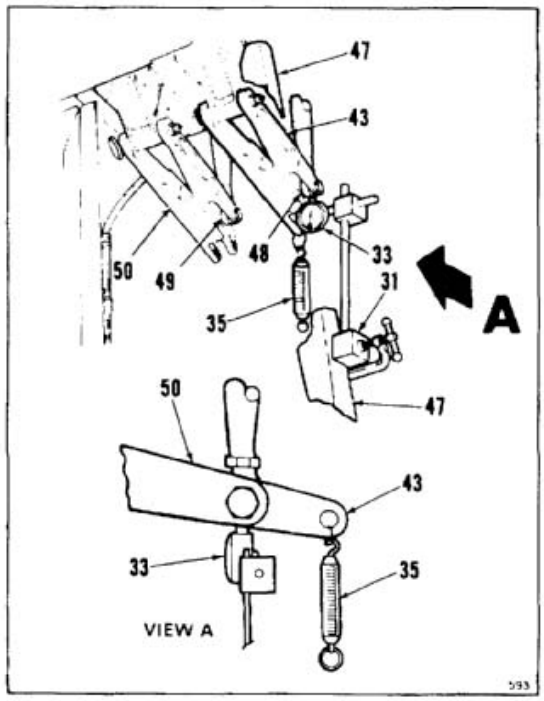
19. Position indicator (33) against rod end bearing (36). Set indicator at mid-stroke.
20. Attach scale (35) to bellcrank (29). Use twine (E433).
21. Repeat steps 15, 16, 17, and 18.
22. Remove indicator (33) and support (31).
23. Remove nut (23), two washers (24 and 25), and bolt (26) from link (28).
24. Position link (28) on bellcrank (27). Install bolt (26), two washers (25 and 24), and nut (23).
25. Torque nut (23) to **30 to 40 inch-pounds**. Install cotter pin (22).
26. Repeat steps 23 and 24 for link (30) and bellcrank (29).
27. Check two bolts (26 and 37). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 25.

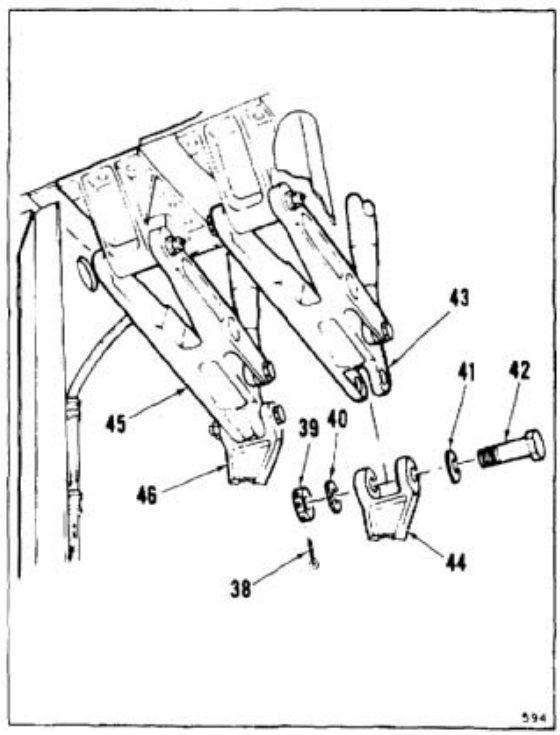


28. Working from cabin, remove cotter pin (38), nut (39), two washers (40 and 41), and bolt (42) from bellcrank (43). Disconnect connecting link (44) from bellcrank.
29. Install bolt (42), two washers (40 and 41), and nut (39) loosely in link (44).
30. Repeat steps 28 and 29 for bellcrank (45) and connecting link (46).



31. Mount support (31) on structure (47). Position dial indicator (33) against rod end bearing (48). Set indicator at mid-stroke.
32. Attach dial indicating scale (35) to bellcrank (43). Use twine (E433).
33. Have helper pull scale (35) down until scale indicates **10 pounds**. Record indicator (33) reading 'C'.
34. Pull scale (35) up until scale indicates **10 pounds**. Record indicator (35) reading 'D'.
35. Subtract reading 'D' from reading 'C'. Result shall not be more than **0.063 inch**. If more, perform Tasks 11-7 and 11-9.
36. Remove scale (35) from bellcrank (43).
37. Position indicator (33) against rod end bearing (49). Set indicator at mid-stroke.
38. Attach scale (35) to bellcrank (50). Use twine (E433).
39. Repeat steps 33, 34, 35, and 36.
40. Remove indicator (33) and support (31).
41. Remove nut (39), two washers (40 and 41), and bolt (42) from link (44).
42. Position link (44) on bellcrank (43). Install bolt (42), two washers (41 and 40) and nut (39).
43. Torque nut (39) to **30 to 45 inch-pounds**. Install cotter pin (38).
44. Repeat steps 41 and 42 for link (46) and bellcrank (45).
45. Check two bolts (42 and 51). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 43.





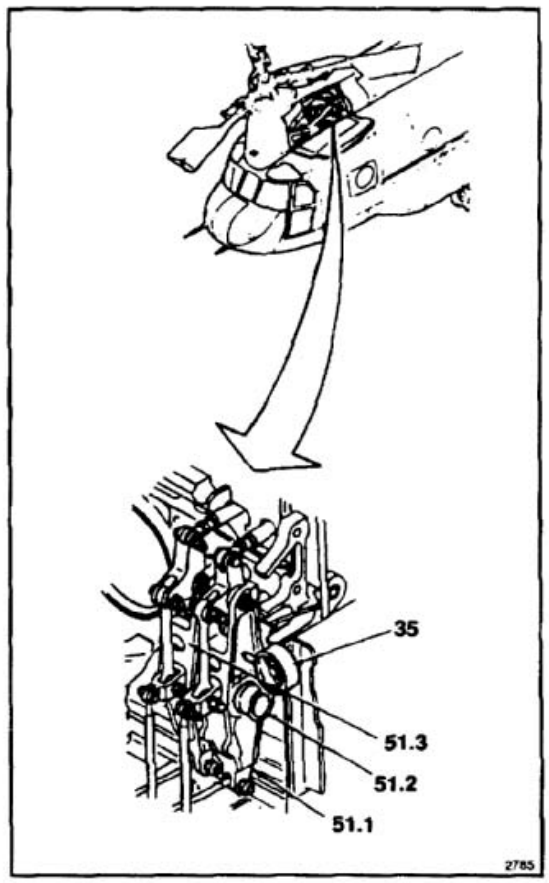
CHECK FIRST STAGE BELLCRANKS

45.1. Position dial indicator (35) against yaw bellcrank (51.1). Move yaw bellcrank axially along shaft (51.2). Total axial movement shall not be more than **0.063 inch**.

45.2. Remove indicator (35).

45.3. Position dial indicator (35) against thrust bellcrank (51.3). Move thrust bellcrank axially along shaft (51.2). Total axial movement shall not exceed **0.063 inch**.

45.4. Remove dial indicator (35).



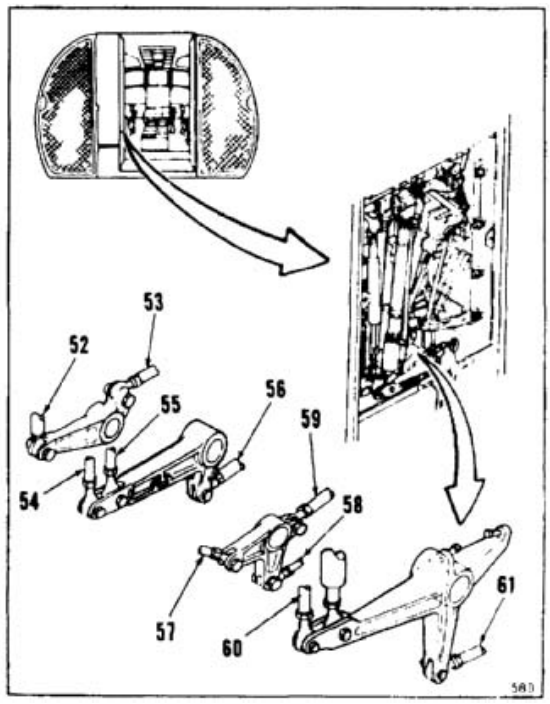
CHECK CLOSET, TRANSFER AND COCKPIT CONNECTING LINKS

NOTE

There is no overall looseness check of the cockpit controls. The controls feel loose when there is no hydraulic pressure applied. Each connecting link must be checked.

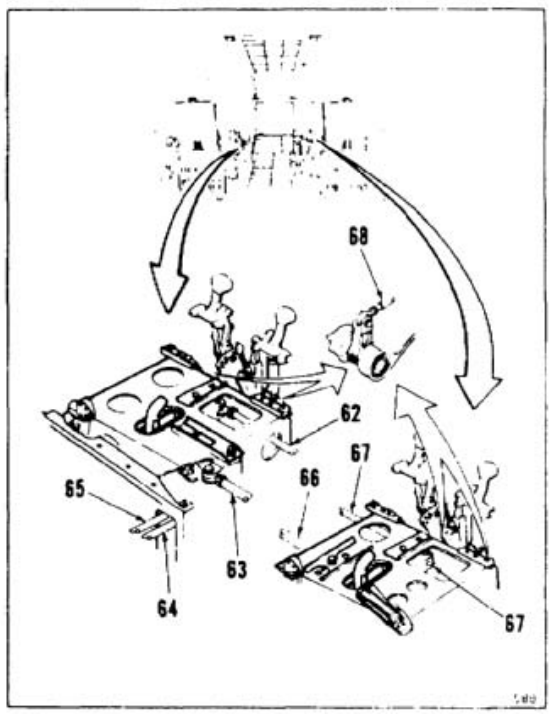
46. Working from passageway, check ten connecting links (52 thru 61) for loose swaged inserts (Tasks 11-7 and 11-7.1) and loose rod end (Task 11-9).

47. Remove pilot's and copilot's floor panels (Task 2-81).



48. Working in cockpit, check six connecting links (62 thru 67) and four links (68) for loose swaged inserts (Tasks 11-7 and 11-7.1) and loose rod end bearings (Tasks 11-9).

49. Remove left and right landing lights (Task 9-69).

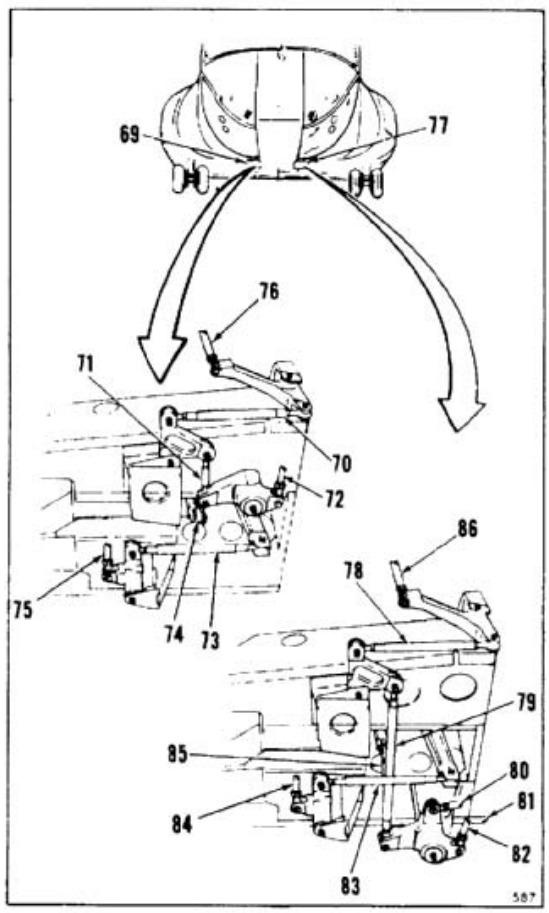


50. Working through right landing light access (69), check six connecting links (70 thru 75) for loose swaged inserts (Tasks 11-7 and 11-7.1) and loose rod end bearings (Task 11-9).

51. Check link (76) for loose bearing (Task 11-9).

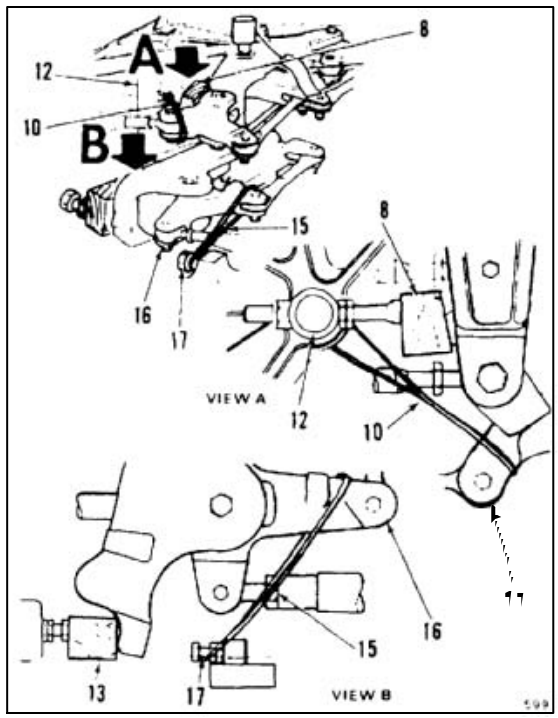
52. Working through left landing light access (77), check eight connecting links (78 thru 85) for loose swaged inserts (Tasks 11-7 and 11-7.1) and loose rod end bearings (Task 11-9).

53. Check link (86) for loose bearing (Task 11-9).

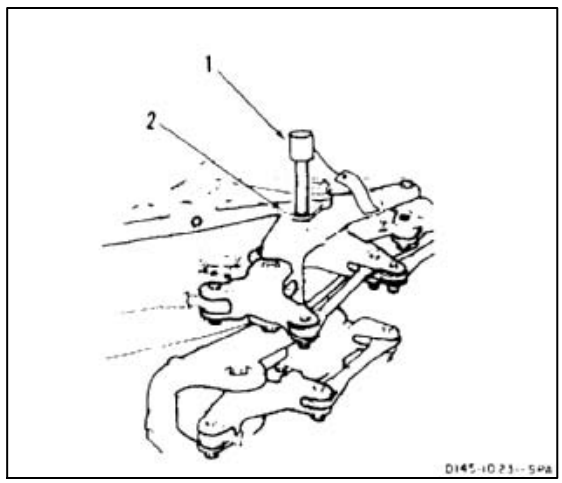


54. Working from forward left work platform, remove strap (10) from bellcrank (11) and tube (12). Remove block (8).

55. Remove strap (15) from bellcrank (16) and bolt (17). Remove block (13).



56. Remove pin (1) from support (2).



FOLLOW-ON MAINTENANCE:

Connecting forward and aft servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Close forward and aft work platforms (Task 2-2).
Install left and right landing lights (Task 9-79).
Install forward transmission drip pan (Task 2-3).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Install pilot's and copilot's floor panels (Task 2-82).
Perform operational check of landing lights (TM 55-1520-240-T).

END OF TASK

11-7 INSPECT FLIGHT CONTROL SYSTEM ALUMINUM AND STEEL CONNECTING LINKS 11-7

INITIAL SETUP

Applicable Configurations:

Without 38

Tools:

As Required

Materials:

As Required

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

Task 11-8
TM 1-1520-253-23

Equipment Condition:

As Required

FIXED (NON-ADJUSTABLE) CONNECTING LINKS

NOTE

Fixed connecting links are made from aluminum and steel forgings with bearings pressed and staked in each end.

1. Inspect link for nicks and scratches.
2. Inspect blending. Depth of blending over entire link must not be more than **10 percent** of material thickness or **0.004 inch**, whichever is less.

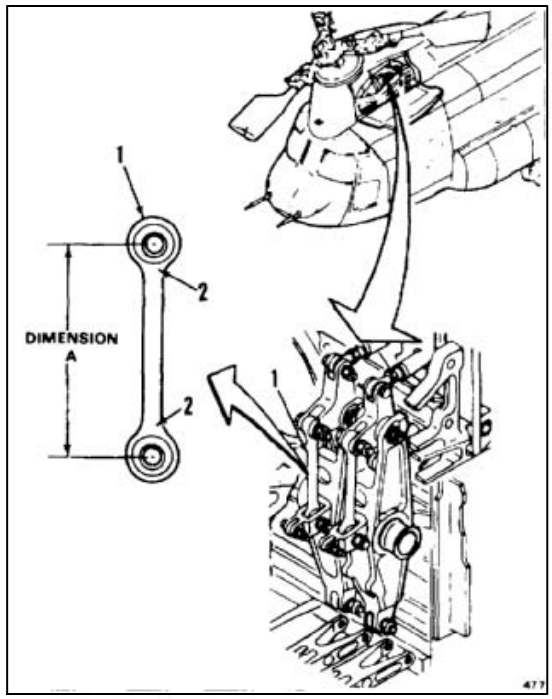
2.1. Inspect link for cracks. There shall be no cracks. If a crack is suspected, refer to TM 1-1520-253-23.

3. Check for bearing looseness (Task 11-8).

WARNING

After APU shutdown and removal of hydraulic power, inspect link for bending. Bending can cause a flight hazard, resulting in personal injury or death.

4. Inspect first stage mixing link (1) for bending in any direction at narrow section (2), both ends of link. There shall be no bending.
5. If bending of link (1) is suspected, remove link and check center to center dimension A. Dimension must not be less than **9.714 inches**.



ADJUSTABLE CONNECTING LINKS

NOTE

Adjustable connecting links are made of round seamless aluminum alloy 2024-T4 or steel tubing 4130. Rod end fittings are swaged or riveted on each end.

6. Inspect links for cracks. There shall be no cracks. If a crack is suspected, refer to TM 1-1520-253-23.

7. Inspect links for nicks and scratches. Blend out (Task 11-14).

8. Check that blended area is large enough to blend smoothly with next undamaged area.

NOTE

These limits apply to out-of-round damage and dents, except for tubes over **2 inches** diameter, which must not be more than **0.015 inch** out-of-round.

9. Check link for dents. Replace link if following limits are exceeded:

   a. Divide tube into three equal lengths.

   b. Check for dents in middle one third of tube. One dent is allowed. Depth of dent must not be more than **0.010 inch**. Dent must be free of nicks and scratches.

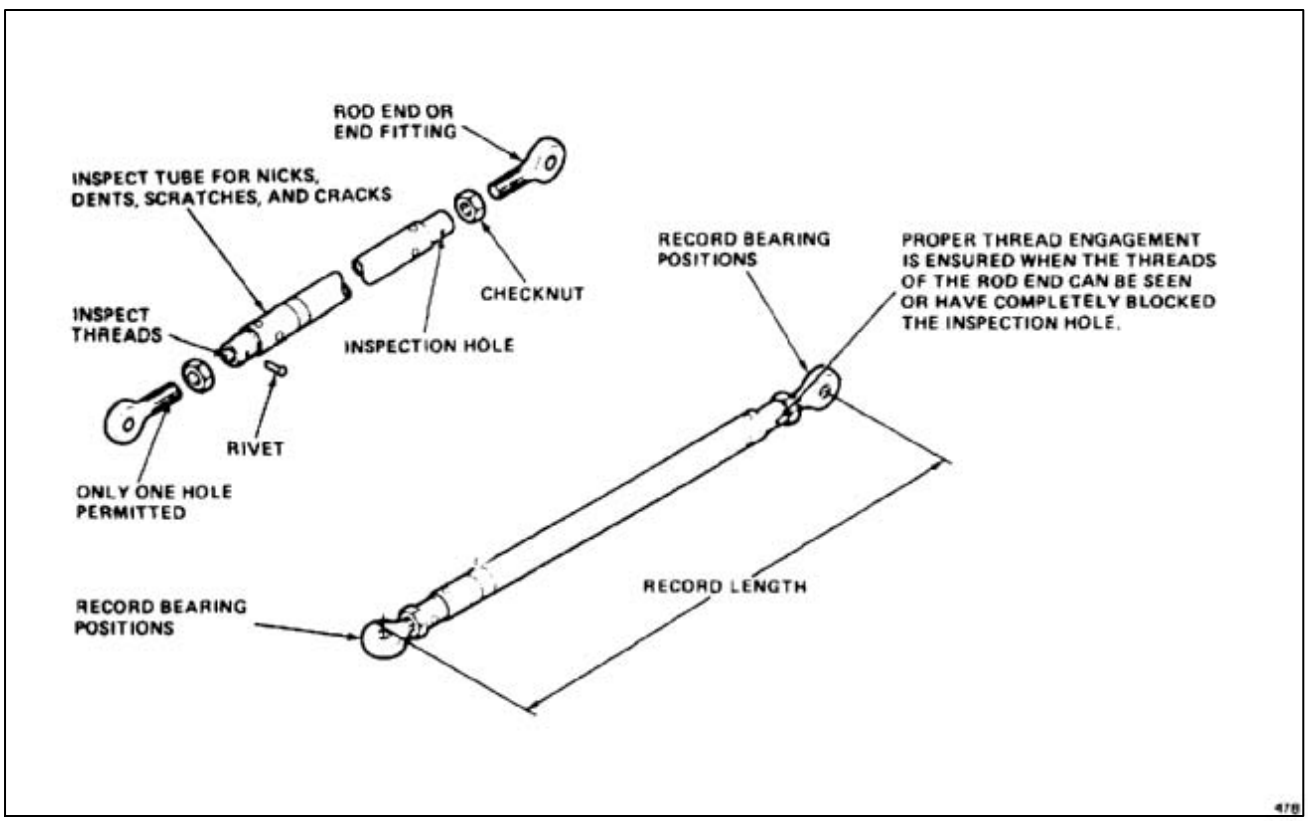
   c. Check for dents in outer thirds of tubes. Total of two dents is allowed. Depth of dent must not be more than **0.015 inch**. Dent must be free of nicks and scratches.

10. Check link for out-of-round. Replace link if following limits are exceeded:

    a. For tubes less than **2 inches** diameter, out-of-round must not be more than **0.010 inch** in middle one third of tube.

    b. For tube larger than **2 inches** diameter, out-of-round must not be more than **0.015 inch** in middle one third of tube.

    c. For any diameter tube, out-of-round must not be more than **0.015 inch** in outer third sections of tubes.



11-7 INSPECT FLIGHT CONTROL SYSTEM ALUMINUM AND STEEL CONNECTING LINKS (Continued) **11-7**

WARNING

Do not reuse rod ends removed from fixed end of connecting links. Adjustable rod ends cannot have a hole in them. Rod end could fail, resulting in loss of flight control.

11. Check link for loose swaged inserts as follows:

NOTE

Loose swaged inserts occur more above mixing linkage control stops.

a. Remove hydraulic power.

b. Check links between sta. 444 and 482 first.

c. Check ends of link for black dust. If dust is found, insert is loose.

d. Check end of link for position of insert. Position of insert must be flush to **0.031 inch** out of tube. If not within limits, insert is loose.

e. Apply hydraulic pressure and check for movement of loose insert.

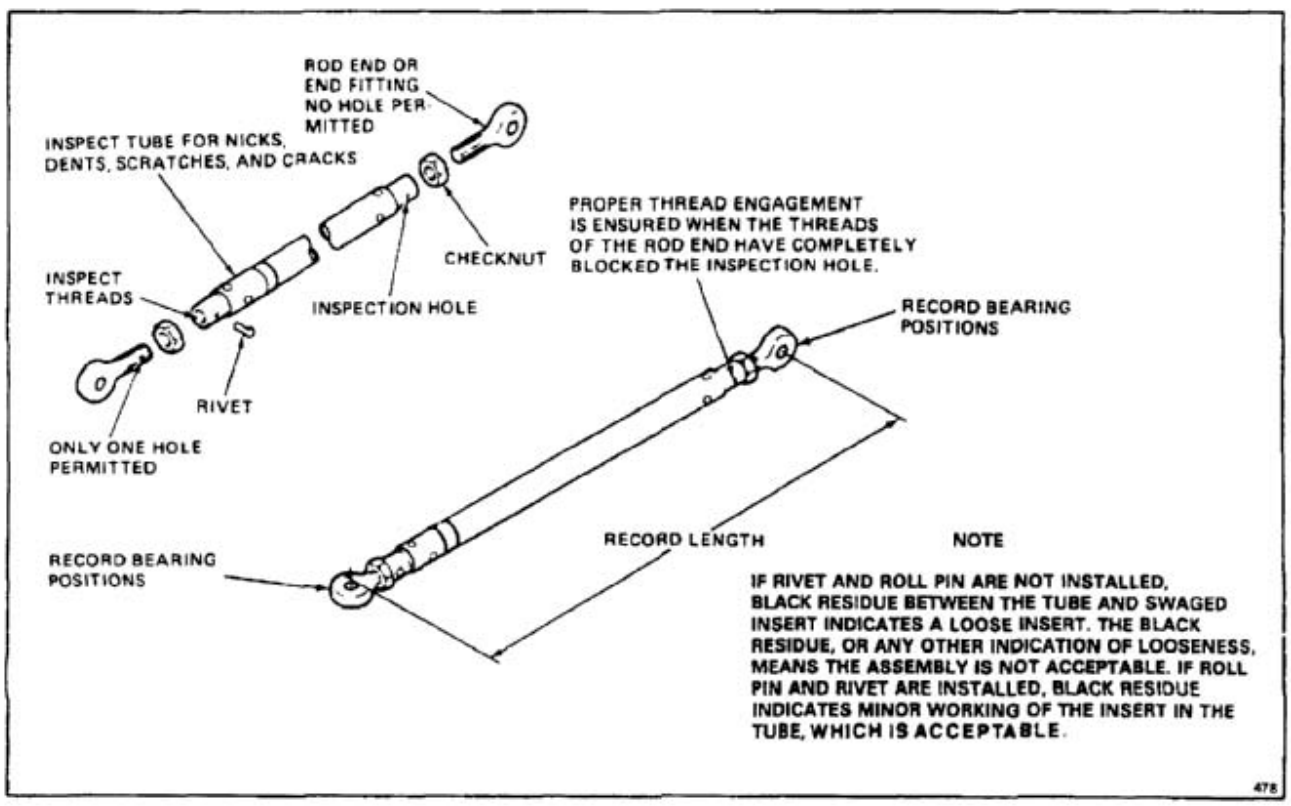
f. Remove hydraulic power.

g. Move link by hand. If insert moves, replace link.

h. If insert does not move under hand load, but insert is not flush with tube or is out of tube more than **0.031 inch,** replace link.

i. If black dust is found at insert, remove link for repair.

j. If insert is loose when moved by hand, replace link.



FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-7.1 INSPECT FLIGHT CONTROL SYSTEM STAINLESS STEEL CONNECTING LINKS 11-7.1

INITIAL SETUP

Applicable Configurations:

With 38

Tools:

As Required

Materials:

As Required

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

Task 11-14.2
TM 1-1520-253-23

Equipment Condition:

As Required

ADJUSTABLE CONNECTING LINKS

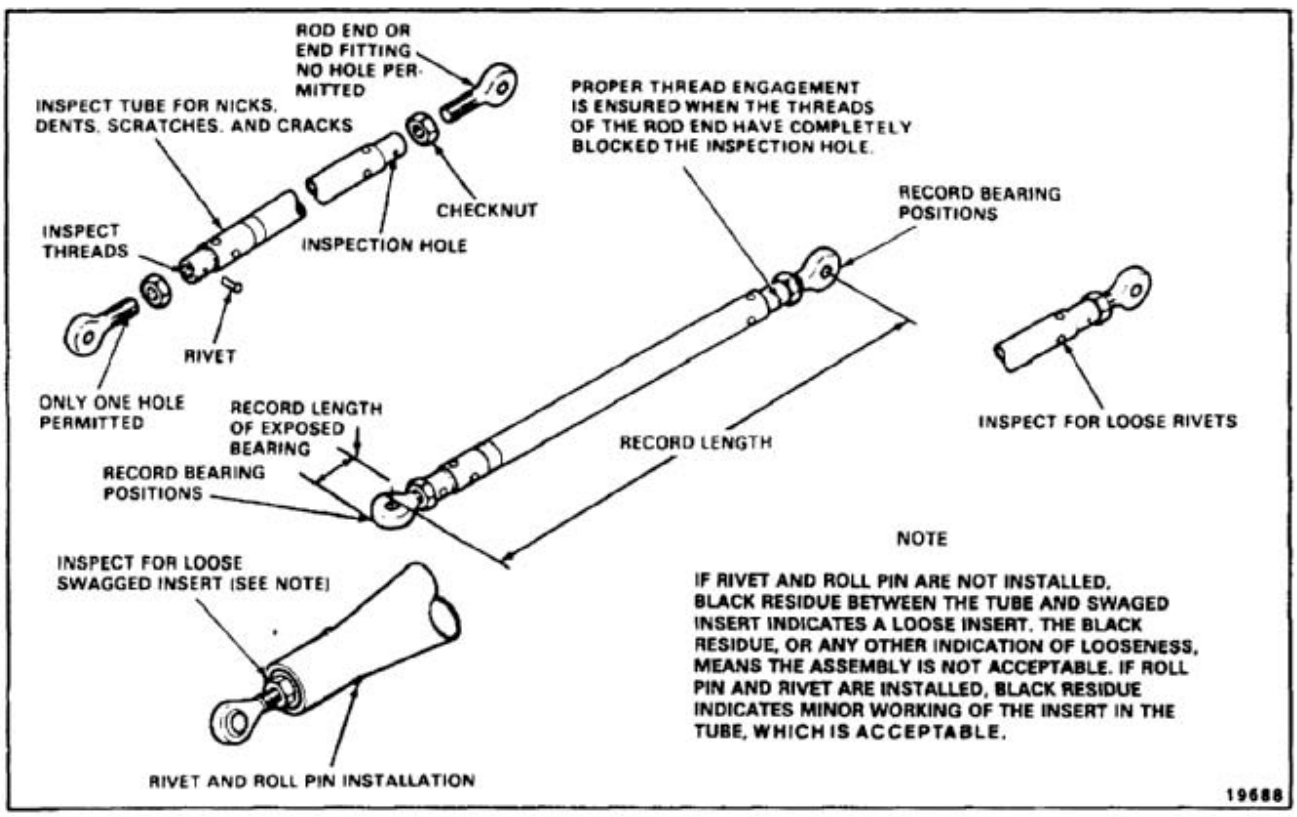
NOTE

Adjustable connecting links are made of round seamless corrosion resistant steel 304. Rod end inserts may be swaged or riveted on each end. One rod end bearing is fixed or riveted on one end of the link and adjustable on the other end.

1. Inspect links for cracks and fractures. There shall be no cracks or fractures. If a crack is suspected, refer to TM 1-1520-253-23.
2. Inspect links for nicks, scratches, gouges, and dents. Links which exceed the following criteria shall be rejected:
   a. Scratches must not be greater than **0.010 inch** deep and **0.020 inch** wide.
   b. Nicks, gouges, and dents must not be greater than **0.010 inch** deep, **0.200 inch** wide, and **0.200 inch** long.
3. Blending of acceptable nicks, gouges, dents, and scratches is permissible but not recommended due to the resulting appearance (Task 11-14.2).

FOLLOW-ON MAINTENANCE:

As Required



END OF TASK

11-8 INSPECT BELLCRANK AND CONNECTING LINK BEARINGS (REMOVED) 11-8

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

Cloths (E120)

Personnel Required:

Inspector

References:

TM 1-1500-204-23
TM 55-1500-322-24

Equipment Condition:

Off Helicopter Task

CAUTION

Do not wash bearing. Solvent will remove lubricant or damage dry-type bearings.

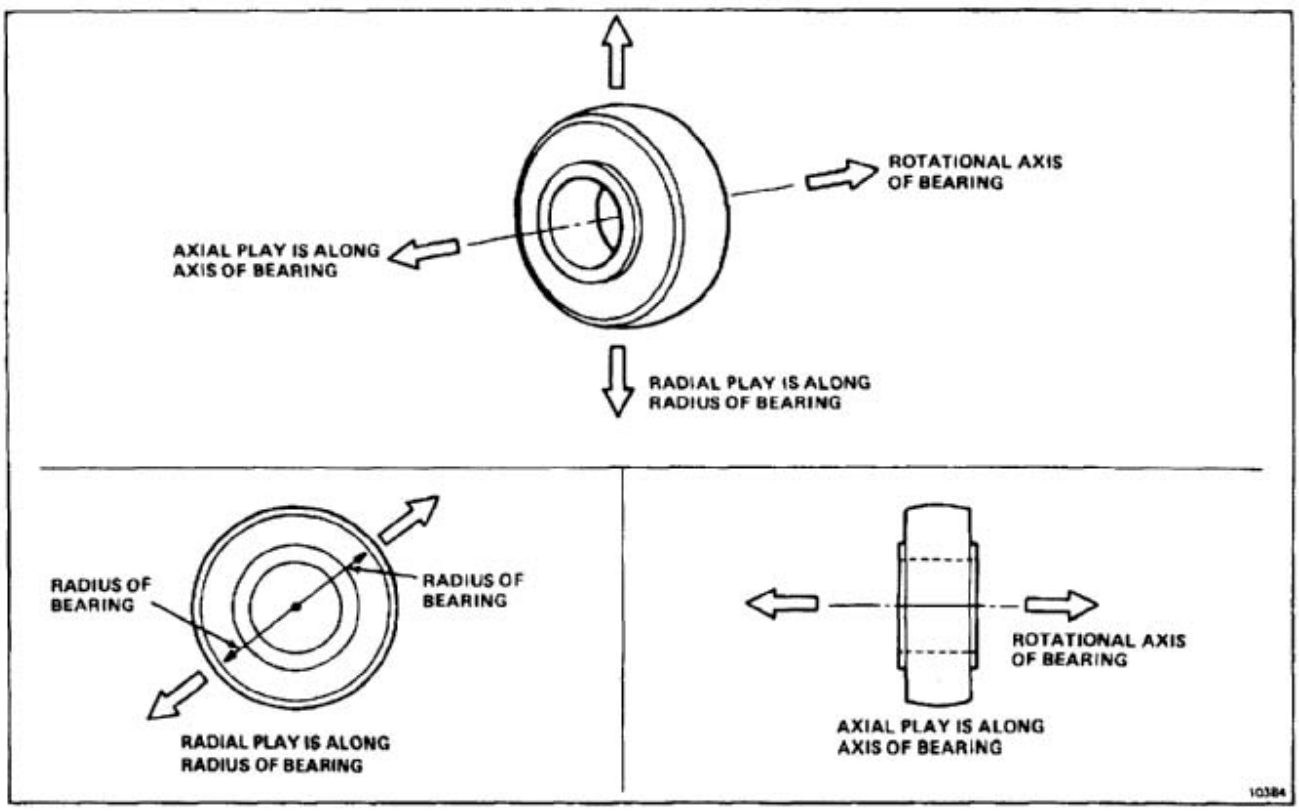
ANTIFRICTION TYPE BEARINGS

1. Check antifriction type rod end bearings as follows:
   a. Wipe bearing with cloth (E120).
   b. Rotate lubricated bearing. Feel for rough spots, binding or radial looseness. If these defects are felt, or radial looseness is more than **0.004 inch**, replace bearing.

NOTE

Radial looseness more than **0.004 inch** may be felt by hand.

Axial play can vary. In most cases this type of check will not indicate extent of bearing damage.



DRY TYPE BEARINGS

2. Check dry type rod end bearings as follows:

   a. Check visually for frayed fabric between inner and outer races. If fraying extends more than **1/8 inch** inside races, replace bearing.

   b. Teflon sticking to spherical ball is acceptable.

   c. Move bearing radially. If looseness is more than **0.007 inch**, replace bearing.

   d. Move bearing axially. If looseness is more than **0.010 inch**, replace bearing.

   e. Rotate bearing. If bearing is hard to turn, replace bearing.

NOTE

High rotational forces cause high starting forces within the flight control system.

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-9 INSPECT BELLCRANK AND CONNECTING LINK BEARINGS (INSTALLED) 11-9

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

Wire (E233)
Insulation Sleeving (E204)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1500-204-23
TM 55-1500-322-24
Task 11-8

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)
Access Door Open (As Required) (Task 2-2)

ANTIFRICTION TYPE BEARINGS

1. Check antifriction type rod end bearing as follows:

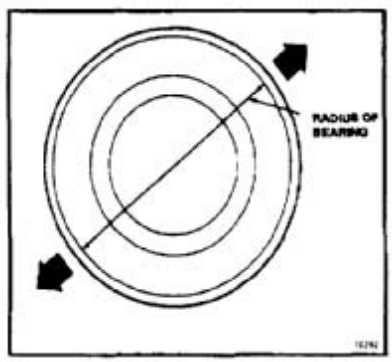
   a. Stop bellcrank from moving. Use wire (E233) covered with vinyl tubing (E204) or wood blocks.

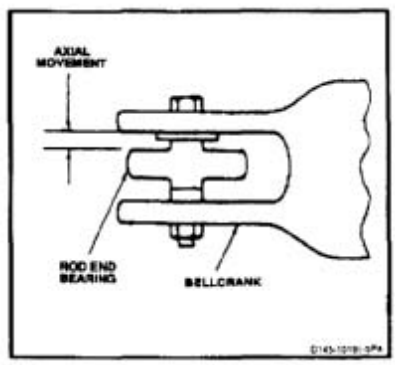
   b. Pull then push bearing radially. If looseness is more than **0.004 inch**, remove link and perform Task 11-8.

   NOTE

   Rolling element bearings are located in the flight control closet area, 1st and 2nd stage mixing units, forward pylon, tunnel area, aft fuselage, aft pylon and pedal box area only.

   c. Where there is evidence of an unserviceable bearing, disconnect sufficient parts of the system as required so that the individual bearings may be examined by hand rotation. Serviceable condition, well-lubricated bearings feel smooth with no perceptible roughness, catching or binding. No excessive external corrosion or worn plating should be evident on the bearing exterior, and shields and seals should be undamaged and operable.





d. Unserviceable bearings are those which have one or more of the following discrepancies:

(1) Fractured Components. Replace all bearings with cracked or broken rings, retainers, or rolling elements.

(2) Frozen Bearings. Replace all bearings that are frozen and cannot be rotated.

(3) Damaged Seals and Shields. Replace bearings if seals and shields are damaged, warped, or bent.

(4) Rough Bearings. Replace any bearings that has any obvious catching or binding when rotated by hand. Roughness may be caused by caked or deteriorated grease, foreign particles, corrosion, brinelling from improper installation, spalling of the rolling elements from metal fatigue. The latter three causes of roughness can be corrected only by replacement of the bearing. The first two causes may be corrected by cleaning and re-lubrication.

(5) Loose Bearings. Replace the bearing if looseness is detected in either axial or radial play. Refer to the appropriate maintenance manual for allowable limits.

(6) Noisy Bearings. Noisy bearings usually indicate a lack of lubricant. Return the bearings to service if lubrication alleviates the problem. Replace the bearing if re-lubrication does not correct the problem.

(7) Corroded Bearings. Excessive external corrosion frequently indicated that the interior may be corroded. Replace the bearing.

(8) Caked or Deteriorated Grease. Damage to bearings may result from lack of lubricant, caked or deteriorated grease. Replace the bearing if lubrication does not correct the problem.

(9) Rod Ends. When rod ends are inspected, the threaded portion of the shank should be examined for damaged threads or looseness between the shank and the linkage or rod, and fretting abrasion or wear. Check for cracks in the thin section of the housing adjoining the shank. Replace the rod end bearing for any of the above inspection. The above inspection is accomplished without removing rod end from flight control rod.

NOTE

Rod end bearings may have either of two types of integral lubrication provisions (grease fittings):

a. Red Nylon Type
b. NAS516-1A Ball Check Type

The nozzle to be used for lubricating the bearing is either MS24203 nozzle or Alemite nozzle 314150.

DRY TYPE BEARING

2. Check dry type rod end bearing as follows:

a. Repeat step 1. If radial looseness is more than **0.007 inch**, remove link and perform Task 11-8.

b. Push bearing to one side of bellcrank. Measure distance between bearing and lug of bellcrank.

c. Push bearing to other side of bellcrank. Measure distance between bearing and same lug of bellcrank used in step b.

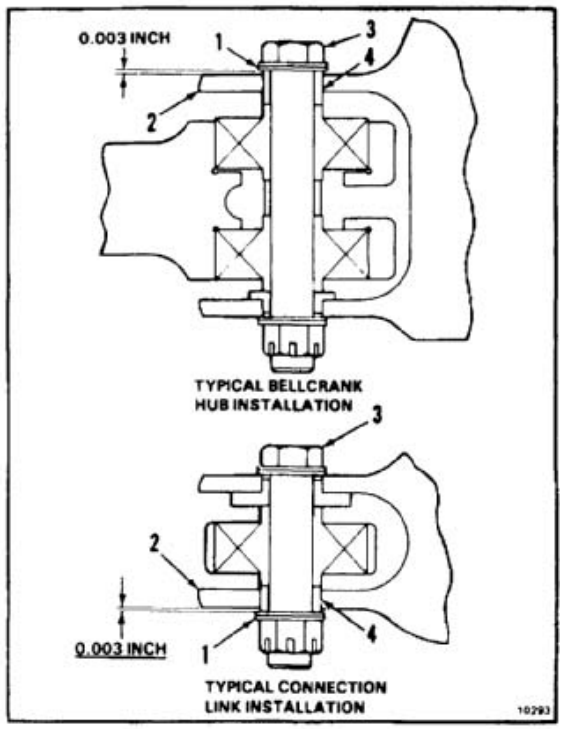
d. Subtract step b distance from step c distance. If difference is more than **0.01 inch**, remove link and perform Task 11-8.

BELLCRANK BEARINGS

CAUTION

If no gap exists, lugs can break.

3. Check that there is a gap of at least **0.003 inch** between washers (1) and lug (2) where bolt (3) goes through bushing (4).



FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-10 INSPECT FLIGHT CONTROL SYSTEM BELLCRANKS AND IDLER ARMS 11-10

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

None

Personnel Required:

Inspector

References:

Task 11-8
Task 11-9
TM 1-1500-204-23

Equipment Condition:

As Required

NOTE

Bellcranks and idler arms are made from 2014-T6 aluminum alloy, 7075-T73, ZK60A-T5 magnesium alloy, or 4340 steel forgings.

Steel bushings (standard and nonstandard) are installed in bolt holes of bellcranks and arms.

MINOR DAMAGE

1. Inspect nicks, scratches, scores, corrosion pits, or similar damage. Depth of damage must not be more than **0.040 inch** or **10 percent** of material thickness, whichever is less, after burnishing. If damage is more, replace part.
2. Burnish around filler, radius, or bolt holes within limits of step 1.

BEARING PLAY

3. If component is installed in flight control system, inspect bearings for play (Task 11-9). If component is removed, inspect bearings for play (Task 11-8).

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-10.1 INSPECT ALBI PAINT ON BELLCRANKS AND IDLERS 11-10.1

INITIAL SETUP

Applicable Configurations:

With 26

Tools:

As Required

Materials:

As Required

Personnel Required:

Inspector

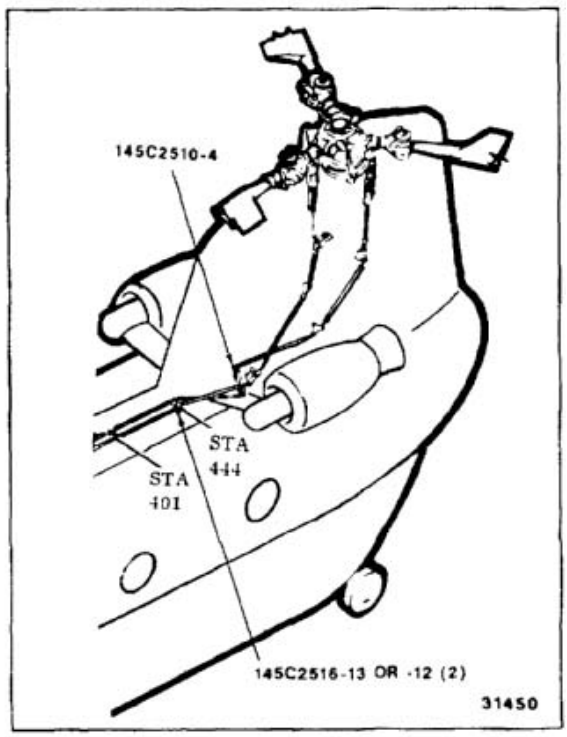
References:

Task 11-7
Task 11-10

Equipment Condition:

As Required

1. Inspect damage through the zinc chromate primer to the bare metal in accordance with Tasks 11-7 and 11-10.
2. Inspect ALBI paint damage where the zinc chromate primer is showing. Voids in the ALBI paint may not exceed **0.30 by 0.30 inch** square. Voids in ALBI paint must be separated by **0.30 inch** of undamaged paint, and a minimum of **50 percent** of the clevis areas shall have undamaged ALBI paint.



FOLLOW-ON MAINTENANCE:

Repair finish of bellcranks and connecting links with 26 (Task 11-14.1).

END OF TASK

11-11 INSPECT FOR CORROSION OF BELLCRANKS 11-11

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

As Required

Personnel Required:

Inspector

References:

TM 1-1500-204-23

Equipment Condition:

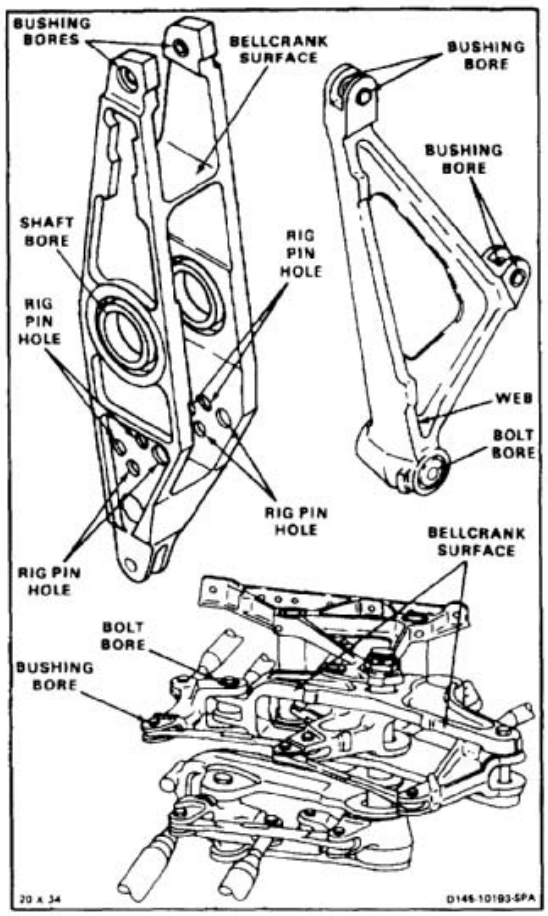
As Required

NOTE

Corrosion usually occurs in areas of dissimilar metal contact where surface protection is damaged.

Surface corrosion looks scaly and blistered. Paint gets discolored, and areas look dull and pitted. Gray or white powder may be on surface.

1. Check for bellcrank corrosion in the following areas.
   a. Bellcrank bearing or bushing bore.
   b. Web areas and joints.
   c. Mounting bolt or shaft lug area.
   d. Rigging pin holes.
   e. General surface corrosion due to damage of surface protection.



FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-12 REPAIR CONTROL ARMS AND BELLCRANKS 11-12

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

As Required

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1500-204-23

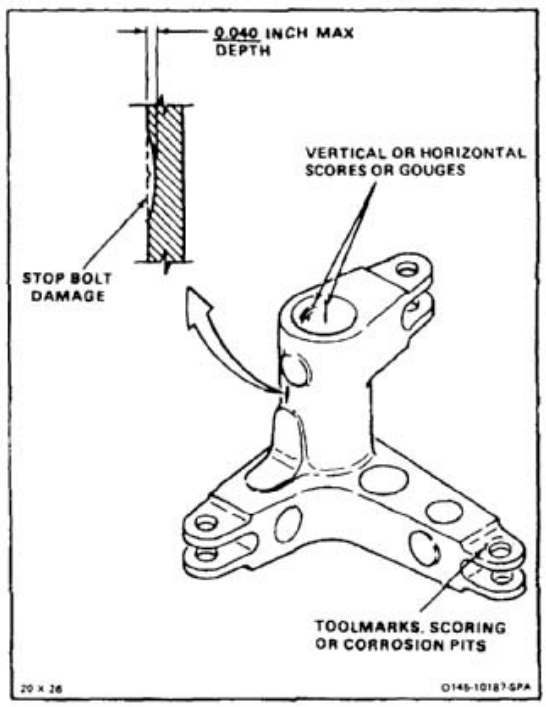
Equipment Condition:

As Required

CAUTION

This does not apply to bearing or bushing bores.

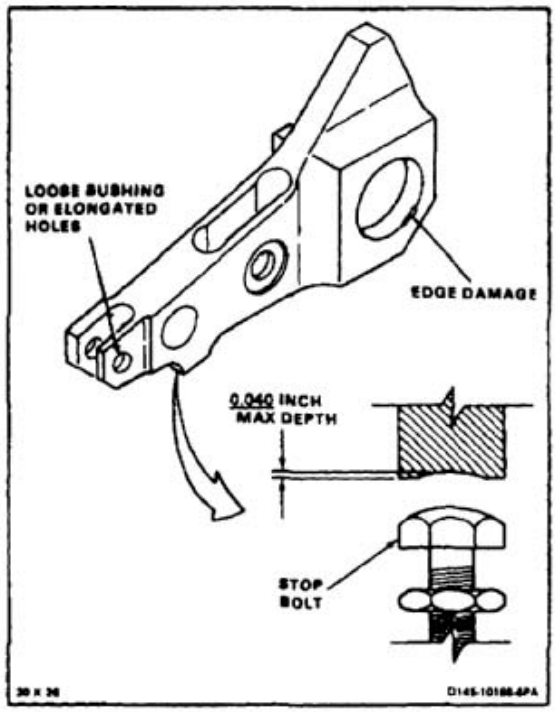
1. Damage to bores or holes must not be more than **0.015 inch** in depth and must not be more than **5 percent** of the load bearing surface.
2. Remove surface scores, tool marks, or corrosion pits by burnishing. Depth after burnishing must not be more than **10 percent** of thickness or **0.040 inch,** whichever is less. An area of **20 times** damage depth may be burnished. If damage is close to fillets, radii, holes, or edges, burnish a greater area.



3. Replace bushings when hole damage is repaired.

FOLLOW-ON MAINTENANCE:

As Required



END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Protective Clothing
Heat Gun
Beaker, 50 cc's
Container, 2 Quart
Thermometer
Rubber Apron

Materials:

Cloths (E112)
Cloths (E120)
Tape (E388)
Abrasive Paper (E9)
Calcium Sulphate (E91)
Sodium Hydroxide (E358)
Chromic Acid (E114)
Nitric Acid (E22)
Thinner (E415)
Epoxy Primer (E293)
Epoxy Topcoat (E425)
Alodine (E65)
Epoxy Primer (E292.1)
Naphtha (E245)
Cleaning Compound (E119)
Gloves (E184.1)

Personnel Required:

Aircraft Structural Repairer
Inspector

Equipment Condition:

As Required

General Safety Instructions:

WARNING

Sodium hydroxide (E358), chromic acid (E114), and nitric acid (E22) are extremely toxic. They can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Thinner (E415) and epoxy primers (E293 and E292.1) are flammable and toxic. They can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Epoxy topcoat (E425) is extremely toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Alodine (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Naphtha (E245) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

Do not remove bellcrank or arms from aircraft unless there is danger of solvents or solution coming in contact with other parts. Do not allow solvents to contact bearings. Do not allow nitric acid (E22) or alodine solution (E65) to contact high strength steel part. Failure of component can result.

NOTE

This procedure is for minor damage to protective coat.

1. Check if component is aluminum. Place a drop of **10 percent** solution of sodium hydroxide (E358) on bare damaged surface. Rapid reaction should occur. Wear gloves (E184.1).
2. Check if component is magnesium. Place a drop of **10 percent** solution of sodium hydroxide (E358) on bare damaged surface. No rapid action should occur. Wear gloves (E184.1).

MAGNESIUM COMPONENTS

3. Repair magnesium components with epoxy finish as follows:
   a. Clean damaged surface. Use cloth (E112) damp with naphtha (E245). Wear gloves (E184.1).
   b. Scuff damage lightly with abrasive paper (E9).
   c. Clean damage. Use cloth (E112) moist with naphtha (E245). Wear gloves (E184.1).
   d. Rinse with water, then dry using heat gun.
   e. Mask damaged area. Use tape (E388).

WARNING

Do not add water to acids. A violent action will result. Avoid contact with skin. Wear protective clothing. Wash thoroughly after using.

   f. Slowly add **1-1/3 ounces** of chromic acid (E114), and **1 ounce** of calcium sulphate (E91) to **1 gallon** of water. Water temperature should be between **70° to 90°F (20° to 30°C)**. Stir vigorously for at least **15 minutes**. Use a stainless steel, aluminum, vinyl, polyethylene, or rubber lined container.
   g. Apply solution from step d to damaged area until solution turns greenish-brown or brassy yellow. Allow area to dry for **30 minutes**. Use brush to apply solution. Mix epoxy primer (E293) per manufacturer's instructions. Thin as necessary. Use thinner (E145).
   h. Apply three coats of epoxy primer. Allow to air dry **1 hour** between coats.
   i. Apply two coats of epoxy topcoat (E425). Mix per instructions. Thin if necessary. Use thinner (E415). Allow to air dry **1 hour** between coats.
   j. Remove masking tape.

ALUMINUM COMPONENTS

4. Repair aluminum components with zinc chromate finish as follows:
   a. Clean damaged surface. Use cloth (E112) damp with naphtha (E245). Wear gloves (E184.1).
   b. Blend damaged surface. Use abrasive paper (E9).
   c. Clean surface. Use cloth (E112) moist with naphtha (E245). Wear gloves (E184.1). Wipe dry.

WARNING

Do not add water to acids. A violent action will result. Avoid contact with skin. Wear protective clothing. Wash thoroughly after using.

d. Slowly add **3 ounces** of alodine 1200 (E65) and **1/2 fluid ounce** of nitric acid (E22) to **1 gallon** of water. Stir until powder is dissolved. Use a stainless steel, aluminum, vinyl, polyethylene, or rubber lined container. Wear gloves (E184.1).

e. Apply solution from step d to damaged surface until coating is formed. Coating should form in **1 to 5 minutes**.

f. Rinse surface. Use cloth (E120) moist with water. Blot dry. Do not rub.

g. Check coated surface. Complete surface must be coated and color range from gold to brown. Allow to dry.

h. Remove any powder from surface. Use cloth (E120).

i. Apply two coats of epoxy primer (E292.1). Wear gloves (E184.1). Allow to air dry **30 minutes** between coats.

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

INITIAL SETUP

Applicable Configurations:

Without 38

Tools:

Inclinometer
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Airframe Repairer's Tool Kit, NSN 5180-00-232-4876

Materials:

As Required

Parts:

Rivets

Personnel Required:

CH-47 Helicopter Repairer
Aircraft Structural Repairer
Inspector

References:

TM 1-1500-204-23
Task 11-7

Equipment Condition:

Off Helicopter Task

WARNING

Rod ends removed from fixed end of link (rivet hole in rod end) are to be discarded.

NOTE

Repair connecting links by replacing rod end bearings and end fittings.

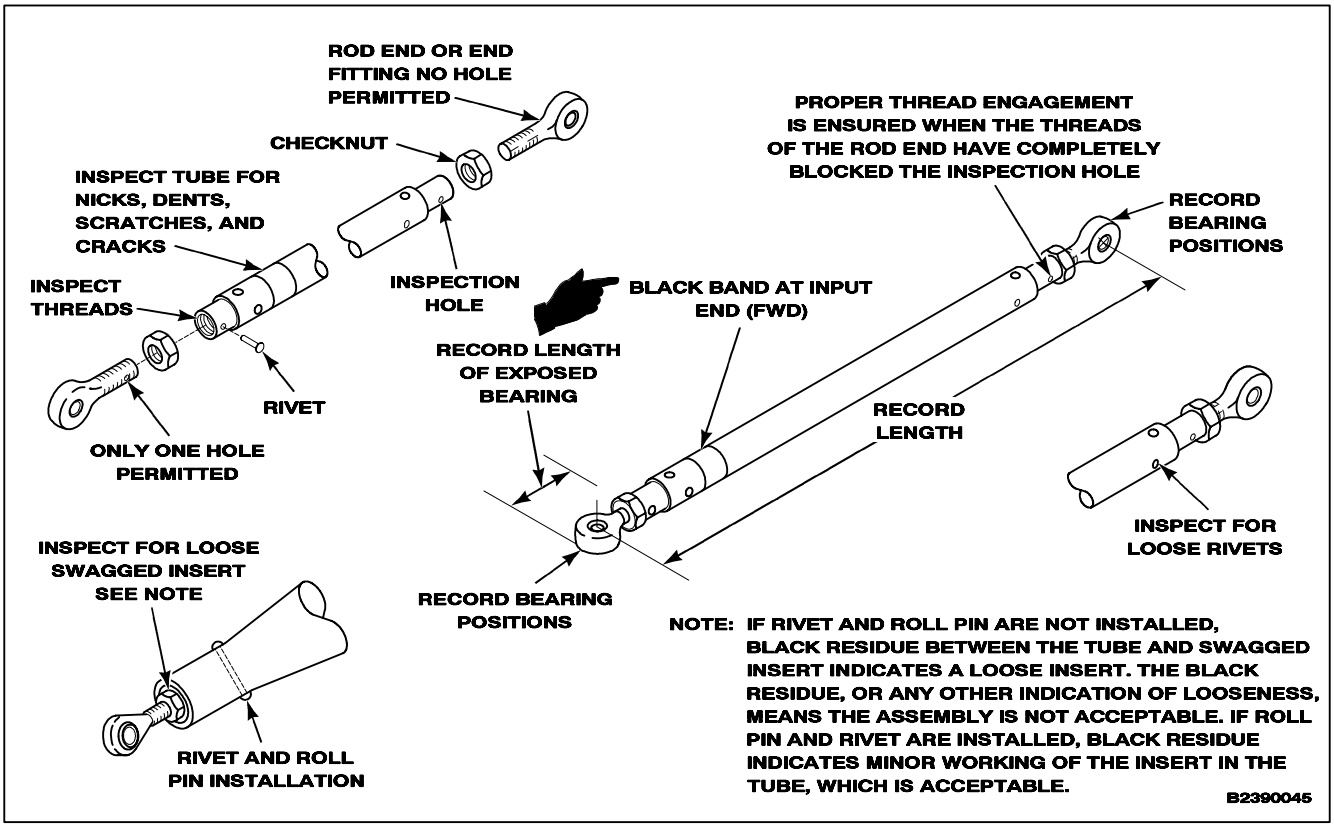
1. Before replacing rod end bearing or end fitting, check link for loose rivets or damaged thread.
2. Blend out nicks and scratches. Depth of blending must not be more than **10 percent** of wall thickness.
3. Check for loose swaged insert (Task 11-7).
4. Replace bearing or end fitting as follows:
   a. Measure and record distance between bearings or end fitting attachment holes.
   b. Measure and record difference in angle of bearing. Use inclinometer.
   c. If bearing or fitting is held by rivet, drill out rivet.
   d. Record length of exposed bearing. Loosen locknut and remove bearing or fitting.
   e. Install locknut on bearing or fitting.
   f. Install bearing or fitting to same length of bearing exposed as recorded from step 4d.
   g. Adjust bearing or insert for length and angle recorded in steps 4a and 4b.
   h. Tighten locknuts and check adjustment measurement.
   i. Check inspection hole at bearing or insert. Hole must be closed with thread.
5. If bearing or insert requires riveting, check the following:

WARNING

Do not enlarge rivet hole. Enlarged hole may cause link failure, resulting in loss of aircraft, and injury or death to personnel.

   a. If link has bearings or inserts with **5/16 inch** diameter thread, and original rivet size cannot be used, reject link.
   b. If link has bearings or inserts with **3/8 inch** thread, **1/8 inch** may be drilled out to **5/32 inch**. If rivet hole is elongated and **5/32 inch** diameter does not remove elongation, reject link.

Connecting Link Assembly	Wall Thickness (Inches)	Connecting Link Assembly	Wall Thickness (Inches)	Connecting Link Assembly	Wall Thickness (Inches)
114C1013-1	0.083	114C3010-3	0.049	145C3360-1	0.049
114C1013-3	0.049	114C3010-5	0.049	145CS360-2	0.049
114C1013-4	0.049	114C3010-7	0.049	145C3361-1	0.049
114C1013-5	0.049	114C3010-9	0.049	145CS360-3	0.049
114C1013-6	0.035	145C1013-1	0.049		
114C1014-1	0.049	145C1014-1	0.049		
114C1014-2	0.049	145C1014-9 6	0.120		
114C1014-3	0.049	145C2010-10	0.058		
114C1014-21	0.049	145C2010-11	0.049		
114C1014-22	0.058	145C2010-12	0.049		
114C1015-1	0.156	145C2010-13	0.049		
114C1015-2	0.156	145C2013-2	0.049		
11403010-1	0.065				



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-14.1 REPAIR FINISH OF BELLCRANKS AND CONNECTING LINKS 11-14.1

INITIAL SETUP

Applicable Configurations:

With 26

Tools:

Airframe Repairer's Tool Kit, NSN 5180-00-323-4876

Materials:

Brush (E86)
Aliphatic Naphtha (E245)
Dry Cleaning Solvent (E162)
Abrasive Paper (E9)
Toluene (E422)
Cloths (E120)
Epoxy Primer (E292.1)
Protective Gloves (E184.1)
ALBI 107A Base Coating (E135.3)
ALBI 144 Top Coating (E135.4)
Alodine Powder (E65)
Nitric Acid (E22)
Marking Ink (E205)

Personnel Required:

Aircraft Structural Repairer
Inspector

References:

TM 55-1500-345-23

Equipment Condition:

Off Helicopter Task

General Safety Instructions:

WARNING

ALBI 107A base coating (E135.3) and ALBI 144 top coating (E135.4) are combustable and toxic. They can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Dry cleaning solvent (E162) is combustable and toxic. Avoid contact with skin, eyes, or clothing. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Toluene (E422) and epoxy primer (E292.1) are flammable and toxic. They can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

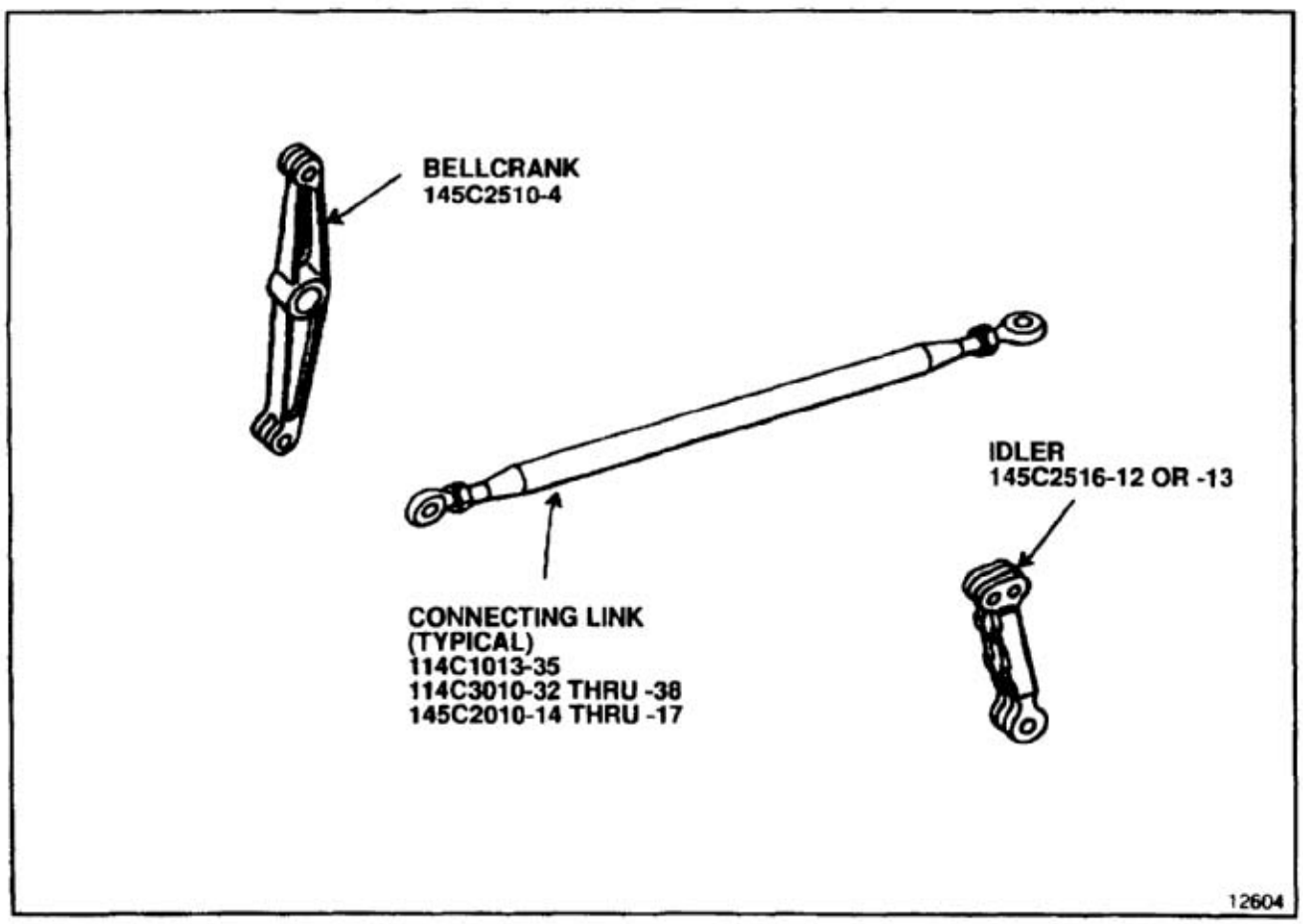
Nitric acid (E22) is extremely toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

WARNING

Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

WARNING

Naphtha (E245) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.



NOTE

This is a complete repair, based on coatings and primer missing down to aluminum base metal. If damage does not extend to metal, it is only necessary to replace missing coatings.

1. Clean the damaged area. Use a clean cloth (E120) damp with naphtha (E245) or dry cleaning solvent (E162). Wear gloves (E184.1) and goggles.
2. Inspect damaged area:
   a. If damage extends over stenciled markings, tag and record markings.
   b. If damage extends to aluminum base metal, go to step 3.
   c. If yellow primer is not damaged, go to step 8.
   d. If basecoat is not damaged, go to step 15.

PREPARE BARE METAL

3. Lightly sand damaged area to blend edges of primer, basecoats, and topcoats. Use abrasive paper (E9) or finer.
4. Remove sanding residue by cleaning as in step 1.
5. Prepare a solution of **3 ounces** alodine powder (E65) and **0.5 ounce** of concentrated nitric acid (E22) in **1 gallon** of water to the damaged area. Use brush (E86) and wear gloves (E184.1) and goggles. Allow about **5 minutes** for a coating to form. Blot area clean with cloths (E120) wet with clean cold water, or flush with clean cold water. Allow metal to air dry or blow dry with clean, dry, oil-free compressed air.

INSPECT

APPLY PRIMER

6. Clean damaged area as in step 1.
7. Thin epoxy primer (E292.1) with an equal amount of toluene (E422). Apply one coat of thinned primer to damaged area (TM 55-1500-345-23). Let dry for at least **4 hours**.

NOTE

ALBI base coat must be applied within **24 hours** of primer application.

APPLY BASECOAT

8. Clean primed area as in step 1.
9. Lightly scuff-sand primer and surrounding area to blend edges of existing basecoats and topcoats. Use abrasive paper (E9) or finer.
10. Remove sanding residue by cleaning as in step 1.
11. Thoroughly mix basecoat (E135.3). Apply a coat over the primed area. Let air dry at least **24 hours at 70ºF (21ºC)**. Do not use heating devices to accelerate drying time between applications.
12. Lightly scuff-sand painted area. Use abrasive paper (E9) or finer.

NOTE

Total basecoat thickness requirement is **0.010 to 0.012 inch** (TM 55-1500-345-23).

13. Repeat steps 11 and 12 until three coats of basecoat (E135.3) have been applied. Let final coat air dry for at least **24 hours at 70ºF (21ºC)** or force dry for **12 hours at 120ºF (49ºC)**.

INSPECT

APPLY TOPCOAT

14. Clean painted area as in step 1.
15. Lightly scuff-sand basecoat and surrounding area to blend edges of existing topcoat. Use abrasive paper (E9) or finer.
16. Remove sanding residue by cleaning as in step 1.
17. Thoroughly mix topcoat (E135.4). Apply a coat of topcoat over the basecoat. Let dry for at least **24 hours at 70ºF (21ºC)**. Do not use heating devices to accelerate drying time between applications.

NOTE

Total top coat thickness requirement is **0.004 to 0.006 inch** (TM 55-1500-345-23).

18. Repeat steps 15 thru 17. Let final coat dry for at least **48 hours at 70ºF (21ºC) or 24 hours at 120ºF (49ºC)**.

INSPECT

19. Replace any markings that were removed. Refer to step 2. Use marking ink (E205).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-14.2 REPAIR OF STAINLESS STEEL CONNECTING LINK 11-14.2

INITIAL SETUP

Applicable Configurations:

With **38**

Tools:

Inclinometer
Fine File

Materials:

Emery Cloth (E123 thru E127 As Required)

Parts:

Rivets

Personnel Required:

Medium Helicopter Repairer
Aircraft Structural Repairer
Inspector

References:

TM 1-1500-204-23
Task 11-7.1

Equipment Condition:

Off Helicopter Task

WARNING

Rod ends removed from fixed end of link (rivet hole in rod end) are to be discarded.

1. Before replacing rod end bearing or end fitting, check link for loose rivets or damaged thread.
2. Replace bearing or end fitting as follows:
   a. Measure and record distance between bearings or end fitting attachment holes.
   b. Measure and record difference in angle of bearing. Use inclinometer.
   c. If bearing or fitting is held by rivet, drill out rivet.
   d. Record length of exposed bearing. Loosen locknut and remove bearing or fitting.
   e. Install locknut on bearing or fitting.
   f. Install bearing or fitting to same length of bearing exposed as recorded from step 2d.
   g. Adjust bearing or insert for length and angle recorded in steps 2a and b.
   h. Tighten locknuts and check adjustment measurement.
   i. Check inspection hole at bearing or insert. Hole must be closed with thread.

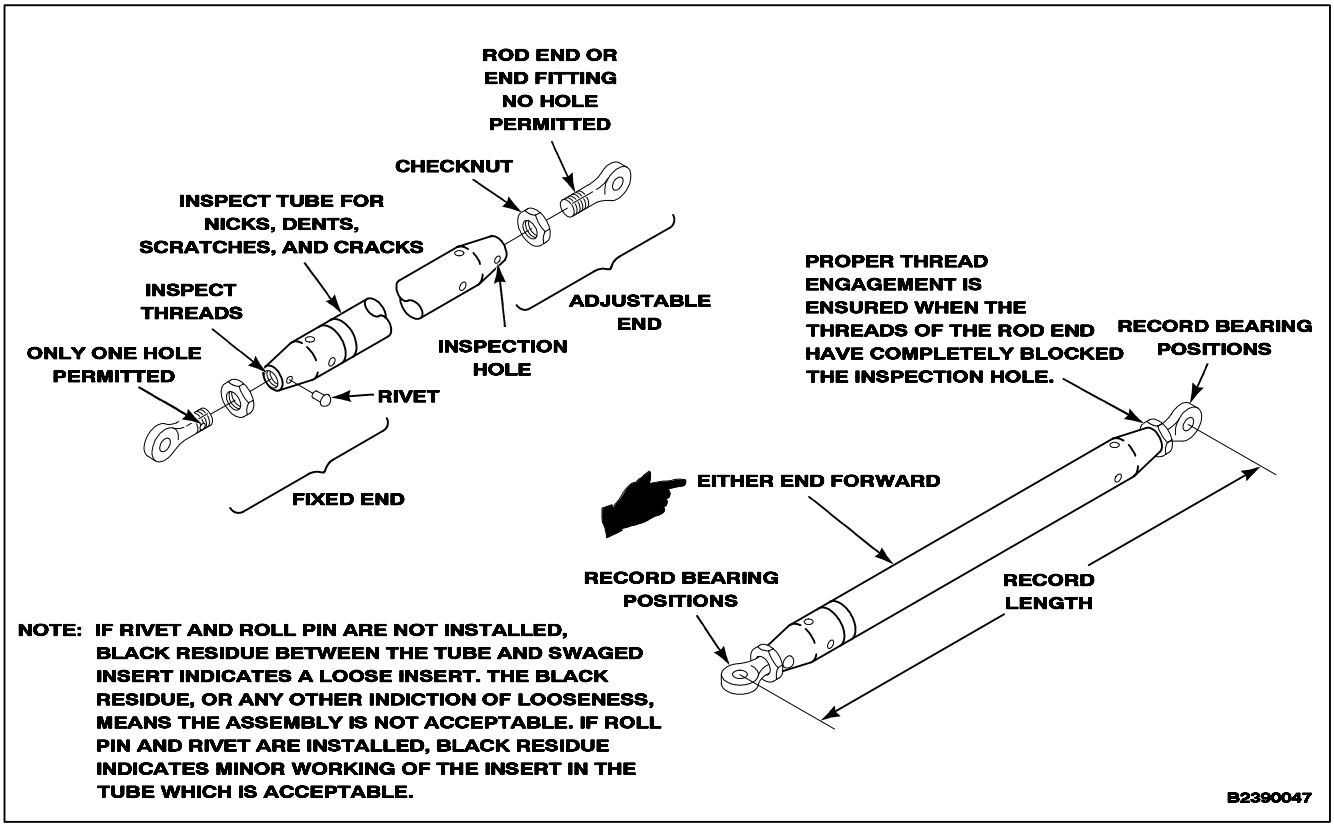
WARNING

Do not enlarge rivet hole. Enlarged hole may cause link failure, resulting in loss of aircraft, and injury or death to personnel.

3. Replace loose rivets with original rivet size. If original rivet size cannot be used or rivet hole is elongated, reject link.
4. Blend out nicks, dents, and scratches. If blending, do not exceed a depth of more than **0.010 inch**. If link has nicks, scratches, and dents greater than **0.010 inch** reject link. If link has nicks scratches, and dents with cracks, or fractures reject link.

5. Smooth out sharp edges of acceptable nicks, scratches, and dents with a fine file or fine emery cloth. Light burnish marks and indications resulting from normal handling are acceptable and should be disregarded.

Connecting Link Assembly	Wall Thickness (Inches)
145CS340-1	0.065
145CS340-3	0.065
145CS340-5	0.065
145CS340-7	0.065
145CS340-9	0.065
145CS340-11	0.065
145CS340-13	0.065
145CS340-15	0.065
145CS340-17	0.065
414C2520-3	0.049
414C2520-4	0.049



FOLLOW-ON-MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Maintenance Tool Kit, NSN 5180-00-323-5114

Materials:

Cloth, Cleaning (E120)

Personnel Required:

Inspector

References:

TM 1-1500-204-23

Equipment Condition:

As Required

CAUTION

Do not wash bearing. Wash solution may remove lubrication from sealed bearing. Wash solution may damage dry-type bearing.

1. Wipe bearing clean. Use clean cloth (E120).
2. Rotate bearing. Feel for rough spots, binding, or radial looseness. Looseness must not be more than **0.004 inch**. Do not check for axial looseness.

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-16 REPLACE BUSHINGS (AVIM) 11-16

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

As Required

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1500-204-23

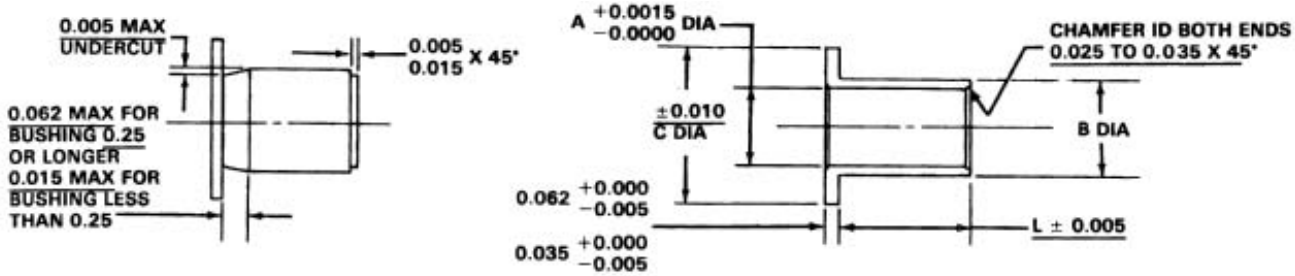
Equipment Condition:

As Required

General Safety Instructions:

As Required

1. Replace damaged or worn bushings.
2. Replace bushings with same type material and heat treatment as original.
3. Replace bushing with correct length, internal and external diameters as shown in following tables:



ORIGINAL PLAIN BUSHING		REPLACEMENT SHOULDER BUSHING										COMPONENT PART NO. 114C UNLESS OTHERWISE NOTED
		0.015 OVERSIZE					0.030 OVERSIZE					
PART NO.	REAMED HOLE	A	B	C	L +.005 −.005	REAMED HOLE	A	B	C	L +.005 −.005	REAMED HOLE	
NAS77-4-8	0.3761	0.250	0.3904 +.0000 −.0005	0.530	0.080	0.3906 +.0005 −.0000	0.250	0.4060 +.0000 −.0005	0.530	0.080	0.4062 +.0005 −.0000	145C1409, 145C1332,
-9					0.090					0.090		145C1408, 145C1410, 145C1411, 145C1420
-10					0.100					0.100		145C1332,
-11					0.110					0.110		1161, 145C1330, 145C1333, 145C1408, 145C1409
-12					0.120					0.120		145C1331
-13					0.130					0.130		1130
-14					0.140					0.140		1163, 145C1333, 145C3110, 145C3122
-16					0.160					0.160		1141, 1160, 145C1413, 145C1414, 145C1457
-17					0.170					0.170		1140
-18					0.180					0.180		1141, 1183, 145C1459
-19					0.190					0.190		1161, 1168, 145C3221, 145C3231
NAS77-4-20	0.3761	0.250	0.3904 +.0000 −.0005	0.530	0.200	0.3906 +.0005 −.0000	0.250	0.4060 +.0000 −.0005	0.530	0.200	0.4062 +.0005 −.0000	1131, 1165

NOTES

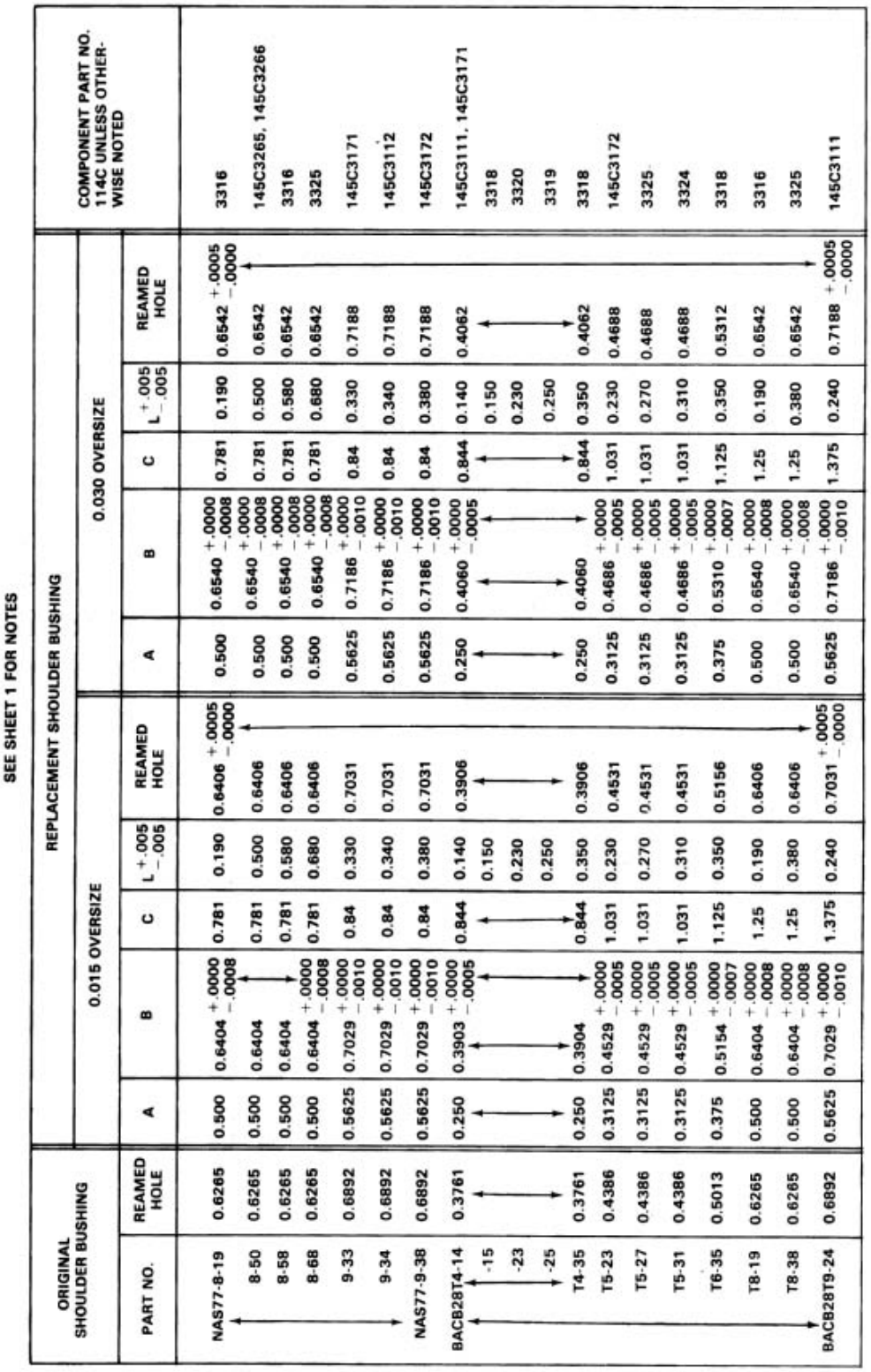
A. ALL DIMENSIONS ARE IN INCHES

B. FABRICATE ALL REPLACEMENT BUSHINGS FROM SAE 4130 ROUND BAR, MIL-S-6758, MIL-S-5000, OR TUBING MIL-T-6736. HEAT TREAT TO 125,000 UTS. INSIDE AND OUTSIDE DIAMETERS TO BE PARALLEL AND CONCENTRIC WITHIN 0.003 TRUE INDICATED READING. BREAK SHARP EDGES 0.015 WHERE APPLICABLE. CADMIUM PLATE IN ACCORDANCE WITH QQ-P-416. ALL DIMENSIONS TO BE MET AFTER PLATING

13595

SEE SHEET 1 FOR NOTES

ORIGINAL SHOULDER BUSHING		REPLACEMENT SHOULDER BUSHING										COMPONENT PART NO. 114C UNLESS OTHERWISE NOTED
		0.015 OVERSIZE				0.030 OVERSIZE						
PART NO.	REAMED HOLE	A	B	C	L +.005 −.005	REAMED HOLE	A	B	C	L +.005 −.005	REAMED HOLE	
NAS77-4-24	0.3761	0.250	0.3904 +.0000 −.0005	0.530	0.240	0.3906 +.0005 −.0000	0.250	0.4060 +.0000 −.0005	0.530	0.240	0.4062 +.0005 −.0000	1141, 1150, 145C3230
-25					0.250					0.250		145C1414
-26					0.260					0.260		145C1410,
-30					0.300					0.300		145C1457
-33					0.330					0.330		145C1458, 145C1459
NAS77-4-46	0.3761	0.250	0.3904	0.530	0.460	0.3906	0.250	0.4060	0.530	0.460	0.4062	145C1413
NAS77-5-19	0.4386	0.3125	0.4529	0.590	0.190	0.4531	0.3125	0.4686	0.590	0.190	0.4688	145C3112, 145C3221, 145C3230-1, 145C2511, 145C2512
-23					0.230					0.230		
-25					0.250					0.250		3325, 145C2515
-26					0.260					0.260		3319, 3320
-27					0.270					0.270		1131
-29					0.290					0.290		145C2514
NAS77-5-33	0.4386	0.3125	0.4529 +.0000 −.0005	0.590	0.330	0.4531	0.3125	0.4686 +.0000 −.0005	0.590	0.330	0.4688	1131, 145C2513
NAS77-6-24	0.5013	0.375	0.5154 +.0000 −.0007	0.650	0.240	0.5156	0.375	0.5310 +.0000 −.0007	0.655	0.240	0.5312	145C3112
-29					0.290					0.290		145C3122
-31					0.310					0.310		3411
-33					0.330					0.330		3324
NAS77-6-58	0.5013	0.375	0.5154 +.0000 −.0007	0.650	0.580	0.5156 +.0005 −.0000	0.375	0.5310 +.0000 −.0007	0.655	0.580	0.5312 +.0005 −.0000	1131

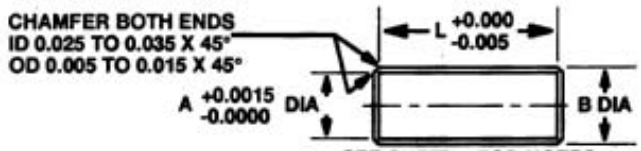


SEE SHEET 1 FOR NOTES

ORIGINAL SHOULDER BUSHING		REPLACEMENT SHOULDER BUSHING										COMPONENT PART NO. 114C UNLESS OTHERWISE NOTED
		0.015 OVERSIZE					0.030 OVERSIZE					
PART NO.	REAMED HOLE	A	B	C	L +.005 -.005	REAMED HOLE	A	B	C	L +.005 -.005	REAMED HOLE	
NAS77-8-19	0.6265	0.500	0.6404 +.0000 -.0008	0.781	0.190	0.6406 +.0005 -.0000	0.500	0.6540 +.0000 -.0008	0.781	0.190	0.6542 +.0005 -.0000	3316
8-50	0.6265	0.500	0.6404	0.781	0.500	0.6406	0.500	0.6540 +.0000 -.0008	0.781	0.500	0.6542	145C3265, 145C3266
8-58	0.6265	0.500	0.6404	0.781	0.580	0.6406	0.500	0.6540 +.0000 -.0008	0.781	0.580	0.6542	3316
8-68	0.6265	0.500	0.6404 +.0000 -.0008	0.781	0.680	0.6406	0.500	0.6540 +.0000 -.0008	0.781	0.680	0.6542	3325
9-33	0.6892	0.5625	0.7029 +.0000 -.0010	0.84	0.330	0.7031	0.5625	0.7186 +.0000 -.0010	0.84	0.330	0.7188	145C3171
9-34	0.6892	0.5625	0.7029 +.0000 -.0010	0.84	0.340	0.7031	0.5625	0.7186 +.0000 -.0010	0.84	0.340	0.7188	145C3112
NAS77-9-38	0.6892	0.5625	0.7029 +.0000 -.0010	0.84	0.380	0.7031	0.5625	0.7186 +.0000 -.0010	0.84	0.380	0.7188	145C3172
BACB28T4-14	0.3761	0.250	0.3903 +.0000 -.0005	0.844	0.140	0.3906	0.250	0.4060 +.0000 -.0005	0.844	0.140	0.4062	145C3111, 145C3171
-15					0.150					0.150		3318
-23					0.230					0.230		3320
-25					0.250					0.250		3319
T4-35	0.3761	0.250	0.3904	0.844	0.350	0.3906	0.250	0.4060	0.844	0.350	0.4062	3318
T5-23	0.4386	0.3125	0.4529 +.0000 -.0005	1.031	0.230	0.4531	0.3125	0.4686 +.0000 -.0005	1.031	0.230	0.4688	145C3172
T5-27	0.4386	0.3125	0.4529 +.0000 -.0005	1.031	0.270	0.4531	0.3125	0.4686 +.0000 -.0005	1.031	0.270	0.4688	3325
T5-31	0.4386	0.3125	0.4529 +.0000 -.0005	1.031	0.310	0.4531	0.3125	0.4686 +.0000 -.0005	1.031	0.310	0.4688	3324
T6-35	0.5013	0.375	0.5154 +.0000 -.0007	1.125	0.350	0.5156	0.375	0.5310 +.0000 -.0007	1.125	0.350	0.5312	3318
T8-19	0.6265	0.500	0.6404 +.0000 -.0008	1.25	0.190	0.6406	0.500	0.6540 +.0000 -.0008	1.25	0.190	0.6542	3316
T8-38	0.6265	0.500	0.6404 +.0000 -.0008	1.25	0.380	0.6406	0.500	0.6540 +.0000 -.0008	1.25	0.380	0.6542	3325
BACB28T9-24	0.6892	0.5625	0.7029 +.0000 -.0010	1.375	0.240	0.7031 +.0005 -.0000	0.5625	0.7186 +.0000 -.0010	1.375	0.240	0.7188 +.0005 -.0000	145C3111

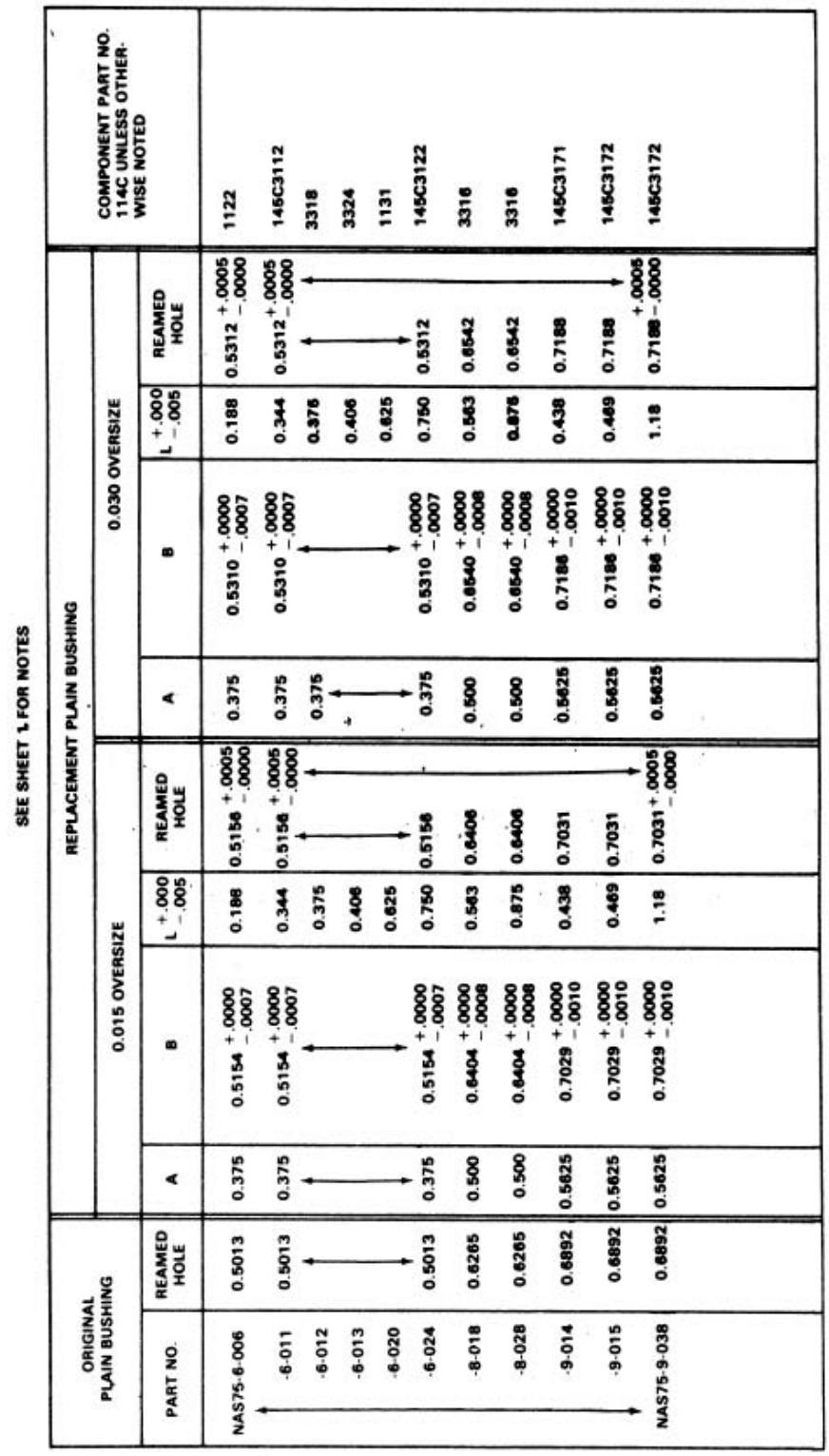
SEE SHEET 1 FOR NOTES

ORIGINAL SHOULDER BUSHING		REPLACEMENT SHOULDER BUSHING										COMPONENT PART NO. 114C UNLESS OTHERWISE NOTED
		0.015 OVERSIZE					0.030 OVERSIZE					
PART NO.	REAMED HOLE	A	B	C	L +.005 −.005	REAMED HOLE	A	B	C	L +.005 −.005	REAMED HOLE	
145C2517-3	0.4388	0.312	0.4529 +.0000 −.0005	01.25	0.23	0.4531 +.0005 −.0000	0.312	0.4686 +.0000 −.0005	01.25	0.23	0.4688 +.0005 −.0000	145C2510, 145C2511, 145C2512
145C2517-4	0.4388	0.312	0.4529 +.0000 −.0005	01.25	0.30	0.4531 +.0005 −.0000	0.312	0.4686 +.0000 −.0005	01.25	0.30	0.4688 +.0005 −.0000	145C2516
145C2517-5	0.3763	0.250	0.3904 +.0000 −.0005	0.84	0.140	0.3906 +.0005 −.0000	0.250	0.4060 +.0000 −.0005	0.84	0.140	0.4062 +.0005 −.0000	145C2514, 145C2515
145C2517-6	0.4388	0.312	0.4529 +.0000 −.0005	01.25	0.330	0.4531 +.0005 −.0000	0.312	0.4529 +.0000 −.0005	01.25	0.330	0.4688 +.0005 −.0000	145C2513



SEE SHEET 1 FOR NOTES

ORIGINAL PLAIN BUSHING		REPLACEMENT PLAIN BUSHING								COMPONENT PART NO. 114C UNLESS OTHERWISE NOTED
		0.015 OVERSIZE				0.030 OVERSIZE				
PART NO.	REAMED HOLE	A	B	L +.000 -.005	REAMED HOLE	A	B	L +.000 -.005	REAMED HOLE	
NAS75-4-005	0.3761	0.250	0.3904 +.0000 -.0005	0.156	0.3906 +.0005 -.0005	0.250	0.4060 +.0000 -.0005	0.156	0.4062 +.0005 -.0000	145C1331
-006				0.188				0.188		145C1408, 145C1409, 145C1410, 145C1411, 145C1420
-007				0.219				0.219		1161, 145C1413, 145C1459
-008				0.250				0.250		1141, 1160, 1163, 1183, 3318, 3320, 145C1330, 145C1331, 145C1332, 145C1333, 145C2515, 145C3110, 145C3111, 145C3112
-009				0.281				0.281		1130, 1141, 1150, 1161, 1165, 1168, 145C1331, 145C1457, 145C3111, 145C3171, 145C3221, 145C3230, 145C3231
-010				0.312				0.312		1131, 1140, 3319, 145C1331, 145C1413, 145C1414
-011				0.344				0.344		145C1332, 145C1333, 145C1458
NAS75-4-012	0.3761	0.250	0.3904	0.375	0.3906	0.250	0.4060	0.375	0.4062	3318
NAS75-5-008	0.4386	0.3125	0.4529	0.250	0.4531	0.3125	0.4686	0.250	0.4682	145C3112, 145C3221, 145C3230
NAS75-5-009	0.4386	0.3125	0.4529	0.281	0.4531	0.3125	0.4686	0.251	0.4688	
-010				0.312				0.312		145C2511, 145C2612, 145C3172
-011				0.343				0.343		3325, 145C2512,
-012				0.375				0.375		3319, 3320, 3325
NAS75-5-013	0.4386			0.406				0.406		3324, 145C2513
NAS75-5-014	0.438		0.4529 +.0000 -.0005	0.438	0.4531 +.0005 -.0000		0.4686 +.0000 -.0005	0.438	0.4688 +.0005 -.0000	
NAS77-5-024	0.750	0.3125		0.750		0.3125		0.750		145S1873



SEE SHEET 1 FOR NOTES

ORIGINAL PLAIN BUSHING		REPLACEMENT PLAIN BUSHING								COMPONENT PART NO. 114C UNLESS OTHERWISE NOTED
		0.015 OVERSIZE				0.030 OVERSIZE				
PART NO.	REAMED HOLE	A	B	L +.000 −.005	REAMED HOLE	A	B	L +.000 −.005	REAMED HOLE	
NAS75-6-006	0.5013	0.375	0.5154 +.0000 −.0007	0.188	0.5156 +.0005 −.0000	0.375	0.5310 +.0000 −.0007	0.188	0.5312 +.0005 −.0000	1122
-6-011	0.5013	0.375	0.5154 +.0000 −.0007	0.344	0.5156 +.0005 −.0000	0.375	0.5310 +.0000 −.0007	0.344	0.5312 +.0005 −.0000	145C3112
-6-012	←	←	←	0.375	←	0.375	←	0.375	←	3318
-6-013	←	←	←	0.406	←	←	←	0.406	←	3324
-6-020	←	←	←	0.625	←	←	←	0.625	←	1131
-6-024	0.5013	0.375	0.5154 +.0000 −.0007	0.750	0.5156	0.375	0.5310 +.0000 −.0007	0.750	0.5312	145C3122
-8-018	0.6265	0.500	0.6404 +.0000 −.0008	0.563	0.6406	0.500	0.6540 +.0000 −.0008	0.563	0.6542	3316
-8-028	0.6265	0.500	0.6404 +.0000 −.0008	0.875	0.6406	0.500	0.6540 +.0000 −.0008	0.875	0.6542	3316
-9-014	0.6892	0.5625	0.7029 +.0000 −.0010	0.438	0.7031	0.5625	0.7186 +.0000 −.0010	0.438	0.7188	145C3171
-9-015	0.6892	0.5625	0.7029 +.0000 −.0010	0.469	0.7031	0.5625	0.7186 +.0000 −.0010	0.469	0.7188	145C3172
NAS75-9-038	0.6892	0.5625	0.7029 +.0000 −.0010	1.18	0.7031 +.0005 −.0000	0.5625	0.7186 +.0000 −.0010	1.18	0.7188 +.0005 −.0000	145C3172

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-17 REMOVE DAMAGED RIG PIN FROM THRUST CONTROL 11-17

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Hacksaw Blade
Aluminum Draft Pin, 3/8 Inch Diameter

Materials:

Acetone (E20)
Cloths (E120)
Sealant (E336)
Straps (E376)
Gloves (E186)

Parts:

Cotter Pins
Gasket

Personnel Required:

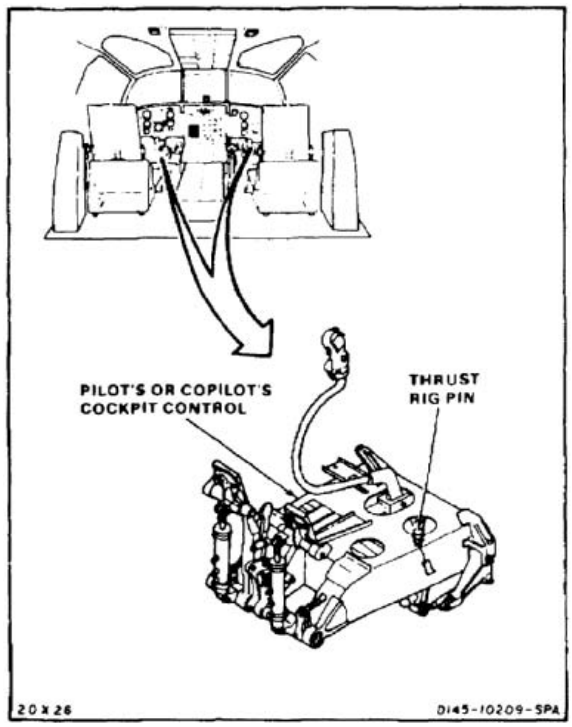
Medium Helicopter Repairer
Inspector

References:

Task 11-18
Task 11-43

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Copilot's Control Stick at Neutral (Task 11-32)
Copilot's Control Pedals at Neutral (Task 11-32)

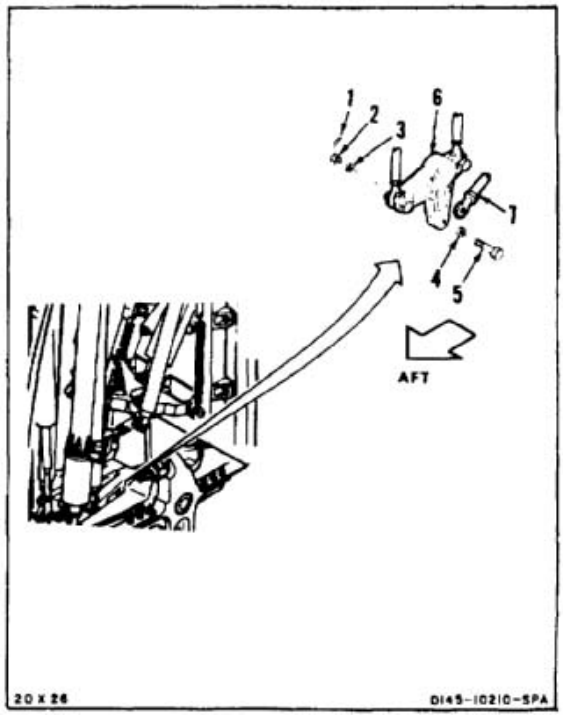


11-17 REMOVE DAMAGED RIG PIN FROM THRUST CONTROL (Continued) 11-17

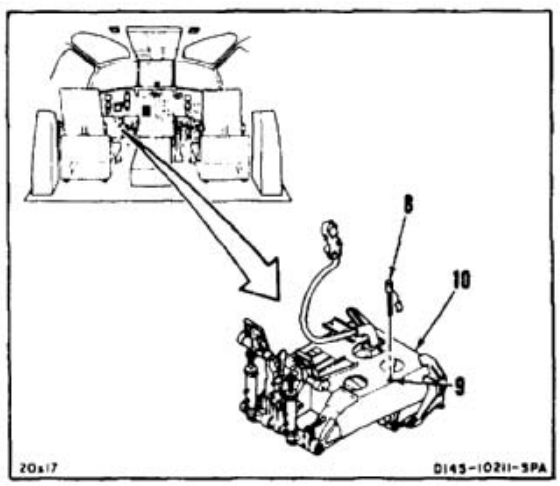
NOTE

Procedure is similar to remove damaged rig pin from pilot's or copilot's cockpit control assemblies. Copilot's assembly is shown here.

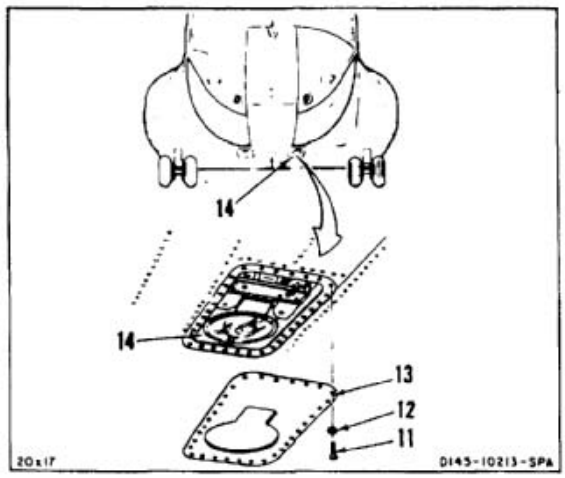
1. Remove cotter pin (1), nut (2), two washers (3 and 4), and bolt (5) from thrust bellcrank (6). Disconnect thrust transfer connecting link (7) from bellcrank.



2. Working in cockpit, remove thrust rig pin (T122) (8) from hole (9) of copilot's control assembly (10). If pin is removed, perform steps 16, 23, 24, and 25, then go to Follow-On Maintenance. If pin cannot be removed, perform steps 3 thru 31.



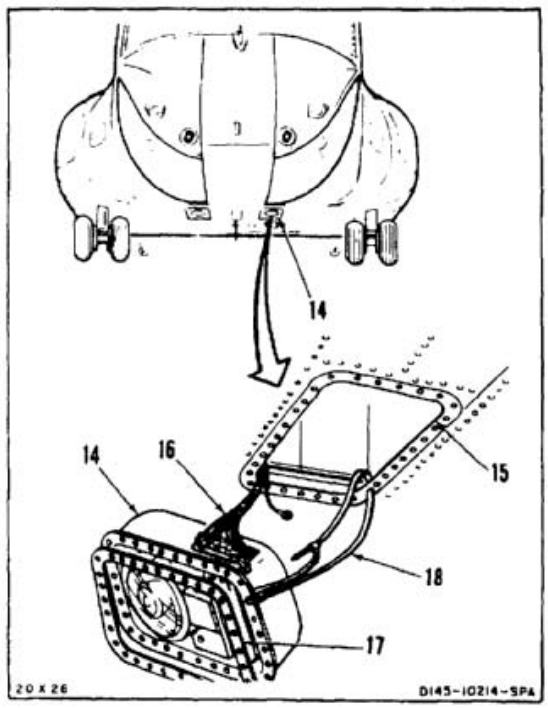
3. Remove 32 screws (11) and washers (12) from housing (13) of left landing light housing (14). Remove housing.



CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

4. Remove left landing light housing (14) from access (15). Support housing so it does not hang by wires (16).
5. Remove gasket (17) from housing (14).
6. Strap housing (14) to access (15) at aft end of access with strap (18). Wires (16) must not support housing. Use strap (E376).

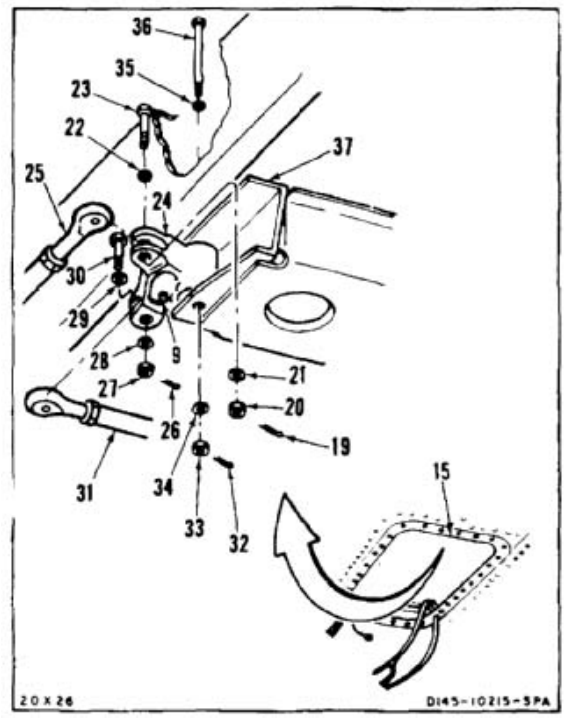


7. Working through left access (15), remove cotter pin (19), nut (20), two washers (21 and 22), and bolt (23) from thrust bellcrank (24). Disconnect link (25) from bellcrank.
8. Remove cotter pin (26), nut (27), two washers (28 and 29), and bolt (30) from bellcrank (24). Disconnect link (31) from bellcrank.
9. Remove cotter pin (32), nut (33), two washers (34 and 35), and bolt (36) from bellcrank (24). Remove bellcrank from fitting (37) and pin (9). If bellcrank cannot be removed perform steps 10 and 11, then go to step 14.
10. Cut pin (9) between bellcrank (24) fitting (37). Use hacksaw blade.

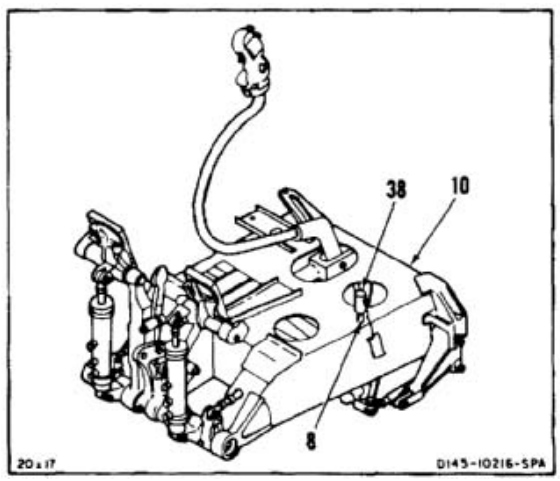
NOTE

Do not damage other parts while using hacksaw blade.

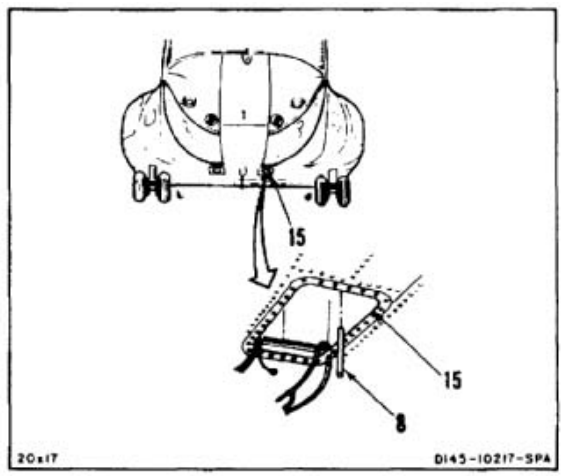
11. Remove bellcrank (24) and tip of pin (9) from fitting (37). Remove burrs from pin.



12. Working in cockpit, remove pin (8) from assembly (10). If pin cannot be removed, perform steps 13, 14, and 15, then go to step 16.
13. Cut head (38) from pin (8). Use hacksaw blade.
14. Drive pin (8) down through assembly (10). Use aluminum drift pin.



15. Working through access (15), remove pin (8).
16. Inspect thrust control assembly for damage (Task 11-18).

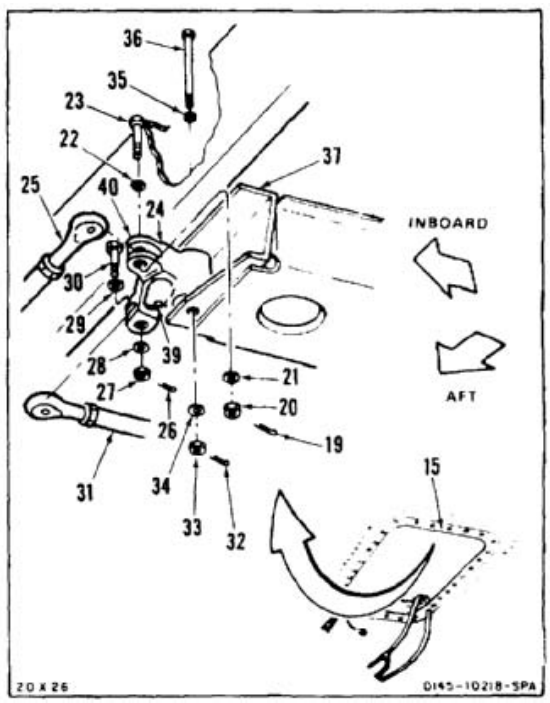


CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).



17. Working through access (15) position bellcrank (24) in fitting (37) hole (39) aft and arm (40) inboard.
18. Install bolt (36), two washers (35 and 34), and nut (33) in fitting (37). Do not torque nut at this time.
19. Position link (31) in bellcrank (24). Install bolt (30), two washers (29 and 28) and nut (27). Do not torque nut at this time.
20. Position link (25) in bellcrank (24). Install bolt (23), two washers (22 and 21), and nut (20).
21. Torque three nuts (20, 27, and 33) to **30 to 45 inch-pounds**. Install three cotter pins (19, 26, and 32).
22. Check three bolts (23, 30, and 36). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 21.

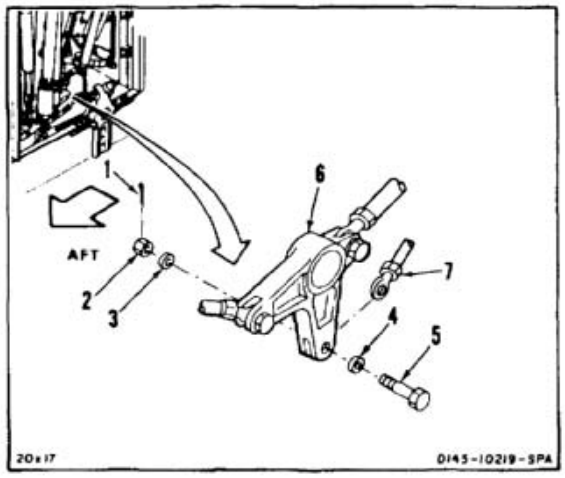
INSPECT

23. Working from passageway, position link (7) in bellcrank (6). Install bolt (5), two washers (4 and 3) and nut (2).

24. Torque nut (2) to **30 to 45 inch-pounds**. Install cotter pin (1).

25. Check bolt (5). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 24.

26. Rig thrust control (Task 11-43).

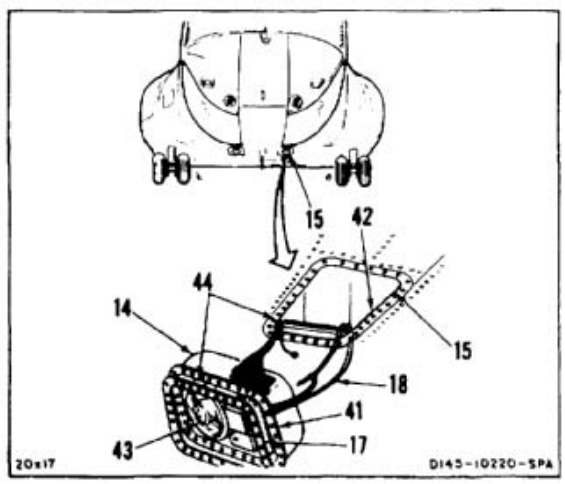


WARNING

Acetone (E20) is extremely flammable. It can be toxic. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

27. Clean sealant from flange (41) and inside surface (42) of access (15). Use acetone (E20) and cloths (E120). Wear gloves (E186).

28. Support housing (14). Remove strap (18).



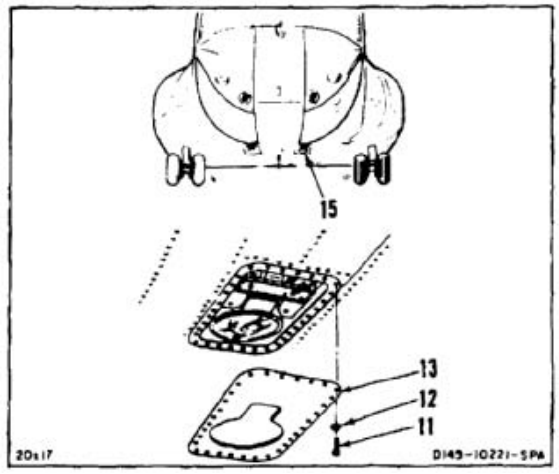
WARNING

Sealant (E336) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

29. Apply sealant (E336) to both sides of (new) gasket (17). Install gasket on flange (41). Remove excess sealant with acetone (E20) and cloths (E120). Wear gloves (E186).

30. Tilt housing (14) and position inside access (15), lamp (43) aft. Align housing and access holes (44).

31. Position housing (13) over access (15). Install 32 washers (12) and screws (11).



INSPECT

FOLLOW-ON MAINTENANCE:

Install cockpit forward floor covers (Task 2-82).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform rig position check (Task 11-32).
Perform operational check of flight controls (TM 55-1520-240-T).
Perform operational check of landing light (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-18 INSPECT FOR DAMAGE AFTER REMOVAL OF BENT OR SHEARED RIGGING PIN 11-18

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

None

Personnel Required:

Inspector

References:

TM 1-1520-253-23

Equipment Condition:

As Required

1. Inspect flight control system components for damage as follows:
   a. Inspect rig pin hole for elongation.
   b. Inspect supports of bellcranks with rig pin holes for cracks, bending, sheared, or loose rivets. No cracks allowed. If a crack in the support is suspected, refer to TM 1-1520-253-23.
   c. Inspect bellcranks with rig pin hole for damage at pin hole and lug holes. No cracks allowed. If a crack in the bellcrank is suspected, refer to TM 1-1520-253-23.
   d. Inspect connecting links in system for bowing, bent rod ends or loose rivets at rod ends.

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-19 REMOVE DAMAGED RIG PIN FROM FIRST STAGE CONTROLS 11-19

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Aluminum Drift Pin, 3/8 Inch Diameter
Hacksaw
Rigging Pin A, First Stage Mixing Linkage (T44)

Materials:

None

Personnel Required:

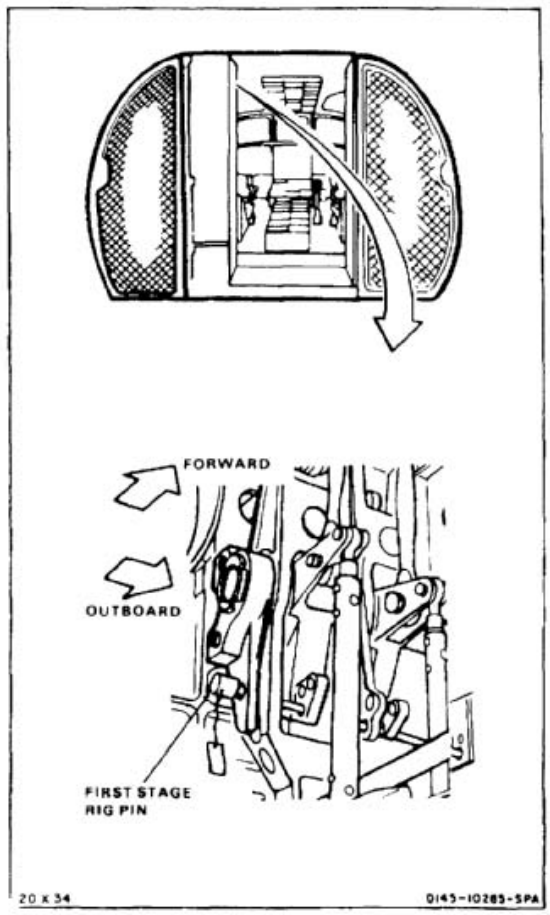
Medium Helicopter Repairer
Inspector

References:

Task 11-18
Task 11-51
Task 11-188
Task 11-189

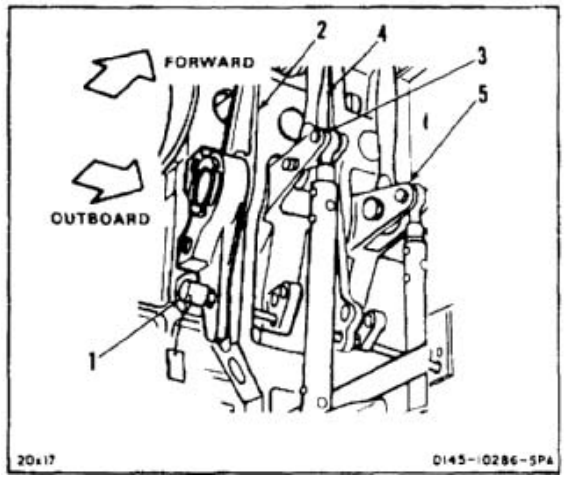
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward and Aft Servocylinder Connecting Links Disconnected (Task 11-192)
Copilot's Cockpit Controls at Neutral (Task 11-32)
Forward Transmission Drip Pan Removed (Task 2-3)
Forward Left Work Platform Open (Task 2-2)



11-19 REMOVE DAMAGED RIG PIN FROM FIRST STAGE CONTROLS (Continued) 11-19

1. Turn first stage rig pin (T44) (1) and pull inboard. Have helper from forward left work platform move four bellcranks (2, 3, 4, and 5). Remove pin. If pin is removed, perform step 8 then go to Follow-On Maintenance. If not, perform steps 2 thru 10.



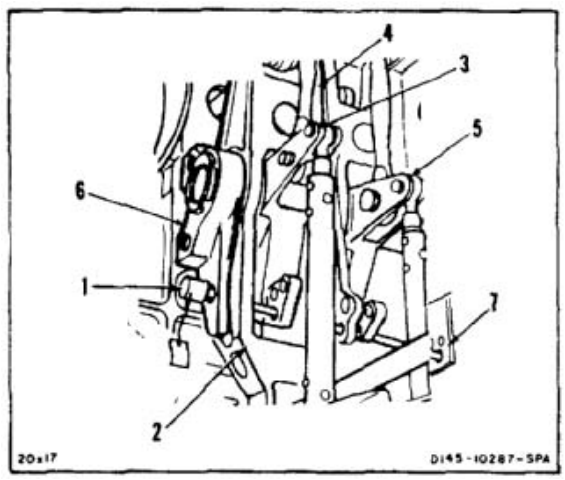
2. Cut pin (1) between fitting (6) and bellcrank (2). Use hacksaw blade.

NOTE

Do not damage other parts while using hacksaw blade.

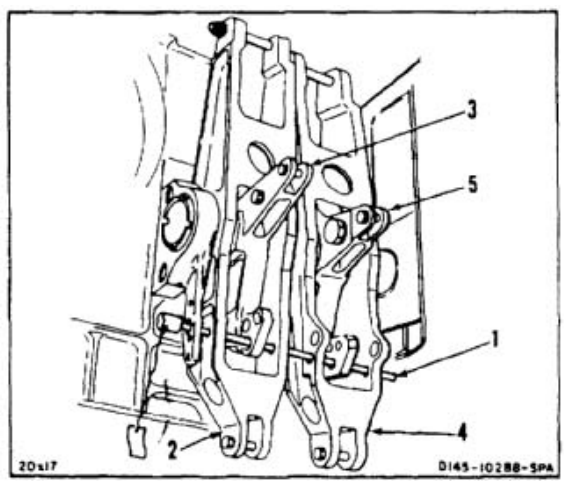
3. Cut pin (1) between bellcrank (4) and fitting (7). Use hacksaw blade.

4. Remove bellcranks (2, 3, 4, and 5) (Task 11-188).

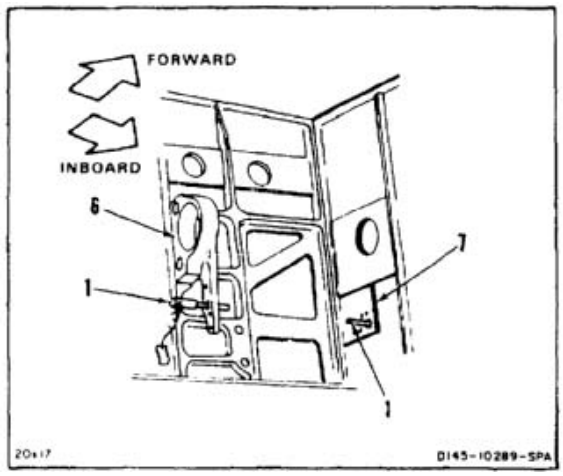


5. Cut pin (1) between bellcranks (4, 5, 3, and 2). Attempt to remove pin after each cut.

6. Drive sections of pin (1) from bellcranks (2, 3, 4, and 5). Use aluminum drift pin.



7. Remove section of pin (1) from fittings (6 and 7).



8. Inspect first stage controls for damage (Task 11-18).
9. Install bellcranks (2, 3, 4, and 5) (Task 11-189).
10. Rig first stage controls (Task 11-51).

FOLLOW-ON MAINTENANCE:

Connect forward and aft servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight controls (TM 55-1520-240-T).
Close forward left work platform (Task 2-2).
Install forward transmission drip pan (Task 2-3).

END OF TASK

11-20 REMOVE DAMAGED RIG PIN FROM SECOND STAGE CONTROLS 11-20

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Aluminum Drift Pin, 3/8 Inch Diameter
Hacksaw

Materials:

None

Personnel Required:

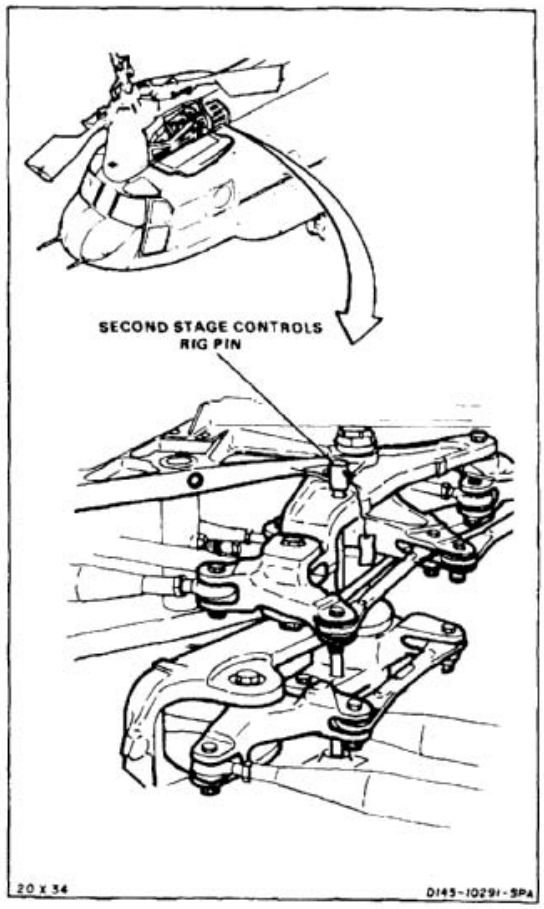
Medium Helicopter Repairer (2)
Inspector

References:

Task 11-18
Task 11-51
Task 11-190
Task 11-191

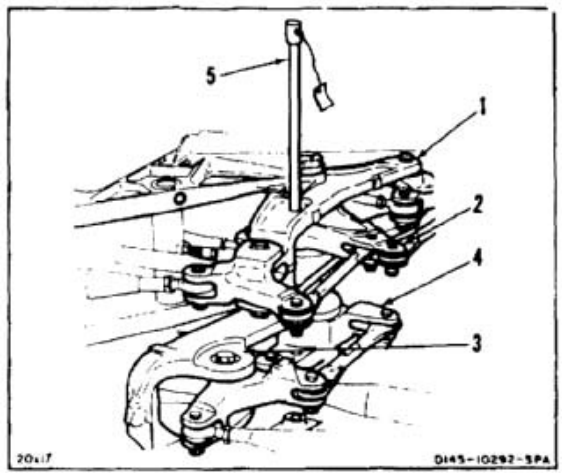
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward and Aft Servocylinder Connecting Links Disconnected (Task 11-192)
Copilot's Cockpit Controls at Neutral (Task 11-32)
Forward Left Work Platform Open (Task 2-2)
Forward Transmission Aft Fairing Removed (Task 2-63)



11-20 REMOVE DAMAGED RIG PIN FROM SECOND STAGE CONTROLS (Continued) 11-20

1. Move four bellcranks (1, 2, 3, and 4) while turning and pulling up on second stage rig pin (5). Remove pin. If pin is removed, perform step 9 then go to Follow-On Maintenance. If not, perform steps 2 and 3.

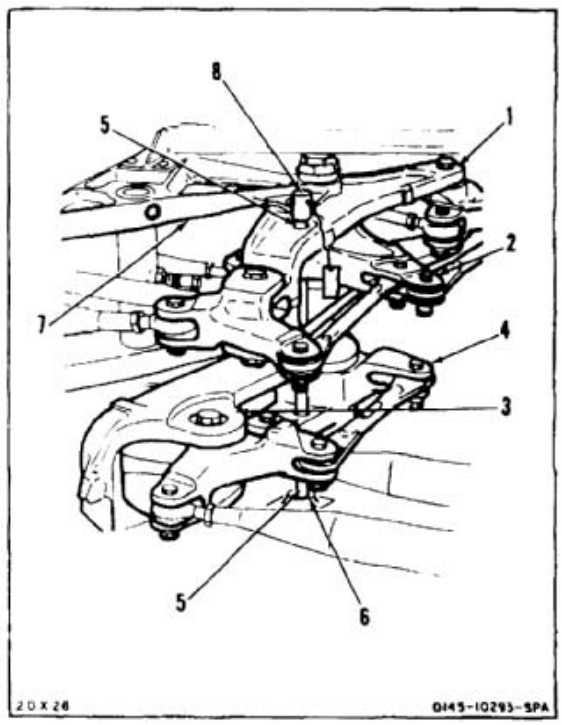


2. Cut pin (5) between fitting (6) and bellcrank (3) close to bellcrank. Use hacksaw blade.

CAUTION

Do not damage other parts while using hacksaw blade.

3. Remove pin (5) from support (7). If pin is removed, perform steps 8 and 9 then go to Follow-On Maintenance. If not, perform step 4.
4. Repeat steps 2 and 3 between four bellcranks (1, 2, 3, and 4) and support (7). If pin is removed, perform steps 8 and 9 then go to Follow-On Maintenance. If not, perform steps 5 thru 11.
5. Cut head (8) from pin (5).
6. Remove bellcranks (1, 2, 3, and 4) (Task 11-190).
7. Drive sections of pin (5) from bellcranks (1, 2, 3, and 4) and support (7).
8. Pull section of pin (5) from fitting (6).
9. Inspect second stage controls for damage (Task 11-18).
10. Install bellcranks (1, 2, 3, and 4) (Task 11-191).
11. Rig second stage controls (Task 11-51).



FOLLOW-ON MAINTENANCE:

Connect forward and aft servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight controls (TM 55-1520-240-T).
Close forward left work platform (Task 2-2).
Install forward transmission aft fairing (Task 2-68).

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

As Required

Materials:

None

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

Task 11-30
Task 11-28
Task 11-192

Equipment Condition:

As Required

WARNING

Rotor blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before moving rotor blades.

CAUTION

Do not apply more than **20 pounds** to cockpit controls. Damage to component can result.

CAUTION

Do not remove hydraulic power with rigging pins installed. Damage to component will result.

1. Install lead/lag absorber rigging tool (T72) if rotary-wing blades are to be turned (Task 11-30).

NOTE

Rotary-wing blades place forces on flight controls.

2. Install safety blocks (T31) in forward and aft servocylinders to lock-out rotary-wing blade forces (Task 11-28).
3. If flight control components are to be disconnected, disconnect forward and aft servocylinder connecting links (Task 11-192).

NOTE

Springs in servocylinder valves in down position.

FOLLOW-ON MAINTENANCE:

As Required

END OF TASK

11-22 INSTALL COCKPIT RIGGING FIXTURE, STICK YOKE, PEDAL PIN AND THRUST PIN 11-22

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Cockpit Controls Rigging Tools (T39)

Materials:

None

Personnel Required:

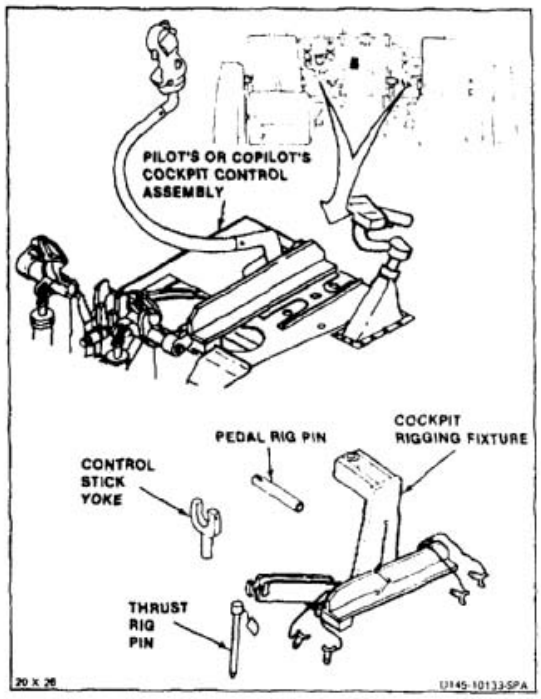
Medium Helicopter Repairer
Inspector

References:

Task 11-42

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Copilot's or Pilot's Floor Panels Removed (Task 2-81)
Copilot's or Pilot's Seats Fully Aft (Task 2-115)
AFCS SYSTEM SEL Switch Set to OFF

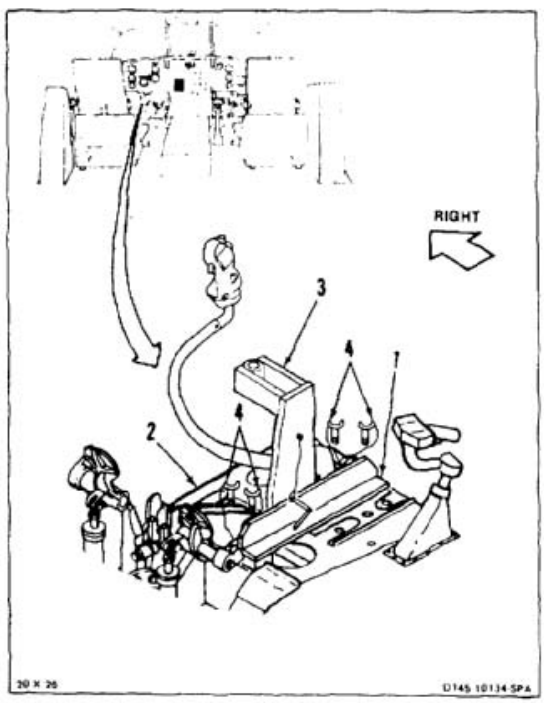


CAUTION

Do not remove hydraulic power while rigging tools are installed; otherwise, damage to components will occur.

NOTE

Procedure is same to install pilot's or copilot's cockpit rigging fixture, stick yoke, pedal pin, and thrust pin. Copilot's rigging tools are shown here.



INSTALL RIGGING FIXTURE

1. Position fixture (1) on copilot's cockpit assembly (2) with arm (3) of fixture to right.
2. Align fixture (1) with holes in assembly (2). Install four bolts (4)through fixture and in assembly.

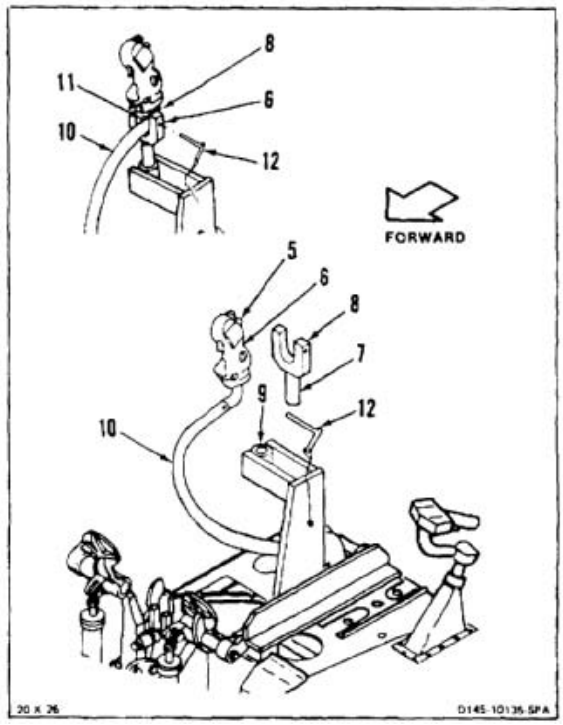
INSPECT

11-22 INSTALL COCKPIT RIGGING FIXTURE, STICK YOKE, PEDAL PIN AND THRUST PIN (Continued) 11-22

INSTALL CONTROL STICK YOLK

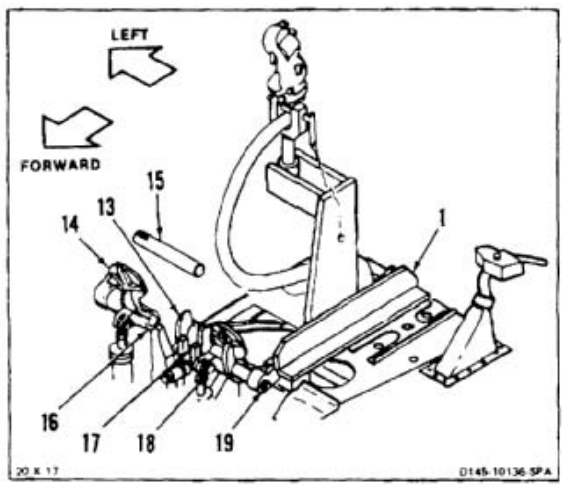
3. Press and hold CENTERING DEVICE RELEASE switch (5) on copilot's control stick grip (6). Move stick forward about **4 inches**.
4. Slide rod (7) of yoke (8) into hole (9) from top.
5. Position grip (6) of stick (10) over yoke (8). Lift yoke and position grip in yoke between grip and first rivet (11) of stick. Release switch (5).
6. Install lock pin (12) through yoke and across stick. If grip cannot be installed in yoke, perform Task 11-42.

INSPECT



INSTALL PEDAL RIG PIN

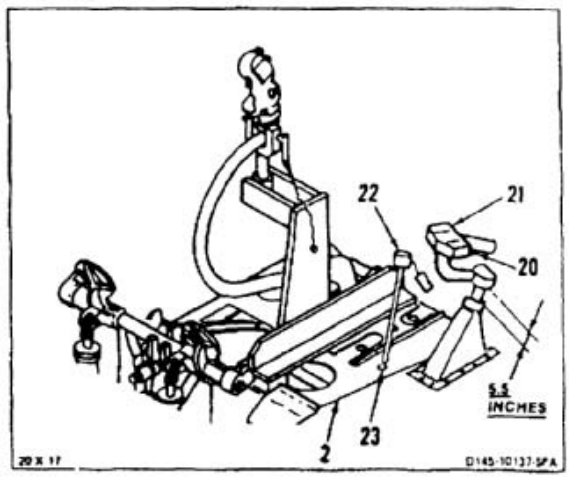
7. Press lever (13) of right pedal. Position pedal aft. Install pedal rig pin (15) in left pedal tube (16) and between two lugs (17) of fixture (1).
8. Push right pedal forward to center adjustment hole (18). Release lever (13).
9. Align pedal tube (19) and pin (15). Slide pin in tube. If pin does not slide in tube, perform Task 11-42.



11-22 INSTALL COCKPIT RIGGING FIXTURE, STICK YOKE, PEDAL PIN AND THRUST PIN (Continued) **11-22**

INSTALL THRUST RIG PIN

10. Press and hold THRUST CONT BRAKE TRIGGER (20) of thrust control (21). Pull control up about **5.5 inches**. Release trigger.
11. Position thrust rig pin (22) in hole (23). Press and hold trigger (20). Slide pin down through assembly (2). Move control (21) up then down until pin slides fully down. Release trigger. If pin does not slide fully down, perform Task 11-42.
12. Take and record measurements required for rig position check (Task 11-32).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-23 REMOVE COCKPIT RIGGING FIXTURE, STICK YOKE, PEDAL PIN AND THRUST PIN 11-23

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

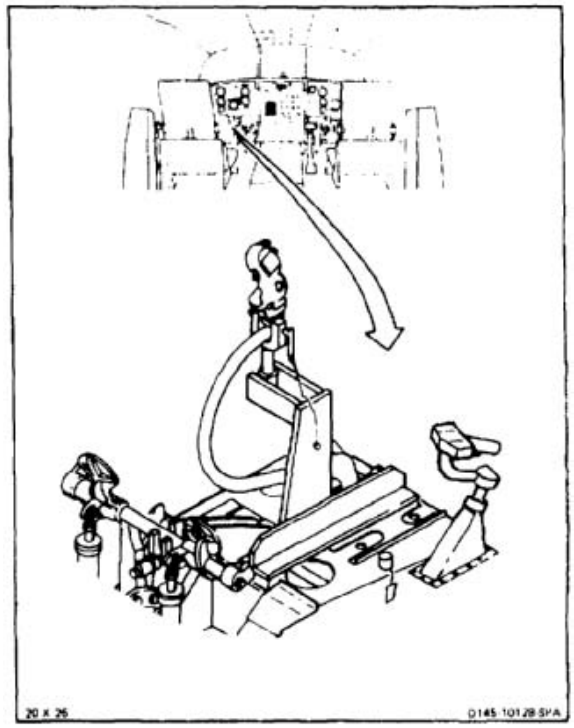
None

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF

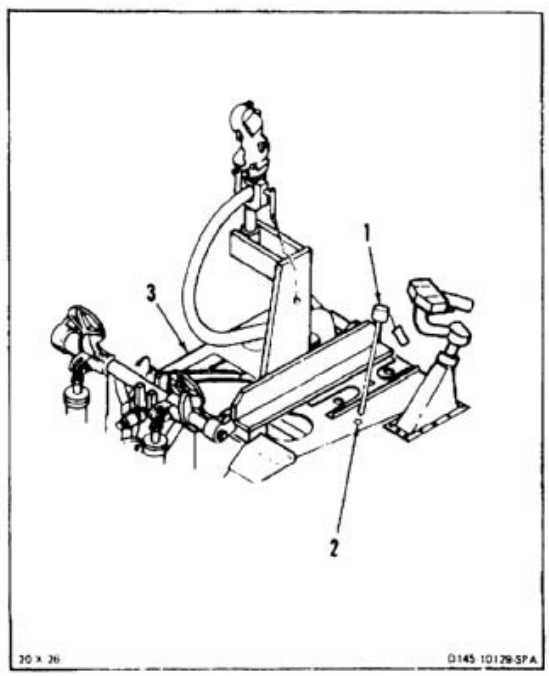


CAUTION

Do not remove hydraulic power while rigging tools are installed; otherwise, damage to components will occur.

NOTE

Procedure is same to remove pilot's or copilot's rigging fixture, stick yoke, pedal pin, and thrust pin. Copilot's rigging tools are shown here.



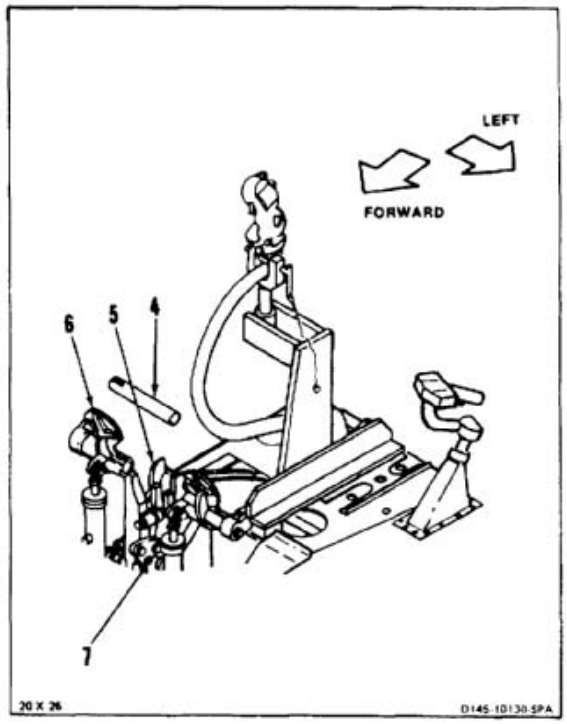
REMOVE THRUST RIG PIN

1. Remove thrust rig pin (1) from hole (2) of copilot's cockpit assembly (3).

11-23 REMOVE COCKPIT RIGGING FIXTURE, STICK YOKE, PEDAL PIN AND THRUST PIN (Continued) 11-23

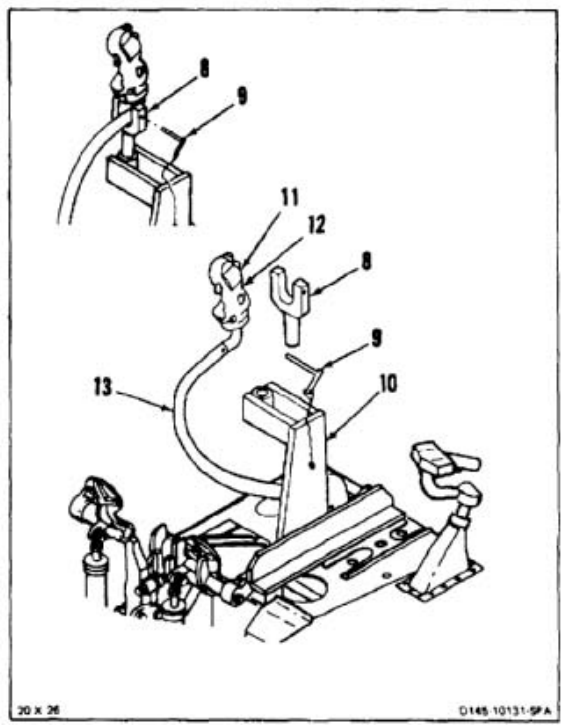
REMOVE PEDAL RIG PIN

2. Slide pedal rig pin (4) fully left. Press lever (5) and position pedal (6) forward. Slide pin fully right. Remove pin.
3. Pull pedal (6) aft to center adjustment hole (7). Release lever (5).



REMOVE CONTROL STICK YOKE

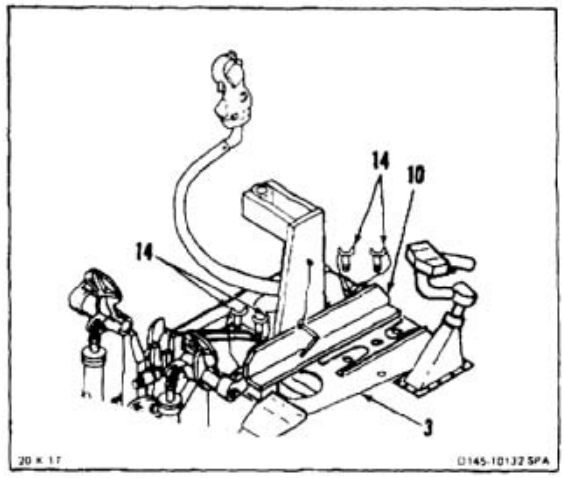
4. Hold control stick yoke (8), remove pin (9) from yoke, and lower yoke in fixture (10).
5. Press and hold CENTERING DEVICE RELEASE switch (11) on control stick grip (12). Move stick (13) forward about **4 inches**.
6. Slide yoke (8) up and out of fixture (10). Remove yoke.
7. Move stick (13) aft about **4 inches**. Release switch (11).



11-23 REMOVE COCKPIT RIGGING FIXTURE, STICK YOKE, PEDAL PIN AND THRUST PIN (Continued) 11-23

REMOVE RIGGING FIXTURE

8. Remove four bolts (14) from fixture (10). Remove fixture from assembly (3).



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Install pilot's or copilot's floor covers (Task 2-82).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-24 INSTALL COCKPIT RIGGING PITCH, ROLL, YAW OR ROLL/YAW TRAVEL QUADRANTS 11-24

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Cockpit Controls Rigging Tools (T39)

Materials:

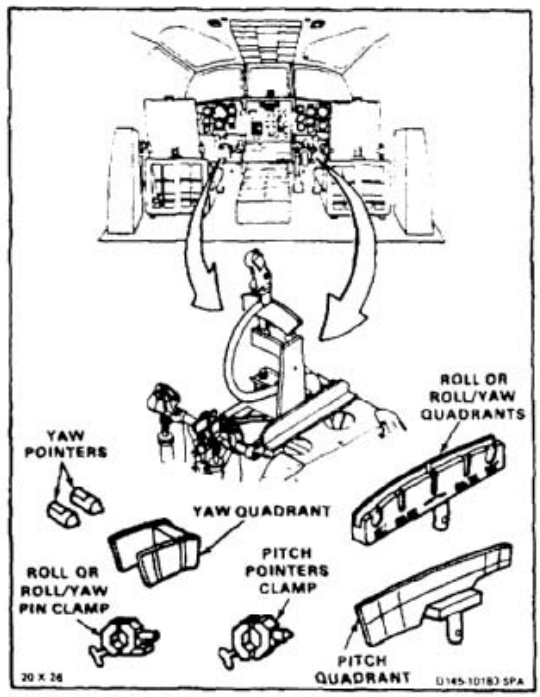
None

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Pilot's or Copilot's Rigging Fixture (T39) Installed (Task 11-22)

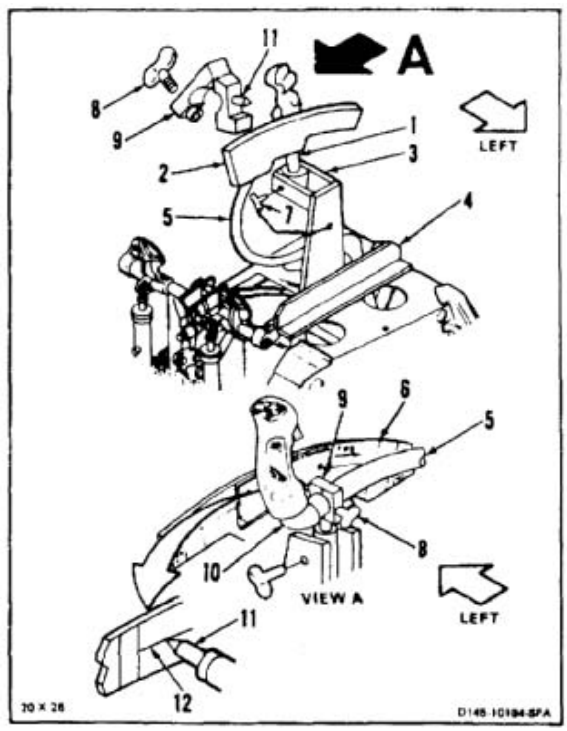


NOTE

Procedure is same to install pilot's or copilot's cockpit rigging pitch, roll, yaw, or roll/yaw travel quadrants. Copilot's rigging quadrants are shown here.

NOTE

Ensure that pitch travel quadrant has been modified/marked with "ADCN3". Do not use unmodified/unmarked pitch travel quadrant. Contact the local AMCOM LAR for rework procedures.



INSTALL PITCH TRAVEL QUADRANT

1. Position rod (1) of pitch travel quadrant (2) in hole (3) of fixture (4) on left of stick (5) with marked surface (6) to left.
2. Align holes of fixture (4) and rod (1). Install pin (7) in fixture.

3. Remove bolt (8) of pointer clamp (9). Open clamp and position on stick (5) touching elbow (10).
4. Align pointer (11) with line (12) on surface (6).
5. Install bolt (8) in clamp (9). Tighten bolt.

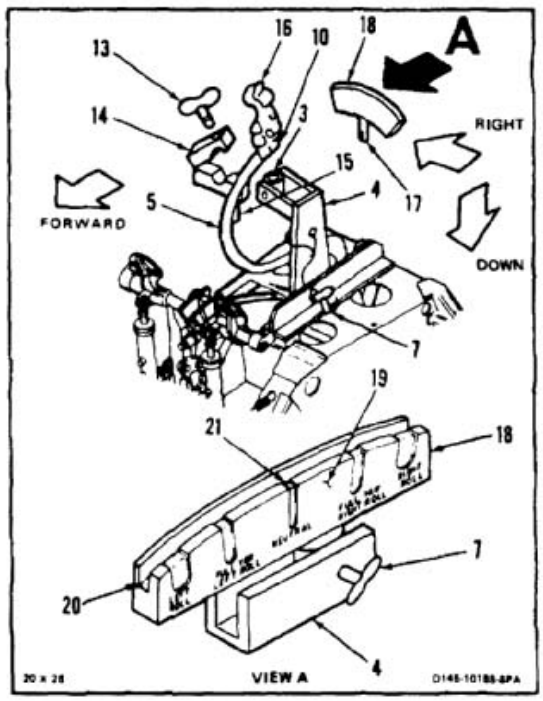
INSPECT

INSTALL ROLL OR ROLL/YAW TRAVEL QUADRANT

NOTE

Procedure is same to install roll or roll/yaw travel quadrants. Roll quadrant is shown here.

6. Remove pitch travel quadrant (Task 11-25).
7. Remove bolt (13) of clamp (14). Open clamp and position on stick (5) touching elbow (10) with pin (15) right.
8. Install bolt (13) in clamp (14) loosely.
9. Press CENTERING DEVICE RELEASE switch (16). Move stick (5) forward about **4 inches**. Release switch.
10. Position rod (17) of roll travel quadrant (18) in hole (3) of fixture (4) with marked surface (19) aft.
11. Align holes of fixture (4) and rod (17). Install pin (7) in fixture.
12. Press switch (16). Move stick (5) aft until pin (15) aligns with slot (20) in quadrant (18).
13. Turn clamp (14) to position pin (15) in slot (20) of quadrant (18). Align with NEUTRAL slot (21). Release switch (16), then tighten bolt (13) of clamp (14).



INSPECT

INSTALL YAW TRAVEL QUADRANT

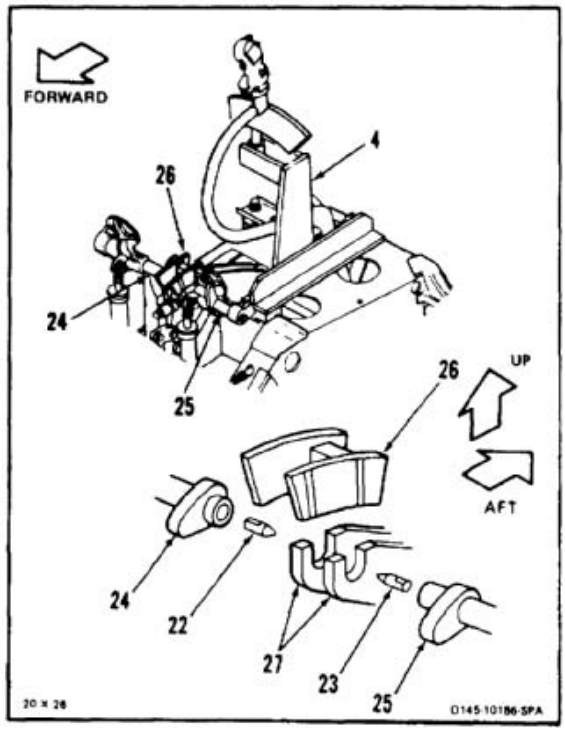
14. Install two pointers (22 and 23) at inboard ends of pedal tubes (24 and 25).

15. Install yaw travel quadrant (26) in lugs (27) of fixture (4), with NEUTRAL up and aft.

INSPECT

FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.



END OF TASK

11-25 REMOVE COCKPIT RIGGING PITCH, ROLL, YAW, OR ROLL/YAW TRAVEL QUADRANTS 11-25

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

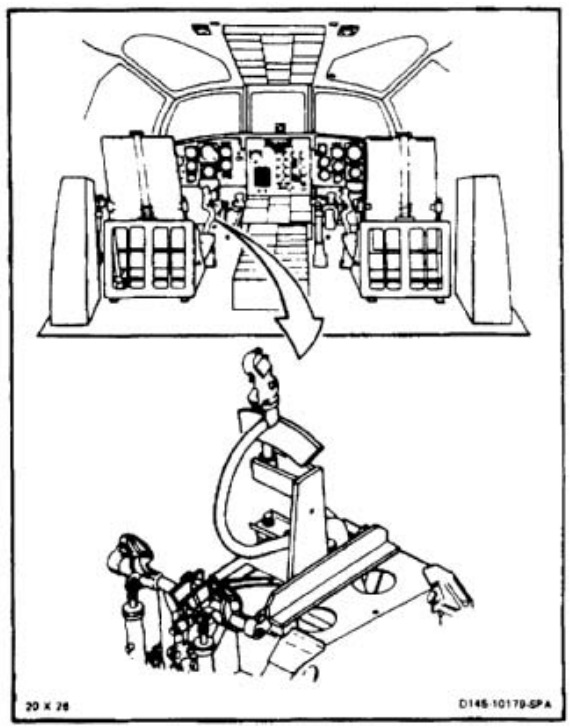
None

Personnel Required:

Medium Helicopter Repairer
Inspector

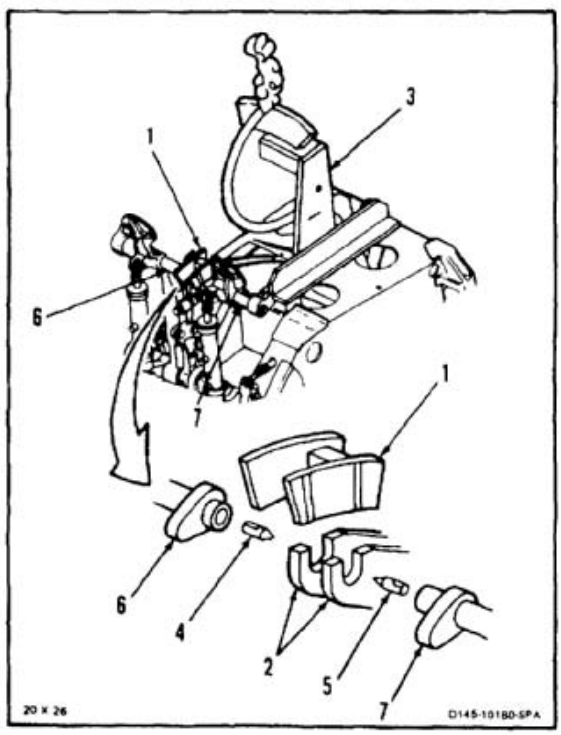
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On



NOTE

Procedure is same to remove pilot's or copilot's cockpit rigging pitch, roll, yaw or roll/yaw travel quadrants. Copilot's rigging quadrants are shown here.



REMOVE YAW TRAVEL QUADRANT

1. Lift and remove yaw travel quadrant (1) from lugs (2) of fixture (3).
2. Slide two pointers (4 and 5) inboard from pedal tubes (6 and 7). Remove pointers.

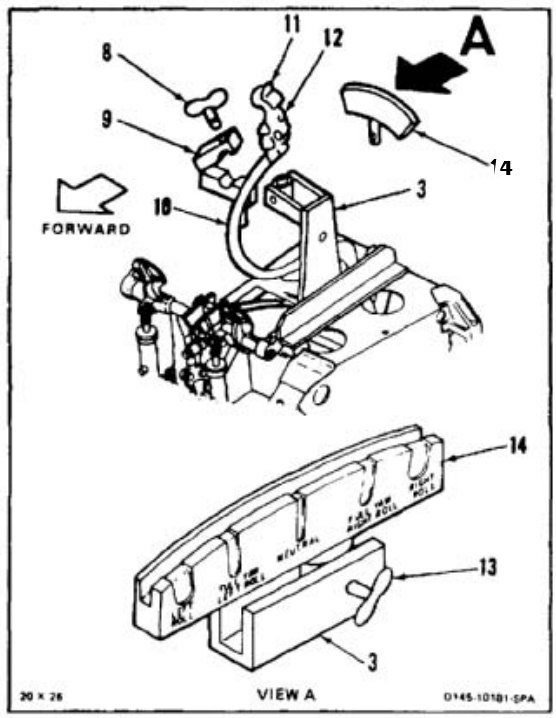
11-25 REMOVE COCKPIT RIGGING PITCH, ROLL, YAW, OR ROLL/YAW TRAVEL QUADRANTS (Continued) 11-25

REMOVE ROLL OR ROLL/YAW TRAVEL QUADRANT

NOTE

Procedure is same to remove roll or roll/yaw travel quadrants. Roll quadrant is shown here.

3. Remove bolt (8) from clamp (9). Turn clamp **90°**. Remove clamp from stick (10).
4. Install bolt (8) in clamp (9).
5. Press CENTERING DEVICE RELEASE switch (11) of grip (12). Move stick (10) forward about **4 inches**. Release switch.
6. Remove pin (13) from fixture (3).
7. Lift and remove roll quadrant (14) from fixture (3).
8. Press switch (11). Position stick (10) at neutral. Release switch.



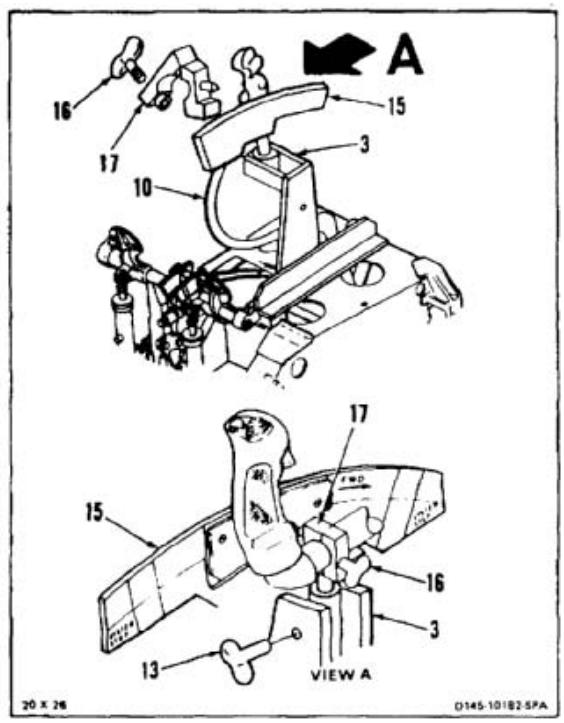
REMOVE PITCH TRAVEL QUADRANT

9. Remove pin (13) from fixture (3).
10. Lift and remove pitch travel quadrant (15) from fixture (3).
11. Remove bolt (16) from clamp (17). Remove clamp from stick (10).

INSPECT

FOLLOW-ON MAINTENANCE:

Remove pilot's or copilot's rigging fixture (T39) (Task 11-23).
Remove servocylinder safety block (T31) (Task 11-29).
Remove hydraulic power.
Remove electrical power.
Install pilot's or copilot's floor panels (Task 2-82).



END OF TASK

11-26 INSTALL DASH ACTUATOR DUMMY LINK 11-26

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dummy Link (T42)

Materials:

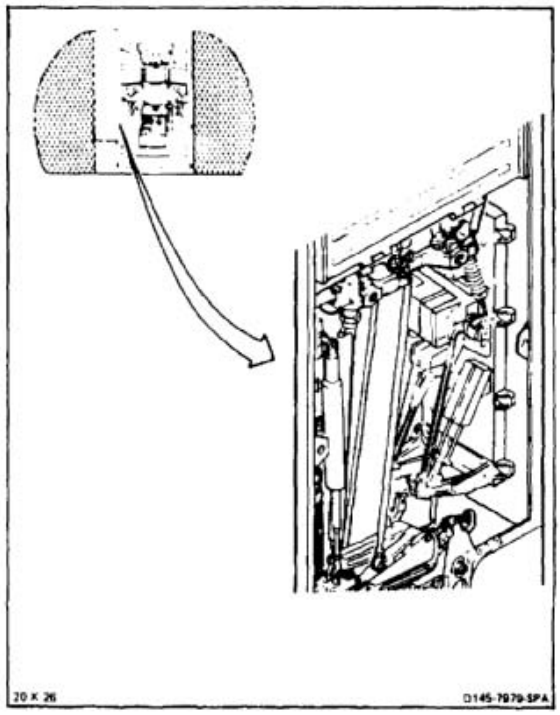
None

Personnel Required:

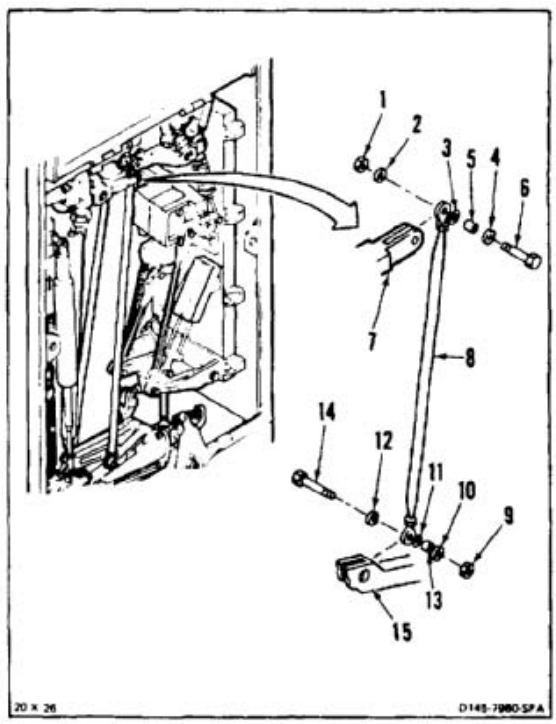
Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
DASH Actuator Removed (Task 11-163)



1. Remove nut (1), three washers (2, 3, and 4), bushing (5), and bolt (6) from ILCA bellcrank (7).
2. Position dummy link (T42) (8) in bellcrank (7). Install bolt (6), three washers (4, 3, and 2), bushing (5), and nut (1).
3. Remove nut (9), three washers (10, 11, and 12), bushing (13), and bolt (14) from pitch transfer bellcrank (15).
4. Position dummy link (T42) (8) in bellcrank (15). Install bolt (14), three washers (12, 11, and 10), and nut (9).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-27 REMOVE DASH ACTUATOR DUMMY LINK 11-27

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

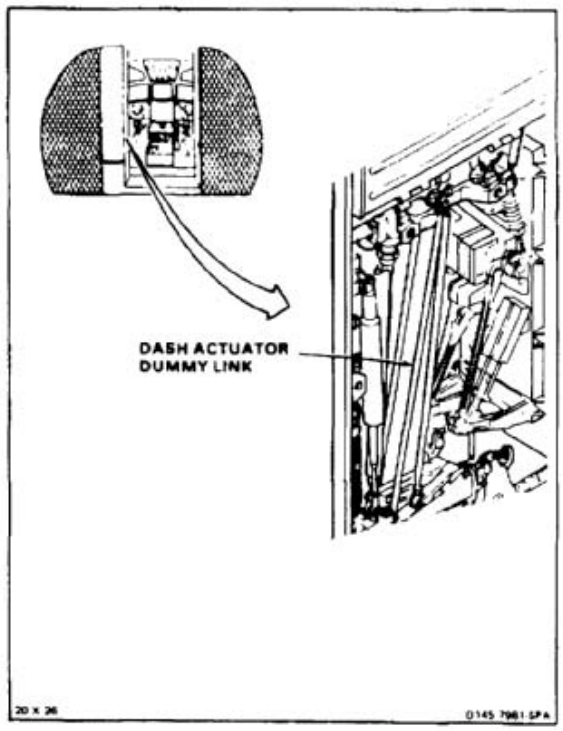
None

Personnel Required:

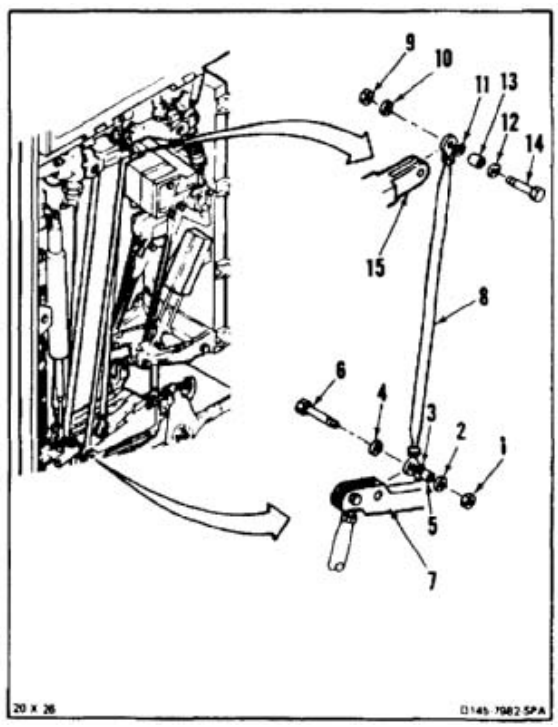
Medium Helicopter Repairer

Equipment Conditions:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off



1. Remove nut (1), three washers (2, 3, and 4), bushing (5), and bolt (6) from pitch transfer bellcrank (7). Disconnect dummy link (T42) (8) from bellcrank.
2. Install bolt (6), three washers (4, 3, and 2), and nut (1) loosely in bellcrank (7).
3. Remove nut (9), three washers (10, 11, and 12), bushing (13), and bolt (14) from ILCA bellcrank (15). Remove dummy link (T42) (8).
4. Install bolt (14), three washers (12, 11, and 10), and nut (9) loosely in bellcrank (15).



FOLLOW-ON MAINTENANCE:

Install DASH actuator (Task 11-164).

END OF TASK

11-28 INSTALL SERVOCYLINDER SAFETY BLOCKS 11-28

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Safety Blocks (T31) (4)

Materials:

None

Personnel Required:

CH-47 Helicopter Repairer (2)
Inspector

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Copilot's Control Stick Positioned at Neutral (Task 11-33)
Copilot's Yaw Pedals Positioned at Neutral (Task 11-33)
AFCS SYSTEM SEL Switch Set to OFF
Forward and Aft Work Platforms Open (Task 2-2)

General Safety Instructions:

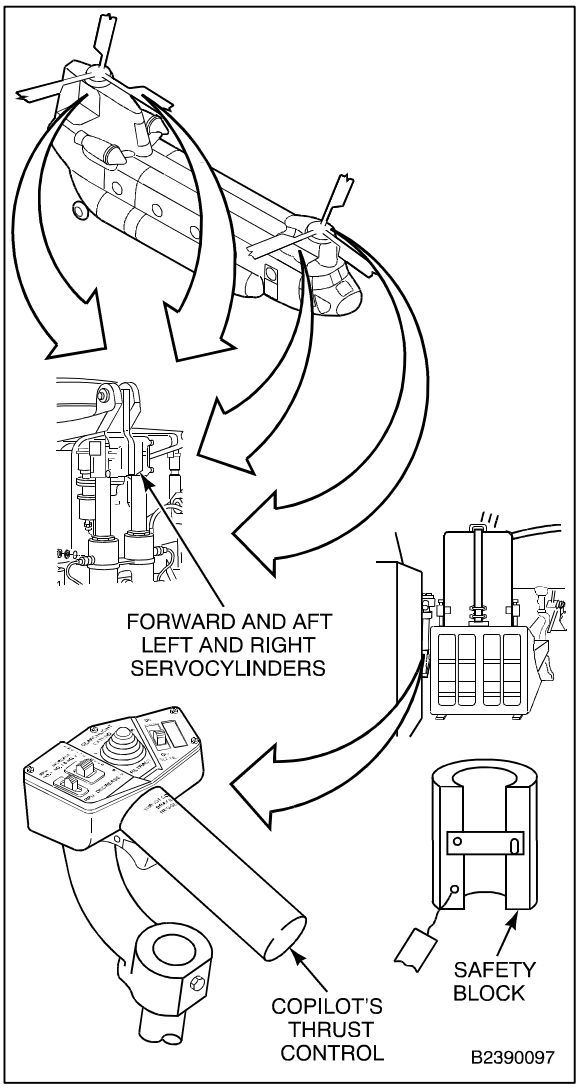
WARNING

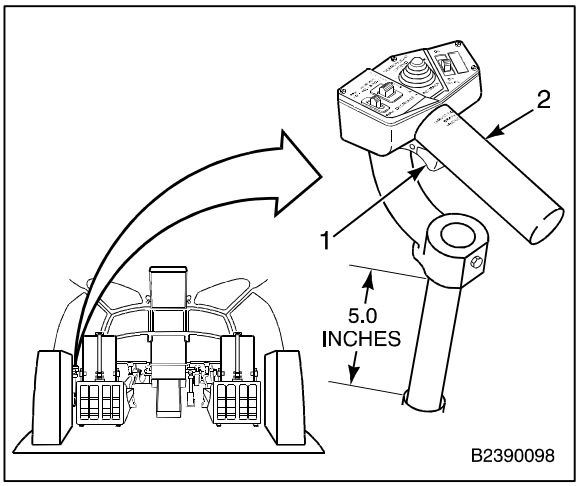
Severe rotor head damage can result when installing safety blocks when any main rotor blade has been removed if lead lag dampner is installed. Remove lead lag dampner prior to installing blocks if main rotor blade is removed or secure dampner to ensure no damage will result.

CAUTION

Prior to installation of servocylinder safety blocks, measure the blocks. If servocylinder blocks are **6.0 inches** in length, contact your local AMCOM Logistic Assistance Representative (LAR) for assistance/instructions. Actuator blocks are to be **5.0 inches** in length to preclude the possibility of the upper boost actuator creeping up during static maintenance conditions.

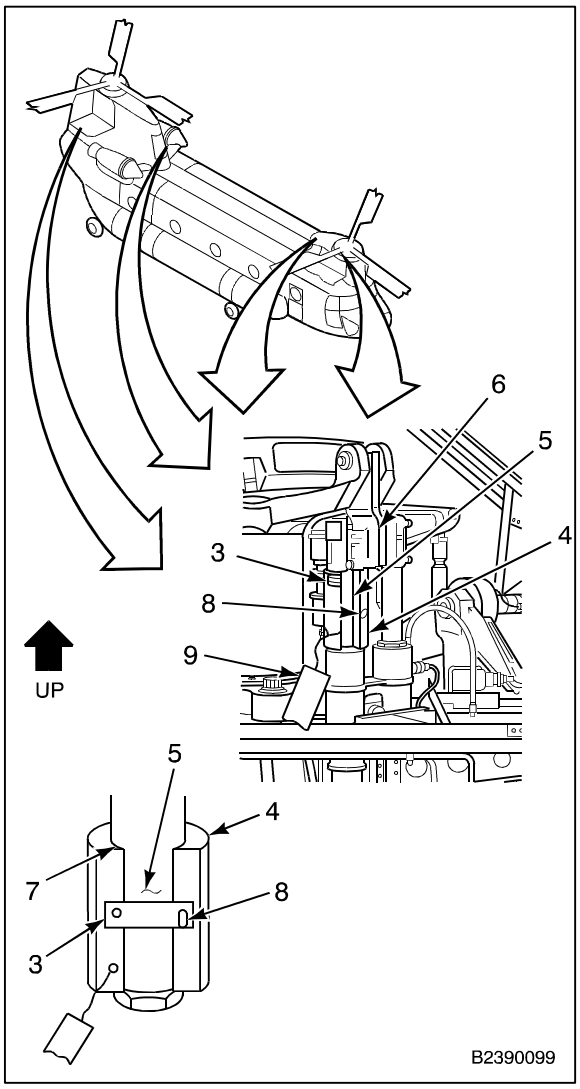
1. Working in cockpit, press copilot's THRUST CONT BRAKE TRIGGER switch (1). Pull control grip (2) up about **5 inches**. Release trigger switch.





2. Working from left forward work platform, rotate latch (3) of safety block (T31) (4) up.
3. Position block on piston (5) of servocylinder (6) with slot (7) of block outward and latch up.
4. Rotate latch (3) down on screw (8). Tighten screw.
5. Place streamer (9) on outside surface of aircraft.
6. Repeat steps 2 thru 5 for right forward servocylinder and aft right and left servocylinders.

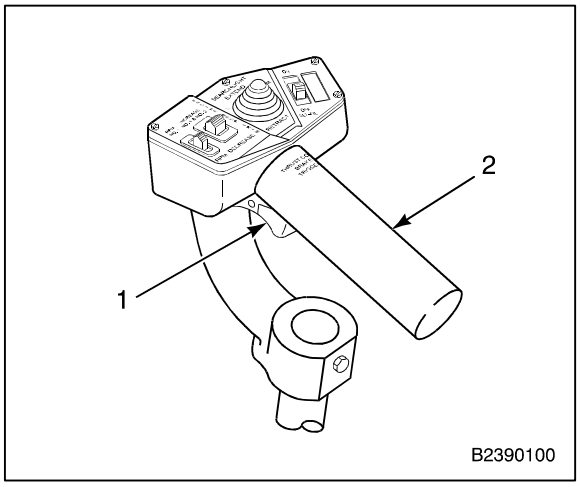
INSPECT



7. Have helper in cockpit press trigger switch (1) and lower grip (2) about **2 inches**. Release switch.

FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.



END OF TASK

11-29 REMOVE SERVOCYLINDER SAFETY BLOCKS 11-29

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

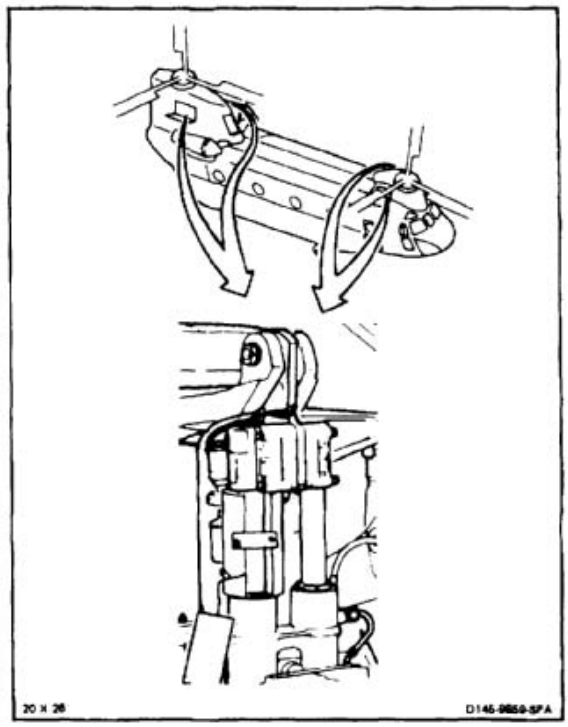
None

Personnel Required:

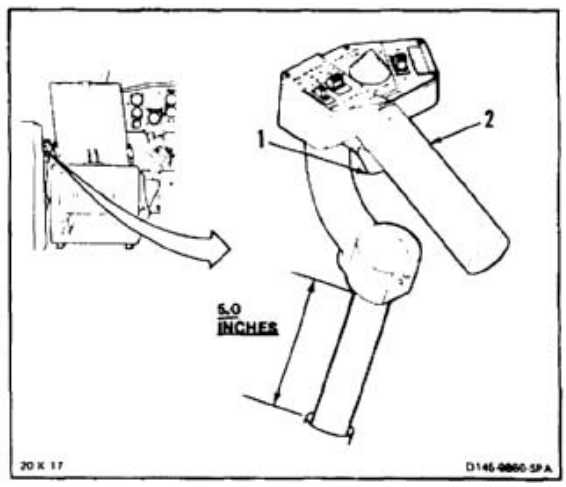
Medium Helicopter Repairer (2)

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Copilot's Control Stick Positioned at Neutral (Task 11-33)
Copilot's Yaw Pedals Positioned at Neutral (Task 11-33)
AFCS SYSTEM SEL Switch Set to OFF

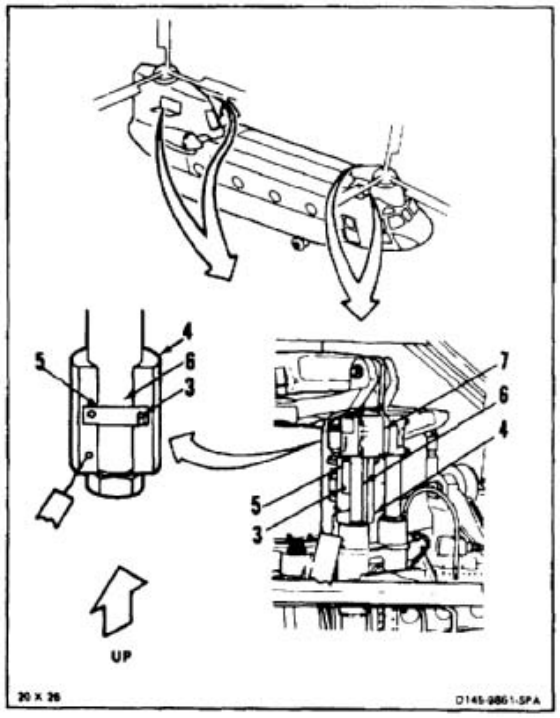


1. Working in cockpit, press copilot's THRUST CONT BRAKE TRIGGER switch (1). Pull control grip (2) up about **5 inches**. Release trigger switch.

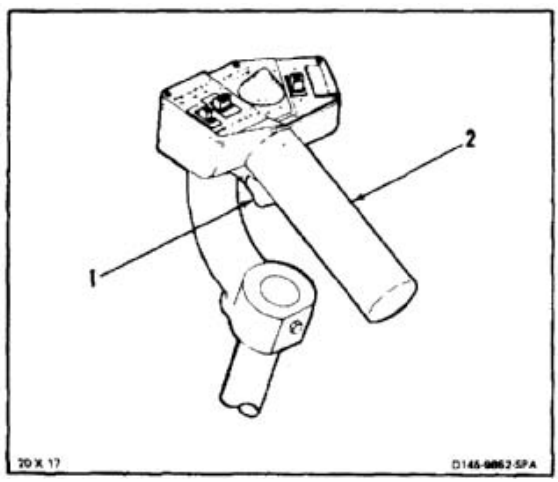


11-29 REMOVE SERVOCYLINDER SAFETY BLOCKS (Continued) 11-29

2. Working from left forward work platform, loosen screw (3) of safety block (T31) (4).
3. Rotate latch (5) up. Remove block (4) from piston (6) of servocylinder (7).
4. Repeat steps 2 and 3 for right forward servocylinder and aft right and left servocylinders.



5. Have helper in cockpit, press trigger switch (1) and lower grip (2) to detent position. Release switch.



FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.
Close forward and aft work platforms (Task 2-2).

END OF TASK

11-30 INSTALL ROTARY-WING BLADE LEAD/LAG TOOL 11-30

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Lead/Lag Tool (T72) (6)
Strap Wrench
Workstand

Materials:

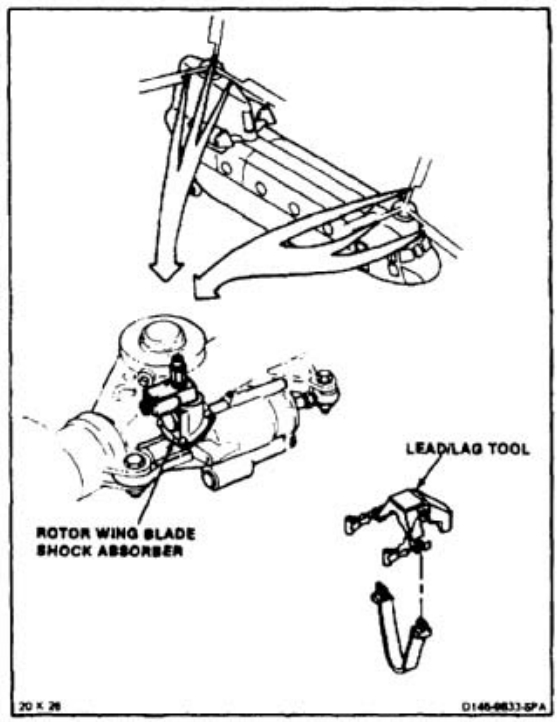
None

Personnel Required:

Medium Helicopter Repairer (3)
Inspector

Equipment Condition:

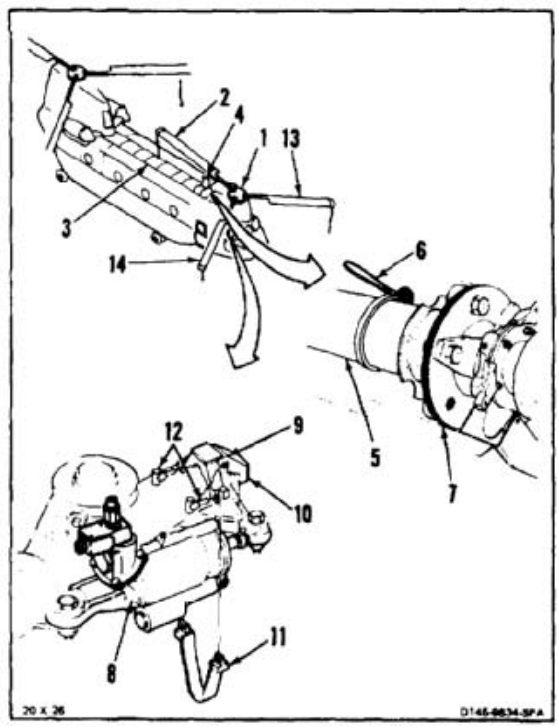
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Forward and Aft Work Platforms Open (Task 2-2)
Forward Tunnel Access Door Open (Task 2-2)
Rotary-Wing Blade Tie Downs Installed (Task 1-26)



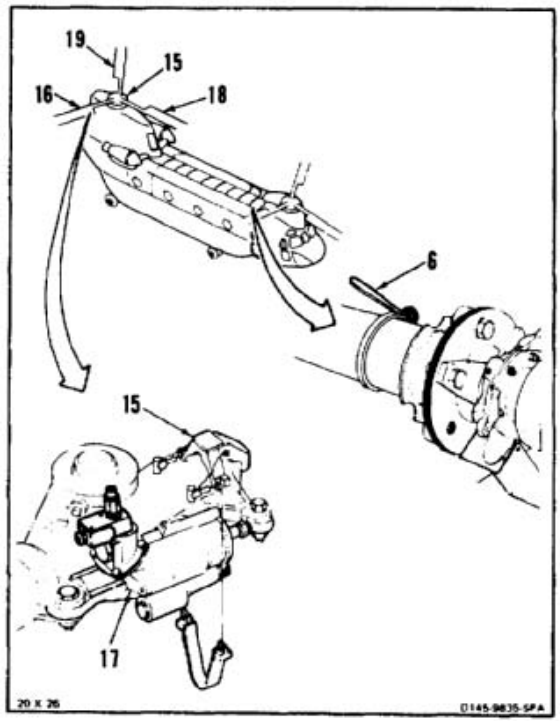
WARNING

Keep objects and personnel away from rotary-wing blades when blades are being turned. Blades may swing unexpectedly and can cause injury to personnel or damage to components.

1. Have helper turn forward rotor head (1) until rotary-wing blade (2) is over tunnel (3). Use tiedown.
2. Working from forward tunnel access (4), have helper hold drive shaft (5). Use strap wrench (6) positioned close to coupling (7).
3. Have helper move and hold blade (2) at about center of absorber (8) travel.
4. Position upper clamp (9) with arm (10) outward on absorber (8).
5. Position lower clamp (11) on lower side of absorber (8) to inward end of clamp (9). Install two pins (12) in clamps (9 and 11).
6. Release wrench (6).
7. Repeat steps 1 thru 6 for forward blades (13 and 14).



8. Have helper turn aft rotor head (15) until blade (16) is over right work platform.
9. Repeat step 2.
10. Have helper move and hold blade (16) at about center of absorber (17) travel. Use tiedown to move blade.
11. Repeat steps 4 and 5 for absorber (17).
12. Release wrench (6).
13. Repeat steps 6 thru 11 for aft blades (18 and 19).



INSPECT

FOLLOW-ON MAINTENANCE:

Close tunnel access door (Task 2-2).
Close forward and aft work platforms (Task 2-2).
Remove rotary-wing blade tiedowns (Task 1-26).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-31 REMOVE ROTARY-WING BLADE LEAD/LAG TOOL 11-31

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Strap Wrench
Workstand

Materials:

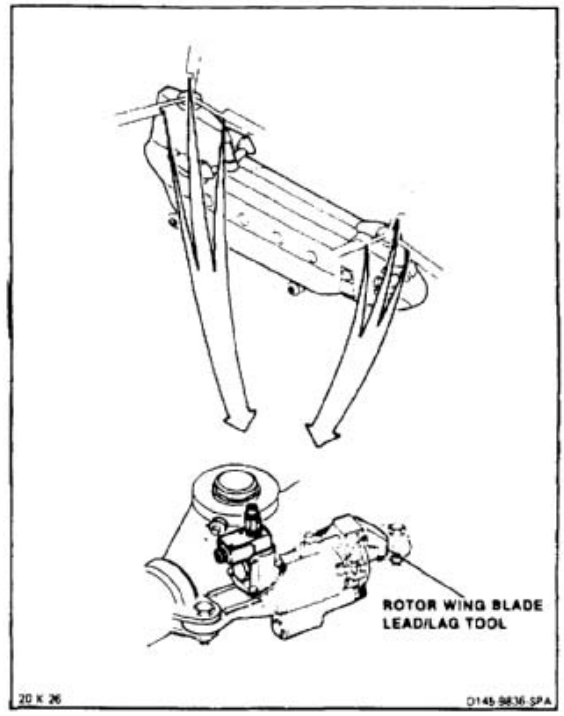
None

Personnel Required:

Medium Helicopter Repairer (3)

Equipment Condition:

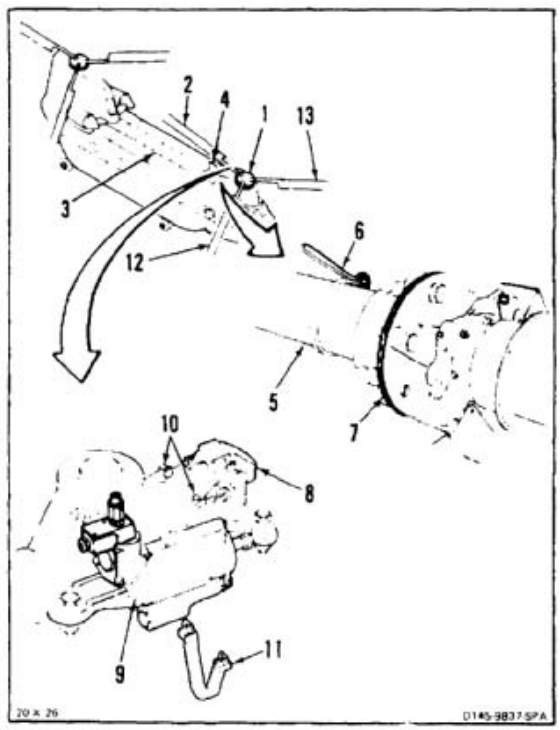
Forward and Aft Work Platforms Open Task 2-2)
Forward Tunnel Access Door Open (Task 2-2)
Rotary-Wing Blade Tiedowns Installed (Task 1-26)



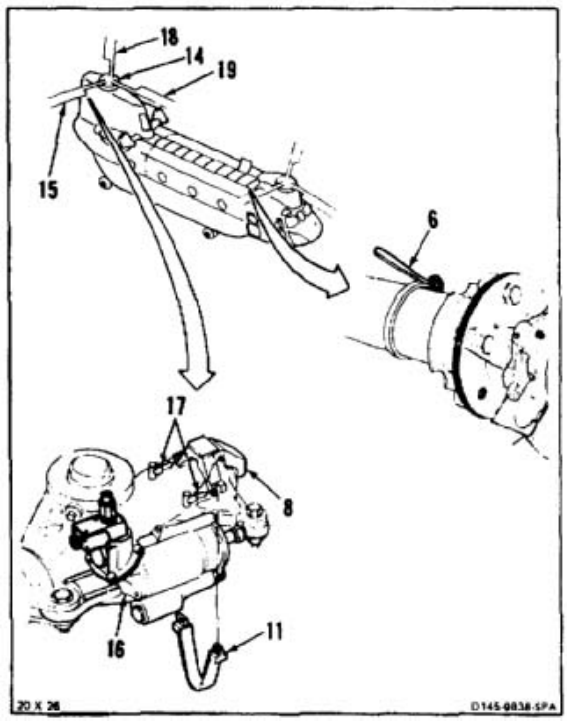
WARNING

Keep objects and personnel away from rotary-wing blades when blades are being turned. Blades may swing unexpectedly and can cause injury to personnel or damage to components.

1. Have helper turn forward rotor head (1) until rotary-wing blade (2) is over tunnel (3). Use tiedown.
2. Working from forward tunnel access (4), have helper hold drive shaft (5). Use strap wrench (6) positioned close to coupling (7).
3. Have helper move and hold blade (2) until lead/lag tool (T72) (8) on shock absorber (9) is loose.
4. Support tool (8). Remove two pins (10) from tool and remove lower clamp (11). Lift and remove tool from absorber (9).
5. Release wrench (6).
6. Repeat steps 1 thru 5 for forward blades (12 and 13).



7. Have helper turn aft rotor head (14) until blade (15) is over right work platform.
8. Repeat step 2.
9. Working from right work platform, have helper move blade (15) until tool (8) on absorber (16) is loose.
10. Support tool (8). Remove two pins (17) from tool and remove lower clamp (11). Lift and remove tool from absorber (16).
11. Release wrench (6).
12. Repeat steps 7 thru 11 for aft blades (18 and 19).



FOLLOW-ON MAINTENANCE:

Close tunnel access door (Task 2-2).
Close forward and aft work platforms (Task 2-2).
Remove rotary-wing blade tiedowns (Task 1-26).

END OF TASK

11-32 RIG POSITION CHECK 11-32

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Second Stage Rig Pin (T135)
Pedal Rig Pin (T127)
Scale, 12 Inch

Materials:

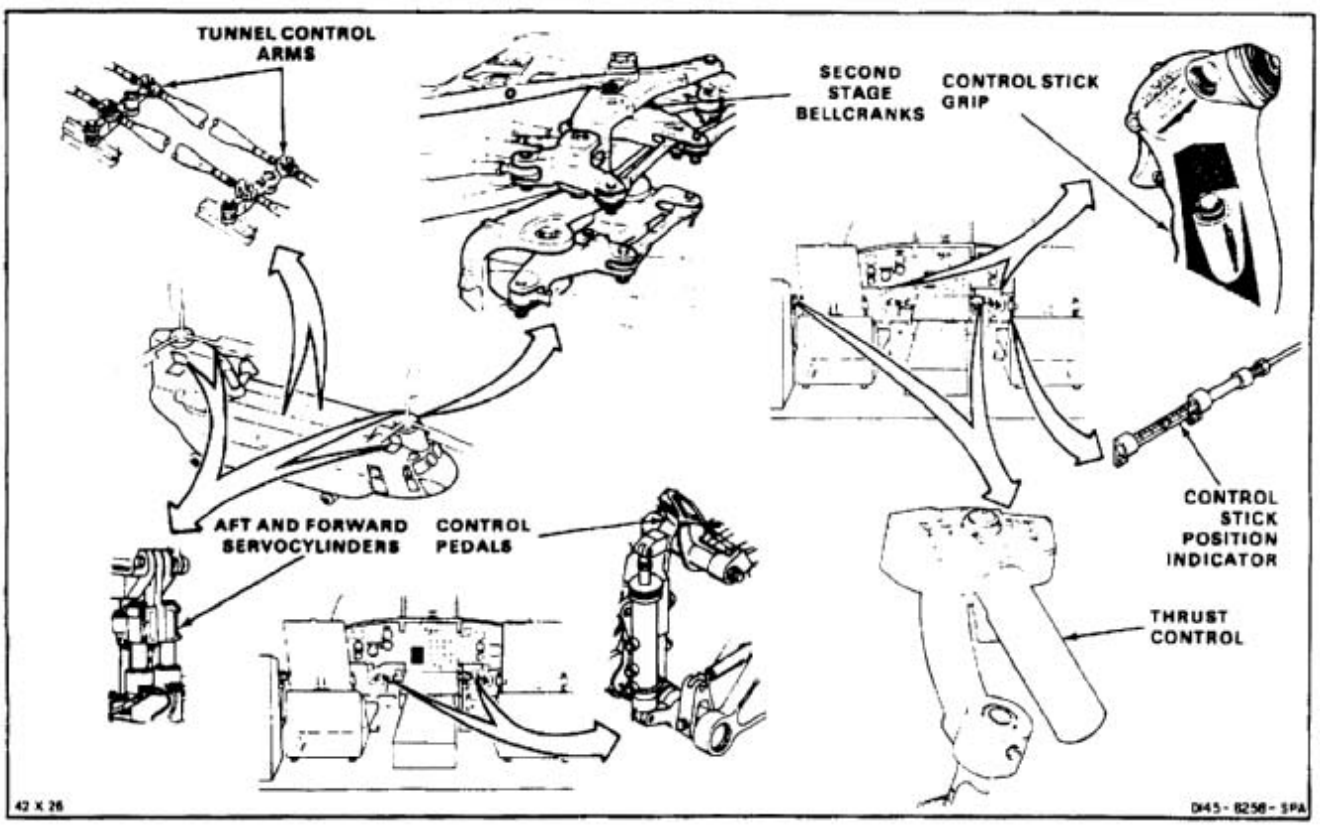
None

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

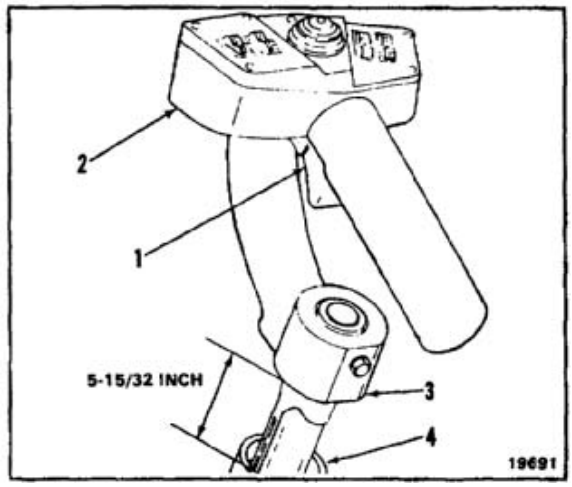
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Off
DASH Actuator Removed (Task 11-163)
DASH Dummy Link (T42) Installed (Task 11-26)
Forward and Aft Work Platforms Open (Task 2-2)
Tunnel Covers Open (Task 2-2)

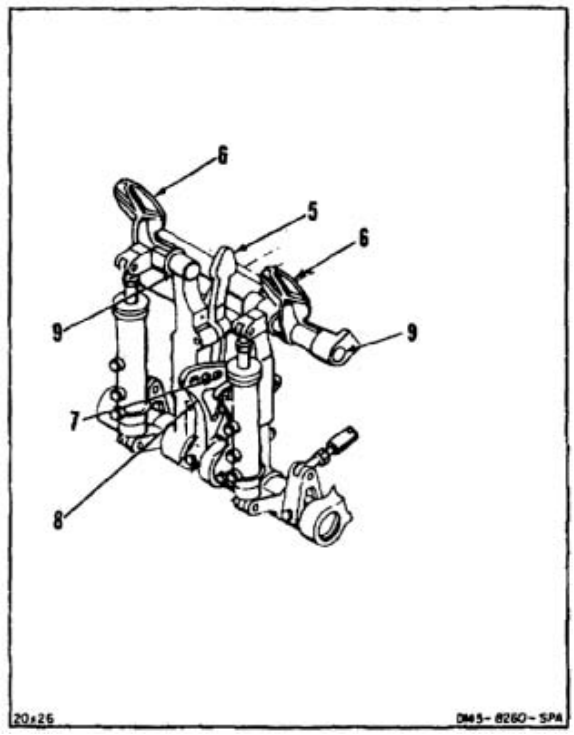


11-32 RIG POSITION CHECK (Continued) 11-32

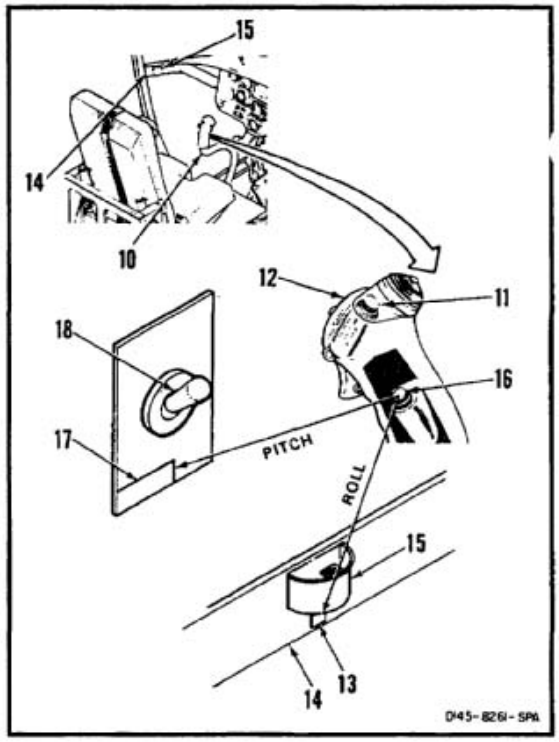
1. Working in cockpit, press THRUST CONT BRAKE TRIGGER switch (1) of thrust control (2). Raise control about **5-3/32 to 5-19/32 inches** measured between grip (3) and pivot block (4).



2. Press lever (5) of copilot's and pilot's control pedals (6). Adjust pedals to center hole (7) of plate (8). Release lever.
3. Align copilot's pedals (6) by sighting through support tubes (9).



4. Position copilot's control stick (10) at neutral as follows:
   a. Press CENTERING DEVICE RELEASE button (11) on grip (12).
   b. Set ROLL distance given on label (13) of side frame (14) under ashtray (15). Measure distance between center of FLARE DISP button (16) and mark on label (13).
   c. Set PITCH distance given on label (17) under VGI switch (18) of copilot's instrument panel. Measure distance between center of button (16) and mark on label (17).
   d. Release button (11).



INSPECT

CAUTION

Do not drive rig pin in rigging hole. Damage to component will result.

CAUTION

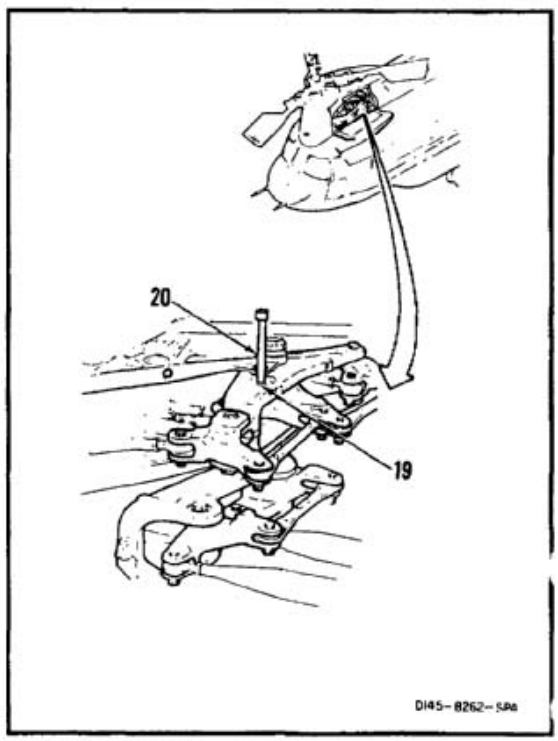
Do not lubricate rig pin. Lubrication will cause accumulation of dust at rigging hole.

CAUTION

Do not move cockpit controls with rig pin installed. Damage to pin and component will result.

CAUTION

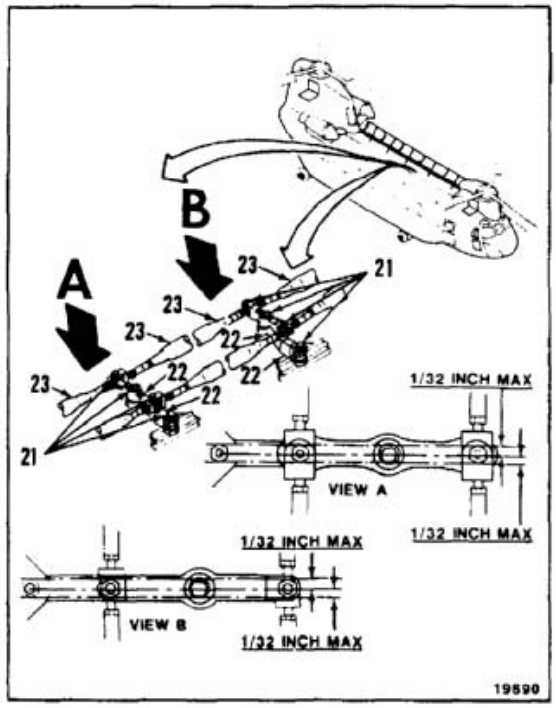
Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).



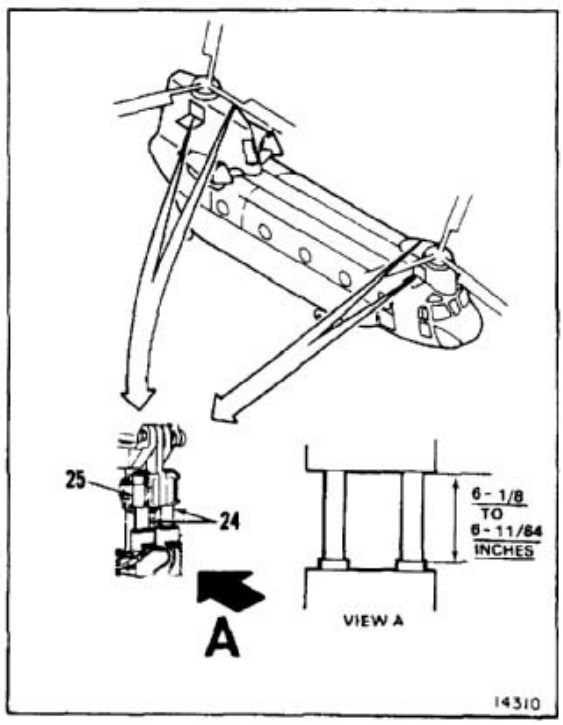
5. Working from forward left work platform, align second stage bellcrank rig pin hole (19). Have helper in cockpit move pedals, control stick or thrust control.
6. Install rig pin (T135) (20). Pin must slide freely.

INSPECT

7. Working outside on cabin roof, check that four pivot bolts (21) of arms (22) and connecting links (23) are aligned. Bolts must be aligned within **1/32 inch** of centerline.



8. Working from forward and aft work platforms, measure length of exposed piston (24) at four servocylinders (25). Piston length must be **6-1/8 to 6-11/64 inches**.

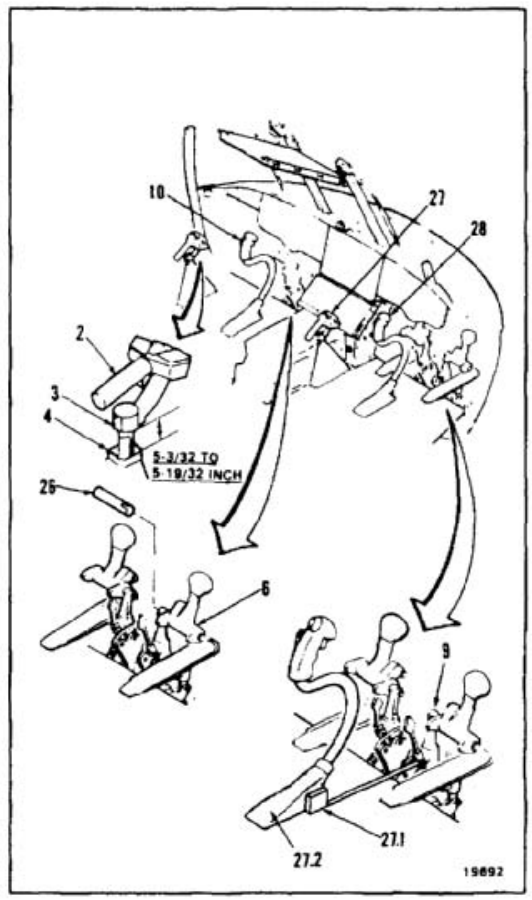


9. Working in the cockpit, install pedal rig pin (T127) (26) through copilot's pedals (6). With pedal rig pin (T127) installed and copilot's pedals aligned in the neutral position, use a tape measure (27.1) positioned at the forward edge of the base of the pilot's cyclic stick boot (27.2) and measure to the edge of right pedal post (9), repeat this procedure for the left pedal post. Pilot's pedals must be aligned within **1/8 inch** of each other.

10. Check position of copilots thrust control (2). Measure between grip (3) and pivot block (4). Distance must be **5-3/32 to 5-19/32 inches**.

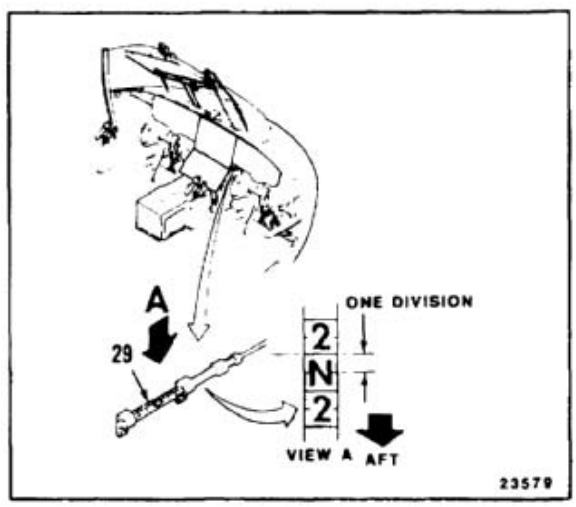
11. Check position of pilots thrust control (27). Control must be within **3/32 inch** of measurement for copilot's control (2).

12. Check position of copilot's cyclic stick (10) and pilot's cyclic stick (28). Pilot's cyclic stick must be about parallel to copilot's cyclic stick.



INSPECT

13. Check cyclic stick position indicator (29). Indicator must indicate 1 division forward of position N.



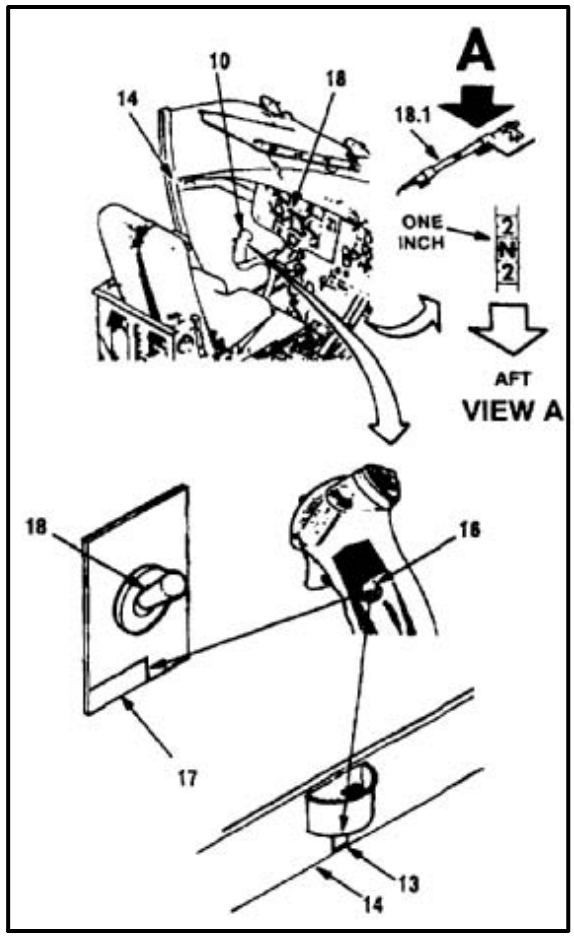
14. Check position of copilot's control stick (10) as follows:

    a. Measure distance between center of button (16) and mark on label (13) on side frame (14).

    b. Measure distance between center of button (16) and mark on label (17) under VGI switch (18).

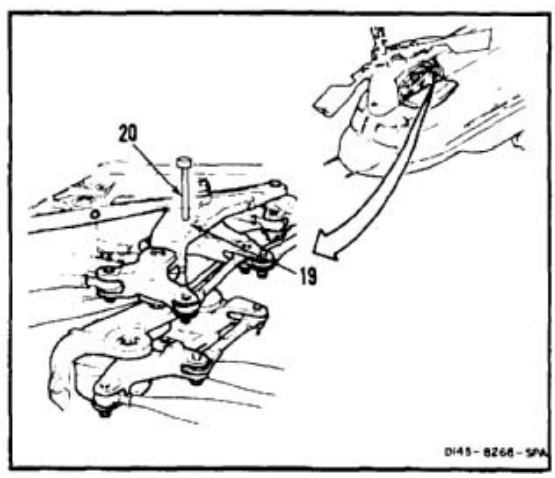
    c. Measurements from steps a and b shall be within **1/4 inch** of measurement given on labels (13 and 17).

    d. Stick position indicator (18.1) shall be **1.0 inch** forward of N.



INSPECT

15. Remove rig pin (20) from hole (19). Work from forward left work platform.



FOLLOW-ON MAINTENANCE:

Remove DASH dummy link (T42) (Task 11-27).
Install DASH actuator (Task 11-164).
Perform operational check of flight control system (TM 55-1520-240-T).
Perform interference check of flight control system (TM 55-1520-240-T).
Close forward and aft work platforms (Task 2-2).
Close tunnel covers (Task 2-2).

END OF TASK

11-33 NEUTRAL RIG CHECK 11-33

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Second Stage Rig Pin (T135)
First Stage Rig Pin (T44)
Protractor Assembly
Blade Angle Tool (T129)

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

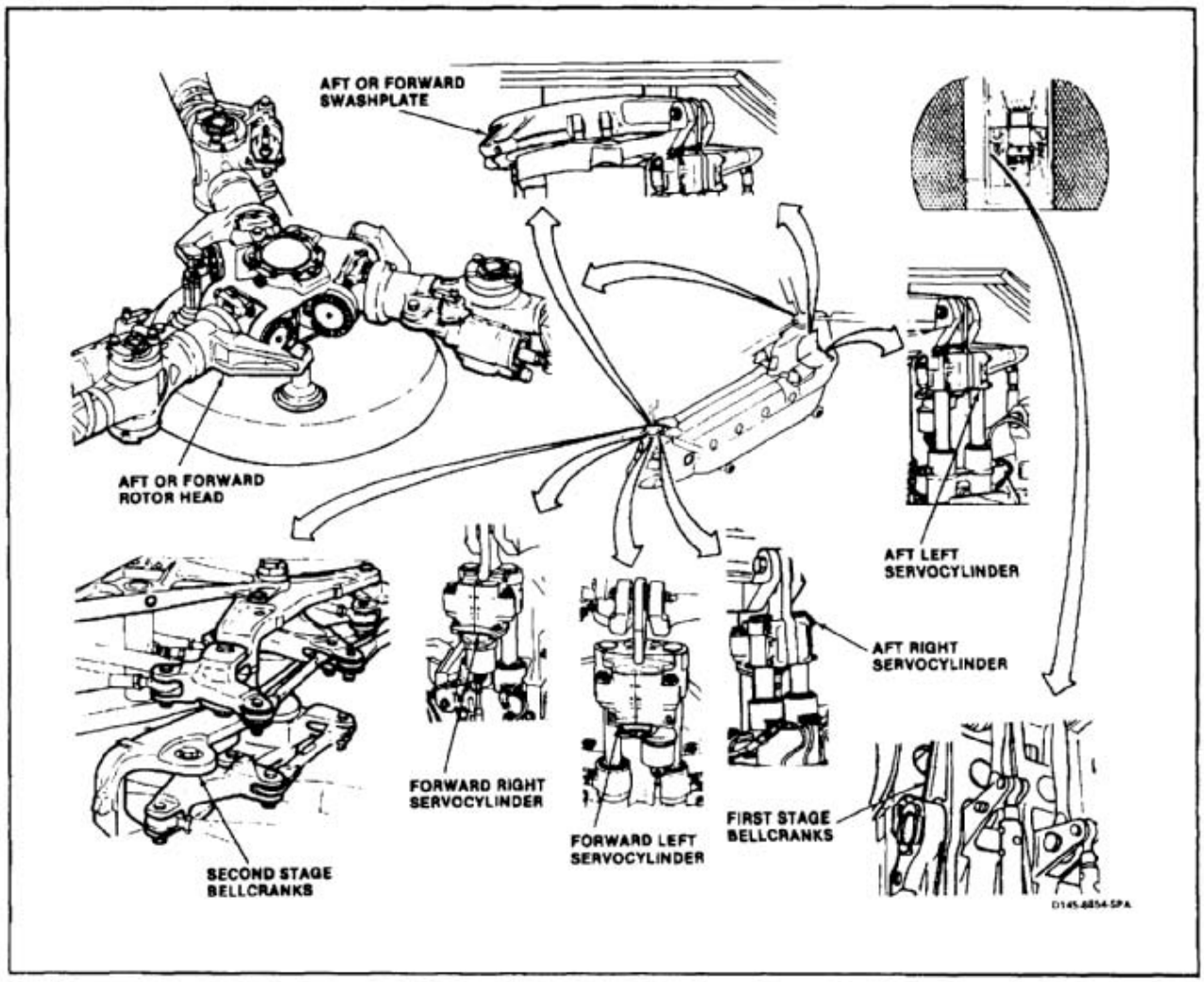
References:

Task 5-94
Task 5-114
Task 11-51
Task 11-54
Task 11-193
Task 11-210
Task 11-225

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Pilot's and Copilot's Seats Fully Aft
Servocylinder Safety Blocks Installed (T31) (Task 11-28)
Blade Lead-Lag Rigging Tool (T72) Installed (Task 11-30)
Pitch Link Positioned Over Forward Right Servocylinder (Task 1-26)
Pilot's and Copilot's Cockpit Control Assemblies Rigged (Task Step 6.)
Copilot's Rigging Tool (T39) Installed (Task 11-22)
DASH Actuator Removed (Task 11-163)
DASH Actuator Dummy Link Installed (T42) (Task 11-26)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Forward and Aft Work Platforms Open (Task 2-2)
Forward and Aft Fairings Open (Task 2-2)
Forward and Aft LCT Actuators Fully Retracted (TM 55-1520-240-T)
Rotary-Wing Blade Tie Down Lines installed (Task 1-26)
Forward and Aft Rotor Shaft Covers Removed (Task 5-8)

11-33 NEUTRAL RIG CHECK (Continued) 11-33



CAUTION

Cockpit rigging pins must not be removed; otherwise, damage to components will occur.

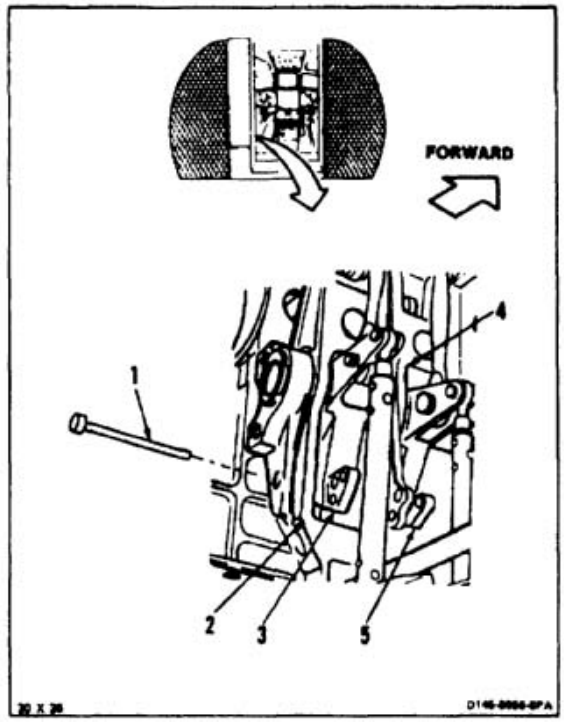
CAUTION

Do not use more than **20 pounds** of force to install rig pin; otherwise, damage to component will occur.

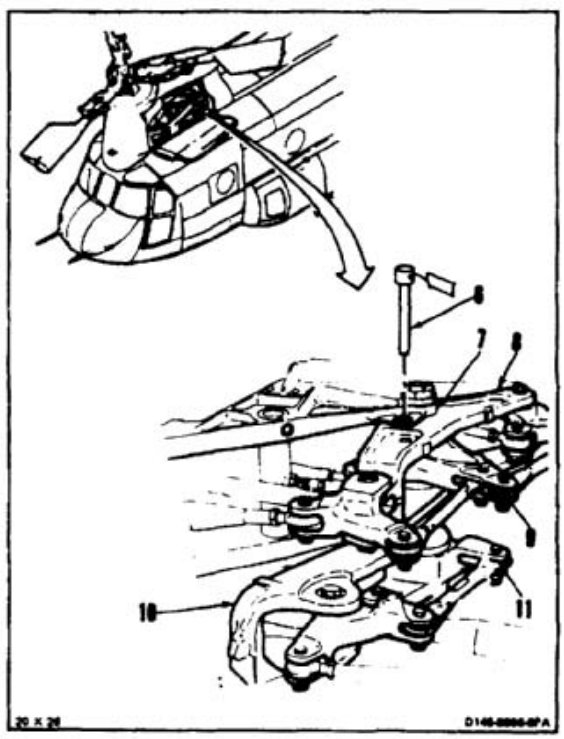
CAUTION

Do not lubricate rig pins. Lubrication will cause dirt to collect at rig pin hole.

1. Working in passageway, install first stage rig pin (T44) (1) in four bellcranks (2, 3, 4, and 5). If pin does not fit, rig first stage bellcranks (Task 11-51), then repeat step 1.
2. Remove pin (1) from bellcranks (2 and 5).



3. Working from forward left work platform, install second stage rig pin (T135) (6) through support (7) and four bellcranks (8, 9, 10, and 11). If pin does not fit, rig second stage bellcranks (Task 11-51), then repeat step 3.



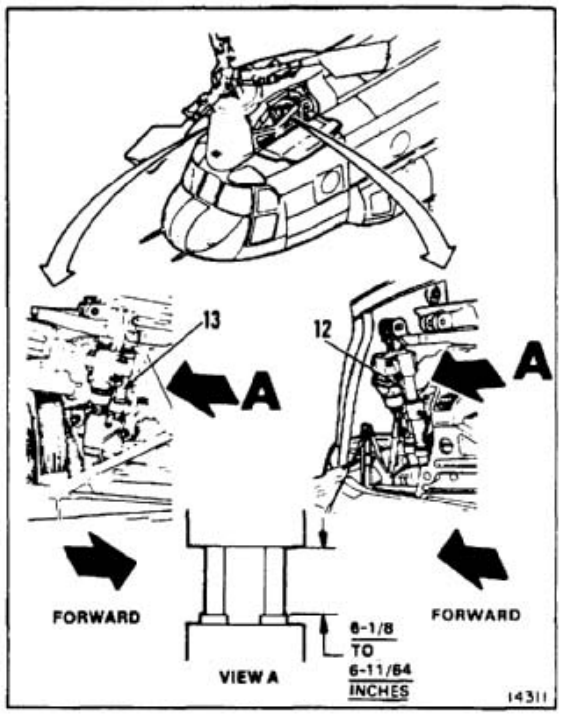
FORWARD SERVOCYLINDERS

NOTE

Due to accumulation of tolerances, and static blade loads, the accuracy of servocylinder piston measurements noted during rigging of the control system may not be repeatable on subsequent neutral rig checks.

Adjust control system rigging as near nominal as possible. Proper rigging is proven by a successful maintenance flight test. If the flight test indicates that control positions and autorotation rpm are within tolerance, subsequent dimensional rigging checks are not required. If the flight control system is disturbed dimensionally, the rigging shall be readjusted within tolerance.

Perform rigging as a continuous step by step process from the copilot position. Each adjustment effects other components, be precise.



4. Working from forward left work platform, measure and record length of left servocylinder pistons (12).
5. Working from forward right work platform, measure and record length of right servocylinder pistons (13).
6. Check lengths of piston (12 and 13) measured in steps 4 and 5. Length shall be **6-1/8 to 6-11/64 inches**. If not, rig forward servocylinders (Task 11-54). Repeat steps 4, 5, and 6.
7. Deleted.

AFT SERVOCYLINDERS

8. Working from aft left work platform, measure and record length of left servocylinder pistons (14).

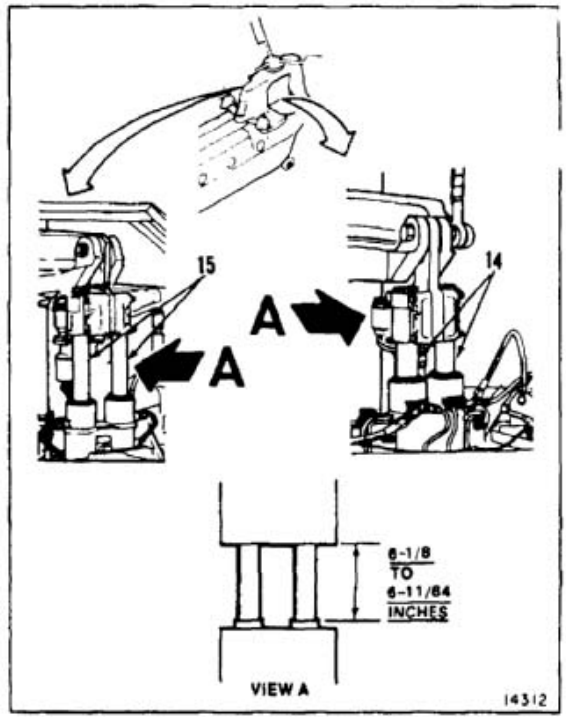
9. Working from aft right work platform, measure and record length of right servocylinder pistons (15).

10. Check pistons (14 and 15) lengths from steps 8 and 9. Length shall be **6-1/8 to 6-11/64 inches**.

11. Deleted.

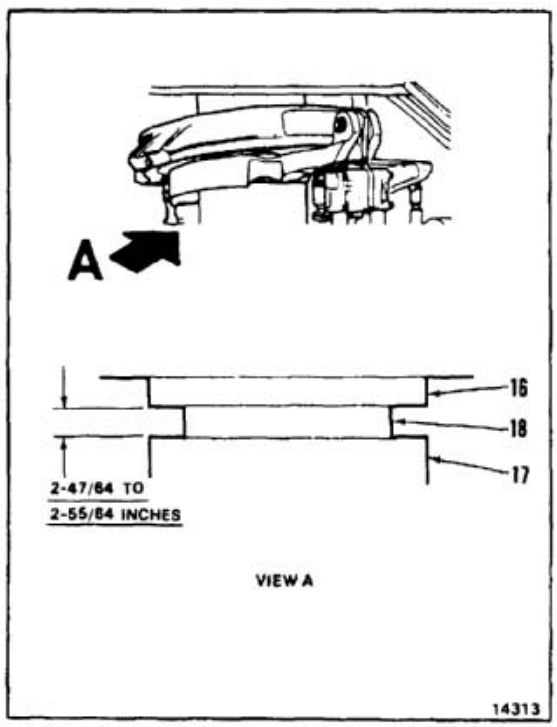
11.1. If length is not within limits of step 10, rig aft servocylinders (Task 11-54). Repeat steps 8 thru 11.1.

11.2. If length is not **3/64 inch** or less, adjust servocylinder connecting links (Task 11-193). Repeat steps 8 thru 11.2.



AFT FIXED SWASHPLATE

12. Measure distance between aft swashplate ball (16) and lower stop (17) of slider guide (18). Distance must be **2-47/64 to 2-55/64 inches**. If not, inspect swashplate ball and slider (Task 5-114).



CAUTION

Keep movement on aircraft to minimum; otherwise, false measurements may result.

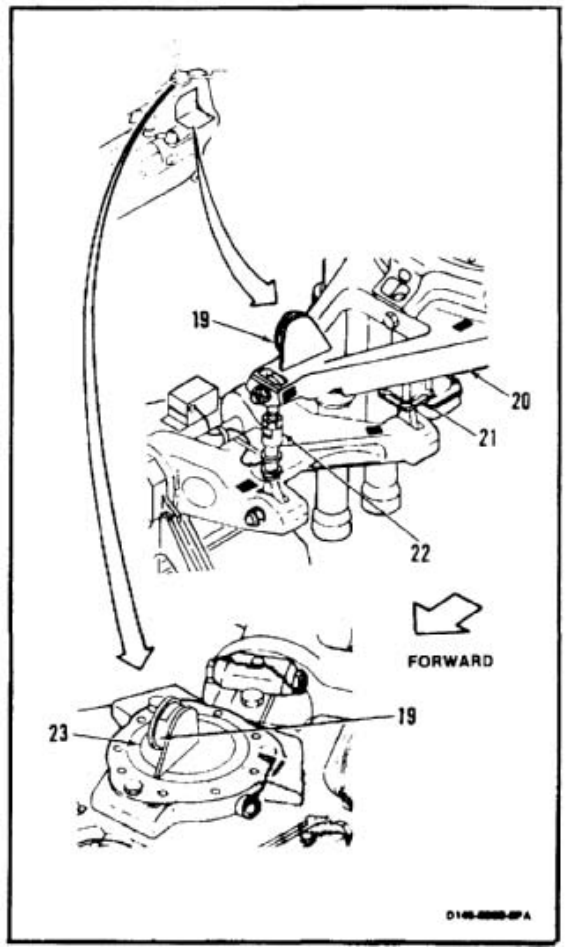
13. Working from aft left work platform, position protractor (19) on fixed swashplate (20). Align protractor with LCT actuator (21) and LCT connecting link (22). Measure and record angle of swashplate. Remove protractor.

NOTE

Make sure the protractor is not turned **180°** after angle is recorded for swashplate and moved to rotor shaft. Maintain same orientation when measuring rotor shaft.

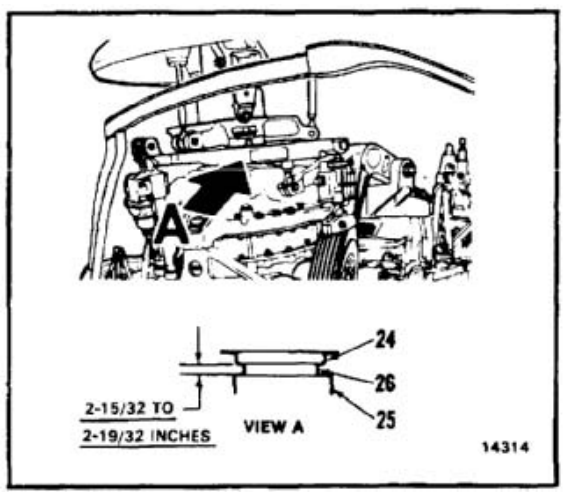
14. Position protractor (19) on top of rotor shaft (23). Align protractor with actuator (21) and link (22). Measure and record angle of rotor shaft. Remove protractor.

15. Check angles measured in steps 13 and 14. Step 13 angle must be less than step 14 angle. Subtract angle of step 13 from angle of step 14. Angle must be **2.6° to 3.0°**. If not, adjust LCT fixed connecting link (Task 11-225), then repeat steps 13, 14, and 15.



FORWARD FIXED SWASHPLATE

16. Working from forward left work platform, measure distance between forward swashplate ball (24) and lower stop (25) of slider guide (26). Distance must be **2-15/32 to 2-19/32 inches**. If not, inspect swashplate ball and slider (Task 5-114).



CAUTION

Keep movement on aircraft to minimum; otherwise, false measurements may result.

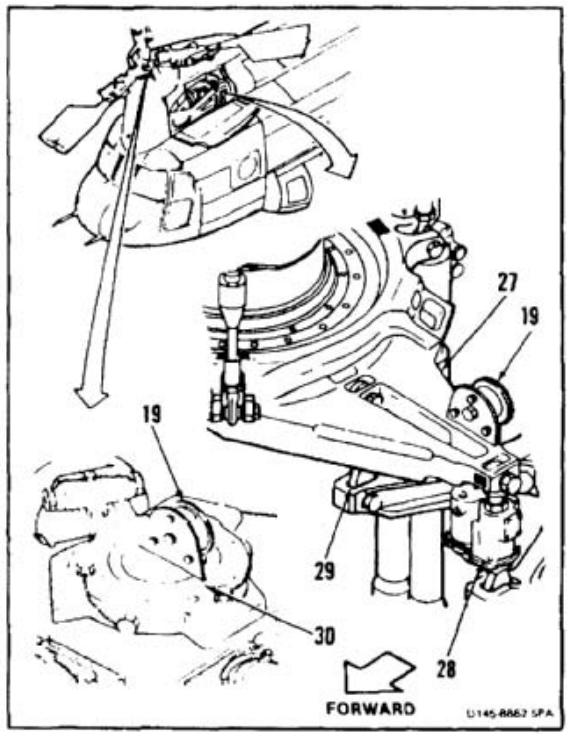
17. Position protractor (19) on fixed swashplate (27). Align protractor with LCT actuator (28) and LCT connecting link (29). Measure and record angle of swashplate. Remove protractor.

NOTE

Make sure the protractor is not turned **180°** after angle is recorded for swashplate and moved to rotor shaft. Maintain same orientation when measuring rotor shaft.

18. Position protractor (19) on top of rotor shaft (30). Align protractor with actuator (28) and link (29). Measure and record angle of rotor shaft. Remove protractor.

19. Check angles measured in steps 17 and 18. Step 17 angle must be less than step 18 angle. Subtract angle of step 17 from angle of step 18. Angle must be **1.0° to 1.4°**. If not, adjust LCT fixed connecting link (Task 11-210), then repeat steps 17, 18, and 19.

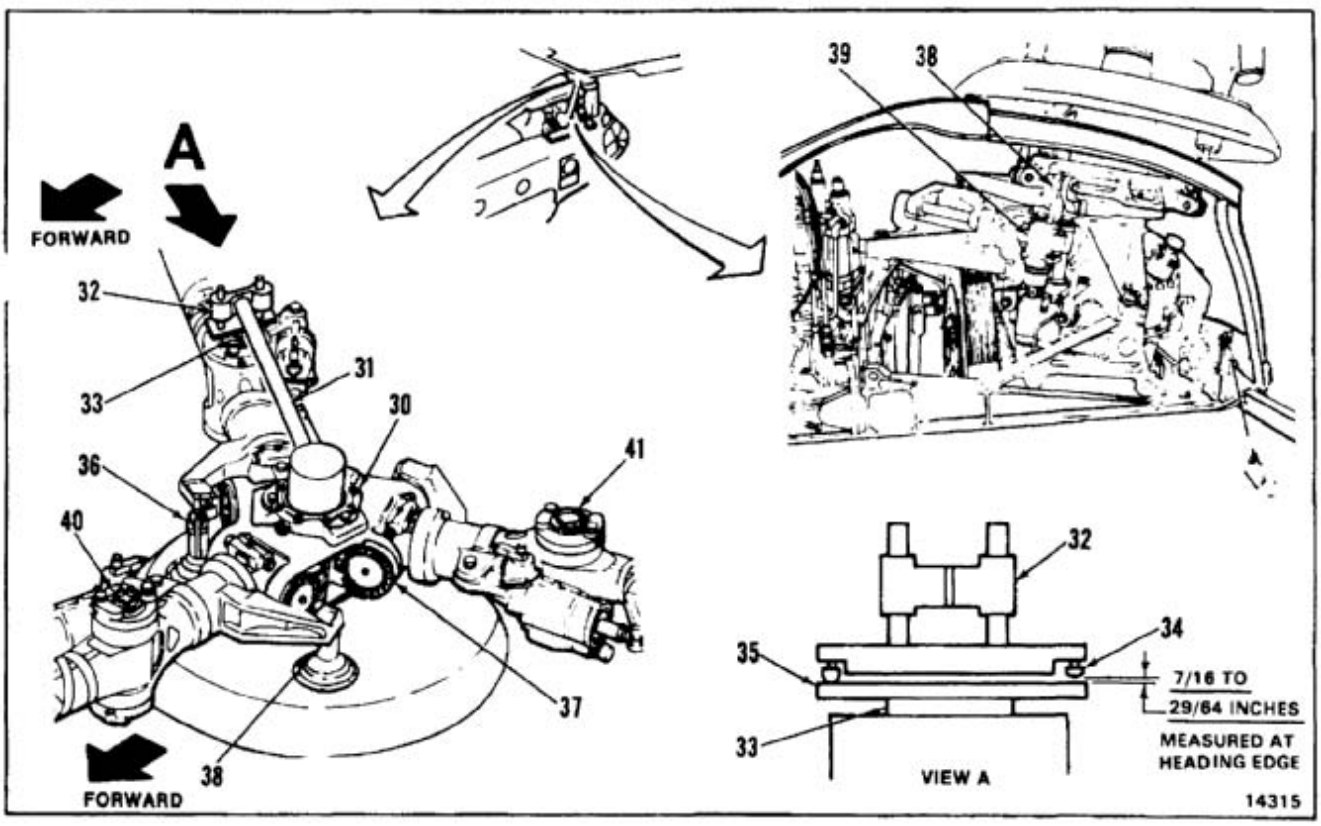


FORWARD ROTOR BLADE

NOTE

Rigging tool (T129) or protractor can be used to measure rotor blade angle. Using tool (T129), perform steps 20 thru 28. Using protractor, perform steps 29 thru 33.

20. Working from forward left work platform, install tool (31) on forward rotor shaft (30).
21. Install plate (32) on vertical pin (33).
22. Measure gap between ball (34) and plate (35) at leading edge. Gap must be **7/16 to 29/64 inch**. If not, adjust pitch link (36) (Task 5-94), then repeat step 22.
23. Remove tool (32) from pin (33).
24. Turn rotor hub (37) to position pitch link (38) above forward right servocylinder (39).
25. Install tool (32) on pin (40).
26. Repeat steps 22 thru 25 for vertical pins (40 and 41).
27. Remove tool (32) from pin (41).
28. Remove tool (31) from rotor shaft (30).



CAUTION

Keep movement on aircraft to minimum; otherwise, false measurements may result.

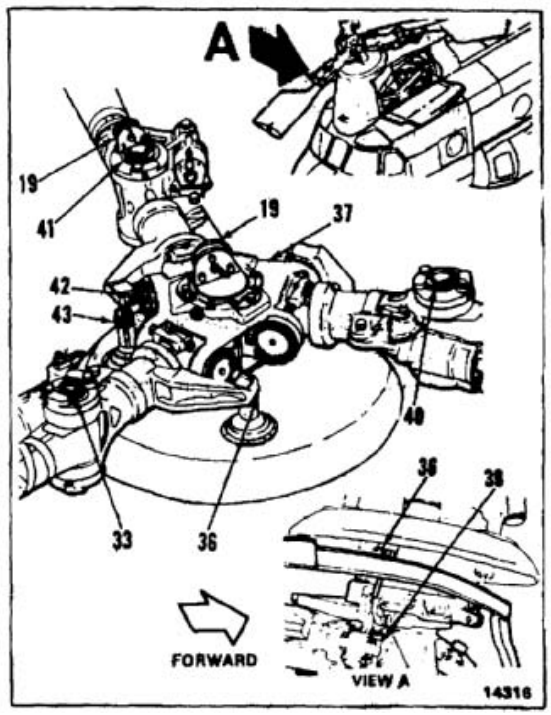
29. Working from forward left work platform, position protractor (19) on rotor hub (37) above and parallel to horizontal pin (42). Measure and record angle of hub. Remove protractor.

30. Position protractor (19) on vertical pin (41) parallel to pin (42). Measure and record angle of pin. Remove protractor.

31. Check angles measured in steps 29 and 30. Subtract angle of step 29 from angle of step 30. Angle must be **–3.4 to –3.7°**. If not, adjust pitch link (43) (Task 5-94) then repeat steps 29, 30, and 31.

32. Turn rotor hub (37). Position pitch link (36) above servocylinder (39).

33. Repeat steps 29 thru 32 for vertical pins (33 and 40).

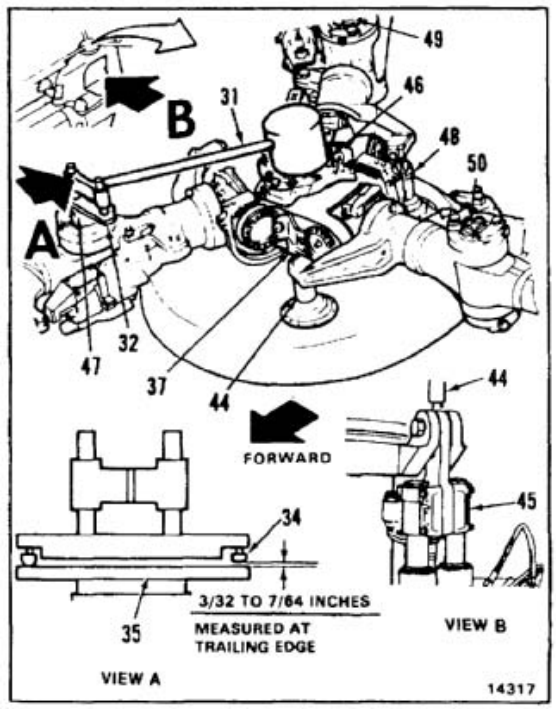


AFT ROTOR BLADE

NOTE

Rigging tool (T129) or protractor can be used to measure rotor blade angle. Using tool (T129), perform steps 34 thru 43. Using protractor, perform steps 44 thru 48.

34. Turn aft rotor hub (37). Position pitch link (44) above aft left servocylinder (45).
35. Working from aft left work platform, install tool (T129) (31) on aft rotor shaft (46).
36. Install plate (32) on vertical pin (47).
37. Measure gap between ball (34) and plate (35) at trailing edge. Gap must be **3/32 to 7/64 inch**. If not, adjust pitch link (44) (Task 5-94) then repeat step 37.
38. Remove tool (31) from pin (47).
39. Turn rotor hub (37) to position link (48) above servocylinder (45).
40. Install tool (32) on pin (49).
41. Repeat steps 37 thru 40 for vertical pins (49 and 50).
42. Remove tool (32) from pin (50).
43. Remove tool (31) from rotor shaft (46).



CAUTION

Keep movement on aircraft to minimum; otherwise, false measurements may result.

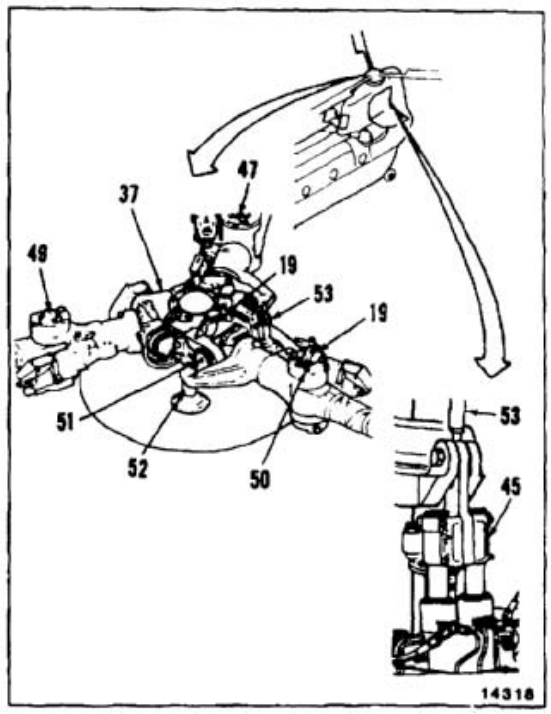
44. Working from aft left work platform, position protractor (19) on rotor hub (37) above and parallel to horizontal pin (51). Measure and record angle of hub. Remove protractor.

45. Position protractor (19) on vertical pin (50) parallel to pin (51). Measure and record angle of pin. Remove protractor.

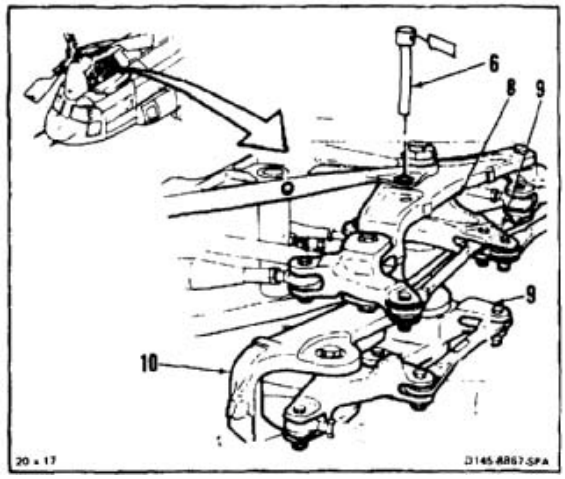
46. Check angles measured in steps 44 and 45. Subtract angle of step 44 from angle of step 45. Angle must be **–0.3° to –0.6°**. If not, adjust pitch link (52) (Task 5-94) then repeat steps 44, 45, and 46.

47. Turn rotor hub (37). Position pitch link (53) above servocylinder (45).

48. Repeat steps 44 thru 47 for vertical pins (47 and 49).



49. Working from forward left work platform, remove pin (6) from four bellcranks (8, 9, 10, and 11).



FOLLOW-ON MAINTENANCE:

Remove DASH actuator dummy link (Task 11-27).
Install DASH actuator (Task 11-164).
Install forward and aft rotor shaft covers (Task 5-9).
Remove blade lead-lag rigging tools (T72) (Task 11-31).
Remove copilot's rigging tool (T39) (Task 11-23).
Remove servocylinder safety blocks (T31) (Task 11-29).
Close forward and aft work platforms (Task 2-2).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Close forward and aft fairings (Task 2-2).
Remove electrical power.
Remove hydraulic power.
Perform ground track of blades (Task 5-140).
Perform maintenance test flight (TM 55-1520-240-MTF).
Adjust copilot's control position transducer (Tasks 11-176 and 11-177).

END OF TASK

11-34 ARTIFICIAL FEEL FORCES CHECK 11-34

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Scale, 0 to 10 Pounds
Dial Indicating Scale, 0 to 50 Pounds
Stop Watch

Materials:

Straps (E376)
Tape (E388)

Personnel Required:

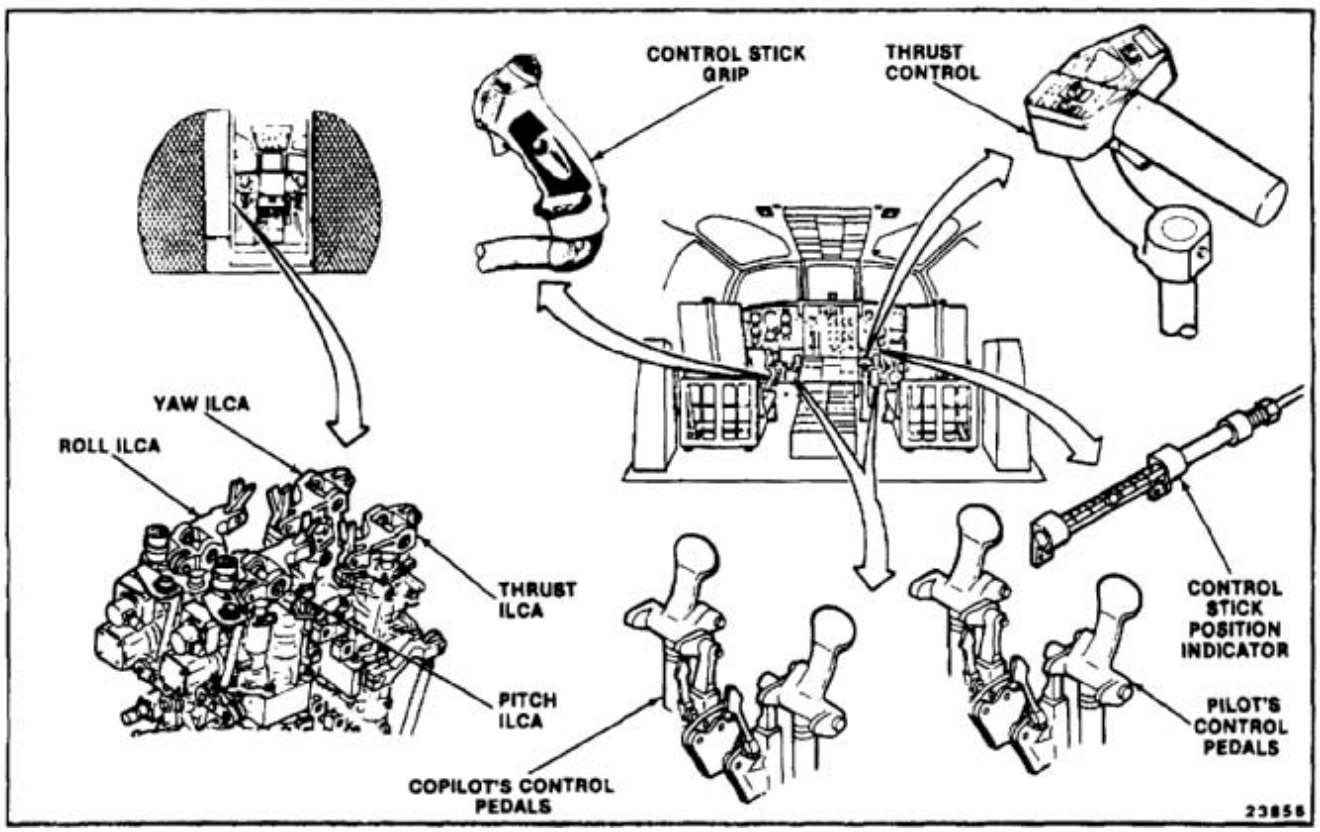
Medium Helicopter Repairer (2)
Inspector

References:

Task 11-133
Task 11-136
Task 11-137
TM 55-1520-240-T

Equipment Condition:

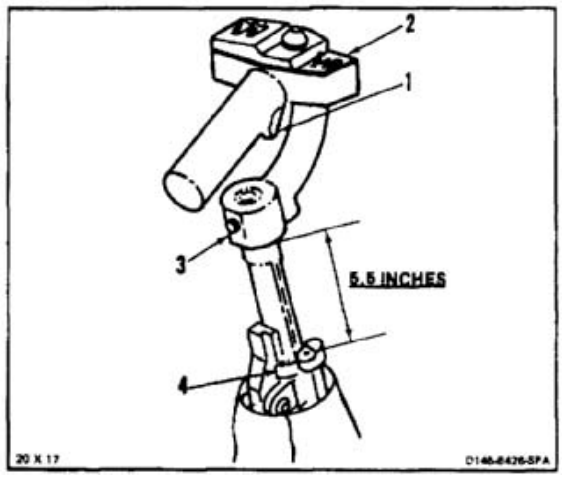
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
FLT CONT HYD Switch Set to BOTH
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



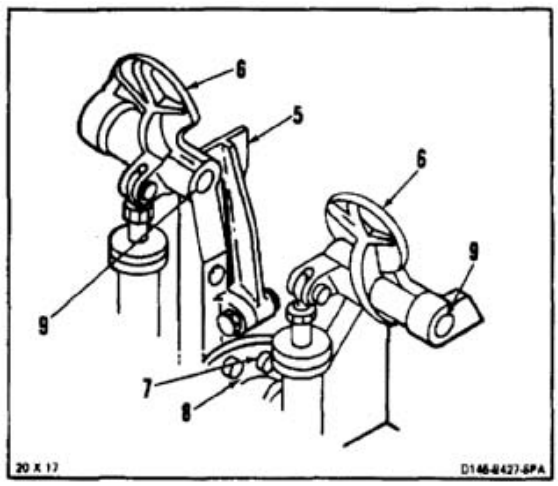
NOTE

If artificial feel is out of limits, refer to adjustment (Task 11-133, 11-136, or 11-137, or TM 55-1520-240-T).

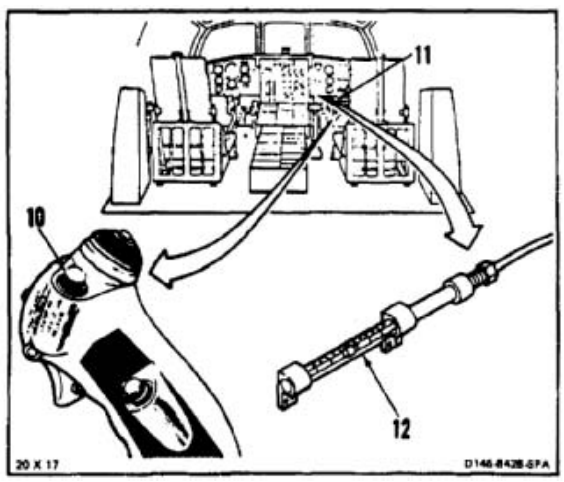
1. Press THRUST CONT BRAKE TRIGGER switch (1) of pilot's thrust control (2). Raise control about **5.5 inches,** measured between grip (3) and pivot block (4). Release switch.



2. Press lever (5) of copilot's and pilot's control pedals (6). Adjust pedals to center hole (7) of plate (8). Release lever.
3. Align pilot's pedals (6) by sighting through support tubes (9).



4. Press CENTERING DEVICE RELEASE button (10) on pilot's control stick (11). Position stick upright, with position indicator (12) at N. Release button.



PITCH AND ROLL CONTROL

NOTE

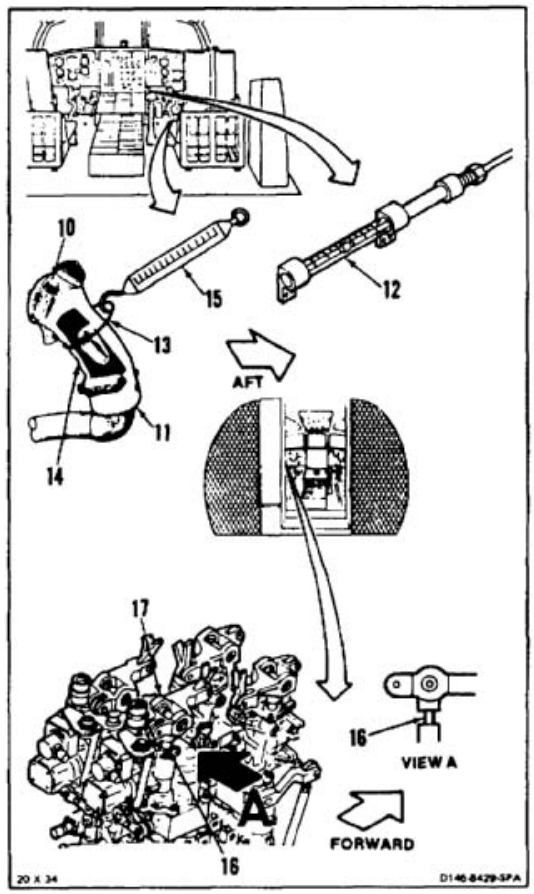
If artificial feel is out of limits, adjust pitch or roll balance springs (Task 11-137) or troubleshoot system (TM 55-1520-240-T).

5. Install strap (13) at second grip (14) position on pilot's stick (11). Use strap (E376).
6. Attach dial indicating scale (15) to strap (13).
7. Have helper in passageway check output rod (16) of pitch ILCA (17) for movement.

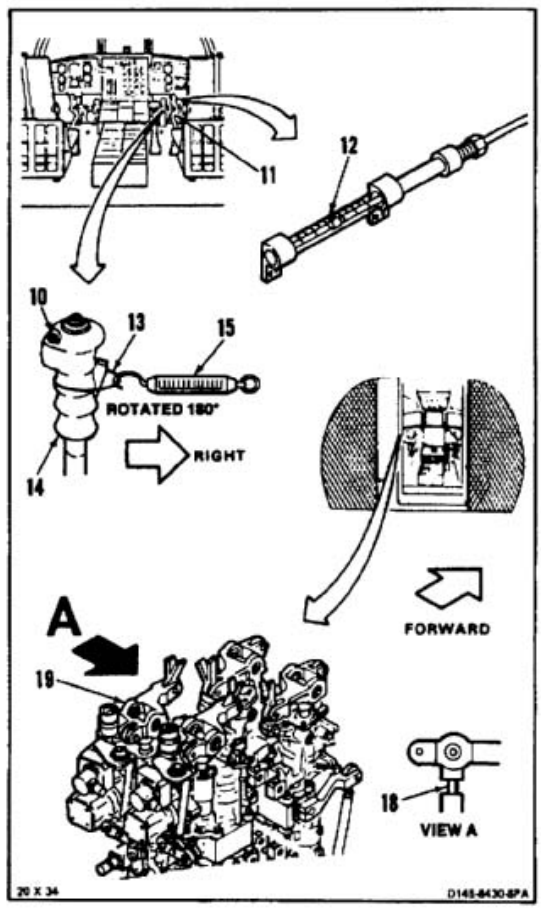
NOTE

Forward breakout force will be greater than aft breakout and be within max/min limits.

8. Position scale (15) aft of grip (14). Apply force aft at grip, **90°** to grip. Measure force when rod (16) starts to move. Force must be **1.80 to 2.50 pounds**.
9. Position scale (15) forward of grip (14). Apply force forward at grip, **90°** to grip. Measure force when rod (16) starts to move. Force must be **1.80 to 2.50 pounds**.
10. Repeat step 4.
11. Position scale (15) aft of grip (14). Apply force aft at grip, **90°** to grip. Measure force until rod (16) stops moving. Force must be **2.3 to 5.0 pounds**.
12. Position scale (15) forward of grip (14). Apply force forward at grip, **90°** to grip. Measure force until rod (16) stops moving. Force must be **4.0 to 8.6 pounds**.
13. Tape button (10) in pressed position. Use tape (E388).
14. Check indicator (12) is at N, with stick (11) upright.
15. Repeat steps 8 and 9. Force must be **0.25 to 0.75 pounds**.
16. Repeat steps 11 and 12. Force must be **0.25 to 1.50 pounds**.
17. Remove tape from button (10).



18. Repeat step 4.
19. Have helper in passageway check output rod (18) of roll ILCA (19) for movement.
20. Position scale (15) left of grip (14). Apply force left at grip, **90º** to grip. Measure force when rod (18) starts to move. Force must be **1.2 to 2.0 pounds**.
21. Position scale (15) right of grip (14). Apply force right at grip, **90º** to grip. Measure force when rod (18) starts to move. Force must be **1.2 to 2.0 pounds**.
22. Apply force right at grip, **90º** to grip. Measure force until rod (18) stops moving. Force must be **4.0 to 7.0 pounds**.
23. Repeat step 4.
24. Position scale (15) left of grip (14). Apply force right at grip, **90º** to grip. Measure force until rod (18) stops moving. Force must be **4.0 to 7.0 pounds**.
25. Tape button (10) in pressed position. Use tape (E388).
26. Check indicator (12) is at N, with stick (11) upright.
27. Repeat steps 20 and 21. Force must be **0.25 to 1.00 pounds**.
28. Repeat steps 22, 23, and 24. Force must be **0.5 to 2.0 pounds**.
29. Remove tape from button (10).
30. Repeat step 4.
31. Remove scale (15) and strap (13) from grip (14).



YAW CONTROLS

NOTE

If artificial feel is out of limits, adjust yaw balance springs (Task 11-136) or troubleshoot system (TM 55-1520-240-T).

32. Align pilot's pedals (6) by sighting through support tubes (9).

33. Have helper in passageway check output rod (20) of yaw ILCA (21) for movement.

33.1. Tape button (10) in depressed position. Use tape (E388).

34. Attach scale (15) to end of pedal tube (9). Apply force aft at pedal post (22), **90°** to post. Measure force when rod (20) starts to move. Force shall be **7.0 to 12.0 pounds**.

35. Position scale (15) forward on tube (9). Apply force forward at post (22), **90°** to post. Measure force when rod (20) starts to move. Force shall be **7.0 to 12.0 pounds**.

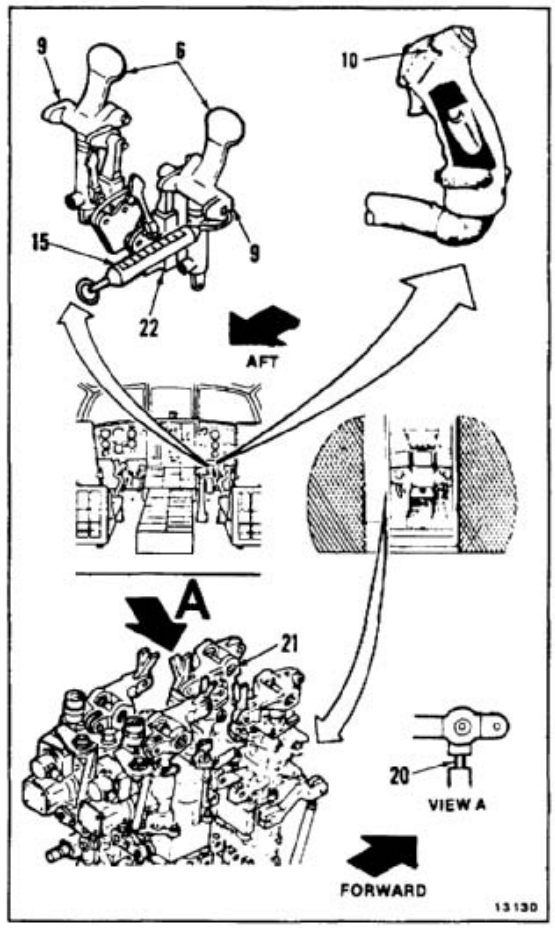
36. Apply force forward at post (22), **90°** to post (22). Measure force until rod (20) stops moving. Force shall be **19.0 to 34.5 pounds**.

36.1. Remove tape from button (10).

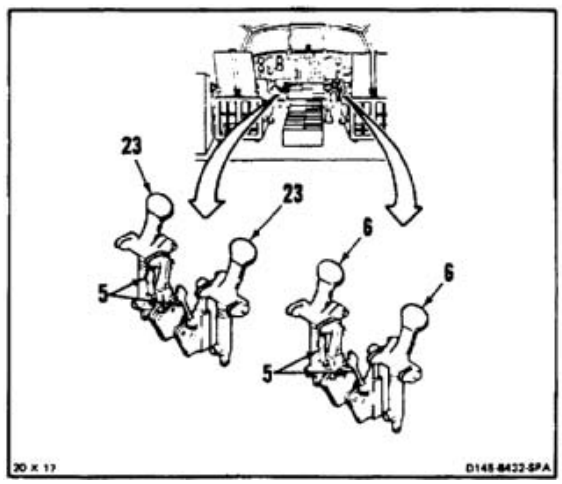
37. Repeat step 32.

38. Position scale (15) aft on tube (9). Apply force aft at post (22), **90°** to post. Measure force until rod (20) stops moving. Force shall be **14.5 to 26.5 pounds**.

39. Remove scale (15) from tube (9).

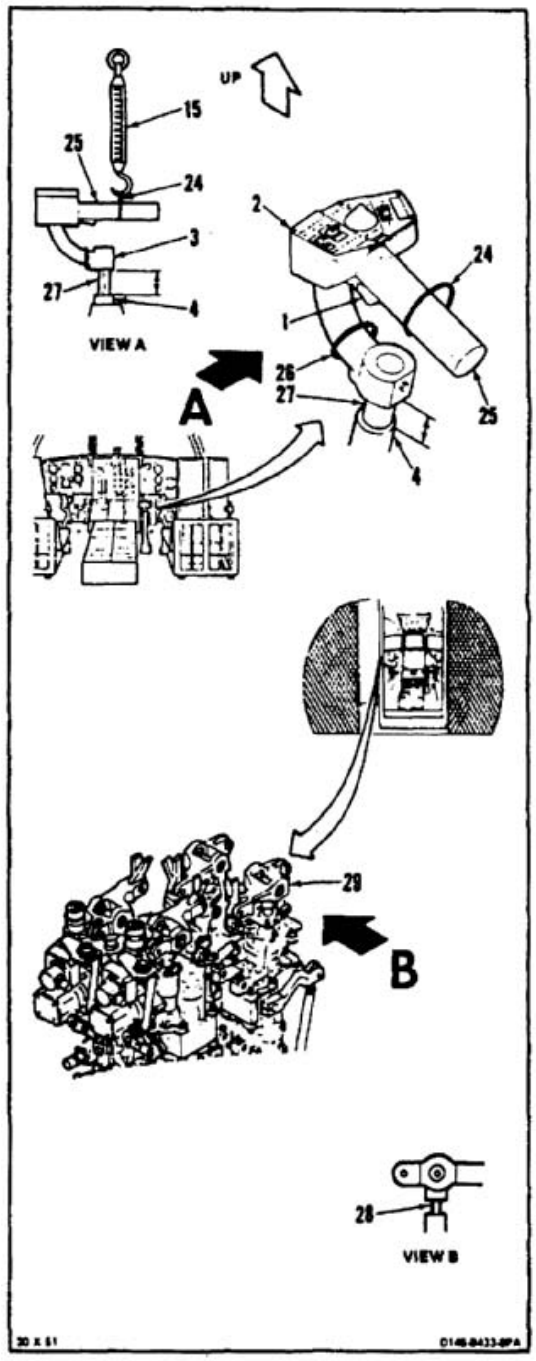


40. Repeat steps 25 and 32. Pedals must not drift.
41. Press lever (5) of pilot's pedals (6). Adjust pedals to full forward position. Release lever.
42. Press lever (5) of copilot's pedals (23). Adjust pedals to full aft position. Release lever.
43. Check pilot's and copilot's right pedals. Pedal drift must not be more than **1.0 inch per second**.
44. Press lever (5) of pilot's pedals (6). Adjust pedals to full aft position. Release lever.
45. Press lever (5) of copilot's pedals (23). Adjust pedals to full forward position. Release lever.
46. Check pilot's and copilot's left pedals. Pedal drift must not be more than **1.0 inch per second**.
47. Repeat steps 17, 2, and 3.



THRUST CONTROL

48. Press switch (1) of control (2). Raise control to about **6.3 inches** measured between grip (3) and pivot block (4). Lower to detent position. Tape switch in pressed position. Use tape (E388).
49. Install strap (24) loose on grip handle (25).
50. Install strap (26) loose on grip (3) close to shaft (27).
51. Attach scale (15) to strap (24).
52. Have helper in passageway check output rod (28) of thrust ILCA (29) for movement.
53. Align scale (15) with shaft (27). Apply force up at handle (25). Measure force when rod (28) starts to move. Force must be **2.0 to 7.0 pounds**.
54. Remove scale (15) from strap (24). Attach scale to strap (26).
55. Position scale (15) down and parallel to shaft (27). Apply force down at handle (25). Measure force when rod (28) starts to move. Force must be **5.0 to 15.0 pounds**.
56. Remove scale (15) from strap (26). Attach scale to strap (24).
57. Align scale (15) with shaft (27). Apply force up at handle (25). Measure force until rod (28) stops moving. Force must be **5.0 to 9.0 pounds**.
58. Raise control (2) to **5.5 inches** measured between grip (3) and pivot block (4).
59. Repeat step 53. Force must be **1.0 to 4.0 pounds**.
60. Repeat step 58.
61. Repeat step 54.
62. Repeat step 55. Force must be **1.0 to 4.0 pounds**.
63. Check force measured in step 59 must be equal to force measured in step 62 within **1.5 pounds**.



64. Position control (2) at **5.5 inches** measured between grip (3) and pivot block (4). Remove tape from switch (1).

CAUTION

Applied force must not be more than **45 pounds**; otherwise, damage to thrust CCDA will occur.

65. Repeat step 53. Force must be **7 to 20 pounds**.

66. Press switch (1) of control (2). Lower control to **5.5 inches** measured between grip (3) and block (4). Release switch.

67. Repeat step 54.

68. Position scale (15) down and parallel to shaft (27). Apply force down until rod (28) starts moving. Force must be **7 to 23 pounds**.

69. Remove scale (15) and two straps (24 and 26) from control (2).

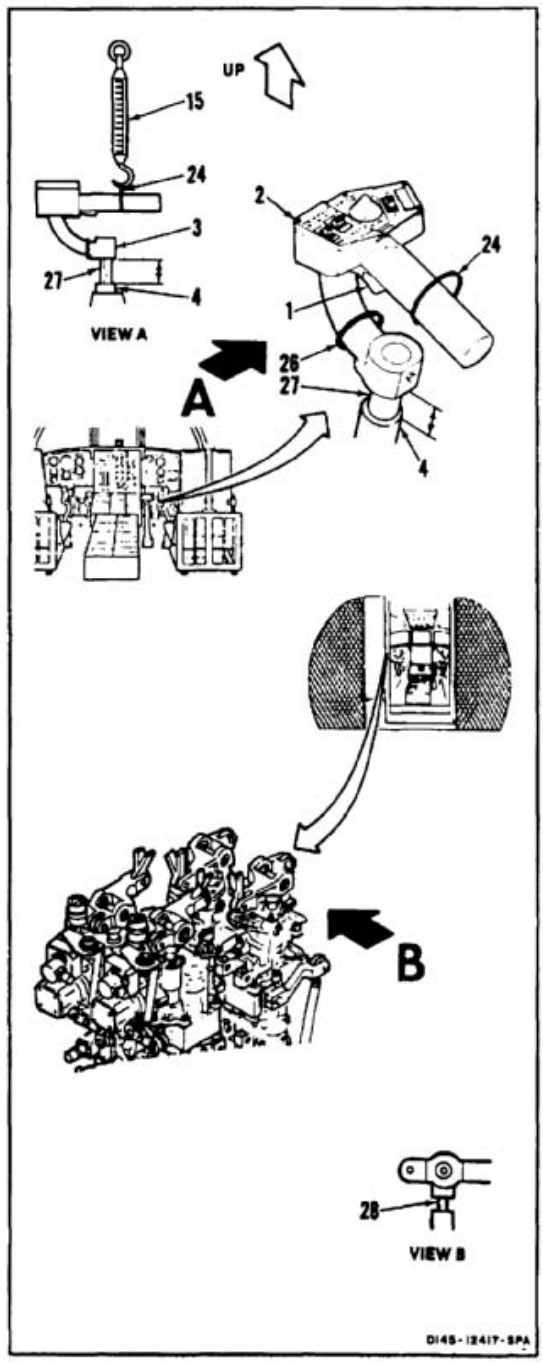
NOTE

If artificial feel is out of limits, refer to adjustment (Task 11-133) or TM 55-1520-240-T.

INSPECT

FOLLOW-ON MAINTENANCE:

Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).



END OF TASK

11-35 YAW CONTROLS TRAVEL CHECK 11-35

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

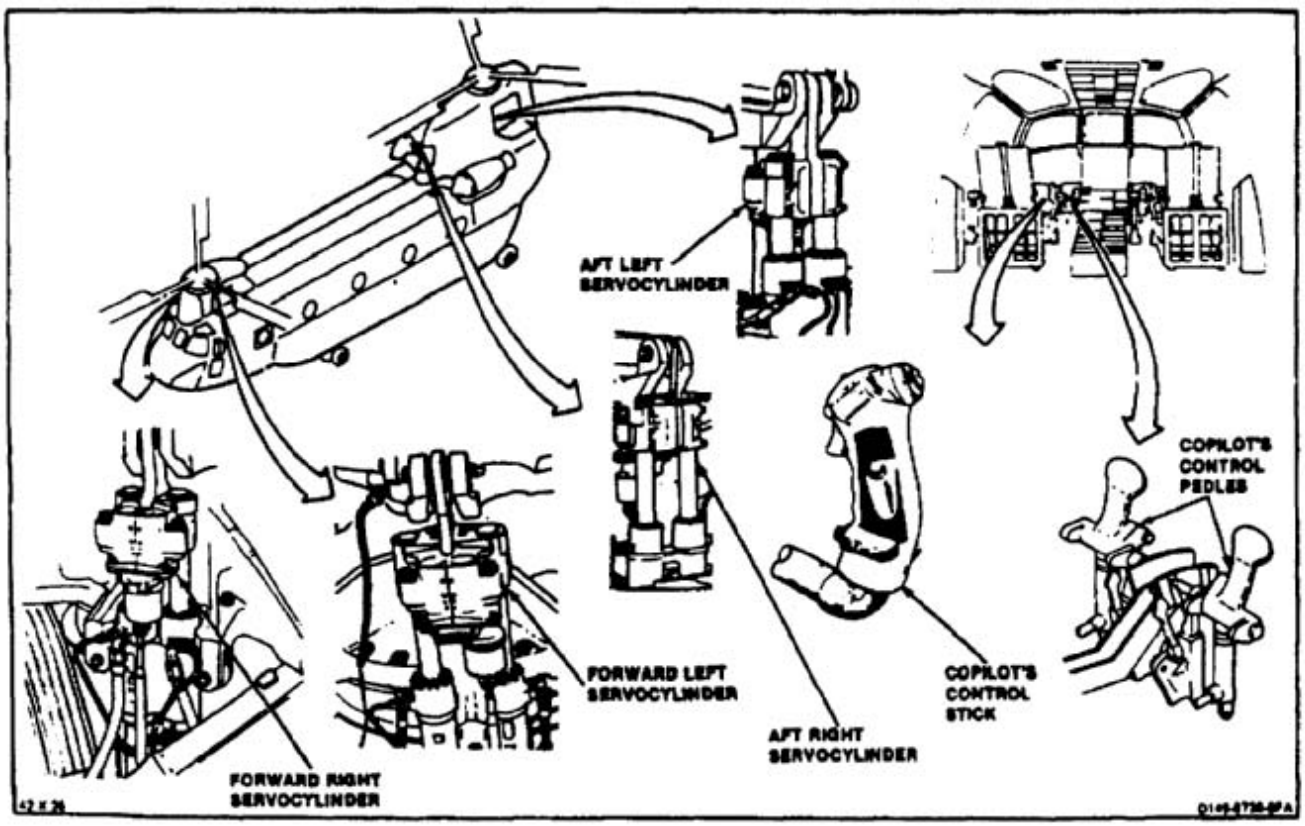
None

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

Equipment Conditions:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Copilot's Controls in Neutral Rig Position (Task 11-42)
Copilot's Rigging Tool (T39) Installed (Task 11-22)
Pitch Link Positioned Over Forward Right Servocylinder (Task 1-26)
Yaw Travel Quadrant and Pointer Installed (Task 11-24)
Pedals Set to Center Hole (Task 11-22)
Forward and Aft Work Platforms Open (Task 2-2)
DASH Actuator Set to 36 Inches (Task 11-165)



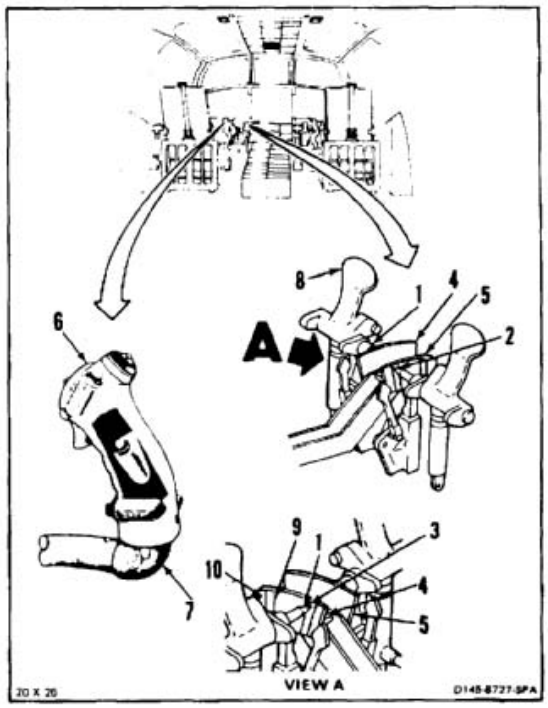
11-35 YAW CONTROLS TRAVEL CHECK (Continued) 11-35

1. Check two yaw pedal pointers (1 and 2). Pointers must be between NEUTRAL lines (3) on yaw quadrants (4 and 5).
2. Have helper press and hold CENTERING DEVICE RELEASE switch (6) on copilot's control stick (7).

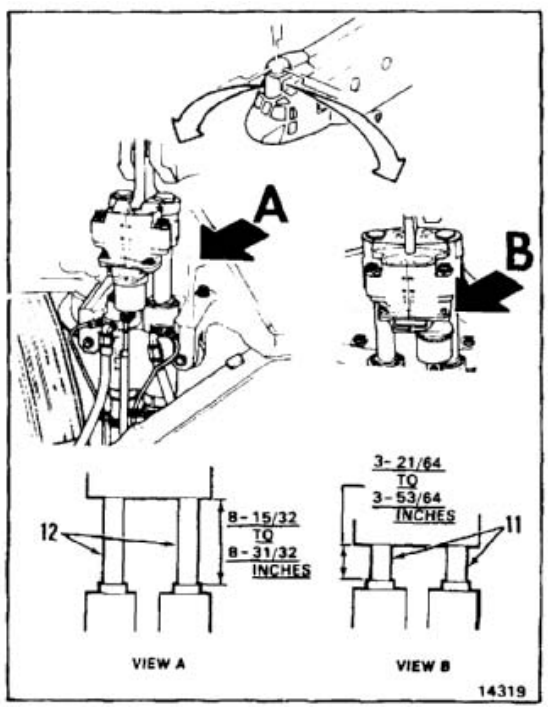
CAUTION

Pedal force must not be more than **20 pounds**; otherwise, damage to components will occur.

3. Push and hold copilots left pedal (8) fully forward with about **10 pounds** of force.
4. Release switch (6) on control stick (7).
5. Check left pedal pointer (1). Pointer must be between SYSTEM STOP lines (9 and 10) on quadrant (4).

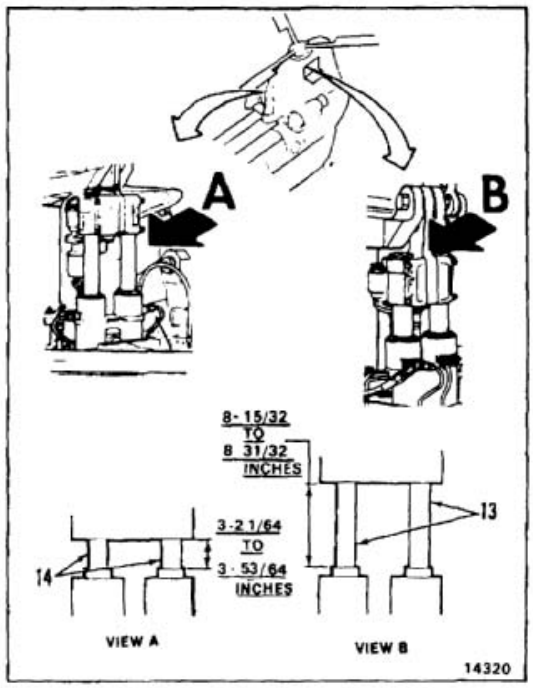


6. Working from forward left work platform, measure and record length of left servocylinder pistons (11). Length must be **3-21/64 to 3-53/64 inches**.
7. Working from forward right work platform, measure and record length of right servocylinder pistons (12). Length must be **8-15/32 to 8-31/32 inches**.



8. Working from aft left work platform, measure and record length of left servocylinder pistons (13). Length must be **8-15/32 to 8-31/32 inches**.

9. Working from aft right work platform, measure and record length of right servocylinder pistons (14). Length must be **3-21/64 to 3-53/64 inches**.

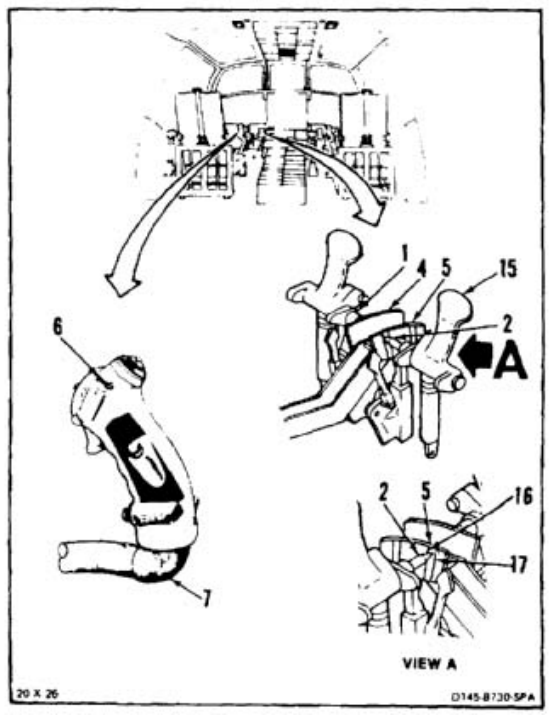


10. Press and hold switch (6) on control stick (7).

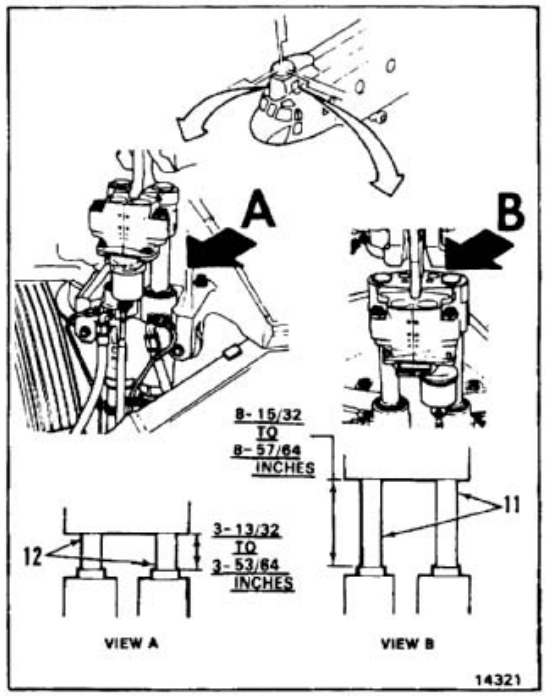
11. Push and hold copilot's right pedal (15) fully forward with about **10 pounds** of force.

12. Release switch (6) on control stick (7).

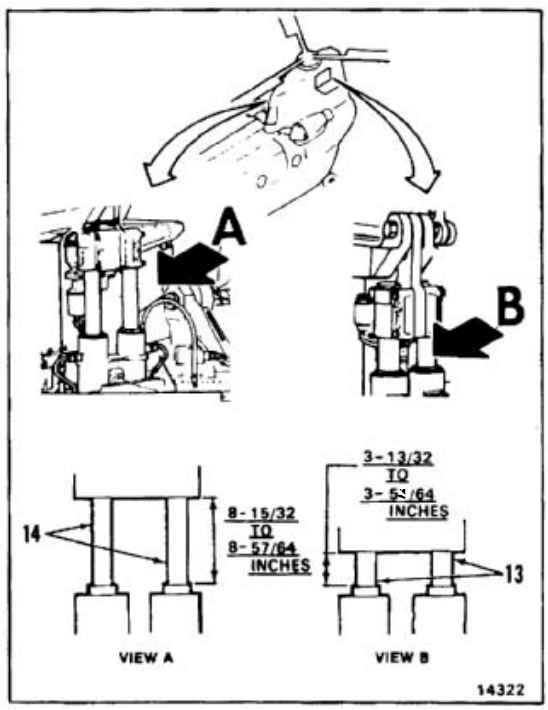
13. Check right pointer (2). Pointer must be between SYSTEM STOP lines (16 and 17) on quadrant (5).



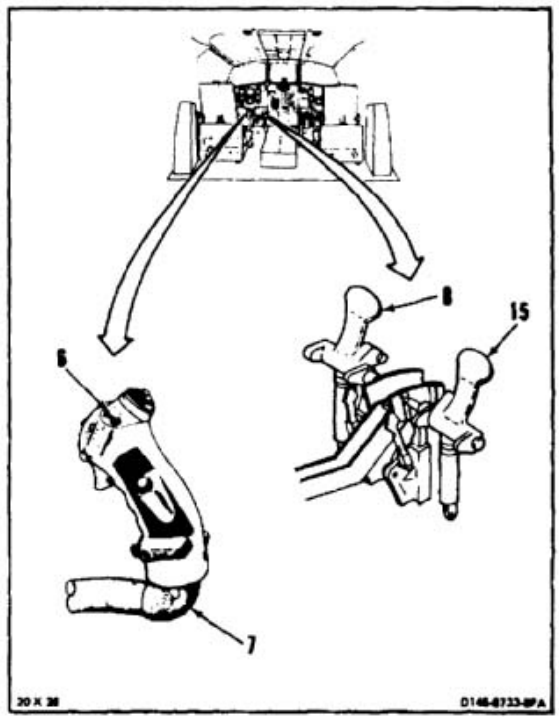
14. Repeat step 6. Length must be **8-15/32 to 8-57/64 inches**.
15. Repeat step 7. Length must be **3-13/32 to 3-53/64 inches**.



16. Repeat step 8. Length must be **3-13/32 to 3-53/64 inches**.
17. Repeat step 9. Length must be **8-15/32 to 8-57/64 inches**.



18. Press and hold switch (6) on control stick (7).
19. Position pedals (8 and 15) at neutral.
20. Release switch (6) on control stick (7).



FOLLOW-ON MAINTENANCE:

Remove pedal travel quadrant and pointer (Task 11-25).
Remove copilot's rigging tool (T39) (Task 11-23).
Close forward and aft work platforms (Task 2-2).
Remove electrical power.
Remove hydraulic power.

END OF TASK

11-36 ROLL CONTROL TRAVEL CHECK 11-36

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Scale, 0 to 10 Pounds

Materials:

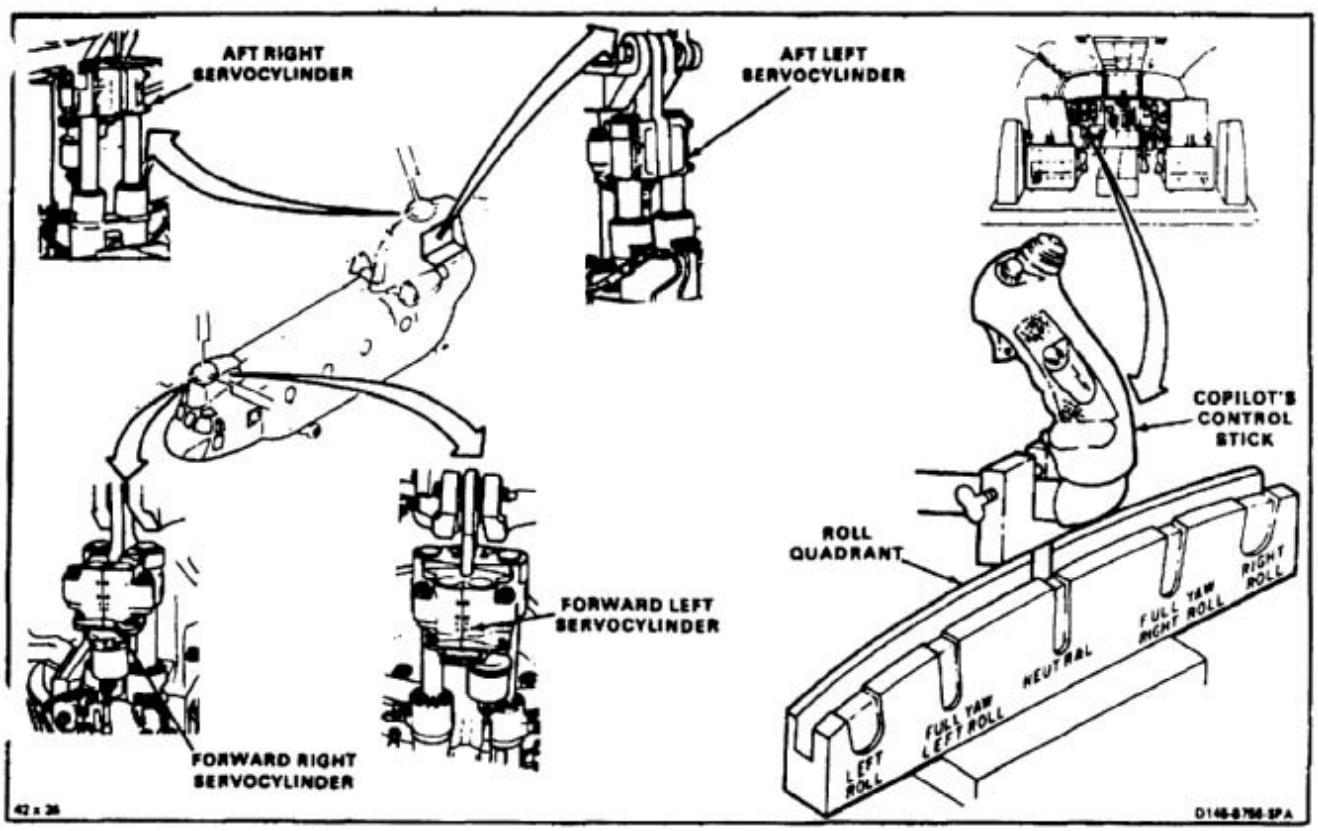
Tape (E388)
Strap (E376)

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

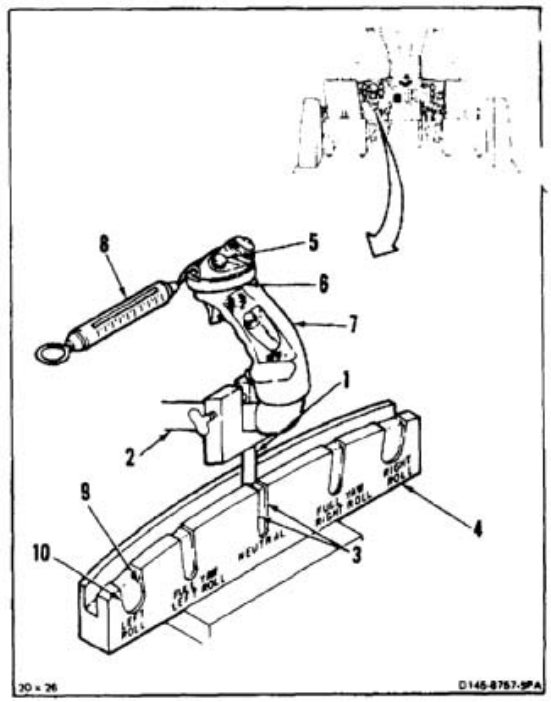
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Copilot's Rigging Tool (T39) Installed (Task 11-22)
Copilot's Controls in Neutral (Rig Position) (Task 11-42)
Pitch Link Positioned Over Forward Right Servocylinder (Task 1-26)
Roll Travel Quadrant and Pointer Installed (Task 11-24)
Forward and Aft Work Platforms Open (Task 2-2)
Blade Lead/Lag Tool (T72) Installed (Task 11-30)

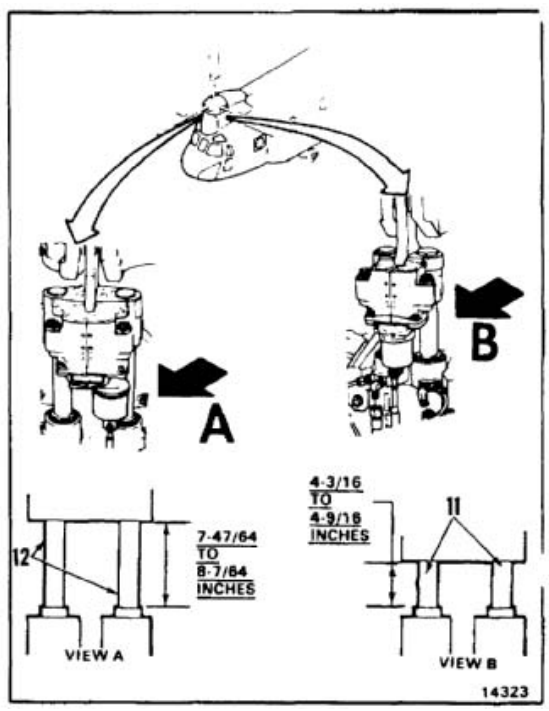


11-36 ROLL CONTROL TRAVEL CHECK (Continued) 11-36

1. Check roll pointer (1) on copilot control stick (2). Pointer must be between NEUTRAL lines (3) on roll quadrant (4).
2. Press and tape CENTERING DEVICE RELEASE switch (5) on control stick (2) in released position. Use tape (E388).
3. Attach strap (6) to grip (7) of control stick (2) at switch (5). Use strap (E376).
4. Attach indicating scale (8) to strap (6).
5. Have helper pull with scale (8) and hold grip (7) fully to left with about **3 pounds** of force.
6. Check pointer (1). Pointer must be between LEFT ROLL lines (9 and 10) on quadrant (4).

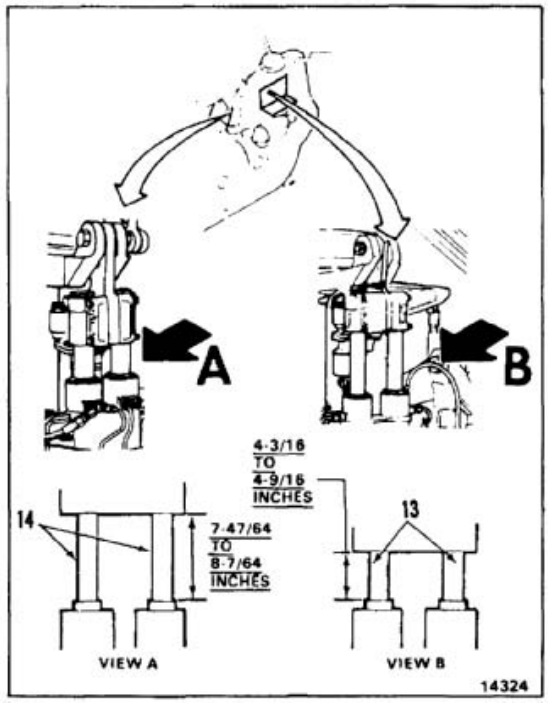


7. Working from forward left work platform, measure and record length of left servocylinder pistons (11). Length must be **4-3/16 to 4-9/16 inches**.
8. Working from forward right work platform, measure and record length of right servocylinder pistons (12). Length must be **7-47/64 to 8-7/64 inches**.



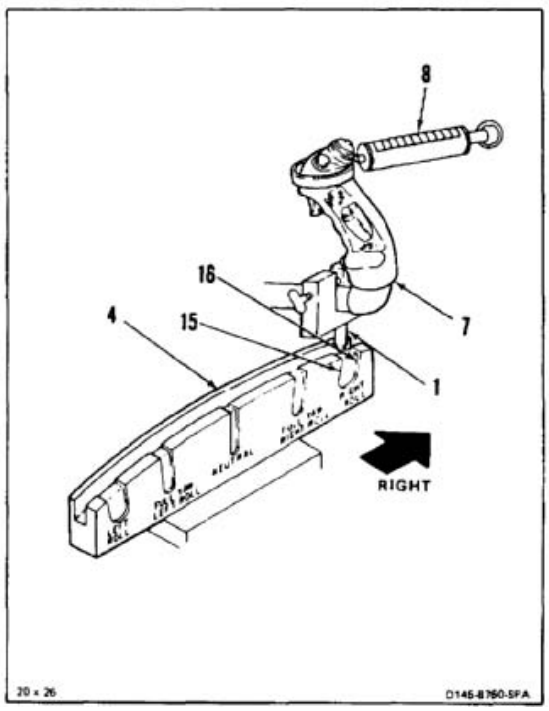
9. Working from aft left work platform, measure and record length of left servocylinder pistons (13). Length must be **4-3/16 to 4-9/16 inches**.

10. Working from aft right work platform, measure and record length of right servocylinder pistons (14). Length must be **7-47/64 to 8-7/64 inches**.

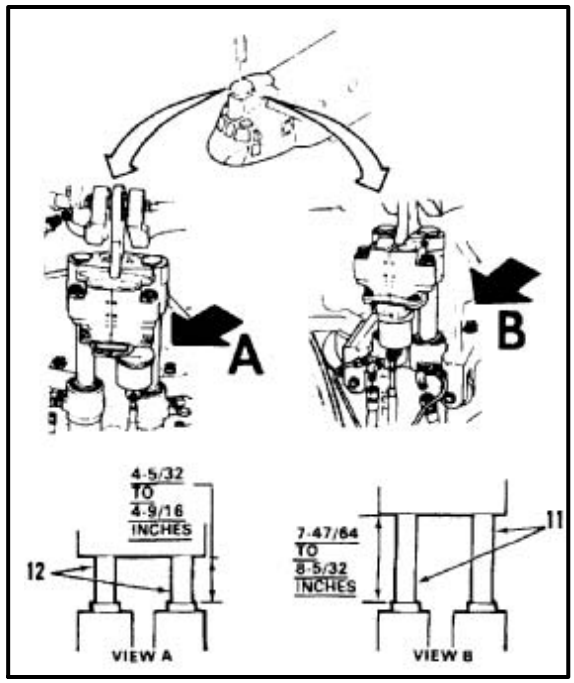


11. Pull with scale (8) and hold grip (7) fully to right with about **3 pounds** of force.

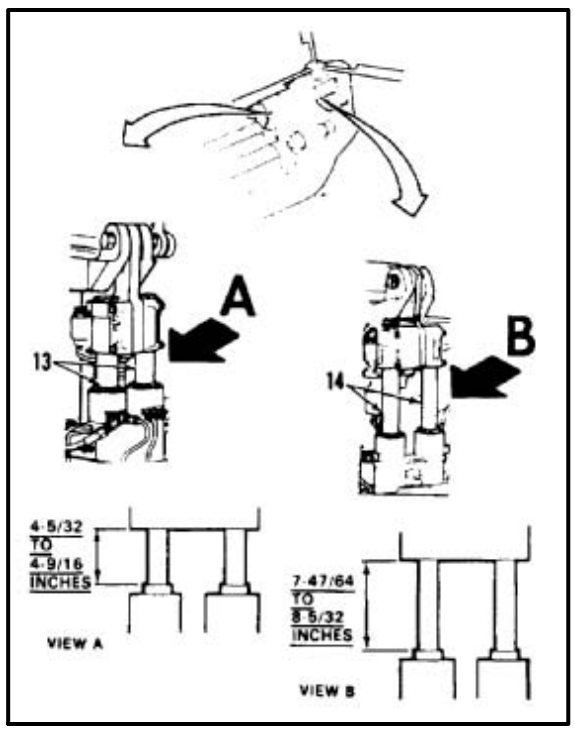
12. Check pointer (1). Pointer must be between RIGHT ROLL lines (15 and 16) on quadrants (4).



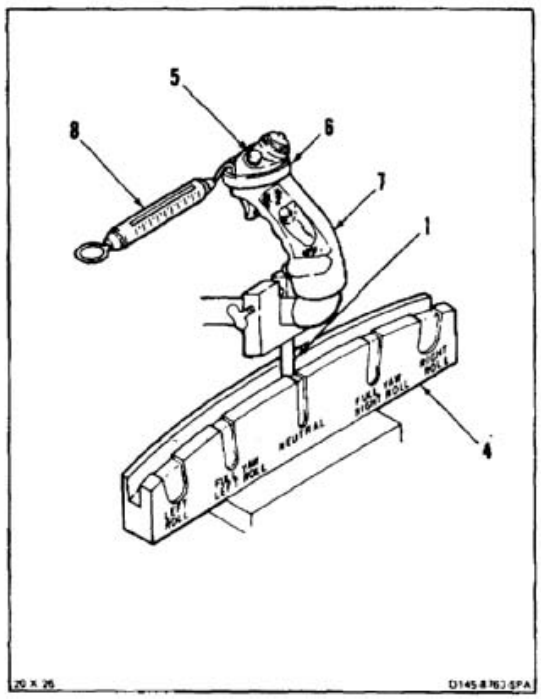
13. Repeat step 7. Length must be **7-47/64 to 8-5/32 inches**.
14. Repeat step 8. Length must be **4-5/32 to 4-9/16 inches**.



15. Repeat step 9. Length must be **7-47/64 to 8-5/32 inches**.
16. Repeat step 10. Length must be **4-5/32 to 4-9/16 inches**.



17. Position pointer (1) on grip (7) at NEUTRAL on quadrant (4).
18. Remove tape from switch (5) on grip (7).
19. Remove scale (8) and strap (6) from grip (7).



FOLLOW-ON MAINTENANCE:

Remove roll travel quadrant and pointer (Task 11-25).
Remove copilot's rigging tool (Task 11-23).
Remove blade lead/lag tool (Task 11-31).
Close forward and aft work platform (Task 2-2).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-37 COMBINED YAW AND ROLL TRAVEL CHECK 11-37

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Scale, 0 to 10 Pounds

Materials:

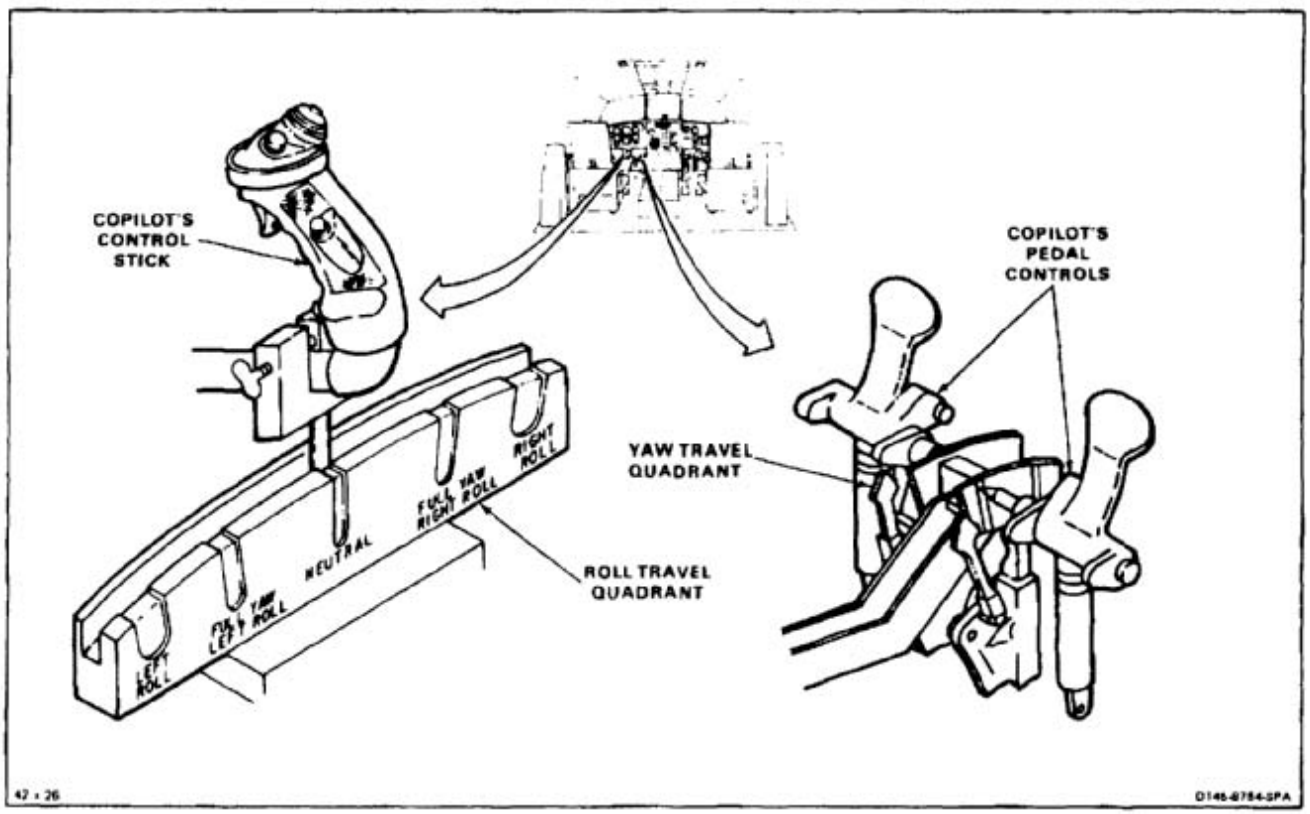
Tape (E388)
Strap (E376)

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

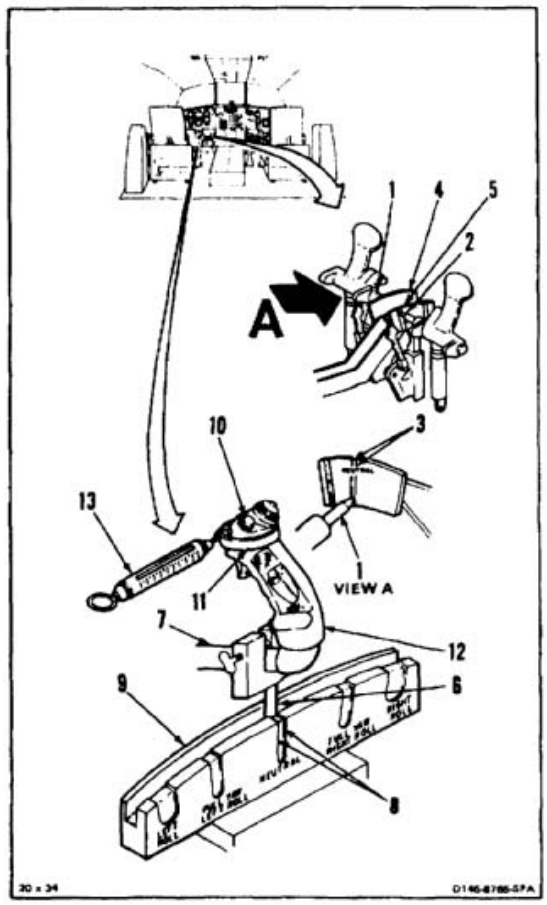
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Copilot's Rigging Tool (T39) Installed (Task 11-22)
Copilot's Control in Neutral Rig Position (Task 11-42)
Pitch Link Positioned Over Forward Right Servocylinder (Task 1-26)
Roll Travel Quadrant and Pointer Installed (Task 11-24)
Yaw Travel Quadrant and Pointer Installed (Task 11-24)



11-37 COMBINED YAW AND ROLL TRAVEL CHECK (Continued) 11-37

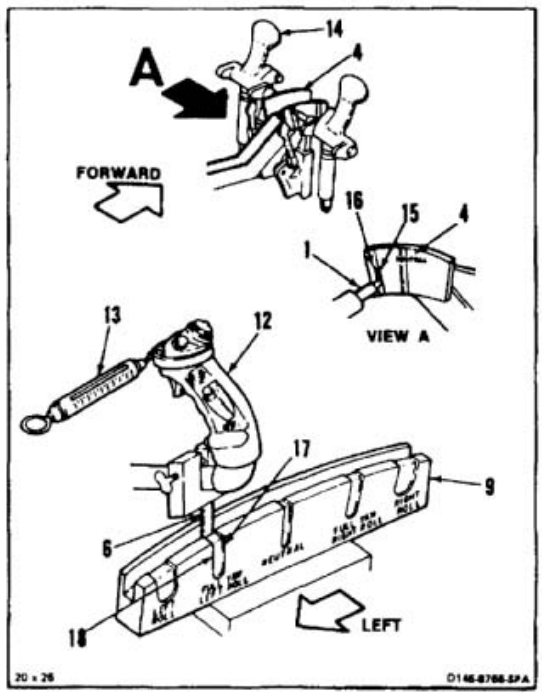
1. Check two yaw pedal pointers (1 and 2). Pointers must be between NEUTRAL lines (3) on yaw quadrant (4 and 5).
2. Check roll pointer (6) on control stick (7). Pointer must be between NEUTRAL lines (8) on roll quadrant (9).
3. Press and tape CENTERING DEVICE RELEASE switch (10) on control stick (7) in released position. Use tape (E388).
4. Attach strap (11) to grip (12) of control stick (7) at switch (10). Use strap (E376).
5. Attach indicating scale (13) to strap (11).



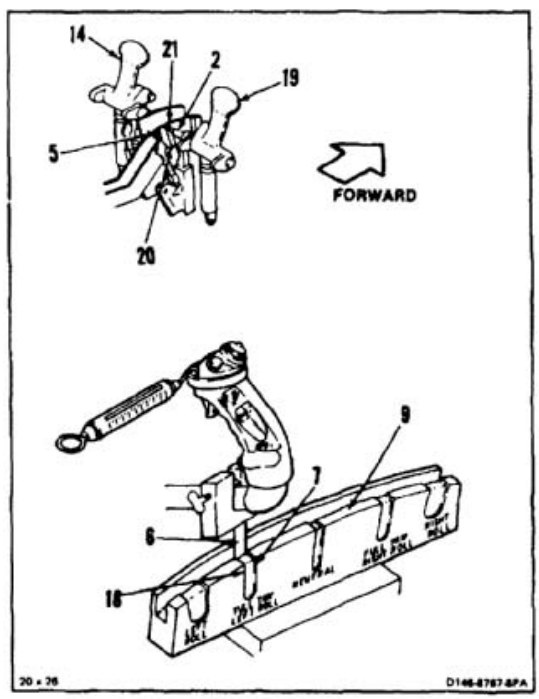
CAUTION

Pedal force must not be more than **20 pounds**; otherwise, damage to components will occur.

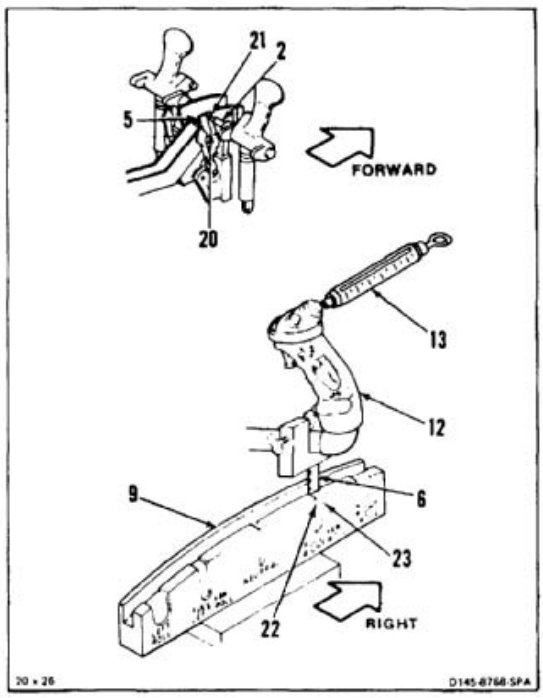
6. Have helper push and hold copilot's left pedal (14) fully forward with about **10 pounds** of force.
7. Check left pedal pointer (1). Pointer must be between SYSTEM STOP lines (15 and 16) on quadrant (4).
8. Have helper pull with scale (13) and hold grip (12) to left with about **3 pounds** of force.
9. Check pointer (6) on quadrant (9). Pointer must be between FULL YAW LEFT ROLL lines (17 and 18) on quadrant (9).



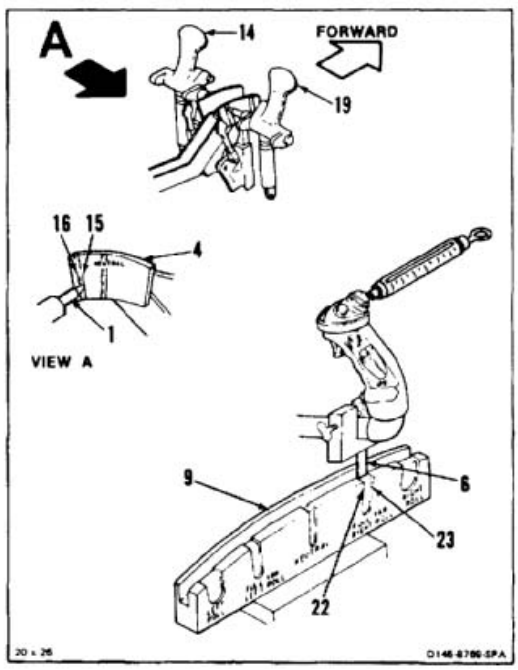
10. Release left pedal (14). Push and hold right pedal (19) fully forward with about **10 pounds** of force.
11. Check right pedal pointer (2). Pointer must be between SYSTEM STOP lines (20 and 21) on quadrant (5).
12. Check pointer (6). Pointer must be between FULL YAW LEFT ROLL lines (17 and 18) on quadrant (9).



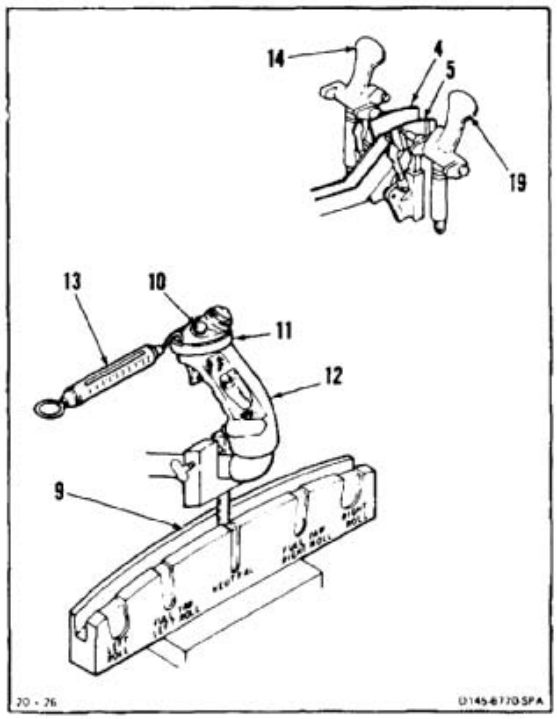
13. Pull with scale (13) and hold grip (12) to right with about **3 pounds** of force. Use scale (13).
14. Check pointer (6). Pointer must be between FULL YAW RIGHT ROLL lines (22 and 23) on quadrant (9).
15. Check right pedal pointer (2). Pointer must be between SYSTEM STOP lines (20 and 21) on quadrant (5).



16. Release right pedal (19). Push and hold left pedal (14) fully forward with about **10 pounds** of force.
17. Check left pedal pointer (1). Pointer must be between SYSTEM STOP lines (15 and 16) on quadrant (4).
18. Check pointer (6). Pointer must be between FULL YAW RIGHT ROLL lines (22 and 23) on quadrant (9).



19. Position grip (12) at NEUTRAL on quadrant (9).
20. Position pedals (14 and 19) at NEUTRAL on quadrant (4 and 5).
21. Remove tape from switch (10) on grip (12).
22. Remove scale (13) and strap (11) from grip (12).



FOLLOW-ON MAINTENANCE:

Remove roll travel quadrant and pointer (Task 11-25).
Remove pedal travel quadrant and pointer (Task 11-25).
Remove copilot's rigging tool (T39) (Task 11-23).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-38 PITCH CONTROL TRAVEL CHECK 11-38

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Scale, 0 to 10 Pounds

Materials:

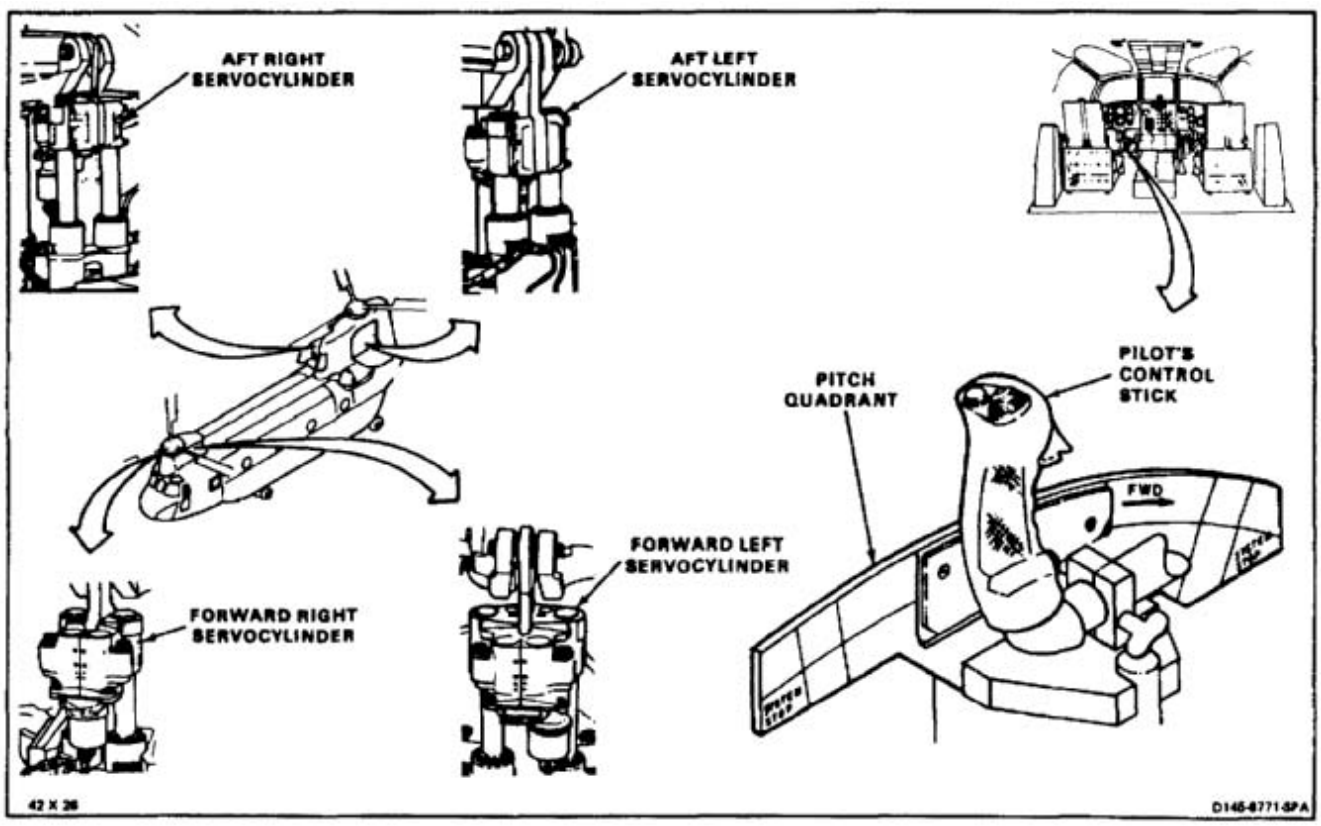
Tape (E388)
Strap (E376)

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

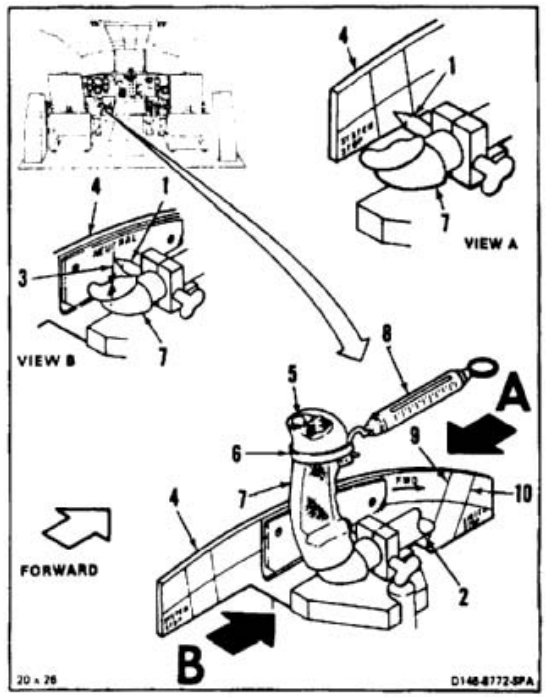
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch to OFF
Copilot's Rigging Tool (T39) Installed (Task 11-22
Copilot's Controls in Neutral Rig Position (Task 11-42)
Pitch Link Positioned Over Forward Right Servocylinder (Task 1-26)
Pitch Travel Quadrant and Pointer Installed (Task 11-24)
Forward and Aft Work Platforms Open (Task 2-2)
DASH Actuator Dummy Link Installed (Task 11-26)
DASH Actuator Removed (Task 11-163)

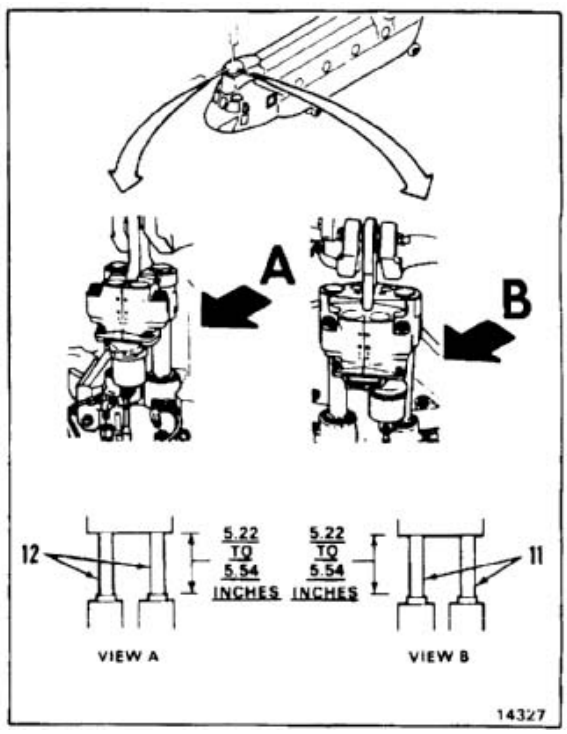


11-38 PITCH CONTROL TRAVEL CHECK (Continued) 11-38

1. Check pitch pointer (1) on copilot's control stick (2). Pointer must be pointing to NEUTRAL line (3) on pitch quadrant (4).
2. Press and tape CENTERING DEVICE RELEASE switch (5) on control stick (2) in released position. Use tape (E388).
3. Attach strap (6) to grip (7) of control stick (2) at switch (5). Use strap (E376).
4. Attach indicating scale (8) to strap (6).
5. Have helper pull with scale (8) and hold grip (7) fully forward with about **3 pounds** of force.
6. Check pointer (1). Pointer must be between SYSTEM STOP lines (9 and 10) on quadrant (4).

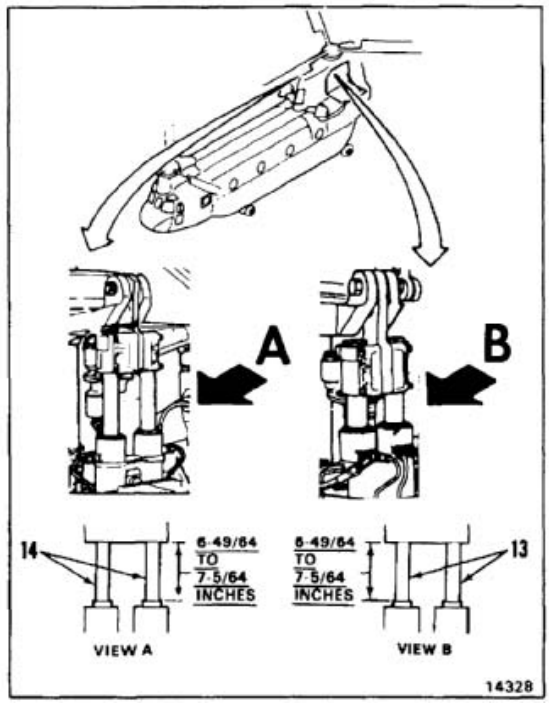


7. Working from forward left work platform, measure and record length of left servocylinder pistons (11). Length must be **5.22 to 5.54 inches**.
8. Working from forward right work platform, measure and record length of right servocylinder pistons (12). Length must be **5.22 to 5.54 inches**.



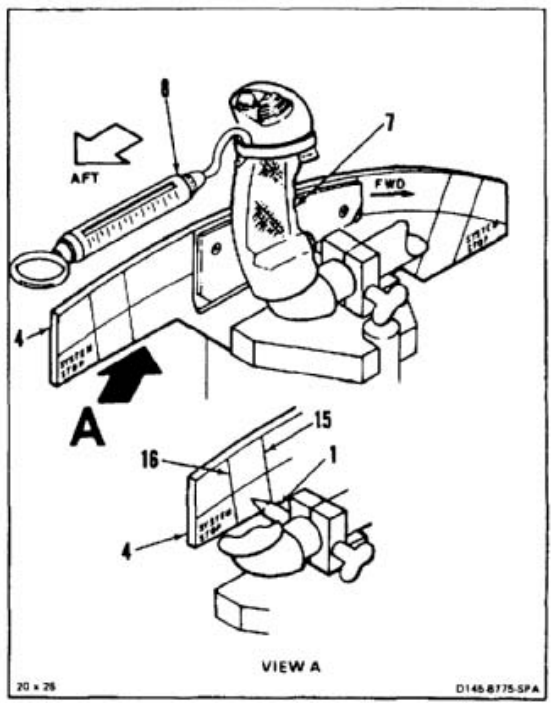
9. Working from aft left work platform measure and record length of left servocylinder pistons (13). Length must be **6-49/64 to 7-5/64 inches**.

10. Working from aft right work platform measure and record length of right servocylinder pistons (14). Length must be **6-49/64 to 7-5/64 inches**.

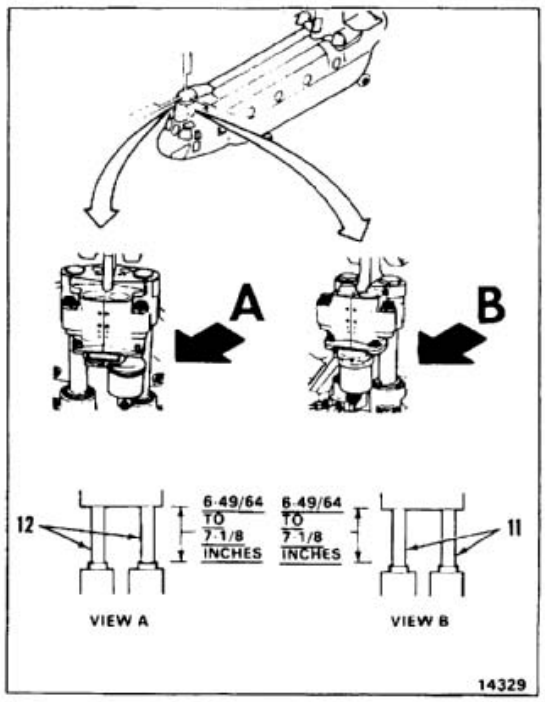


11. Pull and hold grip (7) fully aft with about **3 pounds** of force. Use scale (8).

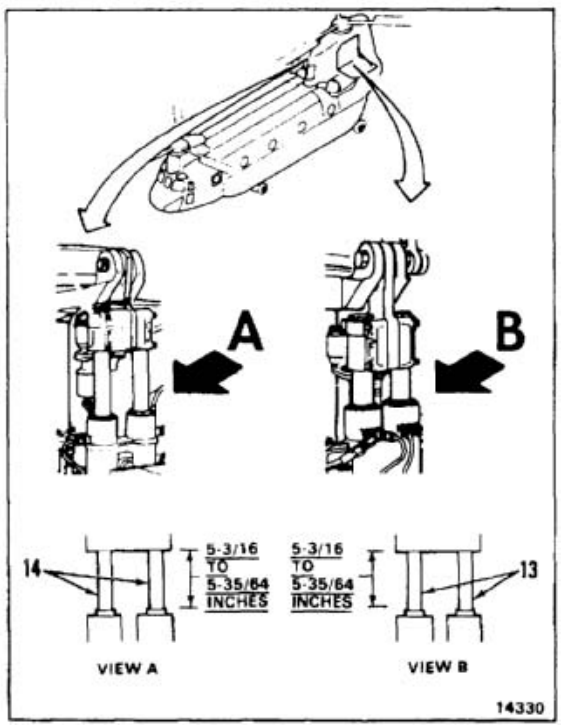
12. Check pointer (1). Pointer must be between SYSTEM STOP lines (15 and 16) on quadrant (4).



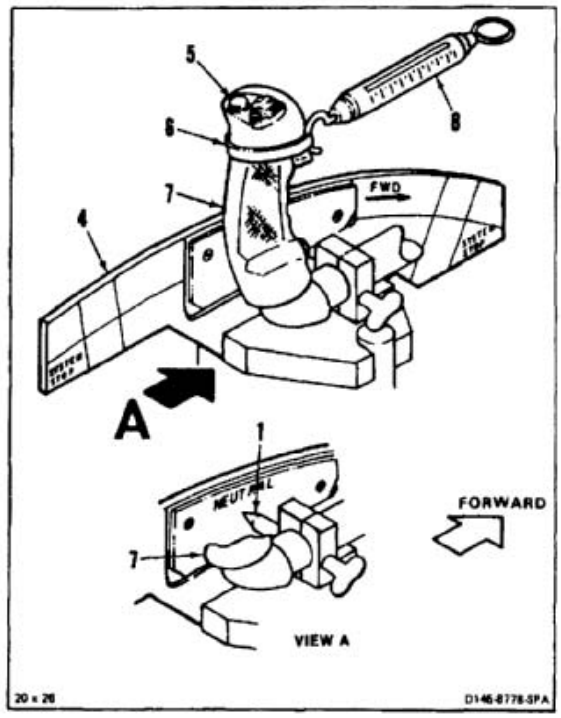
13. Repeat step 7. Length must be **6-49/64 to 7-1/8 inches**.
14. Repeat step 8. Length must be **6-49/64 to 7-1/8 inches**.



15. Repeat step 9. Length must be **5-3/16 to 5-35/64 inches**.
16. Repeat step 10. Length must be **5-3/16 to 5-35/64 inches**.



17. Position pointer (1) on grip (7) at NEUTRAL on quadrant (4).
18. Remove tape from switch (5) on grip (7).
19. Remove scale (8) and strap (6) from grip (7).



FOLLOW-ON MAINTENANCE:

Remove pitch travel quadrant and pointer (Task 11-25).
Remove copilot's rigging tool (T39) (Task 11-23).
Close forward and aft work platform (Task 2-2).
Remove DASH actuator dummy link (Task 11-27).
Install DASH actuator (Task 11-164).
Fully retract DASH actuator (Task 11-165).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-39 THRUST CONTROL TRAVEL CHECKS 11-39

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

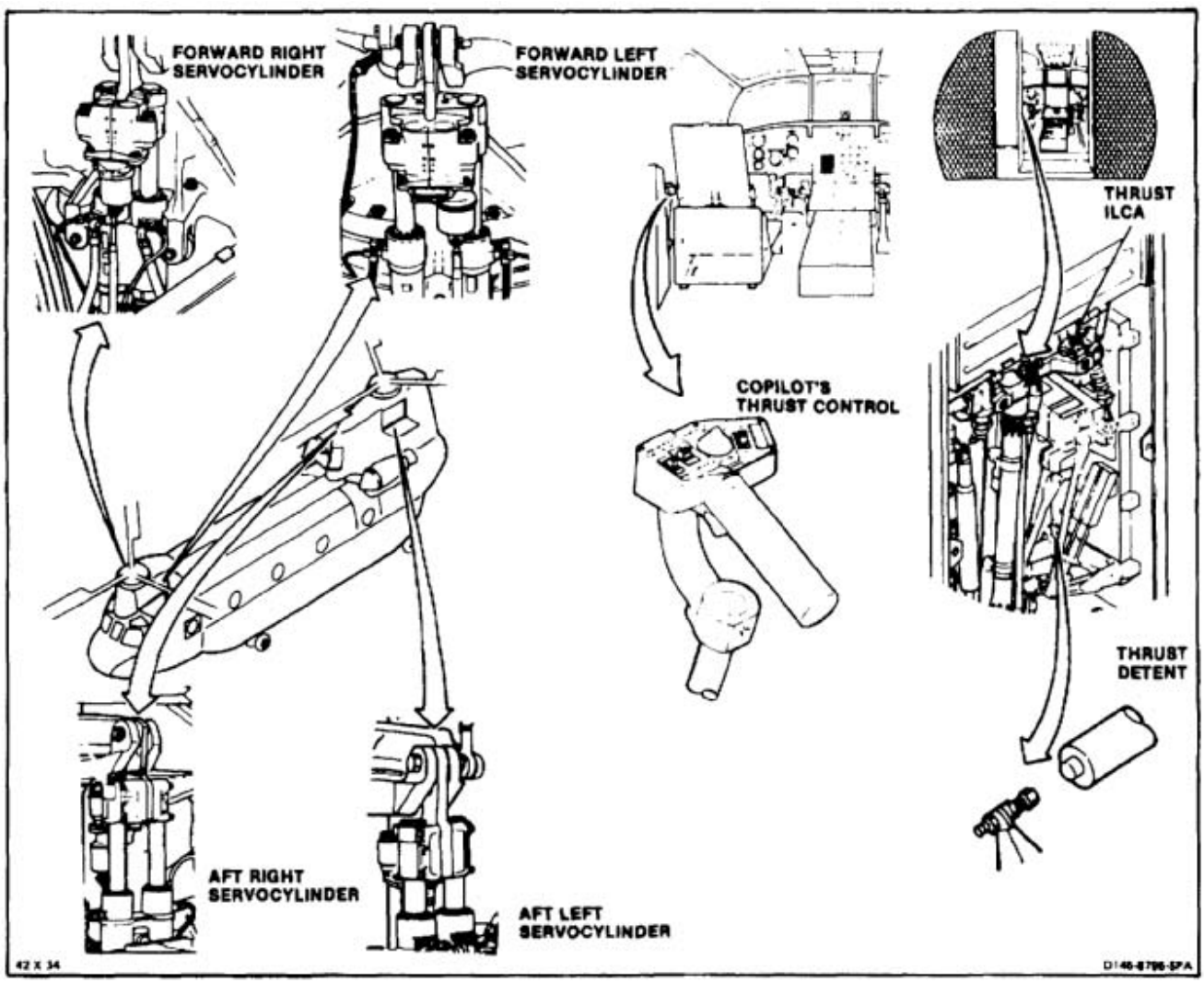
Medium Helicopter Repairer (2)
Inspector

References:

Task 11-109

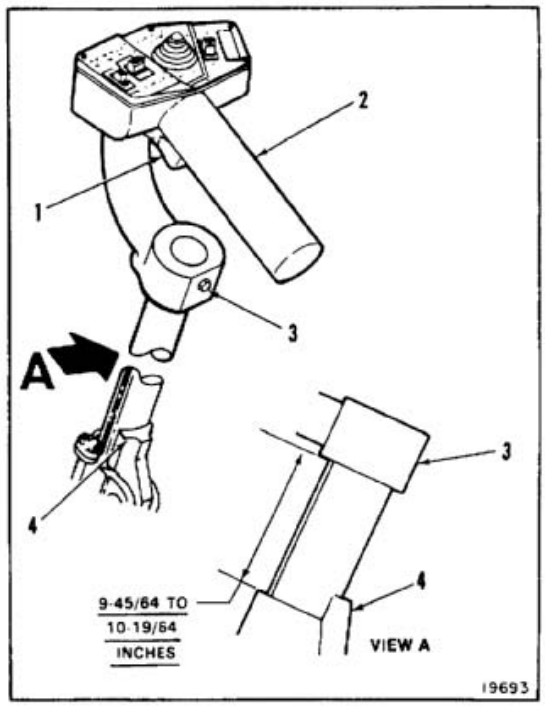
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Copilot's Controls in Neutral Rig Position (Task 11-42)
Pitch Link Positioned Over Forward Right Servocylinder (Task 1-26)
Forward and Aft Work Platforms Open (Task 2-2)
Remove Closet Acoustic Blanket (Task 2-107)
Remove Closet Backup Panel (Task 2-2)

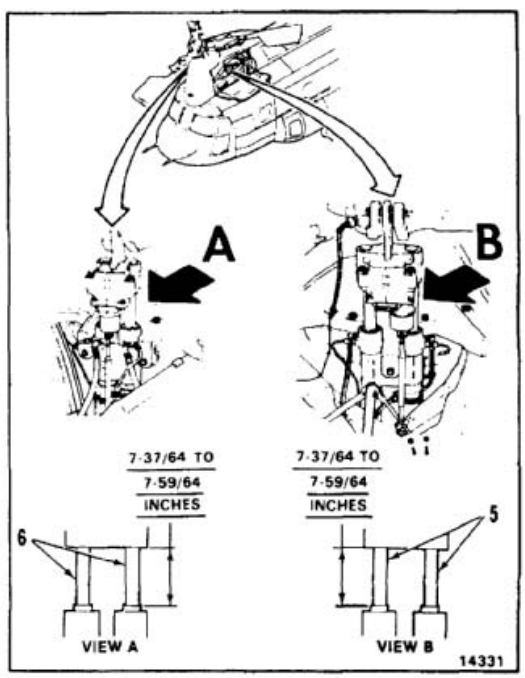


11-39 THRUST CONTROL TRAVEL CHECKS (Continued) 11-39

1. Have helper press and hold THRUST CONT BRAKE TRIGGER (1) of thrust control (2). Pull control up to full up position. Release trigger.
2. Check control (2). Distance between grip (3) and pivot block (4) must be **9-45/64 to 10-19/64 inches**.

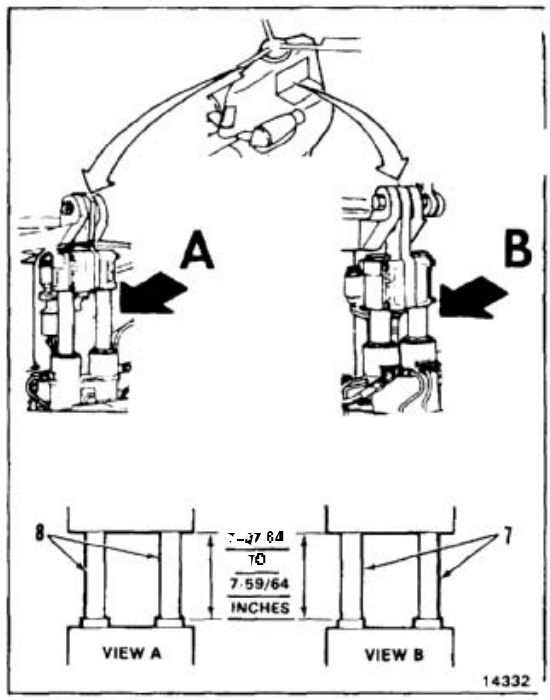


3. Working from forward left work platform, measure and record length of left servocylinder pistons (5). Length must be **7-37/64 to 7-59/64 inches**.
4. Working from forward right work platform, measure and record length of right sercylinder pistons (6). Length must be **7-37/64 to 7-59/64 inches** and within **1/8 inch** of length from step 3.



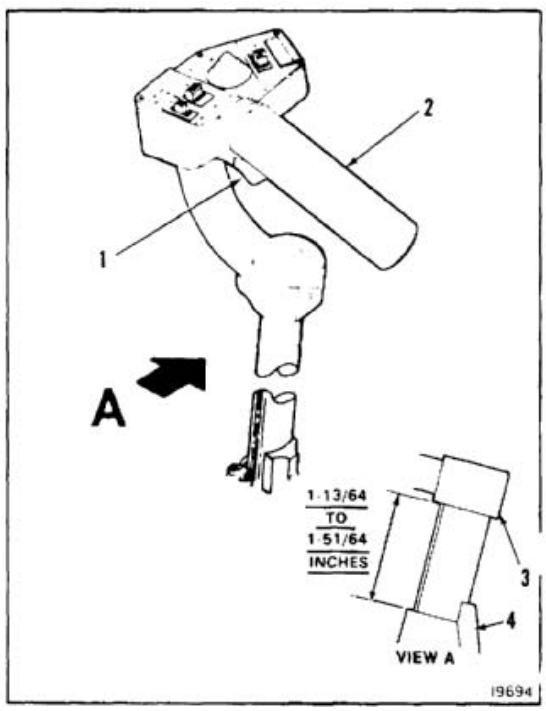
5. Working from aft left work platform measure and record length of left servocylinder pistons (7). Length must be **7-37/64 to 7-59/64 inches**.

6. Working from aft right work platform measure and record length of right servocylinder pistons (8). Length must be **7-37/64 to 7-59/64 inches** and within **1/8 inch** of length from step 5.



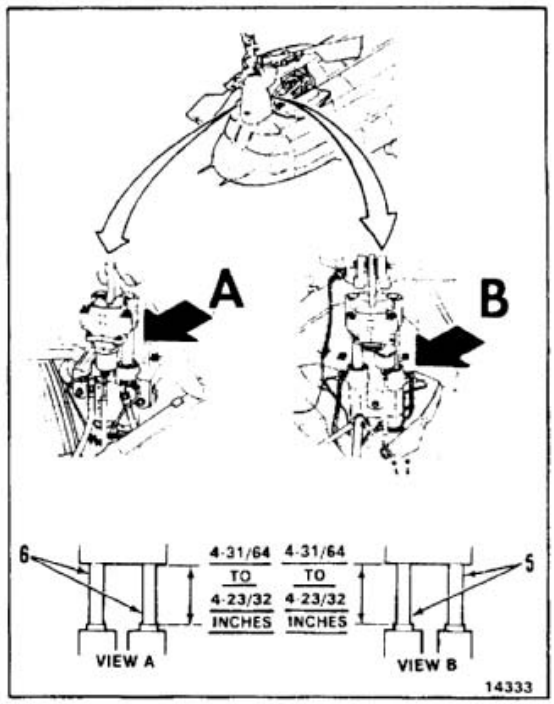
7. Have helper press and hold TRIGGER (1) of thrust control (2). Push control down to full down position. Release switch.

8. Check control (2). Distance between grip (3) and pivot block (4) must be **1-13/64 to 1-51/64 inches**.



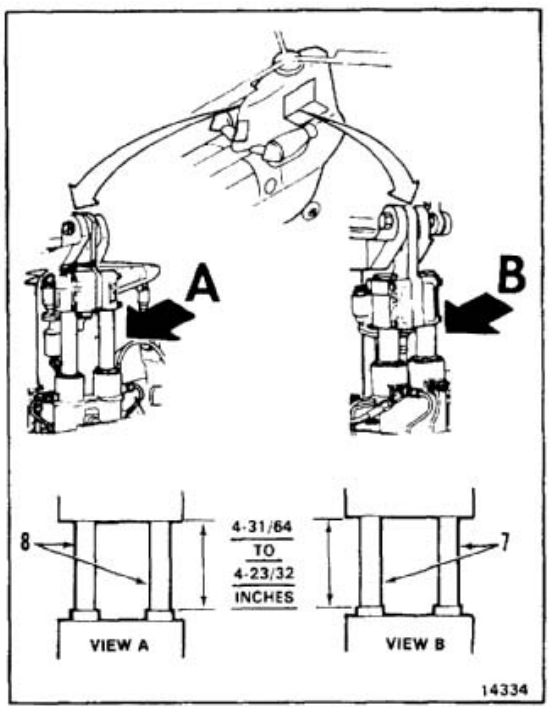
9. Repeat step 3. Length must be **4-31/64 to 4-23/32 inches**.

10. Repeat step 4. Length must be **4-31/64 to 4-23/32 inches** and within **1/8 inch** of length from step 9.



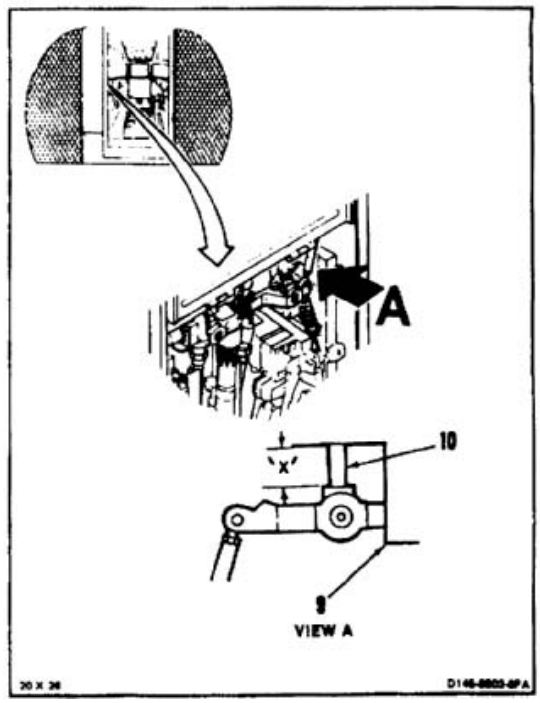
11. Repeat step 6. Length must be **4-31/64 to 4-23/32 inches**.

12. Repeat step 7. Length must be **4-31/64 to 4-23/32 inches** and within **1/8 inch** of length from step 11.

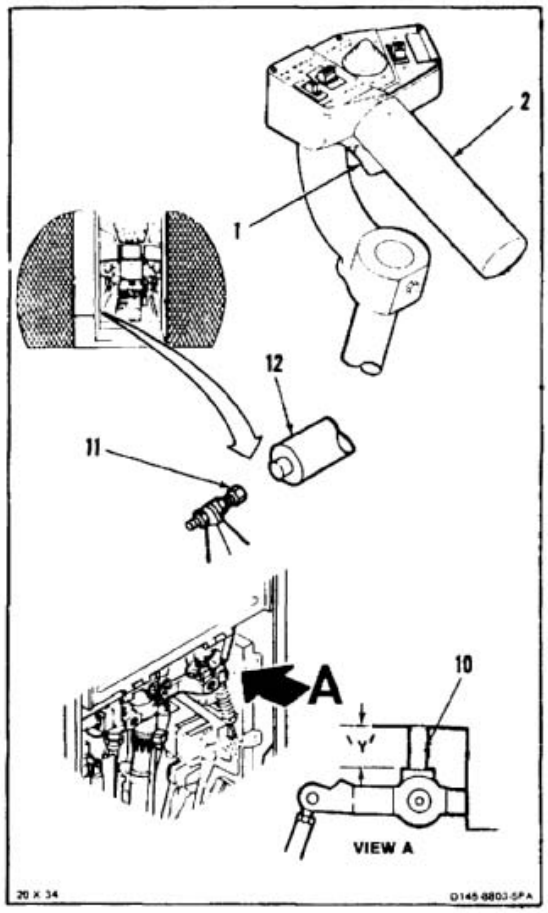


11-39 THRUST CONTROL TRAVEL CHECKS (Continued) 11-39

13. Working from passageway, measure and record length ‘X’ of thrust ILCA (9) lower piston (10).



14. Have helper press and hold TRIGGER (1) of thrust control (2). Pull control up about **6 inches** then lower control until thrust transfer bellcrank stop (11) in control closet just touches detent (12).
15. Measure and record length 'Y' of piston (10).
16. Release TRIGGER (1) of control (2).
17. Check piston (10) lengths 'X' and 'Y'. Subtract 'Y' from 'X'. Difference must be **7-64 to 5/32 inch**. If more or less, adjust detent (Task 11-109) then repeat steps 14 thru 17.



FOLLOW-ON MAINTENANCE:

Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Close forward and aft work platforms (Task 2-2).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-40 RIGGING CHECK OF FORWARD AND AFT LONGITUDINAL CYCLIC TRIM ACTUATORS 11-40

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicator, 0 to 0.2 Inch

Materials:

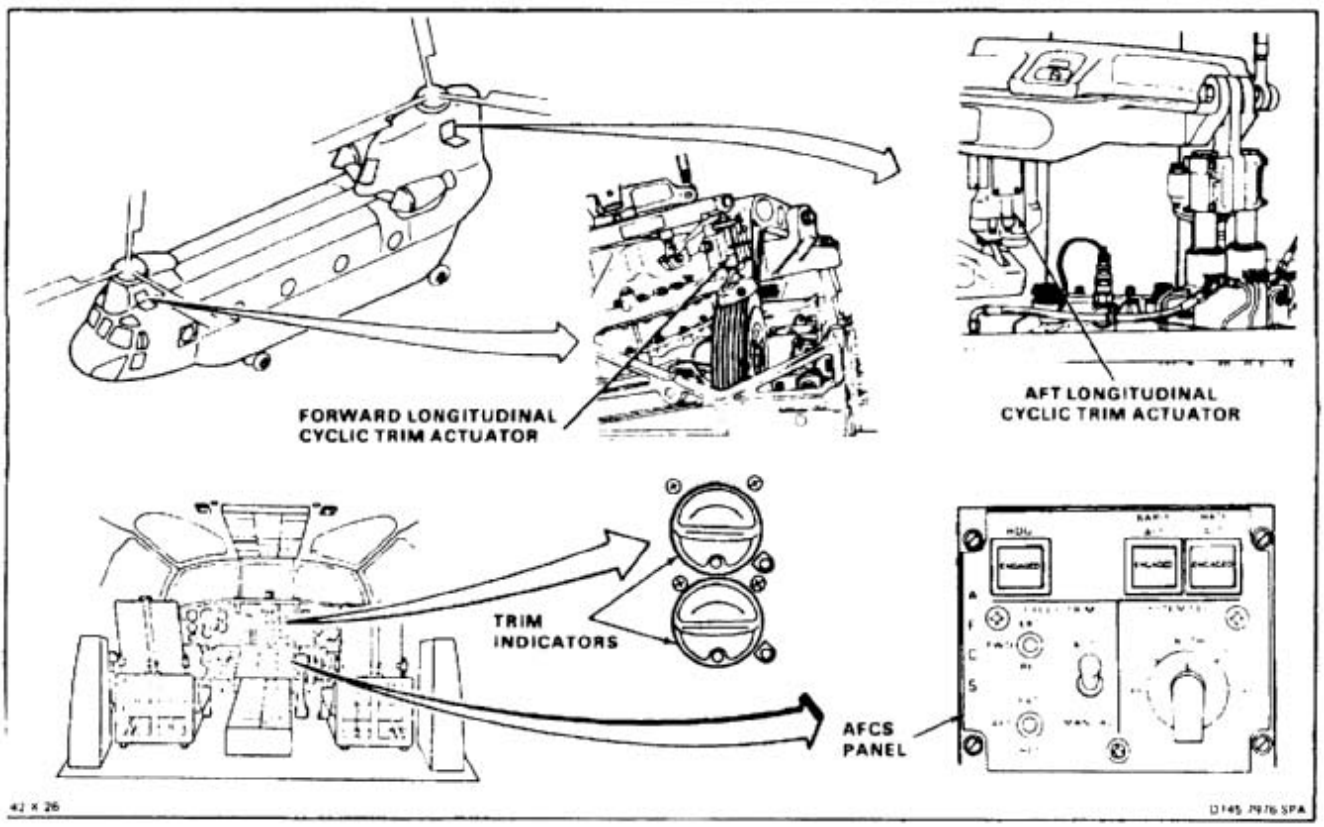
None

Personnel Required:

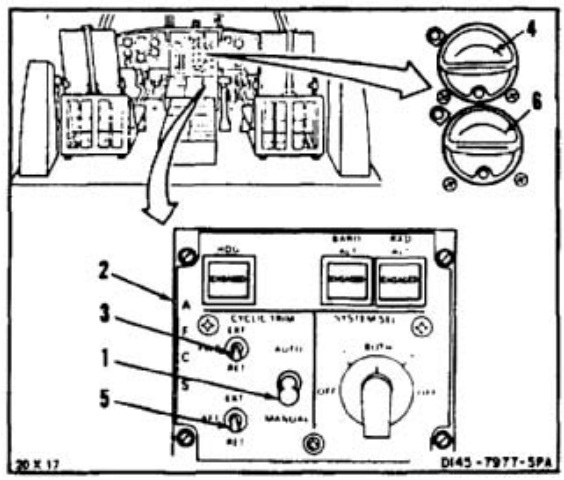
Medium Helicopter Repairer (2)
Inspector

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
CYCLIC TRIM FWD ACT Circuit Breaker On No. 1 PDP Closed
CYCLIC TRIM MAN Circuit Breaker On No. 1 PDP Closed
CYCLIC TRIM AFT ACT Circuit Breaker on No. 2 PDP Closed
Forward and Aft Left Work Platforms Open (Task 2-2)



1. Set CYCLIC TRIM switch (1) on AFCS panel (2) to MANUAL.
2. Set FWD CYCLIC TRIM switch (3) on AFCS panel (2) to RET. Release when trim indicator (4) indicates **60 knots**.
3. Set AFT CYCLIC TRIM switch (5) on AFCS panel (2) to RET. Release when trim indicator (6) indicates **60 knots**.



3.1. Working from forward left work platform, measure and record exposed portion of cyclic trim actuator piston between washer (8) and nut (9).

3.2. Working from aft left work platform, measure and record exposed portion of cyclic trim actuator piston between washer (11) and nut (12).

4. Have helper in cockpit set FWD switch (3) to EXT. Indicator (4) must indicate **150 knots**.
5. Working from forward left work platform, check forward actuator (7). Actuator must extend the measurement from step 3.1 plus **0.873 to 0.903 inch**, measure between washer (8) and nut (9).

INSPECT

6. Have helper in cockpit set AFT switch (5) to EXT. Indicator (6) must indicate **150 knots**.
7. Working from aft left work platform, check aft actuator (10). Actuator must extend the measurement from step 3.2 plus **1.223 to 1.253 inches,** measure between washer (11) and nut (12).

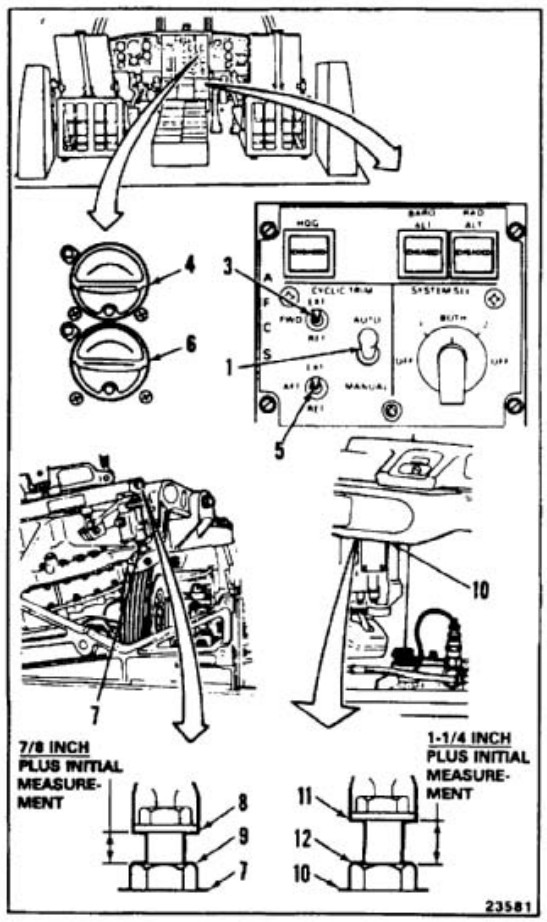
INSPECT

8. Set CYCLIC TRIM switch (1) to AUTO. Forward actuator (7) and aft actuator (10) must be in their ground position. Check that indicators (4 and 6) are in the GND position.

INSPECT

FOLLOW-ON MAINTENANCE:

Close forward and aft left work platforms (Task 2-2).



END OF TASK

11-41 SWASHPLATE BALL AND SLIDER TRAVEL CHECK 11-41

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

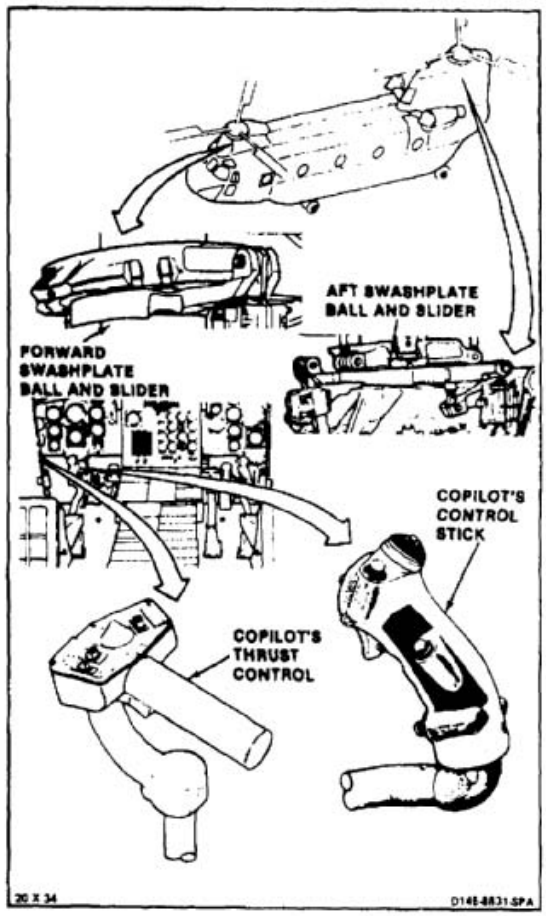
None

Personnel Required:

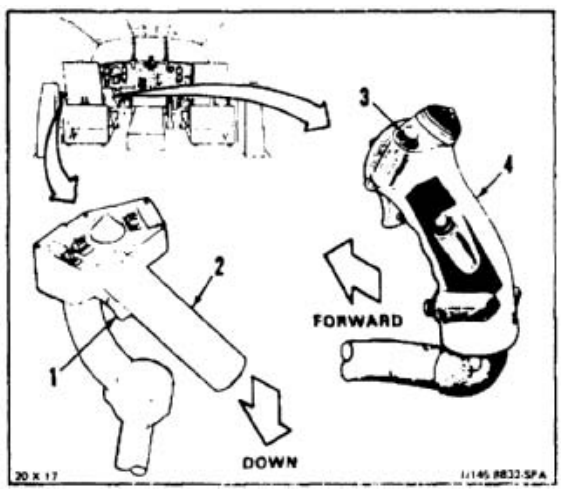
Medium Helicopter Repairer (2)
Inspector

Equipment Condition:

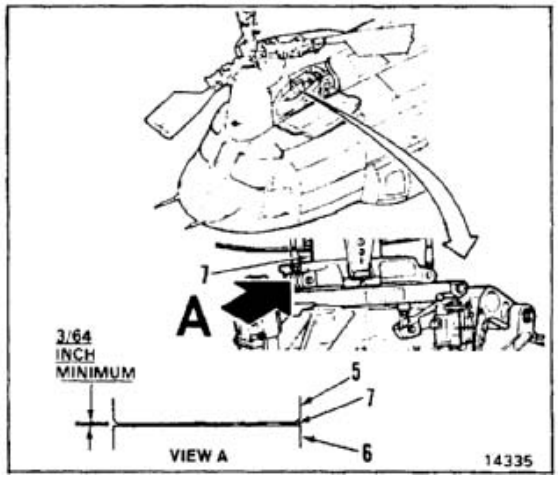
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Neutral Rig Checked (Task 11-33)
Forward and Aft Left Work Platforms Open (Task 2-2)



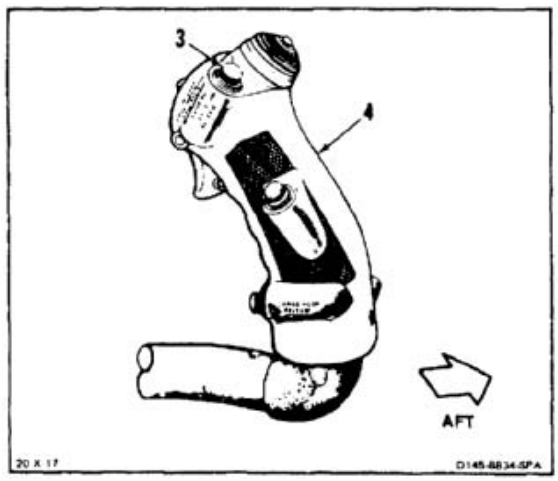
1. Have helper in cockpit, press THRUST CONT BRAKE TRIGGER (1) of copilot's thrust control (2). Position control fully down. Release trigger.
2. Press CENTERING DEVICE RELEASE switch (3) on copilot's stick (4). Position stick fully forward. Do not move stick left or right. Release switch.



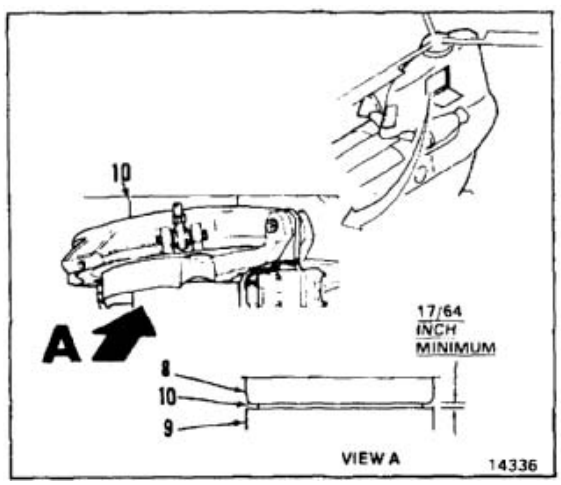
3. Working from forward left work platform, measure and record distance between bottom of swashplate ball slide (5) and stop (6) on slider guide (7). Distance must not be less than **3/64 inch**. Use a feeler gage.



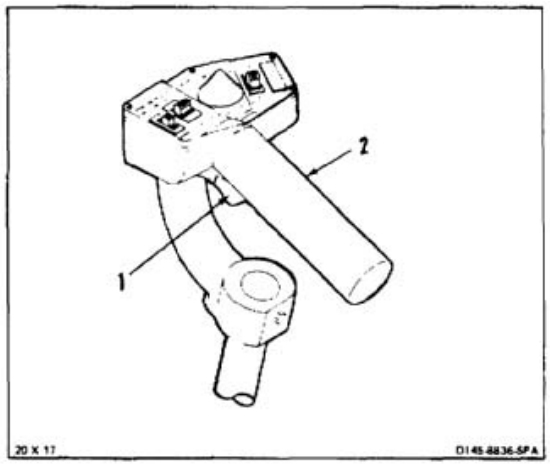
4. Press switch (3) on stick (4). Position stick fully aft. Do not move stick left or right. Release switch.



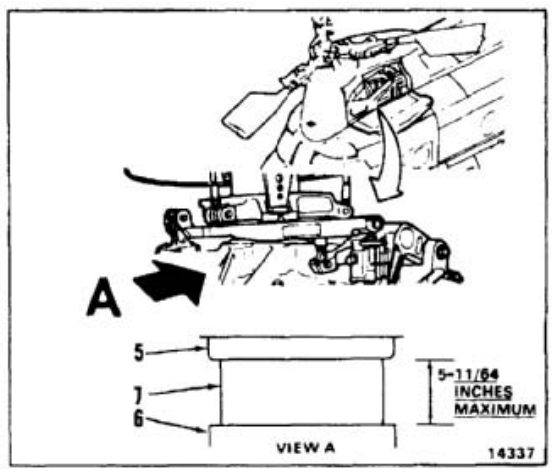
5. Working from aft left work platform, measure and record distance between bottom of swashplate ball slider (8) and stop (9) on slider guide (10). Distance must not be less than **17/64 inch**.



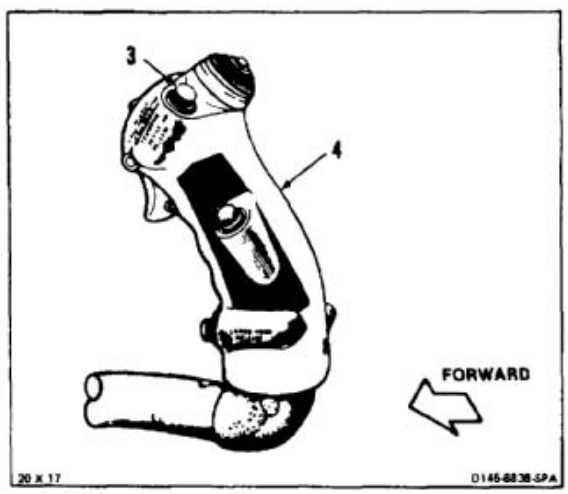
6. Press trigger (1) of control (2). Position control fully up. Release trigger.



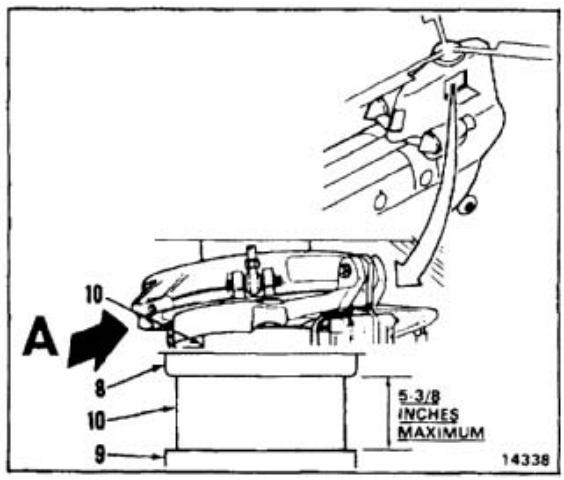
7. Repeat step 3. Distance must not be more than **5-11/64 inches**.



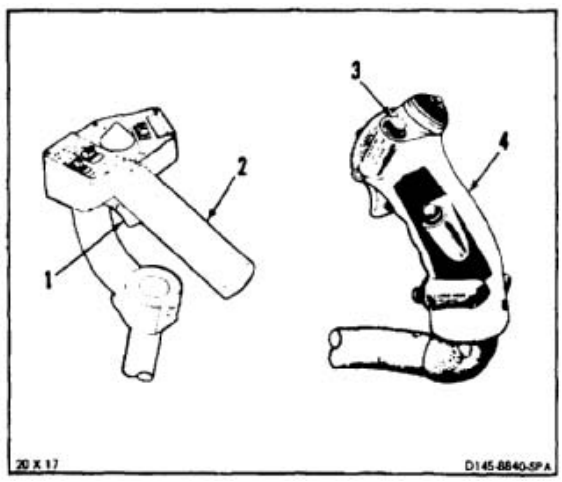
8. Press switch (3) of stick (4). Position stick fully forward. Do not move stick left or right. Release switch.



9. Repeat step 5. Distance must not be more than **5-3/8 inches**.



10. Press trigger (1). Position control (2) down to detent. Release trigger.
11. Press switch (3). Position stick (4) at neutral. Release switch.



FOLLOW-ON MAINTENANCE:

Close forward and aft left work platforms (Task 2-2).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-42 RIG COCKPIT CONTROL ASSEMBLIES 11-42

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Pedal Rig Pin (T127)
Thrust Rig Pin (T122)
Control Stick Yoke (T125)

Materials:

Cloths (E120)
Acetone (E20)
Straps (E376)
Gloves (E186)

Parts:

Gasket
Cotter Pins

Personnel Required:

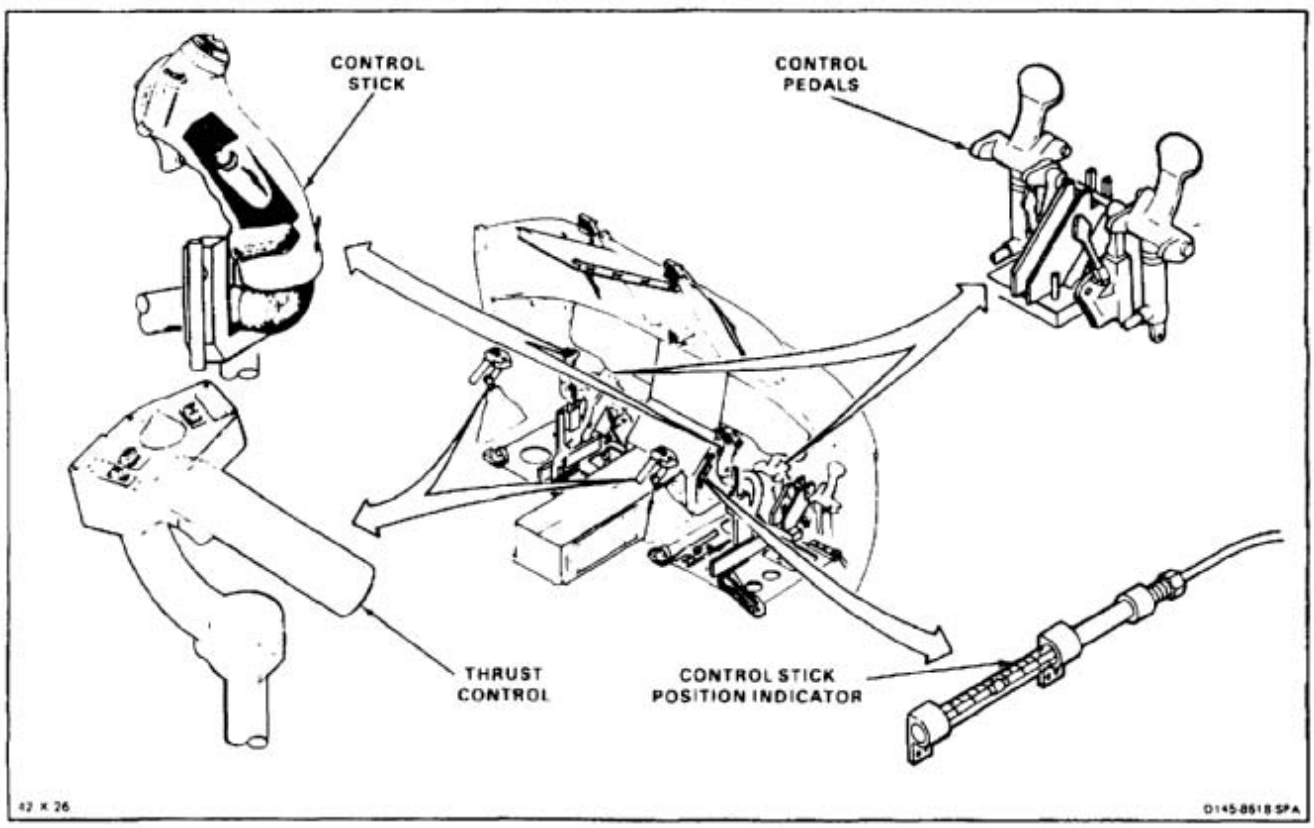
Medium Helicopter Repairer (2)
Inspector

References:

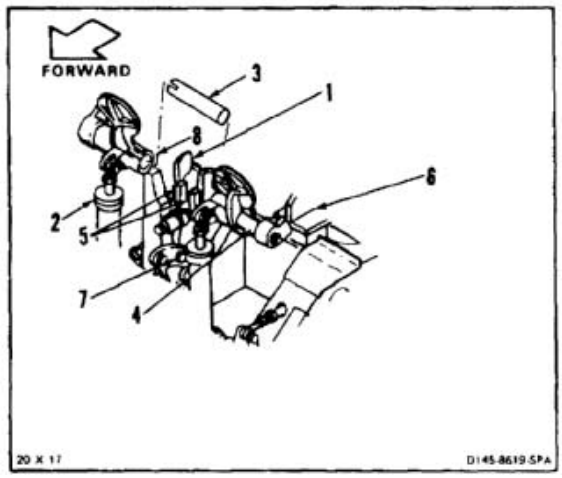
TM 55-1520-240-23P
Task 11-30
Task 11-43

Equipment Condition:

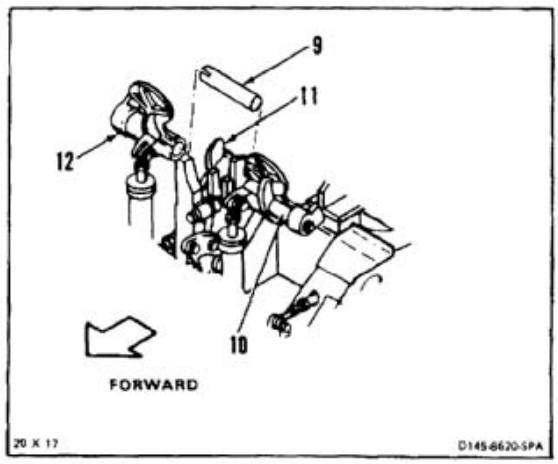
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Rigging Fixture (T123) Installed on Pilot and Copilot Control Assemblies (Task 11-22)
Yoke (T125) Installed on Copilot Control Stick (Task 11-22)
Rig Pin (T127) Installed on Copilot Pedals (Task 11-22)
Pilot Control Assembly Rigged (Task 11-80)
Copilot Control Assembly Rigged (Task 11-79)
Closet Acoustic Blanket Removed (Task 2-107)



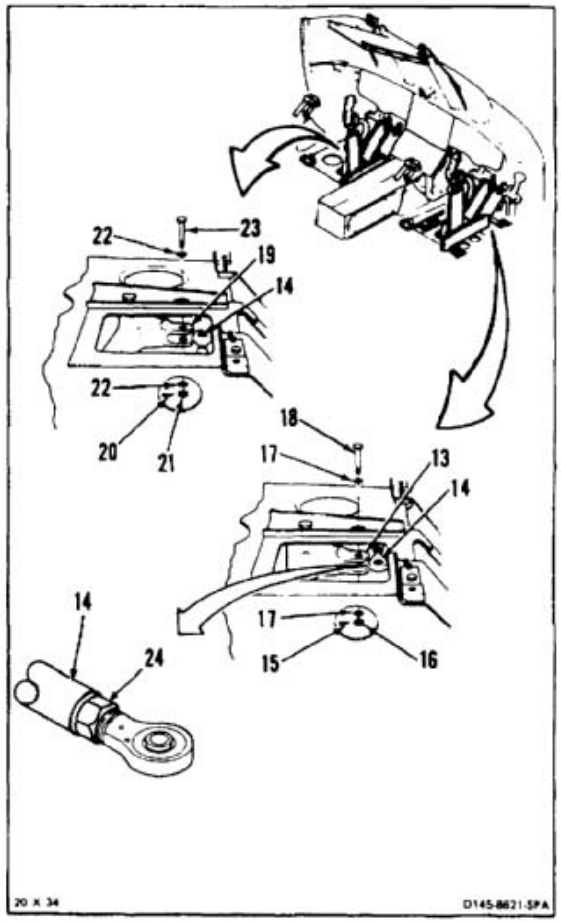
1. Rig yaw controls. Press lever (1) of pilot's pedals. Position right pedal (2) forward. Install pedal rig pin (T127) (3) in left pedal tube (4) and between two lugs (5) of fixture (6).
2. Pull pedal (2) aft to center adjustment hole (7). Release lever (1). Align pedal tube (8) and pin (3). Slide pin in tube. If pin slides in tube, go to step 19. If pin and tube do not align, perform steps 3 thru 18.



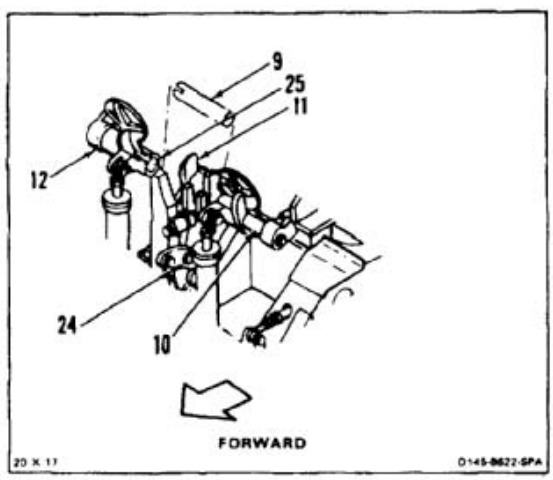
3. Slide rig pin (T127) (9) of copilot's pedals, in pedal tube 10. Press lever (11) and position pedal (12) forward. Release lever.
4. Remove pin (9) from tube (10).



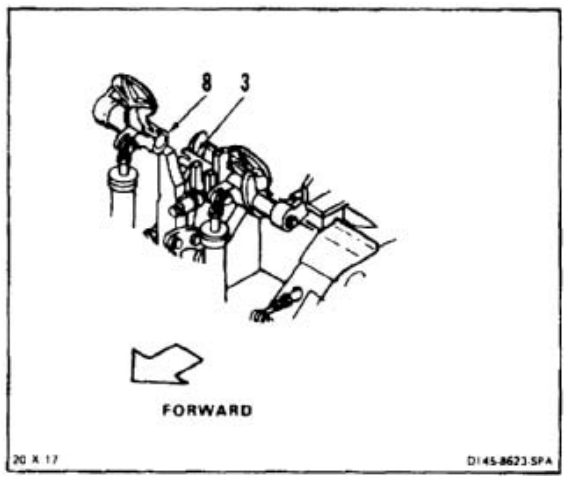
5. Move bellcrank (13) for access to link (14).
6. Remove cotter pin (15), nut (16), two washers (17), and bolt (18) from bellcrank (13). Disconnect link.
7. Move bellcrank (19) for access to link (14).
8. Remove cotter pin (20), nut (21), two washers (22), and bolt (23) from bellcrank (19). Disconnect link (14) from bellcrank. Slide link fully right.
9. Loosen nut (24) of link (14).
10. Slide link (14) left. Position link in two bellcranks (13 and 19). Install bolt (23) loosely in bellcrank (19) and link (14).



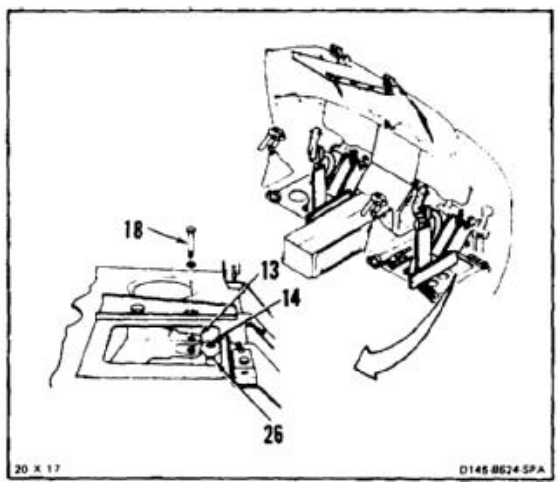
11. Install pin (9) in tube (10) of copilot's pedal.
12. Press lever (11). Pull right pedal (12) aft to center adjustment hole (24). Release lever (11). Align pedal tube (25) and pin (9). Slide pin in tube.



13. Align pilot's pedal tube (8) and pin (3). Slide pin in tube.



14. Turn rod end (26) of link (14) until link can be positioned in bellcrank (13) with bolt (18) installed loosely.



15. Remove two bolts (18 and 23) from bellcranks (13 and 19). Slide link (14) right. Torque nut (24) to **103 inch-pounds**.

CAUTION

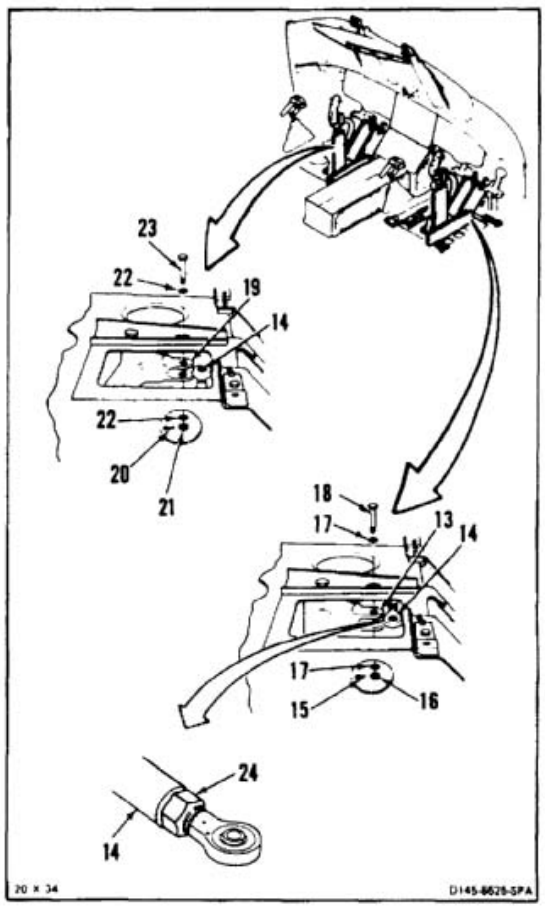
Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

16. Position link (14) in bellcranks (13 and 19). Install two bolts (18 and 23), four washers (22 and 17), and nuts (16 and 21) in bellcranks.

17. Torque two nuts (16 and 21) to **30 to 45 inch-pounds**. Install two cotter pins (15 and 20).

18. Check two bolts (18 and 23). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 17.

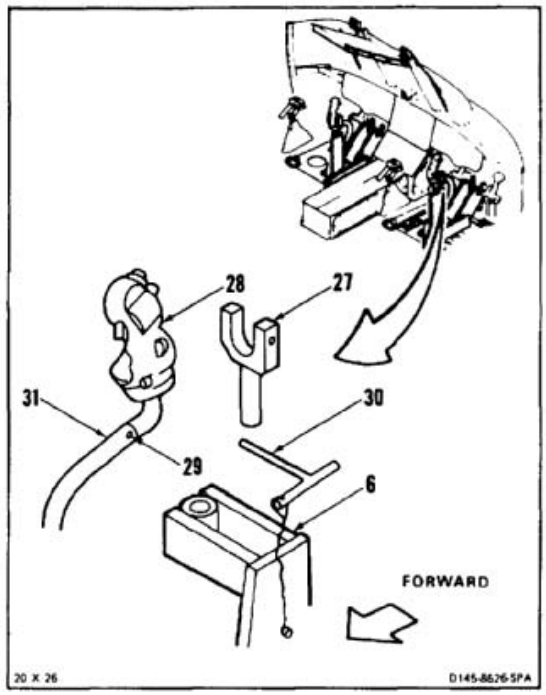
INSPECT



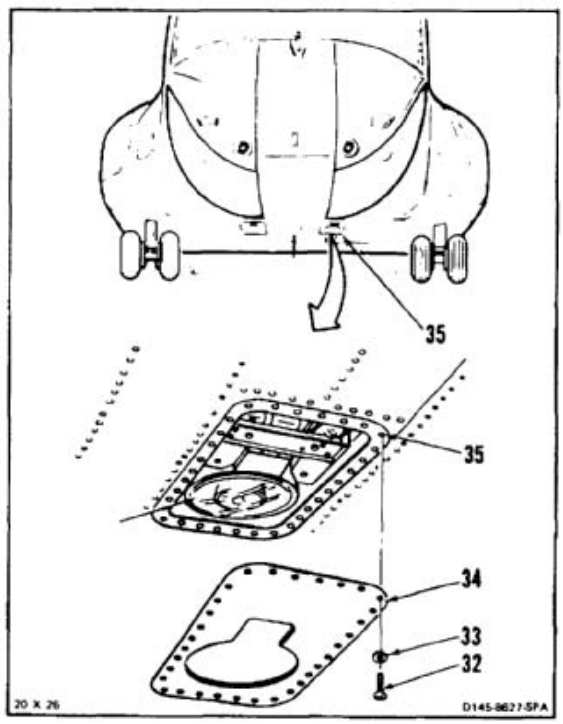
RIG PITCH AND ROLLS CONTROL

19. Install yoke (T125) (27) in pilot's fixture (6).

20. Lift yoke (27) and position between grip (28) and first rivet (29) from grip. Install yoke pin (30) in yoke. If yoke positions on control stick (31), go to step 42. If yoke does not position on stick, perform steps 21 thru 41.



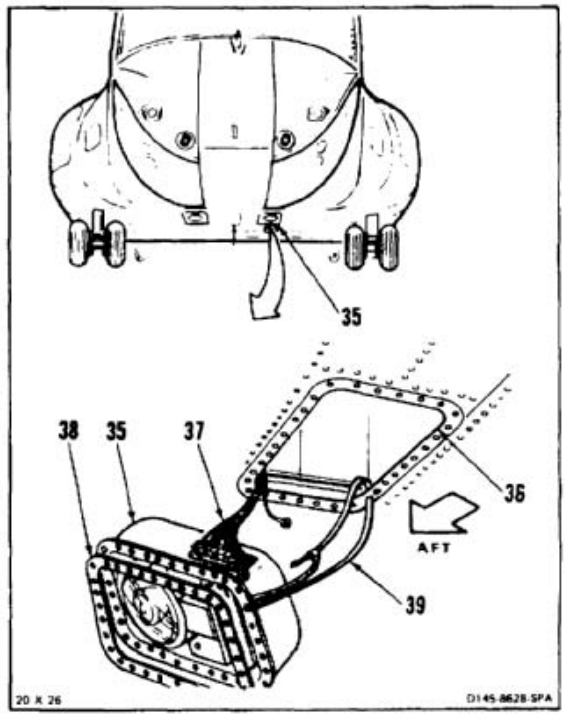
21. Working outside aircraft, remove 32 screws (32) and washers (33) from housing (34) of left landing light housing (35). Remove housing.



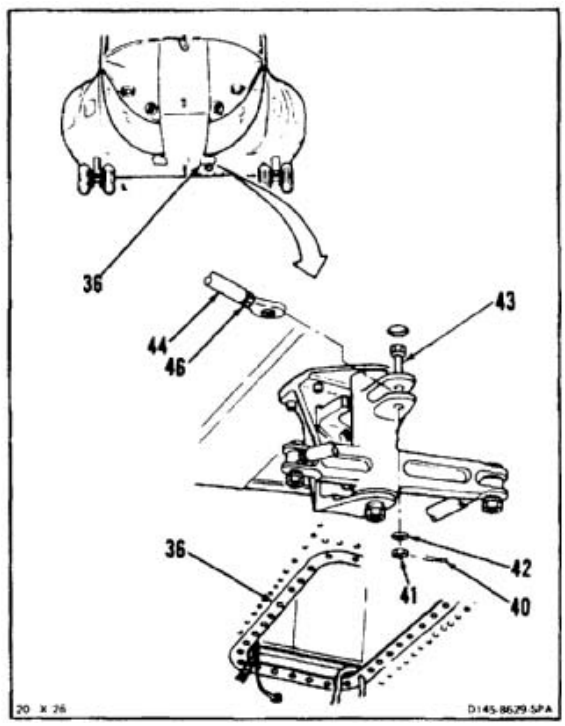
CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

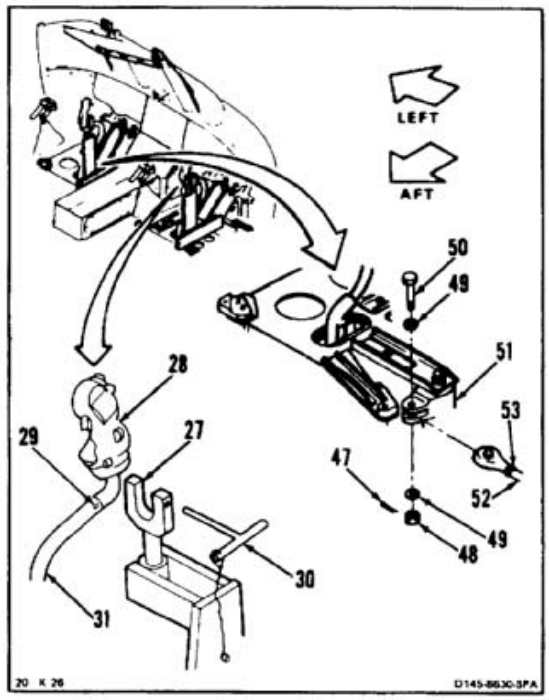
22. Remove left landing light housing (35) from access (36). Support housing so it does not hang by wires (37).
23. Remove gasket (38) from housing (35).
24. Strap housing (35) to access (36) at aft end with strap (39). Wires (37) must not support housing. Use strap (E376).



25. Working through left access (36), remove cotter pin (40), nut (41), and washer (42) from bolt (43).
26. Lift bolt (43) to release link (44). Disconnect link from bellcrank (45). Lower bolt in bellcrank.
27. Loosen nut (46) on link (44).

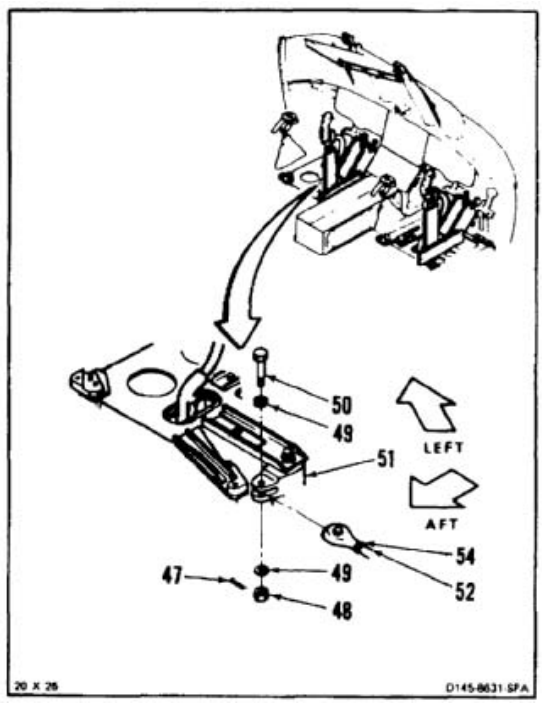


28. Working in cockpit, remove cotter pin (47), nut (48), two washers (49), and bolt (50) from bellcrank (51).
29. Disconnect link (52) from bellcrank (51). Move link aft.
30. Loosen nut (53) on link (52).
31. Lift yoke (27) and position between grip (28) and first rivet (29) from grip of pilot's control stick (31). Install yoke pin (30) in yoke.



32. Turn rod end (54) of link (52) until link can be positioned in bellcrank (51) with bolt (50) installed loosely.
33. Torque nut (54) of link (52) to **103 inch-pounds**.
34. Install bolt (50), two washers (49), and nut (48) in bellcrank (51).
35. Torque nut (48) to **30 to 45 inch-pounds**. Install cotter pin (47).
36. Check bolt (50). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 35.

INSPECT



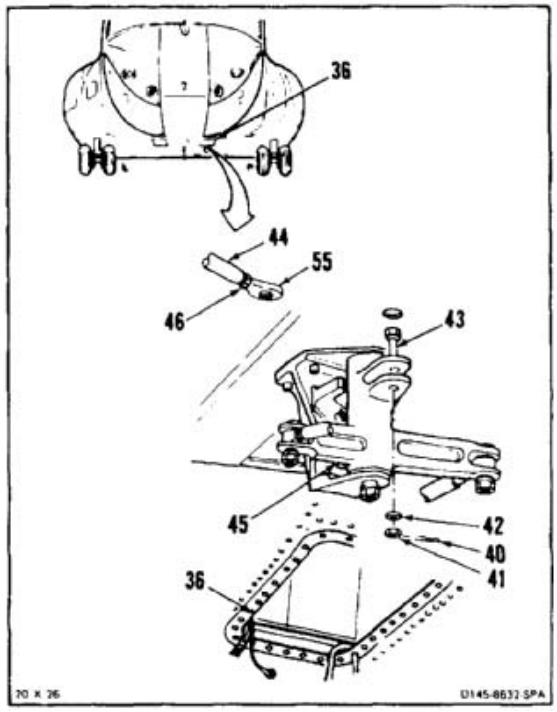
37. Working through left access (36), turn rod end (55) of link (44) until link can be positioned in bellcrank (45) with bolt (43) installed loosely.

38. Torque nut (46) of link (44) to **103 inch-pounds**.

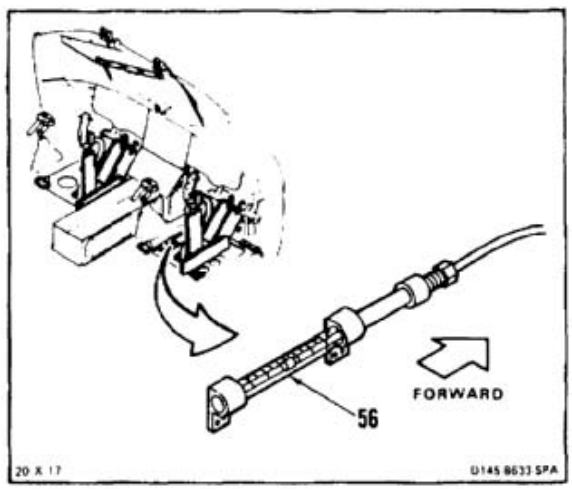
39. Install bolt (43), washer (42), and nut (40) in bellcrank (45).

40. Torque nut (41) to **30 to 45 inch-pounds**. Install cotter pin (40).

41. Check bolt (43). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step (40).



42. Working in cockpit, check control stick position indicator (56). Indicator must indicate 1 division forward of N, if not adjust indicator (Task 11-45).



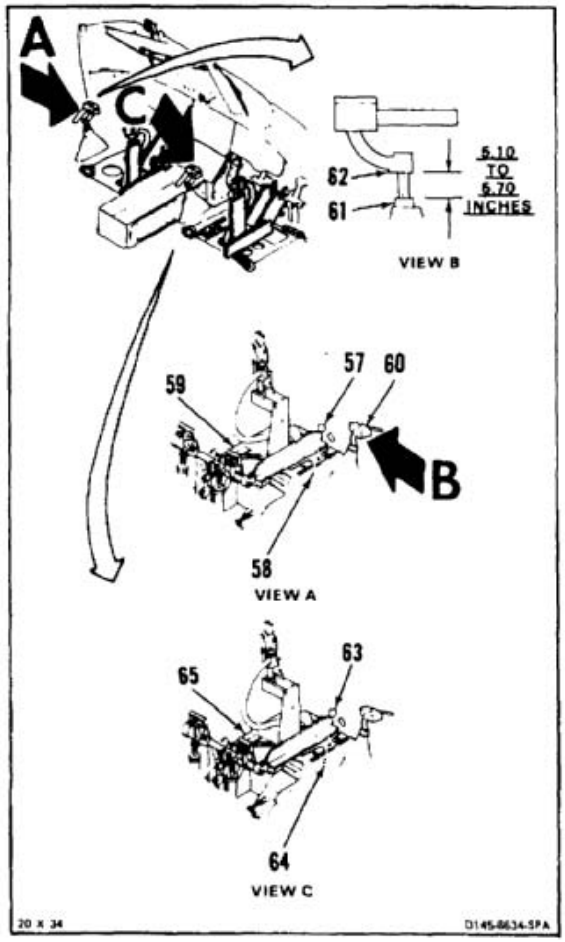
RIG THRUST CONTROLS

43. Working in cockpit, install thrust rig pin (57) in hole (58) of copilot's control support (59). Move thrust control (60) up or down until pin slides fully down in hole.

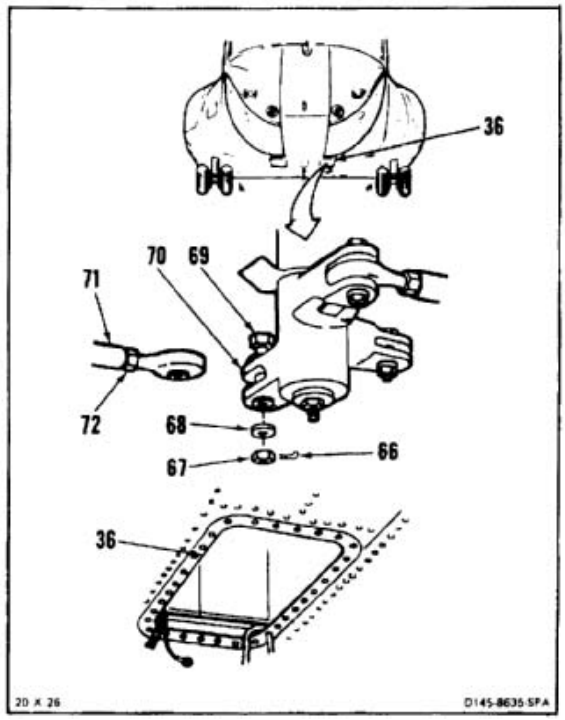
44. Check position of control (60). Measure and record distance between pivot block (61) and grip (62). Distance must be **5.10 to 5.70 inches**. If distance is same, go to step 46. If distance is not same, perform step 45.

45. Rig thrust control (Task 11-43).

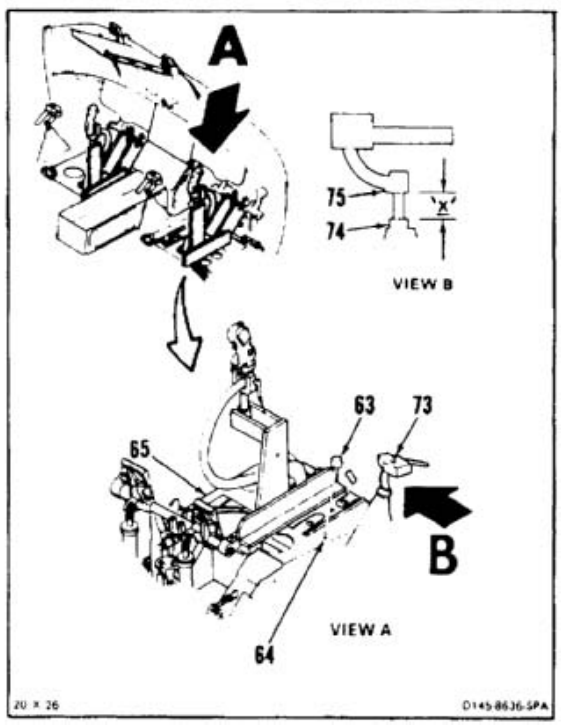
46. Install thrust rig pin (63) in hole (64) of pilot's control support (65). Pin must slide freely fully down in hole. If pin slides fully down go to step 58. If pin does not slide fully down, perform steps 21 thru 24, then steps 47 thru 57.



47. Working through left access (36) remove cotter pin (66), nut (67), and washers (68) from bolt (69) of bellcrank (70).
48. Lift bolt (69) to release link (71). Disconnect link from bellcrank (70). Lower bolt in bellcrank.
49. Loosen nut (72) of link (71).

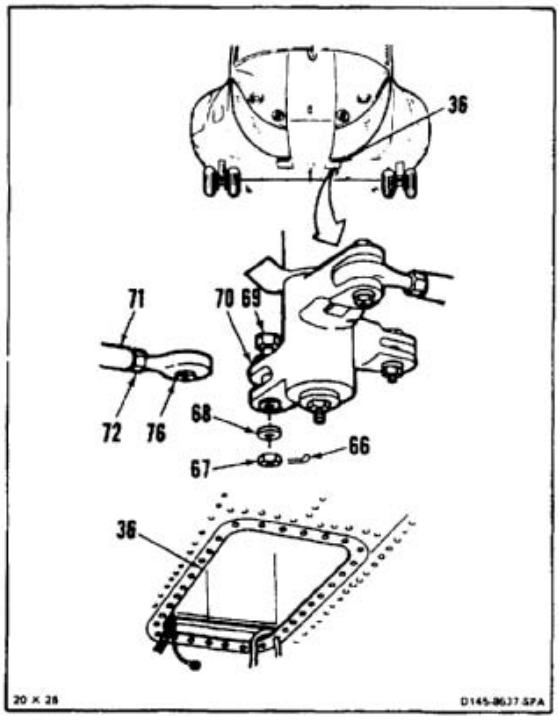


50. Working in cockpit, install pin (63) in hole (64) of pilot's support (65) until fully down in hole.
51. Check position of control (73). Distance 'X' between pivot block (74) and grip (75) must not be more than **0.06 inch** up or down from distance measured in step 44 or 45. If distance is same, go to step 53. If distance is not same, perform step 52.
52. Rig thrust control (Task 11-43).



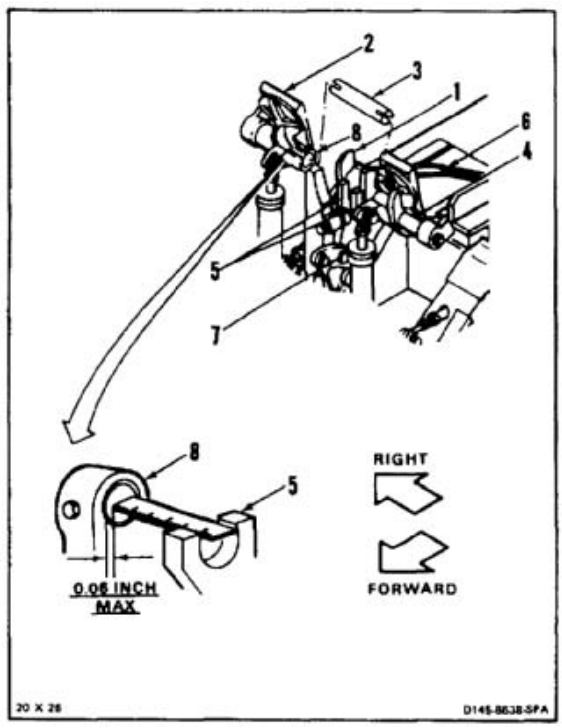
53. Working through left access (36) turn rod end (76) of link (71) until link can be positioned in bellcrank (70) with bolt (69) installed loosely.
54. Torque nut (72) of link (71) to **103 inch-pounds**.
55. Install bolt (69), washer (68), and nut (67) in bellcrank (70).
56. Torque nut (67) to **30 to 45 inch-pounds**. Install cotter pin (66).
57. Check bolt (69). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step (56).

INSPECT



NEUTRAL ALIGNMENT CHECK

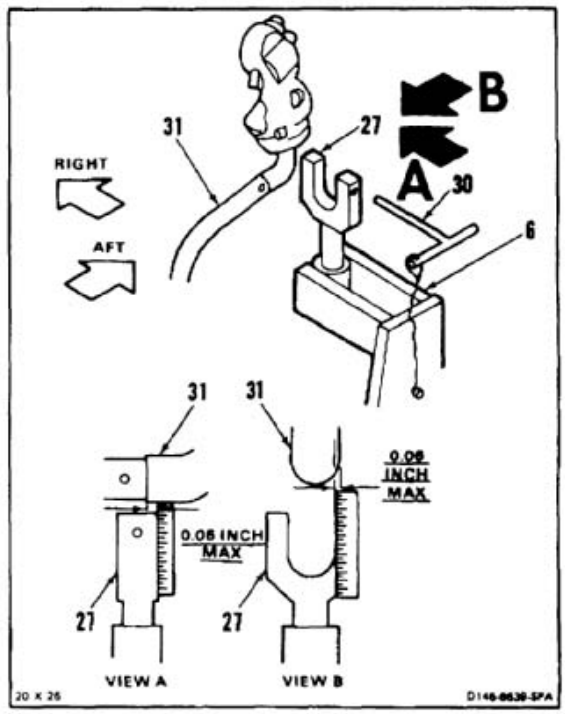
58. Working in cockpit, slide pin (3) out of pilot's pedal tube (8). Press lever (1) and position right pedal (2) forward. Release lever.
59. Remove pin (3) from tube (4).
60. Press lever (1). Pull pedal (2) aft to center adjustment hole (7). Release lever.
61. Check position of pedal tubes (4 and 8). Measure tube positions from lugs (5) of fixture (6). Distance must not be more than **0.06 inch** forward or aft. If distance is not more, go to step 62. If distance is more, repeat steps 1 thru 18, then steps 58 thru 61.



62. Hold yoke (27) of pilot's fixture (6). Remove pin (30). Lower yoke fully in fixture.

63. Position yoke (27) **90°** to control stick (31).

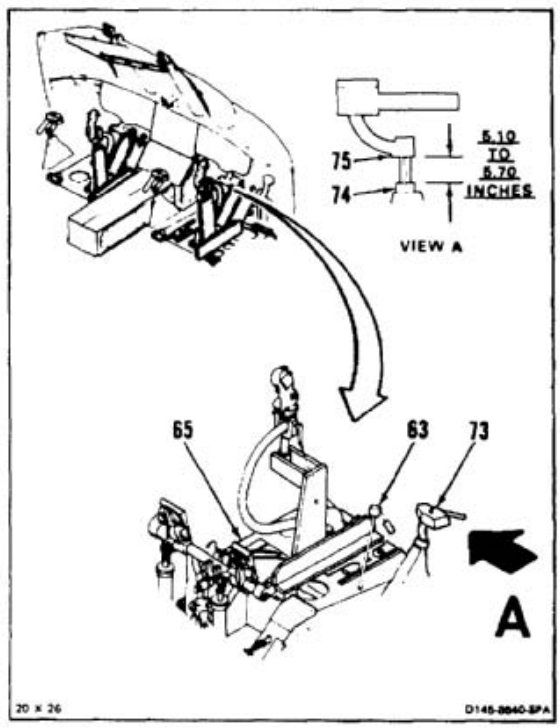
64. Check position of stick (31) forward or aft, then right or left. Measure distance between yoke (27) and stick. Distance must not be more than **0.06 inch**. If distance is not more go to step 65. If distance is more repeat steps 25 thru 41 then steps 62 thru 64.



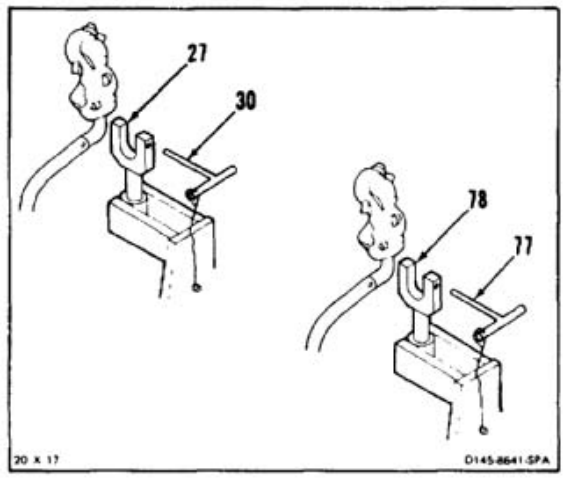
65. Check position of pilot's control (73). Measure distance 'Y' between pivot block (74) and grip (75). Record distance.

66. Remove pin (63) from pilot's support (65).

67. Repeat step 65. Distance must not be more than **0.06 inch** up or down from distance measured in step 65. If distance is not more go to step 68. If distance is more repeat steps 46 thru 57 then steps 65 thru 67.

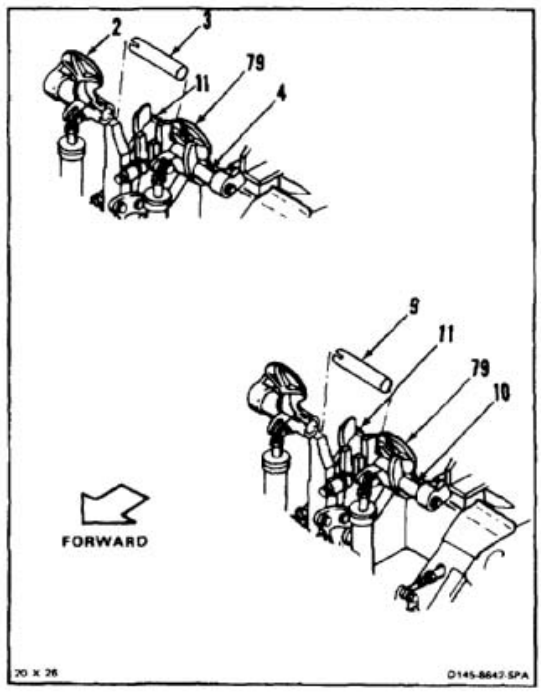


68. Remove two pins (30 and 77) from pilot's yoke (27) and copilot's yoke (78).



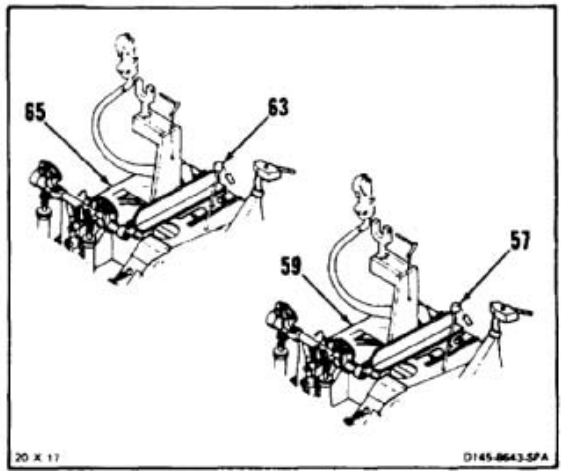
69. Slide pins (3 and 9) in tubes (4 and 10) of pilot's and copilot's pedals (79). Press two levers (11) and position pedals forward. Release levers.

70. Remove pins (3 and 9) from tubes (4 and 10).



71. Remove pin (63) from pilot's control support (65).

72. Remove pin (57) from copilot's control support (59).

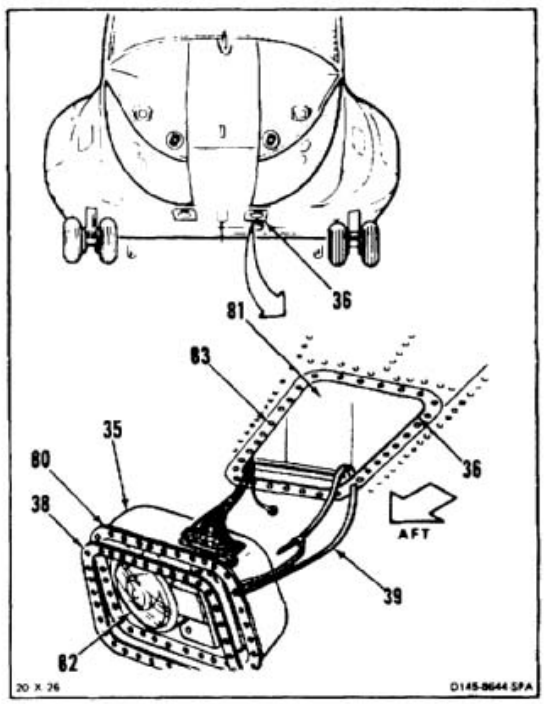


WARNING

Acetone (E20) is extremely flammable. It can be toxic. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes or clothing. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

73. Working outside aircraft, clean sealant from flange (80) and inside surface (81) of access (36). Use acetone (E20) and cloths (E120). Use gloves (E186).

74. Support landing light housing (35). Remove strap (39).



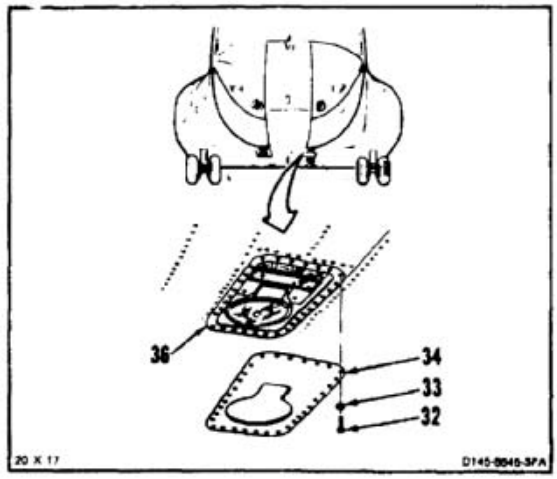
WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

75. Apply sealant (E336) to both sides of new gasket (38). Install gasket on flange (80). Remove excess sealant with acetone (E20) and cloths (E120). Use gloves (E186).

76. Tilt housing (35) and position inside access (36), lamp (82) aft. Align housing and access holes (83).

77. Position housing (34) over access (36). Install 32 washers (33) and screws (32).



INSPECT

FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove pilot's and copilot's rigging tool (T39) (Task 11-23).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform artificial feel forces check (Task 11-34).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-43 RIG PILOT'S OR COPILOT'S THRUST CONTROL 11-43

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Strap (E376)
Acetone (E20)
Cloths (E120)
Sealant (E336)
Gloves (E186)

Parts:

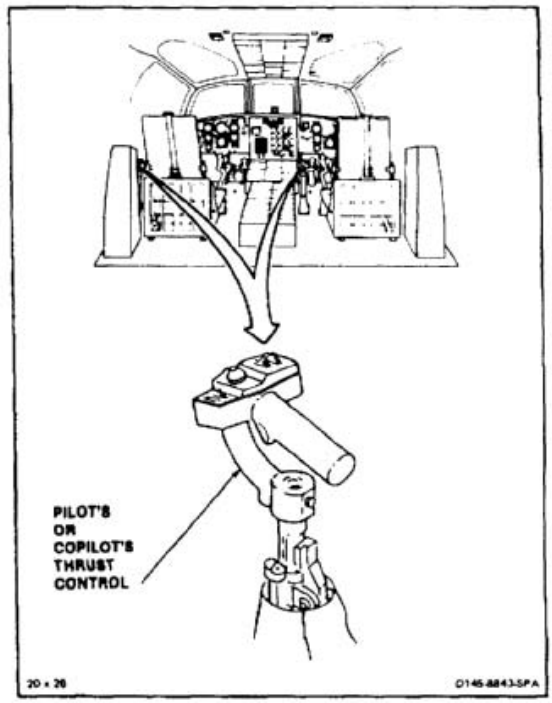
Cotter Pin

Personnel Required:

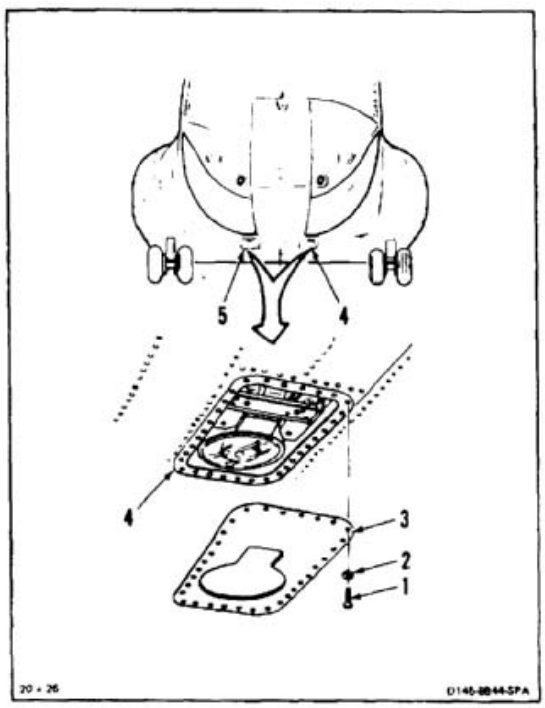
Medium Helicopter Repairer (2)
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pilots and Copilot's Cockpit Controls Rigged (Task 11-42)
Pilot's and Copilot's Thrust Rig Pins (T122) Installed (Task 11-22)



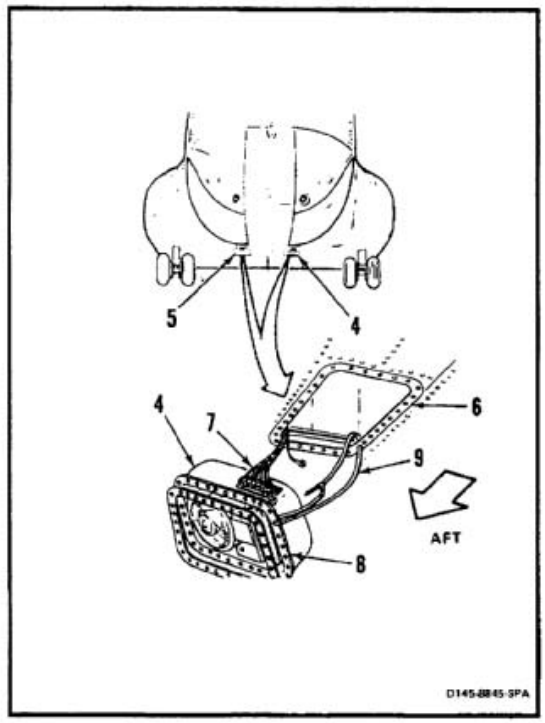
1. Remove 32 screws (1) and washers (2) from housing (3) of left landing light housing (4). Remove housing.
2. Repeat step 1 for right landing light housing (5).



CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

3. Remove left landing light housing (4) from access (6). Support housing so it does not hang by wires (7).
4. Remove gasket (8) from housing (4).
5. Strap housing (4) to access (6) at aft end of access with strap (9). Wires (7) must not support housing. Use strap (E376).
6. Repeat steps 4 and 5 for right landing light housing (5).

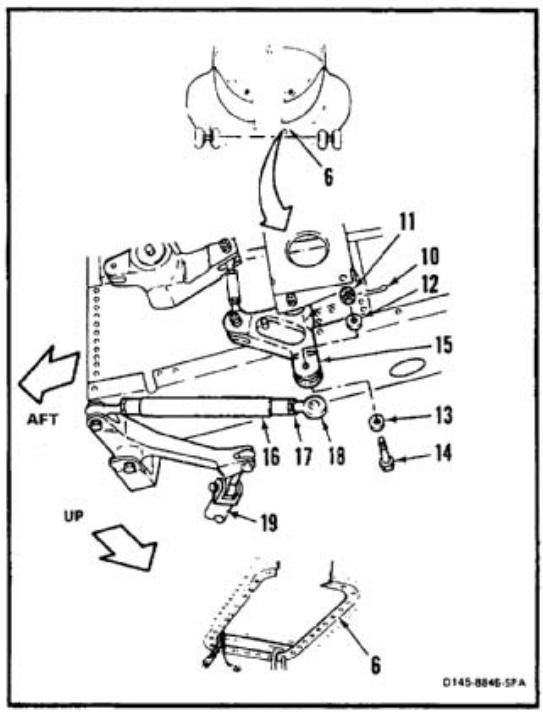


RIG COPILOT'S THRUST CONTROL

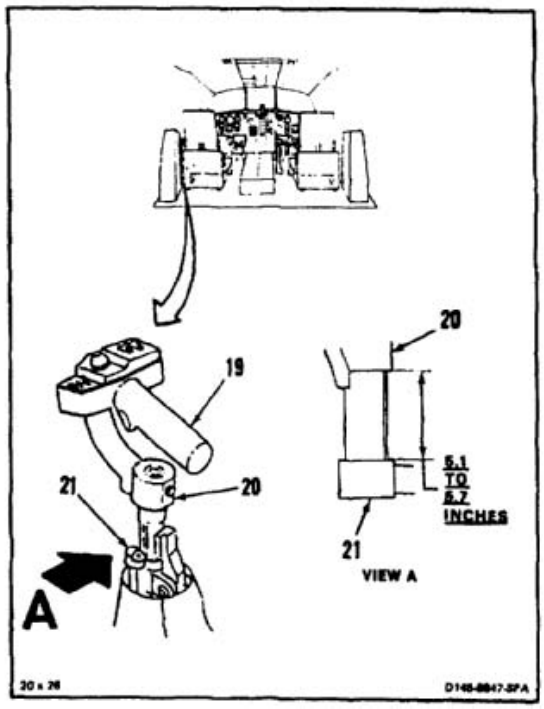
CAUTION

Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

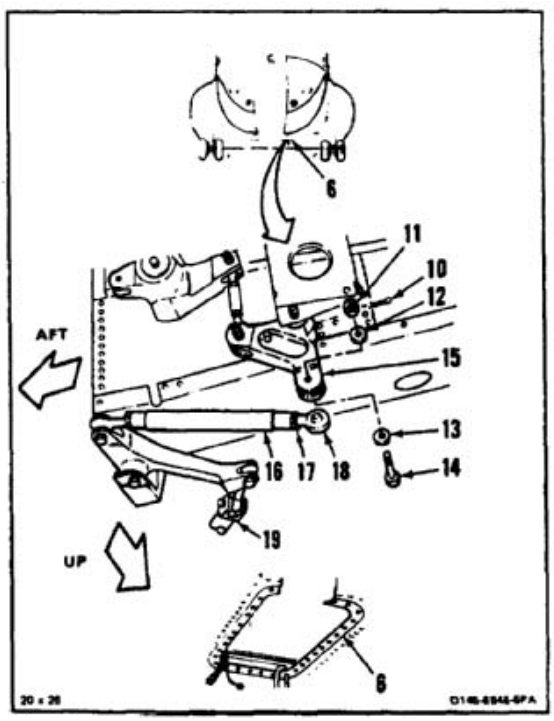
7. Working through left access (6), remove cotter pin (10), nut (11), two washers (12 and 13) and bolt (14) from bellcrank (15).
8. Disconnect connecting link (16) from bellcrank (15). Loosen nut (17) on link.
9. Turn rod end (18). One turn moves thrust control (19) **0.18 inch**. Turn clockwise to move control (19) up.
10. Position link (16) in bellcrank (15). Install bolt (14) loosely in bellcrank.



11. Have helper in cockpit, measure distance between grip (20) and pivot block (21) of control (19). Distance must be **5.1 to 5.7 inches**. If not repeat steps 7 thru 11.



12. Working through left access (6) torque nut (17) to **103 inch-pounds**.
13. Remove bolt (14) from bellcrank (15).
14. Install bolt (14), two washers (13 and 12) and nut (11) in bellcrank (15).
15. Torque nut (11) to **30 to 45 inch-pounds**. Install cotter pin (10).
16. Check bolt (14). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose add washer under nut and repeat step 15.



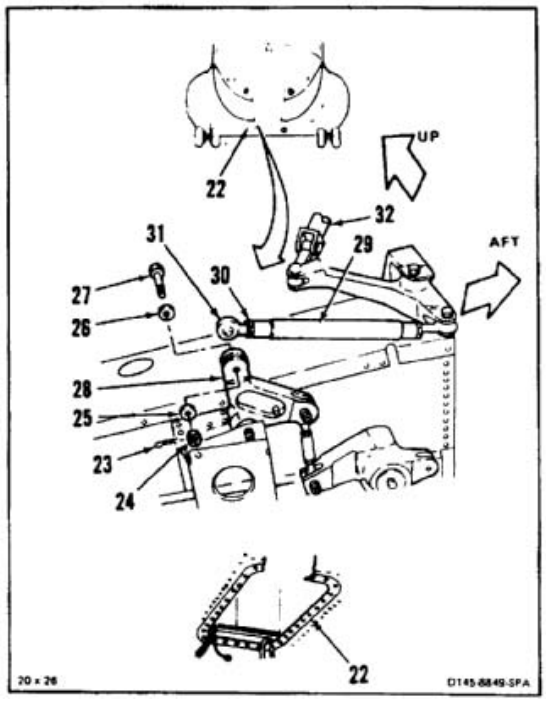
RIG PILOT'S THRUST CONTROL

17. Working through right access (22), remove cotter pin (23), nut (24), two washers (25 and 26), and bolt (27) from bellcrank (28).

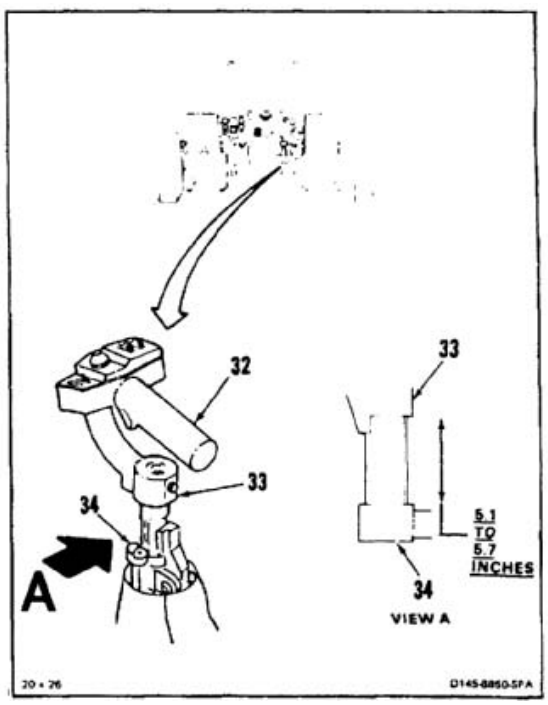
18. Disconnect connecting link (29) from bellcrank (28). Loosen nut (30) on link.

19. Turn rod end (31). One turn moves thrust control (32) **0.18 inch**. Turn clockwise to move control (32) up.

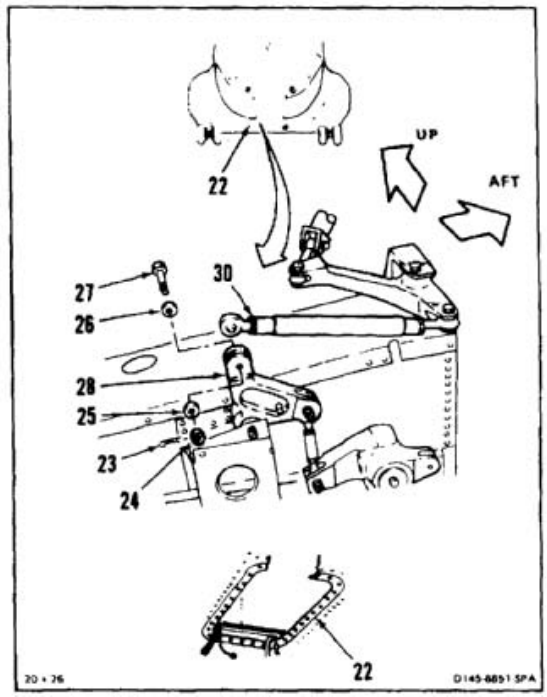
20. Position link (29) in bellcrank (28). Install bolt (27) loosely in bellcrank.



21. Have helper in cockpit, measure distance between grip (33) and pivot block (34) of control (32). Distance must be **5.1 to 5.7 inches**. If same go to step 21. If not repeat steps 16 thru 20.



22. Working through right access (22), torque nut (30) to **103 inch-pounds**.
23. Remove bolt (27) from bellcrank (28).
24. Install bolt (27), two washers (25 and 26) and nut (24) in bellcrank (28).
25. Torque nut (24) to **30 to 45 inch-pounds**. Install cotter pin (23).
26. Check bolt (27). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 24.



WARNING

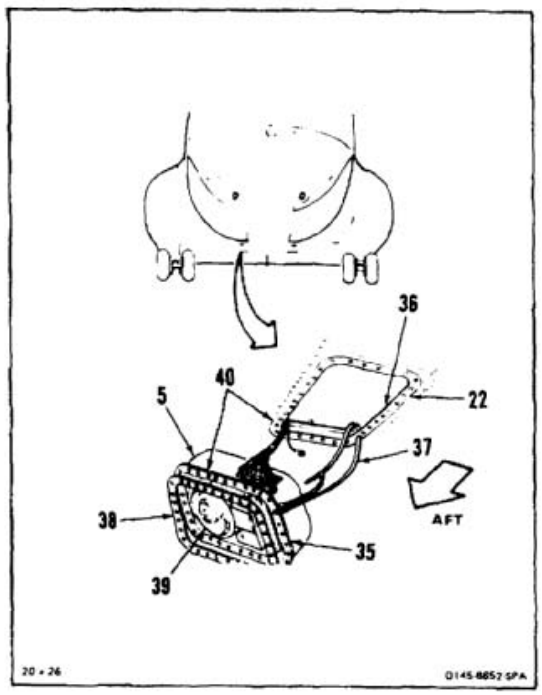
Acetone (E20) can form toxic vapors if exposed to flame. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

27. Clean sealant from flange (35) and inside surface (36) of access. Use goggles, acetone (E20), and cloths (E120). Use gloves (E186).
28. Support right housing assembly (5). Remove strap (37).

WARNING

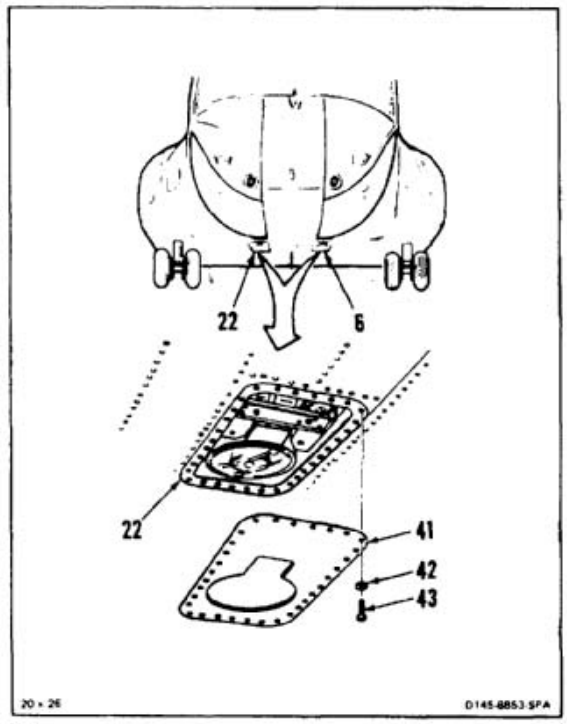
Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

29. Apply sealant (E336) to both sides of gasket (38). Install gasket on flange (35).
30. Remove excess sealant with acetone (E20) and cloths (E120). Use goggles for eyes. Use gloves (E186).
31. Tilt housing assembly (5) and position up and inside access (22), lamp (39) aft. Align housing and access holes (40).
32. Repeat steps 27 thru 31 for left housing, then go to step 33.



33. Position housing (41) over right access (22). Install 32 washers (42) and screws (43).

34. Repeat step 33 for left access (6), then go to inspect.



INSPECT

FOLLOW-ON MAINTENANCE:

Remove pilot's and copilot's thrust rig pins (T122) (Task 11-23).
Perform operational check of flight controls (TM 55-1520-240-T).
Perform operational check of landing light (TM 55-1520-240-T).

END OF TASK

11-44 RIG PITCH OVERTRAVEL STOP 11-44

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Straps (E376)
Acetone (E20)
Cloths (E120)
Sealant (E336)
Gloves (E186)

Parts:

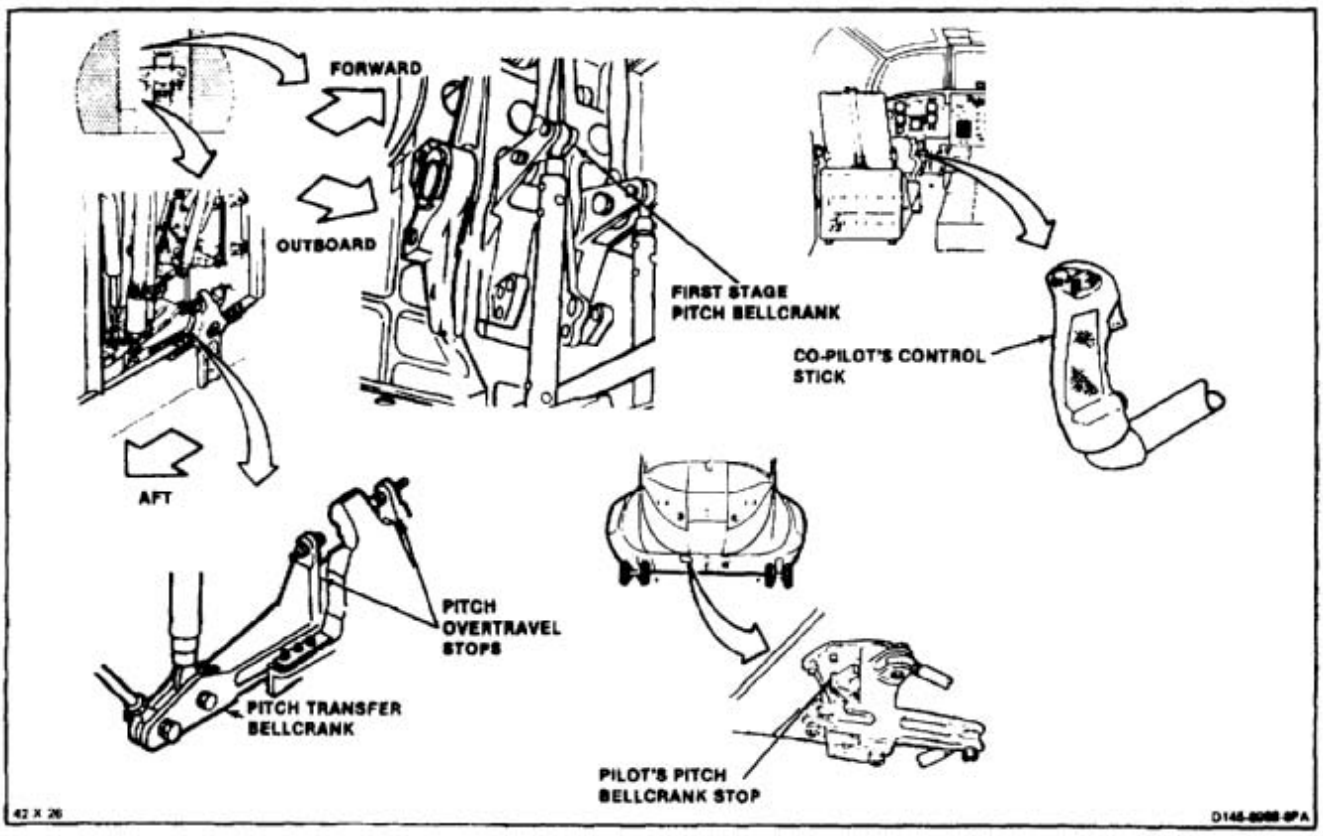
Gasket

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

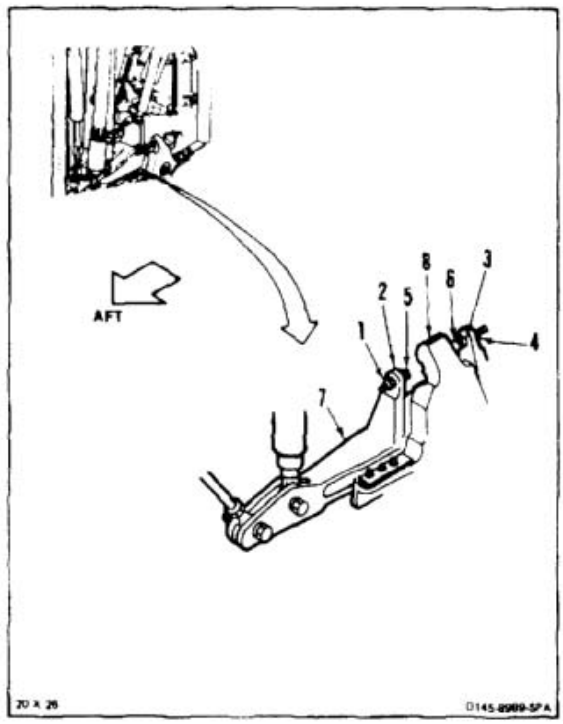
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Cockpit Controls Rigged (Task 11-42)
Cockpit Transfer Bellcranks Rigged (Task 11-46)
First and Second Stage Bellcranks Rigged (Task 11-51)
DASH Actuator Removed (Task 11-163)
DASH Actuator Dummy Link Installed (Task 11-26)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Passageway Overhead Acoustic Blanket Removed (Task 2-2)

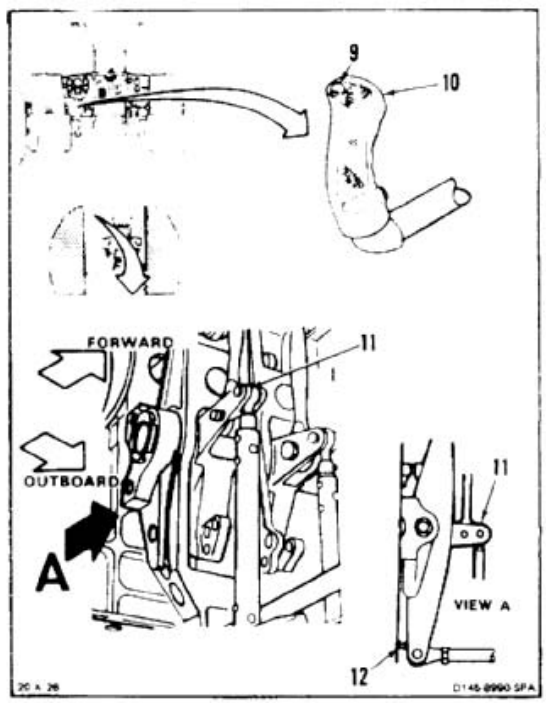


11-44 RIG PITCH OVERTRAVEL STOP (Continued) 11-44

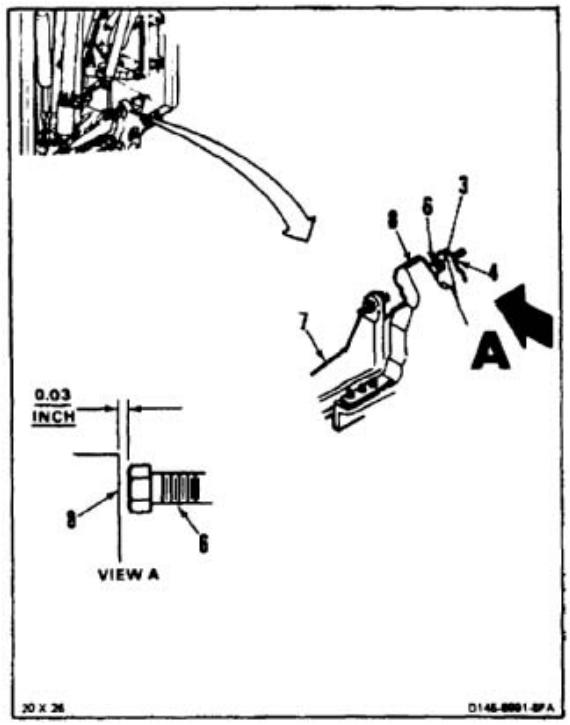
1. Loosen four nuts (1, 2, 3, and 4) on two stop bolts (5 and 6) of bellcrank (7).
2. Turn bolts (5 and 6) clockwise about four turns. Bolts must move away from support (8).



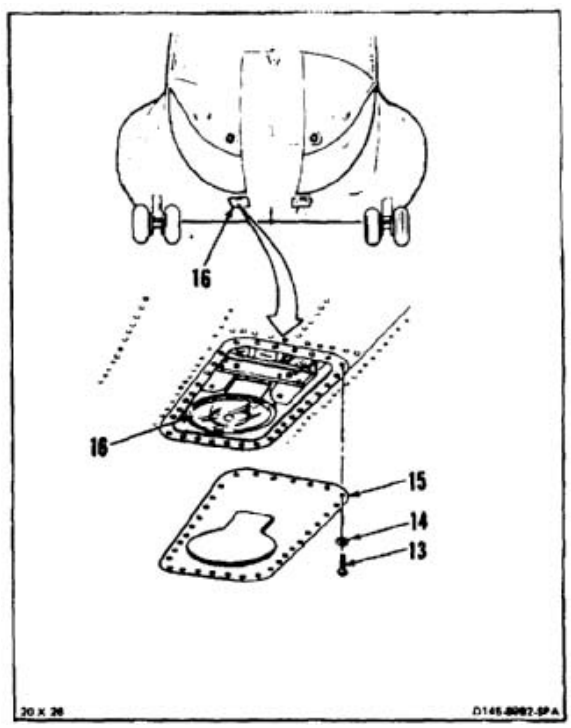
3. Have helper in cockpit press CENTERING DEVICE RELEASE switch (9) and position copilot's control stick (10) forward until bellcrank (11) just touches lower stop (12). Hold stick position. Release switch.



4. Working from passageway, turn bolt (6) of bellcrank (7) counterclockwise until gap between bolt and support (8) is **0.03 inch**. Tighten two nuts (3 and 4).



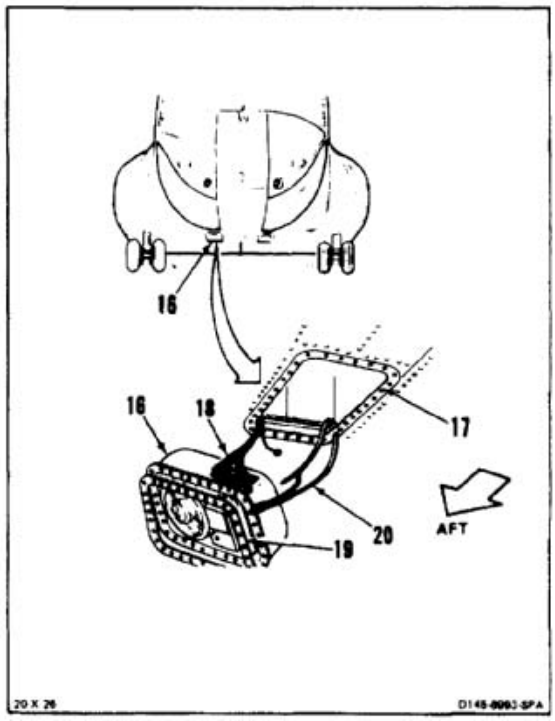
5. Working outside helicopter, remove 32 screws (13) and washers (14) from housing (15) of right landing light housing (16). Remove housing.



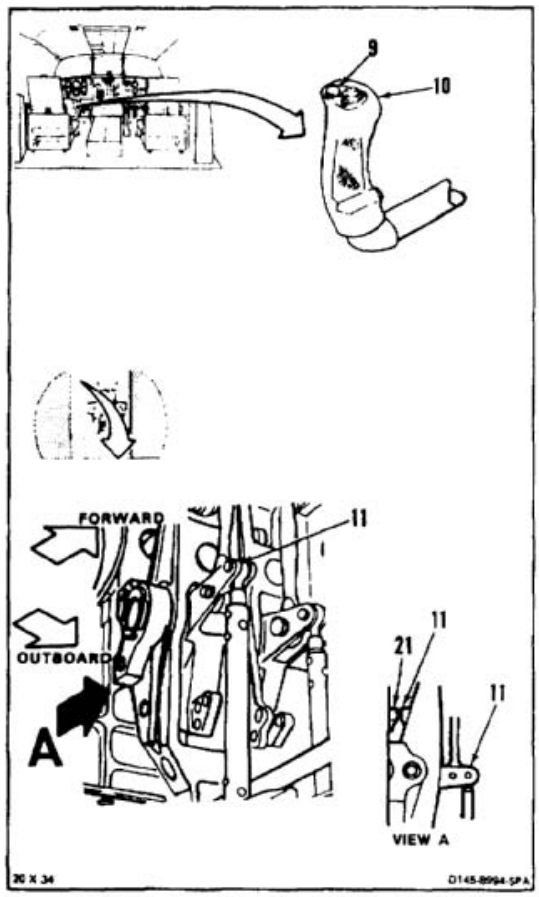
CAUTION

Wire must not support housing; otherwise, damage to equipment could occur.

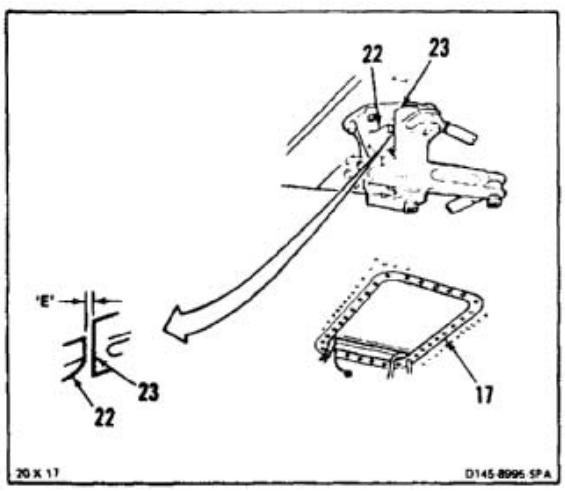
6. Remove right landing light housing (16) from access (17). Support housing so it does not hang by wires (18).
7. Remove gasket (19) from housing (16).
8. Strap housing (16) to access (17) at aft end with strap (20). Wires (18) must not support housing. Use strap (E376).



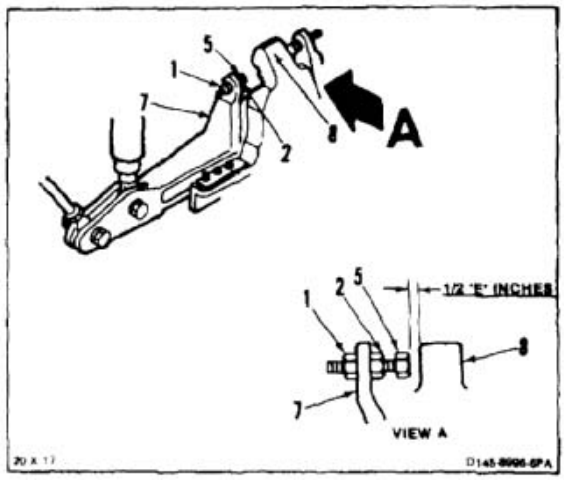
9. Working in passageway, check first stage bellcrank stop (21). Have helper in cockpit press switch (9) and move stick (10) aft until bellcrank (11) just touches stop (21). Hold stick position. Release switch.



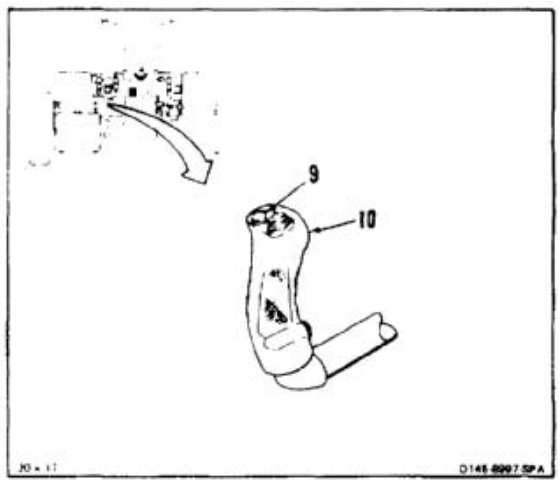
10. Working through right access (17), measure and record distance 'E' between stop (22) and bellcrank (23).



11. Working in passageway, adjust position of bolt (5) in bellcrank (7), to one half distance 'E' measured in step 10. Turn bolt counterclockwise until gap between bolt and support (8) is half of distance 'E'. Tighten two nuts (1 and 2).



12. Have helper press switch (9) and position stick (10) at about neutral. Release switch.



WARNING

Acetone (E20) can form toxic vapors if exposed to flame. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

13. Clean sealant from flange (24) and inside surface (25) of access. Use acetone (E20) and cloths (E120). Use goggles for eyes. Use gloves (E186).

CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

14. Support housing (16). Remove strap (20).

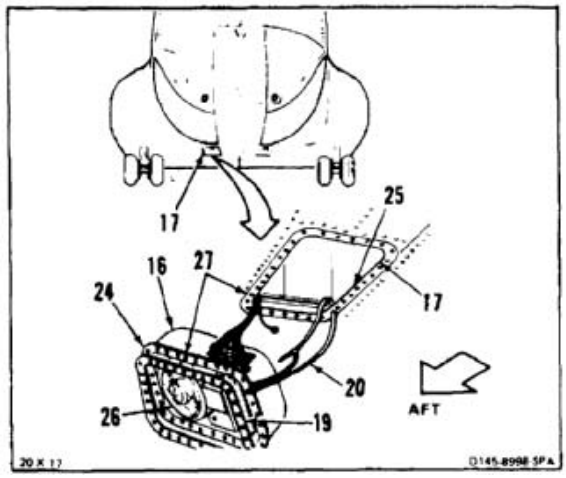
WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

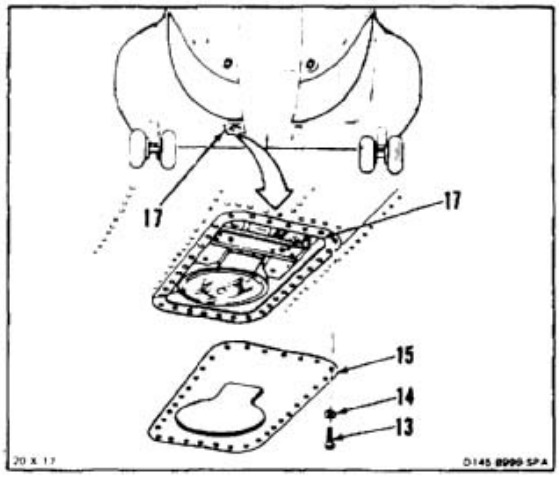
15. Apply sealant (E336) to both sides of new gasket (19). Install gasket on flange (24). Use gloves (E186).

16. Remove excess sealant with acetone (E20) and cloths (E120). Use goggles for eyes. Use gloves (E186).

17. Tilt housing assembly (16) and position up and inside access (17), lamp (26) aft. Align housing and access holes (27).



18. Position housing (15) over access (17). Install 32 washers (14) and screws (13).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove DASH actuator dummy link (Task 11-27).
Install DASH actuator (Task 11-164).
Perform operational check of landing light (TM 55-1520-240-T).
Remove hydraulic power.
Remove electrical power.
Install closet acoustic blanket (Task 2-108).
Install closet backup panel (Task 2-210).
Install passageway overhead acoustic blanket (Task 2-2).

END OF TASK

11-45 RIG PITCH CONTROL POSITION INDICATOR 11-45

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

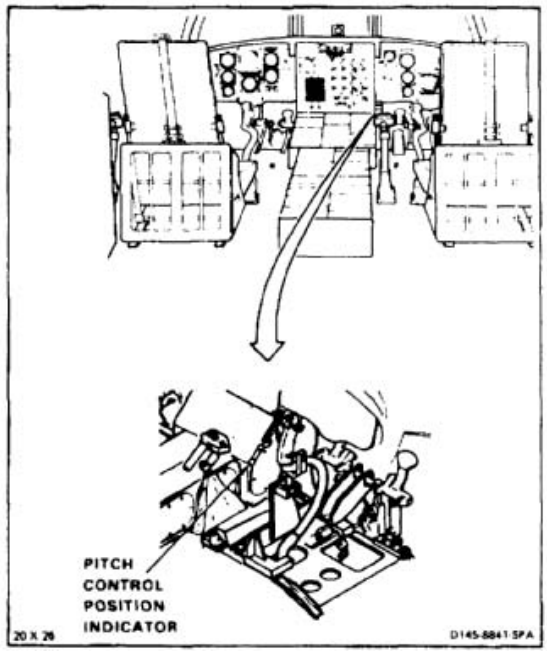
Lockwire (E231)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power On
Hydraulic Power On
Pilot's Seat Full Aft (Task 2-115)
Pilot's Rigging Fixture Installed (Task 11-22)
Pilot's Control Stick Yoke Installed (Task 11-22)

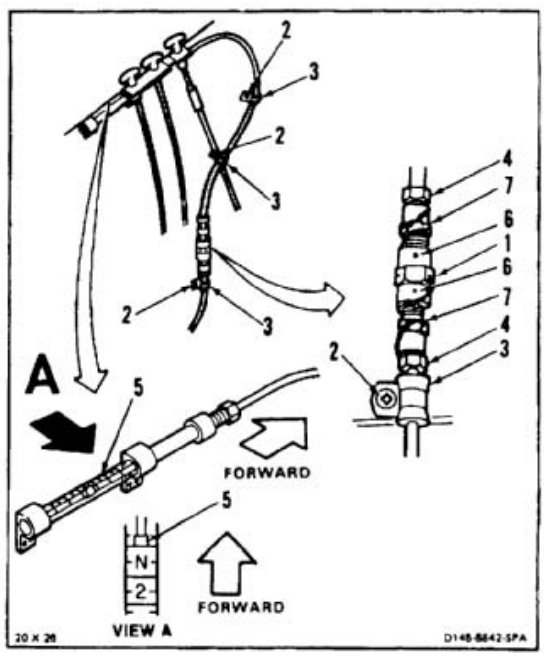


1. Remove lockwire from adjuster (1).

CAUTION

Do not kink or deform tubing or cable; otherwise, damage to component will result.

2. Loosen three screws (2) of clamps (3).
3. Loosen two nuts (4) of adjuster (1).
4. Turn adjuster (1) until pitch control position indicator (5) is one division forward of N.
5. Check inspection holes (6) of adjuster (1). Thread of nuts (4) must show in holes.
6. Tighten two nuts (4) of adjuster (1).
7. Tighten three screws (2) of clamps (3).
8. Lockwire two fittings (7) and adjuster (1). Use lockwire (E231).



FOLLOW-ON MAINTENANCE:

Remove pilot's control stick yoke (Task 11-23).
Remove pilot's rigging fixture (Task 11-23).

END OF TASK

11-46 RIG COCKPIT TRANSFER BELLCRANKS 11-46

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Transfer Bellcrank Rig Pin (T128)

Materials:

None

Parts:

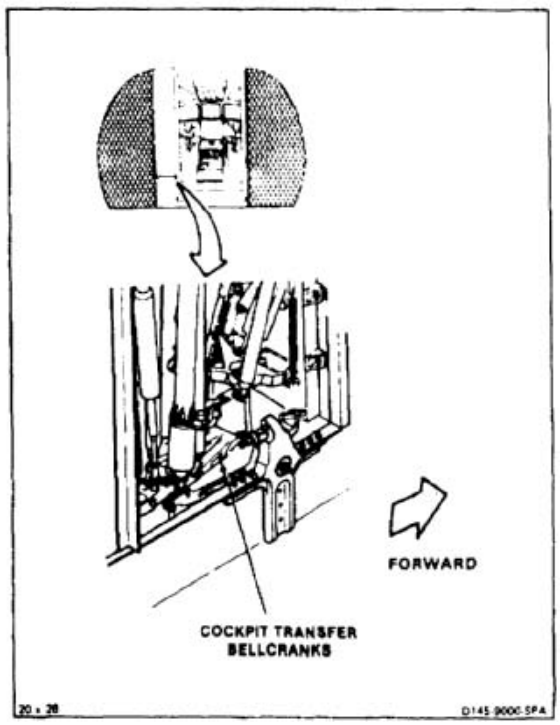
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Disconnect Battery (Task 1-39)
DASH Actuator Set to 36 Inches (Task 11-165) or Dummy Link Installed (Task 11-26)
Electrical Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Hydraulic Power Off
Copilot's Rigging Fixture (T39) Installed (Task 11-22)
Copilot's Thrust Control Rig Pin (T122) Installed (Task 11-22)
Copilot's Yaw Pedal Rig Pin (T127) Installed (Task 11-22)
Copilot's Control Stick Yoke (T125) Installed (Task 11-22)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



General Safety Instructions:

CAUTION

Make sure bushings are in bellcranks before installing bolts; otherwise, damage to bellcranks will result.

NOTE

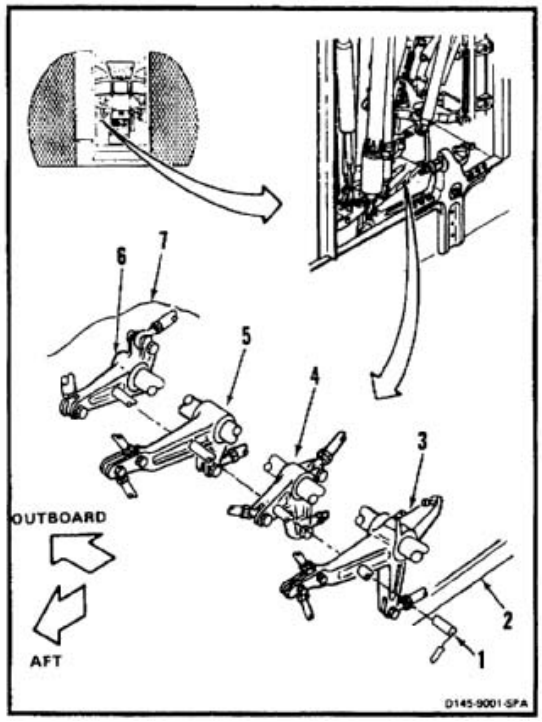
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require special torque and nut.

INSTALL TRANSFER BELLCRANK RIG PIN

CAUTION

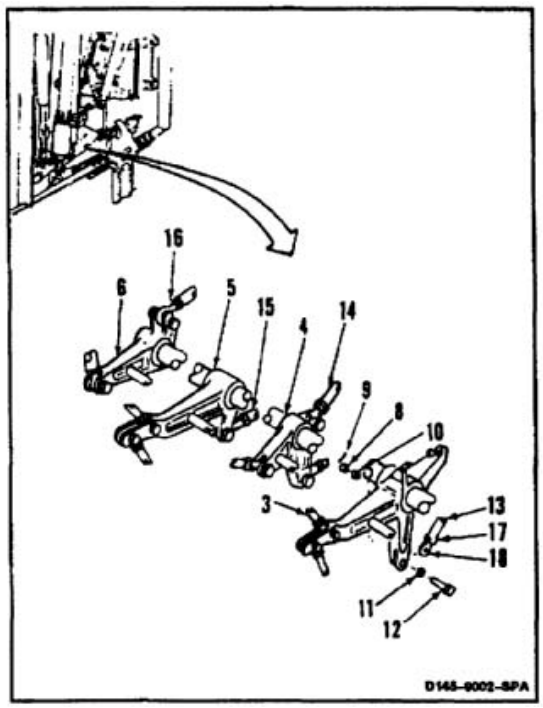
Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

1. Install transfer bellcrank rig pin (T128) (1) through structure (2), four bellcranks (3, 4, 5, and 6) and structure (7). Pin must slide freely. If free, go to step 11. If not, perform steps 2 thru 11.



RIG TRANSFER BELLCRANKS

2. Remove cotter pin (8), nut (9), two washers (10 and 11), and bolt (12) from bellcrank (3). Disconnect link (13) from bellcrank.
3. Repeat step 2 for three bellcranks (4, 5, and 6) and links (14, 15, and 16).
4. Repeat step 1. Leave pin installed.
5. Loosen nut (17) of link (13). Turn rod end (18) until link can be positioned in bellcrank (13) with bolt (12) installed loosely.
6. Torque nut (17) of link (13) to **103 inch-pounds**.
7. Install bolt (12), two washers (11 and 10), and nut (9) in bellcrank (3).
8. Torque nut (9) to **30 to 45 inch-pounds**. Install cotter pin (8).
9. Check bolt (12). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 8.
10. Repeat steps 5 thru 9 for three links (14, 15, and 16) and bellcranks (4, 5, and 6).
11. Remove pin (1) from structure (7), four bellcranks (6, 5, 4, and 3), and structure (2).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove dummy link (Task 11-27).
Install DASH actuator (Task 11-164).
Perform neutral alignment check (Task 11-42).
Remove copilot's rigging fixture (T39) (Task 11-23).
Remove servocylinder safety blocks (T31) (Task 11-29).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-47 RIG ROLL, YAW OR THRUST ILCA INPUT CONNECTING LINKS 11-47

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
First Stage Rig Pin (T46)

Materials:

None

Parts:

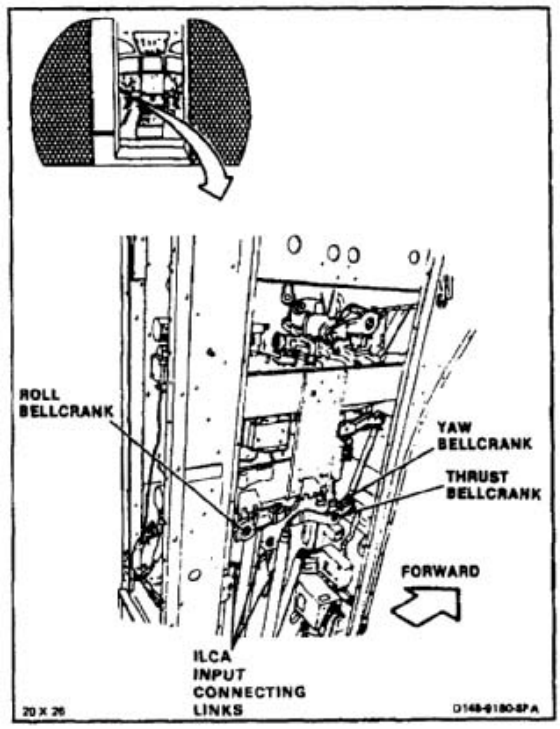
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Cockpit Controls Rigged (Task 11-42)
Transfer Bellcranks Rigged (Task 11-46)
First and Second Stage Bellcranks Rigged (Task 11-51)
DASH Actuator Set to 36 Inches (Task 11-165)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Transfer Bellcranks Rig Pin Installed (Task 11-46)



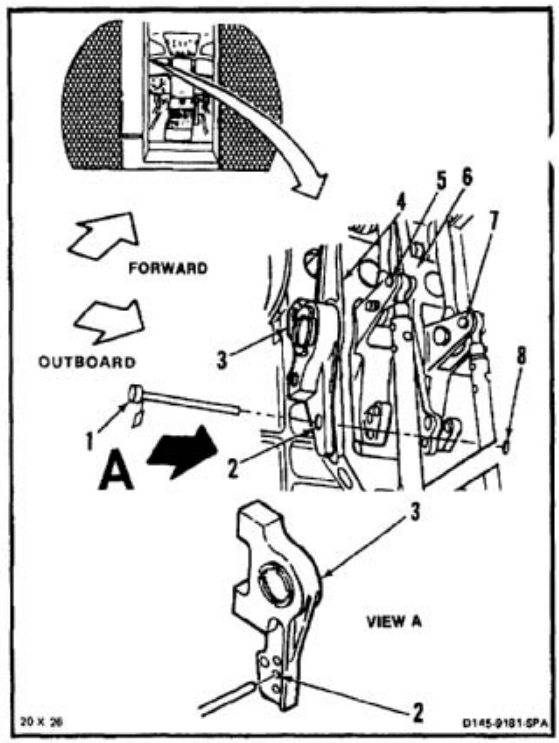
CAUTION

Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

NOTE

Procedure is same to rig roll, yaw, or thrust intermediate bellcrank connecting links. Roll connecting link is shown here.

1. Install first stage rig pin (T46) (1) through hole (2) in fitting (3), four bellcranks (4, 5, 6, and 7), and fitting (8). Pin must slide freely.
2. Remove pin (1) from fitting (3).



3. Measure and record length 'X' of roll ILCA output piston (9).
4. Measure and record length 'Y' of roll ILCA input piston (10).
5. Check length 'X' and 'Y' for roll pistons (9 and 10). Subtract 'X' from 'Y'. Difference must not be more than **0.04 inches**. If not more, go to step 14. If more, perform steps 6 thru 11.
6. Remove cotter pin (11), nut (12), two washers (13 and 14), and bolt (15) from roll ILCA input arm (16).

CAUTION

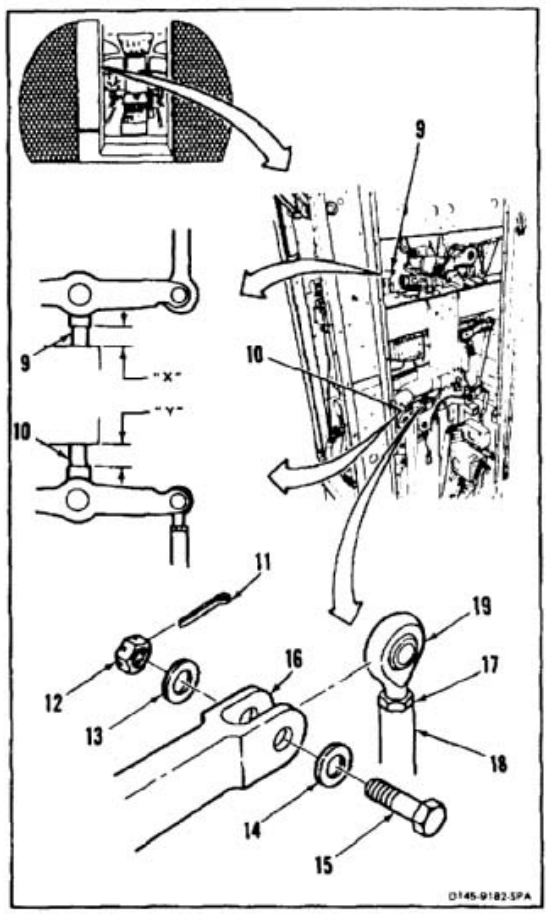
Do not move input arm; otherwise, damage to components may occur.

7. Loosen nut (17) of link (18). Turn rod end (19) one half turn.

NOTE

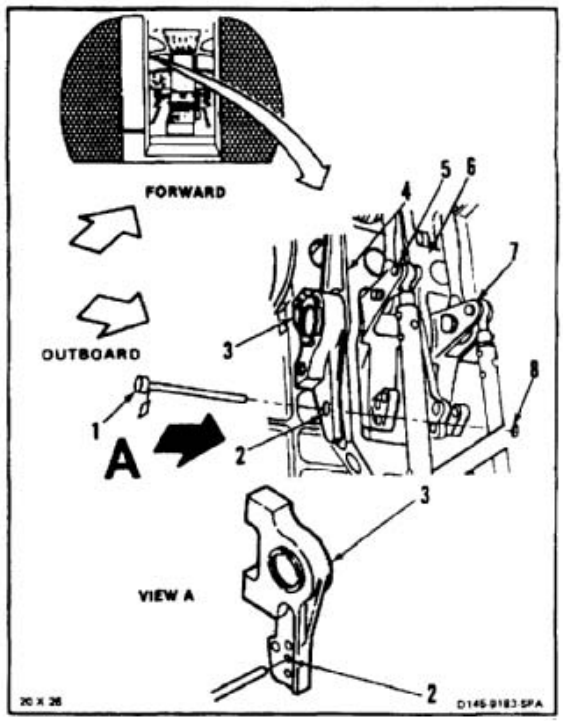
Turn rod end clockwise to increase length 'Y'.

8. Position rod end (19) in arm (16). Install bolt (15) loosely in arm.
9. Repeat steps 3 and 4.
10. Repeat step 5. If not more, perform step 11. If more, repeat steps 7 thru 10.
11. Remove bolt (15) from arm (16). Install bolt, two washers (14 and 13) and nut (12) in arm.
12. Torque nut (17) of link (18) to **103 inch-pounds**.
13. Torque nut (12) to **30 to 45 inch-pounds**. Install cotter pin (11).
14. Check bolt (15). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 13.



15. Install pin (1) through hole (2) in fitting (3), four bellcranks (4, 5, 6, and 7), and fitting (8). Pin must slide freely.

16. Remove pin (1) from fitting (3).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (T31) (Task 11-29).
Remove transfer bellcrank rig pin (Task 11-46).
Remove hydraulic power.
Remove electrical power.
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-48 RIG PALLET THRUST AND YAW IDLER BELLCRANKS 11-48

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Pallet Rig Pin (T133)
Transfer Bellcranks Rig Pin (T128)

Materials:

None

Parts:

Cotter Pins

Personnel Required:

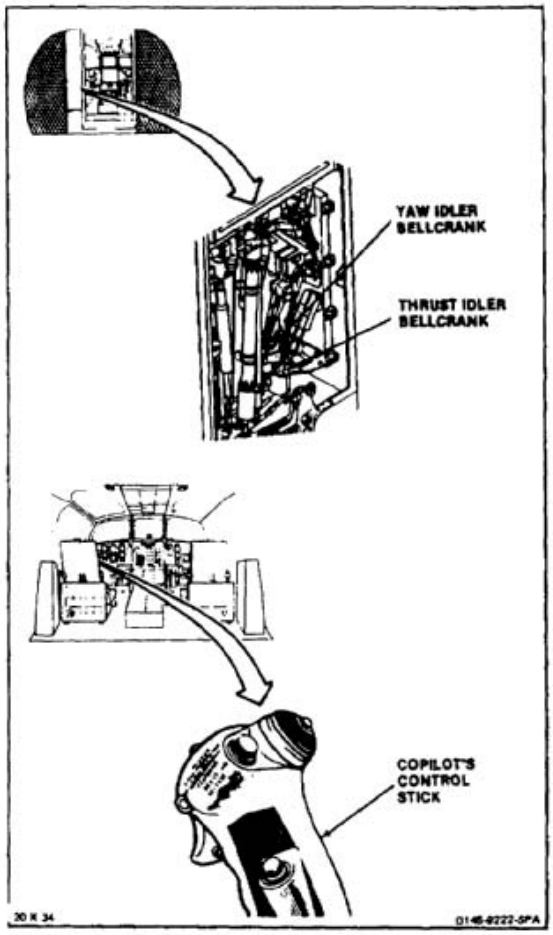
Medium Helicopter Repairer (2)
Inspector

References:

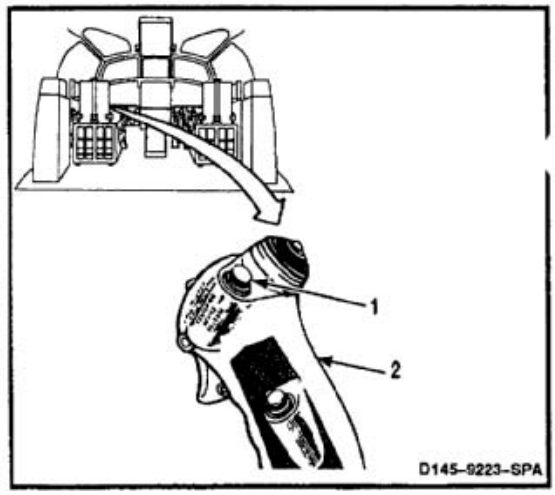
Task 11-176

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Cockpit Controls Rigged (Task 11-42)
Cockpit Transfer Bellcranks Rigged (Task 11-46)
First and Second Stage Bellcranks Rigged (Task 11-51)
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



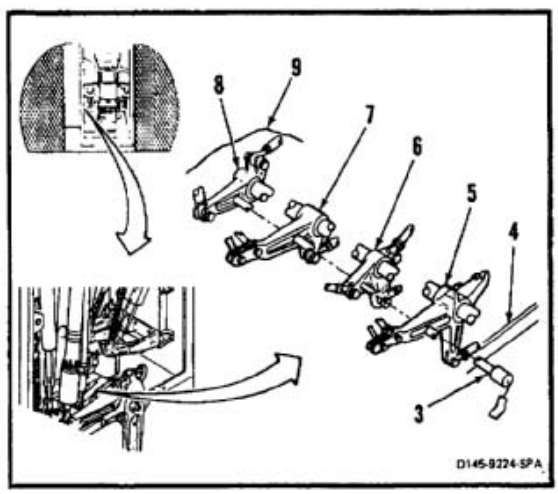
1. Have helper in cockpit press and hold CENTERING DEVICE RELEASE switch (1) on copilot's control stick (2).



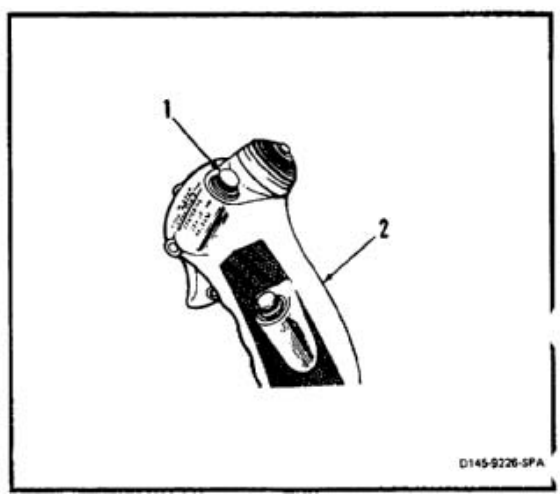
CAUTION

Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

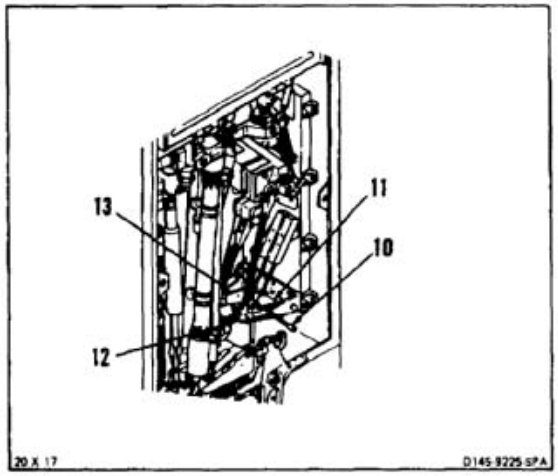
2. Install transfer bellcrank rig pin (T128) (3) through structure (4), four bellcranks (5, 6, 7, and 8) and structure (9).



3. Have helper release switch (1) of control stick (2).



4. Install thrust and yaw idler bellcrank rig pin (T133) (10) through support (11) and two bellcranks (12 and 13). Pin must slide freely. If pin (10) moves freely, remove pin, then go to step 18. If not, perform steps 4 thru 17, then go to step 18.
5. Remove pin (10) from support (11).

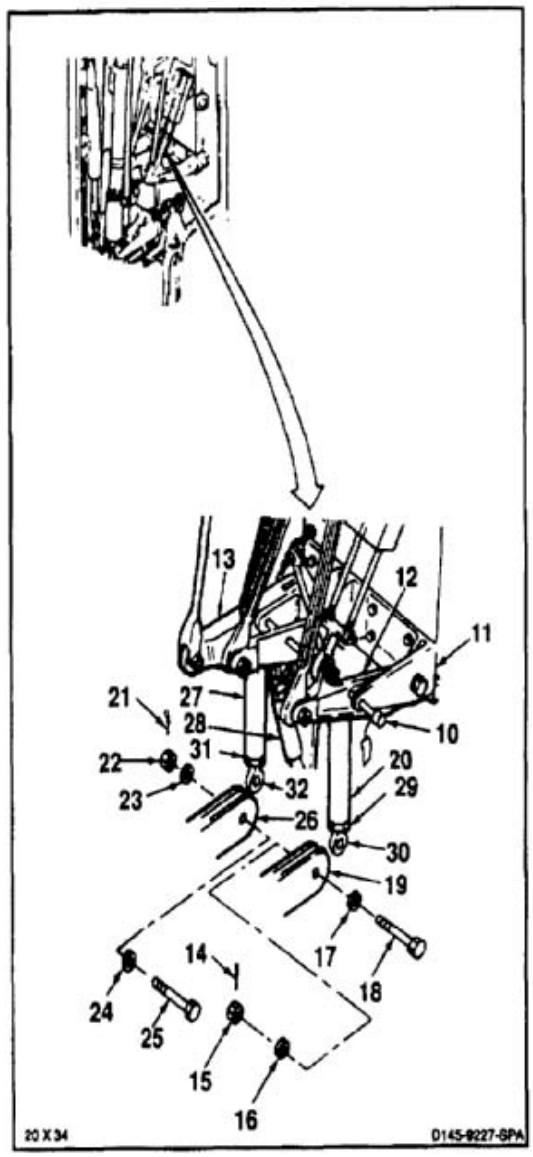


6. Remove cotter pin (14), nut (15), two washers (16 and 17), and bolt (18) from pitch transfer bellcrank (19). Disconnect thrust input link (20) from bellcrank.
7. Remove cotter pin (21), nut (22), two washers (23 and 24), and bolt (25) from roll transfer bellcrank (26). Disconnect yaw input link (27) from bellcrank.
8. Install pin (10) through support (11) and two bellcranks (12 and 13). Pin must slide freely. If not repeat steps 1, 8, and 3, then go to step 9.
9. Adjust yaw position transducers (28 and 29) (Task 11-176).
10. Loosen nut (29) of link (20). Turn rod end (33) until link can be positioned in bellcrank (19) with bolt (18) installed loosely.

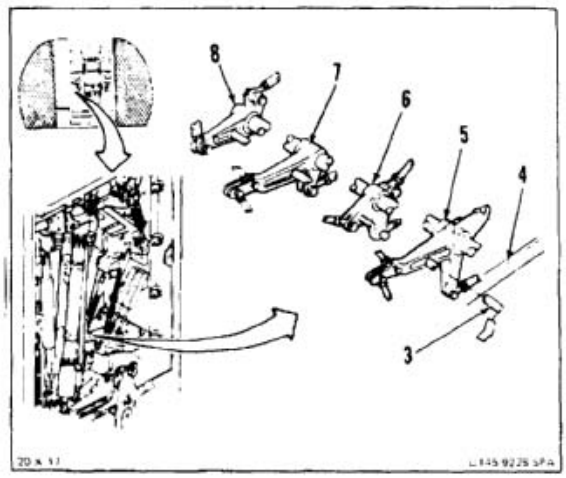
CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

11. Install bolt (18), two washers (17 and 16), and nut (15) in bellcrank (19). Do not torque nut at this time.
12. Loosen nut (31) of link (27). Turn rod end (32)n until link can be positioned in bellcrank (26) with bolt (25) installed loosely.
13. Install bolt (25), two washers (24 and 23), and nut (22) in bellcrank (26).
14. Torque two nuts (15 and 22) to **30 to 45 inch-pounds**. Install two cotter pins (14 and 21).
15. Torque two nuts (30 and 31) to **30 to 40 inch-pounds**.
16. Check two bolts (18 and 25). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose add washer under nut and repeat 14.
17. Remove pin (10) from support (11).



18. Remove pin (3) from four bellcranks (5, 6, 7, and 8) and structure (4).



FOLLOW-ON MAINTENANCE:

Adjust engine droop eliminator resistor (Task 4-121).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform artificial feel forces check (Task 11-34).
Perform operational check of flight control system (TM 55-1520-240-T).
Remove electrical power.
Remove hydraulic power.
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-49 RIG PALLET PITCH AND ROLL IDLER BELLCRANKS 11-49

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Pallet Rig Pin (T133)
Transfer Bellcranks Rig Pin (T128)

Materials:

None

Parts:

Cotter Pins

Personnel Required:

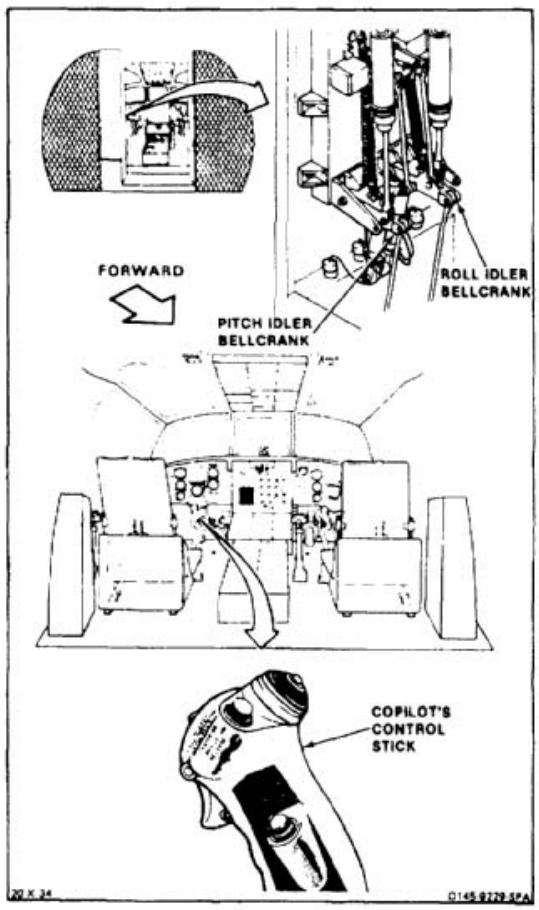
Medium Helicopter Repairer (2)
Inspector

References:

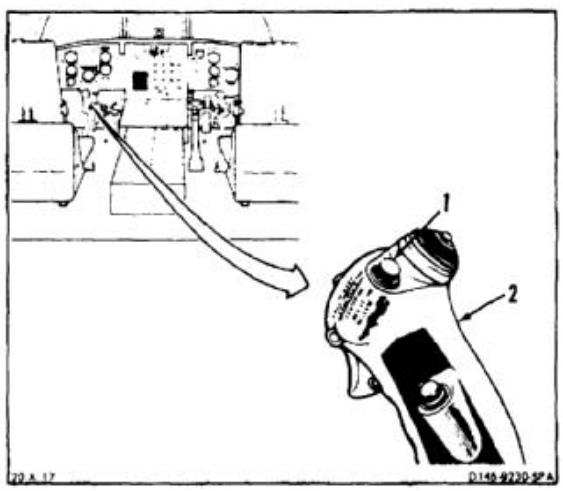
Task 11-176

Equipment Conditions:

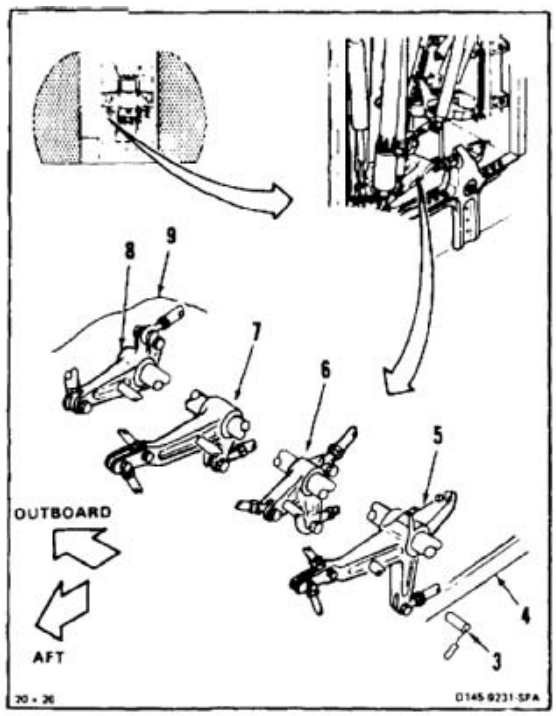
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Cockpit Controls Rigged (Task 11-42)
Cockpit Transfer Bellcranks Rigged (Task 11-46)
First and Second Stage Bellcranks Rigged (Task 11-51)
Servocylinder Safety Blocks Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



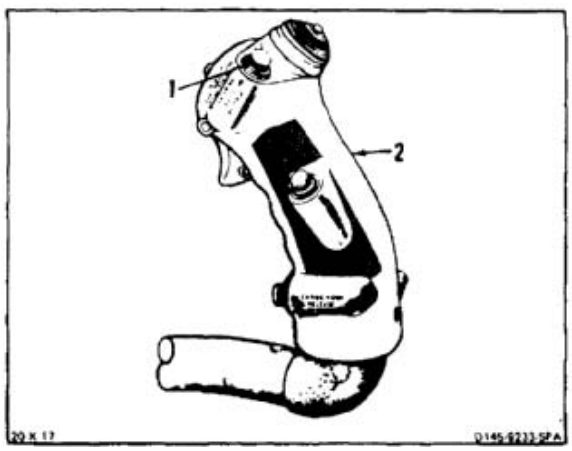
1. Have helper in cockpit press and hold CENTERING DEVICE RELEASE switch (1) on copilot's control stick (2).



2. Install transfer bellcrank rig pin (T128) (3) through structure (4), four bellcranks (5, 6, 7, and 8) and structure (9).

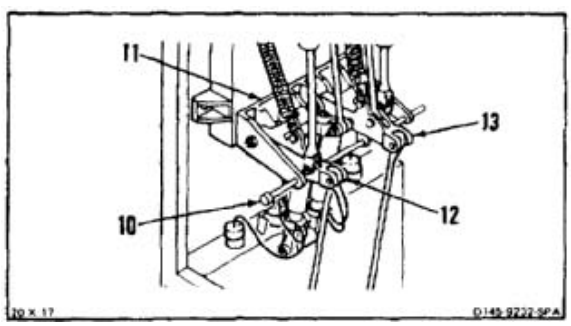


3. Have helper release switch (1) of control stick (2).



4. Install pitch and roll idler bellcrank rig pin (T133) (10) through support (11) and two bellcranks (12 and 13). Pin must slide freely. If free go to step 18. If not perform steps 4 thru 17, then go to 18.

5. Remove pin (10) from support (11).

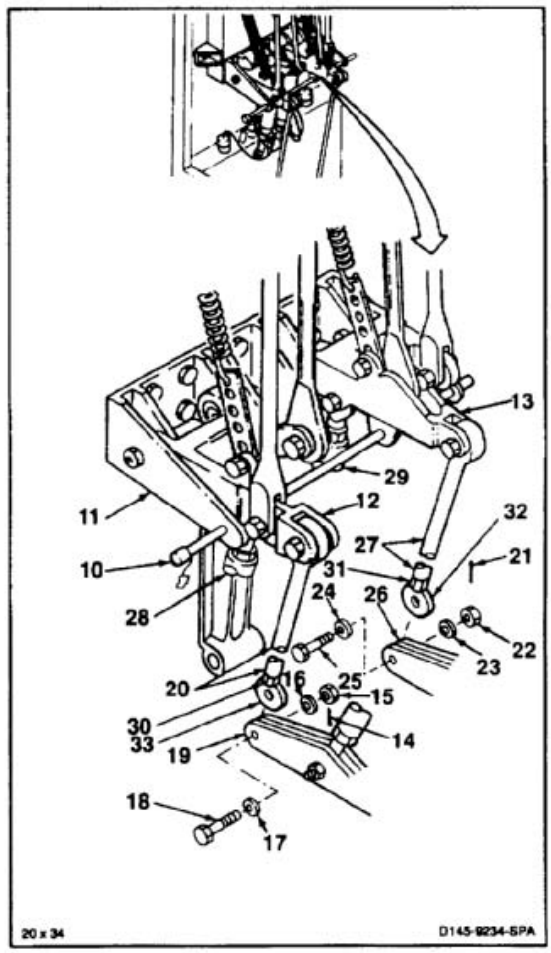


6. Remove cotter pin (14), nut (15), two washers (16 and 17), and bolt (18) from thrust transfer bellcrank (19). Disconnect thrust input link (20) from bellcrank.
7. Remove cotter pin (21), nut (22), two washers (23 and 24), and bolt (25) from yaw transfer bellcrank (26). Disconnect role input link (27) from bellcrank.
8. Install pin (10) through support (11) and two bellcranks (12 and 13). Pin must slide freely. If not repeat steps 1, 8, and 3 then go to 9.
9. Adjust yaw position transducer (28) (Task 11-176).
10. Loosen nut (30) of link (20). Turn rod end (30) until link can be positioned in bellcrank (19) with bolt (18) installed loosely.

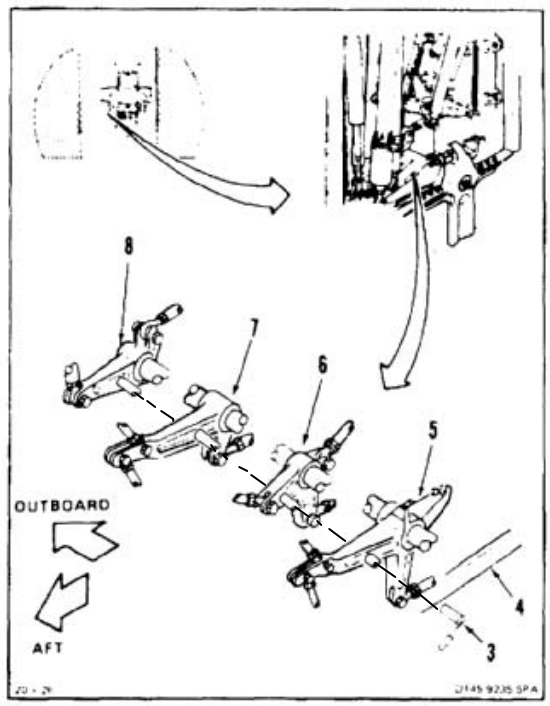
CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

11. Install bolt (18), two washers (17 and 16), and nut (15) in bellcrank (19). Do not torque nut at this time.
12. Loosen nut (31) of link (27). Turn rod end (32) until link can be positioned in bellcrank (26) with bolt (25) installed loosely.
13. Install bolt (25), two washers (24 and 23), and nut (22) in bellcrank (26).
14. Torque two nuts (15 and 22) to **30 to 45 inch-pounds**. Install two cotter pins (14 and 21).
15. Torque two nuts (29 and 31) to **30 to 40 inch-pounds**.
16. Check two bolts (18 and 25). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose add washer under nut and repeat step 14.
17. Remove pin (10) from support (11).



18. Remove pin (3) from four bellcranks (5, 6, 7, and 8) and structure (4).



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (T31) (Task 11-29).
Perform artificial feel forces check (Task 11-34).
Perform operational check of flight control system (TM 55-1520-240-T).
Remove electrical power.
Remove hydraulic power.
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-50 RIG DASH ACTUATOR FOR HOVER 11-50

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
DASH Actuator Rigging Tool

Materials:

Lockwire (E231)
Twine (E433)

Personnel Required:

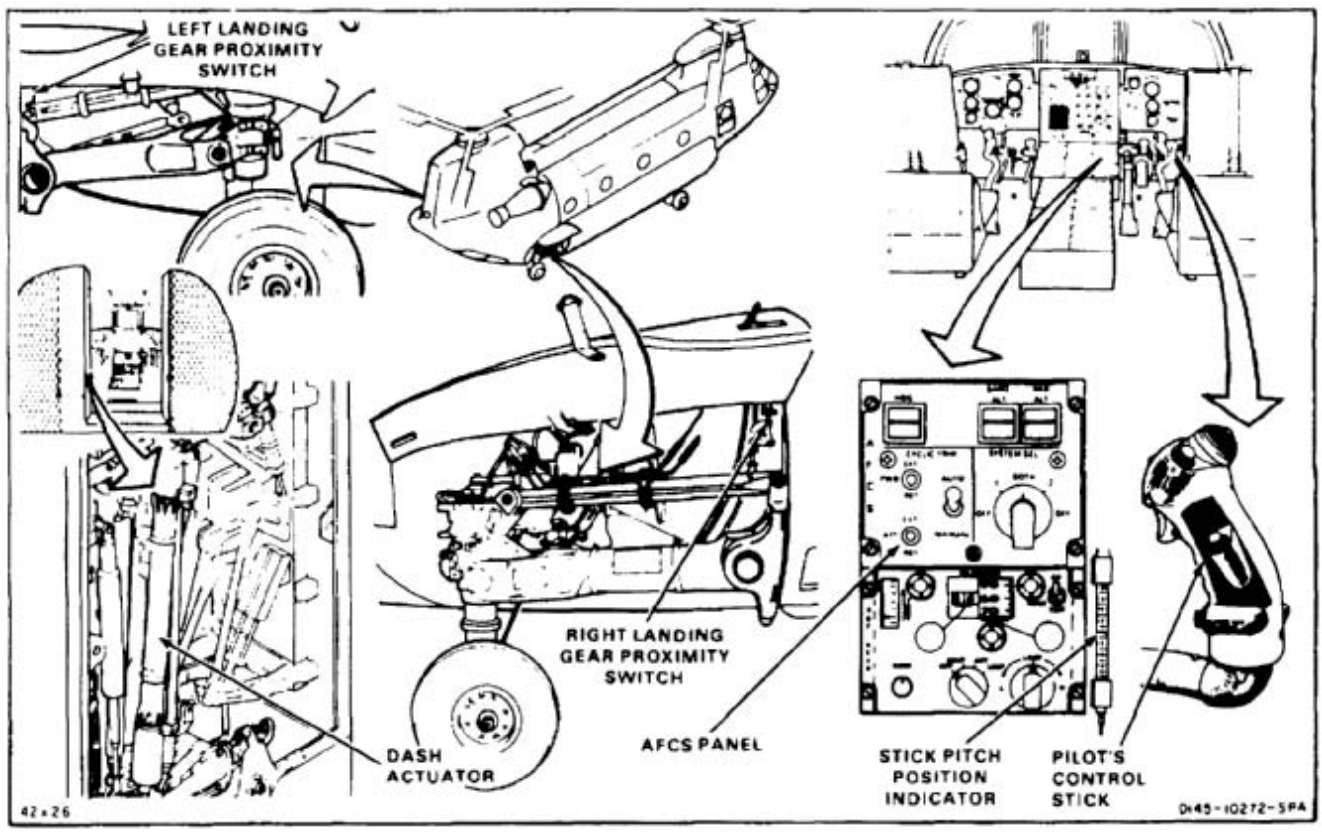
Medium Helicopter Repairer
Army Rotary-Wing Aviator (2)
Inspector

References:

Task 2-2
Task 5-94
TM 55-1520-240-10
TM 55-1500-240-T

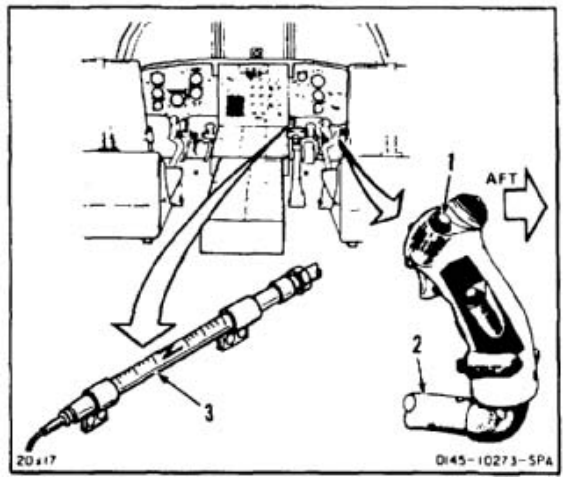
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Aft Landing Gear Access Panels Open (Task 2-2)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)

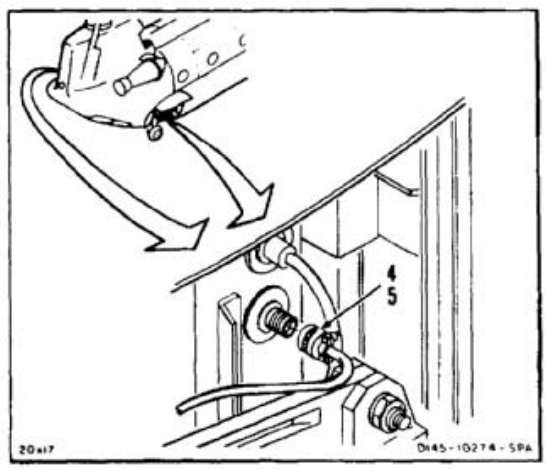


11-50 RIG DASH ACTUATOR FOR HOVER (Continued) 11-50

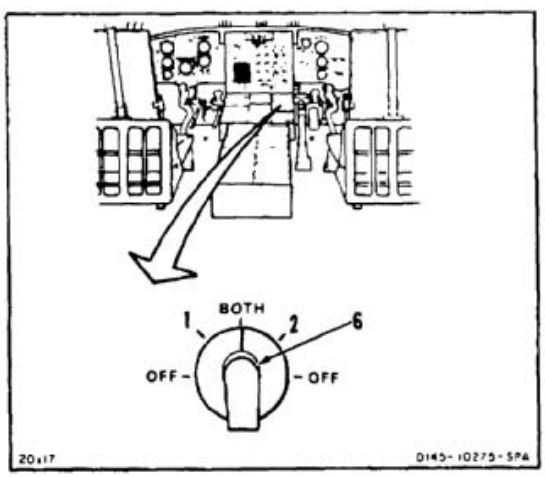
1. Press and hold CENTERING DEVICE RELEASE switch (1). Move control stick (2) aft and position pitch position indicator (3) at N. Release switch.
2. Remove electrical power.



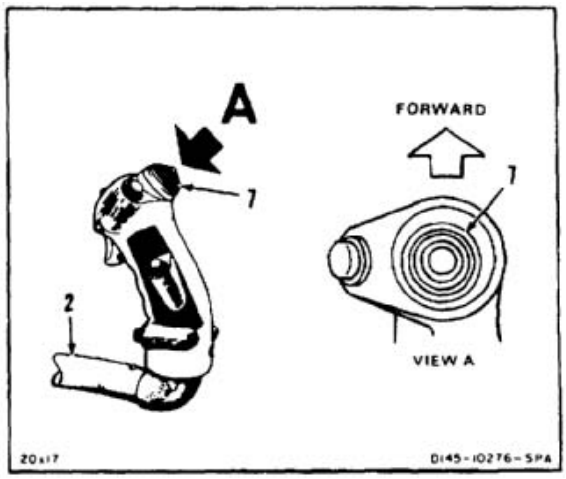
3. Working at aft landing gear, remove lockwire from left then right landing gear proximity switch connectors (4 and 5). Disconnect connectors.



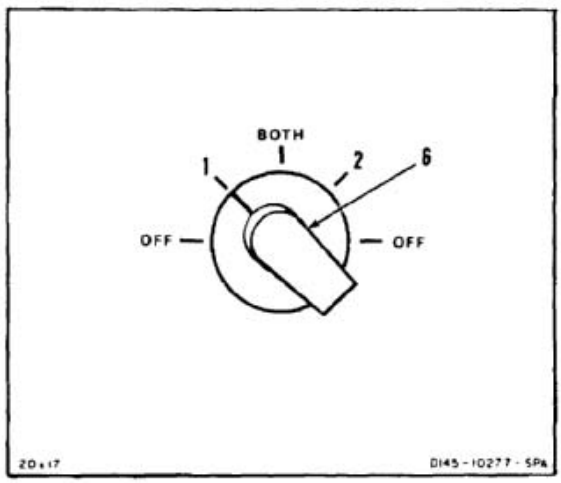
4. Working in cockpit set AFCS SYSTEM sel switch (6) to BOTH.
5. Apply electrical power.



6. Beep pitch and roll trim switch (7) forward until control stick (2) moves about **1 inch** foward.

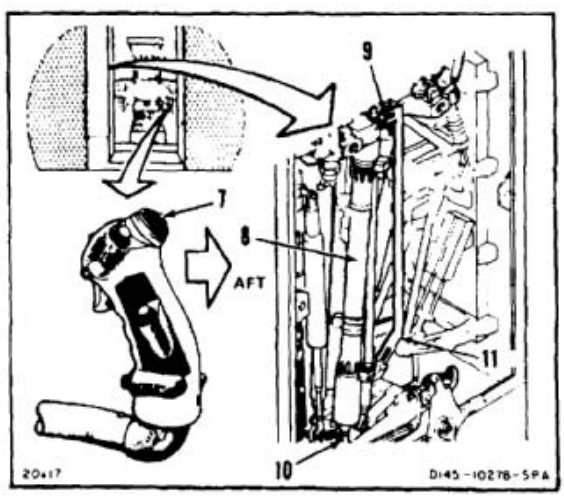


7. Set switch (6) to 1.

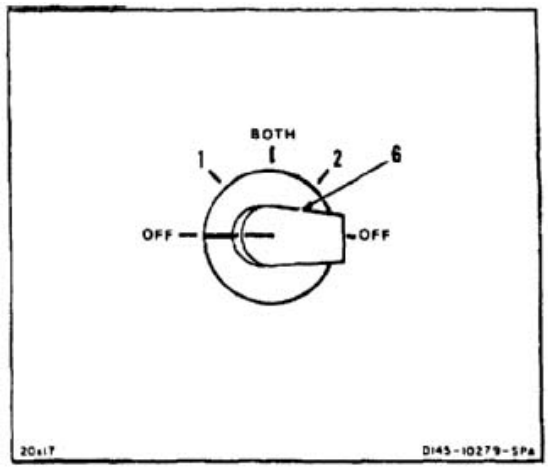


8. Working from passageway, set DASH actuator (8) to **36 inches** between bolts (9 and 10) of actuator by beeping switch (7) aft. Use DASH actuator rigging tool (11).

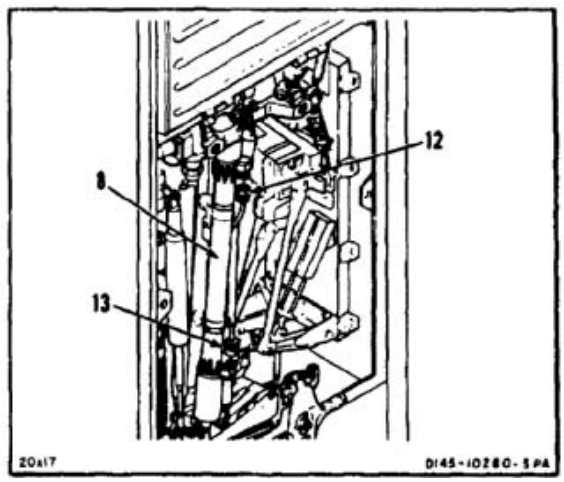
INSPECT



9. Set switch (8) to OFF.
10. Remove electrical power.



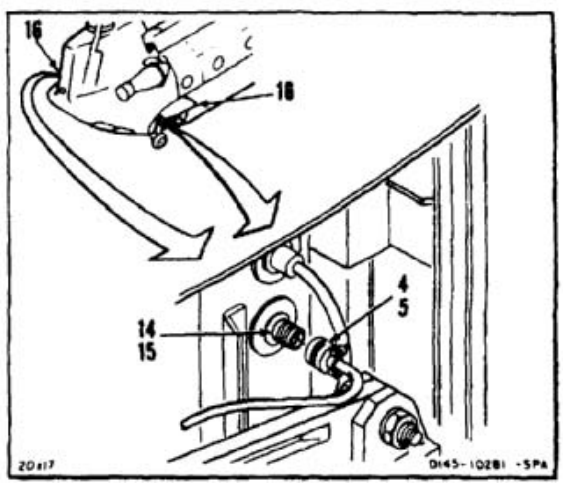
11. Disconnect two electrical connectors (12 and 13) from DASH actuator (8). Tie to actuator. Use twine (E433).



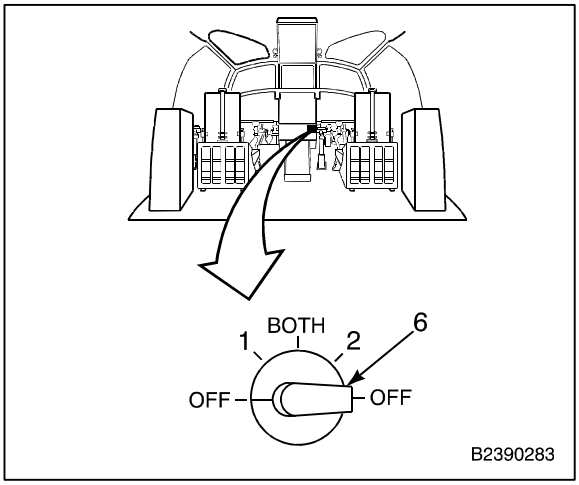
12. Working at aft landing gear connect left and right proximity switch connectors (4 and 5) to receptacles (14 and 15).
13. Lockwire connectors (4 and 5) to receptacles (14 and 15). Use lockwire (E231).

INSPECT

14. Apply electrical power.
15. Close aft landing gear access (Task 2-2).



16. Set switch (6) to OFF.



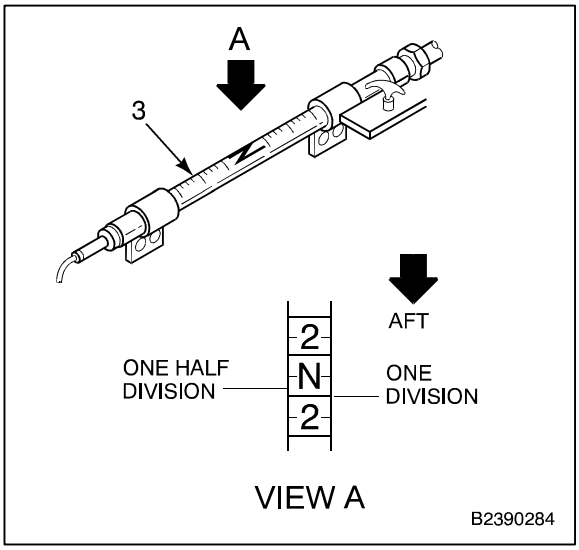
17. Have pilot start engines and hover aircraft crosswind (TM 1-1520-240-10).

18. Working in cockpit; check indicator (3). Indication must be between one half to one division aft of N. If indication is within limits perform step 19 then go to step 22. If not, perform steps 19, 20, and 21.

INSPECT

19. Have pilot land aircraft (TM 1-1520-240-10).

20. Adjust all six pitch links one half the amount of limit determined in step 18. If indication from step 18 is less than limit, shorten forward pitch links and lengthen aft pitch links. If indication is more, lengthen forward pitch links, and shorten aft pitch links. All pitch links must be adjusted the same amount (Task 5-94).



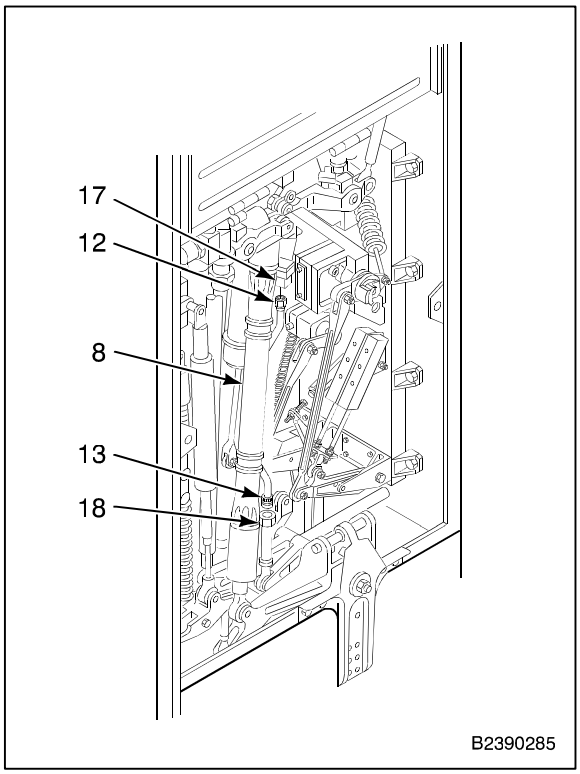
NOTE

A **10 mark** adjustment of each pitch link gives **0.75 inch** stick position change.

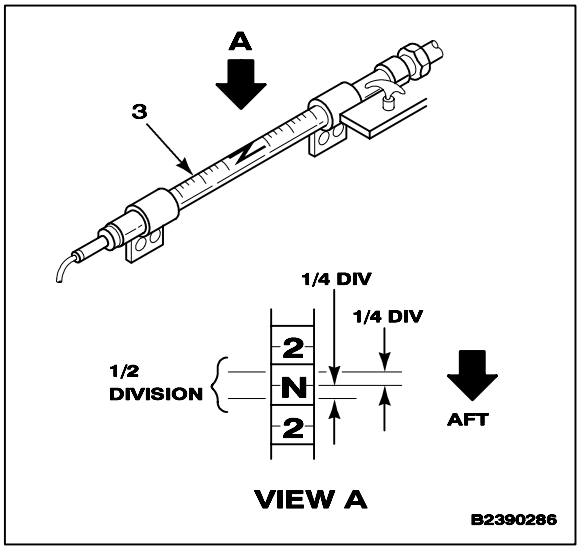
21. Repeat steps 17 and 18.
22. Remove electrical power.
23. Connect two connectors (12 and 13) to receptacles (17 and 18) of DASH actuator (8).

INSPECT

24. Apply electrical power.
25. Deleted.
26. Deleted.



27. Have pilot hover aircraft crosswind. Check stick position indicator (3). Indication shall be within one quarter division on either side of N. If within limit, go to Follow-On Maintenance. If not, perform step 29, then repeat step 27.
28. Repeat steps 1 thru 18, then repeat steps 22 thru 27.
28.1. Have pilot land aircraft.

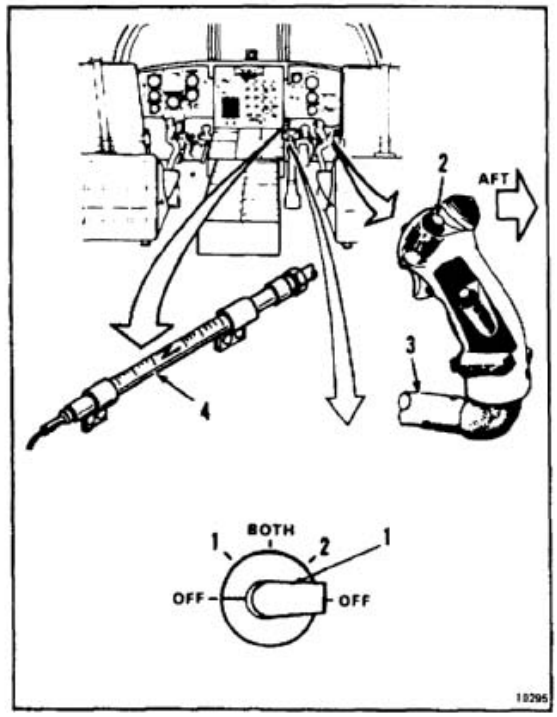


29. Have pilot position AFCS (1) to OFF.

30. Press and hold CENTERING DEVICE release switch (2). Move control stick (3) forward to stop position. Stick position indicator (4) shall indicate between **7.30 and 8.60**.

31. Move control stick (3) aft to stop position. Stick position indicator (4) shall indicate between **4.50 and 6.00**.

32. Set control stick (3) to N on position indicator (4). Release switch (2).



33. Perform operational check of AFCS (TM 55-1520-240-T).

INSPECT

FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.
Install closet backup of panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-51 RIG FIRST AND SECOND STAGE BELLCRANKS 11-51

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
First Stage Rig Pin (T44)
Second Stage Rig Pin (T135)
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds

Materials:

None

Parts:

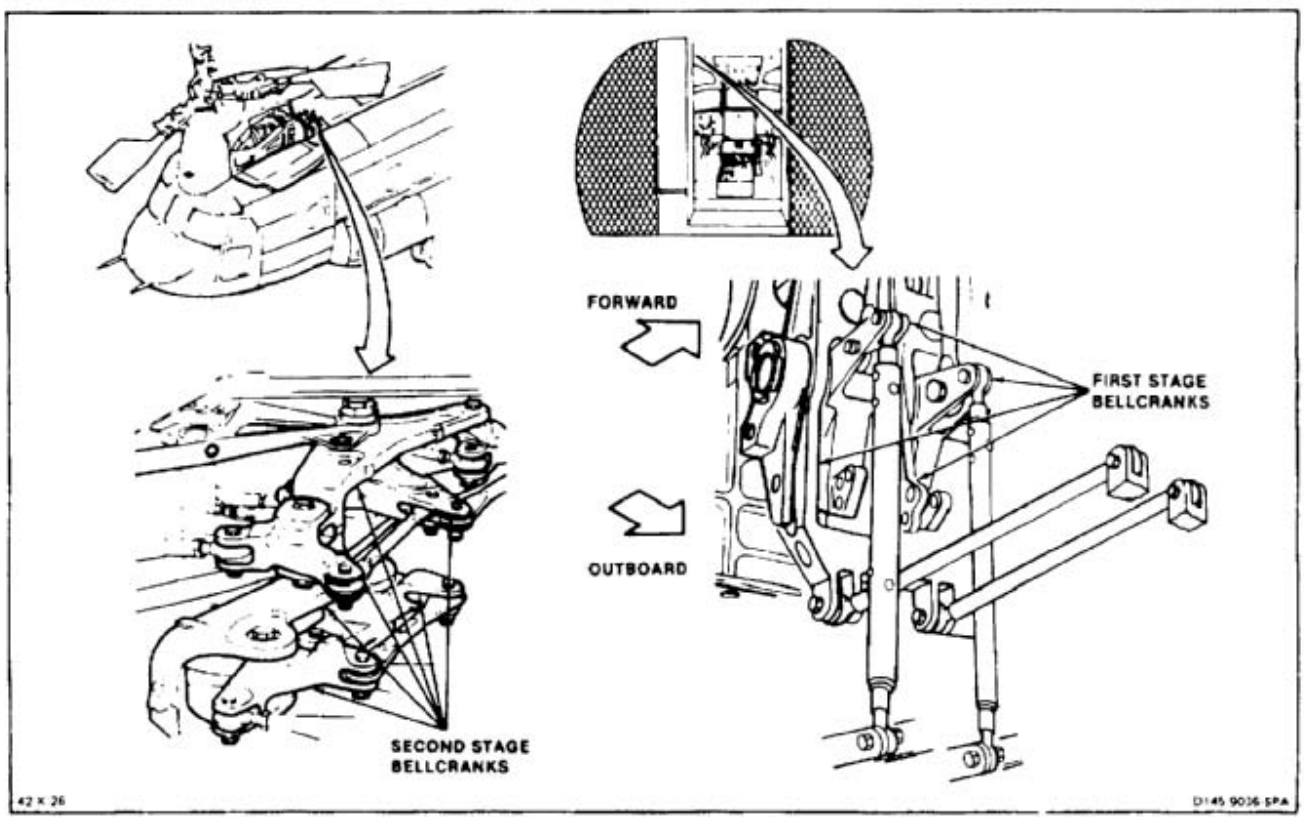
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward and Aft Servocylinder Connecting Links Disconnected (Task 11-192)
Forward Left Work Platform Open (Task 2-2)
Closet Acoustic Blanket Removed (Task 2-107)
Forward Transmission Drip Pan Removed (Task 2-3)
Closet Backup Panel Removed (Task 2-2)
Copilot's Rigging Fixture (T39) Installed (Task 11-22)
Copilot's Thrust Rig Pin (T122) Installed (Task 11-22)
Copilot's Yaw Pedal Rig Pin (T127) Installed (Task 11-22)
Copilot's Control Stick Yoke (T125) Installed (Task 11-22)
DASH Actuator Removed (Task 11-163)
DASH Actuator Dummy Link (T42) Installed (Task 11-26)
Cockpit Controls Rigged (Task 11-33)
Cockpit Transfer Bellcranks Rigged (Task 11-46)



RIG FIRST STAGE BELLCRANKS

CAUTION

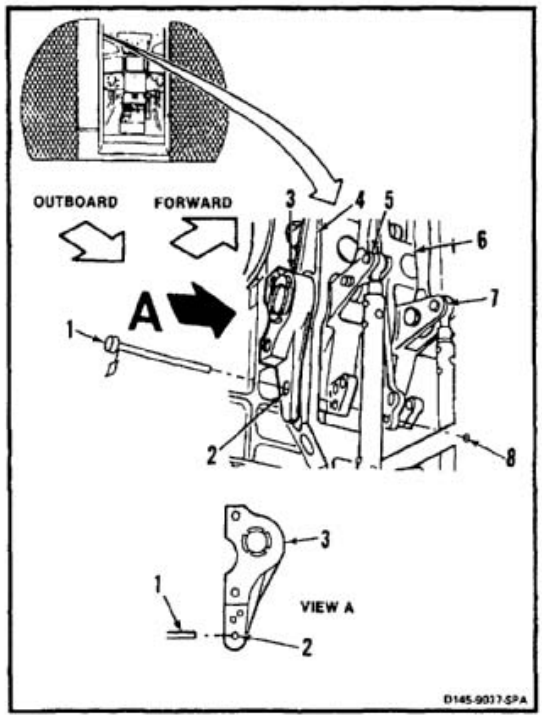
Make sure bushings are in bellcranks before installing bolts; otherwise, damage to component will result.

CAUTION

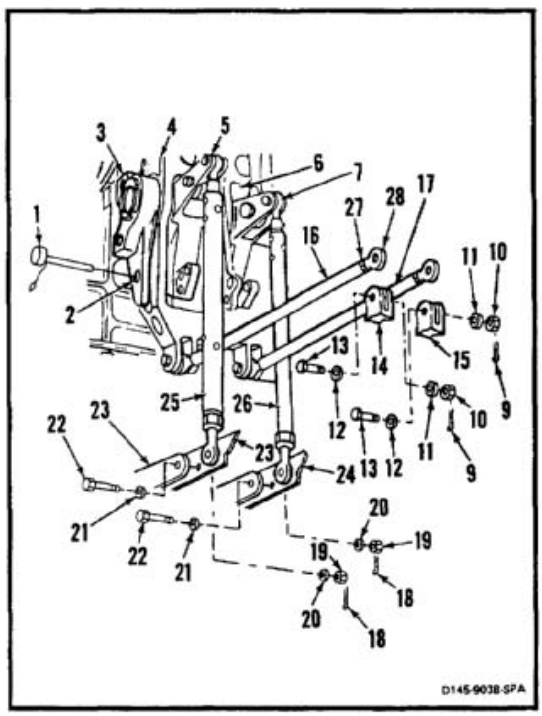
Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

NOTE

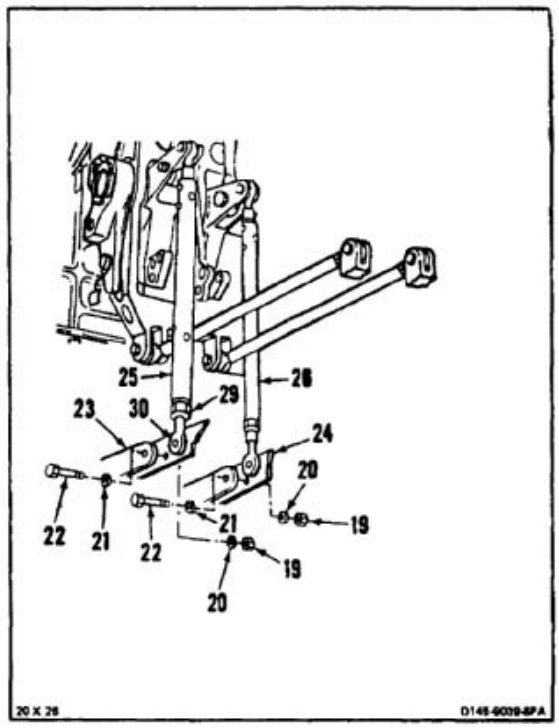
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).



1. Install first stage rig pin (T44) (1) through hole (2) in fitting (3), four bellcranks (4, 5, 6, and 7) and hole (8) in structure. Pin must slide freely. If free go to step 13. If not, perform steps 2 thru 12, then go to step 13.
2. Remove two cotter pins (9), nuts (10), two washers (11), two washers (12), and bolts (13) from bellcranks (14 and 15). Disconnect two links (16 and 17) from bellcranks.
3. Remove two cotter pins (18), nuts (19), two washers (20), two washers (21), and bolt (22) from bellcranks (23 and 24). Disconnect two links (25 and 26) from bellcranks.
4. Install pin (1) through hole (2) in fitting (3), and four bellcranks (4, 5, 6, and 7).
5. Loosen nut (27) on link (16). Turn rod end (28) until link can be positioned in bellcrank (14) with bolt (13) installed loosely.
6. Torque nut (27) of link (16) to **95 to 100 inch-pounds**.
7. Install bolt (13) two washers (12 and 11) and nut (10) in bellcrank (14). Do not torque nut at this time.
8. Repeat steps 5, 6, and 7 for link (17) and bellcrank (15).

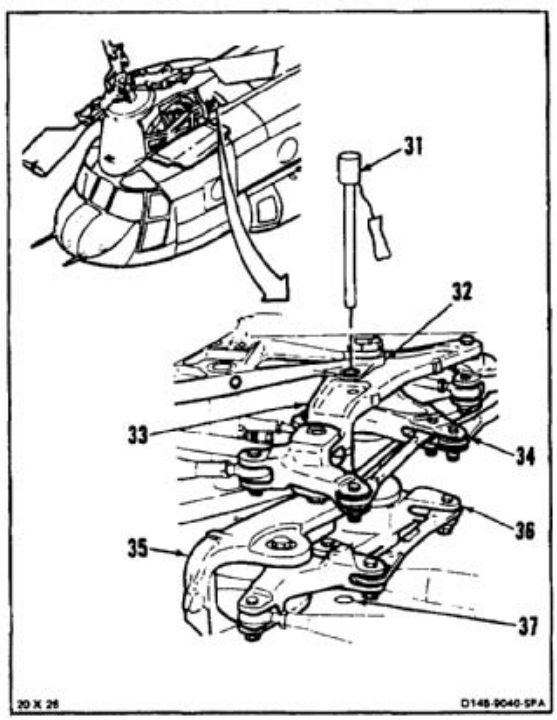


9. Loosen nut (29) on link (25). Turn rod end (30) until link can be positioned in bellcrank (23) with bolt (22) installed loosely.
10. Torque nut (29) of link (25) to **95 to 100 inch-pounds**.
11. Install bolt (22), two washers (21 and 20), and nut (19) in bellcrank (23). Do not torque nut at this time.
12. Repeat steps 9, 10, and 11 for link (26) and bellcrank (24).

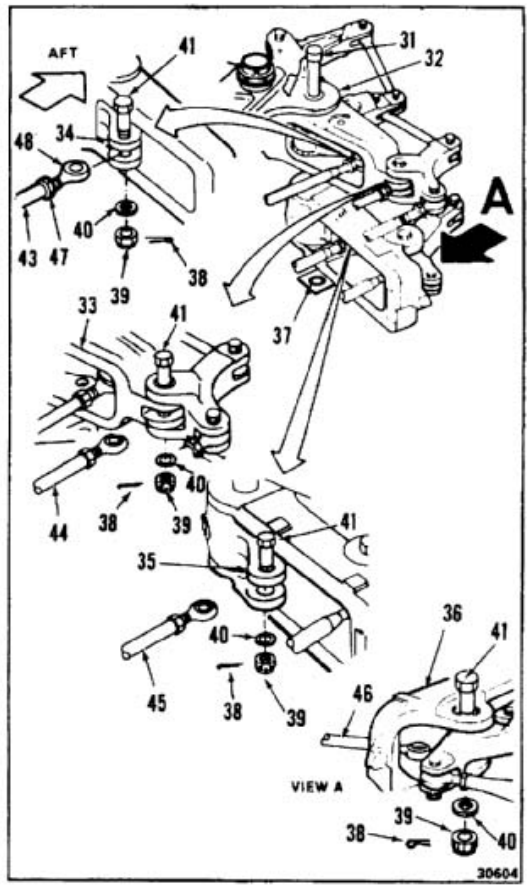


RIG SECOND STAGE BELLCRANKS

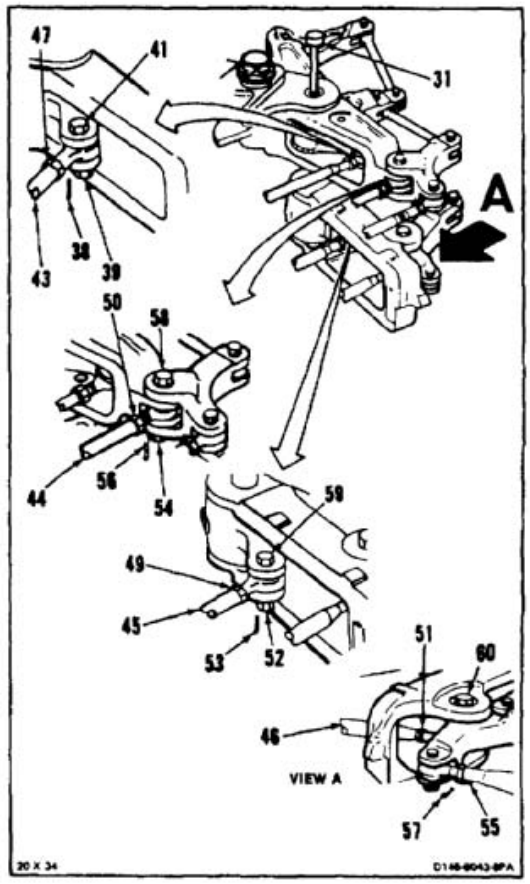
13. Working from forward left work platform, install second stage rig pin (T135) (31) through support (32), four bellcranks (33, 34, 35, and 36), and hole (37) in structure. Pin must slide freely. If free remove pin then go to Follow-On Maintenance. If not, perform steps 14 thru 29.



14. Remove cotter pin (38), nut (39), and washer (40) from bolt (41). Lift bolt (41) from bellcrank (34) to release link (43). Move bellcrank aft.
15. Repeat step 14 for three links (44, 45, and 46) in bellcranks (33, 35, and 36).
16. Install pin (31) through support (32), four bellcranks (33, 34, 35, and 36), and hole (37) in structure.
17. Loosen nut (47) on link (43).
18. Adjust rod end (48) of link (43). Turn rod end until bolt (41) can be installed in bellcrank (34) and link.
19. Install washer (40) and nut (39) on bolt (41). Do not torque nut at this time.
20. Repeat steps 17, 18, and 19 for three links (44, 45, and 46) and bellcranks (33, 35, and 36).



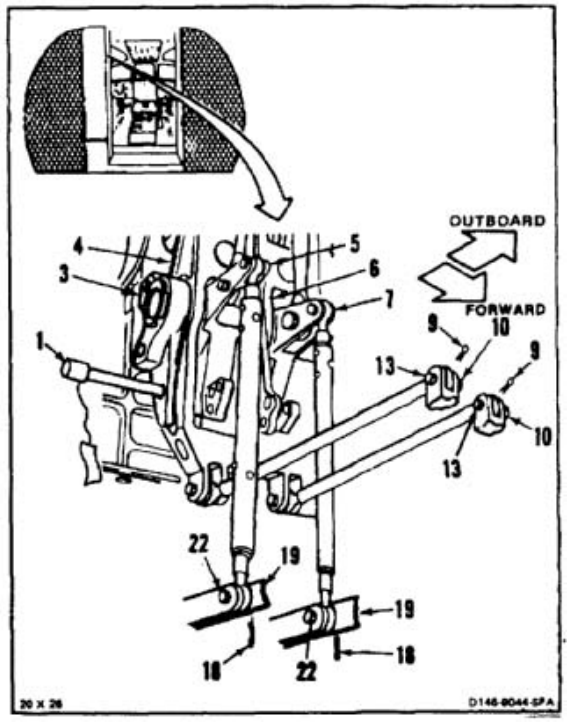
21. Torque two nuts (47 and 49) of links (43 and 45) to **285 inch-pounds**.
22. Torque two nuts (50 and 51) of links (44 and 46) to **350 inch-pounds**.
23. Torque two nuts (39 and 52) to **60 to 90 inch-pounds**. Install cotter pins (38 and 53).
24. Torque two nuts (54 and 55) to **195 to 280 inch-pounds**. Install cotter pins (56 and 57).
25. Check four bolts (41, 58, 59, and 60). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat steps 23 and 24.
26. Remove pin (31) from bellcranks (33, 34, 35, and 36).



27. Working from passageway, torque four nuts (10 and 19) to **30 to 45 inch-pounds**. Install four cotter pins (9 and 18).

28. Check four bolts (13 and 22). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness if bolt rotates or is loose, add washer under nut and repeat step 24.

29. Remove pin (1) from bellcranks (7, 6, 5, and 4) and fitting (3).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove DASH actuator dummy link (Task 11-27).
Install DASH actuator (Task 11-164).
Adjust cumulative stops (Task 11-52).
Remove copilot's control stick yoke (T125) (Task 11-23).
Remove copilot's yaw pedal rig pin (T127) (Task 11-23).
Remove copilot's thrust rig pin (T122) (Task 11-23).
Remove copilot's rigging fixture (T39) (Task 11-23).
Connect forward and aft servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install forward transmission drip pan (Task 2-3).
Close forward left work platform (Task 2-2).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-52 ADJUST FIRST AND SECOND STAGE BELLCRANK CUMULATIVE STOPS 11-52

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
First Stage Rig Pin (T44)
First Stage Rig Pin (T45)
First Stage Rig Pin (T46)
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Twine (E433)

Parts:

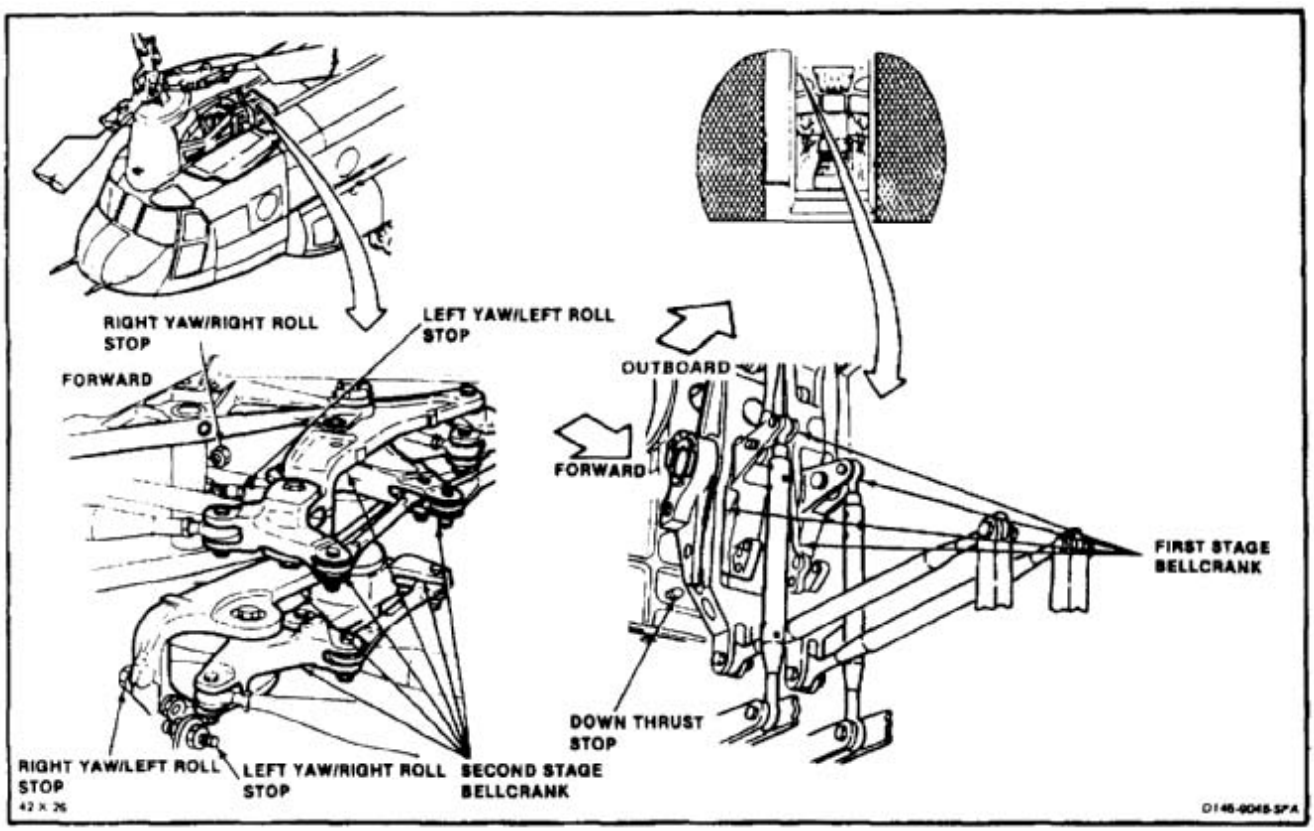
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
First and Second Stage Bellcranks Rigged (Task 11-51)
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward and Aft Servocylinder Connecting Links Disconnected (Task 11-192)
Closet Acoustic Blanket Removed (Task 2-107)
Forward Transmission Drip Pan Removed (Task 2-3)
Closet Backup Panel Removed (Task 2-2)
Forward Left Work Platform Open (Task 2-2)



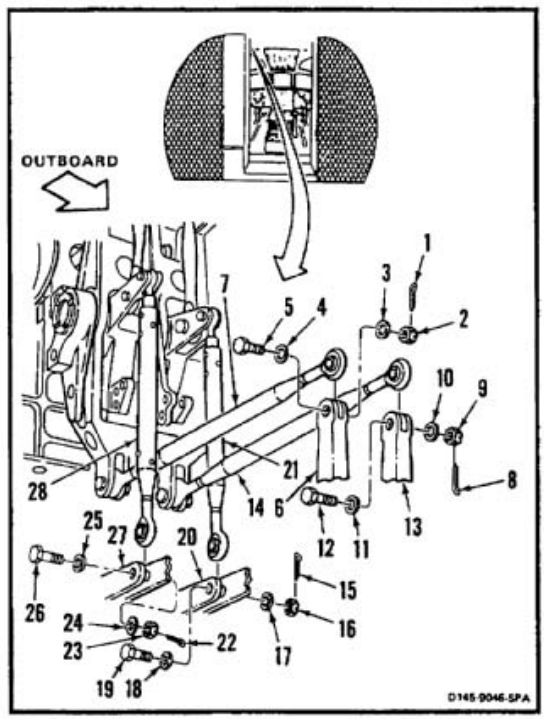
CAUTION

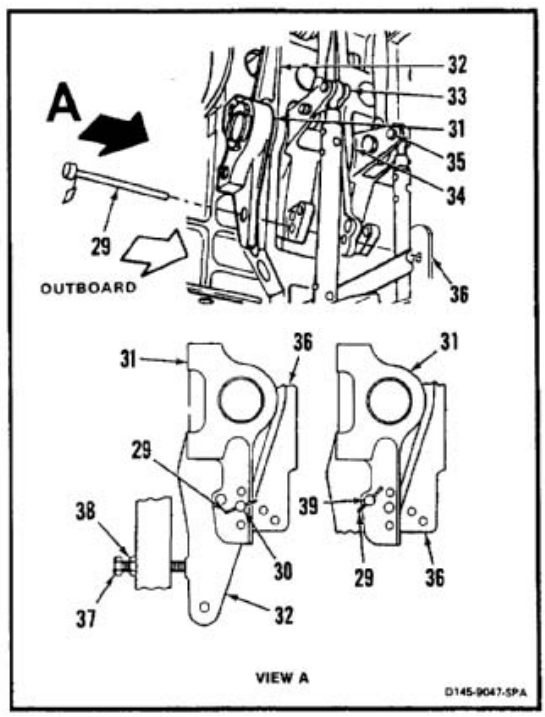
Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

1. Working in passageway, remove cotter pin (1), nut (2), two washers (3 and 4), and bolt (5) from bellcrank (6). Disconnect link (7) from bellcrank. Tie link away from bellcrank. Use twine (E433).
2. Remove cotter pin (8), nut (9), two washers (10 and 11), and bolt (12) from bellcrank (13). Disconnect link (14) from bellcrank. Tie link away from bellcrank. Use twine (E433).
3. Remove cotter pin (15), nut (16), two washers (17 and 18), and bolt (19) from bellcrank (20). Disconnect link (21) from bellcrank. Tie away from bellcrank. Use twine (E433).
4. Remove cotter pin (22), nut (23), two washers (24 and 25), and bolt (26) from bellcrank (27). Disconnect link (28) from bellcrank. Tie away from bellcrank. Use twine (E433).
5. Working from passageway, install first stage rig pin (T44) (29) through hole (30) in fitting (31), four bellcranks (32, 33, 34, and 35) and in fitting (36).
6. Adjust down thrust stop bolt (37). Loosen nut (38). Turn bolt until bolt just touches bellcrank (32). Tighten nut (38).
7. Remove pin (29) from fitting (36), bellcranks (32, 33, 34, and 35), and fitting (31).
8. Install pin (29) through hole (39) of fitting (31) and four bellcranks (32, 33, 34, and 35), and in fitting (36).

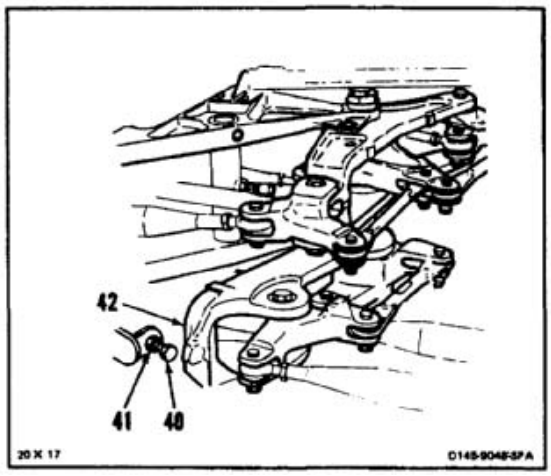
NOTE

Bellcranks (32 and 33) have oversize holes.

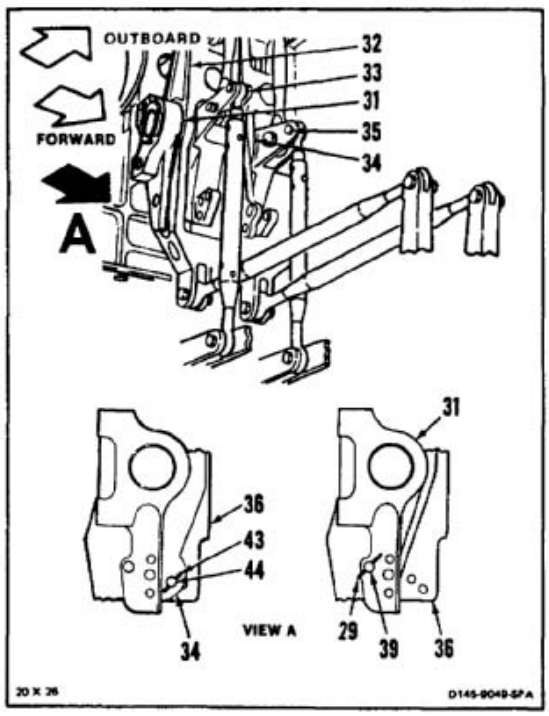




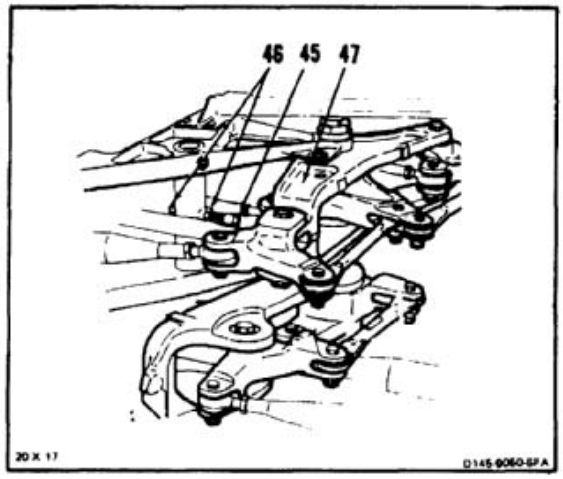
9. Have helper working from forward left work platform, adjust right yaw/left roll stop belt (40). Loosen nut (41). Turn bolt until it just touches bellcrank (42). Tighten nut (41).



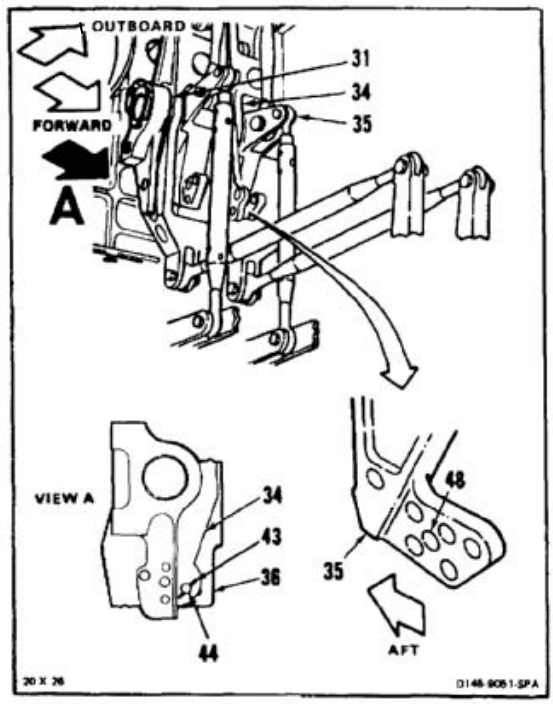
10. Working in passageway, remove pin (29) from fitting (36) from bellcranks (32, 33, 34, and 35), and hole (39) of fitting (31).
11. Move lower end of bellcranks (32 and 33) fully aft.
12. Install pin (T45) (43) through most forward hole (44) of bellcrank (34), bellcrank (35), and in fitting (36).



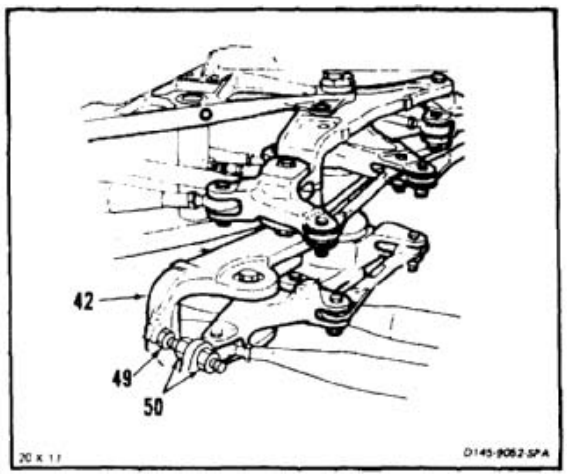
13. Have helper working from forward left work platform, adjust left yaw/left roll stop bolt (45). Loosen three nuts (46). Turn bolt until it just touches bellcrank (47). Tighten nuts (46).



14. Working from passageway, remove pin (43) from fitting (36) and bellcranks (34 and 35).
15. Align most aft hole (48) of bellcrank (35), and most forward hole (44) of bellcrank (34).
16. Install pin (43) through hole (44) of bellcrank (34), bellcrank (35) and in fitting (36).

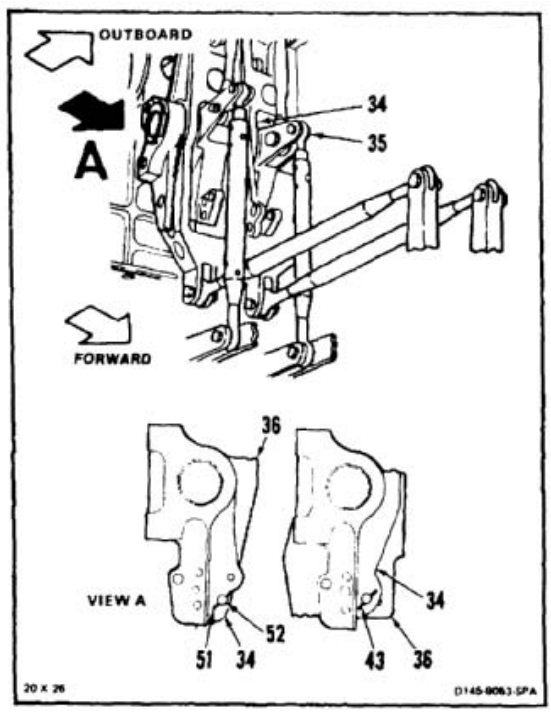


17. Have helper working from forward left work platform adjust left yaw right roll stop bolt (49). Loosen two nuts (50). Turn bolt until it just touches bellcrank (42). Tighten nuts (50).

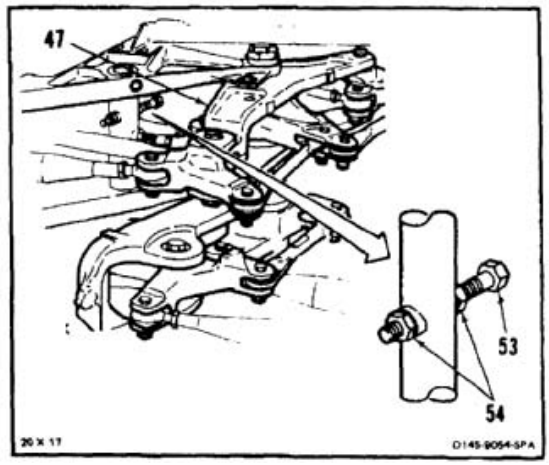


18. Working from passageway, remove pin (43) from fitting (36) and two bellcranks (34 and 35).

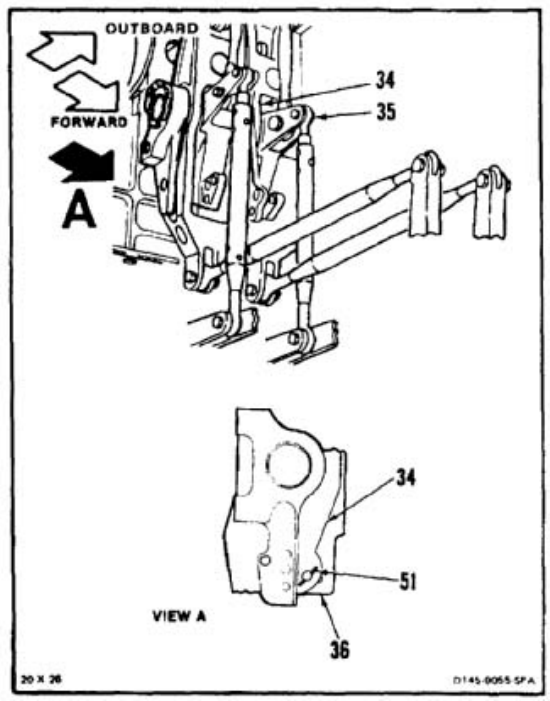
19. Install pin (T46) (51) through two bellcranks (34 and 35) and in most forward lower hole (52) of fitting (36).



20. Have helper working from forward left work platform adjust right yaw/right roll stop bolt (53). Loosen two nuts (54). Turn bolt until it just touches bellcrank (47). Tighten nuts (54).



21. Working from passageway, remove pin (51) from fitting (36) and bellcranks (34 and 35).



CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

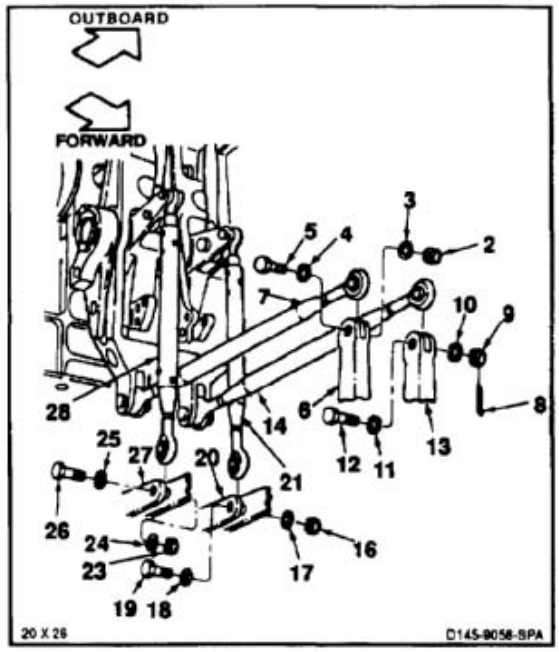
22. Untie and position link (28) in bellcrank (27). Install bolt (26), two washers (25 and 24) and nut (23). Do not torque nut at this time.

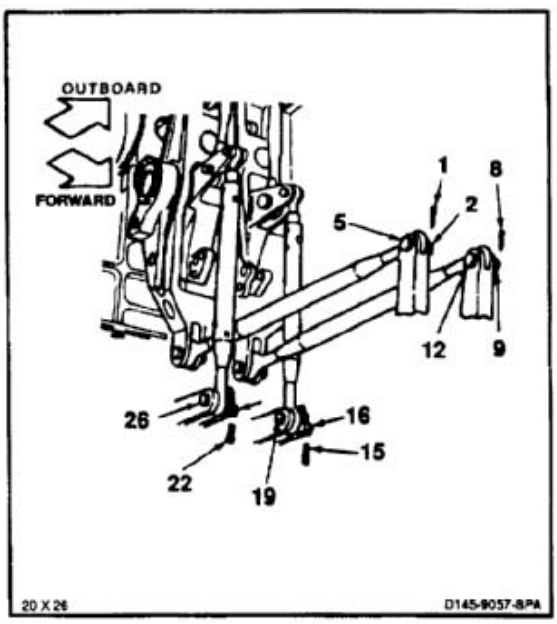
23. Untie and position link (21) in bellcrank (20). Install bolt (19), two washers (18 and 17), and nut (16). Do not torque nut at this time.

24. Untie and position link (14) in bellcrank (13). Install bolt (12), two washers (11 and 10), and nut (9). Do not torque nut at this time.

25. Untie and position link (7) in bellcrank (6). Install bolt (5), two washers (4 and 3), and nut (2). Do not torque nut at this time.

26. Torque four nuts (2, 9, 16, and 23) to **30 to 45 inch-pounds**. Install four cotter pins (1, 8, 15, and 22). Check four bolts (5, 12, 19, and 26). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 26.





FOLLOW-ON MAINTENANCE:

Connect forward and aft servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install forward transmission drip pan (Task 2-3).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Close forward left work platform (Task 2-2).

END OF TASK

11-52.1 ADJUST FIRST AND SECOND-STAGE BELLCRANK THRUST UP INBOARD AND YAW RIGHT OUTBOARD STOPS 11-52.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Twine (E433)

Parts:

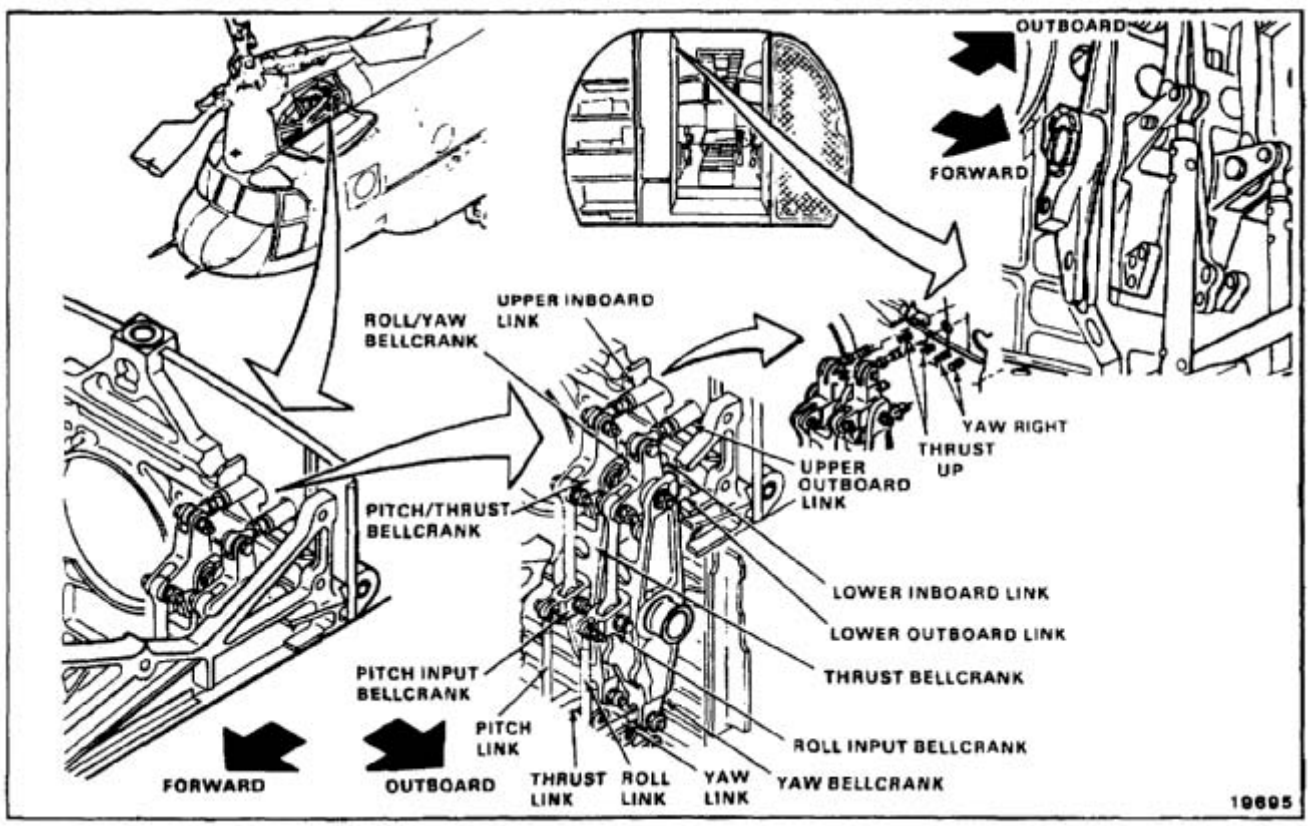
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
First and Second Stage Bellcranks Rigged (Task 11-51)
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward and Aft Servocylinder Connecting Links Disconnected (Task 11-192)
Closet Acoustic Blanket Removed (Task 2-107)
Forward Transmission Drip Pan Removed (Task 2-3)
Closet Backup Panel Removed (Task 2-2)
Forward Left Work Platform Open (Task 2-2)

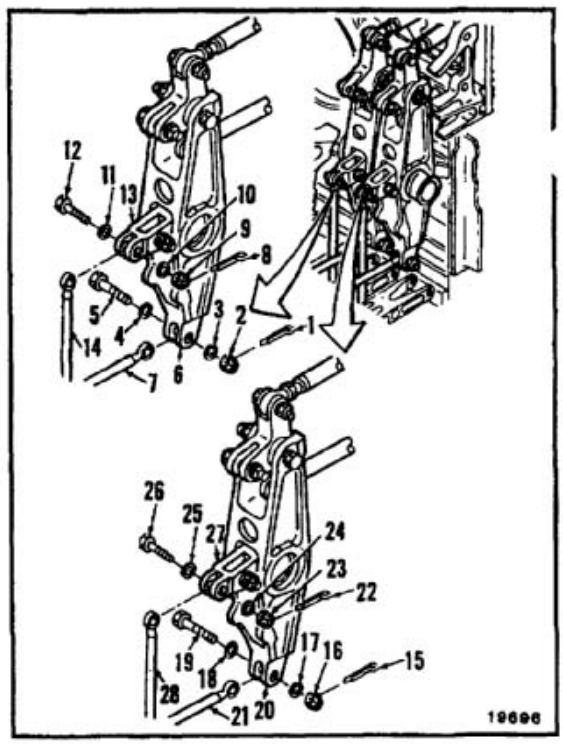


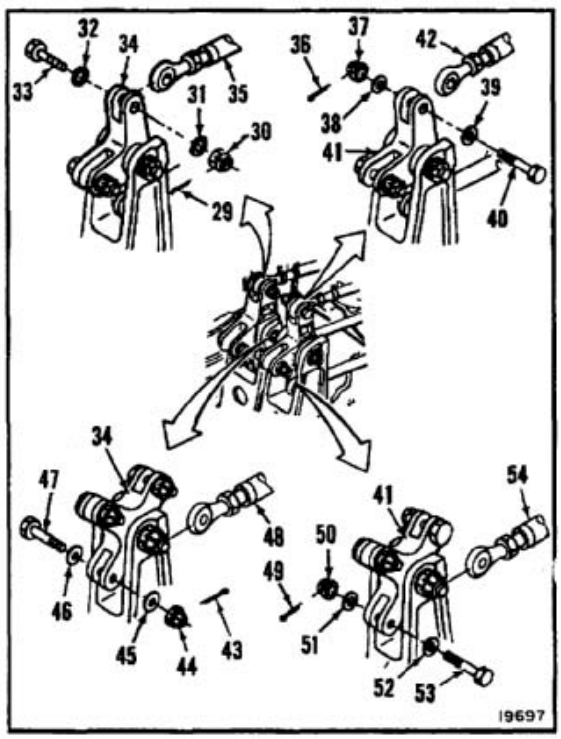
11-52.1 ADJUST FIRST AND SECOND-STAGE BELLCRANK THRUST UP INBOARD AND YAW RIGHT OUTBOARD STOPS (Continued) 11-52.1

CAUTION

Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

1. Working in passageway, remove cotter pin (1), nut (2), two washers (3 and 4), and bolt (5) from bellcrank (6). Disconnect link (7) from bellcrank. Tie link away from bellcrank. Use twine (E433).
2. Remove cotter pin (8), nut (9), two washers (10 and 11), and bolt (12) from bellcrank (13). Disconnect link (14) from bellcrank. Tie link away from bellcrank. Use twine (E433).
3. Remove cotter pin (15), nut (16), two washers (17 and 18), and bolt (19) from bellcrank (20). Disconnect link (21) from bellcrank. Tie link away from bellcrank. Use twine (E433).
4. Remove cotter pin (22), nut (23), two washers (24 and 25), and bolt (26) from bellcrank (27). Disconnect link (28) from bellcrank. Tie link away from bellcrank. Use twine (E433).
5. Have helper working from forward left work platform, remove cotter pin (29), nut (30), two washers (31 and 32), and bolt (33) from bellcrank (34). Disconnect link (35) from bellcrank. Tie link away from bellcrank. Use twine (E433).
6. Remove cotter pin (36), nut (37), two washers (38 and 39), and bolt (40) from bellcrank (41). Disconnect link (42) from bellcrank. Tie link away from bellcrank. Use twine (E433).
7. Remove cotter pin (43), nut (44), two washers (45 and 46), and bolt (47) from bellcrank (34). Disconnect link (48) from bellcrank. Tie link away from bellcrank. Use twine (E433).
8. Remove cotter pin (49), nut (50), two washers (51 and 52), and bolt (53) from bellcrank (41). Disconnect link (54) from bellcrank. Tie link away from bellcrank. Use twine (E433).





NOTE

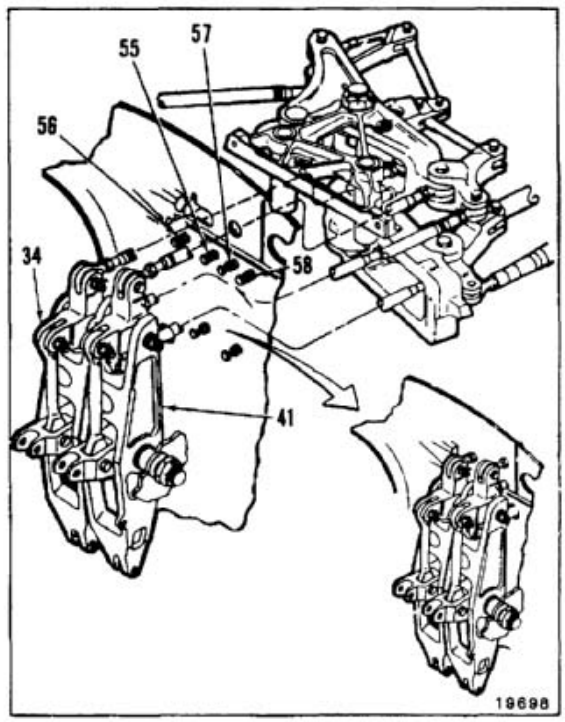
Outboard thrust up stop (55) at 11.0 BL is preset at a fixed dimension and should not be adjusted.

9. Position bellcrank (34) against fixed stop (55), adjust inboard stop (56) at 8.46 BL so both stops contact bellcrank.

NOTE

Inboard right hand pedal forward stop (57) at 12.36 BL is preset at a fixed dimension and should not be adjusted.

10. Position bellcrank (41) against fixed stop (57), adjust outboard stop (58) at 15.28 BL so both stops contact bellcrank.



CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

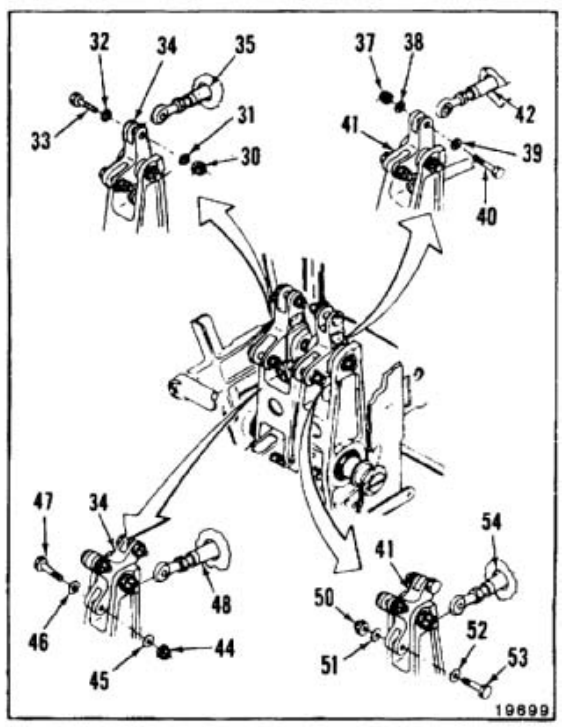
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

11. Have helper working from left forward platform, untie and position link (54) in bellcrank (41). Install bolt (53), two washers (51 and 52), and nut (50).

12. Untie and position link (48) in bellcrank (34). Install bolt (47), two washers (45 and 46), and nut (44).

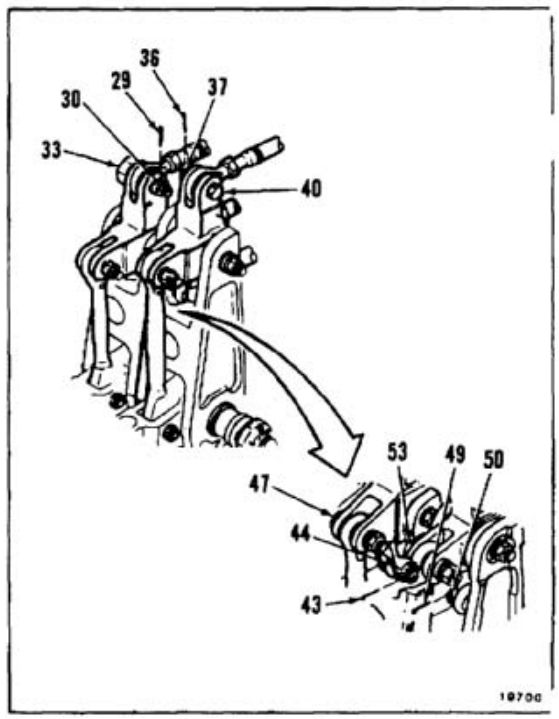
13. Untie and position link (42) in bellcrank (41). Install bolt (40), two washers (38 and 39), and nut (37).

14. Untie and position link (35) in bellcrank (34). Install bolt (33), two washers (31 and 32), and nut (30).



11-52.1 ADJUST FIRST AND SECOND-STAGE BELLCRANK THRUST UP INBOARD AND YAW RIGHT OUTBOARD STOPS (Continued) 11-52.1

15. Torque four nuts (30, 37, 44, and 50) to **60 to 90 inch-pounds**. Install four cotter pins (29, 36, 43. and 49). Check four bolts (33, 40, 47, and 53). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 15.

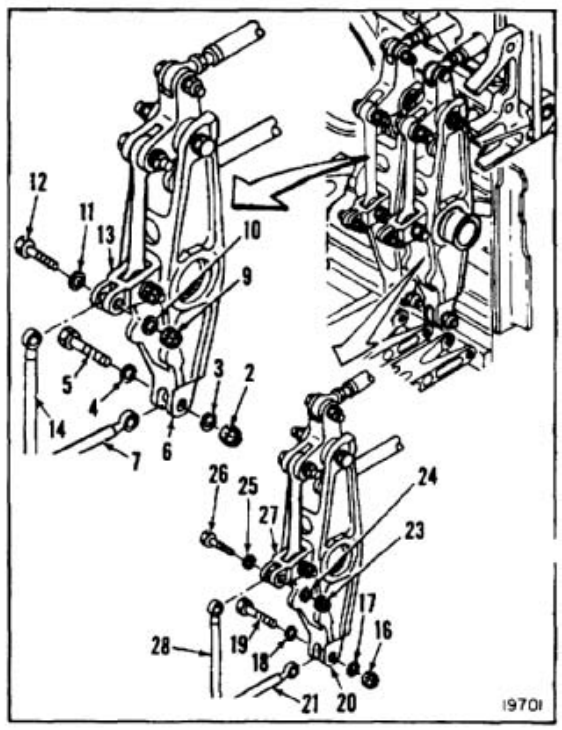


16. Working in passageway, untie and position link (28) in bellcrank (27). Install bolt (26), two washers (25 and 24) and nut (23).

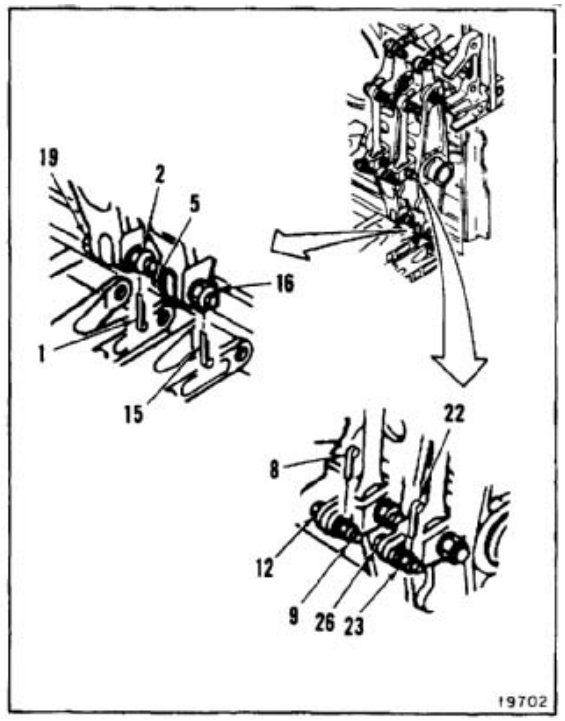
17. Untie and position link (21) in bellcrank (20). Install bolt (19), two washers (18 and 17), and nut (16).

18. Untie and position link (14) in bellcrank (13). Install bolt (12), two washers (11 and 10), and nut (9).

19. Untie and position link (7) in bellcrank (6). Install bolt (5), two washers (4 and 3), and nut (2).



20. Torque four nuts (2, 9, 16, and 23) to **60 to 90 inch-pounds**. Install four cotter pins (1, 8, 15, and 22). Check four bolts (5, 12, 19, and 26). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 20.



FOLLOW-ON MAINTENANCE:

Connect forward and aft servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install forward transmission drip pan (Task 2-3).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Close forward left work platform (Task 2-2).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-53 RIG FORWARD UPPER BELLCRANKS 11-53

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
First Stage Rig Pin (T44)
Second Stage Rig Pin (T135)

Materials:

None

Parts:

Cotter Pins

Personnel Required:

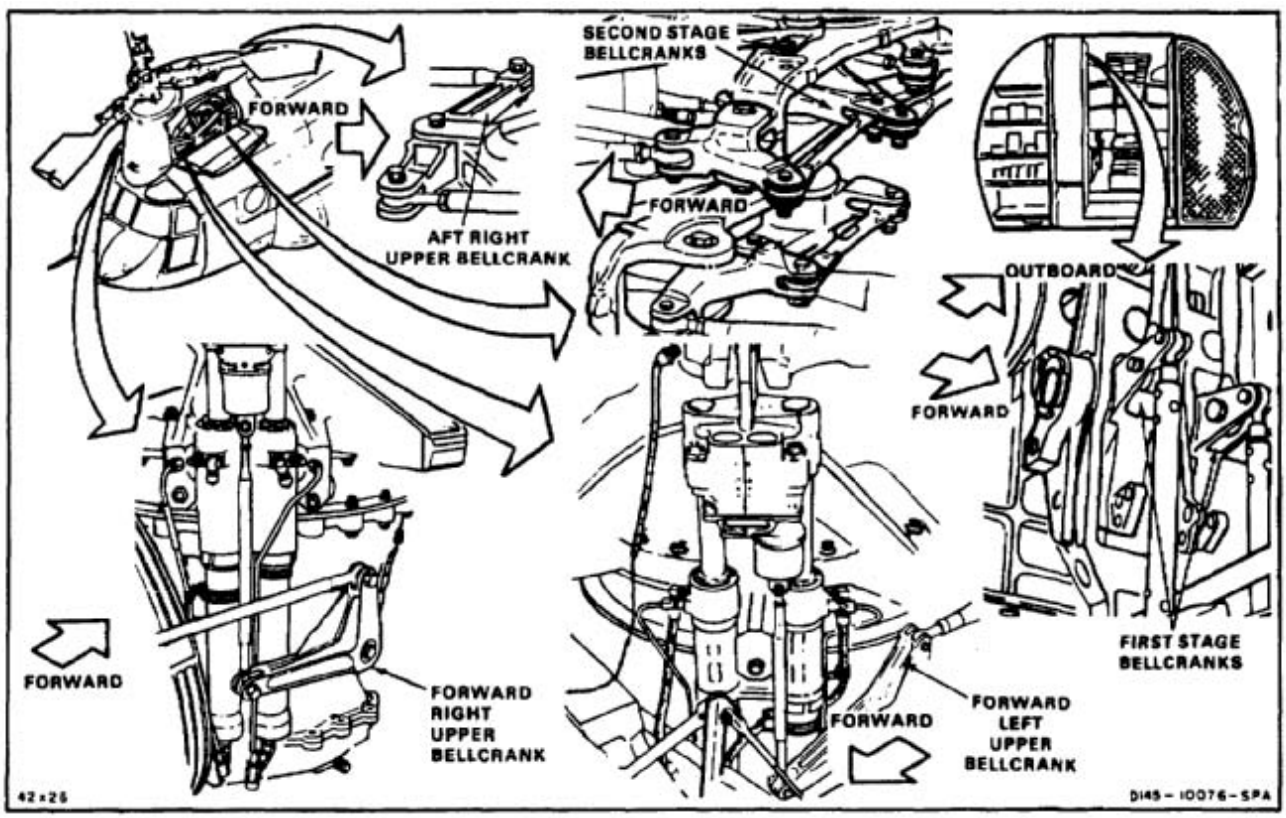
Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 11-51

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Servocylinder Safety Blocks (T31) Installed (Task 11-29)
Forward Left and Right Work Platforms Open (Task 2-2)
Forward Transmission Drip Pan Removed (Task 2-3)
Copilot's Cockpit Controls Set to Neutral (Task 11-32)



CAUTION

Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

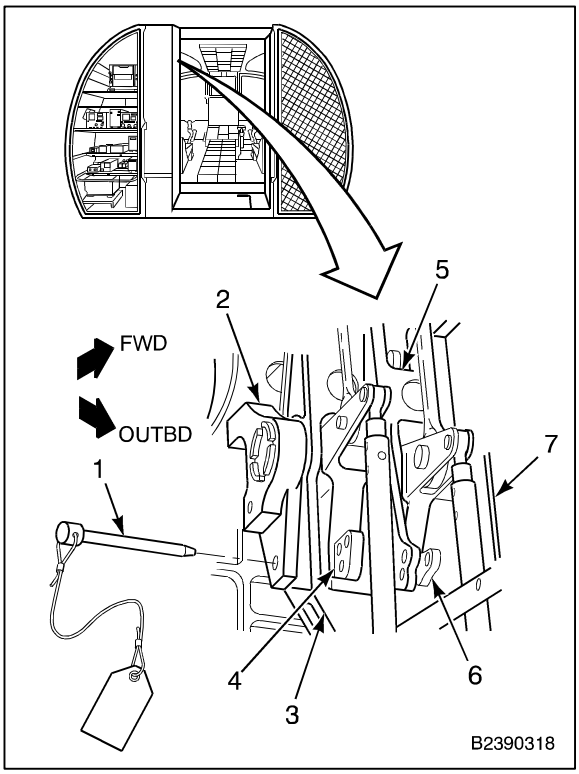
CAUTION

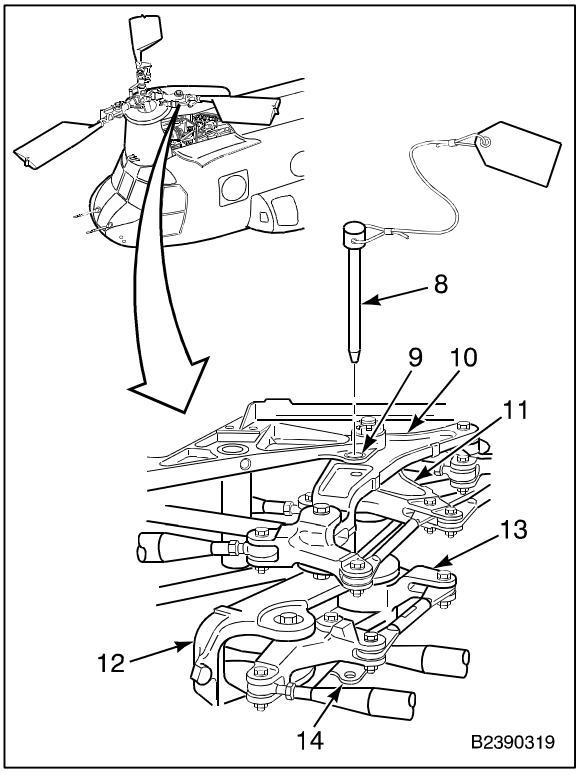
Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Working in passageway, install first stage rig pin (T44) (1) through fitting (2), four bellcranks (3, 4, 5, and 6), and fitting (7). Pin must slide freely. If not, rig first stage bellcranks (Task 11-51), then repeat step 1.
2. Remove pin (1) from fitting (2).
3. Working from forward left work platform, install second stage rig pin (T135) (8) through support (9), four bellcranks (10, 11, 12, and 13), and fitting (14). Pin must slide freely. If not, rig second stage bellcranks (Task 11-51), then repeat step 3.



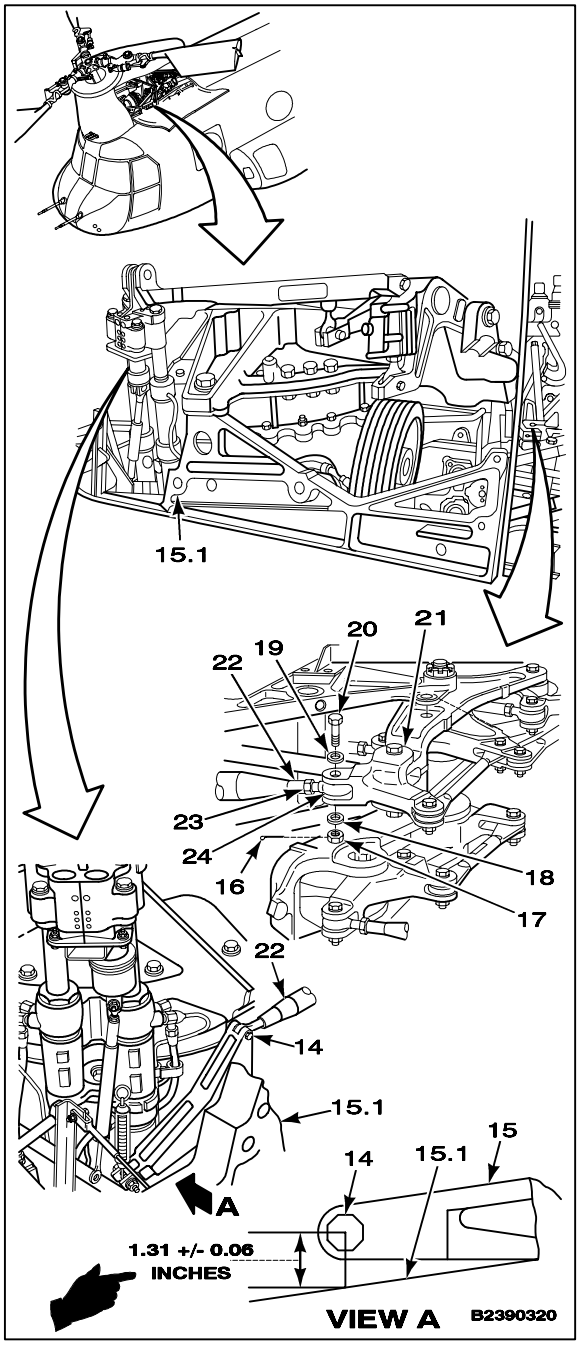


4. Check bolt (14) of left bellcrank (15). Measure and record distance between center of bolt and fitting (15.1). Distance must be **1.31 ±0.06 inches**. If within limit, go to step 12. If not, perform steps 5 thru 11, then go to step 12.
5. Remove cotter pin (16), nut (17), two washers (18 and 19), and bolt (20) from bellcrank (21). Disconnect link (22) from bellcrank.
6. Loosen nut (23) of link (22). Turn rod end (24) clockwise to move bolt (14) aft.

NOTE

One-half turn of rod end moves bolt about **0.02 inch**.

7. Position link (22) in bellcrank (21). Install bolt (20), two washers (19 and 18), and nut (17). Tighten nut.
8. Repeat step 4. If distance is within limit, go to step 9. If not, repeat steps 5 thru 8.
9. Torque nut (23) of link (22) to **103 inch-pounds**.
10. Torque nut (17) to **60 to 90 inch-pounds**. Install cotter pin (16).
11. Check bolt (20). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 10.

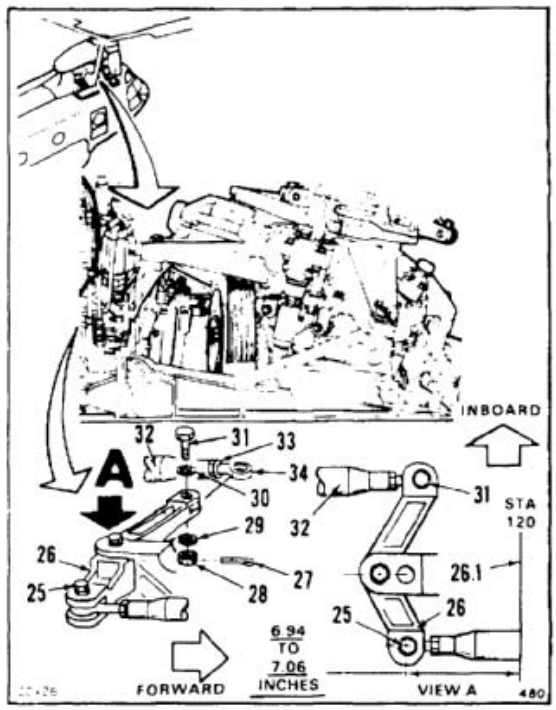


12. Working from forward right work platform, check bolt (25) of right aft bellcrank (26). Measure and record distance between center of bolt and aft surface (26.1) at sta. 120. Distance must be between **6.94 to 7.06 inches**. If within limit, go to step 20. If not, perform steps 13 thru 19, then go to step 20.
13. Remove cotter pin (27), nut (28), two washers (29 and 30), and bolt (31) from bellcrank (26). Disconnect link (32) from bellcrank.
14. Loosen nut (33) of link (32). Turn rod end (34) clockwise to move bolt (25) forward.

NOTE

One half turn of rod end moves bolt about **0.02 inch**.

15. Position link (32) in bellcrank (26). Install bolt (31), two washers (30 and 29), and nut (28). Tighten nut.
16. Repeat step 12. If distance is same, go to step 17. If not, repeat steps 13 thru 16.
17. Torque nut (33) of link (32) to **103 inch-pounds**.
18. Torque nut (28) to **60 to 90 inch-pounds**. Install cotter pin (27).
19. Check bolt (31). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 18.

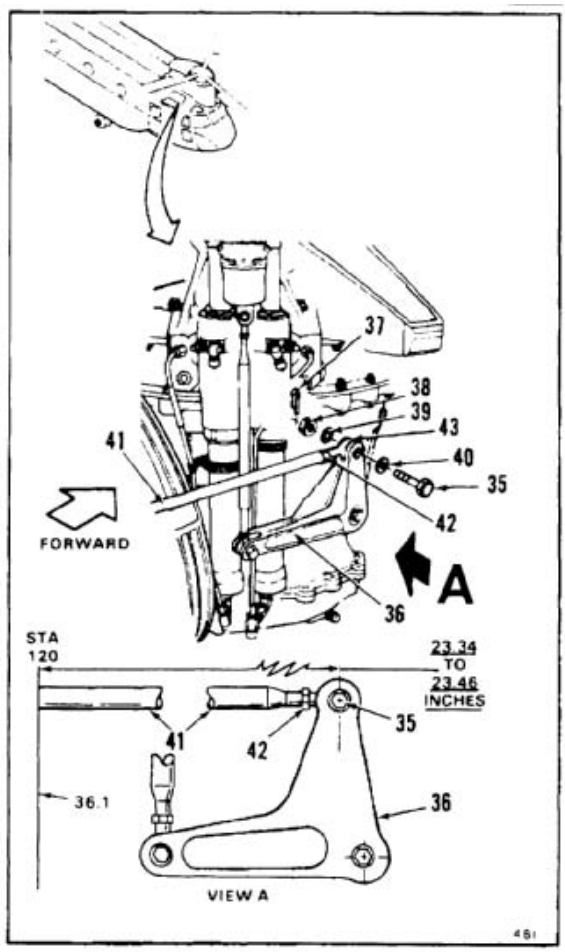


20. Check bolt (35) of right forward bellcrank (36). Measure and record distance between center of bolt and forward surface (36.1) at sta. 120. Distance must be between **23.34 to 23.46 inches**. If within limit, go to step 28. If not, perform steps 21 thru 27, then go to step 28.
21. Remove cotter pin (37), nut (38), two washers (39 and 40), and bolt (35) from bellcrank (36). Disconnect link (41) from bellcrank.
22. Loosen nut (42) of link (41). Turn rod end (43) clockwise to move bolt (35) aft.

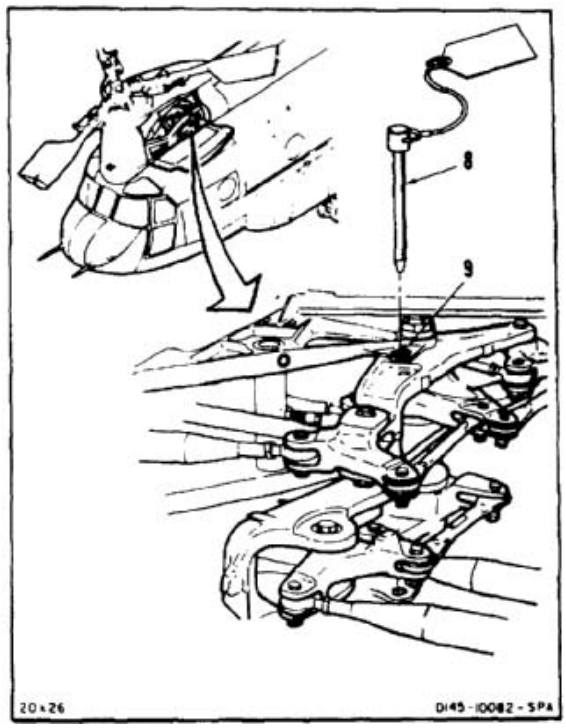
NOTE

One half turn of rod end moves bolt about **0.015 inch**.

23. Position link (41) in bellcrank (36). Install bolt (35), two washers (40 and 39), and nut (38). Tighten nut.
24. Repeat step 20. If distance is same, go to step 25. If not, repeat steps 21 thru 24.
25. Torque nut (42) of link (41) to **103 inch-pounds**.
26. Torque nut (38) to **60 to 90 inch-pounds**. Install cotter pin (37).
27. Check bolt (35). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 26.



28. Working from forward left work platform, remove pin (8) from support (9).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (T31) (Task 11-28).
Close forward left and right work platforms (Task 2-2).
Install transmission drip pan (Task 2-3).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-54 RIG FORWARD OR AFT SWASHPLATE AND SERVOCYLINDERS 11-54

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Protractor Assembly
First Stage Rig Pin (T44)
Second Stage Rig Pin (T135)

Materials:

Cloths (E120)

Parts:

Cotter Pins

Personnel Required:

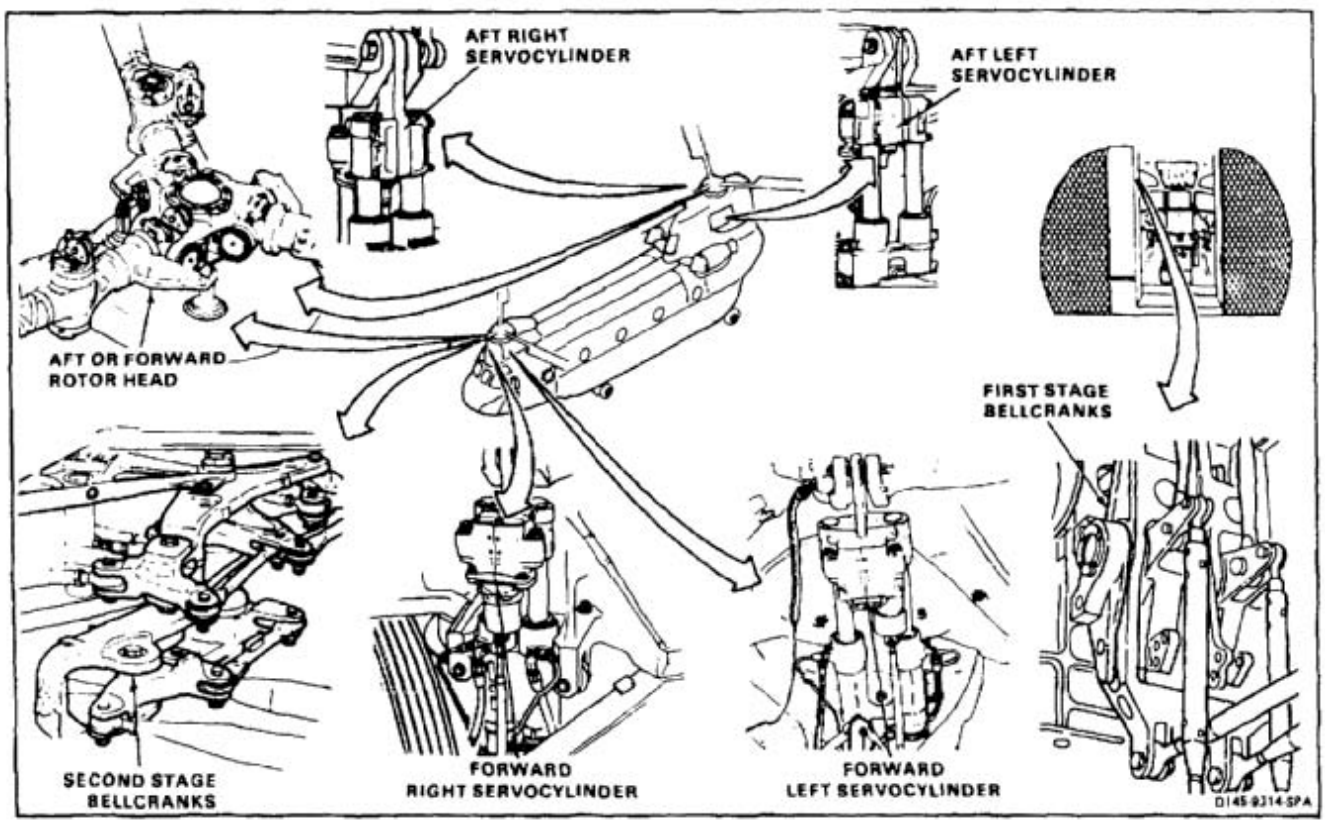
Medium Helicopter Repairer (2)
Inspector

References:

Task 11-51
Task 11-193
Task 11-210

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Blade Lead/Lag Rig Tool (T72) Installed (Task 11-31)
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
AFCS SYSTEM SEL Switch Set to OFF
Forward or Aft LCT Actuators Fully Retracted (TM 55-1520-240-T)
DASH Actuator Removed (Task 11-163)
DASH Actuator Dummy Link (T42) Installed (Task 11-26)
Pitch Link Positioned Over Forward Right or Aft Left Servocylinders (Task 1-26)
Forward or Aft Rotor Shaft Cover Removed (Task 5-8)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Forward or Aft Work Platforms Open (Task 2-2)
Forward or Aft Rotary-Wing Blade Tie Down Lines Installed (Task 1-26)
Cockpit Controls at Neutral (Task 11-32)



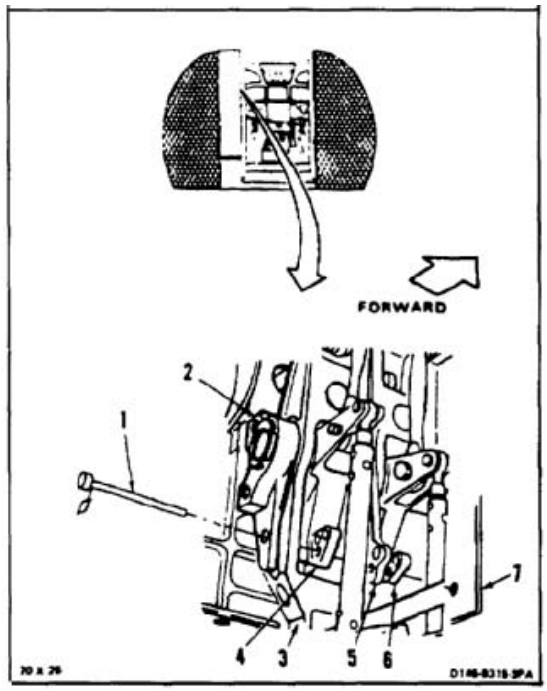
WARNING

Death or serious injury may occur if the correct procedures are not followed when removing the upper rod end bolt to the pilot valve with hydraulic power applied to any of the servocylinders.

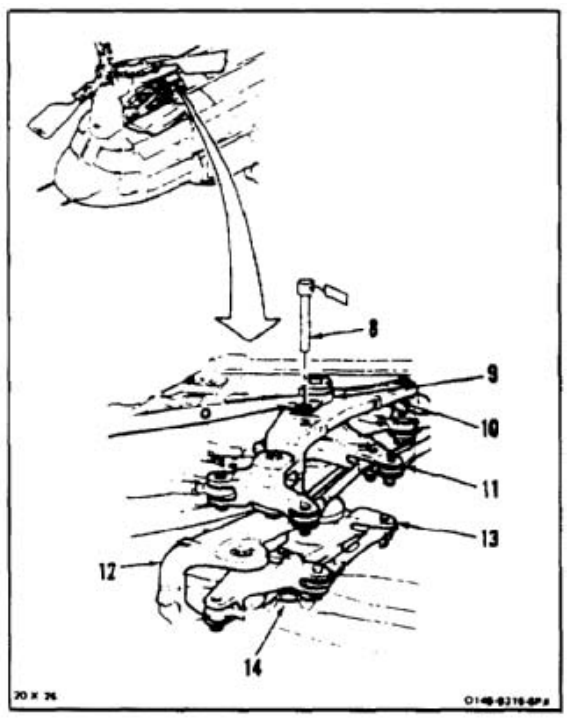
CAUTION

Cockpit rigging pins must not be removed; otherwise, damage to components will occur.

1. Working in passageway, install first stage rig pin (T44) (1) through fitting (2), four bellcranks (3, 4, 5, and 6) and fitting (7). Pin must slide freely. If not, rig first stage bellcranks (Task 11-51), then repeat step 1.
2. Remove pin (1) from fitting (2).



3. Working from forward left work platform, install second stage rig pin (T135) (8) through support (9) and four bellcranks (10, 11, 12, and 13) and fitting (14). Pin must slide freely. If not rig second stage bellcranks (Task 11-51), then repeat step 3.



RIG FORWARD SWASHPLATE AND SERVOCYLINDERS

4. Working from forward left work platform, measure and record length of left servocylinder pistons (15).

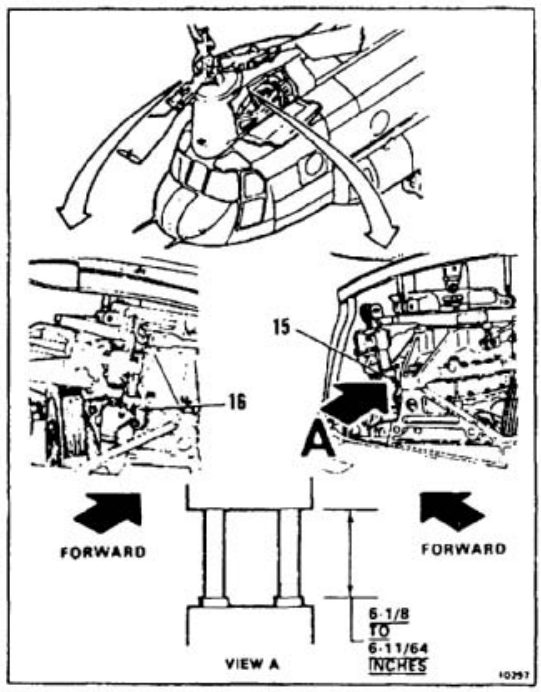
5. Working from forward right work platform, measure and record length of right servocylinder pistons (16).

6. Check pistons (15 and 16) lengths from steps 4 and 5. Length shall be **6-1/8 to 6-11/64 inches**.

6.1. Deleted.

6.2. If length is not within limits of step 6, rig forward servocylinders (Task 11-54), then repeat steps 4 thru 6.2.

6.3. If length is not **3/64 inch** less, adjust servocylinder connecting links, then repeat steps 4 thru 6.3.



ADJUST SERVOCYLINDER CONNECTION LINK

WARNING

Death or serious injury may occur if the correct procedures are not followed when removing the upper rod end bolt to the pilot valve with hydraulic power applied to any of the servocylinders.

NOTE

Procedure is same to adjust forward or aft left or right servocylinder connecting link. Left forward connecting link is shown here.

7. Remove cotter pin (17), nut (18). washers (19), and bolt (20) from bellcrank (21). Disconnect forward left connecting link (22) from bellcrank.

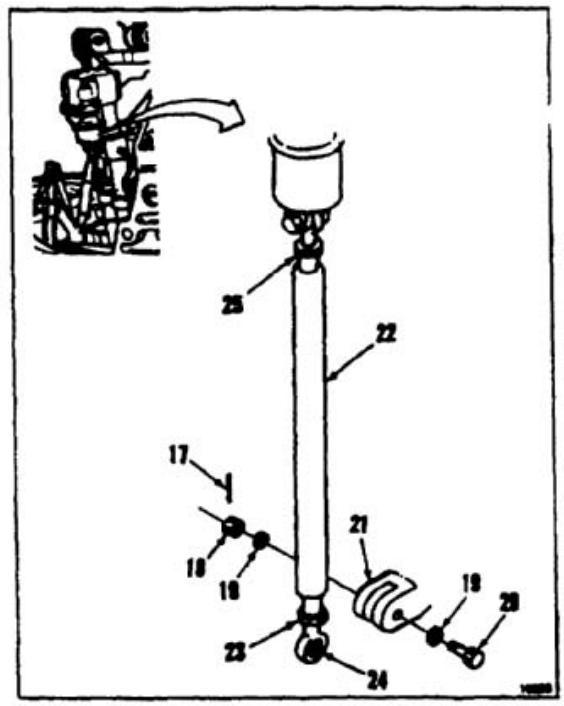
NOTE

One-half turn of bearing or connecting link moves servocylinder pistons **0.02 inch**.

8. Loosen nut (23). Turn bearing (24). If bearing will not turn, loosen nut (25), end turn connecting link (22). Torque nuts (23 end 25) to **103 inch-pounds**.

9. Position link (22) in bellcrank (21). Install washers (19) bolt (20), end nut (18). Torque nut (18) to **30 inch-pounds**. Continue tightening only as needed to align cotter pin holes. Do not exceed **45 inch-pounds**. Install cotter pin (17).

10. Deleted.



CAUTION

Keep movement on aircraft to minimum; otherwise, false measurements can occur.

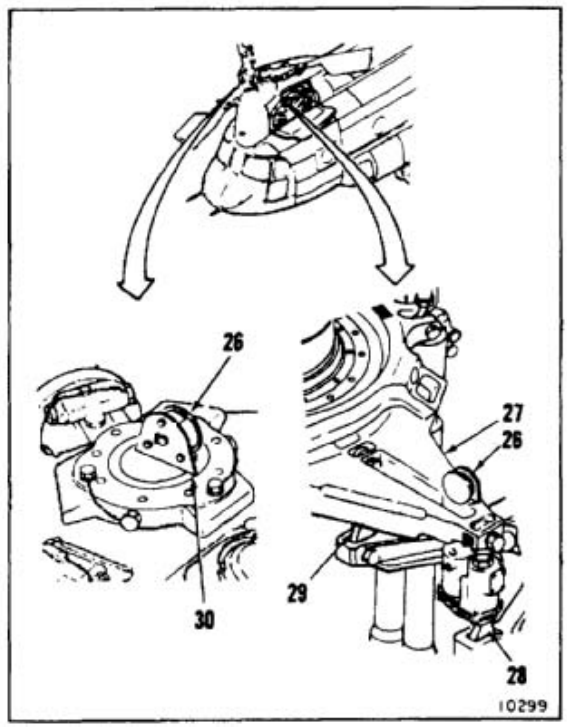
11. Working from forward left work platform, position protractor (26) on fixed swashplate (27). Align protractor with LCT actuator (28) and LCT connecting link (29). Measure and record angle of swashplate. Remove protractor.

CAUTION

Do not rotate protractor between measurements; otherwise, false measurements will occur.

12. Position protractor (26) on top of rotor shaft (30). Align protractor with actuator (28) and link (29). Measure and record angle of rotor shaft. Remove protractor.

13. Check angles measured in steps 11 and 12. Step 11 angle must be less than step 12 angle. Subtract angle of step 11 from angle of step 12. Difference must be **1.0° to 1.4°**. If same, go to step 27. If not, perform steps 14 thru 26, then repeat steps 11, 12, and 13.



14. Remove lockwire from nut (31) and clip (32). Loosen nut.
15. Remove cotter pin (33), nut (34), washers (35), and bolt (36) from connecting link (37) and swashplate (38).
16. Remove cotter pin (39), nut (40), and washer (41) from upper bolt (42).
17. Hold actuator (43) and link (37). Remove bolt (42) and gently lower actuator and link.
18. Lift clip (32) and turn nut (31) until locking tabs (44) are out of notches (45).
19. Turn bearing (46). Find number of turns to adjust link (37) as follows:
    a. N = Number of turns of bearing
    b. D = Difference in minutes from step 13 (1 Degree = 60 Minutes)

FORMULA FOR FORWARD SWASHPLATE

c. $$N = \frac{72 - D}{15}$$

FORMULA FOR AFT SWASHPLATE

d. $$N = \frac{168 - D}{15}$$

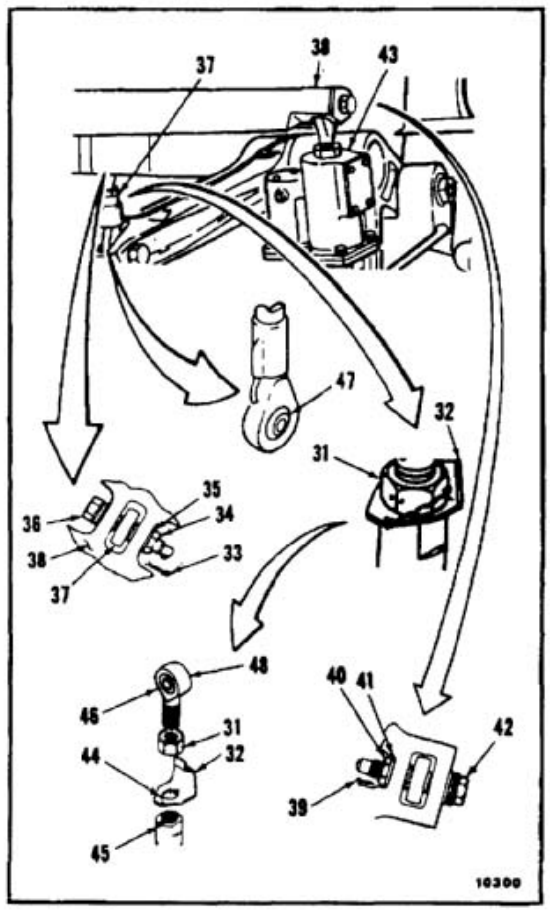
e. If N is negative (–), shorten link.

f. If N is positive (+), lengthen link.

NOTE

Adjust link to nearest one-half turn.

20. Align bearing (46) with lower bearing (47).
21. Position tab (44) of clip (32) in notch (45) of link (37). Make sure flat surface (48) of bearing (46) and alignment guide (32) of clip are parallel.



NOTE

Do not allow bearing to turn when tightening nut.

22. Hold bearing (46) and tighten nut (31). Torque nut to **450 inch-pounds**. Lockwire nut to clip.

23. Have helper hold link (37) and actuator (43). Position link and actuator in swashplate.

CAUTION

Bushing must be in swashplate before installing bolts; otherwise, damage to components will result.

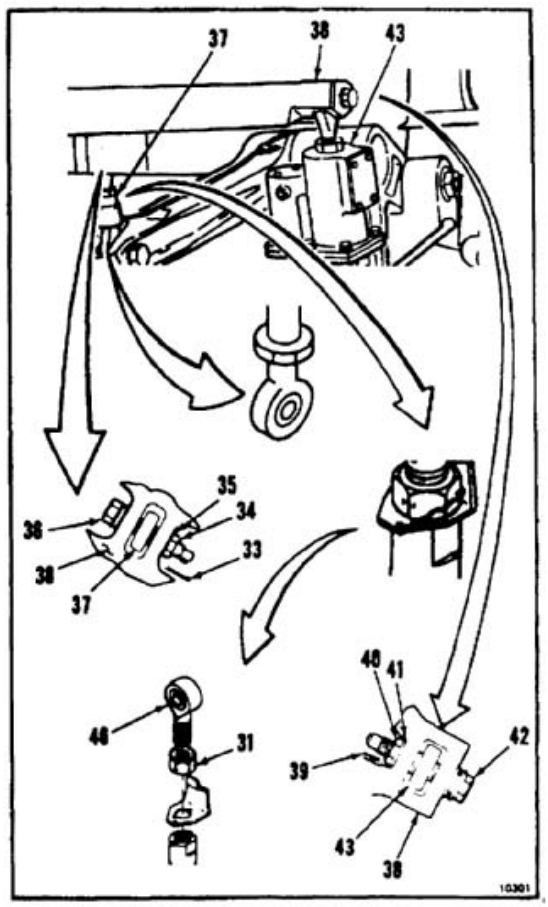
NOTE

Positive retention bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

24. Install bolt (42), head aft, washer (41), and nut (40) in swashplate (38) and actuator (43). Torque nut to **660 inch-pounds**. Continue tightening only as needed to align cotter pin holes. Do not exceed **1400 inch-pounds**. Install cotter pin (39).

25. Install bolt (36), head forward, washer (35), and nut (34) in swashplate (38) and link (37). Torque nut to **600 inch-pounds**. Continue tightening only as needed to align cotter pin holes. Do not exceed **1400 inch-pounds**. Install cotter pin (33).

26. If aft swashplate and servocylinders are not to be rigged, go to step 34.



RIG AFT SWASHPLATE AND SERVOCYLINDERS

27. Working from aft left work platform, measure and record length of left servocylinder pistons (49).

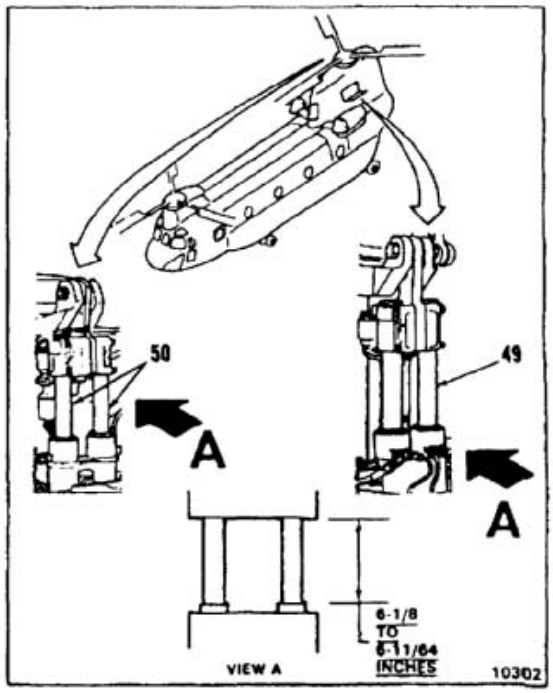
28. Working from aft right work platform, measure and record length of right servocylinder pistons (50).

29. Check pistons (49 and 50) lengths from steps 27 and 28. Length shall be **6-1/8 to 6-11/64 inches**.

30. Deleted.

30.1. If length is not within limits of step 29, rig aft servocylinders (Task 11-54), then repeat steps 29 thru 30.1.

30.2. If length is not **3/64 inch** or less, adjust servocylinder connecting links, then repeat steps 29 thru 30.2.



CAUTION

Keep movement on aircraft to minimum; otherwise, false measurements can occur.

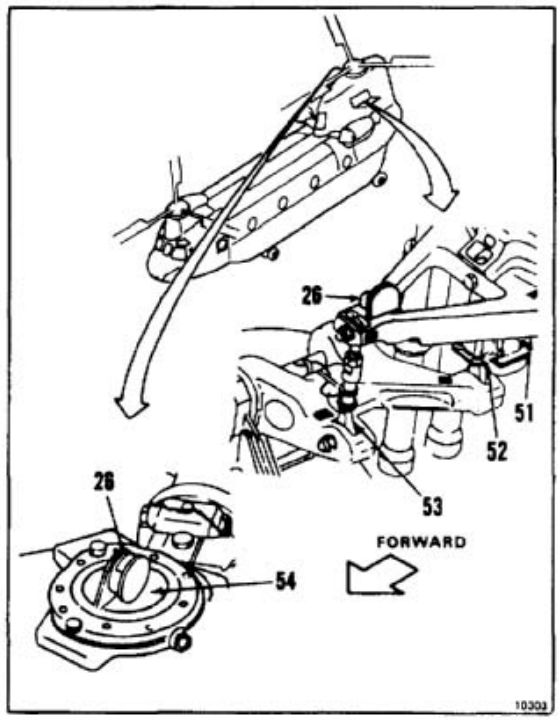
31. Working from aft left work platform, position protractor (26) on fixed swashplate (51). Align protractor with LCT actuator (52) and LCT connecting link (53). Measure and record angle of swashplate. Remove protractor.

CAUTION

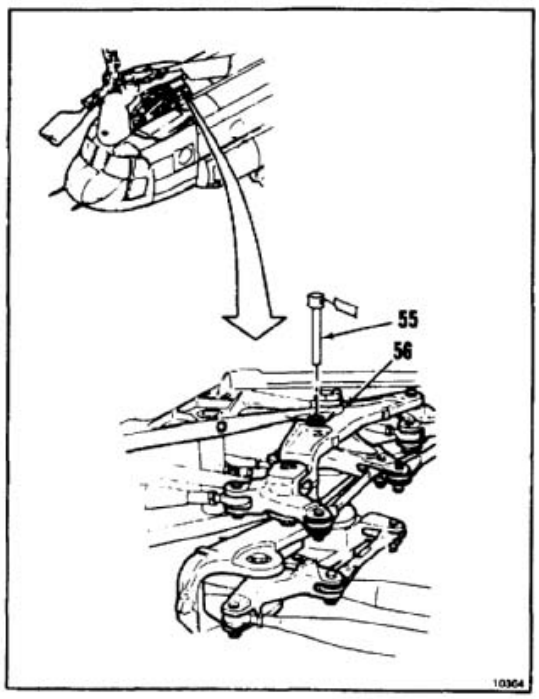
Do not rotate protractor between measurements; otherwise, false measurements will occur.

32. Position protractor (26) on top of rotor shaft (54). Align protractor with actuator (52) and link (53). Measure and record angle of rotor shaft. Remove protractor.

33. Check angles measured in steps 31 and 32. Step 31 angle must be less than step 32 angle. Subtract angle of step 31 from angle of step 32. Difference must be **2.6º to 3.0º**. If within limit, go to step 34. If not, within limits, perform steps 14 thru 26, then repeat steps 31, 32, and 33.



34. Working from forward left work platform, remove pin (55) from support (56).



FOLLOW-ON MAINTENANCE:

Remove DASH actuator dummy link (Task 11-27).
Install DASH actuator (Task 11-164).
Remove blade lead/lag rig tool (T72) (Task 11-28).
Remove servocylinder safety blocks (T31) (Task 11-29).
Install forward or aft rotor shaft cover (Task 5-9).
Remove hydraulic power.
Remove electrical power.
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Close forward or aft work platforms (Task 2-2).
Remove forward or aft rotary-wing blade tie downs (Task 1-26).

END OF TASK

11-55 RIG FORWARD ROTARY WING BLADES 11-55

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Second Stage Rig Pin (T135)
First Stage Rig Pin (T44)
Protractor Assembly
Blade Angle Setting Tool (T129)

Personnel Required:

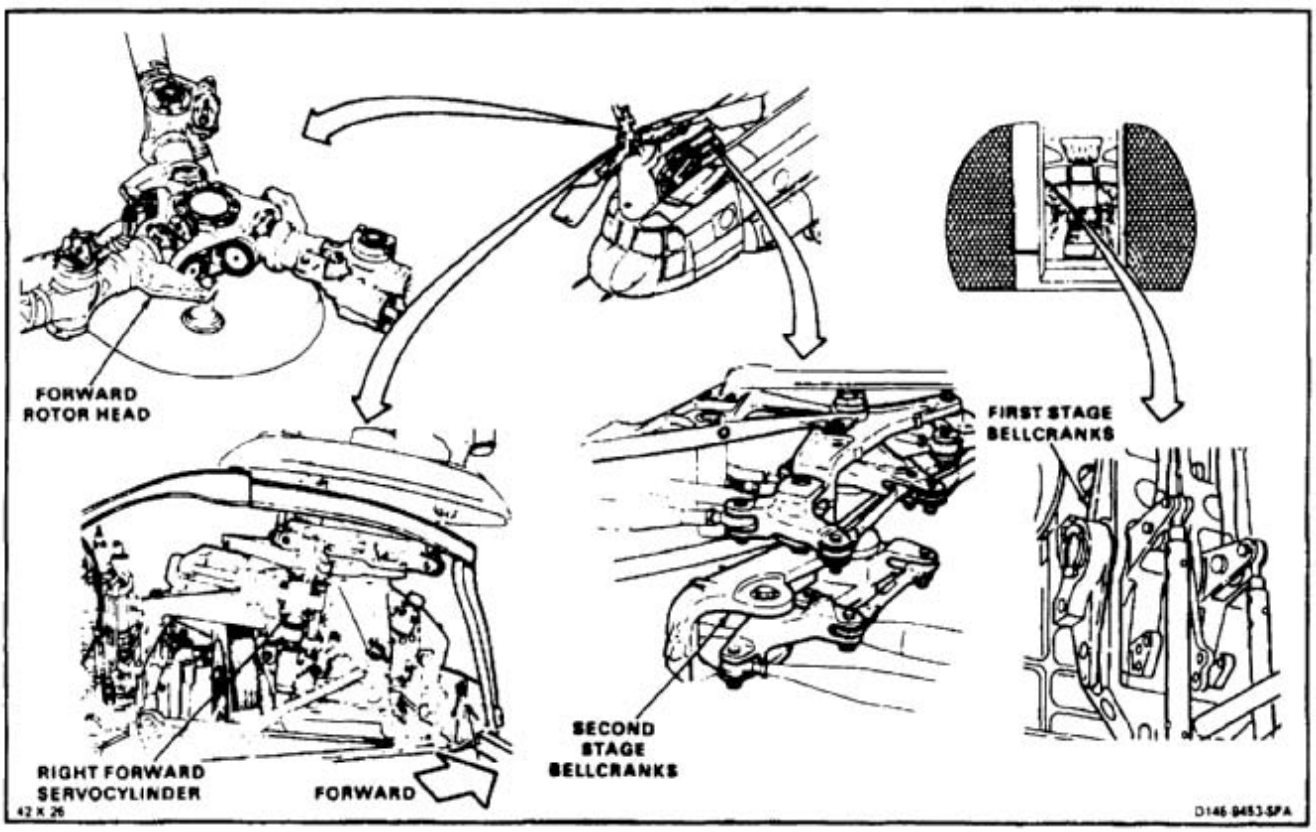
Medium Helicopter Repairer (2)
Inspector

References:

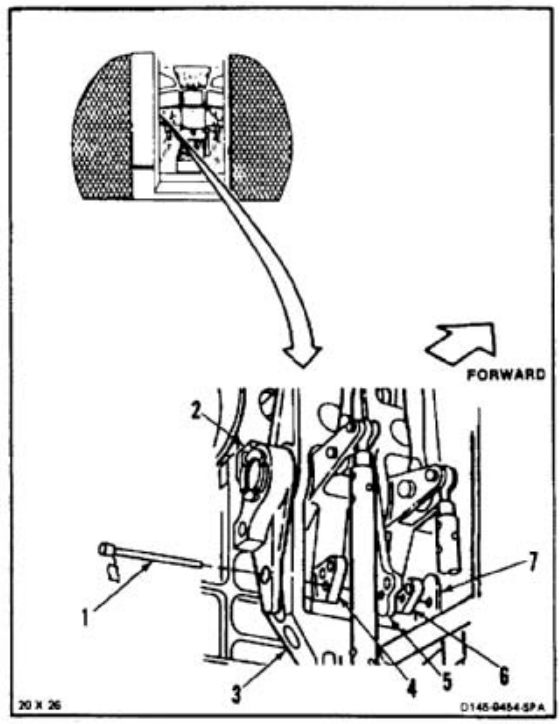
Task 5-94
Task 11-51

Equipment Condition:

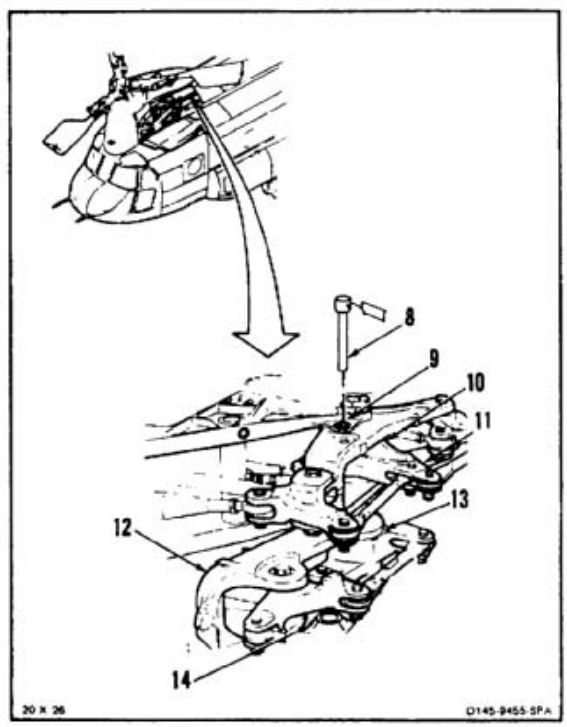
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Blade Lead/Lag Rigging Tool (T72) Installed (Task 11-30)
Helicopter Rigged for Neutral (Task 11-33)
DASH Actuator Removed (Task 11-163)
DASH Actuator Dummy Link (T42) Installed (Task 11-26)
Forward Swashplate and Servocylinders Rigged (Task 11-54)
Forward LCT Actuators Fully Retracted (TM 55-1520-240-T)
Pitch Link Positioned Over Forward Right Servocylinders (Task 1-26)
Forward Rotor Shaft Cover Removed (Task 5-8)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Forward Work Platforms Open (Task 2-2)
Forward Rotary-Wing Blade Tie Down Lines Installed (Task 1-26)
Forward Transmission Drip Pan Removed (Task 2-3)



1. Working in passageway, install first stage rig pin (T44) (1) through fitting (2), four bellcranks (3, 4, 5, and 6) and in fitting (7). Pin must slide freely. If not, rig first stage bellcrank (Task 11-51), then repeat step 1.
2. Remove pin (1) from fitting (2).



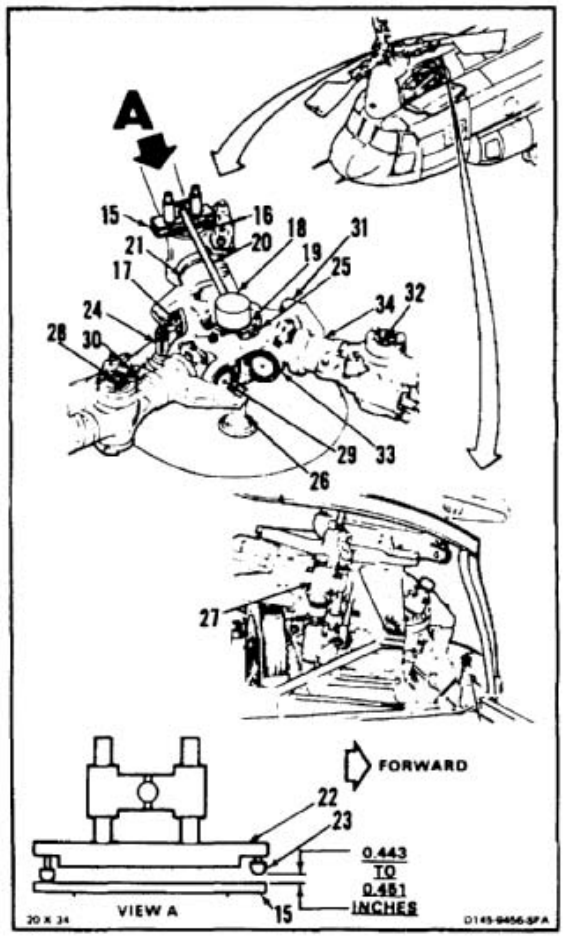
3. Working from forward left work platform, install second stage rig pin (T135) (8) through support (9) and four bellcranks (10, 11, 12, and 13) and in filling (14). Pin must slide freely. If not, rig second stage bellcranks (Task 11-51), then repeat step 3.



NOTE

Rigging tool (T129) or protractor can be used to measure rotary wing blade angles. Using tool (T129), perform steps 4 thru 18. Using protractor, perform steps 19 thru 26.

4. Working from forward right work platform install plate (15) in vertical pin (16), parallel to horizontal pin (17).
5. Install tool (T129) (18) in rotor shaft (19). Position arm (20) parallel to pitch housing (21) with plate (22) parallel and on plate (15).
6. Measure gap between ball (23) and plate (15). Gap must be **0.443 to 0.451 inches**. If not, adjust pitch link (24) (Task 5-94), then repeat step 6.
7. Position tool (18) away from plate (15). Remove plate from pin (16).
8. Turn rotor hub (25) and position pitch link (26) above forward right servocylinder (27).
9. Install plate (15) in pin (28) parallel to horizontal pin (29).
10. Position arm (20) parallel to housing (30) with plate (22) parallel and on plate (15).
11. Repeat step 6 for pin (28) and link (26).
12. Position tool (18) away from plate (15). Remove plate from pin (28).
13. Turn rotor hub (25) and position pitch link (31) above forward right servocylinder (27).
14. Install plate (15) in pin (32) parallel to pin (33).
15. Position arm (20) parallel to housing (34) with plate (22) parallel and on plate (15).
16. Repeat step 6 for pin (32) and link (31).
17. Remove tool (18) from shaft (19).
18. Remove plate (15) from pin (32), then go to step 26.



CAUTION

Keep movement on aircraft to minimum; otherwise, false measurements can occur.

19. Work from forward right work platform, position protractor (35) on rotor hub (25) above and parallel to horizontal pin (17). Measure and record angle of hub. Remove protractor.

CAUTION

Do not rotate protractor between measurements; otherwise, false measurements will occur.

20. Position protractor (35) on vertical pin (16) parallel to pin (17). Measure and record angle of pin. Remove protractor.

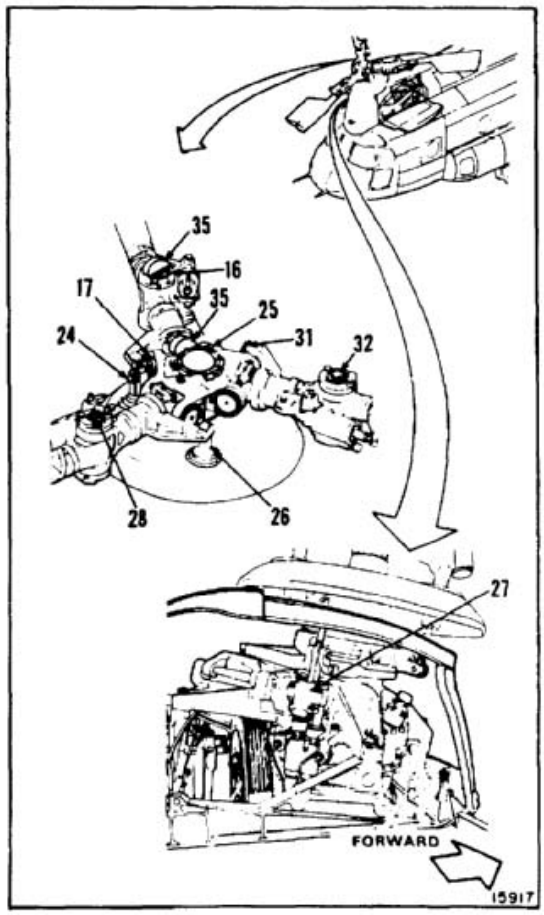
21. Check angles measured in steps 19 and 20. Subtract angle of step 19 from angle of step 20. Difference must be **–3.4° to –3.7°**. If not, adjust pitch link (24) (Task 5-94), then repeat steps 19, 20, and 21.

22. Turn rotor hub (25). Position pitch link (26) above servocylinder (27).

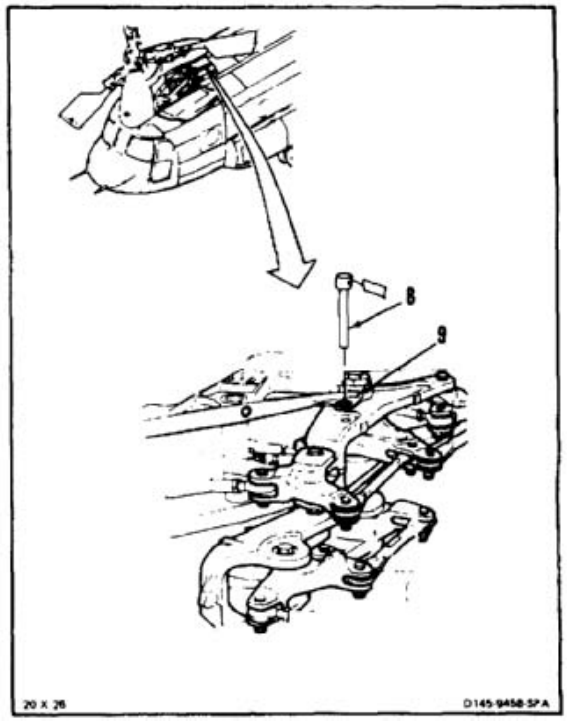
23. Repeat steps 19, 20, and 21 for vertical pin (28).

24. Turn hub (25). Position pitch link (31) above servocylinder (27).

25. Repeat steps 19, 20, and 21 for vertical pin (32).



26. Working from forward left work platform, remove pin (8) from support (9).



FOLLOW-ON MAINTENANCE:

Remove DASH actuator dummy link (Task 11-27).
Install DASH actuator (Task 11-164).
Remove blade lead/lag rigging tools (T72) (Task 11-31).
Install forward rotor shaft cover (Task 5-9).
Remove servocylinder safety blocks (T31) (Task 11-29).
Remove hydraulic power.
Remove electrical power.
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Close forward work platforms (Task 2-2).
Remove forward rotary wing blade tie downs (Task 1-26).
Track and balance blades (Task 5-140).
Flight test aircraft for autorotation check (TM 55-1520-240-MTF).

END OF TASK

11-56 RIG TUNNEL CONTROLS LINKAGE 11-56

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
First Stage Rig Pin (T44)
Second Stage Rig Pin (T135)
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Combination Square

Materials:

None

Parts:

Cotter Pins

Personnel Required:

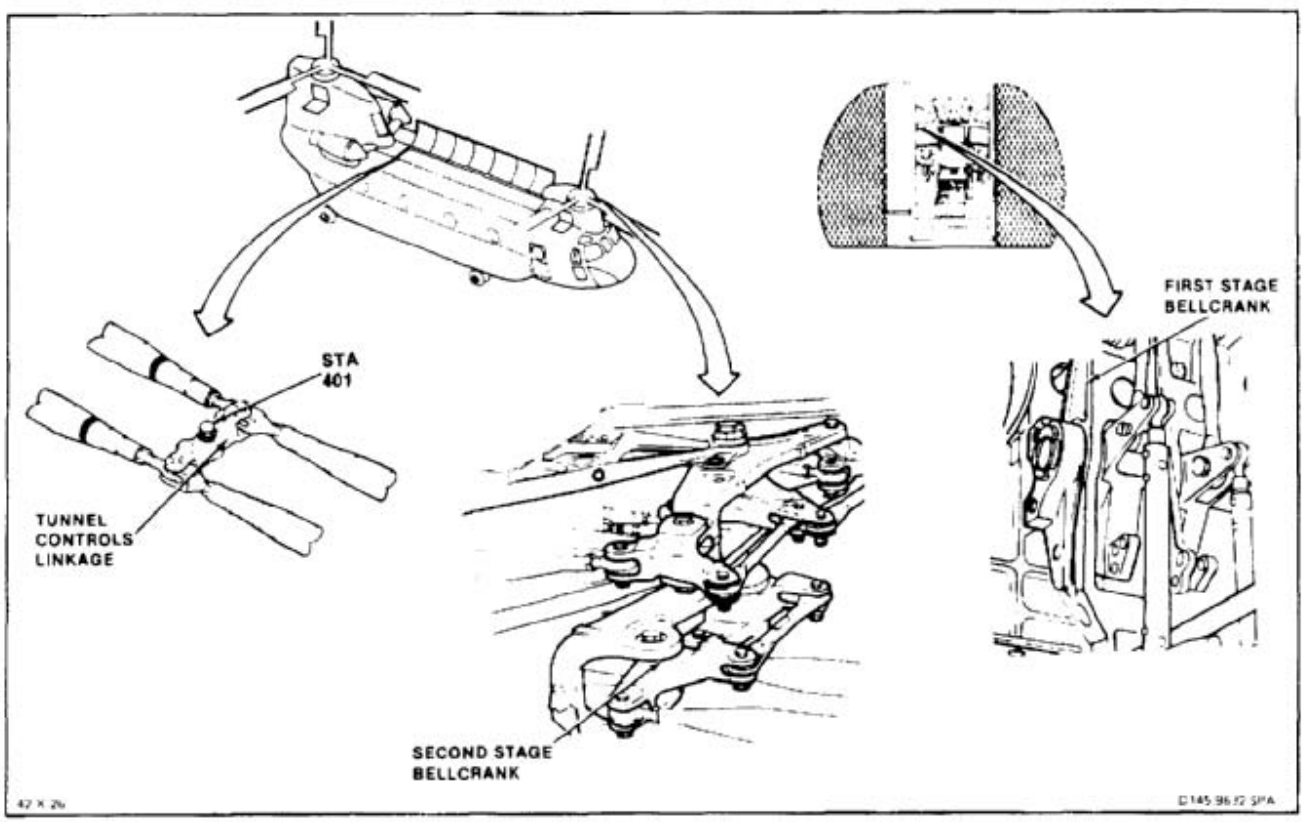
Medium Helicopter Repairer
Inspector

References:

Task 11-51

Equipment Condition:

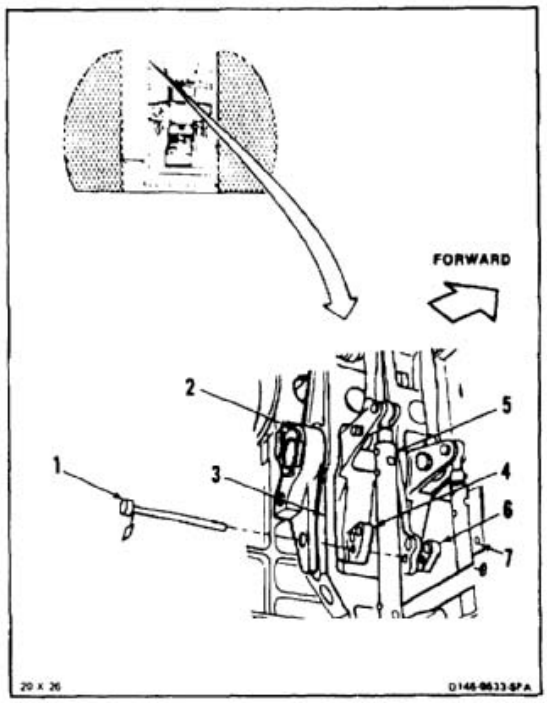
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Cockpit Controls at Neutral (Task 11-32)
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
AFCS SYSTEM SEL Switch Set to OFF
Forward Left Work Platform Open (Task 2-2)
Tunnel Access Doors Open (Task 2-2)
Forward Transmission Drip Pan Removed (Task 2-3)



NOTE

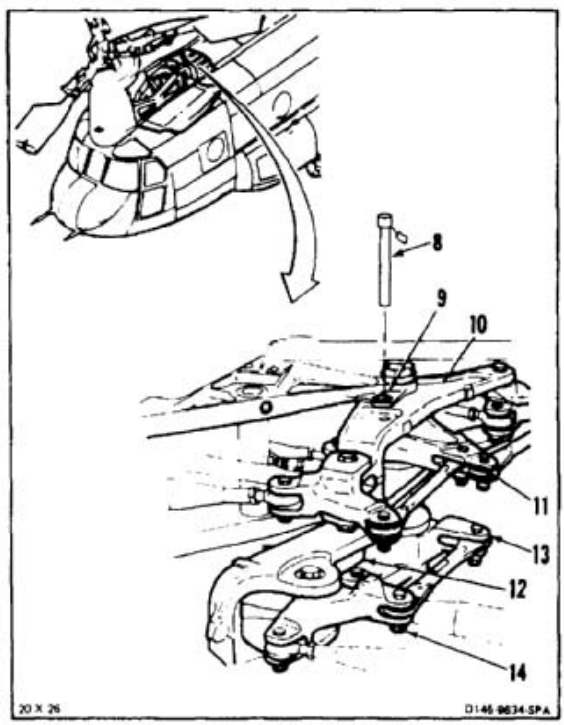
Procedure is same to rig all tunnel controls linkage. Linkages are located at sta. 163, 201, 241, 281, 321, 361, and 401. Linkage at sta. 401 is shown here.

1. Working in passageway install first stage rig pin (T44) (1) through fitting (2), four bellcranks (3, 4, 5, and 6) and in fitting (7). Pin must slide freely. If not, rig first stage bellcranks (Task 11-51), then repeat step 1.
2. Remove pin (1) from fitting (2).



3. Working from forward left work platform, install second stage rig pin (T135) (8) through support (9) and four bellcranks (10, 11, 12, and 13) and fitting (14). Pin must slide freely. If not, rig second stage bellcranks (Task 11-51), then repeat step 3.

INSPECT



4. Working in tunnel section check four bolts (15, 16, 17, and 18) sta. 401. Bolts must align and be parallel to line 'X' - 'X', **90°** to surface (19) to within **0.03 inch**. If aligned go to step 11. If not perform steps 5 thru 8. Use combination square.

5. Remove two cotter pins (20), nuts (21), washers (22), and two bolts (18 and 16) from idler arm (24). Disconnect links (25 and 26) from arm.

6. Loosen nut (27) of links (25 and 26). Turn device (28) one complete turn. Turn clockwise to move end of arm (24) forward.

NOTE

One turn of device moves end of arm about **0.02 inches**.

7. Position links (25 and 26) in arm (24). Install bolts (16 and 18), washers (22), and nuts (21). Tighten nuts.

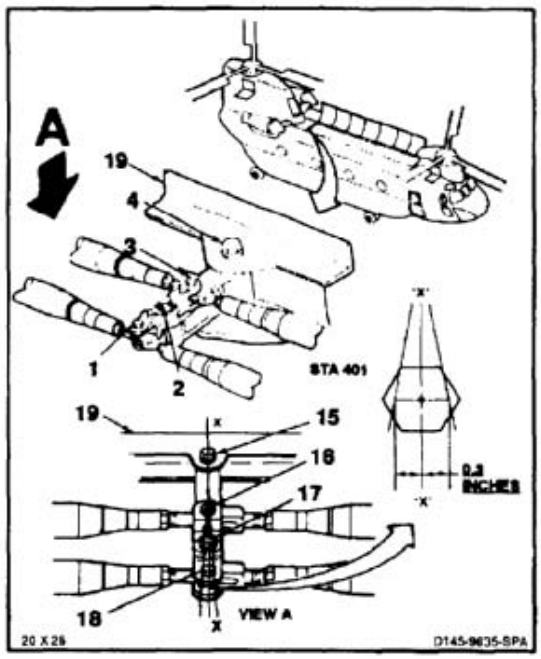
8. Repeat step 4. If aligned perform step 9. If not repeat steps 5 thru 8.

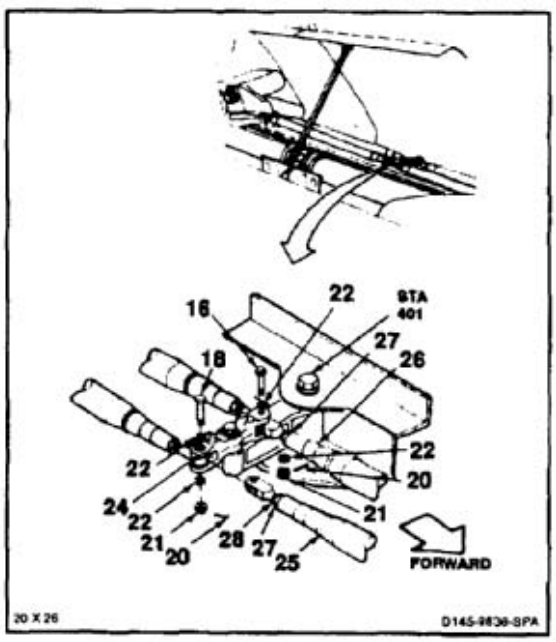
9. Torque nuts (27) of links (25 and 26) to the following values:

   Jam nut AN316-6R to **103 inch-pounds**.
   Jam nut AN316-7R to **285 inch-pounds**.

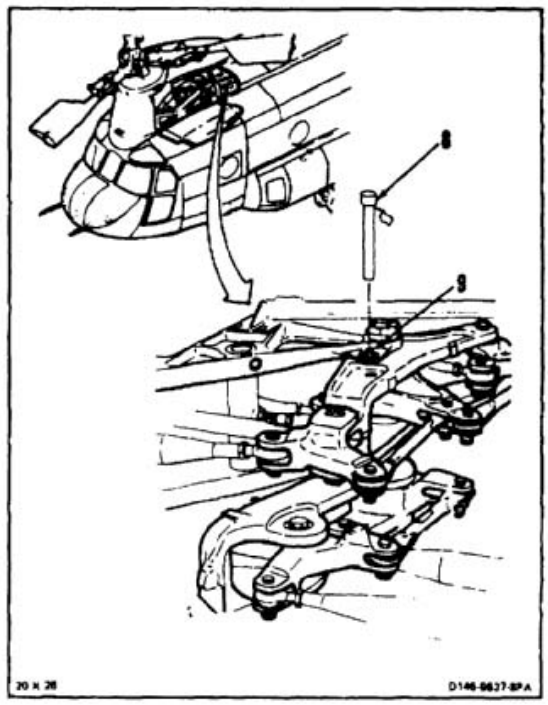
10. Torque nuts (21) to **60 to 90 inch-pounds**. Install cotter pins (20).

11. Check bolts (16 and 18). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 10.





12. Working from forward left work platform, remove pin (8) from support (9).



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (T31) (Task 11-29).
Close forward left work platform (Task 2-2).
Close tunnel access doors (Task 2-2).
Install forward transmission drip pan (Task 2-3).
Install closet acoustic blanket (Task 2-108).
Remove electrical power.
Remove hydraulic power.

END OF TASK

11-57 RIG AFT CABIN AND PYLON LINKAGE 11-57

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
First Stage Rig Pin (T44)
Second Stage Rig Pin (T135)
Workstand

Materials:

None

Parts:

Cotter Pins

Personnel Required:

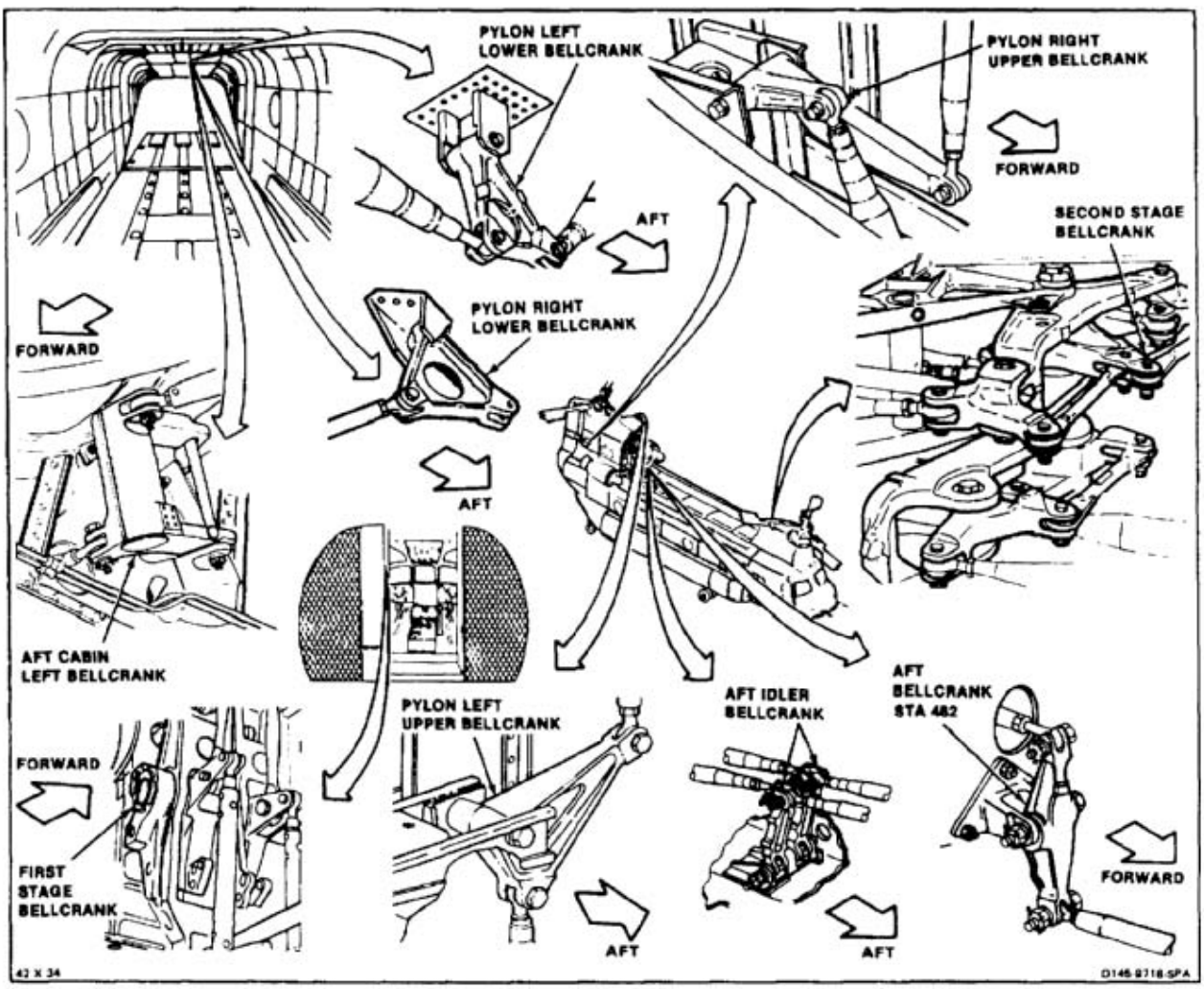
Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 11-51

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward Left Work Platform Open (Task 2-2)
Aft Tunnel Access Doors Open (Task 2-2)
Pylon Doors Open (Task 2-2)
Pylon Left and Right Work Platforms Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)
Forward Transmission Drip Pan Removed (Task 2-3)
Copilot's Cockpit Controls Set to Neutral (Task 11-32)
Tunnel Controls Linkage Rigged (Task 11-56)



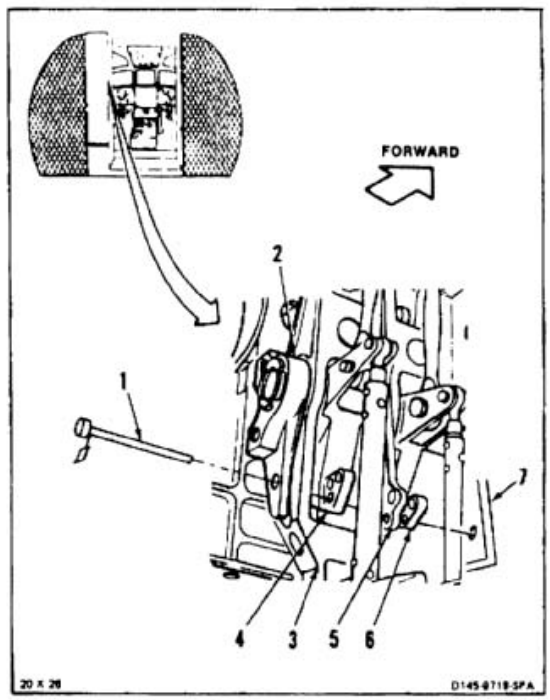
CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

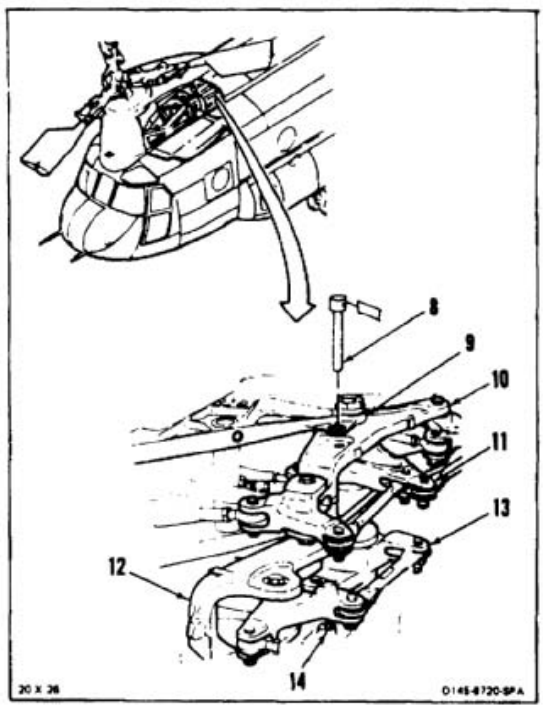
NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Working in passageway, install first stage rig pin (T44) (1) through fitting (2), four bellcranks (3, 4, 5, and 6), and fitting (7). Pin must slide freely. If not, rig first stage bellcranks (Task 11-51), then repeat step 1.
2. Remove pin (1) from fitting (2).



3. Working from forward left work platform, install second stage rig pin (T135) (8) through support (9), four bellcranks (10, 11, 12, and 13), and fitting (14). Pin must slide freely. If not, rig second stage bellcranks (Task 11-51), then repeat step 3.



4. Working in aft tunnel section, check four bolts (15, 16, 17, and 18) of aft idler bellcranks (19 and 20) at sta. 444.5. Measure and record distance 'Y' between center of bolts and surface (21) at sta. 440. Bolt centers must be parallel to within **0.03 inch**. If parallel, go to step 12. If not, perform steps 5 thru 11, then go to step 12.

NOTE

Procedure is same to adjust position of bellcranks (19 and 20). Bellcrank (19) is shown here.

5. Remove cotter pin (22), nut (23), two washers (24 and 25), and bolt (15) from bellcrank (19). Disconnect link (26) from bellcrank.

6. Loosen nut (27) of link (26). Turn rod end (28) clockwise to move bellcrank (19) forward.

NOTE

One half turn of rod end moves bellcrank about **0.02 inch**.

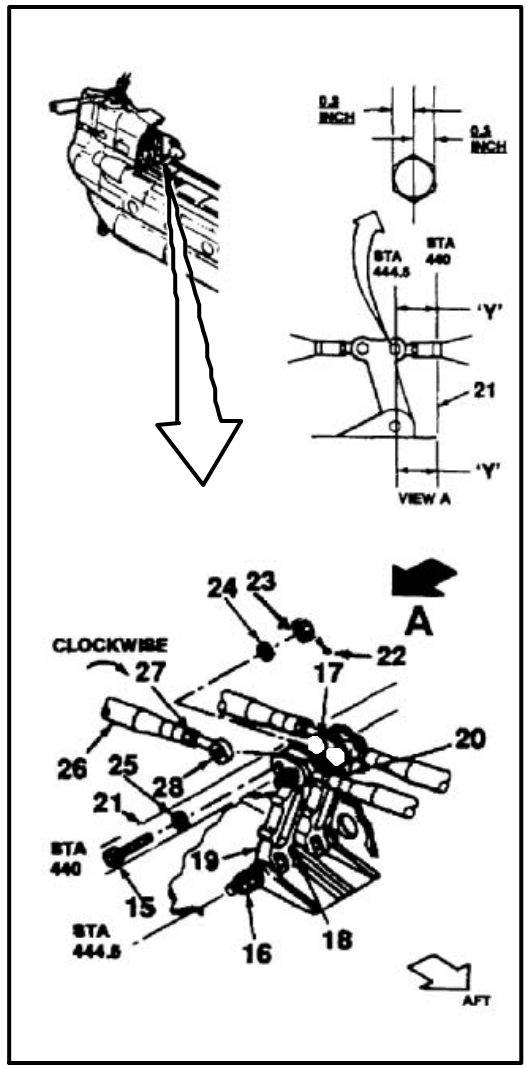
7. Position link (26) in bellcrank (19). Install bolt (15), two washers (25 and 24), and nut (23). Tighten nut.

8. Repeat step 4. If distance is same, go to step 9. If not, repeat steps 5 thru 8.

9. Torque nut (27) of link (26) to **103 inch-pounds**.

10. Torque nut (23) to **60 to 90 inch-pounds**. Install cotter pin (22).

11. Check bolt (15). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 10.

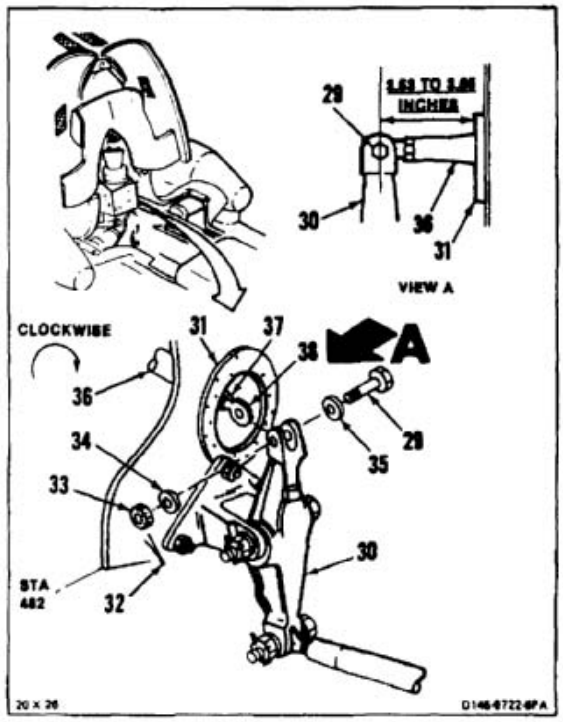


12. Check bolt (29) of aft bellcrank (30). Measure and record distance between center of bolt and hole doubler (31) at sta. 482. Distance must be **3.53 to 3.65 inches**. If same, go to step 20. If not, perform steps 13 thru 19, then go to step 20.
13. Remove cotter pin (32), nut (33), two washers (34 and 35), and bolt (29) from bellcrank (30). Disconnect link (36) from bellcrank.
14. Loosen nut (37) of link (36). Turn rod end (38) clockwise to move bellcrank (30) aft.

NOTE

One half turn of rod end moves bellcrank about **0.02 inch**.

15. Position link (36) in bellcrank (30). Install bolt (29), two washers (35 and 34), and nut (33). Tighten nut.
16. Repeat step 12. If distance is same, go to step 17. If not, repeat steps 12 thru 16.
17. Torque nut (37) of link (36) to **103 inch-pounds**.
18. Torque nut (33) to **60 to 90 inch-pounds**. Install cotter pin (32).
19. Check bolt (29). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 18.



20. Working in cabin, check bolt (39) of aft cabin left bellcrank (40). Measure and record distance between center of bolt and bulkhead (41) at sta. 482. Distance must be **3.96 to 4.08 inches**. If same, go to step 28. If not, perform steps 21 thru 27, then go to step 28.

21. Remove cotter pin (42), nut (43), two washers (44 and 45), and bolt (39) from bellcrank (40). Disconnect link (46) from bellcrank.

22. Loosen nut (47) of link (46). Turn rod end (48) clockwise to move bellcrank (40) forward.

NOTE

One half turn of rod end moves bellcrank about **0.02 inch**.

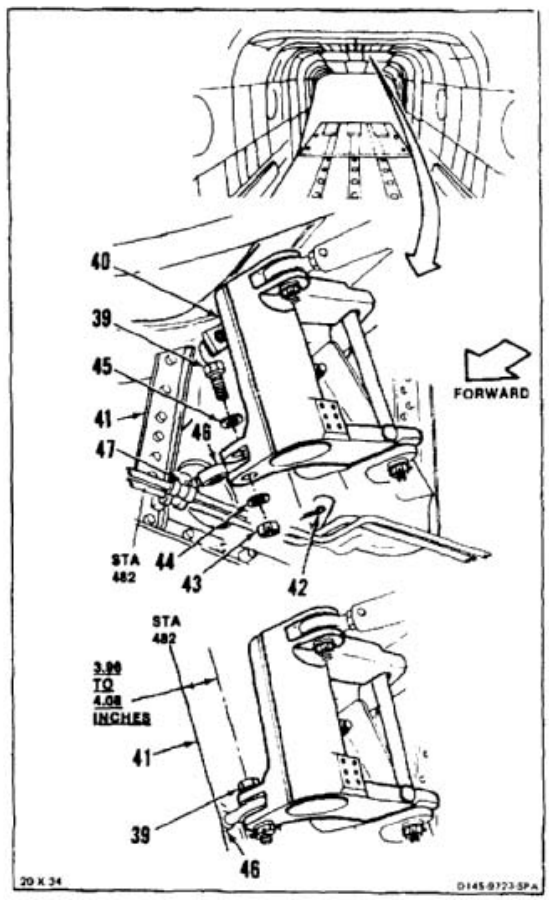
23. Position link (46) in bellcrank (40). Install bolt (39), two washers (45 and 44), and nut (43). Tighten nut.

24. Repeat step 20. If distance is same, go to step 25. If not, repeat steps 20 thru 24.

25. Torque nut (47) of link (46) to **103 inch-pounds**.

26. Torque nut (43) to **60 to 90 inch-pounds**. Install cotter pin (42).

27. Check bolt (39). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 26.



28. Check bolt (49) of pylon left lower bellcrank (50). Measure and record distance between center of bolt and bulkhead (51) at sta. 534. Distance must be **6.69 to 6.93 inches**. If same, go to step 36. If not, perform steps 29 thru 35, then go to step 36.

29. Remove cotter pin (52), nut (53), two washers (54 and 55), and bolt (49) from bellcrank (50). Disconnect link (36) from bellcrank.

30. Working from aft tunnel section, loosen nut (37) of link (36). Turn link clockwise to move bellcrank (50) forward.

NOTE

One half turn of link moves bellcrank about **0.02 inch**.

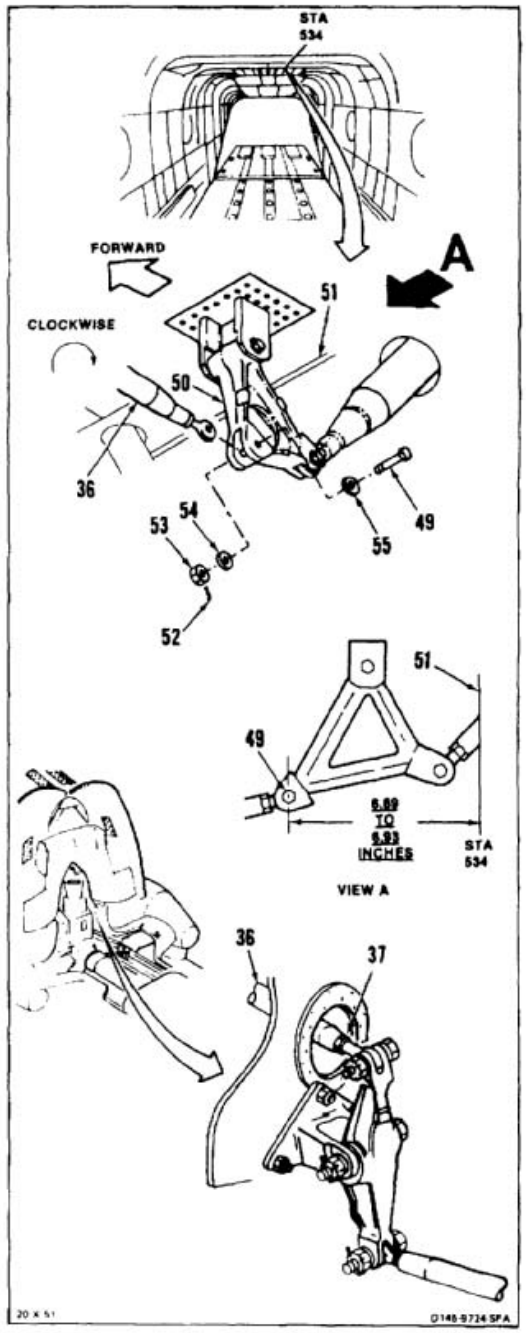
31. Working in cabin, position link (36) in bellcrank (50). Install bolt (49), two washers (55 and 54), and nut (53). Tighten nut.

32. Repeat step 28. If distance is same, go to step 33. If not, repeat steps 28 thru 32.

33. Working from aft tunnel section, torque nut (37) of link (36) to **103 inch-pounds**.

34. Working in cabin, torque nut (53) to **60 to 90 inch-pounds**. Install cotter pin (52).

35. Check bolt (49). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 34.



36. Check bolt (56) of pylon right lower bellcrank (57). Measure and record distance between center of bolt and deck (58) at WL 72. Distance must be **3.47 to 3.71 inches**. If same, go to step 44. If not, perform steps 37 thru 43, then go to step 44.

37. Remove cotter pin (59), nut (60), two washers (61 and 62), and bolt (63) from bellcrank (57). Disconnect link (64) from bellcrank.

38. Loosen nut (65) of link (64). Turn rod end (66) clockwise to move arm (67) of bellcrank (57) down.

NOTE

One half turn of rod end moves bellcrank about **0.015 inch**.

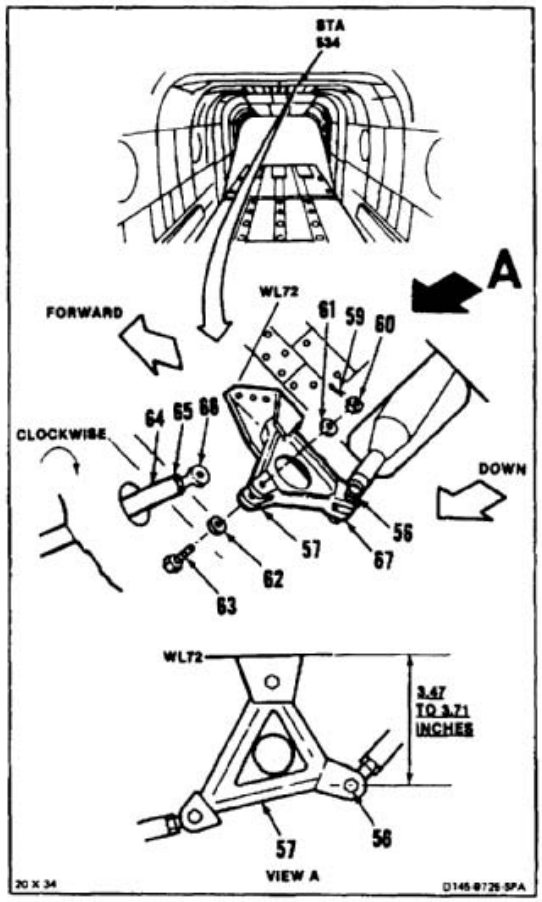
39. Position link (64) in bellcrank (57). Install bolt (63), two washers (62 and 61), and nut (60). Tighten nut.

40. Repeat step 36. If distance is same, go to step 41. If not, repeat steps 36 thru 40.

41. Torque nut (65) of link (64) to **103 inch-pounds**.

42. Torque nut (60) to **60 to 90 inch-pounds**. Install cotter pin (59).

43. Check bolt (63). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 42.

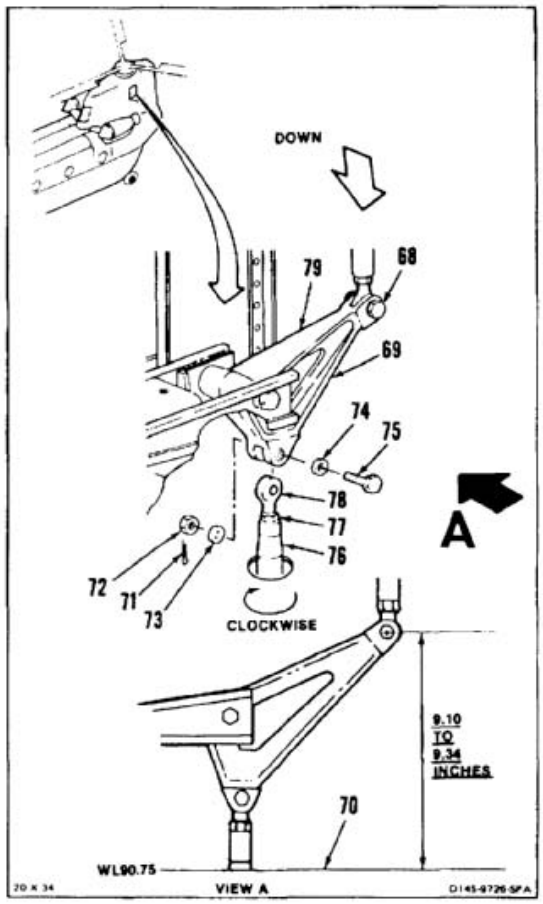


44. Working from left work platform, check bolt (68) of pylon left upper bellcrank (69). Measure and record distance between center of bolt and deck (70) of WL 90.75. Distance must be **9.10 to 9.34 inches**. If same, go to step 52. If not, perform steps 45 thru 51, then go to step 52.
45. Remove cotter pin (71), nut (72), two washers (73 and 74), and bolt (75) from bellcrank (69). Disconnect link (76) from bellcrank.
46. Loosen nut (77) of link (76). Turn rod end (78) clockwise to move arm (79) of bellcrank (69) down.

NOTE

One half turn of rod end moves arm about **0.015 inch**.

47. Position link (76) in bellcrank (69). Install bolt (75), two washers (74 and 73), and nut (72). Tighten nut.
48. Repeat step 44. If distance is same, go to step 49. If not, repeat steps 44 thru 48.
49. Torque nut (77) of link (76) to **103 inch-pounds**.
50. Torque nut (72) to **60 to 90 inch-pounds**. Install cotter pin (71).
51. Check bolt (75). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 50.

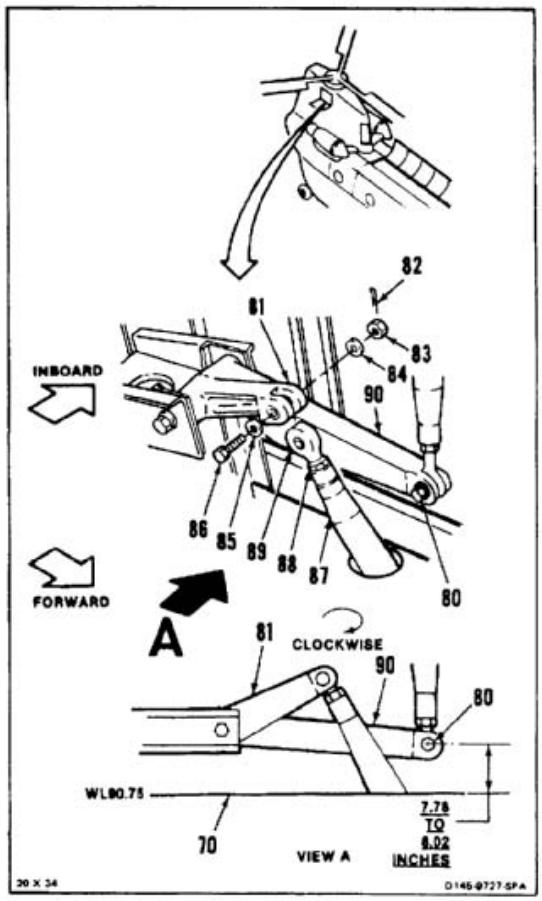


52. Working from right work platform, check bolt (80) of pylon right upper bellcrank (81). Measure and record distance between center of bolt and deck (70) of WL 90.75. Distance must be **7.78 to 8.02 inches**. If same, go to step 60. If not, perform steps 53 thru 59, then go to step 60.
53. Remove cotter pin (82), nut (83), two washers (84 and 85), and bolt (86) from bellcrank (81). Disconnect link (87) from bellcrank.
54. Loosen nut (88) of link (87). Turn rod end (89) clockwise to move arm (90) of bellcrank (81) down.

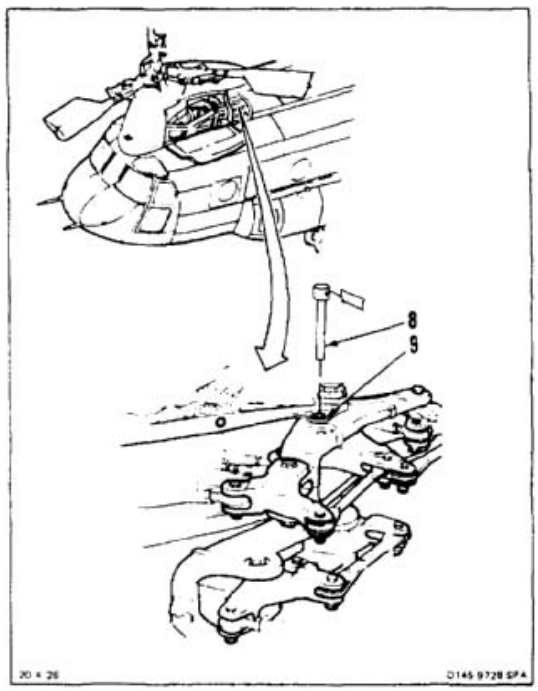
NOTE

One half turn of rod end moves arm about **0.03 inch**.

55. Position link (87) in bellcrank (81). Install bolt (86), two washers (85 and 84), and nut (83). Tighten nut.
56. Repeat step 52. If distance is same, go to step 57. If not, repeat steps 52 thru 56.
57. Torque nut (88) of link (87) to **103 inch-pounds**.
58. Torque nut (83) to **60 to 90 inch-pounds**. Install cotter pin (82).
59. Check bolt (86). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 58.



60. Working from forward left work platform, remove pin (8) from support (9).



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (T31) (Task 11-29).
Close forward left workplatform (Task 2-2).
Close tunnel access doors (Task 2-2).
Close pylon doors (Task 2-2).
Close pylon left and right work platforms (Task 2-2).
Close cargo ramp (TM 55-1520-240-T).
Install forward transmission drip pan (Task 2-3).
Remove electrical power.
Remove hydraulic power.

END OF TASK

11-58 RIG AFT ROTARY WING BLADES 11-58

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Second Stage Rig Pin (T135)
First Stage Rig Pin (T44)
Protractor Assembly
Blade Angle Tool (T129)

Materials:

None

Personnel Required:

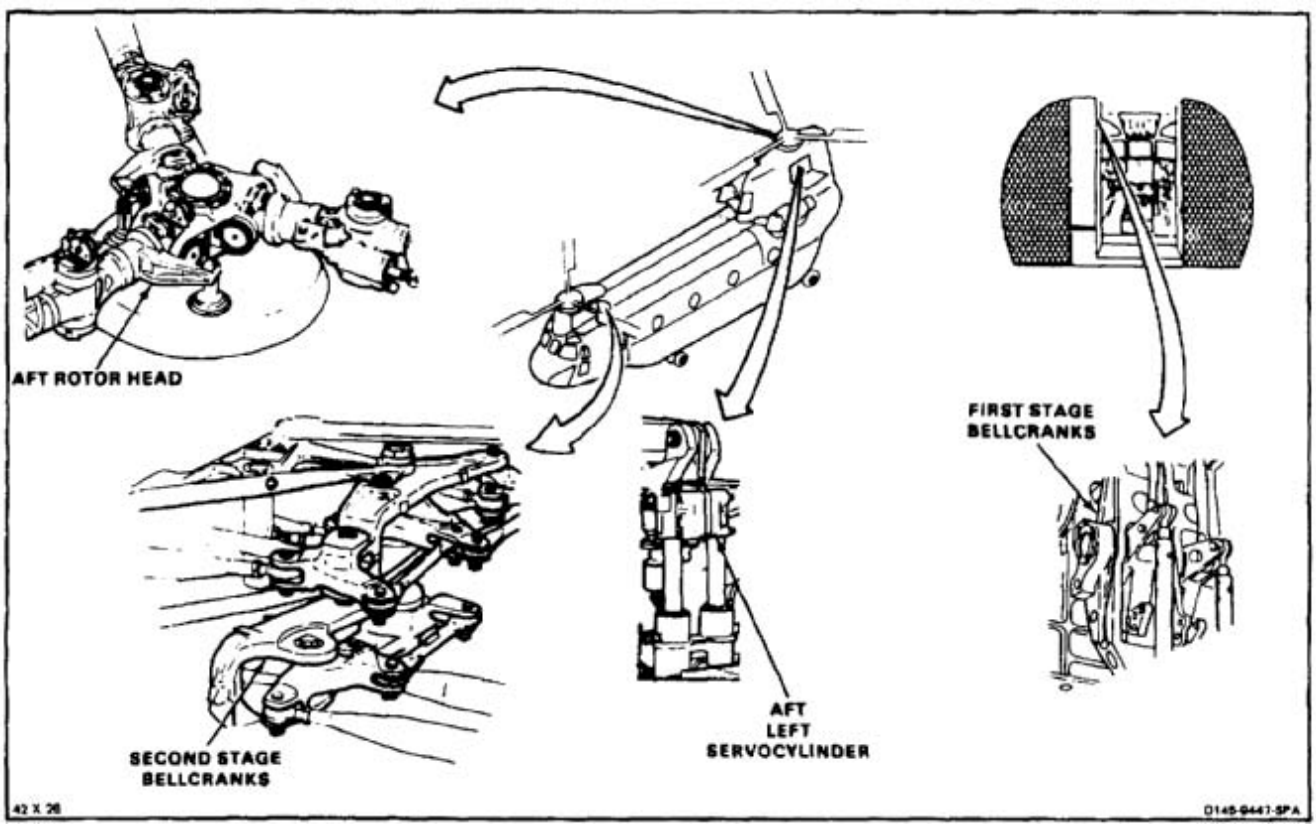
Medium Helicopter Repairer (2)
Inspector

References:

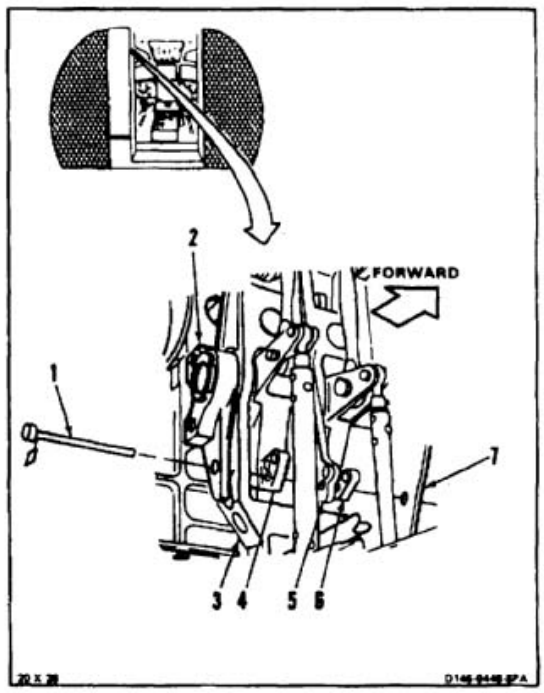
Task 5-94
Task 11-51

Equipment Condition:

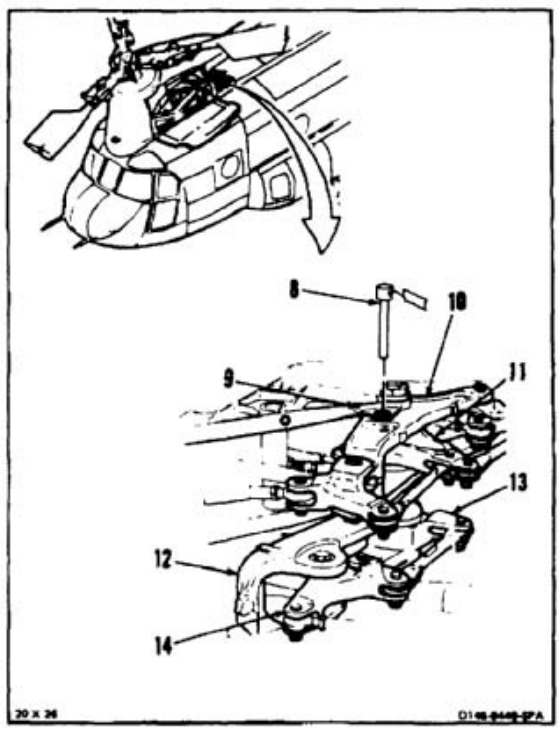
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM SEL Switch Set to OFF
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Blade Lead/Lag Rigging Tool (T72) Installed (Task 11-30)
Helicopter Rigged for Neutral (Task 11-33)
DASH Actuator Removed (Task 11-163)
DASH Actuator Dummy Link (T42) Installed (Task 11-26)
Aft Swashplate and Servocylinders Rigged (Task 11-54)
Aft LCT Actuators Fully Retracted (TM 55-1520-240-T)
Pitch Link Positioned Over Aft Left Servocylinder (Task 1-26)
Aft Rotor Shaft Cover Removed (Task 5-8)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Aft Work Platforms Open (Task 2-2)
Aft Rotary Wing Blade Tie Down Lines Installed (Task 1-26)
Forward Left Work Platform Open (Task 2-2)
Forward Transmission Drip Pan Removed (Task 2-3)



1. Working in passageway, install first stage rig pin (T46) (1) through fitting (2) four bellcranks (3, 4, 5, and 6) and in fitting (7). Pin must slide freely. If not, rig first stage bellcrank (Task 11-51), then repeat step 1.
2. Remove pin (1) from filling (2).



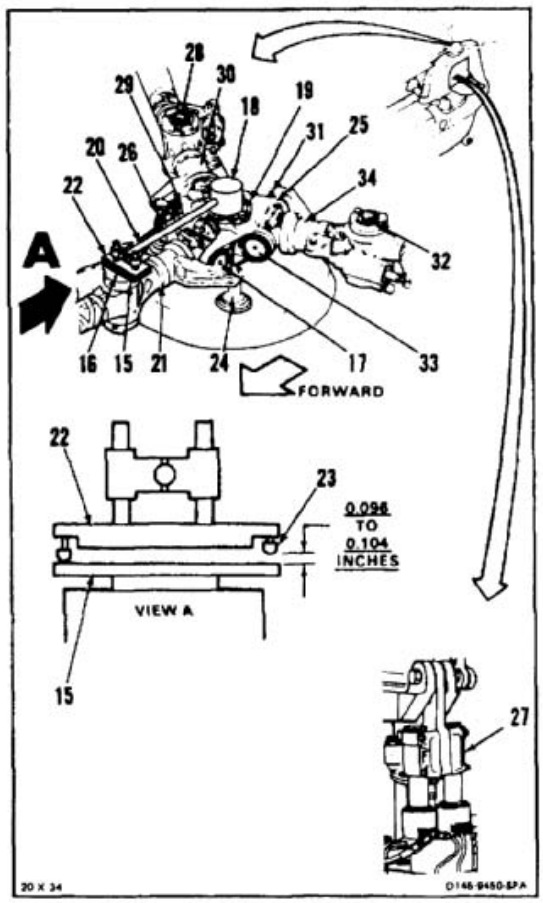
3. Working from forward left work platform, install second stage rig pin (T135) (8) through support (9) and four bellcranks (10, 11, 12, and 13) and fitting (14). Pin must slide freely. If not, rig second stage bellcrank (Task 11-51), then repeat step 3.



NOTE

Rigging tool (T129) or protractor can be used to measure rotary wing blade angles. Using tool (T129), perform steps 4 thru 18. Using protractor, perform steps 19 thru 26.

4. Working from aft left work platform install plate (15) in vertical pin (16) parallel to horizontal pin (17).
5. Install tool (T129) (18) in rotor shaft (19). Position arm (20), parallel to pitch housing (21) with plate (22) parallel and on plate (15).
6. Measure gap between ball (23) and plate (15). Gap must be **0.096 to 0.104 inches**. If not, adjust pitch link (24) (Task 5-94), then repeat step 6.
7. Position tool (18) away from plate (15). Remove plate from pin (16).
8. Turn rotor hub (25) and position pitch link (26) above aft left servocylinder (27).
9. Install plate (15) in pin (28) parallel to horizontal pin (29).
10. Position arm (20) parallel to housing (30) with plate (22) parallel and on plate (15).
11. Repeat step 6 for pin (28) and link (26).
12. Position tool (18) away from plate (15). Remove plate from pin (28).
13. Turn rotor hub (25) and position pitch link (31) above aft left servocylinder (27).
14. Install plate (15) in pin (32) parallel to pin (33).
15. Position arm (20) parallel to housing (34) with plate (22) parallel and on plate (15).
16. Repeat step 6 for pin (32) and link (31).
17. Remove tool (18) from shaft (19).
18. Remove plate (15) from pin (32), then go to step 26.



CAUTION

Keep movement on aircraft to minimum; otherwise, false measurements can occur.

19. Work from aft left work platform, position protractor (35) on rotor hub (25) above and parallel to horizontal pin (17). Measure and record angle of hub. Remove protractor.

CAUTION

Do not rotate protractor between measurement; otherwise, false measurements will occur.

20. Position protractor (35) on vertical pin (16) parallel to pin (17). Measure and record angle of pin. Remove protractor.

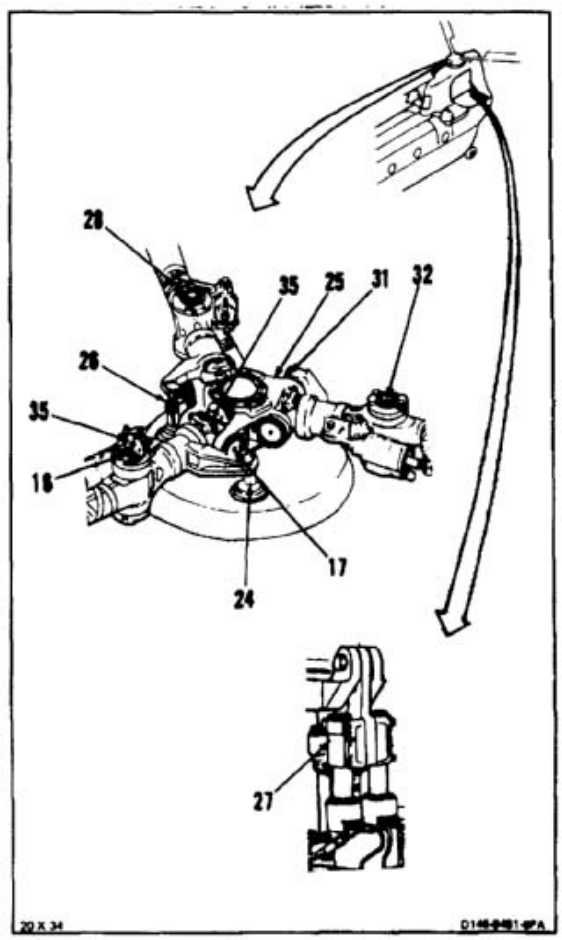
21. Check angles measured in steps 19 and 20. Subtract angle of step 19 from angle of step 20. Difference must be **–0.3° to –0.6°**. If not, adjust pitch link (24) (Task 5-94), then repeat steps 19, 20, and 21.

22. Turn rotor hub (25). Position pitch link (26) above servocylinder (27).

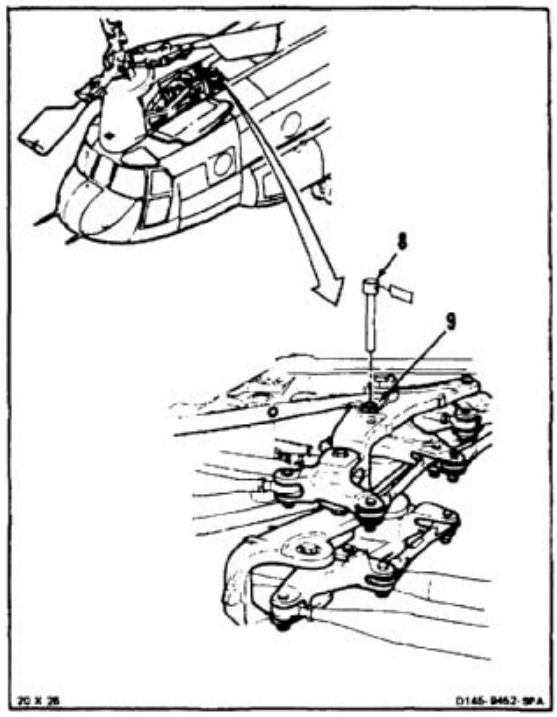
23. Repeat steps 19, 20, and 21 for vertical pin (28).

24. Turn hub (25). Position pitch link (31) above servocylinder (27).

25. Repeat steps 19, 20, and 21 for vertical pin (32).



26. Working from forward left work platform, remove pin (8) from support (9).



FOLLOW-ON MAINTENANCE:

DASH actuator dummy link removed (Task 11-27).
DASH actuator installed (Task 11-164).
Remove blade lead/lag rigging tools (T72) (Task 11-31).
Install aft rotor shaft cover (Task 5-9).
Remove servocylinder safety blocks (T31) (Task 11-29).
Remove hydraulic power.
Remove electrical power.
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Close forward left work platform (Task 2-2).
Close aft work platforms (Task 2-2).
Remove forward rotary wing blade tie downs (Task 1-26).
Track and balance blades (Task 5-140).
Flight test aircraft for autorotation check (TM 55-1520-240-MTF).

END OF TASK

SECTION III
COCKPIT CONTROLS

11-59 CLEAN THRUST CONTROL (INSTALLED) 11-59

INITIAL SETUP

Applicable Configurations:

All

Tools:

Brush

Materials:

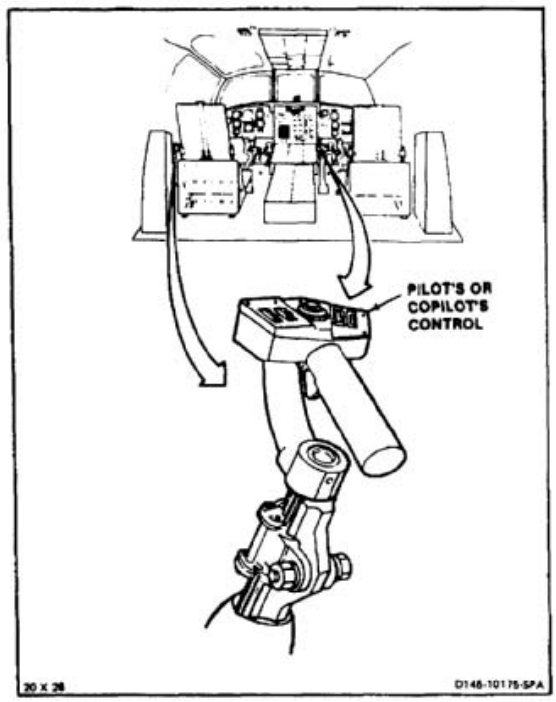
Cloths (E120)
Dry Cleaning Solvent (E162)
Tape (E388)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Pilot's or Copilot's Seat Fully Aft (Task 2-115)



1. Press THRUST CONT BRAKE TRIGGER switch (1). Pull control grip (2) fully up. Release switch.
2. Cover control grip (2) with plastic (3).
3. Apply tape (4) over bearing covers (5). Use tape (E388).

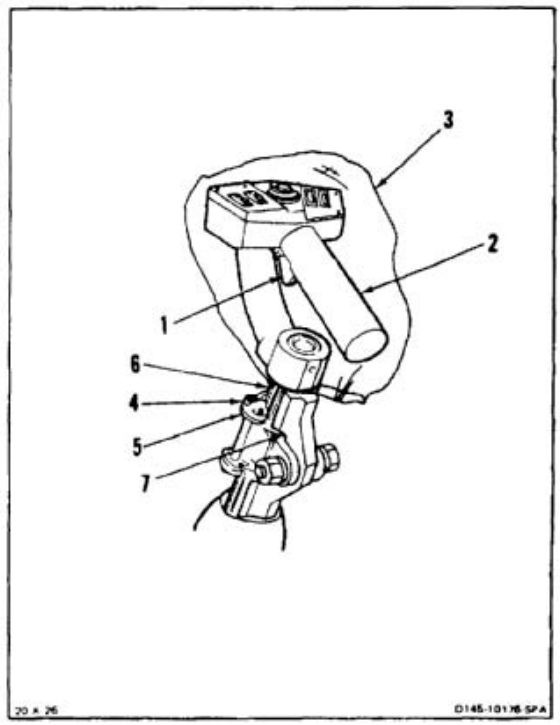
WARNING

Dry cleaning solvent (E162) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

Do not immerse control in solvent. Damage to components can occur.

4. Remove dust and dirt from shaft (6) and pivot block (7). Use brush then cloth (E120) moist with solvent (E162). Wear gloves (E186).
5. Press switch (1). Position grip (2) down about **3 inches**.
6. Repeat step 4 for lower end of shaft (6).
7. Remove tape from bearing covers (5).
8. Remove plastic (3) from grip (2).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.

END OF TASK

11-60 INSPECT THRUST CONTROL 11-60

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

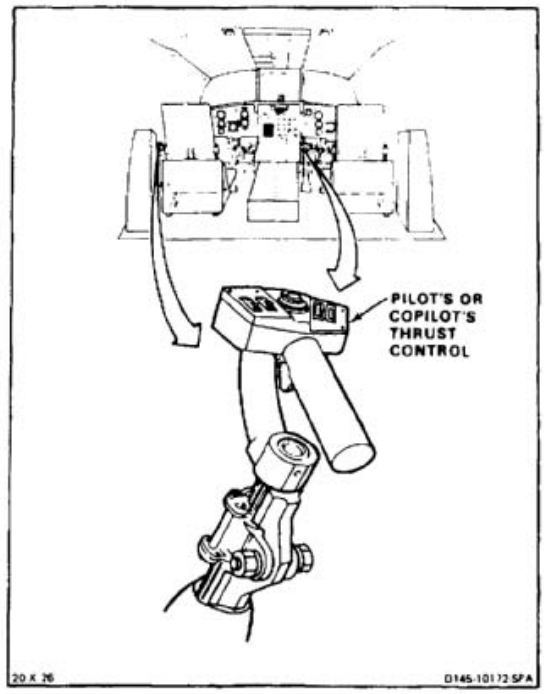
None

Personnel Required:

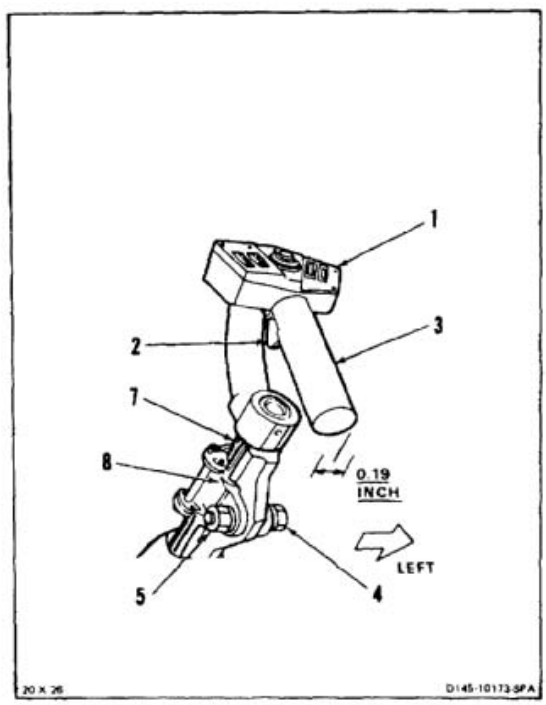
Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On



1. Inspect thrust control (1) for looseness as follows:
   a. Press THRUST CONT BRAKE TRIGGER switch (2). Pull control (1) up about **3 inches**. Release switch.
   b. Push control grip (3) left then right. Apply force of about **10 pounds** at end of grip.
   c. Measure movement at end of grip (3). Distance must not be more than **0.19 inch**. If distance is less, go to step f. If more, perform steps d and e then go to step f.
   d. Check looseness at pivot block bolt (4). If loose, tighten nut (5).
   e. Check looseness between shaft (7) and ball spline assembly (8). If looseness causes **0.19 inch** movement at grip (3) replace ball spline assembly.
   f. Press switch (2). Position control (1) fully down. Release switch.



INSPECT

FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.

END OF TASK

11-61 REMOVE THRUST CONTROL (PILOT) 11-61

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Strap (E376)

Parts:

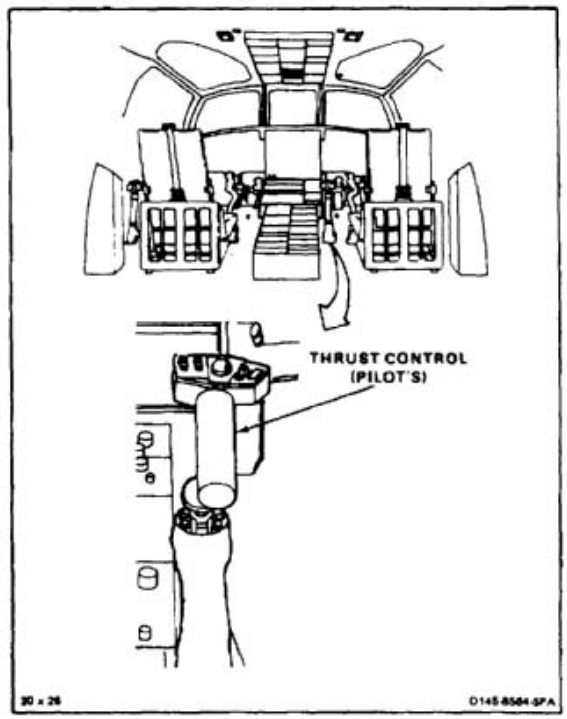
None

Personnel Required:

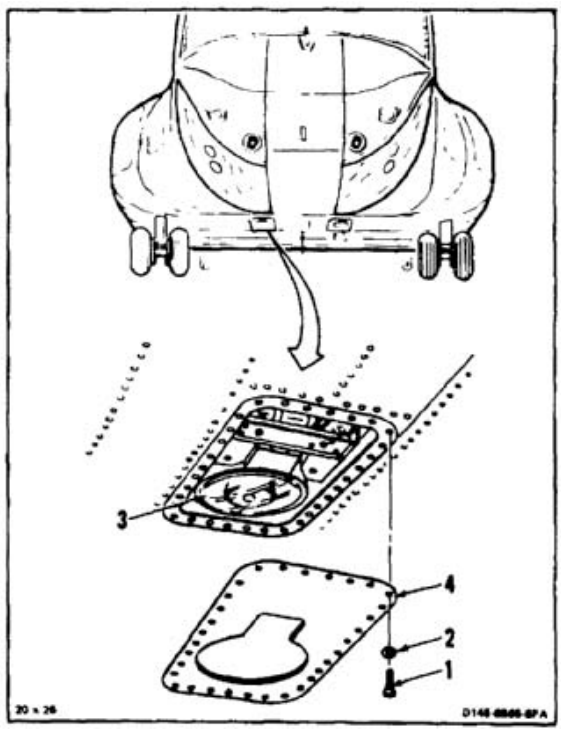
Medium Helicopter Repairer

Equipment Condition:

Thrust Control Fully Down
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Flight Control Hydraulic System Depressurized (TM 55-1520-240-T)

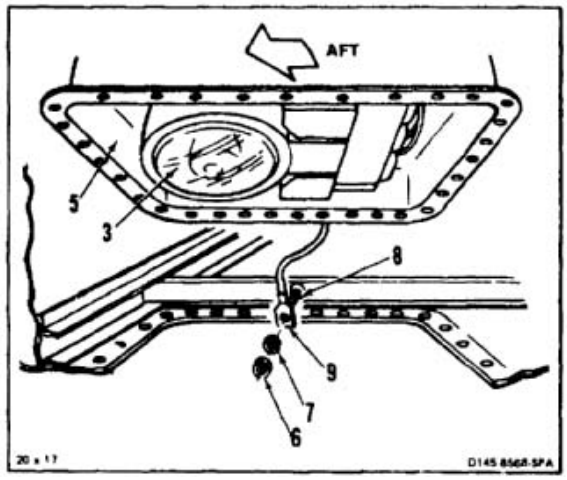


1. Remove 32 screws (1) and washers (2) from landing light (3) and housing (4).
2. Remove housing (4).

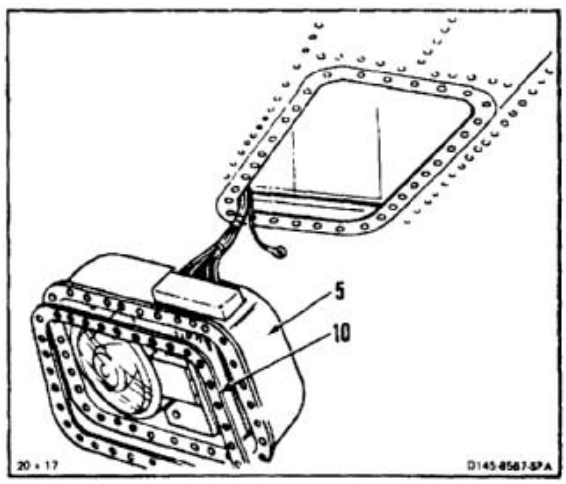


11-61 REMOVE THRUST CONTROL (PILOT) (Continued) 11-61

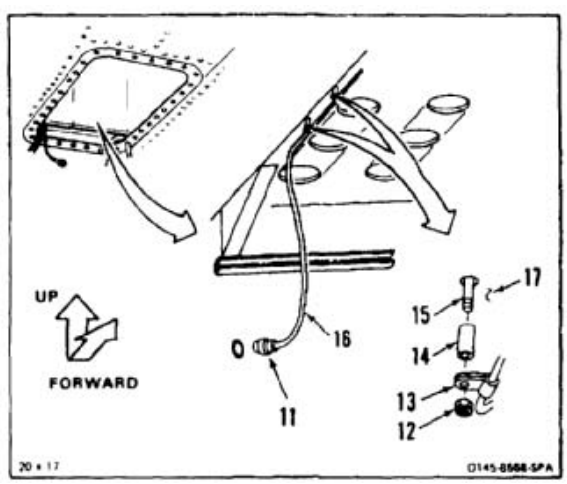
3. Tilt light (3) and housing assembly (5) to one side and support it.
4. Remove nut (6) and washer (7) from ground stud (8). Disconnect electrical lead (9).



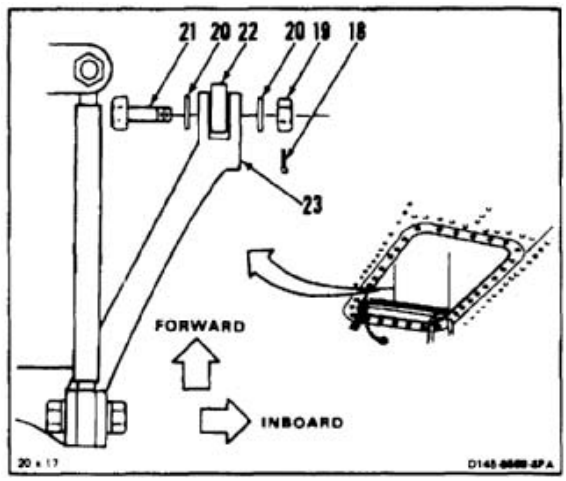
5. Lower housing assembly (5). Support housing assembly so it does not hang. Use strap (E376). Remove gasket (10).



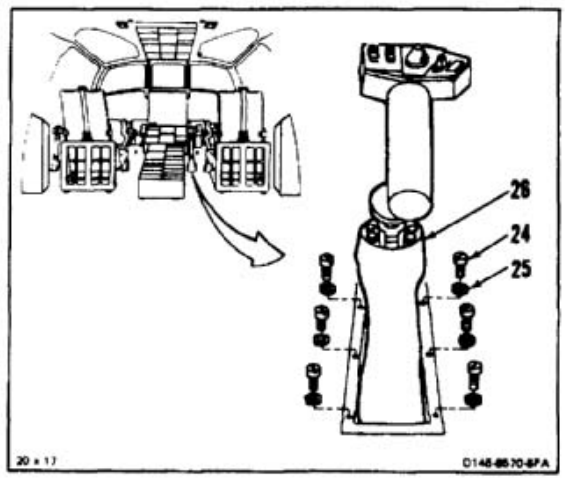
6. Disconnect electrical connector (11). Remove two nuts (12), two clamps (13), and two spacers (14) from two screws (15). Remove clamps (13) from cable (16). Do not remove screws (15) from panel (17).



7. Remove cotter pin (18), nut (19), washers (20), and bolt (21).
8. Remove link (22) from bellcrank (23).
9. Install bolt (21), washers (20), and nut (19) in bellcrank (23) to prevent loss of bushings. Do not torque nut.



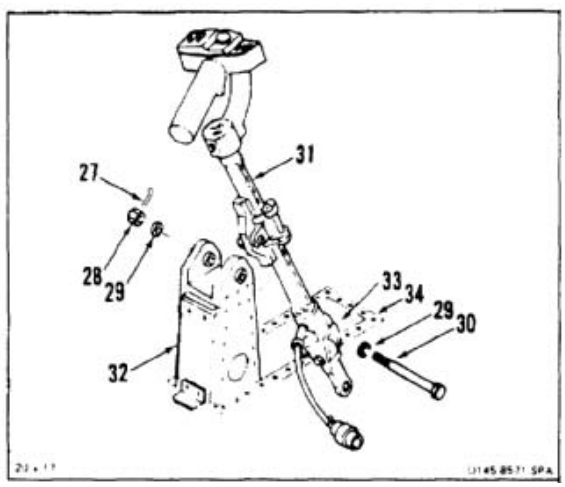
10. Remove six screws (24) and washers (25) and boot (26).



11. If applied, remove silicone rubber coating from cotter pin (27) and nut (28). Remove cotter pin, nut, washers (29), and bolt (30).
12. Lift thrust control (31) from support (32). Guide electrical cable through hole (33) in floor (34).
13. Replace bolt (30), washers (29), and nut (28) into support (32) to prevent loss of bushings. Do not torque nut.

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-62 REMOVE THRUST CONTROL (COPILOT) 11-62

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Strap (E376)

Parts:

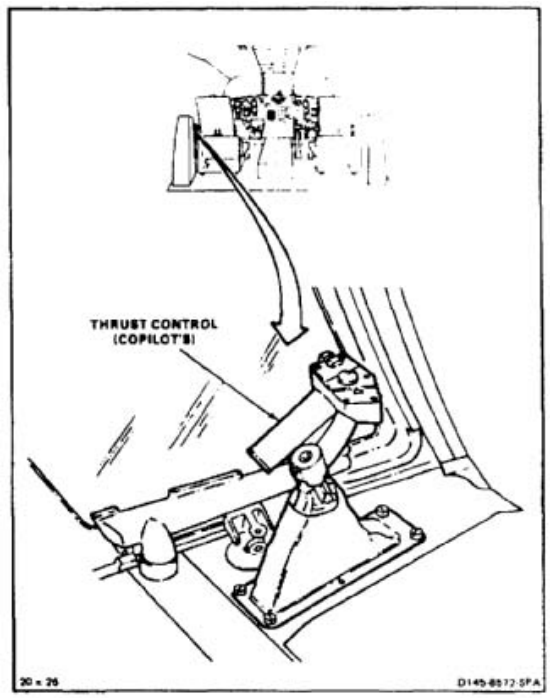
None

Personnel Required:

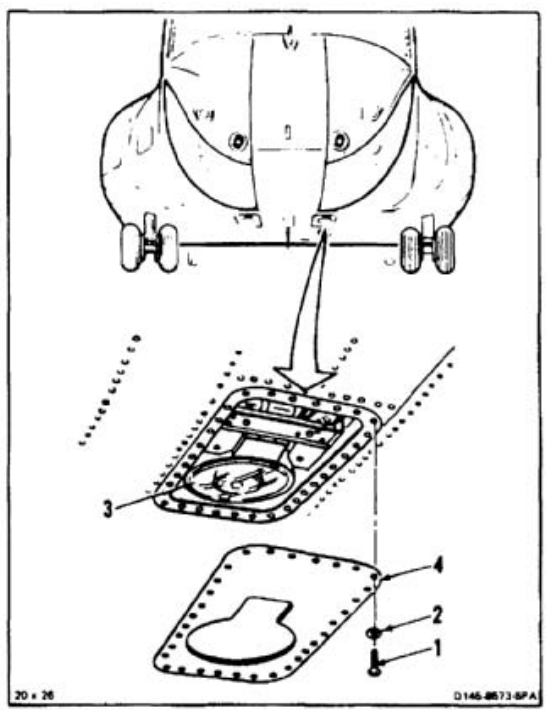
Medium Helicopter Repairer

Equipment Condition:

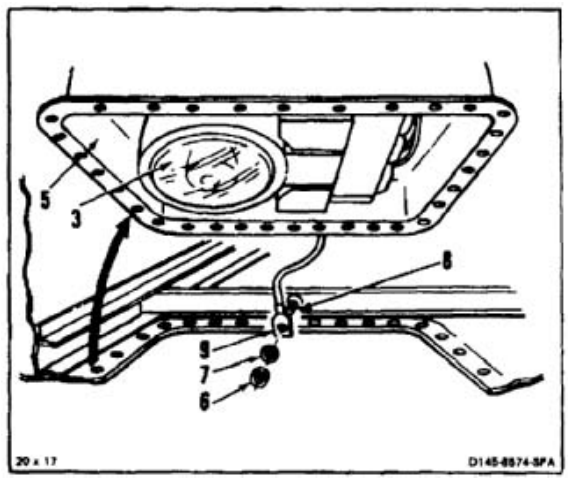
Thrust Control Fully Down
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Flight Control Hydraulic System Depressurized (TM 55-1520-240-T)



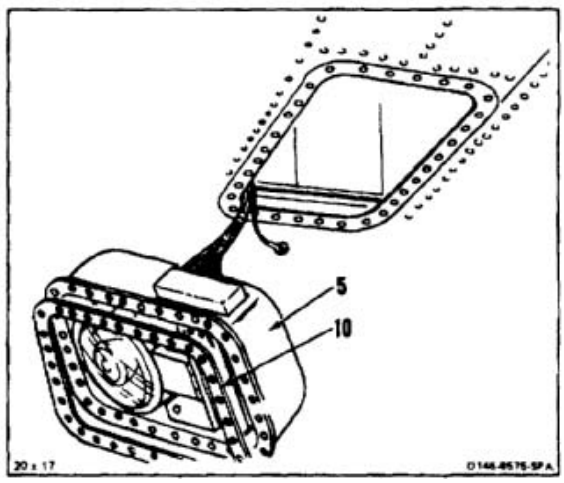
1. Remove 32 screws (1) and washers (2) from landing light (3) and housing (4).
2. Remove housing (4).



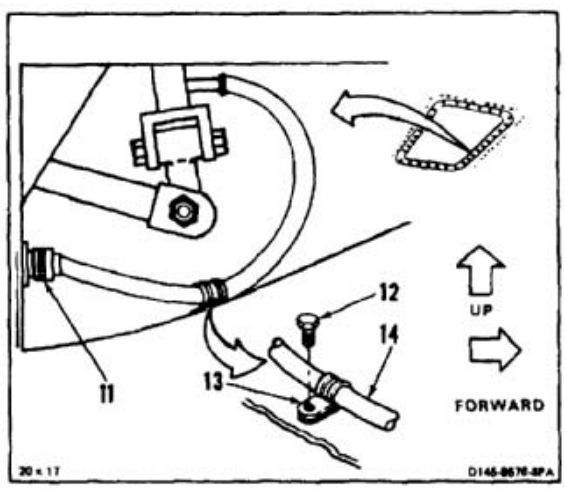
3. Tilt light (3) and housing assembly (5) to one side and support it.
4. Remove nut (6) and washer (7) from ground stud (8). Disconnect electrical lead (9).



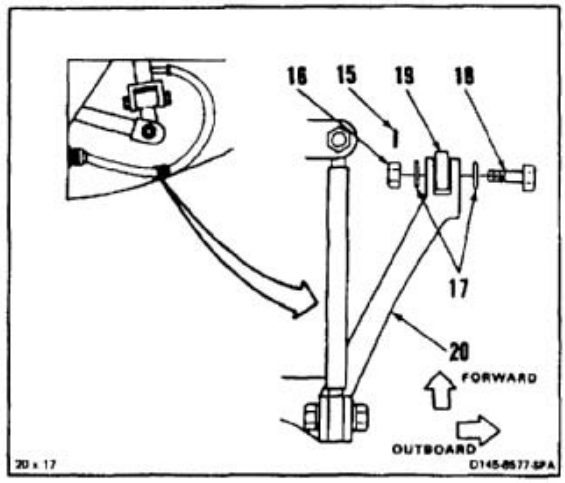
5. Lower housing assembly (5). Support housing assembly so it does not hang. Use strap (E376). Remove gasket (10).



6. Disconnect electrical connector (11).
7. Remove screw (12) and clamp (13). Remove clamp (13) from cable (14).



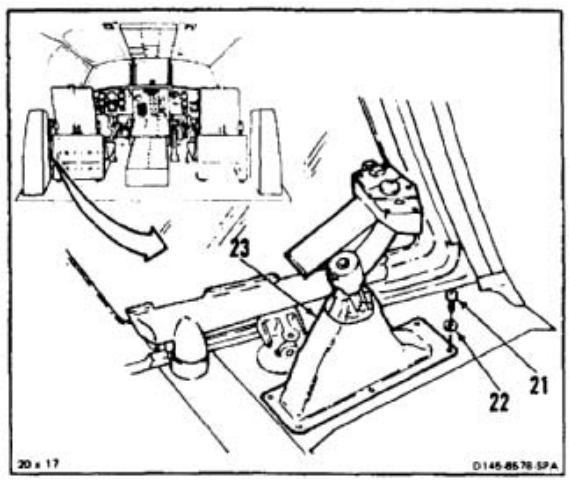
8. Remove cotter pin (15), nut (16), washers (17), and bolt (18).
9. Remove link (19) from bellcrank (20).
10. Replace back bolt (18), washers (17), and nut (16) into bellcrank (20) to prevent loss of bushings. Do not torque nut.



11. Remove six screws (21), six washers (22) and boot (23).

NOTE

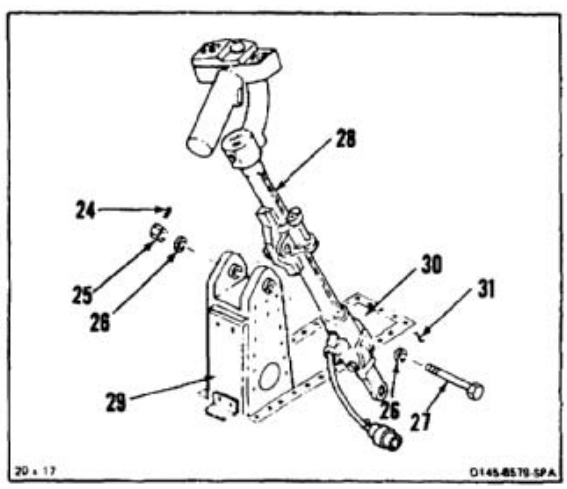
To prevent ball bearing loss from thrust control pivot block, wrap tape (E388) around thrust control shaft above and below pivot block.



12. If applied, remove silicone rubber coating from cotter pin (24) and nut (25). Remove cotter pin, nut, washers (26), and bolt (27).
13. Lift thrust control (28) out of support (29). Guide cable through hole (30) in floor (31).
14. Replace bolt (27), washers (26), and nut (25) into support (29) to prevent loss of bushings. Do not torque nut.

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-63 DISASSEMBLE THRUST CONTROL (AVIM) 11-63

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Electrical Repairer's Tool Kit, NSN 5180-00-323-4915
Insertion/Extraction Tool For Crimp-Type Contacts, No. 20 Size
Straight Drive Pin Punch, 3/16 Inch Diameter
Arbor Press

Materials:

Tape (E388)

Personnel Required:

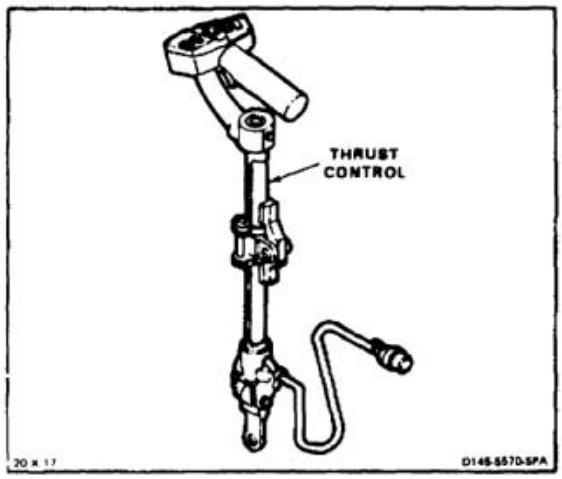
Medium Helicopter Repairer
Aircraft Electrician
Aircraft Structural Repairer

References:

TM 1-1520-253-23

Equipment Condition:

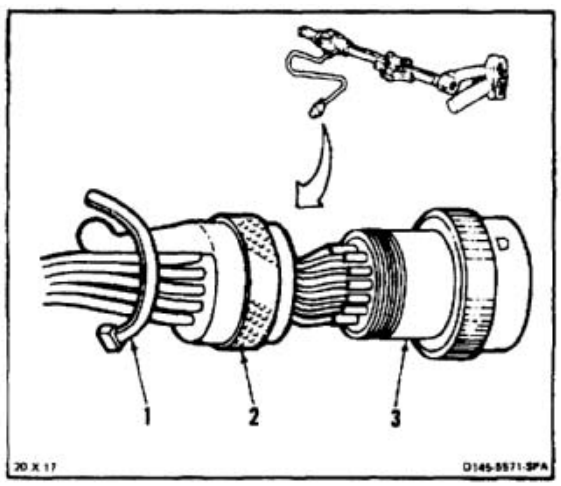
Off Helicopter Task



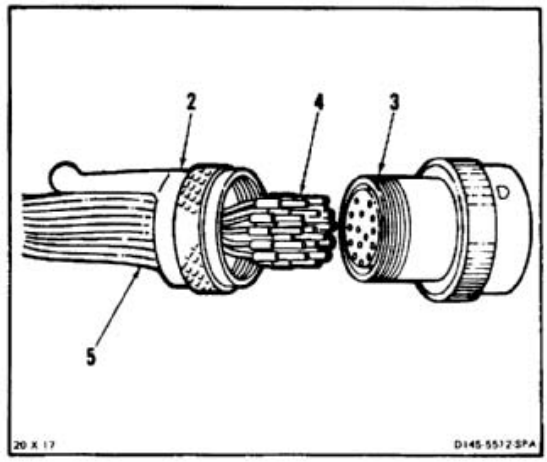
NOTE

If a crack in the connecting link is suspected, refer to TM 1-1520-253-23.

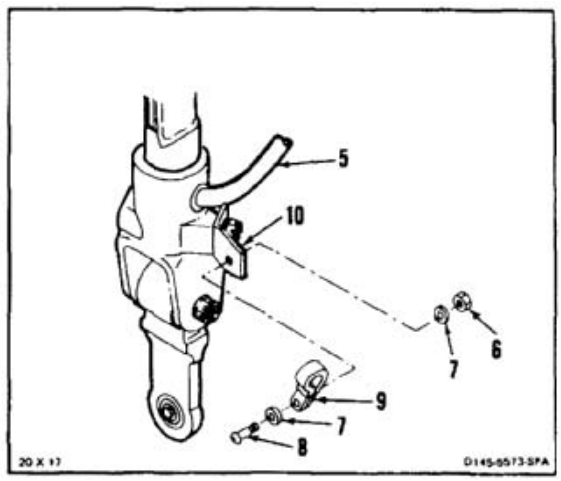
1. Remove cable strap (1). Remove backshell (2) from connector (3).



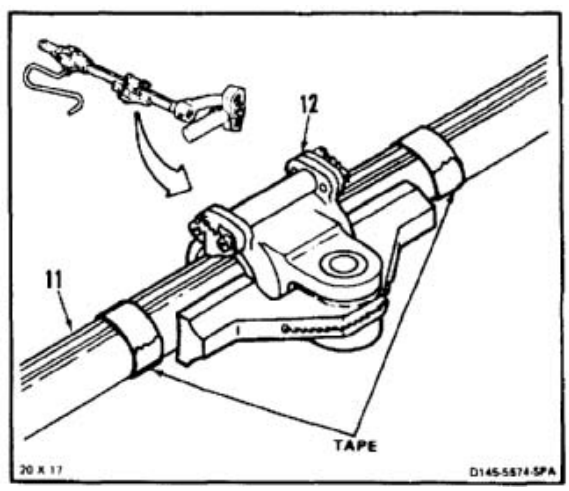
2. Disconnect 15 contact pins (4) of cable (5) from connector (3). Use insertion/extraction tool. Remove backshell (2). Wrap tape (E388) tightly around bundle of contact pins for protection.



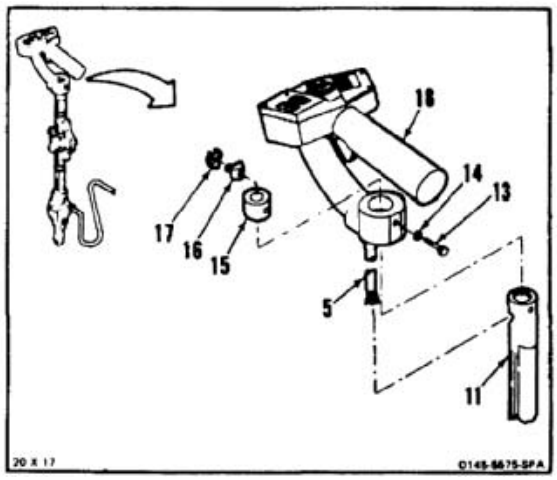
3. Remove nut (6), two washers (7), screw (8), and clamp (9) from clip (10). Remove clamp from cable (5).



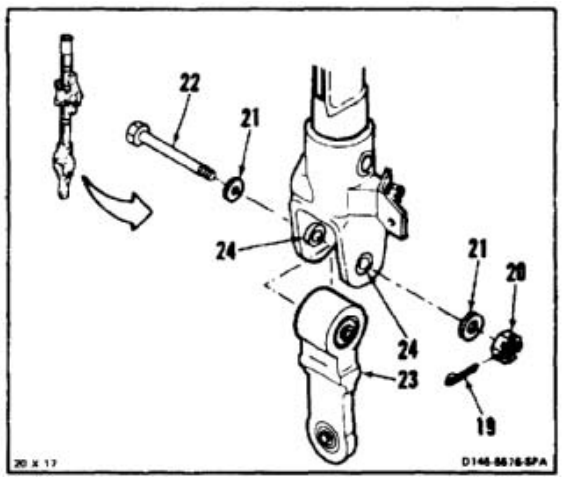
4. Wrap tape (E388) around shaft (11) to prevent motion of pivot block (12).



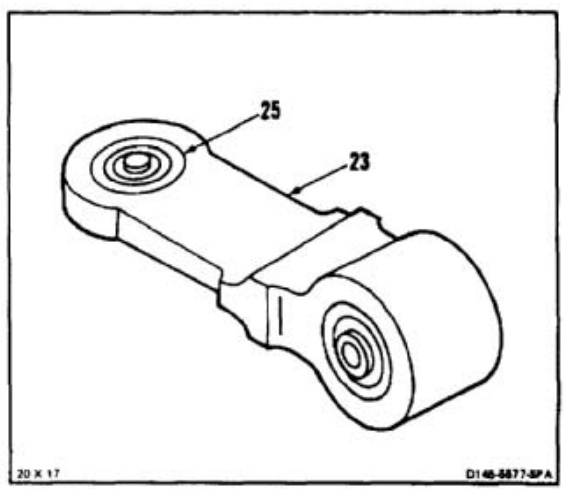
5. Remove bolt (13), washer (14), and sleeve bushing (15).
6. Remove barrel nut (16) and retainer (17) from sleeve bushing (15).
7. Remove grip (18) from shaft (11) while feeding cable (5) through shaft.



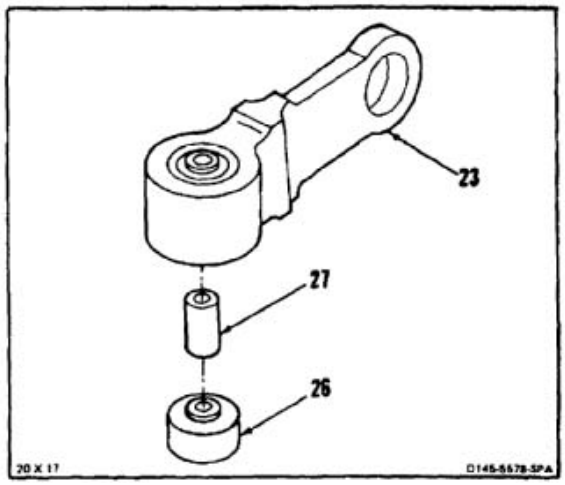
8. Remove cotter pin (19), nut (20), two washers (21), and bolt (22). Remove connecting link (23).
9. Remove two bushings (24).



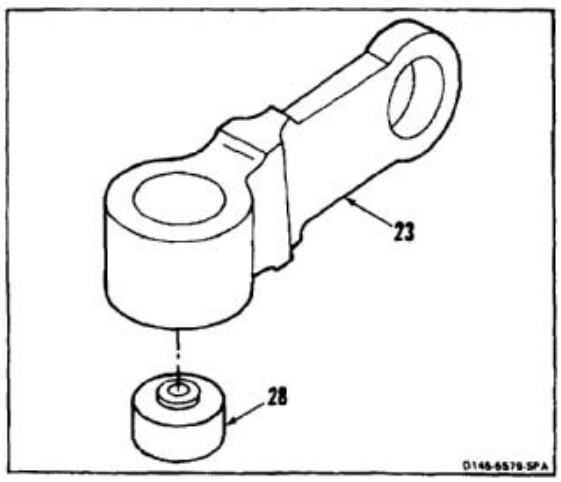
10. Install small end of link (23) in arbor press. Press out bearing (25). Remove link from arbor press.



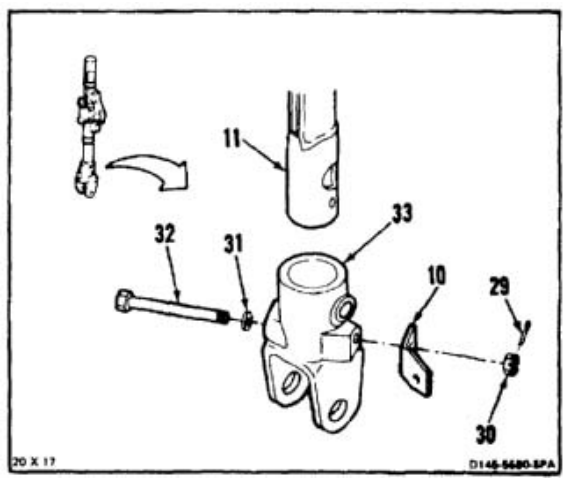
11. Support large end of link (23). Drive out lower bearing (26) and spacer (27). Use pin punch.



12. Turn link (23) over and install in arbor press. Press out bearing (28). Remove link from arbor press.



13. Remove cotter pin (29), nut (30), clip (10), washer (31), and bolt (32). Remove fitting (33) from shaft (11).

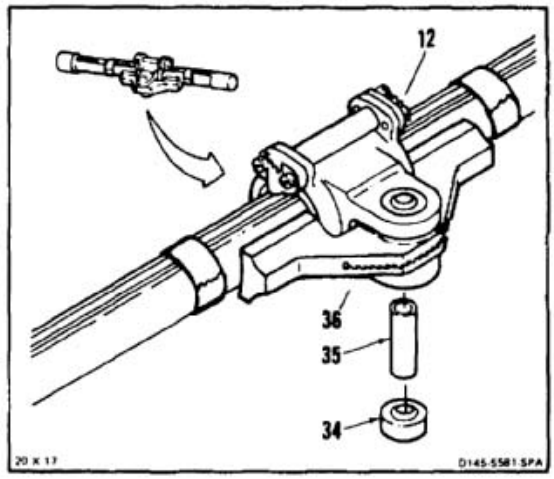


CAUTION

Do not remove pivot block from shaft. Assembly contains 54 ball bearings which are matched by manufacturer. If pivot block is removed, bearings will fall out.

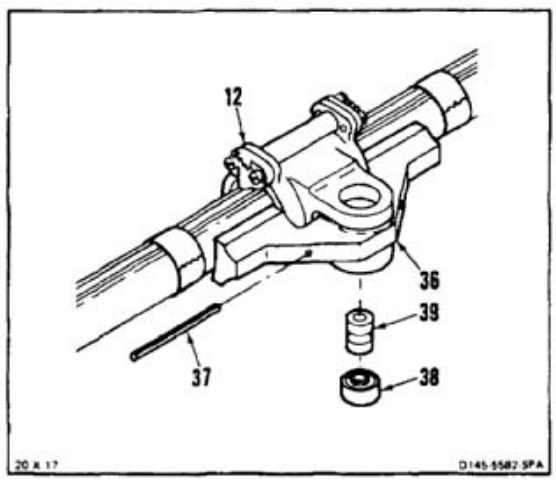
14. Support pivot block (12). Drive out lower bearing (34) and spacer (35). Use pin punch.

15. Remove lockwire from stop (36).



16. Drive out retaining pin (37).

17. Turn pivot block (12) over and install in arbor press. Press out bearing (38) and bushing (39). Remove stop (36). Remove pivot block from arbor press.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-64 CLEAN THRUST CONTROL (REMOVED) (AVIM) 11-64

INITIAL SETUP

Applicable Configurations:

All

Tools:

Low Pressure Air Supply
Brush

Materials:

Dry Cleaning Solvent (E162)
Cloths (E120)
Tape (E388)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

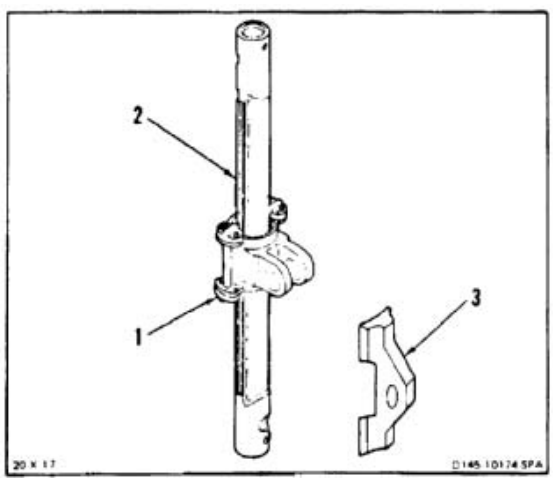
Off Helicopter Task
Task 11-61

General Safety Instructions:

WARNING

Dry cleaning solvent (E162) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

1. Remove dirt and dust from pivot block (1), shaft (2), and stop (3). Use brush then cloth (E120) moist with solvent (E162).
2. Move block (1) and repeat step 1 for shaft (2).
3. Clean block (1), shaft (2), and stop (3) with solvent (E162). Use gloves (E186).
4. Dry block (1), shaft (2), and stop (3). Use cloth (E120) and low pressure air. Use gloves (E186).



INSPECT

FOLLOW-ON MAINTENANCE:

Assemble thrust control (Task 11-65).

END OF TASK

11-65 ASSEMBLE THRUST CONTROL (AVIM) 11-65

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Electrical Repairer's Tool Kit, NSN 5180-00-323-4915
Insertion/Extraction Tool for Crimp-Type Contacts, No. 20 Size
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 5 to 50 Inch-Pounds
Arbor Press
Drill Press
Roller Staking Kit
Bolt, 1/4 Inch x 2 Inches Long

Materials:

Lockwire (E231)
Epoxy Primer (E292)
Cable Strap (E376)
Dry Cleaning Solvent (E162)
Cloth (E120)
Gloves (E184.1)

Parts:

Cotter Pins
Spring Pin, Slotted
Washers

Personnel Required:

Medium Helicopter Repairer
Aircraft Electrician
Inspector
Aircraft Structural Repairer

References:

TM 55-1520-240-23P
TM 1-1520-253-23

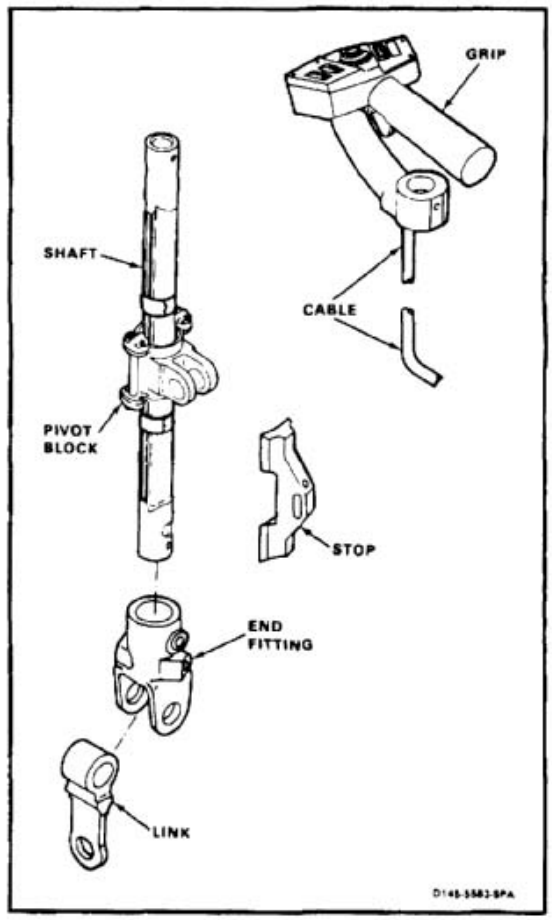
General Safety Instructions:

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

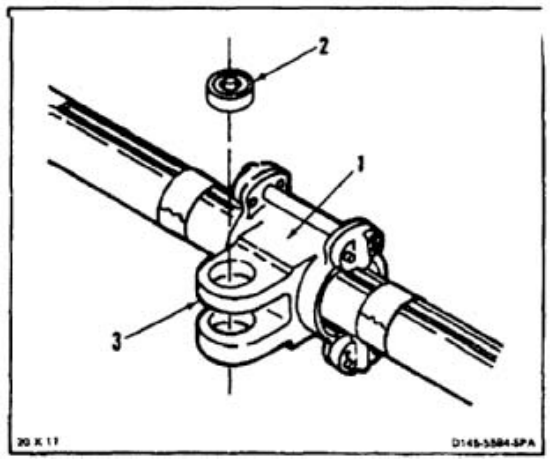
Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



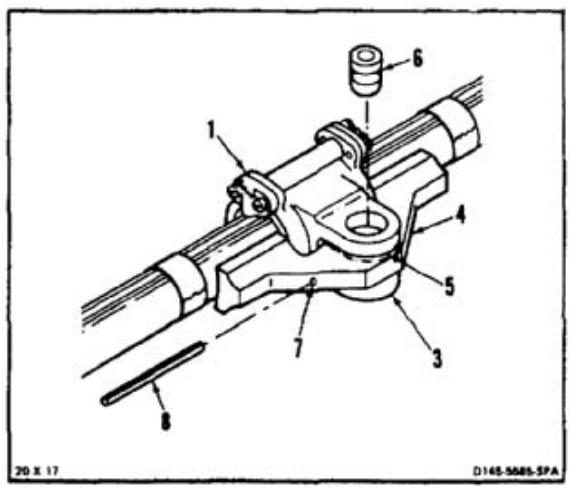
NOTE

If a crack in the connecting link is suspected, refer to TM 1-1520-253-23.

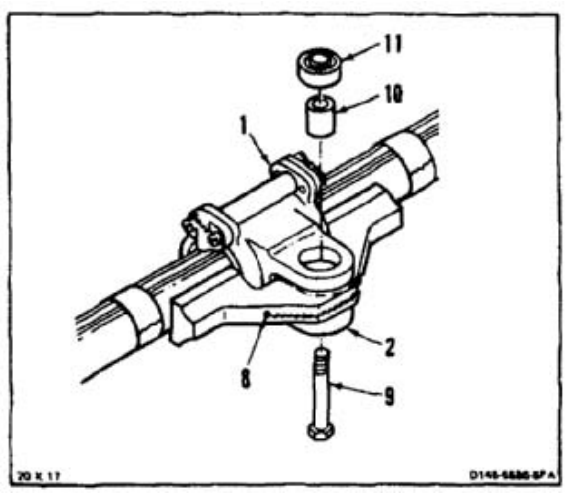
1. Install pivot block (1) in arbor press. Press bearing (2) into upper lug (3).



2. Turn pivot block (1) over. Position stop (4) between lugs (3 and 5) of pivot block. Align holes. Slide grooved bushing (6) through hole in upper lug and into stop. Align bushing groove with small hole (7) in stop.
3. Drive slotted spring pin (8) into hole (7) until centered in stop (4).



4. Install lockwire (E231) through pin (8).
5. Place **1/4 inch** bolt (9) through lower bearing (2). Install spacer (10) and bearing (11) on bolt. Press in bearing until seated on spacer. Remove bolt. Remove pivot block (1) from arbor press.



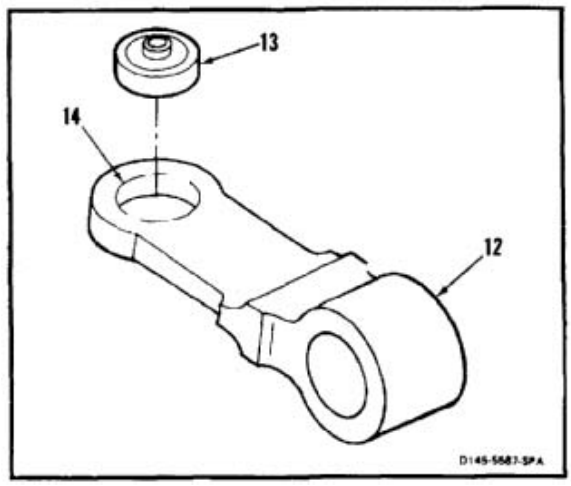
6. Coat bearing bores of link (12) with epoxy primer (E292). Wear gloves (E184.1).

NOTE

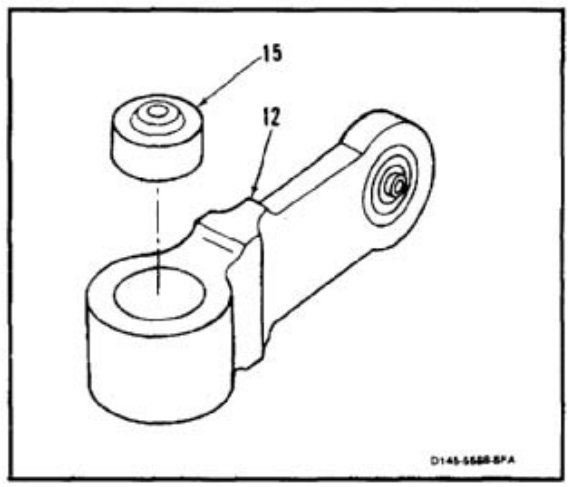
Install bearings in link while primer is wet.

7. Support small end of link (12) in arbor press. While primer is wet, press in bearing (13). Remove from arbor press.

8. Roller swage both sides of bearing housing (14). Use drill press and roller staking tool.

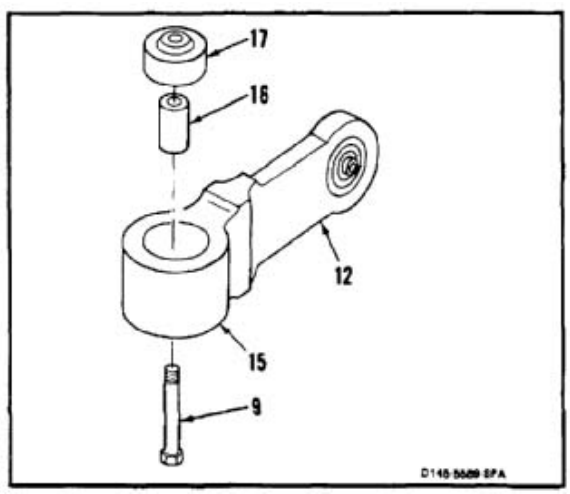


9. Support large end of link (12) in arbor press. While primer is wet, press in bearing (15).



10. Turn link (12) over and support in arbor press.

11. Place **1/4 inch** bolt (9) through lower bearing (15). Install spacer (16) and bearing (17) over bolt (9). While primer is wet, press in bearing until seated on spacer. Remove bolt. Remove link (12) from arbor press.



12. Coat inside of large hole on top of end fitting (18) with epoxy primer (E292). While primer is wet, slide end fitting onto shaft (19). Align holes in end fitting and shaft. Wear gloves (E184.1).

13. Install bolt (20), two washers (21), clip (22) and nut (23). Torque nut to **30 to 60 inch-pounds**. Install cotter pin (24).

14. Check bolt (20). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall not have axial looseness. If bolt rotates or is loose, add washer (21) under nut (23). Torque and cotter pin nut again.

15. Coat inside of holes in lugs (25) of end fitting (18) with epoxy primer (E292). While primer is wet, install bushing (26) and shoulder bushing (27). Wear gloves (E184.1).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both bearings and related spacer are properly installed at upper end of the link assembly.

Ensure single bearing is properly installed and retained at the lower end of the link assembly.

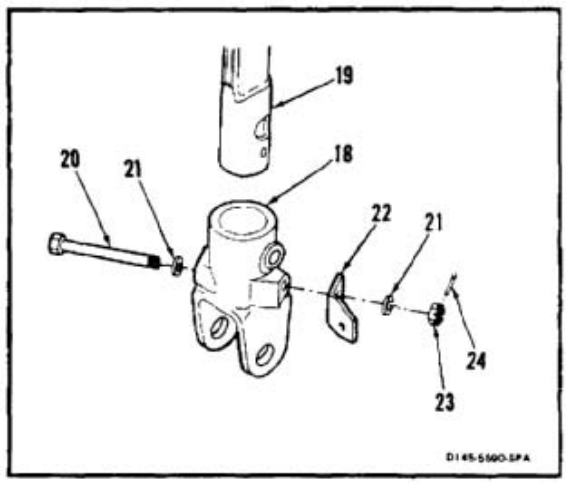
Ensure proper orientation of the link assembly at installation.

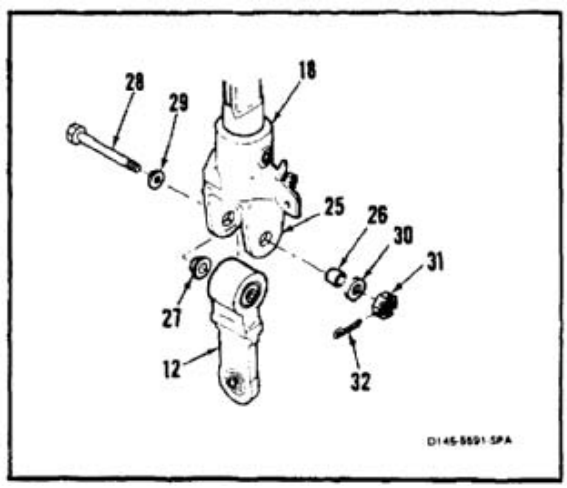
At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

16. Position link (12) in end fitting (18). Install bolt (28), washers (29 and 30) and nut (31). Torque nut to **30 to 60 inch-pounds**. Install cotter pin (32).

17. Check bolt (28). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall not have axial looseness. If bolt rotates or is loose, add washer (30) under nut (31). Torque and cotter pin nut again.





18. Coat sleeve bushing (33) with epoxy primer (E292). While primer is wet, install panel nut (34) and retainer (35) in bushing. Align holes in nut and bushing. Wear gloves (E184.1).

19. Coat top **1-1/2 inches** of shaft (19) with epoxy primer (E292). Wear gloves (E184.1).

NOTE

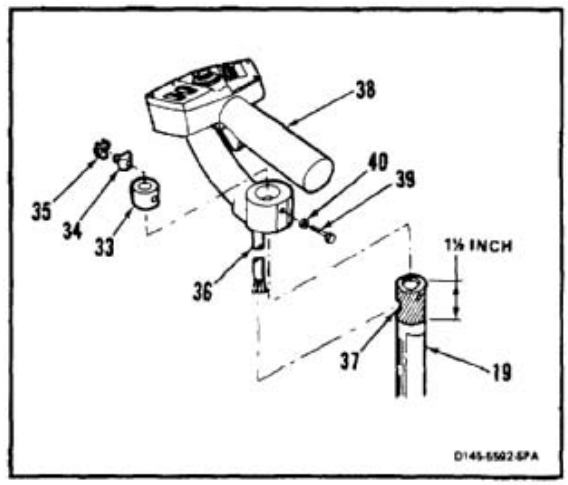
Assemble shaft and grip while primer is wet.

20. Feed cable (36) into large hole (37) on side of shaft (19). Feed through shaft and out lower end of shaft.

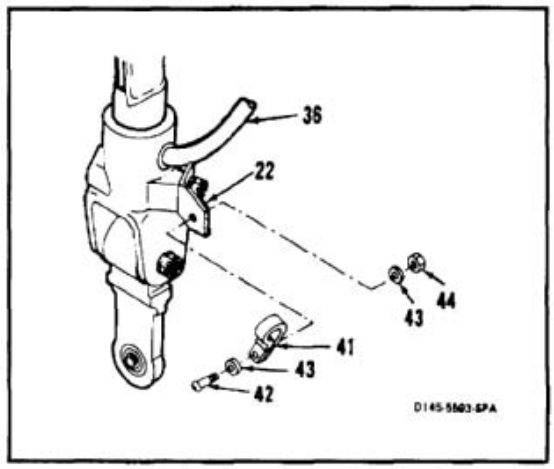
21. While primer is wet, install grip (38) on shaft (19).

22. While primer is wet, install bushing (33) in top of shaft (19).

23. Install bolt (39) and washer (40).



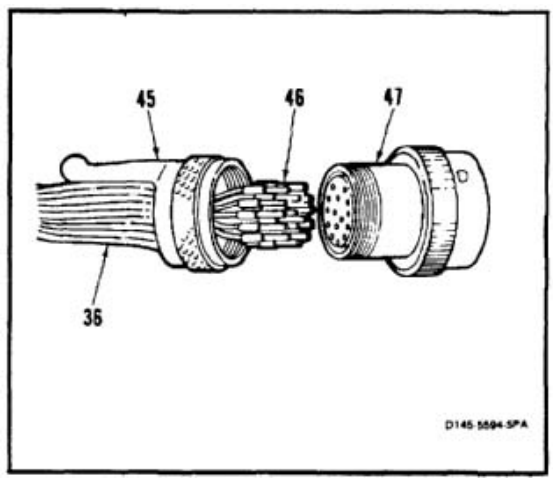
24. Install clamp (41) on cable (36).
25. Position clamp (41) on clip (22). Install screw (42), two washers (43), and nut (44).



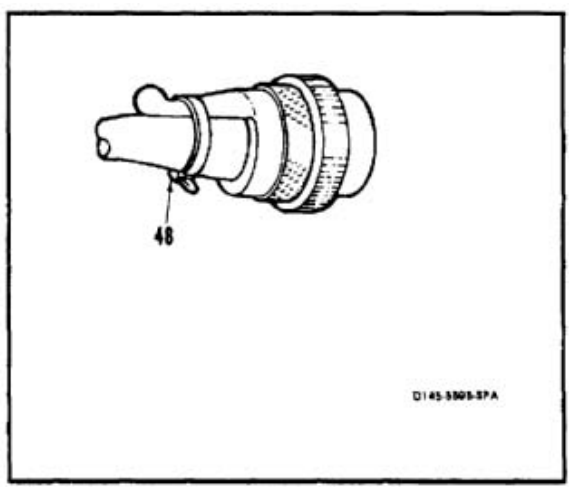
26. Insert cable (36) through backshell (45).
27. Remove tape from end of cable (36). Clean all contact pins (46) with dry cleaning solvent (E162) and cloth (E120). Wear goggles to protect eyes. Wear gloves (E184.1).
28. Insert 15 contact pins (46) into electrical connector (47). Use insertion/extraction tool. Match letter on wire to letter on connector.

INSPECT

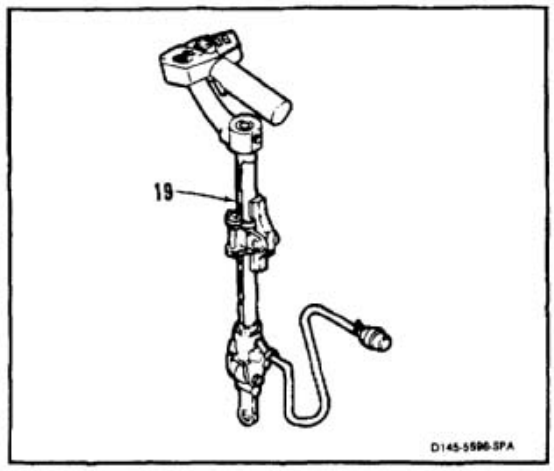
29. Install backshell (45) onto connector (47).



30. Install cable strap (E376) (48).



31. Remove masking tape from shaft (19). Clean shaft with dry cleaning solvent (E162) and clean cloth (E120). Wear gloves (E164.1) and goggles.



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-66 INSTALL THRUST CONTROL (PILOT) 11-66

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

Acetone (E20)
Cloths (E120)
Sealant (E336)
Sealant (E340)
Gloves (E186)

Parts:

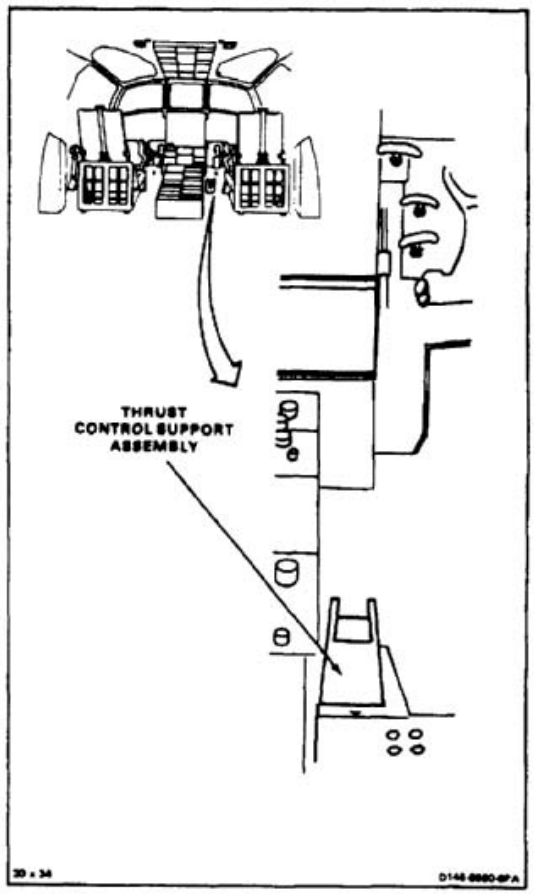
Cotter Pins
Cable Clamps
Washers
Gasket

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), washers (2), and bolt (3) from support (4). Make sure bushings (5) are in place in support assembly.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure smooth operation of ball slide assembly.

Ensure thrust grip assembly is secured to the lever assembly, including the grip wire bundle, associated clamping arrangement, and connector.

Ensure that all bushings are properly installed (including orientation) in the adjacent structural support.

After verification of proper installation of the pivot hardware, apply sealant over cotter pin sharp edges to prevent tearing of the boot assembly.

Orient lower end of thrust lever attaching hardware so as to provide maximum amount of clearance with the cockpit floor opening.

Ensure routing of grip wire bundle under the floor does not interfere with the full thrust lever motion as defined in the flight controls motions check.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

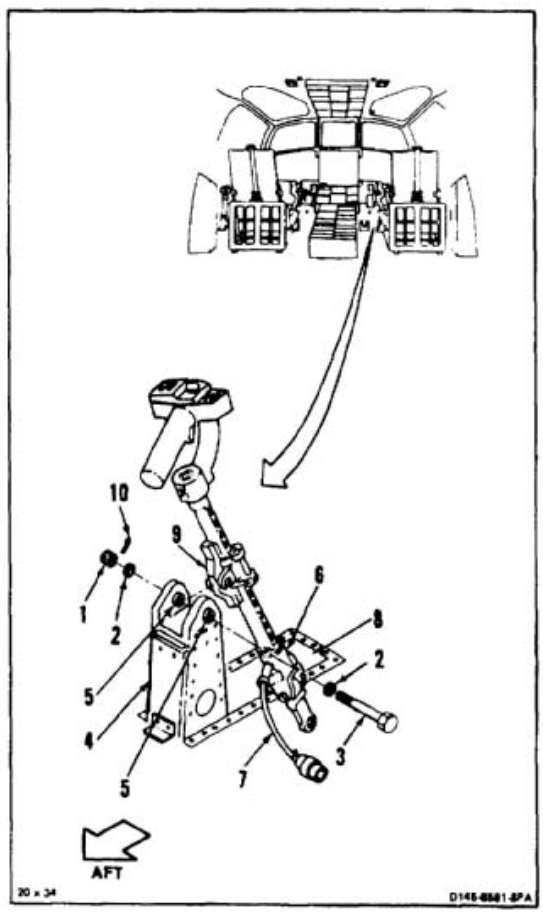
2. Position lower end of thrust control (6) and cable (7) through opening (8) in cockpit floor. Pivot block (9) shall face aft.

3. Position pivot block (9) in support (4). Install bolt (3), head outboard, two washers (2), and nut (1). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (10).

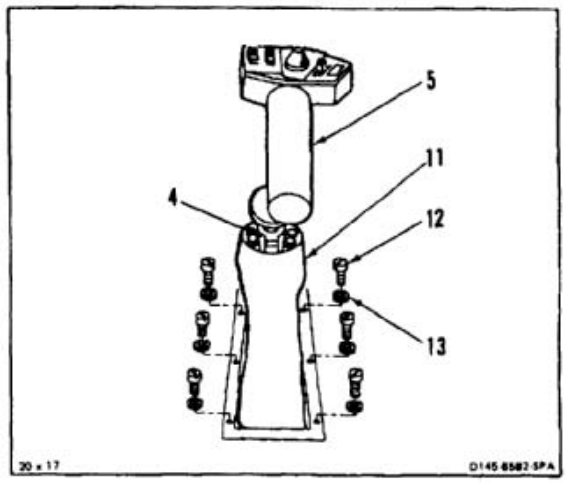
4. Check bolt (3). Bolt shall not rotate with a torque less than **10 inch-pounds**. Bolt shall not have axial looseness. If bolt rotates or is loose, add washer under nut. Torque and cotter pin nut again.

4.1. Apply sealant (E340) over nut (1) and cotter pin (10). Cover all sharp edges.

INSPECT

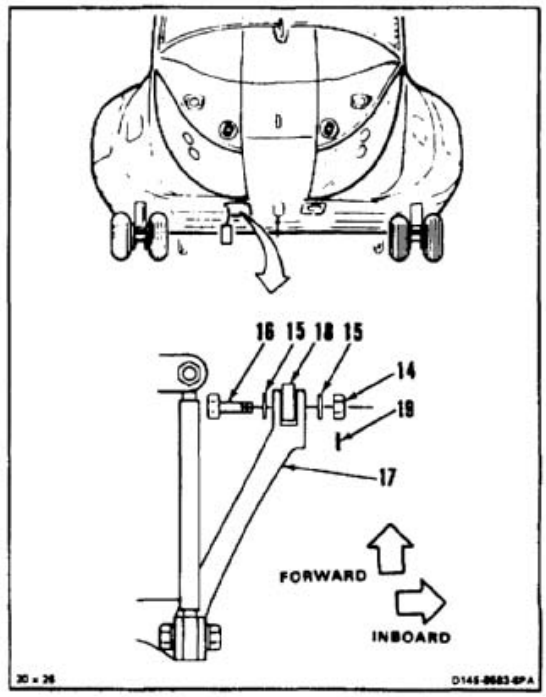


5. Install boot (11) over thrust control (5) and support (4). Install six screws (12) and washers (13). Close hook and pile tape fastener on front of boot.



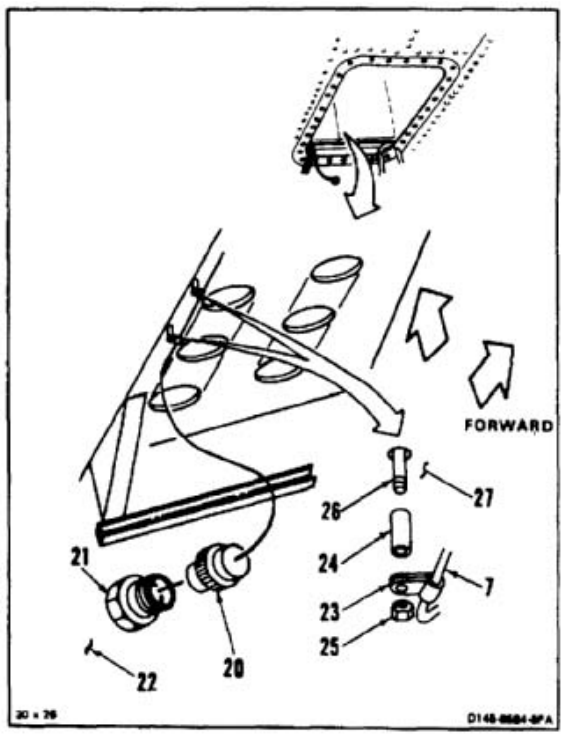
6. Remove nut (14), washers (15), and bolt (16) from bellcrank (17). Make sure bushings are in place in bellcrank.
7. Position thrust control bottom link (18) in bellcrank (17). Install bolt (16), head outboard, two washers (15), and nut (14). Torque nut to **30 to 46 inch-pounds**. Install cotter pin (19).
8. Check bolt (16). Bolt shall not rotate with a torque less than **10 inch-pounds**. Bolt shall not have axial looseness. If bolt rotates or is loose, add washer under nut. Torque and cotter pin nut again.

INSPECT



9. Connect electrical connector (20) to receptacle (21) on bulkhead (22).
10. Install two cable clamps (23) on cable (7).
11. Install two spacers (24), two clamps (23), and two nuts (25) on two screws (26) in console panel (27).

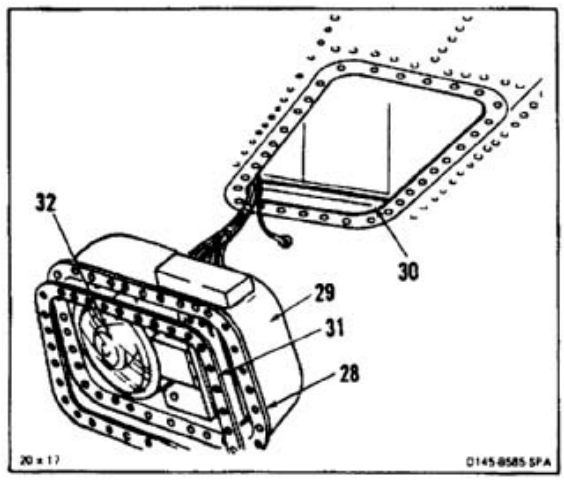
INSPECT



WARNING

Acetone (E20) can form toxic vapors if exposed to flares. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

12. Clean old sealant from flange (28) of landing light housing assembly (29). Use acetone (E20) and cloths (E120). Clean old sealant from inside of flange (30). Wear gloves (E186).



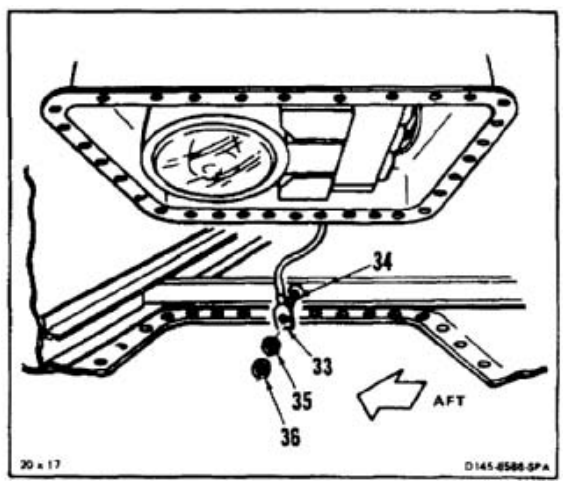
WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

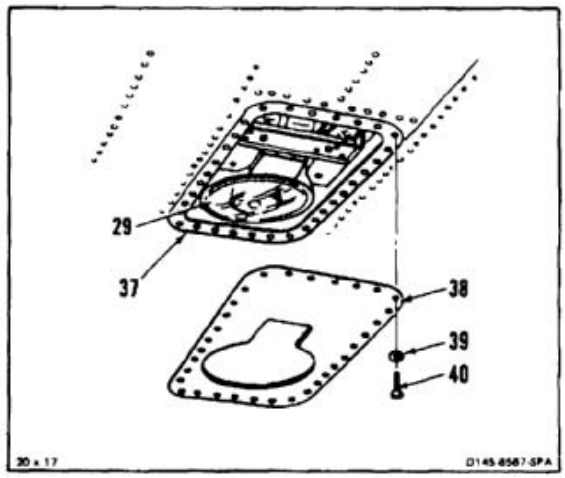
13. Apply sealant (E336) to both sides of gasket (31). Install gasket on flange (28). Wear gloves (E186).

14. Tilt housing assembly (29) to one side and guide it up and inside structure (30). Make sure lamp (32) is aft.

15. Connect electrical lead (33) to stud (34). Install washer (35) and nut (36).



16. Position housing assembly (29) and align holes with mounting holes on structure (37).
17. Position housing (38) and install 32 washers (39) and screws (40).



INSPECT

FOLLOW-ON MAINTENANCE:

Check operation of landing light (TM 55-1520-240-T).
Check operation of flight controls (TM 55-1520-240-T).

END OF TASK

11-67 INSTALL THRUST CONTROL (COPILOT) 11-67

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

Acetone (E20)
Cloths (E120)
Sealant (E336)
Sealant (E340)
Gloves (E186)

Parts:

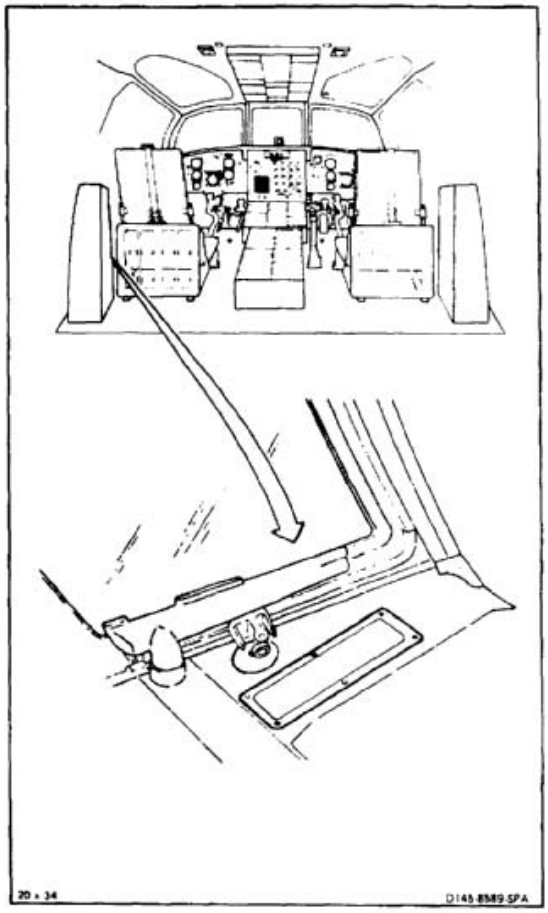
Cotter Pins
Cable Clamps
Washers
Gasket

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), washers (2), and bolt (3) from support (4). Make sure bushings (5) are in place in support.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure smooth operation of ball slide assembly.

Ensure thrust grip assembly is secured to the lever assembly, including the grip wire bundle, associated clamping arrangement, and connector.

Ensure that all bushings are properly installed (including orientation) in the adjacent structural support.

After verification of proper installation of the pivot hardware, apply sealant over cotter pin sharp edges to prevent tearing of the boot assembly.

Orient lower end of thrust lever attaching hardware so as to provide maximum amount of clearance with the cockpit floor opening.

Ensure routing of grip wire bundle under the floor does not interfere with the full thrust lever motion as defined in the flight controls motions check.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

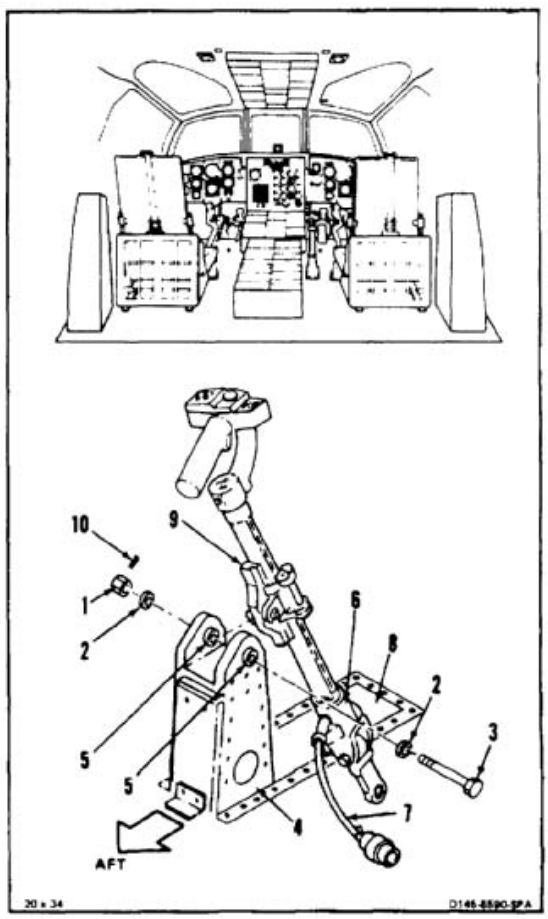
2. Position lower end of thrust control (6) and cable (7) through opening (8) in cockpit floor. Pivot block (9) shall face aft.

3. Position pivot block (9) in support, install bolt (3), head inboard, two washers (2), and nut (1). Torque nut to **30 to 45 inch-pounds**.

4. Check bolt (3). Bolt shall not rotate with a torque less than **10 inch-pounds**. Bolt shall not have axial looseness. If bolt rotates or is loose, add washer under nut. Torque and cotter pin nut again.

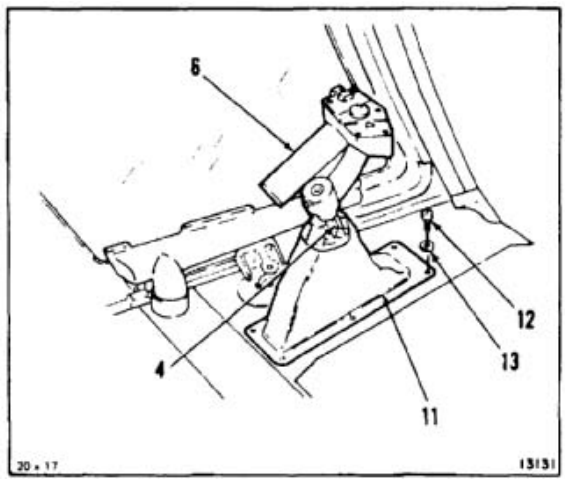
4.1. Apply sealant (E340) over nut (1) and cotter pin (10). Cover all sharp edges.

INSPECT



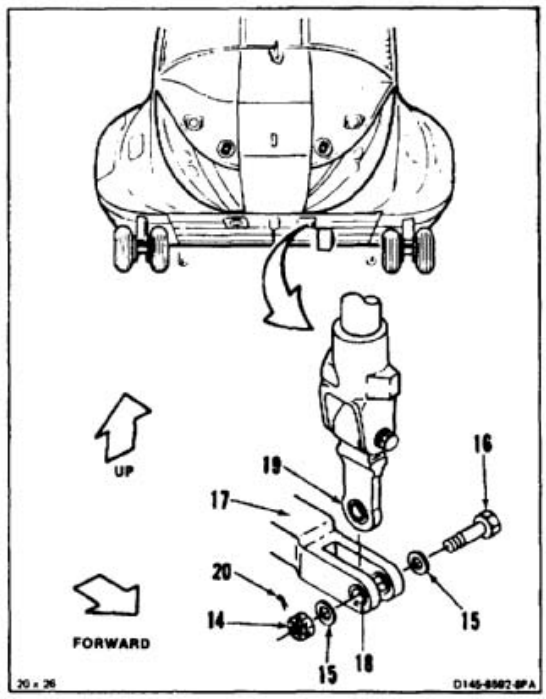
11-67 INSTALL THRUST CONTROL (COPILOT) (Continued) 11-67

5. Install boot (11) over thrust control (6) and support (4). Install six screws (12) and six washers (13). Close hook and pile tape fastener on front of boot.



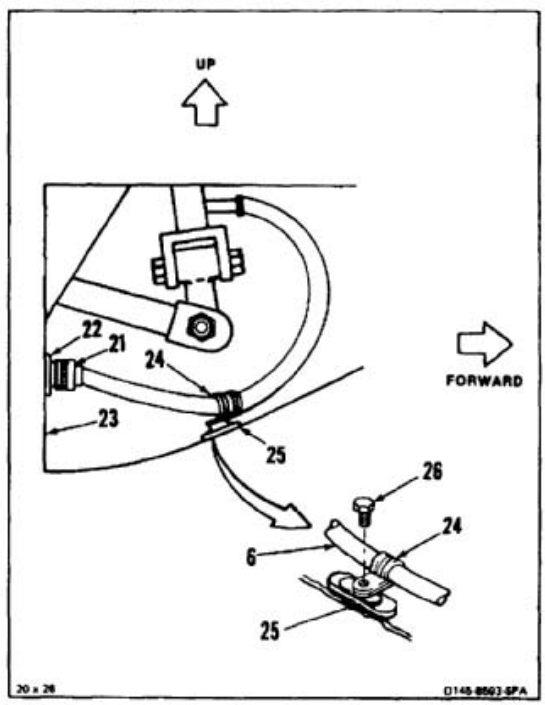
6. Remove nut (14), washers (15), and bolt (16) from bellcrank (17). Make sure bushings (18) are in place in bellcranks.
7. Position thrust control bottom link (19) in bellcrank (17). Install bolt (16), head outboard, two washers (15), and nut (14). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (20).
8. Check bolt (16). Bolt shall not rotate with a torque less than **10 inch-pounds**. Bolt shall not have axial looseness. If bolt rotates or is loose, add washer under nut. Torque and cotter pin nut again.

INSPECT



9. Connect electrical connector (21) to receptacle (22) on bulkhead (23).
10. Install cable clamp (24) to structure (25) and screw (26).

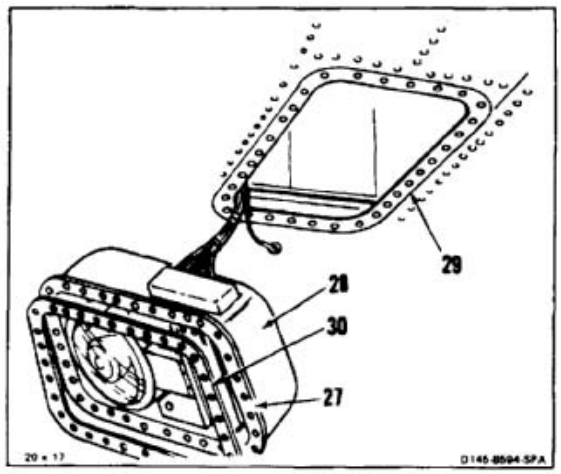
INSPECT



WARNING

Acetone (E20) can form toxic vapors if exposed to flame. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

11. Clean old sealant from flange (27) of landing light housing assembly (28). Use acetone (E20) and cloths (E120). Clean old sealant from inside of flange (29). Wear gloves (E186).



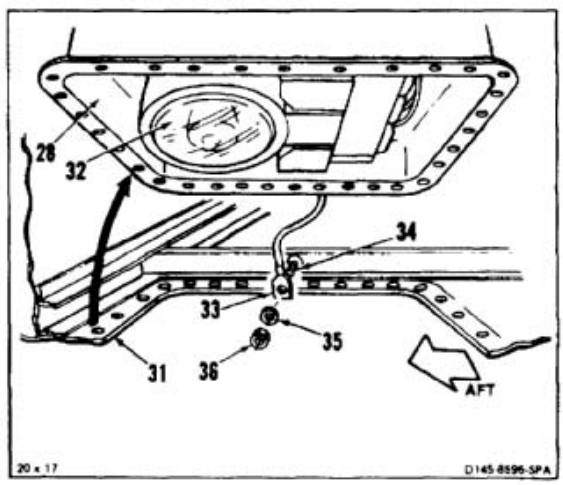
WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

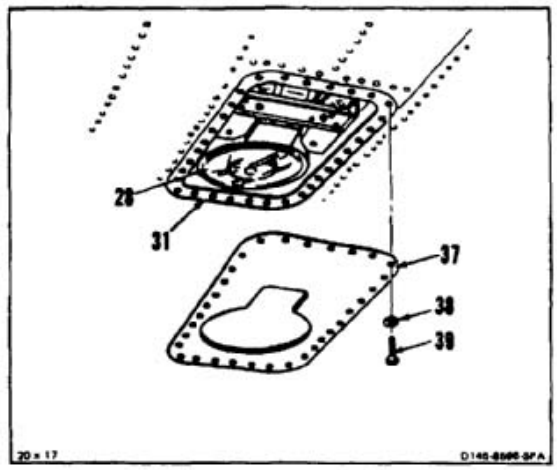
12. Apply sealant (E336) to both sides of gasket (30). Install gasket on flange (27). Wear gloves (E186).

13. Tilt housing assembly (28) to one side and guide it up and inside instructure (31). Make sure lamp (32) is aft.

14. Connect electrical lead (33) to stud (34). Install washer (35) and nut (36).



15. Position housing assembly (28) and align holes with mounting holes on structure (31).
16. Position housing (37) and install 32 washers (38) and screws (39).



FOLLOW-ON MAINTENANCE:

Check operation of landing light (TM 55-1520-240-T).
Check operation of flight controls (TM 55-1520-240-T).

END OF TASK

11-68 PAINT THRUST CONTROL 11-68

INITIAL SETUP

Applicable Configurations:

All

Tools:

None

Materials:

Black Polyurethane Paint (E285.1)
Dry Cleaning Solvent (E162)
Cloths (E120)
Gloves (E184.1)

Personnel Required:

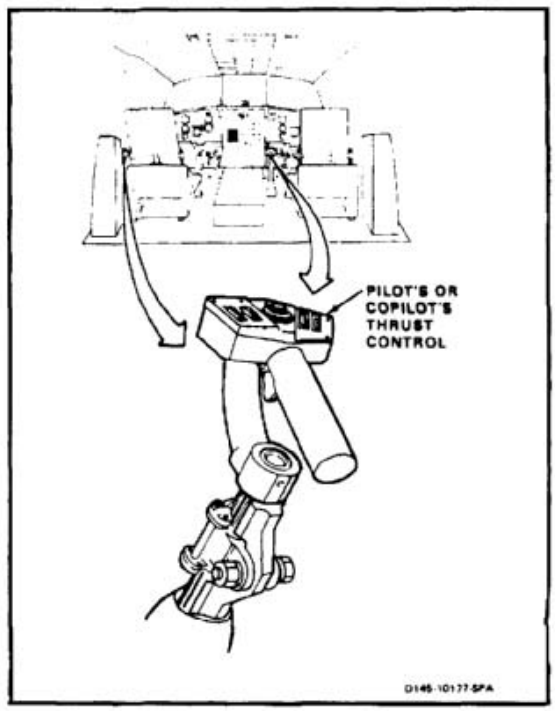
Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pilot's or Copilot's Seats Fully Aft (Task 2-115)

References:

Task 2-350.1



WARNING

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

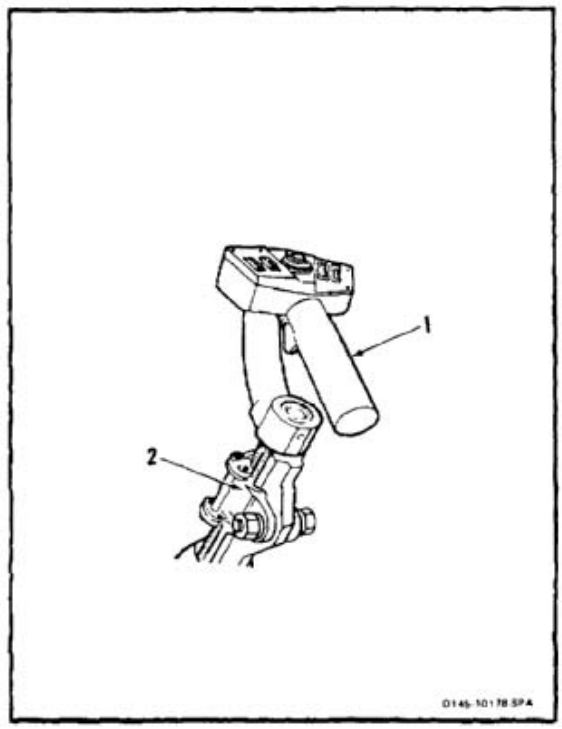
Do not immerse control in solvent. Damage to components can occur.

1. Clean damaged painted areas of control grip (1) and pivot block (2). Use cloth (E120) moist with solvent (E162). Wear gloves (E184.1). Allow areas to dry.

WARNING

Polyurethane paint (E285.1) is flammable and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. Keep away form heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

2. Apply coat of black polyurethane paint (E285.1) (Task 2-350.1) to damaged areas.



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-69 REMOVE PILOT'S PITCH AND ROLL CONTROL STICK 11-69

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

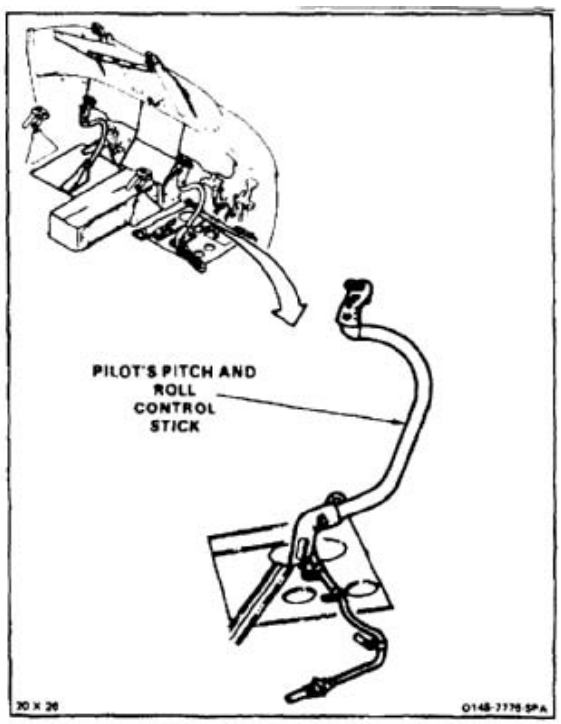
None

Personnel Required:

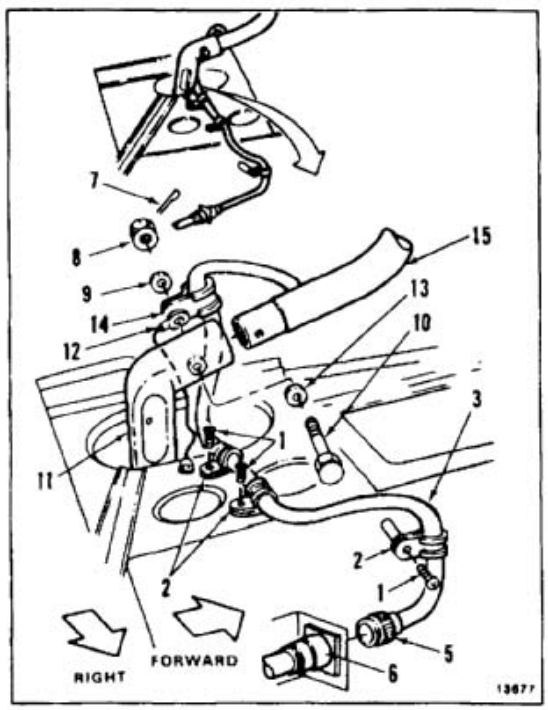
Medium Helicopter Repairer

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Pilot's Seat Fully Aft (Task 2-115)
Control Stick Boot Removed (Task 2-81)
Pilot's Forward Right Floor Cover Removed (Task 2-81)



1. Remove three screws (1) from three clamps (2). Remove cable (3) from clamps. Install clamps and screws loosely in control assembly (4).
2. Disconnect connector (5) from receptacle (6) on right of control assembly (4).
3. If applied, remove silicone rubber coating from cotter pin (7) and nut (8). Remove cotter pin, nut, washer (9), clamp (14), and bonding jumper (12) from bolt (10) in socket (11). Remove clamp from cable (3).
4. Remove bolt (10), and washer (3) from socket (11). Disconnect bonding jumper (12) from bolt and cable (3). Cut ties.
5. Disconnect pitch and roll control stick (15) from socket (11). Twist and pull stick forward. Remove stick and cable (3).
6. Install bolt (10), washer (13), clamp (14), washer (9), and nut (8) loosely in socket (11).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-70 REMOVE COPILOT'S PITCH AND ROLL CONTROL STICK 11-70

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

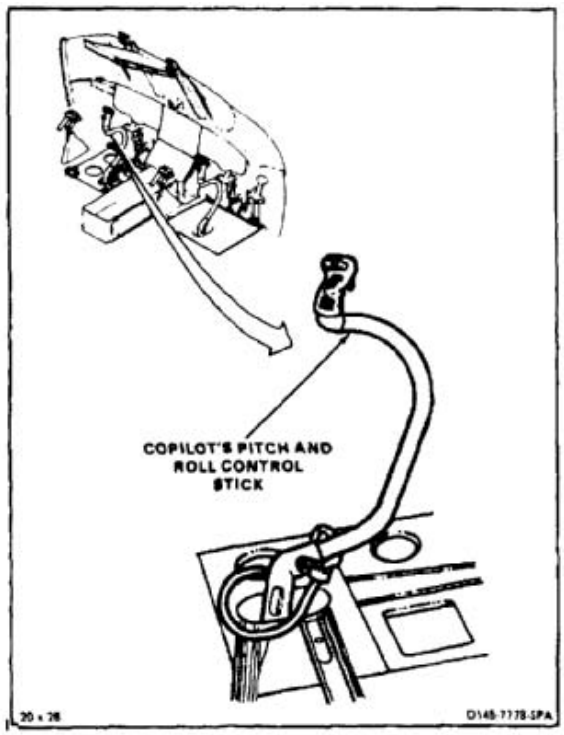
None

Personnel Required:

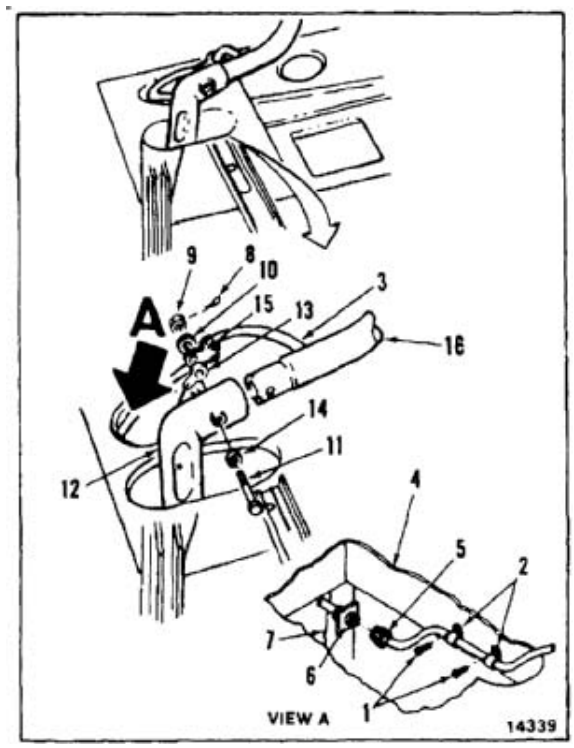
Medium Helicopter Repairer

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Copilot's Seat Fully Aft (Task 2-115)
Control Stick Boot Removed (Task 2-81)
Copilot's Forward Left Floor Cover Removed (Task 2-81)



1. Remove two screws (1) from two clamps (2). Remove cable (3) from clamps. Install clamps and screws loosely in control assembly (4).
2. Disconnect connector (5) from receptacle (6) on structure (7) under control assembly (4).
3. If applied, remove silicone rubber coating from cotter pin (8) and nut (9). Remove cotter pin, nut, washer (10), and clamp (15) from bolt (11) in socket (12). Disconnect bonding jumper (13) from bolt and cable (3). Cut ties.
4. Remove bolt (11) and washer (14), from socket (12). Remove clamp from cable (3).
5. Disconnect pitch and roll control stick (16) from socket (12). Twist and pull stick forward. Remove stick and cable (3).
6. Install bolt (11), washer (14), clamp (15), washer (10), and nut (9) loosely in socket (12).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-71 INSTALL PILOT'S PITCH AND ROLL CONTROL STICK 11-71

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

Epoxy Primer (E292)
Twine (E433)
Gloves (E184.1)
Sealant (E340)

Parts:

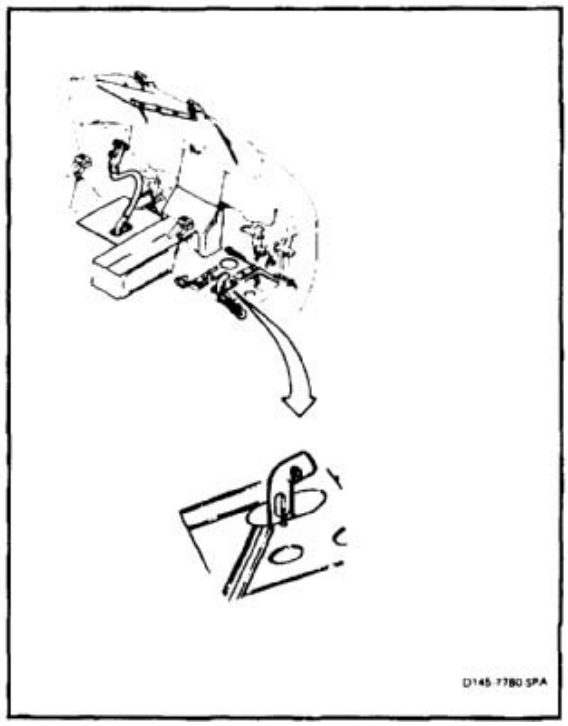
Cotter Pin

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



1. Remove nut (1), washer (2), clamp (3), washer (4), and bolt (5) from socket (6).
2. Insert pitch and roll control stick (7), cable (8) on left, in socket (6). Align holes (9).
3. Install cable (8), close to stick (7) in clamp (3), bolt hole aft, with cable down through clamp.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the adjacent component.

Ensure elbow assembly is properly attached and secured to the tube.

Ensure the cyclic grip assy is properly attached to the elbow assembly.

Ensure rubber grommet is installed at wire bundle exit to prevent wire chafing.

Ensure connector is properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

4. Apply coat of epoxy primer (E292) to bolt (5) and washer (4). Wear gloves (E184.1). Install bolt and washer on outboard side of socket (6) while primer is wet.

WARNING

Bonding jumper and cable must not restrict control stick travel. Restricted control stick travel during flight can be dangerous.

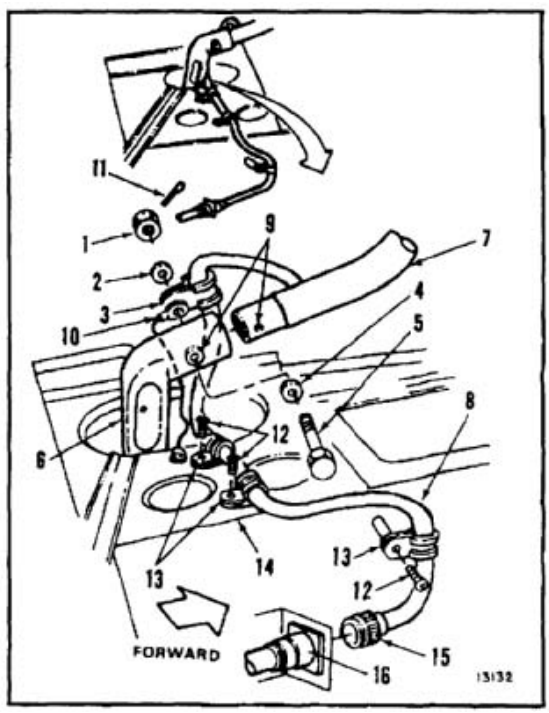
5. Install bonding jumper (10), clamp (3), washer (2), and nut (1) on bolt (5).
6. Tie bonding jumper (10) to cable (8) with three ties. Use twine (E433).

WARNING

Sealant (E340) may be toxic, can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. Immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

7. Torque nut (1) to **15 to 20 inch-pounds**. Install cotter pin (11). Apply sealant (E340) over nut and cotter pin. Cover all sharp edges.
8. Remove three screws (12) and three clamps (13) from structure (14). Mount clamps on cable (8), with screw holes aft. Install clamps and screws.
9. Connect connector (15) to receptacle (16).

INSPECT



FOLLOW-ON MAINTENANCE:

Perform operational check of pitch and roll control stick (TM 55-1520-240-T).
Install pilot forward right floor cover (Task 2-82).
Install control stick boot (Task 2-82).

END OF TASK

11-72 INSTALL COPILOT'S PITCH AND ROLL CONTROL STICK 11-72

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

Epoxy Primer (E291)
Twine (E433)
Gloves (E184.1)
Sealant (E340)

Parts:

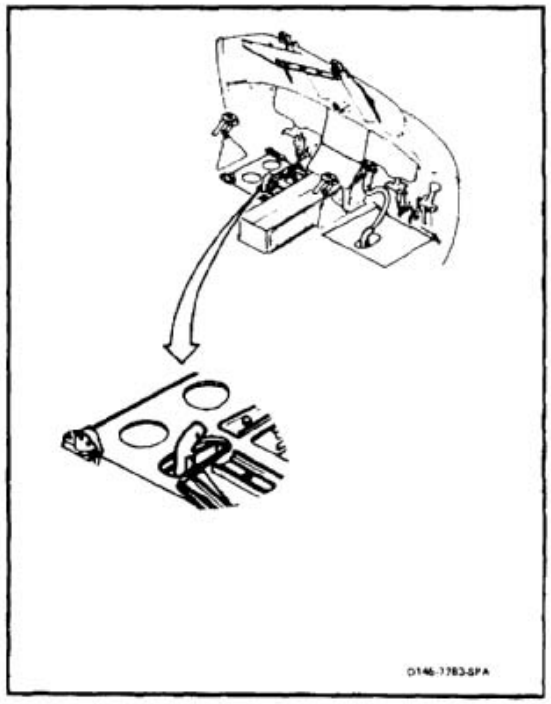
Cotter Pin

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



1. Remove nut (1), washer (2), clamp (3), washer (4), and bolt (5) from socket (6).
2. Insert pitch and roll control stick (7), cable (8) on left, in socket (6). Align holes (9).
3. Install cable (8), close to stick (7), in clamp (3), bolt hole aft, with cable down through clamp.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the adjacent component.

Ensure elbow assembly is properly attached and secured to the tube.

Ensure the cyclic grip assy is properly attached to the elbow assembly.

Ensure rubber grommet is installed at wire bundle exit to prevent wire chafing.

Ensure connector is properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

4. Apply coat of primer (E292) to bolt (5) and washer (4). Wear gloves (E184.1). Install bolt and washer on inboard side of socket (6) while primer is wet.

WARNING

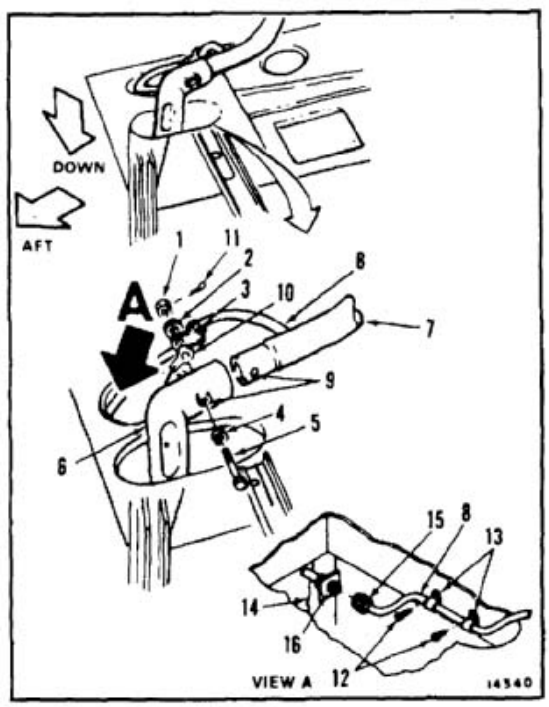
Bonding jumper and cable must not restrict control stick travel. Restricted control stick travel during flight can be dangerous.

5. Install bonding jumper (10), clamp (3), washer (2), and nut (1) on bolt (5).
6. Tie bonding jumper (10) to cable (8) with three ties. Use twine (E433).

WARNING

Sealant (E340) may be toxic, can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. Immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

7. Torque nut (1) to **15 to 20 inch-pounds**. Install cotter pin (11). Apply sealant (E340) over nut and cotter pin. Cover all sharp edges.
8. Remove two screws (12) and two clamps (13) from structure (14). Mount clamps on cable (8), with screw holes up. Install clamps and screws.
9. Connect connector (15) to receptacle (16).



FOLLOW-ON MAINTENANCE:

Perform operational check of pitch and roll control stick (TM 55-1520-240-T).
Install copilot's forward left floor cover (Task 2-82).
Install control stick boot (Task 2-82).

END OF TASK

11-73 REMOVE PILOT'S COCKPIT CONTROL ASSEMBLY 11-73

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 2 Quart

Materials:

Paper Tags (E264)
Cloths (E120)
Straps (E376)

Personnel Required:

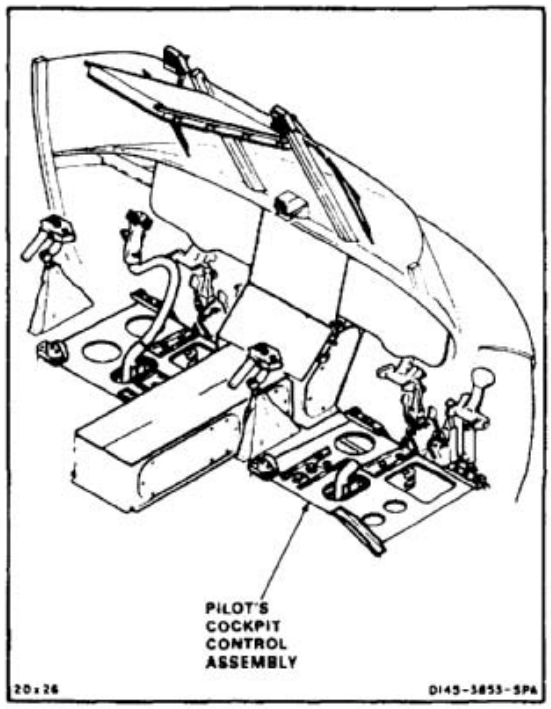
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

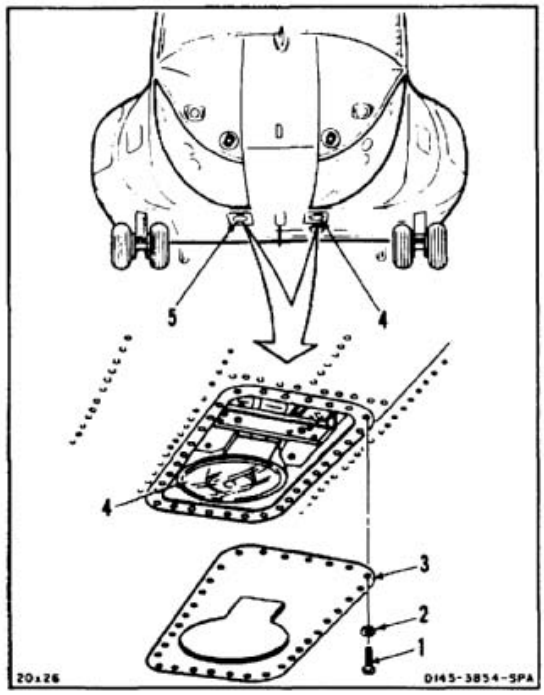
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Utility Hydraulic System Depressurized (TM 55-1520-240-T)
Pilot's And Copilot's Seats Removed (Task 2-111)
Pilot's Control Stick Removed (Task 11-69)
Cockpit Forward Floor Covers Removed (Task 2-81)



NOTE

If a crack in the connecting link is suspected, refer to TM 1-1520-253-23.

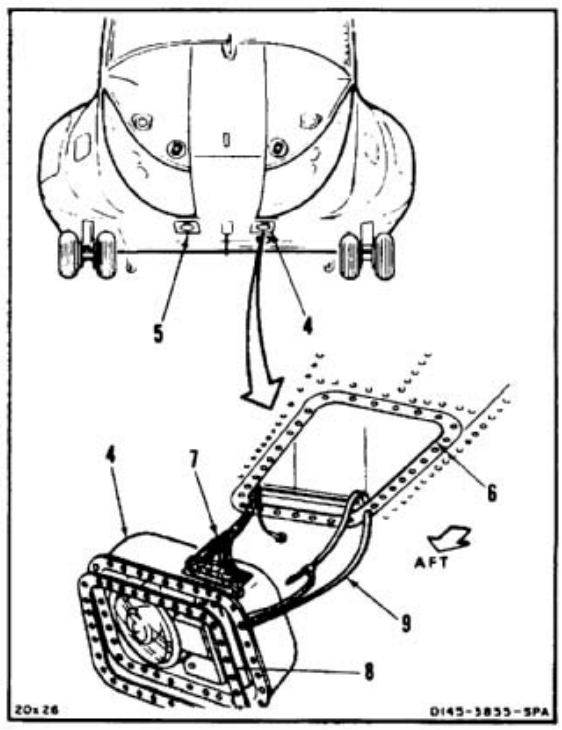
1. Remove 32 screws (1), and washers (2) from housing (3) of left landing light housing (4). Remove housing.
2. Repeat step 1 for right landing light housing (5).



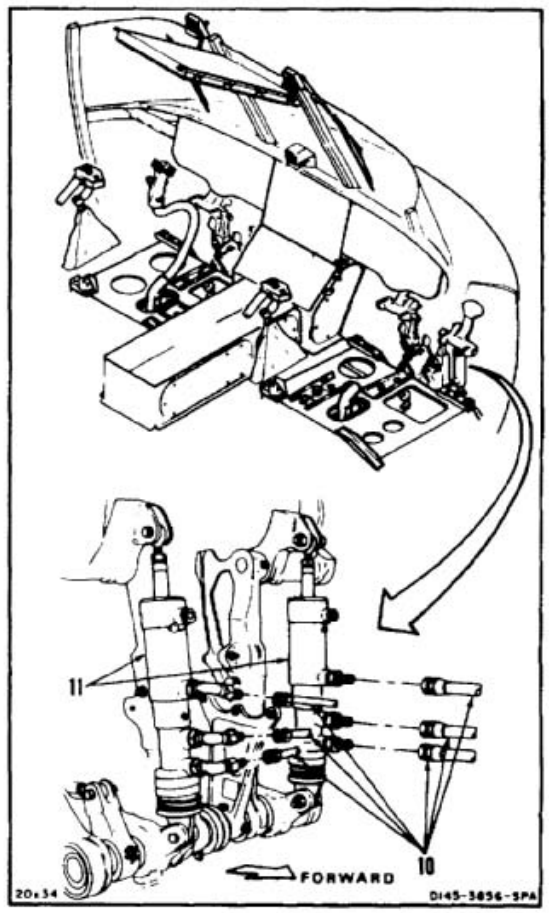
CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

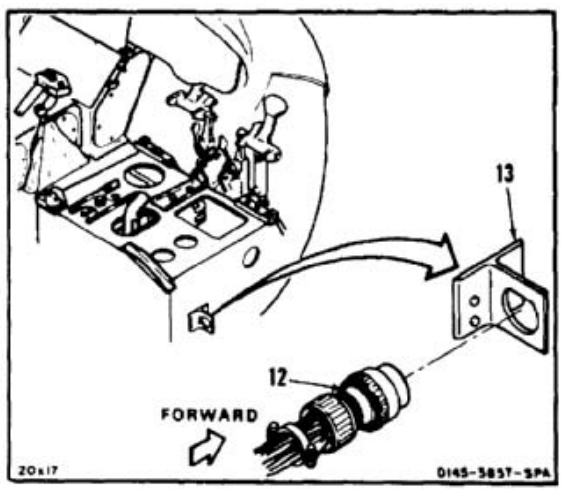
3. Remove left landing light housing (4) from access (6). Support housing so it does not hang by wires (7).
4. Remove gasket (8) from housing (4).
5. Strap housing (4) to access (6) at aft end with strap (9). Wires (7) must not support housing. Use strap (E376).
6. Repeat steps 3 thru 5 for right landing light housing (5).



7. Tag and disconnect six hydraulic hoses (10) from cylinders (11). Use container and cloths (E120) for spilled fluid.



8. Tag and remove receptacle (12) from bracket (13).

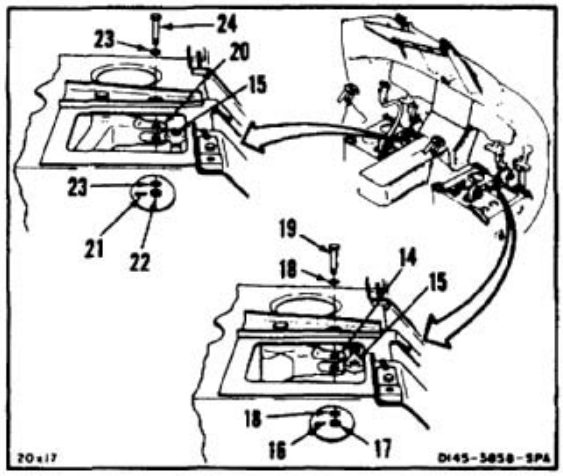


NOTE

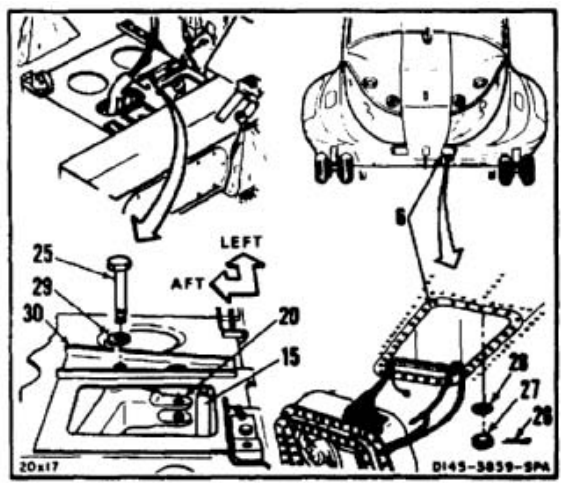
Attaching bolt, washers, and nut will be temporarily installed after links are removed.

REMOVE YAW CONNECTING LINK

9. Move bellcrank (14) for access to link (15).
10. Tag yaw connecting link (15). Remove cotter pin (16), nut (17), two washers (18) and bolt (19) from bellcrank (14). Disconnect link.
11. Move bellcrank (20) for access to link (15).
12. Remove cotter pin (21), nut (22), two washers (23), and bolt (24) from bellcrank (20). Disconnect link.
13. Install two bolts (19 and 24), four washers (18 and 23) and two nuts (17 and 22) in bellcranks (14 and 20).

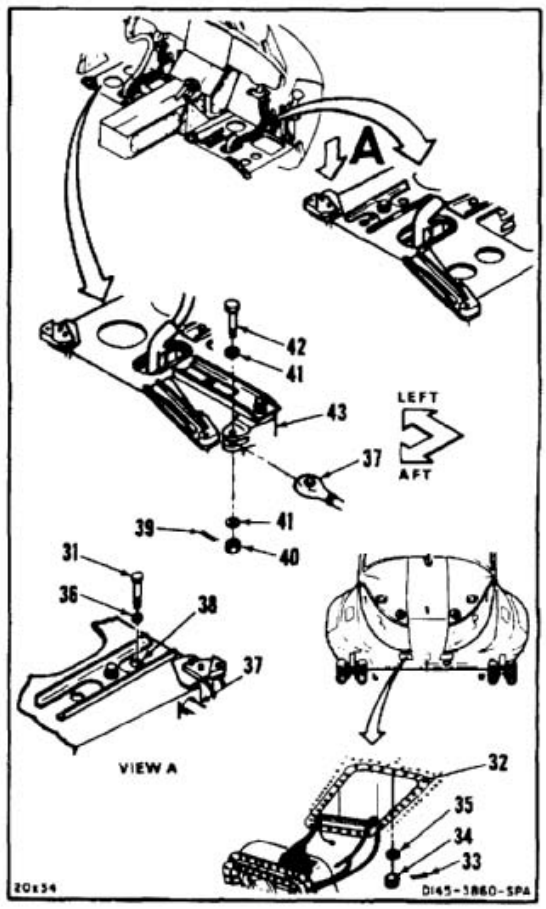


14. Have helper in cockpit hold bolt (25). Working through left access (6), remove cotter pin (26), nut (27), and washer (28).
15. Remove bolt (25) and washer (29). Slide bellcrank (20) fully aft.
16. Slide link (15) fully left.
17. Install bolt (25) two washers (29 and 28), and nut (27) in structure (30).



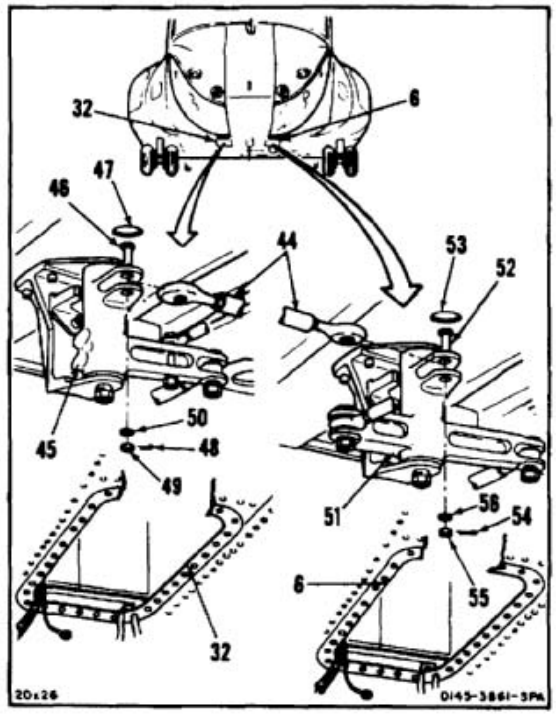
REMOVE ROLL CONNECTING LINK

18. Have helper in cockpit hold bolt (31). Working through right access (32), remove cotter pin (33), nut (34), and washer (35) from bolt.
19. Remove bolt (31) and washer (36). Tag and disconnect roll connecting link (37) from bellcrank (38).
20. Install bolt (31), two washers (35 and 36), and nut (34) in bellcrank (38).
21. Remove cotter pin (39), nut (40), two washers (41), and bolt (42) from bellcrank (43).
22. Remove link (37) from bellcrank (43). Move link aft and slide fully left.
23. Install bolt (42), two washers (41), and nut (40) in bellcrank (43).



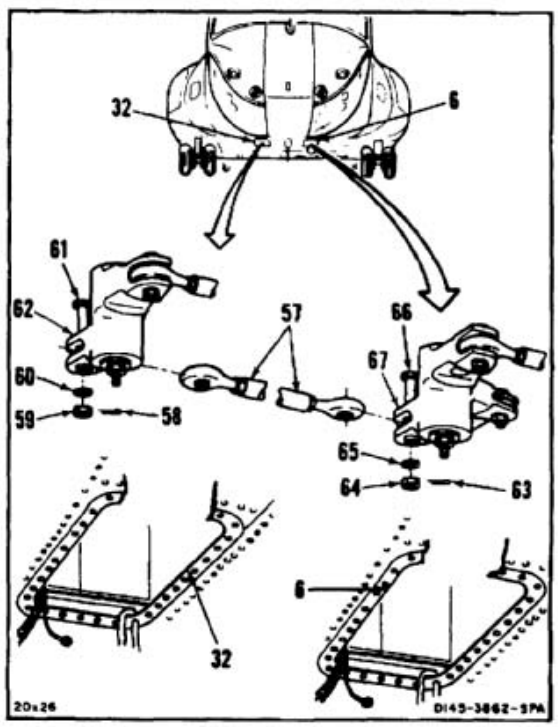
REMOVE PITCH CONNECTING LINK

24. Working through right access (32), tag pitch connecting link (44).
25. Position bellcrank (45) to align bolt (46) and hole (47).
26. Remove cotter pin (48), nut (49), and washer (50) from bolt (46).
27. Lift bolt (46) to release link (44). Disconnect link from bellcrank (45).
28. Install bolt (46), washer (50), and nut (49) in bellcrank (45).
29. Working through left access (6) position bellcrank (51) to align bolt (52) and hole (53).
30. Remove cotter pin (54), nut (55), and washer (56) from bolt (52).
31. Lift bolt (52) to release link (44). Disconnect link from bellcrank (51). Remove link.
32. Install bolt (52), washer (56), and nut (55) in bellcrank (51).



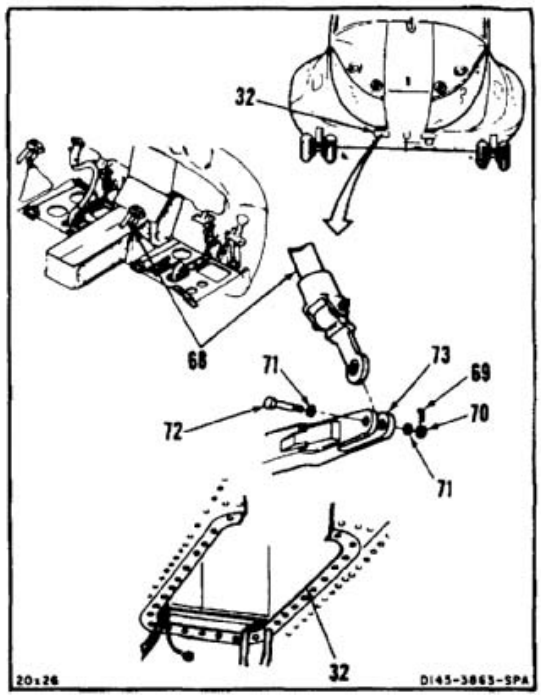
REMOVE THRUST CONNECTING LINK

33. Working through right access (32) tag thrust connecting link (57).
34. Remove cotter pin (58), nut (59), and washer (60) from bolt (61) in bellcrank (62).
35. Lift bolt (61) to release link (57). Disconnect link from bellcrank (62).
36. Install bolt (61), washer (60), and nut (59) in bellcrank (62).
37. Working through left access (6), remove cotter pin (63), nut (64), and washer (65) from bolt (66) in bellcrank (67).
38. Lift bolt (66) to release link (57). Disconnect link from bellcrank (67). Remove link.
39. Install bolt (66), washer (65), and nut (64) in bellcrank (67).



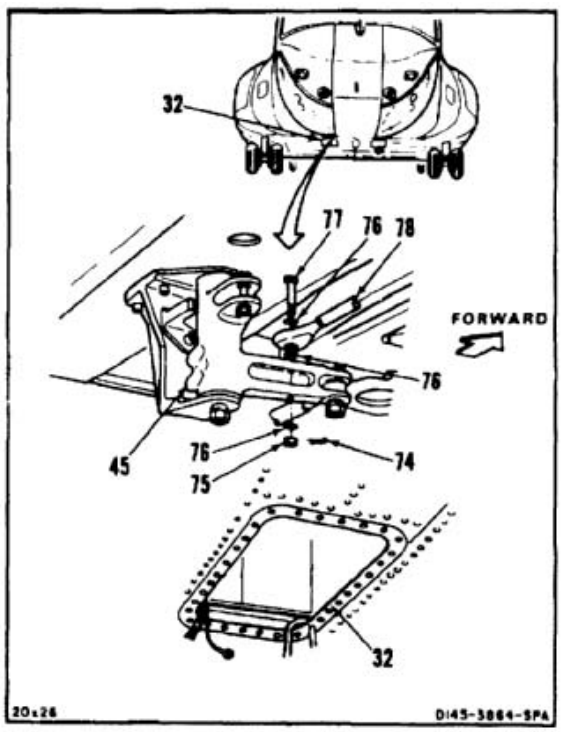
DISCONNECT THRUST CONTROL

40. Have helper in cockpit set thrust control (68) fully down.
41. Working through right access (32) remove cotter pin (69), nut (70), two washer (71), and bolt (72) from bellcrank (73).
42. Disconnect control (68) from bellcrank (73). Have helper in cockpit set control fully up and secure up. Use strap (E376).
43. Install bolt (72), two washers (71), and nut (70) in bellcrank (73).



DISCONNECT CONTROL STICK INDICATOR

44. Working through right access (32), move bellcrank (45) fully forward.
45. Remove cotter pin (74), nut (75), three washers (76), and bolt (77) from bellcrank (45).
46. Disconnect indicator (78) and move bellcrank (45) aft.
47. Install bolt (77), three washers (76), and nut (75) in bellcrank (45).



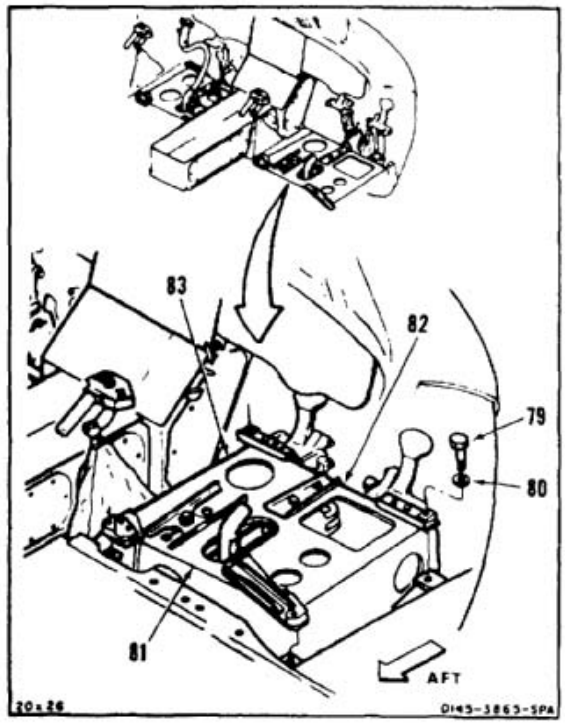
REMOVE CONTROL ASSEMBLY

48. Remove four bolts (79) and washers (80) from control assembly (81).

WARNING

Control assembly weighs about **50 pounds**. Do not drop, injury to personnel or damage to equipment could occur.

49. Slide assembly (81) forward about **6 inches**. Lift forward end (82) about **6 inches**, and tilt left side (83) down. With aid from helper, remove assembly.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-74 REMOVE COPILOT'S COCKPIT CONTROL ASSEMBLY 11-74

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Container, 2 Quart

Materials:

Paper Tags (E264)
Cloths (E120)
Straps (E376)

Personnel Required:

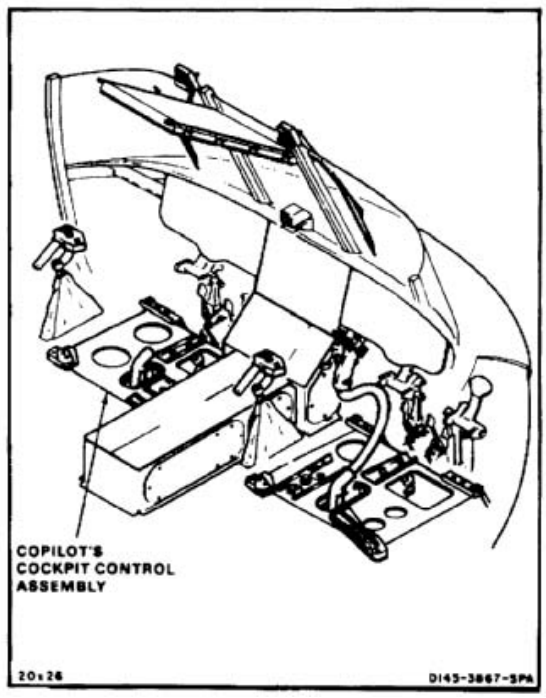
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Flight Control Hydraulic System Depressurized (TM 55-1520-240-T)
Pilot's And Copilot's Seats Removed (Task 2-111)
Copilot's Control Stick Removed (Task 11-70)
Cockpit Forward Floor Covers Removed (Task 2-81)
Servocylinder Connecting Links Disconnected (Task 11-192)

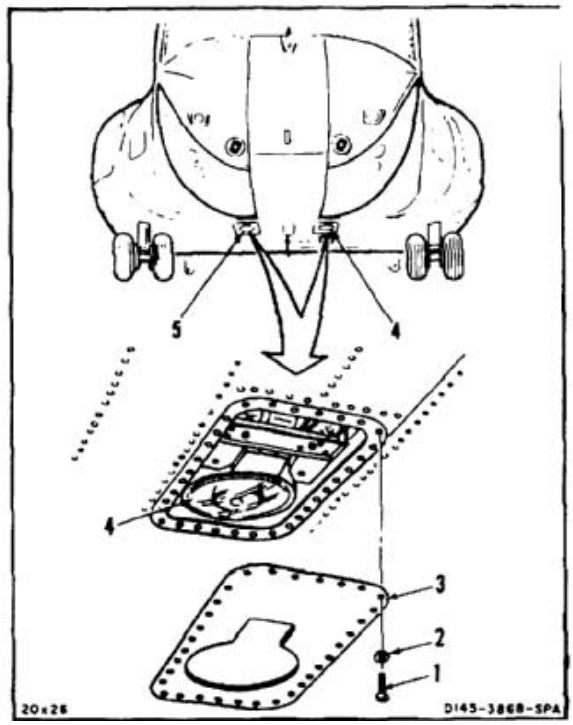


11-74 REMOVE COPILOT'S COCKPIT CONTROL ASSEMBLY (Continued) 11-74

NOTE

If a crack in the connecting link or bellcrank is suspected, refer to TM 1-1520-253-23.

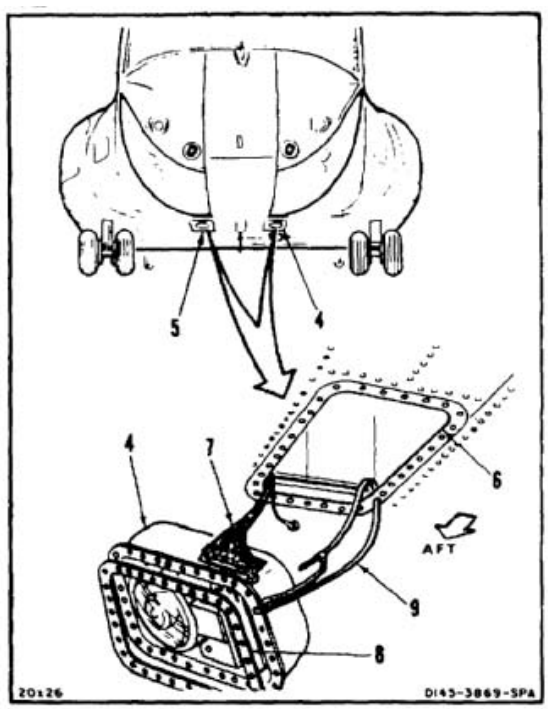
1. Remove 32 screws (1) and washers (2) from housing (3) of left landing light housing (4). Remove housing.
2. Repeat step 1 for right landing light housing (5).



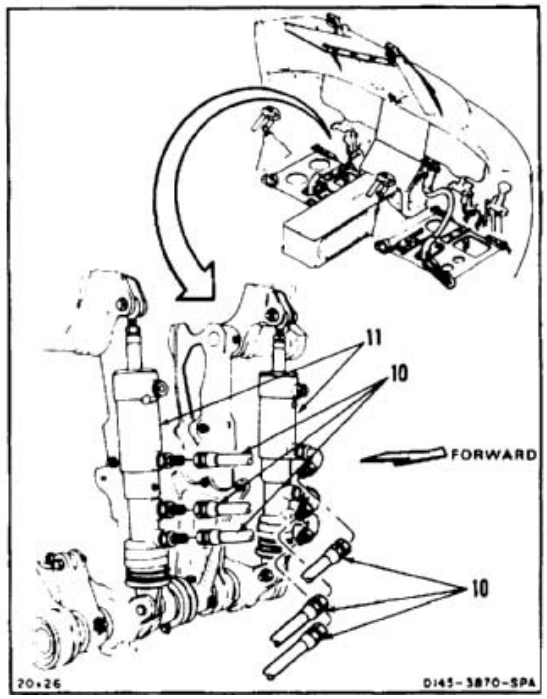
CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

3. Remove left landing light housing (4) from access (6). Support housing so it does not hang by wires (7).
4. Remove gasket (8) from housing (4).
5. Strap housing (4) to access (6) at aft end of access with strap (9). Wires (7) must not support housing. Use strap (E376).
6. Repeat steps 3, 4, and 5 for right landing light housing (5).



7. Tag and disconnect six hydraulic hoses (10) from cylinders (11). Use container and cloths (E120) for spilled fluid.

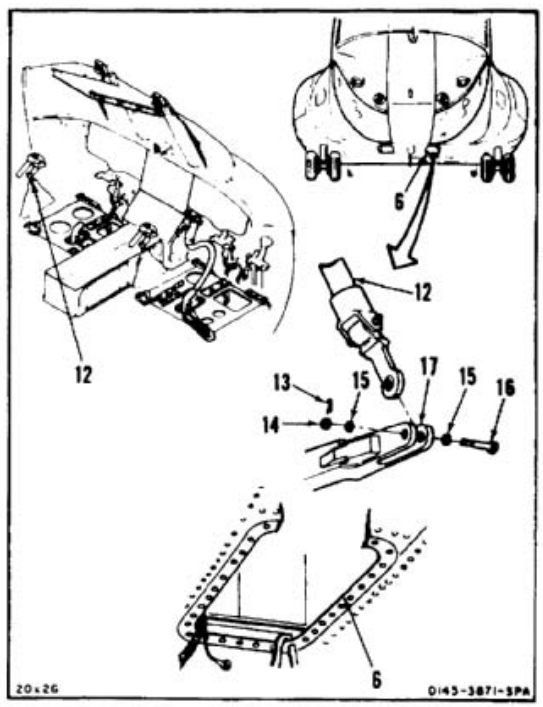


NOTE

Attaching bolt, washers, and nut will be temporarily installed after links are removed.

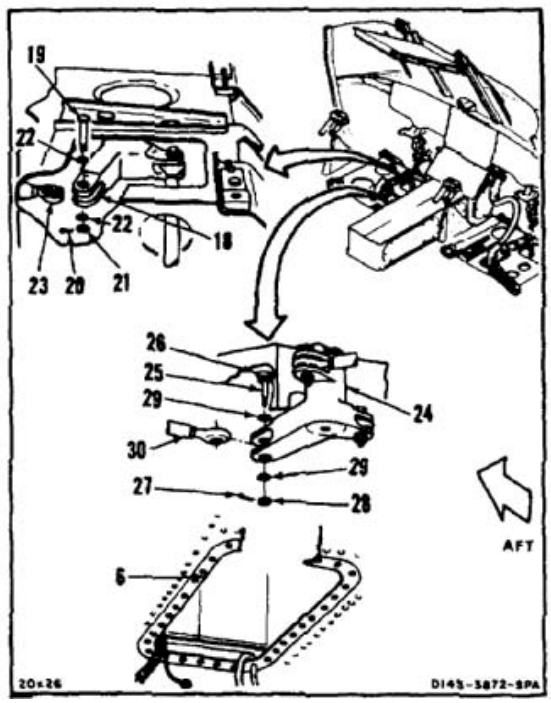
DISCONNECT THRUST CONTROL

8. Have helper in cockpit set thrust control (12) fully down.
9. Working through left access (6), remove cotter pin (13), nut (14), two washers (15), and bolt (16) from bellcrank (17).
10. Disconnect control (12) from bellcrank (17). Have helper in cockpit set control fully up and secure up. Use strap (E376).
11. Install bolt (16), two washers (15), and nut (14) in bellcrank (17).

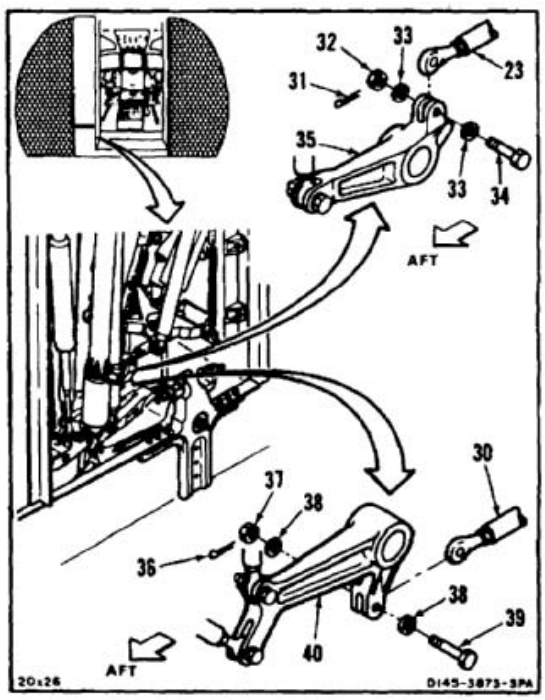


REMOVE YAW AND ROLL TRANSFER CONNECTING LINKS

12. Move bellcrank (18) for access to bolt (19). Remove cotter pin (20), nut (21), two washers (22), and bolt from bellcrank.
13. Tag and disconnect yaw connecting link (23) from bellcrank (19).
14. Install bolt (19), two washers (22), and nut (21) in bellcrank (18).
15. Move bellcrank (24) to align bolt (25) and hole (26). Have helper in cockpit hold bolt (25).
16. Working through left access (6) remove cotter pin (27), nut (28), two washers (29), and bolt (25).
17. Tag and disconnect roll connecting link (30) from bellcrank (24).
18. Install bolt (25), two washers (29), and nut (28) in bellcrank (24).

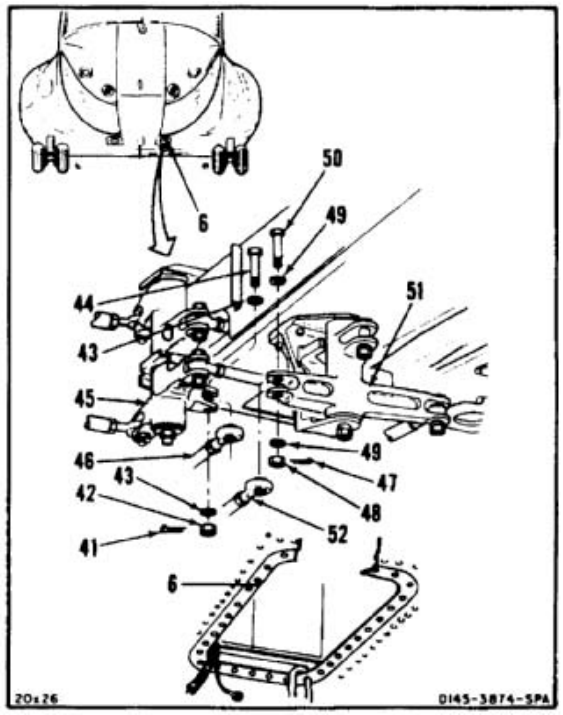


19. Working from passageway, remove cotter pin (31), nut (32), two washers (33), and bolt (34) from bellcrank (35).
20. Remove yaw link (23) from bellcrank (35). Slide link fully aft.
21. Install bolt (34), two washer (33), and nut (32) in bellcrank (35).
22. Remove cotter pin (36), nut (37), two washers (38), and bolt (39) from bellcrank (40).
23. Remove roll link (30) from bellcrank (40). Slide link about **10 inches** aft.
24. Install bolt (39), two washers (38), and nut (37) in bellcrank (40).



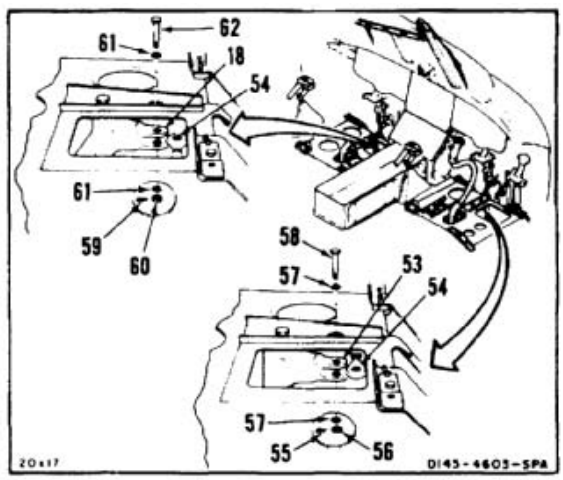
DISCONNECT PITCH AND THRUST TRANSFER CONNECTING LINKS

25. Working through left access (6), remove cotter pin (41), nut (42), two washers (43), and bolt (44) from bellcrank (45).
26. Tag and disconnect thrust connecting link (46) from bellcrank (45).
27. Install bolt (44), two washers (43), and nut (42) in bellcrank (45).
28. Remove cotter pin (47), nut (48) two washers (49), and bolt (50) from bellcrank (51).
29. Tag and disconnect pitch connecting link (52) from bellcrank (51).
30. Install bolt (50), two washers (49), and nut (46) in bellcrank (51).



REMOVE YAW CONNECTING LINK

31. Move bellcrank (53) for access to link (54).
32. Tag yaw connecting link (54). Remove cotter pin (55), nut (56), two washers (57) and bolt (58) from bellcrank (53). Disconnect link.
33. Move bellcrank (18) for access to link (54).
34. Remove cotter pin (59), nut (60), two washers (61), and bolt (62) from bellcrank (18). Disconnect link (54) from bellcrank. Slide link fully right.
35. Install two bolts (58 and 62), four washers (57 and 61) and two nuts (56 and 60) in bellcranks (53 and 18).



REMOVE ROLL CONNECTING LINK

36. Have helper in cockpit hold bolt (63). Working through right access (64), remove cotter pin (65), nut (66), and washer (67) from bolt.

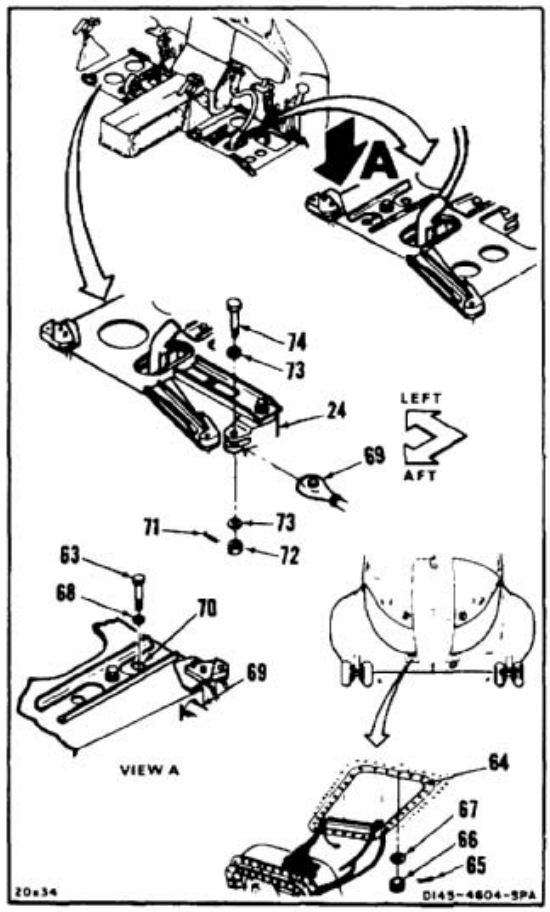
37. Remove bolt (63) and washer (68). Tag and disconnect roll connecting link (69) from bellcrank (70).

38. Install bolt (63), two washers (68 and 67) and nut (66) in bellcrank (70).

39. Remove cotter pin (71), nut (72), two washers (73), and bolt (74) from bellcrank (24).

40. Disconnect link (69) from bellcrank (24). Move link aft, and slide fully right.

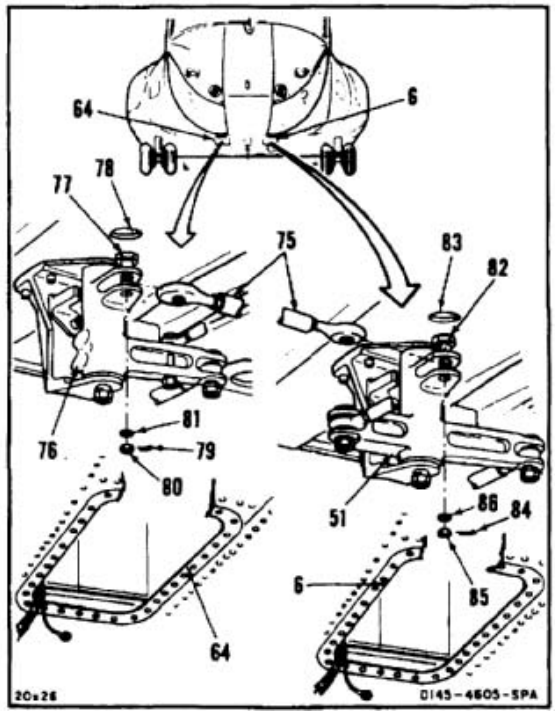
41. Install bolt (74), two washers (73), and nut (72) in bellcrank (24).



11-74 REMOVE COPILOT'S COCKPIT CONTROL ASSEMBLY (Continued) 11-74

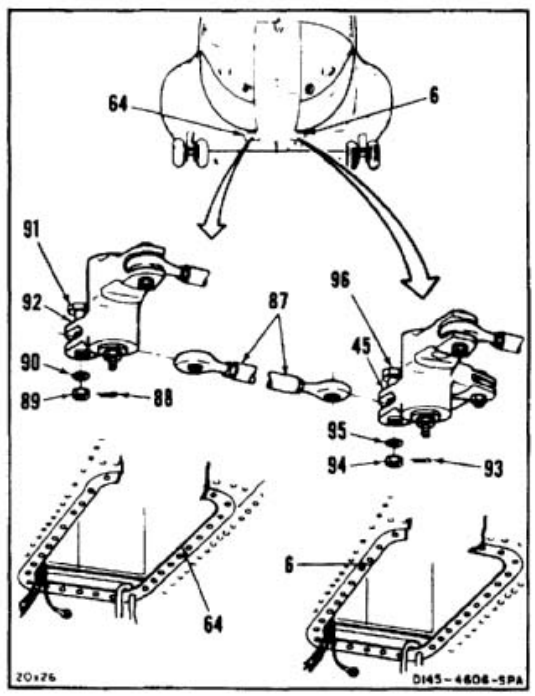
REMOVE PITCH CONNECTING LINK

42. Working through right access (64), tag pitch connecting link (75).
43. Position bellcrank (76) to align bolt (77) and hole (78).
44. Remove cotter pin (79), nut (80), and washer (81) from bolt (77).
45. Lift bolt (77) to release link (75). Disconnect link from bellcrank (76).
46. Install bolt (77), washer (81), and nut (80) in bellcrank (76).
47. Working through left access (6) position bellcrank (51) to align bolt (82) and hole (83).
48. Remove cotter pin (84), nut (85), and washer (86) from bolt (82).
49. Lift bolt (82) to release link (75). Disconnect link from bellcrank (51). Remove link.
50. Install bolt (82), washer (86), and nut (85) in bellcrank (51).



REMOVE THRUST CONNECTING LINK

51. Working through right access (64), tag thrust connecting link (87).
52. Remove cotter pin (88), nut (89), and washer (90) from bolt (91) in bellcrank (92).
53. Lift bolt (91) to release link (87). Disconnect link from bellcrank (92).
54. Install bolt (91), washer (90), and nut (89) in bellcrank (92).
55. Working through left access (6) remove cotter pin (93), nut (94), and washer (95) from bolt (96) in bellcrank (45).
56. Lift bolt (96) to release link (87). Disconnect link from bellcrank (45). Remove link.
57. Install bolt (96), washer (95), and nut (94) in bellcrank (45).



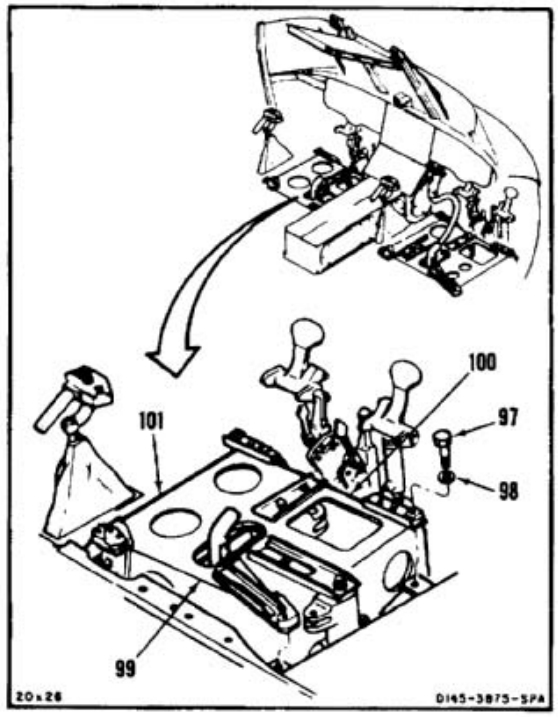
REMOVE CONTROL ASSEMBLY

58. Remove four bolts (97) and washers (98) from control assembly (99).

WARNING

Control assembly weighs about **50 pounds**. Do not drop assembly; otherwise, injury to personnel or damage to equipment could occur.

59. Slide assembly (99) forward about **6 inches**. Lift forward end (100) about **6 inches**, and tilt left side (101) down. With help from helper, remove assembly.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-75 DISASSEMBLE PILOT'S COCKPIT CONTROL ASSEMBLY 11-75

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Retaining Ring Pliers
Gun Heater

Materials:

Paper Tags (E264)

Personnel Required:

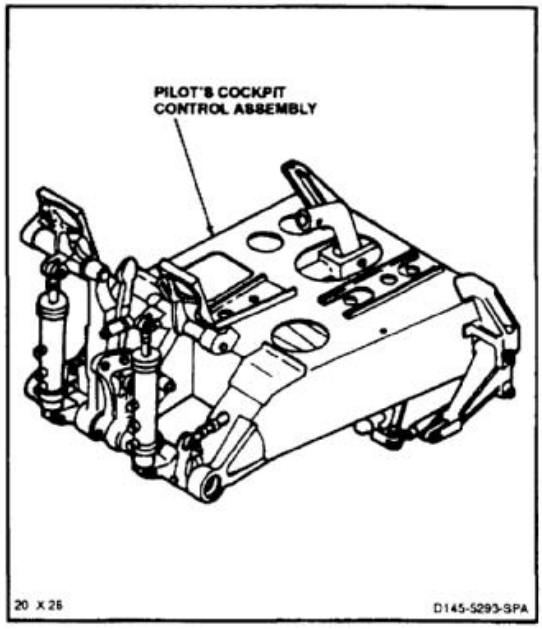
Medium Helicopter Repairer
Aircraft Structural Repairer

References:

TM 1-1520-253-23

Equipment Condition:

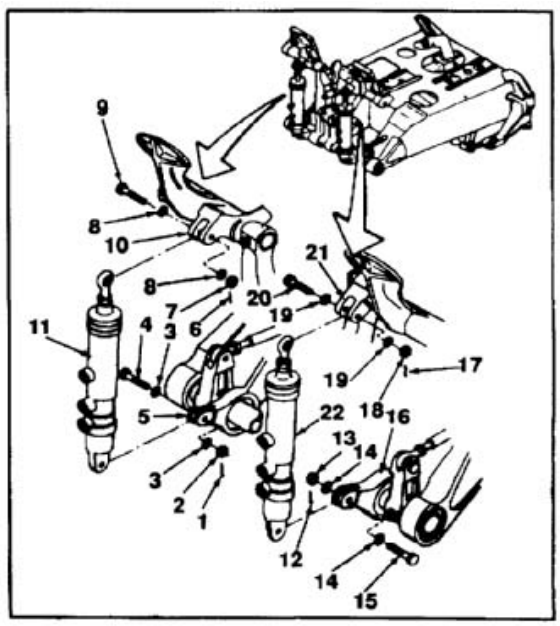
Off Helicopter Task



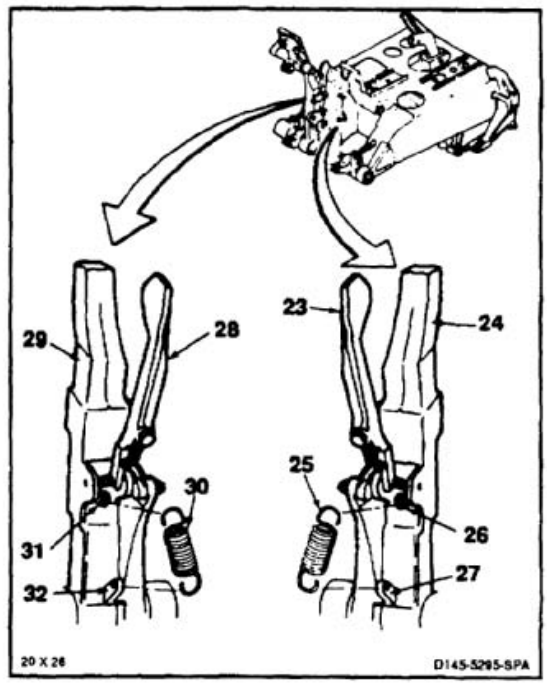
NOTE

If a crack in the connecting link, bellcrank, or support is suspected during disassembly, refer to TM 1-1520-253-23.

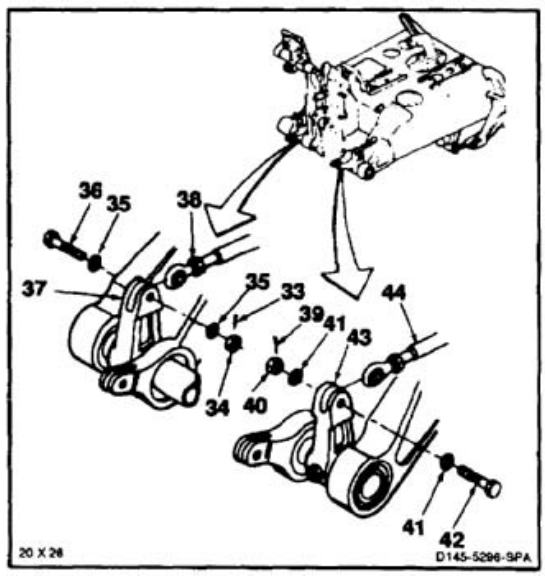
1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from support arm (5).
2. Remove cotter pin (6), nut (7), two washers (8), and bolt (9) from pedal (10). Remove cylinder (11).
3. Remove cotter pin (12), nut (13), two washers (14), and bolt (15) from support arm (16).
4. Remove cotter pin (17), nut (18), two washers (19), and bolt (20) from pedal (21). Remove cylinder (22).



5. Push lever (23) to release post (24). Set post fully aft.
6. Disconnect spring (25) from bolt (26) of post (24) and arm (27). Remove spring.
7. Push lever (28) to release post (29). Set post fully aft.
8. Disconnect spring (30) from bolt (31) of post (29) and arm (32). Remove spring.

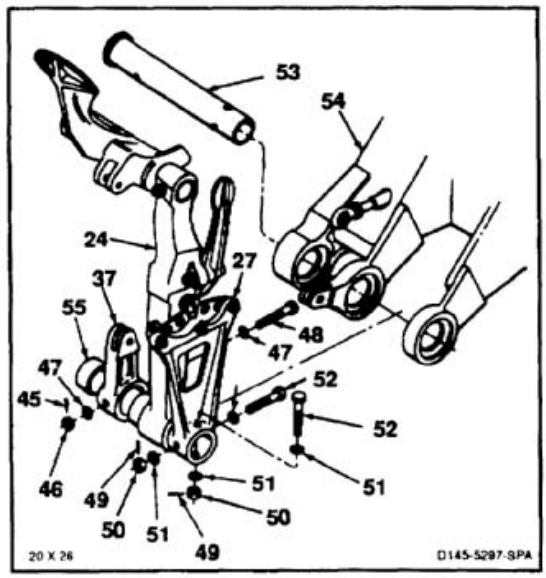


9. Remove cotter pin (33), nut (34), two washers (35), and bolt (36) from pedal arm (37).
10. Tag and disconnect right yaw link (38) from arm (37).
11. Remove cotter pin (39), nut (40), two washers (41), and bolt (42) from pedal arm (43).
12. Tag and disconnect left yaw link (44) from arm (43).

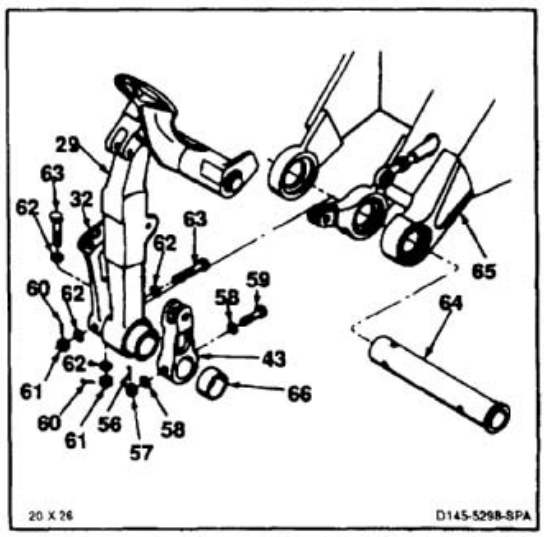


DISASSEMBLE PEDALS, ARMS AND SUPPORT

13. Remove cotter pin (45), nut (46), two washers (47), and bolt (48) from arm (37).
14. Remove two cotter pins (49), two nuts (50), four washers (51), and two bolts (52) from arm (27).
15. Pry bushing (53) from support (54). Slide out bushing to release arm (27), post (24), arm (37), and spacer (55). Remove two arms, post, and spacer as a unit. Tag arm (37).
16. Tag and remove bushing (53) from support (54).

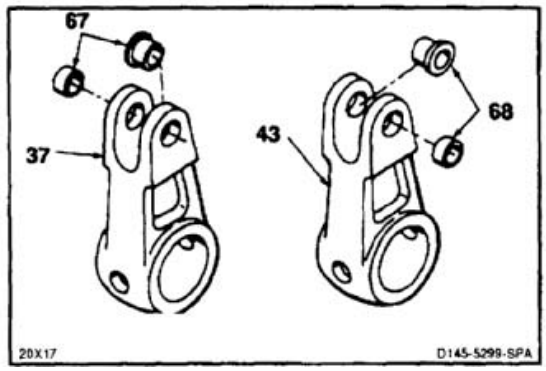


17. Remove cotter pin (56), nut (57), two washers (58), and bolt (59) from arm (43).
18. Remove two cotter pins (60), two nuts (61), four washers (62), and two bolts (63) from arm (32).
19. Pry bushing (64) from support (65). Slide out bushing to release arm (32) and post (29), arm (43), and spacer (66). Remove two arms, post, and spacer as a unit. Tag arm (43).
20. Tag and remove bushing (64) from support (65).



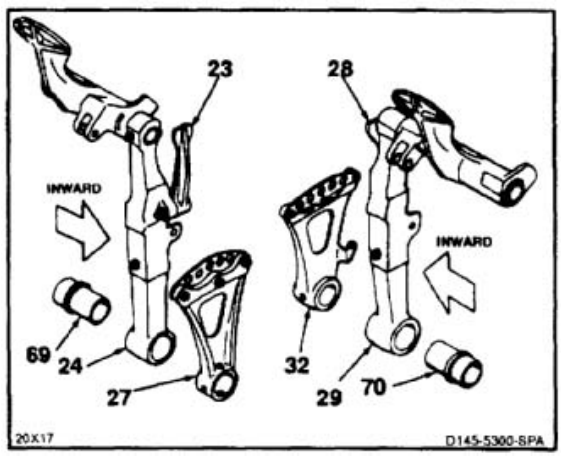
DISASSEMBLE LEFT AND RIGHT ARMS

21. Remove two bushings (67) from arm (37).
22. Remove two bushings (68) from arm (43).

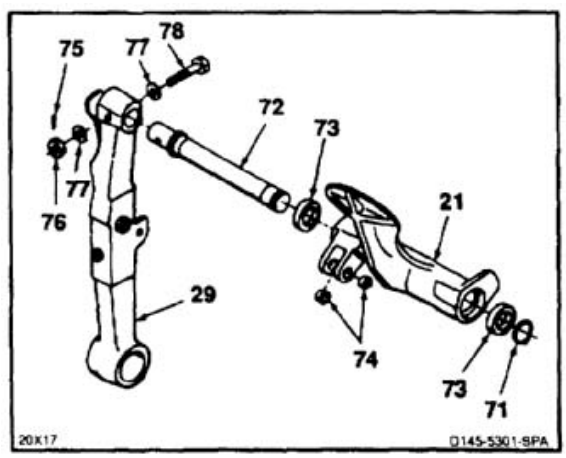


DISASSEMBLE LEFT AND RIGHT ARMS AND PEDALS

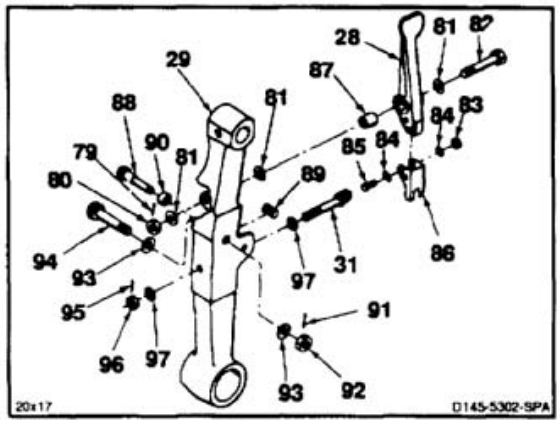
23. Push lever (23) inward to release post (24). Remove arm (27) from post.
24. Remove spacer (69) from post (24). Use gun heater.
25. Push lever (28) inward to release post (29). Remove arm (32).
26. Remove spacer (70) from post (29). Use gun heater.



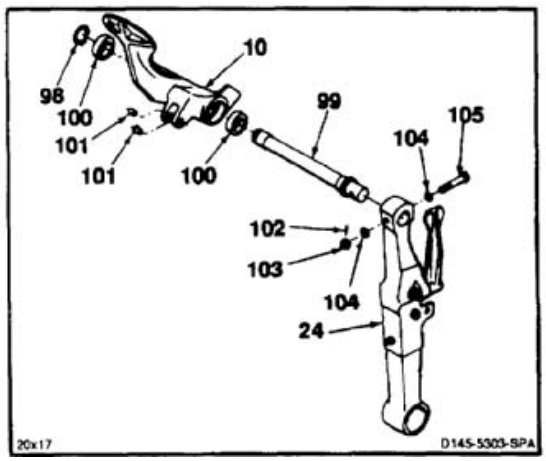
27. Remove retainer (71) from shaft (72). Use retaining ring pliers.
28. Slide left pedal (21) from shaft (72).
29. Remove two bearings (73) and two bushings (74) from pedal (21).
30. Remove cotter pin (75), nut (76), two washers (77), and bolt (78) from post (29). Remove shaft (72) from post. Use gun heater.



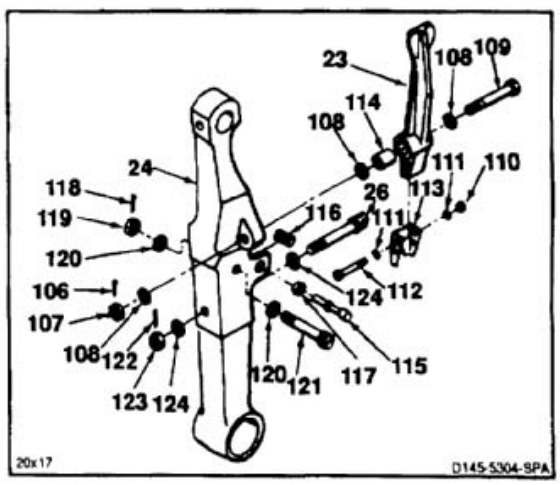
31. Remove cotter pin (79), nut (80), three washers (81), and bolt (82) from post (29). Remove lever (28).
32. Remove two nuts (83), four washers (84), and two bolts (85) from lever (28). Remove channel (86) from lever.
33. Remove bushing (87) from lever (28).
34. Remove pin (88), spring (89), and bushing (90) from post (29).
35. Remove cotter pin (91), nut (92), two washers (93), and pin (94).
36. Remove cotter pin (95), nut (96), two washers (97), and bolt (31).



37. Remove retainer (98) from shaft (99).
38. Slide right pedal (10) from shaft (99).
39. Remove two bearings (100) and two bushings (101) from pedal (10).
40. Remove cotter pin (102), nut (103), two washers (104), and bolt (105), from post (24). Remove shaft (99) from post.

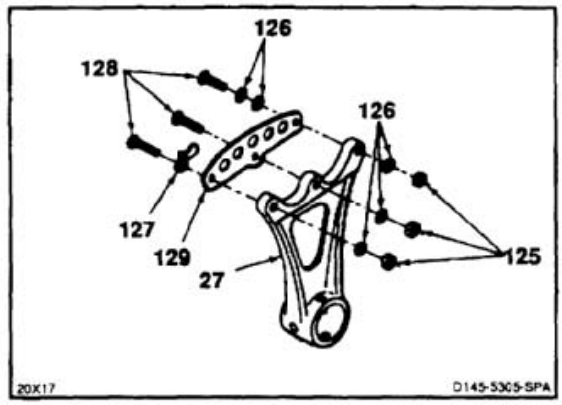


41. Remove cotter pin (106), nut (107), three washers (108), and bolt (109) from post (24). Remove lever (23) from post.
42. Remove two nuts (110), four washers (111), and two bolts (112) from lever (23). Remove channel (113) from lever.
43. Remove bushing (114) from lever (23).
44. Remove pin (115), spring (116), and bushing (117) from post (24).
45. Remove cotter pin (118), nut (119), two washers (120), and pin (121) from post (24).
46. Remove cotter pin (122), nut (123), two washers (124), and bolt (26) from post (24).

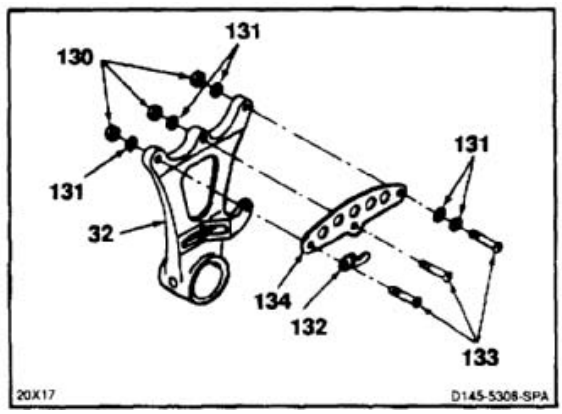


DISASSEMBLE LEFT AND RIGHT ARM ASSEMBLIES

47. Remove three nuts (125), five washers (126), stop (127), and three bolts (128) from arm (27). Remove plate (129) from arm.



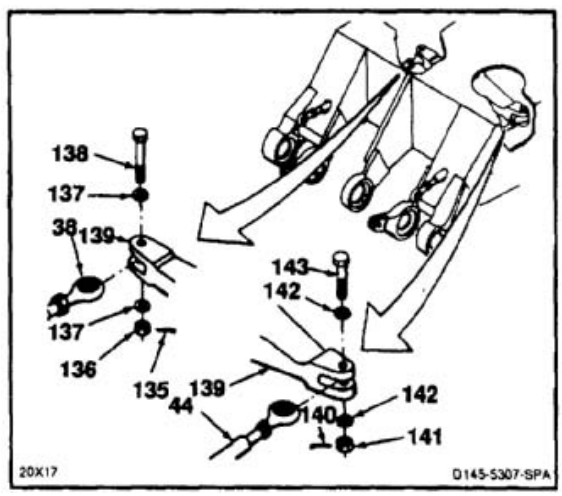
48. Remove three nuts (130), five washers (131), stop (132), and three bolts (138) from left arm (32). Remove plate (134) from arm.



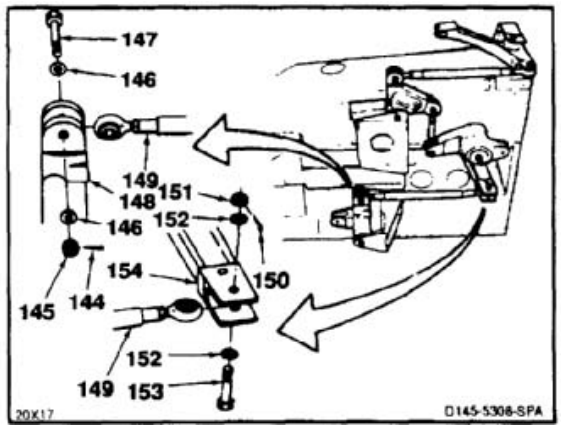
REMOVE CONNECTING LINKS

49. Remove cotter pin (135), nut (136), two washers (137), and bolt (138) from bellcrank (139). Remove link (38).

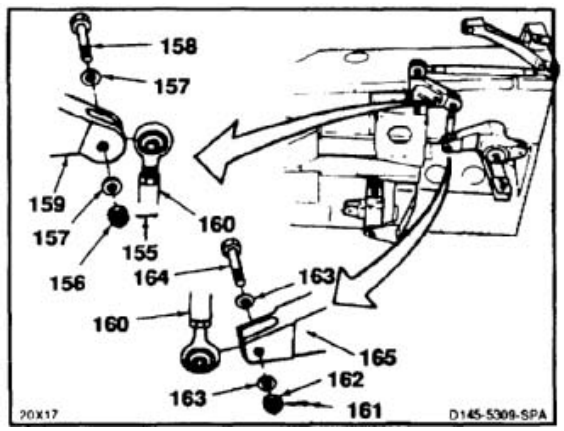
50. Remove cotter pin (140), nut (141), two washers (142), and bolt (143) from bellcrank (139). Remove link (44).



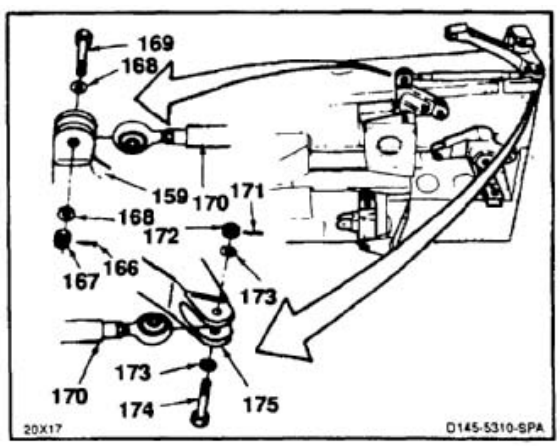
51. Remove cotter pin (144), nut (145), two washers (146), and bolt (147) from bellcrank (148).
52. Tag and disconnect pitch connecting link (149) from bellcrank (148).
53. Remove cotter pin (150), nut (151), two washers (152), and bolt (153) from socket (154). Remove link (149).



54. Remove cotter pin (155), nut (156), two washers (157), and bolt (158) from bellcrank (159).
55. Tag and disconnect thrust connecting link (160) from bellcrank (159).
56. Remove cotter pin (161), nut (162), two washers (163), and bolt (164) from bellcrank (165). Remove link (160).



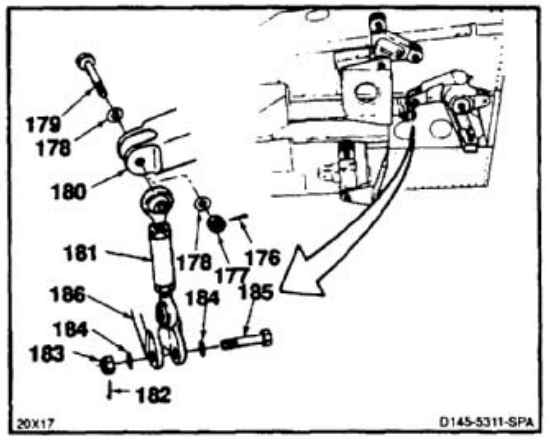
57. Remove cotter pin (166), nut (167), two washers (168), and bolt (169) from bellcrank (159).
58. Tag and disconnect thrust connecting link (170) from bellcrank (159).
59. Remove cotter pin (171), nut (172), two washers (173), and bolt (174) from bellcrank (175). Remove link (170).



60. Remove cotter pin (176), nut (177), two washers (178), and bolt (179) from bellcrank (180).

61. Tag and disconnect roll connecting link (181) from bellcrank (180).

62. Remove cotter pin (182), nut (183), two washers (184), and bolt (185) from bellcrank (186). Remove link (181).



REMOVE YAW BELLCRANK

63. Remove cotter pin (187), nut (188), two washers (189), and bolt (190) from support (191).

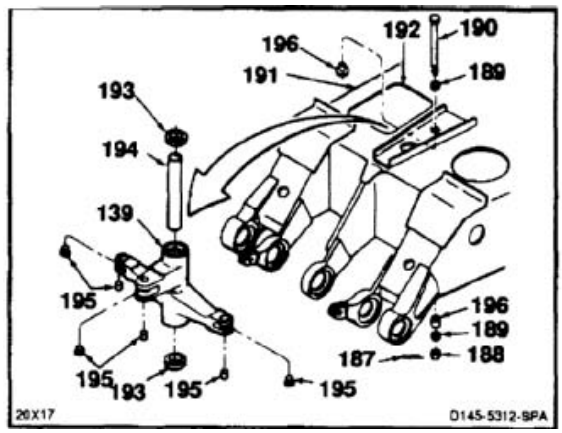
64. Tag and remove yaw bellcrank (139) from support (191) through access (192).

DISASSEMBLE YAW BELLCRANK

65. Remove two bearings (193) and spacer (194) from bellcrank (139).

66. Remove six bushings (195) from bellcrank (139).

67. Remove two bushings (196) from support (191).



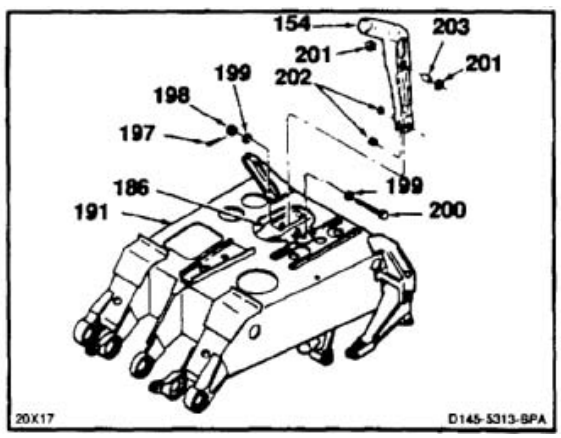
REMOVE PITCH AND ROLL INPUT BELLCRANK

68. Remove cotter pin (197), nut (198), two washers (199), and bolt (200) from bellcrank (186) in support (191).

69. Remove socket (154) from bellcrank (186).

DISASSEMBLE PITCH AND ROLL INPUT BELLCRANK

70. Remove two bearings (201), two bushings (202), and spacer (203) from socket (154).



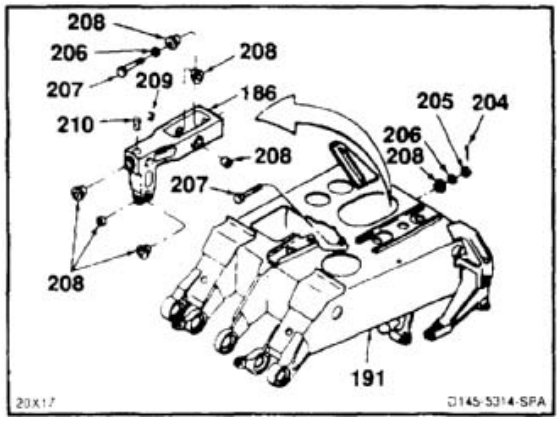
REMOVE ROLL INPUT BELLCRANK

71. Remove cotter pin (204), nut (205), two washers (206), and two bolts (207) from support (191).

72. Remove bellcrank (186) from support (191).

DISASSEMBLE ROLL INPUT BELLCRANK

73. Remove seven bushings (208), retainer (209), and nut (210) from bellcrank (186).



REMOVE THRUST INPUT BELLCRANK

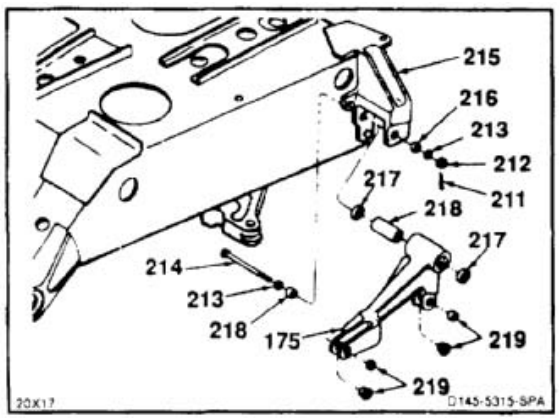
74. Remove cotter pin (211), nut (212), two washers (213), and bolt (214) from fitting (215).

75. Remove bellcrank (175).

DISASSEMBLE THRUST INPUT BELLCRANK

76. Remove two bushings (216).

77. Remove two bearings (217), spacer (218), and four bushings (219) from bellcrank (175).



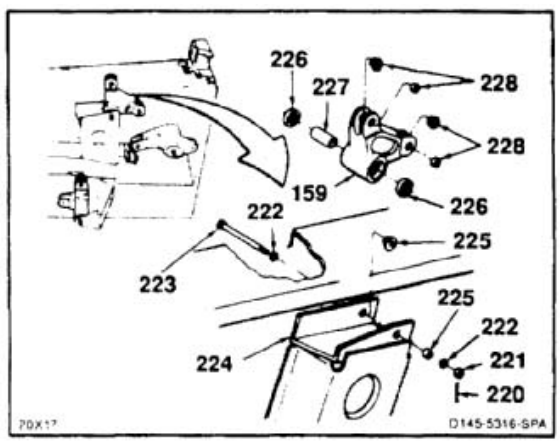
REMOVE THRUST IDLER BELLCRANK

78. Remove cotter pin (220), nut (221), two washers (222), and bolt (223) from support (224).

79. Remove bellcrank (159), and two bushings (225) from support (224).

DISASSEMBLE THRUST IDLER BELLCRANK

80. Remove two bearings (226), spacer (227), and four bushings (228) from bellcrank (159).



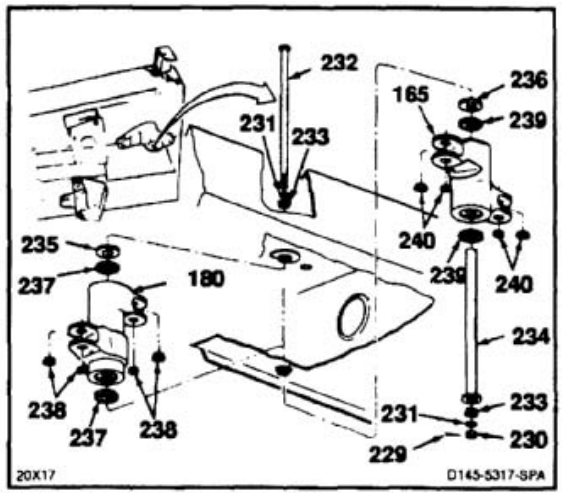
REMOVE ROLL AND THRUST TRANSFER BELLCRANKS

81. Remove cotter pin (229), nut (230), two washers (231), and bolt (232) from support (191).

82. Remove two bushings (233) from shaft (234).

83. Slide shaft (234) from bellcrank (165) to release bellcrank (180). Remove spacer (235) and bellcrank (180) from support (191).

84. Remove shaft (234), bushing (236), and bellcrank (165).



DISASSEMBLE ROLL TRANSFER BELLCRANK

85. Remove two bearings (237) and four bushings (238) from bellcrank (180).

DISASSEMBLE THRUST TRANSFER BELLCRANK

86. Remove two bearings (239) and four bushings (240) from bellcrank (165).

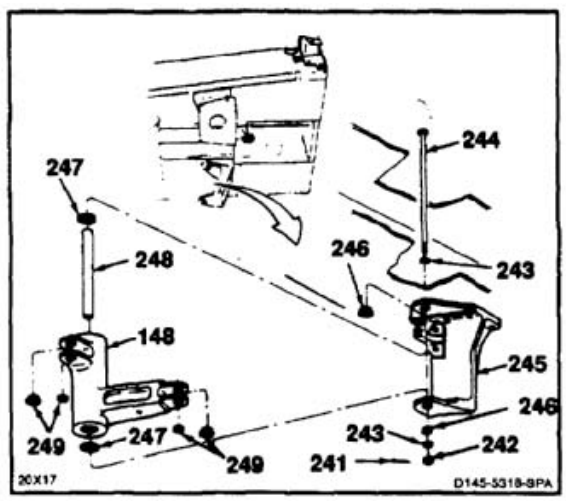
REMOVE PITCH TRANSFER BELLCRANK

87. Remove cotter pin (241), nut (24), two washers (243), and bolt (244) from support (245).

88. Remove bellcrank (148) and two bushings (246) from support (245).

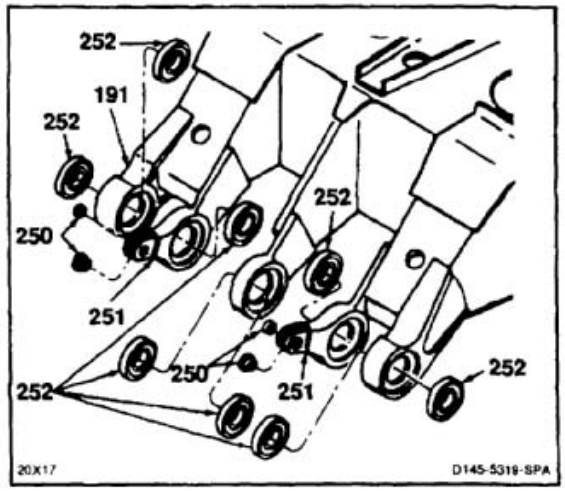
DISASSEMBLE PITCH TRANSFER BELLCRANK

89. Remove two bearings (247), spacer (248), and four bushings (249) from bellcrank (148).



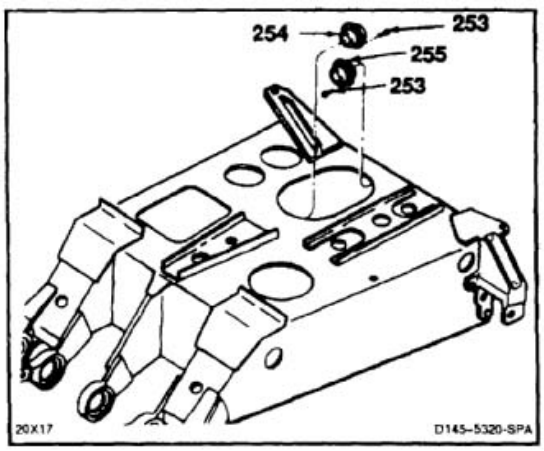
90. Remove four bushings (250) from arms (251) of support (191).

91. Remove eight bearings (252) from support (191).



92. Remove 12 rivets (253) from bearing (254). Remove bearing.

93. Remove 12 rivets (253) from bearing (255). Remove bearing.



FOLLOW ON MAINTENANCE:

None

END OF TASK

11-76 DISASSEMBLE COPILOT'S COCKPIT CONTROL ASSEMBLY 11-76

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Retaining Ring Pliers
Gun Heater

Materials:

Paper Tags (E264)

Personnel Required:

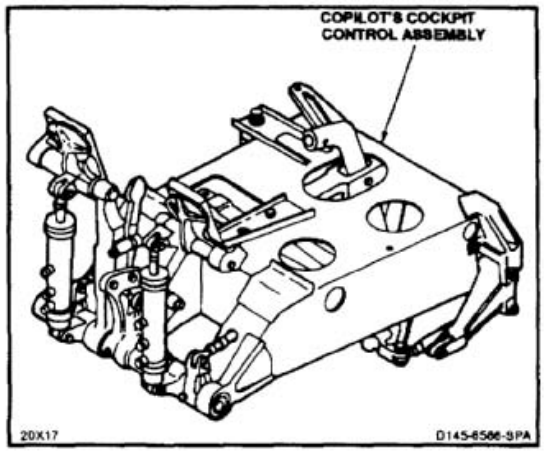
Medium Helicopter Repairer
Aircraft Structural Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Off Helicopter Task

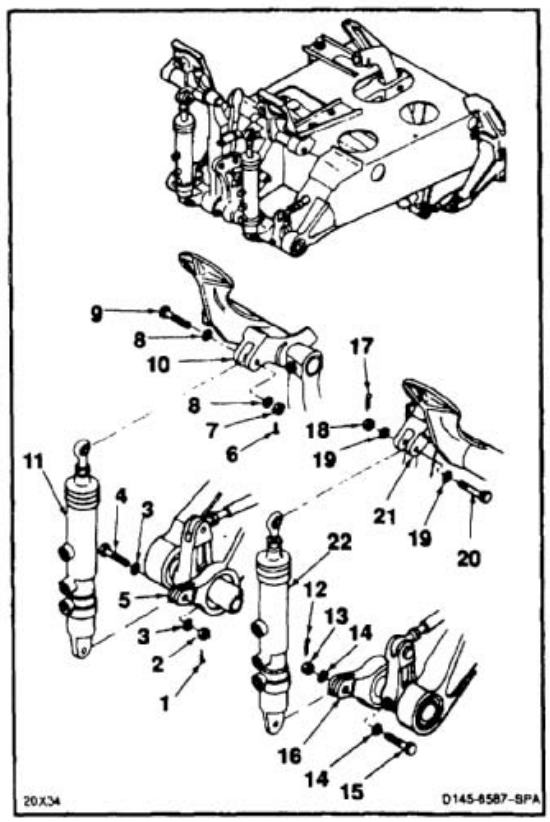


NOTE

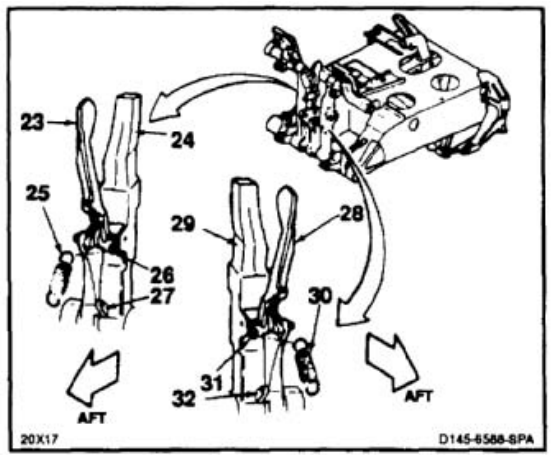
If a crack in the connecting link, bellcrank, or support is suspected during disassembly, refer to TM 1-1520-253-23.

REMOVE CYLINDERS AND PEDAL ASSEMBLIES

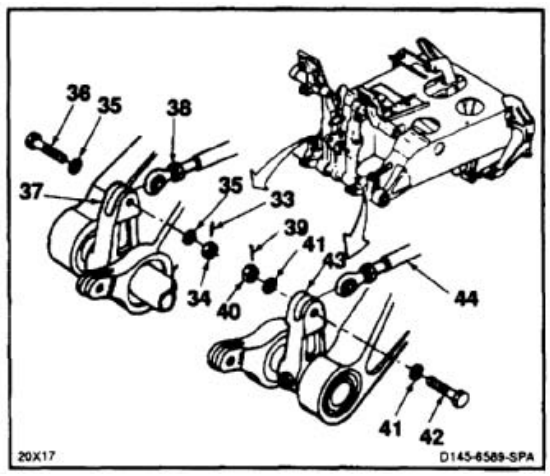
1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from support arm (5).
2. Remove cotter pin (6), nut (7), two washers (8), and bolt (9) from pedal (10). Remove cylinder (11).
3. Remove cotter pin (12), nut (13), two washers (14), and bolt (15) from support arm (16).
4. Remove cotter pin (17), nut (18), two washers (19), and bolt (20) from pedal (21). Remove cylinder (22).



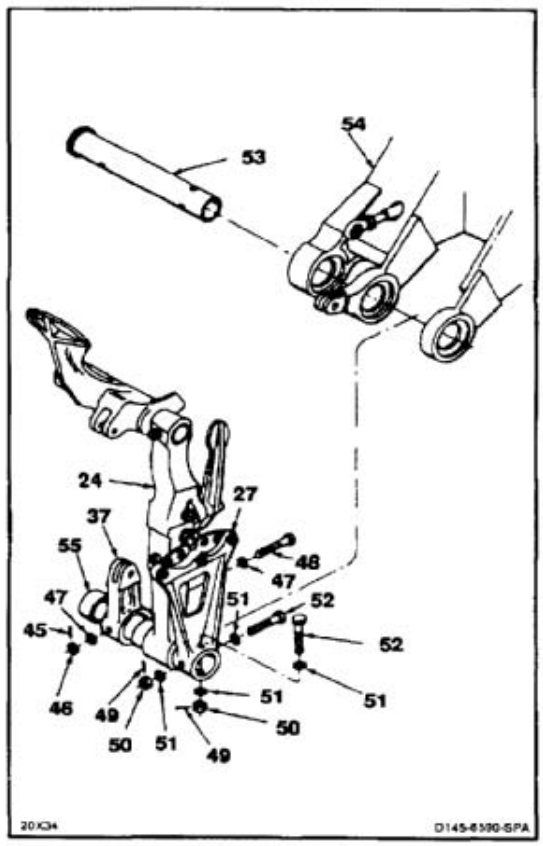
5. Push lever (23) to release post (24). Set post fully aft.
6. Disconnect spring (25) from bolt (26), of post (24), and right arm (27). Remove spring.
7. Push lever (28) to release post (29). Set post fully aft.
8. Disconnect spring (30) from bolt (31), of post (29), and left arm (32). Remove spring.



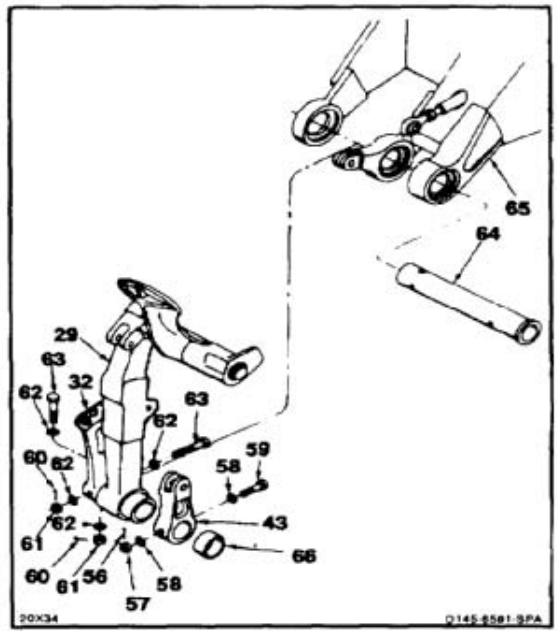
9. Remove cotter pin (33), nut (34), two washers (35), and bolt (36) from pedal arm (37).
10. Tag and disconnect right yaw link (38) from right output arm (37).
11. Remove cotter pin (39), nut (40), two washers (41), and bolt (42) from pedal left output arm (43).
12. Tag and disconnect left yaw link (44) from arm (43).



13. Remove cotter pin (45), nut (46), two washers (47), and bolt (48) from arm (37).
14. Remove two cotter pins (49), two nuts (50), four washers (51), and two bolts (52) from arm (27).
15. Pry bushing (53) from support (54). Slide out bushing to release arm (27), post (24), arm (37), and spacer (55). Remove two arms, post, and spacer as a unit. Tag arm (37).
16. Tag and remove bushing (53) from support (54).

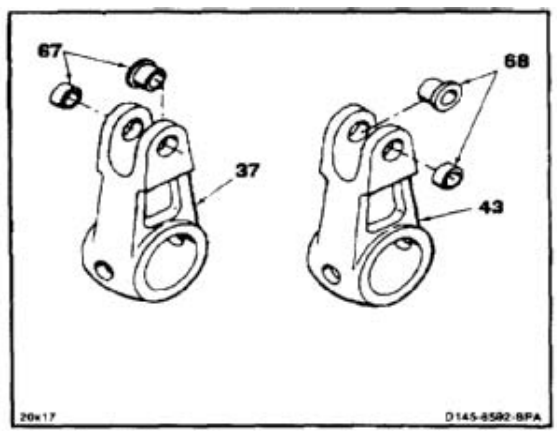


17. Remove cotter pin (56), nut (57), two washers(58), and bolt (59) from arm (43).
18. Remove two cotter pins (60), two nuts (61), four washers (62), and two bolts (63) from arm (32).
19. Pry bushing (64) from support (65). Slide bushing out to release arm (32), post (29), arm (43), and spacer (66). Remove two arms, post, and spacer as a unit. Tag arm (43).
20. Tag and remove bushing (64) from support (65).



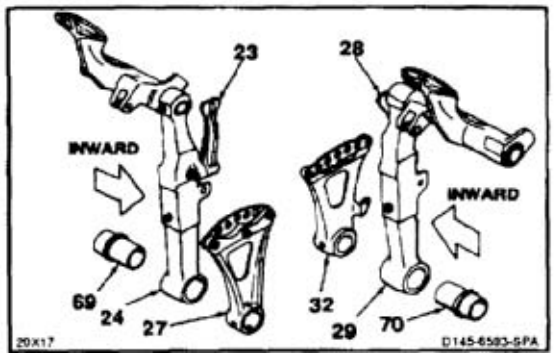
DISASSEMBLE LEFT AND RIGHT OUTPUT ARMS

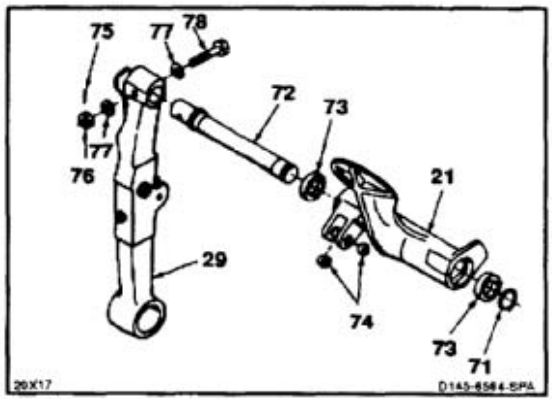
21. Remove two bushings (67) from right output arm (37).
22. Remove two bushings (68) from left output arm (43).

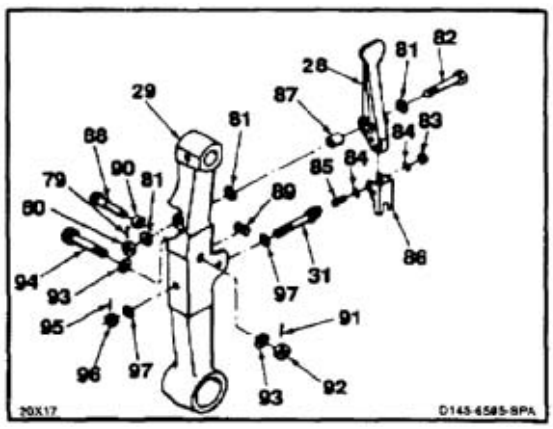


DISASSEMBLE LEFT AND RIGHT ARMS AND PEDALS

23. Push lever (23) inward to release post (24). Remove right arm (27) from post.
24. Remove spacer (69) from post (24). Use gun heater.
25. Push lever (28) inward to release post (29). Remove left arm (32).
26. Remove spacer (70) from post (29). Use gun heater.
27. Remove retainer (71) from shaft (72). Use retaining ring pliers.
28. Slide left pedal (21) from shaft (72).
29. Remove two bearings (73) and two bushings (74) from pedal (21).
30. Remove cotter pin (75), nut (76), two washers (77), and bolt (78) from post (29). Remove shaft (72) from post. Use gun heater.
31. Remove cotter pin (79), nut (80), three washers (81), and bolt (82) from post (29). Remove lever (28).
32. Remove two nuts (83), four washers (84), and two bolts (85) from lever (28). Remove channel (86) from lever.
33. Remove bushing (87) from lever (28).
34. Remove pin (88), spring (89), and bushing (90) from post (29).
35. Remove cotter pin (91), nut (92), two washers (93), and pin (94).
36. Remove cotter pin (95), nut (96), two washers (97), and bolt (31).



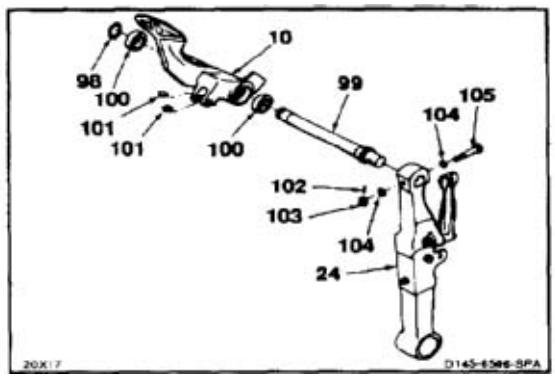


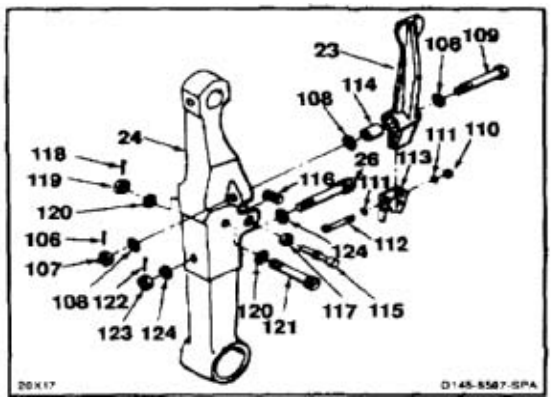


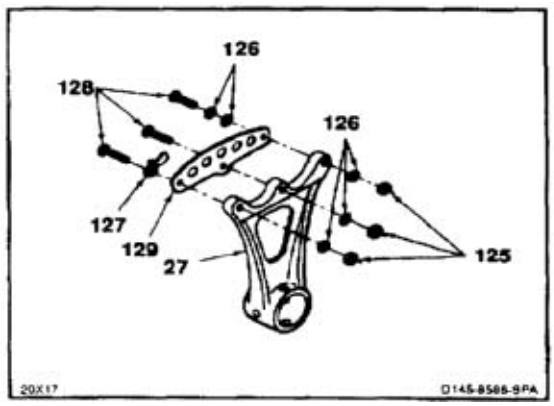
37. Remove retainer (98) from shaft (99).
38. Slide right pedal (10) from shaft (99).
39. Remove two bearings (100) and bushings (101) from pedal (10).
40. Remove cotter pin (102), nut (103), two washers (104), and bolt (105) from post (24). Remove shaft (99) from post. Use gun heater.
41. Remove cotter pin (106), nut (107), three washers (108), and bolt (109) from post (24). Remove lever (23) from post.
42. Remove two nuts (110), four washers (111), and two bolts (112) from lever (23). Remove channel (113) from lever.
43. Remove bushing (114) from lever (23).
44. Remove pin (115), spring (116), and bushing (117) from post (24).
45. Remove cotter pin (118), nut (119), two washers (120), and pin (121) from post (24).
46. Remove cotter pin (122), nut (123), two washers (124), and bolt (26) from post (24).

DISASSEMBLE LEFT AND RIGHT PEDAL ARMS

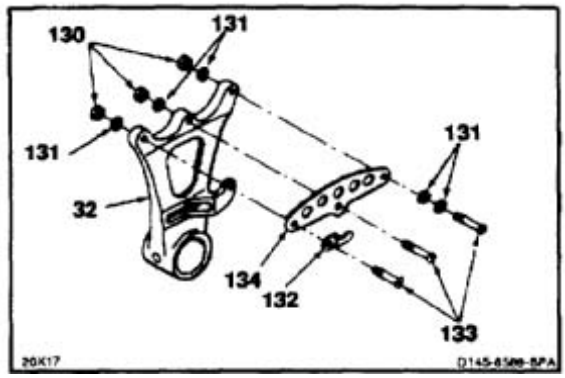
47. Remove three nuts (125), five washers (126), stop (127), and three bolts (128) from right arm (27). Remove plate (129) from arm.







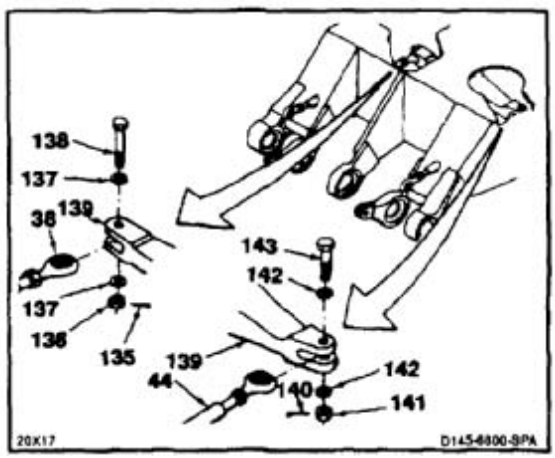
48. Remove three nuts (130), five washers (131), stop (132), and three bolts (133) from left arm (32). Remove plate (134) from arm.



REMOVE CONNECTING LINKS

49. Remove cotter pin (135), nut (136), two washers (137), and bolt (138) from bellcrank (139). Remove link (38).

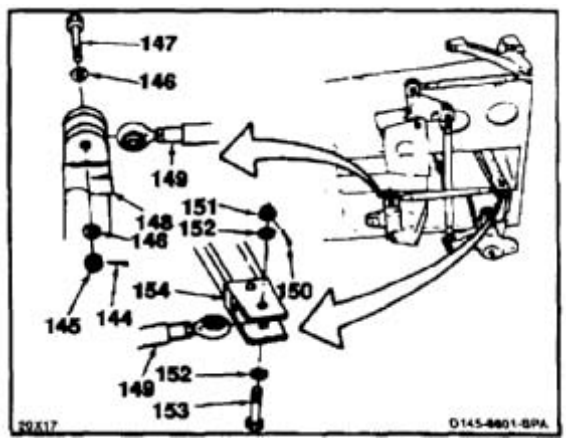
50. Remove cotter pin (140), nut (141), two washers (142), and bolt (143) from bellcrank (139). Remove link (44).



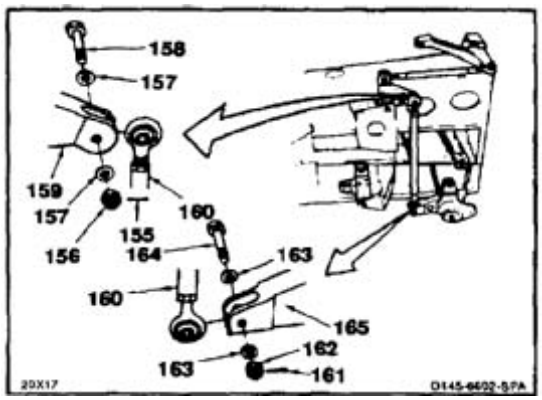
51. Remove cotter pin (144), nut (145), two washers (146), and bolt (147) from bellcrank (148).

52. Tag and disconnect pitch connecting link (149) from bellcrank (148).

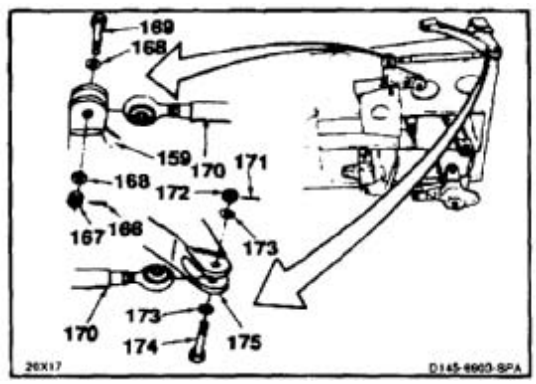
53. Remove cotter pin (150), nut (151), two washers (152), and bolt (153) from socket (154). Remove link (149).



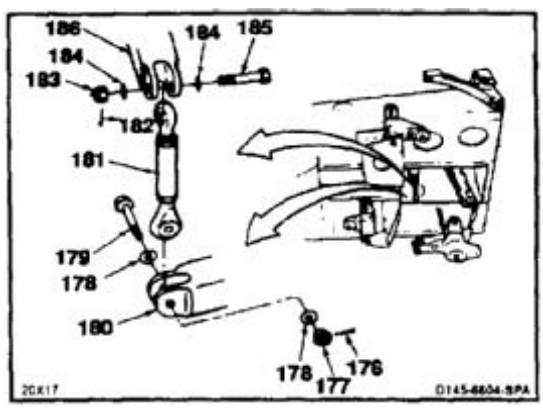
54. Remove cotter pin (155), nut (156), two washers (157), and bolt (158) from bellcrank (159).
55. Tag and disconnect thrust connecting link (160) from bellcrank (159).
56. Remove cotter pin (161), nut (162), two washers (163), and bolt (164) from bellcrank (165). Remove link (160).



57. Remove cotter pin (166), nut (167), two washers (168), and bolt (169) from bellcrank (159).
58. Tag and disconnect thrust connecting link (170) from bellcrank (159).
59. Remove cotter pin (171), nut (172), two washers (173), and bolt (174) from bellcrank (175). Remove link (170).

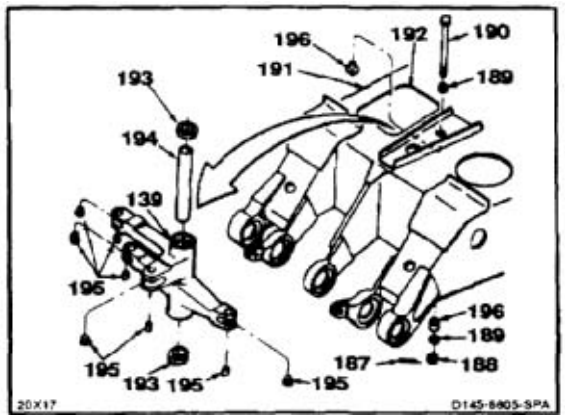


60. Remove cotter pin (176), nut (177), two washers (178), and boll (179) from bellcrank (180).
61. Tag and disconnect roll connecting link (181) from bellcrank (180).
62. Remove cotter pin (182), nut (183), two washers (184), and bolt (185) from bellcrank (186). Remove link (181).



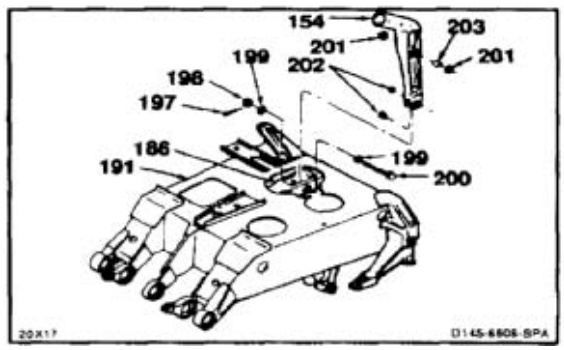
REMOVE AND DISASSEMBLE YAW BELLCRANK

63. Remove cotter pin (187), nut (188), two washers (189), and bolt (190) from support (191).
64. Tag and remove yaw bellcrank (139) from support (191) through access (192).
65. Remove two bearings (193) and spacer (194) from bellcrank (139).
66. Remove eight bushings (196) from bellcrank (139).
67. Remove two bushings (196) from support (191).



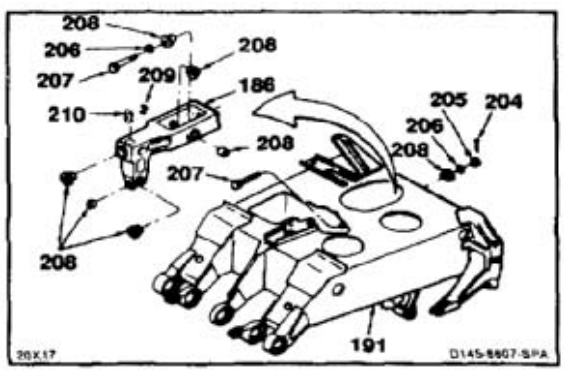
REMOVE AND DISASSEMBLE PITCH AND ROLL INPUT SOCKET

68. Remove cotter pin (197), nut (198), two washers (199), and bolt (200), from bellcrank (186) in support (191).
69. Tag and remove socket (154) from bellcrank (186).
70. Remove two bearings (201), two bushings (202), and spacer (203) from socket (154).



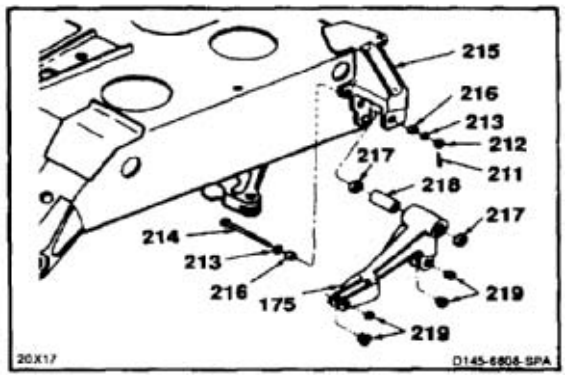
REMOVE AND DISASSEMBLE ROLL INPUT BELLCRANK

71. Remove cotter pin (204), nut (205), two washers (206), and two bolts (207) from support (191).
72. Tag and remove roll input bellcrank (186) from support (191).
73. Remove seven bushings (208), retainer (209), and nut (210) from bellcrank (186).



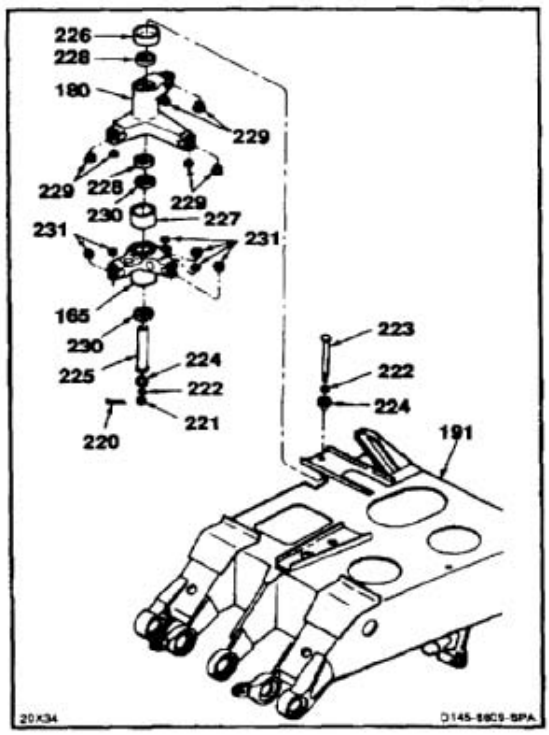
REMOVE AND DISASSEMBLE THRUST INPUT BELLCRANK

74. Remove cotter pin (211), nut (212), two washers (213), and bolt (214) from fitting (215).
75. Tag and remove thrust input bellcrank (175).
76. Remove two bushings (216).
77. Remove two bearings (217), spacer (218), and four bushings (219) from bellcrank (175).



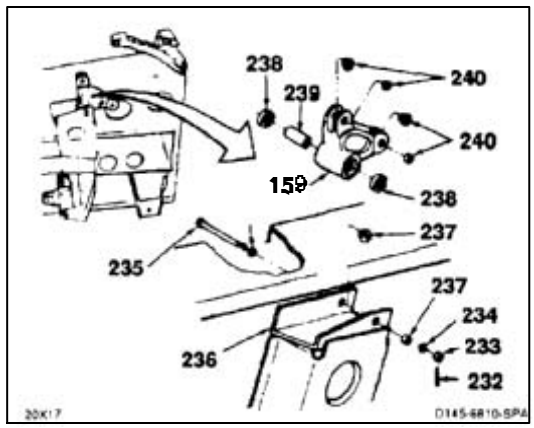
REMOVE AND DISASSEMBLE ROLL AND THRUST TRANSFER BELLCRANKS

78. Remove cotter pin (220), nut (221), two washers (222), and bolt (223) from support (191).
79. Remove two bushings (224) from shaft (225).
80. Tag roll transfer bellcrank (180). Slide shaft (225) from bellcrank (165) to release bellcrank (180). Remove spacer (226) and bellcrank (180) from support (191).
81. Tag thrust bellcrank (165). Remove shaft (225), bushing (227), and bellcrank.
82. Remove two bearings (228) and six bushings (229) from bellcrank (180).
83. Remove two bearings (230) and six bushings (231) from bellcrank (165).



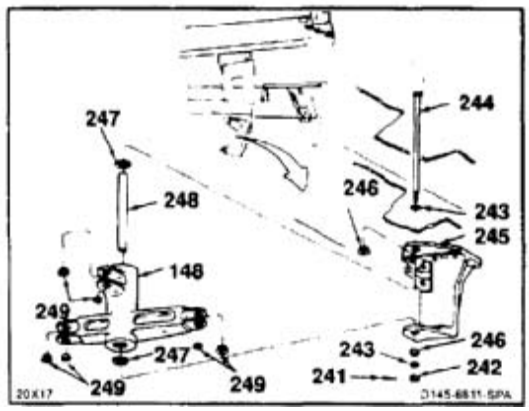
REMOVE AND DISASSEMBLE THRUST IDLER BELLCRANK

84. Remove cotter pin (232), nut (233), two washers (234), and bolt (235) from support (236).
85. Tag and remove thrust idler bellcrank (159) and two bushings (237) from support (236).
86. Remove two bearings (238), spacer (239), and four bushings (240) from bellcrank (159).



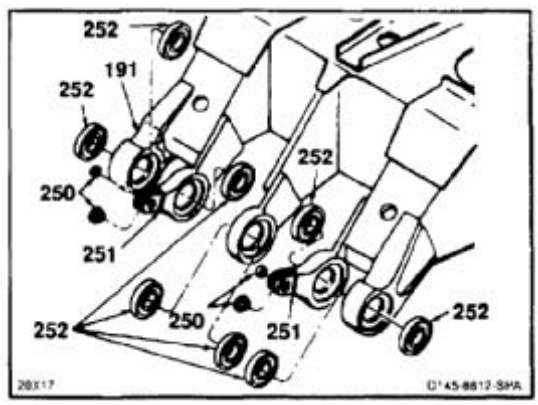
REMOVE AND DISASSEMBLE PITCH TRANSFER BELLCRANK

87. Remove cotter pin (241), nut (242), two washers (243), and bolt (244) from support (245).
88. Tag and remove pitch transfer bellcrank (148).
89. Remove two bushings (246) from support (245).
90. Remove two bearings (247), spacer (248), and six bushings (249) from bellcrank (148).



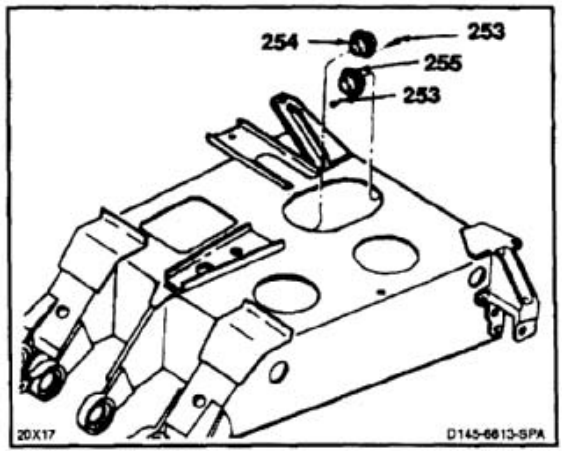
DISASSEMBLE SUPPORT

91. Remove four bushings (250) from arms (251) of support (191).
92. Remove eight bearings (252) from support (191).



93. Remove 12 rivets (253) from bearing (254). Remove bearing.

94. Remove 12 rivets (253) from bearing (255). Remove bearing.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-77 ASSEMBLE PILOT'S COCKPIT CONTROL ASSEMBLY 11-77

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Rivet Tool
Cockpit Control Bearing Installation Tool (APP E-15)
Arbor Press
Snapring Pliers
Gun-Type Heater

Materials:

Epoxy Primer (E292)
Gloves (E184.1)

Parts:

Cotter Pins
Nuts, Self-Lock
Rivets
Bearings
Bushings

Personnel Required:

Medium Helicopter Repairer
Inspector

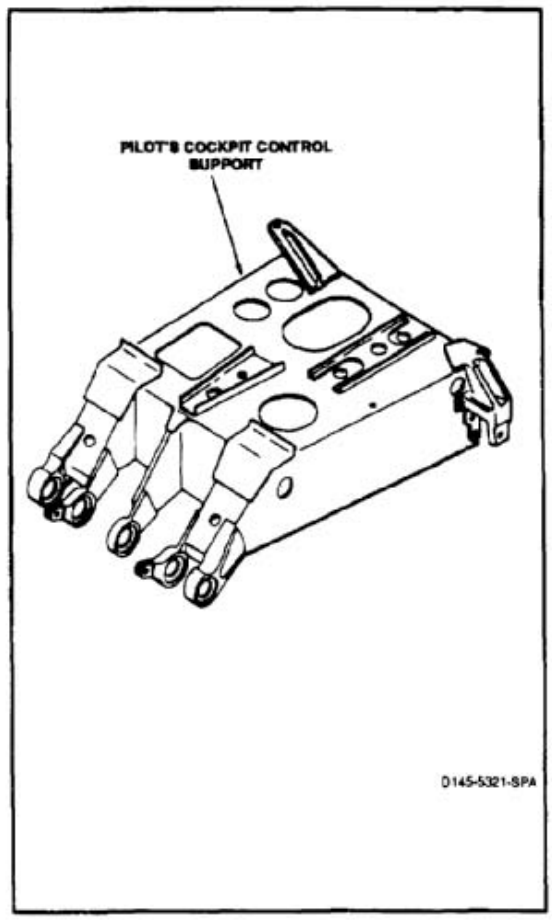
References:

TM 1-1520-253-23
TM 55-1520-240-23P
Task 11-42
Appendix E

General Safety Instructions:

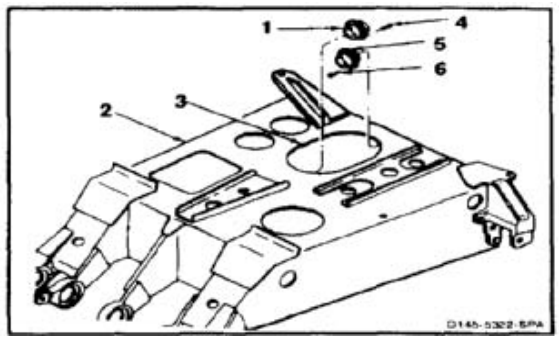
WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, and clothing in case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



NOTE

If a crack in the connecting link, bellcrank, or support is suspected during disassembly, refer to TM 1-1520-253-23.



ASSEMBLE SUPPORT

NOTE

Assemble dissimilar metals wet with epoxy primer (E292). Wear gloves (E184).

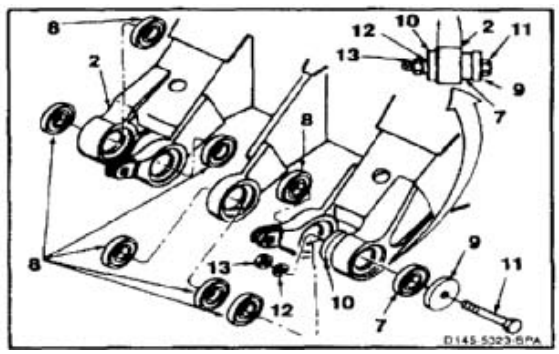
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Position bearing (1) in forward end of support (2) Work through access (3). Install 12 rivets (4).
2. Position bearing (5) in aft end of support (2). Work through access (3). Install 12 rivets (6).
3. Install bearing (7) as follows:
   a. Align bearing (dissimilar metals) (7) in support (2).
   b. Position plate (9) to bearing (7) and plate (10) to support (2). Install bolt (11), washer (12), and nut (13) through plates.

NOTE

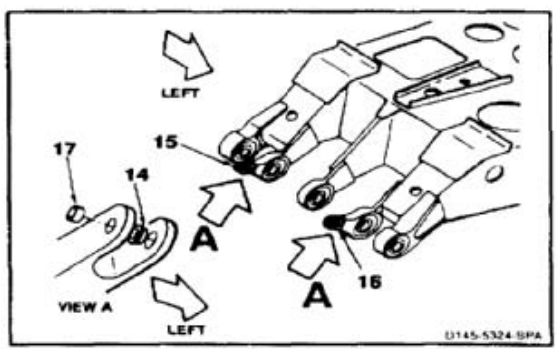
Plates, bolt and nut are part of bearing tool.

   c. Tighten nut (13) until bearing (7) bottoms in support (2).
   d. Remove nut (13), washer (12), bolt (11), and two plates (9 and 10) from support (2).
4. Repeat step 3 for remaining seven bearings (7).



5. Install two bushings (dissimilar metals) (14) flange inward, in left lugs of arms (15 and 16).
6. Install two bushings (dissimilar metals) (17) in right lug of arms (15 and 16).

INSPECT



ASSEMBLE PITCH TRANSFER BELLCRANK

7. Press bearing (dissimilar metals) (18) in pitch bellcrank (19) until it bottoms. Use arbor press.
8. Install spacer (dissimilar metals) (20) in bellcrank (19).
9. Press bearing (dissimilar metals) (21) in bellcrank (19) until it bottoms. Use arbor press.
10. Install two bushings (dissimilar metals) (22 and 23) flange inward, in upper lugs of arms (24 and 25).
11. Install two bushings (dissimilar metals) (26 and 27) in lower lugs of arms (24 and 25).

INSPECT

INSTALL PITCH TRANSFER BELLCRANK

12. Install bushing (dissimilar metals) (28) in support (29), upper arm, flange inward.
13. Install bushing (dissimilar metals) (30) in support (29) lower arm.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

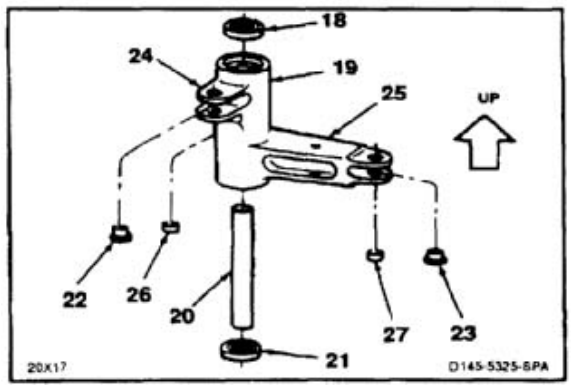
Ensure bellcrank hub bearings are serviceable and properly installed.

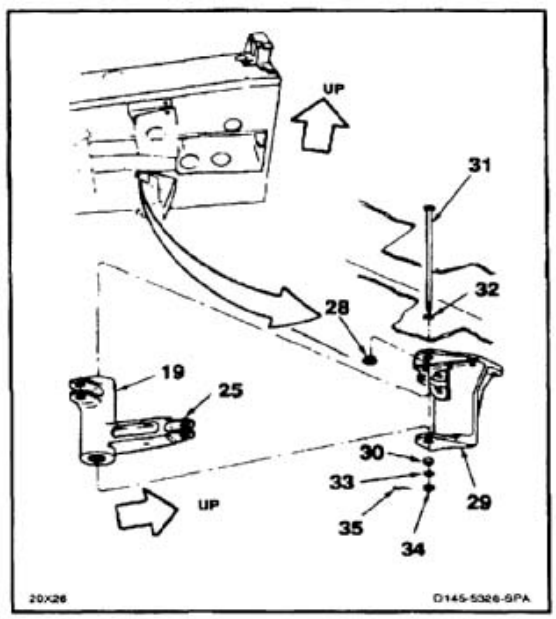
Ensure associated bushings are properly installed in the adjacent support assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

14. Position bellcrank (19) in support (29), long arm (25) up. Install bolt (31), two washers (32 and 33), and nut (34) in support.
15. Torque nut (34) to **60 to 90 inch-pounds**. Install cotter pin (35).
16. Check bolt (31). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 15.

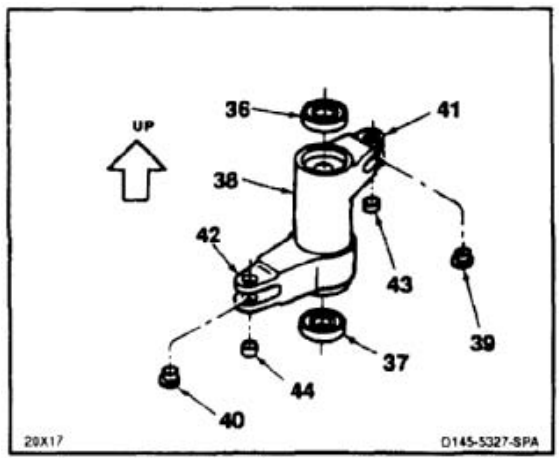




ASSEMBLE ROLL TRANSFER BELLCRANK

17. Press two bearings (dissimilar metals) (36 and 37) in bellcrank (38) until they bottom. Use arbor press.
18. Install two bushings (dissimilar metals) (39 and 40) flange inward, in upper lugs of arms (41 and 42).
19. Install two bushings (dissimilar metals) (43 and 44) in lower lugs of arms (41 and 42).

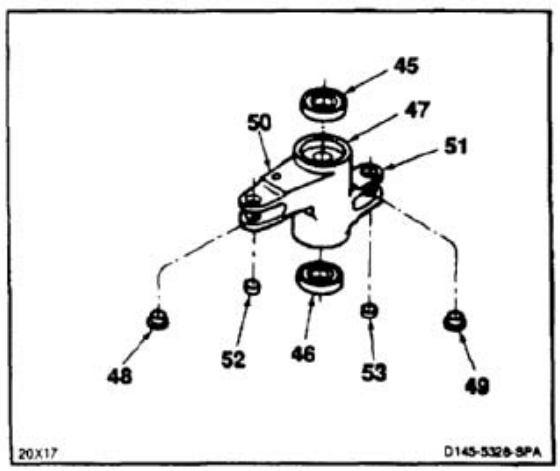
INSPECT



ASSEMBLE THRUST TRANSFER BELLCRANK

20. Press two bearings (dissimilar metals) (45 and 46) in bellcrank (47) until they bottom. Use arbor press.
21. Install two bushings (dissimilar metals) (48 and 49) flange inward, in upper lugs of arms (50 and 51).
22. Install two bushings (dissimilar metals) (52 and 53) in lower lugs of arms (50 and 51).

INSPECT



INSTALL ROLL AND THRUST TRANSFER BELLCRANKS

23. Install bushing (54) in fitting (55) of support (2).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bellcrank assembly and pivot axis hardware including shaft, spacers, plugs, and bushings, are properly installed so as not to prevent free rotation of the component.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

24. Position bellcrank (47) on fitting (55) long arm (50) down and forward.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that all associated spacers, washers, and bushings are installed.

At installation of 114CS130-1 bolt, ensure that the AN320-6 nut is tightened using proper installation procedure to prevent excess torque application to the associated bellcrank hub bearings thereby restricting free rotation of the components.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

25. Slide shaft (56) through bellcrank (47) and bushing (54) until flush with bushing.

26. Position spacer (57) on fitting (58).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

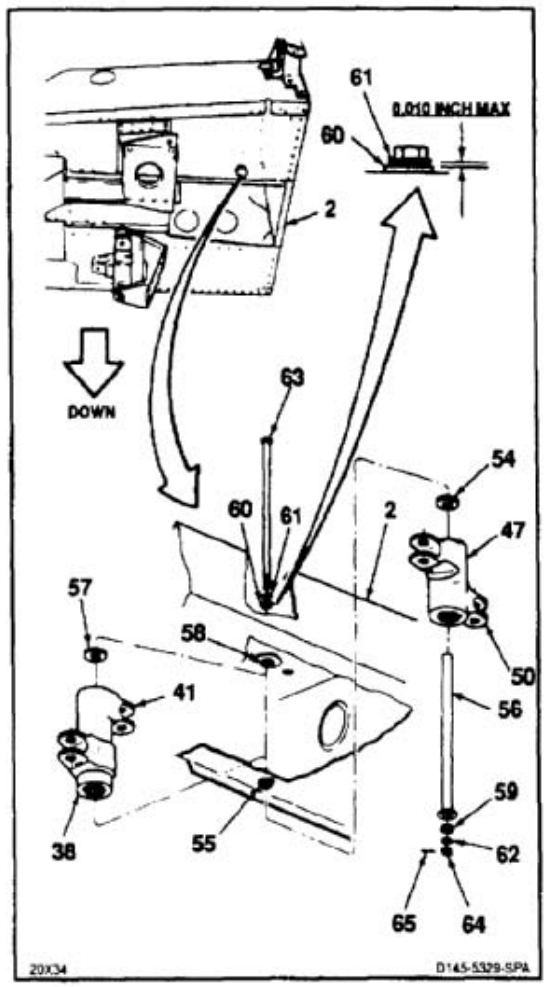
Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bellcrank assembly and pivot axis hardware including shaft, spacers, plugs, and bushings, are properly installed so as not to prevent free rotation of the component.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



27. Position bellcrank (38) on spacer (57) short arm (41) down and aft.

28. Slide shaft (56) through bellcrank (38) spacer (57), and fitting (58) until it bottoms.

29. Install two bushing (59 and 60) in shaft (56).

30. Install two washer (61 and 62), bolt (63), and nut (64) in shaft (56). Tighten nut until bellcranks (38 and 47) do not move up and down, but rotate freely. Back off nut to align cotter pin holes.

31. Check gap between washer (61) and bushing (60). Gap shall be **0.010 inch** maximum.

32. Install cotter pin (65).

ASSEMBLE THRUST IDLER BELLCRANK

33. Press bearing (dissimilar metals) (66) in bellcrank (67) until it bottoms. Use arbor press.
34. Install spacer (68) in bellcrank (67).
35. Press bearing (dissimilar metals), (69) in bellcrank (67), until it bottoms. Use arbor press.
36. Install two bushings (dissimilar metals), (70 and 71), flange inward, in lower lug of bellcrank (67).
37. Install two bushings (dissimilar metals) (72 and 73), in upper lugs of bellcrank (67).

INSPECT

INSTALL THRUST IDLER BELLCRANK

38. Install bushing (dissimilar metals) (74), flange inward, in upper arm of support (75).
39. Install bushing (76) in lower arm of support (75).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bushings are properly installed in the adjacent support assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

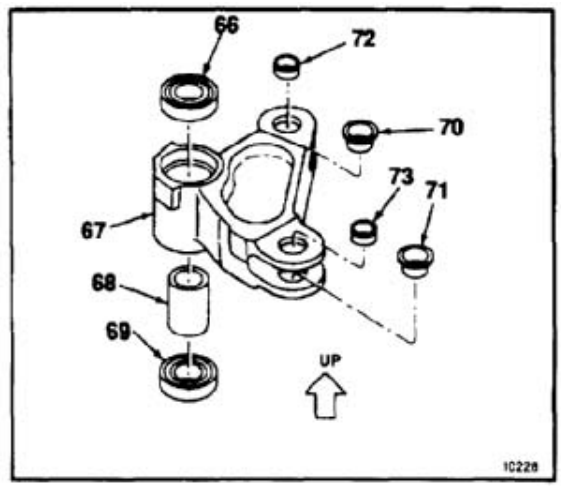
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

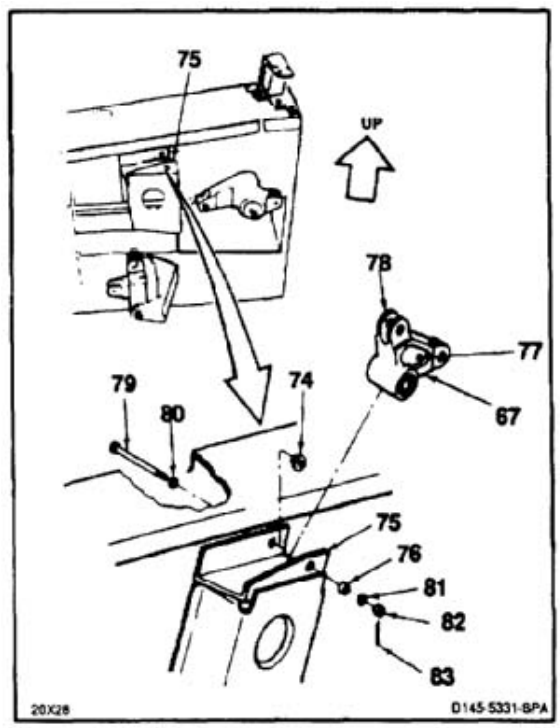
CAUTION

Bellcrank shall be positioned as indicated by marks on bellcrank; otherwise, serious damage to components can occur.

40. Position bellcrank (67) in support (75), hole (77) aft and arm (78) up.
41. Install bolt (79), two washers (80 and 81), and nut (82) in support (75).
42. Torque nut (82) to **30 inch-pounds**. Continue tightening to align cotter pin holes. Do not exceed **45 inch-pounds**. Install cotter pin (83).
43. Check bolt (79). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 42.

INSPECT

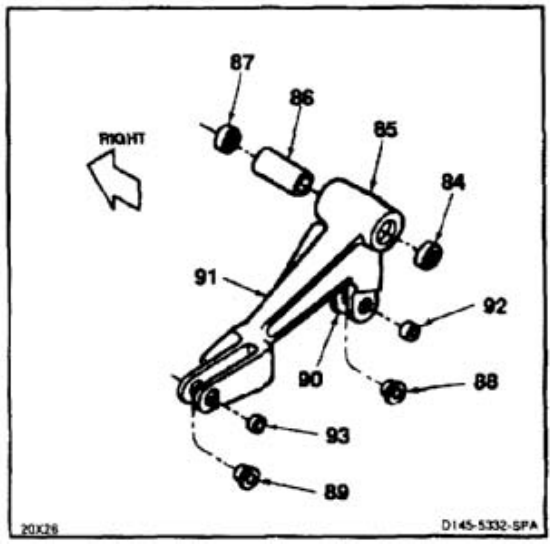




ASSEMBLE THRUST INPUT BELLCRANK

44. Press bearing (dissimilar metals) (84) in bellcrank (85) until it bottoms. Use arbor press.
45. Install spacer (dissimilar metals) (86) in bellcrank (85).
46. Press bearing (dissimilar metals) (87) in bellcrank (85) until it bottoms. Use arbor press.
47. Install two bushings (dissimilar metals) (88 and 89) flanges inward, in right lugs of arms (90 and 91).
48. Install two bushings (dissimilar metals) (92 and 93) in left lugs of arms (90 and 91).

INSPECT



INSTALL THRUST INPUT BELLCRANK

49. Install bushing (dissimilar metals) (94), flange inward, in inboard lug of fitting (95).
50. Install bushing (dissimilar metals) (96) in outboard lug of fitting (95).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

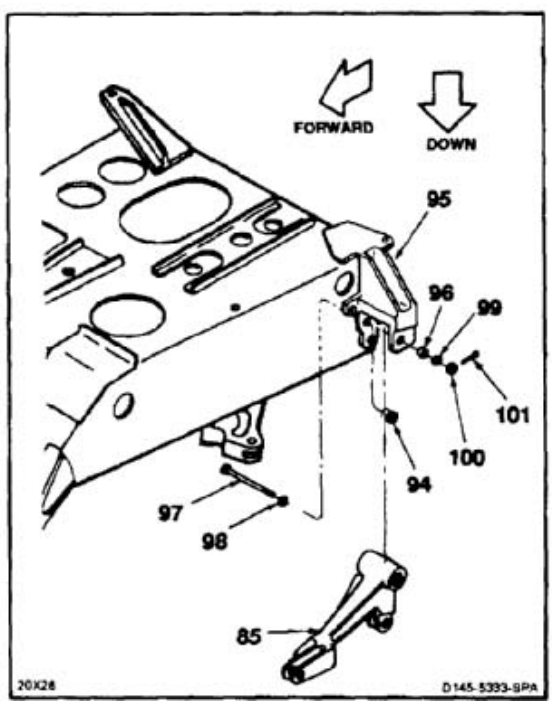
Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bushings are properly installed in the adjacent support assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

51. Position bellcrank (85) in fitting (95) long arm forward, short arm down.
52. Install bolt (97), two washers (98 and 99), and nut (100).
53. Torque nut (100) to **60 to 90 inch-pounds**. Install cotter pin (101).
54. Check bolt (97). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 53.



ASSEMBLE ROLL INPUT BELLCRANK

55. Position nut (102) in retainer (103), flat side to retainer.
56. Install nut (102) and retainer (103) in hole (104) of bellcrank (105), nut forward.
57. Install bushing (dissimilar metals) (106) in forward end of bellcrank (105).
58. Install two bushings (dissimilar metals) (107 and 108) in aft end of bellcrank (105).
59. Install bushing (dissimilar metals) (109) flange inward, in right side of bellcrank (105).
60. Install bushing (dissimilar metals) (110) in left side of bellcrank (105).
61. Install bushing (dissimilar metals) (111) flange inward, in aft lug of arm (112).
62. Install bushing (dissimilar metals) (113) in forward lug of arm (112).

INSPECT

INSTALL ROLL INPUT BELLCRANK

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

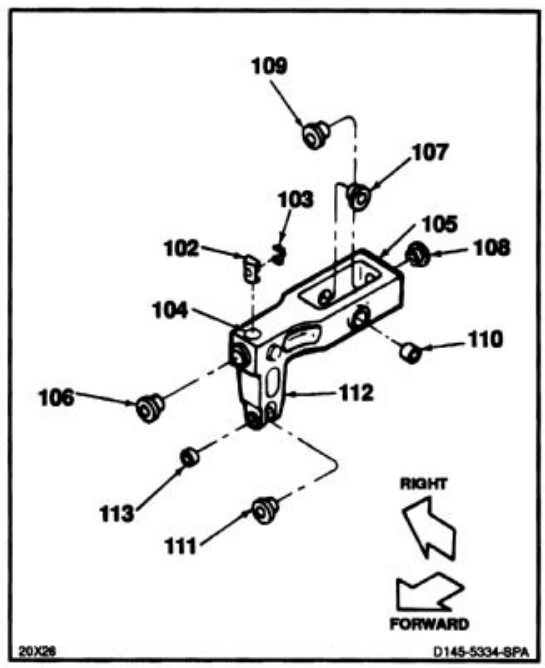
Ensure that all bushings are properly installed (including orientation) at the following locations: at the output clevis of the bellcrank, at both the forward and aft ends along the roll pivot axis, and on both sides at the pivot axis of the mating socket assembly.

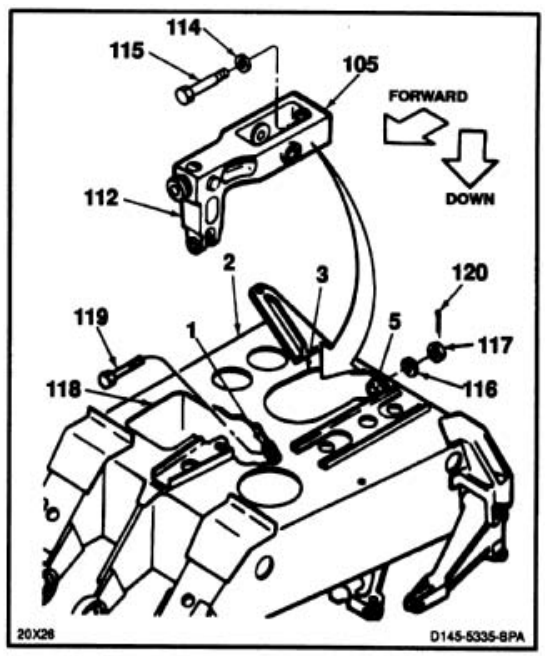
Ensure proper barrel nut and retainer are installed in cavity at forward end of the bellcrank.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

63. Working through access (3), position bellcrank (105) in support (2), arm (112) down and forward.
64. Install washer (114) and bolt (115) through aft end of bellcrank (105) and bearing (5).
65. Install washer (116) and nut (117) on bolt (115). Do not tighten nut at this time.
66. Working through access (118), slide bolt (119) through bearing (1) and install in bellcrank (105). Torque bolt to **75 inch-pounds**.
67. Torque nut (117) to **60 to 90 inch-pounds**. Install cotter pin (120).





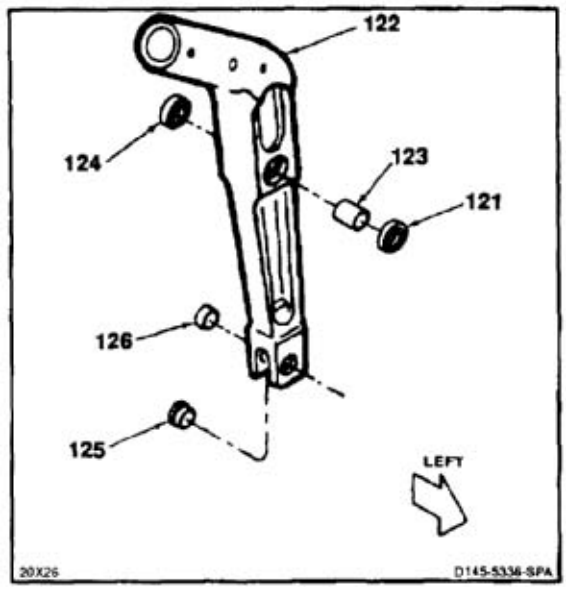
ASSEMBLE PITCH AND ROLL INPUT SOCKET

68. Press bearing (dissimilar metals) (121) in socket (122) until it bottoms. Use arbor press.

69. Install spacer (123) in socket (122). Press bearing (dissimilar metals) (124) in socket until it bottoms. Use arbor press.

70. Install bushing (dissimilar metals) (125) flange inward, in left lug of socket (122).

71. Install bushing (dissimilar metals) (126) in right lug of socket (122).



INSPECT

INSTALL PITCH AND ROLL INPUT SOCKET

WARNING

FLIGHT SAFETY PARTS

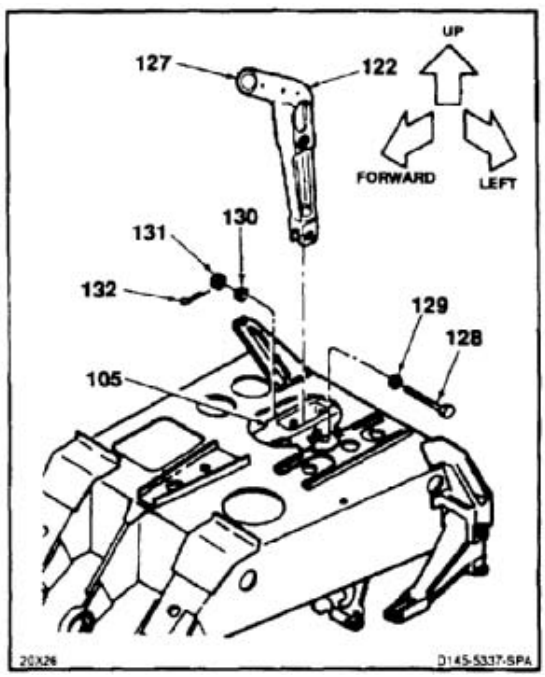
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



72. Position socket (122) in bellcrank (105), tube (127) up and forward.

73. Install bolt (128) head left, two washers (129 and 130), and nut (131).

74. Torque nut (131) to **85 to 192 inch-pounds**. Install cotter pin (132).

ASSEMBLE YAW BELLCRANK

75. Press bearing (dissimilar metals) (133) in bellcrank (134) until it bottoms. Use arbor press.

76. Install spacer (dissimilar metals) (135) in bellcrank (134). Press bearing (dissimilar metals) (136) in bellcrank until it bottoms. Use arbor press.

77. Install three bushings (dissimilar metals) (137, 138, and 139), flange inward, in upper lugs of bellcrank (134).

78. Install three bushings (dissimilar metals) (140, 141, and 142) in lower lugs of bellcrank (134).

INSPECT

INSTALL YAW BELLCRANK

79. Install bushing (dissimilar metals) (143), flange inward, in hole (144) of support (2).

80. Install bushing (dissimilar metals) (145) opposite hole (144) in support (2).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

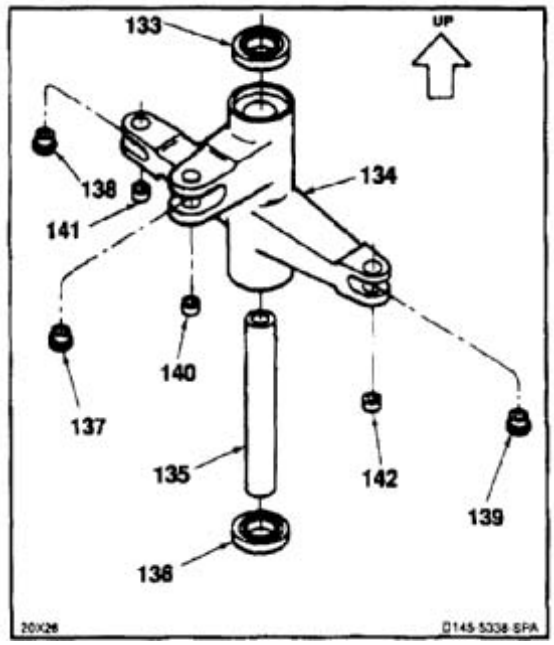
Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bushings are properly installed in the adjacent control box assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

81. Install bellcrank (134) in support (2) with arm (146) up and forward. Remove tag.

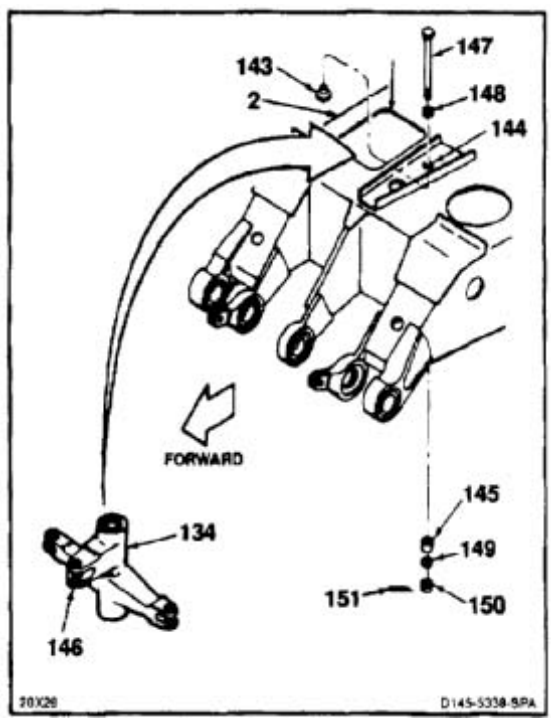


82. Install bolt (147), two washers (148 and 149) and nut (150) in support (2) and bellcrank (134).

83. Torque nut (150) to **60 to 90 inch-pounds**. Install cotter pin (151).

84. Check bolt (147) not shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 83.

INSPECT



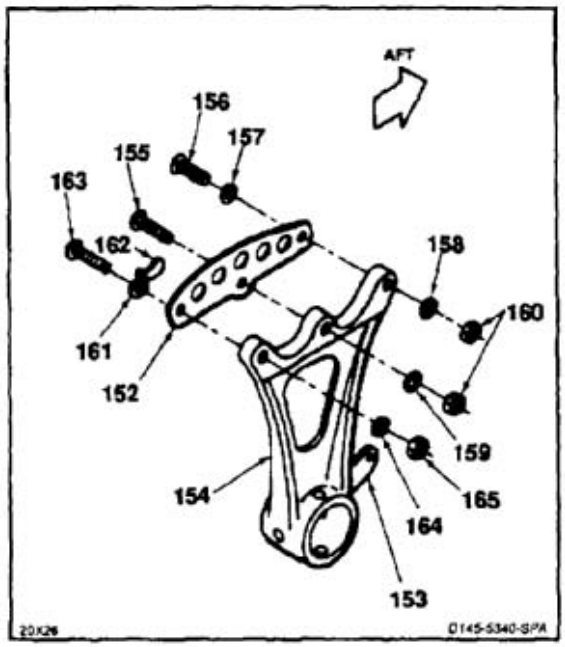
ASSEMBLE LEFT AND RIGHT ARM ASSEMBLIES

NOTE

Procedure is same to assemble left or right arm. Right arm is shown here.

85. Position one plate (152), curved side up, on mount (153) side of each arm (154). Install two bolts (dissimilar metals) (155 and 156), three washers (157, 158, and 159), and nuts (160) in each arm.

86. Position one stop (161) on each plate (152), tip (162) up and aft. Install bolt (163), washer (164), and nut (165).



ASSEMBLE LEFT AND RIGHT PEDALS

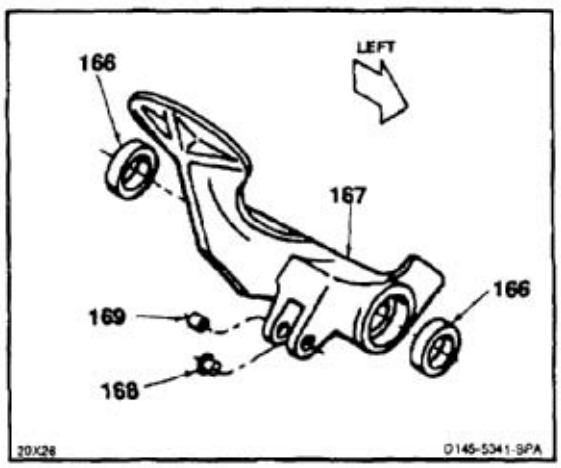
NOTE

Procedure is same to assemble left or right pedal. Right pedal shown here.

87. Press two bearings (dissimilar metals) (166) in pedal (167) until they bottom.

88. Install bushing (dissimilar metals) (168) flange inward, in left lug of pedal (167).

89. Install bushing (dissimilar metals) (169) in right lug of pedal (167).

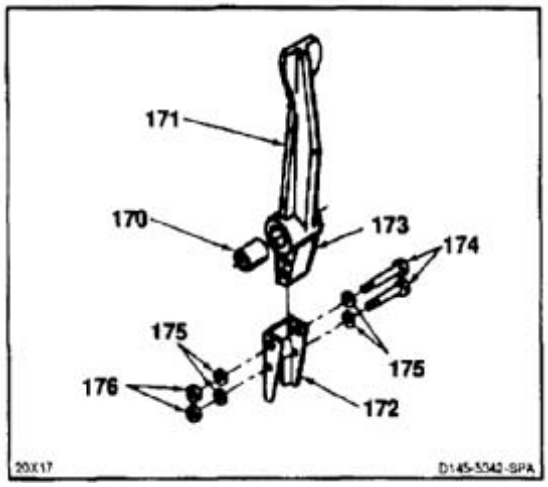


INSPECT

90. Install bushing (dissimilar metals) (170) in lever (171) until flush.

91. Position channel (172) on flat surface (173) of lever (171). Install two bolts (dissimilar metals) (174), four washers (175), and nuts (176).

INSPECT



92. Install bushing (dissimilar metals) (177) in right lug (178) of post (179).

93. Install bolt (dissimilar metals) (180) two washers (dissimilar metals) (181 and 182) and nut (183) in post (179), hole (184) horizontal.

94. Torque nut (183) to **15 to 20 inch-pounds**. Install cotter pin (185).

95. Install pin (dissimilar metals) (186) two washers (dissimilar metals) (187 and 188) and nut (189) in post (179). Use gun heater.

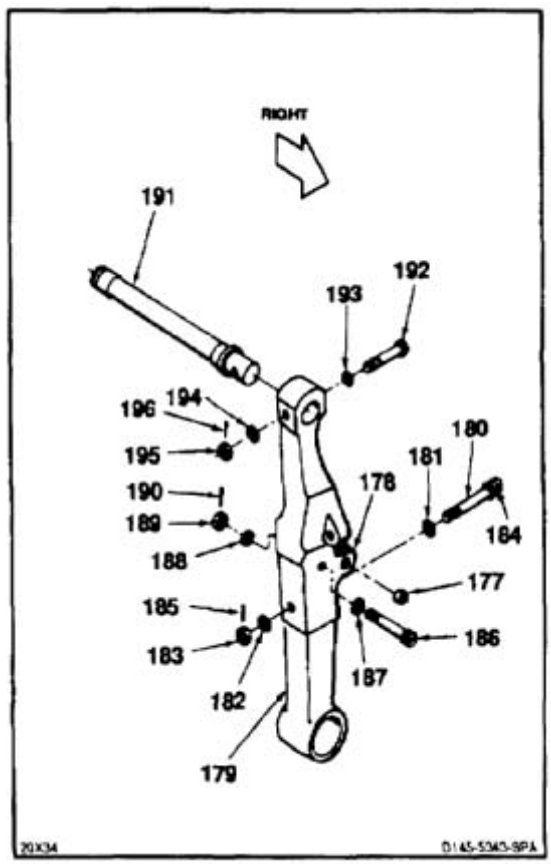
96. Torque nut (189) to **30 to 60 inch-pounds**. Install cotter pin (190).

97. Install shaft (dissimilar metals) (191) in post (179), holes aligned, until it bottoms. Use gun heater.

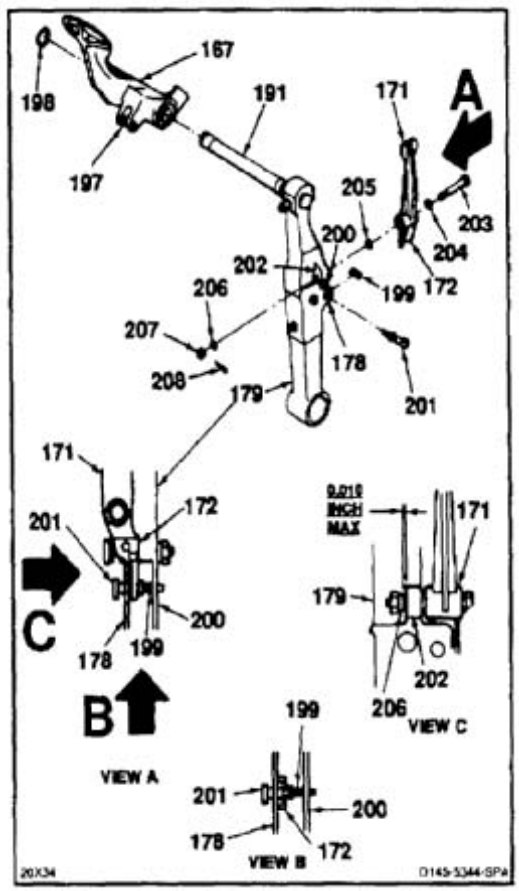
98. Install bolt (dissimilar metals) (192) two washers (dissimilar metals) (193 and 194) and nut (195) in post (179).

99. Torque nut (195) to **15 to 20 inch-pounds**. Install cotter pin (196).

INSPECT



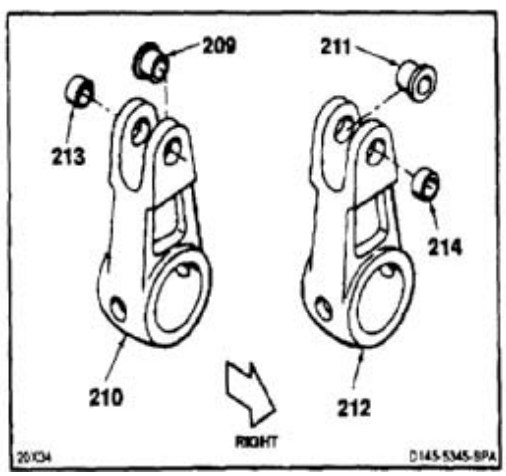
100. Install pedal (167) on shaft (191), lug (197) inward until it bottoms.
101. Install retainer (198) on shaft (191). Use retaining ring pliers.
102. Position spring (199) between lugs (178 and 200) of post (179).
103. Install pin (201) in lug (178) and through spring (199).
104. Position lever (171) on aft side of lug (202) of post (179), with channel (172) between lug (178 and 200).
105. Install bolt (203), three washers (204, 205, and 206), and nut (207). Tighten nut until lever does not move forward or aft but rotates freely. Back off nut to align cotter pin hole.
106. Check gap between washer (206) and lug (202). Gap shall be **0.010 inch** maximum.
107. Install cotter pin (208).



INSPECT

ASSEMBLE LEFT AND RIGHT ARMS

108. Install bushing (dissimilar metals) (209) in right lug of arm (210), flange inward.
109. Install bushing (dissimilar metals) (211) in left lug of arm (212), flange inward.
110. Install bushing (dissimilar metals) (213) in left lug of arm (210).
111. Install bushing (dissimilar metals) (214), in right lug of arm (212).



INSPECT

INSTALL CONNECTING LINKS

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

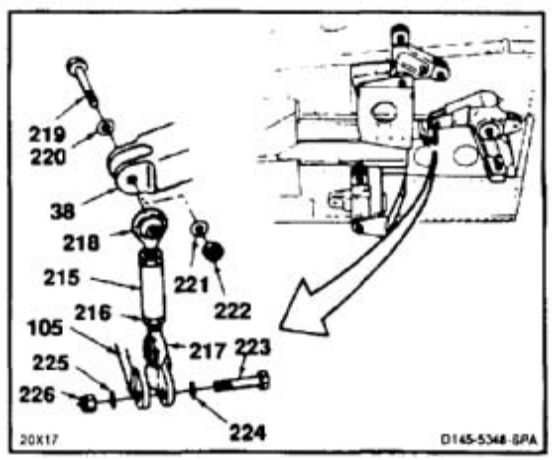
At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

112. If roll connecting link (215) is a replacement, loosen nut (216) of adjustable end. Turn bearing (217) **90°** to bearing (218). Torque nut to **100 inch-pounds**.

113. Position link (215) in bellcrank (38), with fixed end toward bellcrank. Install bolt (219), two washers (220 and 221), and nut (222). Do not tighten nut at this time.

114. Position link (215) in bellcrank (105). Install bolt (223), two washers (224 and 225), and nut (226). Do not tighten nut at this time. Remove tag from link.



115. If thrust connecting link (227) is a replacement, loosen nut (228) of adjustable end. Turn bearing (229) **90°** to bearing (230). Torque nut to **100 inch-pounds**.

116. Position link (227) in bellcrank (67), with fixed end toward bellcrank. Install bolt (231), two washers (232 and 233), and nut (234). Do not tighten nut at this time.

117. Position link (227) in short arm of bellcrank (67). Install bolt (235), two washers (236 and 237), and nut (238). Do not tighten nut at this time. Remove tag.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

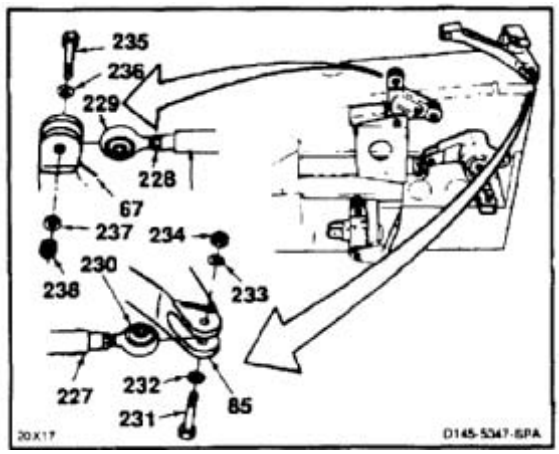
Ensure that the rivet through the fixed rod end bearing is secure.

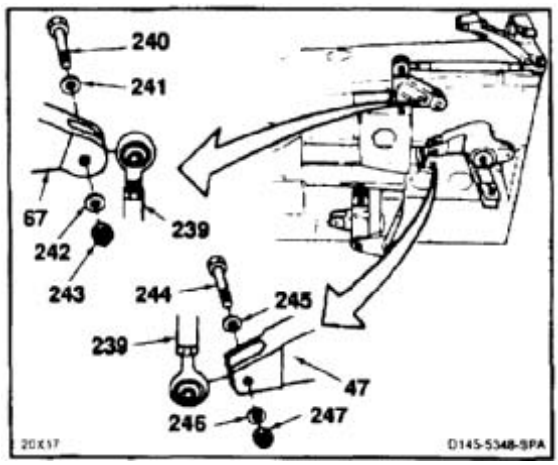
At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

118. Position thrust connecting link (239) in bellcrank (67), with fixed end toward bellcrank. Install bolt (240), two washers (241 and 242), and nut (243). Do not tighten nut at this time.

119. Position link (239) in long arm of bellcrank (47). Install bolt (244), two washers (245 and 246), and nut (247). Do not tighten nut at this time. Remove tag.





WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both machined rod ends attached to the link are secure.

Ensure that both rod end jam nuts are installed and torqued.

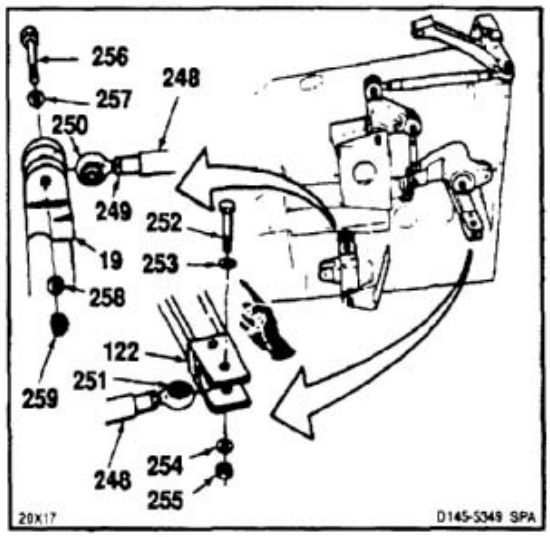
Ensure that the rivet through the fixed rod end bearing is secure.

Ensure painted band on control rod faces towards pilot. (AFT)

Ensure rod end bearing faces aft attaching to socket assembly.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



120. If pitch connecting link (248) is a replacement, loosen nut (249) of adjustable end. Turn bearing (250) **90°** to bearing (251). Torque nut to **100 inch-pounds**.

121. Position link (248) in lugs of socket (122) with fixed end toward socket. Install bolt (252), two washers (253 and 254), and nut (255). Do not tighten nut at this time.

122. Position link (248) in bellcrank (19). Install bolt (256), two washers (257 and 258), and nut (259). Do not tighten nut at this time.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both machined rod ends attached to the link are secure.

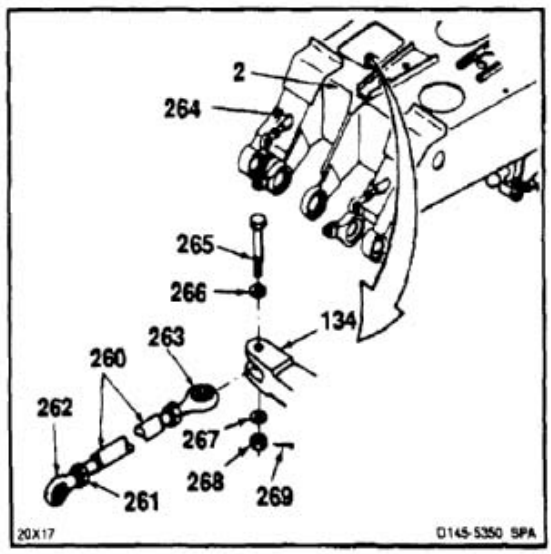
Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure adjustable rod end bearing faces forward.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



ASSEMBLE LEFT OR RIGHT YAW CONNECTING LINK

NOTE

Procedure is same to assemble left or right link. Right link is shown here.

123. If yaw connecting link (260) is a replacement, loosen nut (261) of adjustable end. Turn bearing (262) **90º** to bearing (263). Torque nut to **100 inch-pounds**.

124. Position link (260) with fixed bearing (263) through hole (264) in support (2) and in bellcrank (134). Install bolt (265), two washers (266 and 267), and nut (268).

125. Torque nut (268) **30 to 60 inch-pounds**. Install cotter pin (269).

126. Check bolt (265). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 125.

INSPECT

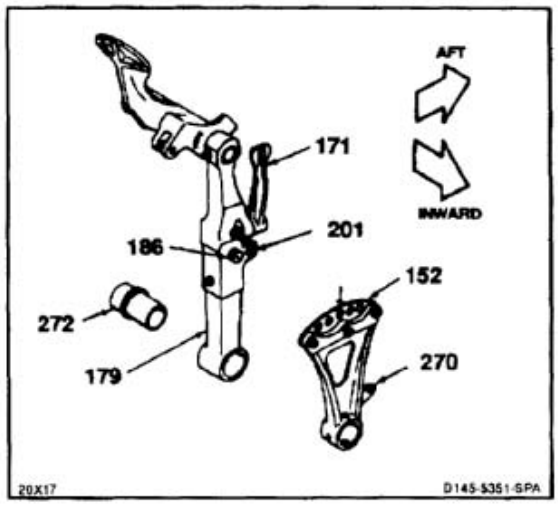
ASSEMBLE LEFT AND RIGHT ARMS AND PEDALS

NOTE

Procedure is same to assemble left or right arm and pedal. Right arm and pedal are shown here.

127. Press levers (171) inward. Position top edge of plates (152) in slot of pins (186), mounts (270) aft. Position pins (201) in center holes (271) of plates. Release levers.

128. Install longer end of spacers (272) in posts (179). Use gun heater.



ASSEMBLE PEDALS, ARMS AND SUPPORT

NOTE

Procedure is same to assemble left or right pedal and arm in support. Right arm and pedal are shown here.

129. Position spacer (273) against inner bearing of arm (274) of support (2).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Shafts are match drilled at assembly with mating components and must be reinstalled in the same location.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

130. Slide bushing (275) through arm (274) and spacer (273) until flush with spacer.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the shaft.

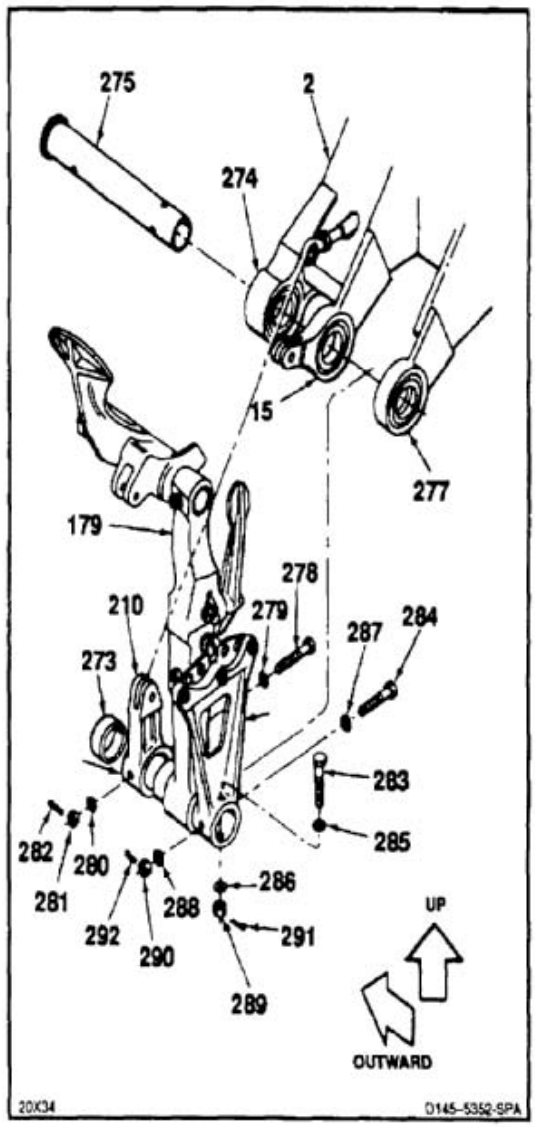
Ensure that all bushings are properly installed (including orientation) in the output clevis of the arm assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

131. Position arm (210) between spacer (273) and arm (15), long end (276) outward and arm (210) up.

132. Slide bushing (275) through arm (210) and arm (15) until flush with inward bearing of arm (15).



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the control box assembly.

Ensure plate and all associated hardware is properly installed.

Ensure spring tab is facing aft.

Ensure proper attaching hardware is installed attaching each arm assembly to the pedal shaft including bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure pedal adjustment lever assemblies move freely and all associated hardware including impedance bolt, plate, guide, pin and lever return spring, eye bolt, and pedal pivot shafts are properly and securely installed.

After installation of the post assembly, ensure free unrestricted operation after engagement of the locking pin into mating drive arm through the entire range yaw control motions.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

133. Position arm (154) and post (179) between arms (15 and 277), with post outward and up.

134. Slide bushing (275) through post (179), arm (154), and arm (277) until it bottoms.

135. Turn bushing (275) to align holes with holes in arms (154 and 210). Use soft faced pliers between arms (210 and 15).

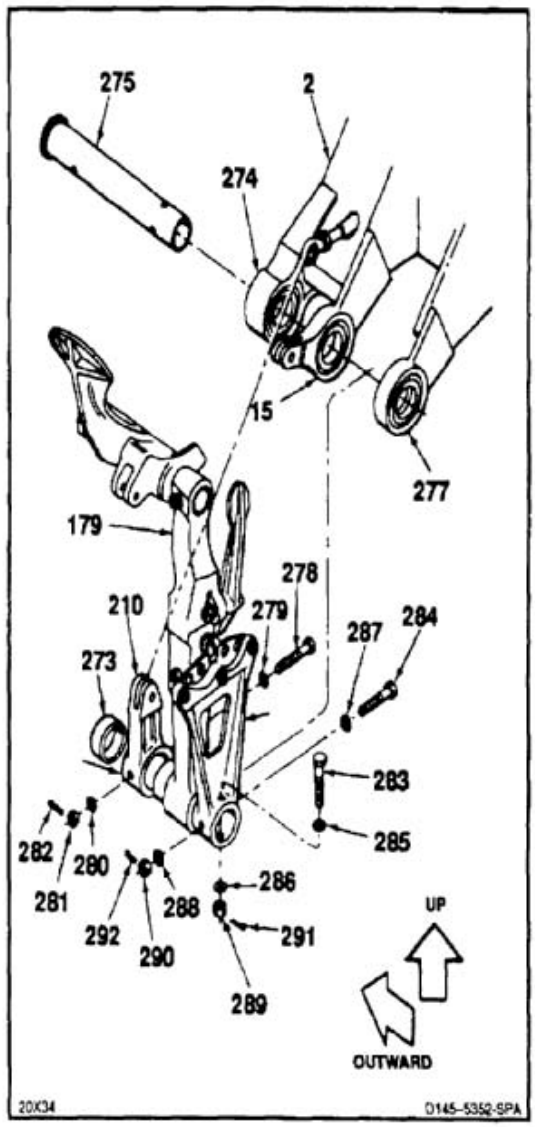
136. Install bolt (278), two washers (279 and 280) and nut (281) in arm (210) and bushing (275).

137. Torque nut (281) to **60 to 90 inch-pounds**. Install cotter pin (282).

138. Install two bolts (283 and 284), four washers (285, 286, 287, and 288), and two nuts (289 and 290) in arm (154).

139. Torque two nuts (289 and 290) to **30 to 60 inch-pounds**. Install cotter pins (291 and 292).

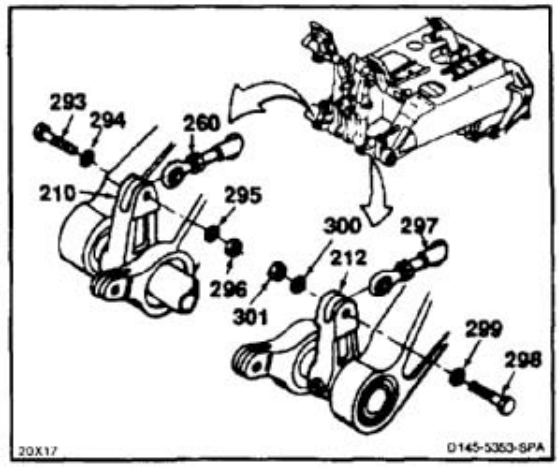
140. Repeat steps 129 thru 139 for left arm and pedal assembly.



11-77 ASSEMBLE PILOT'S COCKPIT CONTROL ASSEMBLY (Continued) 11-77

141. Position link (260) in arm (210). Install bolt (293), two washers (294 and 295), and nut (296). Do not tighten nut at this time.

142. Position link (297) in arm (212). Install bolt (298), two washers (299 and 300), and nut (301). Do not tighten nut at this time.



143. Press lever (171) inward. Position post (179) fully aft. Release lever.

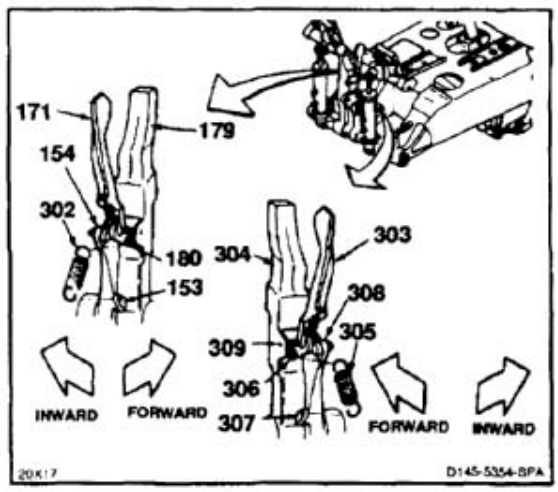
144. Connect spring (302) to bolt (180) and mount (153).

145. Press lever (171) inward. Position post (179) forward to align center hole of arm (154). Release lever.

146. Press lever (303) inward. Position post (304) fully aft. Release lever.

147. Connect spring (305) to bolt (306) and mount (307).

148. Press lever (303) inward. Position post (304) forward to align center hole of arm (308) with pin (309). Release lever.



149. Position cylinder (310) in upper mount (311), ports (312) forward.

150. Install bolt (313), two washers (314 and 315), and nut (316). Torque nut to **30 to 60 inch-pounds**. Install cotter pin (317).

151. Position cylinder (310) in arm (15).

152. Install bolt (318), two washers (319 and 320), and nut (321). Torque nut to **30 to 60 inch-pounds**. Install cotter pin (322).

153. Position cylinder (323) in upper mount (324), ports (325) forward.

154. Install bolt (326), two washers (327 and 328), and nut (329). Torque nut to **30 to 60 inch-pounds**. Install cotter pin (330).

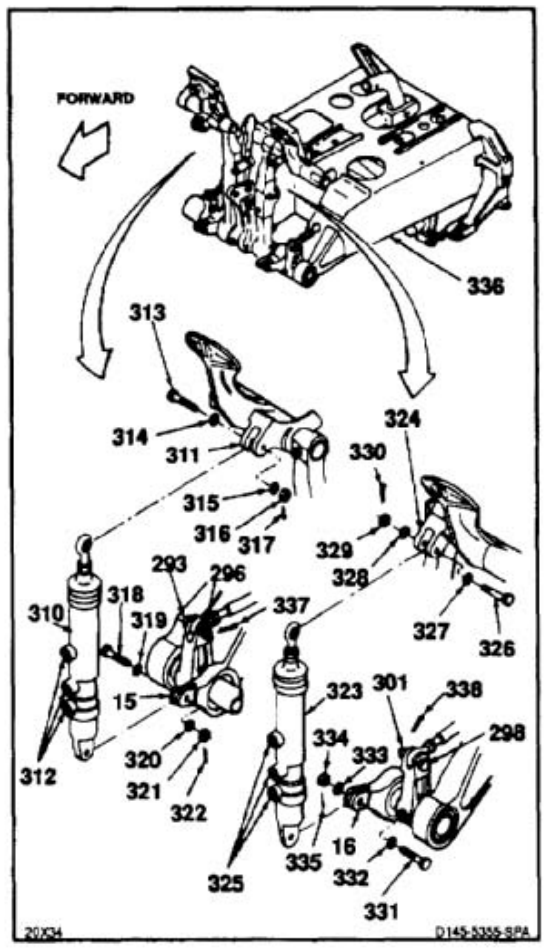
155. Position cylinder (323) in arm (16).

156. Install bolt (331), two washers (332 and 333), and nut (334). Torque nut to **30 to 60 inch-pounds**. Install cotter pin (335).

157. Rig control assembly (336) (Task 11-42).

158. Torque two nuts (296 and 301) to **30 to 60 inch-pounds**. Install corner pins (337 and 338).

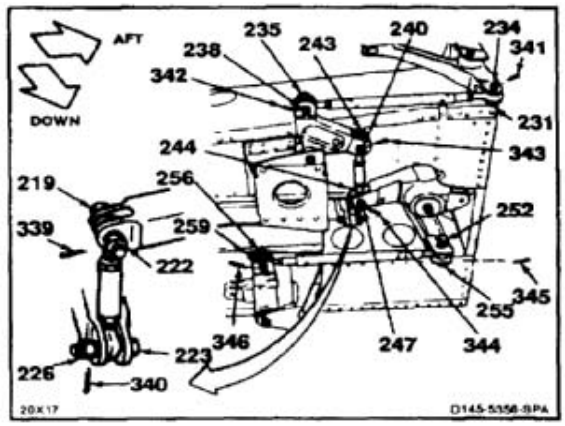
159. Check bolts (293 and 298). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 158.



160. Torque eight nuts (222, 226, 234, 238, 243-247, 255, and 259) to **30 to 60 inch-pounds**.

161. Install eight cotter pins (339, 340, 341, 342, 343, 344, 345, and 346).

162. Check eight bolts (219, 223, 231, 235, 240, 244, 252, and 256). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat steps 160 and 161.



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-78 ASSEMBLE COPILOT'S COCKPIT CONTROL ASSEMBLY 11-78

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Rivet Tool
Cockpit Control Bearing Installation Tool (APP E-15)
Arbor Press
Retaining Ring Pliers

Materials:

Epoxy Primer (E292)
Twine (E433)
Gloves (E184.1)

Parts:

Cotter Pins
Nuts, Self-Lock
Rivets
Bearings
Bushings

Personnel Required:

Medium Helicopter Repairer (2)
Aircraft Structural Repairer
Inspector

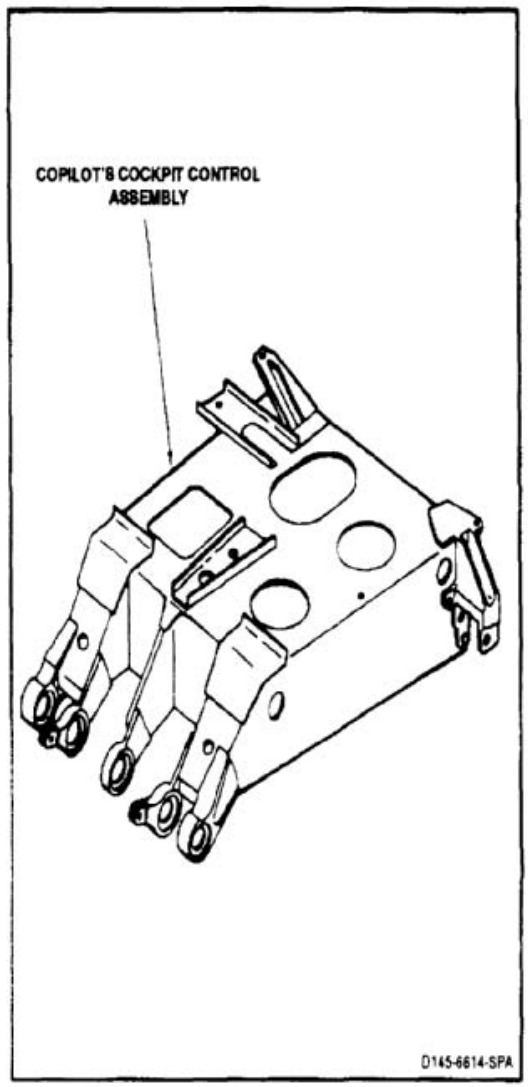
References:

TM 55-1500-322-24
TM 55-1520-240-23P
TM 1-1520-253-23
Task 1-13
Task 11-42
Appendix E

General Safety Instructions:

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



NOTE

If a crack in the connecting link, bellcrank, or support is suspected during disassembly, refer to TM 1-1520-253-23.

NOTE

Assemble dissimilar metals wet with epoxy primer (E292). Wear gloves (E184.1).

Impedance bolts are installed in flight control connections. These bolts are self-retaining and required a special nut and torque (Task 1-13).

ASSEMBLE SUPPORT

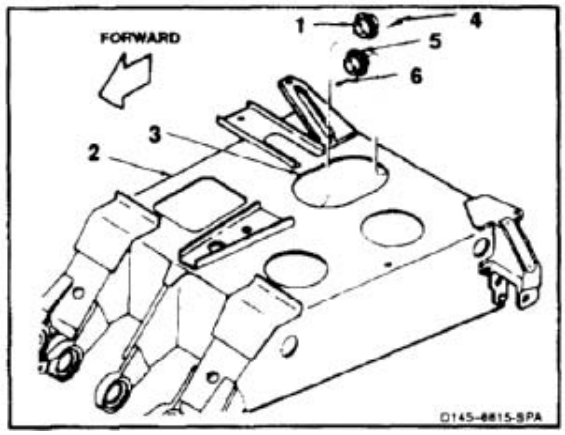
1. Position bearing (1) in forward end of support (2). Work through access (3). Install 12 rivets (4).
2. Position bearing (5) in aft end of support (2). Work through access (3). Install 12 rivets (6).
3. Install bearing (7) as follows:
   a. Align bearing (dissimilar metals) (7) in support (2).
   b. Position plate (8) to bearing (7) and plate (9) to support (2). Install bolt (10) washer (11) and nut (12) through plates.

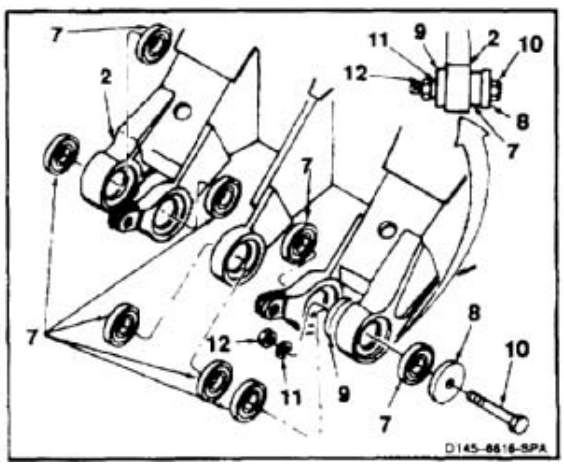
NOTE

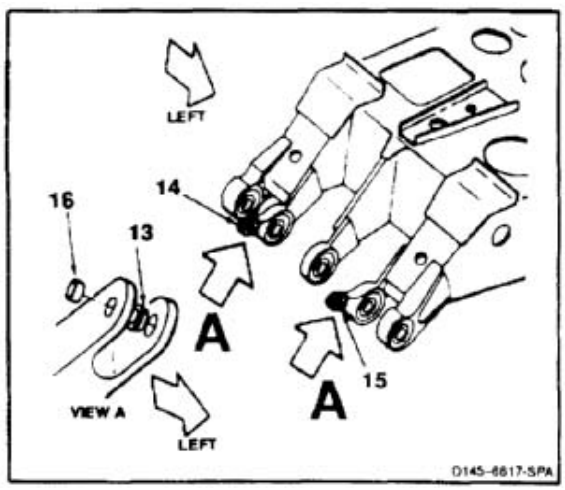
Plates, bolt, and nut are part of bearing tool.

   c. Tighten nut (12) until bearing (7) bottoms in support (2).
   d. Remove nut (12), washer (11), bolt (10), and two plates (8 and 9) from support (2).
4. Repeat step 3 for remaining seven bearings (7).
5. Install two bushings (dissimilar metals) (13) flange inward, in left lugs of arms (14 and 15).
6. Install two bushings (dissimilar metals) (16) in right arms (14 and 15).

INSPECT







ASSEMBLE PITCH TRANSFER BELLCRANK

7. Press bearing (dissimilar metals) (17) in pitch transfer bellcrank (18) until it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.
8. Install spacer (dissimilar metals) (19) in bellcrank (18).
9. Press bearing (dissimilar metals) (20) in bellcrank (18) until it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.
10. Install three bushings (dissimilar metals) (21, 22, and 23) flange inward, in upper lugs of two arms (24) and arm (25).
11. Install three bushings (dissimilar metals) (26, 27, and 28) in lower lugs of two arms (24) and arm (25).

INSPECT

INSTALL PITCH TRANSFER BELLCRANK

12. Install bushing (dissimilar metals) (29) in support (30) upper arm, flange inward.
13. Install bushing (dissimilar metals) (31) in support (30) lower arm.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

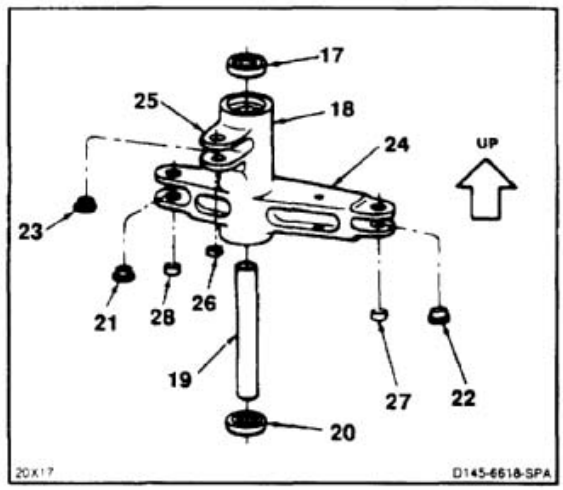
Ensure bellcrank hub bearings are serviceable and properly installed.

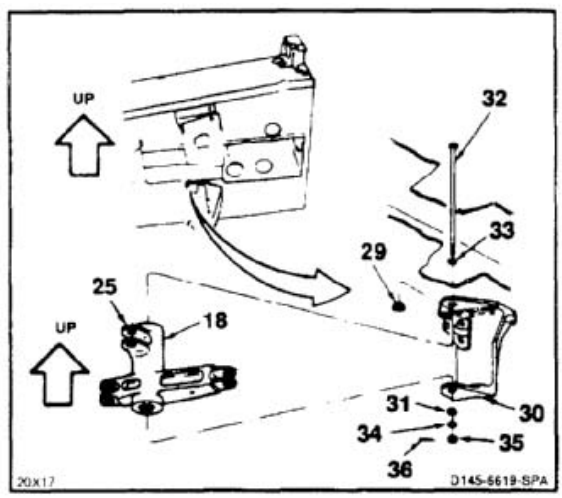
Ensure associated bushings are proeprly installed in the adjacent support assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

14. Position pitch transfer bellcrank (18) in support (30) arm (25) up and forward. Install bolt (32), two washers (33 and 34), and nut (35) in support. Remove tag.
15. Torque nut (35) to **60 to 90 inch-pounds**. Install cotter pin (36).
16. Check bolt (32). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 15.





ASSEMBLE THRUST IDLER BELLCRANK

17. Press bearing (dissimilar metals) (37) in thrust idler bellcrank (38) until it bottoms. (Refer to TM 55-1520-322-24.) Use arbor press.
18. Install spacer (39) in bellcrank (38).
19. Press bearing (dissimilar metals) (40) in bellcrank (38) until it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.
20. Install two bushings (dissimilar metals) (41 and 42) flange inward, in lower lugs of bellcrank (38).
21. Install two bushings (dissimilar metals) (43 and 44) in upper lugs of bellcrank (38).

INSPECT

INSTALL THRUST IDLER BELLCRANK

22. Install bushing (dissimilar metals) (45) flange inward, in upper arm of support (46).
23. Install bushing (dissimilar metals) (47) lower arm of support (46).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bushings are properly installed in the adjacent support assembly.

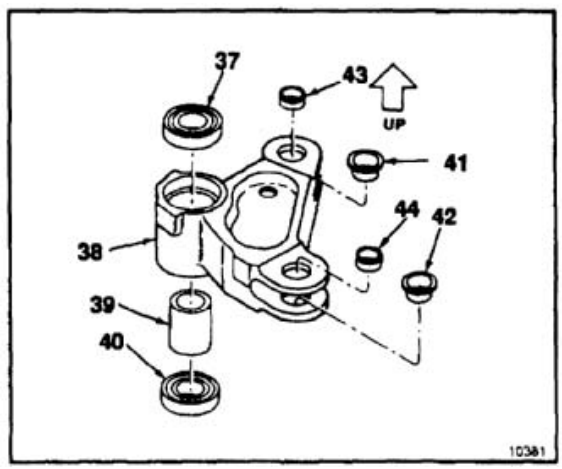
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

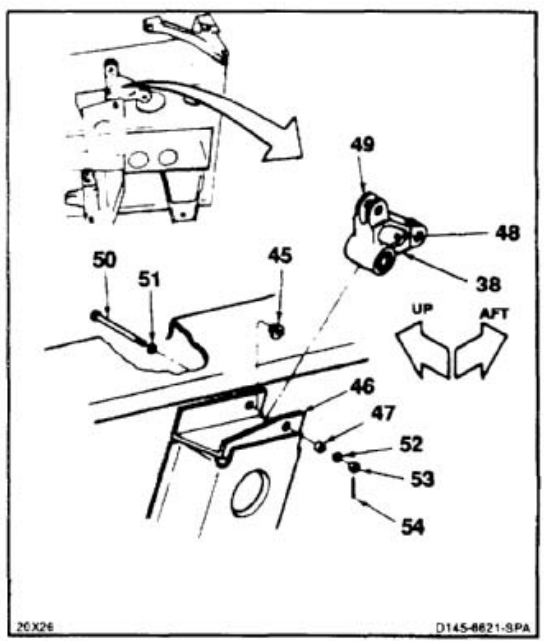
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Bellcrank shall be positioned as indicated by marks on bellcrank; otherwise, serious damage to components can occur.

24. Position bellcrank (38) in support (46) hole (48) aft and arm (49) up.
25. Install bolt (50), two washers (51 and 52), and nut (53) in support (46). Remove tag from bellcrank (38).
26. Torque nut (53) to **30 inch-pounds**. Continue tightening to align cotter pin holes. Do not exceed **45 inch-pounds**. Install cotter pin (54).
27. Check bolt (50). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 26.





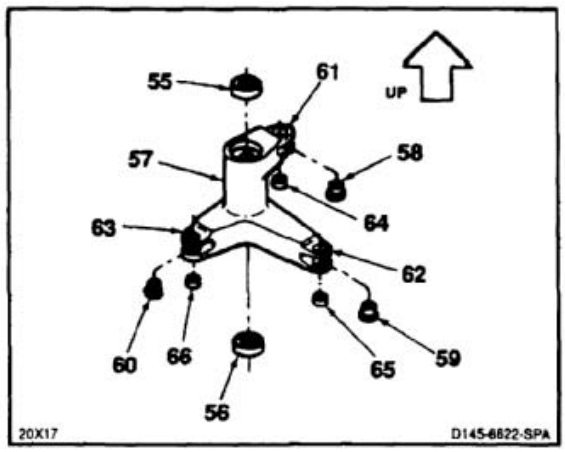
ASSEMBLE ROLL TRANSFER BELLCRANK

28. Press two bearings (dissimilar metals) (55 and 56) in roll transfer bellcrank (57) until they bottom. (Refer to TM 55-1500-322-24.) Use arbor press.

29. Install three bushings (dissimilar metals) (58, 59, and 60) flange inward in upper lugs of arms (61, 62, and 63).

30. Install three bushings (dissimilar metals) (64, 65, and 66) in lower lugs of arms (61, 62, and 63).

INSPECT



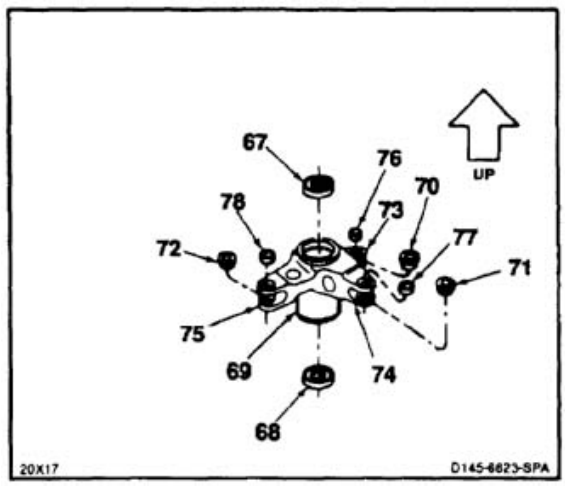
ASSEMBLE THRUST TRANSFER BELLCRANK

31. Press two bearings (dissimilar metals) (67 and 68) in thrust transfer bellcrank (69) until they bottom. (Refer to TM 55-1520-322-24.) Use arbor press.

32. Install three bushings (dissimilar metals) (70, 71, and 72) flange inward, in lower lugs of arms (73, 74, and 75).

33. Install three bushings (dissimilar metals) (76, 77, and 78) in upper lugs of arms (73, 74, and 75).

INSPECT



INSTALL ROLL AND THRUST TRANSFER BELLCRANKS

34. Install bushing (79) in fitting (80) of support (2).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bellcrank assembly and pivot axis hardware including shaft, spacers, plugs, and bushings, are properly installed so as not to prevent free rotation of the component.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

35. Position bellcrank (69) on fitting (80) lower side, arm (74) up and inward.

36. Slide shaft (81) through bellcrank (69) and bushing (79) until flush with bushing.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bellcrank assembly and pivot axis hardware including shaft, spacers, plugs, and bushings, are properly installed so as not to prevent free rotation of the component.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

37. Position bellcrank (57) on fitting (80), arm (61) up and aft. Slide shaft (81) through bellcrank until flush.

38. Position spacer (82) between bellcrank (57) and fitting (83) of support (2).

WARNING

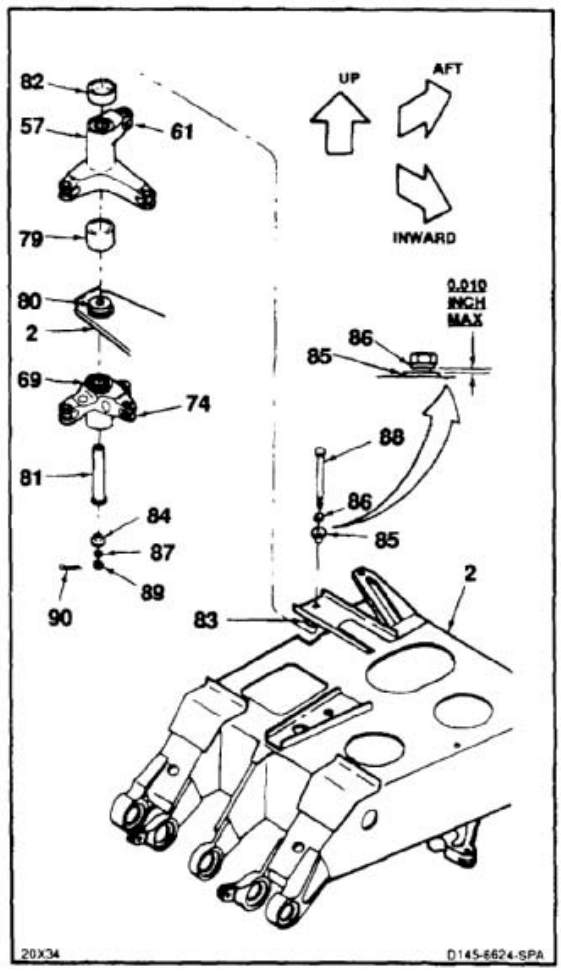
FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that all associated spacers, washers, and bushings are installed.

At installation of bolt ensure that the AN320-6 nut is tightened using proper installation procedure to prevent excess torque application to the associated bellcrank hub bearings thereby restricting free rotation of the components.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



39. Slide shaft (81) through spacer (82) and fitting (83) until it bottoms.

40. Install two bushings (84 and 85) in shaft (81).

41. Install two washers (86 and 87), bolt (88) and nut (89) in shaft (81). Tighten nut until bellcranks (57 and 69) do not move up and down, but rotate freely. Back off nut to align cotter pin holes.

42. Check gap between washer (86) and bushing (85). Gap shall be **0.010 inch** maximum.

43. Install cotter pin (90). Remove tags from bellcranks (57 and 69).

INSPECT

ASSEMBLE THRUST INPUT BELLCRANK

44. Press bearing (dissimilar metals) (91) in thrust input bellcrank (92) until it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.
45. Install spacer (dissimilar metals) (93) in bellcrank (92).
46. Press bearing (dissimilar metals) (94) in bellcrank (92) until it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.
47. Install two bushings (dissimilar metals) (95 and 96) flanges inward, in right lugs of arms (97 and 98).
48. Install two bushings (dissimilar metals) (99 and 100) in left lugs of arms (97 and 98).

INSPECT

INSTALL THRUST INPUT BELLCRANK

49. Install bushing (dissimilar metals) (101) flange inward, in inboard lug of fitting (102).
50. Install bushing (dissimilar metals) (103) in outboard lug of fining (102).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

Ensure bellcrank hub bearings are serviceable and properly installed.

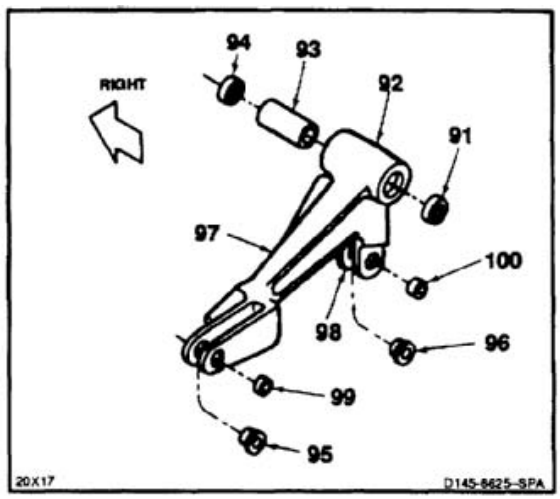
Ensure associated bushings are properly installed in the adjacent support assembly.

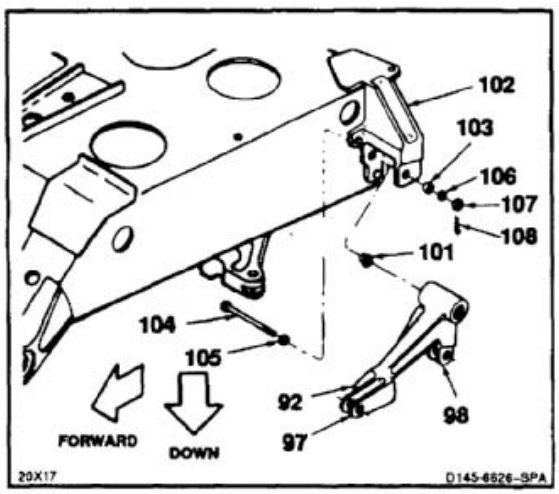
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

51. Position bellcrank (92) in fitting (102) long arm (97) forward, short arm (98) down.
52. Install bolt (104), two washers (105 and 106), and nut (107) in fitting (102). Remove tag from bellcrank (92).
53. Torque nut (107) to **60 to 90 inch-pounds**. Install cotter pin (108).
54. Check bolt (104). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose add washer under nut and repeat step 53.

INSPECT





ASSEMBLE ROLL INPUT BELLCRANK

55. Position nut (109) in retainer (110), flat side to retainer.
56. Install nut (109) and retainer (110) in hole (111) of bellcrank (112), nut forward.
57. Install bushing (dissimilar metals) (113) in forward end of bellcrank (112).
58. Install two bushings (dissimilar metals) (114 and 115) in aft end of bellcrank (112).
59. Install bushing (dissimilar metals) (116), flange inward, in right side of bellcrank (112).
60. Install bushing (dissimilar metals) (117) in left side of bellcrank (112).
61. Install bushing (dissimilar metals) (118) flange inward, in aft lug of arm (119).
62. Install bushing (dissimilar metals) (120) in forward lug of arm (119).

INSPECT

INSTALL ROLL INPUT BELLCRANK

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) at the following locations: at the output clevis of the bellcrank, at both the forward and aft ends along the roll pivot axis, and on both sides at the pivot axis of the mating socket assembly.

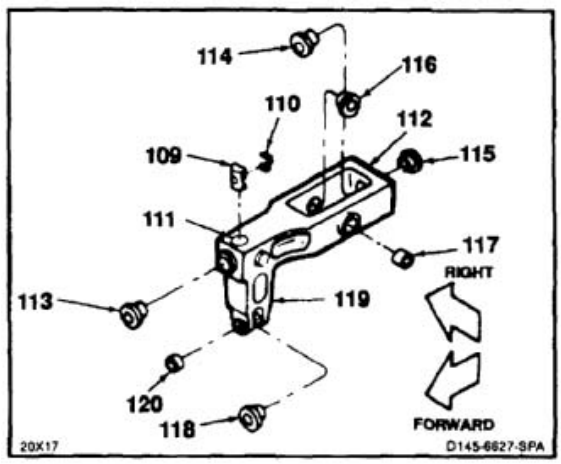
Ensure proper barrel nut and retainer are installed in cavity at forward end of the bellcrank.

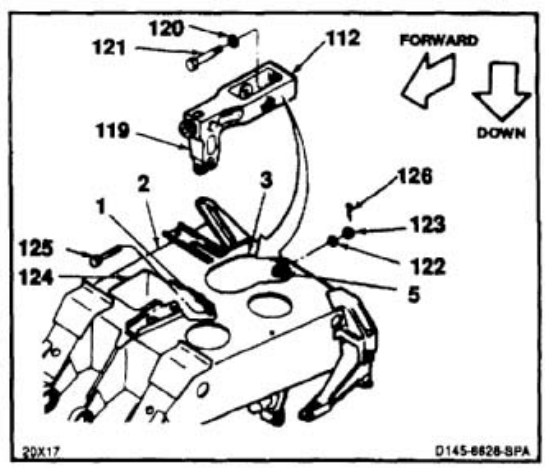
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

63. Working through access (3), position bellcrank (112) in supply (2), arm (119) down and forward.
64. Install washer (120) and bolt (121) through aft end of bellcrank (112) and bearing (5).
65. Install washer (122) and nut (123) on bolt (121). Do not tighten nut at this time.
66. Working through access (124), slide bolt (125) through bearing (1) and install in bellcrank (112). Torque bolt to **75 inch-pounds**.
67. Torque nut (123) to **60 to 90 inch-pounds**. Install cotter pin (126).
68. Check bolt (121). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 67.

INSPECT





ASSEMBLE PITCH AND ROLL INPUT SOCKET

69. Press bearing (dissimilar metals) (127) in socket (128) until it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.

70. Install spacer (dissimilar metals) (129) in socket (128). Press bearing (dissimilar metals) (130) in socket unit it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.

71. Install bushing (dissimilar metals) (131) flange inward in left lug of socket (128).

72. Install bushing (dissimilar metals) (132) in right lug of socket (128).

INSPECT

INSTALL PITCH AND ROLL INPUT SOCKET

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in the output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

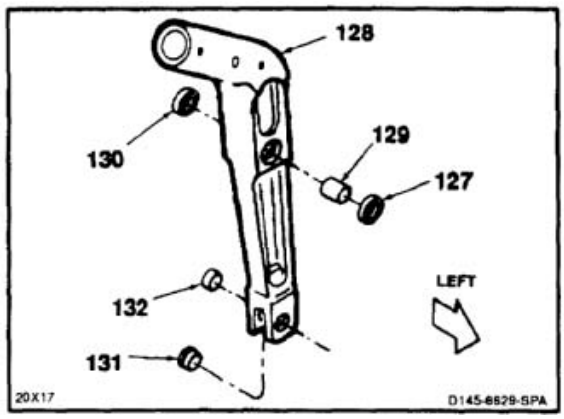
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

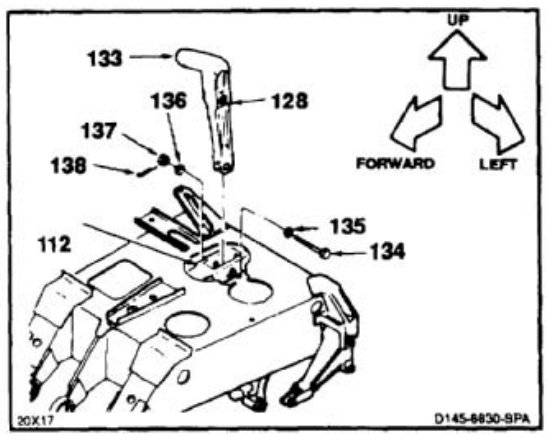
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

73. Position socket (128) in bellcrank (112), tube (133) up and forward.

74. Install bolt (134), head left, two washers (135 and 136) and nut (137) in bellcrank (112). Remove tag from socket (128).

75. Torque nut (137) to **85 to 125 inch-pounds**. Install cotter pin (138).





76. Check bolt (134). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose add washer under nut and repeat step 75.

INSPECT

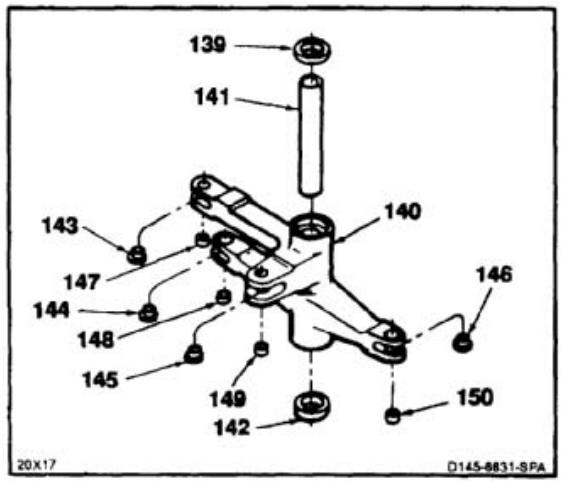
ASSEMBLE YAW BELLCRANK

77. Press bearing (dissimilar metals) (139) in yaw bellcrank (140) until it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.

78. Install spacer (dissimilar metals) (141) in bellcrank (140). Press bearing (dissimilar metals) (142) in bellcrank until it bottoms. (Refer to TM 55-1500-322-24.) Use arbor press.

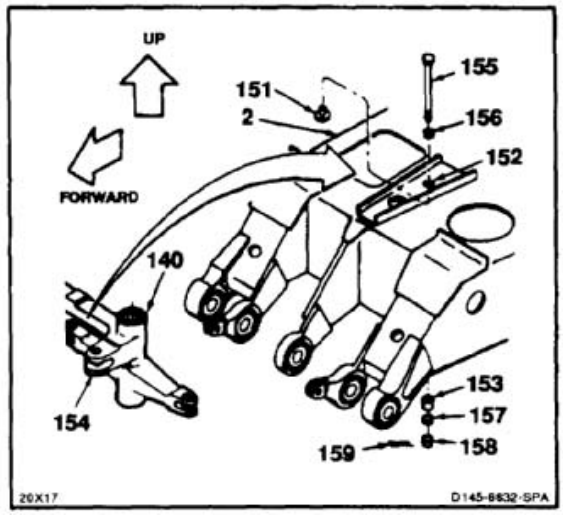
79. Install four bushings (dissimilar metals) (143, 144, 145, and 146) flange inward, in upper lugs of bellcrank (140).

80. Install four bushings (dissimilar metals) (147, 148, 149, and 150) in lower lugs of bellcrank (140).



INSPECT

INSTALL YAW BELLCRANK



81. Install bushing (dissimilar metals) (151), flange inward, in hole (152) of support (2).

82. Install bushing (dissimilar metals) (153) opposite hole (152) in support (2).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

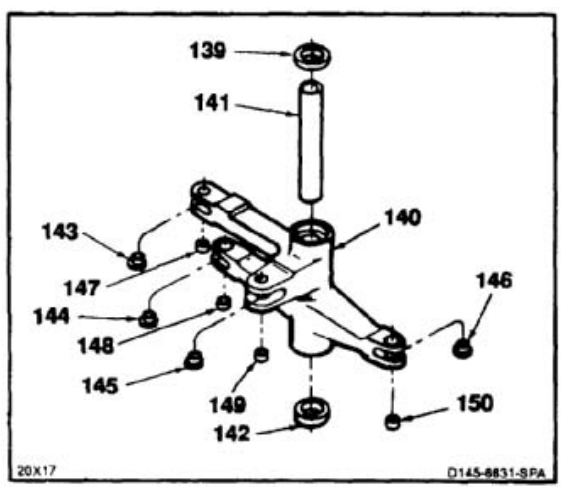
Ensure that all bushings are properly installed (including orientation) in the output and input clevises of the bellcrank assembly.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure associated bushings are properly installed in the adjacent control box assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



83. Install bellcrank (140) in support (2), arm (154) up and forward.

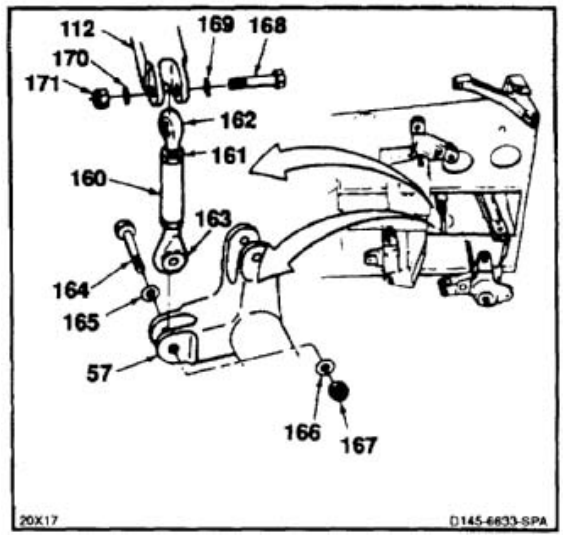
84. Install bolt (155), two washers (156 and 157), and nut (158) in support (2). Remove tag from bellcrank (140).

85. Torque nut (158) to **60 to 90 inch-pounds**. Install cotter pin (159).

86. Check bolt (155). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 85.

INSPECT

INSTALL CONNECTING LINKS



87. If roll connecting link (160) is a replacement, loosen nut (161) of adjustable end. Turn bearing (162) **90°** to bearing (163). Torque nut to **100 inch-pounds**.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both machined rod ends attached to the link are secure.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

88. Position link (160) between bellcranks (57 and 112), fixed end in bellcrank (57). Install bolt (164), two washers (165 and 166) and nut (167). Do not tighten nut at this time.

89. Position link (160) in bellcrank (112). Install bolt (168), two washers (169 and 170), and nut (171). Do not tighten nut at this time. Remove tag from link.

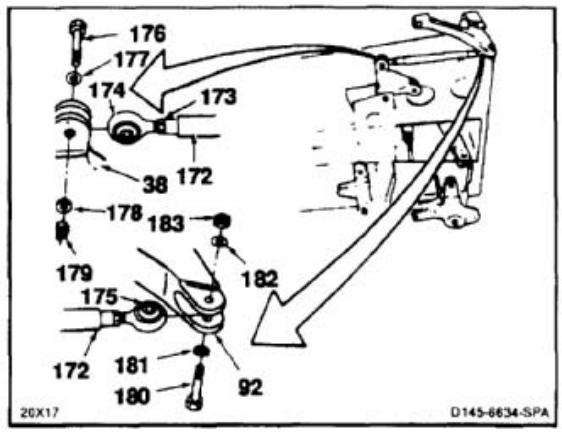
90. If thrust connecting link (172) is a replacement, loosen nut (173) of adjustable end. Turn bearing (174) **90°** to bearing (175). Torque nut to **100 inch-pounds**.

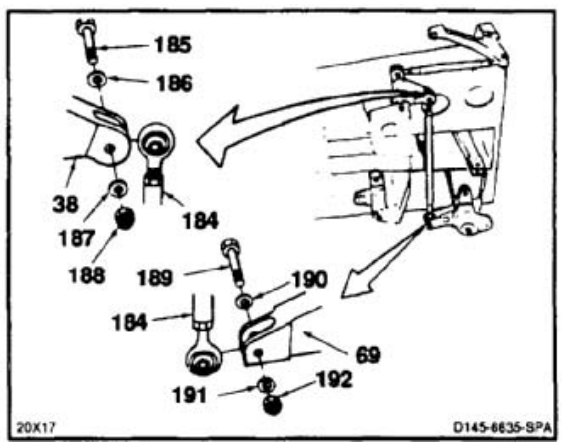
91. Position link (172) in bellcrank (38) upper arm, fixed end toward bellcrank. Install bolt (176), two washers (177 and 178), and nut (179). Do not tighten nut at this time.

92. Position link (172) in short arm of bellcrank (92). Install bolt (180), two washers (181 and 182), and nut (183). Do not tighten nut at this time. Remove tag from link.

93. Position thrust connecting link (184) in bellcrank (38), fixed end toward bellcrank. Install bolt (185), two washers (186 and 187), and nut (188). Do not tighten nut at this time.

94. Position link (184) in long arm of bellcrank (69). Install bolt (189), two washers (190 and 191), and nut (192). Do not tighten nut at this time. Remove tag from link.





WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both machined rod ends attached to the link are secure.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure painted band on control rod faces towards pilot. (AFT)

Ensure rod end bearing faces aft attaching to socket assembly.

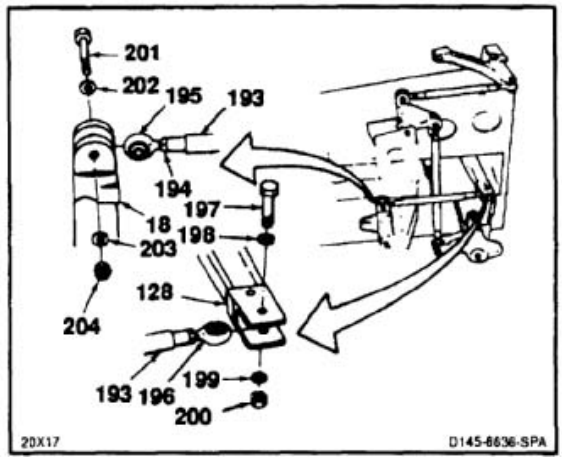
At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

95. If pitch connecting link (193) is a replacement, loosen nut (194) of adjustable end. Turn bearing (195) **90°** to bearing (196). Torque nut to **100 inch-pounds**.

96. Position link (193) in socket (128), fixed end toward socket. Install bolt (197) two washers (198 and 199), and nut (200). Do not tighten nut at this time.

97. Position link (193) in bellcrank (18). Install bolt (201), two washers (202 and 203), and nut (204). Do not tighten nut at this time. Remove tag from link.



CONNECT LEFT OR RIGHT YAW CONNECTING LINK

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both machined rod ends attached to the link are secure.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure adjustable rod end bearing faces forward.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

NOTE

Procedure is same to connect left or right link. Right link is shown here.

98. If yaw connecting link (205) is a replacement, loosen nut (206) of adjustable end. Turn bearing (207) **90º** to bearing (208). Torque nut to **100 inch-pounds**.
99. Position link (205) with fixed bearing (208) through hole (209) in support (2) and in bellcrank (140), lower arm. Install bolt (210), two washers (211 and 212), and nut (213).
100. Tie link (205) to support (2). Use twine (E433).
101. Torque nut (213) to **30 to 60 inch-pounds**. Install cotter pin (214).
102. Check bolt (210). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 101.
103. Repeat steps 98 thru 102 for left yaw connecting link (209).

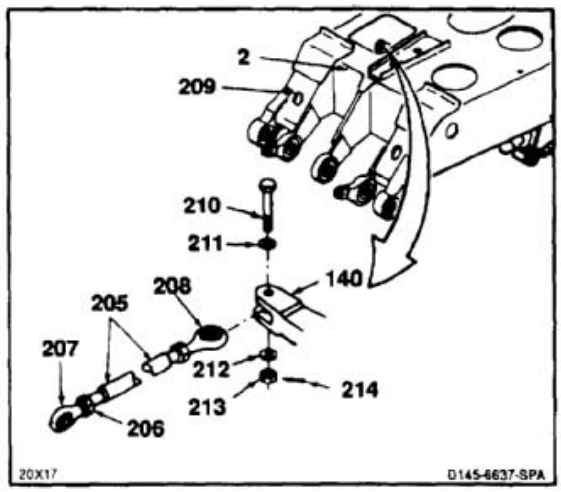
INSPECT

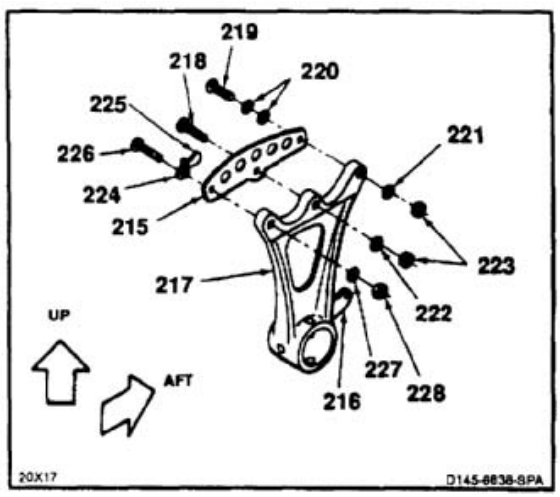
NOTE

Procedure is same to assemble left or right pedal arm. Right arm is shown here.

ASSEMBLE LEFT AND RIGHT PEDAL ARM ASSEMBLIES

104. Position plate (215), curved side up, on mount (216) side of arm (217). Install two bolts (dissimilar metals) (218 and 219), two washers (220), washers (221 and 222), and two nuts (223).
105. Position stop (224) on plate (215), tip (225) up and aft. Install bolt (226), washer (227), and nut (228).
106. Repeat steps 101 and 102 for left arm (217).





NOTE

Procedure is same to assemble left or right pedals. Right pedal is shown here.

ASSEMBLE LEFT AND RIGHT PEDALS

107. Press two bearings (dissimilar metals) (229) in pedal (230) until they bottom. (Refer to TM 55-1500-322-24.) Use arbor press.

108. Install bushing (dissimilar metals) (231) flange inward, in left lug of pedal (230).

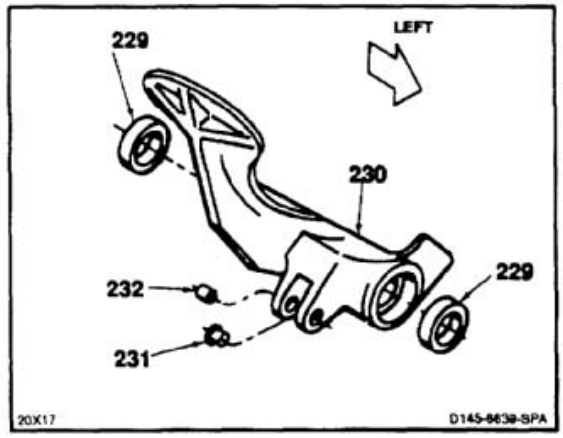
109. Install bushing (dissimilar metals) (232) in right lug of pedal (230).

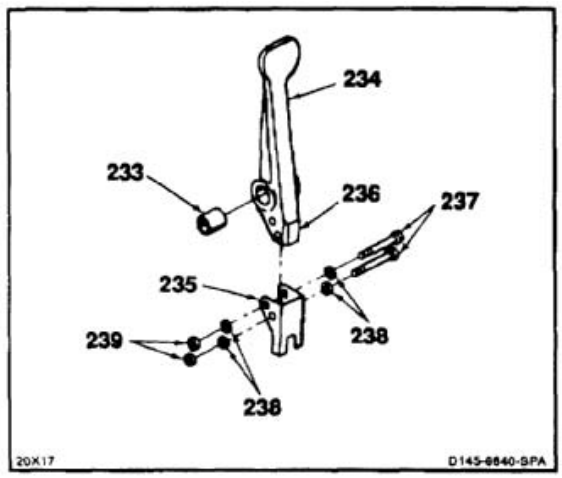
INSPECT

110. Install bushing (dissimilar metals) (233) in lever (234).

111. Position channel (235) on flat surface (236) of lever (234). Install two bolts (dissimilar metals) (237) four washers (238), and two nuts (239).

INSPECT





112. Install bushing (dissimilar metals) (240) in right lug (241) of post (242).

113. Install bolt (dissimilar metals) (243) two washers (244 and 245), and nut (246) in post (242) left to right spring hole (247).

114. Torque nut (246) to **15 to 20 inch-pounds**. Install cotter pin (248).

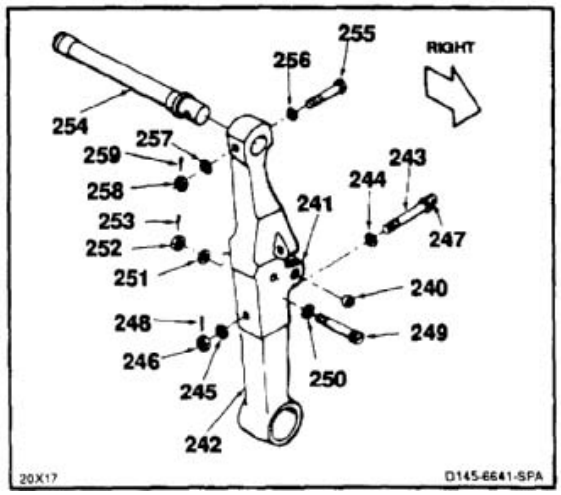
115. Install pin (dissimilar metals) (249) two washers (dissimilar metals) (250 and 251) and nut (252) in post (242).

116. Torque nut (252) to **30 to 45 inch-pounds**. Install cotter pin (253).

117. Install shaft (dissimilar metals) (254). In post (242), holes aligned, until it bottoms. Use gun heater.

118. Install bolt (dissimilar metals) (255), two washers (dissimilar metals) (256 and 257), and nut (258) in post (242).

119. Torque nut (258) to **15 to 20 inch-pounds**. Install cotter pin (259).



INSPECT

120. Install pedal (230) on shaft (254), lug (260) inward. Make sure it bottoms.

121. Install retainer (261) on shaft (254). Use retaining ring pliers.

122. Position spring (262) between lugs (241 and 263) of post (242).

123. Install pin (264) in lug (241) and through spring (262).

124. Position lever (234) on aft side of lug (265) of post (242) with channel (235) between lugs (241 and 263).

125. Install bolt (266), three washers (267, 268, and 269), and nut (270). Tighten nut until lever does not move forward or aft, but rotates freely. Back off nut to align cotter pin hole.

126. Check gap between washer (269) and lug (265). Gap shall be **0.010 inch** maximum.

127. Install cotter pin (271).

128. Repeat steps 107 thru 127 for left pedal (230).

INSPECT

ASSEMBLE LEFT AND RIGHT OUTPUT ARMS

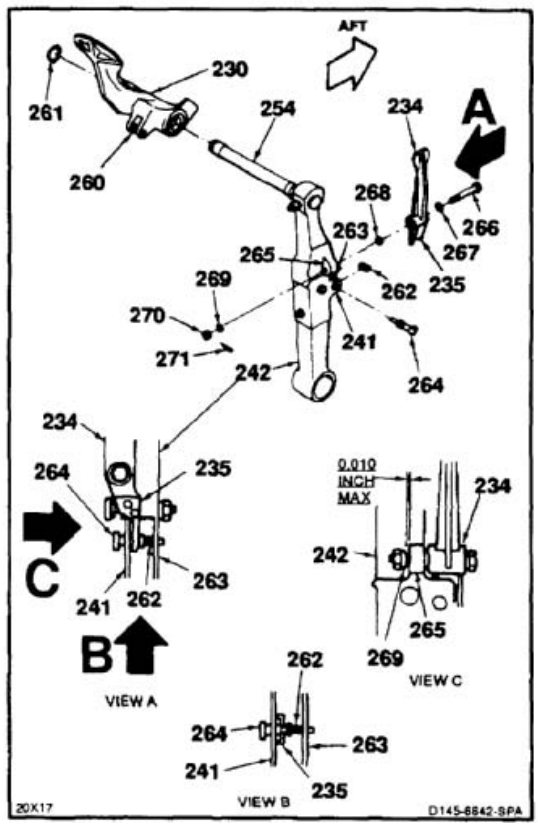
129. Install bushing (dissimilar metals) (272) in right lug of right output arm (273), flange inward.

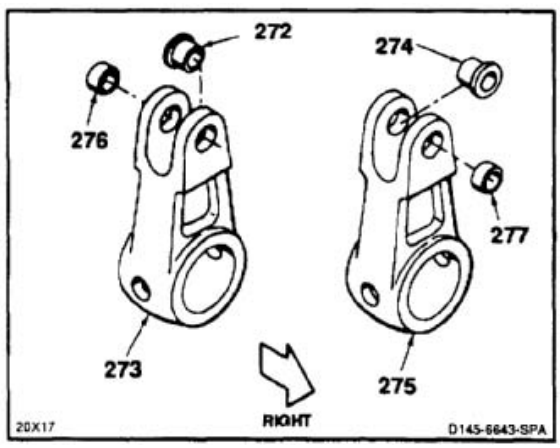
130. Install bushing (dissimilar metals) (274) in left lug of left output arm (275), flange inward.

131. Install bushing (dissimilar metals) (276) in left lug of arm (273).

132. Install bushing (dissimilar metals) (277) in right lug of arm (275).

INSPECT





ASSEMBLE LEFT AND RIGHT PEDAL ARMS AND PEDALS

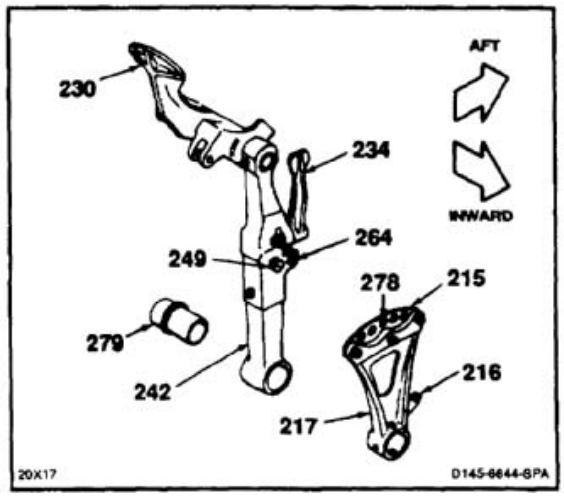
NOTE

Procedure is same to assemble left or right pedal arm and pedal. Right arm and pedal are shown here.

133. Press lever (234) inward. Position top edge of plate (215) in groove of pin (249), mount (216) aft. Position pin (264) in center hole (278) of plate. Release lever.

134. Install longer end of spacer (279) in post (242). Use gun heater.

135. Repeat steps 133 and 134 for left arm (217) and pedal (230).



ASSEMBLE PEDALS, OUTPUT ARMS, AND SUPPORT

NOTE

Procedure is same to assemble left or right pedal and output arm in support. Right arm and pedal are shown here.

136. Position spacer (280) against inner bearing of arm (281) of support (2).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Shafts are match drilled at assembly with mating components and must be reinstalled in the same location.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

137. Slide bushing (282) through arm (281) and spacer (280) until flush with spacer.

WARNING

FLIGHT SAFETY PARTS

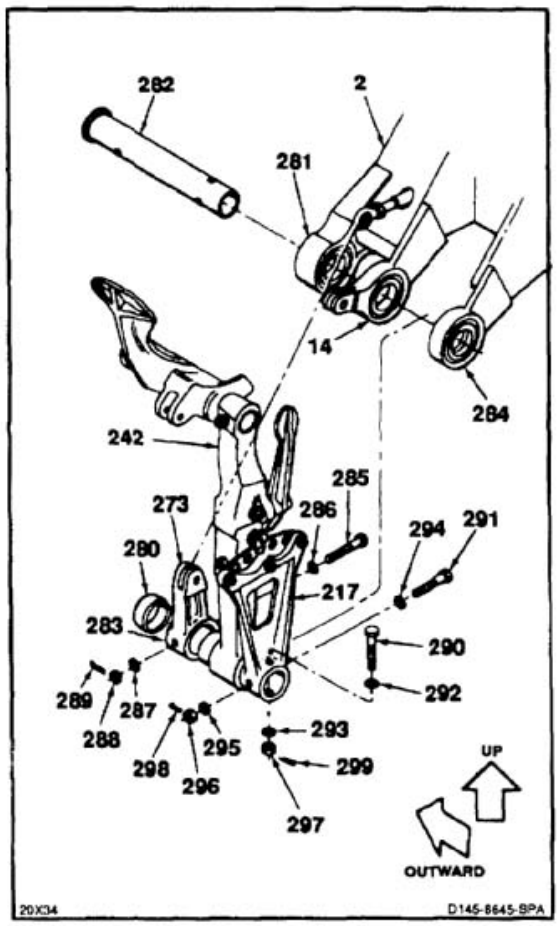
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the shaft.

Ensure that all bushings are properly installed (including orientation) in the output clevis of the arm assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

138. Position arm (273) between spacer (280) and arm (14), long end (283) outward and arm (273) up.



139. Slide bushing (282) through arm (273) and arm (14) until flush with inward bearing of arm (14).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the control box assembly.

Ensure plate and all associated hardware is properly installed.

Ensure spring tab is facing aft.

Ensure proper attaching hardware is installed attaching each arm assembly to the pedal shaft including bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure pedal adjustment lever assemblies move freely and all associated hardware including impedance bolt, plate, guide, pin and lever return spring, eye bolt, and pedal pivot shafts are properly and securely installed.

After installation of the post assembly, ensure free unrestricted operation after engagement of the locking pin into mating drive arm through the entire range yaw control motions.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

140. Position arm (217) and post (242) between arms (14 and 284), post outward and up.

141. Slide bushing (282) through post (242), arm (217), and arm (284) until it bottoms.

142. Turn bushing (282) to align holes with holes in arms (273 and 217). Use soft faced pliers between arms (273 and 14).

143. Install bolt (285), two washers (286 and 287), and nut (288) in arm (273) and bushing (282).

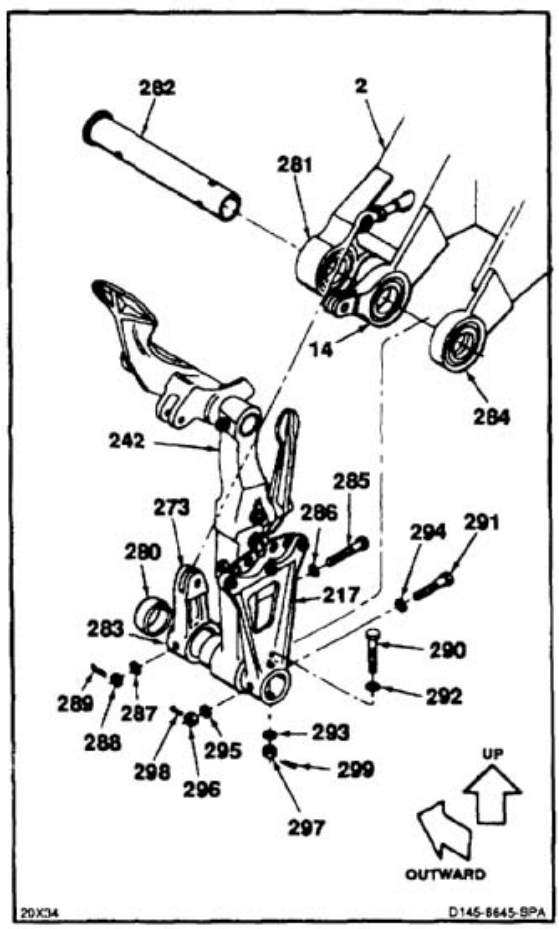
144. Torque nut (288) to **60 to 90 inch-pounds**. Install cotter pin (289).

145. Install two bolts (290 and 291), four washers (292, 293, 294, and 295) and two nuts (296 and 297) in arm (217).

146. Torque two nuts (296 and 297) to **30 to 45 inch-pounds**. Install cotter pins (298 and 299).

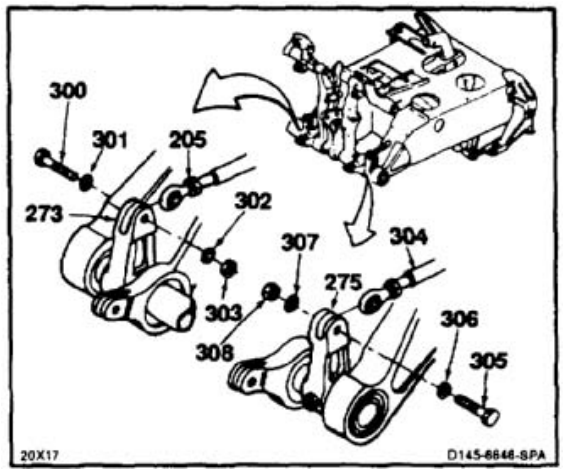
147. Repeat steps 136 thru 146 for left arm (217) and pedal (230).

INSPECT



148. Position link (205) in arm (273). Install bolt (300), two washers (301 and 302), and nut (303). Do not tighten nut at this time.

149. Position link (304) in arm (275). Install bolt (305), two washers (306 and 307), and nut (308). Do not tighten nut at this time.



150. Press lever (234) inward. Position post (242) fully aft. Release lever.

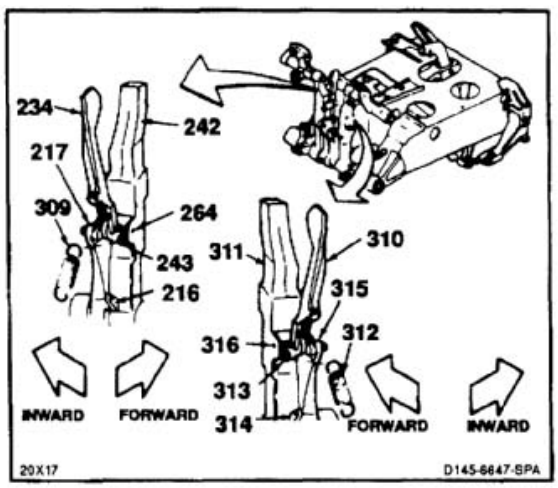
151. Connect spring (309) to bolt (243) and mount (216).

152. Press lever (234) inward. Position post (242) forward to align center hole of arm (217) with pin (264). Release lever.

153. Press lever (310) inward. Position post (311) fully aft. Release lever.

154. Connect spring (312) to bolt (313) and mount (314).

155. Press lever (310) inward. Position post (311) forward to align center hole of arm (315) with pin (316). Release lever.



156. Position cylinder (317) in upper mount (318) ports (319) forward.

157. Install bolt (320), two washers (321 and 322), and nut (323). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (324).

158. Position cylinder (317) in arm (14).

159. Install bolt (325), two washers (326 and 327), and nut (328). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (329).

160. Position cylinder (330) in upper mount (331), ports (332) forward.

161. Install bolt (333), two washers (334 and 335), and nut (336). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (337).

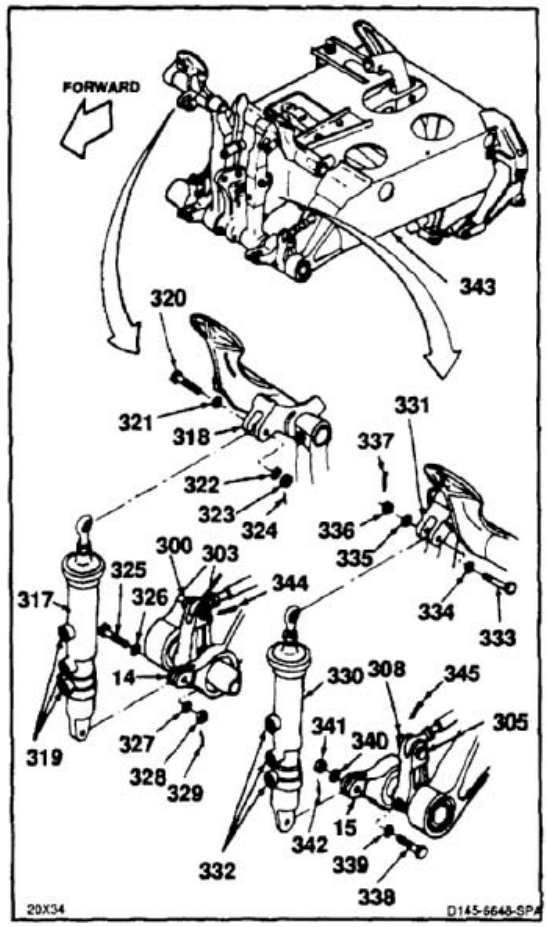
162. Position cylinder (330) in arm (15).

163. Install bolt (338), two washers (339 and 340), and nut (341). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (342).

164. Rig control assembly (343) (Task 11-42).

165. Torque two nuts (303 and 308) to **30 to 45 inch-pounds**. Install two cotter pins (344 and 345).

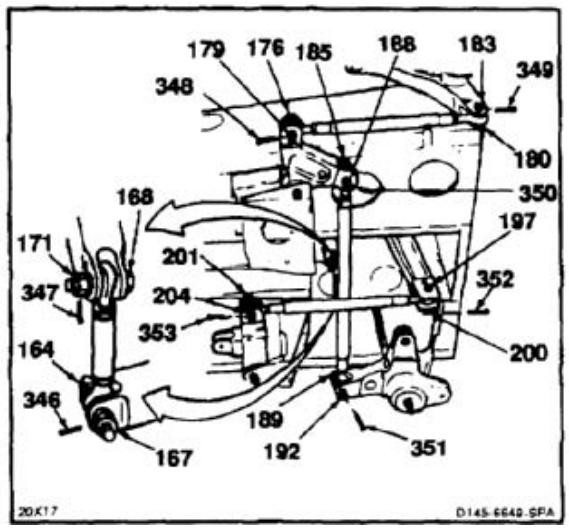
166. Check two bolts (300 and 305). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 165.



167. Torque eight nuts (167, 171, 179, 183, 188, 192, 200, and 204) to **30 to 45 inch-pounds**.

168. Install eight cotter pins (346, 347, 348, 349, 350, 351, 352, and 353).

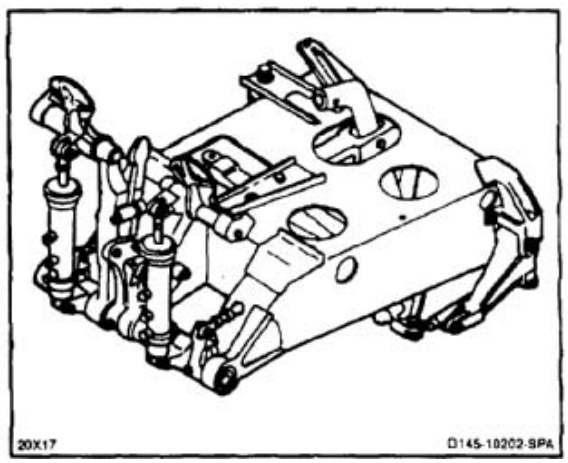
169. Check eight bolts (164, 168, 176, 180, 185, 189, 197, and 201). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat steps 167 and 168.



INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-79 RIG COPILOT'S COCKPIT CONTROL ASSEMBLY 11-79

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Rigging Set, Controls (T39)
Torque Wrench, 30 to 150 Inch-Pounds
Scale, 6 Inch

Materials:

None

Parts:

Cotter Pins

Personnel Required:

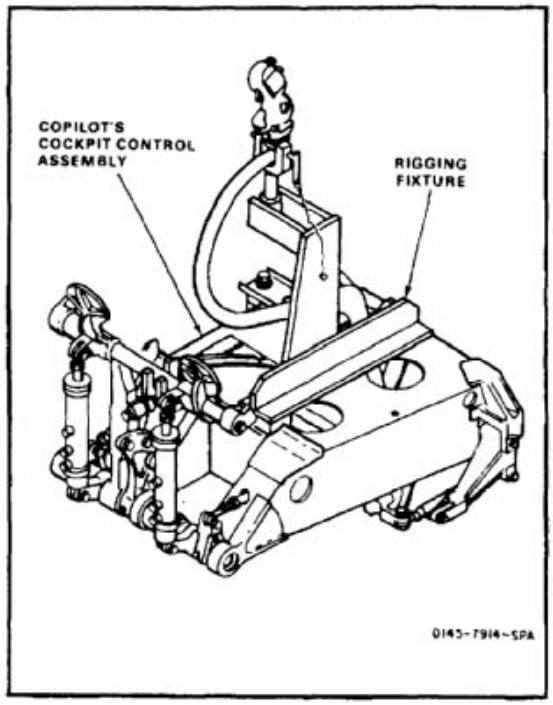
Medium Helicopter Repairer
Inspector

References:

Task 1-13

Equipment Condition:

Off Helicopter Task
Rigging Fixture (T39) Installed (Task 11-22)



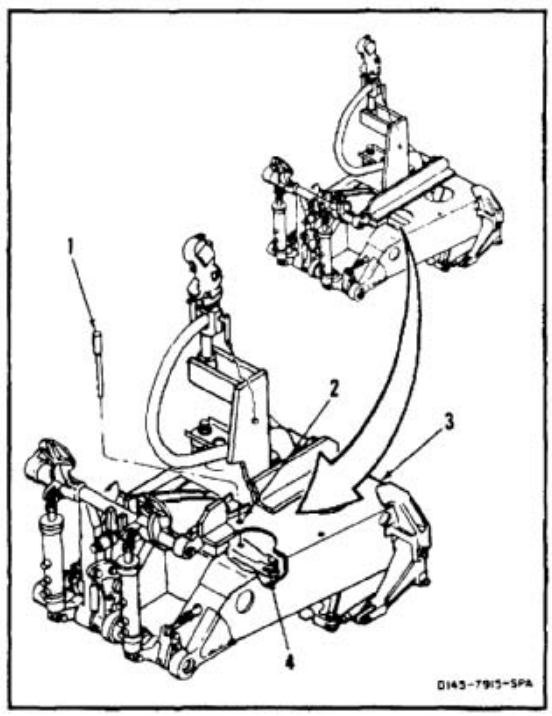
CAUTION

Do not drive a rig pin into rigging hole. Damage to component will result.

Do not lubricate rig pin. Lubrication will cause accumulation of dirt at rigging hole.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).



RIG YAW CONTROL

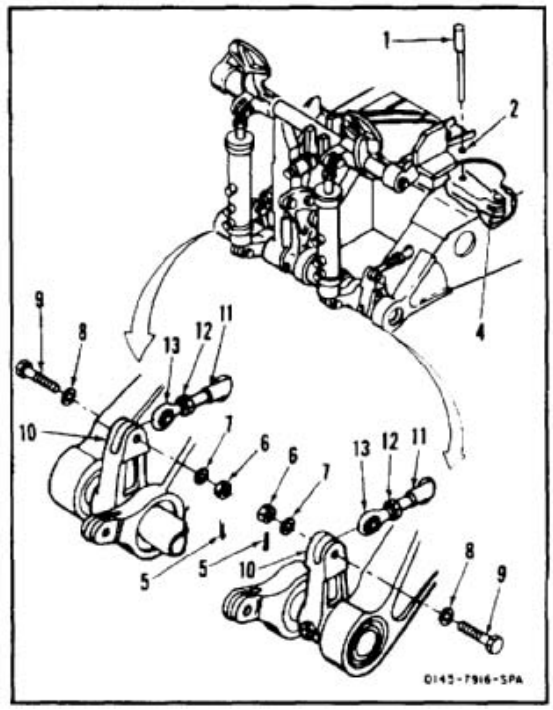
1. Insert rig pin (1) fully in rigging hole (2) of support assembly (3) through yaw bellcrank (4) and through rigging pin hole in bottom of support assembly (3). If pin slides freely, go to step 10. If pin does not slide freely, remove pin. Perform steps 2 thru 10.

2. Loosen two nuts (12) of links (11).
3. Remove two cotter pins (5), two nuts (6), two washers (7), two washers (8), and two bolts (9) from two arms (10). Disconnect two yaw connecting links (11) from arms.
4. Check that rigging pin (1) is fully inserted in hole (2) through yaw bellcrank (4) and hole (2) in bottom of support.

WARNING

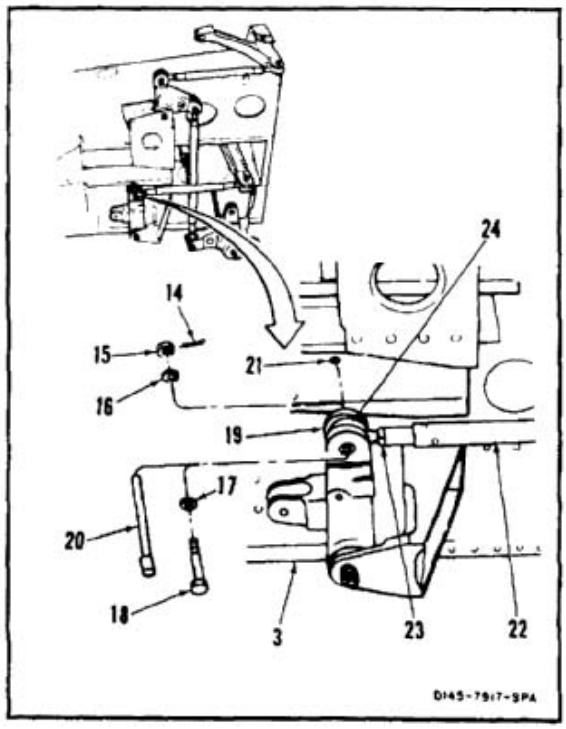
After adjusting rod ends, insure that safety holes of connecting links are blocked to insure adequate thread engagement.

5. Turn two rod ends (13) until links (11) can be positioned in arms (10) with bolts (9) freely inserted. Check pin (1) is free with bolts inserted.
6. Connect links (11) to arms (10). Install two bolts (9), two washers (8), two washers (7), and nuts (6).
7. Torque two nuts (6) to **30 to 45 inch-pounds**. Install two cotter pins (5).
8. Check two bolts (9). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 7.
9. Torque two nuts (12) to **103 inch-pounds**.
10. Remove rigging pin (1) from holes (2) and bellcrank (4).



INSPECT

RIG PITCH CONTROL



11. Turn assembly (3) for access to bottom.
12. Remove cotter pin (14), nut (15), two washers (16 and 17) and bolt (18) from pitch bellcrank (19).
13. Insert rig pin (20) fully in rigging hole (21) through bellcrank (19) and pitch connecting link (22). If pin can be installed fully and slides freely, go to step 17. If pin does not slide freely, perform steps 14 thru 19.
14. Loosen nut (23) of link (22).
15. Remove rigging pin (20) from bellcrank (19). Disconnect link (22) from bellcrank.

WARNING

After adjusting rod ends insure that safety holes of connecting links are blocked to insure adequate thread engagement.

16. Turn rod end (24) until link can be positioned in bellcrank (19) with pin (20) freely inserted through bellcrank, link and hole (21).
17. Remove rigging pin (20) from bellcrank (19). Install bolt (18), two washers (17 and 16), and nut (15).
18. Torque nut (15) to **30 to 45 inch-pounds**. Install cotter pin (14).
19. Check bolt (18). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 18.
20. Torque nut (23) to **103 inch-pounds**.

INSPECT

RIG THRUST CONTROL

21. Insert rig pin (25) in rigging hole (26) of thrust idler bellcrank (27) and through rigging holes in bottom and top of assembly (3).

22. Check that a line through centers of bolts (30 and 31) is parallel with the rear edge (28) of fitting (29) as follows:

    a. Hold scale (40) against read edge (28) of fitting (29).

    b. Measure distance from center of each bolt to edge of scale (40) as shown.

    c. Subtract smaller dimension from larger dimension. This value shall be **0.06 inch** or less.

    d. If valve is **0.06 inch** or less go to step 30. If valve is greater than **0.06 inch**, repeat steps 23 thru 29.

23. Loosen nut (38) of link (37).

24. Remove cotter pin (32), nut (33), two washers (34 and 35) and bolt (36) from bellcrank (27). Disconnect thrust connecting link (37) from bellcrank.

WARNING

After adjusting rod ends insure that safety holes of connecting links are blocked to insure adequate thread engagement.

25. Turn rod end (39) until link can be positioned in bellcrank (27), with bolt (36) inserted, and the bolt center to edge measurements between two bolts (30 and 31) and edge (28) are equal. Use two scales (40).

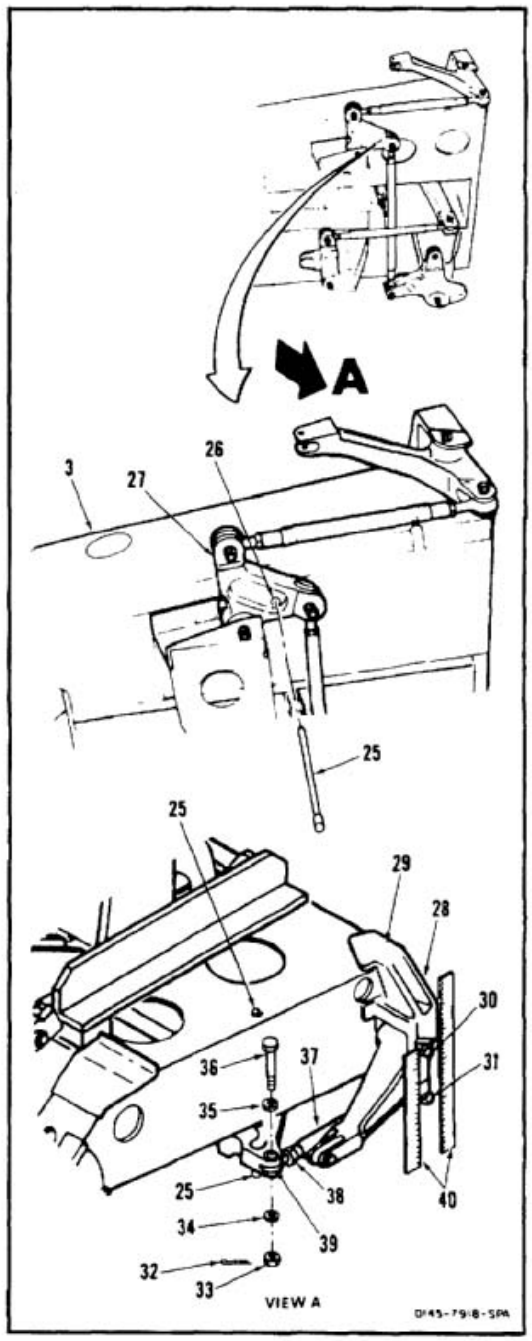
26. Install bolt (36), two washers (35 and 34), and nut (33).

27. Torque nut (33) to **30 to 45 inch-pounds**. Install cotter pin (32).

28. Check bolt (36). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 27.

29. Torque nut (38) to **103 inch-pounds**.

INSPECT

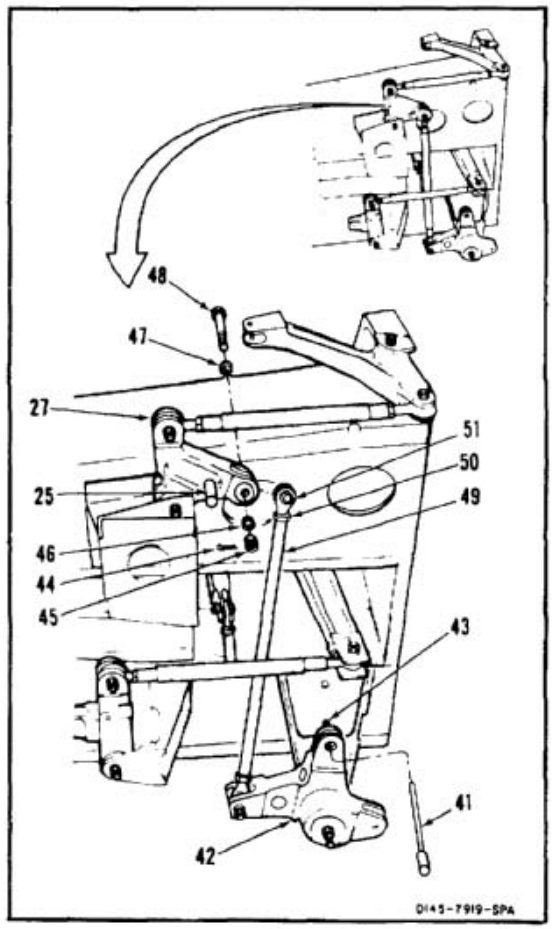


30. Leave pin (25) in bellcrank (27). Insert rig pin (41) through thrust bellcrank (42) and in rigging hole (43). If pin slides freely, remove pins (25 and 41). If pin does not slide freely, perform steps 31 thru 39.
31. Loosen nut (50) of link (49).
32. Remove cotter pin (44), nut (45), two washers (46 and 47) and bolt (48) from bellcrank (27). Disconnect link (49) from bellcrank.
33. Check that pin (41) is fully inserted through bellcrank (42) and in hole (43).

WARNING

After adjusting rod ends insure that safety holes of connecting links are blocked to insure adequate thread engagement.

34. Turn rod end (51) until link (49) can be positioned in bellcrank (27) with bolt (48) inserted. Check pin (41) is free with bolt inserted.
35. Connect link (49) to bellcrank (27). Install bolt (48), two washers (47 and 46) and nut (45).
36. Torque nut (45) to **30 to 45 inch-pounds**. Install cotter pin (44).
37. Check bolt (48). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 36.
38. Torque nut (50) to **103 inch-pounds**.
39. Remove two pins (25 and 41) from bellcranks (27 and 42).



INSPECT

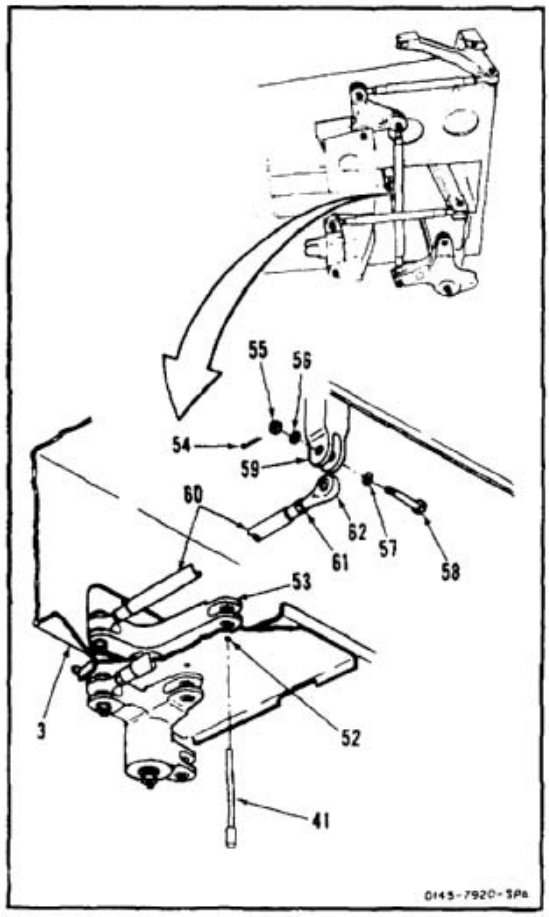
RIG ROLL CONTROL

40. Insert rig pin (41) in rigging hole (52) of assembly (3) and through roll bellcrank (53). If pin slides freely, go to step 49. If pin does not slide freely, perform steps 41 thru 49.
41. Loosen nut (61) of link (60).
42. Remove cotter pin (54), nut (55), two washers (56 and 57), and bolt (58) from roll input bellcrank (59). Disconnect link (60) from bellcrank.
43. Check that rigging pin (41) is fully inserted in hole (52), and through bellcrank (53).

WARNING

After adjusting rod ends insure that safety holes of connecting links are blocked to insure adequate thread engagement.

44. Turn rod end (62) until link (60) can be positioned in bellcrank (59) with bolt (58) inserted. Check pin (41) is free with bolt inserted.
45. Connect link (60) to bellcrank (59). Install bolt (58), two washers (57 and 56), and nut (55).
46. Torque nut (55) to **30 to 45 inch-pounds**. Install cotter pin (54).
47. Check bolt (58). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 46.
48. Torque nut (61) to **103 inch-pounds**.
49. Remove rigging pin (41) from bellcrank (53) and hole (52).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove rigging fixture (Task 11-23).

END OF TASK

11-80 RIG PILOT'S COCKPIT CONTROL ASSEMBLY 11-80

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Rigging Set, Controls (T39)
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Scale, 6 Inch

Materials:

None

Parts:

Cotter Pins

Personnel Required:

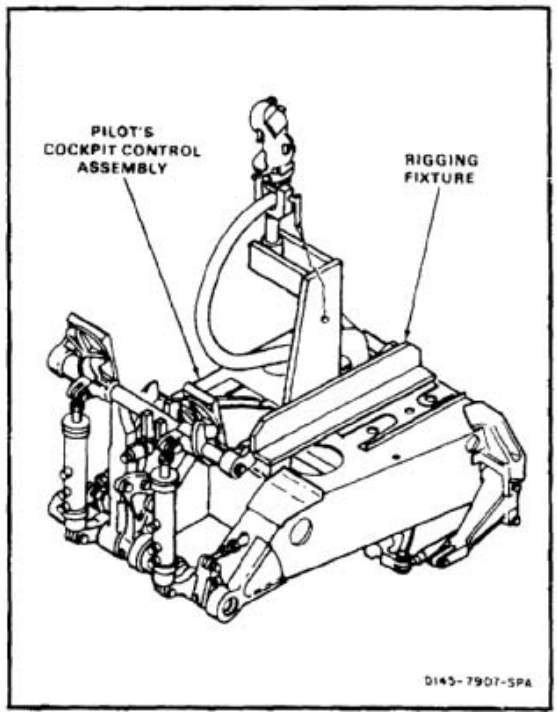
Medium Helicopter Repairer
Inspector

References:

Task 1-13

Equipment Condition:

Off Helicopter Task
Rigging Fixture (T39) Installed (Task 11-22)



CAUTION

Do not drive rig pin in rigging hole. Damage to component will result.

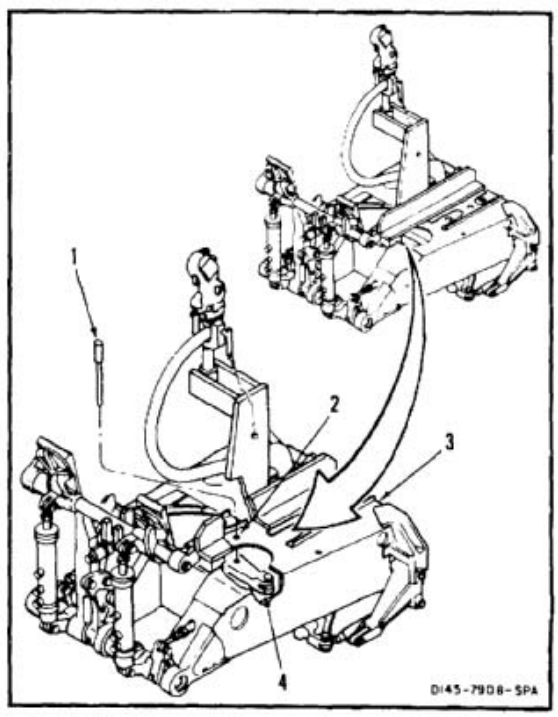
Do not lubricate rig pin. Lubrication will cause accumulation of dirt at rigging hole.

NOTE

Impedance bolts are installed in flights control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

RIG YAW CONTROL

1. Insert rig pin (1) fully in rigging holes (2) in top and bottom of support assembly (3), and through yaw bellcrank (4). If pin slides freely, go to step 10. If pin does not slide freely, perform steps 2 thru 10.

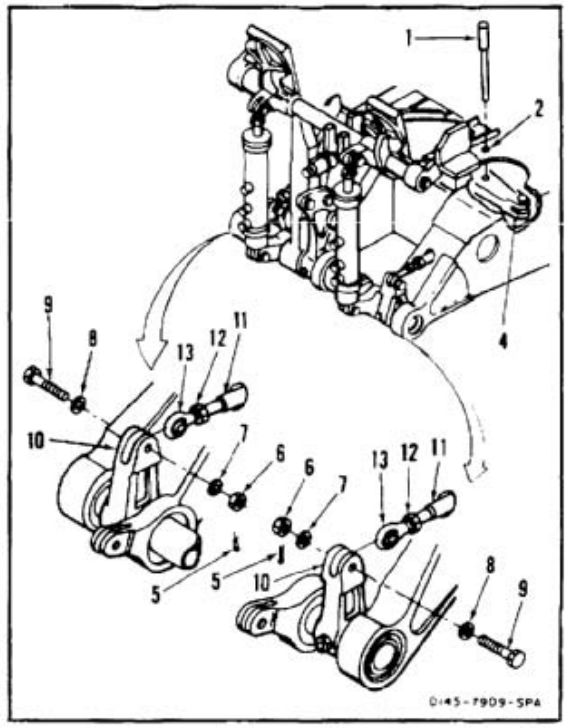


2. Loosen two nuts (12) of links (11).
3. Remove two cotter pins (5), two nuts (6), two washers (7), two washers (8), and two bolts (9) from two arms (10). Disconnect two yaw connecting links (11) from arms.
4. Check that rigging pin (1) is fully inserted in hole (2) through top of support assembly through yaw bellcrank (4), and through hole (2) in bottom of support assembly.

WARNING

After adjusting rod ends insure that safety holes of connecting links are blocked to insure adequate thread engagement.

5. Turn two rod ends (13) until links (11) can be positioned in arms (10) with bolts (9) freely inserted. Check pin (1) is free with bolts inserted.
6. Connect links (11) to arms (10). Install two bolts (9), two washers (8), two washers (7), and nuts (6).
7. Torque two nuts (6) to **30 to 45 inch-pounds**. Install two cotter pins (5).
8. Check two bolts (9). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 7.
9. Torque two nuts (12) to **103 inch-pounds**.
10. Remove rigging pin (1) from holes (2) and bellcrank (4).



INSPECT

RIG PITCH CONTROL

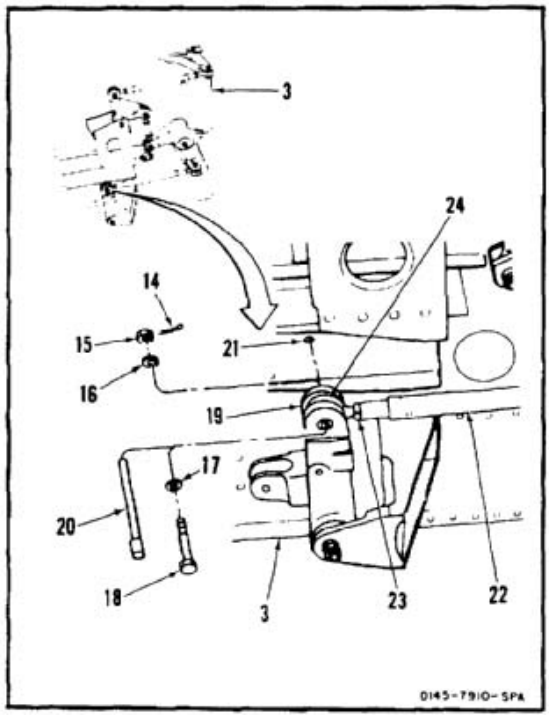
11. Turn assembly (3) for access to bottom.
12. Remove cotter pin (14), nut (15), two washers (16 and 17), and bolt (18) from pitch bellcrank (19).
13. Insert rig pin (20) fully through bellcrank (19), pitch connecting link (22) and into rigging hole (21). If pin can be inserted fully and slides freely, go to step 17. If pin does not slide freely, perform steps 14 thru 20.
14. Loosen nut (23) of link (22).
15. Remove rigging pin (20) from bellcrank (19). Disconnect link (22) from bellcrank.

WARNING

After adjusting rod ends insure that safety holes of connecting links are blocked to insure adequate thread engagement.

16. Turn rod end (24) until link (22) can be positioned in bellcrank (19) with pin (20) freely inserted through bellcrank, link, and hole (21).
17. Remove rigging pin (20) from bellcrank (19). Install bolt (18), two washers (17 and 16), and nut (15).
18. Torque nut (15) to **30 to 45 inch-pounds**. Install cotter pin (14).
19. Check bolt (18). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 18.
20. Torque nut (23) to **103 inch-pounds**.

INSPECT



RIG THRUST CONTROL

21. Insert rig pin (25) in rigging hole (26) of thrust idler bellcrank (27) and through rigging holes in bottom and top of assembly (3).

22. Check that a line through centers of bolts (30 and 31) is parallel with the rear edge (28) of fitting (29) as follows:

    a. Hold scale (40) against rear edge (28) of fitting (29).

    b. Measure distance from center of each bolt to edge of scale (40) as shown.

    c. Subtract smaller dimension from larger dimension. This value shall be **0.06 inch** or less.

    d. If value is within **0.06 inch** or less, go to step 30.

    e. If value is greater than **0.006 inch**, repeat steps 23 thru 29.

23. Loosen nut (38) of link (37).

24. Remove cotter pin (32), nut (33), two washers (34 and 35), and bolt (36) from bellcrank (27). Disconnect thrust connecting link (37) from bellcrank.

WARNING

After adjusting rod ends insure that safety holes of connecting links are blocked to insure adequate thread engagement.

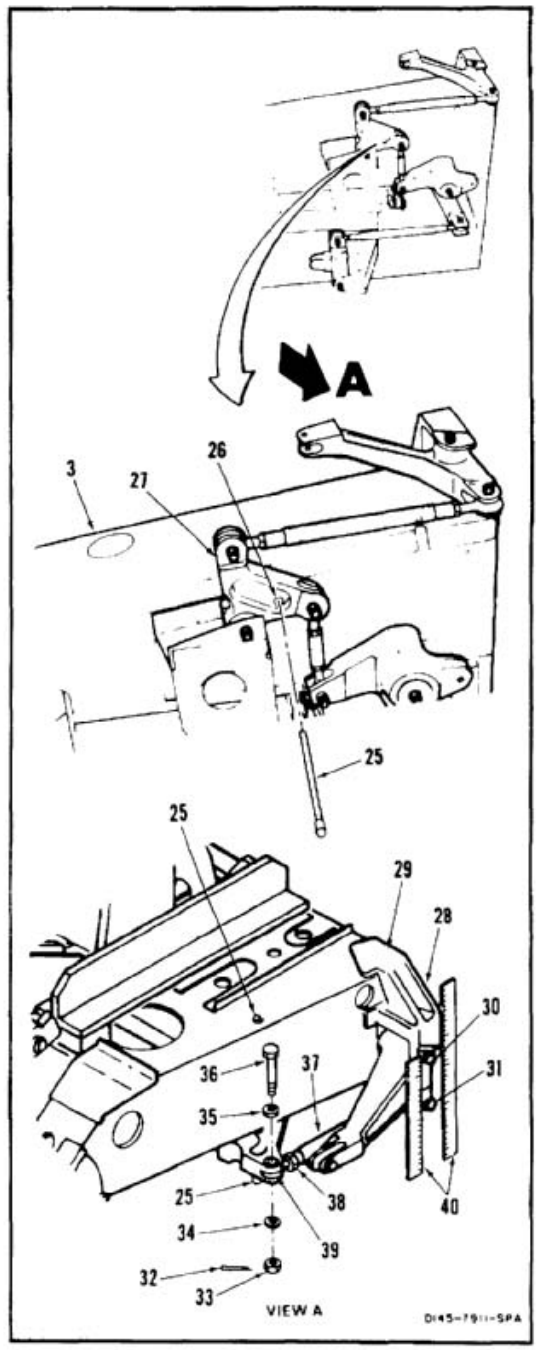
25. Turn rod end (39) until link (37) can be positioned in bellcrank (27) with bolt (36) inserted, and the bolt center to edge measurements between two bolts (30 and 31), and edge (28) are equal. Use two scales (40).

26. Install bolt (36), two washers (35 and 34), and nut (33).

27. Torque nut (33) to **30 to 45 inch-pounds**. Install cotter pin (32).

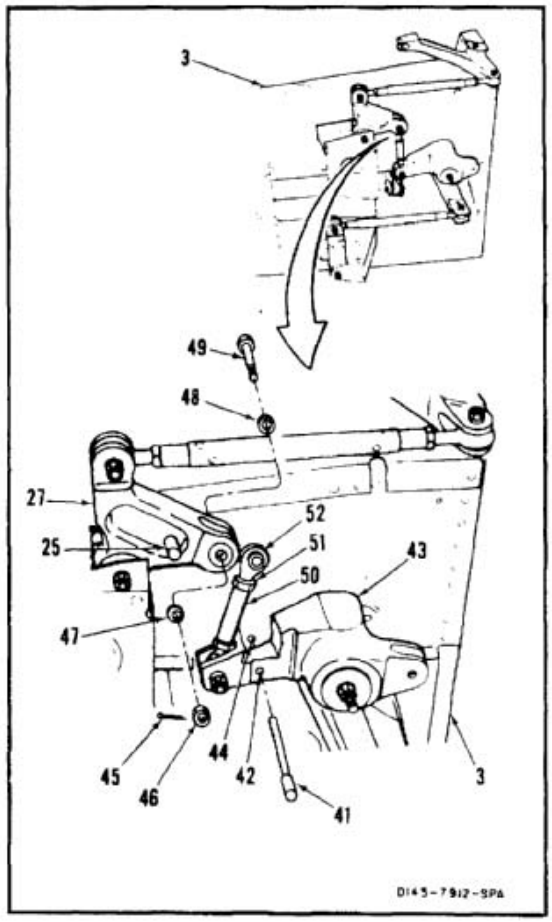
28. Check bolt (36). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axiel looseness. If bolt rotates or is loose, add washer under nut and repeat step (27).

29. Torque nut (38) to **103 inch-pounds**.



30. Leave rigging pin (25) in bellcrank (27).
31. Remove cotter pin (45), nut (46), two washers (47 and 48), and bolt (49) from bellcrank (43) and link (50).
32. Insert rigging pin (41) fully through bellcrank (43) connecting link and into hole (44).
33. Loosen nut (51) of link (50).
34. Turn rod end (52) until link can be positioned in bellcrank (43) with pin (41) fully and freely inserted through bellcrank, link, and hole.
35. Connect link (50) to bellcrank (43). Install bolt (49), two washers (48 and 47), and nut (46).
36. Torque nut (46) to **30 to 45 inch-pounds**. Install cotter pin (45).
37. Check bolts (49). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 36.
38. Torque nut (51) to **103 inch-pounds**.
39. Remove two pins (25 and 41) from bellcranks (27 and 43).

INSPECT



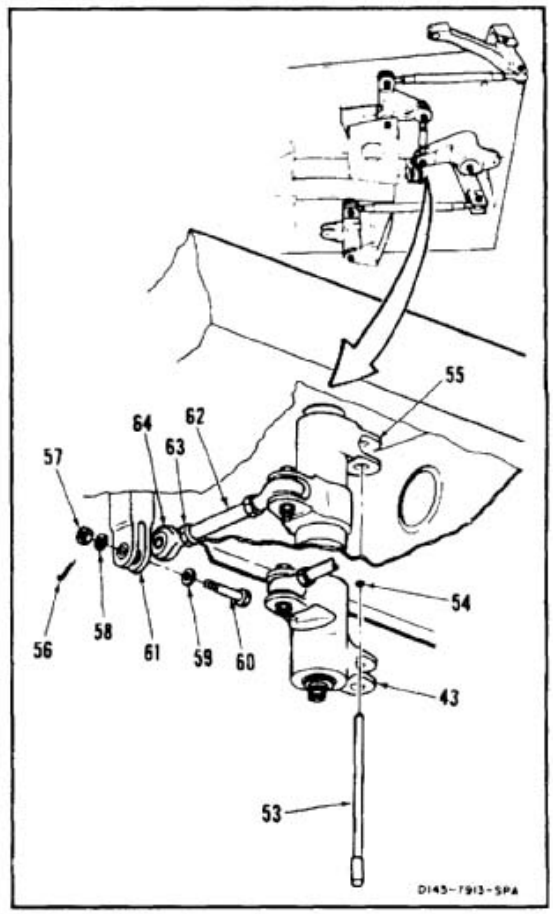
RIG ROLL CONTROL

40. Move bellcrank (43) and insert rig pin (53) in rigging hole (54) of assembly (3) and through roll bellcrank (55). If pin slides freely go to step 49. If pin does not slide freely perform steps 41 thru 49.
41. Loosen nut (63) of link (62).
42. Remove cotter pin (56), nut (57), two washers (58 and 59), and bolt (60) from roll input bellcrank (61). Disconnect link (62) from bellcrank.
43. Check that pin (53) is fully inserted in hole (54) and through bellcrank (55).

WARNING

After adjusting rod ends insure that safety holes of connecting links are blocked to insure adequate thread engagement.

44. Turn rod end (64) until link (62) can be positioned in bellcrank (61) with bolt (60) inserted. Check pin (53) is free with bolt inserted.
45. Connect link (62) to bellcrank (61). Install bolt (60), two washers (59 and 58), and nut (57).
46. Torque nut (57) to **30 to 45 inch-pounds**. Install cotter pin (56).
47. Check bolt (60). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose add washer under nut and repeat step 46.
48. Torque nut (63) to **103 inch-pounds**.
49. Remove rigging pin (53) from bellcrank (55) and hole (54).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove rigging fixture (T39) (Task 11-23).

END OF TASK

11-81 INSTALL PILOT'S COCKPIT CONTROL ASSEMBLY 11-81

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Acetone (E20)
Cloths (E120)
Sealant (E336)
Gloves (E186)

Parts:

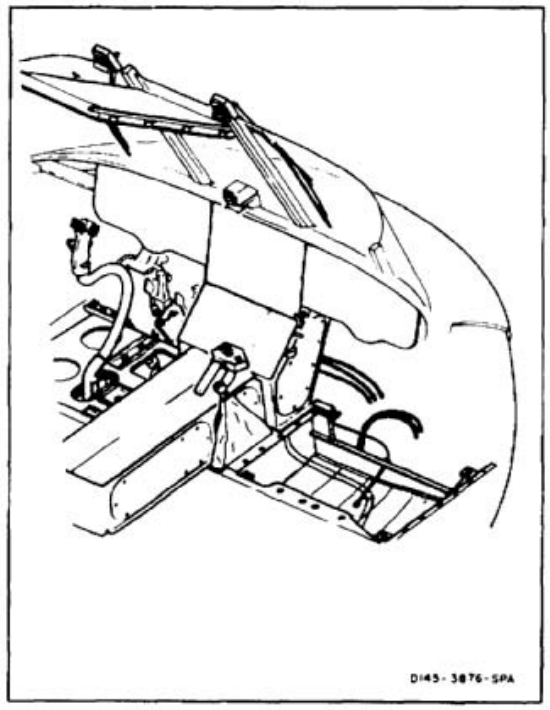
Gasket
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-33
Task 11-71

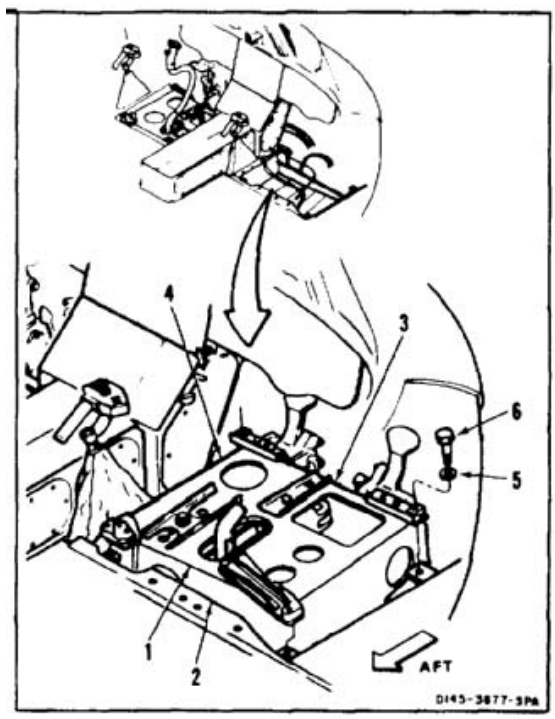


INSTALL CONTROL ASSEMBLY

WARNING

Control assembly weighs about **50 pounds**. Do not drop, injury to personnel or damage to equipment could occur.

1. Position control assembly (1) about **6 inches** forward in floor recess (2).
2. Lift forward end (3) about **6 inches**, and tilt left side (4) down into recess (2). Move assembly (1) aft and lower forward end. Align assembly in recess.
3. Install four washers (5) and bolts (6).



CAUTION

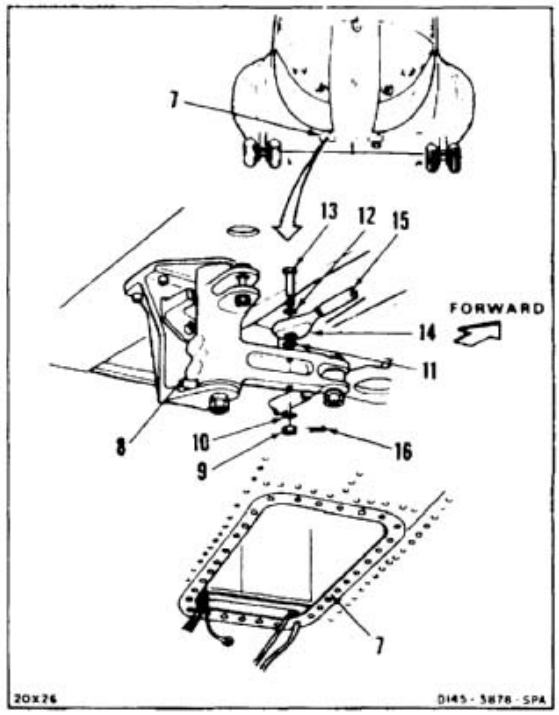
Do not install bolts unless bushings are in bellcranks; otherwise, damage to bellcranks will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require special torque and nut (Task 1-13).

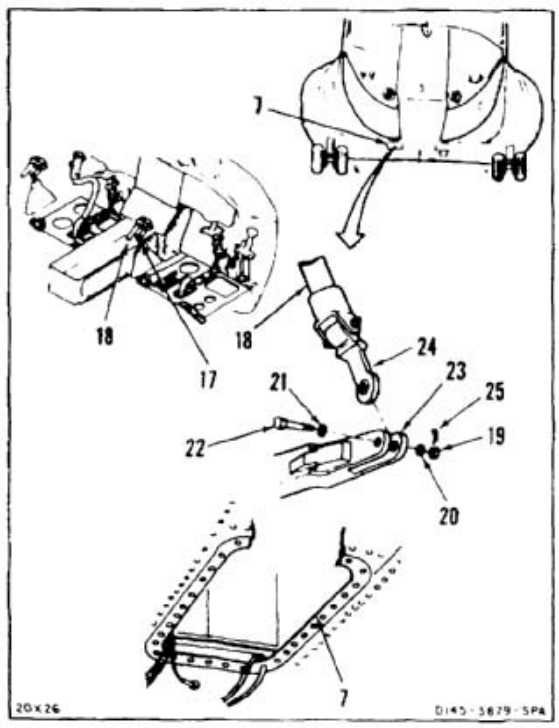
CONNECT CONTROL STICK INDICATOR

4. Working through right access (7), move bellcrank (8) fully forward.
5. Remove nut (9), three washers (10, 11, and 12), and bolt (13) from bellcrank (8).
6. Position rod end (14) of indicator (15) on top of bellcrank (8).
7. Position washer (11) between rod end (14) and bellcrank (8). Install washer (12) bolt (13), washer (10), and nut (9). Torque nut to **30 to 60 inch-pounds**. Install cotter pin (16).



CONNECT THRUST CONTROL

8. Remove strap (17) from thrust control (18). Set control fully down.
9. Working through right access (7), remove nut (19), two washers (20 and 21), and bolt (22) from bellcrank (23).
10. Position link (24) in bellcrank (23).
11. Install bolt (22), two washers (21 and 20), and nut (19).
12. Torque nut (19) to **30 to 60 inch-pounds**. Install cotter pin (25).
13. Check bolt (22). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 12.



INSTALL THRUST CONNECTING LINK

14. Working through left access (26), remove nut (27), two washers (28 and 29) and bolt (30), from bellcrank (31).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

15. Position thrust connecting link (32) in bellcrank (31). Check that link is free of electrical wiring.

16. Install bolt (30), two washers (29 and 28), and nut (27) in bellcrank (31). Remove tag from link (32).

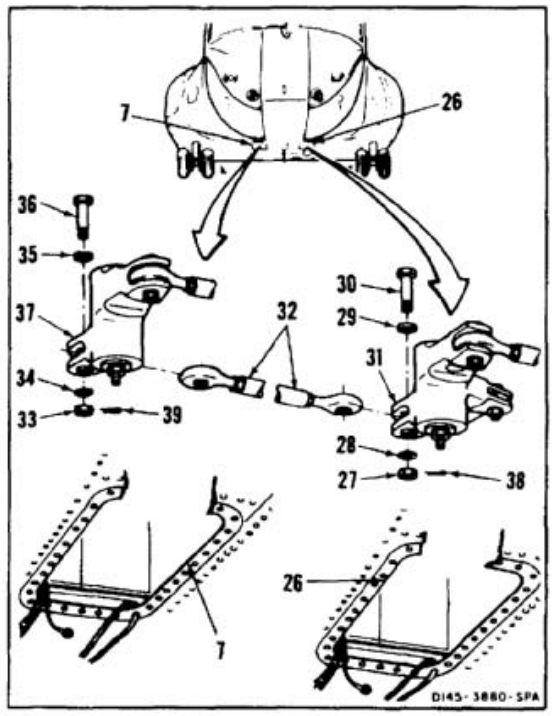
17. Working through right access (7), remove nut (33), two washers (34 and 35), and bolt (36) from bellcrank (37).

18. Position link (32) in bellcrank (37).

19. Install bolt (36), two washers (35 and 34), and nut (33) in bellcrank (37).

20. Torque nuts (27 and 33) to **30 to 45 inch-pounds** in accordance with standard torque limit applications (Task 1-13, Note 5). Install two cotter pins (38 and 39).

21. Check bolts (30 and 36). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 20.



INSTALL PITCH CONNECTING LINK

22. Working through left access (26), position bellcrank (40) to align bolt (41) and hole (42).

23. Remove nut (43), two washers (44 and 45), and bolt (41) from bellcrank (40).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

24. Position pitch connecting link (46) in bellcrank (40). Check that link is free of electrical wiring.

25. Install bolt (41), two washers (45 and 44), and nut (43) in bellcrank (40). Remove tag from link (46).

26. Working through right access (7), position bellcrank (47) to align bolt (48) and hole (49).

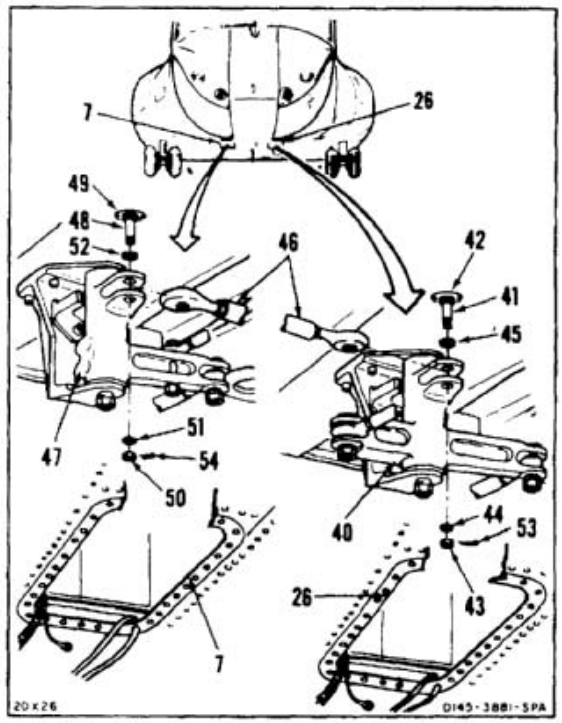
27. Remove nut (50), two washers (51 and 52), and bolt (48) from bellcrank (47).

28. Position link (46) in bellcrank (47).

29. Install bolt (48), two washers (52 and 51), and nut (50) in bellcrank (47).

30. Torque nuts (43 and 50) to **30 to 60 inch-pounds**. Install two cotter pins (53 and 54).

31. Check bolts (41 and 48). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 30.



INSTALL ROLL CONNECTING LINK

32. Position bellcrank (55) to align bolt (56) and hole (57).
33. Working through right access (7), remove nut (58), and washer (59) from bolt (56).
34. Have helper in cockpit remove bolt (56) and washer (60).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

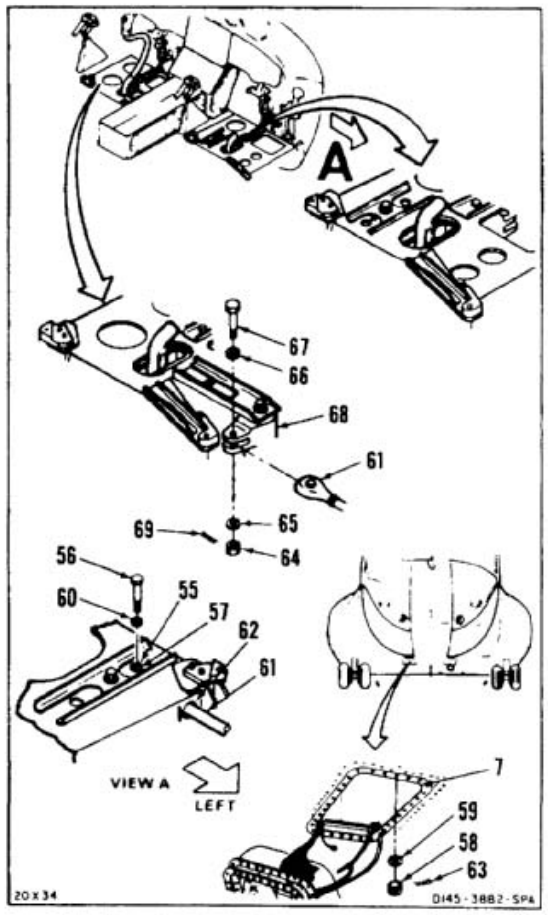
Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

35. Slide roll connecting link (61) from left, through hole (62) and position in bellcrank (55).
36. Check that link (61) is free of electrical wiring.
37. Have helper install washer (60) and bolt (56) in bellcrank (55) and hold bolt.
38. Install washer (59), and nut (58) on bolt (56). Remove tag from link (61).
39. Torque nut (58) to **30 to 60 inch-pounds**. Install cotter pin (63).
40. Working from cockpit, remove nut (64), two washers (65 and 66), and bolt (67) from bellcrank (68).
41. Position link (61) in bellcrank (68).
42. Install bolt (67), two washers (66 and 65), and nut (64) in bellcrank (68).
43. Torque nut (64) to **30 to 60 inch-pounds**. Install cotter pin (69).
44. Check bolts (56 and 67). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 39 or 43.



INSTALL YAW CONNECTING LINK

45. Move bellcrank (70) for access to bolt (71). Remove nut (72), two washers (73 and 74) and bolt (71).

WARNING

FLIGHT SAFETY PARTS

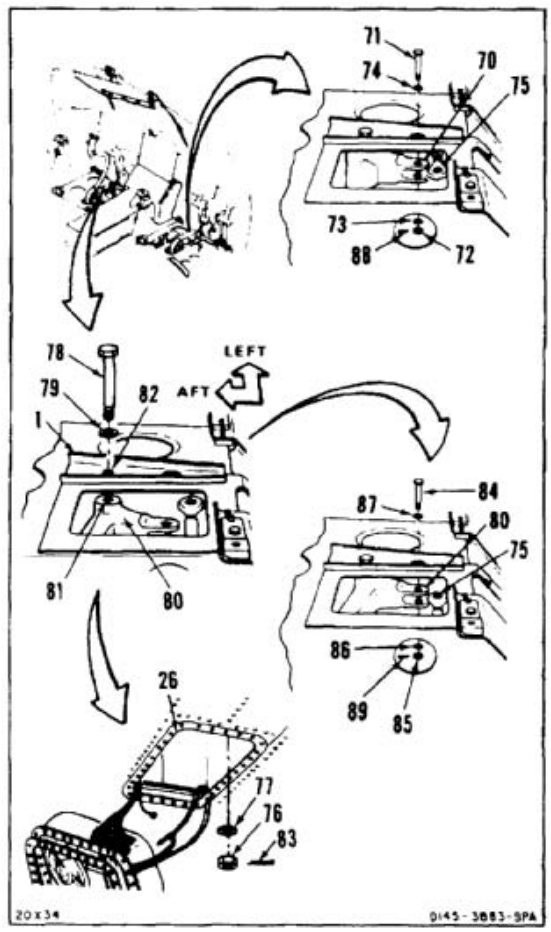
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



46. Slide yaw connecting link (75) from left and position in bellcrank (70).

47. Install bolt (71), two washers (74 and 73), and nut (72) in bellcrank (70).

48. Working through left access (26) remove nut (76) and washer (77) from bolt (78).

49. Have helper working from cockpit, remove bolt (78) and washer (79) from assembly (1).

50. Move bellcrank (80) forward to align bellcrank pivot hole (81) and hole (82).

51. Install washer (79) and bolt (78) through assembly (1) and bellcrank (80).

52. Working through left access (26), install washer (77) and nut (76).

53. Torque nut (76) to **60 to 90 inch-pounds**. Install cotter pin (83).

54. Have helper working from cockpit, move bellcrank (80) for access to bolt (84). Remove nut (85) two washers (86 and 87) and bolt (84).

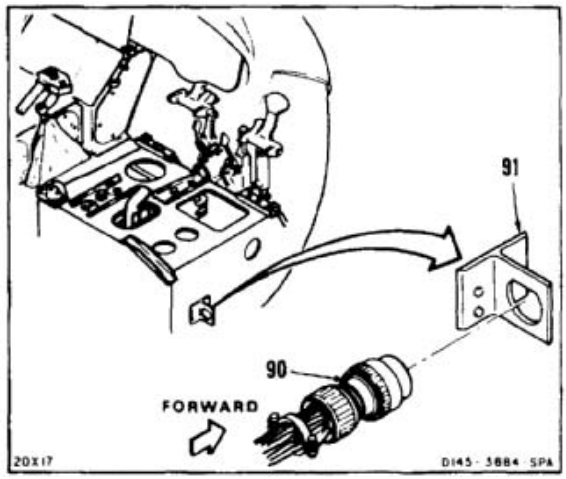
55. Position link (75) in bellcrank (80).

56. Install bolt (84), two washers (87 and 86), and nut (85) in bellcrank (80).

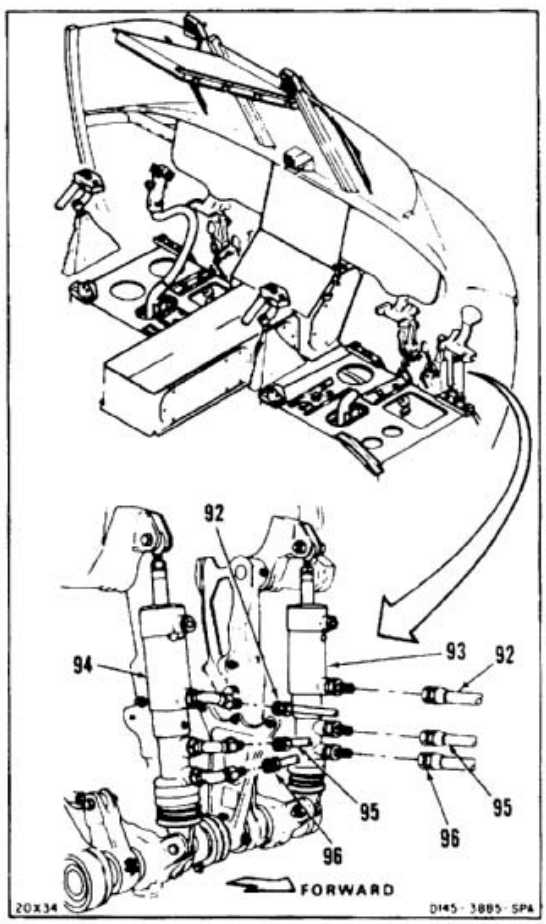
57. Torque nuts (72 and 85) to **30 to 60 inch-pounds**. Install two cotter pins (88 and 89).

58. Check bolts (71, 78, and 84). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 53 or 57.

59. Install receptacle (90) in bracket (91). Remove tag.



60. Connect two BRAKE hoses (92) to cylinders (93 and 94). Remove tags.
61. Connect two PRESS hoses (95) to cylinders (93 and 94). Remove tags.
62. Connect two RET hoses (96) to cylinders (93 and 94). Remove tags.
63. Install pilot's control stick (Task 11-71).
64. Perform neutral rig check (Task 11-33).



WARNING

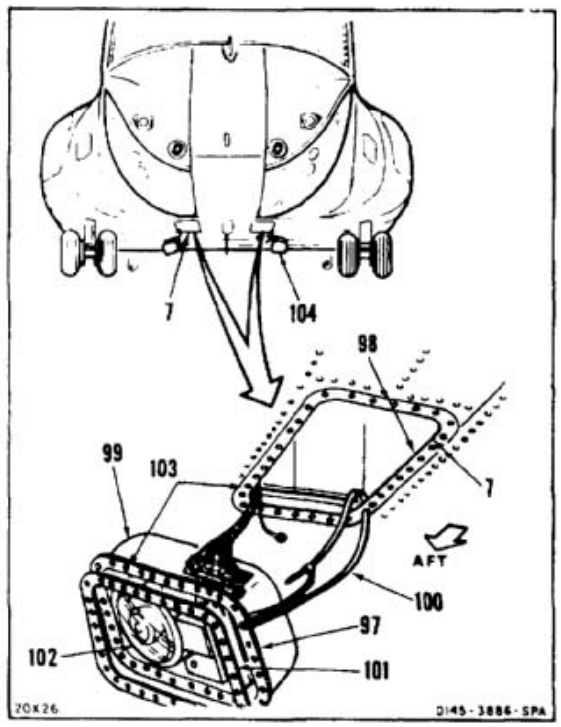
Acetone (E20) can form toxic vapors if exposed to flame. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

65. Clean sealant from flange (97) and inside surface (98) of access. Use acetone (E20) and cloths (E120). Wear gloves (E186) and goggles.
66. Support right housing assembly (99). Remove strap (100).

WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

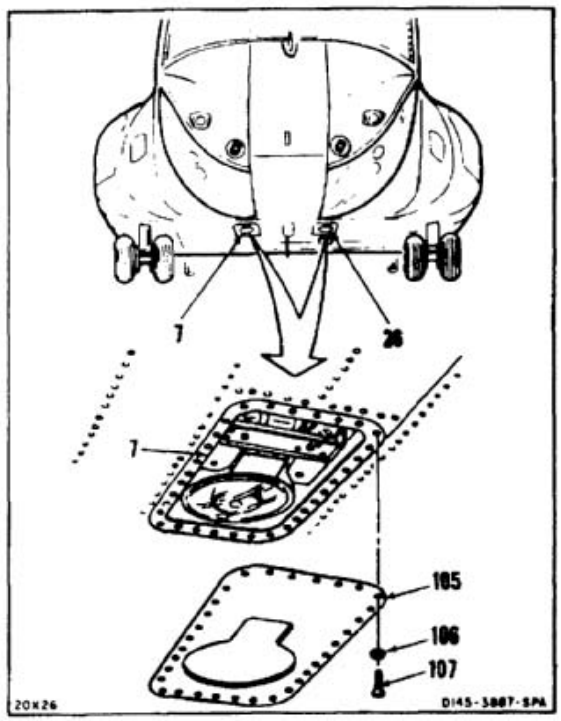
67. Apply sealant (E336) to both sides of gasket (101). Install gasket on flange (102). Remove excess sealant with acetone (E20) and cloths (E120). Wear gloves (E186) and use goggles.
68. Tilt housing assembly (99) and position housing up and inside access (7), lamp (102) aft. Align housing and access holes (103).
69. Repeat steps 65 thru 66 for left housing (104), then go to step 70.



70. Position housing (105) over right access (7). Install 32 washers (106) and screws (107).

71. Repeat step 70 for left access (26), then go to inspect.

INSPECT



FOLLOW-ON MAINTENANCE:

Install cockpit forward floor covers (Task 2-82).
Remove servocylinder safety blocks (Task 11-29).
Install pilot's and copilot's seats (Task 2-114).
Perform operational check of flight controls (TM 55-1520-240-T).
Perform operational check of landing light (TM 55-1520-240-T).

END OF TASK

11-82 INSTALL COPILOT'S COCKPIT CONTROL ASSEMBLY 11-82

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Acetone (E20)
Cloths (E120)
Sealant (E336)
Gloves (E186)

Parts:

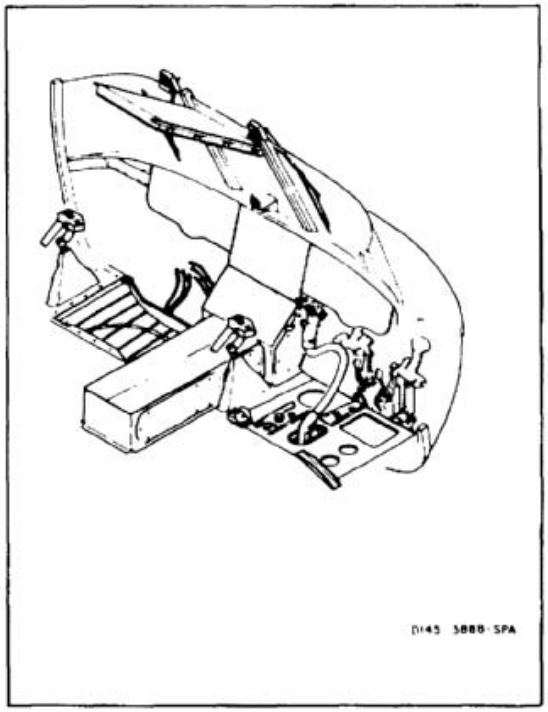
Gasket
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-33
Task 11-72

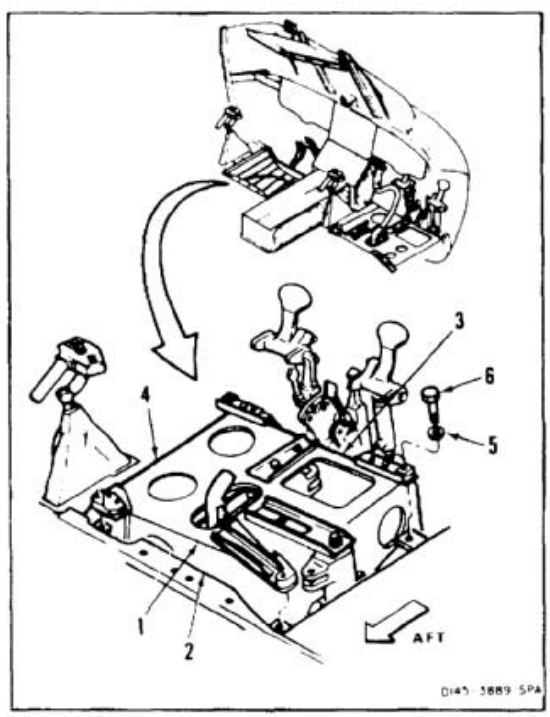


INSTALL CONTROL ASSEMBLY

WARNING

Control assembly weighs about **50 pounds**. Do not drop assembly; otherwise, injury to personnel or damage to equipment could occur.

1. With aid from helper, position control assembly (1) about **6 inches** forward in floor recess (2).
2. Lift forward end (3) about **6 inches** and tilt left side (4) down into recess (2). Move assembly (1) aft and lower forward end. Align assembly in recess.
3. Install four washers (5) and bolts (6).



CAUTION

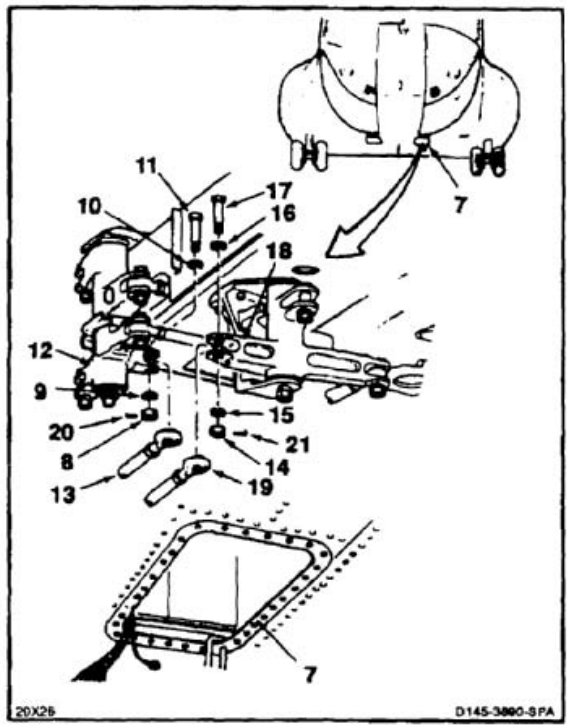
Do not install bolts unless bushings are in bellcrank; otherwise, damage to bellcrank will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require special torque and nut (Task 1-13).

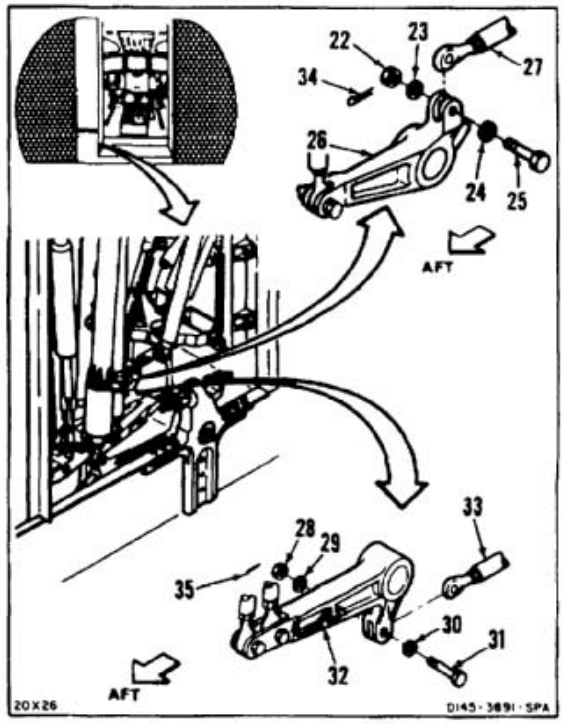
CONNECT PITCH AND THRUST TRANSFER CONNECTING LINKS

4. Working through left access (7), remove nut (8), two washers (9 and 10), and bolt (11) from bellcrank (12).
5. Position thrust connecting link (13) in bellcrank (12).
6. Install bolt (11), two washers (10 and 9), and nut (8) in bellcrank (12). Remove tag from link (13).
7. Remove nut (14), two washers (15 and 16), and bolt (17) from bellcrank (18).
8. Position pitch connecting link (19) in bellcrank (18).
9. Install bolt (17), two washers (16 and 15), and nut (14) in bellcrank (18). Remove tag from link (19).
10. Torque nuts (8 and 14) to **30 to 60 inch-pounds**. Install two cotter pins (20 and 21).
11. Check bolts (11 and 17). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 10.

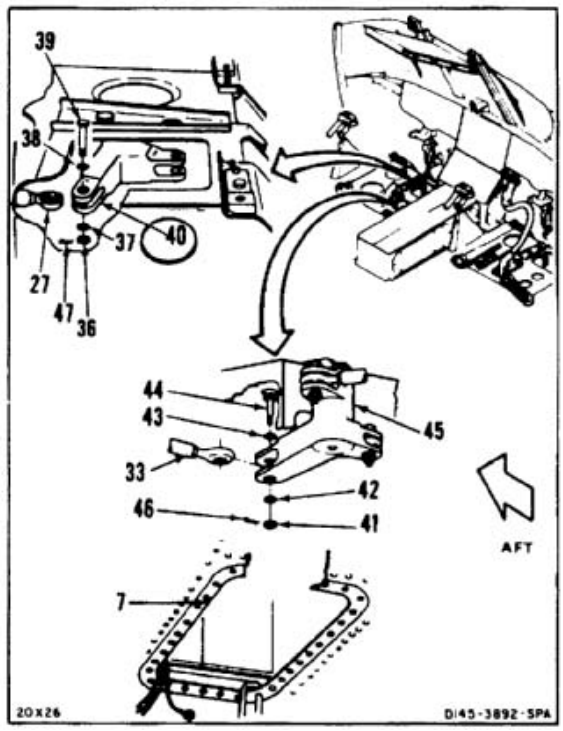


INSTALL YAW AND ROLL TRANSFER CONNECTING LINKS

12. Working from passageway, remove nut (22), two washers (23 and 24), and bolt (25) from bellcrank (26).
13. Position yaw connecting link (27) in bellcrank (26).
14. Install bolt (25), two washers (24 and 23), and nut (22) in bellcrank (26).
15. Remove nut (28), two washers (29 and 30), and bolt (31) from bellcrank (32).
16. Position roll connecting link (33) in bellcrank (32).
17. Install bolt (31), two washers (30 and 29), and nut (28) in bellcrank (32).
18. Torque nuts (22 and 28) to **30 to 60 inch-pounds**. Install two cotter pins (34 and 35).
19. Check bolts (25 and 31). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 18.

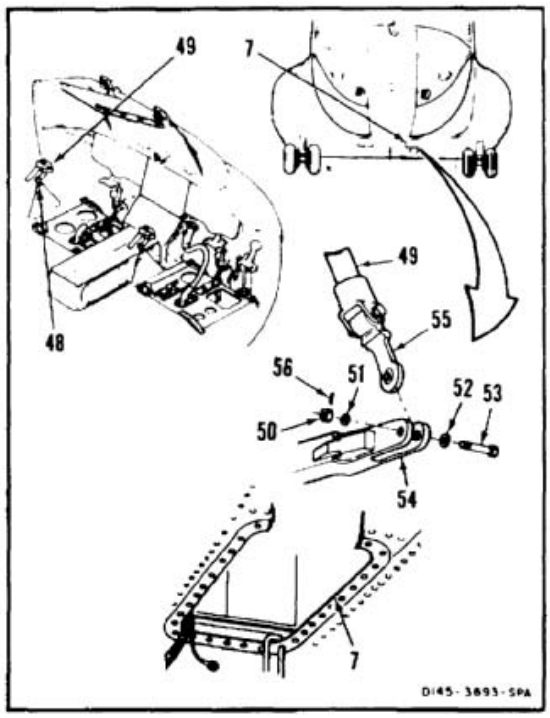


20. Remove nut (36), two washers (37 and 38), and bolt (39) from bellcrank (40).
21. Position yaw link (27) in bellcrank (40).
22. Install bolt (39), two washers (38 and 37), and nut (36) in bellcrank (40). Remove tag from link (27).
23. Working through left access (7), remove nut (41), two washers (42 and 43), and bolt (44) from bellcrank (45).
24. Position roll link (33) in bellcrank (45).
25. Install bolt (44), two washers (43 and 42), and nut (41) in bellcrank (45). Remove tag from link (33).
26. Torque nuts (36 and 41) to **30 to 60 inch-pounds**. Install two cotter pins (46 and 47).
27. Check bolts (39 and 44). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 26.



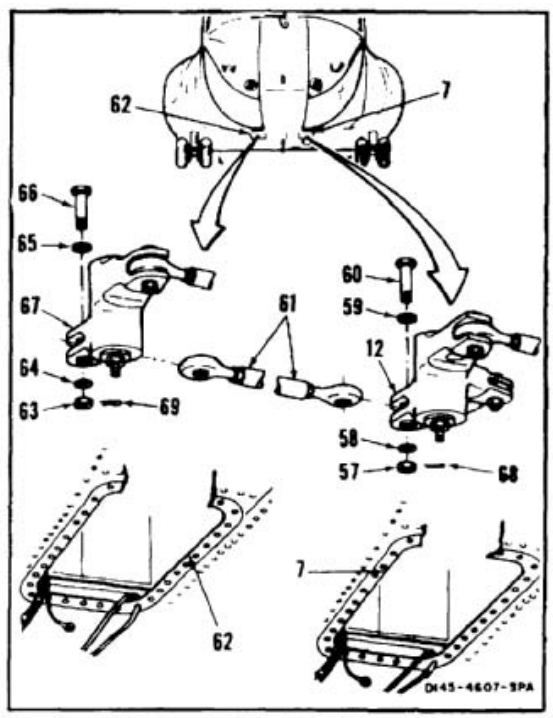
CONNECT THRUST CONTROL

28. Have helper in cockpit, remove strap (48) from thrust control (49). Set control fully down.
29. Working through left access (7), remove nut (50), two washers (51 and 52), and bolt (53) from bellcrank (54).
30. Position link (55) in bellcrank (54).
31. Install bolt (53), two washers (52 and 51), and nut (50) in bellcrank (54).
32. Torque nut (50) to **30 to 45 inch-pounds** in accordance with standard torque limit applications (Task 1-13, Note 5). Install cotter pin (56).
33. Check bolt (53). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 32.



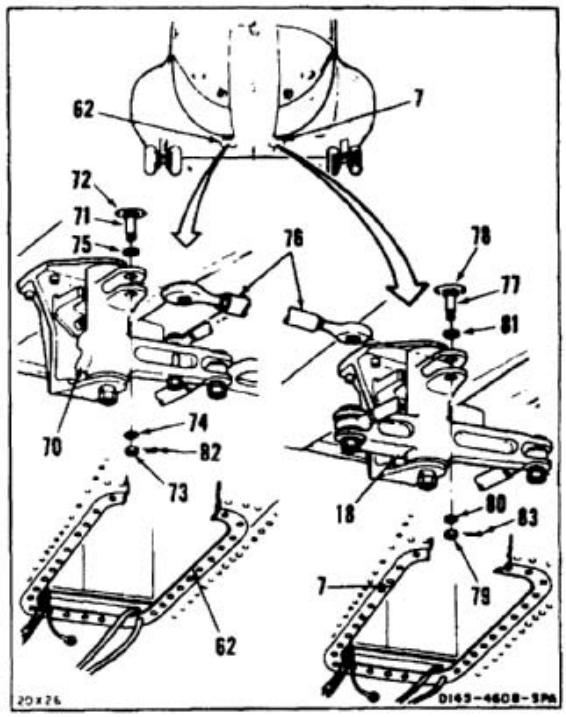
INSTALL THRUST CONNECTING LINK

34. Working through left access (7), remove nut (57), two washers (58 and 59), and bolt (60) from bellcrank (12).
35. Position thrust connecting link (61) in bellcrank (12). Check that link is free of electrical wiring.
36. Install bolt (60), two washers (59 and 58), and nut (57) in bellcrank (12). Remove tag.
37. Working through right access (62), remove nut (63), two washers (64 and 65), and bolt (66) from bellcrank (67).
38. Position link (61) in bellcrank (67).
39. Install bolt (66) two washers (65 and 64), and nut (63) in bellcrank (67).
40. Torque nuts (57 and 63) to **30 to 45 inch-pounds**. Install two cotter pins (68 and 69).
41. Check bolts (60 and 66). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 40.



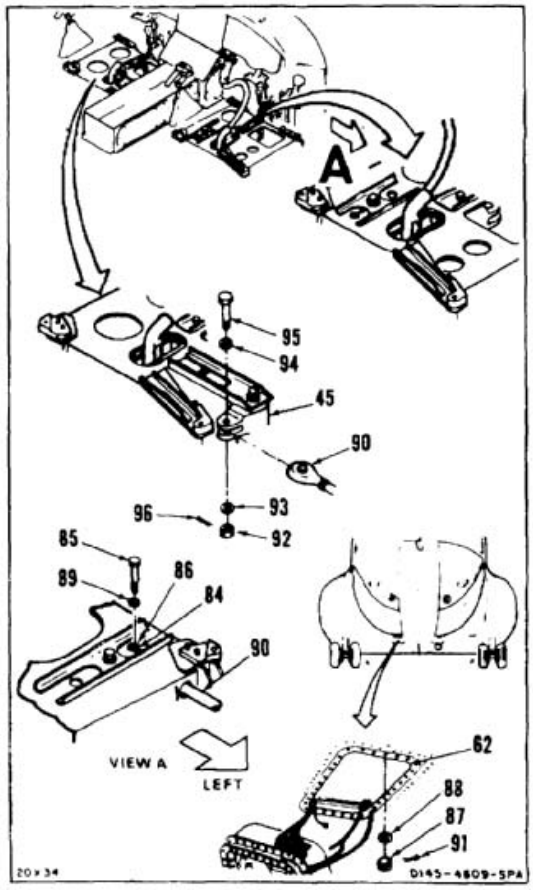
INSTALL PITCH CONNECTING LINK

42. Working through right access (62), position bellcrank (70) to align bolt (71) and hole (72).
43. Remove nut (73), two washers (74 and 75) and bolt (71) from bellcrank (70).
44. Position pitch connecting link (76) in bellcrank (70). Check that link is free of electrical wiring.
45. Install bolt (71), two washers (75 and 74) and nut (73) in bellcrank (70). Remove tag.
46. Working through left access (7) position bellcrank (18) to align bolt (77) and hole (78).
47. Remove nut (79), two washers (80 and 81) and bolt (77) from bellcrank (18).
48. Position link (76) in bellcrank (18).
49. Install bolt (77), two washers (81 and 80) and nut (79) in bellcrank (18).
50. Torque nuts (73 and 79) to **30 to 60 inch-pounds**. Install two cotter pins (82 and 83).
51. Check bolts (71 and 77). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 50.

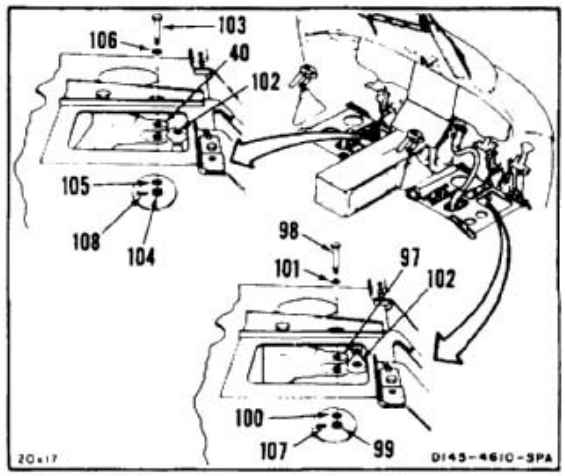


INSTALL ROLL CONNECTING LINK

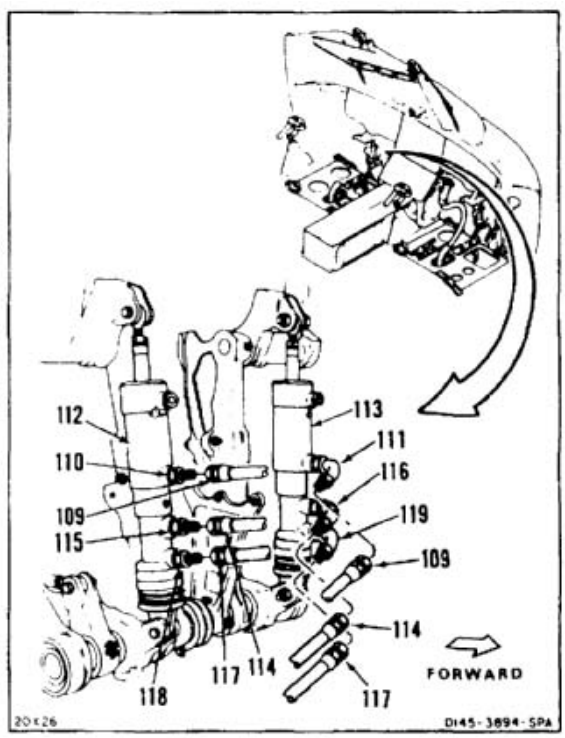
52. Position bellcrank (84) to align bolt (85) and hole (86).
53. Working through right access (62), remove nut (87) and washer (88) from bolt (85).
54. Have helper in cockpit remove bolt (85) and washer (89).
55. Slide roll connecting link (90) from left into position in bellcrank (84). Check that link is free of electrical wiring.
56. Have helper install washer (89) and bolt (85) in bellcrank (84) and hold bolt.
57. Install washer (88) and nut (87) on bolt (85). Remove tag from link (90).
58. Torque nut (87) to **30 to 60 inch-pounds**. Install cotter pin (91).
59. Working from cockpit, remove nut (92) two washers (93 and 94), and bolt (95) from bellcrank (45).
60. Position link (90) in bellcrank (45).
61. Install bolt (95), two washers (94 and 93), and nut (92) in bellcrank (45).
62. Torque nut (92) to **30 to 60 inch-pounds**. Install cotter pin (96).
63. Check bolts (85 and 95). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 58 or 62.



INSTALL YAW CONNECTING LINK



64. Move bellcrank (97) for access to bolt (98). Remove nut (99), two washers (100 and 101) and bolt.
65. Slide yaw connecting link (102) to left into position in bellcrank (97).
66. Install bolt (98), two washers (101 and 100) and nut (99) in bellcrank (97). Remove tag from link (102).
67. Move bellcrank (40) for access to bolt (103). Remove nut (104) two washers (105 and 106) and bolt.
68. Position link (102) in bellcrank (40).
69. Install bolt (103), two washers (106 and 105) and nut (104) in bellcrank (40).
70. Torque nuts (99 and 104) to **30 to 60 inch-pounds**. Install two cotter pins (107 and 108).
71. Check bolts (98 and 103). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 70.



72. Connect two BRAKE hoses (109) to nipple (110) and elbow (111) of cylinders (112 and 113). Remove tags.
73. Connect two PRESS hoses (114) to nipple (115) and elbow (116) of cylinders (112 and 113). Remove tags.
74. Connect two RET hoses (117) to nipple (118) and elbow (119) of cylinders (112 and 113). Remove tags.
75. Install copilot's control stick (Task 11-72).
76. Perform neutral rig check (Task 11-33).

WARNING

Acetone (E20) can form toxic vapors if exposed to flame. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

77. Clean sealant from flange (120) and inside surface (121) of access (7). Use acetone (E20) and cloths (E120). Wear gloves (E186).

78. Support left landing light housing (122). Remove strap (123).

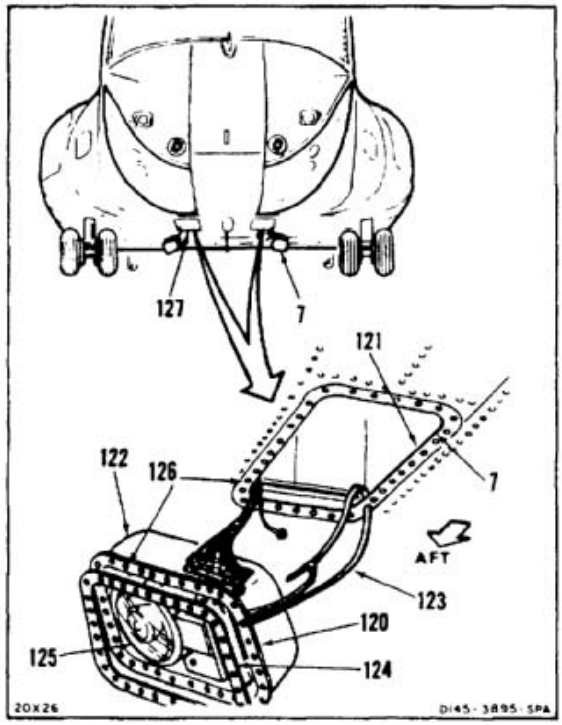
WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

79. Apply sealant (E336) to both sides of gasket (124). Install gasket on flange (120). Remove excess sealant with acetone (E20) and cloths (E120). Wear gloves (E186).

80. Tilt housing (122) and position inside access (7), lamp (125), aft. Align housing and access holes (126).

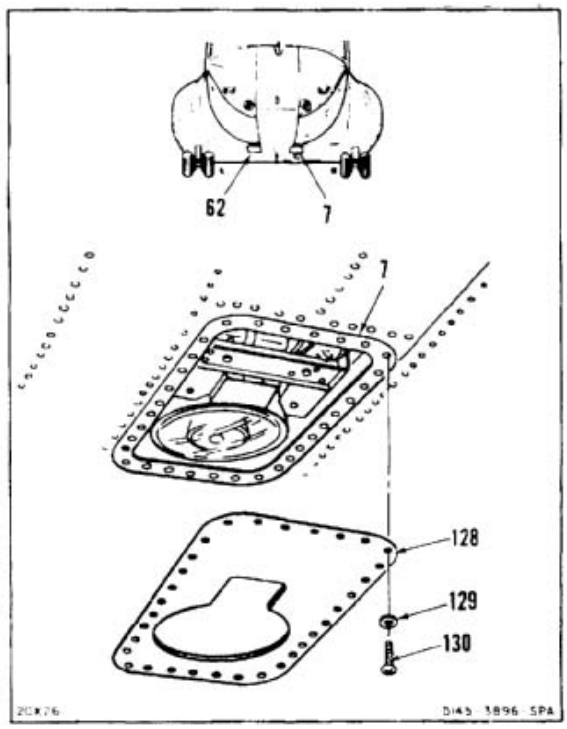
81. Repeat steps 77 thru 80 for right housing (127).



82. Position housing (128) over left access (7). Install 32 washers (129), and screws (130).

83. Repeat step 82 for right access (62).

INSPECT



FOLLOW-ON MAINTENANCE:

Install cockpit forward floor covers (Task 2-82).
Connect servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (T31) (Task 11-29).
Install pilot's and copilot's seats (Task 2-114).
Bleed brake hydraulic system (Task 7-330).
Perform operational check of flight controls (TM 55-1520-240-T).
Perform operational check of landing light (TM 55-1520-240-T).

END OF TASK

11-83 REMOVE STICK PITCH POSITION INDICATOR 11-83

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

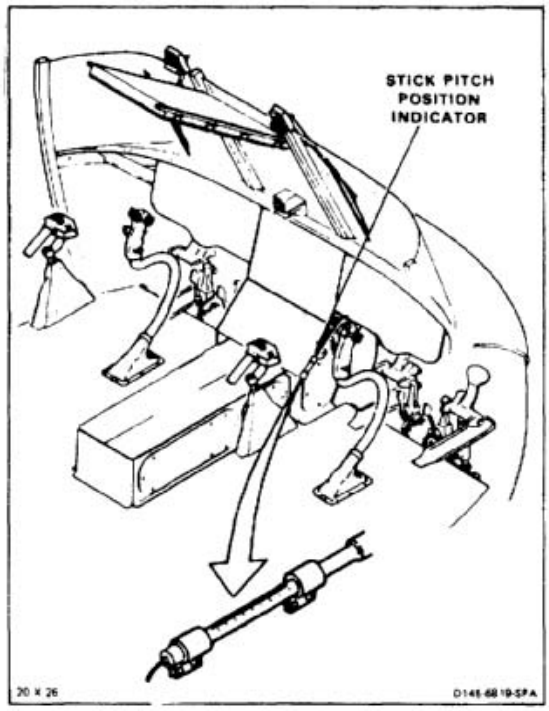
Strap (E376)

Personnel Required:

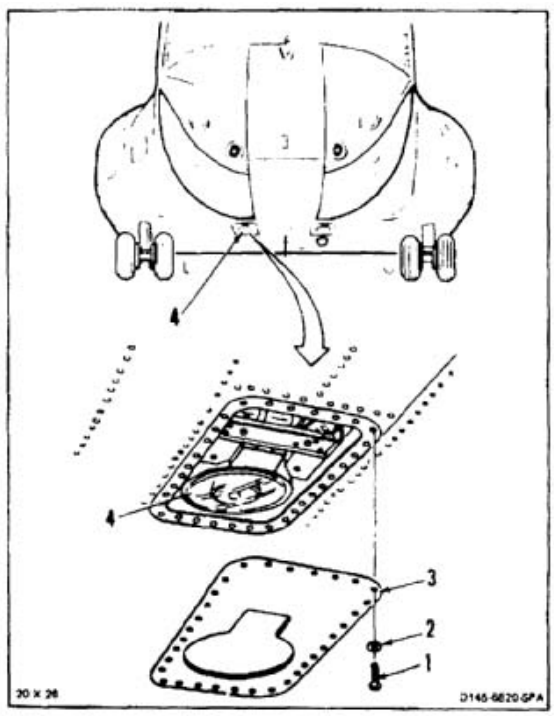
Medium Helicopter Repairer (2)

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pilot's Seat Fully Aft
AFCS Panel Removed (Task 11-269)
ADF RCVR Panel Removed (TM 11-1520-240-20)



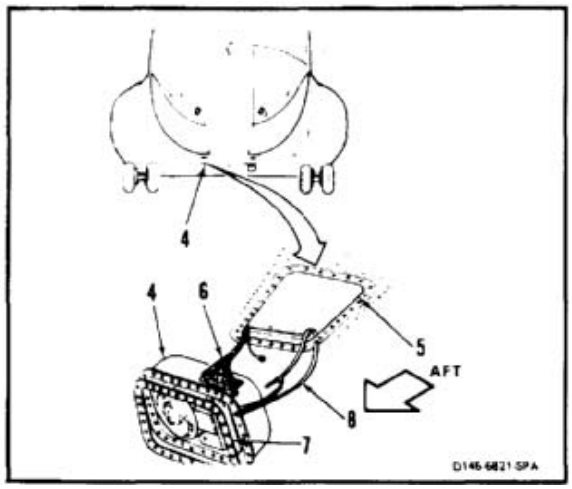
1. Remove 32 screws (1) and washers (2) from housing (3) of right landing light housing (4). Remove housing.



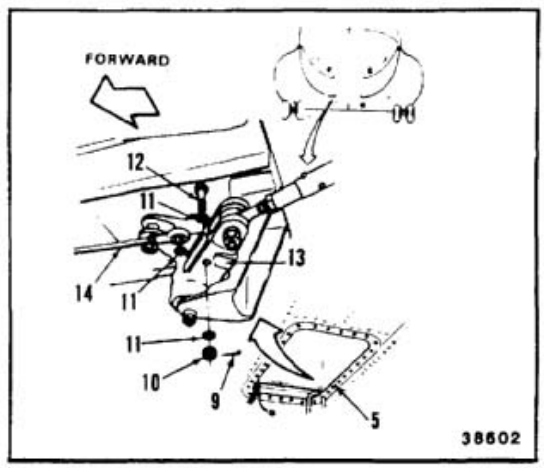
CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

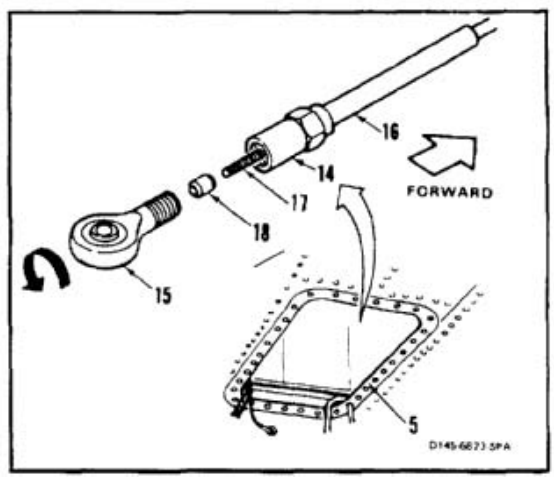
2. Remove right landing light housing (4) from access (5). Support housing so it does not hang by wires (6).
3. Remove gasket (7) from housing (4).
4. Strap housing (4) to access (5) at aft end with strap (E376) (8). Wires (6) must not support housing.



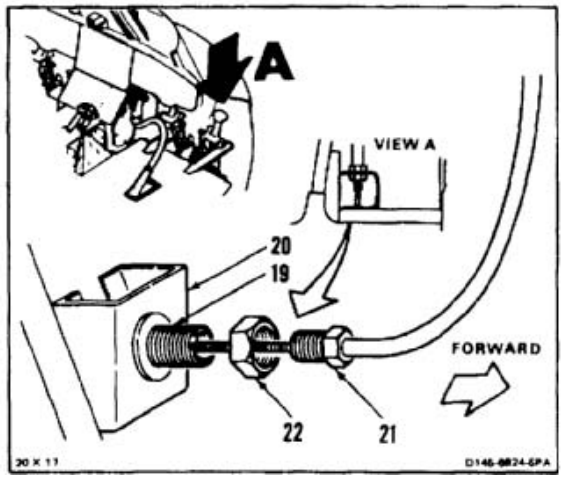
5. Working through right access (5), remove cotter pin (9), nut (10), three washers (11), and bolt (12) from bellcrank (13).
6. Disconnect indicator (14) from bellcrank (13).



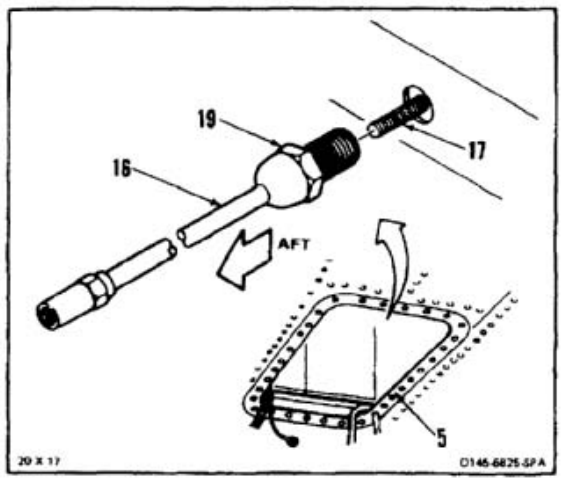
7. Working through right access (5), remove lockwire from bearing (15) and tube (16) of indicator (14).
8. Remove bearing (15) from tube (16) of indicator (14). Turn counterclockwise.
9. Slide tube (16) forward for access to cable (17) and collet (18). Remove collet from cable of indicator (14). Turn counterclockwise.



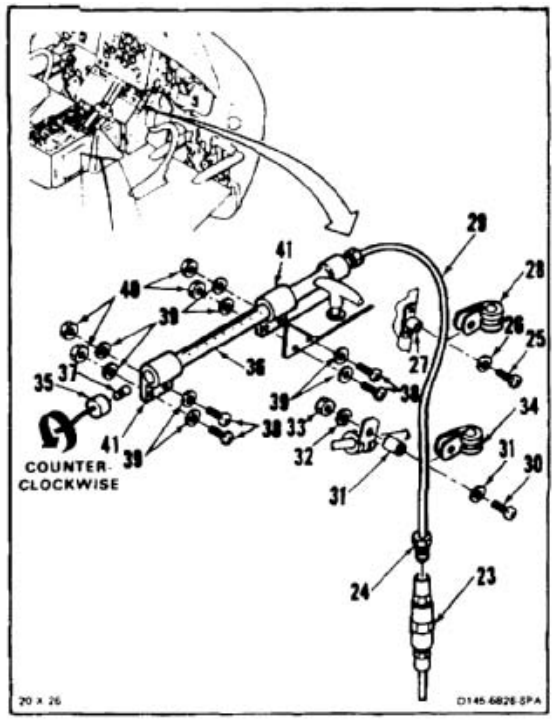
10. Have helper in cockpit remove lockwire from swivel fitting (19) and structure (20).
11. Disconnect tube nut (21) from fitting (19).
12. Remove nut (22) from fitting (19). Slide nut forward.



13. Working through access (5), remove rod (16) and fitting (19). Pull aft until free of cable (17).



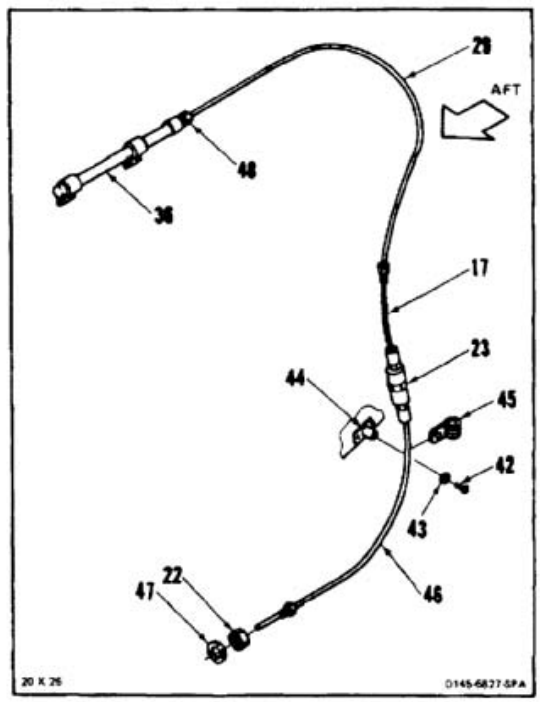
14. Working from cockpit, remove lockwire from tube adjuster (23).
15. Remove tube nut (24) from top of adjuster (23).
16. Remove screw (25) and washer (26) from mount (27) and clamp (28). Remove clamp from tube (29).
17. Remove screw (30), spacer (31), washer (32), and nut (33) from clamp (34). Remove clamp from tube (29).
18. Disconnect cap (35) from indicator (36). Turn counterclockwise. Remove lamp (37) from cap.
19. Remove four bolts (38), eight washers (39), and four nuts (40) from two mounts (41).



CAUTION

Do not kink or deform tubing or cable; otherwise, damage to component will result.

20. Remove indicator (36), tubing (29), and cable (17) from adjuster (23). Guide aft.
21. Remove screw (42) and washer (43) from mount (44) and clamp (45). Remove clamp from tube (46).
22. Slide washer (47), nut (22) from tube (46). Remove nut.
23. Remove adjuster (23) and tube (46).
24. Remove lockwire from indicator (36) and nut (48).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-84 INSTALL STICK PITCH POSITION INDICATOR 11-84

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Dial Indicating Scale, 0 to 10 Pounds

Materials:

Acetone (E20)
Cloths (E120)
Sealant (E336)
Lockwire (E231)
Gloves (E186)

Parts:

Gasket
Cotter Pin

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 11-45

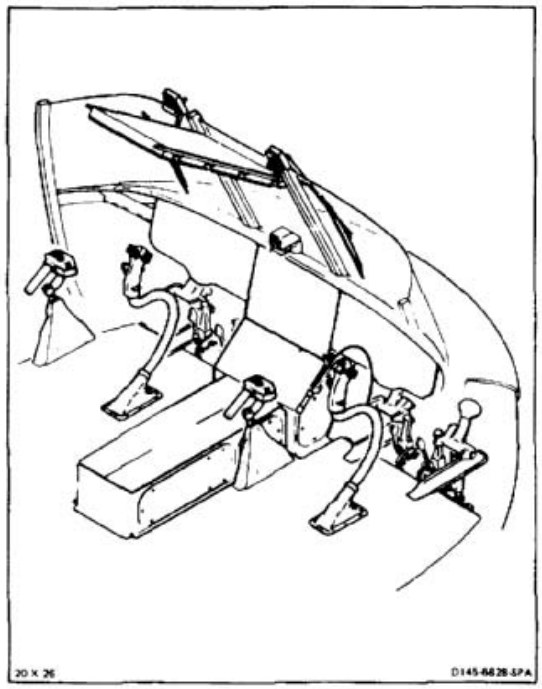
General Safety Instructions:

WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Acetone (E20) can form toxic vapors if exposed to flame. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

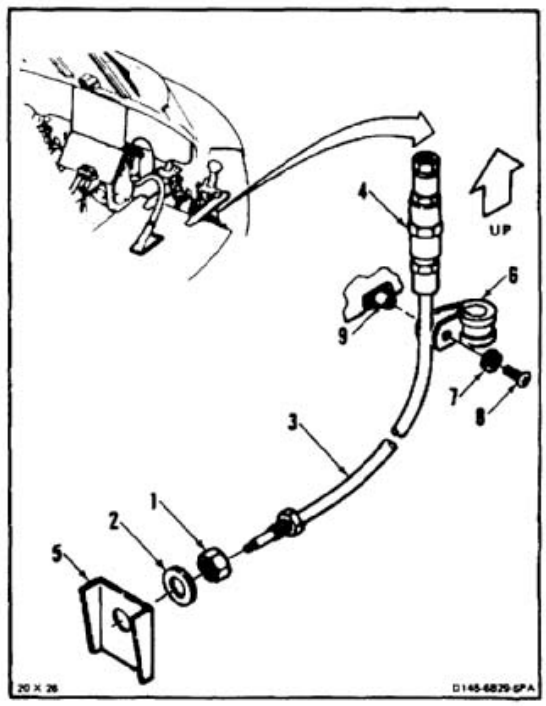


11-84 INSTALL STICK PITCH POSITION INDICATOR (Continued) 11-84

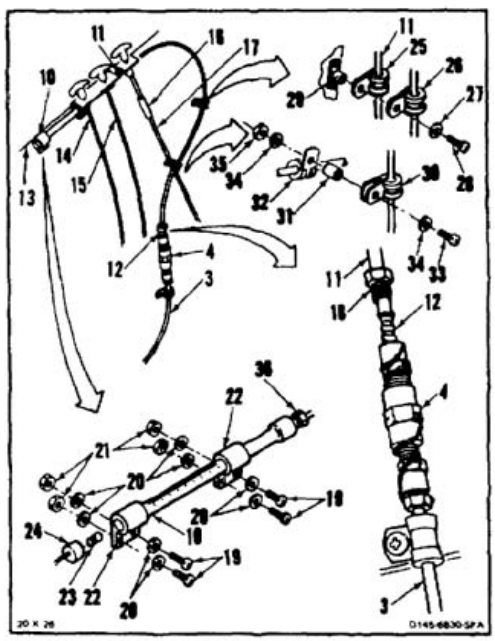
CAUTION

Do not kink or deform tubing or cable; otherwise, damage to component will result.

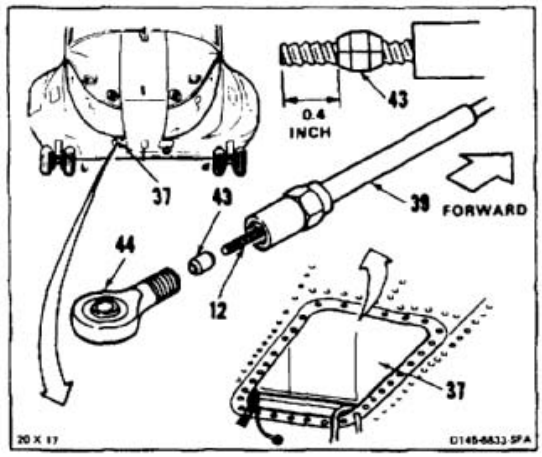
1. Slide nut (1) and washer (2) on tube (3). Position tube and adjuster (4) in structure (5) with adjuster up.
2. Position clamp (6) on tube (3) just below adjuster (4). Install washer (7) and screw (8) in clamp and mount (9).



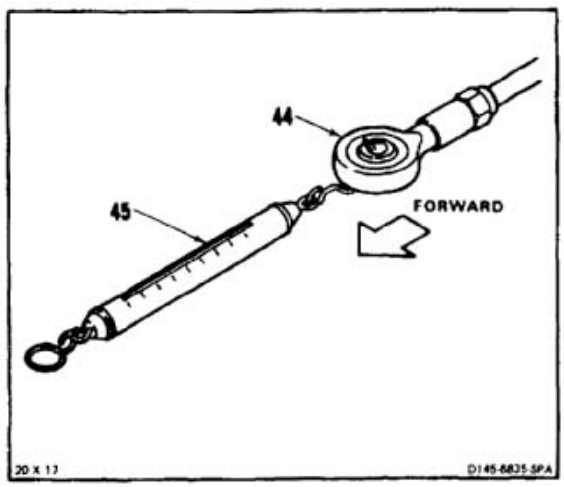
3. Position indicator (10), tube (11), and cable (12) on right of console (13). Guide cable and tube inboard of three controls (14, 15, and 16) then outboard of rod (17).
4. Insert cable (12) into adjuster (4) and tube (3) until nut (18) touches adjuster.
5. Install nut (18) in adjuster (4).
6. Install four bolts (19), eight washers (20), and four nuts (21) in two mounts (22) of indicator (10).
7. Install lamp (23) indicator (10).
8. Connect cap (24) to indicator (10).
9. Position clamp (25) on tube (11) and under clamp (26). Install washer (27) and screw (28) in clamps and mount (29).
10. Position clamp (30) on tube (11). Position spacer (31) between clamp (30) and clamp (32). Install bolt (33), two washers (34), and nut (35).
11. Tighten nut (36). Lockwire nut to indicator (10). Use lockwire (E231).



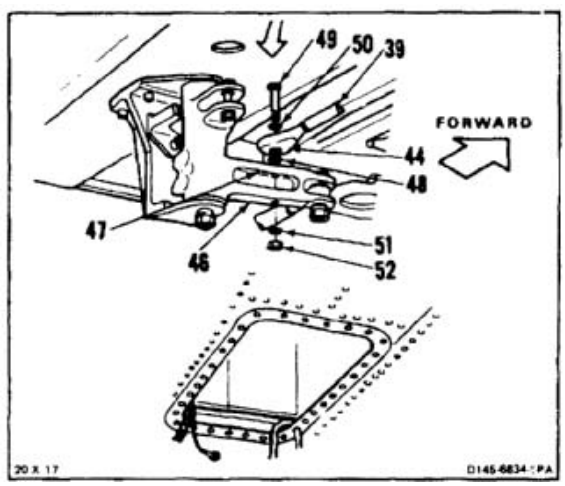
12. Working through access (37), slide tube (39) forward until about **1 inch** of cable (12) shows from end of tube.
13. Install collet (43) on cable (12), about **0.4 inch** from end of cable. Turn clockwise.
14. Pull tube (39) aft until collet bottoms in tube.
15. Install bearing (44) in tube (39) until bottomed. Turn clockwise.



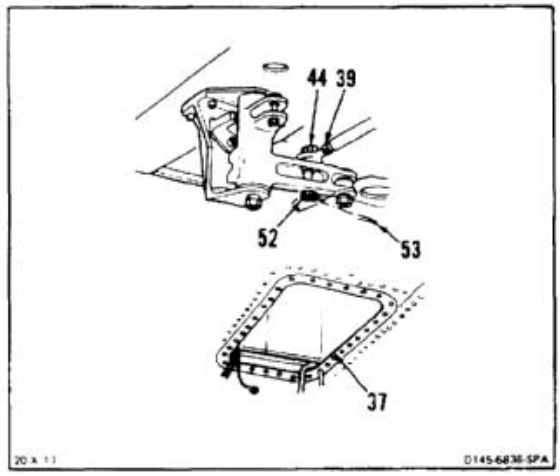
16. Check bearing (44). Move bearing fully forward and fully aft using dial indicating scale (45). Force required to move bearing shall be less than **1 pound**.



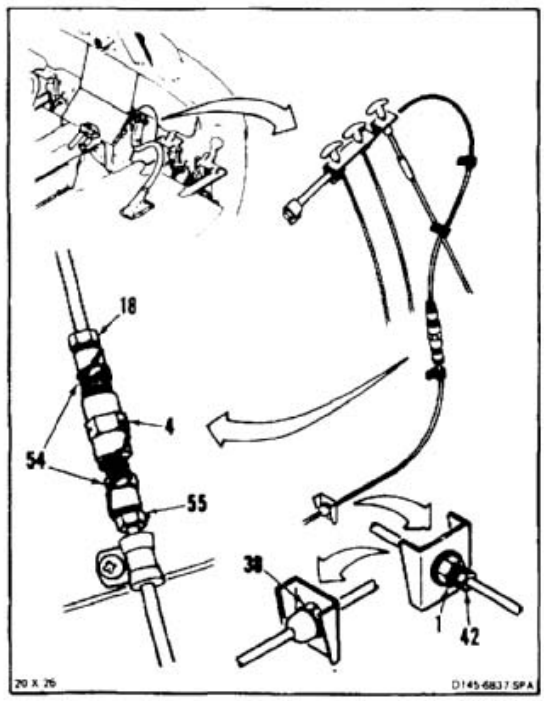
17. Move bellcrank arm (46) forward and slide tube (39) aft. Align bearing (44) with hole (47) in arm.
18. Position washer (48) between bearing (44) and arm (46). Install bolt (49), two washers (50 and 51) and nut (52). Do not tighten nut at this time.
19. Rig stick position indicator (Task 11-45).



20. Working through access (37), lockwire bearing (44) to tube (39). Use lockwire (E231).
21. Torque nut (52) to **30 to 60 inch-pounds**. Install cotter pin (53).



22. Working in cockpit, lockwire nut (18), nuts (54), adjuster (4), and nut (55). Use lockwire (E231).
23. Lockwire nut (42), nut (1), and fitting (38). Use lockwire (E231).



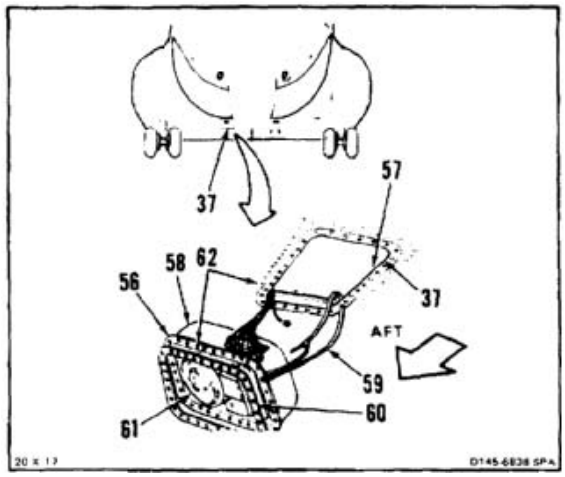
24. Clean sealant from flange (56) and inside surface (57) of access. Use acetone (E20) and cloths (E120). Wear gloves (E186) and goggles.

CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

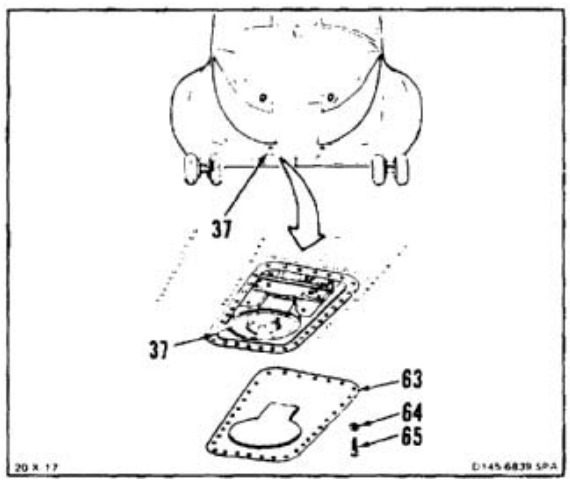
25. Support housing (58). Remove strap (59).

26. Apply sealant (E336) to both sides of gasket (60). Install gasket on flange (56). Remove excess sealant with acetone (E20) and cloths (E120). Use goggles for eyes.



27. Tilt housing assembly (58) and position up and inside access (37), lamp (61) aft. Align housing and access holes (62).

28. Position housing (63) over access (37). Install 32 washers (64) and screws (65).



INSPECT

FOLLOW-ON MAINTENANCE:

Install AFCS panel (Task 11-273).
Install ADF RCVR panel (TM 11-1520-240-20).
Perform operational check of landing light (TM 55-1520-240-T).

END OF TASK

11-85 REMOVE COCKPIT CONTROL TRANSFER CONNECTING LINKS 11-85

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)
Cable Straps (E376)

Personnel Required:

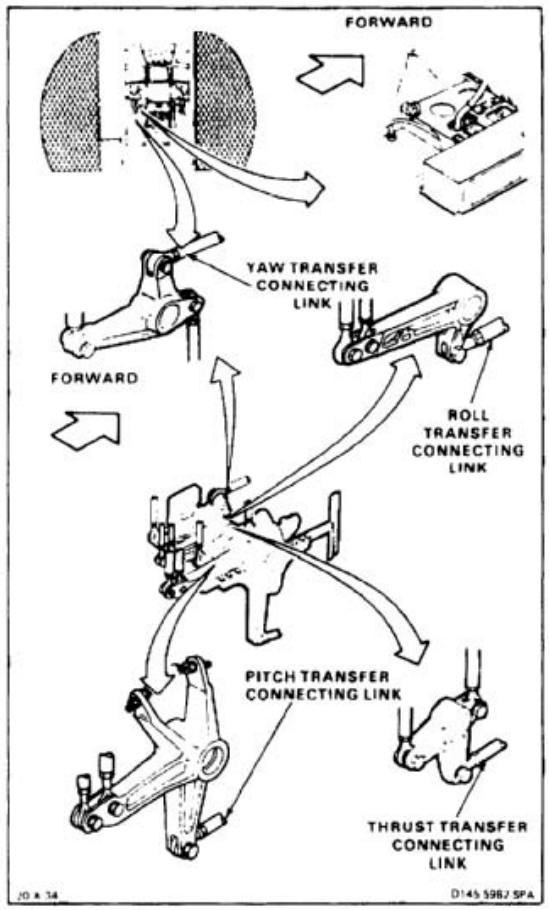
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

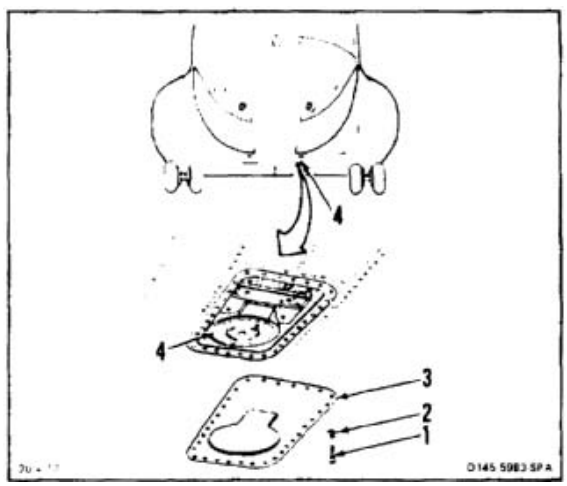
Battery Disconnected (Task 1-39)
Electrical Power Off
Safety Blocks (T31) Installed (Task 11-28)
Copilot's Seat Removed (Task 2-111)
Copilot's Floor Access Panel Removed (Task 2-79)
Copilot's Forward Floor Covers Removed (Task 2-81)
Control Closet Backup Panel Removed (Task 2-2)
Servocylinder Connecting Links Disconnected (Task 11-192)



NOTE

If a crack in the connecting link is suspected during removal, refer to TM 1-1520-253-23.

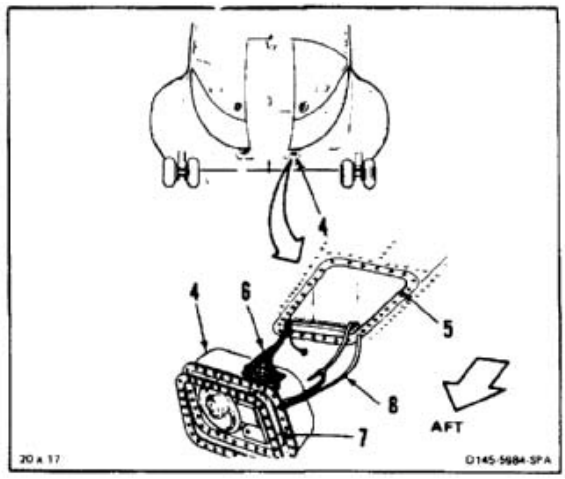
1. Remove 32 screws (1) and washers (2) from housing (3) of left landing light housing (4). Remove housing.



CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

2. Remove left landing light housing (4) from access (5). Support housing so it does not hang by wires (6).
3. Remove gasket (7) from housing (4).
4. Strap housing (4) to access (5) at aft end with strap (E376) (8). Wires (6) must not support housing.

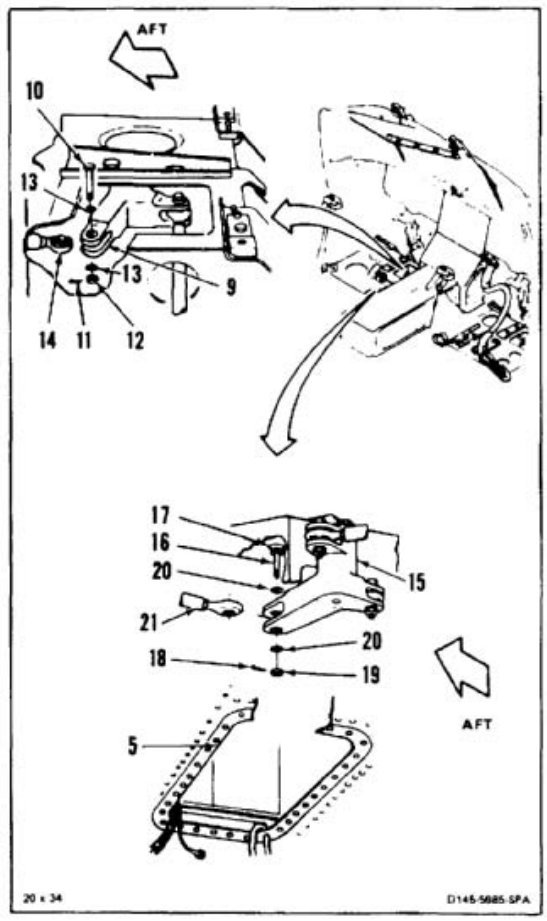


NOTE

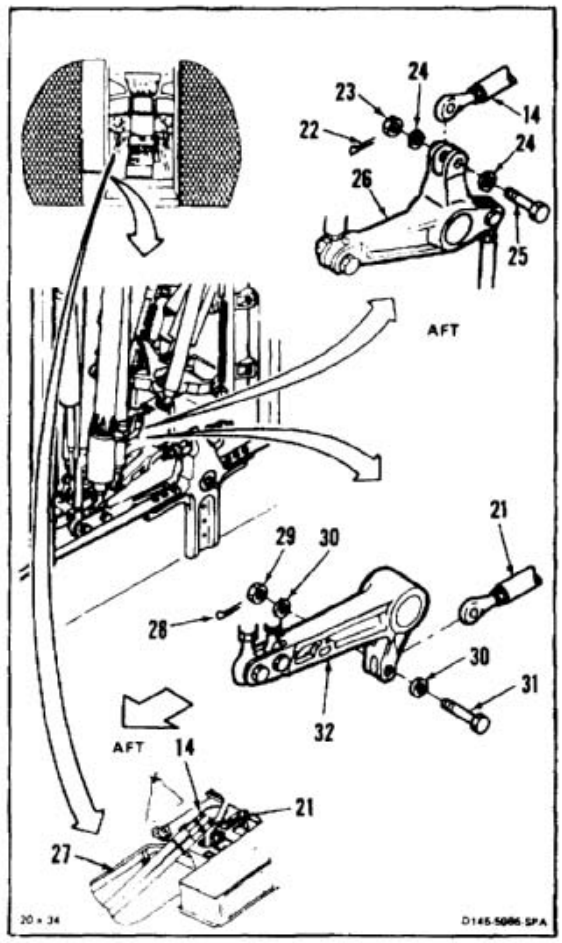
Attaching bolts, washers, and nuts will be temporarily installed after links are removed.

REMOVE YAW AND ROLL TRANSFER CONNECTING LINKS

5. Move bellcrank (9) for access to bolt (10). Remove cotter pin (11), nut (12), two washers (13), and bolt from bellcrank.
6. Tag and disconnect yaw connecting link (14) from bellcrank (9).
7. Install bolt (10), two washers (13), and nut (12) in bellcrank (9).
8. Move bellcrank (15) to align bolt (16) and hole (17). Have helper in cockpit hold bolt (16).
9. Remove cotter pin (18), nut (19), two washers (20), and bolt (16).
10. Tag and disconnect roll connecting link (21) from bellcrank (15).
11. Install bolt (16), two washers (20), and nut (19) in bellcrank (15).

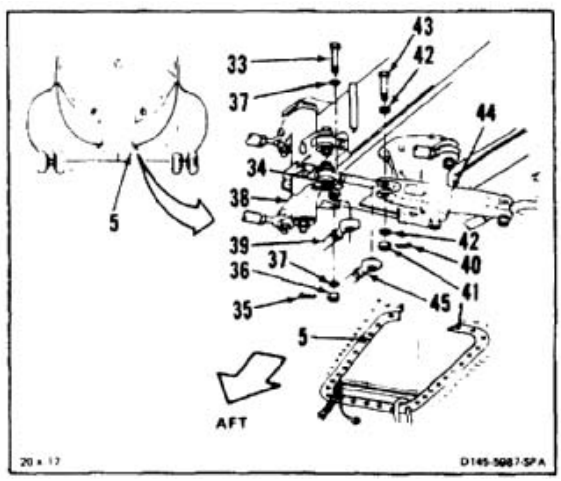


12. Working from passageway, remove cotter pin (22), nut (23), two washers (24), and bolt (25) from bellcrank (26).
13. Disconnect yaw link (14) from bellcrank (26). Move link aft.
14. Install bolt (25), two washers (24), and nut (23) in bellcrank (26).
15. Working from cockpit, lift link (14) upward and forward through oval access (27). Remove link.
16. Working from passageway, remove cotter pin (28), nut (29), two washers (30), and bolt (31) from bellcrank (32).
17. Disconnect roll link (21) from bellcrank (32). Move link aft.
18. Install bolt (31), two washers (30), and nut (29) in bellcrank (32).
19. Working from cockpit, lift link (21) upward and forward out of oval access (27). Remove link.

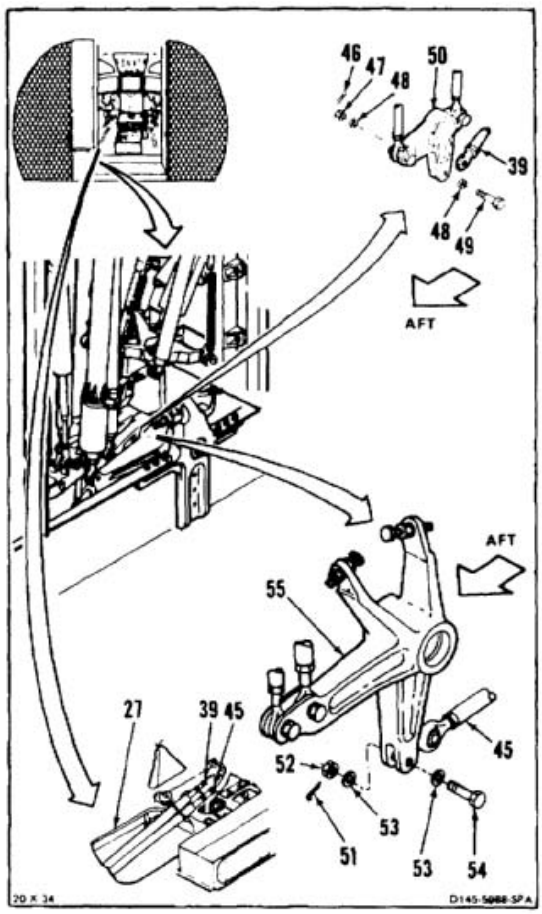


REMOVE PITCH AND THRUST TRANSFER CONNECTING LINKS

20. Working through left access (5), align bolt (33) and hole (34). Remove cotter pin (35), nut (36), two washers (37), and bolt (33) from bellcrank (38).
21. Tag and disconnect thrust connecting link (39) from bellcrank (38).
22. Install bolt (33), two washers (37), and nut (36) in bellcrank (38).
23. Remove cotter pin (40), nut (41), two washers (42), and bolt (43) from bellcrank (44).
24. Tag and disconnect pitch connecting link (45) from bellcrank (44).
25. Install bolt (43), two washers (42), and nut (41) in bellcrank (44).



26. Working from passageway, remove cotter pin (46), nut (47), two washers (48), and bolt (49) from bellcrank (50).
27. Disconnect thrust link (39) from bellcrank (50). Position link fully aft.
28. Install bolt (49), two washers (48), and nut (47) in bellcrank (50).
29. Remove cotter pin (51), nut (52), two washers (53), and bolt (54) from bellcrank (55).
30. Disconnect pitch link (45) from bellcrank (55). Move link aft.
31. Install bolt (54), two washers (53), and nut (52) in bellcrank (55).
32. Working from cockpit, lift links (39 and 45) upward and forward through access (27). Remove links.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-86 INSTALL COCKPIT CONTROL TRANSFER CONNECTING LINKS 11-86

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Acetone (E20)
Cloths (E120)
Sealant (E336)
Gloves (E186)

Parts:

Gasket
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 11-46

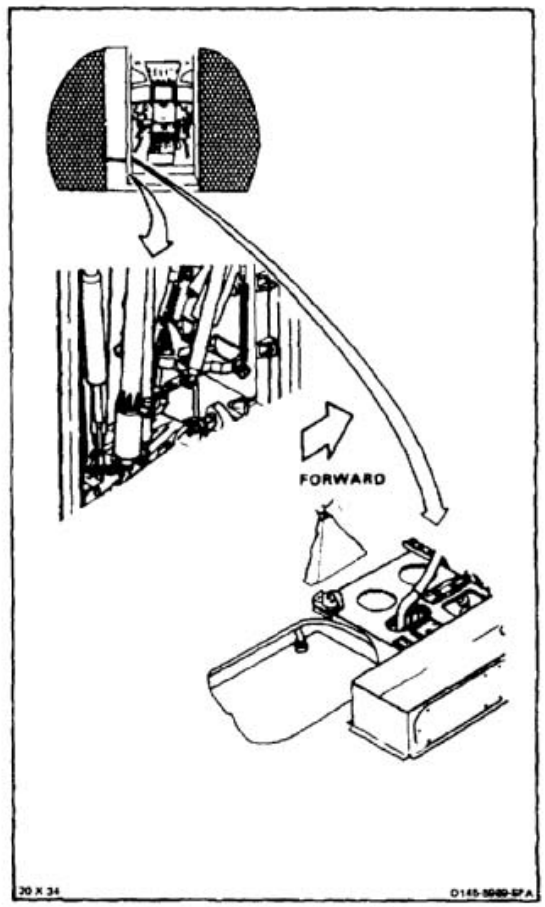
General Safety Instructions:

WARNING

Make sure bushings are in bellcranks before installing bolts; otherwise, damage to bellcranks will result.

WARNING

Acetone (E20) can form toxic vapors if exposed to flame. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require special nut and torque (Task 1-13).

INSTALL PITCH AND THRUST TRANSFER CONNECTING LINKS

1. If pitch connecting link (1) is a replacement, loosen nut (2) of adjustable end. Turn bearing (3) **90º** to bearing (4). Torque nut to **110 inch-pounds**.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

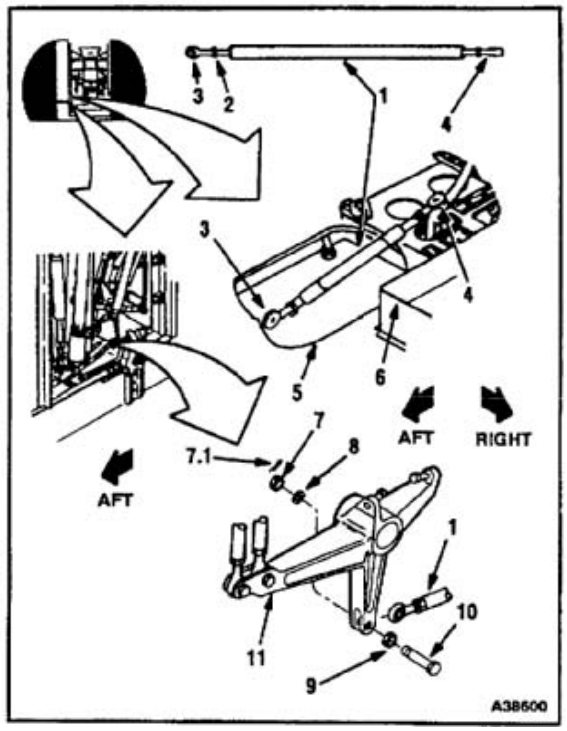
Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position link (1) in access (5), bearing (3) aft. Move link aft and down into access. Move link forward about **12 inches** under right side of control assembly (6).
3. Working from passageway, remove cotter pin (7.1), nut (7), two washers (8 and 9), and bolt (10) from bellcrank (11).
4. Position link (1) in bellcrank (11). Install bolt (10), two washers (9 and 8), and nut (7) in bellcrank. Do not torque nut at this time.



5. If thrust connecting link (11) is a replacement, loosen nut (12) of adjustable end. Turn bearing (13) **90°** to bearing (14). Torque nut to **110 inch-pounds**.

WARNING

FLIGHT SAFETY PARTS

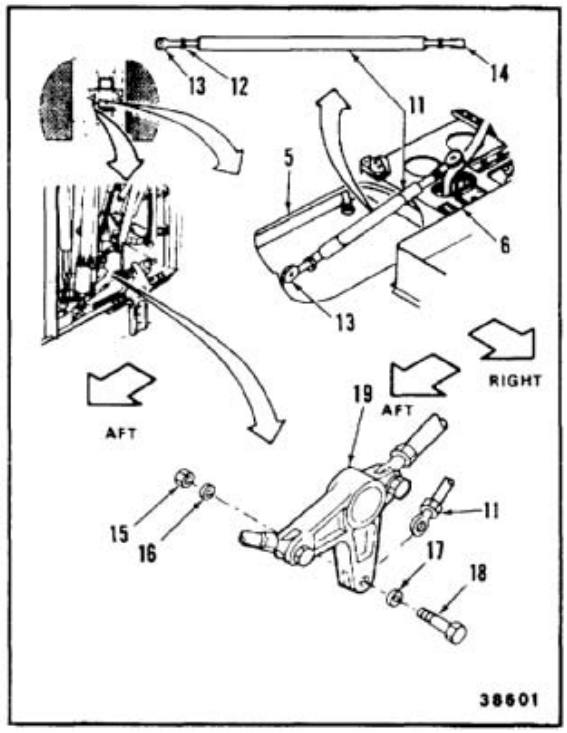
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



6. Position link (11) in access (5), bearing (13) aft. Move link aft and down into access. Move link forward about **3 inches**, under right side of control assembly (6).

7. Working from passageway, remove nut (15), two washers (16 and 17), and bolt (18) from bellcrank (19).

8. Position link in bellcrank (19). Install bolt (18), two washers (17 and 16), and nut (15) in bellcrank. Do not torque nut at this time.

9. Working through left access (20), remove nut (21), two washers (22 and 23), and bolt (24) from bellcrank (25).

10. Position link (1) in bellcrank (25). Install bolt (24), two washers (23 and 22), and nut (21) in bellcrank. Do not torque nut at this time. Remove tag from link.

11. Working from cockpit, remove nut (26), two washers (27 and 28), and bolt (29) from bellcrank (30).

12. Position link (11) in bellcrank (30). Install bolt (29), two washers (28 and 27), and nut (26) in bellcrank. Do not torque nut at this time. Remove tag from link.

INSTALL YAW AND ROLL TRANSFER CONNECTING LINKS

13. If roll connecting link (31) is a replacement, loosen nut (32) of adjustable end. Turn bearing (33) **90º** to bearing (34). Torque nut to **110 inch-pounds**.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

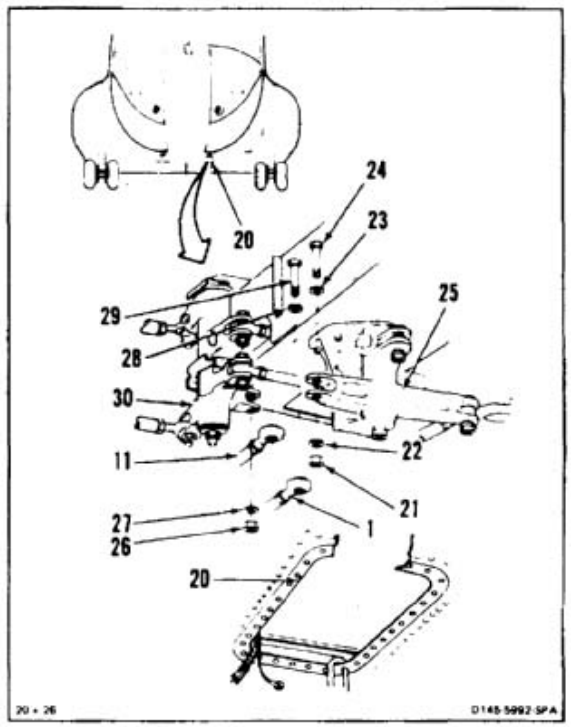
Ensure that the rivet through the fixed rod end bearing is secure.

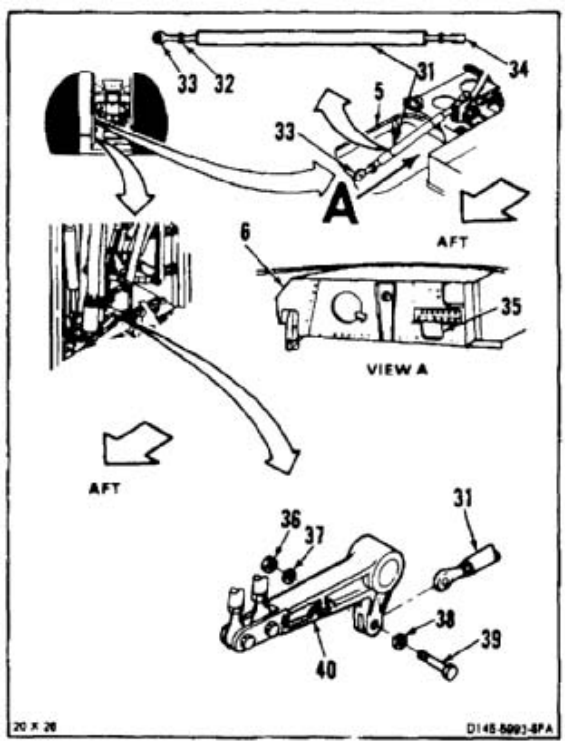
At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

14. Position link (31) in access (5), bearing (33) aft. Move link aft and down into access. Move link forward about **5 inches** through access (35) of control assembly (6).

15. Working from passageway, remove nut (36), two washers (37 and 38), and bolt (39) from bellcrank (40).





16. Position link (31) in bellcrank (40). Install bolt (39), two washers (38 and 37), and nut (36) in bellcrank. Do not torque nut at this time.

17. If yaw connecting link (41) is a replacement, loosen nut (42) of adjustable end. Turn bearing (43) **90º** to bearing (44). Torque nut to **110 inch-pounds**.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that machined rod end and solid section attachments to the tube are secure.

Ensure smaller diameter section of the link assembly faces aft towards the transfer bellcrank.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

18. Position link (41) in access (5), bearing (43) aft. Move link aft and down into access. Move link forward about **12 inches** through access (45) of control assembly (6).

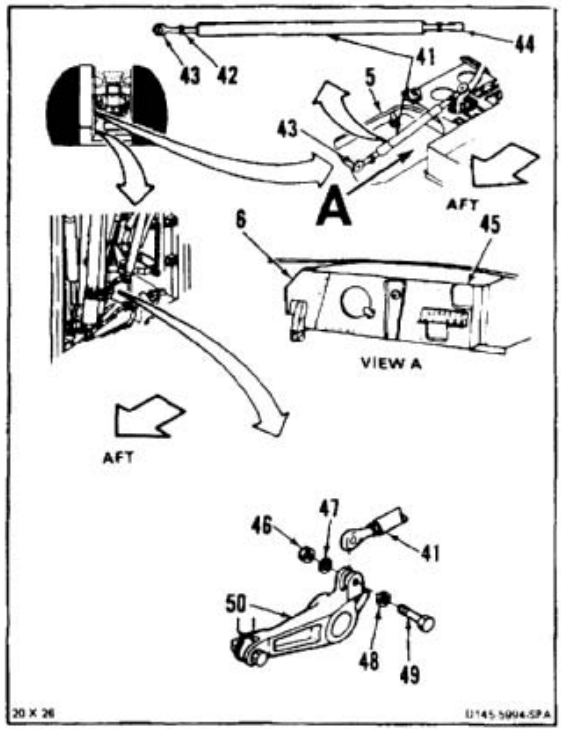
19. Working from passageway, remove nut (46) two washers (47 and 48), and bolt (49) from bellcrank (50).

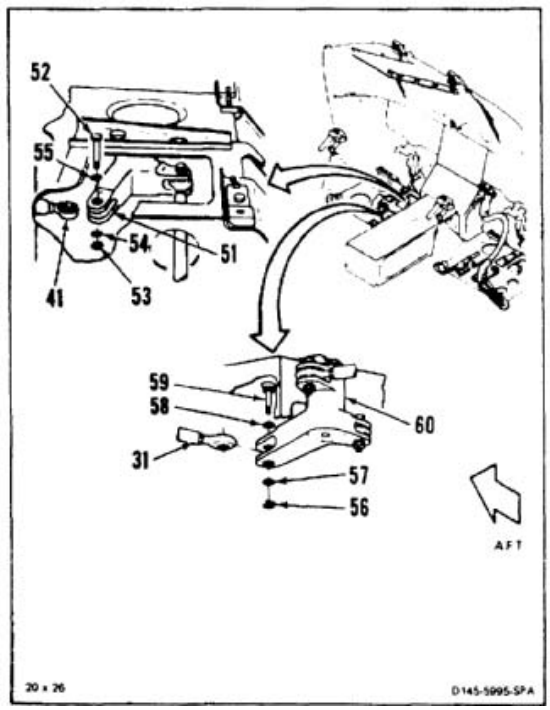
20. Position link (41) in bellcrank (50). Install bolt (49), two washers (48 and 47) and nut (46) in bellcrank. Do not torque nut at this time.

21. Move bellcrank (51) for access to bolt (52). Remove nut (53), two washers (54 and 55), and bolt from bellcrank.

22. Position link (41) in bellcrank (51). Install bolt (52), two washers (55 and 54), and nut (53) in bellcrank. Do not torque nut at this time. Remove tag from link.

23. Remove nut (56), two washers (57 and 58), and bolt (59) from bellcrank (61).



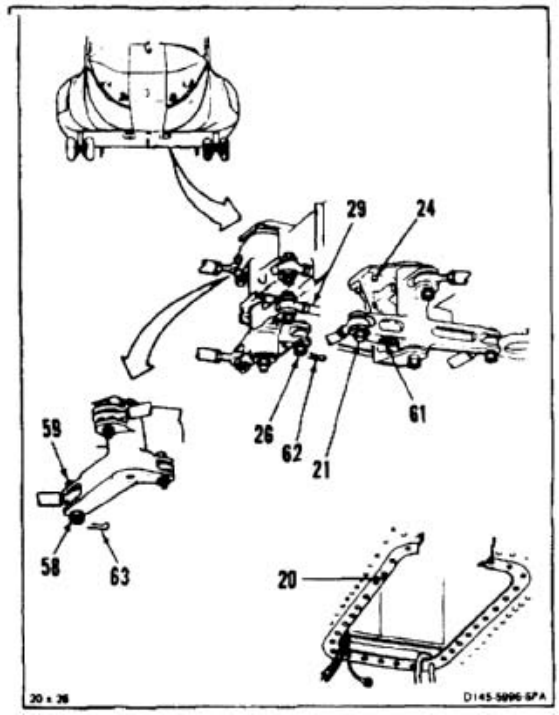


24. Position link (31) in bellcrank (60). Install bolt (59), two washers (58 and 57), and nut (56) in bellcrank. Have helper in cockpit hold bolt. Do not torque nut at this time. Remove tag from link.

25. Neutral rig transfer bellcranks (Task 11-46).

26. Working through left access (20), torque three nuts (21, 26, and 58) to **30 to 60 inch-pounds**. Install cotter pins (61, 62, and 63).

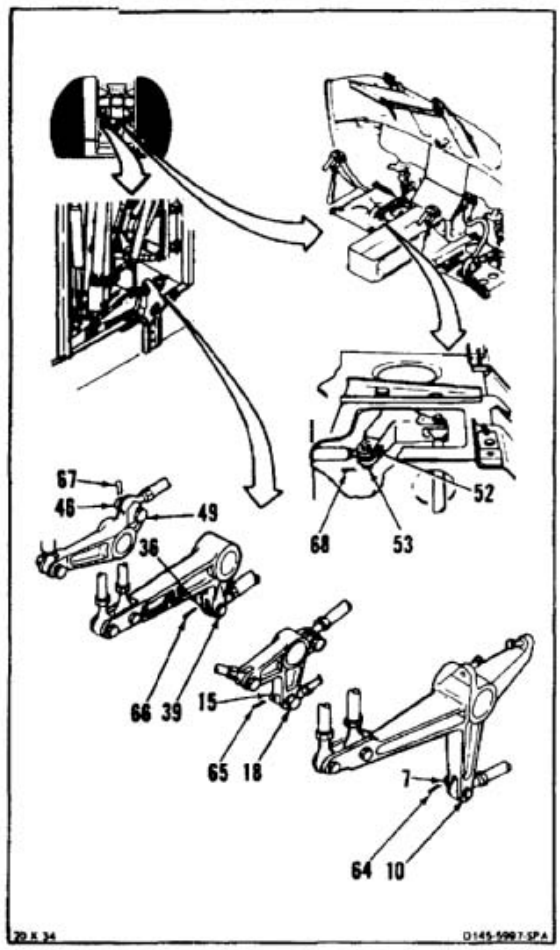
27. Check three bolts (24, 29, and 59). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 26.



28. Working in passageway and cockpit, torque five nuts (7, 15, 36, 48, and 53) to **30 to 60 inch-pounds**. Install cotter pins (64, 65, 66, 67, and 68).

29. Check five bolts (10, 18, 39, 49, and 52). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 28.

INSPECT



30. Clean sealant from flange (69) and inside surface (70) of access (20). Use acetone (E20) and cloths (E120). Wear gloves (E186) and goggles.

CAUTION

Wires must not support housing; otherwise, damage to equipment could occur.

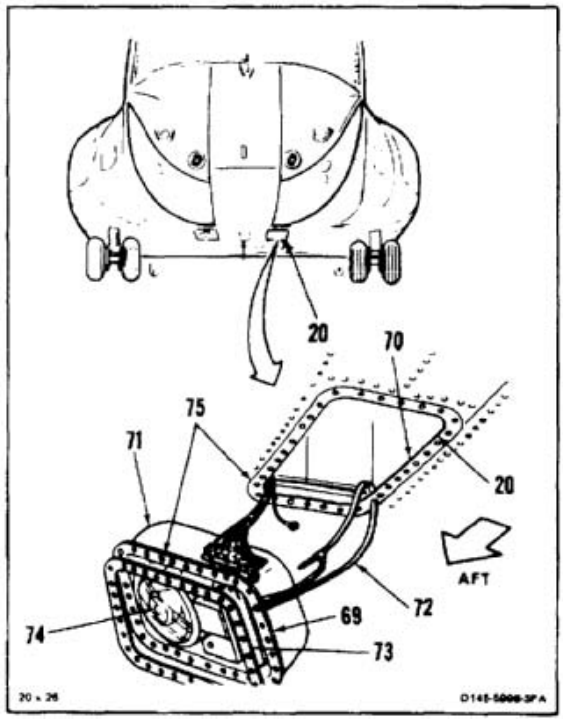
31. Support landing light housing (71). Remove strap (72).

WARNING

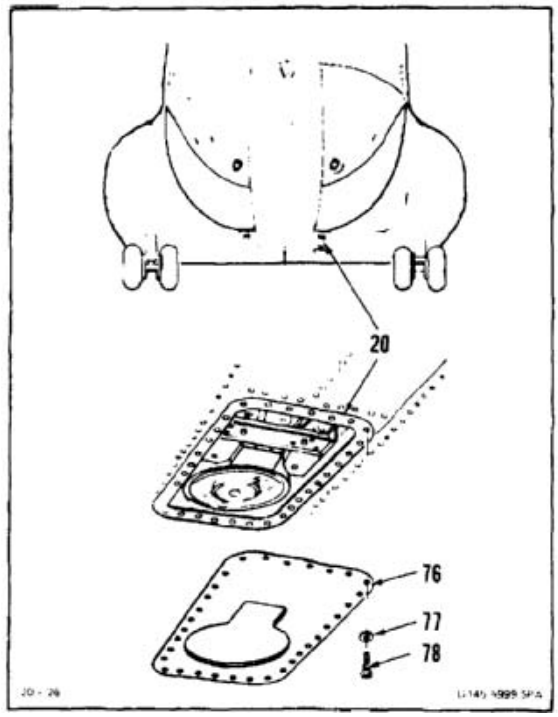
Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

32. Apply sealant (E336) to both sides of gasket (73). Install gasket on flange (69). Remove excess sealant with acetone (E20) and cloths (E120). Wear gloves (E186) and goggles.

33. Tilt housing (71) and position inside access (20), lamp (74) aft. Align housing and access holes (75).



34. Position housing (76) over access (20). Install 32 washers (77) and screws (78).



INSPECT

FOLLOW-ON MAINTENANCE:

Install cockpit forward floor covers (Task 2-82).
Install copilot's floor access panel (Task 2-80).
Install control closet backup panel (Task 2-2).
Install copilot's seat (Task 2-114).
Connect servocylinder connecting links (Task 11-193).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform operational check of flight controls (TM 55-1520-240-T).
Perform operational check of landing light (TM 55-1520-240-T).

END OF TASK

SECTION IV
CLOSET CONTROLS

11-87 REMOVE COCKPIT CONTROL TRANSFER BELLCRANKS 11-87

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Puller (APP E-38)

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

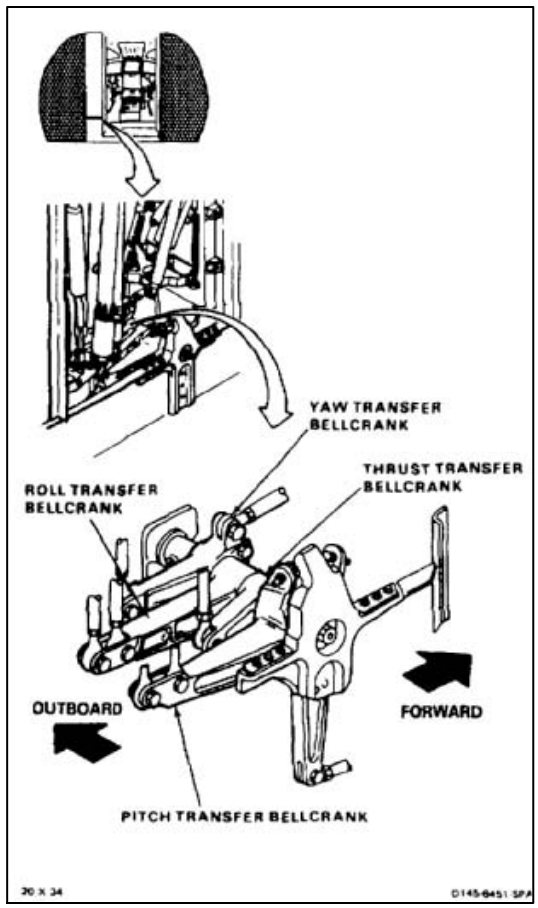
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Flight Control Hydraulic System Depressurized (TM 55-1520-240-T)
Forward and Aft Connecting Links to Servocylinders Disconnected (Task 11-192)
Control Closet Blanket Removed (Task 2-107)



CAUTION

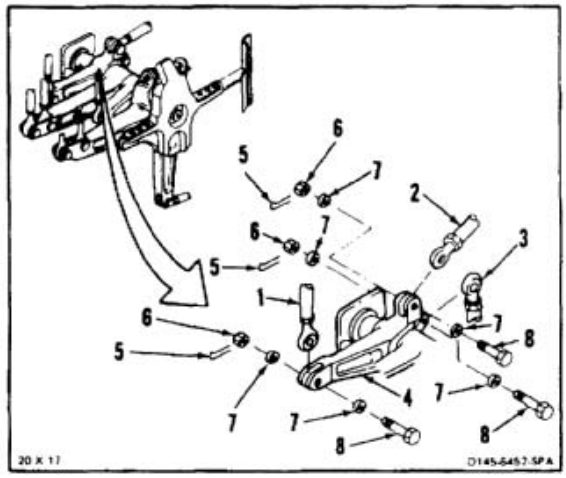
Do not allow bellcrank to drop; otherwise, damage to components can occur.

NOTE

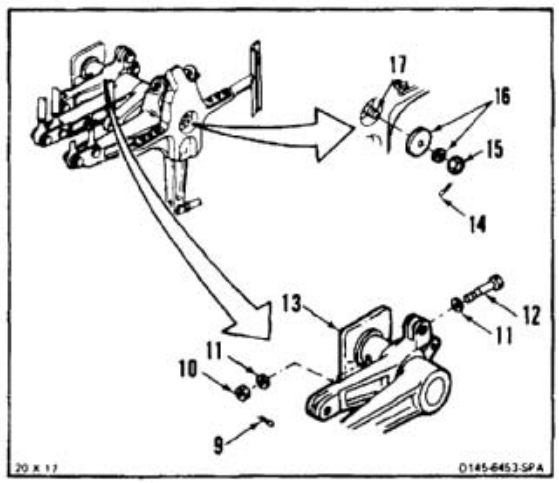
If a crack in the bellcrank or support is suspected during removal, refer to TM 1-1520-253-23.

REMOVE YAW TRANSFER BELLCRANK

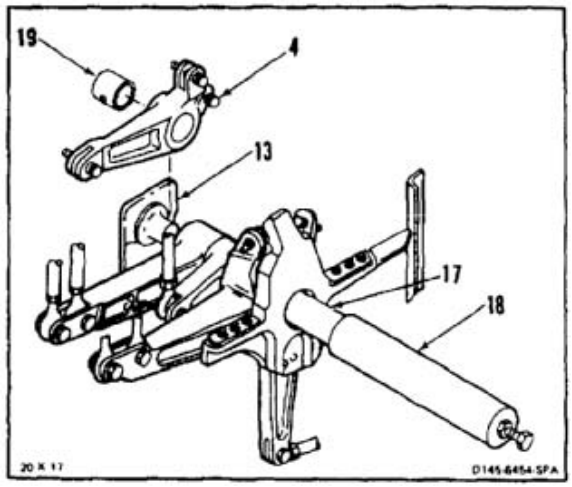
1. Tag yaw ILCA connecting link (1), yaw idler connecting link (2), yaw transfer connecting link (3), and yaw transfer bellcrank (4).
2. Remove three cotter pins (5), nuts (6), six washers (7) and three bolts (8) from bellcrank (4).
3. Disconnect three links (1, 2, and 3) from bellcrank (4). Tie links away from bellcrank. Use twine (E433).
4. Install three bolts (8), six washers (7), and three nuts (6) in bellcrank (4).



5. Remove cotter pin (9), nut (10), two washers (11), and bolt (12) from support (13).
6. Remove cotter pin (14), nut (15), and two washers (16) from shaft (17).

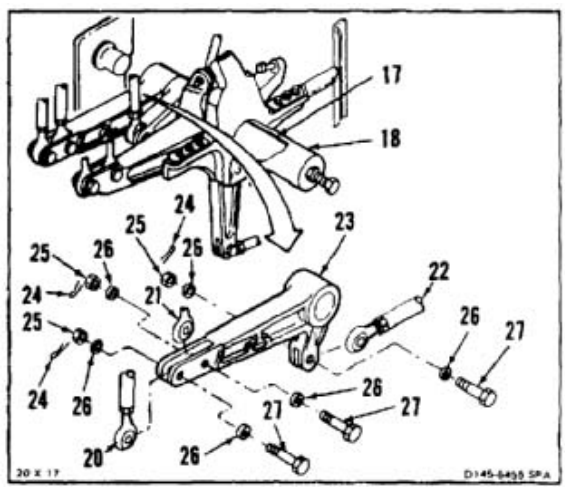


7. Install shaft puller (APP E-38) (18) on shaft (17).
8. Tie bellcrank (4) to hold bellcrank in position. Use twine (E433).
9. Pull shaft (17) until bellcrank (4) is free. Untie and remove bellcrank.
10. Remove spacer (19) from support (13).

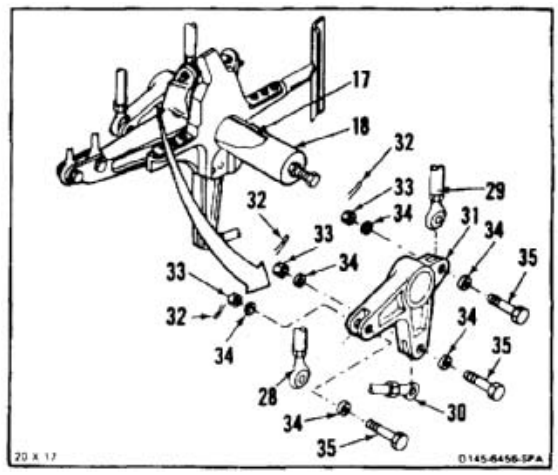


REMOVE ROLL TRANSFER BELLCRANK

11. Tag roll idler connecting link (20), roll ILCA connecting link (21), roll transfer connecting link (22) and bellcrank (23).
12. Remove three cotter pins (24), nuts (25), six washers (26), and three bolts (27) from bellcrank (23).
13. Disconnect three links (20, 21, and 22) from bellcrank (23). Tie links away from bellcrank. Use twine (E433).
14. Install three bolts (27), washers (26), and nuts (25) in bellcrank (23).
15. Tie bellcrank (23) to hold bellcrank in position. Use twine (E433).
16. Pull shaft (17) with shaft puller (APP E-38) (18) until bellcrank (23) is free. Untie and remove bellcrank.

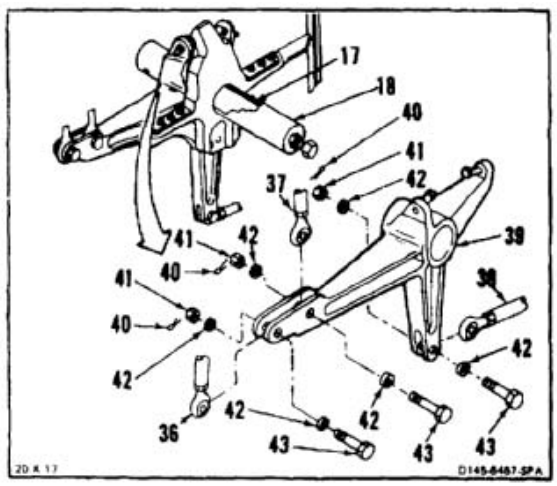


REMOVE THRUST TRANSFER BELLCRANK



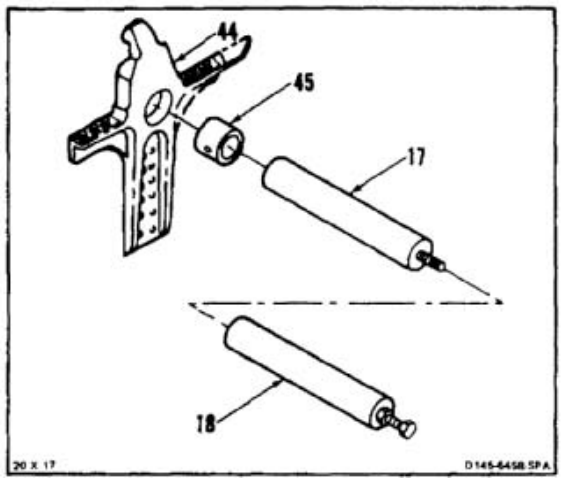
17. Tag thrust ILCA connecting link (28) thrust idler connecting link (29), thrust transfer connecting link (30), and thrust transfer bellcrank (31).
18. Remove three cotter pins (32), nuts (33), six washers (34), and three bolts (35) from bellcrank (31).
19. Disconnect three links (28, 29, and 30) from bellcrank (31). Tie links away from bellcrank. Use twine (E433).
20. Install three bolts (35), six washers (34), and three nuts (33) in bellcrank (31).
21. Tie bellcrank (31) to hold bellcrank in position. Use twine (E433).
22. Pull shaft (17) with shaft puller (APP E-38) (18) until bellcrank (31) is free. Untie and remove bellcrank.

REMOVE PITCH TRANSFER BELLCRANK



23. Tag pitch idler connecting link (36), pitch DASH actuator (37), pitch transfer link (38), and pitch transfer bellcrank (39).
24. Remove three cotter pins (40), nuts (41), six washers (42), and three bolts (43) from bellcrank (39).
25. Disconnect two links (36 and 38) and actuator (37) from bellcrank (39). Tie links and actuator away from bellcrank. Use twine (E433).
26. Install three bolts (43), six washers (42), and three nuts (41) in bellcrank (39).
27. Tie bellcrank (39) to hold bellcrank in position. Use twine (E433).
28. Pull shaft (17) with shaft puller (APP E-38) (18) until bellcrank (39) is free. Untie and remove bellcrank.

29. Remove puller (APP E-38) (18) and shaft (17) from support (44). Remove puller from shaft.
30. Remove bushing (45) from support (44).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-88 INSTALL COCKPIT CONTROL TRANSFER BELLCRANKS 11-88

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Cloth (E120)
Pencil (E271)

Parts:

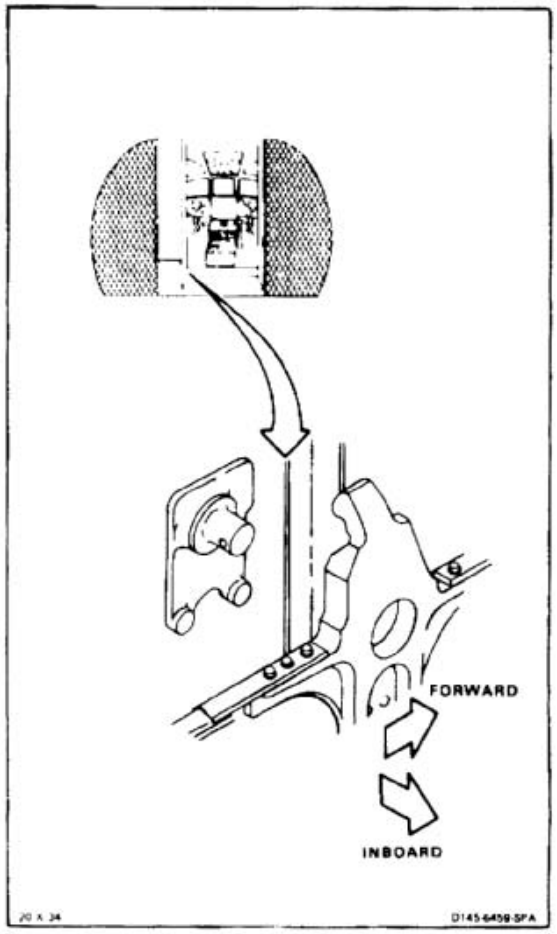
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

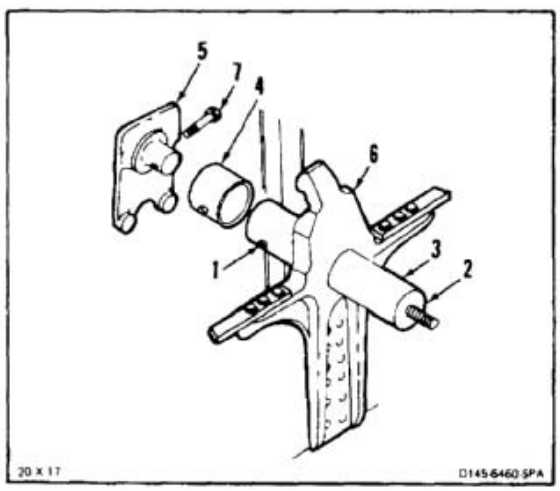
References:

TM 55-1520-240-23P
Task 11-33
Task 11-46



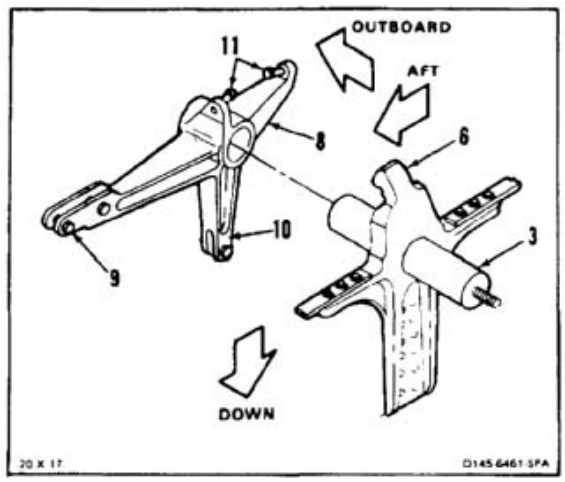
INSTALL PITCH TRANSFER BELLCRANK

1. Mark position of hole (1) on end (2) of shaft (3). Use pencil (E271).
2. Position spacer (4) on outboard support (5). Align holes.
3. Slide shaft (3) through inboard support (6) and on to support (5). Align holes of spacer (4), shaft (3), and support (5). Install bolt (7) through holes.
4. Mark position of spacer (4) on support (5). Use pencil (E271).
5. Remove shaft (3) and spacer (4).



6. Clean shaft (3). Use cloth (E120).

7. Insert shaft (3) about **3 inches** through inboard side of support (6), hollow end outboard.



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure stop bolts are correctly installed and adjusted.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

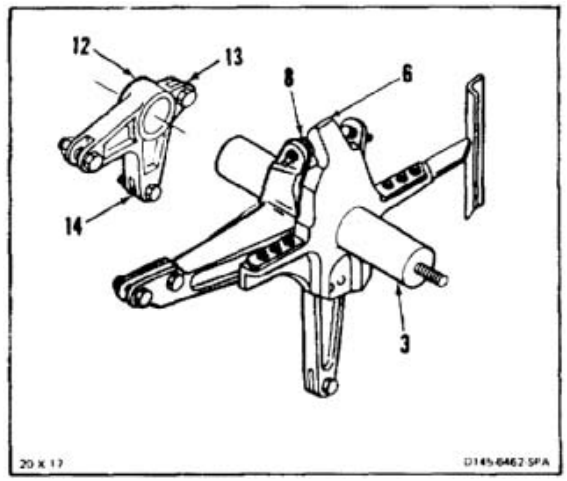
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Do not drive shaft through bellcranks. Damage to bellcranks and bearings will result.

8. Slide pitch transfer bellcrank (8) on outboard end of shaft (3), arm (9) aft, and arm (10) down, until bottomed. Top of support (6) must be between two bolts (11).

INSTALL THRUST TRANSFER BELLCRANK



9. Hold bellcrank (8) against support (6). Slide shaft (3) about **3 inches** through bellcrank. Move bellcrank to assist sliding of shaft.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure proper orientation of bellcrank output arms.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

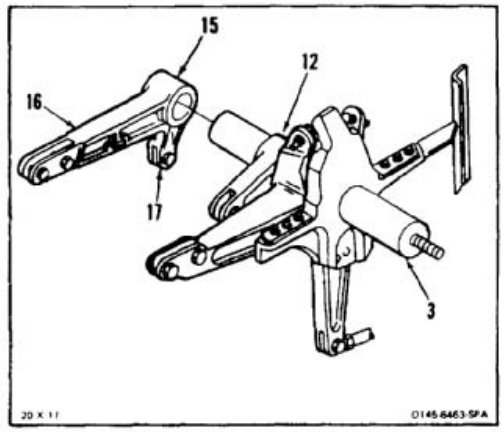
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

10. Slide thrust transfer bellcrank (12) on shaft (3), short arm (13) forward, and long arm (14) down, until bottomed on bellcrank (8). Move bellcrank (12) to assist sliding.

INSTALL ROLL TRANSFER BELLCRANK

11. Hold bellcrank (12) against bellcrank (8). Slide shaft (3) about **3 inches** through bellcrank (12). Move bellcranks to assist sliding of shaft.



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

12. Slide roll transfer bellcrank (15) on shaft (3), arm (16) aft, and arm (17) down, until bottomed on bellcrank (12). Move bellcrank (15) to assist sliding.

INSTALL YAW TRANSFER BELLCRANK

13. Install spacer (4) on support (5), with marks aligned.

14. Align mark on end (2) of shaft (3) with hole (18) in support (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure proper orientation of bellcrank.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

15. Position yaw transfer bellcrank (19) between bellcrank (15) and support (5), long arm (20) aft and arm (21) up.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

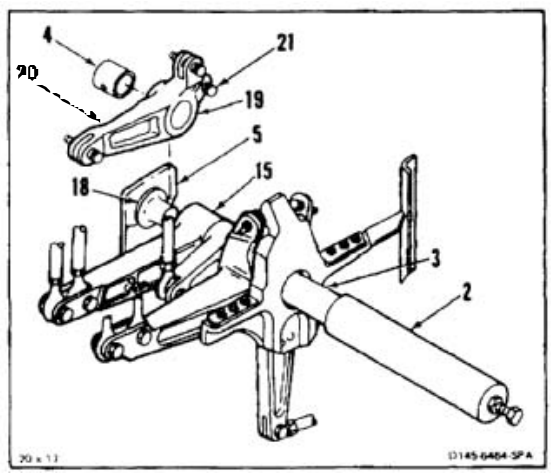
Ensure that all associated spacers, washers, and bushings are installed.

Ensure MS17826-4 nut is tightened using proper installation procedure to prevent excess torque application to the associated bellcrank hub bearings thereby restricting free rotation of the components.

At installation of this component, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

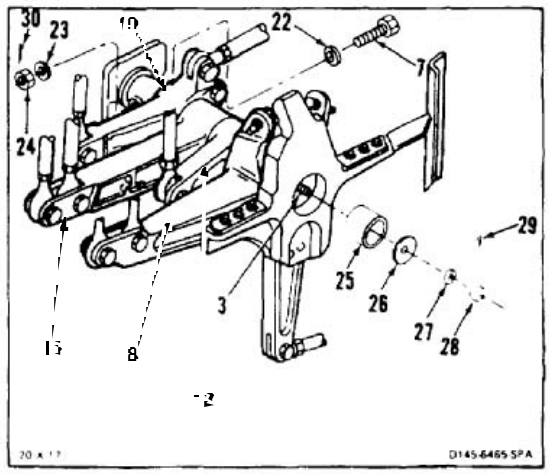
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

16. Slide shaft (3) through bellcrank (19) and into spacer (4). Align holes of spacer (4), shaft (3), and support (5). Move bellcranks and tap end of shaft to assist sliding of shaft. Use soft-faced hammer.



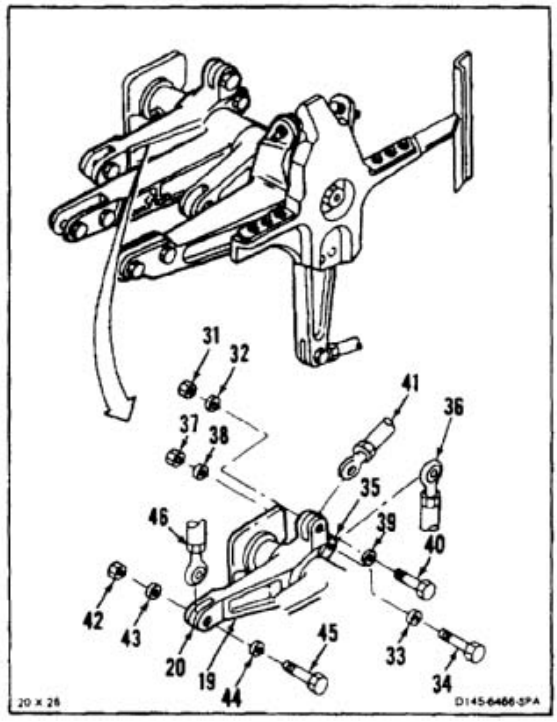
17. Install bolt (7), two washers (22 and 23), and nut (24) in support (5). Do not tighten nut at this time.
18. Install bushing (25) in support (6).
19. Install large washer (26), washer (27), and nut (28) on shaft (3). Tighten nut until there is no inboard or outboard movement of bellcranks (8, 12, 15, and 19) and bellcranks are free to rotate. Back off nut to align nearest cotter pin hole. Install cotter pin (29).
20. Torque nut (24) to **30 to 45 inch-pounds**. Install cotter pin (30).

INSPECT



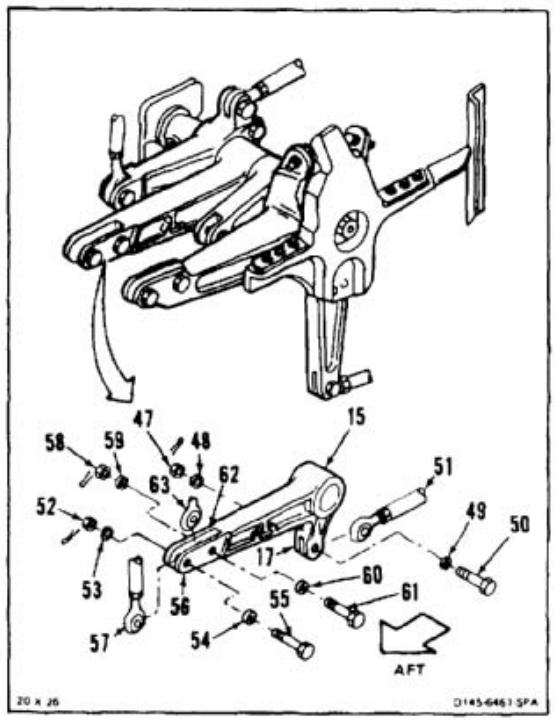
CONNECT YAW CONNECTING LINKS

21. Remove nut (31), two washers (32 and 33), and bolt (34) from forward arm (35) of bellcrank (19).
22. Untie yaw idler connecting link (36). Position link in forward arm of bellcrank (19). Install bolt (34), two washers (33 and 32), and nut (31). Do not torque nut at this time.
23. Remove nut (37), two washers (38 and 39), and bolt (40) from upper arm (21) of bellcrank (19).
24. Untie yaw transfer connecting link (41). Position link in upper arm (21) of bellcrank (19). Install bolt (40), two washers (39 and 38), and nut (37). Do not torque nut at this time.
25. Remove nut (42), two washers (43 and 44), and bolt (45) from aft arm (20) of bellcrank (19).
26. Untie yaw ILCA connecting link (46). Position link in aft arm (20) of bellcrank (19). Install bolt (45), two washers (44 and 43), and nut (42). Do not torque nut at this time.
27. Remove tags from links (36, 41, and 46) and bellcrank (19).



CONNECT ROLL CONNECTING LINKS

28. Remove nut (47), two washers (48 and 49), and bolt (50) from lower forward arm (17) of bellcrank (15).
29. Untie roll transfer connecting link (51). Position link in lower forward arm (17) of bellcrank (15). Install bolt (50), two washers (49 and 48), and nut (47). Do not torque nut at this time.
30. Remove nut (52), two washers (53 and 54), and bolt (55) from aft lower arm (56) of bellcrank (15).
31. Untie roll idler connecting link (57). Position link in aft lower arm (56) of bellcrank (15). Install bolt (55), two washers (54 and 53), and nut (52). Do not torque nut at this time.
32. Remove nut (58), two washers (59 and 60), and bolt (61) from upper arm (62) of bellcrank (15).
33. Untie roll ILCA connecting link (63). Position link in upper arm (62) of bellcrank (15). Install bolt (61), two washers (60 and 59), and nut (58). Do not torque nut at this time.
34. Remove tags from links (51, 57, and 63) and bellcrank (15).



CONNECT THRUST CONNECTING LINKS

35. Remove nut (64), two washers (65 and 66), and bolt (67) from lower arm (14) of bellcrank (12).

36. Untie thrust transfer connecting link (68). Position link in lower arm (14) of bellcrank (12). Install bolt (67) two washers (66 and 65), and nut (64). Do not torque nut at this time.

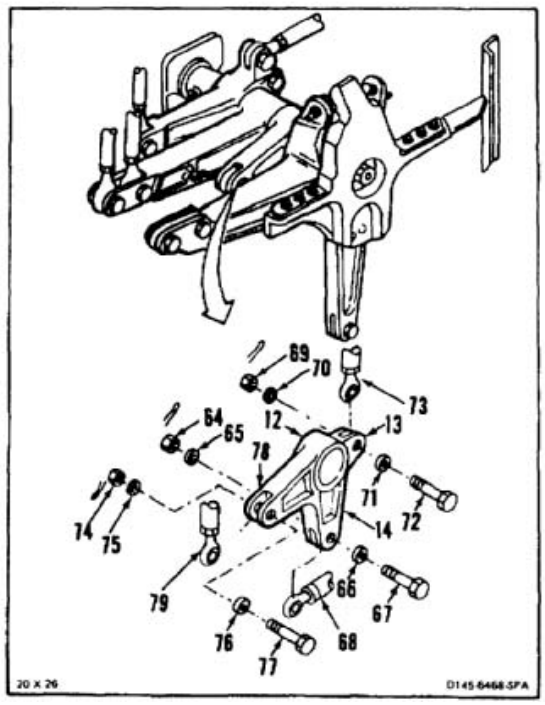
37. Remove nut (69), two washers (70 and 71), and bolt (72) from forward arm (13) of bellcrank (12).

38. Untie thrust idler connecting link (73). Position link in forward arm (13) of bellcrank (12). Install bolt (72), two washers (71 and 70), and nut (69). Do not torque nut at this time.

39. Remove nut (74), two washers (75 and 76), and bolt (77) from aft arm (78) of bellcrank (12).

40. Untie thrust ILCA connecting link (79). Position link in aft arm (78) of bellcrank (12). Install bolt (77), two washers (76 and 75), and nut (74). Do not torque nut at this time.

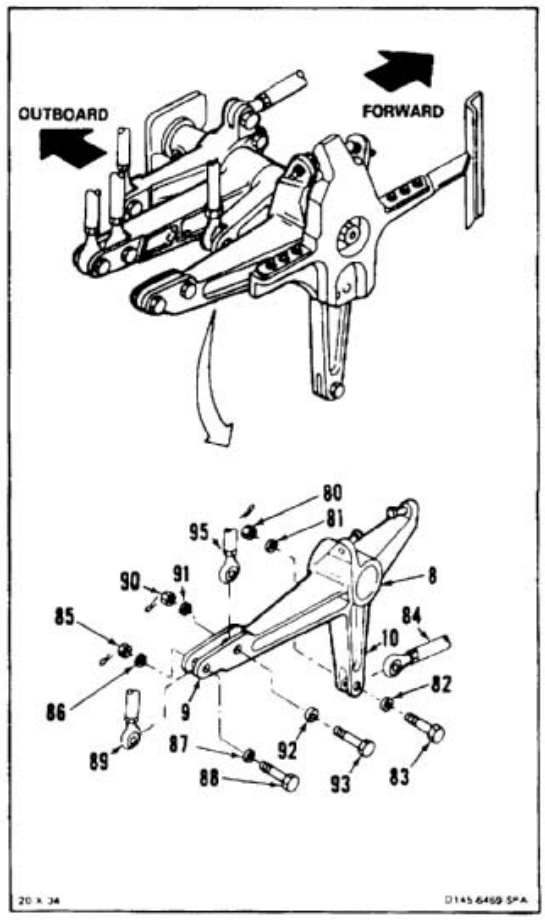
41. Remove tags from links (68, 73, and 79) and bellcrank (12).



CONNECT PITCH CONNECTING LINKS AND DASH ACTUATOR

42. Remove nut (80), two washers (81 and 82), and bolt (83) from lower arm (10) bellcrank (8).
43. Untie pitch transfer connecting link (84). Position link in lower arm (10) of bellcrank (8). Install bolt (83), two washers (82 and 81), and nut (80). Do not torque nut at this time.
44. Remove nut (85), two washers (86 and 87), and bolt (88) from aft arm (9) of bellcrank (8).
45. Untie pitch idler connecting link (89). Position link in aft arm (9) of bellcrank (8). Install bolt (88), two washers (87 and 86), and nut (85). Do not torque nut at this time.
46. Remove nut (90) two washers (91 and 92), and bolt (93) from aft upper arm (94) of bellcrank (8).
47. Untie DASH actuator (95). Position actuator (95) in aft upper arm (9) of bellcrank (8). Install bolt (93), two washers (91 and 92), bushing (92.1), and nut (90). Do not torque nut at this time.
48. Remove tags from links (84 and 89), actuator (95), and bellcrank (8).
49. Neutral rig cockpit transfer bellcranks (Task 11-46).
50. Perform neutral rig check of cockpit flight controls (Task 11-33).

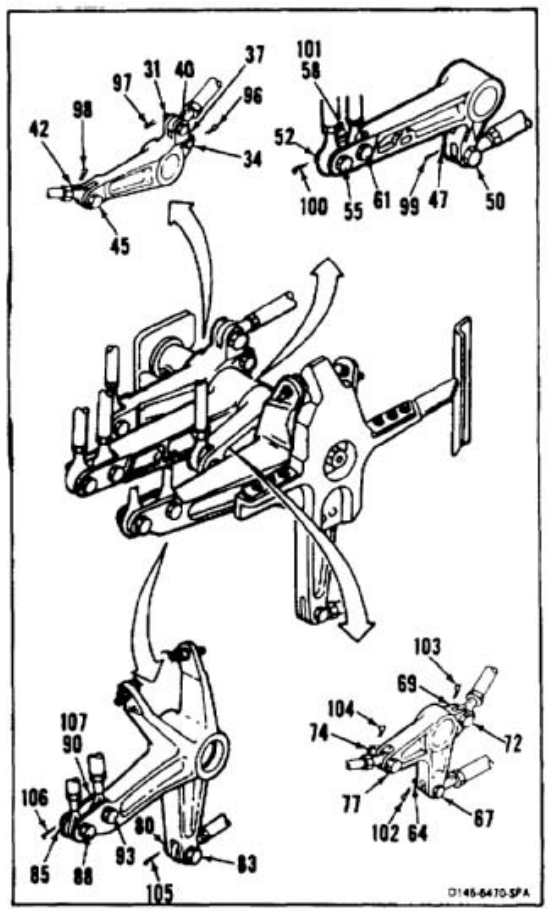
INSPECT



51. Torque nuts (31, 37, 42, 47, 52, 58, 64, 68, 74, 80, 86, and 90) to **30 to 46 inch-pounds**. Install cotter pins (96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, and 107).

52. Check bolts (34, 40, 46, 60, 66, 61, 67, 72, 77, 83, 88, and 93). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolts rotate or are loose, add washer under nut and repeat step 51.

INSPECT



FOLLOW-ON MAINTENANCE:

Connect forward and aft connecting links to servocylinders (Task 11-193).
Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight controls (TM 55-1520-240-T).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-88.1 INSPECT INSERTS IN CONTROL PALLET STA 95 AND STA 120 11-88.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

None

Materials:

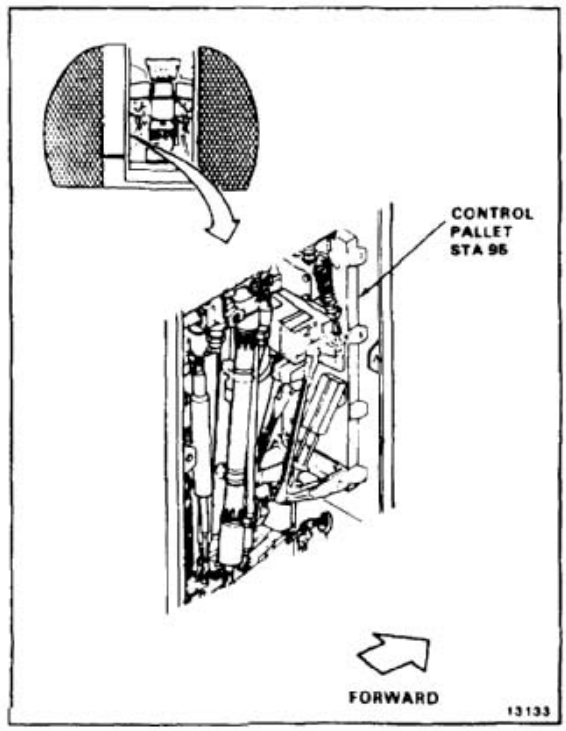
None

Personnel Required:

Aircraft Structure Repairer

Equipment Condition:

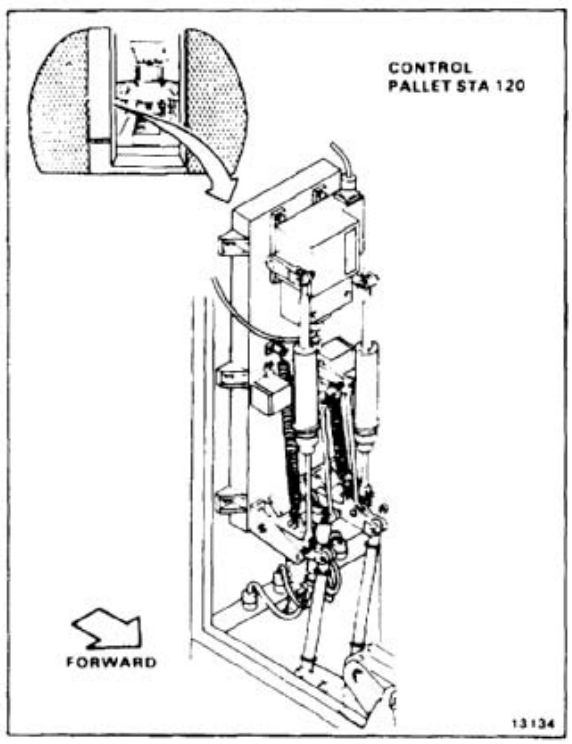
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Thrust and Yaw Connecting Links Removed (Task 11-105)



NOTE

It is not necessary to remove any components from pallet.

1. Examine pallet for defective inserts or inserts displaced from their normal position.
2. Apply hand pressure to pallet mounted components. Check for looseness between components and the pallet. Any gap between component mounting lugs and pallet inserts indicates loose inserts.
3. Visually inspect for a round plug of white adhesive in a gap to identify loose inserts.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-89 REMOVE CONTROL PALLET STA 95 11-89

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

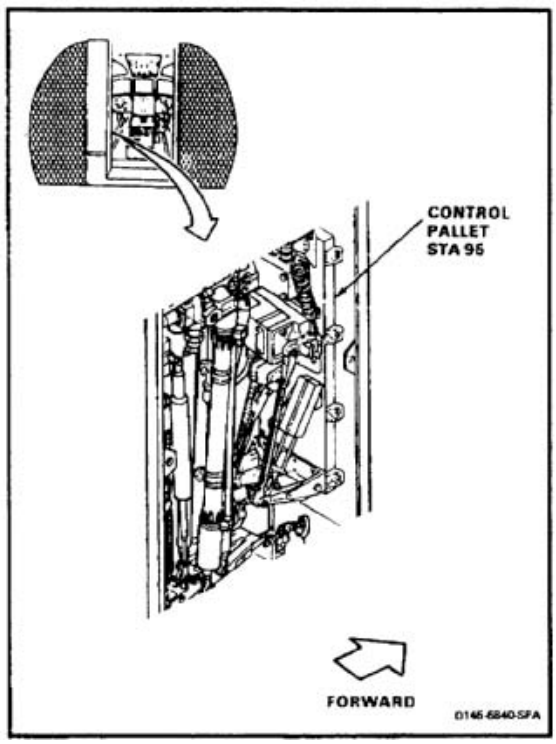
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Opened (Task 2-2)
Thrust and Yaw Connecting Links Removed (Task 11-105)

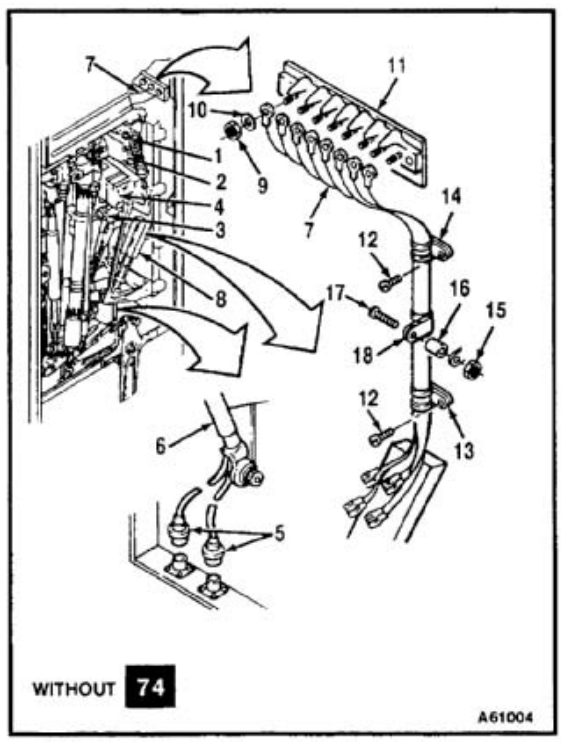


NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing links.

NOTE

If a crack in the connecting links or bellcrank is suspected, refer to TM 1-1520-253-23.

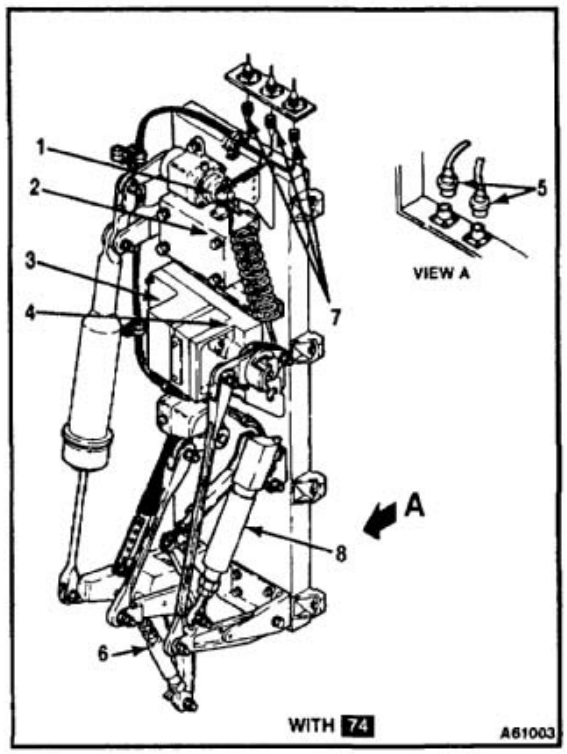


1. On helicopters without 74, perform the following steps:
   a. Tag and disconnect connector (1) from yaw magnetic brake (2).
   b. Tag and disconnect connector (3) from thrust CCDA (4).
   c. Tag and disconnect two connectors (5) of yaw CPT (6).
   d. Tag eight electrical wires (7) from thrust potentiometer (8). Remove eight nuts (9) and washers (10) from terminal block (11). Disconnect wires.
   e. Remove two screws (12) from clamps (13 and 14). Remove clamps.
   f. Remove nut (15), spacer (16), screw (17), and clamp (18) from wire (7).

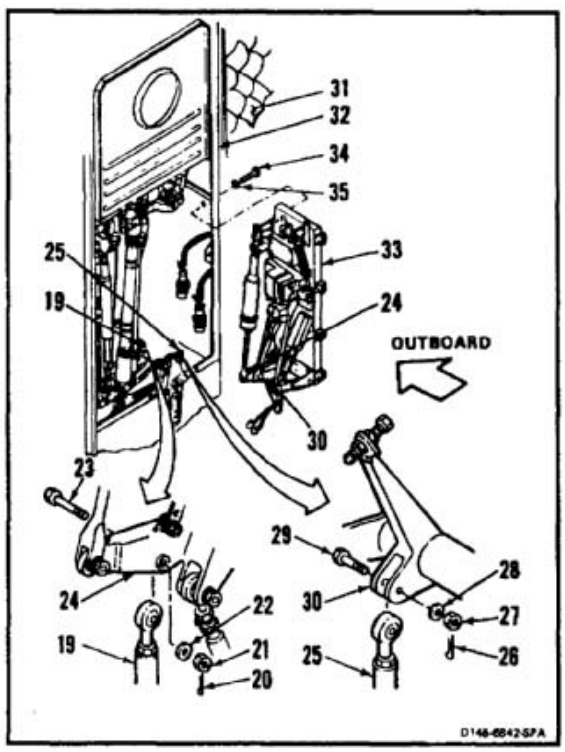
NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing links.

2. On helicopters with 74, perform the following steps:
   a. Tag and disconnect connector (1) from yaw magnetic brake (2). Use tag (E264).
   b. Tag and disconnect connector (3) from thrust CCDA (4). Use tag (E264).
   c. Tag and disconnect two connectors (5) of yaw CPT (6). Use tag (E264).
   d. Tag and disconnect three electrical connectors (7) from thrust potentiometer (8). Use tag (E264).



3. Tag yaw input link (19). Remove cotter pin (20), nut (21), and washer (22) from bolt (23). Slide bolt outboard to release link from yaw idler bellcrank (24). Disconnect link.
4. Install bolt (23), washer (22), and nut (21) loosely in bellcrank (24).
5. Tag thrust input link (25). Remove cotter pin (26), nut (27), and washer (28) from bolt (29). Slide bolt outboard to release link from thrust idler bellcrank (30). Disconnect link.
6. Install bolt (29), washer (28), and nut (27) loosely in bellcrank (30).
7. Pull edge of blanket (31) away from bulkhead (32).
8. Have helper support control pallet (33). Working in cockpit, remove eight bolts (34) and washers (35) from pallet and bulkhead (32). Remove pallet.



FOLLOW-ON MAINTENANCE:

Repair control pallet (Task 11-90.1).

END OF TASK

11-90 REMOVE CONTROL PALLET STA 120 11-90

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

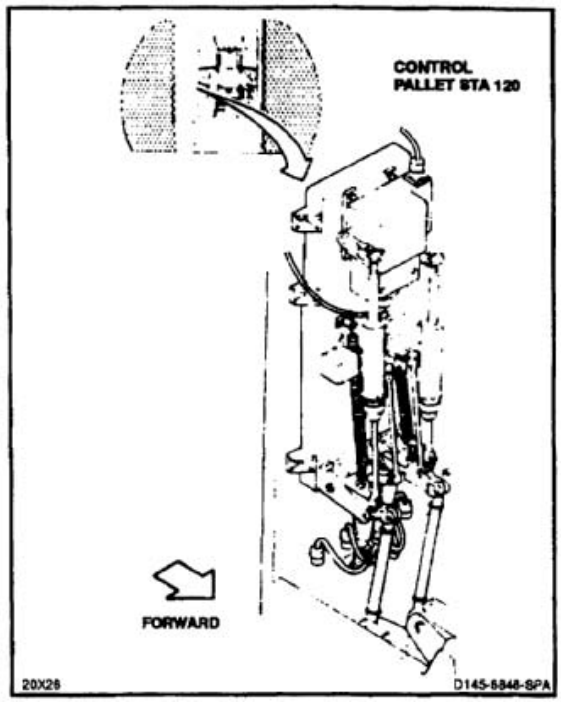
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Yaw, Thrust and Roll Connecting Links Removed (Task 11-105)
DASH Actuator Removed (Task 11-163)

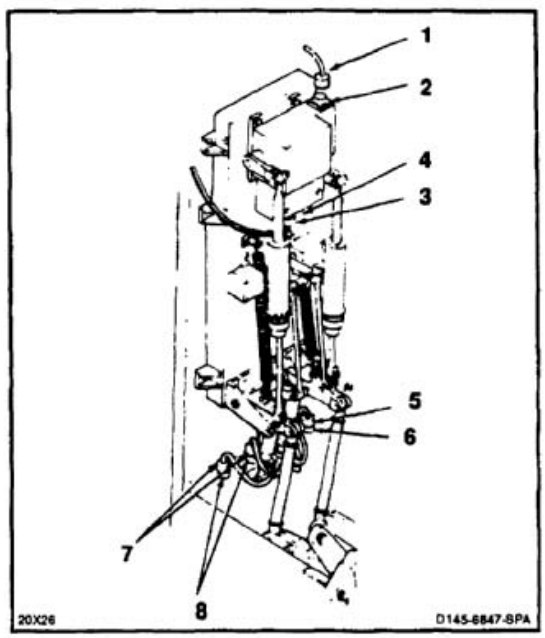


NOTE

If a crack in the connecting link or bellcranks is suspected, refer to TM 1-1520-253-23.

NOTE

Attaching bolts, washers, and nut will be temporarily installed after removing links and bellcranks.

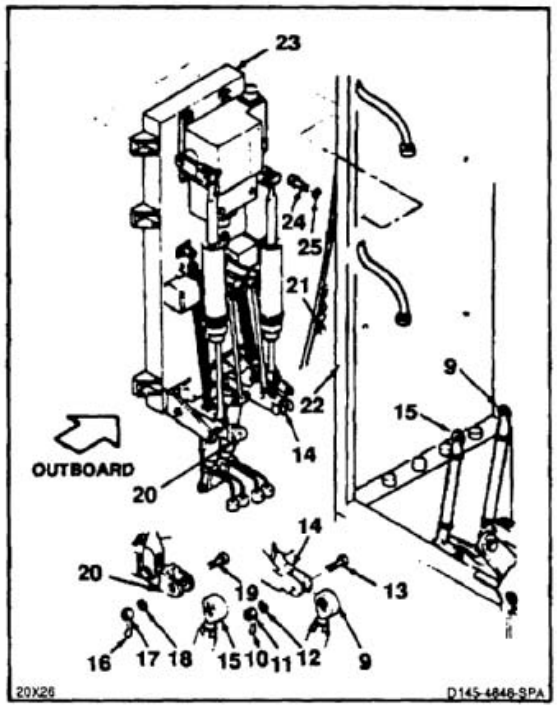


1. Tag and disconnect connector (1) from pitch CCDA (2).
2. Tag and disconnect connector (3) from roll magnetic brake (4).
3. Tag and disconnect two roll LVDT connectors (5) from structure receptacles (6).
4. Tag and disconnect two pitch LVDT connectors (7) from structure receptacle (8).

5. Tag roll input link (9). Remove cotter pin (10), nut (11), and washer (12) from bolt (13). Slide bolt outboard to release link from roll idler bellcrank (14). Disconnect link.
6. Install bolt (13), washer (12), and nut (11) loosely in bellcrank (14).
7. Tag pitch input link (15). Remove cotter pin (16), nut (17), and washer (18) from bolt (19). Slide bolt outboard to release link from pitch idler bellcrank (20). Disconnect link.
8. Install bolt (19), washer (18), and nut (17) loosely in bellcrank (20).
9. Pull edge of blanket (21) away from bulkhead (22).
10. Have helper support control pallet (23). Working in cabin, remove six bolts (24) and washers (25) from pallet and bulkhead (22). Remove pallet.

FOLLOW-ON MAINTENANCE:

Repair control pallet (Task 11-90.1).



END OF TASK

11-90.1 REPLACE INSERTS IN CONTROL PALLET STA 95 AND STA 120 (AVIM) 11-90.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Airframe Repairer's Tool Kit, NSN 5180-00-323-4876
Vacuum Cleaner
Explosion-Proof Heat Lamp
Hypodermic Injector
Counterbore Set, NSN 5133-00-378-3813
Portable Drill, NSN 5130-00-293-1978
Drill Press
Drill Bit, 3/4 Inch
Drill Bit, 11/16 Inch
Drill Bit, No. 43
C-Clamps
Wood Blocks, 2 x 2 X 0.5 Inch (2)
Aligning Tool NAS1837G7 or NAS1837G9
Trip Balance, NSN 6670-00-401-7195

Materials:

Adhesive (E40 or E41)
Acetone (E20)

General Safety Instructions:

WARNING

Methyl-ethyl-ketone (E244) is flammable and toxic. Use only with adequate ventilation. Keep away from heat, sparks, or open flame. Do not inhale. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Acetone (E20) is extremely flammable. It can be toxic. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

Methyl-Ethyl-Ketone (E244)
Gloves (E184.1)
Polyethylene Cup (E157)
Wood Spatula (E424)
Temperature Indicating Strips (E413)
Cloths (E120)
Abrasive Paper (E7)
Epoxy Primer (E292.11)

Parts:

Inserts
- NAS1835A3M
- NAS1835A4M
- NAS1834A3-1122

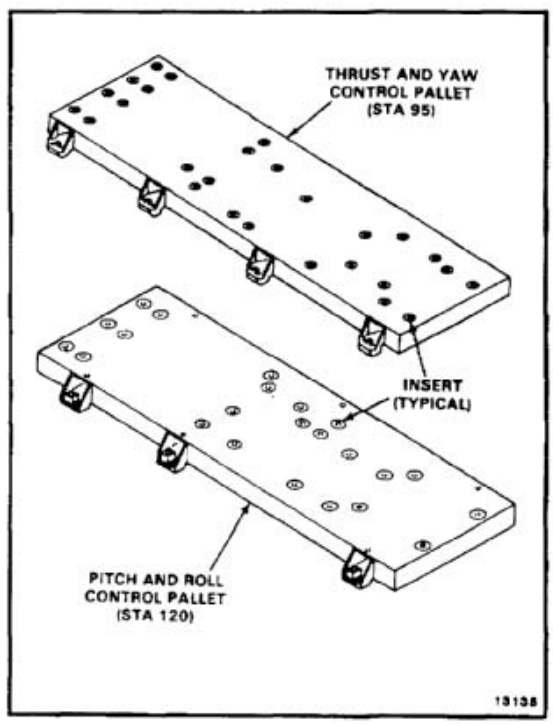
Installation Tabs
- NAS1837T7
- NAS1837T9

Personnel Required:

Aircraft Structure Repairer
Inspector

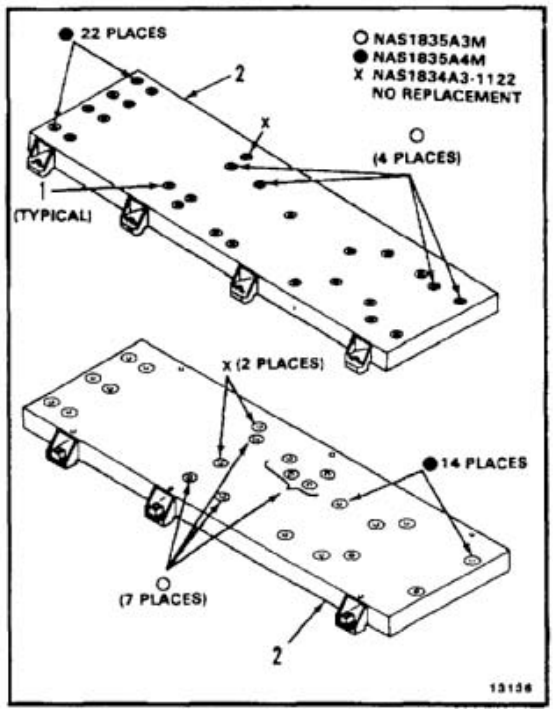
Equipment Condition:

Off Helicopter Task



PREPARE PALLET

1. Remove defective insert (1). If insert is loose enough, carefully remove it by hand. Go to step 2. If insert is bonded into pallet, drill or bore out insert as follows:
   a. Select suitable drill bit or counterbore. Use **11/16 inch** drill bit or counterbore for NAS1835A3M inserts. Use **3/4 inch** drill bit or counterbore for NAS1835A4M inserts.
   b. Install boring tool in drill press. Adjust table height.
   c. Limit depth of bore to at least **1/8 inch** from opposite face of pallet.
   d. Align insert to be drilled or bored out on drill press table. Clamp pallet (2) in place. Use C-clamps and wood blocks. Avoid excessive clamping pressure.
   e. Set drill press to highest speed. Slowly drill out insert. Remove pallet.

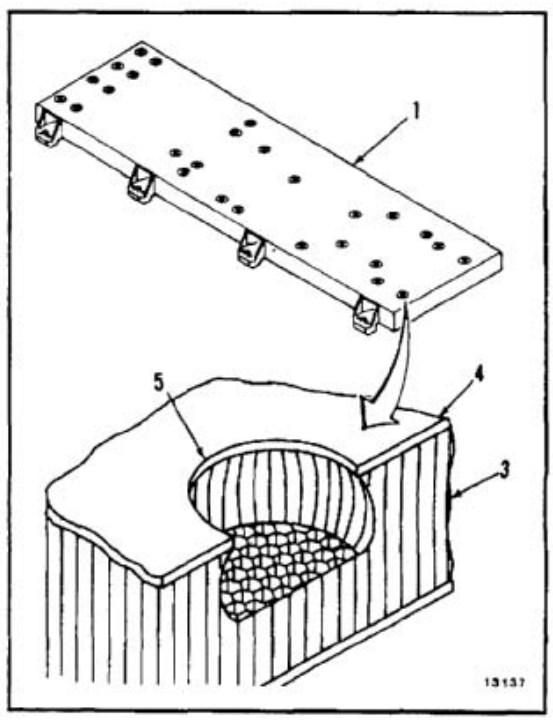


2. Clamp pallet (1) to workbench. Use C-clamps and wood blocks.

NOTE

Do not leave a smooth surface within the bore. Proper adhesive bonding requires a rough surface.

3. Enlarge diameter of bore in honeycomb (3) below surface plate (4). Do not enlarge hole (5) in surface plate.
4. Vacuum debris from hole (5). Clean the area around the hole with a clean cloth (E120) damp with acetone (E20) or methyl-ethyl-ketone (E244). Wear gloves (E184.1) and goggles.



PREPARE INSERT

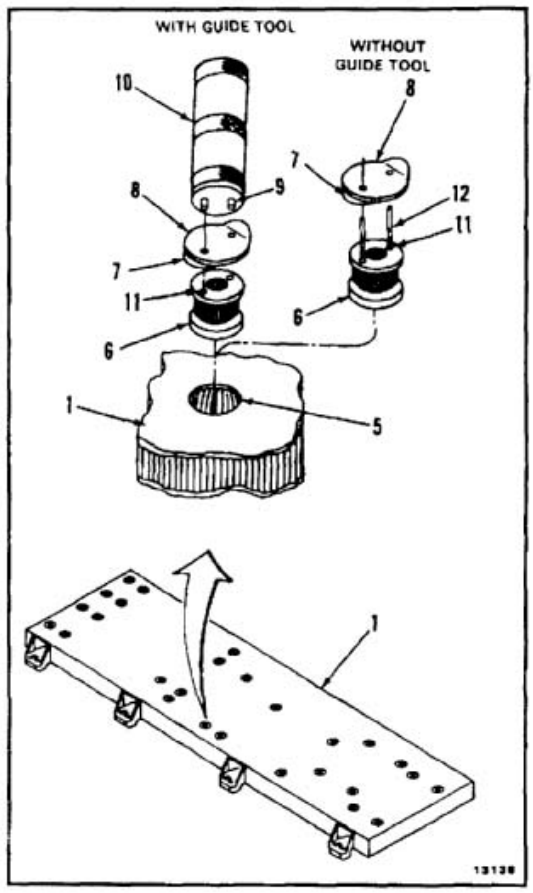
CAUTION

To ensure a strong adhesive bond, wear clean, protective gloves (E184.1) while handling repair components and adhesives.

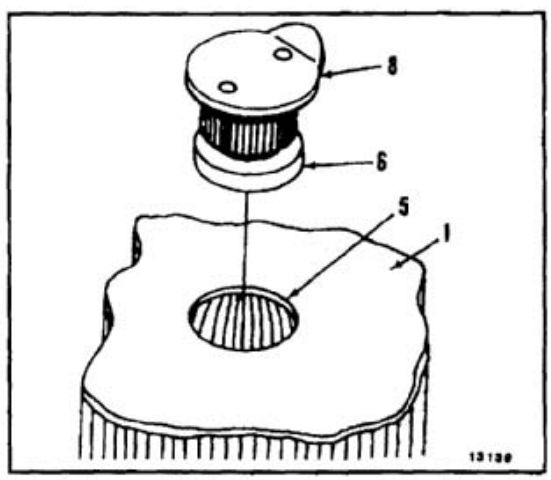
NOTE

If guide tool (10) is not available, go to step 8.

5. Clean insert (6). Use a clean cloth (E120) damp with acetone (E20) or methyl-ethyl-ketone (E244). Wear gloves (E184.1) and goggles.
6. Remove paper backing (7) from installation tab (8) to expose adhesive face. Place tab on pins (9) of guide tool (10) with adhesive side toward insert.
7. Align holes (11) in insert (6) with pins (9) of tool (10). Press insert firmly against adhesive face of tab (8). Remove tool. Go to step 9.
8. If guide tool (10) is not available, perform the following:
   a. Install a number 43 drill bit (12) through each hole (11) in insert (6).
   b. Remove adhesive backing (7) from installation tab (8). Install tab over drills with adhesive side toward insert. Press tab on insert and remove drills.



9. Install insert (6) into hole (5). Press down on tab (8) so that it sticks firmly to the top of pallet (1).



MIX ADHESIVE

10. Mix adhesive (E40 or E41) as follows:

WARNING

Adhesives (E40 and E41) are toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

NOTE

Adhesive (E40) is preferred. Use adhesive (E41) only if adhesive (E40) is not available.

a. Mix a tube of prepackaged adhesive (E40). Follow instructions on kit. Wear gloves (E186).

b. If prepackaged adhesive (E40) is not available, prepare adhesive (E41). Mix **100 parts** of resin and **23 parts** of hardener by weight. Use trip balance and polyethylene cup (E157). Stir until color is uniform. Use wood spatula (E424).

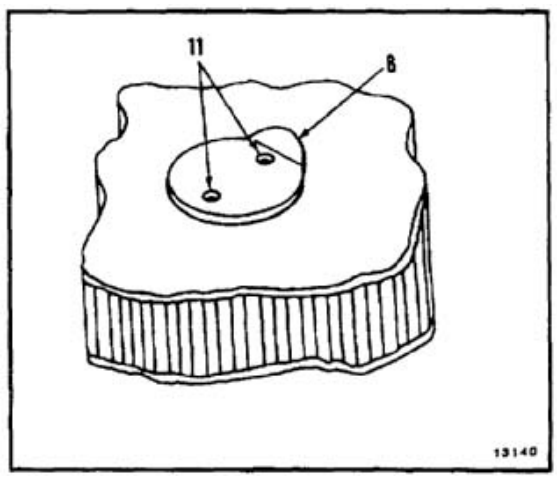
NOTE

Working life of adhesive is about **30 minutes**.

INSTALL INSERT

11. Inject adhesive mixture through either hole (11) in tab (8). Use hypodermic injector. Continue to inject mixture until it flows from the other hole.

12. Wipe off excess adhesive from top of tab (8). Use cloths (E120).



CAUTION

Do not exceed **160ºF (71ºC)** at pod surface. Damage to pod can occur.

13. Cure adhesive at **140º to 160ºF (60º to 71ºC) for 2 hours**. Use explosion-proof heat lamp set **11 to 12 inches** from insert (6). Monitor temperature with temperature indicating strips (E413).

NOTE

Serviceable cure can be achieved without heat at **70º to 80ºF (21º to 27ºC) in 24 hours**.

14. Remove tab (8).

INSPECT

15. Smooth any adhesive deposit around insert (6). Use abrasive paper (E7).

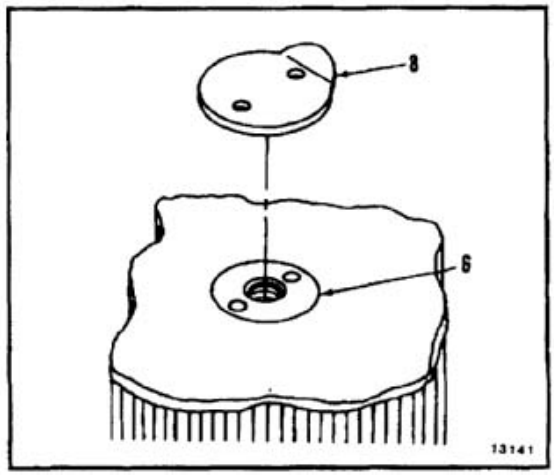
WARNING

Epoxy primer (E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

16. Touch up area around insert (6) as needed with epoxy primer (E292.1).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-91 INSTALL CONTROL PALLET STA 95 11-91

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

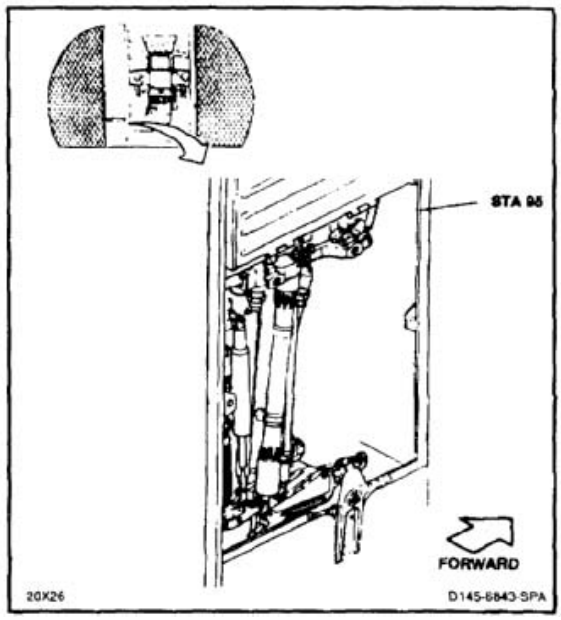
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 11-48



CAUTION

Do not install bolts unless bushings are in bellcranks; otherwise, damage to components will result.

NOTE

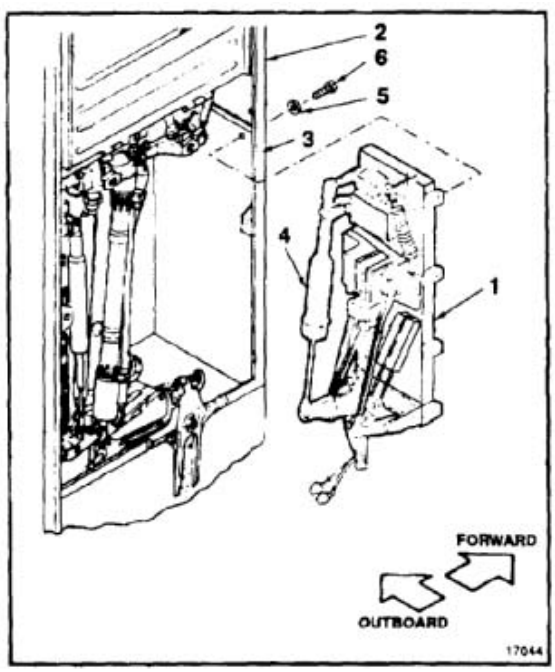
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require special torque and nut (Task 1-13).

1. Position control pallet (1) inside closet (2) on bulkhead (3), with feel spring (4) outboard and aft.

NOTE

Longer bolts are installed outboard, shorter bolts inboard.

2. Have helper support pallet (1). Working in cockpit, install eight washers (5) and bolts (6) through bulkhead (3) and in pallet. Torque bolts to **50 to 70 inch-pounds**.



3. On helicopters without 74 perform the following steps:

   a. Remove nut (7) and washer (8). Slide bolt (9) outboard and position yaw input link (10) in yaw idler bellcrank (11).

   b. Install bolt (9), washer (8), and nut (7) in bellcrank (11). Do not tighten nut at this time. Remove tag from link (10).

   c. Remove nut (12) and washer (13). Slide bolt (14) outboard and position thrust input link (15) in thrust idler bellcrank (16).

   d. Install bolt (14), washer (13), and nut (12) in bellcrank (16). Do not tighten nut at this time. Remove tag from link (15).

   e. Position clamp (17) on wires (18) from thrust potentiometer (19). Install screw (20), spacer (21), and nut (22).

   f. Position two clamps (23 and 24) on wire (18). Install two screws (25 and 26).

   g. Connect eight wires (18) to terminal block (27). Install eight washers (28) and nuts (29) to block. Remove tags from wires.

   h. Connect two connectors (30) of yaw CPT (31) to receptacles (32) on structure (33). Remove tag.

   i. Connect connector (34) to thrust CCDA (35). Remove tag.

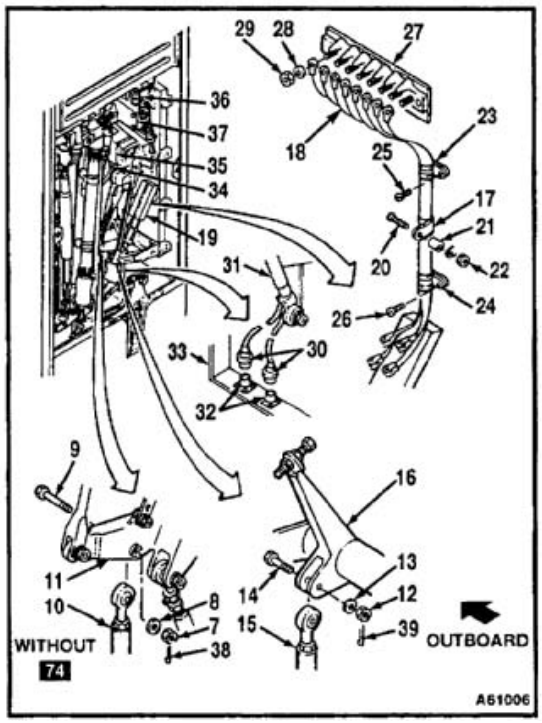
   j. Connect connector (36) to yaw magnetic brake (37). Remove tag.

   k. Perform pallet yaw control rig check (Task 11-48).

   l. Perform pallet thrust control rig check (Task 11-48).

   m. Torque two nuts (7 and 12) to **30 to 60 inch-pounds**. Install two cotter pins (38 and 39).

   n. Check two bolts (9 and 14). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolts rotate or are loose, add washer under nuts and repeat step m.



INSPECT

4. On helicopters with 74, perform the following steps:

   a. Remove nut (7) and washer (8). Slide bolt (9) outboard and position yaw input link (10) in yaw idler bellcrank (11).

   b. Install bolt (9), washer (8), and nut (7) in bellcrank (11). Do not tighten nut at this time. Remove tag from link (10).

   c. Remove nut (12) and washer (13). Slide bolt (14) outboard and position thrust input link (15) in thrust idler bellcrank (16).

   d. Install bolt (14), washer (13), and nut (12) in thrust idler bellcrank (16). Do not tighten nut at this time. Remove tag from link (15).

   e. Connect three electrical connectors (17) to bulkhead receptacles (18). Remove tags from wires.

   f. Connect two connectors (19) of yaw CPT (20) to receptacles (21) on structure (22). Remove tag.

   g. Connect connector (23) to thrust CCDA (24). Remove tag.

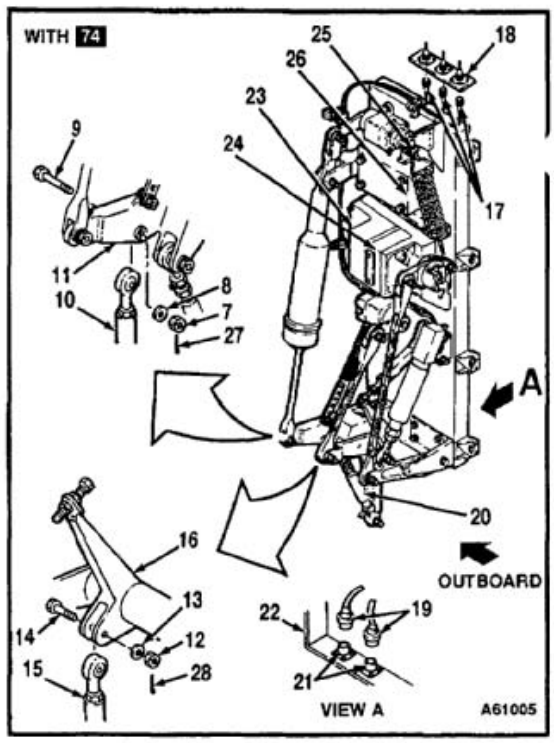
   h. Connect connector (25) to yaw magnetic brake (26). Remove tag.

   i. Perform pallet yaw control rig check (Task 11-48).

   j. Perform pallet thrust control rig check (Task 11-48).

   k. Torque two nuts (7 and 12) to **30 to 60 inch-pounds**. Install two cotter pins (27 and 28).

   l. Check two bolts (9 and 14). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolts rotate or are loose, add washer under nuts and repeat step k.



INSPECT

FOLLOW-ON MAINTENANCE:

Install thrust and yaw connecting links (Task 11-106).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform operational check of flight controls (TM 55-1520-240-T).
Close closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-92 INSTALL CONTROL PALLET STA 120 11-92

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Transfer Bellcrank Rig Pin (T128)
Pitch and Roll Pallet Rig Pin (T134)

Materials:

None

Parts:

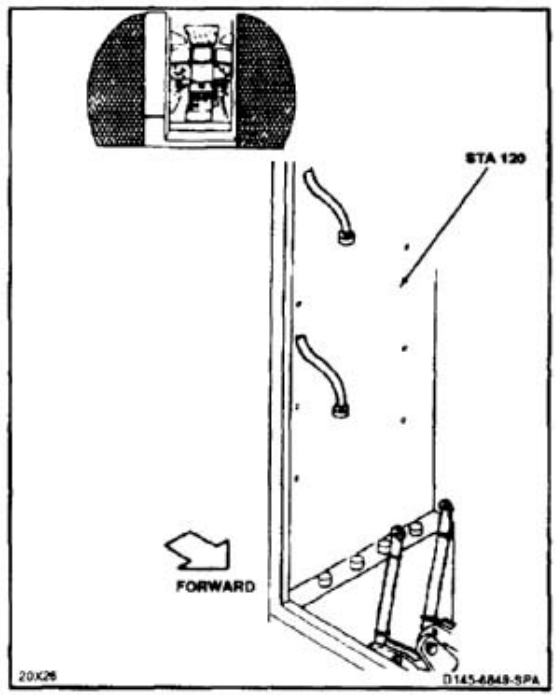
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P



CAUTION

Do not install bolts unless bushings are in bellcranks; otherwise, damage to bellcranks will result.

NOTE

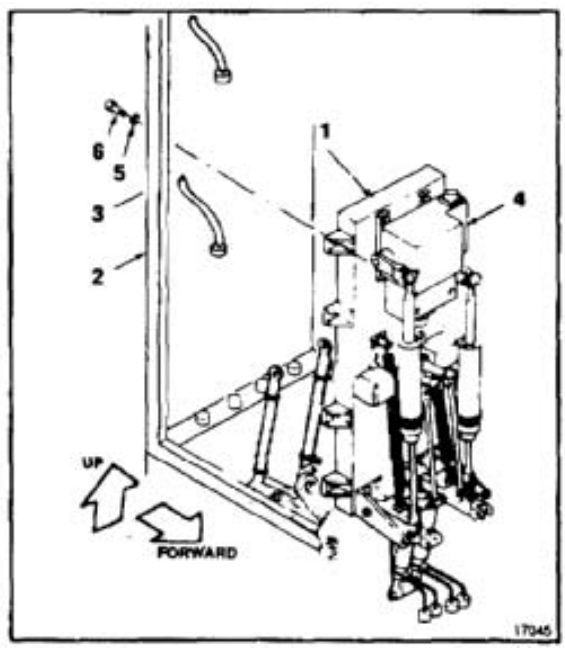
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require special torque and nut (Task 1-13).

1. Position control pallet (1) inside closet (2) on bulkhead (3), with CCDA (4) up and forward.

NOTE

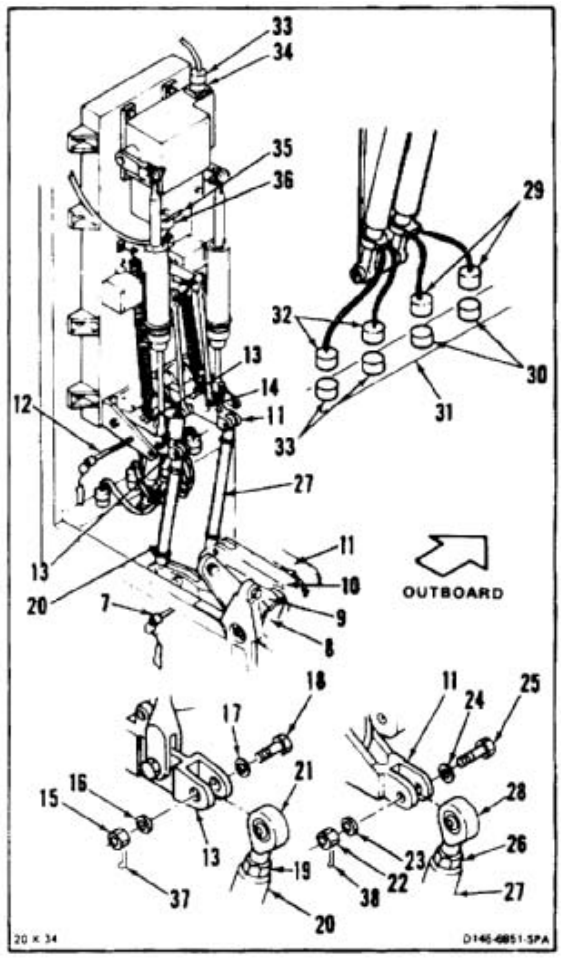
Longer bolts are installed outboard, shorter bolts inboard.

2. Have helper support pallet (1). Working in cabin, install eight washers (5) and bolts (6) through bulkhead (3) and in pallet. Torque bolts from **50 to 60 inch-pounds**.



3. Install transfer bellcrank rig pin (T128) (7) through four bellcranks (8, 9,10, and 11).
4. Install pitch and roll rig pin (T134) (12) through two bellcranks (13 and 14).
5. Remove nut (15), two washers (16 and 17), and bolt (18) from bellcrank (13).
6. Loosen nut (19) of link (20). Turn rod end (21) until link can be positioned in bellcrank (13) with bolt installed loosely.
7. Install bolt (18), two washers (17 and 16) and nut (15) in bellcrank (13). Do not torque nut at this time.
8. Remove nut (22), two washers (23 and 24) and bolt (25) from bellcrank (11).
9. Loosen nut (26) of link (27). Turn rod end (28) until link can be positioned in bellcrank (11) with bolt (25) installed loosely.
10. Install bolt (25), two washers (24 and 23) and nut (22) in bellcrank (11). Do not torque nut at this time.
11. Connect two roll LVDT connectors (29) to receptacles (30) on structure (31). Remove tag.
12. Connect two pitch LVDT connectors (32) to receptacles (33) on structure (31). Remove tag.
13. Connect connector (33) to pitch CCDA (34). Remove tag.
14. Connect connector (35) to roll magnetic brake (36). Remove tag.
15. Torque two nuts (19 and 26) to **103 inch-pounds**.
16. Torque two nuts (15 and 22) to **30 to 45 inch-pounds**. Install two cotter pins (37 and 38).
17. Check two bolts (18 and 25). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness, if bolts rotate or are loose, add washer under nuts and repeat step 16.
18. Remove pin (12) from bellcranks (13 and 14).
19. Remove pin (7) from bellcranks (8, 9, 10, and 11).

INSPECT



FOLLOW-ON MAINTENANCE:

Install roll, yaw, and thrust connecting links (Task 11-106).
Install DASH actuator (Task 11-164).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform operational check of flight controls (TM 55-1520-240-T).
Close closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-93 REMOVE YAW IDLER BELLCRANK 11-93

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Twine (E433)
Pencil (E271)

Personnel Required:

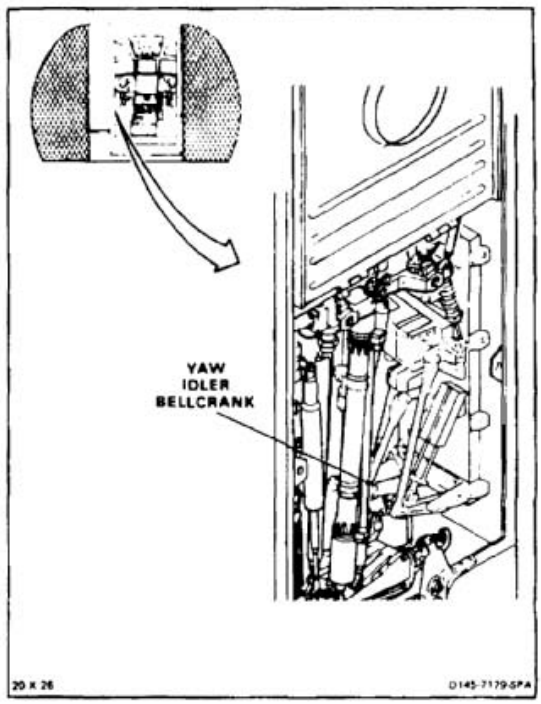
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Yaw Controls at Neutral (TM 55-1520-240-T)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



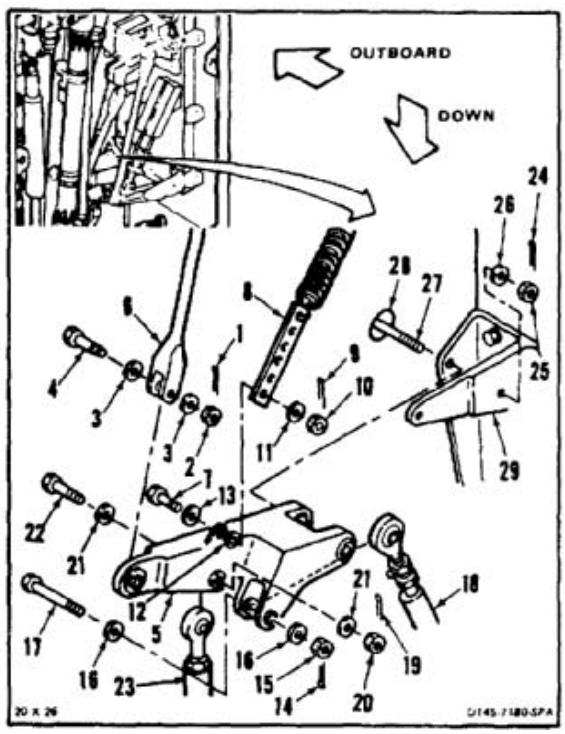
NOTE

If a crack in the connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing links and bellcrank.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from yaw idler bellcrank (5). Disconnect spring assembly (6) from bellcrank. Tie spring assembly away from bellcrank. Use twine (E433).
2. Install bolt (4), two washers (3), and nut (2) loosely in spring (6).
3. Mark position of bolt (7) in support (8). Use pencil (E271).
4. Remove cotter pin (9), nut (10), washer (11), and bushing (12) from bolt (7). Push support (8) down. Remove bolt (7) and washer (13). Disconnect support and tie support away from bellcrank (5). Use twine (E433).
5. Install bolt (7), two washers (11 and 13), bushing (12), and nut (10) loosely in bellcrank (5).
6. Remove cotter pin (14), nut (15), two washers (16), and bolt (17) from bellcrank (5). Disconnect transducer (18) from bellcrank.
7. Install bolt (17), two washers (16), and nut (15) loosely in bellcrank (5).
8. Remove cotter pin (19), nut (20), two washers (21), and bolt (22) from bellcrank (5). Disconnect link (23) from bellcrank.
9. Install bolt (22), two washers (21), and nut (20) loosely in bellcrank (5).
10. Remove cotter pin (24), nut (25), and washer (26) from bolt (27). Slide bolt outboard through hole (28) until bellcrank (5) is released. Remove bellcrank from support (29).
11. Install bolt (27), washer (26), and nut (25) loosely in support (29).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-94 INSTALL YAW IDLER BELLCRANK 11-94

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

Cleaning Cloth (E120)
Dry Cleaning Solvent (E162)
Epoxy Primer (E292)
Gloves (E184.1)

Parts:

Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1520-253-23
TM 55-1520-240-23P

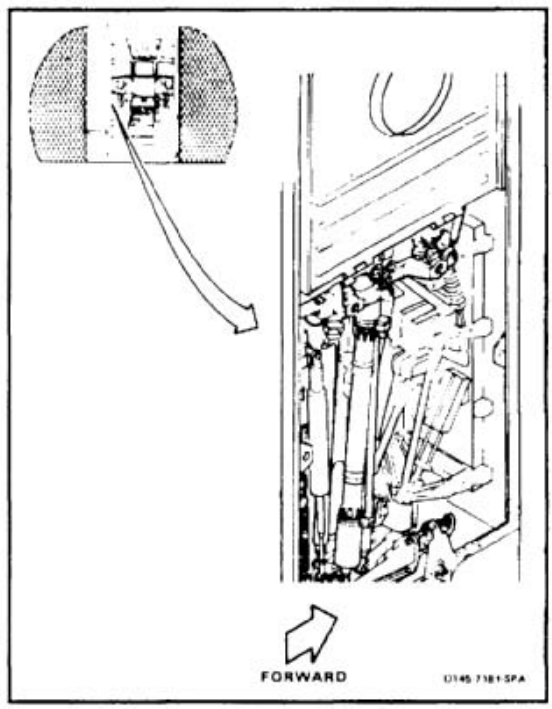
General Safety Instructions:

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



CAUTION

Bushings must be in bellcrank and support before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

NOTE

If a crack in the connecting link, bellcrank, or support is suspected during disassembly, refer to TM 1-1520-253-23.

1. Remove nut (1) and washer (2) from bolt (3). Slide bolt outboard through hole (4) until flush with lug (5) of support (6).

1.1. Remove slipfit bushing (6.1) from support (6). Clean bushing and bore with dry cleaning solvent (E162) and cloth (E120). Wear gloves (E184.1) and goggles.

1.2. Coat bushing (6.1) with epoxy primer (E292). Install bushing wet in support (6).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

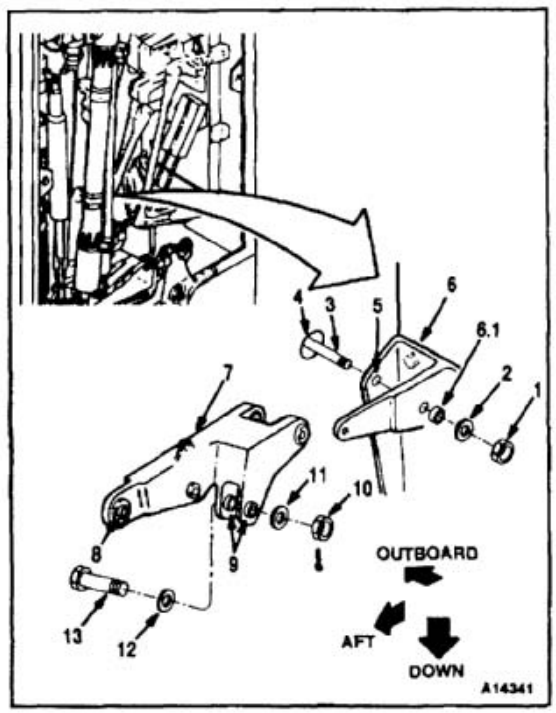
Ensure that all bushings are properly installed (including bushing orientation) in each input and output clevis and lug of the idler.

Ensure idler hub bearings are serviceable and properly installed.

Ensure proper attaching hardware associated with all components mounted to this idler assembly itself (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position yaw idler bellcrank (7), lug (8) aft, and two lugs (9) down in support (6). Install bolt (3), washer (2), and nut (1) in support. Do not torque nut at this time.



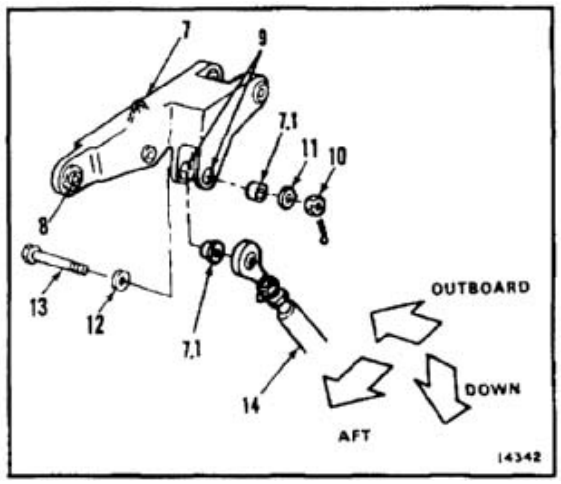
11-94 INSTALL YAW IDLER BELLCRANK (Continued) 11-94

3. Remove nut (10), two washers (11 and 12), and bolt (13) from bellcrank (7).

3.1. Remove slipfit bushings (7.1) from lugs (9) of bellcrank (7). Clean bushings with dry cleaning solvent (E162) and clean cloth (E120). Wear gloves (E184.1) and goggles.

3.2. Coat bushings (7.1) with epoxy primer (E292). Install bushings in lugs (9) of bellcrank (7).

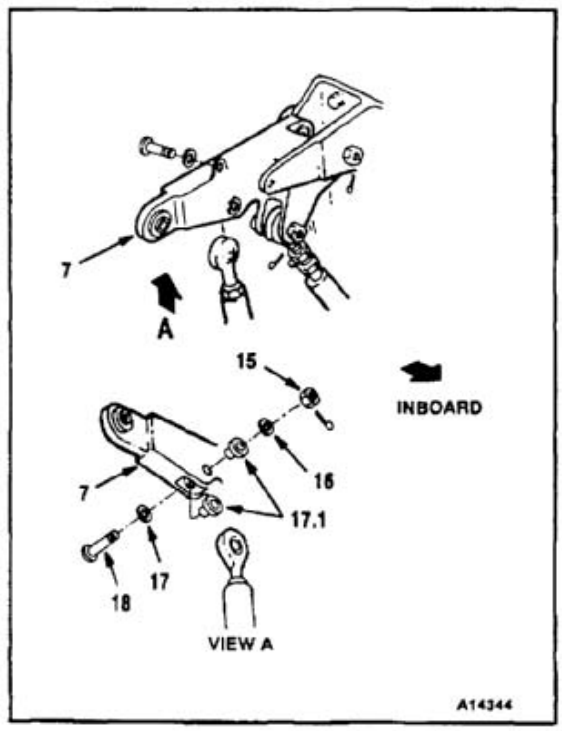
4. Position transducer (14) between lugs (9) of bellcrank (7). Install bolt (13), two washers (12 and 11) and nut (10). Do not torque nut at this time.



5. Remove nut (15), two washers (16 and 17), and bolt (18) from bellcrank (7).

5.1. Remove slipfit bushings (17.1) from bellcrank (7). Clean bushings with dry cleaning solvent (E162) and clean cloth (E120). Wear gloves (E184.1) and goggles.

5.2. Coat bushings (17.1) with epoxy primer (E292). Install bushings in bellcrank (7).

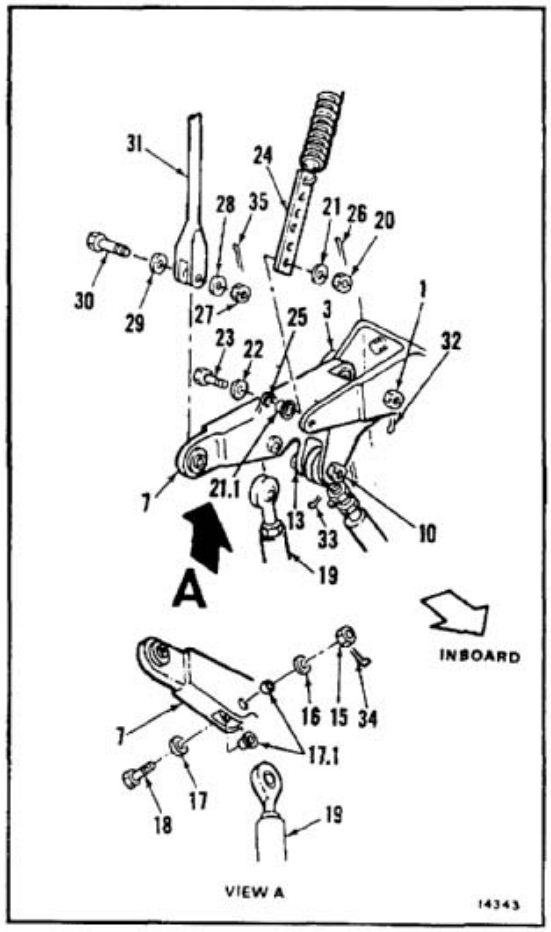


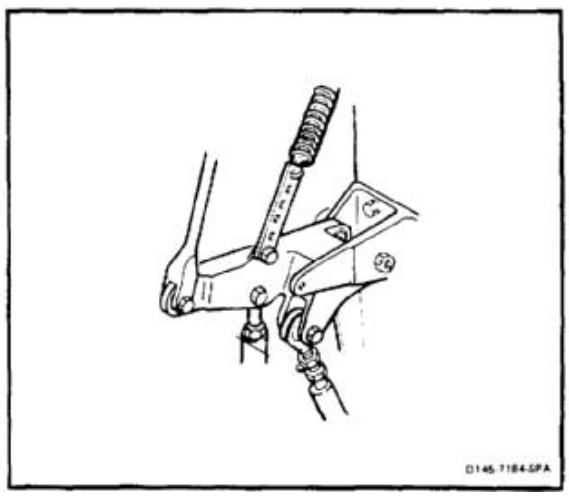
6. Position link (19) in bellcrank (7). Install bolt (18), two washers (17 and 16) and nut (15). Do not torque nut at this time.
7. Remove nut (20), two washers (21 and 22), and bolt (23) from bellcrank (7).
7.1. Remove slipfit bushing (21.1) from position spring support adjustment strap (24). Clean bushing with dry cleaning solvent (E162) and cleaning cloth (E120). Wear gloves (E184.1) and goggles.
7.2. Coat bushing (21.1) with epoxy primer (E292). Install bushing in position spring support (24), with shoulder against lug (25).
8. Untie and position spring support adjustment strap (24) marked hole on bellcrank (7), inboard of lug (25). Install bolt (23), with head outboard, two washers (22 and 21), and nut (20). Torque nut to **15 to 25 inch-pounds**. Install cotter pin (26).
9. Remove nut (27), two washers (28 and 29), and bolt (30) from bellcrank (7).
10. Untie and position spring (31) on bellcrank (7). Install bolt (30), two washers (29 and 28), and nut (27).
11. Torque four nuts (1, 10, 15, and 27) to **30 to 45 inch-pounds**. Install four cotter pins (32, 33, 34, and 35).
12. Check five bolts (3, 13, 18, 23, and 30). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness, if bolt rotates or is loose, add washer under nut, and repeat step 8 or 11 as required.

INSPECT

FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).





END OF TASK

11-95 REMOVE PALLET THRUST IDLER BELLCRANK 11-95

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

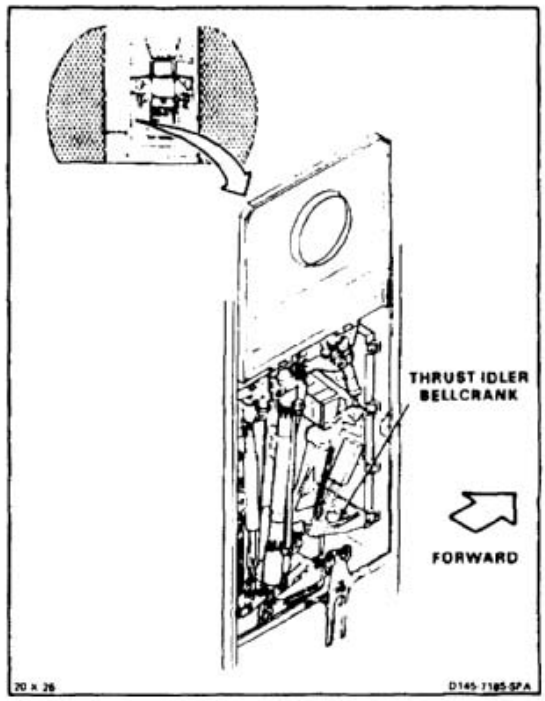
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Thrust Controls at Neutral (TM 55-1520-240-T)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

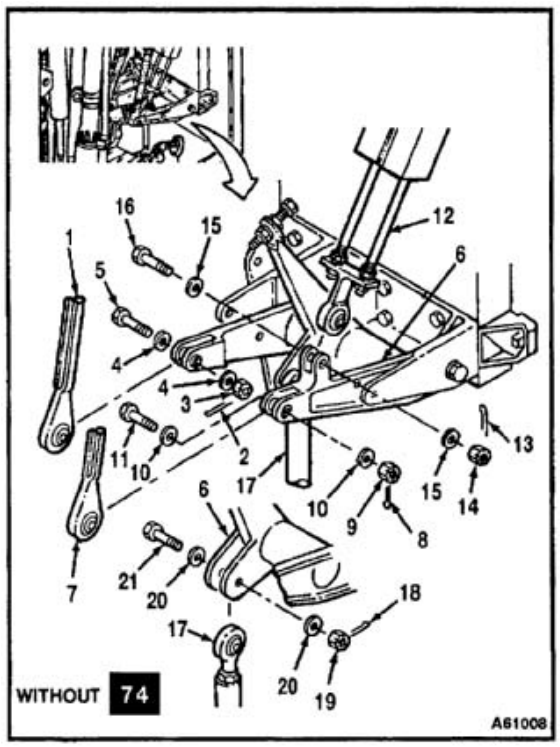
NOTE

If a crack in the connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing links and bellcrank.

1. On helicopters without 74, perform the following steps:
   a. Tag damper connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from bellcrank (6). Disconnect link from bellcrank. Tie link away from bellcrank. Use twine (E433).
   b. Install bolt (5), two washers (4), and nut (3) loosely in bellcrank (6).
   c. Tag CCDA connecting link (7). Remove cotter pin (8), nut (9), two washers (10), and bolt (11) from bellcrank (6). Disconnect link from bellcrank. Tie link away from bellcrank. Use twine (E433).
   d. Install bolt (11), two washers (10), and nut (9) loosely in bellcrank (6).
   e. Tag droop eliminator potentiometer (12). Remove cotter pin (13), nut (14), two washers (15), and bolt (16) from bellcrank (6). Disconnect droop eliminator potentiometer (12) from bellcrank. Tie droop eliminator potentiometer away from bellcrank. Use twine (E433).
   f. Install bolt (16), two washers (15), and nut (14) loosely in bellcrank (6).
   g. Tag input connecting link (17). Remove cotter pin (18), nut (19), two washers (20), and bolt (21) from bellcrank (6). Disconnect link from bellcrank.
   h. Install bolt (21), two washers (20), and nut (19) loosely in bellcrank (6).



2. On helicopters with 74, perform the following steps:

   a. Tag (E264) damper connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from bellcrank (6). Disconnect link from bellcrank. Tie link away from bellcrank. Use twine (E433).

   b. Install bolt (5), two washers (4), and nut (3) loosely in bellcrank (6).

   c. Tag (E264) CCDA connecting link (7). Remove cotter pin (8), nut (9), two washers (10), and bolt (11) from bellcrank (6). Disconnect link (7) from bellcrank (6). Tie link (7) away from bellcrank (6). Use twine (E433).

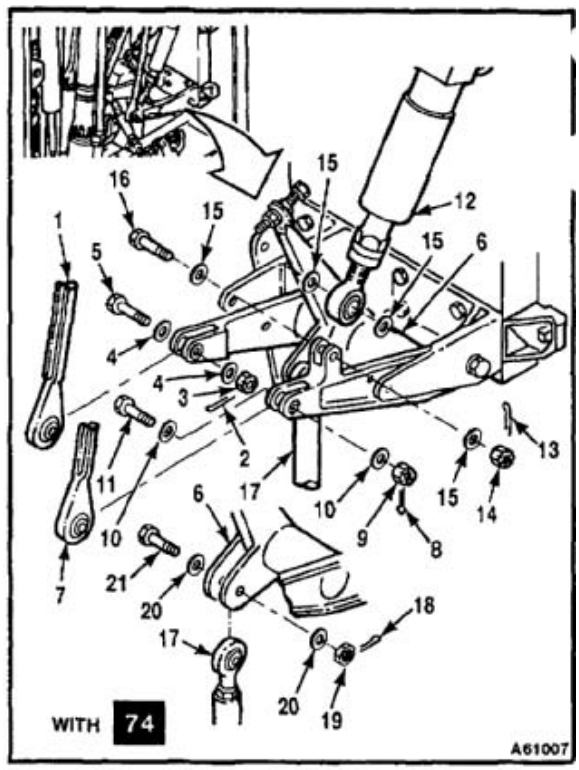
   d. Install bolt (11), two washers (10), and nut (9) loosely in bellcrank (6).

   e. Tag (E264) thrust control position transducer (CPT) (12). Remove cotter pin (13), nut (14), four washers (15), and bolt (16) from bellcrank (6). Disconnect CPT (12) from bellcrank (6). Tie CPT (12) away from bellcrank (6). Use twine (E433).

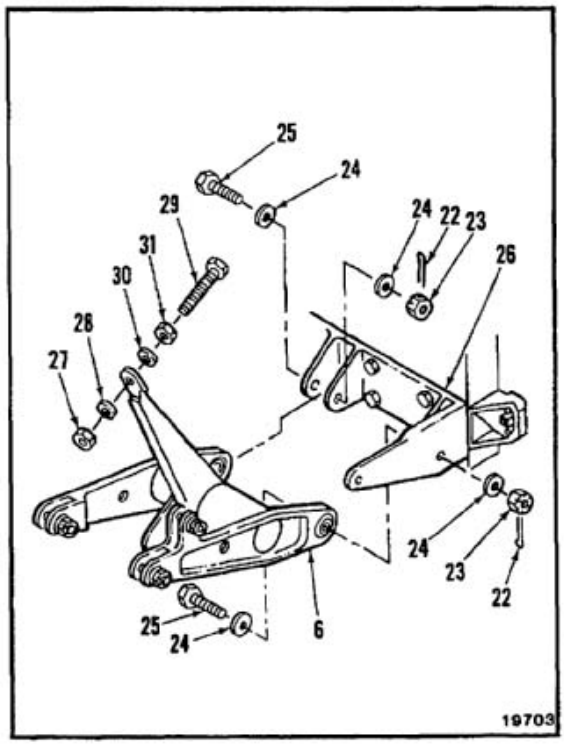
   f. Install bolt (16), four washers (15), and nut (14) loosely in bellcrank (6).

   g. Tag (E264) input connecting link (17). Remove cotter pin (18), nut (19), two washers (20), and bolt (21) from bellcrank (6). Disconnect link (17) from bellcrank (6).

   h. Install bolt (21), two washers (20), and nut (19) loosely in bellcrank (6).



3. Remove two cotter pins (22), nuts (23), four washers (24), and two bolts (25) from support (26). Remove bellcrank (6) from support.
4. Install two bolts (25), four washers (24), and two nuts (23) loosely in support (26).
5. Remove nut (27) and washer (28) from bolt (29). Remove bolt. Remove washer (30) and nut (31) from bolt.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-96 INSTALL PALLET THRUST IDLER BELLCRANK 11-96

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

Cleaning Cloth (E120)
Dry Cleaning Solvent (E162)
Epoxy Primer (E292.1)
Gloves (E184.1)

Personnel Required:

Medium Helicopter Repairer (5)
Inspector

References:

TM 55-1520-240-23P
TM 1-1520-253-23

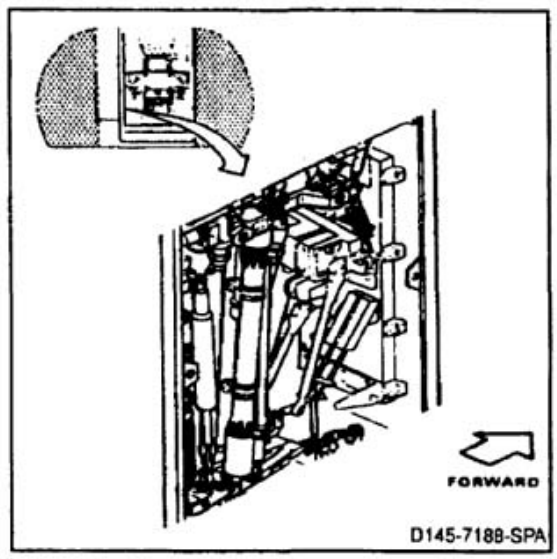
General Safety Instructions:

WARNING

Epoxy primer (E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



NOTE

If a crack in the connecting link, bellcrank, or support is suspected during installation, refer to TM 1-1520-253-23.

1. On helicopters without 74, perform the following steps:

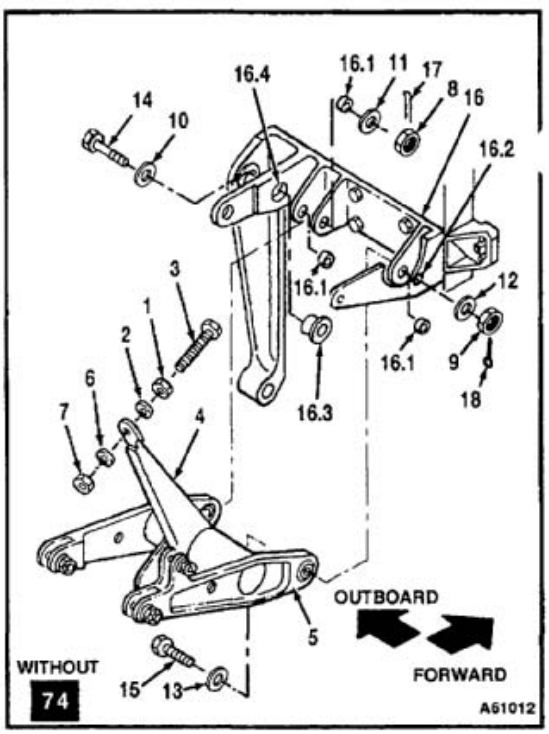
   a. Check nut (1) on bolt (3) to make sure it is at about mid-position.

   b. Insert bolt (3), with washer (2), in arm (4) of thrust idler bellcrank (5). Install washer (6) and nut (7) on the bolt. Do not torque the nut at this time.

   c. Remove two nuts (8 and 9), four washers (10, 11, 12, and 13), and two bolts (14 and 15) from support (16).

   d. Remove two slip fit bushings (16.1). Clean bushings (16.1), bushing bores, and inside diameter of bushing (16.2) with dry cleaning solvent (E162) and clean cloths (E120).

   e. Coat bushings (16.1) with yellow epoxy primer (E292.1). Install bushings wet in support (16).



   f. Temporarily remove bushing (16.3) from hole (16.4) in support (16).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the idler.

Ensure idler hub bearings are serviceable and properly installed.

Ensure detent striker bolt and locknuts are secure.

Ensure proper attaching hardware associated with all components mounted to this idler assembly and the idler assembly itself (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

   g. Position bellcrank (5) in support (16), with arm (4) up and forward. Install bolt (14), with washer (10), through hole (16.4) in the support arm of support (16), into the hole with bushing (16.1), then through the bellcrank and the outboard end of the support. Install washer (11) and nut (8).

   h. Install bushing (16.3) in hole (16.4) of support (16).

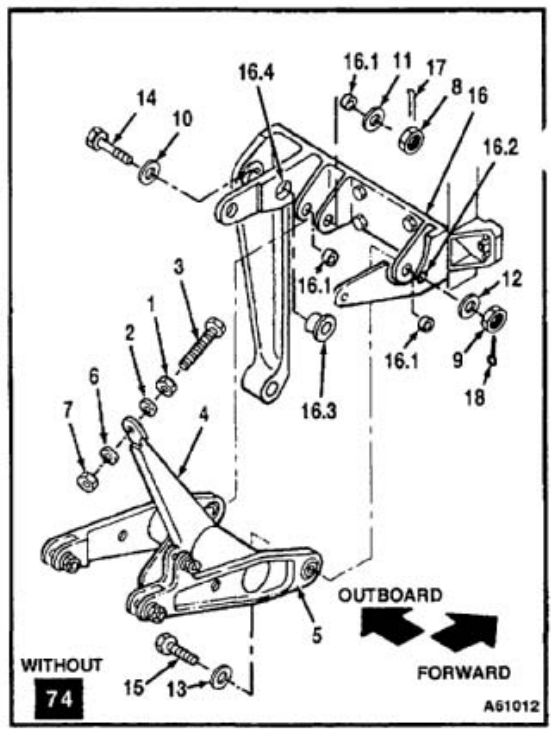
   i. Install bolt (15), with two washers (13 and 12), and nut (9) in the inboard lug of support (16).

j. Torque nuts (8 and 9) to **30 to 45 inch-pounds**. Install cotter pins (17 and 18).

NOTE

During verification of the impedance bolt stack-up integrity for bolt (14), it is acceptable for the bolt/nut/bushing assembly to rotate with a torque less than **10 inch-pounds** as long as both bushings and the bearing (in the bellcrank) rotate with the bolt. If the bolt/nut assembly rotates independently of bushings (16.1) and/or bearing, proper clamp-up has not been achieved and re-adjustment of the stack is required.

k. Check bolts (14 and 15). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness, if a bolt rotates or is loose, add a second washer (11 or 12), as applicable, under nut (8 or 9) and repeat step j.



l. Remove nut (19), two washers (20 and 21), and bolt (22) from lugs (23) of bellcrank (5).

m. Position input connecting link (24) between lugs (23) of bellcrank (5). Install bolt (22), two washers (21 and 20), and nut (19). Do not torque nut at this time. Remove tag from link.

n. Remove nut (25), two washers (26 and 27), and bolt (28) from lugs (29) of bellcrank (5).

o. Position droop eliminator potentiometer (30) between lugs (29) of bellcrank (5). Install bolt (28), two washers (27 and 26), and nut (25). Do not torque nut at this time. Remove tag from potentiometer.

p. Remove nut (31), two washers (32 and 33), and bolt (34) from lugs (35) of bellcrank (5).

q. Position damper connecting link (36) between lugs (35) of bellcrank (5). Install bolt (34), two washers (33 and 32), and nut (31). Do not torque nut at this time. Remove tag from link.

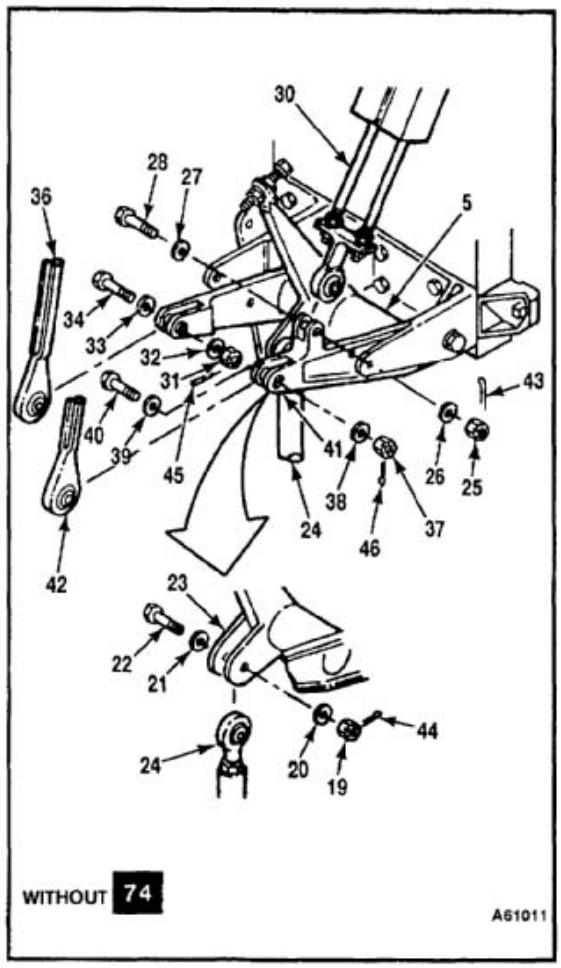
r. Remove nut (37), two washers (38 and 39) and bolt (40) from lugs (41) of bellcrank (5).

s. Position CCDA connecting link (42) between lugs (41) of bellcrank (5). Install bolt (40), two washers (39 and 38), and nut (37). Do not torque nut at this time. Remove tag from link.

t. Torque nut (25) to **15 to 20 inch-pounds**. Install cotter pin (43).

u. Torque three nuts (19, 31, and 37) to **30 to 45 inch-pounds**. Install three cotter pins (44, 45, and 46).

v. Check four bolts (22, 28, 34, and 40). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step t or u.



INSPECT

2. On helicopters with 74, perform the following steps:

   a. Install nut (1) and washer (2) on bolt (3) about mid-position.

   b. Insert bolt (3) in arm (4) of thrust idler bellcrank (5). Install washer (6) and nut (7) on bolt (3). Do not torque nut at this time.

   c. Remove two nuts (8 and 9), four washers (10, 11, 12, and 13), and two bolts (14 and 15) from support (47).

   d. Remove slipfit bushings (16). Clean bushings (16), bores, and inside diameter of bushing (48) with dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E184.1).

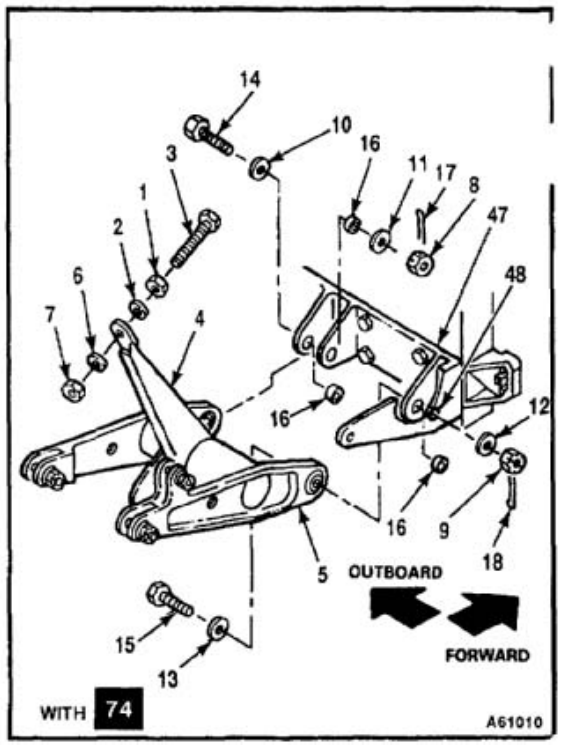
   e. Coat bushings (16) with epoxy primer (E292.1). Install bushings (16) wet in support (47). Wear gloves (E184.1).

   f. Position bellcrank (5) in support (47), arm (4) up and forward. Install bolt (14), two washers (11 and 10), and nut (8) in support (47), outboard end.

   g. Install bolt (15), two washers (12 and 13), and nut (9) in support (47), inboard end.

   h. Torque two nuts (8 and 9) to **30 to 45 inch-pounds**. Install two cotter pins (17 and 18).

   i. Check bolts (14 and 15). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step h.



INSPECT

j. Remove nut (19), two washers (20 and 21), and bolt (22) from lugs (23) of bellcrank (5).

k. Position input connecting link (24) between lugs (23) of bellcrank (5). Install bolt (22), two washers (21 and 20), and nut (19). Do not torque nut at this time. Remove tag from link (24).

l. Remove nut (25), four washers (26 and 27), and bolt (28) from lugs (29) of bellcrank (5).

m. Position thrust CPT (30) between lugs (29) of bellcrank (5). Install bolt (28), four washers (27 and 26), and nut (25). Do not torque nut at this time. Remove tag from CPT (30).

n. Remove nut (31), two washers (32 and 33), and bolt (34) from lugs (35) of bellcrank (5).

o. Position damper connecting link (36) between lugs (35) of bellcrank (5). Install bolt (34), two washers (33 and 32), and nut (31). Do not torque nut at this time. Remove tag from link (36).

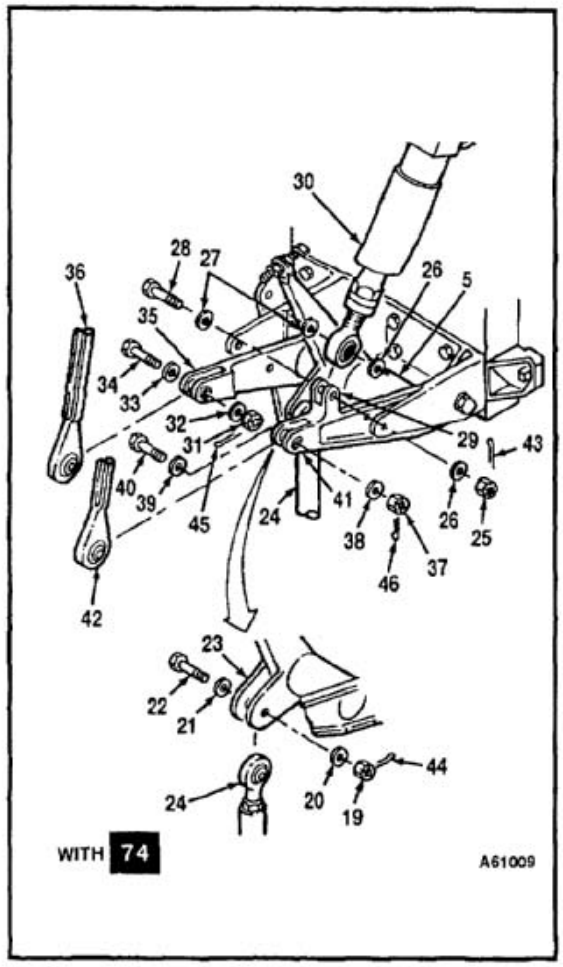
p. Remove nut (37), two washers (38 and 39), and bolt (40) from lugs (41) of bellcrank (5).

q. Position CCDA connecting link (42) between lugs (41) of bellcrank (5). Install bolt (40), two washers (39 and 38), and nut (37). Do not torque nut at this time. Remove tag from link (42).

r. Torque nut (25) to **15 to 20 inch-pounds**. Install cotter pin (43).

s. Torque three nuts (19, 31, and 37) to **30 to 45 inch-pounds**. Install three cotter pins (44, 45, and 46).

t. Check four bolts (22, 28, 34, and 40). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step r or s.



INSPECT

FOLLOW-ON MAINTENANCE:

Rig pallet thrust idler bellcrank (Task 11-48).
Remove servocylinder safety blocks (Task 11-29).
Adjust thrust detent (Task 11-109).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-97 REMOVE ROLL IDLER BELLCRANK 11-97

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Twine (E433)
Pencil (E271)
Paper Tags (E264)

Personnel Required:

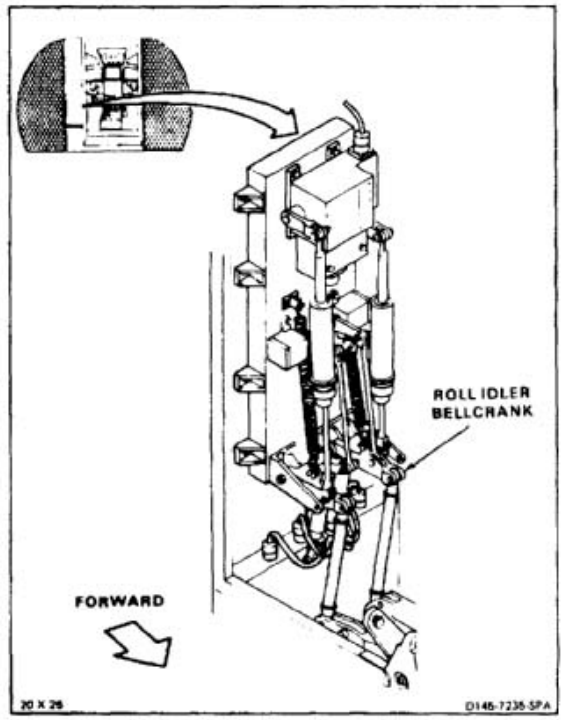
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Roll Controls at Neutral (TM 55-1520-240-T)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



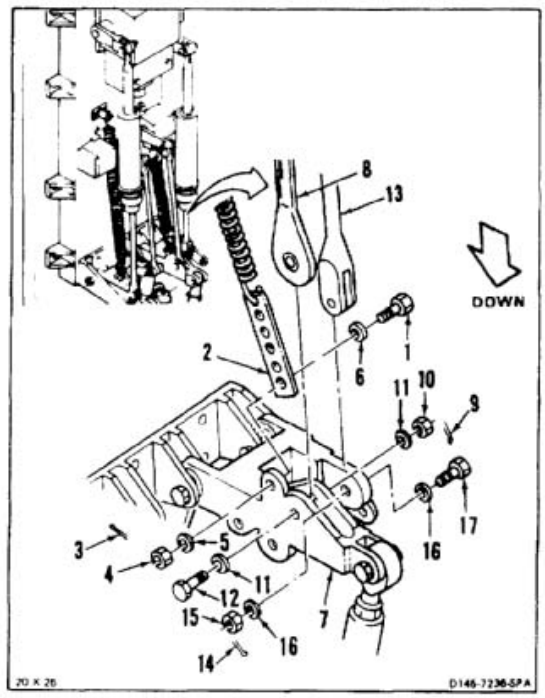
NOTE

If a crack in the connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

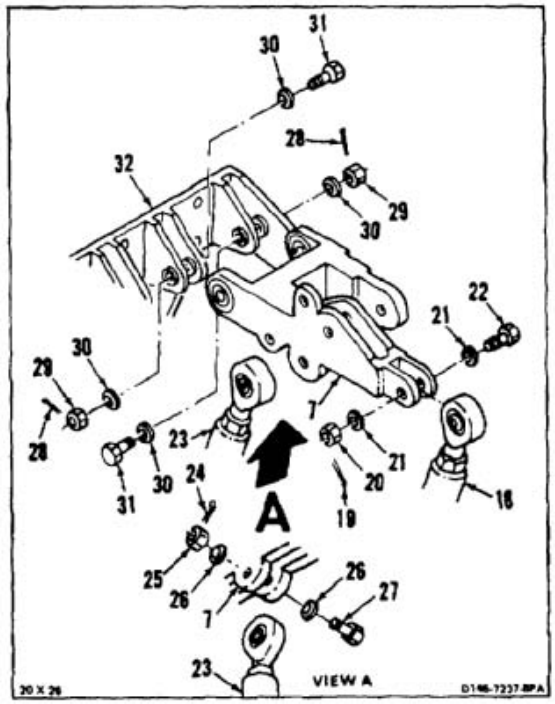
NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing links and bellcrank.

1. Mark position of bolt (1) in spring support (2). Use pencil (E271).
2. Tag spring support (2). Remove cotter pin (3), nut (4), and washer (5) from bolt (1). Push support (2) down. Remove bolt (1) and washer (6). Disconnect support and tie support away from bellcrank (7). Use twine (E433).
3. Install bolt (1), two washers (5 and 6) and nut (4) loosely in bellcrank (7).
4. Tag magnetic brake connecting link (8). Remove cotter pin (9), nut (10), two washers (11), and bolt (12) from bellcrank (7). Disconnect link and tie link away from bellcrank. Use twine (E433).
5. Install bolt (12), two washers (11), and nut (10) loosely in bellcrank (7).
6. Tag spring assembly (13). Remove cotter pin (14), nut (15), two washers (16), and bolt (17) from bellcrank (7). Disconnect spring and tie spring away from bellcrank. Use twine (E433).
7. Install bolt (17), two washers (16), and nut (15) loosely in bellcrank (7).



8. Tag roll input connecting link (18). Remove cotter pin (19), nut (20), two washers (21), and bolt (22) from bellcrank (7). Disconnect link from bellcrank.
9. Install bolt (22), two washers (21), and nut (20) loosely in bellcrank (7).
10. Tag roll transducer (23). Remove cotter pin (24), nut (25), two washers (26), and bolt (27) from bellcrank (7). Disconnect transducer from bellcrank.
11. Install bolt (27), two washers (26), and nut (25) loosely in bellcrank (7).
12. Remove two cotter pins (28), two nuts (29), four washers (30), and two bolts (31) from support (32). Remove bellcrank (7) from support.
13. Install two bolts (31), four washers (30), and two nuts (29) loosely in support (32).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-98 INSTALL ROLL IDLER BELLCRANK 11-98

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Dial Indicating Scale, 0 to 10 Pounds

Materials:

Cleaning Cloth (E120)
Dry Cleaning Solvent (E162)
Epoxy Primer (E292)
Gloves (E184.1)

Parts:

Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1520-253-23
TM 55-1520-240-23P
Task 1-13

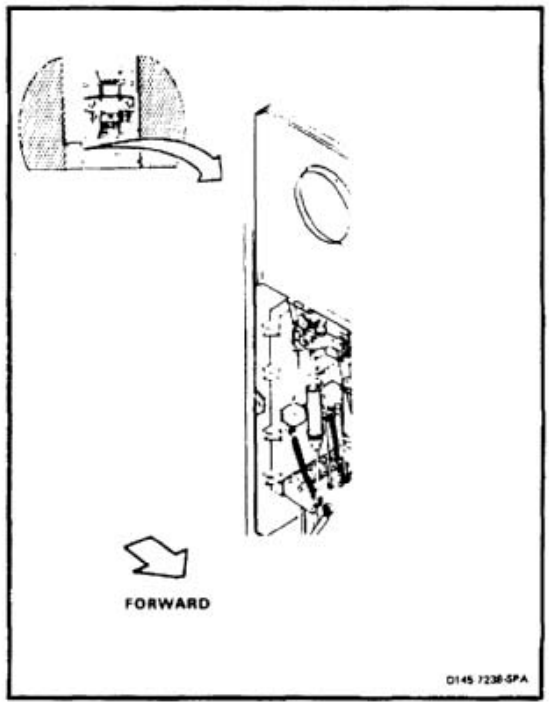
General Safety Instructions:

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



CAUTION

Bushings must be in bellcranks and links before installing bolts; otherwise, damage to components will result.

NOTE

If a crack in the connecting link, bellcrank, or support is suspected during installation, refer to TM 1-1520-253-23.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove two nuts (1 and 2), four washers (3, 4, 5, and 6), and two bolts (7 and 8) from support (9).

1.1. Remove bushings (9.1 and 9.2) from support (9). Clean bushings and bores with dry cleaning solvent (E162) and cloth (E120). Wear gloves (E184.1) and goggles.

1.2. Coat bushings (9.1 and 9.2) with epoxy primer (E292). Install bushings wet in support (9).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including bushing orientation) in each clevis of the support assembly.

Ensure proper attaching hardware associated with all components mounted to this support assembly (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Ensure all hardware mounting the support assembly to the pallet assembly is secure and that there is no evidence of loose pallet inserts.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

To obtain proper clamp-up and prevent damage to controls, if a light washer is used under nut, prior to applying torque make sure the washer does not hang up in the bolt retaining feature groove.

2. Position roll idler bellcrank (10), lugs (11) forward, and arm (12) outboard in support (9). Install two bolts (7 and 8), four washers (3, 4, 5, and 6) and two nuts (1 and 2) in support. Remove tag from bellcrank.

3. Torque two nuts (1 and 2) to **30 to 45 inch-pounds**. Use wrench and dial indicating scale. Install two cotter pins (13 and 14).

4. Check two bolts (7 and 8). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 3.

INSPECT

5. Remove nut (15), two washers (16 and 17), and bolt (18) from lugs (19) of bellcrank (10).

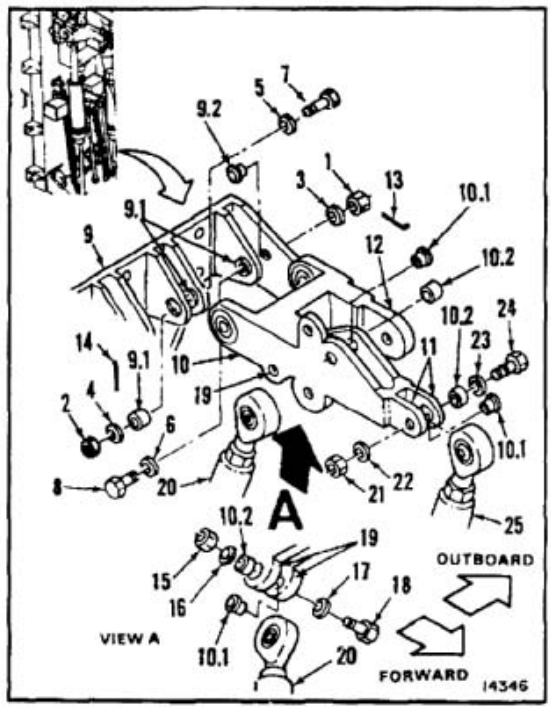
5.1. Remove bushings (10.1 and 10.2) from bellcrank (10). Clean bushings with dry cleaning solvent (E162) and cloth (E120). Wear gloves (E184.1) and goggles.

5.2. Coat bushings (10.1 and 10.2) with epoxy primer (E292). Install bushings in support (10).

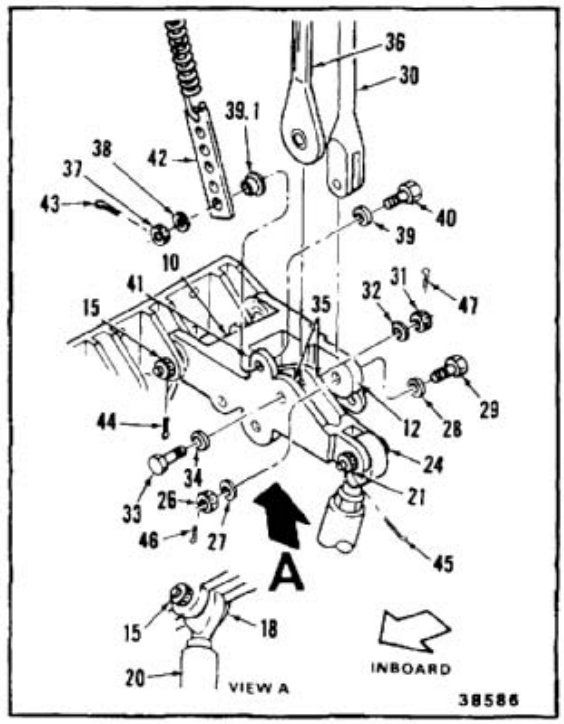
6. Position roll transducer (20) between lugs (19) of bellcrank (10). Install bolt (18), two washers (17 and 16), and nut (15). Do not torque nut at this time. Remove tag from transducer.

7. Remove nut (21), two washers (22 and 23), and bolt (24) from lugs (11) of bellcrank (10).

8. Position roll input connecting link (25) between lugs (11) of bellcrank (10). Install bolt (24), two washers (23 and 22), and nut (21). Do not torque nut at this time. Remove tag from link.



9. Remove nut (26), two washers (27 and 28), and bolt (29) from arm (12) of bellcrank (10).
10. Untie and position spring assembly (30) on arm (12) of bellcrank (10). Install bolt (29), two washers (28 and 27), and nut (26). Do not torque nut at this time. Remove tag from spring assembly.
11. Remove nut (31), two washers (32 and 33), and bolt (34) from lugs (35) of bellcrank (10).
12. Untie and position damper connecting link (36) between lugs (35) of bellcrank (10). Install bolt (34), two washers (33 and 32), and nut (31). Do not torque nut at this time. Remove tag from link.
13. Remove nut (37), two washers (38 and 39), bushing (39.1) and bolt (40) from lug (41) of bellcrank (10).
14. Untie and position spring support (42) marked hole, on bellcrank (10) inboard of lug (41). Install bolt (40), two washers (39 and 38), bushing (39.1) and nut (37). Torque nut **15 to 25 inch-pounds**. Install cotter pin (43).
15. Torque four nuts (15, 21, 26, and 31) to **30 to 45 inch-pounds**. Install four cotter pins (44, 45, 46, and 47).
16. Check five bolts (18, 24, 29, 34, and 40). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 14 or 15.



INSPECT

FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-99 REMOVE PITCH IDLER BELLCRANK 11-99

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Twine (E433)
Pencil (E271)
Paper Tags (E264)

Personnel Required:

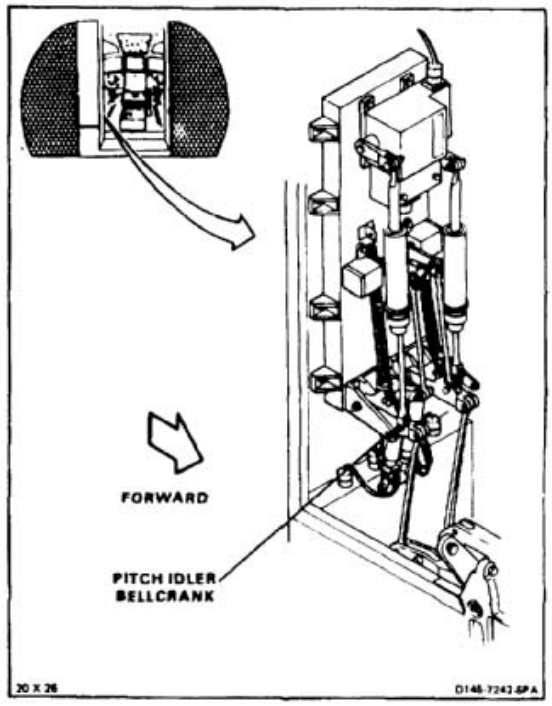
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Pitch Controls at Neutral (TM 55-1520-240-T)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)

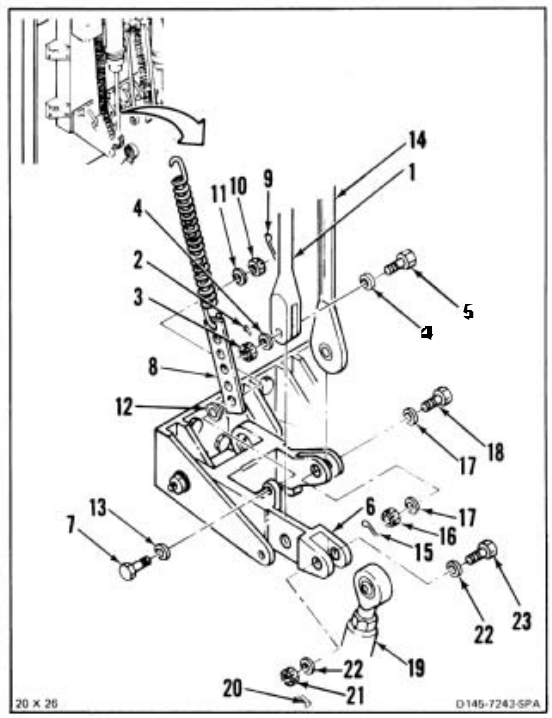


NOTE

If a crack in the connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

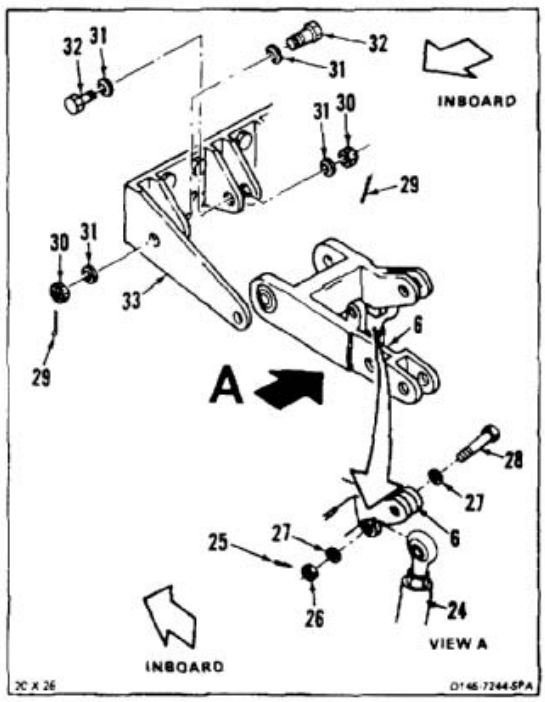
NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing links and bellcrank.



1. Tag spring assembly (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from pitch idler bellcrank (6). Disconnect spring assembly from bellcrank. Tie away spring assembly from bellcrank. Use twine (E433).
2. Install bolt (5), two washers (4), and nut (3) loosely in spring (1).
3. Mark position of bolt (7) in spring support (8). Use pencil (E271).
4. Tag spring support (8). Remove cotter pin (9), nut (10), washer (11), and bushing (12) from bolt (7). Push support down. Remove bolt (7) and washer (13). Disconnect support and tie support away from bellcrank (6). Use twine (E433).
5. Install bolt (7), two washers (11 and 13), bushing (12), and nut (10) loosely in bellcrank (6).
6. Tag damper connecting link (14). Remove cotter pin (15), nut (16), two washers (17), and bolt (18) from bellcrank (6). Disconnect link and tie link away from bellcrank. Use twine (E271).
7. Install bolt (18), two washers (17), and nut (16) loosely in bellcrank (6).
8. Tag pitch input link (19). Remove cotter pin (20), nut (21), two washers (22), and bolt (23) from bellcrank (6). Disconnect link from bellcrank.
9. Install bolt (23), two washers (22), and nut (21) loosely in bellcrank (6).

10. Tag pitch transducer (24). Remove cotter pin (25), nut (26), two washers (27), and bolt (28) from bellcrank (6). Disconnect transducer from bellcrank.
11. Install bolt (28), two washers (27), and nut (26) in bellcrank (6).
12. Remove two cotter pins (29), two nuts (30), four washers (31), and two bolts (32) from support (33). Remove bellcrank (6) from support.
13. Install two bolts (32), four washers (31), and two nuts (30) loosely in support (33).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-100 INSTALL PITCH IDLER BELLCRANK 11-100

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds
Dial Indicating Scale, 0 to 10 Pounds

Materials:

Cleaning Cloth (E120)
Dry Cleaning Solvent (E162)
Epoxy Primer (E292)
Gloves (E184.1)

Parts:

Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1520-253-23
TM 55-1520-240-23P
Task 1-13

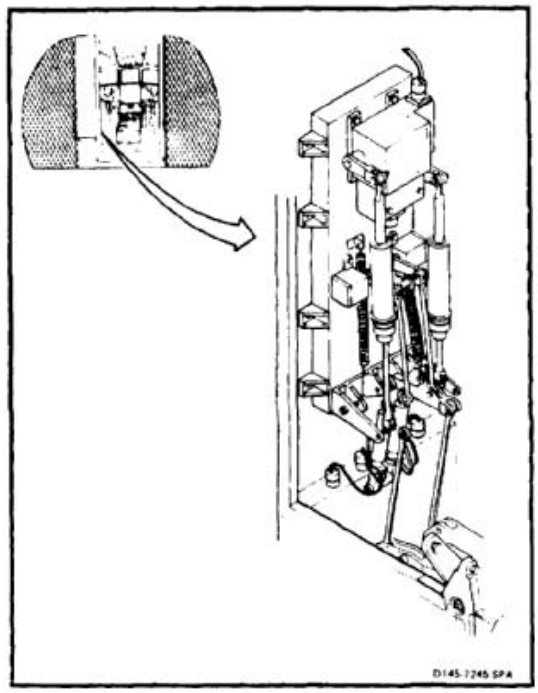
General Safety Instructions:

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



CAUTION

Bushings must be in bellcranks and links before installing bolts; otherwise, damage to components will result.

NOTE

If a crack in the connecting link, bellcrank, or support is suspected during installation, refer to TM 1-1520-253-23.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove two nuts (1 and 2), four washers (3, 4, 5, and 6) and two bolts (7 and 8) from support (9).

1.1. Remove bushings (9.1 and 9.2) from support (9). Clean bushings and bores with dry cleaning solvent (E162) and clean cloth (E120). Wear gloves (E184.1) and goggles.

1.2. Coat bushings (9.1 and 9.2) with epoxy primer (E292). Install bushings wet in support (9).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings and bearings are properly installed (including bushing orientation) in each input and output clevis of the idler.

Ensure hub bearings are serviceable and properly installed.

Ensure proper attaching hardware associated with all components mounted to this idler assembly and the idler assembly itself (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.

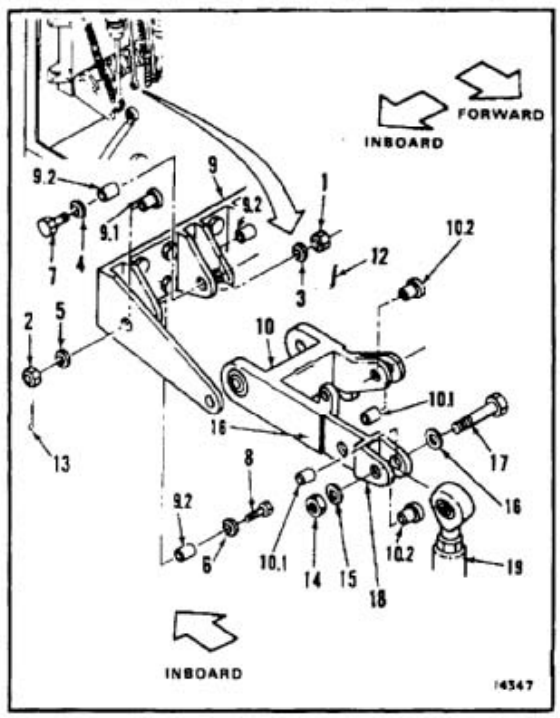
2. Position pitch idler bellcrank (10) in support (9), arm (11) forward and inboard. Install two bolts (7 and 8), four washers (6, 5, 4, and 3), and two nuts (1 and 2), in support.

3. Torque two nuts (1 and 2) to **30 to 45 inch-pounds**. Use wrench and dial indicating scale. Install two cotter pins (12 and 13).

4. Check bolts (7 and 8). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness, if bolt rotates or is loose, add washer under nut, and repeat step 3.

INSPECT

5. Remove nut (14), two washers (15 and 16), and bolt (17) from lugs (18) of bellcrank (10).

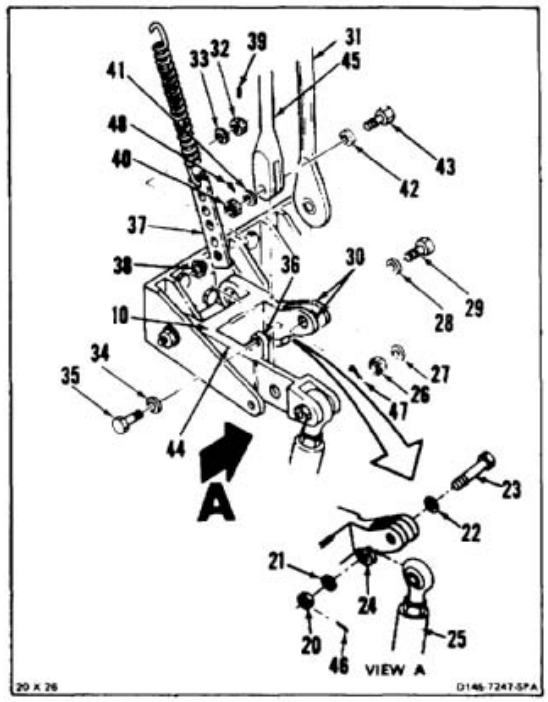


5.1. Remove bushings (10.1 and 10.2) from bellcrank (10). Clean bushings with dry cleaning solvent (E162) and clean cloth (E120). Wear gloves (E184.1) and goggles.

5.2. Coat bushings (10.1 and 10.2) with epoxy primer (E292). Install bushings wet in bellcrank (10).

6. Position pitch input connecting link (19), between lugs (18) of bellcrank (10). Install bolt (17), two washers (16 and 15), and nut (14). Do not torque nut at this time.

7. Remove nut (20), two washers (21 and 22), and bolt (23) from lugs (24) of bellcrank (10).
8. Position transducer (25) on lug (24) of bellcrank (10). Install bolt (23), two washers (22 and 21), and nut (20). Do not torque nut at this time. Remove tag from transducer.
9. Remove nut (26), two washers (27 and 28), and bolt (29) from lugs (30) of bellcrank (10).
10. Untie and position damper connecting link (31) between lugs (30) of bellcrank (10). Install bolt (29), two washers (28 and 27), and nut (26). Do not torque nut at this time. Remove tag from link.
11. Remove nut (32), two washers (33 and 34), and bolt (35) from lug (36) of bellcrank (10).
12. Untie and position spring support (37) at marked hole on bellcrank (10), outboard of lug (36). Install bolt (35), two washers (34 and 33), bushing (38), and nut (32). Torque nut to **15 to 25 inch-pounds**. Install cotter pin (39). Remove tag from spring support.
13. Remove nut (40), two washers (41 and 42), and bolt (43) from arm (44) of bellcrank (10).
14. Untie and position spring assembly (45) on arm (44) of bellcrank (10). Install bolt (43), two washers (42 and 41), and nut (40). Remove tag from spring.
15. Torque three nuts (20, 26, and 40) to **30 to 45 inch-pounds**. Install three cotter pins (46, 47, and 48).
16. Check four bolts (23, 29, 35, and 43). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat steps 12 and 15.



INSPECT

FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240 T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-101 REMOVE YAW AND THRUST IDLER BELLCRANK SUPPORT 11-101

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

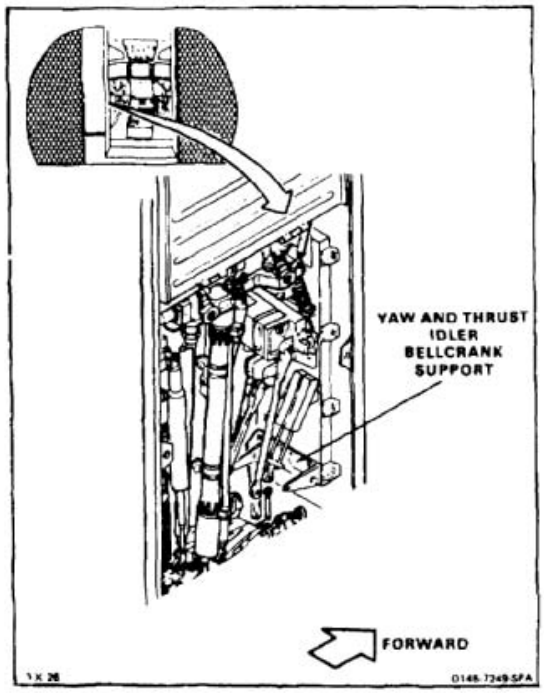
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

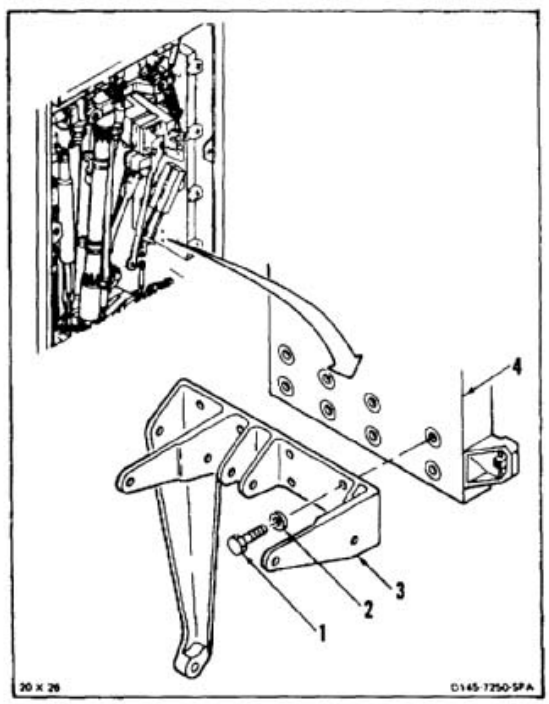
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Yaw Control Position Transducer Removed (Task 11-166)
Yaw Idler Bellcrank Removed (Task 11-93)
Thrust Idler Bellcrank Removed (Task 11-95)



NOTE

If a crack in the bellcrank support is suspected during removal, refer to TM 1-1520-253-23.

1. Remove eight bolts (1) and washers (2) from yaw and thrust idler bellcrank support (3) and pallet (4). Remove support.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-102 INSTALL YAW AND THRUST IDLER BELLCRANK SUPPORT 11-102

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

None

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P

WARNING

FLIGHT SAFETY PARTS

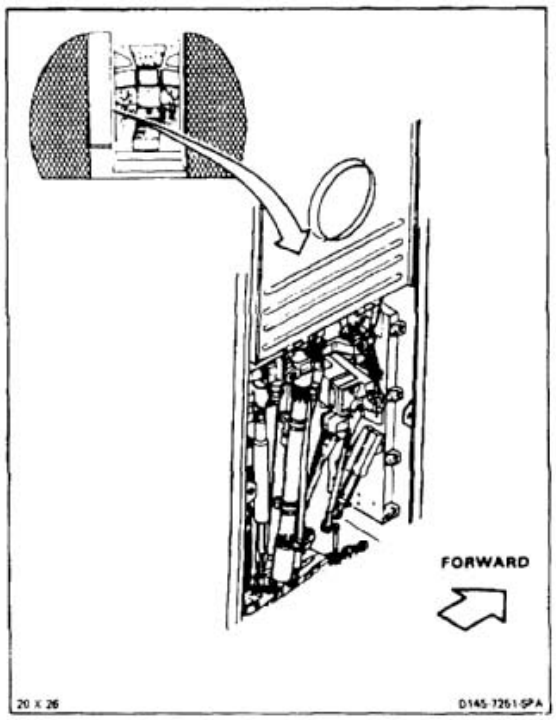
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

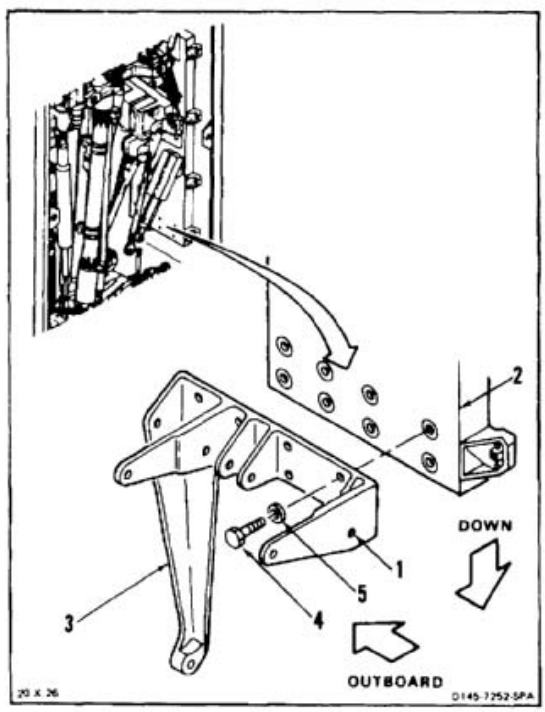
Ensure that all bushings are properly installed (including orientation) in each clevis of the bellcrank.

Ensure proper attaching hardware associated with all components mounted to this support assembly (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Ensure all hardware mounting the support assembly to the pallet assembly is secure and that there is no evidence of loose pallet inserts.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.





1. Position yaw and thrust idler bellcrank support (1) on pallet (2), arm (3) down and outboard. Install eight bolts (4) and eight washers (5).
2. Torque bolts (4) to **45 inch-pounds**.

INSPECT

FOLLOW-ON MAINTENANCE:

Install yaw idler bellcrank (Task 11-94).
Install thrust idler bellcrank (Task 11-96).
Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-103 REMOVE PITCH AND ROLL IDLER BELLCRANK SUPPORT 11-103

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

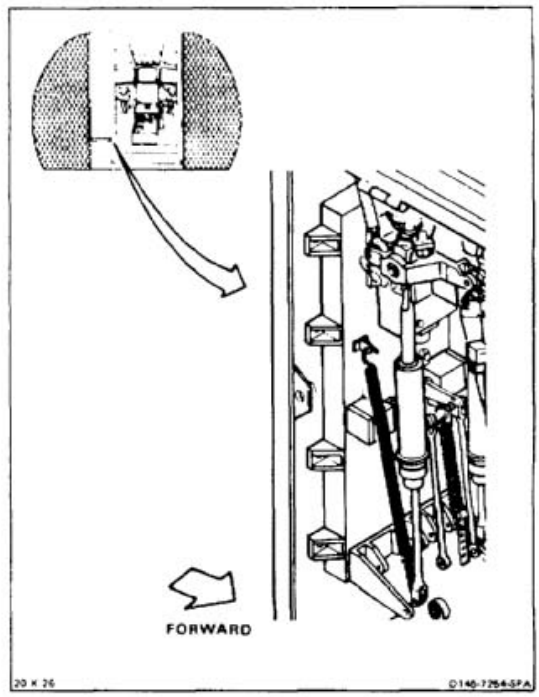
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

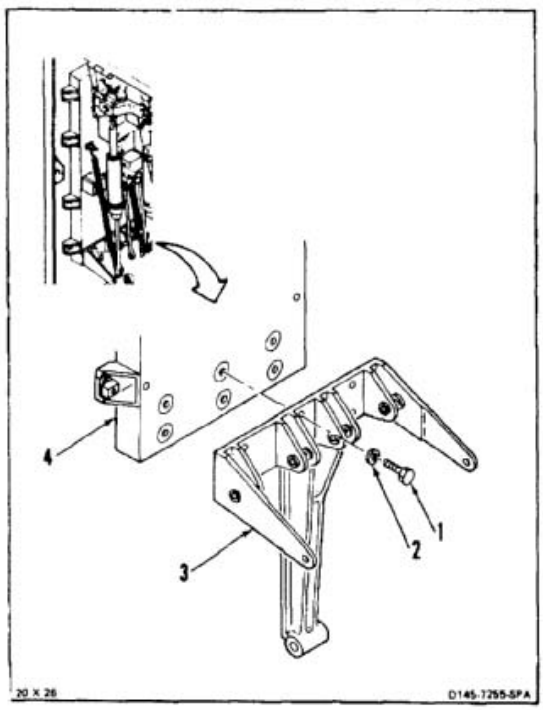
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Roll Control Linear Transducer Removed (Task 11-170)
Pitch Control Linear Transducer Removed (Task 11-168)
Roll Idler Bellcrank Removed (Task 11-97)
Pitch Idler Bellcrank Removed (Task 11-99)



NOTE

If a crack in the bellcrank support is suspected during removal, refer to TM 1-1520-253-23.

1. Remove six bolts (1) and washers (2) from pitch and roll idler bellcrank support (3) and pallet (4). Remove support.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-104 INSTALL PITCH AND ROLL IDLER BELLCRANK SUPPORT 11-104

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

None

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P

WARNING

FLIGHT SAFETY PARTS

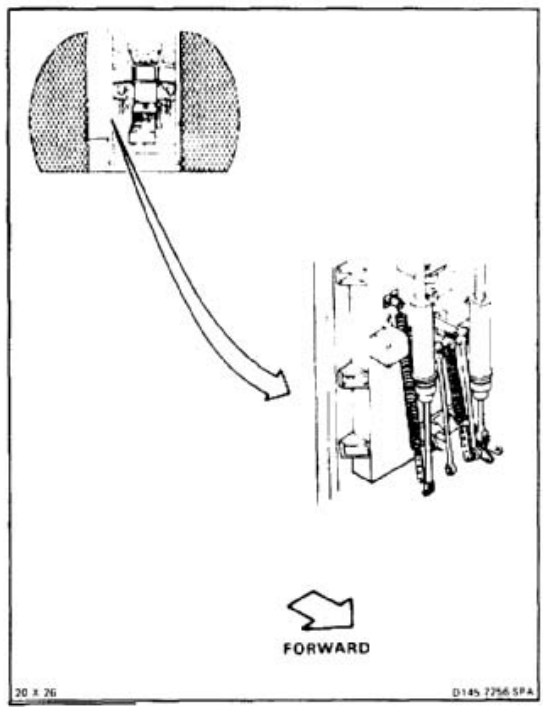
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

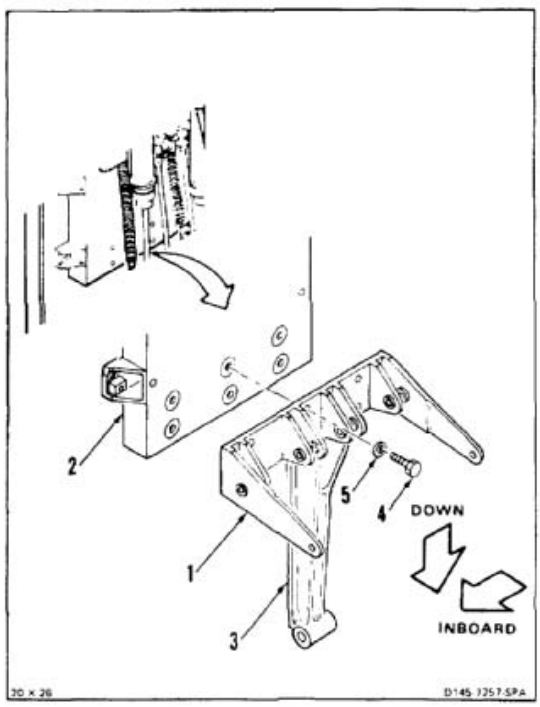
Ensure that all bushings are properly installed (including orientation) in each clevis of the support assembly.

Ensure proper attaching hardware associated with all components mounted to this support assembly (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Ensure all hardware mounting the support assembly to the pallet assembly is secure and that there is no evidence of loose pallet inserts.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.





1. Position pitch and roll idler bellcrank support (1) on pallet (2), arm (3) down. Install six bolts (4) and six washers (5).
2. Torque bolts (4) to **45 inch-pounds**.

INSPECT

FOLLOW-ON MAINTENANCE:

Install roll idler bellcrank (Task 11-98).
Install pitch idler bellcrank (Task 11-100).
Install roll control linear transducer (Task 11-171).
Install pitch control linear transducer (Task 11-169).
Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-105 REMOVE YAW THRUST OR ROLL CONNECTING LINKS OR PITCH, YAW, THRUST OR ROLL INPUT LINKS BETWEEN STA 95 AND STA 120 11-105

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

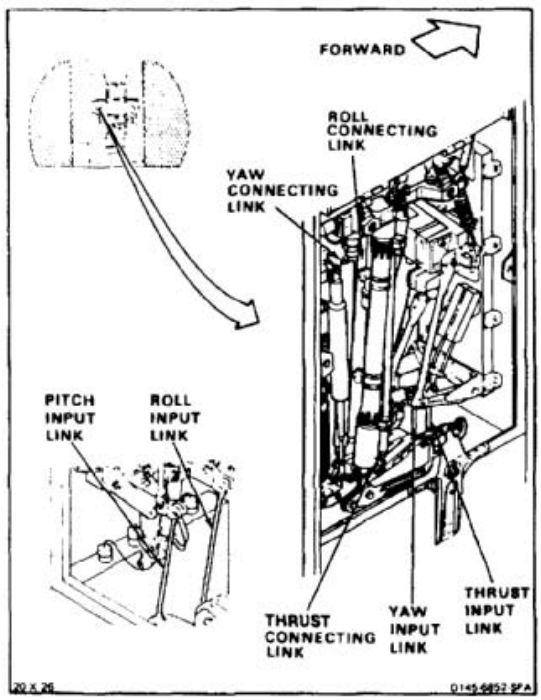
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



CAUTION

Rotary-wing heads must not be turned; otherwise, damage to components will result.

CAUTION

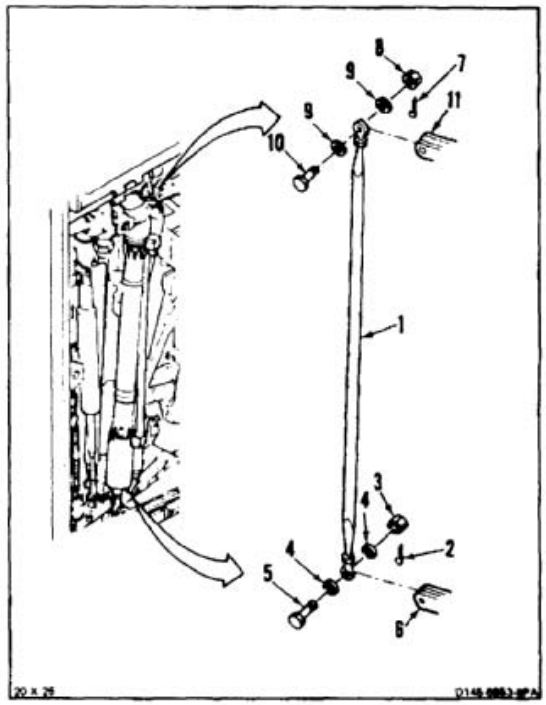
Do not move cockpit thrust control; otherwise, damage to components will result.

NOTE

If a crack in the connecting links is suspected during removal, refer to TM 1-1520-253-23.

NOTE

Procedure is same to remove yaw, thrust, or roll connecting links, or pitch, yaw, thrust or roll input links. Thrust connecting link is shown here.



1. Tag thrust connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5). Disconnect link from bellcrank (6).
2. Install bolt (5), two washers (4), and nut (3) loosely in bellcrank (6).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (11). Remove link (1).
4. Install bolt (10), two washers (9), and nut (8) loosely in bellcrank (11).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-106 INSTALL YAW, THRUST OR ROLL CONNECTING LINKS OR PITCH, YAW, THRUST OR ROLL INPUT LINKS BETWEEN STA 95 AND STA 120 11-106

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

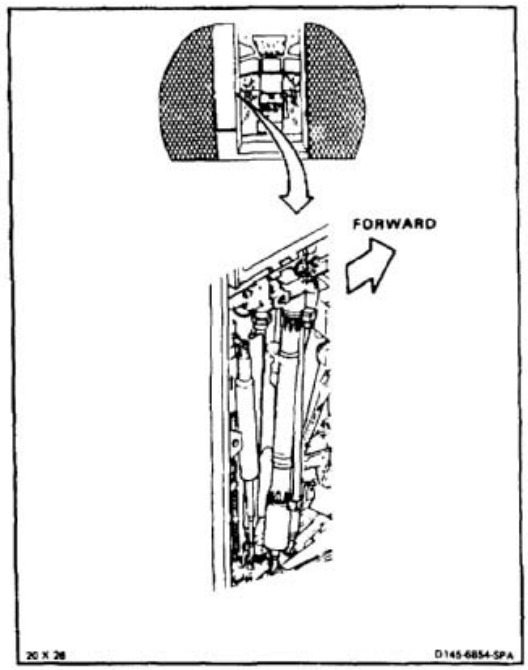
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



11-106 INSTALL YAW, THRUST OR ROLL CONNECTING LINKS OR PITCH, YAW, THRUST OR ROLL INPUT LINKS BETWEEN STA 95 AND STA 120 (Continued) 11-106

CAUTION

Rotary-wing heads must not be turned; otherwise, damage to components will result.

CAUTION

Do not move cockpit thrust control; otherwise, damage to components will result.

CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

Procedure is same to install yaw, thrust, or roll connecting links, or pitch, yaw, thrust or roll input links. Thrust connecting link is shown here.

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

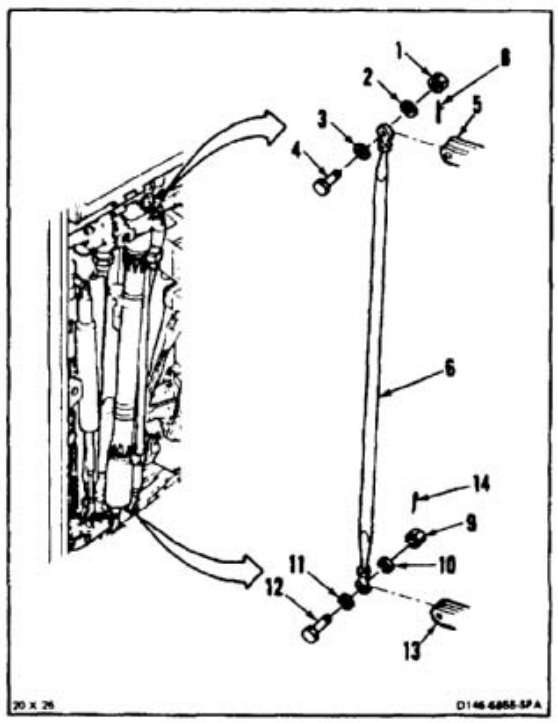
Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position thrust connecting link (6) in bellcrank (5) with inspection hole (7) to bellcrank. Install bolt (4), two washers (2 and 3), and nut (1).
3. Torque nut (1) to **30 to 45 inch-pounds**. Install cotter pin (8).
4. Remove nut (9), two washers (10 and 11), and bolt (12) from bellcrank (13).
5. Position link (6) in bellcrank (13). Install bolt (12), two washers (11 and 10) and nut (9).
6. Torque nut (9) to **30 to 45 inch-pounds**. Install cotter pin (14).
7. Check two bolts (4 and 12). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolts rotate or are loose, add washer under nut and repeat step 3 or 6.

INSPECT



FOLLOW-ON MAINTENANCE:

Perform closet thrust control travel check (Task 11-39).
Perform neutral rig check (Task 11-33).
Perform operation check of flight control (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-107 REMOVE THRUST DETENT 11-107

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

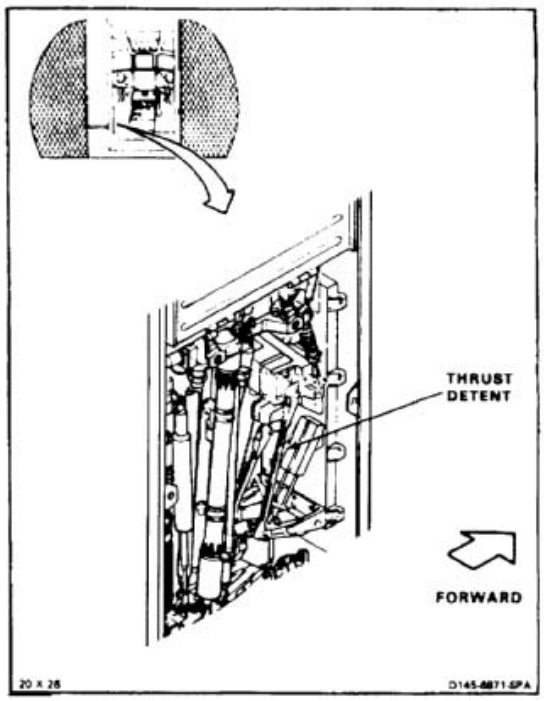
None

Personnel Required:

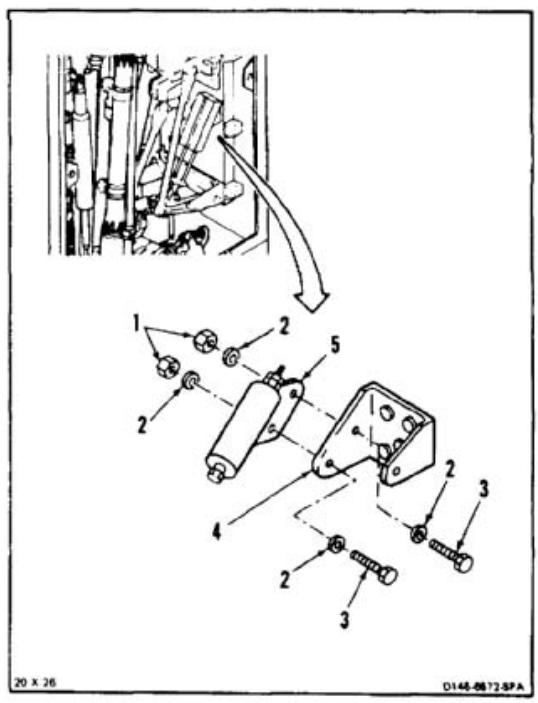
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Cockpit Thrust Control Fully Up



1. Remove two nuts (1), four washers (2), and two bolts (3) from support (4).
2. Remove thrust detent (5).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-108 INSTALL THRUST DETENT 11-108

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

None

Parts:

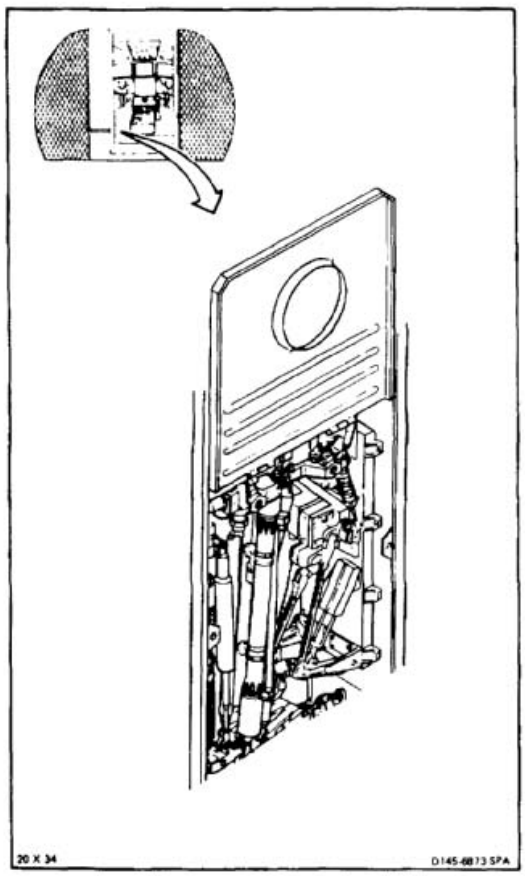
Self-Locking Nuts

Personnel Required:

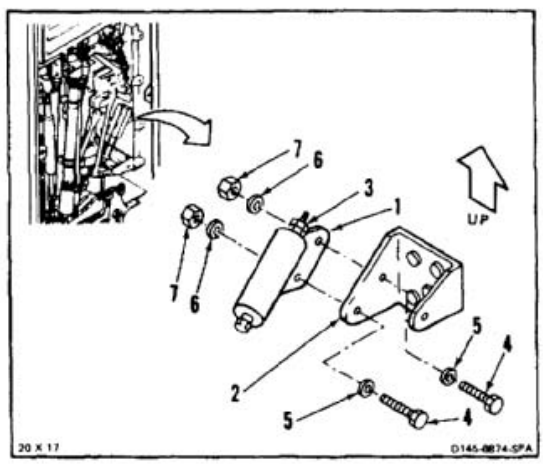
Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



1. Position thrust detent (1) on support (2) nut (3) up. Install two bolts (4), washers (5), washers (6), and nuts (7).
2. Torque two nuts (7) to **15 inch-pounds**.



INSPECT

FOLLOW-ON MAINTENANCE:

Adjust thrust detent (Task 11-109).
Perform operational check of flight controls (TM 1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-109 ADJUST THRUST CONTROL DETENT 11-109

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

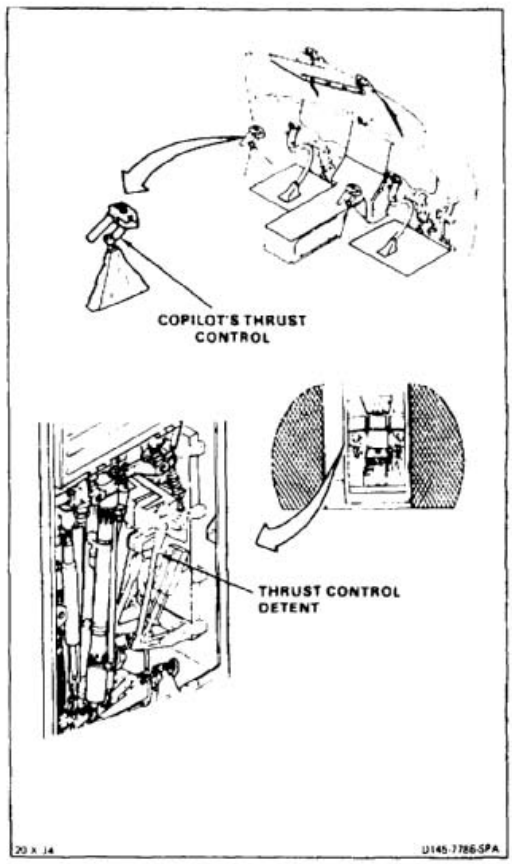
None

Personnel Required:

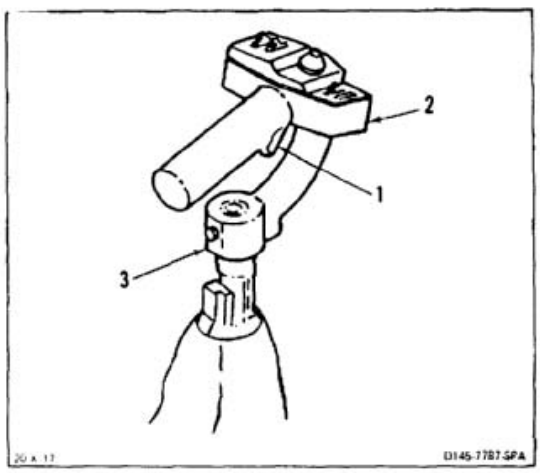
Medium Helicopter Repairer (2)
Inspector

Equipment Condition:

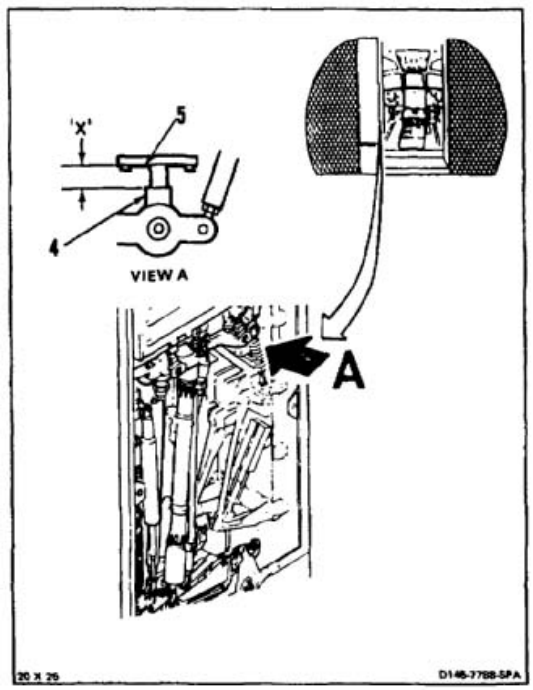
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Flight Control Hydraulic System Pressurized (TM 55-1520-240-T)
Thrust Control Rigged (Task 11-43)
Pallet Thrust Idler Bellcrank Rigged (Task 11-48)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



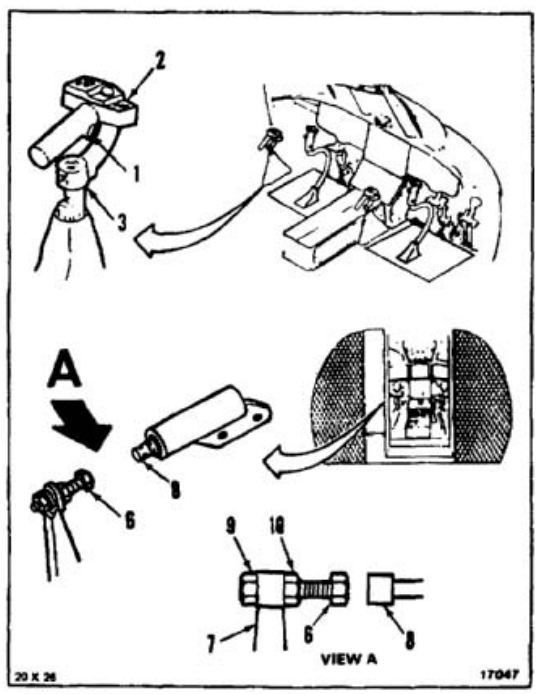
1. Press trigger switch (1) of copilot's thrust control (2). Position thrust lever (3) fully down. Release trigger.



2. Measure and record distance 'X' between ILCA bellcrank (4) and ILCA housing (5).



3. Have helper in cockpit, press trigger switch (1) of thrust control (2) and pull thrust lever (3) up about **7 inches**.
4. Push lever down until stop screw (6) on transfer bellcrank (7) just touches detent (8). Hold this position. Release trigger.
5. Repeat step 2. Check that difference between measurements is **3/32 to 5/32 inch**. If more than **5/32 inch,** loosen nut (10) and tighten nut (9) of screw (6). If less than **3/32 inch,** loosen nut (9) and tighten nut (10). Tighten nuts after check.
6. Repeat steps 3, 4, and 5.



INSPECT

FOLLOW-ON MAINTENANCE:

Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-110 REMOVE THRUST DETENT SUPPORT 11-110

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

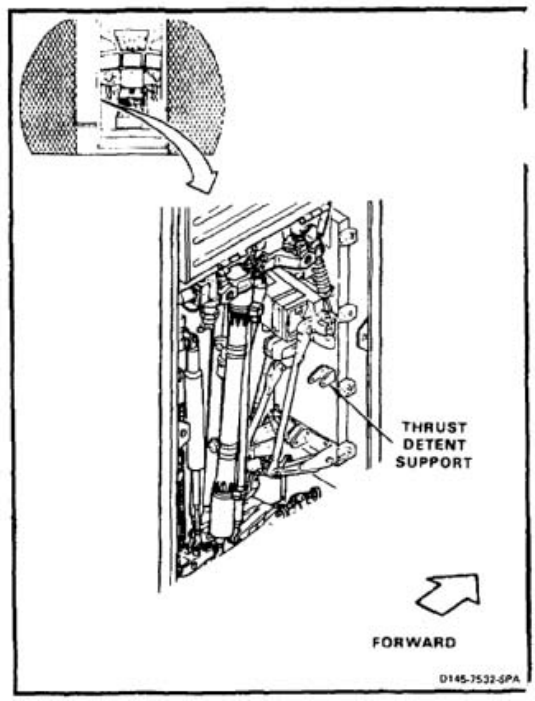
None

Personnel Required:

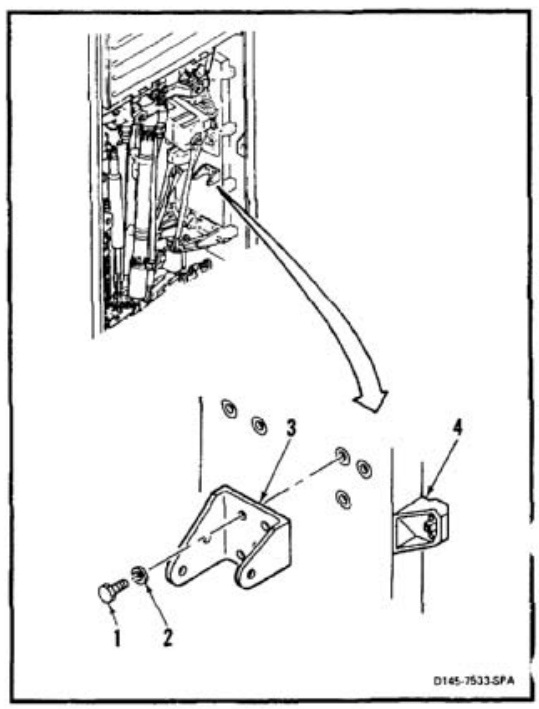
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Thrust Control at Neutral (TM 55-1520-240-T)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Thrust Detent Removed (Task 11-107)
Engine Droop Variable Resistor Removed (Task 4-119 Without 74)
Thrust CPT Removed (Task 4-153 With 74)



1. Remove three bolts (1) and three washers (2) from thrust detent support (3). Remove support from pallet (4).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-111 INSTALL THRUST DETENT SUPPORT 11-111

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

None

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

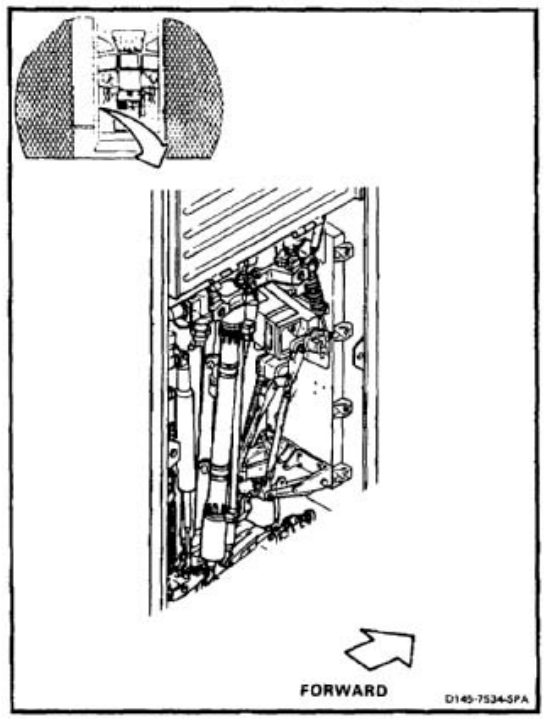
TM 55-1520-240-23P

General Safety Instructions:

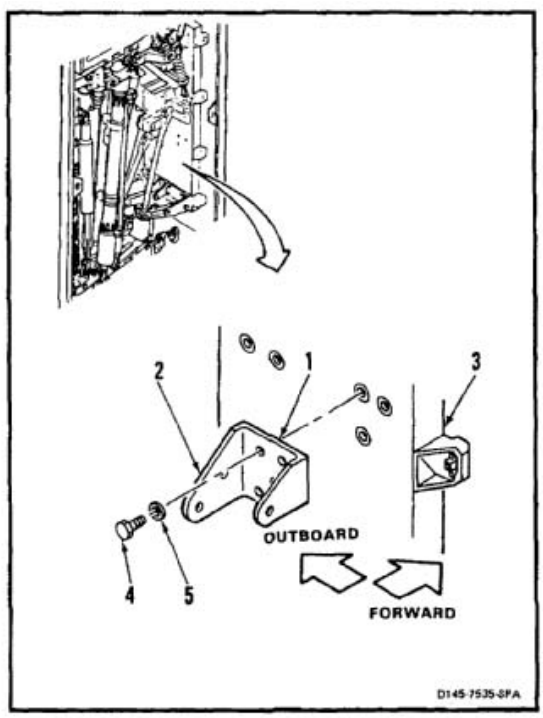
WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly/installation must be adhered to.



1. Position thrust detent support (1), long arm (2) aft and outboard, on pallet (3). Install three bolts (4) and three washers (5).
2. Torque bolts (4) to **45 inch-pounds**.



INSPECT

FOLLOW-ON MAINTENANCE:

Install thrust detent (Task 11-108).
Install engine droop variable resistor (Task 4-122 Without 74).
Install and rig thrust CPT (Task 4-154 With 74).
Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-112 REMOVE THRUST VISCOUS DAMPER 11-112

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

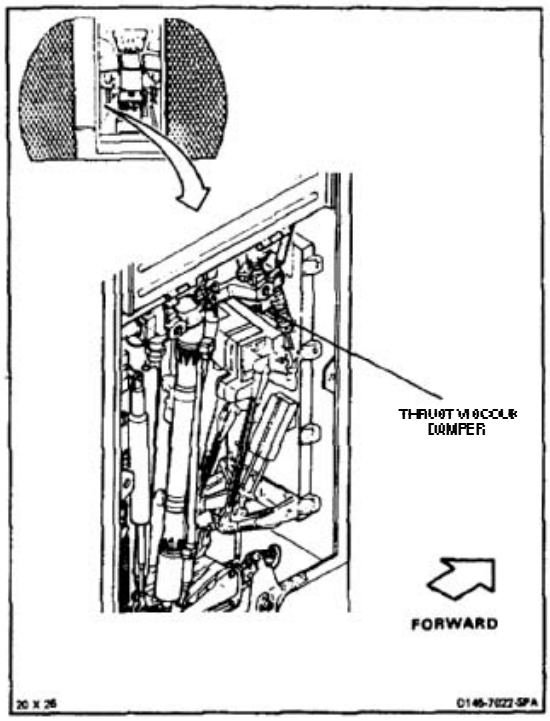
Pencil (E271)

Personnel Required:

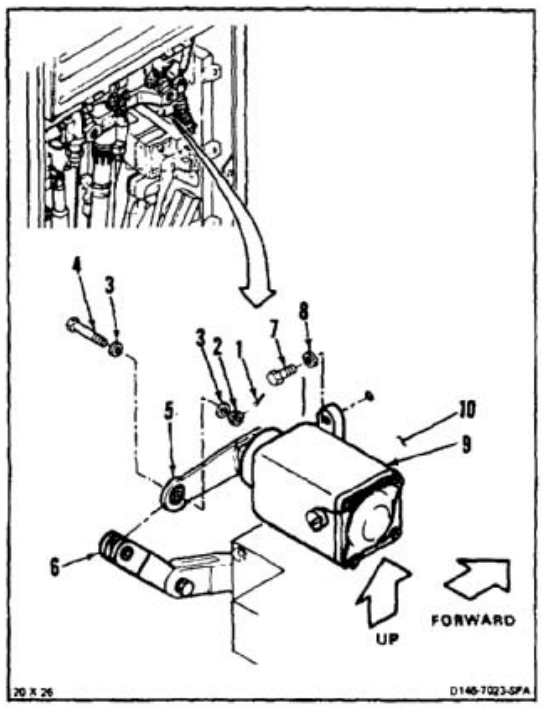
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



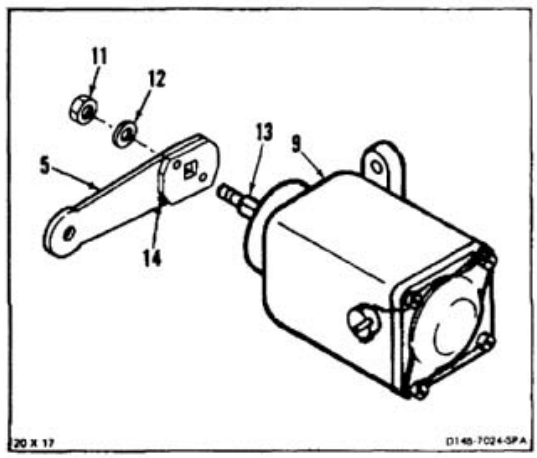
1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from damper arm (5). Disconnect arm, rotate arm up and forward.
2. Install bolt (4), two washers (3), and nut (2) loosely in link (6).
3. Remove two bolts (7) and washers (8) from viscous damper (9). Remove damper from pallet (10).



4. Mark position of arm (5) on damper (9). Use pencil (E271). Remove nut (11) and washer (12) from shaft (13).
5. Loosen setscrew (14) in arm (5) and slide arm from shaft (13).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-113 REMOVE PITCH OR ROLL VISCOUS DAMPERS 11-113

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

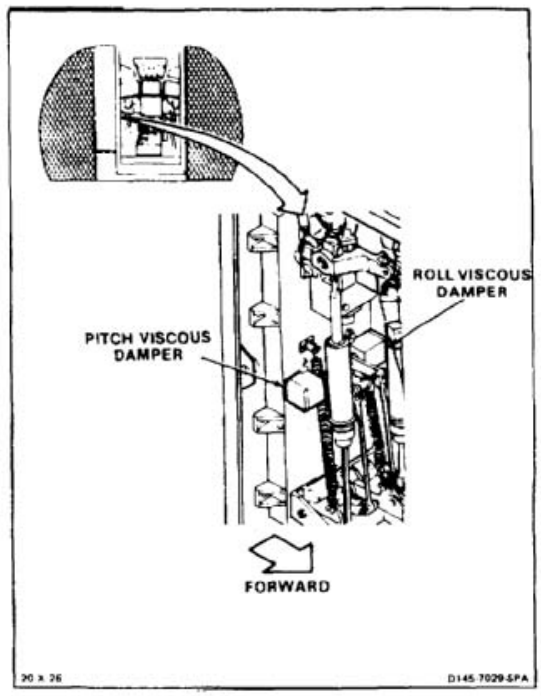
Pencil (E271)

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

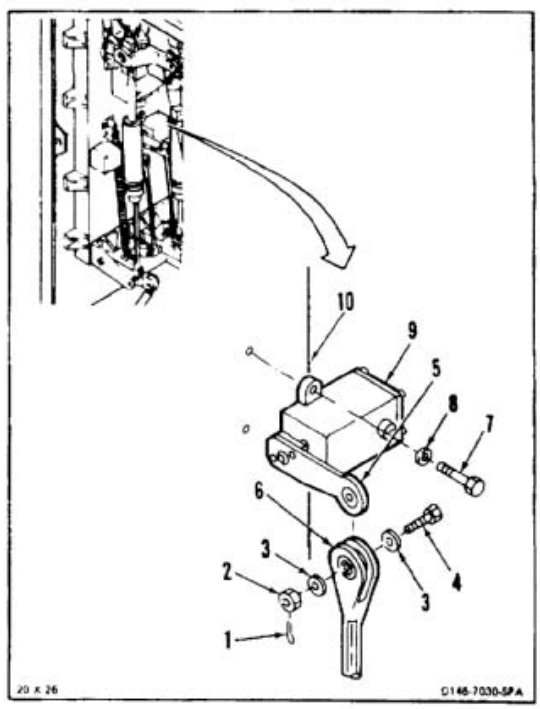
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed Task (2-107)
Closet Backup Panel Removed (Task 2-2)



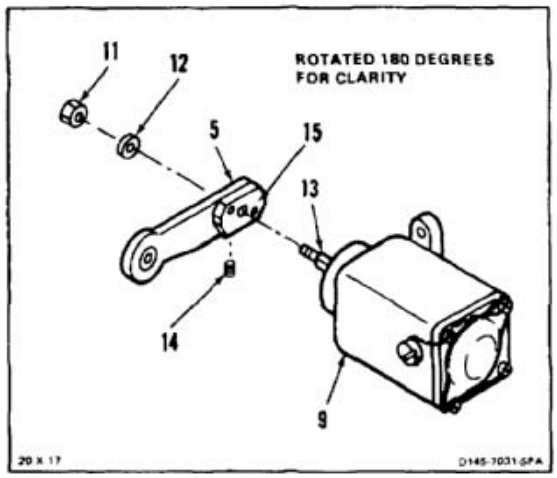
NOTE

Procedure is same to remove pitch or roll viscous dampers. Roll damper is shown here.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from damper arm (5). Disconnect arm, move link (6) away from arm.
2. Install bolt (4), two washers (3), and nut (2) loosely in link (6).
3. Remove two bolts (7) and washer (8) from viscous damper (9). Remove damper from pallet (10).



4. Mark position of arm (5) on damper (9). Use pencil (E271). Remove nut (11) and washer (12) from shaft (13).
5. Loosen setscrew (14) in plate (15) and slide arm from shaft (13).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-114 REMOVE YAW VISCOUS DAMPER 11-114

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

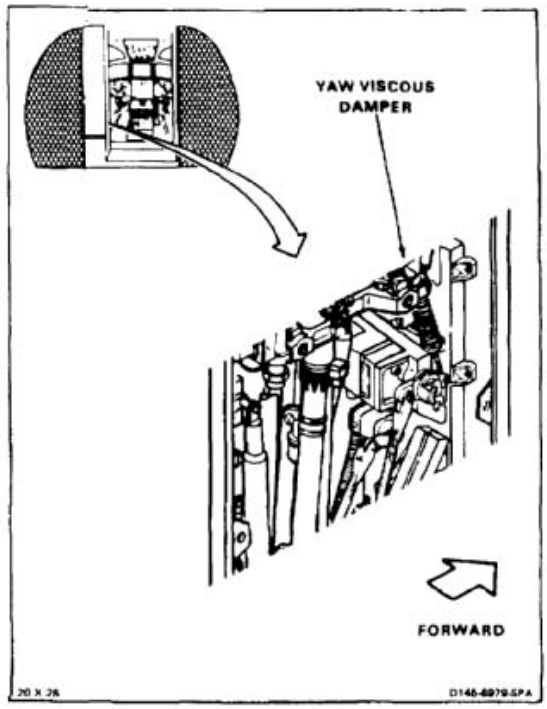
Pencil (E271)

Personnel Required:

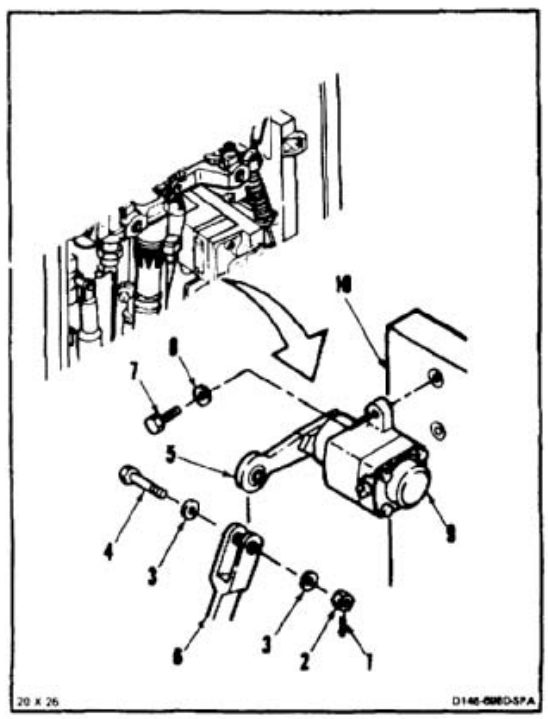
Medium Helicopter Repairer

Equipment Condition:

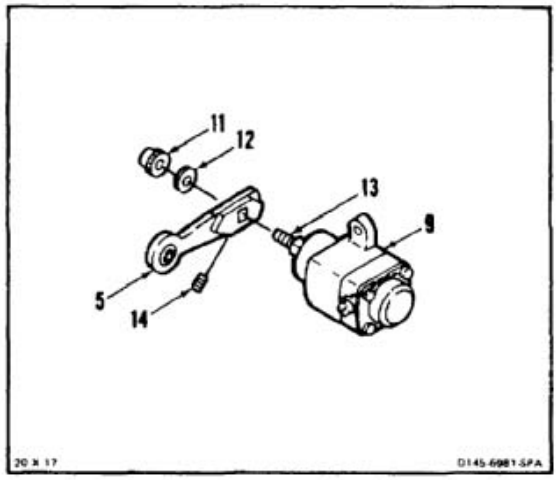
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from damper arm (5). Disconnect arm. Move link (6) away from arm.
2. Install bolt (4), two washers (3), and nut (2) loosely in link (6).
3. Remove two bolts (7) and washer (8) from viscous damper (9). Remove damper from pallet (10).



4. Mark position of arm (5) on damper (9). Use pencil (E271). Remove nut (11) and washer (12) from shaft (13).
5. Loosen setscrew (14) in arm (5) and slide arm from shaft (13).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-115 DISASSEMBLE, INSPECT AND REPAIR THRUST, PITCH OR YAW VISCOUS DAMPER (1025-930 OR 1025-940) (AVIM) 11-115

INITIAL SETUP

Applicable Configurations:

All

Tools:

Hydraulic Repairer's Tool Kit, NSN 5180-00-323-4891
Technical Inspector's Tool Kit, NSN 5180-00-323-5114
Container, 2 Quart
Retaining Ring Pliers
Arbor Press
Soft Jawed Vise

Materials:

Cloths (E120)
Lockwire (E234)
Crocus Cloth (E123)

Personnel Required:

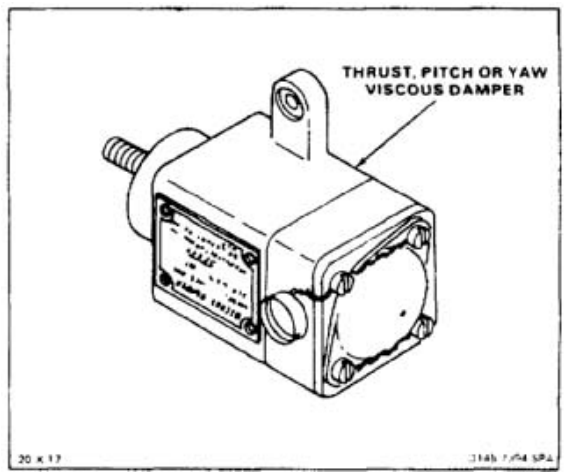
Aircraft Pneudraulics Repairer
Inspector

References:

TM 55-1500-322-24
Task 1-92

Equipment Condition:

Off Helicopter Task



11-115 DISASSEMBLE, INSPECT AND REPAIR THRUST, PITCH OR YAW VISCOUS DAMPER (1025-930 OR 1025-940) (AVIM) (Continued) 11-115

NOTE

This task must be performed in a clean area. Dirt on parts can cause component malfunction.

General inspection criteria apply unless otherwise stated (Task 1-92).

The thrust, pitch or yaw viscous dampers are temperature compensated.

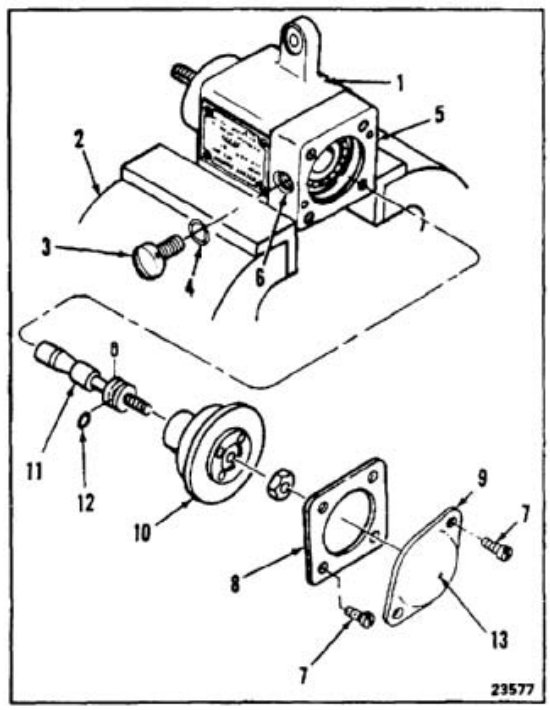
Inspection steps cover parts that are subject to wear.

1. Install damper case (1) in vise (2).
2. Remove lockwire from screw (3). Remove screw and packing (4) from abutment (5).
3. Remove case (1) from vise (2). Drain damping fluid through port (6). Use container and cloths (E120) for spilled fluid.
4. Install case (1) in vise (2).
5. Remove lockwire from four screws (7). Remove screws, cover (8), and end cover (9) from abutment (5).

NOTE

Do not tear diaphragm; otherwise, damper will malfunction.

6. Lift diaphragm (10) outer edge. Remove diaphragm and valve assembly (11) from abutment (5).
7. Remove valve (11) from diaphragm (10) and packing (12) from valve assembly (11).
8. Inspect diaphragm (10) for damage. There shall be no cracks, tears, or nicks. Check retainer is bonded to diaphragm. Gently pull diaphragm at **90°** to retainer.
9. Check vent hole (13) in cover (9) is open.

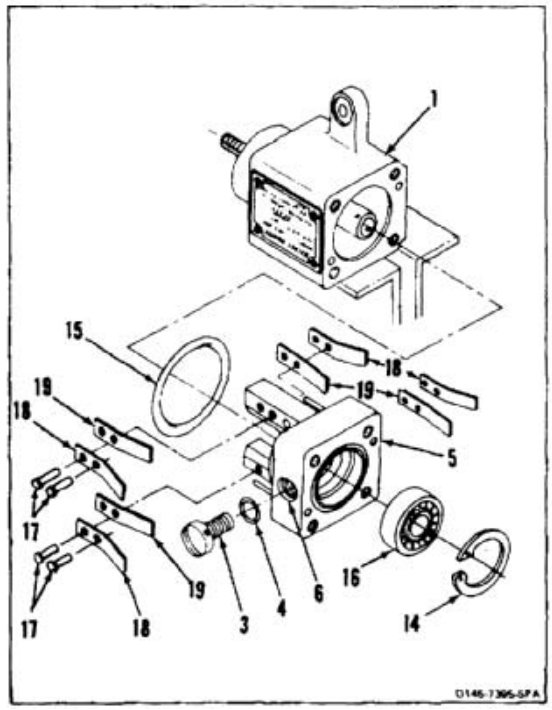


10. Remove retaining ring (14) from abutment (5). Use retaining ring pliers.
11. Pull abutment (5) outward. Remove abutment from case (1).
12. Remove packing (15) from abutment (5).
13. Remove bearing (16) from abutment (5). Use arbor press.
14. Inspect bearing (16) (TM 55-1500-322-24).

CAUTION

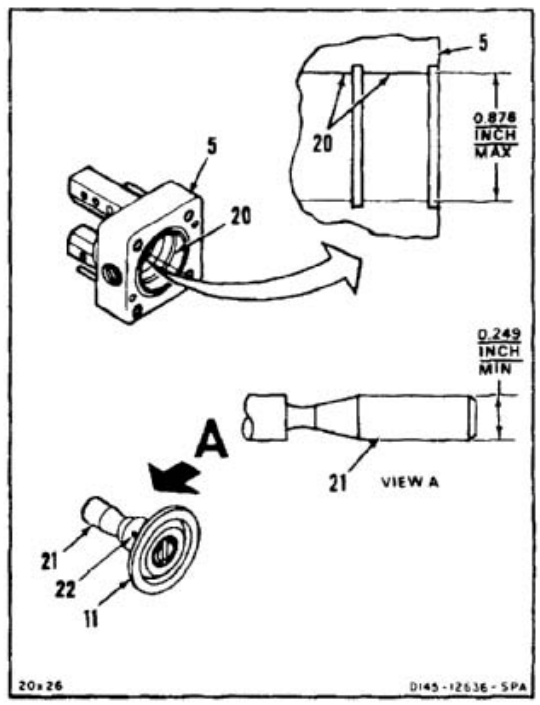
Use care inspecting valve stops and check valves. Damage to stops or valves can cause component malfunction.

15. Inspect rivets (17), valve stops (18), and check valves (19) for damage. There shall be no looseness, distortion or cracks. If damaged, do step 16. If not, go to step 17.
16. Remove four rivets (17), four valve stops (18), and four check valves (19) from abutment (5).



INSPECT

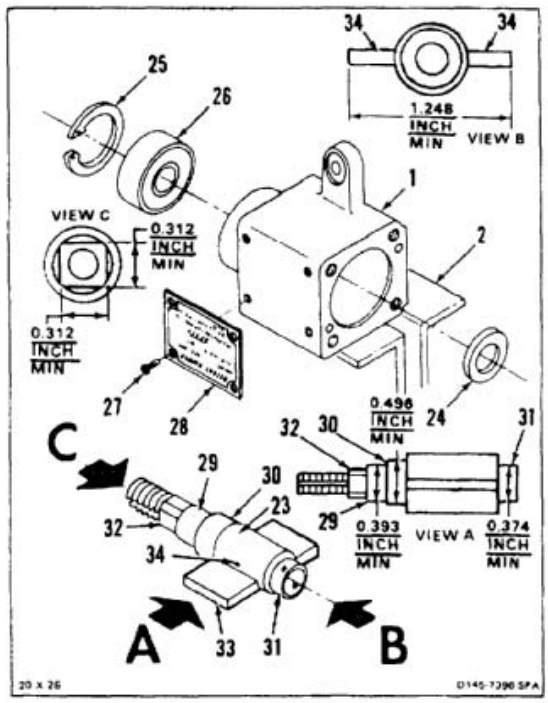
17. Inspect bearing bore (20) of abutment (5). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Bore shall be **0.876 inch** dia maximum.
18. Inspect shaft (21). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Outside diameter of shaft shall be **0.249 inch** minimum.
19. Check oil port (22) in shaft (21) is open. Use lockwire (E234).



20. Tap thread end of vane shaft (23). Remove shaft from case (1). Use soft-faced hammer.
21. Remove packing (24) from case (1).
22. Remove retaining ring (25) from case (1). Use retaining ring pliers.
23. Remove case (1) from vise (2).
24. Remove bearing (26) from case (1). Use arbor press.
25. Inspect bearing (26) (TM 55-1500-322-24).
26. Remove four screws (27) from nameplate (28). Remove nameplate from case (1).

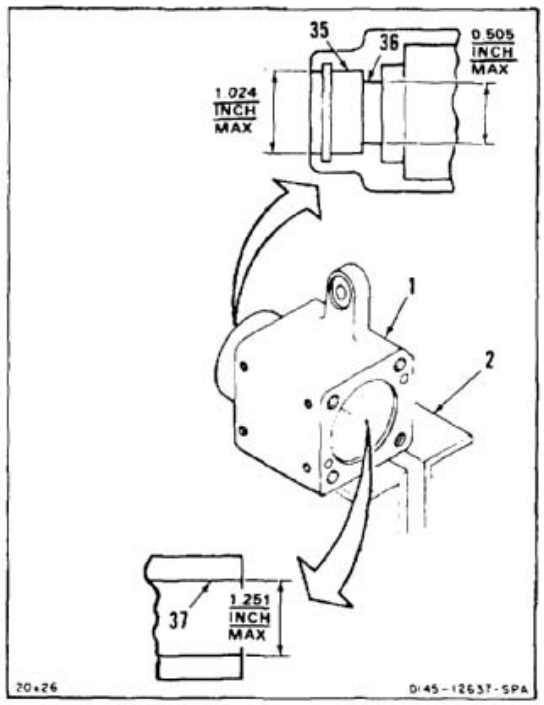
INSPECT

27. Inspect shaft (23). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Measurements of shaft shall be as follows:
    a. Outside diameter (29) — **0.393 inch** min.
    b. Outside diameter (30) — **0.496 inch** min.
    c. Outside diameter (31) — **0.374 inch** min.
    d. Square (32) — **0.312 x 0.312 inch** min.
    e. Shaft vanes (33) — **1.248 inch** min width.
28. Check four oil ports (34) in shaft (23) are open. Use lockwire (E234).



INSPECT

29. Inspect case (1). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Internal measurements of case shall be as follows:
    a. Bore (35) — **1.024 inch** dia max.
    b. Bore (36) — **0.505 inch** dia max.
    c. Bore (37) — **1.251 inch** dia max.
30. Remove case (1) from vise (2).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-116 DISASSEMBLE, INSPECT AND REPAIR ROLL VISCOUS DAMPER (1025-820) (AVIM) 11-116

INITIAL SETUP

Applicable Configurations:

All

Tools:

Hydraulic Repairer's Tool Kit, NSN 5180-00-323-4891
Technical Inspector's Tool Kit, NSN 5180-00-323-5114
Container, 2 Quart
Retaining Ring Pliers
Arbor Press
Soft Jawed Vise

Materials:

Cloths (E120)
Lockwire (E234)
Crocus Cloth (E123)

Personnel Required:

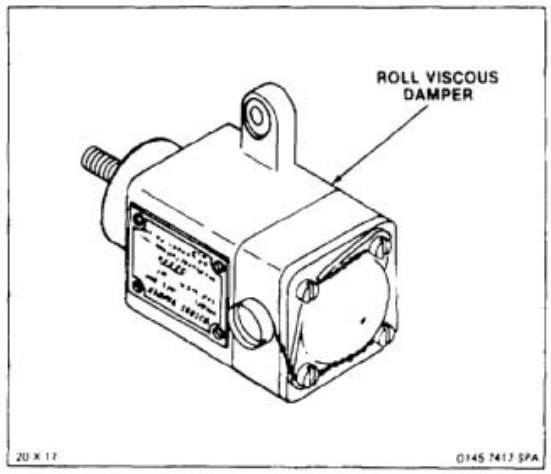
Aircraft Pneudraulics Repairer
Inspector

References:

TM 55-1500-322-24
Task 1-92

Equipment Condition:

Off Helicopter Task



CAUTION

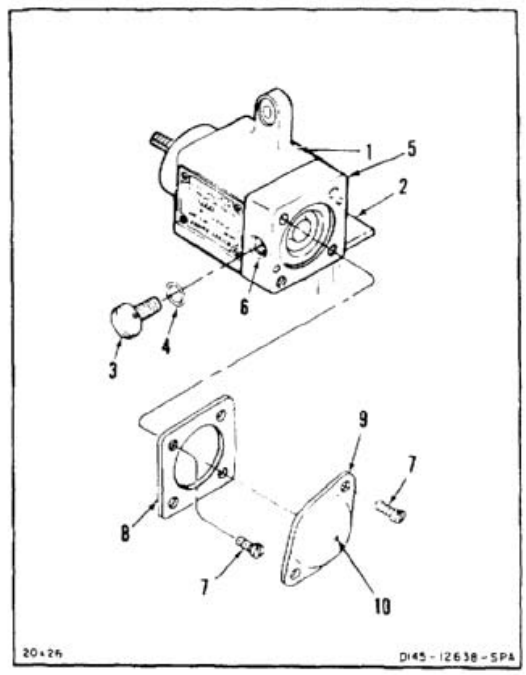
This task must be performed in a clean area. Dirt on parts can cause component malfunction.

NOTE

General inspection criteria apply unless otherwise stated (Task 1-92).

The roll viscous damper is nontemperature compensated.

Inspection steps cover parts that are subject to wear.



1. Install roll viscous damper case (1) in vise (2).
2. Remove lockwire from screw (3). Remove screw and packing (4) from abutment (5). Drain damping fluid through port (6). Remove case (1) from vise (2). Use container and cloths (E120) for spilled fluid.
3. Install case (1) in vise (2).
4. Remove lockwire from four screws (7). Remove screws and cover (8) and end cover (9) from abutment (5).
5. Check vent hole (10) in cover (9) is open.

CAUTION

Do not tear diaphragm; otherwise, damper will malfunction.

6. Lift diaphragm (11) outer edge. Remove diaphragm from abutment (5).
7. Inspect diaphragm (11) for damage. There shall be no cracks, tears or nicks.
8. Remove retaining ring (12) from abutment (5). Use retaining ring pliers.
9. Pull abutment (5) outward. Remove abutment from case (1).
10. Remove packing (13) from abutment (5).
11. Remove bearing (14) from abutment (5). Use arbor press.
12. Inspect bearing (14) (TM 55-1500-322-24).

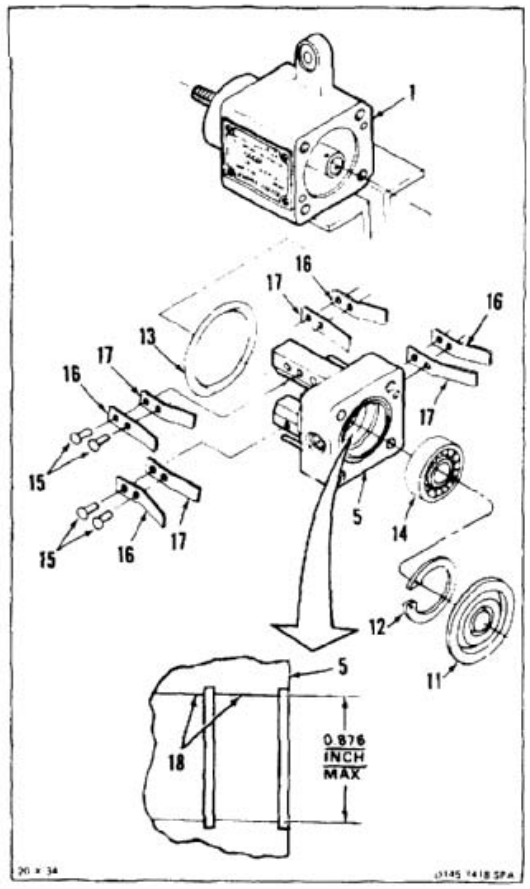
CAUTION

Use care inspecting valve stops and check valves. Damage to stops or valves can cause component malfunction.

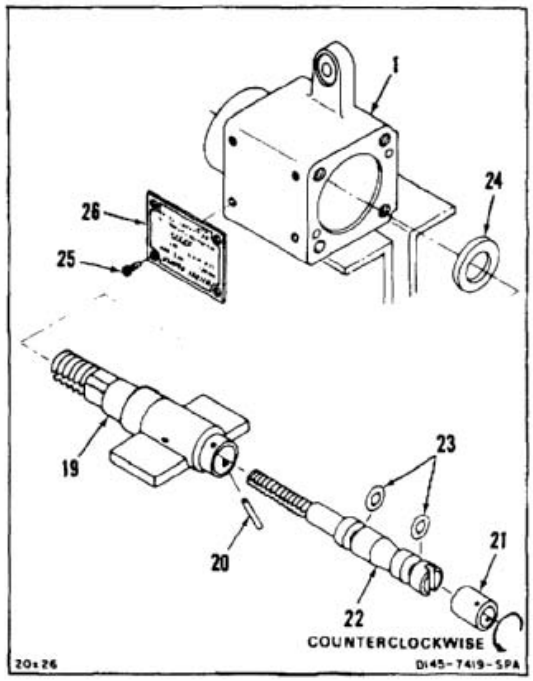
13. Inspect rivets (15), valve stops (16), and check valves (17) for damage. There shall be no looseness, distortion, or cracks. If damaged, perform step 14. If not, go to step 15.
14. Remove four rivets (15), four valve stops (16), and four check valves (17) from abutment (5).

INSPECT

15. Inspect bearing bore (18) of abutment (5). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Bore shall be **0.876 inch** dia maximum.



16. Tap thread end of vane shaft (19). Remove shaft from case (1). Use soft faced hammer.
17. Push pin (20) from end of shaft (19). Remove stop (21) from end of shaft.
18. Remove valve (22) from shaft (19). Turn counterclockwise.
19. Remove two packings (23) from valve (22).
20. Remove packing (24) from case (1).
21. Remove four screws (25) from nameplate (26). Remove nameplate from case (1).

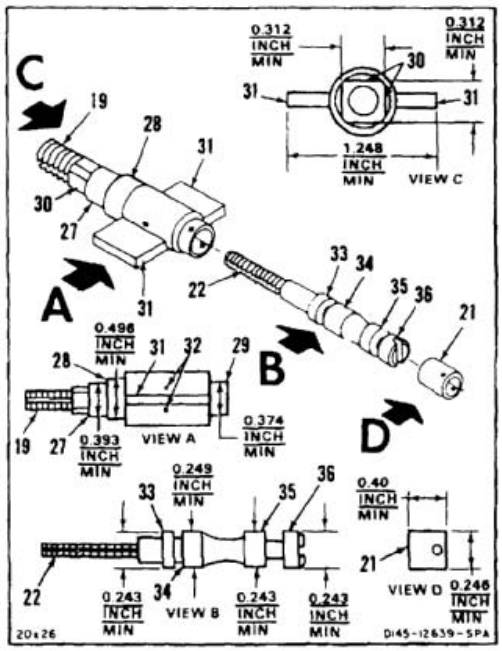


INSPECT

22. Inspect shaft (19). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Measurements of shaft shall be as follows:
    a. Outside diameter (27) — **0.393 inch** min.
    b. Outside diameter (28) — **0.496 inch** min.
    c. Outside diameter (29) — **0.374 inch** min.
    d. Square (30) — **0.312 x 0.312 inch** min.
    e. Shaft vanes (31) — **1.248 inch** min width.
23. Check four oil ports (32) in shaft (19) are open. Use lockwire (E234).

INSPECT

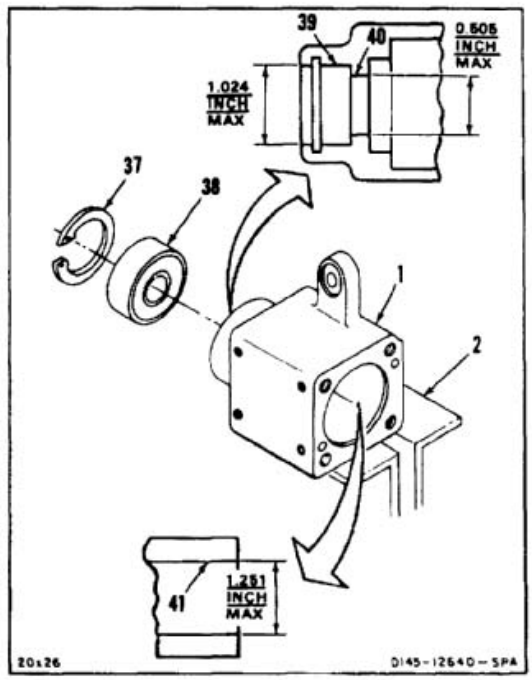
24. Inspect shaft (22). Check threads of shaft are tight in shaft (19). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Measurements of shaft shall be as follows:
    a. Outside diameter (33) — **0.243 inch** min.
    b. Outside diameter (34) — **0.249 inch** min.
    c. Outside diameter (35) — **0.243 inch** min.
    d. Outside diameter (36) — **0.243 inch** min.
25. Inspect stop (21). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Measurements of stop shall be as follows:
    a. Length — **0.40 inch** min.
    b. Outside diameter — **0.246 inch** min.



26. Remove retaining ring (37) from case (1). Use retaining ring pliers.
27. Remove case (1) from vise (2).
28. Remove bearing (38) from case (1). Use arbor press.
29. Inspect bearing (38) (TM 55-1500-322-24).

INSPECT

30. Inspect case (1). Blend out damaged areas by burnishing or sanding. Use crocus cloth (E123). Internal measurements of case shall be as follows:
    a. Bore (39) — **1.024 inch** dia max.
    b. Bore (40) — **0.505 inch** dia max.
    c. Bore (41) — **1.251 inch** dia max.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-117 ASSEMBLE THRUST, PITCH OR YAW VISCOUS DAMPER (1025-930 OR 10-25-940) (AVIM) 11-117

INITIAL SETUP

Applicable Configurations:

All

Tools:

Hydraulic Repairer's Tool Kit, NSN 5180-00-323-4891
Container, 2 Quart
Retaining Ring Pliers
Arbor Press
Soft Jawed Vise

Materials:

Cloths (E120)
Damper Fluid (E176)
Lockwire (E231)

Parts:

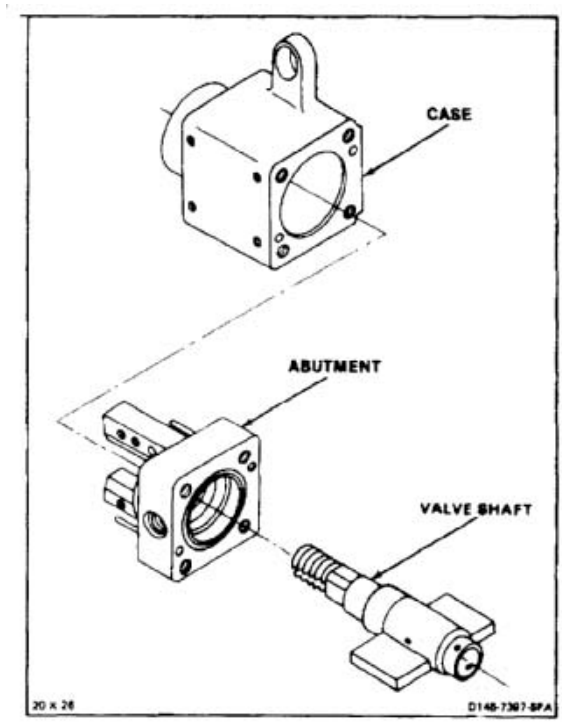
Preformed Packing
Quad Ring

Personnel Required:

Aircraft Pneudraulics Repairer
Inspector

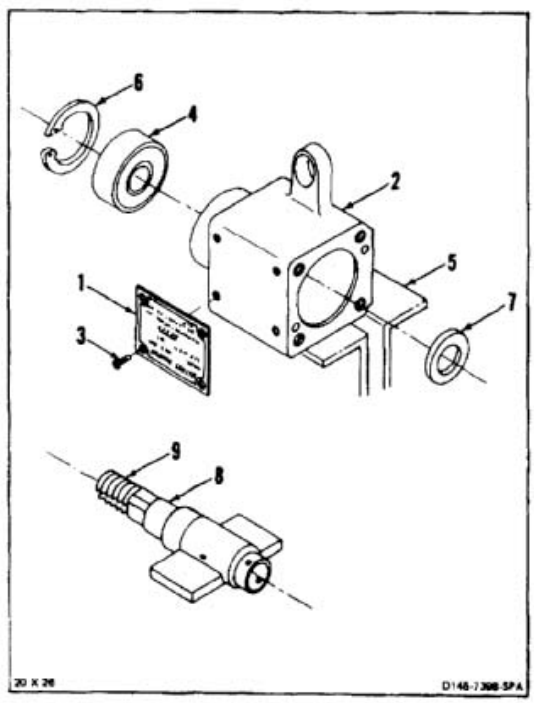
References:

TM 55-1520-240-23P



1. Position nameplate (1) on case (2). Install four screws (3).
2. Install bearing (4) in case (2) until bottomed. Use arbor press.
3. Install case (2) in vise (5).
4. Install retaining ring (6) in case (2). Use retaining ring pliers.
5. Install quad ring (7) in case (2).
6. Install shaft (8) thread end (9) inward in case (2) until bottomed. Use soft faced hammer.

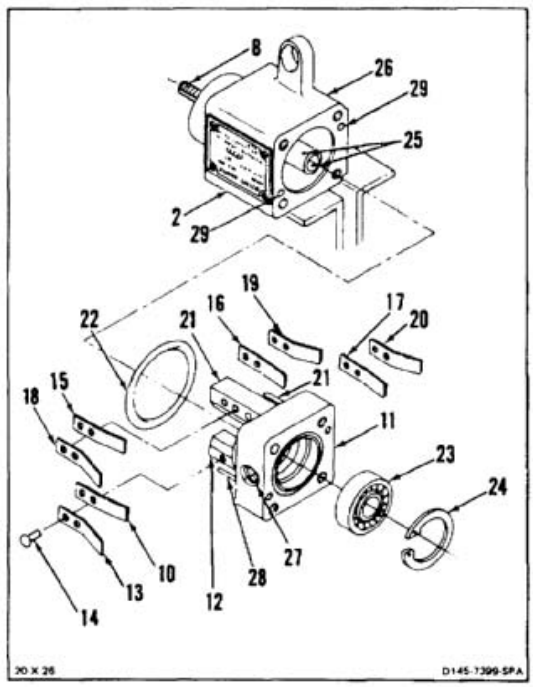
INSPECT



7. Position check valve (10) toward abutment (11) on arm (12). Position valve stop (13), curve outward and toward abutment, on check valve. Align holes.
8. Install two rivets (14).
9. Repeat step (steps 7 and 8) for three check valves (15 and 16, and 17) and three valve stops (18, 19, and 20) for two arms (12 and 21) of abutment (11).
10. Install packing (22) on abutment (11).
11. Install bearing (23) in abutment (11) until bottomed. Use arbor press.

INSPECT

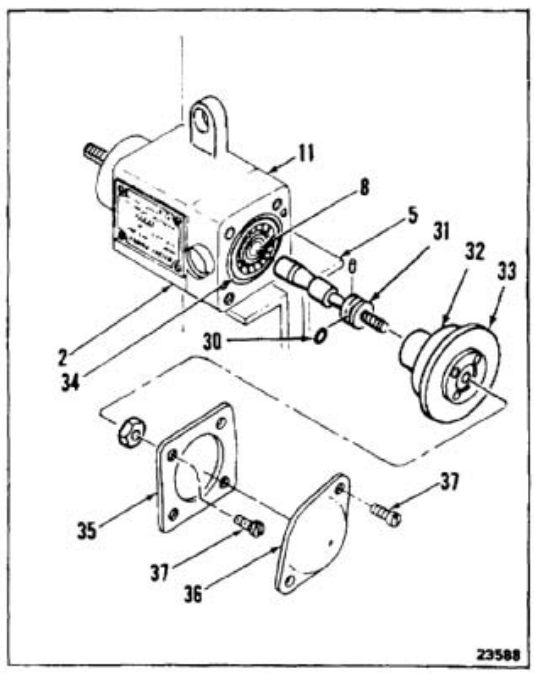
12. Install retaining ring (24) in abutment (11). Use retaining ring pliers.
13. Turn shaft (8) to position vanes (25) about **90°** to mounting surface (26).
14. Position abutment (11) with port (27) about **90°** and away from surface (26). Align two dowels (28) in abutment with case (2) holes (29). Install abutment on case until bottomed.



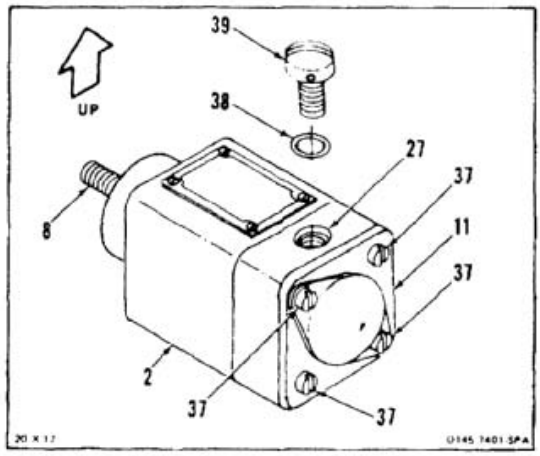
15. Install packing (30) on valve assembly (31).
16. Install valve assembly (31) and diaphragm (32) on abutment (11) with valve assembly in shaft (8). Insert lip (33) in groove (34) of abutment.

INSPECT

17. Position cover (35) and end cover (36) on abutment (11). Install four screws (37).
18. Remove case (2) from vise (5).



19. Position case (2) with port (27) up. Fill case and abutment (11) with damper fluid (E176). Turn shaft (8) clockwise then counterclockwise during filling until fluid in port is air free. Use cloth (E120) for spilled fluid.



INSPECT

20. Install packing (38) on screw (39).

21. Install screw (39) in port (27) of abutment (11).

22. Lockwire four screws (37) and screw (39). Use lockwire (E231).

INSPECT

FOLLOW-ON MAINTENANCE:

Adjust thrust, pitch or yaw viscous damper (Task 11-121).

END OF TASK

11-118 ASSEMBLE ROLL VISCOUS DAMPER (1025-820) (AVIM) 11-118

INITIAL SETUP

Applicable Configurations:

All

Tools:

Hydraulic Repairer's Tool Kit, NSN 5180-00-323-4891
Container, 2 Quart
Retaining Ring Pliers
Arbor Press
Soft Jawed Vise

Materials:

Cloths (E120)
Damper Fluid (E176)
Lockwire (E231)

Parts:

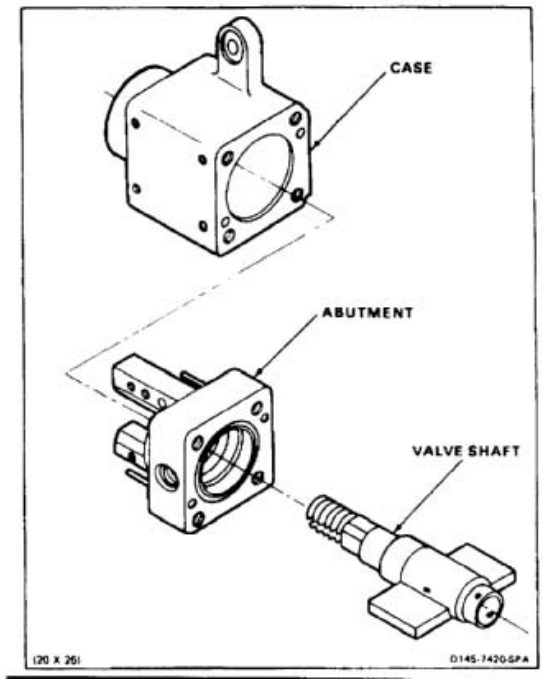
Preformed Packing
Quad Ring

Personnel Required:

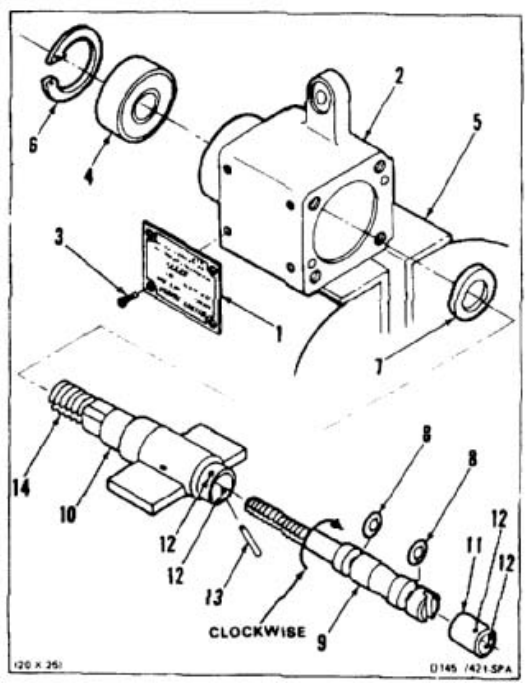
Aircraft Pneudraulics Repairer
Inspector

References:

TM 55-1520-240-23P



1. Position nameplate (1) on case (2). Install four screws (3).
2. Install bearing (4) in case (2) until bottomed. Use arbor press.
3. Install case (2) in vise (5).
4. Install retaining ring (6) in case (2). Use retaining ring pliers.
5. Install quad ring (7) in case (2).
6. Install two packings (8) on valve (9).
7. Install valve (9) in valve shaft (10). Turn clockwise. Do not tighten.
8. Position stop (11) on shaft (10). Align holes (12).
9. Install pin (13) in holes (12) until flush.
10. Install shaft (10) thread end (14) inward, in case (2) until bottomed. Use soft faced hammer.

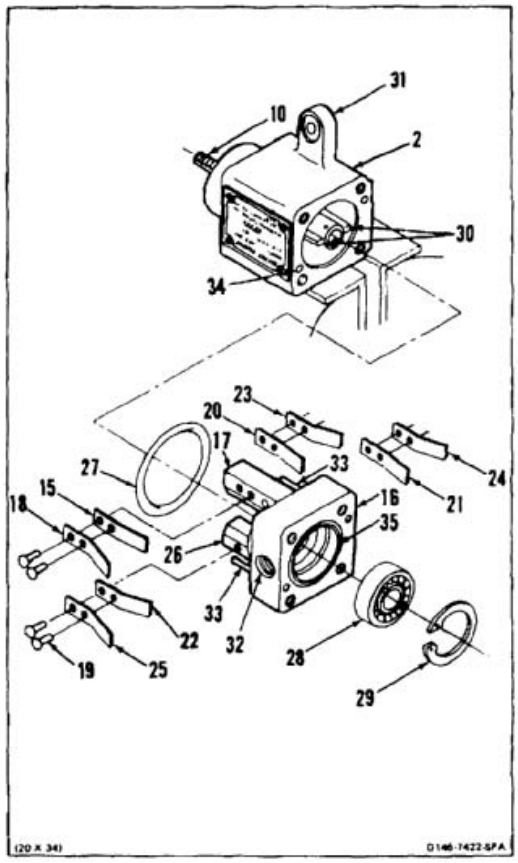


INSPECT

11. Position check valve (15) toward abutment (16), on arm (17). Position valve stop (18), curve outward and toward abutment, on check valve. Align holes.
12. Install two rivets (19).
13. Repeat step (steps 11 and 12) for three check valves (20, 21, and 22) and three valve stops (23, 24, and 25) on two arms (17 and 26) of abutment (16).
14. Install packing (27) on abutment (16).
15. Install bearing (28) in abutment (16) until bottomed. Use arbor press.

INSPECT

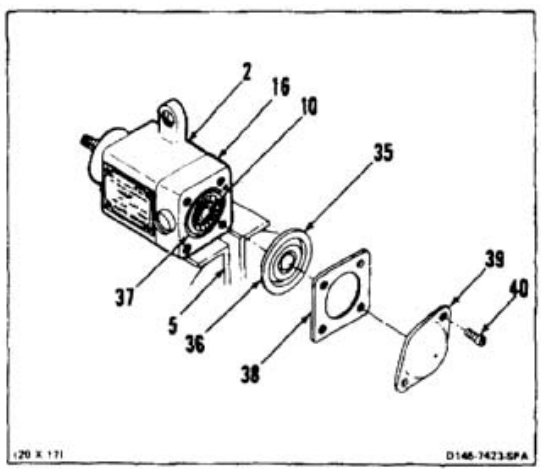
16. Install retaining ring (29) in abutment (16). Use retaining ring pliers.
17. Turn shaft (10) to position vanes (30) about **90°** to mounting surface (31).
18. Position abutment (16) with port (32) about **90°** and away from surface (31). Align two dowels (33) in abutment, holes (34) in case (2). Install abutment on case until bottomed.



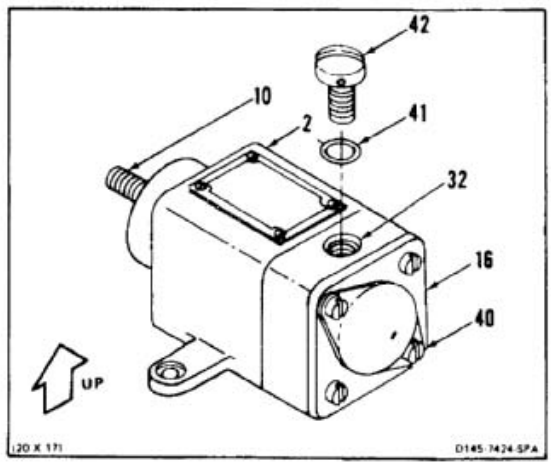
19. Position diaphragm (35), lip (36) inward, on abutment (16) and shaft (10). Install lip in abutment groove (37).

INSPECT

20. Position cover (38) and end cover (39) on abutment (16). Install four screws (40).
21. Remove case (2) from vise (5).



22. Position case (2) with port (32) up. Fill case and abutment (16) with damper fluid (E176). Turn shaft (10) clockwise then counterclockwise during filling until fluid port is air free.



INSPECT

23. Install packing (41) on screw (42).
24. Install screw (42) in port (32) of abutment (16).
25. Lockwire four screws (40) and screw (42). Use lockwire (E231).

FOLLOW-ON MAINTENANCE:

Adjust roll viscous damper (Task 11-120).

END OF TASK

11-119 TEST VISCOUS DAMPERS (1025-820, 930 OR 940) (AVIM) 11-119

INITIAL SETUP

Applicable Configurations:

All

Tools:

Hydraulic Repairer's Tool Kit, NSN 5180-00-323-4891
Test Set (T100)
Clamps (2)

Materials:

None

Parts:

Bolts
Washers

Personnel Required:

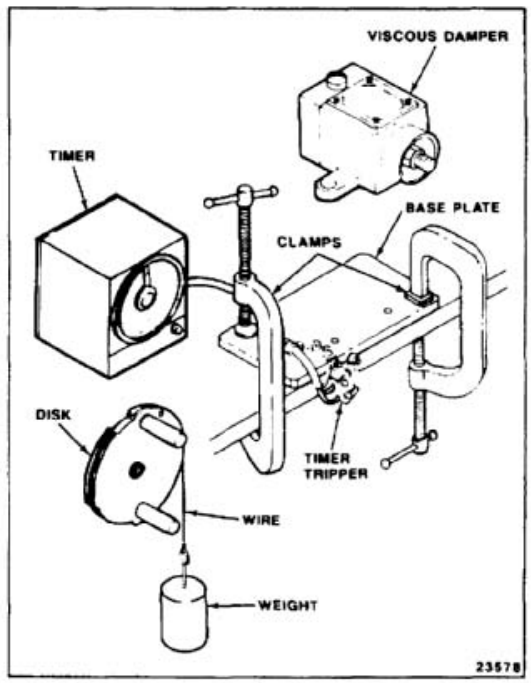
Aircraft Pneudraulic Repairer
Inspector

References:

TM 55-1520-240-23P
Task 11-120
Task 11-121

Equipment Condition:

Off Helicopter Task
Viscous Damper Arm Removed (Task 11-138)

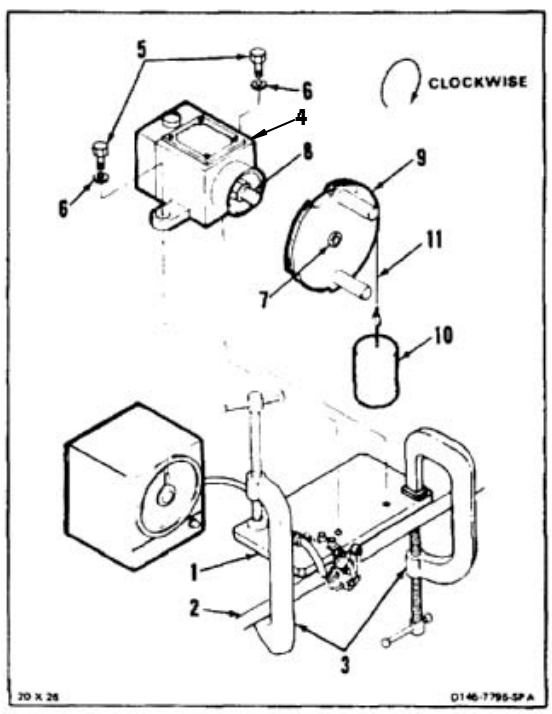


NOTE

Viscous damper must be stored between **70° to 80°F (20° to 25°C)** for at least **2 hours** just before test.

Procedure is same to test viscous dampers 1025-820, 1025-930, and 1025-940 except where noted.

1. Clamp base plate (1) to level surface (2). Use two clamps (3).
2. Position damper (4) on support (1). Install two bolts (5) and washers (6).
3. Install disk (7) on damper shaft (8), with wire anchor (9) on top of disk when disk is turned fully clockwise.
4. Hook weight (10) on wire (11). Allow weight to hang free.



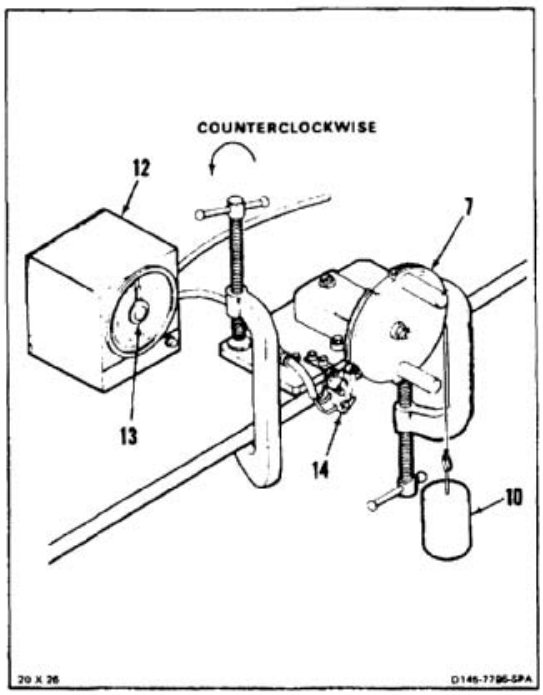
CAUTION

Use minimum force to turn disk. Excessive force can damage disk and timing tripper.

5. Turn disk (7) fully counterclockwise. Hold disk with weight (10) in full up position.
6. Set timer (12) to zero. Turn knob (13).
7. Release disk (7). Check tripper (14) starts and stops timer (12). Record indicated time from timer.
8. Repeat steps 5, 6, and 7, three times. Add recorded times and divide total by 3. Result must be within the following time range:

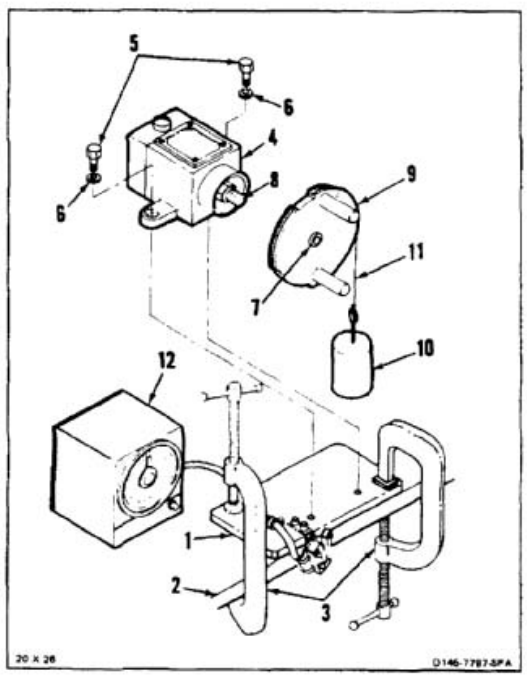
Viscous Damper	Range (Seconds)
1025-820	**0.94 to 1.04**
1025-930	**4.5 to 5.1**
1025-940	**9.5 to 13.5**

If result is not within range, adjust damper (Task 11-120 or 11-121).



INSPECT

9. Remove weight (10) from wire (11).
10. Remove disk (7) from damper shaft (8).
11. Remove two bolts (5) and washers (6). Remove damper (4).
12. Remove two clamps (3) from base plate (1). Remove support (1) and timer (12).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-120 ADJUST VISCOUS DAMPER 1025-820 (AVIM) 11-120

INITIAL SETUP

Applicable Configurations:

All

Tools:

Hydraulic Repairer's Tool Kit, NSN 5180-00-323-4891
Soft-Jawed Vise
Soldering Gun

Materials:

Insulating Enamel (E164)
Gloves (E186)

Personnel Required:

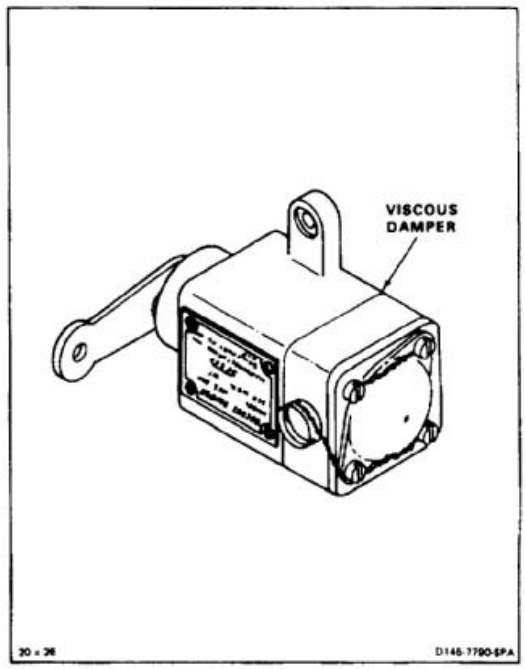
Aircraft Pneudraulic Repairer
Inspector

References:

Task 11-119

Equipment Condition:

Off Helicopter Task



1. Clamp viscous damper (1) in vise (2).
2. Apply heat to socket head screw (3) in end of shaft (4). Use soldering gun.

NOTE

Screw is coated with insulating enamel. Heat will soften enamel.

3. Turn screw (3) about 1/8 turn. Turn screw clockwise for more damping. Turn screw counterclockwise for less damping.

NOTE

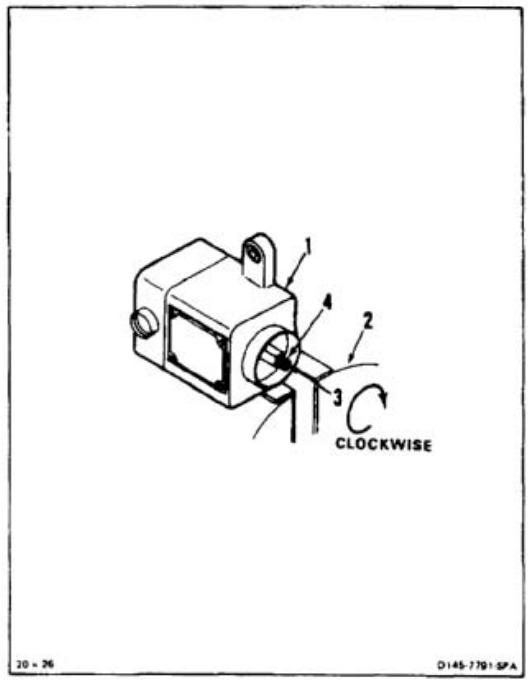
One complete turn clockwise gives maximum damping.

4. Remove damper (1) from vise (2).
5. Perform damper test (Task 11-119).

WARNING

Enamel (E164) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes. Wear gloves (E186).

6. Apply coat of enamel (E164) to head of screw (3).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-121 ADJUST VISCOUS DAMPER (1025-940 OR 1025-930) (AVIM) 11-121

INITIAL SETUP

Applicable Configurations:

All

Tools:

Hydraulic Repairer's Tool Kit, NSN 5180-00-323-4891
Soft-Jawed Vise
Spanner Wrench, Viscous Damper (T64)

Materials:

Lockwire (E230)

Personnel Required:

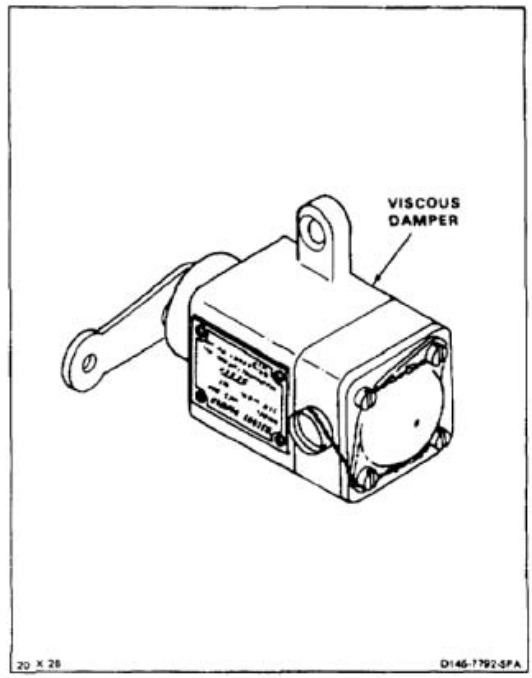
Aircraft Pneudraulic Repairer
Inspector

References:

Task 11-119

Equipment Condition:

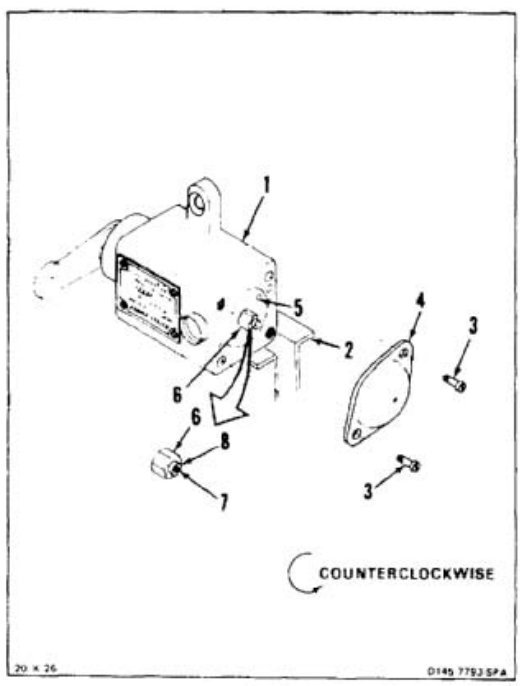
Off Helicopter Task



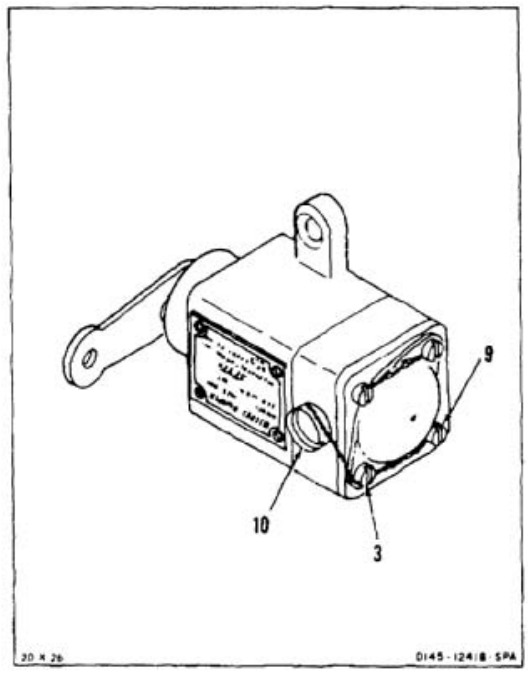
1. Clamp viscous damper (1) in vise (2).
2. Remove lockwire from two screws (3).
3. Remove two screws (3) and end cap (4) from damper (1).
4. Hold diaphragm (5). Use spanner wrench (T64). Loosen nut (6).
5. Hold diaphragm (5). Use spanner wrench (T64). Turn socket head screw (7) in valve shaft (8) about 1/8 turn. Turn screw clockwise for less damping. Turn screw counterclockwise for more damping.
6. Remove damper (1) from vise (2).
7. Perform damper test (Task 11-119).
8. Hold diaphragm (5). Use spanner wrench (T64). Tighten nut (6).

INSPECT

9. Install cap (4), and two screws (3).



10. Lockwire two screws (3) to screws (9) and screw (10). Use lockwire (E230).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-122 INSTALL YAW VISCOUS DAMPER 11-122

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

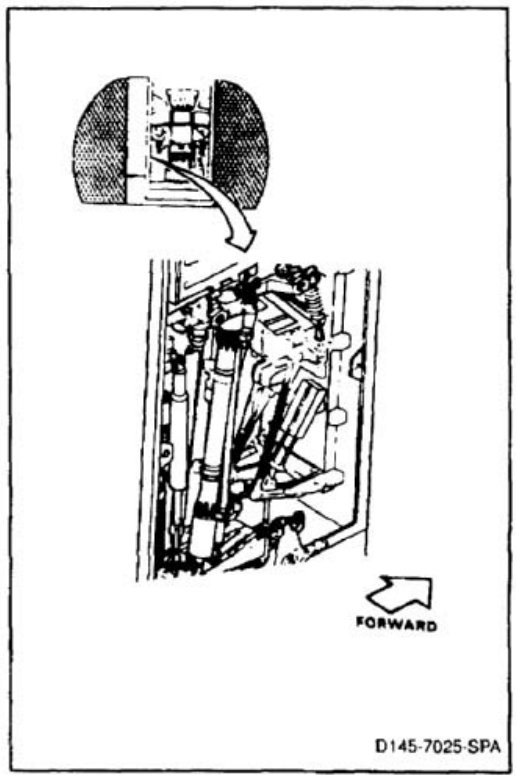
Epoxy Primer (E292)
Sealant (E327)
Pencil (E271)
Gloves (E184.1)
Pans
Cotter Pin

Personnel Required:

Medium Helicopter Repairer
Inspector

Reference:

TM 55-1520-240-23P
Task 1-13



1. If arm (1) is a replacement, slide arm temporarily on shaft (2), arm away from mounting surface (3), and plate (4) to damper (5). Rotate arm fully up. Rotate arm fully down mark position, then position arm about mid-position. Arm shall be about **90°** to mounting surface of damage. Mark position of arm on damper. Use pencil (E271).
2. Remove arm (1) from shaft (2).
3. Remove setscrew (6) from plate (4).
4. Align marks on arm (1) and damper (5). Slide arm on shaft (2), plate (4) to damper. Install washer (7) and nut (8) on shaft.

WARNING

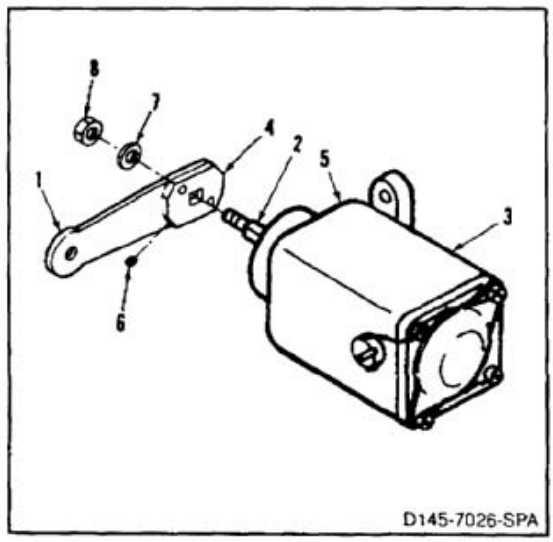
Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

5. Apply coat of epoxy primer (E292) to setscrew (6). Wear gloves (E184.1) and goggles. Install setscrew in plate (4) of arm (1) while epoxy primer is wet.

WARNING

Sealant (E327) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

6. Apply coat of sealant (E327) on setscrew (6). Wear gloves (E184.1) and goggles.



INSPECT

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that the correct damper is installed in the yaw axis. Incorrect axis orientation will adversely affect force feel damping characteristics of the flight control system.

Ensure the proper damper arm assembly is installed. Arm assembly has shear rivets sized to specific load requirements in the event of a damper failure.

Ensure all hardware mounting the damper assembly to the pallet assembly is secure and that there is no evidence of loose pallet inserts.

Loose attachments within flight control secondary linkage will degrade aircraft control, missing components may cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that the correct damper is installed in the thrust axis. Incorrect axis orientation will adversely affect force feel damping characteristics of the flight control system.

Ensure the proper damper arm assembly is installed. Arm assembly has shear rivets sized to specific load requirements in the event of a damper failure.

Ensure all hardware mounting the damper assembly to the pallet assembly is secure and that there is no evidence of loose pallet inserts.

Loose attachments within flight control secondary linkage will degrade aircraft control, missing components may cause loss of control.

CAUTION

Bushing must be link before installing bolt; otherwise, damage to component will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

7. Position damper (5) on pallet (9), arm (1) outboard and aft. Install two bolts (10) and washers (11) in damper.

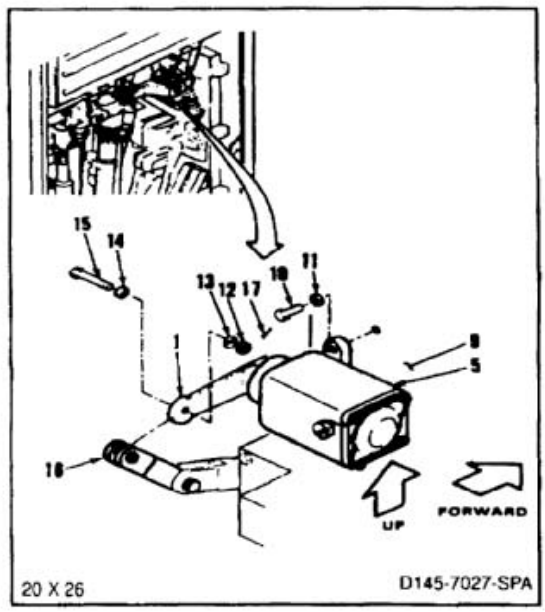
7.1. Torque bolts (10) to **23 inch-pounds**.

8. Remove nut (12), two washers (13 and 14) and bolt (15) from link (16).

9. Position arm (1) in link (16). Install bolt (15), two washers (14 and 13), and nut (12) in link and arm. Bolthead must be outboard.

10. Torque nut (12) to **15 to 25 inch-pounds**. Install cotter pin (17).

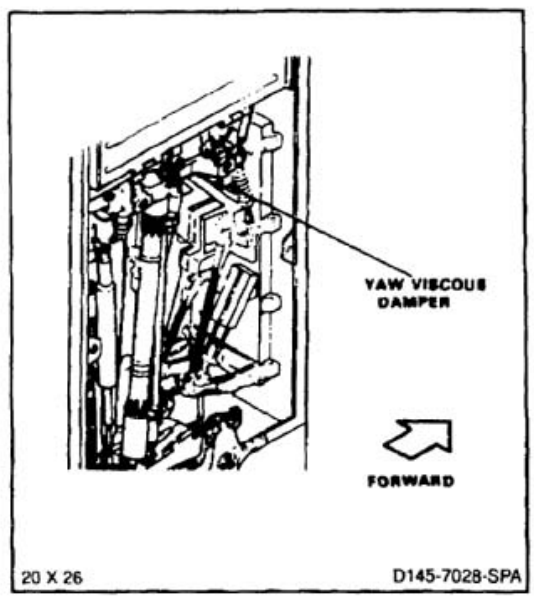
11. Check bolt (15). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, and washer under nut and repeat step 10.



INSPECT

FOLLOW-ON MAINTENANCE:

Perform yaw control operational check (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).



END OF TASK

11-123 INSTALL PITCH OR ROLL VISCOUS DAMPERS 11-123

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

Epoxy Primer (E292)
Sealant (E327)
Pencil (E271)
Gloves (E184.1)

Parts:

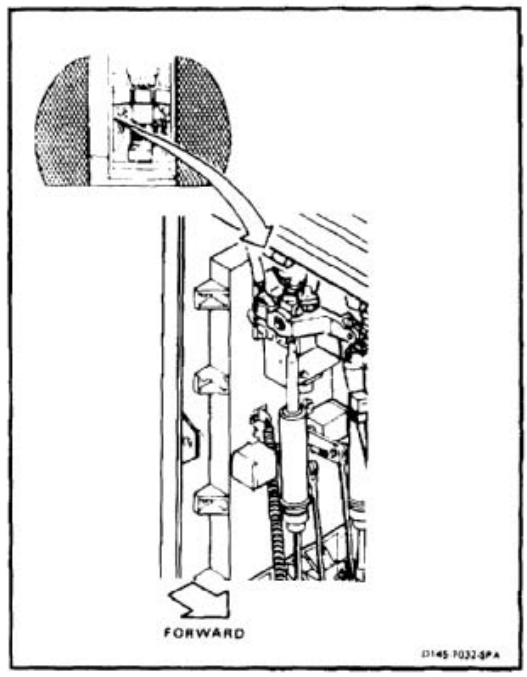
Cotter Pin

Personnel Required:

Medium Helicopter Repairer
Inspector

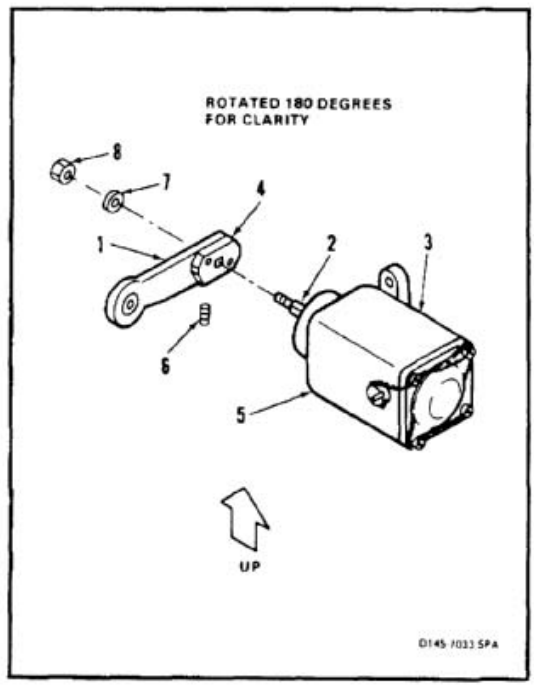
References:

TM 55-1520-240-23P
Task 1-13



NOTE

Procedure is same to install pitch or roll viscous dampers or roll viscous dampers. Roll damper is shown here.



1. If arm (1) is a replacement, slide arm temporarily on shaft (2), arm away from mounting surface (3) and plate (4) to damper (5). Rotate arm fully up, mark position. Rotate arm fully down, mark position then position arm about mid-position. Arm shall be about **90°** to mounting surface of damper. Mark position of arm on damper. Use pencil (E271).
2. Remove arm (1) from shaft (2).
3. Remove setscrew (6) from plate (4),
4. Align marks on arm (1) and damper (5). Slide arm on shaft (2), plate (4) to damper (5) and arm forward. Install washer (7) and nut (8) on shaft. Remove marks from arm and damper.

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

5. Apply coat of epoxy primer (E292) to setscrew (6). Wear gloves (E184.1) and goggles. Install setscrew in plate (4) of arm (1) while epoxy primer is wet.

WARNING

Sealant (E327) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

6. Apply coat of sealant (E327) on setscrew (6). Wear gloves (E184.1) and goggles.

INSPECT

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that the correct damper is installed in the pitch or roll axis. Incorrect axis orientation will adversely affect force feel damping characteristics of the flight control system.

Ensure the proper damper arm assembly is installed. Arm assembly has shear rivets sized to specific load requirements in the event of a damper failure.

Ensure all hardware mounting the damper assembly to the pallet assembly is secure and that there is no evidence of loose pallet inserts.

Loose attachments within flight control secondary linkage will degrade aircraft control, missing components may cause loss of control.

CAUTION

Bushings must be in link before installing bolt; otherwise, damage to component will result.

NOTE

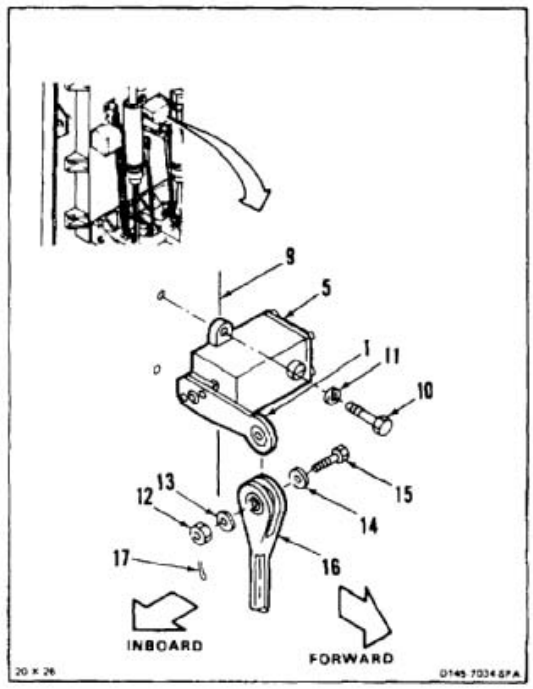
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

7. Position damper (5) on pallet (9), arm (1) inboard. Install two bolts (10) and washers (11) in damper.

7.1. Torque bolts (10) to **23 inch-pounds**.

8. Remove nut (12), two washers (13 and 14), and bolt (15) from link (16).

9. Position arm (1) in link (16). Install bolt (15), two washers (14 and 13) and nut (12) in link and arm.



10. Torque nut (12) to **15 to 25 inch-pounds**. Install cotter pin (17).

11. Check bolt (15). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer (13) under nut (12) and repeat step 10.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform pitch or roll control operational check (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-124 INSTALL THRUST VISCOUS DAMPER 11-124

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

Epoxy Primer (E292)
Sealant (E327)
Pencil (E271)
Gloves (E184.1)

Parts:

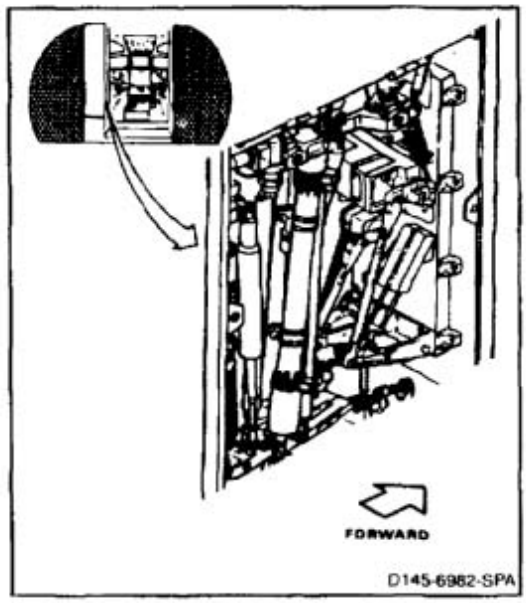
Cotter Pin

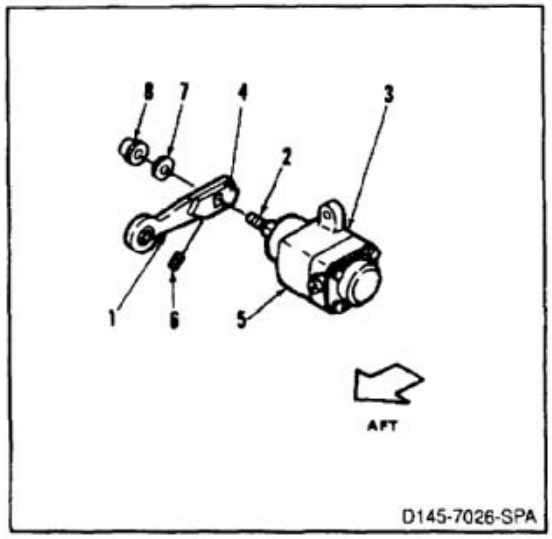
Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13





1. If arm (1) is a replacement, slide arm temporarily on shaft (2), arm away from mounting surface (3), and plate (4) to damper (5). Rotate arm fully down, mark position then position arm about mid-position. Arm shall be about **90°** to mounting surface of damage. Mark position of arm on damper. Use pencil (E271).
2. Remove arm (1) from shaft (2).
3. Remove setscrew (6) from plate (4).
4. Align marks on arm (1) and damper (5). Slide arm on shaft (2), plate (4) to damper. Install washer (7) and nut (8) on shaft. Remove marks from arm and damper.

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact wit skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

5. Apply coat of epoxy primer (E292) to setscrew (6). Wear gloves (E184.1) and goggles. Install setscrew in plate (4) of arm (1) while epoxy primer is wet.

WARNING

Sealant (E327) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

6. Apply coat of sealant (E327) on setscrew (6). Wear gloves (E184.1) and goggles.

INSPECT

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that the correct damper is installed in the thrust axis. Incorrect axis orientation will adversely affect force feel damping characteristics of the flight control system.

Ensure the proper damper arm assembly is installed. Arm assembly has shear rivets sized to specific load requirements in the event of a damper failure.

Ensure all hardware mounting the damper assembly to the pallet assembly is secure and that there is no evidence of loose pallet inserts.

Loose attachments within flight control secondary linkage will degrade aircraft control, missing components may cause loss of control.

CAUTION

Bushing must be link before installing bolt; otherwise, damage to component will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

7. Position damper (5) on pallet (9), arm (1) outboard. Install two bolts (10) and washers (11) in damper.

7.1. Torque bolts (10) to **23 inch-pounds**.

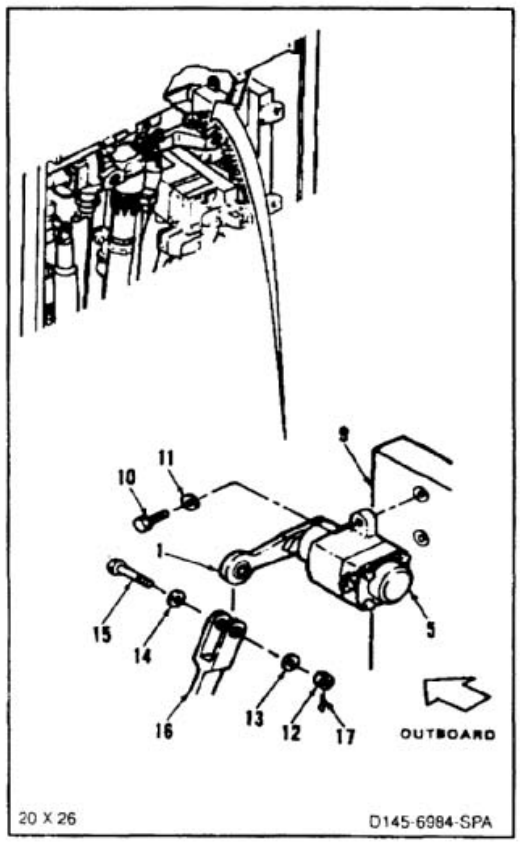
8. Remove nut (12), two washers (13 and 14) and bolt (15) from link (16).

9. Position arm (1) in link (16). Install bolt (15), two washers (14 and 13), and nut (12) in link and arm.

10. Torque nut (12) to **15 to 25 inch-pounds**. Install cotter pin (17).

11. Check bolt (15). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, and washer under nut and repeat step 10.

INSPECT



FOLLOW-ON MAINTENANCE:

Perform thrust control operational check (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-125 REMOVE THRUST OR PITCH VISCOUS DAMPER CONNECTING LINK 11-125

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

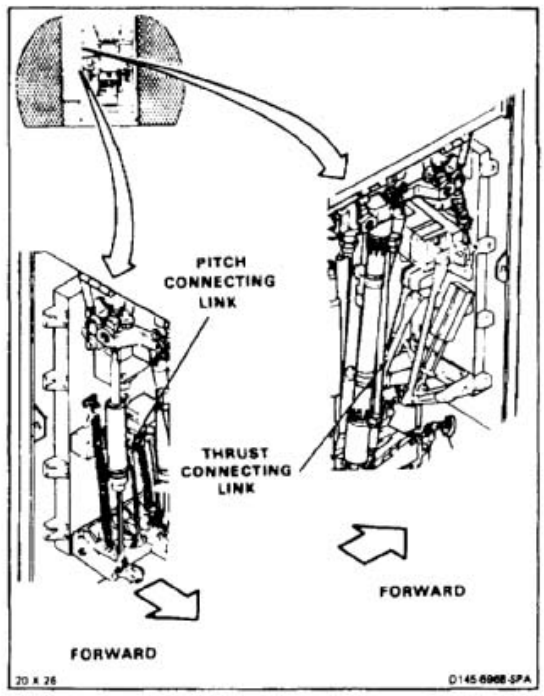
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)

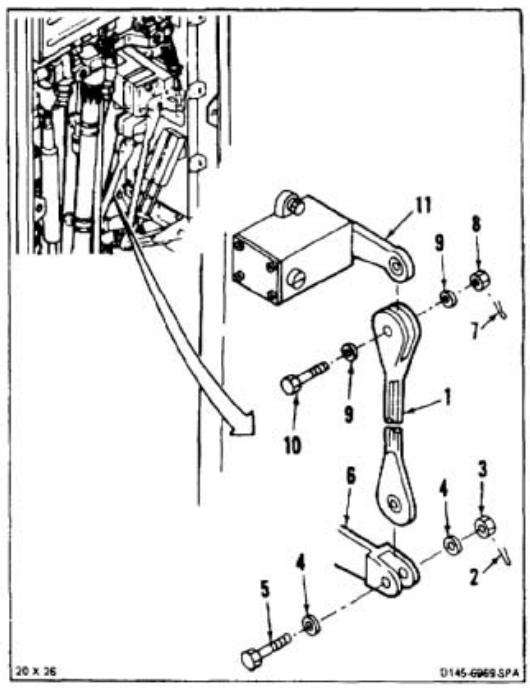


NOTE

If a crack in the connecting link is suspected during disassembly, refer to TM 1-1520-253-23.

NOTE

Procedure is same to remove thrust or pitch viscous damper connecting link. Thrust connecting link is shown here.



1. Tag thrust damper connecting link (1). Remove cotter pin (2), nut (3), two washers (4) and bolt (5), from idler bellcrank (6). Disconnect link from bellcrank.
2. Install bolt (5), two washers (4), and nut (3) loosely in bellcrank (6).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from link (1) and damper arm (11). Remove link.
4. Install bolt (10), two washers (9), and nut (8) loosely in arm (11).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-126 INSTALL THRUST OR PITCH VISCOUS DAMPER CONNECTING LINK 11-126

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 50 to 50 Inch-Pounds
Torque Wrench, 30 to 60 Inch-Pounds

Materials:

None

Parts:

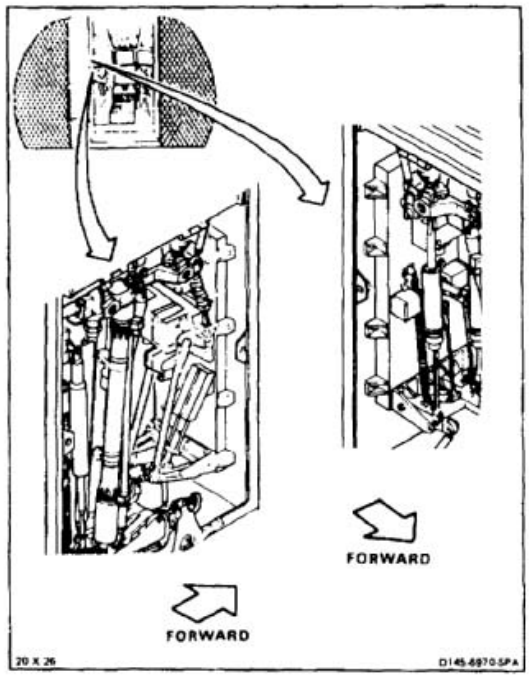
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure bearing is properly staked.

Ensure flanged and straight slip bushings are installed at clevis end of link assembly.

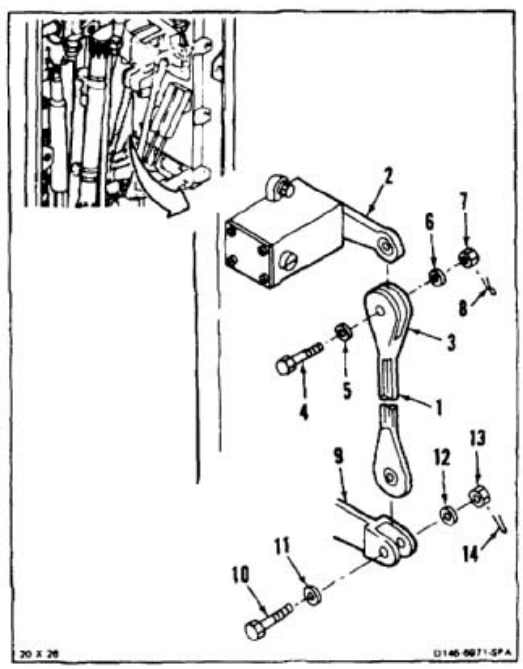
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.

NOTE

Procedure is same to install thrust or pitch viscous damper connecting link. Thrust connecting link is shown here.

Attaching bolts, washers, and nuts will be temporarily installed after removing transducer.



1. Position thrust damper connecting link (1) on damper arm (2), with clevis end (3) to arm. Install bolt (4), two washers (5 and 6), and nut (7).
2. Torque nut (7) to **15 to 25 inch-pounds**. Install cotter pin (8).
3. Position link (1) in bellcrank (9), move arm (2) to align. Install bolt (10), two washers (11 and 12) and nut (13). Remove tag from link.
4. Torque nut (13) to **30 to 45 inch-pounds**. Install cotter pin (14).
5. Check two bolts (4 and 10). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat steps 2 and 4.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform thrust or pitch control operational check (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install acoustic closet blanket (Task 2-108).

END OF TASK

11-127 REMOVE ROLL VISCOUS DAMPER CONNECTING LINK 11-127

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

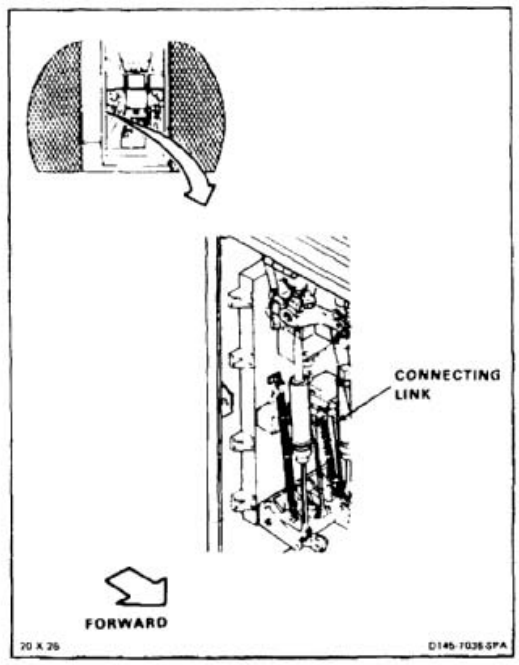
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

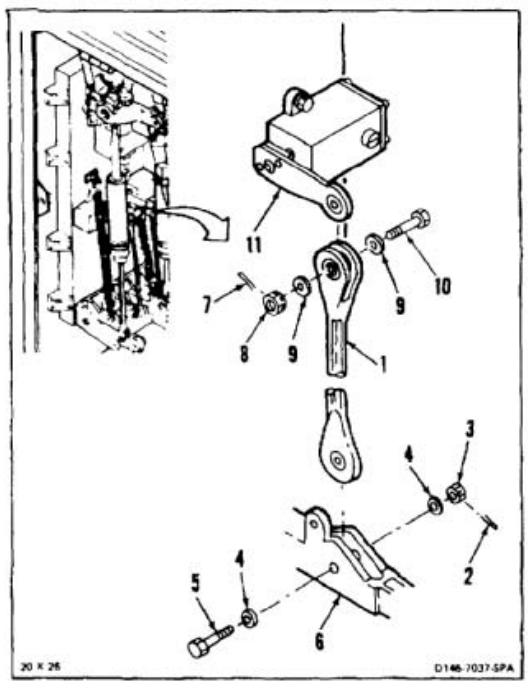
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



NOTE

If a crack in the connecting link is suspected during disassembly, refer to TM 1-1520-253-23.

1. Tag roll viscous damper connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5). Disconnect link from idler bellcrank (6).
2. Install bolt (5), two washers (4), and nut (3) loosely in bellcrank (6).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10). Remove link (1) from damper arm (11).
4. Install bolt (10), two washers (9), and nut (8), loosely in arm (11).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-128 INSTALL ROLL VISCOUS DAMPER CONNECTING LINK 11-128

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

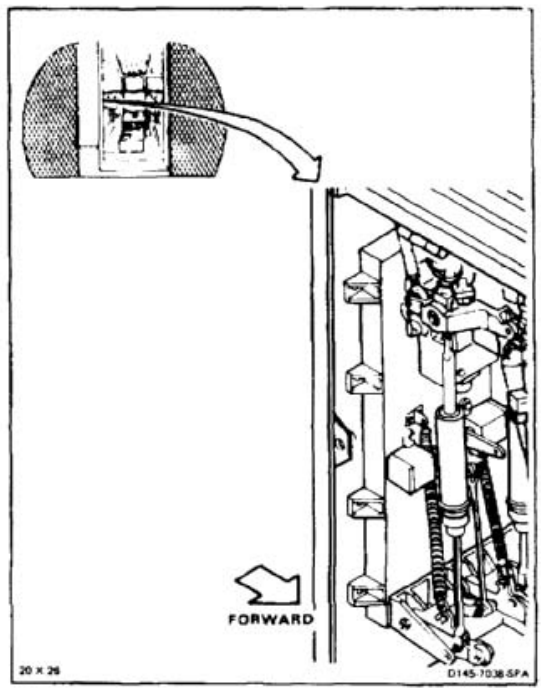
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Bushings must be in bellcrank and link before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from idler bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure bearing is properly staked.

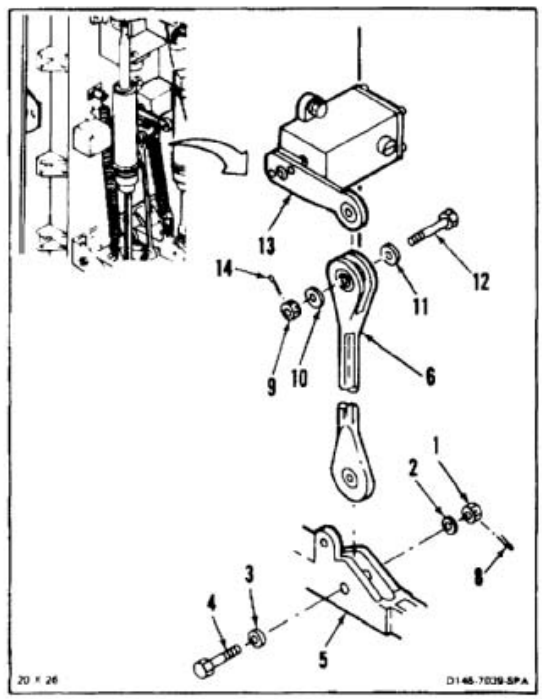
Ensure flanged and straight slip bushings are installed at clevis end of link assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position roll viscous damper connecting link (6) in bellcrank (5), lugs (7) in bellcrank. Install bolt (4), two washers (3 and 2), and nut (1).
3. Torque nut (1) to **30 to 45 inch-pounds**. Install cotter pin (8).
4. Remove nut (9), two washers (10 and 11) and bolt (12) from damper arm (13).
5. Position link (6) on arm (13). Move arm to align. Install bolt (12), two washers (11 and 10), and nut (9).
6. Torque nut (9) **15 to 25 inch-pounds**. Install cotter pin (14).
7. Check two bolts (4 and 12). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 3 or 6.

INSPECT



FOLLOW-ON MAINTENANCE:

Perform roll control operational check (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-129 REMOVE YAW VISCOUS DAMPER CONNECTING LINK 11-129

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

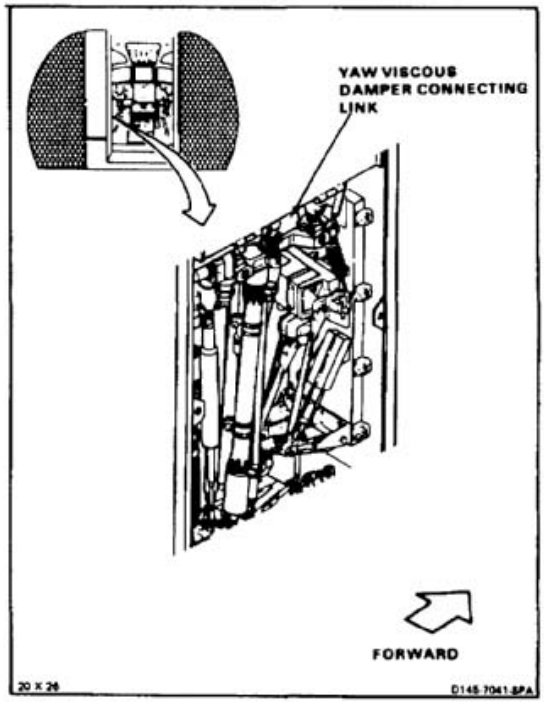
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

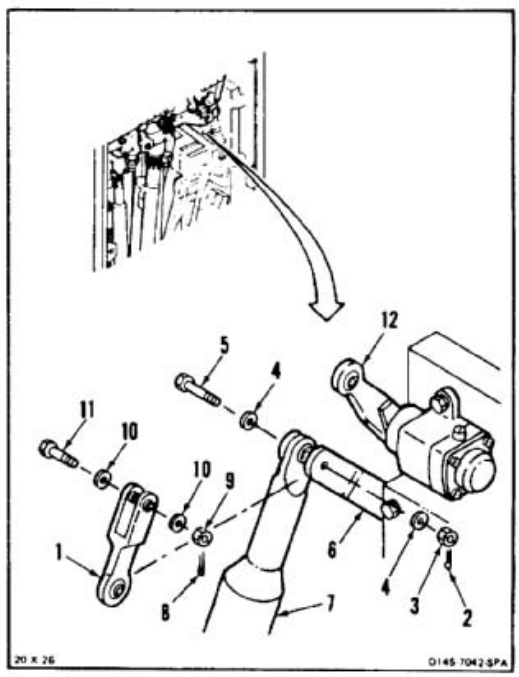
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



NOTE

If a crack in the connecting link is suspected during disassembly, refer to TM 1-1520-253-23.

1. Tag yaw viscous damper connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from magnetic brake arm (6). Disconnect link from arm.
2. Install bolt (5), two washers (4), and nut (3) loosely in arm (6) and spring assembly (7).
3. Remove cotter pin (8), nut (9), two washers (10), and bolt (11) from link (1) and damper arm (12). Remove link.
4. Install bolt (11), two washers (10), and nut (9) loosely in arm (12).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-130 INSTALL YAW VISCOUS DAMPER CONNECTING LINK 11-130

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

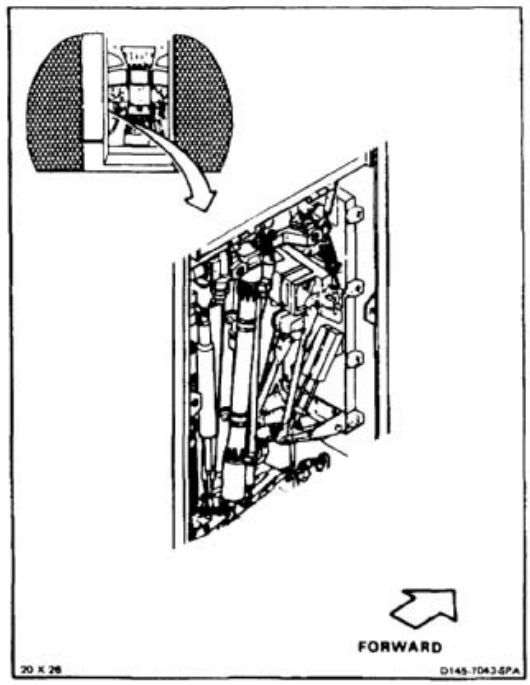
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Bushings must be in links before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from magnetic brake arm (5), and spring assembly (6).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

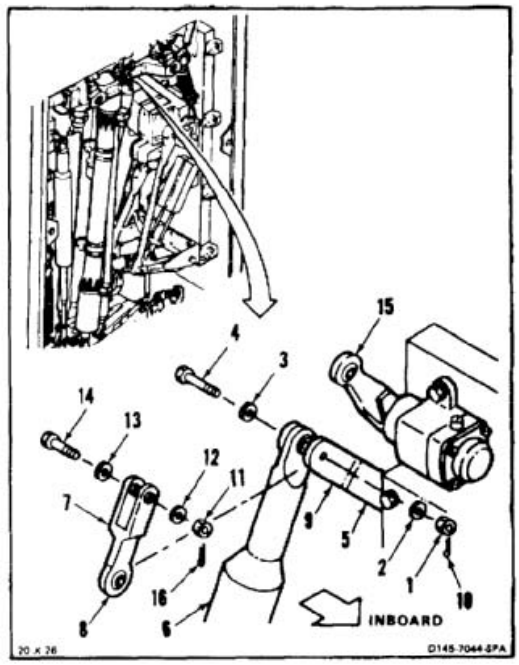
Ensure bearing is properly staked.

Ensure flanged and straight slip bushings are installed at clevis end of link assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position yaw viscous damper connecting link (7) yoke end (8), between spring (6) and inboard lug (9) of arm (5). Install bolt (4), two washers (3 and 2), and nut (1).
3. Torque nut (1) to **30 to 45 inch-pounds**. Install cotter pin (10).
4. Remove nut (11), two washers (12 and 13), and bolt (14) from damper arm (15).
5. Position link (7) on arm (15). Move arm to align. Install bolt (14), two washers (13 and 14) and nut (11). Remove tag from link.



6. Torque nut (11) to **15 to 25 inch-pounds**. Install cotter pin (16).
7. Check two bolts (4 and 14). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer (2 or 12) under nut (1 or 11) and repeat step 3 or 6.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform yaw control operational check (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-131 REMOVE THRUST BALANCE SPRING 11-131

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

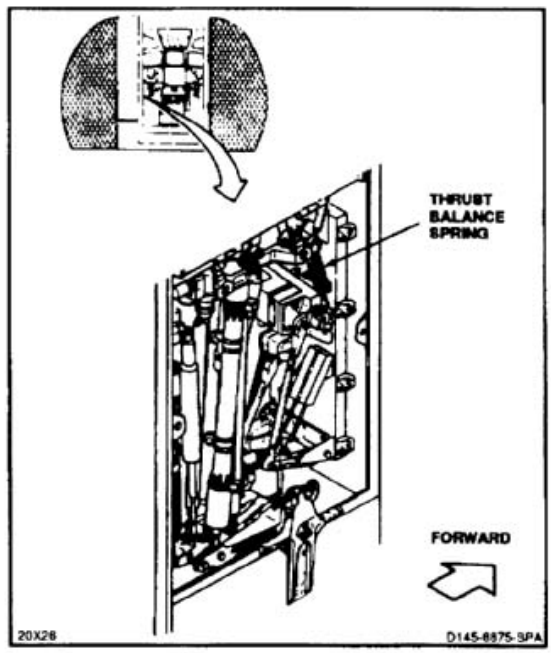
Pencil (E271)

Personnel Required:

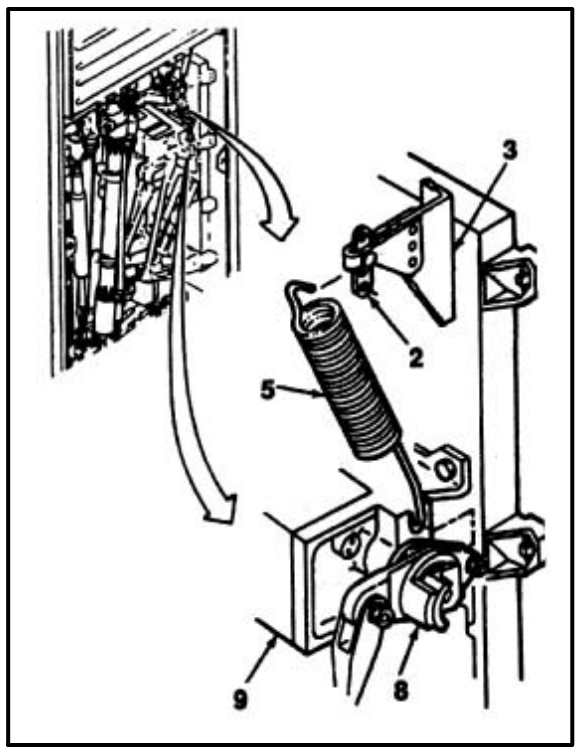
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Thrust CCD Actuator at Full Down Position (TM 55-1520-240-T)



1. Mark position of spring (5) in strap (2) of bracket (3). Use pencil (E271).
2. Pull spring (5) up from strap (2). Release spring (5).
3. Disconnect spring (5) from arm (8) of CCD actuator (9). Remove spring.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-131.1 REMOVE THRUST BALANCE SPRING BRACKET 11-131.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

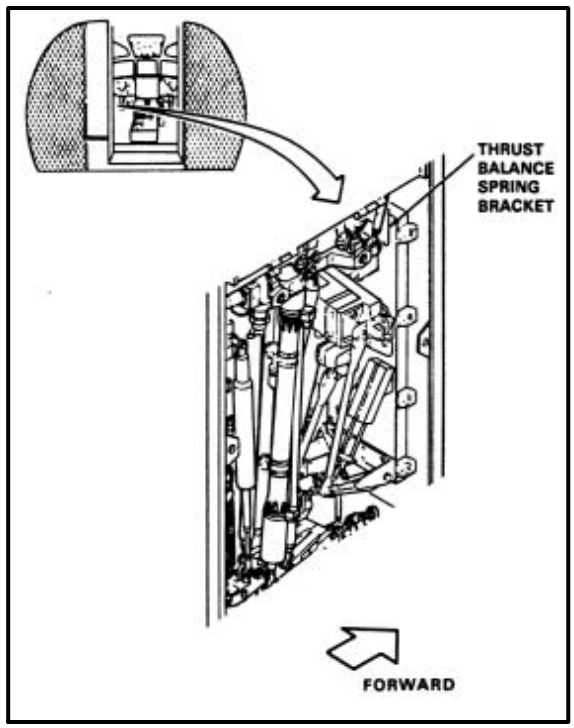
None

Personnel Required:

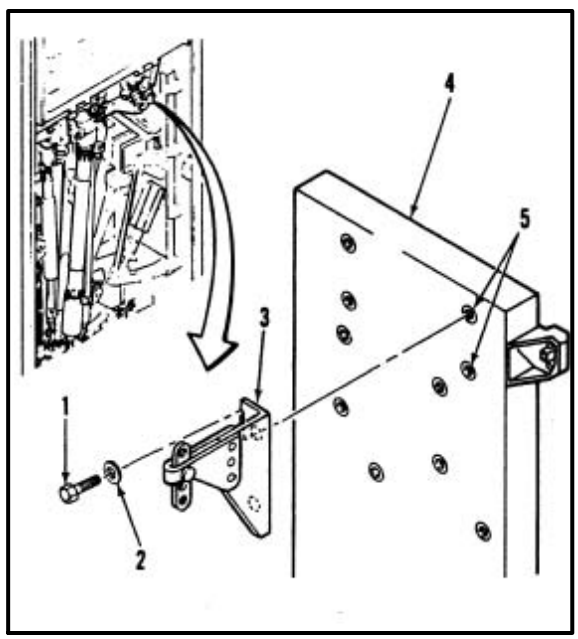
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Thrust Balance Spring Removed (Task 11-131)



1. Remove two bolts (1), two washers (2), and bracket (3) from pallet (4).
2. Inspect the pallet (4) for loose inserts (5).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-131.2 INSTALL THRUST BALANCE SPRING BRACKET 11-131.2

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

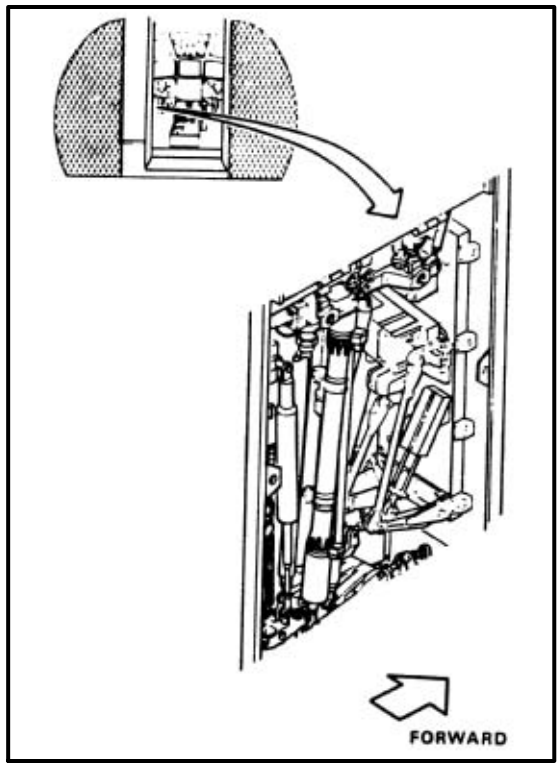
None

Personnel Required:

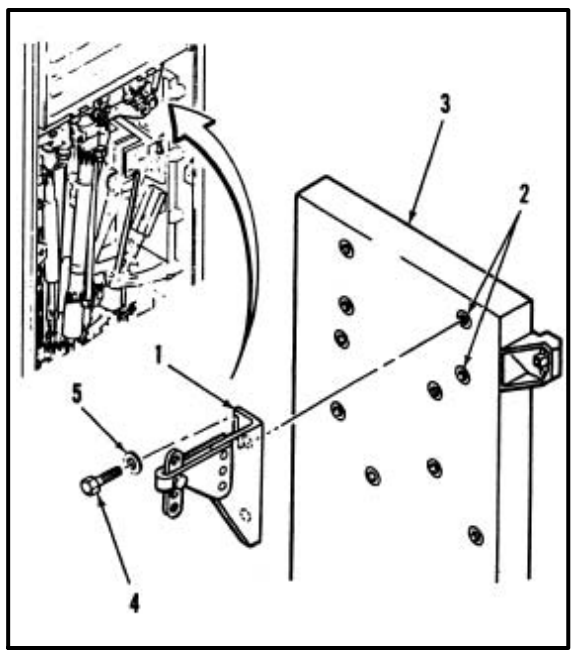
Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



1. Align bracket (1) with two inserts (2) on pallet (3). Install two bolts (4) and washers (5).
2. Torque bolts (4) to **45 inch-pounds**.



INSPECT

FOLLOW-ON MAINTENANCE:

Install thrust balance spring (Task 11-132).

END OF TASK

11-132 INSTALL THRUST BALANCE SPRING 11-132

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

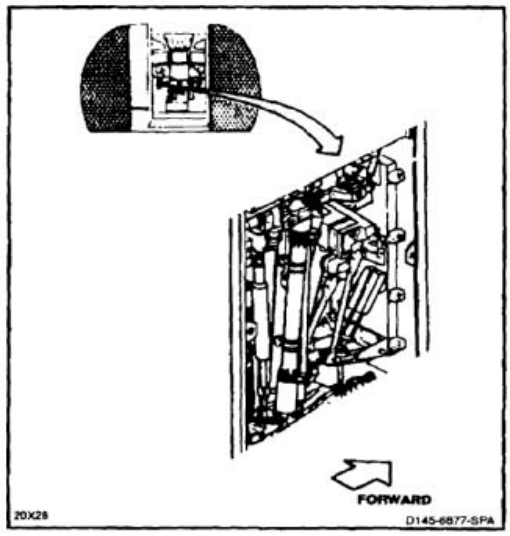
None

Personnel Required:

Medium Helicopter Repairer
Inspector

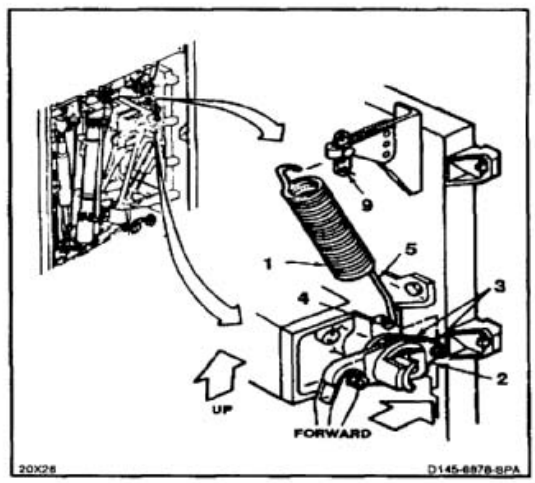
References:

TM 55-1520-240-23P



1. Connect spring (1) to CCD actuator arm (2) between lugs (3). Long end (4) of spring to arm and bend (5) in arm forward.
2. Connect spring (1) small end, to marked hole of strap (9).

INSPECT



FOLLOW-ON MAINTENANCE:

Perform operational check of flight controls (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Scale, 0 to 50 Pounds

Materials:

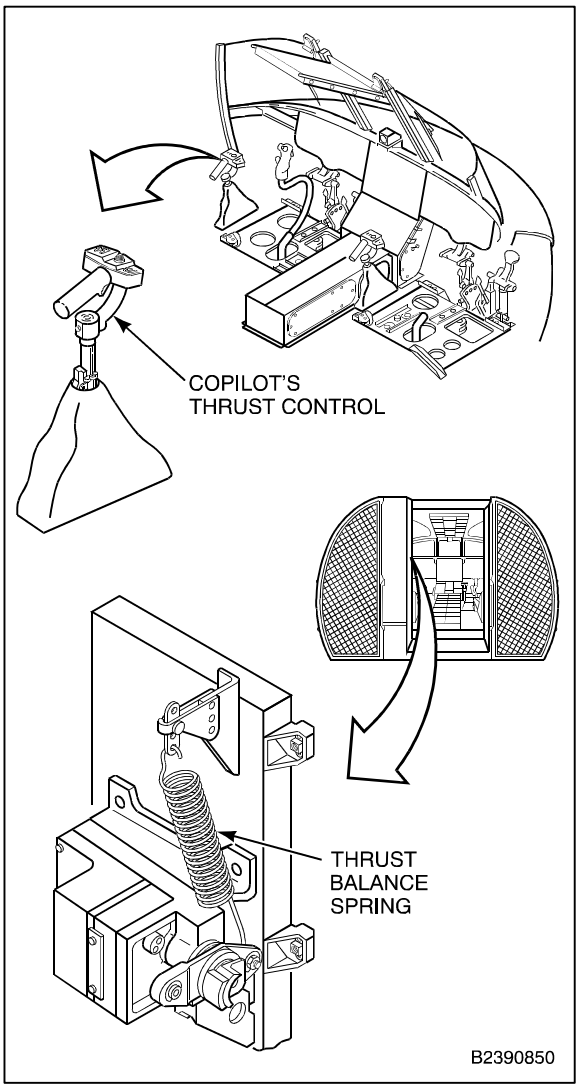
Straps (E376)

Personnel Required:

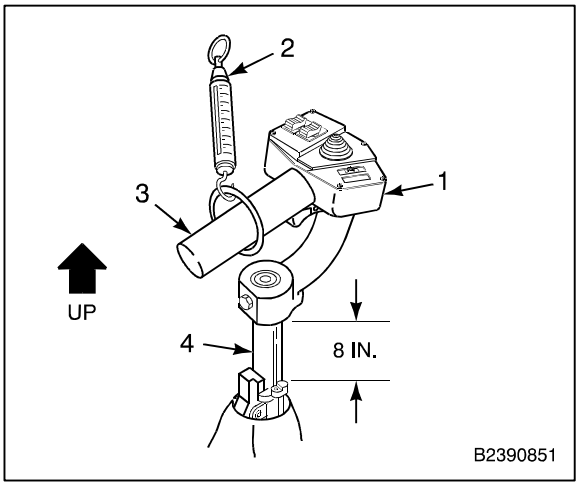
CH-47 Helicopter Repairer
Inspector

Equipment Condition:

Thrust Brake Circuit Breaker Open (TM 55-1520-240-T)
Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



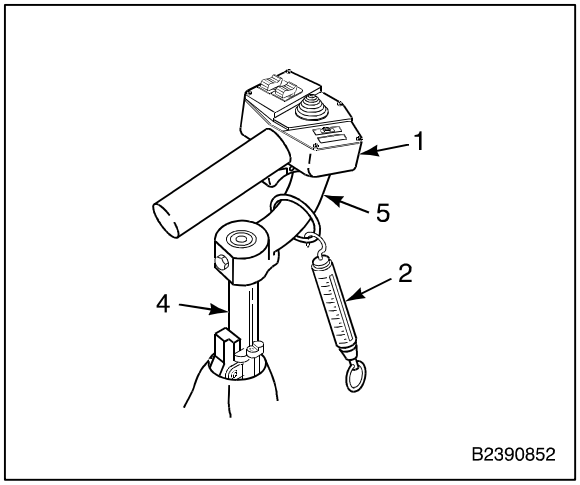
1. Position copilot's thrust control (1) fully down then pull up about **9 inches**.
2. Mount dial indicating scale (2) on grip (3) of control (1). Use strap (E376).
3. Position scale (2) at **0 pounds**. Align scale with shaft (4) of control (1). Pull scale up and measure force to move shaft. Record indication. Remove scale.



4. Mount scale (2) downward on tube (5) of control (1). Use strap (E376).
5. Repeat step 1.
6. Position scale (2) at **0 pounds**. Align scale with shaft (4) of control (1). Pull scale down and measure force to move shaft. Record force. Remove scale.

INSPECT

7. Check measured force from steps 3 and 6. Forces must not differ by more than **1.5 pounds**. If forces differ by more the **1.5 pounds** perform steps 8 and 9. If forces do not differ more than **1.5 pounds**, go to Follow-On Maintenance.

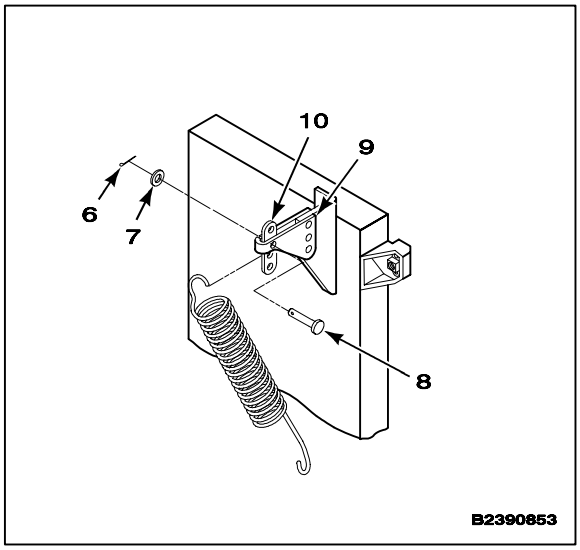


8. Remove cotter pin (6), washer (7), and pin (8) from bracket (9). Move strap (10) up one hole to increase force of step 1. Move strap (10) down one hole to decrease force of step 3.
9. Repeat steps 1 thru 7.

INSPECT

FOLLOW-ON MAINTENANCE:

Close thrust brake circuit breaker (TM 55-1520-240-T).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).



END OF TASK

11-134 REMOVE PITCH, ROLL OR YAW BALANCE SPRINGS 11-134

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

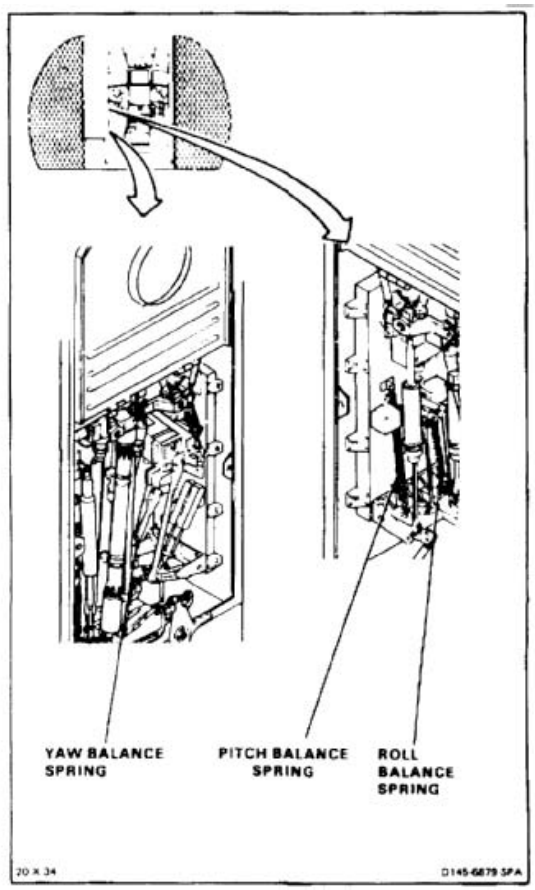
Pencil (E271)

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

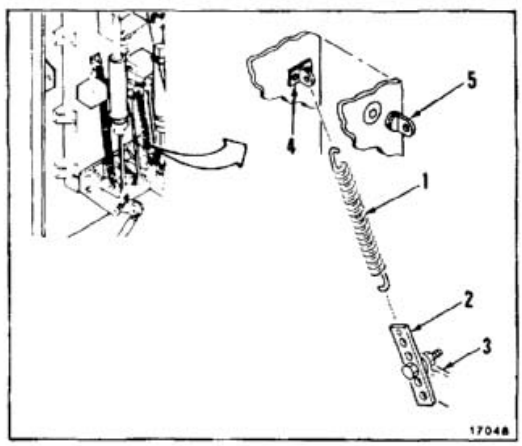
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



NOTE

Procedure is same to remove pitch, roll or yaw balance springs. Roll spring is shown here.

1. Mark position of balance spring (1) on strap (2). Use pencil (E271).
2. Disconnect spring (1) from strap (2) of idler bellcrank (3).
3. Disconnect spring (1) from pitch bracket (4) or roll, yaw bracket (5). Remove spring.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-134.1 REMOVE PITCH BALANCE SPRING BRACKET 11-134.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

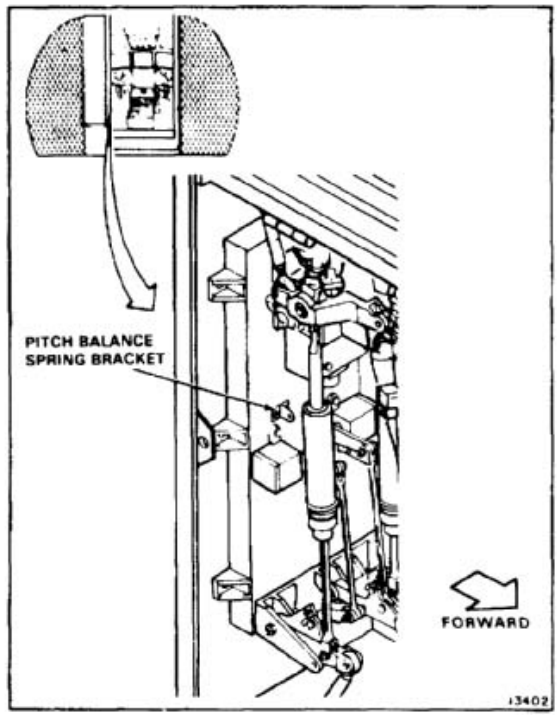
None

Personnel Required:

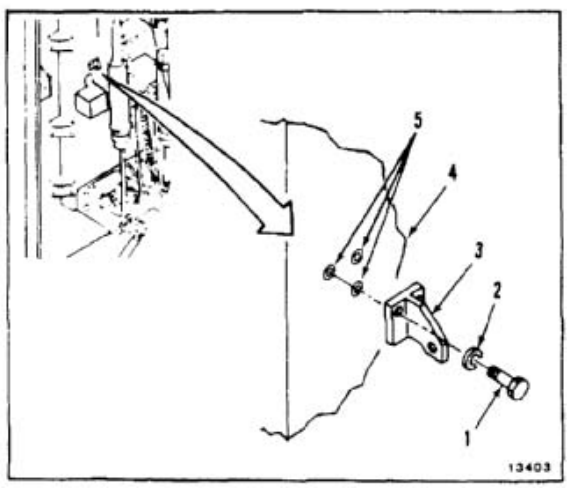
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Pitch Balance Spring Removed (Task 11-134)



1. Remove three bolts (1), three washers (2), and bracket (3) from pallet (4).
2. Inspect the pallet (4) for loose inserts (5).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-134.2 INSTALL PITCH BALANCE SPRING BRACKET 11-134.2

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

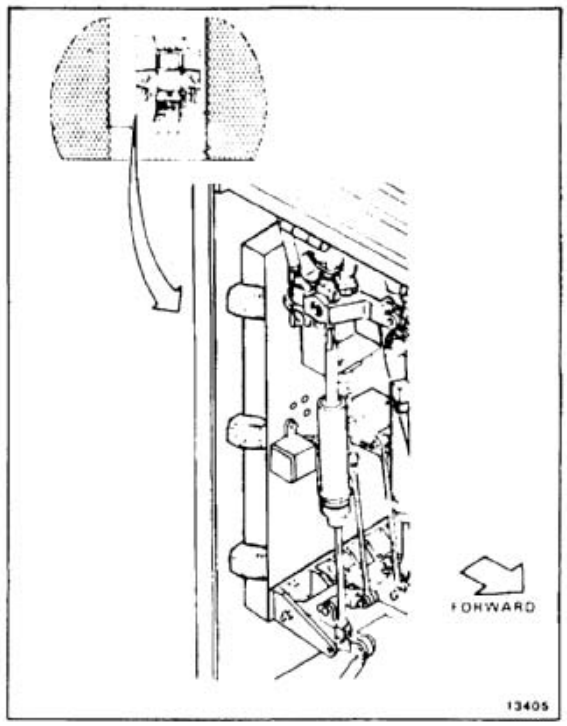
None

Personnel Required:

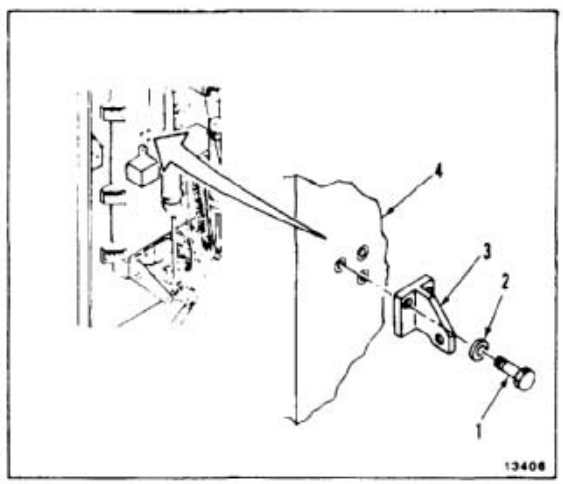
Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



1. Install bracket (3), three washers (2), and three bolts (1) on pallet (4).
2. Torque bolts (1) to **23 inch-pounds**.



FOLLOW-ON MAINTENANCE:

Install pitch balance spring (Task 11-135).

END OF TASK

11-135 INSTALL PITCH, ROLL OR YAW BALANCE SPRING 11-135

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

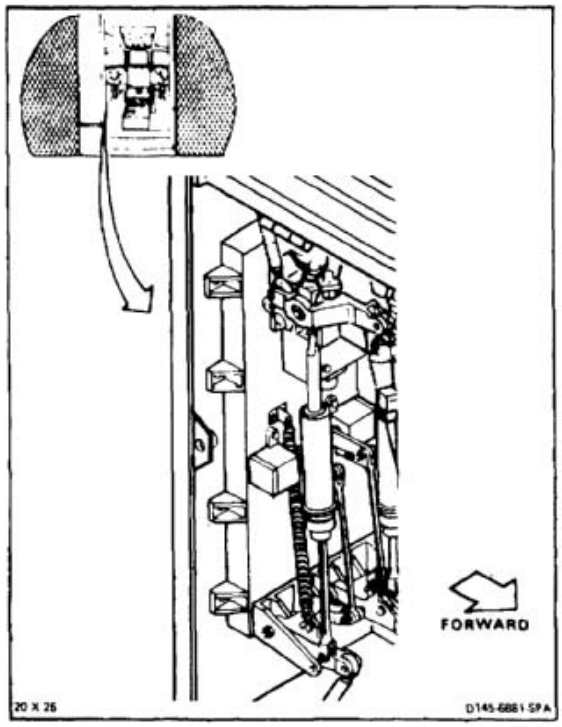
None

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



NOTE

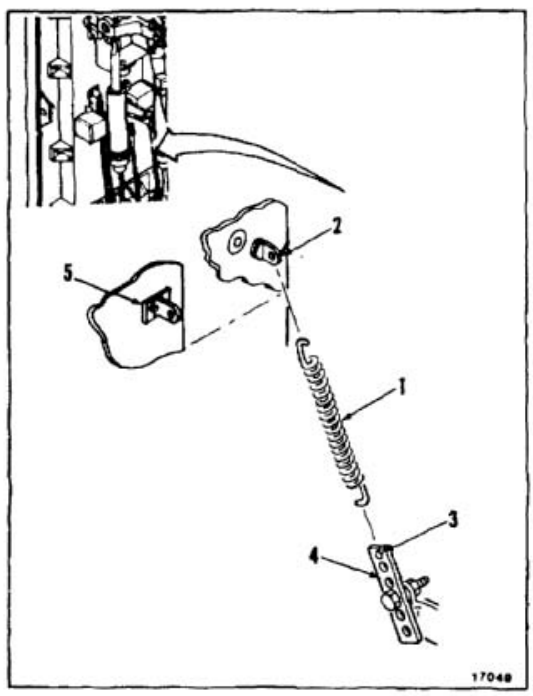
Procedure is same to install pitch, roll or yaw balance springs. Roll spring is shown here.

1. Connect balance spring (1) to either roll or yaw bracket (2) or pitch bracket (5).
2. Connect spring (1) to small hole (3) of strap (4).

INSPECT

FOLLOW-ON MAINTENANCE:

Perform operational check of flight controls (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).



END OF TASK

11-136 ADJUST YAW BALANCE SPRING 11-136

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Surface Gage

Materials:

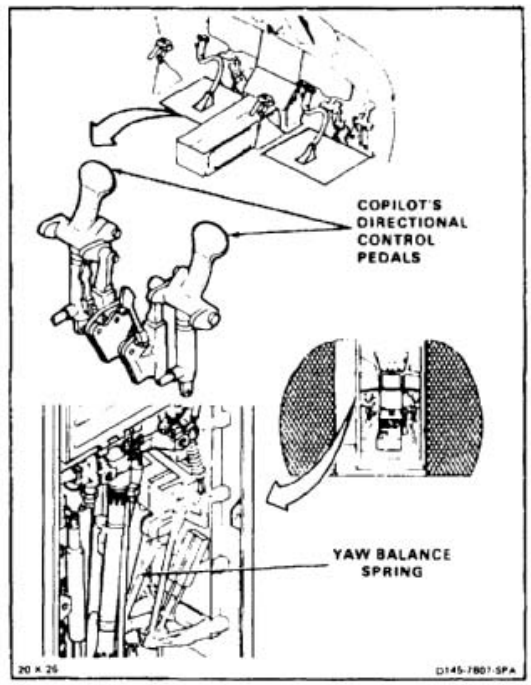
Pencil (E271)

Personnel Required:

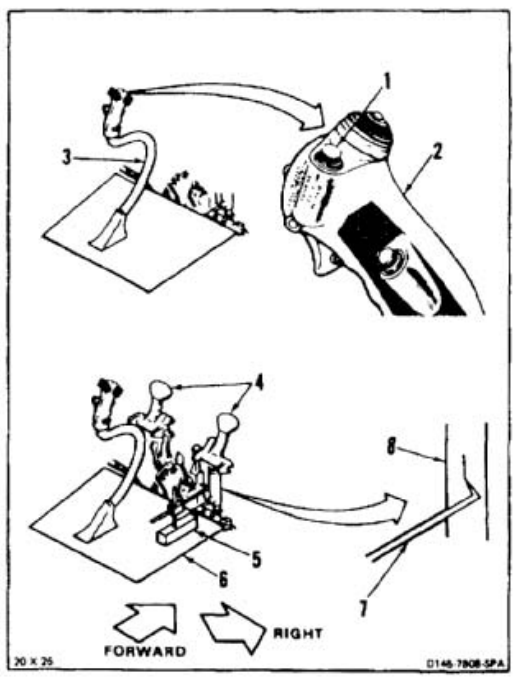
Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



1. Press CENTERING DEVICE RELEASE button (1) on grip (2) of copilot's control stick (3). Position copilot's and copilot's control pedals (4) in center adjustment hole.
2. Position surface gage (5) on cockpit floor (6) with scriber (7) near side of right pedal post (8). Mark position of scriber point on post with pencil. Use pencil (E271).
3. Press left pedal (4) fully forward. Release pedal.
4. Check right pedal (4). Pedal must return to marked position with no drift. If pedal returns to marked position with no drift, go to step 9. If pedal is forward or aft of marked position, perform steps 5 thru 9.
5. Repeat steps 2, 3, and 4 for left pedal.

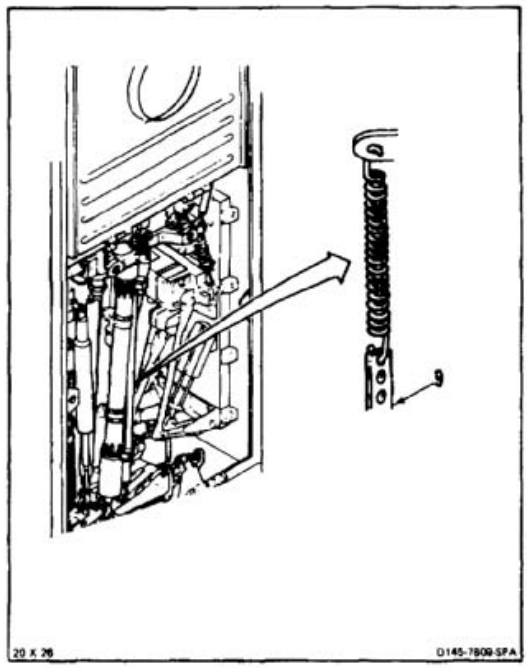


WARNING

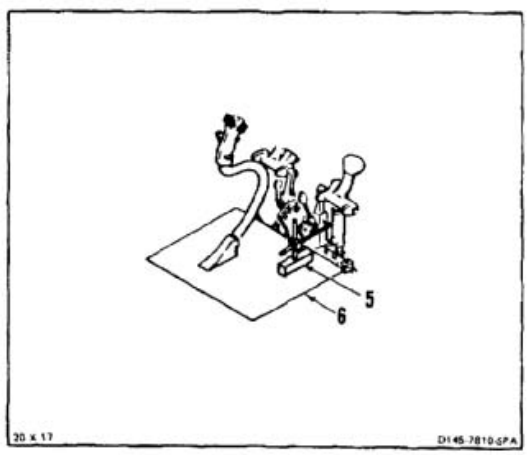
Hydraulic power must be removed before adjusting spring; otherwise, injury to personnel can occur.

6. Remove hydraulic power.
7. Working in closet, move strap (9) up one hole if drift is aft, and down one hole if drift is forward.
8. Apply hydraulic power.
9. Repeat steps 1 thru 4.

INSPECT



10. Remove surface gage (5) from cockpit floor (6).



FOLLOW-ON MAINTENANCE:

Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-137 ADJUST PITCH OR ROLL BALANCE SPRINGS 11-137

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Plumb Bob

Materials:

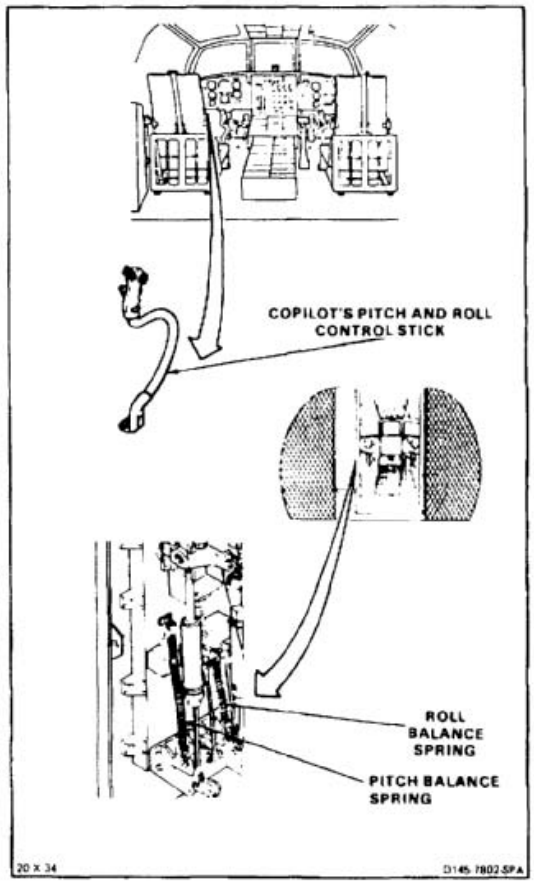
Masking Tape (E388)

Personnel Required:

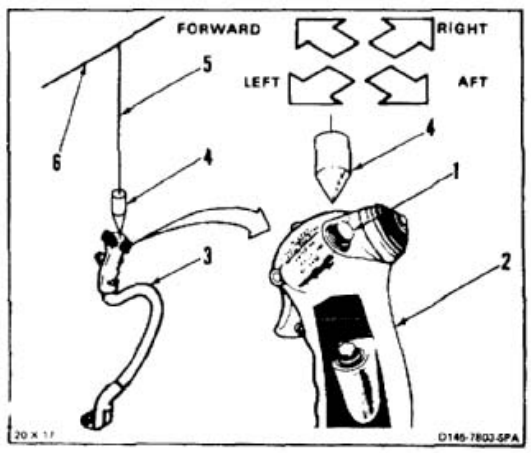
Medium Helicopter Repairer
Inspector

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)



1. Press CENTERING DEVICE RELEASE button (1) on grip (2) of copilot's control stick (3). Center control stick. Release button.
2. Position plumb bob (4) above and near grip (2). Hold plumb bob in place by taping cord (5) to cockpit ceiling (6). Use tape (E388).
3. Repeat step 1.
4. Check control stick (3). Stick must remain within **1 inch** of forward or aft, and right or left of center position. If stick does not move, go to step 12. If stick moves forward or aft perform steps 5 thru 8. If stick moves right or left, perform steps 9 thru 12.

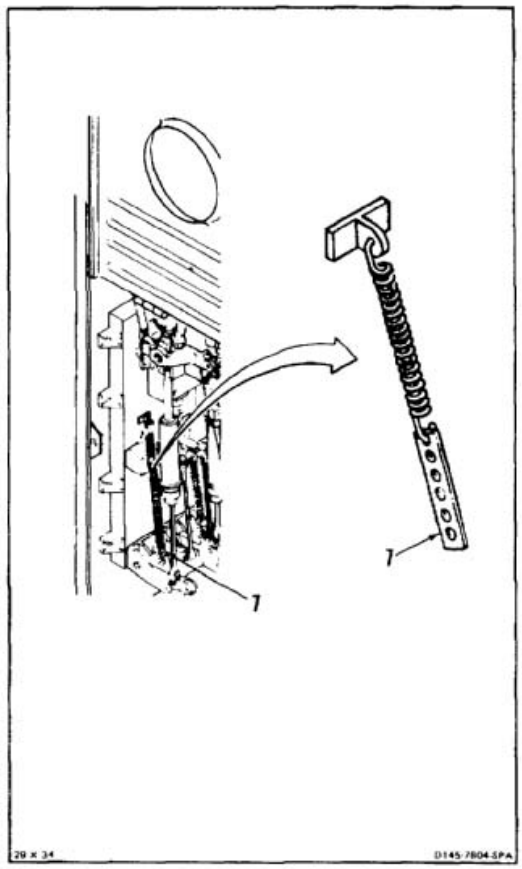


INSPECT

WARNING

Hydraulic power must be removed before adjusting spring; otherwise, injury to personnel can occur.

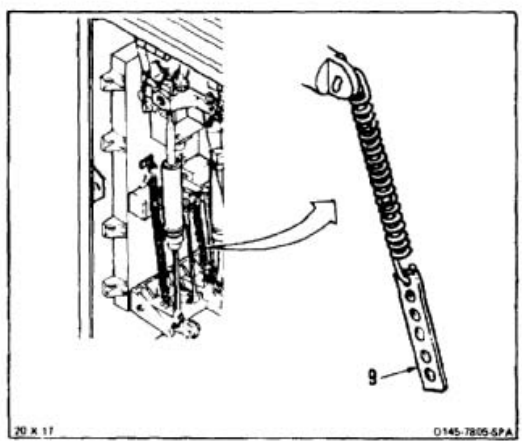
5. Remove hydraulic power.
6. Working in closet, move strap (7) up one hole if movement is aft and down one hole if movement is forward.
7. Apply hydraulic power.
8. Repeat steps 1 thru 4.



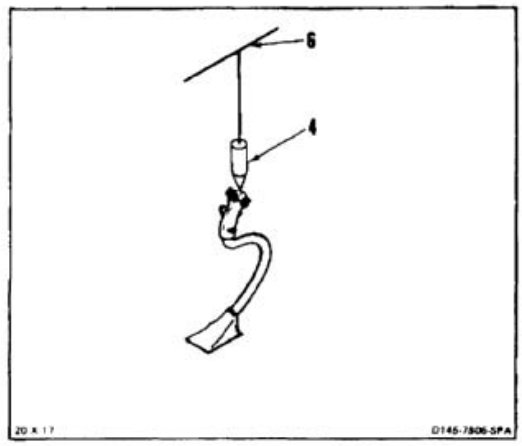
WARNING

Hydraulic power must be removed before adjusting spring; otherwise, injury to personnel can occur.

9. Remove hydraulic power.
10. Working in closet, move strap (9) up one hole if movement is left, and down one hole if movement is right.
11. Apply hydraulic power.
12. Repeat steps 1 thru 4.



13. Remove plumb bob (4) from cockpit ceiling (6).



FOLLOW-ON MAINTENANCE:

Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-138 REMOVE YAW, THRUST, ROLL OR PITCH VISCOUS DAMPER ARMS 11-138

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Pencil (E271)

Personnel Required:

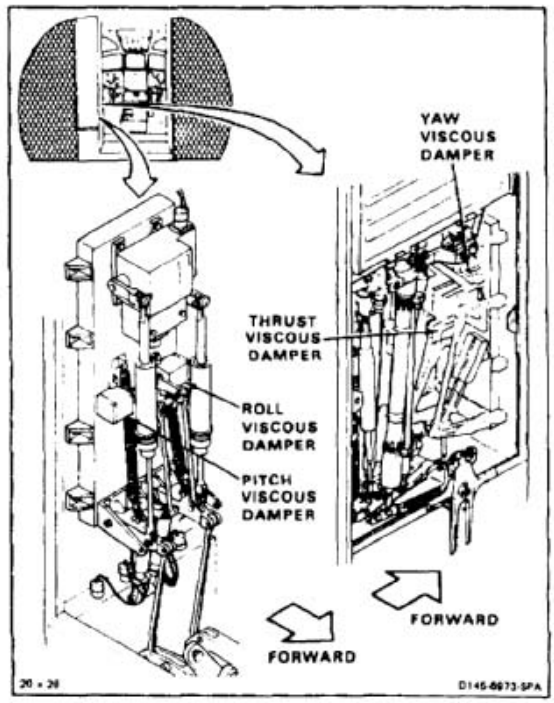
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)

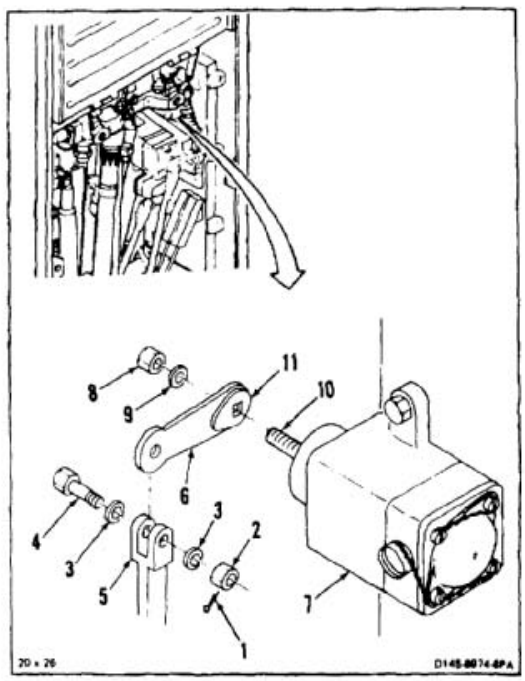


NOTE

Procedure is same to remove yaw, thrust, roll, or pitch viscous damper arms. Yaw damper arm is shown here.

NOTE

If a crack in the connecting link is suspected during removal, refer to TM 1-1520-253-23.



1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from link (5). Disconnect damper arm (6). Rotate arm up.
2. Install bolt (4), two washers (3), and nut (2), loosely in link (5).
3. Mark position of arm (6) on damper (7). Use pencil (E271).
4. Remove nut (8) and washer (9) from shaft (10).
5. Loosen setscrew (11) in arm (6). Slide arm from shaft (10).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-139 INSTALL YAW, THRUST, ROLL OR PITCH VISCOUS DAMPER ARMS 11-139

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-3234692
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

Pencil (E271)
Epoxy Primer (E292)
Sealant (E327)
Gloves (E184.1)

Parts:

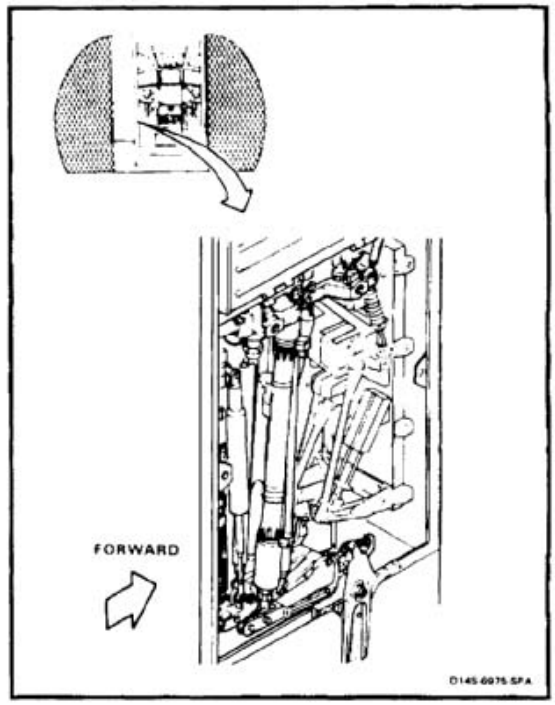
Cotter Pin

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

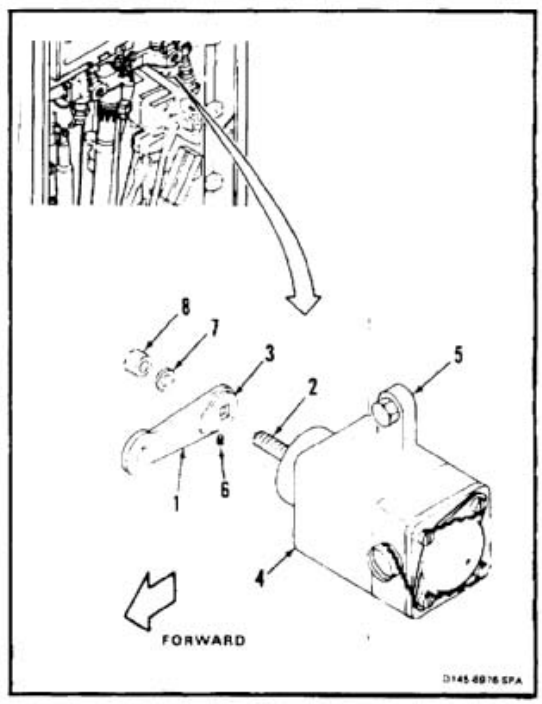
TM 55-1520-240-23P
Task 1-13



NOTE

Procedure is same to install yaw, thrust, roll and pitch viscous damper arms. Yaw damper arm is shown here.

1. If arm (1) is a replacement slide arm on shaft (2), arm forward and plate (3) to damper (4). Rotate arm fully up and fully down then position arm about mid-position. Arm shall be about **90°** to mounting surface (5) of damper. Mark position of arm on damper. Use pencil (E271).
2. Remove arm (1) from shaft (2).
3. Remove setscrew (6) from plate (3) on arm (1).
4. Align marks on arm (1) and damper (4). Slide arm on shaft (2), plate (3) to damper (4) and arm forward. Install washer (7) and nut (8) on shaft. Remove marks from arm and damper.



WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

5. Apply coat of epoxy primer (E292) to setscrew (6). Wear gloves (E184.1). Use goggles to protect eyes. Install setscrew in plate (3) of arm (1) while epoxy primer is wet.

WARNING

Sealant (E327) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

6. Apply coat of sealant (E327) on setscrew (6). Use goggles to protect eyes. Wear gloves (E184.1).

INSPECT

CAUTION

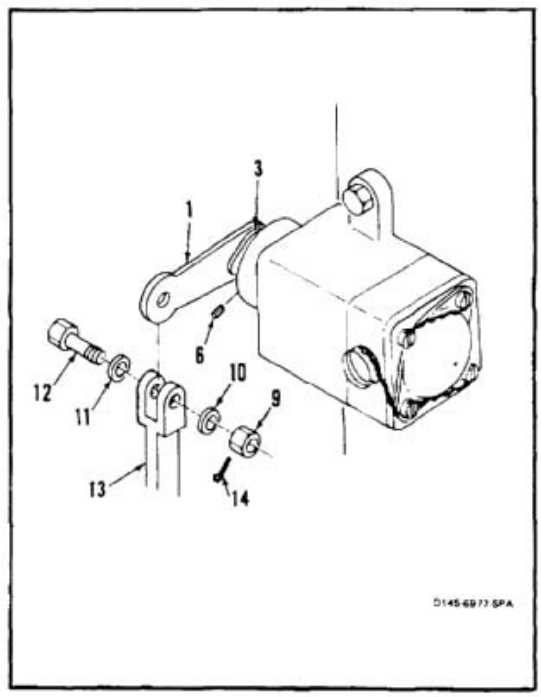
Bushings must be in link before installing bolt; otherwise, damage to component will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

7. Remove nut (9), two washers (10 and 11), and bolt (12) from link (13).

8. Position arm (1) in link (13). Install bolt (12), two washers (11 and 10) and nut (9) in link and arm.



9. Torque nut (9) to **15 to 25 inch-pounds**. Install cotter pin (14).

10. Check bolt (12). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness, if bolt rotates or is loose, add washer under nut and repeat step 9.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform yaw, thrust, roll, or pitch control operational check (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-140 REMOVE YAW SPRING ASSEMBLY 11-140

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tag (E264)

Personnel Required:

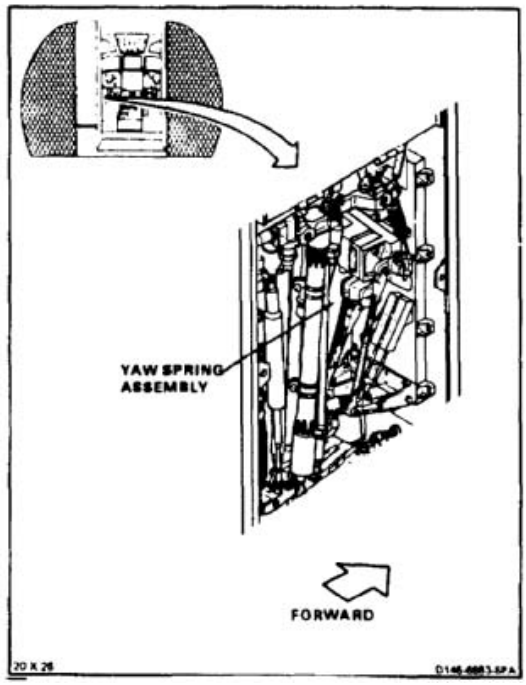
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

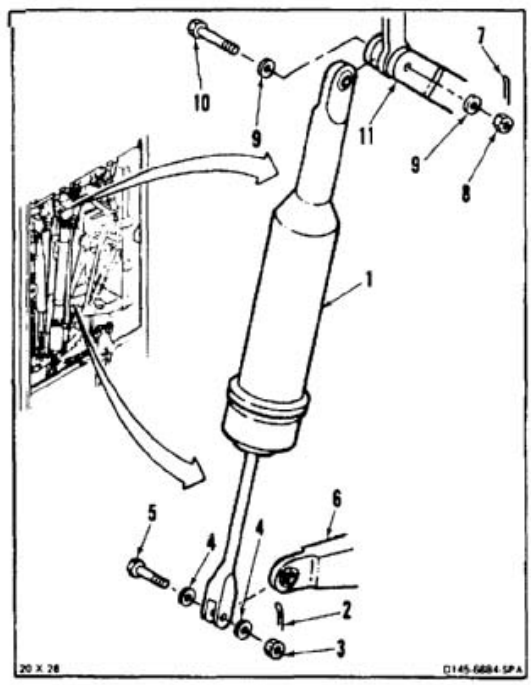
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Yaw Magnetic Brake at Neutral (TM 55-1520-240-T)



NOTE

If a crack in the bellcrank is suspected during removal, refer to TM 1-1520-253-23.

1. Tag yaw spring assembly (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from idler bellcrank (6). Disconnect spring from bellcrank.
2. Install bolt (5), two washer (4), and nut (3) loosely in bellcrank (6).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from magnetic brake arm (11). Remove spring (1).
4. Install bolt (10), two washers (9), and nut (8) loosely in arm (11).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-141 REMOVE PITCH OR ROLL SPRING ASSEMBLY 11-141

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

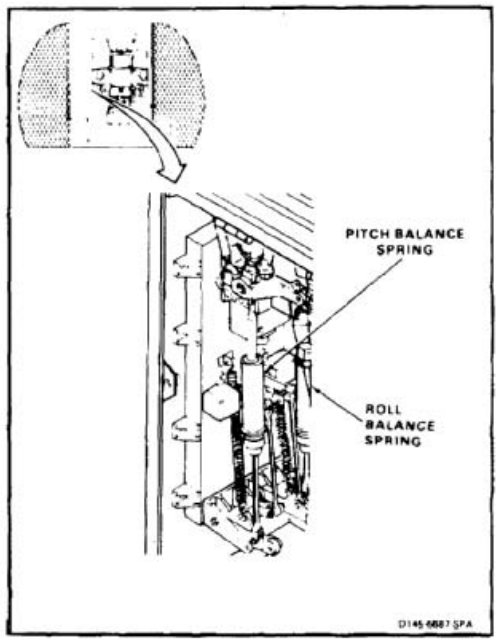
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Pitch CCD Actuator or Roll Magnetic Brake at Neutral (TM 55-1520-240-T)



NOTE

Procedure is same, except as noted, to remove pitch or roll spring assemblies. Pitch spring is shown here.

NOTE

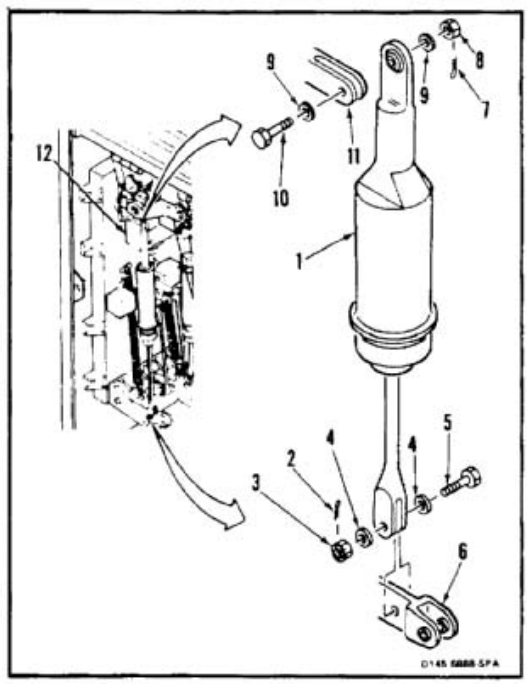
If a crack in the bellcrank is suspected during removal, refer to TM 1-1520-253-23.

1. Tag pitch spring assembly (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from idler bellcrank (6). Disconnect spring from bellcrank.
2. Install bolt (5), head inboard relative to pallet, two washers (4), and nut (3) loosely in bellcrank (6).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from arm (11) of CCD actuator (12). Remove spring (1).

NOTE

Roll spring assembly is removed from arm of roll magnetic brake.

4. Install bolt (10), head outboard relative to pallet, two washers (9), and nut (8) loosely in arm (11).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-142 DISASSEMBLE PITCH, ROLL OR YAW SPRING ASSEMBLY (AVIM) 11-142

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Soft Jawed Vise
Arbor Press

Materials:

Paper Tags (E264)

Personnel Required:

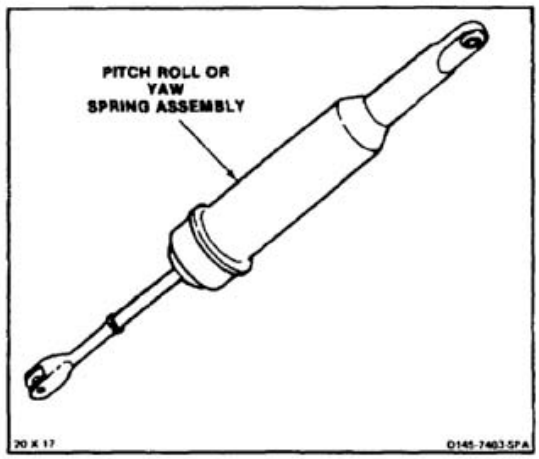
Medium Helicopter Repair

References:

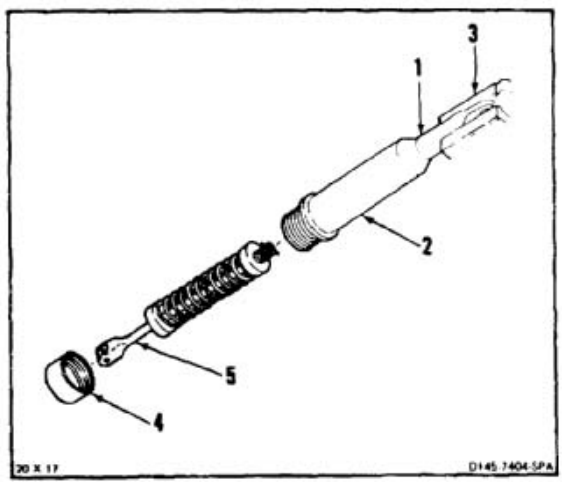
TM 55-1500-322-24

Equipment Condition:

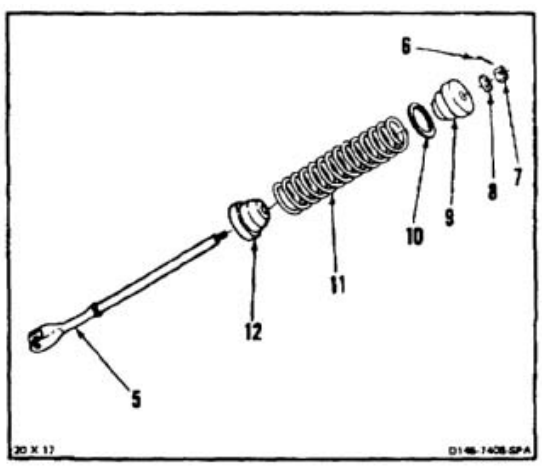
Off Helicopter Task



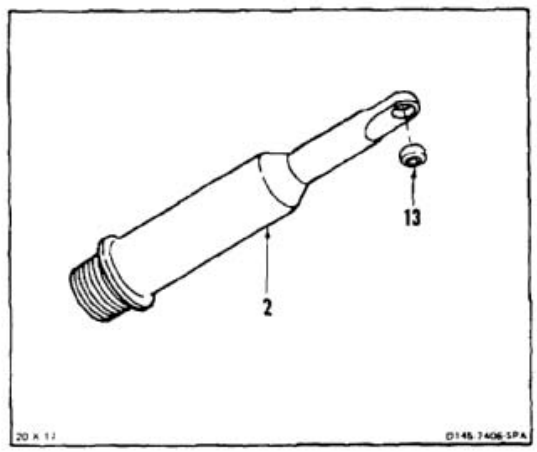
1. Clamp bearing end (1) of housing (2) in vise (3).
2. Remove lockwire from end cap (4).
3. Remove cap (4) from housing (2). Turn cap counterclockwise.
4. Pull rod (5) outward from housing (2). Remove rod from housing.
5. Remove housing (2) from vise (3).



6. Remove cotter pin (6), nut (7), and washer (8) from rod (5).
7. Remove piston (9), shims (10), spring (11), and piston (12) from rod (5). Tag and record number of shims.



8. Remove bearing (13) from housing (2) (TM 55-1500-322-24). Use arbor press.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-143 ASSEMBLE PITCH, ROLL OR YAW SPRING ASSEMBLY (AVIM) 11-143

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Soft Jawed Vise
Arbor Press
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Roller Staking Tool, NSN 5120-00-311-5446
Crowsfoot, 1-1/4 Inch

Materials:

Epoxy Primer (E292)
Cloths (E120)
Lockwire (E231)
Gloves (E184.1)
Dry Cleaning Solvent (E162)
Antiseize Thread Compound (E76)

Parts:

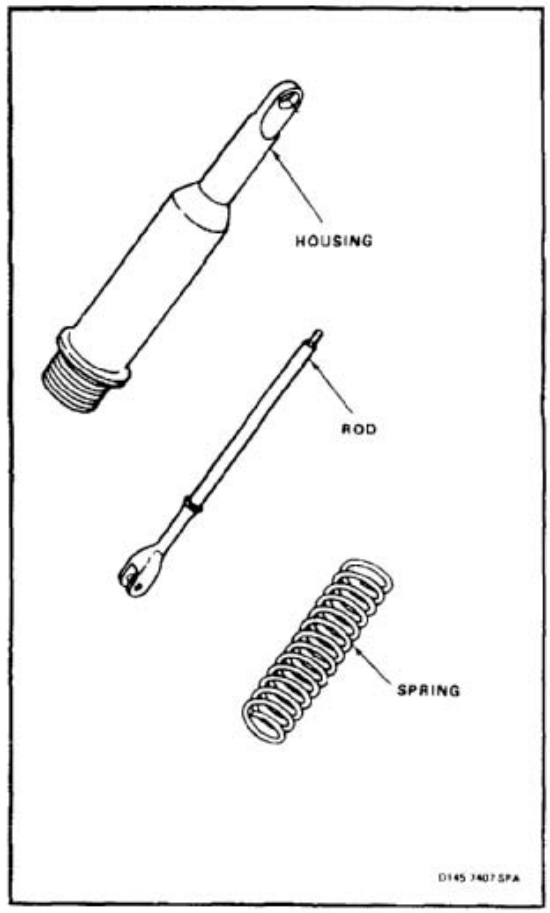
Cotter Pin

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

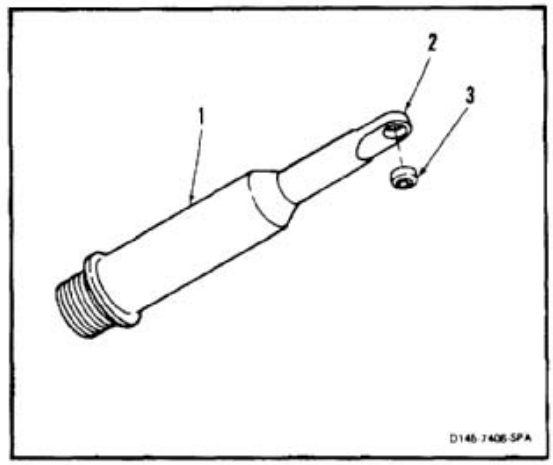
TM 55-1520-240-23P
TM 55-1500-322-24



WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



1. Clean bearing (3) and bearing surface with dry cleaning solvent (E162). Use cloths (E120). Wear gloves (E184.1) and goggles.
2. Apply coat of epoxy primer (E292) on housing (1) bearing surface (2). Install bearing (3) in housing while primer is wet. Use arbor press. Use cloth (E120) to remove excess primer. Wear gloves (E184.1) and goggles.
3. Stake bearing (3) (TM 55-1500-322-24) in housing (1). Use roller staking tool.

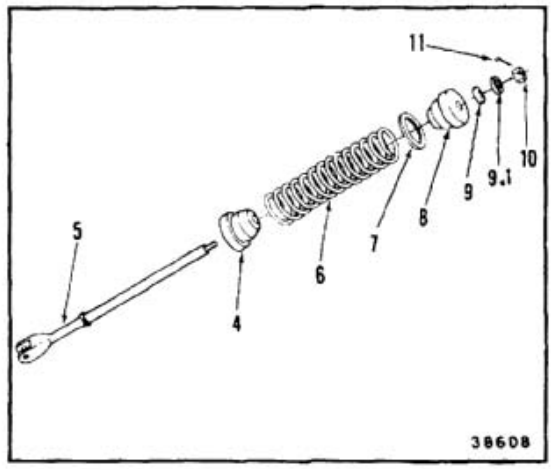
CAUTION

Do not lubricate any parts of spring assembly, except as noted; otherwise, component malfunction can occur.

NOTE

Wipe all components with dry cloth (E120).

4. Install piston (4) large diameter inward, on rod (5).
5. Install spring (6) on rod (5).
6. Remove tag from shims (7). Install shims on rod.
7. Install piston (8) small diameter inward, on rod (5).
8. Install washer (9) and nut (10) on rod (5). Torque nut to **25 inch-pounds**. Continue tightening to align cotter pin holes. Do not exceed **35 inch-pounds**. Install an AN960-416(L) washer (9.1) between washer (9) and nut (10) as required to align cotter pin (11). Install cotter pin (11).

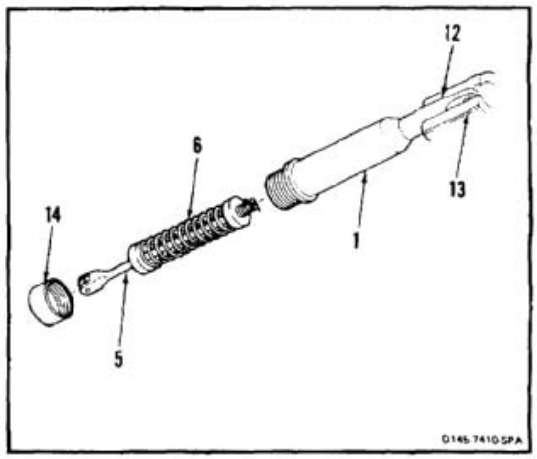


9. Clamp bearing end (12) of housing (1) in vise (13).
10. Install rod (5), spring (6) inward, in housing (1).

WARNING

Antiseize thread compound (E76) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

11. Apply a thin coat of antiseize thread compound (E76) to threads of cap (14). Use gloves (E184.1). Install cap (14) on housing (1). Torque cap to **135 inch-pounds**.
12. Lockwire cap (14) to housing (1). Use lockwire (E231).
13. Remove housing (1) from vise (13).



INSPECT

FOLLOW-ON MAINTENANCE:

Adjust spring assembly (Task 11-145).

END OF TASK

11-144 TEST PITCH, ROLL OR YAW SPRING ASSEMBLY (AVIM) 11-144

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Push/Pull Scale, 0 to 50 Pounds
Soft Jawed Vise

Materials:

None

Parts:

Bolt
Nut

Personnel Required:

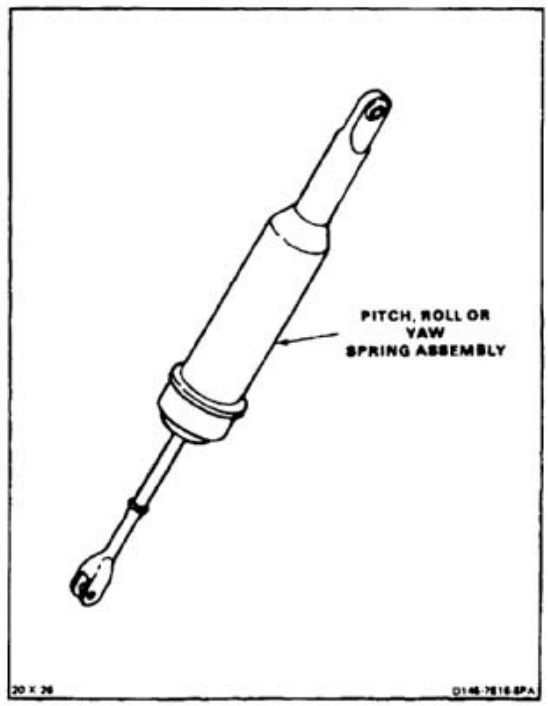
Medium Helicopter Repairer
Inspector

References:

Task 11-145

Equipment Condition:

Off Helicopter Task



CAUTION

Do not lubricate any parts of spring assembly, except as noted; otherwise, component malfunction can occur.

1. Clamp bearing end (1) of spring assembly housing (2) in vise (3).
2. Install bolt (4) and nut (5) loosely in rod (6).
3. Hook dial indicating scale (7) on bolt (4) between lugs (8) of rod (6).
4. Align scale (7) with rod (6). Pull scale and measure force as rod just starts to move. Force must be as follows:

PITCH Spring Assembly	ROLL Spring Assembly	YAW Spring Assembly
7.38 to 9.02 pounds	3.37 to 4.13 pounds	15.3 to 18.7 pounds

If force is correct, go to step 9. If force is more or less, perform steps 5, 6, 7, and 8.

5. Repeat step 4, pushing scale (7).

INSPECT

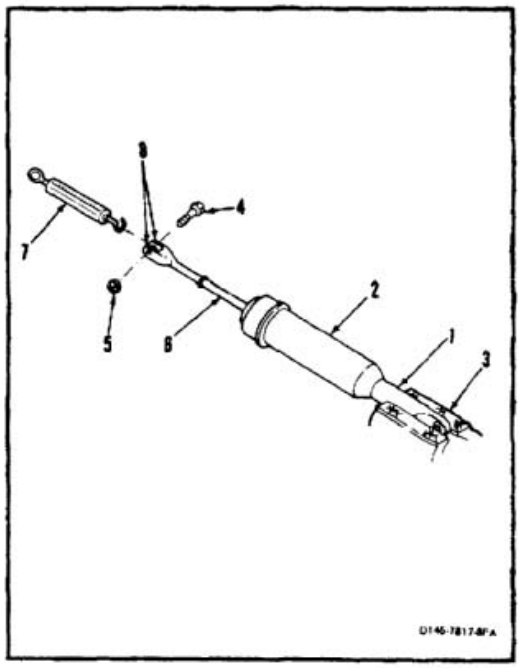
6. Remove scale (7), nut (5), and bolt (4) from rod (6).
7. Adjust spring assembly (Task 11-145).
8. Repeat steps 1 thru 4.

INSPECT

9. Remove scale (7), nut (5), and bolt (4) from rod (6).
10. Remove housing (2) from vise (3).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-145 ADJUST PITCH, ROLL OR YAW SPRING ASSEMBLY (AVIM) 11-145

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Soft Jawed Vise
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Lockwire (E231)
Cloth (E120)
Gloves (E184.1)
Antiseize Thread Compound (E75)

Parts:

Shim Washers
Cotter Pin

Personnel Required:

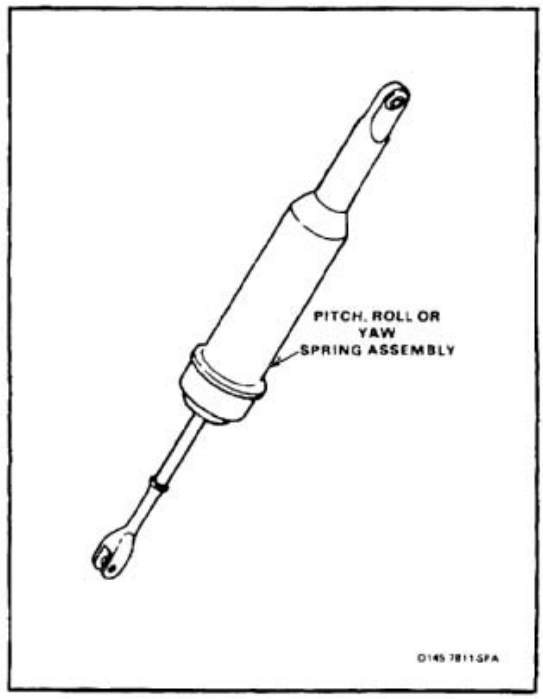
Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 11-144

Equipment Condition:

Off Helicopter Task
Pitch, Roll or Yaw Spring Assembly Tested (Task 11-144)

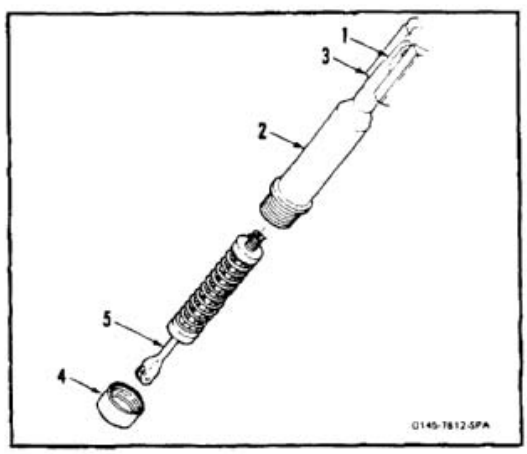


CAUTION

Do not lubricate any parts of spring assembly, except as noted; otherwise, component malfunctions can occur.

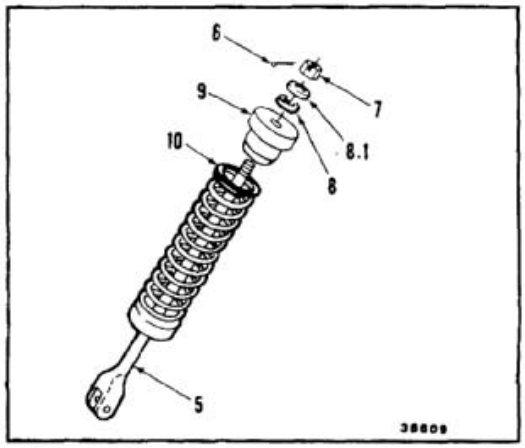
NOTE

Wipe all components with dry cloth (E120).



1. Clamp bearing end (1) of housing (2) in vise (3).
2. Remove lockwire from end cap (4).
3. Remove cap (4) from housing (2). Turn cap counterclockwise.
4. Pull rod (5) outward from housing (2). Remove rod from housing.

5. Remove cotter pin (6), nut (7), washer (8), piston (9), and shims (10), from rod (5). If spring force is high, remove shims as required. If spring force is low, add shims as required.



NOTE

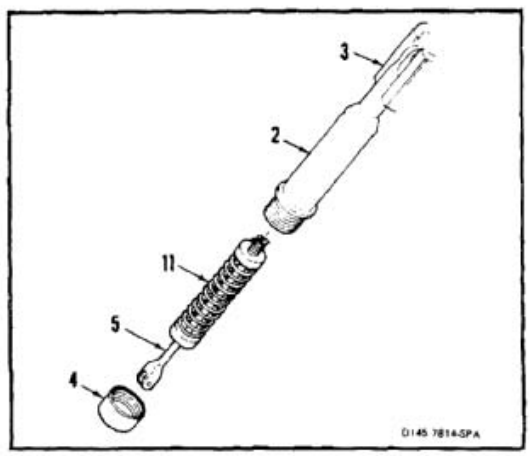
One shim changes spring force as follows:

PITCH	ROLL	YAW
0.42 pounds	0.31 pounds	0.94 pounds

6. Install shims (10), piston (9), washer (8), and nut (7). Torque nut to **25 to 35 inch-pounds**. Install an AN960-416(L) washer (8.1) between washer (8) and nut (9) as required to align cotter pin, install cotter pin (6).

INSPECT

7. Install rod (5), spring (11), inward in housing (2).



WARNING

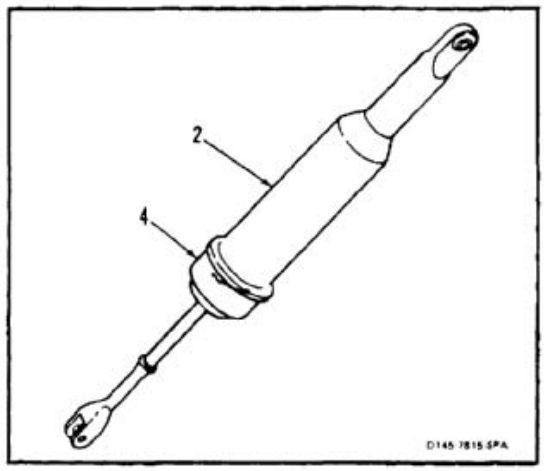
Antiseize thread compound (E75) can form toxic vapors if exposed to flame. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

8. Apply a thin coat of antiseize thread compound (E75) to threads of cap (4). Use gloves (E184.1). Install cap (4) on housing (2). Torque cap to **135 inch-pounds**.

INSPECT

9. Remove housing (2) from vise (3).

10. Test spring assembly (Task 11-144).
11. Lockwire cap (4) to housing (2). Use lockwire (E231).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-146 INSTALL YAW SPRING ASSEMBLY 11-146

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

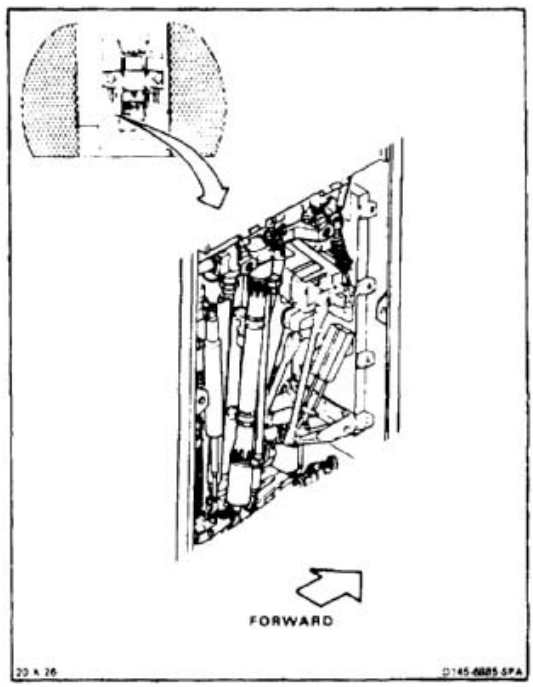
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Make sure bushings are in bellcranks before installing bolts or component damage will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from magnetic brake arm (5).
2. Position lug (6) of yaw spring assembly (7) in arm (5) between link (8) and outboard lug (9) of arm.
3. Install bolt (4), two washers (3 and 2), and nut (1) in arm (5). Do not torque nut at this time.
4. Remove nut (10), two washers (11 and 12), and bolt (13) from idler bellcrank (14).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure yaw spring assembly is installed in the yaw axis. Incorrect axis orientation will adversely affect force feel damping characteristics of the flight control system.

Ensure bearing is properly staked and secure in the housing.

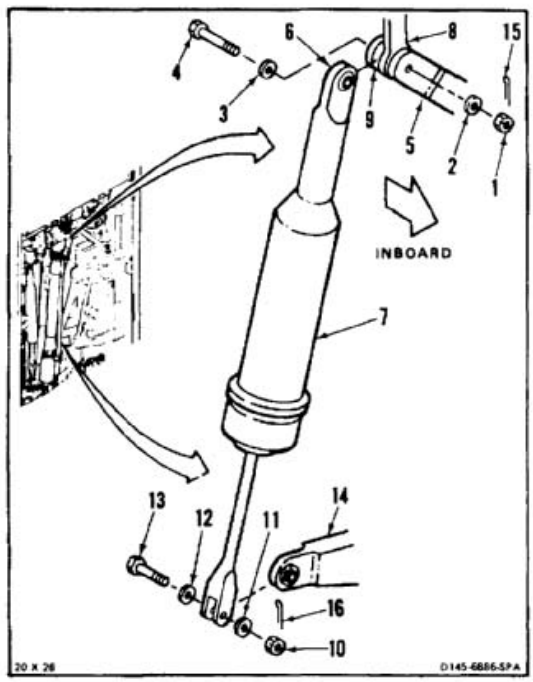
Ensure threaded end cap is secured to the housing including installation of lockwire.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control, missing components may cause loss of control.

5. Position spring (7) on bellcrank (14). Install bolt (13), two washers (12 and 11), and nut (10). Remove tag from spring.
6. Torque two nuts (1 and 10) to **30 to 45 inch-pounds**. Install two cotter pins (15 and 16).
7. Check two bolts (4 and 13). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolts rotate or are loose add washer under nut and repeat step 6.

INSPECT



FOLLOW-ON MAINTENANCE:

Perform operational check of flight controls (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-147 INSTALL PITCH OR ROLL SPRING ASSEMBLIES 11-147

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

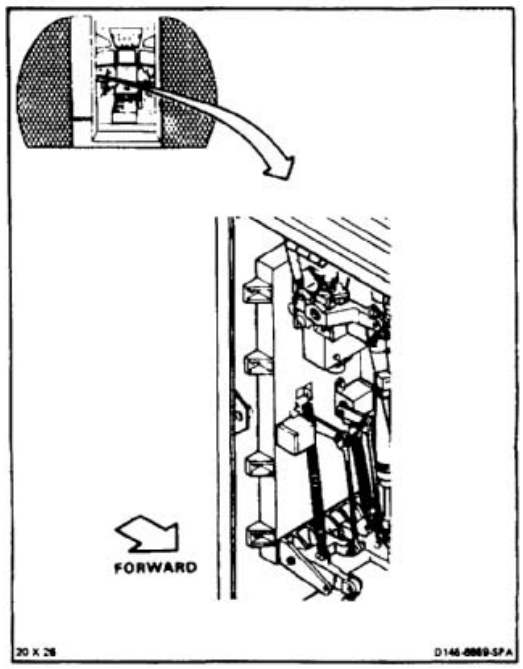
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Make sure bushings are in bellcranks before installing bolts or component damage will result.

NOTE

Procedure is same to install pitch or roll spring assemblies. Pitch spring is shown here.

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from CCD actuator arm (5).
2. Position lug (6) of pitch spring assembly (7) in arm (5). Install bolt (4) two washers (3 and 2), and nut (1). Do not torque nut at this time.

NOTE

Roll spring assembly is installed in arm of roll magnetic brake.

3. Remove nut (8), two washers (9 and 10), and bolt (11) from idler bellcrank (12).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure pitch spring is installed in the pitch axis. Incorrect axis orientation will adversely affect flight controls force feel characteristics.

Ensure bearing is properly staked and secure in the housing.

Ensure threaded end cap is secured to the housing including installation of lockwire.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components may cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

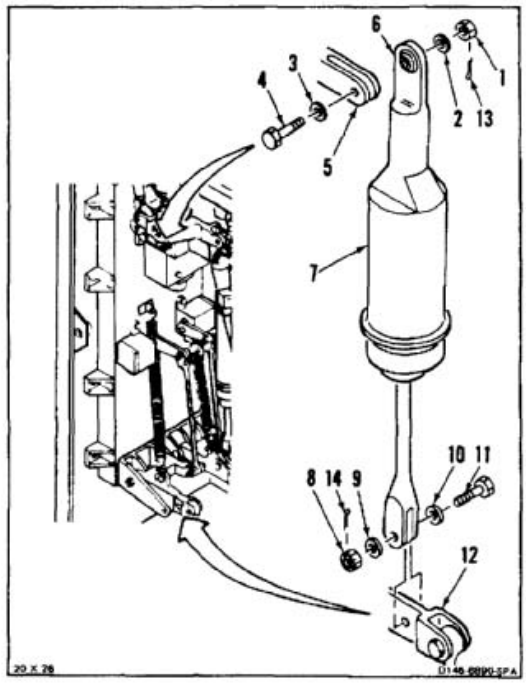
Ensure roll spring is installed in the roll axis. Incorrect axis orientation will adversely affect flight controls force feel characteristics.

Ensure bearing is properly staked and secure in the housing.

Ensure threaded end cap is secured to the housing including installation of lockwire.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components may cause loss of control.



4. Position spring (7) on bellcrank (12). Install bolt (11), two washers (10 and 9), nut (8). Remove tag from spring.
5. Torque two nuts (1 and 8) to **30 to 45 inch-pounds**. Install two cotter pins (13 and 14).
6. Check two bolts (4 and 11). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolts rotate or are loose, add washer under nut and repeat step 5.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform operational check of flight controls (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-148 REMOVE YAW MAGNETIC BRAKE 11-148

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

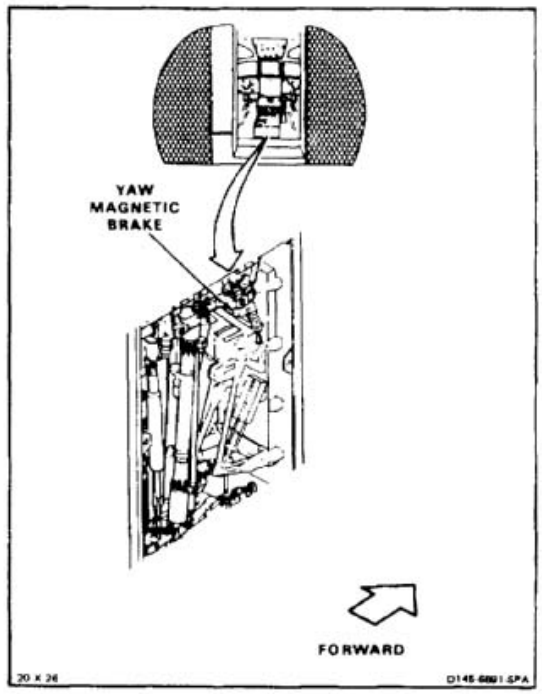
Medium Helicopter Repairer

References:

TM 1-1520-253-23

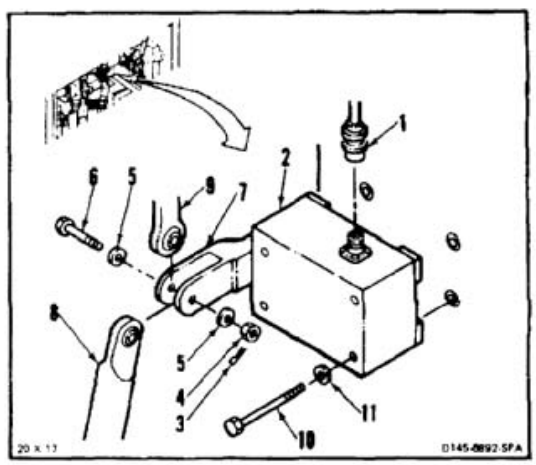
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Yaw Magnetic Brake at Neutral (TM 55-1520-240-T)



NOTE

If a crack in the connecting link is suspected during removal, refer to TM 1-1520-253-23.



1. Tag and disconnect connector (1) from yaw magnetic brake (2).
2. Remove cotter pin (3), nut (4), two washers (5), and bolt (6) from arm (7) of brake (2).
3. Disconnect spring (8) and link (9) from arm (7).
4. Remove four bolts (10) and washers (11) from brake (2). Remove brake.

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-149 REMOVE ROLL MAGNETIC BRAKE 11-149

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

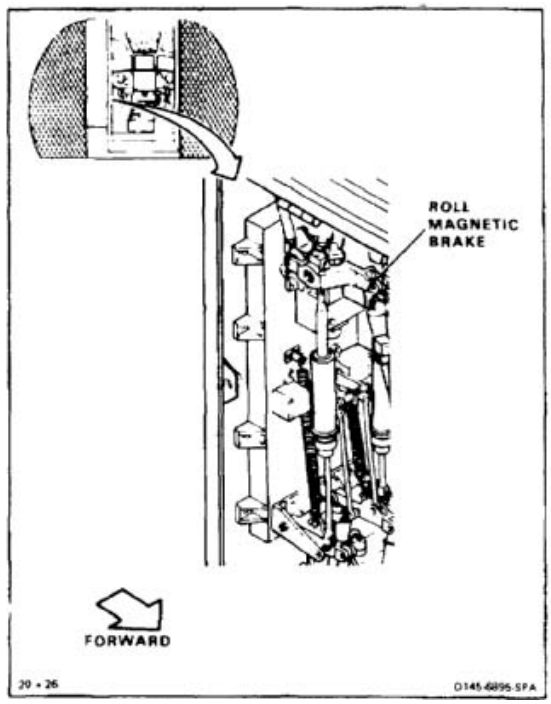
Paper Tags (E264)

Personnel Required:

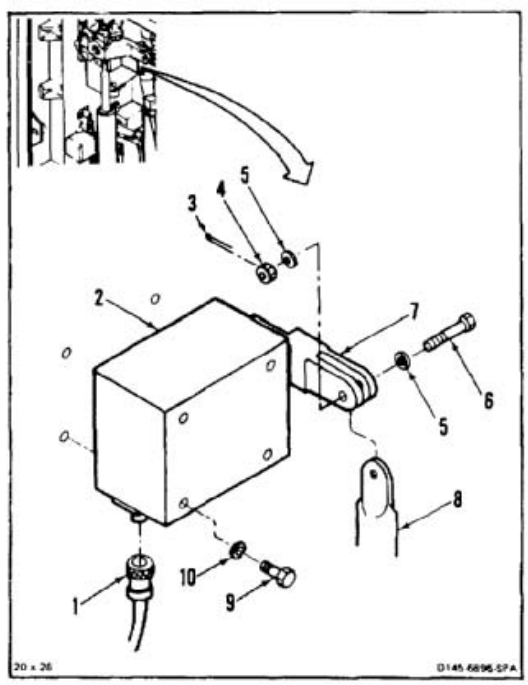
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Roll Magnetic Brake at Neutral (TM 55-1520-240-T)



1. Tag and disconnect connector (1) from roll magnetic brake (2).
2. Remove cotter pin (3), nut (4), two washers (5), and bolt (6) from arm (7) of brake (2).
3. Disconnect spring (8) from arm (7).
4. Remove four bolts (9) and washers (10) from brake (2). Remove brake.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-150 TEST MAGNETIC BRAKES (R460M39-3 OR R460M39-4) (AVIM) 11-150

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Dial Indicating Scale, 0 to 10 Pounds
Dial Indicator, 0 to 0.03 Inch
Clamps (2)

Materials:

None

Parts:

Bolt
Nut

Personnel Required:

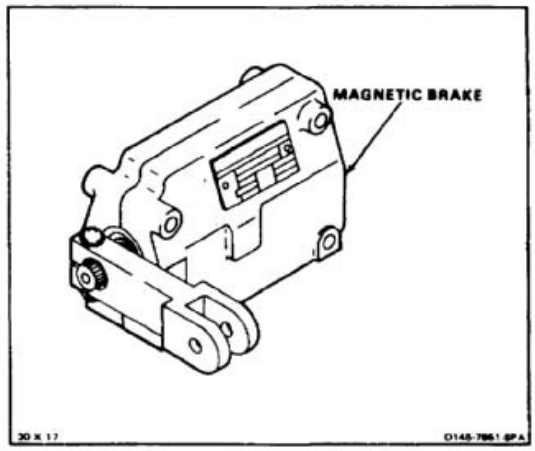
Medium Helicopter Repairer
Inspector

References:

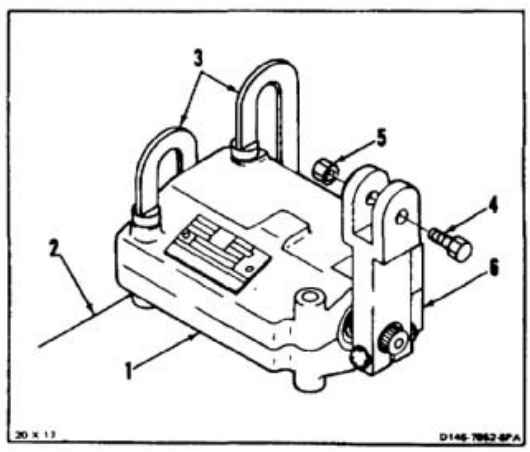
Task 11-151

Equipment Condition:

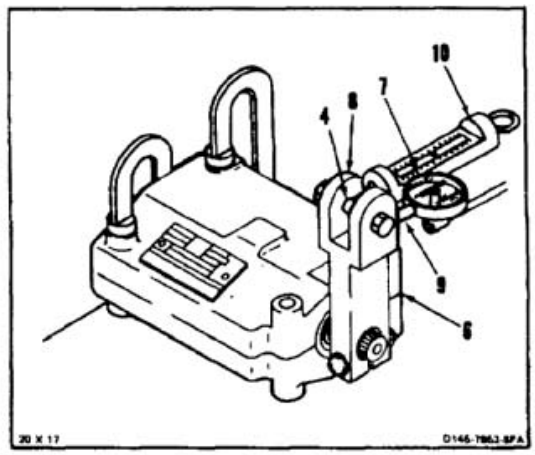
Off Helicopter Task
Magnetic Brake Adjusted (Task 11-151)



1. Clamp magnetic brake (1) to bench top (2), with two clamps (3).
2. Install bolt (4) and nut (5) loosely in arm (6).



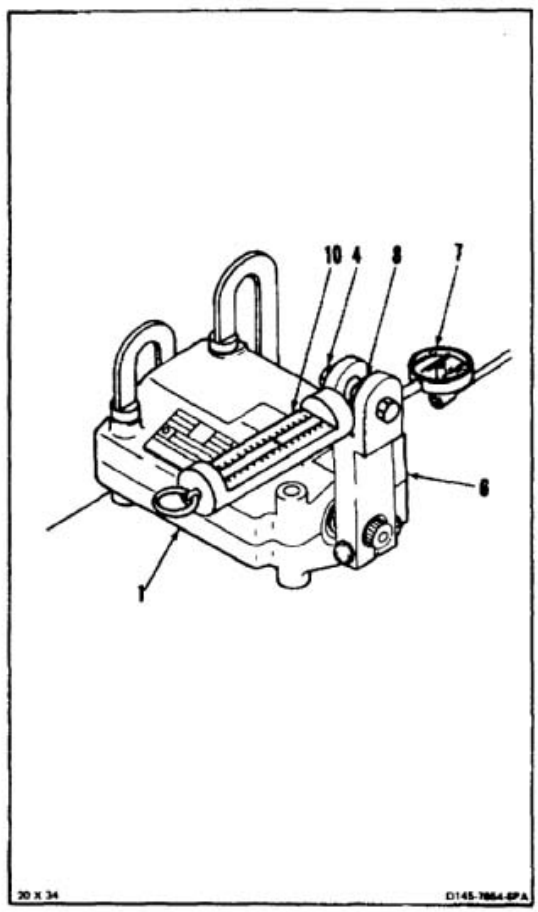
3. Mount dial indicator (7) on lug (8) of arm (6), about **90º** to arm and bolt (4).
4. Set indicator (7) to mid-travel. Depress plunger (9) against arm (6).
5. Connect dial indicating scale (10) to bolt (4) inward of lug (8) and toward indicator (7). Align scale and indicator (7).
6. Apply **2 pounds** to arm (6). Pull scale (10).
7. Set indicator (7) to **0 inch** with force applied to arm (6).
8. Disconnect scale (10) from arm (6).



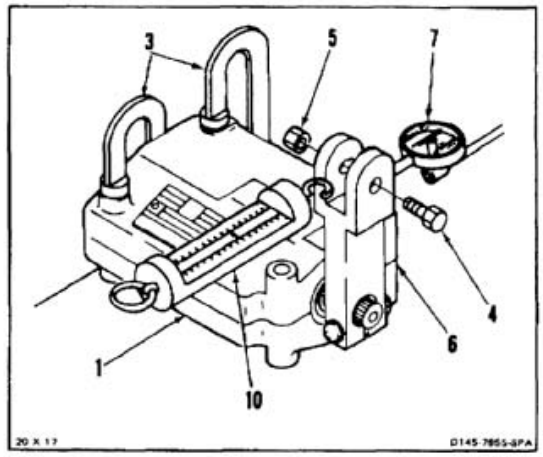
9. Connect scale (10) to bolt (4) inward of lug (8), away from indicator (7). Align scale and indicator.
10. Check indicator (7) indicates **0 inch**. If indication is not **0 inch,** repeat steps 5 thru 10.
11. Apply **2 pounds** to arm (6). Pull scale (10).
12. Check indicator (7) for movement of arm (6). Arm movement shall not be more than:

Magnetic Brake	Magnetic Brake
R460M39-3	R460M39-4
0.013 inch	**0.012 inch**

If movement of arm is greater, adjust brake (1) (Task 11-151).



13. Disconnect scale (10) from arm (6).
14. Remove indicator (7) from arm (6).
15. Remove nut (5) and bolt (4) from arm.
16. Remove two clamps (3) from brake (1). Remove brake.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-151 ADJUST MAGNETIC BRAKE (R460M39-3 OR R460M39-4) (AVIM) 11-151

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
DC Power Supply, 0 to 28 Volts

Materials:

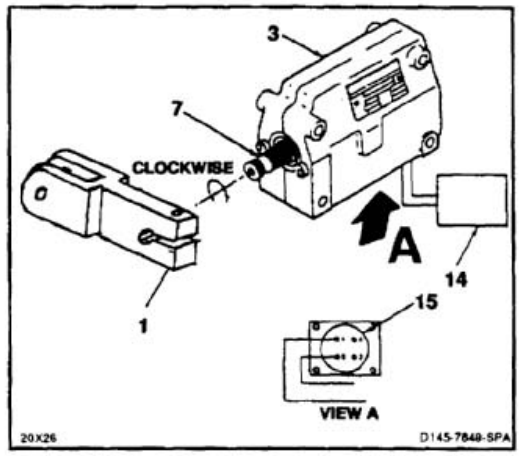
Paper Tags (E264)
Pencil (E271)

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Off Helicopter Task
Magnetic Brake Tested (Task 11-150)

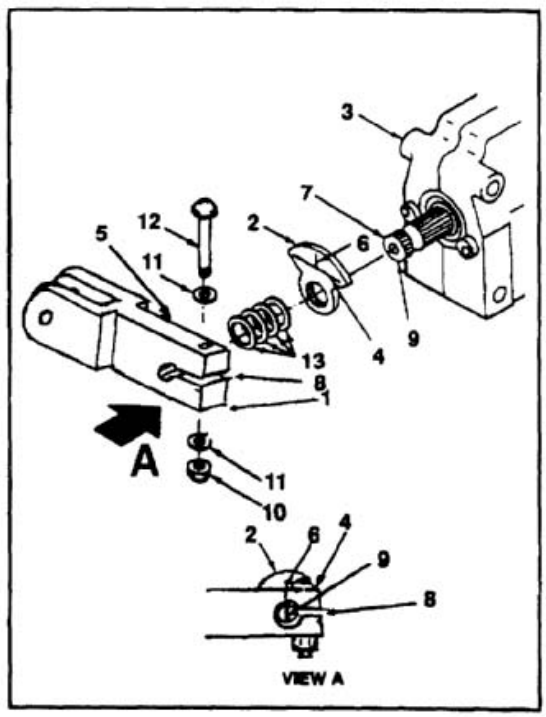


1. Mark position of arm (1) on stop (2) of magnetic brake (3). Mark line (4) along edge (5) of arm on stop. Use pencil (E271).
2. Mark line (6) **90°** to line (4) on stop (2) inline with center of shaft (7). Use pencil.
3. Mark position of slot (8) of arm (1) on end of shaft (7). Mark line (9) fully across shaft.
4. Remove nut (10), two washers (11), and bolt (12) from arm (1). Remove arm from shaft (7).

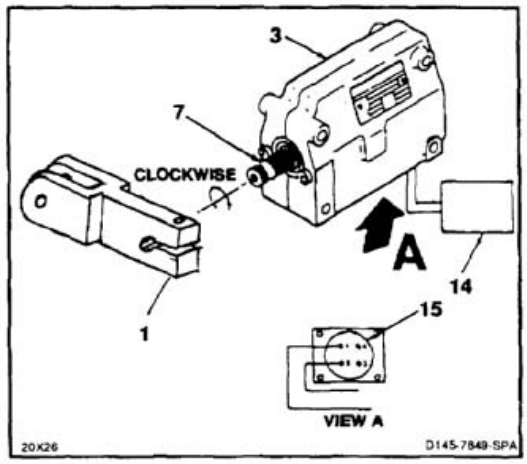
CAUTION

Number of shims must not be changed; otherwise, damage to component can occur.

5. Remove shims (13) from shaft (7). Tag shims.
6. Remove stop (2) from shaft (7).



7. Apply **28 vdc** from power supply (14) to pins 1 and 2 of receptacle (15) on brake (3).
8. Slide arm (1) on shaft (7). Turn shaft clockwise about **90°**. Remove arm.
9. Remove power from receptacle (15).

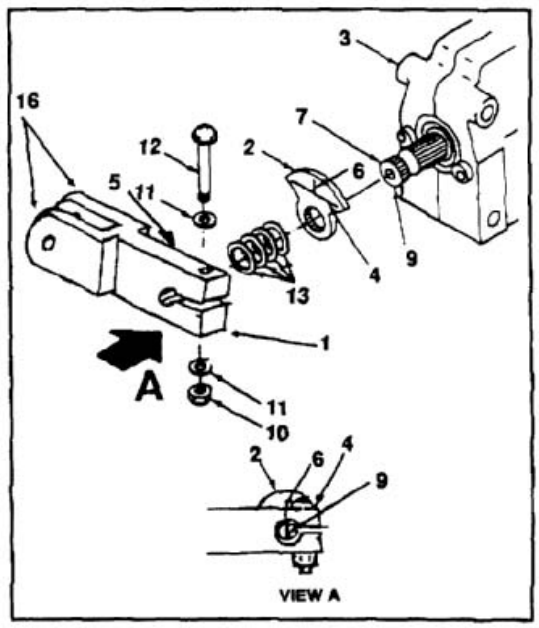


10. Install stop (2) on shaft (7). Align line (6) on stop and line (9) on shaft.
11. Remove tag from shims (13). Install shims on shaft (7).
12. Install arm (1) on shaft (7), with lugs (16) away from mounting surface. Align edge (5) of arm and line (4) on stop (2).
13. Push arm (1) towards brake (3) until arm, shim (13), and stop (2) just touch damper.
14. Install bolt (12), two washers (11) and nut (10) in arm (1).

INSPECT

FOLLOW-ON MAINTENANCE:

Test magnetic brake (Task 11-150).



END OF TASK

11-152 INSTALL YAW MAGNETIC BRAKE 11-152

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

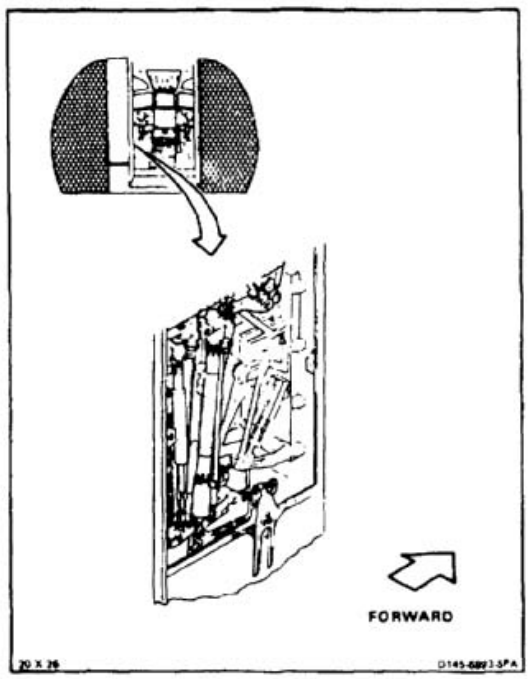
Cotter Pin

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-48



CAUTION

Make sure bushings are in arm before installing bolt or component damage will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. If yaw magnetic brake (1) is a replacement, perform rigging check (Task 11-48).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection including its mounting to the pallet assembly.

Ensure mag brake output arm is properly positioned and secured to the output shaft of the actuator.

Ensure proper torque values are utilized when installing brake to pallet mounting hardware.

Ensure proper attaching hardware (self retaining type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position brake (1) on pallet (2) with arm (3) outboard, receptacle (4) up. Install four bolts (5) and washers (6). Torque bolts to **45 inch-pounds**.

3. Position spring (7) and link (8) in arm (3) with link (8) against lug (9) of arm. Install bolt (10), two washers (11 and 12), and nut (13).

4. Torque nut (13) to **30 inch-pounds**. If necessary, continue tightening to align cotter pin holes. Do not exceed **45 inch-pounds**. Install cotter pin (14).

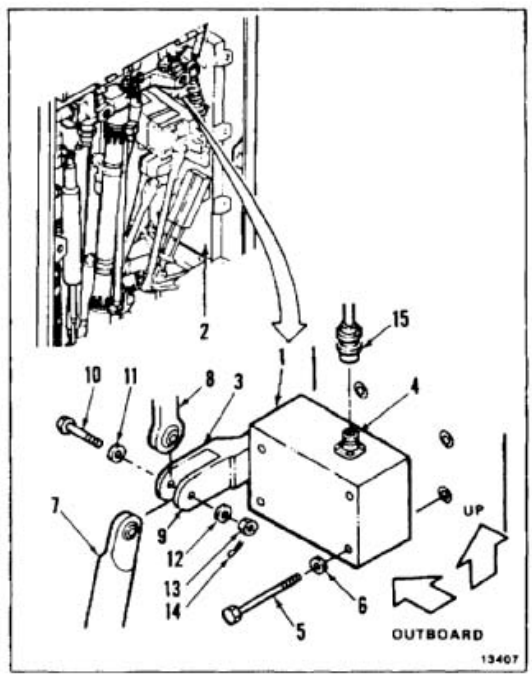
5. Connect connector (15) to receptacle (4) of brake (1). Remove tag from connector.

6. Check bolt (10). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 4.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform artificial feel forces check (Task 11-34).
Perform operational check of flight controls (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).



END OF TASK

11-153 INSTALL ROLL MAGNETIC BRAKE 11-153

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

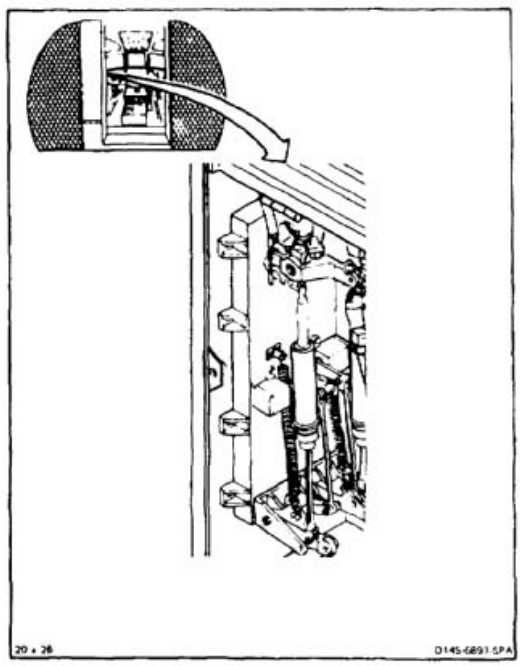
Cotter Pin

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-49



CAUTION

Make sure bushings are in arm before installing bolt or component damage will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. If roll magnetic brake (1) is a replacement, perform rigging check (Task 11-49).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection including its mounting to the pallet assembly.

Ensure mag brake output arm is properly positioned and secured to the output shaft of the actuator.

Ensure proper torque values are utilized when instaling brake to pallet mounting hardware.

Ensure proper attaching hardware (self retaining type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

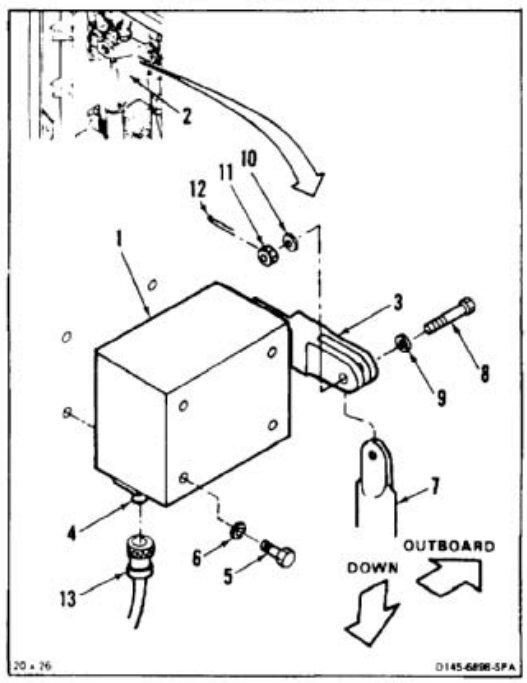
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position brake (1) on pallet (2), arm (3) outboard, receptacle (4) down. Install four bolts (5) and washers (6). Torque bolts to **45 inch-pounds**.
3. Position spring (7) in arm (3). Install bolt (8), two washers (9 and 10) and nut (11).
4. Torque nut (11) to **30 inch-pounds**. If necessary, continue tightening to align cotter pin holes. Do not exceed **45 inch-pounds**. Install cotter pin (12).
5. Connect connector (13) to receptacle (4) of brake (1). Remove tag from connector.
6. Check bolt (8). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 4.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform pallet roll controls rig check (Task 11-49).
Perform operational check of flight controls (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).



END OF TASK

11-154 REMOVE THRUST CCD ACTUATOR 11-154

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

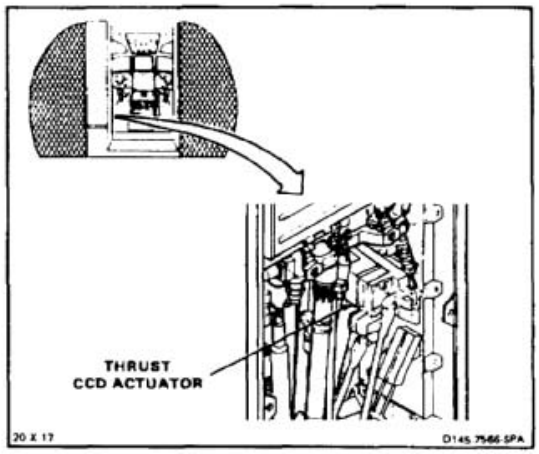
Medium Helicopter Repairer

References:

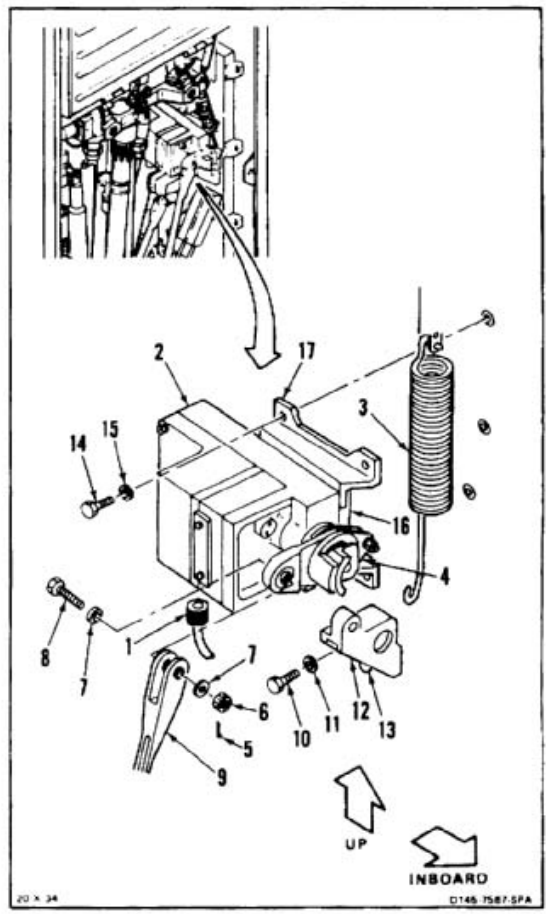
Task 11-131

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Thrust CCD Actuator Full Up (TM 55-1520-240-T)



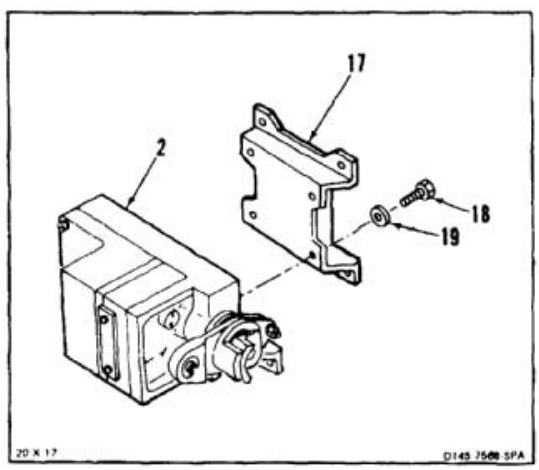
1. Tag and disconnect connector (1) from thrust CCD actuator (2).
2. Disconnect spring (3) from arm (4) of actuator (2) (Task 11-131).
3. Remove cotter pin (5), nut (6), two washers (7), and bolt (8) from arm (4). Disconnect link (9) from arm. Install bolt, washers and nut loosely in link. Tie link away from actuator. Use twine (E433).
4. Remove bolt (10) and washer (11) from stop (12). Loosen bolt (13) of stop.
5. Remove three bolts (14) and washers (15) from actuator (2). Remove actuator. Lift inboard end (16) up to release support (17) from stop (12).



6. Remove lockwire from four bolts (18).
7. Remove four bolts (18) and washers (19) from support (17). Remove support from actuator (2).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-155 DISASSEMBLE THRUST CCD ACTUATOR (AVIM) 11-155

INITIAL SETUP

Applicable Configurations:

All

Tools:

Tool Kit, Electronic Equipment TK-105/G, NSN 5180-00-610-8177
Arbor Press
Crowfoot, 1 Inch

Materials:

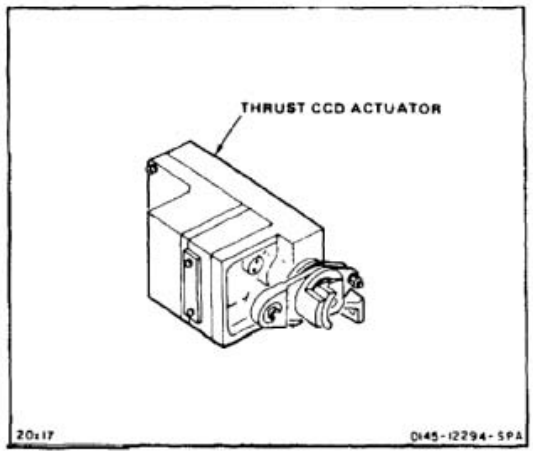
Tags (E264)

Personnel Required:

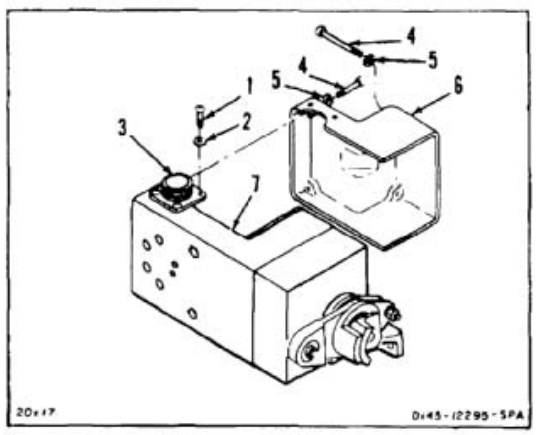
Avionic Navigation and Flight Control Equipment Repairer

Equipment Condition:

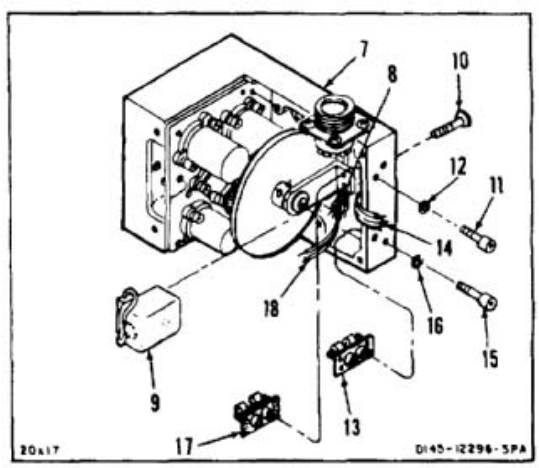
Off Helicopter Task



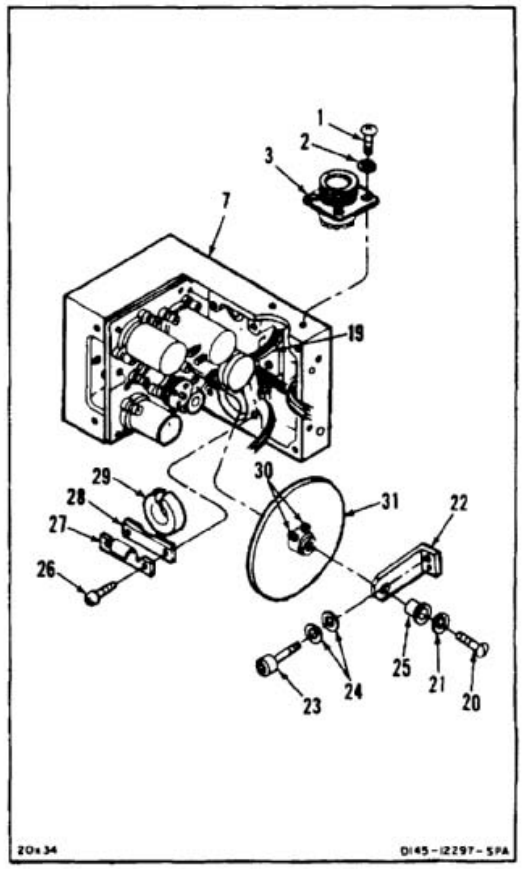
1. Remove lockwire from two screws (1). Heat heads of screws to soften sealing compound. Use soldering gun. Remove screws and washers (2) from receptacle (3).
2. Remove four screws (4) and washers (5) from cover (6). Remove cover from chassis (7).



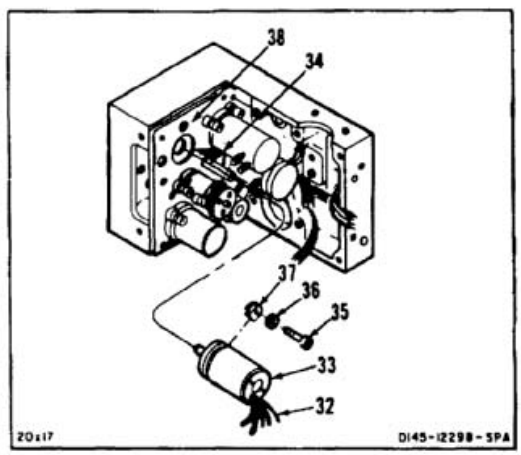
3. Tag and unsolder seven wires (8) from amplifier (9).
4. Remove screw (10) from chassis (7). Remove amplifier (9). Heat screw heads. Use soldering gun.
5. Remove two screws (11), and washers (12), from board (13). Remove board from chassis (7). Heat screw heads. Use soldering gun.
6. Tag and unsolder six wires (14) from terminal board (13).
7. Remove two screws (15) and washers (16) from board (17). Remove board from chassis (7). Heat screw heads. Use soldering gun.
8. Tag and unsolder two wires (18) from terminal board (17).



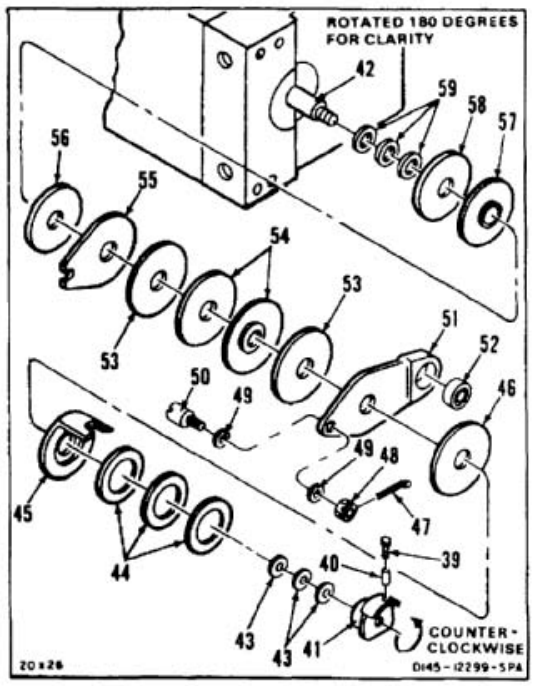
9. Remove two screws (1) and washers (2) from receptacle (3). Remove receptacle. Heat screw heads. Use soldering gun.
10. Tag and unsolder 13 wires (19) from receptacle (3).
11. Remove screw (20) and washer (21) from bracket (22).
12. Remove two screws (23) and washers (24) from bracket (22) and chassis (7). Remove bracket.
13. Remove bearing (25) from bracket (22).
14. Remove two screws (26) from clamp (27) and bracket (28). Remove clamp, bracket, and magnet (29).
15. Loosen two setscrews (30) from disc (31). Remove disc.



16. Tag and unsolder five wires (32) of servo motor (33) from wire harness (34).
17. Remove three screws (35), washers (36), and clamps (37) from gear plate (38). Remove motor (33).



18. Remove rivet (39) and spacer (40) from nut (41). Remove nut from shaft (42). Turn counterclockwise.
19. Remove shims (43), three sprIng washers (44), plate (45), and disc (46) from shaft (42).
20. Remove cotter pin (47), nut (48), two washers (49), and pin (50) from arm (51). Remove arm from shaft (42).
21. Remove bearing (52) from arm (51). Use arbor press.
22. Remove two discs (53), two plates (54) from shaft (42).
23. Remove arm (55), disc (56), plate (57), spacer (58), and shims (59) from shaft (42).



FOLLOW-ON MAINTENANCE:

Inspect servo motor (Task 11-156).

END OF TASK

11-156 INSPECT SERVO OR TRIM MOTOR (AVIM) 11-156

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Electrical Tool Kit, NSN 5180-00-323-4915
Dial Indicator, 0 to 0.030 Inch
Dial Indicating Scale, 0 to 50 Pounds
Vise, Soft Jawed

Materials:

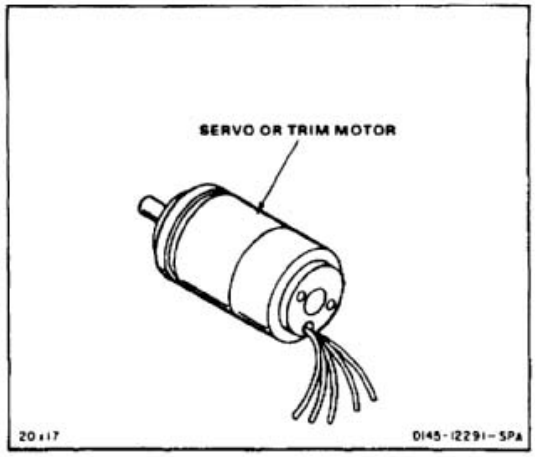
None

Personnel Required:

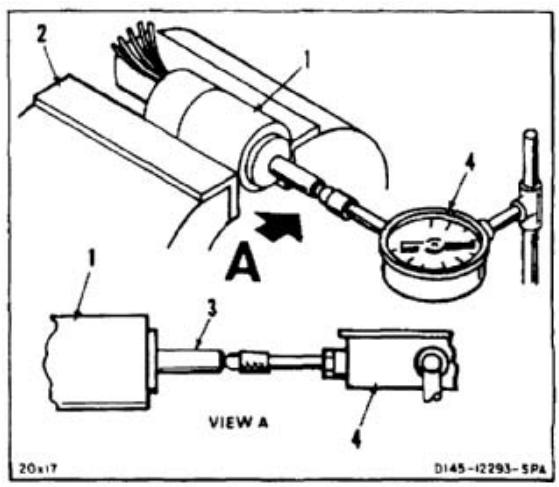
Avionics Mechanic
Inspector

Equipment Condition:

Off Helicopter Task



1. Clamp motor (1) in vise (2).
2. Apply **1 pound** inward to end of shaft (3). Use dial indicating scale. Remove scale.
3. Mount indicator (4) so that movable arm contacts end surface of shaft (3). Align with shaft axis. Set indicator to zero.
4. Apply about **2 pounds** a outward on shaft (3). Pull shaft by hand. Check indicator (4) movement. Indicator must not indicate more than **0.006 inch**.
5. Remove indicator (4).
6. Remove motor (1) from vise (2).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-157 ASSEMBLE THRUST CCD ACTUATOR (AVIM) 11-157

INITIAL SETUP

Applicable Configurations:

All

Tools:

Tool Kit, Electronic Equipment TK-1051G, NSN 5180-00-610-8177
Arbor Press
Drill Bushing, 0.312 Inch Outside Diameter
Feeler Gage
Torque Wrench, 5 to 50 Inch-Pounds
Crowfoot, 1 Inch

Materials:

Hydraulic Fluid (E199)
Lockwire (E229)
Solder (E360)
Cloths (E120)
Sealant (E345)
Silicone Grease (E461)
Epoxy Primer (E292)
Sleeving (E204)
Gloves (E184.1)

Parts:

Cotter Pin
Rivet
Shims

Personnel Required:

Avionic Navigation and Flight Control Equipment Repairer
Inspector

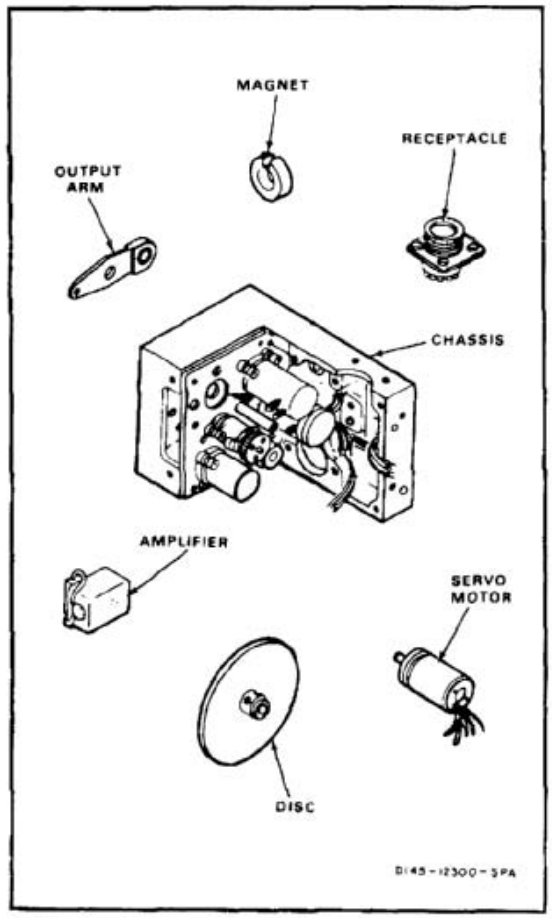
References:

TM 55-1520-240-23P
Task 11-279

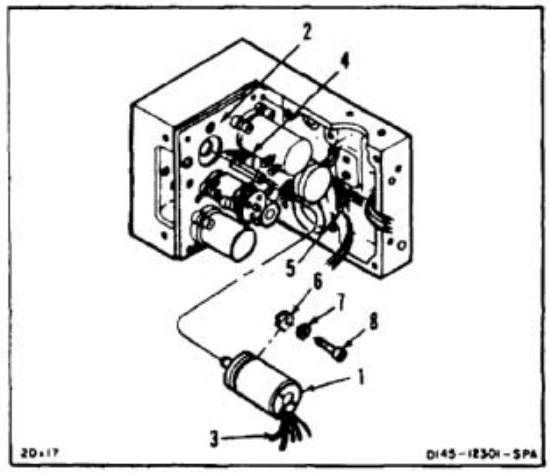
General Safety Instructions:

WARNING

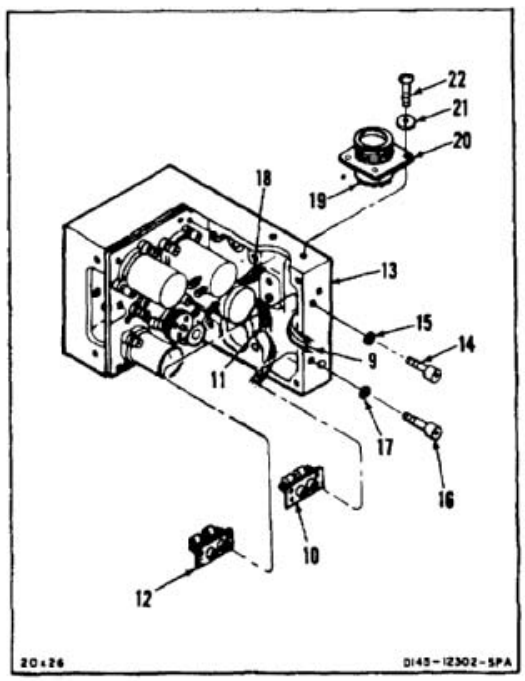
Sealant (E345) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



1. Install servo motor (1) in gear plate (2). Align wires (3) of motor and wires (4) of harness (5).
2. Install three clamps (6), washers (7), and screws (8) in plate (2).
3. Solder five wires (4) to wires (3). Use sleeving (E204), solder (E360), and soldering gun. Remove tags.



4. Solder six wires (9) to terminal board (10). Use sleeving (E204), solder (E360), and soldering gun. Remove tags.
5. Solder two wires (11) to terminal board (12). Use sleeving (E204), solder (E360), and soldering gun. Remove tags.
6. Position board (10) on chassis (13). Install two screws (14) and washers (15) in chassis and board.
7. Position board (12) on chassis (13). Install two screws (16) and washers (17) in chassis and board.
8. Solder 13 wires (18) to terminals (19) of receptacle (20). Use sleeving (E204), solder (E360), and soldering gun. Remove tags.
9. Position receptacle (20) on chassis (13). Install two washers (21) and screws (22).



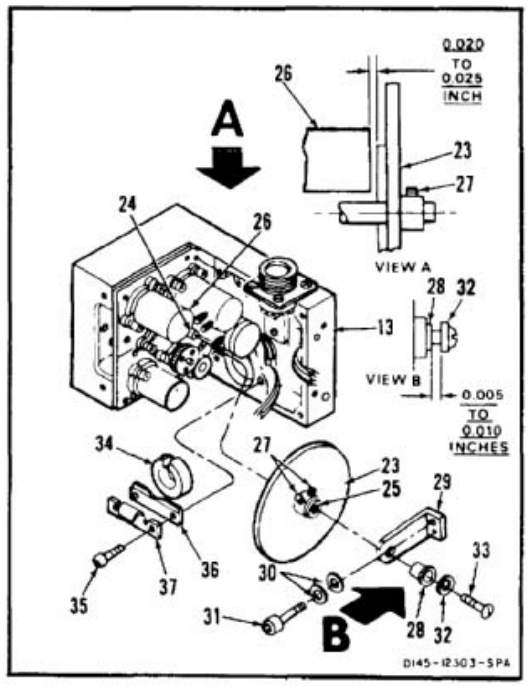
10. Slide damper disk (23) on shaft (24) with boss (25) outward until disk is **0.025 inch** from end of magnetic brake (26). Use feeler gage.
11. Apply coat of sealant (E345) to thread of two setscrews (27). Install and tighten set-screws in disk (23). Wear gloves (E184.1).
12. Check distance between disk (23) and brake (26) is **0.020 to 0.025 inch**. If not, loosen screws (27) and repeat steps 10 and 11.

INSPECT

13. Install bearing (28) in bracket (29).
14. Position bracket (29) on chassis (13). Install four washers (30) and two screws (31). Do not tighten screws at this time.
15. Install washer (32) and screw (33) in disk (23).
16. Adjust in and out movement of disk (23) to **0.005 to 0.010 inch**. Move bracket (29) in or out. Measure distance between bearing (28) and washer (32). Tighten screws (31). Use feeler gage.

INSPECT

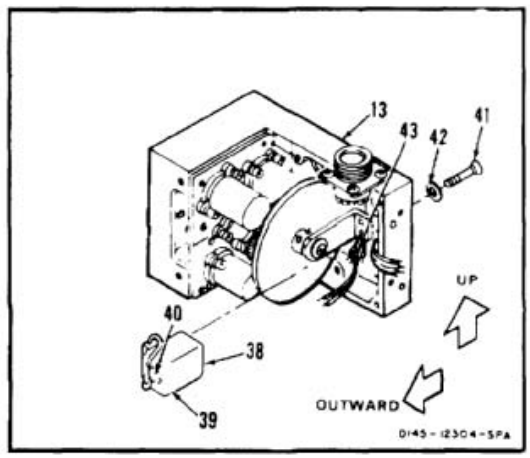
17. Position magnet (34) in chassis (13), smooth surface to chassis.
18. Apply coat of sealant (E345) to thread of two screws (35). Wear gloves (E184.1). Position bracket (36) and clamp (37) on chassis. Install screws and align magnet (34) with same gap on each side of disk (23). Tighten screws (35).



19. Apply coat of silicone grease (E461) to end (38) of amplifier (39). Position amplifier with pin (40) up and outward on chassis (13).

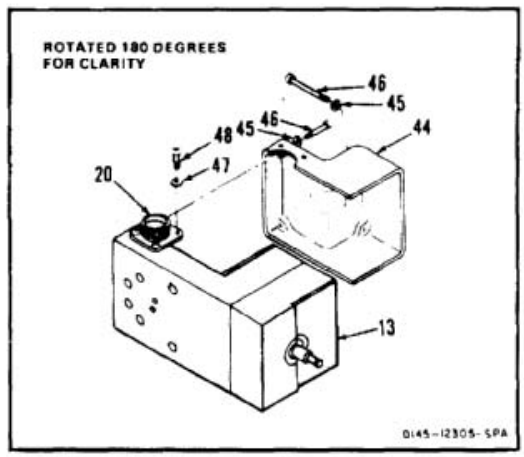
20. Apply coat of sealant (E345) to two screws (41). Install two washers (42) and screws in chassis (13) and amplifier (39). Wear gloves (E184.1).

21. Solder six wires (43) to amplifier (39). Use sleeving (E204), solder (E360), and soldering gun. Remove tags.



22. Position cover (44) on chassis (13). Install four washers (45) and screws (46) in cover and chassis.

23. Install two washers (47) and screws (48) in receptacle (20) and cover (44). Lockwire screws. Use lockwire (E229).



WARNING

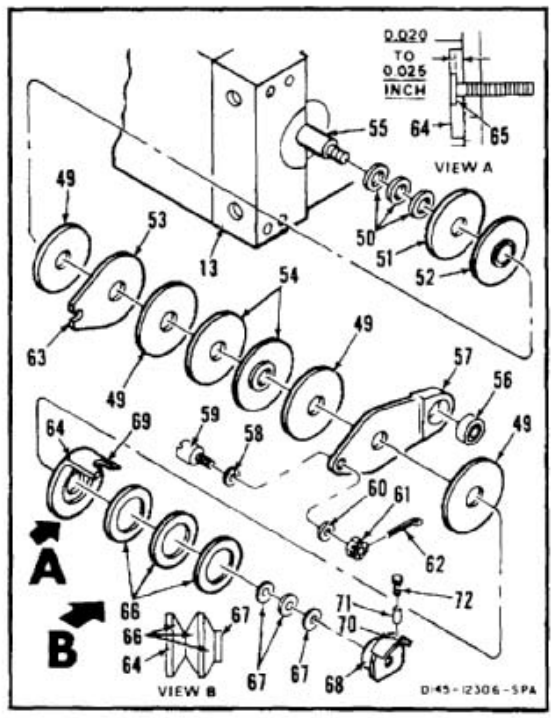
Hydraulic fluid (E199) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

24. Soak four new disks (49) in hydraulic fluid (E199) for **one hour** before installing. Wear gloves (E184.1).
25. Install shims (50), spacers (51), plate (52), new disk (49), arm (53), two new disks (49), and two plates (54) on shaft (55).
26. Install bearing (56) in arm (57). Use arbor press.

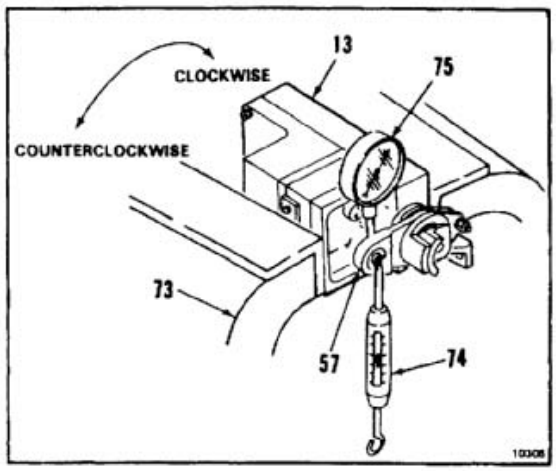
WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and use burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

27. Apply coat of epoxy primer (E292) on washer (58). Install washer wet on pin (59). Use gloves (E184.1).
28. Install pin (59), washer (60), nut (61), and cotter pin (62) in arm (57).
29. Install arm (57) on shaft (55). Align pin (59) and slot (63) in arm (53).
30. Install new disk (49) and plate (64) on shaft (55).
31. Press plate (64) toward chassis (13). Check outer surface of plate is **0.020 to 0.025 inch** outward of shoulders (65) on shaft (55). Use feeler gage and scale. If gap is greater, remove shims (50). If gap is smaller, add shim (50). There must be a minimum of one shim between spacer (51) and chassis (13).
32. Install three spring washers (66), shims (67), and nut (68). Torque nut to **27 inch-pounds**.
33. Perform torque test (Task 11-279).
34. Align slot (69) of plate (64) and hole (70) of nut (68).
35. Install spacer (71) and rivet (72) in hole (70). Use **0.312 inch** outside diameter drill bushing in slot (69).



36. Clamp chassis (13) in soft jawed vise (73).
37. Attach scale (74) to arm (57).
38. Position, then preload, dial indicator (75) on arm (57). Align with scale (74).
39. Apply **1.75 pounds,** clockwise to arm (57). Record indicator (75) reading 'X'.
40. Apply **1.78 pounds** counterclockwise to arm (57). Record indicator (75) reading 'Y'.
41. Subtract Y from X. Result shall not be more than **0.012 inches**.
42. Remove chassis (13) from vise (73).



FOLLOW-ON MAINTENANCE:

Perform AFCS bench test (Task 11-279).

END OF TASK

11-158 INSTALL THRUST CCD ACTUATOR 11-158

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Lockwire (E227)

Parts:

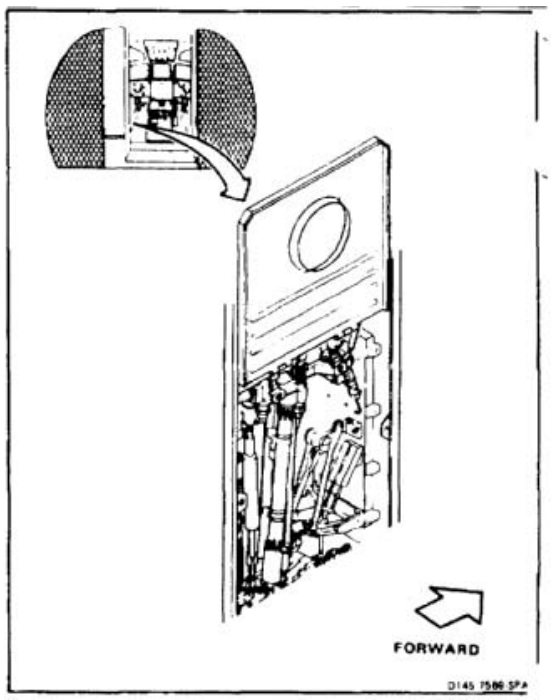
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-132

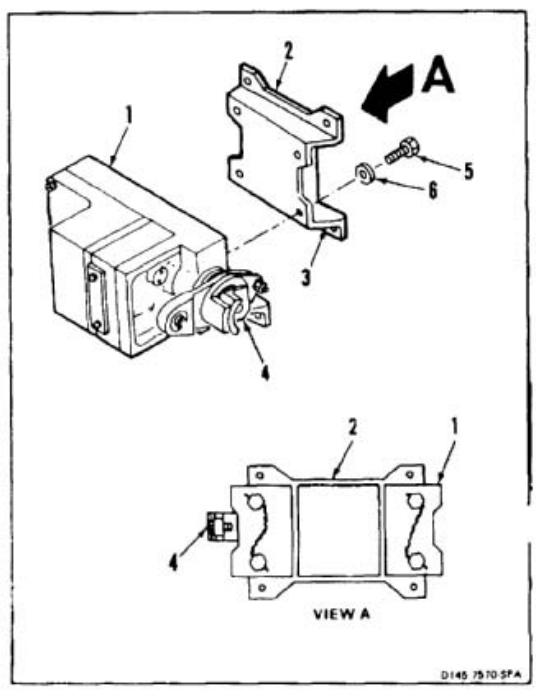


CAUTION

Make sure bushings are in arm before installing bolt or component damage will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).



1. If thrust CCD actuator (1) is a replacement, check if actuator arm is at neutral (Task 11-39).
2. Position support (2) on actuator (1) thick end (3) to arm (4). Install four bolts (5) and washer (6). Torque bolts to **40 inch-pounds**.
3. Lockwire four bolts (5). Use lockwire (E227).

INSPECT

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the pallet assembly.

Ensure actuator mounting support is properly installed including safety wire between mounting bolts.

Ensure proper torque values are utilized when installing the actuator support to pallet mounting hardware.

Ensure proper attaching hardware (self retaining type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components may cause loss of control.

4. Position actuator (1) on pallet (7), arm (4) inboard, with lower inboard lug (8) of support (2) between pallet and stop (9). Install bolt (10) and washer (11) in stop. Do not tighten at this time.
5. Install three bolts (12) and washers (13) in actuator (1). Torque bolts to **45 inch-pounds**.
6. Tighten bolt (14) of stop (9). Torque two bolts (10 and 14) to **45 inch-pounds**.
7. Remove nut (15), two washers (16 and 17), and bolt (18) from link (19). Untie link.

WARNING

FLIGHT SAFETY PARTS

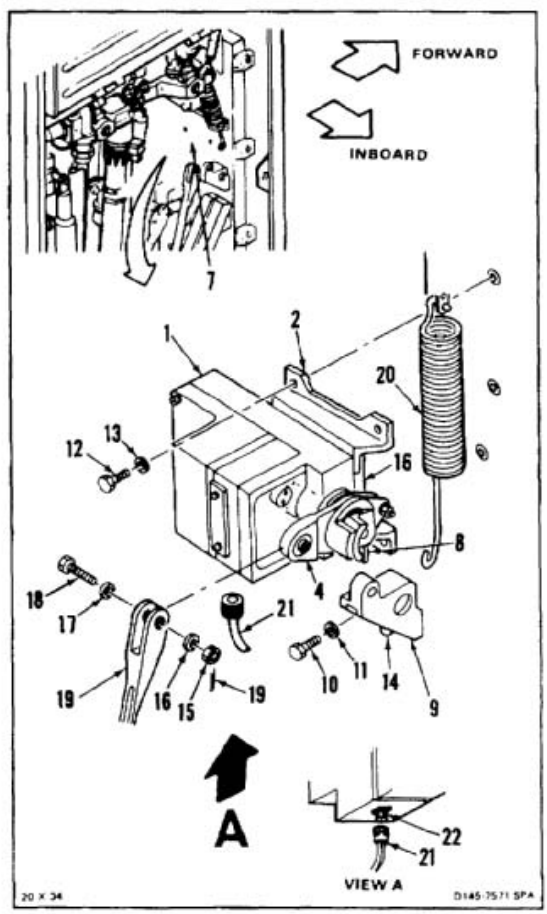
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure bearing is properly staked.

Ensure flanged and straight slip bushings are installed at clevis end of link assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight controls secondary linkage will degrade aircraft control. Missing linkage may cause loss of control.



8. Position link (19) in arm (4). Install bolt (18), two washers (17 and 16) and nut (15).

8.1. Torque nut (15) to **30 inch-pounds**. If necessary, continue tightening to align cotter pin holes. Do not exceed **45 inch-pounds**. Install cotter pin (19).

9. Check bolt (18). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 8.

10. Connect spring (20) to forward end of arm (4) (Task 11-132).

11. Connect connector (21) to receptacle (22) of actuator (1). Remove tag.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform operational check of advance flight control system (TM 55-1520-240-T).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-159 REMOVE PITCH CCD ACTUATOR 11-159

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

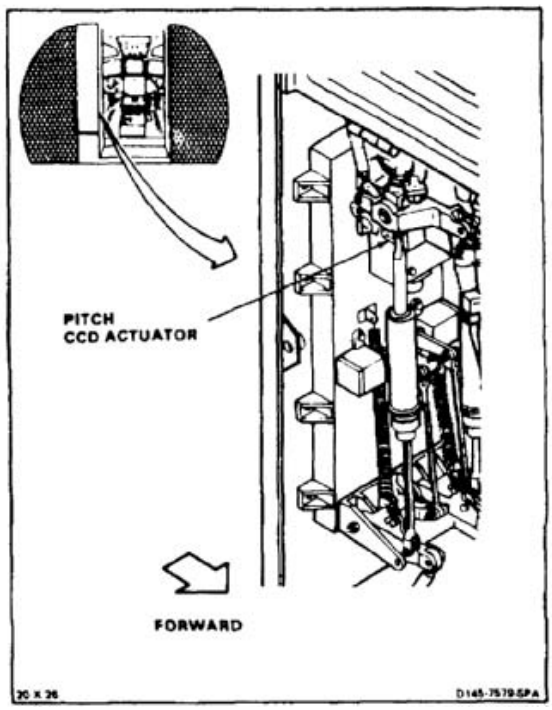
Paper Tags (E264)

Personnel Required:

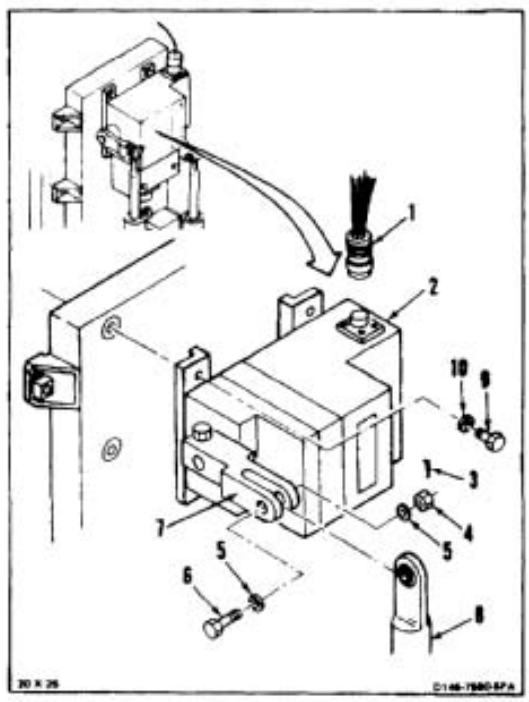
Medium Helicopter Repairer

Equipment Condition:

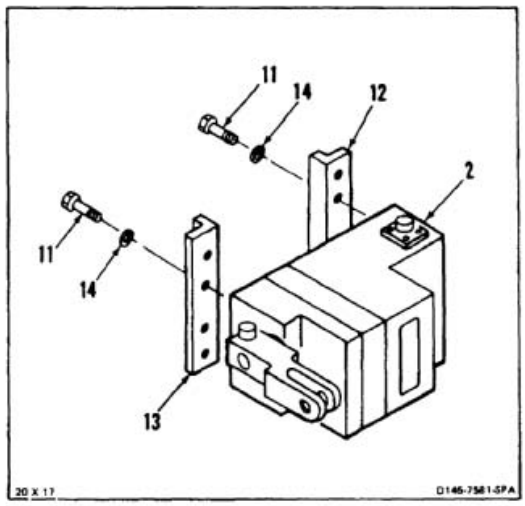
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Pitch CCD Actuator at Neutral (TM 55-1520-240-T)



1. Tag and disconnect connecter (1) from pitch CCD actuator (2).
2. Remove cotter pin (3), nut (4), two washers (5), and bolt (6) from arm (7). Disconnect link (8) from arm. Install bolt, washers, and nut loosely in link.
3. Remove four bolts (9) and washers (10) from actuator (2). Remove actuator.



4. Remove lockwire from four bolts (11) of two supports (12 and 13). Tag supports.
5. Remove four bolts (11) and washers (14) from two supports (12 and 13) of actuator (2). Remove supports.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-160 DISASSEMBLE PITCH CCD ACTUATOR (AVIM) 11-160

INITIAL SETUP

Applicable Configurations:

All

Tools:

Tool Kit, Electronic Equipment, TK-105/G, NSN 5180-00-610-8177
Arbor Press

Materials:

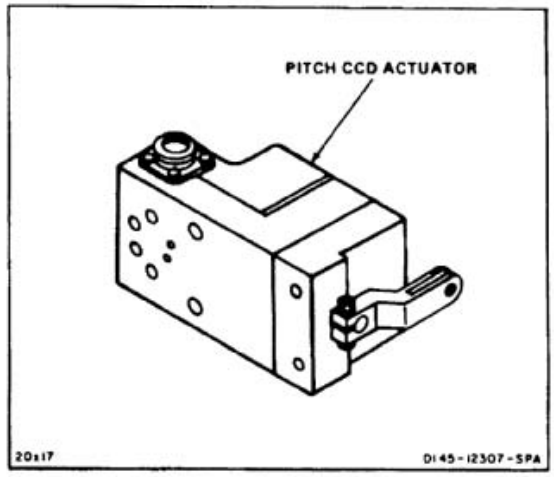
Tags (E264)
Masking Tape (E388)
Pencil (E271)

Personnel Required:

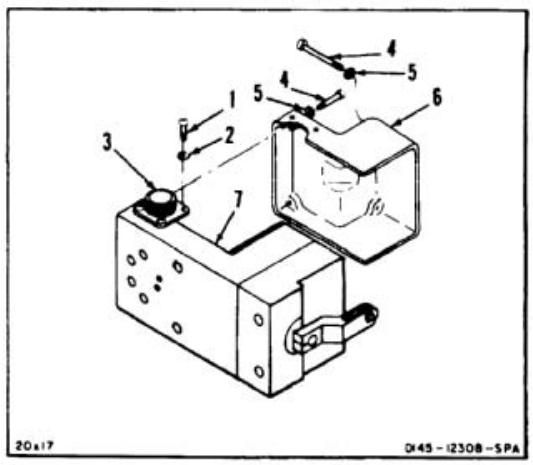
Avionic Navigation and Flight Control Equipment Repairer

Equipment Condition:

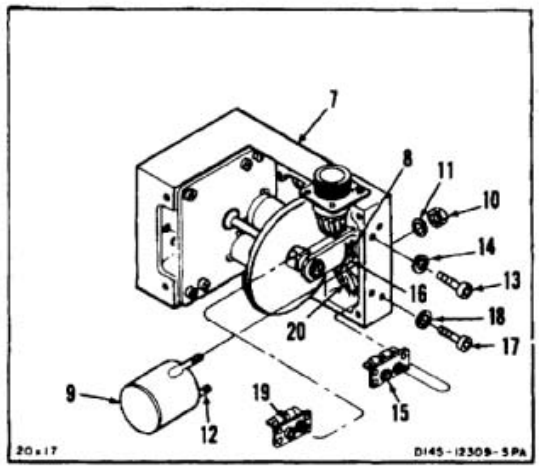
Off Helicopter Task

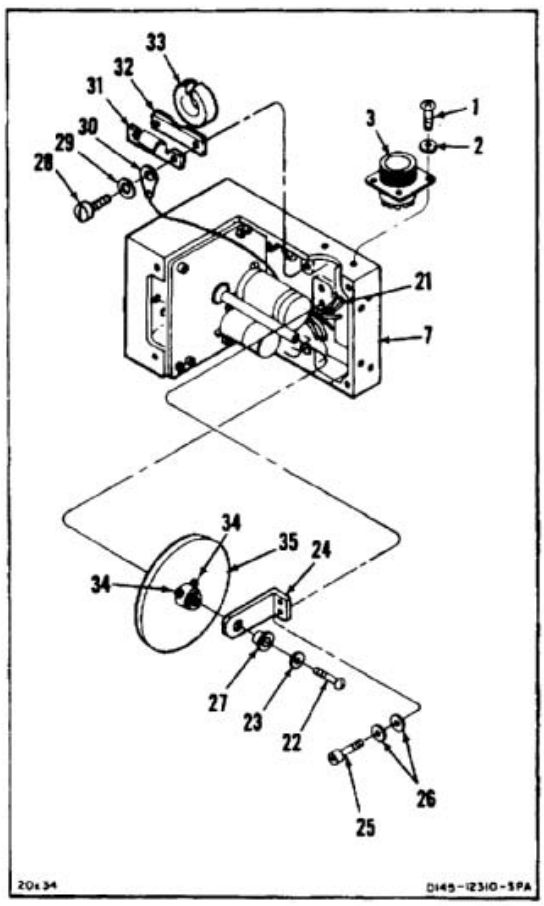


1. Remove lockwire from two screws (1). Remove screws and washers (2) from receptacle (3).
2. Remove four screws (4) and washers (5) from cover (6). Remove cover from chassis (7).



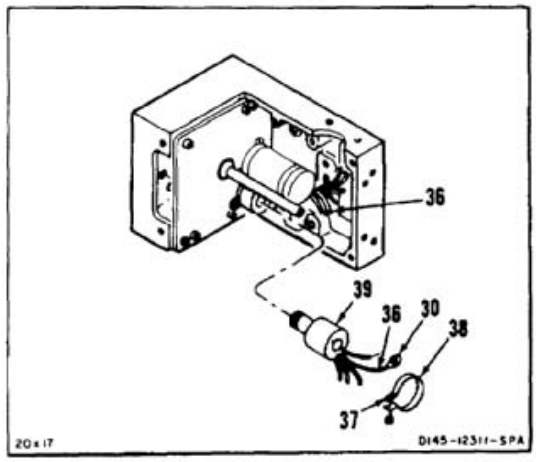
3. Tag and unsolder three wires (8) from transformer (9).
4. Remove two nuts (10) and washers (11) from transformer (9) and studs (12). Remove transformer.
5. Remove two screws (13) and washers (14) from board (15). Remove board from chassis (7). Heat screw heads. Use soldering gun.
6. Tag and unsolder three wires (16) from terminal board (15).
7. Remove two screws (17) and washers (18) from board (19). Remove board from chassis (7). Heat screw heads. Use soldering gun.
8. Tag and unsolder two wires (20) from terminal board (19).
9. Tag and unsolder seven wires (21) from receptacle (3).
10. Remove two screws (1) and washers (2) from receptacle (3). Remove receptacle. Heat screw heads, Use soldering gun.
11. Remove screw (22) and washer (23) from bracket (24).
12. Remove two screws (25) and washers (26) from bracket (24) and chassis (7). Remove bracket.
13. Remove bearing (27) from bracket (24).
14. Remove two screws (28), washer (29), terminal lug (30), clamp (31), bracket (32), and magnet (33) from chassis (7). Heat screw heads. Use soldering gun.
15. Loosen two setscrews (34) in disk (35). Remove disk.





16. Tag and unsolder 5 wires (36) from lug (30).

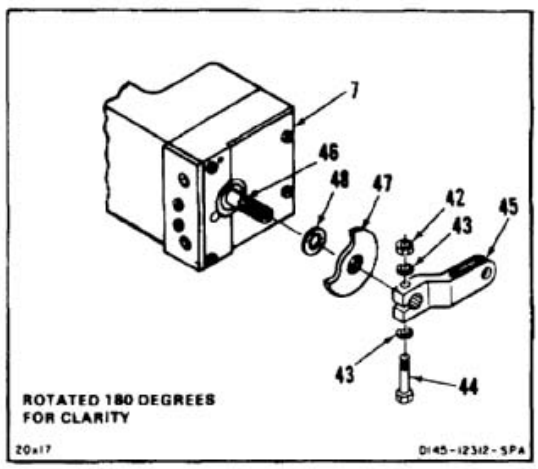
17. Loosen screw (37) of clamp (38). Remove motor (39) and clamp. Pull outward.



18. Mark position of output arm (45) and stop plate (47) on chassis (7). Use masking tape (E388) and pencil (E271).

19. Remove nut (42), washers (43), and bolt (44) from arm (45). Slide arm from shaft (46).

20. Slide plate (47) and shim (48) from shaft (46).



FOLLOW-ON MAINTENANCE:

Inspect trim motor (Task 11-156).

END OF TASK

11-161 ASSEMBLE PITCH CCD ACTUATOR (AVIM) 11-161

INITIAL SETUP

Applicable Configurations:

All

Tools:

Tool Kit, Electronic Equipment TK-105/G, NSN 5180-00-610-8177
Torque Wrench, 5 to 50 Inch-Pounds
Feeler Gages
Dial Indicating Scale, 0 to 10 Pounds
Vise, Soft Jawed

Materials:

Lockwire (E229)
Solder (E360)
Cloths (E120)
Sealant (E345)
Sleeving (E204)
Gloves (E184.1)

Parts:

Cotter Pins
Shims

Personnel Required:

Avionic Navigation and Flight Control Equipment Repairer
Inspector

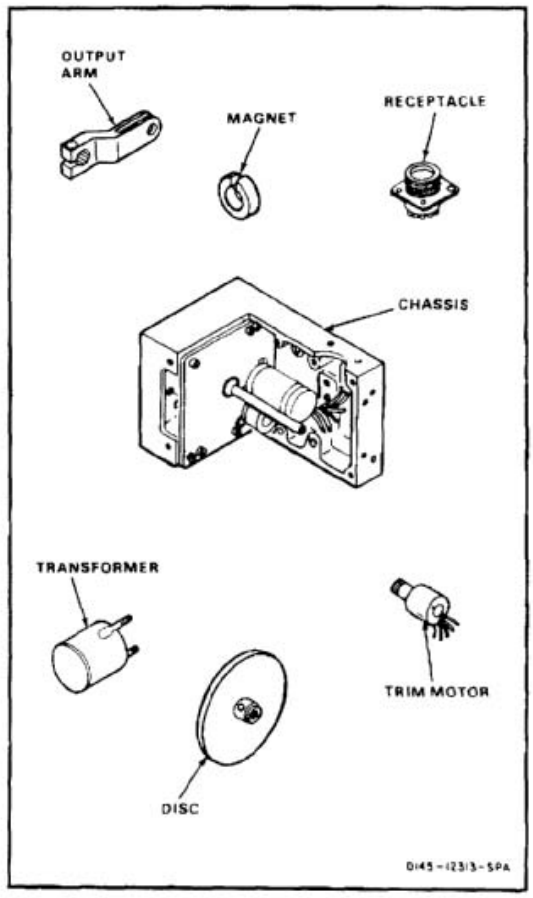
References:

TM 55-1520-240-23P

General Safety Instructions:

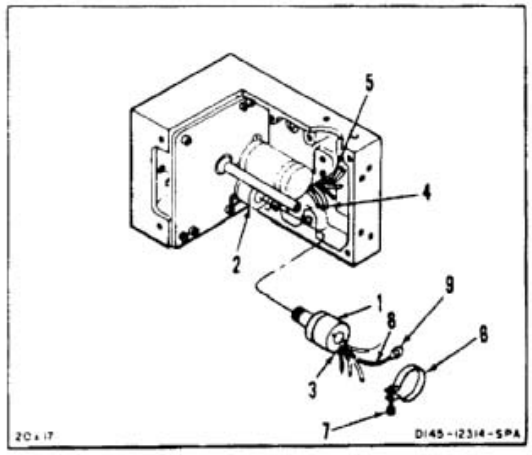
WARNING

Sealant (E345) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

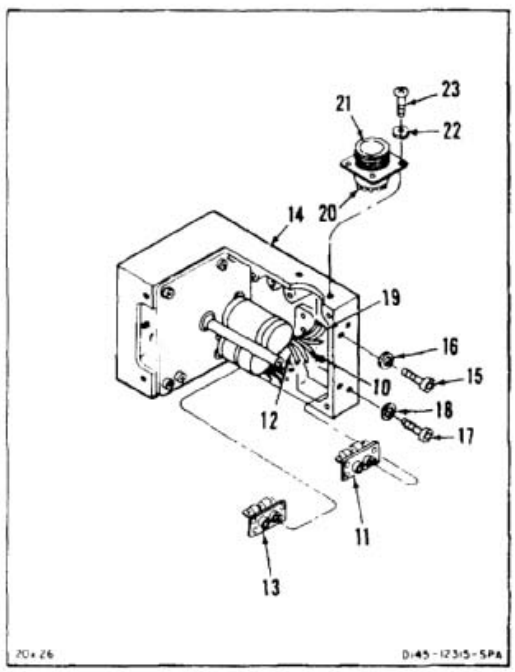


11-161 ASSEMBLE PITCH CCD ACTUATOR (AVIM) (Continued) 11-161

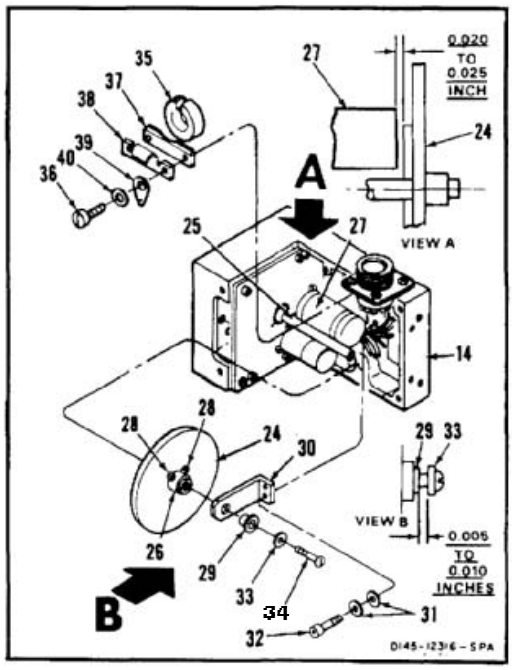
1. Install trim motor (1) in motor support. Align wires (3) of motor and wires (4) of harness (5).
2. Position clamp (6) on motor (1) and motor support (2). Tighten nut (7).
3. Solder wire (8) to lug (9). Use sleeving (E204), solder (E360), and soldering gun. Remove tag.



4. Solder three wires (10) to terminal board (11). Use sleeving (E204), solder (E360), and soldering gun. Remove tags.
5. Solder two wires (12) to terminal board (13). Use sleeving (E204), solder (E360), and soldering gun. Remove tags.
6. Position board (11) on chassis (14). Install two screws (15) and washers (16) in chassis and board.
7. Position board (13) on chassis (14). Install two screws (17) and washers (18) in chassis and board.
8. Solder seven wires (19) to terminals (20) of receptacle (21). Use sleeving (E204), solder (E360), and soldering gun. Remove tags.
9. Position receptacle (21) on chassis (14). Install two washers (22) and screws (23).



10. Slide damper disk (24) on shaft (25) with boss (26) out until disk is **0.025 inch** from end of magnetic brake (27). Pull shaft outward of brake while setting distance. Use feeler gage.
11. Apply coat of sealant (E345) to thread of two setscrews (28). Tighten setscrews in disk (24). Wear gloves (E184.1).
12. Check distance between disk (24) and brake (27) is **0.020 to 0.025 inches**. If not, loosen screws (28) and repeat steps 10 and 11.

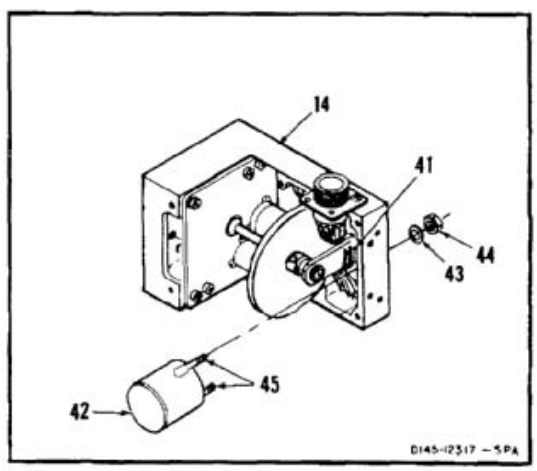


INSPECT

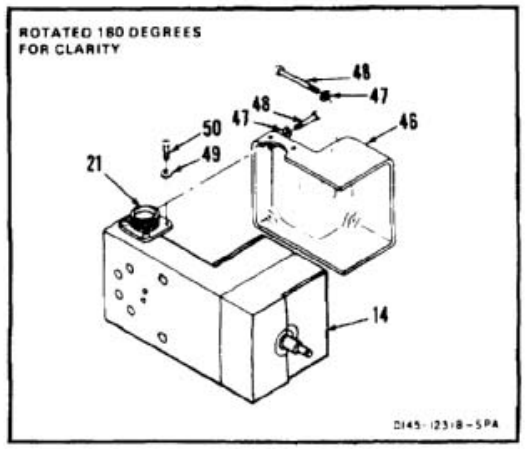
13. Install bearing (29) in bracket (30).
14. Position bracket (30) on chassis (14). Install four washers (31) and two screws (32). Do not tighten screws at this time.
15. Install washer (33) and screw (34) in disk (24).
16. Adjust in and out movement of disk (24) to **0.005 to 0.010 inch**. Move bracket (30) in or out. Measure distance between bearing (29) and washer (33). Tighten screws (32). Use feeler gage.

INSPECT

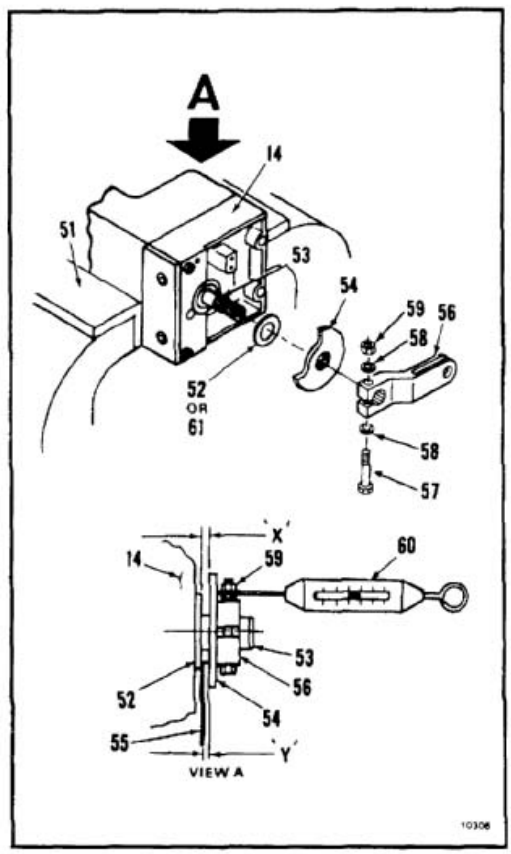
17. Position magnet (35) in chassis (14), smooth surface to chassis.
18. Apply coat of sealant (E345) to thread of two screws (36). Position bracket (37) and clamp (36) on chassis. Install terminal lug (39), washers (40), screws, and align magnet (35) with same gap on each side of disk (24). Tighten screws. Wear gloves (E184.1).
19. Solder three wires (41) to transformer (42). Use sleeving (E204), solder (E319), and soldering gun. Remove tags.
20. Position transformer (42) on chassis (14). Install washers (43) and nuts (44) on transformer studs (45).



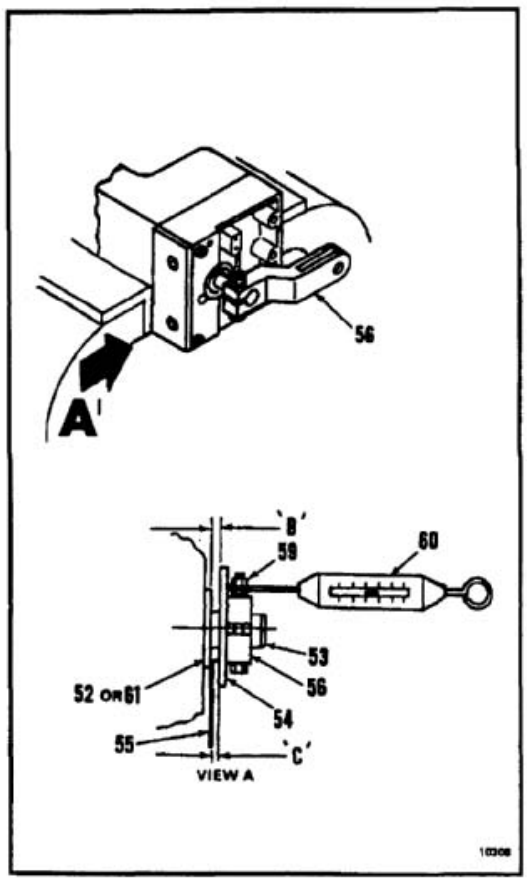
21. Position cover (46) on chassis (14). Install four washers (47) and screws (48) in cover and chassis.
22. Install two washers (49) and screws (50) in receptacle (21) and cover (46). Lockwire screws. Use lockwire (E229).



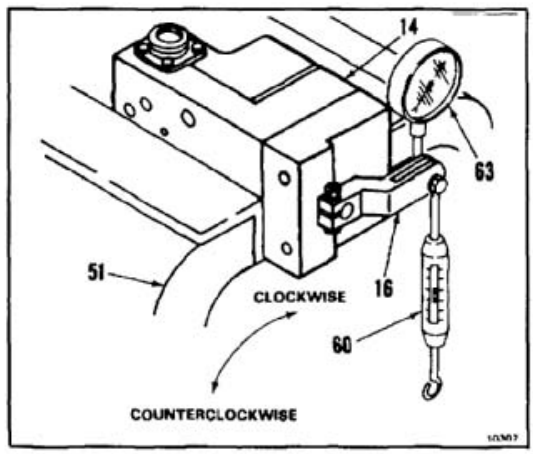
23. Mount chassis (14) in vise (51).
24. Install shim (52) on shaft (53).
25. Align mark on chassis (14) and stop plate (54). Install plate on shaft (53).
26. Position and hold **0.002 inch** feeler gage (55) between shim (52) and plate (54).
27. Align marks on arm (56) and chassis (14). Install arm on shaft (53) and slide against plate (54). Install bolt (57), two washers (58), and nut (59) in arm. Tighten nut until arm does not slide on shaft.
28. Attach scale (60) to nut (59). Position scale parallel to shaft (53). Apply **6 pounds** inward to nut (59). Check gap between shim (52) and plate (54). Gap shall not be less than **0.002 inch**. If gap is less, perform steps 29 thru 33. If gap is more, go to step 34.
29. Measure gap X. Subtract X from **0.002** to give Y. Use feeler gages.
30. Loosen nut (59). Remove arm (56) and plate (54).
31. Measure thickness Z of shim (52). Add Y of step 29 to Z to give thickness A.
32. Install shim (61) of thickness A, on shaft (53), in place of shim (52).
33. Repeat steps 25 thru 28 with shim (61) installed.



34. Attach scale (60) to nut (59). Position scale parallel to shaft (53). Apply **6 pounds** outward to nut. Remove gage (55) and check gap between shim (52 or 61) and plate (54). Gap shall not be more than **0.005 inch**. If gap is more, perform steps 35 thru 38. If gap is not more, go to step 39.
35. Measure gap B. Subtract **0.002 inch** from B for distance C. Use feeler gages.
36. Loosen nut (59). Remove arm (56) and plate (54).
37. Install shims of thickness C on shaft (53).
38. Repeat steps 25 thru 28.
39. Torque nut (59) **23 inch-pounds**.



40. Attach scale (60) to arm (16).
41. Position, then preload dial indicator (63) on arm (16). Align with scale (60).
42. Apply **1.35 pounds** clockwise to arm (16). Record indicator (63) reading 'X'.
43. Apply **1.35 pounds** counterclockwise to arm (16). Record indicator (63) reading 'Y'.
44. Subtract Y from X. Result shall not be more than **0.008 inch**.
45. Remove chassis (14) from vise (51).



FOLLOW-ON MAINTENANCE:

Perform AFCS bench test (Task 11-279).

END OF TASK

11-162 INSTALL PITCH CCD ACTUATOR 11-162

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Lockwire (E227)

Parts:

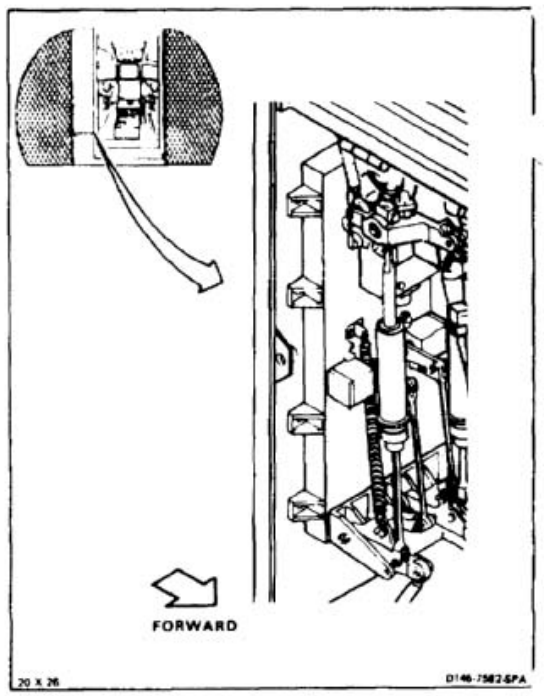
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-38
Task 11-54
Task 11-279



CAUTION

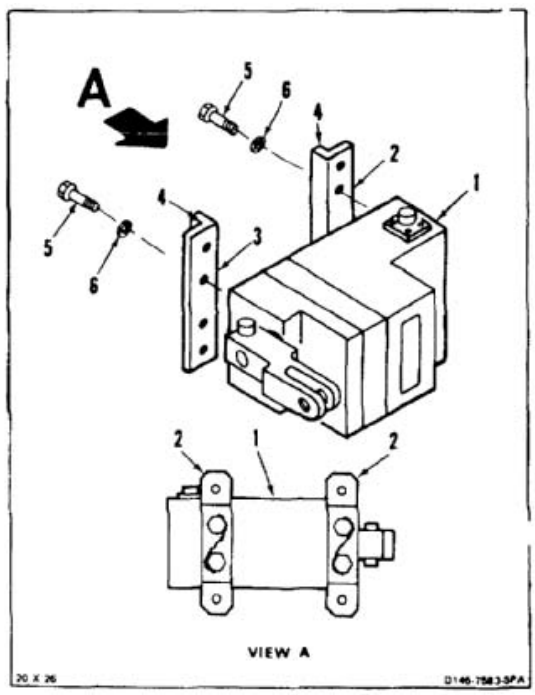
Make sure bushings are in arm before installing bolts or component damage will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. If pitch CCD actuator (1) is a replacement, check if actuator arm is at neutral (Task 11-38).
2. Position two supports (2 and 3) on actuator (1), lugs (4) away from actuator. Install four bolts (5) and four washers (6). Torque bolts to **40 inch-pounds**.
3. Lockwire four bolts (5). Use lockwire (E227).

INSPECT



WARNING

FLIGHT SAFETY PARTS

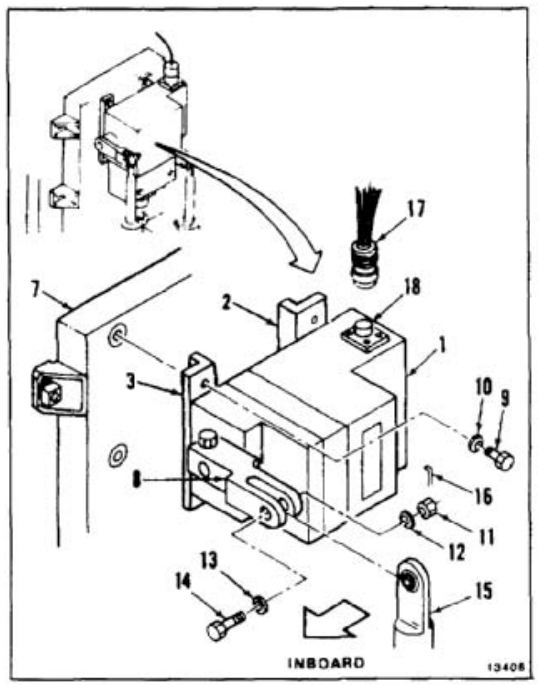
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the pallet assembly.

Ensure actuator mounting supports are properly installed including safety wire between mounting bolts.

Ensure proper torque values are utilized when installing the actuator supports to pallet mounting hardware.

Ensure proper attaching hardware (self retaining type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing componets will cause loss of control.



4. Position actuator (1) on pallet (7), arm (8) inboard and supports (2 and 3) to pallet. Install four bolts (9), and four washers (10). Torque bolts to **45 inch-pounds**.
5. Remove nut (11), two washers (12 and 13), and bolt (14) from spring (15).
6. Position spring (15) in arm (8). Install bolt (14), two washers (13 and 12), and nut (11).
6.1. Torque nut (11) to **30 inch-pounds**. If necessary, continue tightening to align cotter pin holes. Do not exceed **45 inch-pounds**. Install cotter pin (16).
7. Check bolt (14). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 6.
8. Connect connector (17) to receptacle (18) of actuator (1). Remove tag.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform operational check of advanced flight control system (TM 55-1520-240-T).
Perform operational check of flight control system (TM 55-1520-240-T).
Close closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-163 REMOVE DASH ACTUATOR 11-163

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

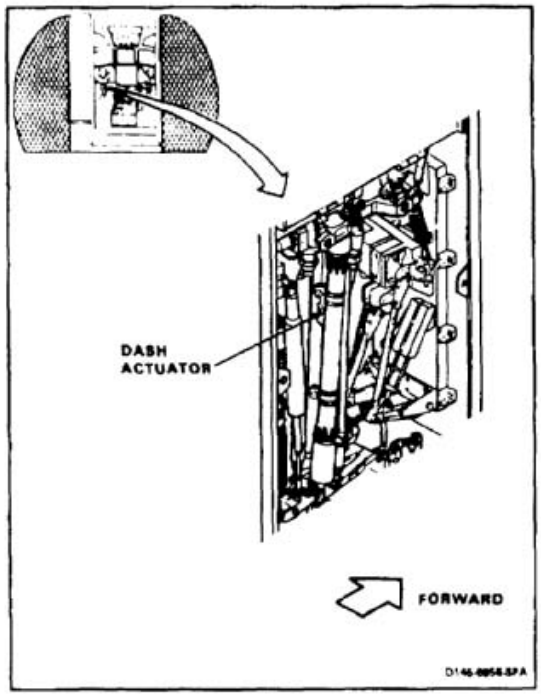
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

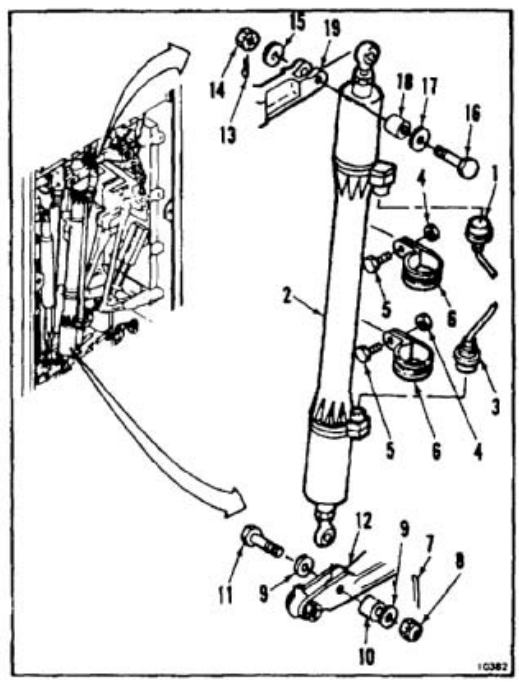
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
DASH Actuator Fully Retracted (TM 55-1520-240-T)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Safety Block (T31) Installed (Task 11-28)



NOTE

If a crack in the bellcrank is suspected, refer to TM 1-1520-253-23.

1. Tag and disconnect No. 1 AFCS connector (1) from upper end of DASH actuator (2).
2. Tag and disconnect No. 2 AFCS connector (3) from lower end of actuator (2).
3. Remove two nuts (4) and screws (5) from two clamps (6). Remove clamps.
4. Remove cotter pin (7), nut (8), two washers (9), bushing (10), and bolt (11) from bellcrank (12). Disconnect actuator (2) from bellcrank.
5. Install bolt (11), two washers (9), bushing (10), and nut (8) loosely in bellcrank (12).
6. Remove cotter pin (13), nut (14), and washer (15) from bolt (16). Support actuator (2). Remove bolt (16), washer (17), and bushing (18) from bellcrank (19). Remove actuator.
7. Install bolt (16), two washers (17 and 15) and nut (14) loosely in bellcrank (19).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-163.1 REPLACE UPPER OR LOWER DIFFERENTIAL AIRSPEED HOLD (DASH) ACTUATOR 11-163.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Solvent (E245)
Sealant (E332.1)
Gloves (E186)
Cloths (E120)

Parts:

Washers
Screws

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Off Helicopter Task

References:

TM 55-1520-240-23P

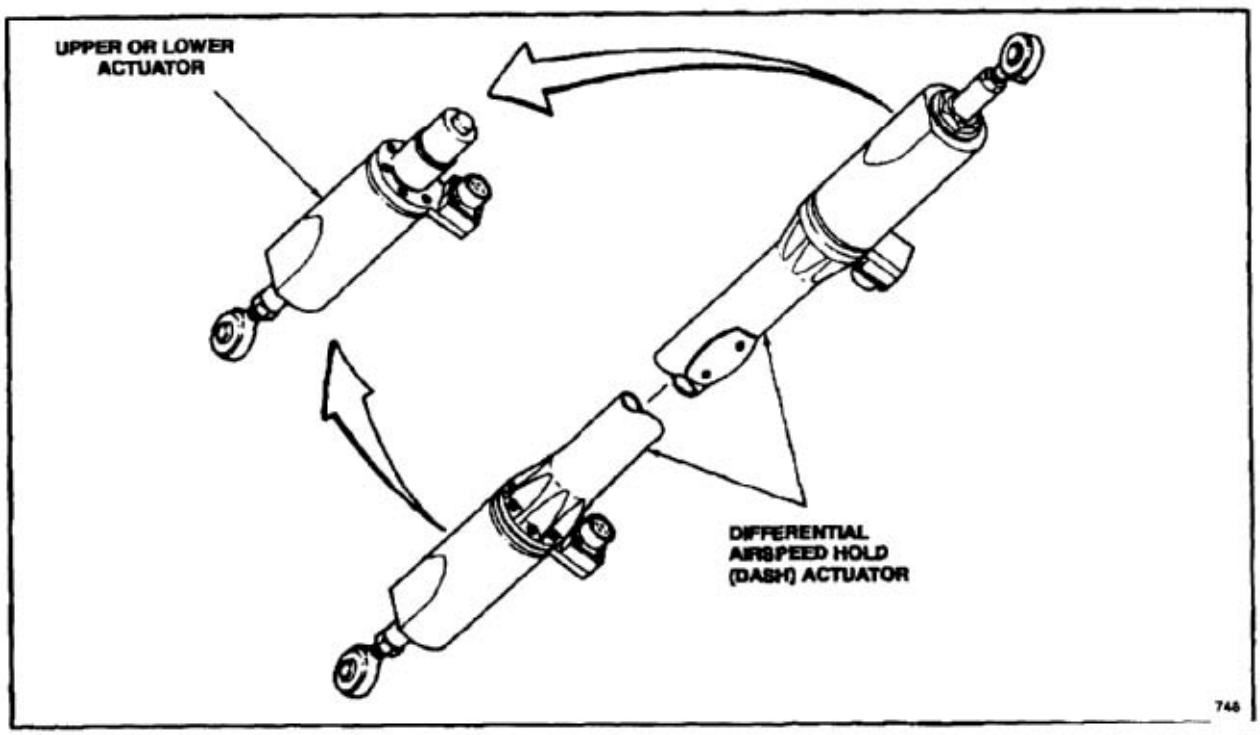
General Safety Instructions:

WARNING

Solvent (E245) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skid or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Sealant (E332.1) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

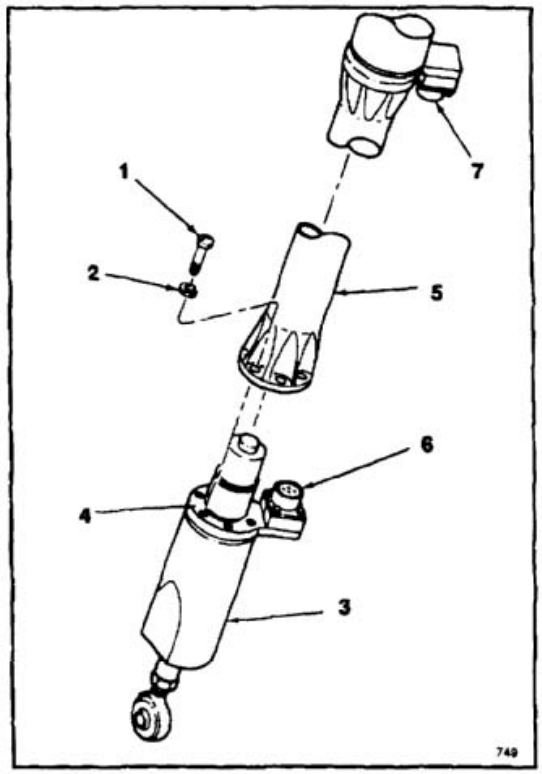


11-163.1 REPLACE UPPER OR LOWER DIFFERENTIAL AIRSPEED HOLD (DASH) ACTUATOR (Continued) 11-163.1

NOTE

Procedure is same to replace upper or lower DASH actuator. Lower DASH actuator is shown here.

1. Soak head of six screws (1) with solvent (E245). Remove sealant. Wear gloves (E186). Use cloths (E120).
2. Remove six screws (1) and washers (2) from lower actuator (3).
3. Clean surface (4) of replacement actuator (3). Use solvent (E245) and cloths (E120). Wear gloves (E186).
4. Apply sealant (E332.1) to surface (4). Wear gloves (E186).
5. Position actuator (3) on tube fitting (5). Align receptacle (6) with upper receptacle (7).
6. Apply sealant (E332.1) to threads of six screws (1). Wear gloves (E186).
7. Install six washers (2) and screws (1) in actuator (3).
8. Apply sealant (E332.1) to heads of screws (1). Wear gloves (E186).



FOLLOW-ON MAINTENANCE:

Install DASH actuator (Task 11-164).

END OF TASK

11-163.2 ADJUST DIFFERENTIAL AIRSPEED HOLD (DASH) ACTUATOR (AVIM) 11-163.2

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Electronic Equipment Tool Kit, NSN
5180-00-064-5178
Trammel
Power Supply, 28 Vdc
Stop Watch

Materials:

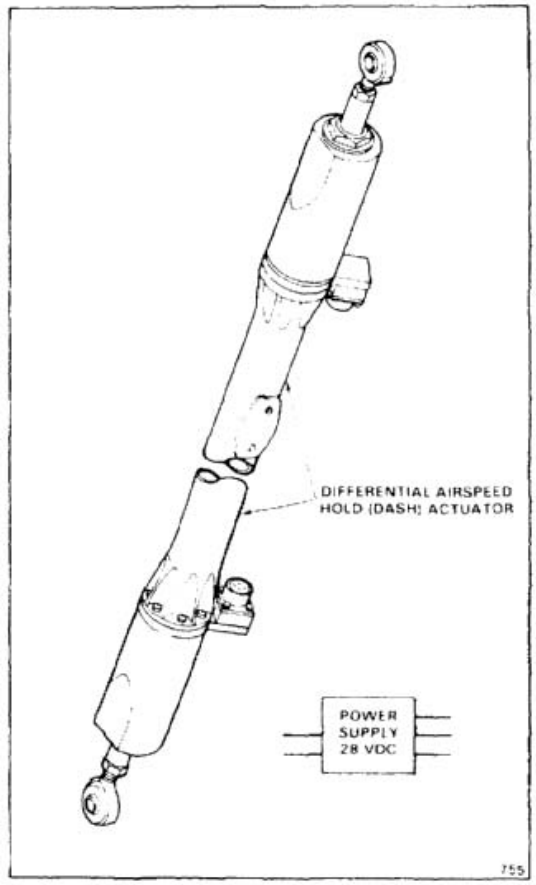
None

Personnel Required:

Avionic Mechanic
Medium Helicopter Repairer
Inspector

Equipment Condition:

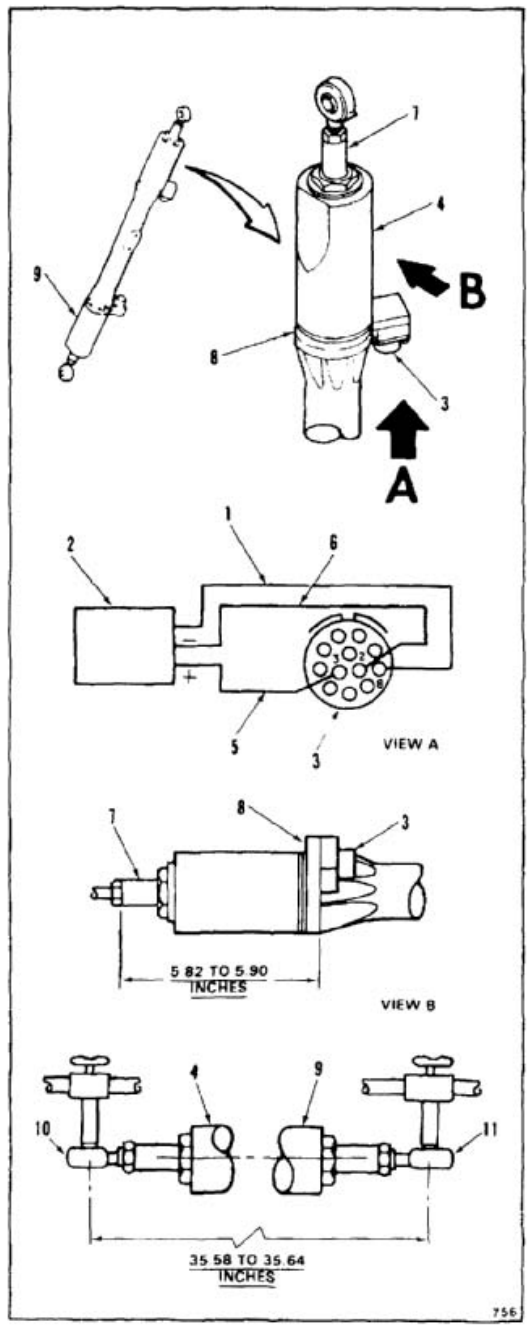
Off Helicopter Task



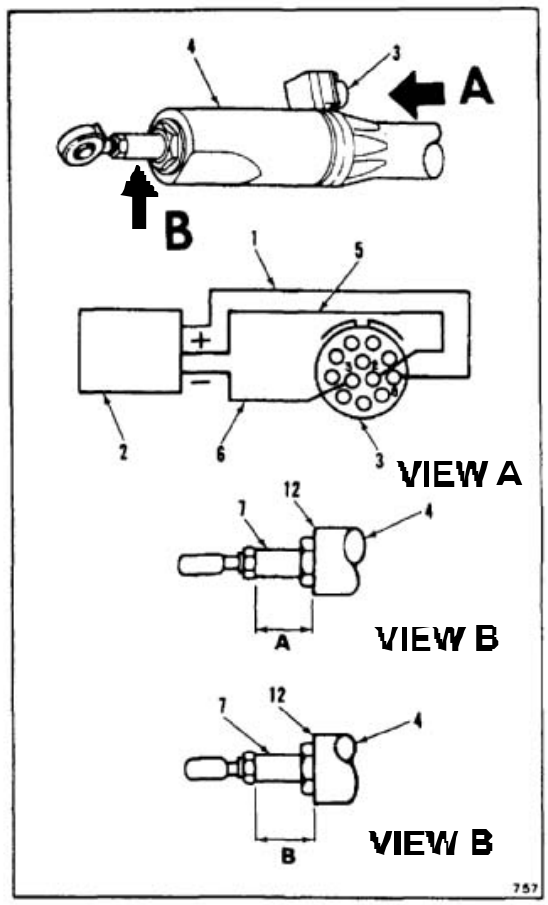
1. Connect ground wire (1) from power supply (2) to pin 8 of receptacle (3) of upper actuator (4).
2. Set power supply (2) to OFF.
3. Connect positive wire (5) from supply (2) to pin 3 of receptacle (3).
4. Connect negative wire (6) from supply (2) to pin 2 of receptacle (3).
5. Set power supply (2) to ON. When piston (7) stops retracting or does not move, set supply to OFF.
6. Measure distance between end of piston (7) and flange (8) of actuator (4). Measurement shall be **5.82 to 5.90 inches**.
7. Perform steps 1 thru 6 for lower actuator (9).
8. Measure distance between centers of rod ends (10 and 11) of actuators (4 and 9). Use trammel. Distance shall be **35.58 to 35.64 inches**.

NOTE

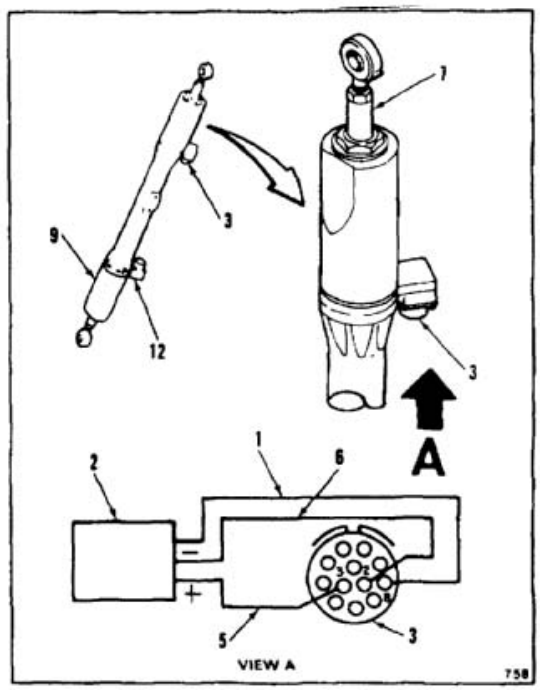
Trammel points must be tight fit in rod ends.



9. Connect ground wire (1) from supply (2) to pin (8) of receptacle (3) of actuator (4).
10. Set supply (2) to OFF.
11. Connect positive wire (5) from supply (2) to pin 2 of receptacle (3).
12. Connect negative wire (6) from supply (2) to pin 3 of receptacle (3).
13. Measure distance A between surface (12) and end of piston (7) of actuator (4).
14. Set supply (2) to ON. Check movement of piston (7). Piston shall fully extend in **3.5 to 6.0 seconds**. Piston movement shall be smooth.
15. Measure distance B between surface (12) and end of piston (7).
16. Subtract distance A of step 13 from distance B of step 15. Result shall be between **0.66 to 0.72 inch**.



17. Set supply (2) to OFF.
18. Connect positive wire (5) from supply (2) to pin 3 of receptacle (3).
19. Connect negative wire (6) from supply (2) to pin 2 of receptacle (3).
20. Set supply to ON. Check movement of piston (7). Piston shall fully retract in **3.5 to 6.0 seconds**. Piston movement shall be smooth.
21. Repeat step 8.
22. Perform steps 9 thru 21 for lower actuator (9).
23. Set power supply (2) to OFF.
24. Disconnect three wires (1, 5, and 6) from receptacle (12) of actuator (9).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-163.3 REMOVE DASH ACTUATOR ROD END BEARING 11-163.3

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Vise, Soft Jaws

Materials:

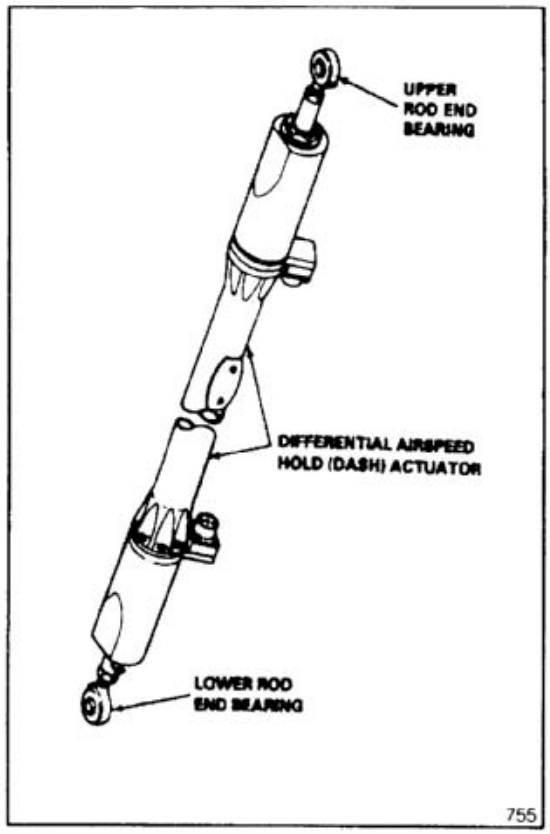
None

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

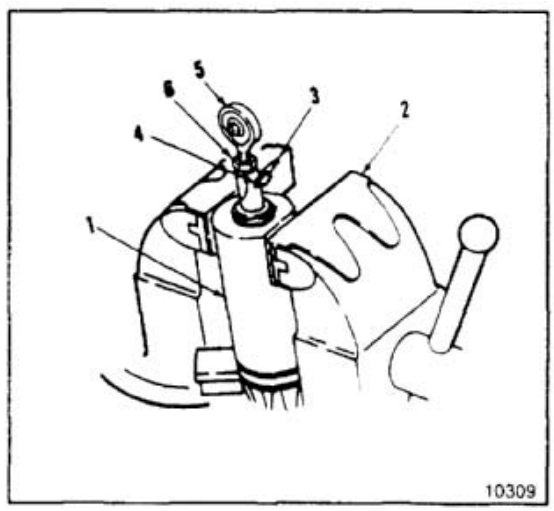
Off Helicopter Task



NOTE

Upper or lower rod end bearing is removed in same manner, except as noted.

1. Clamp lower DASH actuator (1) in vise (2).
2. Remove lockwire (3).
3. On lower rod end bearing only, using a drift, drive out roll pin (4).
4. Hold rod end bearing (5) with open end wrench. Loosen checknut (6).
5. Remove rod end bearing (5).
6. Remove checknut (6) from rod end bearing (5).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-163.4 INSTALL DASH ACTUATOR ROD END BEARING 11-163.4

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Vise, Soft Jaws
Protractor

Materials:

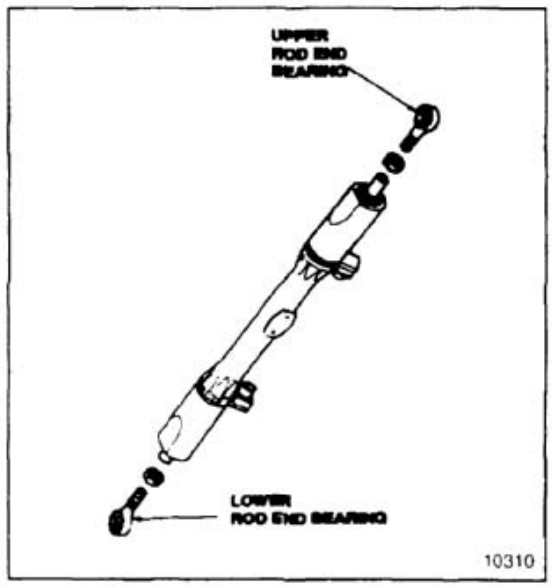
Lockwire (E231)
Epoxy Primer (E292)
Gloves (E184.1)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

None



NOTE

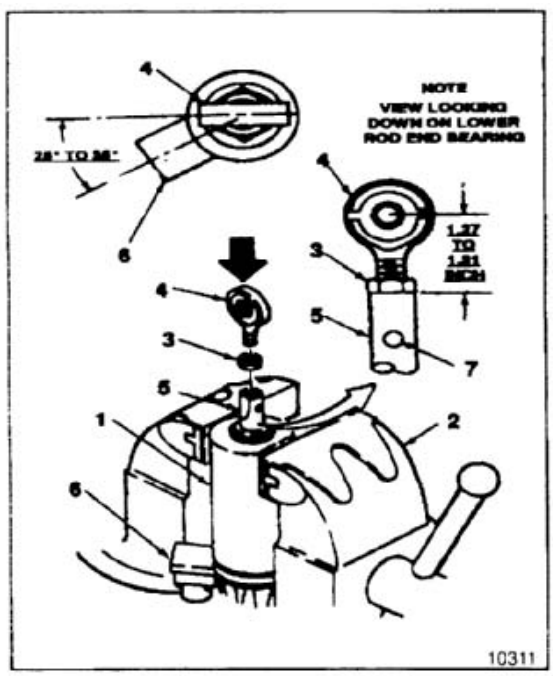
Upper or lower rod end bearing is installed in same manner, except as noted.

1. Install actuator (1) in vise (2) with lower rod end up.
2. Install checknut (3) on rod end bearing (4).
3. Install rod end bearing (4) into actuator shaft (5) to **1.27 to 1.31 inch** dimension.
4. Rotate and position rod end bearing (4) to **30°** angle with relation to electrical connector block (6). Use protractor. Tighten checknut (3).

NOTE

Steps 5 thru 9 apply to lower rod end bearing only.

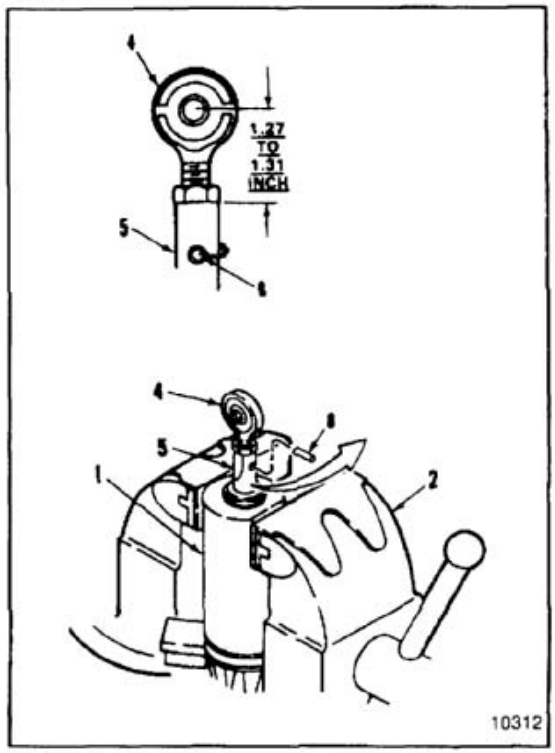
5. On lower rod end bearing only, drill hole (7) through rod end bearing threads from both sides using slightly smaller drill than existing hole in actuator shaft (5). Enlarge hole to **0.094 to 0.97 inch**.



WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

6. On lower rod end bearing only, coat roll pin (8) with epoxy primer (E292). Wear gloves (E184.1) and goggles.
7. On lower rod end bearing only, install roll pin (8) through hole (7) in actuator shaft (5) and rod end bearing (4).
8. On lower rod end bearing only, install lockwire (E231) through roll pin (8) and around actuator shaft (5).
9. Remove actuator (1) from vise (2).



INSPECT

FOLLOW-ON MAINTENANCE:

Perform adjustment of differential airspeed hold (DASH) actuator (Task 11-165).

END OF TASK

11-164 INSTALL DASH ACTUATOR 11-164

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 50 Inch-Pounds

Materials:

None

Parts:

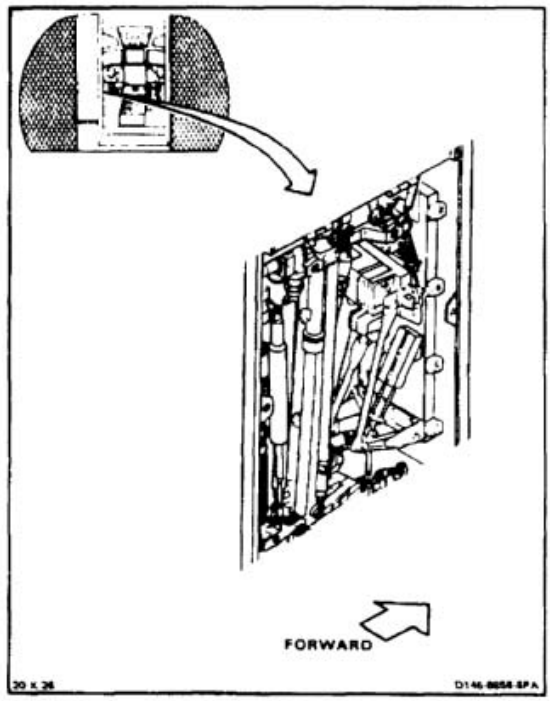
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
TM 1-1520-253-23
Task 1-13
Task 11-163.2
Task 11-163.4



CAUTION

Bushing must be in bellcranks before installing bolt; otherwise, damage to component will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

Prior to installation verify dimension of upper rod end bearing and check tightness of rod end checknut. (Reference Task 11-163.4.)

NOTE

If a crack in the bellcrank is suspected, refer to TM 1-1520-253-23.

1. If DASH actuator (1) is a replacement, perform adjustment check (Task 11-163.2).
2. Remove nut (2), two washers (3 and 5), bushing (6), and bolt (7) from upper bellcrank (8).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection.

Ensure actuator is installed with adjustable rod end up.

Ensure actuator is installed at retracted length of **35.58 to 35.64 inches**.

Ensure proper attaching hardware (self retaining type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

NOTE

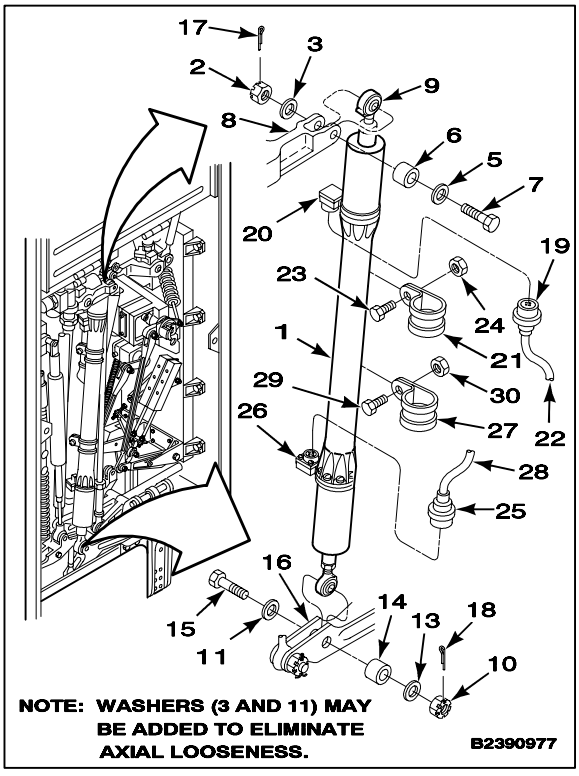
Washers (3) may be added to eliminate axial looseness.

3. Position actuator (1), small bearing (9) up and AFCS connector (20) outboard in bellcrank (8). Install bolt (7), two washers (5 and 3), bushing (6), and nut (2). Do not torque nut at this time.
4. Remove nut (10), two washer (11 and 13), bushing (14), and bolt (15) from lower bellcrank (16).

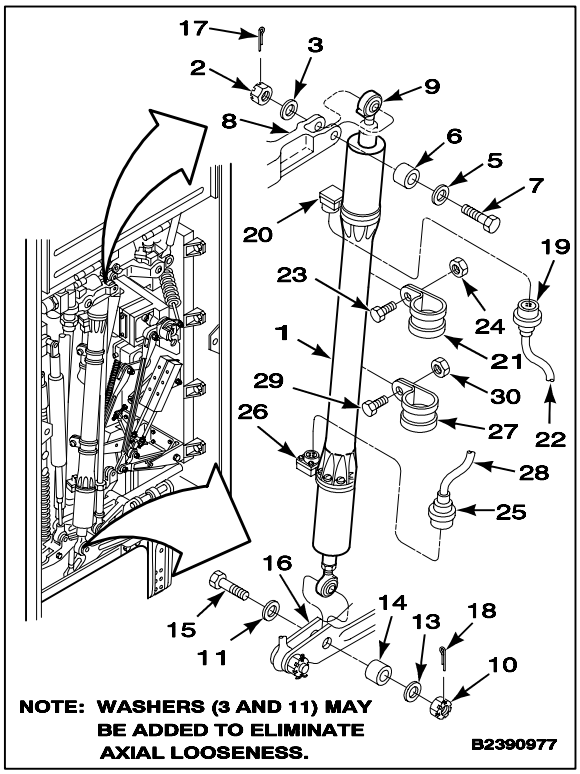
NOTE

Washers (11) may be added to eliminate axial looseness.

5. Position actuator (1), AFCS connector (26) facing outboard in bellcrank (16). Install bolt (15) bolt head facing outboard, washer (11) under bolt head, bushing (14) between bellcrank (16) washer (13) and nut (10).
6. Torque two nuts (2 and 10) to **30 inch-pounds**. If necessary, continue tightening to align cotter pin holes. Do not exceed **45 inch-pounds**. Install cotter pins (17 and 18).



7. Check two bolts (7 and 15). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolts rotate or are loose, add washer under nut and repeat step 6.
8. Connect No. 1 AFCS connector (19) to upper receptacle (20) of actuator (1). Remove tag from connector.
9. Position clamp (21) on actuator (1) to hold wire (22). Install screw (23) and nut (24) in clamp.
10. Connect No. 2 AFCS connector (25) to lower receptacle (26) of actuator (1). Remove tag from connector.
11. Position clamp (27) on actuator (1) to hold wire (28). Install screw (29) and nut (30) in clamp.



INSPECT

FOLLOW-ON MAINTENANCE:

Perform flight control operational check (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-165 ADJUST DIFFERENTIAL AIRSPEED HOLD (DASH) ACTUATOR 11-165

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Electronic Equipment Tool Kit, NSN 5180-00-064-5178
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

None

Parts:

Cotter Pin

Personnel Required:

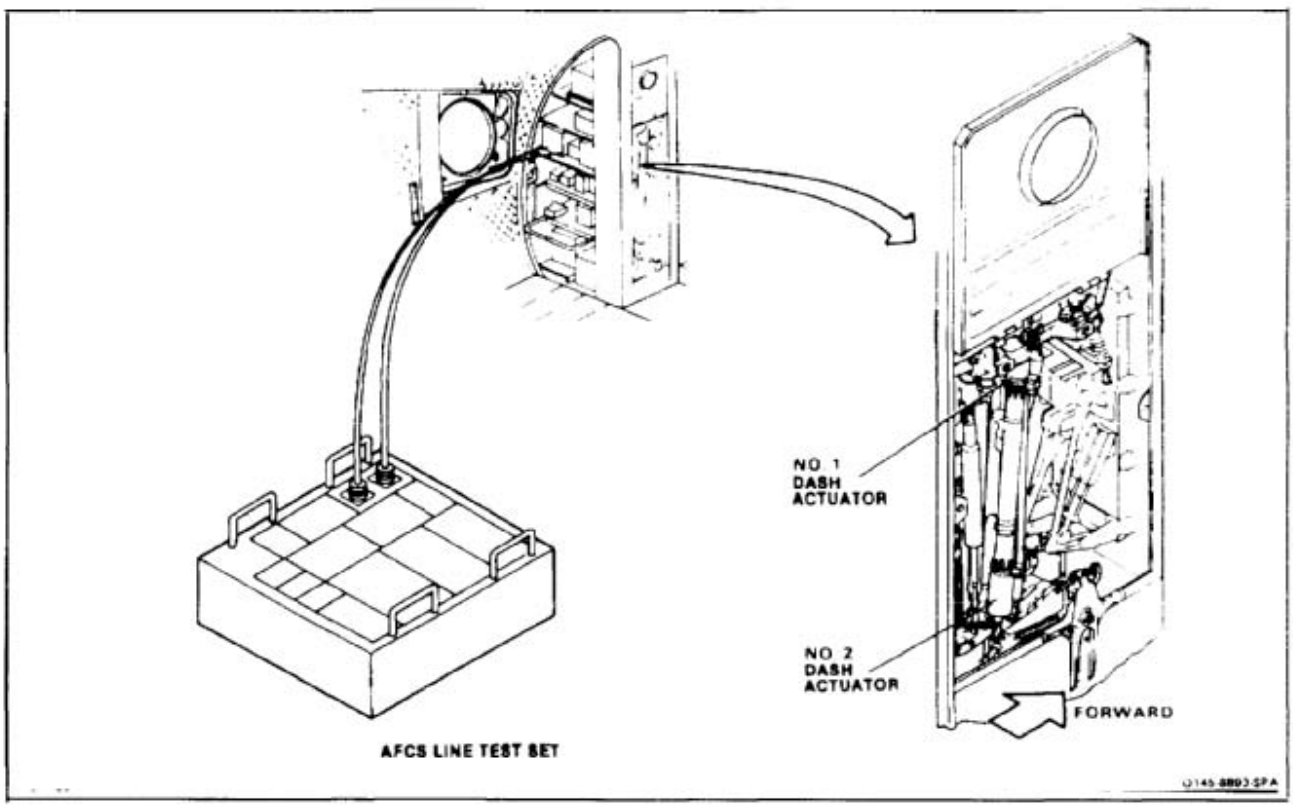
Avionic Mechanic
Medium Helicopter Repairer
Inspector

References:

TM 1-1520-253-23
TM 55-4920-429-13

Equipment Condition:

AECS Line Test Set 145G0009-1 Prepared for Use (TM 55-4920-429-13)
Pilot's and Copilot's Cockpit Controls Rigged (Task 11-42)
Cockpit Transfer Bellcranks Rigged (Task 11-46)
AFCS SYSTEM SEL Switch Set to BOTH
DASH Actuator Set Between 35.58 to 35.64 Inches (Task 11-50)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Panel Removed (Task 2-2)
Copilot's Rigging Fixture Installed (Task 11-22)
Copilot's Pitch Travel Quadrant and Pointer (T121) Installed (Task 11-22)
DASH Actuator Adjusted (Task 11-163.2)



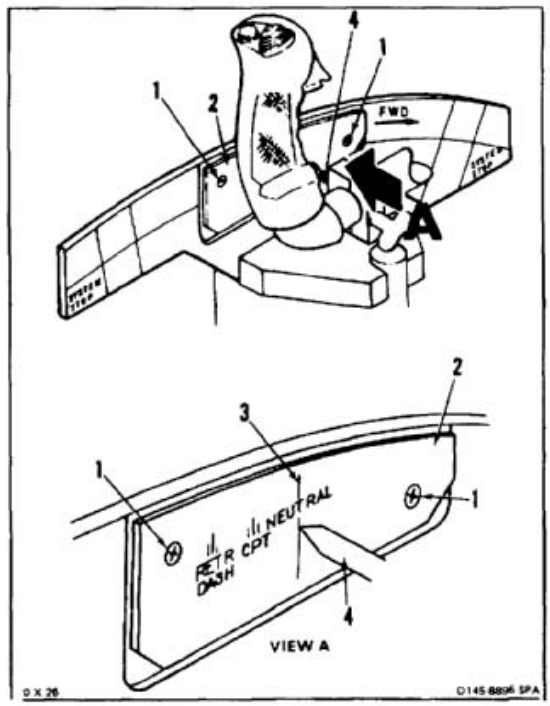
NOTE

Cyclic control stick is set at neutral.

NOTE

If a crack in the bellcrank is suspected during adjustment, refer to TM 1-1520-253-23.

1. Working in cockpit, loosen two screws (1) on plate (2). Align NEUTRAL line (3) on plate with pointer (4). Tighten screws.

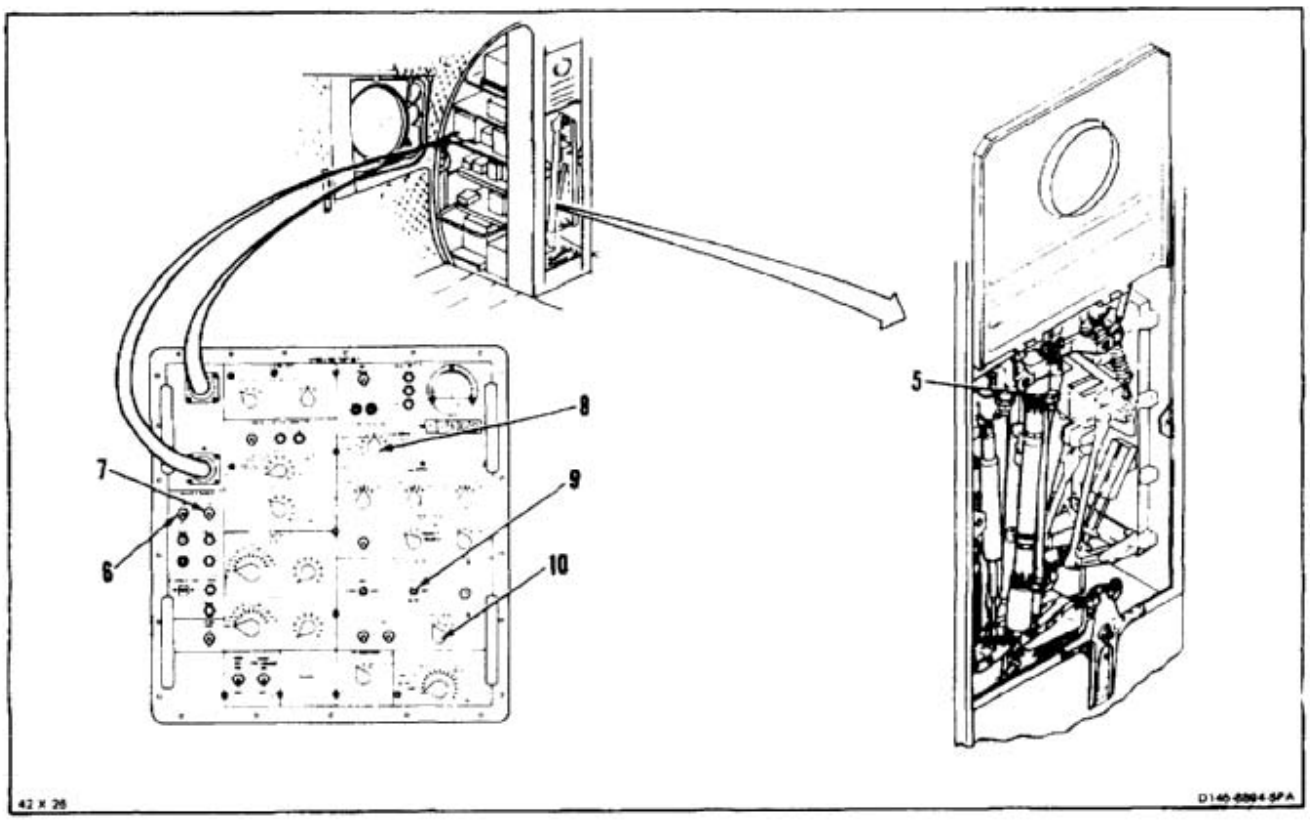


NOTE

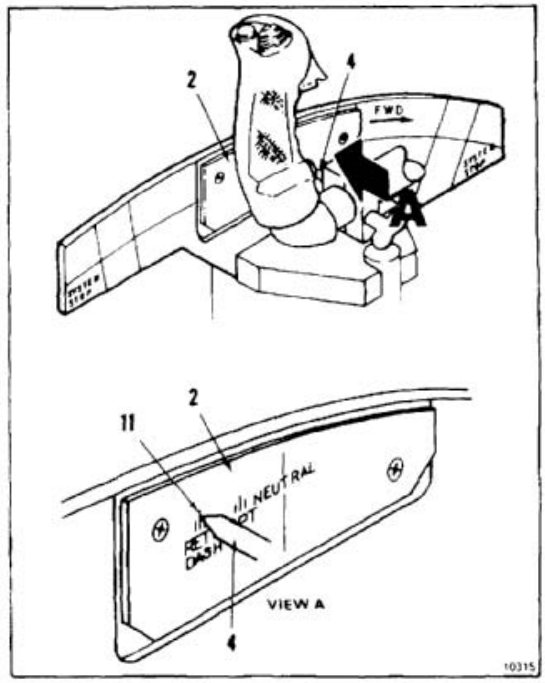
Procedure is same to adjust upper or lower DASH actuator. Adjust of upper DASH actuator is shown here.

Upper actuator is controlled by No. 1 AFCS. Lower actuator is controlled by No. 2 AFCS.

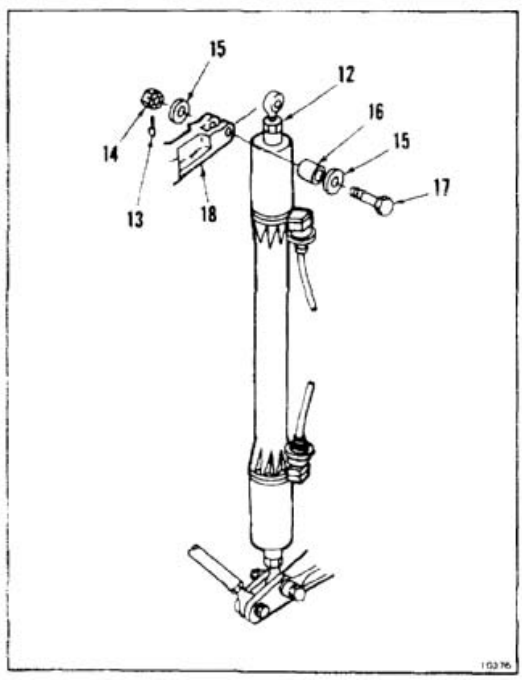
2. To retract upper actuator (5), set AFCS line test set switches as follows:
   a. Set power switches (6 and 7) to ON.
   b. Set METER SOURCE switch (8) to ACTUATOR DRIVE.
   c. Set ACTUATOR DRIVE DASH switch (9) to OFF.
   d. Set FEEDBACK MONITOR switch (10) to DASH.
3. Set ACTUATOR DRIVE DASH switch (9) to RETR. Upper actuator (5) shall retract.
4. Set ACTUATOR DRIVE DASH switch (9) to OFF.
5. Set power switches (6 and 7) to OFF.
6. Shut down electrical and hydraulic power.



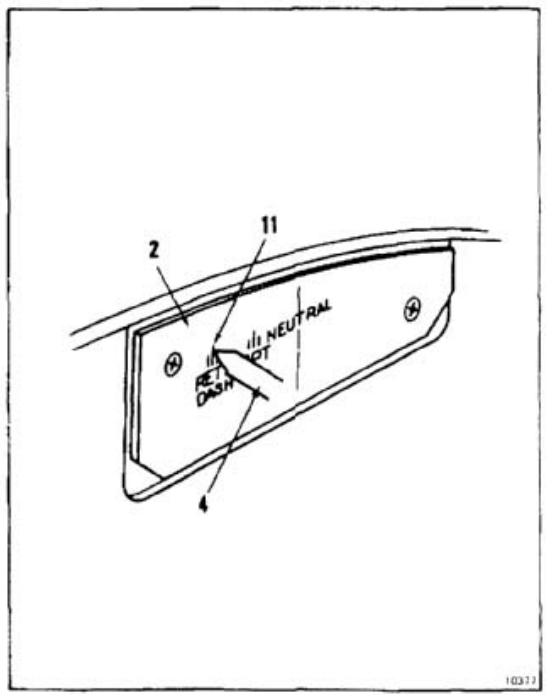
7. Check position of pointer (4). Pointer shall align with RETR DASH line (11) on plate (2). If pointer aligns, go to step 16. If not, perform steps 8 thru 15.



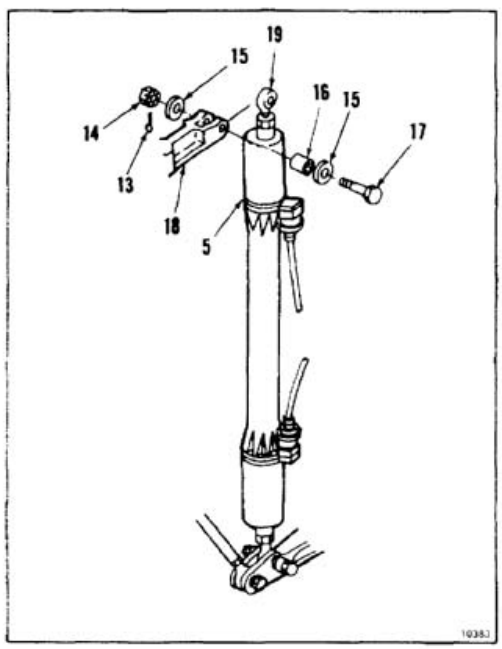
8. Loosen locknut (12).
9. Remove cotter pin (13), nut (14), two washers (15), bushing (16), and bolt (17) from bellcrank (18).



10. Align pointer (4) with line (11) on plate (2) and hold position.



11. Adjust rod end (19) until actuator (5) can be positioned in bellcrank (18) with bolt (17) loosely installed.
12. Install bolt (17), two washers (15), bushing (16), and nut (14) in bellcrank (18).
13. Torque nut (14) to **30 inch-pounds**. Continue tightening only as needed to align cotter pin holes. Do not exceed **45 inch-pounds**.
14. Install cotter pin (13).
15. Check bolt (17). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat steps 13 and 14.



INSPECT

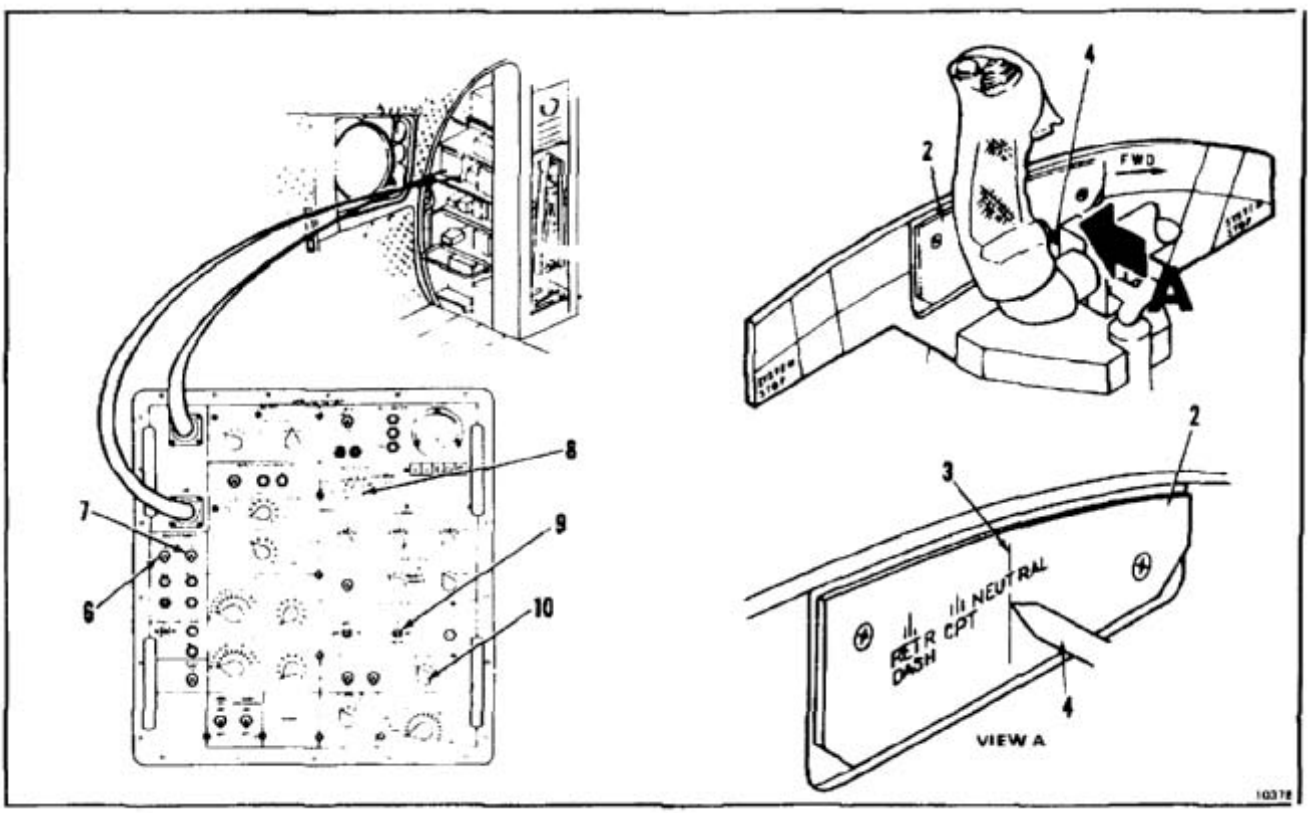
16. Apply electrical and hydraulic power.
17. Position pointer (4) at neutral line (3) as follows:
    a. Set power switches (6 and 7) to ON.
    b. Set METER SOURCE switch (8) to ACTUATOR DRIVE.
    c. Set ACTUATOR DRIVE DASH switch (9) to OFF.
    d. Set FEEDBACK MONITOR switch (10) to DASH.
    e. Set ACTUATOR DRIVE DASH switch (9) to EXT. Hold until pointer (4) is aligned with NEUTRAL line (3) on plate (2), then set switch (9) to OFF.

INSPECT

18. Shutdown electrical and hydraulic power.
19. If no further testing is required, shut down AFCS line test set 145G009-1 (TM 55-4920-429-13).

FOLLOW-ON MAINTENANCE:

Perform AFCS interface test (Task 11-280).
Remove copilot's pitch travel quadrant and pointer (Task 11-25).
Remove copilot's rigging fixture (Task 11-23).
Install closet panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).



END OF TASK

11-166 REMOVE YAW POSITION TRANSDUCER 11-166

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

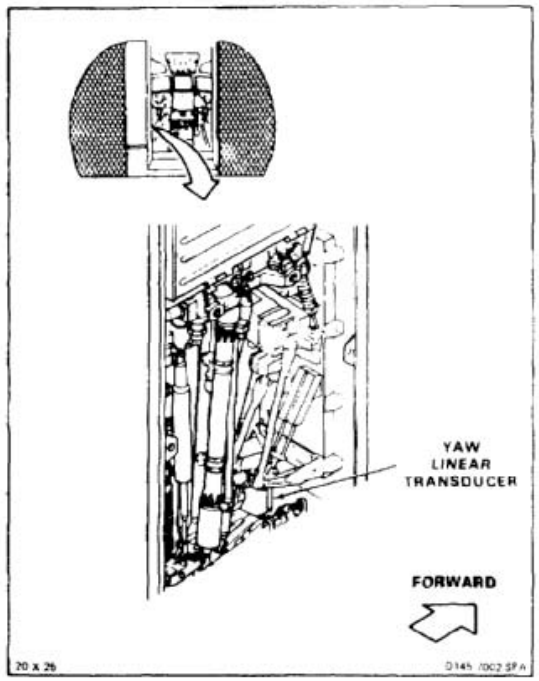
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)

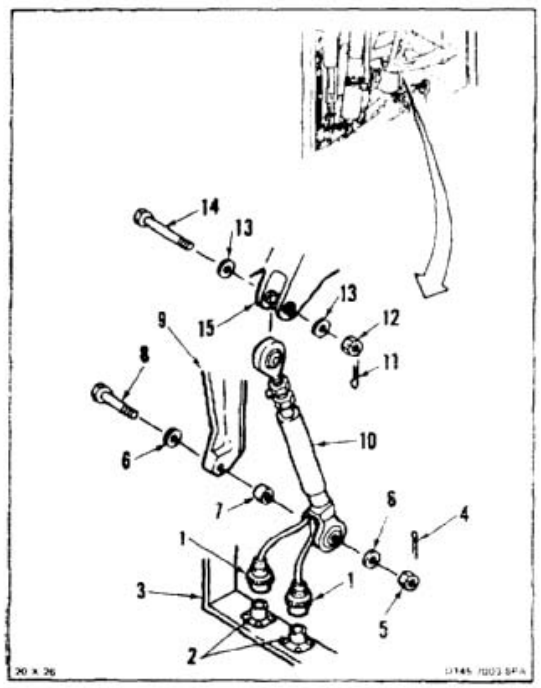


NOTE

Attaching bolts, washers and nuts will be temporarily installed after removing transducer.

NOTE

If a crack in the bellcrank is suspected during removal, refer to TM 1-1520-253-23.



1. Tag and disconnect two connectors (1) from receptacles (2) on structure (3).
2. Remove cotter pin (4), nut (5), two washers (6), spacer (7), and bolt (8) from support (9). Disconnect yaw linear transducer (10) from support.
3. Install bolt (8), two washers (6), spacer (7), and nut (5) loosely in support (9).
4. Remove cotter pin (11), nut (12), two washers (13), and bolt (14) from bellcrank (15). Remove transducer (10) from bellcrank.
5. Install bolt (14), two washers (13), and nut (12) loosely in bellcrank (15).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-167 INSTALL YAW POSITION TRANSDUCER 11-167

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

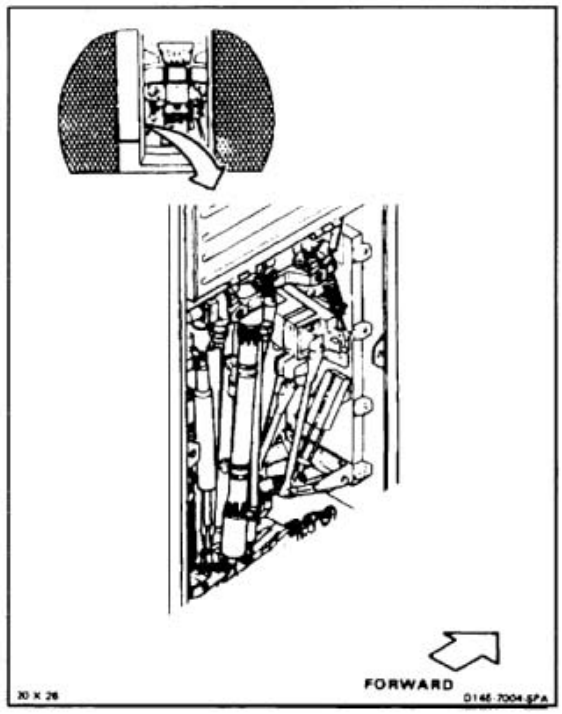
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Bushings must be in bellcrank and support before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

After electrical nulling procedure is accomplished, ensure adjustable rod end bearing assembly is properly saftied by torquing jam nut against locking tab washer assembly per BAC5009, and installing safety wire between jam nut and locking tab washer assy per BAC5018.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

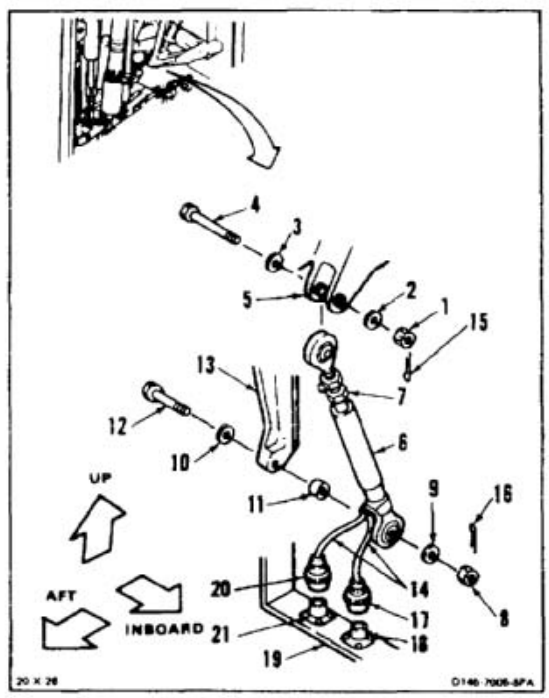
Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position yaw linear transducer (6), adjustable end (7) up, in bellcrank (5). Install bolt (4), two washers (3 and 2), and nut (1). Do not tighten nut at this time.
3. Remove nut (8), two washers (9 and 10), spacer (11), and bolt (12) from support (13).
4. Position transducer (6), wires (14) aft, on support (13) with spacer (11) between transducer and support. Install bolt (12), two washers (10 and 9), spacer (11) between support and transducer, and nut (8).
5. Torque two nuts (1 and 8) to **30 to 45 inch-pounds**. Install two cotter pins (15 and 16).
6. Check two bolts (4 and 12). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 5.

CAUTION

Connectors must be installed in fully locked position; otherwise, component malfunction can result.

7. Connect connector (17) of wire with green band of transducer (6) to inboard receptacle (18) on structure (19). Remove tag.
8. Connect connector (20) of wire with red band of transducer (6) to outboard receptacle (21) on structure (19). Remove tag.



FOLLOW-ON MAINTENANCE:

Perform yaw linear transducer adjustment check (Task 11-176).
Perform operational test of advanced flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-168 REMOVE PITCH LINEAR TRANSDUCER 11-168

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

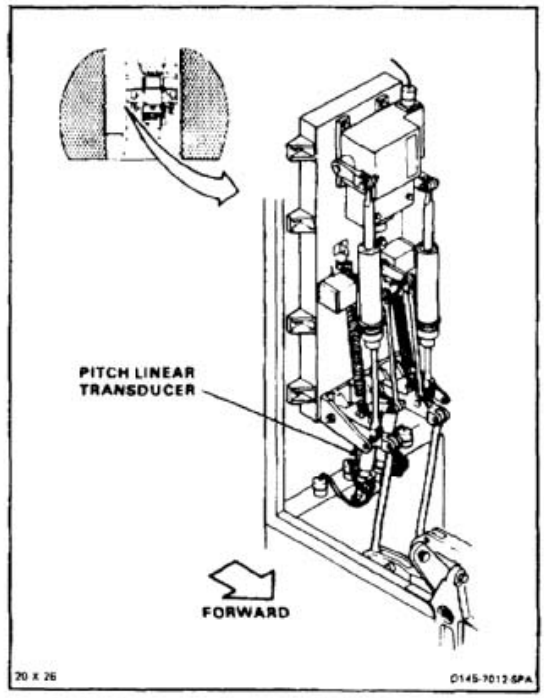
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)

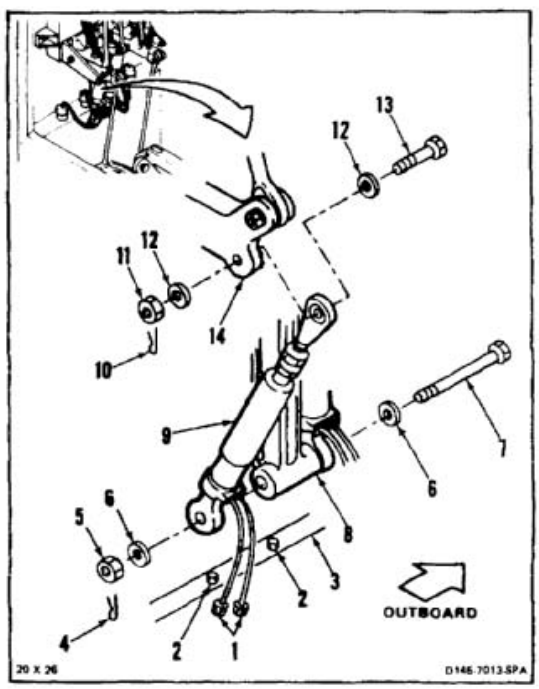


NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing transducer.

NOTE

If a crack in the bellcrank is suspected during removal, refer to TM 1-1520-253-23.



1. Tag and disconnect two connectors (1) from receptacles (2) on structure (3).
2. Remove cotter pin (4), nut (5), and washer (6) from bolt (7) in support (8). Slide bolt outboard to release pitch linear transducer (9). Disconnect transducer from support.
3. Install washer (6) and nut (5) loosely on bolt (7) in support (8).
4. Remove cotter pin (10), nut (11), two washers (12), and bolt (13) from bellcrank (14). Remove transducer (9).
5. Install bolt (13), two washers (12), and nut (11) loosely in bellcrank (14).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-169 INSTALL PITCH POSITION TRANSDUCER 11-169

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

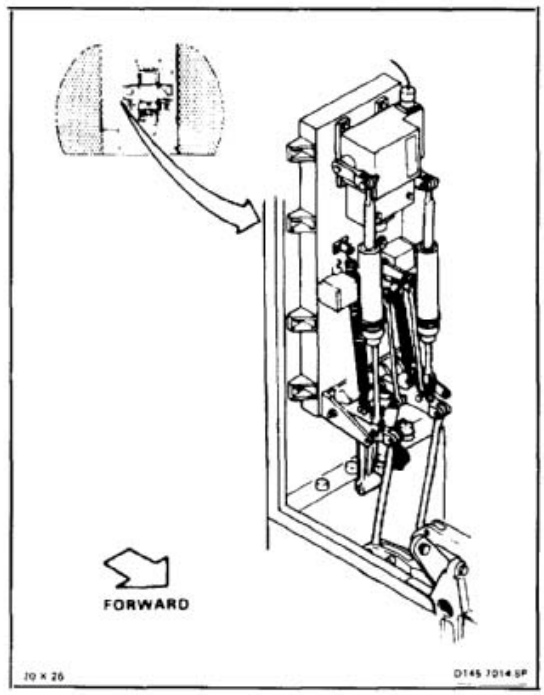
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Make sure bushings are in bellcrank and support before installing bolts or component damage will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

After electrical nulling procedure is accomplished, ensure adjustable rod end bearing assembly is properly saftied by torquing jam nut against locking tab washer assembly per BAC5009, and installing safety wire between jam nut and locking tab washer assy per BAC5018.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control secondary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position pitch linear transducer (6) adjustable end (7) up, on outboard side of bellcrank (5). Install bolt (4), two washers (3 and 2) and nut (1). Do not tighten nut at this time.
3. Remove nut (8) and washer (9) from bolt (10). Slide bolt outboard until flush with support (11).
4. Position transducer (6), wires (12) forward, on support (11). Install bolt (10) washer (9), and nut (8).
5. Torque two nuts (1 and 8) to **30 to 45 inch-pounds**. Install cotter pins (12 and 13).
6. Check bolts (4 and 11). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 5.

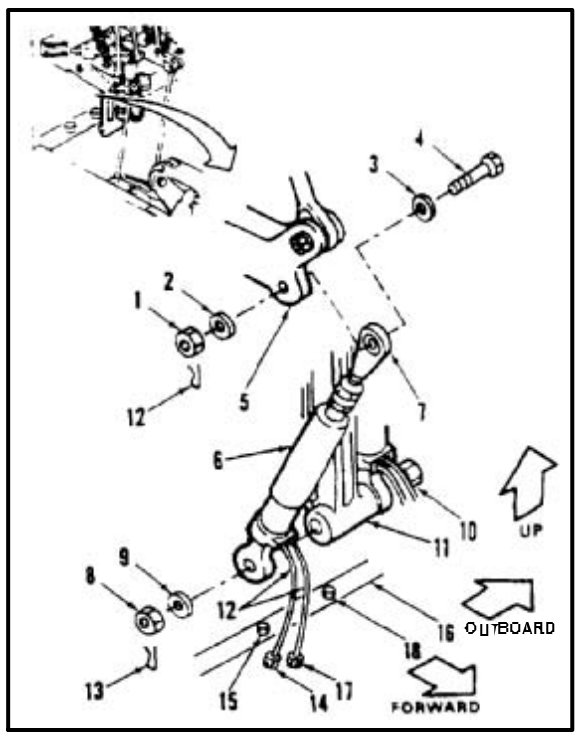
CAUTION

Connectors must be installed in fully locked position; otherwise, component malfunction can result.

7. Connect connector (14) of wire with green band of transducer (6) outboard receptacle (15) on structure (16). Remove tag.
8. Connect connector (17) of wire with red band of transducer (6) to inboard receptacle (18) on structure (16). Remove tag.

NOTE

When connecting CPT to structure receptacle, check to ensure wiring is connected to the correct marked and banded wire both ends.



INSPECT

FOLLOW-ON MAINTENANCE:

Perform pitch linear transducer adjustment check (Task 11-177).
Perform operational test of advanced flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-170 REMOVE ROLL LINEAR TRANSDUCER 11-170

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

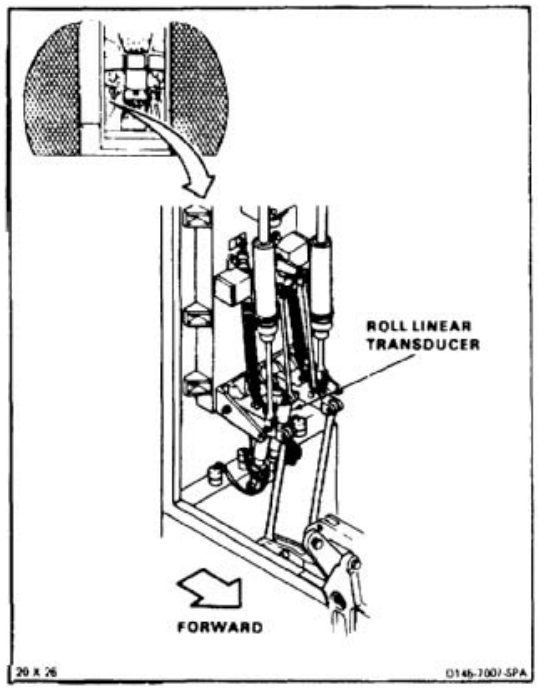
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)

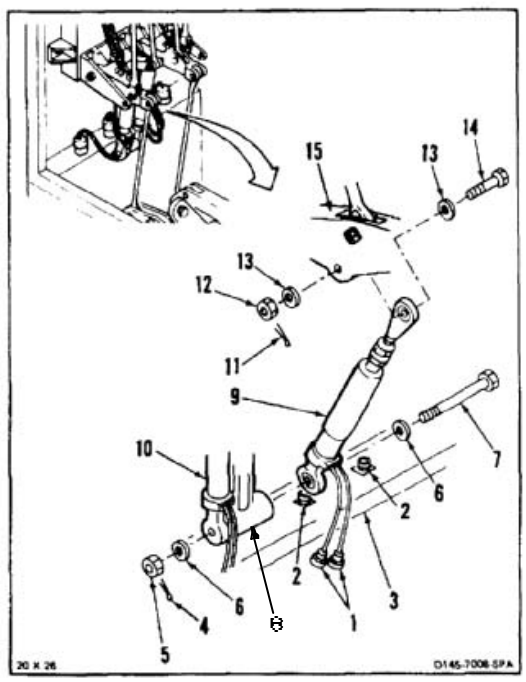


NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing transducer.

NOTE

If a crack in the bellcrank is suspected during removal, refer to TM 1-1520-253-23.



1. Tag and disconnect two connectors (1) from receptacles (2) on structure (3).
2. Remove cotter pin (4), nut (5), two washers (6), and bolt (7) from support (8). Disconnect roll linear transducer (9) from support and transducer (10).
3. Install bolt (7), two washers (6), and nut (5) loosely in support (8).
4. Remove cotter pin (11), nut (12), two washers (13), and bolt (14) from bellcrank (15). Remove transducer (9).
5. Install bolt (14), two washers (13), and nut (12) loosely in bellcrank (15).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-171 INSTALL ROLL LINEAR TRANSDUCER 11-171

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanics Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

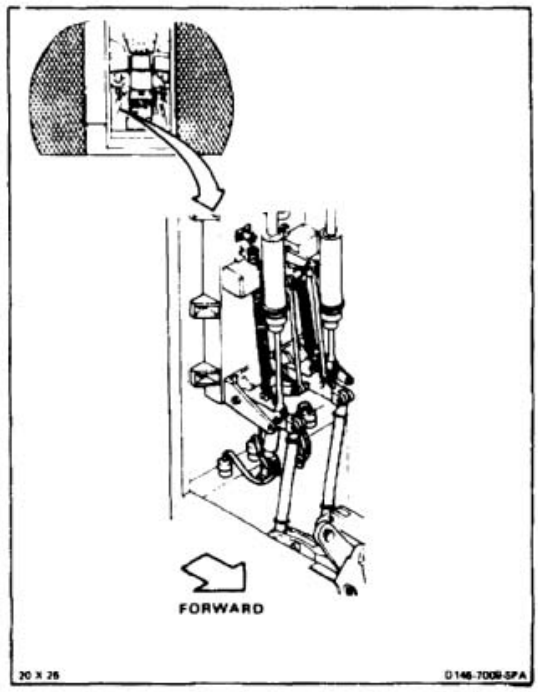
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Make sure bushings are in bellcrank and support before installing bolts or component damage will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

After electrical nulling procedure is accomplished, ensure adjustable rod end bearing assembly is properly saftied by torquing jam nut against locking tab washer assembly per BAC5009, and installing safety wire between jam nut and locking tab washer assy per BAC5018.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

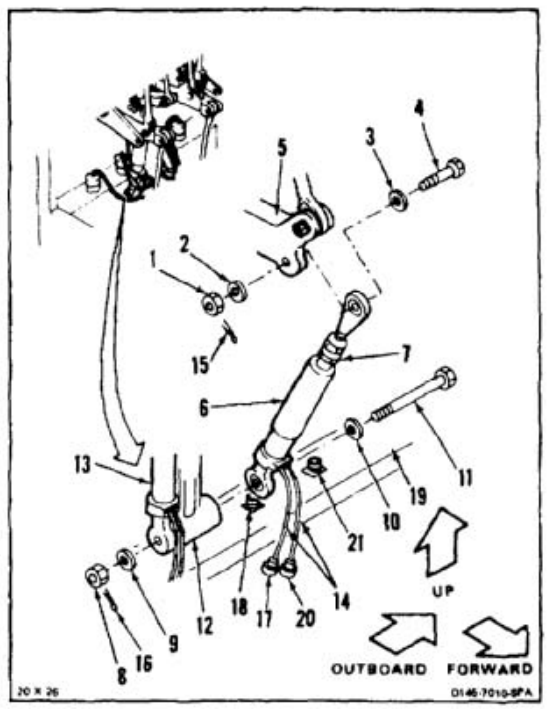
Loose attachments within flight control secondary linkage will degrade aircraft control. Missing componets will cause loss of control.

2. Position roll linear transducer (6), adjustable end (7) up, in bellcrank (5). Install bolt (4), two washers (3 and 2) and nut (1). Do not tighten nut at this time.
3. Remove nut (8), two washers (9 and 10), and bolt (11) from support (12) and transducer (13).
4. Position transducer (6), wires (14) forward, on support (12) outboard side. install bolt (11), two washers (10 and 9) and nut (8).
5. Torque two nuts (1 and 8) to **30 to 60 inch-pounds**. Install cotter pins (15 and 16).
6. Check bolts (4 and 11). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 5.

CAUTION

Connectors must be installed in fully locked position; otherwise, component malfunction can result.

7. Connect connector (17) of wire with red band of transducer (6) to inboard receptacle (18) on structure (19). Remove tag.
8. Connect connector (20) of wire with green band of transducer (6) to outboard receptacle (21) on structure (19). Remove tag.



INSPECT

FOLLOW-ON MAINTENANCE:

Perform roll control transducer adjustment check (Task 11-176).
Perform operational test of advanced flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-172 REMOVE LINEAR TRANSDUCER ROD END BEARING (AVIM) 11-172

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

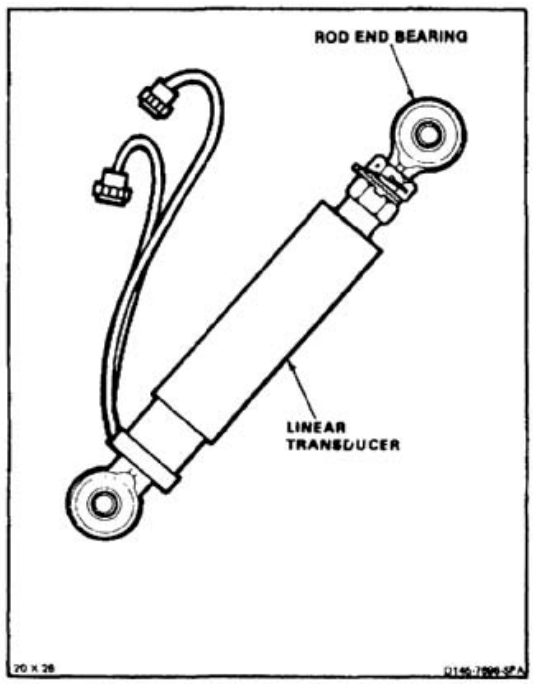
None

Personnel Required:

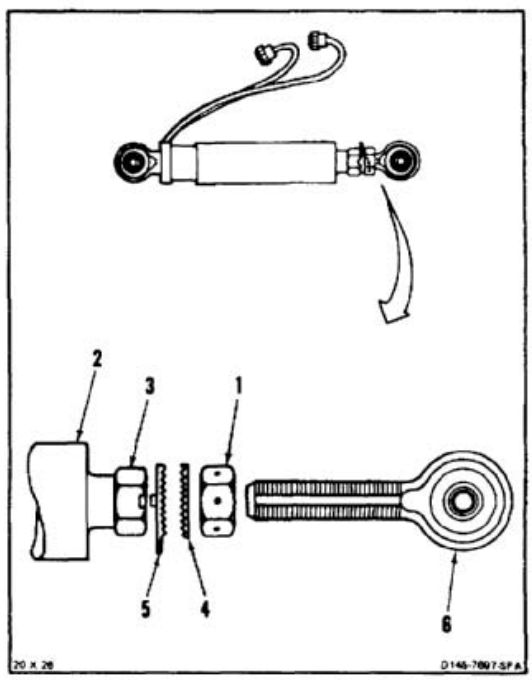
Medium Helicopter Repairer

Equipment Condition:

Off Helicopter Task



1. Remove lockwire from nut (1).
2. Hold transducer (2) with wrench on hexagon (3). Loosen nut (1) and back off several turns.
3. Separate outer part (4) of locking device from inner part (5) of locking device.
4. Unscrew rod end (6) from transducer (2).
5. Remove locking device (4 and 5) and nut (1) from rod end (6). Retain locking device and nut for reassembly.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-173 INSTALL LINEAR TRANSDUCER ROD END BEARING (AVIM) 11-173

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

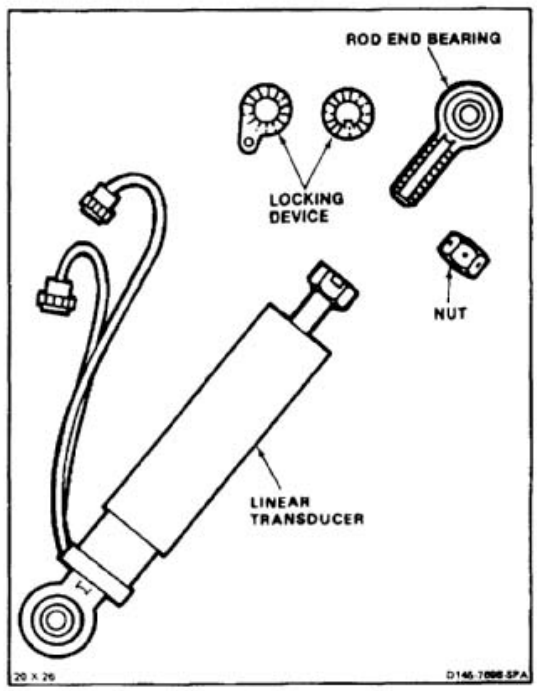
Antiseize Compound (E75)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P

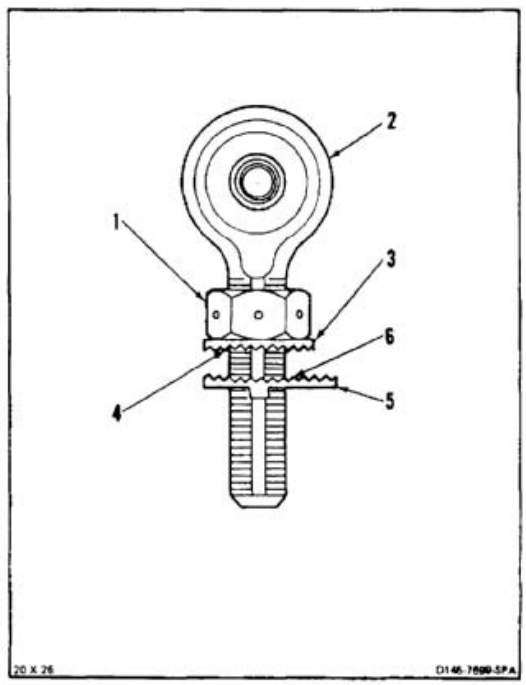


1. Assemble nut (1) on to rod end (2). Run nut to end of thread.
2. Assemble outer part (3) of locking device on to rod end (2). Serrations (4) shall face away from nut (1).
3. Assemble inner part (5) of locking device on to rod end (2). Serrations (6) shall face serrations (5) of outer part (3).

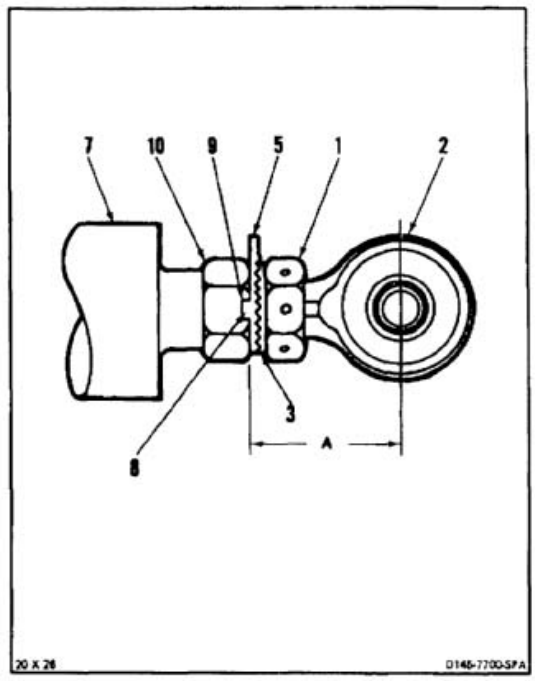
WARNING

Antiseize compound (E75) can form toxic vapors if exposed to flame. Use in well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

4. Apply antiseize compound (E75) to threads of rod end. Wear gloves (E186).



5. Install rod end assembly (2, 1, 3, and 5) into transducer (7). Adjust so that dimension A is **1-3/8 inches**.
6. Engage tabs (8) of inner part (5) of locking device with slots (9) in end of transducer (7).
7. Tighten nut (1). Hold transducer (7) with wrench on hexagon (10).



INSPECT

NOTE

Do not lockwire at this time. Nut shall be lockwired after final adjustment during helicopter flight controls rigging.

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-174 REMOVE LINEAR TRANSDUCER END FITTING BEARING (AVIM) 11-174

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Arbor Press
Adapters

Materials:

None

Personnel Required:

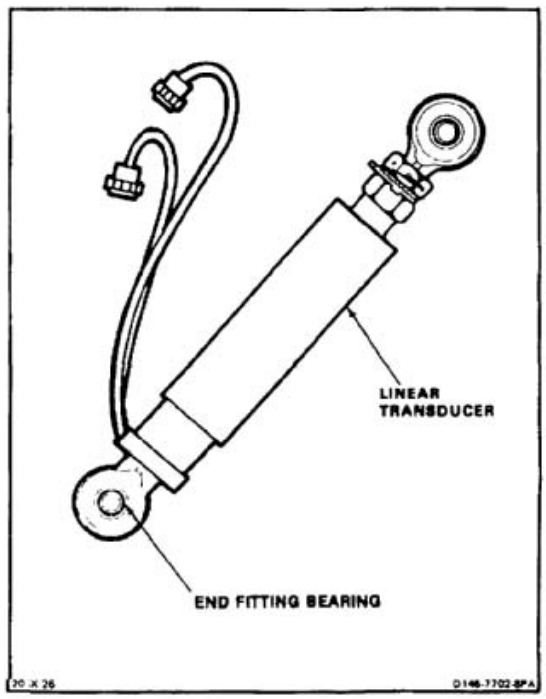
Medium Helicopter Repairer
Inspector

References:

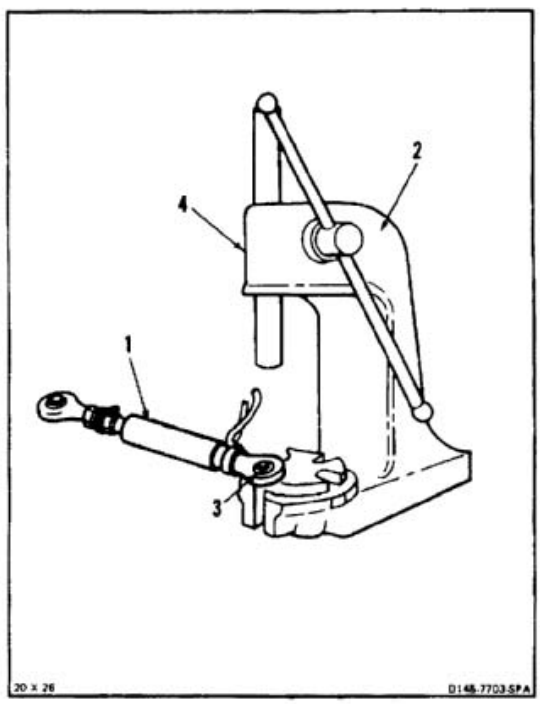
TM 55-1500-322-24

Equipment Condition:

Off Helicopter Task



1. Support transducer (1) in arbor press (2).
2. Align end fitting bearing (3) with arbor press ram (4).
3. Press out bearing (3) (TM 55-1500-322-24). Use adapter.



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-175 INSTALL LINEAR TRANSDUCER END FITTING BEARING (AVIM) 11-175

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Arbor Press
Adapters
Staking Tool, Circumferential Line Type

Materials:

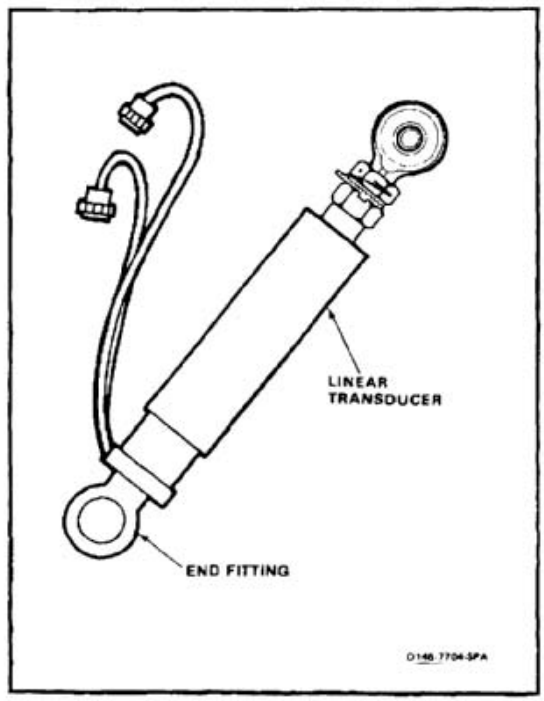
Carbon Dioxide (Dry Ice) (E92)
Methanol (E243)
Epoxy Primer (E292)
Cloth (E120)
Gloves (E184.1)
Kevlar Gloves (E187)

Personnel Required:

Machinist
Inspector

References:

TM 55-1520-240-23P
TM 55-1500-322-24



General Safety Instructions:

WARNING

Carbon dioxide (dry ice) (E92) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Methanol (E243) is flammable and toxic. Use only with adequate ventilation. Keep away from heat and open flame. Do not inhale. Do not contact eyes, skin, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Carbon dioxide (dry ice) (E92) in methanol (E243) has a temperature of **–120°F (–84°C)**. Employ all suitable safety measures when working with dry ice (E92) and methanol (E243), and when handling chilled parts. Avoid breathing carbon dioxide vapor.

WARNING

Wear protective Kevlar gloves (E187) when handling chilled bearing.

1. Place bearing (1) in small plastic bag. Seal bag. Place bag in carbon dioxide (dry ice) (E92) and methanol (E243). Wear Kevlar gloves (E187). Allow bearing to cool thoroughly.

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

2. Coat bore of end fitting (2) with epoxy primer (E292). Wear gloves (E184.1).

3. Support transducer (3) in arbor press (4). Side of end fitting (2) from which old bearing was pressed, must face up.

NOTE

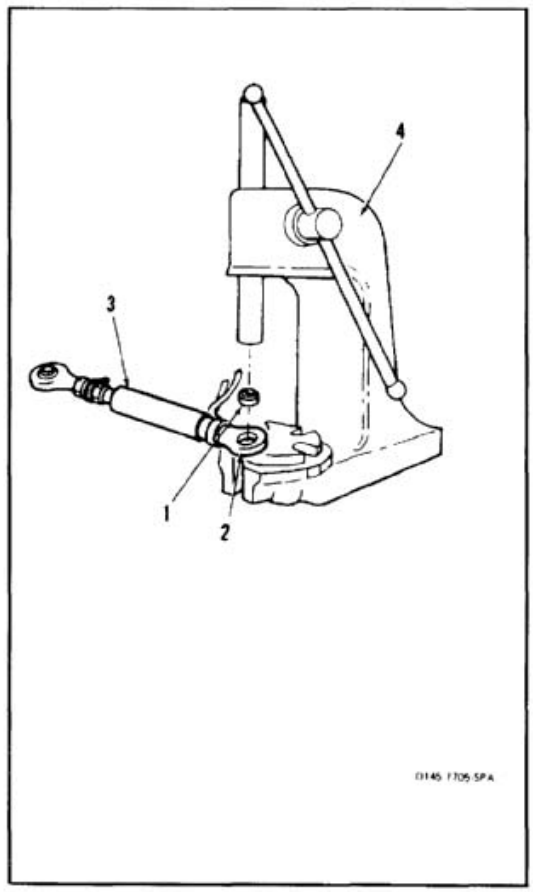
Work quickly with chilled bearing. Bearing must be installed before it warms.

4. Remove bearing (1) from dry ice. Remove bearing from plastic bag. Wipe clean with cloth (E120). Wear Kevlar gloves (E187).

5. While primer is wet position bearing (1) on end fitting (2). Wear Kevlar gloves (E187). Press bearing fully into end fitting (TM 55-1500-322-24). Remove transducer (3) from arbor press (4).

6. Stake bearing (1) with self-centering circumferential line staking tool (TM 55-1500-322-24).

7. Wipe off excess primer from end fitting (2). Use cloth (E120).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-176 ADJUST ROLL OR YAW CONTROL POSITION TRANSDUCER (CPT) 11-176

INITIAL SETUP

Applicable Configurations:

All

Tools:

Electrical Repairer's Tool Kit, NSN 5180-00-323-4915
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Pallet Rig Pin (T133)
Transfer Bellcrank Rig Pin (T128)

Materials:

Lockwire (E231)

Personnel Required:

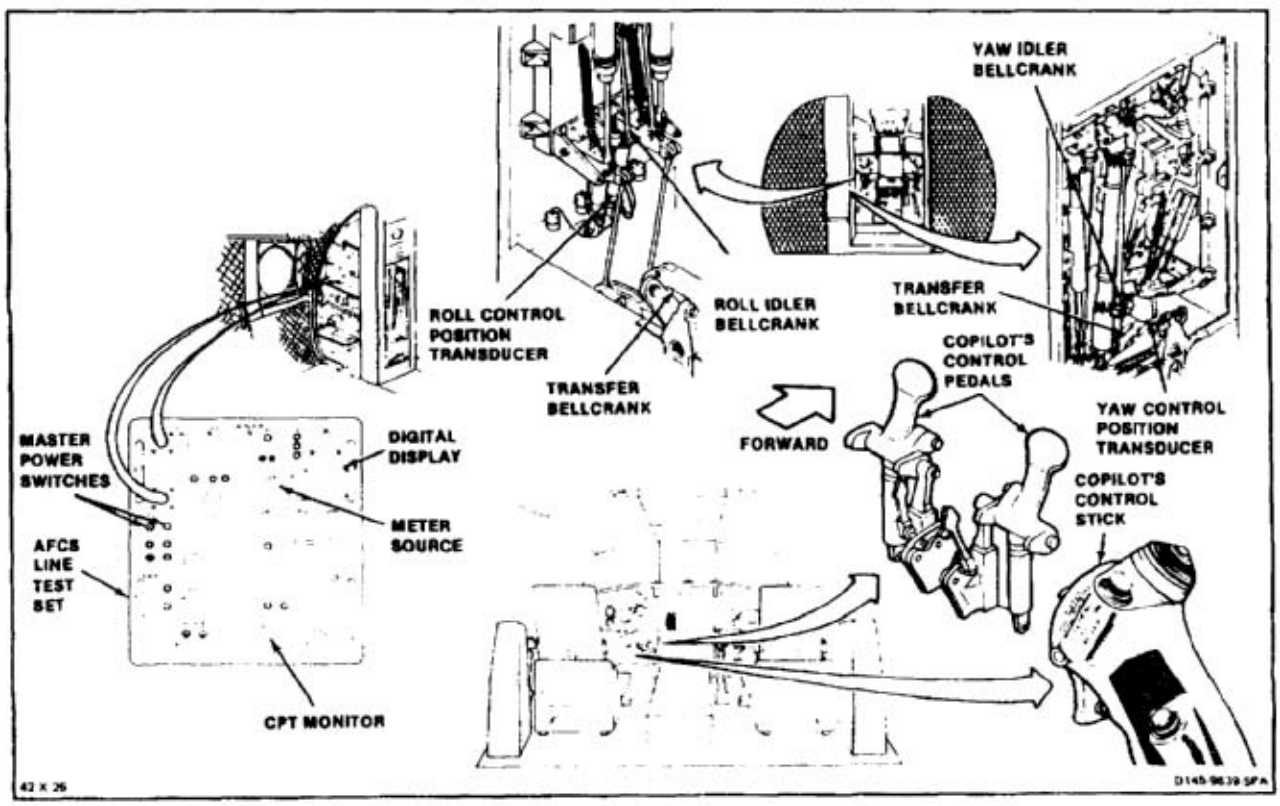
Aircraft Electrician
Medium Helicopter Repairer
Inspector

References:

TM 55-4920-429-13

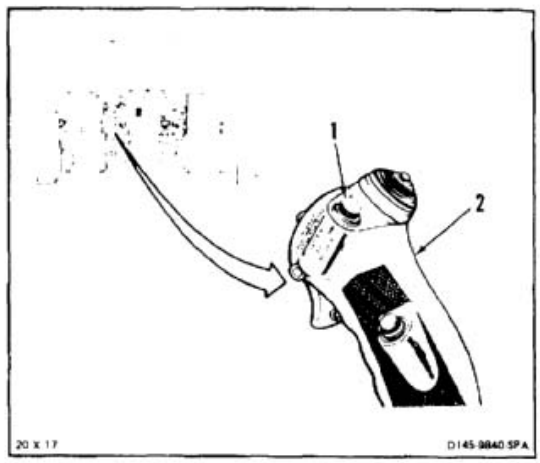
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM Sel Switch Set to NO. 1
AFCS Line Test Set 145G0009-1 Connected to No. 1 System (TM 55-4920-429-13)
Pilot's and Copilot's Cockpit Controls Rigged (Task 11-42)
Cockpit Transfer Bellcranks Rigged (Task 11-46)
First and Second Stage Bellcranks Rigged (Task 11-51)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Remove (Task 2-2)

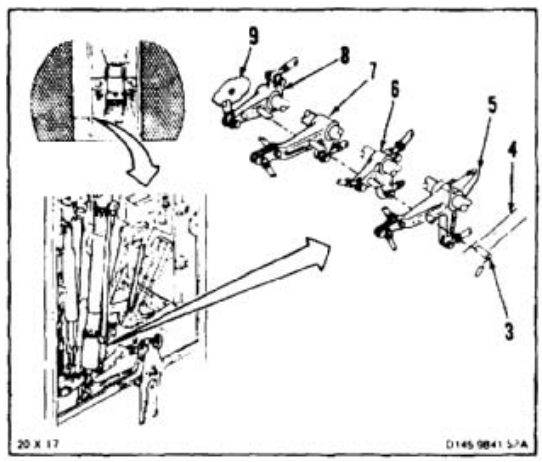


11-176 ADJUST ROLL OR YAW CONTROL POSITION TRANSDUCER (CPT) (Continued) 11-176

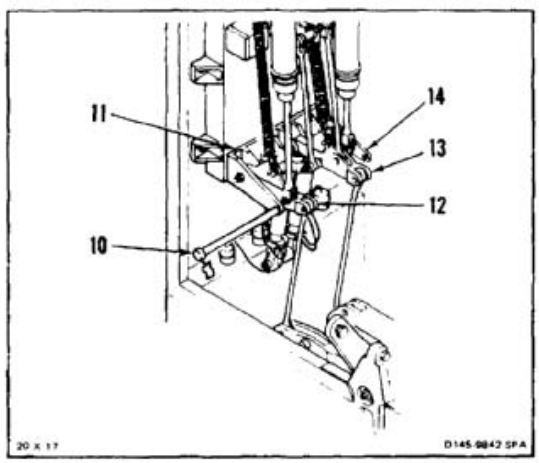
1. Have helper in cockpit press and hold CENTERING DEVICE RELEASE switch (1) on copilot's control stick (2).



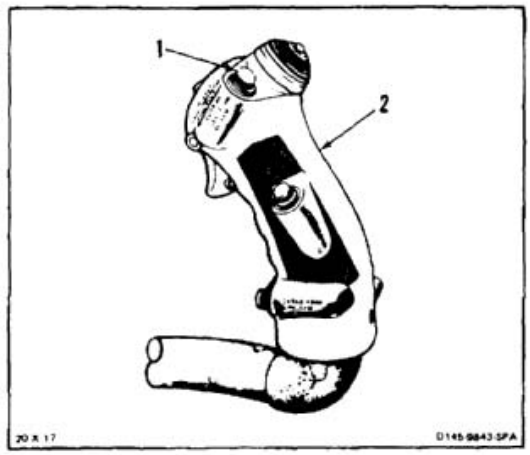
2. Working from passageway, install transfer bellcrank rig pin (T128) (3) through structure (4), four bellcranks (5, 6, 7, and 8), and in structure (9).



3. Install pitch and roll idler bellcrank rig pin (T133) (10) through support (11), two bellcranks (12 and 13), and in support (14).



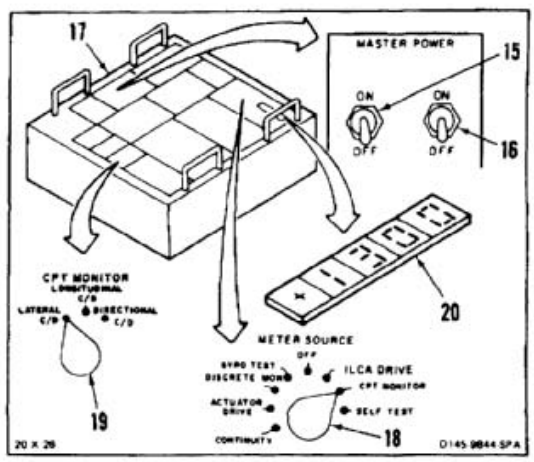
4. Have helper release switch (1) of stick (2).



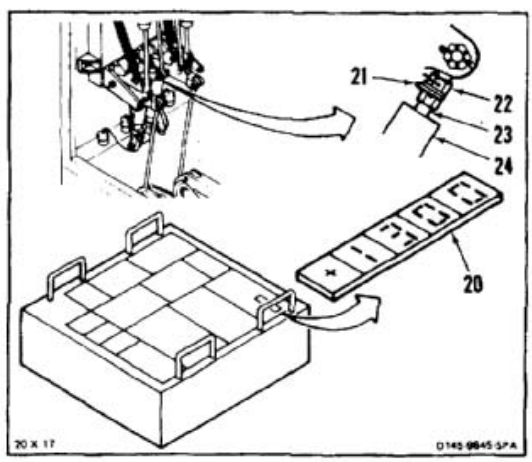
5. Set MASTER POWER switches (15 and 16) of line test set (17) to ON.
6. Set METER SOURCE switch (18) to CPT MONITOR.

ADJUST ROLL CPT

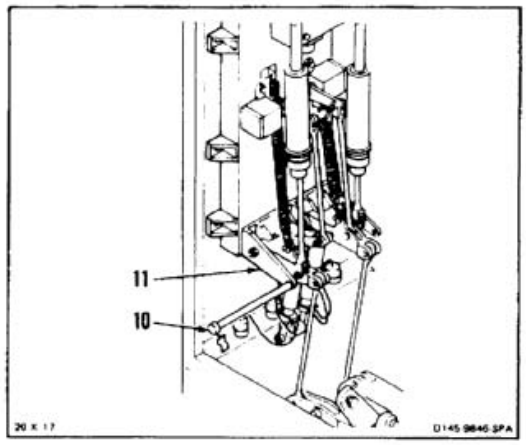
7. Set CPT MONITOR switch (19) to LATERAL.
8. Check digital display (20). Display must indicate between –**0.050 to +0.050 vac**. If indication is within limits, go to step 12. If not, perform steps 9 thru 11, then go to step 12.



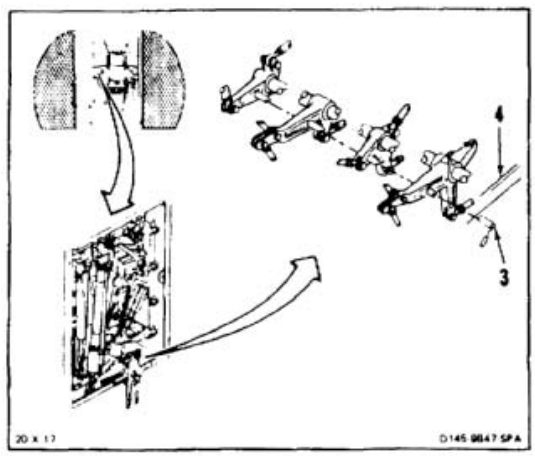
9. Remove lockwire from lockwasher (21) and nut (22) of roll position transducer (23). Loosen nut.
10. Turn outer shell (24) of transducer (23) until display (20) indicates between –**0.050 to +0.050 vac**.
11. Align lockwasher (21) and tighten nut (22). Lockwire nut to lockwasher. Use lockwire (E231).



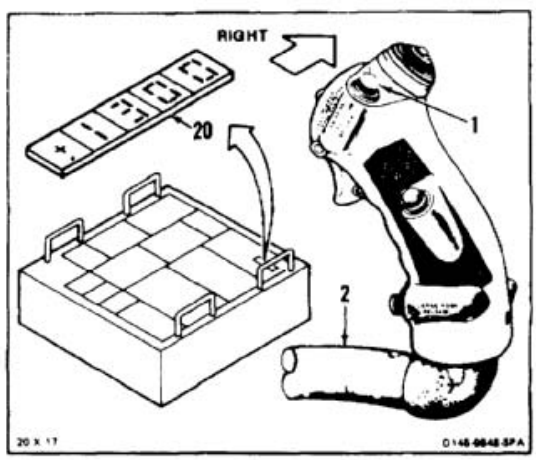
12. Remove pin (T133) (10) from support (11).



13. Remove pin (3) from structure (4).

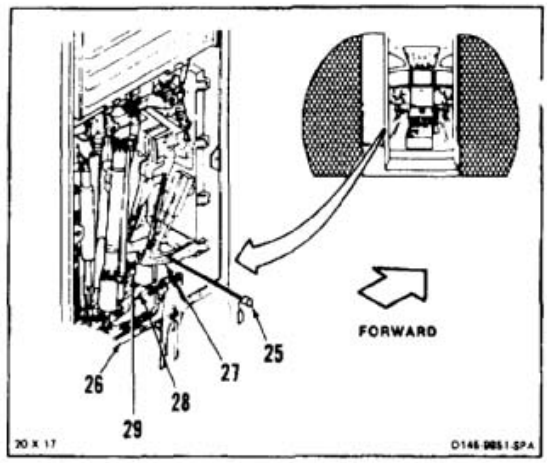


14. Have helper press switch (1) and move stick (2) fully right.
15. Check digital display (20). Display will indicate between **+4 to +6 vac**.
16. Move stick (2) fully left.
17. Check digital display (20). Display will indicate between **–4 to –6 vac**.
18. Move stick (2) to neutral. Release switch (1).

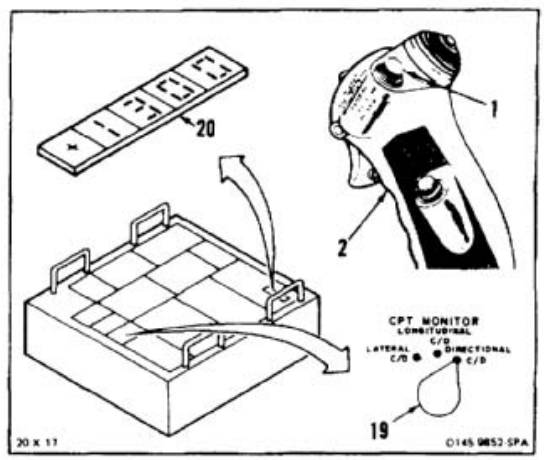


ADJUST YAW CPT

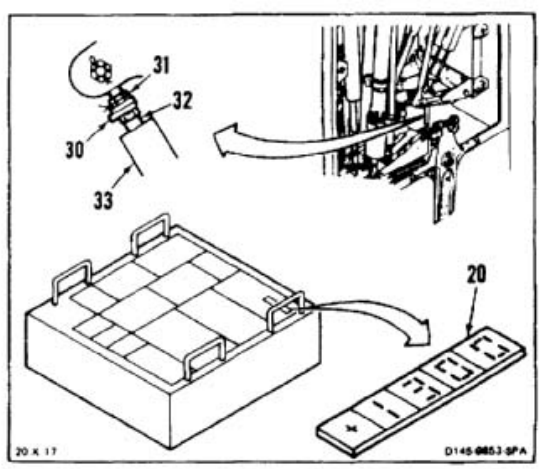
19. Repeat steps 1 and 2.
20. Install thrust and yaw idler bellcrank rig pin (T134) (25) through support (26), two bellcranks (27 and 28), and in support (29).



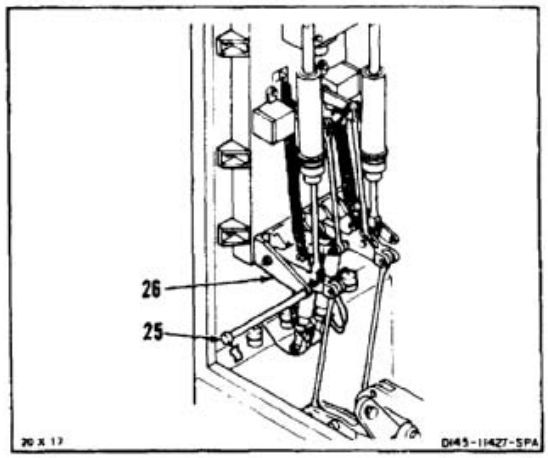
21. Have helper release switch (1) of stick (2).
22. Repeat steps 5 and 6.
23. Set CPT MONITOR switch (19) to DIRECTIONAL.
24. Check digital display (20). Display must indicate between –**0.050 to +0.050 vac**. If indication is within limits, go to step 30. If not, perform steps 25 thru 28, then go to step 30.
25. Remove lockwire from lockwasher (30) and nut (31) of yaw position transducer (32). Loosen nut.



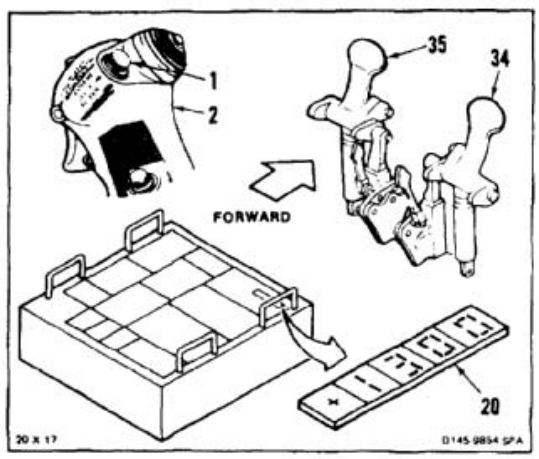
26. Turn outer shell (33) of transducer (32) until display (20) indicates between –**0.050 to +0.050 vac**.
27. Align lockwasher (30) and tighten nut (31). Lockwire nut to lockwasher. Use lockwire (E231).



28. Remove pin (25) from support (26).
29. Repeat step 13.



30. Have helper press switch (1) on stick (2) then press right pedal (34) fully forward.
31. Check digital display (20). Display will indicate between **–4 to –6 vac**.
32. Release right pedal (34) and press left pedal (35) fully forward.
33. Check digital display (20). Display will indicate between **+4 to +6 vac**.
34. Release left pedal (35), then switch (1).



FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.
Remove AFCS line test set (TM 55-4920-429-13).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-177 ADJUST PITCH CONTROL POSITION TRANSDUCER (CPT) 11-177

INITIAL SETUP

Applicable Configurations:

All

Tools:

Electrical Repairer's Tool Kit, NSN 5180-00-323-4915
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Lockwire (E231)

Personnel Required:

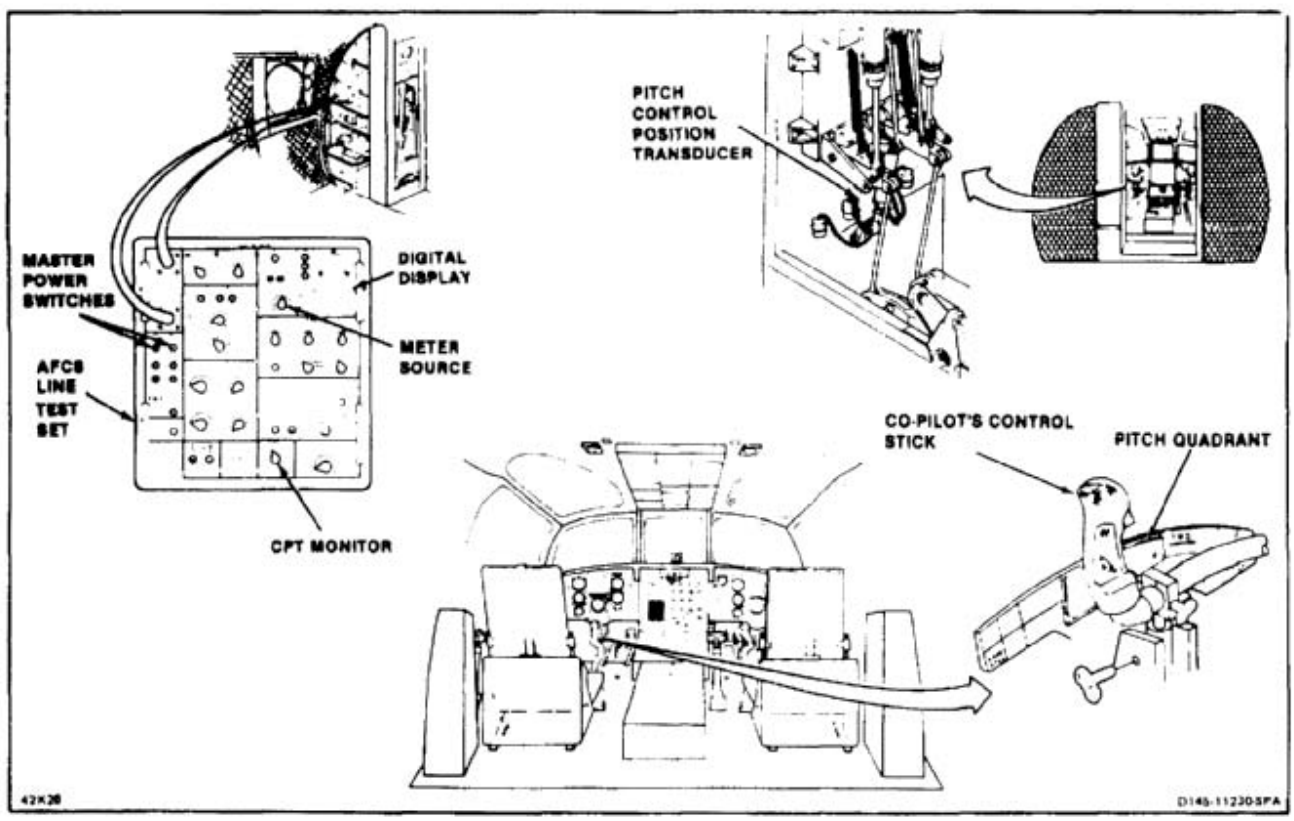
Aircraft Electrician
Medium Helicopter Repairer
Inspector

References:

TM 55-4920-429-13

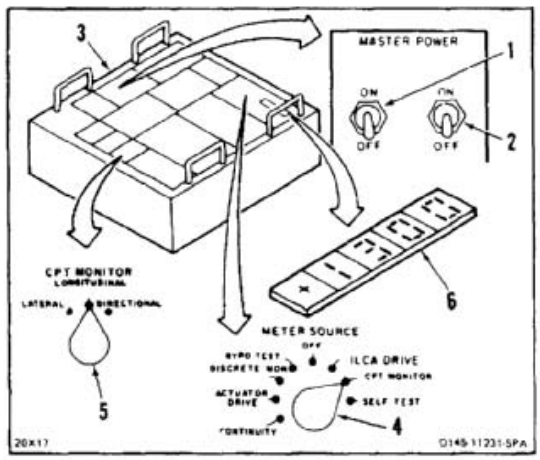
Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
AFCS SYSTEM Sel Switch Set to NO. 1
AFCS Line Test Set 145G0009-1 Connected to No. 1 System (TM 55-4920-429-13)
Pilot's and Copilot's Cockpit Controls Rigged (Task 11-42)
Cockpit Transfer Bellcranks Rigged (Task 11-46)
Control Pallets Rigged (Task 11-49)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Remove (Task 2-2)
Copilot's Cockpit Rigging Fixture Installed (Task 11-22)
Copilot's Stick Yoke Installed (Task 11-22)

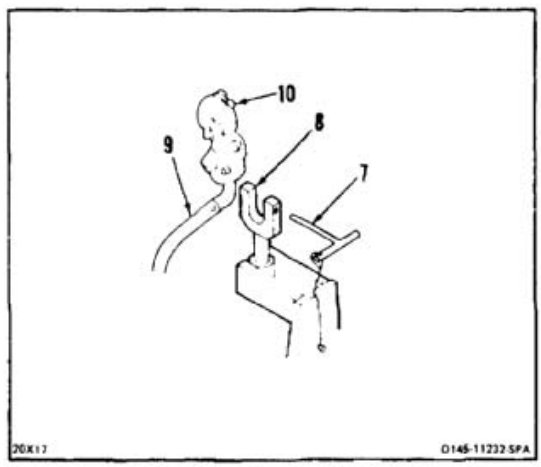


11-177 ADJUST PITCH CONTROL POSITION TRANSDUCER (CPT) (Continued) 11-177

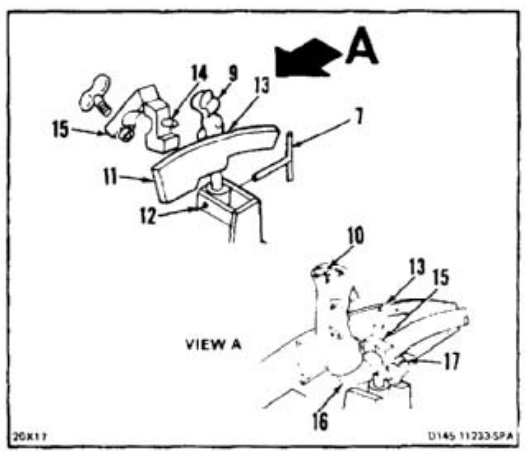
1. Set MASTER POWER switches (1 and 2) of line test set (3) to ON.
2. Set METER SOURCE switch (4) to CPT MONITOR.
3. Set CPT MONITOR switch (5) to LONGITUDINAL.
4. Record indication on digital display (6).



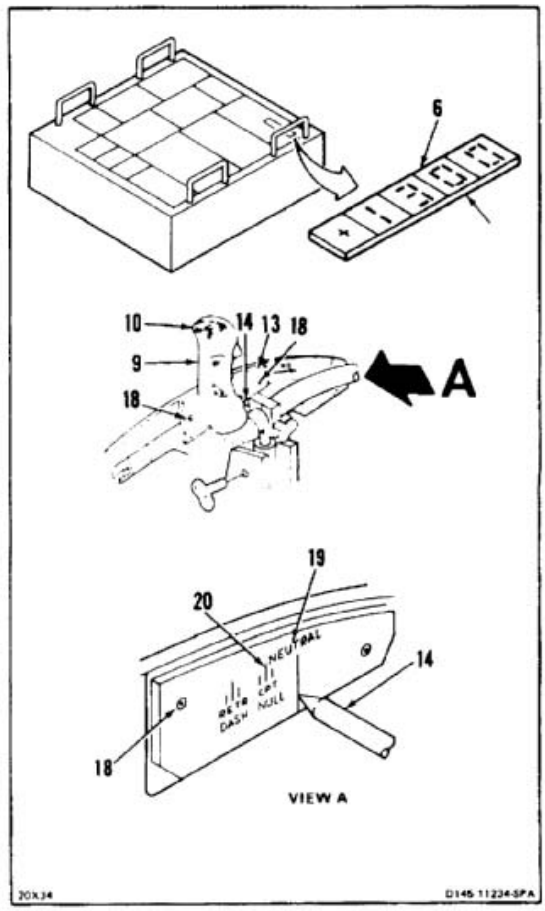
5. Working in cockpit, remove pin (7) from yoke (8) of copilot's control stick (9). Lower yoke.
6. Press switch (10) of stick (9). Move stick forward and remove yoke (8). Release switch.



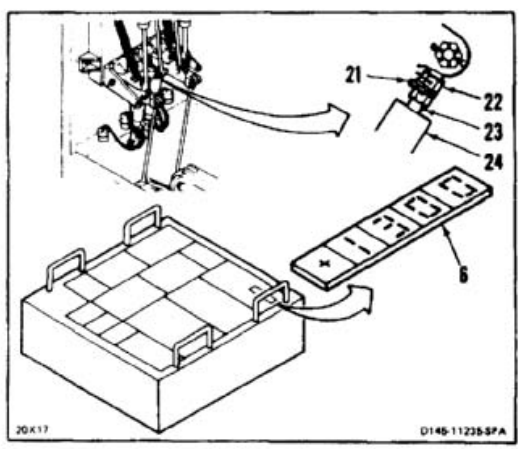
7. Position pitch quadrant (11) in fixture (12) with vernier plate (13) to right. Install pin (7).
8. Install pointer (14) and clamp (15) on stick (9) between elbow (16) and first rivet (17) with pointer toward plate (13).



9. Have helper press switch (10) and move stick (9) until indication on display (6) is same as recorded in step 4. Release switch.
10. Loosen two screws (18) on plate (13). Align NEUTRAL line (19) on plate with pointer (14). Tighten screws. Check display (6) is same as recorded in step 4.
11. Press switch (10) and move stick (9) aft until pointer (14) is at CPT NULL line (20). Release switch.
12. Check display (6). Display must indicate between –**0.05 +0.05 vac**. If indication is within limits, go to step 16. If not, perform steps 13 thru 15, then go to step 16.

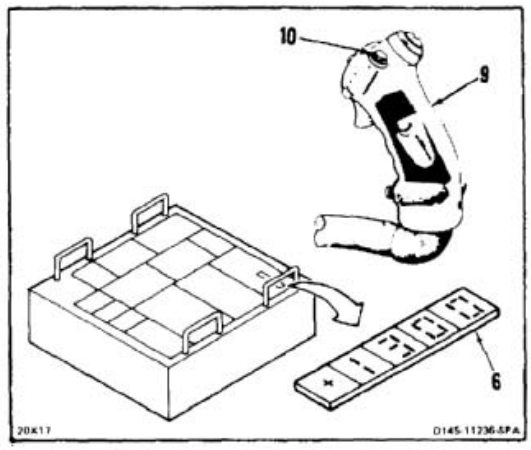


13. Working in passageway remove lockwire from lockwasher (21) and nut (22) of pitch position transducer (23). Loosen nut.
14. Turn outer shell (24) of transducer (23) until display (6) indicates between –**0.05 +0.05 vac**.
15. Align lockwasher (21) and tighten nut (22). Lockwire nut to lockwasher. Use lockwire (E231).

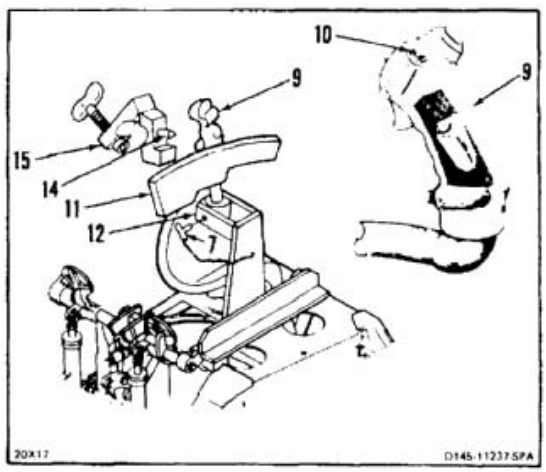


INSPECT

16. Have helper press switch (10) and move stick (9) fully aft.
17. Check display (6). Display will indicate **+2 to +4 vac**.
18. Move stick (9) fully forward.
19. Check display (6). Display will indicate between **–4 to –6 vac**.



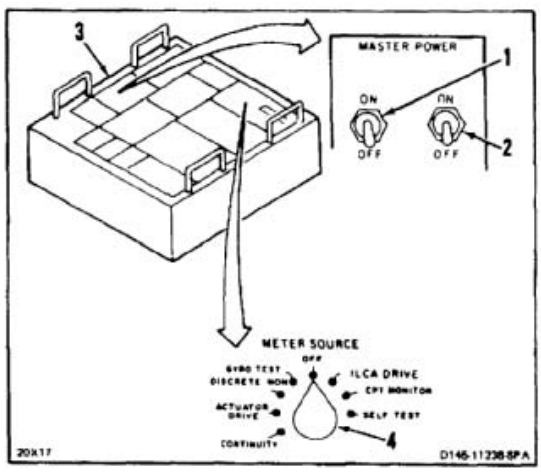
20. Remove pin (7) from fixture (12). Remove quadrant (11).
21. Position stick (9) at about neutral. Release switch (10). Remove clamp (15) and pointer (14) from stick.



22. Set MASTER POWER switches (1 and 2) of test set (3) to OFF.
23. Set METER SOURCE switch (4) to OFF.

FOLLOW-ON MAINTENANCE:

Remove hydraulic power.
Remove electrical power.
Remove AFCS line test set (TM 55-4920429-13).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).
Remove copilot's stick yoke (Task 11-23).
Remove copilot's rigging fixture (Task 11-23).



END OF TASK

11-178 REMOVE YAW, THRUST, ROLL OR PITCH ILCA INTERMEDIATE CONNECTING LINKS 11-178

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)

NOTE

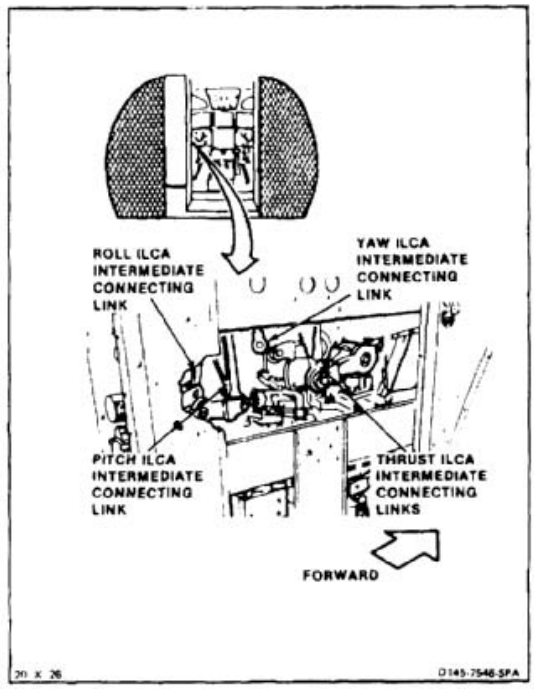
Procedure is same to remove yaw, thrust, roll, or pitch ILCA intermediate connecting links. Thrust link is shown here.

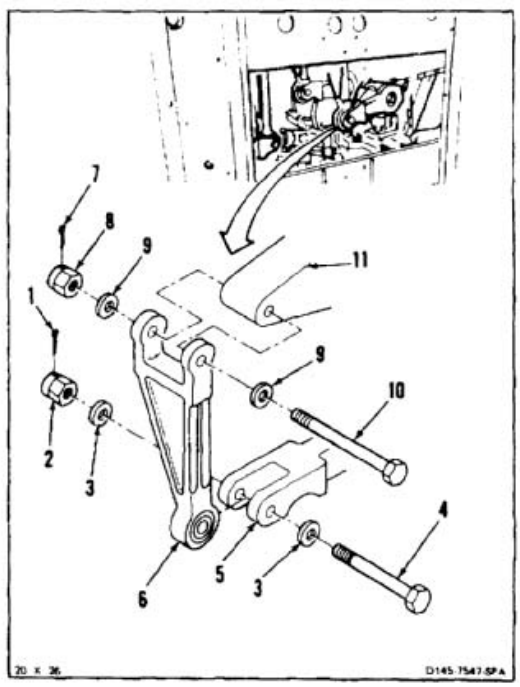
Attaching bolts, washers and nuts will be temporarily installed after removing link.

NOTE

If a crack in the intermediate connecting link or bellcrank is suspected during removal, refer to TM 1-1520-253-23.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5). Disconnect yaw ILCA intermediate connecting link (6) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) loosely in bellcrank (5).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (11). Remove link (6).





4. Install bolt (10), two washers (9), and nut (8) loosely in bellcrank (11).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-178.1 REPAIR YAW, THRUST, ROLL, OR PITCH ILCA INTERMEDIATE CONNECTING LINKS (AVIM) 11-178.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Machine Shop Set, NSN 4920-00-405-9279
Arbor Press
Roller Staking Kit (T169)

Materials:

Crocus Cloth (E122)
Epoxy Primer (E292)
Epoxy Primer (E292.1)
Gloves (E184.1)
Kevlar Gloves (E187)
Acetone (E20)
Carbon Dioxide (Dry Ice) (E92)
Methanol (E243)
Cloth (E120)

Parts:

Bearings
Sleeve

Personnel Required:

Machinist
Inspector

References:

TM 1-1520-253-23
TM 55-1500-322-24
TM 55-1520-240-23P
MIL-I-6866
Task 11-8

Equipment Condition:

Off Helicopter Task

General Safety Instructions:

WARNING

Acetone (E20) is extremely flammable. It can be toxic. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Carbon dioxide (dry ice) (E92) is toxic. It can irritate skin and causes burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Methanol (E243) is flammable and toxic. Use only with adequate ventilation. Keep away from heat and open flame. Do not inhale. Do not contact eyes, skin, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Carbon dioxide (dry ice) (E92) in methanol (E243) has temperature of **–120ºF (–84ºC)**. Observe all safety measures when working with dry ice (E92) and methanol (E243), and when handling chilled parts. Avoid breathing carbon dioxide vapor.

WARNING

Wear protective Kevlar gloves (E187) when handling chilled bearings.

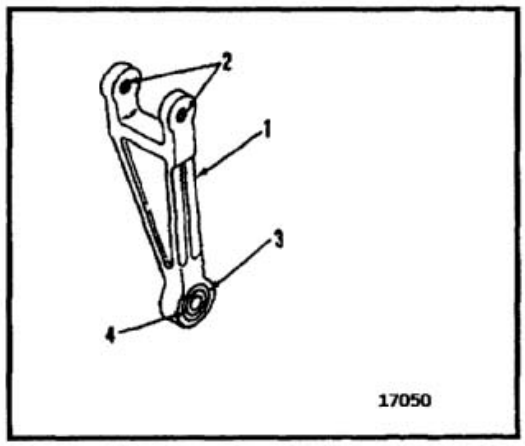
WARNING

Epoxy primer (E292 or E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

REPAIR CONNECTING LINK SURFACE

1. Remove minor nicks, burrs, scores, scratches and pits on connecting link (1). Use crocus cloth (E122).
2. Touch up reworked areas with epoxy primer (E292.1). Wear gloves (E184.1).
3. Check condition of bushings (2), bearing (3), and sleeve (4) (Task 11-8). If bearings and sleeve are good, go to Follow-On Maintenance. If any bearing must be replaced, go to step 4. If sleeve must be replaced, go to step 6.

INSPECT



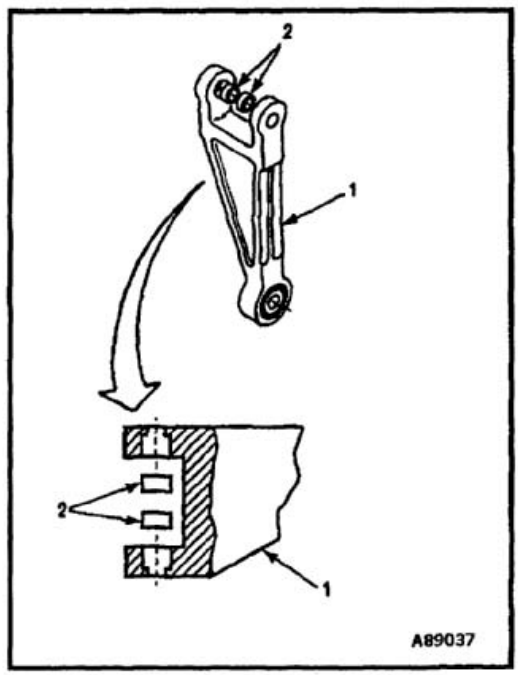
REMOVE BEARINGS AND SLEEVE

NOTE

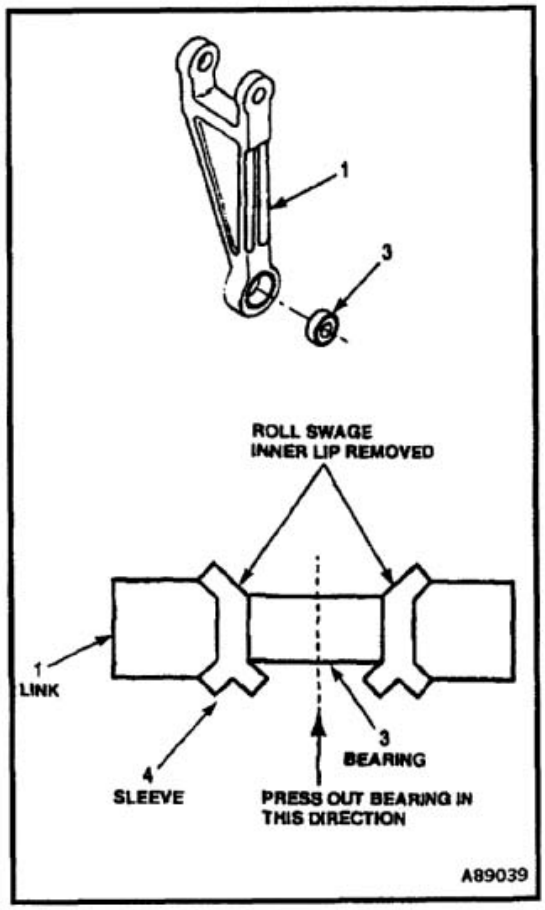
The bores of bushings (2) have a shoulder on the outboard side. Remove bearings by pressing inboard.

4. Remove bushings (2) from link (1). Use an arbor press (TM 55-1500-322-24).

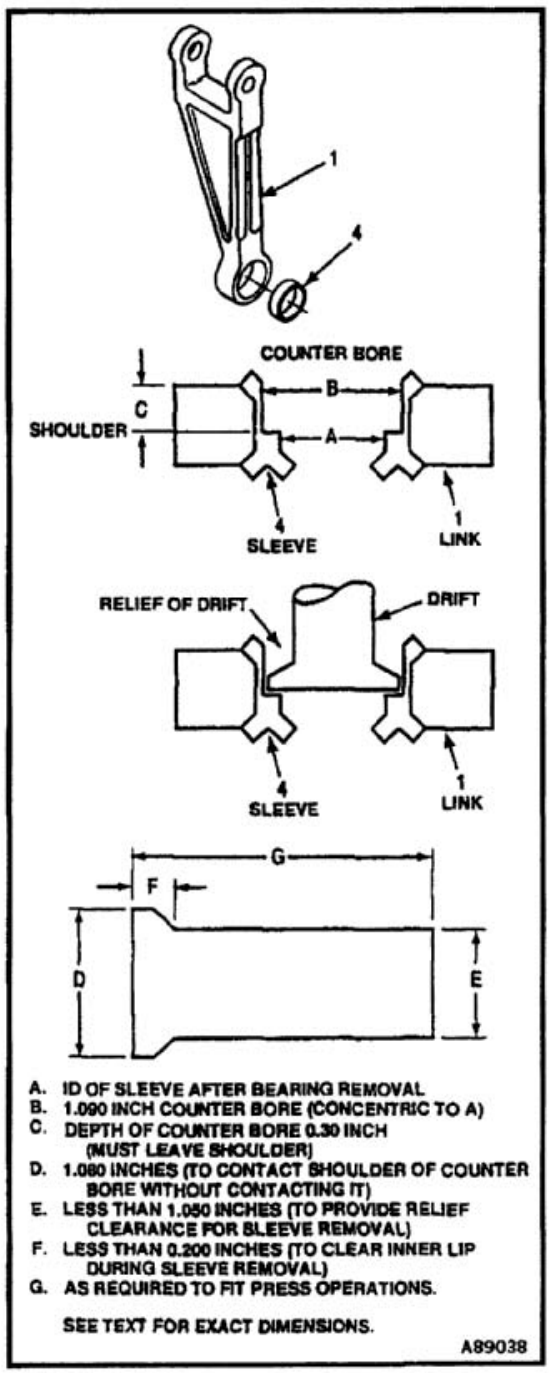
INSPECT



5. Remove bearing (3) from link (1). Remove the inner lip of the roller swage (see figure). Make sure that the lip of the sleeve has been completely removed before pressing out the beating. Failure to fully remove the lip may result in damage to the ink. Support the link in an arbor press (TM 55-1500-322-24) and press out the bearing in the direction shown in the figure.



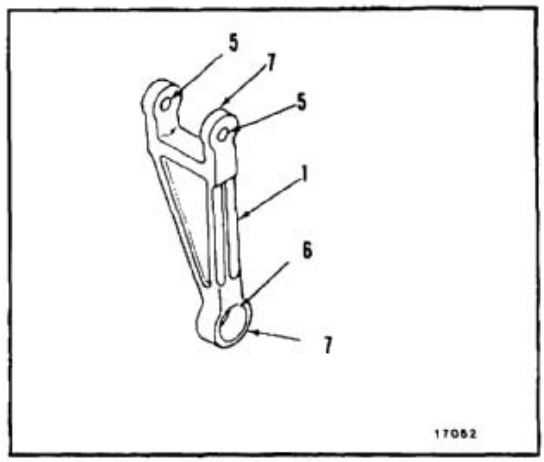
6. Remove sleeve (4) from link (1). Counter bore the sleeve to a diameter of **1.085" to 1.090"** to a depth of **0.290" to 0.300"**. The counter bore to be made from the same side that the roller stake was and the bearing was pressed. Failure to counter bore the lip sleeve may result in damage to the link. Support the link in an arbor press (TM 55-1500-322-24). Using a drift of **1.080"** diameter press out the remainder of the sleeve. See figure for drift dimensions.



7. Clean bearing bores (5 and 6) and lug (7). Use acetone (E20). Wear gloves (E184.1).
8. Penetrant inspect bores and lugs (MIL-I-6866). Check for radial and axial cracks. If cracks are found, reject link (1).

NOTE

If a crack in the intermediate connecting link is suspected during disassembly, refer to TM 1-1520-253-23.



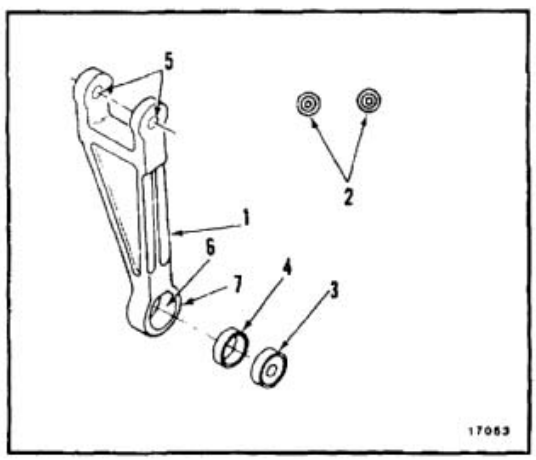
INSTALL BEARINGS AND SLEEVE

9. Make sure bores (5 and 6) of link (1) are clean and undamaged.
10. Coat sleeve (4) with epoxy primer (E292). Wear gloves (E184.1).
11. Support link (1) in arbor press.
12. Install sleeve (4) wet with epoxy primer (E292) in bore (6). Use an arbor press (TM 55-1500-322-24). Press sleeve flush with lug (7).
13. Place bearings (2 and 3) in carbon dioxide (dry ice) (E92) and methanol (E243). Wear goggles and Kevlar gloves (E187). Allow bearings to cool thoroughly.
14. Coat bores (5) and sleeve (6) with epoxy primer (E292). Wear Kevlar gloves (E187).
15. Support link (1) in arbor press.

NOTE

Work quickly with chilled bearing. Bearing must be installed before it warms.

16. Remove bearing (3) from dry ice and wipe clean and dry. Use cloth (E120). Wear goggles. Wear Kevlar gloves (E187).
17. While primer is wet, press bearing (3) into sleeve (6) until fully seated (TM 55-1500-322-24). Use an arbor press.
18. Wipe off excess primer from bearing (4). Use cloth (E120). Allow bearing to warm to room temperature.



NOTE

Work quickly with chilled bushings. Bushings must be installed before they warm.

19. Remove bushings (2) from dry ice and wipe clean and dry. Use cloth (E120). Wear goggles. Wear Kevlar gloves (E187).

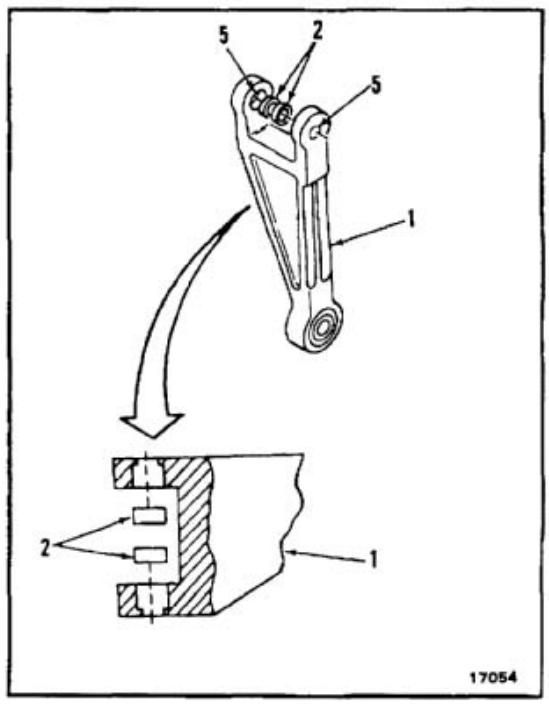
NOTE

The bores of link (1) have a shoulder on the outside. Install bushings (2) by pressing outboard.

20. While epoxy primer (E292) is wet, press bushings (2) into bores (5) until fully seated (TM 55-1500-322-24). Use an arbor press.

21. Wipe off excess primer from bushings (2). Use cloth (E120) and wear gloves (E184.1). Allow bearings to warm to room temperature.

INSPECT



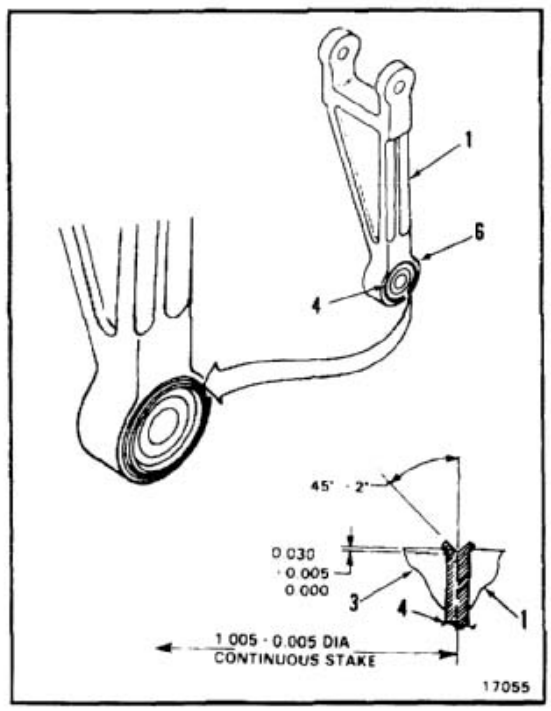
22. Roller or impression stake sleeve (4) to lug (6) and bearing (3) on both sides. Use roller swage sleeve staking method or circumferential line impression staking method (TM 55-1500-322-24). Use roller kit (T169) where applicable.

INSPECT

23. Touch up reworked areas of link (1). Use epoxy primer (E292.1). Wear gloves (E184.1).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-179 INSTALL YAW, THRUST, ROLL OR PITCH ILCA INTERMEDIATE CONNECTING LINKS 11-179

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

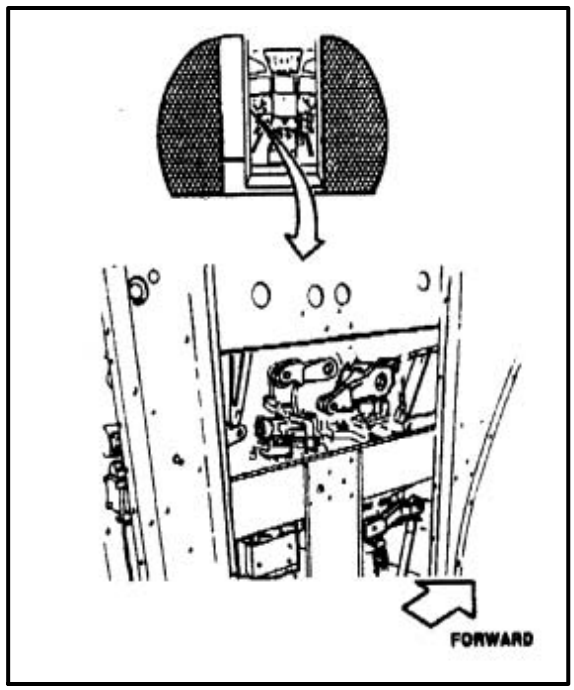
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



11-179 INSTALL YAW, THRUST, ROLL OR PITCH ILCA INTERMEDIATE CONNECTING LINKS (Continued) 11-179

CAUTION

Make sure bushings are in bellcrank and link before installing bolts or component damage will result.

NOTE

Procedure is same to install yaw, thrust, or roll pitch ILCA intermediate connecting links. Thrust link is shown here.

Impendance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure lower bearing and sleeve assembly is properly installed and secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

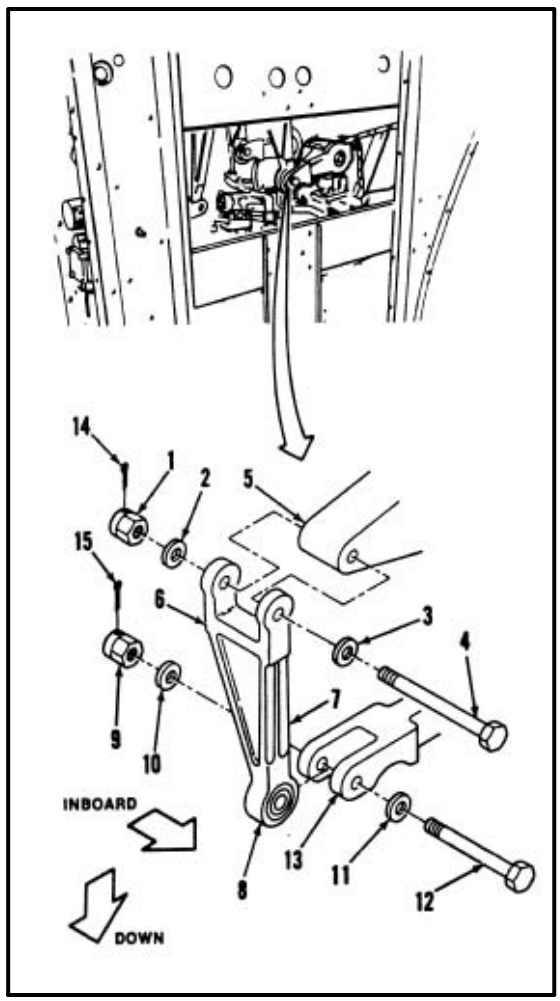
Loose attachments within light control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position thrust ILCA intermediate connecting link (6), straight side (7) inboard and lug (8) down, on bellcrank (5). Install bolt (4), two washers (3 and 2), and nut (1). Do not tighten at this time.

NOTE

Position straight side of pitch or roll link outboard.

3. Remove nut (9), two washers (10 and 11), and bolt (12) from bellcrank (13).
4. Position link (6) in bellcrank (13). Install bolt (12), two washers (11 and 10), and nut (9).
5. Torque two nuts (1 and 9) to **30 to 45 inch-pounds**. Install two cotter pins (14 and 15).
6. Check two bolts (4 and 12). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 5.



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-180 REMOVE PITCH OR ROLL INTERMEDIATE BELLCRANKS 11-180

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Aft Acoustic Blanket Removed (Task 2-107)

NOTE

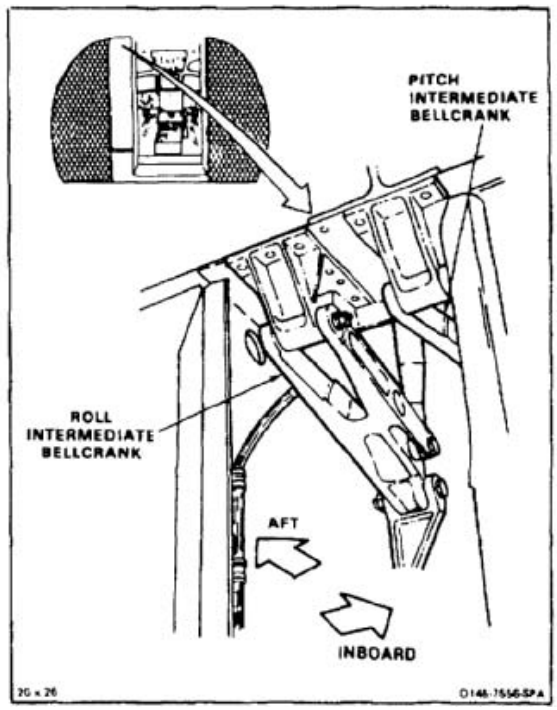
Procedure is same to remove pitch or roll intermediate bellcranks. Roll bellcrank is shown here.

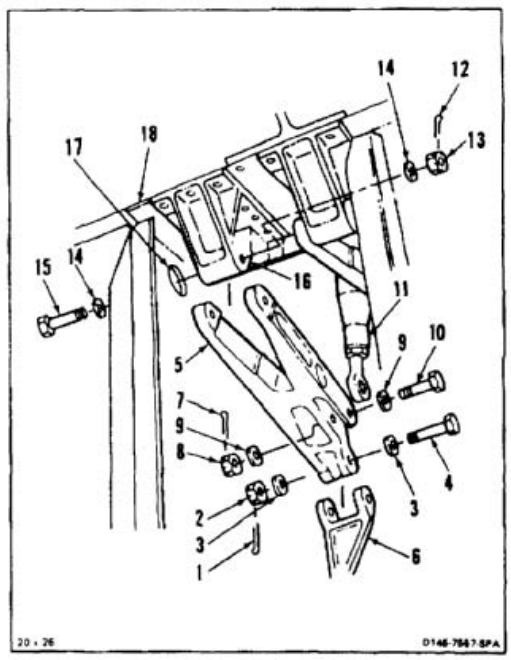
Attaching bolts, washers, and nuts will be temporarily installed during removal of bellcrank.

NOTE

If a crack in connecting links, bellcranks, or supports is suspected during removal, refer to TM 1-1520-253-23.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from roll intermediate outboard bellcrank (5). Disconnect link (6) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) loosely in link (6).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (5). Disconnect link (11) from bellcrank.
4. Install bolt (10), two washers (9), and nut (8) loosely in link (11).
5. Remove cotter pin (12), nut (13), and washer (14) from bolt (15) in support (16). Slide bolt through hole (17) in structure (18) until bellcrank (5) is released from support. Remove bellcrank.





6. Install bolt (15), two washers (14), and nut (13) loosely in support (16).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-181 INSTALL PITCH OR ROLL INTERMEDIATE BELLCRANKS 11-181

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

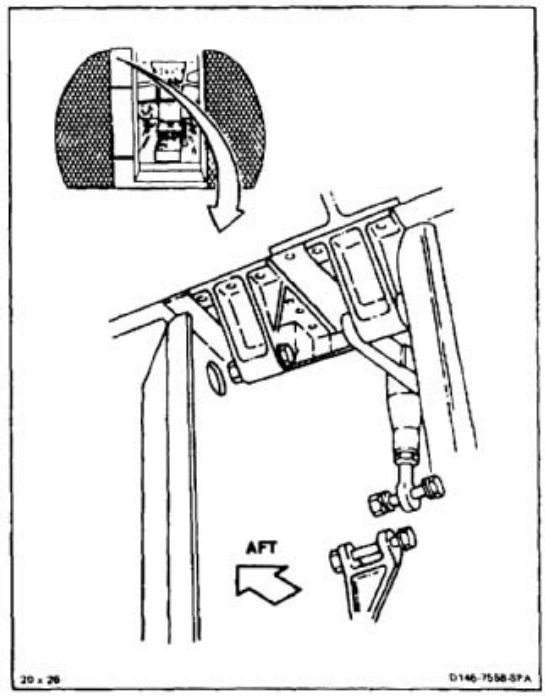
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Make sure bushings are in bellcranks and link before installing bolts or component damage will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

Procedure is same to install pitch or roll intermediate bellcranks except where noted. Roll bellcrank is shown here.

1. Remove nut (1), two washers (2 and 3), and bolt (4) from support (5). Slide bolt through hole (6).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the idler assembly.

Ensure idler hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position roll intermediate bellcrank (7), lug (8) inboard and forward on support (5). Install bolt (4), two washers (3 and 2) and nut (1). If pitch intermediate bellcrank is being installed, install bolt with head inboard.

3. Torque nut (1) to **30 to 45 inch-pounds**. Install cotter pin (9). If pitch bellcrank is being installed, torque nut to **60 to 90 inch-pounds**.

4. Remove nut (10), two washers (11 and 12) and bolt (13) from link (14).

5. Install bolt (13), two washers (12 and 11) and nut (10). Do not tighten at this time.

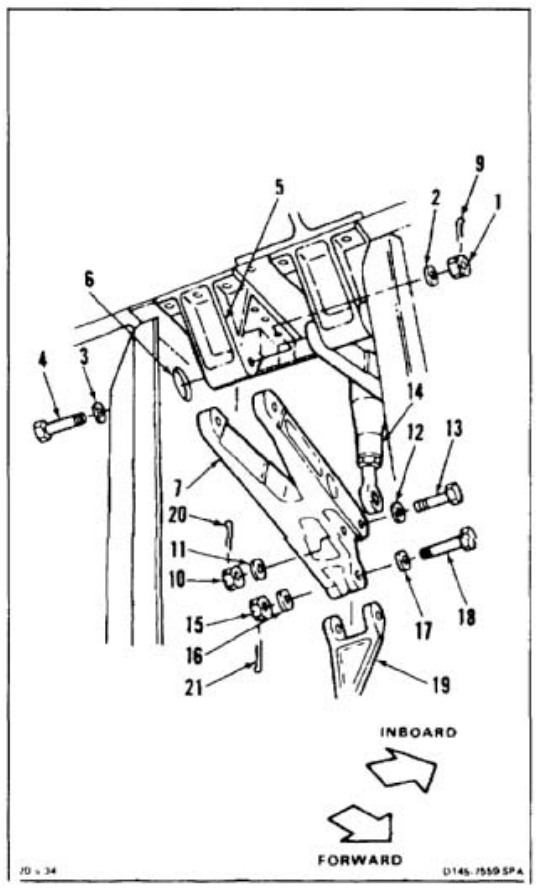
6. Remove nut (15), two washers (16 and 17). and bolt (18) from link (19).

7. Position link (19) on bellcrank (7). Install bolt (18), two washers (17 and 16) and nut (15).

8. Torque two nuts (10 and 15) to **30 to 45 inch-pounds**. Install two cotter pins (20 and 21).

9. Check three bolts (4, 13, and 18). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 3 or 8.

INSPECT



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install aft closet acoustic blanket (Task 2-108).

END OF TASK

11-182 REMOVE YAW OR THRUST INTERMEDIATE BELLCRANKS 11-182

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Twine (E433)

Personnel Required:

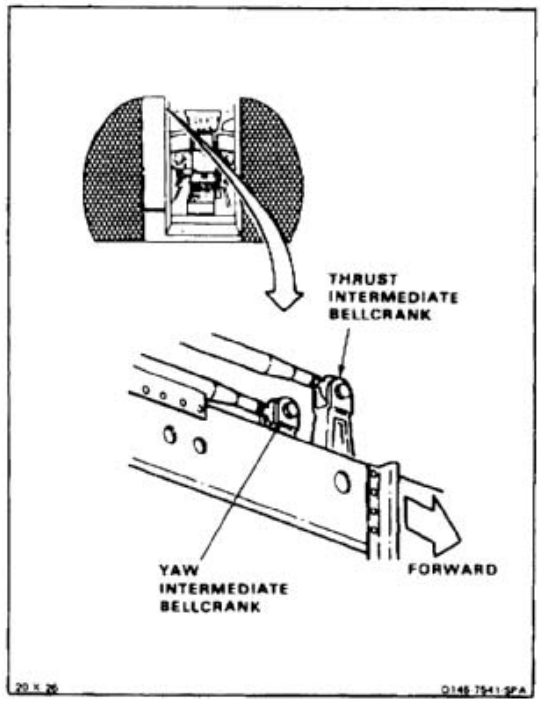
Medium Helicopter Repairer

References:

TM 1-1520-253-23
Task 1-13

Equipment Conditions:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Forward Transmission Drip Pan Removed (Task 2-3)



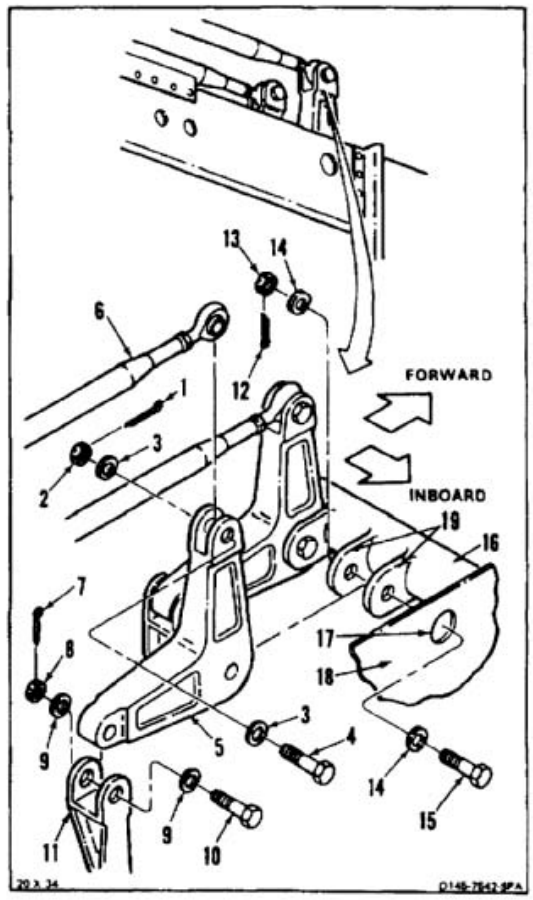
NOTE

Procedure is same to remove yaw or thrust intermediate bellcranks. Thrust bellcrank is shown here.

Attaching bolts, washers, and nuts will be temporarily installed during removal of bellcrank (Task 1-13).

NOTE

If a crack in the connecting links, bellcranks, or supports is suspected during disassembly, refer to TM 1-1520-253-23.



1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from thrust intermediate bellcrank (5). Disconnect link (6) from bellcrank. Tie link away from bellcrank. Use twine (E433).
2. Install bolt (4), two washers (3), and nut (2) loosely in link (6).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from link (11). Disconnect link from bellcrank (5).
4. Install bolt (10), two washers (9), and nut (8) loosely in link (11).
5. Remove cotter pin (12), nut (13), and washer (14) from bolt (15) in support (6). Slide bolt inboard through hole (17) in structure (18) until bellcrank (5) is released from support. Remove bellcrank.
6. Slide bolt (15) through two lugs (19) of support (16). Install washer (14) and nut (13) loosely on bolt.

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-183 INSTALL YAW OR THRUST INTERMEDIATE BELLCRANKS 11-183

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

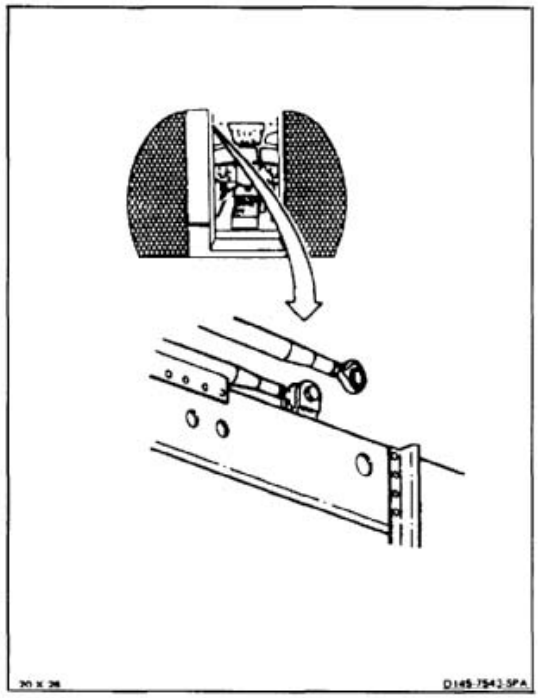
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



WARNING

Make sure bushings are in bellcrank, link, and support lugs, before installing bolts or component damage will result.

NOTE

Procedure is same to install yaw or thrust intermediate bellcranks. Thrust bellcrank is shown here.

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from lugs (5) of support (6).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position thrust intermediate bellcrank (7), lugs (8) up, between lugs (5). Insert bolt (4) and washer (3), through hole (9) in structure (10), and install in lugs (5) and bellcrank.

NOTE

Bolt of yaw bellcrank is installed with head outboard.

3. Install washer (2) and nut (1) on bolt (4). Do not tighten at this time.

4. Remove nut (11), two washers (12 and 13), and bolt (14) from link (15).

5. Position bellcrank (7) in link (15). Install bolt (14), two washers (13 and 12), and nut (11). Do not tighten at this time.

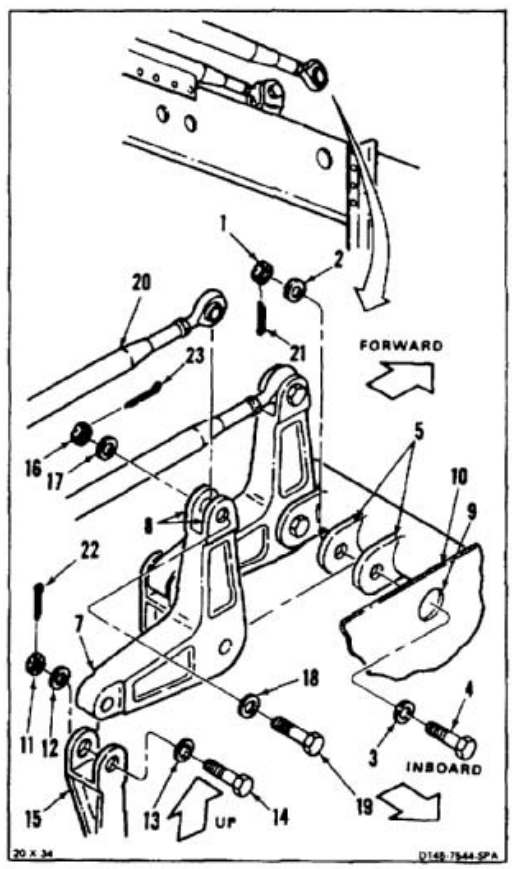
6. Remove nut (16), two washers (17 and 18), and bolt (19) from link (20).

7. Untie link (20) and position in bellcrank (7). Install bolt (19), two washers (18 and 17), and nut (16).

8. Torque three nuts (1, 11, and 16) to **30 to 45 inch-pounds**. Install three cotter pins (21, 22, and 23).

9. Check three bolts (4, 14, and 19). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness, if bolt rotates or is loose, add washer under nut and repeat step 8.

INSPECT



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Install forward transmission drip pan (Task 2-3).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

11-184 REMOVE YAW, THRUST, PITCH OR ROLL INTERMEDIATE CONNECTING LINKS 11-184

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Closet Acoustic Blanket Removed (Task 2-107)
Closet Backup Panel Removed (Task 2-2)
Forward Transmission Drip Pan Removed (Task 2-3)

NOTE

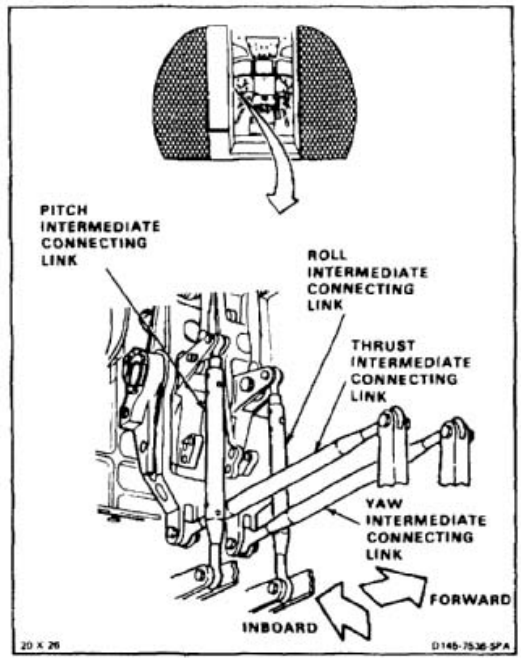
Procedure is same to remove yaw, thrust, pitch or roll intermediate connecting links. Pitch connecting link is shown here.

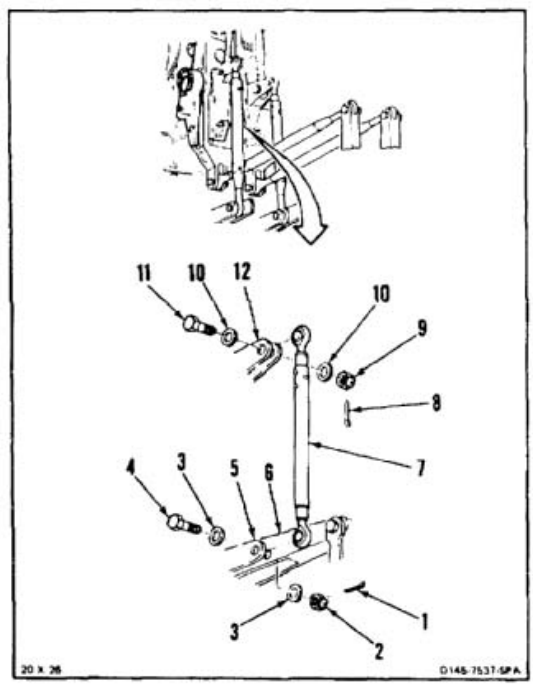
Attaching bolts, washers, and nuts will be temporarily installed after removing link.

NOTE

If a crack in the intermediate connecting link or bellcrank is suspected during removal, refer to TM 1-1520-253-23.

1. Remove Cotter pin (1), nut (2), two washers (3), and bolt (4) from lug (5) of bellcrank (6). Disconnect pitch intermediate connecting link (7) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) loosely in lug (5) and bellcrank (6).
3. Remove cotter pin (8), nut (9), two washers (10), and bolt (11) from bellcrank (12). Remove link (7).





4. Install bolt (11), two washers (10), and nut (9) loosely in bellcrank (12).

FOLLOW ON MAINTENANCE:

None

END OF TASK

11-185 INSTALL YAW, THRUST, PITCH, OR ROLL INTERMEDIATE CONNECTING LINKS 11-185

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

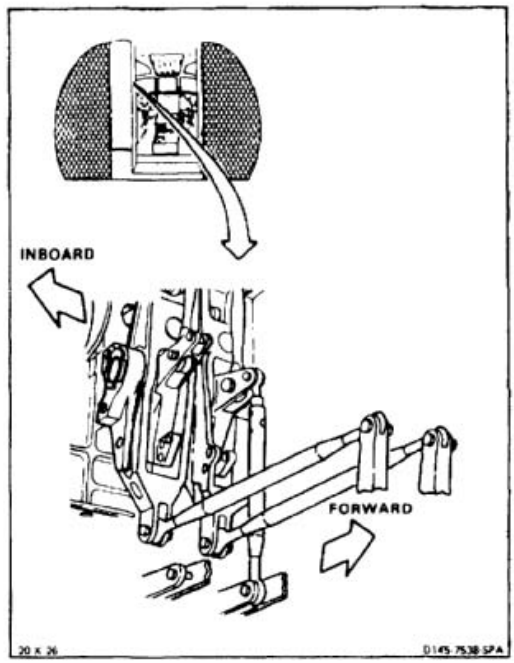
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



11-185 INSTALL YAW, THRUST, PITCH, OR ROLL INTERMEDIATE CONNECTING LINKS (Continued) 11-185

CAUTION

Make sure bushings are in bellcranks before installing bolts or component damage will result.

NOTE

Procedure is same to install yaw, thrust, pitch or roll intermediate connecting links. Pitch connecting link is shown here.

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1) two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

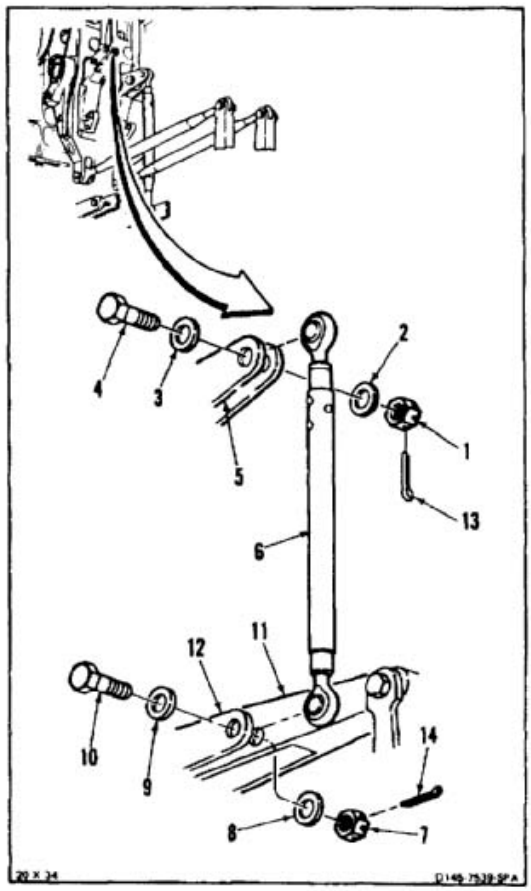
Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end insert and rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position pitch intermediate connecting link (6) in bellcrank (5). Install bolt (4), two washers (3 and 2), and nut (1). Do not tighten at this time.
3. Remove nut (7), two washers (8 and 9), and bolt (10) from bellcrank (11).
4. Position link (6) in bellcrank (11) on inside of lug (12). Install bolt (10), two washers (9 and 8) and nut (7).



5. Torque two nuts (1 and 7) to **30 to 45 inch-pounds**. Install two cotter pins (13 and 14).
6. Check two bolts (4 and 10). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 5.

INSPECT

FOLLOW-ON MAINTENANCE:

Perform neutral rig check of flight control system (Task 11-33).
Perform operational check of flight control system (TM 55-1520-240-T).
Install forward transmission drip pan (Task 2-3).
Install closet backup panel (Task 2-2).
Install closet acoustic blanket (Task 2-108).

END OF TASK

SECTION V
MIXING CONTROLS

11-186 REMOVE MIXING LINKAGE CONNECTING LINKS 11-186

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

Paper Tags (E264)

Personnel Required:

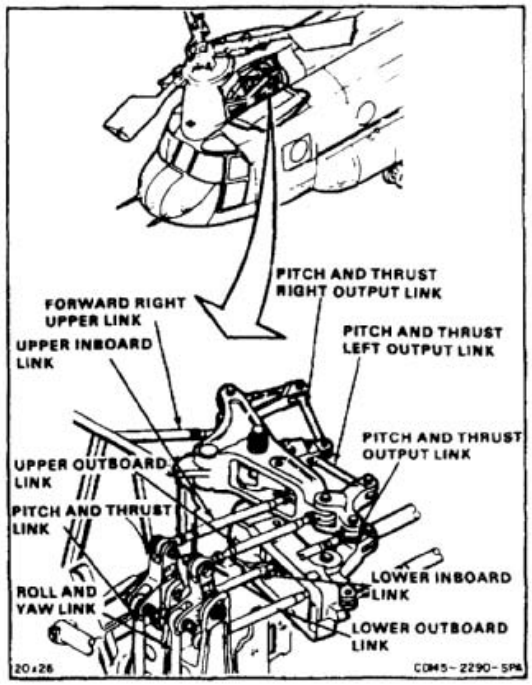
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Flight Control Hydraulic System Depressurized (TM 55-1520-240-T)
Forward Transmission Left Work Platform Open (Task 2-2)
Forward and Aft Connecting Links To Servocylinders Disconnected (Task 11-192)
Pitch, Roll, Yaw, and Thrust Links Disconnected at Intermediate Bellcranks (Task 11-184)



NOTE

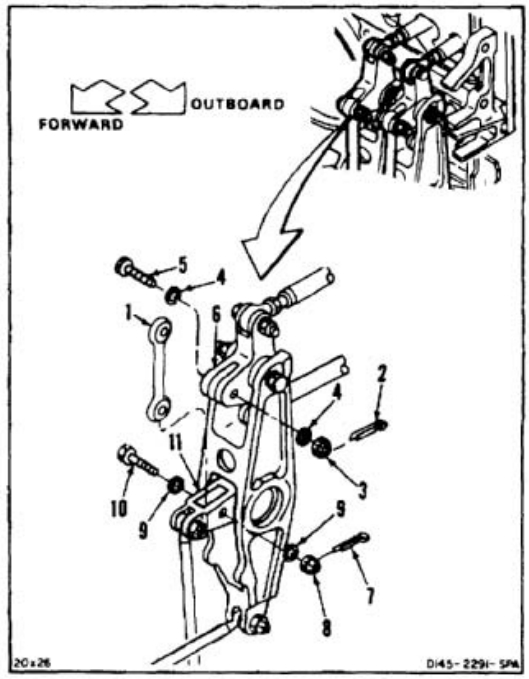
Attaching bolts, washers, and nut will be temporarily installed after major component removal.

NOTE

If a crack in the connecting links or bellcranks is suspected during removal, refer to TM 1-1520-253-23.

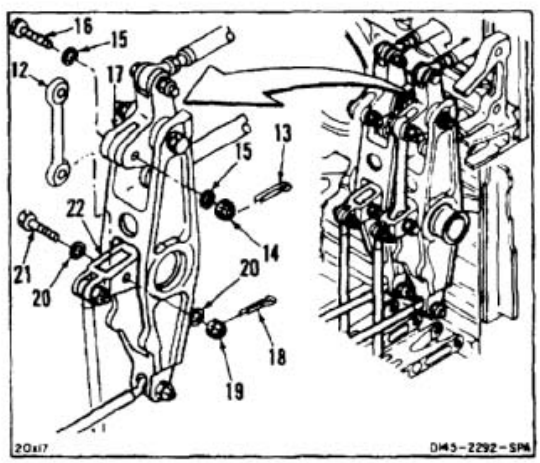
REMOVE PITCH AND THRUST LINK

1. Tag pitch and thrust link (1). Remove cotter pin (2), nut (3), washers (4), and bolt (5) from bellcrank (6). Remove link from bellcrank. Install bolt, washers, and nut in bellcrank.
2. Remove cotter pin (7), nut (8), washers (9), and bolt (10) from bellcrank (11). Remove link (1). Install bolt, washers, and nut in bellcrank.



REMOVE ROLL AND YAW LINK

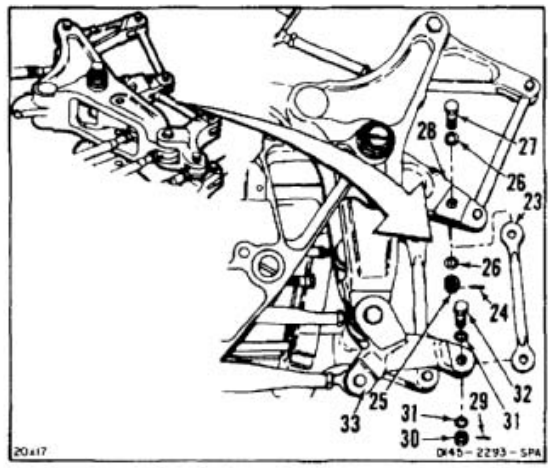
3. Tag roll and yaw link (12). Remove cotter pin (13), nut (14), washers (15), and bolt (16) from bellcrank (17). Remove link from bellcrank. Install bolt, washers, and nut in bellcrank.
4. Remove cotter pin (18), nut (19), washers (20), and bolt (21) from bellcrank (22). Remove link (12). Install bolt, washers, and nut in bellcrank.



REMOVE PITCH AND THRUST LEFT OUTPUT LINK

5. Tag pitch and thrust left output link (23). Remove cotter pin (24), nut (25), washers (26), and bolt (27) from bellcrank (28). Remove link from bellcrank. Install bolt, washers, and nut in bellcrank.

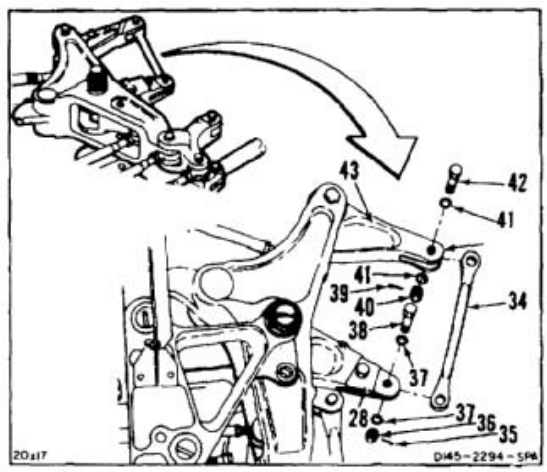
6. Remove cotter pin (29), nut (30), washers (31), and bolt (32) from bellcrank (33). Remove link (23). Install bolt, washers, and nut in bellcrank.



REMOVE PITCH AND THRUST RIGHT OUTPUT LINK

7. Tag pitch and thrust right output link (34). Remove cotter pin (35), nut (36), washers (37), and bolt (38) from bellcrank (28). Remove link from bellcrank. Install bolt, washers, and nut in bellcrank.

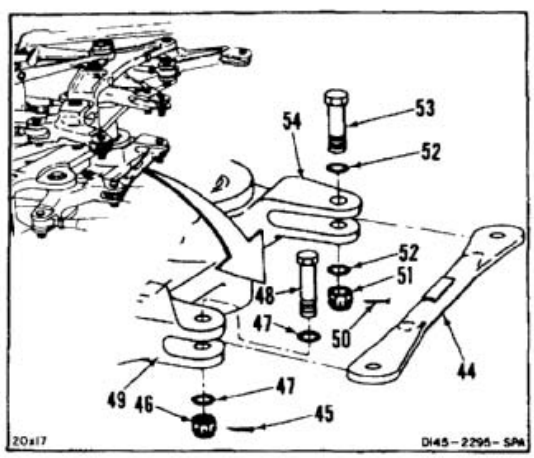
8. Remove cotter pin (39), nut (40), washers (41), and bolt (42) from bellcrank (43). Remove link (34). Install bolt, washers, and nut in bellcrank.



REMOVE PITCH AND THRUST OUTPUT LINK

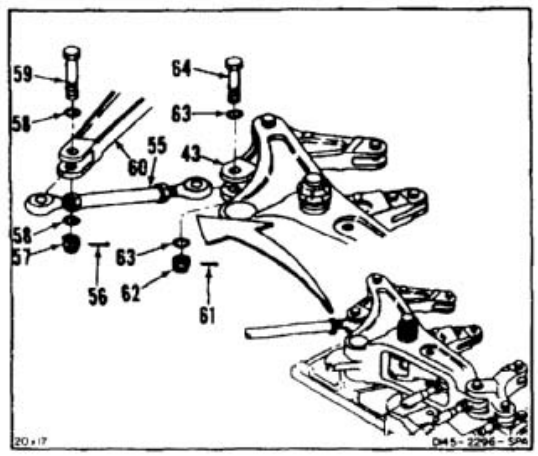
9. Tag pitch and thrust output link (44). Remove cotter pin (45), nut (46), washers (47), and bolt (48) from bellcrank (49). Remove link from bellcrank. Install bolt, washers, and nut in bellcrank.

10. Remove cotter pin (50), nut (51), washers (52), and bolt (53) from bellcrank (54). Remove link (44). Install bolt, washers, and nut in bellcrank.



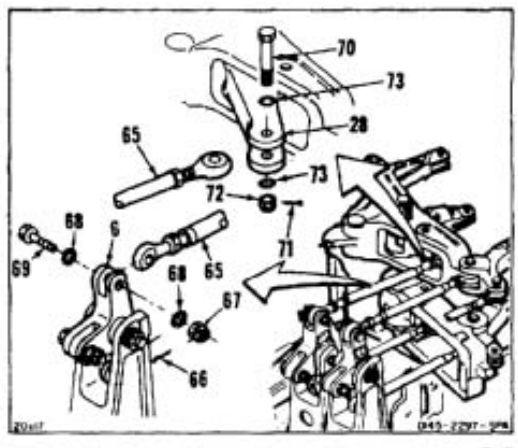
REMOVE FORWARD RIGHT UPPER LINK

11. Tag forward right upper link (55). Remove cotter pin (56), nut (57), washers (58), and bolt (59) from bellcrank (60). Remove link from bellcrank. Install bolt, washers, and nut in bellcrank.
12. Remove cotter pin (61), nut (62), washers (63), and bolt (64) from bellcrank (43). Remove link (55). Install bolt washers, and nut in bellcrank.



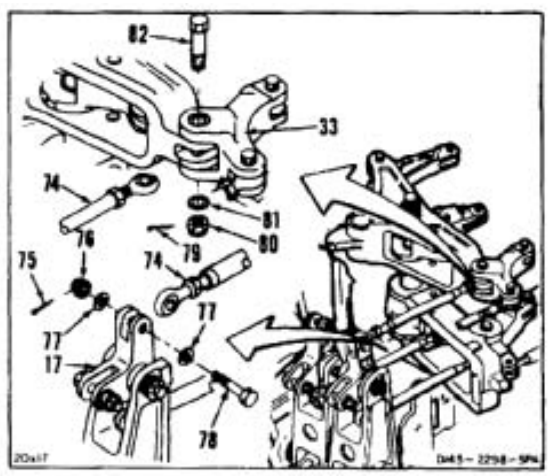
REMOVE UPPER INBOARD LINK

13. Tag forward end of upper inboard link (65). Remove cotter pin (66), nut (67), washers (68), and bolt (69) from bellcrank (6).
14. Move bellcrank (28) to expose bolt (70). Remove cotter pin (71), nut (72), washers (73), and bolt. Remove link (65). Install bolt, washer, and nut in bellcrank.
15. Install bolt (69), washers (68), and nut (67) in bellcrank (6).



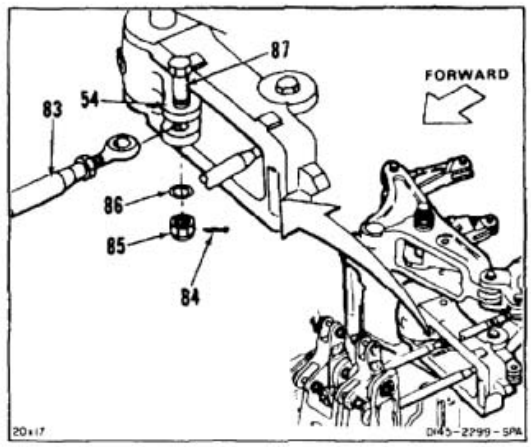
REMOVE UPPER OUTBOARD LINK

16. Tag forward end of upper outboard link (74). Remove cotter pin (75), nut (76), washers (77), and bolt (78) from bellcrank (17).
17. Remove pin (79), nut (80), and washer (81). Lift bolt (82) from bellcrank (33). Remove link (74). Install bolt, washer, and nut in bellcrank.
18. Install bolt (78), washers (77), and nut (76) in bellcrank (17).

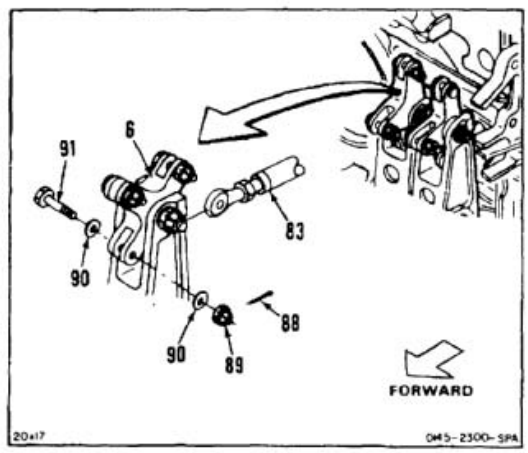


REMOVE LOWER INBOARD LINK

19. Tag aft end of lower inboard link (83). Remove cotter pin (84), nut (85), and washer (86). Lift bolt (87) from bellcrank (54) to release link (83). Pull link forward. Install bolt, washer, and nut in bellcrank.

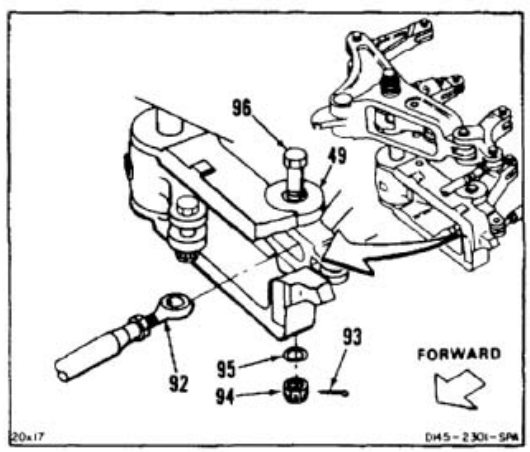


20. Move bellcrank (6) forward. Remove cotter pin (88), nut (89), washers (90), and bolt (91). Remove link (83). Install bolt, washers, and nut in bellcrank.

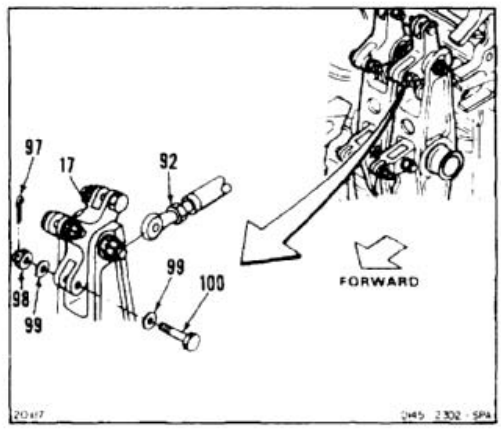


REMOVE LOWER OUTBOARD LINK

21. Tag aft end of lower outboard link (92). Remove cotter pin (93), nut (94), and washer (95). Lift bolt (96) from bellcrank (49) to release link (92). Pull link forward. Install bolt, washer, and nut in bellcrank.



22. Move bellcrank (17) forward. Remove cotter pin (97), nut (98), washers (99), and bolt (100). Remove link (92). Install bolt, washers, and nut in bellcrank.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-187 INSTALL MIXING LINKAGE CONNECTING LINKS 11-187

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand
Torque Wrench, 30 To 150 Inch-Pounds
Torque Wrench, 150 To 750 Inch-Pounds

Materials:

None

Parts:

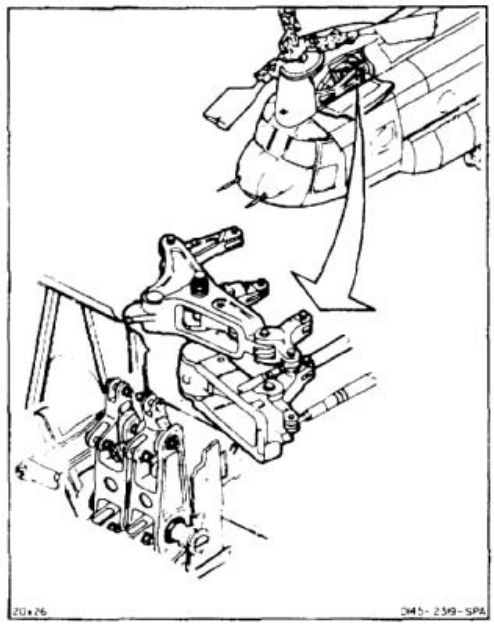
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-51



CAUTION

Make sure bushings are in bellcranks before installing bolts or component damage will result.

To obtain proper clamp-up and prevent damage to controls, if a light washer is used under nut, prior to applying torque make sure the washer does not hang up in the bolt retaining feature groove.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

INSTALL LOWER OUTBOARD LINK

1. If lower outboard link (1) is a replacement, loosen nut (2). Turn rod end (3) **90°** to rod end (4). Torque nut (2) to **350 inch-pounds**.
2. Insert link (1) through bellcrank (5) and access hole.
3. Remove bolt (7), washer (8 and 9), and nut (10) from bellcrank (11).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

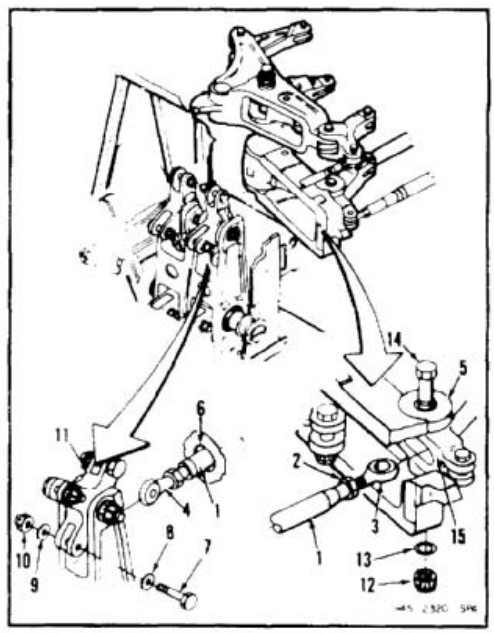
Ensure that the rivet through the fixed rod end bearing is secure.

Ensure larger diameter bore rod end bearing is facing aft.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

4. Position link (1) in bellcrank (11). Install bolt (7), washers (8 and 9), and nut (10) in bellcrank. Do not torque nut at this time. Remove tag.
5. Remove nut (12) and washer (13) from bolt (14).
6. Raise bolt (14) from bellcrank (5). Position link (1) in bellcrank (15).
7. Install bolt (14), washer (13), and nut (12). Do not torque nut at this time.



INSTALL LOWER INBOARD LINK

8. If lower inboard link (16) is a replacement, loosen nut (17). Turn rod end (18) **90°** to rod end (19). Torque nut (17) to **285 inch-pounds**.
9. Insert link (16) through bellcrank (5) and access hole (20).
10. Remove bolt (21), washers (22 and 23), and nut (24) from bellcrank (25).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

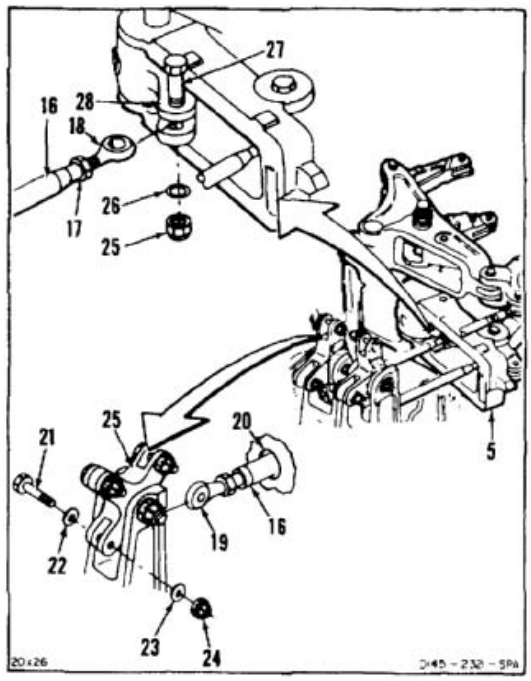
Ensure that the rivet through the fixed rod end bearing is secure.

Ensure larger diameter bore rod end bearing is facing aft.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

11. Position link (16) in bellcrank (25). Install bolt (21), washers (22 and 23), and nut (24). Do not torque nut at this time. Remove tag.
12. Remove nut (25) and washer (26) from bolt (27).
13. Raise bolt (27) from bellcrank (28). Position link (16) in bellcrank.
14. Install bolt (27), washer (26), and nut (25). Do not torque nut at this time.



INSTALL UPPER OUTBOARD LINK.

15. If upper outboard link (29) is a replacement, loosen nut (30). Turn rod end (31) **90º** to rod end (32). Torque nut to **350 inch-pounds**.

16. Insert link (29) through access hole (33) from aft side. Remove bolt (34), washers (35 and 36), and nut (37).

17. Do not torque nut at this time. Remove tag.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure larger diameter bore rod end bearing is facing aft.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

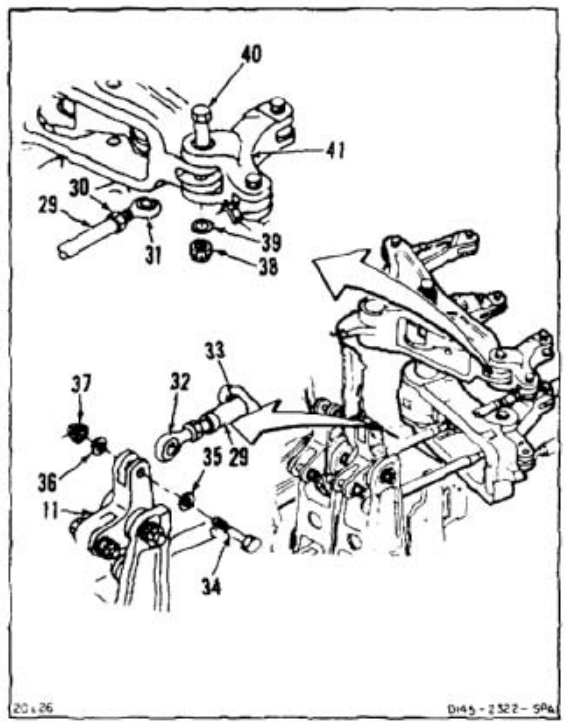
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

18. Position link (29) in bellcrank (11). Install bolt (34), washers (35 and 36), and nut (37).

19. Remove nut (38) and washer (39) from bolt (40).

20. Raise bolt (40) from bellcrank (41). Position link (29) in bellcrank.

21. Install bolt (40), washer (39), and nut (38). Do not torque nut at this time.



INSTALL UPPER INBOARD LINK

22. If upper inboard link (42) is a replacement, loosen nut (43). Turn rod end (44) **90°** to rod end (45). Torque nut to **285 inch-pounds**.

23. Insert link (42) through bellcrank (46) and access hole (47).

24. Remove bolt (48), washers (49 and 50), and nut (51) from bellcrank (25).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure larger diameter bore rod end bearing is facing aft.

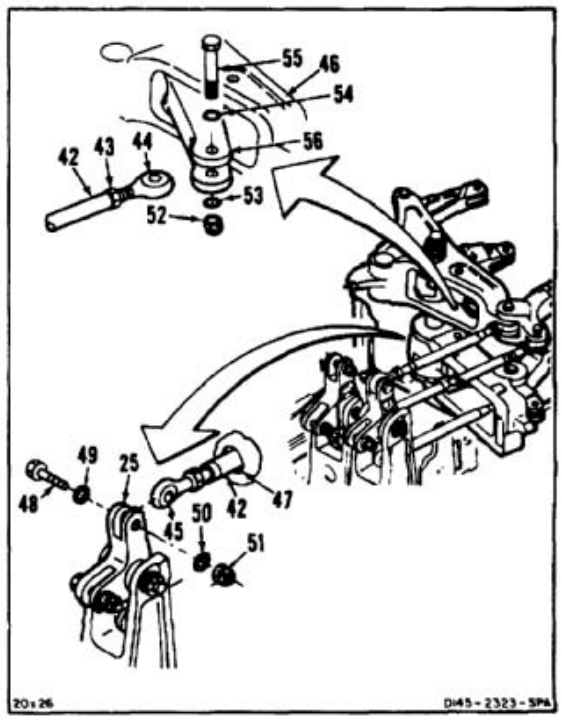
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

25. Position link (42) in bellcrank (25). Install bolt (48), washers (49 and 50), and nut (51). Do not torque nut at this time. Remove tag.

26. Remove nut (52), washers (53 and 54), and bolt (55) from bellcrank (56).

27. Position link (42) in bellcrank (56). Install bolt (56), washer (54 and 53), and nut (52). Do not torque nut at this time.



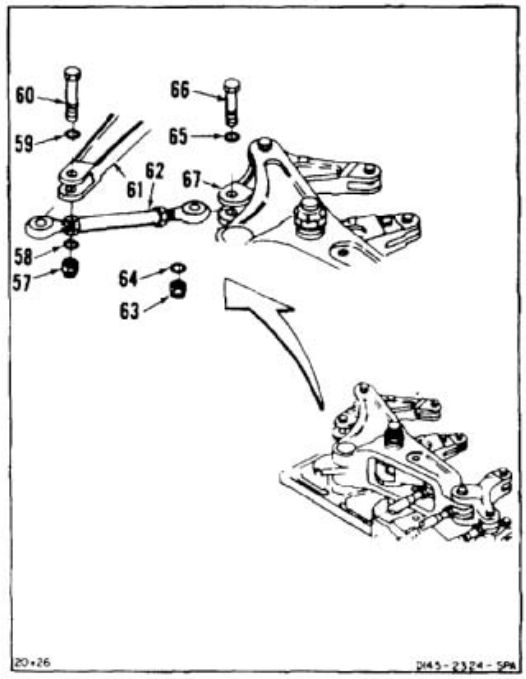
INSTALL FORWARD RIGHT UPPER LINK

28. Remove nut (57), washers (58 and 59), and bolt (60) from bellcrank (61).

29. Position forward right upper link (62) in bellcrank (61). Install bolt (60), washers (59 and 58), and nut (57). Remove tag.

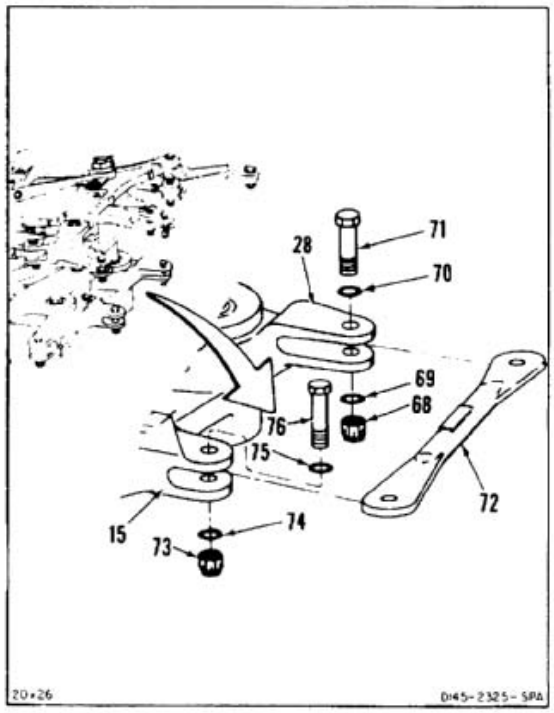
30. Remove nut (63), washers (64 and 65), and bolt (66) from bellcrank (67). Do not torque nut at this time.

31. Position link (62) in bellcrank (67). Install bolt (67), washers (65 and 64), and nut (63). Do not torque nut at this time.



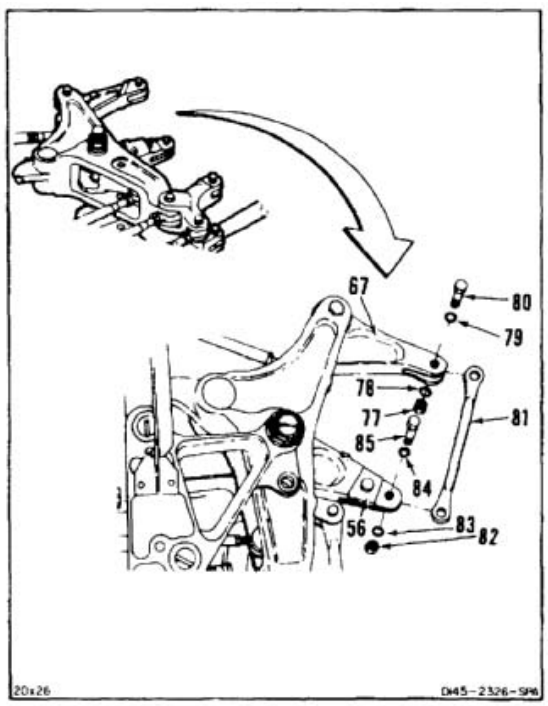
INSTALL PITCH AND THRUST OUTPUT LINK

32. Remove nut (68), washers (69 and 70), and bolt (71) from bellcrank (28).
33. Position pitch and thrust output link (72) in bellcrank (28). Install bolt (71), washers (70 and 69), and nut (68). Do not torque nut at this time. Remove tag.
34. Remove nut (73), washers (74 and 75), and bolt (76) from bellcrank (15).
35. Position link (72) in bellcrank (15). Install bolt (76), washers (75 and 74), and nut (73). Do not torque nut at this time.



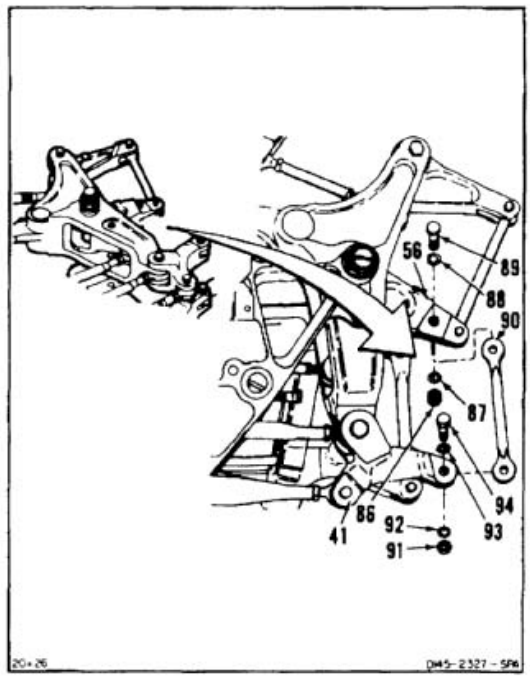
INSTALL PITCH AND THRUST RIGHT OUTPUT LINK

36. Remove nut (77), washers (78 and 79), and bolt (80) from bellcrank (67).
37. Position pitch and thrust right output link (81) in bellcrank (67). Install bolt (80), washers (79 and 78), and nut (77). Do not torque nut at this time. Remove tag.
38. Remove nut (82), washers (83 and 84), and bolt (85) from bellcrank (56).
39. Position link (81) in bellcrank (56). Install bolt (85), washers (84 and 83), and nut (82). Do not torque nut at this time.



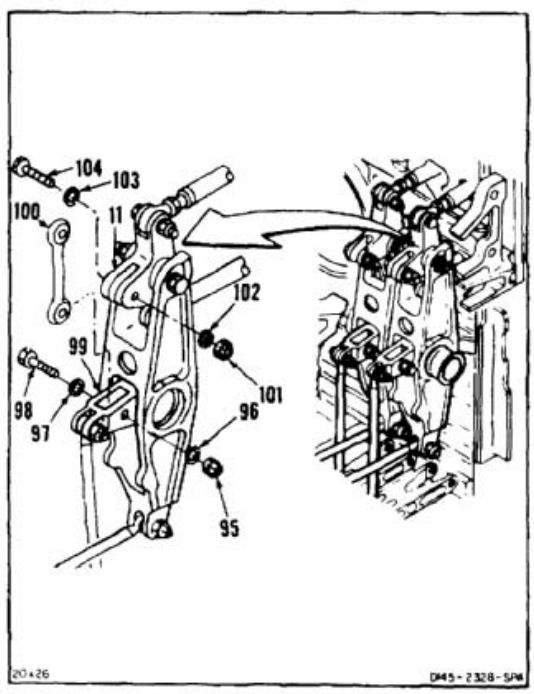
INSTALL PITCH AND THRUST LEFT OUTPUT LINK

40. Remove nut (86), washers (87 and 88), and bolt (89) from bellcrank (56).
41. Position pitch and thrust left output link (90) in bellcrank (56). Install bolt (89), washers (88 and 87), and nut (86). Do not torque nut at this time. Remove tag.
42. Remove nut (91), washers (92 and 93), and bolt (94) from bellcrank (41).
43. Position link (90) in bellcrank (41). Install bolt (94), washers (93 and 92), and nut (91). Do not torque nut at this time.



INSTALL ROLL AND YAW LINK

44. Remove nut (95), washers (96 and 97), and bolt (98) from bellcrank (99).
45. Position roll and yaw link (100) in bellcrank (99). Install bolt (98), washers (97 and 96), and nut (95). Do not torque nut at this time. Remove tag.
46. Remove nut (101), washers (102 and 103), and bolt (104) from bellcrank (11).
47. Position link (100) in bellcrank (11). Install bolt (104), washers (103 and 102), and nut (101). Do not torque nut at this time.



INSTALL PITCH AND THRUST LINK

48. Remove nut (105), washers (106 and 107), and bolt (108) from bellcrank (109).

WARNING

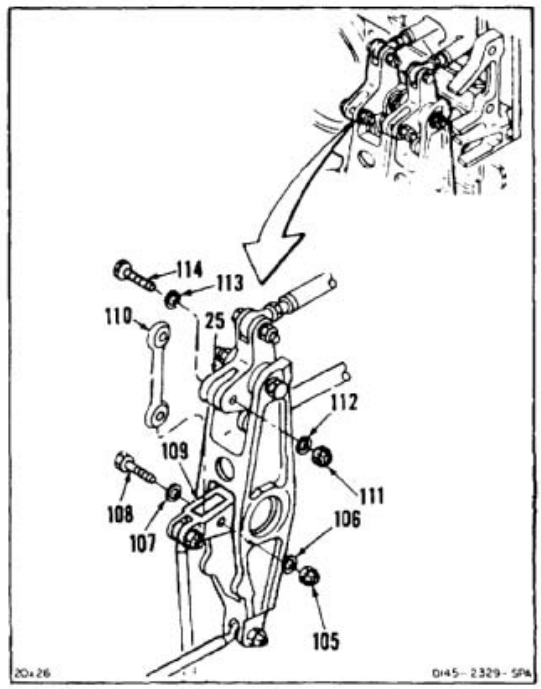
FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure bearings are properly staked.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



49. Position pitch and thrust link (110) in bellcrank (109). Install bolt (108), washers (107 and 106), and nut (105). Do not torque nut at this time. Remove tag.

50. Remove nut (111), washers (112 and 113), and bolt (114) from bellcrank (25).

51. Position link (110) in bellcrank (25). Install bolt (114), washers (113 and 112), and nut (111). Do not torque nut at this time.

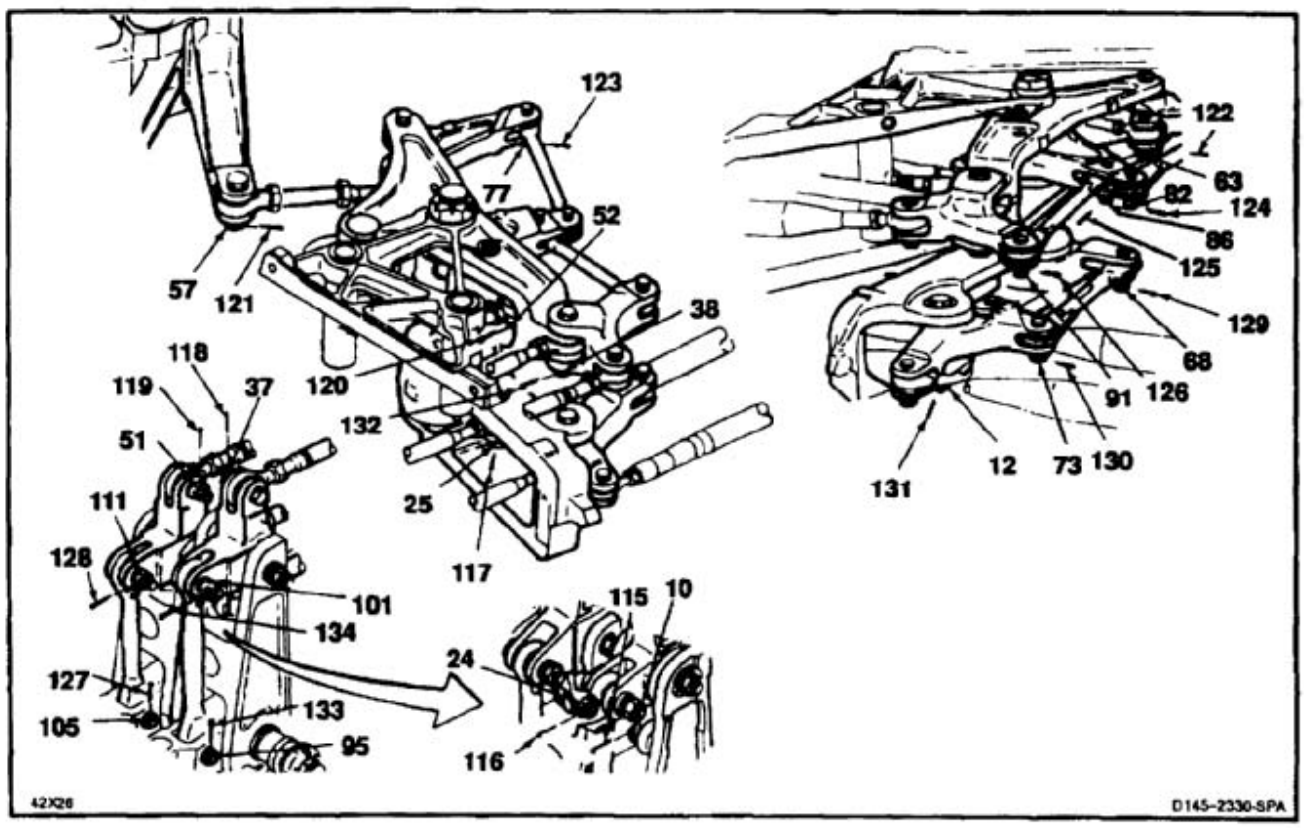
52. Neutral rig first and second stage linkage (Task 11-51).

53. Torque nuts (10, 24, 25, 37, 51, 52, 57, 63, 77, 86, and 91) to **60 to 90 inch-pounds**. Install cotter pins (115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, and 126).

54. Torque nuts (68 and 73) to **85 to 125 inch-pounds**. Install cotter pins (129 and 130).

55. Torque nuts (12 and 38) to **195 to 280 inch-pounds**. Install cotter pins (131 and 132).

56. Torque nuts (95, 101, 105, and 111) to **85 to 200 inch-pounds**. Install cotter pins (127, 128, 133, and 134).

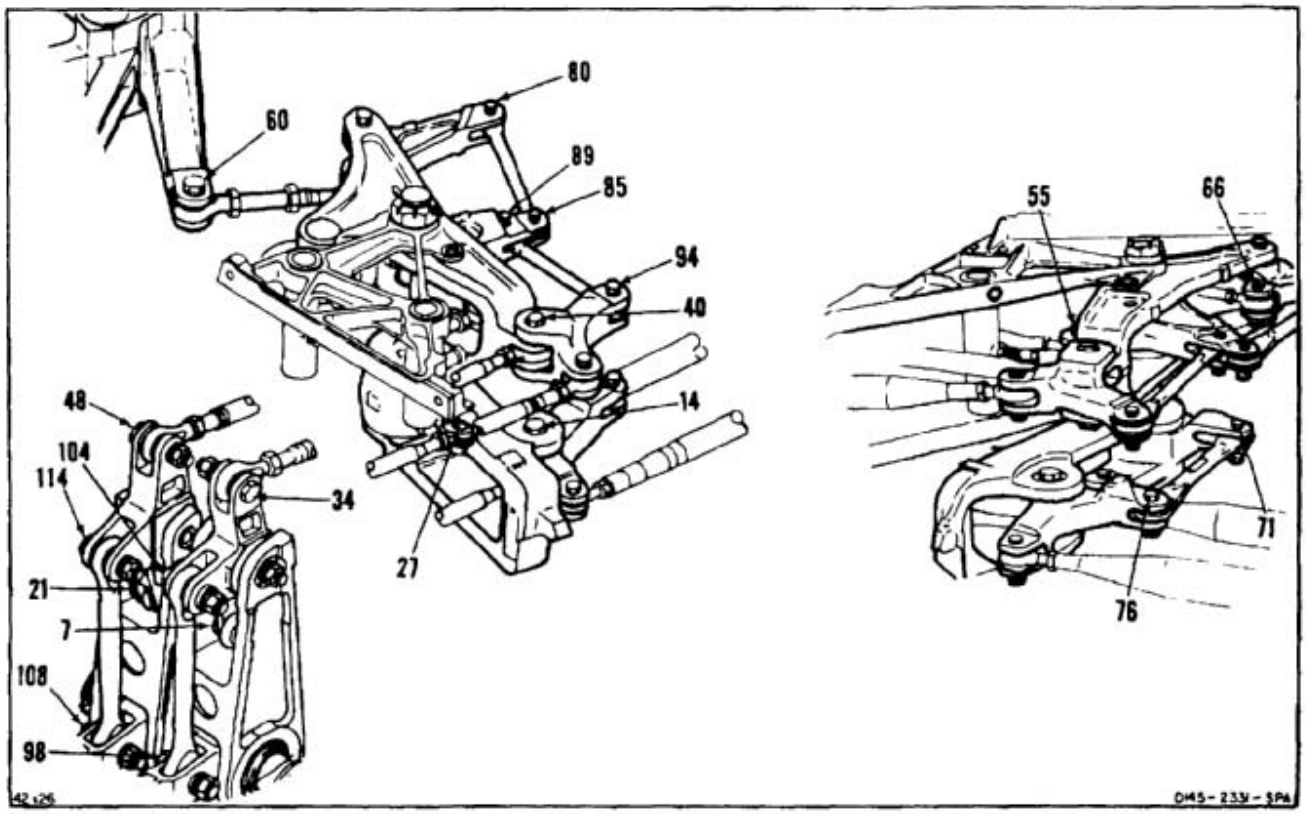


57. Check bolts (7, 14, 21, 27, 34, 40, 48, 55, 60, 66, 71, 76, 80, 85, 89, 94, 98, 104, 108, and 114). Bolts shall not be rotated with a torque less than **10 inch-pounds**. Bolts shall not have axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 53, 54, 55, or 56.

INSPECT

FOLLOW-ON MAINTENANCE:

Connect forward and aft connecting links to servocylinders (Task 11-193).
Connect pitch, roll, yaw and thrust at intermediate bellcranks (Task 11-185).
Perform neutral rig check (Task 11-33).
Perform controls clearance check (Task 11-5).
Close forward left work platform (Task 2-2).



END OF TASK

11-188 REMOVE FIRST STAGE MIXING ASSEMBLY 11-188

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Socket, 2-1/8 Inch
Metal Rod, 3/8 Inch x 12 Inches or Spanner Set AN 8515-1

Materials:

Paper Tags (E264)

Personnel Required:

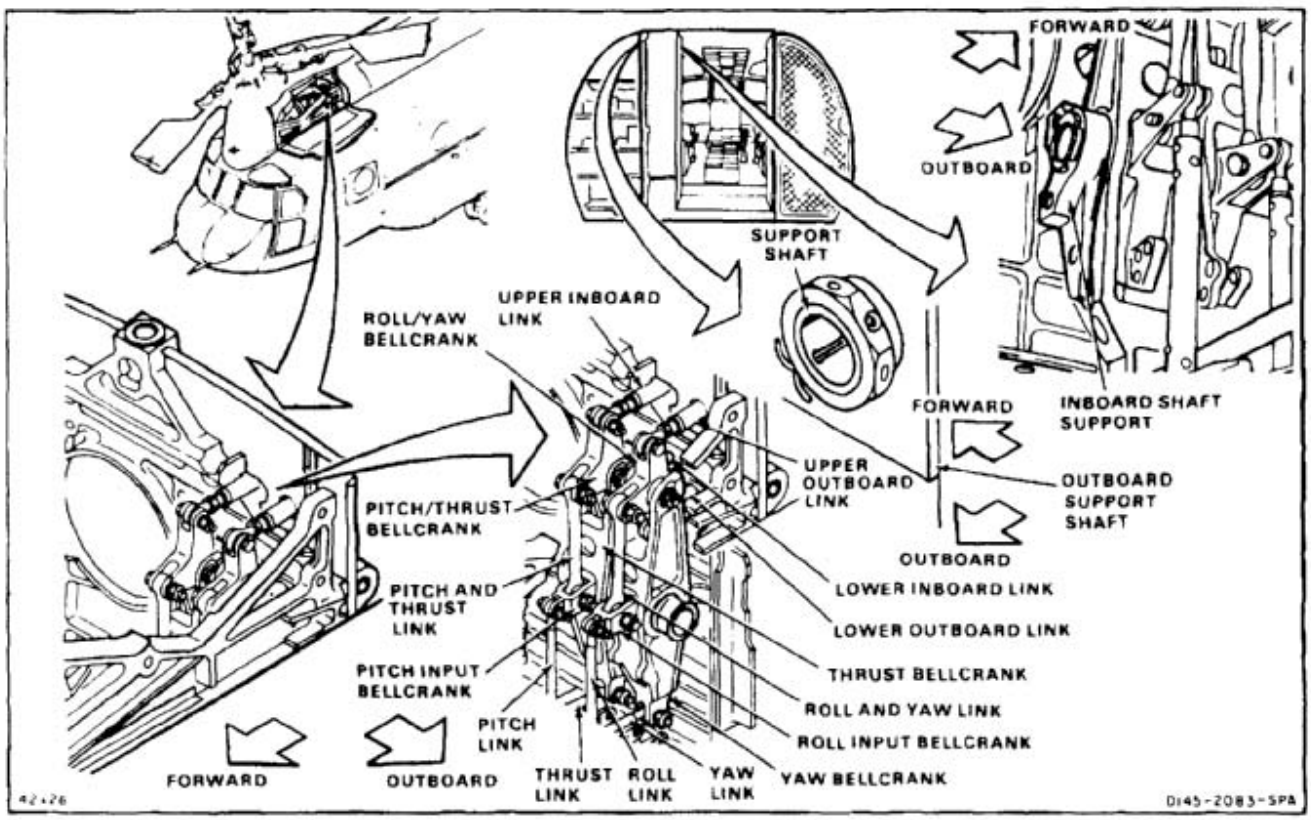
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Forward Left Work Platform Open (Task 2-2)
Forward and Aft Connecting Links to Servocylinders Disconnected (Task 11-192)
Forward Left Connecting Link Removed (Task 11-194)
Forward Transmission Drip Pan Removed (Task 2-3)
Lower Half of Forward Transmission Inlet Duct Removed (Task 6-121)
Control Closet Access Panel Open (Task 2-2)
Avionics Compartment Acoustical Blanket Removed (Task 2-107)
Receiver/Transmitter R/T-1220/ALQ156 Removed (TM 11-1520-240-20)

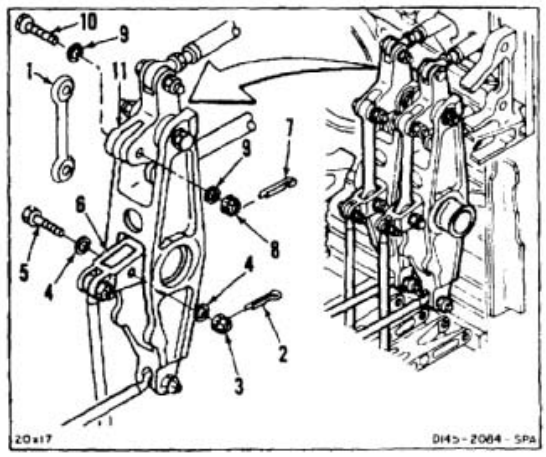


NOTE

Attaching bolt, washers, and nut will be temporarily installed after removing links and bellcranks. Amount of washers may vary.

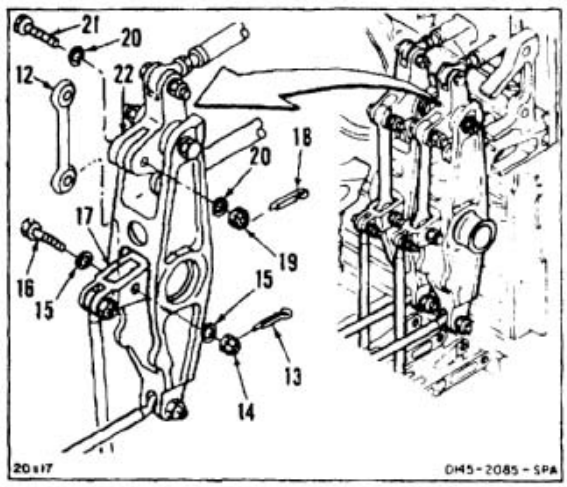
NOTE

If a crack in the connecting links, bellcranks, or supports is suspected during removal, refer to TM 1-1520-253-23.



TO REMOVE PITCH AND THRUST CONNECTING LINK

1. Tag pitch and thrust connecting link (1). Remove cotter pin (2), nut (3), washers (4), and bolt (5) from bellcrank (6).
2. Remove cotter pin (7), nut (8), washers (9), and bolt (10) from bellcrank (11).
3. Remove link (1).
4. Install two bolts (5 and 10), washers (4 and 9), and two nuts (3 and 8) in bellcranks (6 and 11).

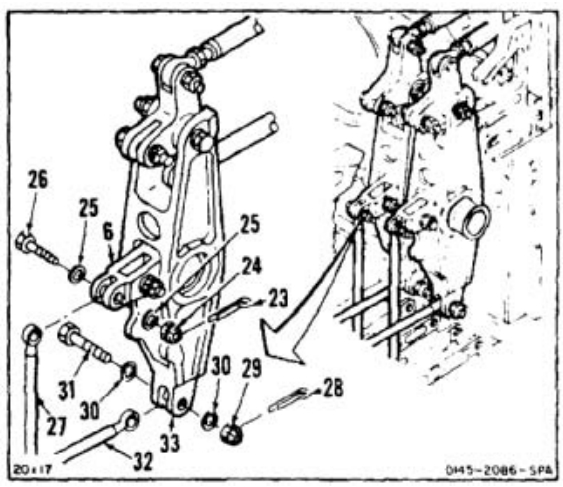


TO REMOVE ROLL AND YAW CONNECTING LINK

5. Tag roll and yaw connecting link (12). Remove cotter pin (13), nut (14), washers (15), and bolt (16) from bellcrank (17).
6. Remove cotter pin (18), nut (19), washers (20), and bolt (21) from bellcrank (22).
7. Remove link (12).
8. Install two bolts (16 and 21), washers (15 and 20), and two nuts (14 and 19) in bellcranks (17 and 22).

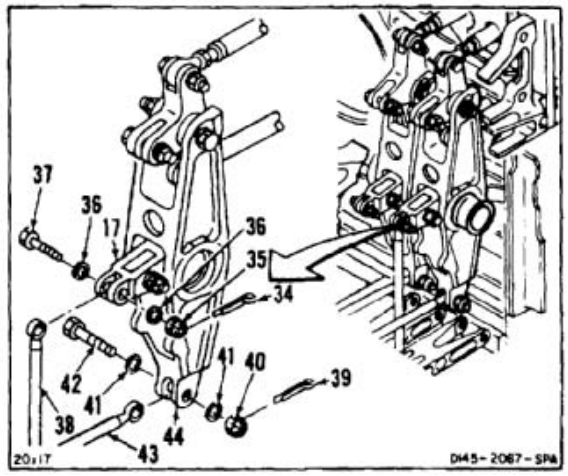
TO DISCONNECT PITCH. THRUST, ROLL AND YAW INTERCONNECTING LINKS

9. Remove cotter pin (23), nut (24), washers (25), and bolt (26). Disconnect pitch link (27) from bellcrank (6). Install bolt, washers, and nut in bellcrank.
10. Remove cotter pin (28), nut (29), washers (30), and bolt (31). Disconnect thrust link (32) from bellcrank (33). Install bolt, washers, and nut in bellcrank.



11. Remove cotter pin (34), nut (35), washers (36), and bolt (37). Disconnect roll link (38) from bellcrank (17). Install bolt, washers, and nut in bellcrank.

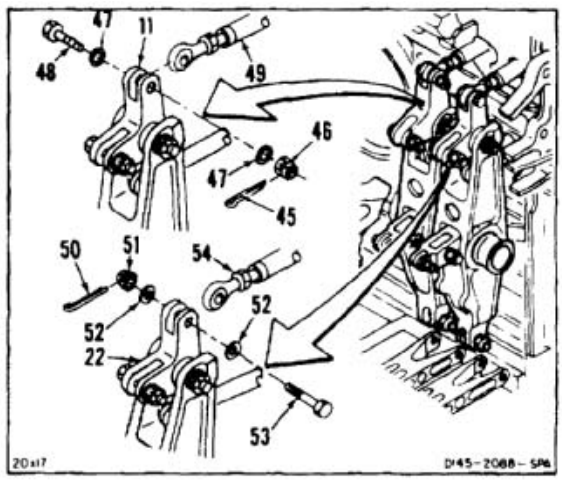
12. Remove cotter pin (39), nut (40), washers (41), and bolt (42). Disconnect yaw link (43) from bellcrank (44). Install bolt, washers, and nut in bellcrank.



TO REMOVE PITCH/THRUST AND ROLL/YAW BELLCRANKS

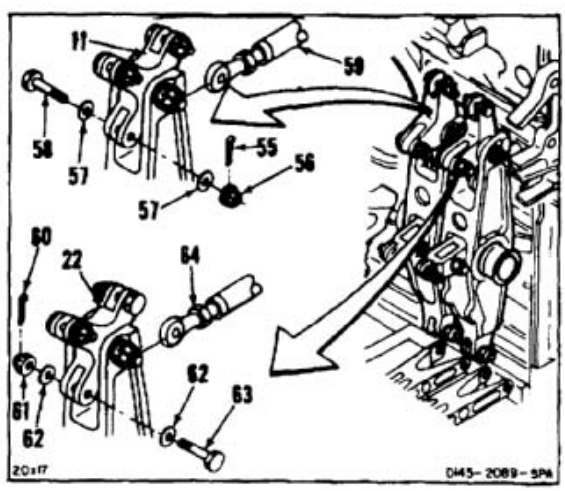
13. Remove cotter pin (45), nut (46), washers (47), and bolt (48). Disconnect upper inboard link (49) from bellcrank (11). Install bolt, washers, and nut in bellcrank.

14. Remove cotter pin (50), nut (51), washers (52), and bolt (53). Disconnect upper outboard link (54) from bellcrank (22). Install bolt, washers, and nut in bellcrank.



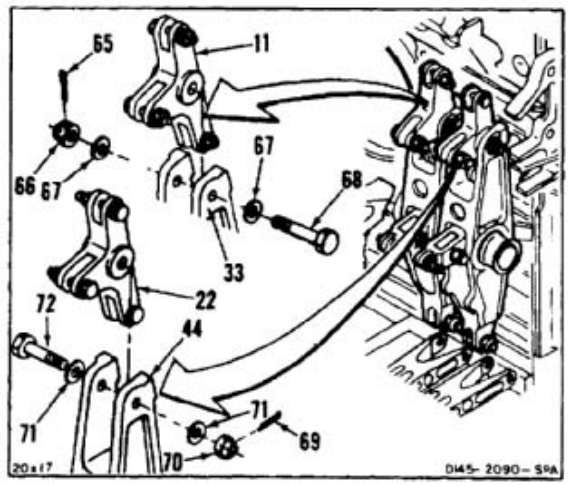
15. Remove cotter pin (55), nut (56), washers (57), and bolt (58). Disconnect lower inboard link (59) from pitch/thrust bellcrank (11). Install bolt, washers, and nut in bellcrank.

16. Remove cotter pin (60), nut (61), washers (62), and bolt (63). Disconnect lower outboard link (64) from roll and yaw bellcrank (22). Install bolt, washers, and nut in bellcrank.



17. Tag bellcrank (11). Remove cotter pin (65), nut (66), washers (67), and bolt (68). Remove bellcrank (11). Install bolt, washers and nut in bellcrank (33).

18. Tag bellcrank (22), Remove cotter pin (69 nut (70), washers (71), and bolt (72). Remove bellcrank (22). Install bolt, washers, and nut in bellcrank (44).

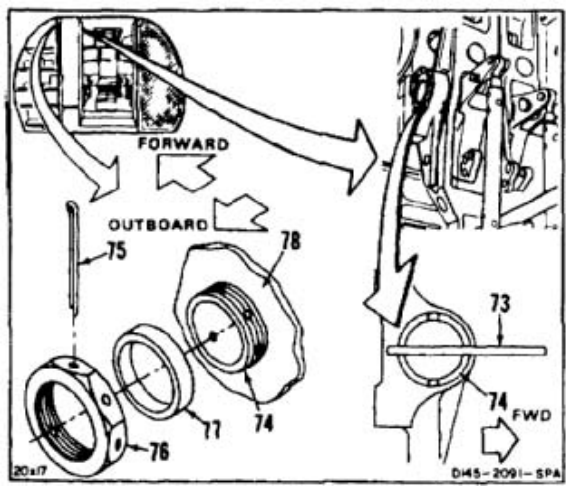


TO REMOVE THRUST, YAW, PITCH INPUT AND ROLL INPUT BELLCRANKS

19. Have helper, in passageway, stop shaft (74) from turning, using rod (73) (or spanner wrench) in slotted end of shaft as shown.

20. Remove cotter pin (75), nut (76), and spacer (77) from shaft (74). Use **2-1/8 inch** socket. Remove rod (73) from shaft.

21. Tap threaded end of shaft (74) until end of shaft is flush with bulkhead (78). Use plastic faced hammer.

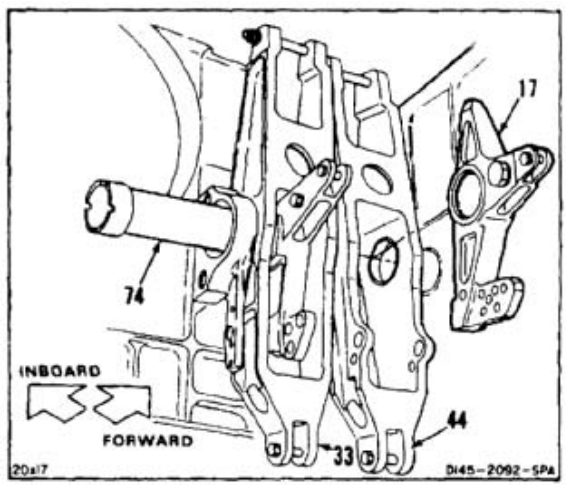


22. Tag roll input bellcrank (17), yaw bellcrank (44), and thrust bellcrank (33). Have helper on work platform support bellcranks (33 and 44).

CAUTION

Do not drive shaft out of bellcranks. Damage to bellcranks and bearings will result.

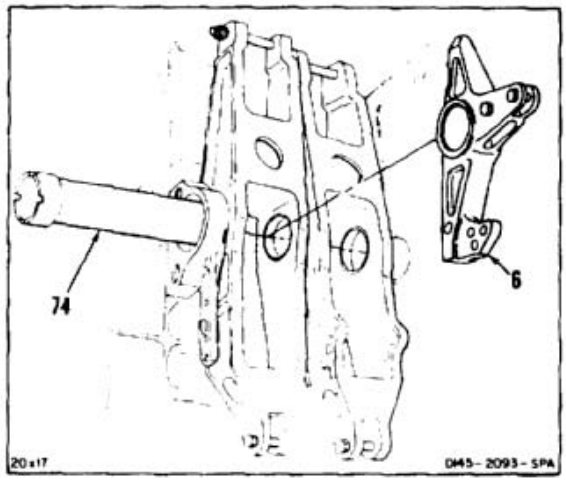
23. Carefully slide shaft (74) inboard until bellcrank (17) is released. Remove bellcrank.



CAUTION

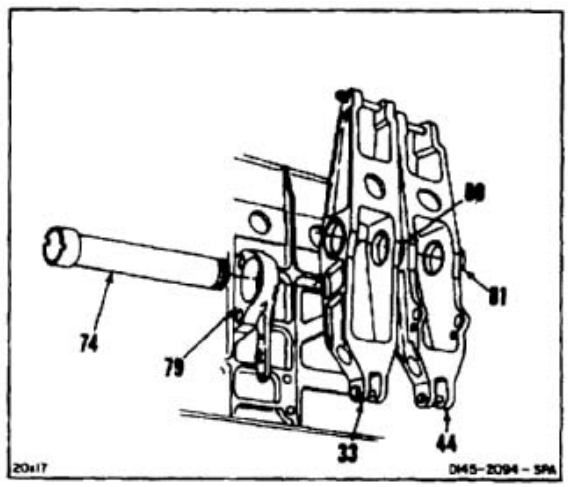
Do not drive shaft out of bellcranks. Damage to bellcranks and bearings will result.

24. Tag pitch input bellcrank (6). Carefully slide shaft (74) inboard until bellcrank (6) is released. Remove bellcrank.



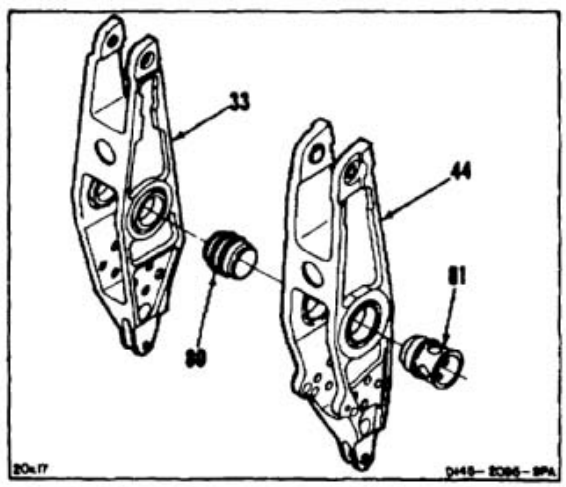
25. Carefully slide shaft (74) out of thrust bellcrank (33) and support (79).

26. Remove bellcranks (33 and 44), and adapters (80 and 81).



27. Remove adapter (80) from bellcranks (33 and 44).

28. Remove adapter (81) from bellcrank (44).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-189 INSTALL FIRST STAGE MIXING ASSEMBLY 11-189

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Socket, 2-1/8 Inch
Metal Rod, 3/8 Inch x 12 Inches or Spanner Set AN 8515-1

Materials:

Cloths (E120)

Parts:

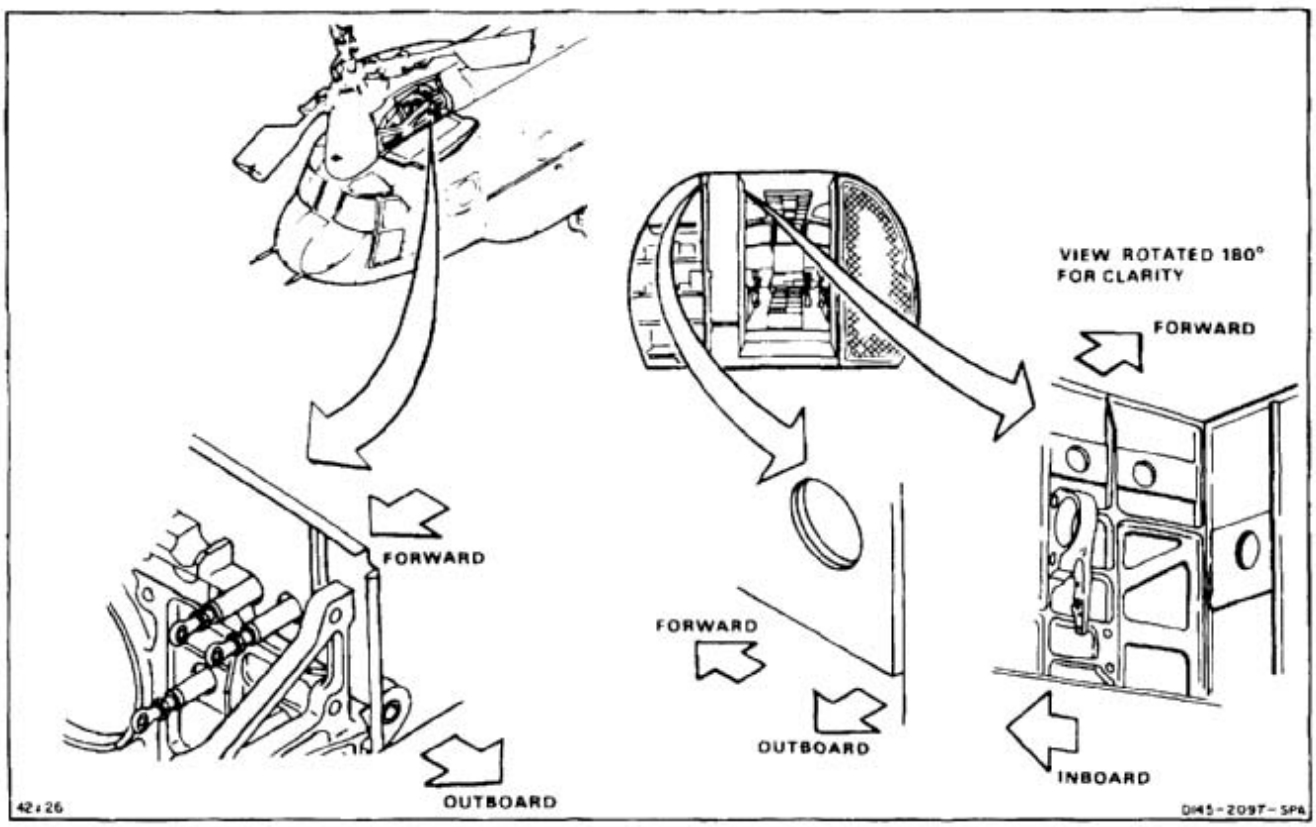
Cotter Pins
Washers

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 11-51



CAUTION

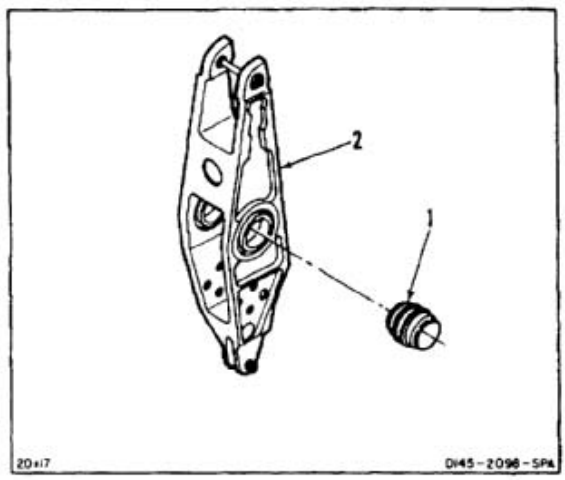
Make sure bushings are in bellcranks before installing bolts or damage will result to bellcranks.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

INSTALL THRUST, YAW, PITCH INPUT AND ROLL INPUT BELLCRANKS

1. Clean adapter (1). Use cloth (E120).
2. Install narrow bearing surface of adapter (1) in thrust bellcrank (2).



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

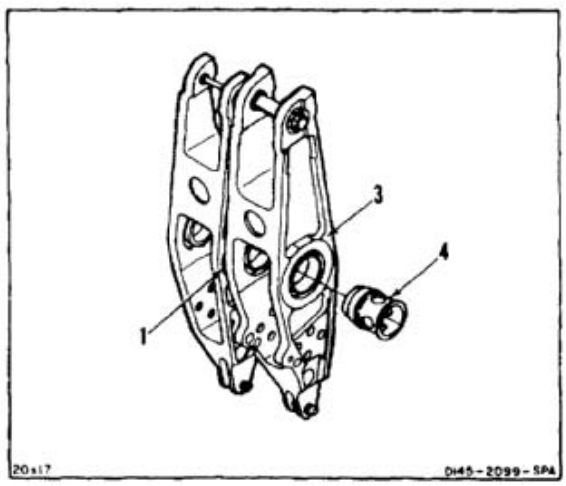
Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

3. Install yaw bellcrank (3) onto adapter (1).
4. Clean adapter (4). Use cloth (E120).
5. Install adapter (4) in bellcrank (3).



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

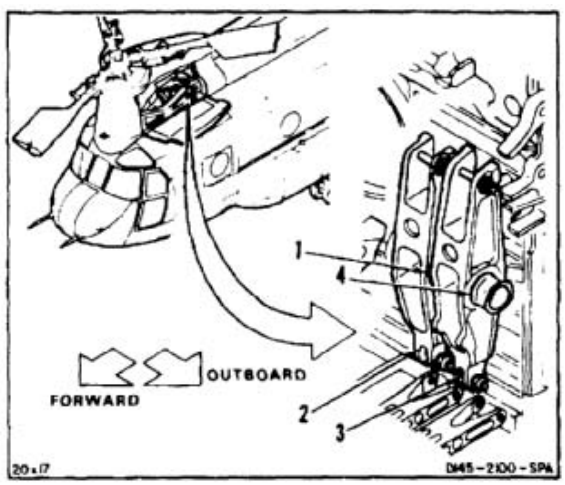
Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

6. Have helper on work platform, position assembled bellcranks (2 and 3) and adapters (1 and 4).



7. Clean shaft (5). Use cloth (E120).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that all associated spacers, washers and bushings are installed.

Ensure 145C3333-1 nut is tightened using proper installation procedure to prevent excess torque application to the associated components.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

8. From passageway, insert shaft (5) through inboard side of support (6).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

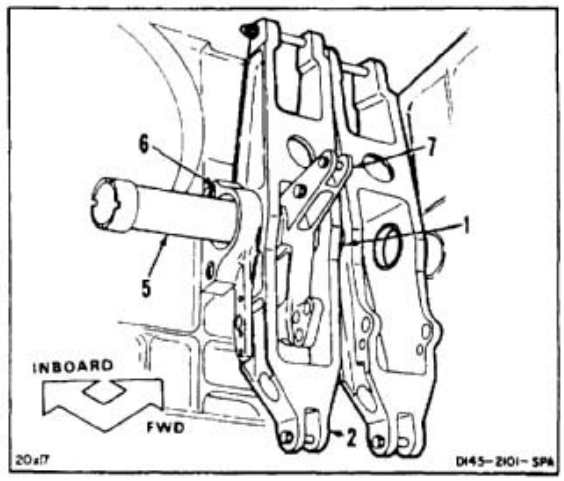
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

9. Position pitch input bellcrank (7) in bellcrank (2) as shown.

CAUTION

Do not drive shaft through bellcranks. Damage to bellcranks and bearings will result.

10. Carefully install shaft (5) through inboard side of bellcrank (2), bellcrank (7), outboard side of bellcrank (2) and into adapter (1). Move bellcranks to assist sliding of shaft.



WARNING

FLIGHT SAFETY PARTS

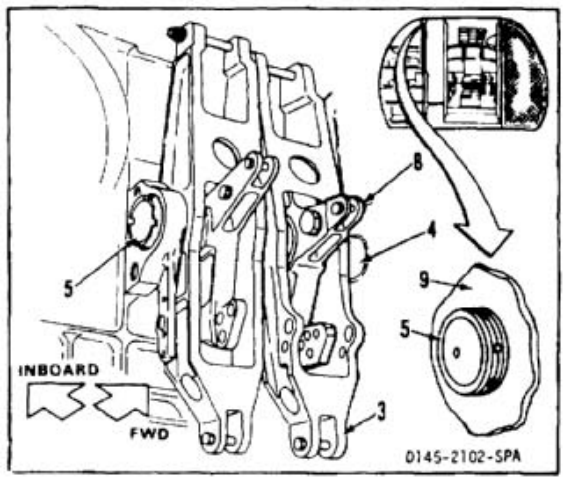
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

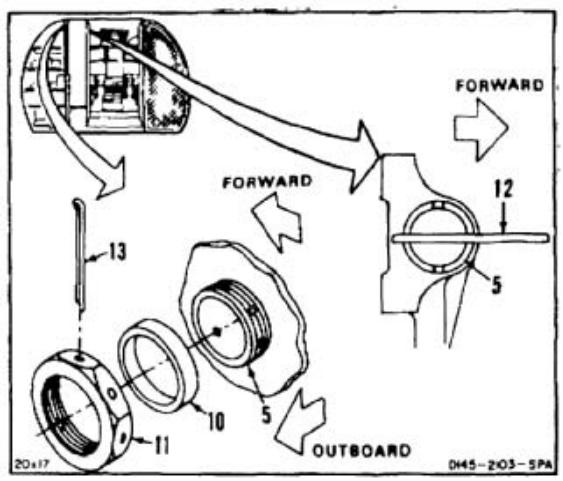
Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



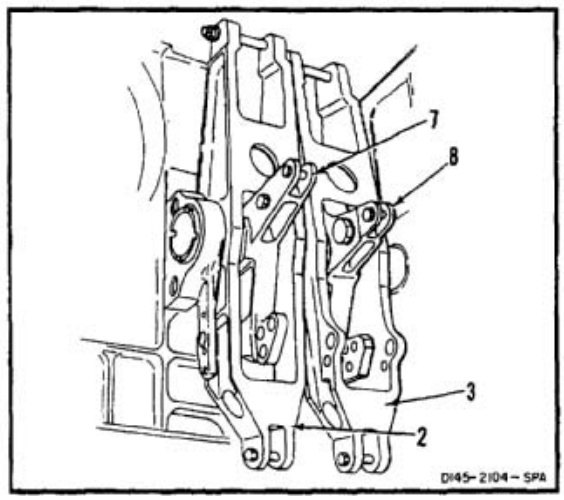


11. Position roll input bellcrank (8) in bellcrank (3).
12. Carefully install shaft (5) through inboard side of bellcrank (3), bellcrank (8), outboard side of bellcrank (3), adapter (4), and into support (9). Move bellcranks to assist sliding of shaft.
13. Install spacer (10) and nut (11) on shaft (5). Have helper, in passageway, stop shaft from turning, using rod (12) (or spanner wrench) in slotted end of shaft as shown.
14. Torque nut (11) to **600 inch-pounds**. Back off nut and torque nut to **300 to 600 inch-pounds**. Install cotter pin (13). Remove rod (12). Use **2-1/8 inch** socket.

14.1. Check that axial play between bellcranks (7 and 2) does not exceed **0.060 inch**.

14.2. Check that axial play between bellcranks (8 and 3) does not exceed **0.060 inch**.

15. Check bellcranks (2, 3, 7, and 8). Bellcranks shall be free to move through full range of travel.



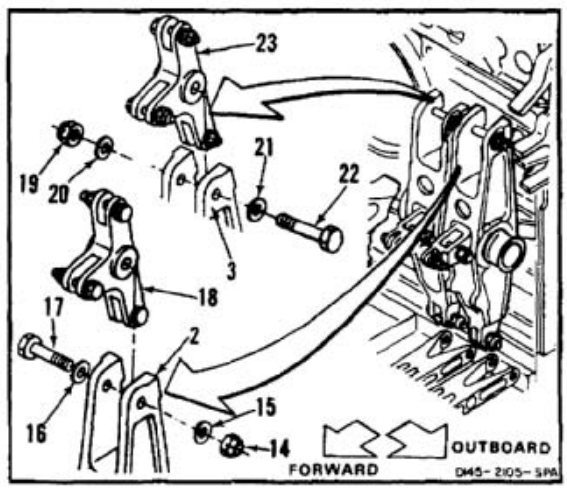
INSTALL PITCH/THRUST AND ROLL/YAW BELLCRANKS

CAUTION

Do not stand, kick, or induce lateral loads to the thrust idler. A cracked arm will cause in-flight failure resulting in disconnecting the thrust cockpit driver actuator (CCDA) and the droop eliminator potentiometers (Without 74) or thrust control position transducer (With 74).

16. Remove nut (14), two washers (15 and 16), and bolt (17) from bellcrank (2).

17. Position roll/yaw bellcrank (18) in bellcrank (2).



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

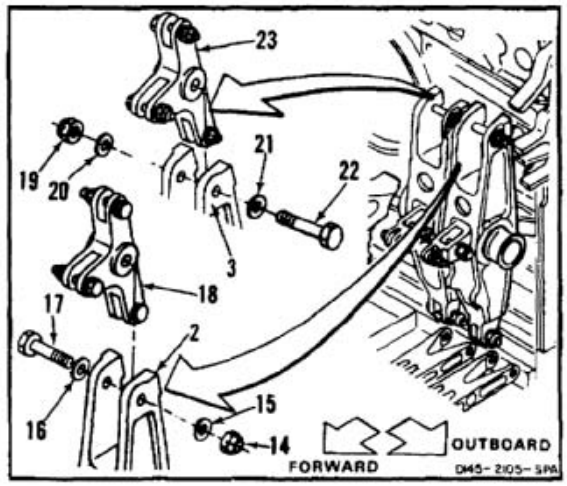
Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

18. Install bolt (17), two washers (16 and 15) and nut (14). Do not torque nut at this time.

19. Remove nut (19), two washers (20 and 21) and bolt (22) from bellcrank (3).



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

20. Position pitch/thrust bellcrank (23) in bellcrank (3).

21. Install bolt (22), two washers (21 and 20) and nut (19). Do not torque nut at this time.

22. Remove nut (24), two washers (25 and 26), and bolt (27) from bellcrank (23).

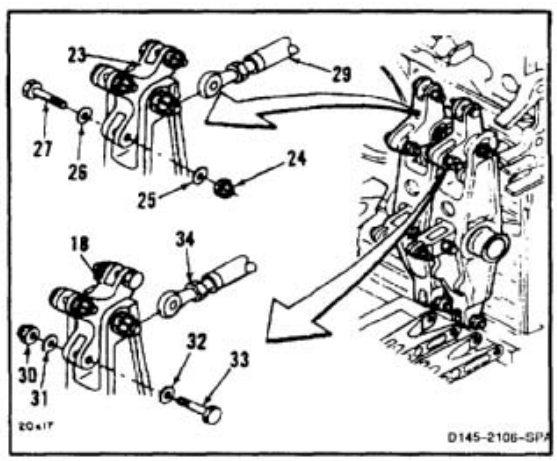
23. Position lower inboard link (29) in bellcrank (23).

24. Install bolt (27), two washers (26 and 25) and nut (24). Do not torque nut at this time.

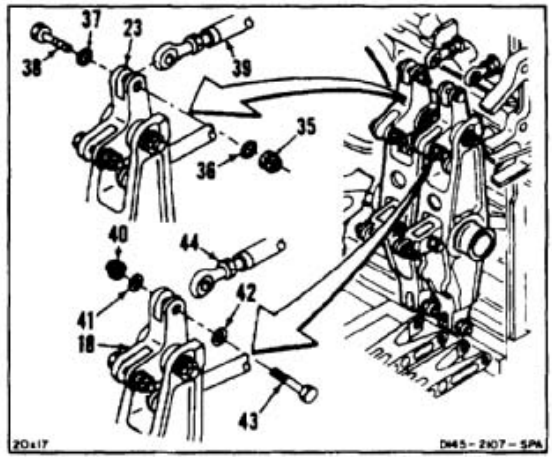
25. Remove nut (30), two washers (31 and 32) and bolt (33) from bellcrank (18).

26. Position lower outboard link (34) in bellcrank (18).

27. Install bolt (33), two washers (32 and 31), and nut (30). Do not torque nut at this time.

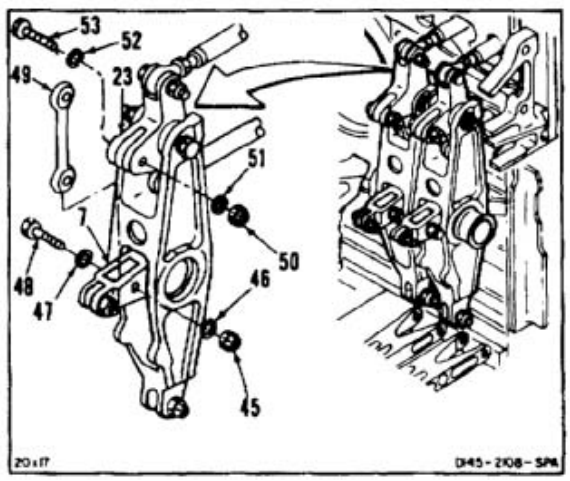


28. Remove nut (35), two washers (36 and 37), and bolt (38) from bellcrank (23).
29. Position upper inboard link (39) in bellcrank (23).
30. Install bolt (38), two washers (37 and 36), and nut (35). Do not torque nut at this time.
31. Remove nut (40), two washers (41 and 42), and bolt (43) from bellcrank (18).
32. Position upper outboard link (44) in bellcrank (18).
33. Install bolt (43), two washers (42 and 41), and nut (40). Do not torque nut at this time.



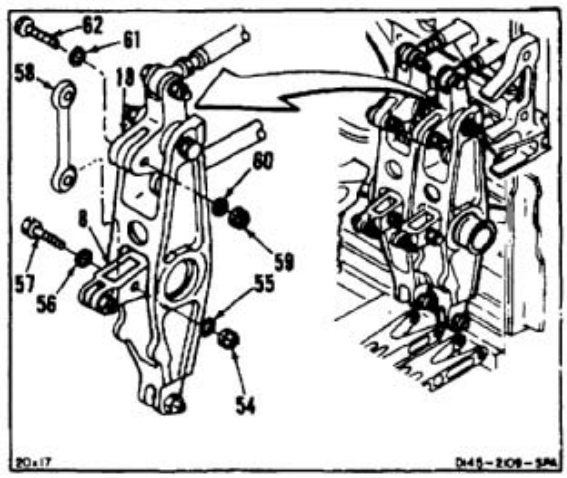
INSTALL PITCH AND THRUST CONNECTING LINK

34. Remove nut (45), two washers (46 and 47), and bolt (48) from bellcrank (7).
35. Position pitch and thrust link (49) in bellcrank (7).
36. Install bolt (48), two washers (47 and 46) and nut (45). Do not torque nut at this time.
37. Remove nut (50), two washers (51 and 52), and bolt (53) from bellcrank (23).
38. Position link (49) in bellcrank (23).
39. Install bolt (53), two washers (52 and 51), and nut (50). Do not torque nut at this time.



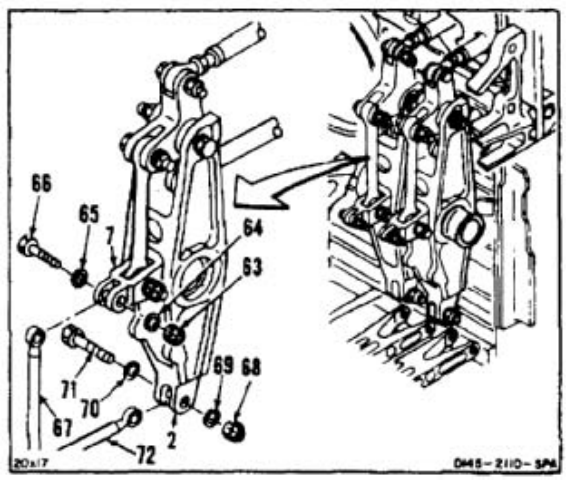
INSTALL ROLL AND YAW CONNECTING LINK

40. Remove nut (54), two washers (55 and 56), and bolt (57) from bellcrank (8).
41. Position roll and yaw link (58) in bellcrank (8).
42. Install bolt (57), two washers (56 and 55), and nut (54). Do not torque nut at this time.
43. Remove nut (59), two washers (60 and 61) and bolt (62) from bellcrank (18).
44. Position link (58) in bellcrank (18).
45. Install bolt (62), two washers (61 and 60), and nut (59). Do not torque nut at this time.
46. Neutral rig first and second stages and check control stop adjustments (Task 11-51).

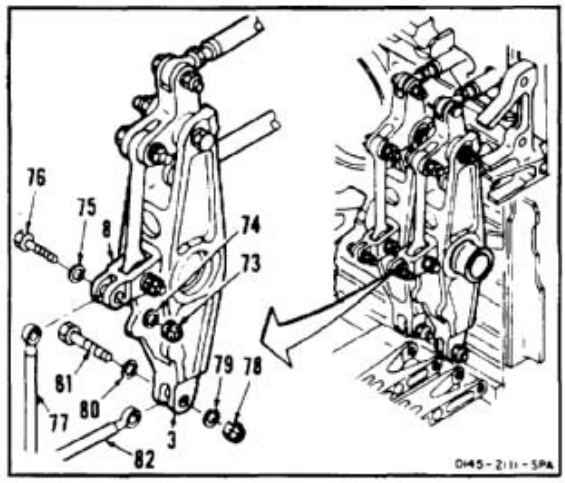


CONNECT PITCH, THRUST, ROLL AND YAW INTERCONNECTING LINKS

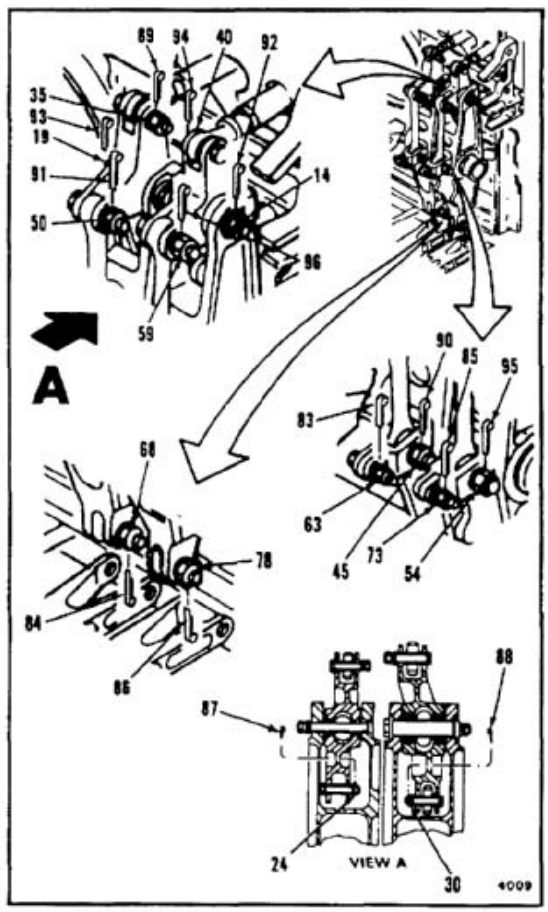
47. Remove nut (63), two washers (64 and 65) and bolt (66) from bellcrank (7).
48. Position pitch link (67) in bellcrank (7).
49. Install bolt (66), two washers (65 and 64), and nut (63). Do not torque nut at this time.
50. Remove nut (68), two washers (69 and 70), and bolt (71) from bellcrank (2).
51. Position thrust link (72) in bellcrank (2).
52. Install bolt (71), two washers (70 and 69), and nut (68). Do not torque at this time.



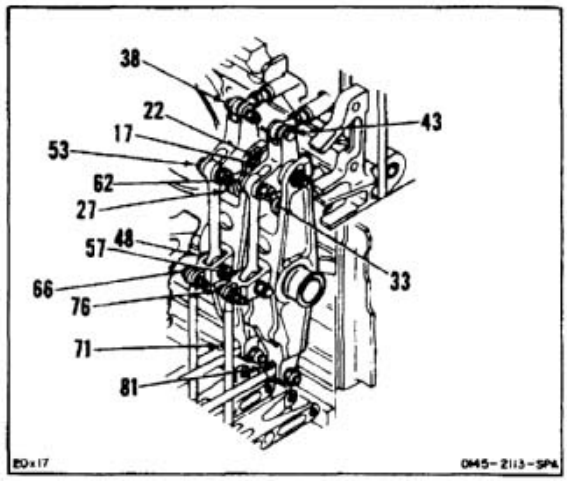
53. Remove nut (73), two washers (74 and 75), and bolt (76) from bellcrank (8).
54. Position roll link (77) in bellcrank (8).
55. Install bolt (76), two washers (75 and 74), and nut (73). Do not torque nut at this time.
56. Remove nut (78), two washers (79 and 80), and bolt (81) from bellcrank (3).
57. Position yaw link (82) in bellcrank (3).
58. Install bolt (81), two washers (80 and 79), and nut (78). Do not torque nut at this time.
59. Remove all tags.



60. Torque nuts (63, 68, 73, and 78) to **30 to 45 inch-pounds**. Install cotter pins (83, 84, 85, and 86).
61. Torque nuts (24, 30, 35, and 40) to **60 to 90 inch-pounds**. Install cotter pins (87, 88, 89, and 94).
62. Torque nuts (14 and 19) to **85 to 125 inch-pounds**. Install cotter pins (92 and 93).
63. Check inside diameter of nuts (45, 50, 54, and 59). If ID is **5/16 inch** torque nuts to **60 to 90 inch-pounds**. If ID is **9/16 inch**, torque nuts to **85 to 200 inch-pounds**. Install cotter pins (90, 91, 95, and 96).



64. Check bolts (17, 22, 27, 33, 38, 43, 48, 53, 57, 62, 66, 71, 76, and 81). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut. Torque nut and cotter pin again.



INSPECT

FOLLOW-ON MAINTENANCE:

Connect forward and aft connecting links to servocylinders (Task 11-193).
Install forward left connecting link (Task 11-195).
Remove safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight controls (TM 55-1520-240-T).
Install forward transmission inlet duct (Task 6-122).
Install forward transmission drip pan (Task 2-3).
Close work platforms (Task 2-2).
Close control closet access panel (Task 2-2).
Install avionics compartment acoustical blanket (Task 2-108).
Install receiver/transmitter RT-1220/ALQ156 (TM 11-1520-240-20).

END OF TASK

11-190 REMOVE SECOND STAGE MIXING ASSEMBLY 11-190

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Socket, 1-1/2 Inch
Workstands

Materials:

Tags (E264)

Personnel Required:

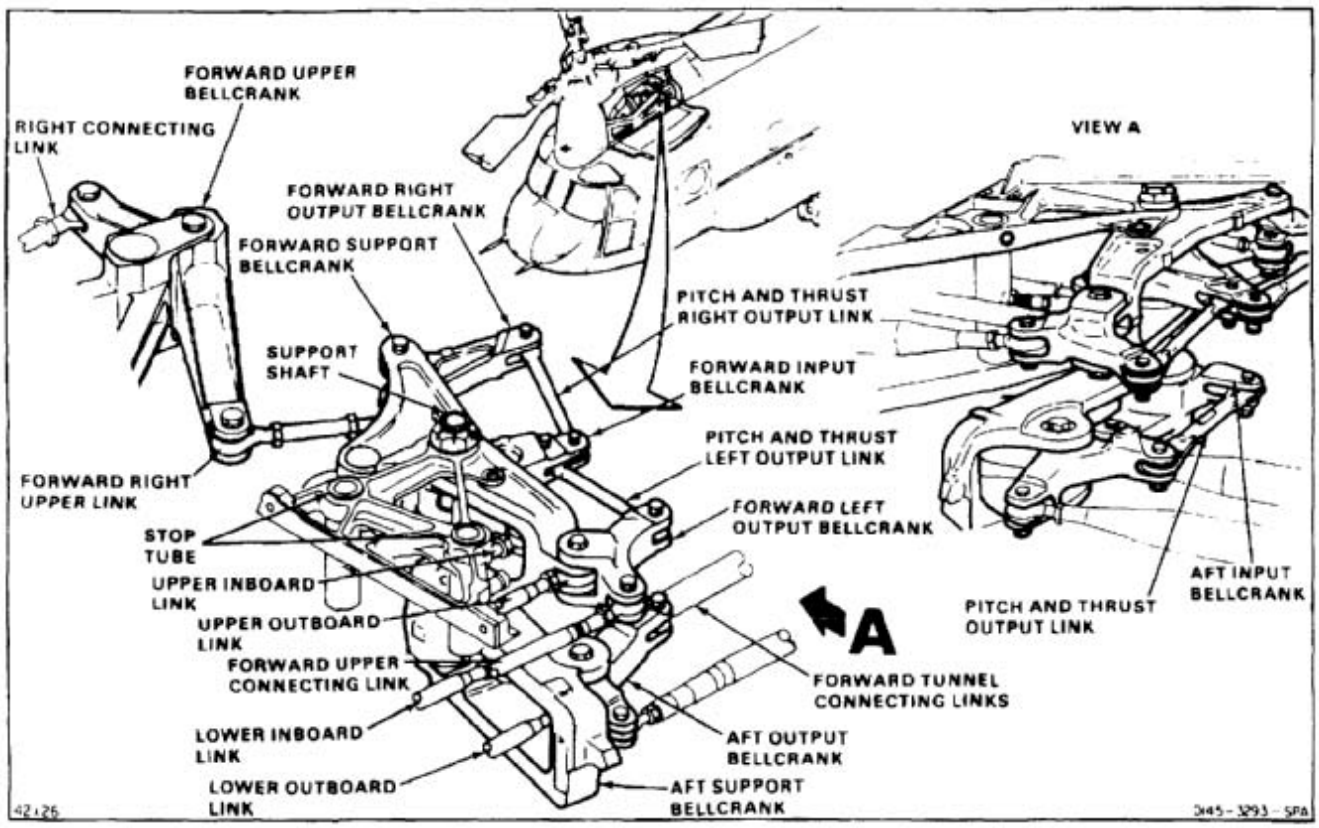
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Flight Control Hydraulic System Depressurized (TM 55-1520-240-T)
Forward Work Platforms Open (Task 2-2)
Forward Transmission Aft Fairing Removed (Task 2-63)
Forward and Aft Connecting Links Disconnected From Servocylinders (Task 11-192)



NOTE

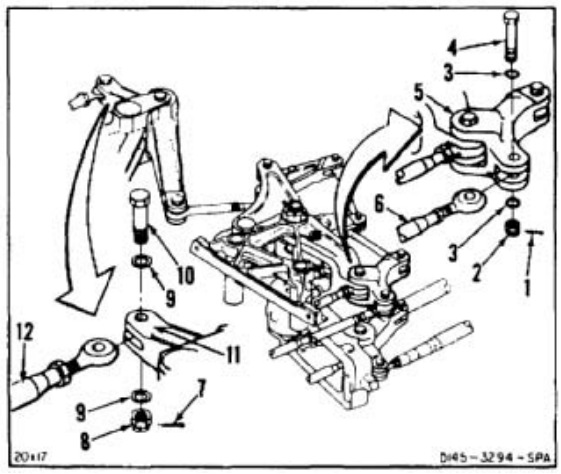
Attaching bolt, washers, and nut will be temporarily installed after removing links and bellcranks.

NOTE

If a crack in the connecting links, bellcranks, or supports is suspected during removal, refer to TM 1-1520-253-23.

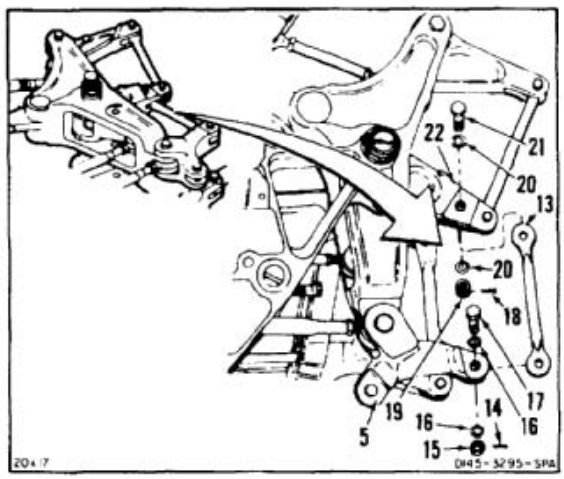
DISCONNECT FORWARD UPPER AND RIGHT CONNECTING LINKS

1. Remove cotter pin (1), nut (2), washers (3), and bolt (4) from forward left output bellcrank (5). Disconnect forward upper connecting link (6) from bellcrank. Install bolt, washers, and nut in bellcrank.
2. Remove cotter pin (7), nut (8), washers (9), and bolt (10) from bellcrank (11). Disconnect right link (12) from bellcrank. Install bolt, washers, and nut in bellcrank.



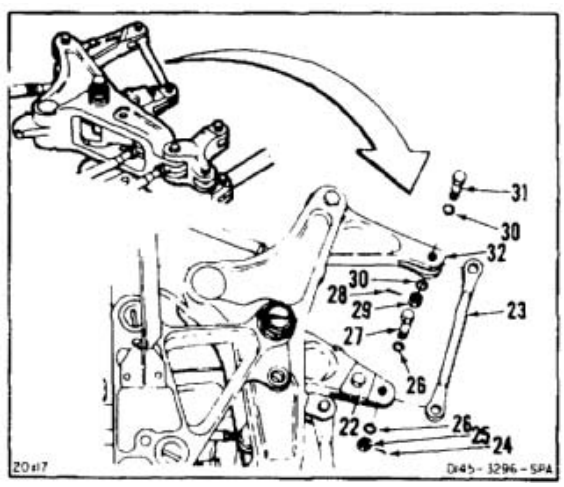
REMOVE PITCH AND THRUST LEFT OUTPUT LINK

3. Tag pitch and thrust left output link (13). Remove cotter pin (14), nut (15), washers (16), and bolt (17) from bellcrank (5). Disconnect link from bellcrank. Install bolt, washers, and nut in bellcrank.
4. Remove cotter pin (18), nut (19), washers (20), and bolt (21) from forward input bellcrank (22). Remove link (13). Install bolt, washers, and nut in bellcrank.



REMOVE PITCH AND THRUST RIGHT OUTPUT LINK

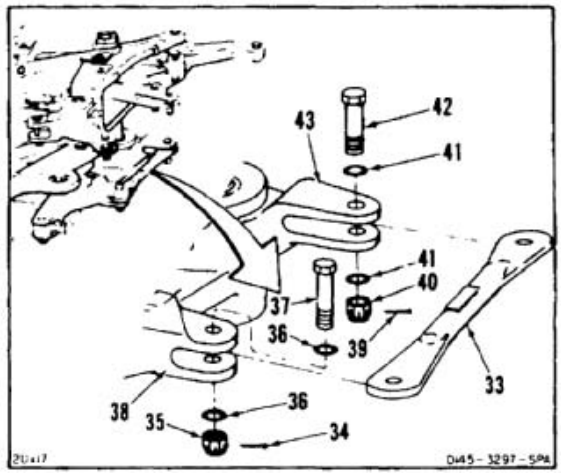
5. Tag pitch and thrust right output link (23). Remove cotter pin (24), nut (25), washers (26), and bolt (27) from forward input bellcrank (22). Disconnect link from bellcrank. Install bolt, washers, and nut in bellcrank.
6. Remove cotter pin (28), nut (29), washers (30), and bolt (31) from bellcrank (32). Remove link (23). Install bolt, washers, and nut in bellcrank.



REMOVE PITCH AND THRUST OUTPUT LINK

7. Tag pitch and thrust output link (33). Remove cotter pin (34), nut (35), washers (36), and bolt (37) from aft output bellcrank (38). Disconnect link from bellcrank. Install bolt, washers, and nut in bellcrank.

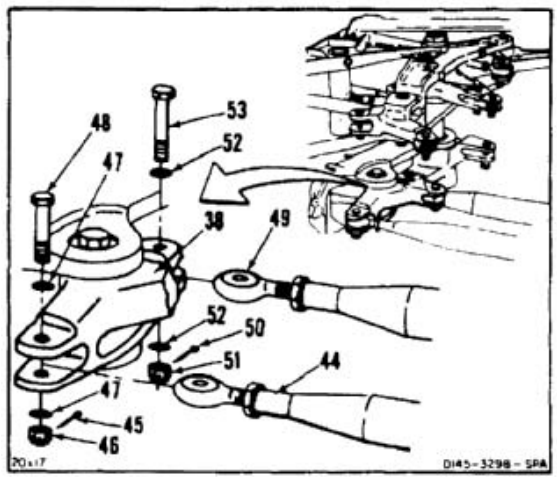
8. Remove cotter pin (39), nut (40), washers (41), and bolt (42) from bellcrank (43). Remove link (33). Install bolt, washers, and nut in bellcrank.



DISCONNECT FORWARD TUNNEL LEFT AND RIGHT CONNECTING LINKS

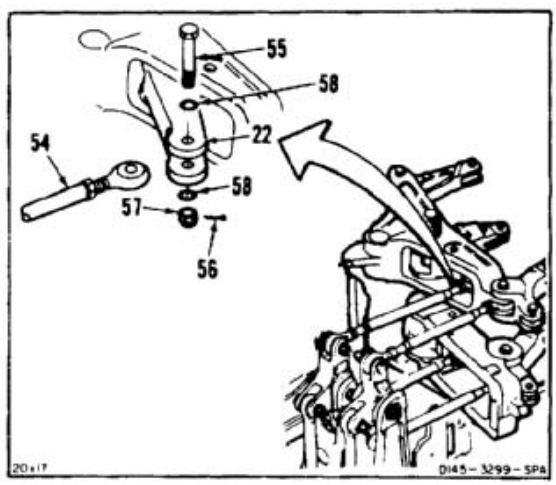
9. Tag forward tunnel left connecting link (44). Remove cotter pin (45), nut (46), washers (47), and bolt (48) from bellcrank (38). Disconnect link from bellcrank. Install bolt, washers, and nut in bellcrank.

10. Tag forward tunnel right connecting link (49). Remove cotter pin (50), nut (51), washers (52), and bolt (53) from bellcrank (38). Disconnect link from bellcrank. Install bolt, washers, and nut in bellcrank.



DISCONNECT UPPER INBOARD LINK

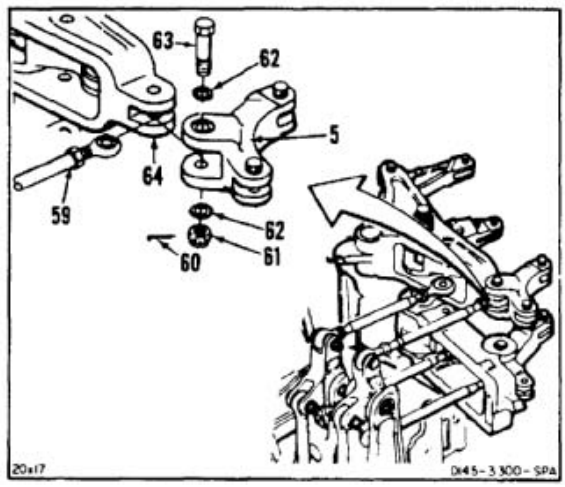
11. Tag upper inboard link (54). Move bellcrank (22) for access to bolt (55). Remove cotter pin (56), nut (57), washers (58), and bolt. Disconnect link from bellcrank. Install bolt, washers, and nut in bellcrank.



REMOVE FORWARD LEFT OUTPUT BELLCRANK

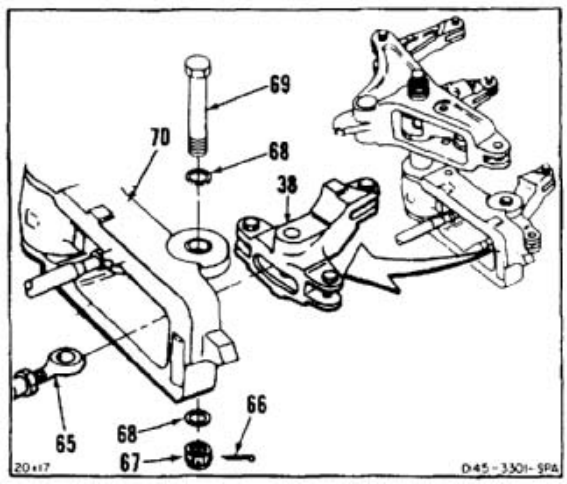
12. Tag forward left output bellcrank (5) and upper outboard link (59). Remove cotter pin (60), nut (61), washers (62), and bolt (63). Remove bellcrank.

13. Disconnect link (59) from bellcrank (64). Install bolt, washers, and nut in bellcrank (5).



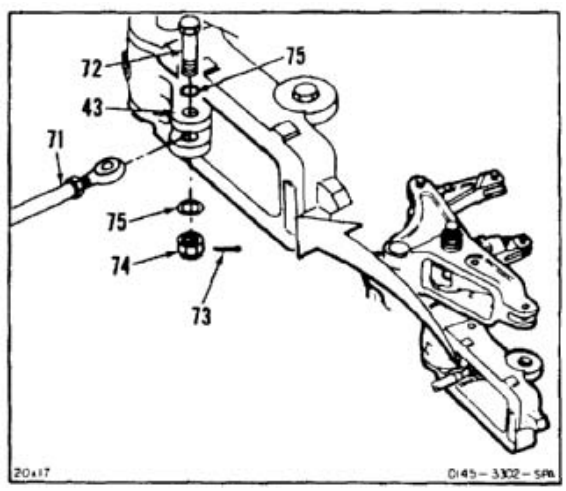
REMOVE AFT OUTPUT BELLCRANK AND DISCONNECT LOWER OUTBOARD LINK

14. Tag aft output bellcrank (38), and lower outboard link (65). Remove cotter pin (66), nut (67), washers (68), and bolt (69). Disconnect link (65) from bellcrank (38). Remove bellcrank (70). Install bolt, washers and nut in bellcrank.



DISCONNECT LOWER INBOARD LINK

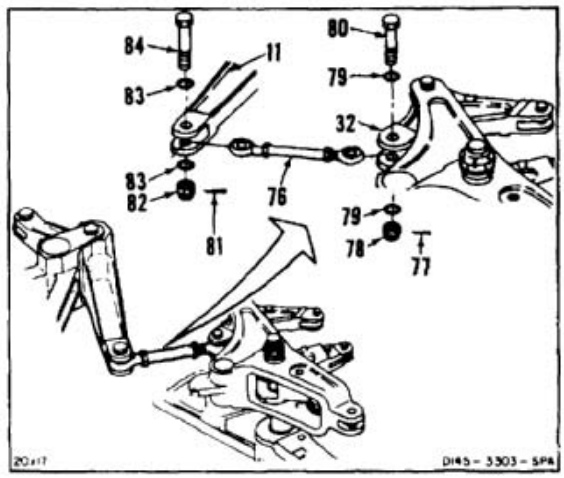
15. Tag lower inboard link (71). Move bellcrank (43) for access to bolt (72). Remove cotter pin (73), nut (74), washers (75), and bolt. Disconnect link from bellcrank. Install bolt, washers, and nut in bellcrank.



REMOVE FORWARD RIGHT UPPER LINK

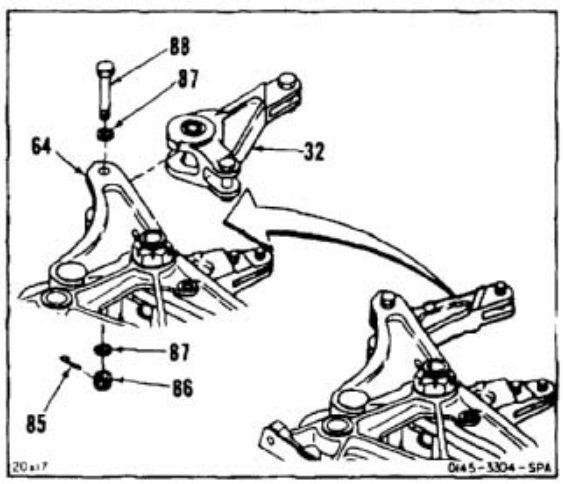
16. Tag forward right upper link (76). Remove cotter pin (77), nut (78), washers (79) and bolt (80) from bellcrank (32). Disconnect link from bellcrank. Install bolt, washers and nut in bellcrank.

17. Remove cotter pin (81), nut (82), washers (83), and bolt (84) from bellcrank (11). Remove link (76). Install bolt, washers, and nut in bellcrank.



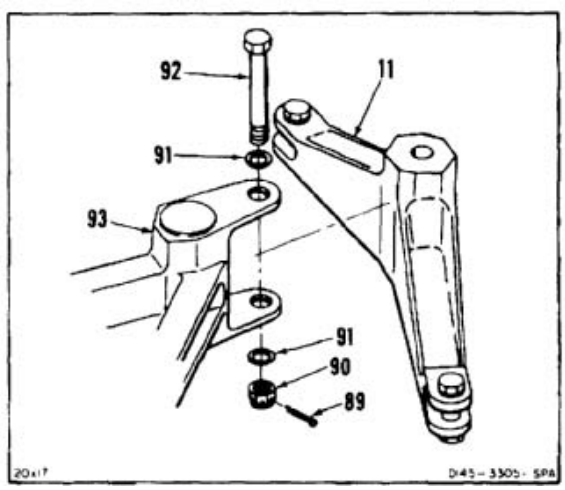
REMOVE FORWARD RIGHT OUTPUT BELLCRANK

18. Tag forward right output bellcrank (32). Remove cotter pin (85), nut (86), washers (87), and bolt (88). Remove bellcrank. Install bolt washers, and nut in bellcrank (64).



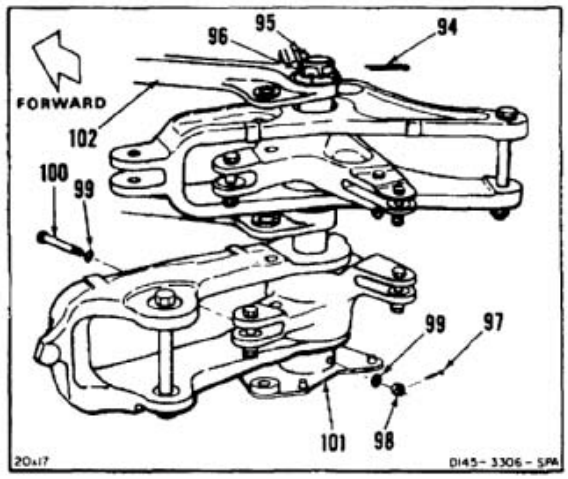
REMOVE FORWARD UPPER BELLCRANK

19. Tag forward upper bellcrank (11). Remove cotter pin (89), nut (90), washers (91), and bolt (92) from support (93). Remove bellcrank. Install bolt, washers, and nut in support.

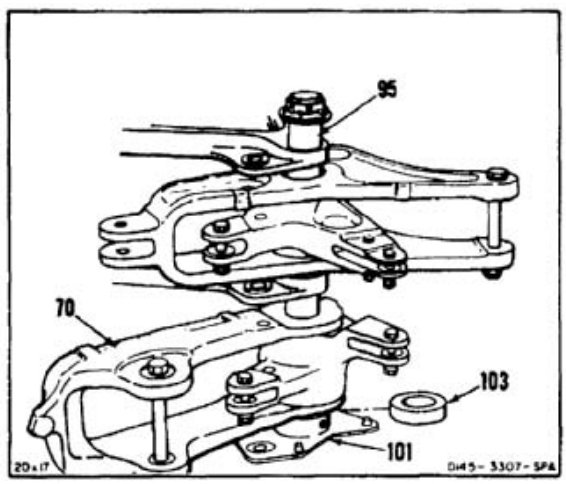


REMOVE AFT INPUT AND SUPPORT BELLCRANKS

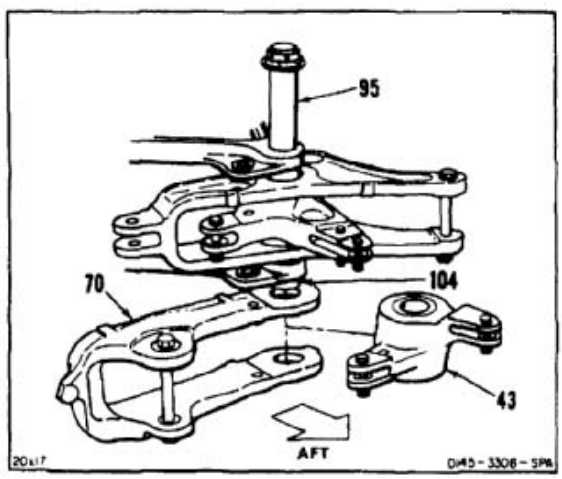
20. Remove cotter pin (94) from shaft (95). Loosen nut (96) four turns. Use **1-1/2 inch** wrench.
21. Remove cotter pin (97), nut (98), washers (99), and bolt (100) from fitting (101).
22. Pull shaft (96) **1 inch** from support (102). If shaft will not tighten nut (96) to lift shaft.



23. Pull up shaft (95) to release spacer (103) between fitting (101) and bellcrank (70). Remove spacer.



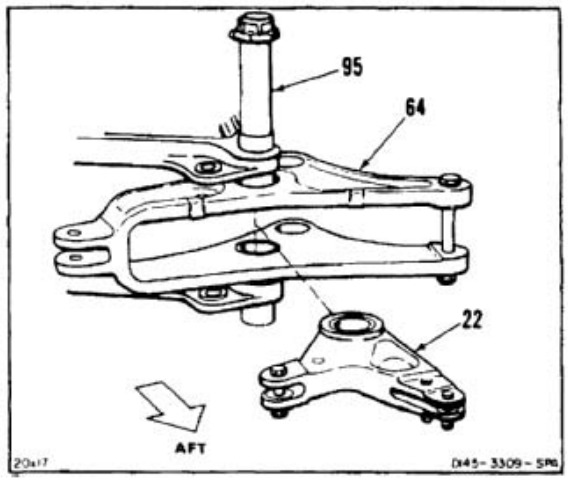
24. Tag aft support bellcrank (70) and aft input bellcrank (43).
25. Have helper hold bellcrank (43 and 70) in position. Pull up shaft (95) to release bellcrank (43). Remove bellcrank. Slide bellcrank aft.
26. Slide bellcrank (70) down from bushing (104). Remove bellcrank.



REMOVE FORWARD INPUT AND SUPPORT BELLCRANKS

27. Tag forward input bellcrank (22) and forward support bellcrank (64).

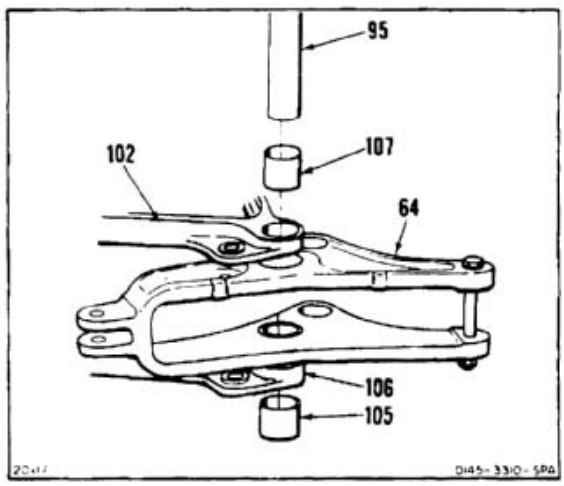
28. Have helper hold bellcranks (22 and 64) in position. Pull up shaft (95) to release bellcrank (22). Remove bellcrank. Slide bellcrank aft.



29. Pull shaft (95) from bellcrank (64) and support (102). Remove shaft (95).

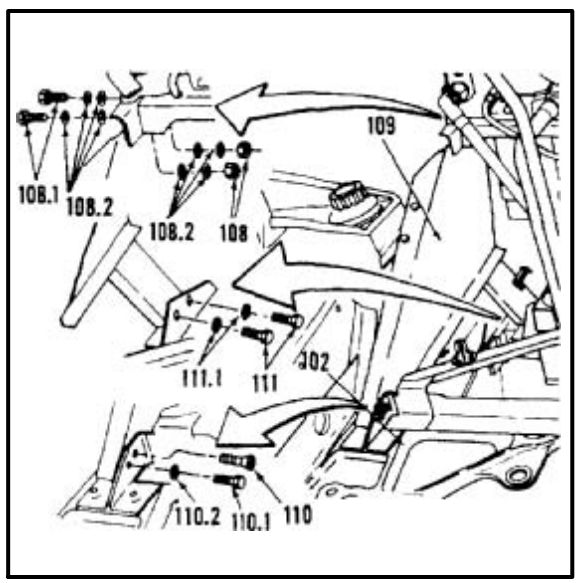
30. Have helper hold bellcrank (64) in position. Remove bushing (105) from bellcrank (64) and support (106). Tag bushing.

31. Remove bushing (107) from bellcrank (64) and support (102). Remove bellcrank (64). Tag bushing.



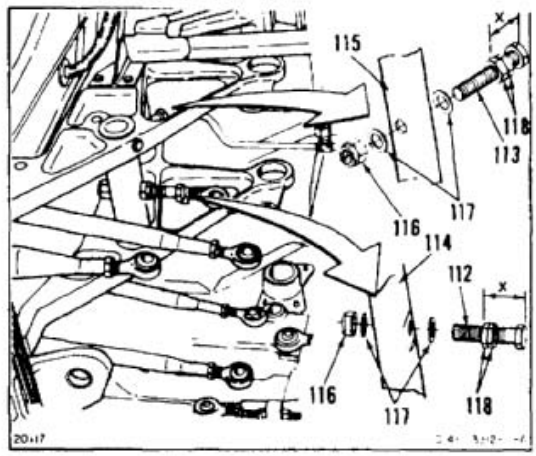
REMOVE STOP TUBES

32. Remove two nuts (108), two bolts (108.1) and eight washers (108.2) from plate (109). Remove screw (110), bolt (110.1) and washer (110.2). Remove two bolts (111) and washers (111.1). Remove plate (109) from support (102).



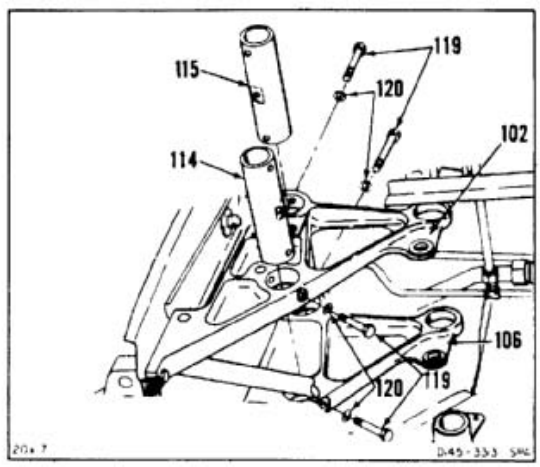
33. Tag two bolts (112 and 113). Record distance X between tubes (114 and 115) and bolt heads (112 and 113) as shown. Record dimension on tag.

34. Remove two nuts (116), four washers (117) and two bolts (112 and 113). Do not change position of four nuts (118).



35. Remove four bolts (119) and washers (120) from stop tubes (114 and 115).

36. Tag and remove tubes (114 and 115). Mark tube positions TOP and FWD on tube bores. Slide tubes up out of supports (102 and 106).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-191 INSTALL SECOND STAGE MIXING ASSEMBLY 11-191

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Socket, 1-1/2 Inch
Workstand
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds

Materials:

Cloths (E120)
Epoxy Primer (E292)
Gloves (E184.1)

Parts:

Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

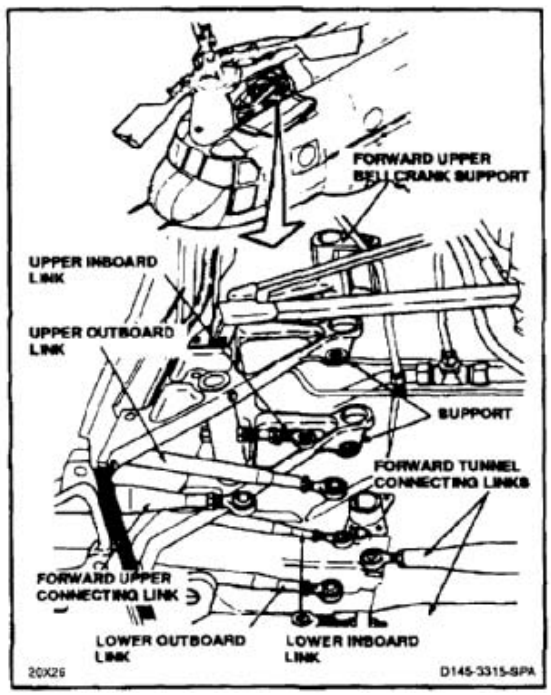
References:

TM 1-1520-253-23
TM 55-1520-240-23P
Task 1-13
Task 11-51

General Safety Instructions:

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

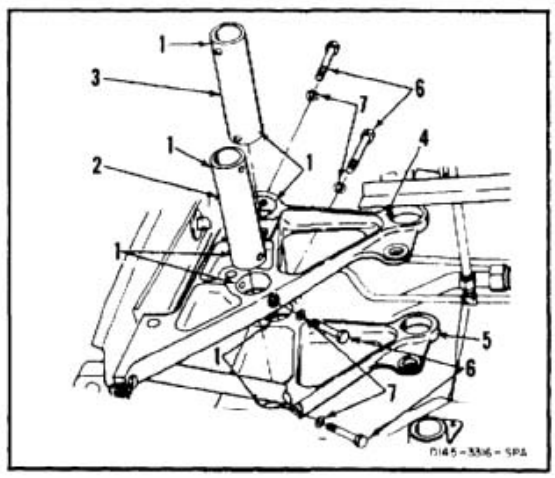
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

NOTE

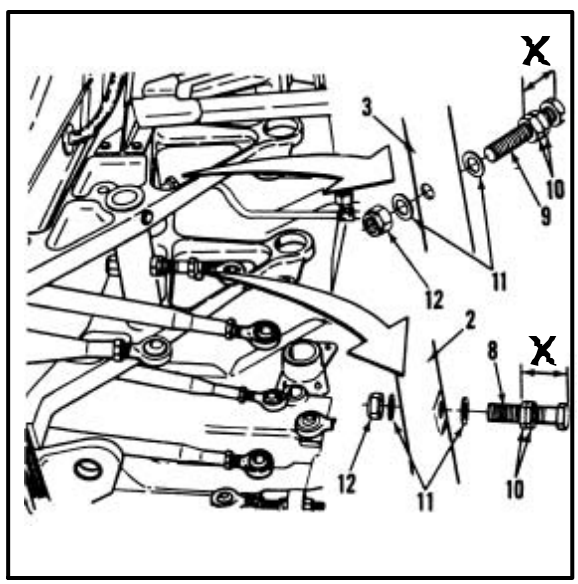
If a crack in the connecting links, bellcranks, or supports is suspected during removal, refer to TM 1-1520-253-23.

INSTALL STOP TUBES

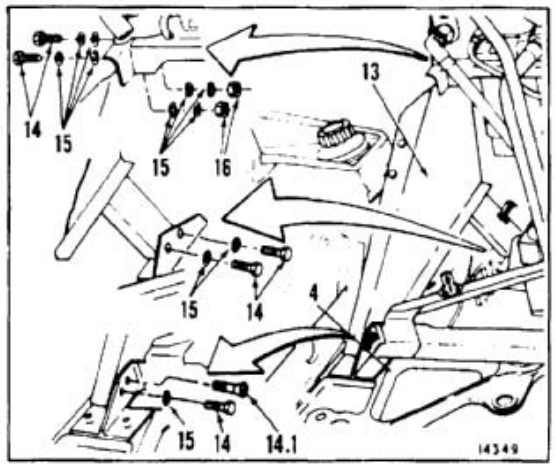
1. Clean seating surfaces (1) of tubes (2 and 3) and supports (4 and 5). Use cloths (E120).
2. Apply coat of epoxy primer (E292) on surfaces (1). Wear gloves (E184.1).
3. Position tubes (2 and 3) as marked in bores. Install tubes in supports (4 and 5) while epoxy primer is wet. Remove tags.
4. Apply coat of epoxy primer (E292) on four bolts (6). Wear gloves (E184.1).
5. Install four washers (7) and bolts (6) in supports (4 and 5) and tubes (2 and 3) while epoxy primer is wet.



6. Install two bolts (8 and 9) heads aft, nuts (10), four washers (11), and two nuts (12).
7. Check that distance X between tubes (2 and 3) and bolt heads (8 and 9) is as recorded on tag. Remove tags.



8. Position plate (13) on support (4). Install five bolts (14), one screw (14.1), 11 washers (15), and two nuts (16) in plate and support.



INSTALL FORWARD INPUT AND SUPPORT BELLCRANKS

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the adjacent shaft.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

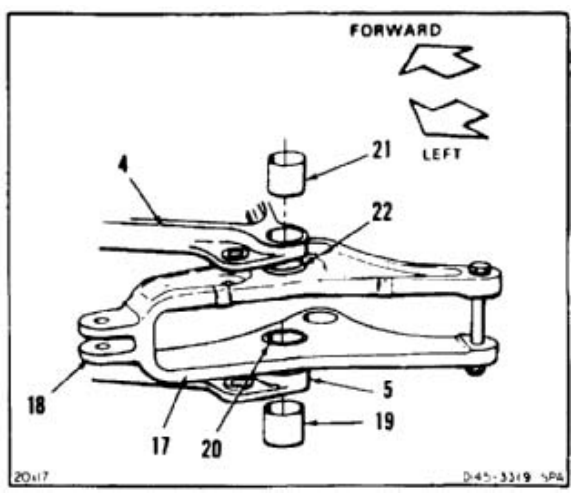
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

9. Have helper position forward support bellcrank (17) between supports (4 and 5), small clevis (18) to left.

10. Install bushing (19) in support (5) and bearing (20).

11. Install bushing (21) in support (4) and bearing (22).

12. Check bushings (19 and 21). Bushings shall be flush with bearings (20 and 22).



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the adjacent shaft.

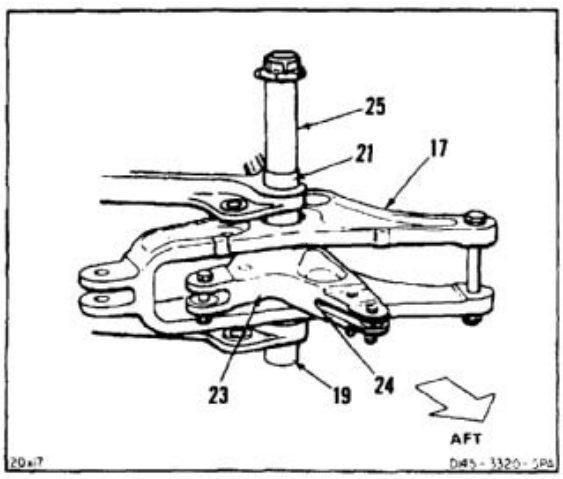
Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

13. Position forward input bellcrank (23) in bellcrank (17), long arm (24) aft.



14. Clean shaft (25). Use cloth (E120).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that all associated spacers, washers, and bushings are installed.

Ensure MS21025-20 nut is tightened using proper installation procedure to prevent excess torque application to the associated components.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

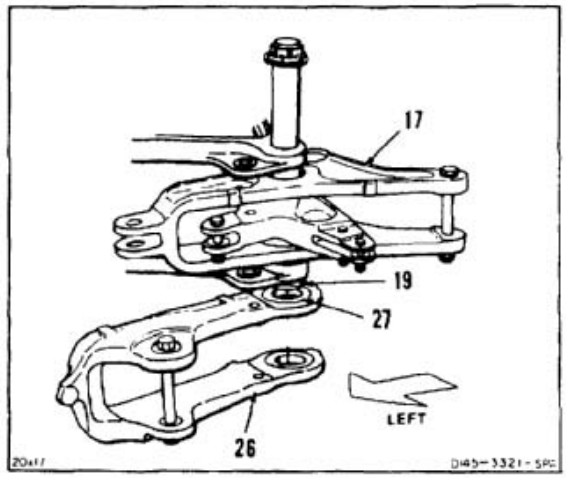
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Do not strike or drive shaft into bellcranks. Damage to bellcrank bearings will result.

15. Slide shaft (25) down through bushing (21), bellcrank (23), and bushing (19). Shaft shall be flush with bushing (19). Remove tags.

INSTALL AFT INPUT AND SUPPORT BELLCRANKS



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the adjacent shaft.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

16. Position aft support bellcrank (26), on bushing (19), bellcrank to left. Bushing shall be flush with bearing (27).

17. Have helper hold bellcrank (26) in position.

WARNING

FLIGHT SAFETY PARTS

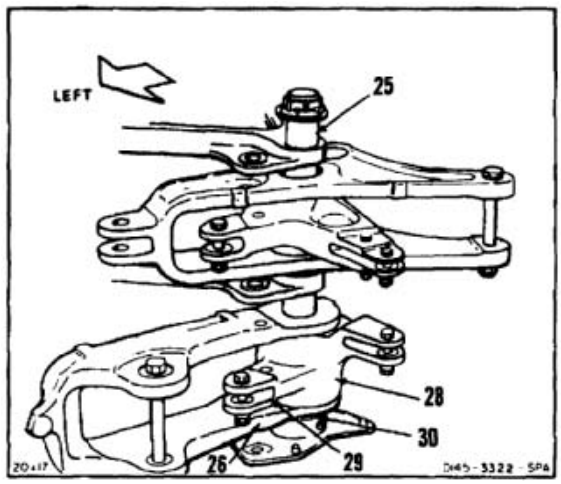
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the adjacent shaft.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



18. Position aft input bellcrank (28) in bellcrank (26), center arm (29) left.
19. Slide shaft (25) down through bellcranks (26 and 28) and lower bearing (30) of bellcrank (26). Shaft shall be flush with bearing. Remove tags.

20. Have helper lift bellcrank (26) to full up position.
21. Position spacer (31) between bellcrank (26) and fitting (32).
22. Slide shaft (25) through spacer (31) and into fitting (32).
23. Align hole in shaft (25) with hole (33) in fitting (32).

NOTE

Top and bottom holes in shaft are aligned.

24. Install bolt (34), two washers (35 and 36), and nut (37). Torque nut **30 to 45 inch-pounds**. Install cotter pin (38).
25. Torque nut (39) to **720 inch-pounds,** then back off nut. Torque nut to **360 to 420 inch-pounds**. Install cotter pin (40). If cotter pin cannot be installed, add washer under nut, and repeat step.
26. Check bellcranks (17, 23, 26, and 28). Bellcranks shall be free to move through full range of travel.

INSTALL FORWARD UPPER BELLCRANK

27. Remove nut (41), two washers (42 and 43), and bolt (44) from support (45).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

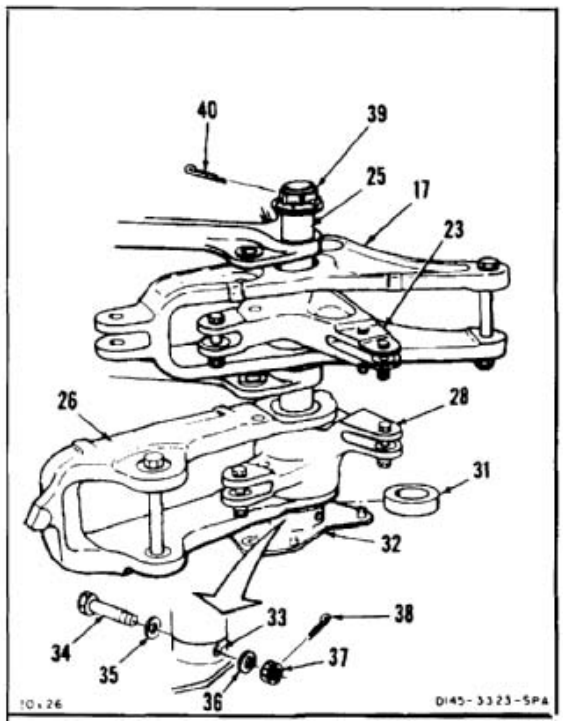
Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

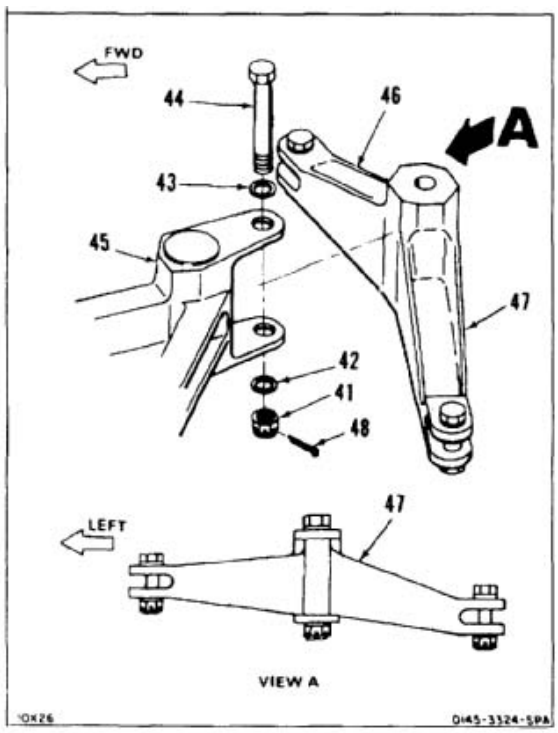
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

28. Position forward upper bellcrank (46), in support (45), upper arm (47) to left and both arms pointing forward.



29. Install bolt (44), two washers (43 and 42) and nut (41). Torque nut **60 to 90 inch-pounds**. Install cotter pin (48).
30. Check bellcrank (46). Bellcrank shall be free to move through full range of travel. Remove tag.



INSTALL FORWARD RIGHT OUTPUT BELLCRANK

31. Remove nut (49), two washers (50 and 51) and bolt (52) from bellcrank (17).

WARNING

FLIGHT SAFETY PARTS

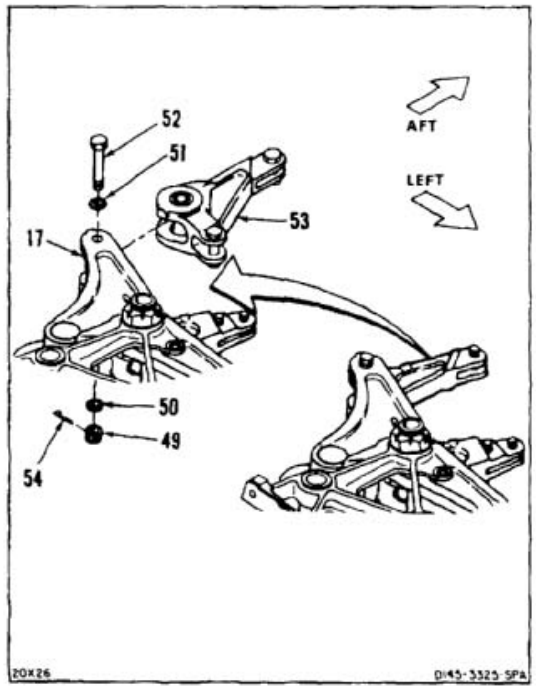
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to adjacent bellcrank assembly.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



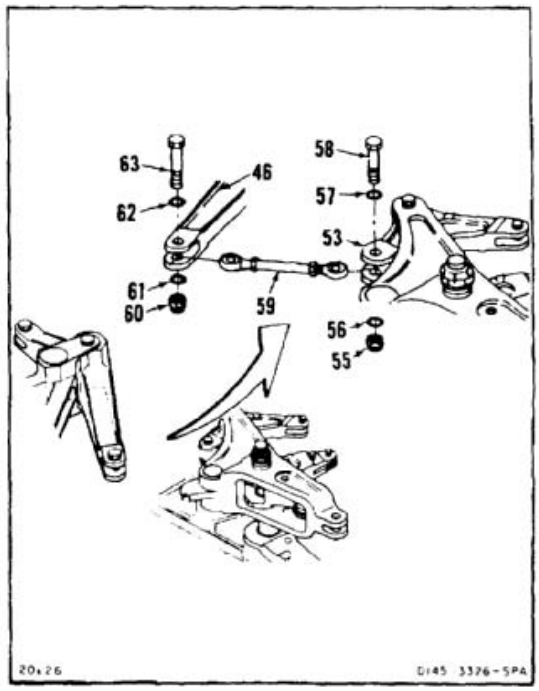
32. Position forward right output bellcrank (53) in bellcrank (17), short arm to left and long arm aft.

33. Install bolt (52), two washers (51 and 50) and nut (49). Torque nut **195 to 280 inch-pounds**. Install cotter pin (54).

34. Check bellcrank (53). Bellcrank shall be free to move through full range of travel. Remove tag.

INSTALL FORWARD RIGHT UPPER LINK

35. Remove nut (55), two washers (56 and 57), and bolt (58) from bellcrank (53).



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

36. Position forward right upper link (59) in bellcrank (53), adjustable end aft. Install bolt (58), two washers (57 and 56), and nut (55). Do not torque nut at this time. Remove tag.

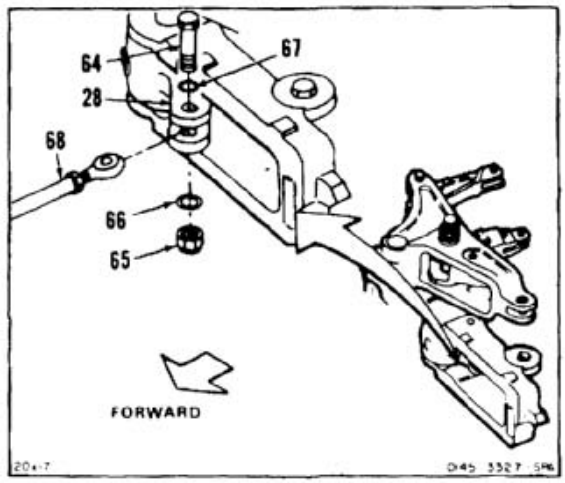
37. Remove nut (60), two washers (61 and 62) and bolt (63) from bellcrank (46).

38. Position link (59) in bellcrank (46). Install bolt (63), two washers (62 and 61), and nut (60). Do not torque nut at this time. Remove tag.

CONNECT LOWER INBOARD LINK

39. Move bellcrank (28) forward for access to bolt (64). Remove nut (65), and two washers (66 and 67) and bolt (64).

40. Position lower inboard link (68) in bellcrank (28). Install bolt (64), two washers (67 and 66) and nut (65). Do not torque nut at this time. Remove tag.



INSTALL AFT OUTPUT BELLCRANK AND CONNECT LOWER OUTBOARD LINK

41. Remove nut (69), two washers (70 and 71), and bolt (72) from bellcrank (26).

WARNING

FLIGHT SAFETY PARTS

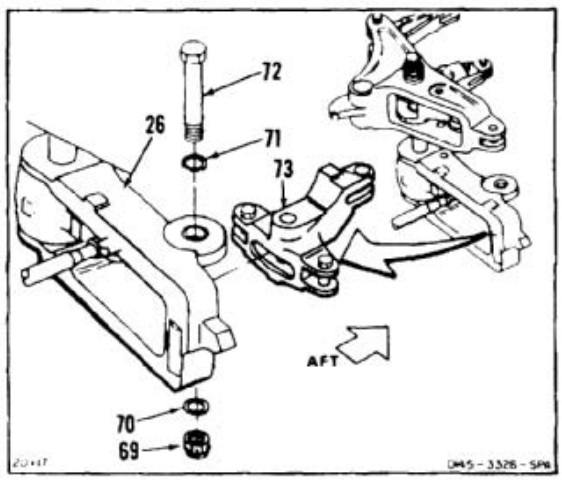
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to adjacent bellcrank assembly.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



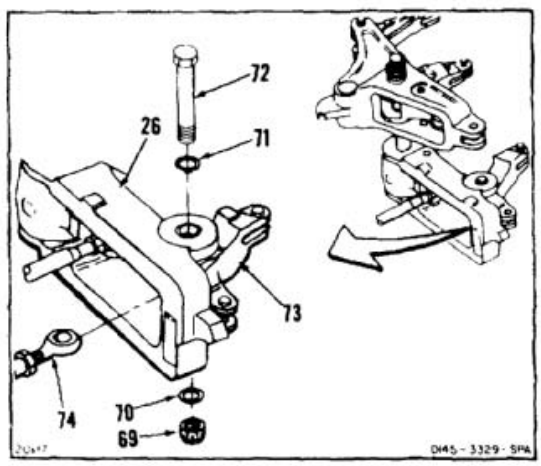
42. Position aft output bellcrank (73) in bellcrank (26), long arm aft.

43. Position lower outboard link (74) in center clevis of bellcrank (73).

44. Install bolt (72) through washer (71) bellcranks (26 and 73), and link (74).

45. Install washer (70) and nut (69) on bolt (72). Do not torque nut at this time.

46. Check bellcrank (73). Bellcrank shall be free to move through full range of travel. Remove tags.



INSTALL FORWARD LEFT OUTPUT BELLCRANK AND UPPER OUTBOARD LINK

47. Remove nut (75), two washers (76 and 77), and bolt (78) from bellcrank (79).

WARNING

FLIGHT SAFETY PARTS

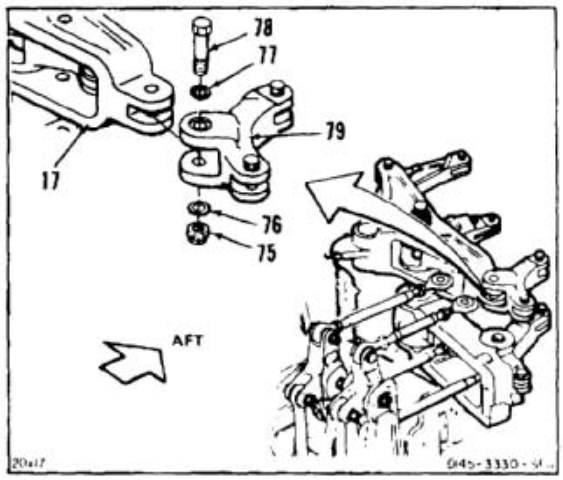
This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to adjacent bellcrank assembly.

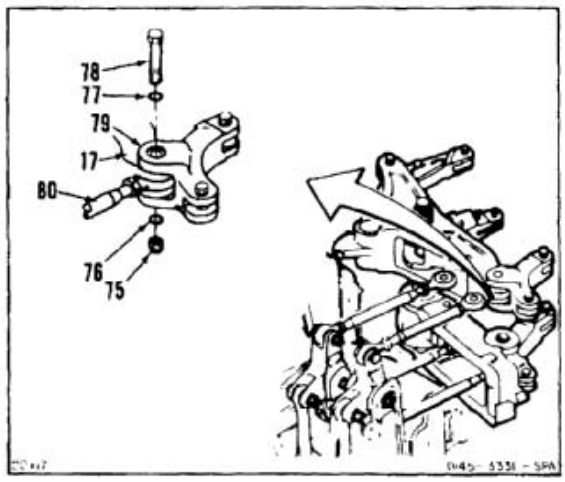
Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.





48. Position forward left output bellcrank (79) on bellcrank (17), long arm aft.

49. Position upper outboard link (80) in bellcrank (17).

50. Install bolt (78) through washer (77), bellcranks (79 and 17), and link (80).

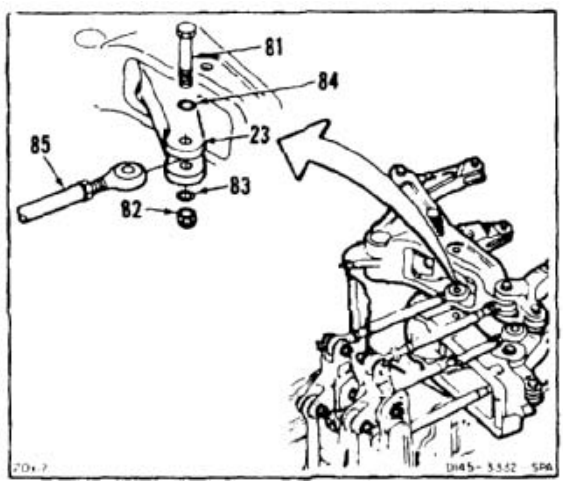
51. Install washer (76) and nut (75). Do not torque nut at this time.

52. Check bellcrank (79). Bellcranks shall be free to move through full range of travel. Remove tags.

CONNECT UPPER INBOARD LINK

53. Move short arm of bellcrank (23) forward for access to bolt (81). Remove nut (82) two washers (83 and 84) and bolt (81).

54. Position upper inboard link (85) in bellcrank (23). Install bolt (81), two washers (84 and 83) and nut (82). Do not torque nut at this time. Remove tag.



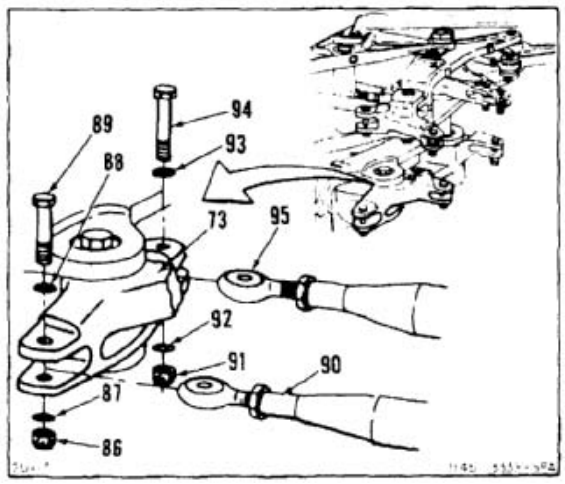
CONNECT FORWARD TUNNEL LEFT AND RIGHT LINKS

55. Remove nut (86), two washers (87 and 88), and bolt (89).

56. Position left forward tunnel connecting link (90) in bellcrank (73). Install bolt (89), two washers (88 and 87), and nut (86). Do not torque nut at this time. Remove tag.

57. Remove nut (91), two washers (92 and 93) and bolt (94).

58. Position right forward tunnel connecting link (95) in bellcrank (73). Install bolt (94), two washers (93 and 92), and nut (91). Do not torque nut at this time. Remove tag.



INSTALL PITCH AND THRUST LEFT OUTPUT LINK

59. Remove nut (96), two washers (97 and 98) and bolt (99) from bellcrank (73).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure bearings are properly staked.

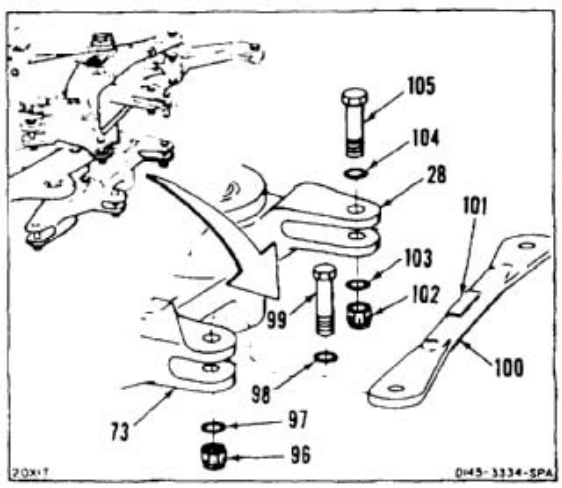
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

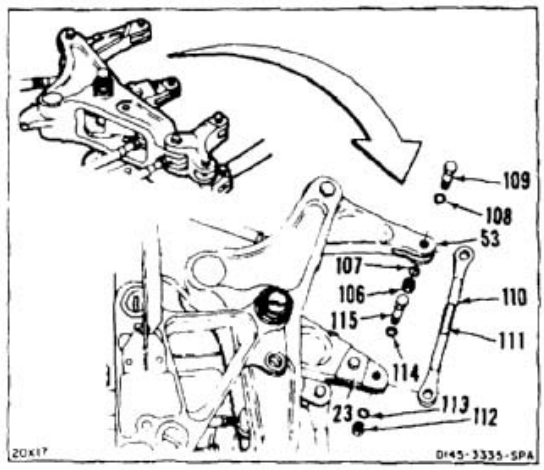
60. Position pitch and thrust left output link (100) in bellcrank (73), part number (101) facing up. Install bolt (99), two washers (98 and 97), and nut (96). Do not torque nut at this time.

61. Remove nut (102), two washers (103 and 104) and bolt (105) from bellcrank (28).

62. Position link (100) in bellcrank (28). Install bolt (105), two washers (104 and 103), and nut (102). Do not torque nut at this time. Remove tag.



INSTALL PITCH AND THRUST RIGHT OUTPUT LINK



63. Remove nut (106), two washers (107 and 108) and bolt (109) from bellcrank (53).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure bearings are properly staked.

Ensure link is properly installed with part number facing upwards.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

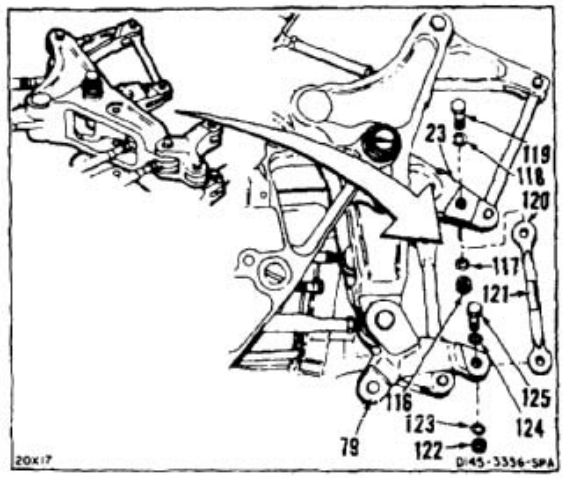
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

64. Position pitch and thrust right output link (110) in bellcrank (53), part number (111) facing up. Install bolt (109), two washers (108 and 107) and nut (106). Do not torque nut at this time.

65. Remove nut (112), two washers (113 and 114) and bolt (115) from outward end of bellcrank (23).

66. Position link (110) in bellcrank (23). Install bolt (115), two washers (114 and 113) and nut (112). Do not torque nut at this time. Remove tag.

INSTALL PITCH AND THRUST LEFT OUTPUT LINK



67. Remove nut (116), two washers (117 and 118) and bolt (119) from bellcrank (23).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure bearings are properly staked.

Ensure link is installed with part number facing upwards.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

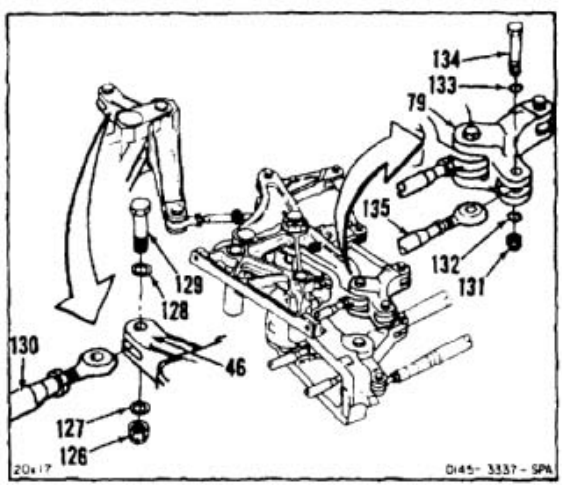
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

68. Position pitch and thrust left output link (120) in bellcrank (23) part number (121) facing up. Install bolt (119), two washers (118 and 117) and nut (116). Do not torque nut at this time.

69. Remove nut (122), two washers (123 and 124) and bolt (125) from bellcrank (79).

70. Position link (120) in bellcrank (79). Install bolt (125) two washers (124 and 123) and nut (122). Do not torque nut at this time. Remove tag.

CONNECT FORWARD UPPER AND RIGHT CONNECTING LINKS



71. Remove nut (126), two washers (127 and 128) and bolt (129) from bellcrank (46).

72. Position forward upper connecting link (130) in bellcrank (46). Install bolt (129), two washers (128 and 127) and nut (126). Do not torque nut at this time. Remove tag.

73. Remove nut (131), two washers (132 and 133) and bolt (134) from bellcrank (79).

74. Position forward right connecting link (135) in bellcrank (79). Install bolt (134), two washers (133 and 132) and nut (131). Do not torque nut at this time. Remove tag.

75. Neutral rig first and second stages and check control stops adjustment (Task 11-51).

76. Torque nuts (55, 60, 65, 82, 86, 91, 106, 112, 116, 122, 126, and 131) to **60 to 90 inch-pounds**. Install cotter pins (135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, and 146).

77. Torque nuts (96 and 102) to **85 to 125 inch-pounds**. Install cotter pins (147 and 148).

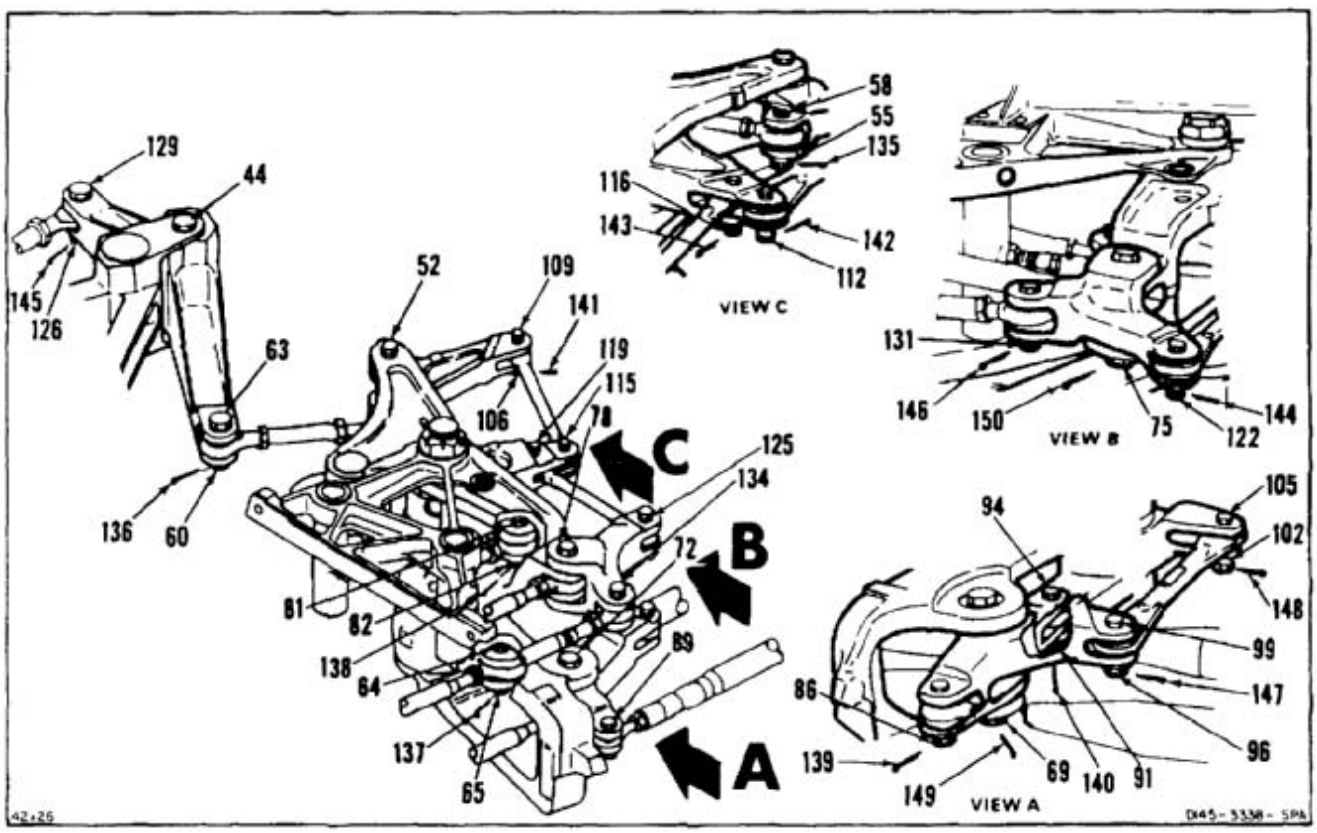
78. Torque nuts (69 and 75) to **195 to 280 inch-pounds**. Install cotter pins (149 and 150).

79. Check bolts (44, 52, 58, 63, 64, 72, 78, 81, 89, 94, 99, 105, 109, 115, 119, 125, 129, and 134). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 76, 77, 78, or 79.

INSPECT

FOLLOW-ON MAINTENANCE:

Connect forward and aft connecting links to servocylinders (Task 11-193).
Perform neutral rig check (Task 11-33).
Perform operational check of flight controls (TM 55-1520-240-T).
Install forward transmission aft fairing (Task 2-68).
Remove servocylinder safety blocks (Task 11-29).
Close work platforms (Task 2-2).



END OF TASK

SECTION VI
UPPER CONTROLS

11-192 REMOVE FORWARD OR AFT SERVOCYLINDER CONNECTING LINKS 11-192

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

None

Personnel Required:

Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Cockpit Controls at Neutral (Task 11-33)
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward or Aft Work Platforms Open (Task 2-2)

NOTE

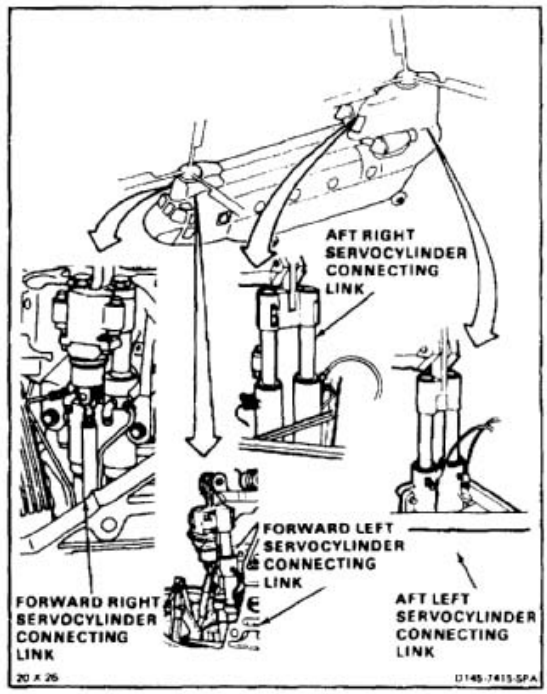
Procedure is same to remove forward or aft servocylinder connecting links. Forward left connecting link is shown here.

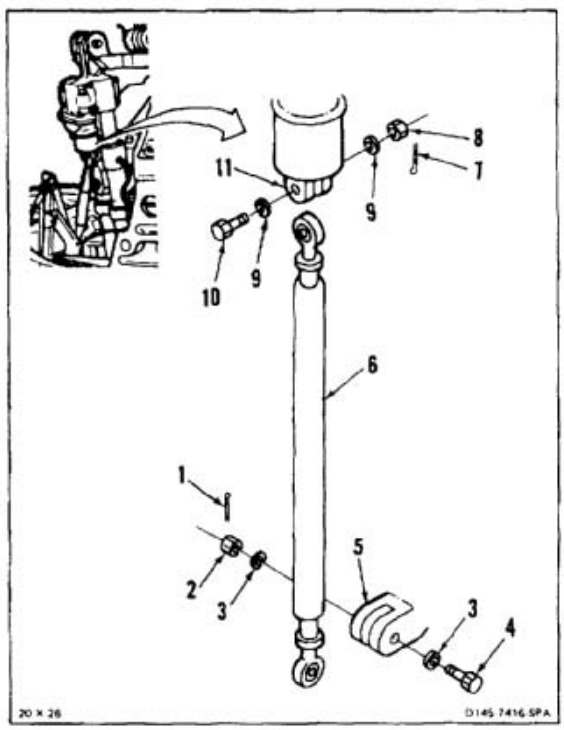
Attaching bolt, washers, and nut will be temporarily installed after removing link.

NOTE

If a crack in the connecting links or bellcranks is suspected during removal, refer to TM 1-1520-253-23.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5). Disconnect forward left connecting link (6) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) in bellcrank (5).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from servocylinder (11). Remove link (6).
4. Install bolt (10), two washers (9), and nut (8) loosely in servocylinder (11).





FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-193 INSTALL FORWARD OR AFT SERVOCYLINDER CONNECTING LINKS 11-193

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Workstand

Materials:

None

Parts:

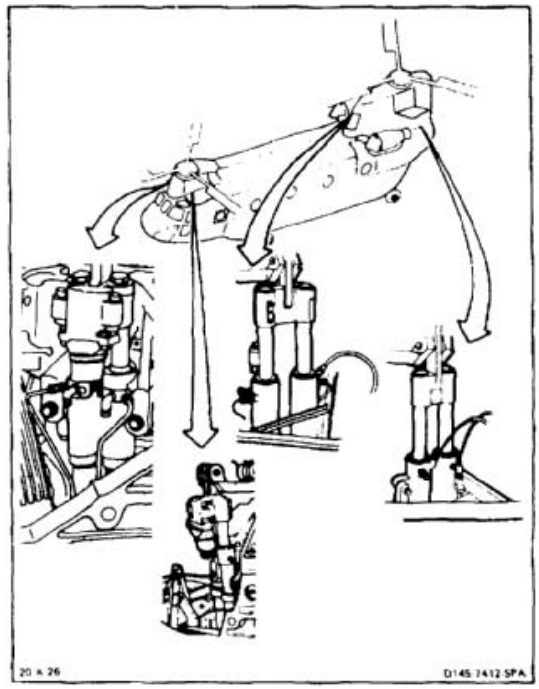
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P



CAUTION

Bushing must be in bellcranks before installing bolt; otherwise, damage to component will result.

NOTE

Procedure is same to install forward or aft servocylinder connecting links. Forward left connecting link is shown here.

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove cotter pin (13), nut (1), washers (2 and 3), and bolt (4) from servocylinder (5).

1.1. Remove inner bushing (3.1) and outer bushing (3.2).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure adjustable rod end bearing faces up attaching to upper boost actuator pilot vavle.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Install inner bushing (3.1) and outer bushing (3.2). Position forward left connecting link (6) between lugs of servocylinder (5). Install bolt (4) with one washer (3) through bushings and lugs, one washer (2), and nut (1). Do not torque nut at this time.

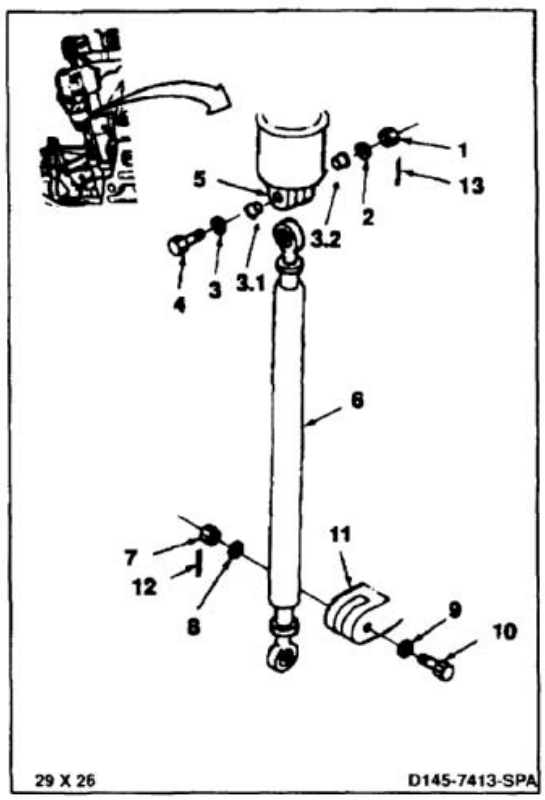
3. Remove nut (7), two washers (8 and 9), and bolt (10) from bellcrank (11).

4. Position link (6) in bellcrank (11). Install bolt (10), two washers (9 and 8), and nut (7).

5. Torque two nuts (1 and 7) to **30 to 45 inch-pounds**. Install two cotter pins (12 and 13).

6. Check two bolts (4 and 10). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 5.

INSPECT



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight control system (TM 55-1520-240-T).
Close forward or aft work platforms (Task 2-2).

END OF TASK

11-194 REMOVE FORWARD RIGHT OR LEFT CONNECTING LINKS 11-194

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

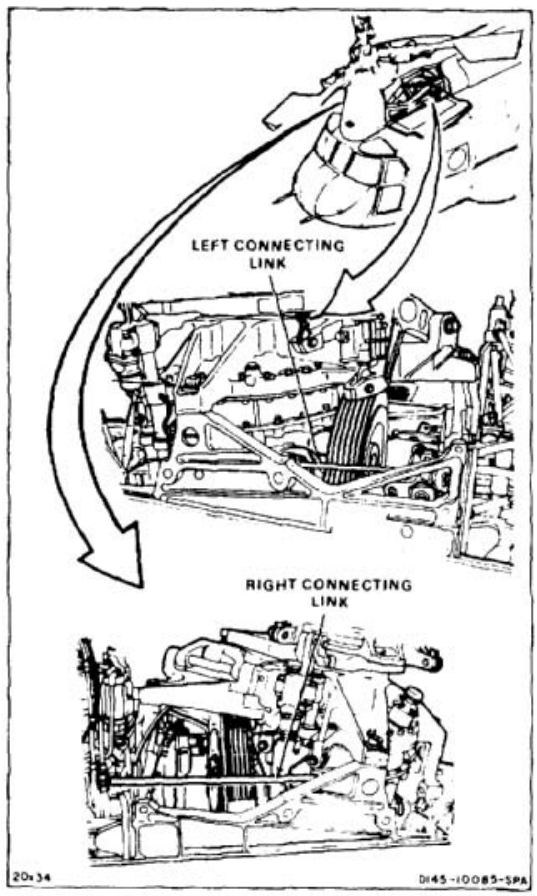
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward Right or Left Work Platforms Open (Task 2-2)
Forward Right or Left Servocylinder Connecting Links Disconnected (Task 11-192)



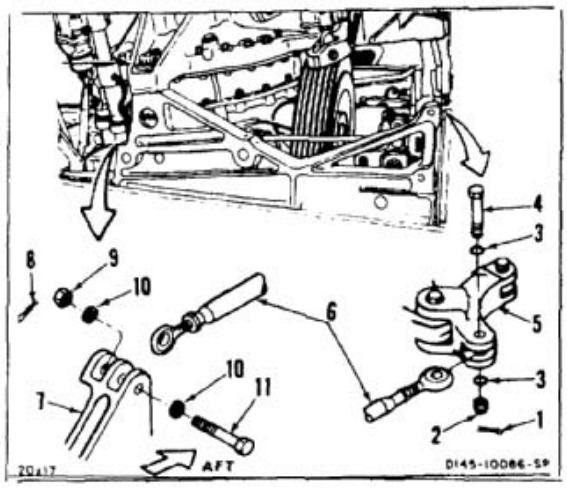
NOTE

Attaching bolts, washers, and nuts will be temporarily installed after links are removed.

Procedure is same to remove forward left or right connecting links. Left connecting is shown here.

NOTE

If a crack in the connecting links or bellcranks is suspected during removal, refer to TM 1-1520-253-23.



1. Working from forward left work platform, remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5). Disconnect link (6) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) loosely in bellcrank (5).
3. Move bellcrank (7) aft. Remove cotter pin (8), nut (9), two washers (10), and bolt (11) from bellcrank (7). Remove connecting link (6) from bellcrank.
4. Install bolt (11), two washers (10), and nut (9) loosely in bellcrank (7).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-195 INSTALL FORWARD RIGHT OR LEFT CONNECTING LINKS 11-195

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds

Materials:

None

Parts:

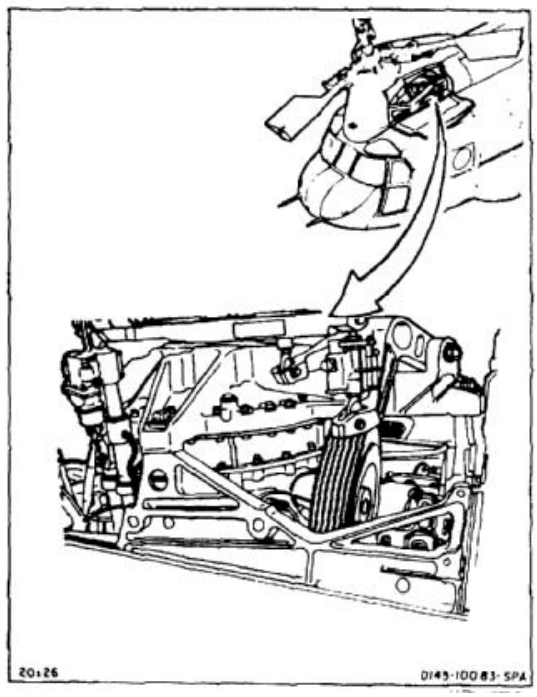
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

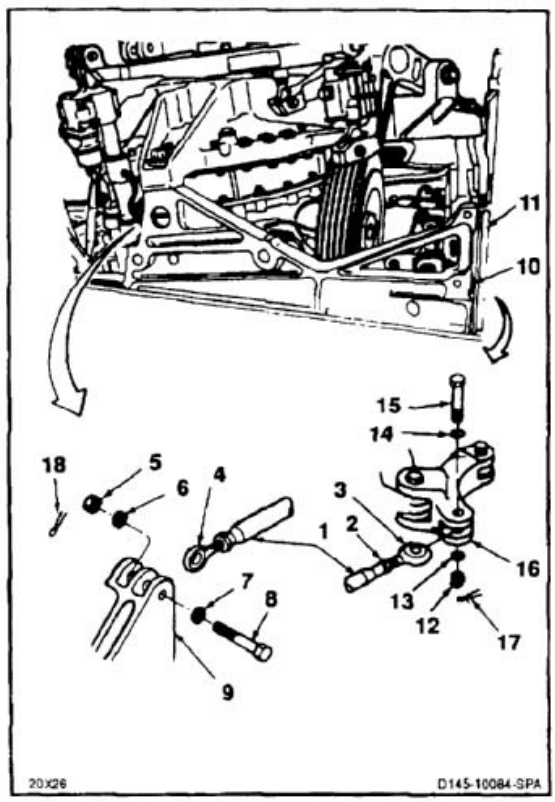
NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

Procedure is same to install forward left or right connecting links. Left connecting is shown here.

1. If left connecting link (1) is a replacement, loosen nut (2) of adjustable end. Turn bearing (3) **90°** to bearing (4). Torque nut to **103 inch-pounds**.
2. Remove nut (5), two washers (6 and 7), and bolt (8) from bellcrank (9).
3. Position link (1) through hole (10) in structure (11) and in bellcrank (9). Install bolt (8), two washers (7 and 6), and nut (5) in bellcrank. Do not torque nut at this time.
4. Remove nut (12), two washers (13 and 14), and bolt (15) from bellcrank (16).
5. Position link (1) in bellcrank (16). Install bolt (15), two washers (14 and 13), and nut (12) in bellcrank.
6. Torque two nuts (5 and 12) to **60 to 90 inch-pounds**. Install two cotter pins (17 and 18).
7. Check two bolts (8 and 15). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 6.

INSPECT



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (T31) (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight control system (TM 55-1520-240-T).
Close forward right or left work platforms (Task 2-2).
Connect forward right or left servocylinder connecting links (Task 11-193).

END OF TASK

11-196 REMOVE SERVOCYLINDER CONTROL VALVE BOOTS 11-196

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

None

Personnel Required:

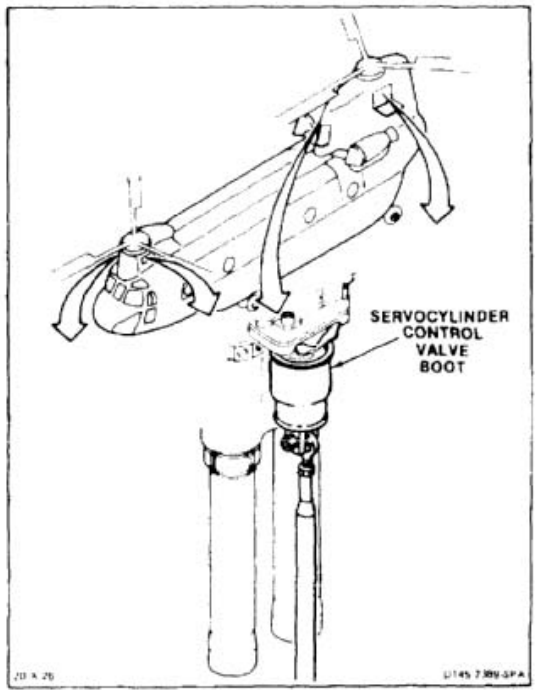
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

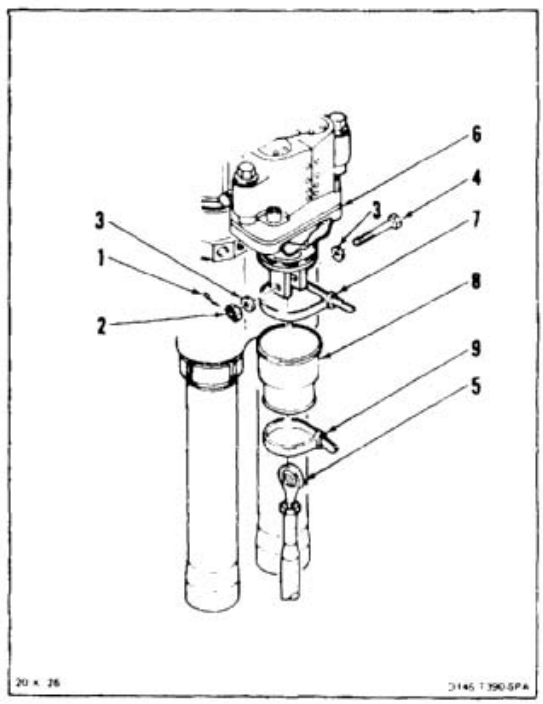
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward or Aft Work Platforms Open (Task 2-2)



NOTE

If a crack in the connecting links is suspected during removal, refer to TM 1-1520-253-23.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4). Disconnect link (5) from servocylinder (6).
2. Cut top strap (7) from control valve boot (8). Remove strap. Use diagonal cutting pliers.
3. Push boot (8) up for access to lower strap (9). Cut strap from boot. Remove strap. Use diagonal cutting pliers.
4. Pull boot (8) down. Remove boot from servocylinder (6).
5. Install bolt (4), two washers (3), and nut (2) loosely in servocylinder (6).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-197 INSTALL SERVOCYLINDER CONTROL VALVE BOOTS 11-197

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Strap Tool (MS90387)

Materials:

Straps (E375)

Parts:

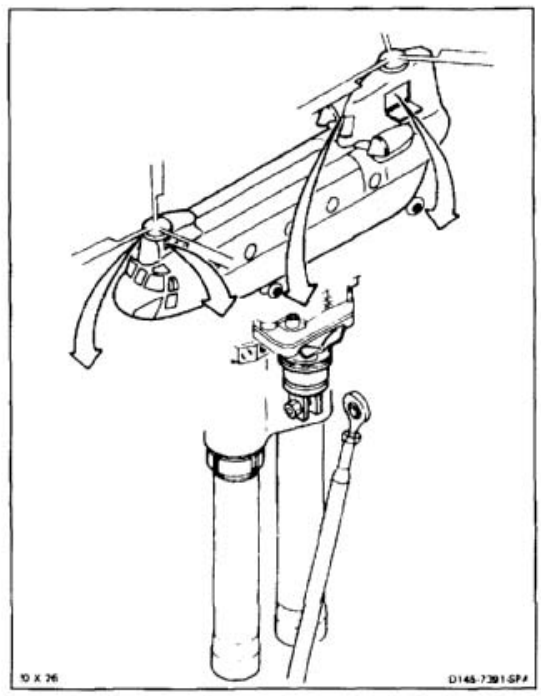
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23
Task 1-13



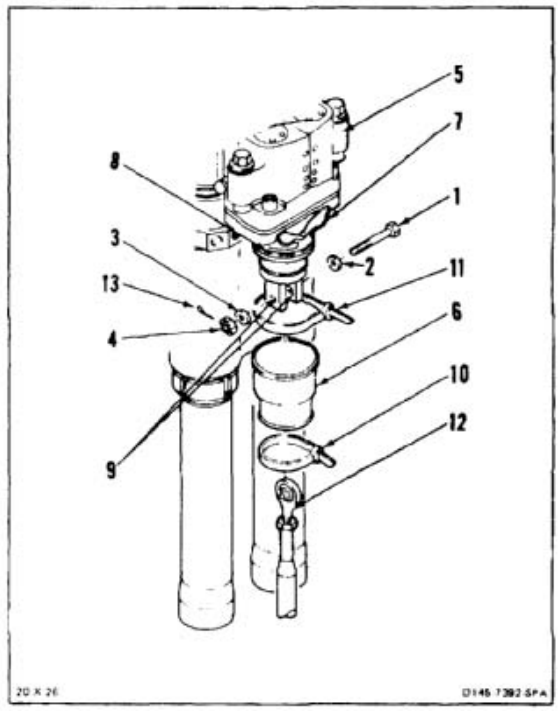
CAUTION

Bushings must be in servocylinder before installing bolt; otherwise, damage to component will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove bolt (1), two washers (2 and 3), and nut (4) from servocylinder (5).
2. Position control valve boot (6), large end up on servocylinder (5). Stretch boot over housing (7) and slide up until small end of boot is in groove (8) above lugs (9).
3. Install strap (10) on small end of boot (6). Tighten strap **5 to 9 pounds** pull force. Use strap (E375) and strap tool.
4. Install strap (11) on large end of boot (6). Tighten strap to **15 to 25 pounds** pull force. Use strap (E375) and strap tool.
5. Position link (12) in lugs (9) of servocylinder (5). Install bolt (1), two washers (2 and 3), and nut (4). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (13).
6. Check bolt (1). Bolt shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 5.



INSPECT

FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform operational check of flight control system (TM 55-1520-240-T).
Close forward or aft work platforms (Task 2-2).

END OF TASK

11-198 REMOVE FORWARD LEFT UPPER BELLCRANK 11-198

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward Left Work Platform Open (Task 2-2)

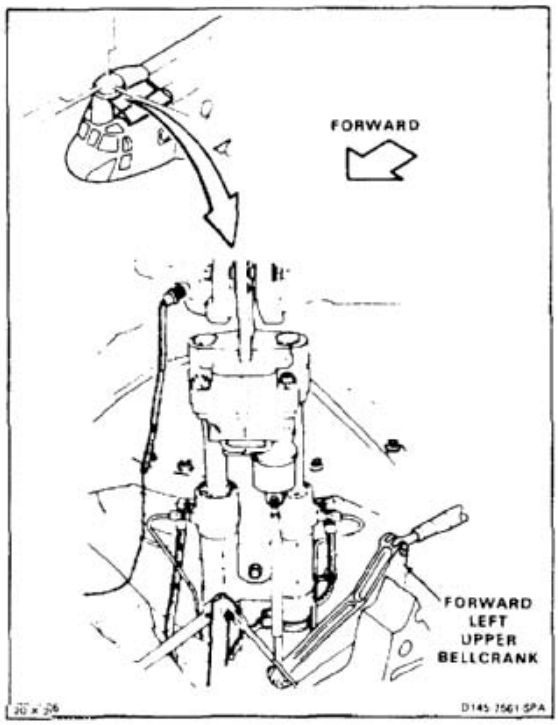
NOTE

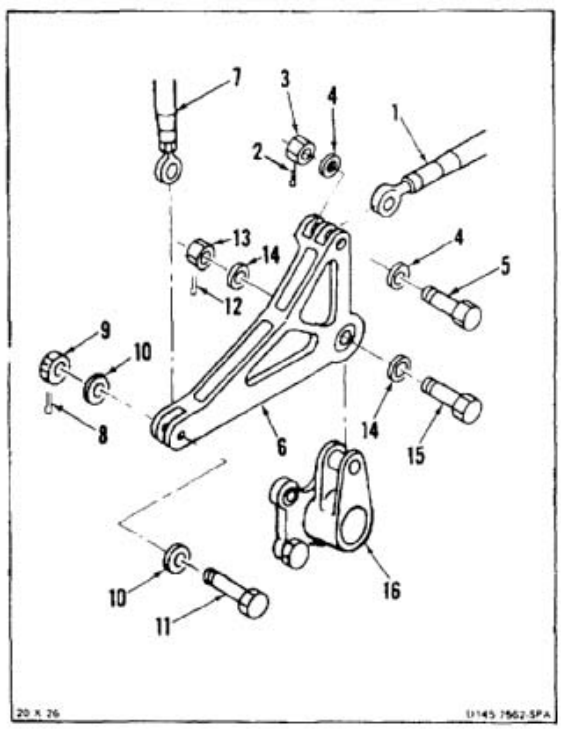
Attaching bolt, washers, and nut will be temporarily installed after removing links and bellcrank.

NOTE

If a crack in the second stage connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

1. Tag second stage connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from forward left bellcrank (6). Disconnect link and tie away from bellcrank. Use twine (E433).
2. Install bolt (5), two washers (4), and nut (3) loosely in bellcrank (6).
3. Tag servocylinder connecting link (7). Remove cotter pin (8), nut (9), two washers (10), and bolt (11) from bellcrank (6). Disconnect link and tie away from bellcrank. Use twine (E433).
4. Install bolt (11), two washers (10), and nut (9) loosely in bellcrank (6).
5. Remove cotter pin (12), nut (13), two washers (14), and bolt (15) from support (16). Remove bellcrank (6) from support.





6. Install bolt (15), two washers (14), and nut (13) loosely in support (16).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-199 INSTALL FORWARD LEFT UPPER BELLCRANK 11-199

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Workstand

Materials:

None

Parts:

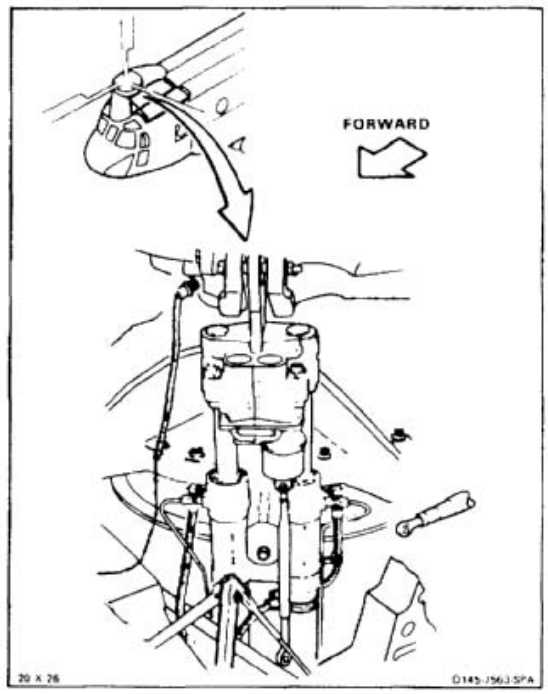
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Bushings must be in bellcrank before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from support (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

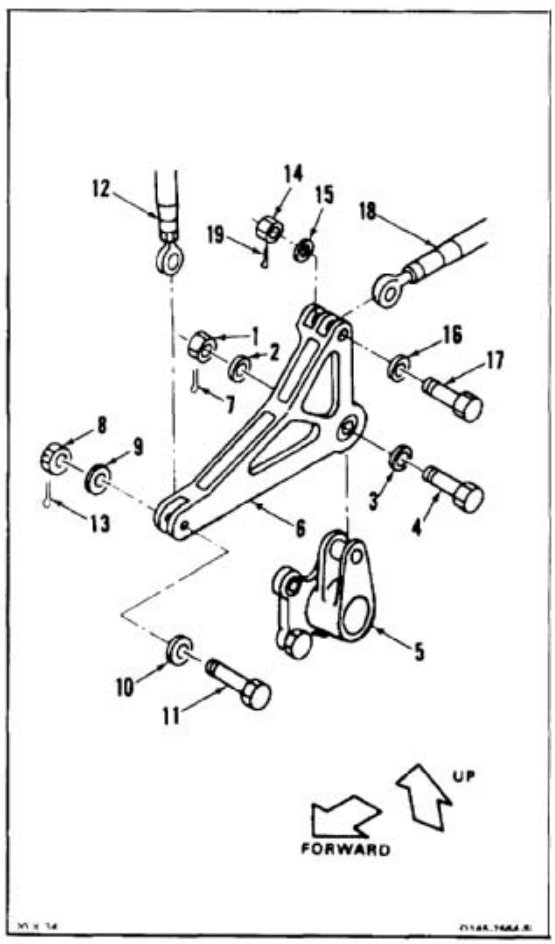
Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position forward left upper bellcrank (6) long arm forward, short arm up, in support (5). Install bolt (4), two washers (3 and 2), and nut (1).
3. Torque nut (1) to **155 to 220 inch-pounds**. Install cotter pin (7).
4. Remove nut (8), two washers (9 and 10), and bolt (11) from forward arm of bellcrank (6).
5. Untie and position servocylinder connecting link (12) in forward arm of bellcrank (6). Install bolt (11), two washers (10 and 9), and nut (8). Remove tag from link.
6. Torque nut (8) to **30 to 45 inch-pounds**. Install cotter pin (13).
7. Remove nut (14), two washers (15 and 16), and bolt (17) from short arm of bellcrank (6).
8. Untie and position second stage connecting link (18) in short arm of bellcrank (6). Install bolt (17), two washers (16 and 15), and nut (14). Remove tag from link.
9. Torque nut (14) to **60 to 90 inch-pounds**. Install cotter pin (19).
10. Check three bolts (4, 11, and 17). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 3, 6, or 9.

INSPECT



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight system controls (TM 55-1520-240-T).
Close forward left work platform (Task 2-2).

END OF TASK

11-200 REMOVE FORWARD RIGHT UPPER BELLCRANK 11-200

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

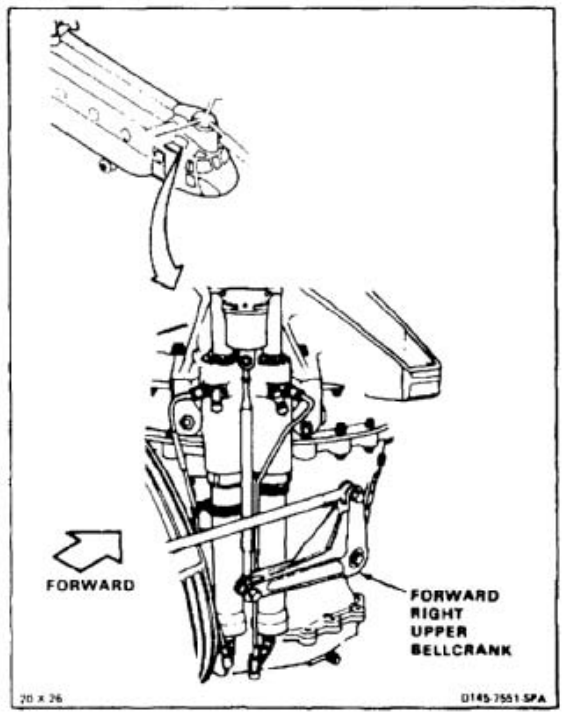
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward Right Work Platform Open (Task 2-2)

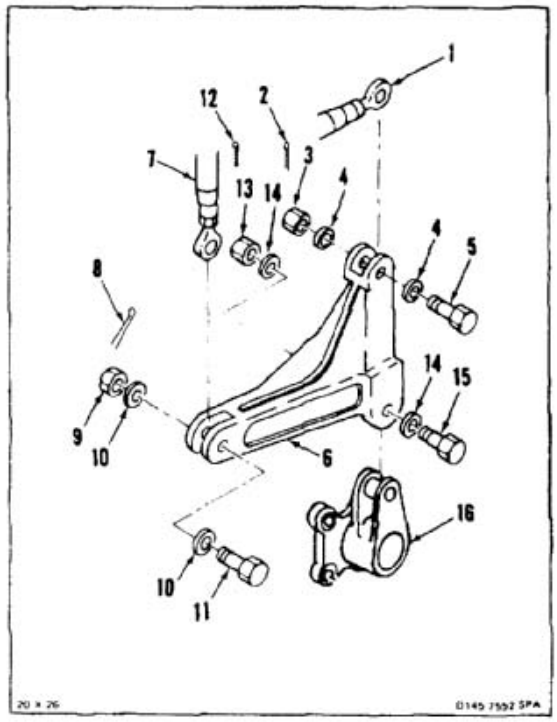


NOTE

Attaching bolt, washers, and nut will be temporarily installed after removing links and bellcrank.

NOTE

If a crack in the second stage connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.



1. Tag second stage connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from forward right bellcrank (6). Disconnect link and tie away from bellcrank. Use twine (E433).
2. Install bolt (5), two washers (4), and nut (3) loosely in bellcrank (6).
3. Tag servocylinder connecting link (7). Remove cotter pin (8), nut (9), two washers (10), and bolt (11) from bellcrank (6). Disconnect link and tie away from bellcrank. Use twine (E433).
4. Install bolt (11), two washers (10), and nut (9) loosely in bellcrank (6).
5. Remove cotter pin (12), nut (13), two washers (14), and bolt (15) from support (16). Remove bellcrank (6) from support.
6. Install bolt (15), two washers (14), and nut (13) loosely in support (16).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-201 INSTALL FORWARD RIGHT UPPER BELLCRANK 11-201

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Workstand

Materials:

None

Parts:

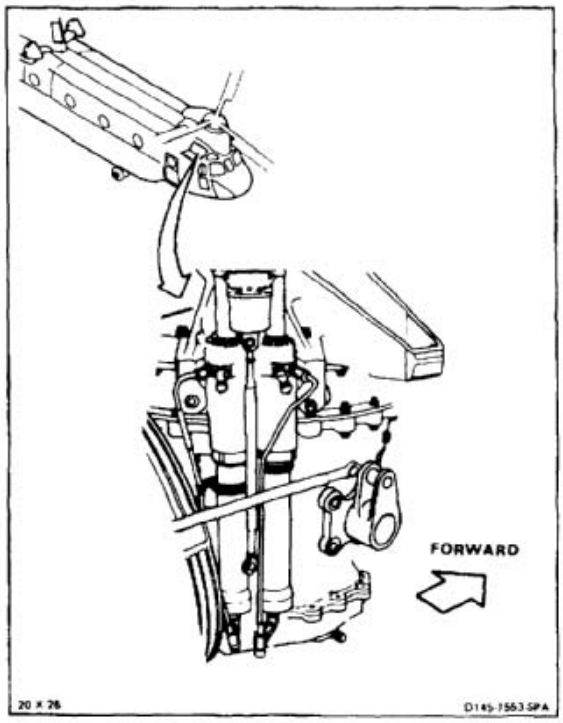
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Bushings must be in bellcrank before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), two washers (2 and 3), and bolt (4) from support (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

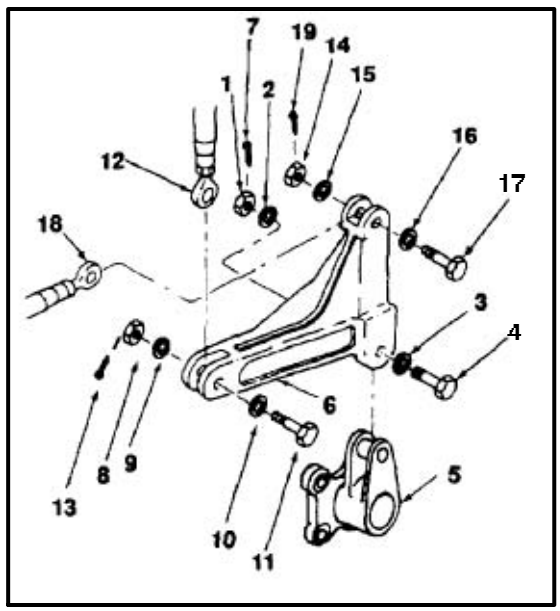
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position forward right upper bellcrank (6), long arm aft, short arm up, in support (5). Install bolt (4), two washers (3 and 2), and nut (1).
3. Torque nut (1) to **155 to 220 inch-pounds**. Install cotter pin (7).
4. Remove nut (8), two washers (9 and 10), and bolt (11) from forward arm of bellcrank (6).
5. Untie and position servocylinder connecting link (12) in aft arm of bellcrank (6).

5.1. Install bolt (11), head inboard, with steel washer (10) under bolt head. Install aluminum washer (9) and nut (8).

6. Torque nut (8) to **30 to 45 inch-pounds**. Install cotter pin (13).
7. Remove nut (14), two washers (15 and 16), and bolt (17) from short arm of bellcrank (6).
8. Untie and position second stage connecting link (18) in short arm of bellcrank (6). Install bolt (17), two washers (16 and 15), and nut (14). Remove tag from link.
9. Torque nut (14) to **60 to 90 inch-pounds**. Install cotter pin (19).
10. Check three bolts (4, 11, and 17). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 3, 6, or 9.

INSPECT



FOLLOW-ON MAINTENANCE:

Remove servocylinder safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight system controls (TM 55-1520-240-T).
Close forward right work platform (Task 2-2).

END OF TASK

11-202 REMOVE FORWARD ACTUATOR 11-202

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5280-00-323-4692

Materials:

None

Personnel Required:

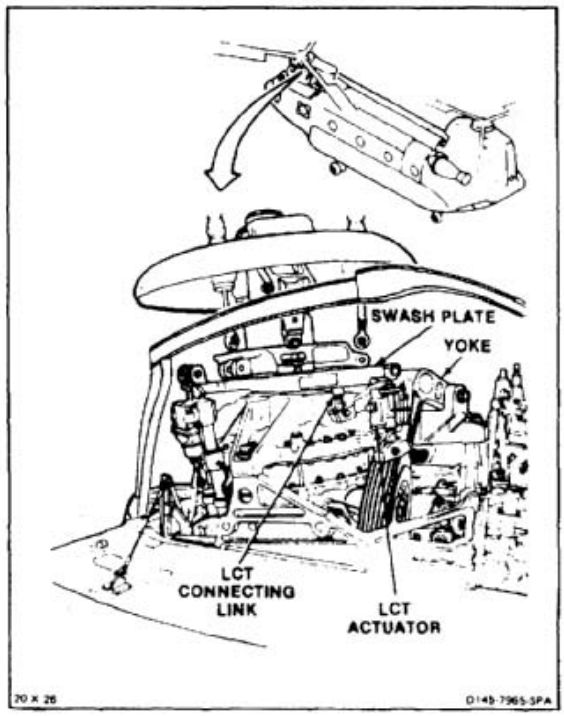
Medium Helicopter Repairer

References:

TM 1-1520-253-23
Task 1-13

Equipment Condition:

Forward LCT Actuator Fully Retracted (TM 55-1520-240-T)
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Forward Pylon Work Platforms Open (Task 2-2)
Forward Rotor Pitch Links Disconnected (Task 5-97)
Servocylinder Safety Blocks (T31) Installed (Task 11-28)



CAUTION

Do not use cadmium plated hardware or tools while working on yoke assembly. Titanium yoke could be damaged.

Do not use chlorinated solvents for cleaning. Titanium yoke could be damaged by this solution.

NOTE

Positive retention bolts are installed in upper controls. Bolts have pawl which prevents nut or bolt removal unless pawl is depressed. Refer to Task 1-13.

Attaching bolts, washers, and nuts will be temporarily installed after removing actuator and connecting link.

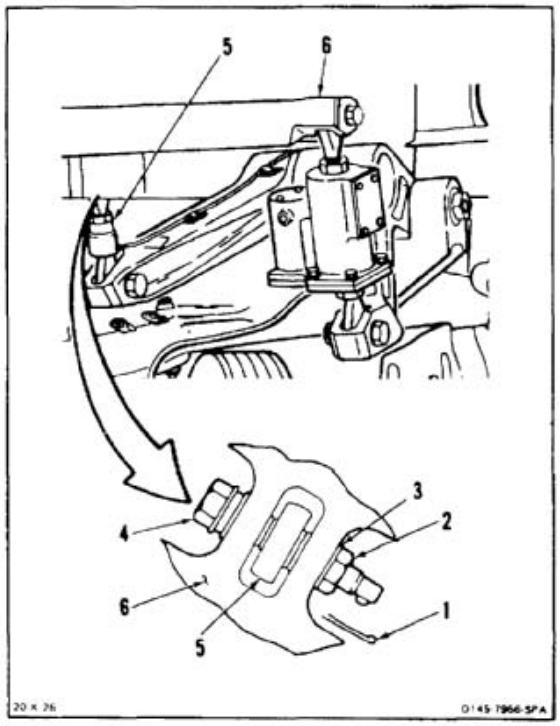
NOTE

If a crack in the connecting link or yoke is suspected during removal, refer to TM 1-1520-253-23.

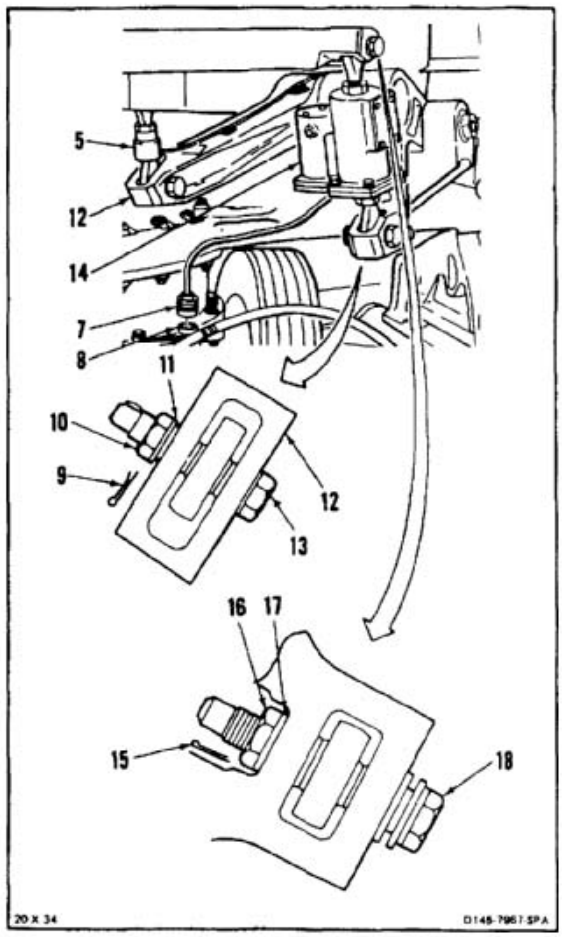
NOTE

If LCT is being removed for replacement, rigging check of replacement actuator may be performed by temporarily placing replacement LCT on work platform and completing Task 11-40.

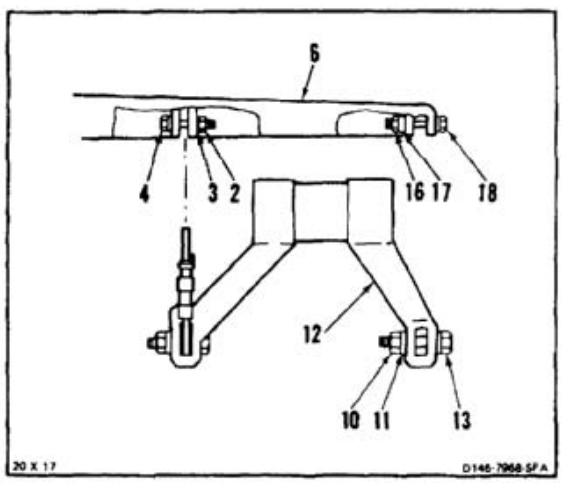
1. Remove cotter pin (1), nut (2), washer (3), and bolt (4) attaching connecting link (5) to swashplate (6).



2. Disconnect actuator connector (7) from receptacle (8).
3. Remove cotter pin (9), nut (10), and washer (11).
4. Support yoke (12) and remove bolt (13) attaching actuator (14) to yoke.
5. Hold connecting link (5) and gently lower yoke (12).
6. Remove cotter pin (15), nut (16), and washer (17).
7. Hold actuator (14) and remove bolt (18).
8. Remove actuator (14).



9. Install bolts (4, 18, 13), washers (3, 17, 11), and nuts (2, 16, 10) in swashplate (6) and yoke (12). Do not torque nuts.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-203 REMOVE LCT ACTUATOR ROD END BEARING (AVIM) 11-203

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Vise, Soft Jaws

Materials:

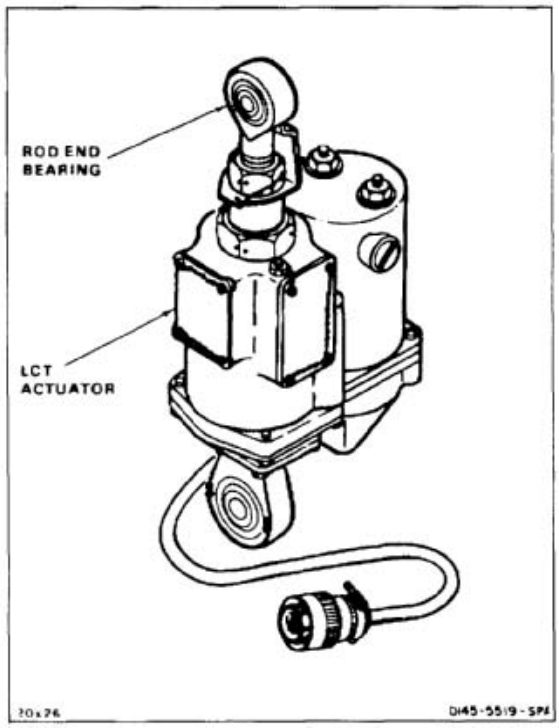
None

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

Off Helicopter Task
LCT Actuator Fully Retracted



NOTE

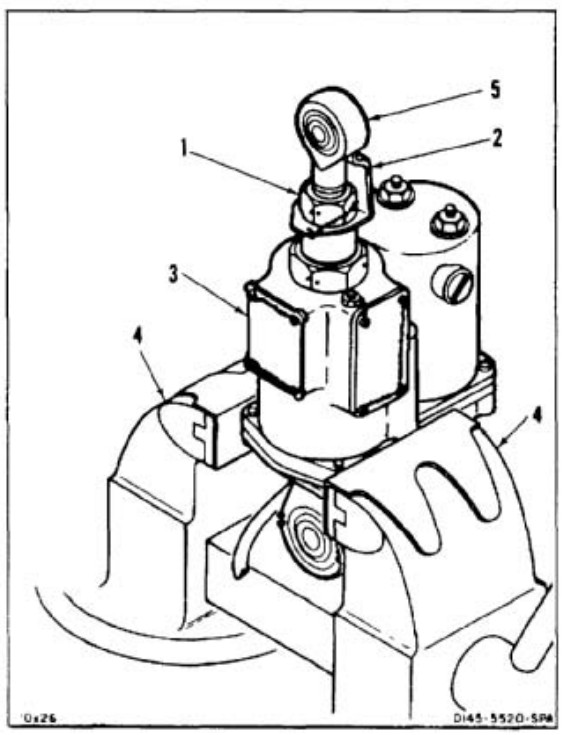
Procedure is same to remove bearing from forward LCT actuator (145CS114-1) or aft LCT actuator (145CS114-2).

1. Remove lockwire from checknut (1) and spring tension clip (2).

CAUTION

Do not damage locking tabs of spring tension clip.

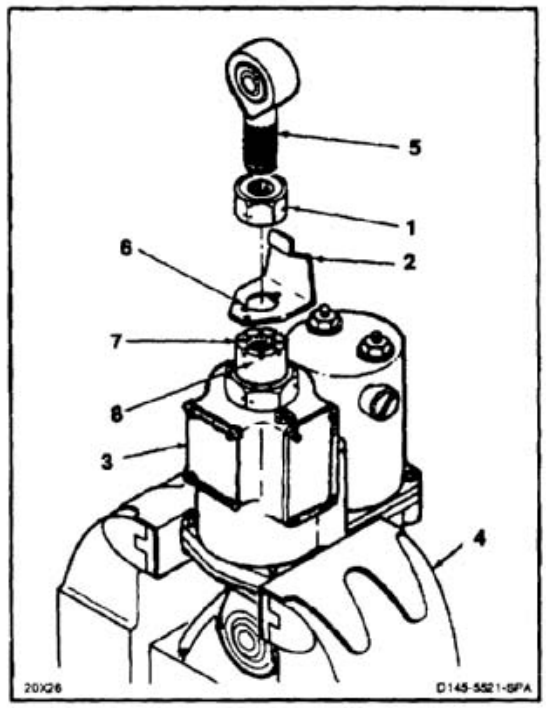
2. Position actuator (3) in vise (4). Hold rod end bearing (5) with open end wrench. Loosen checknut (1).



3. Loosen nut (1). Lift dip (2) until locking tabs (6) are out of notches (7) on actuator shaft (8).
4. Remove rod end bearing (5).
5. Remove dip (2) and nut (1) from bearing (3). Remove actuator (3) from vise (4).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-204 INSTALL LCT ACTUATOR ROD END BEARING (AVIM) 11-204

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds
Crowfoot Attachment, 1 Inch
Vise, Soft Jaws

Materials:

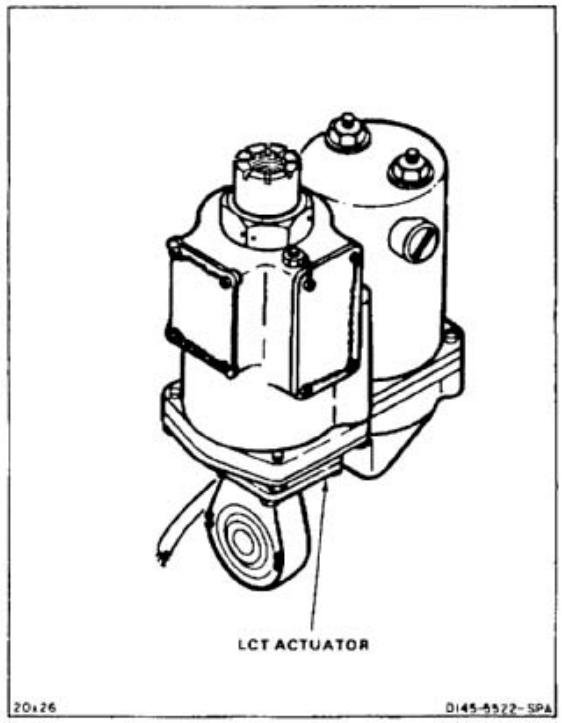
Lockwire (E231)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 11-203



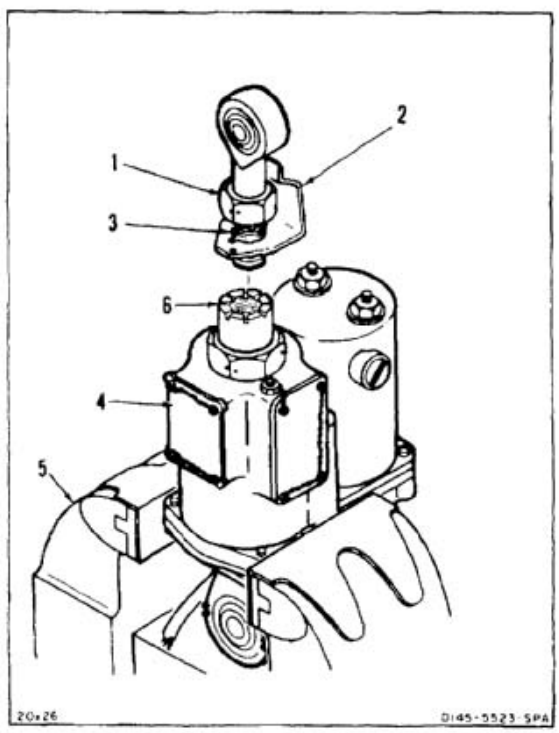
NOTE

Procedure is same to install rod end bearing in forward LCT actuator (145CS114-1) or aft LCT actuator (145C5114-2).

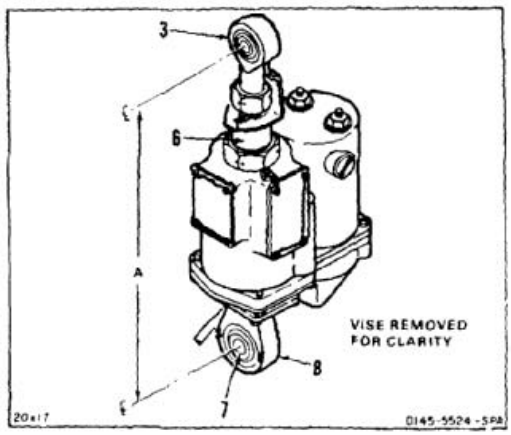
Rod end bearing (1140S118-2) is used for LCT actuator (145CS114-1).

Rod end bearing (114CS123-1) is used for LCT actuator (145CS114-2).

1. Install checknut (1) and spring tension clip (2) on rod end bearing (3).
2. Position actuator (4) in vise (5). Install rod end bearing (3) in actuator shaft (6).



3. Make sure actuator shaft (6) is fully retracted. Adjust rod end bearing (3). Dimension A shall be **9-45/64 to 9-3/4 inches** for actuator (145CS114-1) and **9-7/8 to 9-15/16 inches** for for actuator (145CS114-2). Dimension A is distance between center of rod end bearing (3) and center of end fitting bearing (7).



INSPECT

4. Align rod end bearing (3) with end fitting (8).

5. Engage locking tab (9) on clip (2) with notch (10) on actuator shaft (6). Make sure flats of rod end bearing (3) and alignment guide (11) of clip are parallel.

NOTE

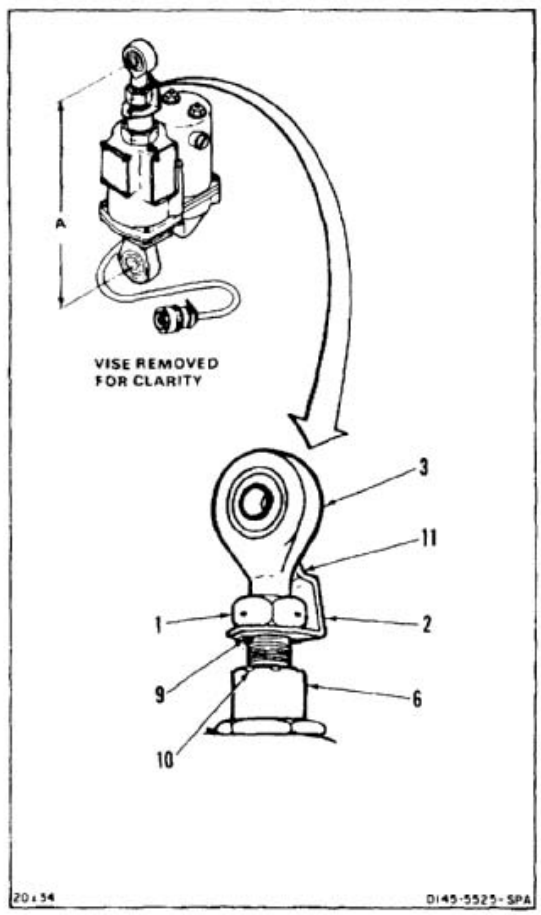
Do not allow rod end bearing to turn when torquing checknut.

6. Hold rod end bearing (3) with open end wrench. Torque checknut (1) to **450 inch-pounds**. Make sure locking tab (9) of clip (2) is seated in notch (10) of shaft (6).

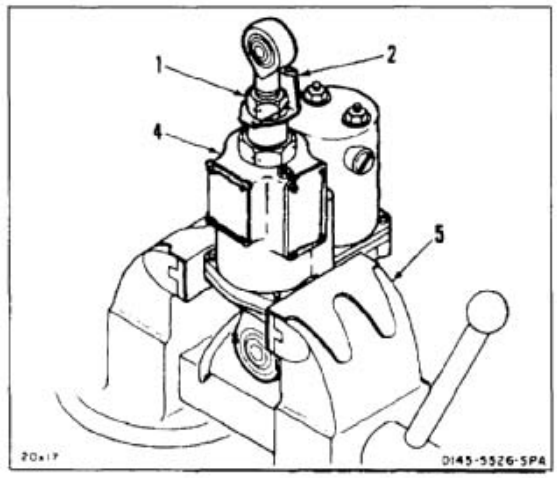
NOTE

Adjustment of bearing must be exact. It is difficult to adjust actuator after installation on helicopter.

7. Check dimension A. If correct, go to step 8. If not correct, loosen checknut (1), lift clip (2) and turn rod end bearing (3) to obtain correct dimension. Repeat steps 4 thru 6.



8. Lockwire clip (2) and checknut (1). Use lockwire (E231). Remove actuator (4) from vise (5).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-205 CHECK LCT ACTUATOR FOR SHAFT ROTATION 11-205

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Rotation Lever (APP E-6)
Dial Indicator and Base, 0 to 0.3 Inches
Vise, Soft Jaw

Materials:

None

Parts:

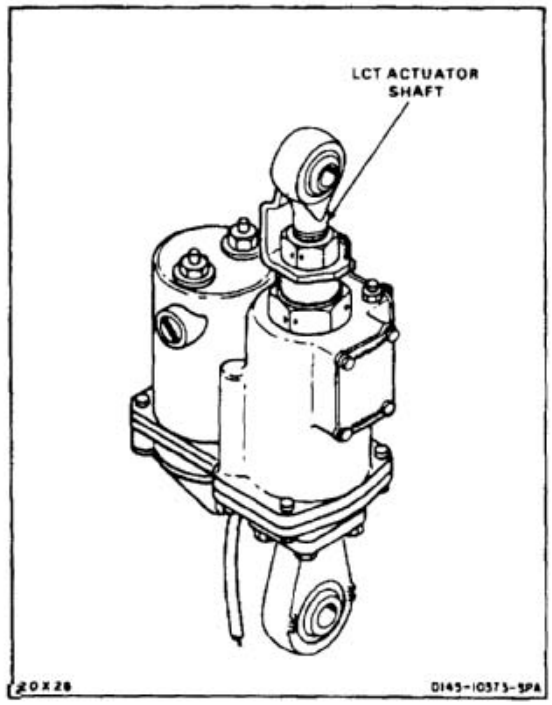
Nut
Bolt
Washer
Bushing

Personnel Required:

Medium Helicopter Repairer
Inspector

Equipment Condition:

Off Helicopter Task

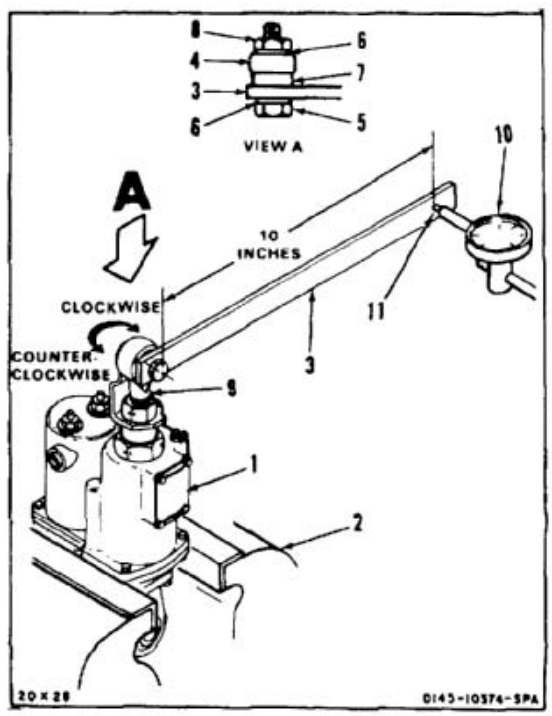


1. Clamp actuator (1) in vise (2).
2. Position lever (APP E-6) (3) on bearing (4). Install bolt (5), two washers (6), bushing (7), and nut (8). Tighten nut.

NOTE

Lever (APP E-6) is clamped to outer surface of bearing.

3. Turn shaft (9) counterclockwise by hand, and hold position.
4. Position dial indicator (10) touching lever (APP E-6) (3) at line (11), **10 inches** from center of bearing (4). Record indication of indicator.
5. Turn shaft (9) clockwise by hand and hold position. Record indication of indicator (10). Difference between recorded indications of steps 4 and 5 must not be more than **0.25 inch**.



INSPECT

6. Remove indicator (10) from lever (APP E-6) (3).
7. Remove nut (8), bushing (7), two washers (6), bolt (5), and lever (3) from bearing (4).
8. Remove actuator (1) from vise (2).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-205.1 REPLACE LONGITUDINAL CYCLIC TRIM (LCT) ACTUATOR VARIABLE RESISTOR (AVIM) 11-205.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Electrical Tool Kit, NSN 5180-00-323-4915
Multimeter

Materials:

Lockwire (E227)
Epoxy Primer (E292)
Solder (E360)
Twine (E433)
Varnish (E434)
Insulation Sleeving (E204)
Gloves (E184.1)

Personnel Required:

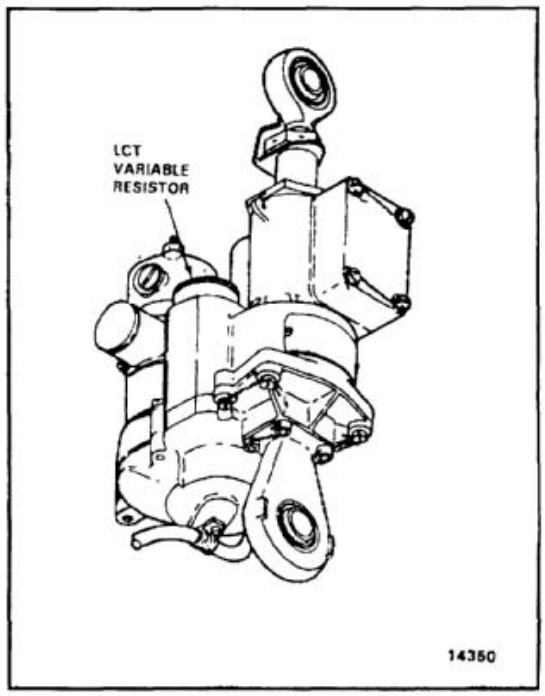
Aircraft Electrician
Inspector

References:

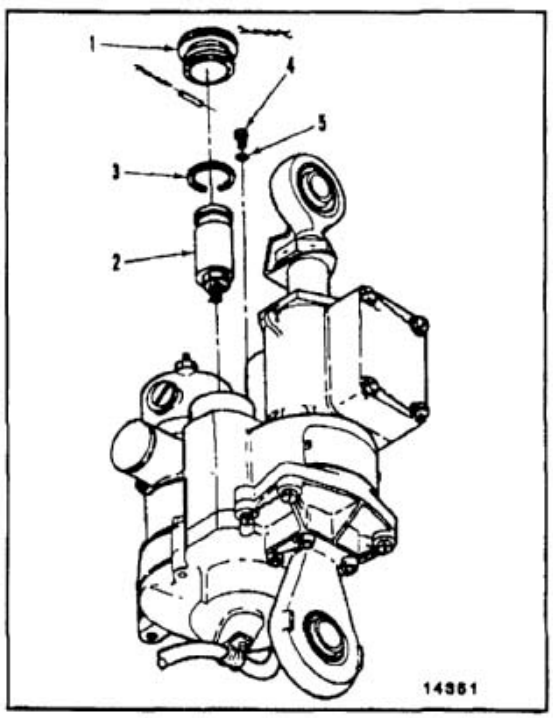
TM 55-1520-240-23P

Equipment Condition:

Off Helicopter Task
LCT Actuator Fully Retracted

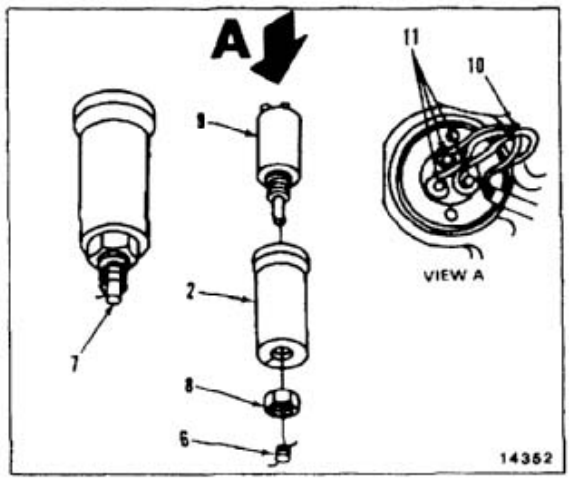


1. Remove lockwire from cover (1). Remove cover (1) by turning counterclockwise.
2. Inspect inside housing. Check that the resistor support (2) and shim washer (3) are separate parts.
   a. If resistor support and shim washer are one part, install cover. Send actuator to overhaul.
   b. If resistor support and shim washer are separate parts, perform steps 3 thru 20.
3. Remove lockwire and insulating sleeve from screws (4). Remove two screws and two washers (5).
4. Remove resistor support (2) with shim washer (3) in place. Remove shim washer.

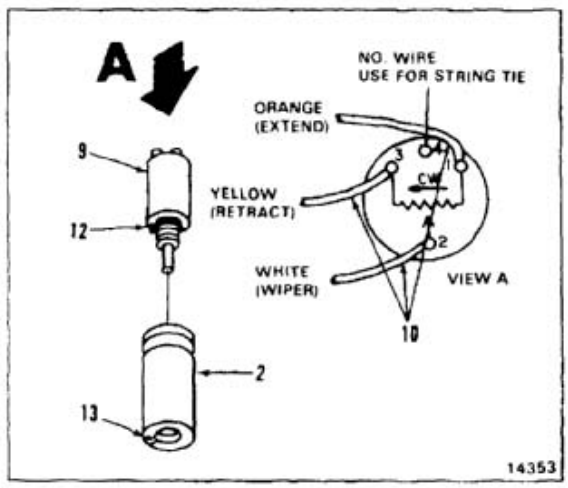


11-205.1 REPLACE LONGITUDINAL CYCLIC TRIM (LCT) ACTUATOR VARIABLE RESISTOR (AVIM) (Continued) 11-205.1

5. Remove spring (6) from resistor shaft (7). To remove spring, carefully twist spring to loosen coils and withdraw shaft.
6. Remove lockwire from nut (8). Remove nut.
7. Remove resistor (9) from support (2).
8. Remove string-tie from wires (10). Unsolder wires at resistor pins (11).



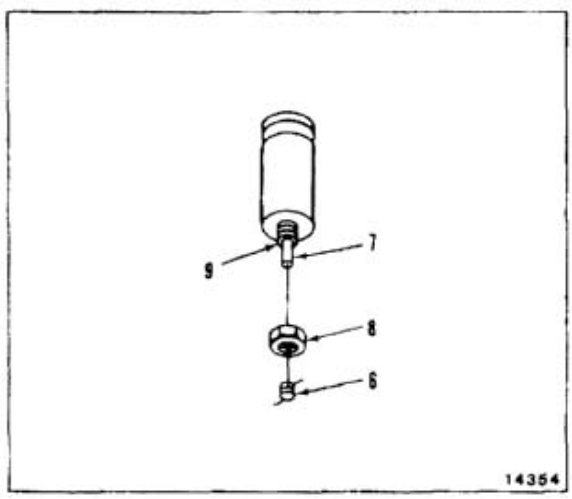
9. Solder replacement resistor wires (10). Use solder (E360).
10. String tie wires to pin 4. Use twine (E433).
11. Install resistor (9) in support (2). Make sure that resistor locator pin (12) goes into support locator hole (13).



CAUTION

Varnish (E434) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

12. Install nut (8) on resistor (9). Secure nut with lockwire (E227). If nut has no hole for lockwire, secure nut with varnish (E434).
13. Install spring (6) on resistor shaft (7). To install spring, twist to open coils and insert shaft.
14. Rotate resistor (9) clockwise one full turn.



CAUTION

Do not use the RX1 scale on ohmmeter. Excessive current will overheat resistor.

15. Check resistance between pins 2 and 3 of resistor. Use ohmmeter. Rotate resistor slightly counterclockwise until **0 to 20 ohms** maximum is indicated.

NOTE

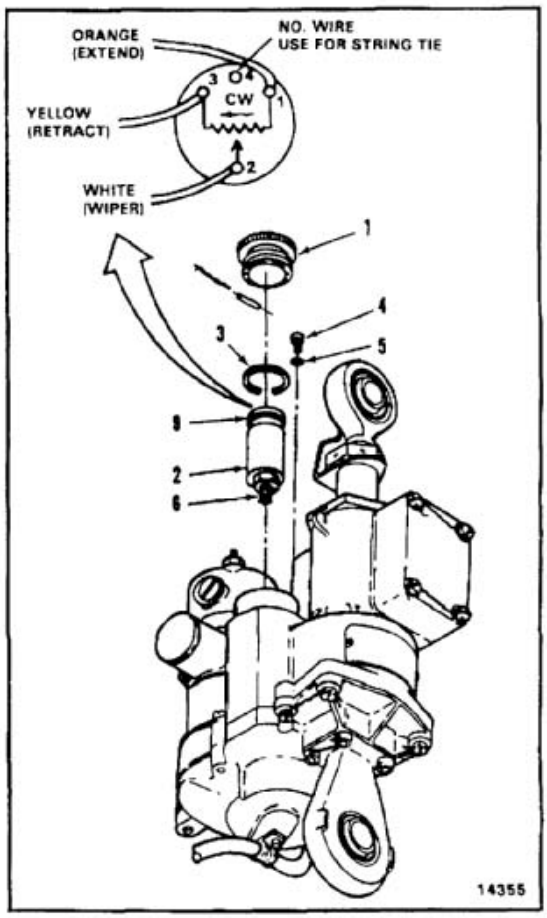
If resistor is rotated fully counterclockwise, resistance should be **3.020 to 3.220 ohms**.

16. Install shim washer (3) on support (2).
17. Install resistor (9) with support (2) in actuator housing. Make sure ends of spring (6) fit in slots at bottom of cavity.
18. Secure resistor support (2) with screws (4) and washers (5).
19. Check resistance per step 15. If required, loosen screws (4) to rotate resistor (9) with support (2) to obtain **0 to 20 ohms** maximum indication. Tighten screws.
20. Lockwire screws (4). Use lockwire (E227) and insulating sleeve (E204). Position sleeve on twisted lockwire between the two screws.

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

21. Coat thread of cover (1) with epoxy primer (E292). Wear gloves (E184.1) and goggles. Install cover while primer is wet. Lockwire cover. Use lockwire (E227).



INSPECT

FOLLOW-ON MAINTENANCE:

Install forward/aft LCT actuator on aircraft (Tasks 11-206 and 11-221).
Perform LCT actuator portion of AFCS operational check (TM 55-1520-240-T).

END OF TASK

11-205.2 REPLACE LCT ACTUATOR MOTOR 11-205.2

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Electrician Tool Kit, NSN 5180-00-323-4915
Vise, Soft Jawed
Soldering Gun
Torque Wrench, 0 to 150 Inch-Pounds

Materials:

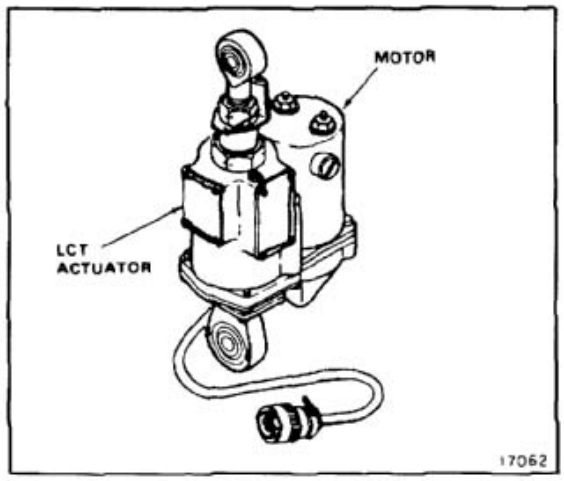
Lockwire (E227)
Primer, Yellow Epoxy (E292.1)
Adhesive (E49.1)
Naphtha (E245)

Personnel Required:

Aircraft Electrician
Inspector

Equipment Condition:

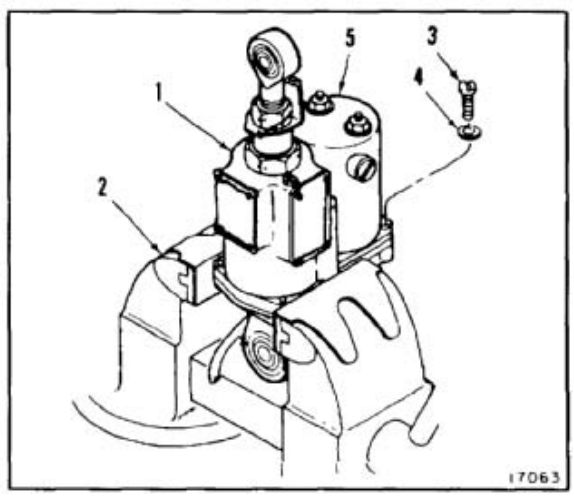
Off Helicopter Task



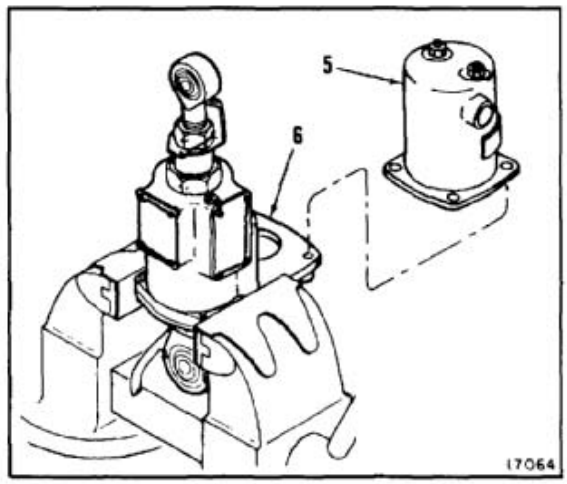
NOTE

Procedure is same to remove motor from forward LCT actuator (145CS114-1) or aft LCT actuator (145CS114-2).

1. Position actuator (1) in vise (2). Remove lockwire from screws (3).
2. Remove three screws (3) and washers (4) securing motor (5) to actuator (1).



3. Break the sealant bead and carefully lift motor (5) straight up until red and green wires are exposed.
4. If wires are crimped, cut as close to crimp as possible. If wires are soldered, use soldering gun to unsolder them.
5. Remove motor (5).
6. Remove old sealant from motor mounting pad (6).



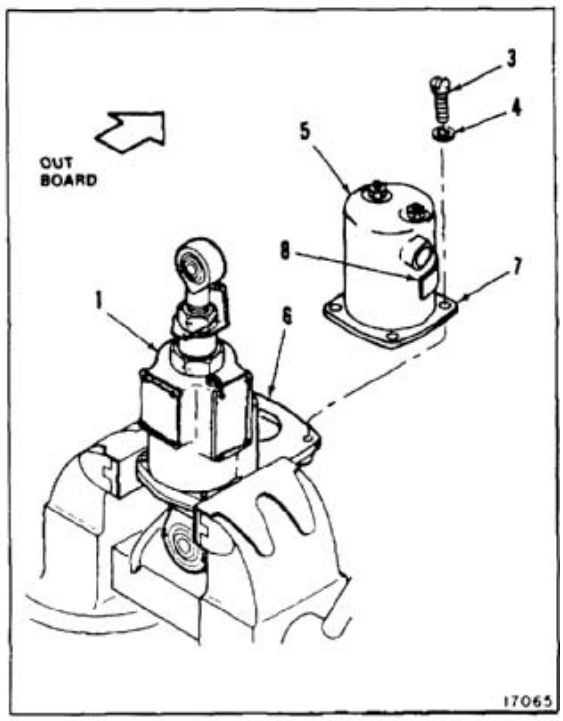
INSPECT

7. Crimp wires from actuator (1) to serviceable motor (5). Red to red, green to green.
8. Clean motor mounting pad (6). Use naphtha (E245.)
- 8.1. Spray motor mount pad (6) with primer (E292.1).
9. Apply adhesive (E49.1) to base of motor (7).

NOTE

During installation of motor (5), be sure that data plate (8) faces away from actuator (1).

10. Install motor (5). Use screws (3) and washers (4). Check that wires are not pinched (actuator sits flush). Torque screws to **28 to 35 inch-pounds**.
11. Lockwire screws (3). Use lockwire (E227).



INSPECT

FOLLOW-ON MAINTENANCE:

Install forward/aft LCT actuator on aircraft (Tasks 11-206 and 11-221).
Perform forward/aft LCT actuator operational check (TM 55-1520-240-T).

END OF TASK

11-206 INSTALL FORWARD LCT ACTUATOR 11-206

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds

Materials:

Antiseize Compound (E75)
Gloves (E184.1)

Parts:

Cotter Pins
Washers

Personnel Required:

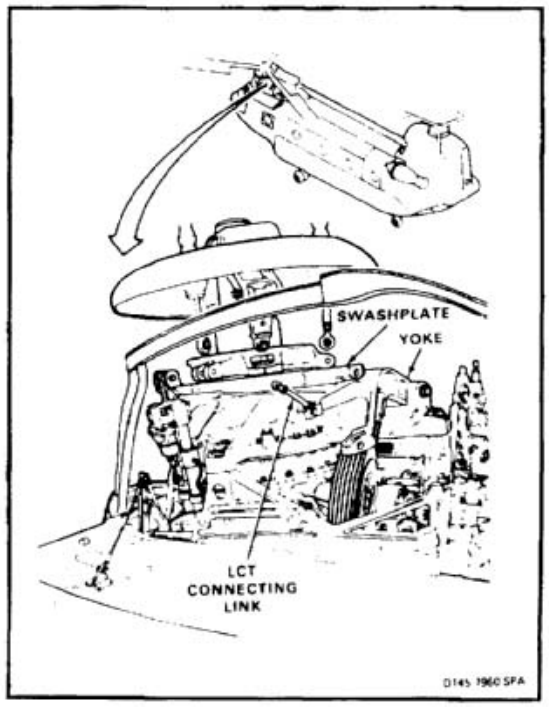
Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-202

Equipment Condition:

LCT Actuator Fully Retracted



CAUTION

Do not use cadmium plated hardware or tools while working on yoke assembly. Titanium yoke could be damaged.

Do not use chlorinated solvents for cleaning. Titanium yoke could be damaged by this solutIon.

Bushings must be in swashplate and yoke before installing bolts; otherwise, damage to components will result.

NOTE

Positive retention bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nuts (1, 2, and 3), washers (4, 5, 6, and 7), and bolts (8, 9, and 10) from swashplate (11) and yoke (12).

WARNING

Antiseize compound (E75) can form toxic vapors if exposed to flame. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

2. Apply antiseize compound (E75) to bushing (13 and 14) on bolts (8 and 9). Keep compound off threads of bolt. Wear gloves (E184.1).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the swashplate and yoke assembly.

Ensure locking tab washer is facing in the proper direction.

Ensure wire bundle is routed so as not to interfere with flight control system motions.

After applying nut torque, ensure locking tab washer is lockwired to the jam nut per BAC5018.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Ensure special countersunk washers are installed properly under the head of self retaining bolts. Countersink must face towards head of bolt.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

3. Position rod end (15) of actuator (16) in attachment lug (17) of swashplate (11). Actuator motor (18) must face forward.

4. Install bolt (8) head aft, through swashplate lug (17) and actuator rod end (15). Install washer (4) and nut (1). Torque nut to **400 to 660 inch-pounds**. Install cotter pin (19).

5. Have helper raise yoke (12). Align bearings of actuator (16) and connecting link (20) in lugs of swashplate (11) and yoke.

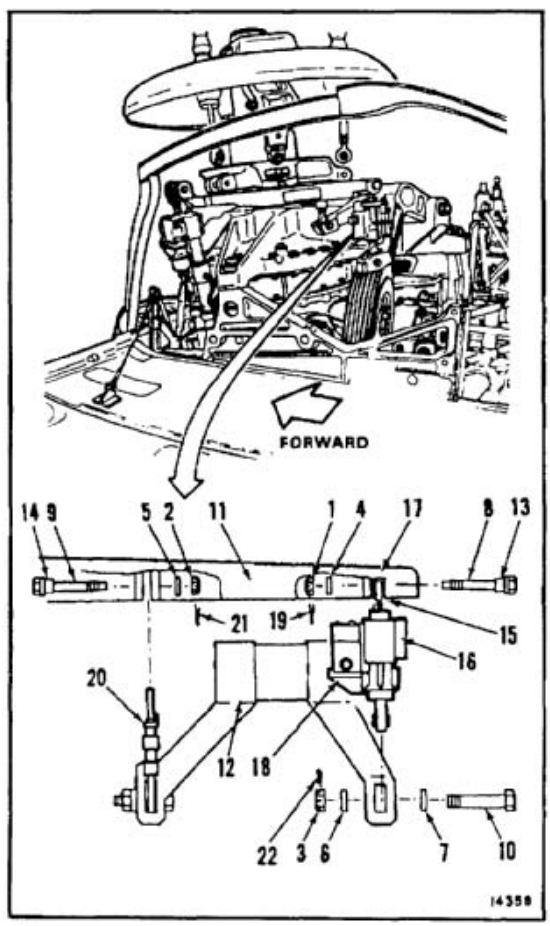
6. Install bolt (9), head forward. Install washer (5) and nut (2). Torque nut to **400 to 660 inch-pounds**. Install cotter pin (21).

7. Install washer (7) on bolt (10), recess toward head. Install bolt (10) dry, head aft, washer (6), and nut (3). Torque nut to **290 to 660 inch-pounds**. Install cotter pin (22).

NOTE

Use additional washers, if needed, to align cotter pin.

INSPECT

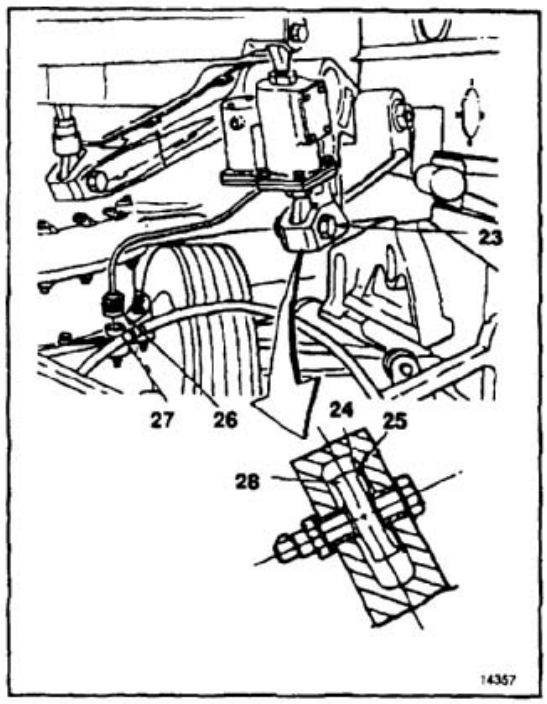


CAUTION

Some clearance is required to ensure that the LCT actuator lower end fitting (28) is not clamped against the face of the bushing flange (25).

8. Check that actuator swivels at lower end fitting bearing (23). Any measurable clearance between the actuator anti-rotation lugs (24) and the bushing flange (25) on the yoke is acceptable. If there is no clearance, add a thin washer between the bearing inner race and the flange bushing.

9. Connect actuator connector (26) to receptacle (27).



INSPECT

FOLLOW-ON MAINTENANCE:

Perform rigging check of forward and aft longitudinal cyclic trim actuators (Task 11-40).
Connect forward rotor pitch links (Task 5-99).
Perform neutral rig check (Task 11-33).
Perform LCT actuator portion of AFCS operational check (TM 55-1520-240-T).
Close pylon work platforms (Task 2-2).

END OF TASK

11-207 REMOVE FORWARD LCT CONNECTING LINK 11-207

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Dry Cleaning Solvent (E162)
Cloth (E120)
Gloves (E186)

Personnel Required:

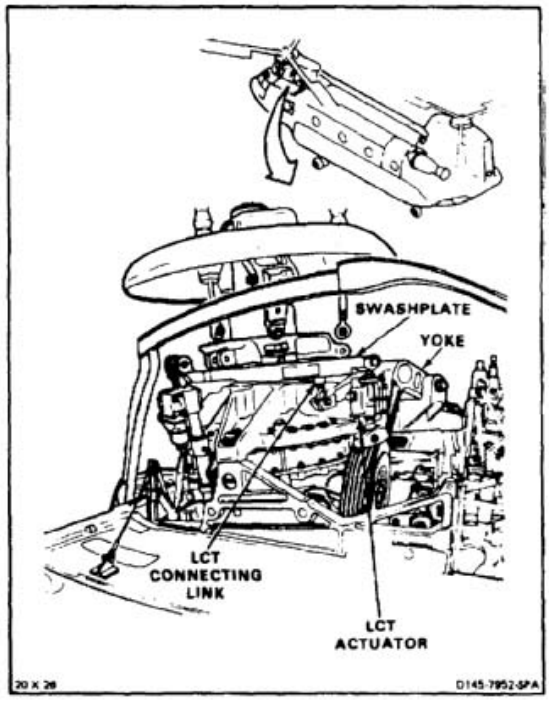
Medium Helicopter Repairer

References:

TM 1-1520-253-23
Task 1-13

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Forward Pylon Work Platforms Open (Task 2-2)
Forward Rotor Pitch Links Disconnected (Task 5-97)
Servocylinder Safety Block (T31) Installed (Task 11-28)



CAUTION

Do not use cadmium plated hardware or tools while working on yoke assembly. Titanium yoke could be damaged.

NOTE

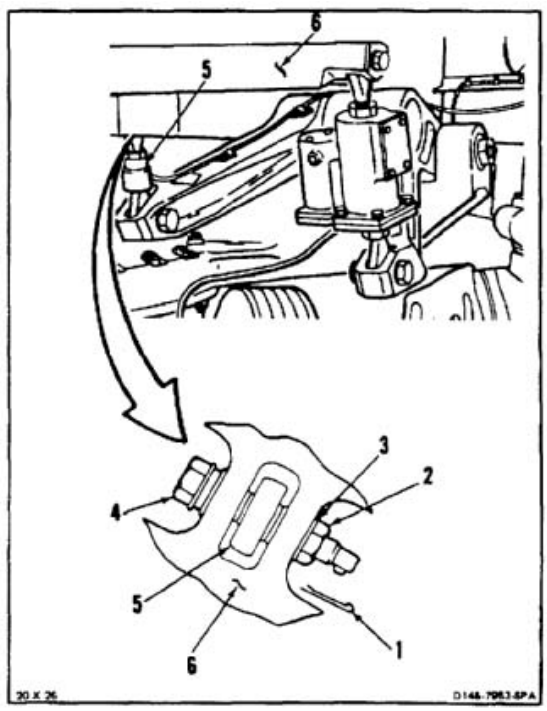
If general cleaning is required before disassembly, use solvent (E162), cloth (E120), gloves (E186).

Positive retention bolts are installed in upper controls. Bolts have pawl which prevents nut or bolt removal unless pawl is depressed (Task 1-13).

Attaching bolts, washers, and nuts will be temporarily installed after removing actuator and connecting link.

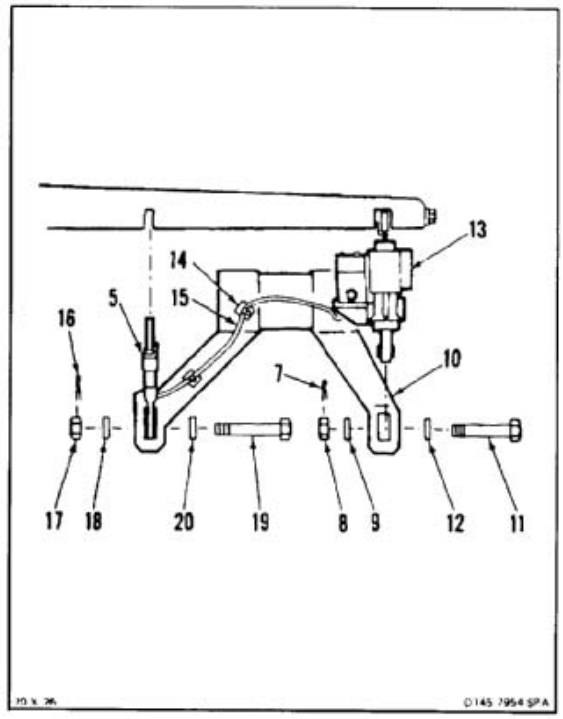
NOTE

If a crack in the connecting link or yoke is suspected during removal, refer to TM 1-1520-253-23.

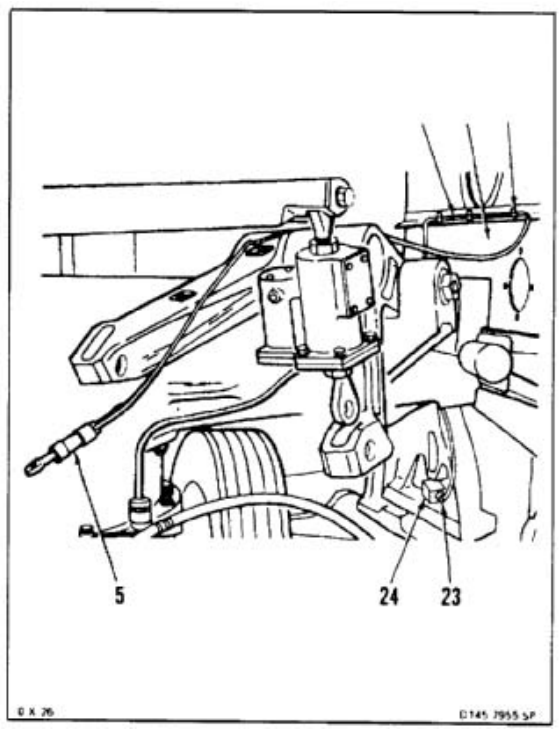


1. Remove cotter pin (1), nut (2), washer (3), and bolt (4) attaching connecting link (5) to swashplate (6).

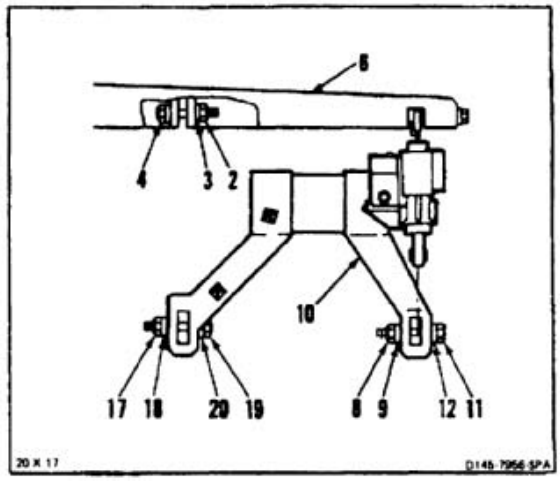
2. Remove cotter pin (7), nut (8), and washer (9).
3. Support yoke (10) and remove bolt (11) and washer (12) connecting actuator (13) to yoke.
4. Hold connecting link (5) and carefully lower yoke (10).
5. Cut and remove five cable straps (14) attaching link cable (15) to yoke (10).
6. Remove cotter pin (16), nut (17), and washer (18).
7. Hold connecting link (5) and remove bolt (19) and washer (20).
8. Remove connecting link (5) from yoke (10).



9. Remove three cable clamps (21) attaching link cable (15) to rear bulkhead (22).
10. Disconnect link connector (23) from cruise guide signal conditioner (24).
11. Cut strap as required. Remove connecting link (5) from helicopter.



12. Install bolts (4, 11, and 19), washers (3, 9, 12, 18, and 20), and nuts (2, 8, and 17) in swashplate (6) and yoke (10). Do not torque nuts.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-208 REMOVE LCT CONNECTING LINK ROD END BEARING (AVIM) 11-208

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Vise, Soft Jaws

Materials:

None

Personnel Required:

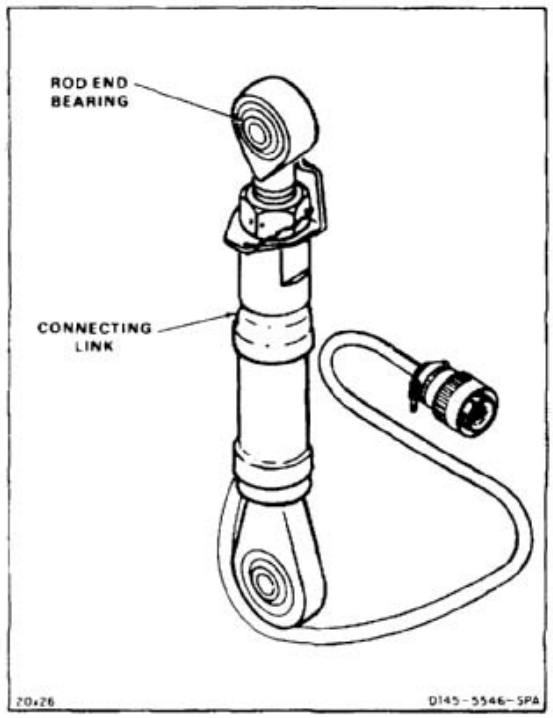
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Off Helicopter Task



NOTE

Procedure is same to remove rod end bearing from forward LCT connecting link (414C3056-4) or aft LCT connecting link (414C3056-3).

NOTE

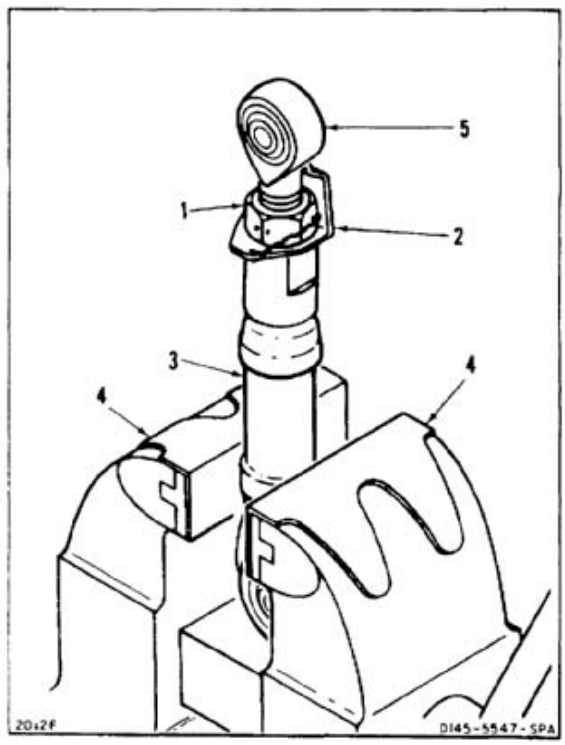
If a crack in the connecting links is suspected during removal, refer to TM 1-1520-253-23.

1. Remove lockwire from checknut (1) and spring tension clip (2).

CAUTION

Do not damage locking tabs of spring tension clip.

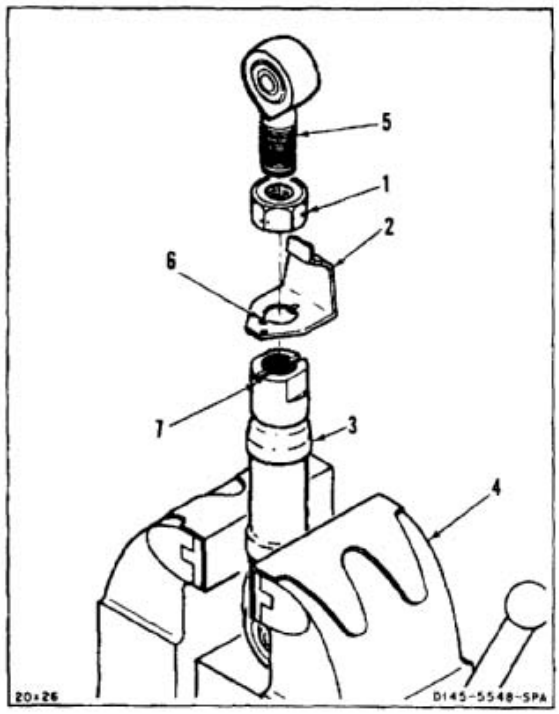
2. Clamp link (3) in vise (4). Hold rod end bearing (5) with open end wrench. Loosen checknut (1).



3. Lift clip (2). Loosen nut (1) until locking tabs (6) are out of notches (7).
4. Remove rod end bearing (5).
5. Remove clip (2) and nut (1) from bearing (5).
6. Remove link (3) from vise (4).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-209 INSTALL LCT CONNECTING LINK ROD END BEARING (AVIM) 11-209

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds
Crowfoot Attachment, 1 Inch
Vise, Soft Jaws

Materials:

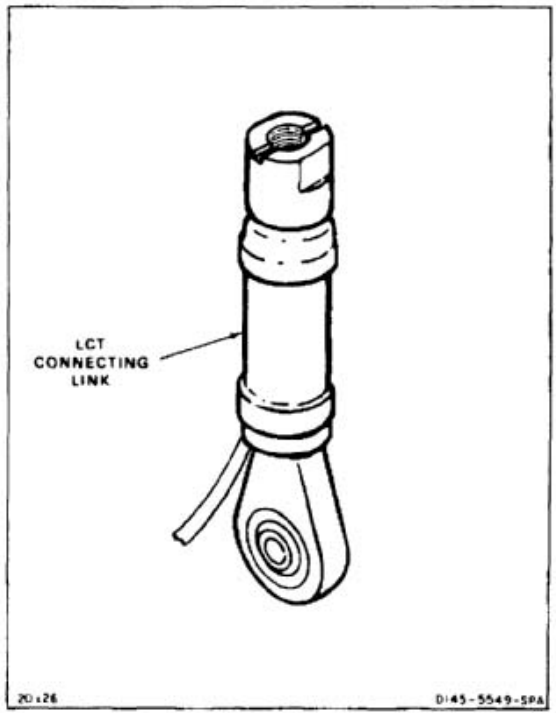
Lockwire (E231)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 1-1520-253-23
TM 55-1520-240-23P
Task 11-208



NOTE

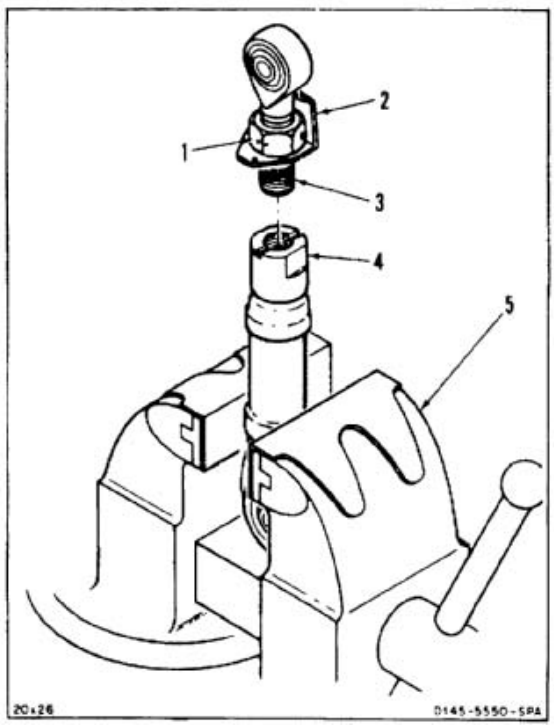
Procedure is same to install rod end bearing in forward LCT connecting link (414C3056-4) and aft LCT connecting link (414C3056-3).

Rod end bearing (114CS118-2) is used for connecting link (414C3056-4).

Rod end bearing (114CS123-1) is used for connecting link (414C3056-3).

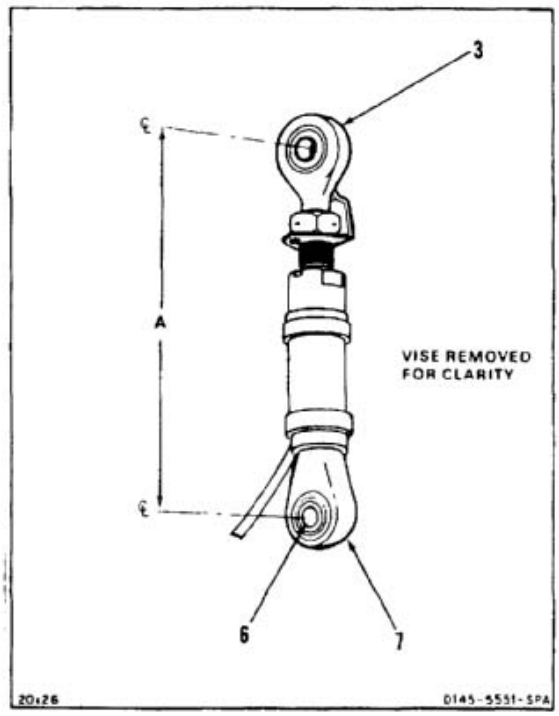
NOTE

If a crack in the connecting link is suspected during removal, refer to TM 1-1520-253-23.



1. Install checknut (1) and spring tension clip (2) on rod end bearing (3).
2. Clamp connecting link (4) in vise (5). Install rod end bearing (3) in link (4).

3. Adjust rod end bearing (3). Dimension A shall be **10-1/2 inches** nominal for connecting link (414C3056-3) and **6-13/16 inches** nominal for connecting link (414C3056-4). Dimension A is distance between center of rod end bearing (3) and center of lower fitting bearing (6).



INSPECT

4. Align rod end bearing (3) with lower fitting (7).

5. Engage locking tab (8) of clip (2) with notch (9) on link (4). Make sure flats of rod end bearing (3) and alignment guide (10) of clip are parallel.

NOTE

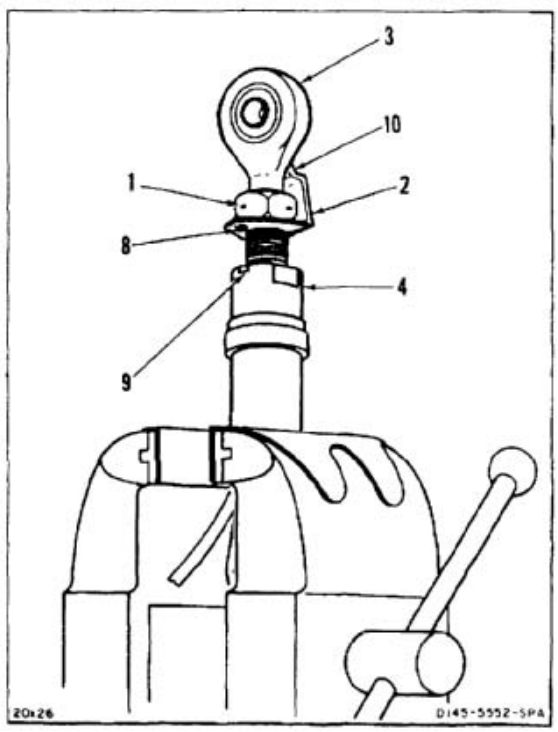
Do not allow rod end bearing to turn when torquing nut.

6. Hold rod end bearing (3) with open end wrench. Torque checknut (1) to **450 inch-pounds**. Make sure locking tab (8) of clip (2) is seated in notch (9) of link (4).

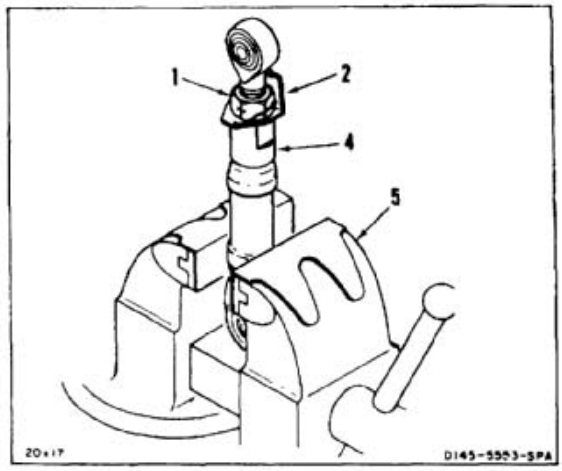
NOTE

Adjustment of bearing must be exact. It is difficult to adjust link after installation on helicopter.

7. Check dimension A. If correct, go to step 8. If not correct, loosen checknut (1), lift clip (2) and turn rod end bearing (3) to obtain correct dimension. Repeat steps 4 thru 6.



8. Lockwire clip (2) and checknut (1). Use lockwire (E231).
9. Remove link (4) from vise (5).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-210 INSTALL FORWARD LCT CONNECTING LINK 11-210

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds

Materials:

Antiseize Compound (E75)
Cable Straps (E375)
Lockwire (E231)
Gloves (E184.1)

Parts:

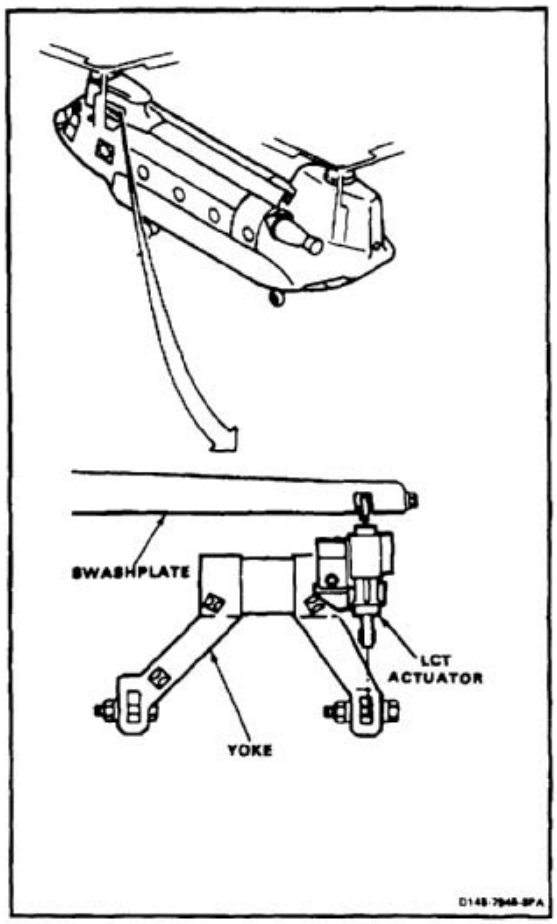
Cotter Pins
Washers

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13



CAUTION

Do not use cadmium plated hardware or tools while working on yoke assembly. Titanium yoke could be damaged.

Bushings must be in swashplate and yoke before installing bolts; otherwise, damage to components will result.

NOTE

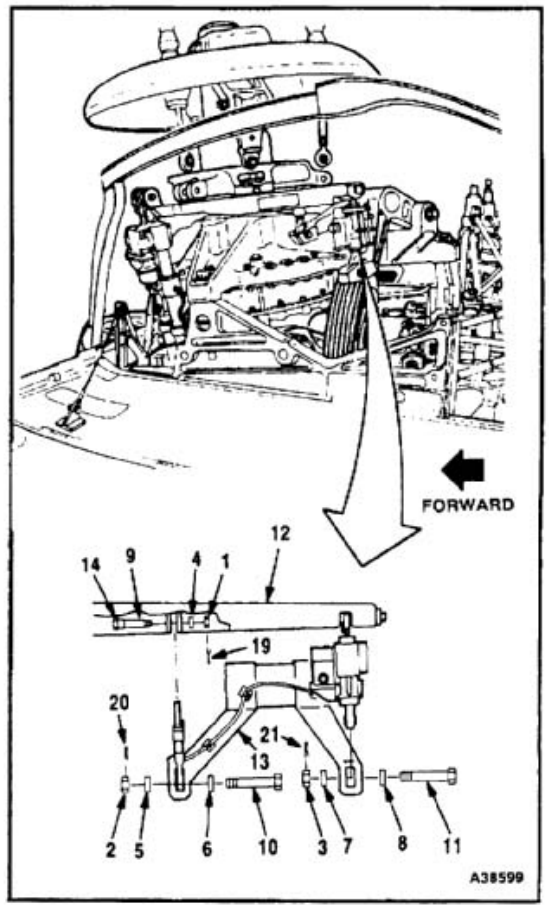
Positive retention bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nuts (1, 2, and 3), washers (4 thru 8), and bolts (9, 10, 11) from swashplate (12) and yoke (13).

WARNING

Antiseize compound (E75) can form toxic vapors if exposed to flame. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

2. Apply antiseize compound (E75) to bushing (14) on bolt (9). Keep compound off threads of bolt. Wear gloves (E184.1).



3. Position link rod end (15) in swashplate (12). Alignment guide (16) shall face aft. Install bolt (9), head forward, washer (4), and nut (1). Torque nut to **400 to 660 inch-pounds**, this includes torque for alignment of the cotter pin. A third washer, AN960C816 or AN960C816L may be required for cotter pin alignment.

INSPECT

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the swashplate and yoke assembly.

Ensure locking tab washer is facing in the proper direction.

Verify all required bushings are installed in the associated clevis of the yoke assembly and swashplate stationary ring.

Ensure wire bundle is routed so as not to interfere with flight control system motions.

After applying nut torque, ensure locking tab washer is lockwired to the jam nut per BAC5018.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Ensure special countersunk washers are installed properly under the head of self retaining bolts. Countersink must face towards head of bolt.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

4. Have helper raise yoke (13). Position end fittings of link (17) and actuator (19) in lugs of yoke.

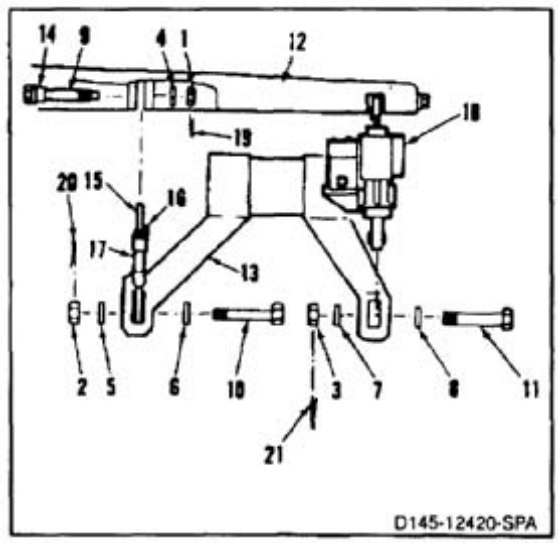
5. Install washers (6 and 8) on bolts (10 and 11), recess toward head.

6. Install bolts (10 and 11), dry, heads aft, washers (5 and 7), and nuts (2 and 3). Torque nuts to **290 to 660 inch-pounds**, this includes torque for alignment of the cotter pin. A third washer, AN960C816 or AN960C816L may be required for cotter pin alignment.

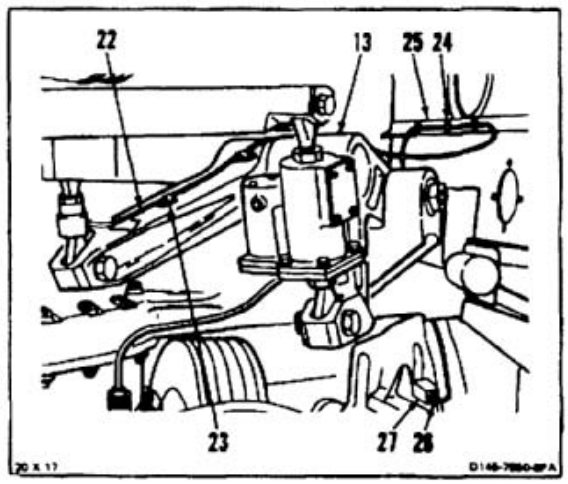
INSPECT

7. Install cotter pins (19, 20, and 21).

INSPECT



8. Route connecting link cable (22) over yoke (13). Attach cable to five mounting plates (23) on yoke. Use cable straps (E375).
9. Install three cable clamps (24) on cable (22). Install clamps on near bulkhead (25).
10. Connect link connector (26) to cruise guide signal conditioner (27).



INSPECT

FOLLOW-ON MAINTENANCE:

Rig forward swashplate and servocylinder (Task 11-54).
Connect pitch links (Task 5-99).
Perform operational check of cruise guide system (TM 55-1520-240-T).
Perform neutral rig check (Task 11-33).
Close aft pylon work platforms (Task 2-2).

END OF TASK

11-211 INSPECT FORWARD LCT YOKE 11-211

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials:

Corrosion-Preventive Compound (E153, E155.1, and E155.6)

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

Task 1-39
Task 11-212
Task 11-217
TM 55-1520-240-T

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Cockpit Thrust Control Fully Up (TM 55-1520-240-T)
Forward Work Platforms Open (Task 2-2)

General Safety Instructions:

WARNING

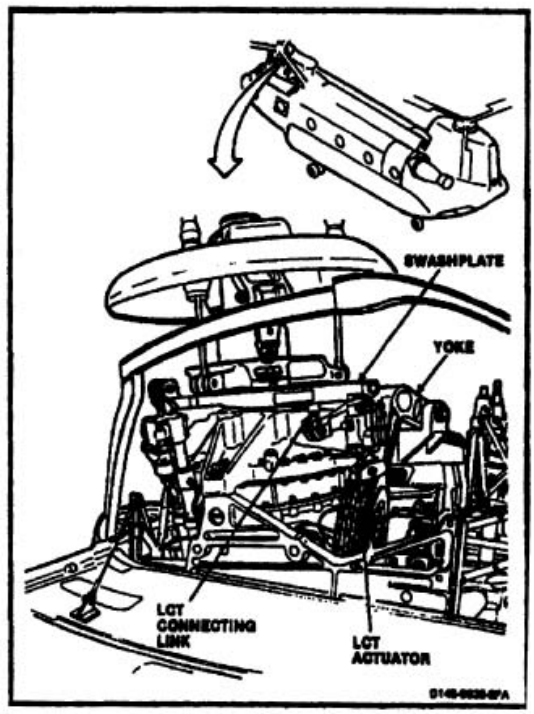
Do not move cockpit controls. Injury to personnel can occur.

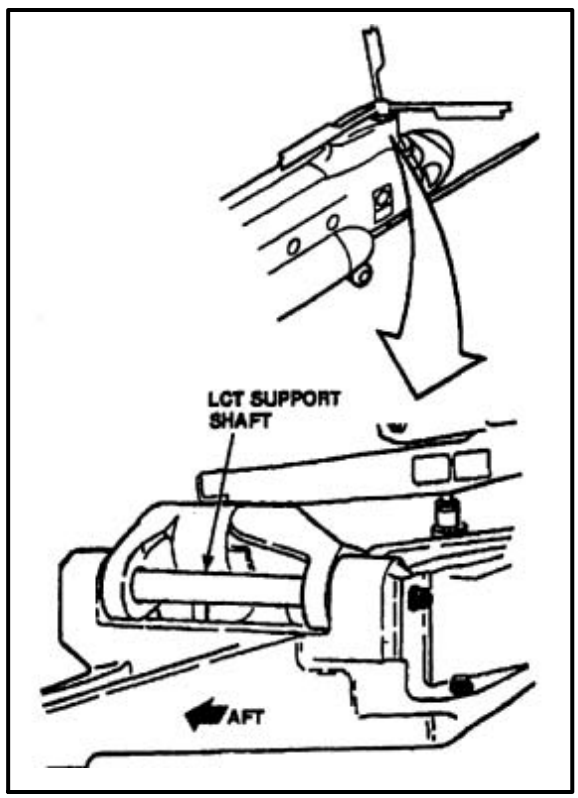
1. Inspect the inside surface of the LCT support shaft for corrosioin or lack of paint.
   a. Inspect all interior surfaces, including the bottom of the bore. Use a borescope or a small flashlight to perform the inspection.

NOTE

If the inside of the shaft cannot be fully inspected while installed, it must be removed (Task 11-212).

   b. If the entire inside surface of the shaft is painted a yellow-green color and there is no corrosion, install the shaft, if removed (Task 11-217). Go to step 2.
   c. If the entire inside surface of the shaft is not painted, or if there is evidence of corrosion, continue with step d.





   d. Put a coat of corrosion-preventive compound (E155.6 or E155.1) on the inside surface of shaft. Use pressurized spray or a pump bottle.

e. Put a coat of corrosion-preventive compound (E153) over the first coat. Use a small brush with a long handle.

f. Install the shaft, if removed (Task 11-217).

2. Prepare the helicopter for yoke inspection.

a. Connect the battery (Task 1-39).

b. Apply electrical power.

c. Appy hydraulic power.

d. Put the cockpit thrust control fully up (TM 55-1520-240-T).

3. Mount dial indicator (1) at aft yoke support (2). Indicator shaft (3) shall be in contact with rear face of yoke (4).

4. Try to move yoke (4) axially in support (2). Record axial movement.

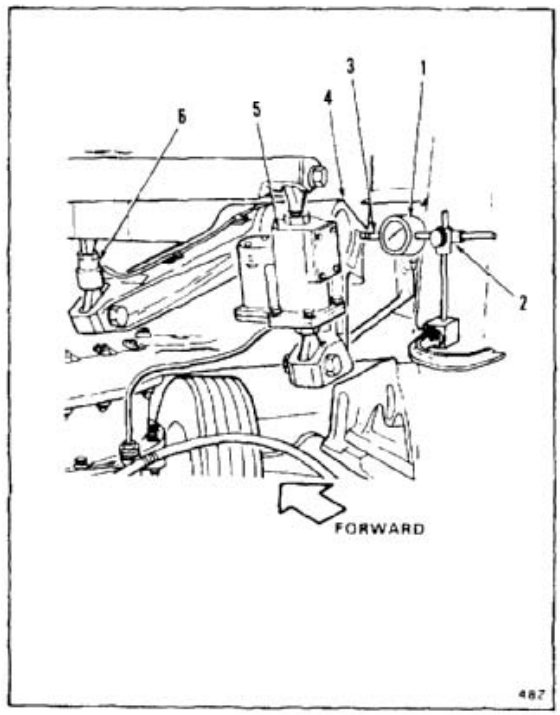
a. If axial movement is not greater than **0.010 inch**, remove dial indicator (1), remove hydraulic power and go to step 14.

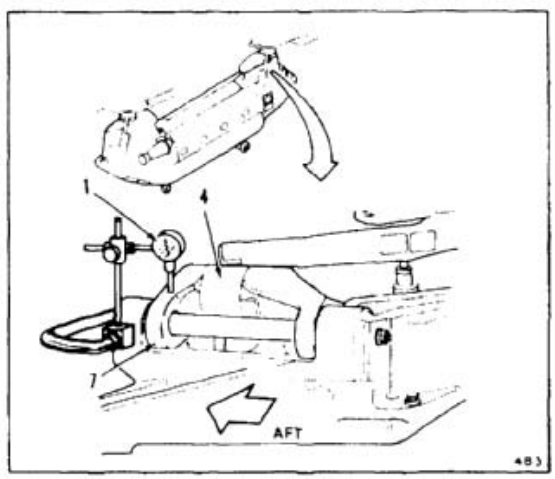
b. If axial movement is greater than **0.010 inch**, go to step 5. Remove hydraulic power.

5. Disconnect actuator (5) and connecting link (6) from yoke (4) (Task 11-212).

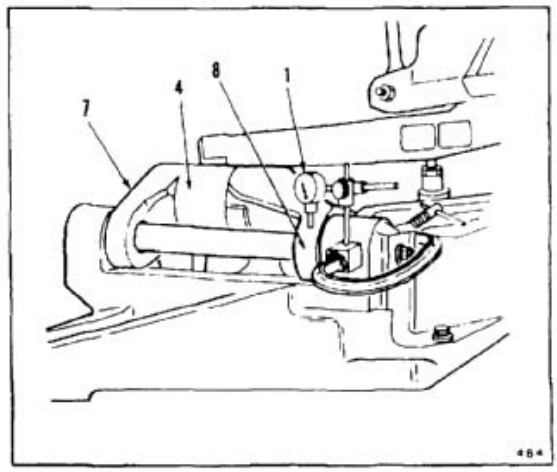
6. Install dial indicator (1) over aft bearing housing (7) of yoke (4).

7. Grasp yoke (4) at bearing housing (7). Try to move yoke up and down. Do not rotate yoke. Record vertical movement.

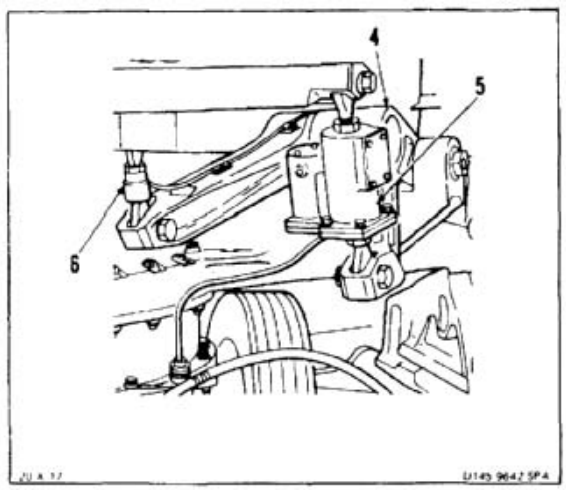




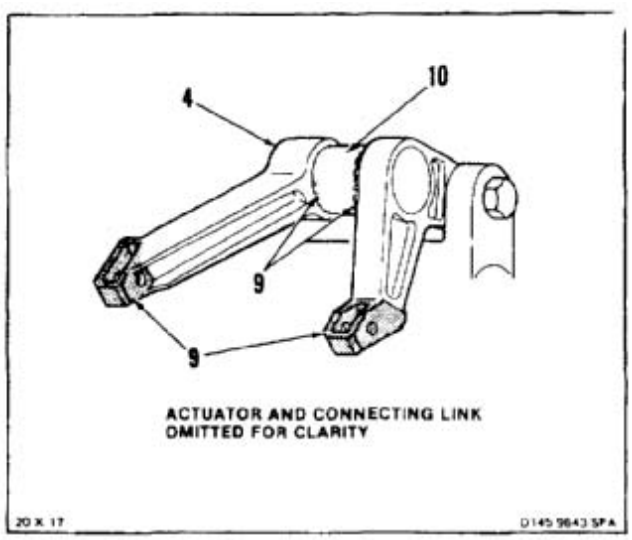
8. Install dial indicator (1) over forward bearing housing (8).
9. Grasp yoke (4) at bearing housing (8). Try to move yoke up and down. Do not rotate yoke. Record vertical movement.
10. Vertical movement at either bearing housing (7 and 8) must be less than **.007 inch**. If vertical movement is more than **.007 inch,** check yoke (4) for correct installation (Task 11-217).



11. Connect actuator (5) and connecting link (6) to yoke (4) (Task 11-217).
12. Apply hydraulic power.
13. Repeat steps 3 and 4.



14. Inspect yoke (4) for nicks, scratches, and gouges, as follows:
    a. In critical areas (9), V-bottom scratches or ragged gouges shall not be deeper than **0.003 inch**. Round-bottom scratches, gouges or nicks shall not be deeper than **0.010 inch**.
    b. In non-critical areas (10), V-bottom scratches or ragged gouges shall not be deeper than **0.010 inch**. Round-bottom scratches, gouges, or nicks shall not be deeper than **0.030 inch**.
15. Remove electrical power.



FOLLOW-ON MAINTENANCE:

Close forward work platforms (Task 2-2).

END OF TASK

11-212 REMOVE FORWARD LCT YOKE 11-212

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Socket Wrench, 1-1/16 Inch
Wrench, 1-7/16 Inch
Aluminum Bar, 1/2 Inch Diameter X 17 Inches Long

Materials:

Dry Cleaning Solvent (E162)
Cloth (E120)
Gloves (E186)

Personnel Required:

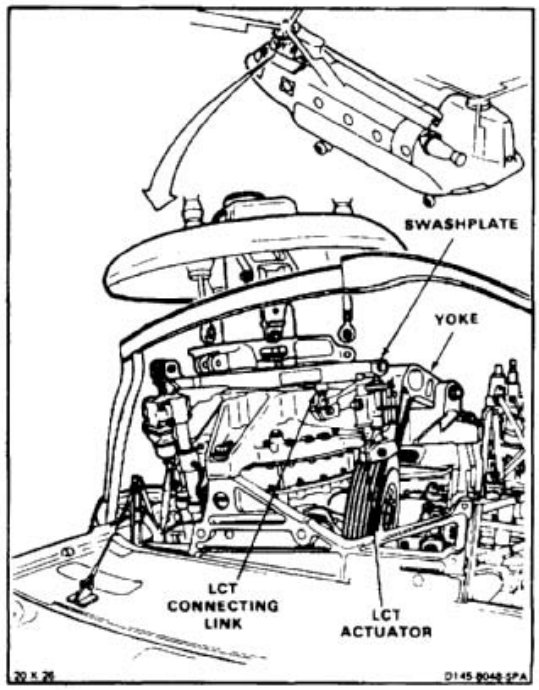
Medium Helicopter Repairer (2)

References:

Task 1-13

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Servocylinder Safety Blocks (T31) Installed (Task 11-28)
Forward Pylon Work Platforms Open (Task 2-2)
Forward Rotor Pitch Links Disconnected (Task 5-97)



WARNING

Dry cleaning solvent (E162) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

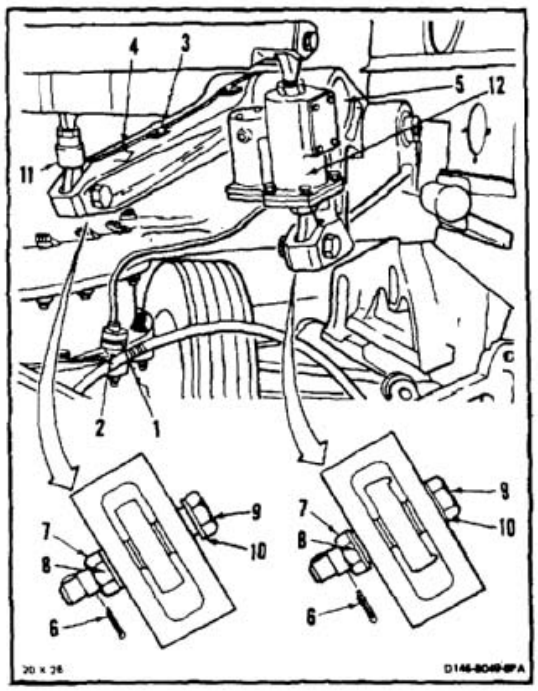
Do not use cadmium plated hardware or tools while working on yoke assembly. Titanium yoke could be damaged.

NOTE

If general cleaning is required before disassembly, use solvent (E162), cloth (E120), gloves (E186).

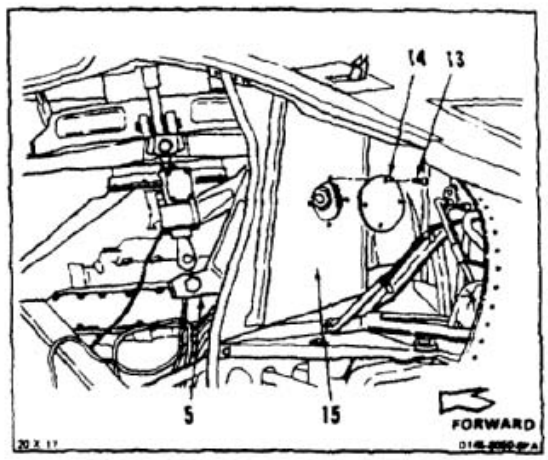
Positive retention bolts are installed in upper controls. Bolts have pawl which prevents nut or bolt removal unless pawl is depressed (Task 1-13).

Attaching bolts, washers and nuts will be temporarily installed after removing components.



1. Disconnect actuator connector (1) from receptacle (2).
2. Cut and remove five cable clamps (3) holding connecting link cable (4) to yoke (5),
3. Remove cotter pins (6), nuts (7), and washers (8).
4. Support yoke (5) and remove bolts (9) and washers (10) attaching connecting link (11) and actuator (12) to yoke.
5. Lower yoke (5).
6. Loosely install bolts (9), washers (8 and 10), and nuts (7) in lugs of yoke (5).

7. Remove four screws (13) and access plate (14) from bulkhead (15) aft of yoke (5).

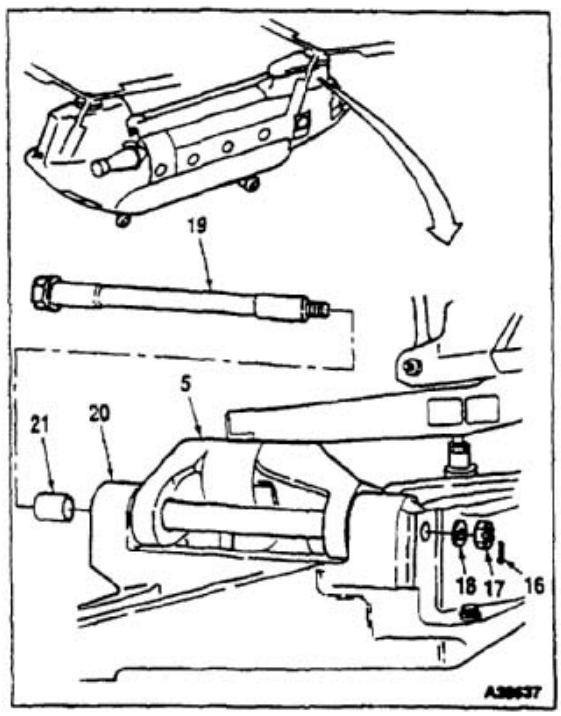


8. Remove cotter pin (16), nut (17), and washer (18).
9. Using aluminum bar carefully, drive out yoke support shaft (19). Have helper support yoke (5).
10. Lift out yoke (5) from yoke mount (20).

NOTE

Ensure slider bushing (21) is not removed and remains with yoke mount (20).

11. Install shaft (19), washer (18), and nut (17) in mount (20). Do not torque nut.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-213 REMOVE FORWARD LCT YOKE BEARINGS 11-213

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Mechanical Puller, Two-Jaw, NSN 5120-00-030-7942
Yoke Bearing Removal Tool (APP E-14)

Materials:

Dry Cleaning Solvent (E162)
Cloth (E120)
Gloves (E186)

Personnel Required:

Medium Helicopter Repairer

Reference:

Appendix E
TM 1-1520-253-23
TM 55-1500-322-24

Equipment Condition:

Off Helicopter Task

WARNING

Dry cleaning solvent (E162) is combustible and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

Do not use cadmium plated hardware or tools while working on yoke assembly. Titanium yoke could be damaged.

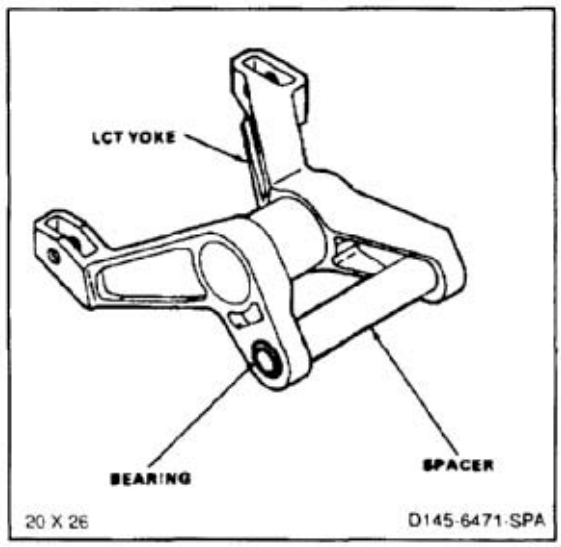
NOTE

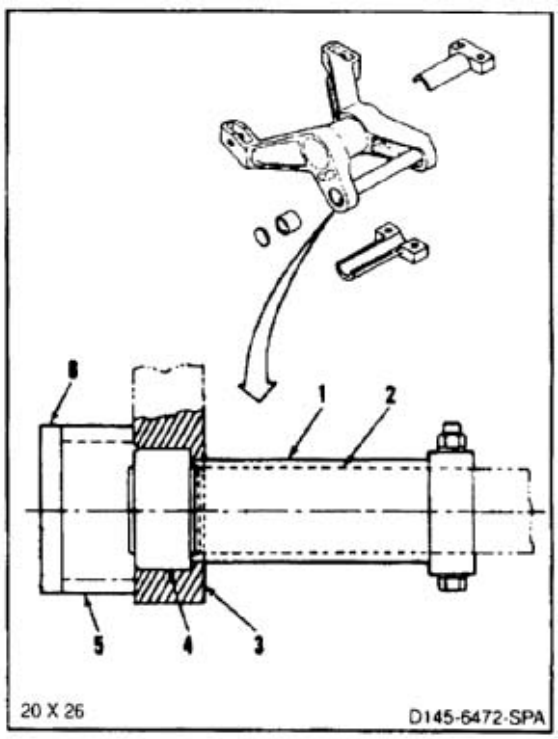
If general cleaning is required before disassembly, use solvent (E162), cloth (E120), and gloves (E186).

NOTE

If a crack in the yoke is suspected during removal, refer to TM 1-1520-253-23.

1. Install split pusher assembly (APP E-14) (1) over spacer (2). Slide pusher assembly into hole in yoke lug (3) until seated against bearing (4).
2. Position reaction tube (5) and reaction plate (6) over bearing (4).

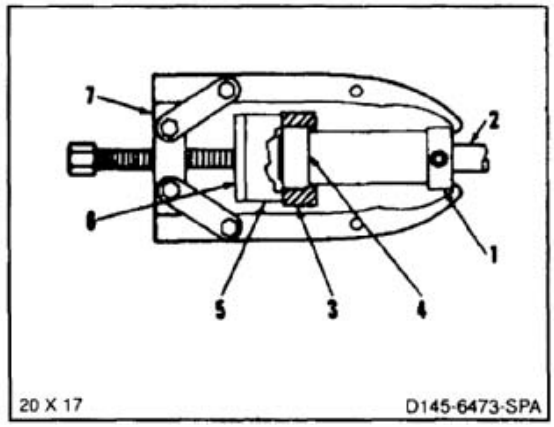


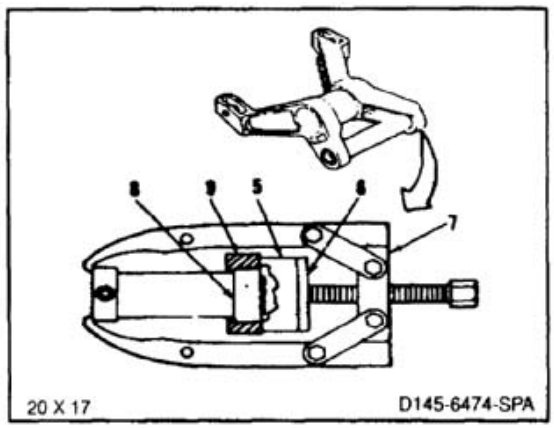


3. Install two-jaw puller (7) across reaction plate (6) and pusher assembly (APP E-14) (1).
4. Push bearing (4) out of lug (3) (TM 55-1500-322-24).
5. Remove gear puller (7), reaction plate (6), reaction tube (5), pusher assembly (APP E-14) (1) and spacer (2).
6. Install pusher assembly (APP E-14) (1) behind bearing (8) in other lug (9).
7. Position reaction tube (5) and reaction plate (6) on outer face of lug (9) over bearing (8).
8. Install two-jaw puller (7) across reaction plate (6) and pusher assembly (APP E-14) (1).
9. Push bearing (8) out of lug (9) (TM 55-1500-322-24).
10. Remove two-jaw puller (7), reaction plate (6) reaction tube (5) and pusher assembly (APP E-14) (1).

FOLLOW-ON MAINTENANCE:

None





END OF TASK

11-214 INSTALL FORWARD LCT YOKE BEARINGS 11-214

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Arbor Press
Adapters
Container, 2 Quart
Bolt, 1-1/4 Inch Diameter X 12 Inches Long

Materials:

Epoxy Primer (E292)
Carbon Dioxide (Dry Ice) (E92)
Methanol (E243)
Cloth (E120)
Gloves (E184.1)
Kevlar Gloves (E187)

Personnel Required:

Machinist
Inspector

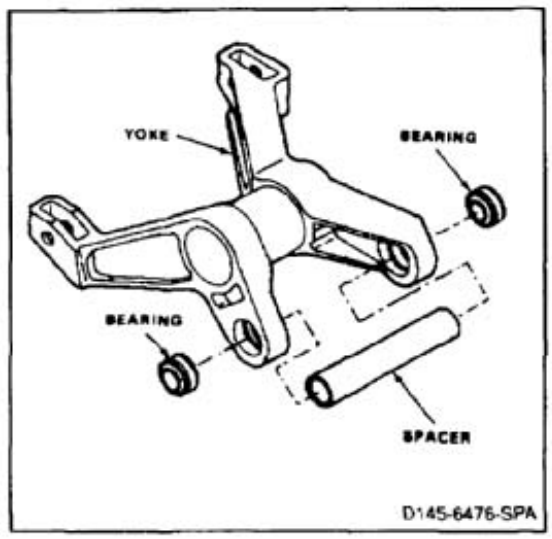
Reference:

TM 1-1520-253-23
TM 55-1500-322-24
TM 55-1520-240-23P

General Safety Instructions:

WARNING

Carbon dioxide (dry ice) (E92) is toxic. It can irritate skin and cause burns. Use with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



WARNING

Methanol (E243) is flammable and toxic. Use only with adequate ventilation. Keep away from heat, sparks, or open flame. Do not inhale. Avoid contact with skin, eyes or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Carbon dioxide (dry ice) (E92) and methanol (E243) has temperature of **–120ºF (–84.4ºC)**. Observe all safety measures when working with dry ice (E92) and methanol (E243), and when handling chilled parts. Avoid breathing carbon dioxide vapor.

WARNING

Wear Kevlar (E187) protective gloves when handling chilled bearings.

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

Do not use cadmium plated hardware or tools while working on yoke assembly. Titanium yoke could be damaged.

NOTE

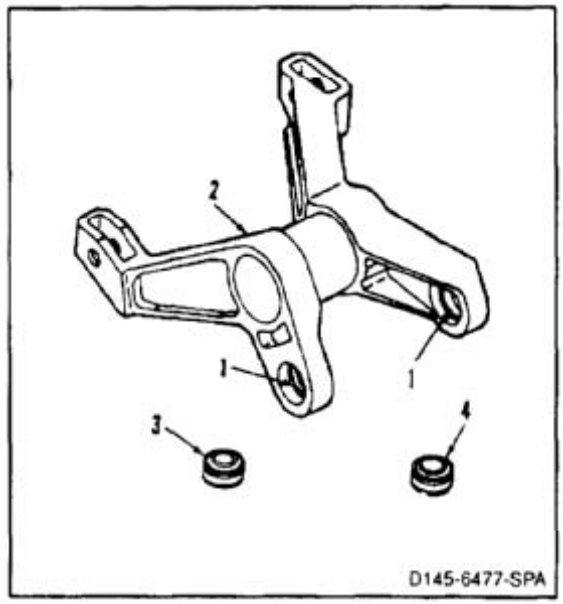
If a crack in the yoke is suspected during removal, refer to TM 1-1520-253-23.

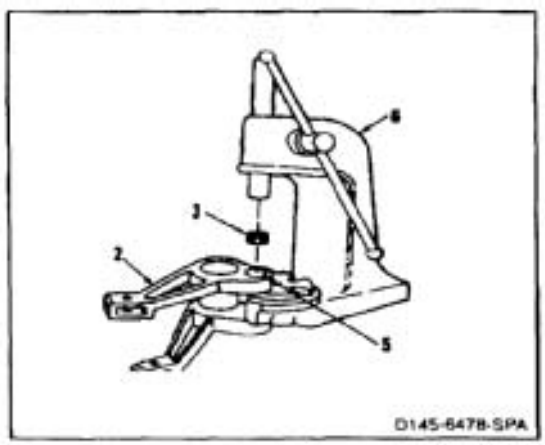
1. Make sure bores (1) of yoke (2) are clean and undamaged.
2. Place both bearings (3 and 4) in carbon dioxide (dry ice) (E92) and methanol (E243). Wear goggles and Kevlar gloves (E187). Allow bearings to cool thoroughly.
3. Coat bores (1) with epoxy primer (E292). Wear gloves (E184.1).
4. Support bearing housing (5) of yoke (2) in arbor press (6).

NOTE

Work quickly with chilled bearing. Bearing must be installed before it warms.

5. Remove one bearing (3) from dry ice and wipe clean and dry. Use cloth (E120). Wear goggles. Wear Kevlar gloves (E187).
6. While epoxy primer (E292) is wet press bearing (3) into housing (5) until fully seated in bore (1) (TM 55-1500-322-24). Use arbor press (6).
7. Wipe off excess primer from bearing (3). Use cloth (E120). Allow bearing to warm to room temperature.





8. Turn yoke (2) over. Support other bearing housing (7) on arbor press base (8). Position yoke so that bearing housing bore is centered over slot in arbor press base.

9. Position spacer (9) in yoke (2) so that it is centered on inner race of lower bearing (3).

10. Install 12 inch bolt (10) through lower bearing (3), spacer (9), and bearing housing (7).

NOTE

Work quickly with chilled bearing. Bearing must be installed before it warms.

11. Remove bearing (4) from carbon dioxide (E92) and wipe clean and dry. Use cloth (E120). Wear goggles to protect eyes. Wear Kevlar gloves (E187).

CAUTION

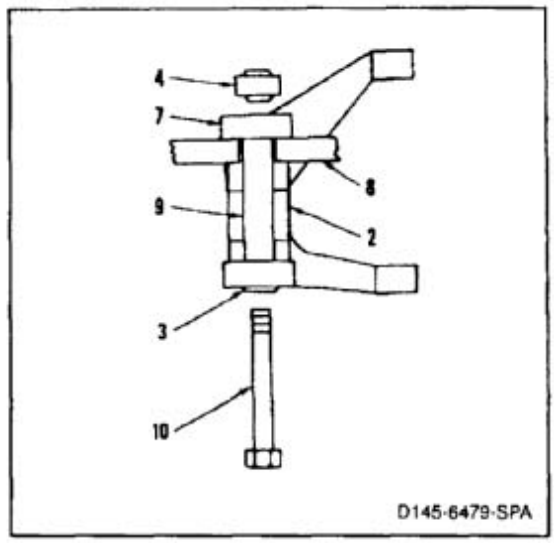
Press in bearing only until spacer is lightly gripped between inner races of bearings. Yoke will not operate properly if bearing is incorrectly in stalled.

12. While epoxy primer (E292) is wet, press bearing (4) into housing (7) (TM 55-1500-322-24).

13. Remove bolt (10).

14. Remove yoke assembly (2) from arbor press base (8).

15. Wipe off excess primer from yoke (2). Use cloth (E120).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-215 REMOVE FORWARD LCT YOKE BUSHINGS 11-215

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Forward Yoke Bushing Puller (APP E-13)

Materials:

Dry Cleaning Solvent (E162)
Cloth (E120)
Gloves (E186)

Personnel Required:

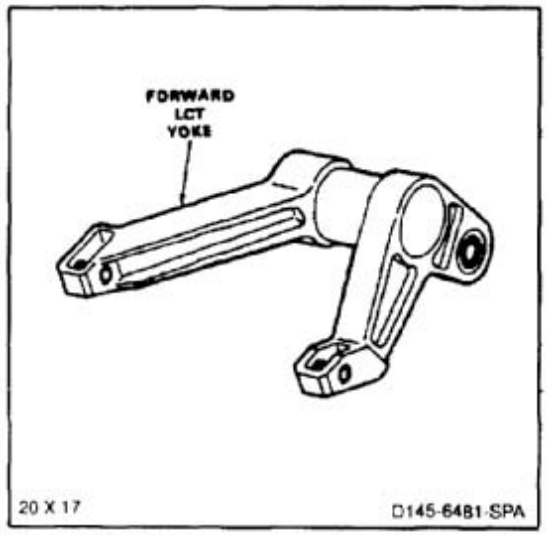
Medium Helicopter Repairer

Reference:

TM 1-1520-253-23
Appendix E

Equipment Condition:

Off Helicopter Task



CAUTION

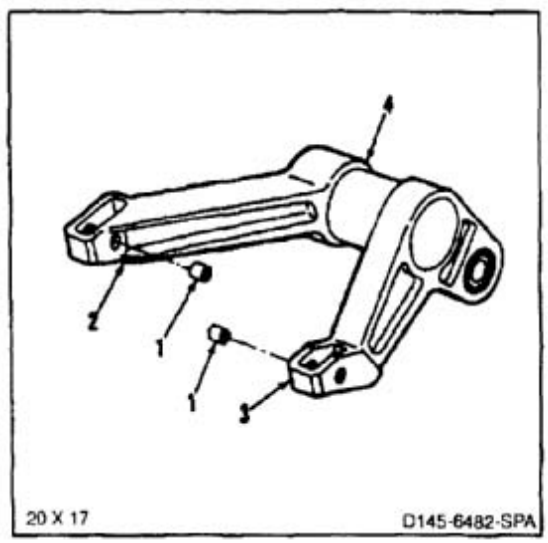
Do not use cadmium plated hardware or tools when working on forward LCT yoke. The yoke can be damaged.

NOTE

If general cleaning is required before disassembly, use solvent (E162), cloth (E120), and gloves (E186).

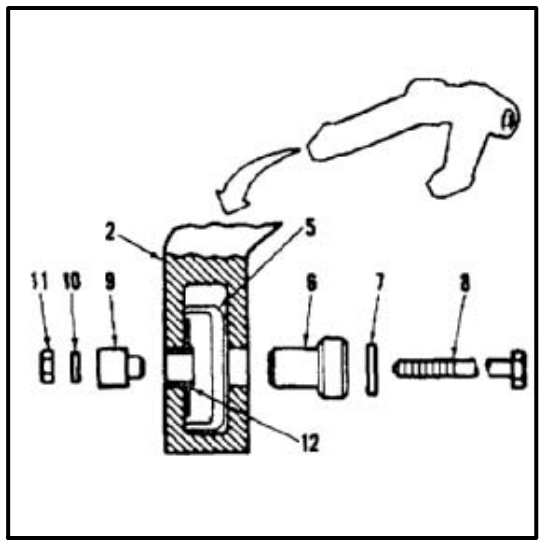
NOTE

If a crack in the yoke is suspected during removal, refer to TM 1-1520-253-23.

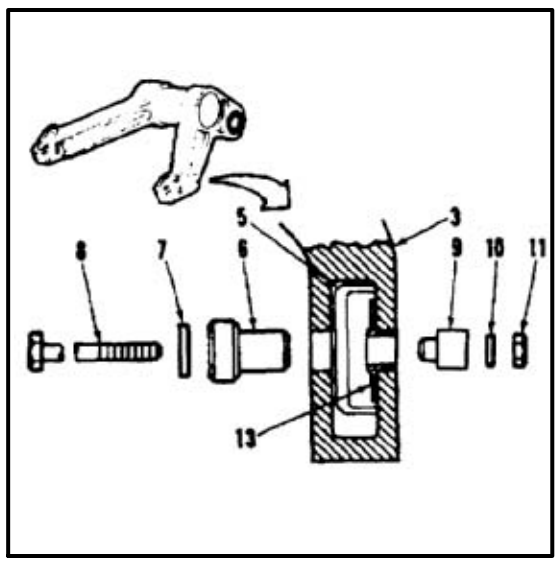


1. Remove two bushings (1) from lugs (2 and 3) of yoke (4).

2. Install body (5), bushing (6), washer (7), bolt (8), bushing (9), washer (10), and nut (11) of bushing Puller in lug (2).
3. Tighten nut (11) to push shoulder bushing (12) from lug (2).
4. Remove nut (11), washer (10), bushing (9), bolt (8), washer (7), bushing (6) and body (5). Remove shoulder bushing (12).



5. Install body (5), bushing (6), washer (7), bolt (8), bushing (9), washer (10) and nut (11) of bushing Puller in lug (3).
6. Tighten nut (11) to push shoulder bushing (13) from lug (3).
7. Remove nut (11), washer (10), bushing (9), bolt (8), washer (7), bushing (6) and body (5). Remove shoulder bushing (13).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-216 INSTALL FORWARD LCT YOKE BUSHINGS 11-216

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Bolt, 7/16 Inch Diameter X 3 Inches Long
Washers, 7/16 Inch (2)
Nut, 7/16 Inch
Bushing, 9/16 Inch OD X 1/2 Inch ID X 1-1/2 Inches Long

Materials:

Carbon Dioxide (Dry Ice) (E92)
Methanol (E243)
Epoxy Primer (E292)
Twine (E433)
Cloth (E120)
Gloves (E184.1)
Kevlar Gloves (E187)

Personnel Required:

Medium Helicopter Repairer
Inspector

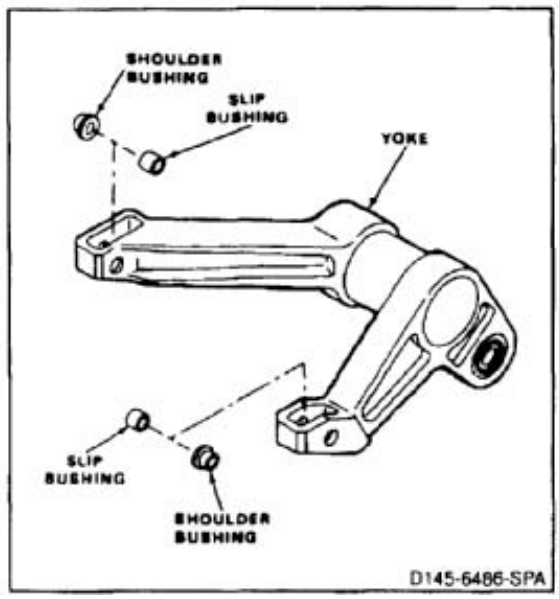
Reference:

TM 1-1520-253-23
TM 55-1520-240-23P

General Safety Instructions:

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



WARNING

Carbon dioxide (dry ice) (E92) is toxic. It can irritate skin and cause burns. Use with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Methanol (E243) is flammable and toxic. Use only with adequate ventilation. Keep away from heat, sparks, or open flame. Do not inhale. Avoid contact with skin, eyes or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Carbon dioxide (dry ice) (E92) and methanol (E243) has temperature of **–120ºF (–84.4ºC)**. Observe all safety measures when working with dry ice (E92) and methanol (E243), and when handling chilled parts. Avoid breathing carbon dioxide vapor.

WARNING

Wear Kevlar (E187) protective gloves when handling chilled bearings.

CAUTION

Do not use cadmium plated hardware or tools while working on yoke assembly. The titanium yoke could be damaged.

NOTE

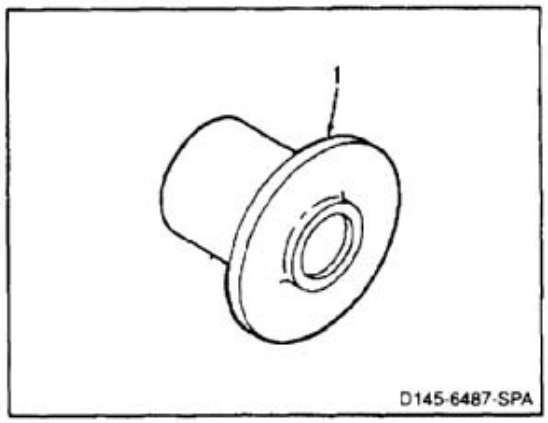
If a crack in the yoke is suspected during removal, refer to TM 1-1520-253-23.

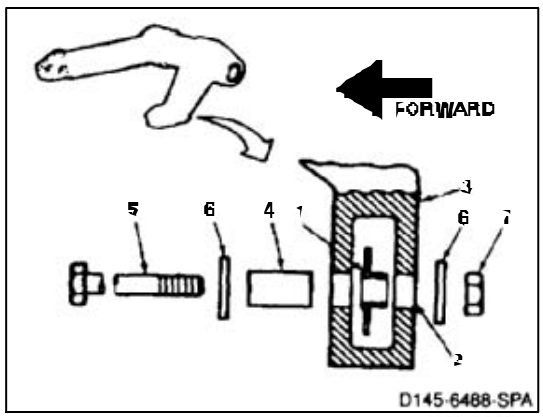
1. Place two shoulder bushings (1) in carbon dioxide (dry ice) (E92) and methanol (E243). Wear goggles to protect eyes. Allow bushings to cool. Wear Kevlar gloves (E187).
2. Coat outer bore (2) of lug (3) with epoxy primer (292). Wear gloves (E184.1).

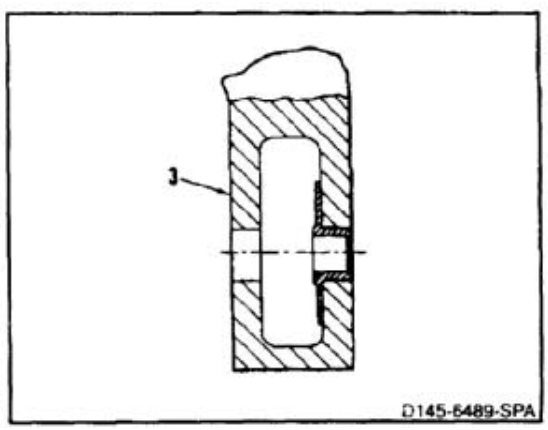
NOTE

Work quickly with chilled bushing. Bushing must be installed before it warms.

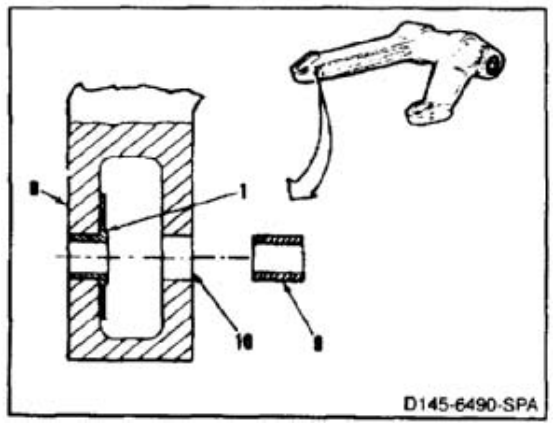
3. Remove one shoulder bushing (1) from carbon dioxide. Wear goggles to protect eyes. Position bushing in opening in lug (3). Wear Kevlar gloves (E187).
4. While epoxy primer (E292) is wet press bushing (1) into bore (2) until shoulder touches inside face of lug (3). Use bushing (4), bolt (5), washer (6), and nut (7) combination. Wear gloves (E184.1).
5. Remove nut (7), washer (6), bolt (5), and bushing (4).
6. Wipe off excess epoxy primer (E292) from lug (3). Use cloth (E120).



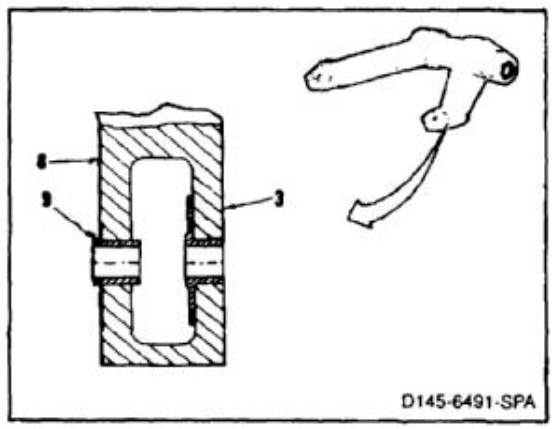




7. Repeat steps 2 thru 6 to install shoulder bushing (1) in lug (8).
8. Coat outer surface of two bushings (9) with epoxy primer (E292). Wear gloves (E184.1).
9. While epoxy primer (E292) is wet, install one bushing (9) into bore (10) of lug (8). Secure bushing to lug with twine (E433). Wear gloves (E184.1).



10. While epoxy primer (E292) is wet, install other bushing (9) into lug (3). Secure bushing to lug with twine (E433). Wear gloves (E184.1).
11. Wipe off excess primer from lugs (3 and 8). Use cloth (E120).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-217 INSTALL FORWARD LCT YOKE 11-217

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Socket Wrench, 1-1/16 Inch
Wrench, 1-7/16 Inch
Torque Wrench, 100 to 750 Inch-Pounds
Scale, 0 to 100 Pounds
Rawhide Mallet

Materials:

Dry Cleaning Solvent (E162)
Cloth (E120)
Cable Straps (E375)
Gloves (E184.1)

Parts:

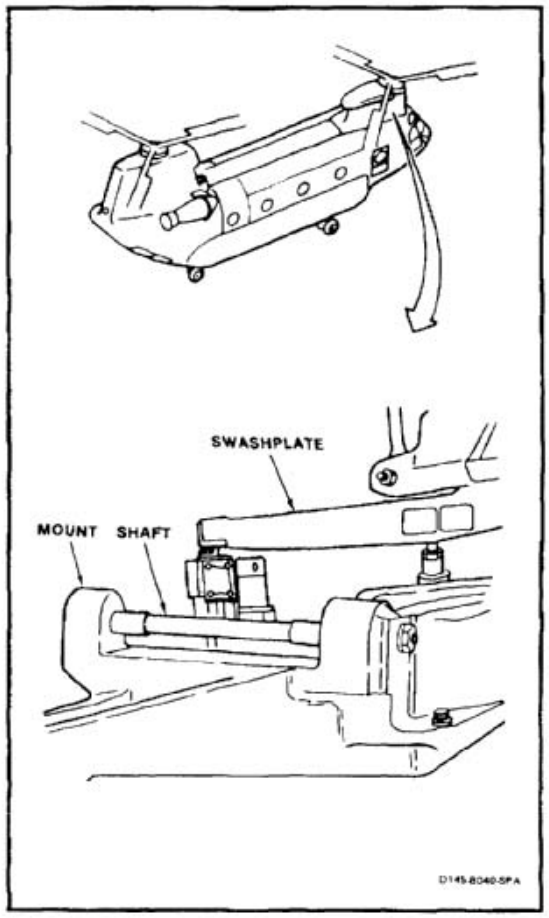
Cotter Pins
Washers
Cable Strap Mounting Plates

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 2-311



CAUTION

Do not use cadmium plated hardware or tools while working on yoke assembly. Titanium yoke could be damaged.

CAUTION

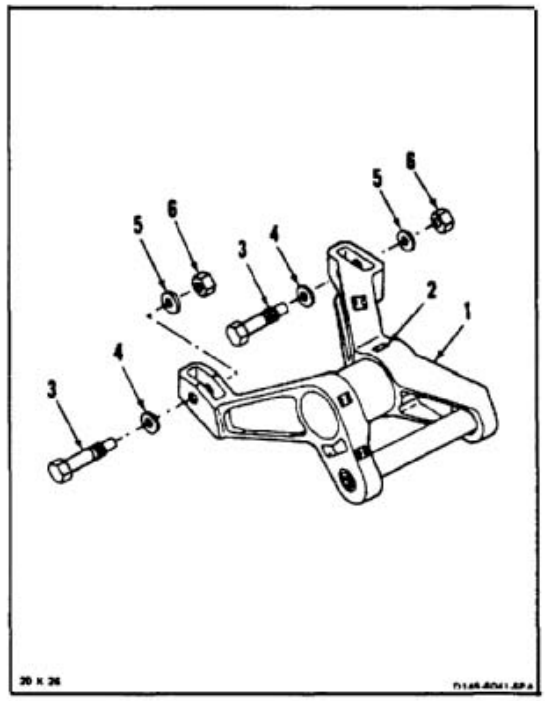
Do not use chlorinated solvent for cleaning. Titanium yoke could be damaged by this solution.

CAUTION

Bushings must be in yoke before installing bolts; otherwise, damage to components will result.

NOTE

Positive retention bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).



1. If yoke (1) has no cable strap mounting plates, attach five mounting plates (2) to top surface. Install plates in same positions as plates on yoke removed. Prepare surface and install plates (Task 2-311).

INSPECT

2. Remove two bolts (3), washers (4 and 5), and nuts (6) from lugs of yoke (1).

3. Remove nut (7), washer (8) end support shaft (9) from yoke mount (10).

WARNING

Dry cleaning solvent (E162) is combustable and toxic. Avoid contact with skin, eyes, or clothing. Avoid inhaling. Use only with adeaquate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Got medical attention for eyes.

NOTE

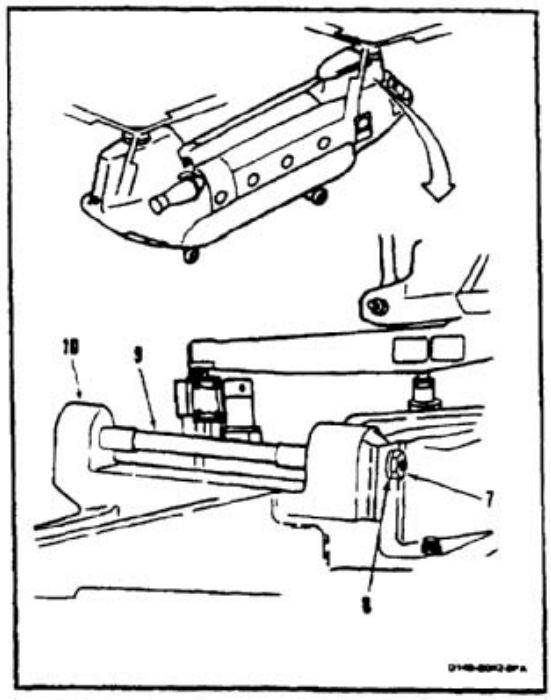
Ensure slider bushing (9.1) is not removed and remains with yoke mount (10).

4. Clean shaft (16) with dry cleaning solvent (E162). Use cloth (E120). Wear gloves (E184.1) and goggles.

5. Make sure recessed washer (11) is under head of shaft (9), recess toward heed.

WARNING

Flight Safety Parts. This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured. Ensure that slider bushing (9.1) is not removed and remains with yoke mount (10).



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its installation including stackup of associated components must be ensured.

Ensure special countersunk washer is installed properly under the head of the yoke shaft. Countersink must face towards hex head of the shaft.

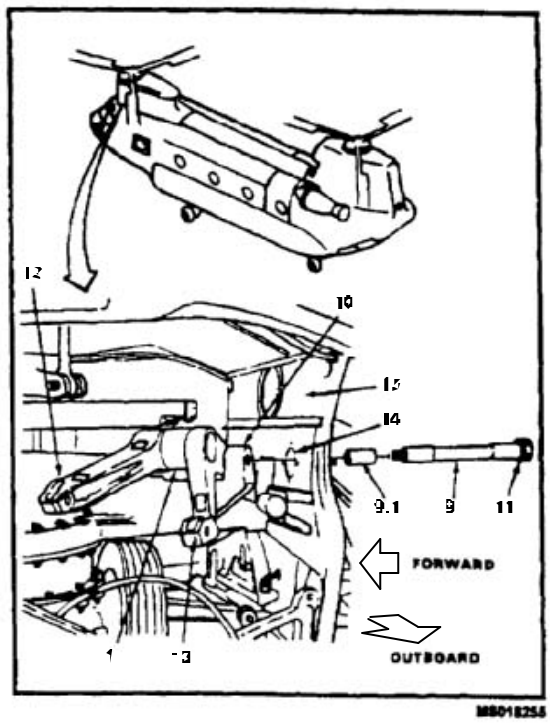
Ensure bushing is installed in outboard lug of the transmission cover clevis prior to yoke shaft installation.

Follow proper nut torquing sequence to allow for yoke assembly bearing preloading procedure.

Apply final nut torque and install cotter pin as required.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

6. Position yoke (1) in mount (10). Lug (12) shall face forward, lug (13) shall face outboard.



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the transmission cover.

The yoke assembly is machined from a titanium forging or billet and therefore requires special handeling.

Verify required flange and slip bushings are properly installed in each clevis of the yoke assembly.

Ensure hub bearings and spacer are properly installed and serviceable.

At installation of the yoke shaft, ensure slip bushing is properly installed in the aft lug of the transmission cover yoke mounting clevis.

For all mating components ensure proper attaching hardware (self retaining type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Ensure special countersunk washers are installed properly under the head of self retaining bolts. Countersink must face towards head of bolt.

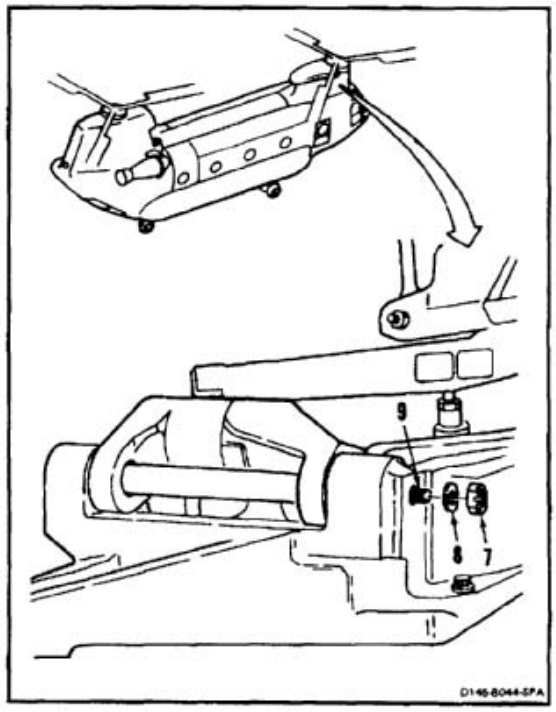
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Support shaft must be installed dry.

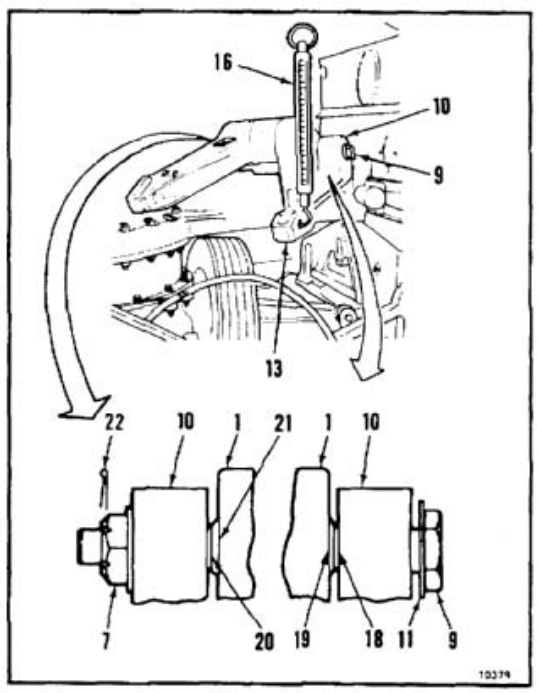
7. Insert support shaft (9), heed aft, through access hole (14) in bulkhead (15). Install shaft in mount (10) and yoke (1). Use rawhide mallet. Make sure threads of shaft are dry.

8. Install washer (8) and nut (7) on shaft (9). Torque nut to **600 inch-pounds**. Continue tightening only as needed to align cotter pin holes. Do not exceed **650 inch-pounds**.
9. If cotter pin holes will not align, remove nut (7) and add one or two washers (8). Install nut and repeat step 8.



10. Check yoke (1) as follows:
    a. Apply force to lug (13). Use dial indicating scale (16). Yoke must rotate with force not greater than **80 pounds**. Shaft (9) shall not rotate in mount (10).
    b. Gap between washer (11) and surface of mounting (10) shall not be less than **0.005 inch**.
    c. There shall be no gap between bushing (18) and bearing (19).
    d. There shall be no gap between bushing (20) and bearing (21).
11. Install cotter pin (22) in nut (7).

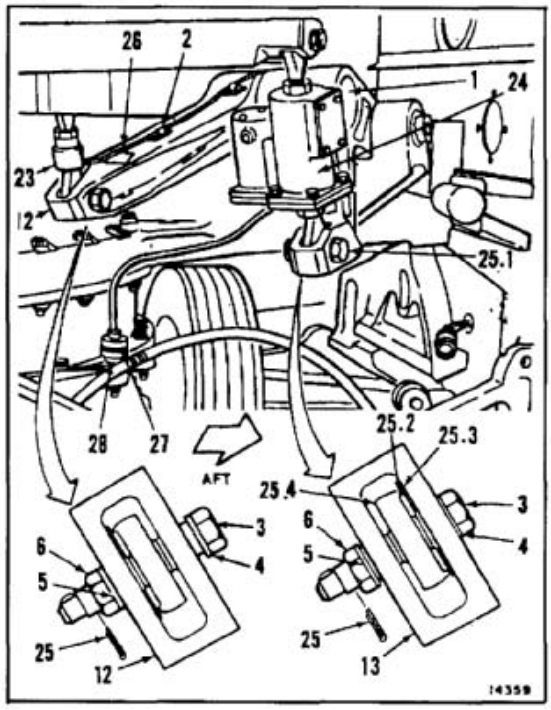
INSPECT



12. Raise yoke (1). Guide connecting link (23) into lug (12) and actuator (24) into lug (13).

13. Install recessed washers (4) on bolts (3), recess toward head. Install bolts (3) dry, heads aft, washers (5), and nuts (6).

14. Torque nuts (6) to **290 to 660 inch-pounds**. Install cotter pins (25). An additional AN960-816L washer may be used to align cotter pin.



CAUTION

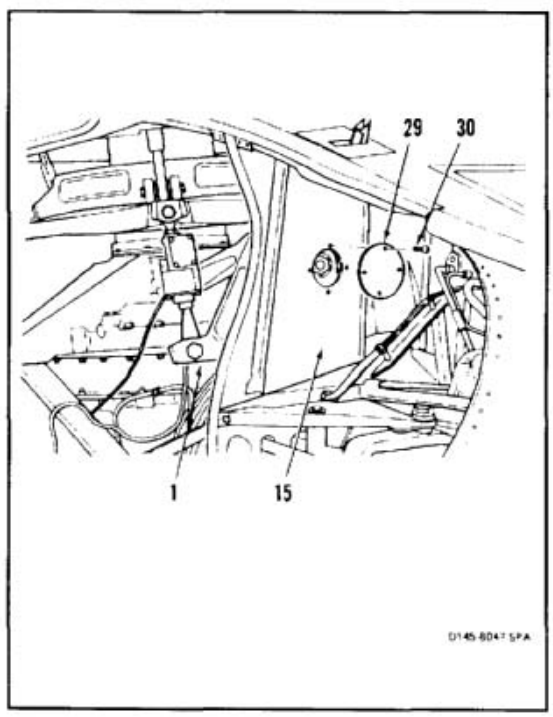
Some clearance is required to ensure that the LCT actuator lower end fitting (25.4) is not clamped against the face of the bushing flange (25.3).

14.1. Check that actuator swivels at lower end-fitting bearing (25.1). Any measurable clearance between the actuator anti-rotation lugs (25.2) and the bushing flange (25.3) on the yoke is acceptable. If there is no clearance, add a thin washer between the bearing inner race and the flange bushing.

15. Attach connecting link cable (26) to five mounting plates (2) on yoke (1). Use cable straps (E375).

16. Connect actuator connector (27) to receptacle (28).

17. Install access plate (29) and four screws (30) in bulkhead (15) aft of yoke (1).



FOLLOW-ON MAINTENANCE:

Connect forward rotor pitch links (Task 5-99).
Remove servocylinder safety blocks (T31) (Task 11-29).
Perform flight controls operational check (TM 55-1520-240-T).
Close forward pylon work platforms (Task 2-2).

END OF TASK

11-218 REMOVE AFT LCT ACTUATOR 11-218

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wood Block, 6 Inch X 6 Inch X 6 Inch Approx.

Materials:

Paper Tags (E264)

Personnel Required:

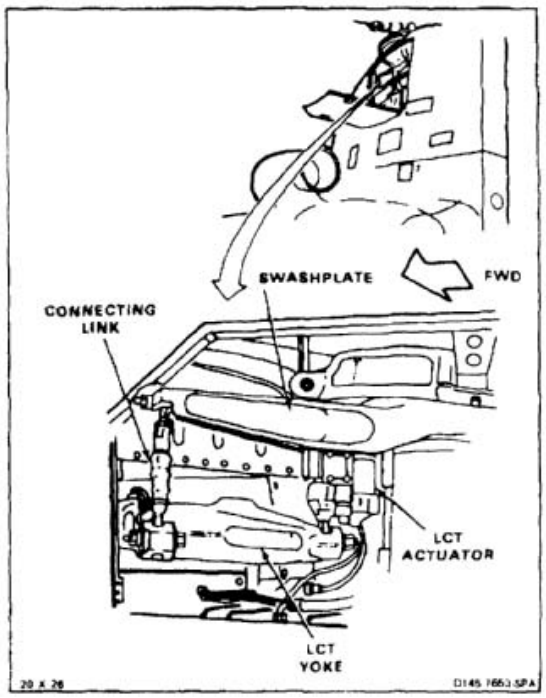
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23
Task 1-13
Task 11-40

Equipment Condition:

Hydraulic Power Off
Electrical Power Off
Battery Disconnected (Task 1-39)
Aft Pylon Work Platforms Open (Task 2-2)
Aft Rotor Pitch Links Disconnected (Task 5-97)
Aft LCT Actuator Fully Retracted (TM 55-1520-240-T)
Safety Blocks (T31) Installed (Task 11-28)



NOTE

Positive retention bolts are installed in upper controls. Bolts have pawl which prevents nut or bolt removal unless pawl is depressed (Task 1-13).

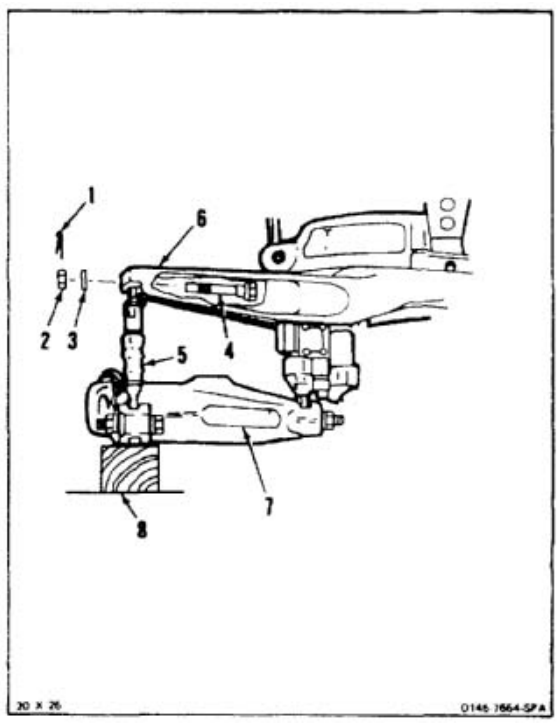
Attaching bolts, washers and nuts will be temporarily installed after removing actuator and connecting link.

NOTE

If a crack in the connecting link or yoke is suspected during removal, refer to TM 1-1520-253-23.

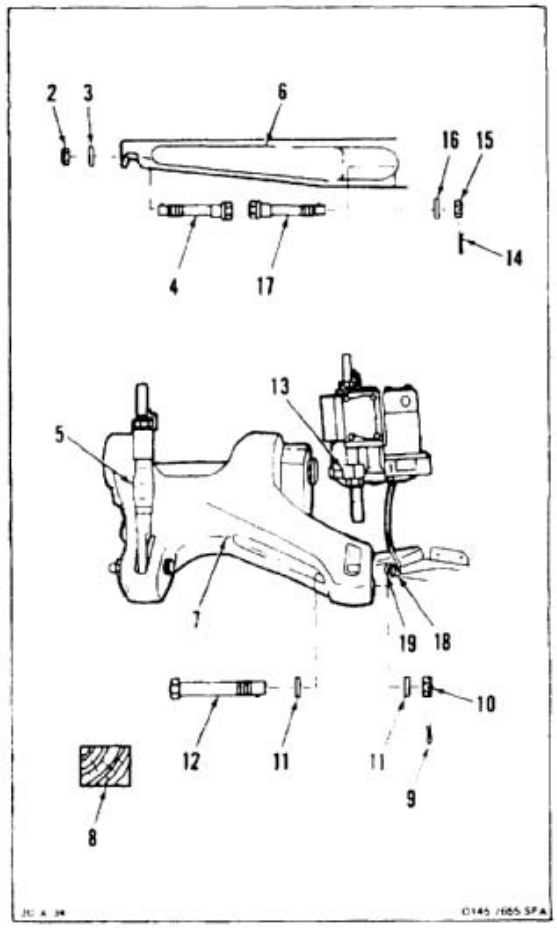
NOTE

If LCT is being removed for replacement, rigging check of replacement actuator may be performed by temporarily placing replacement LCT on work platform and completing Task 11-40.



1. Remove cotter pin (1), nut (2), washer (3), and bolt (4) attaching connecting link (5) to swashplate (6).
2. Support yoke (7) with wooden block (8).

3. Remove cotter pin (9), nut (10), washers (11), and bolt (12) attaching actuator (13) to yoke (7).
4. Hold link (5) and yoke (7). Remove block (8) and gently lower yoke. Have helper support swashplate (6).
5. Remove cotter pin (14), nut (15), washer (16), and bolt (17) attaching actuator (13) to swashplate (6).
6. Disconnect actuator connector (18) from receptacle (19).
7. Tag and remove actuator (13) and tag.
8. Install bolt (4), washer (3), and nut (2) in swashplate (6) and connecting link (5). Install bolts (17 and 12), washers (16 and 11), and nuts (15 and 10) in swashplate and yoke (7). Do not tighten nuts.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-219 REMOVE LCT ACTUATOR END FITTING BEARING (AVIM) 11-219

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Arbor Press

Materials:

None

Personnel Required:

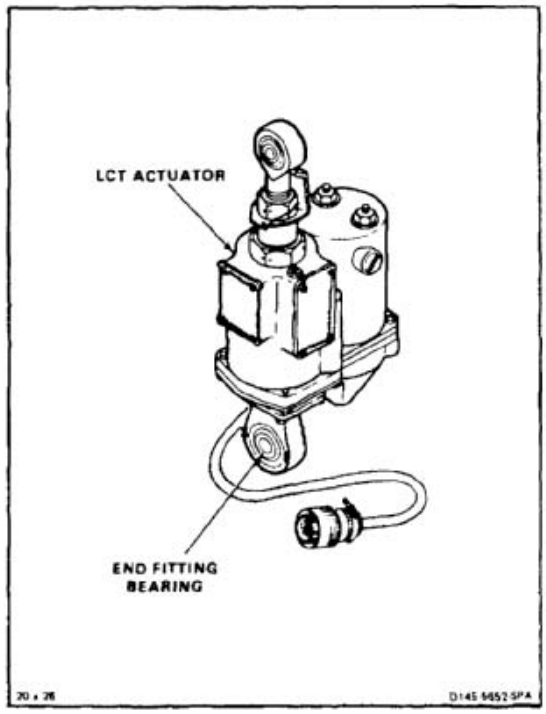
Medium Helicopter Repairer

References:

TM 55-1500-322-24

Equipment Condition:

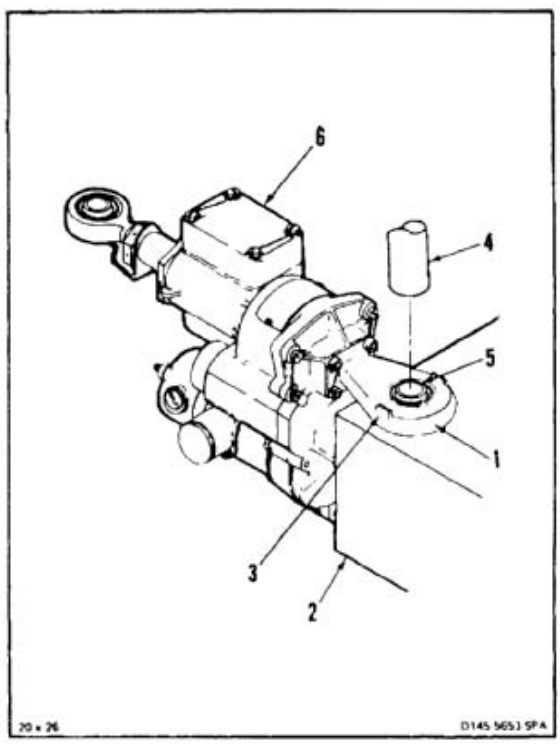
Off Helicopter Task



NOTE

Procedure is same to remove bearing from forward LCT actuator (145CS114-1) or from aft LCT actuator (145CS114-2).

1. Install actuator end fitting (1) in arbor press (2). Anti-rotational lands (3) must face ram (4).
2. Press out bearing (5) using arbor press (TM 55-1500-322-24).
3. Remove actuator (6) from arbor press (2).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-220 INSTALL LCT ACTUATOR END FITTING BEARING (AVIM) 11-220

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Arbor Press
Drill Press
Roller Staking Kit, NSN 5120-00-311-5446
Container, 2 Quart

Materials:

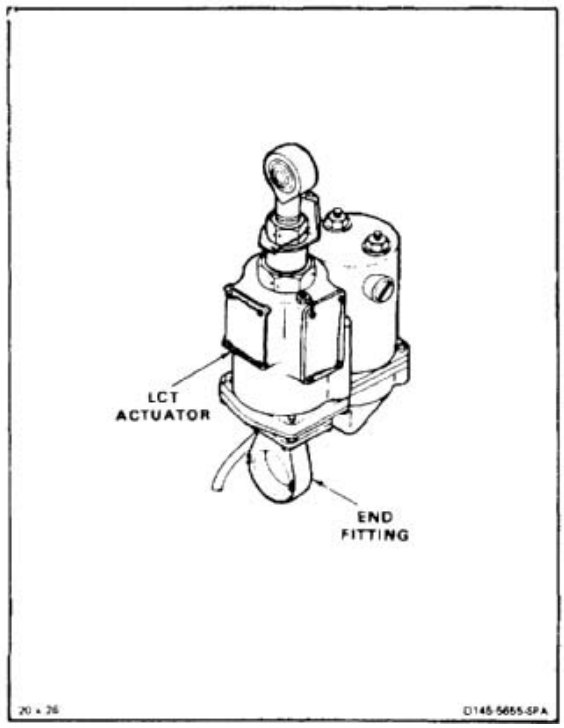
Corrosion Preventive Compound (E153)
Carbon Dioxide (Dry Ice) (E92)
Methanol (E243)
Cleaning Cloth (E120)
Gloves (E186)
Kevlar Gloves (E187)

Personnel Required:

Medium Helicopter Repairer
Inspector
Machinist

References:

TM 55-520-240-23P
TM 55-1500-322-24



WARNING

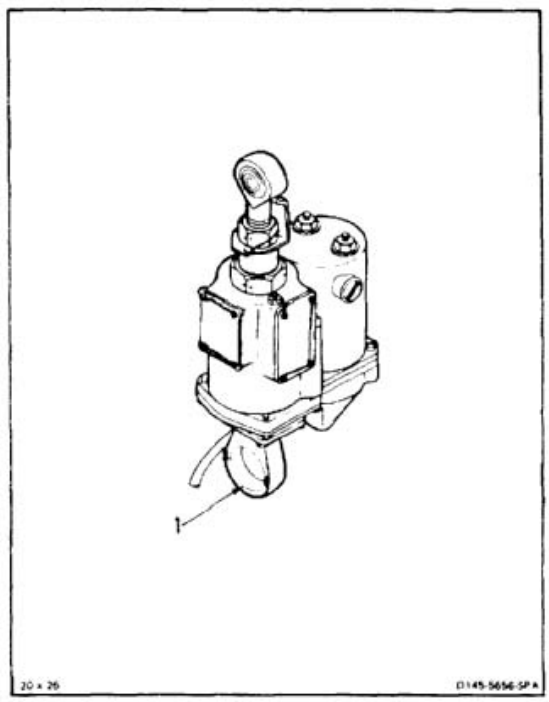
Corrosion preventive compound (E153) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes.** Get medical attention for eyes.

NOTE

Procedure is same to install bearing in forward LCT actuator (145CS114-1) or aft LCT actuator (145CS114-2).

Bearing (114HS662-1) is used for actuator (145CS114-1).

Bearing (114CS124-1) is used for actuator (145CS114-2).



1. Coat bore (1) with corrosion preventive compound (E153). Wear gloves (E186).

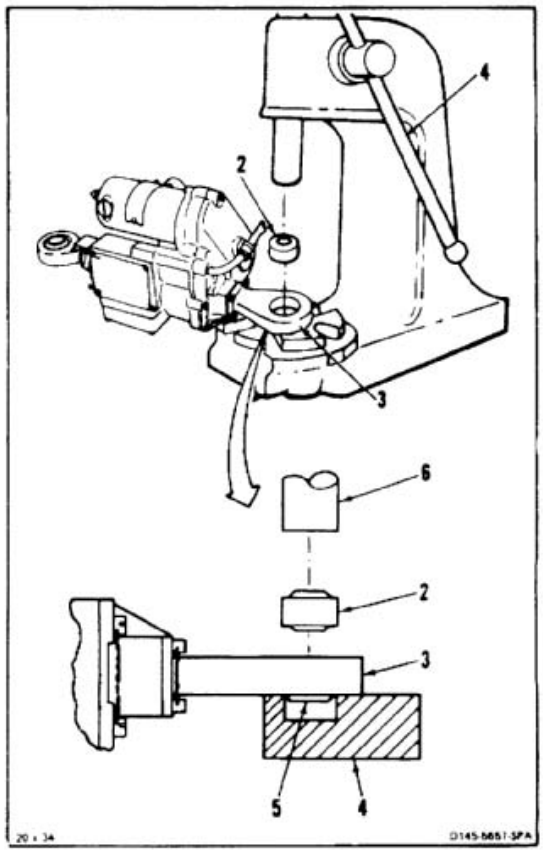
WARNING

Carbon dioxide (dry ice) (E92) causes severe burns (frost bite) and gives off toxic fumes. Use only in well-ventilated area. Do not get in eyes, on skin, or clothing. In case of contact, immediately flush with water. Get medical attention for eyes.

WARNING

Methanol (E243) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

2. Place bearing (2) in carbon dioxide (dry ice) (E92) and methanol (E243). Allow bearing to cool thoroughly. Wear Kevlar gloves (E187).
3. Support actuator end fitting (3) in arbor press (4). Anti-rotational lands (5) must face away from ram (6).



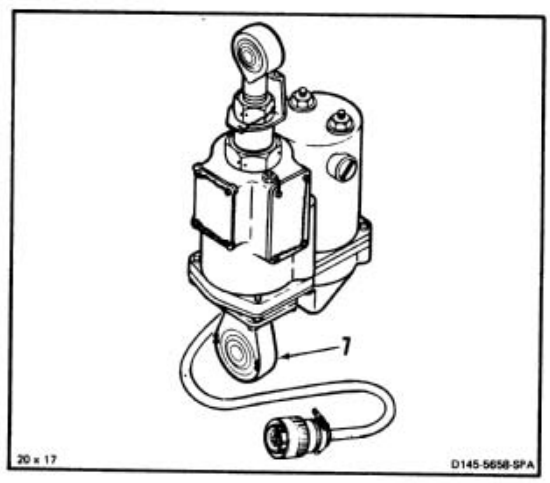
WARNING

Wear Kevlar gloves (E187) when handling chilled bearing.

NOTE

Work quickly with chilled bearing. It must be installed before it warms.

4. Remove bearing (2) from dry ice. Wipe clean and dry. Use cloth (E120).
5. Press bearing (2) into end fitting (3) (TM 55-1500-322-24).
6. Wipe off excess corrosion preventive compound from bearing (2) and end fitting (3). Allow bearing to warm to room temperature.
7. Roller swage bearing housing (7). Use drill press and roller staking kit (TM 55-1500-322-24).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-221 INSTALL AFT LCT ACTUATOR 11-221

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds

Materials:

Antiseize Compound (E75)
Gloves (E184.1)

Parts:

Cotter Pins
Washers

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13

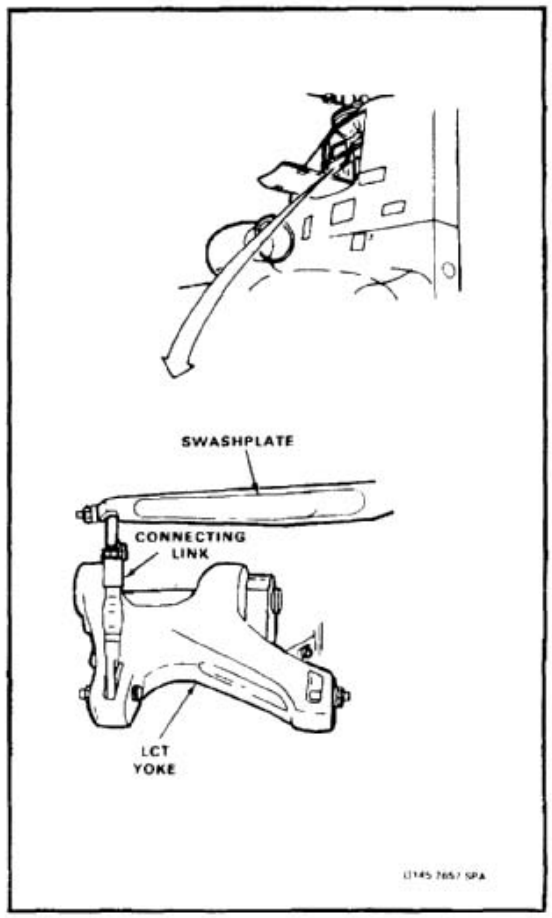
Equipment Condition:

LCT Actuator Fully Retracted (TM 55-1520-240-T)

General Safety Instructions:

WARNING

Antiseize compound (E75) can form toxic vapors if exposed to flame. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



CAUTION

Bushings must be in swashplate and yoke before installing bolts; otherwise, damage to components will result.

NOTE

Positive retention bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (1), washer (2), and bolt (3) from swashplate (4) and connecting link rod end (5).
2. Remove nut (6), washer (7), and bolt (8) from swashplate (4).
3. Apply antiseize compound (E75) to bushing (9) on bolt (8). Keep compound off threads of bolt. Wear gloves (E184.1) and goggles.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection including its mounting to the swashplate and yoke assembly.

Ensure locking tab washer is facing in the proper direction.

Ensure wire bundle is routed so as not to interfere with flight control system motions.

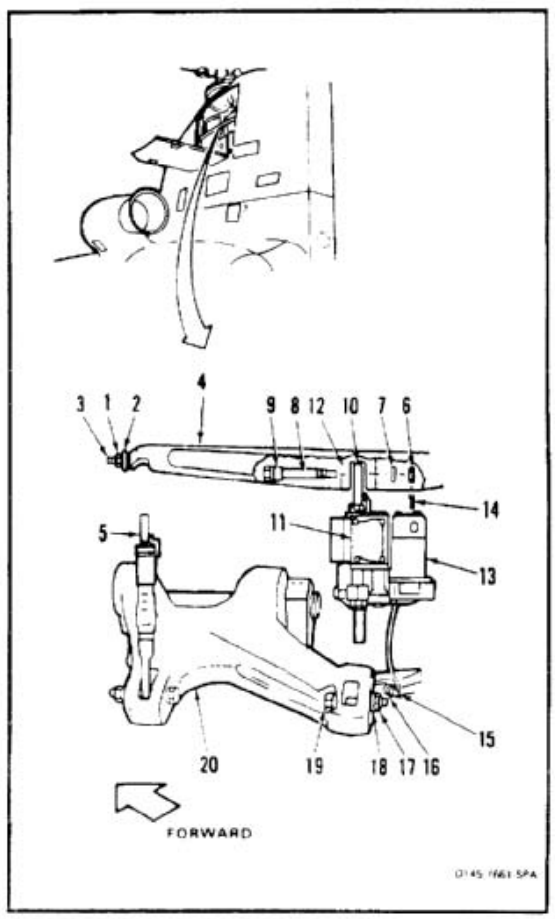
After applying nut torque, ensure locking tab washer is lockwired to the jam nut per BAC5018.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

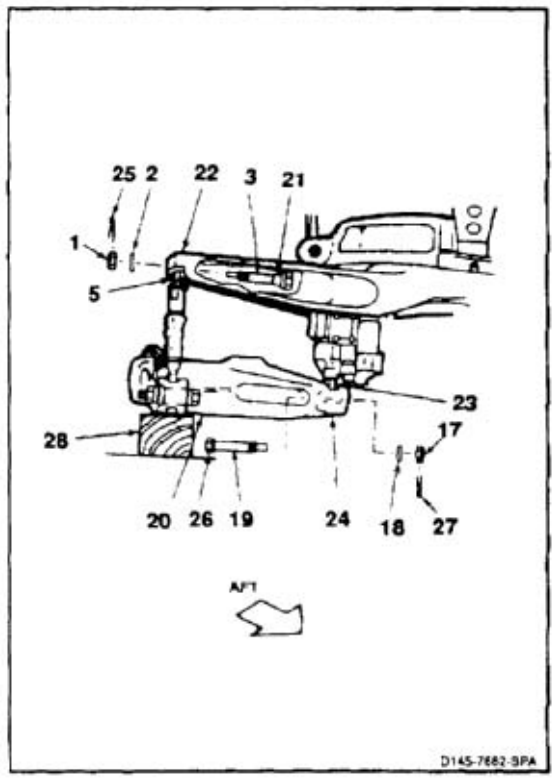
Ensure special countersunk washers are installed properly under the head of self retaining bolts. Countersink must face towards head of bolt.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

4. Position rod end (10) of actuator (11) in attachment lug (12) of swashplate (4). Actuator motor (13) must face aft.
5. Install bolt (8), head forward, through swashplate lug (12) and actuator rod end (10). Install washer (7) and nut (6). Torque nut to **660 to 780 inch-pounds**. Do not exceed **1400 inch-pounds** for cotter pin alignment. Install cotter pin (14).
6. Connect actuator connector (15) to receptacle (16).
7. Remove nut (17), washer (18), and bolt (19) from yoke (20).



8. Apply antiseize compound (E75) to bushing (21) on bolt (3). Keep compound off threads of bolts. Wear gloves (E184.1).
9. Have helper raise yoke (20). Guide rod end bearing (5) into lug (22). Guide end fitting bearing (23) into lug (24).
10. Install bolt (3) head aft, through swashplate lug (22) and connecting link rod end (5). Install washer (2) and nut (1). Torque nut to **660 to 780 inch-pounds**. Do not exceed **1400 inch-pounds** for cotter pin alignment. Install cotter pin (25).
11. Install recessed washer (26) on bolt (19), recess toward head. Install bolt dry, head forward, through yoke lug (24) and actuator bearing (23). Install washer (18) and nut (17).
12. Torque nut (17) to **660 to 780 inch-pounds**. Continue tightening on for cotter pin hole alignment. Do not exceed **1400 inch-pounds**.
13. Remove block (28).



INSPECT

FOLLOW-ON MAINTENANCE:

Perform rigging check of forward and aft longitudinal cydic trim actuators (Task 11-40).
Connect aft rotor pitch links (Task 5-99).
Perform neutral rig check (Task 11-33).
Perform LCT actuator portion of AFCS operational check (TM 55-1520-240-T).
Close pylon work platforms (Task 2-2).

END OF TASK

11-222 REMOVE AFT LCT CONNECTING LINK 11-222

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

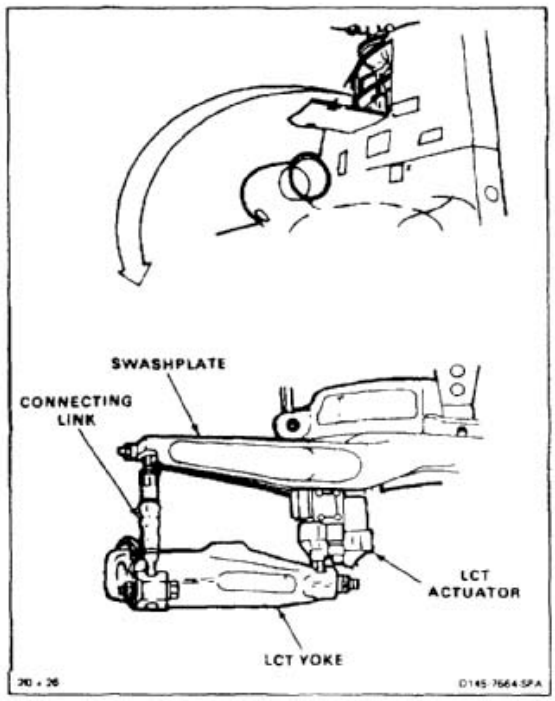
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Hydraulic Power Off
Electrical Power Off
Aft Pylon Work Platforms Open (Task 2-2)
Aft Rotor Pitch Links Disconnected (Task 5-97)
Safety Blocks (T31) Installed (Task 11-28)



NOTE

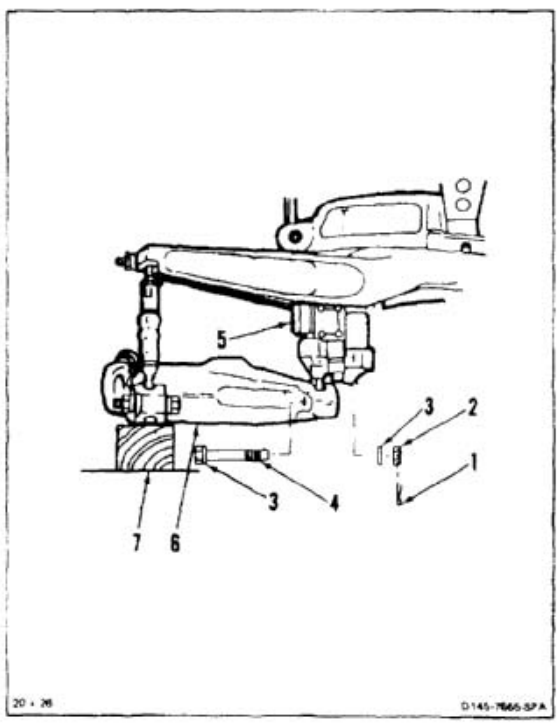
Positive retention bolts are installed in upper controls. Bolts have a pawl which prevents nut or bolt removal unless pawl is depressed (Task 1-13).

Attaching bolts, washers and nuts will be temporarily installed after removing connecting link and actuator.

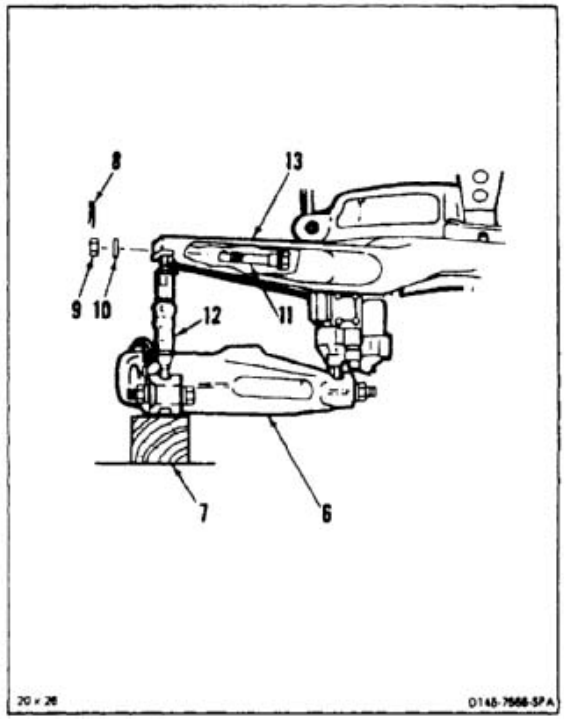
NOTE

If a crack in the connecting link or yoke is suspected during removal, refer to TM 1-1520-253-23.

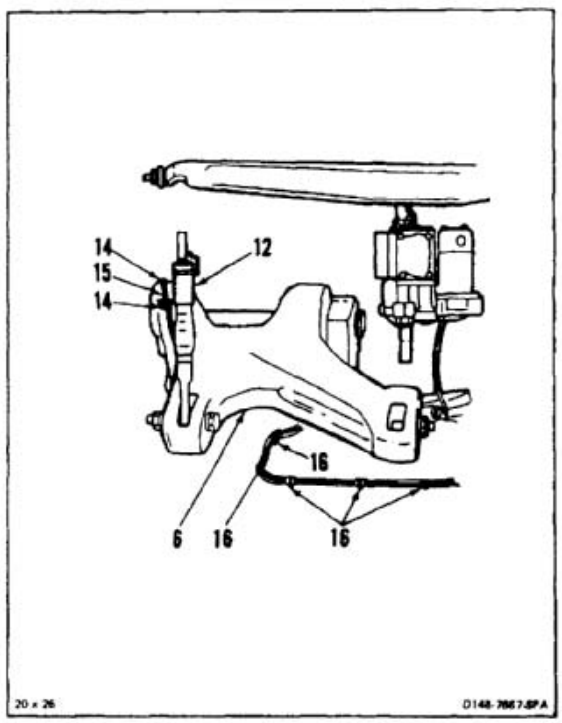
1. Remove cotter pin (1), nut (2), washers (3), and tilt (4) attaching LCT actuator (5) to yoke (6).
2. Support yoke (6) with wood block (7).



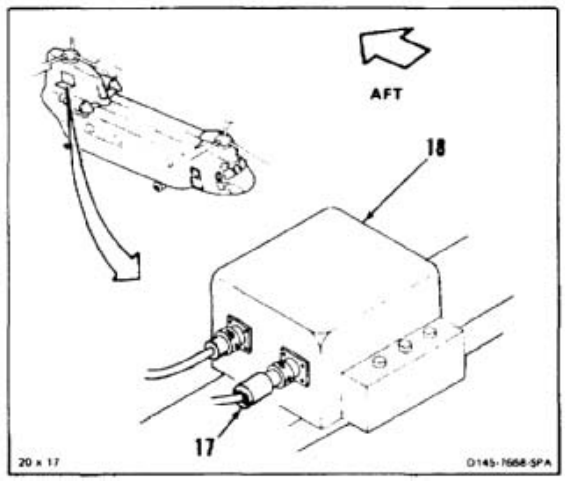
3. Remove cotter pin (8), nut (9), washer (10), and bolt (11) attaching link (12) to swashplate (13).
4. Hold link (12) and yoke (6). Remove block (7) and gently lower yoke. Have helper support swashplate (13).



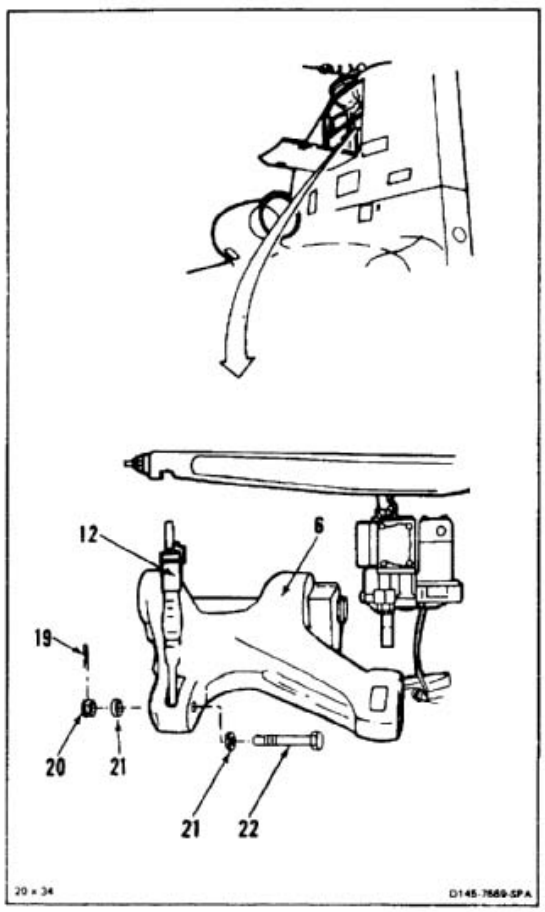
5. Cut and remove two cable straps (14) attaching link cable (15) to yoke (6).
6. Trace cable (15) from link (12). Remove 15 cable clamps (16).



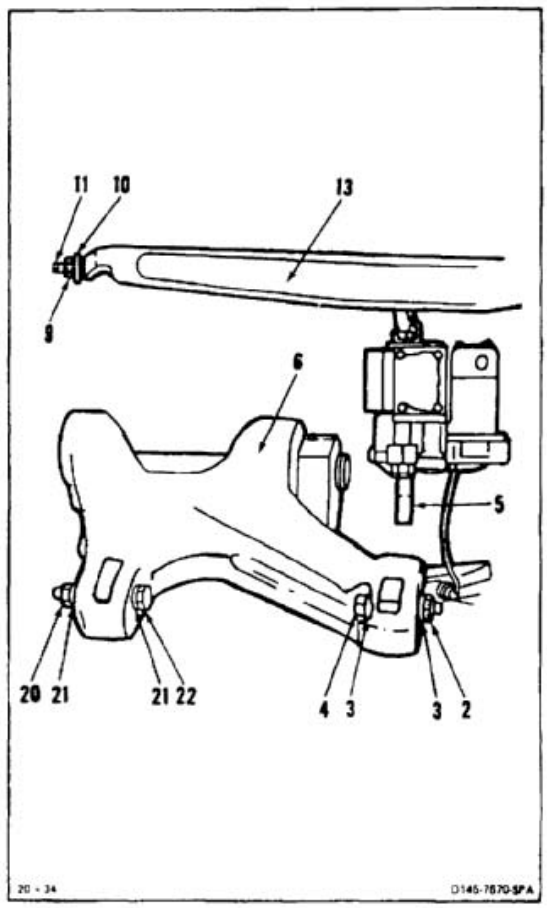
7. Disconnect link connector (17) from cruise guide signal processor (18).



8. Remove cotter pin (19), nut (20), washers (21), and bolt (22) attaching link (12) to yoke (6).
9. Remove and tag link (12). Use paper tag (E264).



10. Install bolt (4), washer (3), and nut (2) in yoke (6) and actuator (5). Install bolts (11 and 22), washers (10 and 21), and nuts (9 and 20) in swashplate (13) and yoke. Do not tighten nuts.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-223 REMOVE LCT CONNECTING LINK LOWER FITTING BEARING (AVIM) 11-223

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Arbor Press

Materials:

None

Personnel Required:

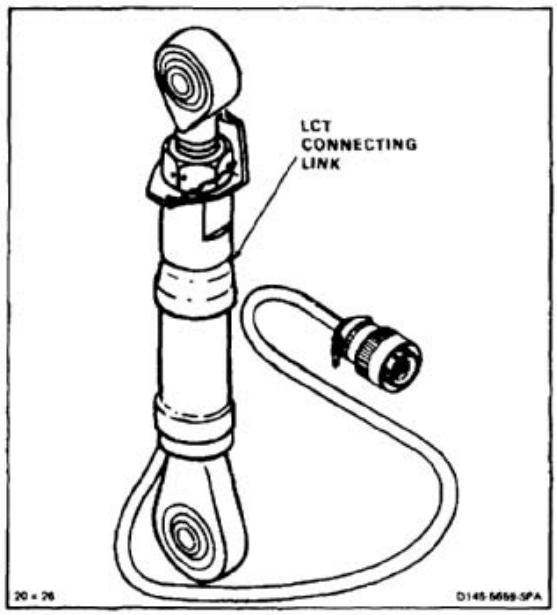
Medium Helicopter Repairer

References:

TM 1-1520-253-23
TM 55-1500-322-24

Equipment Condition:

Off Helicopter Task



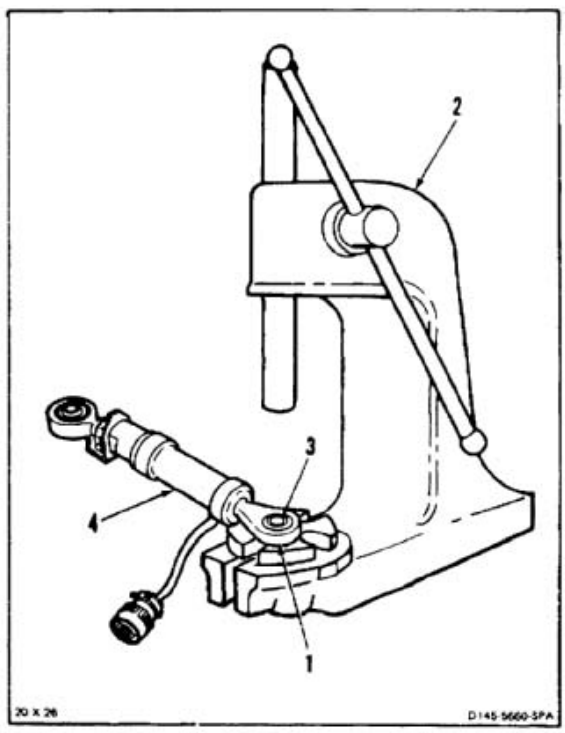
NOTE

Procedure is same to remove bearing from forward LCT connecting link (414C3056-4), or from aft LCT connecting link (414C3056-3).

NOTE

If a crack in the connecting link is suspected during removal, refer to TM 1-1520-253-23.

1. Install connecting link lower fitting (1) in arbor press (2).
2. Press out bearing (3) using arbor press (2) (TM 55-1500-322-24).
3. Remove link (4) from arbor press (2).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-224 INSTALL LCT CONNECTING LINK LOWER FITTING BEARING (AVIM) 11-224

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Arbor Press
Drill Press
Roller Staking Kit, 114G1425-1
Container, 2 Quart

Materials:

Corrosion Preventive Compound (E153)
Carbon Dioxide (Dry Ice) (E92)
Methanol (E243)
Cloth (E120)
Gloves (E186)
Kevlar Gloves (E187)

Personnel Required:

Medium Helicopter Repairer
Inspector
Machinist

References:

TM 1-1520-253-23
TM 55-1500-322-24
TM 55-1520-240-23P

WARNING

Corrosion preventive compound (E153) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

NOTE

Procedure is same to install bearing in forward connecting link (414C3056-4) and aft connecting link (414C3056-3).

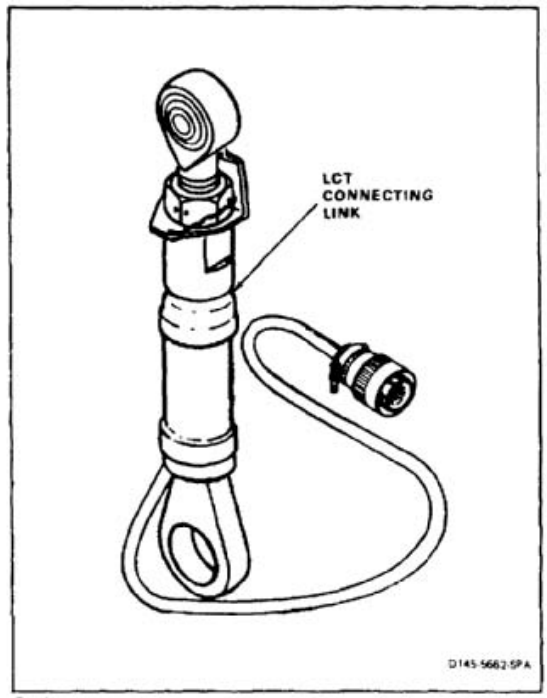
Bearing (114HS662-1) is used for link (414C3056-4).

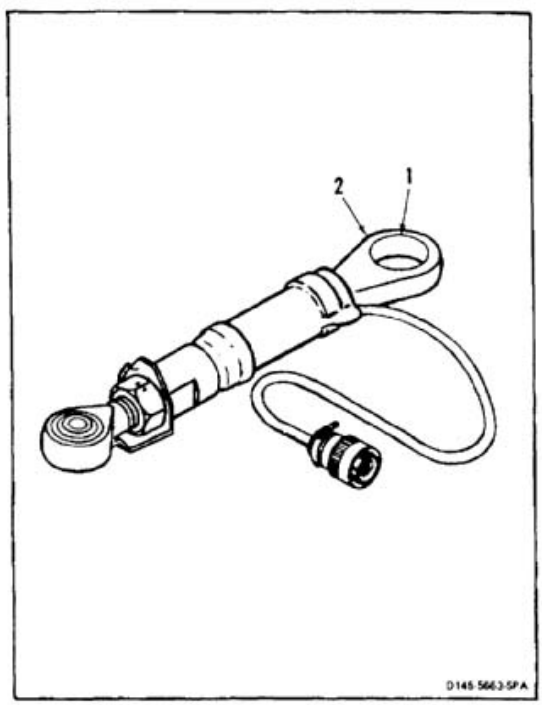
Bearing (114CS124-1) is used for link (414C3056-3).

NOTE

If a crack in the connecting link is suspected during installation, refer to TM 1-1520-253-23.

1. Coat bore (1) of lower fitting (2) with corrosion preventive compound (E153). Wear gloves (E186).





WARNING

Carbon dioxide (dry ice) (E92) causes severe burns (frost bite) and gives off toxic fumes. Use only in well-ventilated area. Do not get in eyes, on skin, or clothing. In case of contact, immediately flush with plenty of water. Get medical attention for eyes.

WARNING

Methanol (E243) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

2. Place bearing (3) in carbon dioxide (dry ice) (E92) and methanol (E243). Wear Kevlar gloves (E187). Allow bearing to cool thoroughly.
3. Support link end fitting (2) in arbor press (4). Bearing (3) must be inserted into fitting from same side that old bearing was removed.

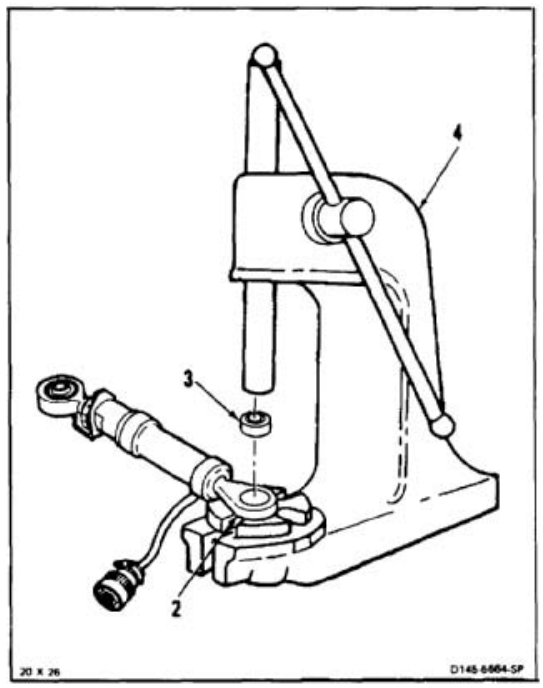
WARNING

Wear Kevlar gloves (E187) when handling chilled bearing.

NOTE

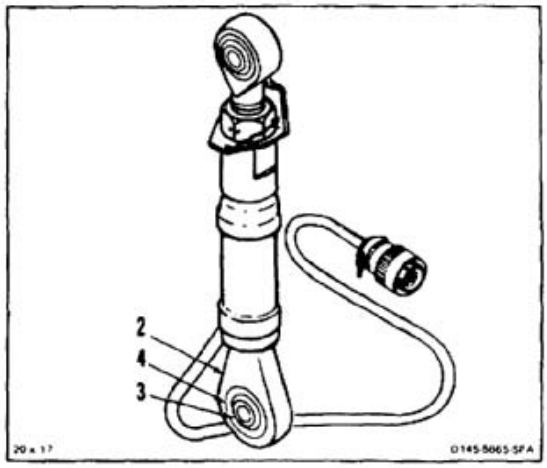
Work quickly with chilled bearing. It must be installed before it warms.

4. Remove bearing (3) from dry ice. Wear Kevlar gloves (E187). Wipe clean and dry. Use cloth (E120).
5. Press bearing (3) into fitting (2) (TM 55-1500-322-24).



6. Wipe off excess corrosion preventive compound from bearing (3) and fitting (2). Use cloth (E120). Allow bearing to warm to room temperature.

7. Roller swags bearing housing (4). Use drill press and roller staking kit (TM 55-1500-322-24).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-225 INSTALL AFT LCT CONNECTING LINK 11-225

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds

Materials:

Antiseize Compound (E75)
Cable Straps (E375)
Lockwire (E231)
Gloves (E184.1)

Parts:

Cotter Pins
Washers

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-222

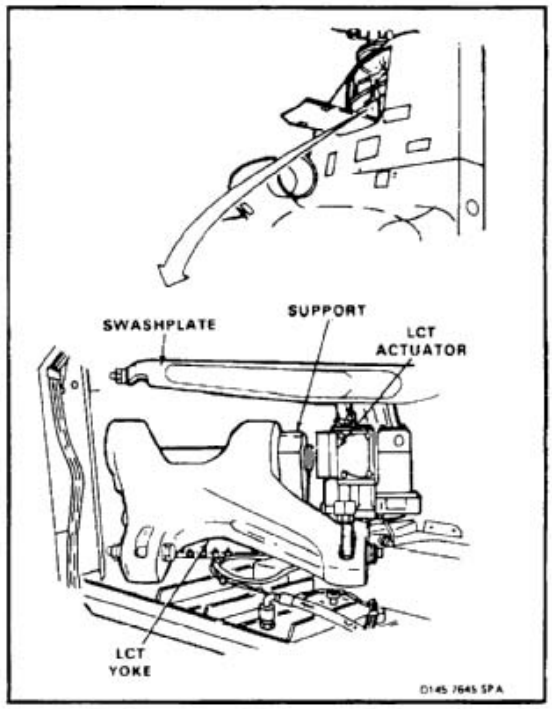
General Safety Instructions:

WARNING

Antiseize compound (E75) can form toxic vapors if exposed to flame. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

Bushings must be in swashplate and yoke before installing bolts; otherwise, damage to components will result.



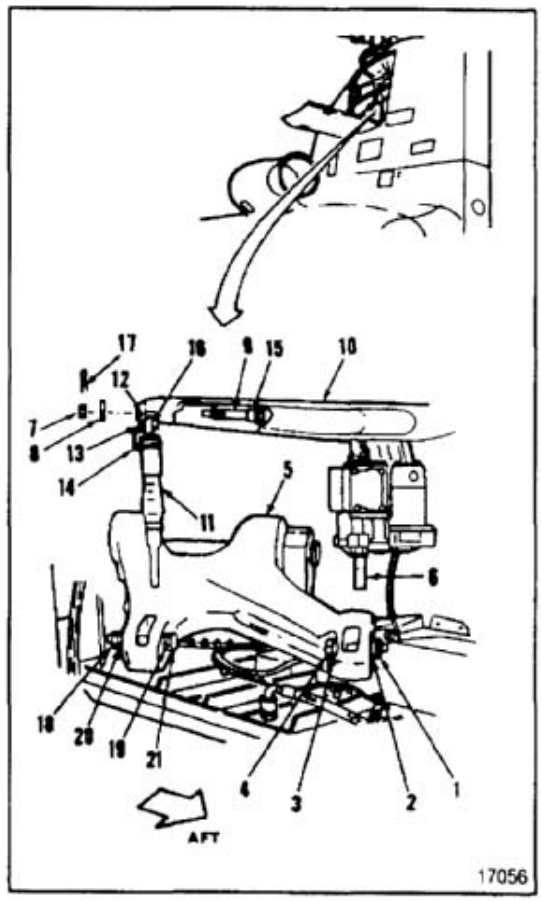
NOTE

Positive retention bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

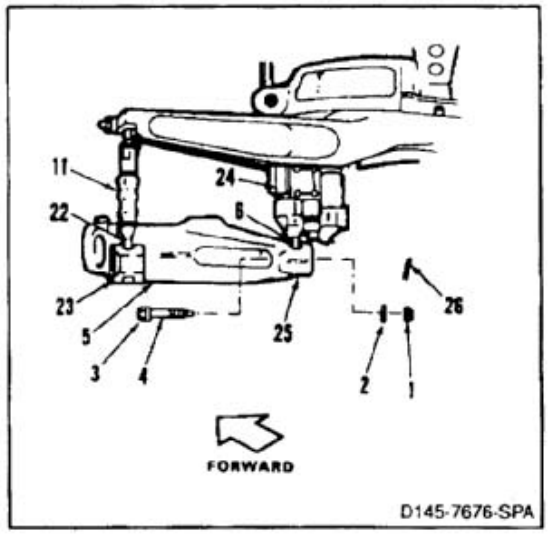
1. Remove nut (1), washers (2 and 3), and bolt (4) from yoke (5) and actuator bearing (6).
2. Remove nut (7), washer (8), and bolt (9) from swashplate (10).
3. Position link (11) in lug (12) of swashplate (10). Cable of link must face inboard and alignment guide (13) of clip (14) must face forward.
4. Apply antiseize compound (E75) to shrink bushing (15) on bolt (9). Keep compound off threads of bolt. Wear gloves (E184.1) and goggles.
5. Install bolt (9) head aft, through lug (12) of swashplate (10) and connecting link rod end bearing (16). Install washer (8) and nut (7). Torque nut to **660 to 780 inch-pounds**. Do not exceed **1400 inch-pounds** for cotter pin alignment.
6. Install cotter pin (17).

INSPECT

7. Remove nut (18), washer (19 and 20), and bolt (21) from yoke (5).

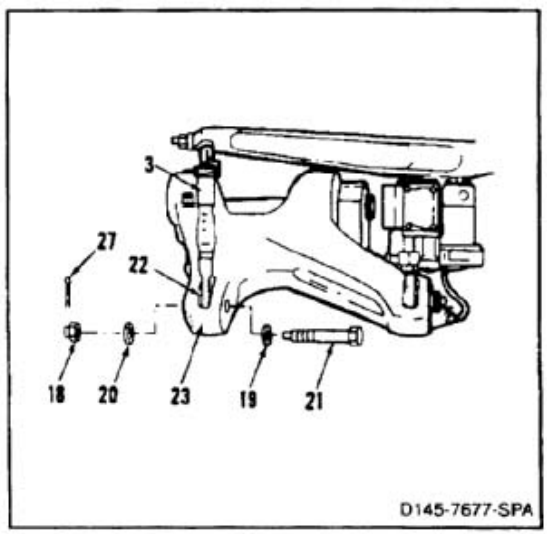


8. Have helper raise yoke (5). Guide end fitting bearing (22) on link (11) into lug (23) of yoke. Guide end fitting bearing (6) of LCT actuator (24) into lug (25) of yoke.
9. Install recessed washer (3) on bolt (4), recess toward head. Install bolt dry, head forward through yoke lug (25) and actuator bearing (6). Install washer (2) and nut (1).
10. Torque nut (1) to **660 to 780 inch-pounds** . Do not exceed **1400 inch-pounds** for cotter pin alignment. Install cotter pin (26).



INSPECT

11. Install recessed washer (19) on bolt (21), recess toward head. Install bolt dry, head aft, through yoke lug (23) and link bearing (22). If bolt can be installed, install washer (20) and nut (18) and go to step 12. If bolt cannot be installed, go to step 13.
12. Torque nut (18) to **660 to 780 inch-pounds**. Do not exceed **1400 inch-pounds** for cotter pin alignment. Install cotter pin (27). Go to step 20.



ADJUST AFT LCT CONNECTING LINK

13. Remove lockwire from check nut (28) and spring tension clip (14).

CAUTION

Do not damage locking tabs of spring tension clip.

14. Hold rod end bearing (16) with open end wrench. Loosen checknut (28).

15. Lift clip (14) so that locking tabs (30) are out of notches (31) on body of link (11).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection including its mounting to the swashplate and yoke assembly.

Ensure locking tab washer is facing the proper direction.

Verify all required bushings are installed in the associated clevis of the yoke assembly and swashplate stationary ring.

Ensure wire bundle is routed so as not to interfere with flight control system motions.

After applying nut torque, ensure locking tab washer is lockwired to the jam nut per BAC5018.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Ensure special countersunk washers are installed properly under the head of self retaining bolts. Countersink must face towards head of bolt.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

16. Adjust rod end bearing (16) so that link (11) can be installed in yoke (5) and swashplate (10) with bolts (9 and 21).

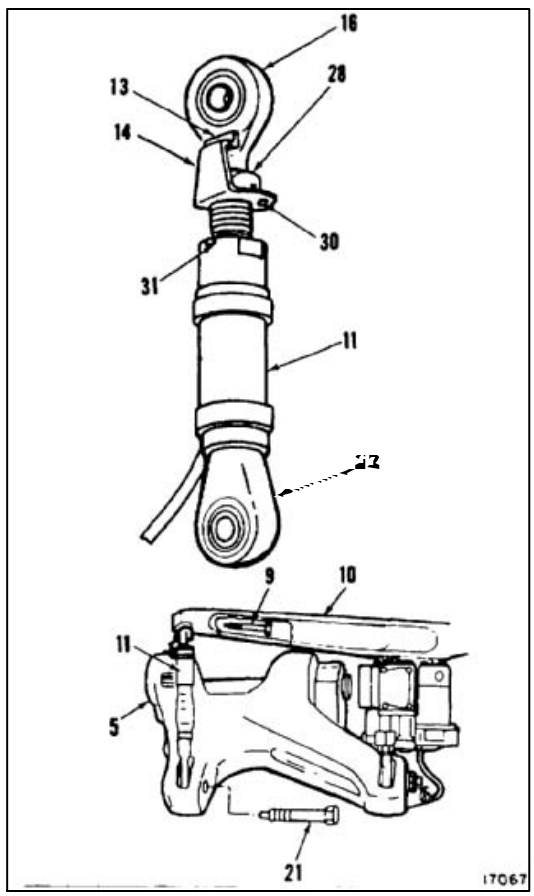
INSPECT

17. Align rod end bearing (16) with end fitting (22). Engage locking tab (30) with notch (31) on body of link (11). Make sure flats of rod end bearing and alignment guide (13) of clip (14) are parallel.

NOTE

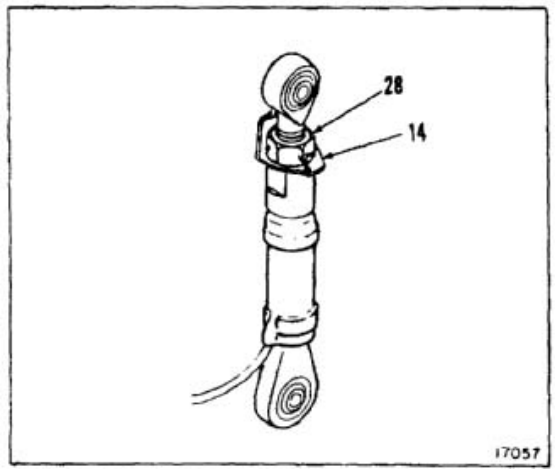
Do not allow rod end bearing to turn when torquing checknut.

18. Hold rod end bearing (16) with open end wrench. Torque checknut (28) to **450 inch-pounds**. Make sure locking tab (30) of clip (14) is seated in notch (31) of link (11).



19. Lockwire checknut (28) to clip (14). Use lockwire (E231).

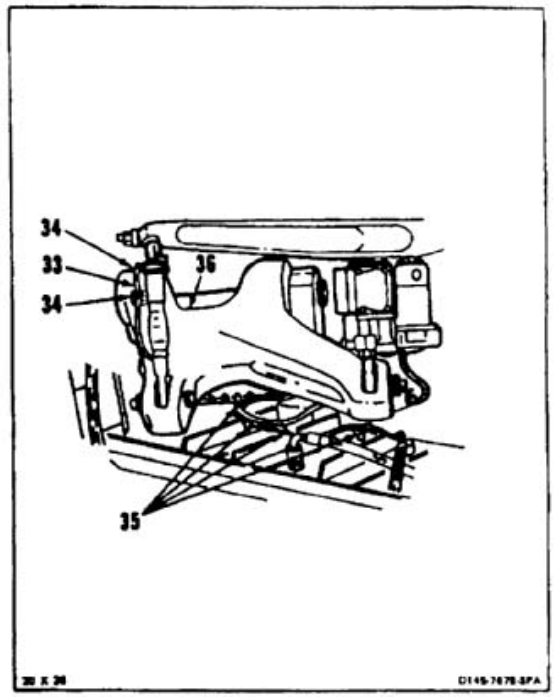
INSPECT



20. Attach link cable (33) to two mounting plates (34) on yoke (5). Use cable straps (E375).

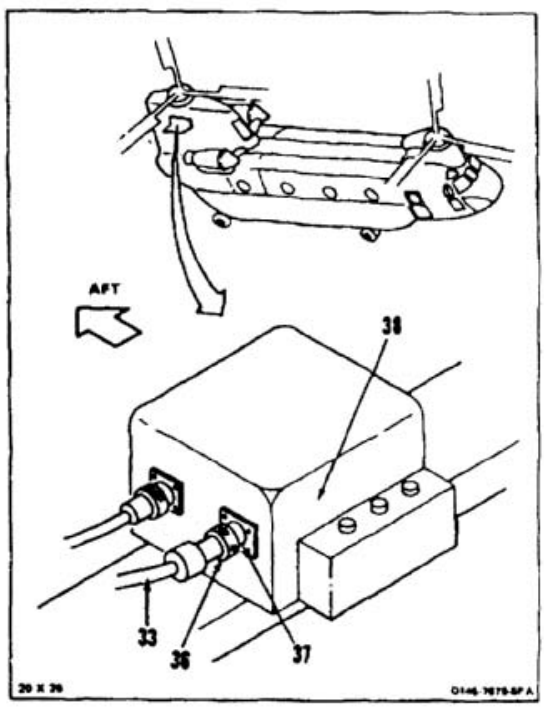
21. Route cable (33) through 15 cable clamps (35) to the rear of the helicopter.

INSPECT



22. Connect connector (36) on link cable (33) to J2/P2 receptacle (37) on cruise guide signal processor (38).

INSPECT



FOLLOW-ON MAINTENANCE:

Rig aft swashplate and servocylinder (Task 11-54).
Connect pitch links (Task 5-99).
Perform operational check of cruise guide system (TM 55-1520-240-T).
Perform neutral rig check (Task 11-33).
Close aft pylon work platforms (Task 2-2).

END OF TASK

11-226 INSPECT AFT LCT YOKE 11-226

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit, NSN 5180-00-323-5114
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

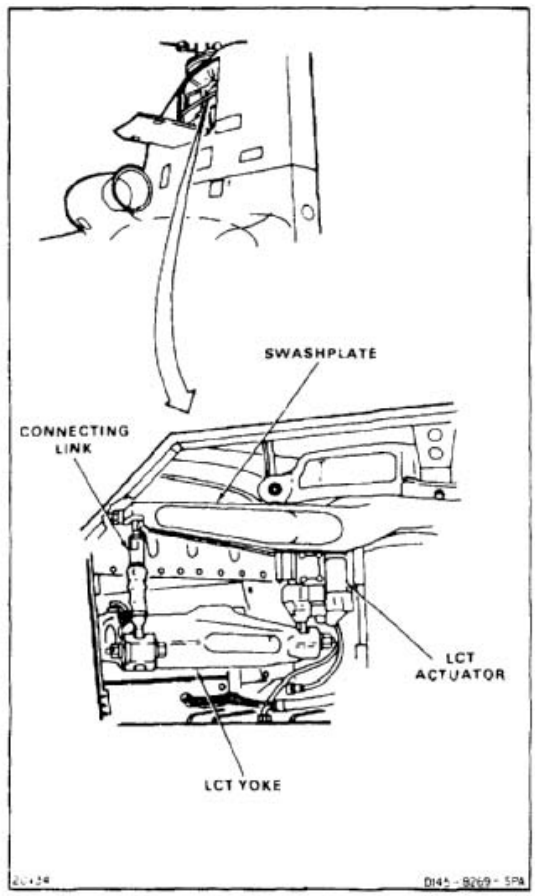
Medium Helicopter Repairer
Inspector

References:

Task 1-39
Task 11-227
Task 11-228
Task 11-233

Equipment Condition:

Battery Connected (Task 1-39)
Electrical Power On
Hydraulic Power On
Cockpit Thrust Control Fully Up (TM 55-1520-240-T)
Pylon Work Platforms Open (Task 2-2)

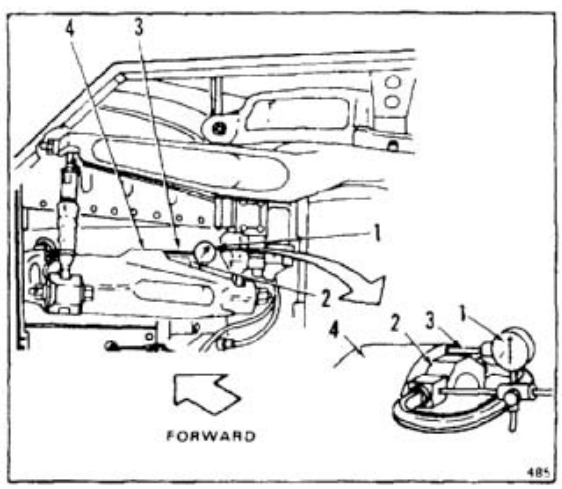


General Safety Instructions:

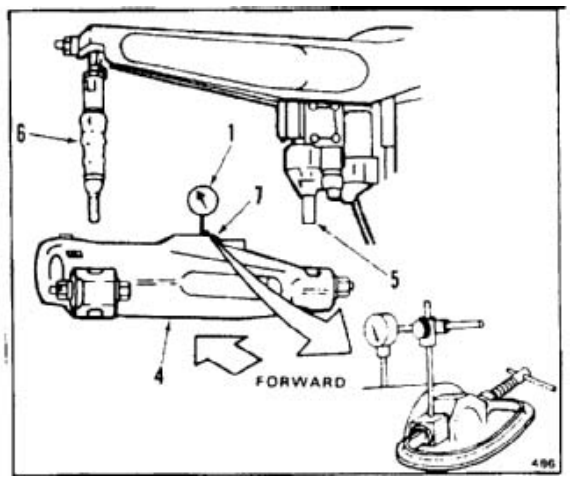
WARNING

Do not move cockpit controls. Injury to personnel can occur.

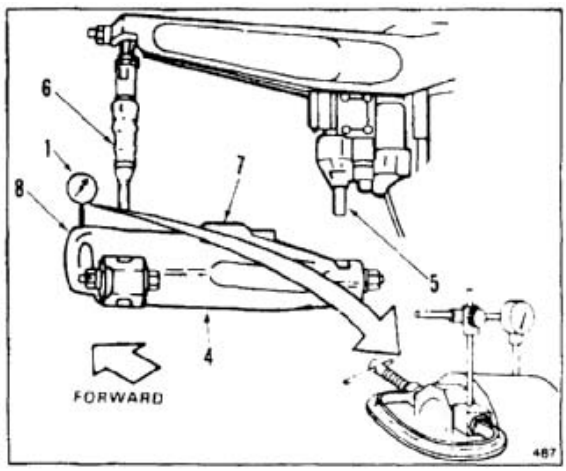
1. Mount dial indicator (1) at aft yoke support (2). Indicator shaft (3) shall be in contact with rear face of yoke (4).
2. Try to move yoke (4) axially in support (2). Record axial movement.
3. If axial movement is not greater than **0.010 inch**, remove dial indicator (1), remove hydraulic power and go to step 14.
4. If axial movement is greater than **0.010 inch**, go to step 5. Remove hydraulic power.



5. Disconnect actuator (5) and connecting link (6) from yoke (4) (Task 11-227).
6. Install dial indicator (1) over aft bearing housing (7).
7. Grasp yoke (4) at bearing housing (7). Try to move yoke up and down. Do not rotate yoke. Record vertical movement.



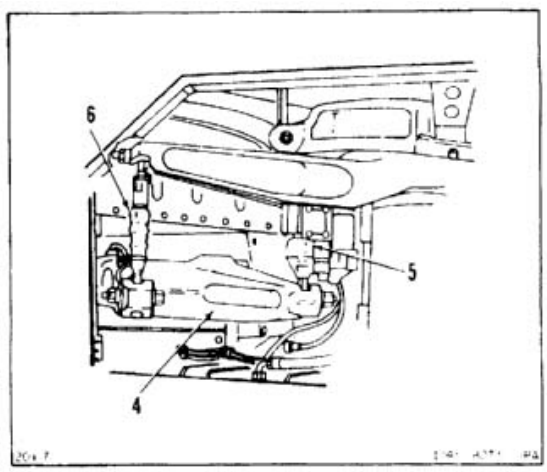
8. Install dial indicator (1) over forward bearing housing (8).
9. Grasp yoke (4) at bearing housing (8). Try to move yoke up and down. Do not rotate yoke. Record vertical movement. Remove dial indicator.
10. Vertical movement at either bearing housing (7 and 8) must be less than **0.007 inch**. If vertical movement is more than **0.007 inch** check yoke (4) for correct installation (Task 11-233).



11. Connect actuator (5) and connecting link (6) to yoke (4) (Task 11-233).
12. Apply hydraulic power.
13. Repeat steps 1 thru 3.
14. Inspect yoke (4) for nicks, scratches, or gouges. Depth of scratches must not be greater than **0.060 inch**. Repair damage less than **0.060 inch** deep (Task 11-228).
15. Remove electrical power.
16. Disconnect battery (Task 1-39).

FOLLOW-ON MAINTENANCE:

Close pylon work platforms (Task 2-2).



END OF TASK

11-227 REMOVE AFT LCT YOKE 11-227

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Open End Wrench, 1-5/8 Inch
Socket Wrench, 1-1/2 Inch
Aluminum Bar, 1-7/32 Inch (Maximum Diameter) X 12 Inches Long
Wood Block, 6 Inch X 6 Inch X 6 Inch Approx.

Materials:

None

Personnel Required:

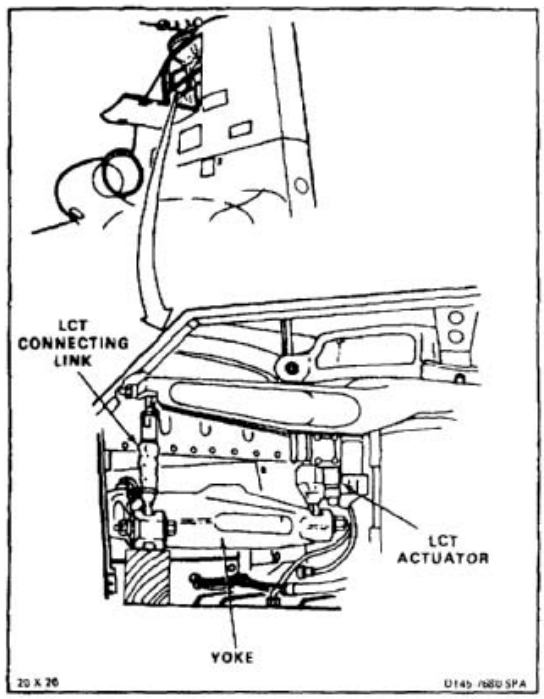
Medium Helicopter Repairer (2)

References:

Task 1-13

Equipment Condition:

Hydraulic Power Off
Electrical Power Off
Battery Disconnected (Task 1-39)
Pylon Work Platforms Open (Task 2-2)
Pylon Forward Crown Fairing Open (Task 2-2)
Aft Rotor Pitch Links Disconnected (Task 5-97)
Safety Blocks (T31) Installed (Task 11-28)



NOTE

There may be two different five digit codes marked on bolt P/N BACB30ST10-40. The five digit code 81996 is not the manufacturer's CAGE code. If so marked the number 81996 identifies the part as having been manufactured in accordance with a government Technical Data Package (TDP).

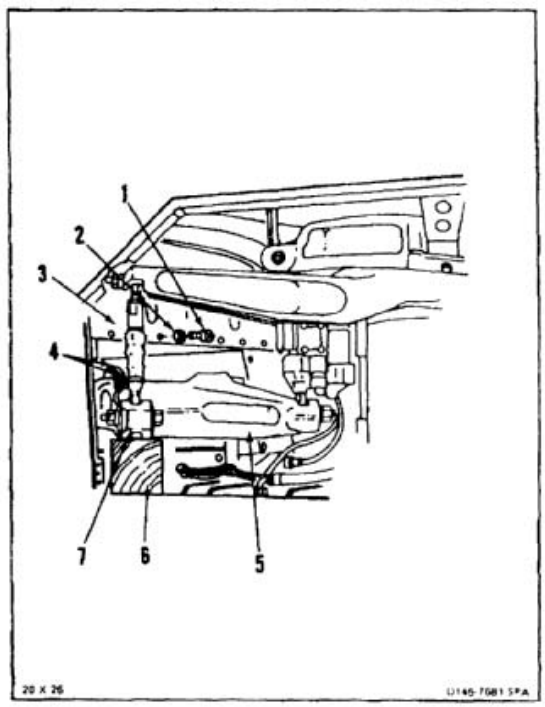
Identify the five digit manufacturer's code or manufacturer's name on the head of the bolt. If the bolt head is marked with one of the CAGE codes or manufacturer's name listed below, the BACB30ST10-40 bolt is serviceable:

1. CAGE code 84256 (Avibank Manufacturing Co.).
2. CAGE code 77272 (Boeing).

Remove and replace any unserviceable bolts with serviceable BACB30ST10-40 bolts from the supply system.

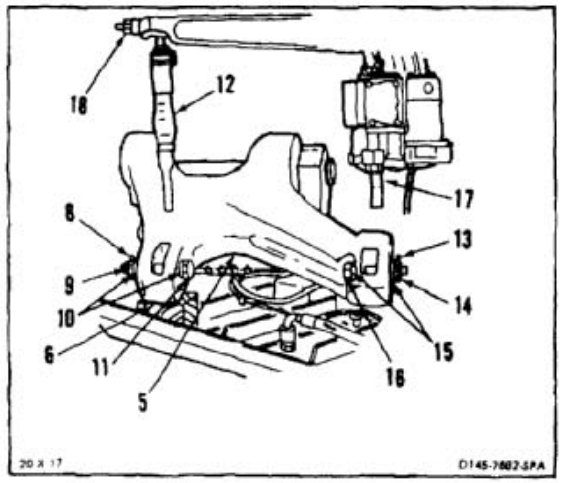
Positive retention bolts are installed in upper controls. Bolts have a pawl which prevents nut or bolt removal unless pawl is depressed (Task 1-13).

Attaching bolts, washers and nuts will be temporarily installed after removing connecting link and actuator.

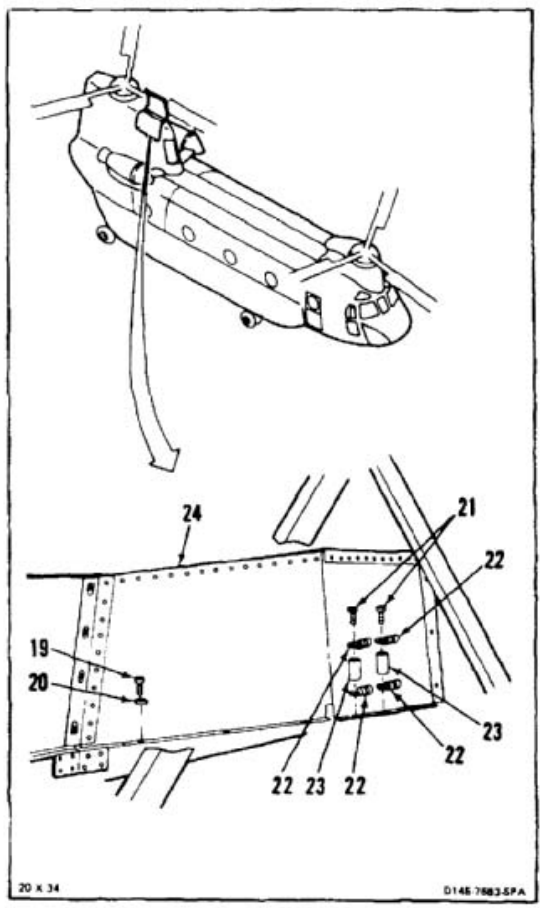


1. Remove 13 screws (1) and washers (2) from forward bulkhead (3).
2. Cut cable straps (4) on yoke (5).
3. Support yoke (5) with block (6) (or equivalent) under lug (7).

4. Remove cotter pin (8), nut (9), washers (10), and bolt (11) attaching connecting link (12) to yoke (5).
5. Remove cotter pin (13), nut (14), washers (15), and bolt (16) attaching LCT actuator (17) to yoke (5). Have helper support swashplate (18).
6. Remove support block (6) and gently lower yoke (5).
7. Install bolts (11 and 16), washers (10 and 15), and nuts (9 and 14) back in yoke (5).



8. Remove seven screws (19) and washers (20).
9. Remove two screws (21), four cable clamps (22) and two spacers (23).
10. Remove bulkhead pocket (24).

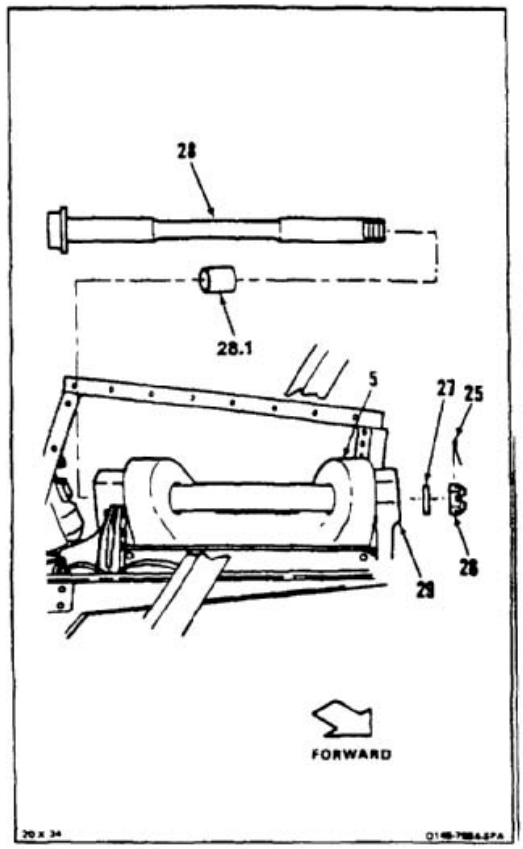


11. Remove cotter pin (25), nut (26), and washer (27).
12. Gently drive out yoke shaft (28) by tapping at forward end. Have helper support yoke (5). Use aluminum bar.
13. Lift out yoke (5) from support (29).

NOTE

Ensure slider bushing (28.1) is not removed and remains with yoke mount (29).

14. Install shaft (28). washer (27) and nut (26) in support (29). Do not torque nut.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-228 REPAIR AFT LCT YOKE 11-228

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit, NSN 5180-00-323-5114
Airframe Structural Repairer's Tool Kit, NSN 5180-01-376-0436

Materials:

Abrasive Cloth (E1)
Cleaning Cloth (E120)
Dry Cleaning Solvent (E162)
Epoxy Primer (E292.1)
Gloves (E184.1)

Personnel Required:

Aircraft Structural Repairer
Inspector

Equipment Condition:

Off Helicopter Task

General Safety Instructions:

WARNING

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Avoid inhaling. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

1. Clean yoke (1). Use dry cleaning solvent (E162) and cloth (E120). Wear gloves (E184.1).

INSPECT

2. Measure depth of any nicks, scratches or gouges. Damage must not be greater than **0.060 inch** deep.
3. In critical areas (2), blend out nicks, scratches or gouges greater than **0.005 inch** deep. Use abrasive cloth (E1). Do not blend deeper than **0.060 inch**. Blend radius must not be less than **1 inch**.
4. In non-critical areas (3), blend out nicks, scratches or gouges greater than **0.015 inch** deep. Use abrasive cloth (E1). Do not blend deeper than **0.060 inch** or **10 percent** of material thickness whichever is less. Blend radius must not be less than **1 inch**.
5. Clean yoke (1). Use dry cleaning solvent (E162). Wear gloves (E184.1).

WARNING

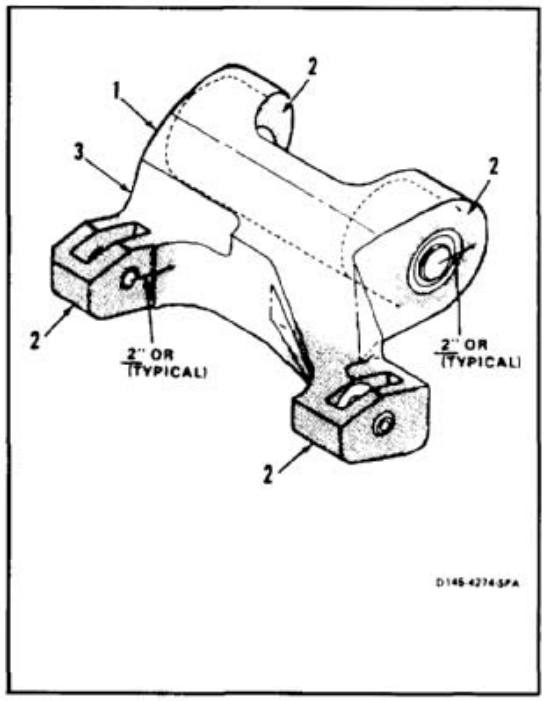
Epoxy primer (E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

6. Coat blended areas with epoxy primer (E292.1). Wear gloves (E184.1).

INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-229 REMOVE AFT LCT YOKE BEARINGS (AVIM) 11-229

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Yoke Bearing Puller (APP E-14)
Two-Jaw Mechanical Puller, NSN 5120-00-030-7942

Materials:

None

Personnel Required:

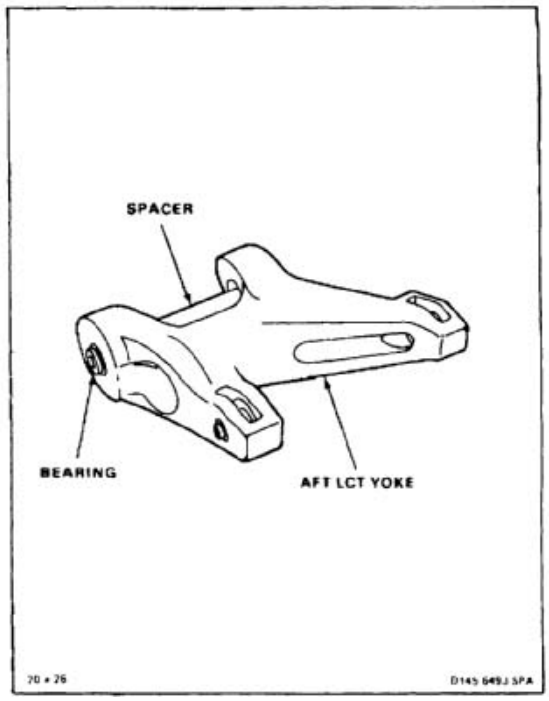
Machinist

References:

TM 1-1520-253-23
TM 55-1500-322-24
Appendix E

Equipment Condition:

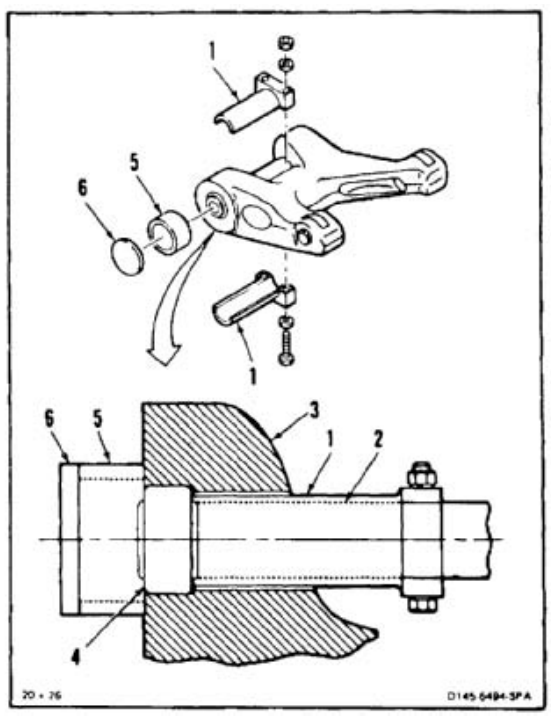
Off Helicopter Task



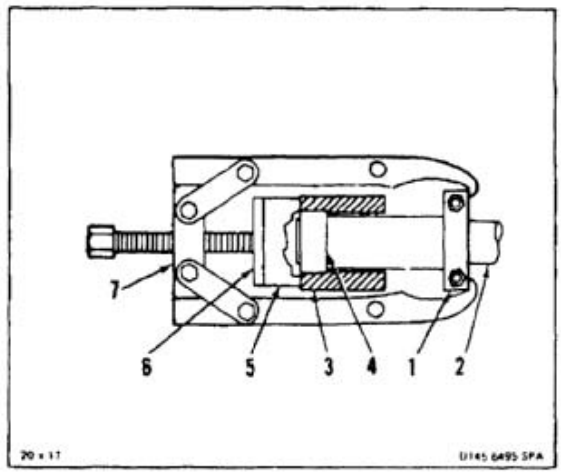
NOTE

If a crack in the yoke is suspected during removal, refer to TM 1-1520-253-23.

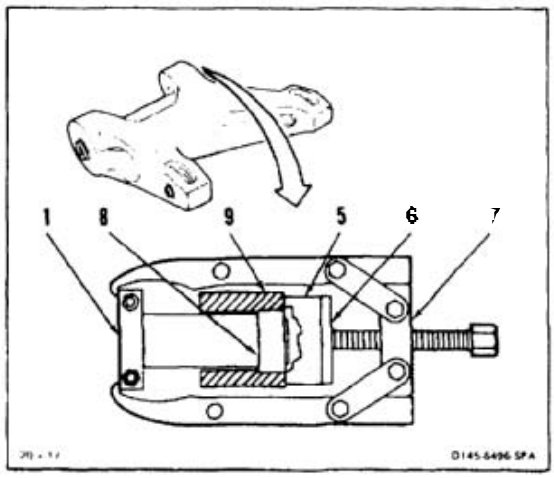
1. Install split pusher assembly (APP E-14) (1) over spacer (2). Slide pusher assembly into hole in yoke lug (3) until seated against bearing (4).
2. Position reaction tube (5) and reaction plate (6) over bearing (4).



3. Install two-jaw puller (7) across reaction plate (6) and pusher assembly (APP E-14) (1).
4. Push bearing (4) from lug (3) (TM 55-1500-322-24).
5. Remove two-jaw puller (7), reaction plate (6), reaction tube (5), pusher assembly (APP E-14) (1), and spacer (2).



6. Install pusher assembly (APP E-14) (1) behind bearing (8) in other lug (9).
7. Position reaction tube (5) and reaction plate (6) on outer face of lug (9), over bearing (8).
8. Install two-jaw puller (7) across reaction plate (6) and pusher assembly (APP E-14) (1).
9. Push bearing (8) from lug (9) (TM 55-1500-322-24).
10. Remove two-jaw puller (7), reaction plate (6), reaction tube (5), and pusher assembly (APP E-14) (1).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-230 INSTALL AFT LCT YOKE BEARINGS (AVIM) 11-230

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Arbor Press
Adapters
Drill Press
Roller Staking Kit, NSN 5120-00-311-5446
Bolt, 1-1/4 Inch Diameter X 12 Inches Long
Container, 2 Quart

Materials:

Carbon Dioxide (Dry Ice) (E92)
Methanol (E243)
Cloth (E120)
Gloves (E184.1)
Epoxy Primer (E292)
Kevlar Gloves (E187)

Personnel Required:

Medium Helicopter Repairer
Inspector

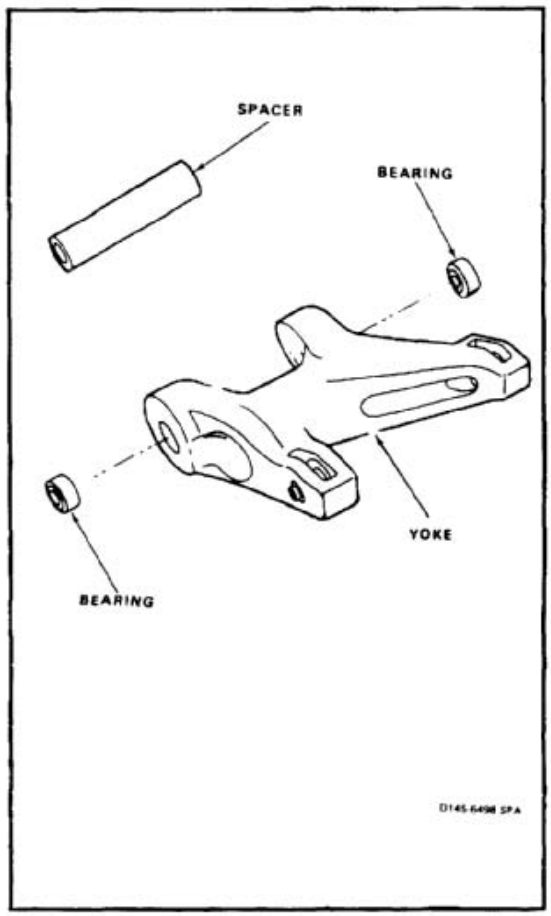
References:

TM 1-1520-253-23
TM 55-1500-322-24
TM 55-1520-240-23P

General Safety Instructions:

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



WARNING

Carbon dioxide (dry ice) (E92) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Methanol (E243) is flammable and toxic. Use only with adequate ventilation. Keep away from heat and open flame. Do not inhale. Do not contact eyes, skin, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Carbon dioxide (dry ice) (E92) in methanol (E243) has a temperature of **–120°F (–84.4°C)**. Observe all safety measures when working with dry ice (E92) and methanol (E243) and when handling chilled parts. Avoid breathing carbon dioxide vapor.

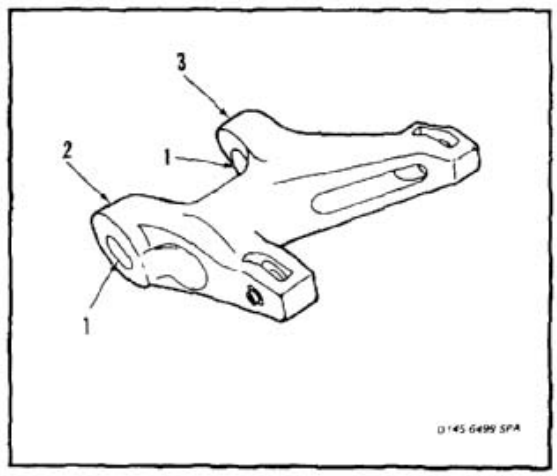
WARNING

Wear Kevlar (E187) protective gloves when handling chilled bearings.

NOTE

If a crack in the yoke is suspected during removal, refer to TM 1-1520-253-23.

1. Make sure bores (1) of yoke lugs (2 and 3) are clean and undamaged.

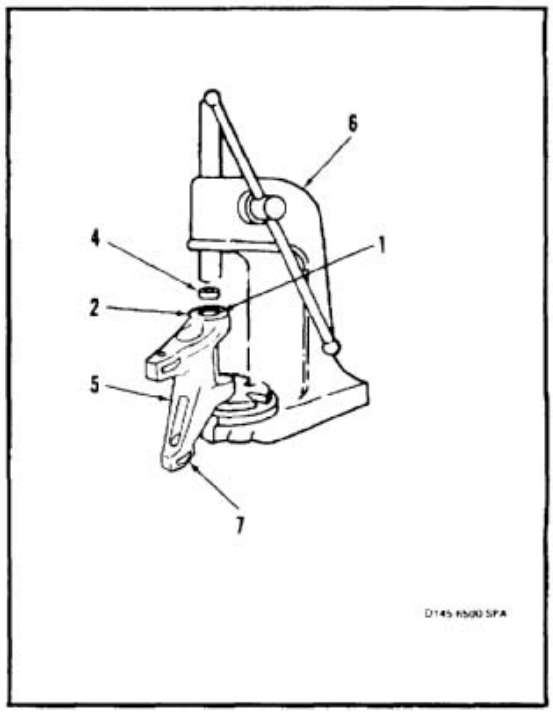


2. Soak two bearings (4) in dry ice (E92) and methanol (E243). Allow bearings to cool thoroughly. Wear goggles and Kevlar gloves (E187).
3. Position yoke (5) in arbor press (6), longer arm (7) down.

NOTE

Work quickly with chilled bearing. Bearing must be installed before it warms.

4. Remove one bearing (4) from dry ice (E92) and wipe clean and dry. Use cloth (E120). Wear goggles and Kevlar gloves (E187).
5. Coat bore (1) with epoxy (E292). Wear gloves (E184.1).
6. While epoxy primer is wet, press bearing (4) into lug (2) until fully seated in bore (1) (TM 55-1500-322-24).
7. Wipe off excess primer from yoke (4). Use cloth (E120). Allow bearing (4) to warm to room temperature.
8. Remove yoke (5) from arbor press (6).
9. Roller stake bearing (4) using drill press and roller staking kit (TM 55-1500-322-24).



10. Position yoke (5) in arbor press (6), longer arm (7) up. Use tube adapter (8) to support face of lower lug (2).
11. Position spacer (9) in yoke (5), centered on inner race of lower bearing (4).
12. Install **12 inch** bolt (10) through lower bearing (4), spacer (9), and lug (3).

NOTE

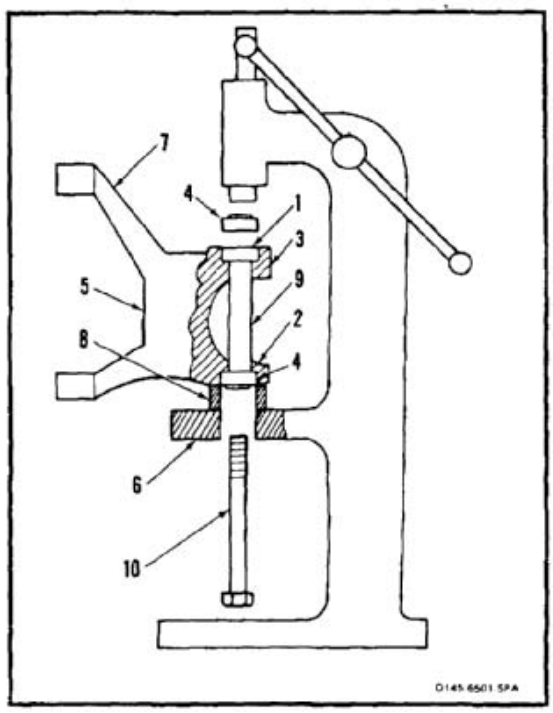
Work quickly with chilled bearing. Bearing must be installed before it warms.

13. Remove other bearing (4) from dry ice (E92) and wipe clean and dry. Use cloth (E120). Wear goggles and Kevlar gloves (E187).
14. Coat bore (1) of lug (3) with epoxy primer (E292). Wear gloves (E184.1).

CAUTION

Press in bearing only until spacer is lightly gripped between inner races of bearings. Yoke will not operate properly if bearing is incorrectly installed.

15. While primer is wet, press bearing (4) into housing (3) (TM 55-1500-322-24).
16. Remove bolt (10).
17. Remove yoke (5) from arbor press (6).
18. Wipe off excess primer from yoke (5). Use cloth (E120).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-231 REMOVE AFT LCT YOKE BUSHINGS (AVIM) 11-231

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Electric Gun Heater, NSN 4940-00-785-1162
Pyrometer
Bolt, 5/8 Inch Diameter X 9 Inches Long
Plain Bushing, 3/4 Inch OD X 5/8 Inch ID X 2-1/2 Inches
Plain Bushing, 1-7/16 Inches OD X 1-1/4 Inches ID X 2 Inches
Plate, 2 Inches OD X 1/2 Inch

Materials:

Kevlar Gloves (E187)

Personnel Required:

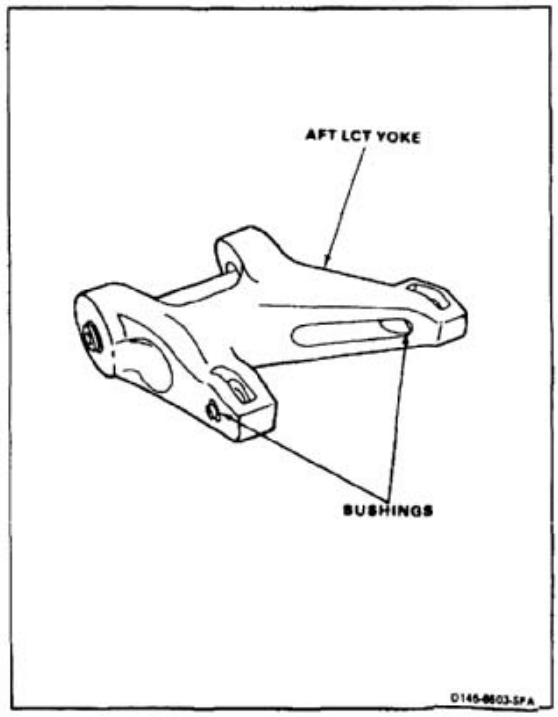
Machinist

References:

TM 1-1520-253-23

Equipment Condition:

Off Helicopter Task



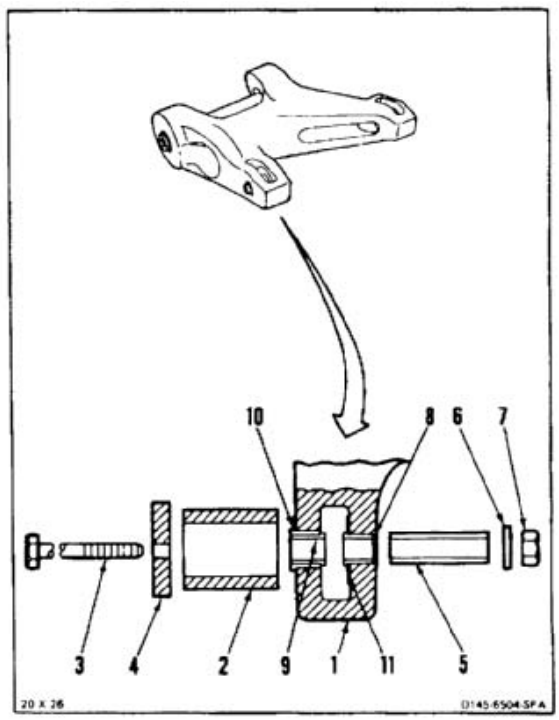
CAUTION

Do not heat yoke over **230ºF (110ºC)**. Damage to shotpeened surface will result.

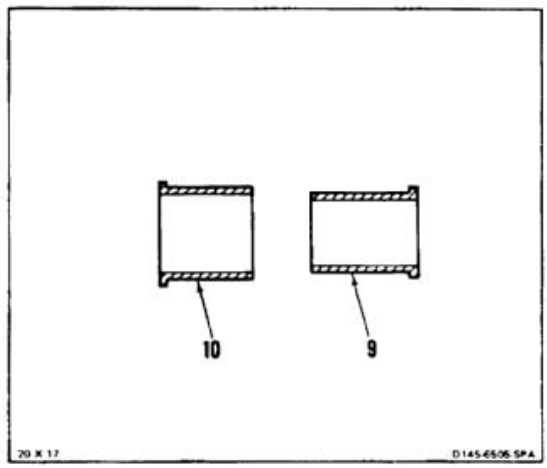
NOTE

If a crack in the yoke is suspected during removal, refer to TM 1-1520-253-23.

1. Heat yoke lug (1) with heat gun. Do not exceed **230ºF (110ºC)**. Use pyrometer to measure temperature. Wear gloves (E187).
2. Position large bushing (2) against outer surface of lug (1). Wear gloves (E187).
3. Install bolt (3) through plate (4), bushing (2), lug (1), and bushing (5). Install washer (6) and nut (7).
4. Tighten nut (7) to push bushings (8, 9, and 10) from lug (1).
5. Remove nut (7), washer (6), bushing (5), bolt (3), plate (4), and bushing (2). Remove bushings (8, 9, and 10) from bushing (2).
6. Remove large washer (11) from lug (1).



7. Remove slip fit bushing (9) from bushing (10).



CAUTION

Do not heat yoke over **230°F (110°C)**. Damage to shotpeened surface will result.

8. Heat yoke lug (12) with heat gun. Do not exceed **230°F (110°C)**. Use pyrometer to measure temperature. Wear Kevlar gloves (E187).

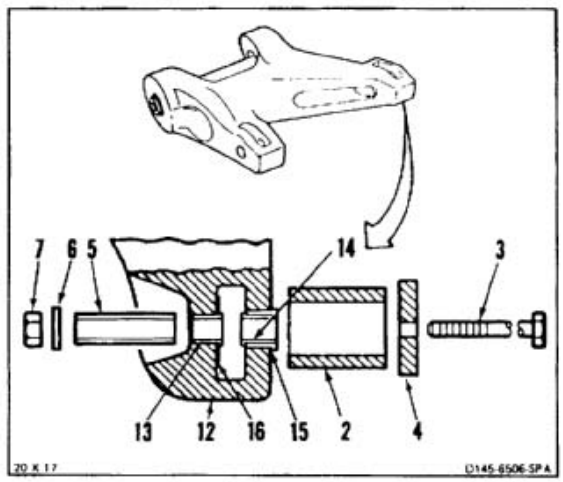
9. Position large bushing (2) against outer surface of lug (12). Wear Kevlar gloves (E187).

10. Install bolt (3) through plate (4), bushing (2), lug (12), and bushing (5). Install washer (6) and nut (7).

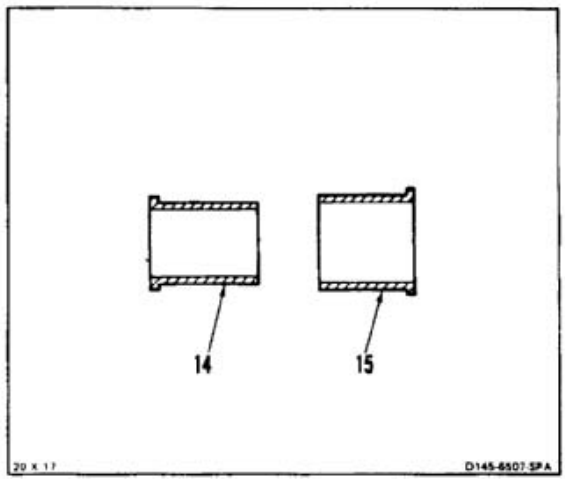
11. Tighten nut (7) to push bushings (13, 14, and 15) from lug (12).

12. Remove nut (7), washer (6), bushing (5), bolt (3), plate (4), and bushing (2). Remove bushings (13, 14, and 15) from bushing (2).

13. Remove large washer (16) from lug (12).



14. Remove slip fit bushing (14) from bushing (15).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-232 INSTALL AFT LCT YOKE BUSHINGS (AVIM) 11-232

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Electric Gun Heater, NSN 4940-00-785-1162
Pyrometer
Arbor Press
Adapters
Container, 2 Quart

Materials:

Carbon Dioxide (Dry Ice) (E92)
Methanol (E243)
Cloth (E120)
Epoxy Primer (E292/E292.1)
Gloves (E184.1)
Kevlar Gloves (E187)

Personnel Required:

Medium Helicopter Repairer
Inspector

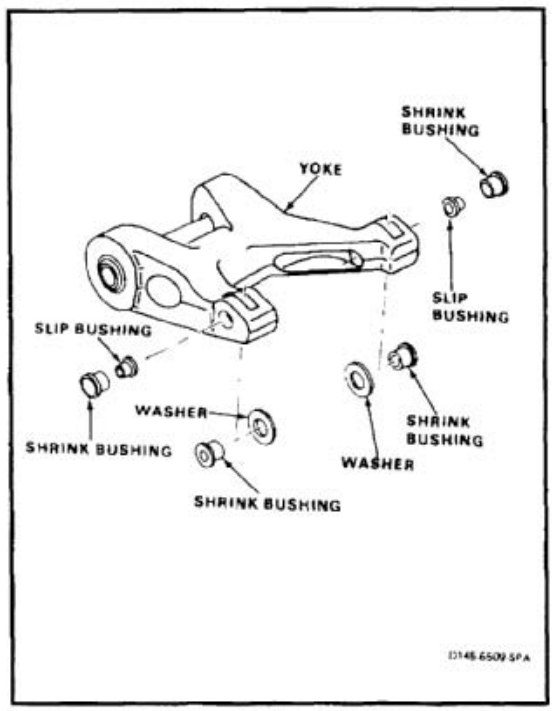
References:

TM 1-1520-253-23
TM 55-1520-240-23P

General Safety Instructions:

WARNING

Epoxy primer (E292/E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



WARNING

Carbon dioxide (dry ice) (E92) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Methanol (E243) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Carbon dioxide (dry ice) (E92) in methanol (E243) has a temperature of **–120ºF (–84.4ºC)**. Observe all safety measures when working with dry ice (E92) and methanol (E243) and when handling chilled parts. Avoid breathing carbon dioxide vapor.

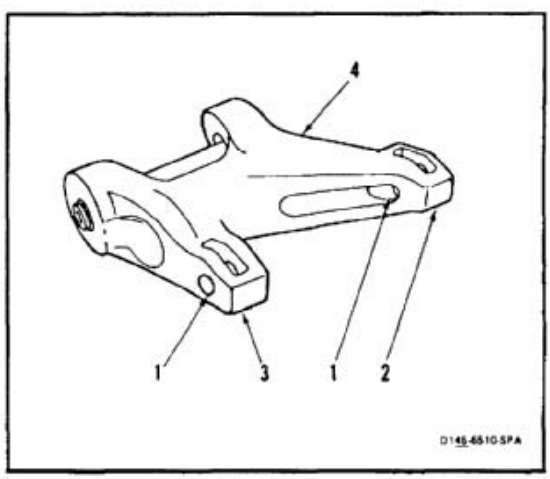
WARNING

Wear Kevlar gloves (E187) when handling chilled bearings or heated yoke.

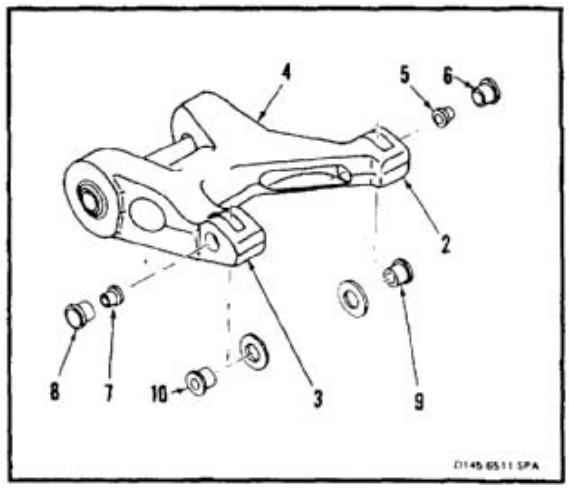
NOTE

If a crack in the yoke is suspected during removal, refer to TM 1-1520-253-23.

1. Make sure bores (1) of lugs (2 and 3) of yoke (4) are clean and undamaged.



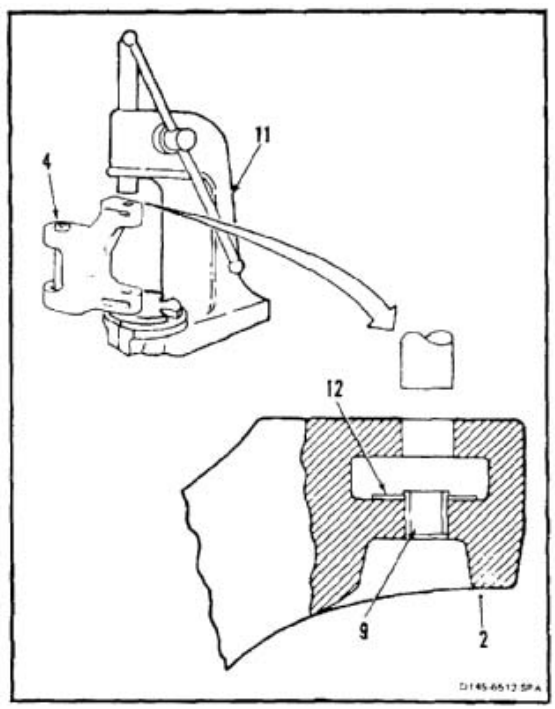
2. Install slip bushing (114C3057-1) (5) in shrink bushing (114C3049-3) (6).
3. Install slip bushing (114C3057-2) (7) in shrink bushing (114C3049-4) (8).
4. Place shrink bushing (114C3058-1) (9), shrink bushing (114C3058-2) (10), and bushing assemblies (5, 6 and 7, 8) in dry ice (E92) and methanol (E243). Allow bushings to chill thoroughly. Wear goggles and Kevlar gloves (E187).



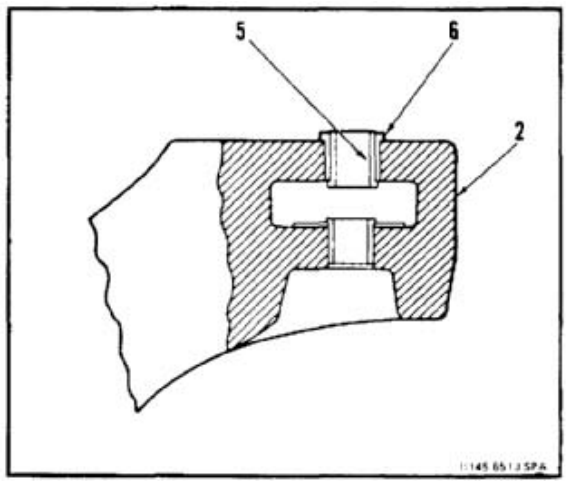
CAUTION

Do not heat yoke over **230°F (110°C)**. Damage to shotpeened surface will result.

5. Heat yoke lug (2) with heat gun. Do not exceed **230°F (110°C)**. Use pyrometer to measure temperature. Wear Kevlar gloves (E187).
6. Install yoke (4) in arbor press (11).
7. Coat washer (12) with epoxy primer (E292.1). Wear gloves (E184.1).
8. Position washer (12) in opening in lug (2). Align hole in washer with holes in lug.
9. Remove bushing (9) from dry ice and wipe clean and dry. Use cloth (E120). Wear goggles and Kevlar gloves (E187).
10. Coat outer surface of bushing (9) with epoxy primer (E292.1). Wear gloves (E184.1).
11. Insert bushing (9) through upper hole of lug (2), through washer (12) and into lower hole of lug. Press bushing fully in.



12. Remove bushing assembly (5 and 6) from dry ice and wipe clean and dry. Use cloth (E120). Wear goggles and Kevlar gloves (E187).
13. Coat outer surface of bushing (6) with epoxy primer (E292). Wear gloves (E184.1).
14. While primer is wet press bushing assembly (5 and 6) into upper hole of lug (2).
15. Allow yoke lug (2) to cool.



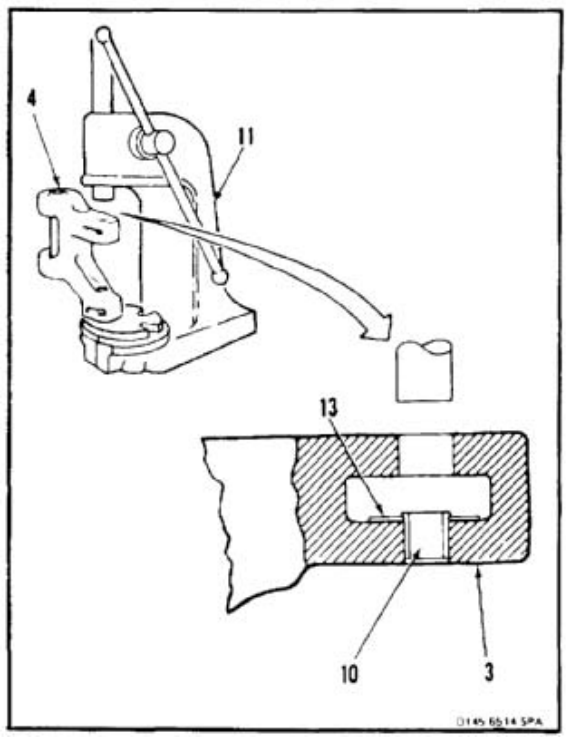
INSPECT

16. Turn yoke (4) over in arbor press (11).

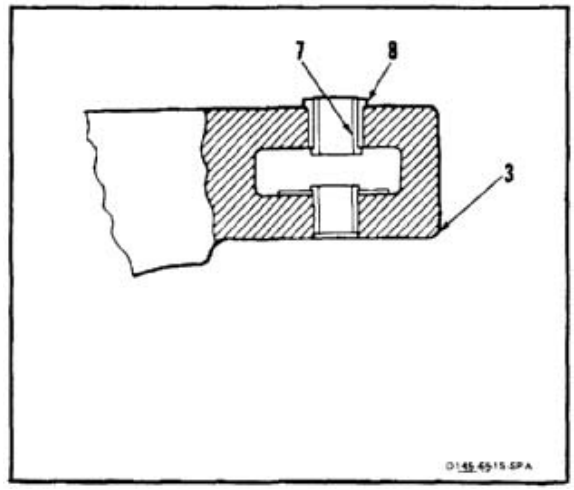
CAUTION

Do not heat yoke over **230ºF (110ºC)**. Damage to shotpeened surface will result.

17. Heat yoke lug (3) with heat gun. Do not exceed **230ºF (110ºC)**. Use pyrometer to measure temperature. Wear Kevlar gloves (E187).
18. Coat washer (13) with epoxy primer (E292.1).
19. Place washer (13) in opening in lug (3). Align hole in washer with holes in lug.
20. Remove bushing (10) from dry ice and wipe clean and dry. Use cloth (E120). Wear goggles and Kevlar gloves (E187).
21. Coat outer surface of bushing (10) with epoxy primer (E292.1). Wear gloves (E184.1).
22. Insert bushing (10) through upper hole of lug (3), through washer (13), and into lower hole of lug. Press bushing fully in.



23. Remove bushing assembly (7 and 8) from dry ice and wipe clean and dry. Use cloth (E120). Wear goggles to protect eyes. Wear Kevlar gloves (E187).
24. Coat outer surface of bushing (8) with epoxy primer (E292).
25. While primer is wet, press bushing assembly (7 and 8) into upper hole of lug (3).
26. Remove yoke from arbor press. Allow lug (3) to cool.



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-233 INSTALL AFT LCT YOKE 11-233

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Wrench, Open End, 1-5/8 Inch
Wrench, Socket, 1-1/2 Inch
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 700 to 1600 Inch-Pounds
Scale, 0 to 100 Pounds

Materials:

Dry Cleaning Solvent (E162)
Cloth (E120)
Cable Straps (E375)
Gloves (E184.1)

Parts:

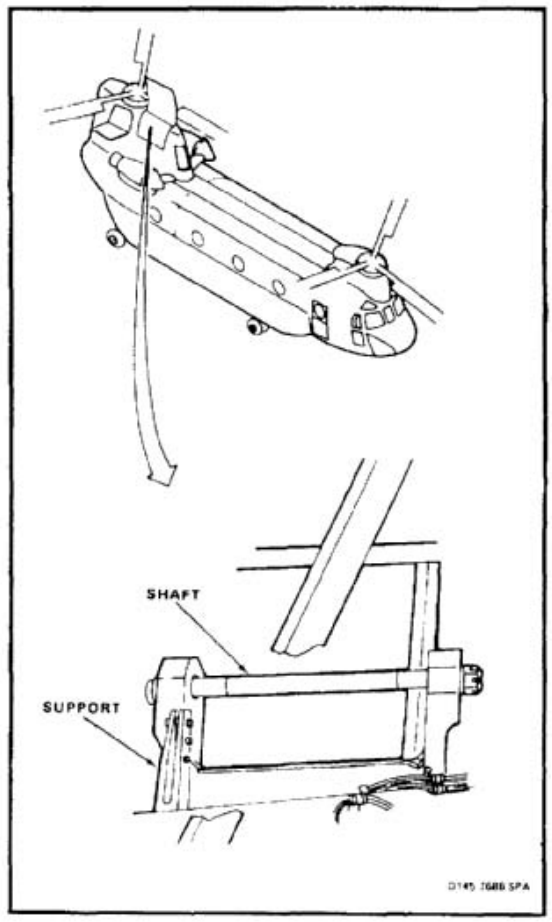
Cotter Pins
Washers
Cable Strap Mounting Plates

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 2-311



NOTE

There may be two different five digit codes marked on bolt P/N BACB30ST10-40. The five digit code 81996 is not the manufacturer's CAGE code. If so marked, the number 81996 identifies the part as having been manufactured in accordance with a government Technical Data Package (TDP).

Identify the five digit manufacturer's code or manufacturer's name on the head of the bolt. If the bolt head is marked with one of the CAGE codes or manufacturer's name listed below, the BACB30ST10-40 bolt is serviceable:

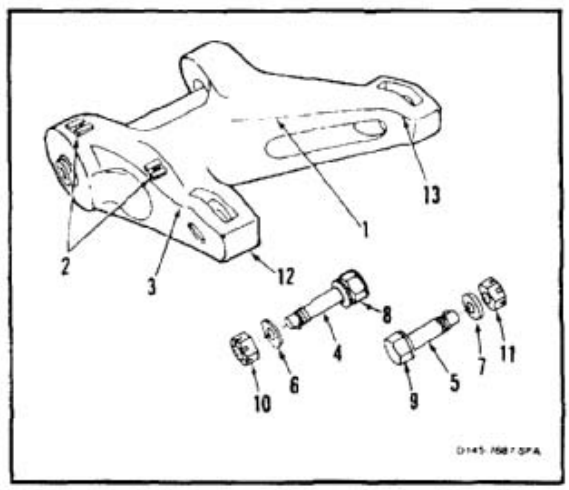
1. CAGE code 84256 (Avibank Manufacturing Co.).
2. CAGE code 77272 (Boeing).

Remove and replace any unserviceable bolts with serviceable BACB30ST10-40 bolts from the supply system.

Positive retention bolts are installed in upper controls. Bolts have a pawl which prevents nut or bolt removal unless pawl is depressed (Task 1-13).

1. If yoke (1) has no cable strap mounting plates, attach two mounting plates (2) to top surface of shorter arm (3). Install plates in same positions as plates on yoke removed. Prepare surface and install plates (Task 2-311).
2. Remove two bolts (4 and 5), washers (6, 7, 8, and 9) and nuts (10 and 11) from lugs (12 and 13) of yoke (1).

INSPECT



NOTE

Ensure slider bushing (18.1) is not removed and remains with yoke mount (17).

3. Remove nut (14), washers (15), and support shaft (16) from yoke support (17).

WARNING

Dry cleaning solvent (E162) is combustable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. In case of. contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

4. Clean shaft (16) with dry cleaning solvent (E162). Use cloth (E120). Wear gloves (E184.1) and goggles.

5. Make sure recessed washer (18) it under head of shaft (16). Recess shall face head.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the transmission cover.

Verify required flange and slip bushings are properly installed in each clevis of the yoke assembly.

Ensure hub bearings and spacer are properly installed and serviceable.

At installation of the yoke shaft, ensure slip bushing and related flanged bushing is properly installed in the inboard structural clevis.

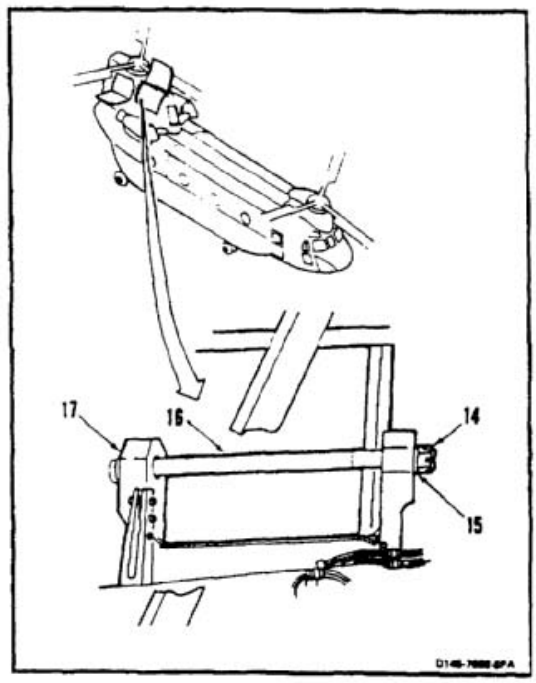
For all mating components, ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

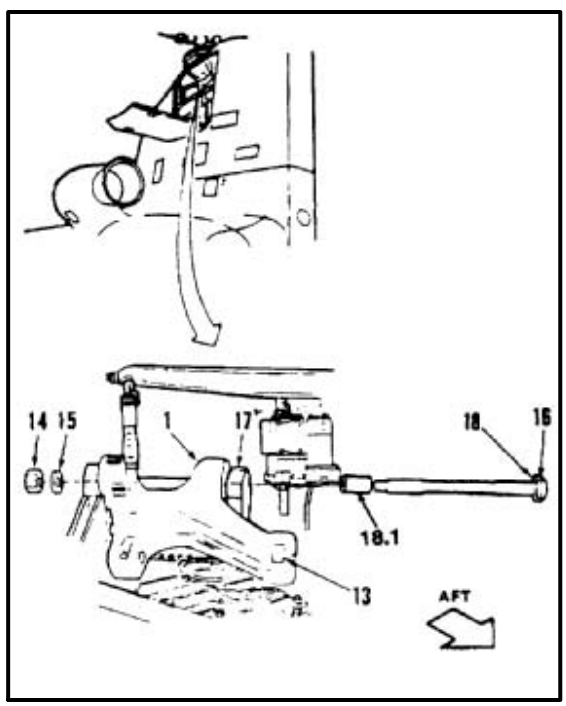
Ensure special countersunk washers are installed properly under the head of self retaining bolts. Countersink must face towards head of bolt.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

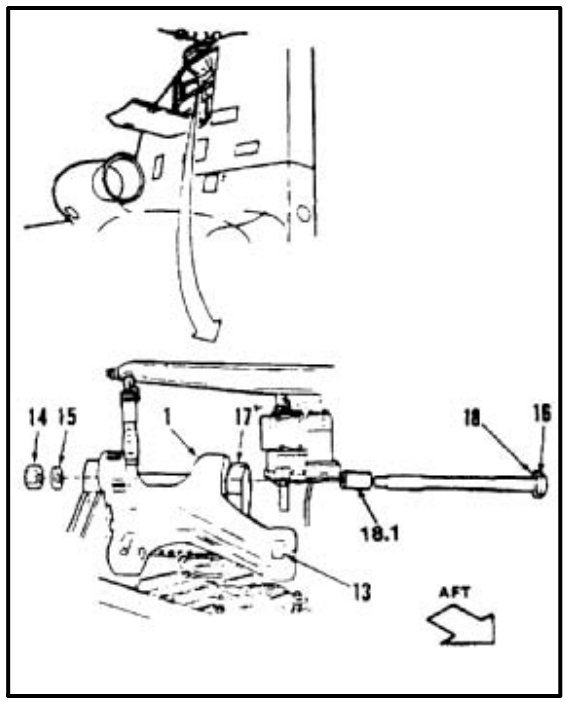
NOTE

Ensure slider bushing (18.1) is not removed and remains with yoke mount (17).





6. Position yoke (1) in support (17). Lug (13) shall face aft.



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation including stackup of associated components must be ensured.

Ensure special countersunk washer is installed properly under the head of the yoke shaft. Countersink must face towards hex head of the shaft.

Ensure slip bushing and flanged bushing are installed in inboard lug of the structural clevis prior to yoke shaft installation.

Ensure flanged bushing is properly installed in the outboard lug of the structural clevis prior to yoke shaft installation.

Follow proper nut torquing sequence to allow for yoke assembly bearing preloading procedure.

Apply final nut torque and install cotter pin as required.

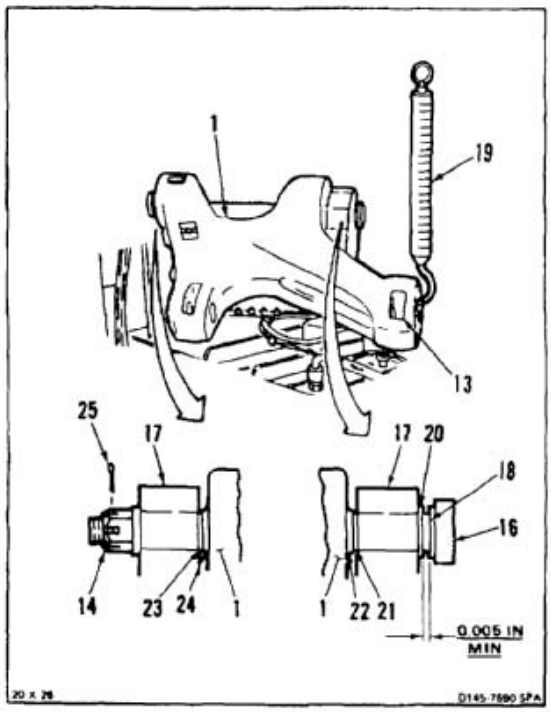
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Support shaft must be installed dry.

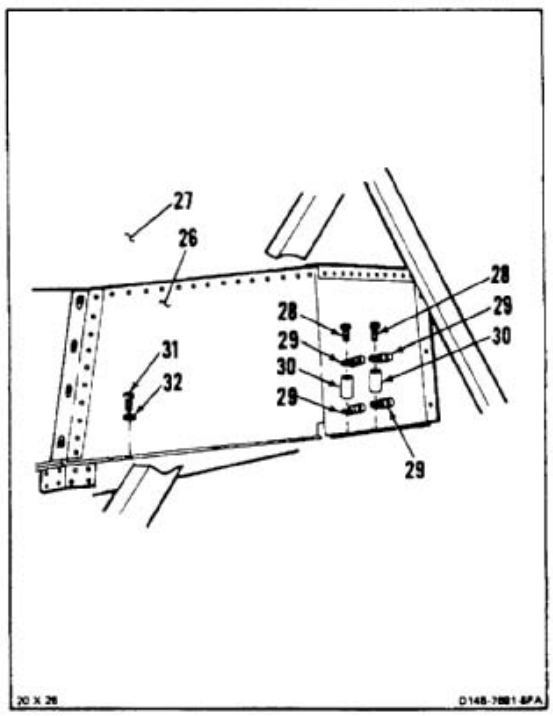
7. Insert support shaft (16), head aft, through support (17) and yoke (1). Make sure threads of shaft are dry.
8. Install washer (15) and nut (14). Torque nut to **1300 inch-pounds**.
9. Back off nut (14) until yoke (1) can be moved without turning shaft (16).
10. Torque nut (14) to **500 to 800 inch-pounds**.
11. If cotter pin holes will not align, remove nut (14) and add one or two washers (15). Repeat step 10.

12. Check yoke (1) as follows:
    a. Apply force to lug (3). Use dial indicating scale (19). Yoke must rotate with force not greater than **80 pounds**. Shaft (16) shall not rotate in support (17).
    b. Gap between washer (18) and shoulder bushing (20) shall not be less than **0.005 inch**.
    c. There shall be no gap between bushing (21) and bearing (22).
    d. There shall be no gap between bushing (23) and bearing (24).
13. Install cotter pin (25) in nut (14).



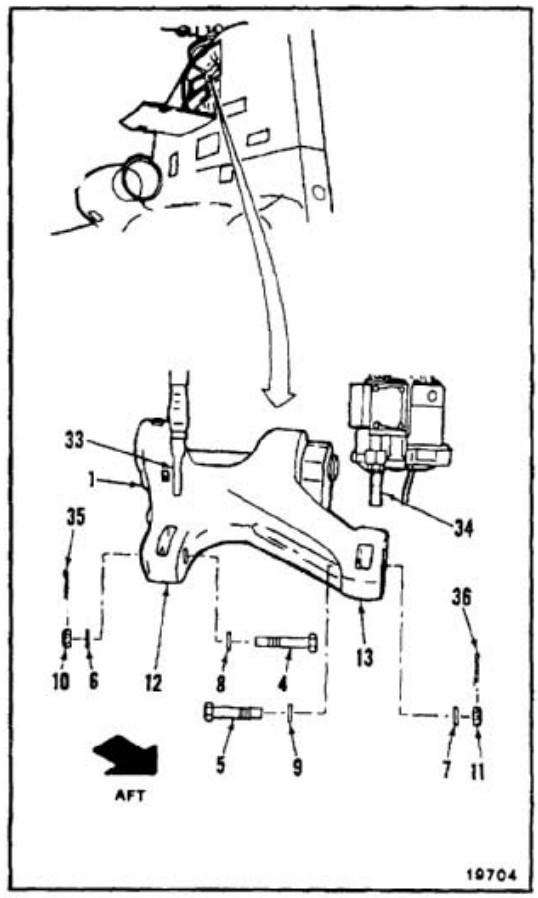
INSPECT

14. Position bulkhead pocket (26) over opening in bulkhead (27).
15. Install two screws (28), four cable clamps (29) and two spacers (30).
16. Install seven screws (3) and washers (32).



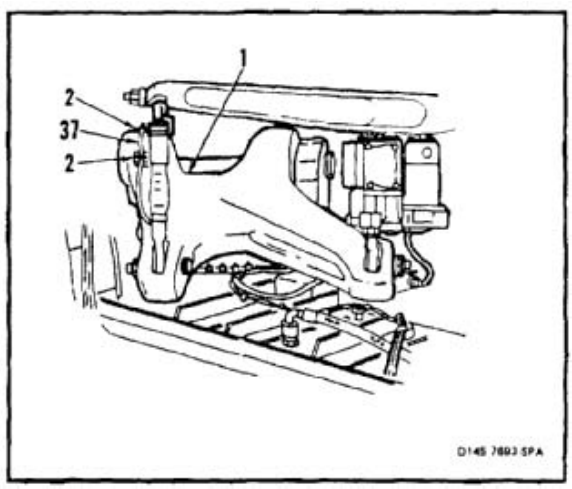
17. Raise yoke (1). Guide connecting link (33) into lug (12). Guide actuator (34) into lug (13).
18. Install bolt (4) dry, head aft, washer (8) with recess toward head, washer (6), and nut (10) in lug (12).
19. Install bolt (5) dry, head forward, washer (9) with recess toward head, washer (7), and nut (11) in lug (13).
20. Torque nuts (10 and 11) to **660 to 780 inch-pounds**. Do not exceed **1400 inch-pounds** for cotter pin alignment. Install cotter pins (35 and 36).

INSPECT

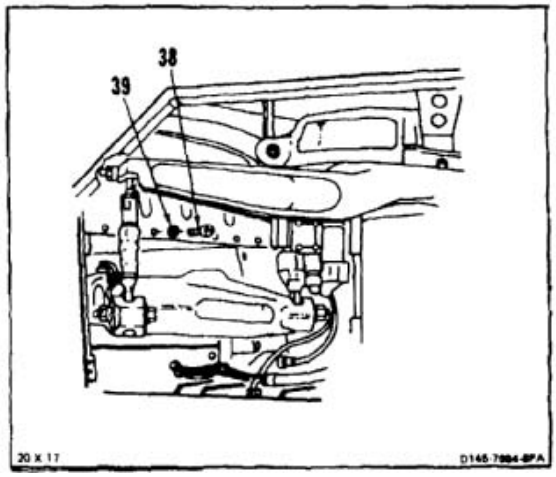


21. Attach connecting link cable (37) to two mounting plates (2) on yoke (1). Use cable straps (E375).

INSPECT



22. Install 13 screws (38) and washers (39).



FOLLOW-ON MAINTENANCE:

Connect aft rotor pitch links (Task 5-99).
Close pylon work platforms (Task 2-2).
Close aft pylon forward crown fairing (Task 2-2).
Perform flight controls operational check (TM 55-1520-240-T).

END OF TASK

SECTION VII
TUNNEL CONTROLS

11-234 REMOVE TUNNEL FORWARD CONNECTING LINKS 11-234

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

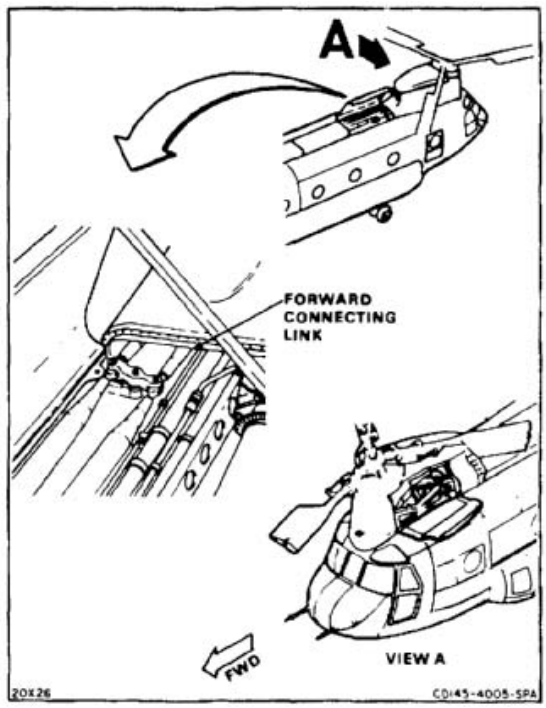
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Forward Transmission Fairing Left Work Platform Opened (Task 2-2)
Tunnel Access Doors Open (Task 2-2)
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)



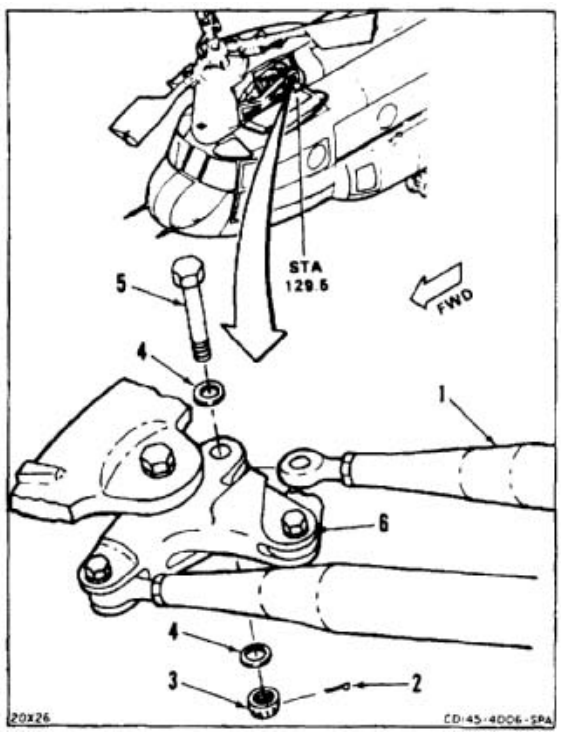
NOTE

Procedure is same to remove left or right forward connecting links. Right forward end at sta. 129.5 and aft end at sta. 163 are shown here.

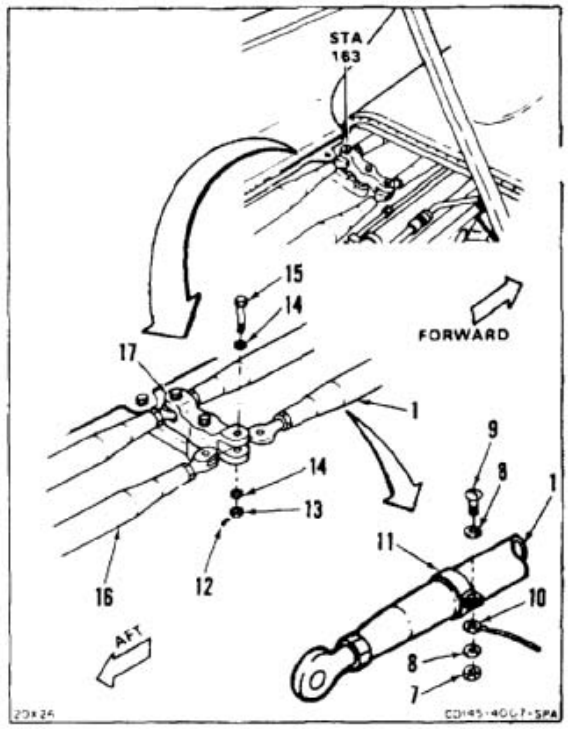
NOTE

If a crack in the connecting link or second stage bellcrank is suspected during removal, refer to TM 1-1520-253-23.

1. Tag connecting link (1).
2. Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from connecting link (1) and second stage bellcrank (6).
3. Remove connecting link (1) from bellcrank (6).



4. Remove nut (7), two washers (8), bolt (9), and electrical lead ground wire (10) from clamp (11).
5. Remove cotter pin (12), nut (13), washers (14), and bolt (15) from connecting links (1 and 16) and control arm (17).
6. Without **38**, if connecting link (1) is to be replaced remove clamp (11) from link.
7. With **38**, if connecting link (1) is to be replaced, leave clamp (11) with link.
8. Remove connecting links (1 and 16) from control arm (17).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-235 INSTALL TUNNEL FORWARD CONNECTING LINKS 11-235

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Alodine (E65)
Epoxy Primer (E292.1)
Abrasive Paper (E11)
Gloves (E184.1)
Sealant, Type 2, Class B-1/2 (E342.1)
Dry Cleaning Solvent (E162)
Cloths (E120)

Parts:

Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P

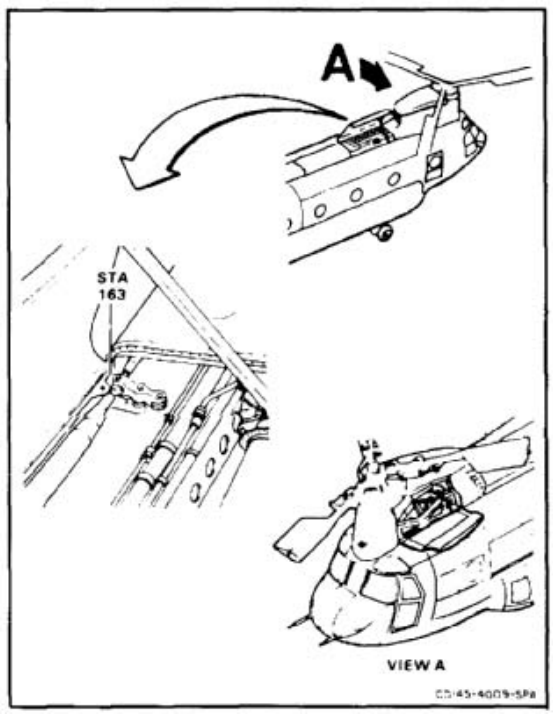
General Safety Instructions:

WARNING

Epoxy primer (E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Avoid inhaling. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



WARNING

Alodine (E65) is an oxidizer. Discard cloths which contain this material in a seperate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Sealant (E342.1) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end insert and rod end bearing is secure.

Ensure rivet, roll pin, and associated hardware through rod end insert at adjustable end of link assy is secure.

Ensure that the bonding jumper clamp is installed and properly located.

Ensure proper application of ALBI fire retardant coatings to the link assy.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure that the bonding jumper clamp is installed and properly located.

Ensure proper application of ALBI fire retardant coatings to the link assy.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

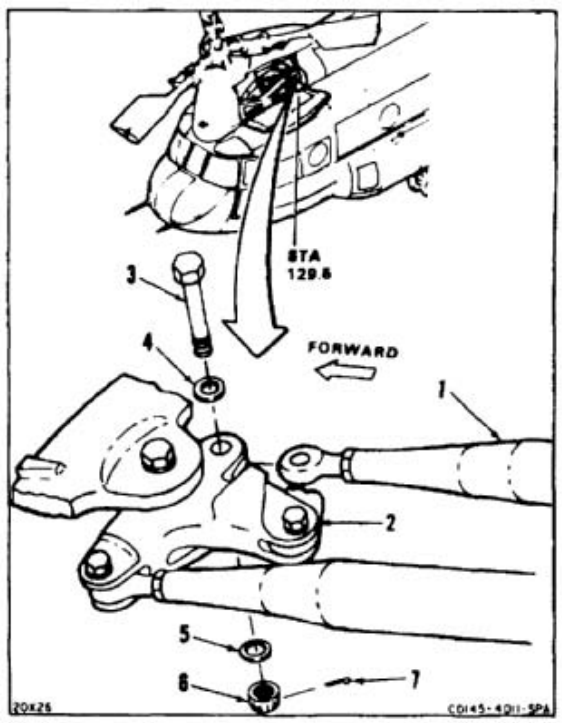
Do not install connecting link unless it is same length as link being replaced. If length is not same, connecting link can cause flight controls to be out-of-rig.

NOTE

All bolts installed in flight control system are self-retaining impedance bolts. During installation of connecting links, make sure all bolts used are self-retaining bolts.

Procedure is same to install left or right forward connecting links except as noted. Right forward end aft sta. 129.5 and aft end at sta. 163 are shown here.

1. Position forward connecting link (1) in second stage bellcrank (2). If link is not marked and one end has a black band, install with band forward.
2. Install bolt (3), two washers (4 and 5), and nut (6). Torque nut to **60 to 90 inch-pounds**. Install cotter pin (7).
3. Check bolt (3). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut, then repeat step 2.



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end insert and rod end is secure.

Ensure rivet, roll pin, and associated hardware through rod end insert at adjustable end of link assy is secure.

Ensure proper application of ALBI fire retardant coatings to the link assy.

Ensure the bushing is installed on the bolt head side of the clevis on the aft end of this link. Omission of this bushing will result in improper stack-up.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end insert is secure.

Ensure the bushing is installed on the bolt head side of the clevis on the aft end of this link. Omission of this bushing will result in improper stack-up.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

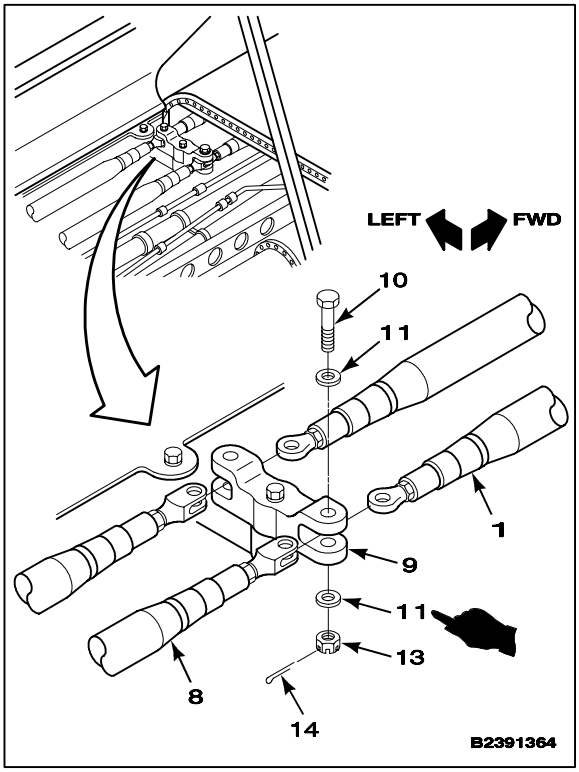
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

NOTE

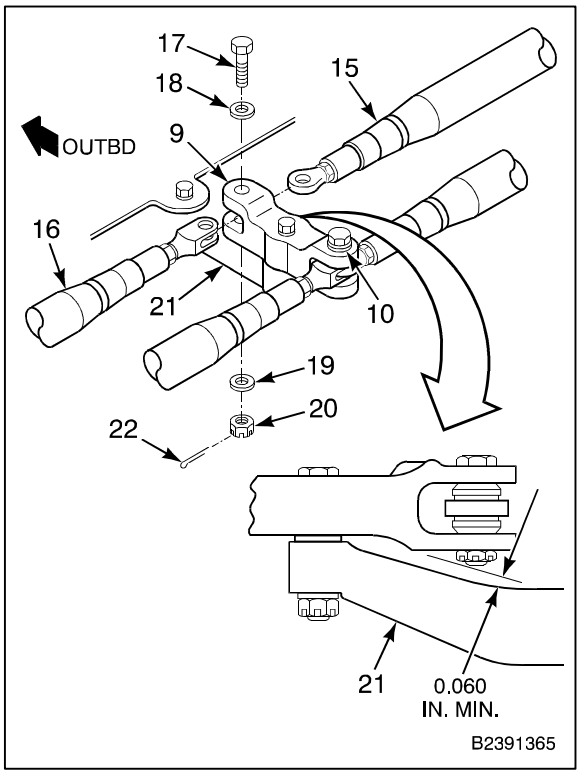
Connecting links at STA 163.00 are shown here. Black band end of a link goes forward. Steel links, either end forward.

4. Ensure bearings are installed in control arm (9). Position right forward connecting link (1) and connecting link (8) in control arm (9).

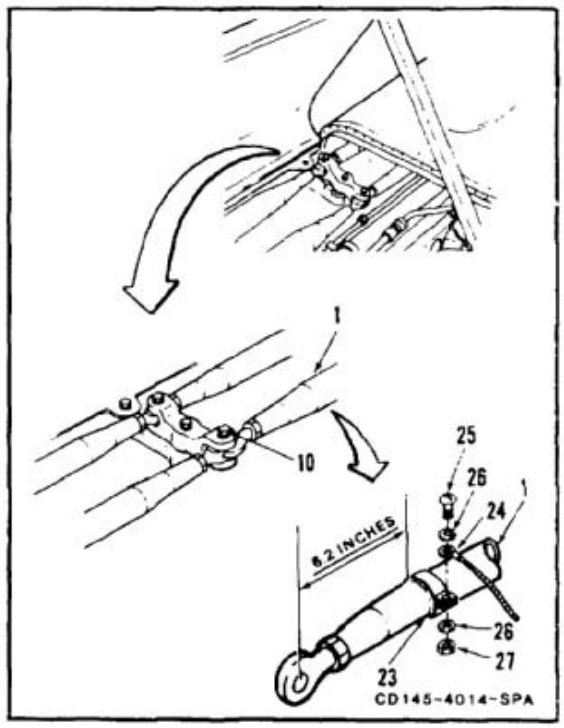
5. Install bolt (10), washer (11), and nut (13). Torque nut to **60 to 90 inch-pounds**. Install cotter pin (14).



6. Position left forward connecting link (15) and connecting link (16) in control arm (9).
7. Install bolt (17), two washers (18 and 19), and nut (20). Torque nut to **60 to 90 inch-pounds**.
8. Check for **0.060 inch** minimum clearance between threaded end of bolt (17) and idler (21). If clearance is **0.060 inch** or more, go to step 13. If clearance is less than **0.060 inch**, go to step 9.
9. Remove nut (20), washers (18 and 19), and bolt (17). Burnish idler (21) under bolt hole. Use abrasive paper (E11). Do not exceed **0.040 inch** in depth and **1 inch** in diameter. There shall be no sharp indentations or gouges in burnished area. Touch up burnished area with **two coats** of epoxy primer (E292.1). Wear gloves (E184.1).
10. Install bolt (17), two washers (18 and 19), and nut (20). Torque nut to **60 to 90 inch-pounds**.
11. Install cotter pin (22) and turn end of cotter pin into nut castellations. Do not turn cotter pin under threaded end of bolt. This is done to maintain **0.060 inch** clearance.
12. Check bolts (10 and 17). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut, then repeat step 5 or 7.



13. Without 38, if connecting link (1) has been repaired or replaced, position clamp (23) as follows:
    a. Measure **6.2 inches** from center of bolt (10) in rod end to non-tapered surface on connecting link (1).
    b. Remove finish from non-tapered surface of link (1) with fine grit abrasive paper (E11). Make sure finish only is removed. No metal shall be removed.
    c. Position clamp (23) on link (1).
14. Without 38, install electrical lead (24), bolt (25), two washers (26), and nut (27) on clamp (23).
15. Without 38, apply alodine (E65) on all bare metal surfaces. Allow to dry thoroughly. Wear gloves (E184.1).
16. Without 38, apply epoxy primer (E292.1) to all bare surfaces coated with alodine (E65). Wear gloves (E184.1).



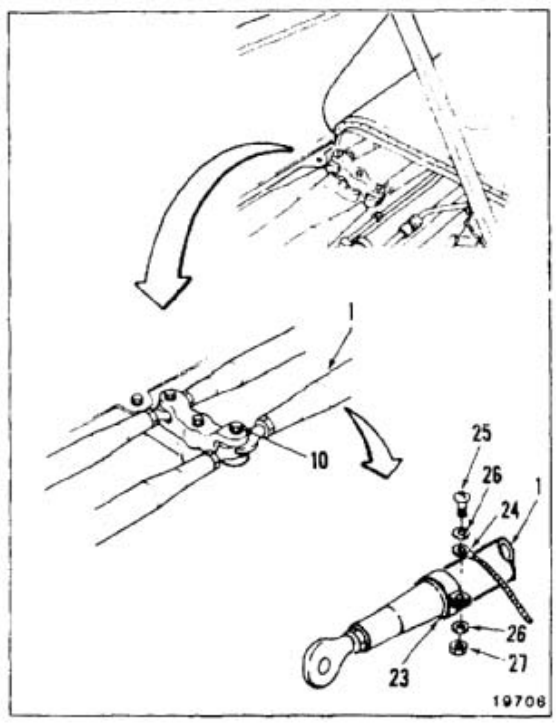
INSPECT

17. With 38, clean inside diameter of clamp (23) and clamp location on link. Use dry cleaning solvent (E162). Wear gloves (E184.1).

NOTE

Clamp (23) is to be positioned on full outer diameter of link. Not on taper end.

18. With 38, position clamp (23) on end of full O.D. of link (1).
19. With 38, install electrical lead (24), bolt (25), two washers (26), and nut (27) on clamp (23).
20. With 38, seal clamp (23) edge around O.D. of link with sealant (E342.1). Wear gloves (E184.1). Allow sealant to air dry for a minimum of **6 hours at 70º to 80ºF (21º to 27ºC)**.



FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform functional check of tunnel controls (TM 55-1520-240-T).
Close tunnel access doors (Task 2-2).

END OF TASK

11-236 REMOVE TUNNEL CONNECTING LINKS 11-236

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

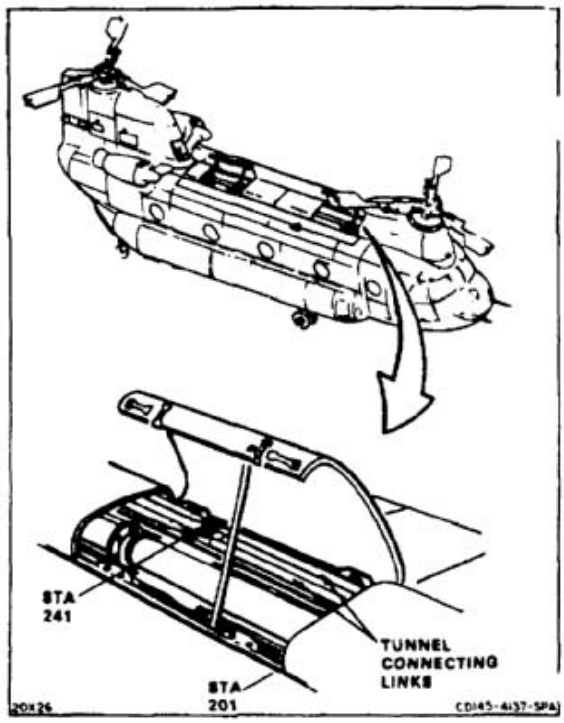
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Tunnel Access Doors Open (Task 2-2)
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)

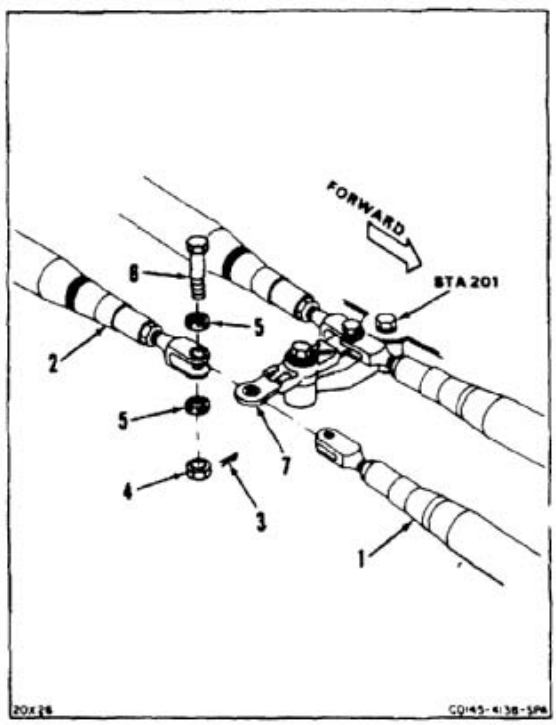


NOTE

Procedure is same for all tunnel connecting links at sta. 201, 241, 281, 321, 361, and 401. Sta. 201, 241, and 401 are shown here.

NOTE

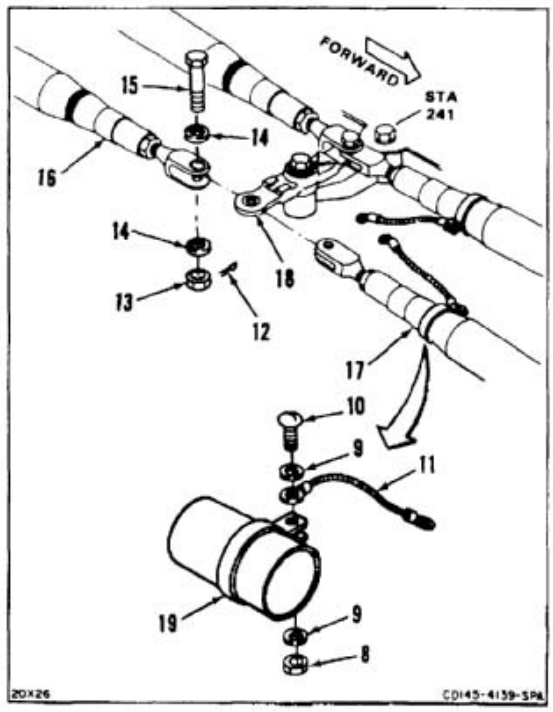
If a crack in the connecting link is suspected during removal, refer to TM 1-1520-253-23.



1. At sta. 201, tag connecting links (1 and 2).
2. Remove cotter pin (3), nut (4), washers (5), and bolt (6) from links (1 and 2) control arm (7).
3. Disconnect connecting links (1 and 2) from control arm (7).

4. At sta. 241, remove nut (8), two washers (9), bolt (10), and electrical lead (11).
5. Remove cotter pin (12), nut (13), washers (14), and bolt (15) from links (16 and 17) and control arm (18).
6. Disconnect connecting links (16 and 17).
7. Without 38, if connecting links (16 and 17) are to be replaced, remove clamp (19).

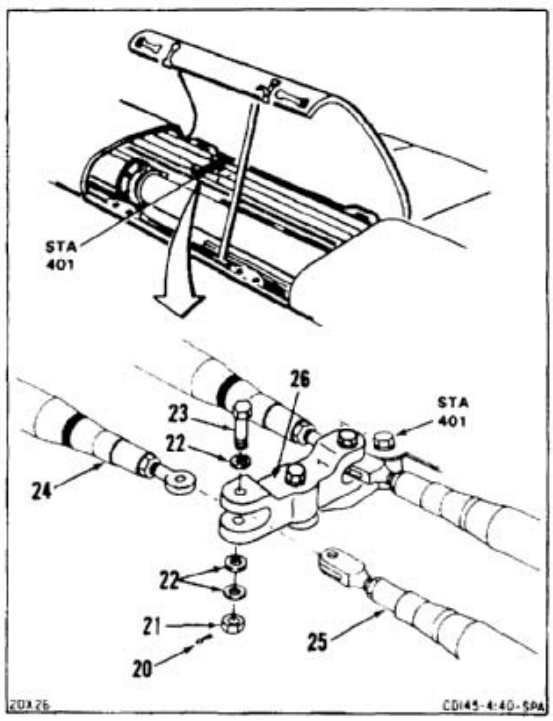
7.1. With 38, if connecting links (16 and 17) are to be replaced, leave clamp (19) with link.



8. At sta. 401 remove cotter pin (20), nut (21), washers (22), and bolt (23) from connecting link (24 and 25) and control arm (26).
9. Disconnect connecting links (24 and 25).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-237 INSTALL TUNNEL CONNECTING LINKS 11-237

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 0 to 30 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds

Material:

Abrasive Paper (E11)
Epoxy Primer (E292.1)
Alodine (E65)
Gloves (E184.1)
Sealant, Type 2, Class B-1/2 (E342.1)
Dry Cleaning Solvent (E162)
Cloths (E120)

Parts:

Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-33

General Safety Instructions:

WARNING

Epoxy primer (E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end is secure.

Ensure the bushing is installed on the bolt head side of the clevis at each end of this link. Omission of this bushing will result in improper joint stack-up.

Ensure that the bonding jumper clamp is installed and properly located.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end insert and rod end is secure.

Ensure rivet, roll pin, and associated hardware through rod end insert at adjustable end of link assy is secure.

Ensure proper application of ALBI fire retardant coatings to the link assy.

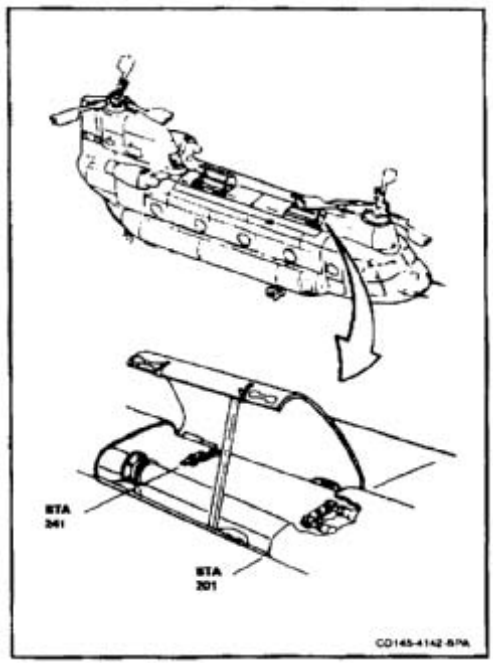
Ensure the bushing is installed on the bolt head side of the clevis on the forward end of this link. Omission of this bushing will result in improper joint stack-up.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Do not install connecting link unless it is same length as link being replaced. If length is not same, connecting link can cause flight controls to be out-of-rig.

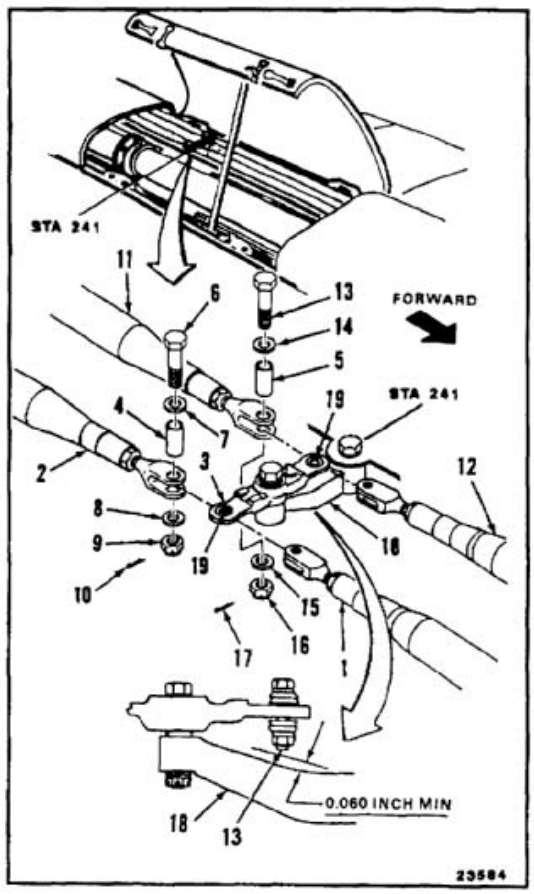


NOTE

Procedure is same for all tunnel connecting links. Links are connected at sta. 201, 241, 281, 321, 361, and 401. Connecting links at sta. 241 are shown here.

All bolts installed in flight control system are self-retaining impedance type bolts. During installation of flight controls make sure all bolts used are self-retaining bolts (Task 1-13).

1. Insure bearings (19) are installed in control arm (3). Position right tunnel connecting links (1 and 2) in control arm (3), with bushing (4) on top. Remove tags.
2. Install bolt (6), two washers (7 and 8), and nut (9). Torque nut to **60 to 90 inch-pounds**. Install cotter pin (10).
3. Position left connecting links (11 and 12) in arm (3), with bushing (5) on top. Remove tags.
4. Install bolt (13), two washers (14 and 15), and nut (16). Torque nut to **60 to 90 inch-pounds**.
5. Check clearance between bolt (13) and idler arm (18). Clearance shall be **0.060 inch** minimum. If clearance is more than **0.060 inch**, go to step 9. If clearance is less than **0.060 inch**, go to step 6.
6. Remove nut (16), two washers (14 and 15), and bolt (13). Burnish idler (18) under bolt hole. Do not exceed **0.040 inch** in depth and **1 inch** in diameter. There shall be no sharp indentations or gouges. Touch up burnished area with two coats of epoxy primer (E292.1). Wear gloves (E184.1).
7. Install bolt (13), two washers (14 and 15), and nut (16). Torque nut to **60 to 90 inch-pounds**.
8. Install cotter pin (17). Turn ends of cotter pin into nut castellations to maintain **0.060 inch** clearance.
9. Check bolts (6 and 13). Bolts shall not be rotated with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 2 or 4.



10. Without **38**, if links (1, 2, 11, and 12) on forward or aft side of sta. 241 are being replaced, install loop clamp (18) on link as follows:

    a. Measure **5.6 inches** from center of hole in clevis end to non-tapered surface of links (1, 2, 11, and 12).

    b. Remove finish from links (1, 2, 11, and 12) surface with fine grit abrasive paper (E11). Make sure only finish is removed from link. There shall be no removal of metal.

    c. Install loop clamp (18) in center of non-tapered surface of links (1, 2, 11, and 12) as shown.

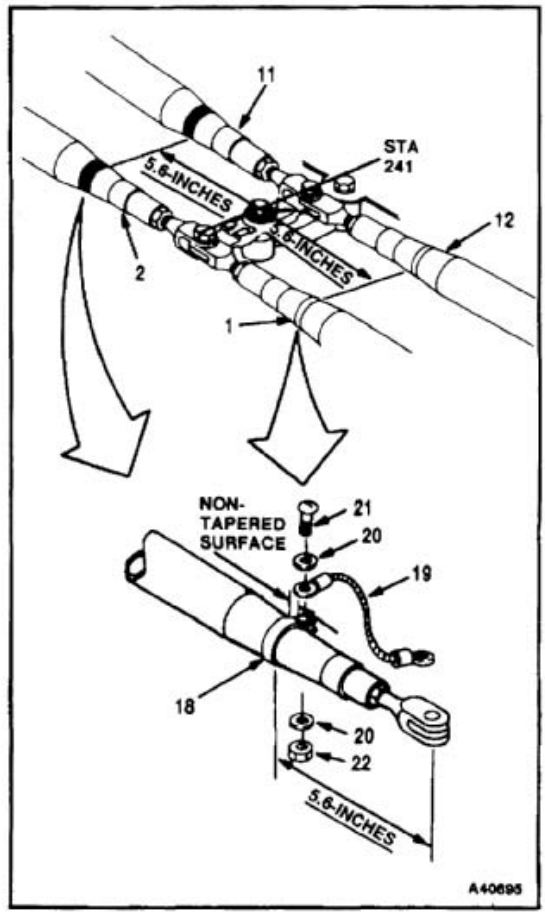
11. Without **38**, install electrical lead (19), two washers (20), bolt (21), and nut (22) on loop clamp (18).

WARNING

Alodine (E65) is an oxidizer. Discard cloths which contain this material in a seperate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

12. Without **38**, apply brush alodine (E65) to loop clamps (18) and all bare metal around clamps. Allow to dry. Wear gloves (E184.1).

13. Without **38**, apply epoxy primer (E292.1) to all bare metal surfaces coated with alodine (E65). Wear gloves (E184.1).



WARNING

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

14. With 38, clean inside diameter of clamp (18) and clamp location on link. Use dry cleaning solvent (E162).

NOTE

Clamp (18) is to be positioned on full outer diameter of link. Not on taper end.

15. With 38, position clamp (18) on end of full O.D. of link.

16. With 38, install electrical lead (19), bolt (21), two washers (20), and nut (22) on clamp (18).

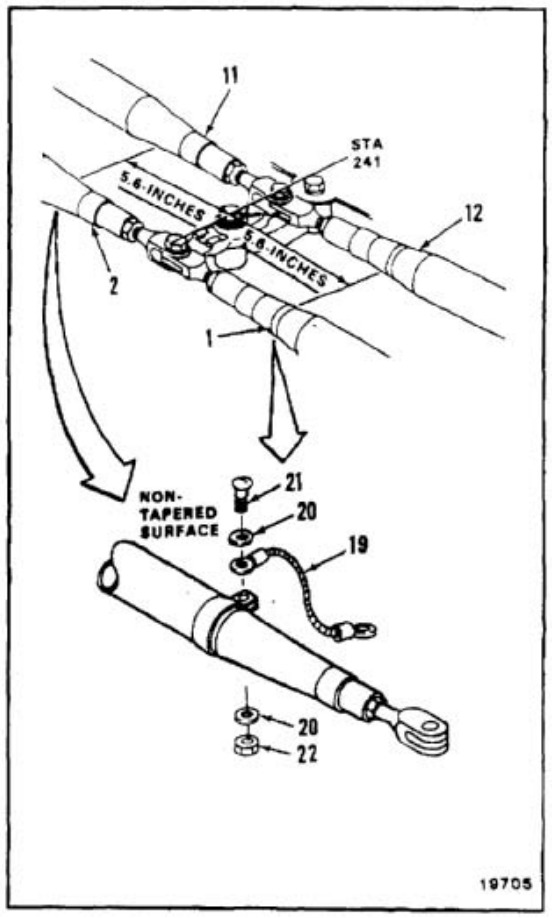
WARNING

Sealant (E342.1) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

17. With 38, seal clamp (18) edge around O.D. of link with sealant (E342.1). Wear gloves (E184.1) Allow sealant to air dry for a minimum of **6 hours at 70° to 80° F (21° to 27°C)**.

NOTE

If connecting link has any change in length, perform neutral rig check (Task 11-33).



INSPECT

FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Perform functional check of tunnel controls (TM 55-1520-240-T).
Close tunnel access doors (Task 2-2).
Remove hydraulic power.
Remove electrical power.

END OF TASK

11-238 REMOVE TUNNEL AFT CONNECTING LINKS 11-238

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

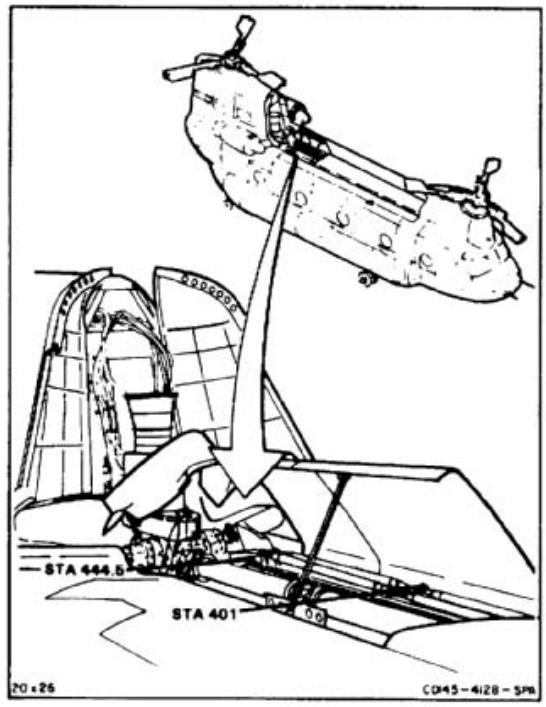
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
No. 5 and No. 6 Tunnel Access Doors Open (Task 2-2)
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)



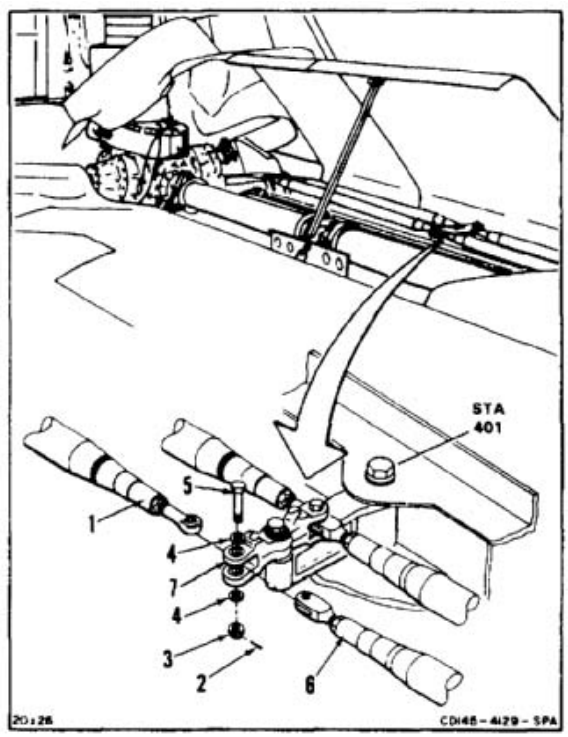
NOTE

Procedure is same to remove left or right connecting links. Right connecting links at sta. 401 and 444.5 are shown here.

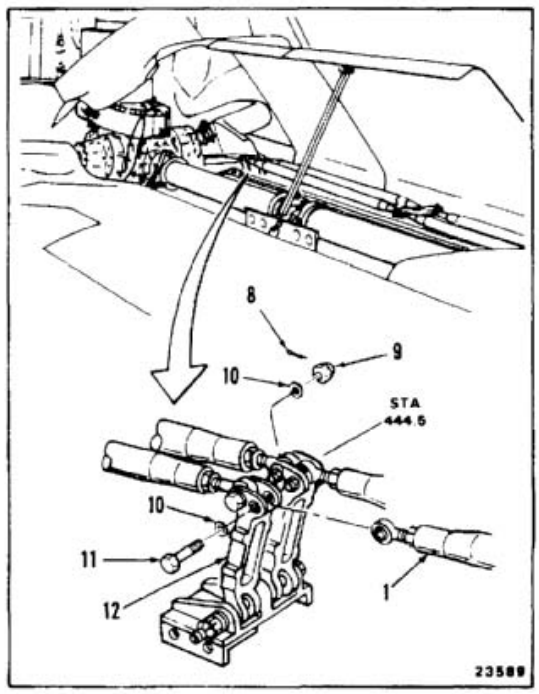
NOTE

If a crack in the connecting link is suspected during removal, refer to TM 1-1520-253-23.

1. At sta. 401, tag connecting link (1).
2. Remove cotter pin (2), nut (3), washers (4), and bolt (5) from forward end of tunnel aft connecting link (1), aft end of tunnel connecting link (6), and control arm (7).
3. Remove forward and of connecting link (1) from tunnel connecting link (6) and control arm (7).



4. At sta. 444.5, remove cotter pin (8), nut (9), washers (10), and bolt (11) from aft end of connecting link (1) and fuselage idler bellcrank (12).
5. Remove aft end of connecting link (1) from fuselage idler bellcrank (12).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-239 INSTALL TUNNEL AFT CONNECTING LINKS 11-239

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Epoxy Primer (E292.1)
Abrasive Paper (E11)
Gloves (E184.1)

Parts:

Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-33

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end insert and rod end bearing is secure.

Ensure rivet, roll pin, and associated hardware through rod end insert at adjustable end of link assy is secure.

Ensure proper application of ALBI fire retardant coatings to the link assy.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

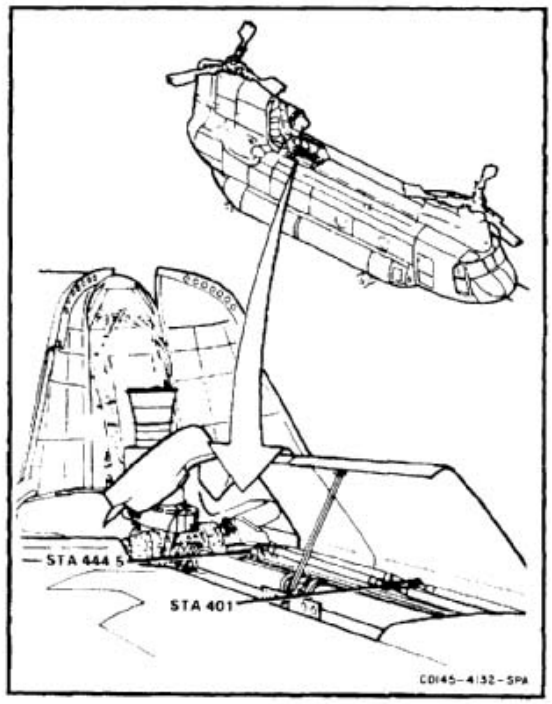
CAUTION

Do not install connecting link unless it is same length as link being replaced. If length is not same, connecting link can cause flight controls to be out-of-rig.

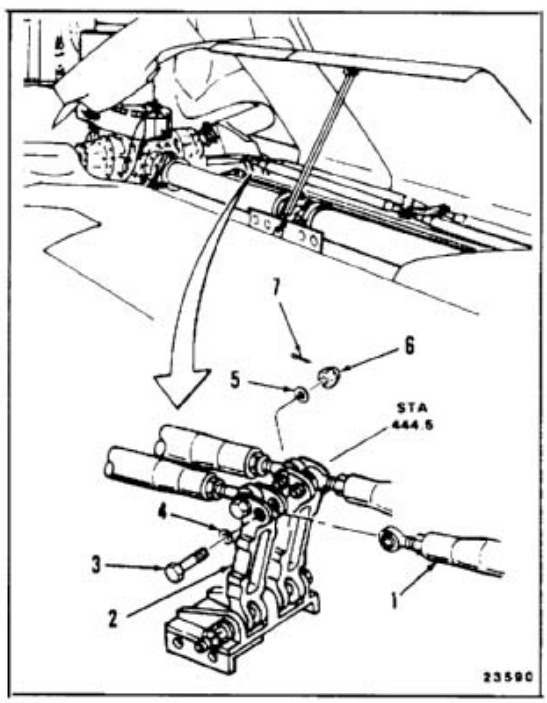
NOTE

Procedure is same to install left and right connecting links. Right connecting link at sta. 401 and 444.5 is shown here.

Bolts installed in flight control system are self-retaining bolts. During installation of connecting links make sure all bolts used are self-retaining (Task 1-13).



1. Position right tunnel aft connecting link (1) in idler bellcrank (2). Remove tag.
2. Install bolt (3), two washers (4 and 5), and nut (6). Torque nut to **60 to 90 inch-pounds**. Install cotter pin (7).
3. Check bolt (3). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness, if bolt rotates or is loose, add washer under nut and repeat step 2.



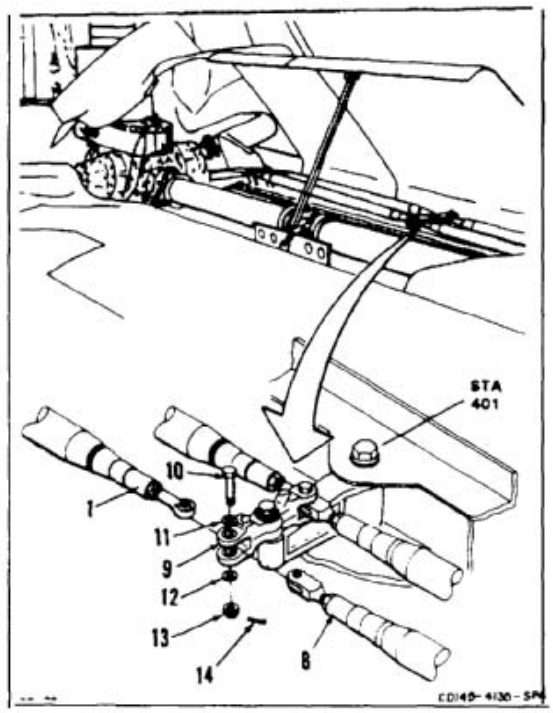
NOTE

Procedure is same for left and right connecting links except as noted in task. Right side at sta. 401 is shown here.

4. Position link (1) and tunnel connecting link (8) in control arm (9).

5. Install bolt (10), two washers (11 and 12), and nut (13). Torque nut to **60 to 90 inch-pounds**. Install cotter pin (14).

6. Check bolt (10). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 5.



7. If left tunnel aft connecting link (15) is being installed, check clearance between bolt (16) and arm (9). Clearance shall be **0.060 inch** minimum. If clearance is more than **0.060 inch**, go to step 11. If clearance is less than **0.060 inch**, go to step 8.

WARNING

Epoxy primer (E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

8. Remove cotter pin (17), nut (18), two washers (19 and 20), and bolt (16). Burnish idler (9) under bolt hole. Use abrasive paper (E11). Do not burnish deeper than **0.040 inch** in depth and **1 inch** in diameter. There shall be no sharp indentations or gouges in burnished area. Touch up burnished area with two coats of epoxy primer (E292.1). Wear gloves (E184.1).

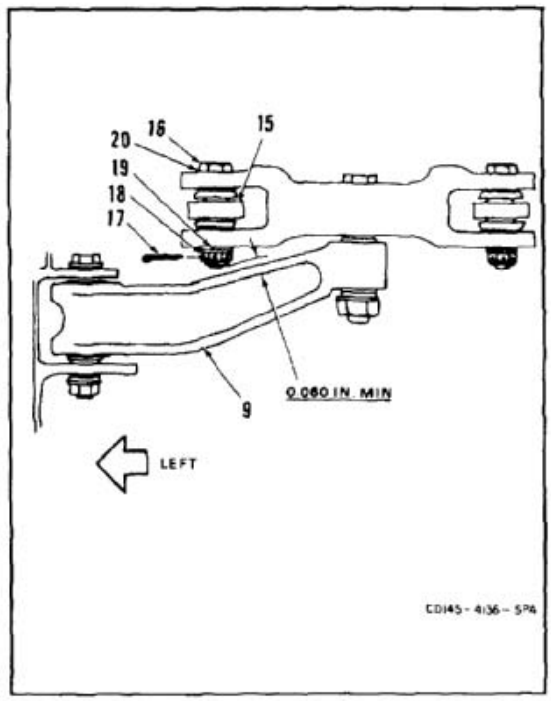
9. Install bolt (16), two washers (20 and 19), and nut (18). Torque nut to **60 to 90 inch-pounds**.

10. Install cotter pin (17). Turn ends of cotter pin into nut castellations to maintain **0.060 inch** clearance.

11. Check bolt (16). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat steps 9 and 10.

NOTE

If any connecting links are changed in length, perform neutral rig check (Task 11-33).



INSPECT

FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety block (Task 11-29).
Functionally check operation of tunnel controls (TM 55-1520-240-T).
Close tunnel access doors (Task 2-2).

END OF TASK

11-240 REMOVE TUNNEL CONTROL ARMS 11-240

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

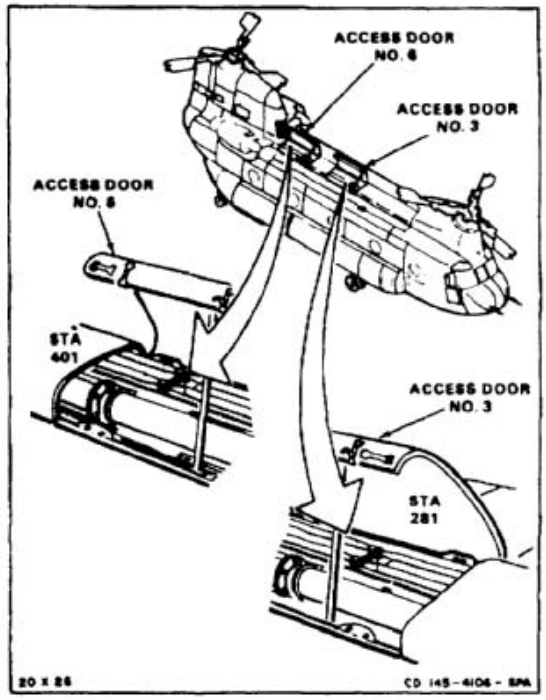
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Tunnel Access Doors No. 3 and No. 6 Open (Task 2-2)
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)

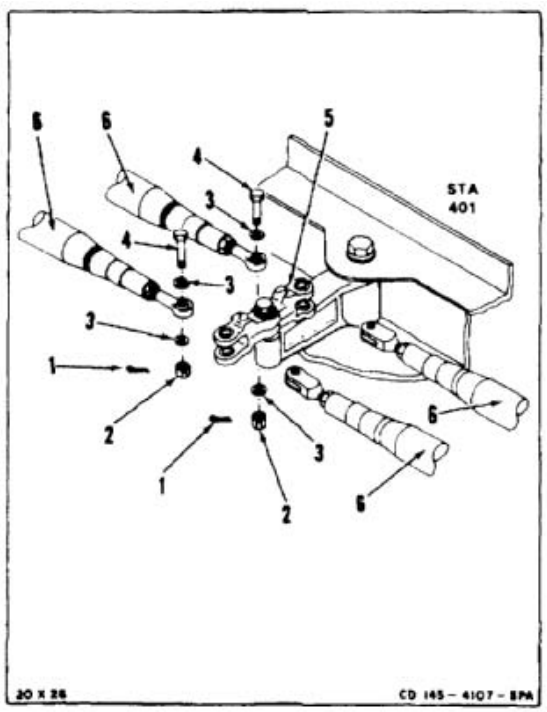


NOTE

Procedure is same for all tunnel control arms. Control arms are located at sta. 163, 201, 241, 281, 321, 361, and 401. Control arms sta. 281 and 401 are shown here.

NOTE

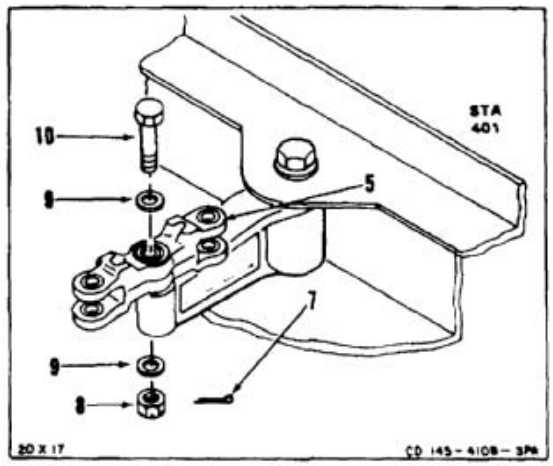
If a crack in the connecting links is suspected during removal, refer to TM 1-1520-253-23.



REMOVE CONTROL ARM AT STA 401

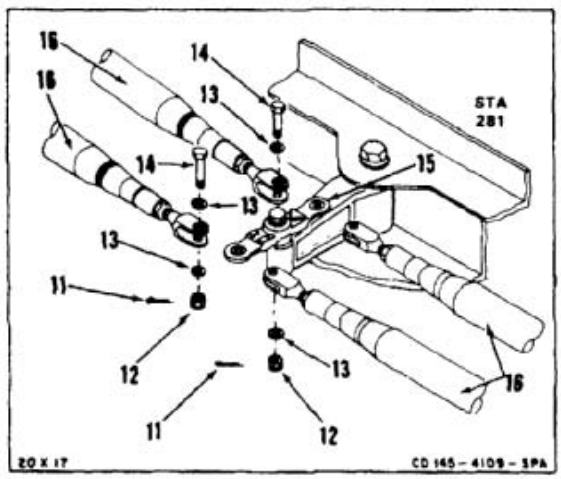
1. Remove two cotter pins (1), two nuts (2), four washers (3), and two bolts (4) from control arm (5).
2. Disconnect four connecting links (6) from control arm (5).

3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10).
4. Tag and remove control arm (5).



REMOVE CONTROL ARM AT STA 281

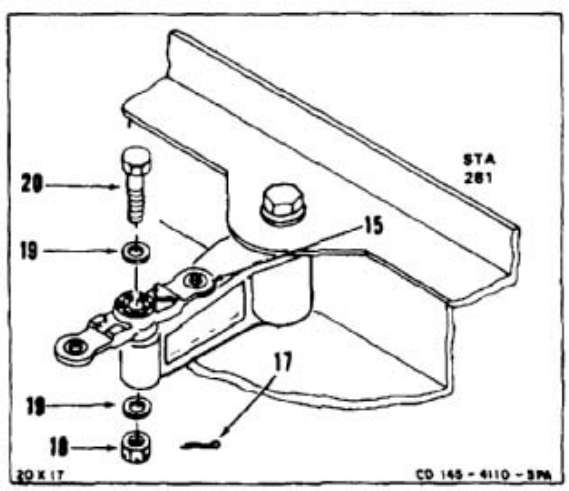
5. Remove two cotter pins (11), two nuts (12), four washers (13), and two bolts (14) from control arm (15).
6. Disconnect four connecting links (16) from control arm (15).



7. Remove cotter pin (17), nut (18), two washers (19), and bolt (20).
8. Tag and remove control arm (16).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-241 INSTALL TUNNEL CONTROL ARMS 11-241

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Epoxy Primer (E292.1)
Abrasive Paper (E5)
Gloves (E184.1)

Parts:

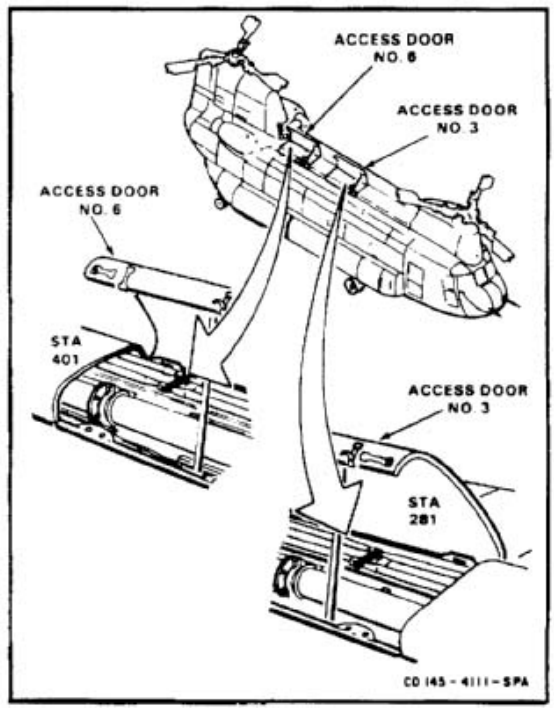
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 11-33



NOTE

Procedure is same for all tunnel control arms. Control arms are located at sta. 163, 201, 241, 281, 321, 361, and 401. Control arms at sta. 281 and 401 are shown here.

All bolts installed in flight control system are self-retaining impedance bolts. During installation of flight controls make sure all bolts used are self-retaining bolts.

INSTALL CONTROL ARMS AT STA 163 AND 401

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that bearings are properly installed and located (2 places) in each clevis of the walking beam.

Ensure walking beam hub bearings are serviceable, secure and properly installed.

Ensure the locating pads on the walking beam forging are installed facing up at all locations.

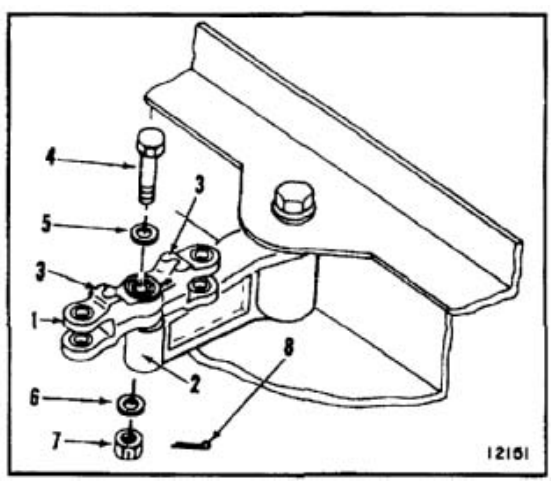
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

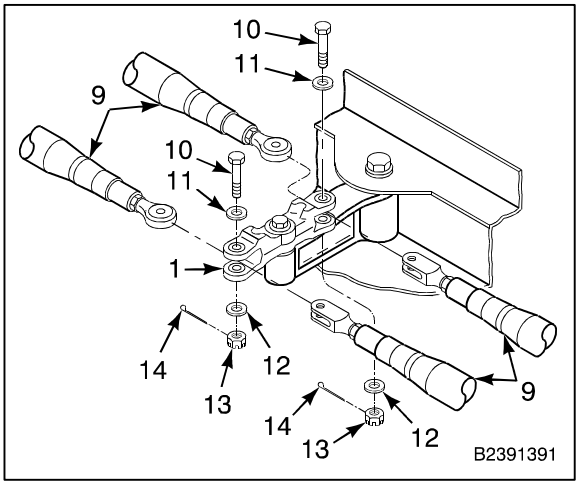
CAUTION

Bellcrank must be positioned with side marked TOP facing up; otherwise, serious damage to components can occur.

1. Remove tag and position control arm (1) on idler (2) with pads (3) and the word TOP up.
2. Install bolt (4), two washers (5 and 6), and nut (7). Torque nut to **85 to 125 inch-pounds**. Install cotter pin (8).
3. Check bolt (4). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 2.



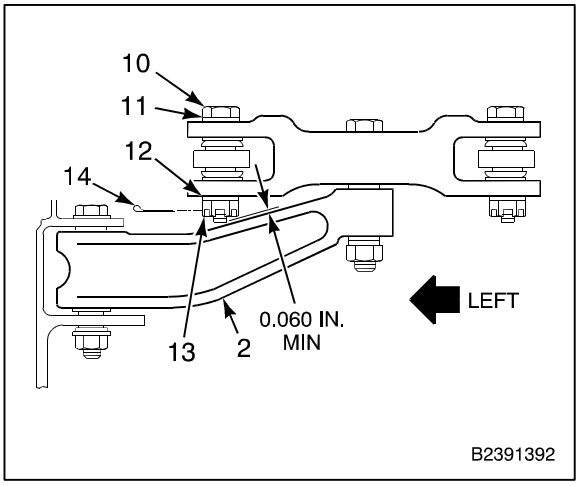
4. Position four connection links (9) in control arm (1).
5. Install two bolts (10), two washers (11), and two nuts (13). Torque two nuts **60 to 90 inch-pounds**. Install two cotter pins (14).
6. Check bolts (10). Bolts shall not rotate with torque less than **10 inch-pounds**. Bolts shall have no axial looseness. If bolts rotate or are loose, add washer under nut and repeat step 5.



7. Check clearance between bolt (10) and idler (2). Clearance shall be **0.060 inch** minimum. If clearance is more than **0.060 inch**, go to step 11. If clearance is less than **0.060 inch**, go to step 8.

WARNING

Epoxy primer (E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



8. Remove cotter pin (14), nut (13), two washers (12 and 11), and bolt (10). Burnish idler (2) under bolt hole. Use abrasive paper (E11). Do not burnish more than **0.040 inch** deep and **1 inch** in diameter. There shall be no sharp indentations or gouges in burnished area. Touch up burnished area with **two coats** of epoxy primer (E292.1). Wear gloves (E184.1).
9. Install bolt (10), two washers (11 and 12) and nut (13). Torque nut to **60 to 90 inch-pounds**.
10. Install cotter pin (14). Turn ends of cotter pin into nut castellations to maintain **0.060 inch** clearance.
11. Check bolt (10). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat steps 9 and 10.

INSTALL CONTROL ARMS AT STA 201.00, 241.00, 281.00, 321.00, AND 361.00

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that bearings are properly installed and staked at each end of the walking beam.

Ensure walking beam hub bearings are serviceable, secure and properly installed.

Ensure the locating pads on the walking beam forging are installed facing up at all locations.

Ensure the slip bushings are installed when attaching the adjacent control rods at each end of the walking beam assembly.

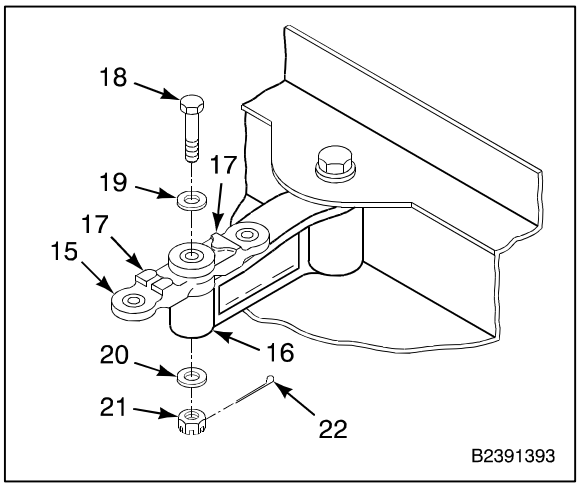
Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Bellcrank must be positioned as indicated, with side marked TOP facing up; otherwise, serious damage to components can occur.

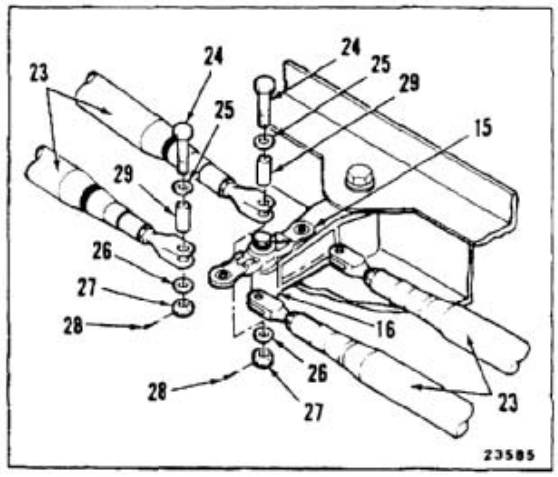
12. Position control arm (15) on idler (16) with pads (17) and the word TOP up.
13. Install bolt (18), two washers (19 and 20), and nut (21). Torque nut **85 to 125 inch-pounds**. Install cotter pin (22).
14. Check bolt (18). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 13.



15. Position four connecting links (23) on control arm (15).

16. Install two bushing (29), two bolts (24), two washers (25), two washers (26), and two nuts (27). Torque two nuts to **60 to 90 inch-pounds**. Install cotter pin (28).

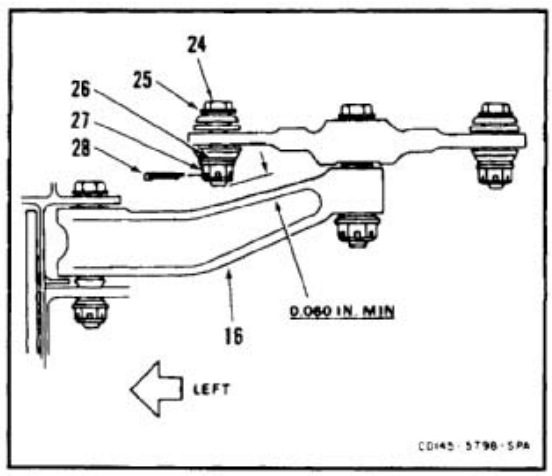
17. Check bolts (24). Bolts shall not rotate with torque less than **10 inch-pounds**. Bolts shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 16.



18. Check clearance between bolt (24) and idler (16). Clearance shall be **0.060 inch** minimum. If clearance is more than **0.060 inch**, go to step 22. If clearance is less than **0.060 inch**, go to step 19.

WARNING

Epoxy primer (E292.1) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



19. Remove cotter pin (28), nut (27), two washers (26 and 25), and bolt (24). Burnish idler (16) under bolt hole. Use abrasive paper (E11). Do not burnish more than **0.040 inch** deep and **1 inch** in diameter. There shall be no sharp indentations or gouges in burnished area. Touch up burnished area with two coats of epoxy primer (E292.1). Wear gloves (E184.1).

20. Install bolt (24), two washers (25 and 26) and nut (27). Torque nut to **60 to 90 inch-pounds**.

21. Install cotter pin (28). Turn ends of cotter pin into nut castellations to maintain **0.060 inch** clearance.

22. Check bolt (24). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat steps 20 and 21.

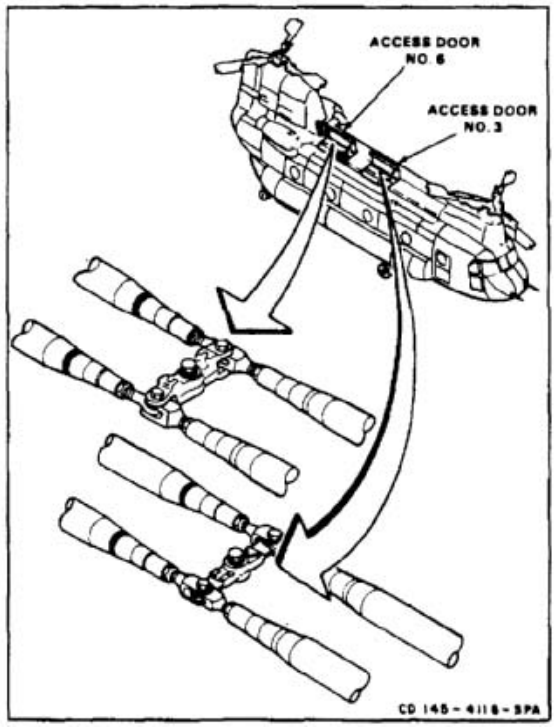
NOTE

If any connecting links had a change in length, perform neutral rig check (Task 11-33).

INSPECT

FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Perform functional test of tunnel controls (TM 55-1520-240-T).
Close No. 3 and No. 6 tunnel access covers (Task 2-2).



END OF TASK

11-242 REMOVE TUNNEL CONTROLS IDLER 11-242

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Personnel Required:

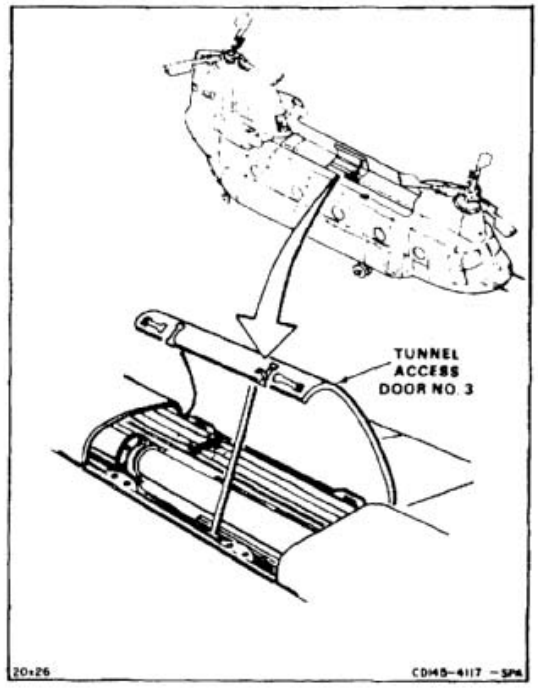
Medium Helicopter Repairer (2)

References:

Task 2-208

Equipment Condition:

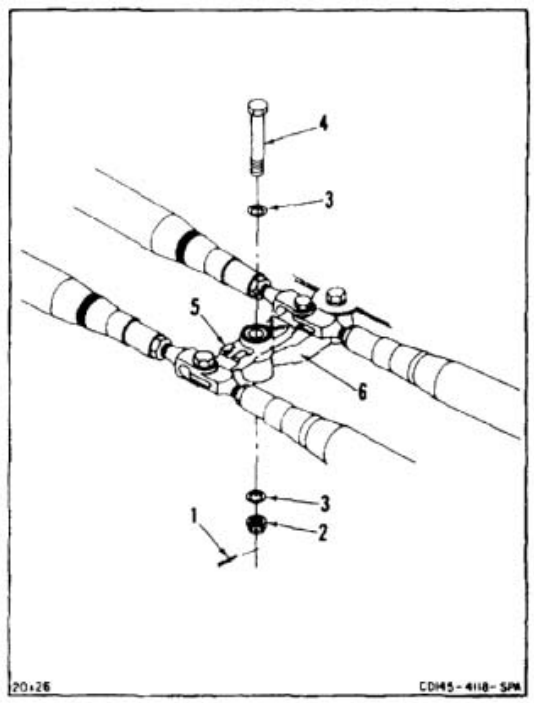
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Tunnel Access Door No. 3 Opened (Task 2-2)
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)



NOTE

Procedure is same for all tunnel controls idlers. Idlers are located at sta. 163, 201, 241, 281, 321, 361, and 401. Idler at sta. 281 is shown here.

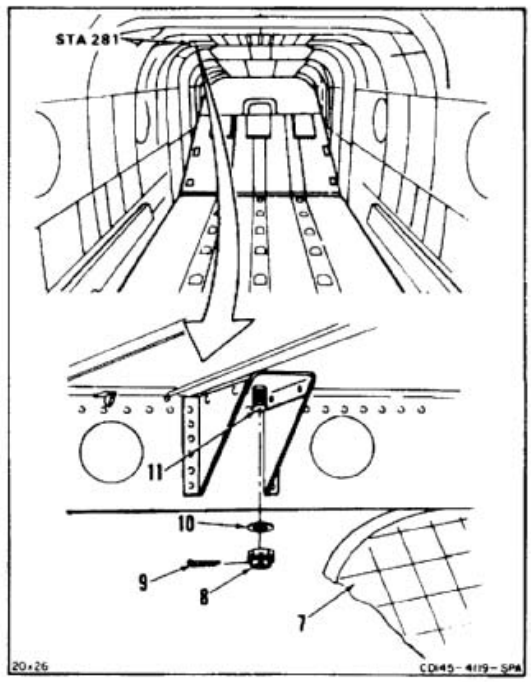
1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from control arm (5) and idler (6).
2. Lift control arm (5) and swing idler (6) clear of control arm.



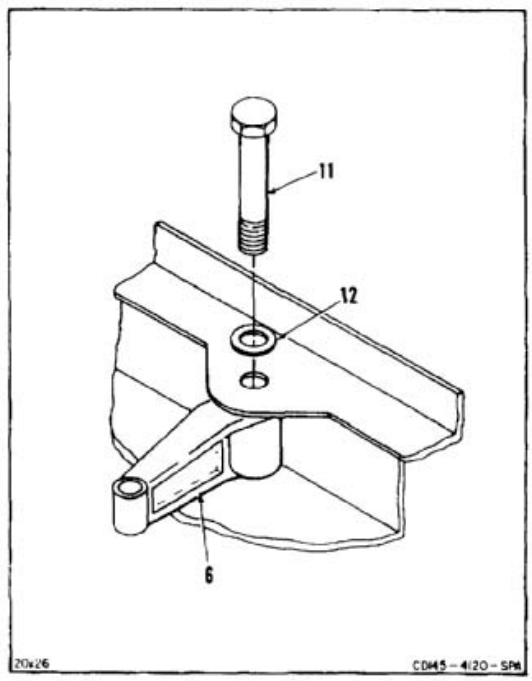
NOTE

All idler attaching hardware is covered by insulation blankets in cabin area.

3. Have helper in cabin area pull down edge of insulation blanket (7) at sta. 281 to expose nut (8) (Task 2-208).
4. Remove cotter pin (9), nut (8), and washer (10) from bolt (11).



5. From outside, remove bolt (11) and washer (12).
6. Remove idler (6).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-243 INSTALL TUNNEL CONTROLS IDLER 11-243

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds

Materials:

None

Parts:

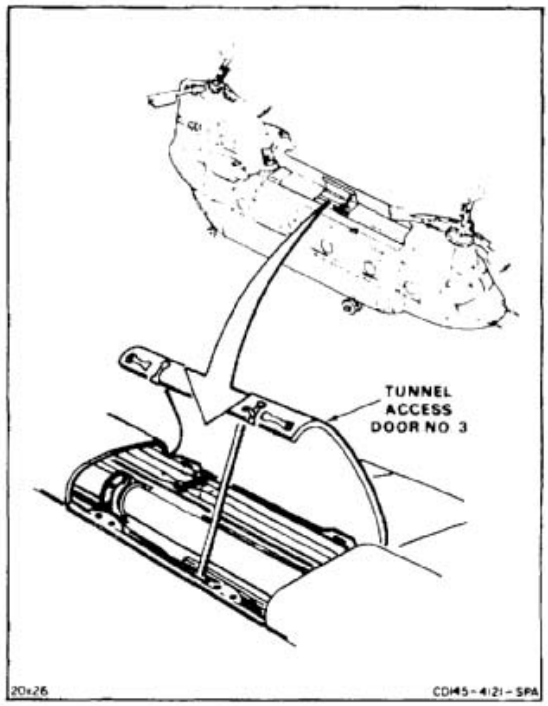
Cotter Pins
Bolt
Tension Nut
Washer

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 2-210
Task 11-33



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that the flanged bushings are properly installed.

Ensure idler assembly hub bearings are serviceable, secure and properly installed.

Ensure clearance cut is present on top side off all idler assemblies and a minimum of **0.06 inch** clearance exists in that area to adjacent connecting link attaching hardware.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

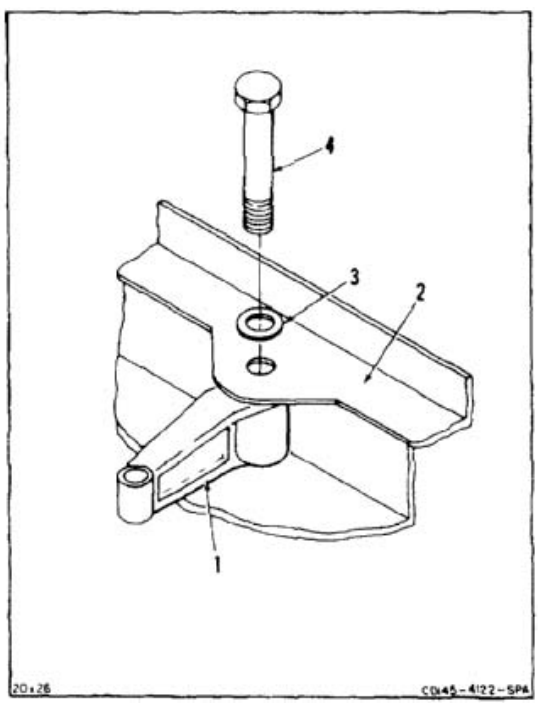
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

NOTE

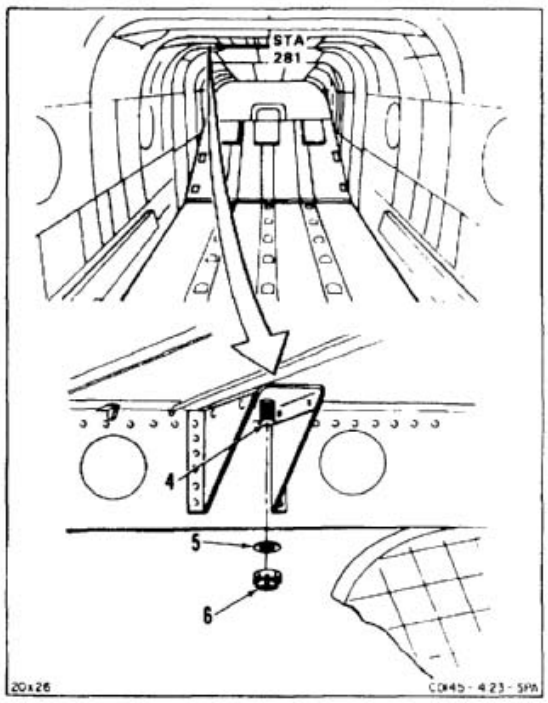
Procedure is same for all tunnel control idlers. Idlers are located at sta. 163, 201, 241, 281, 321, 361, and 401. Idler at sta. 281 is shown here.

All bolts installed in flight control system are self-retaining impedance bolts. During installation of flight controls make sure all bolts used are self-retaining bolts.

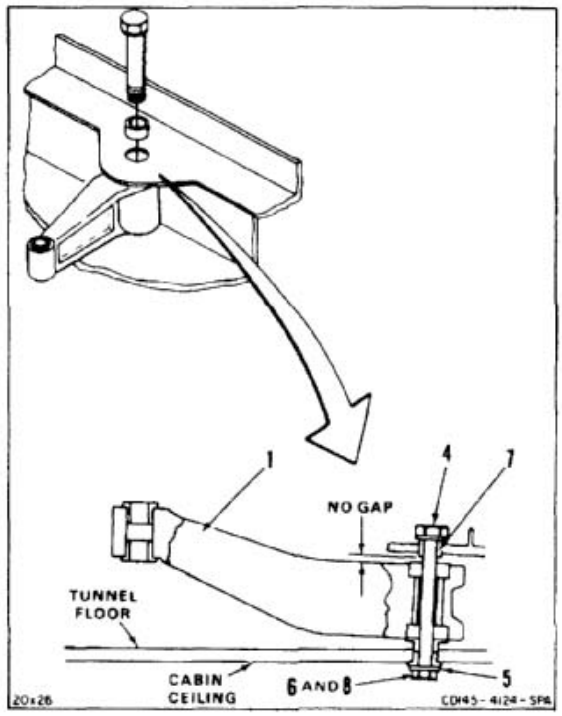
1. Position tunnel control idler (1) in structure (2).
2. Install washer (3) and bolt (4) through idler (1).
3. Hold bolt (4) with wrench while helper works in cabin area.



4. In cabin area install washer (5), and nut (6) on bolt (4).
5. Torque nut (8) to **60 to 90 inch-pounds**.



6. Check idler (1) for up and down play. Check for gap between bushing (7) and idler (1). There shall be no gap. If there is play or gap, adjust idler as follows:



CAUTION

Do not use shear nut to pull bushing into contact with idler bearing. Nut can strip and damage bolt.

a. Remove shear nut (6).

b. Install tension nut (8).

CAUTION

Do not damage or bend structure while seating bushing.

c. Torque nut (8) to seat bushing (7) on idler bearing. Do not exceed **170 inch-pounds**.

CAUTION

Do not strike bolthead with strong force. Damage to structure can result.

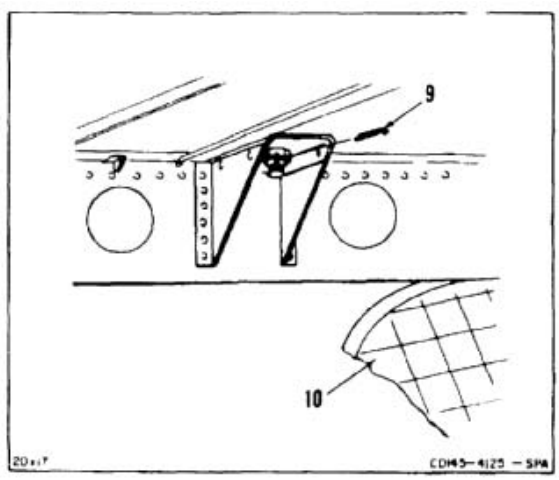
d. If necessary, carefully tap head of bolt (4) to seat bushing (7) on bearing.

e. Install new bolt (4), new nut (6), and new washer (5). Torque nut to **60 to 90 inch-pounds**.

7. Check tunnel control idler (1) for binding. If there is no binding go to step 8. If there is binding replace idler. There shall be no binding.

8. Install cotter pin (9).

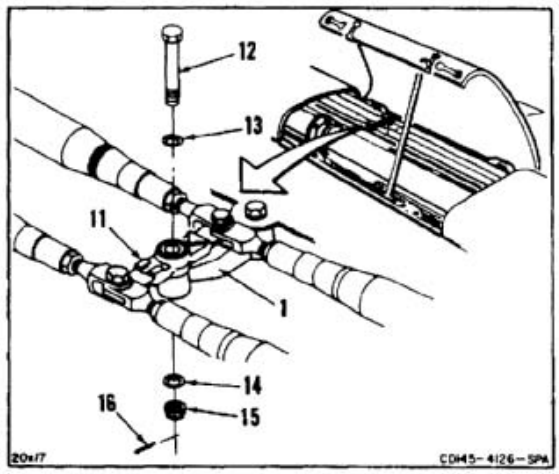
9. Push edge of insulation blanket (10) back into place (Task 2-210).



10. From outside lift control arm (11). Swing idler (1) under control arm.
11. Install bolt (12), two washers (13 and 14), and nut (15). Torque nut to **85 to 125 inch-pounds**. Install cotter pin (16).
12. Check bolt (12). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 11.

NOTE

If connecting links are changed in length, perform neutral rig check Task 11-33).



INSPECT

FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Perform functional test of tunnel controls (Tasks 11-5 and 11-6).
Close tunnel access door No. 3 (Task 2-2).

END OF TASK

SECTION VIII
AFT FUSELAGE AND PYLON CONTROLS

11-244 REMOVE AFT FUSELAGE CONNECTING LINKS 11-244

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)

Personnel Required:

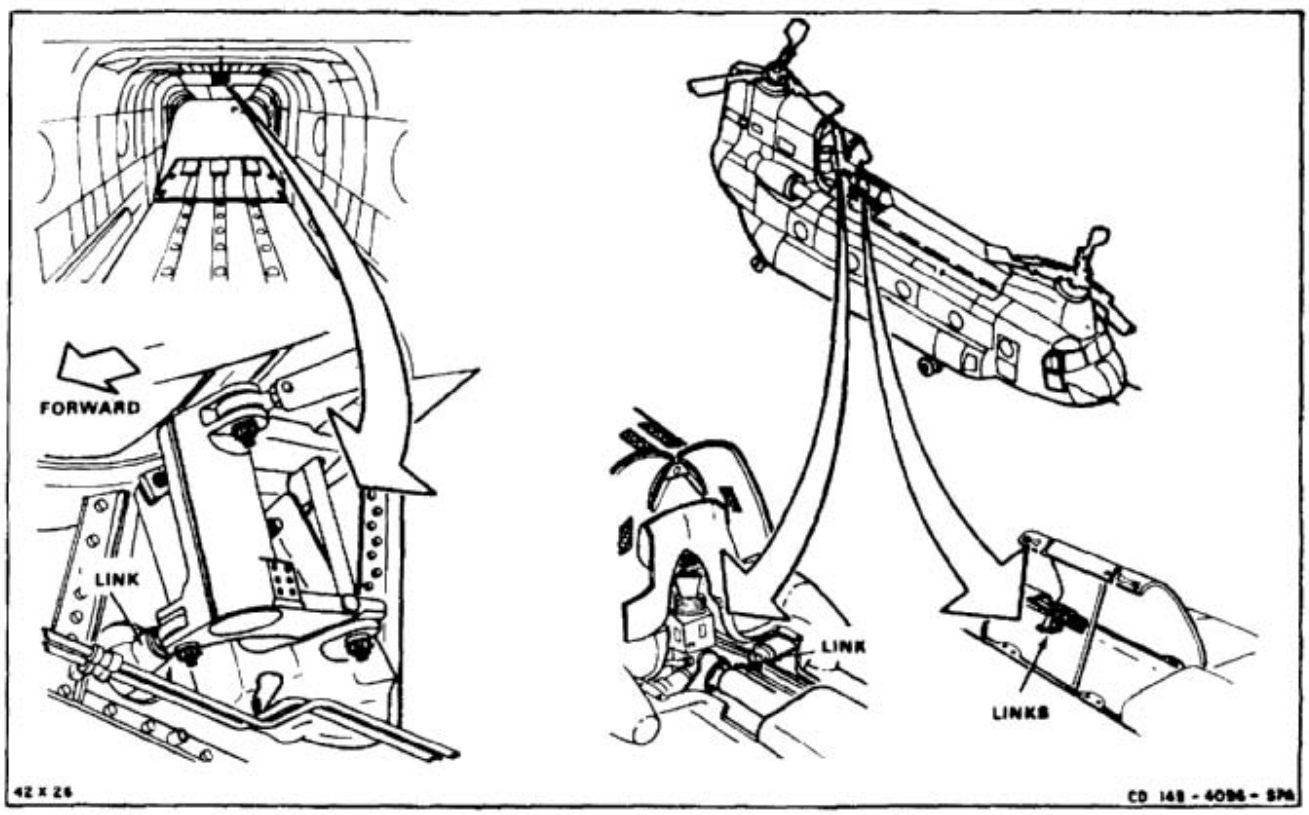
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)
Tunnel Access Covers Opened (Task 2-2)
Pylon Doors Opened (Task 2-2)
Cargo Ramp Opened (TM 55-1520-240-T)



11-244 REMOVE AFT FUSELAGE CONNECTING LINKS (Continued) 11-244

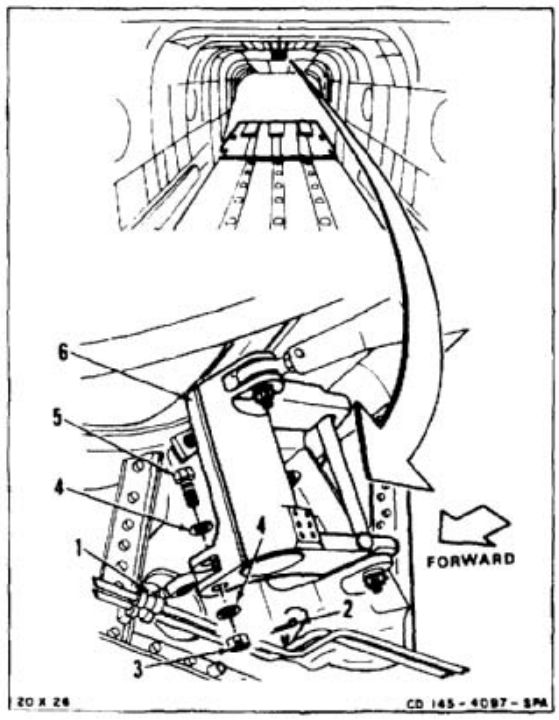
NOTE

Attaching bolts, washers, and nuts will be temporarily installed after removing links and bellcranks.

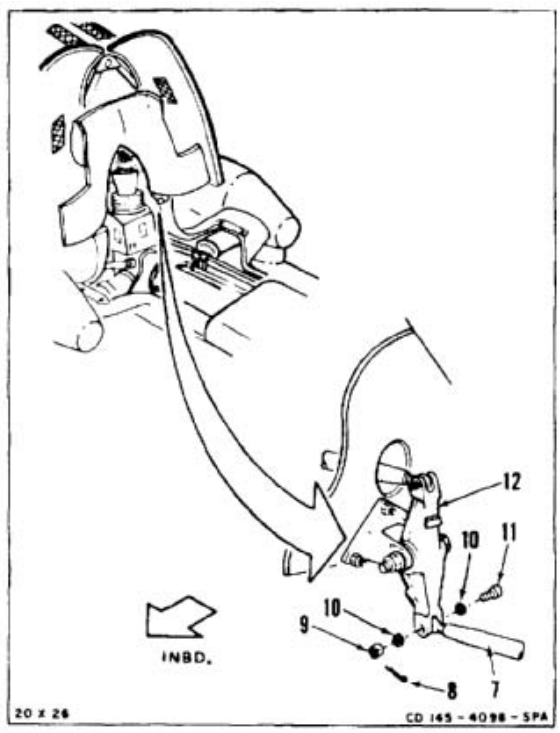
NOTE

If a crack in the connecting link or bellcrank is suspected during removal, refer to TM 1-1520-253-23.

1. Tag left side connecting link (1).
2. Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from connecting link (1) and bellcrank (6).
3. Remove connecting link (1) from bellcrank (6). Install bolt (5), two washers (4), and nut (3) in bellcrank.



4. Tag right side connecting link (7).
5. Remove cotter pin (8), nut (9), two washers (10), and bolt (11) from bellcrank (12) and connecting link (7).
6. Remove connecting link (7) from bellcrank (12). Install bolt (11), two washers (10), and nut (9) in bellcrank.



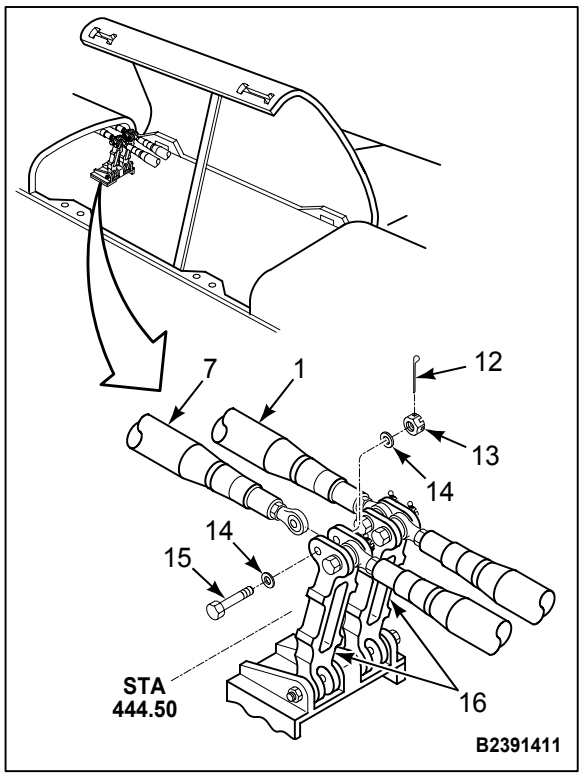
NOTE

Procedure is same for forward end of left and right connecting link. Right side connecting link at sta. 444.5 is shown here.

7. Remove cotter pin (12), nut (13), two washers (14), and bolt (15).
8. Remove connecting links (1 or 7) from fuselage idler bellcrank (16). Install bolt (15), two washers (14), and nut (13) in bellcrank.

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-245 INSTALL AFT FUSELAGE CONNECTING LINKS 11-245

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

Gloves (E186)

Parts:

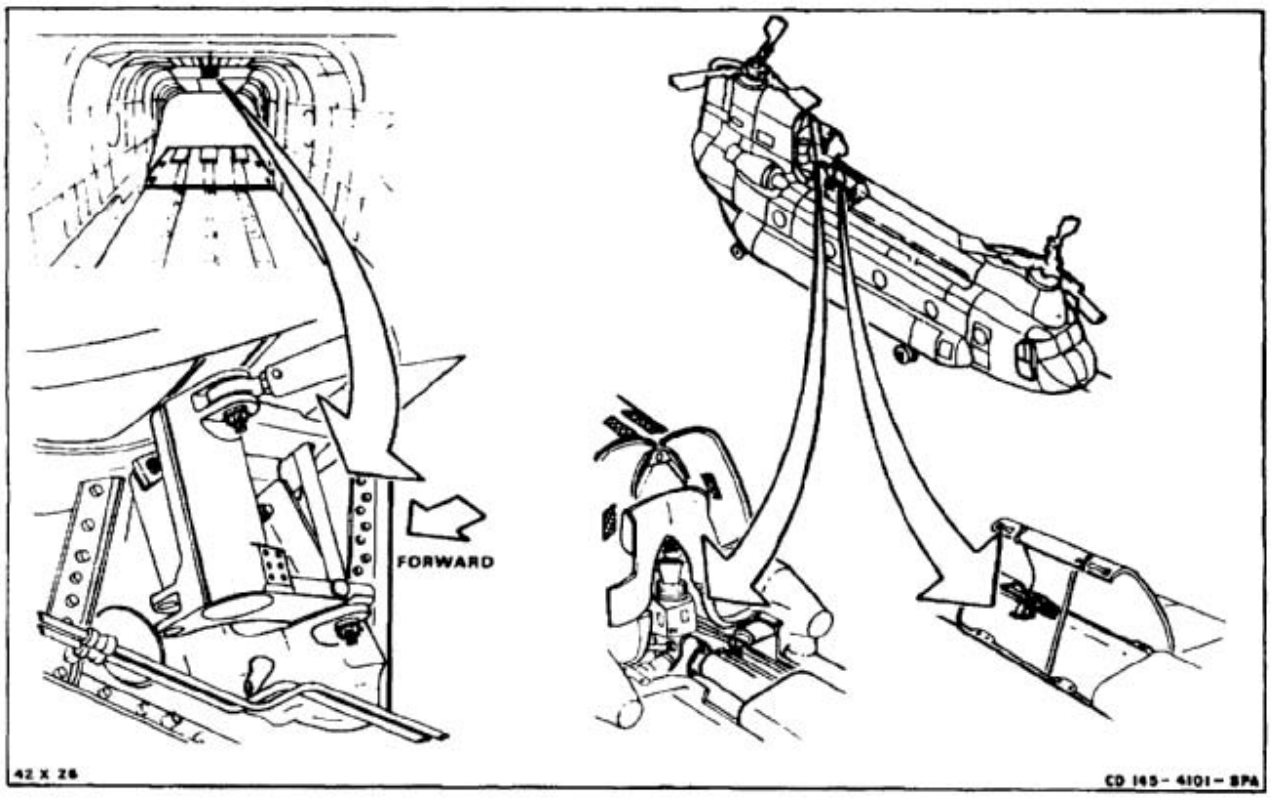
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P



WARNING

Install only steel connecting links 414C2520-3 and -4. See mandatory safety-of-flight message CH-47-84-04.

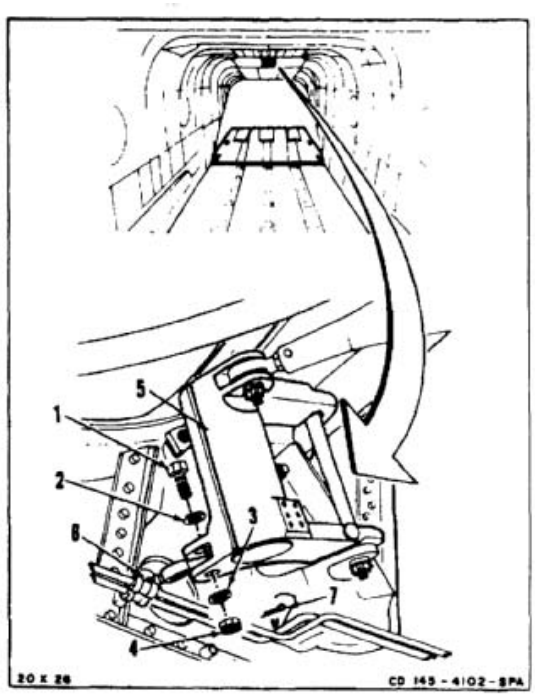
CAUTION

Do not install connecting link unless it is same length as link being replaced. If length is not same, connecting link can cause flight controls to be out-of-rig.

Make sure bushings are in bellcranks before installing bolts or damage will result to bellcranks.

NOTE

All bolts installed in flight control system are self-retaining impedance bolts. During installation of flight controls make sure all bolts used are self-retaining bolts.



1. Remove bolt (1), two washers (2 and 3), and nut (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Position left side connecting link (6) in bellcrank (5). Remove tag.
3. Install bolt (1), two washers (2 and 3), and nut (4). Torque nut to **60 to 90 inch-pounds**. Install cotter pin (7).
4. Check bolt (1). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolts shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 3.

5. Remove bolt (8), two washers (9 and 10), and nut (11) from bellcrank (12).
6. Position right side connecting link (13) in bellcrank (12). Remove tag.
7. Install bolt (8), two washers (9 and 10), and nut (11). Torque nut to **60 to 90 inch-pounds**. Install cotter pin (14).
8. Check bolt (8). Bolt shall not rotate with torque less than 10 inch-pounds. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 7.

NOTE

Procedure is same for forward end of left and right connecting link. Right side connecting link at sta. 444.5 is shown here.

9. Remove bolt (15), two washers (16 and 17), and nut (18) from bellcrank (19).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

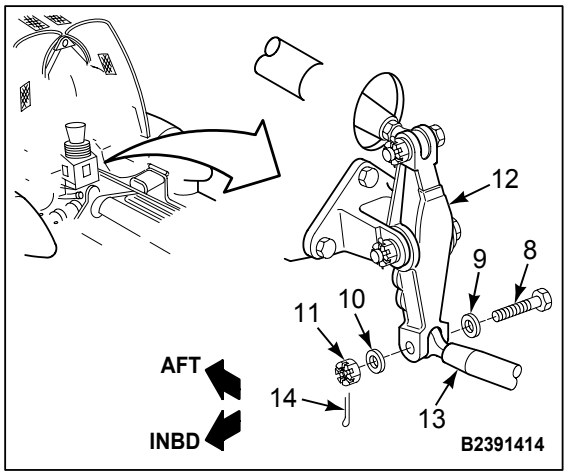
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

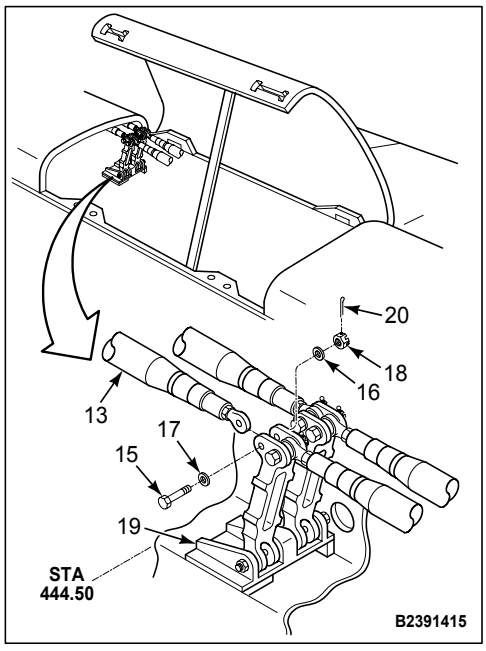
10. Position connecting link (13) in bellcrank (19).
11. Install bolt (15), two washers (16 and 17), and nut (18). Torque nut to **60 to 90 inch-pounds**. Install cotter pin (20).
12. Check bolt (15). Bolt shall not rotate with torque less than **10 inch-pounds.** Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 11.

NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).

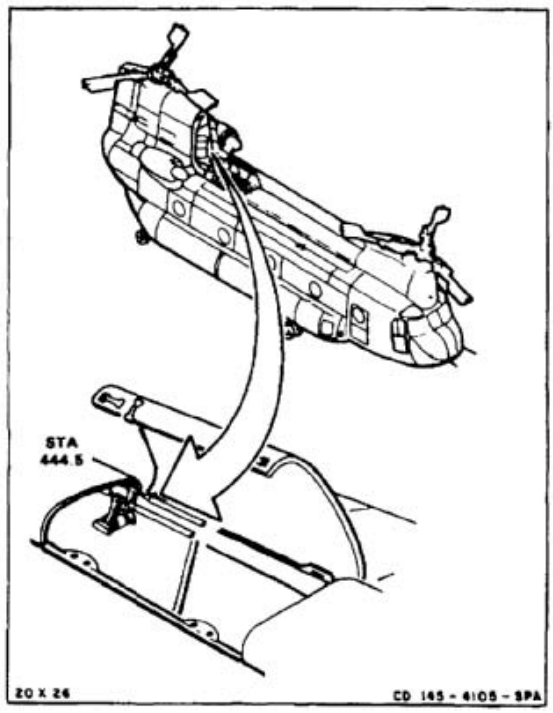
INSPECT





FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform functional test of tunnel flight controls (TM 55-1520-240-T).
Close tunnel access covers (Task 2-2).
Close pylon doors (Task 2-2).
Close cargo ramp (TM 55-1520-240-T).



END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323- 4692

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

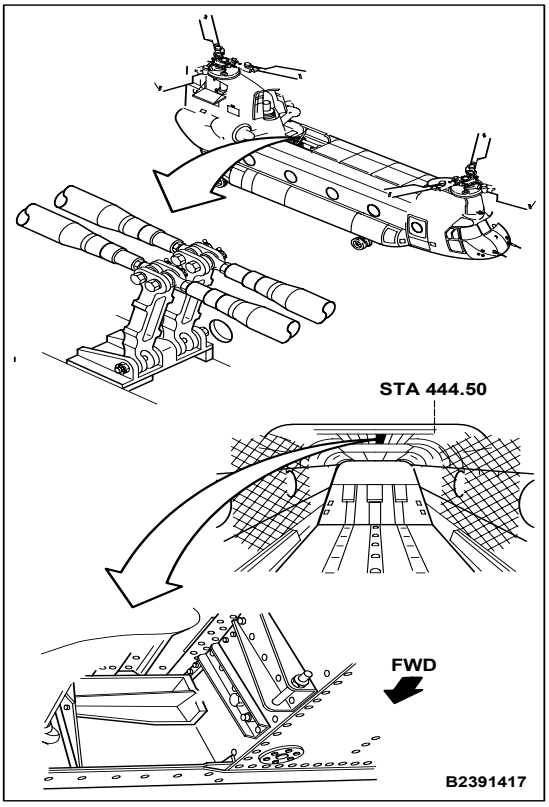
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed
Servocylinder Connecting Links Disconnected (Task 11-192)
Tunnel Access Cover No. 6 Opened (Task 2-2)
Pylon Access Doors Opened (Task 2-2)



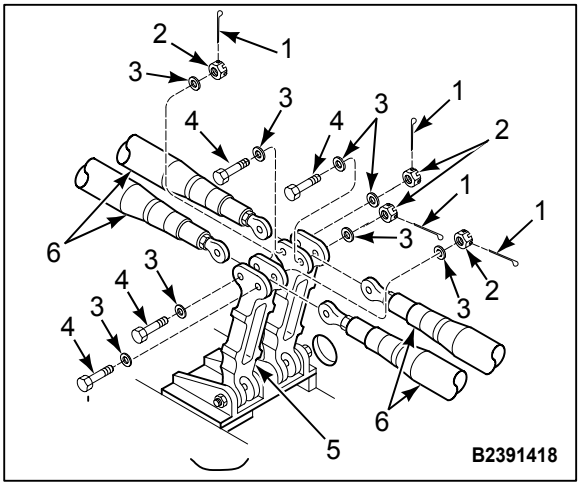
NOTE

Attaching bolts, washers, and nut will be temporarily installed after removing links and bellcranks.

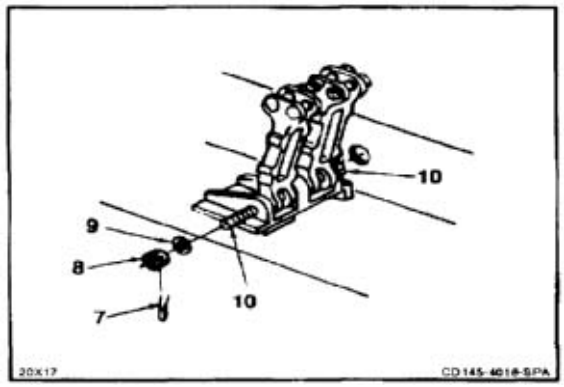
NOTE

If a crack in the connecting links, bellcranks, or support is suspected during removal, refer to TM 1-1520-253-23.

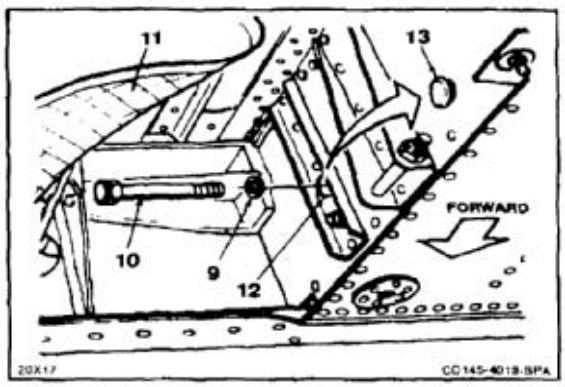
1. Remove four cotter pins (1), four nuts (2), eight washers (3), and four bolts (4) from two idler bellcranks (5) and four connecting links (6).
2. Tag idler bellcranks (5).
3. Disconnect connecting links (6) from bellcranks (5). Tie links out of way of bellcranks. Use twine (E433).
4. Install four bolts (4), eight washers (3), and four nuts (2) in two bellcranks (5).



5. Remove cotter pin (7), nut (8), and washers (9) from bolt (10).



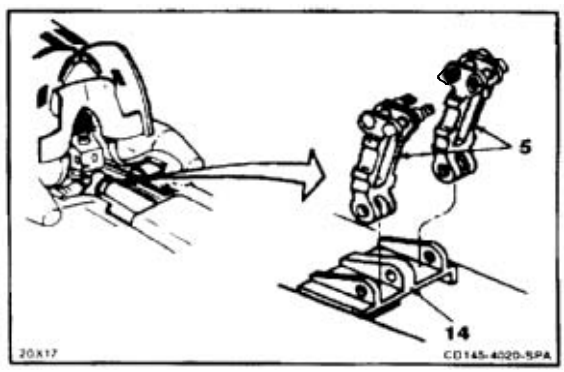
6. Have helper in cabin area pull edge of blanket (11) clear of hole (12).
7. Remove plug button (13).
8. From outside, push bolt (10) into access hole (12). Have helper in cabin area remove bolt and washer (9).



9. Remove bellcranks (5) from support (14).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-247 INSTALL AFT FUSELAGE IDLER BELLCRANKS 11-247

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds

Materials:

None

Parts:

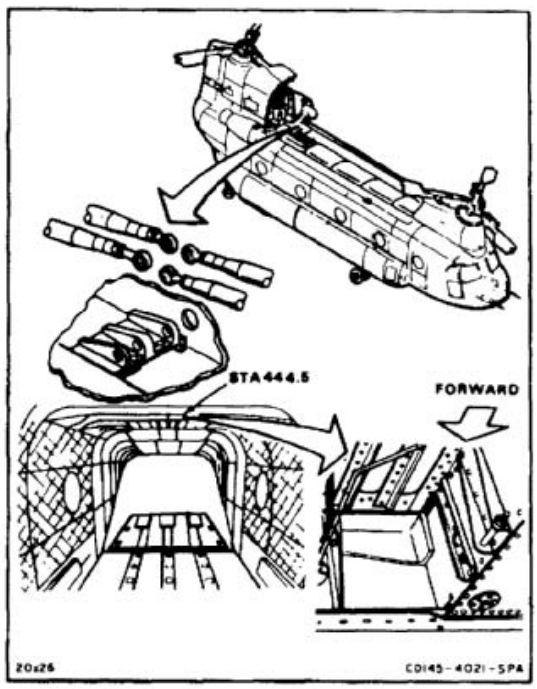
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure ALBI fire retardant coating is properly applied to each bellcrank assembly.

Ensure proper orientation of the bellcrank assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper orientation of the bellcrank assembly.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

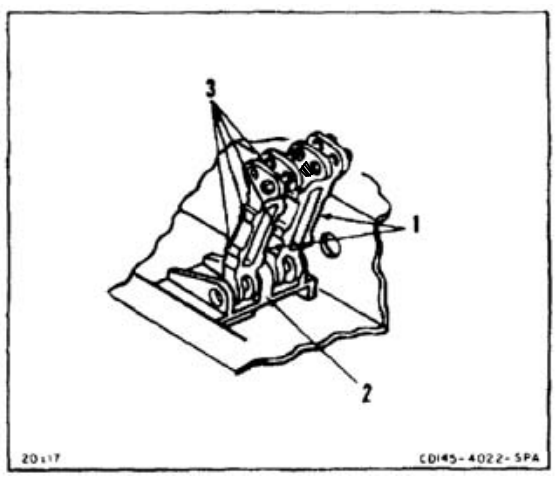
CAUTION

Make sure bushings are in bellcranks before installing bolts or damage will result to bellcranks.

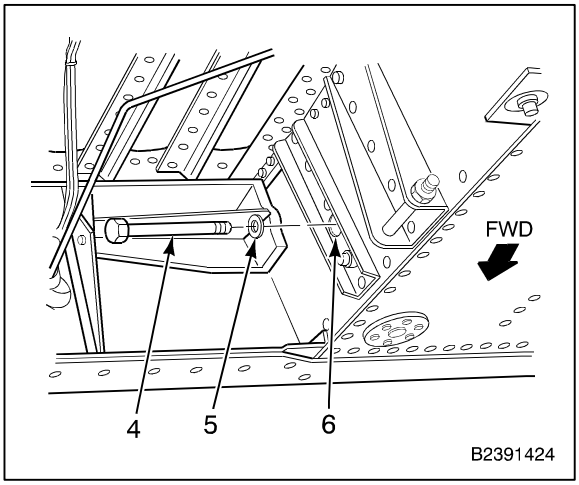
NOTE

All bolts installed in flight control system are self-retaining impedance bolts. During installation of flight controls, make sure all bolts used are self-retaining bolts.

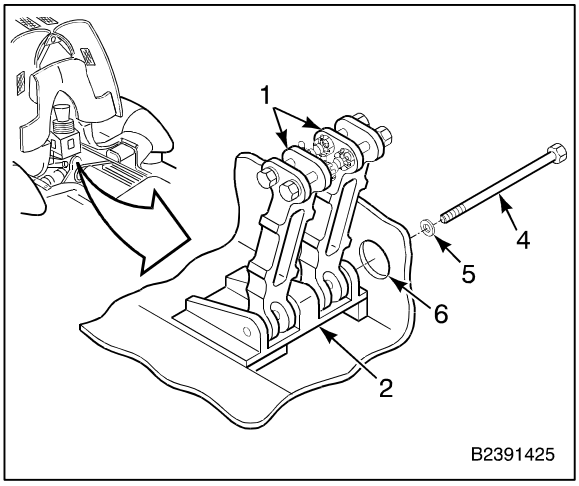
1. Remove tags and position two idler bellcranks (1) in support assembly (2), with pads (3) right.



2. Have helper in cabin area insert bolt (4) and washer (5) through access hole (6).



3. From outside, guide bolt (4) and washer (5) through access hole (6), support (2), and idler bellcranks (1).



4. Install washer (7) and nut (8) on bolt. Torque nut to **80 to 150 inch-pounds**. Align cotter pin hole.

5. Check two bellcranks (1) as follows:

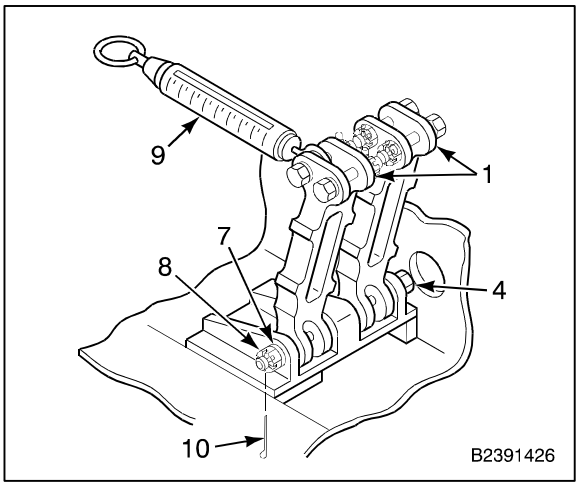
   a. Apply force to bellcranks. Use dial indicating scale (9). Bellcrank must rotate with force less than **3 pounds** and bolt (4) must not turn. If bolt turns, go to step b. If bolt does not turn, go to step 6.

   b. Back off nut (8) until bolt does not turn when bellcrank is rotated. Check cotter pin hole is aligned.

   c. Check that nut torque is more than **80 inch-pounds** with cotter pin hole aligned.

   d. Repeat step a.

6. Install cotter pin (10).



INSPECT

7. Remove four bolts (11), four washers (12), four washers (13), and four nuts (14) from bellcranks (1).
8. Untie and position four links (15) in idler bellcranks (1).

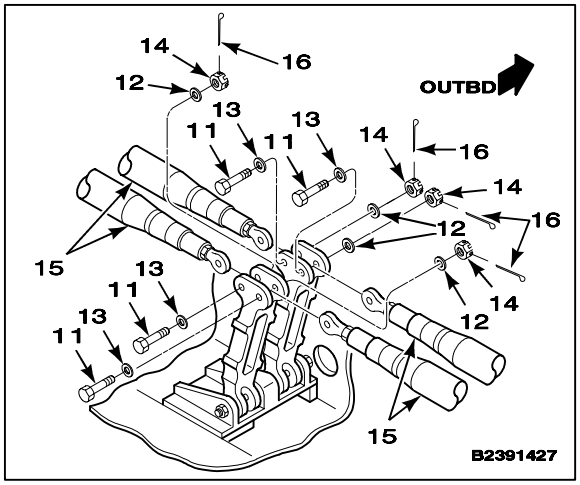
NOTE

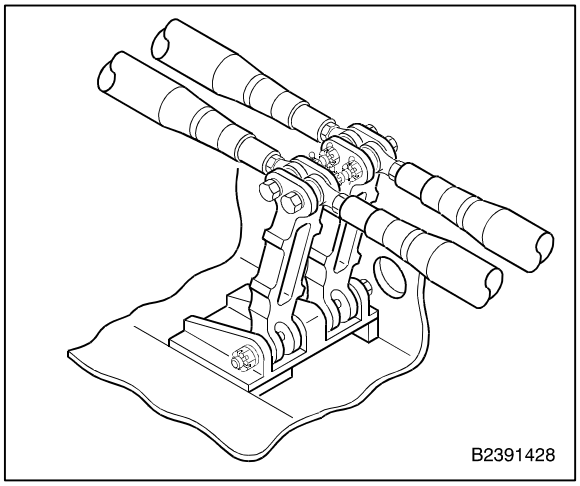
Bolt heads (11) must face inboard.

9. Install four bolts (11), four washers (12), four washers (13), and four nuts (14).
10. Torque four nuts (14) to **60 to 90 inch-pounds**. Install four cotter pins (16).
11. Check four bolts (11). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut (14), and repeat step 10.

NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).





FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Perform functional test of tunnel controls (Tasks 11-5 and 11-6).
Close tunnel access doors (Task 2-2).

END OF TASK

11-248 REMOVE AFT FUSELAGE BELLCRANK (FWD SIDE STA 482 BULKHEAD) 11-248

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

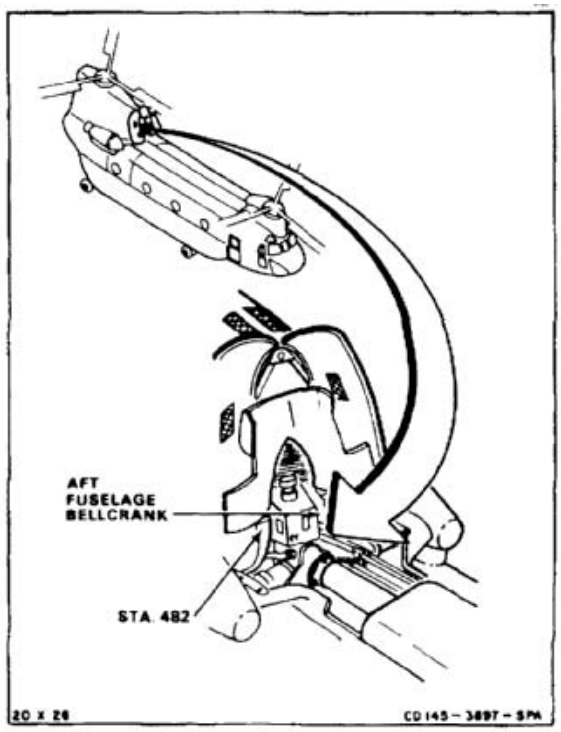
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

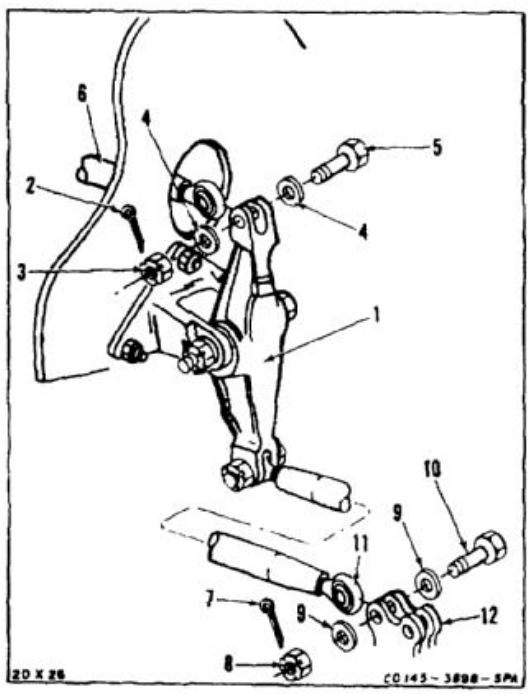
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)
Pylon Doors Open (Task 2-2)



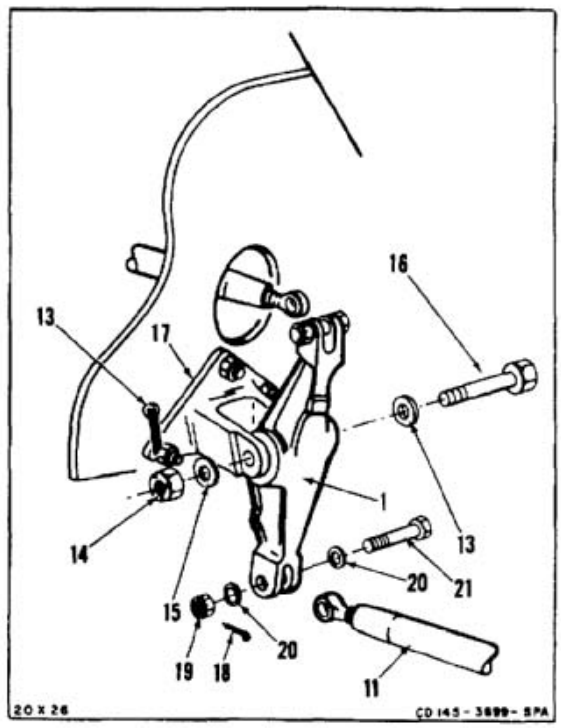
NOTE

If a crack in the connecting link, bellcrank, or support stage is suspected during removal, refer to TM 1-1520-253-23.

1. Tag bellcrank (1).
2. Remove cotter pin (2), nut (3), washers (4), and bolt (5).
3. Disconnect connecting link (6) from bellcrank (1). Tie link out of way of bellcrank. Use twine (E433).
4. Install bolt (5), washers (4), and nut (3) in bellcrank (1).
5. Remove cotter pin (7), nut (8), washers (9), and bolt (10).
6. Disconnect connecting link (11) from bellcrank (12).
7. Install bolt (10), washers (9), and nut (8) in bellcrank (12).



8. Remove cotter pin (13), nut (14), washers (15), and bolt (16) from support (17). Remove bellcrank (1) and link (11).
9. Install bolt (16), washers (15), and nut (14) in support (17).
10. Remove cotter pin (18), nut (19), washers (20), and bolt (21) from bellcrank (1). Remove link (11).
11. Install bolt (21), washers (20), and nut (14) in bellcrank (1).



FOLLOW-ON-MAINTENANCE:

None

END OF TASK

11-249 INSTALL AFT FUSELAGE BELLCRANK (FORWARD SIDE STATION 482 BULKHEAD) 11-249

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Dial Indicating Scale, NSN 6670-00-240-5821

Materials:

None

Parts:

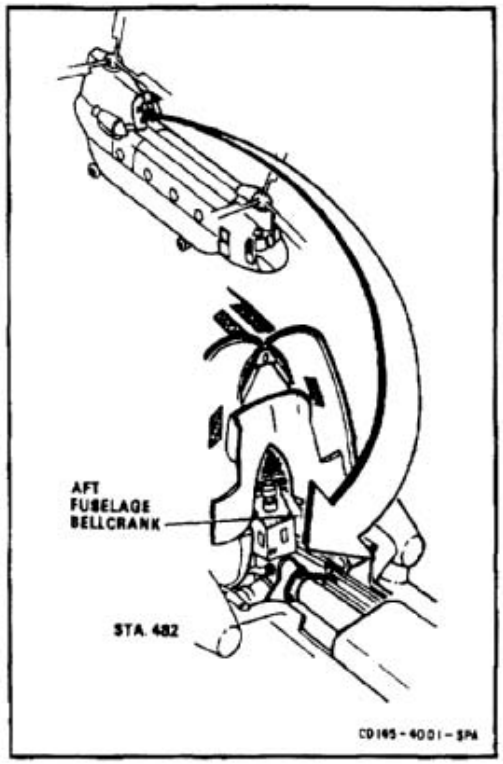
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13



11-249 INSTALL AFT FUSELAGE BELLCRANK (FORWARD SIDE STATION 482 BULKHEAD) (Continued) 11-249

CAUTION

Bushings must be in bellcrank before installing bolts; otherwise, damage to components will result.

NOTE

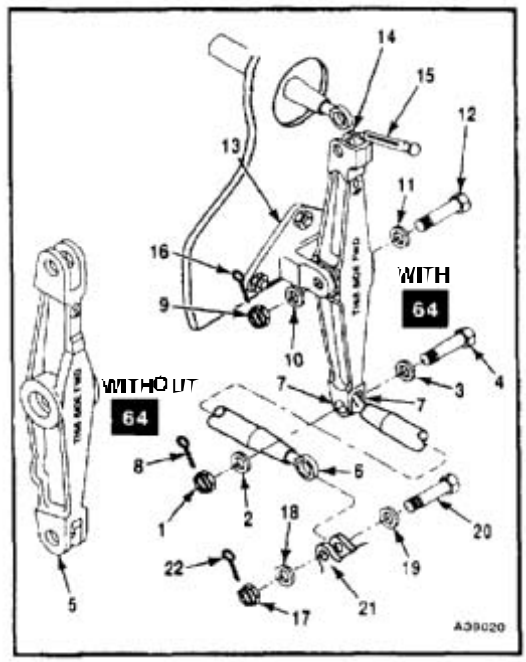
Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. Remove nut (9), two washers (10 and 11), and bolt (12) from support (13).

NOTE

If bellcrank is not properly marked, measure the distance between center hole and two end holes in bellcrank. Without 64, mark longer side (**6.00 inches**) and short side (**5.91 inches**) on bellcrank with grease pencil. Place longer side up and straight side forward. With 64, the closed clevis is up with the closed side forward.

2. Install bolt (12), two washers (11 and 10), and nut (9).
3. Torque nut (9) to **250 inch-pounds**.
4. Check bellcrank (5) as follows:
   a. Back off torque to at least **100 inch-pounds** and apply force to end of arm (14). Use dial indicating scale (15). Bellcrank must rotate with force less than **3 pounds** and bolt (12) must not turn. If bolt turns, go to step b. If bolt does not turn, go to step 10.
   b. Back off nut (9) until bolt does not turn when bellcrank is rotated. Check cotter pin hole is aligned.
   c. Check that nut torque is more than **100 inch-pounds** with cotter pin hole aligned.
   d. Repeat step a.
5. Install cotter pin (16).
6. Remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).



11-249 INSTALL AFT FUSELAGE BELLCRANK (FORWARD SIDE STATION 482 BULKHEAD) (Continued) 11-249

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

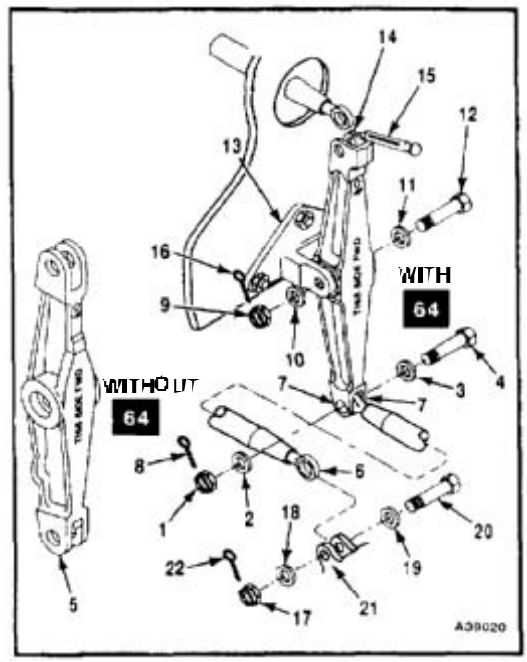
Ensure proper orientation of the bellcrank assembly at installation.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Without 64, bellcrank must be positioned as indicated by arrow and word UP and THIS SIDE FWD on the long end of the bellcrank with flat side forward; otherwise, serious damage to components can occur. With 64, bellcrank must be positioned as indicated by the arrow and the words UP and THIS SIDE FWD on the long end of the bellcrank with the flat side forward, also on the long end side of the bellcrank, the arrows and words UP and FWD indicate position. The bellcrank also must have the clevis with one edge closed out positioned UP, with close out FWD.



7. Position link (6) in lower lugs (7), forward side of bellcrank (5).
8. Install bolt (4), two washers (3 and 2) and nut (1) in bellcrank (5).
9. Torque nut (1) to **60 to 90 inch-pounds**. Install cotter pin (8).
10. Remove nut (17), two washers (18 and 19), and bolt (20) from bellcrank (21).
11. Position link (6) in bellcrank (21). Install bolt (20), two washers (19 and 18), and nut (17).
12. Torque nut (17) to **60 to 90 inch-pounds**. Install cotter pin (22).

13. Remove nut (23), two washers (24 and 25), and bolt (26) from bellcrank (5).

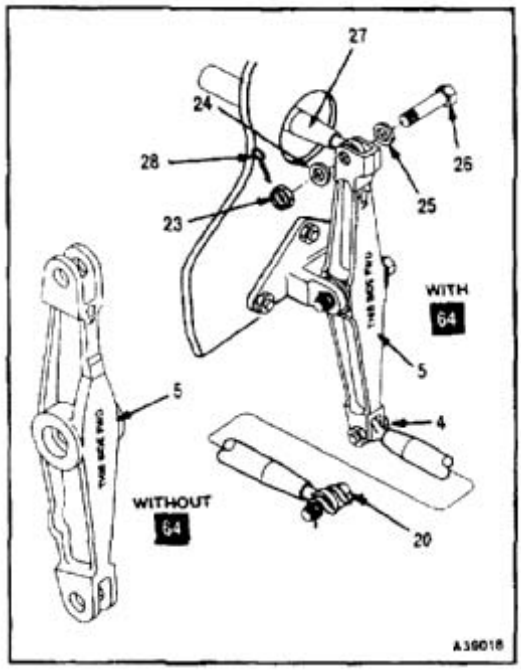
14. Untie link (27) and position link in bellcrank (5). Install bolt (26), two washers (25 and 24), and nut (23).

15. Torque nut (23) to **60 to 90 inch-pounds**. Install cotter pin (28).

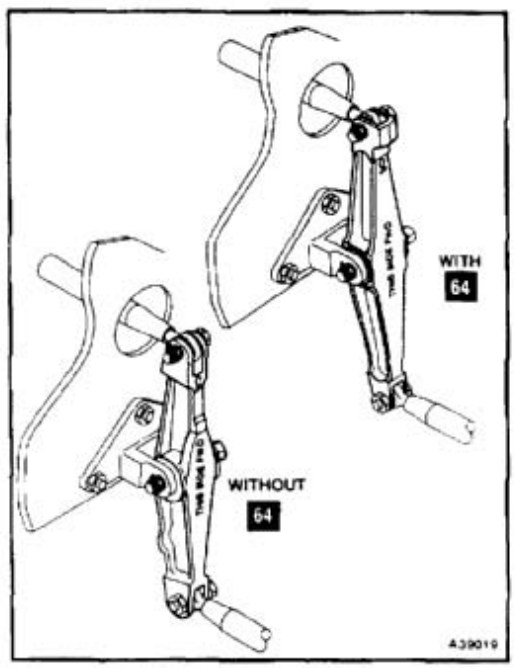
16. Check three bolts (4, 20, and 26). Bolts shall not rotate with a torque less than **10 inch-pounds** torque. There shall be no axial looseness. If bolt rotates or is loose, add AN960 washer under nut, and repeat step 9, 12, or 16. If an AN960 light washer is used, prior to torquing, make sure that the washer does not hang up in the bolt retaining feature groove.

NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).



INSPECT



FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Close pylon doors (Task 2-2).

END OF TASK

11-250 REMOVE AFT BELLCRANK STA 482 11-250

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

Twine (E433)

Personnel Required:

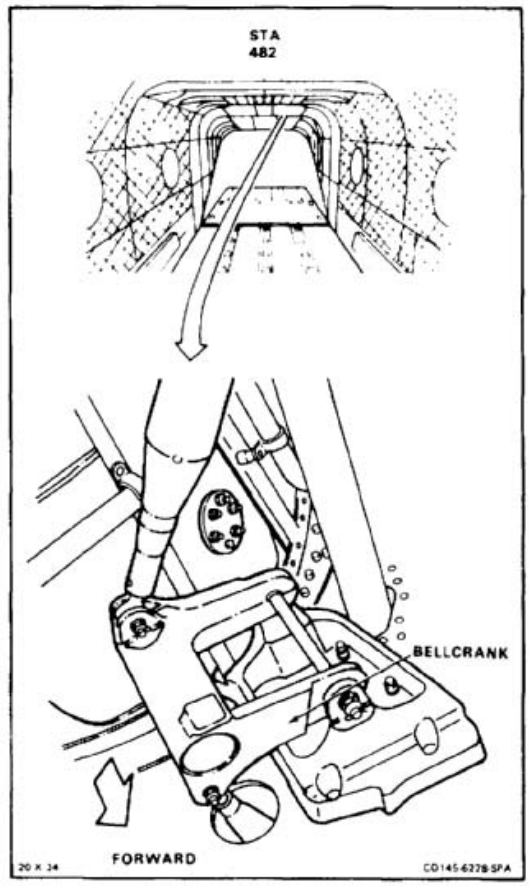
Medium Helicopter Repairer (2)

References:

TM 1-1520-253-23

Equipment Condition:

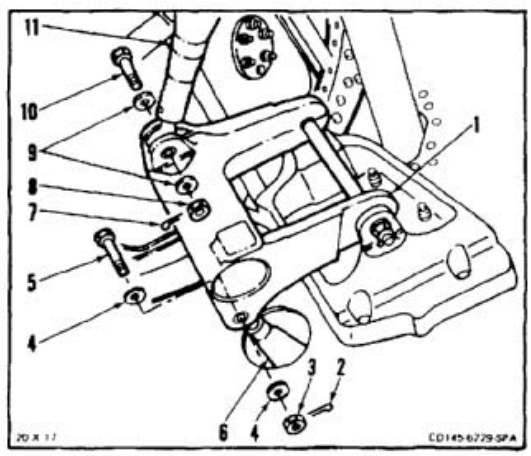
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Pylon Work Platforms Open (Task 2-2)
Aft Servocylinder Connecting Links Disconnected (Task 11-192)
Cargo Ramp Open And Level (Task 2-2)



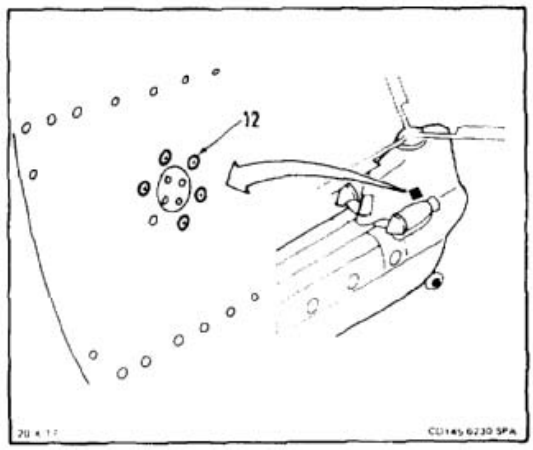
NOTE

If a crack in the connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

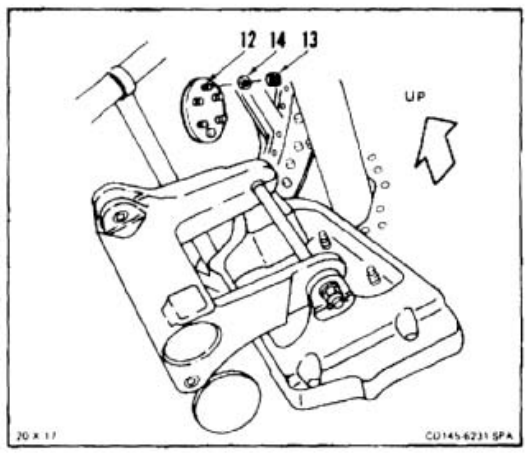
1. Tag bellcrank (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5), from bellcrank and connecting link (6).
2. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (1) and right side connecting link (11).
3. Disconnect connecting links (6 and 11) from bellcrank (1). Tie connecting link (11) out of way. Use twine (E433).



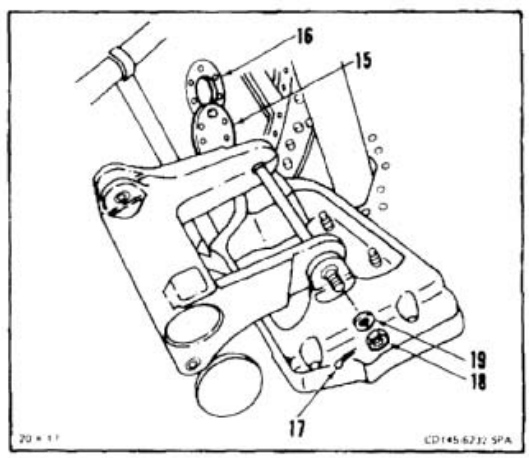
4. Have helper hold head of five screws (12) from outside.



5. From inside helicopter, remove five nuts (13) and washers (14).
6. Push five screws (12) up. Have helper from outside remove screws.



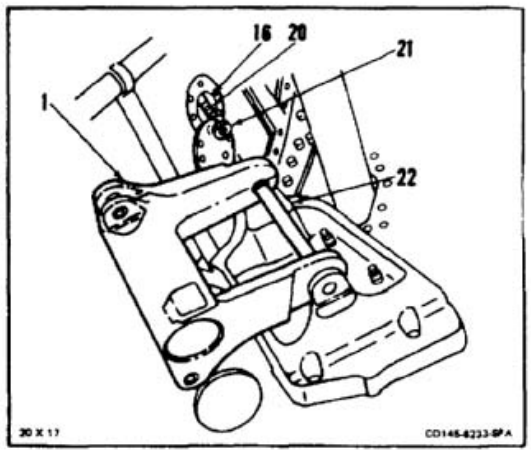
7. Slide cover (15) clear of access (16).
8. Remove cotter pin (17), nut (18) and washer (19).



NOTE

Helper will remove bolt when pushed through access hole.

9. Remove bolt (20), washer (21), from bellcrank (1) and control support (22).
10. Push bolt (20) and washer (21) through access hole (16). Have helper remove bolt and washer.
11. Remove bellcrank (1) from control support (22).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-251 INSTALL AFT BELLCRANK STA 482 11-251

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Dial Indicating Scale, 0 to 50 Pounds

Materials:

Sealant (E336)
Primer (E299)
Gloves (E186)

Parts:

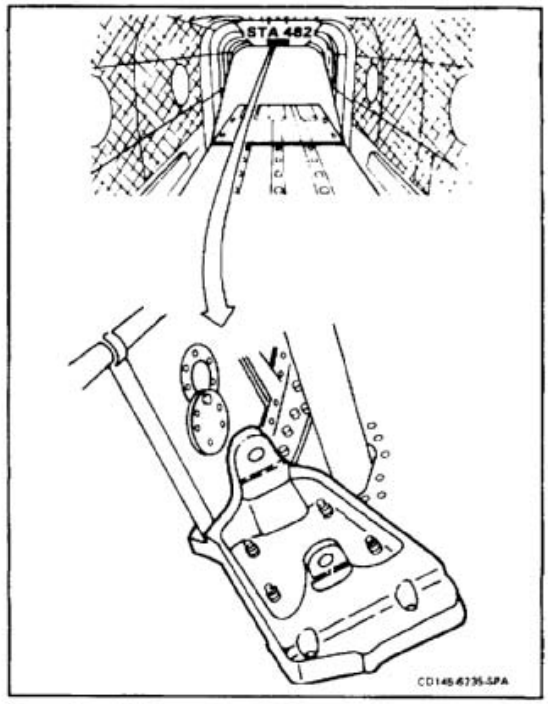
Cotter Pins

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

References:

TM 55-1520-240-23P
Task 11-33



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper orientation of the bellcrank assembly at installation.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

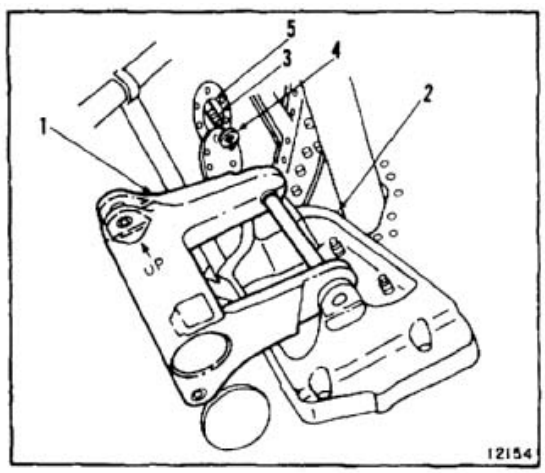
CAUTION

Bellcrank must be positioned as indicated by arrow and the word UP on bellcrank; otherwise, serious damage to components can occur.

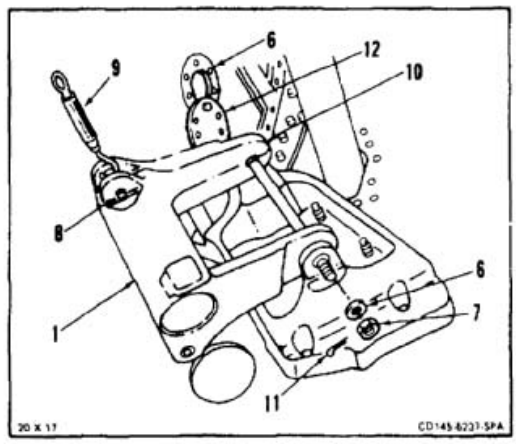
NOTE

All bolts installed in flight control system are self-retaining (impedance) bolts. During installation of flight controls, make sure all bolts used are self-retaining bolts.

1. Position bellcrank (1) in control support (2).
2. Have helper push bolt (3) and washer (4), from outside through access (5).
3. Guide bolt (3) and washer (4), through bellcrank (1) and control support (2).



4. Install washer (6) and nut (7). Torque nut (7) to **250 inch-pounds**.
5. Install bolt (8). Hook dial indicating scale (9) to bolt (8).
6. Apply force to bellcrank (1) with scale (9) at **90°** to arm (10). Bellcrank shall turn, bolt (3) shall not turn. Force shall not exceed **3 pounds**.



CAUTION

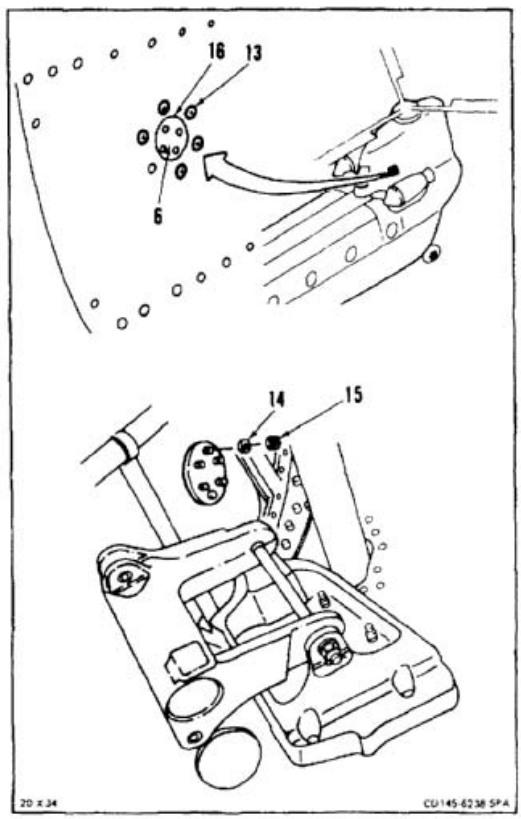
Do not reduce torque to less than **100 inch-pounds**; otherwise, damage to components will result.

7. If bolt (3) turns, reduce bolt torque by **5 inch-pounds** repeat step 6.
8. Install cotter pin (11).
9. Remove scale (9) and bolt (8).
10. Slide cover (12) over access (5).

WARNING

Primer (E299) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

11. Have outside helper coat five screws (13) with primer (E299). Install screws while primer is wet. Wear gloves (E186).
12. Have helper hold heads of five screws (13).
13. From inside helicopters, install five washers (14) and nuts (15).



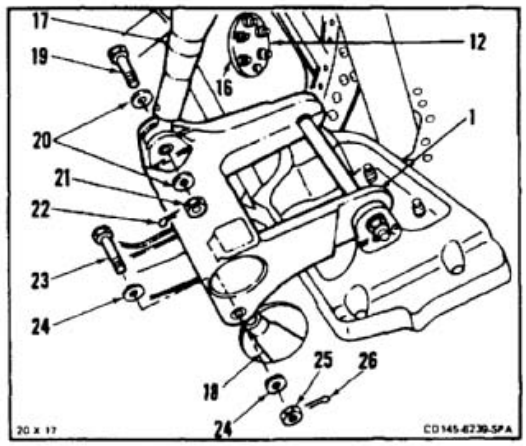
WARNING

Sealant (E336) can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

14. Seal edge (16) of access (12) with sealant (E336). Wear goggles to protect eyes. Wear gloves (E186).
15. Untie connecting links (17 and 18).
16. Position connecting link (17) in bellcrank (1).
17. Install bolt (19), two washers (20), and nut (21). Torque nut to **60 to 90 inch-pounds**.
18. Check bolt (19). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut. Repeat step 17.
19. Install cotter pin (22).
20. Position connecting link (18) in bellcrank (1).
21. Install bolt (23), two washers (24), and nut (25). Torque nut to **60 to 90 inch-pounds**.
22. Check bolt (23). Bolt shall not rotate with torque less than **10 inch-pounds**. Bolt shall have no axial looseness. If bolt rotates or is loose, add washer under nut. Repeat step 21.
23. Install cotter pin (26).

NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).



INSPECT

FOLLOW-ON MAINTENANCE:

Connect aft servocylinder connecting links (Task 11-193).
Perform operational check of flight controls (TM 55-1520-240-T).
Close pylon work platforms (Task 2-2).
Close cargo ramp (Task 2-2).

END OF TASK

11-251.1 REMOVE BELLCRANK SUPPORT FITTINGS, STA 482 11-251.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

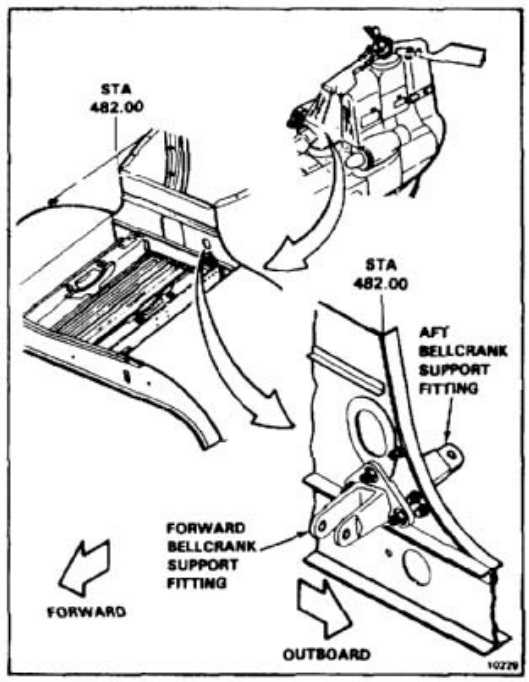
None

Personnel Required:

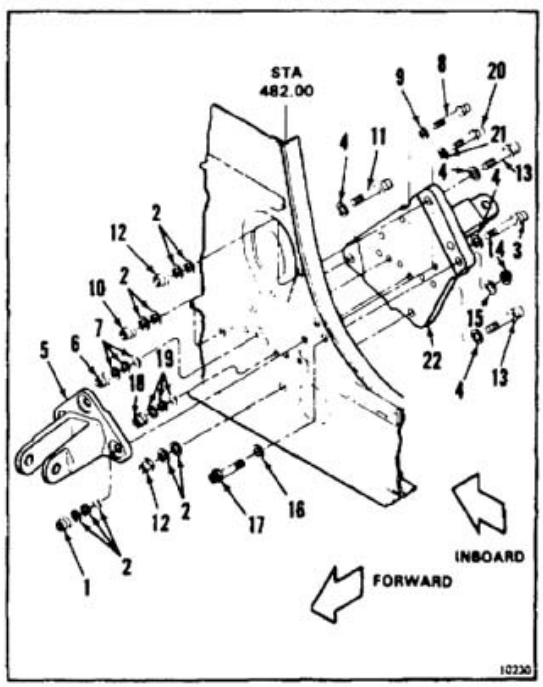
Medium Helicopter Repairer (2)

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Remove Aft Fuselage Bellcrank (Fwd Side Sta. 482 Bulkhead) (Task 11-248)
Remove Aft Bellcrank Sta 487 (Task 11-250)



1. Remove three nuts (1), nine washers (2), three bolts (3), three washers (4), and forward bellcrank support fitting (5).
2. Remove five nuts (6), fifteen washers (7), five bolts (8), and five washers (9).
3. Remove nut (10), two washers (2), bolt (11), and washer (4).
4. Remove two nuts (12), four washers (2), two bolts (13), and two washers (4).
5. Remove two nuts (14), washers (15), bolts (17), and washers (16).
6. Remove nut (18), three washers (19), bolt (20), washer (21), and aft bellcrank support fitting (22).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-251.2 INSTALL BELLCRANK SUPPORT FITTINGS STA 482 11-251.2

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 100 to 750 Inch-Pounds
Workstand

Materials:

Epoxy Primer (E292)
Gloves (E184.1)
Cloths (E120)
Dry Cleaning Solvent (E162)

Personnel Required:

Medium Helicopter Repairer (2)
Inspector

Equipment Condition:

Battery Disconnected (Task 1-39)
Electric Power Off
Hydraulic Power Off
Pylon Doors Open (Task 2-2)
Cargo Ramp Open and Level (TM 55-1520-240-T)

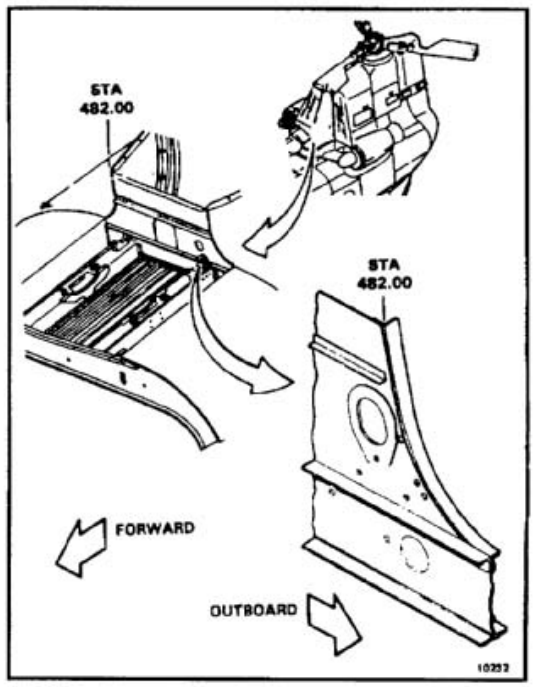
General Safety Instructions:

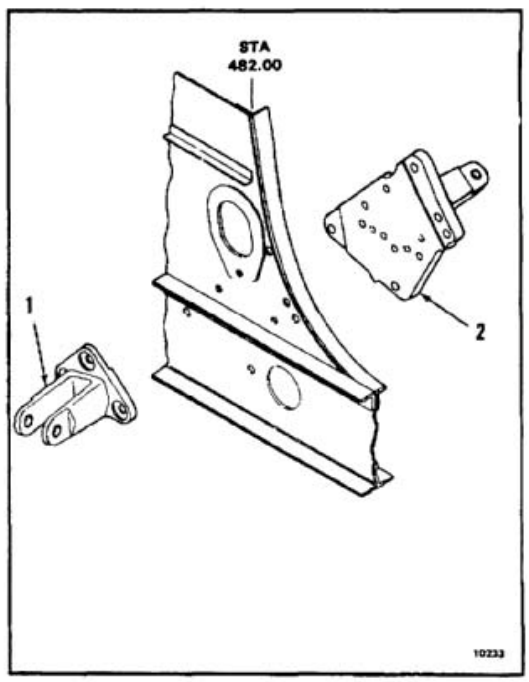
WARNING

Dry cleaning solvent (E162) is combustible and toxic. Avoid contact with skin, eyes, or clothing. Avoid inhaling. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

WARNING

Epoxy primer (E292) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat and open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



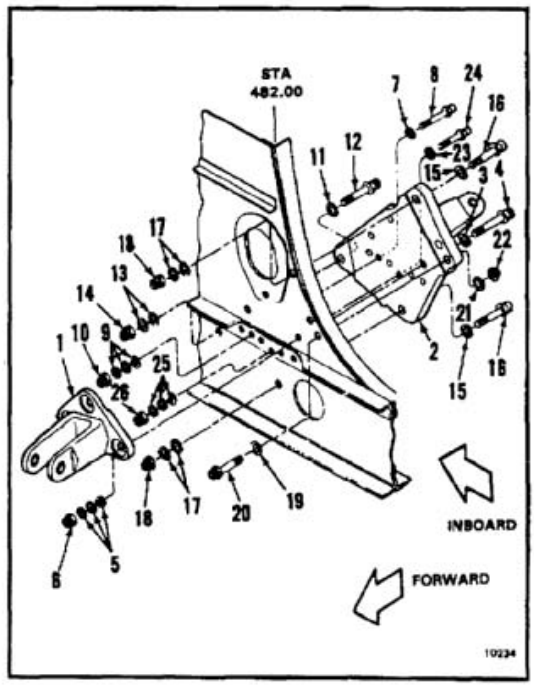


1. Clean fittings (1 and 2) and structure with solvent (E162). Use cloths (E120). Wear gloves (E184.1) and goggles.

NOTE

If aft support is new, line-drill to hole pattern in structure.

2. Apply epoxy primer (E292) to fitting surfaces and all bolts. Wear gloves (E184.1) and goggles.
3. With helper, position forward support (1) and aft support (2).
4. Install wet, three washers (3), three bolts (4), nine washers (5), and three nuts (6). Tighten nut (6), but do not torque.
5. Install wet, five washers (7), five bolts (8), fifteen washers (9), and five nuts (10). Tighten nuts (10), but do not torque.
6. Install wet, washer (11), bolt (12), two washers (13), and nut (14). Tighten nut (14), but do not torque.
7. Install wet, two washers (15), two bolts (16), four washers (17), and two nuts (18). Tighten nuts (18), but do not torque.
8. Install wet, two washers (19), two bolts (20), two washers (21), and two nuts (22). Tighten nuts (22), but do not torque.
9. Install wet, washer (23), bolt (24), three washers (25), and nut (26). Tighten nut (26), but do not torque.
10. Torque nuts (10, 22, and 26) to **87 inch-pounds**.
11. Torque nuts (6, 14, and 18) to **172 inch-pounds**.



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-252 REMOVE AFT FUSELAGE LEFT CONNECTING LINK 11-252

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Material:

None

Personnel Required:

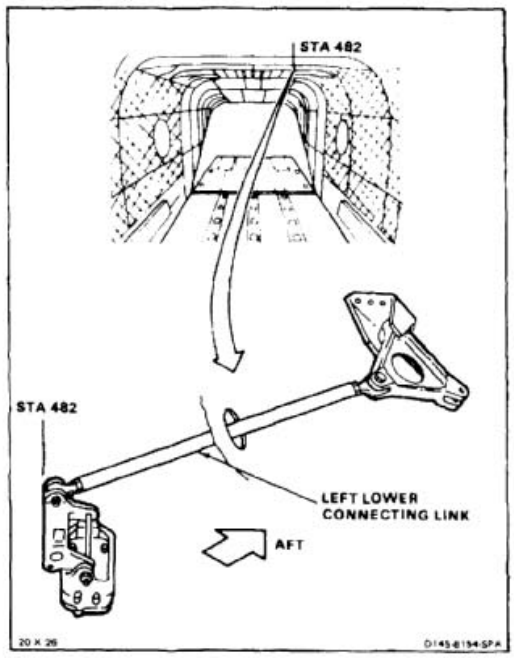
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Cargo Ramp Open and Level (TM 55-1520-240-T)



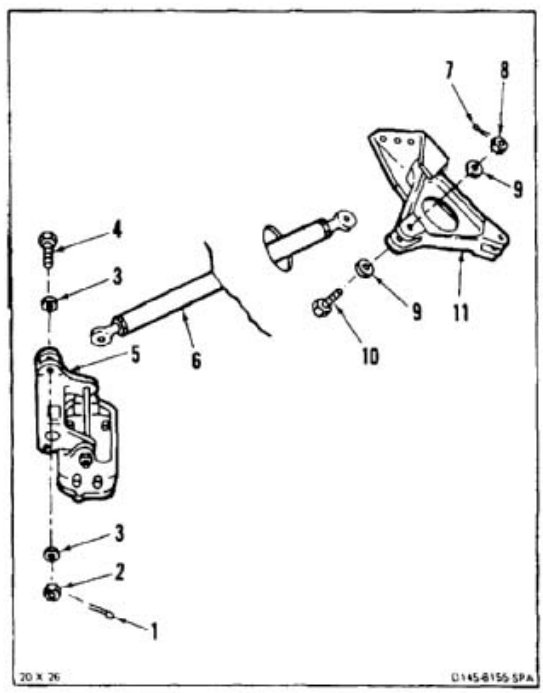
NOTE

Attaching bolt, washers, and nut will be temporarily installed after removing links.

NOTE

If a crack in the connecting link or bellcrank is suspected during removal, refer to TM 1-1520-253-23.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5). Disconnect connecting link (6) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) loosely in bellcrank (5).
3. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (11). Remove link (6).
4. Install bolt (10), two washers (9), and nut (8) loosely in bellcrank (11).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-253 INSTALL AFT FUSELAGE LEFT CONNECTING LINK 11-253

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

None

Parts:

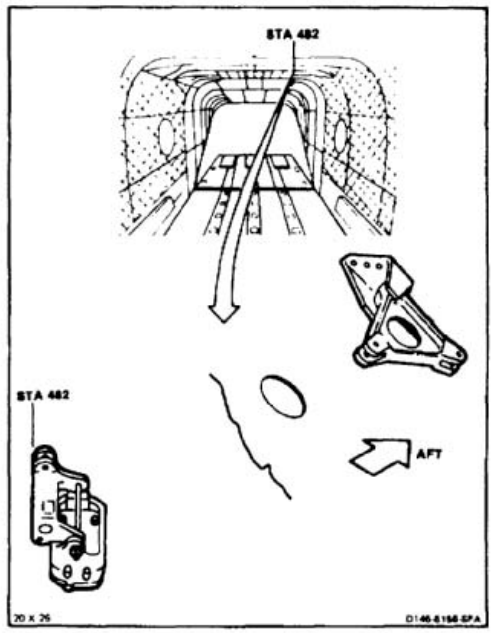
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-33



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end insert and rod end is secure.

Ensure rivet, roll pin, and associated hardware through rod end insert at adjustable end of the link assy is secure.

Ensure proper application of ALBI fire retardant coatings to the link assy.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

1. If connecting link (1) is a replacement, loosen nut (2). Turn rod end (3) **90º** to rod end (4). Torque nut (2) to **350 inch-pounds**.
2. Remove nut (5), two washers (6 and 7), and bolt (8) from bellcrank (9).
3. Insert rod end (3) of link (1) aft through hole (10) in structure.

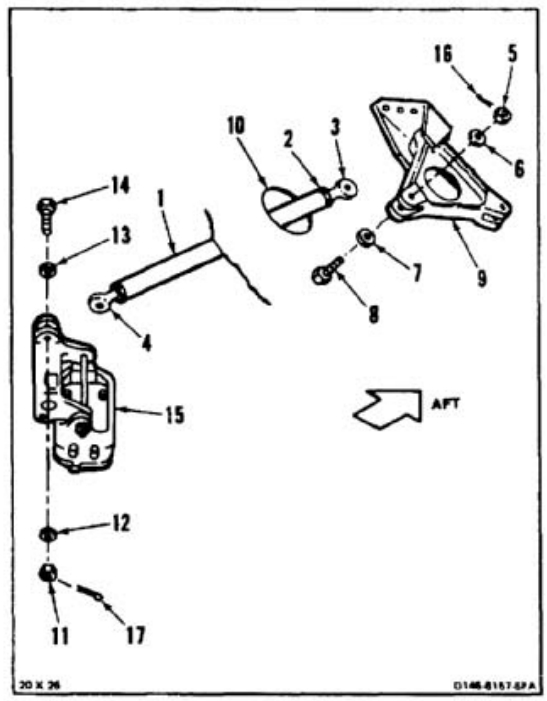
NOTE

Adjustable end (3) is connected as shown to bellcrank (9), when possible the adjustable ends should be aft or up.

4. Position link (1) in bellcrank (9). Install bolt (8), two washers (7 and 6), and nut (5) in bellcrank.
5. Remove nut (11), two washers (12 and 13), and bolt (14) from bellcrank (15).
6. Position link (1) in bellcrank (15). Install bolt (14), two washers (13 and 12), and nut (11) in bellcrank.
7. Torque two nuts (5 and 11) to **60 to 90 inch-pounds**. Install two cotter pins (16 and 17).
8. Check two bolts (8 and 14). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 7.

NOTE

If connecting links are changed in length perform neutral rig check (Task 11-33).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight control system (TM 55-1520-240-T).
Close cargo ramp (Task 2-2).

END OF TASK

11-254 REMOVE AFT FUSELAGE RIGHT CONNECTING LINK 11-254

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

None

Personnel Required:

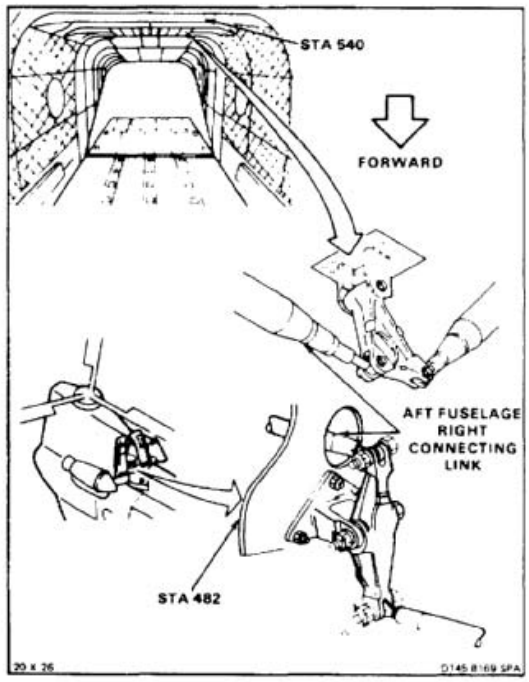
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Cargo Ramp Open and Level (Task 2-2)
Pylon Doors Open (Task 2-2)



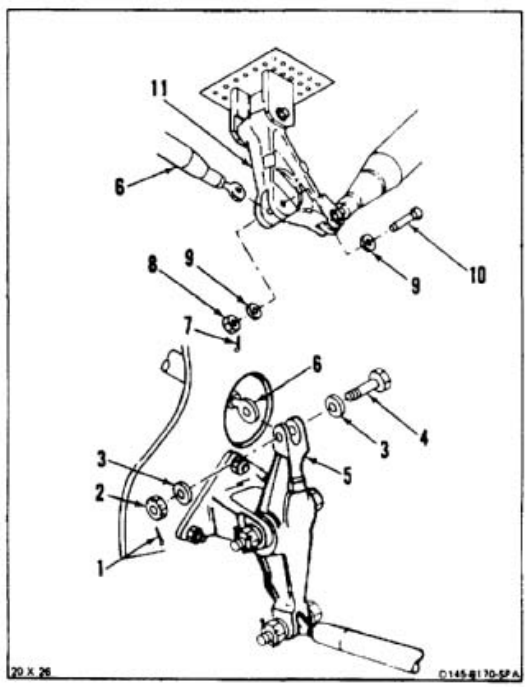
NOTE

Attaching bolt, washers, and nut will be temporarily installed after removing links.

NOTE

If a crack in the connecting link or bellcrank is suspected during removal, refer to TM 1-1520-253-23.

1. Working from left of combining transmission, remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5). Disconnect connecting link (6) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) loosely in bellcrank (5).
3. Working aft upper fuselage remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (11). Remove link (6).
4. Install bolt (10), two washers (9), and nut (8) loosely in bellcrank (11).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-255 INSTALL AFT FUSELAGE RIGHT CONNECTING LINK 11-255

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

None

Parts:

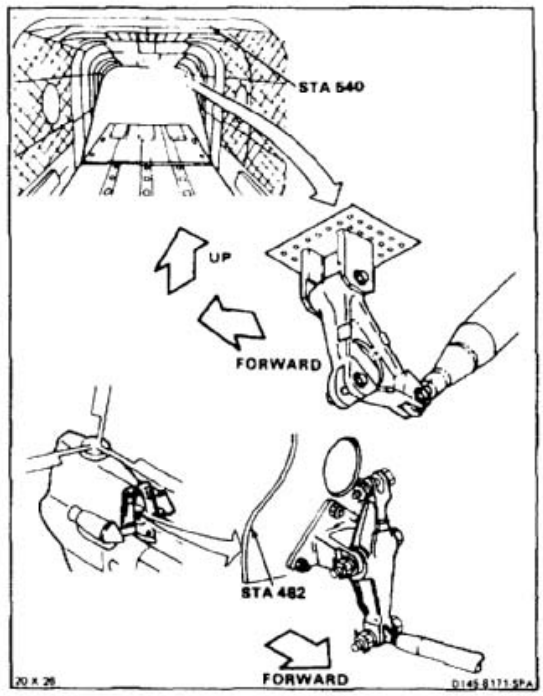
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-33



CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

Adjustable rod ends should be aft or up.

1. Working from ramp, remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

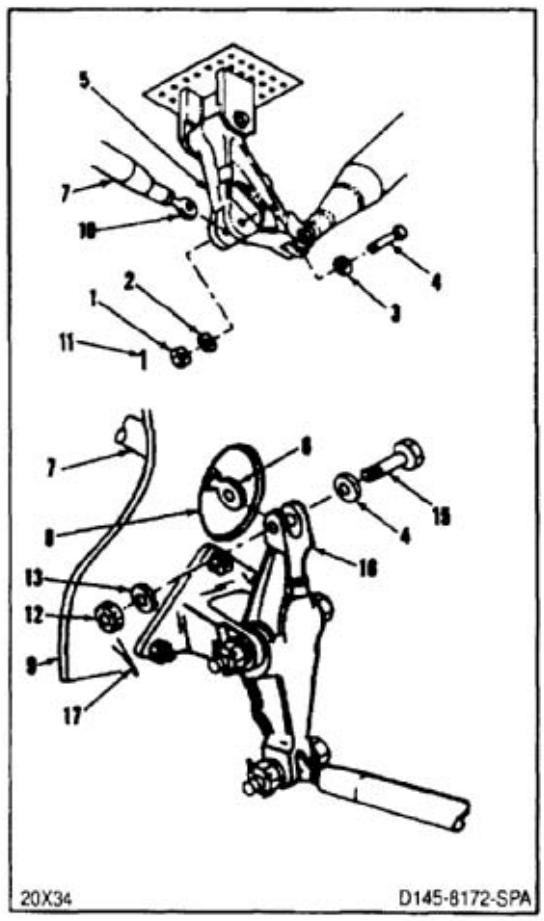
Ensure that the rivet through the fixed rod end insert and rod end is secure.

Ensure rivet, roll pin, and associated hardware through rod end insert at adjustable end of the link asssy is secure.

Ensure proper application of ALBI fire retardant coatings to the link assy.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

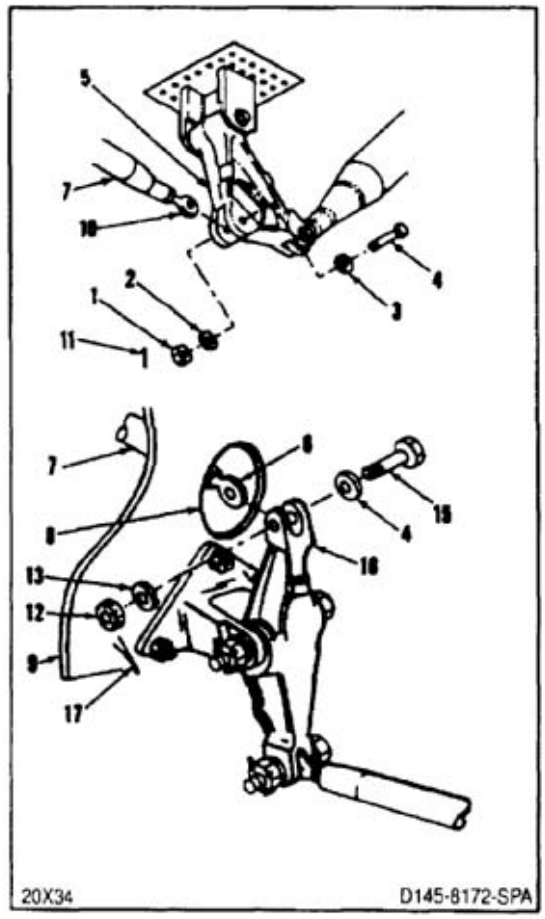
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



2. Insert end (6) of connecting link (7) through hole (8) in structure (9). Position end (10) of link in bellcrank (5).
3. Install bolt (4), two washers (3 and 2), and nut (1) in bellcrank (5).
4. Torque nut (1) to **60 to 90 inch-pounds**. Install cotter pin (11).
5. Working from aft upper fuselage, remove nut (12), two washers (13 and 14), and bolt (15) from bellcrank (16).
6. Position end (6) of link (7) in bellcrank (16). Install bolt (15), two washers (14 and 13), and nut (12) in bellcrank.
7. Torque nut (12) to **60 to 90 inch-pounds**. Install cotter pin (17).
8. Check two bolts (4 and 15). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness, bolt rotates or is loose, add washer under nut and repeat step 4 or 7.

NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight control system (TM 55-1520-240-T).
Close cargo ramp (Task 2-2).
Close pylon doors (Task 2-2).

END OF TASK

11-256 REMOVE PYLON LEFT LOWER BELLCRANK STA 534 11-256

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tag (E264)

Personnel Required:

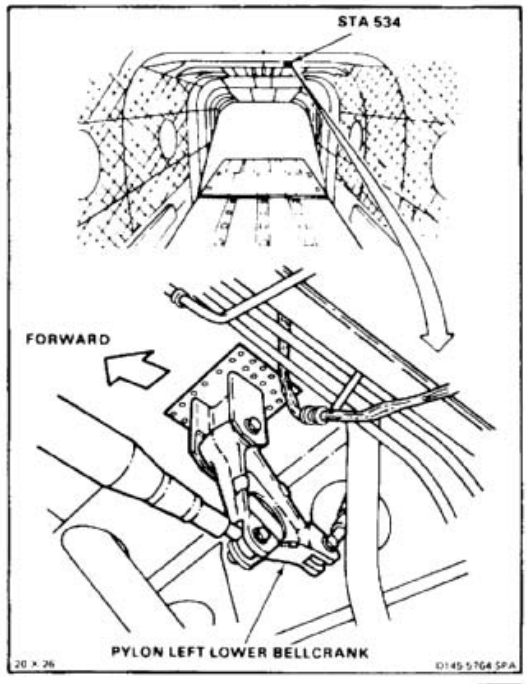
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

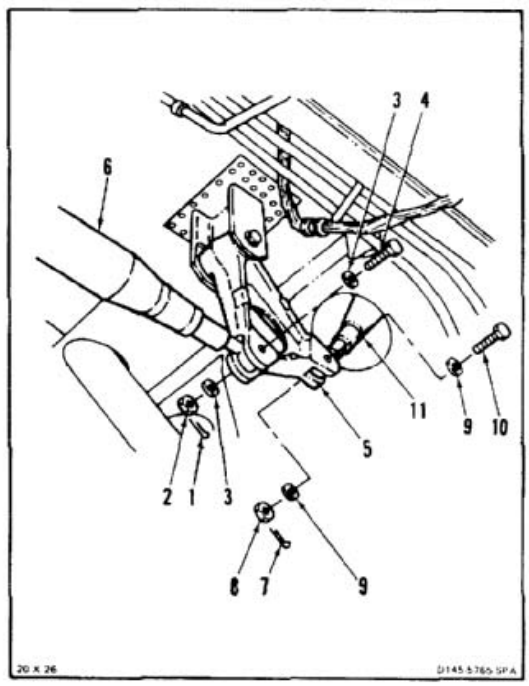
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)
Cargo Ramp Open and Level (Task 2-2)



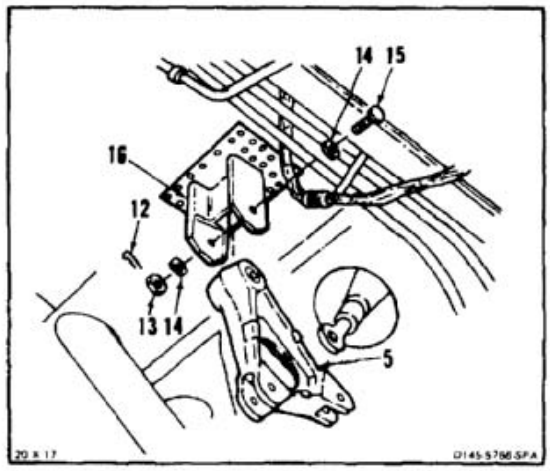
NOTE

If a crack in the connecting link, bellcrank, or support stage is suspected during removal, refer to TM 1-1520-253-23.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5) and connecting link (6). Disconnect link from bellcrank.
2. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (5) and connecting link (11). Disconnect link from bellcrank.



3. Tag bellcrank (5). Remove cotter pin (12), nut (13), two washers (14), and bolt (15) from support (16) and bellcrank. Remove bellcrank.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-257 INSTALL PYLON LEFT LOWER BELLCRANK STA 534 11-257

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Dial Indicating Scale, 0 to 10 Pounds

Materials:

None

Parts:

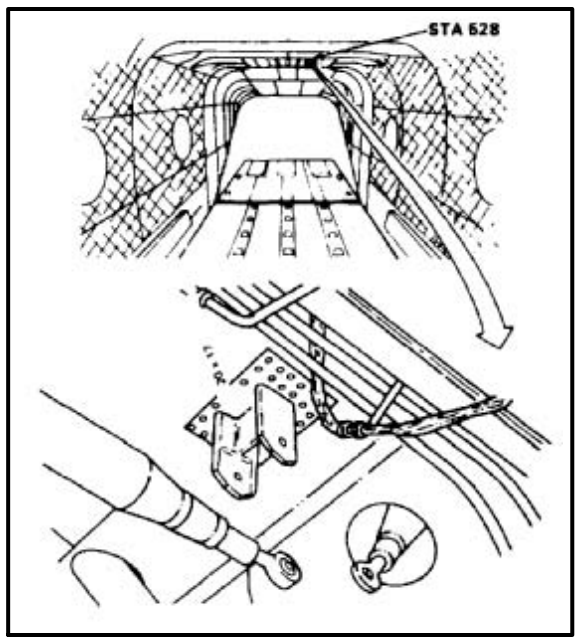
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 11-33



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper orientation of the bellcrank at installation.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

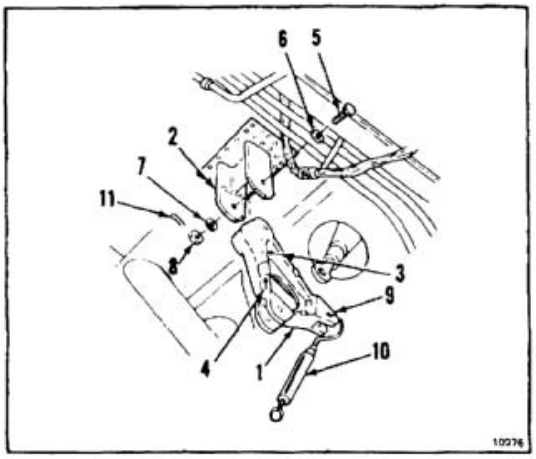
CAUTION

Bellcrank must be positioned as indicated by arrows on bellcrank; otherwise, serious damage to components can occur.

NOTE

All bolts installed in flight control system are self-retaining (impedance) bolts. During installation of flight controls, make sure all bolts used are self-retaining bolts.

1. Position bellcrank (1) in support (2) with arrow (3) forward and arrow (4) up. Install bolt (5), two washers (6 and 7), and nut (8) in support. Remove tag.
2. Torque nut (8) to **85 to 125 inch-pounds**. Align cotter pin hole.
3. Check bellcrank (1) as follows:
   a. Apply force to end of arm (9). Use dial indicating scale (10). Bellcrank must rotate with force less than **3 pounds** and bolt (5) must not turn. If bolt turns, go to step b. If bolt does not turn, go to step 4.
   b. Back off nut (8) until bolt does not turn when bellcrank is rotated. Check cotter pin hole is aligned.
   c. Check that nut torque is more than **85 inch-pounds** with cotter pin hole aligned.
   d. Repeat step a.
4. Install cotter pin (11).

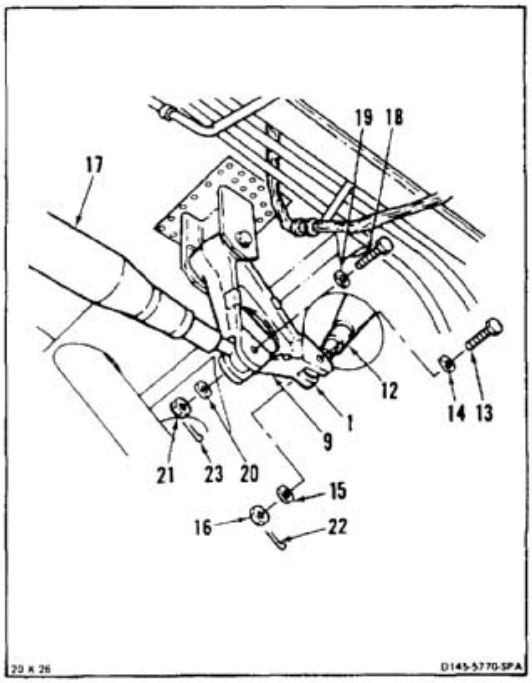


INSPECT

5. Position connecting link (12) in aft arm (9) of bellcrank (1). Install bolt (13), two washers (14 and 15), and nut (16).
6. Position connecting link (17) in bellcrank (1). Install bolt (18), two washers (19 and 20) and nut (21).
7. Torque two nuts (16 and 21) to **60 to 90 inch-pounds**. Install cotter pins (22 and 23).
8. Check two bolts (13 and 18). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 7.

NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).



FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Close cargo ramp (Task 2-2).

END OF TASK

11-258 REMOVE PYLON RIGHT LOWER BELLCRANK STA 534 11-258

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

Paper Tag (E264)

Personnel Required:

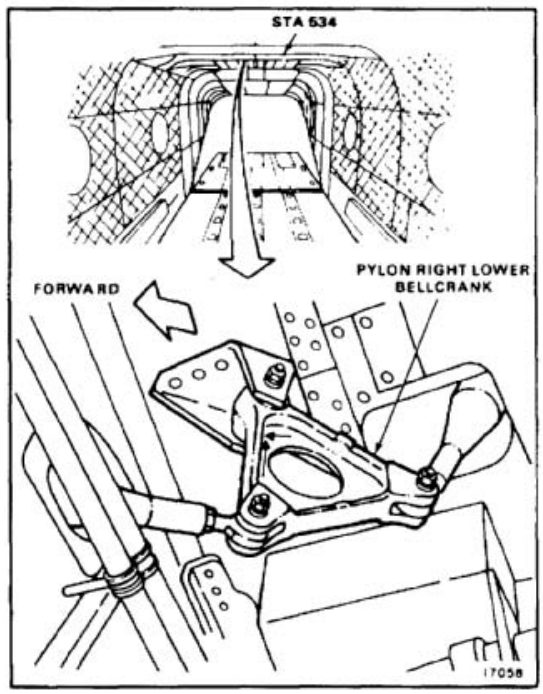
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

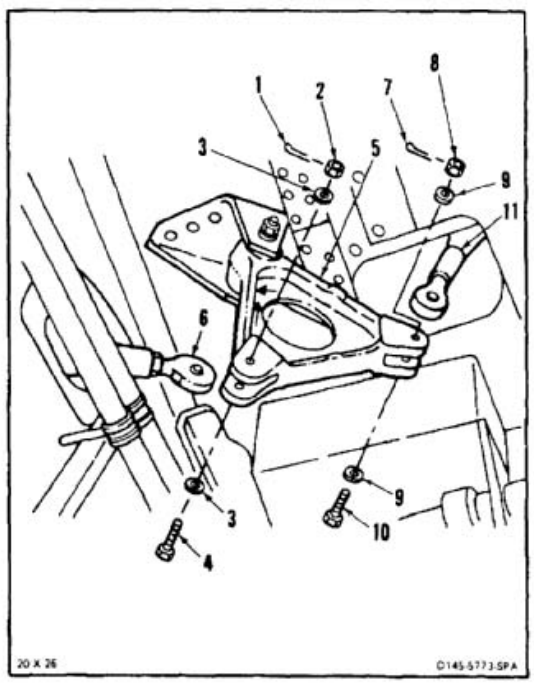
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)
Cargo Ramp Open and Level (Task 2-2)



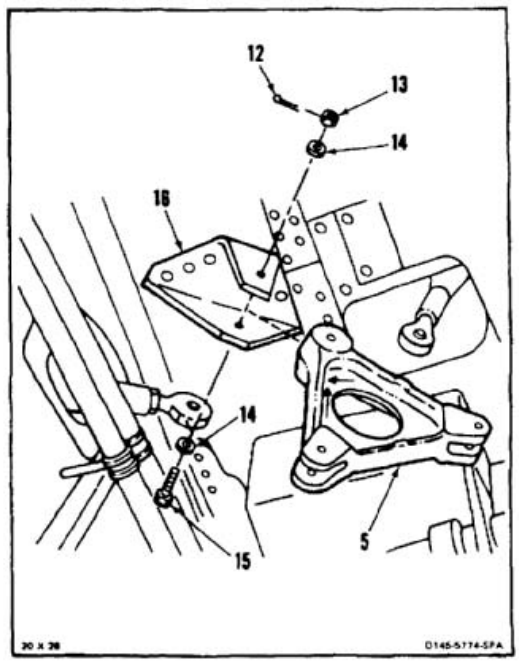
NOTE

If a crack in the connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

1. Remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5) and connecting link (6). Disconnect link from bellcrank.
2. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (5) and connecting link (11). Disconnect link from bellcrank.



3. Tag bellcrank (5). Remove cotter pin (12), nut (13), two washers (14), and bolt (15) from support (16) and bellcrank. Remove bellcrank.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-259 INSTALL PYLON RIGHT LOWER BELLCRANK STA 534 11-259

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Dial Indicating Scale, 0 to 10 Pounds

Materials:

None

Parts:

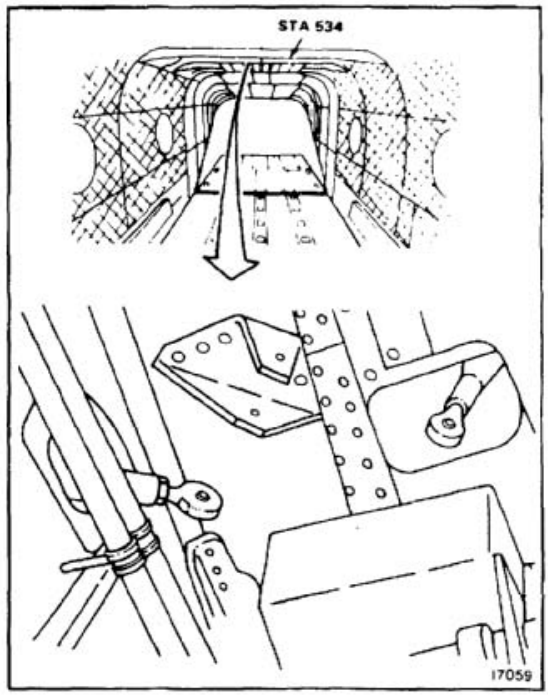
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 11-33



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper orientation of the bellcrank at installation.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

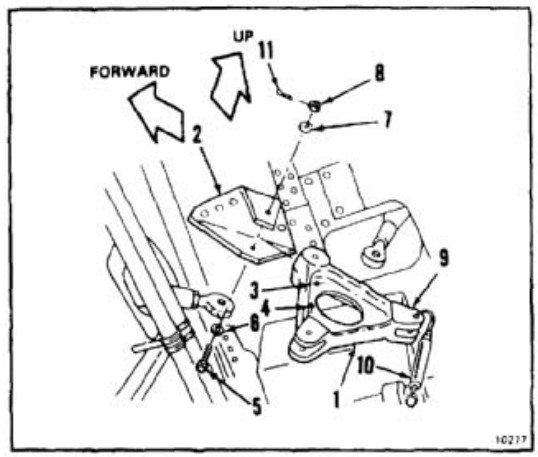
CAUTION

Bellcrank must be positioned as indicated by arrows on bellcrank; otherwise, serious damage to components can occur.

NOTE

All bolts installed in flight control system are self-retaining (impedance) bolts. During installation of flight controls, make sure all bolts used are self-retaining bolts.

1. Position bellcrank (1) in support (2) with arrow (3) forward and arrow (4) up. Install bolt (5), two washers (6 and 7), and nut (8) in support. Remove tag.
2. Torque nut (8) to **85 to 125 inch-pounds**. Align cotter pin hole.
3. Check bellcrank (1) as follows:
   a. Apply force to end of arm (9). Use dial indicating scale (10). Bellcrank must rotate with force less than **3 pounds** and bolt (5) must not turn. If bolt turns go to step b. If bolt does not turn go to step 4.
   b. Back off nut (8) until bolt does not turn when bellcrank is rotated. Check cotter pin hole is aligned.
   c. Check that torque on nut (8) is more than **85 inch-pounds** with cotter pin hole aligned.
   d. Repeat step a.
4. Install cotter pin (11).



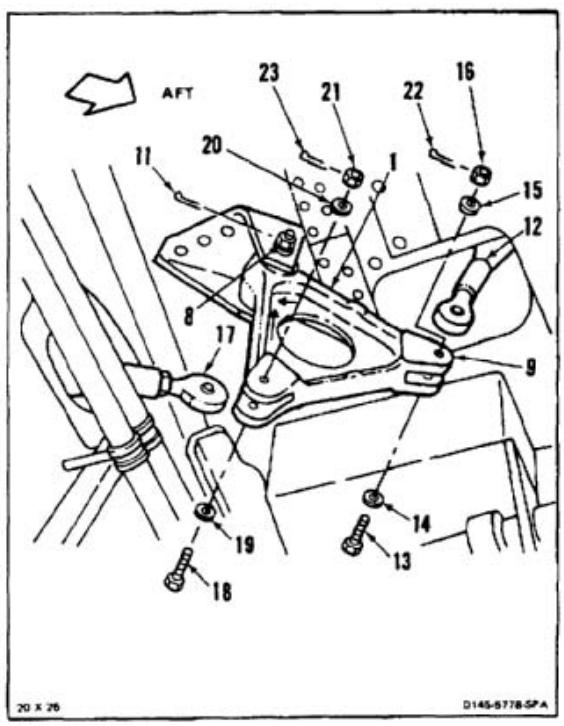
NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).

INSPECT

5. Position connecting link (12) in aft arm of bellcrank (1). Install bolt (13), two washers (14 and 15), and nut (16).
6. Position connecting link (17) in bellcrank (1). Install bolt (18), two washers (19 and 20), and nut (21).
7. Torque two nuts (16 and 21) to **60 to 90 inch-pounds**. Install cotter pins (22 and 23).
8. Check two bolts (13 and 18). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut (16 or 21) and repeat step 7.

INSPECT



FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Close cargo ramp (Task 2-2).

END OF TASK

11-260 REMOVE PYLON LEFT UPPER CONNECTING LINK 11-260

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

None

Personnel Required:

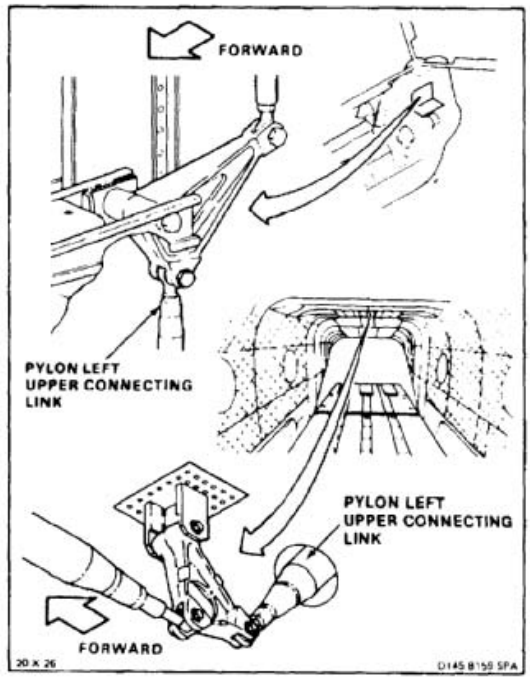
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Cargo Ramp Open and Level (Task 2-2)
Pylon Left Work Platform Open (Task 2-2)

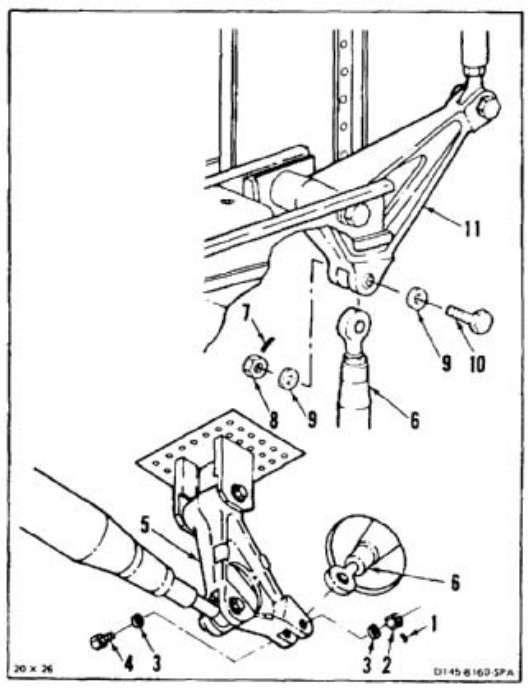


NOTE

Attaching bolt, washers, and nut will be temporarily installed after removing links.

NOTE

If a crack in the connecting link or bellcrank is suspected during removal, refer to TM 1-1520-253-23.



1. Working from ramp, remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5). Disconnect left connecting link (6) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) loosely in bellcrank (5).
3. Work from left work platform, remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (11). Remove link (6).
4. Install bolt (10), two washers (9), and nut (8) loosely in bellcrank (11).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-261 INSTALL PYLON LEFT UPPER CONNECTING LINK 11-261

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

None

Parts:

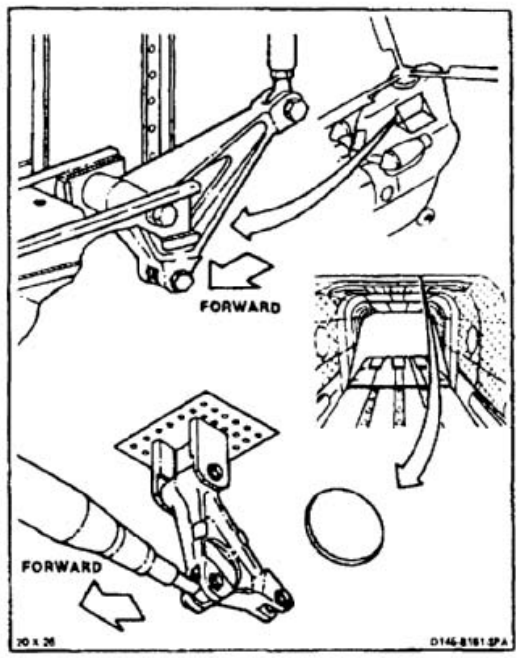
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-33



CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

Adjustable rod ends should be aft or up.

1. Working from pylon left work platform, remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

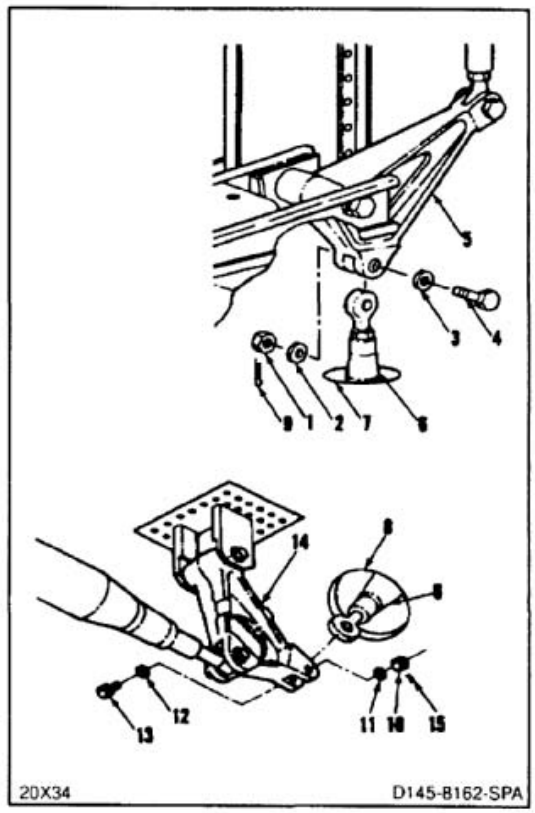
Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

2. Insert connecting link (6) through hole (7) in upper structure and hole (8) in lower structure. Position link in bellcrank (5).
3. Install bolt (4), two washers (3 and 2), and nut (1) in bellcrank (5).
4. Torque nut (1) to **60 to 90 inch-pounds**. Install cotter pin (11).
5. Working from ramp, remove nut (10), two washers (11 and 12), and bolt (13) from bellcrank (14).
6. Position link (6) in bellcrank (14). Install bolt (13), two washers (12 and 11), and nut (10) in bellcrank.



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

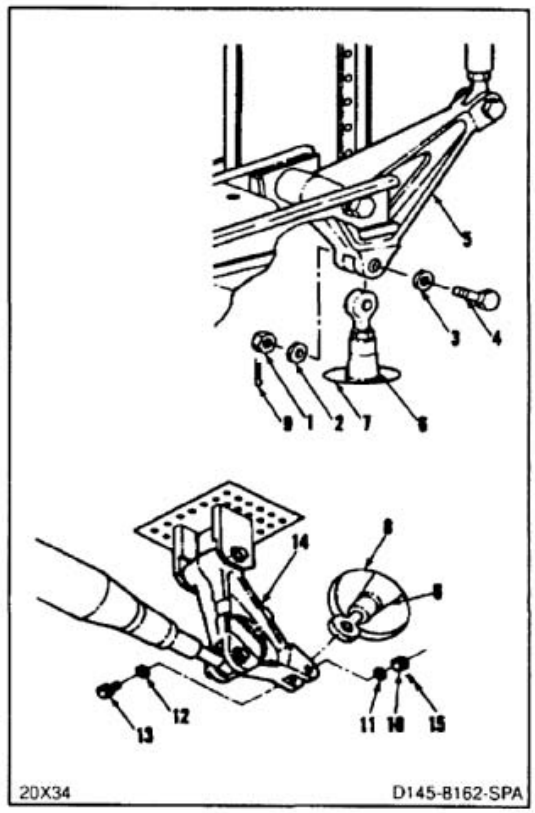
Ensure that the rivet through the fixed rod end insert and rod end is secure.

Ensure rivet, roll pin, and associated hardware through rod end insert at adjustable end of the link assy is secure.

Ensure proper application of ALBI fire retardant coatings to the link assy.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



7. Torque nut (10) to **60 to 90 inch-pounds**. Install cotter pin (15).

8. Check two bolts (4 and 13). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 4 or 7.

NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).

INSPECT

FOLLOW-ON MAINTENANCE:

Remove safety blocks (T31) (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight control system (TM 55-1520-240-T).
Close cargo ramp (Task 2-2).
Close pylon left work platform (Task 2-2).

END OF TASK

11-262 REMOVE PYLON RIGHT UPPER CONNECTING LINK 11-262

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

None

Personnel Required:

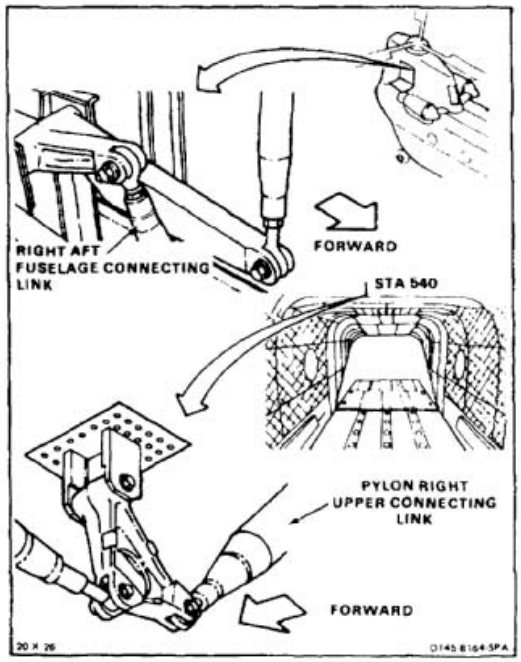
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Cargo Ramp Open and Level (Task 2-2)
Pylon Right Work Platform Open (Task 2-2)

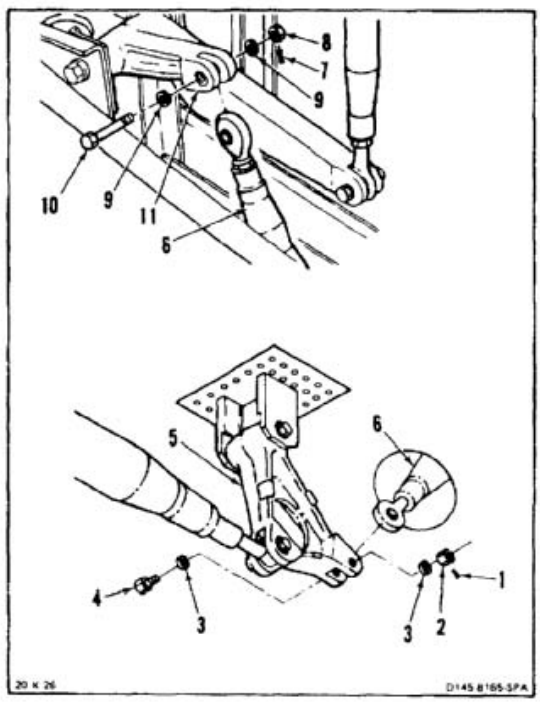


NOTE

Attaching bolt, washers, and nut will be temporarily installed after removing links.

NOTE

If a crack in the connecting link or bellcrank is suspected during removal, refer to TM 1-1520-253-23.



1. Working from ramp, remove cotter pin (1), nut (2), two washers (3), and bolt (4) from bellcrank (5). Disconnect left connecting link (6) from bellcrank.
2. Install bolt (4), two washers (3), and nut (2) loosely in bellcrank (5).
3. Working from right work platform, remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (11). Remove link (6).
4. Install bolt (10), two washers (9), and nut (8) loosely in bellcrank (11).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-263 INSTALL PYLON RIGHT UPPER CONNECTING LINK 11-263

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand
Torque Wrench, 30 to 150 Inch-Pounds
Torque Wrench, 5 to 50 Inch-Pounds

Materials:

None

Parts:

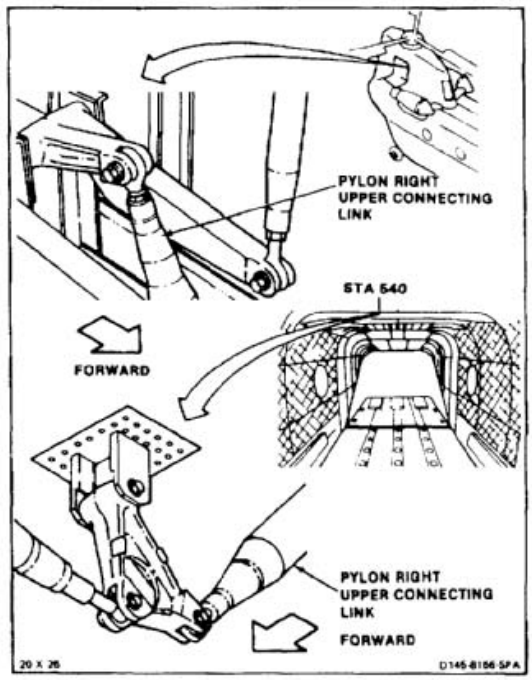
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 1-13
Task 11-33



CAUTION

Bushings must be in bellcranks before installing bolts; otherwise, damage to components will result.

NOTE

Impedance bolts are installed in flight control connections. These bolts are self-retaining and require a special nut and torque (Task 1-13).

The adjustable rod end should be aft or up.

1. Working from pylon right work platform, remove nut (1), two washers (2 and 3), and bolt (4) from bellcrank (5).

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

Ensure that the rivet through the fixed rod end bearing is secure.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure that both rod end jam nuts are installed and torqued.

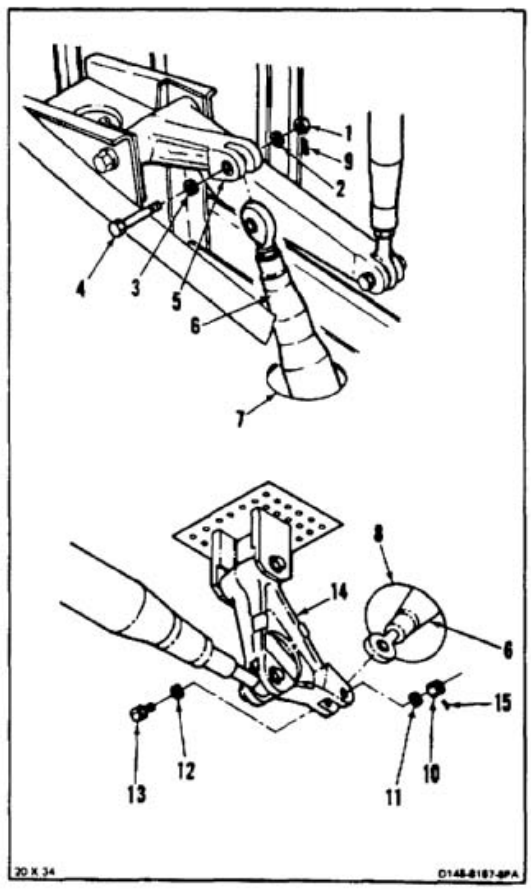
Ensure that the rivet through the fixed rod end insert and rod end is secure.

Ensure rivet, roll pin, and associated hardware through rod end insert at adjustable end of the link assy is secure.

Ensure proper application of ALBI fire retardant coatings to the link assy.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

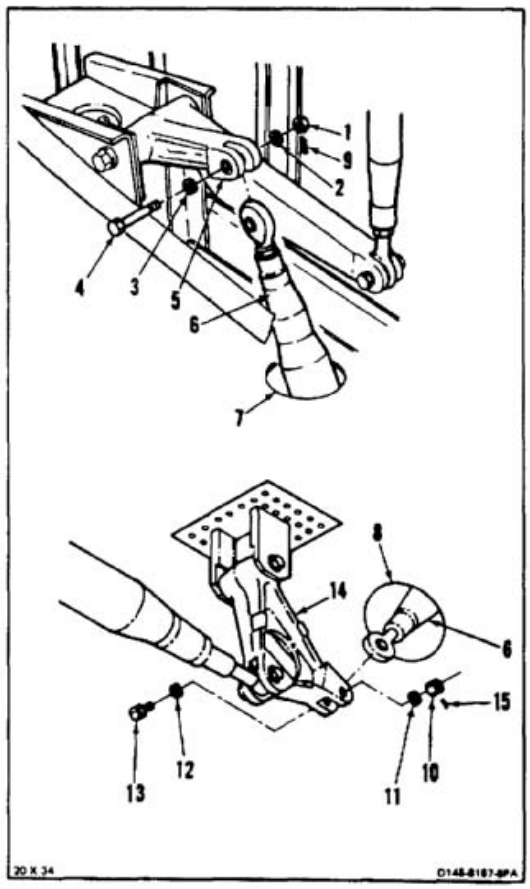
Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.



2. Insert connecting link (6) through hole (7) in upper structure and hole (8) in lower structure. Position link in bellcrank (5).
3. Install bolt (4), two washers (3 and 2), and nut (1) in bellcrank (5).
4. Torque nut (1) to **60 to 90 inch-pounds**. Install cotter pin (9).
5. Working from ramp, remove nut (10), two washers (11 and 12), and bolt (13) from bellcrank (14).
6. Position link (6) in bellcrank (14). Install bolt (13), two washers (12 and 11), and nut (10) in bellcrank.
7. Torque nut (10) to **60 to 90 inch-pounds**. Install cotter pin (15).
8. Check two bolts (4 and 13). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 4 or 7.

NOTE

If connecting links are changed in length, perform neutral rig check (Task 11-33).



INSPECT

FOLLOW-ON MAINTENANCE:

Remove safety blocks (Task 11-29).
Perform neutral rig check (Task 11-33).
Perform operational check of flight control system (TM 55-1520-240-T).
Close cargo ramp (Task 2-2).
Close pylon right work platform (Task 2-2).

END OF TASK

11-264 REMOVE PYLON LEFT UPPER BELLCRANK 11-264

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

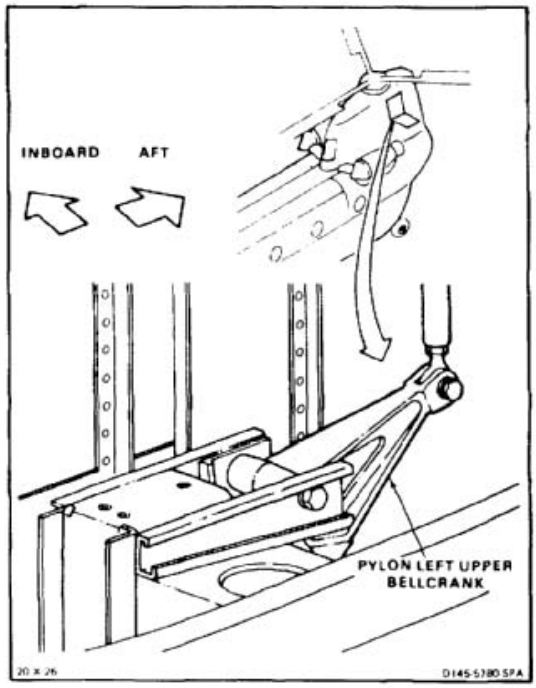
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

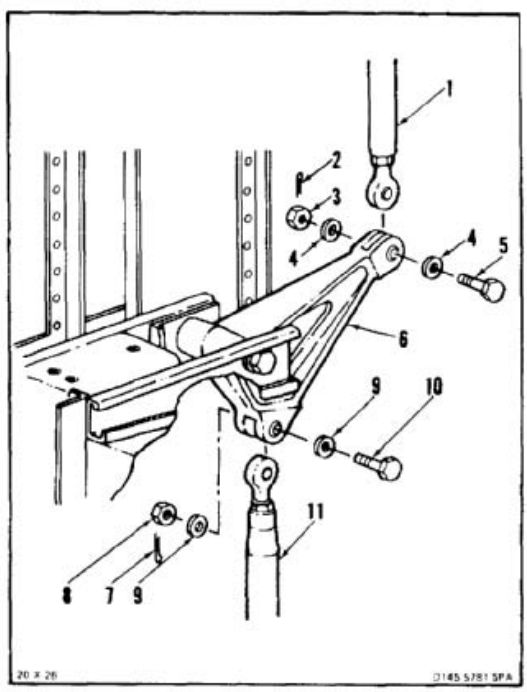
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)
Cargo Ramp Open and Level (Task 2-2)
Pylon Left Work Platform Open (Task 2-2)



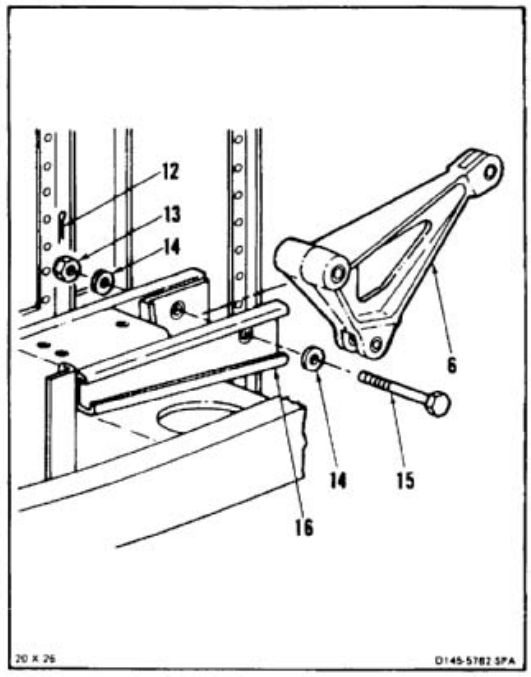
NOTE

If a crack in the second stage connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

1. Tag connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from bellcrank (6). Remove link.
2. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (6). Disconnect link (11) and tie away from bellcrank. Use twine (E433).



3. Tag bellcrank (6). Remove cotter pin (12), nut (13), two washers (14), and bolt (15) from support (16) and bellcrank. Remove bellcrank.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-265 INSTALL PYLON LEFT UPPER BELLCRANK 11-265

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 100 to 750 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Dial Indicating Scale, 0 to 10 Pounds

Materials:

None

Parts:

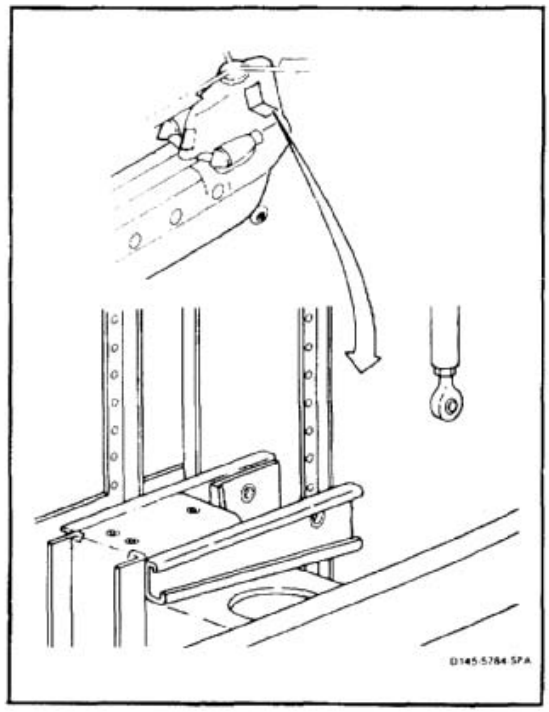
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 11-9
Task 11-33



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

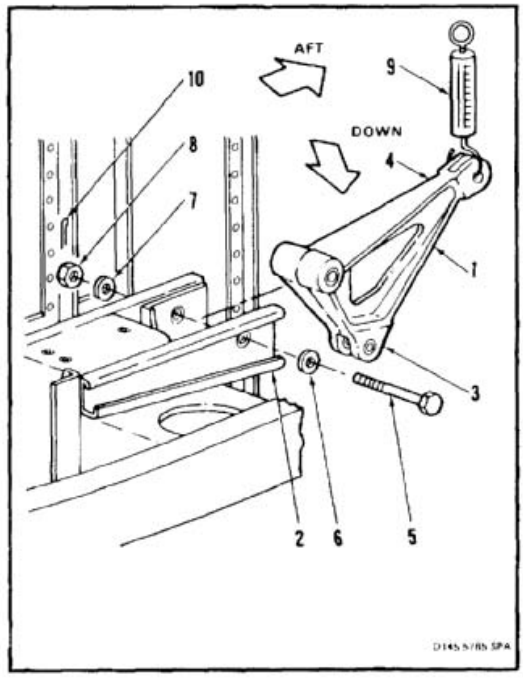
Ensure proper orientation of bellcrank at installation.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

NOTE

All bolts installed in flight control system are self-retaining (impedance) bolts. During installation of flight controls, make sure all bolts used are self-retaining bolts.



1. Position bellcrank (1) in support (2), short arm (3) down, long arm (4) aft. Install bolt (5), two washers (6 and 7) and nut (8). Remove tag.
2. Torque nut (8) to **155 to 220 inch-pounds**. Align cotter pin hole.
3. Check bellcrank (1) as follows:
   a. Apply force to end of arm (4). Use dial indicating scale (9). Bellcrank must rotate with force less than **3 pounds** and bolt (5) must not turn. If bolt turns, go to step b. If bolt does not turn go to step 4.
   b. Back off nut (8) until bolt does not turn when bellcrank is rotated. Check cotter pin hole is aligned.

c. Check that torque on nut (8) is more than **155 inch-pounds** with cotter pin hole aligned.

d. Repeat step a.

4. Install cotter pin (10).

NOTE

The adjustable rod ends should be aft or up.

INSPECT

5. Untie connecting link (11). Position link in short arm (3) of bellcrank (1). Install bolt (12), two washers (13 and 14), and nut (15).

6. Torque nut (15) to **60 to 90 inch-pounds**. Install cotter pin (16).

7. Position connecting link (17) in bellcrank (1). Install bolt (18), two washers (19 and 20) and nut (21). Remove tag.

8. Torque nut (21) to **30 to 45 inch-pounds**. Install cotter pin (22).

9. Check two bolts (12 and 18). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut and repeat step 6 or 8.

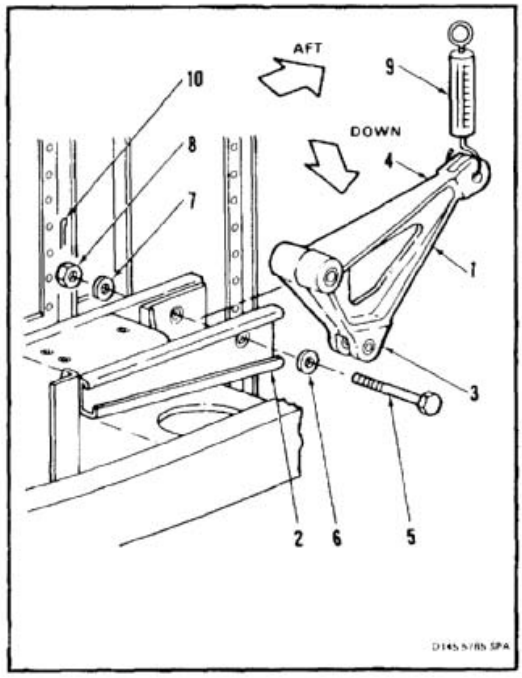
NOTE

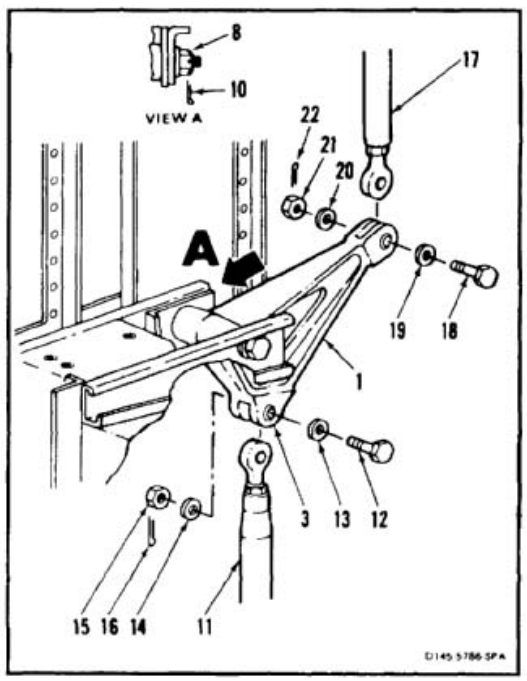
If the connecting links are changed in length, perform neutral rig check (Task 11-33).

INSPECT

NOTE

Inspect bellcrank and connecting link bearings (Task 11-9).





FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Close pylon left work platform (Task 2-2).
Close cargo ramp (Task 2-2).

END OF TASK

11-266 REMOVE PYLON RIGHT UPPER BELLCRANK 11-266

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Workstand

Materials:

Paper Tags (E264)
Twine (E433)

Personnel Required:

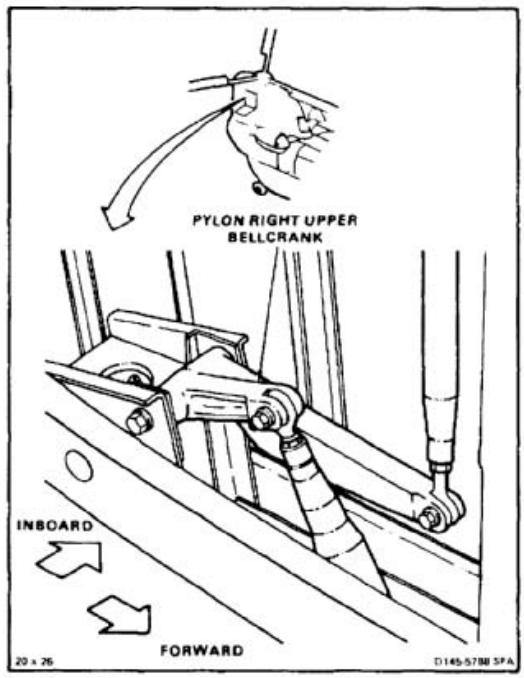
Medium Helicopter Repairer

References:

TM 1-1520-253-23

Equipment Condition:

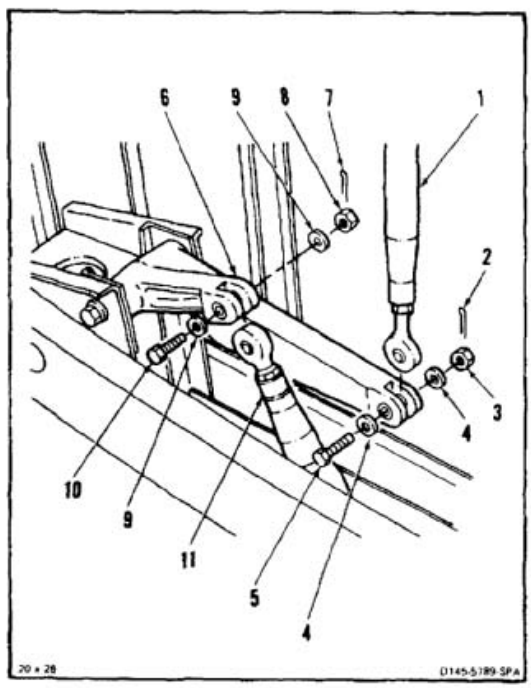
Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Safety Blocks (T31) Installed (Task 11-28)
Servocylinder Connecting Links Disconnected (Task 11-192)
Cargo Ramp Open and Level (Task 2-2)
Pylon Left Work Platform Open (Task 2-2)



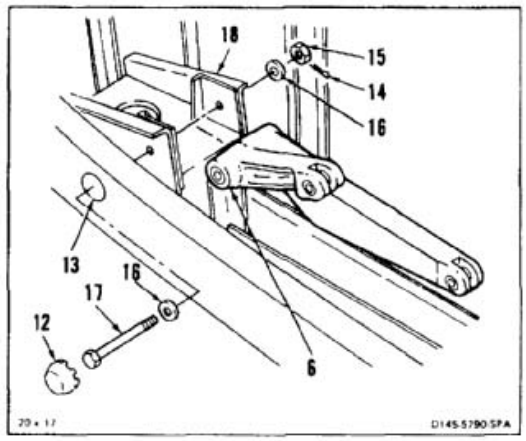
NOTE

If a crack in the connecting link, bellcrank, or support is suspected during removal, refer to TM 1-1520-253-23.

1. Tag connecting link (1). Remove cotter pin (2), nut (3), two washers (4), and bolt (5) from bellcrank (6). Remove link.
2. Remove cotter pin (7), nut (8), two washers (9), and bolt (10) from bellcrank (6). Disconnect connecting link (11) and tie away from bellcrank. Use twine (E433).



3. Pry plug (12) from hole (13) in structure.
4. Tag bellcrank (6). Remove cotter pin (14), nut (15), two washers (16), and bolt (17) from support (18). Remove bolt through hole (13). Remove bellcrank.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-267 INSTALL PYLON RIGHT UPPER BELLCRANK 11-267

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
Torque Wrench, 5 to 50 Inch-Pounds
Torque Wrench, 30 to 150 Inch-Pounds
Dial Indicating Scale, 0 to 10 Pounds

Materials:

None

Parts:

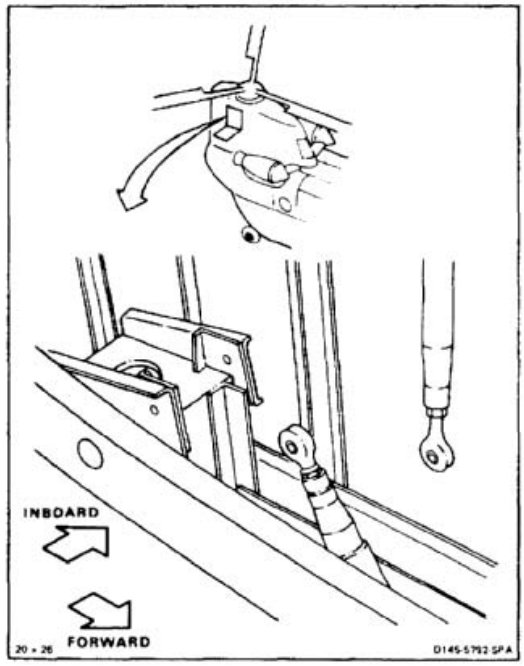
Cotter Pins

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

TM 55-1520-240-23P
Task 11-33



WARNING

FLIGHT SAFETY PARTS

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured at each joint connection and mounting to the airframe.

Ensure that all bushings are properly installed (including orientation) in each input and output clevis of the bellcrank.

Ensure bellcrank hub bearings are serviceable and properly installed.

Ensure proper orientatioin of the bellcrank at installation.

Ensure proper attaching hardware (impedance type bolt, nut, and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pins.

Loose attachments within flight control primary linkage will degrade aircraft control. Missing components will cause loss of control.

NOTE

All bolts installed in flight control system are self-retaining (impedance) bolts. During installation of flight controls, make sure all bolts used are self-retaining bolts.

1. Position bellcrank (1) in support (2), short arm (3) up and forward. Install bolt (4) through hole (5), two washers (6 and 7), and nut (8). Remove tag.
2. Torque nut (8) to **80 to 125 inch-pounds**. Align cotter pin hole.
3. Check bellcrank (1) as follows:
   a. Apply force to end of arm (3). Use dial indicating scale (9). Bellcrank must rotate with force less than **3 pound** and bolt (4) must not turn. If bolt turns, go to step b. If bolt does not turn, go to step 4.
   b. Back off nut (8) until bolt does not turn when bellcrank is rotated. Check cotter pin hole is aligned.
   c. Check that torque on nut (8) is more than **80 inch-pounds** with cotter pin hole aligned.
   d. Repeat step a.
4. Install cotter pin (10).
5. Install plug (11) in hole (5).

INSPECT

NOTE

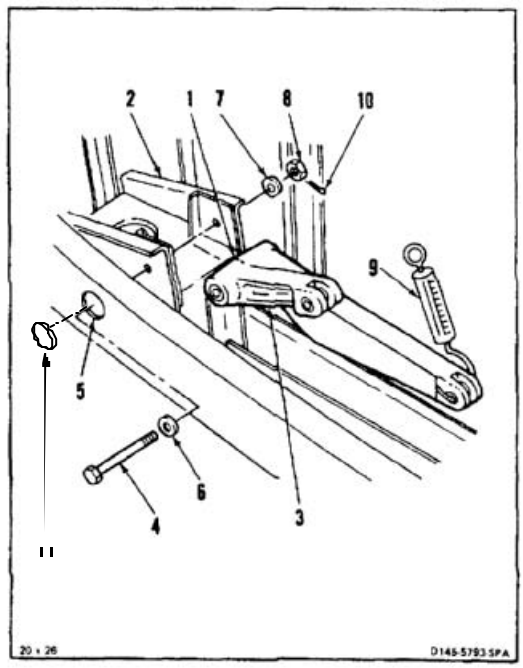
The adjustable rod ends should be aft or up.

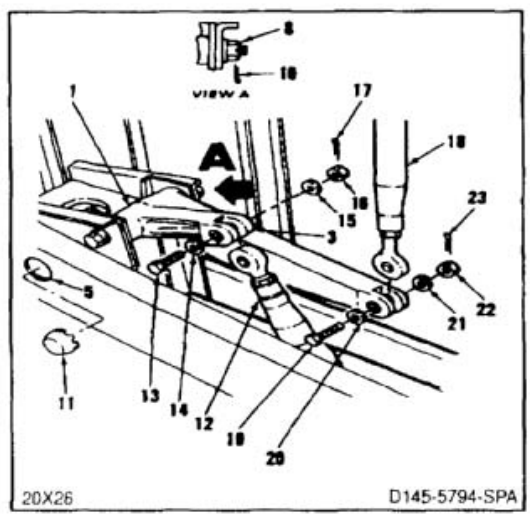
6. Untie connecting link (12). Position link in short arm (3) of bellcrank (1). Install bolt (13), two washers (14 and 15), and nut (16).
7. Torque nut (16) to **60 to 90 inch-pounds**. Install cotter pin (17).
8. Position connecting link (18) In bellcrank (1). Install bolt (19), two washers (20 and 21), and nut (22). Remove tag.
9. Torque nut (22) to **30 to 60 inch-pounds**. Install cotter pin (23).
10. Check two bolts (13 and 19). Bolts shall not rotate with torque less than **10 inch-pounds**. There shall be no axial looseness. If bolt rotates or is loose, add washer under nut, and repeat step 7 or 9.

NOTE

If the connecting links are changed in length, perform neutral rig check (Task 11-33).

INSPECT





FOLLOW-ON MAINTENANCE:

Connect servocylinder connecting links (Task 11-193).
Remove safety blocks (Task 11-29).
Close pylon left work platform (Task 2-2).
Close cargo ramp (Task 2-2).

END OF TASK

SECTION IX
ADVANCED FLIGHT CONTROL SYSTEM DESCRIPTION AND OPERATION

11-268 ADVANCED FLIGHT CONTROL SYSTEM 11-268

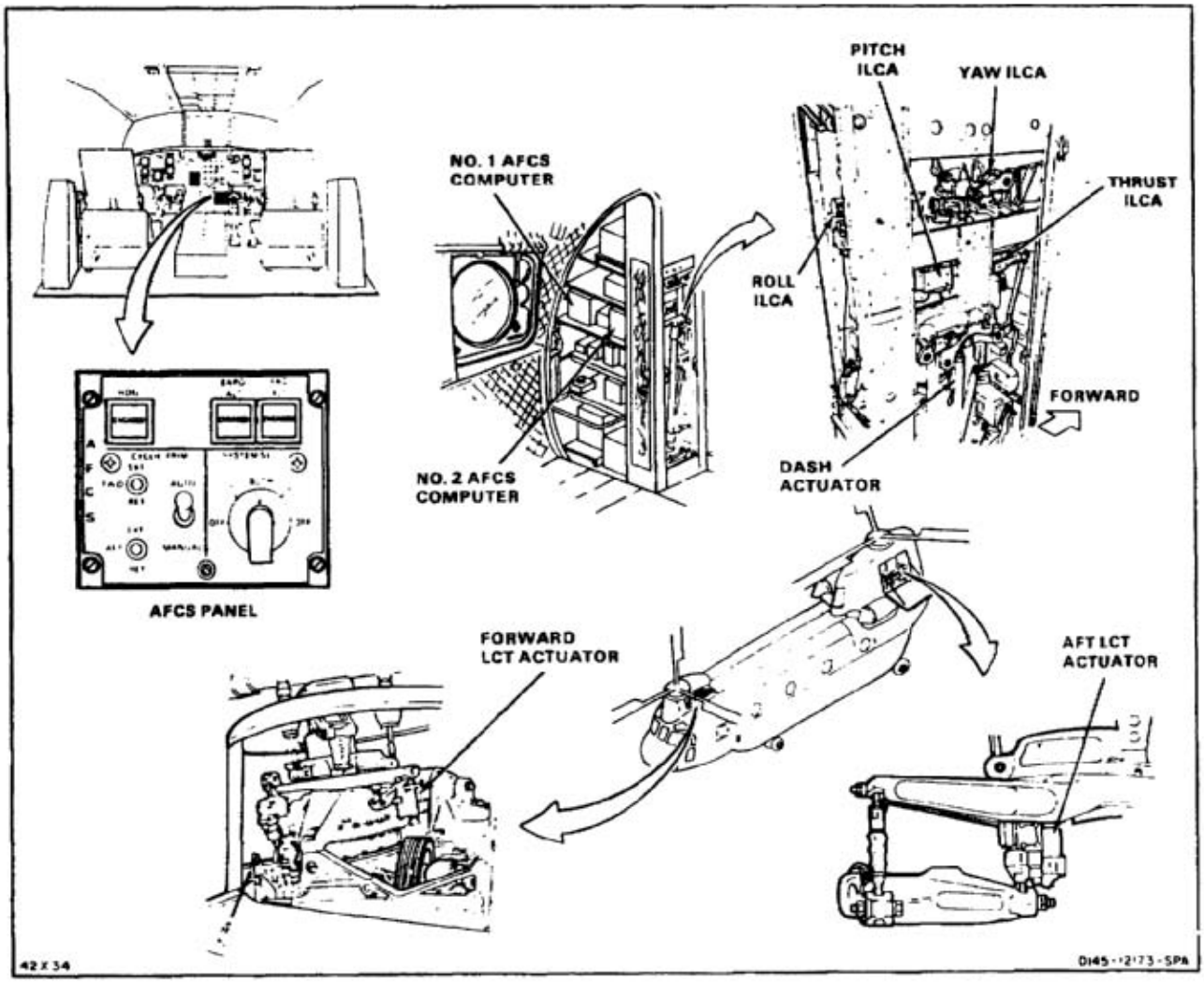
The advanced flight control system (AFCS) is an electronic system that independently changes the position of the flight controls as needed to keep the helicopter steady in flight.

The system stabilizes the helicopter in the pitch, roll, and yaw axes. It also maintains a pilot-selected airspeed, altitude, bank angle, and heading. An automatic turn (heading select) feature is also included. With this feature, the pilot selects a heading and the AFCS automatically puts the helicopter into a coordinated turn to that heading.

During flight, sensors in each flight axis sense changes in helicopter attitude caused by outside forces such as wind gusts. The system automatically reacts to change the position of the flight controls to hold attitude steady. During a maneuver, transducers on the stick and pedal controls sense pilot commands and signal the system to move the flight controls to change attitude.

The AFCS is a redundant installation, using two separate but interconnected systems. Normally, both systems operate at the same time, with each providing half the input to the flight controls. Each system is said to have half gain and half authority. If one system fails, all input comes from the remaining system. However, this input is limited to three-fourths of that provided when both systems are working, up to the maximum travel available from the good system. This maximum travel stays at half of that available when both systems are working. In this case, the remaining system is said to have three-fourths gain and half authority. The pilot can manually select either system at any time.

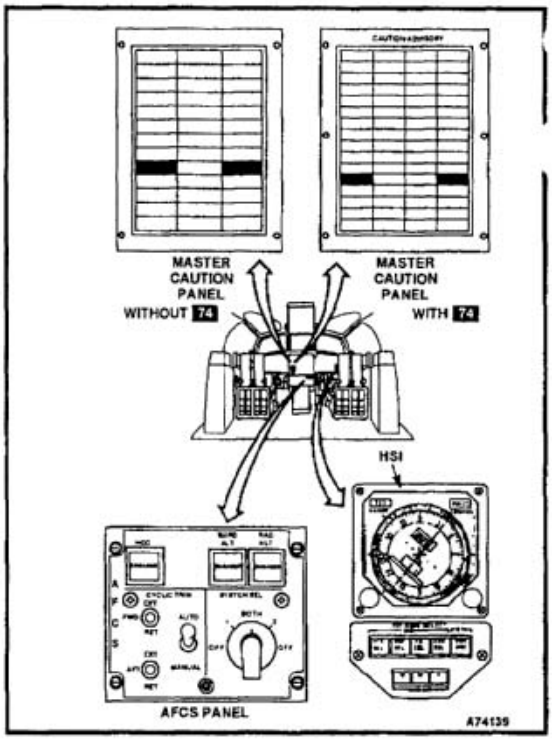
Major parts of the AFCS are the control panel, computers, ILCAs, DASH actuator, and LCT actuators.



Control Panel

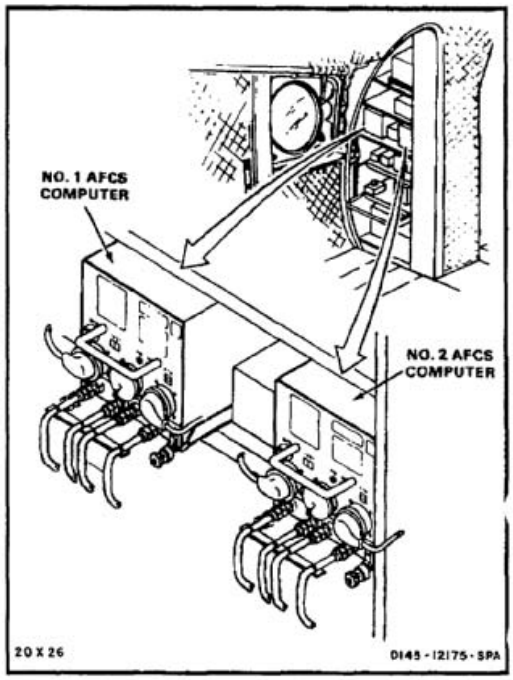
A control panel on the canted console allows manual selection of four features of the AFCS:

1. A system select switch allows the pilot to select either or both systems or to shut down both. A light on the master caution panel comes on when a system is shut down, either manually or automatically.
2. Two altitude switches allow selection of barometric or radar altitude sensing as input to the system. Barometric is normally used for all forward flight. Radar is normally used when hovering.
3. A heading switch allows engagement of automatic turning to a preselected heading. Heading selection is done at the pilot or copilot horizontal situation indicator (HSI).
4. A switch allows selection of automatic or manual cyclic trim control. When manual is selected, extension or retraction is controlled through separate forward and aft switches on the panel.



Computers

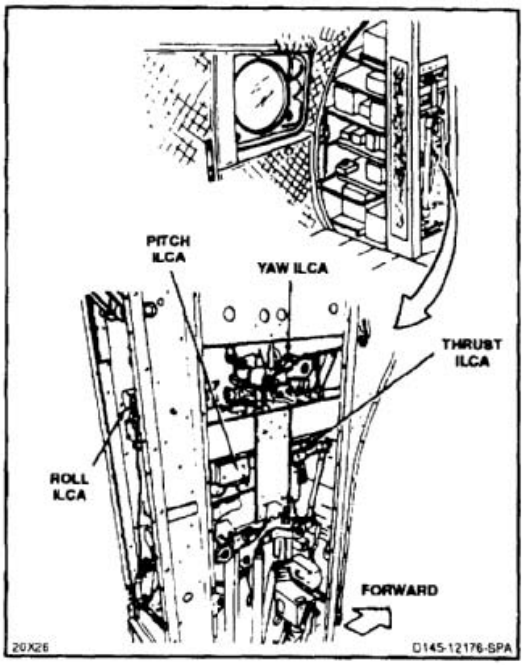
Two computers in the electronics compartment convert sensed information about helicopter flight condition into electronic signals. Input to the computers comes from attitude gyros, the pitot static system and sideslip ports, and transducers on the stick and pedal controls. Built in test equipment (BITE) in each computer allows the complete system to be checked out on the ground.



Integrated Lower Control Actuators

Four integrated lower control actuators (ILCAs) controlling pitch, roll, and yaw, and thrust are in the flight controls closets. Each ILCA has two sections — a lower boost actuator and a dual extensible link. The lower boost actuator is controlled by manual input from the cockpit controls. The dual extensible links extend or retract in response to signals from the AFCS computers. Movement of the links increases or reduces input from the cockpit controls to modify input to the upper flight controls.

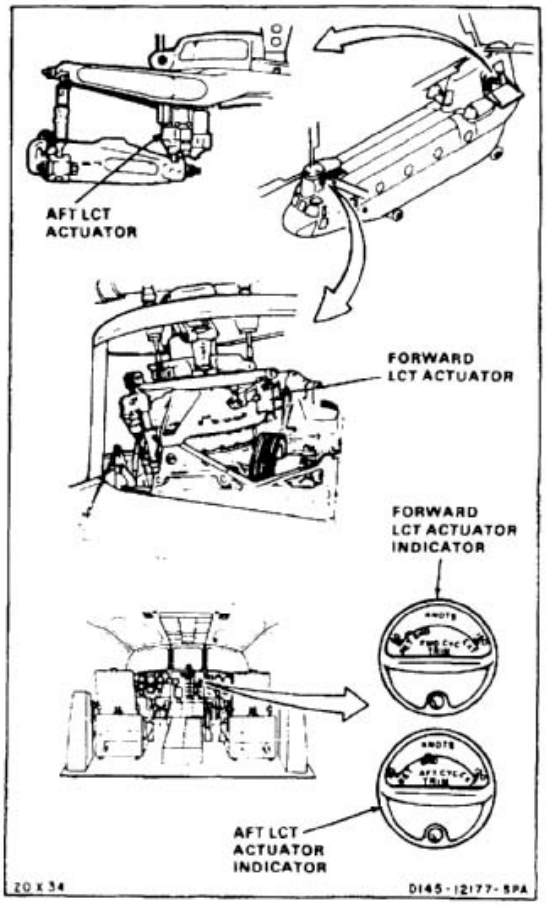
The total travel of each dual extensible link is the sum of the travel of two separate rods. The upper rod is controlled by the No. 1 computer. The lower rod is controlled by the No. 2 computer.



Longitudinal Cyclic Trim Actuators

Longitudinal cyclic trim (LCT) actuators in the forward and aft upper controls extend or retract to change the tilt of the rotor heads. LCT reduces fuselage nose down attitude as airspeed and altitude increase. It also reduces rotor blade flapping. The result is lower drag and rotor shaft stress.

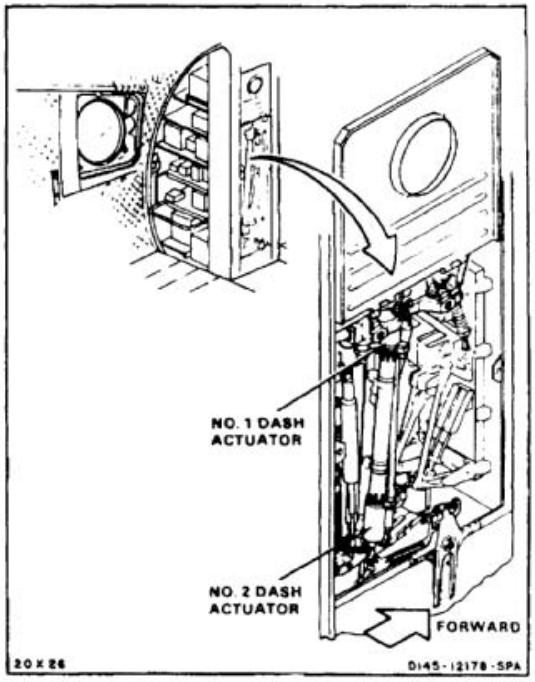
The actuators are controlled automatically by signals from the AFCS computer, or manually, by switches on the AFCS panel. In the automatic mode, the forward LCT is controlled by the No. 1 AFCS computer and the aft by the No. 2 computer. LCT position is shown by indicators on the center instrument panel.



Differential Airspeed Hold Actuator

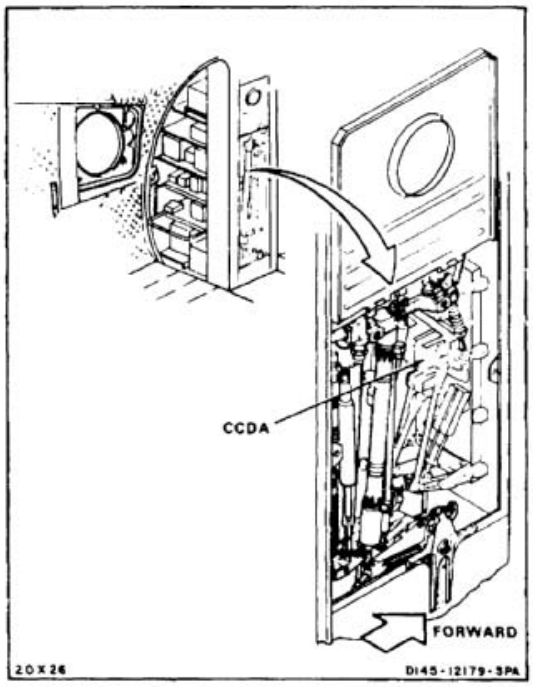
The differential airspeed hold (DASH) actuator holds pitch and airspeed constant during steady flight. It also provides a positive gradient for the cyclic control stick. This makes helicopter airspeed proportional to stick movement.

The DASH actuator is composed of two separate sections at the ends of a metal tube. The upper section is controlled by the No. 1 AFCS computer. The lower section is controlled by the No. 2 computer.



Collective Control Driver Actuator

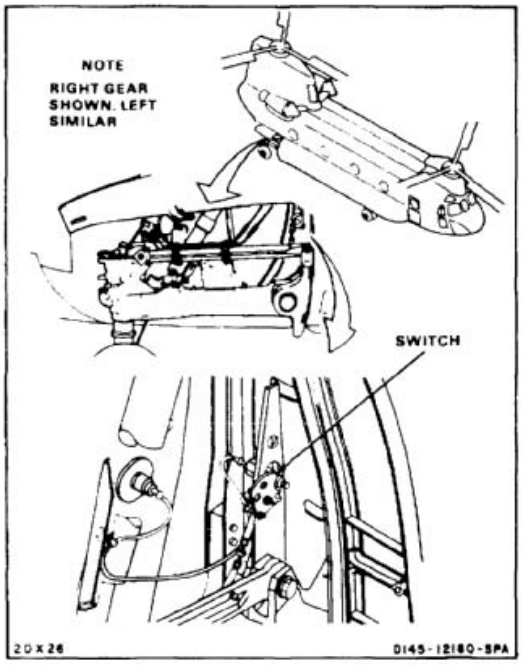
The collective control driver actuator (CCDA) automatically moves the thrust control lever to hold altitude steady. It also acts as a magnetic brake for the lever. The CCDA is controlled by the No. 1 computer. It is located near the upper end of the DASH actuator in the flight controls closet.



Proximity Switches

A switch on each aft landing gear energizes a relay whenever the helicopter is on the ground. This signals the AFCS computers to reduce input to the pitch ILCA by **50 percent** and disable longitudinal input to the DASH actuator. The switches also drive the LCT actuators at the rotor heads to a ground position.

The left landing gear switch controls the No. 1 sections of the pitch ILCA and DASH actuator. The right landing gear switch controls the No. 2 sections. The forward and aft LCT actuators are each controlled by both switches.



END OF TASK

SECTION X
ADVANCED FLIGHT CONTROL SYSTEM

11-269 REMOVE AFCS PANEL ASSEMBLY 11-269

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

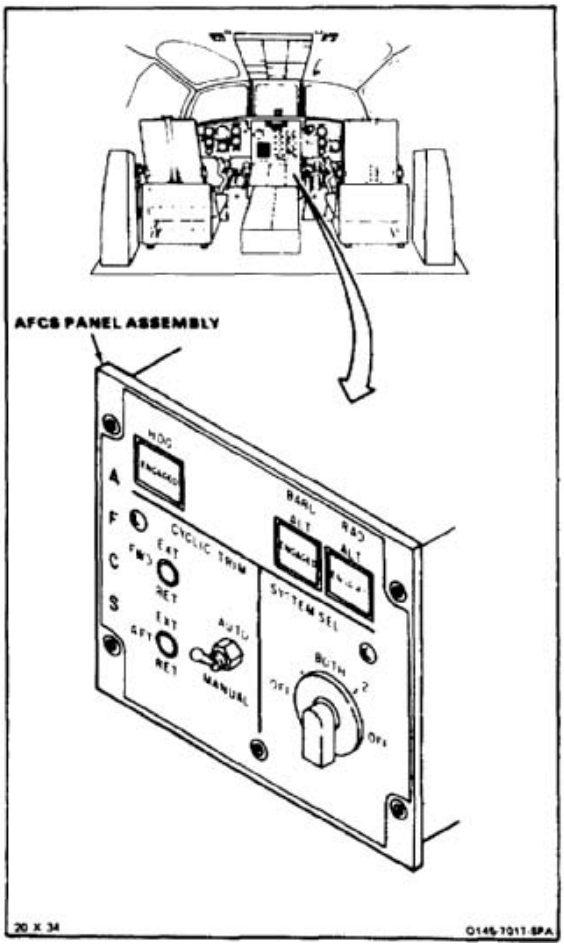
Paper Tags (E264)

Personnel Required:

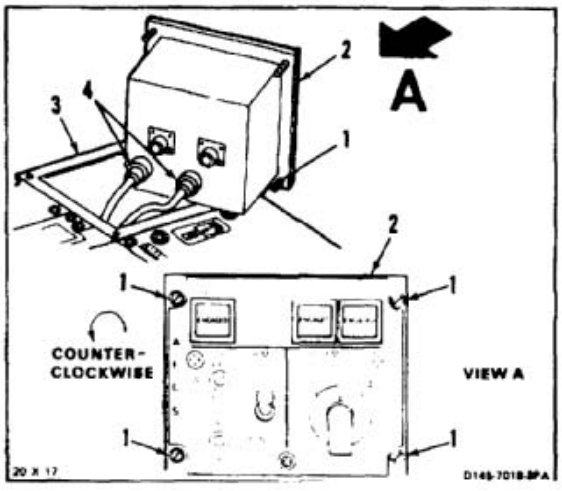
Medium Helicopter Repairer

Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off



1. Loosen four fasteners (1) on AFCS panel assembly (2) by turning them counterclockwise one quarter turn.
2. Lift panel assembly (2) from console (3) for access to connectors (4).
3. Tag and disconnect two connectors (4) from panel assembly (2). Remove panel assembly.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-270 DISASSEMBLE AFCS CONTROL PANEL (AVIM) 11-270

INITIAL SETUP

Applicable Configurations:

All

Tools:

Tool Kit, Electronic Equipment TK-105/G, NSN 5180-00-610-8177
Contact Insertion/Removal Tool M83723-31-20

Materials:

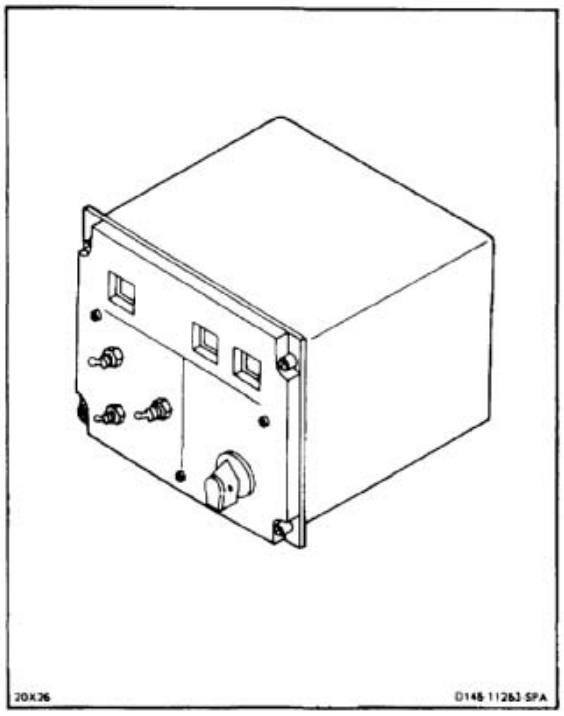
Tags (E264)

Personnel Required:

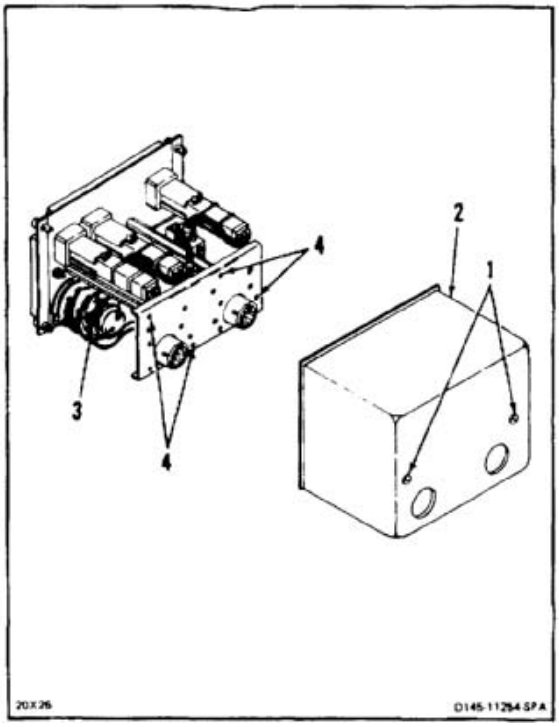
Avionic Navigation and Flight Control Equipment Repairer

Equipment Condition:

Off Helicopter Task



1. Turn two fasteners (1) 1/4 turn.
2. Remove rear cover (2).
3. Remove braided tape and tiecord from wire harness (3) as necessary.
4. Remove four screws (4).

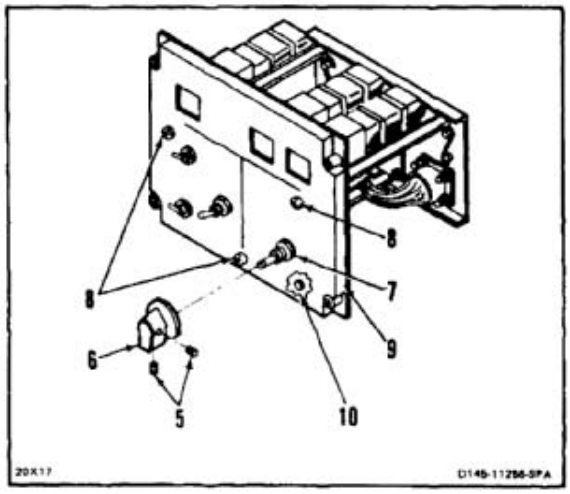


5. Remove two setscrews (5) from knob (6).
6. Remove knob (6) from rotary switch shaft (7).

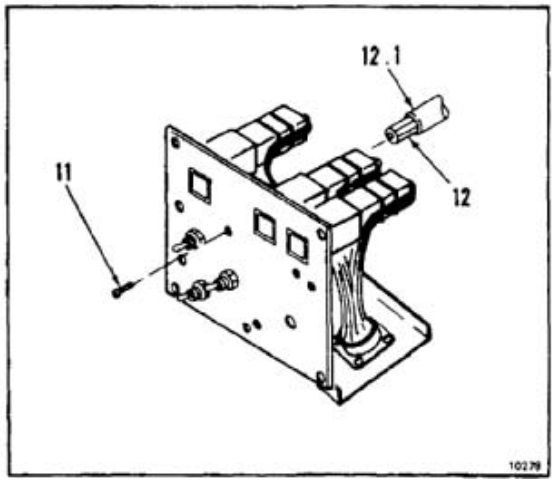
NOTE

Be careful when removing illumination panel at lamp receptacle connector.

7. Remove three screws (8).
8. Remove front illumination panel (9). Use common screwdriver to pry panel loose at lamp receptacle connector (10).



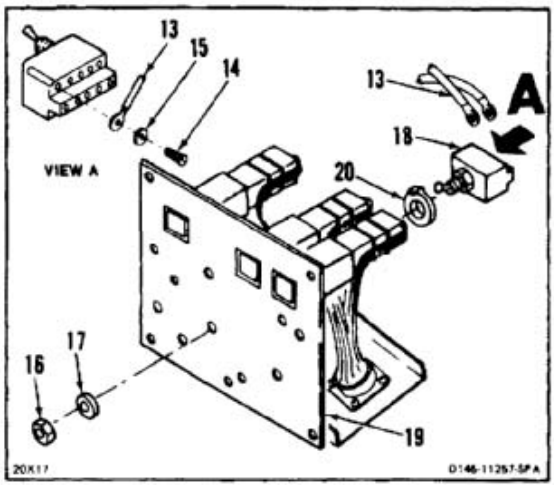
9. Remove four screws (11).
10. Remove four support rods (12).
10.1. Inspect tubing (12.1) covering support rods (12). There shall be no chafing or burns.



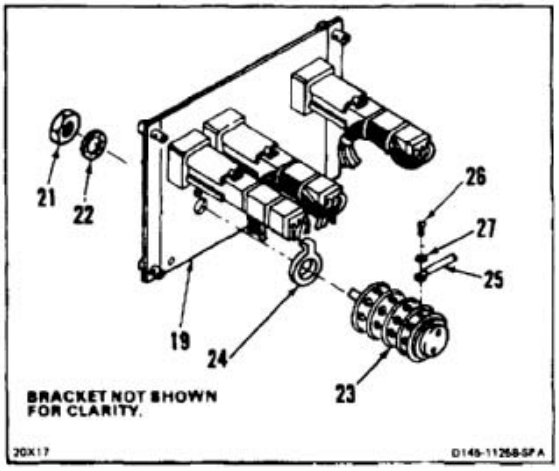
NOTE

Procedure to remove three toggle switches is the same. CYCLIC TRIM-AUTO/MAN switch is shown here.

11. Tag and disconnect 12 wires (13) by removing 12 screws (14) and washers (15).
12. Remove nut (16) and washer (17).
13. Remove switch (18) from mounting plate (19).
14. Remove locking ring (20) from switch (18).



15. Remove nut (21) and washer (22) from rotary switch (23).
16. Remove switch (23) from mounting plate (19).
17. Remove locking ring (24) from switch (23).
18. Tag and disconnect five terminal lugs (25) by removing five screws (26) and washers (27).



NOTE

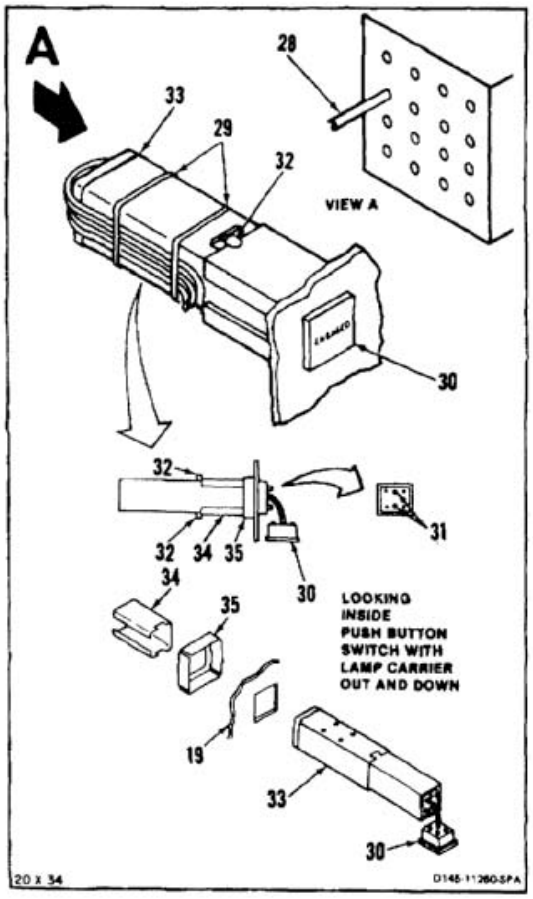
Removal of three pushbutton switches is the same. RAD ALT ENGAGE switch is shown here.

19. Tag and disconnect 11 wires (28). Use insertion/extraction tool. Remove wire ties (29).

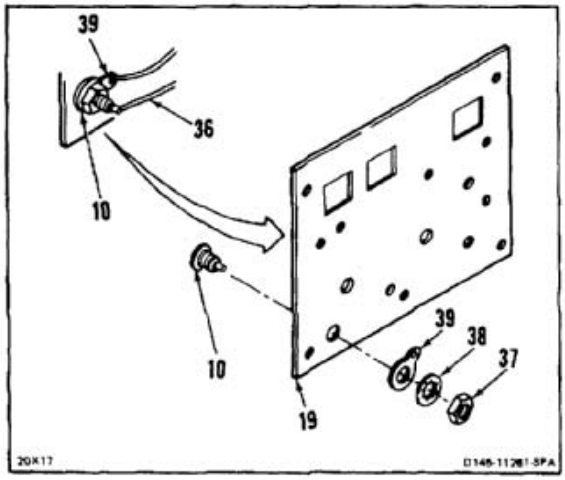
CAUTION

Be careful when removing lamp carrier. Lamp carrier is attached to pushbutton switch by a sliding retainer. Pull lamp carrier out carefully and only enough to rotate down.

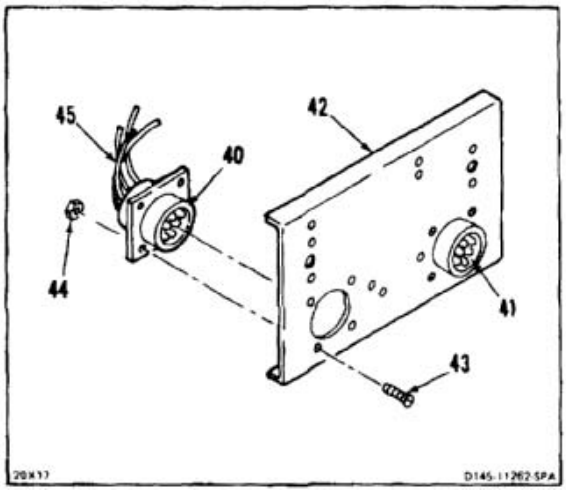
20. Pull lamp earner (30) out and turn down.
21. Loosen two screws (31) to allow tabs (32) to rotate in toward switch (33) freeing retainer sleeve (34) and adapter sleeve (35).
22. Slide pushbutton switch (33) out of mounting plate (19). Tag switch.



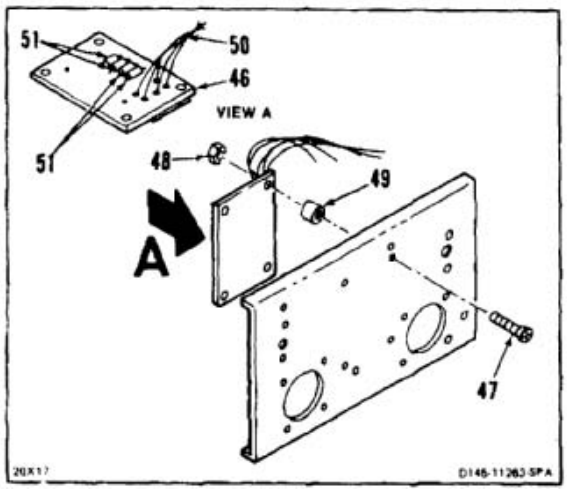
23. Tag and unsolder wire (36) from receptacle connector (10).
24. Remove nut (37), washer (38) and solder lug (39).
25. Remove receptacle connector (10) from mounting plate (19).



26. Tag and remove two connectors (40 and 41) from connector bracket (42) by removing eight screws (43) and nuts (44).
27. Tag and remove wires (45) from connectors (40 and 41). Use insertion/removal tool.



28. Remove printed circuit board (46) by removing four screws (47), nuts (48) and standoffs (49).
29. Tag and unsolder wires (50) from printed circuit board (46).
30. Remove four diodes (51) from printed circuit board (46). Record anode/cathode position.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-270.1 REPLACE AFCS CONTROL PANEL NON-NVG (RED) LENSES WITH NVG (BLUE/GREEN) LENSES 11-270.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Tool Kit, Electronic Equipment TK-105/G, NSN 5180-00-610-8177

Materials:

Sealant (E345)

Parts:

Screw, 10-32, 2 Inches Long
NVG Filters, NSN 6220-01-354-5557

Personnel Required:

Avionics Navigation Flight Control Equipment Repairer
Inspector

Equipment Condition:

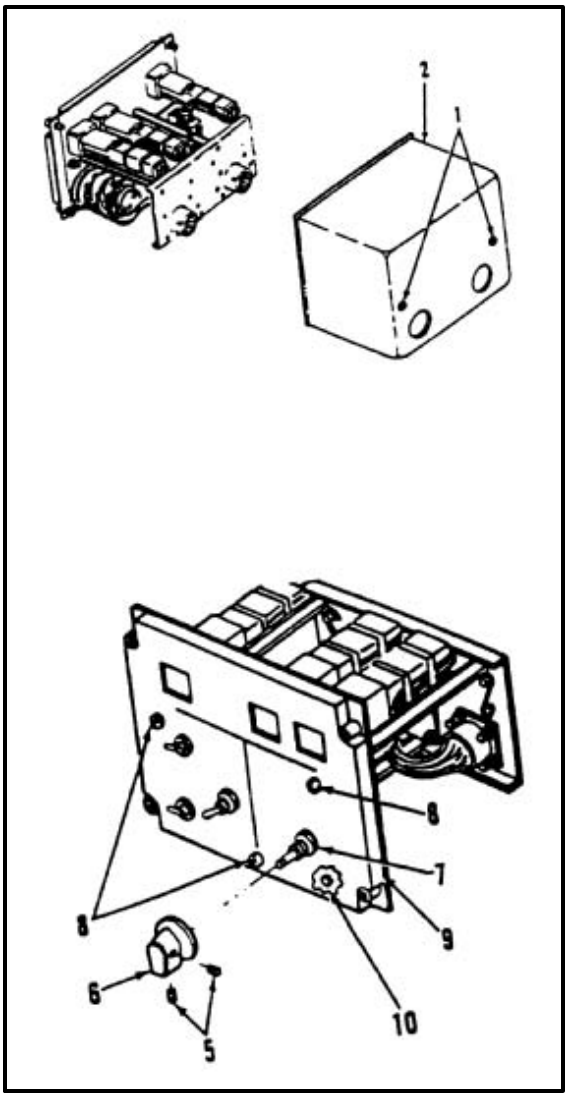
Off Helicopter Task

1. Turn two fasteners (1) 1/4 turn.
2. Remove rear cover (2).
3. Remove two setscrews (5) from knob (6).
4. Remove knob (6) from rotary switch shaft (7).
5. Remove three screws (8).

NOTE

Be careful when removing illumination panel at lamp receptacle connector.

6. Remove front illumination panel (9). Use common screwdriver to pry loose at receptacle connector (10).
7. Remove twelve screws from the back of the illumination panel.
8. Remove fourteen red plastic inserts using a 10-32 screw by threading screw into insert.
9. Install fourteen NVG Filters (NSN 6220-01-354-5557).
10. Install twelve screws into the back of the illumination panel.



11. Position front illumination panel (42) on front mount panel (15). Make sure lamp receptacle connector (14) and illumination panel plug (43) snap together.

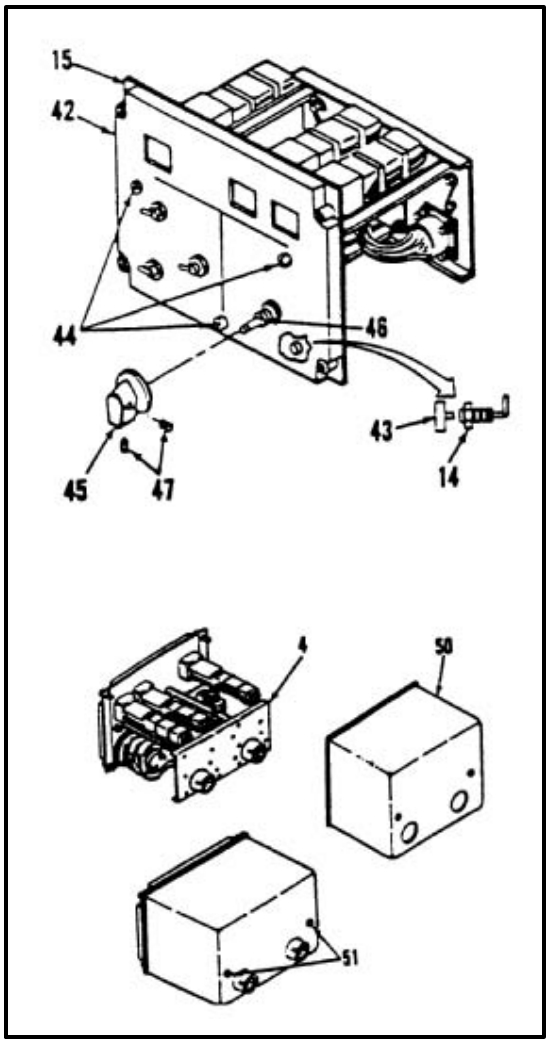
WARNING

Sealant can irritate and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

12. Install three screws (44). Use sealant (E345) on screws.
13. Position knob (45) on switch shaft (46) and tighten two setscrews (47).
14. Position rear cover (50) over assembly (4).
15. Engage lock and two fasteners (51). Fasteners require 1/4 turn clockwise to lock.

FOLLOW-ON MAINTENANCE:

Bench test AFCS control panel (Task 11-272).



END OF TASK

11-271 ASSEMBLE AFCS CONTROL PANEL (AVIM) 11-271

INITIAL SETUP

Applicable Configurations:

All

Tools:

Tool Kit, Electronic Equipment TK-105/G, NSN 5180-00-610-8177
Contact Insertion/Removal Tool M83723-31-20

Materials:

Braided Nomex Tape (E403)
Solder (E360)
Sealant (E345)
Adhesive (E62)

Personnel Required:

Avionic Navigation and Flight Control Equipment Repairer
Inspector

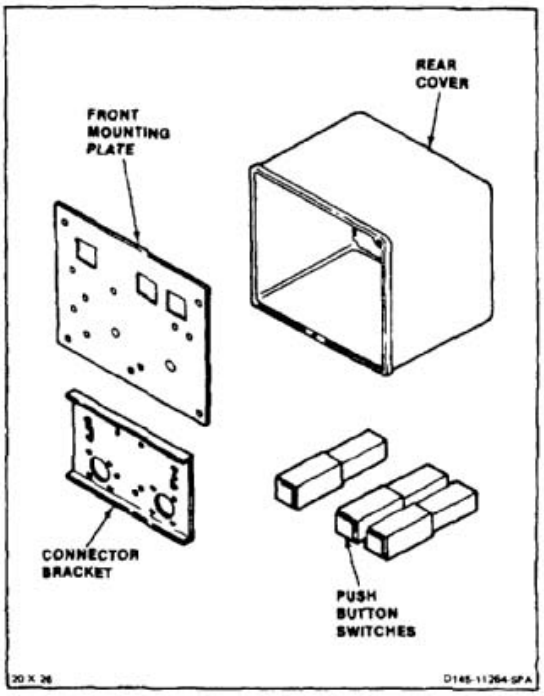
References:

TM 55-1520-240-23P
TM 55-1500-323-25
TM 55-1520-240-T

General Safety Instructions:

WARNING

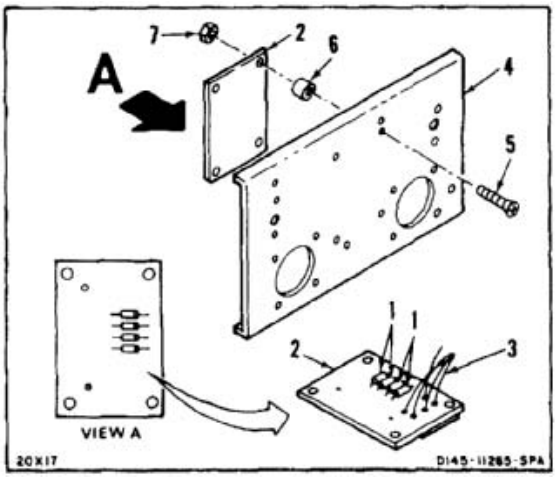
Sealant (E345) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



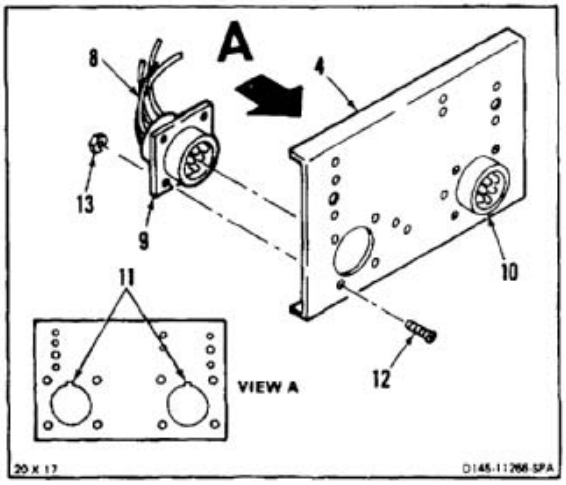
CAUTION

Cathode of diode must be positioned correctly; otherwise, component will malfunction.

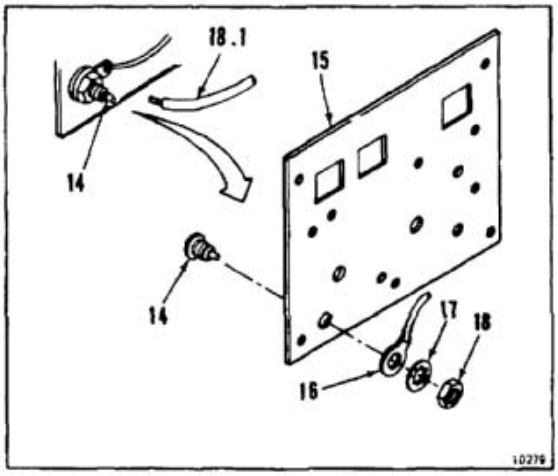
1. Install four diodes (1) on printed circuit board (2). Use soldering iron and heat sinks.
2. Connect and solder wires (3) on printed circuit board (2). Remove tags.
3. Install printed circuit board (2) on connector bracket (4) by installing four screws (5), standoffs (6), and nuts (7). Use sealant (E345) on screws and nuts.



4. Connect wires (8) to connectors (9 and 10). Use contact insertion/removal tool. Remove tags.
5. Install two connectors (9 and 10) in connector bracket (4). Position keyways (11) up.
6. Install eight screws (12) and nuts (13). Use sealant (E345) on screws and nuts.



7. Install receptacle connector (14) in front mounting plate (15).
8. Install ground lug (16), washer (17) and nut (18).
8.1. Solder wire (18.1) to receptacle connector (14).



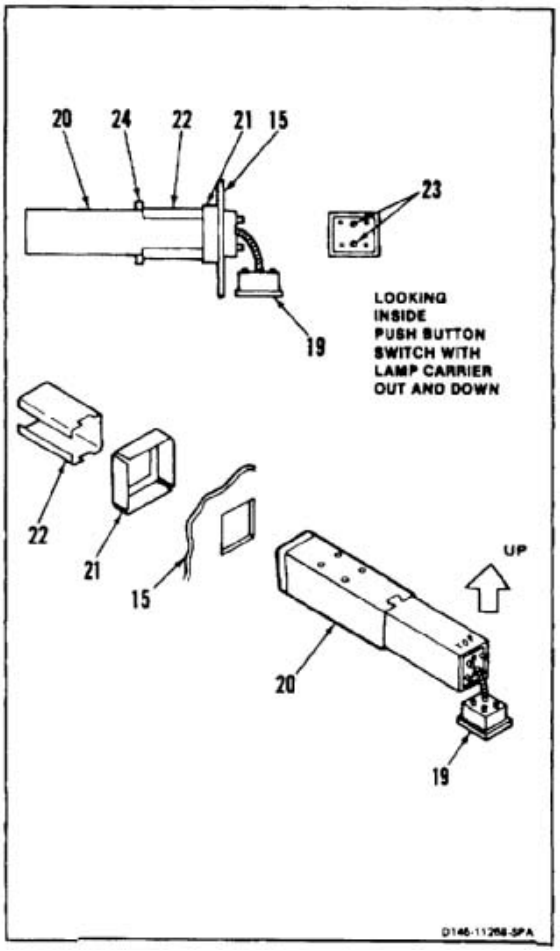
CAUTION

Be careful when removing lamp carrier. Lamp carrier is attached to pushbutton switch by a sliding retainer. Retainer can be damaged by excessive force. Pull lamp carrier out only enough to rotate down.

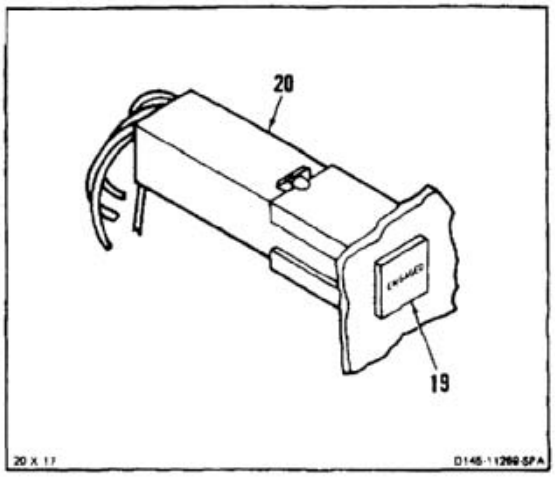
NOTE

Installation of three pushbutton switches is the same. RAD ALT ENGAGE switch is shown here.

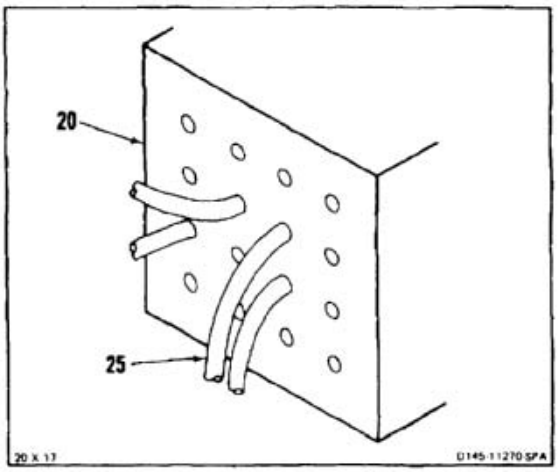
9. Pull lamp carrier (19) out and down.
10. Remove tag. Install pushbutton switch (20) in front mount panel (15) with TOP up.
11. Install adapter sleeve (21) and retainer sleeve (22) onto back of pushbutton switch (20).
12. Tighten two screws (23) inside pushbutton switch (20). Tabs (24) must turn out away from switch and pull sleeves (21 and 22) against mounting plate (15).



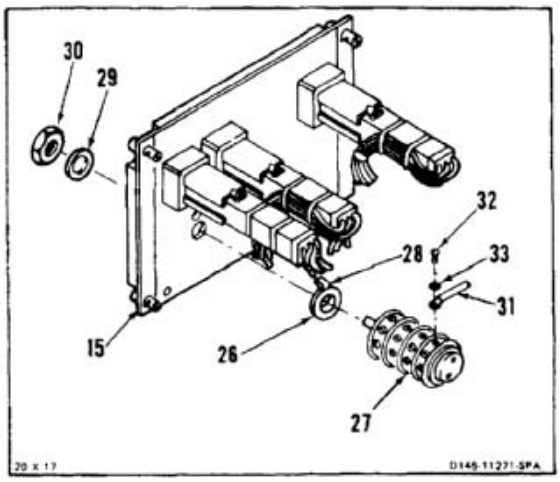
13. Rotate lamp carrier (19) up and push into switch (20).



14. Connect wires (25) to switch (20). Use contact insertion/removal tool. Remove tags.



15. Install locking ring (26) on switch (27). Make sure tab (28) of locking ring faces away from switch and engages index hole.
16. Remove tag and install switch (27) in front mount panel (15).
17. Install washer (29) and nut (30).
18. Connect five wires (31) to switch by installing five screws (32) and washers (33).



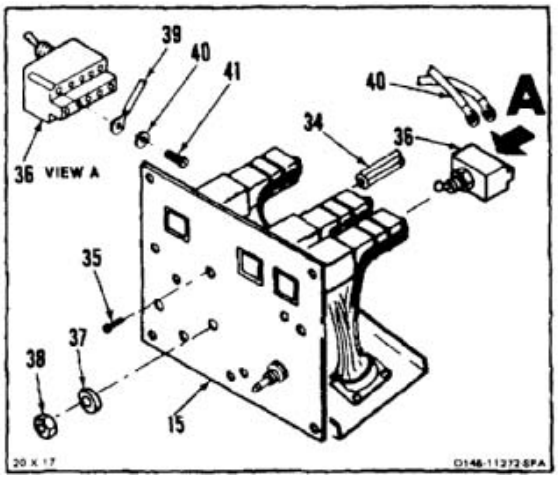
19. Position four support rods (34) on front mount panel (15) and install four screws (35). Use sealant (E345) on screws.

NOTE

Procedure to install three toggle switches is the same. CYCLIC TRIM AUTO/MAN switch is shown here.

20. Position switch (36) in panel (15). Install washer (37) and nut (38).

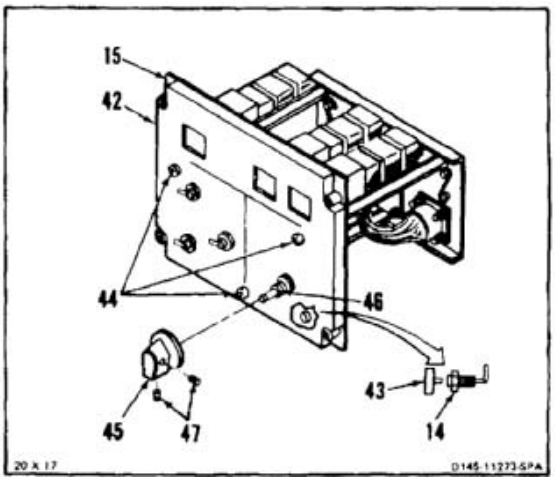
21. Connect 12 wires (39) to switch (36) using washers (40) and screws (41).



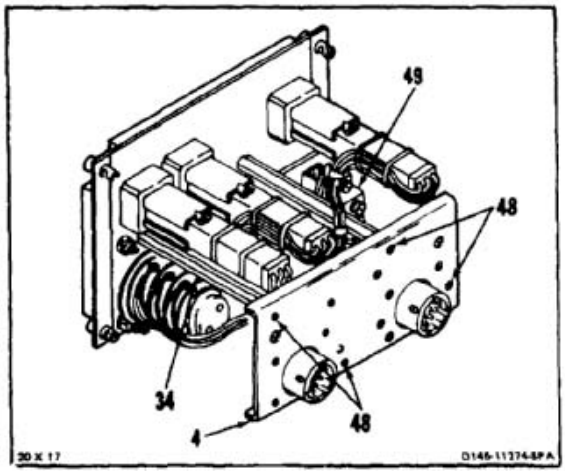
22. Position front illumination panel (42) on front mount panel (15). Make sure lamp receptacle connector (14) and illumination panel plug (43) snap together.

23. Install three screws (44). Use sealant (E345) on screws.

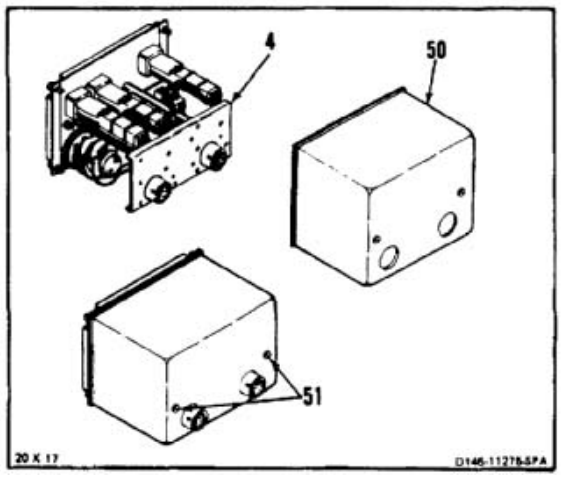
24. Position knob (45) on switch shaft (46) and tighten two set screws (47).



25. Position connector bracket (4) on four support rods (34) and install four screws (48). Use sealant (E345).
26. Install braided nomex tape (E403) as necessary to wire harness (49). After tying nomex tape, apply adhesive (E62) to knots.



27. Position rear cover (50) over connector bracket (4).
28. Engage and lock two fasteners (51). Fasteners require **1/4 turn** clockwise to lock.



FOLLOW-ON MAINTENANCE:

Bench test AFCS control panel (Task 11-272).

END OF TASK

11-272 BENCH TEST AFCS CONTROL PANEL (AVIM) 11-272

INITIAL SETUP

Applicable Configurations:

All

Tools:

Electronic Repairer's Tool Kit, NSN 5180-00-064-5178
Multimeter AN/PSM-45A

Materials:

None

Personnel Required:

Avionics Mechanic
Inspector

References:

TM 55-4920-430-13

Equipment Condition:

Off Helicopter Task
AFCS Bench Test Set 145G0008-1 Prepared for Use (TM 55-4920-430-13)

General Safety Instructions:

WARNING

High voltage is used in this equipment. Observe safety precautions; otherwise, personal injury or death can occur.

NOTE

The following tests are included:

TEST

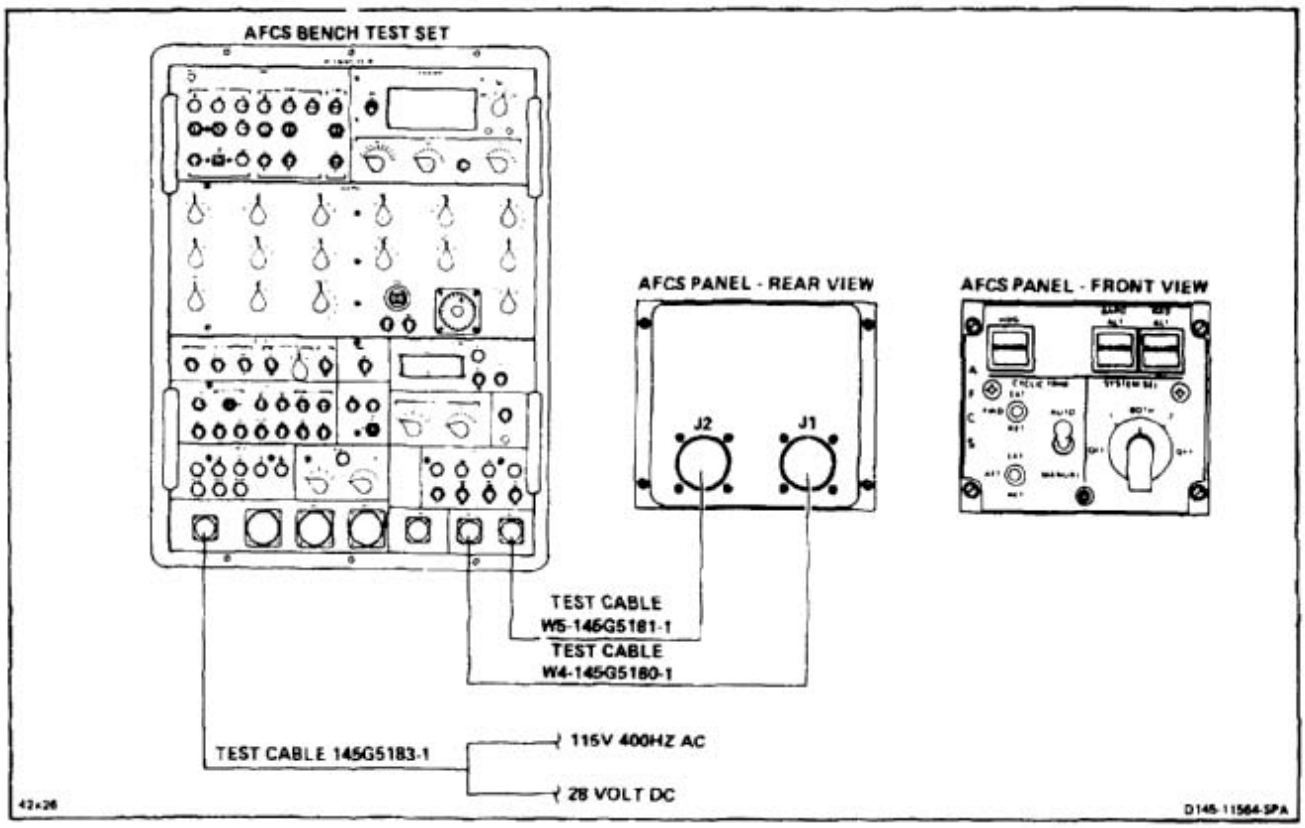
1. Systems Select Tests
2. Radar Altitude Tests
3. Barometric Altitude Tests
4. Heading Test
5. Cyclic Trim — Manual Test
6. Cyclic Trim — Automatic Test
7. Panel Illumination Test
8. Diodes Test

NOTE

Allow **5 minutes** warm up of AFCS unit before any test segments are run.

RAD ALT ENGAGED switch, BARO ALT ENGAGED switch, and HDG ENGAGED switch have internal switch lamps.

11-272 BENCH TEST AFCS CONTROL PANEL (AVIM) (Continued) 11-272



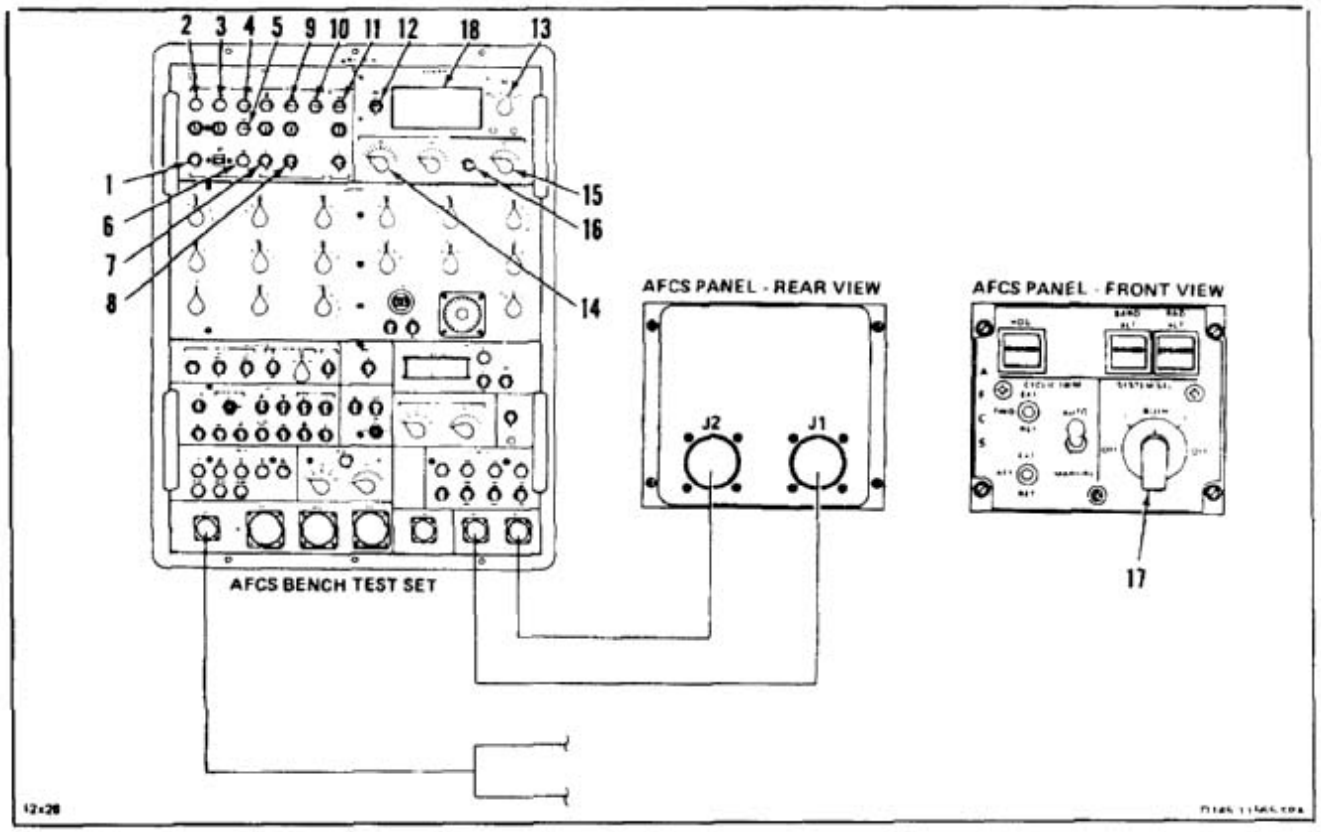
TEST 1

SYSTEMS SELECT TESTS

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

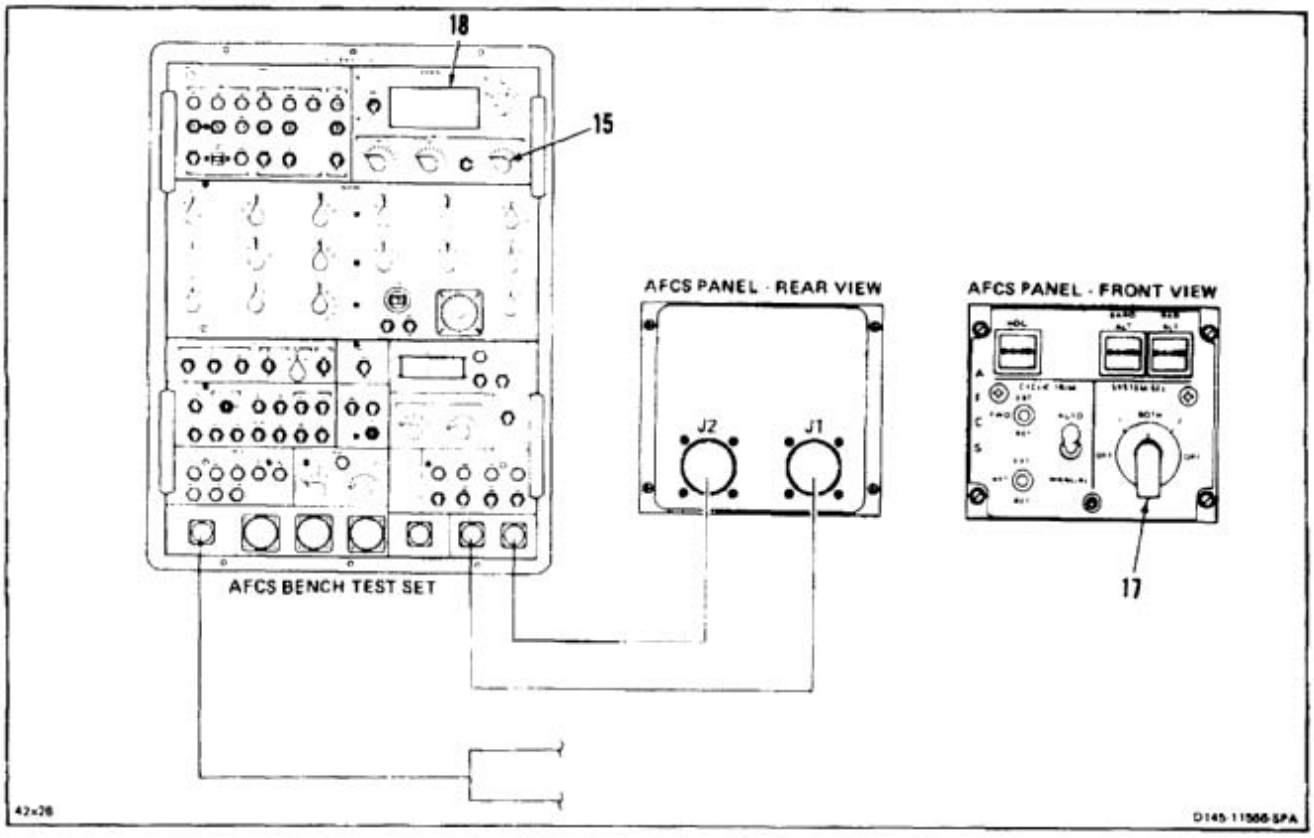
1. Set TESTER POWER switch (1) to ON. The following lamps shall be on:
   a. 115V 400 HZ lamp (2).
   b. +28VDC lamp (3).
   c. +5VDC lamp (4).
   d. +15VDC lamp (5).
   e. –15VDC lamp (6)
2. Set AFCS POWER switches (7 and 8) to ON. The following lamps shall be on:
   a. 115V 400 HZ lamp (9).
   b. +28VDC lamp (10).
   c. +5VAC lamp (11).
3. Set METER switch (12) to DC.
4. Set METER RANGE switch (13) to 200V.
5. Set CIRCUIT SELECT TENS switch (14) to 00.
6. Set CIRCUIT SELECT B UNITS switch (15) to 2.
7. Set CIRCUIT SELECT A/B SELECT switch (16) to B.
8. Turn AFCS SYSTEM SEL switch (17) counterclockwise to OFF. Read AC/DC VOLTAGE (18). Reading shall be –**1.00 to +1.00**.



11-272 BENCH TEST AFCS CONTROL PANEL (AVIM) (Continued) 11-272

9. Set CIRCUIT SELECT B UNITS switch (15) to 3. Read AC/DC VOLTMETER (18). Reading shall be –**1.00 to +1.00**.
10. Set AFCS SYSTEM SEL switch (17) to 1. Read AC/DC VOLTMETER (18). Reading shall be –**1.00 to +1.00**.
11. Set CIRCUIT SELECT B UNITS switch (15) to 2. Read AC/DC VOLTMETER (18). Reading shall be **+24.00 to +29.00**.
12. Set AFCS SYSTEM SEL switch (17) to BOTH. Read AC/DC VOLTMETER (18). Reading shall be **+24.00 to +29.00**.
13. Set CIRCUIT SELECT B UNITS switch (15) to 3. Read AC/DC VOLTMETER (18). Reading shall be **+24.00 to +29.00**.
14. Set AFCS SYSTEM SEL switch (17) to 2. Read AC/DC VOLTMETER (18). Reading shall be **+24.00 to 29.00**.
15. Set CIRCUIT SELECT B UNITS switch (15) to 2. Read AC/DC VOLTMETER (18). Reading shall be –**1.00 to +1.00**.
16. Turn AFCS SYSTEM SEL switch (17) clockwise to OFF. Read AC/DC VOLTMETER (18). Reading shall be –**1.00 to +1.00**.
17. Set CIRCUIT SELECT B UNITS switch (15) to 3. Read AC/DC VOLTMETER (18). Reading shall be –**1.00 to +1.00**.

END SYSTEMS SELECT TEST



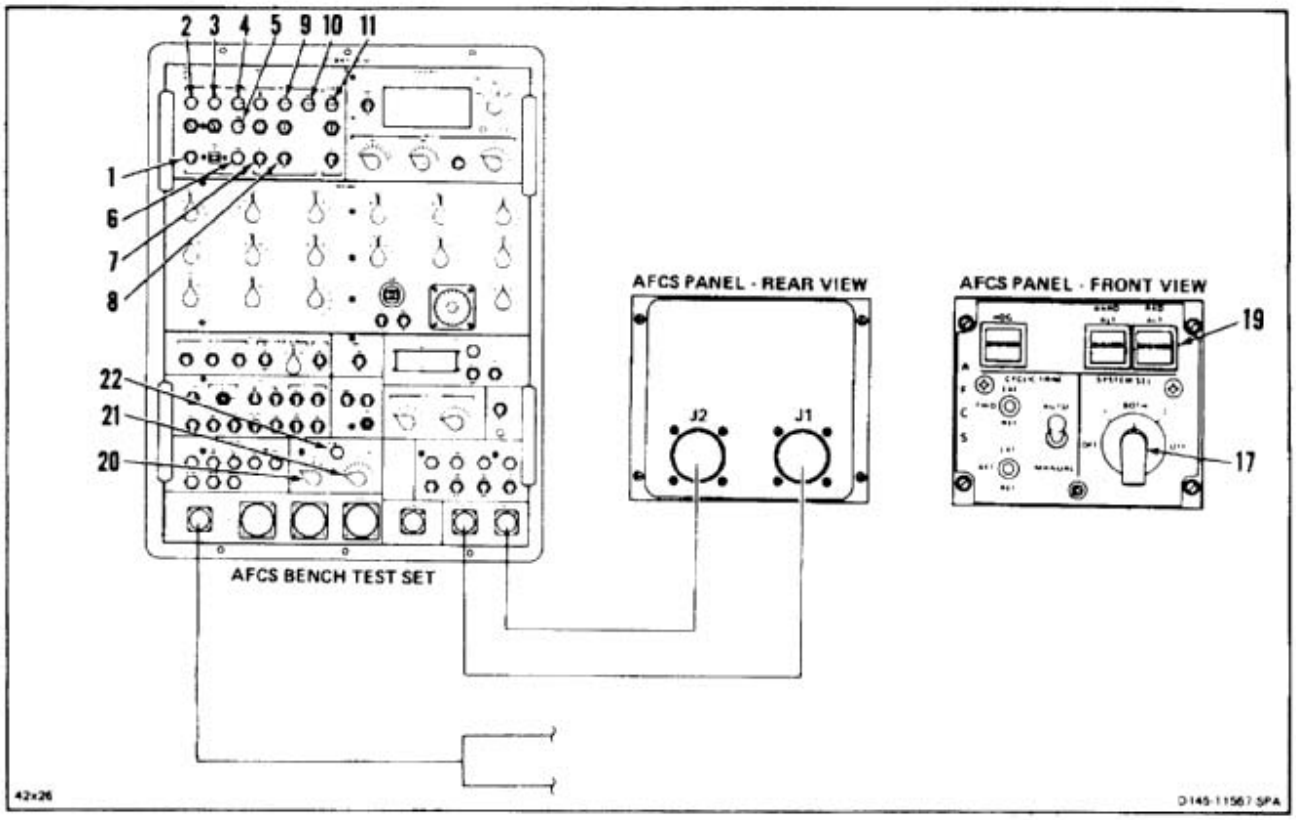
TEST 2

RADAR ALTITUDE TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

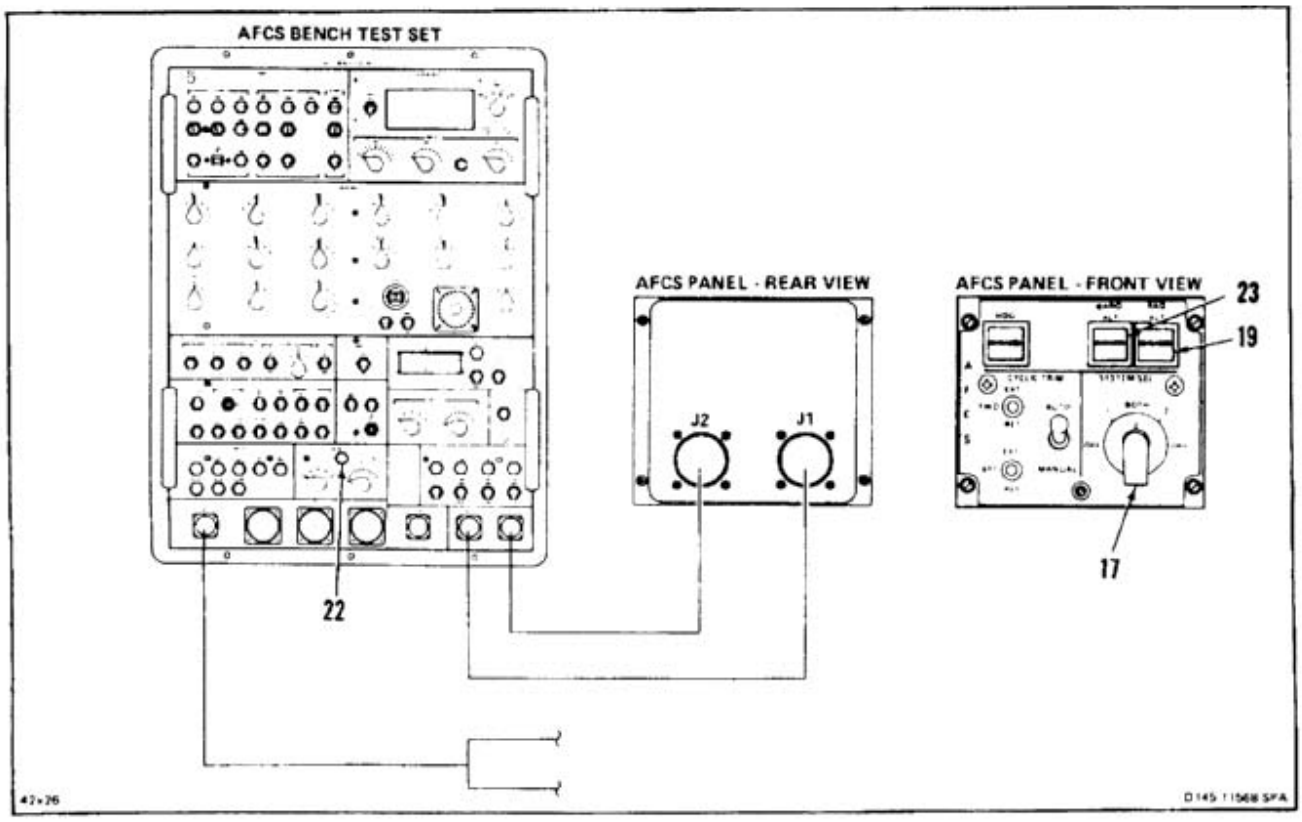
18. Set TESTER POWER switch (1) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (2).
    b. +28VDC lamp (3).
    c. +5VDC lamp (4).
    d. +15VDC lamp (5).
    e. –15VDC lamp (6).
19. Set AFCS POWER switches (7 and 8) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (9).
    b. +28VDC lamp (10).
    c. +5VAC lamp (11).
20. Set AFCS SYSTEMS SEL switch (17) to 1.
21. Press RAD ALT ENGAGED switch (19).
22. Set CONTINUITY TEST TENS switch (20) to 00.
23. Set CONTINUITY TEST UNITS switch (21) to 2. CONTINUITY TEST lamp (22) and RAD ALT ENGAGED switch lamp (19) shall be on.
24. Turn AFCS SYSTEMS SEL switch (17) counterclockwise to OFF. CONTINUITY TEST lamp (22) and RAD ALT ENGAGED switch lamp (19) shall be off.
25. Set AFCS SYSTEMS SEL switch (17) to BOTH.



11-272 BENCH TEST AFCS CONTROL PANEL (AVIM) (Continued) 11-272

26. Press RAD ALT ENGAGED switch (19). Switch lamp shall be on. CONTINUITY TEST lamp (22) shall be on.
27. Press BARO ALT ENGAGED switch (23). Switch lamp shall be on and RAD ALT ENGAGED switch lamp (19) and CONTINUITY TEST lamp (22) shall be off.
28. Set CONTINUITY TEST UNITS switch (21) to 3. Lamp (22) shall be on.
29. Press RAD ALT ENGAGED switch (19). Switch lamp shall be on. CONTINUITY TEST lamp (22) shall be off.
30. Set AFCS SYSTEM SEL switch (17) to 2. RAD ALT ENGAGED switch (19) lamp shall be on and CONTINUITY TEST lamp (22) shall be off.
31. Turn AFCS SYSTEMS SEL switch (17) clockwise to OFF. RAD ALT ENGAGED switch (19) lamp shall be off.

END RADAR ALTITUDE TEST



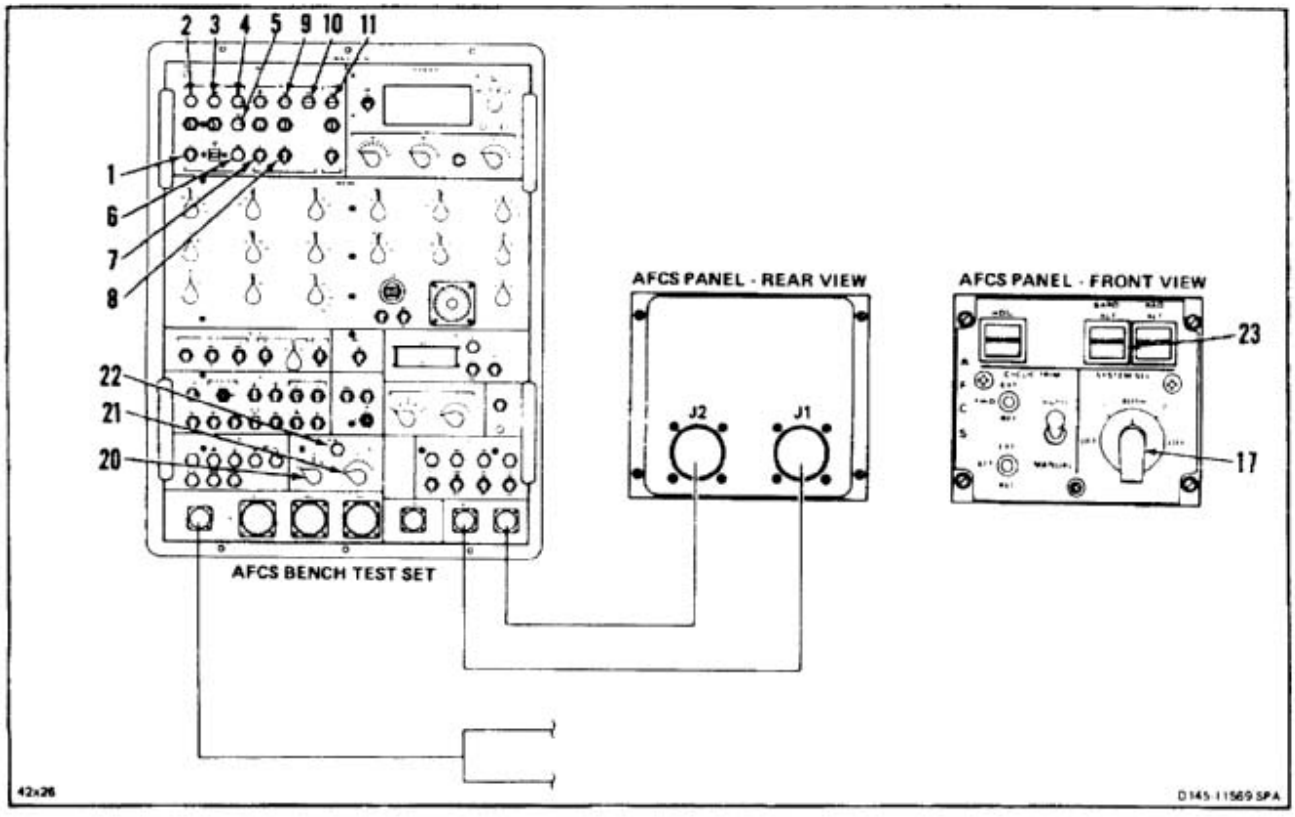
TEST 3

BAROMETRIC ALTITUDE TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

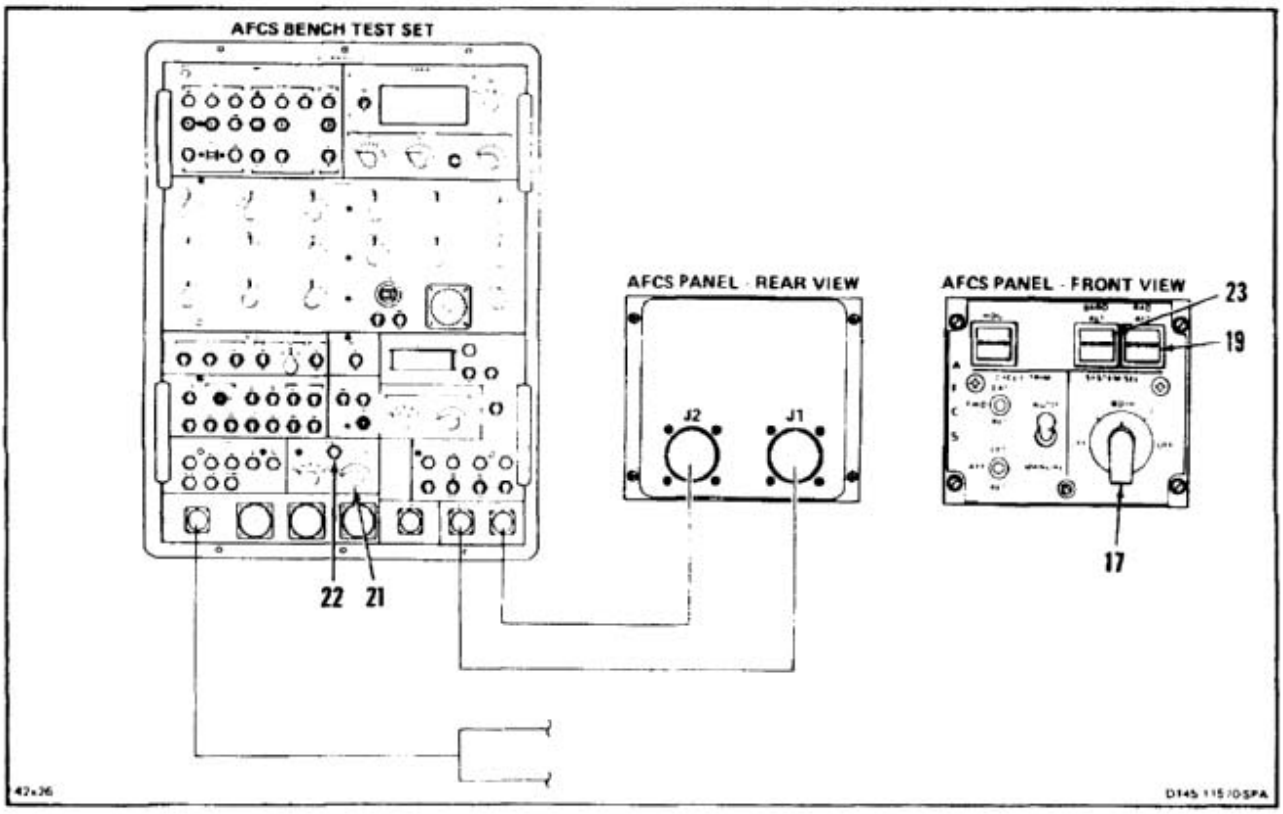
32. Set TESTER POWER switch (1) to ON. The following lamps shall be on.
    a. 115V 400 HZ lamp (2).
    b. +28VDC lamp (3).
    c. +5VDC lamp (4).
    d. +15VDC lamp (5).
    e. –15VDC lamp (6).
33. Set AFCS POWER switches (7 and 8) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (9).
    b. +28VDC lamp (10).
    c. +5VAC lamp (11).
34. Set AFCS SYSTEMS SEL switch (17) to 1.
35. Press BARO ALT ENGAGED switch (23).
36. Set CONTINUITY TEST TENS switch (20) to 00.
37. Set CONTINUITY TEST UNITS switch (21) to 3. Lamp (22) and BARO ALT ENGAGED switch (23) lamp shall be on.
38. Turn AFCS SYSTEMS SEL switch (17) counterclockwise to OFF. CONTINUITY TEST lamp (22) and BARO ALT ENGAGED switch (23) lamp shall be off.



11-272 BENCH TEST AFCS CONTROL PANEL (AVIM) (Continued) 11-272

39. Set AFCS SYSTEMS SEL switch (17) to BOTH.
40. Press BARO ALT ENGAGED switch (23). Switch lamp shall be on. CONTINUITY TEST lamp (22) shall be on.
41. Press RAD ALT ENGAGED switch (19). Switch lamp shall be on and BARO ALT ENGAGED switch (23) lamp and CONTINUITY TEST lamp (22) shall be off.
42. Set CONTINUITY TEST UNITS switch (21) to 2. Lamp (22) shall be on.
43. Set AFCS SYSTEM SEL switch (17) to 2.
44. Press BARO ALT ENGAGED switch (23). Switch (23) shall light and CONTINUITY TEST lamp (22) shall be off. Release switch. Lamp (22) shall be off.
45. Turn AFCS SYSTEMS SEL switch (17) clockwise to OFF. BARO ALT ENGAGED switch (23) lamp shall be off.

END BAROMETRIC ALTITUDE TEST



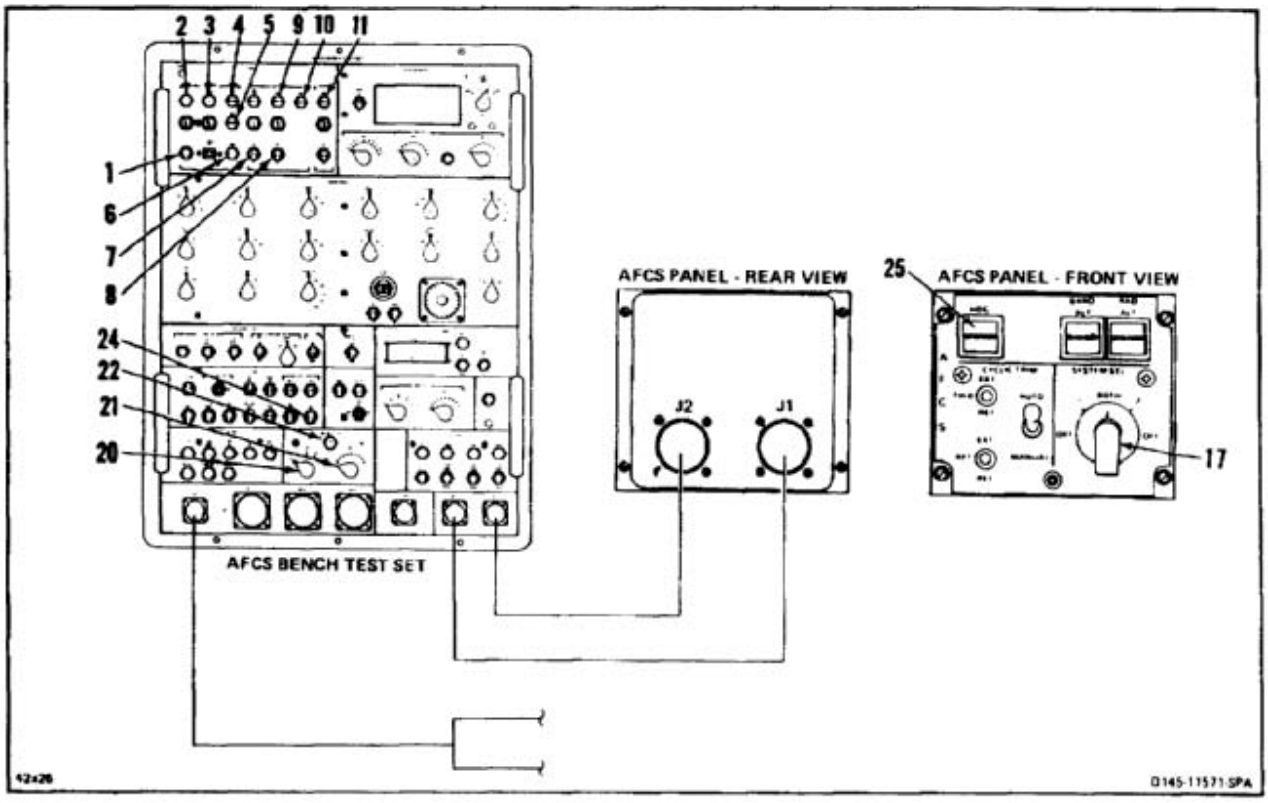
TEST 4

HEADING TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

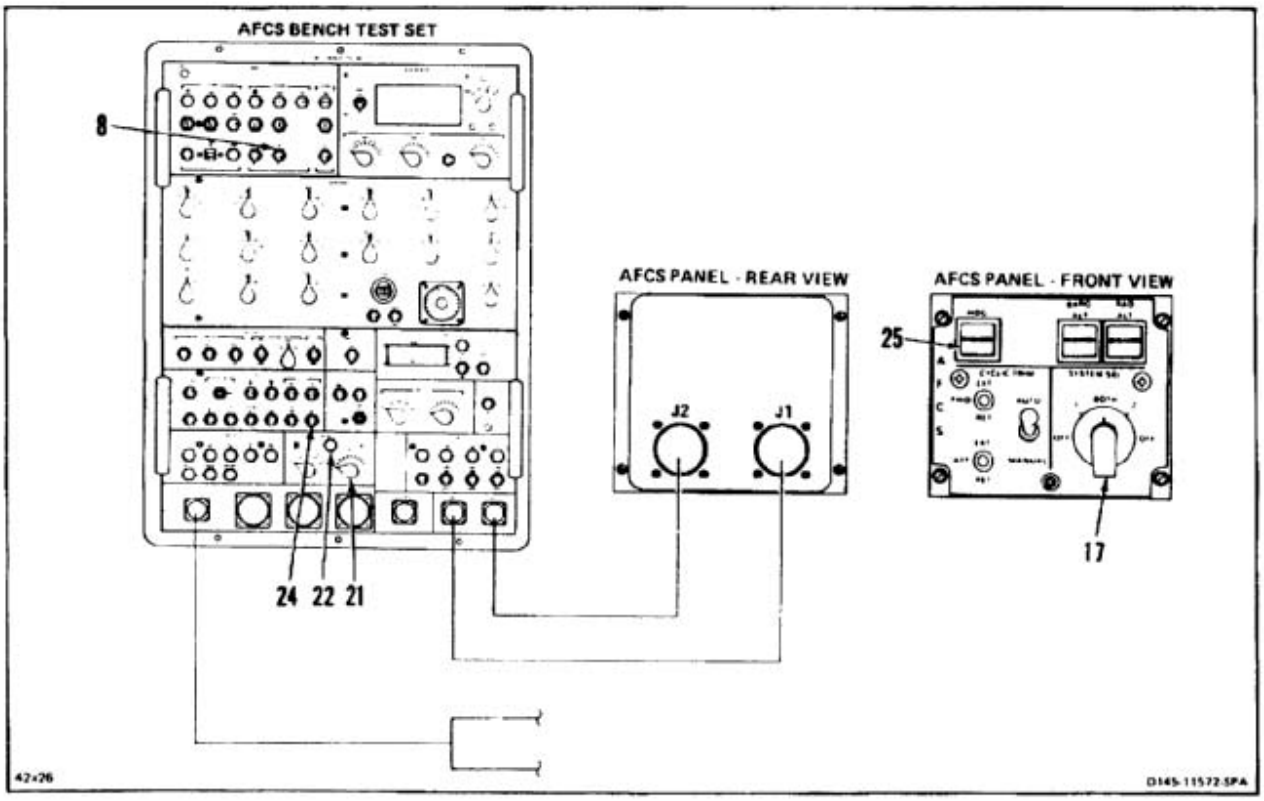
46. Set TESTER POWER switch (1) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (2).
    b. +28VDC lamp (3).
    c. +5VDC lamp (4).
    d. +15VDC lamp (5).
    e. –15VDC lamp (6).
47. Set AFCS POWER switches (7 and 8) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (9).
    b. +28VDC lamp (10).
    c. +5VAC lamp (11).
48. Set AFCS SYSTEMS SEL switch (17) to 1.
49. Set DISCRETE SIGNALS HDG switch (24) to 1.
50. Press HDG ENGAGED switch (25). Switch lamp shall be on.
51. Set CONTINUITY TEST TENS switch (20) to 00.
52. Set CONTINUITY TEST UNITS switch (21) to 4. Lamp (22) shall be on.
53. Set CONTINUITY TEST UNITS switch (21) to 5. Lamp (22) shall be on.



11-272 BENCH TEST AFCS CONTROL PANEL (AVIM) (Continued) 11-272

54. Set AFCS SYSTEMS SEL switch (17) to BOTH. Continuity test lamp (22) and HDG ENGAGED switch (25) lamp shall be on.
55. Set AFCS POWER switch (8) to OFF. CONTINUITY TEST lamp (22) shall be off.
56. Set CONTINUITY TEST UNITS switch (21) to 4. Lamp (22) shall be off.
57. Set AFCS POWER switch (8) to ON.
58. Set AFCS SYSTEMS SEL switch (17) to 2.
59. Press HDG ENGAGED switch (25). Switch lamp and CONTINUITY TEST lamp (22) shall be on.
60. Turn AFCS SYSTEMS SEL switch (17) clockwise to OFF. HDG ENGAGED switch (25) lamp and CONTINUITY TEST lamp (22) shall be off.
61. Set AFCS SYSTEMS SEL switch (17) to BOTH.
62. Press HDG ENGAGED switch (25). Switch lamp shall be on.
63. Set DISCRETE SIGNALS HDG switch (24) to 0. HDG ENGAGED switch (25) lamp shall be off.
64. Set CONTINUITY TEST UNITS switch (21) to 6. Lamp (22) shall be on.
65. Turn AFCS SYSTEM SEL switch (17) clockwise to OFF. HDG ENGAGED switch (25) lamp shall be off.

END HEADING TEST



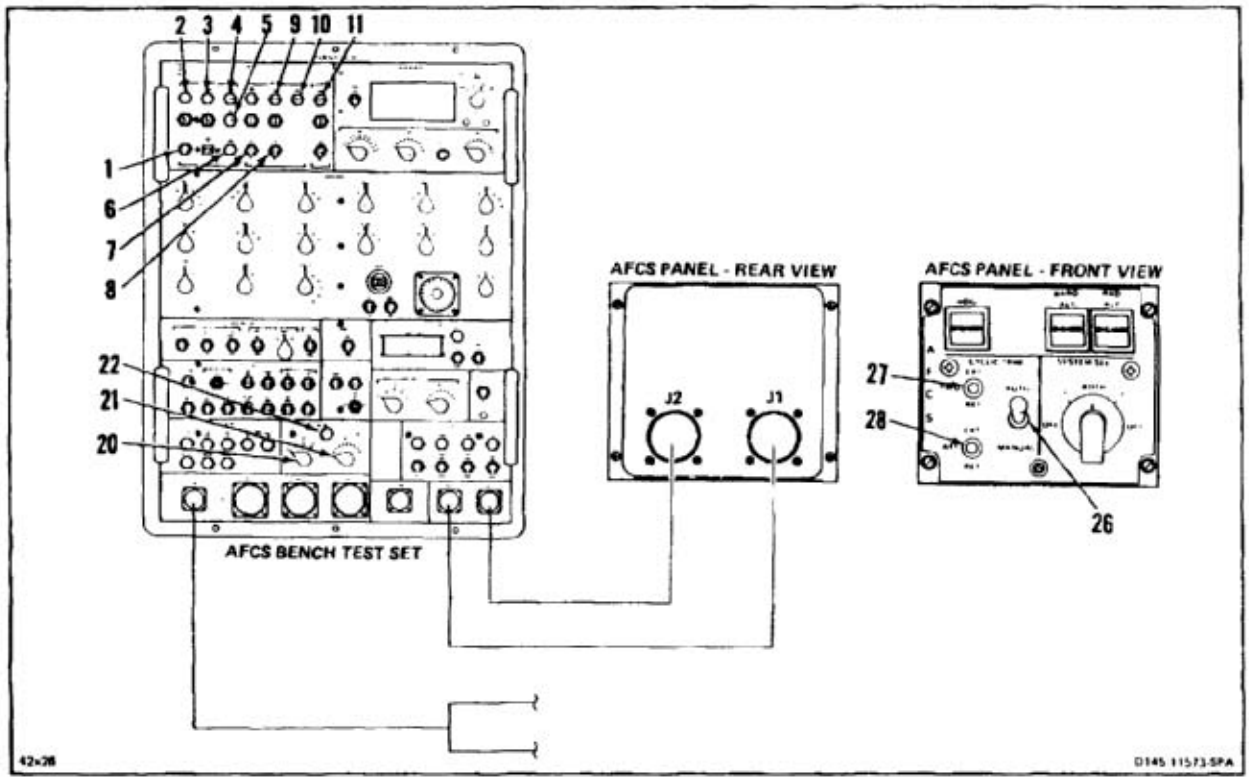
TEST 5

CYCLIC TRIM MANUAL TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

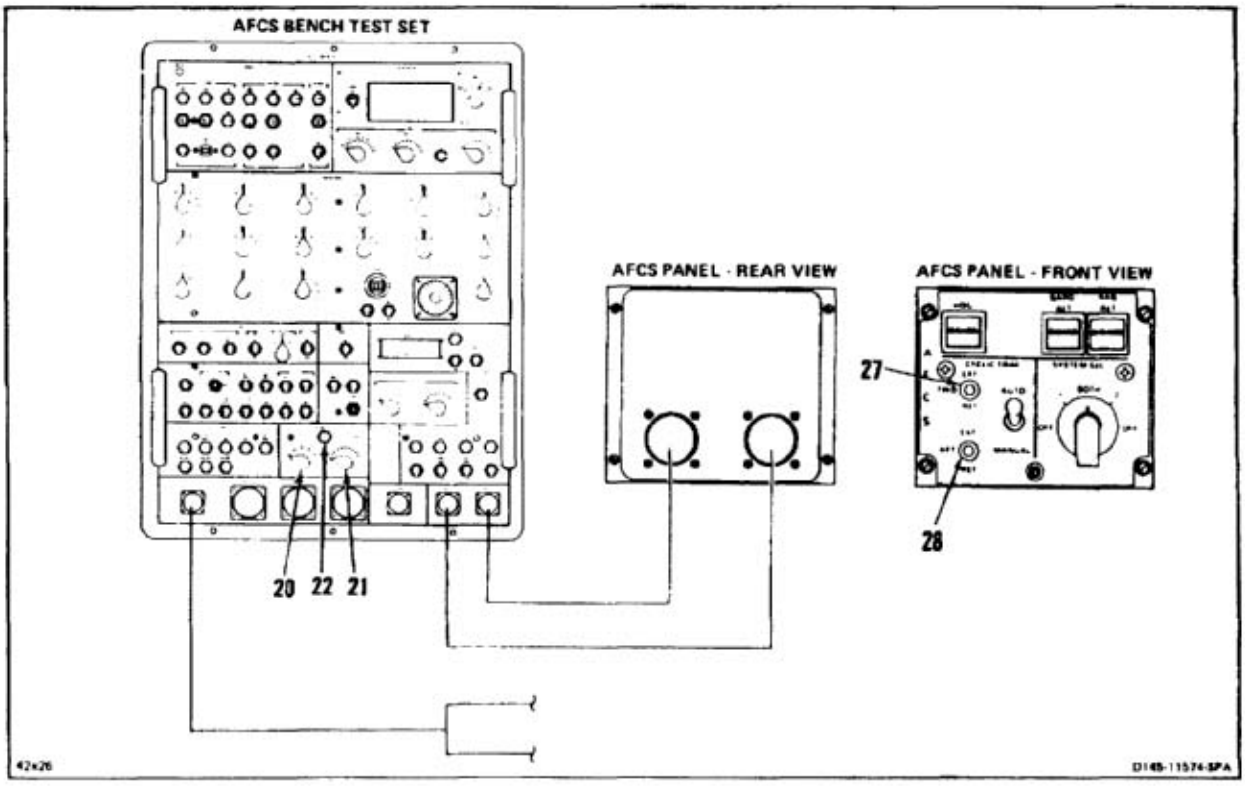
66. Set TESTER POWER switch (1) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (2).
    b. +28VDC lamp (3).
    c. +5VDC lamp (4).
    d. +15VDC lamp (5).
    e. –15VDC lamp (6).
67. Set AFCS POWER switches (7 and 8) to ON. The following lamps shall be on.
    a. 115V 400 HZ lamp (9).
    b. +28VDC lamp (10).
    c. +5VAC lamp (11).
68. Set CYCLIC TRIM switch (26) to MANUAL.
69. Set CONTINUITY TEST TENS switch (20) to 00.
70. Set CONTINUITY TEST UNITS switch (21) to 7. Lamp (22) shall be off.
71. Set and hold CYCLIC TRIM fwd switch (27) to EXT. CONTINUITY TEST. Lamp (22) shall be on. Release switch. Lamp shall be off.
72. Set CONTINUITY TEST UNITS switch (21) to 8.
73. Set and hold CYCLIC TRIM AFT switch (28) to EXT. CONTINUITY TEST. Lamp (22) shall be on. Release switch. Lamp shall be off.



11-272 BENCH TEST AFCS CONTROL PANEL (AVIM) (Continued) 11-272

74. Set CONTINUITY TEST UNITS switch (21) to 9. Lamp (22) shall be off.
75. Set and hold CYCLIC TRIM FWD switch (27) to RET. CONTINUITY TEST, lamp (22) shall be on. Release switch. Lamp shall be off.
76. Set CONTINUITY TEST TENS switch (20) to 10.
77. Set CONTINUITY TEST UNITS switch (22) to 0.
78. Set and hold CYCLIC TRIM AFT switch (28) to RET. CONTINUITY TEST. Lamp (22) shall be on. Release switch. Lamp (22) shall be off.
79. Set CONTINUITY TEST UNITS switch (21) to 1. Lamp (22) shall be on.
80. Set CONTINUITY TEST UNITS switch (21) to 2. Lamp (22) shall be off.
81. Set CONTINUITY TEST UNITS switch (21) to 3. Lamp (22) shall be off.
82. Set CONTINUITY TEST UNITS switch (21) to 4. Lamp (22) shall be off.
83. Set CONTINUITY TEST UNITS switch (21) to 5. Lamp (22) shall be off.

END CYCLIC TRIM MANUAL TEST



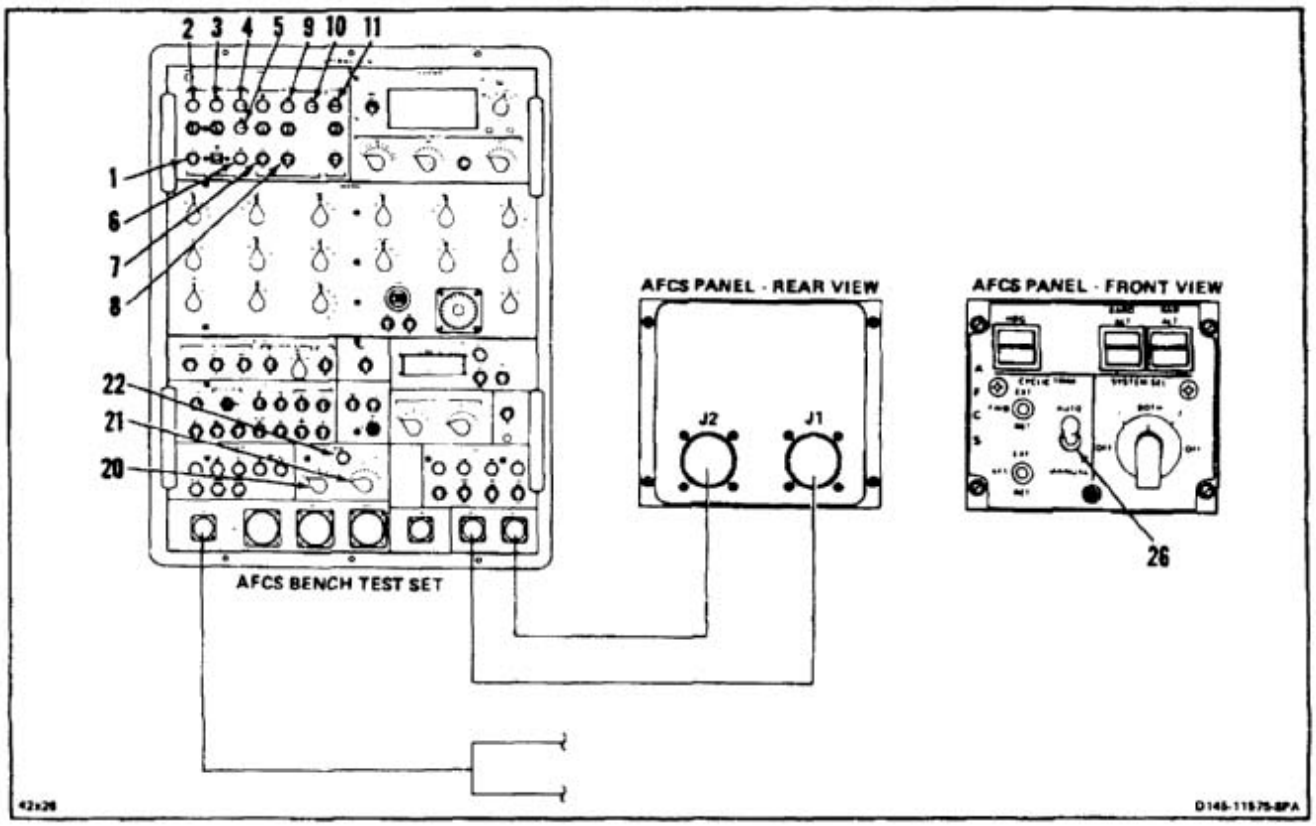
TEST 6

CYCLIC TRIM AUTOMATIC TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

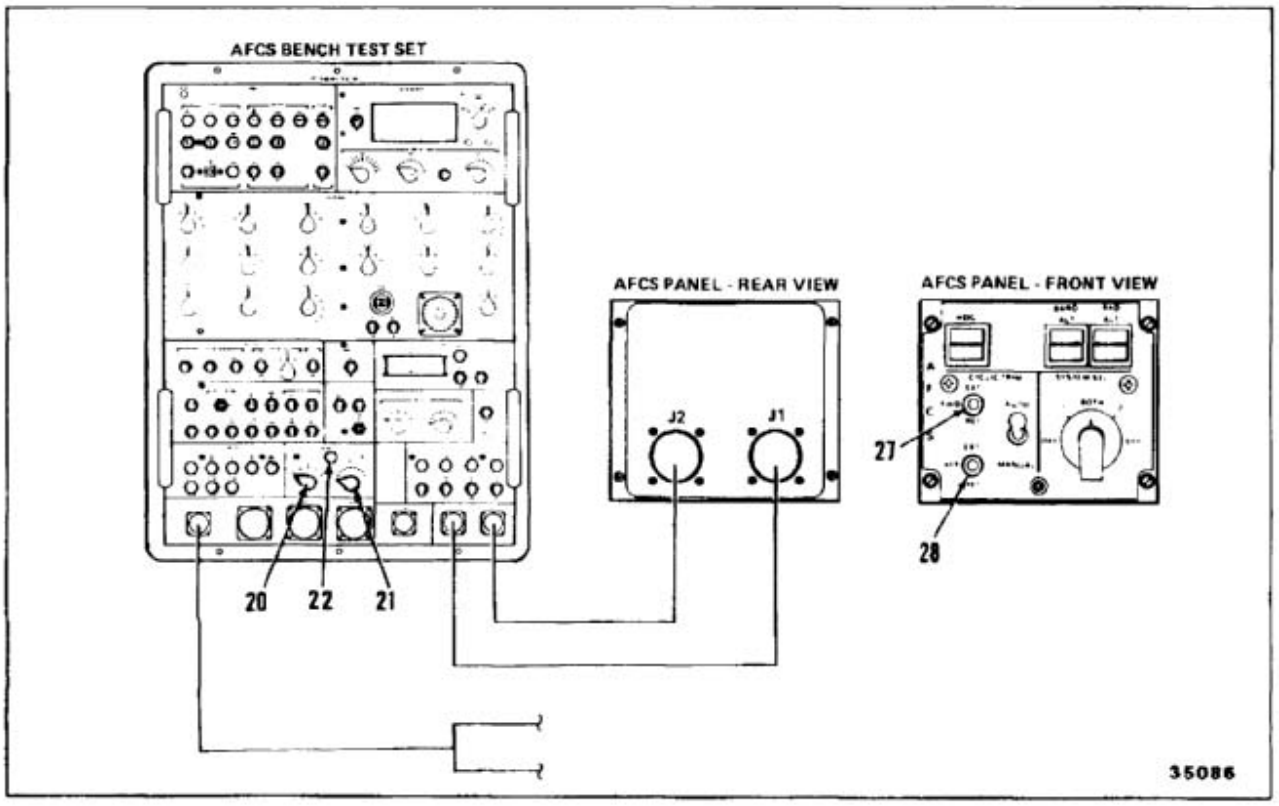
84. Set TESTER POWER switch (1) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (2).
    b. +28VDC lamp (3).
    c. +5VDC lamp (4).
    d. +15VDC lamp (5).
    e. –15VDC lamp (6).
85. Set AFCS POWER switches (7 and 8) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (9).
    b. +28VDC lamp (10).
    c. +5VAC lamp (11).
86. Set CYCLIC TRIM switch (26) to AUTO.
87. Set CONTINUITY TEST TENS switch (20) to 10.
88. Set CONTINUITY TEST UNITS switch (21) to 2. Lamp (22) shall be on.
89. Set CONTINUITY TEST UNITS switch (21) to 3. Lamp (22) shall be on.
90. Set CONTINUITY TEST UNITS switch (21) to 4. Lamp (22) shall be on.
91. Set CONTINUITY TEST UNITS switch (21) to 5. Lamp (22) shall be on.
92. Set CONTINUITY TEST TENS switch (20) to 00.



11-272 BENCH TEST AFCS CONTROL PANEL (AVIM) (Continued) 11-272

93. Set CONTINUITY TEST UNITS switch (21) to 9.
94. Set and hold CYCLIC TRIM FWD switch (27) to RET. CONTINUITY TEST, lamp (22) shall be off. Release switch.
95. Set CONTINUITY TEST UNITS switch (21) to 0.
96. Set CONTINUITY TEST TENS switch (20) to 10.
97. Set and hold CYCLIC TRIM AFT switch (28) to RET. CONTINUITY TEST, lamp (22) shall be off. Release switch.
98. Set CONTINUITY TEST TENS switch (20) to 00.
99. Set CONTINUITY TEST UNITS switch (21) to 7.
100. Set and hold CYCLIC TRIM FWD switch (27) to EXT. CONTINUITY TEST, lamp (22) shall be off. Release switch. Lamp (22) shall be off.
101. Set CONTINUITY TEST UNITS switch (21) to 8.
102. Set and hold CYCLIC TRIM AFT switch (28) to EXT. CONTINUITY TEST, lamp (22) shall be off. Release switch. Lamp (22) shall be off.

END CYCLIC TRIM AUTOMATIC TEST



TEST 7

PANEL ILLUMINATION

NOTE

Perform preliminary test procedure before test. (Refer to TM 55-4920-430-13.)

103. Set TESTER POWER switch (1) to ON. The following lamps shall be on:
   a. 115V 400 HZ lamp (2).
   b. +28VDC lamp (3).
   c. +5VDC lamp (4).
   d. +15VDC lamp (5).
   e. –15VDC lamp (6).

104. Set AFCS POWER switches (7 and 8) to ON. The following lamps shall be on:
   a. 115V 400 HZ lamp (9).
   b. +28VDC lamp (10).
   c. +5VDC lamp (11).

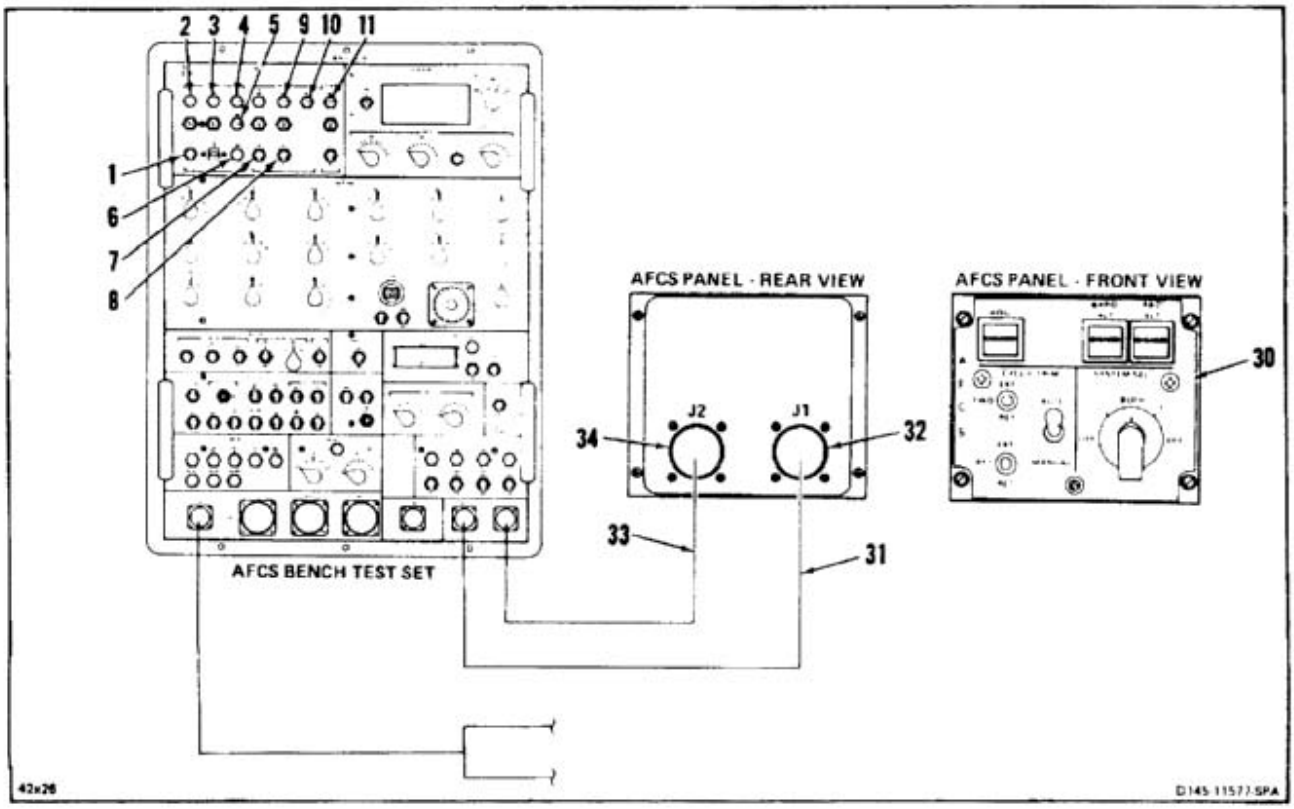
105. Check AFCS panel (30). All panel illumination lamps shall be on and red in color.

106. Set TESTER POWER switch (1) and AFCS POWER switches (7 and 8) to OFF.

107. Disconnect test cable W4 145G5180-1 (31) from AFCS panel (30) receptacle J1 (32).

108. Disconnect test cable W5 145G5181-1 (33) from AFCS panel (30) receptacle J2 (34).

END PANEL ILLUMINATION TEST

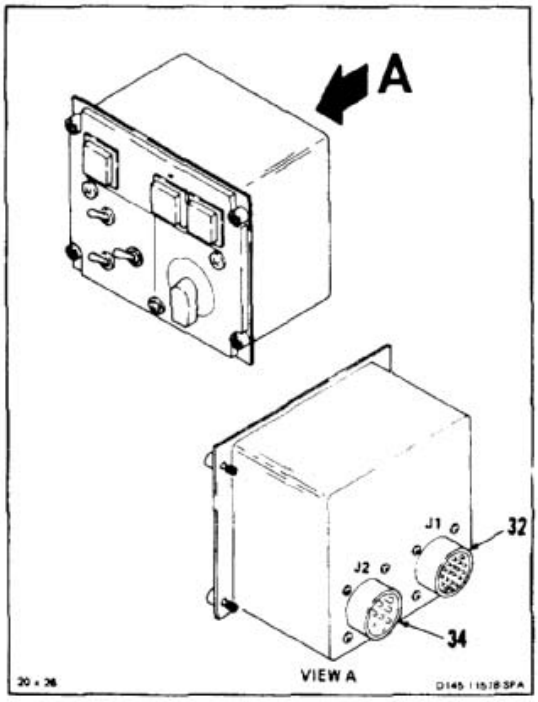


TEST 8

DIODE CHECK

109. Read diode resistance from J1 receptacle (32) and J2 receptacle (34) using a multimeter. Readings shall be as listed below.

RECEPTACLE PIN		RECEPTACLE PIN	READ-ING
J2-R	to	J2-E	OPEN
J2-P	to	J2-E	OPEN
J1-R	to	J2-E	OPEN
J1-P	to	J2-E	OPEN
J2-E	to	J2-R	100 ohms
J2-E	to	J2-P	100 ohms
J2-E	to	J1-R	100 ohms
J2-E	to	J1-P	100 ohms



END DIODE CHECK TEST

INSPECT

110. Shut down AFCS BENCH TEST SET 145G008-1 (TM 55-4920-430-13).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-273 INSTALL AFCS PANEL ASSEMBLY 11-273

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

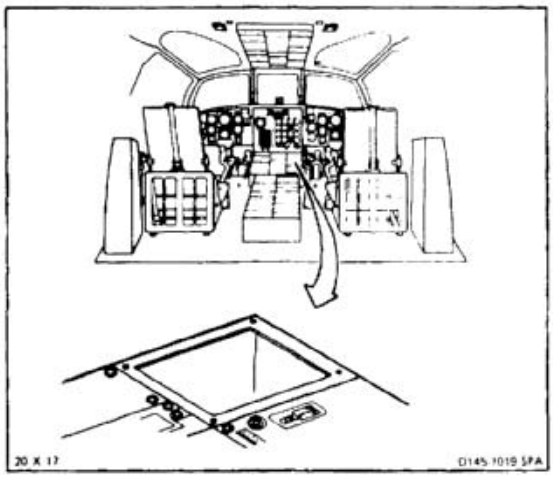
None

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

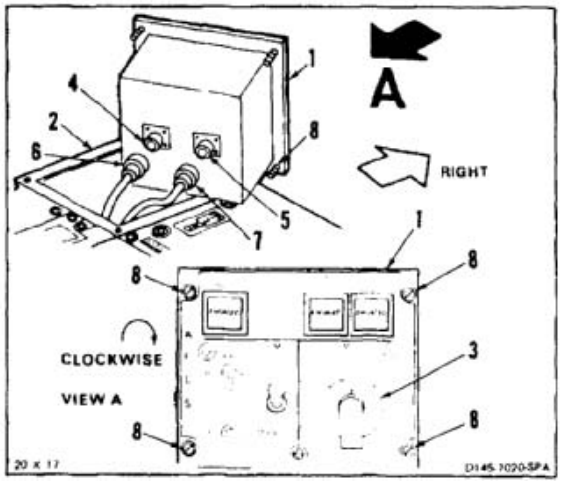
TM 55-1520-240-23P

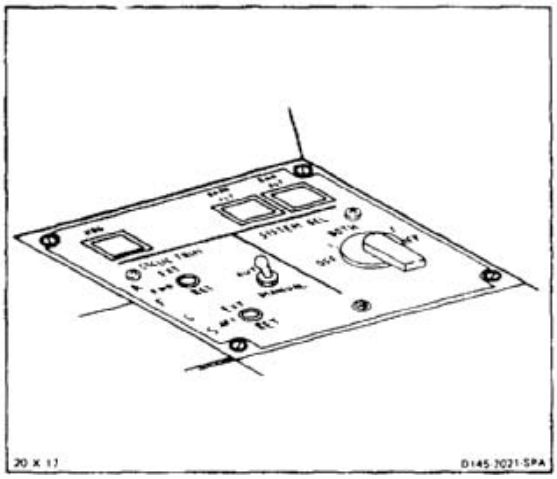


1. Position AFCS panel assembly (1) in console (2), control knob (3) lower right.
2. Position panel assembly (1) for access to two receptacles (4 and 5).
3. Connect connector (6) to receptacle (4). Remove tag.
4. Connect connector (7) to receptacle (5). Remove tag.

INSPECT

5. Repeat step 1, then go to step 6.
6. Tighten four fasteners (8) on panel assembly (1) by pressing fastener down and turning clockwise 1/4 turn.





INSPECT

FOLLOW-ON MAINTENANCE:

Perform operational test of advanced flight control system (TM 55-1520-240-T).

END OF TASK

11-274 REMOVE NO. 1 OR NO. 2 AFCS COMPUTER 11-274

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

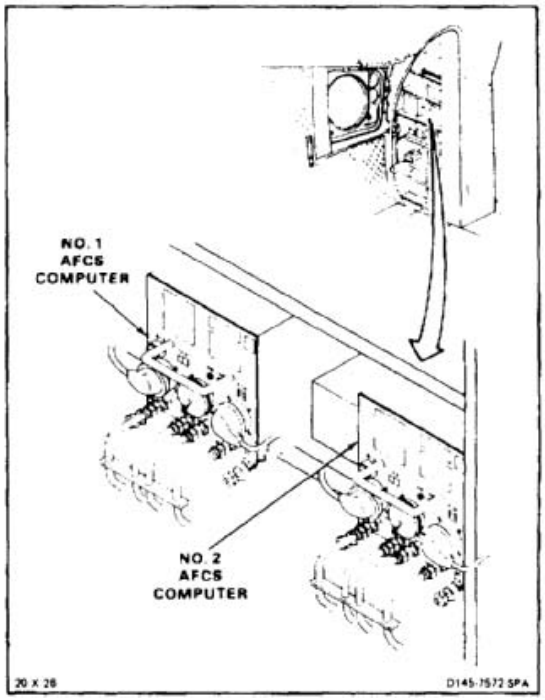
Paper Tags (E264)

Personnel Required:

Medium Helicopter Repairer

Equipment Condition:

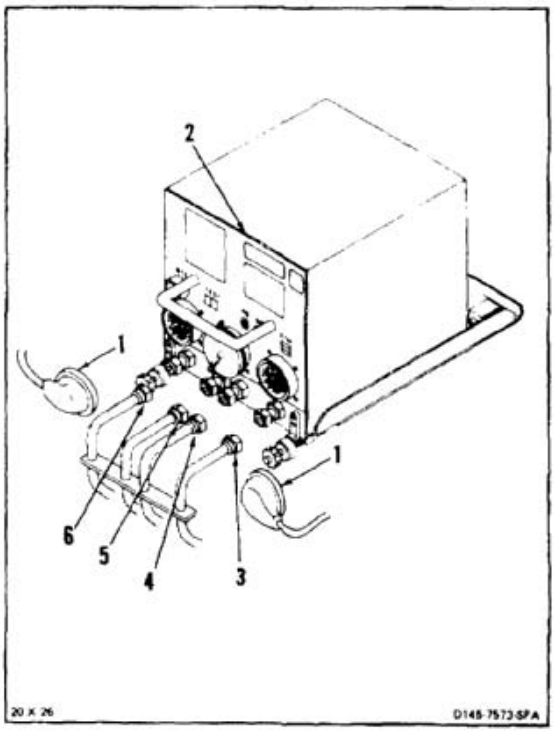
Battery Disconnected (Task 1-39)
Electrical Power Off
Electronic Compartment Acoustic Blanket Removed (Task 2-107)



NOTE

Procedure is same to remove No. 1 or No. 2 AFCS computers. No. 1 computer is shown here.

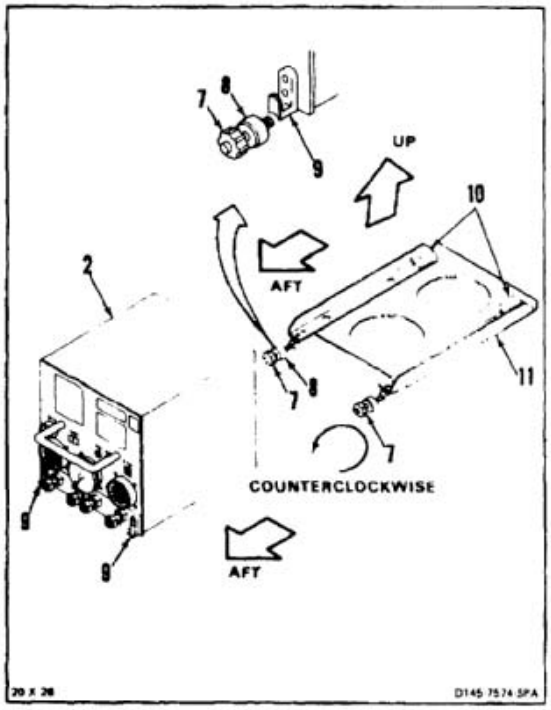
1. Tag and disconnect two electrical connectors (1) from AFCS computer (2).
2. Tag and disconnect R.H. SIDESLIP air hose (3) from computer (2).
3. Tag and disconnect L.H. SIDESLIP air hose (4) from computer (2).
4. Tag and disconnect L.H. PITOT PRESS air hose (5) from computer (2).
5. Tag and disconnect STATIC PRESS air hose (6) from computer (2).



6. Turn two knobs (7) counterclockwise until collars (8) are loose. Lift collar up and slide aft from fitting (9) on computer (2).
7. Pull computer (2) aft to release computer from pins (10). Lift and remove computer from mounting base (11).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-275 DISASSEMBLE AFCS COMPUTER UNIT (CONTROL BOX) (AVIM) 11-275

INITIAL SETUP

Applicable Configurations:

All

Tools:

Electronic Equipment Tool Kit, TK-105/G, NSN 5180-00-610-8177

Materials:

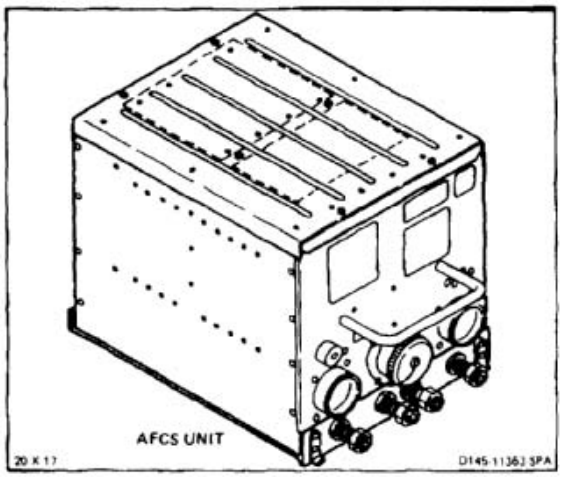
Tags (E264)

Personnel Required:

Avionic Navigation and Flight Control Equipment Repairer

Equipment Condition:

Off Helicopter Task



1. Remove cover (1) by turning 6 fasteners (2) 1/4 turn each.

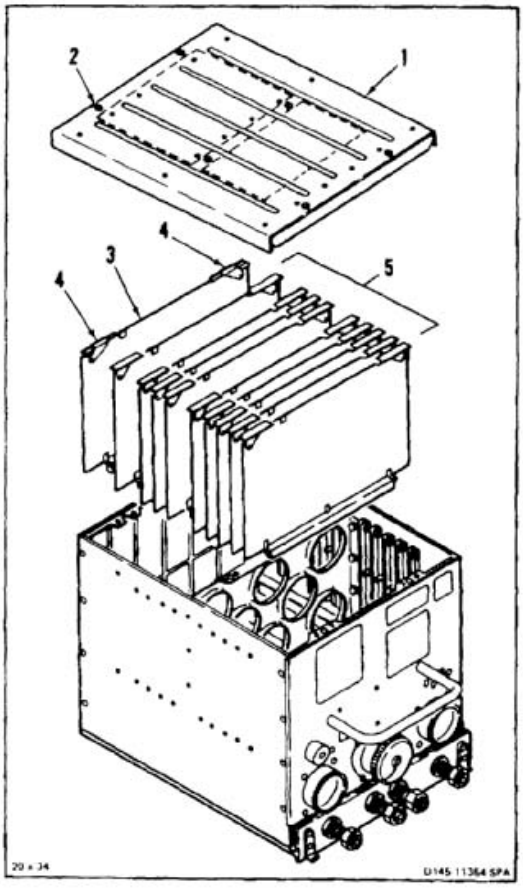
CAUTION

This equipment contains parts and assemblies sensitive to damage by electrostatic discharge (ESD). Use ESD precautionary procedures when touching, removing or inserting.

CAUTION

Do not place cards on top of each other. Damage to cards and components can occur.

2. Remove power switching circuit card (3) first, by lifting up on two locking tabs (4). Tag card.
3. Remove nine remaining circuit cards (5). Use same procedure as in step 2. Tag cards.

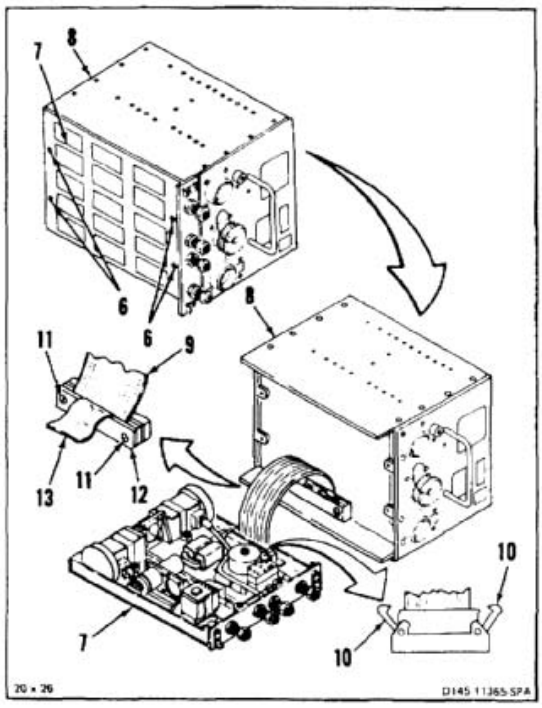


4. Loosen four captive screws (6).

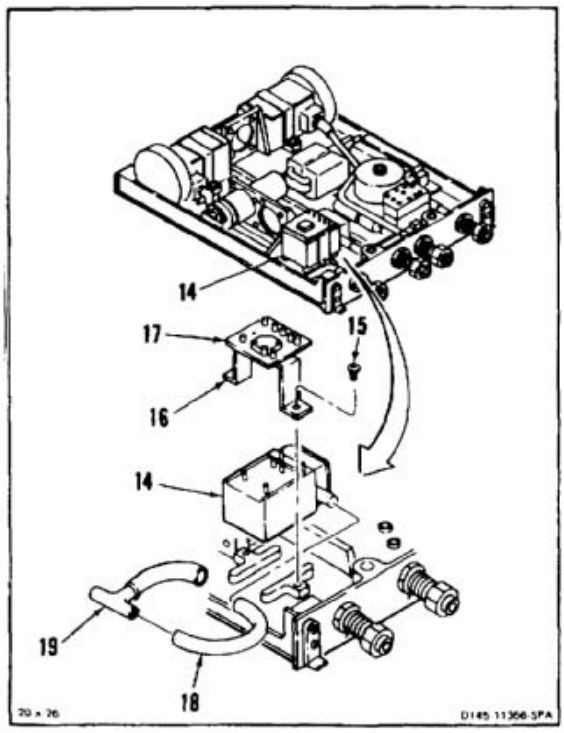
CAUTION

Be careful when separating base from box to prevent damage to flat cable and connectors.

5. Separate base (7) from box (8).
6. Disconnect flat cable (9) from base (7) by releasing locking tabs (10).
7. Disconnect flat cable (9) from box (8) by removing two screws (11) and retainer (12). Use pull tab (13) to remove connector from box.

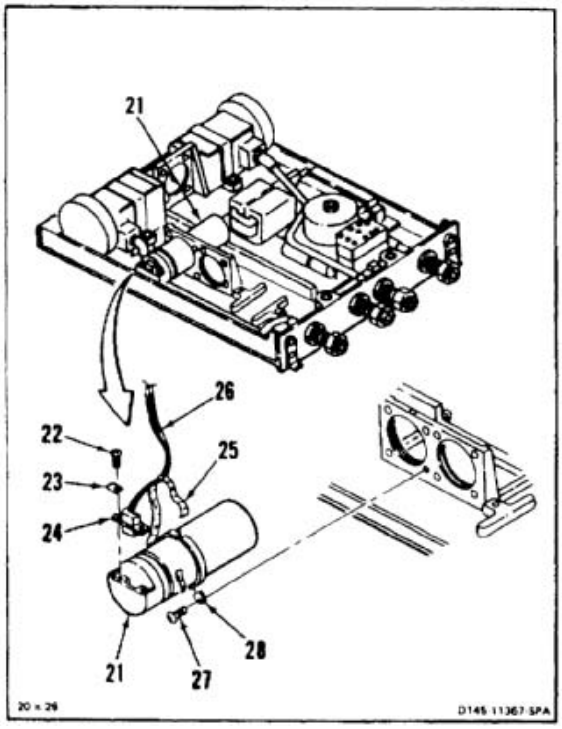


8. Remove altitude transducer (14) as follows:
   a. Remove two screws (15).
   b. Remove bracket (16) with terminal board (17).
   c. Tag and remove tube (18) from transducer (14).
   d. Remove transducer (14).
   e. Tag and remove tube (18) from tee union fitting (19).

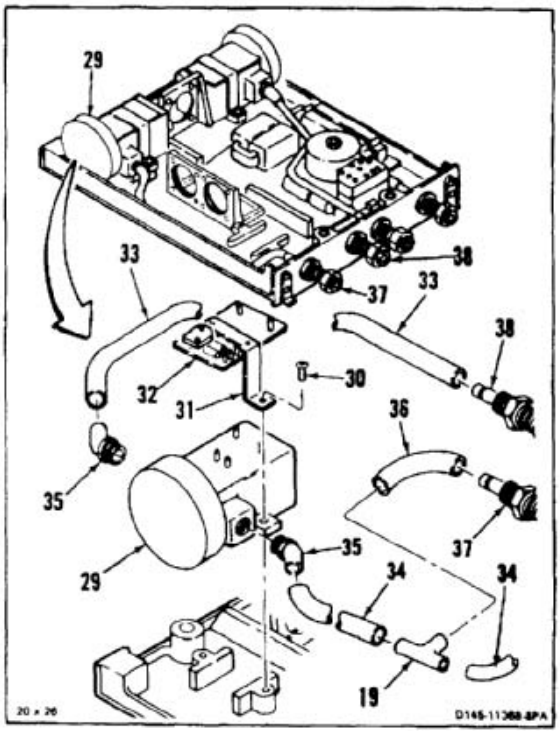


11-275 DISASSEMBLE AFCS COMPUTER UNIT (CONTROL BOX) (AVIM) (Continued) 11-275

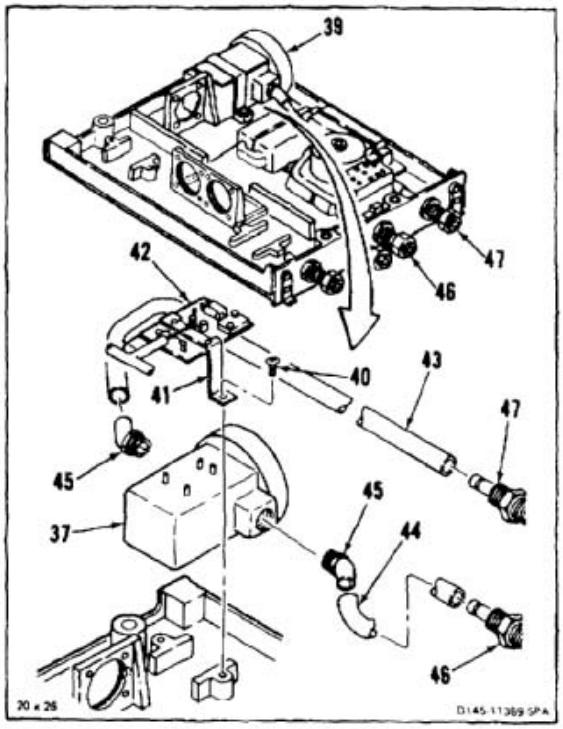
9. Remove rate gyroscope (21) as follows:
   a. Remove two screws (22) and two brackets (23).
   b. Remove connector (24).
   c. Remove braided tape (25) to remove wire harness (26) from gyroscope (21).
   d. Remove four screws (27) and clamps (28).
   e. Remove gyroscope (21).



10. Remove airspeed transducer (29) as follows:
   a. Remove two screws (30).
   b. Remove bracket (31) with terminal board (32).
   c. Remove two tubes (33 and 34) from transducer (29).
   d. Tag and remove transducer (29).
   e. Tag and remove two fittings (35) from transducer (29).
   f. Tag and remove tube (34) from tee union fitting (19).
   g. Remove tee union fitting (19) from tube (36).
   h. Remove tube (36) from static fitting (37).
   i. Tag and remove tube (33) from pitot fitting (38).



11. Remove sideslip transducer (39) as follows:
    a. Remove two screws (40).
    b. Remove bracket (41) with terminal board (42).
    c. Tag and remove transducer (39).
    d. Remove tubes (43 and 44) from transducer (39).
    e. Tag and remove two fittings (45) from transducer (39).
    f. Remove tube (44) from left sideslip fitting (46). Tag tube.
    g. Remove tube (43) from fitting (47).

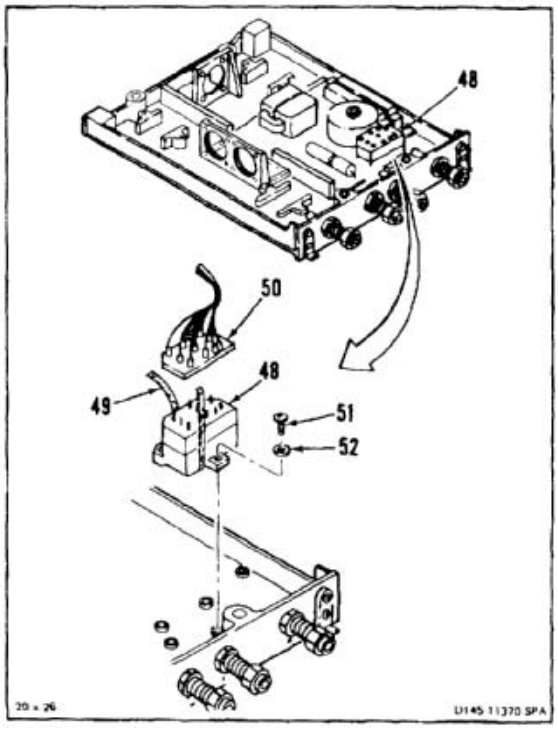


12. Remove norm accelerometer (48) as follows:
    a. Remove braided tape (49).

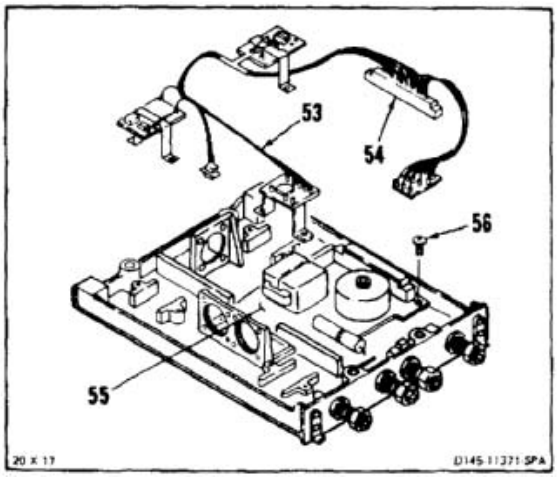
CAUTION

Be careful when removing connector board from accelerometer to prevent damage to pins.

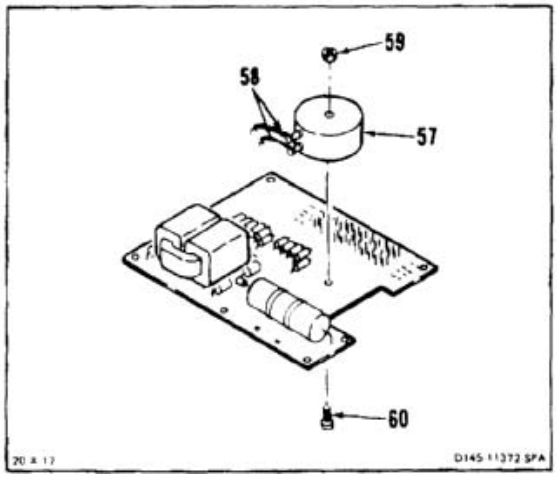
    b. Remove connector board (50).
    c. Remove three screws (51) and washers (52).
    d. Remove accelerometer (48).



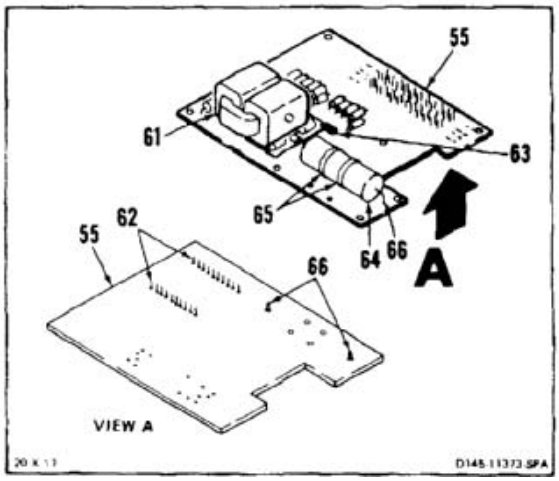
13. Remove wire harness (53) by disconnecting connector (54) from base circuit card (55).
14. Remove base circuit card (55) by removing eight screws (56).



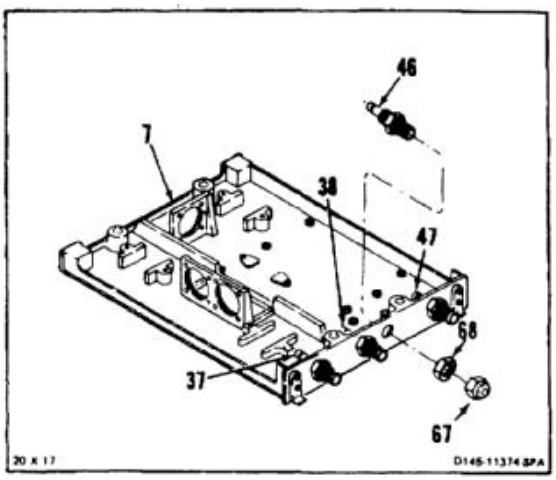
15. Remove choke (57) as follows:
    a. Tag and unsolder two wires (58) from choke (57).
    b. Remove nut (59) and screw (60)



16. Remove transformer (61) by unsoldering 20 pins (62) at bottom of base circuit card (55), and lug (63).
17. Remove capacitor (64) by removing braided tape (65), turn card (55) over, and unsolder two leads (66).



18. Remove four caps (67) and nuts (68) from four fittings (37, 38, 46, and 47). Remove fittings from base (7).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-276 ASSEMBLE AFCS COMPUTER UNIT (CONTROL BOX) (AVIM) 11-276

INITIAL SETUP

Applicable Configurations:

All

Tools:

Electronic Equipment Tool Kit, TK-105/G, NSN 5180-00-610-8177

Materials:

Braided Nomex Tape (E403)
Solder (E360)
Adhesive (E62)
Sealant (E345)
Teflon Tape (E401)
Gloves (E186)

Personnel Required:

Avionic Navigation and Flight Control Equipment Repairer
Inspector

References:

TM 55-1520-240-23P
TM 55-1500-323-25

General Safety Instructions:

WARNING

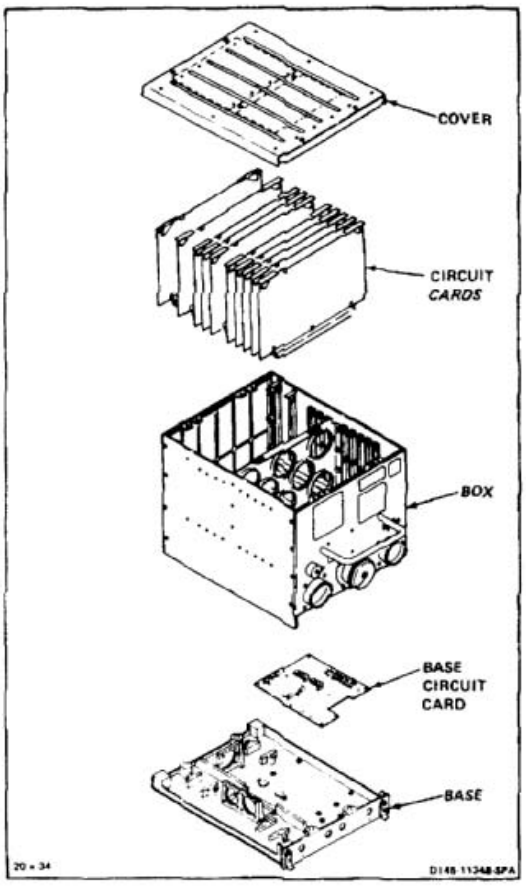
Sealant (E345) and adhesive (E62) can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

CAUTION

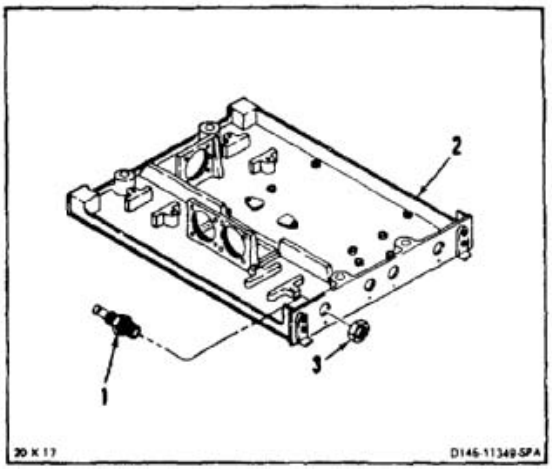
This equipment contains parts and assemblies sensitive to damage by electrostatic discharge (ESD). Use ESD precautionary procedures when touching, removing or inserting.

CAUTION

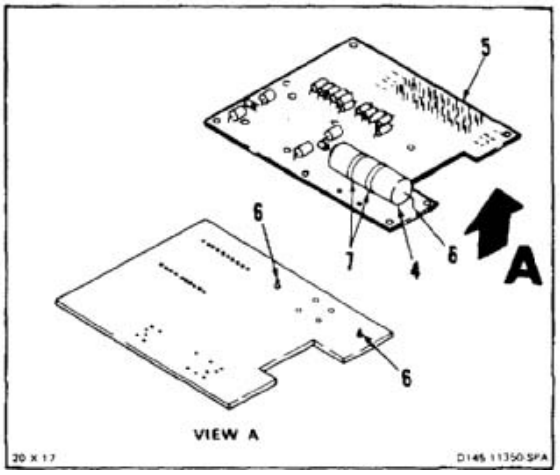
Do not place cards on top of each other. Damage to cards and components can occur.



1. Position four fittings (1) in base (2) and install four nuts (3).



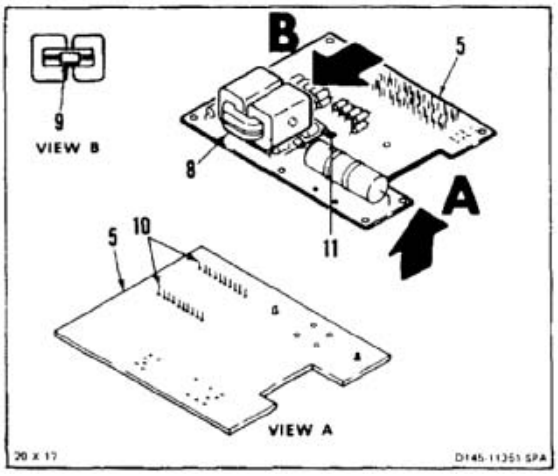
2. Position capacitor (4) on base circuit board (5), turn board over and solder two leads (6).
3. Tie capacitor (4) to base circuit board (5) at two places (7). Use braided tape (E403). Apply adhesive (E62) to knots of braided tape. Wear gloves (E186).



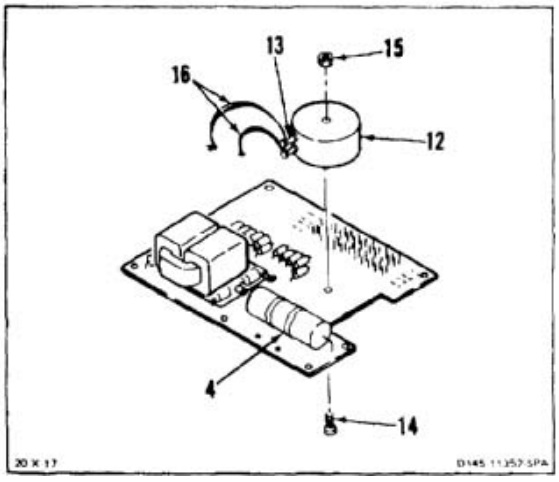
CAUTION

Transformer must be installed with assembly band splice toward center of base circuit board to prevent damage to electrical equipment in AFCS unit.

4. Position transformer (8) on base circuit board (5). Make sure assembly band splice (9) is toward center of board.
5. Turn board (5) over and solder 20 transformer pins (10) and lug (11). Use solder (E360).

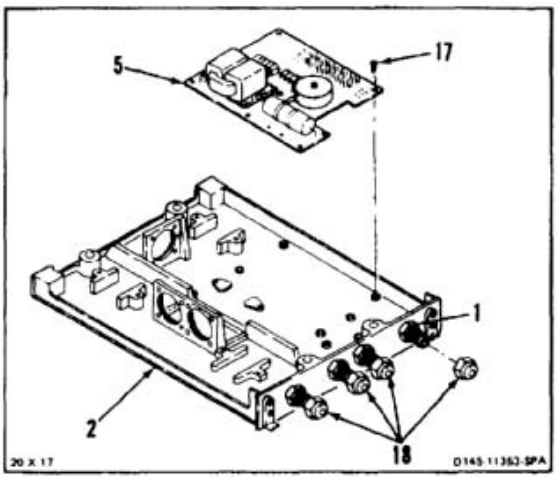


6. Position choke (12), flat side down, with solder terminals (13) toward capacitor (4).
7. Install screw (14) and nut (15). Use sealant (E345) on screw and nut. Wear gloves (E186).
8. Solder two wires (16) to terminals (13) of choke (12). Remove tags.



9. Position base circuit board (5) in base (2) and install eight screws (17). Use sealant (E345) on screws.

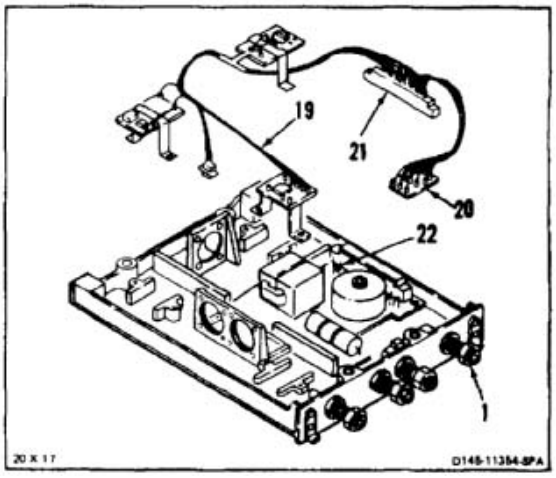
10. Install four caps (18) on fittings (1).



CAUTION

Connector must be installed correctly. Serious damage can occur if connector is incorrectly installed.

11. Position wire harness (19) with board (20) towards fittings (1). Install connector (21) on base circuit board pins (22).



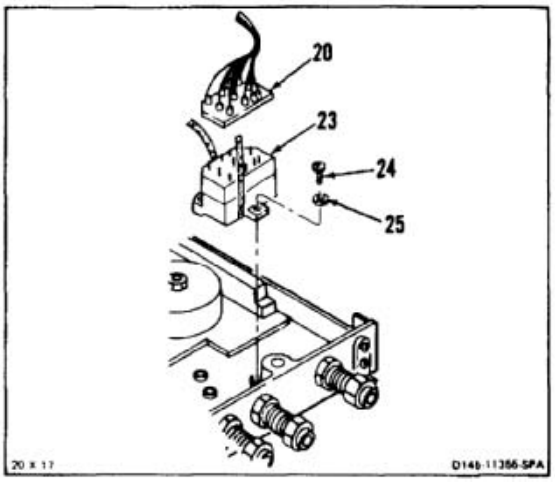
12. Install accelerometer (23) as follows:

a. Position accelerometer (23) on base (2).

b. Install three screws (24) and washers (25). Use sealant (E345) on screws.

c. Install connector board (20).

d. Install braided tape (E403) around accelerometer (23) and connector board (20). Apply adhesive (E62) to knots of braided tape. Wear gloves (E186).



13. Install sideslip transducer (26) as follows:

    a. Install tube (27) to right sideslip fitting (28). Remove tag.

    b. Install tube (29) to left sideslip fitting (30). Remove tag.

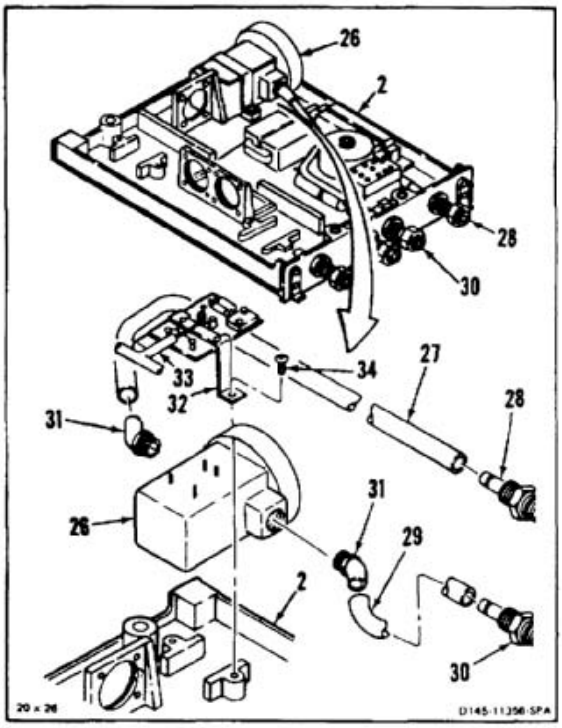
    c. Install two fittings (31) in transducer (26). Use Teflon tape (E401) on threaded end of fittings. Remove tags.

    d. Install tubes (27 and 29) on fittings (31).

    e. Position transducer (26) on base (2). Remove tag.

    f. Position bracket (32) on transducer (26) with wires (33) inward.

    g. Install two screws (34). Use sealant (E345) on screws. Wear gloves (E186).



14. Install airspeed transducer (35) as follows:

    a. Install fittings (36 and 37) in transducer (35). Use Teflon tape (E401) on threaded end of fittings. Remove tags.

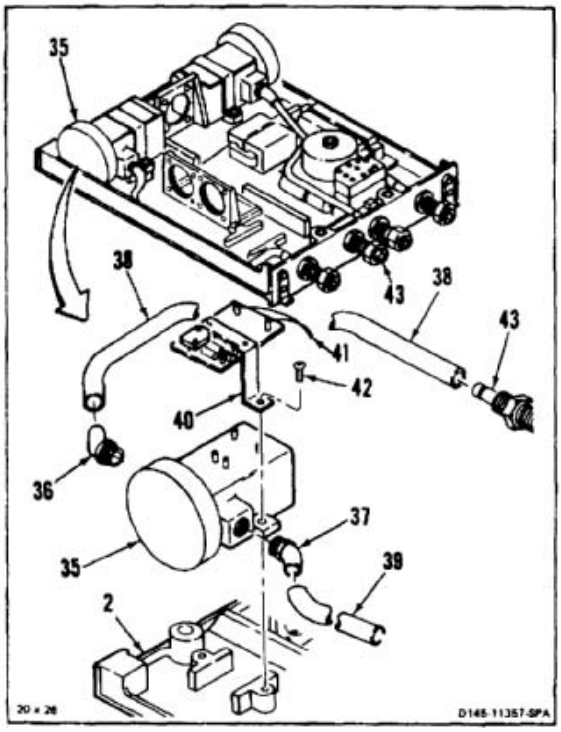
    b. Install tubes (38 and 39) on transducer (35).

    c. Position transducer (35) on base (2). Remove tag.

    d. Position bracket (40) on transducer (35) with wires (41) inward.

    e. Install two screws (42). Use sealant (E345) on screws. Wear gloves (E186).

    f. Install tube (38) on pitot fitting (43).



15. Install gyroscope (44) as follows:

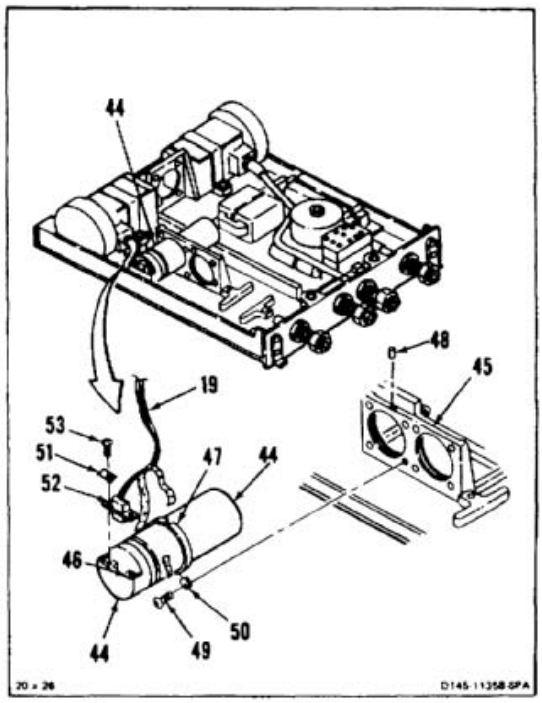
    a. Position gyro (44) in base (45). Make sure receptacle (46) is up and align notch (47) with pin (48).

    b. Install four screws (49) and clamps (50). Use sealant (E345) on screws. Wear gloves (E186).

    c. Install two brackets (51) on connector (52) and position connector on gyro (44).

    d. Install two screws (53) in connector (52).

    e. Tie wire harness (19) to gyro (44). Use braided tape (E403). Apply adhesive (E62) to knots of braided tape. Wear gloves (E186).



16. Install altitude transducer (54) as follows:

    a. Install tube (55) on transducer (54). Remove tag.

    b. Position transducer (54) in base (2). Remove tag.

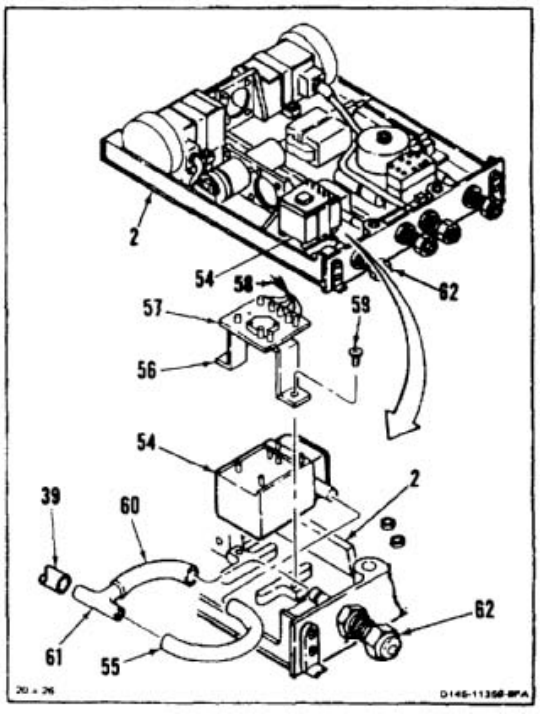
    c. Position bracket (56) with terminal board (57) over transducer (54) With wires (58) inward.

    d. Install two screws (59). Use sealant (E345) on screws. Wear gloves (E186).

    e. Install tube (60) on tee fitting (61).

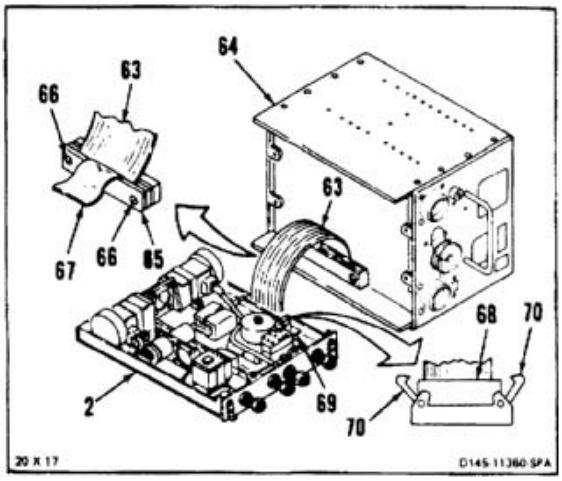
    f. Install tubes (39 and 55) on fitting (61).

    g. Install tube (60) on static fitting (62).

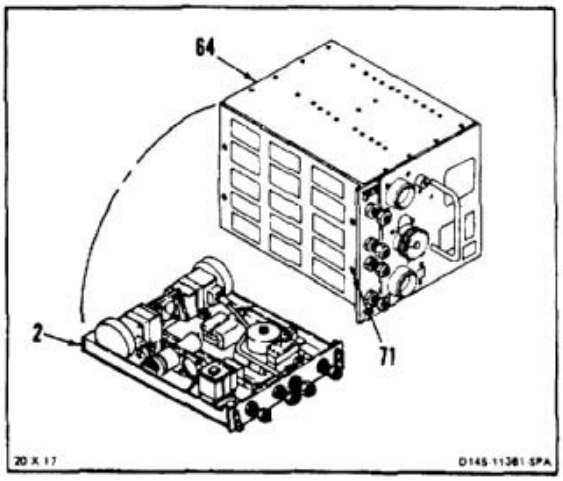


17. Connect flat cable (63) to box (64).
18. Install retainer (65) and two screws (66). Make sure pull tab (67) is positioned flat against cable (63).
19. Connect flat cable (63) to base (2) by positioning connector (68) on base circuit board receptacle (69) and latching locking tabs (70).

INSPECT



20. Position base (2) in box (64).
21. Tighten four captive screws (71).

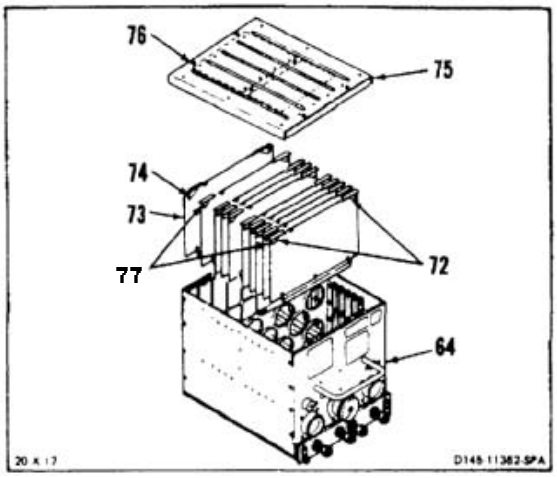


22. Remove tags and install 9 circuit cards (77). Make Sure cards are Completely seated. Press down on locking tabs (72) on all cards.
23. Remove tag and install power switching circuit card (73). Make sure card is completely seated. Press down on locking tabs (74).
24. Position cover (75) on box (64).
25. Lock six fasteners (76). Turn 1/4 turn.

INSPECT

FOLLOW-ON MAINTENANCE:

Bench test AFCS computer (Task 11-277).



END OF TASK

11-276.1 ADJUST SIDESLIP AIRSPEED OR BAROMETRIC ALTITUDE PRESSURE TRANSDUCER, AFCS COMPUTER (AVIM) 11-276.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Electrical Tool Kit, NSN 5180-00-323-4915
AFCS Bench Test Set (T52)
AFCS Computer Test Hose 2 (E-37)

Materials:

None

Personnel Required:

Avionic Navigation and Flight Control Equipment Repairer
Inspector

References:

TM 55-1520-240-23P
TM 55-4920-378-14&P
TM 55-4920-430-13
Appendix E

Equipment Condition:

Off Helicopter Task
AFCS Bench Test Set 145G0008-1 Prepared For Use (TM 55-4920-430-13)

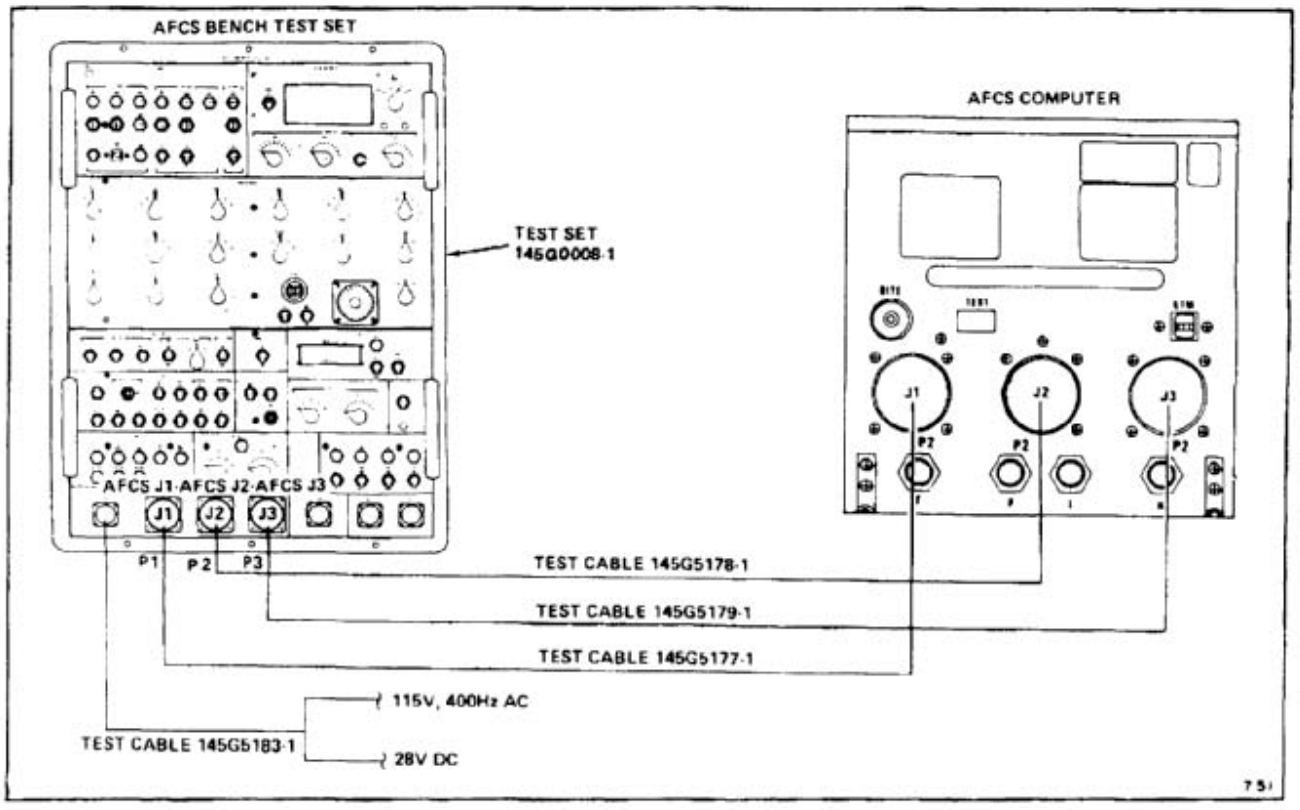
General Safety Instructions:

WARNING

High voltage is used in this equipment. Observe safety precautions; otherwise, personal injury or death can occur.

CAUTION

Do not move computer for **5 minutes** after removal of power; otherwise, damage to yaw gyro can occur.



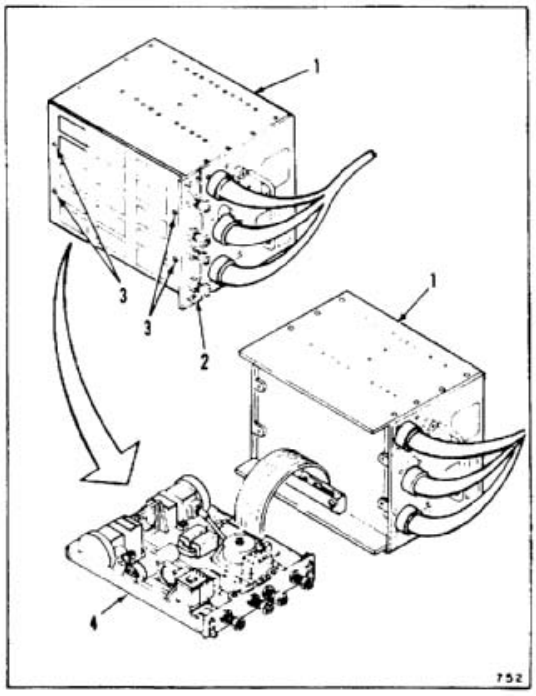
11-276.1 ADJUST SIDESLIP AIRSPEED OR BAROMETRIC ALTITUDE PRESSURE TRANSDUCER, AFCS COMPUTER (AVIM) (Continued) 11-276.1

1. Position computer unit (1) on right side (2). Loosen four captive screws (3).

CAUTION

Be careful when separating base from box to prevent damage to flat cable and connectors.

2. Separate base (4) from unit (1). Rotate base down from unit.



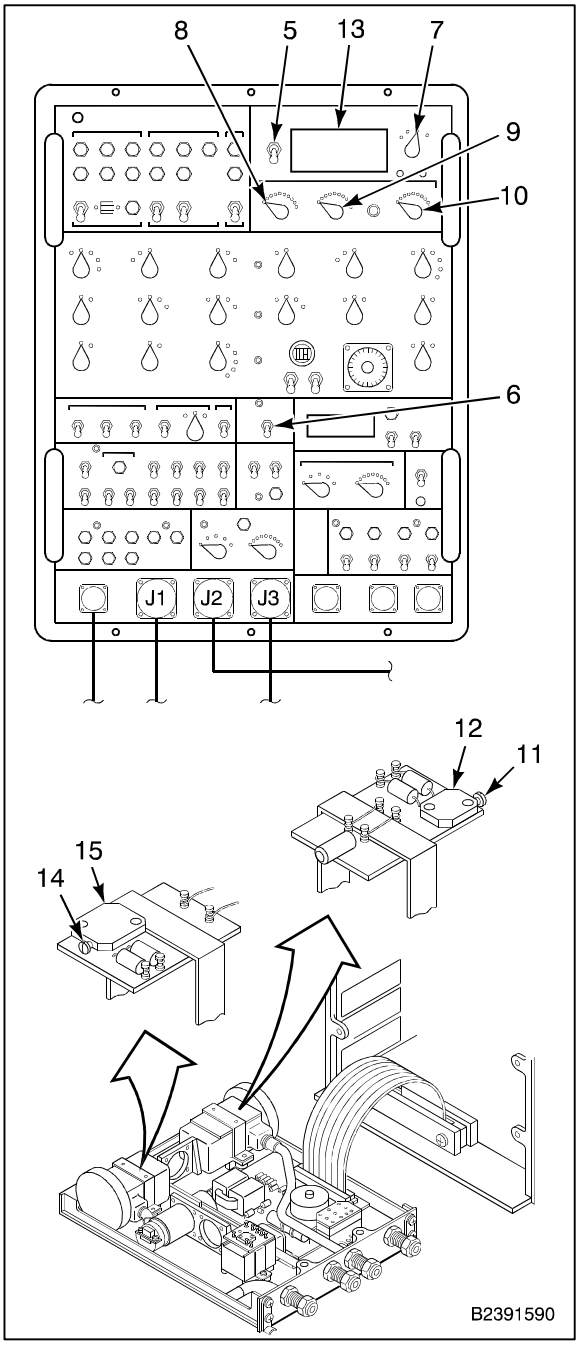
3. Set METER switch (5) to DC.
4. Set NORM ACCEL J2-52 switch (6) to GND.
5. Set METER RANGE switch (7) to 200 MV.

SIDESLIP TRANSDUCER

6. Set CIRCUIT SELECT TENS switch (8) to 30.
7. Set CIRCUIT SELECT A UNITS switch (9) to 7.
8. Set CIRCUIT SELECT A/B switch (10) to A.
9. Turn screw (11) of sideslip transducer potentiometer (12) until VOLTMETER (13) indicates –**0.005 vdc**. VOLTMETER must indicate between –**0.007 to** –**0.003**.

AIRSPEED TRANSDUCER

10. Set CIRCUIT SELECT TENS switch (8) to 40.
11. Set CIRCUIT SELECT A UNITS switch (9) to 0.
12. Turn screw (14) of airspeed transducer potentiometer (15) until VOLTMETER (13) indicates –**0.005 vdc**. VOLTMETER must indicate between –**0.010 to +0.000**.



BAROMETRIC ALTITUDE TRANSDUCER

NOTE

If test is being conducted at sea level, perform only steps 21, 22, 24, 30, 31, and 32.

13. Set PRESSURE knob (16) of tester (T52) (17) to OFF.
14. Set VACUUM knob (18) to ALT & R.O.C. 0-50,000 FT.
15. Set INCREASE knob (19) and DECREASE knob (20) fully clockwise.

CAUTION

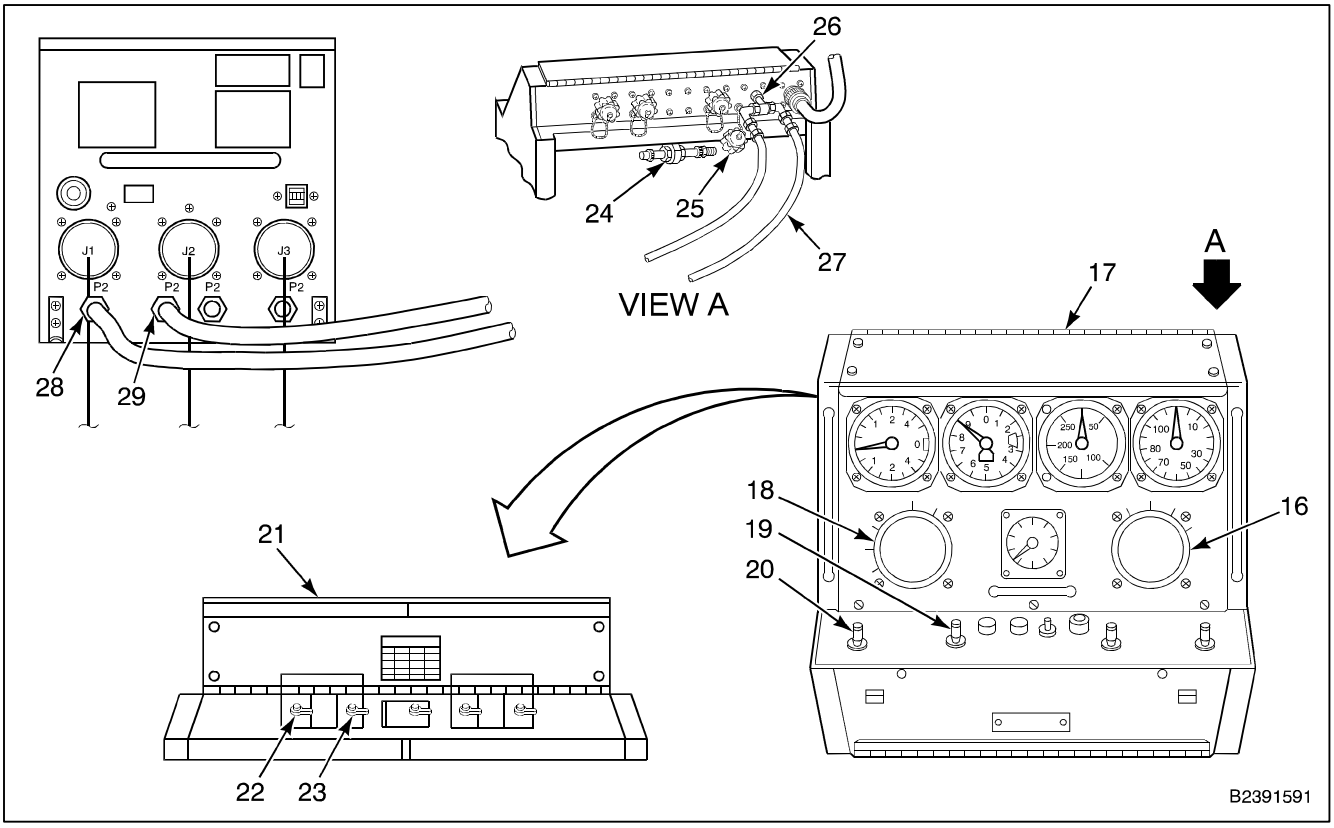
The case leak valve levers must be in these positions, and the safety valve closed, to isolate altitude indicator from vacuum source; otherwise, damage to instrument can occur.

16. Open cover (21).
17. Set lever (22) to NOR and lever (23) to CL. Close cover (21).
18. Turn knob (24) fully clockwise.
19. Remove cap (25) from fitting (26).

CAUTION

Hose assembly must be connected to both pitot and static ports; otherwise, damage to altitude differential pressure transducer can occur.

20. Connect hose (27) (APP E-37) to fitting (26), port S (28), and port P (29).



20.1. Set PRESSURE knob (16) to MANIFOLD PRESSURE.

20.2. Check MANIFOLD PRESSURE indicator (29.1). Indicator shall show **30** (sea level). Adjust pressure if necessary. (Refer to TM 55-4920-378-14.)

21. Set CIRCUIT SELECT TENS switch (8) to 60.

22. Set CIRCUIT SELECT A UNITS switch (9) to 3.

23. Set power switch (30) to ON.

24. Turn screw (31) of barometric altitude transducer potentiometer (32) until VOLTMETER (13) indicates **0**.

25. Set power switch (30) to OFF.

26. Turn INCREASE knob (19) and DECREASE knob (20) fully clockwise.

CAUTION

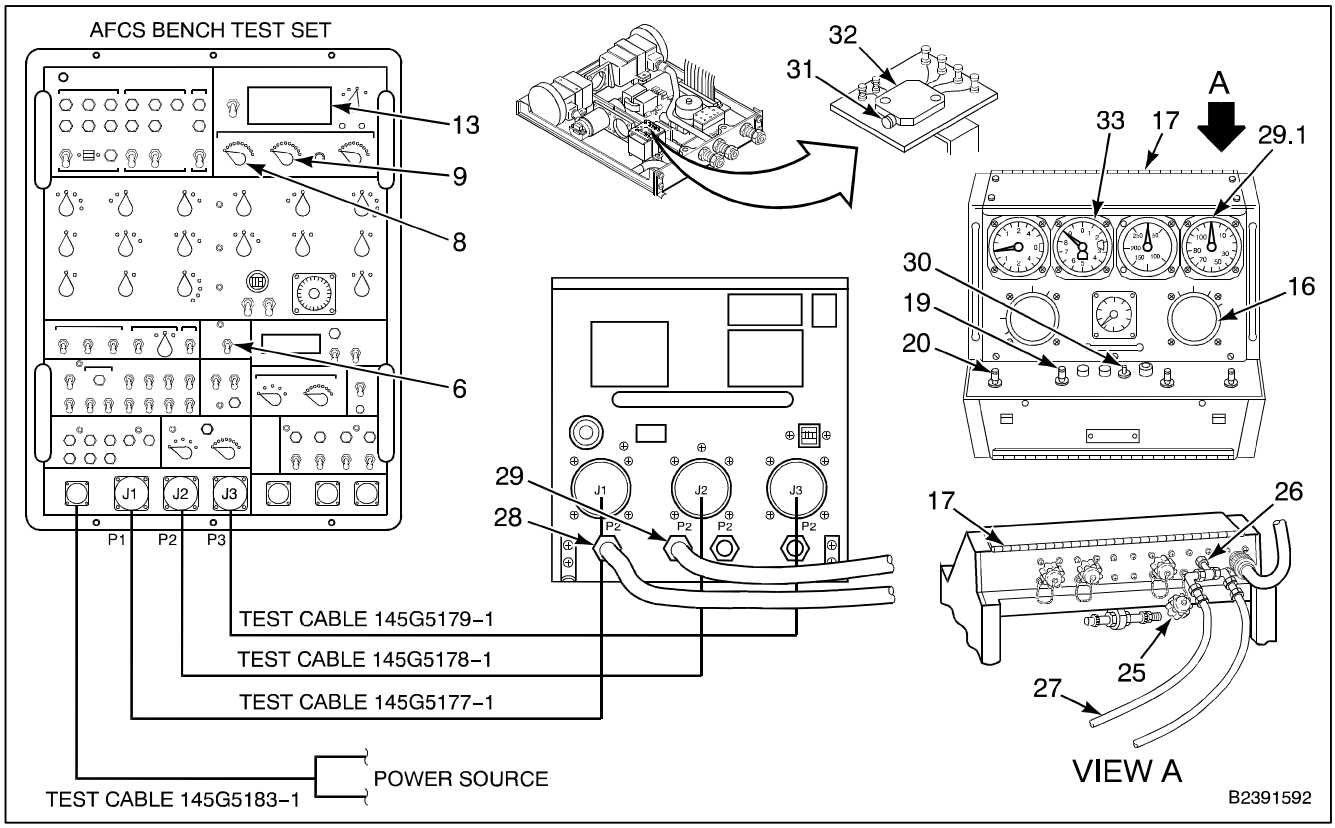
Do not disconnect hose assemblies from tester or change position of vacuum or pressure selector knobs before all instruments return to their normal readings; otherwise, instruments can be damaged.

27. When ALT indicator (33) reads **0**, disconnect hose (27) from port S (28), port P (29), and fitting (26).

28. Install cap (25) on fitting (26).

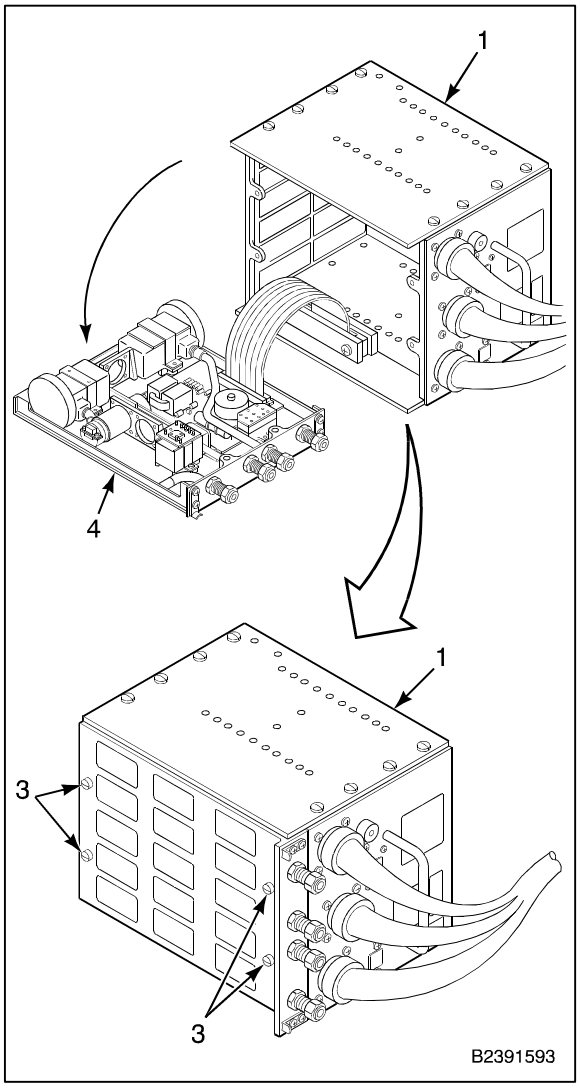
29. Remove power source from tester (17).

30. Set NORM ACCEL J2-52 switch (6) to NORM.



31. Position base (4) on unit (1).
32. Tighten four captive screws (3).

INSPECT



FOLLOW-ON MAINTENANCE:

Shut down AFCS bench test set 145G0008-1 (TM 55-4920-430-13).

END OF TASK

11-277 BENCH TEST AFCS COMPUTER (AVIM) 11-277

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Electrical Tool Kit, NSN 4920-00-718-6480
Simulator, Aircraft Displacement Rate Table (T41)
Tester Pitot and Static Systems, NSN 4920-00-718-6480
AFCS Bench Test Set (T52)
Hose (APP E-36)
Hose (APP E-37)

Materials:

None

Personnel Required:

Avionic Navigation and Flight Control Equipment Repairer
Inspector

References:

TM 55-1520-240-T
TM 55-4920-430-13
TM 55-4920-378-14&P
Appendix E

Equipment Condition:

Off Helicopter Task
AFCS Bench Test Set 145G0008-1 Prepared For Use (TM 55-4920-430-13)

General Safety Instructions:

WARNING

High voltage is used in this equipment. Observe safety precautions; otherwise, personal injury or death can occur.

CAUTION

Do not move computer for **5 minutes** after removal of power; otherwise, damage to yaw gyro can occur.

NOTE

The following tests are included:

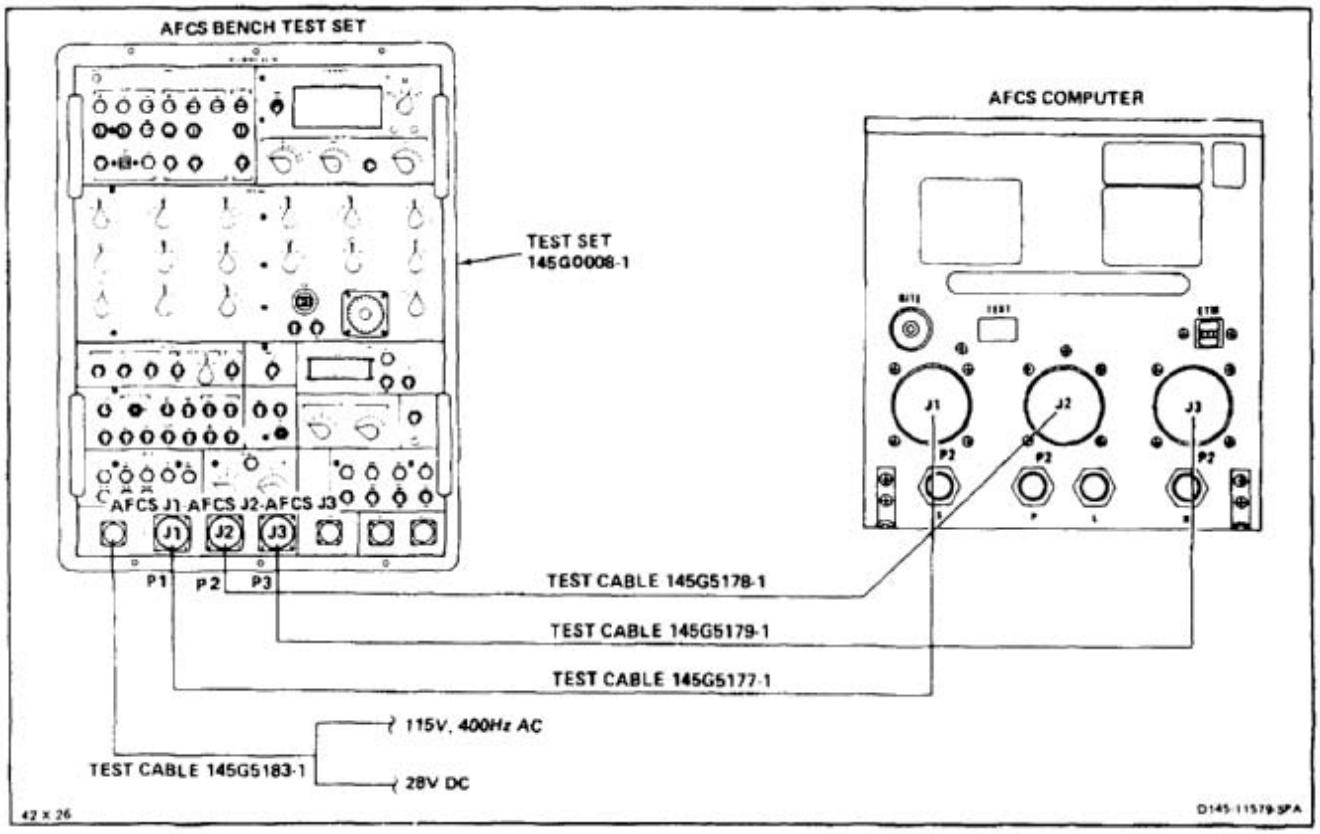
TEST

1. Continuity Test
2. Power Supply Test
3. Logic Test
4. Pitch Axis Test
5. Roll Axis Test
6. Yaw Axis Test
7. DASH Test
8. Longitudinal Cyclic Trim (LCT) Test
9. Collective Control Driver Actuator (CCDA) Test
10. Yaw Rate Test
11. Normal Acceleration Test
12. Pressure Transducers Test
13. Bite Test

NOTE

Allow **5 minutes** warm up of AFCS unit before any test segments are run.

11-277 BENCH TEST AFCS COMPUTER (AVIM) (Continued) 11-277



TEST 1

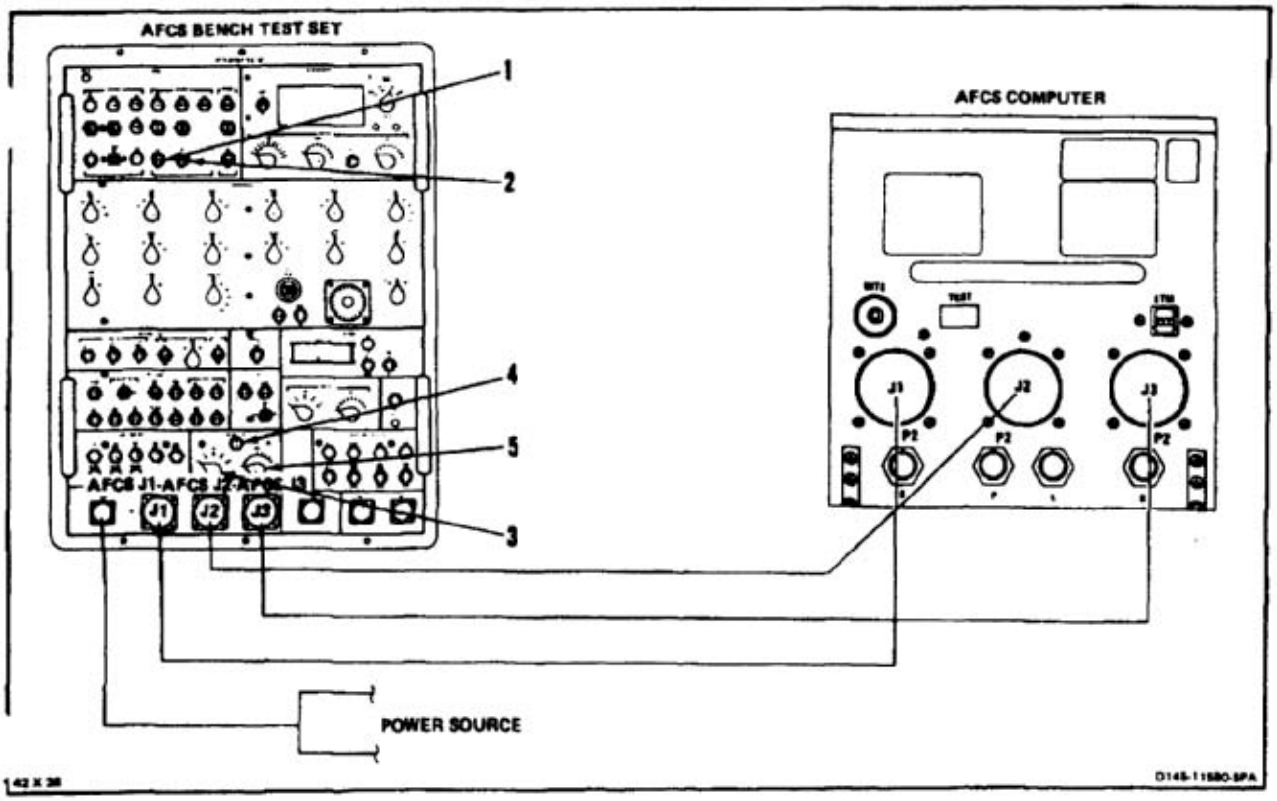
CONTINUITY TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

1. Set POWER switches (1 and 2) to OFF.
2. Set CONTINUITY TEST TENS switch (3) to 20. CONTINUITY INDICATOR lamp (4) shall be on.
3. Set CONTINUITY TEST UNITS switch (5) to positions 1 through 9. CONTINUITY INDICATOR lamp (4) shall be on in all positions.
4. Set CONTINUITY TEST UNITS switch (5) to 0.
5. Set CONTINUITY TEST TENS switch (3) to 30. CONTINUITY INDICATOR lamp (4) shall be on.
6. Set CONTINUITY TEST UNITS switch (5) to positions 1 through 6. CONTINUITY INDICATOR lamp (4) shall be on in all positions.
7. Set CONTINUITY TEST UNITS switch (5) to 0.
8. Set CONTINUITY TEST TENS switch (3) to 00.

END CONTINUITY TEST



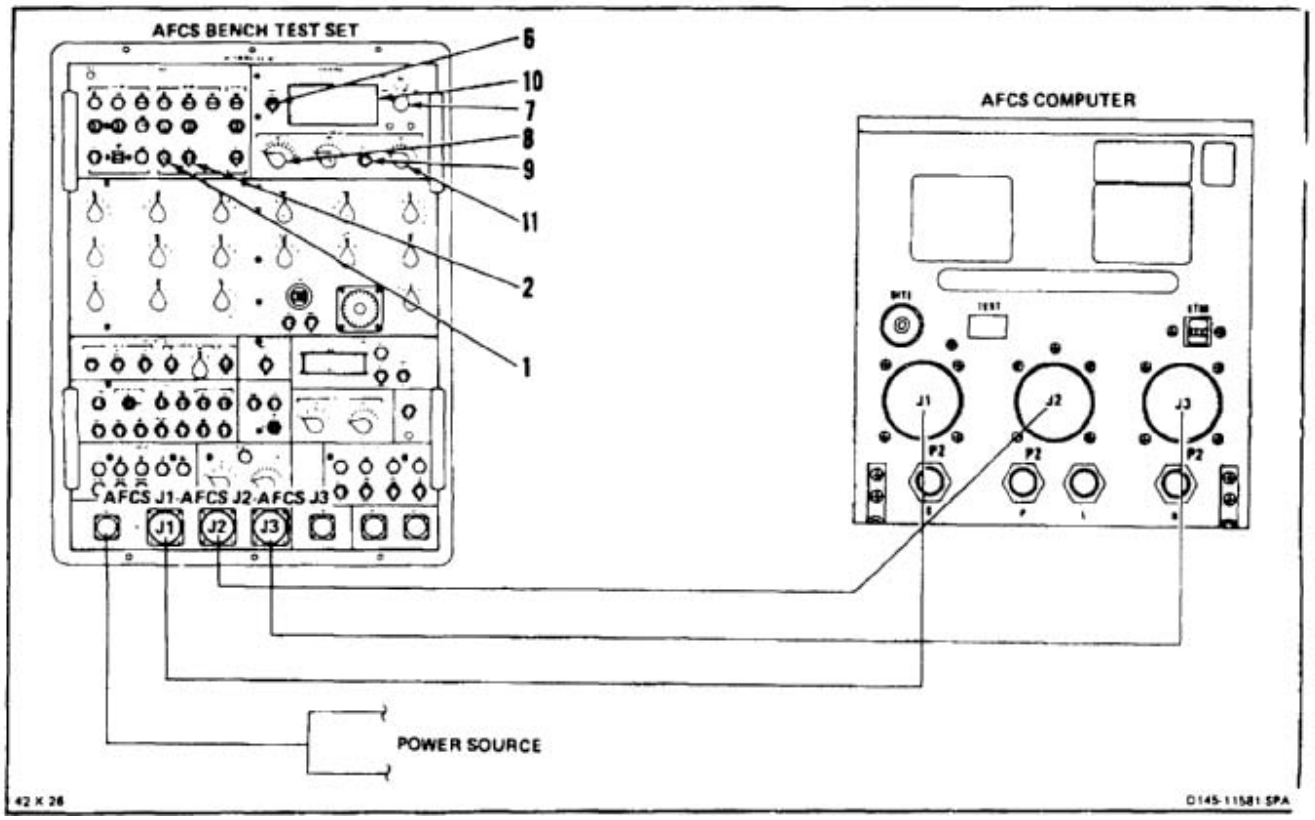
TEST 2

POWER SUPPLY TEST

NOTE

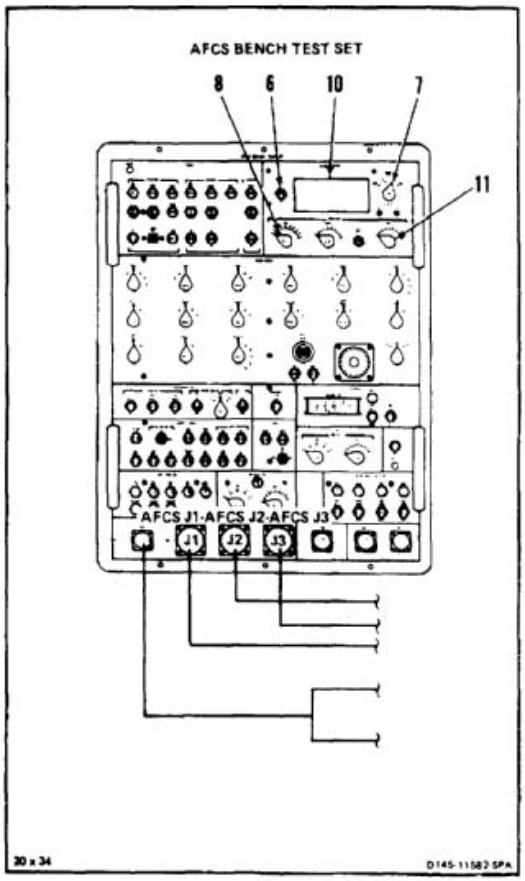
Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

9. Set POWER switches (1 and 2) to ON.
10. Set METER switch (6) to AC.
11. Set METER RANGE switch (7) to 200V.
12. Set CIRCUIT SELECT TENS switch (8) to 10.
13. Set CIRCUIT SELECT A/B SELECT switch (9) to B. Read AC/DC VOLTMETER (10). Reading shall be **+112.5 to +117.5**.
14. Set METER switch (6) to DC.
15. Set CIRCUIT SELECT B UNITS switch (11) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+24.0 to +28.5**.
16. Set METER RANGE switch (7) to 20V.
17. Set CIRCUIT SELECT B UNITS switch (11) to 2. Read AC/DC VOLTMETER (10). Reading shall be **+6.86 to +7.14**.
18. Set CIRCUIT SELECT B UNITS switch (11) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.86 to +7.14**.
19. Set CIRCUIT SELECT B UNITS switch (11) to 4. Read AC/DC VOLTMETER (10). Reading shall be **–6.86 to –7.14**.
20. Set CIRCUIT SELECT B UNITS switch (11) to 5. Read AC/DC VOLTMETER (10). Reading shall be **–6.86 to –7.14**.



21. Set CIRCUIT SELECT B UNITS switch (11) to 6. Read AC/DC VOLTMETER (10). Reading shall be **+11.26 to +12.74**.
22. Set CIRCUIT SELECT B UNITS switch (11) to 7. Read AC/DC VOLTMETER (10). Reading shall be **–11.26 to –12.74**.
23. Set METER switch (6) to AC.
24. Set METER RANGE switch (7) to 200V.
25. Set CIRCUIT SELECT B UNITS switch (11) to 8. Read AC/DC VOLTMETER (10). Reading shall be **+24.58 to +27.42**.
26. Set METER RANGE switch (7) to 20V.
27. Set CIRCUIT SELECT B UNITS switch (11) to 9. Read AC/DC VOLTMETER (10). Reading shall be **+12.29 to +13.71**.
28. Set CIRCUIT SELECT B UNITS switch (11) to 0.
29. Set CIRCUIT SELECT TENS switch (8) to 20. Read AC/DC VOLTMETER. Reading shall be **+12.29 to +13.71**.
30. Set CIRCUIT SELECT TENS switch (8) to 00.

END POWER SUPPLY TEST



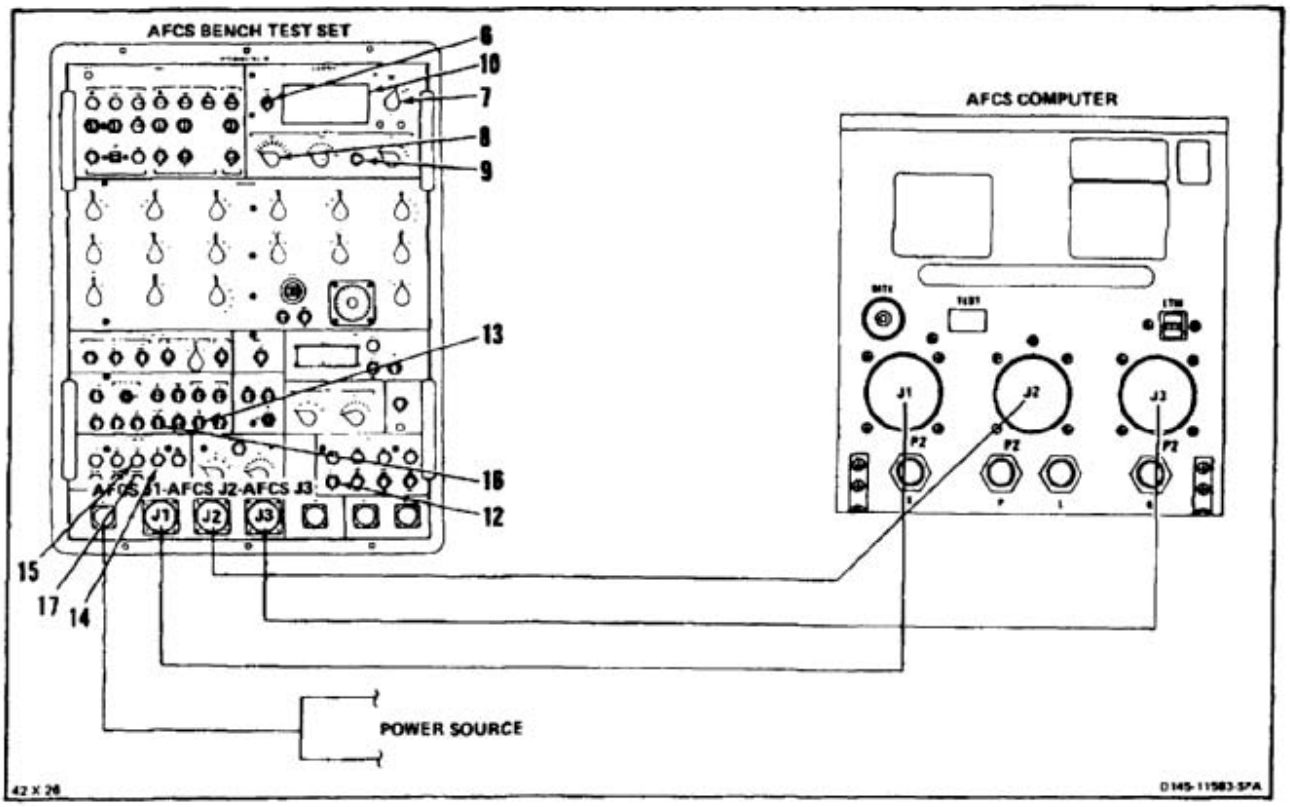
TEST 3

LOGIC TEST

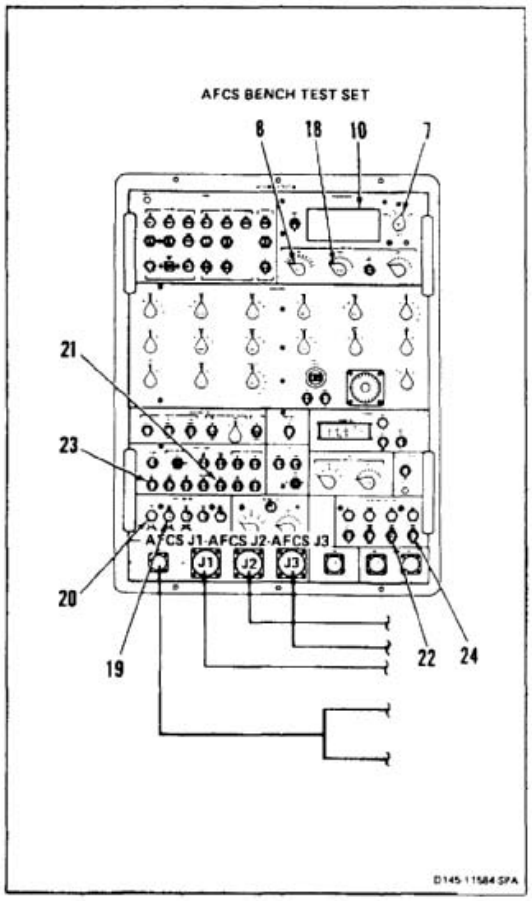
NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

31. Set METER switch (6) to DC.
32. Set METER RANGE switch (7) to 2V.
33. Set CONTROL PANEL SIMULATION AFCS switch (12) to SELECT.
34. Set DISCRETE SIGNALS HYD PRESS switch (13) to 1. DISCRETE MONITORS HYD SOL lamp (14) shall be off and AFCS ANN lamp (15) shall be on.
35. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 1.
36. Set METER RANGE switch (7) to 200V. AFCS ANN lamp (15) shall be off, HYD SOL lamp (14) shall be on, and DASH DRIVE lamp (17) shall be blinking.
37. Set HYD PRESS switch (13) to 0.
38. Set METER RANGE switch (7) to 20V. AFCS ANN lamp (15) shall be on.
39. Set VERT GYRO VALID switch (16) to 0.
40. Set CONTROL PANEL SIMULATION AFCS SELECT switch (12) to OFF.
41. Set CIRCUIT SELECT TENS switch (8) to 20.
42. Set CIRCUIT SELECT WB SELECT switch (9) to A. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 TO –7.5**.



43. Set CIRCUIT SELECT TENS switch (8) to 20.
44. Set CIRCUIT SELECT A UNITS switch (18) to 1. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**. CCDA BRAKE lamp (19) and CCDA CLUTCH lamp (20) shall be off.
45. Set DISCRETE SIGNALS between SET & ALT VALID switch (21) to 1.
46. Set METER RANGE switch (7) to 200V.
47. Set CONTROL PANEL SIMULATION BARO switch (22) to ENGAGE. CCDA BRAKE lamp (19) and CCDA CLUTCH lamp (20) shall be on.
48. Set METER RANGE switch (7) to 20V. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**.
49. Set CIRCUIT SELECT A UNITS between select & switch (18) to 0. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.
50. Set DISCRETE SIGNALS COLL BRAKE switch (23) to 1. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**. CCDA BRAKE lamp (19) shall be on.
51. Set CONTROL PANEL SIMULATION RADAR switch (24) to ENGAGE.
52. Set CONTROL PANEL SIMULATION BARO switch (22) to DISENG.
53. Set CIRCUIT SELECT A UNITS switch (18) to 1. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**.



54. Set DISCRETE SIGNALS COLL BRAKE switch (23) to 0. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

55. Set CIRCUIT SELECT A UNITS switch (18) to 0. Read AC/DC VOLTMETER (10). Reading shall be **–7.5 to –6.5**. CCDA BRAKE lamp (19) and CCDA CLUTCH lamp (20) shall be on.

56. Set CONTROL PANEL SIMULATION BARO switch (22) to ENGAGE. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

57. Set CIRCUIT SELECT A UNITS switch (18) to 1. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

58. Set CONTROL PANEL SIMULATION BARO switch (22) to DISENG.

59. Set ANALOG SIGNALS BARO ALT switch (25) to 2. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

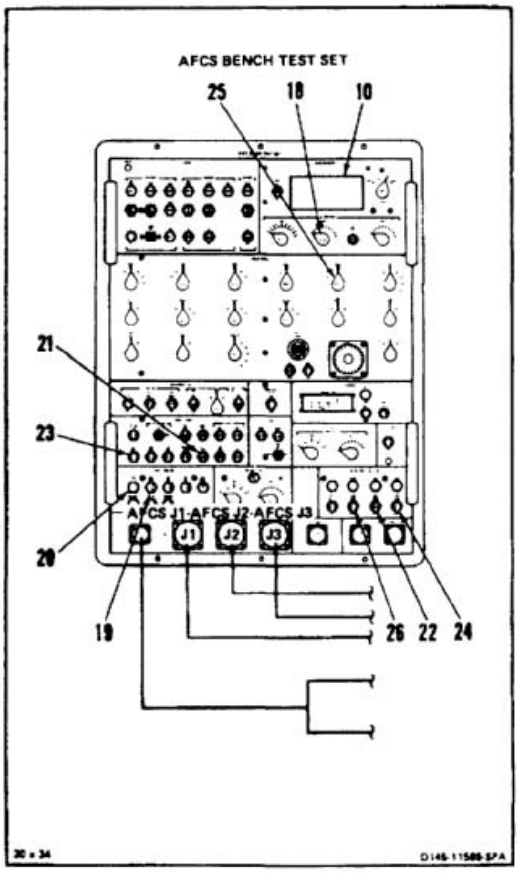
60. Set ANALOG SIGNALS BARO ALT switch (25) to 3.

61. Set DISCRETE SIGNALS ALT VALID switch (21) to 0. Read ACVOLTMETER (10). Reading shall be **–6.5 to –7.5**.

62. Set CONTROL PANEL SIMULATION RADAR switch (24) to DISENG.

63. Set CONTROL PANEL SIMULATION HEADING switch (26) to ENGAGE.

64. Set CIRCUIT SELECT A UNITS switch (18) to 2. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.



65. Set CIRCUIT SELECT A UNITS switch (18) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

66. Set CONTROL PANEL SIMULATION HEADING switch (26) to DISENG.

67. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

68. Set CIRCUIT SELECT A UNITS switch (18) to 2. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

69. Set DISCRETE SIGNAL CYCLIC BRAKE switch (27) to 0.

70. Set DISCRETE SIGNALS DETENT ROLL switch (28) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

71. Set DISCRETE SIGNALS DETENT ROLL switch (28) to 0.

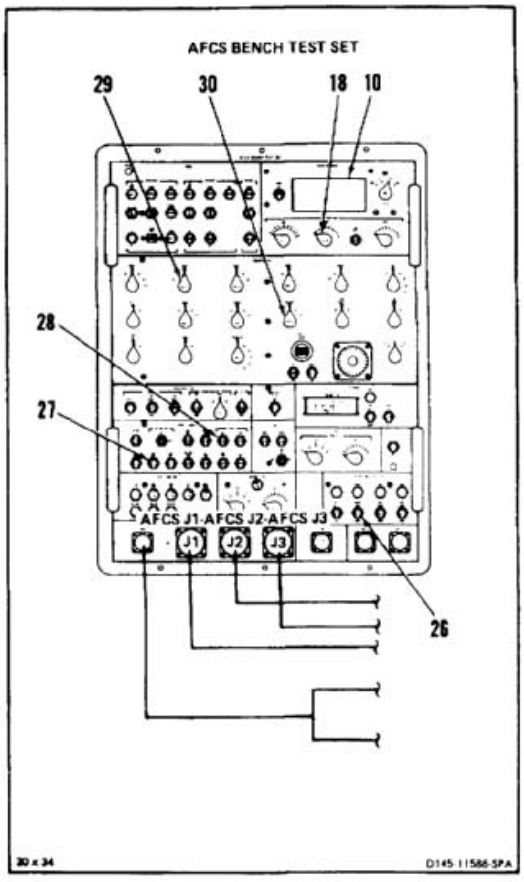
72. Set ANALOG SIGNALS LAT CPT switch (29) to 2.

73. Set ANALOG SIGNALS ROLL RATE switch (30) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

74. Set ANALOG SIGNALS LAT CPT switch (29) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

75. Set ANALOG SIGNALS ROLL RATE switch (30) to 2. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

76. Set CIRCUIT SELECT A UNITS switch (18) to 4. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.



77. Set DISCRETE SIGNALS SWIVEL LOCK switch (31) to 1.

78. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

79. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 0.

80. Set DISCRETE SIGNALS DETENT YAW switch (32) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

81. Set DISCRETE SIGNALS DETENT YAW switch (32) to 0.

82. Set ANALOG SIGNALS DIR CPT switch (33) to 2.

83. Set ANALOG SIGNALS YAW RATE switch (34) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

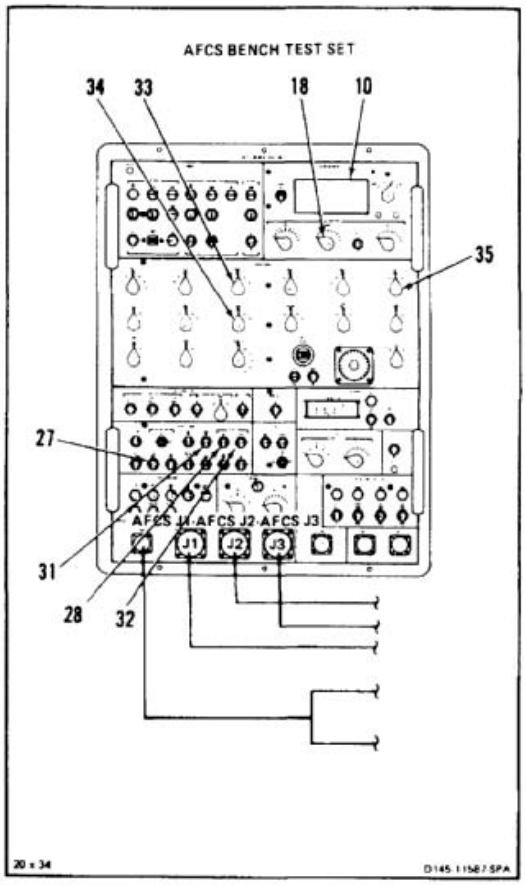
84. Set ANALOG SIGNALS DIR CPT switch (33) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

85. Set ANALOG SIGNALS YAW RATE switch (34) to 2. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

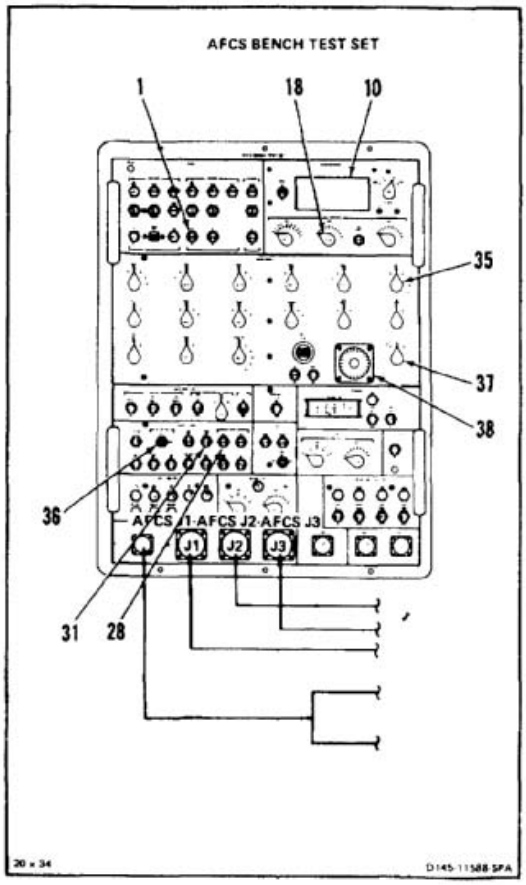
86. Set CIRCUIT SELECT A UNITS switch (18) to 5.

87. Set DISCRETE SIGNALS DETENT ROLL switch (28) to 1. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

88. Set ANALOG SIGNALS AIRSPEED switch (35) to 4. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.



89. Set DISCRETE SIGNALS DETENT ROLL switch (28) to 0.
90. Hold DISCRETE SIGNALS ROLL BEEP TRIM switch (36) to RIGHT. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**. Release switch.
91. Set ANALOG SIGNALS ATT SELECT switch (37) to ROLL.
92. Set ANALOG SIGNALS ATT synchro (38) to 3.0º.
93. Set DISCRETE SIGNALS SWIVEL LOCK switch (31) to 0. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.
94. Set DISCRETE SIGNALS SWIVEL LOCK switch (31) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.
95. Set ANALOG SIGNALS ATT synchro (38) to 0.0º. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.
96. Set ANALOG SIGNALS AIRSPEED switch (35) to 2.
97. Set DISCRETE SIGNALS SWIVEL LOCK switch (31) to 0.
98. Set AFCS POWER switch (1) to OFF.
99. Set ANALOG SIGNALS ATT synchro (38) to 15.0º.
100. Set AFCS POWER switch (1) to ON.
101. Set CIRCUIT SELECT A UNITS switch (18) to 6.



102. Set METER RANGE switch (7) to 2V. Read AC/DC VOLTMETER (10). Reading shall be **−0.01 to +0.01**.

103. Set ANALOG SIGNALS ATT synchro (38) to 0.0º.

104. Set ANALOG SIGNALS ATT SELECT switch (37) to HDG.

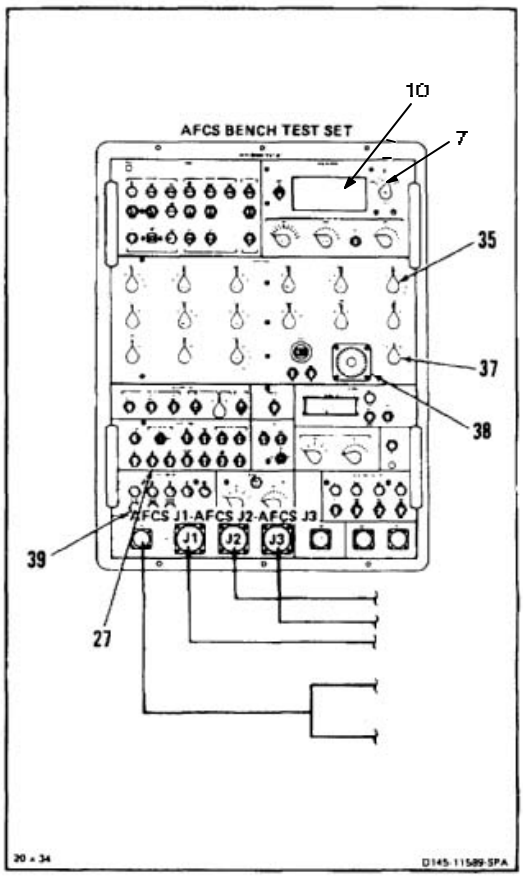
105. Set ANALOG SIGNALS AIRSPEED switch (35) to 4. DISCRETE MONITORS HDG ENABLE lamp (39) shall be on.

106. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1. DISCRETE MONITORS HDG ENABLE lamp (39) shall be off.

107. Set ANALOG SIGNALS AIRSPEED switch (35) to 2. DISCRETE MONITORS HDG ENABLE lamp (39) shall be off.

108. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 0. DISCRETE MONITORS HDG ENABLE lamp (39) shall be off.

END LOGIC TEST



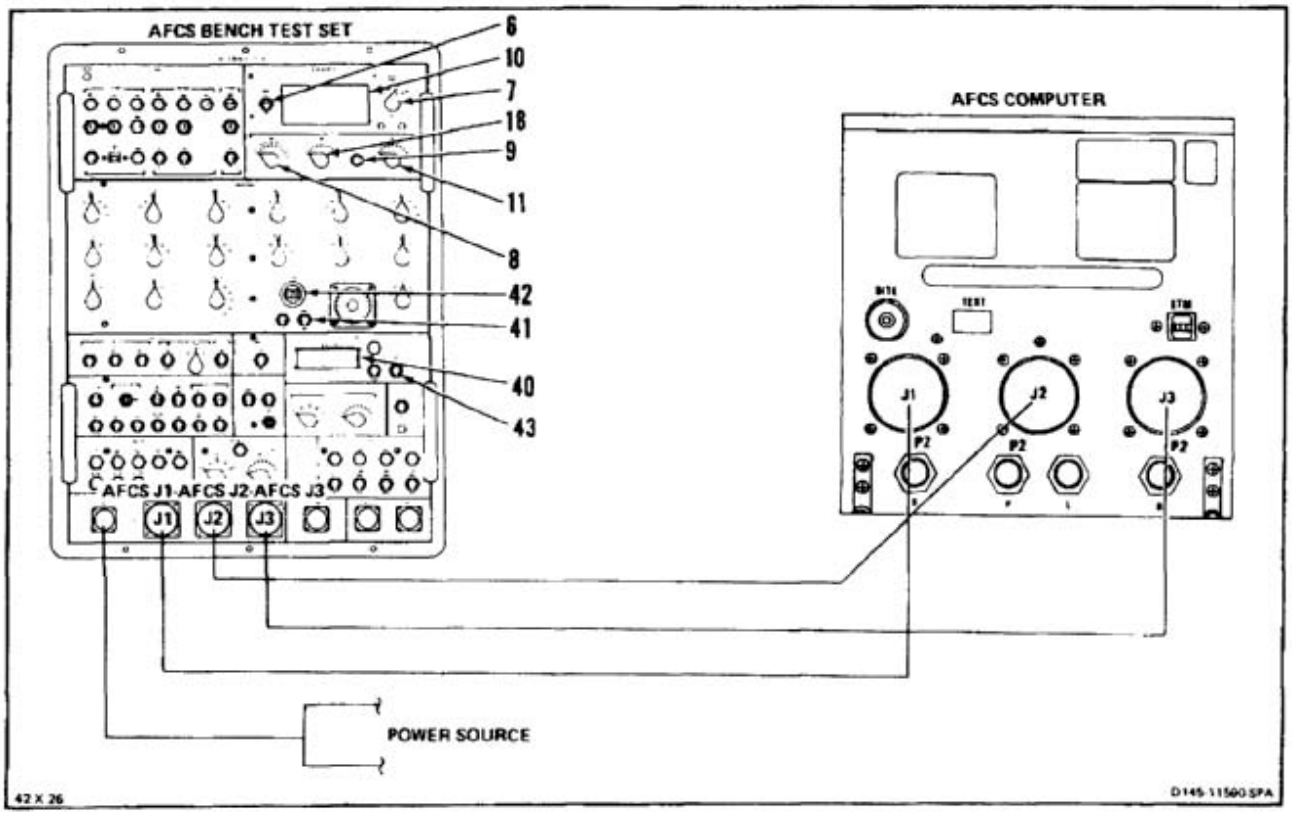
TEST 4

PITCH AXIS TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

109. Set METER RANGE 7 switch to 2V.
110. Set METER switch (6) to DC.
111. Set CIRCUIT SELECT switch (8) to 20.
112. Set CIRCUIT SELECT A/B SELECT switch (9) to A.
113. Set CIRCUIT SELECT A UNITS switch (18) to 7. Read AC/DC VOLTMETER (10). Reading shall be –**0.475 to +0.475**.
114. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.05.
115. Set METER switch (6) to AC.
116. Set CIRCUIT SELECT B UNITS switch (11) to 6.
117. Set CIRCUIT SELECT A/B SELECT switch (9) to B.
118. Set ANALOG SIGNALS GND-SIGNAL switch (41) to SIGNAL.
119. Adjust ANALOG SIGNALS PITCH ATT HSI HDG potentiometer (POT). (42) towards 490 until AC/DC VOLTMETER (10) reads 0.33.
120. Set METER switch (6) to DC.
121. Set RESPONSE TEST MODE switch (43) to ON and METER RANGE switch (7) to 20V.
122. Set CIRCUIT SELECT A/B SELECT switch (9) to A.



123. Set CIRCUIT SELECT A UNITS switch (18) to 8.

124. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **+1.94 to +2.74**.

125. Set RESPONSE TEST STIM switch (44) to REMOVE.

126. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.11.

127. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **+0.86 to +1.32**.

128. Set RESPONSE TEST STIM switch (44) to REMOVE.

129. Set ANALOG SIGNALS RESPONSE TEST TIME DELAY-SEC switches (40) to 1.00.

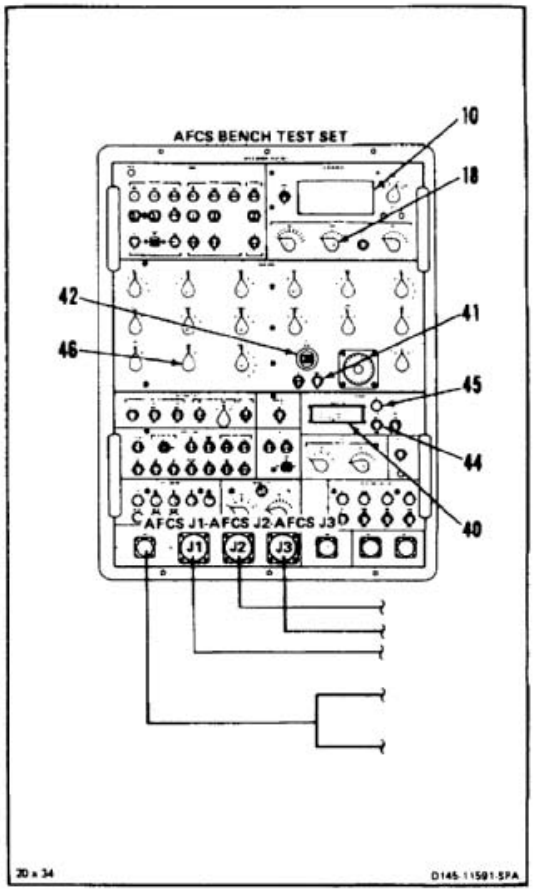
130. Set ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) to 500.

131. Set ANALOG SIGNALS GND-SIGNAL switch (41) to GND.

132. Set ANALOG SIGNALS PITCH RATE switch (46) to 2.

133. Set CIRCUIT SELECT A UNITS switch (18) to 7.

134. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **+7.26 to +10.45**.



135. Set RESPONSE TEST STIM switch (44) to REMOVE.

136. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 10.0. Wait **60 seconds**.

137. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **+3.08 to +4.44**.

138. Set RESPONSE TEST STIM switch (44) to REMOVE.

139. Set RESPONSE TEST MODE switch (43) to OFF.

140. Set ANALOG SIGNALS PITCH RATE switch (46) to 1. Wait **60 seconds**.

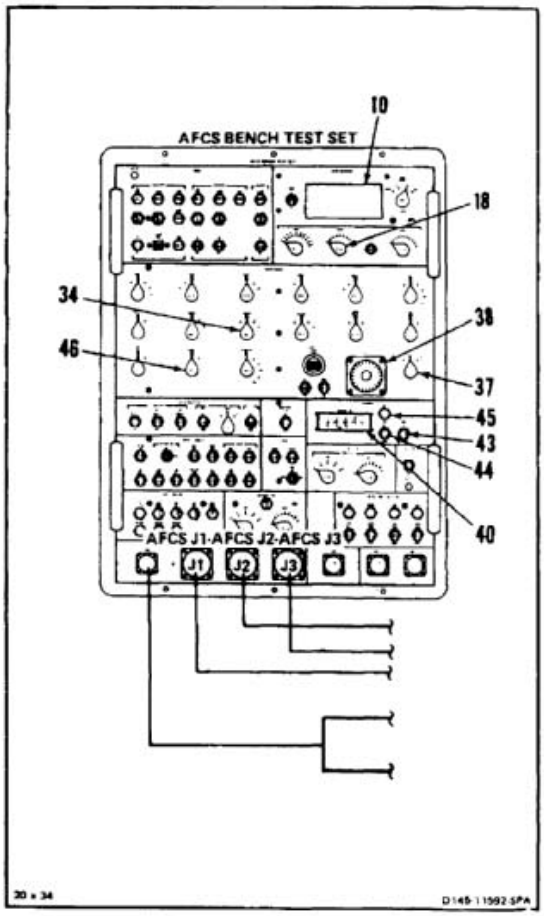
141. Set CIRCUIT SELECT A UNITS switch (18) to 9. Read and record V1 reading on AC/DC VOLTMETER (10).

142. Set ANALOG SIGNALS ATT SELECT switch (37) to ROLL.

143. Set ANALOG SIGNALS YAW RATE switch (34) to 4.

144. Set ANALOG SIGNALS ATT synchro (38) to 45º. Read and record V2 reading on AC/DC VOLTMETER (10).

145. Calculate V3. Subtract reading in step 141 from reading in step 144 (V3 = V2 -V1). Result shall be **+2.16 to +3.02 volts**.



146. Set DISCRETE SIGNALS LDG GEAR switch (47) to 1.

147. Set METER RANGE switch (7) to 2V. Read AC/DC VOLTMETER (10). Reading shall be **+1.06 to +1.54**.

148. Set DISCRETE SIGNALS LDG GEAR switch (47) to 0.

149. Set ANALOG SIGNALS YAW RATE switch (34) to 2.

150. Set ANALOG SIGNALS ATT SELECT switch (37) to HDG.

151. Set ANALOG SIGNALS ATT synchro (38) to **0°**.

152. Set CONTROL PANEL SIMULATION AFCS switch (12) to SELECT.

153. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 1.

NOTE

Disregard DASH DRIVE blinking light.

154. Set DISCRETE SIGNALS HYD PRESS switch (13) to 1.

155. Set SERVO SIMULATION ILCA SIMULATION PITCH switch (48) to OPERATE.

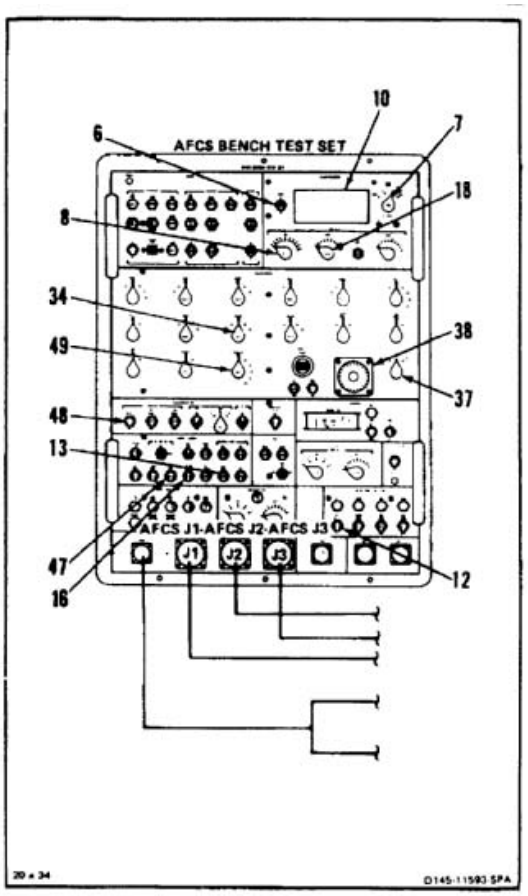
156. Set ANALOG SIGNAL PULSER STIM switch (49) to 3.

157. Set CIRCUIT SELECT A UNITS switch (18) to 7. Read AC/DC VOLTMETER (10). Reading shall be –**0.05 to +0.05**.

158. Set METER switch (6) to AC.

159. Set CIRCUIT SELECT TENS switch (8) to 10.

160. Set CIRCUIT SELECT A UNITS switch (18) to 0. Read AC/DC VOLTMETER (10). Reading shall be **+0.49 to +0.71**.



161. Set CIRCUIT SELECT A UNITS switch (18) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+0.19 to +0.42**.

162. Set CIRCUIT SELECT A UNITS switch (18) to 2. Read AC/DC VOLTMETER (10). Reading shall be **+0.19 to +0.42**.

163. Set ANALOG SIGNALS PULSER STIM switch (49) to 1.

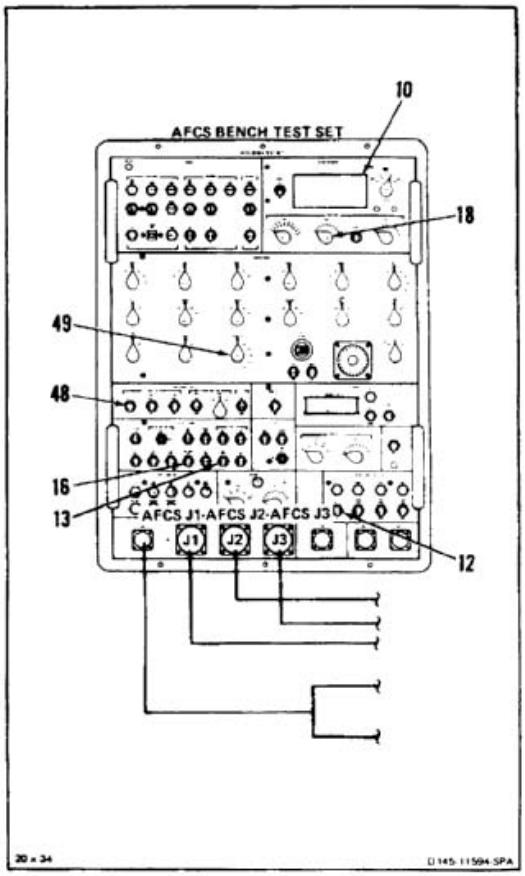
164. Set SERVO SIMULATION ILCA SIMULATION PITCH switch (48) to RESET.

165. Set CONTROL PANEL SIMULATION AFCS switch (12) to OFF.

166. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 0.

167. Set DISCRETE SIGNALS HYD PRESS switch (13) to 0.

END PITCH AXIS TEST



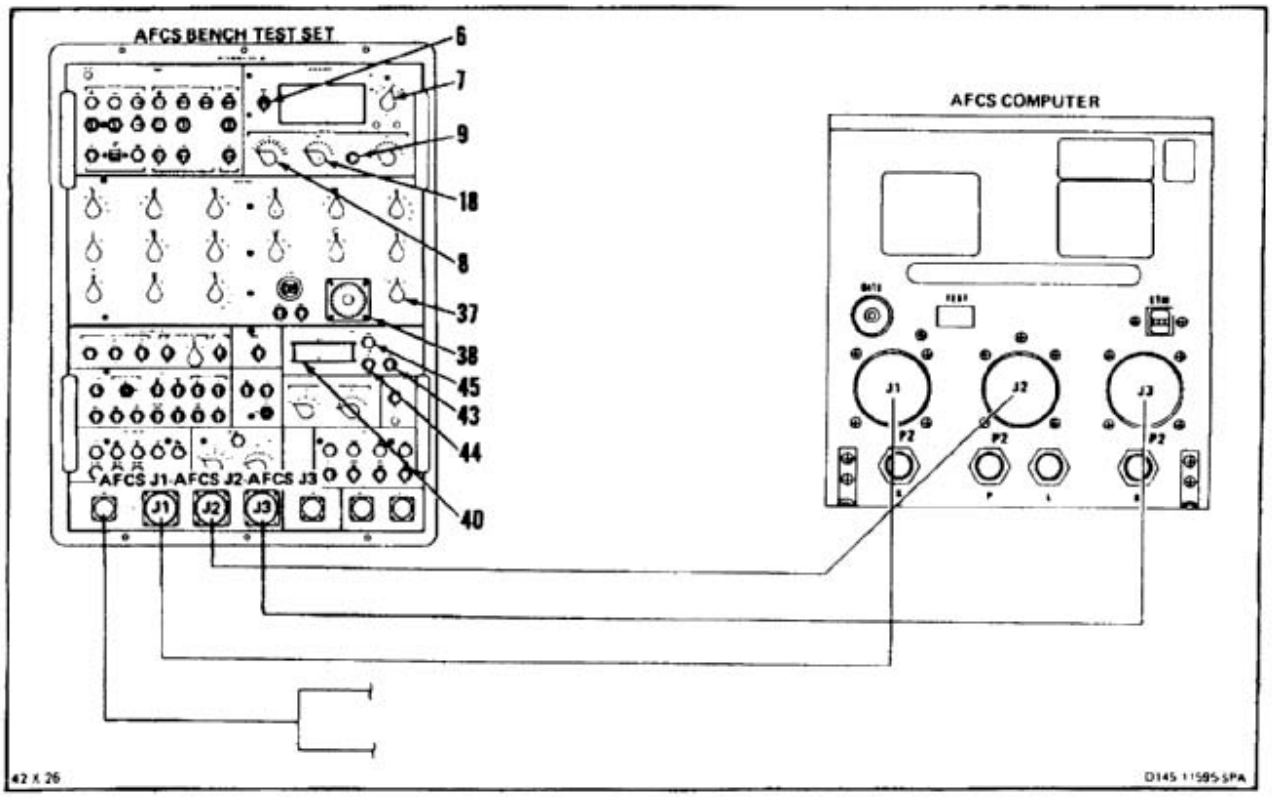
TEST 5

ROLL AXIS TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

168. Set METER switch (6) to DC.
169. Set METER RANGE switch (7) to 20V.
170. Set CIRCUIT SELECT A/B SELECT switch (9) to A.
171. Set CIRCUIT SELECT TENS switch (8) to 10.
172. Set CIRCUIT SELECT A UNITS switch 18 to 3.
173. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.05.
174. Set RESPONSE TEST MODE switch (43) to ON.
175. Set ANALOG SIGNALS ATT SELECT switch (37) to ROLL.
176. Set ANALOG SIGNALS ATT synchro (38) to **2.5°**.
177. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **+2.83 to +4.07**.
178. Set RESPONSE TEST STIM switch (44) to REMOVE.
179. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.11.
180. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **+1.59 to +2.29**.



181. Set RESPONSE TEST STIM switch (44) to REMOVE.

182. Set ANALOG SIGNALS ATT synchro (38) to **0.0°**.

183. Set ANALOG SIGNALS ATT SELECT switch (37) to HDG.

184. Set RESPONSE TEST MODE switch (43) to OFF.

185. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0.

186. Set CIRCUIT SELECT A UNITS switch (18) to 4.

187. Set METER RANGE switch (7) to 2V. Read and record V1 reading on AC/DC VOLTMETER (10). Reading shall be –**0.64 to +0.64**.

188. Set RESPONSE TEST MODE switch (43) to ON.

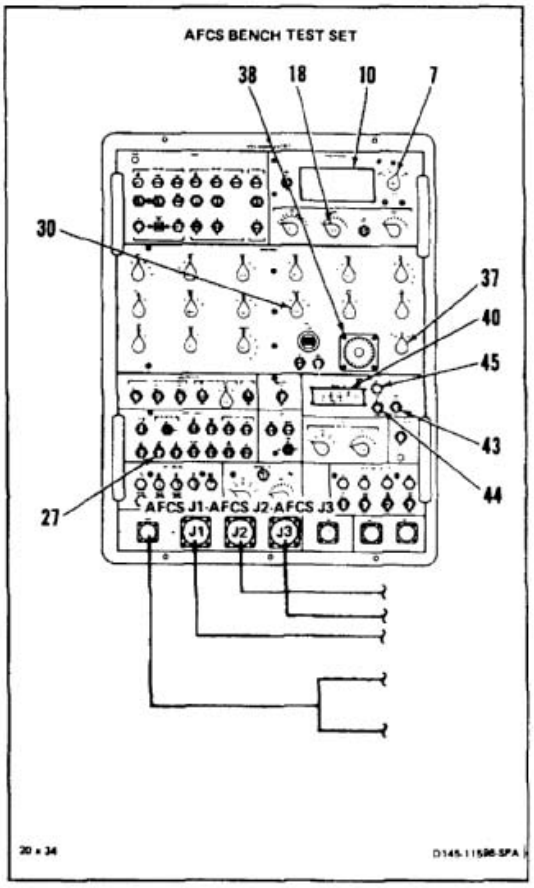
189. Set ANALOG SIGNALS ROLL RATE switch (30) to 4.

190. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.021.

191. Set METER RANGE switch (7) to 20V.

192. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V2 AC/DC VOLTMETER (10) reading.

193. Calculate V3. Subtract reading of step 187 from reading of step 192 (V3 = V2 - V1). Result shall be –**3.15 to** –**4.73 volts**.



194. Set RESPONSE TEST STIM switch (44) to REMOVE.

195. Set ANALOG SIGNALS ROLL RATE switch (30) to 2.

196. Set ANALOG SIGNALS LAT CPT switch (29) to 2.

197. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 1.5.

198. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V4 AC/DC VOLTMETER (10) reading.

199. Calculate V5. Subtract reading of step 187 from reading of step 198 (V5 = V4 - V1). Result shall be **–5.76 to –8.29 volts**.

200. Set RESPONSE TEST STIM switch (44) to REMOVE.

201. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 4.0. Wait **60 seconds**.

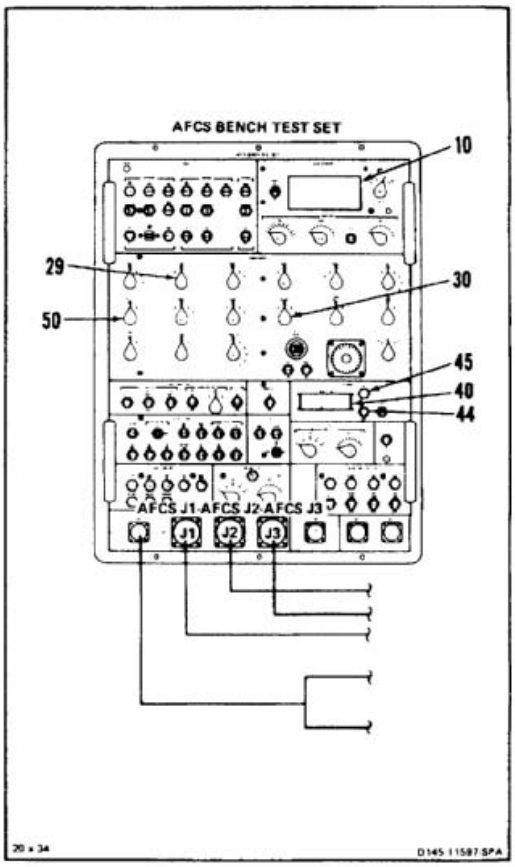
202. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V6 AC/DC VOLTMETER (10) reading.

203. Calculate V7. Subtract reading of step 187 from reading of step 202 (V7 = V6 - V1). Result shall be **–3.52 to –5.06 volts**.

204. Set RESPONSE TEST STIM switch (44) to REMOVE.

205. Set ANALOG SIGNALS LAT CPT switch (29) to 3.

206. Set ANALOG SIGNALS ROLL ATT switch (50) to 2.



207. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.15. Read and record V8 AC/DC VOLTMETER (10) reading.

208. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V9 AC/DC VOLTMETER (10) reading.

209. Calculate V10. Subtract reading of step 207 from reading of step 208 (V10 = V9 - V8). Voltage shall be **+1.18 to +1.70**.

210. Set RESPONSE TEST STIM switch (44) to REMOVE.

211. Set ANALOG SIGNALS ROLL ATT switch (50) to 1.

212. Set ANALOG SIGNALS ATT SELECT switch (37) to ROLL.

213. Set RESPONSE TEST MODE switch (43) to OFF.

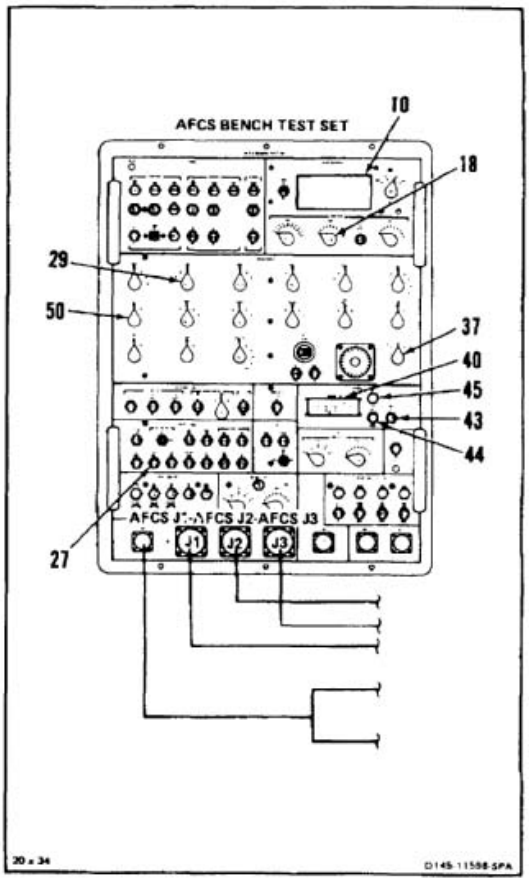
214. Set ANALOG SIGNALS LAT CPT switch (29) to 2.

215. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then 0.

216. Set CIRCUIT SELECT A UNITS switch (18) to 5. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**.

217. Set ANALOG SIGNALS LAT CPT switch (29) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

218. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then 0. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**.



219. Set ANALOG SIGNALS LAT CPT switch (29) to 2. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

220. Set ANALOG SIGNALS LAT CPT switch (29) to 3.

221. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0.

222. Set CIRCUIT SELECT A UNITS switch (18) to 6.

223. Set ANALOG SIGNALS ATT synchro (38) to 0.8º. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

224. Set ANALOG SIGNALS ATT synchro (38) to 2.2º. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

225. Set ANALOG SIGNALS ATT synchro (38) to 359.2º. Read AC/DC VOLTMETER (10). Reading shall be **–6.5 to –7.5**.

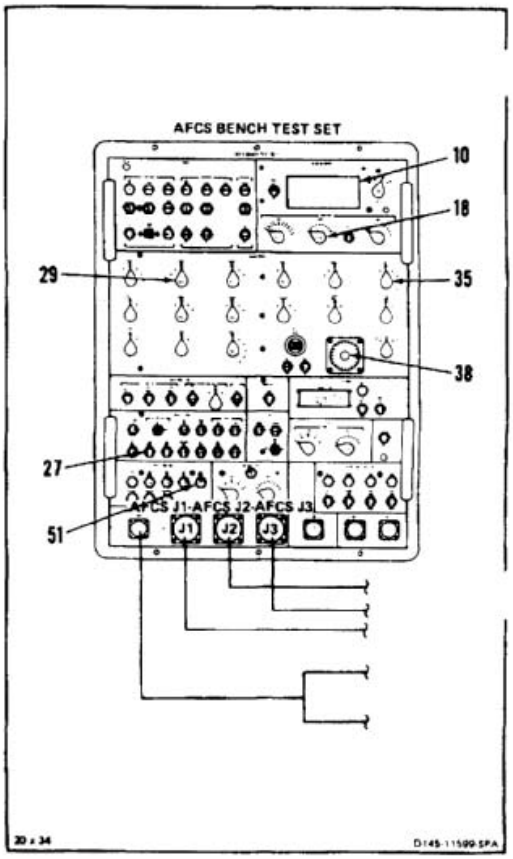
226. Set ANALOG SIGNALS ATT synchro (38) to 357.8º. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

227. Set ANALOG SIGNALS AIRSPEED switch (35) to 4.

228. Set ANALOG SIGNALS ATT synchro (38) to 353.1º. DISCRETE MONITORS ERECT CUTOUT lamp (51) shall be off.

229. Set ANALOG SIGNALS ATT SYNCHRO (38) to 350.9º. DISCRETE SIGNALS ERECT CUTOUT lamp (51) shall be on.

230. Set ANALOG SIGNALS ATT synchro (38) to 6.9º. DISCRETE MONITORS ERECT CUTOUT lamp (51) shall be off.



231. Set ANALOG SIGNALS ATT synchro (38) to 9.1º. DISCRETE MONITORS ERECT CUTOUT lamp (51) shall be on.

232. Set ANALOG SIGNALS AIRSPEED switch (35) to 2. DISCRETE SIGNALS ERECT CUTOUT lamp (51) shall be off.

233. Set ANALOG SIGNALS ATT synchro (38) to 0.0º.

234. Set CIRCUIT SELECT A UNITS switch (18) to 7. Read AC/DC VOLTMETER (10). Reading shall be **−6.5 to −7.5**.

235. Set ANALOG SIGNALS ROLL RATE switch (30) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

236. Set ANALOG SIGNALS ROLL RATE switch (30) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

237. Set ANALOG SIGNALS ROLL RATE switch (30) to 4.

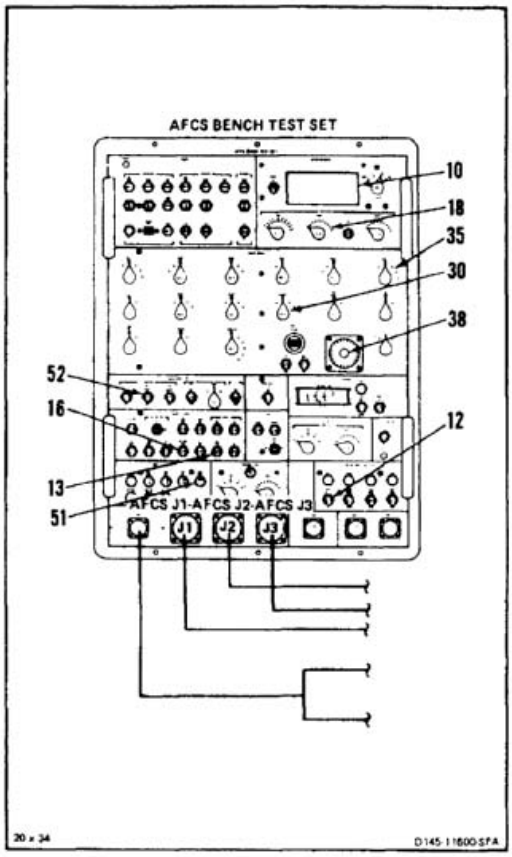
238. Set CONTROL PANEL SIMULATION AFCS switch (12) to SELECT.

239. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 1.

240. Set DISCRETE SIGNALS HYD PRESS switch (13) to 1.

241. Set SERVO SIMULATION ILCA SIMULATION ROLL switch (52) to OPERATE.

242. Set CIRCUIT SELECT A UNITS switch (18) to 4.



243. Set METER RANGE switch (7) to 2V. Read AC/DC VOLTMETER (10). Reading shall be **−0.05 to +0.05**.

244. Set METER switch (6) to AC.

245. Set CIRCUIT SELECT A UNITS switch (18) to 8. Reading shall be **+0.721 to +1.082**.

246. Set CIRCUIT SELECT A UNITS switch (18) to 9. Read AC/DC VOLTMETER (10). Reading shall be **+0.361 to +0.541**.

247. Set CIRCUIT SELECT TENS switch (8) to 00. Read AC/DC VOLTMETER (10). Reading shall be **+0.361 to +0.541**.

248. Set ANALOG SIGNALS ROLL RATE switch (30) to 2.

249. Set SERVO SIMULATION ILCA SIMULATION ROLL switch (52) to RESET.

250. Set METER RANGE switch (7) to 20V.

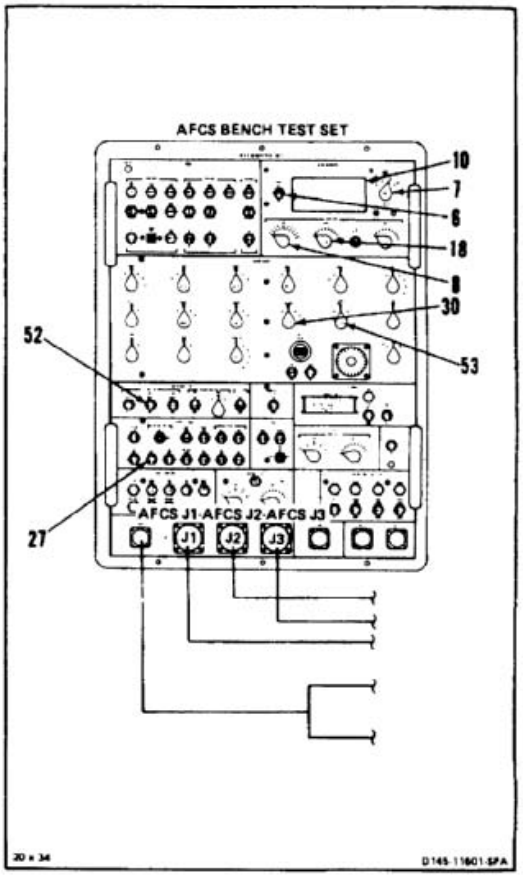
251. Set METER switch (6) to DC.

252. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0.

253. Set ANALOG SIGNALS XFEED ROLL ATT switch (53) to 3.

254. Set CIRCUIT SELECT TENS switch (8) to 20.

255. Set CIRCUIT SELECT A UNITS switch (18) to 6.



256. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 12.0.

257. Set RESPONSE TEST MODE switch (43) to ON.

258. Hold DISCRETE SIGNALS ROLL BEEP TRIM switch (36) to LEFT.

259. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, release DISCRETE SIGNALS ROLL BEEP TRIM switch (36) to OFF. Read and record V11 AC/DC VOLTMETER (10) reading.

260. Set RESPONSE TEST STIM switch (44) to REMOVE.

261. Set RESPONSE TEST MODE switch (43) to OFF.

262. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0.

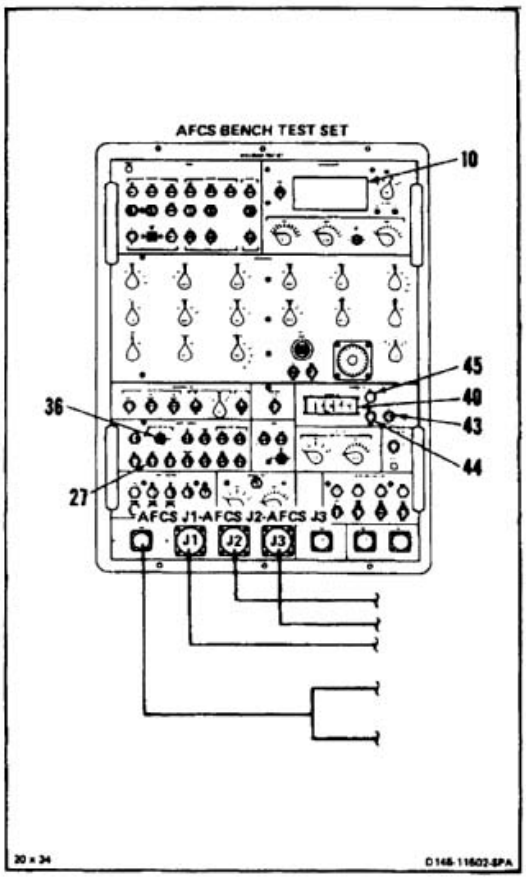
263. Set RESPONSE TEST MODE switch (43) to ON. Wait **30 seconds**.

264. Hold DISCRETE SIGNALS ROLL BEEP TRIM switch (36) to RIGHT.

265. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, release DISCRETE SIGNALS ROLL BEEP TRIM switch (36) to OFF. Read and record V12 AC/DC VOLTMETER (10) reading.

266. Set RESPONSE TEST STIM switch (44) to REMOVE.

267. Calculate Rate R. Subtract reading of step 259 from reading of step 265 and divide by 24, (R = V12 – V11) ÷ 24. Rate R shall be **0.20 to 0.30 vdc/sec**.



268. Calculate XRP. Add readings of steps 265 and 259 and divide by 24, (XRP = V12 +V11) ÷ 24. Calculation shall be 0.018 to 0.056.

269. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0.

270. SEt RESPONSE TEST MODE switch (43) to OFF.

271. Set ANALOG SIGNAL XFEED ROLL ATT switch (53) to 2.

272. Set DISCRETE SIGNALS DETENT ROLL switch (28) to 1.

273. Set METER RANGE switch (7) to 2V.

274. Set ANALOG SIGNALS ATT synchro (38) to 70.0º. Read AC/DC VOLTMETER (10). Reading shall be –**0.015 to +0.015**.

275. Set ANALOG SIGNALS ATT synchro (38) to 290.0º. Read AC/DC VOLTMETER (10). Reading shall be –**0.015 to +0.015**.

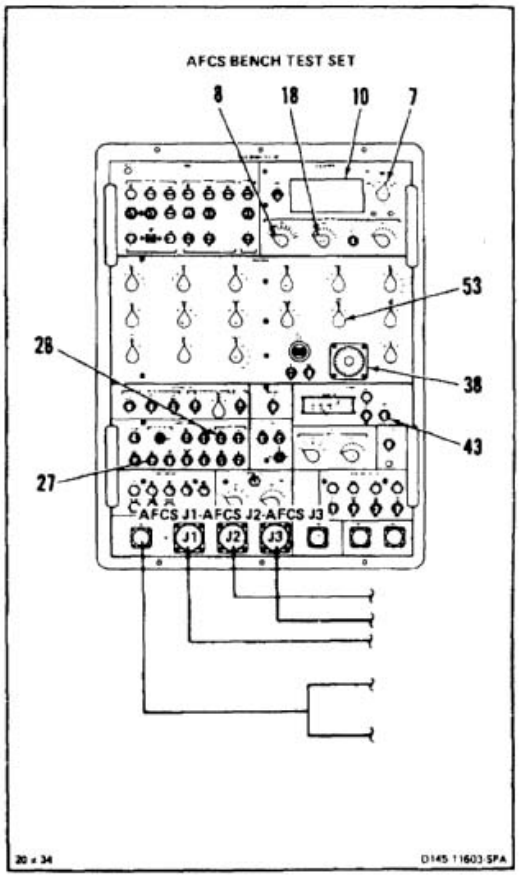
276. Set ANALOG SIGNALS ATT synchro (38) to 0.0º.

277. Set DISCRETE SIGNALS DETENT ROLL switch (28) to 0.

278. Set METER RANGE switch (7) to 20V.

279. Set CIRCUIT SELECT TENS switch (8) to 10.

280. Set CIRCUIT SELECT A UNITS switch (18) to 4.



281. Set ANALOG SIGNALS ATT synchro (38) to 1.0. Read and record V13 AC/DC VOLTMETER (10) reading.

282. Set ANALOG SIGNALS ATT synchro (38) to 359.0°. Read and record V14 AC/DC VOLTMETER (10) reading.

283. Calculate V15. Subtract reading of step 282 from reading of step 281 (V15 = V13 – V14). Result shall be **+3.80 to +4.65 volts**.

284. Set ANALOG SIGNALS ATT synchro (38) to 356.0°. Read AC/DC VOLTMETER (10). Reading shall be –**4.89 to** –**7.03**.

285. Set ANALOG SIGNALS ATT synchro (38) to 4.0. Read AC/DC VOLTMETER (10). Reading shall be **+4.89 to +7.03**.

286. Set CONTROL PANEL SIMULATION HEADING switch (26) to ENGAGE.

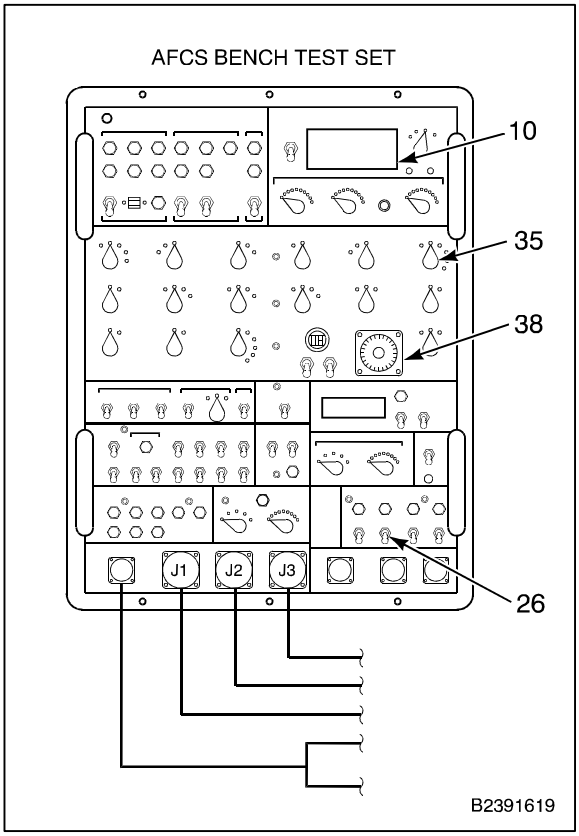
287. Set ANALOG SIGNALS AIRSPEED switch (35) to 5.

288. Set ANALOG SIGNALS ATT synchro (38) to 0.0°. Read AC/DC VOLTMETER (10). Reading shall be –**0.64 to +0.64**.

289. Set ANALOG SIGNALS ATT synchro (38) to 1.0°. Read and record V16 AC/DC VOLTMETER (10) reading.

290. Set ANALOG SIGNALS ATT synchro (38) to 359.0°. Read and record V17 AC/DC VOLTMETER (10) reading.

291. Calculate V18. Subtract reading of step 290 from reading of step 289 (V18 = V16 – V17). Result shall be **+4.94 to +6.04**.



292. Set ANALOG SIGNALS ATT synchro (38) to 0.0°.

293. Set ANALOG SIGNALS PITCH HSI switch (54) to HSI. Read and record V19 AC/DC VOLTMETER (10) reading.

294. Set ANALOG SIGNALS GND SIGNAL switch (41) to SIGNAL.

295. Set METER switch (6) to AC.

296. Set CIRCUIT SELECT TENS switch (8) to 20.

297. Set CIRCUIT SELECT A/B switch (9) to B.

298. Set CIRCUIT SELECT B UNITS switch (11) to 6.

299. Set METER RANGE switch (7) to 2V.

300. Adjust ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) toward 525 until AC/DC VOLTMETER (10) reads **+0.603**.

301. Set METER switch (6) to DC.

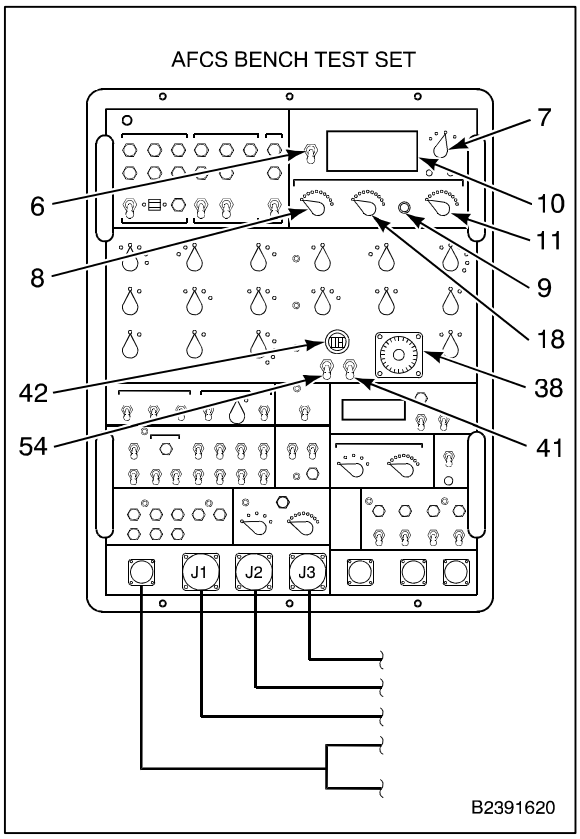
302. Set METER RANGE switch (7) to 20V.

303. Set CIRCUIT SELECT TENS switch (8) to 10.

304. Set CIRCUIT SELECT A UNITS switch (18) to 4.

305. Set CIRCUIT SELECT A/B switch (9) to A. Read and record V20 AC/DC VOLTMETER (10) reading.

306. Calculate V21. Subtract reading of step 293 from reading of step 305 (V21 = V20 – V19). Result shall be –**1.44 to** –**1.73 volts**.



307. Set ANALOG SIGNALS AIRSPEED switch (35) to 6. Read and record V22 AC/DC VOLTMETER (10) reading.

308. Calculate V23. Subtract reading of step 293 from reading of step 307 (V23 = V22 – V19). Result shall be **–3.20 to –4.10 volts**.

309. Set ANALOG SIGNALS AIRSPEED switch (35) to 5.

310. Set METER switch (6) to AC.

311. Set CIRCUIT SELECT TENS switch (8) to 20.

312. Set CIRCUIT SELECT B UNITS switch (11) to 6.

313. Set CIRCUIT SELECT A/B SELECT switch (9) to B.

314. Adjust ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) toward 900 until AC/DC VOLTMETER reads **+8.88**.

315. Set METER switch (6) to DC.

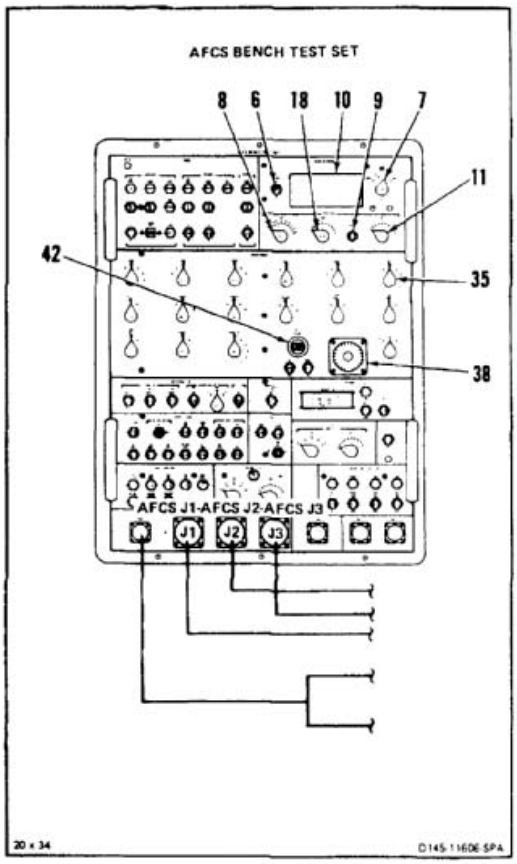
316. Set CIRCUIT SELECT TENS switch (8) to 10.

317. Set CIRCUIT SELECT A UNITS switch (18) to 4.

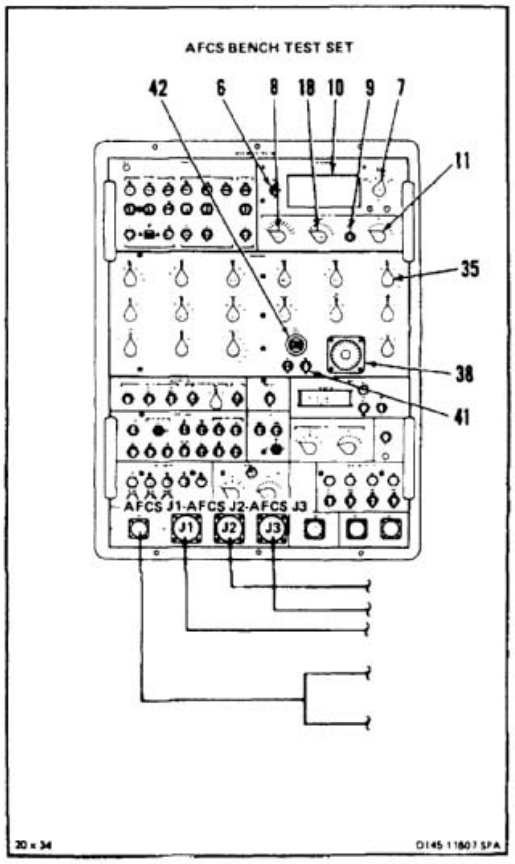
318. Set CIRCUIT SELECT A/B SELECT switch (9) to A.

319. Set METER RANGE switch (7) to 2V.

320. Adjust ANALOG CIRCUITS ATT synchro (38) toward 170 until AC/DC VOLTMETER (10) reads 0 or obtain a NULL. Read ATT synchro dial setting. Reading shall be 170.2º to 172.7º.



321. Set METER RANGE switch (7) to 20V.
322. Set METER switch (6) to AC.
323. Set CIRCUIT SELECT TENS switch (8) to 20.
324. Set CIRCUIT SELECT B UNITS switch (11) to 6.
325. Set CIRCUIT SELECT A/B SELECT switch (9) to B.
326. Adjust ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) through 500 toward 100 until AC/DC VOLTMETER (10) reads **+8.88**.
327. Set METER switch (6) to DC.
328. Set METER RANGE switch (7) to 2V.
329. Set CIRCUIT SELECT TENS switch (8) to 10.
330. Set CIRCUIT SELECT A UNITS switch (18) to 4.
331. Set CIRCUIT SELECT A/B SELECT switch (9) to A.
332. Adjust ANALOG SIGNALS ATT synchro (38) toward 190 until AC/DC VOLTMETER (10) reads 0 or obtain a NULL. Read ATT synchro dial setting. Reading shall be 187.3º to 189.8º.



333. Set ANALOG SIGNALS ATT synchro (38) to 0.0°.

334. Set ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) to 500.

335. Set ANALOG SIGNALS GND SIGNAL switch (41) to GND.

336. Set ANALOG SIGNALS AIRSPEED switch (35) to 2.

337. Set CONTROL PANEL SIMULATION HEADING switch (26) to DISENG.

338. Set CONTROL PANEL SIMULATION AFCS switch (12) to OFF.

339. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 0.

340. Set DISCRETE SIGNALS HYD PRESS switch (13) to 0.

341. Set ANALOG SIGNALS PITCH HSI switch (54) to PITCH.

342. Set ANALOG SIGNALS ATT SELECT switch (37) to HDG.

343. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0.

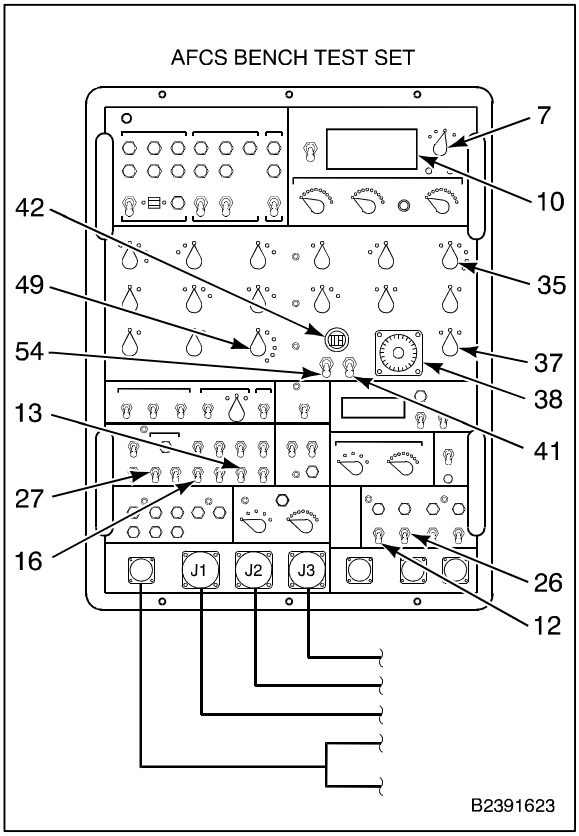
344. Set METER RANGE switch (7) to 20V. Read and record V24 reading on AC/DC VOLTMETER (10).

345. Set ANALOG SIGNALS PULSER STIM switch (49) to 4. Read and record V25 reading on AC/DC VOLTMETER (10).

346. Calculate V26. Subtract reading of step 344 from reading of step 345 (V26 = V25 – V24). Result shall be **–4.04 to –4.65 volts**.

347. Set ANALOG SIGNALS PULSER STIM switch (49) to 1.

END ROLL AXIS TEST



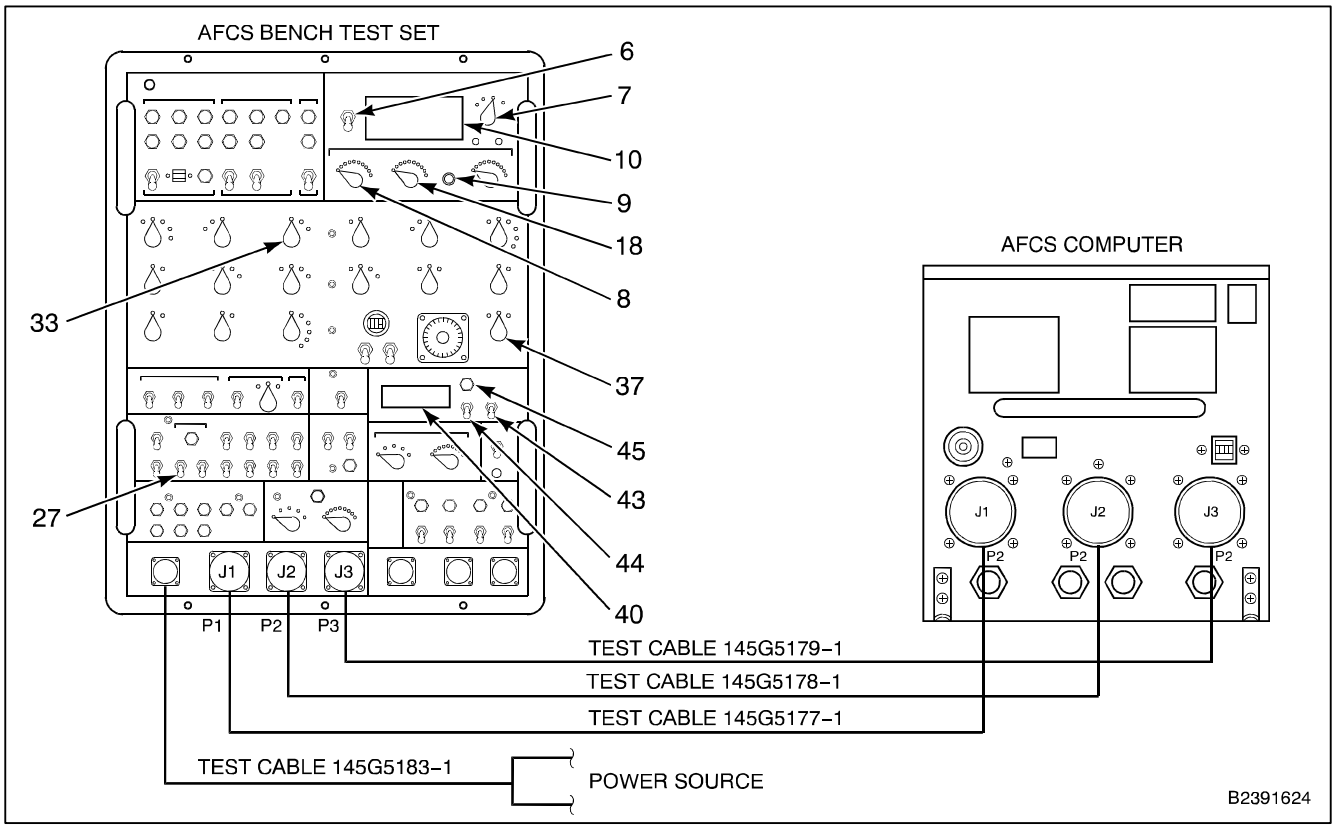
TEST 6

YAW AXIS TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

348. Set METER switch (6) to DC.
349. Set METER RANGE switch (7) to 2V.
350. Set CIRCUIT SELECT TENS switch (8) to 30.
351. Set CIRCUIT SELECT A UNITS switch (18) to 0.
352. Set CIRCUIT SELECT A/B SELECT switch (9) to A. Measure and record V1 AC/DC VOLTMETER (10) reading. Reading shall be –**1.31 to +1.31**.
353. Set RESPONSE TEST MODE switch (43) to ON.
354. Set ANALOG SIGNALS ALL SELECT switch (37) to HDG.
355. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1.
356. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.2.
357. Set ANALOG SIGNALS DIR CPT switch (33) to 2.
358. Set METER RANGE switch (7) to 20V. Read and record V2 AC/DC VOLTMETER (10) reading.
359. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V3 AC/DC VOLTMETER (10) reading.



360. Calculate V4. Subtract reading of step 358 from reading of step 359 (V4 = V3 – V2). Result shall be **+4.70 to +7.05 volts**.

361. Set RESPONSE TEST STIM switch (44) to REMOVE.

362. Set ANALOG SIGNALS DIR OPT switch (33) to 1.

363. Set ANALOG SIGNALS AIRSPEED switch (35) to 4. Wait **20 seconds**. Read and record V5 AC/DC VOLTMETER (10) reading.

364. Set ANALOG SIGNALS YAW RATE switch (34) to 3.

365. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V6 AC/DC VOLTMETER reading.

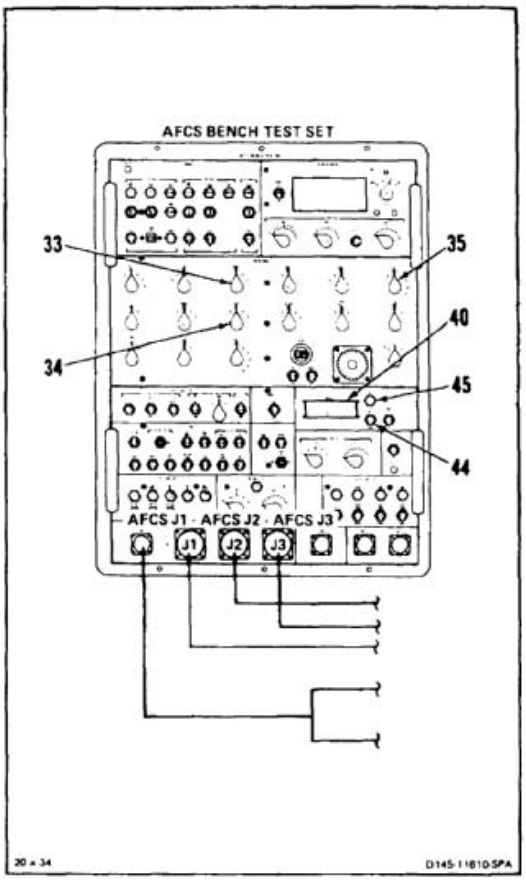
366. Calculate V7. Subtract reading of step 363 from reading of step 365 (V7 = V6 – V5). Result shall be **+2.13 to +3.47 volts**.

367. Set RESPONSE TEST STIM switch (44) to REMOVE.

368. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 4.0. Wait **60 seconds**.

369. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V8 AC/DC VOLTMETER (10) reading.

370. Calculate V9. Subtract reading of step 363 from reading of step 369 (V9 = V8 – V5). Result shall be **+0.93 to 1.41 volts**.



371. Set RESPONSE TEST STIM switch (44) to REMOVE.

372. Set ANALOG SIGNAL AIRSPEED switch (35) to 2.

373. Set ANALOG SIGNALS YAW RATE switch (34) to 2.

374. Set ANALOG SIGNALS SIDESLIP switch (55) to 4.

375. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.25.

376. Set CIRCUIT SELECT A UNITS switch (18) to 1. Read and record V10 AC/DC VOLTMETER (10) reading.

377. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V11 AC/DC VOLTMETER (10) reading.

378. Calculate V12. Subtract reading of step 376 from reading of step 377 (V12 = V11 – V10). Result shall be **2.18 to 327 volts**.

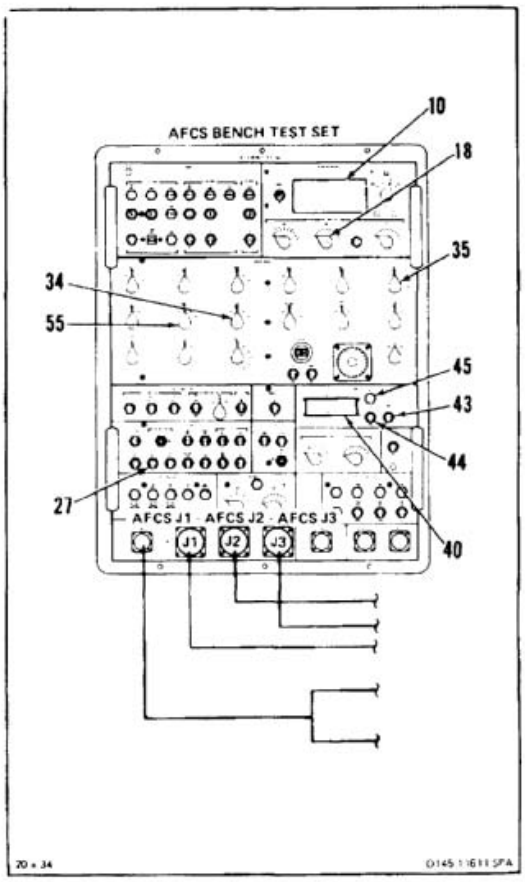
379. Set ANALOG SIGNALS SIDESLIP switch (55) to 2.

380. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 0.

381. Set RESPONSE TEST STIM switch (44) to REMOVE.

382. Set RESPONSE TEST MODE switch (43) to OFF.

383. Set CIRCUIT SELECT A UNITS switch (18) to 0. Read and record V13 AC/DC VOLTMETER (10) reading.



384. Calculate V14. Add reading of step 383 + 5.0 (V14 = V13 + 5.0). Record resultant voltage.

385. Set DISCRETE SIGNAL SWIVEL LOCK switch (31) to 1.

386. Set RESPONSE TEST STIM switch (44) to APPLY.

387. Adjust ANALOG SIGNALS ATT synchro (38) until AC/DC VOLTMETER (10) reads calculated voltage V14 from step 384.

388. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.24.

389. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1. When RESPONSE TEST HOLD lamp (45) comes on, read and record V15 AC/DC VOLTMETER (10) reading.

390. Calculate V16. Subtract reading of step 383 from reading of step 389 (V16 = V15 – V13). Result shall be **+1.54 to +2.32 volts**.

391. Set RESPONSE TEST STIM switch (44) to REMOVE.

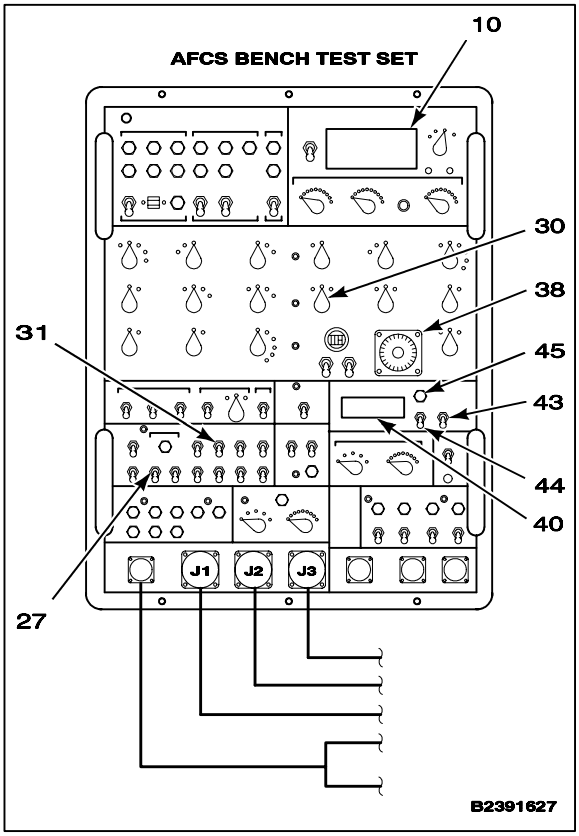
392. Set ANALOG SIGNALS ATT synchro (38) to 0.

393. Set DISCRETE SIGNAL SWIVEL LOCK switch (31) to 0.

394. Set RESPONSE TEST MODE switch (43) to ON.

395. Set ANALOG SIGNALS ROLL RATE switch (30) to 4.

396. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 4. Wait **20 seconds** then read and record V17 AC/DC VOLTMETER (10) reading.



397. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V18 AC/DC VOLTMETER (10) reading.

398. Calculate V19. Subtract reading of step 396 from reading of step 397 (V19 = V18 – V17). Result shall be **+3.25 to +4.69 volts**.

399. Set RESPONSE TEST STIM switch (44) to REMOVE.

400. Set ANALOG SIGNALS ROLL RATE switch (30) to 2.

401. Set RESPONSE TEST MODE switch (43) to OFF.

402. Set ANALOG SIGNALS DIR CPT switch (33) to 2.

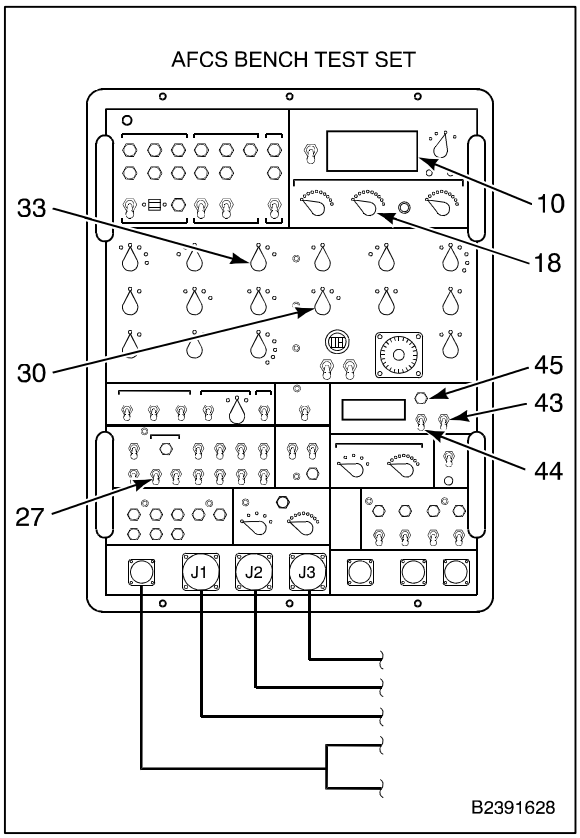
403. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 0.

404. Set CIRCUIT SELECT A UNITS switch (18) to 2. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**.

405. Set ANALOG SIGNALS DIR CPT switch (33) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

406. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**.

407. Set ANALOG SIGNALS DIR CPT switch (33) to 2. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.



408. Set ANALOG SIGNALS DIR CPT switch (33) to 1.

409. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0.

410. Set CIRCUIT SELECT A UNITS switch (18) to 3. Read AC/DC VOLTMETER (10). Reading shall be –**6.5 to** –**7.5**.

411. Set ANALOG SIGNALS YAW RATE switch (34) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

412. Set CIRCUIT SELECT A UNITS switch (18) to 0. Read and record V20 reading on AC/DC VOLTMETER (10).

413. Calculate V21. Subtract reading of step 396 from reading of step 412 (V21 = V20 – V17). Result shall be **+2.68 to 3.30 volts**.

414. Set ANALOG SIGNALS YAW RATE switch (34) to 1.

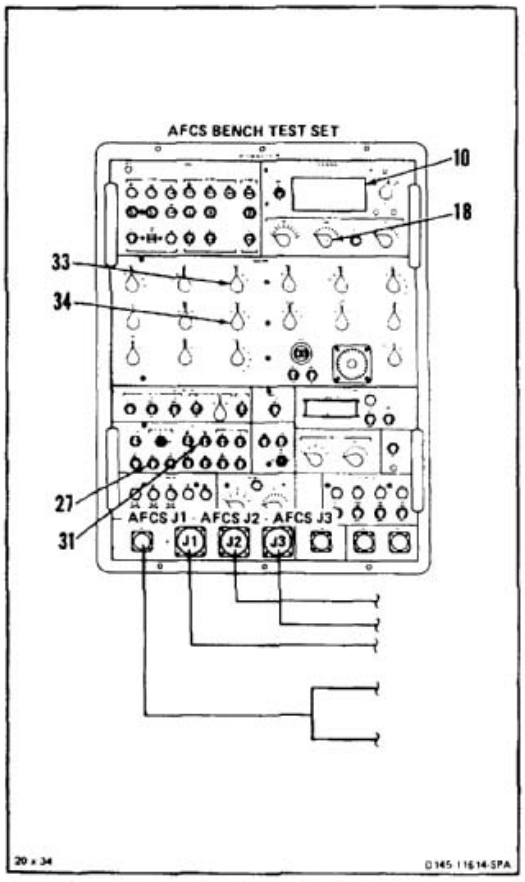
415. Set CIRCUIT SELECT A UNITS switch (18) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

416. Set ANALOG SIGNALS YAW RATE switch (34) to 2.

417. Set DISCRETE SIGNALS SWIVEL LOCK switch (31) to 1.

418. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1.

419. Set CIRCUIT SELECT A UNITS switch (18) to 0. Read AC/DC VOLTMETER (10). Reading shall be –**1.31 to +1.31**.



420. Set ANALOG SIGNALS ATT synchro (38) to 180º. Read AC/DC VOLTMETER (10). Reading shall be –**1.31 to +1.31**.

421. Set ANALOG SIGNALS ATT synchro (38) to 0.0º.

422. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 0.

423. Set ANALOG SIGNALS AIRSPEED switch (35) to 6.

424. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 1.

425. Set CONTROL PANEL SIMULATION AFCS switch (12) to SELECT.

426. Set DISCRETE SIGNALS HYD PRESS switch (13) to 1.

427. Set SERVO SIMULATION ILCA SIMULATION YAW switch (56) to OPERATE.

428. Set CIRCUIT SELECT A UNITS switch (18) to 4.

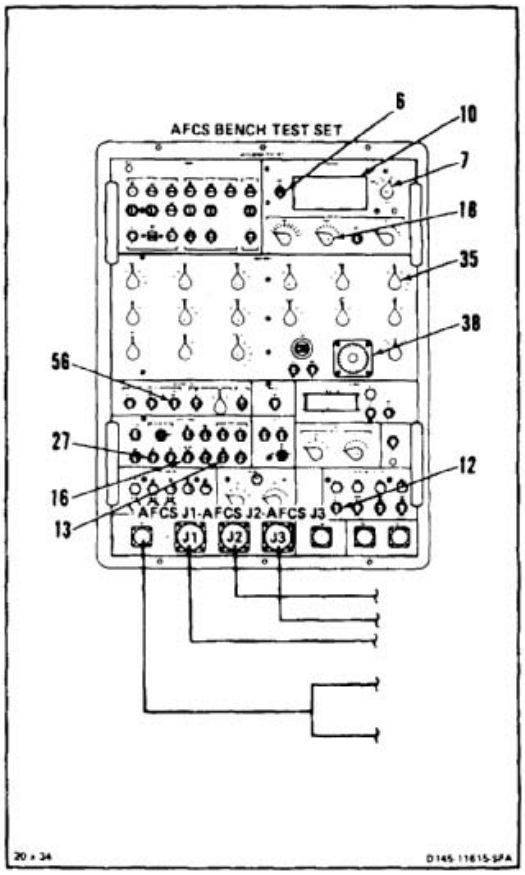
429. Set METER switch (6) to AC.

430. Set METER RANGE switch (7) to 2V.

431. Set ANALOG SIGNALS ATT synchro (38) to 7.0º. Read and record V22 AC/DC VOLTMETER (10) reading.

432. Set ANALOG SIGNALS ATT Synchro (38) to 353º. Read and record V23 AC/DC VOLTMETER (10) reading.

433. Calculate V24. Add reading of step 431 and reading of step 432 (V24 = V23 + V22). Result shall be **+2.04 to +2.66 volts**.



434. Adjust ANALOG SIGNALS ATT synchro (38) until AC/DC VOLTMETER (10) nulls.

435. Set ANALOG SIGNALS SIDESLIP switch (55) to 4. Read AC/DC VOLTMETER (10). Reading shall be **+0.586 to +0.751**.

436. Set CIRCUIT SELECT A UNITS SWITCH (18) to 5. Read AC/DC VOLTMETER (10). Reading shall be **+0.293 to +0.376**.

437. Set CIRCUIT SELECT A UNITS switch (18) to 6. Read AC/DC VOLTMETER (10). Reading shall be **+0.293 to 0.376**.

438. Set CIRCUIT SELECT A UNITS switch (18) to 0.

439. Set METER switch (6) to DC. Read AC/DC VOLTMETER (10). Reading shall be **–0.075 to +0.075**.

440. Set ANALOG SIGNALS AIRSPEED switch (35) to 5.

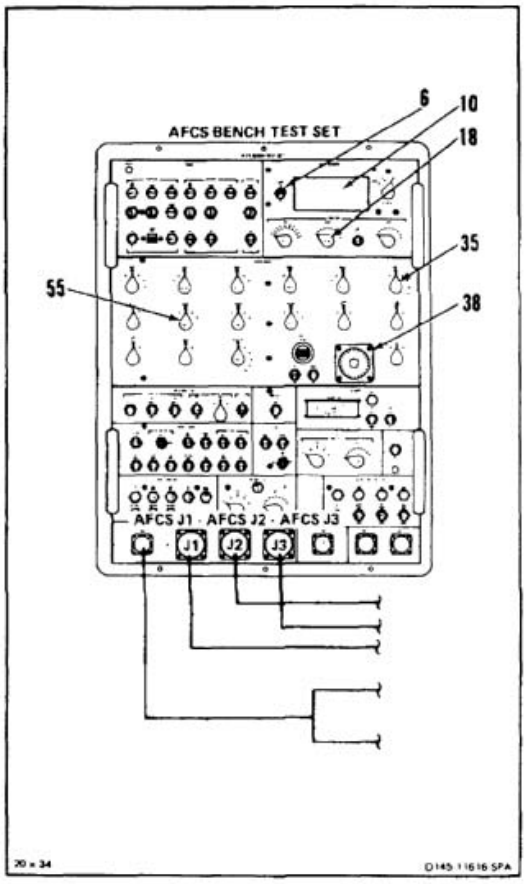
441. Set ANALOG SIGNALS SIDESLIP switch (55) to 2.

442. Set CIRCUIT SELECT A UNITS switch (18) to 4.

443. Set METER switch (6) to AC.

444. Adjust ANALOG SIGNALS ATT synchro (38) until AC/DC VOLTMETER (10) nulls.

445. Set ANALOG SIGNALS SIDESLIP switch (55) to 1. Read AC/DC VOLTMETER (10). Reading shall be **+1.04 to +1.41**.



446. Set ANALOG SIGNALS ATT synchro (38) to 0.0º.

447. Set METER RANGE switch (7) to 20V.

448. Set SERVO SIMULATION ILCA SIMULATION YAW switch (56) to RESET.

449. Set DISCRETE SIGNALS HYD PRESS switch (13) to 0.

450. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 0.

451. Set CONTROL PANEL SIMULATION AFCS switch (12) to OFF.

452. Set ANALOG SIGNALS AIRSPEED switch (35) to 4.

453. Set CIRCUIT SELECT A UNITS switch (18) to 0.

454. Set ANALOG SIGNALS YAW RATE switch (30) to 4.

455. Set ANALOG SIGNALS SIDESLIP switch (55) to 2. Wait **60 seconds**.

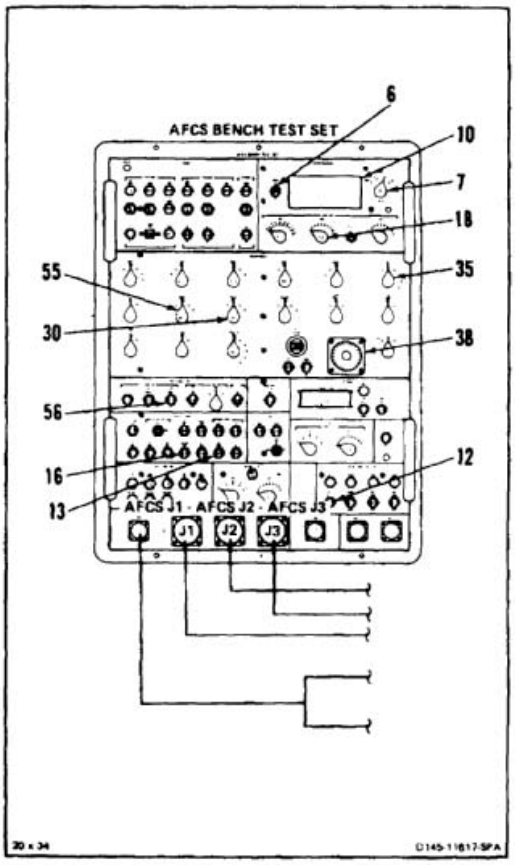
456. Set METER switch (6) to DC. Read and record V25 AC/DC VOLTMETER (10) reading.

457. Set ANALOG SIGNALS AIRSPEED switch (35) to 3. Wait **20 seconds**.

NOTE

Start time measurement when AIRSPEED switch is set.

458. Set ANALOG SIGNALS AIRSPEED switch (35) to 4. Measure time required for AC/DC VOLTMETER (10) to read V25 reading of step 456. Time measurement shall be **3.5 to 9.5 seconds**.



459. Set ANALOG SIGNALS AIRSPEED switch (35) to 2.

460. Set DISCRETE SIGNALS SWIVEL LOCK switch (31) to 0.

461. Set ANALOG SIGNALS YAW RATE switch (34) to 2.

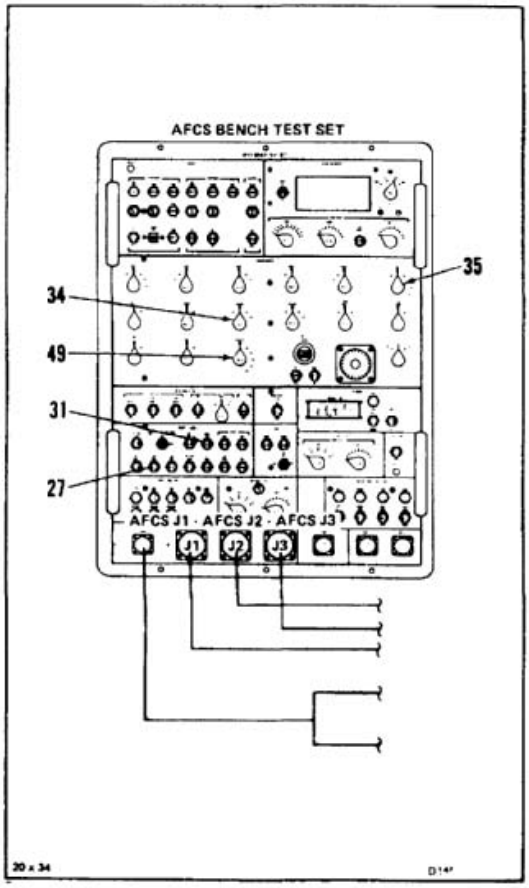
462. Set DISCRETE SIGNALS CYCLIC BRAKE switch (27) to 1 momentarily and then to 0. Read and record V26 AC/DC VOLTMETER (10) reading.

463. Set ANALOG SIGNALS PULSER STIM SWITCH (49) to 5. Read and record V27 AC/DC VOLTMETER (10) reading.

464. Calculate V28. Subtract reading of step 462 from reading of step 463 (V28 = V27 – V26). Result shall be –**3.93 to** –**4.52 volts**.

465. Set ANALOG SIGNALS PULSER STIM switch (49) to 1.

END YAW AXIS TEST



TEST 7

DASH TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

466. Set DISCRETE SIGNALS LDG GEAR switch (47) to 1.

467. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.5.

468. Set RESPONSE TEST MODE switch (43) to ON.

469. Set ANALOG SIGNALS AIRSPEED switch (35) to 1.

470. Set METER switch (6) to DC.

471. Set METER RANGE switch (7) to 20V.

472. Set CIRCUIT SELECT TENS switch (8) to 40.

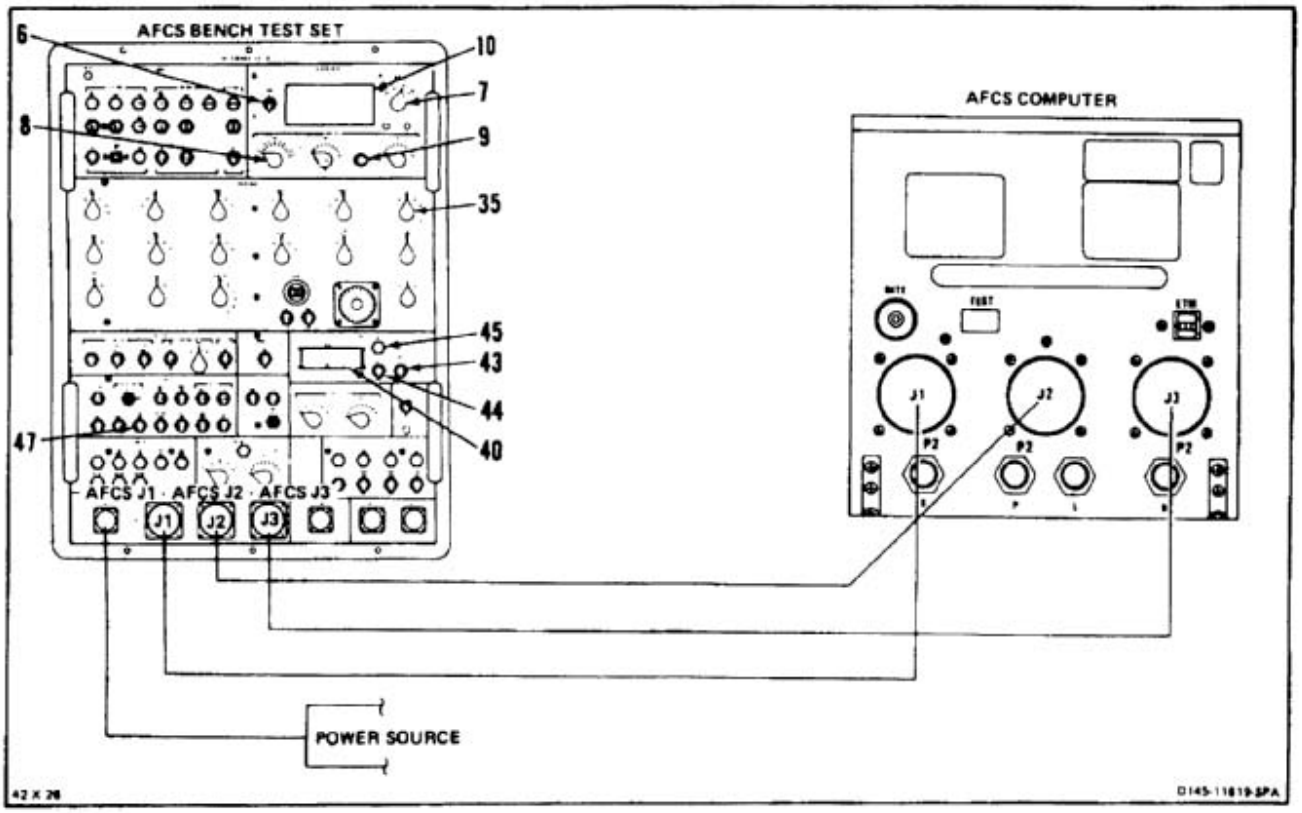
473. Set CIRCUIT SELECT A/B SELECT switch (9) to A.

474. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **+1.50 to +2.16**.

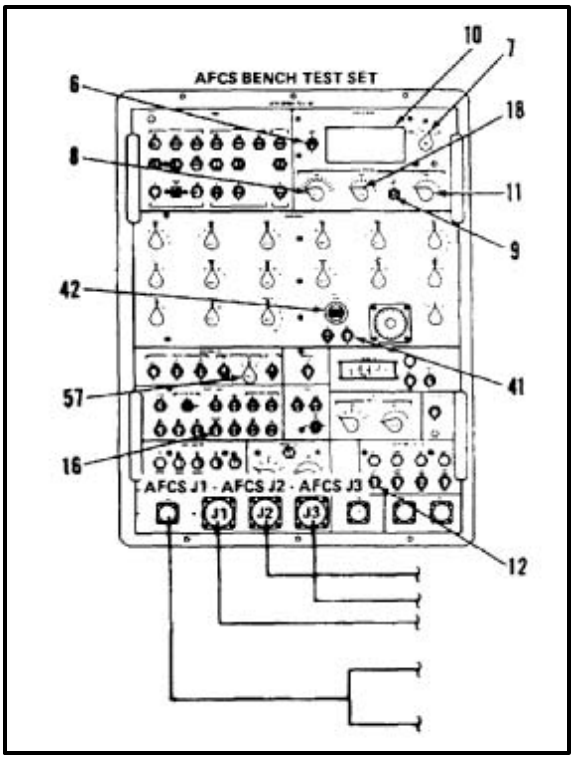
475. Set RESPONSE TEST STIM switch (44) to REMOVE.

476. Set RESPONSE TEST MODE switch (43) to OFF.

477. Set ANALOG SIGNALS AIRSPEED switch (35) to 2.



478. Set CONTROL PANEL SIMULATION AFCS switch (12) to SELECT.
479. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 1.
480. Set METER switch (6) to AC.
481. Set CIRCUIT SELECT TENS switch (8) to 20.
482. Set CIRCUIT SELECT A/B SELECT switch (9) to B.
483. Set CIRCUIT SELECT B UNITS switch (11) to 6.
484. Set ANALOG SIGNALS GND SIGNAL switch (41) to SIGNAL.
484.1. Set METER RANGE switch (7) to 2V.
485. Adjust ANALOG SIGNALS PITCH AIT HSI HDG pot. (42) toward 520 until AC/DC VOLTMETER (10) reads +0.412.
486. Set METER switch (6) to DC.
487. Set ACTUATOR SIMULATION DASH switch (57) to TFI.
488. Set CIRCUIT SELECT TENS switch (8) to 40.
489. Set CIRCUIT SELECT A UNITS switch (18) to 1.
490. Set CIRCUIT SELECT A/B SELECT switch (9) to A. Read AC/DC VOLTMETER (10). Reading shall be –**0.200 to +0.200**.
491. Set CIRCUIT SELECT A UNITS switch (18) to 2. Read AC/DC VOLTMETER (10). Reading shall be –**1.20 to** –**1.80**.



492. Set ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) to 500.

493. Set ANALOG SIGNALS GND SIGNAL switch (41) to GND.

494. Set CONTROL PANEL SIMULATION AFCS switch (12) to OFF.

495. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 0.

496. Set METER RANGE switch (7) to 20V.

497. Set ANALOG SIGNALS AIRSPEED switch (35) to 3.

498. Set CIRCUIT SELECT A UNITS switch (18) to 3. Read AC/DC VOLTMETER (10). Reading shall be **–4.5 to –5.5**.

499. Set CIRCUIT SELECT A UNITS switch (18) to 4.

500. Set METER RANGE switch (7) to 2V. Read AC/DC VOLTMETER (10). Reading shall be **+0.91 to +1.09**.

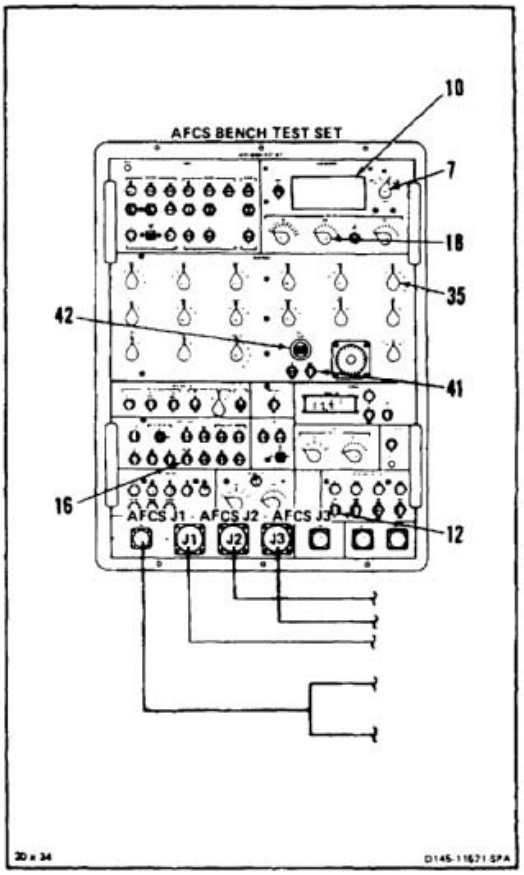
501. Set ANALOG SIGNALS AIRSPEED switch (35) to 4.

502. Set METER RANGE switch (7) to 20V.

503. Set CIRCUIT SELECT A UNITS switch (18) to 3. Read AC/DC VOLTMETER (10). Reading shall be **+6.5 to +7.5**.

504. Set CIRCUIT SELECT A UNITS switch (18) to 4.

505. Set METER RANGE switch (7) to 2V. Read AC/DC VOLTMETER (10). Reading shall be be **+1.00 to +1.30**.



506. Set ANALOG SIGNALS AIRSPEED switch (35) to 5. Read AC/DC VOLTMETER (10). Reading shall be **+1.27 to +1.51**.

507. Set DISCRETE SIGNALS LOG GEAR switch (47) to 0.

508. Set CONTROL PANEL SIMULATION AFCS switch (12) to SELECT.

509. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 1.

510. Set ANALOG SIGNALS LONG CPT switch (58) to 3. Wait **60 seconds**.

511. Set CIRCUIT SELECT A UNITS switch (18) to 1. Read AC/DC VOLTMETER (10). Reading shall be –**0.200 to +0.200**.

512. Set METER RANGE switch (7) to 20V.

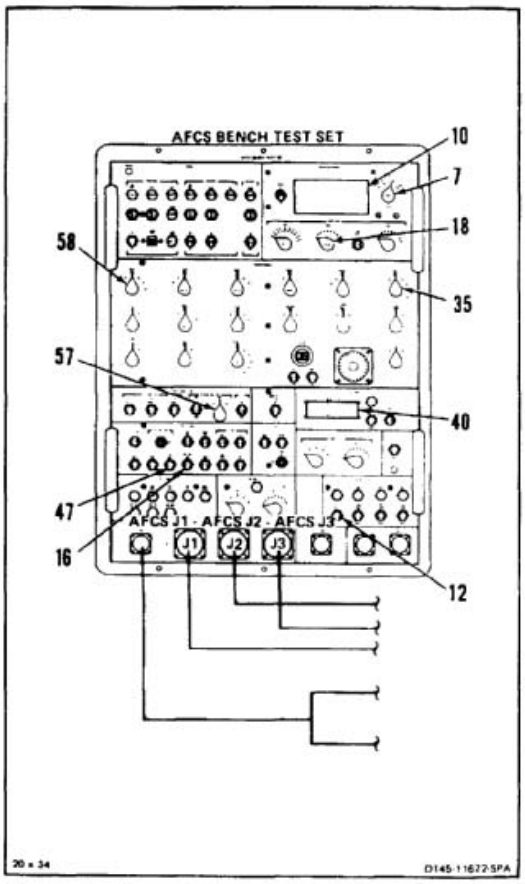
513. Set CIRCUIT SELECT A UNITS switch (18) to 2. Read and record V1 AC/DC VOLTMETER (10) reading.

514. Set ANALOG SIGNALS LONG CPT switch (58) to 2. Read and record V2 AC/DC VOLTMETER (10) reading.

515. Calculate V3. Subtract reading of step 514 from reading of step 513 (V3 = V1 – V2). Result shall be –**3.79 to –5.13 volts**.

516. Set SERVO SIMULATION ACTUATOR SIMULATION DASH switch (57) to GND.

517. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 20.



518. Set RESPONSE TEST MODE switch (43) to ON.

519. Set ANALOG SIGNALS LONG OPT switch (58) to 1.

520. Set CIRCUIT SELECT A UNITS switch (18) to 5.

521. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **+1.85 to +3.59**.

522. Set RESPONSE TEST STIM switch (44) to REMOVE.

523. Set ANALOG SIGNALS LONG CPT switch (58) to 5. Wait **60 seconds**.

524. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read AC/DC VOLTMETER (10). Reading shall be **−1.85 to −3.59**.

525. Set RESPONSE TEST STIM switch (44) to REMOVE.

526. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 1.0.

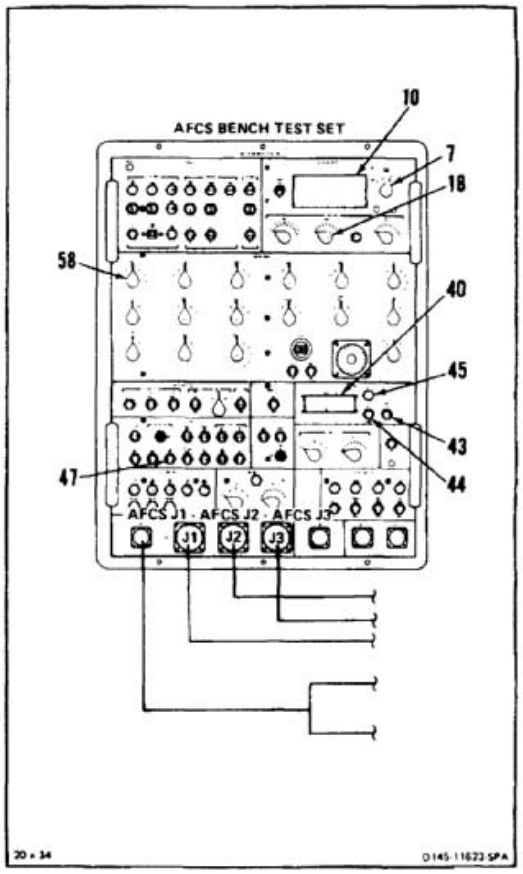
527. Set METER RANGE switch (7) to 2V.

528. Set CIRCUIT SELECT A UNITS switch (18) to 6.

529. Set ANALOG SIGNALS LONG CPT switch (58) to 4.

530. Set RESPONSE TEST MODE switch (43) to OFF.

531. Set DISCRETE SIGNALS LDG GEAR switch (47) to 1. Wait **90 seconds**. Read AC/DC VOLTMETER (10). Reading shall be **−0.40 to +0.40**.



532. Set RESPONSE TEST MODE switch (43) to ON.

533. Set DISCRETE SIGNALS LDG GEAR switch (47) to 0. Read and record V4 AC/DC VOLTMETER (10) reading.

534. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V5 AC/DC VOLTMETER (10) reading.

535. Calculate V6. Subtract reading of step 533 from reading of step 534 (V6 = V5 – V4). Result shall be **+0.20 to +0.39 volt**.

536. Set RESPONSE TEST STIM switch (44) to REMOVE.

537. Set RESPONSE TEST MODE switch (43) to OFF.

538. Set ANALOG SIGNALS LONG CPT switch (58) to 2.

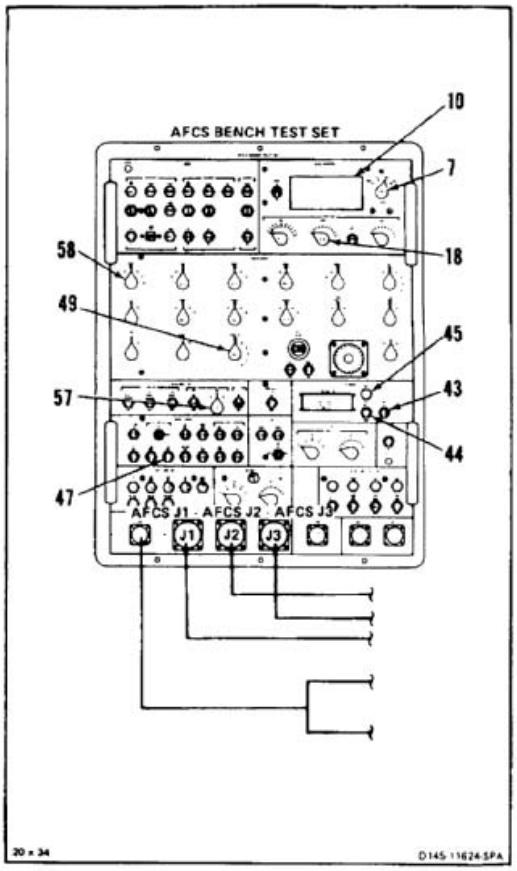
539. Set SERVO SIMULATION ACTUATOR SIMULATION DASH switch (57) to TFI.

540. Set CIRCUIT SELECT A UNITS switch (18) to 2.

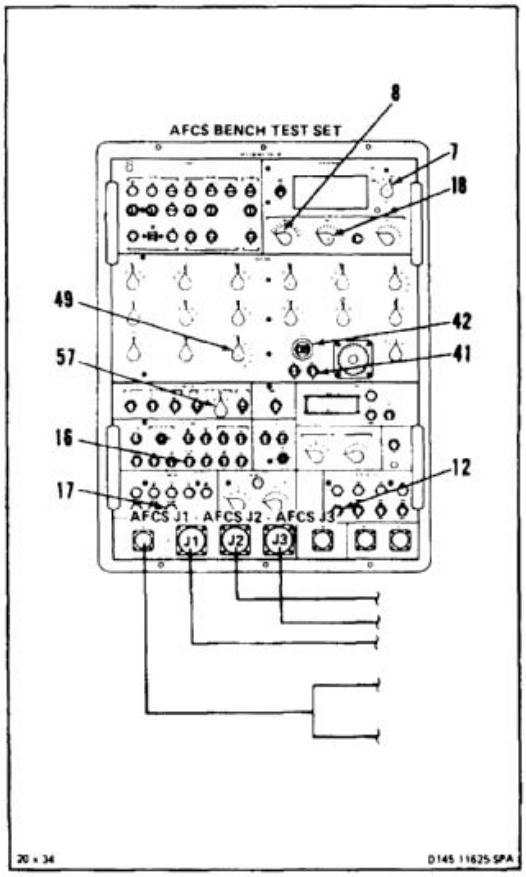
541. Set METER RANGE switch (7) to 20V. Wait **60 seconds**. Read and record V7 AC/DC VOLTMETER (10) reading.

542. Set ANALOG SIGNALS PULSER STIM switch (49) to 6. Read and record V8 AC/DC VOLTMETER (10) reading.

543. Calculate V9. Subtract reading of step 541 from reading of step 542 (V9 = V8 – V7). Result shall be –**4.65 to** –**5.35 volts**.



544. Set ANALOG SIGNALS PULSER STIM switch (49) to 1.
545. Set CONTROL PANEL SIMULATION AFCS switch (12) to OFF.
546. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 0.
547. Set SERVO SIMULATION ACTUATOR SIMULATION DASH switch (57) to GND.
548. Set CIRCUIT SELECT A UNITS switch (18) to 1.
549. Set ANALOG SIGNALS GND SIGNAL switch (41) to SIGNAL.
550. Adjust ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) towards 800 until AC/DC VOLTMETER (10) reads +6.0.
551. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 1. DISCRETE MONITORS DASH DRIVE lamp (17) shall be off.
552. Set CONTROL PANEL SIMULATION AFCS switch (12) to SELECT. DISCRETE MONITORS DASH DRIVE lamp (17) shall flash continuously.
553. Adjust ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) towards 800. AC/DC VOLTMETER (10) reads –5.0. DISCRETE MONITORS DASH DRIVE lamp (17) shall be off.
554. Set METER RANGE switch (7) to 200V.
555. Set CIRCUIT SELECT TENS switch (8) to 00.



556. Set CIRCUIT SELECT A/B SELECT switch (9) to B.

557. Set CIRCUIT SELECT B UNITS switch (11) to 8. Read AC/DC VOLTMETER (10). Reading shall be **+20.0 to +28.0**.

558. Set CIRCUIT SELECT TENS switch (8) to 40.

559. Set CIRCUIT SELECT A/B SELECT switch (9) to A.

560. Set CIRCUIT SELECT A UNITS switch (18) to 1.

561. Set METER RANGE switch (7) to 20V.

562. Set CONTROL PANEL SIMULATION AECS switch (12) momentarily to OFF. Return AFCS switch (12) to SELECT. DISCRETE MONITORS DASH DRIVE lamp (17) shall be flashing and DASH ANN lamp (59) shall be on.

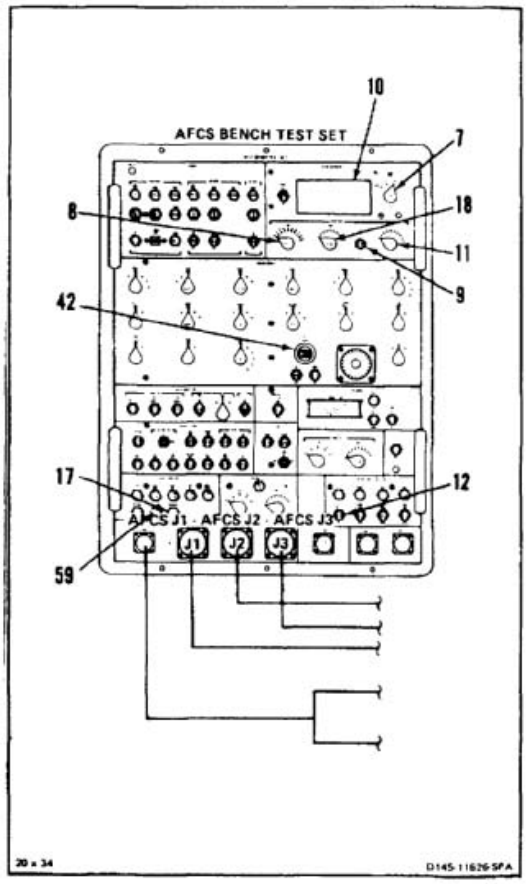
563. Adjust ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) toward 500 until AC/DC VOLTMETER (10) reads +6.0. DISCRETE MONITORS DASH DRIVE lamp (17) and DASH ANN lamp (59) shall be off.

564. Set METER RANGE switch (7) to 200V.

565. Set CIRCUIT SELECT TENS switch (8) to 00.

566. Set CIRCUIT SELECT A/B SELECT switch (9) to B.

567. Set CIRCUIT SELECT B UNITS switch (11) to 7. Read AC/DC VOLTMETER (10). Reading shall be **+20.0 to +28.0**.



568. Set METER RANGE switch (7) to 20V.

569. Set CIRCUIT SELECT B UNITS switch (11) to 4.

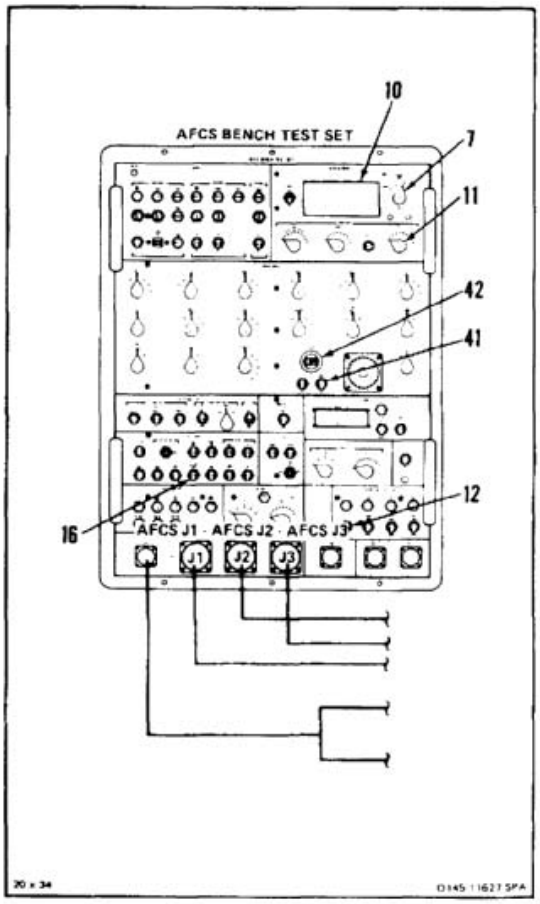
570. Set CONTROL PANEL SIMULATION AFCS switch (12) to OFF. Read AC/DC VOLTMETER (10). Reading shall be –**5.0 to +5.0**.

571. Set ANALOG SIGNALS PITCH ATT HSI HDG pot. (42) to 500.

572. Set ANALOG SIGNALS GND SIGNAL switch (41) to GND.

573. Set DISCRETE SIGNALS VERT GYRO VALID switch (16) to 0.

END DASH TEST



TEST 8

LONGITUDINAL CYCLIC TRIM (LCT) TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

574. Set SERVO SIMULATION LCT switch (60) to NORM.

575. Set DISCRETE SIGNALS BOX IDENT switch (61) to 0.

576. Set POWER LCT switch (62) to ON.

577. Set CIRCUIT SELECT TENS switch (8) to 50.

578. Set CIRCUIT SELECT A UNITS switch (18) to 0.

579. Set CIRCUIT SELECT A/B SELECT switch (9) to A.

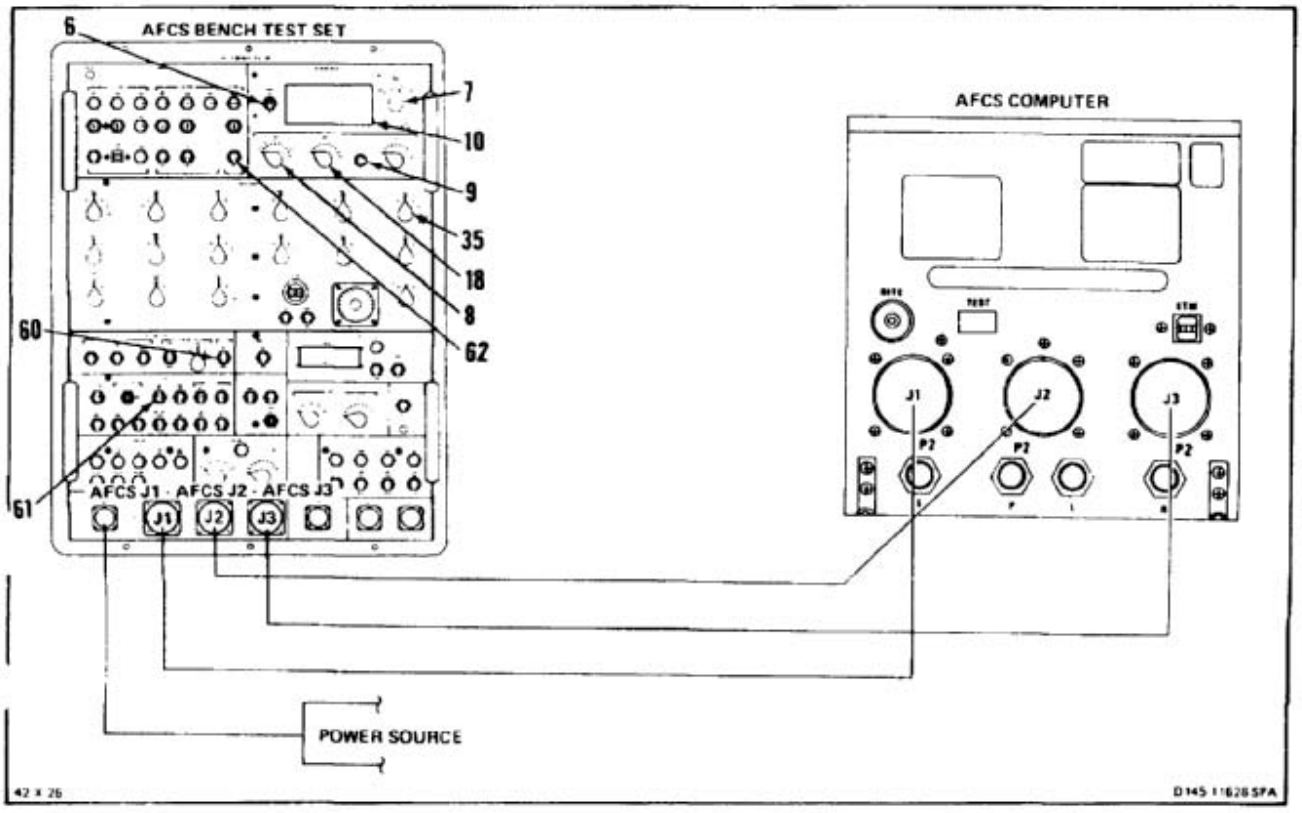
580. Set ANALOG SIGNALS AIRSPEED switch (35) to 6.

581. Set METER switch (6) to DC.

582. Set METER RANGE switch (7) to 20V. Wait **60 seconds**. Read AC/DC VOLTMETER (10). Reading shall be **−3.77 to −5.10**.

583. Set CIRCUIT SELECT A UNITS switch (18) to 1.

584. Set METER RANGE switch (7) to 2V. Read AC/DC VOLTMETER (10). Reading shall be **−0.444 to −0.600**.



585. Set CIRCUIT SELECT A UNITS switch (18) to 2. Read AC/DC VOLTMETER (10). Reading shall be –**0.328 to** –**0.444**.

586. Set ANALOG SIGNALS AIRSPEED switch (35) to 5.

587. Set CIRCUIT SELECT A UNITS switch (18) to 0. Wait **60 seconds**. Read AC/DC VOLTMETER (10). Reading shall be –**0.316 to +0.05**.

588. Set ANALOG SIGNALS AIRSPEED switch (35) to 2. Read AC/DC VOLTMETER (10). Reading shall be **0.092 to +0.05**.

589. Set DISCRETE SIGNALS BOX IDENT switch (61) to 1. Read AC/DC VOLTMETER (10). Reading shall be –**0.068 to +0.05**.

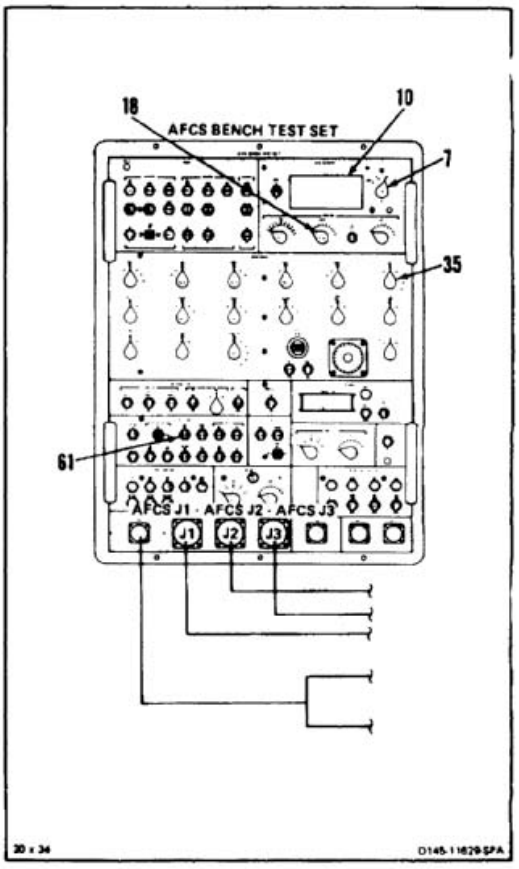
590. Set ANALOG SIGNALS AIRSPEED switch (35) to 5. Read AC/DC VOLTMETER (10). Reading shall be –**0.235 to +0.05**.

591. Set ANALOG SIGNALS AIRSPEED switch (35) to 6.

592. Set METER RANGE switch (7) to 20V. Wait **60 seconds**. Read AC/DC VOLTMETER (10). Reading shall be –**2.56 to** –**3.46**.

593. Set CIRCUIT SELECT A UNITS switch (18) to 3.

594. Set METER RANGE switch (7) to 2V. Read AC/DC VOLTMETER (10). Reading shall be be –**0.604 to +0.604**.



595. Set ANALOG SIGNALS AIRSPEED switch (35) to 5.

596. Set ANALOG SIGNALS BARO ALT switch (25) to 1.

597. Set CIRCUIT SELECT A UNITS switch (18) to 0.

598. Set METER RANGE switch (7) to 20V. Read and record V1 reading on AC/DC VOLTMETER (10).

599. Set ANALOG SIGNALS BARO ALT switch (25) to 2. Wait **20 seconds**. Read and record V2 reading on AC/DC VOLTMETER (10).

600. Calculate V3. Subtract reading of step 598 from reading of step 599 (V3 = V2 – V1). Result shall be **+2.09 to +2.55**.

601. Set DISCRETE SIGNALS LDG GEAR switch (47) to 1. Read AC/DC VOLTMETER (10). Reading shall be –**0.763 to** –**1.011**.

602. Set DISCRETE SIGNALS BOX IDENT switch (61) to 0. Read AC/DC VOLTMETER (10). Reading shall be –**2.01 to** –**2.73**.

603. Set DISCRETE SIGNALS BOX IDENT switch (61) to 1.

604. Set DISCRETE SIGNALS LDG GEAR switch (47) to 0.

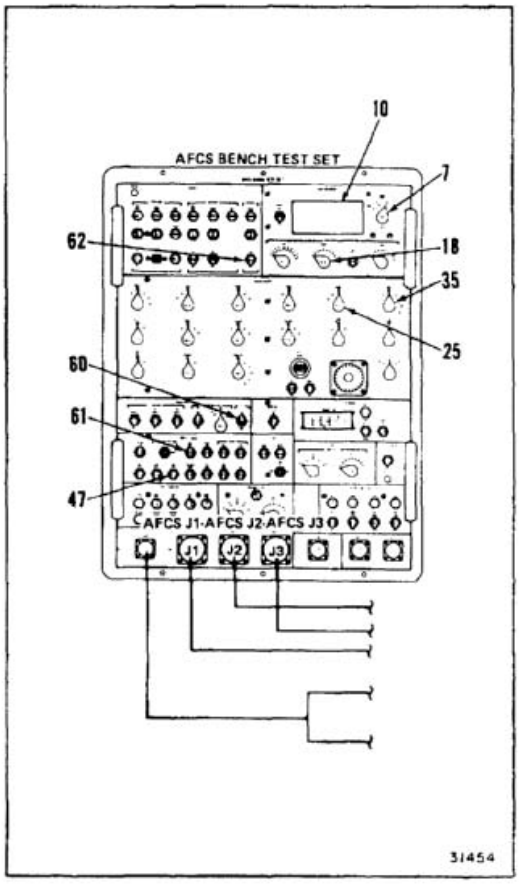
605. Set ANALOG SIGNALS BARO ALT switch (25) to 3.

606. Set LCT POWER switch (62) to OFF.

607. Set ANALOG SIGNALS AIRSPEED switch (35) to 2.

608. Set SERVO SIMULATION LCT switch (60) to GND.

END LCT TEST



TEST 9

COLLECTIVE CONTROL DRIVER ACTUATOR (CCDA) TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

609. Set RESPONSE TEST MODE switch (43) to ON.

610. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 15.

611. Set ANALOG SIGNALS NORM ACCEL switch (64) to 2. Wait **3 minutes**.

612. Set METER switch (6) to DC.

613. Set METER RANGE switch (7) to 20V.

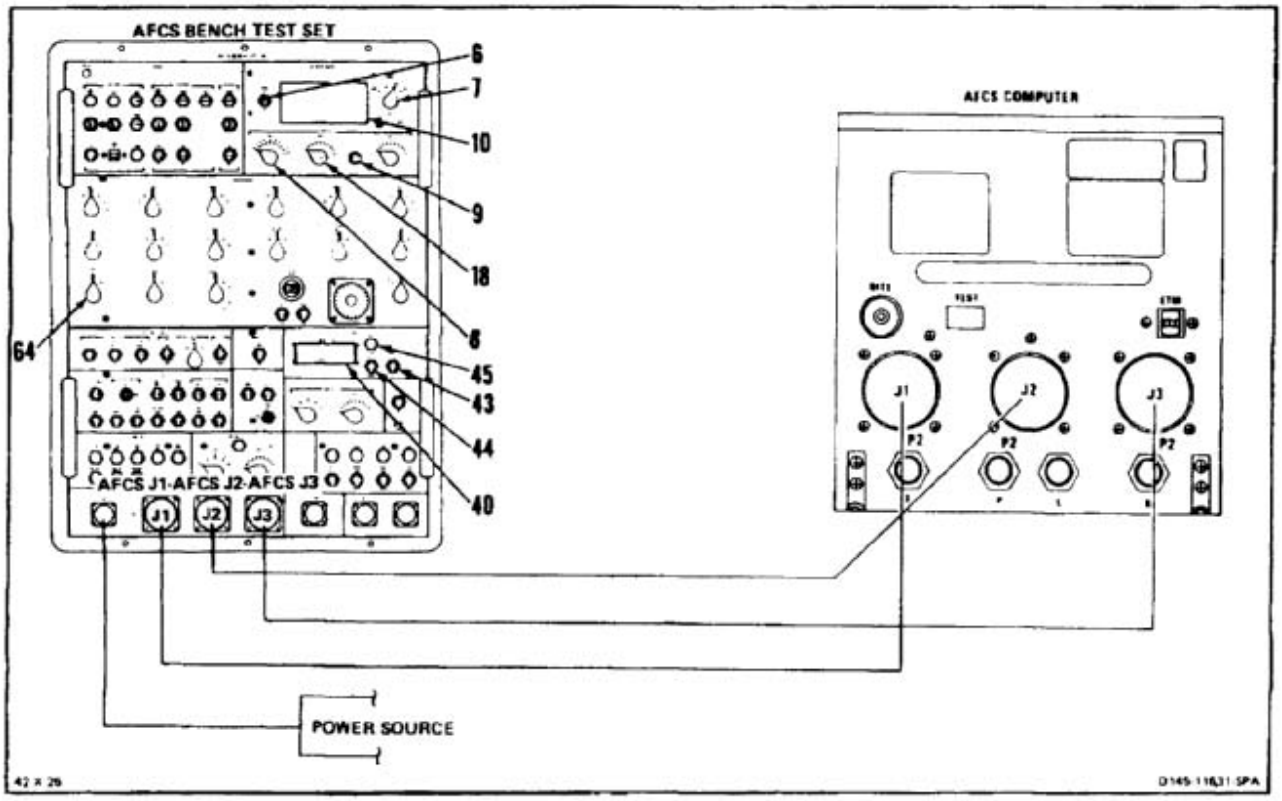
614. Set CIRCUIT SELECT TENS switch (8) to 60.

615. Set CIRCUIT SELECT A UNITS switch (18) to 0.

616. Set CIRCUIT SELECT A/B SELECT switch (9) to A. Read and record V1 AC/DC VOLTMETER (10) reading.

617. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V2 AC/DC MULTIMETER (10) reading.

618. Calculate V3. Subtract reading of step 616 from reading of step 617 (V3 = V2 – V1). Result shall be **+4.99 to +7.48**.



619. Set RESPONSE TEST STIM switch (44) to REMOVE.

620. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 50. Wait **3 minutes**.

621. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V4 AC/DC VOLTMETER (10) reading.

622. Calculate V5. Subtract reading of 616 from reading of step 621 (V5 = V4 – V1). Result shall be **+1.68 to +2.80**.

623. Set RESPONSE TEST STIM switch (44) to REMOVE.

624. Set ANALOG SIGNALS ATT SELECT switch (37) to ROLL.

625. Set ANALOG SIGNALS ATT servo (38) to 0.0º.

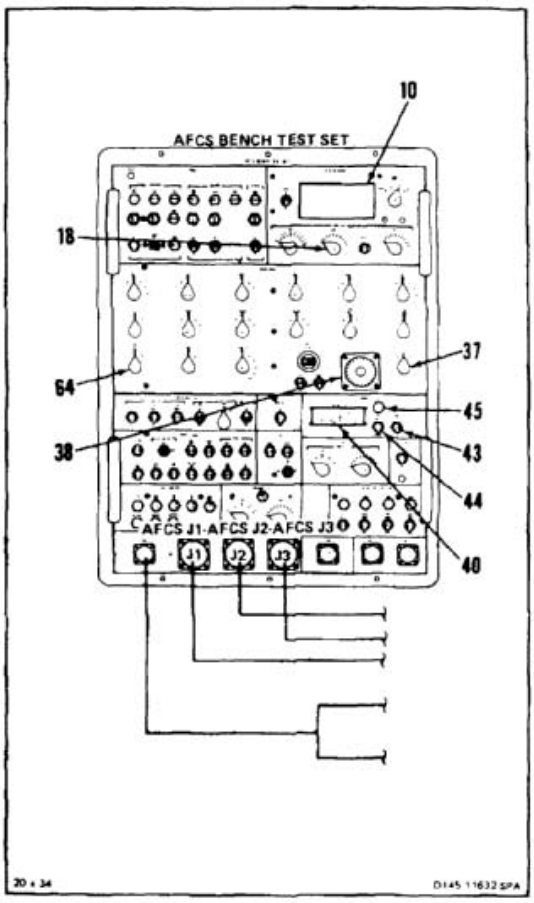
626. Set ANALOG SIGNALS NORM ACCEL switch (64) to 1.

627. Set RESPONSE TEST MODE switch (43) to OFF.

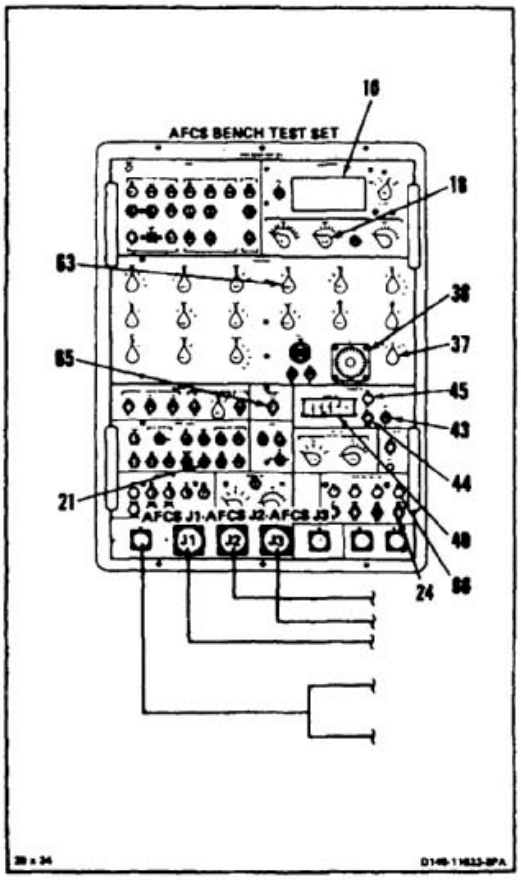
628. Set CIRCUIT SELECT A UNITS switch (18) to 2. Read and record V6 AC/DC VOLTMETER (10) reading.

629. Set ANALOG SIGNALS ATT servo (38) to 30.0º. Read and record V7 AC/DC VOLTMETER (10) reading.

630. Calculate V8. Subtract reading of step 628 from reading of step 629 (V8 = V7 – V6). Result shall be **+0.57 to +0.77 for** computer 145VS100-3. Result shall be **+0.24 to +0.32** for computer 145VS100-5.



631. Set ANALOG SIGNALS ATT synchro (38) to 0.0º.
632. Set ANALOG SIGNALS ATT SELECT switch (37) to HDG.
633. Set CIRCUIT SELECT A UNITS switch (18) to 1.
634. Set NORM ACCEL J2-52 switch (65) to GND.
635. Set RESPONSE TEST MODE switch (43) to ON.
636. Set CONTROL PANEL SIMULATION RADAR switch (24) to ENGAGE. ENGAGE lamp (66) shall come on.
637. Set DISCRETE SIGNALS ALT VALID switch (21) to 1.
638. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.2.
639. Set ANALOG SIGNALS RAD ALT switches (63) to 1. Wait **3 minutes**. Read and record V9 AC/DC VOLTMETER (10) reading.
640. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V10 AC/DC VOLTMETER reading.
641. Calculate V11. Subtract reading of step 639 from reading of step 640 (V11 = V10 – V9). Result shall be **–3.32 to –4.98**.
642. Set RESPONSE TEST STIM switch (44) to REMOVE.
643. Set RESPONSE TEST mode switch (43) to OFF.



644. Set CIRCUIT SELECT A UNITS switch (18) to 6.

645. Set CONTROL PANEL SIMULATION RADAR switch (24) to DISENG.

646. Set METER RANGE switch (7) to 2V.

647. Set SERVO SIMULATION ACTUATOR SIMULATION CCD switch (67) to NORMAL.

648. Set METER switch (6) to AC. Wait **90 seconds**. Read AC/DC VOLTMETER (10). Reading shall be **+0.250** or less.

649. Set ANALOG SIGNALS RAD ALT switch (63) to 2.

650. Set DISCRETE SIGNALS ALT VALID switch (21) to 0.

651. Set METER RANGE switch (7) to 20V.

652. Set CIRCUIT SELECT A UNITS switch (18) to 3.

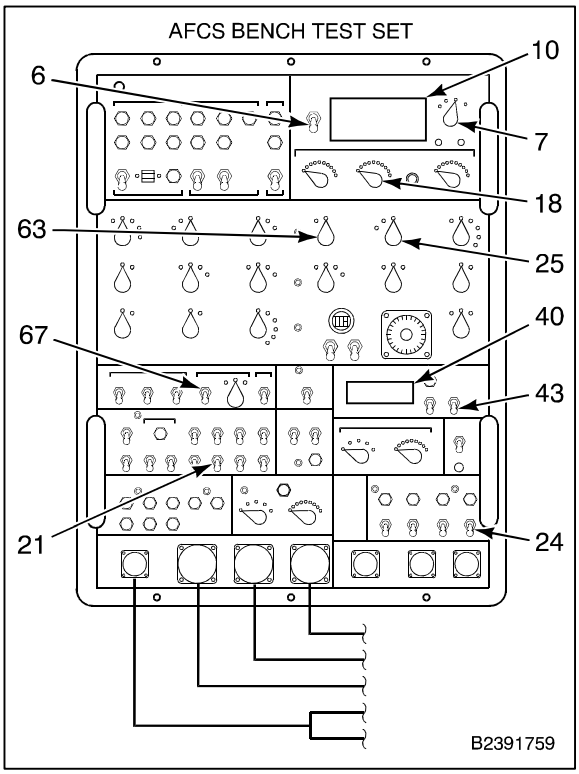
653. Set ANALOG SIGNALS BARO ALT switch (25) to 1.

654. Set SERVO SIMULATION ACTUATOR SIMULATION CCD switch (67) to GND.

655. Set METER switch (6) to DC.

656. Set RESPONSE TEST MODE switch (43) to ON. Read and record V12 AC/DC VOLTMETER (10) reading.

657. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.5.



658. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V13 AC/DC VOLTMETER (10) reading.

659. Calculate V14. Subtract reading of step 656 from reading of step 658 (V14 = V13 – V12). Result shall be **+1.55 to +2.23**.

660. Set RESPONSE TEST STIM switch (44) to REMOVE.

661. Set RESPONSE TEST MODE switch (43) to OFF.

662. Set SERVO SIMULATION ACTUATOR SIMULATOR CCD switch (67) to NORM.

663. Set CIRCUIT SELECT A UNITS switch (18) to 6.

664. Set METER switch (6) to AC.

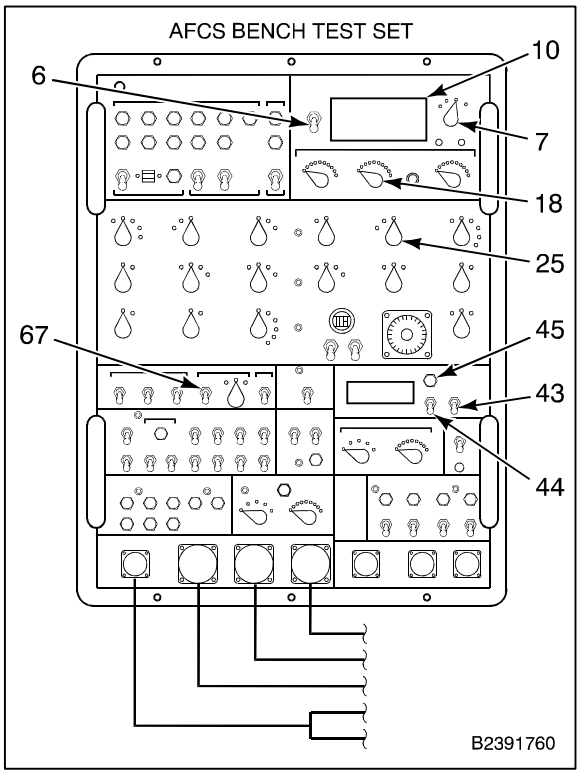
665. Set METER RANGE switch (7) to 2V. Wait **90 seconds**. Read AC/DC VOLTMETER (10). Reading shall be **+0.250** or less.

666. Set ANALOG SIGNALS BARO ALT switch (25) to 3.

667. Set SERVO SIMULATION ACTUATOR SIMULATOR CCD switch (67) to GND.

668. Set METER switch (6) to DC.

669. Set CIRCUIT SELECT A UNITS switch (18) to 1. Read and record V15 AC/DC VOLTMETER (10) reading.



670. Set ANALOG SIGNALS CCDA DEMOD switch (68) to 2. Read and record V16 AC/DC VOLTMETER (10) reading.

671. Calculate V17. Subtract reading of step 669 from reading of step 670 (V17 = V16 – V15). Result shall be **+0.55 to +0.65**.

672. Set RESPONSE TEST MODE switch (43) to ON.

673. Set CONTROL PANEL SIMULATION RADAR switch (24) to ENGAGE.

674. Set DISCRETE SIGNALS ALT VALID switch (21) to 1. Wait **60 seconds**. Read and record V18 AC/DC VOLTMETER (10) reading.

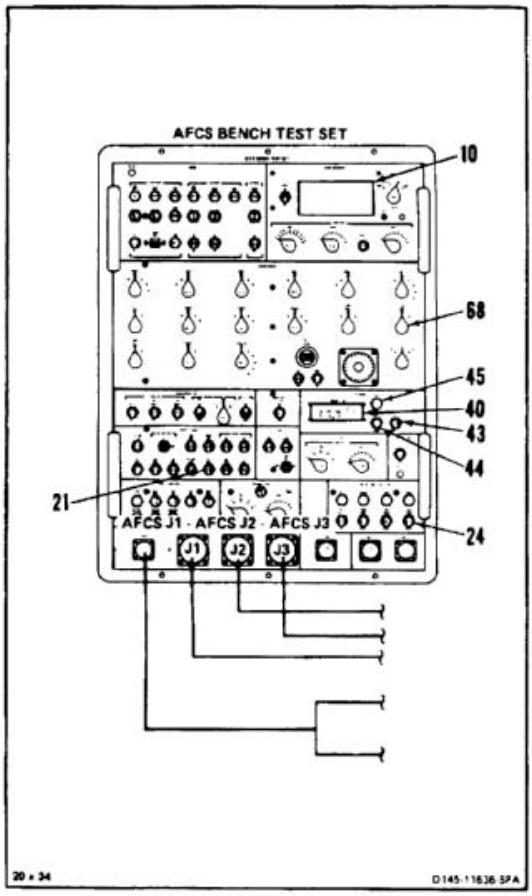
675. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 0.01.

676. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V19 AC/DC VOLTMETER (10) reading.

677. Calculate V20. Subtract reading of step 674 from reading of step 676 (V20 = V19 – V18). Result shall be **+1.86 to +2.79**.

678. Set RESPONSE TEST STIM switch (44) to REMOVE.

679. Set RESPONSE TEST TIME DELAY-SEC switches (40) to 10.0. Wait **60 seconds**. Read and record V21 AC/DC VOLTMETER (10) reading.



680. Set RESPONSE TEST STIM switch (44) to APPLY. When HOLD lamp (45) comes on, read and record V22 AC/DC VOLTMETER (10) reading.

681. Calculate V23. Substract reading of step 679 from reading of step 680 (V23 = V22 – V21). Result shall be **+0.174 to +0.275**.

682. Set CONTROL PANEL SIMULATION RADAR switch (24) to DISENG.

683. Set DISCRETE SIGNALS ALT VALID switch (21) to 0.

684. Set RESPONSE TEST STIM switch (44) to REMOVE.

685. Set RESPONSE TEST MODE switch (43) to OFF.

686. Set ANALOG SIGNALS CCDA DEMOD switch (68) to 1.

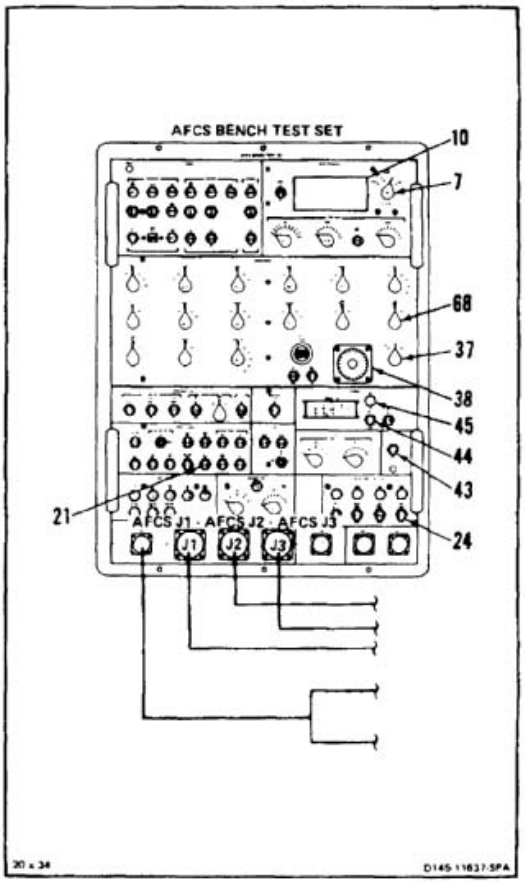
687. Set METER RANGE switch (7) to 20V.

688. Set ANALOG SIGNALS ATT SELECT switch (37) to ROLL. Wait **60 seconds**. Read and record V24 AC/DC VOLTMETER (10) reading.

689. Set ANALOG SIGNALS ATT synchro (38) to 50. Wait **20 seconds**. Read and record V25 AC/DC VOLTMETER (10) reading.

690. Calculate V26. Subtract reading of step 688 from reading of step 689 (V26 = V25 – V24). Result shall be **+2.47 to +3.35**.

691. Set ANALOG SIGNALS ATT synchro (38) to 0.0º. Read and record V27 AC/DC VOLTMETER (10) reading.



692. Set ANALOG SIGNALS PULSER STIM switch (49) to 2. Read and record V28 AC/DC VOLTMETER (10) reading.

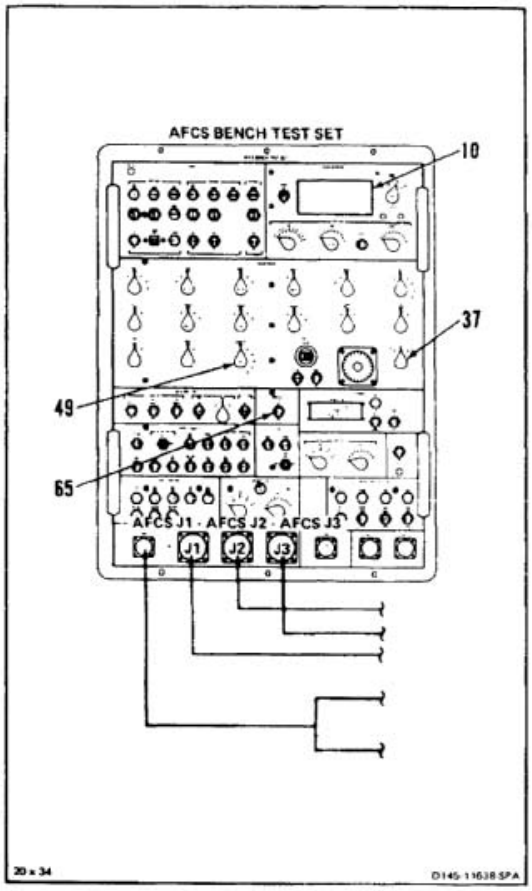
693. Calculate V29. Subtract reading of step 691 from reading of step 692 (V29 = V28 – V27). Result shall be **–3.13 to –3.62**.

694. Set ANALOG SIGNALS PULSER STIM switch (49) to 1.

695. Set NORM ACCEL J2-52 switch (65) to NORM.

696. Set ANALOG SIGNALS ATT SELECT switch (37) to HDG.

END CCDA TEST



TEST 10

YAW RATE TEST

697. Set computer (69) on rate table (70) in normal up position.

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

698. Set METER switch (6) to DC.

699. Set METER RANGE switch (7) to 20V.

700. Set CIRCUIT SELECT TENS switch (8) to 30.

701. Set CIRCUIT SELECT UNITS switch (18) to 0.

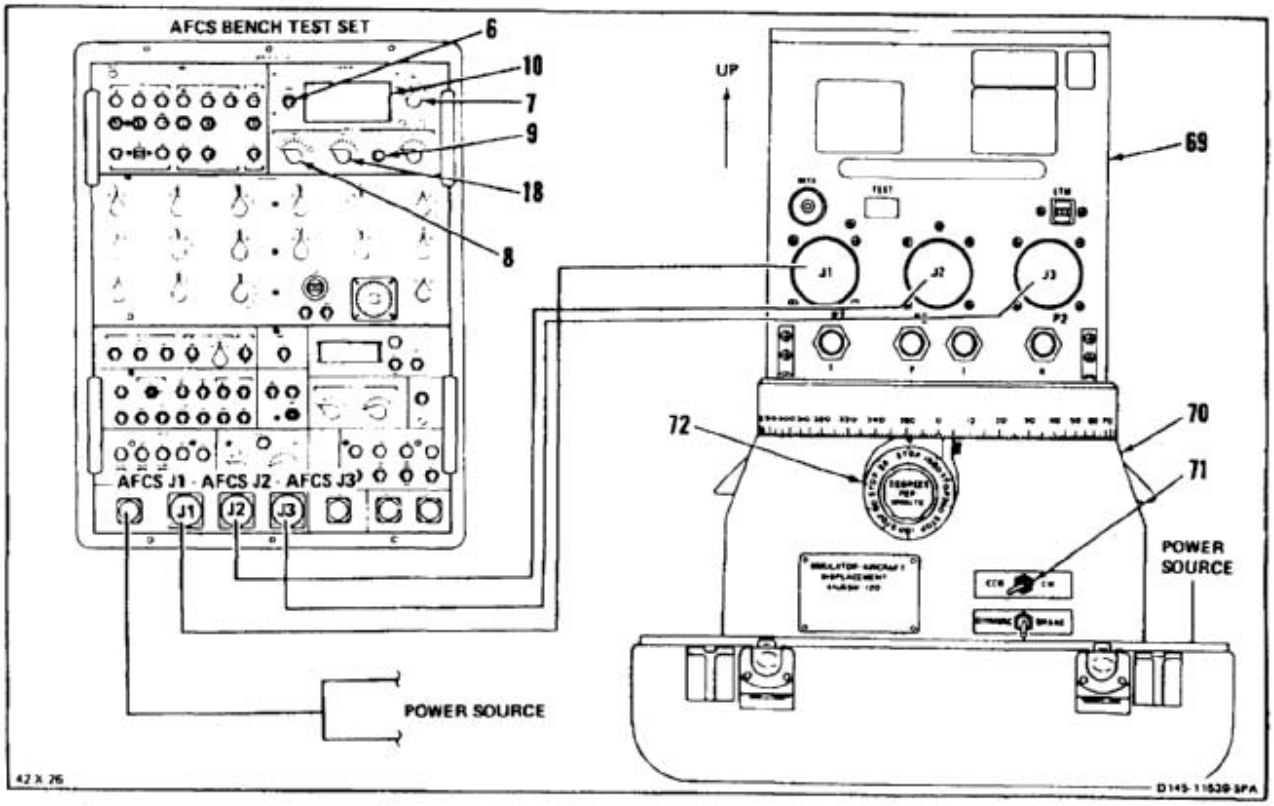
702. Set CIRCUIT SELECT A/B SELECT switch (9) to A. Read and record V1 AC/DC VOLTMETER (10) reading.

703. Set DEGREES PER MINUTE knob (72) to 180.

704. Set CCW-CW switch (71) to CW. Read and record V2 AC/DC VOLTMETER (10) reading.

705. Set CCW-CW switch (71) to OFF.

706. Calculate V3. Subtract reading of step 702 from reading of step 704 (V3 = V2 – V1). Result shall be **–2.87 to –4.80**.



707. Set CCW-CW switch (71) to CCW. Read and record V4 AC/DC VOLTMETER (10) reading.

708. Set CCW-CW switch (71) to OFF.

709. Set DEGREES PER MINUTE knob (72) to STOP.

710. Calculate V5. Subtract reading of step 702 from reading of step 707 (V5 = V4 – V1). Result shall be **+2.87 to +4.80**.

711. Set DEGREES PER MINUTE knob (72) to 360.

712. Set CCW-CW switch (71) to CW. Read and record V6 AC/DC VOLTMETER (10) reading.

713. Set CCW-CW switch (71) to OFF.

714. Calculate V7. Subtract reading of step 702 from reading of step 712 (V7 = V6 – V1). Result shall be **–5.75 to –9.61**.

715. Set CCW-CW switch (71) to CCW. Read and record V8 AC/DC VOLTMETER (10) reading.

715. Set CCW-CW switch (71) to OFF.

717. Calculate V9. Subtract reading of step 702 from reading of step 715 (V9 = V8 – V1). Result shall be **+5.75 to +9.61**.

CAUTION

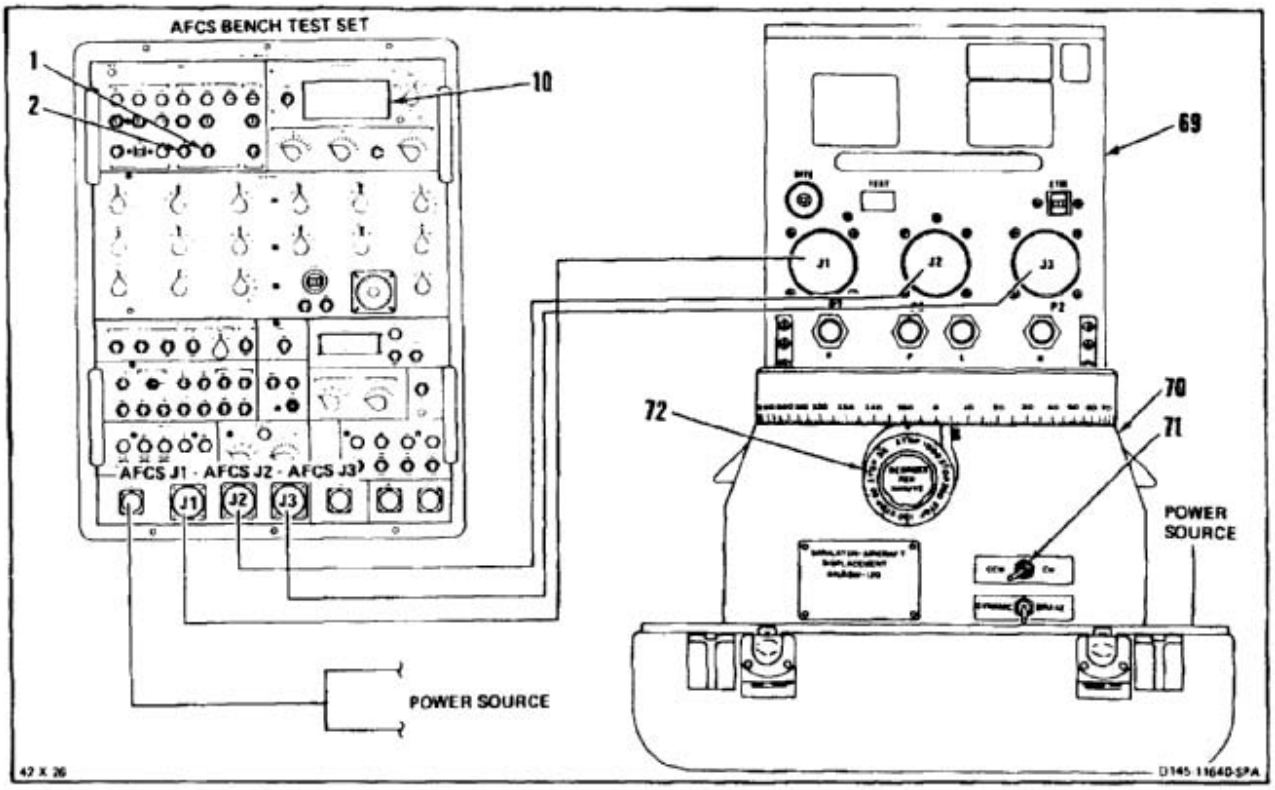
Do not move computer for **five minutes** after removal of power; otherwise, damage to yaw gyro can occur.

718. Set AFCS power switches (1 and 2) to OFF.

719. Set DEGREES PER MINUTE knob (72) to STOP.

720. Remove computer (69) from rate table (70).

END YAW RATE TEST



TEST 11

NORMAL ACCELERATION TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

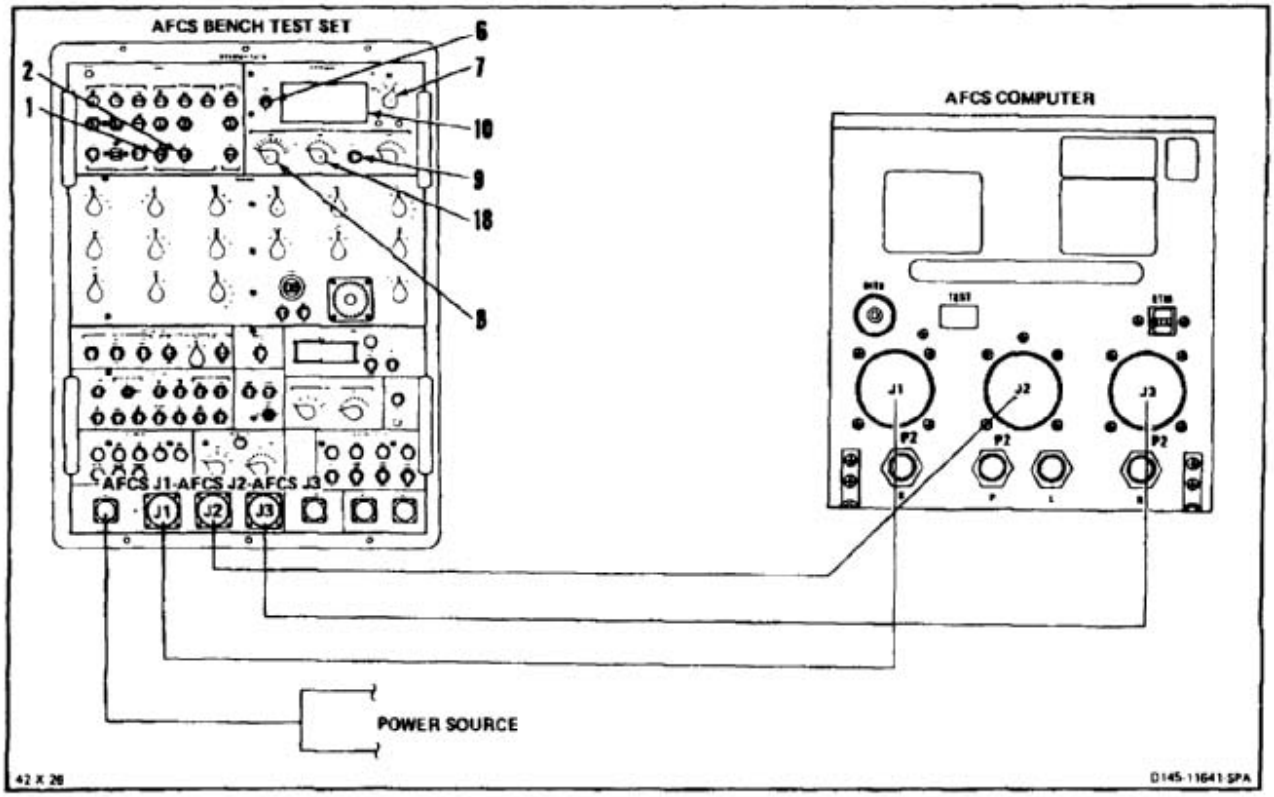
721. Set METER switch (6) to DC.

722. Set METER RANGE switch (7) to 2V.

723. Set CIRCUIT SELECT TENS switch (8) to 60.

724. Set CIRCUIT SELECT A UNIT switch (18) to 2.

725. Set CIRCUIT SELECT A/B SELECT switch (9) to A. Read and record V1 AC/DC VOLTMETER (10) reading.



726. Set METER RANGE switch (7) to 20V.

727. Turn computer (69) **90°** to normal in roll axis.

728. Read and record V2 AC/DC VOLTMETER (10) reading.

729. Calculate V3. Subtract reading of step 725 from reading of step 728 (V3 = V2 – V1). Result shall be 4.00 to 6.00 for computer 145VS100-3. Result shall be 1.68 to 2.52 for computer 145VS100-5.

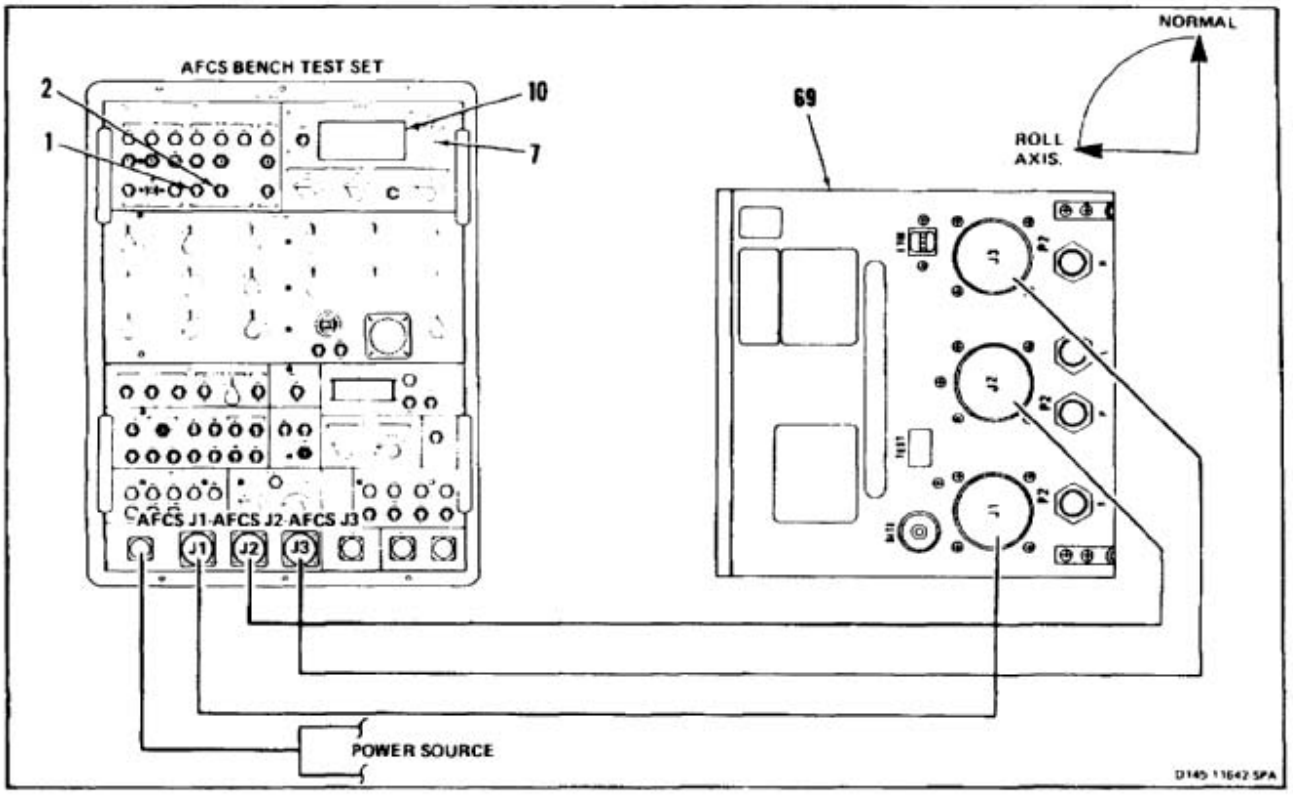
730. Turn computer (69) to normal position.

CAUTION

Do not move computer for **five minutes** after removal of power; otherwise, damage to yaw gyro can occur.

731. Set AFCS POWER switches (1 and 2) to OFF.

END NORMAL ACCELERATION TEST



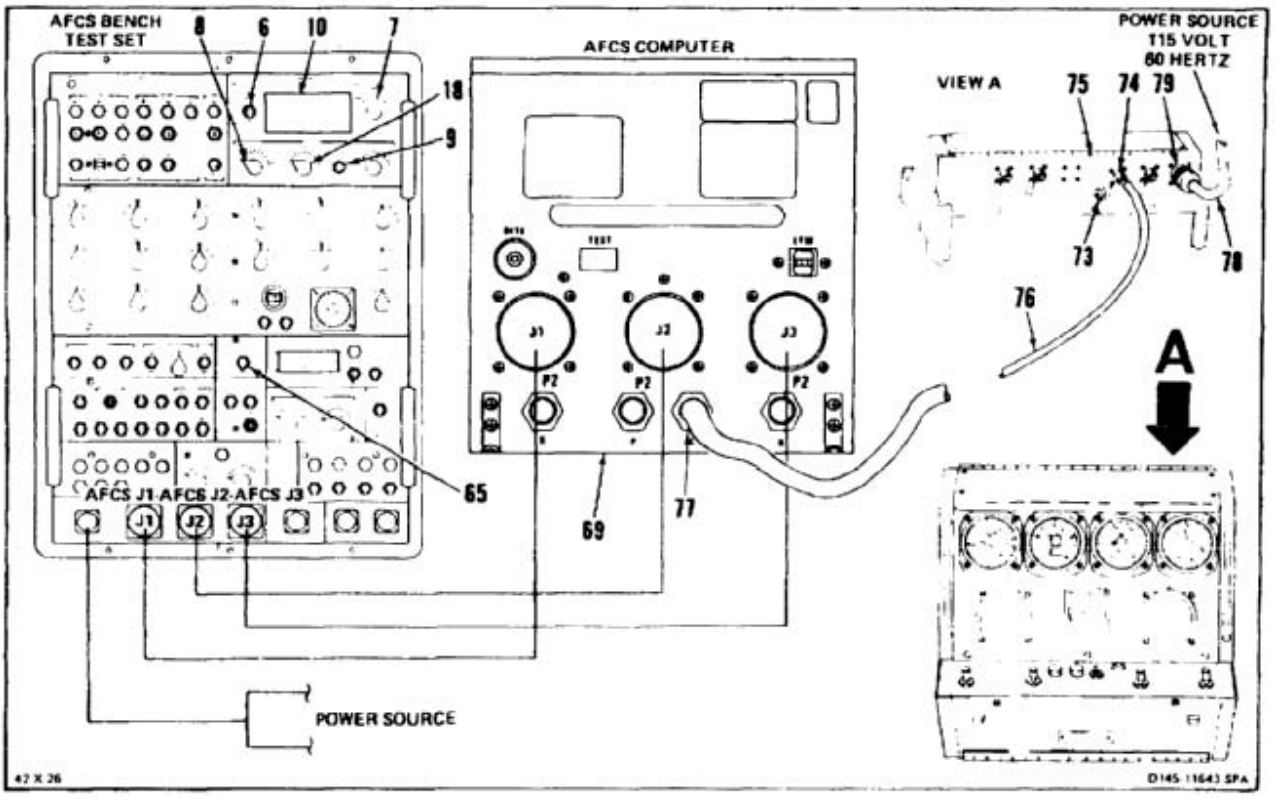
TEST 12

PRESSURE TRANSDUCERS TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

732. Set METER switch (6) to DC.
733. Set NORM ACCEL J2-52 switch (65) to GND.
734. Set METER RANGE switch (7) to 2V.
735. Set CIRCUIT SELECT TENS switch (8) to 30.
736. Set CIRCUIT SELECT A UNITS switch (18) to 7.
737. Set CIRCUIT SELECT A/B SELECT switch (9) to A. Read and record V1 AC/DC VOLTMETER (10) reading. Reading shall be be –**0.030 to +0.030**.
738. Remove cap (73) from fitting (74) on back of tester (75).
739. Connect hose (76) (APP E-36) to fitting (74) and port L (77) on computer (69).
740. Connect cable (78) to receptacle (79) and **115 volt 60 Hz** bench power supply.



CAUTION

Do not operate tester with the reservoir dry for more than **10 seconds** as it will damage the motor pump assembly. Operation of the tester with excessive oil in the vacuum or pressure sumps will damage the instruments and valves. Do not change position of pressure or vacuum selector knobs when pump motor is running, as serious damage to instruments on tester can result.

CAUTION

When pressure or vacuum selector knob is in a test position, the other selector knob must be in the OFF position to prevent damage to instruments.

741. Set PRESSURE knob (80) to **20-250 KNOTS**.

742. Set power switch (81) to ON.

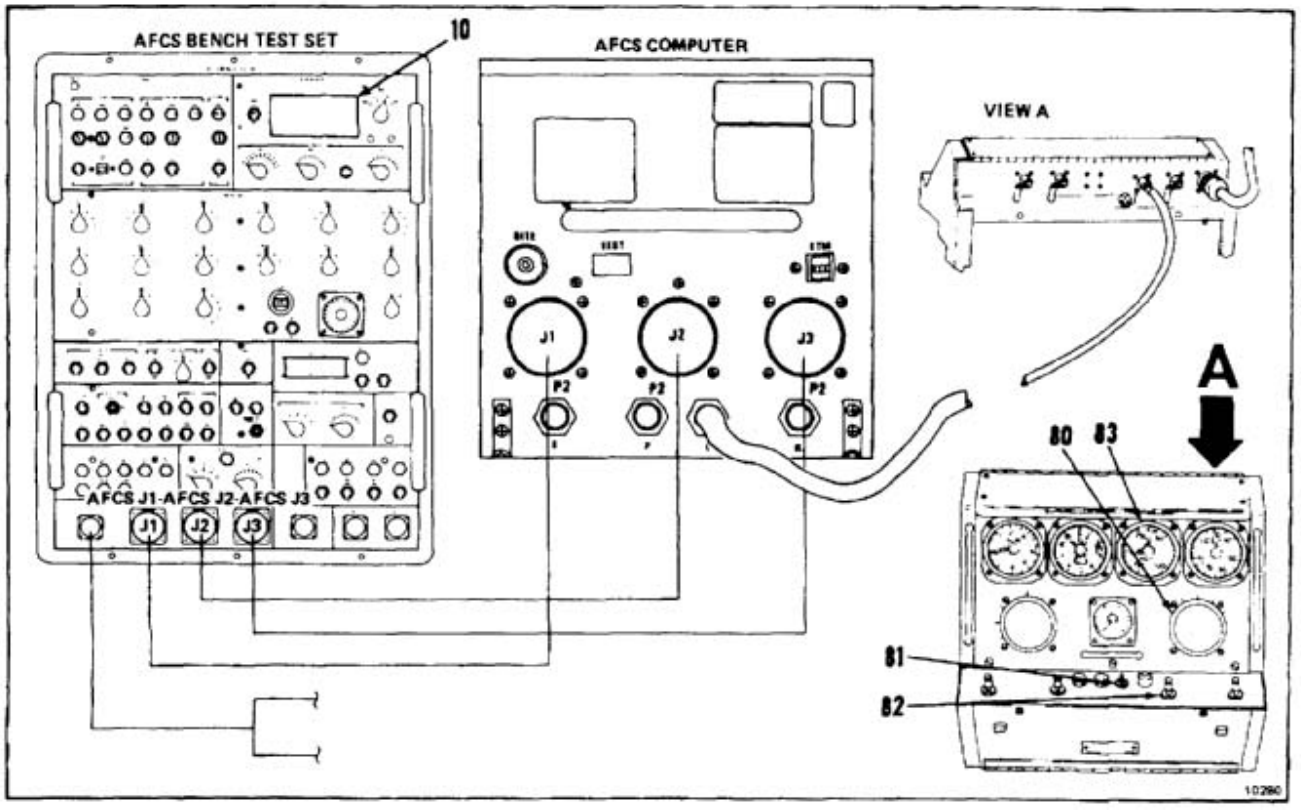
743. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads 40. Turn knob fully clockwise. Read and record V2 AC/DC VOLTMETER (10) reading.

744. CalculateV3. Subtract reading of step 737 from reading of step 743 (V3 = V2 – V1). Result shall be –**0.104 to** –**0.120**.

745. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads 165. Turn knob fully clockwise. Read and record V4 AC/DC VOLTMETER (10) reading.

746. Calculate V5. Subtract reading of step 737 from reading of step 745 (V5 = V4 – V1). Result shall be –**1.692 to** –**1.946**.

747. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads 145. Turn knob fully clockwise. Read and record V6 AC/DC VOLTMETER (10) reading.



11-277 BENCH TEST AFCS COMPUTER (AVIM) (Continued) 11-277

748. Wait **5 minutes**. Read and record V7 AC/DC VOLTMETER (10) reading.

749. CalculateV8. Subtract reading of step 747 from reading of step 748 (V8 = V7 – V6). Reading shall be **0.000 to +0.200**.

750. Set power switch (81) to OFF.

CAUTION

Do not disconnect hose assemblies from tester or change position of vacuum or pressure selector knobs before all instruments return to their normal readings, as the instruments involved can be damaged.

751. Slowly turn INCREASE knob (82) and DECREASE knob (84) fully clockwise.

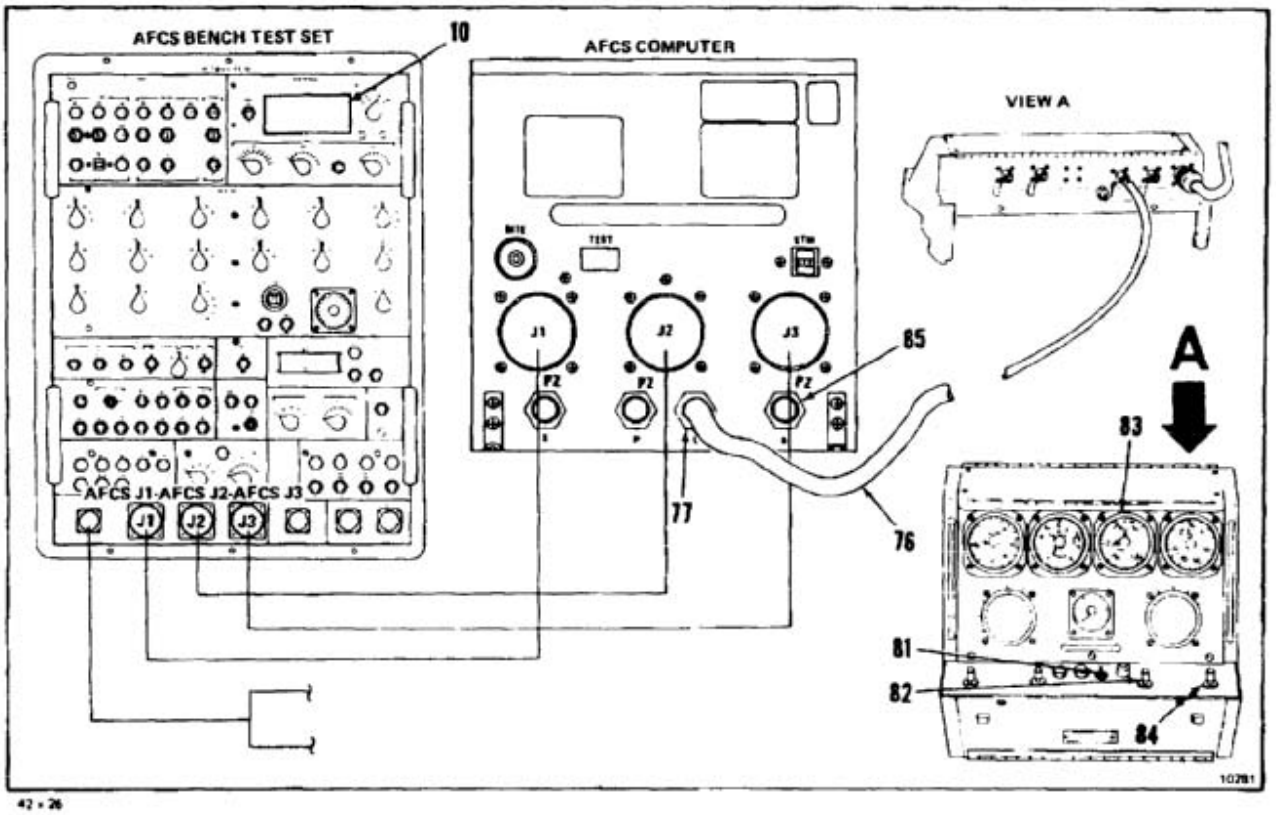
752. When KNOTS indicator (83) reads 0 indication, disconnect hose (76) from port L (77).

753. Connect hose (76) (APP E-36) to port R (85).

754. Set power switch (81) to ON.

755. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads 60. Turn knob fully clockwise. Read and record V9 AC/DC VOLTMETER (10) reading.

756. CalculateV10. Subtract reading of step 737 from reading of step 755 (V10 = V9 – V1). Result shall be **+0.208 to +0.240**.



757. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads 80. Turn knob fully clockwise. Read and record V11 AC/DC VOLTMETER (10) reading.

758. Calculate V12. Subtract reading of step 737 from reading of step 752 (V12 = V11 – V1). Result shall be **+0.417 to +0.479**.

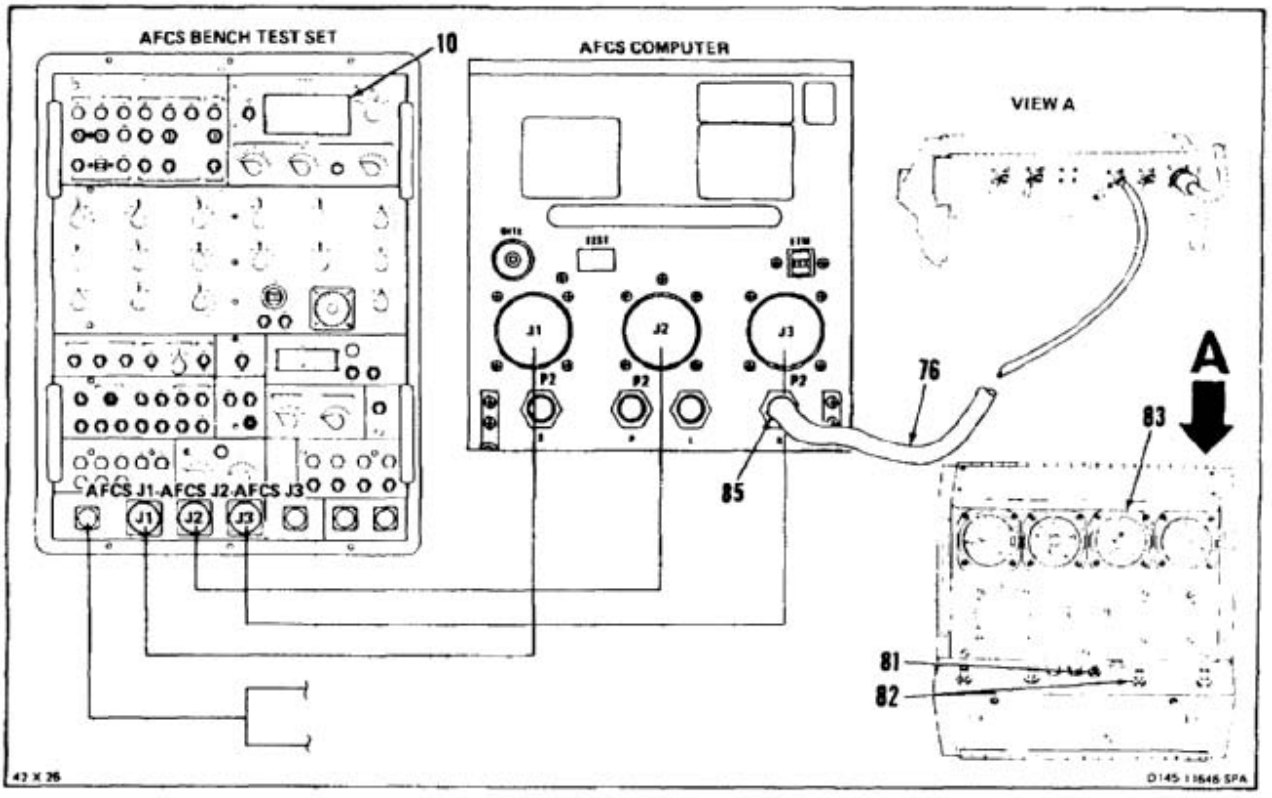
759. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads 115. Turn knob fully clockwise. Read and record V13 AC/DC VOLTMETER (10) reading.

760. Calculate V14. Subtract reading of step 737 from reading of step 759 (V14 = V13 – V1). Result shall be **+0.833 to +0.960**.

761. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads 165. Turn knob fully clockwise. Read and record V15 AC/DC VOLTMETER (10) reading.

762. Calculate V16. Subtract reading of step 737 from reading of step 761 (V16 = V15 – V1). Result shall be **+1.692 to +1.946**.

763. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads 150. Turn knob fully clockwise. Read and record V17 AC/DC VOLTMETER (10) reading.



11-277 BENCH TEST AFCS COMPUTER (AVIM) (Continued) 11-277

764. Wait 5 minutes. Read and record V18 AC/DC VOLTMETER (10) reading.

765. Calculate V19. Subtract reading of step 763 from reading of step 764 (V19 = V18 – V17). Result shall be **0.000 to –0.200**.

766. Set power switch (81) to OFF.

767. Slowly turn INCREASE knob (82) and DECREASE knob (84) fully counterclockwise.

CAUTION

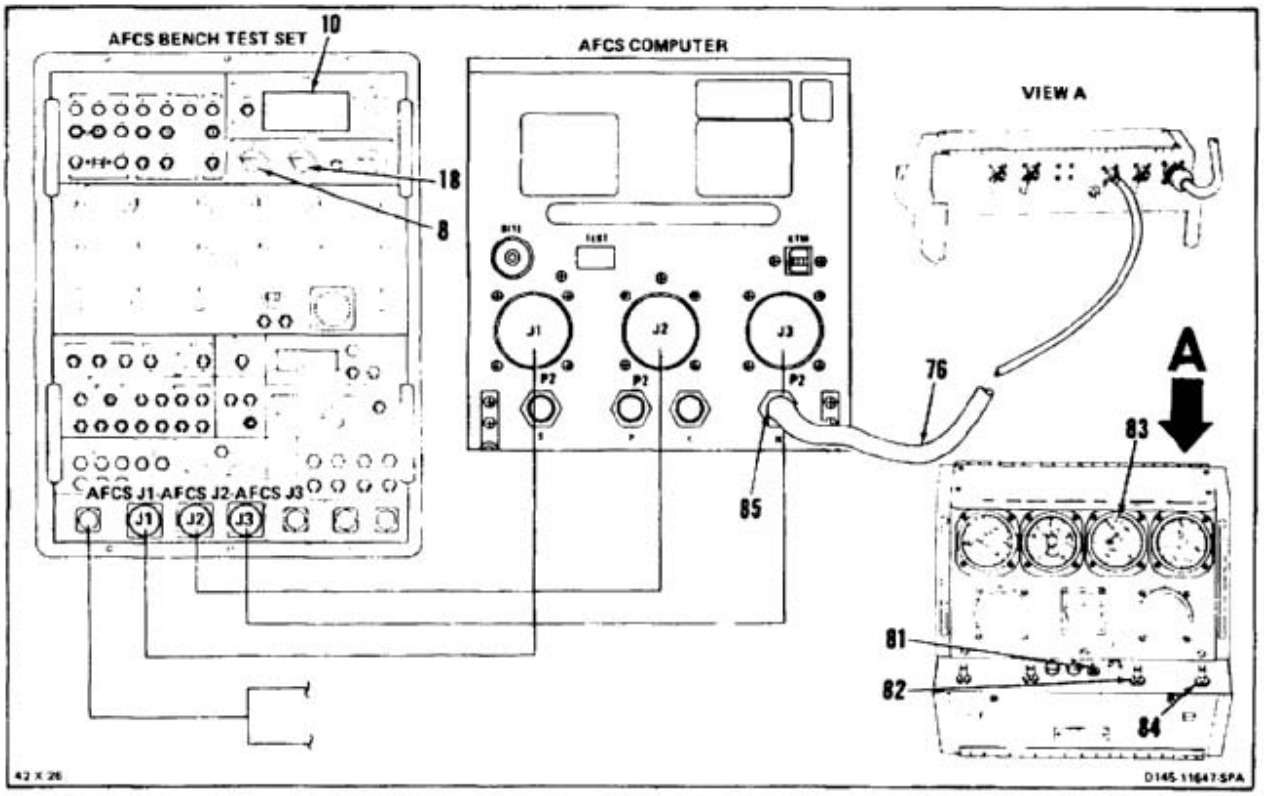
Do not disconnect hose assemblies from tester or change position of vacuum or pressure selector knobs before all instruments return to their normal readings, as the instruments involved can be damaged.

768. When KNOTS indicator (83) reads 0, disconnect hose (76) from port R (85).

769. Turn INCREASE knob (82) and DECREASE knob (84) fully clockwise.

770. Set CIRCUIT SELECT TENS switch (8) to 40.

771. Set CIRCUIT SELECT A UNITS switch (18) to 0. Read and record V20 AC/DC VOLTMETER (10) reading. Reading shall be **–0.030 to +0.030**.



772. Connect hose (76) (APP E-36) to port P (86).

772.1. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads **35**. Turn knob fully clockwise.

772.2. Check HDG ENABLE lamp (86.1) is OFF.

773. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads **40**. Turn knob fully clockwise. Read and record V21 AC/DC VOLTMETER (10) reading.

774. Calculate V22. Subtract reading of step 771 from reading of step 773 (V22 = V21 – V20). Reading shall be –**0.141 to** –**0.173**.

774.1. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads **45**. Turn knob fully clockwise.

774.2. Check HDG ENABLE lamp (86.1) is ON.

775. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads **50**. Turn knob fully clockwise. Read and record V23 AC/DC VOLTMETER (10) reading.

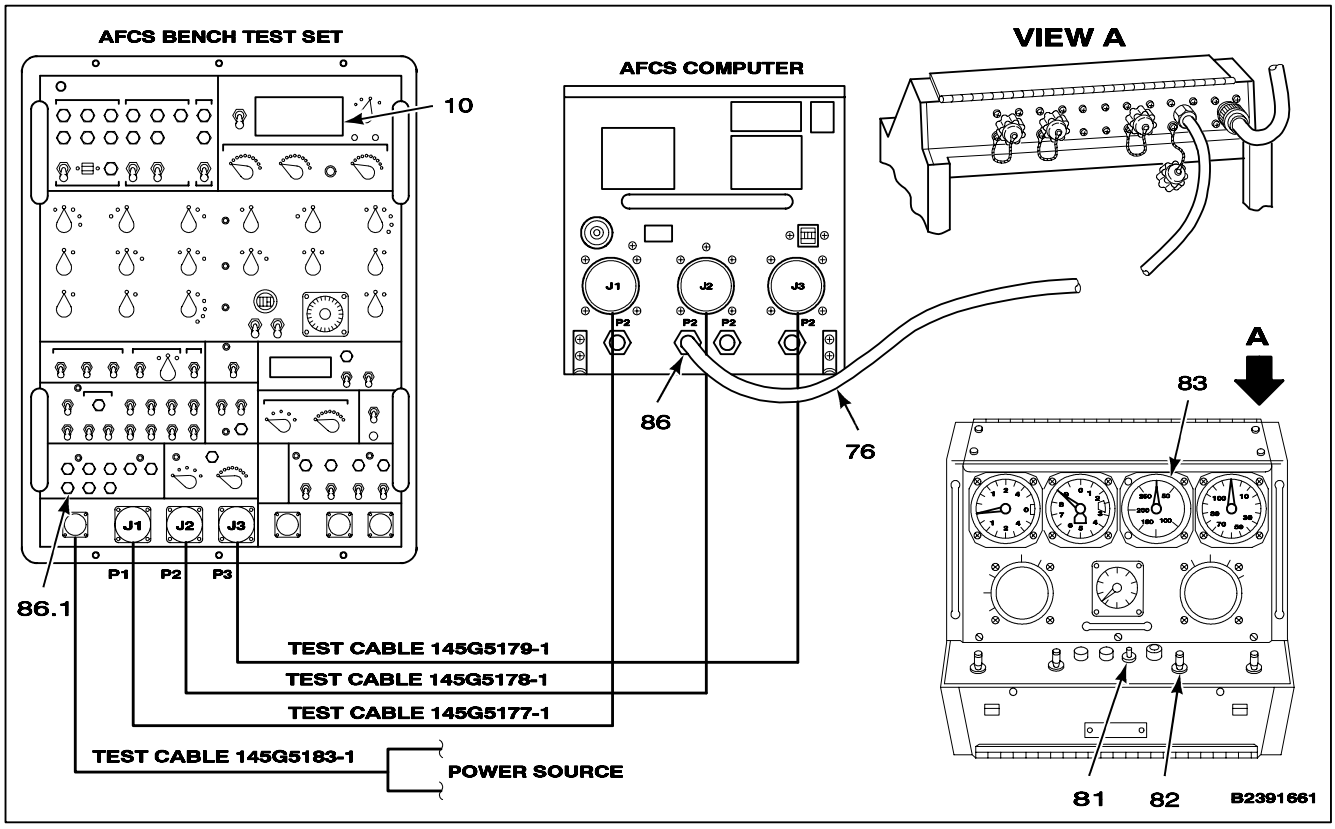
776. Calculate V24. Subtract reading of step 771 from reading of step 775 (V24 = V23 – V20). Result shall be –**0.225 to** –**0.275**.

776.1. Deleted.

777. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads **100**. Turn knob fully clockwise. Read and record V25 AC/DC VOLTMETER (10) reading.

778. Calculate V26. Subtract reading of step 771 from reading of step 777 (V26 = V25 – V20). Result shall be –**0.900 to** –**1.100**.

779. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads **150**. Turn knob fully clockwise.



780. Set METER RANGE switch (7) to 20V. Read and record V27 AC/DC VOLTMETER (10) reading.

781. Calculate V28. Subtract reading of step 771 from reading of step 780 (V28 = V27 – V20). Result shall be –**2.023 to** –**2.473**.

782. Slowly turn INCREASE knob (82) counterclockwise until KNOTS indicator (83) reads **200**. Turn knob fully clockwise. Read and record V29 AC/DC VOLTMETER (10) reading.

783. Calculate V30. Subtract reading of step 771 from reading of step 782 (V30 = V29 – V20). Result shall be –**3.597 to** –**4.397**.

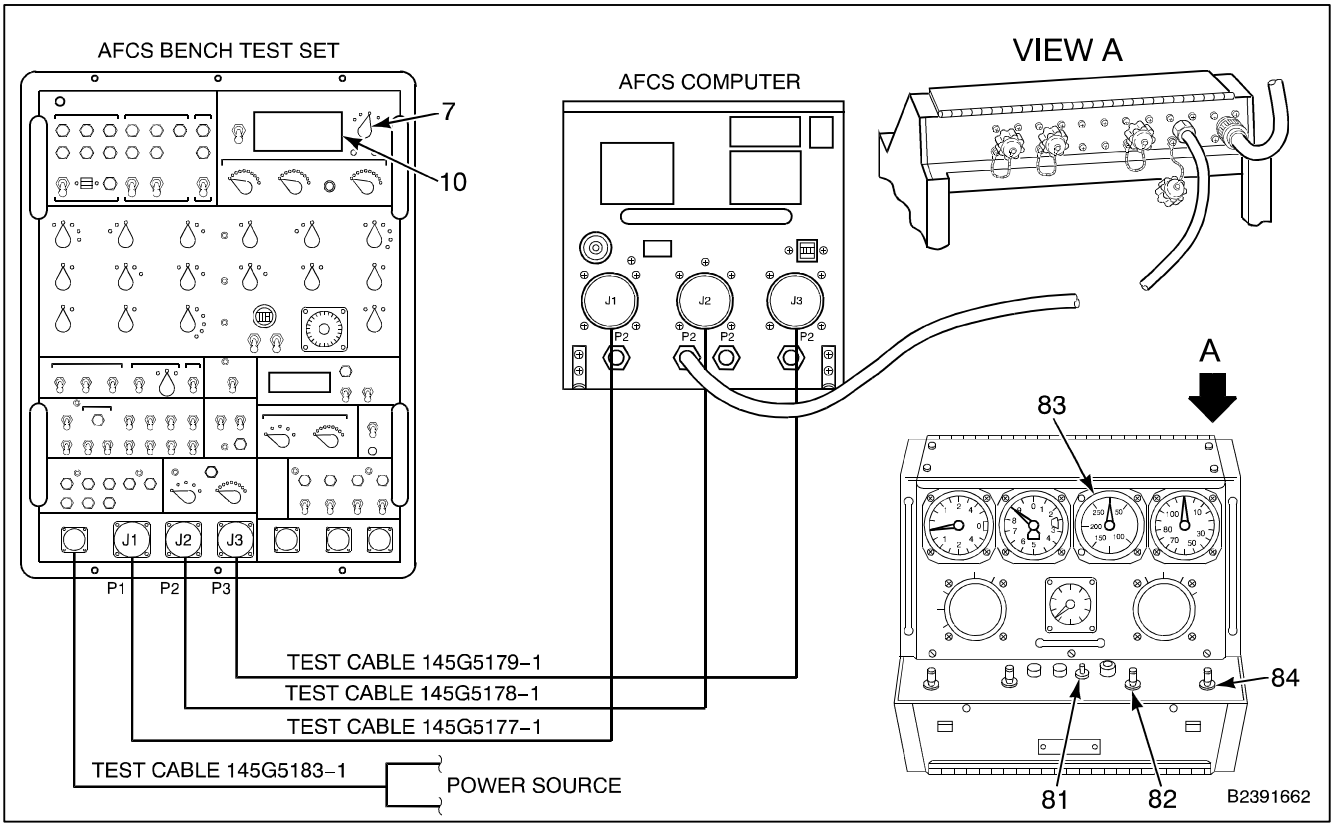
784. Slowly turn INCREASE knob (82) until KNOTS indicator (83) reads **160**. Turn knob fully clockwise. Read and record V31 AC/DC VOLTMETER (10) reading.

785. Wait **5 minutes**. Read and record V32 AC/DC VOLTMETER (10) reading.

786. Calculate V33. Subtract reading of step 784 from reading of step 785 (V33 = V32 – V31). Result shall be **0.000 to +0.200**.

787. Set power switch (81) to OFF.

788. Slowly turn INCREASE knob (82) and DECREASE knob (84) fully counterclockwise.



CAUTION

Do not disconnect hose assemblies from tester or change position of vacuum or pressure selector knobs before all instruments return to their normal readings, as the instruments involved can be damaged.

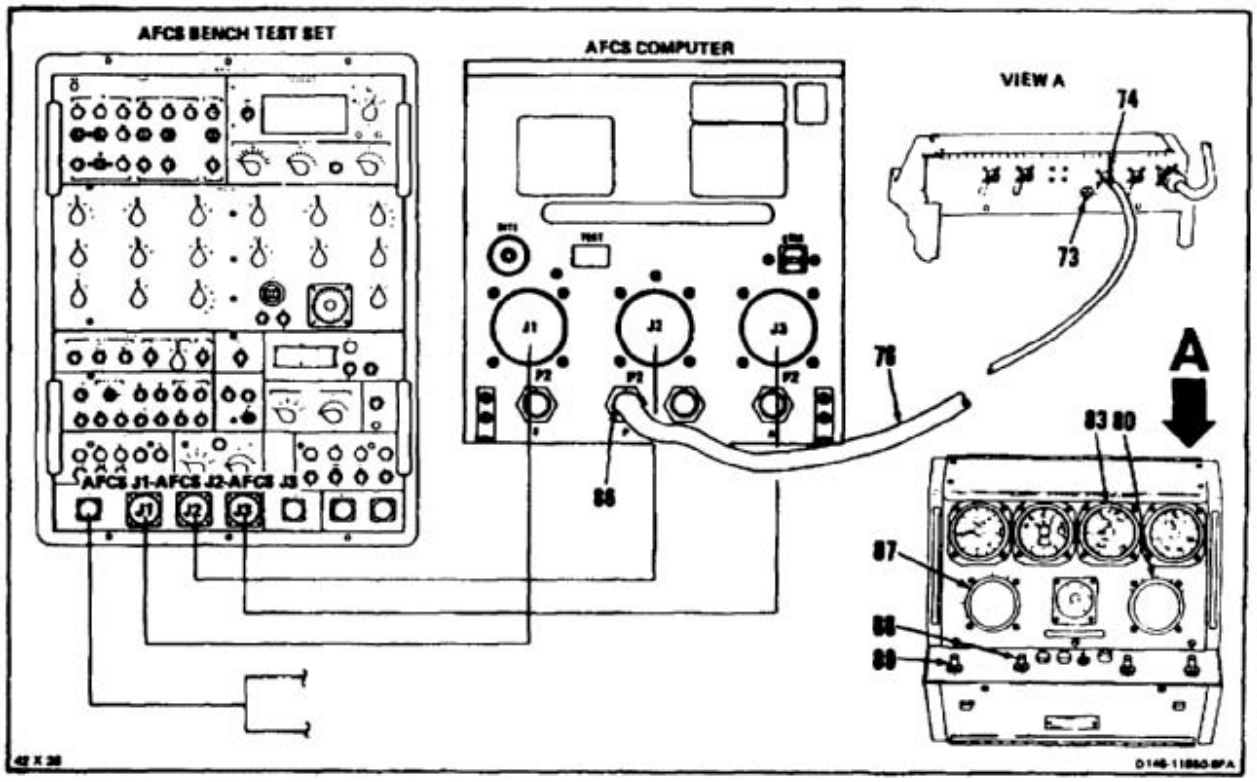
789. When KNOTS indicator (83) reads 0, disconnect hose (76) from port P (86) and fitting (74).

790. Install cap (73) on fitting (74).

791. Set PRESSURE knob (80) to OFF.

792. Set VACUUM knob (87) to ALT & R.O.C. **0 - 50,000 FT**.

793. Set INCREASE knob (88) and DECREASE knob (89) fully clockwise.



CAUTION

The case leak valve levers must be in these positions, and the safety valve closed, to isolate the airspeed indicator from the vacuum source; otherwise, damage to the instrument can occur.

794. Open cover (90).

795. Set lever (91) to NOR and lever (92) to CL. Close cover (90).

796. Turn knob (93) fully clockwise.

797. Remove cap (94) from fitting (95).

CAUTION

Hose assembly must be connected to both pitot and static ports; otherwise, damage to airspeed differential pressure transducer can occur.

798. Connect hose (96) (APP E-37) to fitting (95), port S (97), and port P (86).

798.1. Set pressure knob (80) to MANIFOLD PRESSURE.

798.2. Check MANIFOLD PRESSURE indicator (97.1). Indicator shall read **30** (sea level). Adjust pressure if necessary (TM 55-4920-378-14).

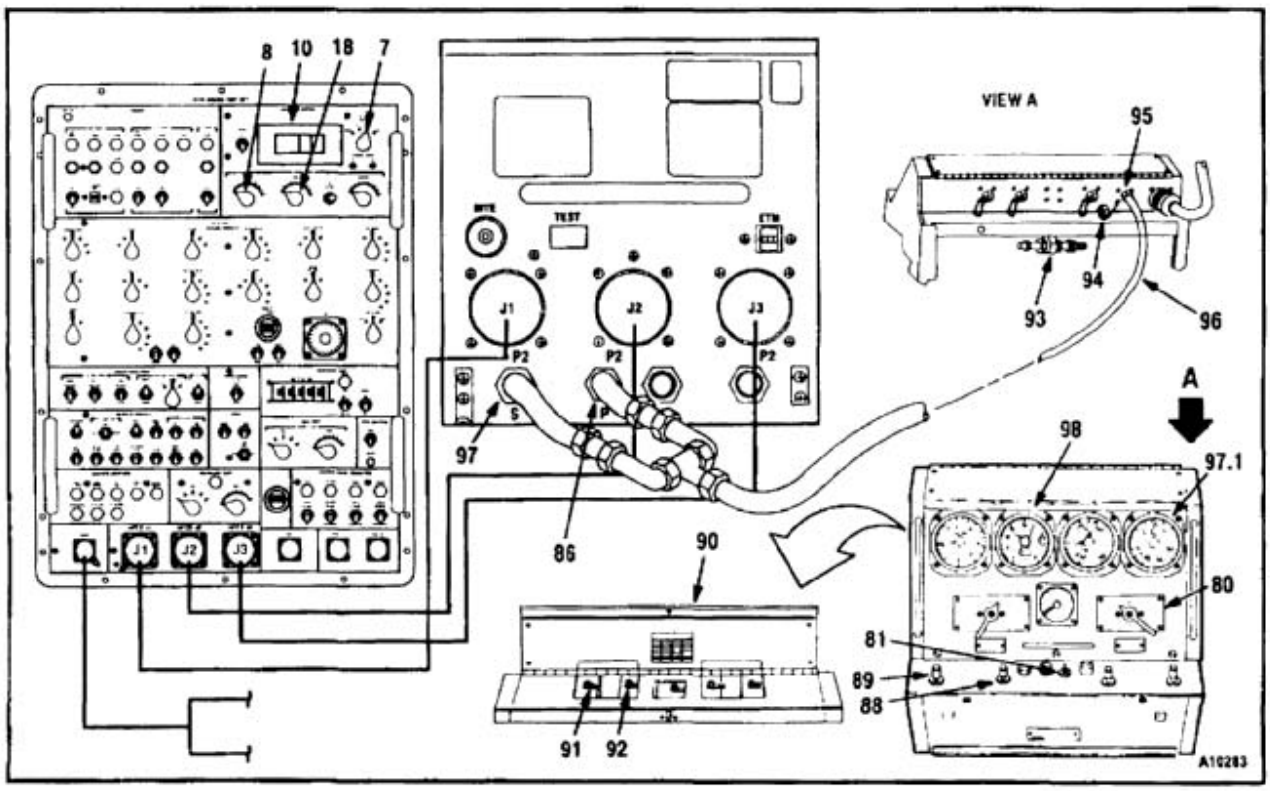
799. Set CIRCUIT SELECT TENS switch (8) to 60.

800. Set CIRCUIT SELECT A UNITS switch (18) to 3.

801. Set METER RANGE switch (7) to 200MV.

802. Set power switch (81) to ON. Read AC/DC VOLTMETER (10). Reading shall be **–0.05 to +0.05**.

803. Slowly turn INCREASE knob (88) counterclockwise until ALT indicator (98) reads **1000 feet**. Turn knob fully clockwise.



804. Set CONTROL PANEL SIMULATION BARO switch (22) to ENGAGE.

805. Slowly turn DECREASE knob (89) clockwise until ALT indicator (98) reads **1098 feet**. Turn knob fully clockwise.

806. Set CIRCUIT SELECT A UNITS switch (18) to 0.

807. Set METER RANGE switch (7) to 20V. Read AC/DC VOLTMETER (10). Reading shall be **−2.78 to −5.16**.

808. Set CIRCUIT SELECT A UNITS switch (18) to 4.

809. Set METER switch (6) to AC. Read AC/DC VOLTMETER (10). Reading shall be **+2.55 to +4.75**.

810. Set METER switch (6) to DC.

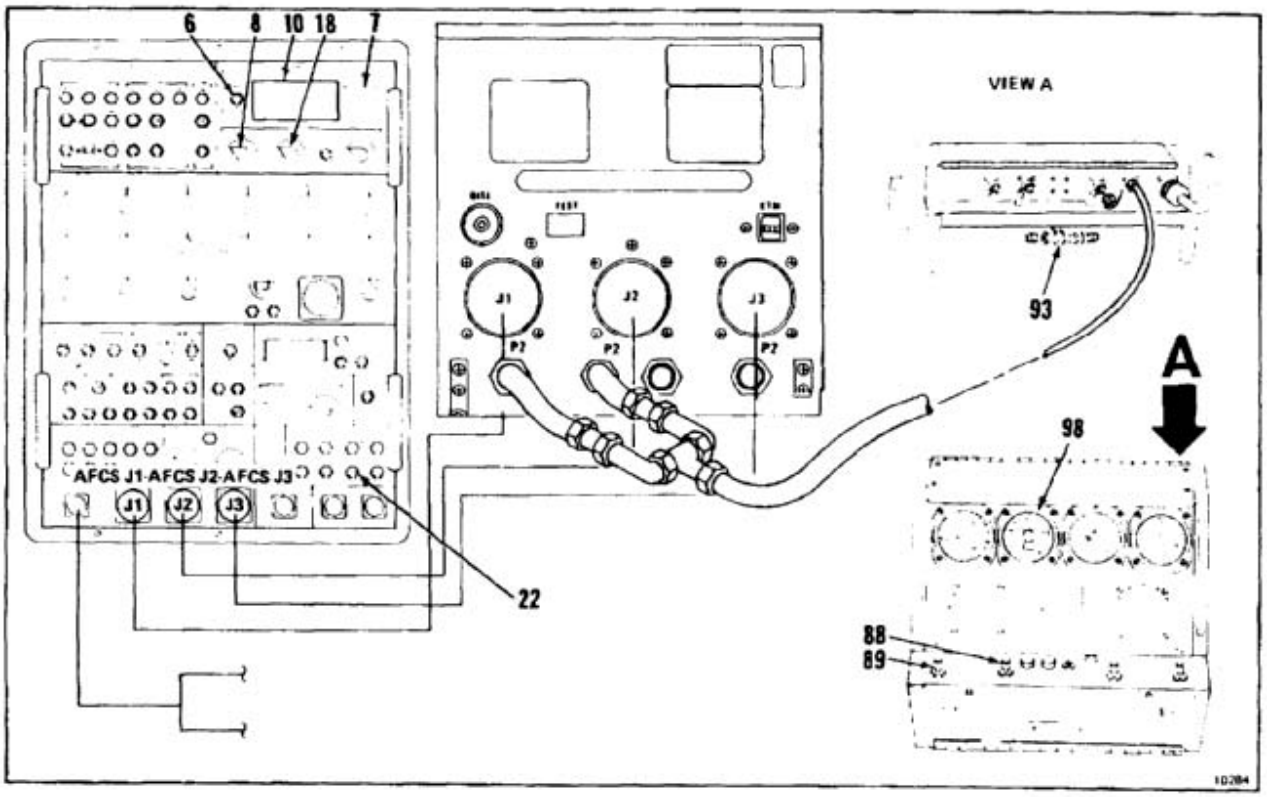
811. Set CIRCUIT SELECT A UNITS switch (18) to 3.

812. Set CONTROL PANEL SIMULATION BARO switch (22) to DISENG.

813. Slowly turn INCREASE knob (88) counterclockwise until ALT indicator (98) reads **10,000 feet**. Turn knob fully clockwise. Read AC/DC VOLTMETER (10). Reading shall be **+1.00 to +1.35**.

814. Slowly turn INCREASE knob (88) counter clockwise until ALT indicator (98) reads **20,000 feet**.

815. Turn DECREASE knob (89) counterclockwise to maintain 20,000 reading on ALT indicator (98). Read AC/DC VOLTMETER (10). Reading shall be **+2.00 to +2.71**.



816. Turn INCREASE knob (88) and DECREASE knob (89) fully clockwise. Read and record V34 AC/DC VOLTMETER (10) reading.

817. Wait **5 minutes**. Read and record V35 AC/DC VOLTMETER (10).

818. Calculate V36. Subtract reading of step 817 from reading of step 816 (V36 = V34 – V35). The absolute value of the reading shall be **0.00 to +0.03**.

819. Set power switch (81) to OFF.

820. Turn INCREASE knob (88) and DECREASE knob (89) fully clockwise.

CAUTION

Do not disconnect hose assemblies from tester or change position of vacuum or pressure selector knobs before all instruments return to their normal readings; otherwise, instruments can be damaged.

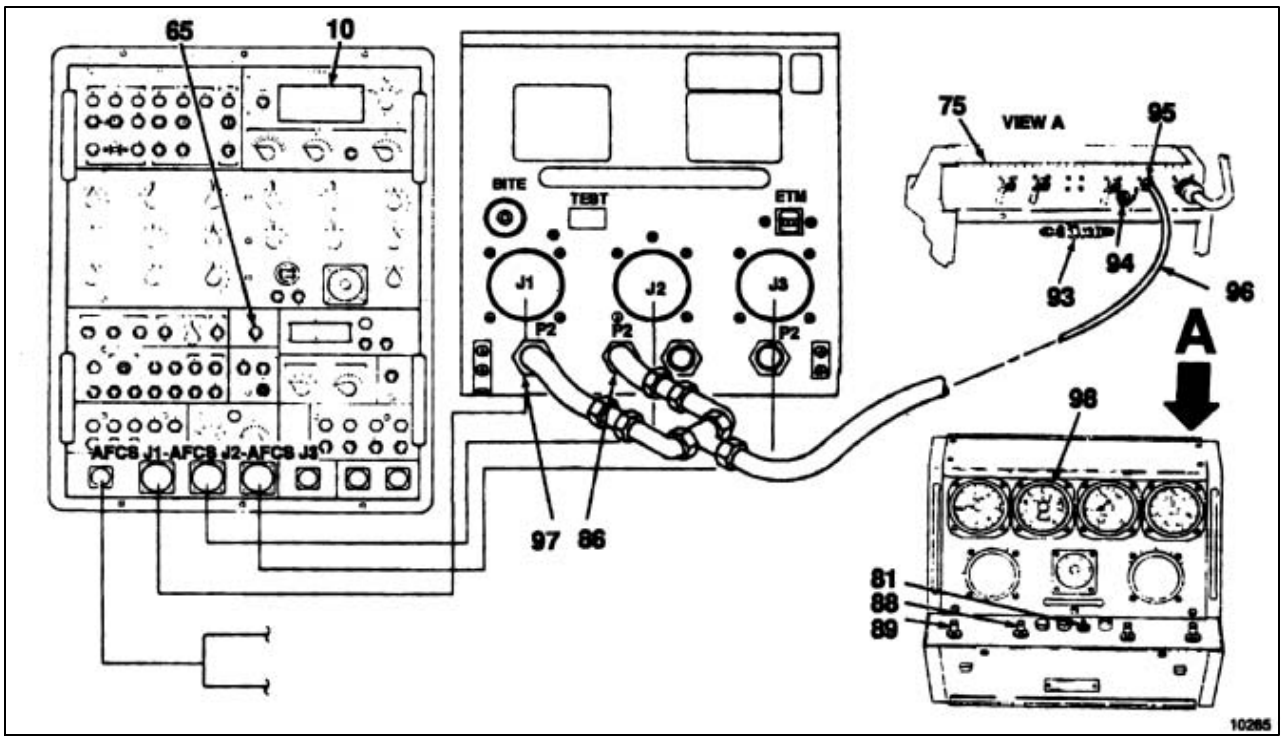
821. When ALT indicator (98) reads 0 disconnect hose (96) from port 5 (97), port P (86), and fitting (95).

822. Install cap (94) on fitting (95).

823. Remove power source from tester (75).

824. Set NORM ACCEL J2-52 switch (65) to NORM.

END PRESSURE TRANSDUCER TEST



TEST 13

BITE TEST

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

825. Set POWER switches (1, 2, and 62) to ON.

826. Set METER RANGE switch (7) to 20V.

827. Set ANALOG SIGNALS PITCH HSI switch (54) to HSI.

828. Set ANALOG SIGNALS SIGNAL GND switch (41) to SIGNAL.

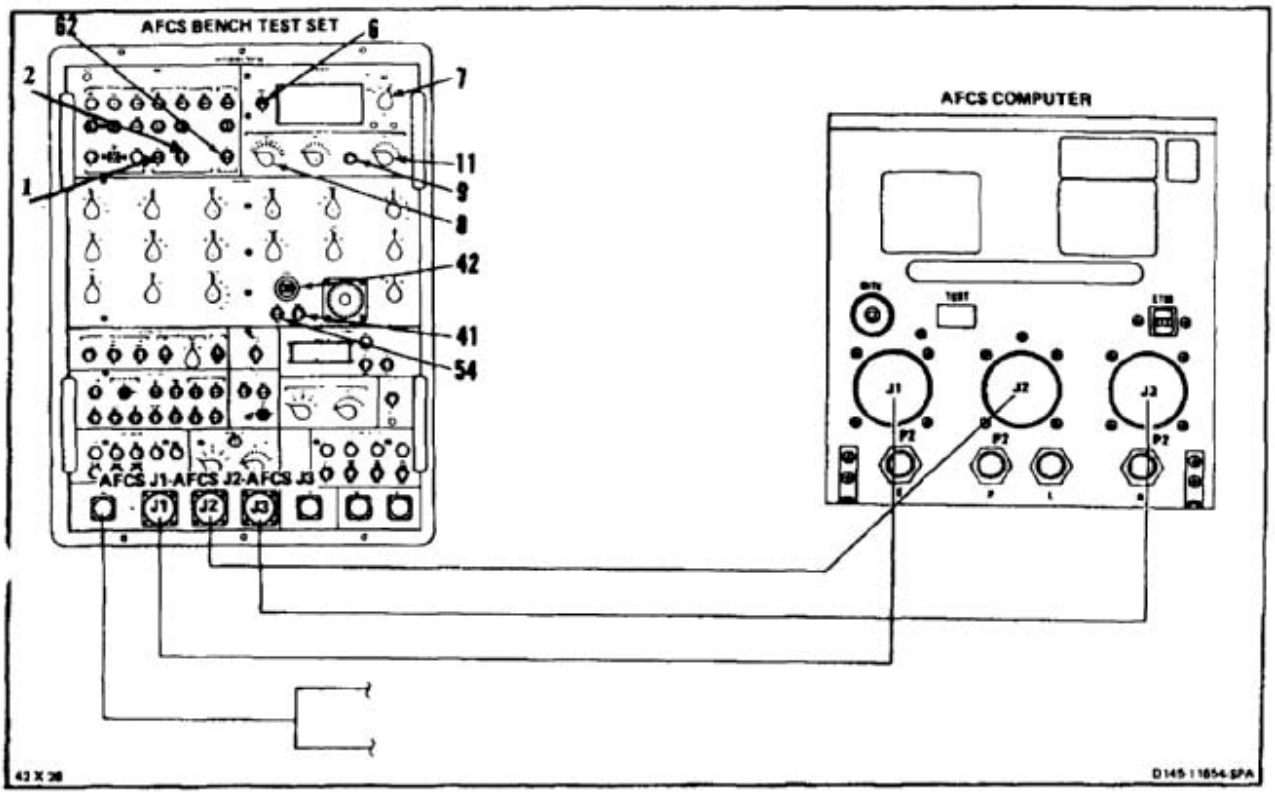
829. Set METER switch (6) to AC. Turn on switches No. 1 and No. 2.

830. Set CIRCUIT SELECT TENS switch (8) to 20.

831. Set CIRCUIT SELECT B UNITS switch (11) to 6.

832. Set CIRCUIT SELECT A/B SELECT switch (9) to B.

833. Adjust ANALOG SIGNALS PITCH ATT HSI pot. (42) towards 39 until AC/DC VOLTMETER (10) reads 10.87.



11-277 BENCH TEST AFCS COMPUTER (AVIM) (Continued) 11-277

834. Set SERVO SIMULATION panel switches as follows:

a. ILCA SIMULATION PITCH switch (48), ROLL switch (52), and YAW switch to OPERATE.

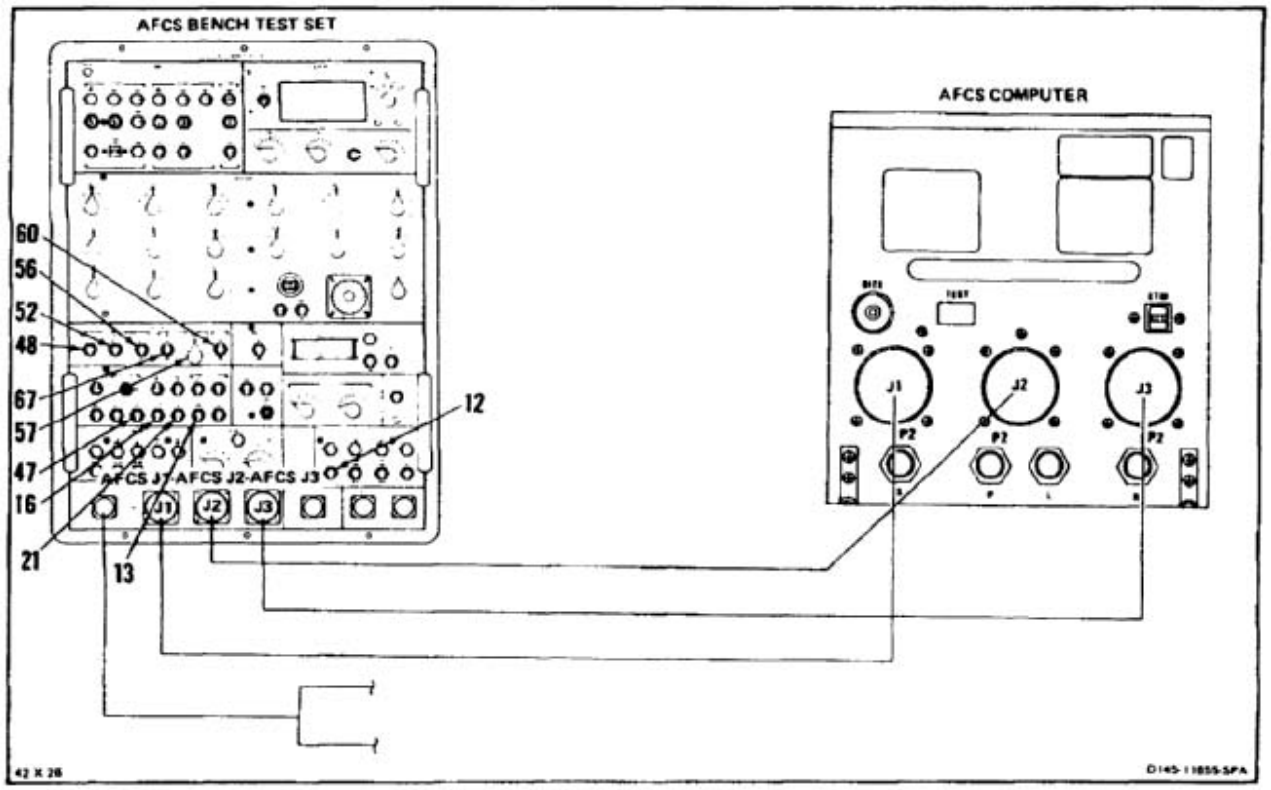
b. ACTUATOR SIMULATION CCDA switch (67) to NORM and DASH switch (57) to TF2.

c. LCT switch (60) to NORM.

835. Set DISCRETE SIGNALS panel switches as follows:

a. LDG GEAR switch (47), VERT GYRO VALID switch (16), ALT VALID switch (21), and HYD PRESS (13) to 1.

836. Set CONTROL PANEL SIMULATION AFCS switch (12) to SELECT.



837. Set BITE CONTROL switch (99) to STEP.

838. Set DISCRETE SIGNALS ENG COND LEVER switch (100) to 0.

839. Press and release computer BITE switch (101). Switch shall not illuminate.

840. Set DISCRETE SIGNALS ENG COND LEVER switch (100) to 1.

841. Press and hold BITE CONTROL INITIATE switch (102). Computer TEST indicator (103) shall display 88.

NOTE

Computer BITE lamp flashes when sequence is running.

Computer BITE lamp shall stay on when stopped on a failed test.

Computer BITE lamp shall be off when sequence is completed.

Sequence may pause on a given test with computer BITE lamp flashing up to **20 seconds** before decision is made.

842. Release BITE CONTROL INITIATE switch (102). Wait **30 seconds**.

843. Set BITE CONTROL switch (99) to RUN.

844. Press and release computer BITE switch (101). Switch shall illuminate and TEST indicator (103) shall stop and display 03.

845. Press and release computer BITE switch (101). Switch shall flash and computer TEST indicator (103) shall sequence with no failures. BITE switch shall stop flashing and be off at end of sequence.

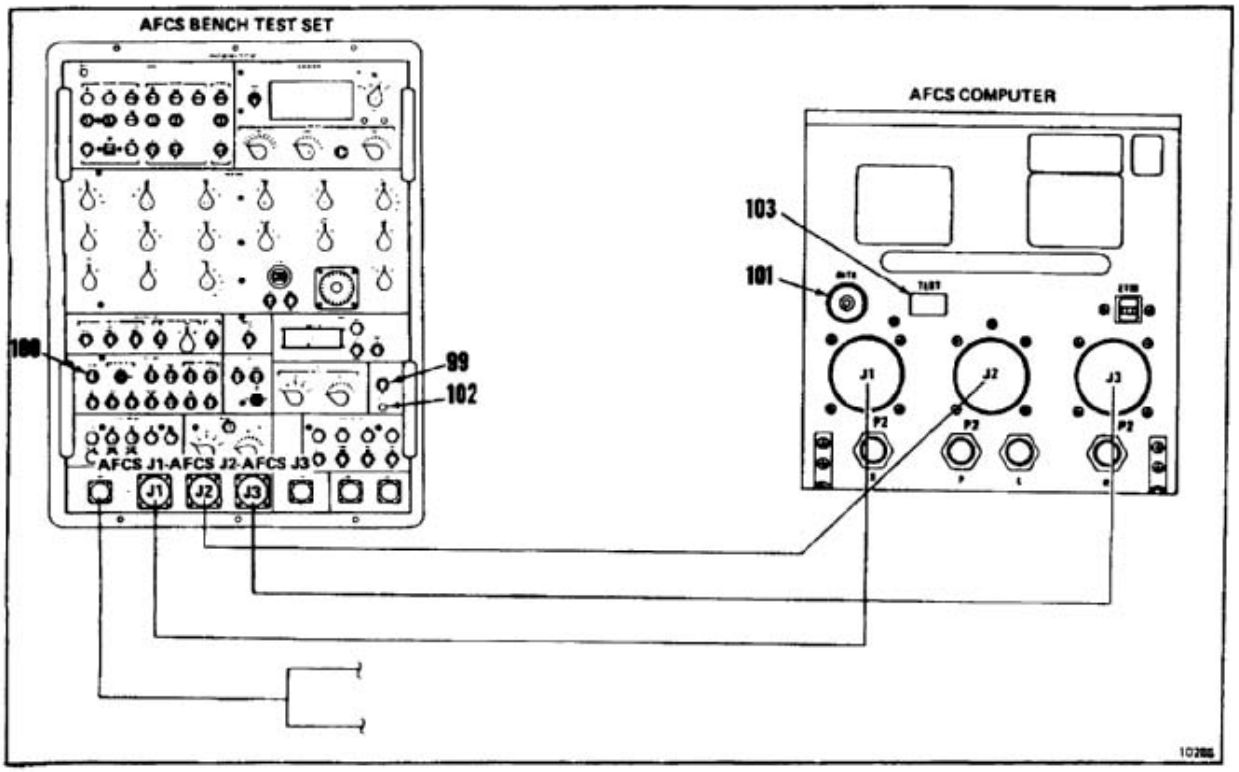
INSPECT

END AFCS BENCH TEST COMPUTER

846. Shut down AFCS bench test set 145G0008-1 (TM 55-4920-430-13).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-278 INSTALL NO. 1 OR NO. 2 AFCS COMPUTER 11-278

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

Parts:

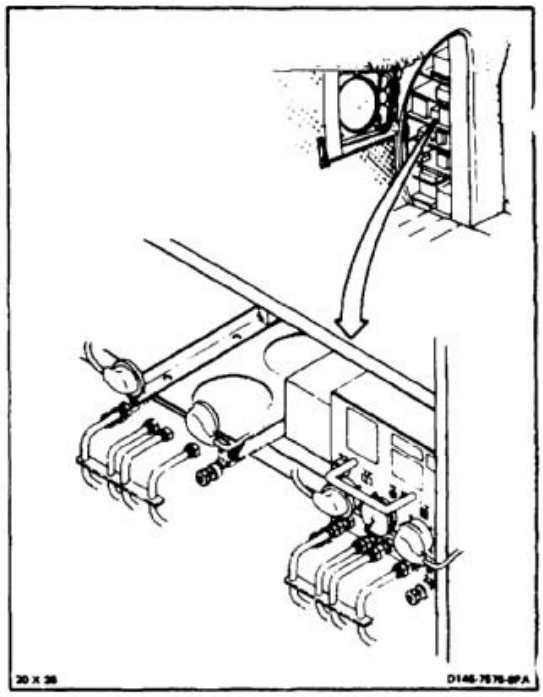
None

Personnel Required:

Medium Helicopter Repairer
Inspector

References:

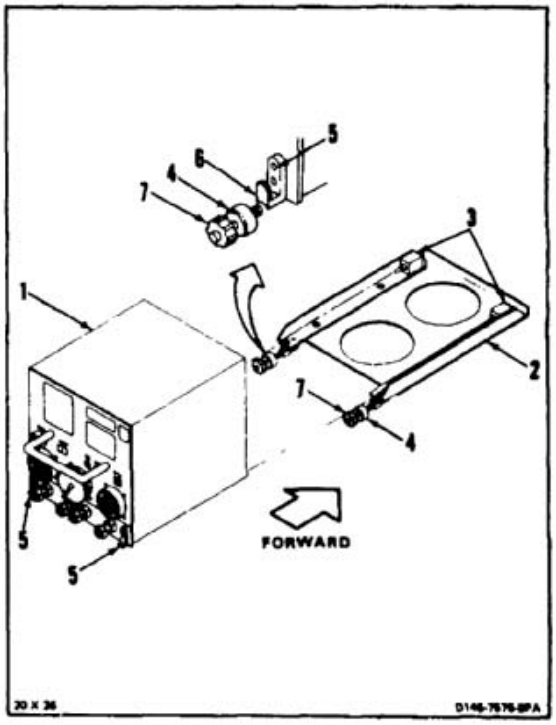
TM 55-1520-240-23P



NOTE

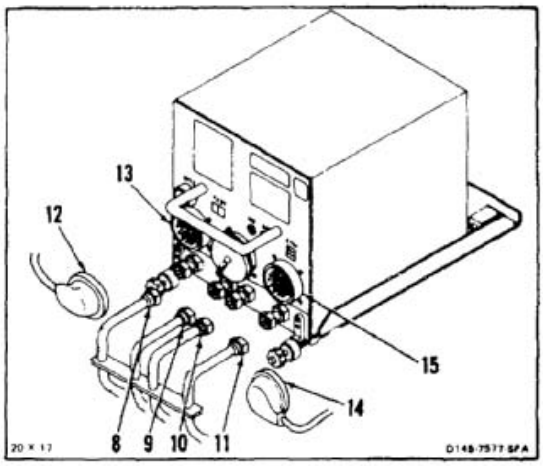
Procedure is same to install No. 1 or No. 2 AFCS computers. No. 1 computer is shown here.

1. Position AFCS computer (1) on mounting base (2). Push computer forward until two pins (3) slide into back of computer.
2. Position two collars (4) on computer fittings (5). Check lip (6) of fitting is inside collar. Tighten two knobs (7).



3. Connect STATIC PRESS hose (8). Remove tag.
4. Connect L.H. PILOT PRESS hose (9). Remove tag.
5. Connect L.H. SIDESLIP hose (10). Remove tag.
6. Connect R.H. SIDESLIP hose (11). Remove tag.
7. Connect connector (12) to receptacle (13). Remove tag.
8. Connect connector (14) to receptacle (15). Remove tag.

INSPECT



FOLLOW-ON MAINTENANCE:

Perform operational check of advanced flight control system (AFCS) (TM 55-1520-240-T).
Install electronic compartment acoustic blanket (Task 2-108).

END OF TASK

11-278.1 REMOVE ROLL ERECT CUTOUT RELAY 11-278.1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

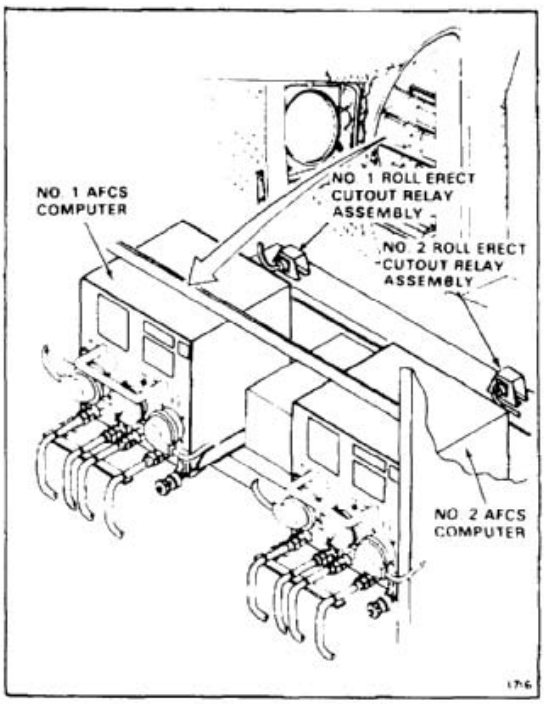
None

Personnel Required:

Medium Helicopter Repairer

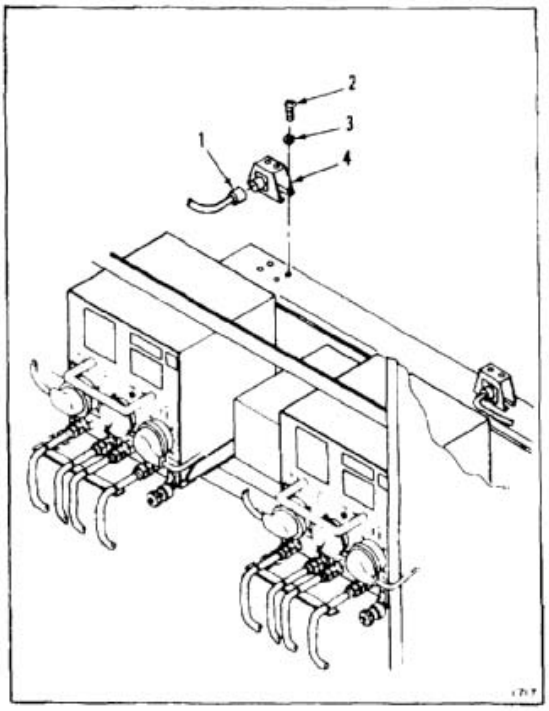
Equipment Condition:

Battery Disconnected (Task 1-39)
Electrical Power Off
Hydraulic Power Off
Electronic Compartment Acoustic Blanket Removed (Task 2-107)
No. 1 or No. 2 AFCS Computer Removed, As Applicable (Task 11-274)



NOTE

Procedure is same to remove No. 1 or No. 2 roll erect cutout relay assemblies. No. 1 relay assembly is shown here.



1. Disconnect electrical connector (1).
2. Remove four screws (2) and washers (3).
3. Remove roll erect cutout relay assembly (4).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-278.2 DISASSEMBLE ROLL ERECT CUTOUT RELAY ASSEMBLY 11-278.2

INITIAL SETUP

Applicable Configurations:

All

Tools:

Tool Kit, Electronic Equipment TK-105/G, NSN 5180-00-610-8177
Contact Insertion/Removal Tool M83723-31-20

Materials:

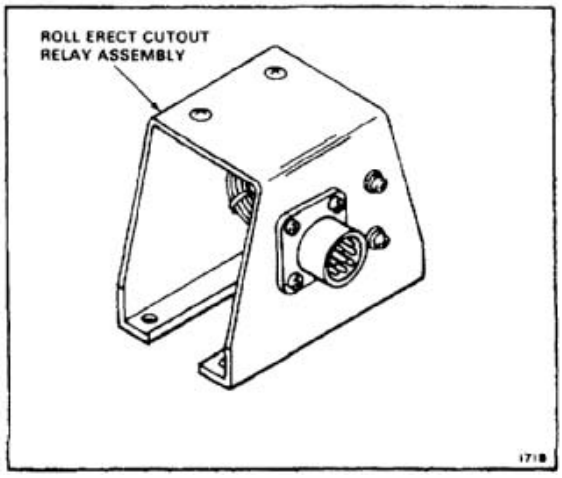
Tags (E264)

Personnel Required:

Avionic Flight Control and Navigation Equipment Repairer

Equipment Condition:

Off Helicopter Task

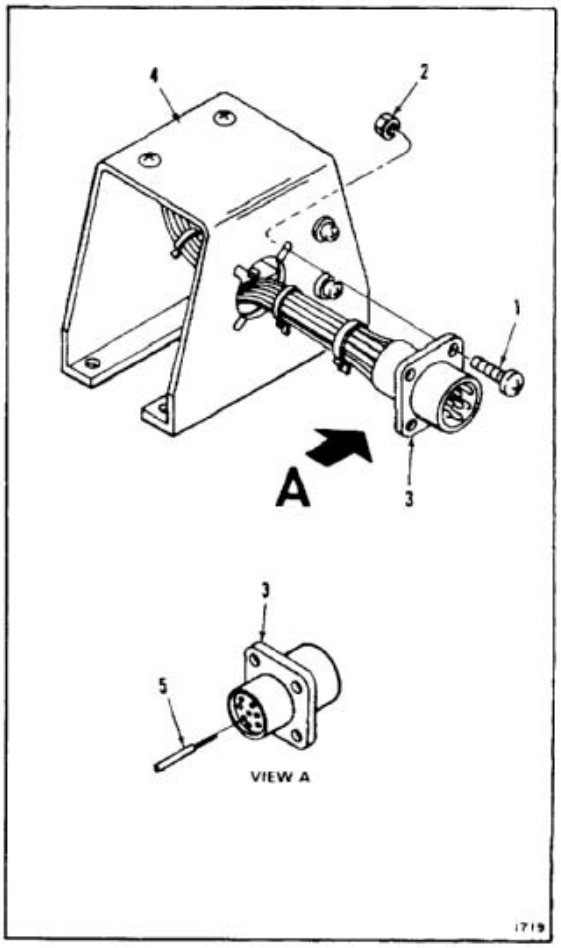


NOTE

Procedure is same to disassemble No. 1 or No. 2 roll erect cutoff relay assembly. No. 1 relay assembly is shown here.

REMOVE CONNECTOR

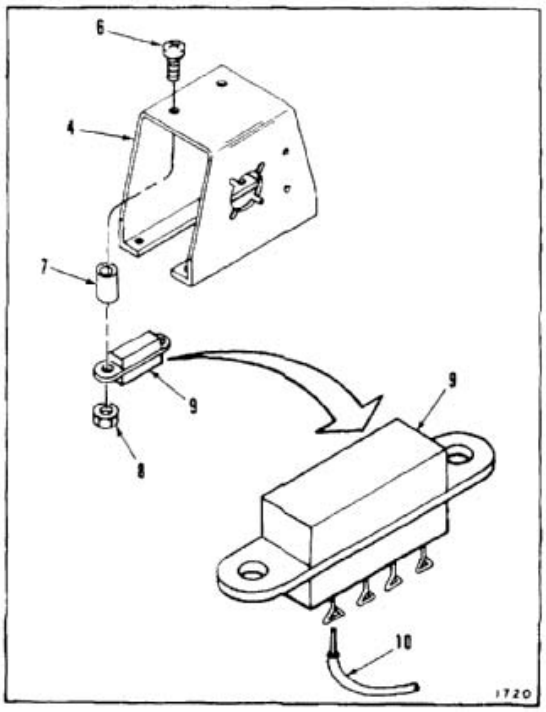
1. Remove four screws (1) and nuts (2). Pull connector (3) out of support (4).
2. Tag and disconnect five wires (5). Use contact insertion/removal tool.



11-278.2 DISASSEMBLE ROLL ERECT CUTOUT RELAY ASSEMBLY (Continued) 11-278.2

REMOVE RELAY

3. Remove two screws (6), spacers (7), and nuts (8). Pull relay (9) from support (4).
4. Tag and unsolder four wires (10).

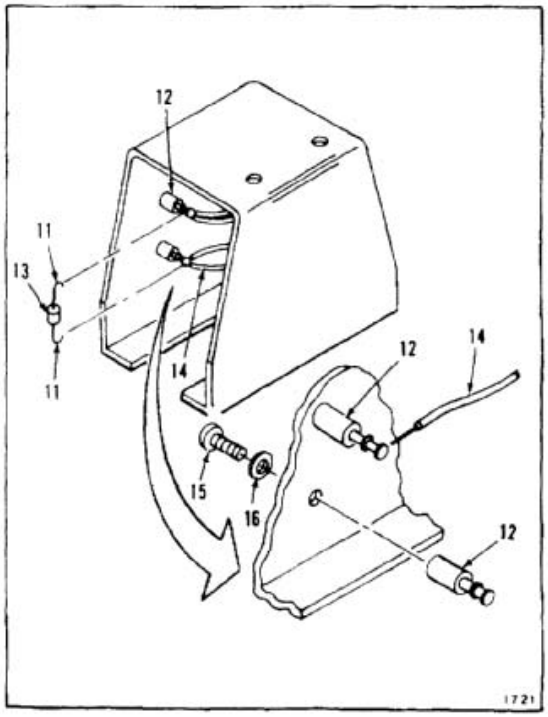


REMOVE DIODE

5. Unsolder two diode leads (11) from terminal standoffs (12). Remove diode (13).

REMOVE TERMINAL STANDOFFS

6. Unsolder four wires (14).
7. Remove two screws (15) and washers (16). Remove two terminal standoffs (12).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-278.3 ASSEMBLE ROLL ERECT CUTOUT RELAY ASSEMBLY 11-278.3

INITIAL SETUP

Applicable Configurations:

All

Tools:

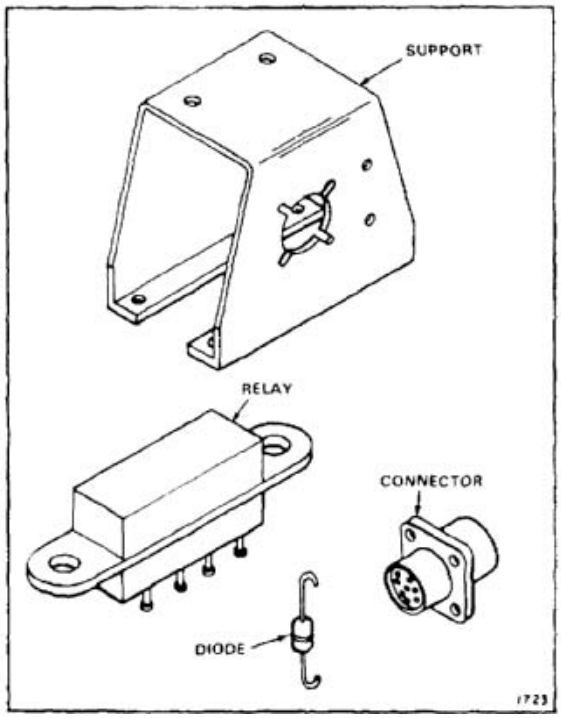
Tool Kit, Electronic Equipment TK105/G, NSN 5180-00-610-8177
Contact Insertion/Removal Tool M83723-31-20
Gun Type Electric Heater

Materials:

Heat Shrinkable Tubing (E431)

Personnel Required:

Avionic Navigation and Flight Control Equipment Repairer
Inspector

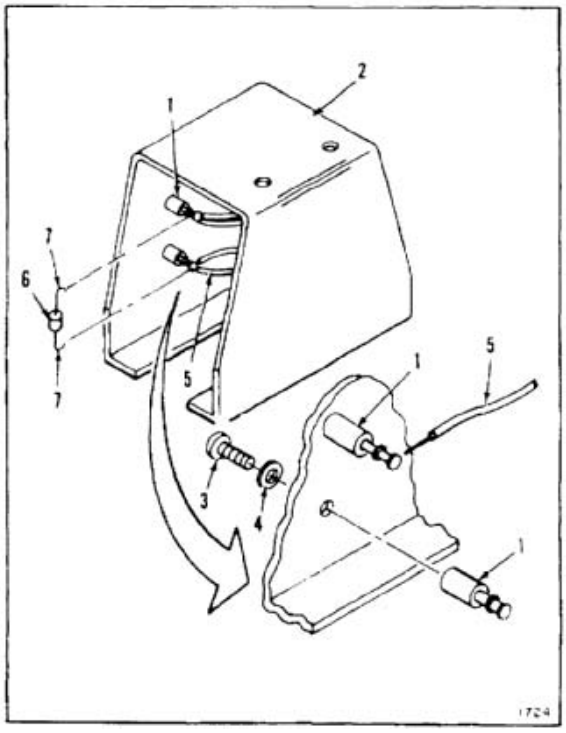


NOTE

Procedure is same to assemble No. 1 or No. 2 roll erect cutoff relay assembly. No. 1 relay assembly is shown here.

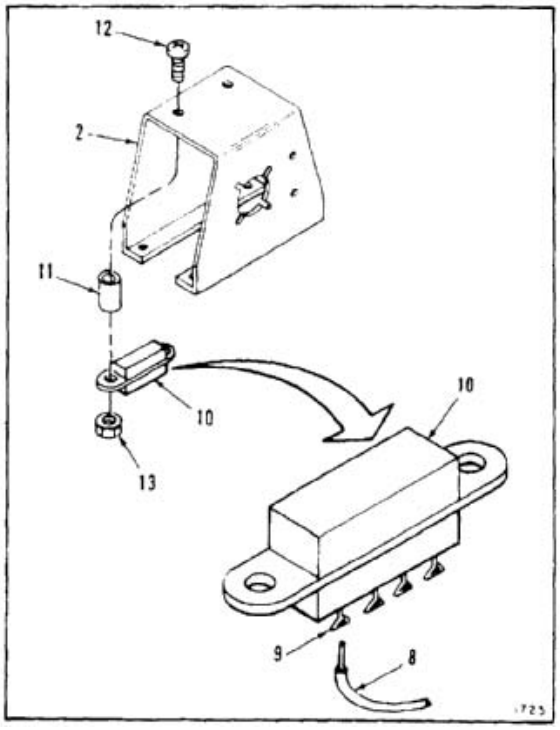
INSTALL TERMINAL STANDOFFS

1. Position two terminal standoffs (1) on support (2). Install two screws (3) and washers (4).
2. Solder four wires (5) to standoffs (1). Remove tags.
3. Position diode (6) between standoffs (1). Solder leads (7) to standoffs.



INSTALL RELAY

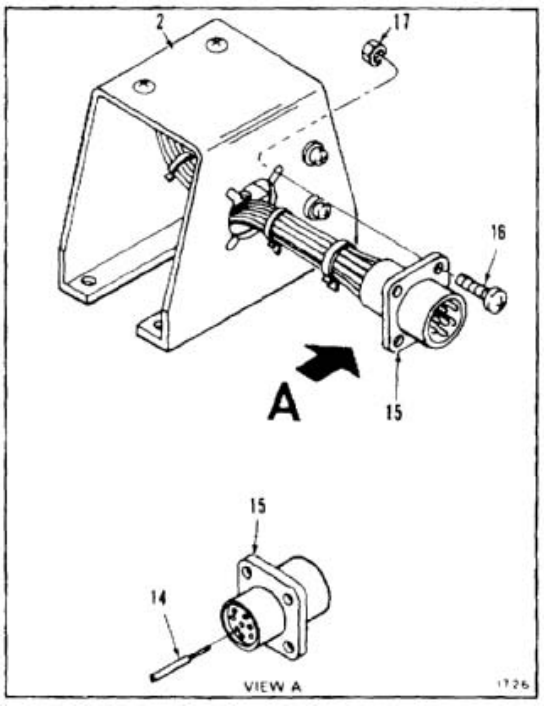
4. Position heat shrinkable tubing (E431) on four wires (8).
5. Solder wires (8) to relay terminals (9). Remove tags.
6. Slide tubing (E431) over terminals (9). Shrink tubing. Use gun type electric heater.
7. Position relay (10) and two spacers (11) in support (2). Install two screws (12) and nuts (13).



INSTALL CONNECTOR

8. Connect five wires (14). Use contact insertion/removal tool. Remove tags.
9. Position connector (15) on support (2). Install four screws (16) and nuts (17).

INSPECT



FOLLOW-ON MAINTENANCE:

None

END OF TASK

11-278.4 INSTALL ROLL ERECT CUTOUT RELAY ASSEMBLY 11-278.4

INITIAL SETUP

Applicable Configurations:

All

Tools:

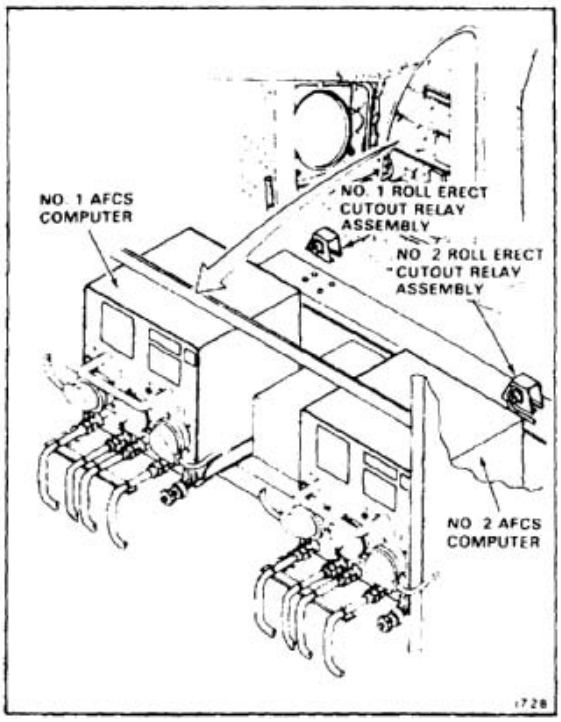
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

Materials:

None

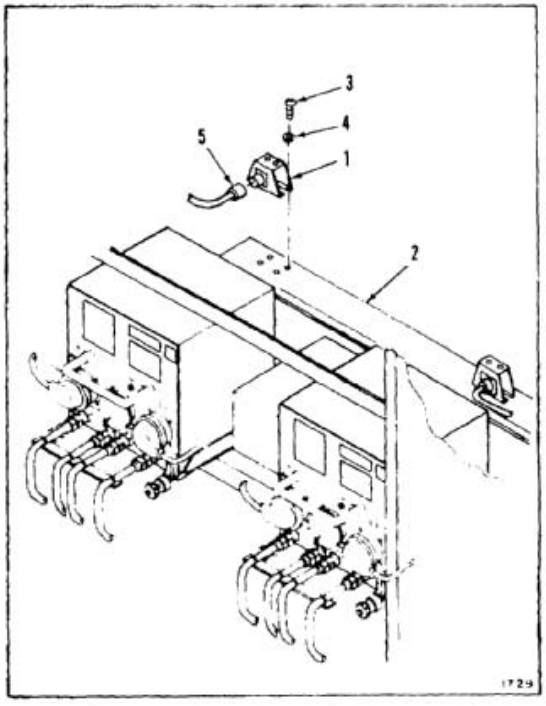
Personnel Required:

Medium Helicopter Repairer
Inspector



NOTE

Procedure is same to install No. 1 or No. 2 roll erect cutout relay assemblies. No. 1 relay assembly is shown here.



1. Position roll erect cutout relay assembly (1) on support (2).
2. Install four screws (3) and washers (4).
3. Connect electrical connector (5).

INSPECT

FOLLOW-ON MAINTENANCE:

Install No. 1 or No. 2 AFCS computer, as applicable (Task 11-278).
Install electronic compartment acoustic blanket (Task 2-108).

END OF TASK

11-279 BENCH TEST AFCS COCKPIT CONTROL DRIVE ACTUATOR (CCDA) (AVIM) 11-279

INITIAL SETUP

Applicable Configurations:

All

Tools:

Electronic Repairers Tool Kit, NSN 5180-00-064-5178
Multimeter AN-URM 105
Stopwatch
Dial Indicating Scale, 0 to 50 Pounds
AFCS Bench Test Set 145G0008-1

Materials:

None

Personnel Required:

Avionics Mechanic
Inspector

References:

TM 55-4920-430-13

Equipment Condition:

Off Helicopter Task

General Safety Instructions:

WARNING

High voltage is used in this equipment. Observe safety precautions; otherwise, personal injury or death can occur.

NOTE

There are two cockpit control drive actuators (CCDA), pitch CCDA and thrust CCDA.

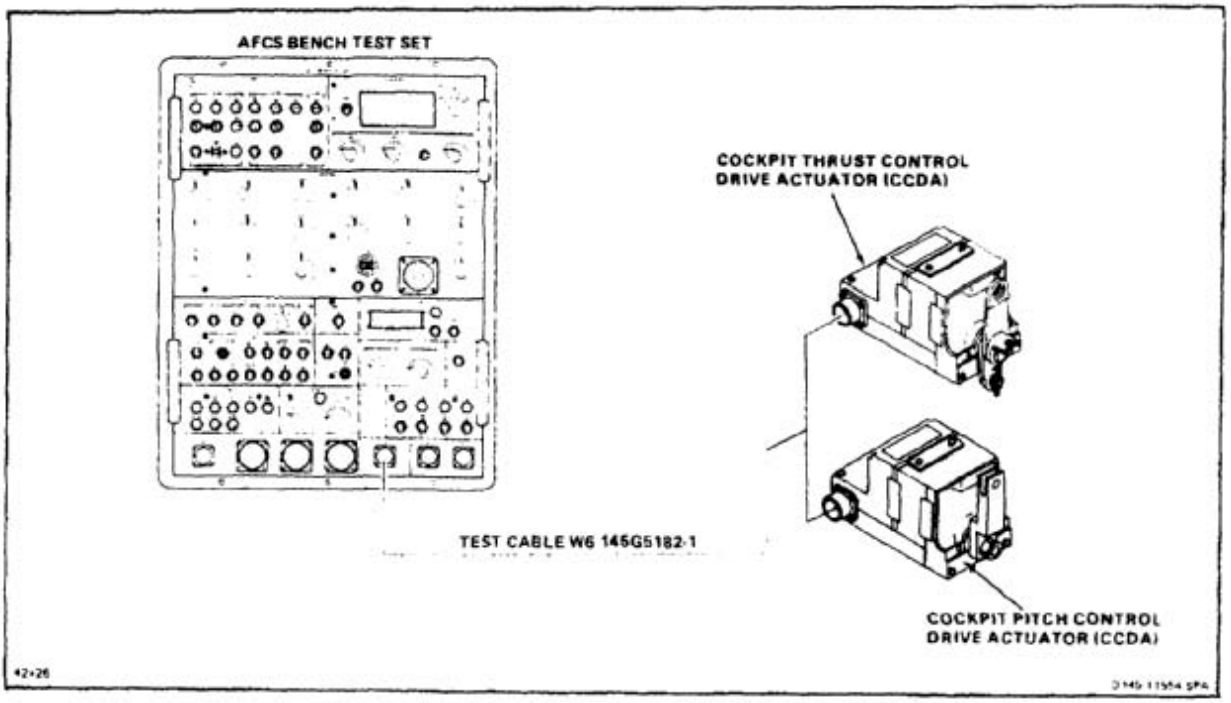
(PITCH) indicates test applies to pitch CCDA.

(THRUST) indicates test applies to thrust CCDA.

The following tests are included:

TEST

1. Circuit Resistance Test (Thrust)
2. Brake Function Test (Thrust)
3. Null Voltage and Phasing Test (Thrust)
4. Circuit Resistance Test (Pitch)
5. Brake Function Test (Pitch)
6. Trim Motor Test (Pitch)



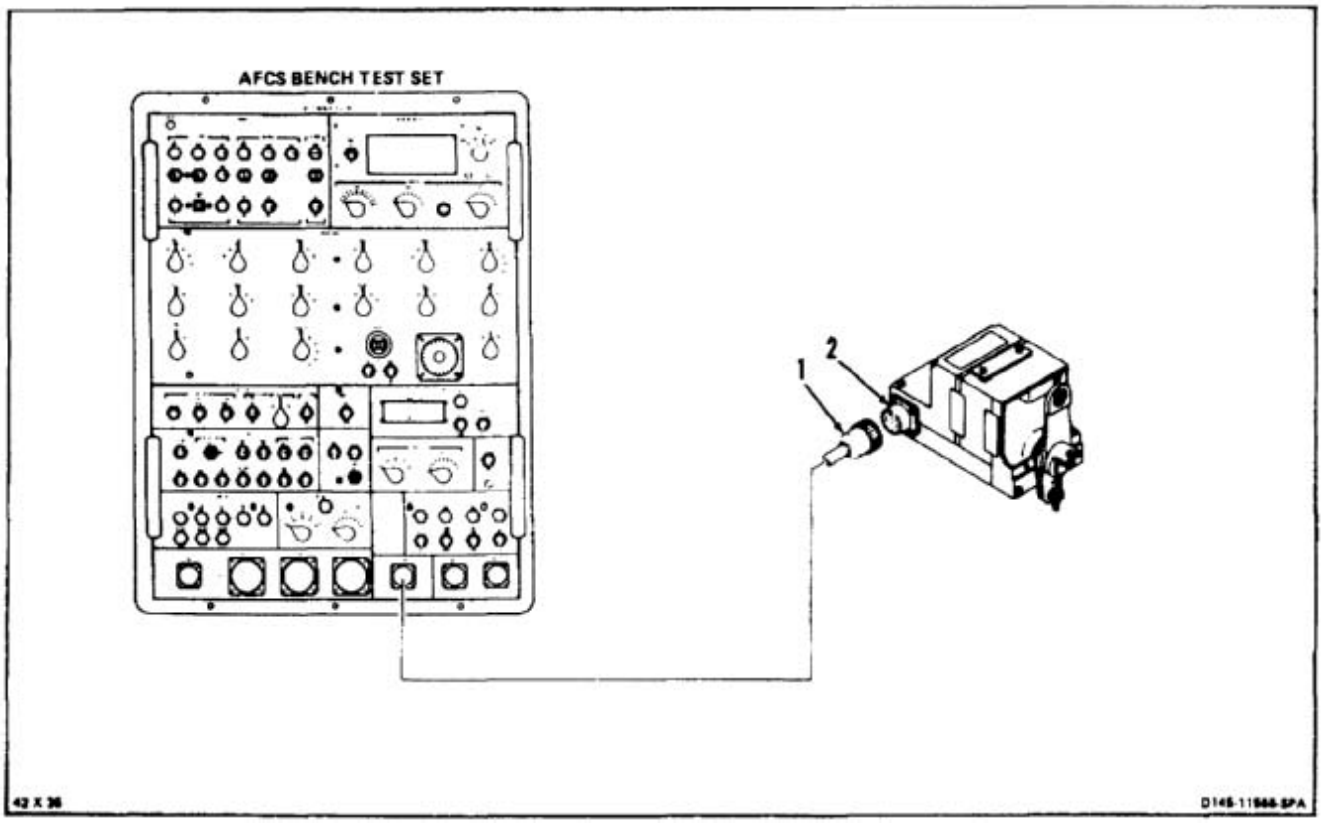
TEST 1

CIRCUIT RESISTANCE TEST (THRUST)

NOTE

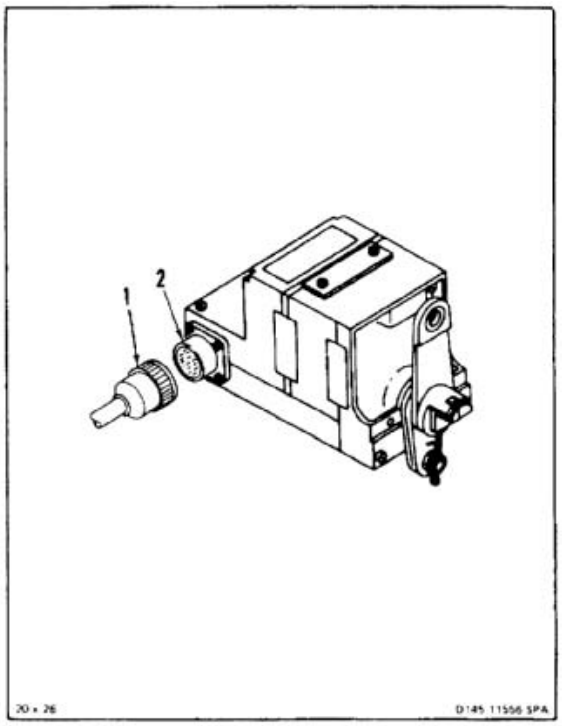
Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

1. Disconnect plug (1) from receptacle (2).
2. Read resistance across receptacle (2) from pin H to pin C. Reading shall be **85 to 120 ohms**.
3. Reverse meter leads. Read resistance across receptacle (2) from pin H to pin C. Reading shall be less than half of reading of step 2.
4. Read resistance across receptacle (2) from pin G to C. Reading shall be **85 to 120 ohms**.
5. Reverse meter leads. Read resistance across receptacle (2) from pin G to pin C. Reading shall be less than half of reading of step 4.



6. Read resistance across receptacle (2) pins. Reading shall be as follows:

PIN	to	PIN	READING
J	to	E	Open
J	to	K	**55 to 75 ohms**
J	to	L	**55 to 75 ohms**
K	to	L	**55 to 75 ohms**
B	to	C	**372 to 540 ohms**
P	to	E	**310 to 420 ohms**
M	to	N	Open
M	to	C	Open
N	to	C	Open
D	to	C	**75K to 130K ohms**



7. Connect plug (1) to receptacle (2).

END CIRCUIT RESISTANCE TEST (THRUST)

TEST 2

BRAKE FUNCTION TEST (THRUST)

NOTE

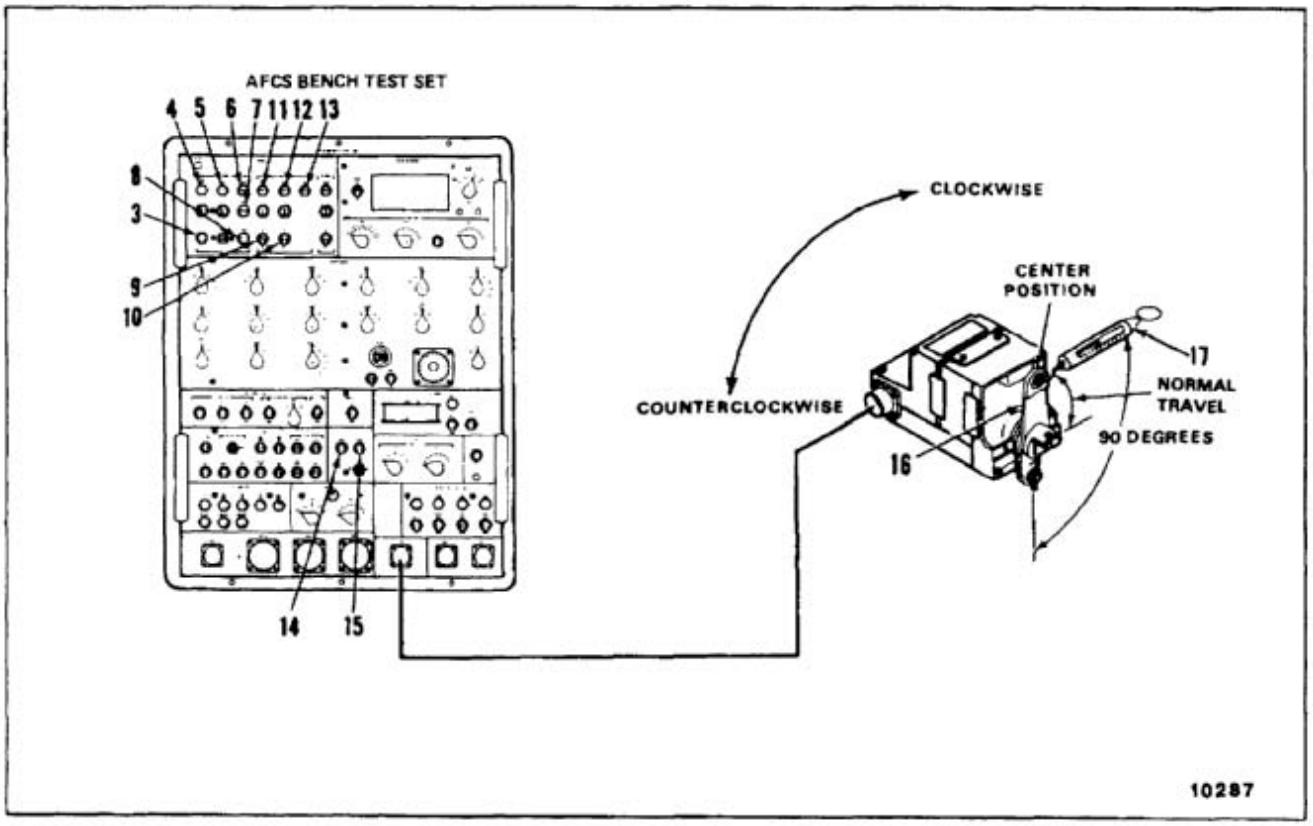
Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

8. Set TESTER POWER switch (3) to ON. The following lamps shall be on:
   a. 115V 400 HZ lamp (4).
   b. +28VDC lamp (5).
   c. +5VDC lamp (6).
   d. +15VDC lamp (7).
   e. –15VDC lamp (8).
9. Set AFCS POWER switches (9 and 10) to ON. The following lamps shall be on:
   a. 115V 400 HZ lamp (11).
   b. +28VDC lamp (12).
   c. 5VAC lamp (13).
10. Set CCDA BRAKE switch (14) to 1.
11. Set CCDA CLUTCH switch (15) to 0.
12. Set output arm (16) to center.
13. Attach indicating scale (17) to arm (16). Apply clockwise force to arm. Pull **90°** to arm. Force to move arm shall not be more than **3.4 pounds**.
14. Apply counterclockwise force to arm (16). Pull **90°** to arm. Force to move arm shall not be more than **3.4 pounds**.
15. Repeat steps 13 and 14 for three positions of arm (16) normal travel.

NOTE

Normal travel of arm is from center position to **45°** clockwise as shown.

15.1. Set output arm (16) to center.

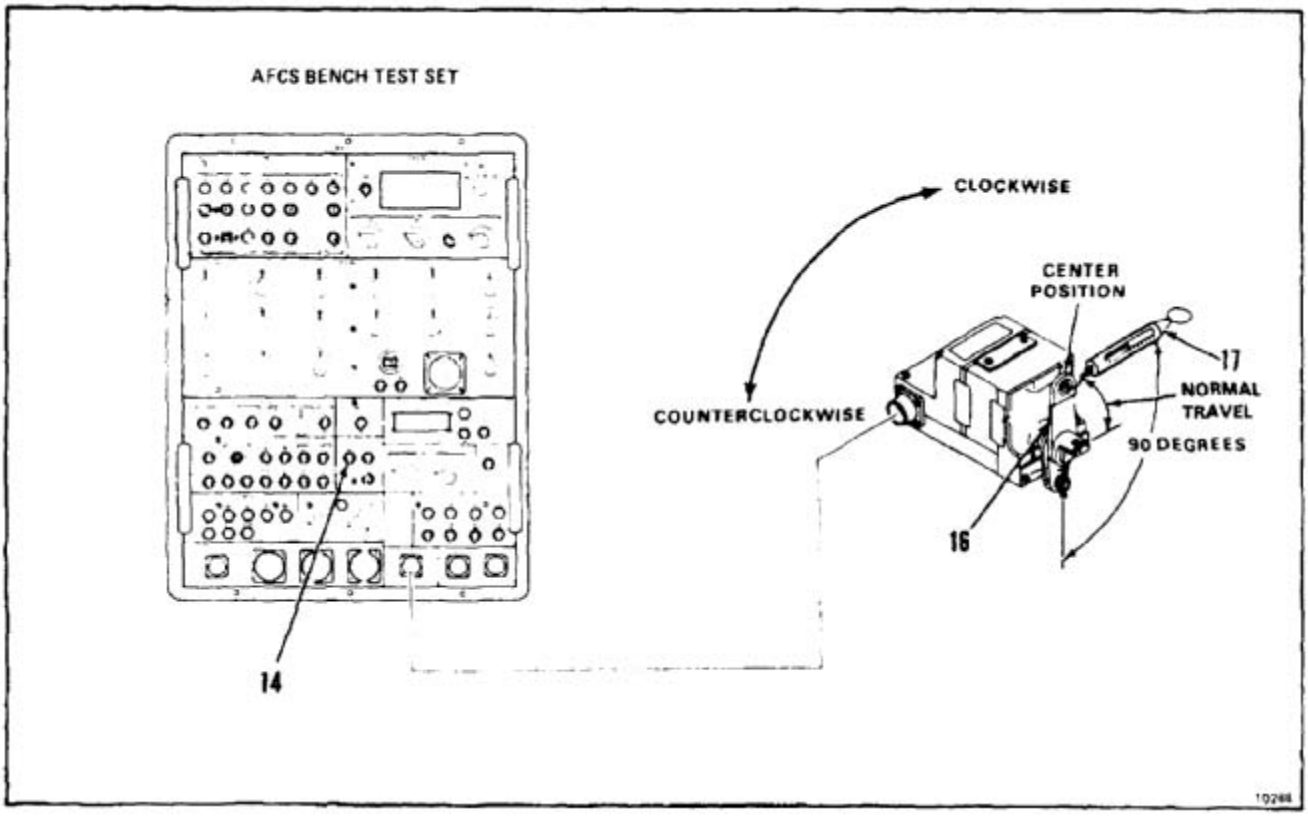


15.2. Set CCDA BRAKE switch (14) to 0. Check output arm (16). Arm should be locked in position.

15.3. Attach indicating scale (17) to arm (16). Apply clockwise torque to arm. Pull and maintain **90º** to arm. Arm shall not move with less than **25 pounds** applied. Arm shall move before more than **65 pounds** is applied.

15.4. Apply counterclockwise torque to arm (16). Pull **90º** to arm. Arm shall not move with less than **25 pounds** applied. Arm shall move before more than **65 pounds** is applied.

END BRAKE FUNCTION TEST (THRUST)



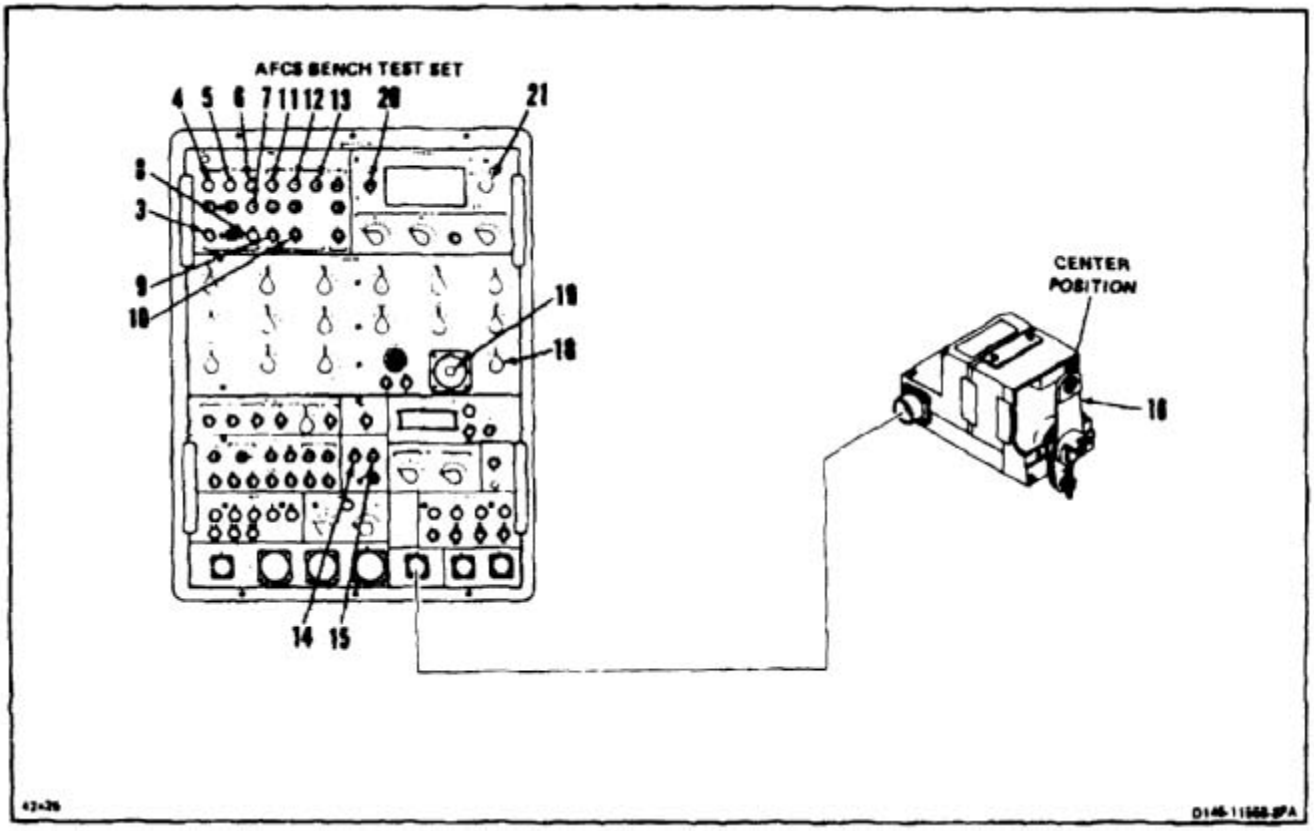
TEST 3

NULL VOLTAGE AND PHASING TEST (THRUST)

NOTE

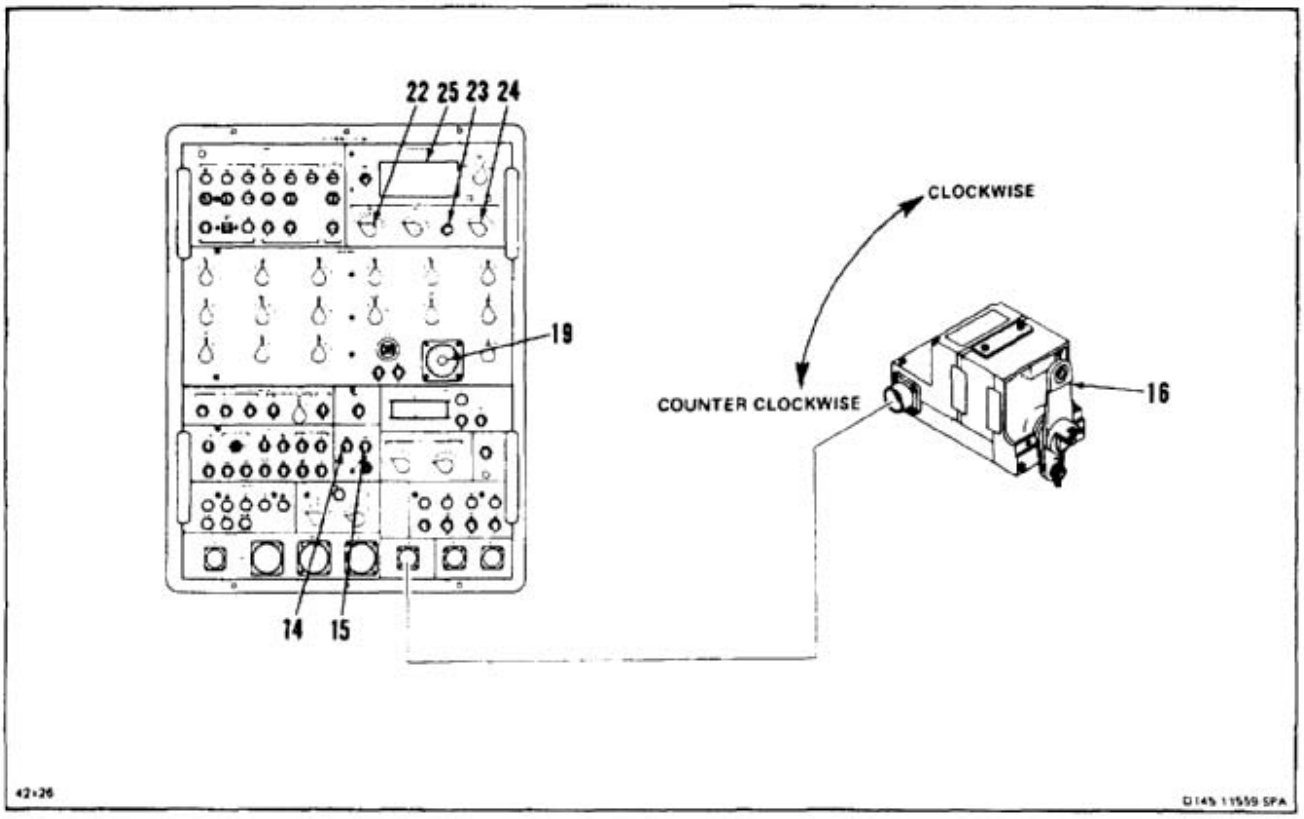
Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

16. Set TESTER POWER switch (3) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (4).
    b. +28VDC lamp (5).
    c. +5VDC lamp (6).
    d. +15VDC lamp (7).
    e. –15VDC lamp (8).
17. Set AFCS POWER switches (9 and 10) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (11).
    b. +28VDC lamp (12).
    c. 5VAC lamp (13).
18. Set ANALOG SIGNALS ATT SELECT switch (18) to CCDA.
19. Set ANALOG SIGNALS ATT synchro (19) to 0.
20. Set CCDA BRAKE switch (14) to 1.
21. Set CCDA CLUTCH switch (15) to 0.
22. Set output arm (16) to center position.
23. Set CCDA CLUTCH switch (15) to 1.
24. Set METER switch (20) to AC.
25. Set METER RANGE switch (21) to 200MV.



26. Set CIRCUIT SELECT TENS switch (22) to 30.
27. Set CIRCUIT SELECT A/B SELECT switch (23) to B.
28. Set CIRCUIT SELECT B UNITS switch (24) to 0.
29. Turn ANALOG SIGNALS ATT synchro (19) clockwise to **10°**. Check output arm (16). Arm shall be approximately **10°** clockwise. Read AC/DC VOLTMETER (25). Reading shall be less than **100**.
30. Set CCDA CLUTCH switch (15) to 0.
31. Move output arm (16) to center.
32. Set CCDA CLUTCH switch (15) to 1.
33. Turn ANALOG SIGNALS ATT synchro (19) counterclockwise to 0. Check output arm (16). Arm shall be approximately **10°** counterclockwise. Read AC/DC VOLTMETER (25). Reading shall be less than **100**.
34. Set CCDA CLUTCH switch (15) to 0.
35. Move output arm (16) to center position.
36. Set CCDA BRAKE switch (14) to 0.

END NULL VOLTAGE AND PHASING TEST (THRUST)



TEST 4

CIRCUIT RESISTANCE TEST (PITCH)

NOTE

Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

37. Disconnect plug (1) from receptacle (2).

38. Read resistance across receptacle (2) from pin H to pin C. Meter shall indicate open.

39. Reverse meter leads. Read resistance across receptacle (2) from pin H to pin C. Meter shall indicate open.

40. Read resistance across receptacle (2) from pin G to pin C. Reading shall be **85 to 120 ohms**.

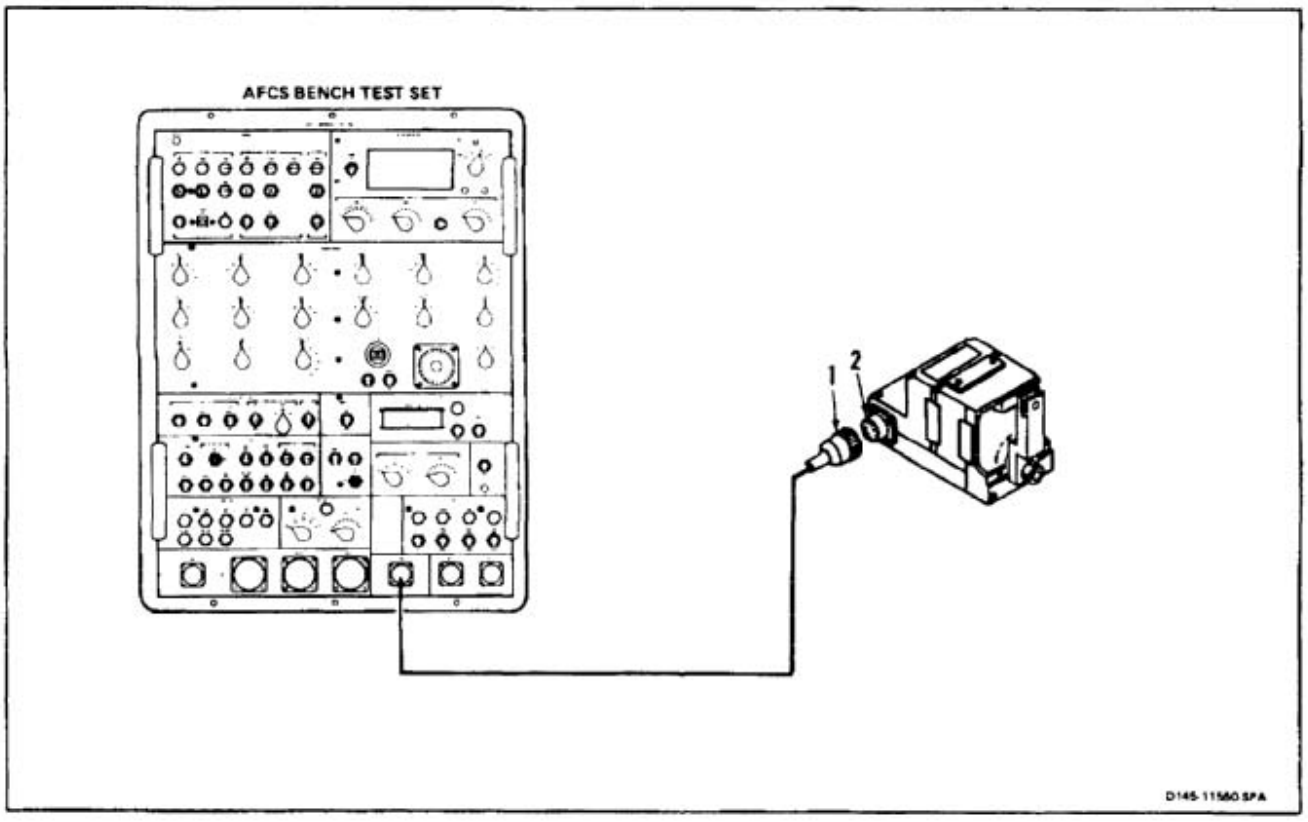
41. Reverse meter leads. Read resistance across receptacle (2) from pin C to pin G. Reading shall be less than one half of reading of step 40.

42. Read resistance across receptacle (2) pins. Readings shall be as follows:

PIN	to	PIN	READING
F	to	C	**0.5 to 5.0 ohms**
F	to	B	**60 to 100 ohms**
J	to	E	Open
J	to	K	Open
J	to	L	Open
K	to	L	Open
B	to	C	**60 to 100 ohms**
P	to	E	Open
M	to	N	**40 to 90 ohms**
M	to	C	**20 to 50 ohms**
N	to	C	**20 to 50 ohms**

43. Connect plug (1) to receptacle (2).

END CIRCUIT RESISTANCE TEST (PITCH)



TEST 5

BRAKE FUNCTION TEST (PITCH)

NOTE

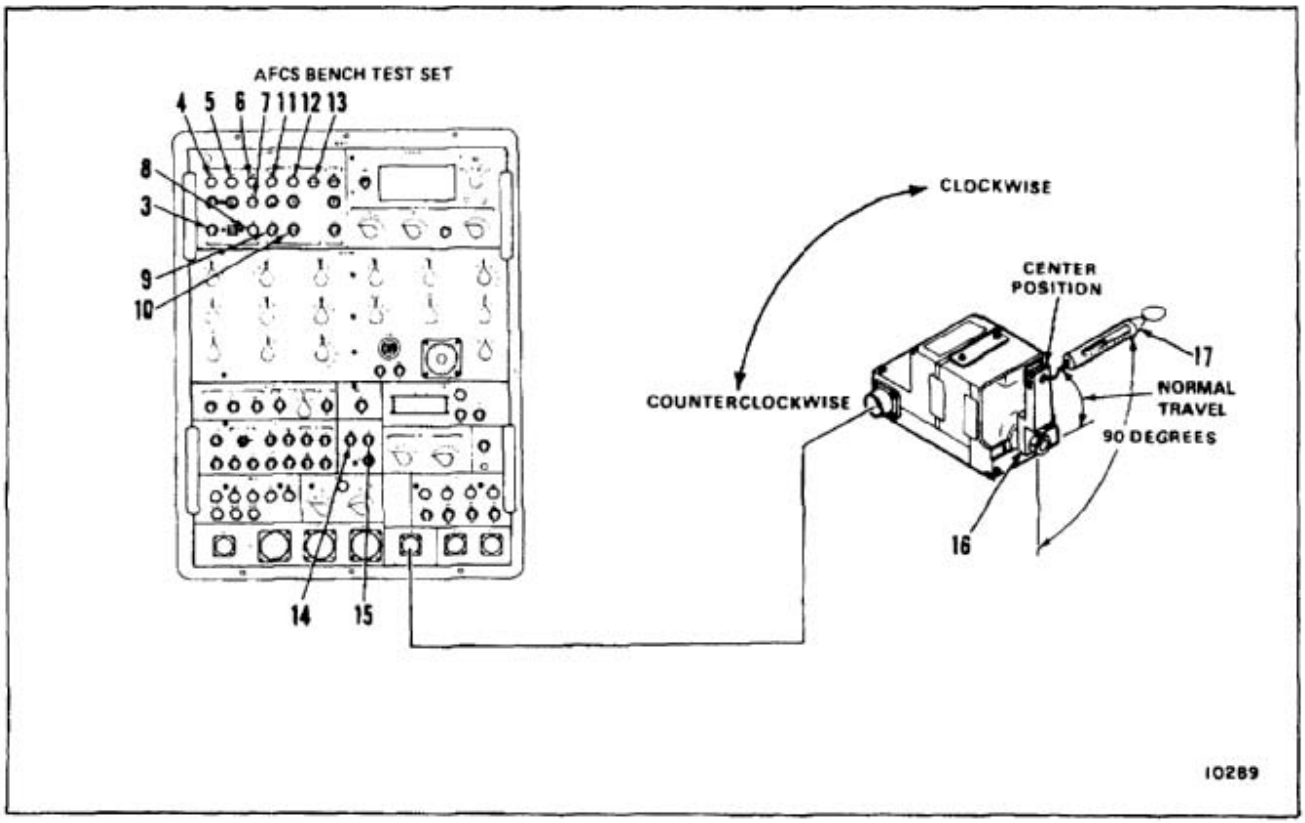
Perform preliminary procedures before test. (Refer to TM 55-4920-430-13.)

44. Set TESTER POWER switch (3) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (4).
    b. +28VDC lamp (5).
    c. +5VDC lamp (6).
    d. +15VDC lamp (7).
    e. –15VDC lamp (8).
45. Set AFCS POWER switches (9 and 10) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (11).
    b. +28VDC lamp (12).
    c. 5VAC lamp (13).
46. Set CCDA BRAKE switch (14) to 1.
47. Set CCDA CLUTCH switch (15) to 0.
48. Move output arm (16) to center position.
49. Attach indicating scale (17) to arm (16). Apply clockwise force to arm. Pull **90°** to arm. Force to move arm shall not be more than **3 pounds**.
49.1. Apply counterclockwise force to arm (16). Pull **90°** to arm. Force to move arm shall not be more than **3 pounds**.

NOTE

Normal travel of arm is from center position to **45°** clockwise.

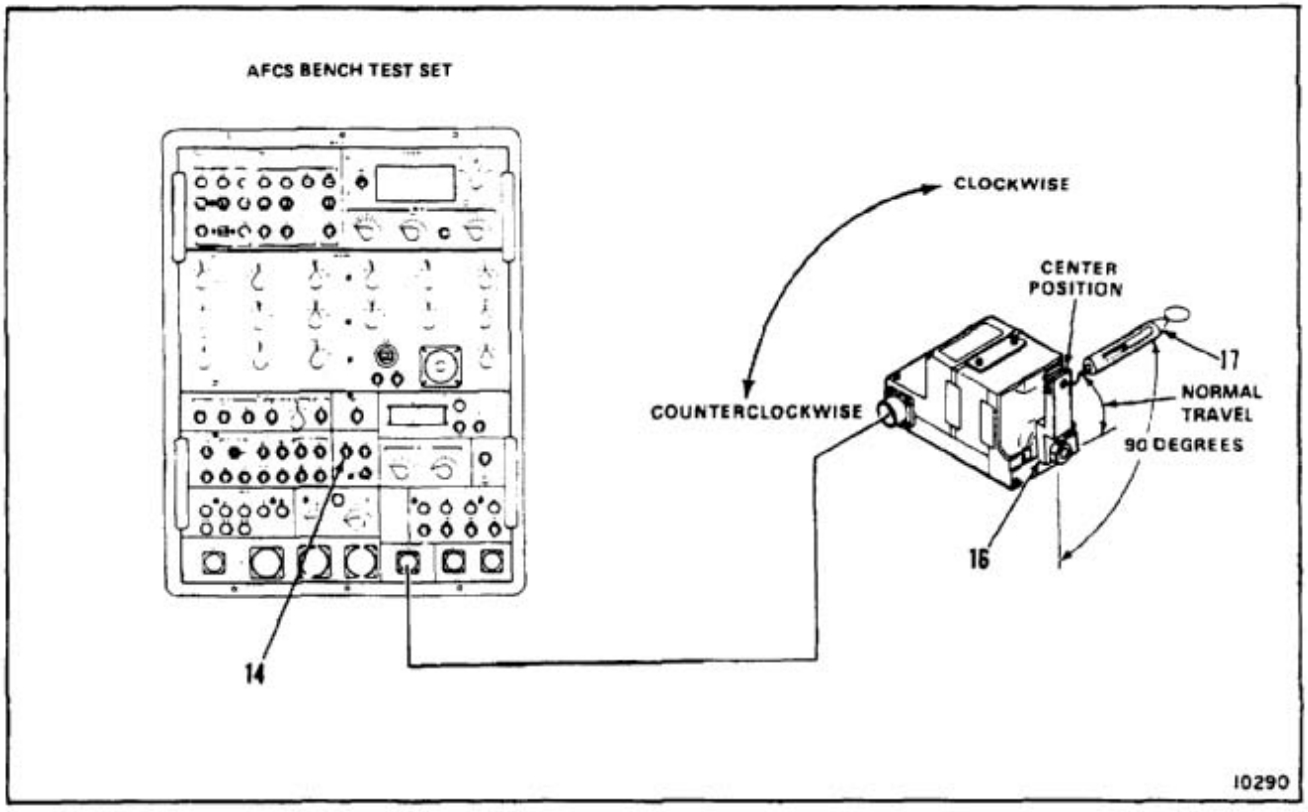
49.2. Repeat steps 49 and 49.1 for three positions of arm (16) normal travel.
49.3. Set output arm (16) to center.



49.4. Set CCDA BRAKE switch (14) to 0.

49.5. Attach scale (17) to arm (16). Apply clockwise force to arm. Pull **90°** to arm. Arm shall not move with **43 pounds** applied.

49.6. Apply counterclockwise force to arm (16). Pull **90°** to arm. Arm shall not move with **43 pounds** applied.



TEST 6

TRIM MOTOR TEST (PITCH)

NOTE

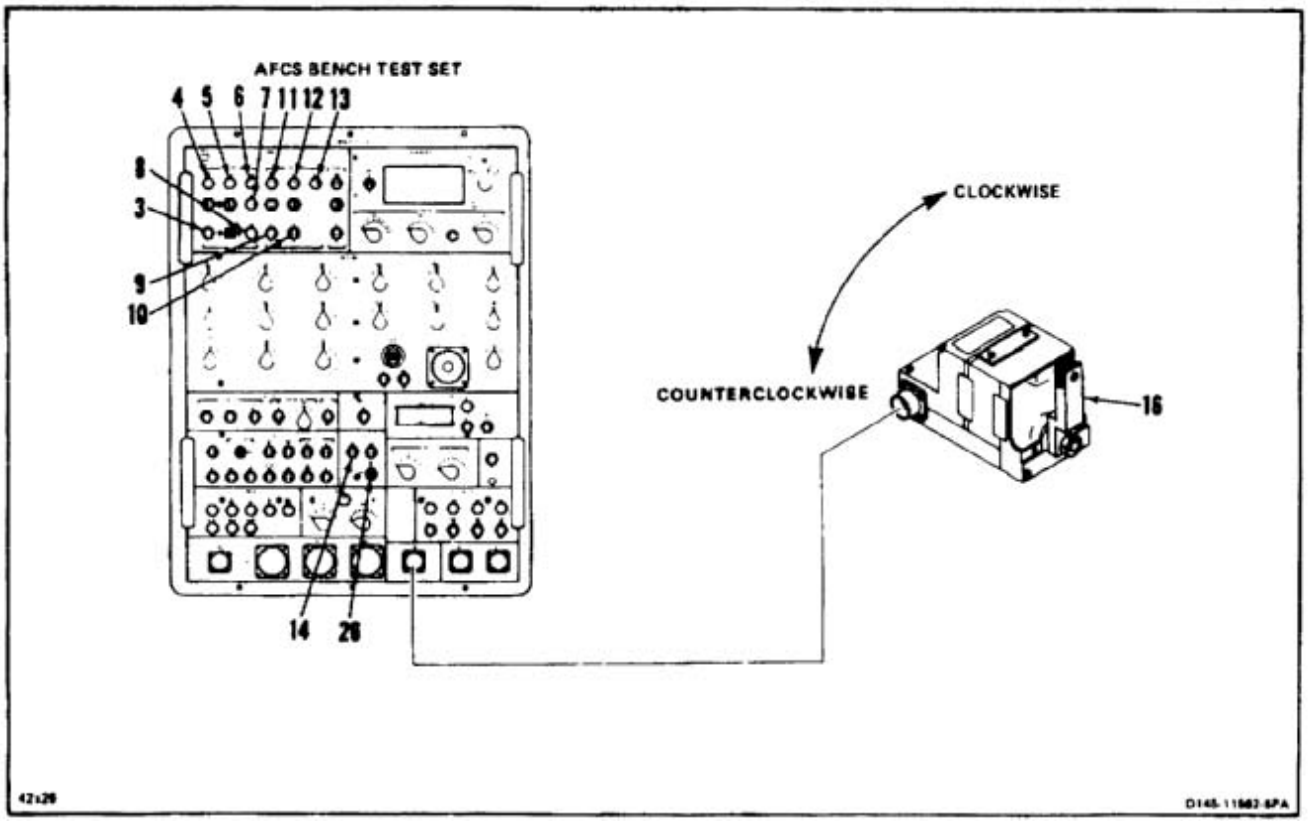
Perform preliminary procedure before test. (Refer to TM 55-4920-430-13.)

50. Set TESTER POWER switch (3) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (4).
    b. +28VDC lamp (5).
    c. +5VDC lamp (6).
    d. +15VDC lamp (7).
    e. –15VDC lamp (8).
51. Set AFCS POWER switches (9 and 10) to ON. The following lamps shall be on:
    a. 115V 400 HZ lamp (11).
    b. +28VDC lamp (12).
    c. 5VAC lamp (13).

CAUTION

Do not allow motor to drive stop plate against stop pin. Damage to the CCDA can result.

52. Set CCDA BRAKE switch (14) to 1.
53. Move output arm (16) to full counterclockwise position.
54. Set CCDA BRAKE switch (14) to 0.
55. Set CCDA CMD switch (26) to CW. Check output arm (16) moves clockwise. Time output arm to reach full clockwise position. Time shall be **80 to 110 seconds**.
56. Set CCDA BRAKE switch (14) to 1.



57. Move output arm (16) to full clockwise position.
58. Set CCDA BRAKE switch (14) to 0.
59. Set CCDA CMD switch (26) to CCW. Check output arm (16) moves to full counterclockwise position. Time output arm to reach full counterclockwise position. Time shall be **80 to 110 seconds**.

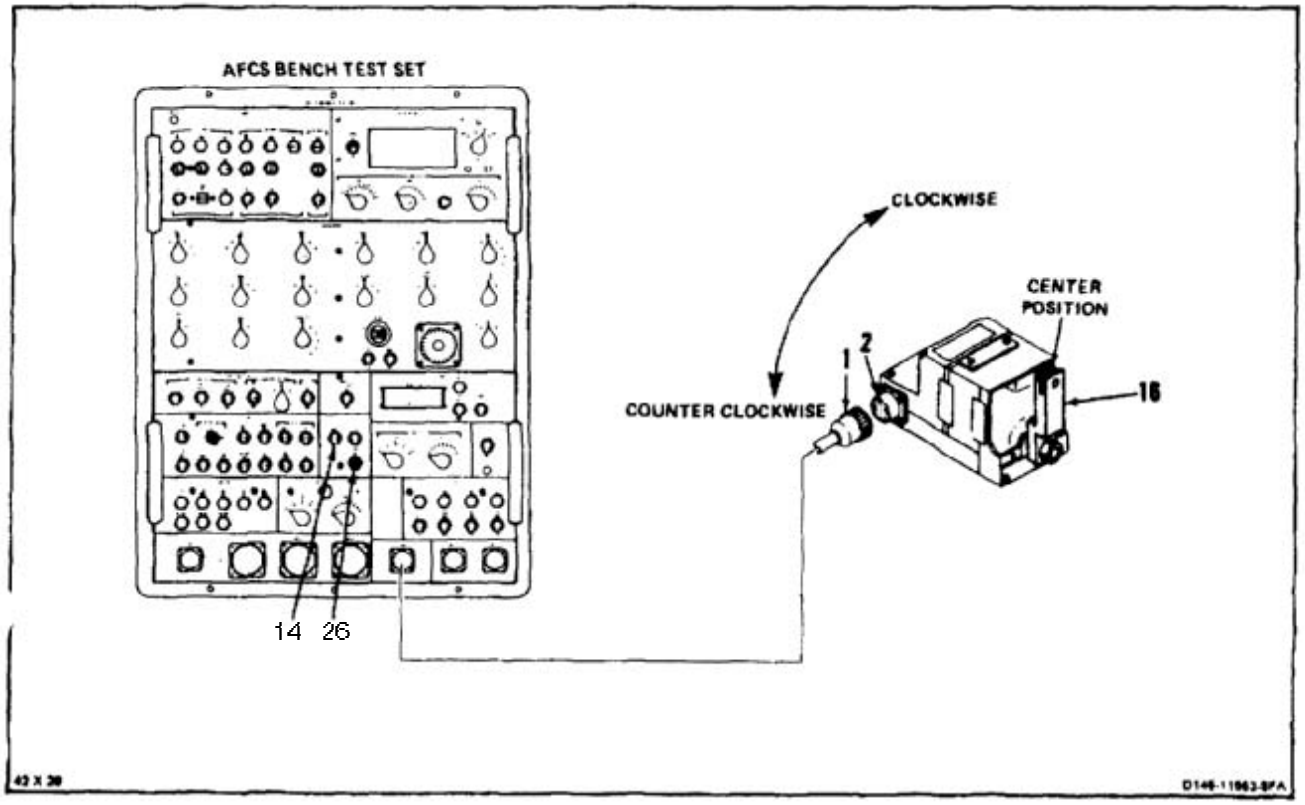
INSPECT

END TRIM MOTOR TEST (PITCH)

60. Set CCDA BRAKE switch (14) to 1.
61. Move output arm (16) to center position.
62. Set TESTER POWER switch (3) and AFCS POWER switches (9 and 10) to OFF.
63. Disconnect plug (1) from receptacle (2).
64. Shut down AFCS bench test set 145G008-1 (TM 55-4920-430-13).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

11-280 AFCS INTERFACE TEST 11-280

INITIAL SETUP

Applicable Configurations:

All

Tools:

Aircraft Electrical Tool Kit, NSN 5180-00-323-4915
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
AFCS Line Test Set 145G0009-1
Stop Watch

Materials:

None

Personnel Required:

Avionic Mechanic
Medium Helicopter Repairer
Inspector

References:

TM 55-4920-429-13
Task 11-24
Task 11-165

Equipment Condition:

Cockpit Rig Fixture Installed (Task 11-22)
Flight Controls Acoustic Blanket Removed (Task 2-107)
Flight Controls Closet Panel Removed (Task 2-2)

WARNING

Make sure personnel are not in the area of the rotor heads. Keep head, hands, and other body parts clear of moving flight controls; otherwise, personal injury can occur.

NOTE

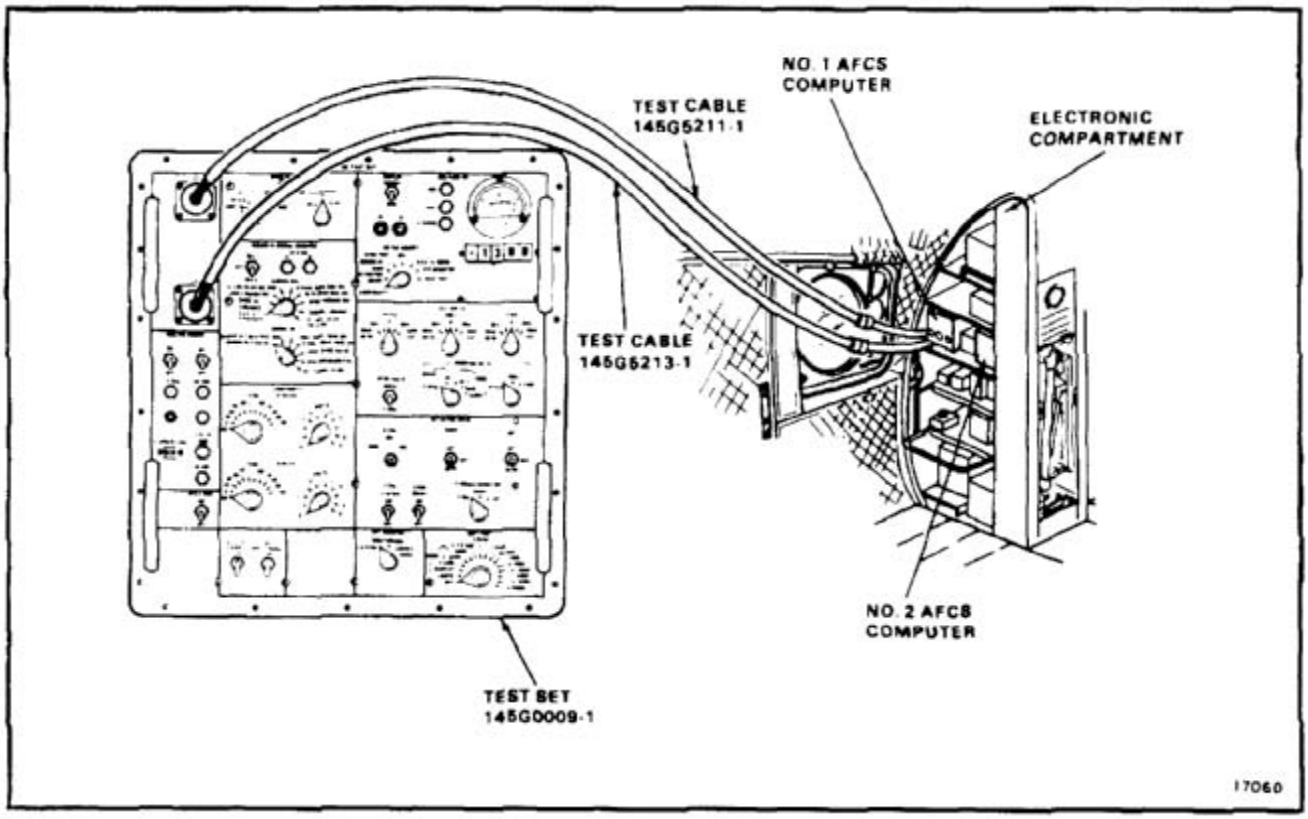
During test, helicopter engines and rotors shall not be operating.

Helicopter weight shall be supported on its landing gear.

Test is same for No. 1 or No. 2 system except where noted.

Test of No. 1 system is shown except where test is for No. 2.

(BOTH) indicates test applies to No. 1 and No. 2 system.



NOTE

(NO. 1) indicates test applies to No. 1 system.

(NO. 2) indicates test applies to No. 2 system.

85 percent authority (extend or retract stroke) of ILCA extensible link for each axis is as follows:

Maximum authority (extend or retract stroke) of ILCA extensible link for each axis is as follows:

	85%	MAX
Pitch	0.14 inch	0.17 inch
Roll	0.19 inch	0.22 inch
Yaw	0.29 inch	0.34 inch

NOTE

Upper extensible link is part of No. 1 system. Lower extensible link is part of No. 2 system.

The following tests are included:

TEST

1. Pitch ILCA Null Test (BOTH)
2. Pitch ILCA Authority/Phasing Test (BOTH)
3. Roll ILCA Null Test (BOTH)
4. Roll ILCA Authority/Phasing Test (BOTH)
5. Yaw ILCA Null Test (BOTH)
6. Yaw ILCA Authority/Phasing Test (BOTH)
7. DASH Actuator Output Motion Test (BOTH)
8. Longitudinal Cyclic Trim Actuator Output Motion Test (BOTH)
9. Collective Cockpit Control Driver Actuator (CCDA) Servo Loop Operation Test (No. 1)
10. CCDA Thrust Control Drive Test (No. 1)
11. Directional (Yaw) CPT Null and Output Test (BOTH)
12. Lateral (Roll) CPT Null and Output Test (BOTH)
13. Longitudinal (Pitch) CPT Null and Output Test (BOTH)
14. Vertical Gyro Validity Test (BOTH)
15. Vertical Gyro Pitch Attitude Test (BOTH)
16. Vertical Gyro Roll Attitude Test (BOTH)
17. Directional Gyro Output Test (BOTH)
18. Horizontal Situation Indicator Null Test (BOTH)
19. Horizontal Situation Indicator Heading Test (BOTH)
20. Pitch Beep Trim Test (BOTH)
21. Roll Beep Trim Test (BOTH)
22. Cyclic Magnetic Brake Test (BOTH)
23. Collective Magnetic Brake Test (BOTH)
24. Hydraulic Pressure Switch Test (BOTH)
25. Left Landing Gear Proximity Switch Test (Both)
26. Right Landing Gear Proximity Switch Test (BOTH)
27. Landing Gear Swivel Lock Test (BOTH)
28. BITE Enable Test (BOTH)
29. AFCS Heading Engage Test (BOTH)
30. Radar Altimeter Select Test (No. 1)
31. Radar Altimeter Validity Test (No. 1)
32. Barometric Altimeter Select Test (No. 1)
33. AFCS Select Signal Test (BOTH)

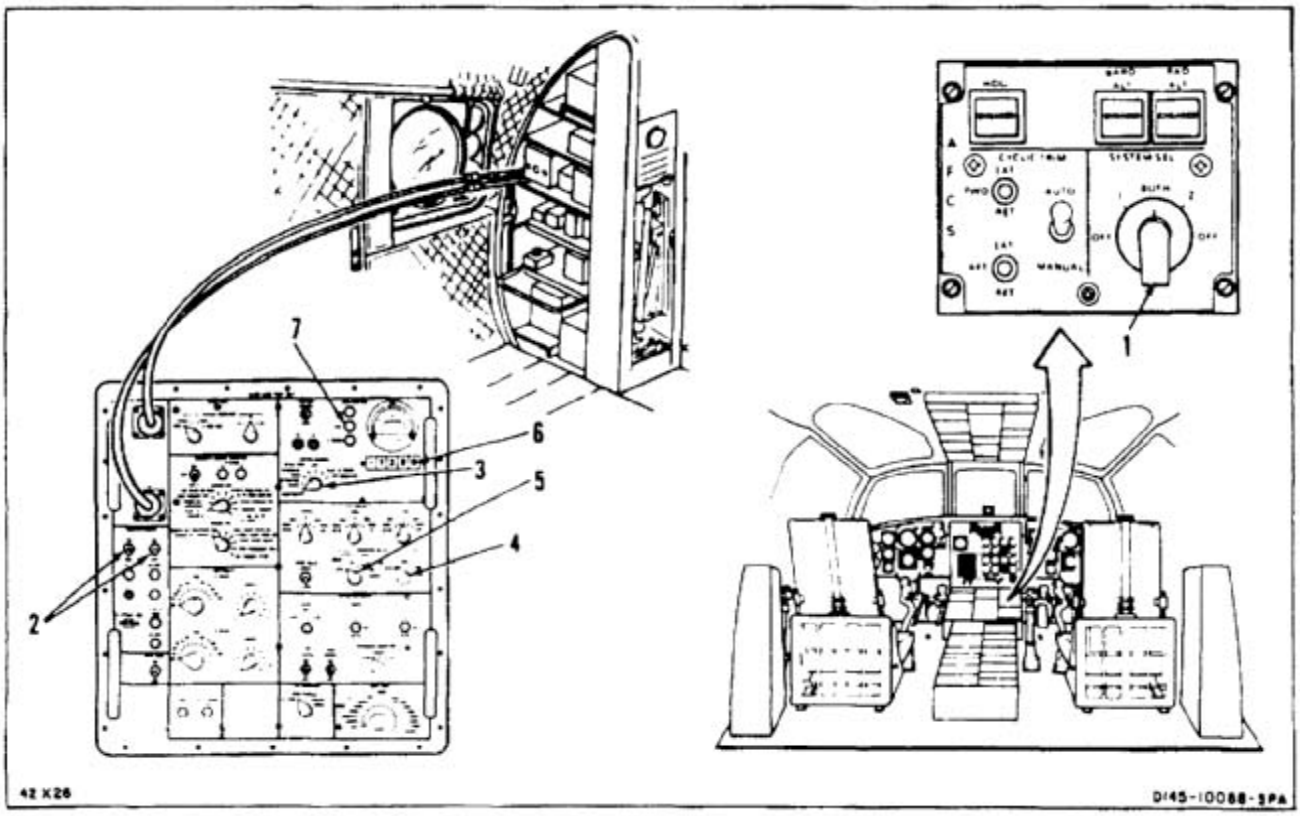
11-280 AFCS INTERFACE TEST (Continued) 11-280

TEST 1

PITCH ILCA NULL TEST (BOTH)

1. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)
2. Set AFCS line test set switches as follows:
   a. Two MASTER POWER switches (2) to ON.
   b. METER SOURCE switch (3) to ILCA DRIVE.
   c. MONITOR SELECT switch (4) to PITCH.
3. Set MONITOR SELECT FDBK switch (5) to SELF. Red digital display (6). Reading shall be **–0.10 to +0.10 VAC**.
4. Set MONITOR SELECT FDBK switch (5) to SUM 1. Red digital display (6). Reading shall be **–0.10 to +0.10 VAC**.
5. Set MONITOR SELECT FDBK switch (5) to SUM 2. Read digital display (6). Reading shall be **–0.10 to +0.10 VAC**.

END PITCH ILCA NULL TEST (BOTH)



TEST 2

PITCH ILCA AUTHORITY/PHASING TEST (BOTH)

6. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)
7. Set AFCS line test set switches as follows:
   a. METER SOURCE switch (3) to ILCA DRIVE.
   b. MONITOR SELECT switch (4) to PITCH.
   c. MONITOR SELECT FDBK switch (5) to SELF.
   d. ILCA DRIVE PITCH switch (7) to 0.
   e. HYDR VALVE switch (8) to OPEN.
8. Set ILCA DRIVE PITCH switch (7) and MONITOR SELECT FDBK switch (5) to positions in Table 11-1. Read voltages on digital display (6). (See Table 11-1.) Observe response of actuator (9). (See Table 11-2.)
9. Set ILCA DRIVE PITCH switch (7) to 0.
10. Set HYDR VALVE switch (8) to CLOSE.

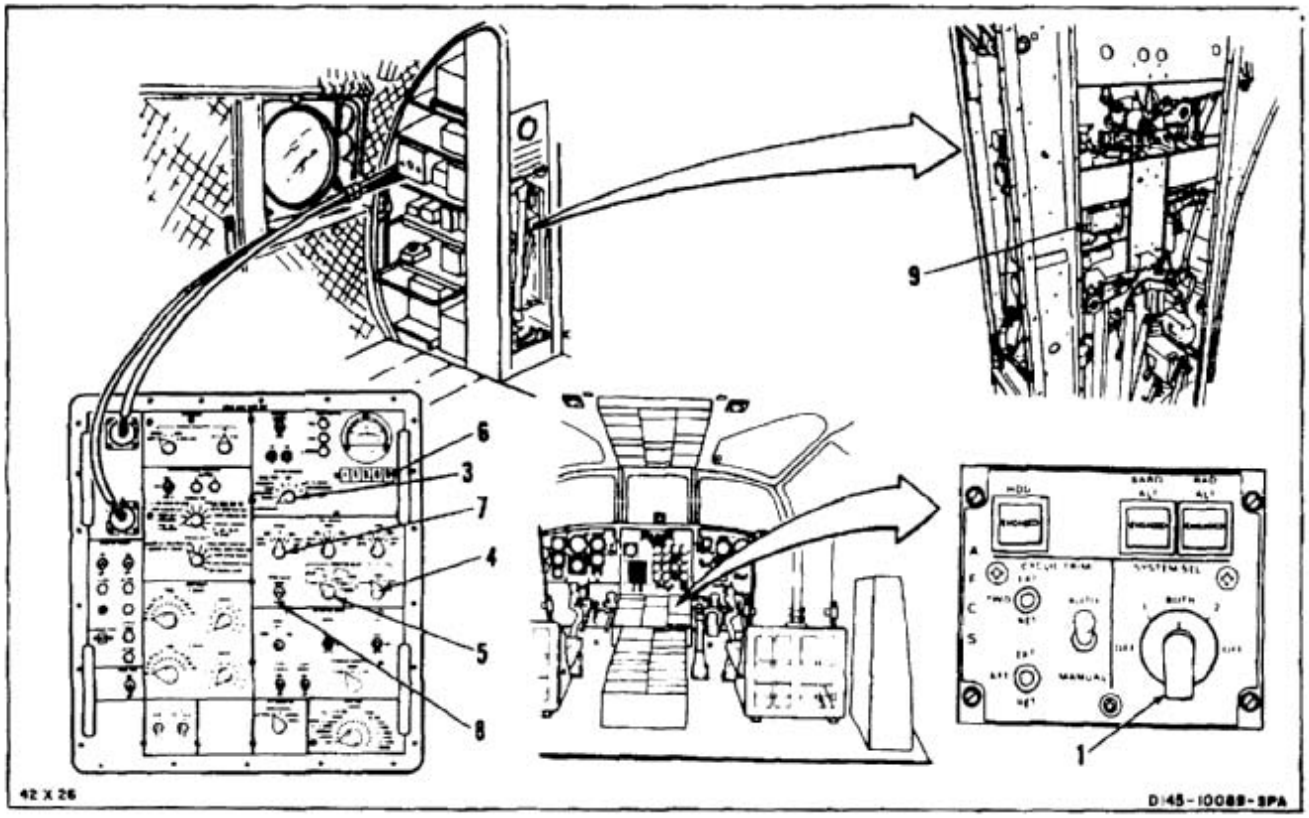


Table 11-1

	MONITOR SELECT FDBK SWITCH POSITION		
ILCA DRIVE PITCH SWITCH POSITION	SELF FDBK (VOLTS AC)	SUM 1 FDBK (VOLTS AC)	SUM 2 FDBK (VOLTS AC)
0	–0.13 TO +0.13	–0.13 TO +0.13	–0.13 TO +0.13
85% RETR	+0.61 to +0.83	+0.31 to +0.42	+0.31 to +0.42
MAX RETR	+0.72 to +0.98	+0.36 to +0.49	+0.36 to +0.49
85% EXT	–0.61 to –0.83	–0.31 to –0.42	–0.31 to –0.42
MAX EXT	–0.72 to –0.98	–0.36 to –0.49	–0.36 to –0.49

Table 11-2

ILCA DRIVE PITCH SWITCH POSITION	ILCA	MECHANICAL OUTPUTS ACTUATOR NO. 1 (UPPER)	MECHANICAL OUTPUTS ACTUATOR NO. 2 (LOWER)
0	Neutral	Neutral	Neutral
85% RETR	85% Retracted	85% RETR	85% EXT
MAX RETR	Full Retracted	FULL RETR	FULL EXT
85% EXT	85% Extended	85% EXT	85% RETR
MAX EXT	Full Extended	FULL EXT	FULL RETR

END PITCH ILCA AUTHORITY/PHASING TEST (BOTH)

TEST 3

ROLL ILCA NULL TEST (BOTH)

11. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

12. Set AFCS line test set switches as follows:

    a. METER SOURCE switch (3) to ILCA DRIVE.

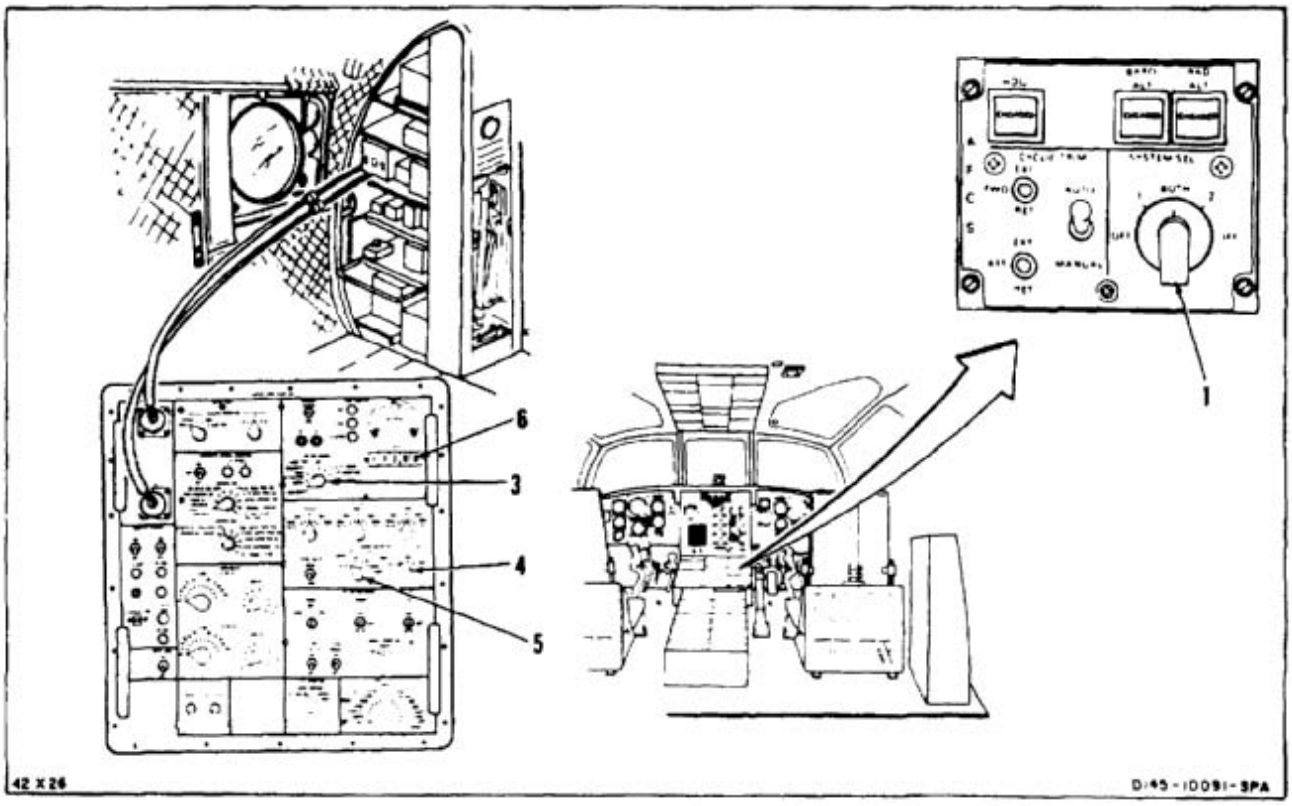
    b. MONITOR SELECT switch (4) to ROLL.

13. Set MONITOR SELECT FDBK switch (5) to SELF. Read digital display (6). Reading shall be **+0.10 to +0.10 VAC**.

14. Set MONITOR SELECT FDBK switch (5) to SUM 1. Read digital display (6). Reading shall be **−0.10 to +0.10 VAC**.

15. Set MONITOR SELECT FDBK switch (5) to SUM 2. Read digital display (6). Reading shall be **−0.10 to +0.10 VAC**.

END ROLL ILCA NULL TEST (BOTH)



TEST 4

ROLL ILCA AUTHORITY/PHASING TEST (BOTH)

16. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)
17. Set AFCS line test set switches as follows:
    a. METER SOURCE switch (3) to ILCA DRIVE.
    b. MONITOR SELECT switch (4) to ROLL.
    c. MONITOR SELECT FDBK switch (5) to SELF.
    d. ILCA DRIVE ROLL switch (10) to 0.
    e. HYDR VALVE switch (8) to OPEN.
18. Set ILCA DRIVE ROLL switch (10) and MONITOR SELECT FDBK switch (5) to positions in Table 11-3. Read voltages on digital display (6). (See Table 11-3.) Observe response of actuator (11). (See Table 11-4.)
19. Set ILCA DRIVE ROLL switch (10) to 0.
20. Set HYDR VALVE switch (8) to CLOSE.

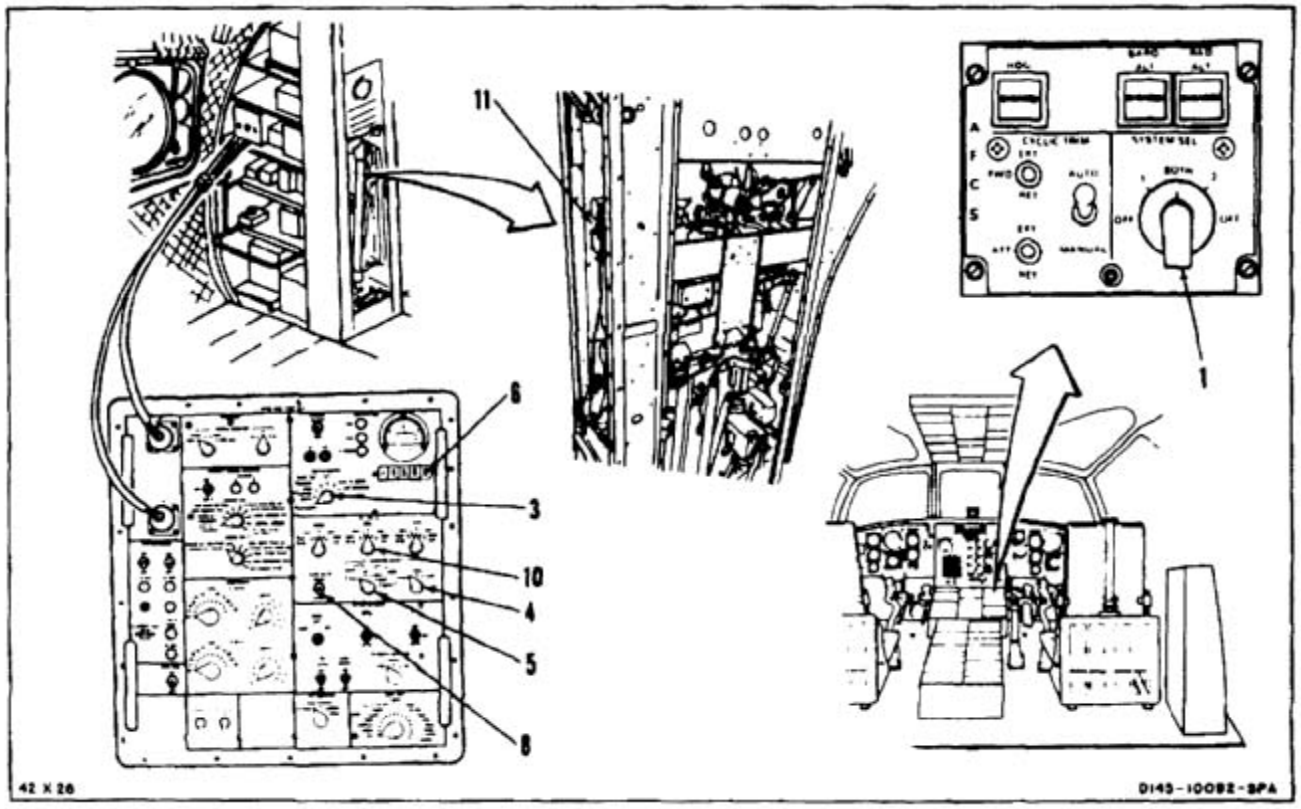


Table 11-3

ILCA DRIVE ROLL SWITCH POSITION	MONITOR SELECT FDBK SWITCH POSITION		
	SELF FDBK (VOLTS AC)	SUM 1 FDBK (VOLTS AC)	SUM 2 FDBK (VOLTS AC)
0	–0.13 TO +0.13	–0.13 TO +0.13	–0.13 TO +0.13
85% RETR	+0.79 to +1.27	+0.40 to +0.54	+0.40 to +0.54
MAX RETR	+0.94 to +1.27	+0.47 to +0.64	+0.47 to +0.64
85% EXT	–0.79 to –1.08	–0.40 to –0.54	–0.40 to –0.54
MAX EXT	–0.94 to –1.27	–0.47 to –0.64	–0.47 to –0.64

Table 11-4

ILCA DRIVE ROLL SWITCH POSITION	ILCA	MECHANICAL OUTPUTS ACTUATOR NO. 1 (UPPER)	MECHANICAL OUTPUTS ACTUATOR NO. 2 (LOWER)
0	Neutral	Neutral	Neutral
85% RETR	85% Retracted	85% RETR	85% EXT
MAX RETR	Full Retracted	FULL RETR	FULL EXT
85% EXT	85% Extended	85% EXT	85% RETR
MAX EXT	Full Extended	FULL EXT	FULL RETR

END ROLL ILCA AUTHORITY/PHASING TEST (BOTH)

TEST 5

YAW ILCA NULL TEST (BOTH)

21. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test).

22. Set AFCS line test set switches as follows:

    a. METER SOURCE switch (3) to ILCA DRIVE.

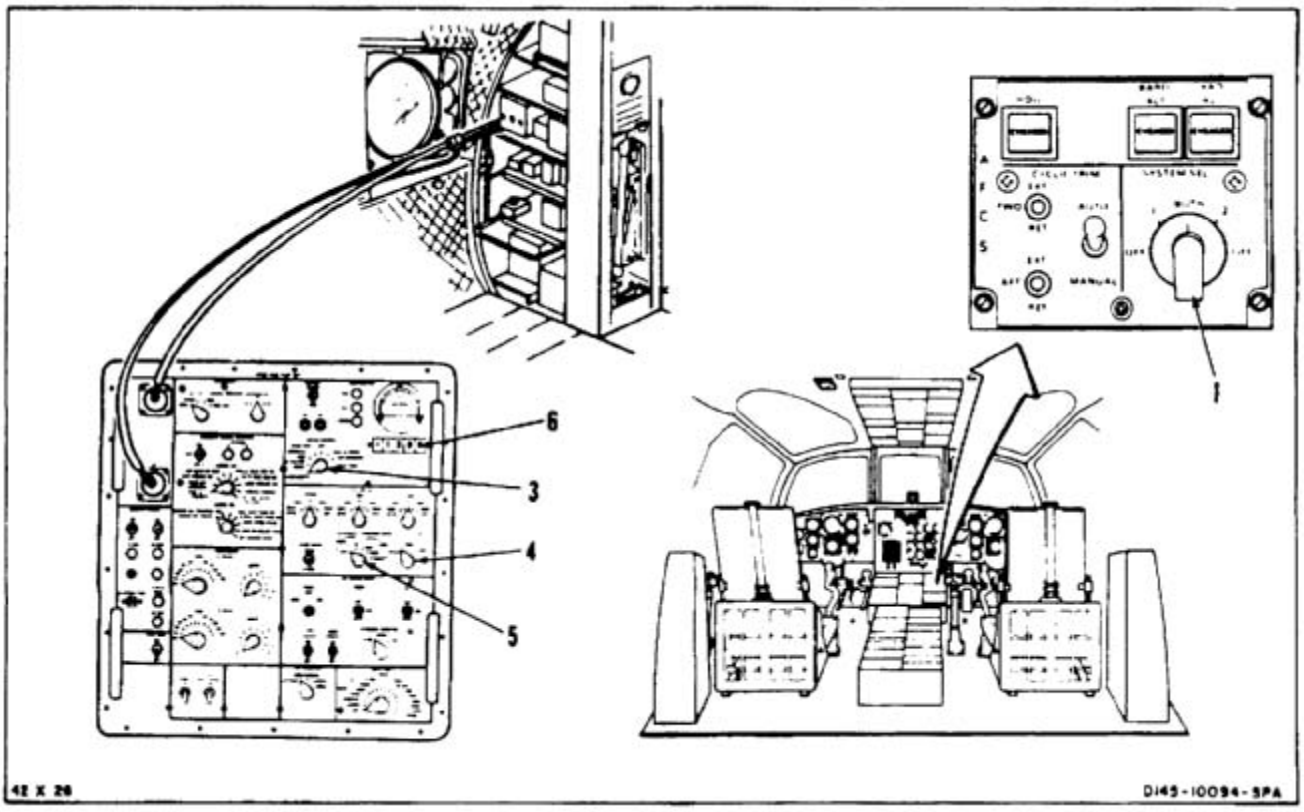
    b. MONITOR SELECT switch (4) to YAW.

23. Set MONITOR SELECT FDBK switch (5) to SELF. Read digital display (6). Reading shall be **−0.10 to +0.10 VAC**.

24. Set MONITOR SELECT FDBK switch (5) to SUM 1. Read digital display (6). Reading shall be **−0.10 to +0.10 VAC**.

25. Set MONITOR SELECT FDBK switch (5) to SUM 2. Read digital display (6). Reading shall be **−0.10 to +0.10 VAC**.

END YAW ILCA NULL TEST (BOTH)



TEST 6

YAW ILCA AUTHORITY/PHASING TEST (BOTH)

26. Set AFCS SYSTEM SEL switch to 1 or 2. (System under test.)
27. Set AFCS line test set switches as follows:
    a. METER SOURCE switch (3) to ILCA DRIVE.
    b. MONITOR SELECT switch (4) to YAW.
    c. MONITOR SELECT FDBK switch (5) to SELF.
    d. ILCA DRIVE YAW switch (12) to 0.
    e. HYDR VALVE switch (8) to OPEN.
28. Set ILCA DRIVE YAW switch (12) and MONITOR SELECT FDBK switch (5) to positions shown in Table 11-5. Read voltages on digital display (6). (See Table 11-5.) Observe response of actuator (13). (See Table 11-6.)
29. Set ILCA DRIVE YAW switch (12) to 0.
30. Set HYDR DRIVE switch (8) to CLOSE.

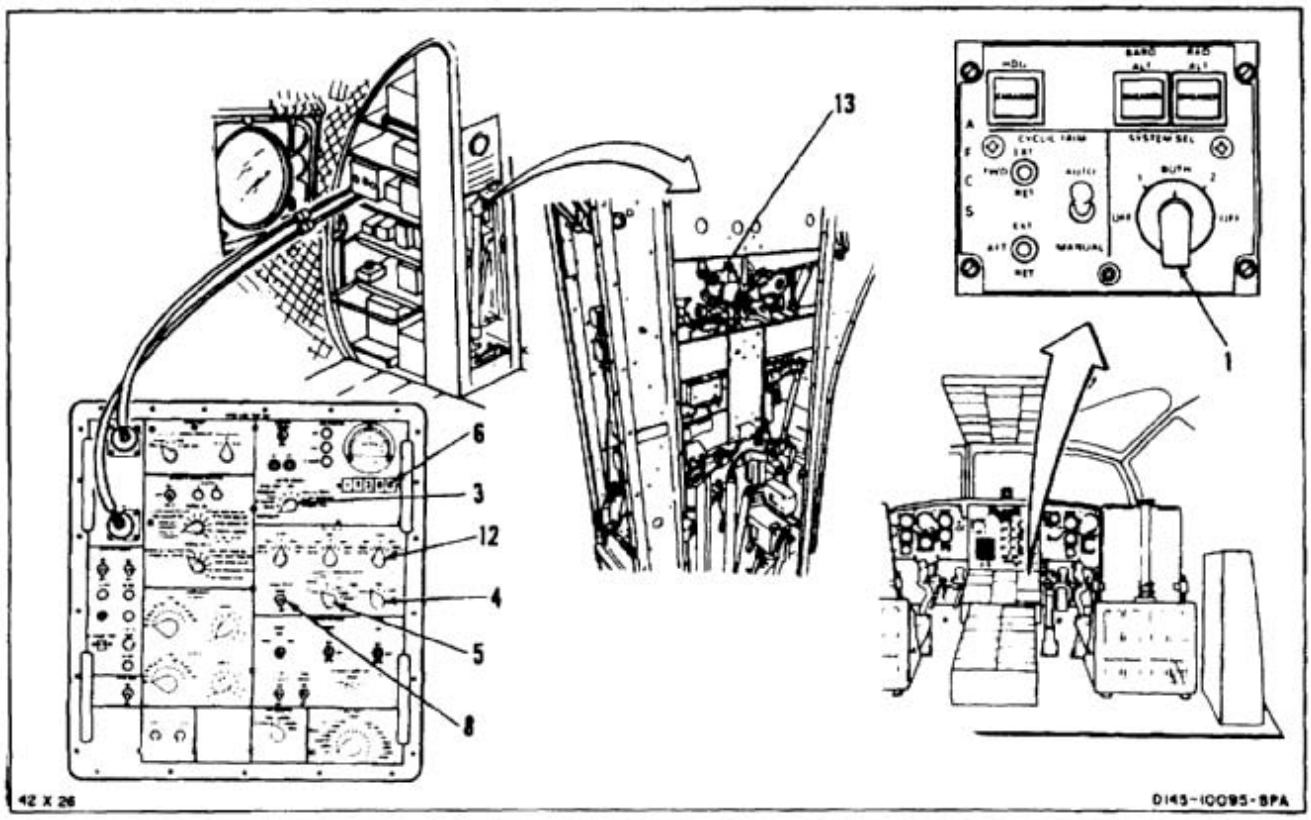


Table 11-5

	MONITOR SELECT FDBK SWITCH POSITION		
ILCA YAW SWITCH POSITION	SELF FDBK (VOLTS AC)	SUM 1 FDBK (VOLTS AC)	SUM 2 FDBK (VOLTS AC)
0	–0.20 TO +0.20	–0.20 TO +0.20	–0.20 TO +0.20
85% RETR	+1.23 to +1.66	+0.62 to +0.83	+0.62 to +0.83
MAX RETR	+1.45 to +1.96	+0.72 to +0.98	+0.72 to +0.98
85% EXT	–1.23 to –1.66	–0.62 to –0.83	–0.62 to –0.83
MAX EXT	–1.45 to –1.96	–0.72 to –0.98	–0.72 to –0.98

Table 11-6

ILCA YAW SWITCH POSITION	ILCA	MECHANICAL OUTPUTS ACTUATOR NO. 1 (UPPER)	MECHANICAL OUTPUTS ACTUATOR NO. 2 (LOWER)
0	Neutral	Neutral	Neutral
85% RETR	85% Retracted	85% RETR	85% EXT
MAX RETR	Full Retracted	FULL RETR	FULL EXT
85% EXT	85% Extended	85% EXT	85% RETR
MAX EXT	Full Extended	FULL EXT	FULL RETR

END YAW ILCA AUTHORITY/PHASING TEST (BOTH)

TEST 7

DASH ACTUATOR OUTPUT MOTION TEST (BOTH)

NOTE

Upper DASH actuator is part of No. 1 AFCS. Lower actuator is part of No. 2 AFCS.

31. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

32. Set AFCS line test set switches as follows:

    a. METER SOURCE switch (3) to ACTUATOR DRIVE.

    b. ACTUATOR DRIVE DASH switch (14) to OFF.

    c. FEEDBACK MONITOR switch (15) to DASH.

33. Set ACTUATOR DRIVE DASH switch (14) to EXT. Read digital display (6). Reading shall be **+3.64 to +5.40 VDC**. Observe actuator (16) extends.

34. Set ACTUATOR DRIVE DASH switch (14) to RETR. Read digital display (6). Reading shall be **–6.86 to –7.00 VDC**. Observe actuator (16) retracts.

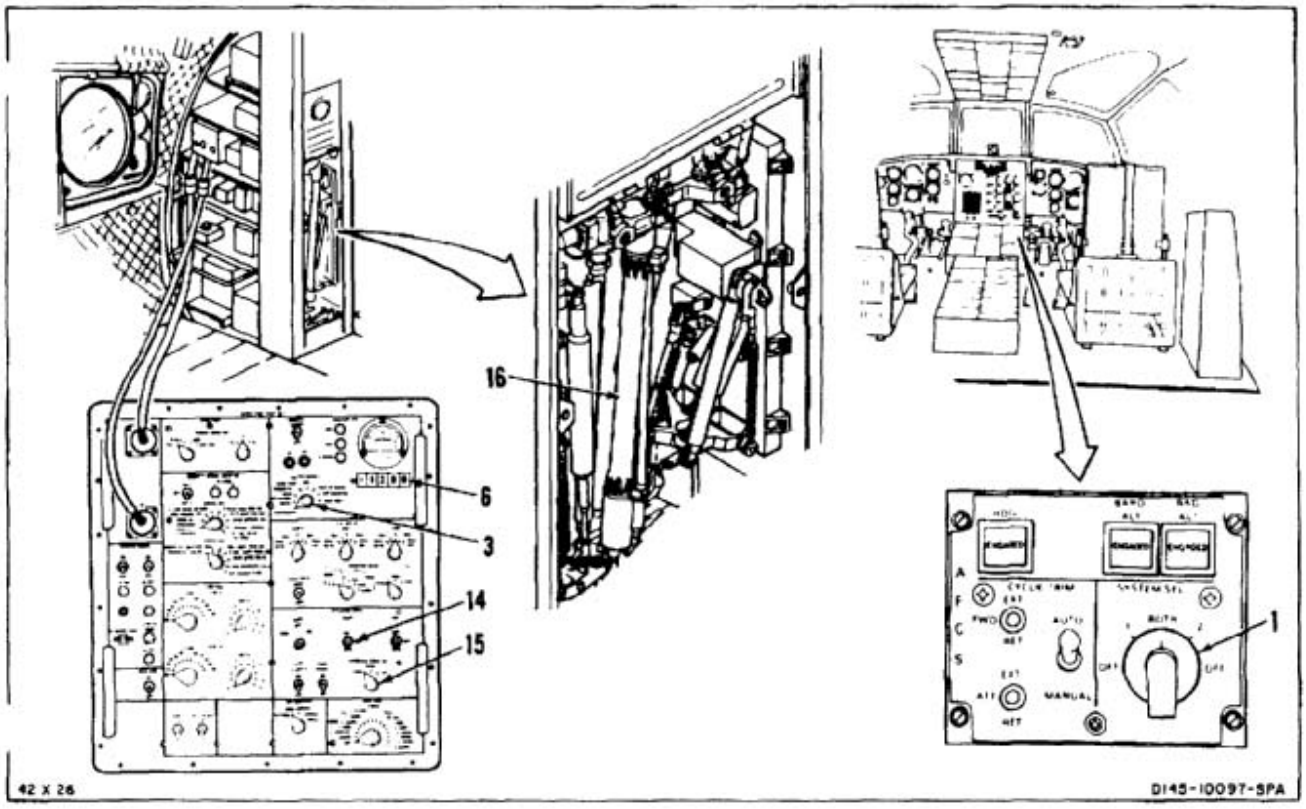
34.1. Set ACTUATOR DRIVE DASH switch (14) to EXT. Measure the time required for actuator (16) to fully extend. Time shall be **3.5 to 7.0 seconds**.

34.2. Set ACTUATOR DRIVE DASH switch (14) to RETR. Measure the time required for actuator (16) to fully retract. Time shall be **3.5 to 7.0 seconds**.

34.3. Set ACTUATOR DRIVE DASH switch (14) to EXT. Extend actuator (16) about halfway.

35. Aft actuator operates with No. 2 AFCS. To test No. 2 AFCS, perform steps 37 thru 39 and steps 42 thru 43.

END DASH ACTUATOR OUTPUT MOTION TEST (BOTH)



TEST 8

LONGITUDINAL CYCLIC TRIM ACTUATOR OUTPUT MOTION TEST (BOTH)

NOTE

Forward actuator operates with No. 1 AFCS. To test No. 1 AFCS, perform steps 37 thru 41.

Aft actuator operates with No. 2 AFCS. To test No. 2 AFCS, perform steps 37 thru 39 and steps 42 thru 43.

Authority of cyclic trim actuator as indicated on cyclic trim indicator is as follows:

FWD and AFT Extend — **150 knots**

FWD and AFT Retract — **60 knots**

36. Deleted.

37. Set ACTUATOR DRIVE LCT switch (17) to OFF.

38. Set FEEDBACK MONITOR switch (15) to LCT. Lamp (18) shall come on.

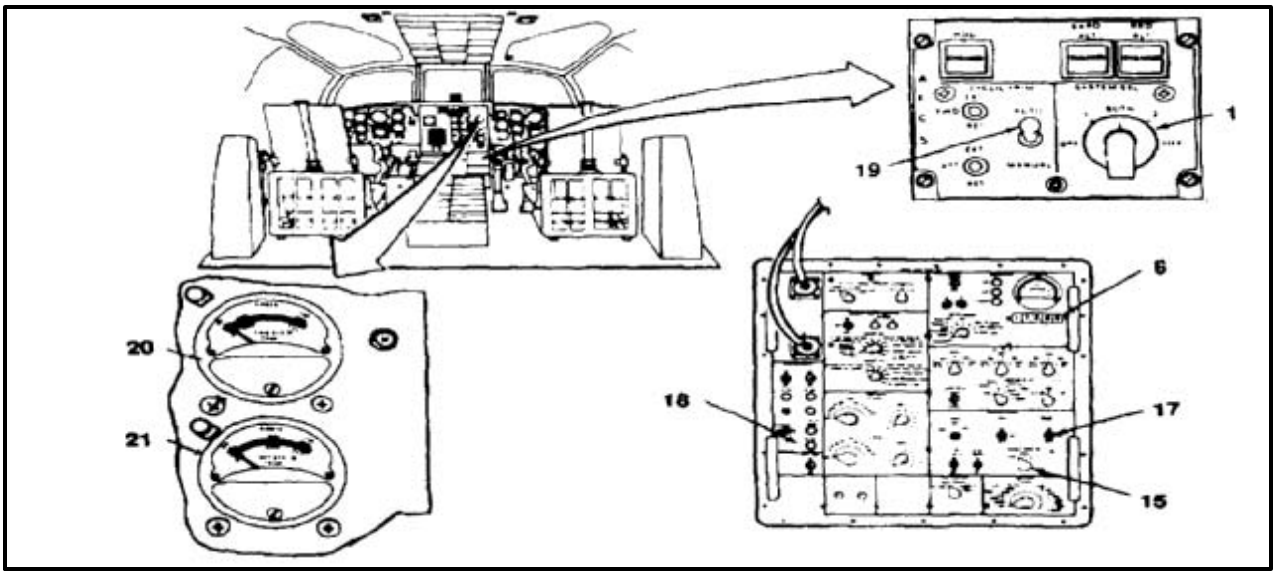
39. Set AFCS CYCLIC TRIM switch (19) to AUTO.

40. Set AFCS SYSTEM SEL switch (1) to 1. Hold ACTUATOR DRIVE LCT switch (17) to RETR until FWD indicator (20) indicates **60 knots**.

40.1. Hold ACTUATOR DRIVE LCT switch (17) to EXT until FWD indicator (20) indicates **150 knots**. Note time required for travel from **60 knots to 150 knots**. Travel time shall be **15 seconds** or less. Read digital display (6). Indication shall be **–3.14 to –3.78 VDC**.

41. Hold ACTUATOR DRIVE LCT switch (17) to RETR until FWD indicator (20) indicates **60 knots**. Note time required for travel from **150 knots to 60 knots**. Travel time shall be **15 seconds**or less. Read digital display (6). Indication shall be **0.00 to –0.38 VDC**.

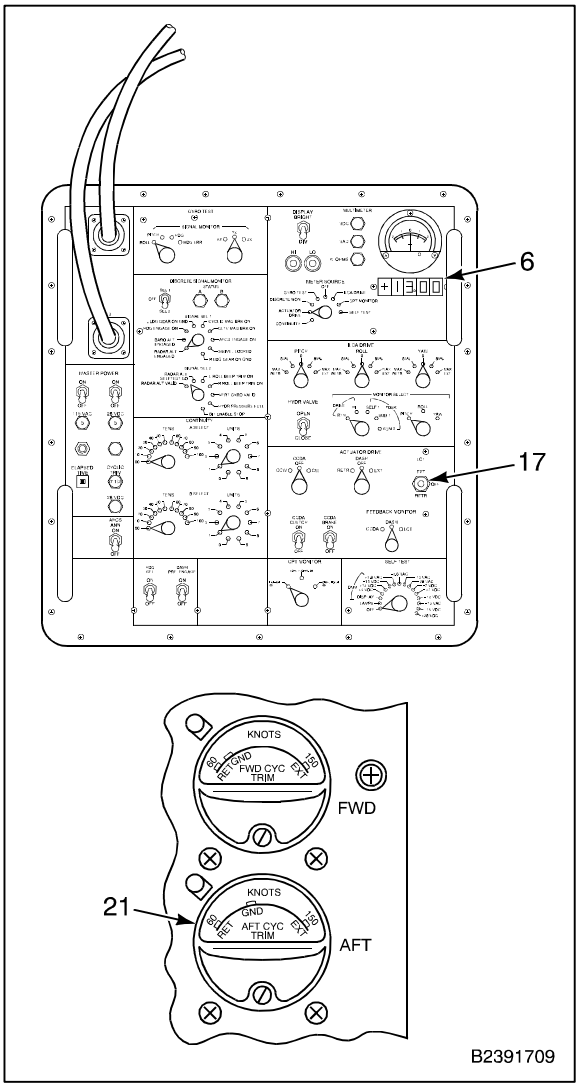
42. Set AFCS SYSTEM SEL switch (1) to 2. Hold ACTUATOR DRIVE LCT switch (17) to RETR until AFT indicator (21) indicates **60 knots**.



42.1. Hold ACTUATOR DRIVE LCT switch (17) to EXT until AFT indicator (21) indicates **150 knots**. Note time required for travel from **60 knots to 150 knots**. Travel time shall be **21 seconds** or less. Read digital display (6). Indication shall be **–4.97 to –5.46 VDC**.

43. Hold ACTUATOR DRIVE LCT switch (17) to RETR until AFT indicator (21) indicates **60 knots**. Note time required for travel from **150 knots to 60 knots**. Travel time shall be **21 seconds** or less. Read digital display (6). Indication shall be **0.00 to –0.38 VDC**.

END LONGITUDINAL CYCLIC TRIM ACTUATOR OUTPUT MOTION TEST (BOTH)

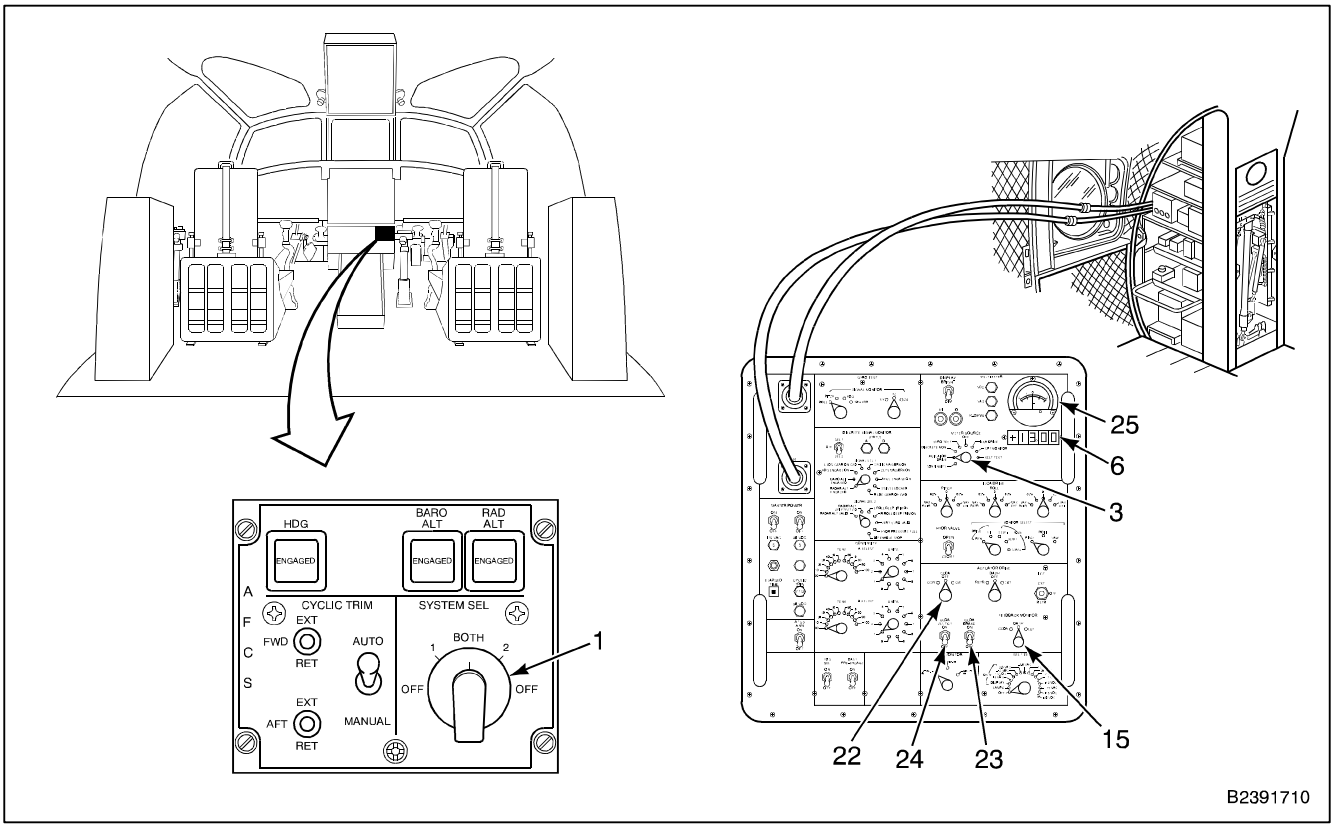


TEST 9

COLLECTIVE COCKPIT CONTROL DRIVE ACTUATOR (CCDA) SERVO LOOP OPERATION TEST (NO. 1)

44. Set AFCS SYSTEM SEL switch (1) to 1.
45. Set AFCS line test set switches as follows:
    a. METER SOURCE switch (3) to ACTUATOR DRIVE.
    b. ACTUATOR DRIVE CCDA switch (22) to OFF.
    c. FEEDBACK MONITOR switch (15) to CCDA.
    d. CCDA BRAKE switch (23) to OFF.
    e. CCDA CLUTCH switch (24) to OFF.
46. Set ACTUATOR DRIVE CCDA switch (22) to CW. Read digital display (6). Reading shall cycle between –**6.50 and +6.50 VAC**. Check meter (25). Meter pointer shall cycle from – to +.
47. Set ACTUATOR DRIVE CCDA switch (22) to CCW. Read digital display (6). Reading shall cycle between –**6.50 to +6.50 VAC**. Check meter (25). Meter pointer shall cycle from – to +.
48. Set ACTUATOR DRIVE CCDA switch (22) to OFF.

END COLLECTIVE COCKPIT CONTROL DRIVE ACTUATOR (CCDA) SERVO LOOP OPERATION TEST (NO.1)



TEST 10

CCDA THRUST CONTROL DRIVE TEST (NO. 1)

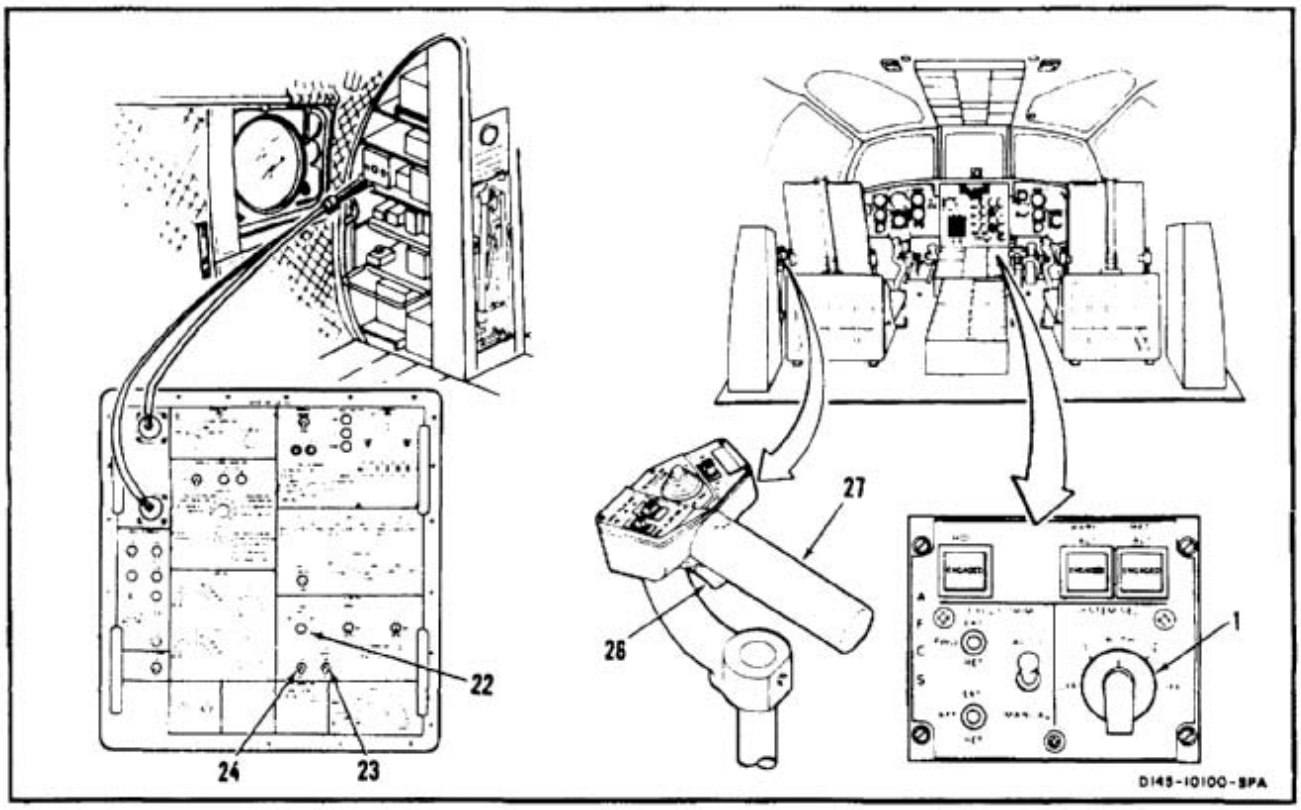
49. Set AFCS SYSTEM SEL switch (1) to 1.
50. Press THRUST CONT BRAKE TRIGGER (26).
51. Push thrust control stick (27) full down and release.
52. Set ACTUATOR DRIVE CCDA CLUTCH switch (24) to ON.
53. Set ACTUATOR DRIVE CCDA BRAKE switch 23) to ON.

CAUTION

Do not permit thrust control to drive full up. Damage to equipment can occur.

54. Set ACTUATOR DRIVE CCDA switch (22) to CCW. Check thrust control (27). Control shall drive up. Set switch to OFF before control contacts up stops.
55. Set ACTUATOR DRIVE CCDA switch (22) to OFF.
56. Set ACTUATOR DRIVE CCDA CLUTCH switch (24) to ON.
57. Set ACTUATOR DRIVE CCDA switch (22) to CW. Check control stick (27). Control shall drive down.
58. Set ACTUATOR DRIVE CCDA switch (22), CCDA BRAKE switch (23), and CCDA CLUTCH switch (24) to OFF.

END CCDA THRUST CONTROL DRIVE TEST (NO. 1)



TEST 11

DIRECTIONAL (YAW) CPT NULL OUTPUT TEST (BOTH)

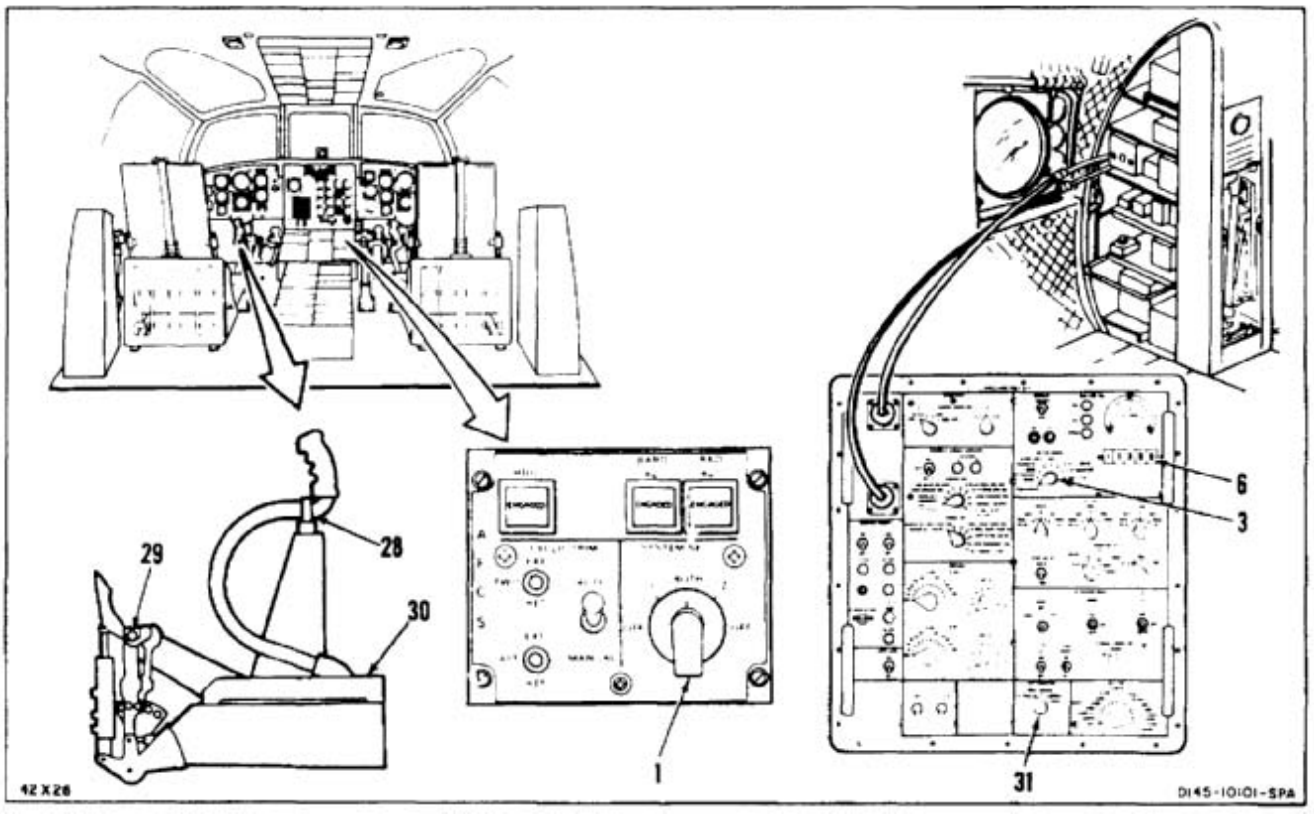
59. Install yoke (28) and pedal rig pin (29) in copilot's controls (30).
60. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)
61. Set METER SOURCE switch (3) to CPT MONITOR.
62. Set CPT MONITOR switch (31) to DIRECTIONAL. Read digital display (6). Reading shall be –**0.05 to +0.05 VAC**.

WARNING

Pedal inputs can cause the rotor heads to turn.

63. Remove pedal rig pins (29).
64. Apply full right pedal. Read digital display (6). Reading shall be –**4 to** –**6 VAC**.
65. Apply full left pedal. Read digital display (6). Reading shall be **+4 to +6 VAC**.
66. Install pedal rig pins (29).

END YAW CPT NULL AND OUTPUT TEST (BOTH)

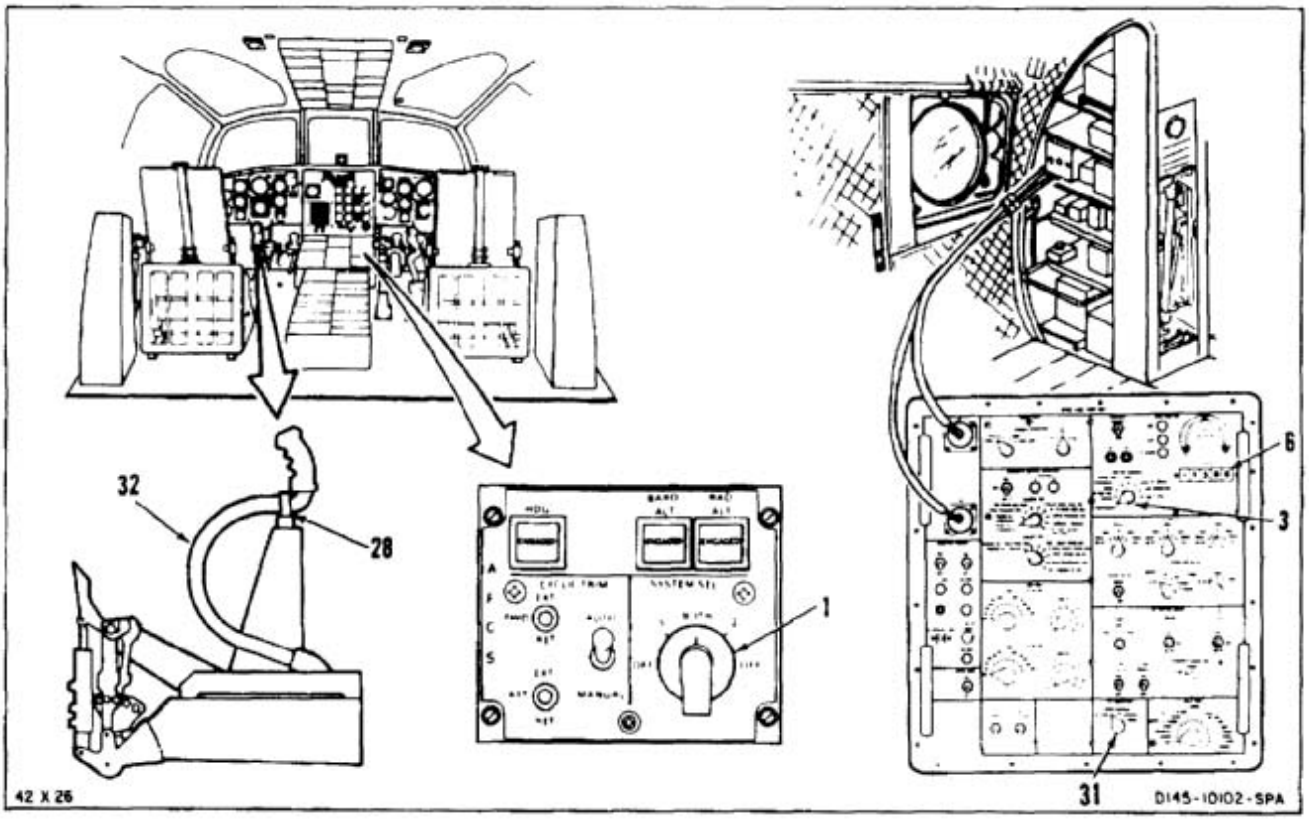


TEST 12

LATERAL (ROLL) CPT NULL AND OUTPUT TEST (BOTH)

67. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)
68. Set METER SOURCE switch (3) to CPT MONITOR.
69. Set CPT MONITOR switch (31) to LATERAL. Read digital (6). Reading shall be –**0.05 to +0.05 VAC**.
70. Remove yoke (28) from control stick (32).
71. Move control stick (32) full right. Read digital display (6). Reading shall be **+4.0 to +6.0 VAC**.
72. Move control stick (32) full left. Read digital display (6). Reading shall be –**4.0 to** –**6.0 VAC**.

END ROLL CPT NULL AND OUTPUT TEST (BOTH)

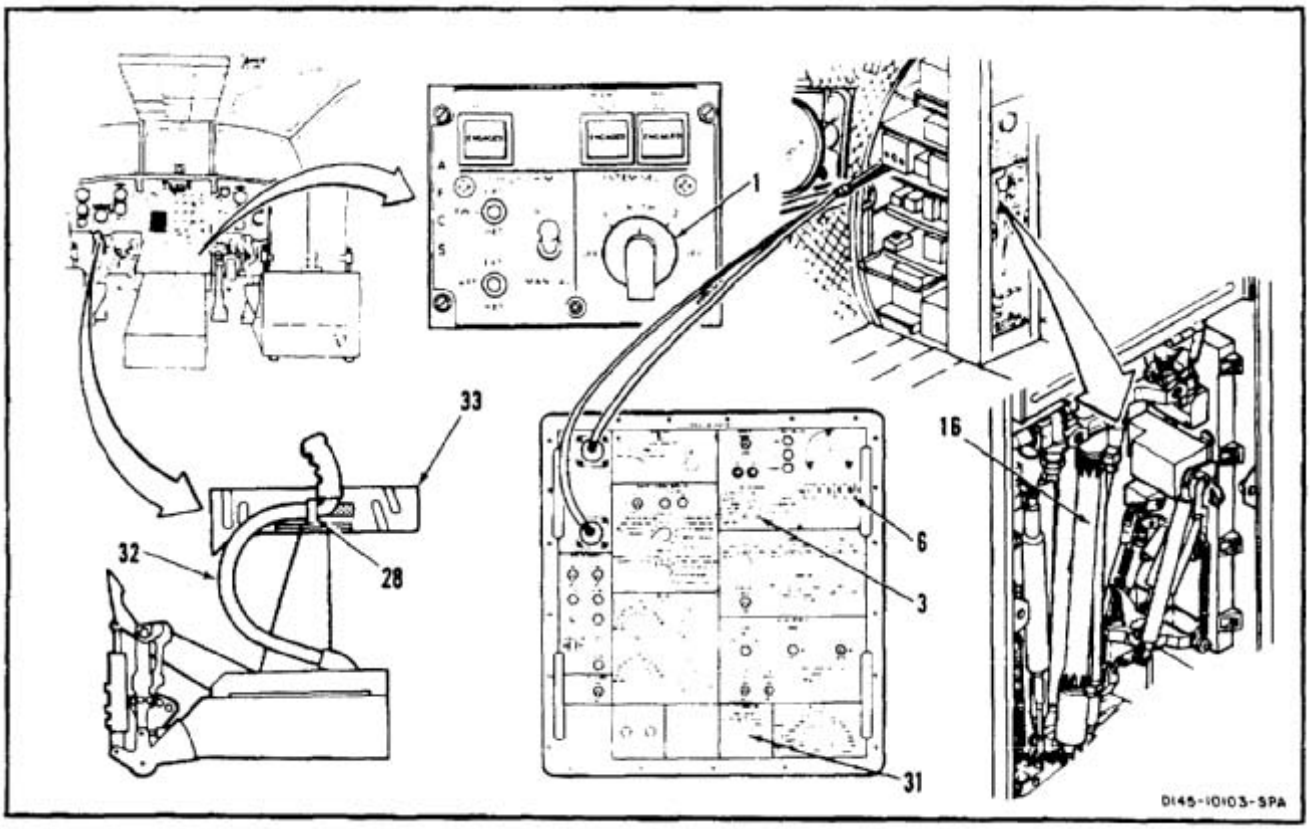


TEST 13

LONGITUDINAL (PITCH) CPT NULL AND OUTPUT TEST (BOTH)

73. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)
74. Install control stick (32) in yoke (28).
75. Set METER SOURCE switch (3) to CPT MONITOR.
76. Set CPT MONITOR switch (31) to LONGITUDINAL. Read digital display (6). Record reading.
77. Install pitch quadrant (33) (Task 11-24).
78. Retract upper and lower DASH actuator (16) (Task 11-165).
79. Adjust control stick (32) to obtain reading of step 76. Read digital display (6). Reading shall be within **0.005 VAC** of reading.
80. Set control stick (32) to neutral on quadrant (33).
81. Move control stick (32) aft to CPT NULL position line on quadrant (33). Read digital display (6). Reading shall be **–.05 to +.05 VAC**.
82. Move control stick (32) full aft. Read digital display (6). Reading shall be **+2 to +4 VAC**.
83. Move control stick (32) full forward. Read digital display (6). Reading shall be **–4 to –6 VAC**.

END LONGITUDINAL (PITCH) CPT NULL AND OUTPUT TEST (BOTH)



TEST 14

VERTICAL GYRO VALIDITY TEST (BOTH)

84. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

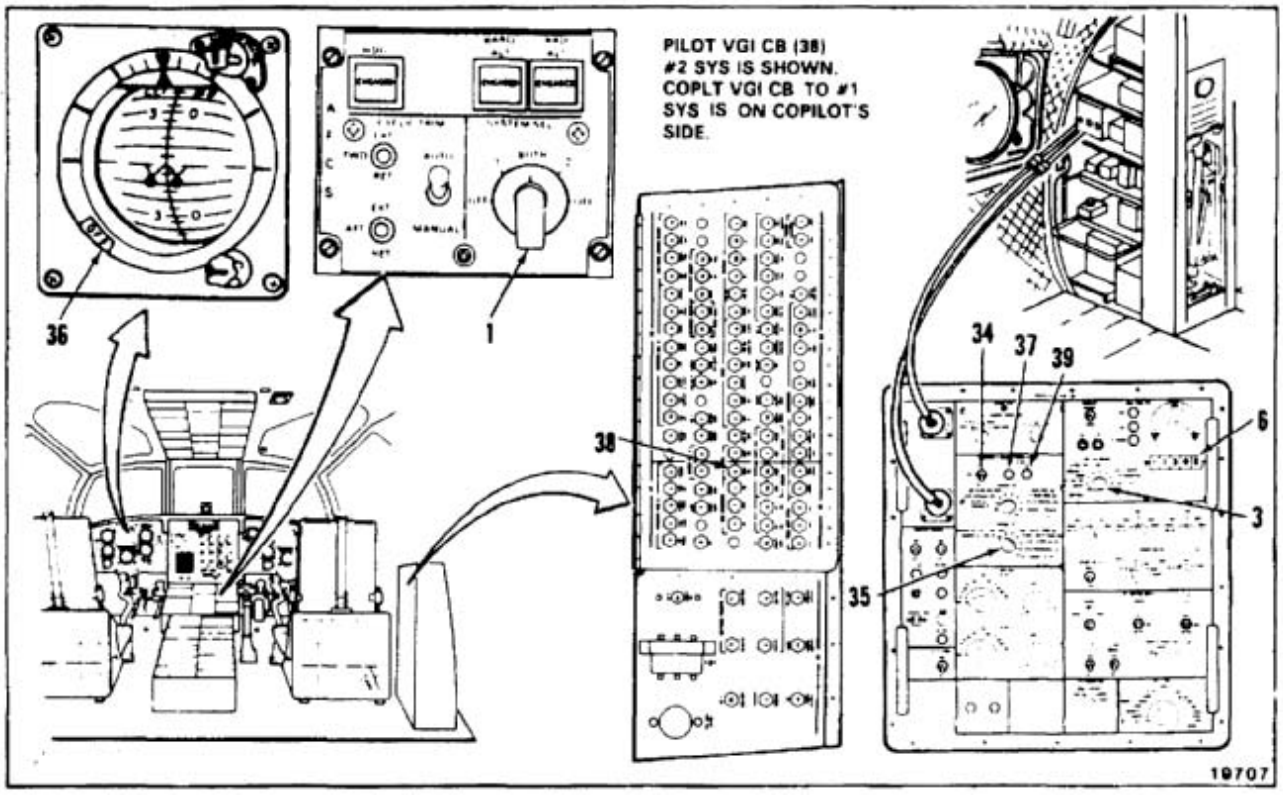
85. Set METER SOURCE switch (3) to DISCRETE MONITOR.

86. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 2 and SIGNAL SEL 2 switch (35) to VERT GYRO VALID. Check gyro indicator OFF flag (36). Flag shall disappear. Read digital display (6). Reading shall be **–0.5 to +0.5 VDC**. STATUS A light (37) shall come on.

87. Open VGI circuit breaker (38) (if system #2 is under test, pilot side or copilot side for #1 sys). Read digital display (6). Reading shall be **+4.0 to +6.0 VDC**. STATUS A light (37) shall go out and STATUS B light (39) shall come on.

88. Close VGI circuit breaker (38). (System under test.) STATUS B light (39) shall go out and STATUS A light (37) shall come on.

END VERTICAL GYRO VALIDITY TEST (BOTH)

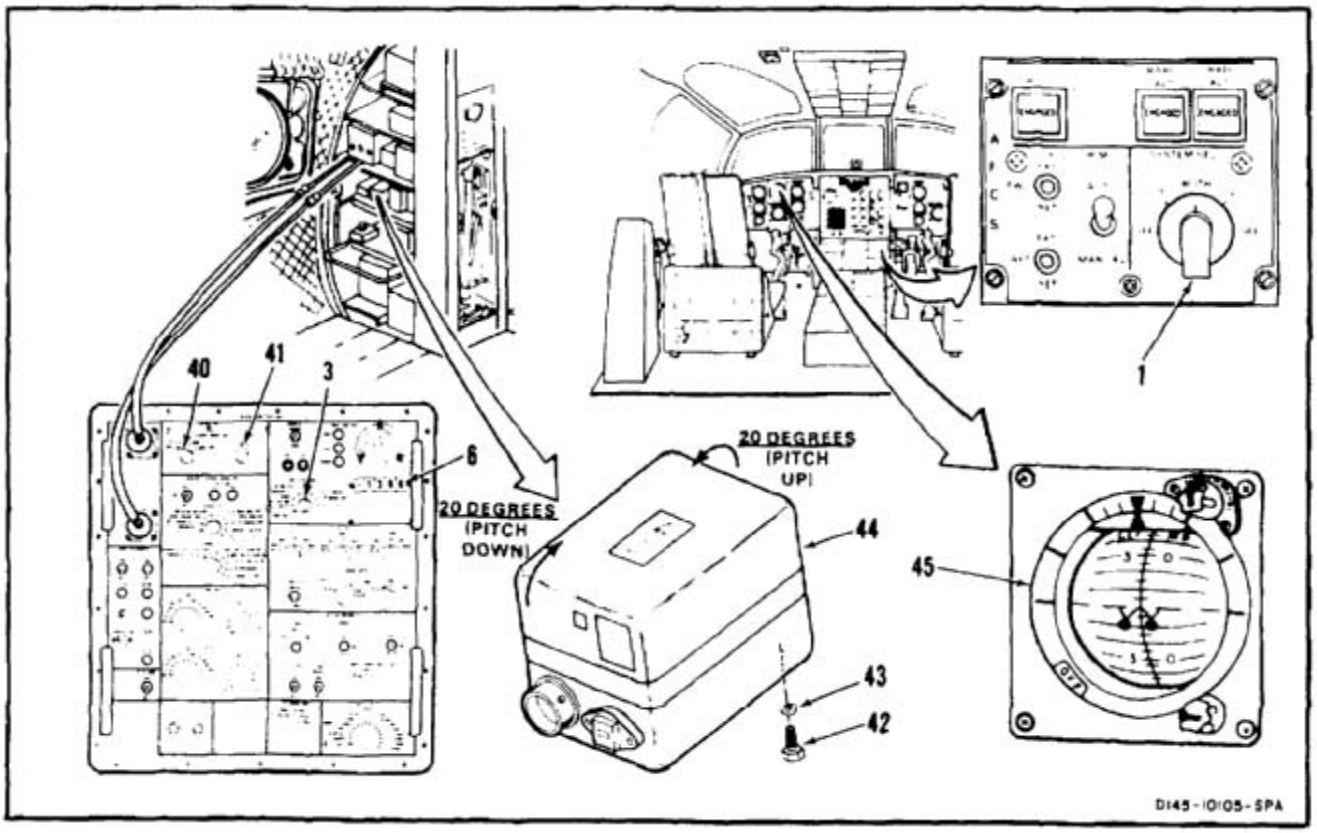


TEST 15

VERTICAL GYRO PITCH ATTITUDE TEST (BOTH)

89. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test).
90. Set METER SOURCE switch (3) to GYRO TEST.
91. Set GYRO TEST SIGNAL MONITOR switch (40) to PITCH.
92. Set GYRO TEST SIGNAL MONITOR switch (41) to XY.
93. Remove three mounting screws (42) and washers (43) from gyro (44).
94. Read digital display (6). Reading shall be **+0.2 to +0.8 VAC**.
95. Have helper observe attitude indicator (45). Tilt gyro (44) about **20°** pitch up. Digital display (6) shall read **+3.0 to +5.0 VAC**.
96. Have helper observe attitude indicator (45). Tilt gyro (44) about **20°** pitch down. Digital display (6) shall read **–3.0 to –5.0 VAC**.
97. If tests are complete, install three screws (42) and washers (43) in gyro (44).

END VERTICAL GYRO ATTITUDE TEST (BOTH)

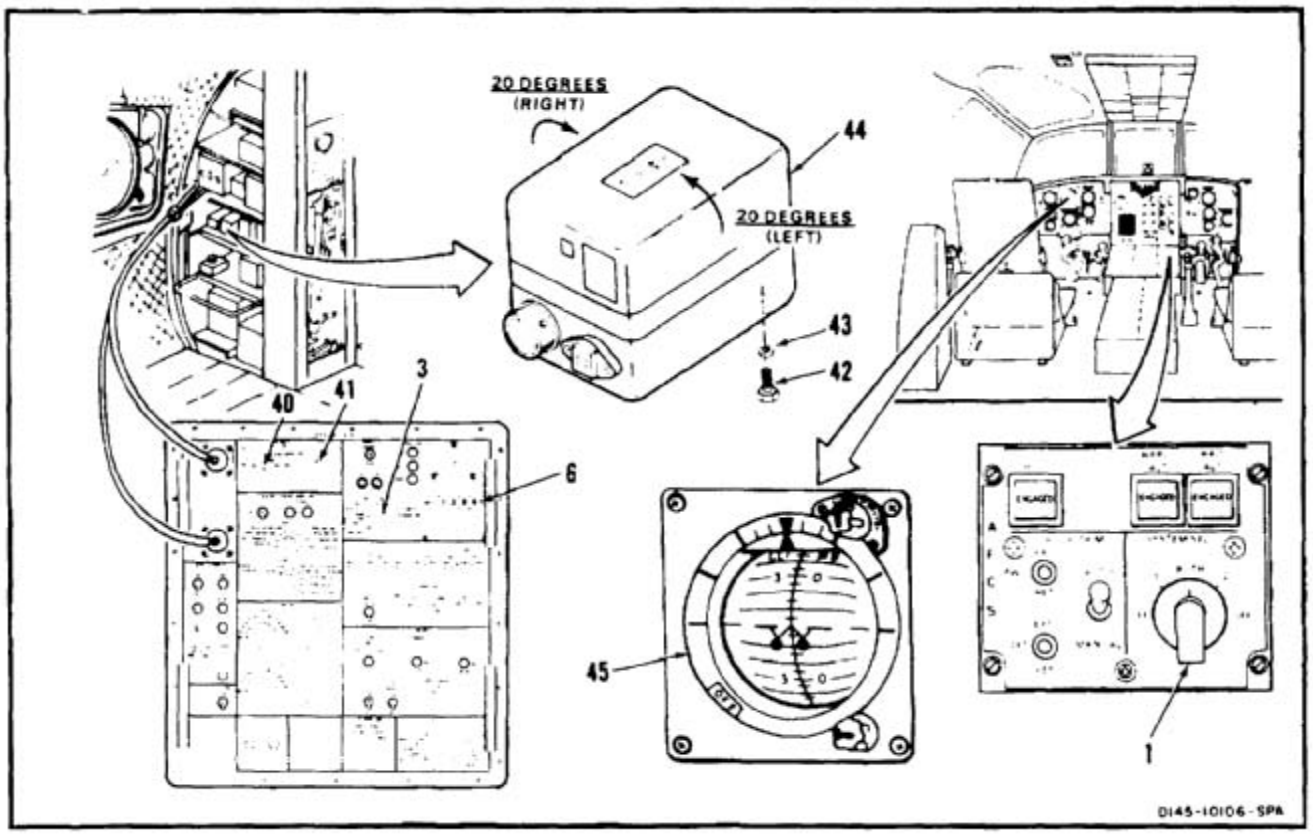


TEST 16

VERTICAL GYRO ROLL ATTITUDE TEST (BOTH)

98. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)
99. Set METER SOURCE switch (3) to GYRO TEST.
100. Set GYRO TEST SIGNAL MONITOR switch (40) to ROLL.
101. Set GYRO TEST SIGNAL MONITOR switch (41) to XY. Read digital display (6). Reading shall be **–0.2 to +0.2 VAC**.
102. Set GYRO TEST SIGNAL MONITOR switch (41) to YZ. Read digital display (6). Reading shall be **+9.0 to +11.0 VAC**.
103. Set GYRO TEST SIGNAL MONITOR switch (41) to 2X. Read digital display (6). Reading shall be **–9.0 to –11.0 VAC**.
104. Set GYRO TEST SIGNAL MONITOR switch (41) to XY.
105. Remove three mounting screws (42), and washers (43) from gyro (44).
106. Have helper observe indicator (45). Tilt gyro (44) about **20º** left roll. Read digital display (6). Reading shall be **–3.0 to –5.0 VAC**.
107. Have helper observe indicator (45). Tilt gyro (44) about **20º** right roll. Read digital display (6). Reading shall be **+3.0 to +5.0 VAC**.
108. Install three screws (42) and washers (43) in gyro (44).

END VERTICAL GYRO ROLL ATTITUDE TEST (BOTH)



TEST 17

DIRECTIONAL GYRO OUTPUT TEST (BOTH)

109. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

110. Set METER SOURCE switch (3) to GYRO TEST.

111. Set GYRO TEST SIGNAL MONITOR switch (40) to HDG.

112. Set GYRO TEST SIGNAL MONITOR switch (41) to XY. Read digital display (6). Record reading.

113. Set GYRO TEST SIGNAL MONITOR switch (41) to YZ. Read digital display (6). Record reading.

114. Set GYRO TEST SIGNAL MONITOR switch (41) to ZX. Read digital display (6). Record reading.

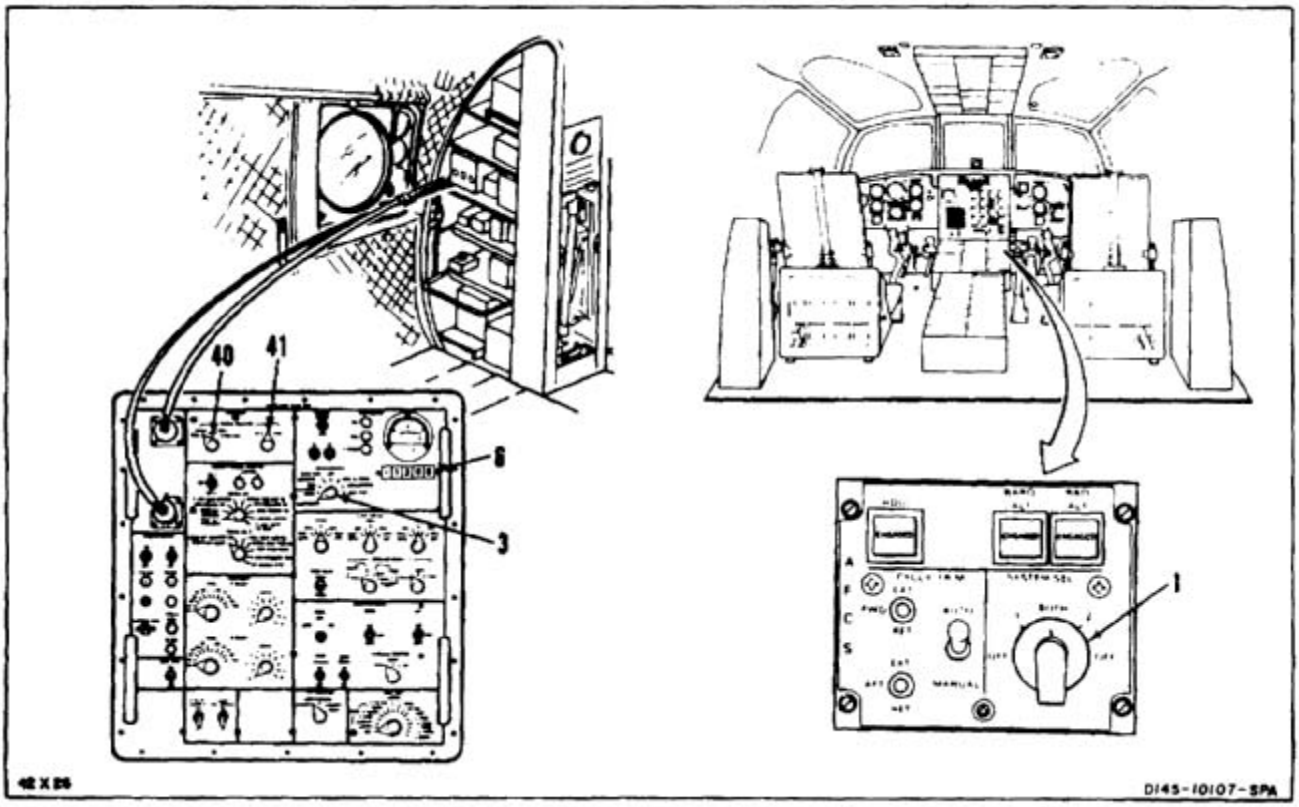
115. Set GYRO TEST SIGNAL MONITOR switch (41) to XY.

116. Add algebraically recorded readings of steps 112, 113, and 114. The sum shall be –**0.5 to +0.5**.

EXAMPLE

XY	=	+12.1
YZ	=	-8.2
ZX	=	-4.3
SUM	=	-0.4

END DIRECTIONAL GYRO OUTPUT TEST (BOTH)



TEST 18

HORIZONTAL SITUATION INDICATOR NULL TEST (BOTH)

117. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

118. Set METER SOURCE switch (3) to GYRO TEST.

119. Set GYRO TEST SIGNAL MONITOR switch (41) to HDG ERR.

120. Set GYRO TEST SIGNAL MONITOR switch (42) to SEL 1 or SEL 2.

120.1. SIGNAL SELECT switch should be position to HDG ENGAGE ON.

121. Set COMPASS switch (46) to SLAVED.

122. Push and rotate PUSH TO SET switch (47) and set compass card (48) to **0º**.

123. Rotate CR6 switch (49) set pointer (50) to **0º**.

124. Rotate HDG switch (51) and set bug (52) to **0º**.

124.1. Set DISCRETE SIGNAL MONITOR switch (51.1) to SEL 1 ON.

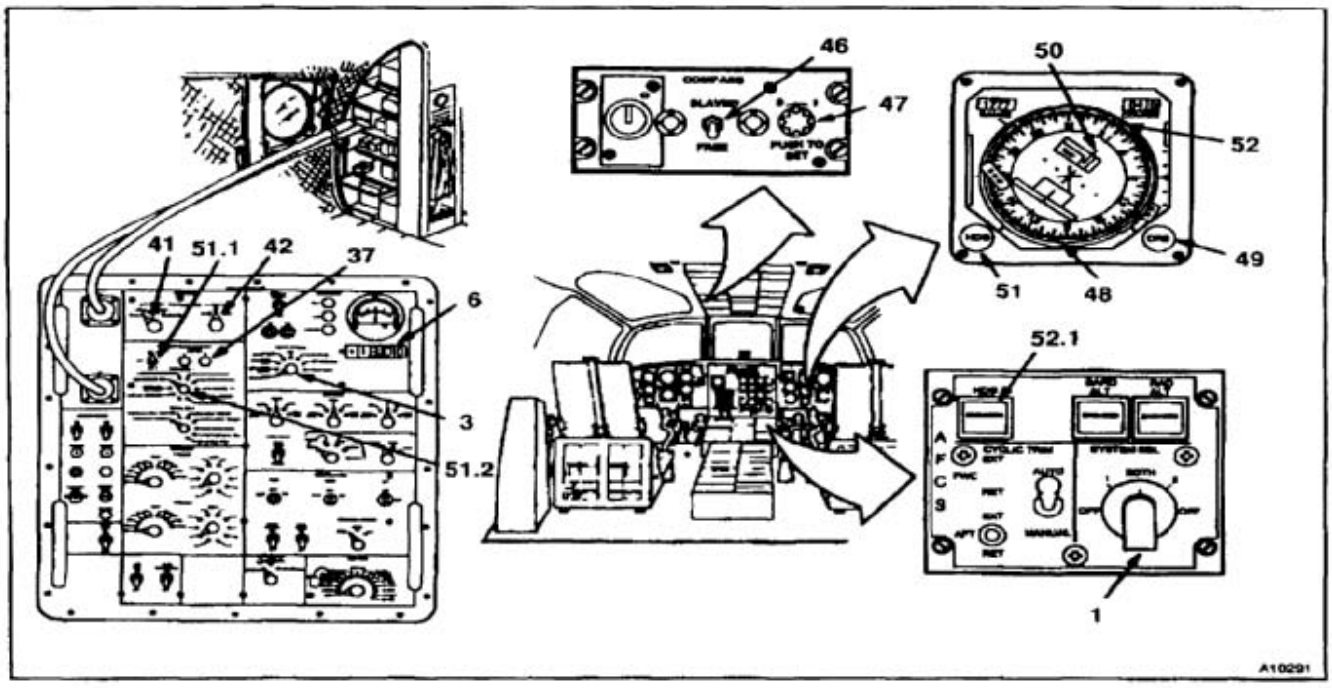
124.2. Set SIGNAL SEL 1 switch (51.2) to HDG ENGAGED ON.

125. Press HDG ENGAGED switch (52.1). STATUS A light (37) shall come on. Read digital display (6). Reading shall be –**0.2 to +0.2 VAC**.

NOTE

Depending on helicopters present heading, compass card may drift. Make sure voltage is read at **0º** on HSI.

END HORIZONTAL SITUATION NULL TEST (BOTH)



TEST 19

HORIZONTAL SITUATION INDICATOR HEADING TEST (BOTH)

125.1. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

126. Set METER SOURCE switch (3) to GYRO TEST.

127. Set GYRO TEST SIGNAL MONITOR switch (41) to HDG ERR.

128. Set GYRO TEST SIGNAL MONITOR switch (42) to XY.

129. Set COMPASS switch (46) to SLAVED.

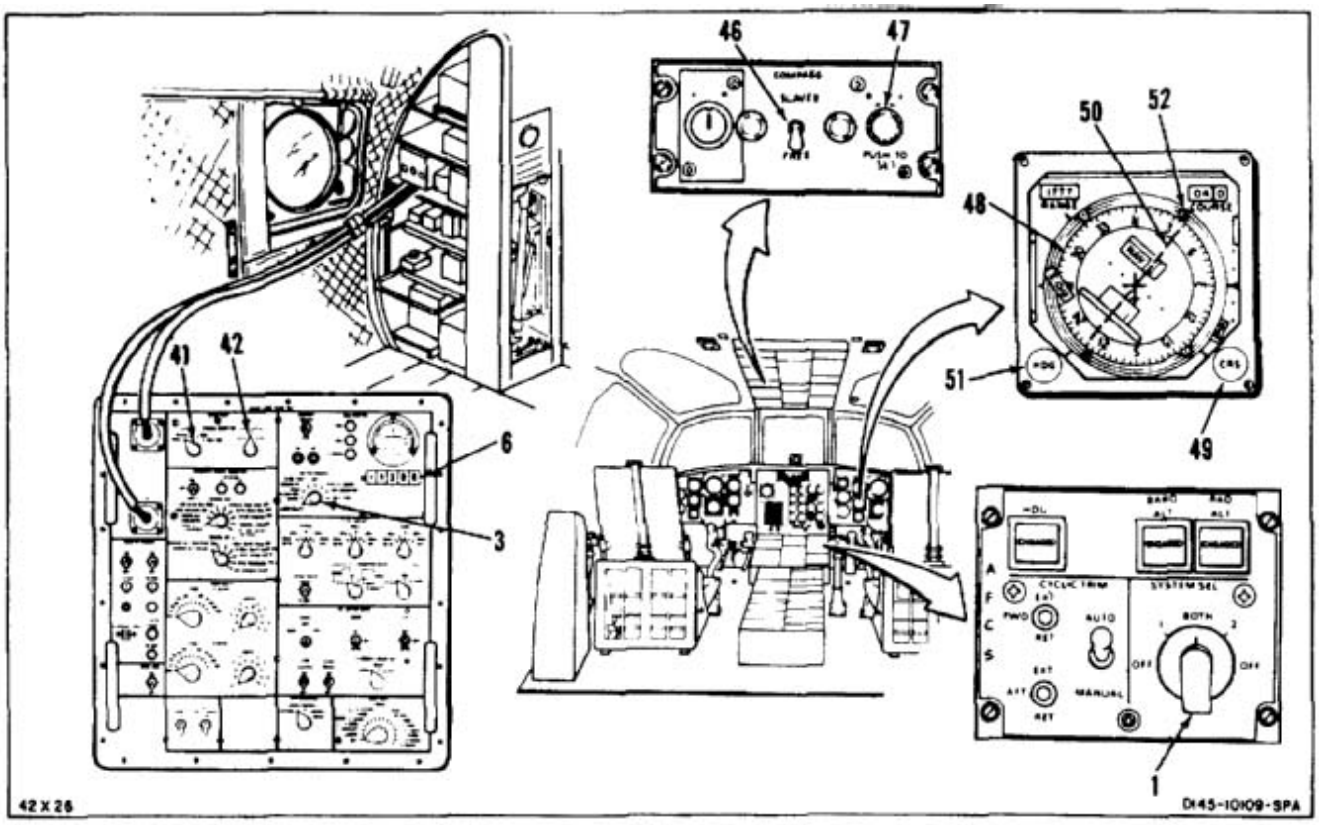
130. Push and rotate PUSH TO SET switch (47). Set compass card (48) to **0º**.

131. Rotate CRS switch (49). Set pointer (50) to **0º**.

132. Rotate HDG switch (51) and set bug (52) to **30º**. Keep compass card (48) at **0º**. Read digital display (6). Reading shall be **–10.25 to –12.25 VAC**.

133. Rotate HDG switch (51) and set bug (52) to **345º**. Keep compass card (48) at **0º**. Read digital display (6). Reading shall be **+4.8 to +6.8 VAC**.

END HORIZONTAL INDICATOR HEADING TEST (BOTH)



TEST 20

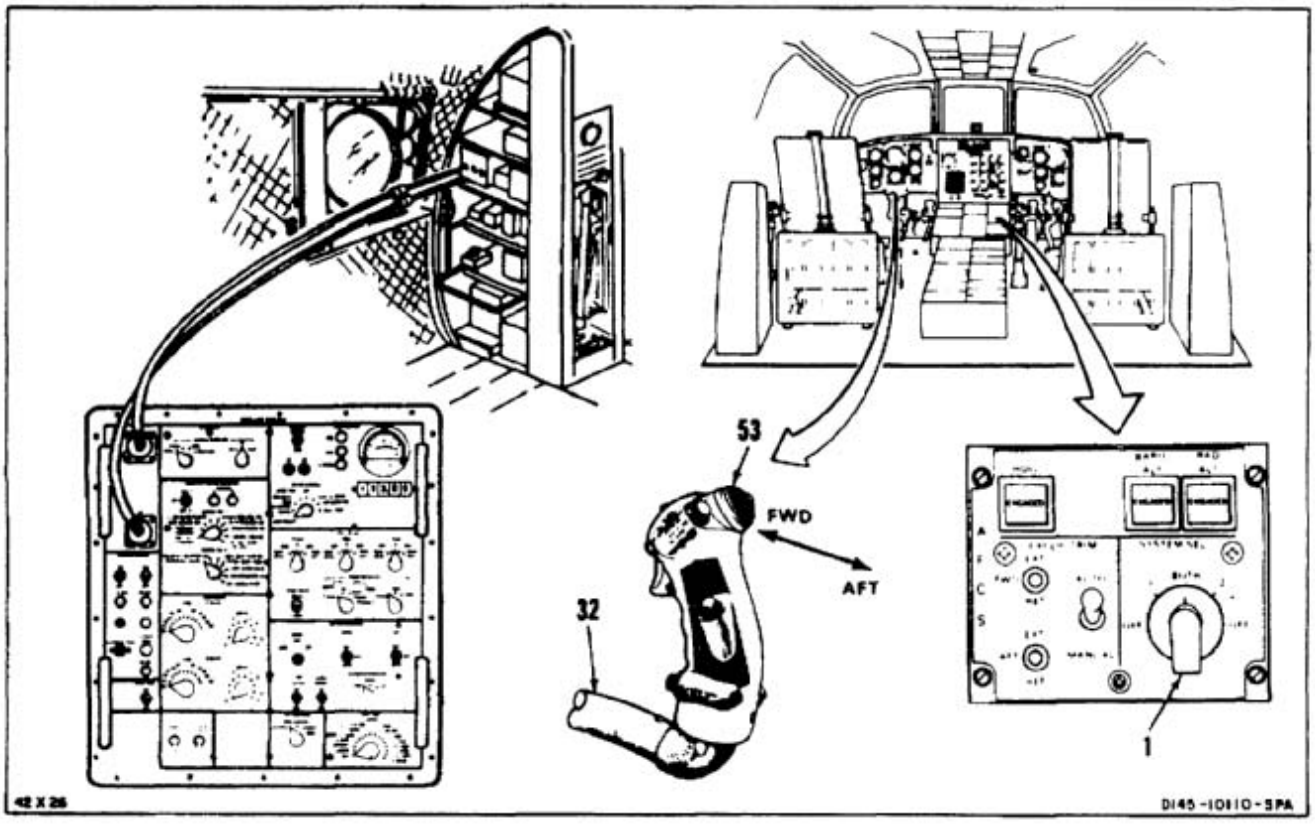
PITCH BEEP TRIM TEST (BOTH)

134. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

135. Set beep trim switch (53) forward. Stick (32) shall move forward.

136. Set swItch (53) aft. Stick (32) shall move aft.

END PITCH BEEP TRIM TEST (BOTH)



TEST 21

ROLL BEEP TRIM TEST (BOTH)

137. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

138. Set METER SOURCE switch (3) to DISCRETE MON.

139. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 2.

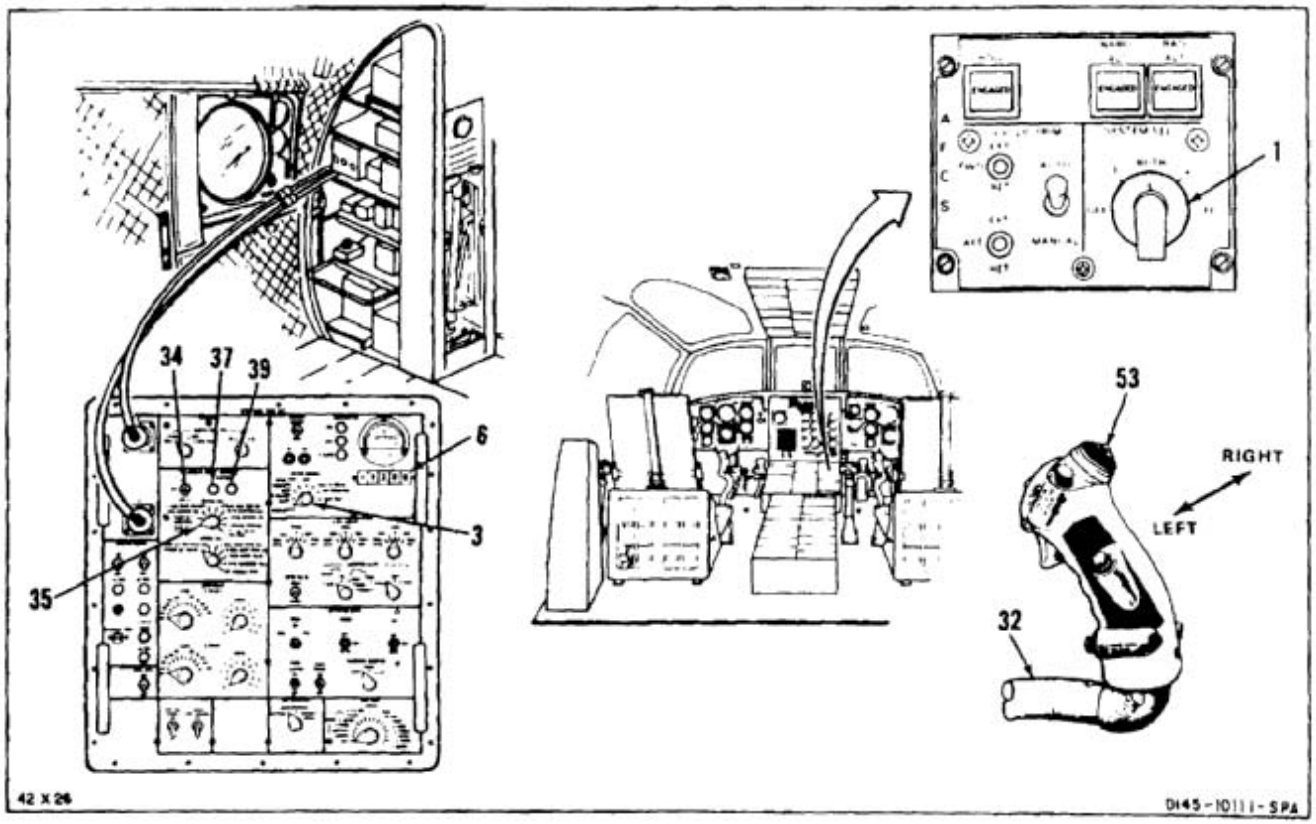
140. Set SIGNAL SEL 2 switch (35) to L ROLL BEEP TRIM ON. STATUS B light (39) shall come on.

141. Press beep trim switch (53) to left. Stick (32) shall not move left. Read digital display (6). Reading shall be **+12.0 to +16.0 VAC**. STATUS A light (37) shall come on. Release switch.

142. Set SIGNAL SEL 2 switch (35) to R ROLL BEEP TRIM ON. STATUS B light (39) shall be on.

143. Press switch (53) right. Stick (32) shall not move right. Read digital display (6). Reading shall be **+12.0 to +16.0 VAC**. Release switch. STATUS A light (37) shall come on.

END ROLL BEEP TRIM TEST (BOTH)



TEST 22

CYCLIC MAGNETIC BRAKE TEST (BOTH)

144. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

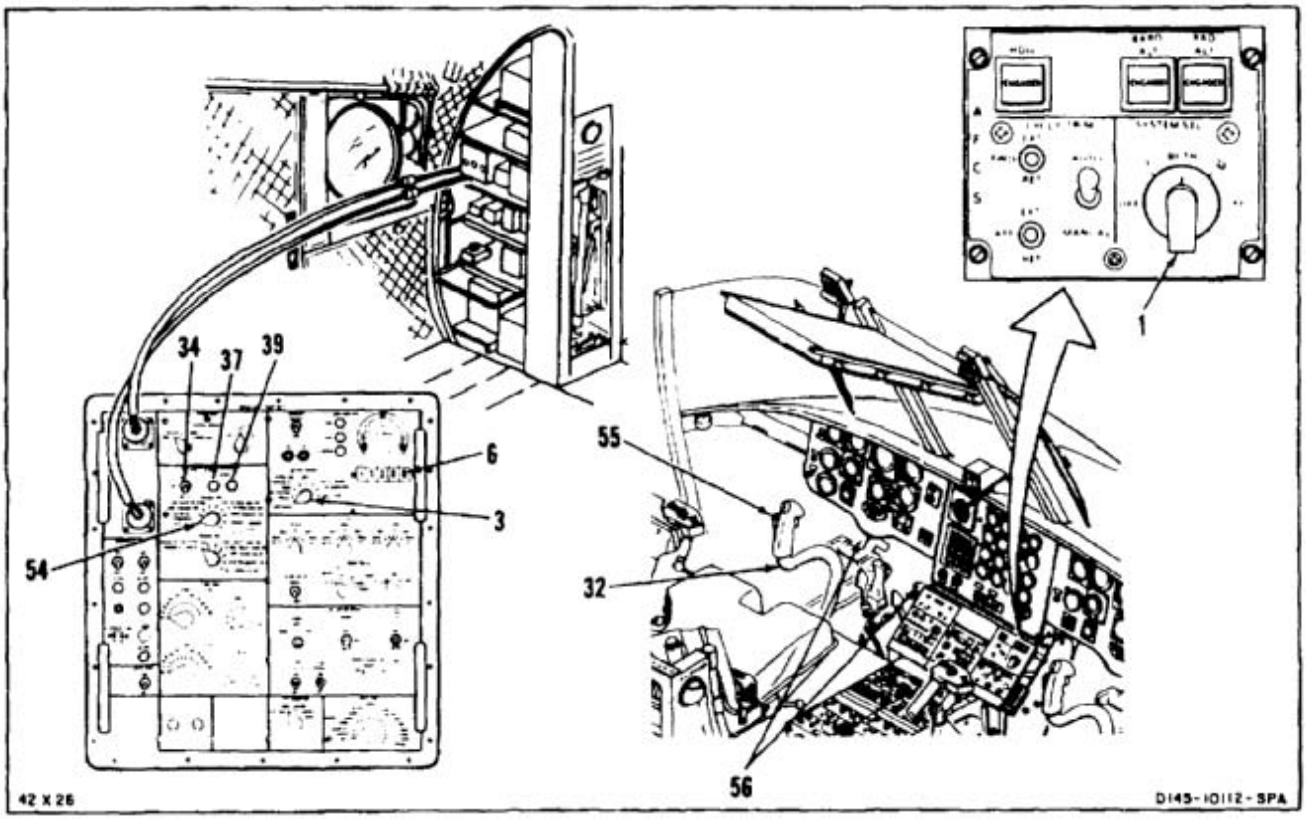
145. Set METER SOURCE switch (3) to DISCRETE MON.

146. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

147. Set SIGNAL SEL 1 switch (54) to CYCLIC MAG BRAKE ON. STATUS B light (39) shall come on.

148. Press CENTERING DEVICE RELEASE switch (55). STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+26.0 to +30.0 VDC**. Check stick (32) and pedals (56). They shall move freely in all directions. Release switch.

END CYCLIC MAGNETIC BRAKE TEST (BOTH)



TEST 23

COLLECTIVE MAGNETIC BRAKE TEST (NO. 1)

149. Set AFCS SYSTEM SEL switch (1) to 1.

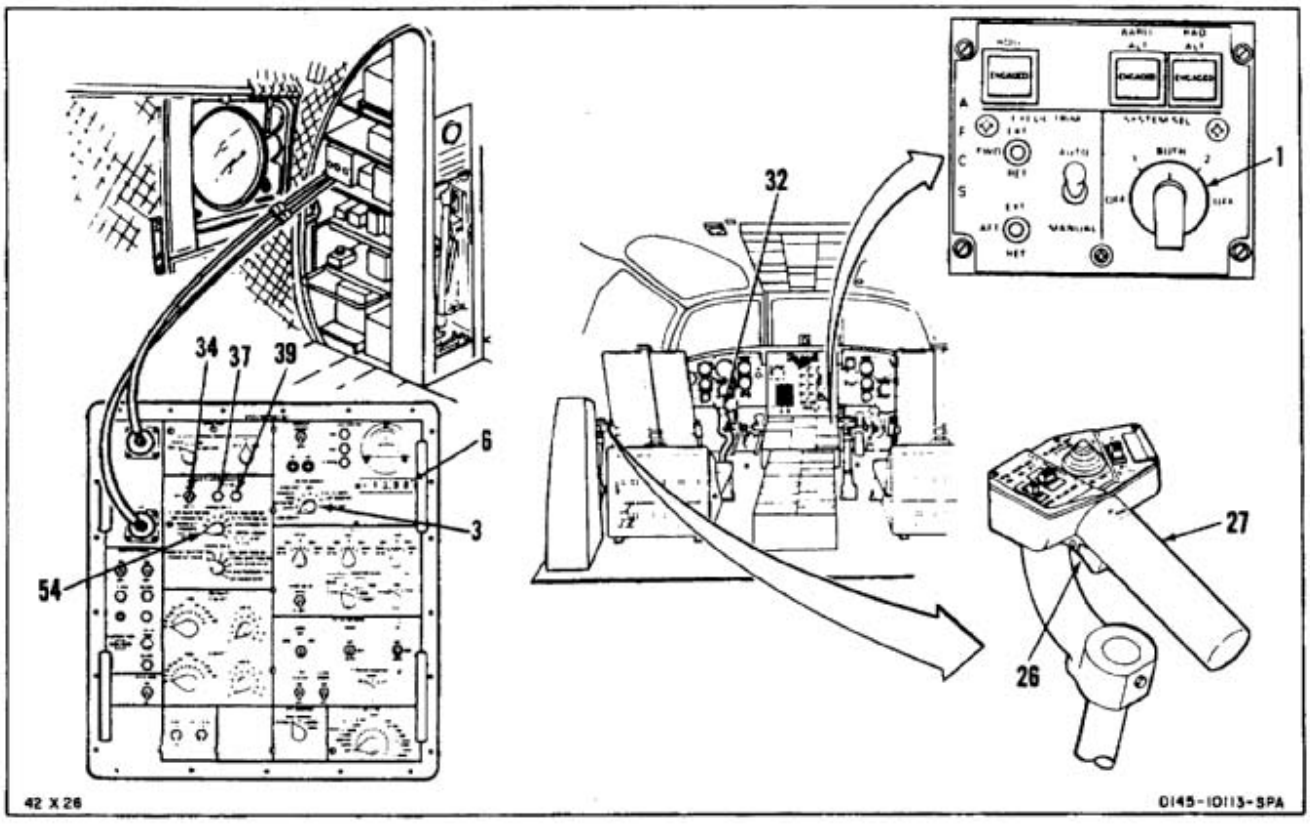
150. Set METER SOURCE switch (3) to DISCRETE MON.

151. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

152. Set SIGNAL SEL 1 switch (54) to CLTV MAG BRK ON. STATUS B light (39) shall come on.

153. Press THRUST CONT BRAKE TRIGGER switch (26). STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+26 to +30 VDC**. Stick (27) shall move freely. Release THRUST CONT BRAKE TRIGGER switch.

END COLLECTIVE MAGNETIC BRAKE TEST (NO. 1)



TEST 24

HYDRAULIC PRESSURE SWITCH TEST (BOTH)

154. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

155. Set METER SOURCE switch (3) to DISCRETE MON.

156. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 2.

157. Set SIGNAL SEL 2 switch (35) to HYD PRESSURE FULL STATUS A, light (37) shall come on. Read digital display (6). Reading shall be –**0.5 to +0.5 VDC**. NO. 1 HYD FLT CONTR caution light (57) shall be out.

NOTE

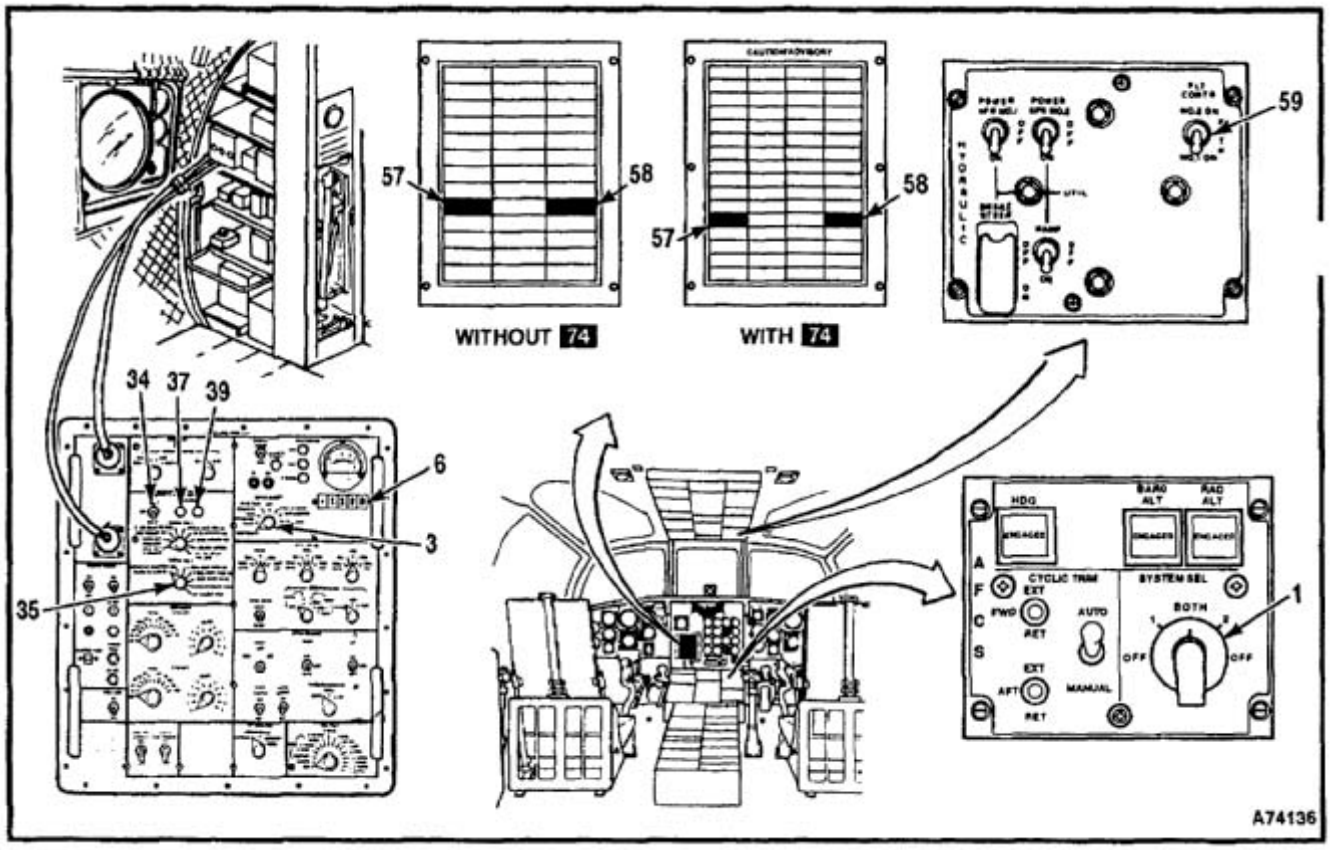
For No. 2 system test, NO. 2 HYD FLT CONTA caution light (58) shall be out.

158. Set HYDRAULIC FLT CONTR switch (59) to (59) to NO.2 ON. STATUS B, light (39) and NO. 1 HYD FLT CONTR (without 74) or HYD 1 (with 74) caution light (57) shall be on. Read digital display (6). Reading shall be **+4.1 to +5.1 VDC**.

NOTE

For No. 2 system test NO. 2 HYD FLT CONTR (without 74) or HYD 2 (with 74) caution light (58) shall be on.

END HYDRAULLIC PRESSURE SWITCH TEST (BOTH)



TEST 25

LEFT LANDING GEAR PROXIMITY SWITCH TEST (SYSTEM 1)

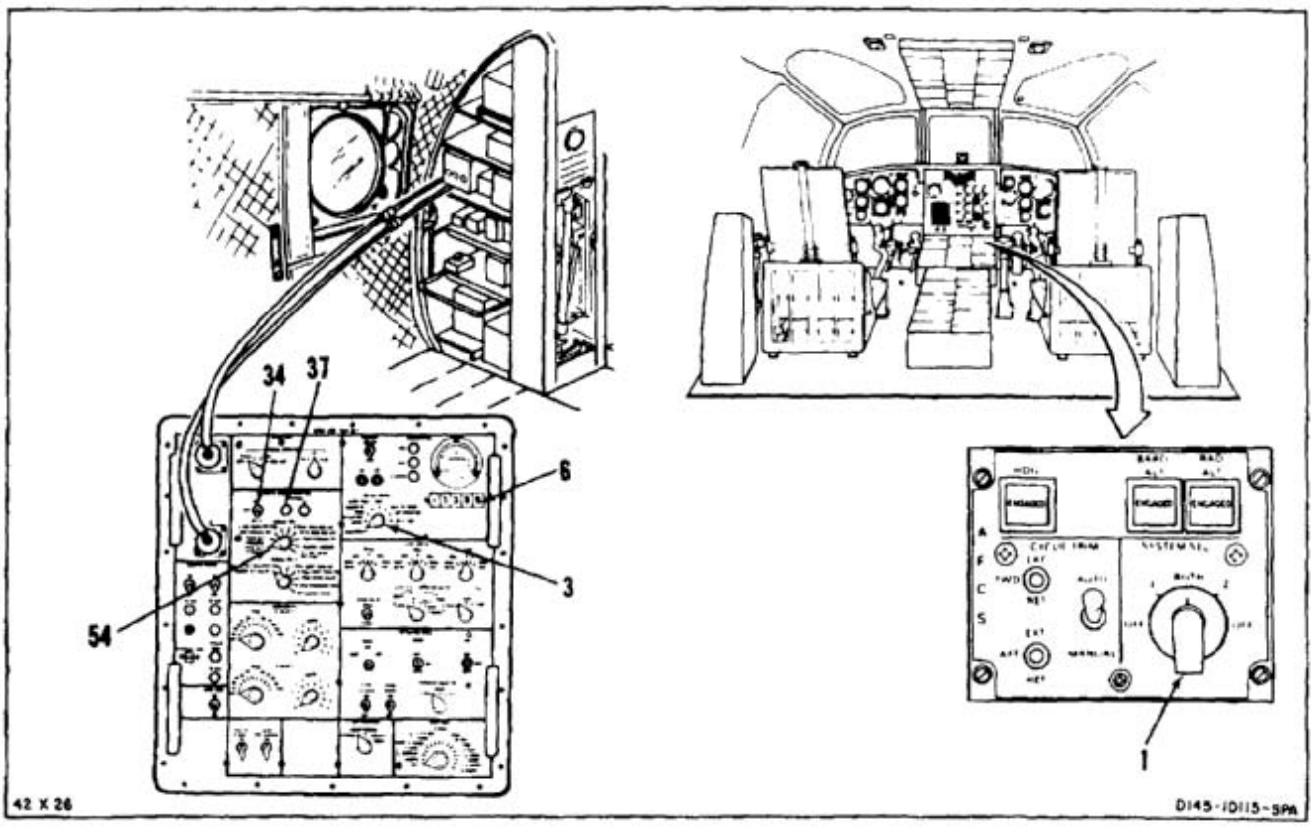
159. Set AECS SYSTEM SEL switch (1) to 1. (System under test.)

160. Set METER SOURCE switch (3) to DISCRETE MON.

161. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

162. Set SIGNAL SEL 1 switch (54) to L LDG GEAR ON GND. STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+11.0 to +13.0 VDC**.

END LEFT LANDING GEAR PROXIMITY SWITCH TEST (SYSTEM 1)



TEST 26

RIGHT LANDING GEAR PROXIMITY SWITCH TEST (SYSTEM 2)

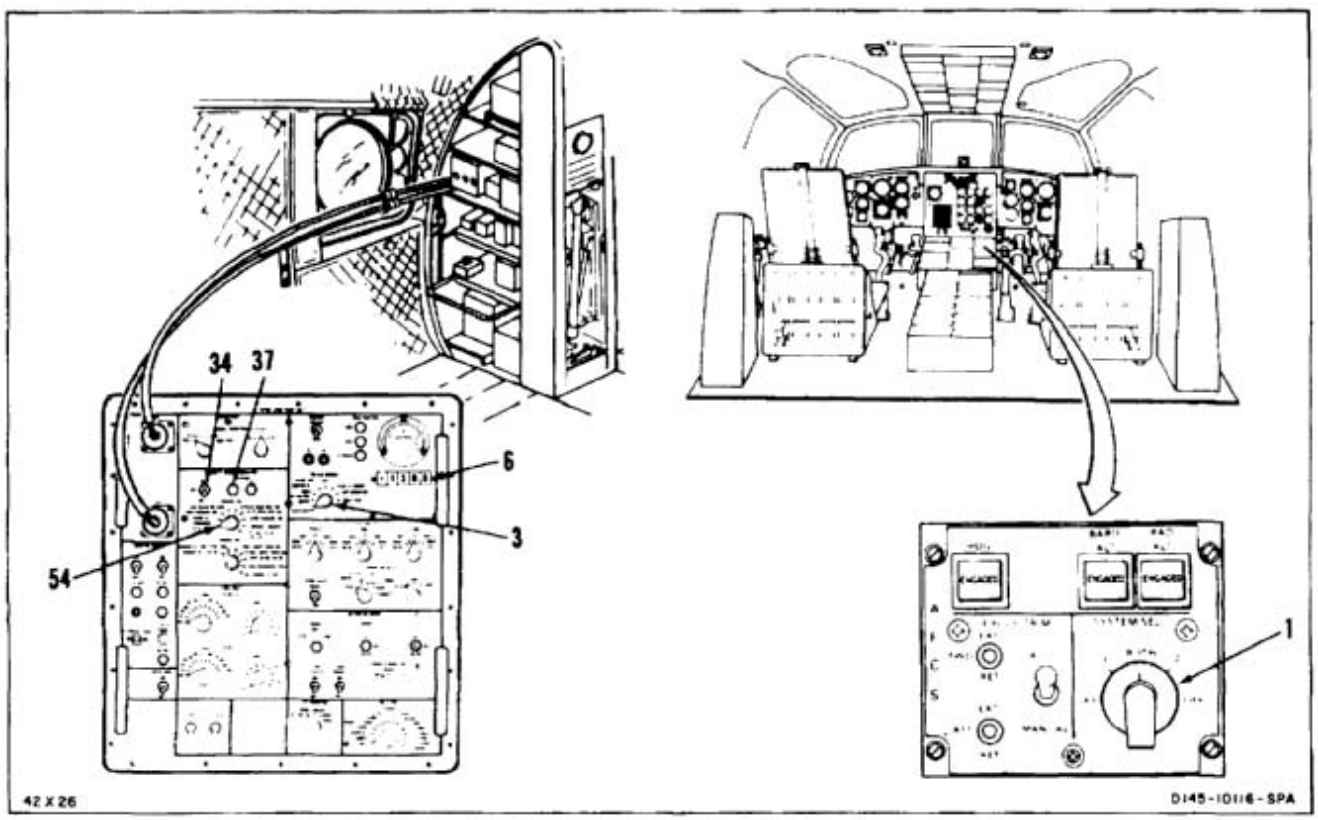
163. Set AFCS SYSTEM SEL switch (1) to 2. (System under test.)

164. Set METER SOURCE switch (3) to DISCRETE MON.

165. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

166. Set SIGNAL SEL 1 switch (54) to L LDG GEAR ON GND. STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+11.0 to +13.0**.

END RIGHT LANDING GEAR PROXIMITY SWITCH TEST (SYSTEM 2)



TEST 27

LANDING GEAR SWIVEL LOCK TEST (BOTH)

167. Set AECS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

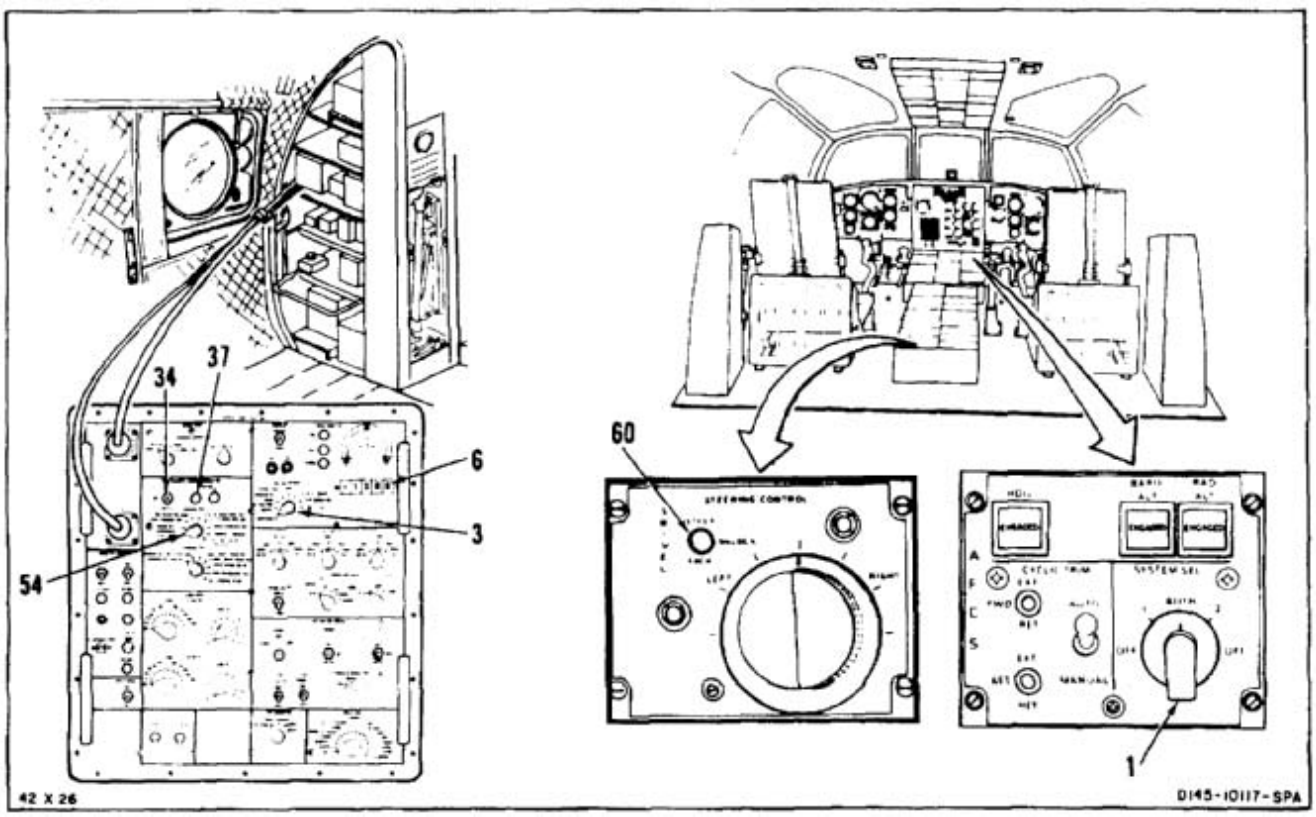
168. Set METER SOURCE switch (3) to DISCRETE MON.

169. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

170. Set SIGNAL SEL 1 switch (54) to SWIVEL LOCKED.

171. Set SWIVEL switch (60) to LOCK. STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+26.0 to +30.0 VDC**.

END LANDING GEAR SWIVEL LOCK TEST (BOTH)



TEST 28

BITE ENABLE TEST (BOTH)

172. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

173. Set METER SOURCE switch (3) to DISCRETE MON.

174. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 2.

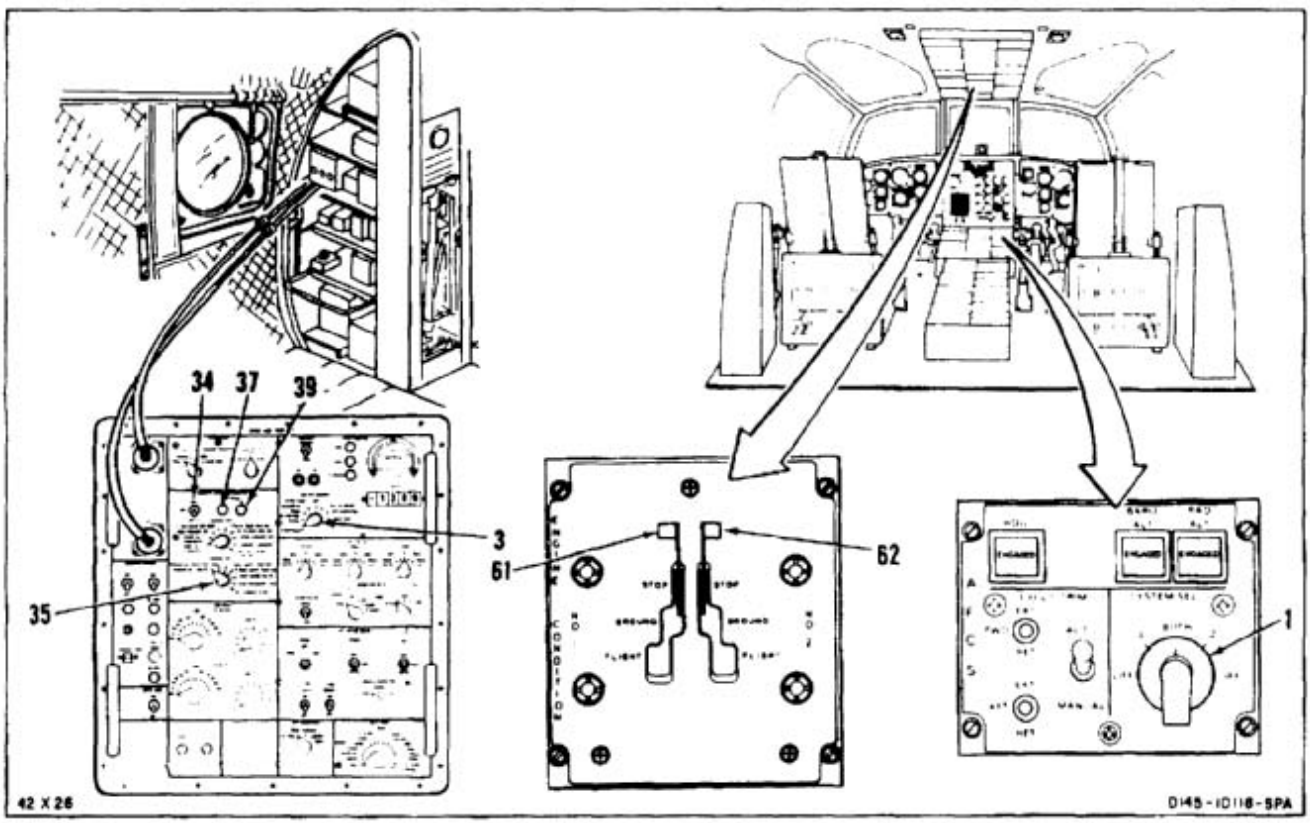
175. Set ENGINE CONDITION levers (61 and 62) to STOP.

176. Set SIGNAL SEL 2 switch (35) to BITE ENABLE STOP. STATUS A light (37) shall come on.

177. Move either ENGINE CONDITION lever (61 or 62) out of STOP. STATUS A light (37) shall go out. STATUS B light (39) shall come on.

178. Set ENGINE CONDITION lever (61 or 62) to STOP.

END BITE ENABLE TEST (BOTH)



TEST 29

AFCS HEADING ENGAGE TEST (NO. 1)

179. Set AFCS SYSTEM SEL switch (1) to 1. (System under test.)

180. Set METER SOURCE switch (3) to DISCRETE MON.

181. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

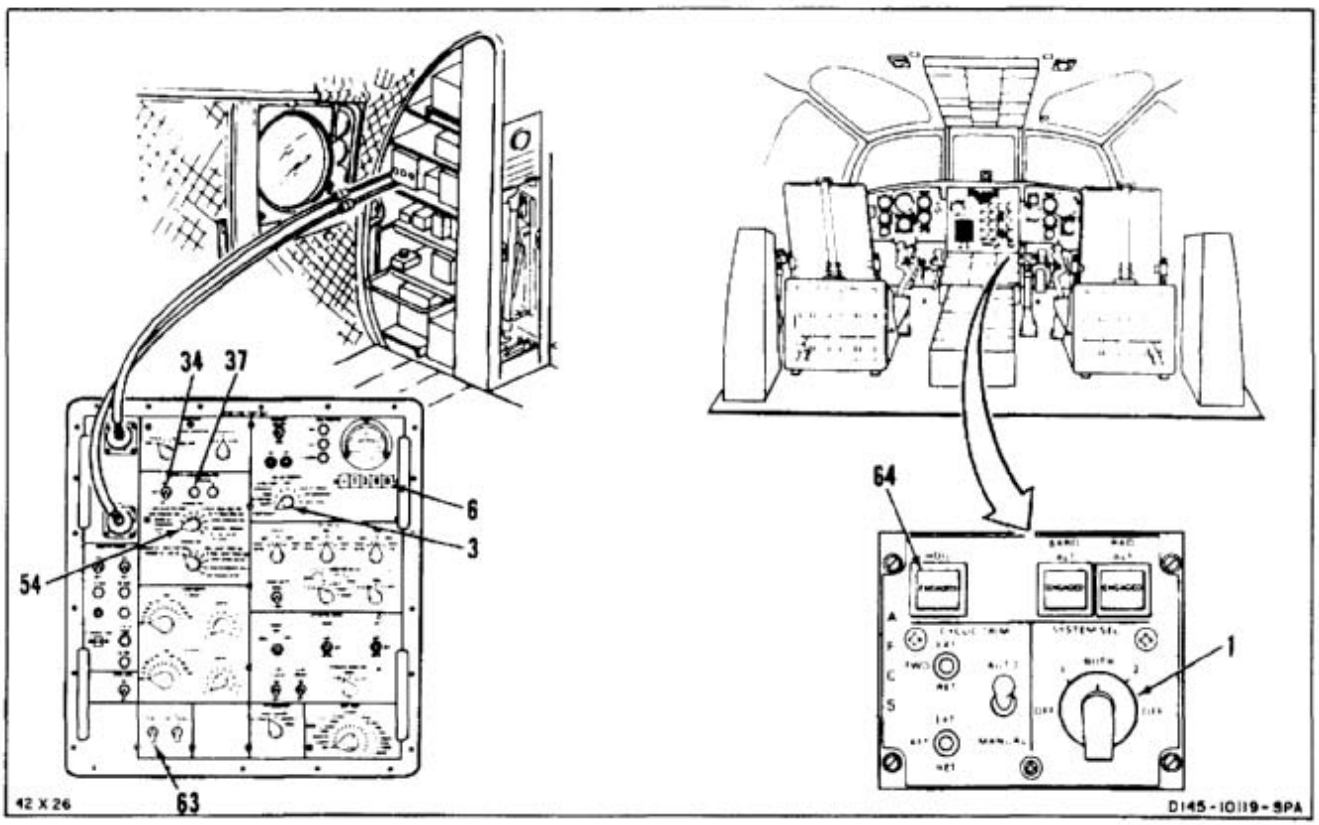
182. Set SIGNAL SEL 1 switch (54) to HDG ENGAGE ON.

183. Set HDG SEL ENABLE switch (63) to ON.

184. Press HDG ENGAGED switch (64). STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+11.0 to +13.0 VDC**.

185. Set HDG SEL ENABLE switch (63) to OFF. HDG ENGAGED switch (64) shall disengage.

END AFCS HEADING ENGAGE TEST (NO. 1)



TEST 30

RADAR ALTIMETER SELECT TEST (NO. 1)

186. Set AECS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

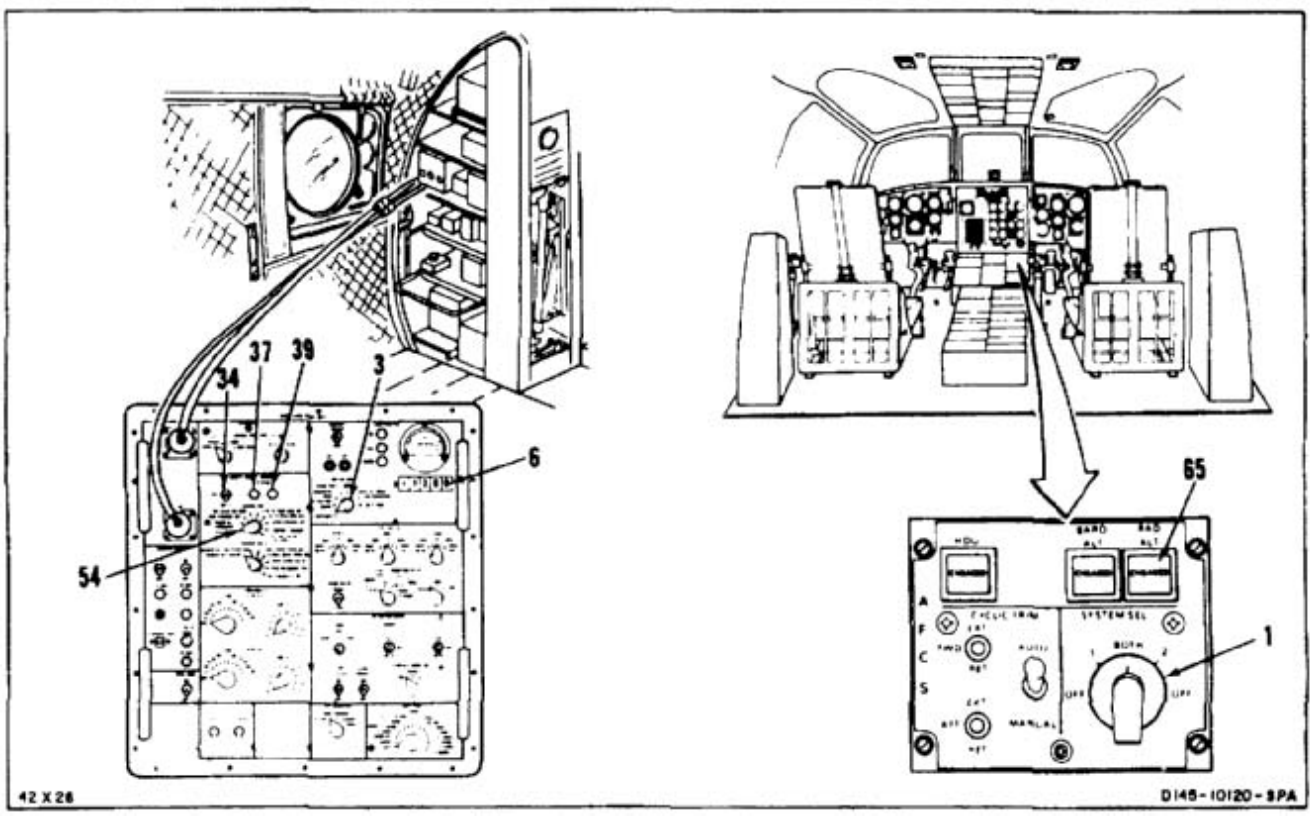
187. Set METER SOURCE switch (3) to DISCRETE MONITOR.

188. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

189. Set SIGNAL SEL 1 switch (54) to RADAR ALT ENGAGED. STATUS B light (39) shall come on. Read digital display (6). Reading shall be **–0.5 to +0.5 VDC**.

190. Press RAD ALT ENGAGED switch (65). STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+11.0 to +13.0 VDC**.

END RADAR ALTIMETER SELECT TEST (NO. 1)



TEST 31

RADAR ALTIMETER VALIDITY TEST (NO. 1)

191. Set AFCS SYSTEM SEL switch (1) to 1.

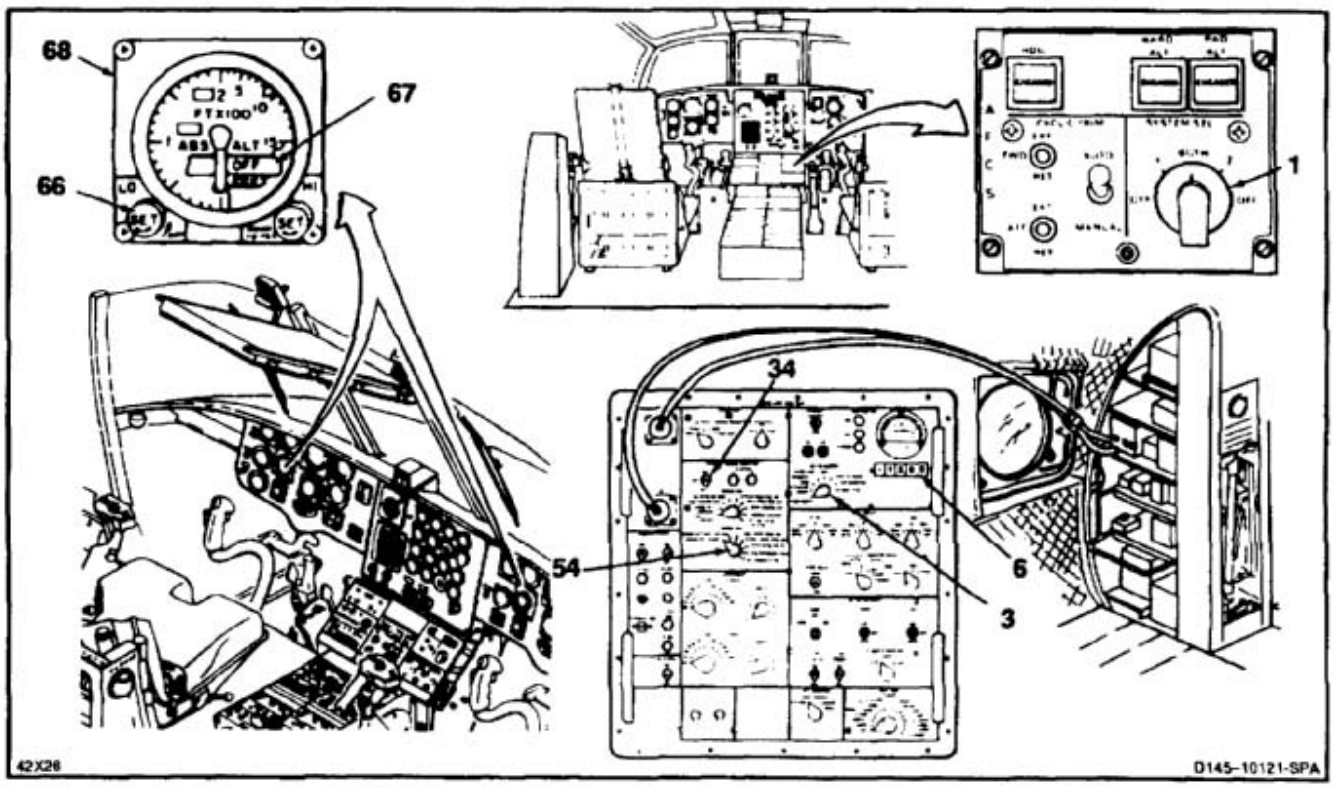
192. Set METER SOURCE switch (3) to DISCRETE MON.

193. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1. Set SIGNAL SEL 1 switch (54) to RADAR ALT VALID.

194. Rotate LO knob (66) clockwise until OFF flag (67) disappears. Read digital display (6). Reading shall be **+3.5 to +5.5 VDC**.

195. Rotate LO knob (66) on copilot and pilot indicator (68) counterclockwise. OFF flag (67) shall appear. Read digital display (6). Reading shall be **–0.5 to +0.5 VDC**.

END RADAR ALTIMETER VAUDITY TEST (NO. 1)



TEST 32

BAROMETRIC ALTIMETER SELECT TEST (NO. 1)

196. Set AFCS SYSTEM SEL switch (1) to 1.

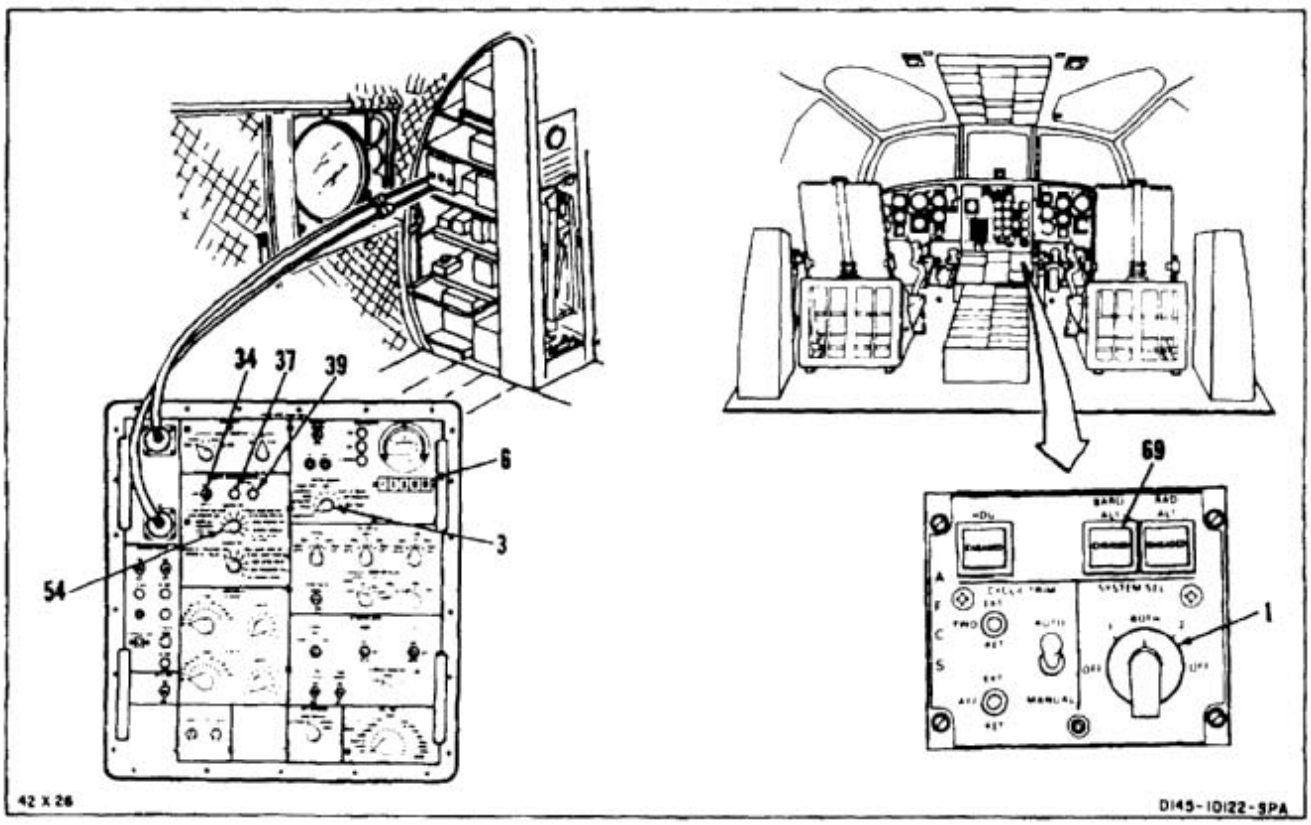
197. Set METER SOURCE switch (3) to DISCRETE MON.

198. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

199. Set SIGNAL SEL 1 switch (54) to BARO ALT ENGAGED. STATUS B light (39) shall come on. Read digital display (6). Reading shall be **–0.5 to +0.5 VDC**.

200. Press BARO ALT switch (69). STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+11.0 to +13.0 VDC**.

END BAROMETRIC ALTIMETER SELECT TEST (NO. 1)



TEST 33

AFCS SELECT SIGNAL TEST (BOTH)

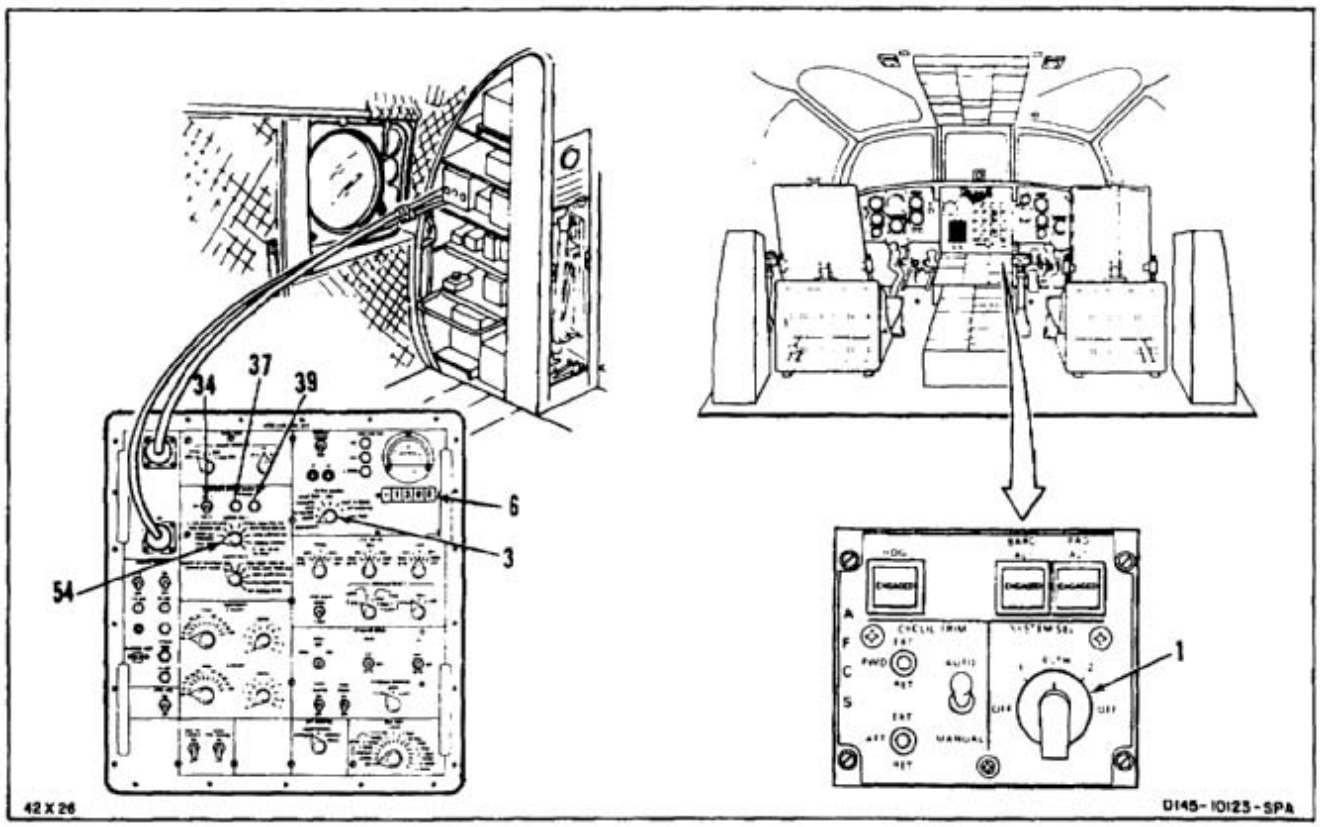
201. Set AFCS SYSTEM SEL switch (1) to 1 or 2. (System under test.)

202. Set METER SOURCE switch (3) to DISCRETE MON.

203. Set DISCRETE SIGNAL MONITOR switch (34) to SEL 1.

204. Set SIGNAL SEL 1 switch (54) to AFCS ENGAGE ON. STATUS A light (37) shall come on. Read digital display (6). Reading shall be **+26.0 to +30.0**.

205. Set AFCS SYSTEM SEL switch (1) to OFF. STATUS B light (39) shall come on.



206. Set AFCS ANN switch (70) to ON. AFCS NO. 1 SYS caution light (71) shall be on.

207. Set AFCS ANN switch (70) to OFF. AFCS NO. 1 SYS (without 74 or AFCS 1 (with 74) caution light (71) shall be off.

208. Set DASH PRE-ENGAGE switch (72) to ON. AFCS NO. 1 SYS (without 74) or AFCS 1 (with 74) caution light (71) shall be on.

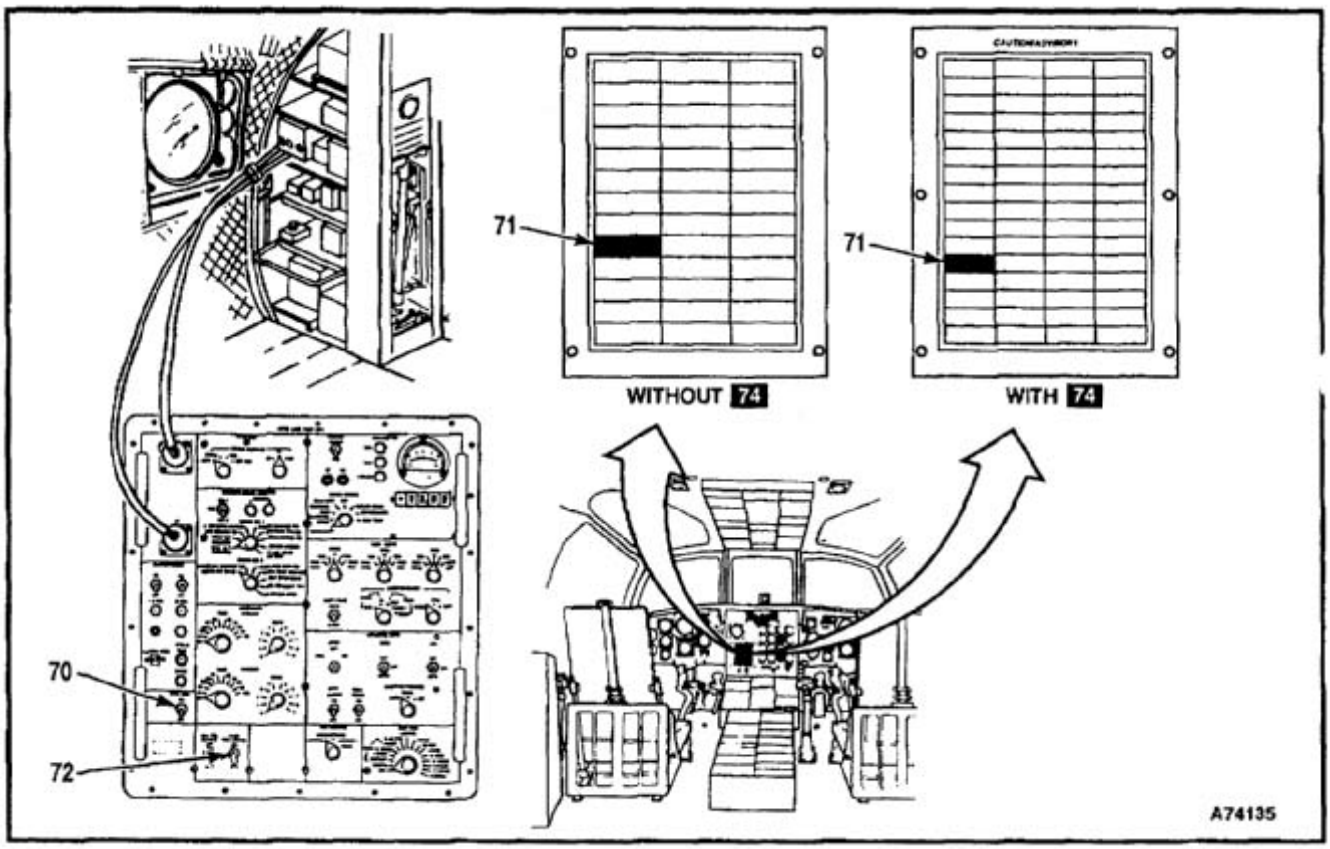
209. Set DASH PRE-ENGAGE switch (72) to OFF. AFCS NO. 1 SYS caution light (71) shall be off.

210. If no further testing is required, shut down AFCS line test set 145G009-1. (Refer to TM 55-4920-429-13.)

END AFCS SELECT SIGNAL TEST (BOTH)

FOLLOW-ON MAINTENANCE:

Remove cockpit rigging tool (Task 11-23).
Install controls closet panel (Task 2-2).
Install controls closet acoustic blanket (Task 2-108).



END OF TASK

By Order of the Secretary of the Army:

Official:

ERIC K. SHINSEKI
General, United States Army
Chief of Staff

JOEL B. HUDSON
Administrative Assistant to the
Secretary of the Army
0220713

DISTRIBUTION:
To be distributed in accordance w ith Initial Distribution N umber (IDN) 311199, requirements for TM 55-1520-240-23-9.

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@wherever.army.mil>
To: 2028@redstone.army.mil

Subject: DA Form 2028

1. ***From:*** Joe Smith
2. *Unit:* home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19−OCT−93
8. ***Pub no:*** 55−2840−229−23
9. ***Pub Title:*** TM
10. ***Publication Date:*** 04−JUL−85
11. *Change Number:* 7
12. *Submitter Rank:* MSG
13. ***Submitter FName:*** Joe
14. *Submitter MName:* T
15. ***Submitter LName:*** Smith
16. ***Submitter Phone:*** 123−123−1234
17. ***Problem:*** **1**
18. *Page:* 2
19. *Paragraph:* 3
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS

For use of this form, see AR 25–30; the proponent agency is ODISC4.

Use Part II (*reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)

DATE: 8/30/02

TO: (*Forward to proponent of publication or form)(Include ZIP Code)*
Commander, U.S. Army Aviation and Missile Command
ATTN: AMSAM–MMC–MA–NP
Redstone Arsenal, 35898

FROM: (*Activity and location)(Include ZIP Code)*
MSG, Jane Q. Doe
1234 Any Street
Nowhere Town, AL 34565

PART 1 – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9–1005–433–24	16 Sep 2002	Organizational, Direct Support, And General Support Maintenance Manual for Machine Gun, .50 Caliber M3P and M3P Machine Gun Electrical Test Set Used On Avenger Air Defense Weapon System

ITEM NO.	PAGE NO.	PARA–GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON
1	WP0005 PG 3		2			Test or Corrective Action column should identify a different WP number.

SAMPLE

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/ AUTOVON, PLUS EXTENSION	SIGNATURE
MSG, Jane Q. Doe, SFC	788–1234	

DA FORM 2028, FEB 74 REPLACES DA FORM 2028, 1 DEC 68, WHICH WILL BE USED. USAPA V3.01

TO: (*Forward direct to addressee listed in publication)*	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**
Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM−MMC−MA−NP Redstone Arsenal, 35898	MSG, Jane Q. Doe 1234 Any Street Nowhere Town, AL 34565	8/30/02

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

SAMPLE

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
MSG, Jane Q. Doe, SFC	788−1234	

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25–30; the proponent agency is ODISC4.	Use Part II (*reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)	DATE
TO: (*Forward to proponent of publication or form)(Include ZIP Code)*	FROM: (*Activity and location)(Include ZIP Code)*	

PART 1 – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9–1005–433–24	16 Sep 2002	Organizational, Direct Support, And General Support Maintenance Manual for Machine Gun, .50 Caliber M3P and M3P Machine Gun Electrical Test Set Used On Avenger Air Defense Weapon System

ITEM NO.	PAGE NO.	PARA–GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/ AUTOVON, PLUS EXTENSION	SIGNATURE

TO: (*Forward direct to addressee listed in publication)*	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE

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PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 053343-000