TECHNICAL MANUAL

AVIATION UNIT AND INTERMEDIATE MAINTENANCE MANUAL

VOLUME 1 OF 9

HELICOPTER, ATTACK, AH-64A APACHE (NSN 1520-01-106-9519) (EIC: RHA)

CHAPTER 1
AIRCRAFT GENERAL

GLOSSARY

ALPHABETICAL INDEX

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16 MAY 1994

CHANGE NO. 9

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A through D	A through D
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————	1–158.1 through 1–158.34
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-----	1-334.1/(1-334.2 blank)
1-385 and 1-386	1-385 and 1-386
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xi and xii	xi and xii
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xi and xii	xi and xii
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1-386.1/(1-386.2 blank)	1-386.1/(1-386.2 blank)
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1-401 and 1-402	1-401 and 1-402
1-402.1 and 1-402.2	1-402.1 through 1-402.4
(1-403 blank)/1-404	(1-403 blank)/1-404
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Index 203 and Index 204	Index 203 and Index 204

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WARNINGS

There are tasks which could cause injury to personnel or damage to the helicopter. WARNINGS are used to tell where there is danger of injury or death to personnel. They appear before the danger item. WARNINGS must be obeyed by all personnel working on the helicopter.

FLIGHT SAFETY PART

Failure to follow maintenance instructions may result in serious injury or death of crewmembers and/or serious damage to the helicopter.

GROUND OPERATION

The engines shall be started and run by assigned personnel only. When near tail rotor of helicopter, tell person at controls personnel are in tail area. Approach tail rotor section of helicopter only from aft right side when engines are running. If injury occurs, seek medical aid.

NOISE

Sound of running engines can exceed U.S. Surgeon General's noise limits (DA PAM 40-501). Ear plugs or aviation helmet must be worn when working on helicopter at these times. If injury occurs, seek medical aid.

CAUSTIC MATERIALS

Battery fluid is an acid that harms skin and clothes. Personnel working with batteries must wear special gloves, clothing, and eye protection. A 15 percent mix of boric acid in water must be used to rinse spilled acid. Spill areas must then be well flushed with water. If injury occurs, seek medical aid.

DANGEROUS CHEMICALS

- Conductive coating paint containing Isocyanates (a poison) and chemicals used for cleaning are explosive, flammable, and highly poisonous. Wear protective clothing and guards when working with these materials. Always assure maximum ventilation when using solvents, methyl ethyl ketone, and trichloroethane. Accidental breathing of vapors can cause dizziness and nausea. If methyl ethyl ketone contacts the skin, rinse immediately with water. If trichloroethane or methyl ethyl ketone contacts the eyes, flush with water and seek medical aid.
- Fire extinguisher fluids can make the eyes and nose sore. Use solvents only in well ventilated areas. Do not breathe solvent vapors or let them touch the skin or eyes. If injury occurs, seek medical aid.
- Dry cleaning solvent is flammable. Do not use it near oxygen storage or oxygen transfer systems. Do not use it near heat or open flame. Do not apply electrical power to aircraft while it is being used. Wear protective clothing, goggles, and respirator. If injury occurs, seek medical aid.
- Paints, thinners, and paint sprays are highly flammable. Never use near ignition sources.
- Wear air supplied respirator, rubber gloves, and protective clothing during all spray paint operations with solvent-based Fluoropolymer and Polyurethane coatings. Ensure that no skin area is exposed to paint spray mist.
- Prolonged breathing of vapors from organic solvents or materials containing organic solvents can have a toxic effect on exposed skin.

ENGINE EXHAUST

Stay clear of engine exhaust when engines are operating. Exhaust gases are hot and could cause burns. Particles in the exhaust could damage eyes. If injury occurs, seek medical aid.

EXTERNAL ELECTRICAL AND HYDRAULIC POWER

Application of external power or APU operation could cause injury to personnel. Ensure that all switches and controls are in a safe condition. Inform all persons working on helicopter that external power is being applied. If injury occurs, seek medical aid.

HOISTED COMPONENTS

Hoisted components can cause injury or death if they fall. Keep away from all hoisted components and loaded crane. If injury occurs, seek medical aid.

SAFETY CHECKS

Failure to perform safety checks could cause injury to personnel. Safety checks must be performed when called for in task. Safety checks ensure that helicopter is in a safe condition for performing tasks. If injury occurs, seek medical aid.

FUEL

- Jet engine fuel is toxic and explosive. Do not breathe vapors. Do not get fuel on clothes or skin. Use water to remove fuel from skin. If injury occurs, seek medical aid.
- Do not allow sparks or flame near helicopter when servicing or maintaining fuel system. Ensure that helicopter is grounded. If injury occurs, seek medical aid.

ROTOR BLADES

Rotor blades can cause injury or death. Stay clear of rotating blades. Blades can still rotate with engines off. Ensure that rotor brake is on when working in path of blades. Inform all personnel working on helicopter that blades can rotate if rotor brake is off or inoperative. If injury occurs, seek medical aid.

IGNITION IGNITER

The ignition system contains high-voltage electricity that can cause injury or death. Extreme caution must be used when working on ignition system. If injury occurs, seek medical aid.

EXTERNAL STORES AND FIRE EXTINGUISHER CARTRIDGES

Static electricity can fire cartridges. To prevent injury to personnel, avoid contact with cartridge primer. Maintenance instructions must be followed to prevent accidental firing of cartridges. If injury occurs, seek medical aid.

HIGH PRESSURE NITROGEN

Shock struts and tires contain nitrogen under high pressure. You could get hurt from a sudden blast. To prevent possible injury, follow deflation instructions carefully. If injury occurs, seek medical aid.

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LIST OF EFFECTIVE PAGES

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Date of issue for original and change pages are:

Original . . . . . 0 . . . . . 16 May 1994
Change . . . . . 1 . . . 30 September 1994
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Change . . . . . 4 . . . . . 16 February 1996
Change . . . . . 5 . . . 30 September 1996
Change . . . . . 6 . . . . 19 December 1997
Change . . . . . 7 . . . . . 27 February 1998
Change . . . . . 8 . . . . . 10 May 2000
Change . . . . . 9 . . . . . 31 July 2001

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LIST OF EFFECTIVE PAGES

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C. 16 May 1994

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL FOR
ARMY MODEL AH-64A HELICOPTER
(NSN 1520-01-106-9519) (EIC: RHA)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 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 35898–5230. A reply will be furnished to you.

You may also send in your comments electronically to our e–mail address: 2028@redstone.army.mil or by fax 256–842–6546/DSN 788–6546. Instructions for sending an electronic 2028 may be found at the end of this manual immediately preceding the hard copy 2028.

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

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HOW TO USE THIS MANUAL

a. Overview

To get the job done correctly, you must be able to find all the information you need. Knowing how to use this manual is the key. You should know what is in this manual, how it is organized, and how to use it.

b. Organization

(1) The complete AH-64A Apache helicopter (AVUM/AVIM) maintenance manual consists of a set of volumes. These volumes are numbered as follows: TM 1-1520-238-23-1 through TM 1-1520-238-23-9. The trouble-shooting manual, TM 1-1520-238-T, contains a full description of each system.

(2) Volumes are made up of chapters. Each chapter is numbered in Arabic numerals (1, 2, 3, etc.). Each chapter is an individual book which has maintenance information on a particular helicopter system.

(3) Chapters (books) are broken down into sections. Sections are numbered in Roman numerals (I, II, III, etc.). Chapters have all the maintenance information you need on a particular system.

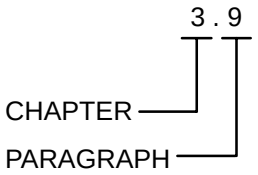
(4) Sections are made up of paragraphs. Each paragraph is numbered in Arabic numerals (1, 2, 3, etc.). The sections cover major parts of a system.

(5) Paragraphs (tasks) are detailed descriptions of a maintenance task. Some paragraphs are brief. Some are several pages long.

(6) A paragraph starts with an initial setup which is followed by a step-by-step procedure on how to perform the task correctly. Each step in the procedure has an illustration to help make things clear.

c. Paragraph Numbering

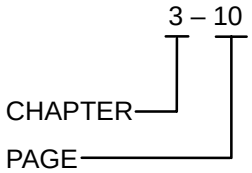
Paragraph numbers are in two parts. The first is the chapter number. The second is the paragraph number in that chapter. Each number is separated by a period (.) as shown in the example:



Paragraph numbers are the most important numbers in the manual. Always use the paragraph number to find information – NOT the page number.

d. Page Numbering

All page numbering is by chapters. The first number is the number of the chapter; the second number is the number of the page in that chapter. The numbers are separated by a dash as shown in the example:



e. Manual Index

(1) The index for the entire manual is in this chapter. The index lists all paragraph titles in alphabetical order. After you find the title in the index, it tells the paragraph number of that task. For example, if you need information on the tire, either main landing gear or tail landing gear tire, go to the ‘‘T’’ section of the index and look under ‘‘Tire.’’ There you will find:

Tire, Main Landing Gear (LGS)		Tire and Tube, Tail Landing Gear (LGS)	
Removal	3.7	Removal	3.47
Installation	3.7	Installation	3.47

The index tells that the tire information for the main landing gear is in chapter 3, paragraph 3.7. For the tail landing gear, it is in chapter 3, paragraph 3.47.

(2) You can find your task in the index, even if you only know a single word in the title. In the sample tire titles you could also find your tasks by looking under ‘‘Landing.’’ Examples:

Landing Gear Tire, Main (LGS)		Landing Gear Tire and Tube, Tail (LGS)	
Removal	3.7	Removal	3.47
Installation	3.7	Installation	3.47

Or, you could look under ‘‘Gear:’’

Gear Tire, Main Landing (LGS)		Gear Tire and Tube, Tail Landing (LGS)	
Removal	3.7	Removal	3.47
Installation	3.7	Installation	3.47

The abbreviation for the system is placed in parentheses, under the paragraph title in the index. In the example, the landing gear system is one of the few where an acronym is used for the system (LGS). For most systems, an abbreviation is used (example: flight control system: Flt Ctrl Sys). In the case of tires, the system would be obvious; tires would only be used on the landing gear. However, in the rest of the manual, some titles are similar though in different systems. This is true with shafts, brackets, supports, bearings, etc. The index will always provide the name of the correct system to help you avoid going to the wrong book.

(3) Any task can be located in the way described. If you know the name, job, part, assembly, procedure, description, etc., you can use one of the words to find the paragraph number in the index. It makes locating information quick and easy.

HOW TO USE THIS MANUAL - continued

f. Glossary

(1) A glossary of words used throughout the manual is located at the back of chapter 1. Section I of the glossary is the list of abbreviations and acronyms. Abbreviations are shortened terms for words. Acronyms are shortened terms for several words and use only the first letter of each of the words. Abbreviations and acronyms are defined where they are used. The list in the glossary, however, provides a good place to check if there is any doubt.

(2) Section II of the glossary contains definitions of unusual terms that appear in the manual. Many words have more than one meaning. A word that has a certain meaning in everyday language could have a different meaning for the helicopter. This is the reason for the definitions. If you see a word in the manual you're not sure of check the list of definitions.

It is always a good idea to look over the glossary and become familiar with abbreviations, acronyms, and unusual terms.

g. Initial Setup (Example next page)

The first page of each maintenance paragraph in the manual is the initial setup. Always check the initial setup before starting a task on the helicopter. The initial setup contains information you must know. DON'T START A TASK UNTIL:

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

An example initial setup is shown on the next page. Not all tasks have all the headings shown.

Each part of the initial setup is explained by the following subparagraphs (1 through 7). Each subparagraph describes initial setup entries in order of its appearance in the example.

(1) **Title:** The title in the upper border contains the chapter/paragraph number and title of the task as listed in the index. The task is performed at the intermediate level if (AVIM) appears in the title.

(2) **Description:** This entry appears in the border below the title. The task may require one or more operations (such as removal and installation). Each operation is listed here in order of its performance in the task.

(3) **Tools:** This heading will list the tool kit of your MOS. The tools in this kit will be all that is required to perform the task. Tasks requiring tools other than those in this tool kit are considered SPECIAL TOOLS. Special tools could be: (1) tools from the shop set; (2) tools from the kits of other MOS's, or (3) tools made specially for the AH-64A Apache helicopter. Special tools will be listed in addition to MOS tool kit when needed. Tool kits and special tools have an item number assigned to them and are located in Appendix H. It is acceptable to use a substitute torque wrench other than listed as long as the torque range is the same. Example: 1/4 torque wrench **30 INCH-POUNDS to 150 INCH-POUNDS**, 3/8 torque wrench **30 INCH-POUNDS to 150 INCH-POUNDS.**

HOW TO USE THIS MANUAL - continued

INITIAL SETUP EXAMPLE

10.12. FORWARD FUEL CELL PILOT VALVE HOSE REPLACEMENT

10.12.1. Description

This task covers: Removal. Cleaning. Inspection. Installation.

10.12.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
5/8 x 3/8-inch drive box end torque wrench adapter (item 14, App H)
150 - 750 inch-pound 3/8-inch drive click type torque wrench (item 442, App H)
0 - 600 inch-pound 3/8-inch drive dial indicator torque wrench (item 447, App H)

References:

TM 1-1520-238-T
TM 9-1090-208-23-1

Materials/Parts:

Bolt MS25789 (used for removal)
Packing (2)
Wire (item 221, App F

Personnel Required:

67R Attack Helicopter Repairer
One person to assist
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors T250L, T250R, T290L, T290R, and L325 opened
10.2	Fuel system safety precautions observed
TM 9-1090-208-23-1	Ammunition storage magazine removed

(4) **Materials and Parts:** This lists materials and parts needed to complete the task. Parts are listed before materials. Most materials cannot be used on the helicopter a second time; they are expendable. Expendable materials are items such as solvent, grease, oil, hydraulic fluid, etc.

(a) Each expendable has an item number assigned to it and is located in Appendix F. The item number is placed in parentheses following the item name on the initial setup page. A typical example of an expendable items is:

Wire (item 221, App F)

See the expendable and durable item list in Appendix F for more information about expendable and durable materials.

(b) Some parts are also expendable. The replacement part will be listed under the heading by part nomenclature if the task step tells you to DISCARD a part. This will help you look up the part in TM 1-1520-238-23P.

A number in parentheses after the part indicates the quantity required for the task. Example:

HOW TO USE THIS MANUAL - continued

Packing (2)

This would mean two packings are required.

(c) Sometimes it is necessary to use a part as a tool to do a step of a task. These parts do not appear in TM 1-1520-238-23P. A typical example would be when a bolt is used to temporarily hold an assembly in place or to aline two pieces of material to be fastened. Parts used as tools will appear in the setup table under **Materials/Parts:**

Bolt MS25784 (used for alinement)

(5) **Personnel Required:** This heading lists the people required to perform the task. It also tells the MOS of each person and the number of persons required. For example:

67R	Attack Helicopter Repairer
	One to assist
67R3T	Attack Helicopter Repairer/Technical Inspector

This listing would indicate that one 67R repairer and any one MOS to assist, and a 67R3T repairer/technical inspector will be needed to complete the task.

IF YOUR MOS IS NOT LISTED IN THE PERSONNEL REQUIRED COLUMN IN THE INITIAL SETUP, CHECK WITH YOUR MAINTENANCE SUPERVISOR FIRST BEFORE STARTING THE TASK.

(6) **References:** This lists other technical manuals (TMs) you will need to complete the task. The steps in the task will tell you when you must refer to another TM.

(7) **Equipment Conditions:** This lists things that must be done before starting the task. It may require an operation such as jacking the helicopter, or just the tail boom; or removing parts, assemblies, etc. These operations are described in other tasks or technical manuals. The paragraphs or TM's that describe how to do these operations are referenced here. If the job is to be done on the helicopter, the statement ''Helicopter safed'' will appear here. The reference will be to paragraph 1.57 where safing is described. Be sure to do the things necessary in order of listing as called out under equipment conditions; then do the task.

h. Warnings, Cautions, and Notes

Icon warnings are pictorial images which may be used in place of words. The safety summary sheet explains in detail what each icon means.

WARNING

WARNINGS are used to tell where there is danger of injury or death to personnel. They appear before the danger item. WARNINGS must be obeyed by all personnel working on the helicopter.

CAUTION

CAUTIONS tell of the danger of damaging the helicopter or its parts. They appear immediately before the item where damage might happen. CAUTIONS must be obeyed by all personnel working on the helicopter.

HOW TO USE THIS MANUAL - continued

NOTE

NOTES tell something extra or special a person must know to do the task. They can appear before or after the item they tell about. NOTES must be read and remembered when working on the helicopter.

i. Use of Shall, Will, Should, and May

Within this technical manual the word “shall” is used to indicate a mandatory requirement. The word “will” is used to express a declaration of purpose. The word “should” is used to indicate a nonmandatory but preferred method of accomplishment. The word “may” is used to indicate an acceptable method of accomplishment.

j. Torquing Information

(1) Inspect (QA) torques as required by specific instructions contained within each task.

(2) There are two types of applied torques. They are: special torques and standard torques.

(3) Each hardware fastener (except types used in sheet metal work) is assigned an applied torque.

(4) Special torques are given, when needed, in each task. Torques appear in bold type. Torque wrenches and adapters to be used when a special torque is given are listed under TOOLS in the initial setup. Special torques usually differ from standard torques.

(5) Standard torques are not in this technical manual. Refer to TM 1-1500-204-23 for all standard torque values.

(6) Run-on torque shall always be added to all nuts in accordance with TM 1-1500-204-23, including nuts requiring special torques and standard torques, unless otherwise stated in each task.

k. Inspection Information

General inspection information is in the front of each chapter or section for the equipment covered in that chapter or section. Inspection criteria peculiar to a specific part, assembly, or component are in the inspection steps of the removal/installation task for that part, assembly, or component.

l. General References

(1) Refer to TM 55-1500-323-24 for all electrical tasks of a general nature not peculiar to the AH-64A helicopter.

(2) Refer to TM 1-1500-204-23 for all mechanical tasks of a general nature not peculiar to the AH-64A helicopter.

(3) Refer to TM 1-1520-264-23 for approved nondestructive inspection methods.

HOW TO USE THIS MANUAL

m. Using AH-64A Helicopter Effectivity Codes

Helicopter effectivity codes designate differences between helicopters by helicopter serial numbers. These codes consist of three letters representing various helicopter serial number blocks. They are used throughout this volume as necessary to aid the helicopter troubleshooting effort.

The codes are used to designate serial number block differences as follows:

- When used within narrative text and fault isolation procedures (FIPs), effectivity codes appear within parentheses.

  For Example: Narrative text and FIPs (AAA)

- When used inside wiring interconnect diagrams, effectivity codes appear within triangular borders and are placed on the line which represents that particular helicopter's configuration.

  For Example: Wiring interconnect diagrams 

This volume uses these effectivity codes and corresponding helicopter serial numbers for reference.

To use the helicopter effectivity codes, note the helicopter serial number on the left side of the fuselage directly below the CPG window. Use this serial number to determine which procedure or path in a wiring interconnect diagram or FIP to use.

The effectivity codes and helicopter serial number blocks applicable to this volume are as follows:

Effectivity Code	Helicopter Serial No.
ADC	Before MWO 1-1520-238-50-49
ADD	After MWO 1-1520-238-50-49
ADF	Before MWO 1-1520-238-50-52
ADG	After MWO 1-1520-238-50-52
ADH	Before MWO 1-1520-238-50-15
ADI	After MWO 1-1520-238-50-15
ADL	Before MWO 1-1520-238-50-51
ADM	After MWO 1-1520-238-50-51
ADN	After MWO 1-1520-238-30-02
ADP	After MWO 1-1520-238-50-50
ADQ	Before ECP 1315/RSN 97A001
ADR	After ECP 1315/RSN 97A001

SAFETY SUMMARY

This publication describes physical and chemical processes which may require the use of chemicals, solvents, paints, or other commercially available material. The user of this publication should obtain the material safety data sheets (Occupational Safety and Health Act (OSHA) Form 20 or equivalent) from the manufacturers or suppliers of materials to be used. The user must become completely familiar with the manufacturer/supplier information and adhere to the procedures, recommendations, warnings, and cautions of the manufacturer/supplier for the safe use, handling, storage, and disposal of these materials. The following are general safety precautions and instructions that people must understand and apply during many phases of operation and maintenance to ensure personal safety and health and the protection of DOD property. Portions of this may be repeated elsewhere in this publication for emphasis.

WARNING AND CAUTION STATEMENTS

WARNING and CAUTION statements have been strategically placed throughout this text prior to operating or maintenance procedures, practices, or conditions considered essential to the protection of personnel (WARNING) or equipment and property (CAUTION). A WARNING or CAUTION will apply each time the related step is repeated. Prior to starting any task, the WARNINGS or CAUTIONS included in the text for that task will be reviewed and understood. Refer to the materials list figure at the beginning of the appropriate manual section for material used during maintenance of this equipment. The detailed warnings for hazardous material only are listed separately in the safety summary as the “Hazardous Materials Warnings” section.

HAZARDOUS MATERIALS WARNINGS

Warnings for hazardous material in this manual are designed to warn personnel of hazards associated with such items when they come in contact with them during actual use. For each hazardous material used, a material safety data sheet (MSDS) is required to be provided and available for review by the users. Consult your local safety and health staff concerning any questions on hazardous chemicals, MSDSs, personal protective equipment requirements, and appropriate handling and emergency procedures.

This Hazardous Materials Warnings section gives the complete warnings for hazardous material used in this manual. To help the user understand the potential hazards of these materials, a more detailed warning for these materials and an explanation of the hazard symbols follow.

SAFETY SUMMARY - continued

EXPLANATION OF HAZARD SYMBOLS

The abstract symbol bug shows that a material may contain bacteria or viruses that present a danger to your life or health.

The symbol of drops of a liquid onto a hand shows that the material will cause burns or irritation of human skin or tissue.

The rapidly expanding symbol shows that the material may explode if subjected to high temperatures, sources of ignition, or high pressure.

The symbol of a person wearing goggles shows that the material will injure your eyes.

The symbol of a flame shows that a material can ignite and burn you.

The symbol of a skull and crossbones shows that a material is poisonous or is a danger to life.

The symbol of a three circular wedges shows that the material emits radioactive energy and can injure human tissue or organs.

The symbol of a human figure in a cloud shows that vapors of a material present a danger to your life or health.

CHAPTER 1
AIRCRAFT GENERAL

CHAPTER OVERVIEW

Chapter 1 contains the maintenance instructions for aircraft general support. Aircraft general troubleshooting information is contained in TM 1-1520-238-T.

CHAPTER INDEX

CHAPTER INDEX – continued

CHAPTER INDEX – continued

SECTION IV. LUBRICATION

CHAPTER INDEX – continued

CHAPTER INDEX – continued

CHAPTER INDEX – continued

CHAPTER INDEX – continued

SECTION I. GENERAL INFORMATION

11.1. SCOPE

a. Type of Manual: Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) manual.

b. Model Numbers and Equipment Name: AH-64A Helicopter.

c. Purpose of Helicopter: Serves as a gun platform for antitank and suppressive firepower.

11.2. MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751, The Army Maintenance Management System – Aviation (TAMMS-A).

11.3. DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE

Destruction procedures you need to know are in TM 750-244-1-5.

11.4. PREPARATION FOR STORAGE OR SHIPMENT

Storage procedures for this helicopter are in Appendix E of this manual. Shipping and transportability requirements for installed engines are met when landing gear tires are inflated to correct pressures and landing gear struts are not bottomed out. Shipping information for the helicopter you may need to know is in TM 55-1520-238-S.

11.5. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Quality assurance information you are required to use is explained in FM 1-511.

GO TO NEXT PAGE

11.6. SUBMITTING DEFICIENCY REPORTS

Submitting Deficiency Reports (DRs) can be done by anyone who is aware of a design error or faulty maintenance procedure. It is not necessary to submit a new design or develop a new maintenance procedure. Simply mail your comment concerning the discrepancy, with your suggestion for improvement, to the address below. DRs will be prepared using SF 368 Quality Deficiency Report (QDR). Instructions for preparing QDRs are provided in DA PAM 738-751, The Army Maintenance Management System – Aviation (TAMMS-A). Mail them to Commander, U.S. Army Aviation and Missile Command, Attn: AMSAM-MMC-LS-P, Redstone Arsenal, AL 35898-5230. A reply will be furnished directly to you.

11.7. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

a. Inspection procedures for this helicopter are in TM 1-1520-238-PMS.

b. Phased maintenance inspection procedures are in TM 1-1520-238-PM.

c. Special inspections are in this TM.

END OF TASK

SECTION II. EQUIPMENT DESCRIPTION AND DATA

1.8. SCOPE

1.8.1. Characteristics

a. Operated by a pilot and copilot/gunner (CPG).

b. Serves as a gun platform for antitank and suppressive firepower.

c. Performs close to the ground at high speeds.

d. Carries hellfire missiles, rockets, and a 30mm automatic gun.

1.8.2. Capabilities and Features

a. Built-in fault detection/location system.

b. Grease-lubricated intermediate and tail rotor gearboxes.

c. Twin engines.

d. Auxiliary power unit (APU) part of helicopter.

e. Hydraulic-powered controls.

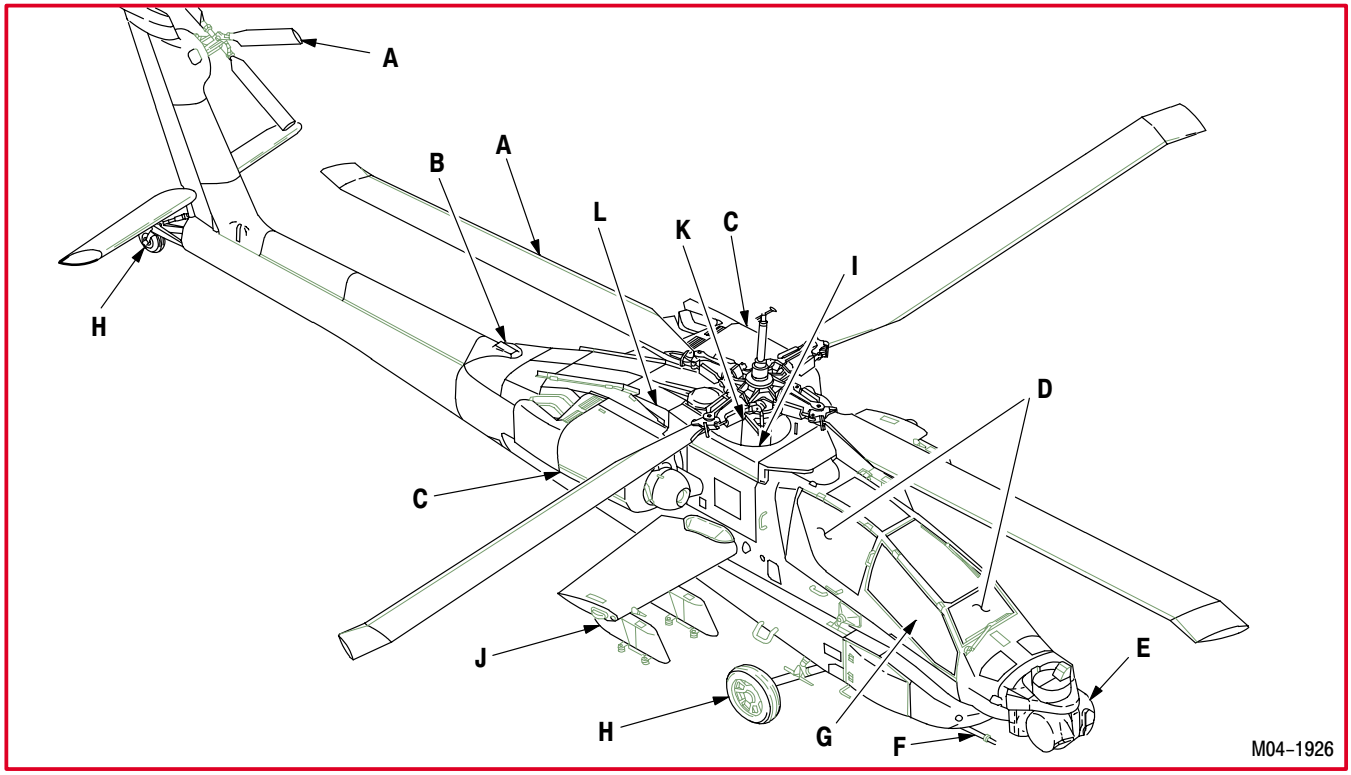
1.8.3. Equipment Data

a. Data on helicopter equipment is in each system chapter.

b. More information on equipment data is in TM 55-1520-238-10.

END OF TASK

1.9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS



A. ROTORS	–	Provide lift and directional control.
B. AIRFRAME	–	Houses flight crew. Provides systems support structure.
C. POWERPLANTS AND DRIVES	–	Provide power to gearboxes and rotors.
D. INSTRUMENT AND ELECTRICAL SYSTEMS	–	Monitor and control most systems. Provide electrical generation and distribution.
E. TADS/PNVS	–	Finds targets. Assists pilot to fly at night.
F. 30mm GUN	–	Mounted on turret. Fires electrically.
G. ENVIRONMENTAL CONTROL SYSTEM	–	Provides conditioned air for pilot and CPG compartments and electrical systems.
H. LANDING GEAR	–	Supports and moves helicopter on the ground.
I. FLIGHT CONTROLS	–	Control rotor operation.
J. PYLONS	–	Have attachments for external stores.
K. HYDRAULIC AND PNEUMATIC SYSTEMS	–	Boost controls and operate equipment.
L. AUXILIARY POWER UNIT	–	Provides ground power.

END OF TASK

1.10. EQUIPMENT CONFIGURATION

The helicopter can be configured in different ways. Information on various configurations is listed in the following table by system.

System	Mission Equipment	Extended Range	Wing Stores
Airframe			Wing stores capable of carrying and jettisoning point target missile launchers, rocket launchers, and auxiliary fuel tanks.
Fuel		One auxiliary fuel tank for each wing pylon (4-tank), or One auxiliary fuel tank for each inboard wing pylon (2-tank).	
Area Weapon	Chaff dispenser installed aft fuselage left side.		
Avionics	IR jammer with infrared transmitter behind main rotor mast. Radar Warning antennas: two on forward fuselage; two at top of vertical stabilizer.		

END OF TASK

1.11. AIRFRAME STATION LOCATIONS

Station locations are shown on the following pages. All dimensions are in inches.

Dimensions have FS, WL, or BL in front of the numbers.

FS – Fuselage stations are distances from a point in front of the helicopter nose. The first station is zero (0.00).

WL – Waterlines are distances from a point below the helicopter. They follow the centerline.

CL – Centerline is an imaginary line that passes through the center of the helicopter. The centerline runs from the nose to the tail.

BL – Buttlines are distances from the centerline. They start at the centerline and show the distance to each side of the helicopter. Buttlines will be either to the left or right side.

These dimensions help you find any point on the helicopter. Each point shown on the next page is a part of the helicopter you can see.

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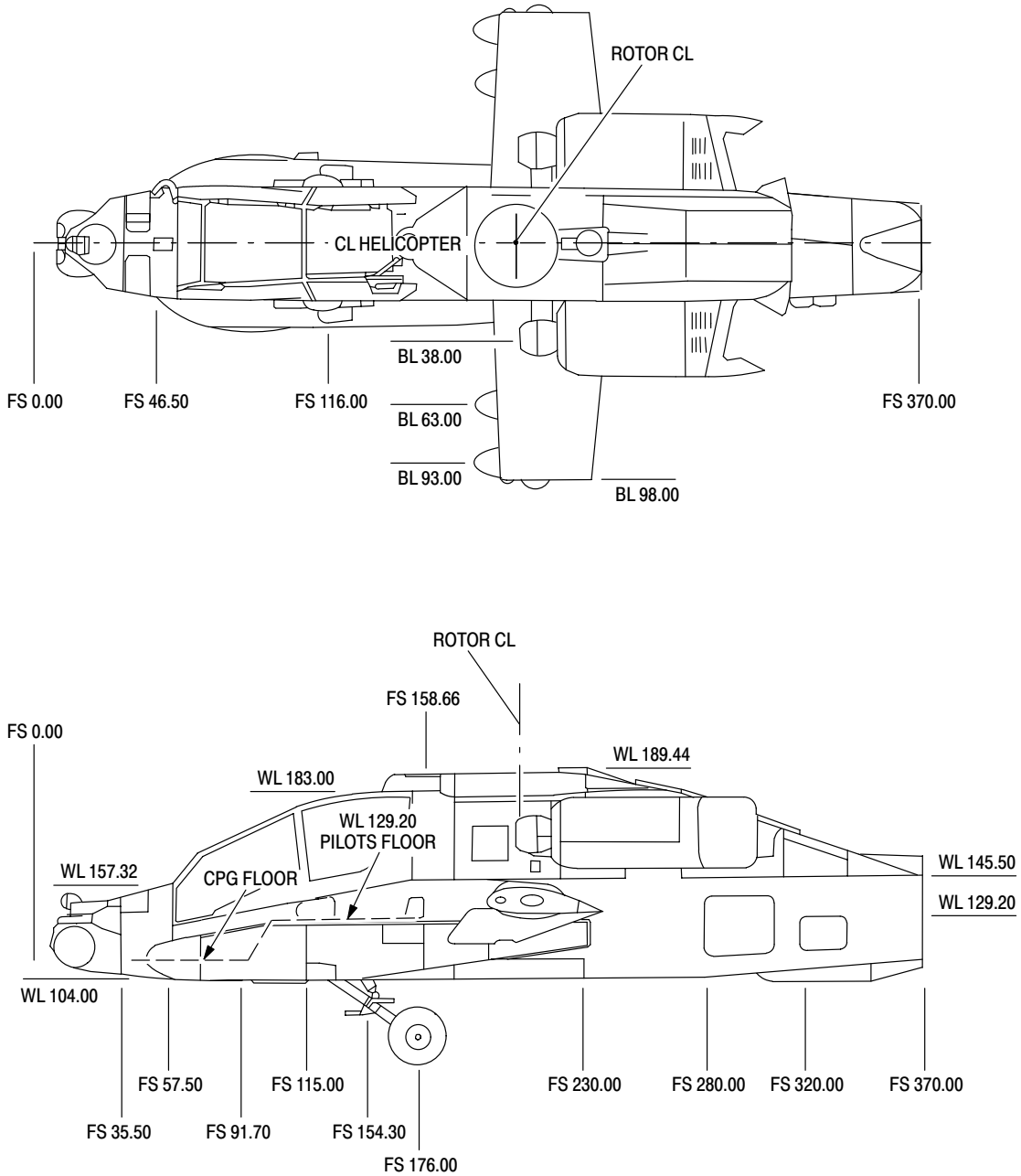
1.11. AIRFRAME STATION LOCATIONS – continued



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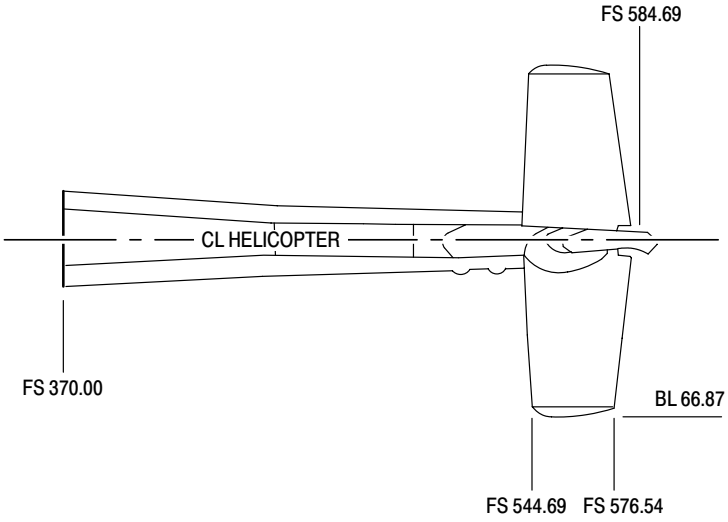
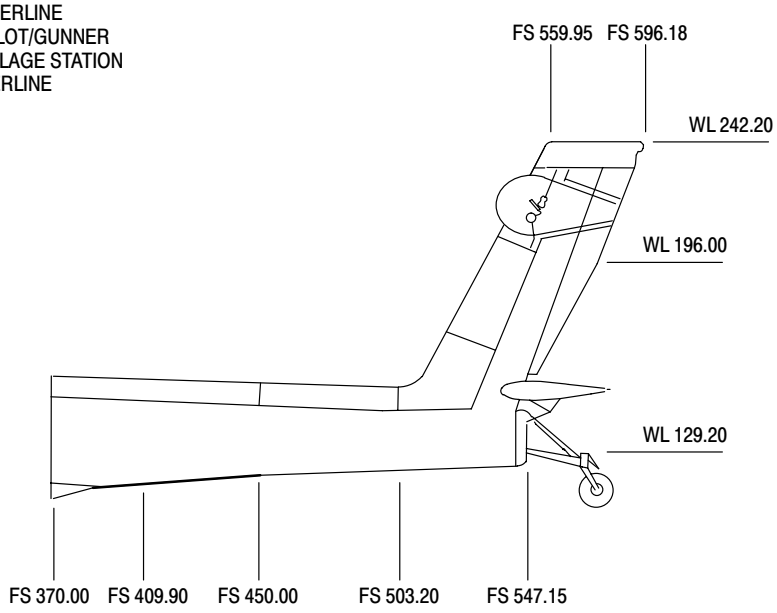
1.11. AIRFRAME STATION LOCATIONS – continued



ALL DIMENSIONS ARE IN INCHES

BL	BUTTLINE
CL	CENTERLINE
CPG	COPILOT/GUNNER
FS	FUSELAGE STATION
WL	WATERLINE



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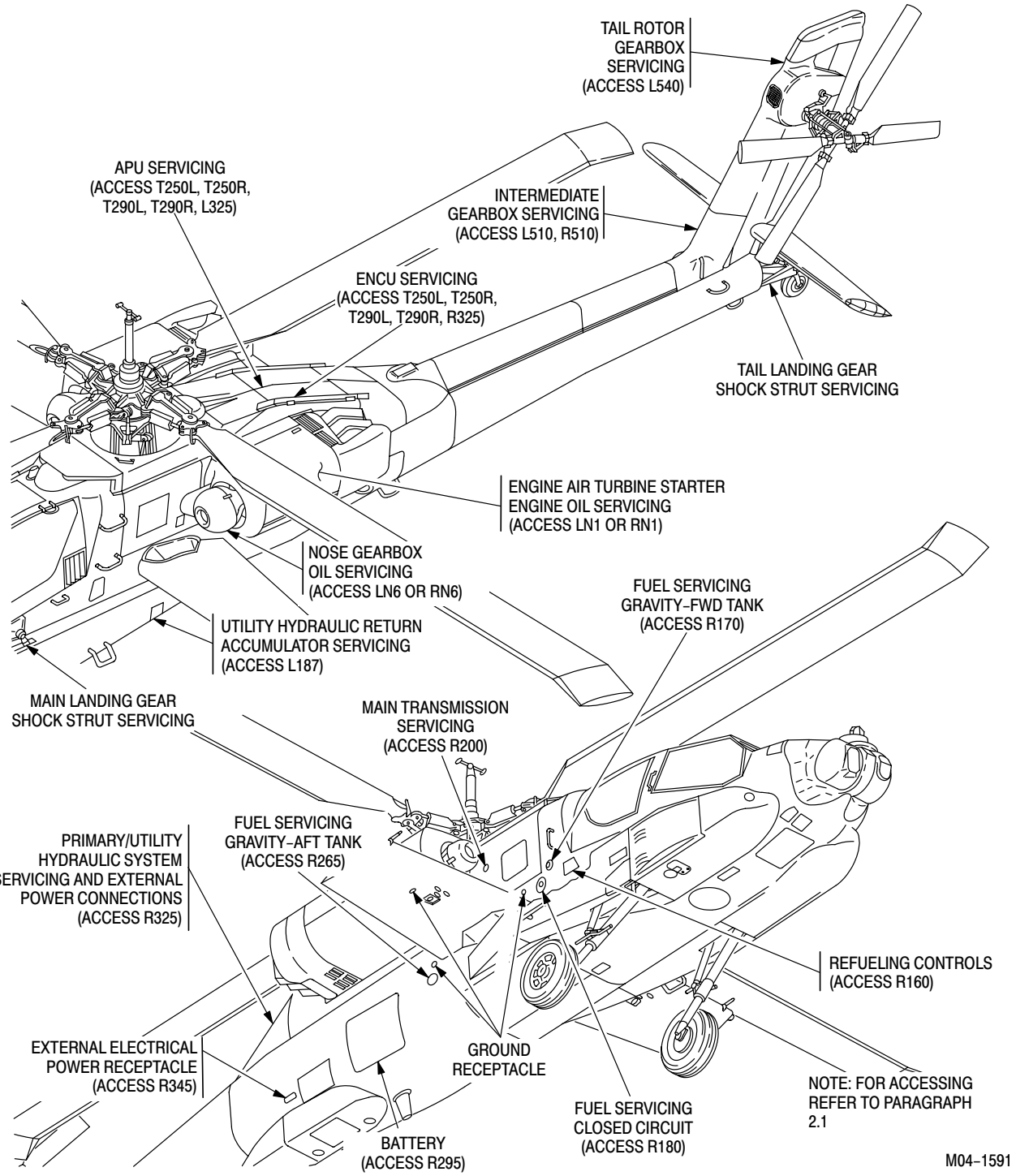
END OF TASK

SECTION III. SERVICING

1.12. SERVICING POINTS



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1.12. SERVICING POINTS – continued

Tank or System	Capacity, US	Materials			Maintenance Instructions
Main Landing Gear Shock Strut	3.8 qt.	Hydraulic Fluid Nitrogen		MIL-H-5606	Para 1.41 Para 1.40
Tail Landing Gear Shock Strut		Nitrogen			Para 1.42
Brake System	0.32 gal.	Hydraulic Fluid		MIL-H-5606	Para 1.45
Engine Oil	7 qt.	Lubricating Oil	* **	MIL-L-23699 MIL-L-7808	Para 1.24
Engine Air Turbine Starter	200 cc.	Lubricating Oil	* **	MIL-L-23699 MIL-L-7808	Para 1.25
Engine Nose Gearbox	5 pt. (2.5 qt.) (each gearbox)	Lubricating Oil	* **	MIL-L-23699 MIL-L-7808	Para 1.28
Tail Rotor Gearbox	3 lb. 5 oz.	Grease, SYN-Tech		HMS 20-1155 NS 4405 FG	Para 1.31
Intermediate Gearbox	2 lb. 2 oz.	Grease, SYN-Tech		HMS 20-1155 NS 4405 FG	Para 1.30
Main Transmission	45 pt. (22.5 qt.)	Lubricating Oil	* **	MIL-L-23699 MIL-L-7808	Para 1.32
Primary Hydraulic System	3 qt.	Hydraulic Fluid	*	MIL-H-83282 MIL-H-5606	Para 1.34
Utility Hydraulic System	2.6 gal.	Hydraulic Fluid	*	MIL-H-83282 MIL-H-5606	Para 1.34
Utility Hydraulic Return Accumulator	231 cu. ft.	Nitrogen		BB-N-411	Para 1.37
Forward Fuel Tank	155 gal.	Turbine Fuel		MIL-T-5624 JP-4 MIL-T-5624 JP-5 MIL-T-83133 JP-8	Para 1.13 thru 1.18
Aft Fuel Tank	220 gal.	Turbine Fuel		MIL-T-5624 JP-4 MIL-T-5624 JP-5 MIL-T-83133 JP-8	Para 1.13 thru 1.18
Auxiliary Fuel Tank	230 gal. (each tank)	Turbine Fuel		MIL-T-5624 JP-4 MIL-T-5624 JP-5 MIL-T-83133 JP-8	Para 1.13 thru 1.18

* Use in outside air temperatures of -25 °F (-32 °C) and above.

** Use in outside air temperatures of -25 °F (-32 °C) and below.

GO TO NEXT PAGE

1.12. SERVICING POINTS – continued

Tank or System	Capacity, US	Materials		Maintenance Instructions
Environmental Control Unit Turbine		Lubricating Oil	* MIL-L-23699	Para 1.52
Auxiliary Power Unit (APU)	2 qt.	Lubricating Oil	* MIL-L-23699 ** MIL-L-7808	Para 1.26

* Use in outside air temperatures of -25 °F (-32 °C) and above.

** Use in outside air temperatures of -25 °F (-32 °C) and below.

END OF TASK

1.13. FUEL SYSTEM SERVICING (GENERAL)

a. Read and observe the following icons and warning before servicing the helicopter fuel system.

WARNING

Fuel servicing shall not be performed during thunderstorms or possible lightning conditions.

b. For servicing fuel system:

END OF TASK

1.14. FUEL SERVICING – GRAVITY METHOD

1.14.1. Description

This task covers: Servicing.

1.14.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

References:

FM 10-68
TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors R160 and R295 opened

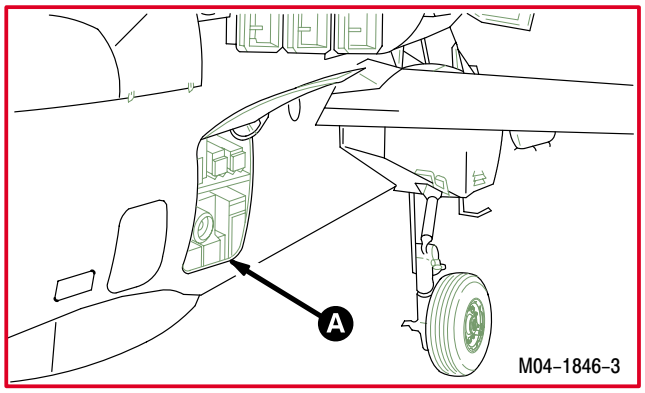
Personnel Required:

67R	Attack Helicopter Repairer
77F	Petroleum Supply Specialist

1.14.3. Servicing

WARNING

Fuel servicing shall not be performed during thunderstorms or possible lightning conditions.



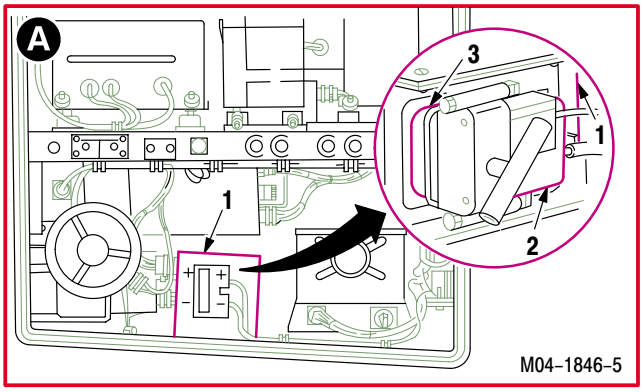
a. **Install static ground lines** (FM 10-68)**.**

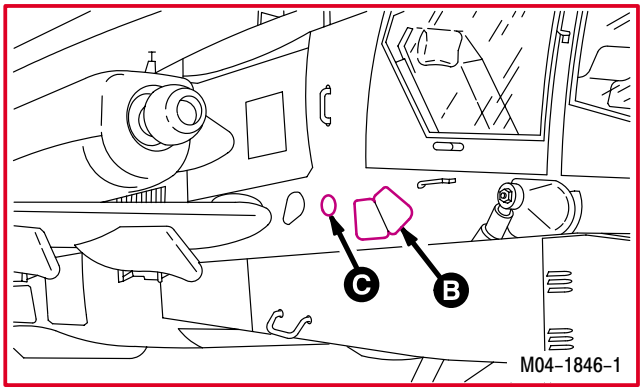
GO TO NEXT PAGE

1.14. FUEL SERVICING – GRAVITY METHOD – continued

b. **Connect battery (1).**

(1) Attach connector P87 (2) to receptacle (BT1)J3 (3).





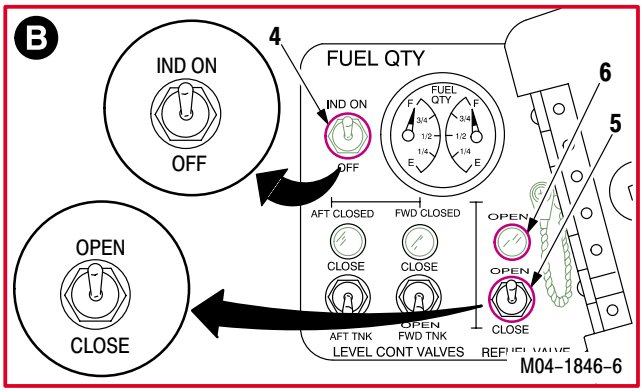
c. **Vent fuel tanks.**

(1) Set **FUEL QTY IND** switch (4) to **IND ON**.

(2) Set **REFUEL VALVE** switch (5) to **OPEN**.

(3) Check that **OPEN** indicator (6) is lighted.

(4) Refer to TM 1-1520-238-T if indicator (6) does not light.



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1.14. FUEL SERVICING – GRAVITY METHOD – continued

d. **Remove forward fuel tank filler cap (7).**

(1) Connect fuel nozzle ground plug (8) to grounding receptacle (9).

(2) Lift and turn locking tab (10) to **OPEN**.

(3) Remove filler cap (7) from filler port (11).

(4) Pull until filler cap chain (12) opens check valve (13).

(5) Position filler cap chain (12) in locking detent (14) to hold check valve (13) open.

e. **Insert fuel nozzle (15) into filler port (11).**

f. **Service forward fuel tank as required.**

g. **Remove fuel nozzle (15) from filler port (11).**

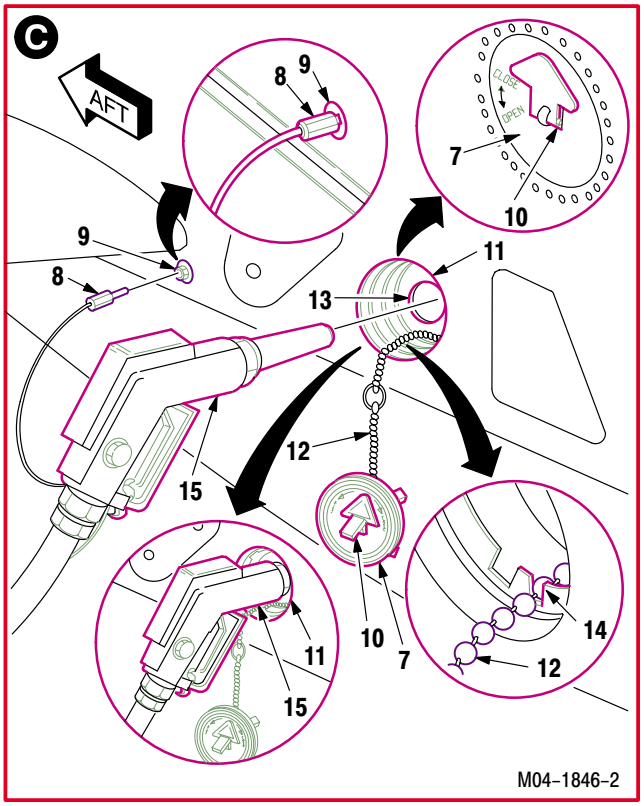
h. **Install filler cap (7).**

(1) Release filler cap chain (12) from locking detent (14).

(2) Install filler cap (7) in filler port (11).

(3) Turn locking tab (10) to **CLOSED**, then press.

(4) Disconnect fuel nozzle ground plug (8) from grounding receptacle (9).



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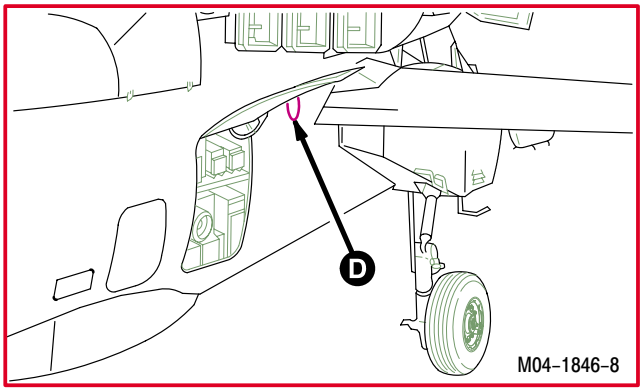
1.14. FUEL SERVICING – GRAVITY METHOD – continued



i. **Remove aft fuel tank filler cap (16).**

(1) Connect fuel nozzle ground plug (8) to grounding receptacle (17).

(2) Lift and turn locking tab (18) to **OPEN**.

(3) Remove filler cap (16) from filler port (19).

(4) Pull until filler cap chain (20) opens check valve (21).

(5) Position filler cap chain (20) in locking detent (22) to hold check valve (21) open.

j. **Insert fuel nozzle (15) into filler port (19).**

k. **Service aft fuel tank as required.**

l. **Remove nozzle (15) from filler port (19).**

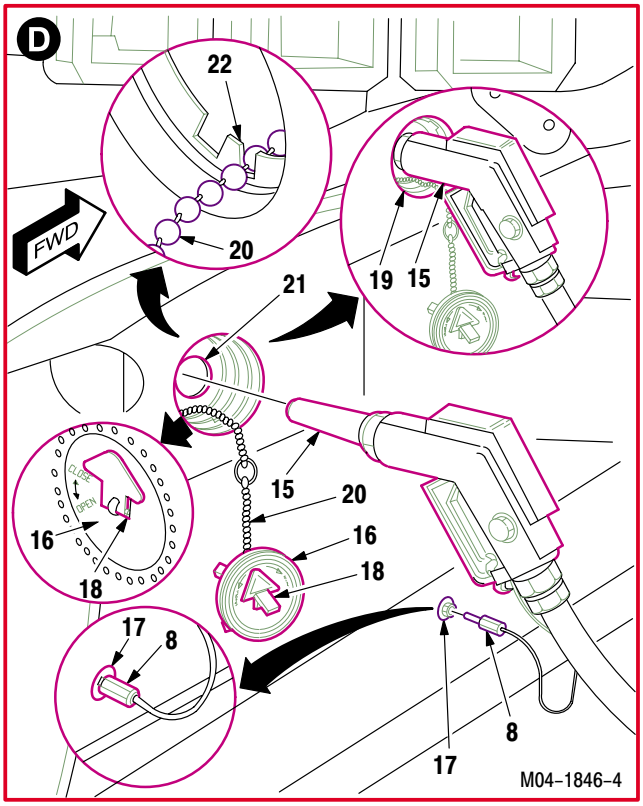
m. **Install filler cap (16).**

(1) Release filler cap chain (20) from locking detent (22).

(2) Disconnect fuel nozzle ground plug (8) from grounding receptacle (17).

(3) Install filler cap (16) in filler port (19).

(4) Turn locking tab (18) to **CLOSED**, then press.



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1.14. FUEL SERVICING – GRAVITY METHOD – continued

NOTE

If fuel quantity indications do not match, refer to fuel quantity indication operational check (TM 1-1520-238-T).

n. **Check fuel indicators (23).**

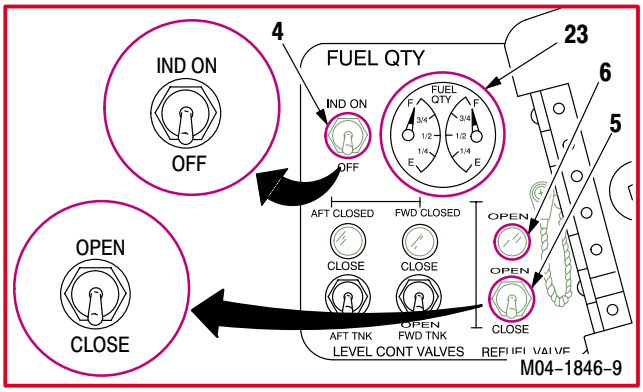
(1) Verify that quantity of fuel put in tanks matches quantities shown on indicators (23).

(2) Set **REFUEL VALVE** switch (5) to **CLOSE**.

(3) Check that indicator (6) is not lighted.

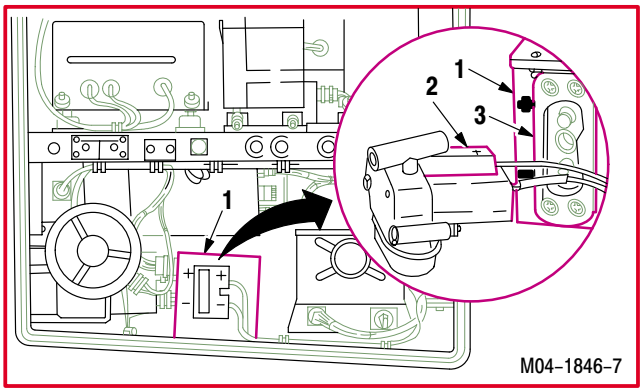
(4) Refer to TM 1-1520-238-T if indicator (6) remains lighted.

(5) Set **FUEL QTY IND** switch (4) to **OFF**.



o. **Disconnect battery (1).**

(1) Detach connector P87 (2) from receptacle (BT1)J3 (3).



p. **Remove static ground lines** (FM 10-68)**.**

q. **Secure access doors R160 and R295** (para 2.2)**.**

END OF TASK

1.15. FUEL SERVICING - CLOSED CIRCUIT REFUELING (CCR) METHOD

1.15.1. Description

This task covers: Servicing.

1.15.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

References:

FM 10-68
TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors R160 and R295 opened; cover R180 removed

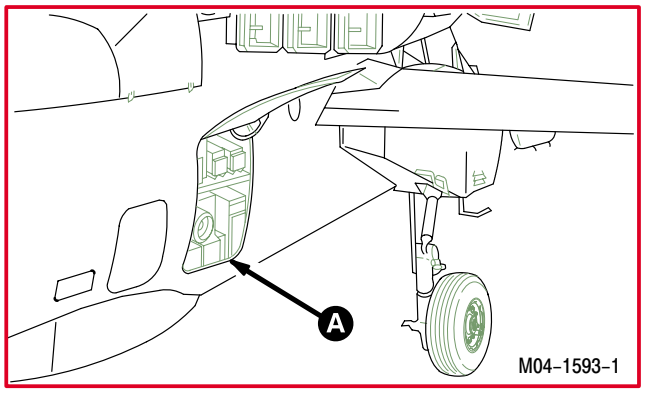
Personnel Required:

67R	Attack Helicopter Repairer
77F	Petroleum Supply Specialist

1.15.3. Servicing

WARNING

Fuel servicing shall not be performed during thunderstorms or possible lightning conditions.



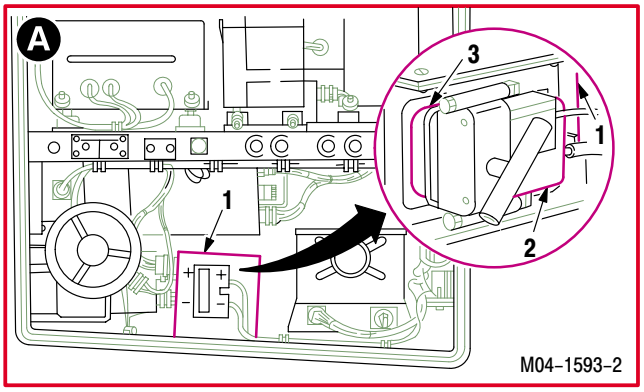
a. **Install static ground lines** (FM 10-68)**.**

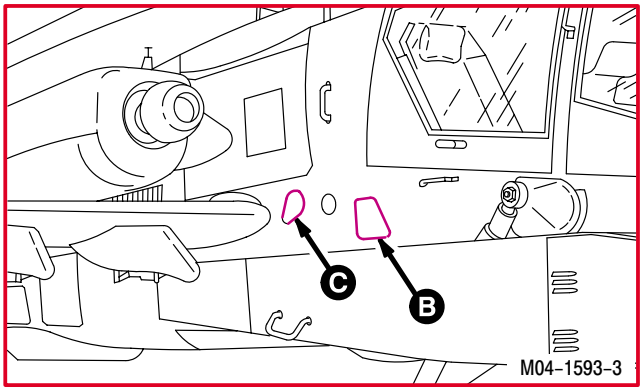
GO TO NEXT PAGE

1.15. FUEL SERVICING - CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

b. **Connect battery (1).**

(1) Attach connector P87 (2) to receptacle (BT1)J3 (3).





c. **Set FUEL QTY IND switch (4) to ON.**

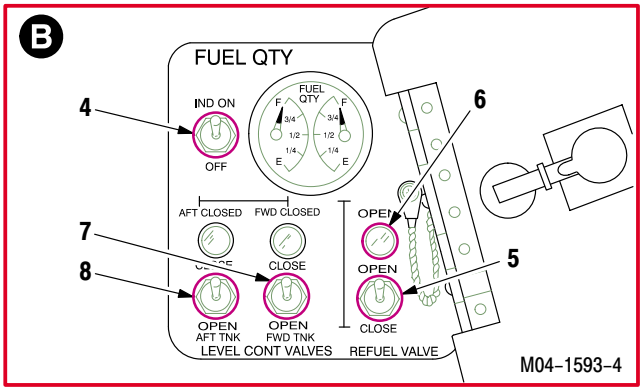
d. **Set REFUEL VALVE switch (5) to OPEN.**

(1) Check that **OPEN** indicator (6) is lighted.

(2) Refer to TM 1-1520-238-T if indicator (6) does not light.

e. **Set FWD TNK switch (7) to CLOSE.**

f. **Set AFT TNK switch (8) to CLOSE.**



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1.15. FUEL SERVICING - CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

CAUTION

To prevent damage to fuel system, do not exceed maximum fueling pressure of 15 psi.

g. **Connect closed circuit refueling nozzle (9) to adapter (10).**

(1) Connect nozzle ground plug (11) to grounding receptacle (12).

(2) Remove cap (13) from adapter (10).

(3) Connect nozzle (9) to adapter (10).

(4) Start refueling pump.

(5) Move flow control (14) to **FLOW**.

(6) Check refueling unit for fuel flow.

CAUTION

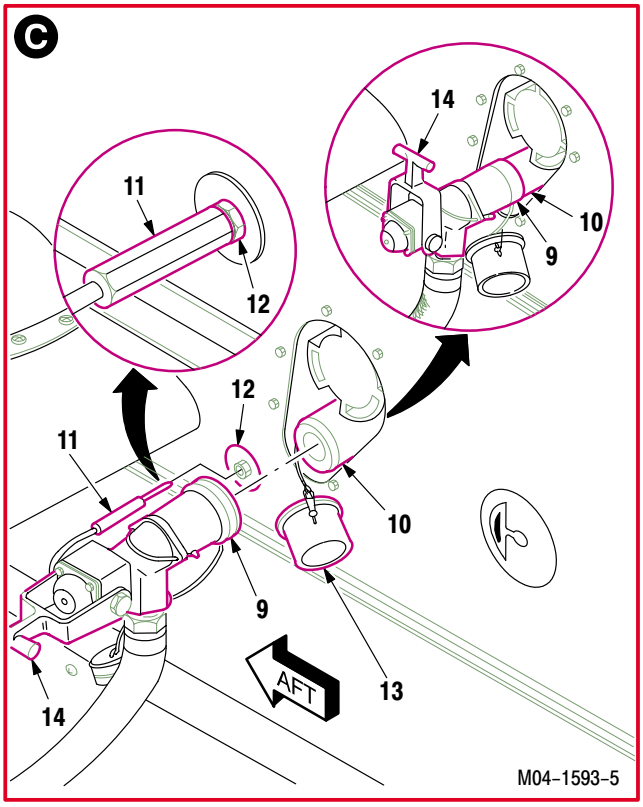
The fuel system may be damaged if **FWD CLOSED** and **AFT CLOSED** indicators do not light within 8 seconds after fuel servicing begins. If indicators do not light, automatic fuel shutoff has not actuated. Stop fuel servicing.

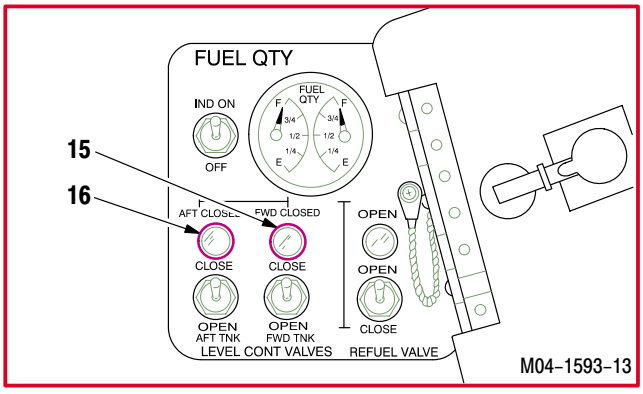
(7) Check that **FWD CLOSED** indicator (15) and **AFT CLOSED** indicator (16) light within 8 seconds after fuel servicing begins.

(8) Stop fuel servicing if indicators do not light (TM 1-1520-238-T).

NOTE

Indication of automatic fuel shutoff is a jerk of the fuel hose and no further increase on the fuel servicing unit quantity indicator.





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1.15. FUEL SERVICING - CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

h. **Service fuel tanks as required.**

(1) To refuel, select level control valve switch position and advisory indicator condition from following chart:

FWD TNK / AFT TNK SWITCHES		TANKS TO BE REFUELED		
		BOTH	AFT ONLY	FWD ONLY
LEVEL CONT VALVES	AFT TANK	OPEN	OPEN	CLOSED
	FWD TANK	OPEN	CLOSED	OPEN
INDICATORS	AFT CLOSED	OFF	OFF	ON
	FWD CLOSED	OFF	ON	OFF

CAUTION

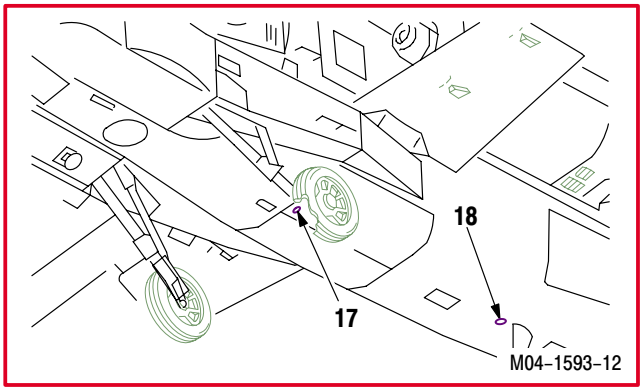
The fuel system may be damaged if air does not vent from fuel cells during servicing.

i. **Check vent tubes (17) and (18) for escaping air.**

j. **Stop fuel servicing if air does not escape from vent tubes (17) and (18).**

NOTE

FWD CLOSED and **AFT CLOSED** indicators will light when fuel cell is full and automatic shutoff has occurred.



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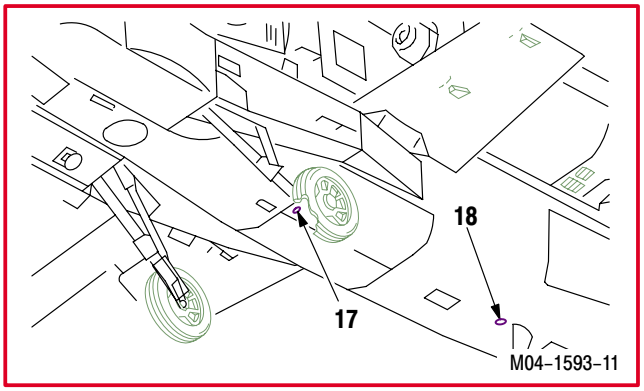
1.15. FUEL SERVICING - CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

WARNING

Failure of automatic shutoff sequence will be indicated by fuel flowing from fuel cell vent tubes. This failure could damage the airframe and injure personnel. Manually stop fuel flow if this occurs. If injury occurs, seek medical aid.



k. **Stop fuel servicing when automatic fuel shutoff has occurred, or if fuel flows from vent tubes (17) and (18).**

l. **Stop refueling unit pump.**

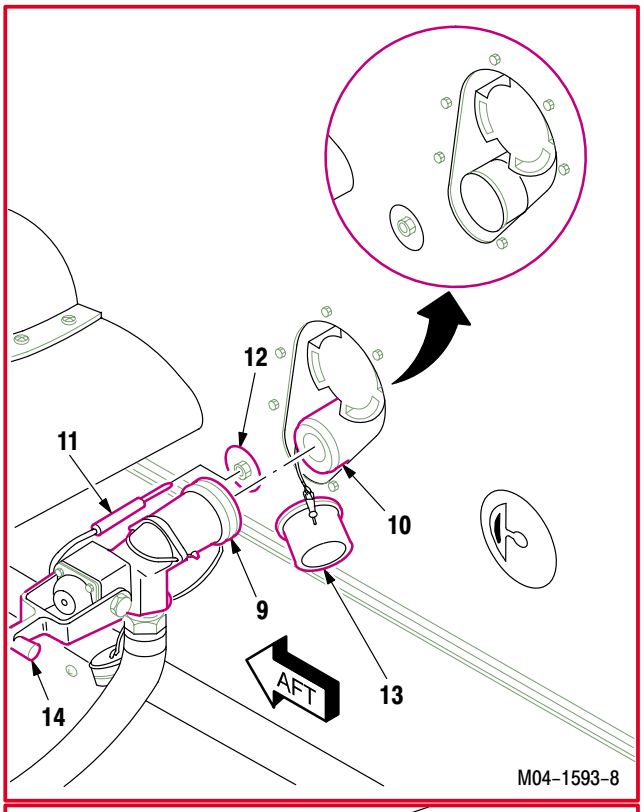
m. **Disconnect nozzle (9) from adapter (10).**

(1) Move handle (14) to **OFF**.

(2) Remove nozzle (9) from adapter (10).

(3) Disconnect nozzle ground plug (11) from grounding receptacle (12).

(4) Install cap (13) on adapter (10).



n. **Set REFUEL VALVE switch (5) to CLOSE.**

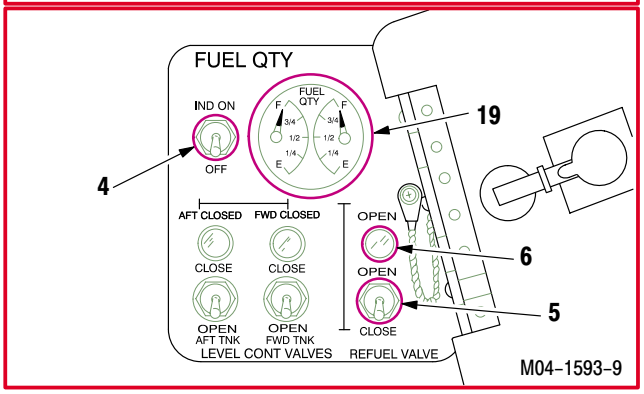
(1) Check that **OPEN** indicator (6) does not light.

(2) Refer to TM 1-1520-238-T if indicator (6) remains lighted.

o. **Check fuel indicators (19).**

(1) Verify that fuel quantity indicated on fuel gage (19) is same as quantity of fuel in tanks.

p. **Set FUEL QTY ON IND switch (4) to OFF.**



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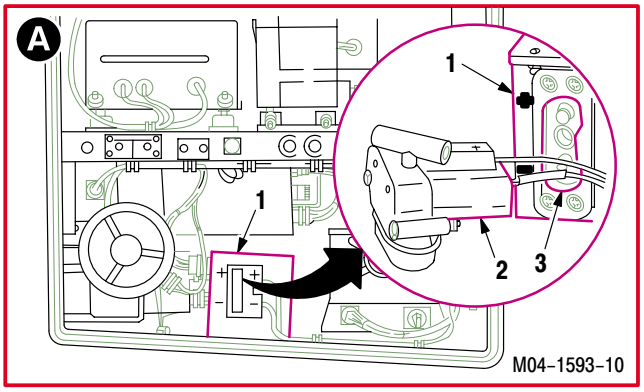
1.15. FUEL SERVICING - CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

q. **Disconnect battery (1).**

(1) Detach connector P87 (2) from receptacle (BT1)J3 (3).

r. **Remove static ground lines** (FM 10-68)**.**

s. **Secure access doors R160 and R295; install cover R180** (para 2.2)**.**



END OF TASK

1.16. FUEL SERVICING – SINGLE POINT ADAPTER (SPA) METHOD

1.16.1. Description

This task covers: Servicing.

1.16.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

References:

FM 10-68
TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors R160 and R295 opened; cover R180 removed

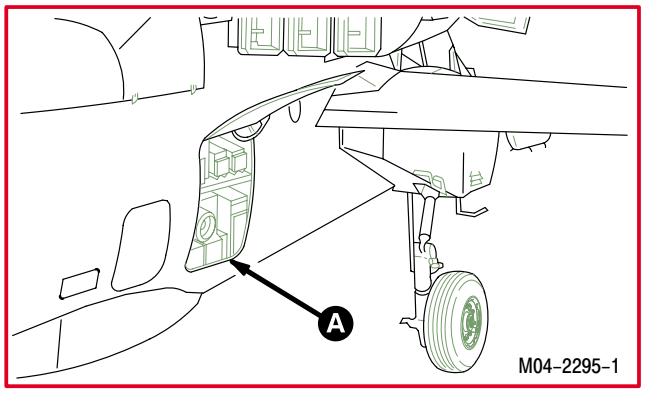
Personnel Required:

67R	Attack Helicopter Repairer
77F	Petroleum Supply Specialist

1.16.3. Servicing

WARNING

Fuel servicing shall not be performed during thunderstorms or possible lightning conditions.



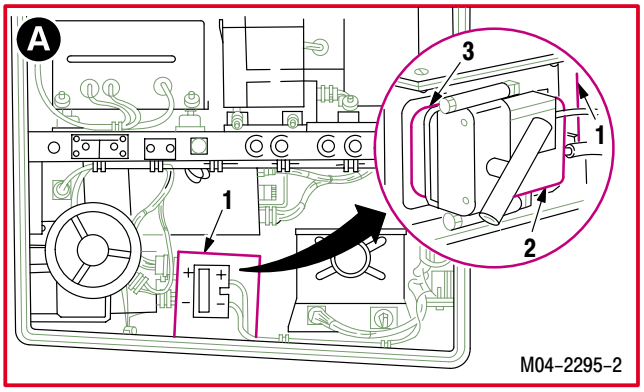
a. **Install static ground lines** (FM 10-68)**.**

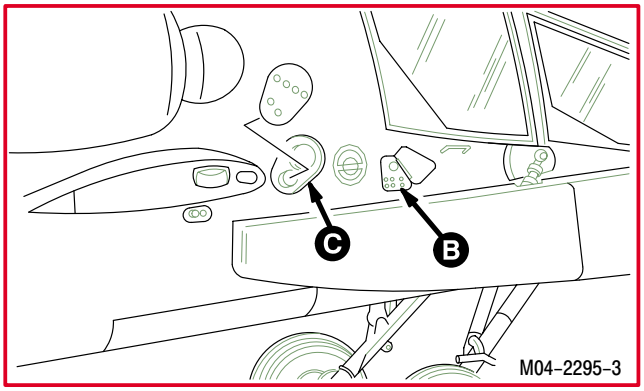
GO TO NEXT PAGE

1.16. FUEL SERVICING – SINGLE POINT ADAPTER (SPA) METHOD – continued

b. **Connect battery (1).**

(1) Attach connector P87 (2) to receptacle (BT1)J3 (3).



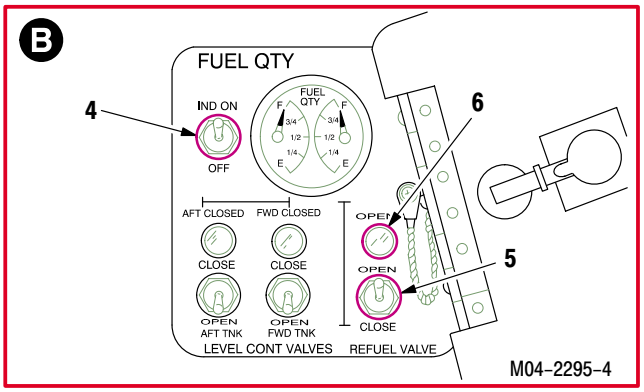


c. **Set FUEL QTY IND switch (4) to ON.**

d. **Set REFUEL VALVE switch (5) to OPEN.**

(1) Check that **OPEN** indicator (6) is lighted.

(2) Refer to TM 1-1520-238-T if indicator (6) does not light.



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1.16. FUEL SERVICING – SINGLE POINT ADAPTER (SPA) METHOD – continued

e. **Connect single point adapter nozzle (7) to adapter (8).**

(1) Connect nozzle ground plug (9) to grounding receptacle (10).

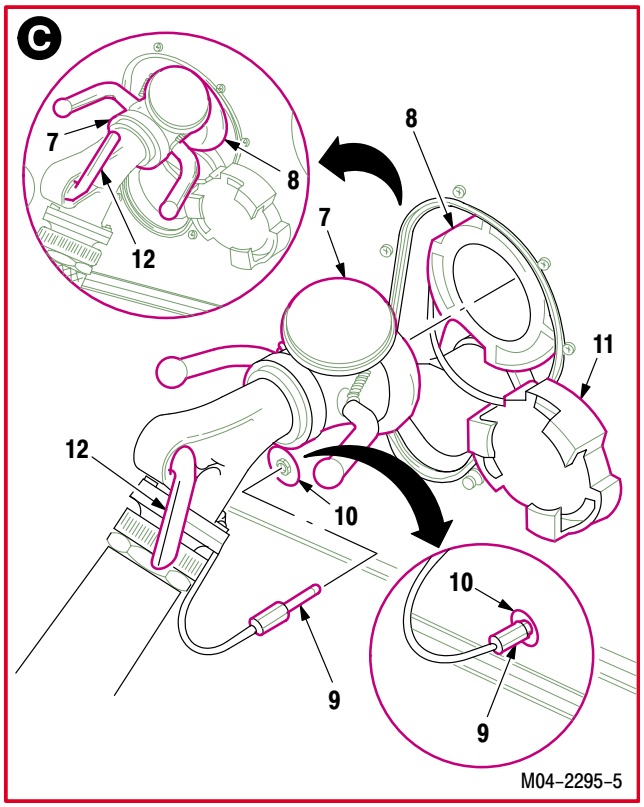
(2) Remove cap (11) from adapter (8).

(3) Connect nozzle (7) to adapter (8) and turn clockwise until it locks.

CAUTION

To prevent damage to the fuel system, do not exceed 50 psi fueling pressure.

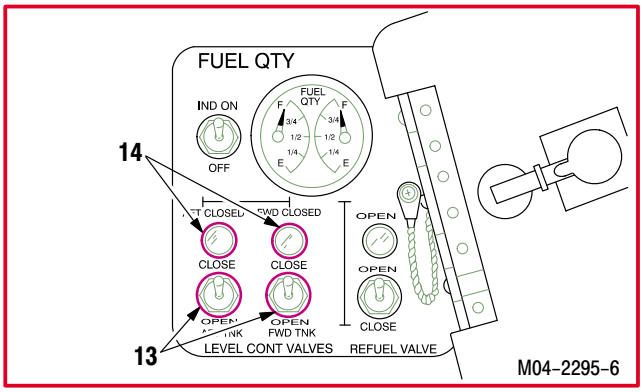
f. **To start refueling, lift valve handle (12) to OPEN position.**



g. **Place FWD and AFT TNK LEVEL CONT VALVES switches (13) to CLOSE.**

CAUTION

The fuel system may be damaged if **FWD CLOSED** and **AFT CLOSED** indicators do not light within 8 seconds after fuel servicing begins. If indicators do not light, automatic fuel shutoff has not actuated. Stop fuel servicing.



h. **Check that indicators FWD CLOSED and AFT CLOSED (14) light within 8 seconds after fuel service begins.**

(1) Stop fuel servicing if indicators do not light (TM 1-1520-238-T).

GO TO NEXT PAGE

1.16. FUEL SERVICING – SINGLE POINT ADAPTER (SPA) METHOD – continued

i. **Check refueling unit for no fuel flow.**

(1) Stop refueling if fuel flow continues (TM 1-1520-238-T).

j. **Refuel helicopter.**

(1) To refuel, select level control valve switch position and advisory indicator condition from following chart:

FWD TNK / AFT TNK SWITCHES		TANKS TO BE REFUELED		
		BOTH	AFT ONLY	FWD ONLY
LEVEL CONT VALVES	AFT TANK	OPEN	OPEN	CLOSED
	FWD TANK	OPEN	CLOSED	OPEN
INDICATORS	AFT CLOSED	OFF	OFF	ON
	FWD CLOSED	OFF	ON	OFF

CAUTION

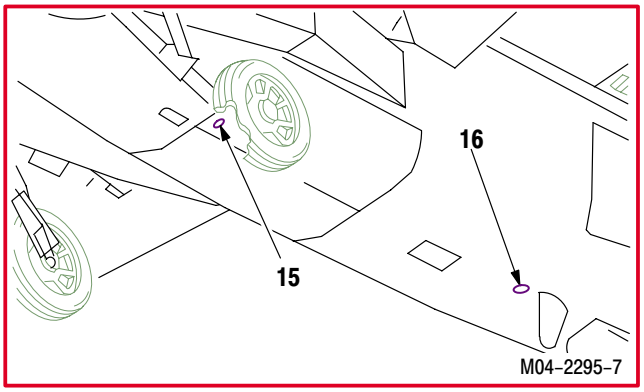
The fuel system may be damaged if air does not vent from the fuel cells during servicing.

k. **Check FWD and AFT fuel cell vents (15) and (16) for escaping air.**

l. **Stop fuel servicing if air does not escape from vent tubes (15) and (16).**

NOTE

FWD CLOSED and **AFT CLOSED** indicators will light when fuel cell is full and automatic shutoff has occurred.



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1.16. FUEL SERVICING – SINGLE POINT ADAPTER (SPA) METHOD – continued

WARNING

Failure of automatic shutoff sequence will be indicated by fuel flowing from fuel cell vent tubes. This failure could damage the airframe and injure personnel. Manually stop fuel flow if this occurs. If injury occurs, seek medical aid.

m. **Disconnect nozzle (7) from adapter (8).**

(1) Stop refueling pump.

(2) Move valve handle (12) to off position.

(3) Turn nozzle (7) counterclockwise until free from adapter (8).

(4) Disconnect nozzle ground plug (9) from grounding receptacle (10).

(5) Install cap (11) on adapter (8).

NOTE

Refueling panel door will not close if either **LEVEL CONT VALVES** switch is in **CLOSE**.

n. **Set FWD TNK and AFT TNK LEVEL CONT VALVES switches (13) to OPEN.**

(1) Check that **FWD CLOSED** and **AFT CLOSED** indicators (14) do not light.

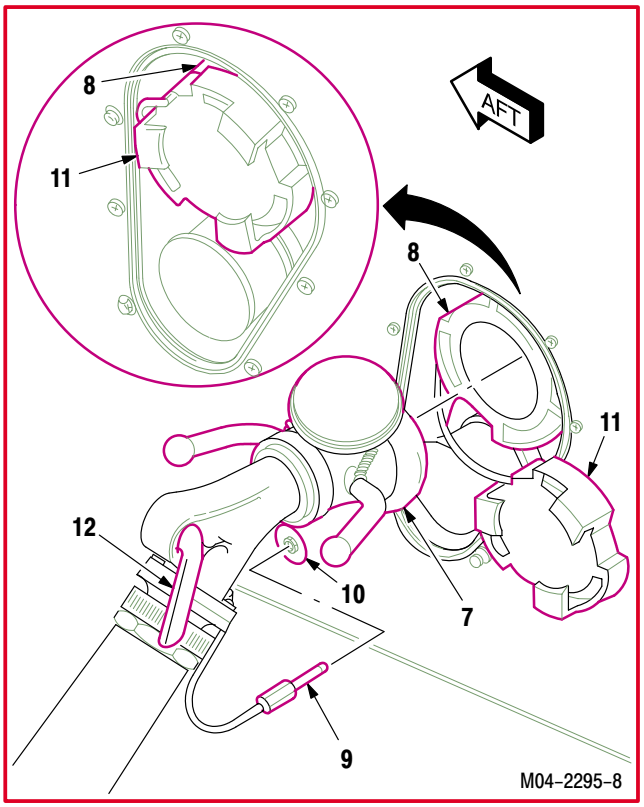
o. **Set REFUEL VALVE switch (5) to CLOSE.**

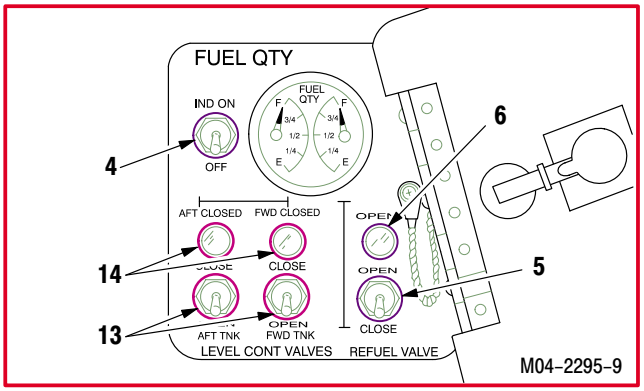
(1) Check that **OPEN** indicator (6) does not light.

(2) Refer to TM 1-1520-238-T if indicator (6) remains lighted.

p. **Set FUEL QTY IND switch (4) to OFF.**

q. **Remove static ground lines** (FM 10-68)**.**





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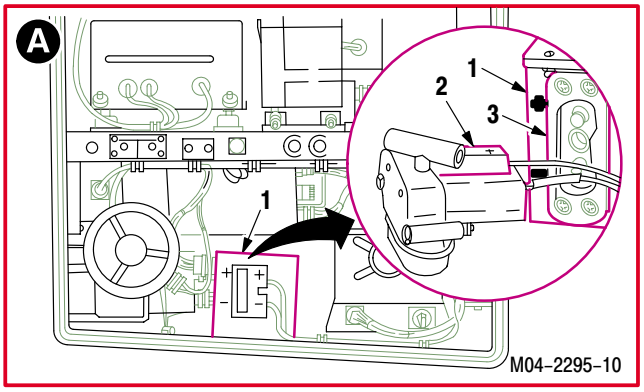
1.16. FUEL SERVICING – SINGLE POINT ADAPTER (SPA) METHOD – continued

r. **Disconnect battery (1).**

(1) Detach connector P87 (2) from receptacle (BT1)J3 (3).

s. **Secure access doors R160 and R295; install cover R180** (para 2.2)**.**



END OF TASK

1.17. FUEL SERVICING – HOT RAPID CLOSED CIRCUIT REFUELING (CCR) METHOD

1.17.1. Description

This task covers: Servicing.

1.17.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Microphone headset (item 174, App H)

References:

FM 10-68
TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
2.2	Access door R160 opened; cover R180 removed
1.134	Headset and microphone connected
TM 9-1090-208-23	Armament safety check performed

Personnel Required:

152F	Pilot (2)
67R	Attack Helicopter Repairer
77F	Petroleum Supply Specialist

1.17.3. Servicing

WARNING

- **Fuel servicing shall not be performed during thunderstorms or possible lightning discharge.**
- **Do not move around rocket pod/missile launchers until armament is safety checked. Approach the helicopter only from the side.**

NOTE

Standard visual signals must be used if servicing is being done without voice communication to the pilot.

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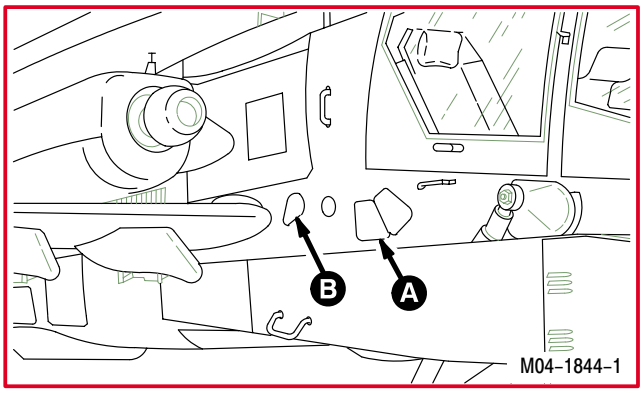
1.17. FUEL SERVICING – HOT RAPID CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

a. **Install static ground lines** (FM 10-68)**.**



WARNING

No. 2 (right) engine should be shut down during refueling. This is to prevent ingestion of fuel vapors. Also, jet engine intake suction can cause injury to personnel. However, when necessary, refueling may proceed with both engines operating.

b. **Establish communication with pilot.**

(1) Request pilot to shut down No. 2 engine.

c. **Perform prefueling check.**

(1) Refer to pressure refuel precheck list on inside of refueling panel access door.

d. **Set FUEL QTY IND switch (1) to ON.**

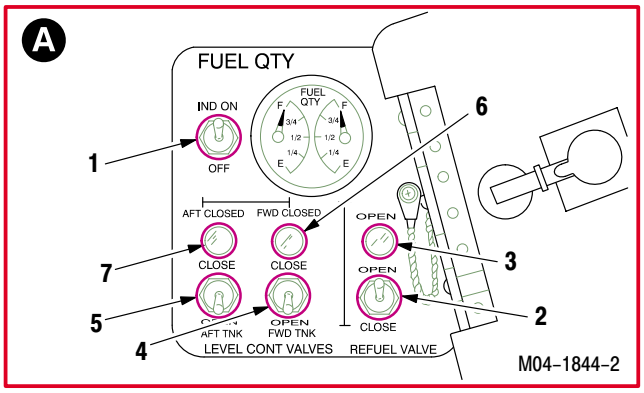
e. **Set REFUEL VALVE switch (2) to OPEN.**

NOTE

Stop fuel servicing and notify pilot if indicator does not light.

(1) Check that **OPEN** indicator (3) is lighted.

(2) Stop fuel servicing if **OPEN** indicator (3) does not light (TM 1-1520-238-T).



f. **Set LEVEL CONT VALVES switches FWD TNK switch (4) and AFT TNK switch (5) to CLOSE.**

(1) Check that indicators **FWD CLOSED** (6) and **AFT CLOSED** (7) does light.

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1.17. FUEL SERVICING – HOT RAPID CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

g. **Connect closed circuit refueling nozzle (8) to adapter (9).**

(1) Connect nozzle ground plug (10) to grounding receptacle (11).

(2) Remove cap (12) from adapter (9).

(3) Connect nozzle (8) to adapter (9).

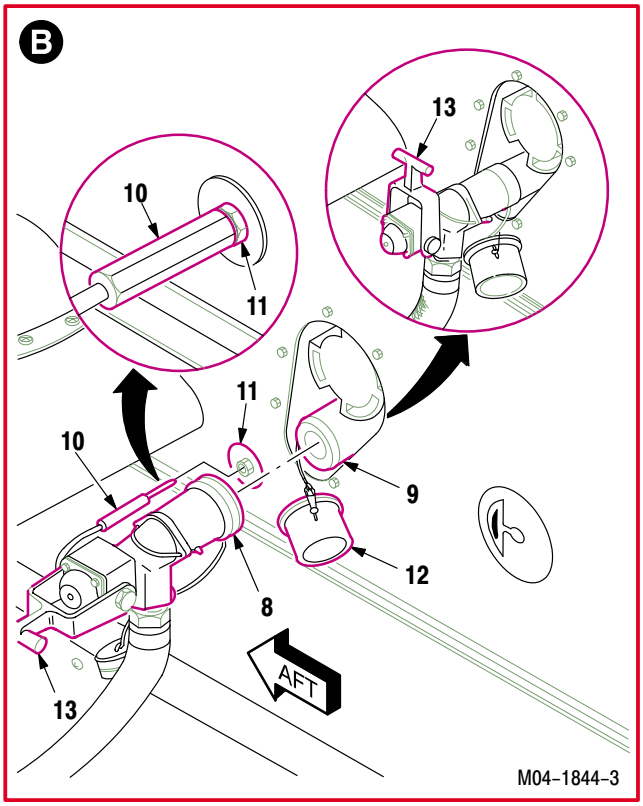
(4) Start refueling pump.

(5) Move flow control handle (13) to **FLOW**.

(6) Check refueling unit for fuel flow.

CAUTION

The fuel system may be damaged if **FWD CLOSED** and **AFT CLOSED** indicators do not light within 8 seconds after fuel servicing begins. If indicators do not light, automatic fuel shutoff has not activated. Stop fuel servicing.



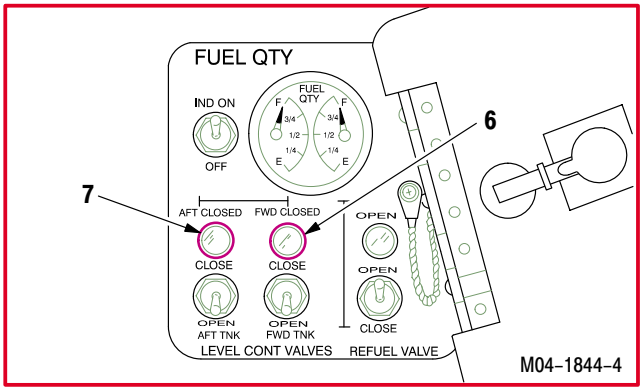
h. **Ensure automatic fuel shutoff actuated.**

(1) Check that indicators **FWD CLOSED** (6) and **AFT CLOSED** (7) lights within 8 seconds after fuel servicing begins.

(2) Stop fuel servicing if indicators do not light (TM 1-1520-238-T).

NOTE

Indication of automatic fuel shutoff is indicated by a jerk of the fuel hose and no further increase on the servicing unit quantity indicator.



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1.17. FUEL SERVICING – HOT RAPID CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

i. **Service fuel tanks, as required, when notified by pilot.**

(1) To refuel, select level control valve switch position and advisory indicator condition from following chart:

FWD TNK / AFT TNK SWITCHES		TANKS TO BE REFUELED		
		BOTH	AFT ONLY	FWD ONLY
LEVEL CONT VALVES	AFT TANK	OPEN	OPEN	CLOSED
	FWD TANK	OPEN	CLOSED	OPEN
INDICATORS	AFT CLOSED	OFF	OFF	ON
	FWD CLOSED	OFF	ON	OFF

CAUTION

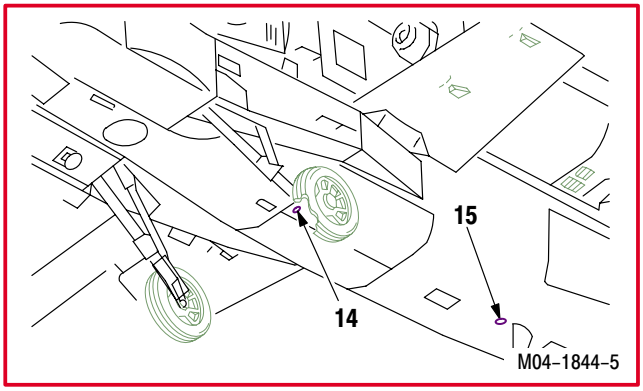
The fuel system may be damaged if air does not vent from fuel cells during servicing. Stop fuel servicing if air does not escape from vent tubes.

j. **Check vent tubes (14) and (15) for escaping air.**

k. **Stop fuel servicing when notified by pilot or when automatic fuel shutoff has occurred.**

NOTE

FWD CLOSED and **AFT CLOSED** indicators will light when fuel cell is full and automatic shutoff has occurred.



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1.17. FUEL SERVICING – HOT RAPID CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

l. **Disconnect nozzle (8) from adapter (9).**

(1) Move handle (13) to **OFF**.

(2) Stop refueling pump.

(3) Remove nozzle (8) from adapter (9).

(4) Disconnect nozzle ground plug (10) from grounding receptacle (11).

(5) Install cap (12) on adapter (9).

NOTE

Notify pilot if indicators remain lighted.

m. **Set LEVEL CONT VALVES switches FWD TNK (4) and AFT TNK (5) to OPEN.**

(1) Check that indicators **FWD CLOSED** (6) and **AFT CLOSED** (7) are not lighted.

NOTE

Refueling panel door will not close if either or both **LEVEL CONT VALVES** switches are in **CLOSE**.

n. **Set REFUEL VALVE switch (2) to CLOSE.**

(1) Check that **OPEN** indicator (3) is not lighted.

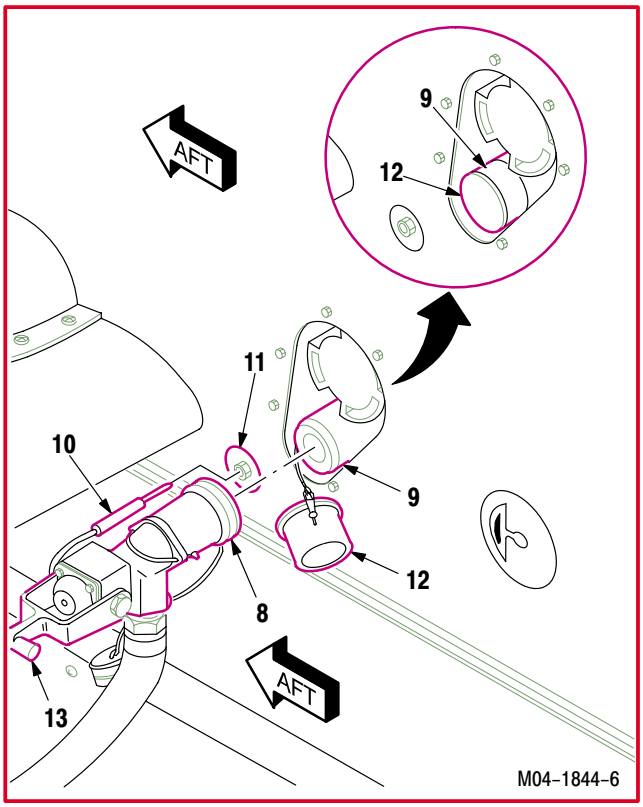
(2) Refer to TM 1-1520-238-T if indicator (3) remains lighted.

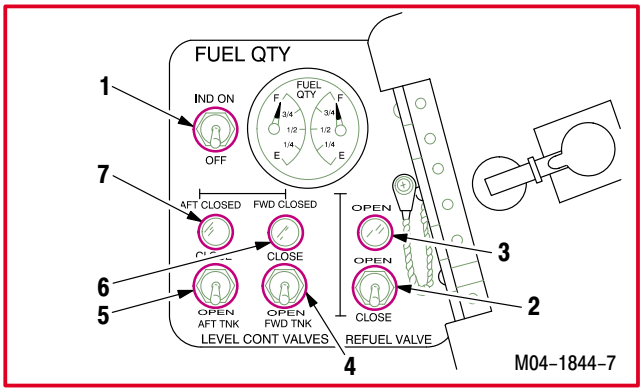
o. **Set FUEL QTY IND switch (1) to OFF.**

p. **Secure access door R160; install cover R180** (para 2.2)**.**

q. **Remove static ground lines** (FM 10-68)**.**

r. **Disconnect headset and microphone** (para 1.134)**.**





END OF TASK

1.18. FUEL SERVICING – HOT RAPID SINGLE POINT ADAPTER (SPA) METHOD

1.18.1. Description

This task covers: Servicing.

1.18.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Microphone headset (item 174, App H)

References:

FM 10-68
TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
2.2	Access door R160 opened; cover R180 removed
1.134	Headset and microphone connected
TM 9-1090-208-23	Armament safety check performed

Personnel Required:

152F	Pilot (2)
67R	Attack Helicopter Repairer
77F	Petroleum Supply Specialist

1.18.3. Servicing

WARNING

Fuel servicing shall not be performed during thunderstorms or possible lightning conditions.

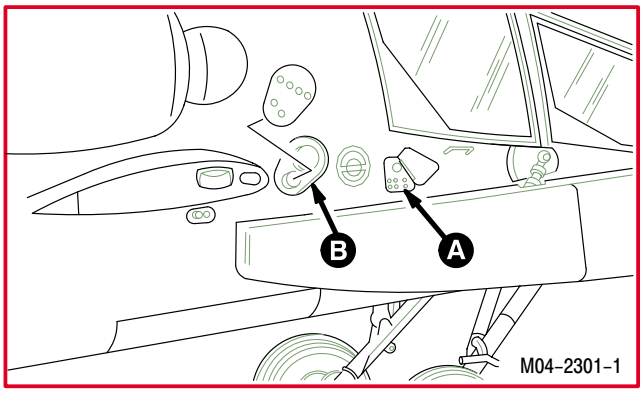
NOTE

Standard visual signals must be used if servicing is being done without voice communication to the pilot.

GO TO NEXT PAGE

1.18. FUEL SERVICING – HOT RAPID SINGLE POINT ADAPTER (SPA) METHOD – continued

a. **Install static ground lines** (FM 10-68)**.**



WARNING

No. 2 (right) engine should be shut down during refueling. This is to prevent ingestion of fuel vapors. Also, jet engine intake suction can cause injury to personnel. However, when necessary, refueling may proceed with both engines operating.

NOTE

Standard visual signals must be used if servicing is being done without voice communication to the pilot.

b. **Establish communication with pilot.**

(1) Request pilot to shut down No. 2 engine.

c. **Perform prefueling check.**

(1) Refer to pressure refuel precheck list on inside of refueling panel access door.

d. **Set FUEL QTY IND switch (1) to ON.**

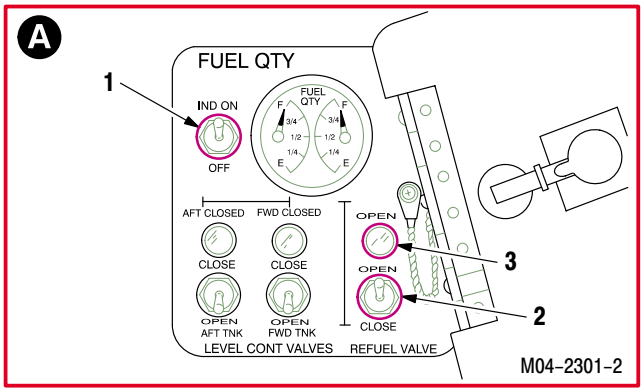
NOTE

Stop fuel servicing and notify pilot if indicator light does not light.

e. **Set REFUEL VALVE switch (2) to OPEN.**

(1) Check that **OPEN** indicator (3) is lighted.

(2) Stop fuel servicing if **OPEN** indicator (3) does not light (TM 1-1520-238-T).



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1.18. FUEL SERVICING – HOT RAPID SINGLE POINT ADAPTER (SPA) METHOD – continued

f. **Connect single point adapter nozzle (4) to adapter (5).**

(1) Connect nozzle ground plug (6) to grounding receptacle (7).

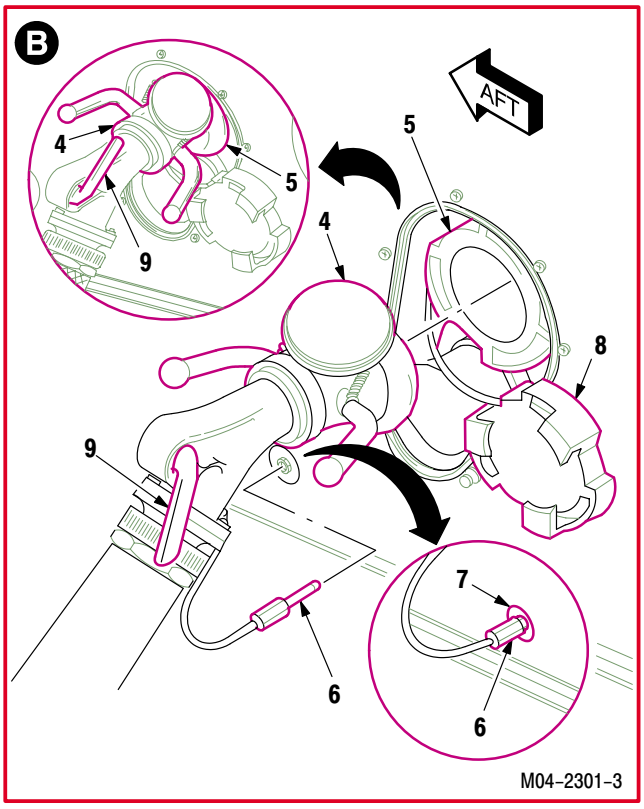
(2) Remove cap (8) from adapter (5).

(3) Connect nozzle (4) to adapter (5). Turn nozzle clockwise until it locks.

(4) Start refueling pump.

(5) Move valve handle (9) to OPEN.

(6) Check refueling unit for fuel flow.



CAUTION

The fuel system may be damaged if **FWD CLOSED** and **AFT CLOSED** indicators do not light within 8 seconds after fuel servicing begins. If indicators do not light, automatic fuel shutoff has not activated. Stop fuel servicing.

g. **Place FWD and AFT TNK LEVEL CONT VALVE switches (10) to CLOSE.**

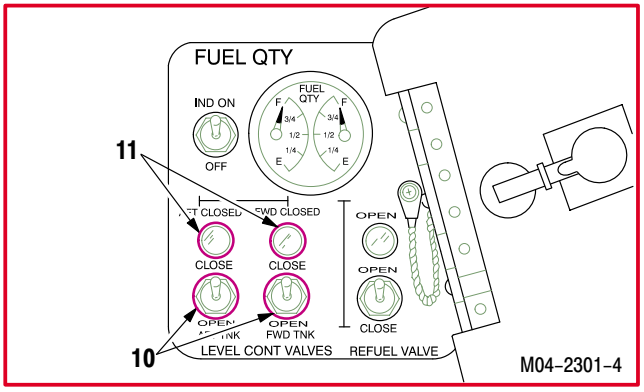
h. **Check that indicator FWD CLOSED and AFT CLOSED (11) are lighted.**

(1) Stop fuel servicing if indicators do not light (TM 1-1520-238-T).

i. **Check refueling unit for no fuel flow.**

j. **Service fuel tanks as required when notified by pilot.**

(1) To refuel, select level control valve switch position and advisory indicator condition from following chart.



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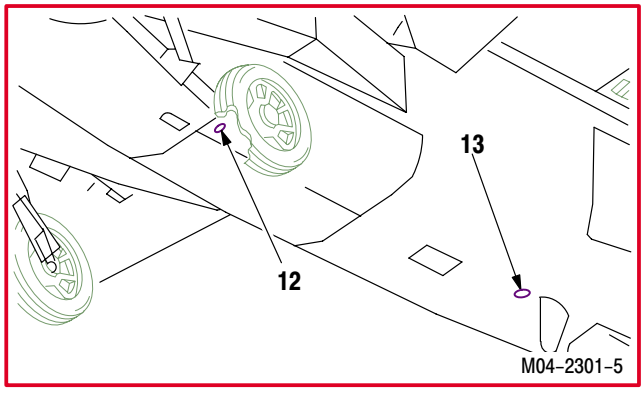
1.18. FUEL SERVICING – HOT RAPID SINGLE POINT ADAPTER (SPA) METHOD – continued

FWD TNK / AFT TNK SWITCHES		TANKS TO BE REFUELED		
		BOTH	AFT ONLY	FWD ONLY
LEVEL CONT VALVES	AFT TANK	OPEN	OPEN	CLOSED
	FWD TANK	OPEN	CLOSED	OPEN
INDICATORS	AFT CLOSED	OFF	OFF	ON
	FWD CLOSED	OFF	ON	OFF

CAUTION

The fuel system may be damaged if air does not vent from the fuel cells during servicing. Stop fuel servicing if air does not escape from vent tubes.

k. **Check forward and aft fuel cell vents (12) and (13) for escaping air.**



WARNING

Failure of automatic shutoff sequence will be indicated by fuel flowing from fuel cell vent tubes. This failure could damage the airframe and injure personnel. Manually stop fuel flow if this occurs. If injury occurs, seek medical aid.

l. **Stop fuel servicing manually if fuel flows from vent tubes (12) and (13).**

GO TO NEXT PAGE

1.18. FUEL SERVICING – HOT RAPID SINGLE POINT ADAPTER (SPA) METHOD – continued

NOTE

FWD CLOSED and **AFT CLOSED** indicators will light when fuel cell is full and automatic shutoff has occurred.

m. **Disconnect nozzle (4) from adapter (5).**

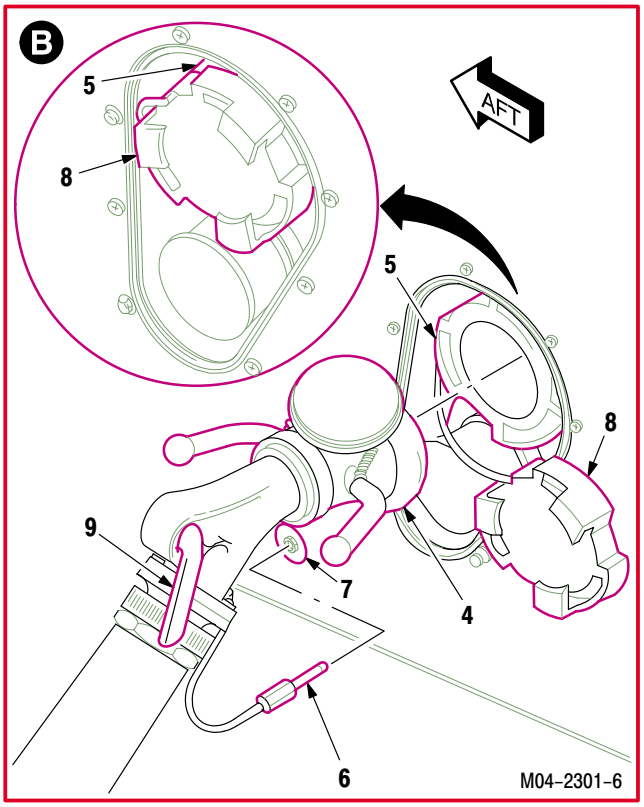
(1) Stop refueling pump.

(2) Move valve handle (9) at **OFF**.

(3) Turn nozzle (4) counterclockwise until free from adapter (5).

(4) Disconnect plug (6) from receptacle (7).

(5) Install cap (8) on adapter (5).



NOTE

Refueling panel door will not close if either or both **LEVEL CONT VALVES** switches are in **CLOSE**.

n. **Move FWD TNK and AFT TNK LEVEL CONT VALVES switches (10) to OPEN.**

(1) Check that indicators **FWD CLOSED** and **AFT CLOSED** (11) are not lighted.

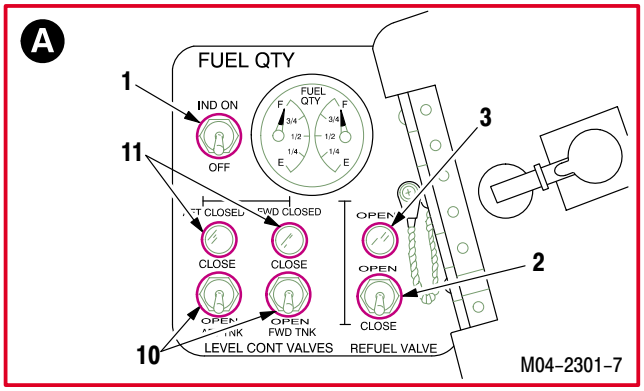
NOTE

Notify pilot if indicators remain lighted.

o. **Set REFUEL VALVE switch (2) to CLOSE.**

(1) Check that **OPEN** indicator (3) is not lighted.

(2) Refer to TM 1-1520-238-T if indicator (3) remains lighted.



p. **Move FUEL QTY IND switch (1) to OFF.**

GO TO NEXT PAGE

1.18. FUEL SERVICING – HOT RAPID SINGLE POINT ADAPTER (SPA) METHOD – continued

q. **Secure access door R160; install cover R180** (para 2.2)**.**

r. **Disconnect headset and microphone** (para 1.134)**.**

s. **Remove static ground lines** (FM 10-68)**.**

END OF TASK

1.19. DEFUELING – SINGLE POINT ADAPTER (SPA) METHOD

1.19.1. Description

This task covers: Defueling.

1.19.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)

Materials/Parts:

Lubricating oil (item 117, App F)

Personnel Required:

67R Attack Helicopter Repairer

References:

FM 10-68
TM 1-1500-204-23
TM 1-1520-238-T

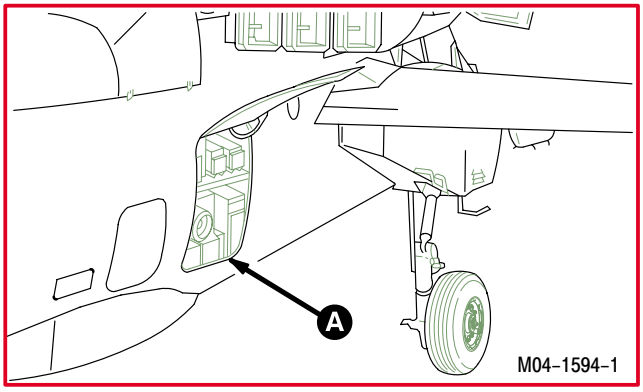
Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors R160 and R295 opened; cover R180 removed

1.19.3. Defueling

WARNING

- **Fuel servicing shall not be performed during thunderstorms or possible lightning conditions.**
- **Defueling is a very hazardous operation because of fuel vapors. Trained fire fighting personnel and equipment must stand by during the entire task.**



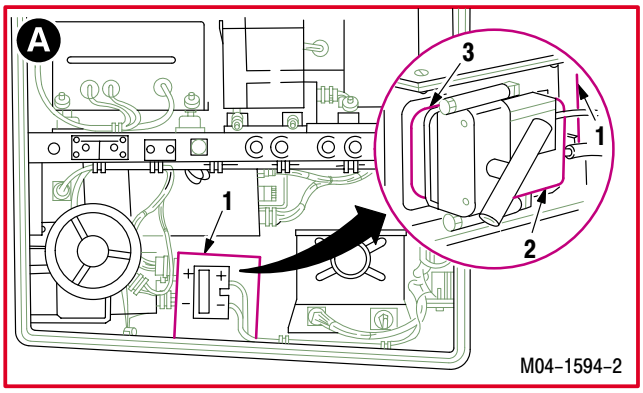
a. **Install static ground lines** (FM 10-68)**.**

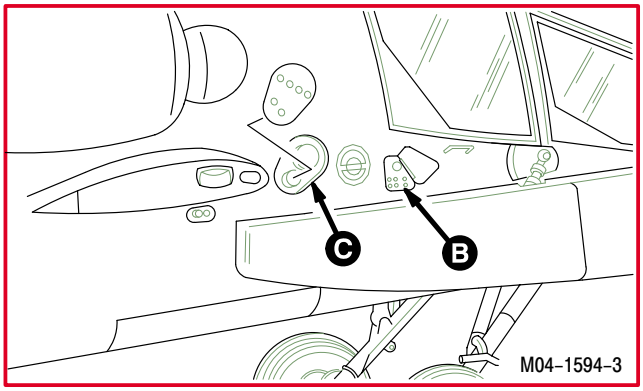
GO TO NEXT PAGE

1.19. DEFUELING – SINGLE POINT ADAPTER (SPA) METHOD – continued

b. **Connect battery (1).**

(1) Attach connector P87 (2) to receptacle (BT1)J3 (3).



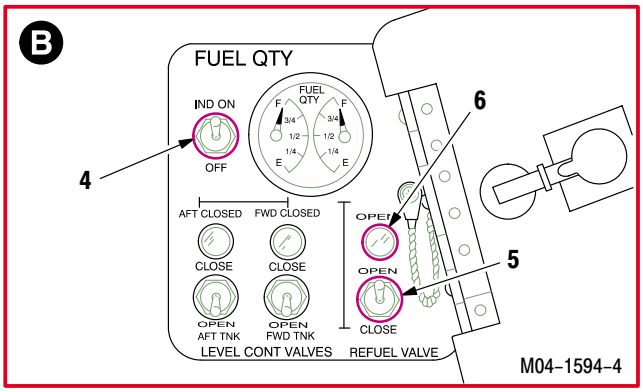


c. **Set FUEL QTY IND switch (4) to ON.**

d. **Set REFUEL VALVE switch (5) to OPEN.**

(1) Check that **OPEN** indicator (6) is lighted.

(2) Refer to TM 1-1520-238-T if indicator (6) does not light.



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1.19. DEFUELING – SINGLE POINT ADAPTER (SPA) METHOD – continued

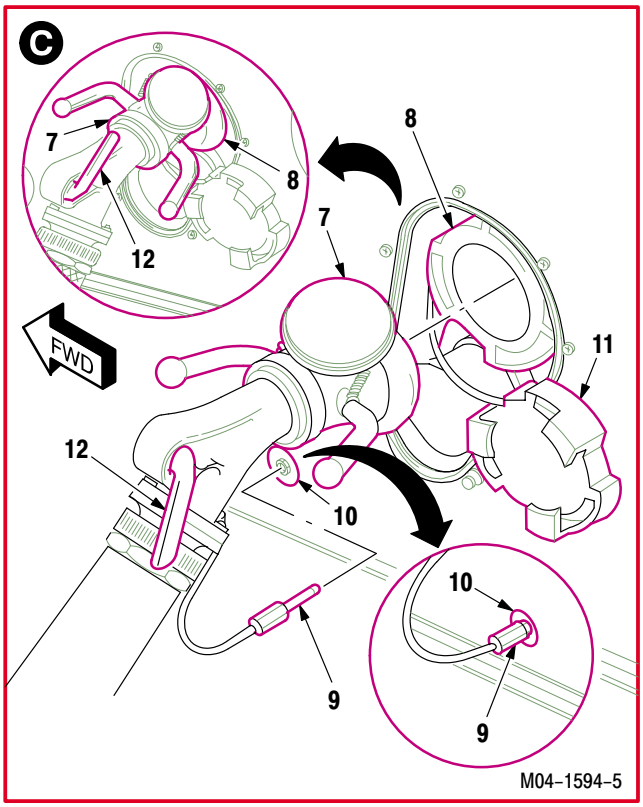
e. **Connect single point adapter nozzle (7) to adapter (8).**

(1) Connect nozzle ground plug (9) to grounding receptacle (10).

(2) Remove cap (11) from adapter (8).

(3) Connect nozzle (7) to adapter (8). Turn nozzle clockwise until it locks.

(4) Move handle (12) to **ON**.

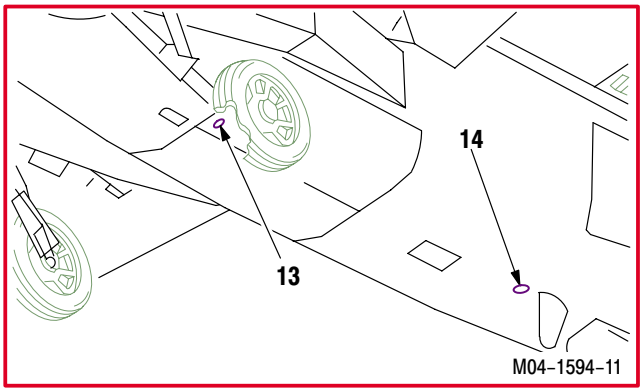


f. **Start pressure defueling.**

CAUTION

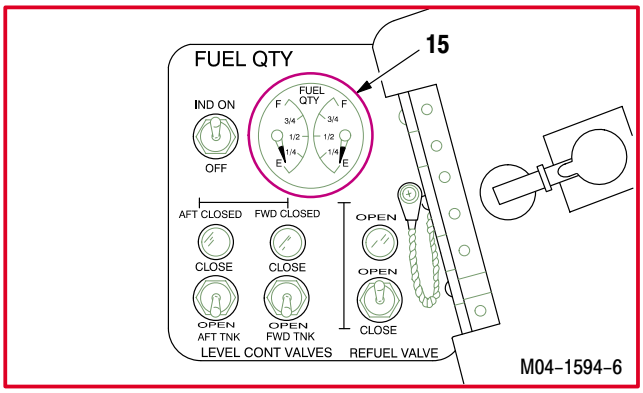
Fuel system may be damaged if air does not flow into fuel cells during defueling. Stop defueling if no air flows into cells.

g. **Check vent tubes (13) and (14) for air flowing into fuel cells.**



h. **Stop pressure defueling.**

(1) Stop defueling when **AFT** and **FWD FUEL QTY** indicator (15) indicates empty.



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1.19. DEFUELING – SINGLE POINT ADAPTER (SPA) METHOD – continued

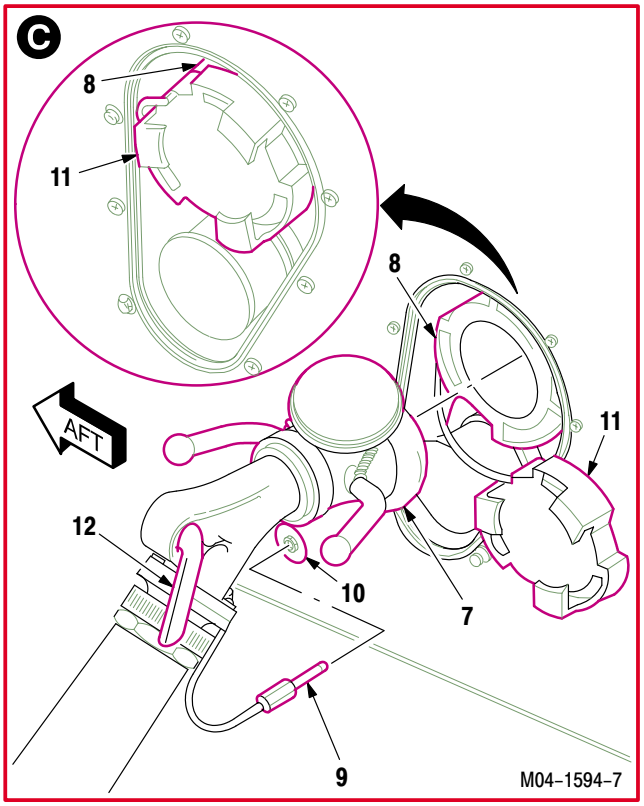
i. **Disconnect nozzle (7) from adapter (8).**

(1) Move handle (12) to **OFF**.

(2) Turn nozzle (7) counterclockwise until free from adapter (8).

(3) Disconnect nozzle ground plug (9) from receptacle (10).

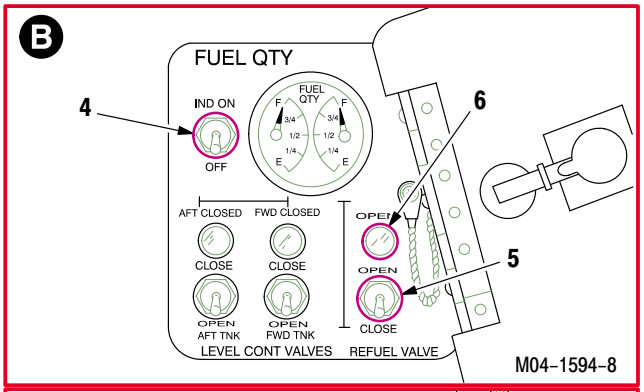
(4) Install cap (11) on adapter (8).



j. **Set REFUEL VALVE switch (5) to CLOSE.**

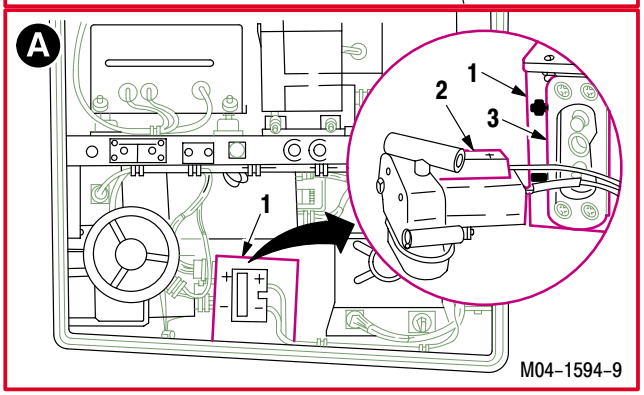
(1) Check that **OPEN** light (6) is not lighted. Refer to TM 1-1520-238-T if light remains lighted.

k. **Set IND ON switch (4) to OFF.**



l. **Disconnect battery (1).**

(1) Detach connector P87 (2) from receptacle (BT1)J3 (3).



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1.19. DEFUELING – SINGLE POINT ADAPTER (SPA) METHOD – continued

m. **Drain aft and forward sumps.**

NOTE

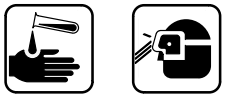
This task is typical for aft and forward tanks.

(1) Place pail under fuel cell sump drain hoses (16).

(2) Ground pail to airframe.

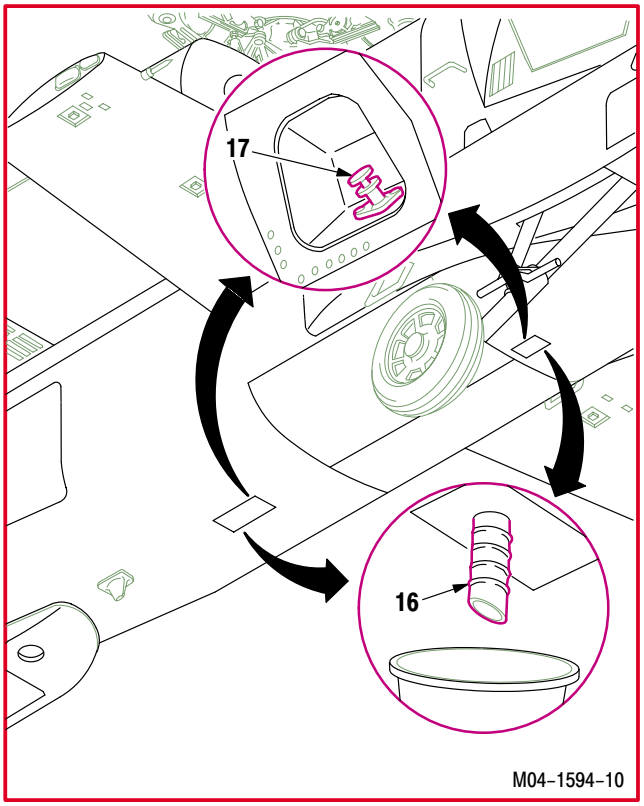
(3) Push and hold **PUSH-TO-DRAIN** button (17).

(4) Dispose of drained fuel.



NOTE

Apply a thin coat of lubricating oil (item 117, App F) to inner liner if the fuel cell is to remain empty more than 10 days (TM 1-1500-204-23).



n. **Remove static ground lines** (FM 10-68)**.**

o. **Secure doors R160 and R295; install cover R180** (para 2.2)**.**

END OF TASK

1.20. DEFUELING – CLOSED CIRCUIT REFUELING (CCR) METHOD

1.20.1. Description

This task covers: Defueling.

1.20.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Chemical protective gloves (item 154, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
14-quart utility pail (item 222, App H)

References:

FM 10-68
TM 1-1500-204-23
TM 1-1520-238-T

Materials/Parts:

Lubricating oil (item 117, App F)

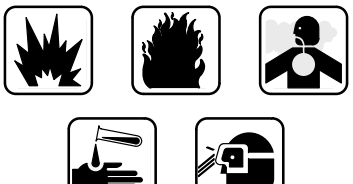
Personnel Required:

67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors R160 and R295 opened; cover R180 removed

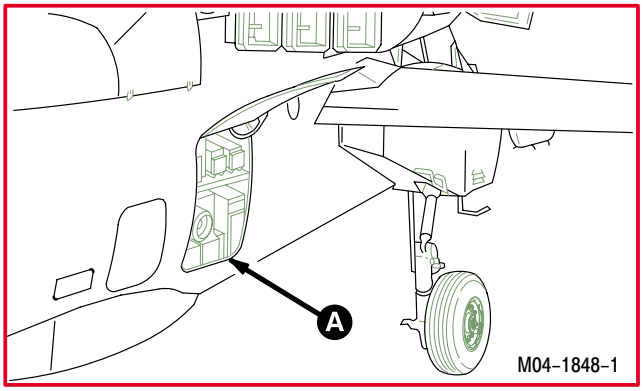
1.20.3. Defueling



WARNING

- **Fuel servicing shall not be performed during thunderstorms or possible lightning conditions.**
- **Defueling is a very hazardous operation because of fuel vapors. Trained fire fighting personnel and equipment must stand by during the entire task.**

a. **Install static ground lines** (FM 10-68)**.**



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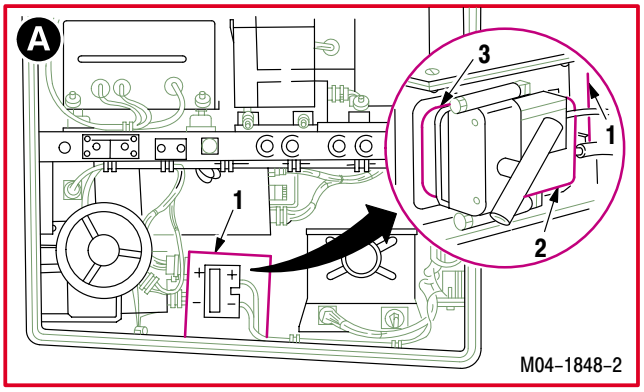
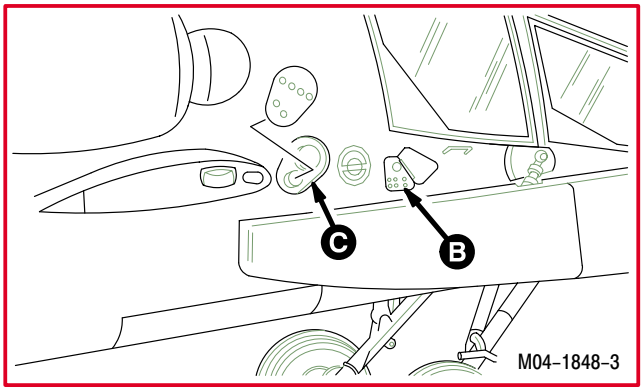
1.20. DEFUELING – CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

b. **Connect battery (1).**

(1) Attach connector P87 (2) to receptacle (BT1)J3 (3).



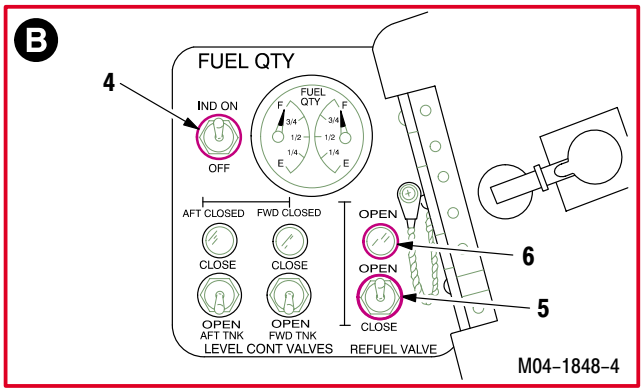


c. **Set IND ON switch (4) to ON.**

d. **Set REFUEL VALVE switch (5) to OPEN.**

(1) Check that **OPEN** indicator (6) is lighted.

(2) Refer to TM 1-1520-238-T if indicator (6) does not light.



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1.20. DEFUELING – CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

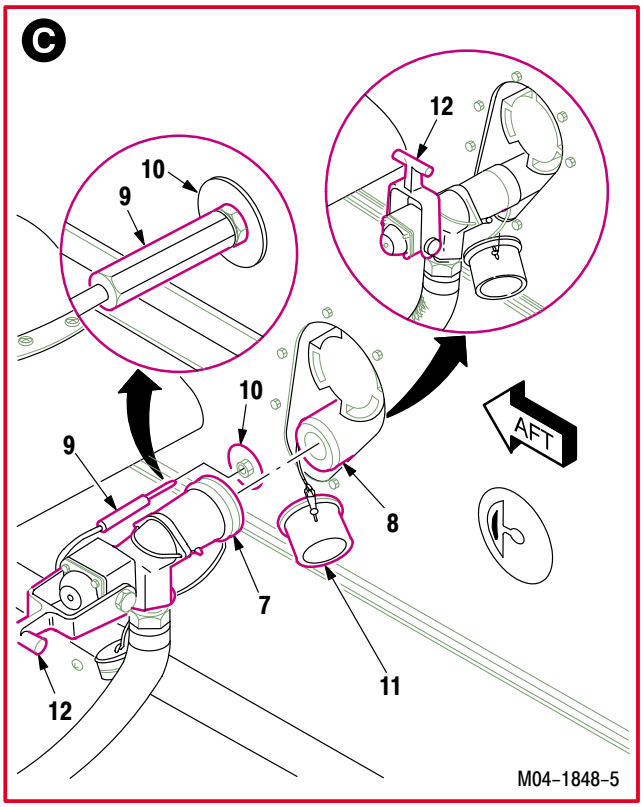
e. **Connect closed circuit refueling nozzle (7) to adapter (8).**

(1) Connect nozzle ground plug (9) to grounding receptacle (10).

(2) Remove cap (11) from adapter (8).

(3) Connect nozzle (7) to adapter (8).

(4) Move flow control handle (12) to **FLOW**.

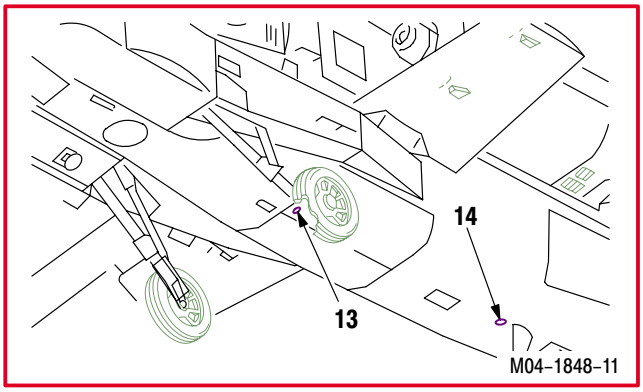


f. **Start pressure defueling.**

CAUTION

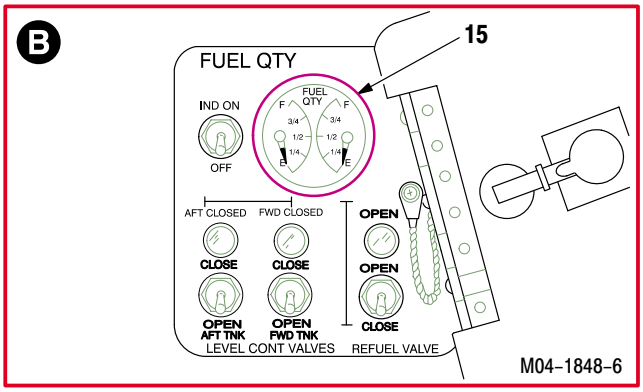
Fuel system may be damaged if air does not flow into fuel cells during defueling. Stop defueling if air does not flow into cells.

g. **Check vent tubes (13) and (14) for air flowing into fuel cells.**



h. **Stop pressure defueling.**

(1) Stop pressure defueling when **AFT** and **FWD FUEL QTY** indicator (15) indicates empty.



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1.20. DEFUELING – CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

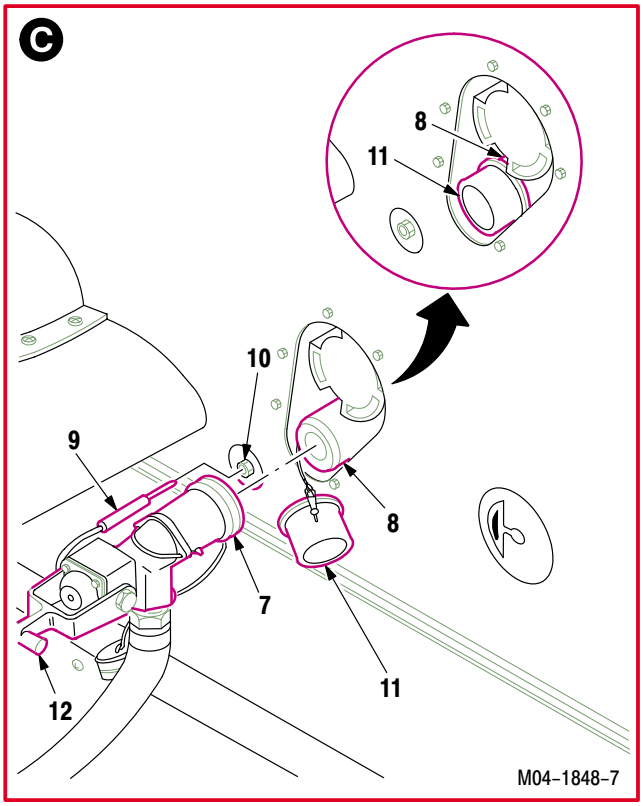
i. **Disconnect closed circuit refueling nozzle (7) from adapter (8).**

(1) Move flow control handle (12) to **OFF** position.

(2) Remove nozzle (7) from adapter (8).

(3) Disconnect nozzle ground plug (9) from grounding receptacle (10).

(4) Install cap (11) on adapter (8).

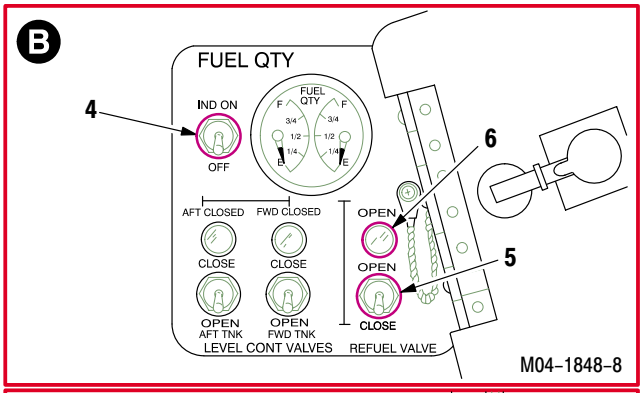


j. **Set REFUEL VALVE switch (5) to CLOSE.**

(1) Check that **OPEN** indicator (6) does not light.

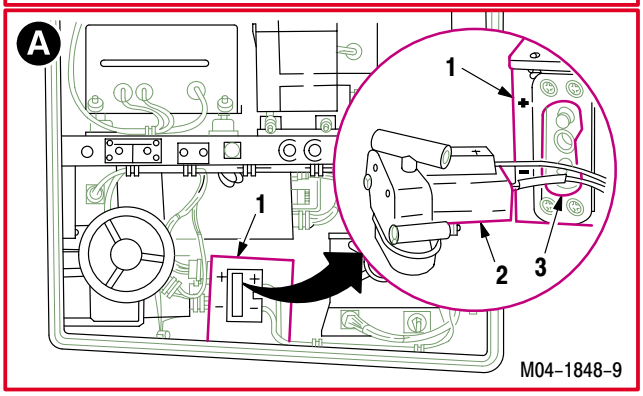
(2) Refer to TM 1-1520-238-T if indicator (6) remains lighted.

k. **Set FUEL QTY IND switch (4) to OFF.**



l. **Disconnect battery (1).**

(1) Detach connector P87 (2) from receptacle (BT1)J3 (3).



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1.20. DEFUELING – CLOSED CIRCUIT REFUELING (CCR) METHOD – continued

m. **Drain aft and forward sumps.**

NOTE

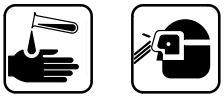
This task is typical for aft and forward tanks.

(1) Place pail under fuel sump drain hose (16).

(2) Ground pail to airframe.

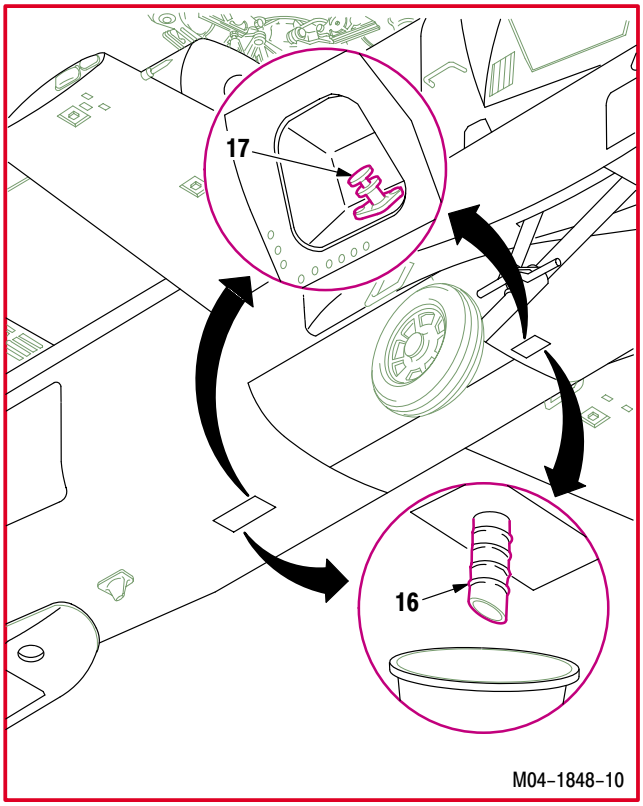
(3) Press and hold **PUSH-TO-DRAIN** button (17).

(4) Dispose of drained fuel.



NOTE

Apply a thin coat of lubricating oil (item 117, App F) to inner liner if fuel cell is to remain empty more than 10 days (TM 1-1500-204-23).



n. **Remove static ground lines** (FM 10-68)**.**

o. **Secure access doors R160 and R295; install cover R180** (para 2.2)**.**

END OF TASK

1.21. DEFUELING – GRAVITY METHOD

1.21.1. Description

This task covers: Defueling.

1.21.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)

Materials/Parts:

Lubricating oil (item 117, App F)

Personnel Required:

67R Attack Helicopter Repairer

References:

FM 10-68
TM 1-1500-204-23

Equipment Conditions:

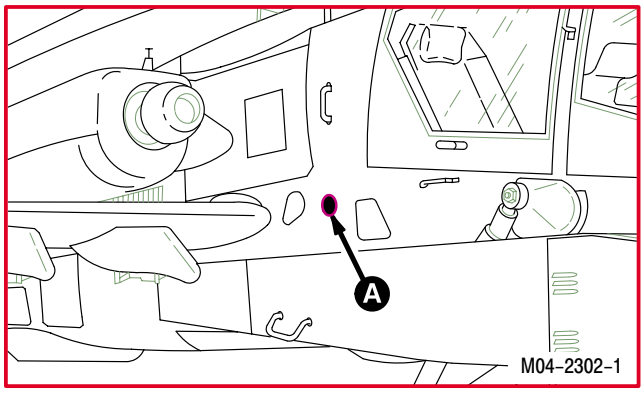
Ref	Condition
1.57	Helicopter safed

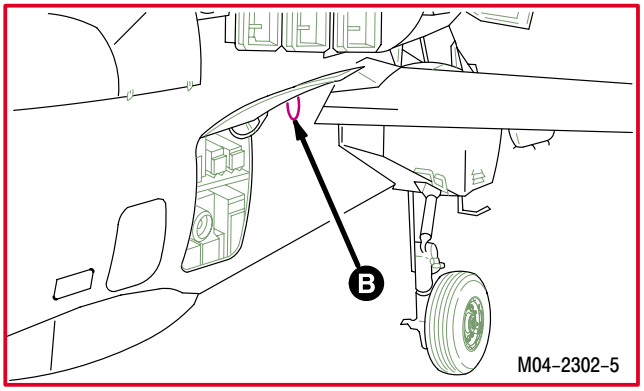
1.21.3. Defueling

WARNING

- **Fuel servicing shall not be performed during thunderstorms or possible lightning conditions.**
- **Defueling is a very hazardous operation because of fuel vapors. Trained fire fighting personnel and equipment must stand by during the entire task.**

a. **Install static ground lines** (FM 10-68).





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1.21. DEFUELING – GRAVITY METHOD – continued

b. **Remove forward fuel tank filler cap (1).**

(1) Lift and turn locking tab (2) to **OPEN**.

(2) Pull filler cap (1) out of filler port (3). Pull until filler cap chain (4) opens check valve (5).

(3) Position filler cap chain (4) in locking detent (6) to hold check valve (5) open.

(4) Connect defuel nozzle ground (7) to grounding receptacle (8).

(5) Insert defueling nozzle (9) into filler port (3).

CAUTION

Fuel cell may be damaged if air does not flow into fuel cell during defueling.

c. **Check vent tubes (10) and (11) for air flowing into fuel cell.**

(1) Stop defueling if air does not flow into fuel cell.

d. **Stop defueling pump when fuel cell is empty.**

e. **Remove defueling nozzle (9).**

(1) Remove defueling nozzle (9) from gravity filler port (3).

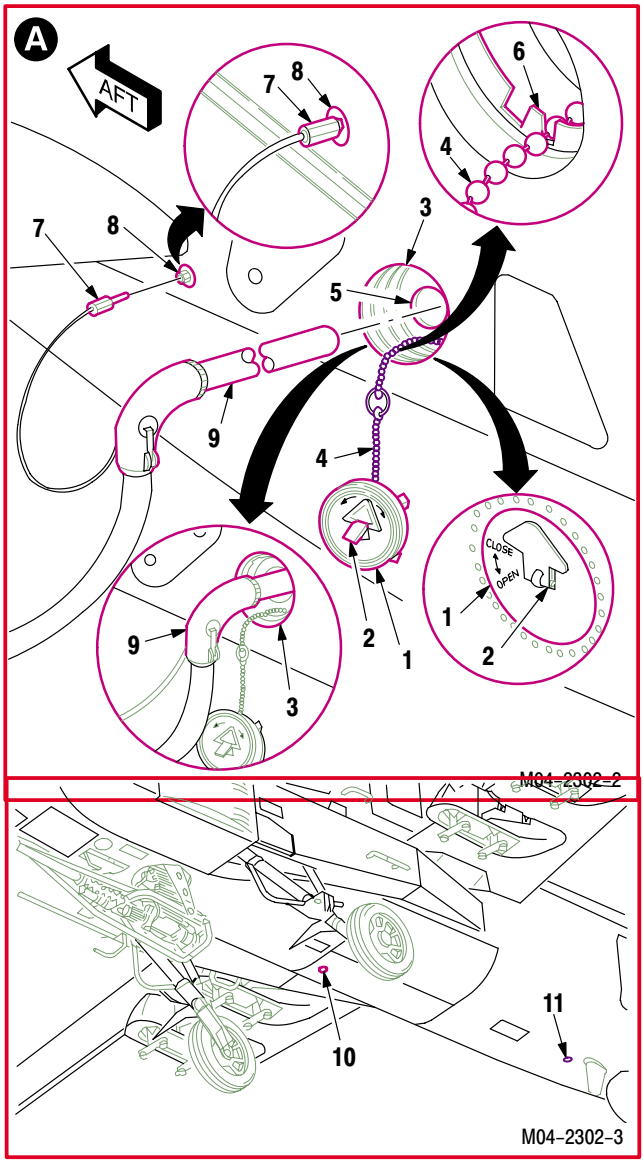
(2) Remove defueling nozzle ground (7) from grounding receptacle (8).

f. **Install filler cap (1).**

(1) Release filler cap chain (4) from locking detent (6).

(2) Install filler cap (1) into filler port (3).

(3) Turn locking tab (2) to **CLOSED**. Press tab (2).



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1.21. DEFUELING – GRAVITY METHOD – continued

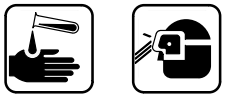
g. **Drain forward sump.**

(1) Place pail under fuel sump drain hose (12).

(2) Ground pail to airframe.

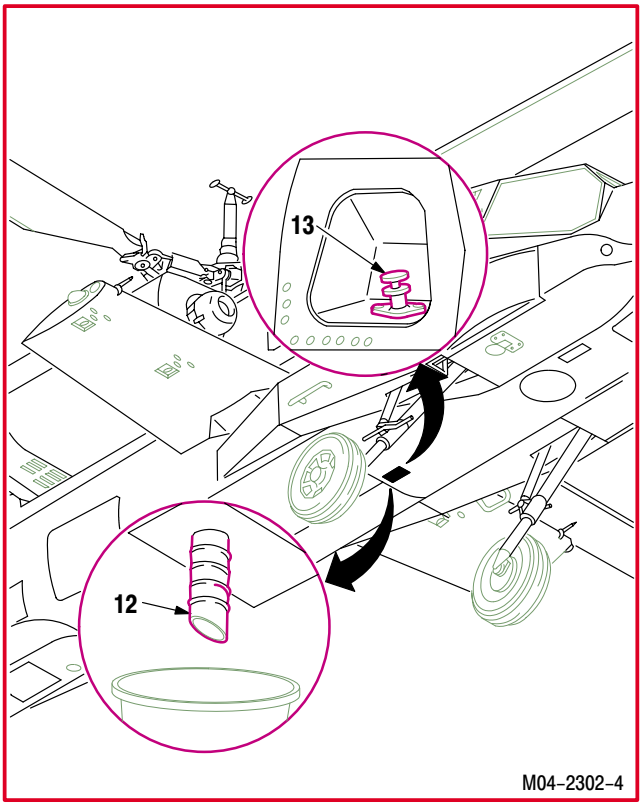
(3) Press and hold **PUSH-TO-DRAIN** button (13).

(4) Dispose of drained fuel.



NOTE

Apply a thin coat of lubricating oil (item 117, App F) to inner liner if fuel cell is to remain empty more than 10 days (TM 1-1500-204-23).



h. **Remove aft fuel tank filler cap (14).**

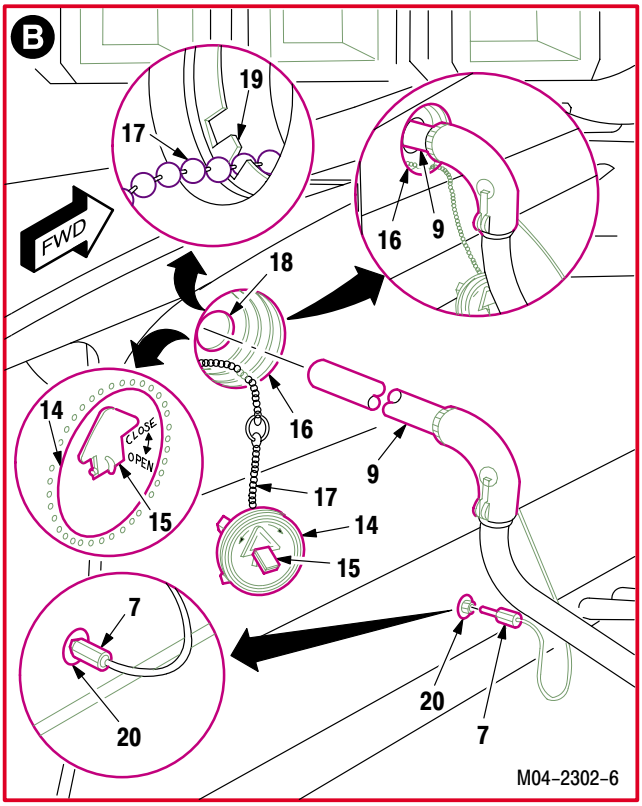
(1) Lift and turn locking tab (15) to **OPEN**.

(2) Pull filler cap (14) out of filler port (16). Pull until filler cap chain (17) opens check valve (18).

(3) Position chain (17) in locking detent (19) to hold check valve (18) open.

(4) Connect defuel nozzle ground (7) to grounding receptacle (20).

(5) Insert defueling nozzle (9) into filler port (16).



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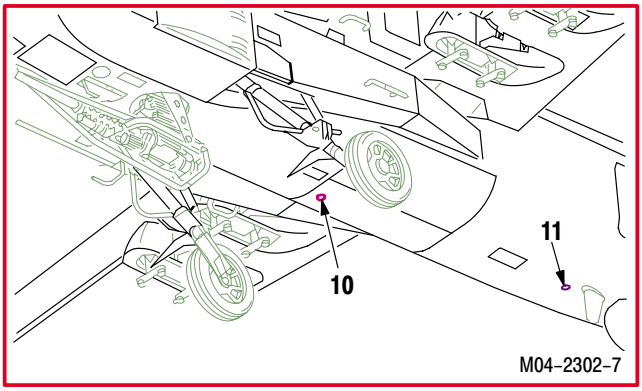
1.21. DEFUELING – GRAVITY METHOD – continued

CAUTION

Fuel cell may be damaged if air does not flow into fuel cell during defueling.

i. **Check vent tubes (10) and (11) for air flowing into fuel cell.**

(1) Stop defueling if air does not flow into cell.



j. **Stop defueling pump when fuel cell is empty.**

NOTE

Apply a thin coat of lubricating oil (item 117, App F) to inner liner if fuel cell is to remain empty more than 10 days (TM 1-1500-204-23).

k. **Remove defueling nozzle (9).**

(1) Remove defueling nozzle (9) from filler port (16).

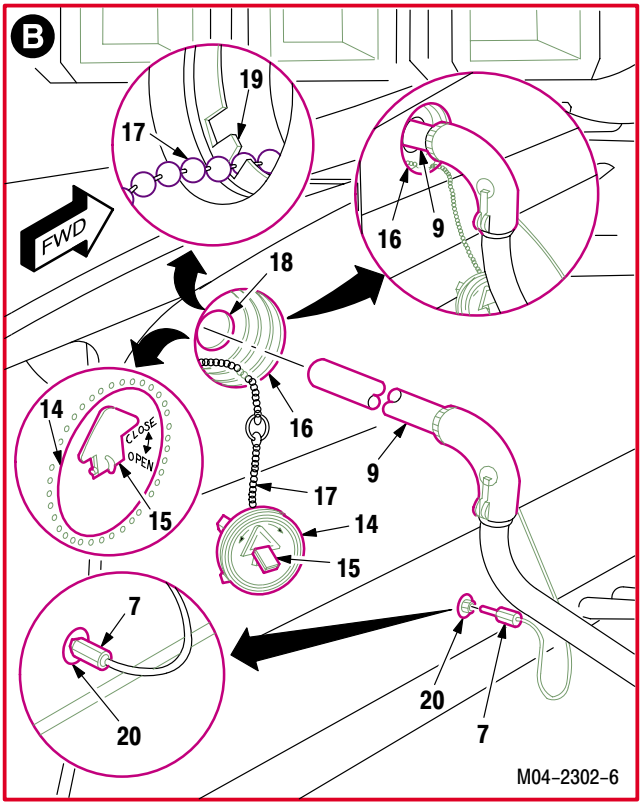
(2) Remove defueling nozzle ground (7) from grounding receptacle (20).

l. **Install aft fuel tank filler cap (14).**

(1) Release filler cap chain (17) from locking detent (19).

(2) Install filler cap (14) into filler port (16).

(3) Turn locking tab (15) to **CLOSED**. Press tab (15).



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1.21. DEFUELING – GRAVITY METHOD – continued

m. **Drain aft sump.**

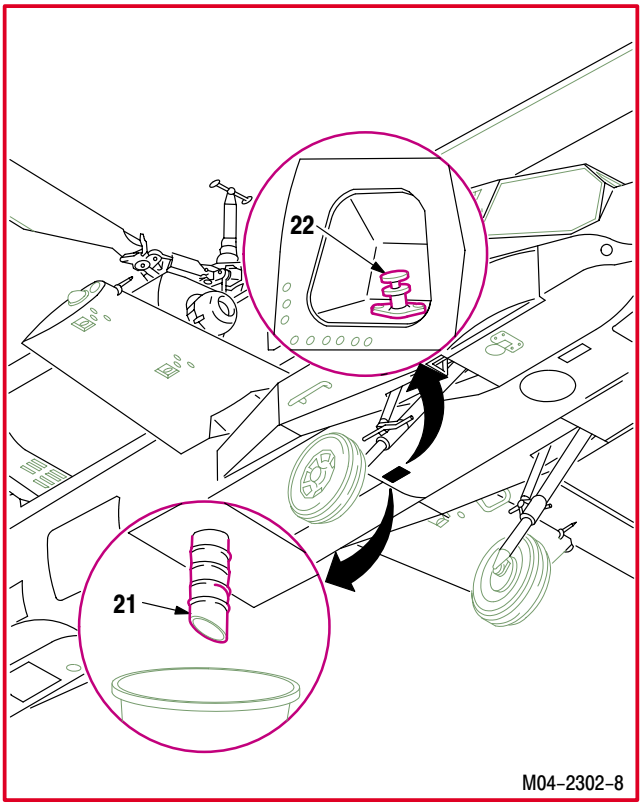
(1) Place pail under fuel sump drain hose (21).

(2) Ground pail to airframe.

(3) Press and hold **PUSH-TO-DRAIN** button (22).

(4) Dispose of drained fuel.

n. **Remove static ground lines** (FM 10-68)**.**



END OF TASK

1.22. FUEL SYSTEM VENTING

1.22.1. Description

This task covers: Venting.

1.22.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)
Aircraft power unit (item 232, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.70	External power – electrical applied
1.71	External power – air applied

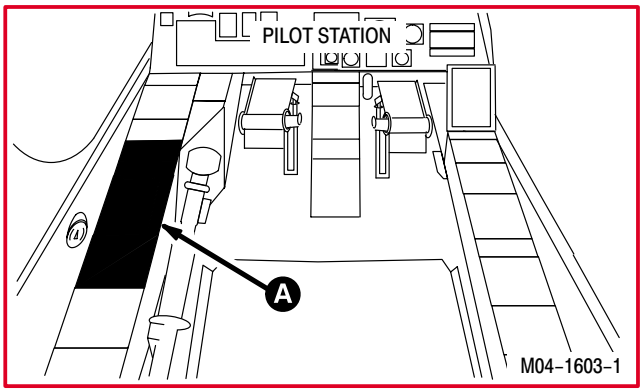
1.22.3. Venting

WARNING

- **Fuel venting shall not be performed during thunderstorms or possible lightning conditions.**
- **Defueling is a very hazardous operation because of fuel vapors. Trained fire fighting personnel and equipment must stand by during the entire task.**

NOTE

This task is typical for No. 1 and No. 2 engine fuel line venting.



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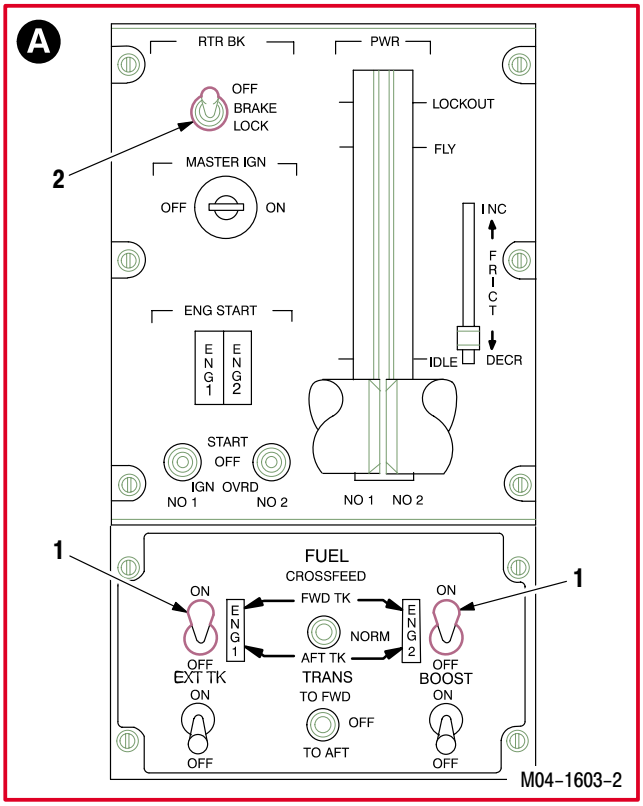
1.22. FUEL SYSTEM VENTING – continued

a. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

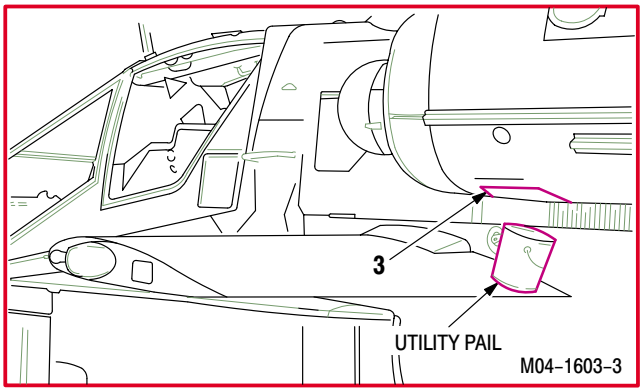
b. **Set two FUEL switches (1) to ON.**

c. **Set RTR BK switch (2) to OFF.**



d. **Place pail under No. 1 engine nacelle drain manifold (3).**

(1) Ground pail to airframe.



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1.22. FUEL SYSTEM VENTING – continued

e. **Place NO. 1 PWR lever (4) in FLY.**

(1) Raise stop release lever (5).

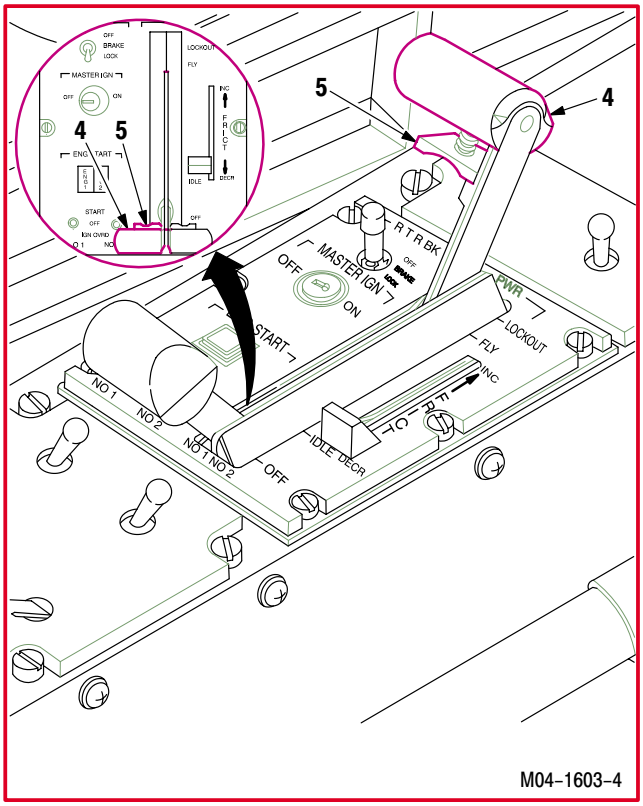
(2) Move lever (4) to **LOCKOUT**.

f. **When fuel stops draining, move NO. 1 PWR lever (4) to OFF.**

(1) Move lever (4) to idle.

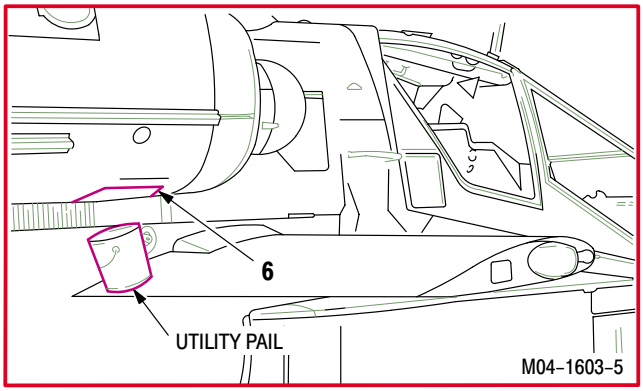
(2) Raise stop release lever (5).

(3) Move lever (4) to **OFF**.



g. **Place pail under No. 2 engine nacelle drain manifold (6).**

(1) Ground pail to airframe.



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1.22. FUEL SYSTEM VENTING – continued

h. **Place NO. 2 PWR lever (7) in FLY.**

(1) Raise stop release lever (8).

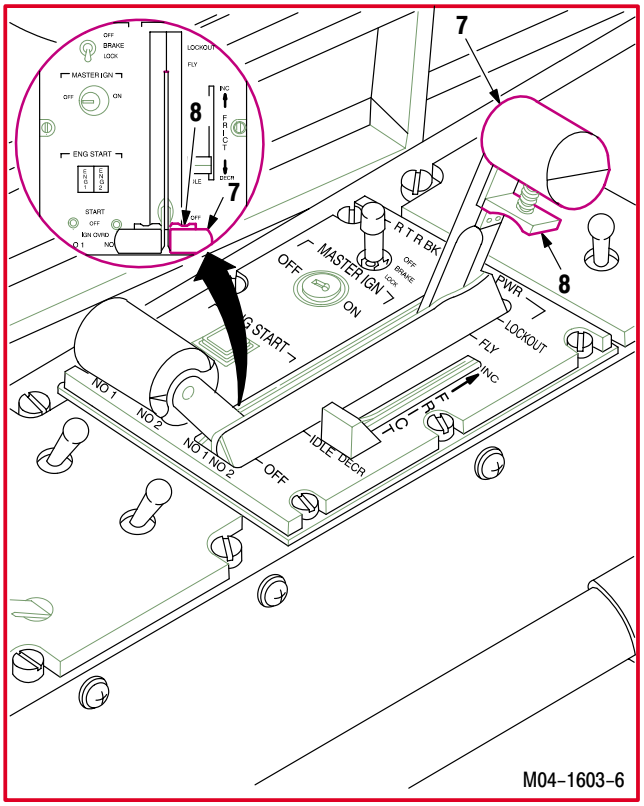
(2) Move lever (7) to **LOCKOUT**.

i. **When fuel stops draining, move NO. 2 PWR lever (7) to OFF.**

(1) Move lever (7) to idle.

(2) Raise stop release lever (8).

(3) Move lever (7) to **OFF**.

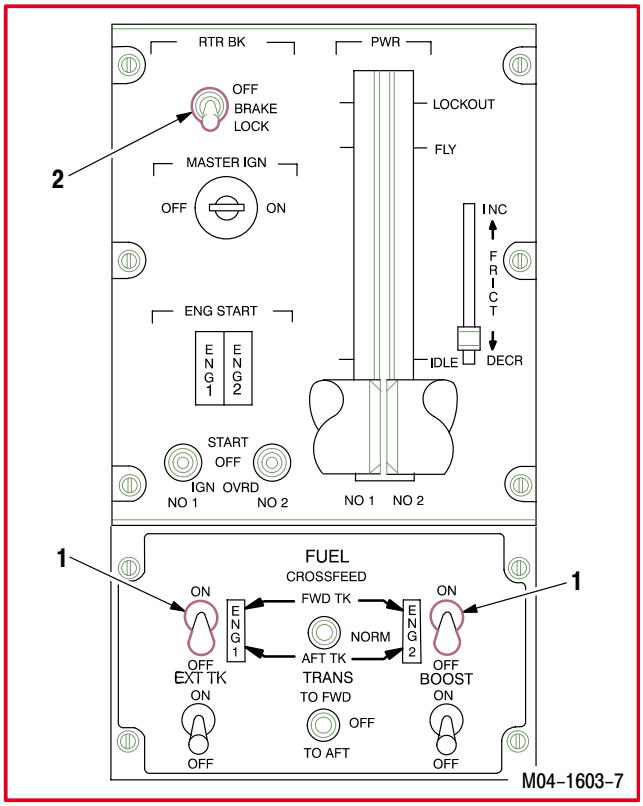


j. **Set RTR BK switch (2) to LOCK.**

k. **Set two FUEL switches (1) to OFF.**

l. **Remove external power – air** (para 1.71)**.**

m. **Remove external power – electrical** (para 1.70)**.**



END OF TASK

1.23. FUEL SYSTEM PRIMING

1.23.1. Description

This task covers: Priming.

1.23.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

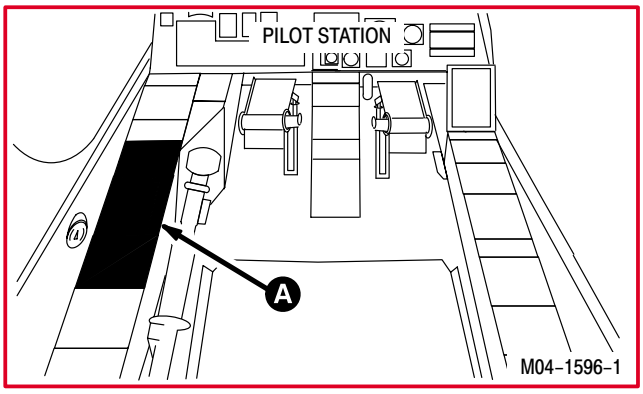
1.23.3. Priming

WARNING

- **Fuel system priming shall not be performed during thunderstorms or possible lightning conditions.**
- **Defueling is a very hazardous operation because of fuel vapors. Trained fire fighting personnel and equipment must stand by during the entire task.**

a. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

b. **Start APU** (para 1.75)**. Observe all safety precautions.**



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1.23. FUEL SYSTEM PRIMING – continued

c. **Set GEN 1 and GEN 2 switches (1) to GEN 1 and GEN 2.**

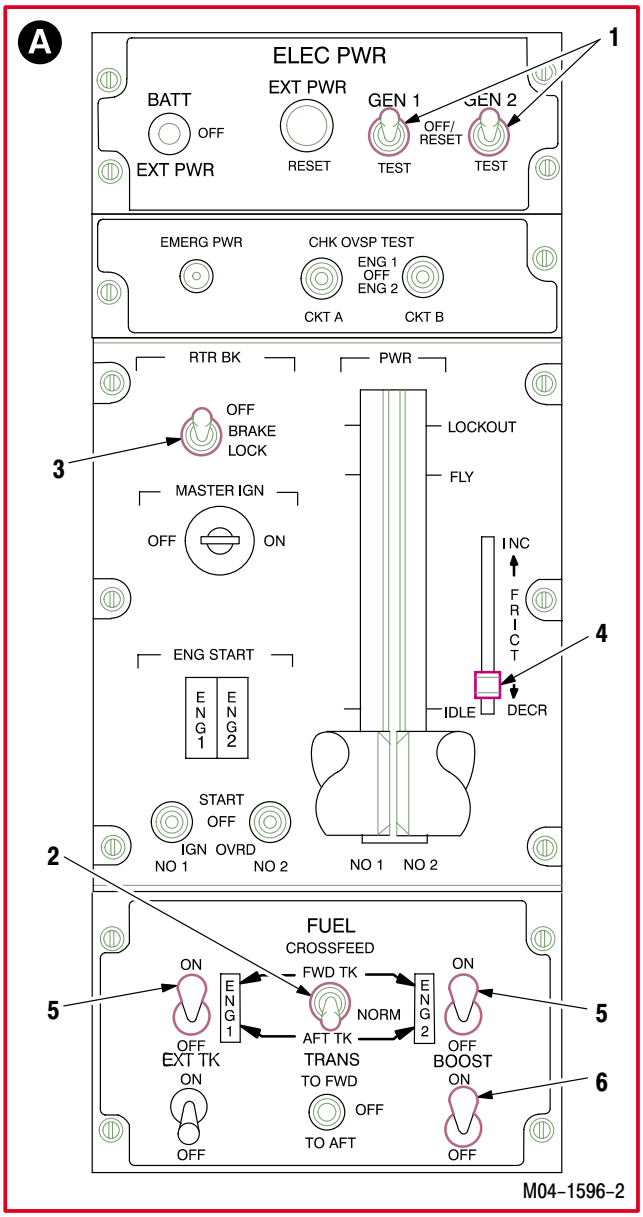
d. **Set CROSSFEED switch (2) to AFT TK.**

e. **Set RTR BK switch (3) to OFF.**

f. **Set PWR FRICT lever (4) to DECR.**

g. **Set two FUEL switches (5) to ON.**

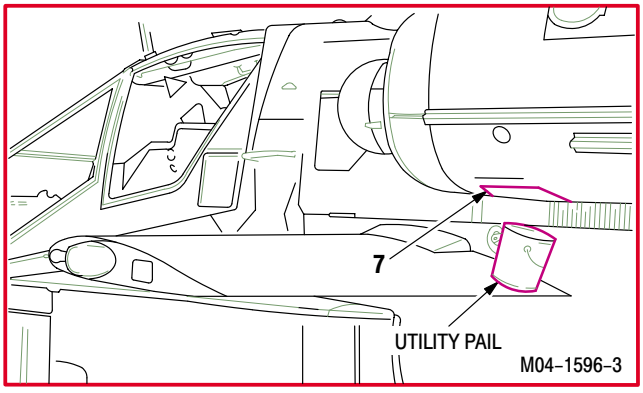
h. **Set BOOST switch (6) to ON.**



i. **Check helicopter for fuel leaks.**

j. **Place utility pail under No. 1 engine nacelle drain manifold (7).**

(1) Ground pail to airframe.



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1.23. FUEL SYSTEM PRIMING – continued

k. **Place No. 1 PWR lever (8) in FLY.**

(1) Raise stop release lever (9).

(2) Move lever (8) to **LOCKOUT**.

l. **Observe fuel draining from manifold.**

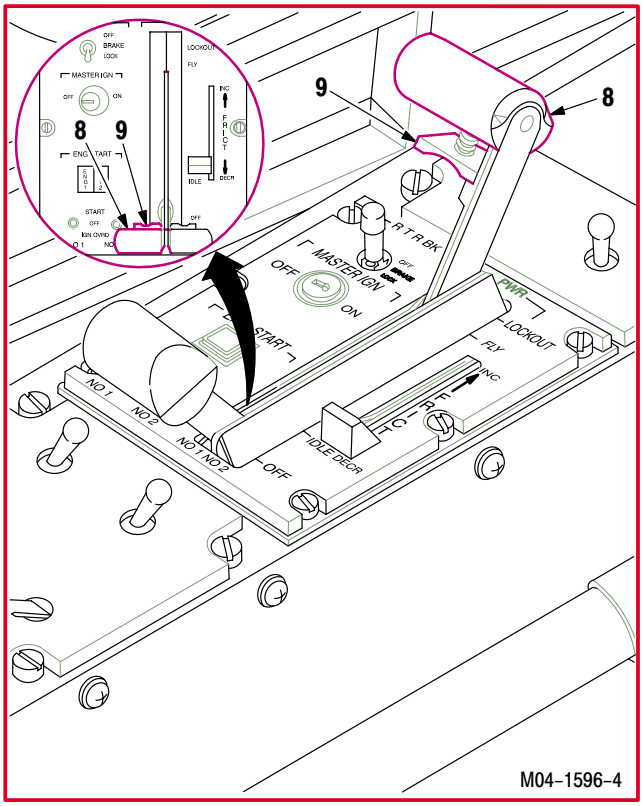
(1) Ensure fuel flow is steady.

m. **Move No. 1 PWR lever (8) to OFF.**

(1) Move lever (8) to **IDLE**.

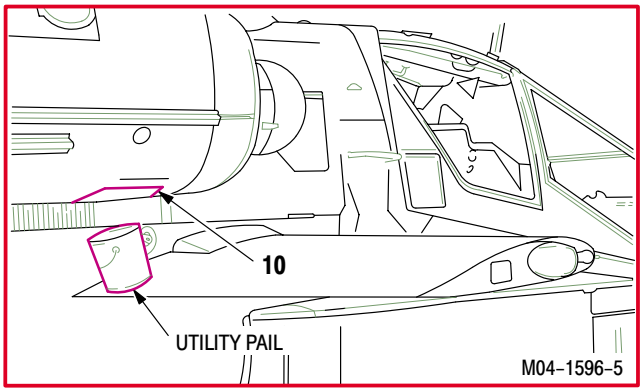
(2) Raise stop release lever (9).

(3) Move lever (8) to **OFF**.



n. **Place utility pail under No. 2 engine nacelle drain manifold (10).**

(1) Ground pail to airframe.



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1.23. FUEL SYSTEM PRIMING – continued

o. **Place No. 2 PWR lever (11) in FLY.**

(1) Raise stop release lever (12).

(2) Move lever (11) to **LOCKOUT**.

p. **Observe fuel draining from manifold.**

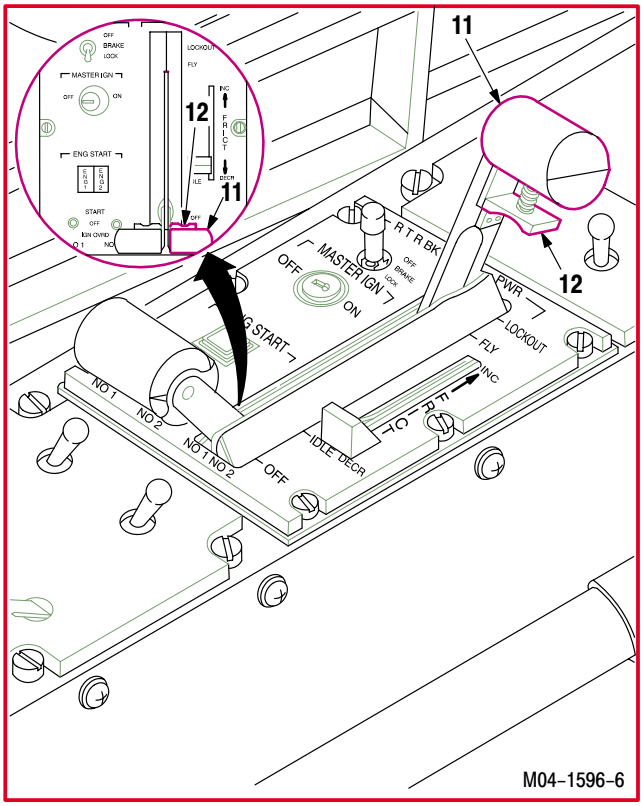
(1) Ensure fuel flow is steady.

q. **Move No. 2 PWR lever (11) to OFF.**

(1) Move lever (11) to **IDLE**.

(2) Raise stop release lever (12).

(3) Move lever (11) to **OFF**.



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1.23. FUEL SYSTEM PRIMING – continued

r. **Set RTR BK switch (3) to LOCK.**

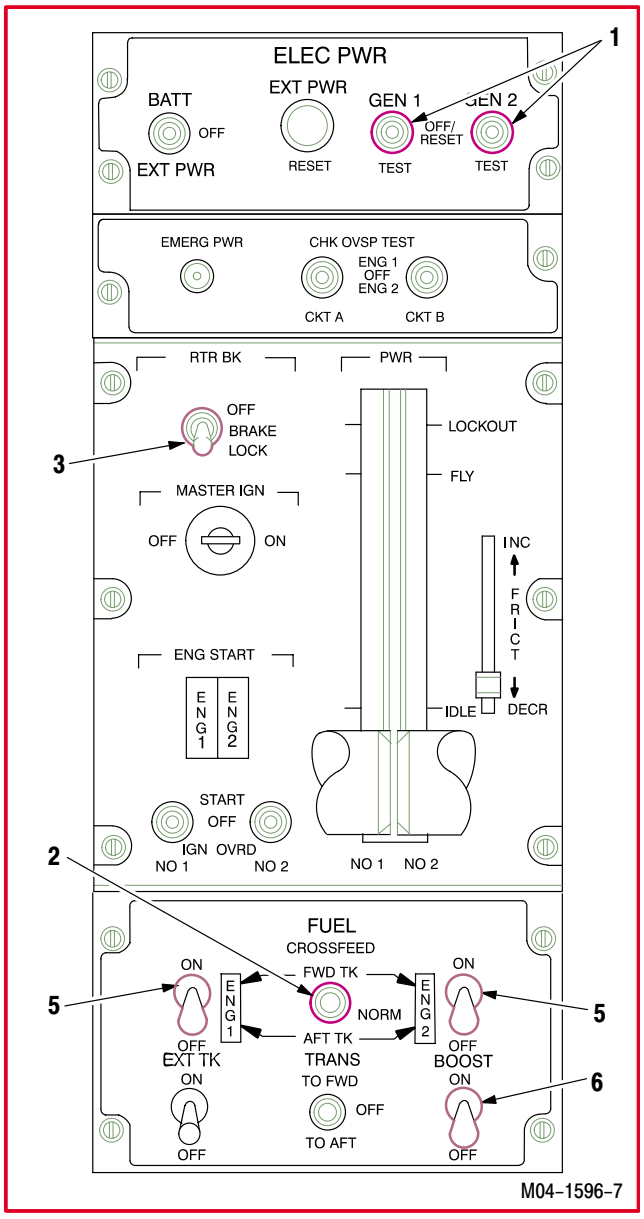
s. **Set two FUEL switches (5) to OFF.**

t. **Set CROSSFEED switch (2) to NORM.**

u. **Set BOOST switch (6) to OFF.**

v. **Set GEN 1 and GEN 2 switches (1) to OFF/RESET.**

w. **Shut down APU** (para 1.75)**.**



END OF TASK

1.24. ENGINE OIL SYSTEM DRAINING AND SERVICING

1.24.1. Description

This task covers: Draining. Servicing.

1.24.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
1-quart funnel (item 140, App H)
Chemical protective gloves (item 154, App H)
Lube drain kit (item 192, App H)
14-quart utility pail (item 222, App H)

Materials/Parts:

Packing
Lubricating oil (item 118, App F) or
Lubricating oil (item 119, App F)

Personnel Required:

67R Attack Helicopter Repairer

References:

TM 55-2840-248-23
TB 55-9150-200-24

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors LN1 and/or RN1 opened; doors LN2 and/or RN2 removed

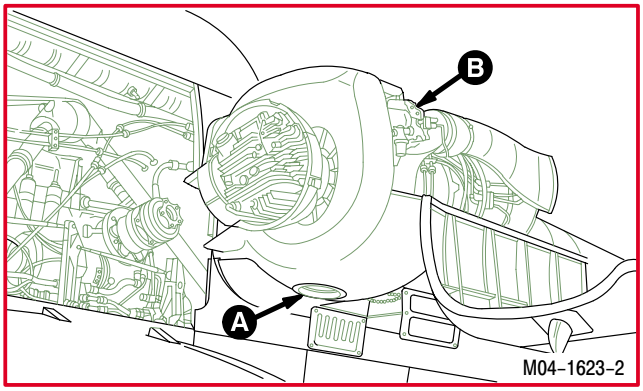
1.24.3. Draining

CAUTION

- Allow engine to cool at least 30 minutes before servicing oil system. This will allow oil to drain into engine reservoir and prevent possible overservicing of engine.
- Do not mix lubricating oil (item 118, App F) with lubricating oil (item 119, App F) except in an emergency. The system must be drained and refilled with the proper oil as soon as possible if it becomes necessary to mix oils.

NOTE

Refer to TB 55-9150-200-24 for conversion of oils MIL-L-23699 and MIL-L-7808. Failure to perform the required checks and services can result in contamination of the affected oil system.



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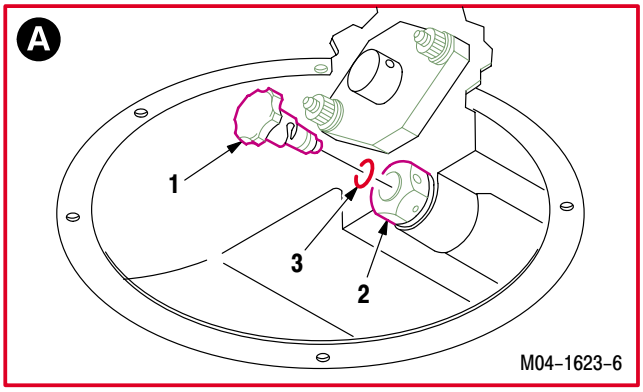
1.24. ENGINE OIL SYSTEM DRAINING AND SERVICING – continued

a. **Remove chip collector probe (1) from chip collector (2).**

(1) Place rags under collector (2) to catch spills.

(2) Push and turn probe (1) 1/2-turn counter-clockwise to remove.

(3) Remove and discard packing (3).



b. **Drain oil from engine.**

(1) Place end of drain hose in pail.

(2) Push drain hose adapter (4) into collector (2) and turn 1/2-turn clockwise to lock.

(3) Drain all oil from engine.

(4) Push and turn adapter (4) 1/2-turn counter-clockwise to remove.

NOTE

Probe is properly installed when knurl tips and hex points aline.

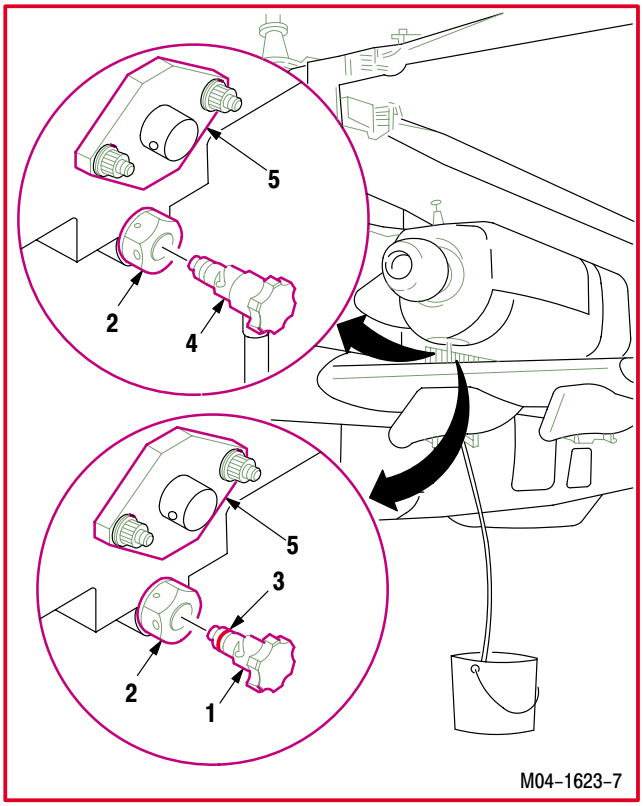
c. **Install new packing (3) on probe (1).**

(1) Lubricate new packing (3). Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

d. **Install probe (1) in collector (2).**

(1) Turn 1/2-turn clockwise to lock.

e. **Remove, clean, inspect, and install engine main frame oil strainer (5)** (TM 55-2840-248-23)**.**



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1.24. ENGINE OIL SYSTEM DRAINING AND SERVICING – continued

1.24.4. Servicing

a. **Service engine with seven quarts of oil.** Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

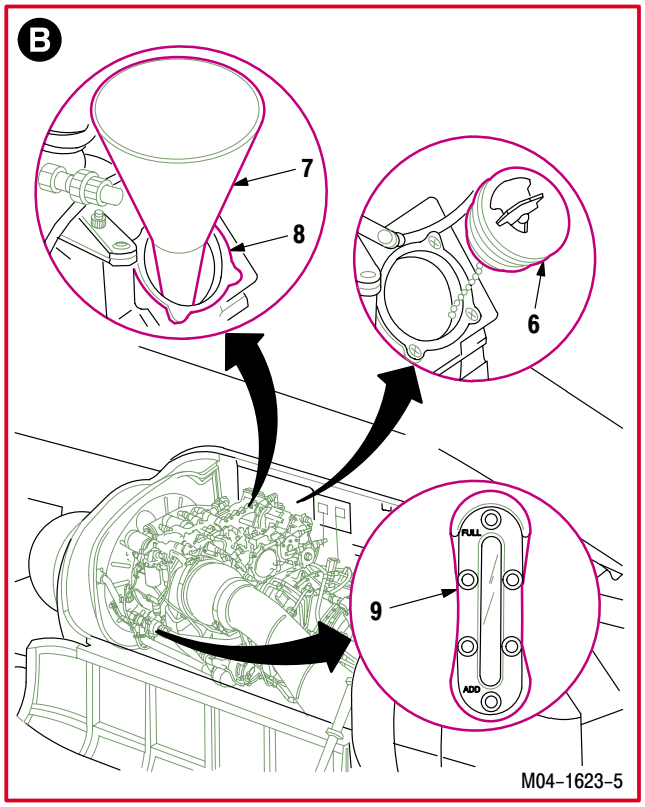
(1) Remove oil filler cap (6).

(2) Insert funnel (7) into oil fill port (8).

(3) Pour seven quarts of oil through funnel (7).

(4) Verify quantity of oil in engine. Use oil level sight window (9).

b. **Secure access doors LN1 and/or RN1; install doors LN2 and/or RN2** (para 2.2)**.**



END OF TASK

1.25. AIR TURBINE STARTER ASSEMBLY SERVICING

1.25.1. Description

This task covers: Servicing.

1.25.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
1-quart funnel (item 140, App H)
Chemical protective gloves (item 154, App H)
0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Materials/Parts:

Packing
Lubricating oil (item 118, App F) or
Lubricating oil (item 119, App F)
Wire (item 226, App F)

Personnel Required:

67R Attack Helicopter Repairer

References:

TB 55-9150-200-24

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors LN1 and/or RN1 opened

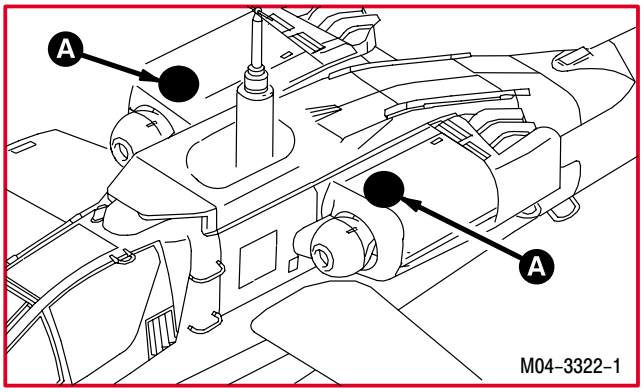
1.25.3. Servicing

CAUTION

Do not mix lubricating oil (item 118, App F) with lubricating oil (item 119, App F) except in an emergency. The system must be drained and refilled with the proper oil as soon as possible if it becomes necessary to mix oils.

NOTE

- This task is typical for left and/or right air turbine starters.
- Refer to TB 55-9150-200-24 for conversion of oils MIL-L-23699 and MIL-L-7808. Failure to perform the required checks and services can result in contamination of the affected oil system.



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1.25. AIR TURBINE STARTER ASSEMBLY SERVICING – continued

a. **Remove turbine starter drain plug (1).**

(1) Remove lockwire from drain plug (1).

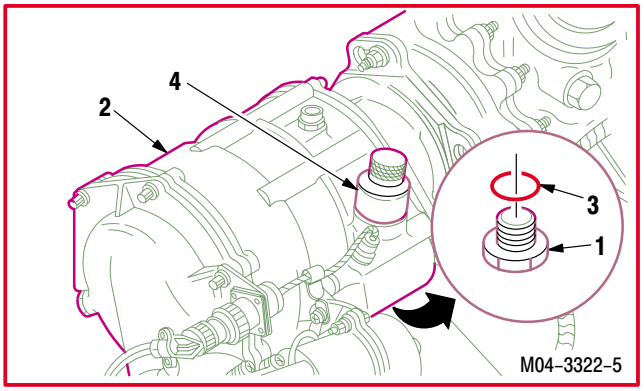
(2) Place rags under starter (2) to catch spilled oil.

(3) Remove drain plug (1) from starter (2).

(4) Remove and discard packing (3).

(5) Vent system. Loosen oil filler cap (4).

(6) Allow starter (2) to drain.



b. **Install drain plug (1) on starter (2).** Torque drain plug (1) to **25 INCH-POUNDS**.

(1) Lubricate new packing (3). Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

(2) Install new packing (3) on drain plug (1).

(3) Install drain plug (1) in starter (2).

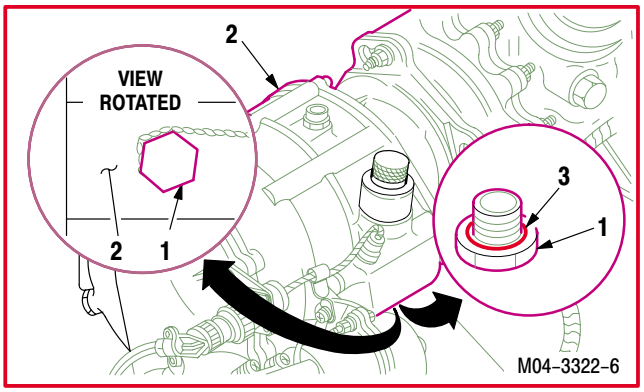
(4) Torque drain plug (1) to **25 INCH-POUNDS**.

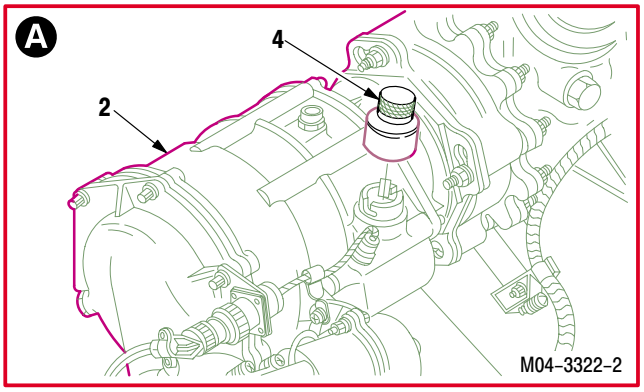
(5) Lockwire drain plug (1) to starter (2). Use wire (item 226, App F).

(6) Service starter (2) with lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

(7) Remove oil filler cap (4) from starter (2).

(8) Push and turn oil filler cap (4) counterclockwise to remove.





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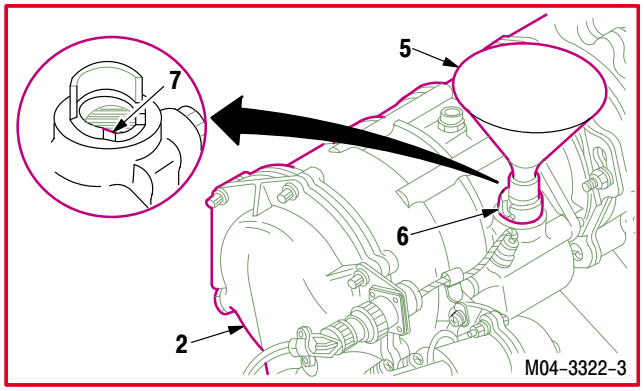
1.25. AIR TURBINE STARTER ASSEMBLY SERVICING – continued

c. **Install funnel (5) into the oil fill port (6).**

(1) Pour oil through funnel (5) until oil level reaches bottom of lower notch (7) of oil fill port (6).

(2) Remove funnel (5) from the oil fill port (6).

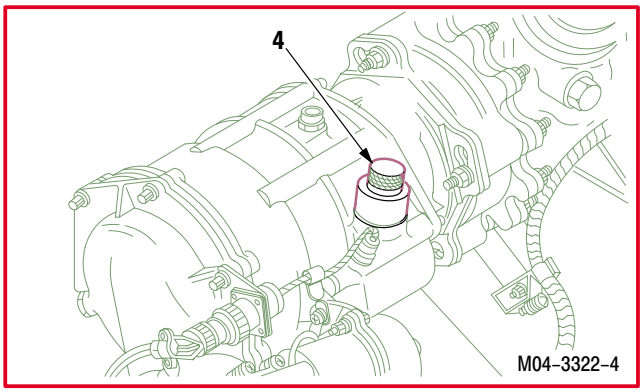


(3) Install oil filler cap (4).

(4) Push and turn cap (4) clockwise until locking lugs are engaged.

(5) Wipe any oil spillage with a clean rag.

d. **Secure access doors LN1 and/or RN1** (para 2.2)**.**



END OF TASK

1.26. APU OIL SYSTEM DRAINING AND SERVICING

1.26.1. Description

This task covers: Draining. Servicing.

1.26.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
1-quart funnel (item 140, App H)
Chemical protective gloves (item 154, App H)
Lube drain kit (item 192, App H)
14-quart utility pail (item 222, App H)

Materials/Parts:

Packing
Lubricating oil (item 118, App F) or
Lubricating oil (item 119, App F)

Personnel Required:

67R Attack Helicopter Repairer

References:

TB 55-9150-200-24

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors RN5, T250L, T250R, T290L, T290R, and L325 opened

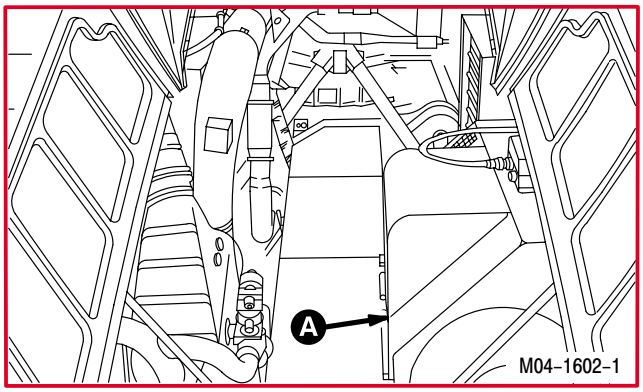
1.26.3. Draining

CAUTION

Do not mix lubricating oil (item 118, App F) with lubricating oil (item 119, App F) except in an emergency. The system must be drained and refilled with the proper oil as soon as possible if it becomes necessary to mix oils.

NOTE

Refer to TB 55-9150-200-24 for conversion of oils MIL-L-23699 and MIL-L-7808. Failure to perform the required checks and services can result in contamination of the affected oil system.



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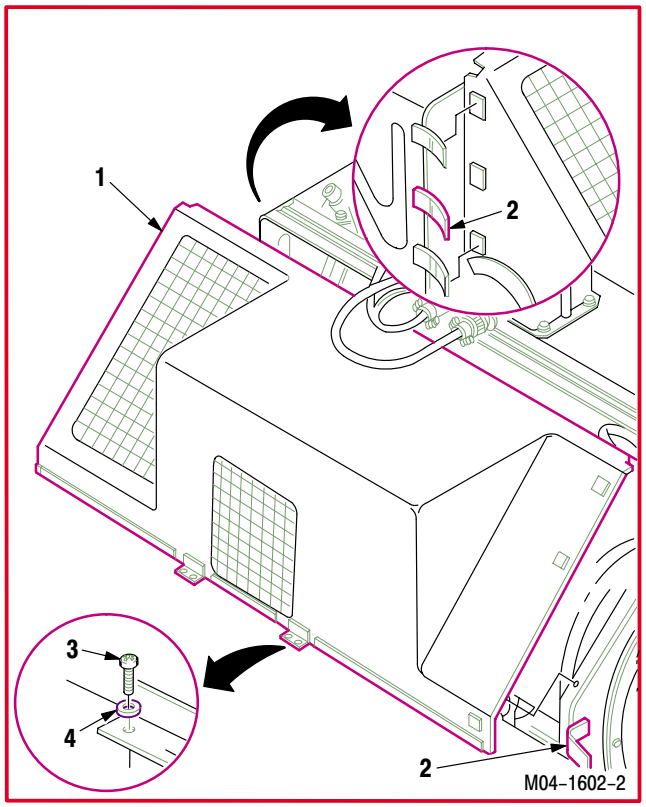
1.26. APU OIL SYSTEM DRAINING AND SERVICING – continued

a. **Remove panel (1).**

(1) Separate hook and pile fasteners (2).

(2) Remove four screws (3) and washers (4).

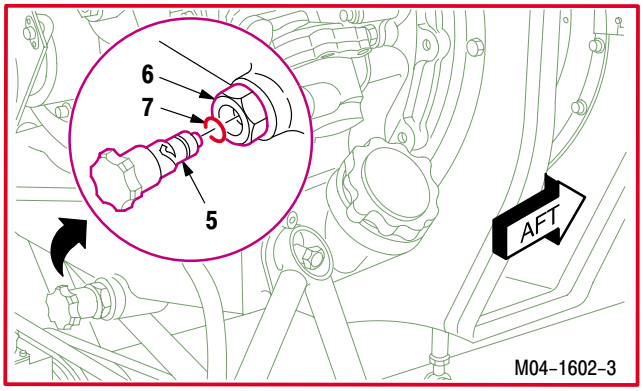


b. **Remove chip collector (5) from magnetic drain plug (6).**

(1) Place rags under plug (6) to catch spills.

(2) Push and turn collector (5) counterclockwise to remove.

(3) Remove and discard packing (7).



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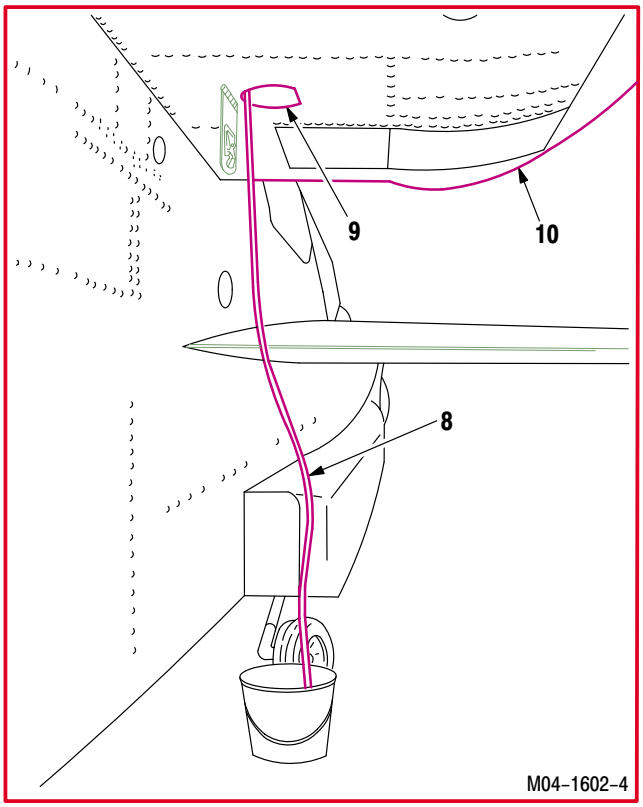
1.26. APU OIL SYSTEM DRAINING AND SERVICING – continued

c. **Connect drain hose (8) to plug (6).**

(1) Route hose (8) through sight gage access (9) at bottom of right nacelle (10).

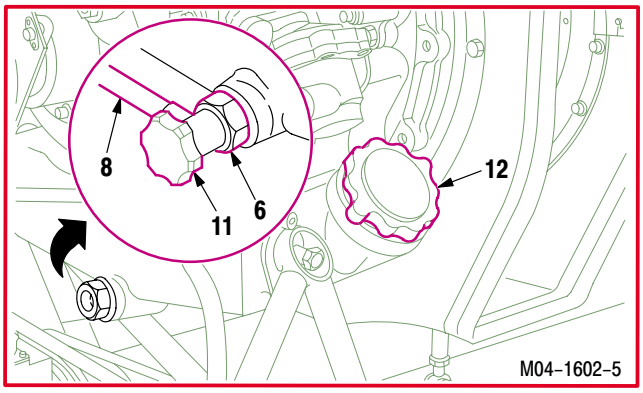
(2) Place end of hose (8) in pail.



(3) Connect hose (8) adapter probe (11) to plug (6). Turn clockwise to lock.

(4) Vent system. Loosen filler cap (12).

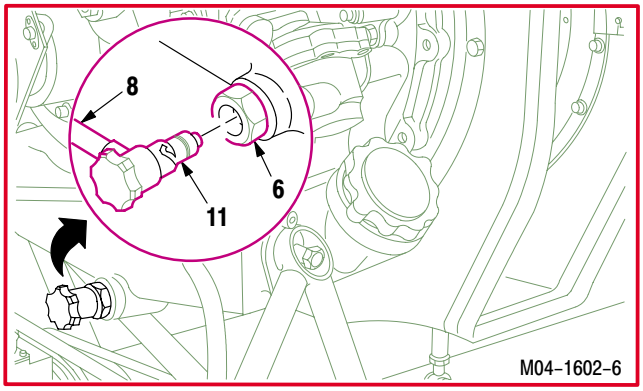
(5) Allow APU oil to drain.



d. **Disconnect drain hose (8) from plug (6).**

(1) Push and turn adapter probe (11) counter-clockwise to unlock.

(2) Remove hose (8).



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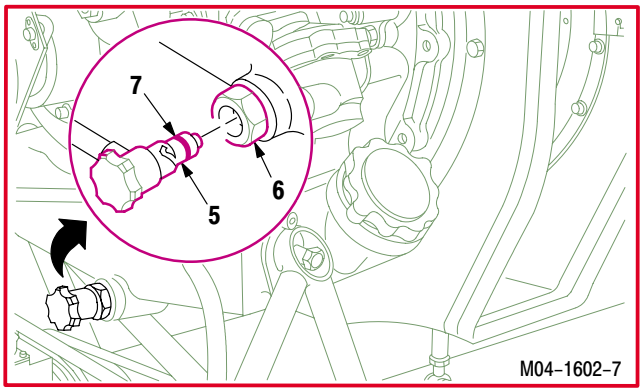
1.26. APU OIL SYSTEM DRAINING AND SERVICING – continued

e. **Install new packing (7) on collector (5).**

(1) Lubricate new packing (7). Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

(2) Install new packing (7) on collector (5).



f. **Install collector (5) in plug (6).**

(1) Turn 1/2-turn clockwise to lock.

NOTE

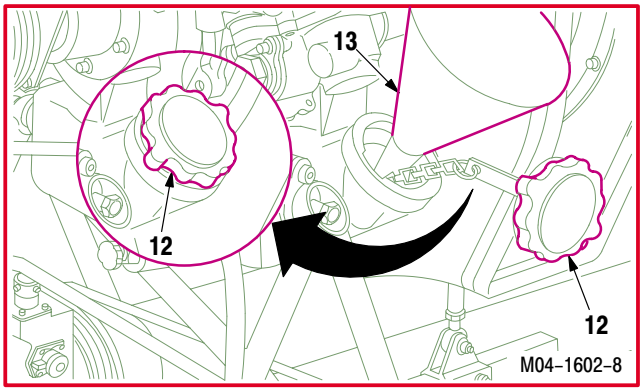
Chip collector is properly installed in magnetic drain plug when knurled tips aline with hex points.

1.26.4. Servicing

a. **Service APU with oil.**

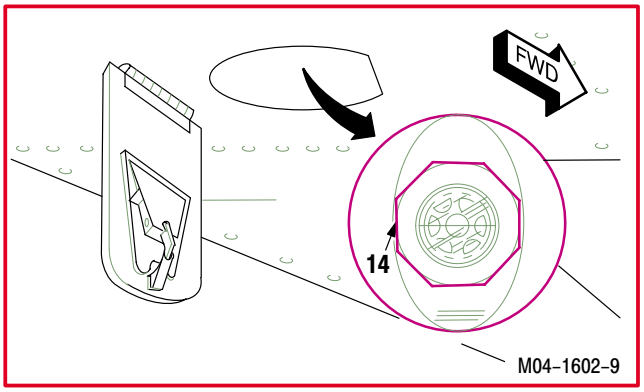
(1) Remove filler cap (12).

(2) Add two quarts lubricating oil (item 118, App F) or lubricating oil (item 119, App F). Use funnel (13).



(3) Verify correct oil level. Indicator ball at gage (14) midpoint.

(4) Install filler cap (12).



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1.26. APU OIL SYSTEM DRAINING AND SERVICING – continued

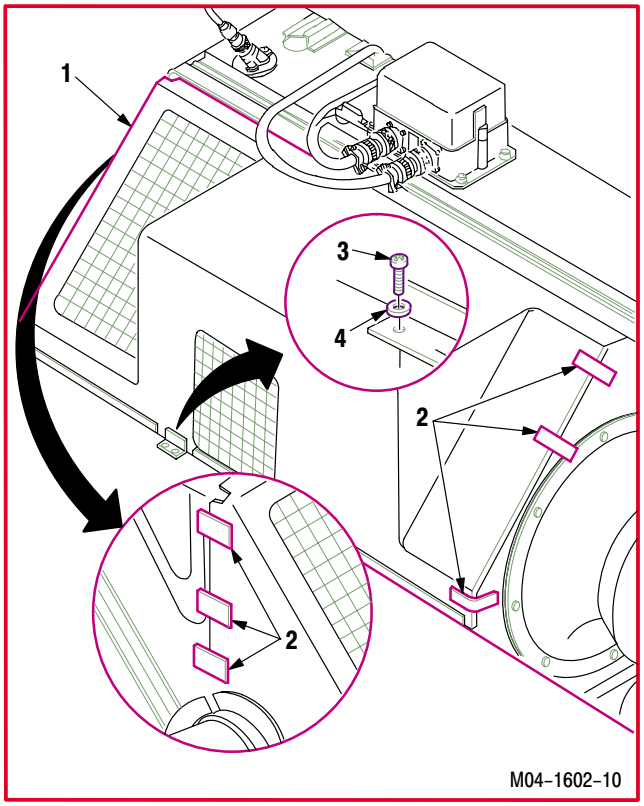
b. **Secure panel (1).**

(1) Position panel (1) over APU.

(2) Join hook and pile fasteners (2).

(3) Install four screws (3) through four washers (4) into panel (1).

c. **Secure access doors RN5, T250L, T250R, T290L, T290R, and L325** (para 2.2)**.**



END OF TASK

1.27. APU OIL SYSTEM SAMPLING

1.27.1. Description

This task covers: Sampling.

1.27.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Chemical protective gloves (item 154, App H)

Personnel Required:

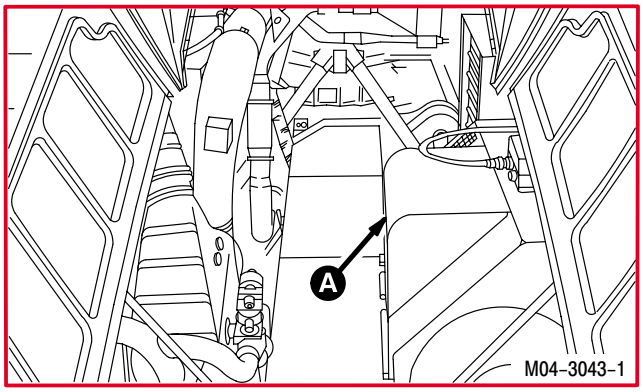
67R Attack Helicopter Repairer

References:

TB 43-0106

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors T250L, T250R, T290L, T290R, and L325 opened



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1.27. APU OIL SYSTEM SAMPLING – continued

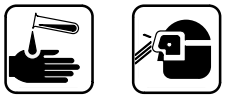
1.27.3. Sampling

a. **Remove panel (1).**

(1) Separate hook and pile fasteners (2).

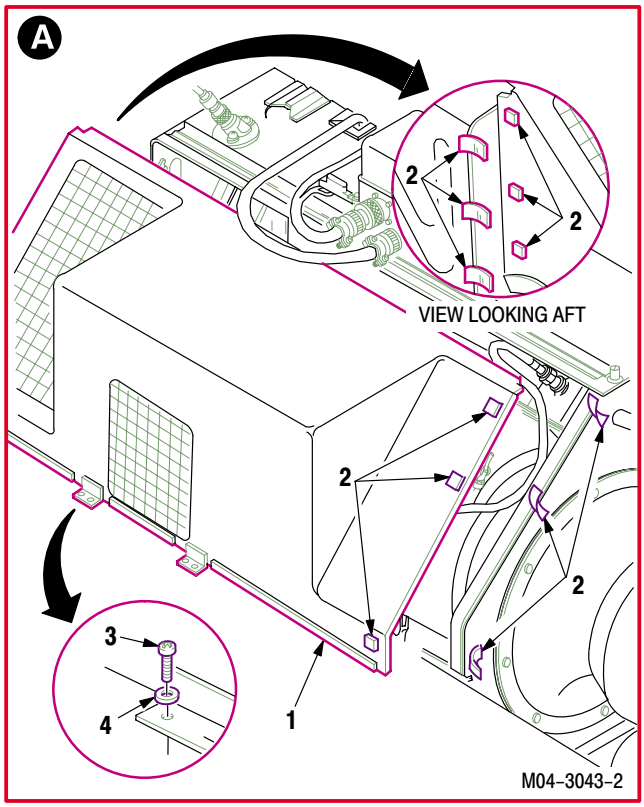
(2) Remove four screws (3) and washers (4).

(3) Remove panel (1).



b. **Obtain oil sample** (TB 43-0106)**.**

c. **Service APU with oil** (para 1.26)**.**



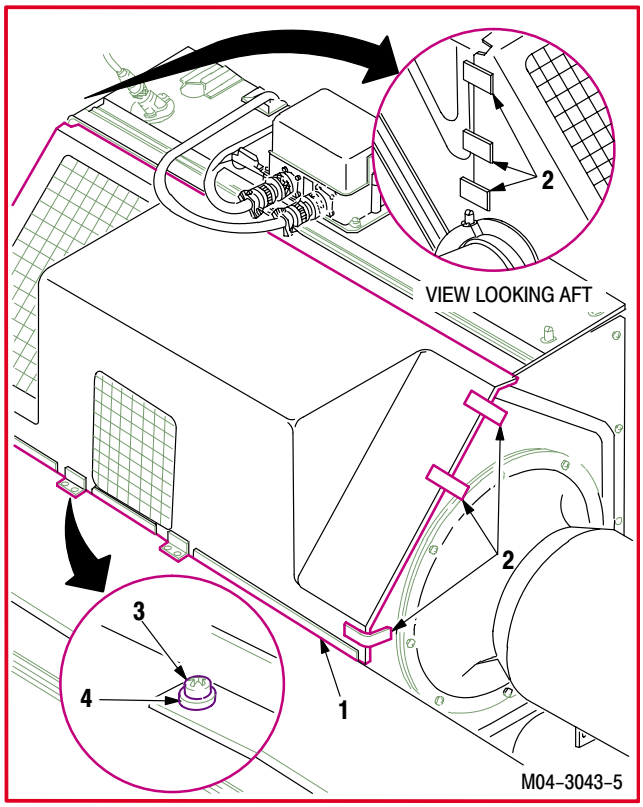
d. **Secure panel (1).**

(1) Position panel (1) over APU.

(2) Join hook and pile fasteners (2).

(3) Install four screws (3) through four washers (4) into panel (1).

e. **Secure access doors T250L, T250R, T290L, T290R, and L325** (para 2.2)**.**



END OF TASK

1.27A. APU FUEL SYSTEM PRIMING

1.27A.1. Description

This task covers: Priming.

1.27A.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)
Adjustable air filtering respirator (item 262, App H)
APU fuel bleeder hose (item D-464, App D)

Materials/Parts:

Petrolatum (item 138, App F)

Personnel Required:

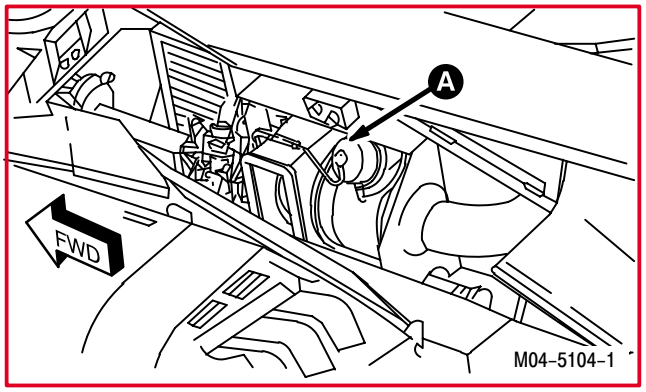
67R Attack Helicopter Repairer
One person to assist
67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
15.41	APU enclosure removed



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1.27A. APU FUEL SYSTEM PRIMING – continued

1.27A.3. Priming

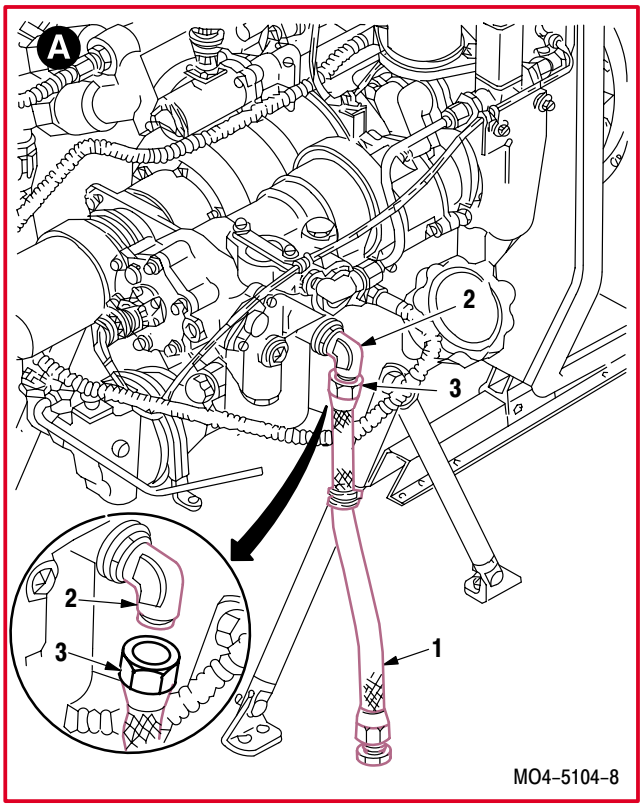
WARNING

- **Fuel system priming shall not be performed during thunderstorms or possible lightning conditions.**
- **APU is easy to start. Disconnect battery and remove all electrical power before performing any maintenance in this area. If APU was to start, death or serious injury could result. If injury occurs, seek medical aid.**

a. **Remove APU fuel supply hose (1) from APU elbow (2).**

(1) Hold elbow (2). Remove nut (3).

(2) Remove hose (1).



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1.27A. APU FUEL SYSTEM PRIMING – continued

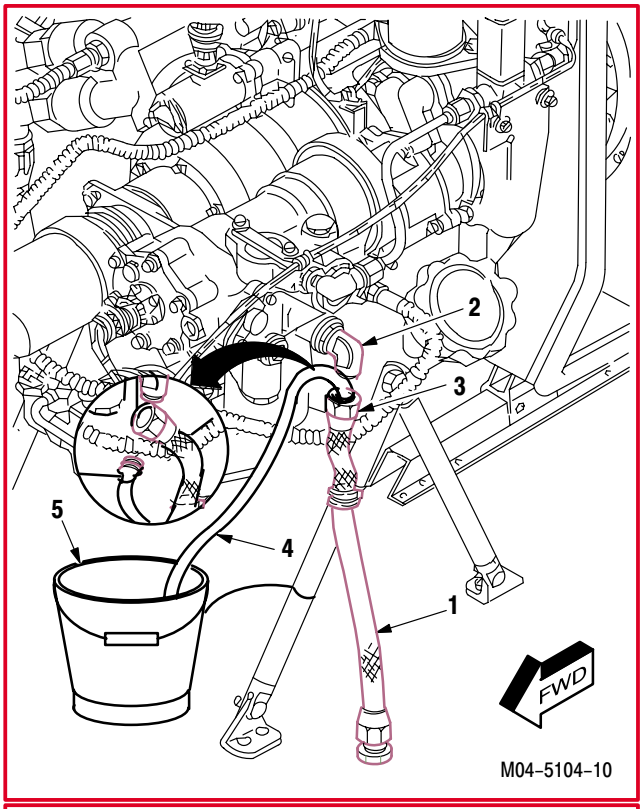
b. **Install fuel bleeder hose (4) on open end of fuel supply hose (1).** Use APU fuel bleeder hose (item D-464, App D).

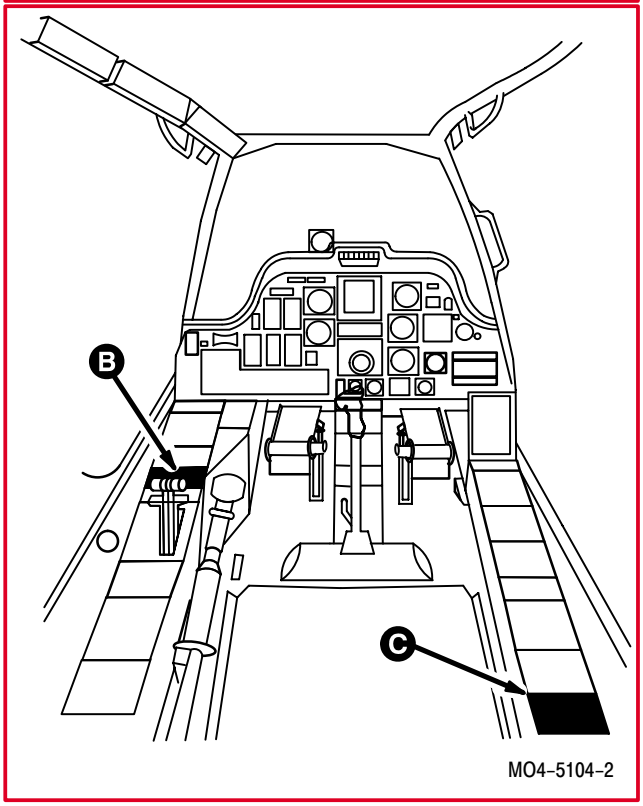
c. **Place open end of fuel bleeder hose (4) in utility pail (5).** Use pail.

(1) Ground pail (5) to airframe.

d. **Apply external electrical power** (para 1.70)**.**

e. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**





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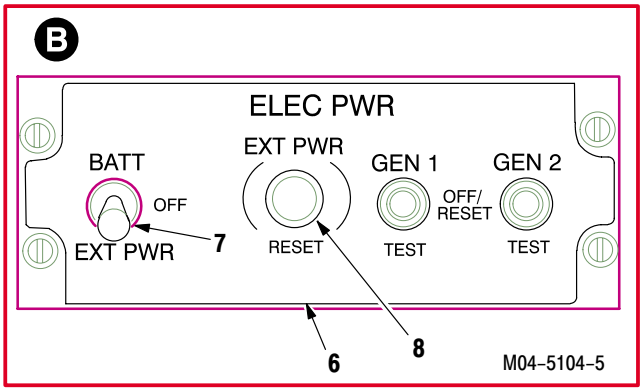
1.27A. APU FUEL SYSTEM PRIMING – continued

f. **On pilot ELEC PWR panel (6), select BATT/ EXT PWR switch (7) to EXT PWR.**

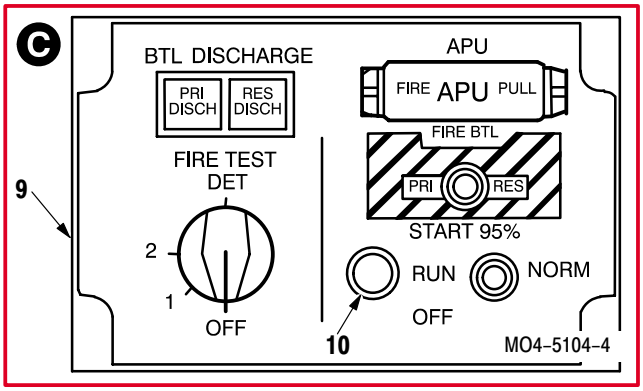
g. **On ELEC PWR panel (6), press EXT PWR RESET (8).**



h. **On pilot APU FIRE TEST panel (9), hold APU RUN/START switch (10) to RUN position for 30 seconds.**

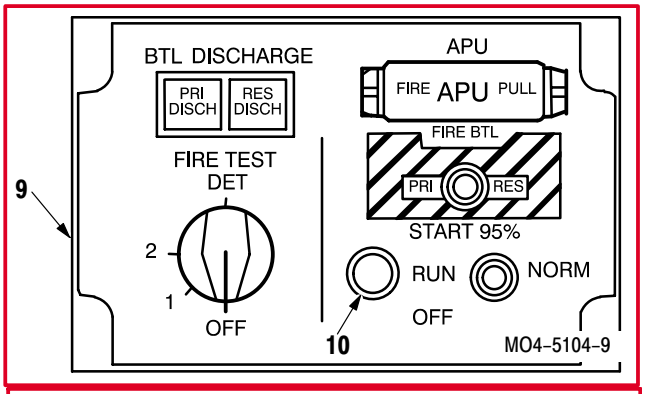
NOTE

No more than three 0.5 inch diameter bubbles allowed in APU bleeder hose during the thirty second **RUN** period.

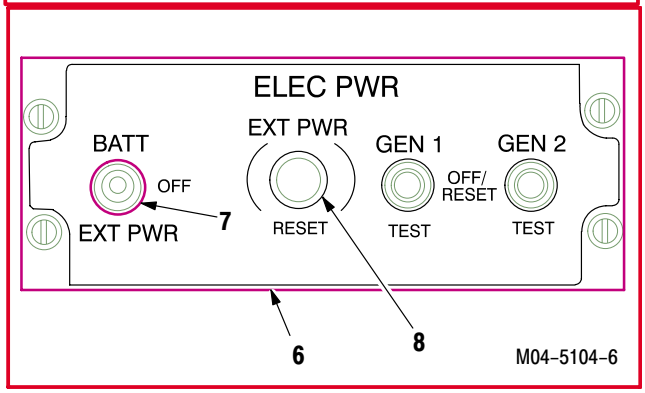


i. **Turn off power.**

(1) On pilot **APU FIRE TEST** panel (9), select pilot **APU RUN/START** switch (10) to **OFF**.



(2) On pilot **ELEC PWR** panel (6), select**BATT/ EXT PWR** switch (7) to **OFF**.



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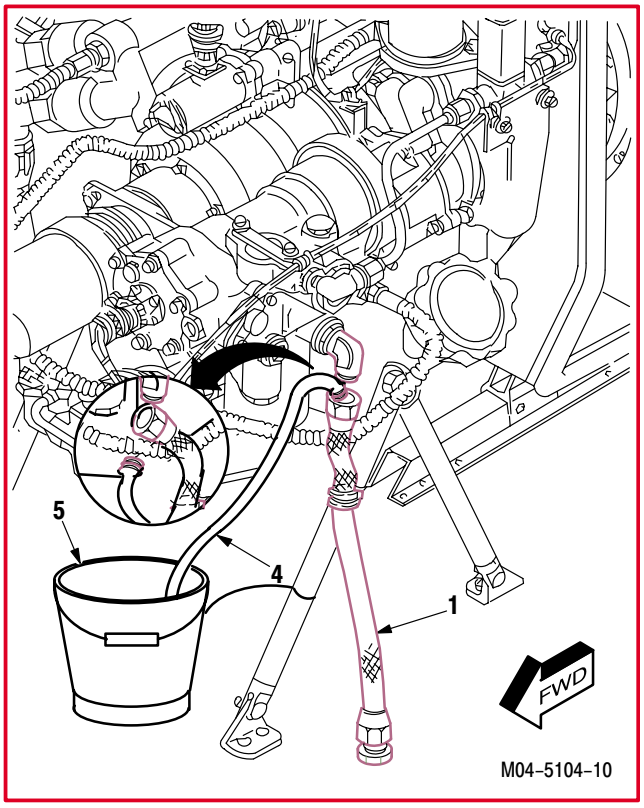
1.27A. APU FUEL SYSTEM PRIMING – continued

j. **Install APU fuel supply hose (1) on APU elbow (2).**

(1) Remove APU fuel bleeder hose (4) from fuel supply hose (1).

(2) Remove pail (5) from airframe ground.

(3) Remove pail (5) and APU fuel bleeder hose (4) from helicopter.



(4) Lubricate threads of elbow (2). Use petrolatum (item 138, App F).

(5) Install fuel supply hose (1) on elbow (2).

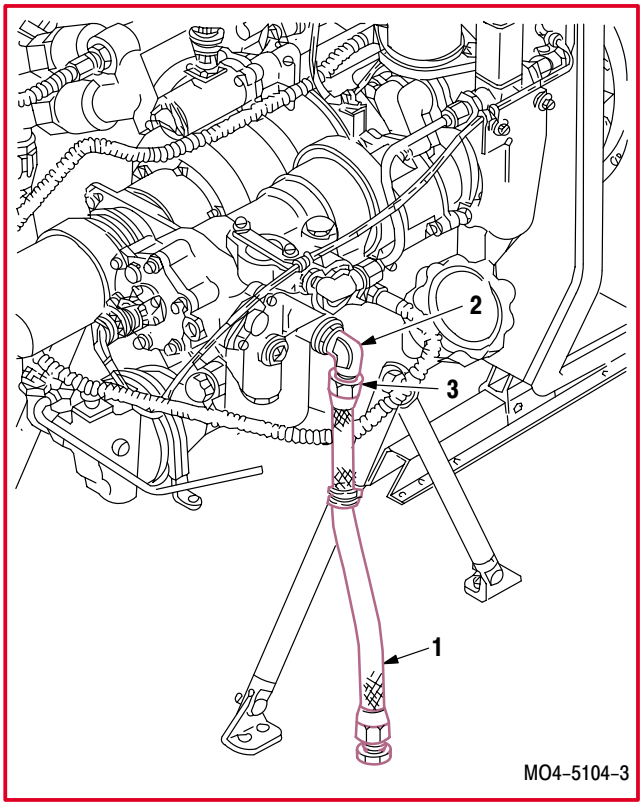
(6) Install nut (3).

k. **Inspect (QA).**

l. **Perform auxiliary power unit maintenance operational check** (TM 1-1520-238-T)**.**

m. **Remove external electrical power** (para 1.70)**.**

n. **Install APU enclosure** (para 15.41)**.**



END OF TASK

1.28. ENGINE NOSE GEARBOX SERVICING

1.28.1. Description

This task covers: Servicing.

1.28.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
1-quart funnel (item 140, App H)
Chemical protective gloves (item 154, App H)
Lube drain kit (item 192, App H)
14-quart utility pail (item 222, App H)

Materials/Parts:

Packing
Lubricating oil (item 118, App F) or
Lubricating oil (item 119, App F)

Personnel Required:

67R Attack Helicopter Repairer

References:

TB 55-9150-200-24

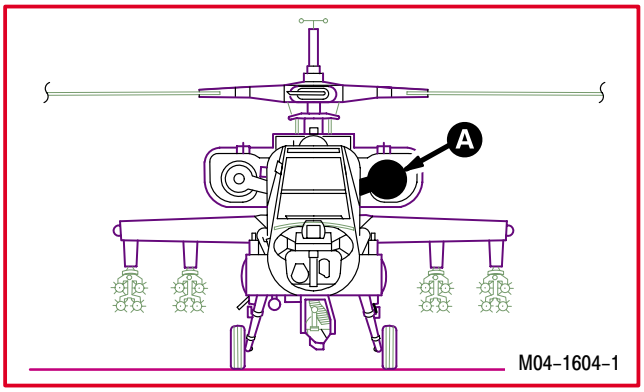
Equipment Conditions:

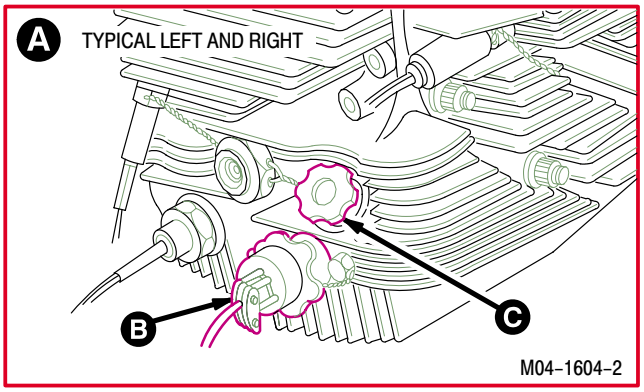
Ref	Condition
1.57	Helicopter safed
2.2	Engine nose gearbox fairing LN6 or RN6 removed

1.28.3. Servicing

NOTE

- The level in the sight indicator may appear high immediately after shutdown. Wait 15 minutes after shutdown for NGB oil level to stabilize.
- Add oil to NGB only if the level in the sight indicator is at or below the quarter level on the sight indicator (one quarter level is 0.18 inch above the bottom of sight indicator).
- Refer to TB 55-9150-200-24 for conversion of oils MIL-L-23699 and MIL-L-7808. Failure to perform the required checks and services can result in contamination of the affected oil system.
- This task is typical for left and/or right engine nose gearbox.





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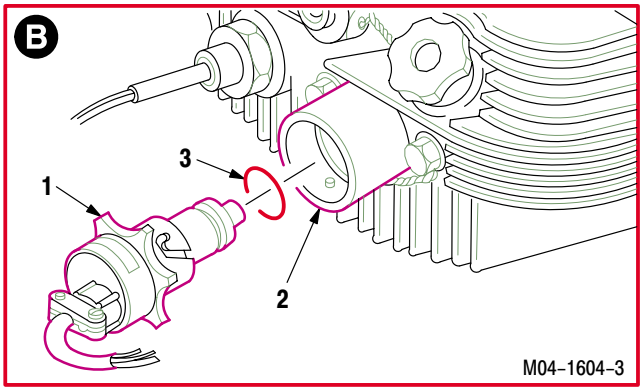
1.28. ENGINE NOSE GEARBOX SERVICING – continued

a. **Remove chip detector probe (1) from gearbox (2).**

(1) Place rags to catch spills.

(2) Push in on probe (1) and turn counterclockwise to remove.

(3) Remove and discard packing (3) from probe (1).



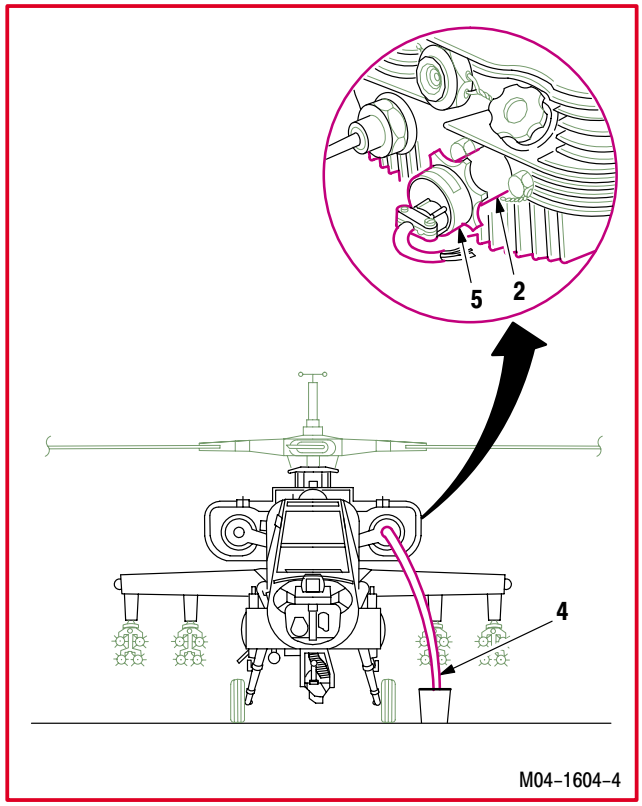
b. **Drain oil from gearbox (2).**

(1) Place end of drain hose (4) in pail.

(2) Push drain hose (4) adapter (5) into gearbox (2). Turn adapter (5) clockwise to lock.

(3) Drain all oil from gearbox (2).

(4) Push adapter (5) and turn counterclockwise to remove.



c. **Install probe (1) in gearbox (2).**

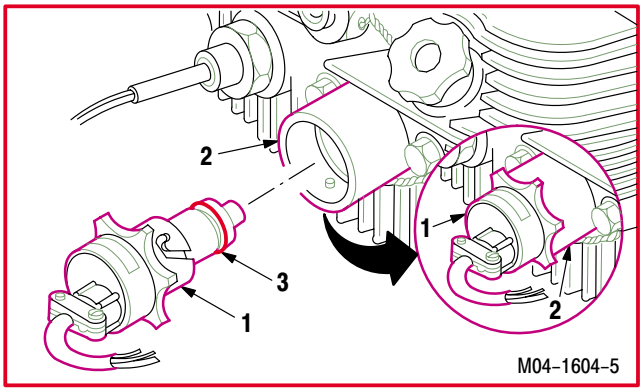
(1) Lubricate new packing (3). Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

(2) Install packing (3) on probe (1).

NOTE

Probe is properly installed when knurl tips aline with hex points.

(3) Insert probe (1) into gearbox (2). Turn probe (1) clockwise to lock.



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1.28. ENGINE NOSE GEARBOX SERVICING – continued

CAUTION

Do not mix lubricating oil (item 118, App F) with lubricating oil (item 119, App F) except in an emergency. The system must be drained and refilled with the proper oil as soon as possible if it becomes necessary to mix oils.

d. **Fill gearbox (2) with new oil.** Use lubricating oil (item 118, App F), or lubricating oil (item 119, App F).

(1) Push on filler cap (6). Turn cap (6) counterclockwise to remove.

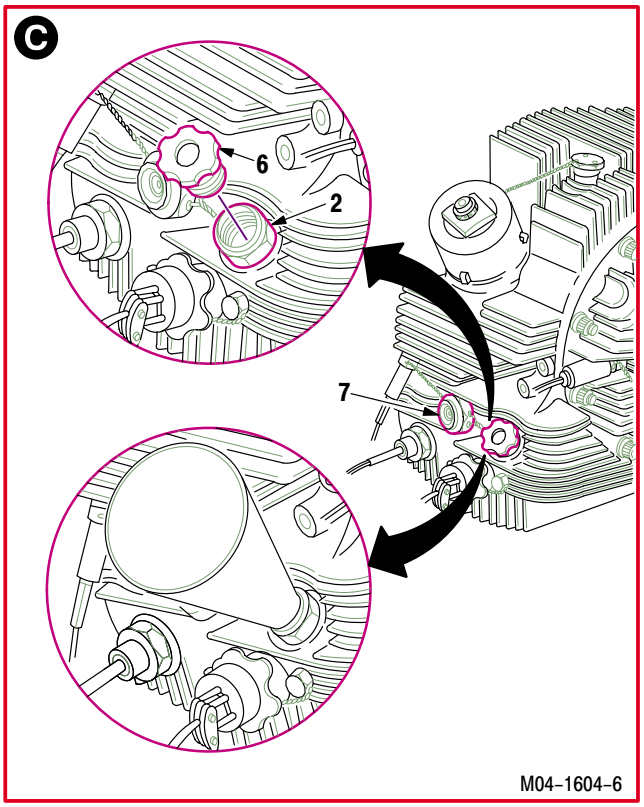
NOTE

- To prevent overservicing, wait 15 minutes after shutdown for oil level to stabilize.
- Add oil only if the level in the sight indicator is at or below the one-quarter level.
- Four ounces of oil will raise the level in the sight indicator one-quarter (0.18 inch). Gearbox is full when oil level is at center of sight indicator.

(2) Add lubricating oil (item 118, App F) or lubricating oil (item 119, App F) until sight indicator (7) shows oil level is at center. Use funnel (8).

(3) Push on filler cap (6) and turn clockwise to lock.

e. **Install engine nose gearbox fairing LN6 or RN6** (para 2.2)**.**



END OF TASK

1.29. ENGINE NOSE GEARBOX OIL SAMPLING

1.29.1. Description

This task covers: Sampling.

1.29.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
Lube drain kit (item 192, App H)

Materials/Parts:

Lubricating oil (item 118, App F) or
Lubricating oil (item 119, App F)

Personnel Required:

67R Attack Helicopter Repairer

References:

TB 43-0106

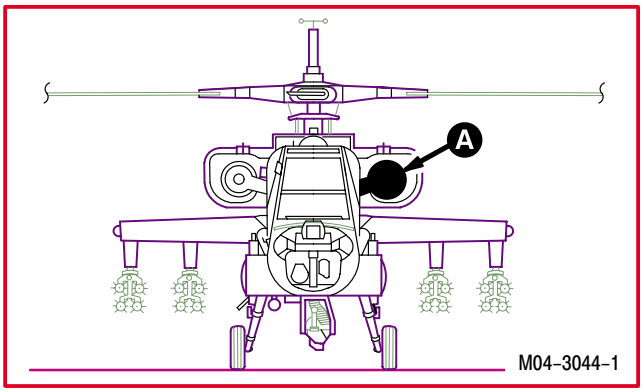
Equipment Conditions:

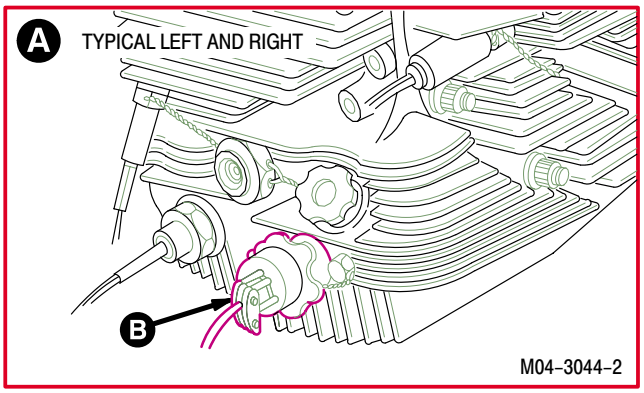
Ref	Condition
1.57	Helicopter safed
2.2	Engine nose gearbox fairing LN6 or RN6 removed

1.29.3. Sampling

NOTE

This task is typical for left and/or right engine nose gearbox.





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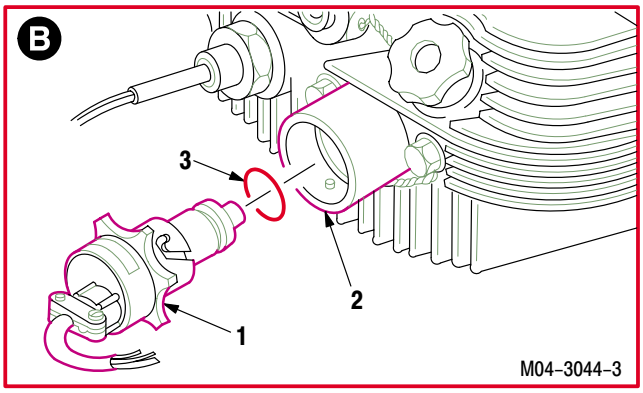
1.29. ENGINE NOSE GEARBOX OIL SAMPLING – continued

a. **Remove chip detector probe (1) from gearbox (2).**

(1) Place rags to catch spills.

(2) Push on probe (1) and turn counterclockwise to remove.

(3) Remove and discard packing (3) from probe (1).

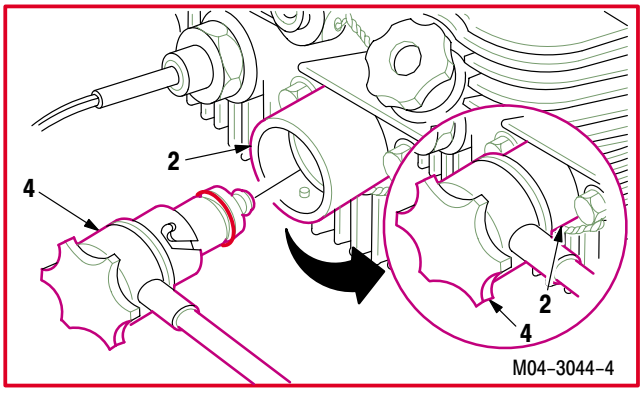


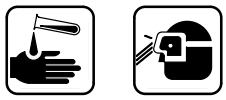
b. **Obtain oil sample** (TB 43-0106)**.**

(1) Insert drain adapter (4) into nose gearbox (2) and turn clockwise to lock.

(2) Obtain oil sample.

(3) Push on drain adapter (4) and turn counterclockwise 1/4-turn to remove.



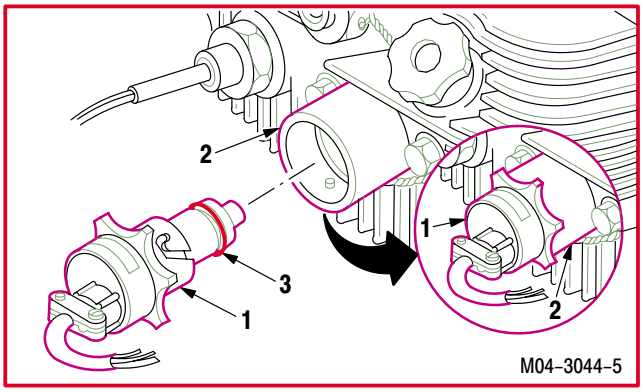


c. **Install probe (1) in gearbox (2).**

(1) Lubricate new packing (3). Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

(2) Install packing (3) on probe (1).

(3) Push probe (1) into gearbox (2). Turn probe (1) clockwise to lock.



NOTE

Probe is properly installed when knurl tips aline with hex points.

d. **Check oil level in engine nose gearbox and add oil if necessary** (para 1.28)**.**

e. **Install engine nose gearbox fairing LN6 and RN6** (para 2.2)**.**

END OF TASK

1.30. INTERMEDIATE GEARBOX SERVICING – GREASE

1.30.1. Description

This task covers: Servicing.

1.30.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
1 5/16 x 3/8-inch drive open end socket wrench crowfoot attachment (item 95, App H)
Hand lubricating gun (item 205, App H)
Adjustable air filtering respirator (item 262, App H)
0 - 75 inch-pound 1/4-inch drive dial indicator torque wrench (item 446, App H)
Intermediate gearbox and tail rotor service tool (figure D-462, App D)

Materials/Parts:

Packing
Grease (item 91, App F)

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access fairings L510 and R510 removed

CAUTION

Helicopter must be on level surface with both main landing gears equal for proper servicing. To prevent overfilling or underfilling the gearbox, wait 10 minutes after rotor shutdown before checking.

GO TO NEXT PAGE

1.30. INTERMEDIATE GEARBOX SERVICING – GREASE – continued

1.30.3. Servicing

a. **Service intermediate gearbox (1).** Torque filler plug (2) to **40 INCH-POUNDS**.

(1) Remove plug (2) from gearbox (1).

(2) Remove and discard packing (3).

(3) Check grease level. Use service tool.

(a) Insert tool with level markings pointing down and handle touching bottom of filler hole.

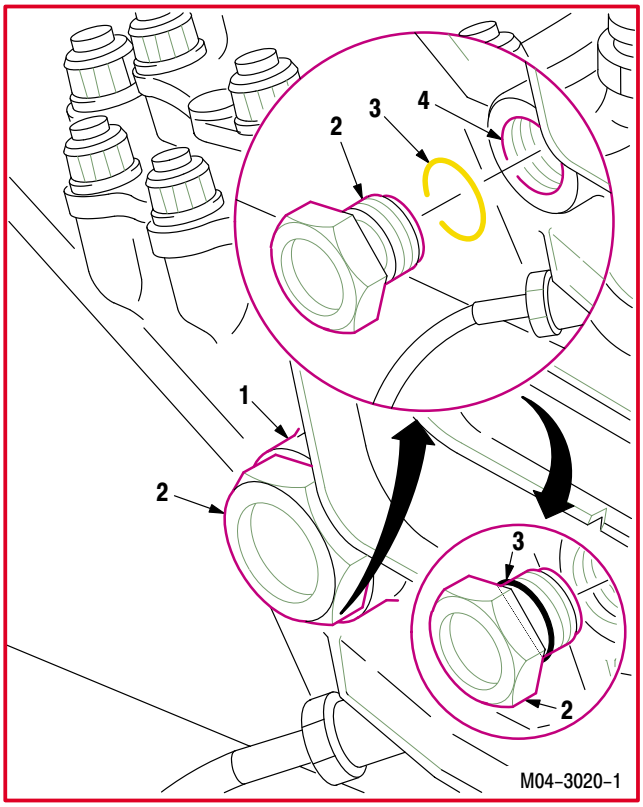
(b) Level must be within the indicated intermediate (I) **0.25 INCH** marking.

(4) Add grease (item 91, App F) as necessary to fill to indicated intermediate (I) **0.25 INCH** markings on tool. Use hand lubricating gun.

(5) Install new packing (3) on plug (2).

(6) Install plug (2) in filler plug hole (4).

(7) Torque plug (2) to **40 INCH-POUNDS**. Use torque wrench, crowfoot, and adapter.



b. **Inspect (QA).**

c. **Install access fairings L510 and R510** (para 2.2)**.**

END OF TASK

1.31. TAIL ROTOR GEARBOX SERVICING – GREASE

1.31.1. Description

This task covers: Servicing.

1.31.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
1 5/16 x 3/8-inch drive open end socket wrench crowfoot attachment (item 95, App H)
Hand lubricating gun (item 205, App H)
Adjustable air filtering respirator (item 262, App H)
0 - 75 inch-pound 1/4-inch drive dial indicator torque wrench (item 446, App H)
Intermediate gearbox and tail rotor service tool (figure D-462, App D)

Materials/Parts:

Packing
Grease (item 91, App F)

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access fairing L540 removed

CAUTION

Helicopter must be on level surface with both main landing gears equal for proper servicing. To prevent overfilling or underfilling the gearbox, wait 10 minutes after rotor shutdown before checking.

GO TO NEXT PAGE

1.31. TAIL ROTOR GEARBOX SERVICING – GREASE – continued

1.31.3. Servicing

a. **Service tail rotor gearbox (1).** Torque filler plug (2) to **40 INCH-POUNDS**.

(1) Remove plug (2) from gearbox (1).

(2) Remove and discard packing (3).

(3) Check grease level. Use service tool.

(a) Insert tool with level markings pointing down and handle touching bottom of filler hole.

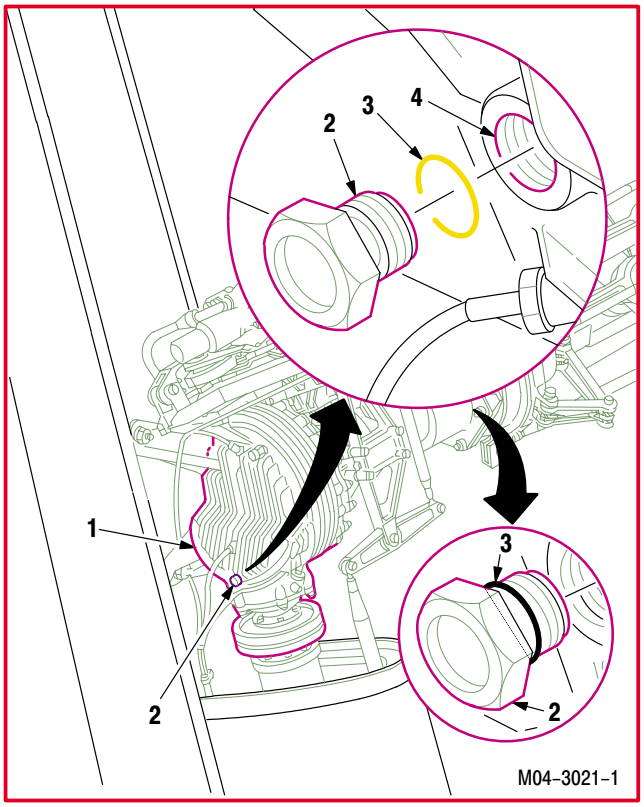
(b) Level must be within the indicated tail rotor (TR) **0.50 INCH** marking.

(4) Add grease (item 91, App F) as necessary to fill to the indicated tail rotor (TR) **0.50 INCH** markings on tool. Use hand lubricating gun.

(5) Install new packing (3) on plug (2).

(6) Install plug (2) in filler plug hole (4).

(7) Torque plug (2) to **40 INCH-POUNDS**. Use torque wrench, crowfoot, and adapter.



b. **Inspect (QA).**

c. **Install access fairing L540** (para 2.2)**.**

END OF TASK

1.32. MAIN TRANSMISSION OIL SYSTEM DRAINING, FLUSHING, AND SERVICING

1.32.1. Description

This task covers: Draining. Flushing. Servicing.

1.32.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
1-quart funnel (item 140, App H)
Chemical protective gloves (item 154, App H)
Lube drain kit (item 192, App H)
14-quart utility pail (item 222, App H)

Materials/Parts:

Packing (2)
Lubricating oil (item 118, App F) or
Lubricating oil (item 119, App F) or

Personnel Required:

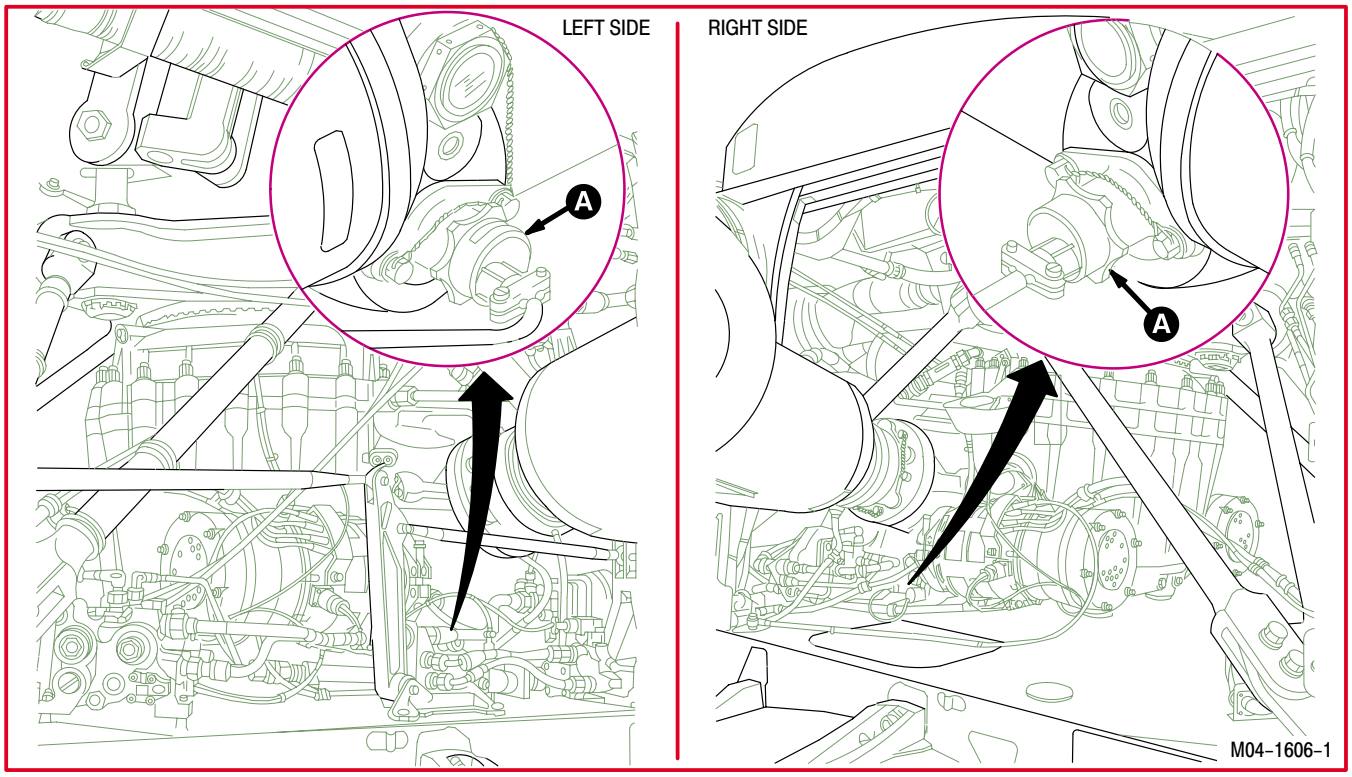
67R Attack Helicopter Repairer
One person to assist

References:

TB 55-9150-200-24

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed



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1.32. MAIN TRANSMISSION OIL SYSTEM DRAINING, FLUSHING, AND SERVICING – continued

NOTE

- Drain and flush transmission oil from left and right chip detector housings at the same time.
- This task is typical for left and right sides of main transmission.

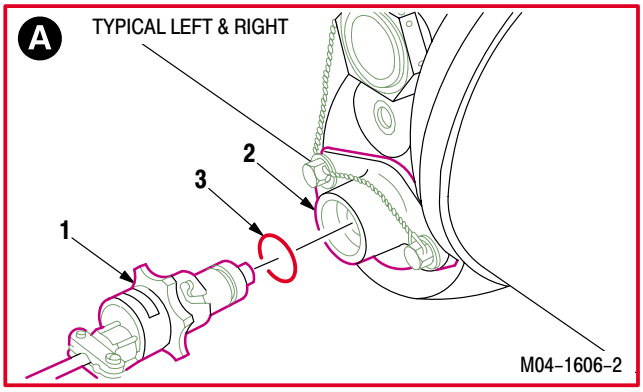
1.32.3. Draining

a. **Remove transmission chip detector probe (1) from housing (2).**

(1) Place rags under housing (2) to catch spilled oil.

(2) Push in probe (1) and turn counterclockwise. Pull out of housing (2).

(3) Remove and discard packing (3).



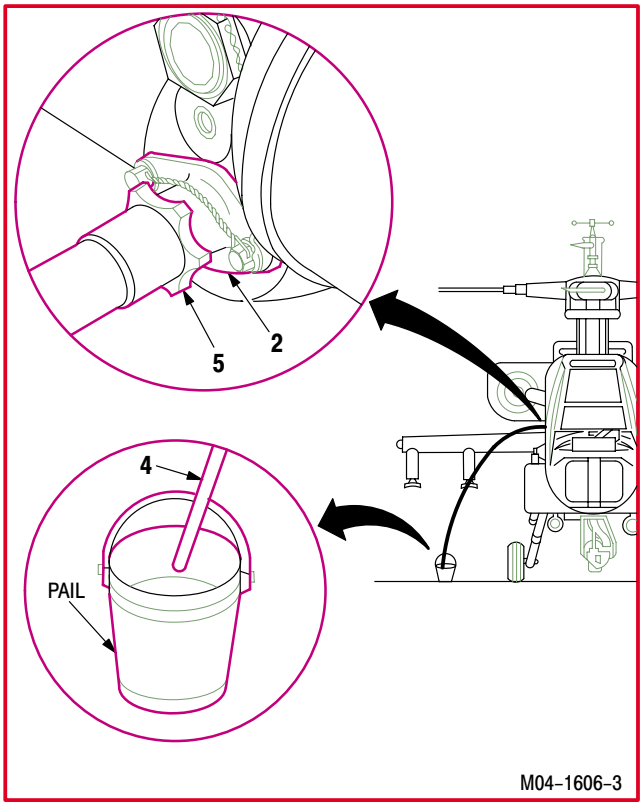
b. **Drain transmission oil.**

(1) Place free end of lube drain kit hose (4) in pail.

(2) Insert lube drain kit hose adapter probe (5) in housing (2).

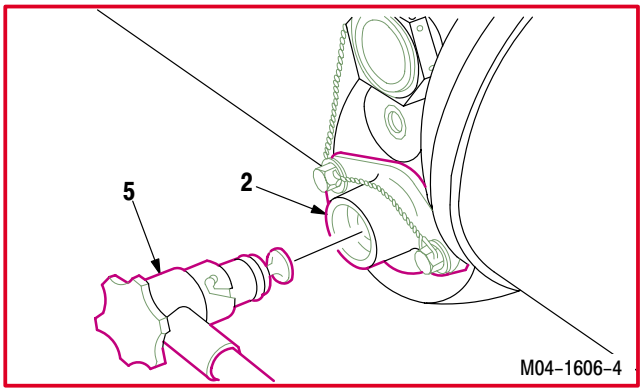
(3) Push in probe (5) and turn clockwise until locked.

(4) Allow transmission oil to drain.



c. **Remove lube drain kit hose probe (5) from housing (2).**

(1) Push in hose probe (5), turn counterclockwise and pull remove from housing (2).



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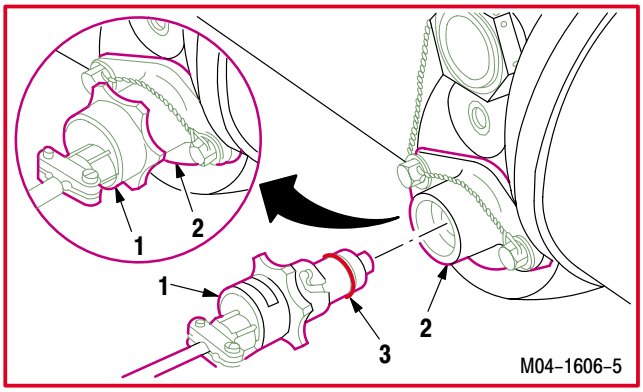
1.32. MAIN TRANSMISSION OIL SYSTEM DRAINING, FLUSHING, AND SERVICING – continued

1.32.4. Flushing

a. **Install probe (1) in housing (2).**



(1) Lubricate new packing (3). Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

(2) Install new packing (3) on probe (1).

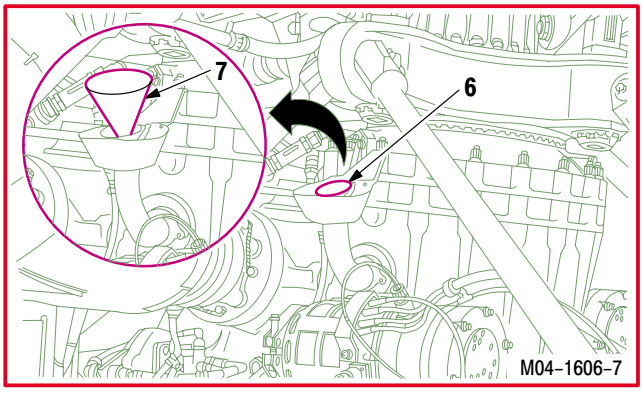
(3) Insert probe (1) into housing (2).

(4) Push probe (1) in and turn clockwise until locked in housing (2).

NOTE

Probe is properly installed when knurled tips aline with hex points.

b. **Flush main transmission oil system.** Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).



(1) Open filler cap (6) on right side of transmission.

(2) Fill transmission with 24 quarts of oil. Use funnel (7) and lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

c. **Repeat main transmission draining steps in paragraph 1.32.3.**

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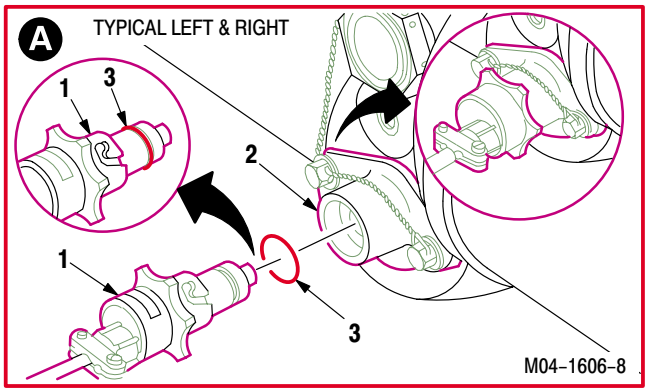
1.32. MAIN TRANSMISSION OIL SYSTEM DRAINING, FLUSHING, AND SERVICING – continued

NOTE

Refer to TB 55-9150-200-24 for conversion of oils MIL-L-23699 and MIL-L-7808. Failure to perform the required checks and services can result in contamination of the affected oil system.

1.32.5. Servicing

a. **Install probe (1) in housing (2).**



(1) Lubricate new packing (3). Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

(2) Install new packing (3) on probe (1).

(3) Insert probe (1) into housing (2).

(4) Push probe (1) in and turn clockwise until locked in housing (2).

NOTE

Probe is properly installed when knurled tips aline with hex points.

GO TO NEXT PAGE

1.32. MAIN TRANSMISSION OIL SYSTEM DRAINING, FLUSHING, AND SERVICING – continued

CAUTION

- Do not mix lubricating oil (item 118, App F) with lubricating oil (item 119, App F) except in an emergency. The system must be drained and refilled with the proper oil as soon as possible if it becomes necessary to mix oils.
- Helicopter must be on level surface with both main landing gears equal for proper servicing. To prevent overfilling or under filling the gearbox, wait 15 minutes after rotor shutdown before checking.

b. **Service main transmission with oil.** Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F).

(1) Open filler cap (6).

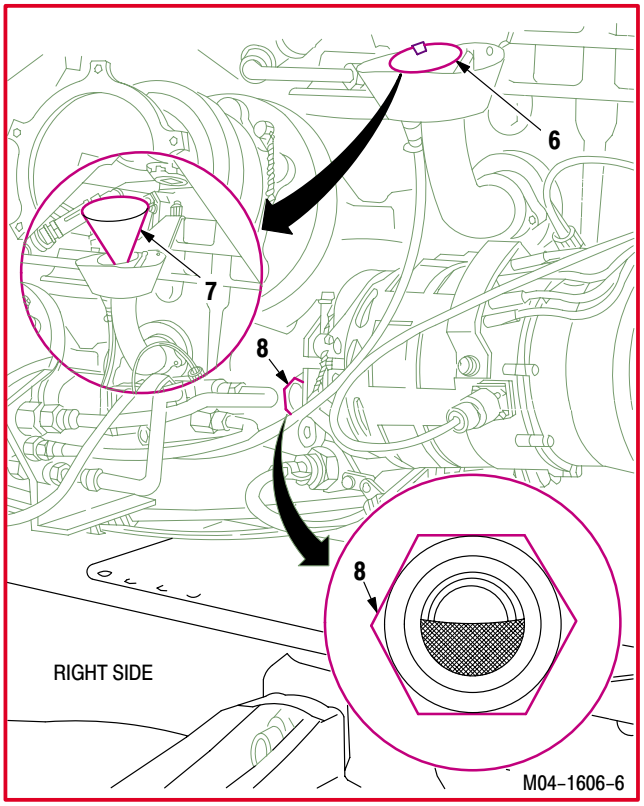
(2) Add lubricating oil (item 118, App F) or lubricating oil (item 119, App F). Use funnel (7).

NOTE

Servicing is complete when oil level is in center of both left and right sight indicators (8).

(3) Remove funnel (7). Close filler cap (6).

c. **Install access panels L200 and R200** (para 2.2)**.**



END OF TASK

1.33. MAIN TRANSMISSION OIL SAMPLING

1.33.1. Description

This task covers: Sampling.

1.33.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
1-quart funnel (item 140, App H)
Chemical protective gloves (item 154, App H)
Lube drain kit (item 192, App H)

Materials/Parts:

Packing
Lubricating oil (item 119, App F)

Personnel Required:

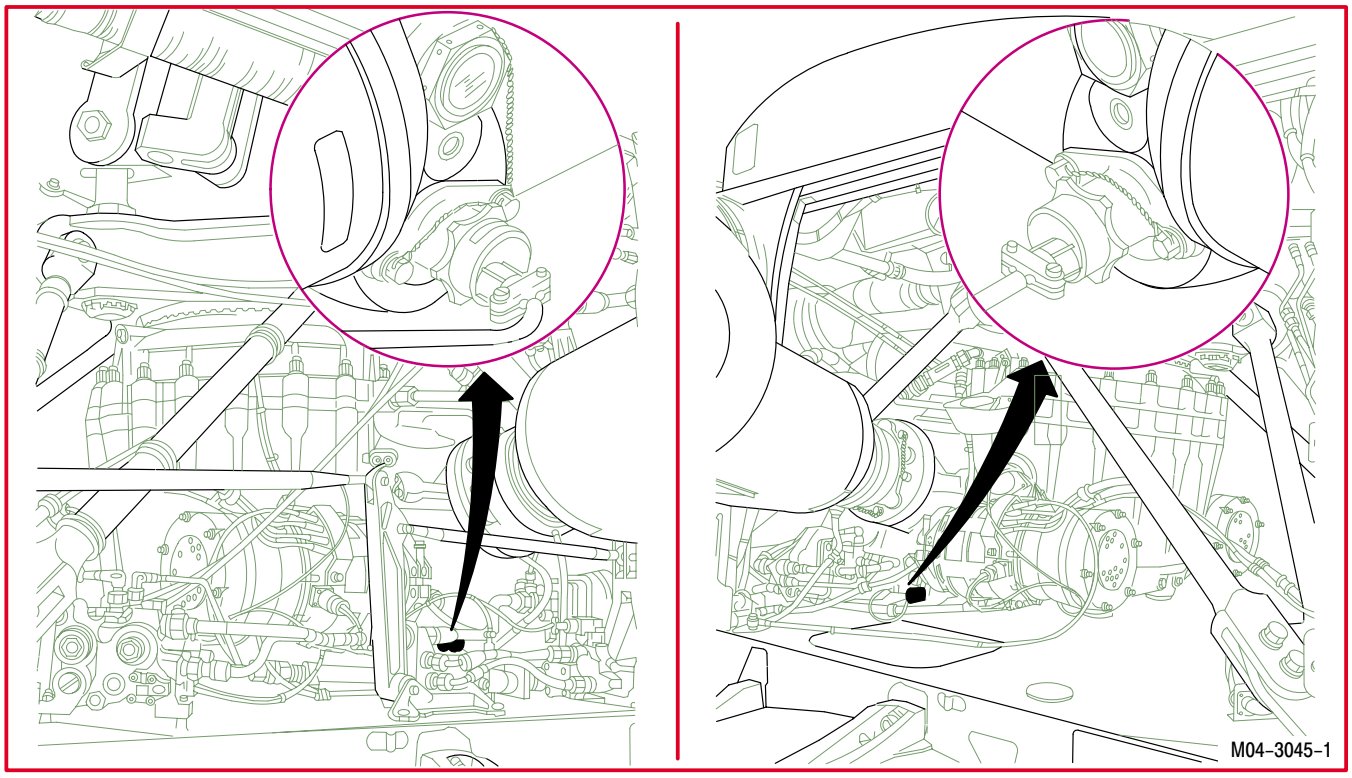
67R Attack Helicopter Repairer

References:

TB 43-0106

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed



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1.33. MAIN TRANSMISSION OIL SAMPLING – continued

NOTE

This task is typical for left and right main transmission sumps.

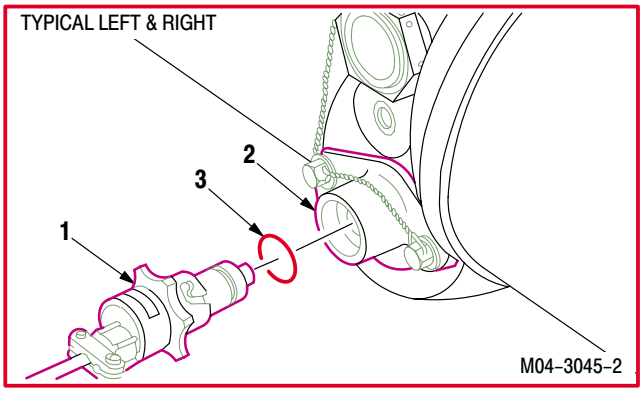
1.33.3. Sampling

a. **Remove transmission chip detector probe (1) from housing (2).**

(1) Place rags under housing (2) to catch spilled oil.

(2) Push probe (1) in and turn counterclockwise and pull out of housing (2).

(3) Remove and discard packing (3).



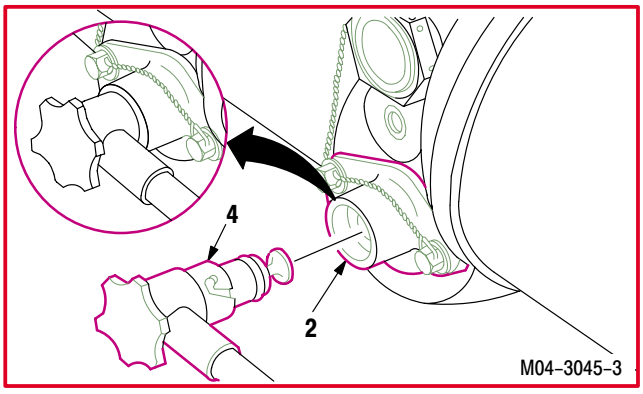
b. **Obtain oil sample** (TB 43-0106)**.**

(1) Insert lube drain kit (4) into transmission chip detector housing (2) and turn clockwise to lock.

(2) Obtain oil sample.

(3) Push on lube drain kit (4) and turn counter-clockwise to remove.

(4) Wipe up any spilled oil.



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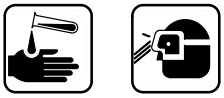
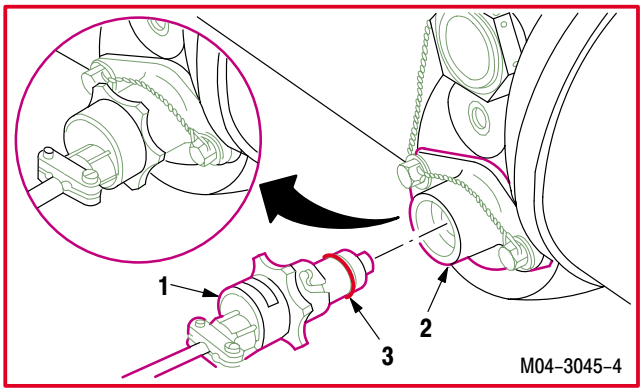
1.33. MAIN TRANSMISSION OIL SAMPLING – continued



c. **Install probe (1) in housing (2).**



(1) Lubricate new packing (3). Use lubricating oil (item 119, App F).

(2) Install packing (3) on probe (1).

(3) Insert probe (1) into housing (2).

(4) Push probe (1) in and turn clockwise 1/4-turn until locked in housing (2).

NOTE

Probe is properly installed when knurl tips aline with hex points.

d. **Wipe up any spilled oil** (para 1.47)**.**

e. **Service transmission with oil** (para 1.32)**.**

f. **Install access panels L200 and R200** (para 2.2)**.**

END OF TASK

1.34. HYDRAULIC SYSTEMS SERVICING – FLUID

1.34.1. Description

This task covers: Servicing.

1.34.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Fluid service unit (item 137, App H)

Personnel Required:

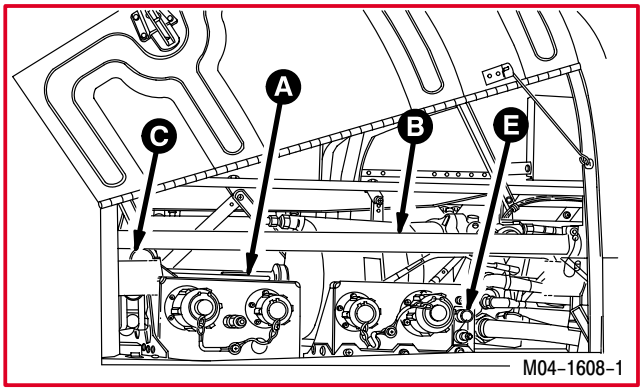
67R Attack Helicopter Repairer
One person to assist

References:

TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.36	Utility hydraulic accumulator serviced with nitrogen
1.37	Utility hydraulic return accumulator serviced with nitrogen
2.2	Access doors L190 and R325 opened

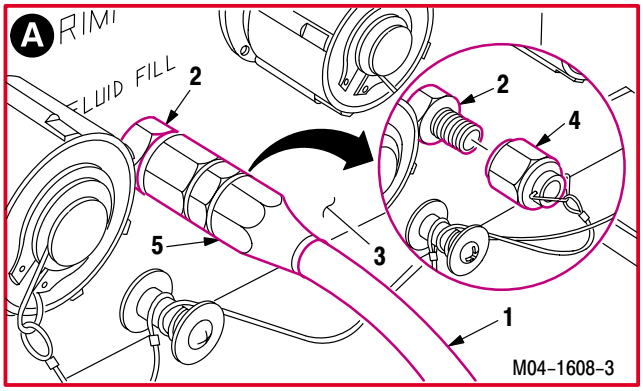


1.34.3. Servicing

a. **Connect fluid service unit hose (1) to fluid fill union (2) on primary service panel (3).**

(1) Hold union (2). Remove dust cap (4).

(2) Install hose (1) with adapter (5) on union (2).



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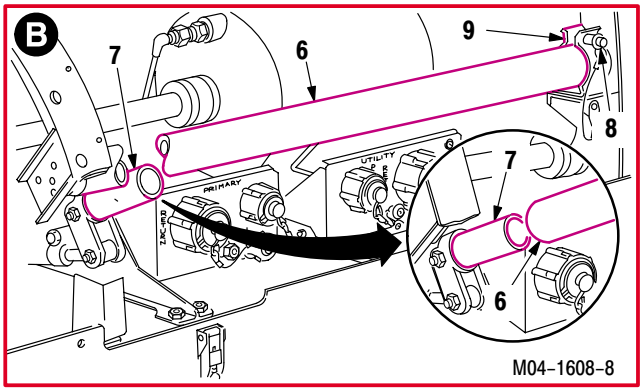
1.34. HYDRAULIC SYSTEMS SERVICING – FLUID – continued

b. **Install pump handle (6) on bellcrank (7).**

(1) Remove retaining pin (8) from clip (9).

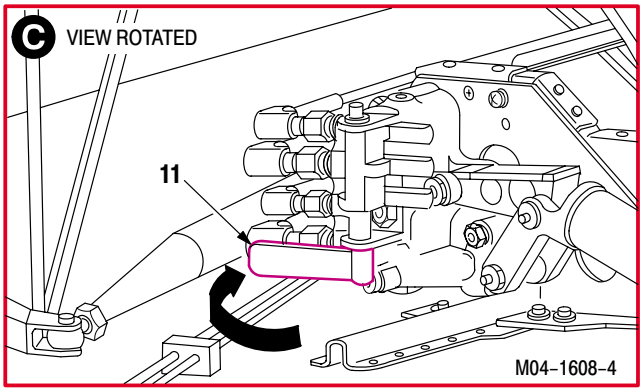
(2) Remove handle (6) from clip (9).

(3) Slide handle (6) over bellcrank (7).



c. **Service primary manifold reservoir (10).**

(1) Move pump selector lever (11) to primary position (inboard).



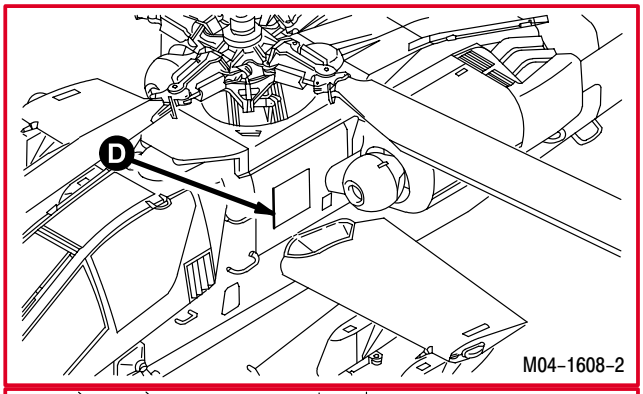
NOTE

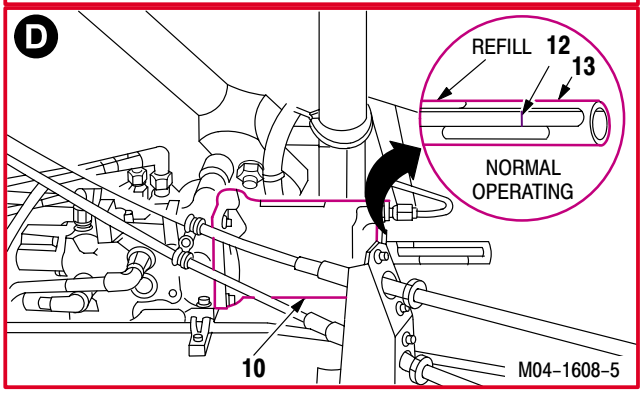
Maximum external leakage when operating hand pump is one drop per twenty-five cycles at the piston cylinder.

(2) Fill reservoir (10) by pumping handle (6) until piston (12) appears in normal operating range of sight indicator (13). Check cylinder for leakage.

(3) Verify indicator (13) reading.

(4) If indicator (13) exceeds normal operating range, go to step e.





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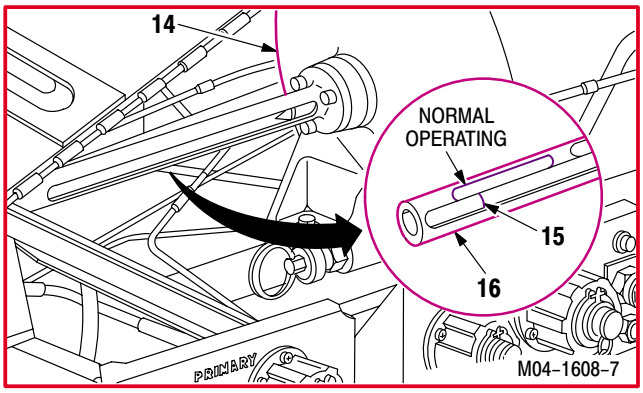
1.34. HYDRAULIC SYSTEMS SERVICING – FLUID – continued

d. **Service utility manifold reservoir (14).**

(1) Position lever (11) to utility position (outboard).

(2) Fill reservoir (14) by pumping handle (6) until piston (15) appears in normal operating range of indicator (16). Check cylinder for leakage.

(3) Verify indicator (16) reading.



e. **If indicator (13) or (16) exceeds normal operating range:**

NOTE

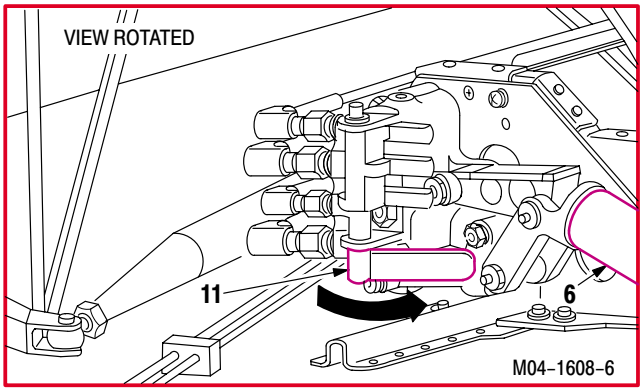
This task forces excess fluid into fluid service unit.

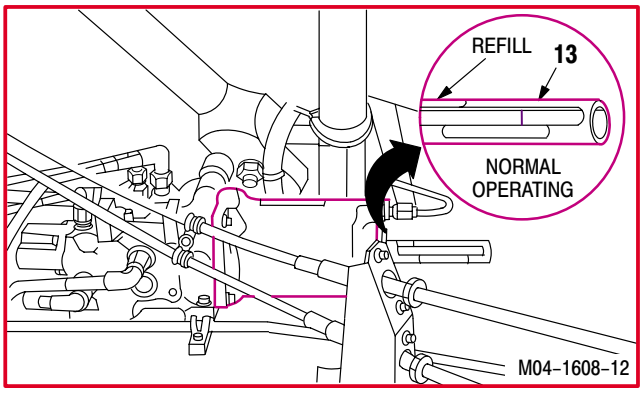
(1) For indicator (13), apply primary hydraulic power (para 1.72). For indicator (16), apply utility hydraulic power (para 1.73).

(2) Apply external power – air (para 1.71).

(3) Pressurize air system (TM 1-1520-238-T).

(4) Operate air and hydraulic servicing units until indicator (13) and/or (16) is in normal operating range.





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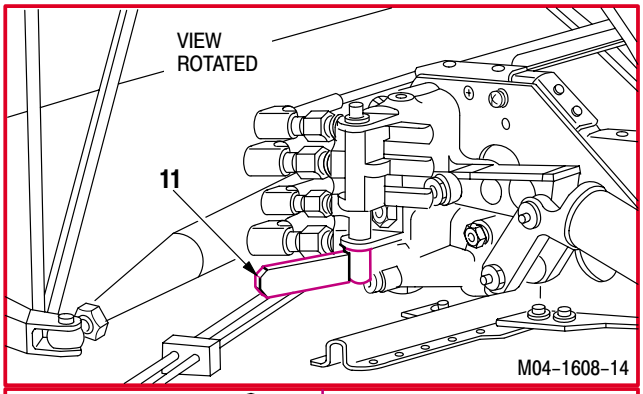
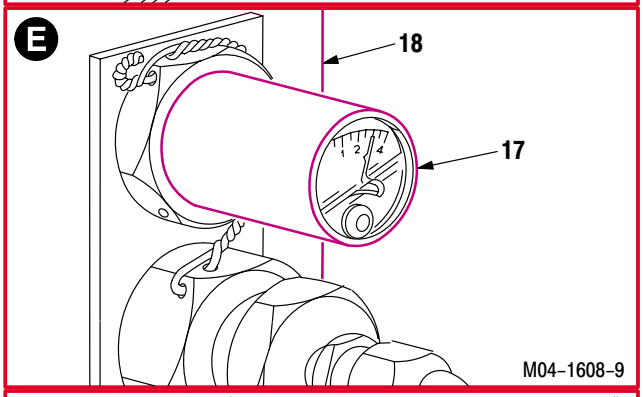
1.34. HYDRAULIC SYSTEMS SERVICING – FLUID – continued

f. **Charge hydraulic accumulator to 3000 psi.**

(1) Position pump selector lever (11) to accumulator position aft.



(2) Fill accumulator until pressure gage (17) on utility service panel (18) indicates 3000 psi. **UTIL ACC** indicator on pilot instrument panel may be used also. Use fluid service unit.

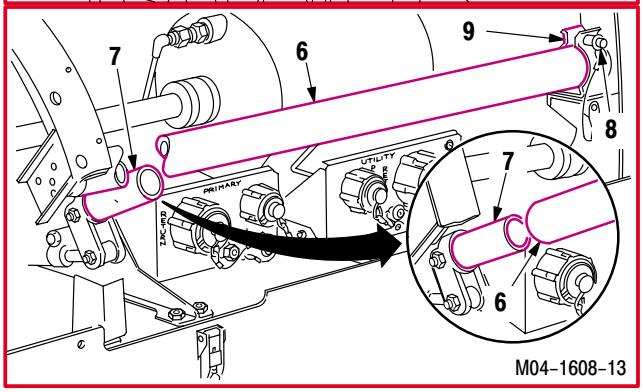


g. **Return pump handle (6) to storage clip (9).**

(1) Slide handle (6) off bellcrank (7).

(2) Place handle (6) in clip (9).

(3) Install retaining pin (8) through clip (9).



h. **Remove hose (1) and adapter (5) from union (2).**

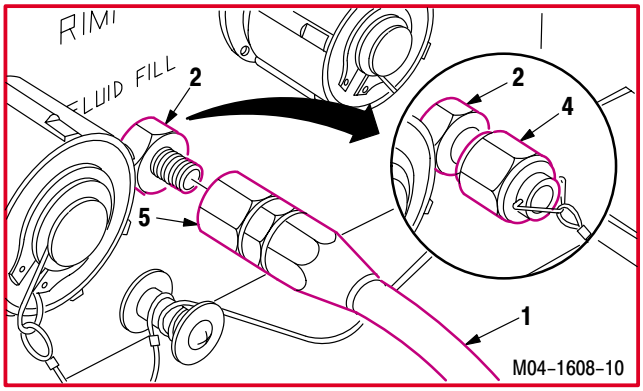
(1) Hold union (2). Remove adapter (5).

(2) Install dust cap (4) on union (2).

i. **Remove external power – air** (para 1.71)**.**

j. **Remove external power – hydraulic (primary or utility)** (para 1.72 or 1.73)**.**

k. **Secure access doors L190 and R325** (para 2.2)**.**



END OF TASK

1.35. HYDRAULIC SYSTEM BLEED

1.35.1. Description

This task covers: System Bleed.

1.35.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft maintenance tool kit (item 373, App H)
Light duty laboratory apron (item 27, App H)
11/16 x 3/8-inch drive open end box socket wrench crowfoot attachment (item 70, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)
Aircraft power unit (item 232, App H)
Hydraulic brake bleeder tube (item 399, App H)
0 - 600 inch-pound 3/8-inch drive dial indicator torque wrench (item 447, App H)
Hydraulic pressure "Y" hose (figure D-466, App D)
Hydraulic return "Y" hose (figure D-467, App D)

Personnel Required:

67R	Attack Helicopter Repairer One person to assist
68X	Armament/Electrical System Repairer
67R3F	Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1270-476-20
TM 1-1520-238-T
TM 9-1090-208-23
TM 55-1730-229-12

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access fairing L175 removed; doors T250L, T250R, T290L, T290R, L325, and R325 opened
1.36	Utility hydraulic accumulator serviced with nitrogen
1.37	Utility hydraulic return accumulator serviced with nitrogen
7.3	Primary hydraulic system vented
7.57	Utility hydraulic system vented
1.70	External power – electrical applied


NOTE

- This procedure is required following replacement of any hydraulic system component. It is also recommended as an air purge to the hydraulic system if the hydraulic system or a component such as flight control actuators have trapped air.
- The procedure starts with an initial AGPU powered bleed which removes the majority of air from the hydraulic systems. An APU run purges the primary and utility hydraulic pumps, APU start motor, and return lines. A final AGPU bleed removes any air that may have pushed into the hydraulic system during the APU run.

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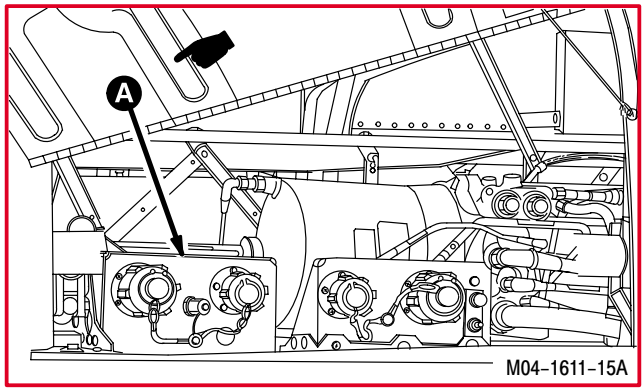
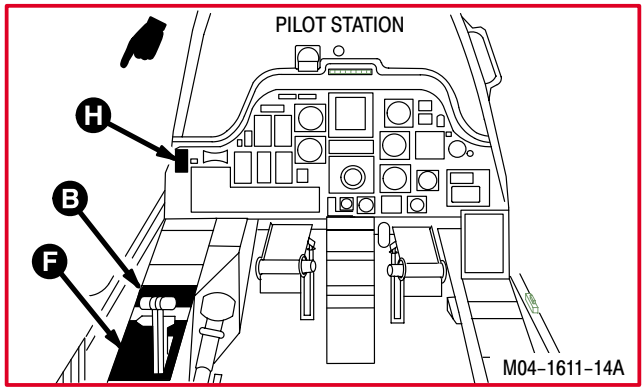
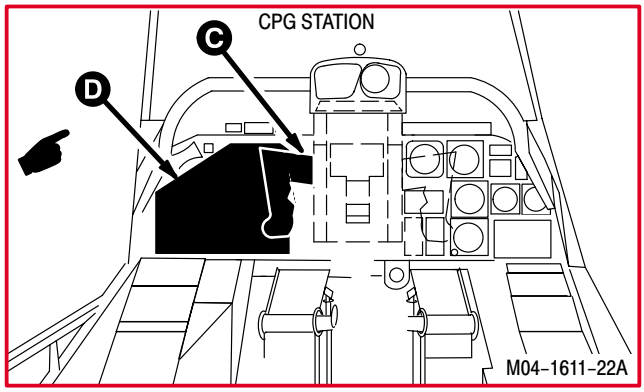
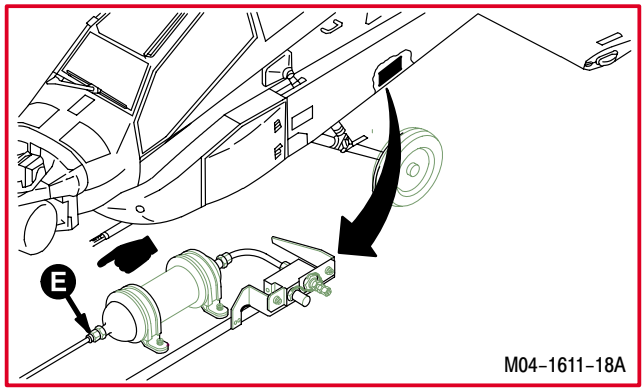
1.35. HYDRAULIC SYSTEM BLEED – continued









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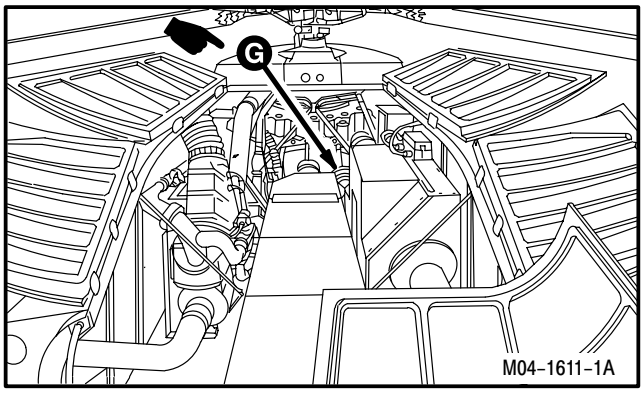
1.35. HYDRAULIC SYSTEM BLEED – continued

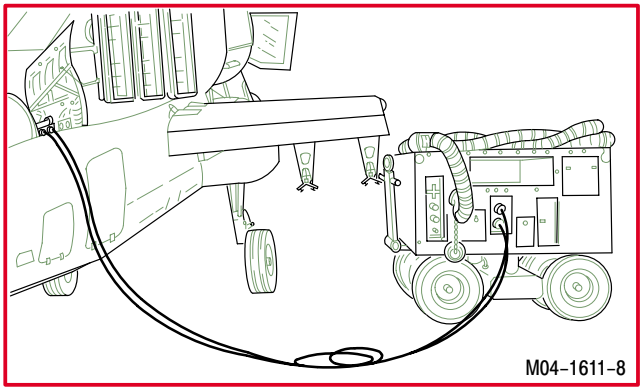


1.35.3. System Bleed

CAUTION

Do not put AGPU under a main rotor blade. Main rotor blade damage may occur from extreme heat of AGPU exhaust.

a. **Position AGPU parallel to right wing tip.**



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1.35. HYDRAULIC SYSTEM BLEED – continued

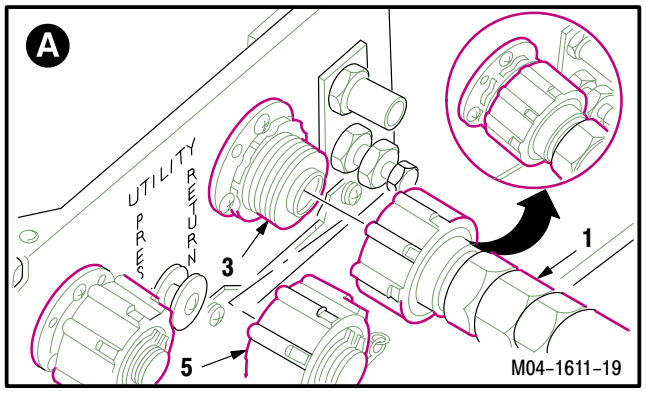
b. **Connect hydraulic return "Y" hoses (1) and (2) to utility return coupling (3) and primary return coupling (4).**

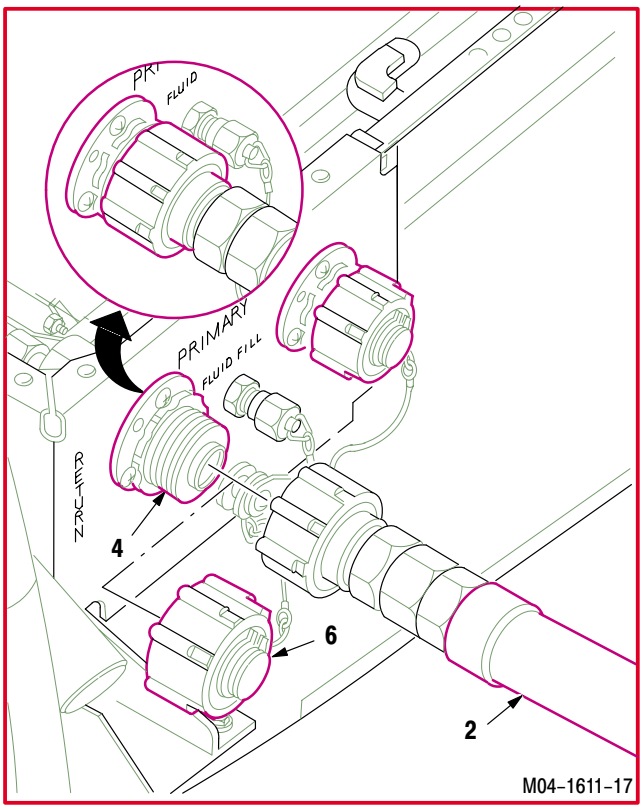
(1) Remove cap (5) from utility return coupling (3).

(2) Remove cap (6) from primary return coupling (4).

(3) Connect return "Y" hose (1) to coupling (3). Use hydraulic return "Y" hose (figure D-467, App D).

(4) Connect return "Y" hose (2) to coupling (4).





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1.35. HYDRAULIC SYSTEM BLEED – continued

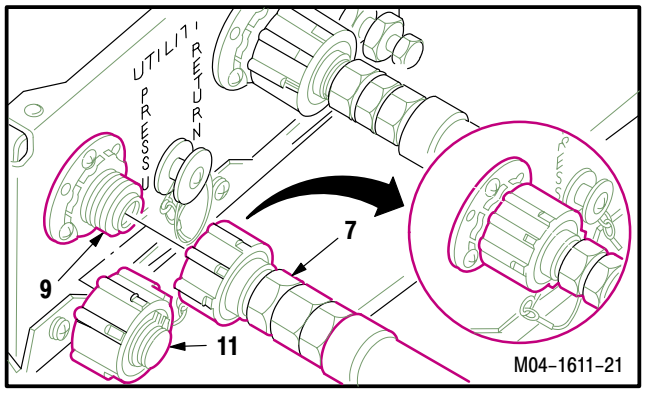
c. **Connect hydraulic pressure "Y" hoses (7) and (8) to utility pressure coupling (9) and primary pressure coupling (10).**

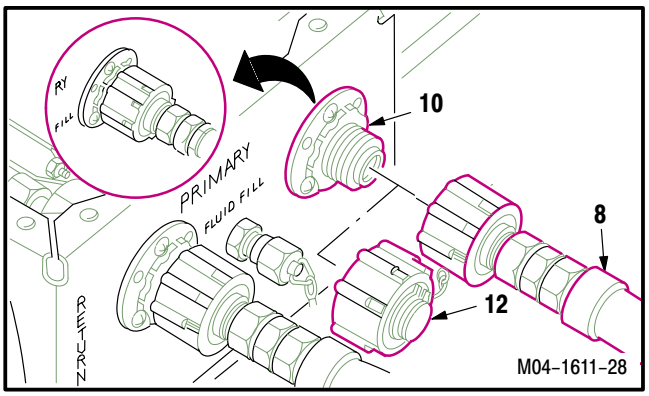
(1) Remove cap (11) from utility pressure coupling (9).

(2) Remove cap (12) from primary pressure coupling (10).

(3) Connect pressure "Y" hose (7) to coupling (9). Use hydraulic pressure "Y" hose (figure D-466, App D).

(4) Connect pressure "Y" hose (8) to coupling (10).





d. **Connect AGPU return hose (13) to return "Y" hose coupling (14).**

(1) Remove cap (15) from "Y" hose coupling (14).

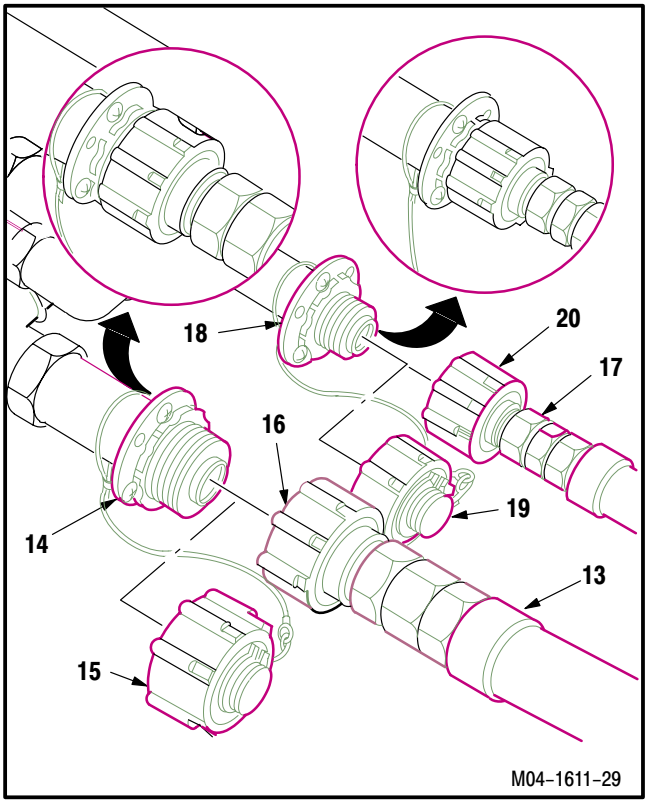
(2) Turn coupling nut (16) clockwise until seated and locking teeth engage fully with teeth on "Y" hose coupling (14).

e. **Connect AGPU pressure hose (17) to pressure "Y" hose coupling (18).**

(1) Remove cap (19) from "Y" hose coupling (18).

(2) Turn coupling nut (20) clockwise until seated and locking teeth engage fully with teeth on "Y" hose coupling (18).

f. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**



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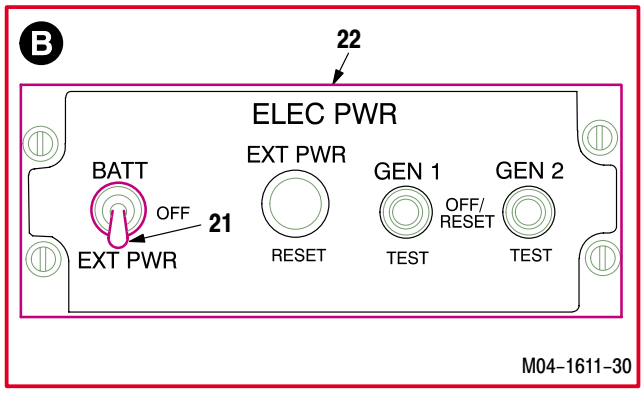
1.35. HYDRAULIC SYSTEM BLEED – continued

g. **Set BATT/EXT PWR switch (21) on ELEC PWR control panel (22) to EXT PWR.**

WARNING

The hydraulic system is pressurized to 3000 psi. Ensure pressure is at 0 psi and system is vented before loosening any connections. Failure to do so could result in death or serious injury. If injury occurs, seek medical aid.



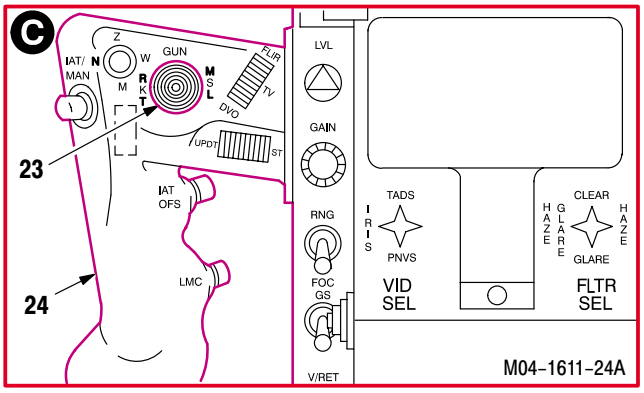
h. **Apply hydraulic pressure to helicopter.**

(1) Adjust AGPU output pressure to **3000 psi** (TM 55-1730-229-12).

i. **Perform area weapon system power up** (TM 9-1090-208-23)**.**

WARNING

- **Hydraulic pressure is 3000 psi. This can cause injury. If injury occurs, seek medical aid.**
- **To prevent injury when moving gun turret, ensure that all personnel are clear of gun travel area during turret operation. If injury occurs, seek medical aid.**

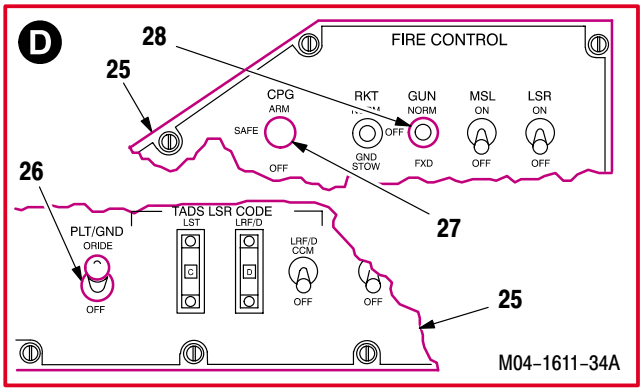


j. **Cycle gun turret to fixed forward position.** Stow turret four times.

(1) Set **RKT/GUN/MSL** switch (23) on CPG ORT left handgrip (24) to **GUN**.

(2) Set switches on CPG FIRE CONTROL panel (25):

Switch	Position
PLT/GND (26)	**ORIDE**
CPG SAFE/ARM (27)	**SAFE**
GUN (28)	**FXD...OFF...FXD.. OFF...FXD...OFF.. FXD...OFF**



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1.35. HYDRAULIC SYSTEM BLEED – continued

(3) Set **RKT/GUN/MSL** switch (23) on CPG ORT left handgrip (24) to center position.

k. **Perform area weapon system power down** (TM 9-1090-208-23)**.**

l. **Adjust AGPU output pressure to 0 psi** (TM 55-1730-229-12)**.**

m. **Place rags between nut (29) on utility hydraulic return accumulator fluid line (30) and airframe (31).**

n. **Bleed utility hydraulic return accumulator fluid line (30).** Torque nut (29) to **160 INCH-POUNDS**.

(1) Hold reducer fitting (32).

(2) Loosen nut (29) 1/4 turn to allow hydraulic fluid to discharge.

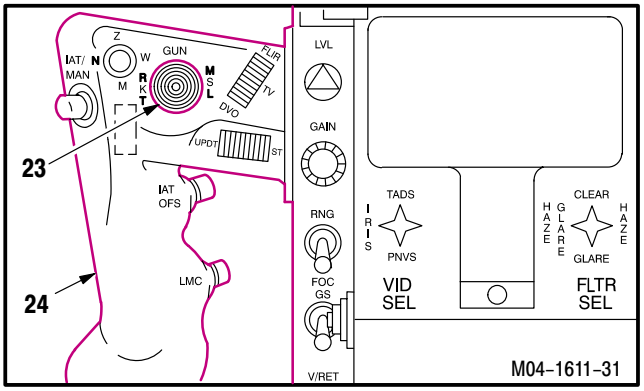
(3) Watch for air bubbles in fluid.

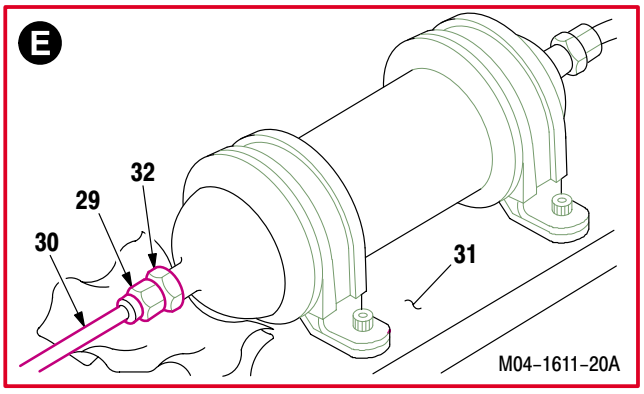
(4) Torque nut (29) to **160 INCH-POUNDS** when fluid no longer discharges. Use torque wrench and crowfoot.

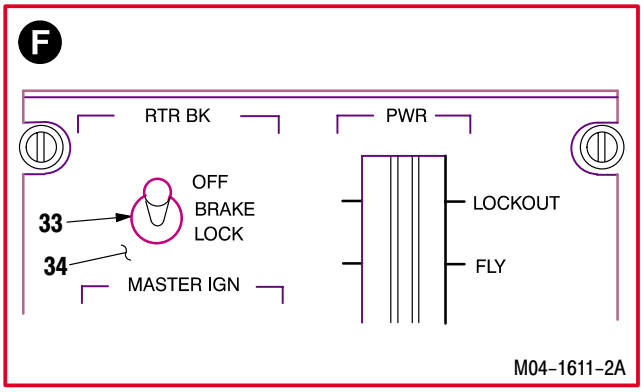
o. **Repeat steps h. thru n. until no air bubbles are visible in discharged fluid.**

p. **Adjust AGPU output pressure to 3000 psi** (TM 55-1730-229-12)**.**

q. **Set RTR BK switch (33) on pilot left console (34) to BRAKE then to OFF.**







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1.35. HYDRAULIC SYSTEM BLEED – continued

WARNING

To prevent injury, make certain all personnel are clear of flight controls before moving pilot controls. If injury occurs, seek medical aid.

CAUTION

The hydraulic system operates at high pressure. To prevent the release of pressurized hydraulic fluid, do not use the **RTR BK** switch **LOCK** position during this task.

NOTE

The helicopter intercommunication system may be used to coordinate maintenance.

r. **Adjust AGPU output pressure to 250 psi** (TM 55-1730-229-12)**. Do not exceed 400 psi.**

s. **Install bleeder hose (35) in aft bleed valve (36).**

(1) Hold valve (36). Remove screw (37).

(2) Install bleeder hose (35) in valve (36). Use bleeder tube.

(3) Place free end of hose (35) in pail.

t. **Bleed aft rotor brake actuator (38).**

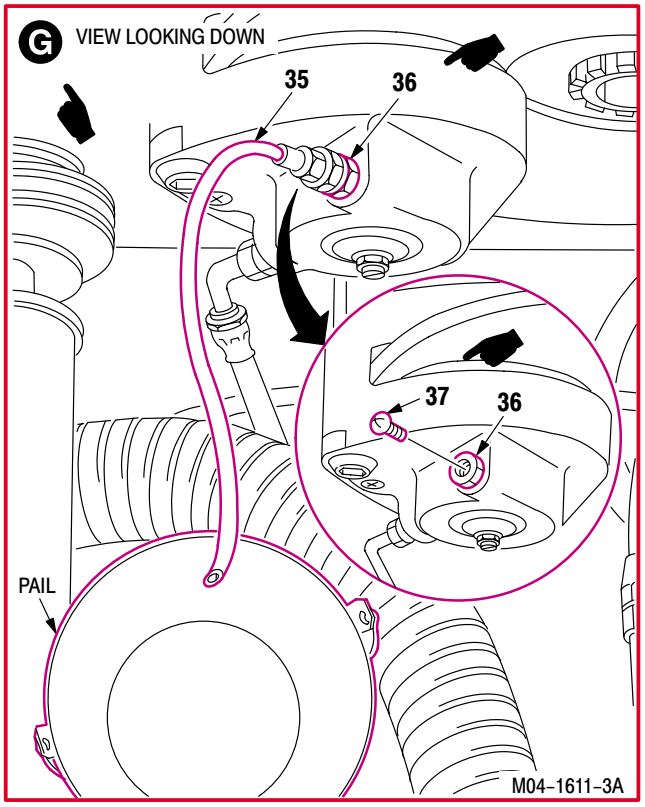
(1) Set **RTR BK** switch (33) to **BRAKE**.

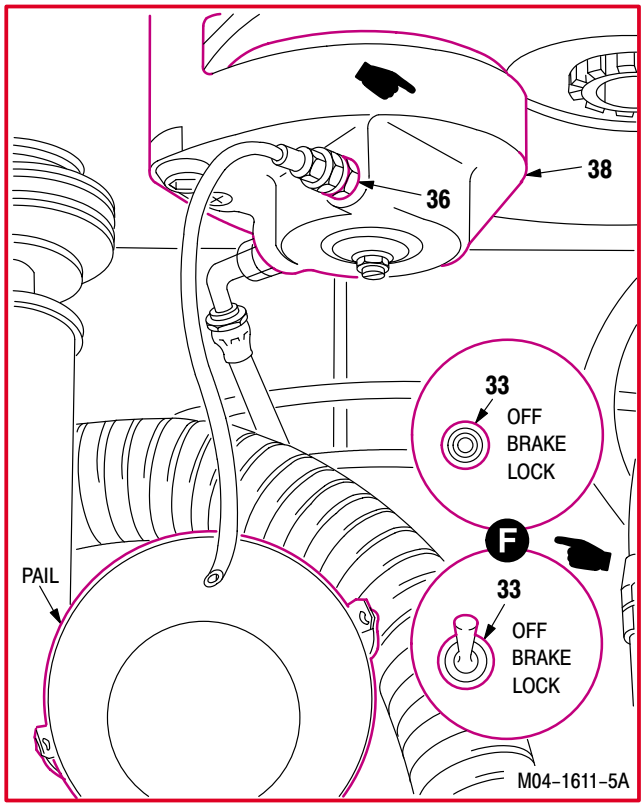
(2) Open bleed valve (36).

(3) Bleed actuator (38) until fluid is free of air bubbles.

(4) Close bleed valve (36).

(5) Set **RTR BK** switch (33) to **OFF**.





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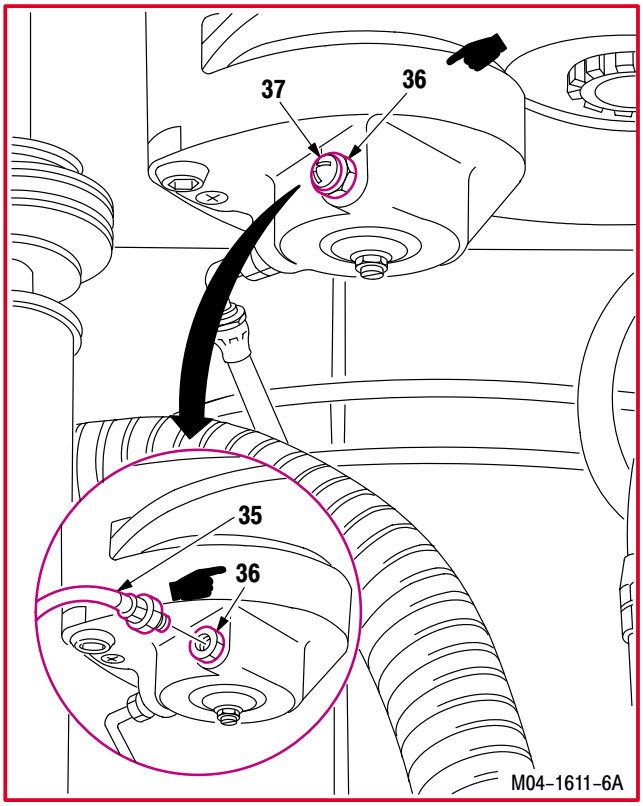
1.35. HYDRAULIC SYSTEM BLEED – continued

u. **Remove hose (35) from valve (36).**

(1) Hold valve (36). Remove hose (35).

(2) Install screw (37) in valve (36).

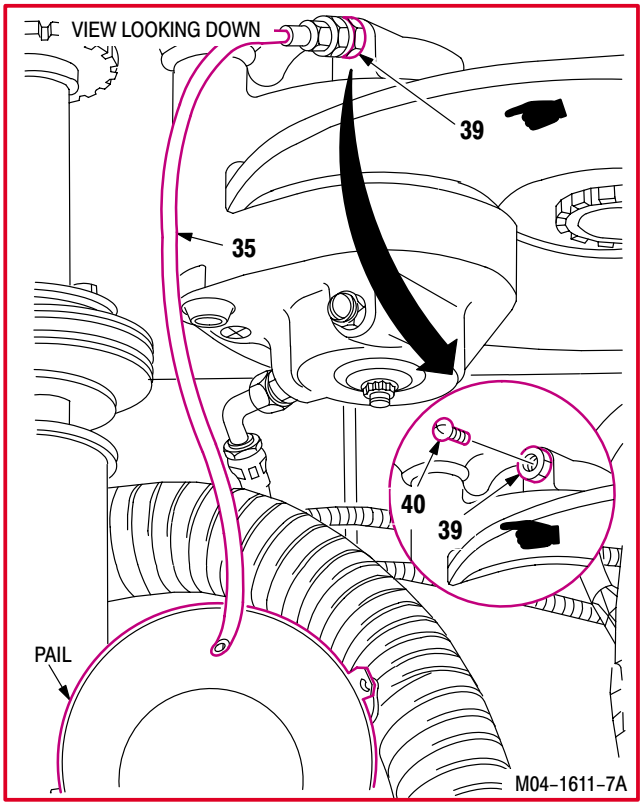


v. **Install bleeder hose (35) in forward bleed valve (39).**

(1) Hold valve (39). Remove screw (40).

(2) Install bleeder hose (35) in valve (39).

(3) Place free end of bleeder hose (35) in pail.



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1.35. HYDRAULIC SYSTEM BLEED – continued

w. **Bleed forward rotor brake actuator (41).**

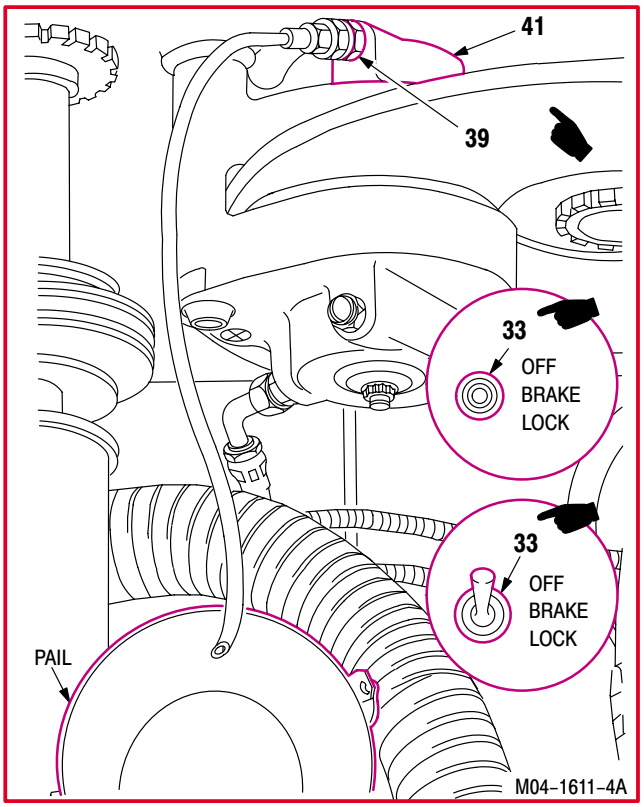
(1) Set **RTR BK** switch (33) to **BRAKE**.

(2) Open bleed valve (39).

(3) Bleed actuator (41) until fluid is free of air bubbles.

(4) Close bleed valve (39).

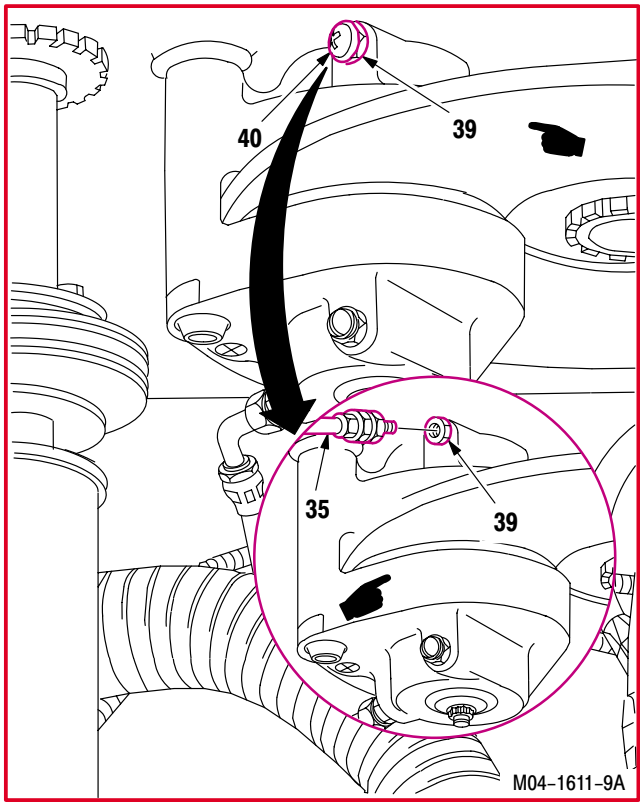
(5) Set **RTR BK** switch (33) to **OFF**.



x. **Remove bleeder hose (35) from forward bleed valve (39).**

(1) Hold valve (39). Remove hose (35).

(2) Install screw (40) in valve (39).



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1.35. HYDRAULIC SYSTEM BLEED – continued

WARNING

Hydraulic pressure is 3000 psi. This can cause injury. If injury occurs, seek medical aid.

y. **Adjust AGPU output pressure to 3000 psi** (TM 55-1730-229-12)**.**

z. **Turn AGPU low pressure bleed valve 1/4 turn open (CCW) for system bleed** (TM 55-1730-229-12)**.**

aa. **Set TAIL WHEEL switch (42) on pilot instrument panel to LOCK.**

NOTE

Control motions must be slow to moderate during actuator movement. This will allow air in system to dispense through AGPU pressure bleed.

ab. **Actuate hydraulic system.**

(1) Articulate pylons 10 complete cycles.

(a) Open access door L115 (para 2.2).

(b) Toggle **PYLON ACTG** switch (43) to the **UP** position then **DOWN** 10 cycles.

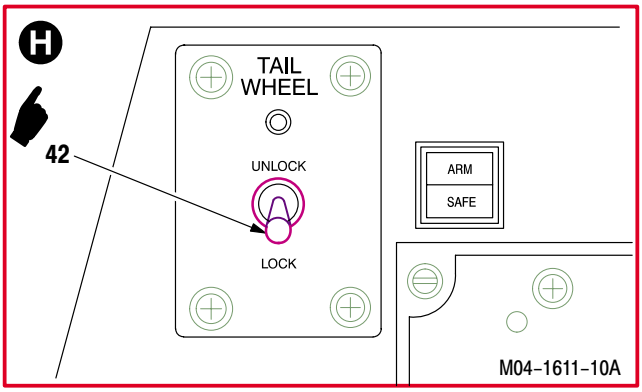
(2) Articulate flight controls 10 complete cycles.

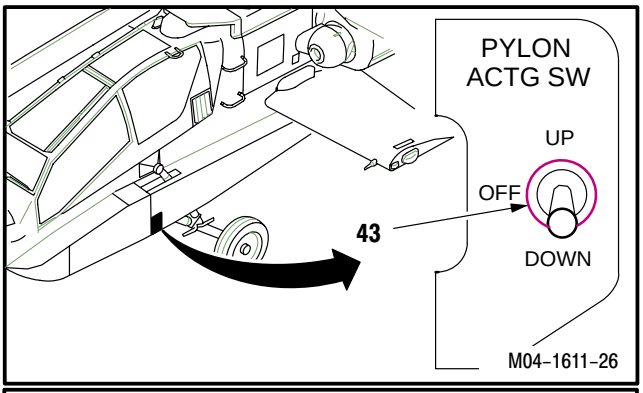
(a) Slowly move pilot cyclic stick (44) in a box motion 10 complete cycles.

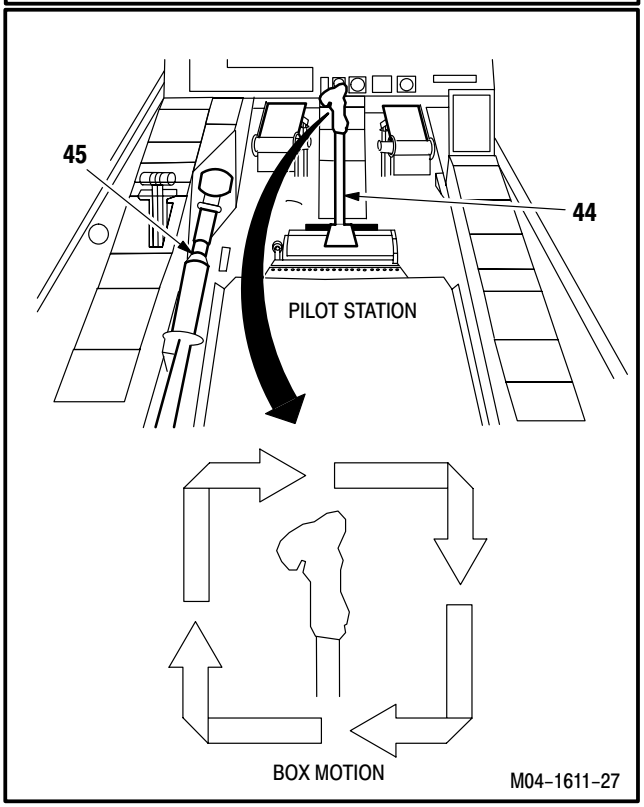
NOTE

Movement of cyclic stick to all four corner stops will be one cycle.

(b) Slowly move pilot collective stick (45) to full up position, then to full down. Repeat 10 complete cycles.







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1.35. HYDRAULIC SYSTEM BLEED – continued

(c) Slowly push pilot right pedal (46) forward to stop then back to center. Repeat for left pedal. Repeat 10 complete cycles.

(3) Verify primary and utility manifold fluid levels are correct (para 1.34).

(4) Check for air bubbles in the AGPU air bleed sight gage. Repeat steps (1) and (2) as required to clear remaining bubbles.

ac. **Reduce AGPU output pressure to 0 psi and shut down AGPU** (TM 55-1730-229-12)**.**

ad. **Disconnect AGPU return hose (13) from return "Y" hose coupling (14).**

(1) Turn coupling nut (16) counterclockwise until it clears "Y" hose coupling (14).

(2) Install cap (15) on "Y" hose coupling (14).

ae. **Disconnect AGPU pressure hose (17) from pressure "Y" hose coupling (18).**

(1) Turn coupling nut (20) counterclockwise until it clears "Y" hose coupling (18).

(2) Install cap (19) on "Y" hose coupling (18).

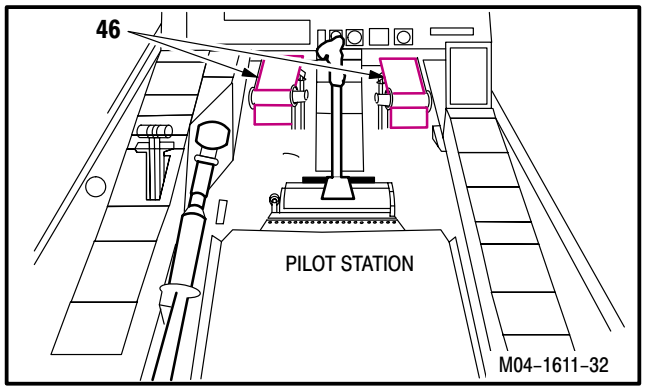
af. **Perform APU power up** (para 1.75)**.**

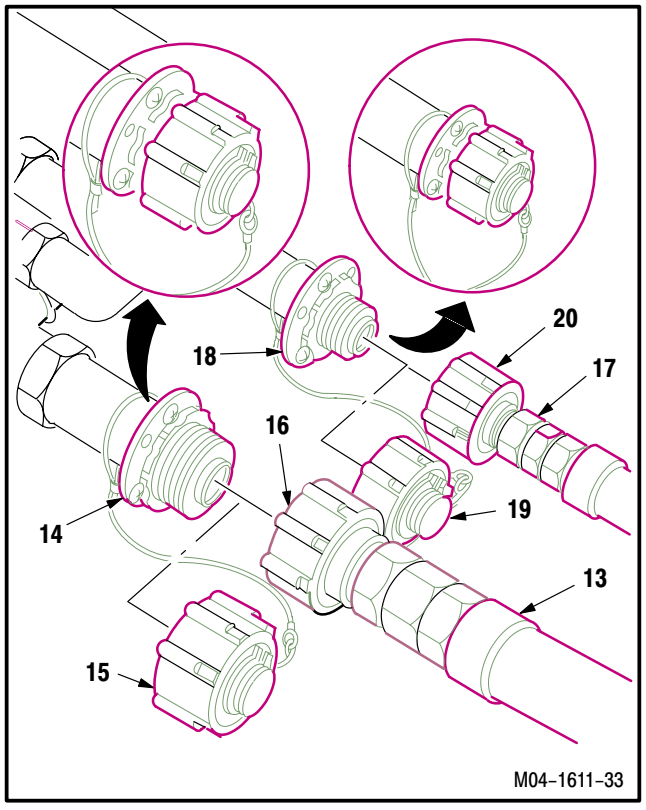
ag. **Perform TADS power up** (TM 1-1270-476-20)**.**

ah. **Perform area weapon system power up** (TM 9-1090-208-23)**.**

WARNING

- **Hydraulic pressure is 3000 psi. This can cause injury. If injury occurs, seek medical aid.**
- **To prevent injury when moving gun turret, ensure that all personnel are clear of gun travel area during turret operation. If injury occurs, seek medical aid.**





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1.35. HYDRAULIC SYSTEM BLEED – continued

NOTE

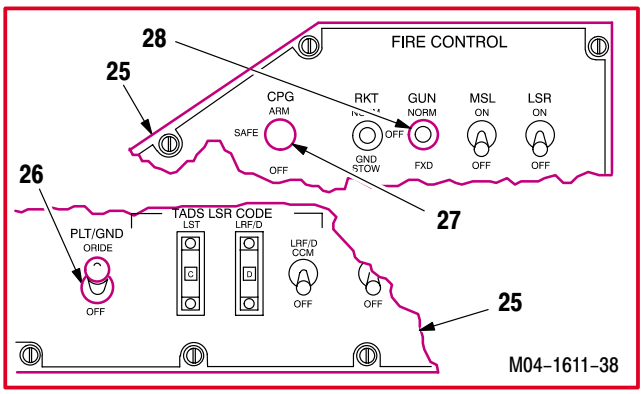
Gun will be slaved to TADS to accomplish azimuth and elevation movement.

ai. **Actuate area weapons system.**

(1) Cycle gun 10 complete cycles in azimuth and elevation.

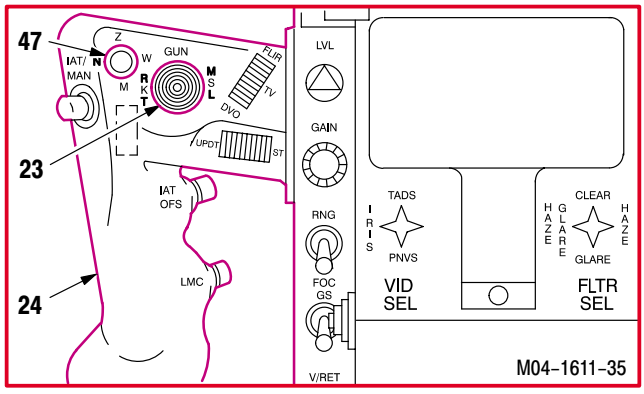
(a) Set switches on CPG **FIRE CONTROL** panel (25):

Switch	Position
PLT/GND (26)	**ORIDE**
CPG SAFE/ARM (27)	**SAFE**
GUN (28)	**NORM**



(b) Set **RKT/GUN/MSL** switch (23) on CPG ORT left handgrip (24) to **GUN**.

(2) Select **N/Z/W/M** field of view switch (47) on CPG ORT left handgrip (24) to **M** medium field of view position.



(3) Slew TADS to full up elevation, then to full down elevation (TM 1-1270-476-20). Repeat 10 complete cycles.

(4) Slew TADS to full left azimuth, then to full right azimuth (TM 1-1270-476-20). Repeat 10 complete cycles.

(5) Set **RKT/GUN/MSL** switch (23) on CPG ORT left handgrip (24) to center position.

(6) Set **GUN NORM/OFF/FIXED** switch (28) on CPG FIRE control panel (25) to **OFF**.

aj. **Perform TADS power down** (TM 1-1270-476-20)**.**

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1.35. HYDRAULIC SYSTEM BLEED – continued

ak. **Repeat step ab.(1) and (2) to articulate pylons and flight controls 10 complete cycles.**

al. **Perform area weapon system power down** (TM 9-1090-208-23)**.**

am. **Perform APU power down** (para 1.75)**.**

an. **Connect AGPU return hose (13) to return "Y" hose coupling (14).**

(1) Remove cap (15) from "Y" hose coupling (14).

(2) Turn coupling nut (16) clockwise until seated and locking teeth engage fully with teeth on "Y" hose coupling (14).

ao. **Connect AGPU pressure hose (17) to pressure "Y" hose coupling (18).**

(1) Remove cap (19) from "Y" hose coupling (18).

(2) Turn coupling nut (20) clockwise until seated and locking teeth engage fully with teeth on "Y" hose coupling (18).

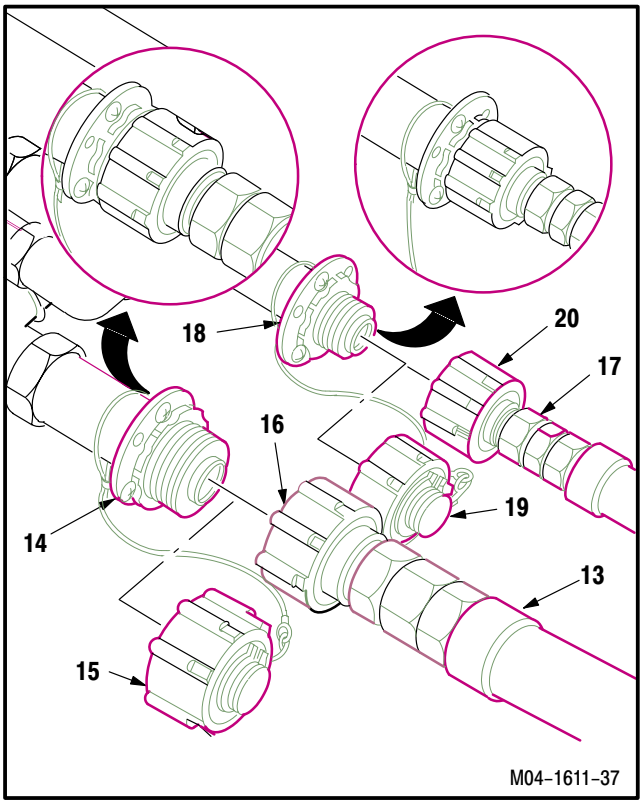
CAUTION

Hydraulic pressure is 3000 psi. This can cause injury. If injury occurs, seek medical aid.

ap. **Apply hydraulic pressure to helicopter.**

(1) Adjust AGPU output pressure to **3000 psi** (TM 55-1730-229-12).

aq. **Turn AGPU low pressure bleed valve 1/4 turn open (CCW) for system bleed** (TM 55-1730-229-12)**.**



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1.35. HYDRAULIC SYSTEM BLEED – continued

ar. **Repeat steps ab.(1) and (2) to articulate pylons and flight controls 10 complete cycles as required until AGPU sight gauge is clear of bubbles.**

as. **Close access door L115** (para 2.2)**.**

at. **Adjust AGPU output pressure to 0 psi** (TM 55-1730-229-12)**.**

au. **Bleed primary hydraulic reservoir.**

(1) Place pail under primary hydraulic overflow drain (48) to catch fluid.

(2) Disconnect return “Y” hose (2) from primary return coupling (4). Install cap (6).

(3) Slowly increase AGPU output pressure to **250 psi** (TM 55-1730-229-12). **Do not exceed 400 psi.**

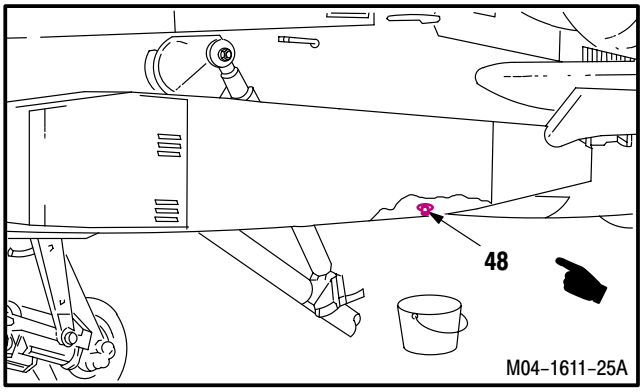
(4) Hold pressure until overflow drain fluid is free of air bubbles.

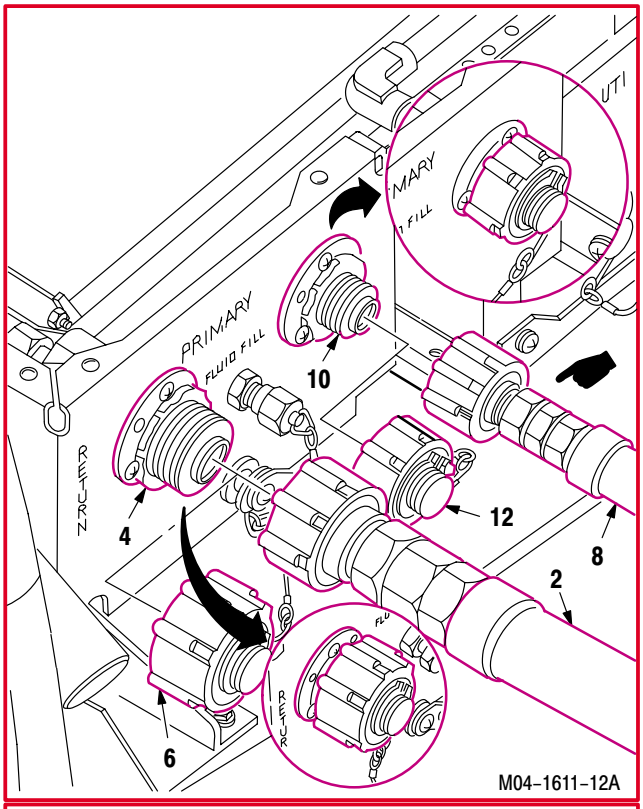
(5) Reduce AGPU output pressure to **0 psi** (TM 55-1730-229-12).

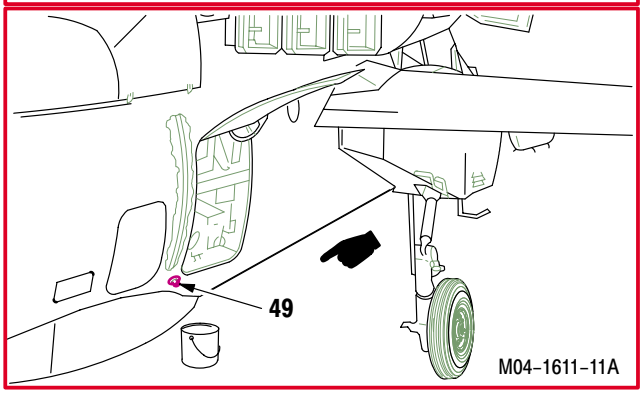
(6) Disconnect pressure “Y” hose (8) from primary pressure coupling (10). Install cap (12).

av. **Bleed utility hydraulic reservoir.**

(1) Place utility pail under utility hydraulic overflow (49) to catch fluid.







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1.35. HYDRAULIC SYSTEM BLEED – continued

(2) Disconnect return “Y” hose (1) from utility return coupling (3). Install cap (5).

(3) Slowly increase AGPU output pressure to **250 psi** (TM 55-1730-229-12). **Do not exceed 400 psi.**

(4) Hold pressure until overflow drain fluid is free of air bubbles.

(5) Reduce AGPU output pressure to **0 psi** (TM 55-1730-229-12).

(6) Disconnect pressure “Y” hose (7) from utility pressure coupling (9). Install cap (11).

aw. **Connect return “Y” hose (1) and (2) to utility return coupling (3) and primary return coupling (4).**

(1) Remove caps (5) and (6).

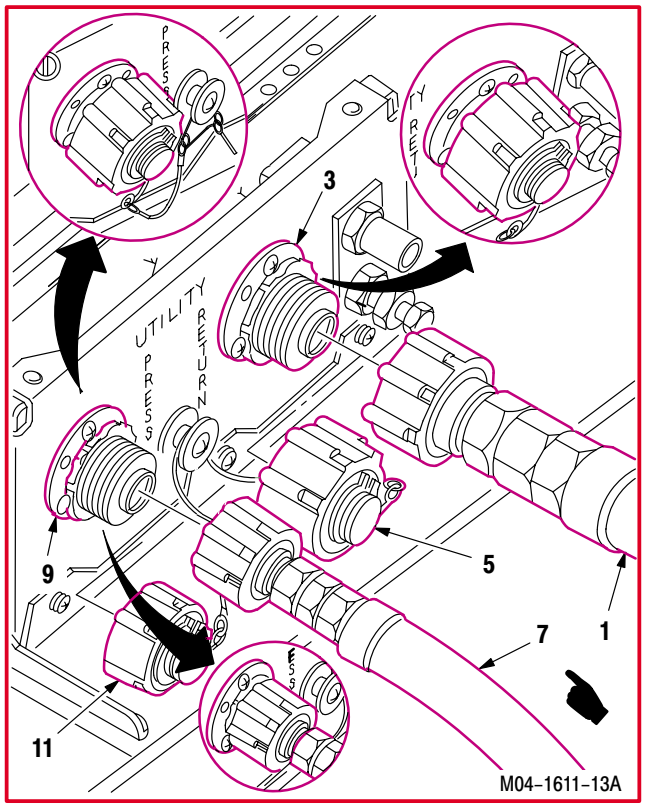
ax. **Pressurize primary and utility hydraulic manifold by applying external power – air** (para 1.71)**.**

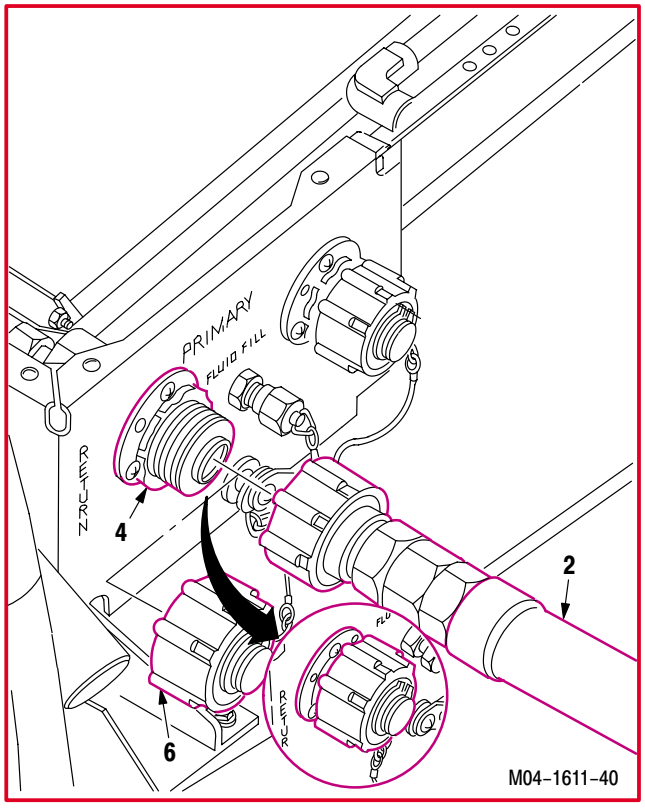
ay. **Operate air pressure until primary and utility manifold piston indicator is in normal operating range** (para 1.34)**.**

az. **Remove external power – air** (para 1.71)**.**

ba. **Disconnect return “Y” hose (1) and (2) from utility return coupling (3) and primary return coupling (4).**

(1) Install caps (5) and (6).





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1.35. HYDRAULIC SYSTEM BLEED – continued

bb. **Disconnect AGPU return hose (13) from return "Y" hose coupling (14).**

(1) Turn coupling nut (16) counterclockwise until it clears "Y" hose coupling (14).

(2) Install cap (15) on "Y" hose coupling (14).

bc. **Disconnect AGPU pressure hose (17) from pressure "Y" hose coupling (18).**

(1) Turn coupling nut (20) counterclockwise until it clears "Y" hose coupling (18).

(2) Install cap (19) on "Y" hose coupling (18).

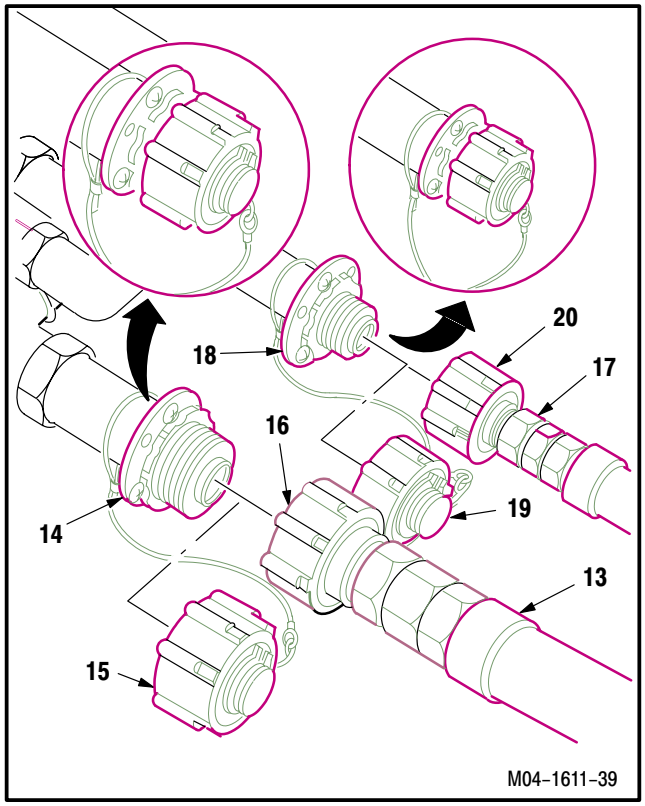
bd. **Set BATT/EXT PWR switch (21) on ELEC PWR control panel (22) to OFF.**

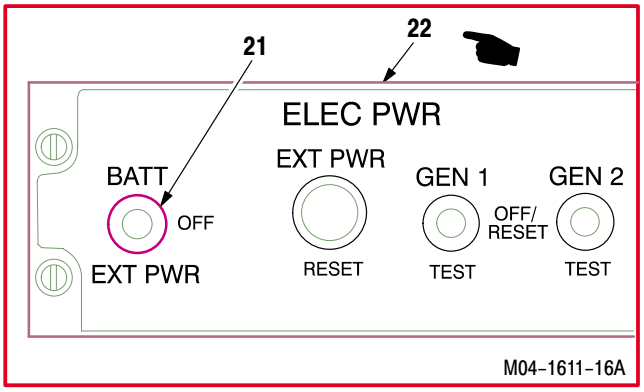
be. **Inspect (QA).**

bf. **Perform primary and utility hydraulic maintenance operational check** (TM 1-1520-238-T)**.**

bg. **Remove external power – electrical** (para 1.70)**.**

bh. **Secure access doors T250L, T250R, T290L, T290R, L325, and R325; install fairing L175** (para 2.2)**.**





END OF TASK

1.36. UTILITY HYDRAULIC ACCUMULATOR SERVICING – NITROGEN

1.36.1. Description

This task covers: Servicing.

1.36.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Industrial goggles (item 156, App H)
Nitrogen hand truck (item NO TAG, App H)
30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access door R325 opened

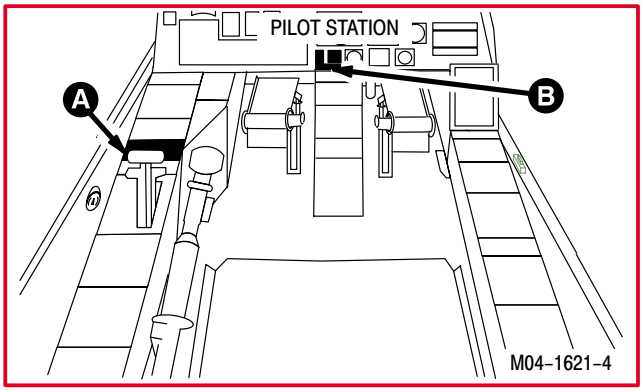
Personnel Required:

67R Attack Helicopter Repairer

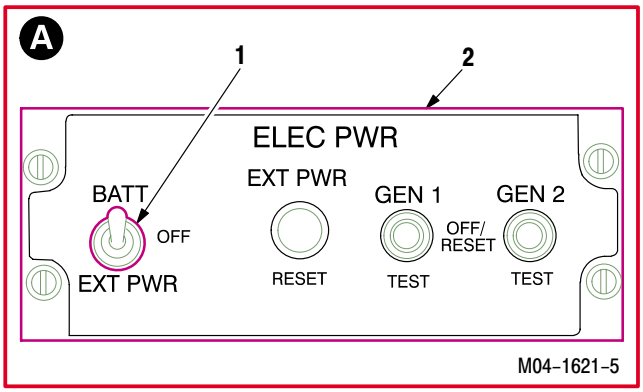
1.36.3. Servicing

a. **Connect battery** (para 9.40)**.**

b. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**



c. **Set BATT/EXT PWR switch (1) on ELEC PWR control panel (2) to BATT.**



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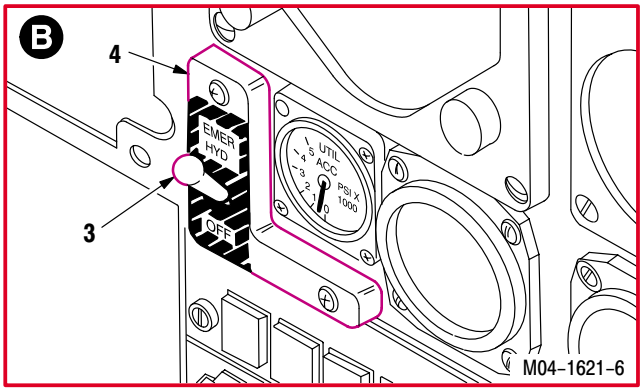
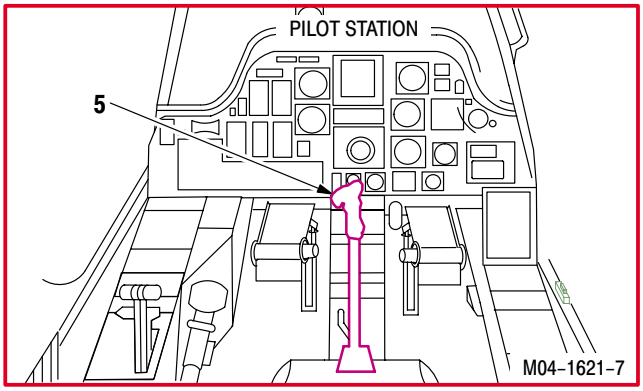
1.36. UTILITY HYDRAULIC ACCUMULATOR SERVICING – NITROGEN – continued

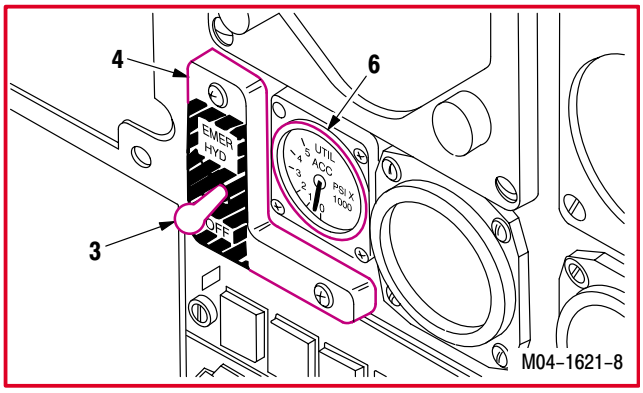
d. **Set EMER HYD switch (3) on EMER HYD panel (4) to EMER HYD.**



e. **Move pilot cyclic stick (5) until UTIL ACC indicator (6) indicates 0 psi.**

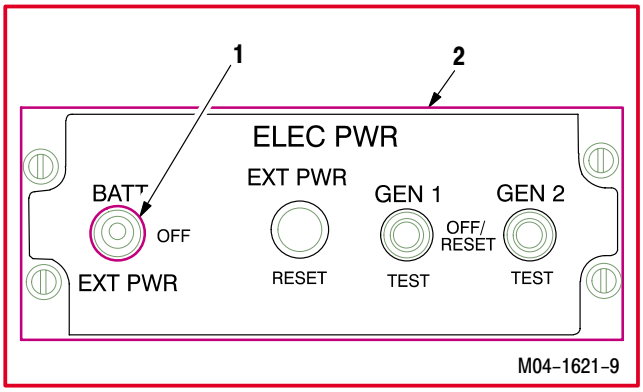


f. **Set EMER HYD switch (3) on EMER HYD panel (4) to OFF.**



g. **Set BATT/EXT PWR switch (1) on ELEC PWR control panel (2) to OFF.**

h. **Disconnect battery** (para 9.40)**.**



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1.36. UTILITY HYDRAULIC ACCUMULATOR SERVICING – NITROGEN – continued

WARNING

The utility hydraulic accumulator contains high pressure nitrogen. Open and close valve carefully to prevent possible injury from sudden blast. If injury occurs, seek medical aid.

i. **Vent utility hydraulic pressure** (para 7.57)**.**

j. **Connect nitrogen truck service hose (7) to valve (8).**

(1) Remove cap (9) from valve (8).

(2) Hold valve (8). Loosen nut (10). Do not allow pressure to escape.

(3) Install service hose nut (11) on valve (8).

k. **Service utility hydraulic accumulator according to specifications on chart (12).**

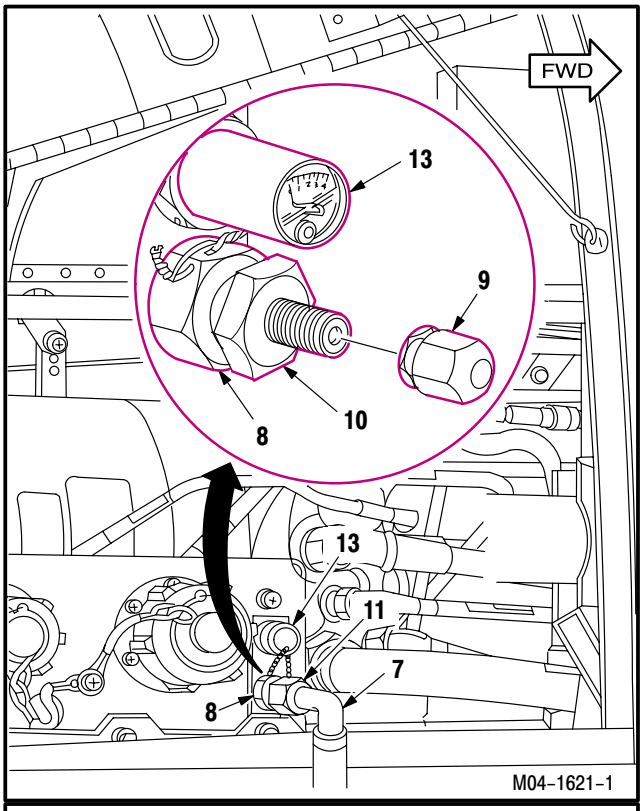
(1) Loosen nut (10) until resistance is felt; then loosen 1/2 to 3/4 turn to off seat valve.

(2) Select correct pressure from chart (12) according to temperature.

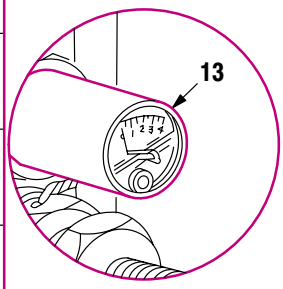
(3) Tighten nut (10) when gage (13) reads correct pressure.

NOTE

Allow pressure to stabilize 5 minutes. Adjust pressure if necessary.



OUTSIDE AIR TEMPERATURE (°F)	NITROGEN PRESSURE (psig)
-65 TO -55	1235-1285
-55 TO -45	1265-1315
-45 TO -35	1295-1345
-35 TO -25	1325-1375
-25 TO -15	1355-1405
-15 TO -5	1385-1435
-5 TO +5	1415-1465
+5 TO +15	1445-1495
+15 TO +25	1474-1525
+25 TO +35	1505-1555
+35 TO +45	1535-1585
+45 TO +55	1565-1615
+55 TO +65	1595-1645
+65 TO +75	1625-1675
+75 TO +85	1655-1705
+85 TO +95	1685-1735
+95 TO +105	1715-1765
+105 TO +115	1745-1795
+115 TO +125	1775-1825
+125 TO +135	1805-1855
+135 TO +145	1835-1885



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1.36. UTILITY HYDRAULIC ACCUMULATOR SservicING – NITROGEN – continued

CAUTION

This chart is for use on aircraft equipped with winterization kit only.

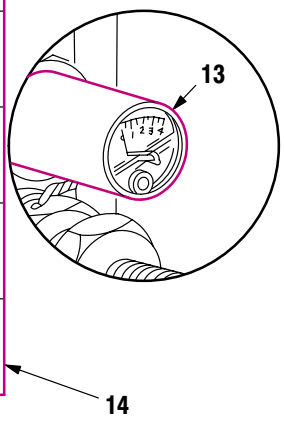
l. **Service utility hydraulic accumulator according to specifications in chart (14).**

(1) Loosen nut (10) until resistance is felt; then loosen 1/2 to 3/4 turn to off seat valve.

(2) Select correct pressure from chart (14) according to temperature.

(3) Tighten nut (10) when gage (13) reads correct pressure.

OUTSIDE AIR TEMPERATURE (°F)	NITROGEN PRESSURE (psig)
+65 TO +75	1995 – 2083
+55 TO +65	1957 – 1995
+45 TO +55	1919 – 1957
+35 TO +45	1881 – 1919
+25 TO +35	1843 – 1881
+15 TO +25	1805 – 1843
+5 TO +15	1767 – 1805
–5 TO +5	1729 – 1767
–15 TO –5	1691 – 1729
–25 TO –15	1653 – 1691
–35 TO –25	1615 – 1653
–45 TO –35	1577 – 1615



M04–1621–10

NOTE

Allow pressure to stabilize 5 minutes. Adjust pressure if necessary.

m. **Disconnect nitrogen truck service hose (7) from valve (8).** Torque nut (10) to **60 INCH-POUNDS**.

(1) Remove nitrogen pressure.

(2) Hold valve (8). Remove nut (11).

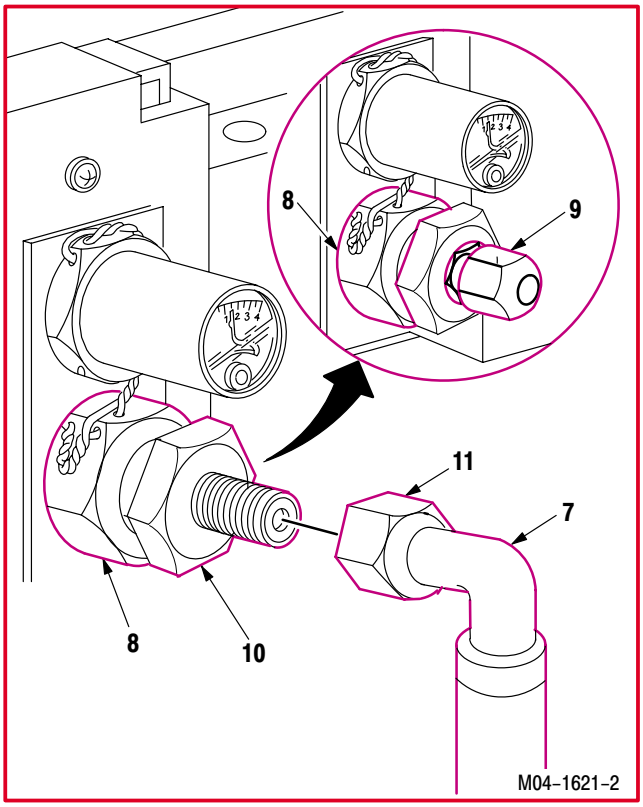
(3) Torque nut (10) to **60 INCH-POUNDS**. Use torque wrench.

(4) Install cap (9) on valve (8).

n. **Inspect (QA).**

o. **Service utility hydraulic system with fluid** (para 1.34)**.**

p. **Secure access door R325** (para 2.2)**.**



M04–1621–2

END OF TASK

1.37. UTILITY HYDRAULIC RETURN ACCUMULATOR SERVICING – NITROGEN

1.37.1. Description

This task covers: Servicing.

1.37.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Tire inflator assembly (item 364, App H)
Nitrogen hand truck (item NO TAG, App H)
30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

Materials/Parts:

Wire (item 226, App F)

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access fairing L175 removed

1.37.3. Servicing

WARNING

The utility hydraulic accumulator contains high pressure nitrogen. Open and close valve carefully to prevent possible injury from sudden blast. If injury occurs, seek medical aid.

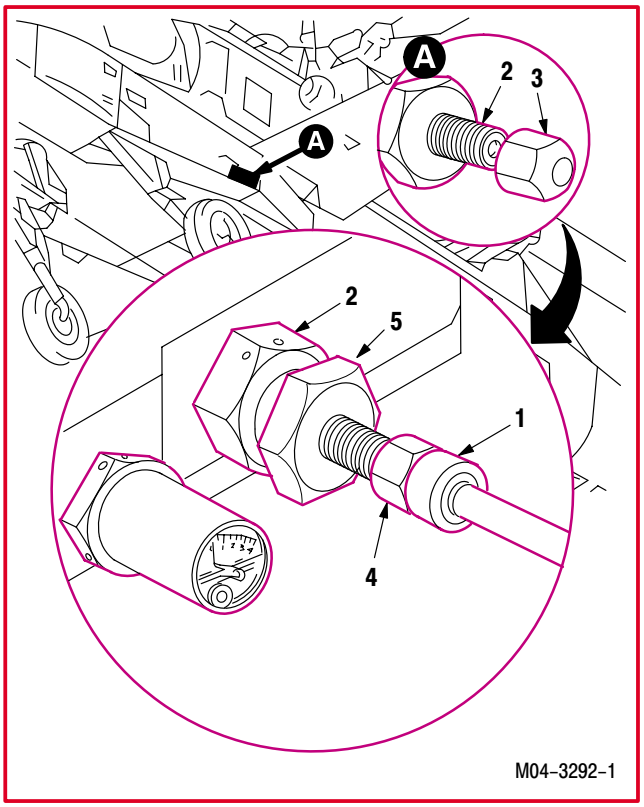
a. **Vent utility hydraulic pressure** (para 7.57)**.**

b. **Connect nitrogen truck and inflator kit service hose (1) to valve (2).**

(1) Remove cap (3) from valve (2).

(2) Remove lockwire from valve (2).

(3) Hold valve (2). Install quick-disconnect adapter (4) and service hose (1) on valve (2).



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1.37. UTILITY HYDRAULIC RETURN ACCUMULATOR SERVICING – NITROGEN – continued

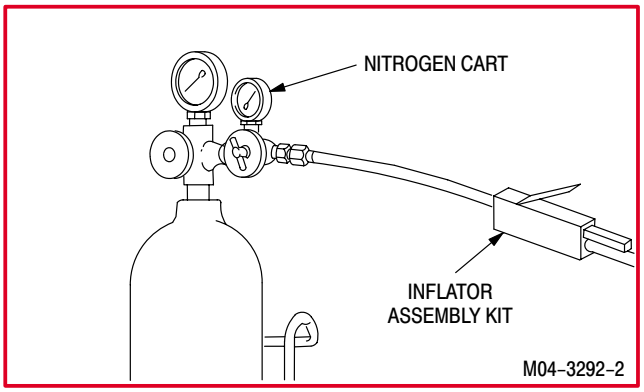
c. **Service utility hydraulic return accumulator with 55 PSIG nitrogen.**

(1) Hold valve (2). Loosen nut (5) until resistance is felt; then loosen 1/2 to 3/4 turn to off seat valve.

(2) Slowly pressurize accumulator to 55 PSIG using pressure regulator and pressure gage in inflator kit.

(3) Allow pressure to stabilize 5 minutes. Readjust pressure if necessary.

(4) Tighten nut (5).



d. **Disconnect nitrogen truck and inflator kit service hose (1) from valve (2).** Torque nut (5) to **60 INCH-POUNDS**.

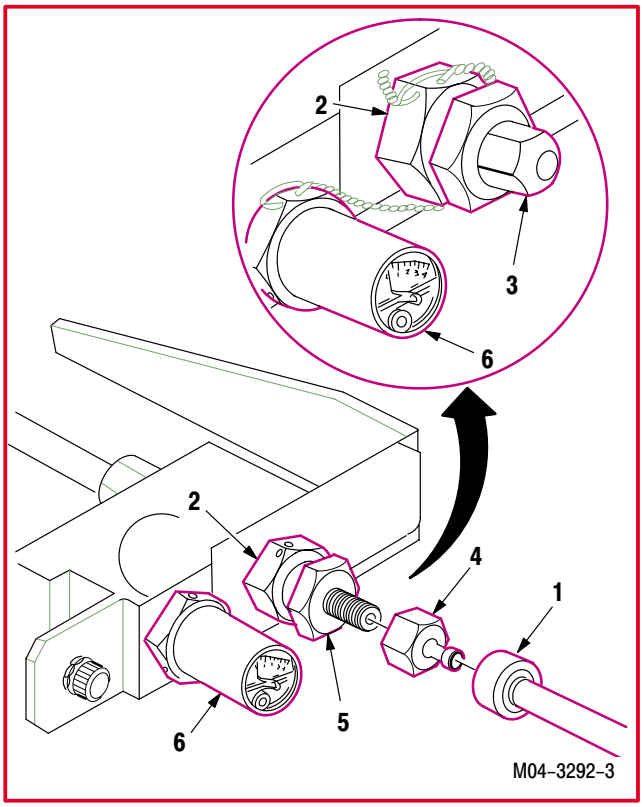
(1) Remove nitrogen pressure.

(2) Hold valve (2). Remove hose (1) and adapter (4).

(3) Torque nut (5) to **60 INCH-POUNDS**. Use torque wrench.

(4) Install cap (3) on valve (2).

(5) Lockwire valve (2) to pressure gage (6). Use wire (item 226, App F).



e. **Inspect (QA).**

f. **Service utility hydraulic system with fluid** (para 1.34)**.**

g. **Install access fairing L175** (para 2.2)**.**

END OF TASK

1.38. UTILITY HYDRAULIC ACCUMULATOR VENTING

1.38.1. Description

This task covers: Venting.

1.38.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

Materials/Parts:

Wire (item 226, App F)

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access door R325 opened

1.38.3. Venting

a. **Vent utility hydraulic accumulator.** Torque nut (1) to **60 INCH-POUNDS**.

(1) Remove cap (2) from fill/bleed valve (3).

(2) Remove lockwire from valve (3).

(3) Hold valve (3). Loosen nut (1) until resistance is felt; then loosen 1/2 to 3/4 turn to off seat valve.

(4) Open valve (3) until gage (4) indicates zero.

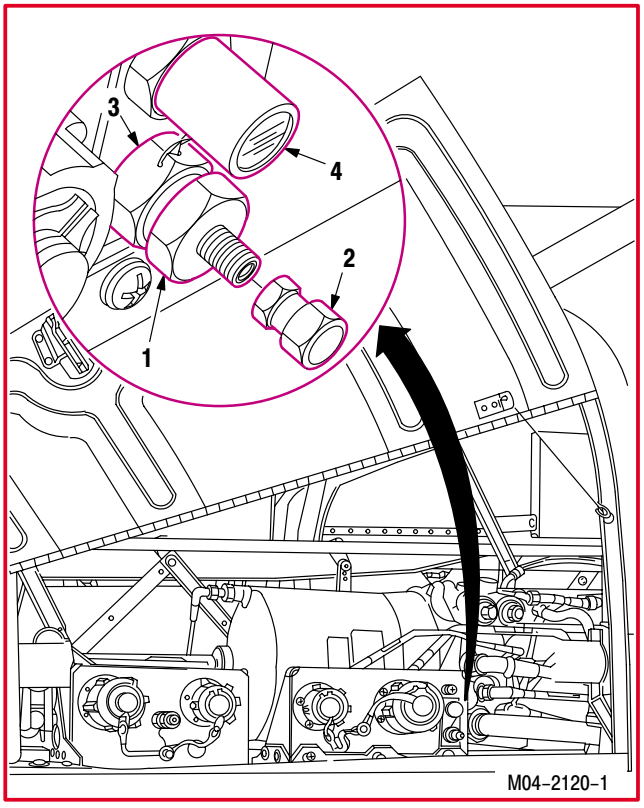
(5) Torque nut (1) to **60 INCH-POUNDS**. Use torque wrench.

(6) Install cap (2).

(7) Lockwire fill/bleed valve (3) to pressure gage (4). Use wire (item 226, App F).

b. **Inspect (QA).**

c. **Secure access door R325** (para 2.2)**.**



END OF TASK

1.39. UTILITY HYDRAULIC RETURN ACCUMULATOR VENTING

1.39.1. Description

This task covers: Venting.

1.39.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

Materials/Parts:

Wire (item 226, App F)

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access fairing L175 removed

1.39.3. Venting

a. **Vent utility hydraulic return accumulator.** Torque nut (1) to **60 INCH-POUNDS**.

(1) Remove cap (2) from fill/bleed valve (3).

(2) Remove lockwire from valve (3).

(3) Hold valve (3). Loosen nut (1) until resistance is felt; then loosen 1/2 to 3/4 turn to off seat valve.

(4) Open valve (3) until gage (4) indicates zero.

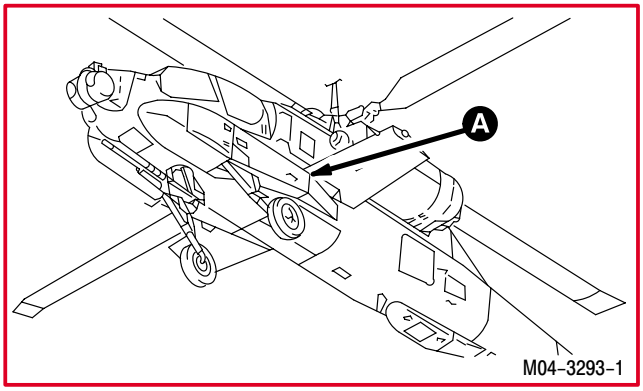
(5) Torque nut (1) to **60 INCH-POUNDS**.Use torque wrench.

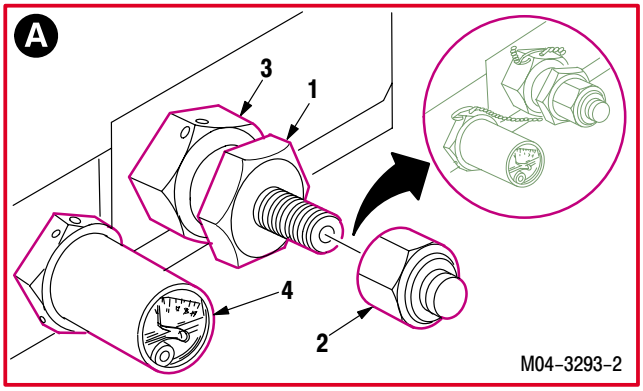
(6) Install cap (2).

(7) Lockwire fill/bleed valve (3) to pressure gage (4). Use wire (item 226, App F).

b. **Inspect (QA).**

c. **Install access fairing L175** (para 2.2)**.**





END OF TASK

1.40. MAIN LANDING GEAR SHOCK STRUT SERVICE – NITROGEN

1.40.1. Description

This task covers: Service.

1.40.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Nitrogen hand truck (item NO TAG, App H)
30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

Personnel Required:

67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.66	Main landing gear jacks in place and weight on wheels or Main landing gear jacked (optional method)

Materials/Parts:

Wire (item 226, App F)

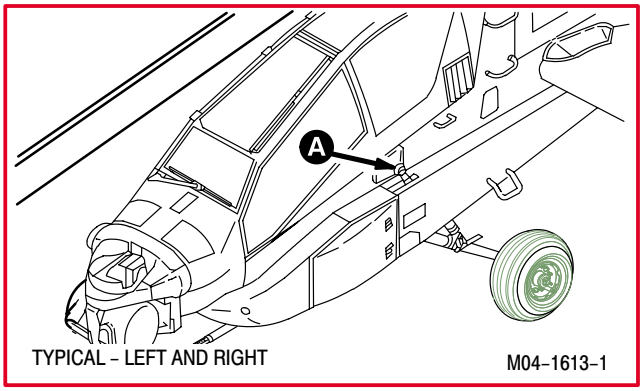
NOTE

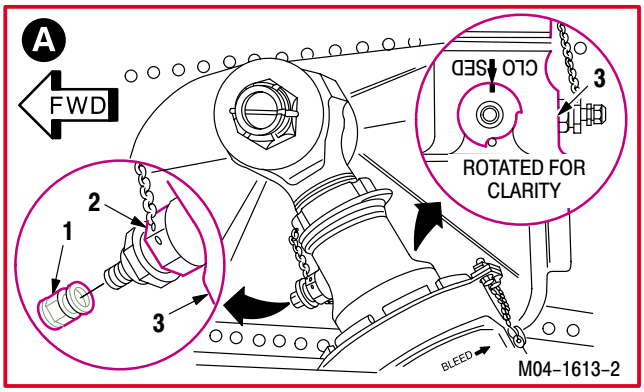
This task is typical for both main landing gear shock struts, except as noted.

1.40.3. Service

a. **Remove cap (1) from charging valve (2) on shock strut (3).**

(1) Remove lockwire if required to hold valve.





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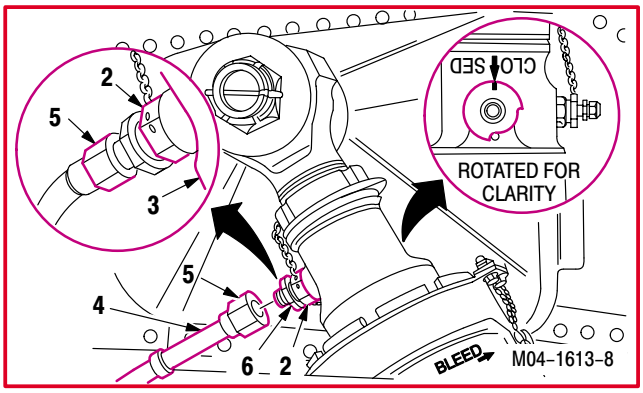
1.40. MAIN LANDING GEAR SHOCK STRUT SERVICE – NITROGEN – continued

b. **Connect nitrogen truck hose (4) to valve (2).** Torque nut (5) to **60 INCH-POUNDS**.

(1) Hold valve (2).

(2) Install nut (5) on valve (2).

(3) Torque nut (5) to **60 INCH-POUNDS**. Use torque wrench.



c. **Open valve (2) on shock strut (3).**

(1) Hold valve (2).

(2) Loosen nut (6) until resistance is felt; then loosen 1/2 to 3/4 turn to offseat valve.

NOTE

- Go to step d. to service shock strut with jacks in place and weight on wheels.
- Go to step e. to service shock strut with helicopter jacked (para 1.66) and wheels free of ground.

d. **Inflate shock strut (3).** Torque nut (6) to **60 INCH-POUNDS**.

(1) Inflate shock strut (3) until pressure and distance match one pair of figures on chart (7). Use nitrogen truck.

(2) Measure distance from center of valve (2) to top of gland nut (8).

(3) Hold valve (2).

(4) Torque nut (6) to **60 INCH-POUNDS**. Use torque wrench.

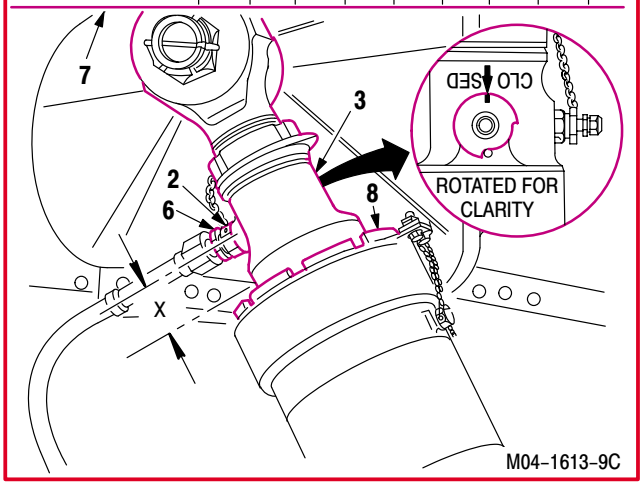
(5) Go to step f.

(WITH JACKS IN PLACE AND WEIGHT ON WHEELS)

SHOCK STRUT INFLACTION INSTRUCTIONS

LOOSEN GAS CHARGING VALVE UPPER 3/4 INCH-HEX NUT UP TO A MAXIMUM OF 3/4 OF A TURN INFLATE WITH DRY NITROGEN UNTIL PRESSURE AND DISTANCE MATCH ONE PAIR OF FIGURES:

PRESSURE± 10 PSIG	2700	2530	2375	2230	2110	2000	1900	1800	1725
DISTANCE X ±.030	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	2.00



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1.40. MAIN LANDING GEAR SHOCK STRUT SERVICE – NITROGEN – continued

e. **Inflate shock strut (3).** Torque nut (6) to **60 INCH-POUNDS**.

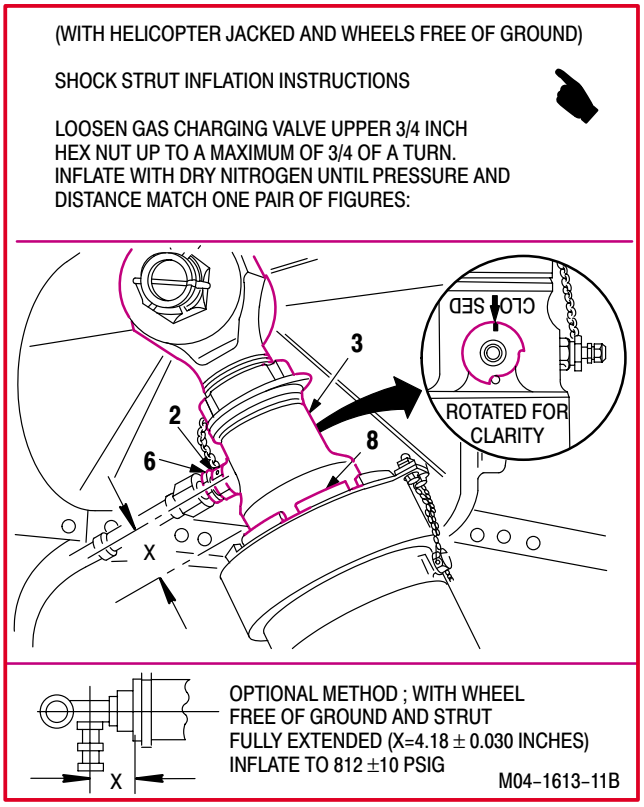
(1) Inflate shock strut (3) to **812 ±10 PSIG**. Use nitrogen truck.

(2) Measure distance from center of valve (2) to top of gland nut (8). Distance shall be **4.18 ±0.030 INCHES**.

(3) Hold valve (2).

(4) Torque nut (6) to **60 INCH-POUNDS**. Use torque wrench.

f. **Inspect (QA).**



g. **Disconnect nitrogen truck hose (4) from valve (2).**

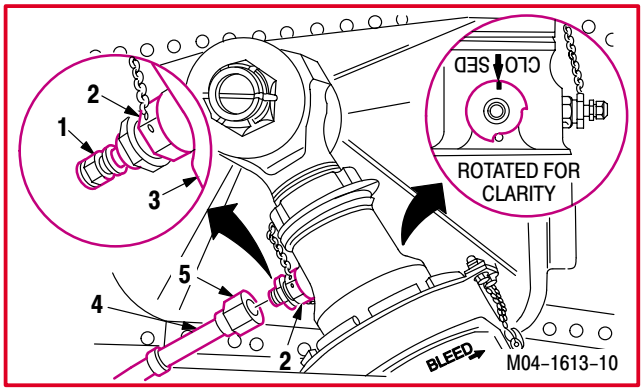
(1) Remove nitrogen pressure.

(2) Hold valve (2).

(3) Remove nut (5) from valve (2). Remove hose (4).

(4) Install cap (1) on valve (2).

(5) Lockwire valve (2) to shock strut (3) if removed. Use wire (item 226, App F).



h. **Repeat steps b. thru e. for opposite main landing gear strut as required.**

i. **Check shock struts for leaks.**

j. **If required, lower helicopter and remove jacks** (para 1.66)**.**

END OF TASK

1.41. MAIN LANDING GEAR SHOCK STRUT SERVICE – FLUID

1.41.1. Description

This task covers: Servicing.

1.41.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
Fluid service unit (item 137, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)
Nitrogen hand truck (item NO TAG, App H)
30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)
Main landing gear bleed hose (figure D-469, App D)

Materials/Parts:

Nipple (MS24392D2 for bleeding)
Packing (MS28778-2 for bleeding)
Packing
Hydraulic fluid (item 93, App F)
Wire (item 226, App F)

Personnel Required:

68H Aircraft Pneudraulics Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

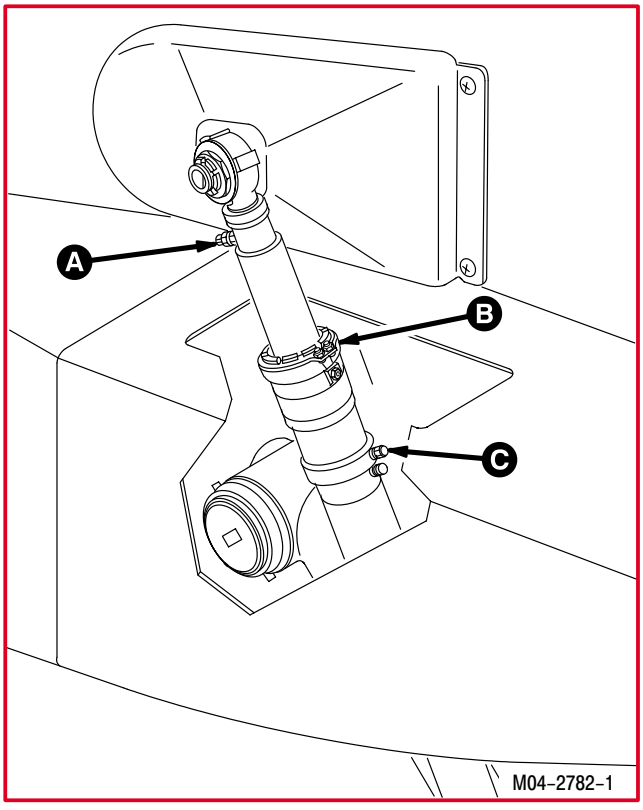
Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.66	Helicopter jacked (three points)
1.67	Main landing gear jacked
2.2	Access fairings L140 and R140 removed

1.41.3. Servicing

NOTE

This task is typical for either left or right main landing gear shock struts, except for position of control.



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1.41. MAIN LANDING GEAR SHOCK STRUT SERVICE – FLUID – continued

a. **Deflate shock strut (1).**

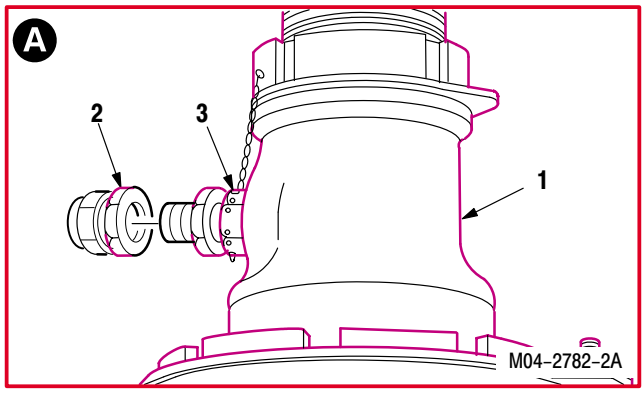
(1) Remove cap (2) from charging valve (3).

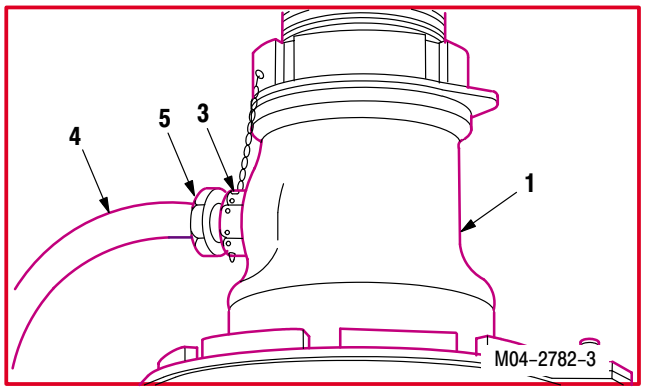
(2) Install hose (4) on valve (3) and outlet end of hose into pail. Use bleed hose (figure D-469, App D) and pail.

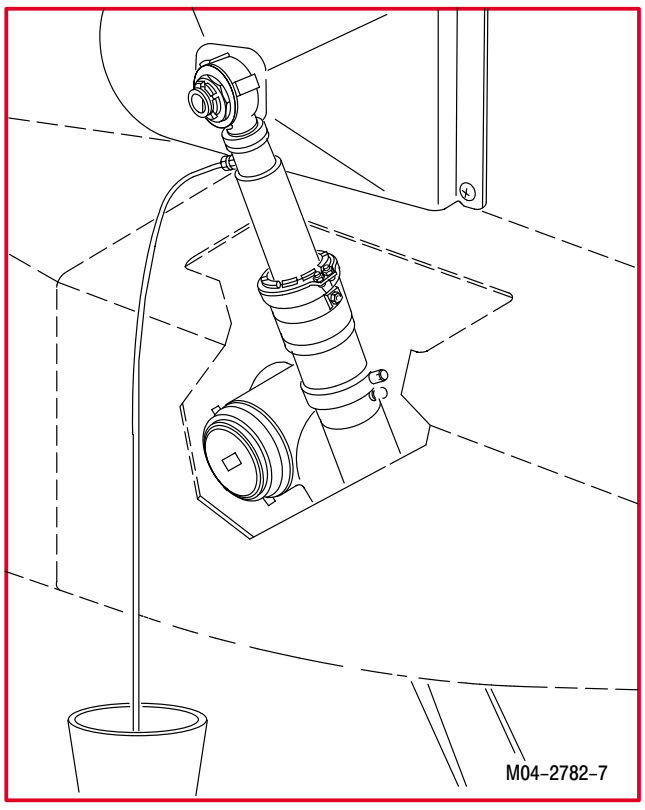
(3) Hold valve (3).

(4) Loosen nut (5) until resistance is felt; then loosen 1/2 to 3/4 turn to off seat valve.

(5) After pressure has escaped, fully open valve (3).







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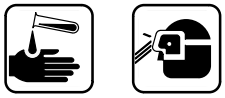
1.41. MAIN LANDING GEAR SHOCK STRUT SERVICE – FLUID – continued

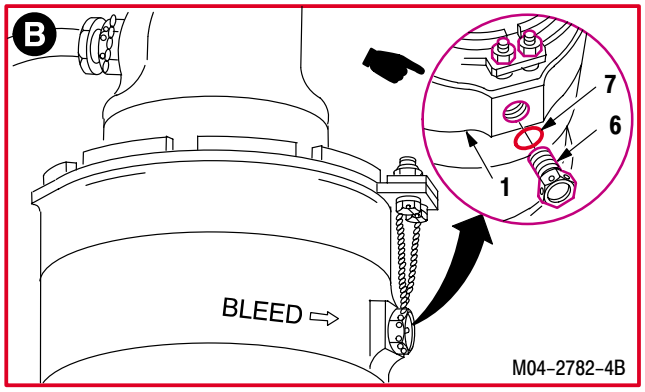


b. **Remove bleed plug (6) from upper section of shock strut (1).**

(1) Remove lockwire from plug (6).

(2) Remove plug (6).

(3) Remove and discard packing (7).



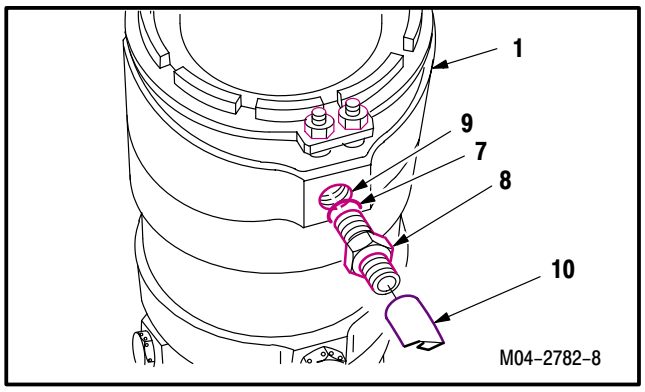
c. **Install nipple (8) on strut (1).**

(1) Lubricate new packing (7) and threads of nipple (8) with hydraulic fluid. Use hydraulic fluid (item 93, App F).

(2) Install packing (7) on nipple (8).

(3) Install nipple (8) in bleed port (9).

(4) Install hose (10) on nipple (8) and outlet end of hose into pail. Use bleed hose (figure D-469, App D) and pail.



d. **Connect hydraulic servicing unit hose (11) to shock strut check valve (12).**

(1) Remove valve cap (13).

(2) Install hose (11) on check valve (12) and tighten nut (14).

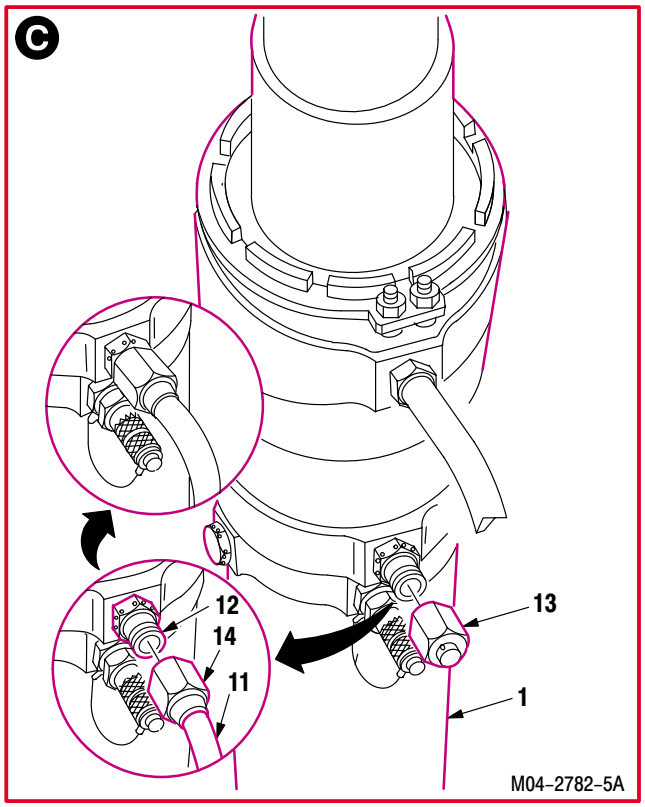
e. **Collapse shock strut (1).** Use main landing gear axle jack (para 1.67).

NOTE

Fluid pressure not to exceed **30 PSI** during filling.

f. **Fill shock strut (1) with hydraulic fluid.**

(1) Fill shock strut (1) until overflow into pail is free of all air bubbles. Use hydraulic servicing unit and hydraulic fluid (item 93, App F).



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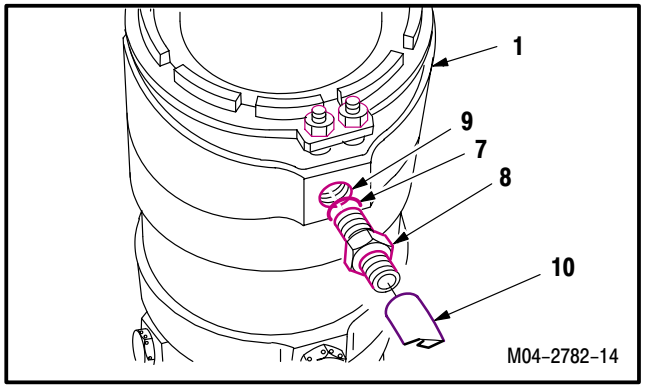
1.41. MAIN LANDING GEAR SHOCK STRUT SERVICE – FLUID – continued

g. **Remove nipple (8) from strut (1).**

(1) Remove hose (10) from nipple (8).

(2) Remove nipple (8) from port (9).

(3) Remove and discard packing (7).



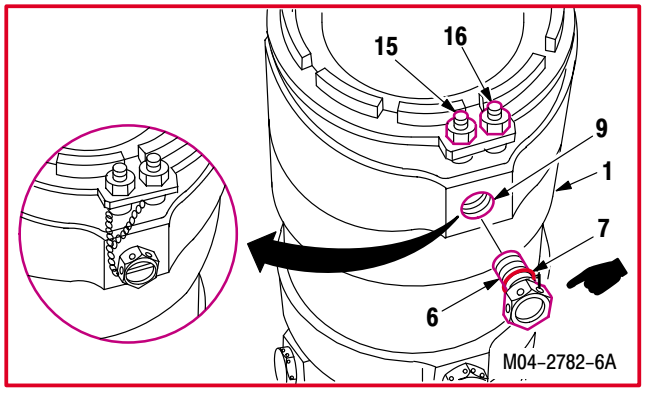
h. **Install plug (6) on strut (1).**

(1) Lubricate new packing (7) and threads of plug (6) with hydraulic fluid. Use hydraulic fluid (item 93, App F).

(2) Install packing (7) on plug (6).

(3) Install plug (6) in port (9).

i. **Lockwire plug (6) to screws (15) and (16).** Use wire (item 226, App F).



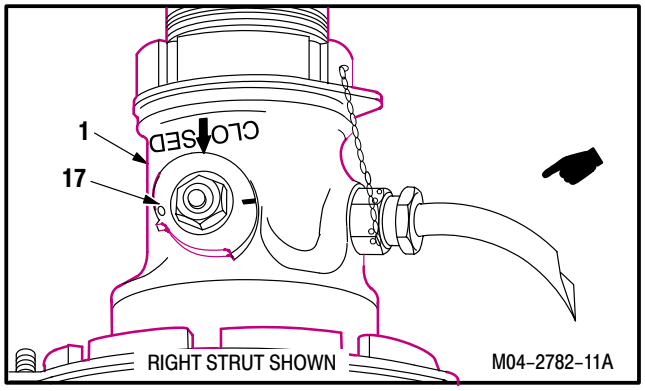
j. **Ensure floating piston is seated at top of strut (1).**

(1) Slowly pressurize strut (1) with hydraulic fluid to **100 to 200 PSI** to seat floating piston.

(2) Remove hydraulic pressure from strut (1).

k. **Open bleed control valve (17).**

(1) Remove lockwire. Rotate valve (17) 90 degrees clockwise.



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1.41. MAIN LANDING GEAR SHOCK STRUT SERVICE – FLUID – continued

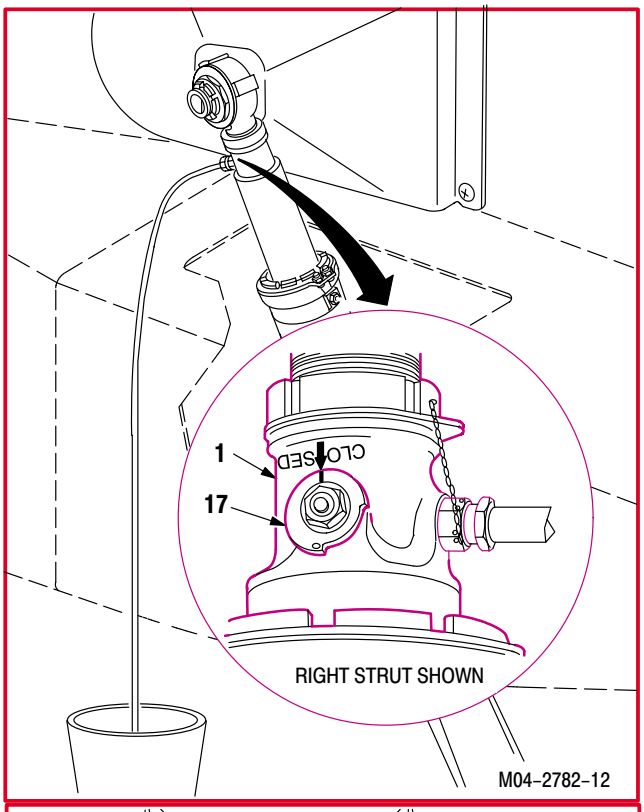
NOTE

Fluid pressure not to exceed **30 PSI** during filling.

l. **Fill shock strut (1) with hydraulic fluid.**

(1) Fill shock strut (1) until overflow into pail is free of all air bubbles. Use hydraulic servicing unit and hydraulic fluid (item 93, App F).

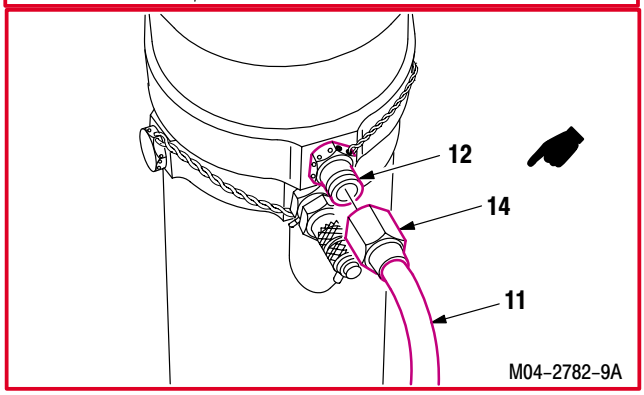
m. **Close valve (17).** Rotate valve (17) counterclockwise to close.



n. **Disconnect hydraulic servicing unit hose (11) from check valve (12).** Torque cap (13) to **135 INCH-POUNDS**.

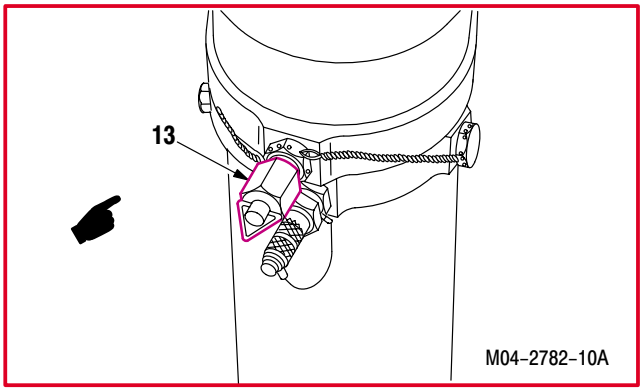
(1) Hold check valve (12).

(2) Loosen nut (14). Remove hose (11) from check valve (12).



(3) Install cap (13).

(4) Torque cap (13) to **135 INCH-POUNDS**. Use torque wrench.



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1.41. MAIN LANDING GEAR SHOCK STRUT SERVICE – FLUID – continued

CAUTION

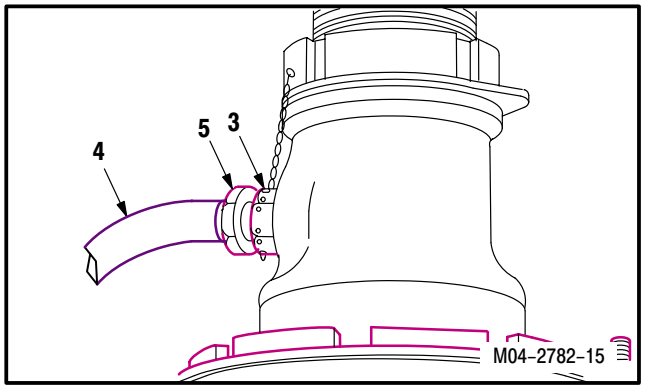
To prevent improper servicing of shock strut, check valve must be closed and capped before removing axle jack.

o. **Close nut (5).** Torque nut (5) to **60 INCH-POUNDS**.

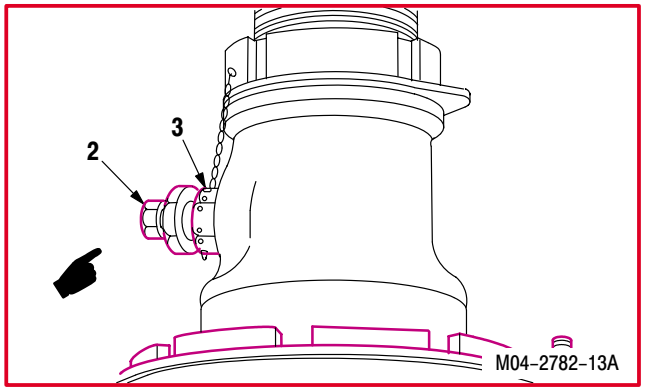
(1) Hold valve (3).

(2) Torque nut (5) to **60 INCH-POUNDS**. Use torque wrench.

(3) Remove hose (4) from valve (3).



(4) Install cap (2) on charging valve (3).



p. **Remove main landing gear from axle jack** (para 1.67)**.**

q. **Service shock strut with nitrogen** (para 1.40)**.**

r. **Remove aircraft from jacks** (para 1.66)**.**

s. **Inspect (QA).**

t. **Install access fairings L140 and R140** (para 2.2)**.**

END OF TASK

1.42. TAIL LANDING GEAR SHOCK STRUT SERVICING – NITROGEN

1.42.1. Description

This task covers: Servicing.

1.42.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Nitrogen hand truck (item NO TAG, App H)
30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

Materials/Parts:

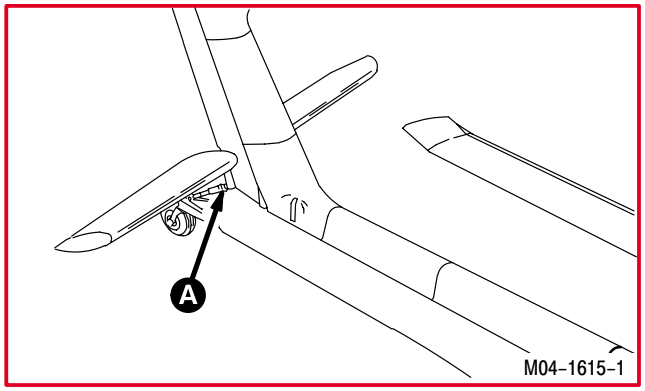
Wire (item 226, App F)

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.68	Tail landing gear jack in place and weight on wheels or Tail landing gear jacked (optional method)



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1.42. TAIL LANDING GEAR SHOCK STRUT SERVICING – NITROGEN – continued

1.42.3. Servicing

a. **Connect nitrogen truck hose (1) to valve (2).** Torque nut (3) to **60 INCH-POUNDS**.

(1) Remove cap (4) from valve (2).

(2) Hold valve (2).

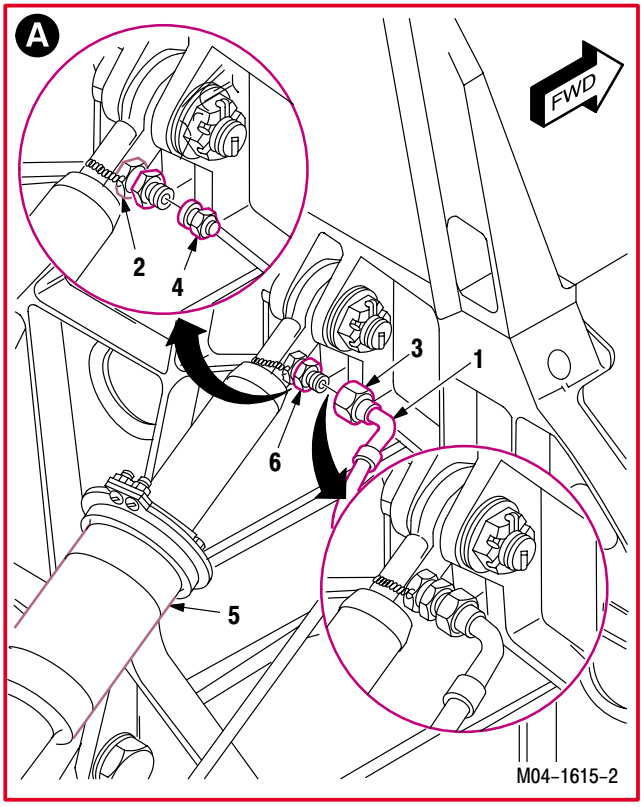
(3) Install nut (3) on valve (2).

(4) Torque nut (3) to **60 INCH-POUNDS**. Use torque wrench.

b. **Open valve (2) on shock strut (5).**

(1) Hold valve (2).

(2) Loosen nut (6) 1/2 turn. Do not exceed 3/4 turn.



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1.42. TAIL LANDING GEAR SHOCK STRUT SERVICING – NITROGEN – continued

NOTE

- Go to step c. to service shock strut with jacks in place and weight on wheels.
- Go to step d. to service shock strut with tail landing gear jacked (para 1.68) and wheel free of ground.

c. **Inflate shock strut (5) to pressures on chart (7).** Torque nut (6) to **60 INCH-POUNDS**.

(1) Inflate shock strut (5) until pressure and distance match one pair of figures on chart (7). Use nitrogen truck.

(2) Measure distance from center of valve (2) to top of gland nut (8).

(3) Hold valve (2).

(4) Torque nut (6) to **60 INCH-POUNDS**. Use torque wrench.

(5) Go to step e.

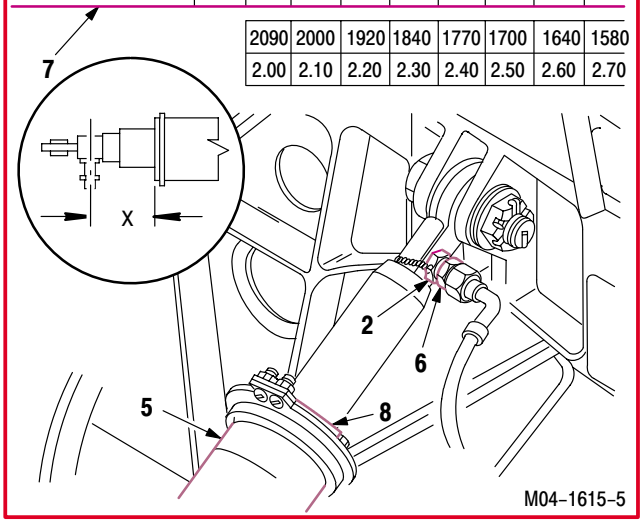
(WITH JACK IN PLACE AND WEIGHT ON WHEEL)

SHOCK STRUT INFLATION INSTRUCTIONS

LOOSEN GAS CHARGING VALVE UPPER 3/4 INCH-HEX NUT UP TO A MAXIMUM OF 3/4 OF A TURN. INFLATE WITH DRY NITROGEN UNTIL PRESSURE AND DISTANCE MATCH ONE PAIR OF FIGURES:

PRESSURE± 10 PSIG	3540	3300	3080	2890	2710	2550	2420	2300	2190
DISTANCE X ±.030	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90

2090	2000	1920	1840	1770	1700	1640	1580
2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70



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1.42. TAIL LANDING GEAR SHOCK STRUT SERVICING – NITROGEN – continued

d. **Inflate shock strut (5).** Torque nut (6) to **60 INCH-POUNDS**.

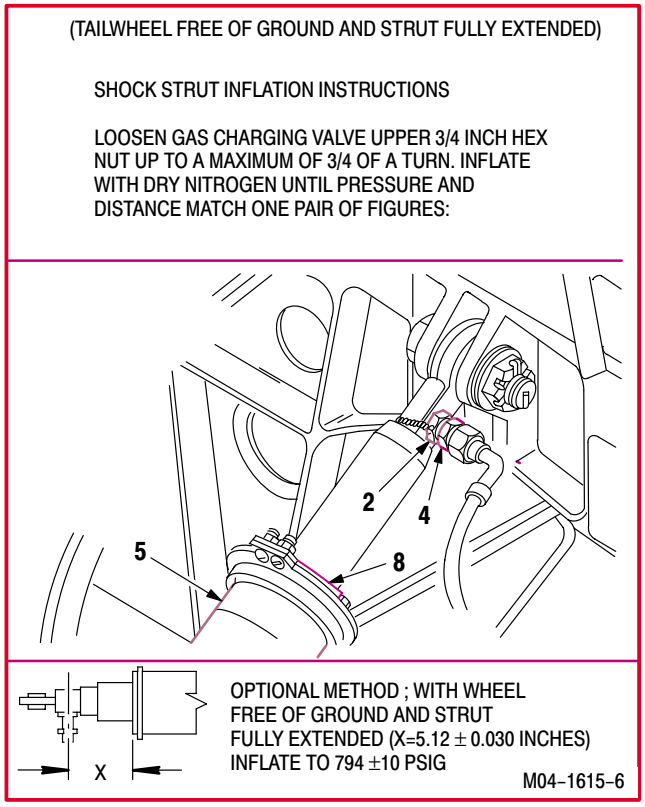
(1) Inflate shock strut (5) to **794 ±10 PSIG**. Use nitrogen truck.

(2) Measure distance from center of valve (2) to top of gland nut (8). Distance shall be **5.12 ±0.030 INCHES**.

(3) Hold valve (2).

(4) Torque nut (6) to **60 INCH-POUNDS**. Use torque wrench.

e. **Inspect (QA).**



f. **Disconnect hose (1) from valve (2).**

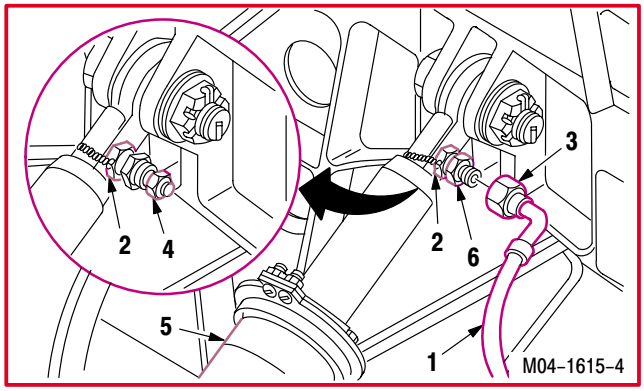
(1) Remove nitrogen pressure.

(2) Hold valve (2).

(3) Remove nut (3) and hose (1).

(4) Install cap (4) on valve (2).

(5) Lockwire valve (2) to shock strut (5) if removed. Use wire (item 226, App F).



g. **Check shock strut for leaks.**

h. **If required, lower tail landing gear and remove jack** (para 1.68)**.**

END OF TASK

1.43. MAIN LANDING GEAR TIRE SERVICING

1.43.1. Description

This task covers: Servicing.

1.43.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Chemical protective gloves (item 154, App H)
Nitrogen hand truck (item NO TAG, App H)

Materials/Parts:

Leak test compound (item 109, App F)

Personnel Required:

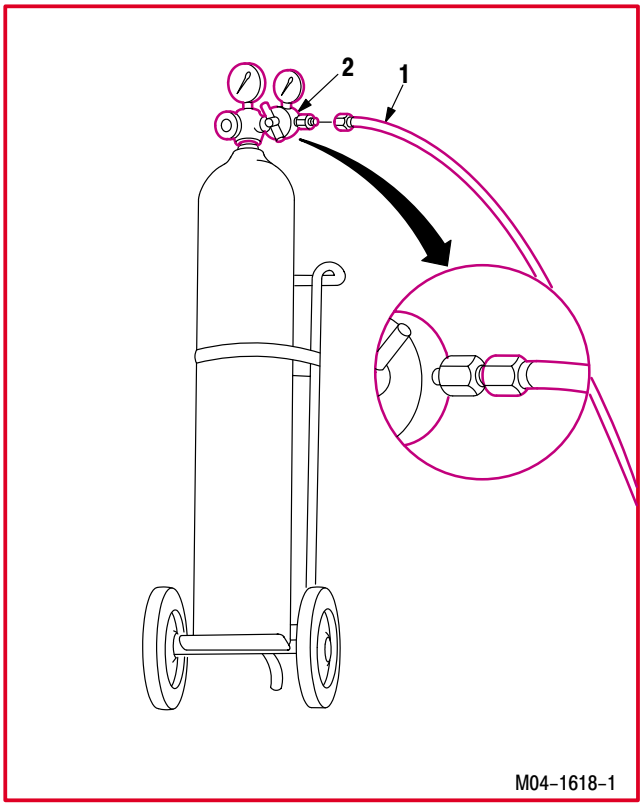
67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

1.43.3. Servicing

a. **Connect tire inflator hose (1) to regulator (2).**



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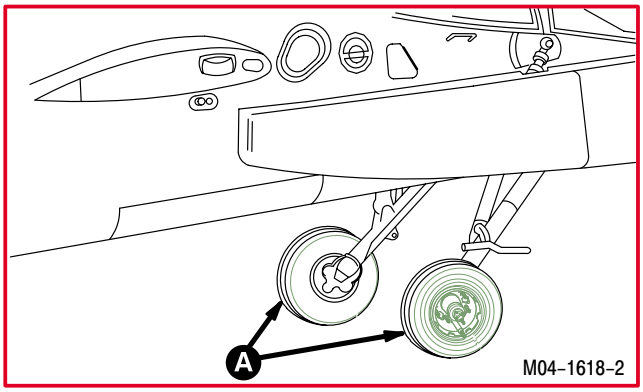
1.43. MAIN LANDING GEAR TIRE SERVICING – continued

WARNING

Tire may explode and cause bodily injury if over inflated. Use extreme care while inflating tire. Keep all personnel away from tire during inflation procedure. If injury occurs, seek medical aid.



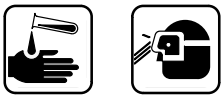
b. **Service main landing gear tire (3) to 105 ±5 psi.**

(1) Remove valve cap (4) from valve stem (5).

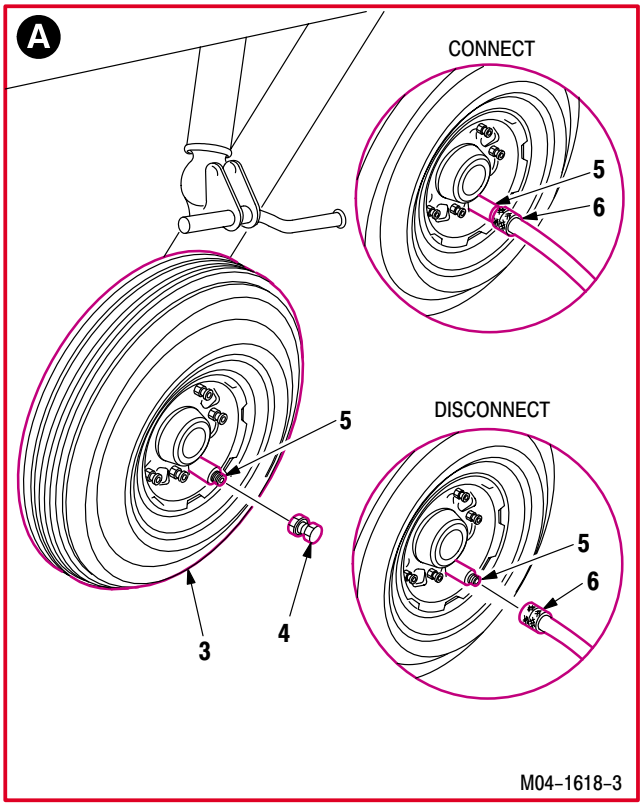
(2) Connect air chuck (6) to stem (5).

(3) Slowly inflate tire (3) to 105 ±5 psi.

(4) Disconnect air chuck (6) from stem (5).



c. **Check tire (3) for leaks.** Use leak test compound (item 109, App F).



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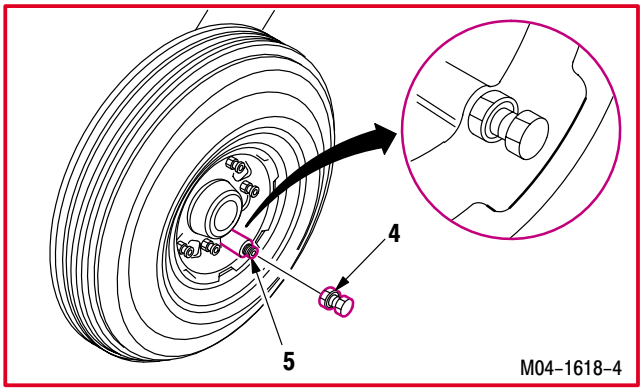
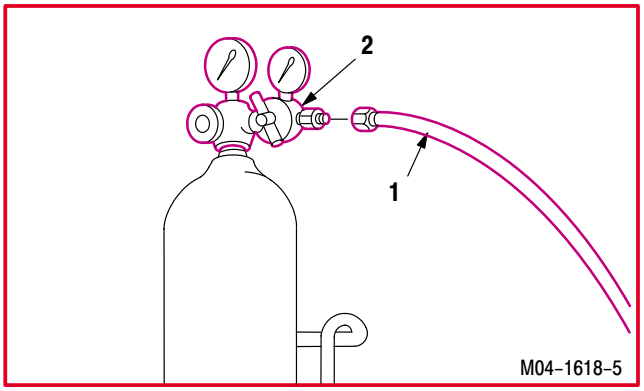
1.43. MAIN LANDING GEAR TIRE SERVICING – continued

d. **Install cap (4) on stem (5).**

e. **Repeat steps b, c, and d for opposite landing gear tire.**



f. **Disconnect tire inflator hose (1) from regulator (2).**



END OF TASK

1.44. TAIL LANDING GEAR TIRE SERVICING

1.44.1. Description

This task covers: Servicing.

1.44.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Chemical protective gloves (item 154, App H)
Nitrogen hand truck (item NO TAG, App H)

Materials/Parts:

Leak test compound (item 109, App F)

Personnel Required:

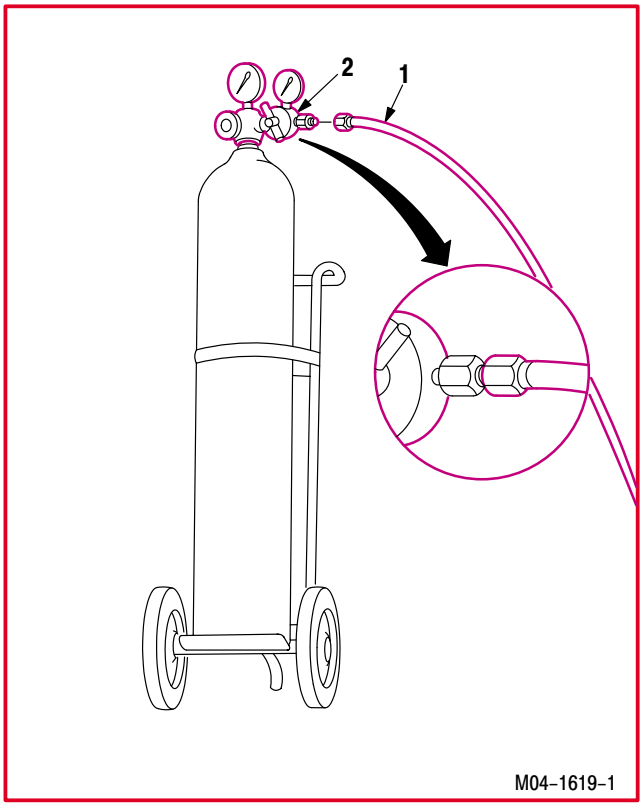
67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

1.44.3. Servicing

a. **Connect tire inflator hose (1) to regulator (2).**



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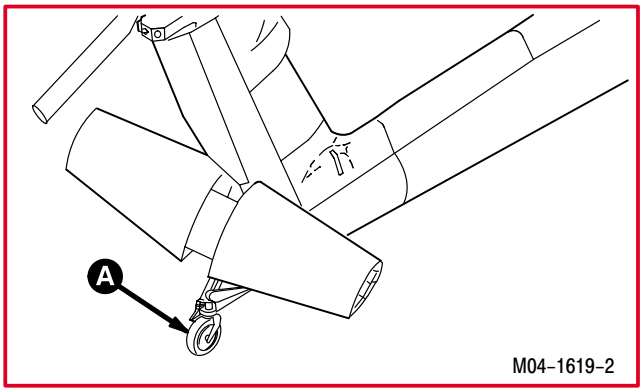
1.44. TAIL LANDING GEAR TIRE SERVICING – continued

WARNING

Tire may explode and cause bodily injury if over inflated. Use extreme care while inflating tire. Keep all personnel away from tire during inflation procedure. If injury occurs, seek medical aid.



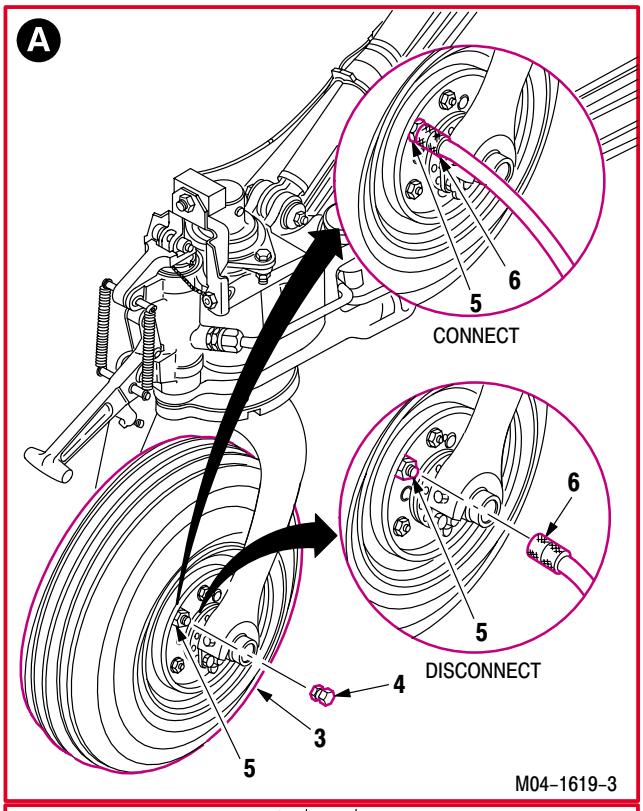
b. **Service tail landing gear tire (3) to 105 ±5 psi.**

(1) Remove valve cap (4) from valve stem (5).

(2) Connect air chuck (6) to stem (5).

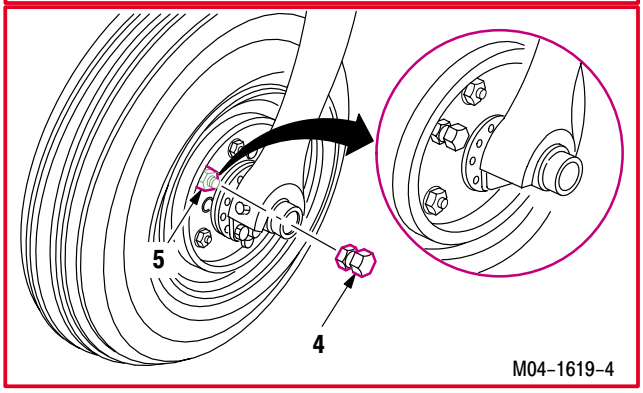
(3) Slowly inflate tire (3) to 105 ±5 psi.

(4) Disconnect air chuck (6) from stem (5).



c. **Check tire (3) for leaks.** Use leak test compound (item 109, App F).

d. **Install cap (4) on stem (5).**



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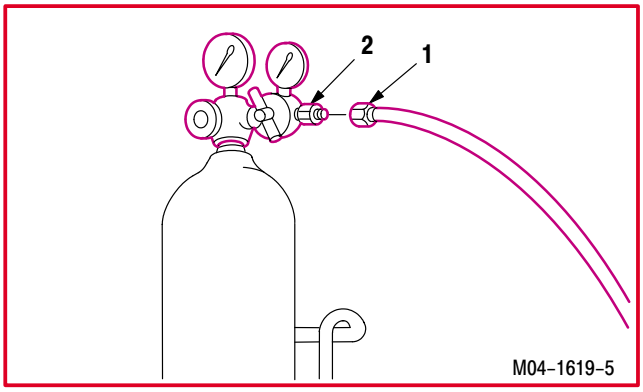
1.44. TAIL LANDING GEAR TIRE SERVICING – continued

e. **Disconnect tire inflator hose (1) from regulator (2).**



END OF TASK

1.45. MAIN LANDING GEAR BRAKE SYSTEM – SERVICE/BLEED

1.45.1. Description

This task covers: Service/Bleed.

1.45.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
Filler and bleeder (item 131, App H)
Chemical protective gloves (item 154, App H)
3/16-inch tube nipple (item 216, App H)
14-quart utility pail (item 222, App H)
Hydraulic brake bleeder tube (item 399, App H)

Materials/Parts:

Seal (2)
Wire (item 226, App F)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.161	CPG seat tilted forward

1.45.3. Service/Bleed

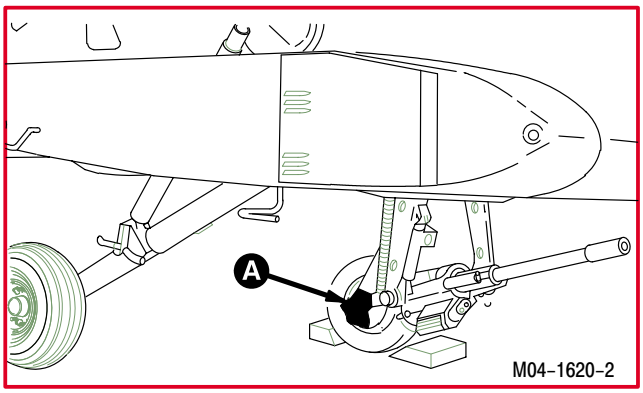
CAUTION

Tighten hose only finger tight when installing bleeder hose. Over torquing can cause damage to bleeder hose or bleeder port.

NOTE

- This task is typical for right and left main landing gear brake. Bleed right side first if bleeding both systems.
- This task is typical for both vendor bleeders except as noted.
- Removal and installation of lockwire is not required on both vendor bleeders.

a. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**



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1.45. MAIN LANDING GEAR BRAKE SYSTEM – SERVICE/BLEED – continued

b. **Release parking brake** (para 1.61)**.**

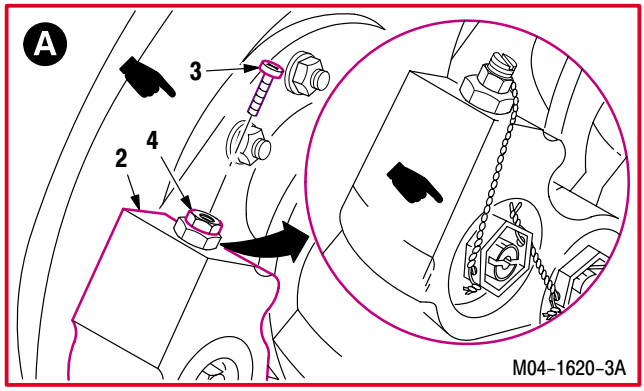
c. **Install hydraulic filler and bleeder pressure hose (1) to wheel brake cylinder (2).**

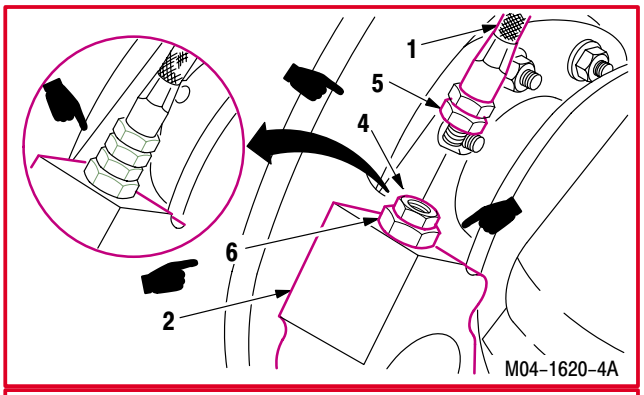
(1) Remove lockwire (if required).

(2) Remove bleeder screw (3) from bleeder valve (4).

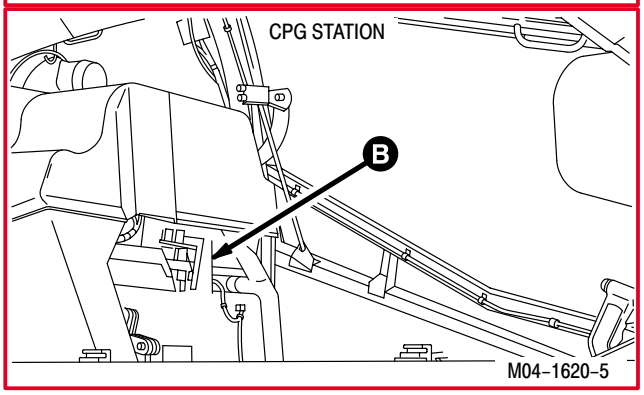
(3) Install hose (1) with nipple tube (5) in bleeder valve adapter (6) on wheel brake cylinder (2).

(4) Loosen bleeder valve (4) as required to allow hydraulic fluid to enter wheel brake cylinder (2).





d. **Enter CPG station** (para 1.56)**. Observe all safety precautions.**



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1.45. MAIN LANDING GEAR BRAKE SYSTEM – SERVICE/BLEED – continued

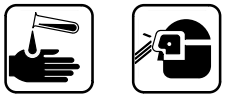
e. **Install bleeder hose (7) to pilot station master cylinder (8).**

(1) Remove lockwire.

(2) Remove screw (9) and seal (10) from port (11). Discard seal (10).

(3) Install hose (7) with adapter (12) in port (11) on master cylinder (8).

(4) Place outlet end of hose (7) in pail.



f. **Bleed pilot station master cylinder (8).**

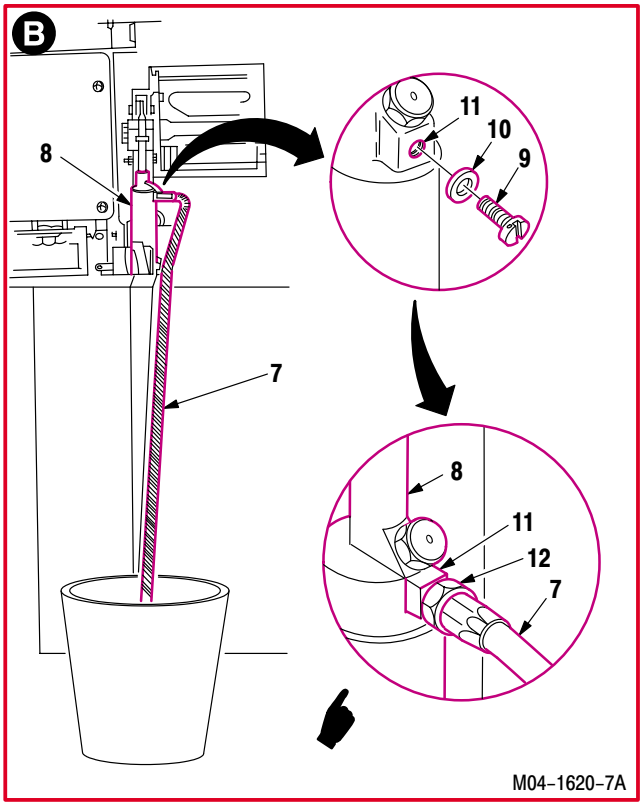
(1) Fill master cylinder (8) through wheel brake cylinder (2) until overflow into pail is free of bubbles. Use filler and bleeder.

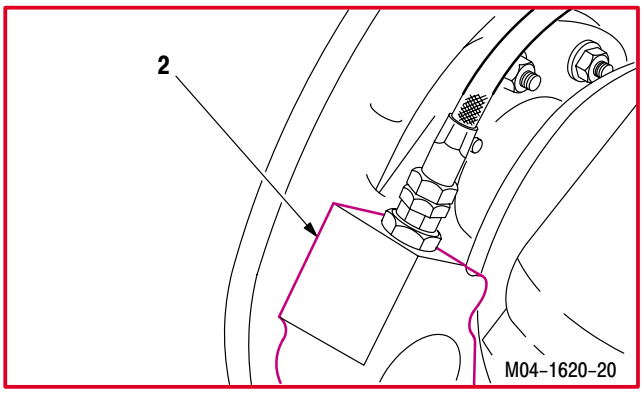
CAUTION

Overservicing the brake hydraulic system may cause system damage.

NOTE

A small amount of fluid can be expected to seep from the check valve weep hole, especially if the brake system is over-serviced with fluid.





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1.45. MAIN LANDING GEAR BRAKE SYSTEM – SERVICE/BLEED – continued

g. **Remove bleeder hose (7) from pilot station master cylinder (8).**

(1) Remove hose adapter (12) with hose (7) from port (11).

(2) Wrap a clean rag around cylinder (8) and allow excess hydraulic fluid to drain from port (11). Wipe up all drained fluid with rag.

(3) Install screw (9) with new seal (10) in port (11).

h. **Lockwire screw (9) to cap (13).** Use wire (item 226, App F).

i. **Set parking brake** (para 1.61)**.**

j. **Install bleeder hose (7) to parking brake compensator bleeder valve (14).**

(1) Remove screw (15) and washer (16).

(2) Install bleeder hose (7) with adapter (12) in bleeder valve (14).

(3) Place outlet end of hose (7) in pail.

(4) Loosen valve (14).

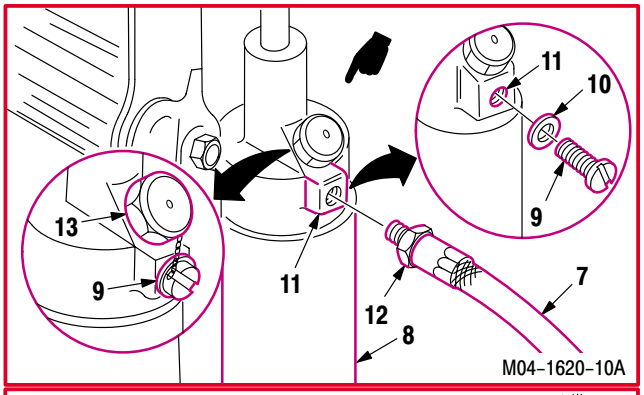
k. **Bleed parking brake compensator bleeder valve (14) until overflow into pail is free of bubbles.** Use filler and bleeder.

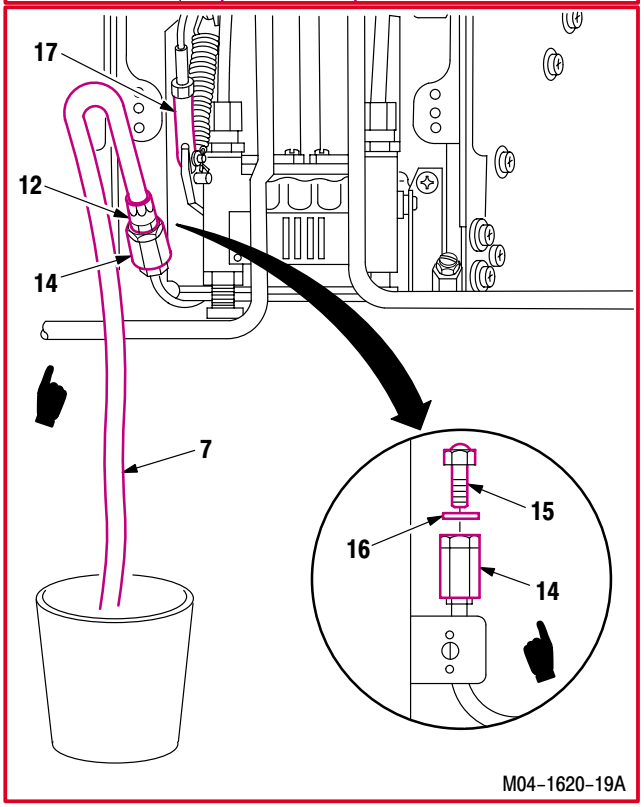
(1) Operate filler and bleeder.

(2) Pull up and hold brake lever (17).

(3) Release brake lever (17) when overflow in pail is free of air bubbles.

(4) Shut off filler and bleeder.





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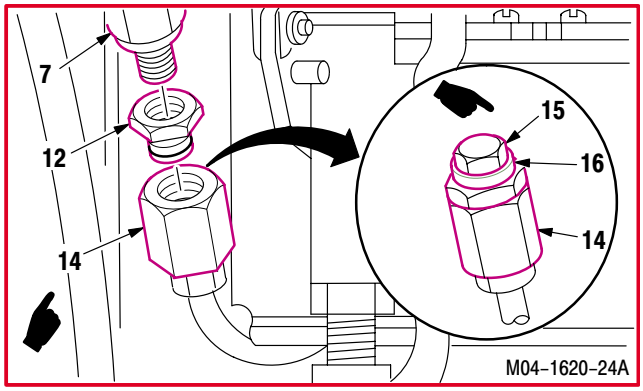
1.45. MAIN LANDING GEAR BRAKE SYSTEM – SERVICE/BLEED – continued

l. **Remove hose (7) from valve (14).**

(1) Tighten valve (14).

(2) Remove hose (7) and adapter (12).

(3) Install washer (16) and screw (15) in valve (14).



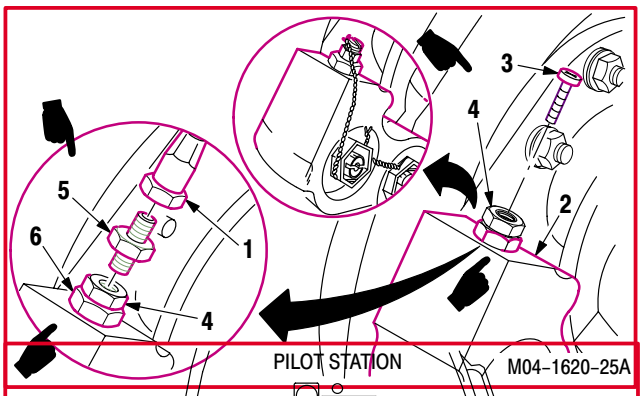
m. **Remove hose (1) from wheel brake cylinder (2).**

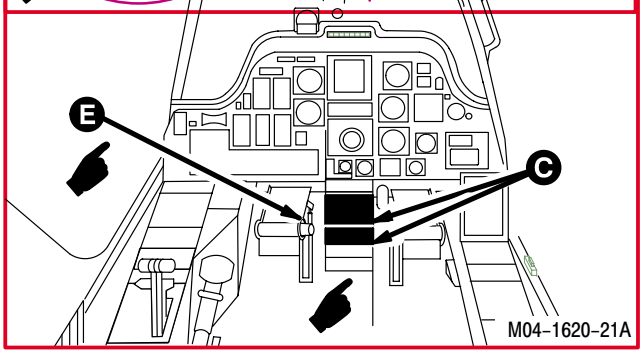
(1) Tighten bleeder valve (4) in bleeder valve adapter (6) on wheel brake cylinder (2).

(2) Remove nipple tube (5) with hose (1) from bleeder valve (4) on adapter (6).

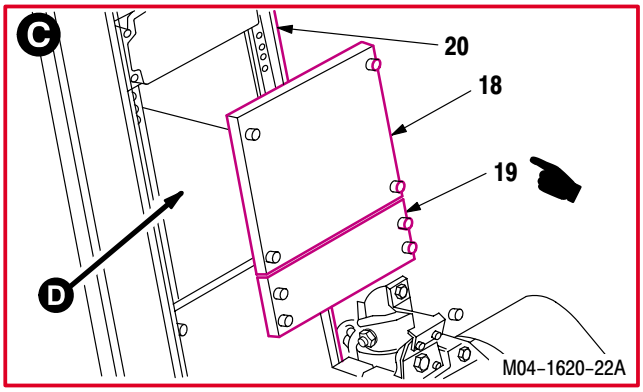
(3) Install bleeder screw (3) in bleeder valve (4).

n. **Lockwire screw (3) to wheel brake cylinder (2) (if required).** Use wire (item 226, App F).





o. **Remove two blank panels (18) and (19) from pilot instrument panel center console (20).**



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1.45. MAIN LANDING GEAR BRAKE SYSTEM – SERVICE/BLEED – continued

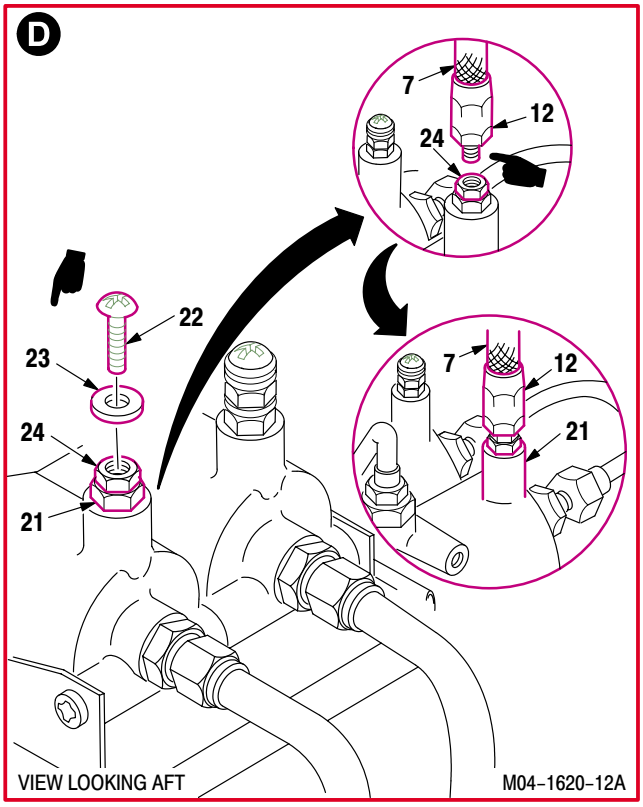
p. **Install bleeder hose (7) to transfer valve (21).**

(1) Remove screw (22) and washer (23) from bleeder valve (24).

(2) Install hose (7) with adapter (12) into valve (24).

(3) Place outlet end of hose (7) in pail.

(4) Loosen bleeder valve (24).

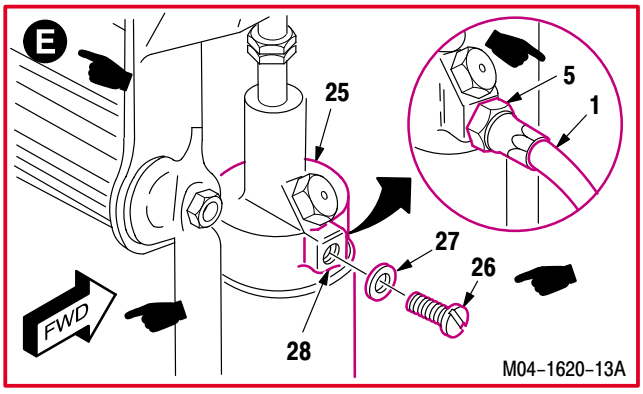


q. **Install hose (1) to CPG master cylinder (25).**

(1) Remove lockwire (if required).

(2) Remove screw (26) and seal (27) from CPG master cylinder port (28). Discard seal (27).

(3) Install hose (1) with nipple tube (5) into port (28).



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1.45. MAIN LANDING GEAR BRAKE SYSTEM – SERVICE/BLEED – continued

r. **Bleed master cylinder (25).**

(1) Fill master cylinder (25) until overflow from transfer valve (21) into pail is free of bubbles. Use filler and bleeder.

CAUTION

Overservicing the brake hydraulic system may cause system damage.

NOTE

A small amount of fluid can be expected to seep from the check valve weep hole. Especially if the brake system is over-serviced with fluid.

s. **Remove hose (1) from CPG master cylinder (25).**

(1) Remove adapter (5) and hose (1) from port (28).

(2) Wrap a clean rag around cylinder (25) and allow excess hydraulic fluid to drain from port (28). Wipe up all drained fluid with a rag.

(3) Install screw (26) with new seal (27) in port (28).

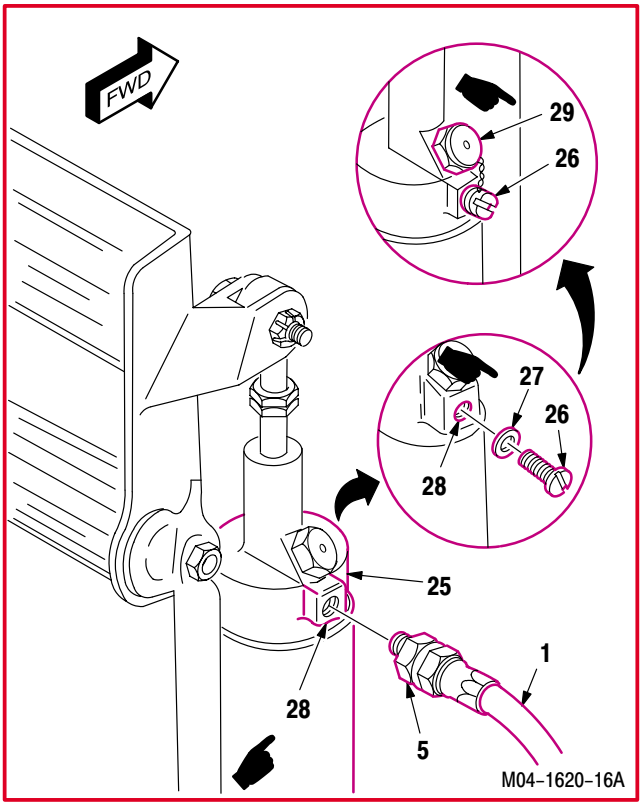
t. **Lockwire screw (26) to cap (29)** (if required). Use wire (item 226, App F).

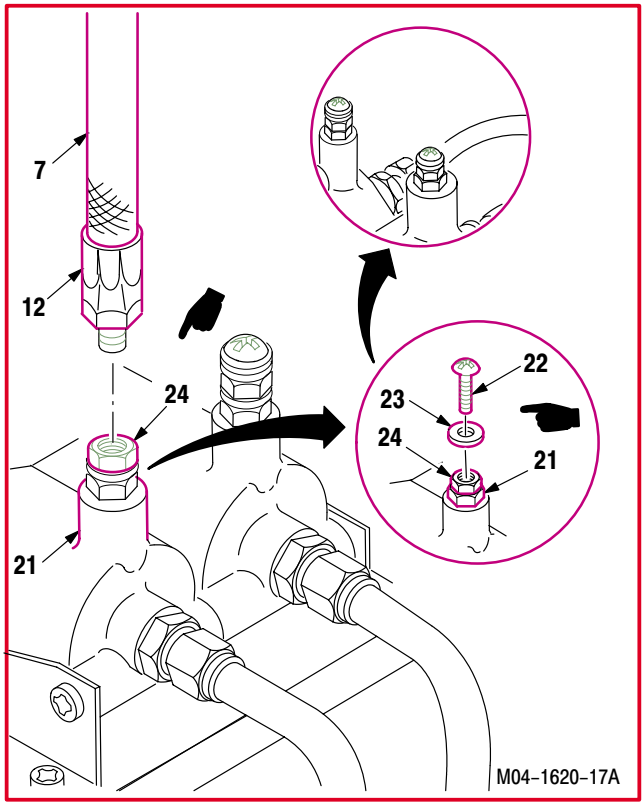
u. **Remove hose (7) from valve (21).**

(1) Tighten valve (24).

(2) Remove adapter (12) and hose (7) from valve (24).

(3) Install screw (22) through washer (23) into valve (24).





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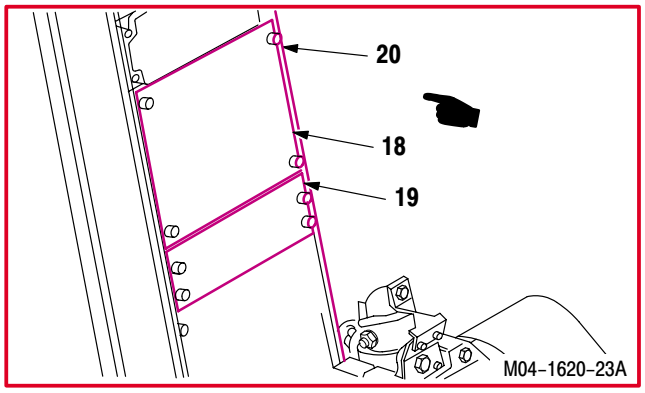
1.45. MAIN LANDING GEAR BRAKE SYSTEM – SERVICE/BLEED – continued

v. **Inspect (QA).**

w. **Install two blank panels (18) and (19) on pilot instrument panel center console (20).**

x. **Install CPG seat** (para 2.161)**.**



END OF TASK

1.46. TARGET ACQUISITION AND DESIGNATION SIGHT (TADS) CLEANING

1.46.1. Description

This task covers: TADS Turret and Shroud Cleaning. Optical Relay Tube (ORT) Window Cleaning.

1.46.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft maintenance tool kit (item 373, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)

Materials/Parts:

Cloth (item 52, App F)
Detergent (item 71, App F)

Personnel Required:

67R Attack Helicopter Repairer
68X Armament/Electrical System Repairer

References:

TM 1-1270-476-20

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
TM 1-1270-476-20	Day sensor assembly (DSA) window cover removed; night sensor assembly (NSA) window cover removed; boresight module window cover removed; Pilot/CPG station maintenance performed

CAUTION

- Do not clean DSA, NSA, or boresight windows unless instructed to do so. Refer to TM 1-1270-476-20 if DSA, NSA, and boresight windows are dirty.
- Water can destroy inner optics and electronics. Ensure shroud assembly and installation hardware are securely fastened before cleaning.
- Do not touch lens with bare hands. Do not wipe lens with cleaning cloth. Damage to special optical coatings could result. Clean with appropriate materials only (TM 1-1270-476-20).

NOTE

Water flow over windows is allowed when washing.

1.46.3. TADS Turret and Shroud Cleaning

a. **Remove foreign matter (leaves, twigs, insects, etc.) from painted areas to be cleaned.**

b. **Wash painted areas with clean lint-free cloth and water.** Move TADS out of stow as necessary to clean all paint surfaces. Use cloth (item 52, App F).

c. **Wipe cleaned area with dampened lint-free cloth.** Use cloth (item 52, App F). Go to step d if additional cleaning is necessary. Go to step e if clean.

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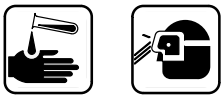
1.46. TARGET ACQUISITION AND DESIGNATION SIGHT (TADS) CLEANING – continued



CAUTION

Water can destroy inner optics and electronics. Ensure shroud assemblies and installation hardware are securely fastened before cleaning.

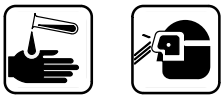
d. **Repeat steps b and c; use detergent and water solution.**

(1) Mix one ounce of detergent with one gallon of water. Use pail and detergent (item 71, App F).

(2) Rinse with clean fresh water.

e. **Allow surface to air dry 10 MINUTES.**

1.46.4. Optical Relay Tube (ORT) Window Cleaning



CAUTION

- Do not touch lens with bare hands. Do not wipe lens with cleaning cloth. Damage to special optical coatings could result. Clean with appropriate materials only (TM 1-1270-476-20).
- The water and detergent solution can damage internal ORT components. Make sure solution does not seep into internal structure.

a. **Mix 1 ounce of detergent with 1 gallon of water.** Use pail and detergent (item 71, App F).

b. **Wash ORT window surfaces with a clean lint-free cloth and water-detergent solution.** Cloth should be damp but not wet enough to drip. Use cloth (item 52, App F) and detergent (item 71, App F).

c. **Rinse all surfaces immediately with clean fresh water.** Use a clean cloth (item 52, App F) that is damp but not wet enough to drip.

d. **Allow surfaces to air dry.**

END OF TASK

1.47. CLEANING - GENERAL

1.47.1. Description

This task covers: Nonremovable Parts. Removeable Parts. Surfaces and Areas. Exterior Water Wash. Electronic/ Electrical Equipment. Hydraulic Hoses and Components. Bearings. Cleanable Filters.

1.47.2. Initial Setup

Tools:

Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
Industrial goggles (item 156, App H)
14-quart utility pail (item 222, App H)
Adjustable air filtering respirator (item 262, App H)

Materials/Parts:

Brush (item 34, App F)
Cloth (item 52, App F)
Dry cleaning solvent (item 74, App F)
Methyl ethyl ketone (item 124, App F)
Tape (item 206, App F)
Wrapping paper

References:

TM 55-1500-322-24

WARNING

Chemicals used for cleaning are explosive, flammable, and highly poisonous. Always assure maximum ventilation when using solvents, methyl ethyl ketone (MEK) and dry cleaning solvent. Accidental breathing of vapors can cause dizziness and nausea. If methyl ethyl ketone contacts the skin, rinse immediately with water. If dry cleaning solvent or methyl ethyl ketone contacts the eyes, flush with water and seek medical aid. When working with cleaning materials, wear protective clothing and guards.

CAUTION

- When cleaning parts, surfaces, and areas of the helicopter: dry cleaning solvent and methyl ethyl ketone must be prevented from spilling or spattering on wiring, adjacent parts, or compartments particularly under the work area. Where cleaning agents can run on or contact ball or roller bearings, rubber parts, or painted surfaces: these areas shall be covered or masked, and dry cleaning solvent (item 74, App F) shall be used for cleaning. Never expose bearings, rubber, or paint to methyl ethyl ketone. Use clean dry rags as a protective coating for nonaffected items or areas. If necessary, use wrapping paper and tape (item 206, App F) to mask wiring, parts, surfaces, openings, or seams. Any area or surface of a part or assembly sensitive to methyl ethyl ketone must be masked before cleaning.

- When cleaning parts, surfaces, and areas of helicopter that will require bonding, sealing, or painting in immediate subsequent repair operations, methyl ethyl ketone (item 124, App F) shall be used.

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1.47. CLEANING - GENERAL – continued

CAUTION

- Do not use trichloroethane, chlorofluoroethane, or any other product with “chlor” in the name, for cleaning titanium, magnesium, aluminium, or galvanized metals. Products with “chlor” in the name are corrosive to these metals.
- Do not allow vapor degreasing of titanium, magnesium, aluminium, or galvanized metals. Vapor degreasing uses trichloroethane and other products with “chlor” in the name which are corrosive to these metals.

NOTE

- Do not allow alcohol to evaporate from surface. Discoloration will occur. Wipe off alcohol residue with distilled water and lint free cloth.
- Pay particular attention to cleaning all scuppers and drains when cleaning the aft equipment bay area.

1.47.3. Nonremovable Parts

a. **Use clean rag dampened in solvent to clean grease and oil from part.** Immediately after cleaning, dry part with clean lint-free cloth. Use dry cleaning solvent (item 74, App F) and cloth (item 52, App F).

b. **To remove stubborn dirt, grime, dried adhesive, or sealant, dip acid swabbing brush lightly in MEK, and brush to dislodge dirt.** If removal is difficult, scrub strongly with increased amount of MEK, but do not flood. Use methyl ethyl ketone (item 124, App F) and brush (item 34, App F). Discard brush in suitable container.

c. **Wipe with clean lint-free cloth.** Use cloth (item 52, App F).

d. **Remove protective rags, covering, or masking if used.**

1.47.4. Removeable Parts

a. **Use clean rag dampened in solvent to remove grease and oil from part.** Dry cleaned part with clean lint-free cloth immediately after cleaning. Use dry cleaning solvent (item 74, App F) and cloth (item 52, App F).

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1.47. CLEANING - GENERAL – continued

b. **To remove stubborn dirt, grime, dried adhesive, or sealant, dip acid swabbing brush lightly in MEK, and use brush to dislodge dirt.** If removal is difficult, scrub strongly with increased amount of MEK. When clean, immediately dry part with clean lint-free cloth. Use methyl ethyl ketone (item 124, App F) and brush (item 34, App F). Discard brush in suitable container.

CAUTION

When cleaning parts that will require bonding, sealing, or painting in immediate subsequent repair operations, methyl ethyl ketone (item 124, App F) shall be used. Use of other cleaners could adversely affect bonding.

c. **A group of small parts can be dipped in pail partly filled with solvent or MEK, then cleaned and dried.** If this method is used, fill pail with only amount of solvent or MEK needed. Use dry cleaning solvent (item 74, App F) or methyl ethyl ketone (item 124, App F).

d. **Wipe with clean lint-free cloth.** Use cloth (item 52, App F).

e. **Remove covering or masking if used.**

1.47.5. Surfaces and Areas

a. **Use clean rag dampened in solvent to remove grease or oil from surface or area.** Use dry cleaning solvent (item 74, App F). Immediately after cleaning, dry area with clean dry rag.

b. **To remove stubborn dirt, grime, dried adhesive, or sealant, dip acid swabbing brush lightly in MEK, and use brush to dislodge dirt.** Use methyl ethyl ketone (item 124, App F) and brush (item 34, App F). If removal is difficult, scrub strongly with increased amount of MEK, but do not flood. Discard brush in suitable container.

c. **Wipe with clean lint-free cloth.** Use cloth (item 52, App F).

d. **Remove covering or masking if used.**

GO TO NEXT PAGE

1.47. CLEANING - GENERAL – continued

1.47.6. Exterior Water Wash

a. **Refer to paragraph 1.53.**

1.47.7. Electronic/Electrical Equipment

a. **Use clean rag dampened in dry cleaning solvent to remove grease, oil, and dirt from the exterior of wiring, connectors, electronic/electrical components and equipment.** Use dry cleaning solvent (item 74, App F).

b. **Immediately dry electronic/electrical units, wiring, and connectors with clean lint-free cloth.** Use cloth (item 52, App F).

1.47.8. Hydraulic Hoses and Components

a. **Use clean rag dampened in solvent to remove grease and oil from part.** Use dry cleaning solvent (item 74, App F). Dry clean part with clean cloth (item 52, App F) immediately after cleaning.

b. **A group of small parts can be dipped in pail partly filled with solvent, then cleaned and dried.** If this method is used, fill pail with only amount of solvent needed. Use dry cleaning solvent (item 74, App F).

c. **Wipe with clean lint-free cloth.** Use cloth (item 52, App F).

d. **Remove covering or masking if used.**

1.47.9. Bearings

a. **Refer to TM 55-1500-322-24.**

1.47.10. Cleanable Filters

a. **Clean filter element in MEK.** Use methyl ethyl ketone (item 124, App F). Allow to drain and dry with low pressure compressed air.

b. **Replace filter element when cracks, tears, or other signs of deterioration are noted.**

END OF TASK

1.48. ENVIRONMENTAL CONTROL UNIT (ENCU) CLEANING (WATER WASH)

1.48.1. Description

This task covers: Cleaning.

1.48.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Electric vacuum cleaner (item 64, App H)
Pneumatic cleaning gun (item 66, App H)
Reciprocating compressor unit (item 67, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
Air blow gun (item 158, App H)
Nonmetallic hose assembly (item 168, App H)
Aircraft power unit (item 232, App H)
Adjustable air filtering respirator (item 262, App H)

Materials/Parts:

Wrapping paper
Brush (item 34, App F)
Cloth (item 52, App F)
Dry cleaning solvent (item 74, App F)
Tape (item 205, App F)

Personnel Required:

67R Attack Helicopter Repairer
Two persons to assist
152F Pilot

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.70	External power – electrical applied
1.71	External power – air applied
2.2	Access doors T250L, T250R, T290L, T290R, and L325 opened
■ 13.12	ENCU filter removed

References:

TM 1-1520-238-CL

CAUTION

- Do this task if environmental control unit (ENCU) malfunctions are reported; or if ENCU compressor makes unusual sounds. To prevent damage to ENCU, do not clean if temperature is below 32 °F (0 °C).
- High pressure water/air can damage helicopter components and electrical wiring. Use only hand-cleaning methods in catwalk and engine-bay areas, or where damage to components or electrical wiring may occur.
- Do not spill solvent on adjacent parts or surfaces, especially under the work area. Mask roller and ball bearings exposed to solvent. Mask wiring, surface openings, and seams.

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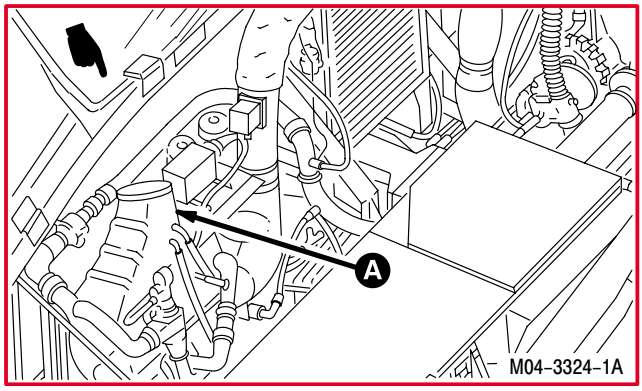
1.48. ENVIRONMENTAL CONTROL UNIT (ENCU) CLEANING (WATER WASH) – continued

1.48.3. Cleaning



CAUTION

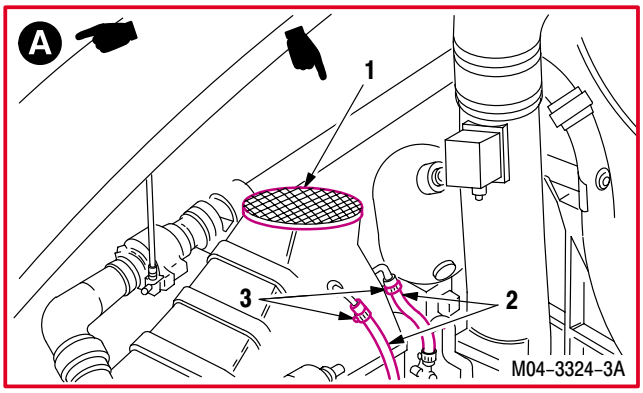
To prevent damage to internal fins, use extreme care when removing debris from ENCU. Fins can be easily bent by finger pressure.

a. **Clean inlet (1).** Use vacuum cleaner.

b. **Remove two hoses (2).**

(1) Loosen two clamps (3).

(2) Remove two hoses (2).



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1.48. ENVIRONMENTAL CONTROL UNIT (ENCU) CLEANING (WATER WASH) – continued

c. **Blow out two hoses (2).** Use compressor and air blow gun, set to discharge air at no more than 80 psi.

d. **Run ENCU (4)** (TM 1-1520-238-CL) **at least 1 MINUTE while spraying solvent into inlet (1).** Use dry cleaning solvent (item 74, App F) and cleaning gun set on coarse spray.

e. **Rinse inlet (1) with clean water for at least 3 MINUTES.**

f. **Stop ENCU (4)** (TM 1-1520-238-CL)**.**

g. **Install two hoses (2).**

(1) Position two clamps (3) on two hoses (2). Do not tighten.

(2) Install two hoses (2) on ENCU (4).

(3) Tighten two clamps (3).

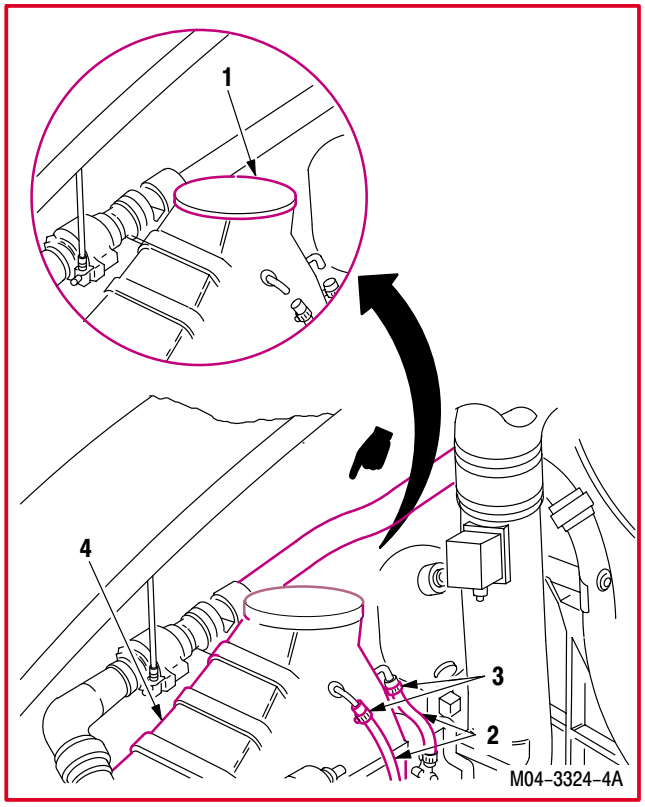
h. **Run ENCU (4)** (TM 1-1520-238-CL) **at least 1 MINUTE to eliminate water from ENCU ducts.**

i. **Install ENCU filter** (para 13.12)**.**

j. **Remove external power – air** (para 1.71)**.**

k. **Remove external power – electrical** (para 1.70)**.**

l. **Secure access doors T250L, T250R, T290L, T290R, and L325** (para 2.2)**.**



END OF TASK

1.49. CORROSION CONTROL/INSPECTION

1.49.1. Description

This task covers: General Corrosion. Corrosion Identification. General Information. Development of Corrosion. Types of Corrosion. Corrosion and Mechanical Factors. Corrosion and Composites. Corrosive Environments. Corrosion Preventative and Corrective Maintenance. Aircraft Inspection Areas. Initial Cleaning and Inspection. Degrees of Corrosion. Corrosion Removal. Corrosion Resistant Coatings. Aircraft Modification Procedures. Aircraft Washing and Cleaning Procedures.

1.49.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Cleaning aircraft brush (item 43, App H)
Scratch wire brush (item 44, App H)
Chemical protective gloves (item 154, App H)
Aircraft cleaning kit (item 188A, App H)
Identification kit (item 190, App H)
14-quart utility pail (item 222, App H)
Adjustable air filtering respirator (item 262, App H)

Materials/Parts:

Adhesive (item 2, App F)
Adhesive (item 3, App F)
Adhesive (item 16, App F)
Brush (item 34, App F)
Calcium sulfite (item 39A, App F)
Chromium trioxide (item 41A, App F)
Cleaning compound (item 44, App F)
Cleaning compound (item 44A, App F)
Cloth (item 47, App F)
Cloth (item 51, App F)
Cloth (item 54, App F)
Corrosion preventive compound (item 61, App F)
Corrosion preventive compound (item 62, App F)
Corrosion preventive compound (item 62A, App F)
Corrosion preventive compound (item 62B, App F)
Corrosion preventive compound (item 63, App F)
Corrosion preventive compound (item 63A, App F)
Corrosion preventive compound (item 64, App F)
Corrosion resistant coating (item 64A, App F)
Corrosion removing compound (item 64B, App F)
Dishwashing compound (item 72, App F)
Dry cleaning solvent (item 74, App F)

Materials/Parts: (continued)

Epoxy primer coating kit (item 76A, App F)
Epoxy primer coating kit (item 76B, App F)
Epoxy primer coating kit (item 78A, App F)
Grease (item 88, App F)
Hydraulic fluid (item 92, App F)
Isopropyl alcohol (item 106, App F)
Lubricating oil (item 119A, App F)
Pad (item NO TAG, App F)
Paper (item 133, App F)
Petrolatum (item 138, App F)
Polyurethane coating (item 140A, App F)
Polyurethane coating (item 140B, App F)
Primer (item 143, App F)
Sealing compound (item 158A, App F)
Sealing compound (item 160, App F)
Sealing compound (item 161, App F)
Sealing compound (item 162, App F)
Sealing compound (item 164, App F)
Sealing compound (item 170A, App F)
Sealing compound (item 170C App F)
Sealing compound (item 171, App F)
Sodium phosphate (item 188, App F)
Tape (item 206, App F)

Personnel Required:

67R Attack Helicopter Repairer
68X Armament/Electrical System Repairer

References:

TM 1-1500-328-23
TM 1-1500-343-23
TM 1-1500-344-23
TM 55-1500-345-23

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1.49. CORROSION CONTROL/INSPECTION – continued

NOTE

- Expendables listed include alternates to be used in the absence of the primary materials.
- This task can be performed in its entirety or by sections, as required, to comply with scheduled maintenance or special inspection requirements.

WARNING

Chemicals used for cleaning are explosive, flammable, and highly poisonous. Always assure maximum ventilation when using solvents, such as dry cleaning solvent. Accidental breathing of vapors can cause dizziness and nausea. If dry cleaning solvent contacts the eyes, flush with water and seek medical aid. When working with cleaning materials, wear protective clothing and guards.

CAUTION

When cleaning parts, surfaces, and areas of the helicopter, dry cleaning solvent must be prevented from spilling or spattering on wiring, adjacent parts, or compartments particularly under the work area. Where cleaning agents can run on or contact ball or roller bearings, rubber parts, or painted surfaces: these areas shall be covered or masked, and dry cleaning solvent (item 74, App F) shall be used for cleaning. Use clean dry rags as a protective coating for nonaffected items or areas. If necessary, use wrapping paper and tape (item 206, App F) to mask wiring, parts, surfaces, openings, or seams.

1.49.3. General Corrosion

a. **Everyone must ensure that safe, clean work habits and methods are used to prevent corrosion.** Refer to TM 1-1500-344-23 for more information.

b. **Corrosion of metal starts as soon as a part is made, and continues through the life of the metal.** Protective coatings and preventive maintenance can slow or stop corrosion.

c. **Check readability of part number and serial number when removing corrosion near identification plates, covers, and placards.**

(1) Use aircraft records to verify part number and serial number.

(2) Use permanent ink that contrasts with color of part if numbers are not present or are unreadable.

(3) Stencil part number and serial number on identification plate, cover, or placard in area originally marked.

(4) Characters shall be a minimum of **0.125 INCH** high.

(5) Cover dried ink with a protective coat of clear lacquer.

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1.49. CORROSION CONTROL/INSPECTION

d. **Remove corrosion where it is found.**

(1) Be sure ALL corrosion is removed. Remove paint to make sure.

(2) Treat area, then paint or protect as directed in paragraphs 1.49.15 and 1.49.16.

e. **There are three general types of metal in the helicopter: aluminum, steel (ferrous alloys), and magnesium.**

(1) Metal identification kit can be used to find the type of metal you are working with.

(2) A simple check will tell you if the material is steel. Use a magnet: if it holds it is on steel.

(3) If required, go to TM 1-1500-344-23 for further corrosion information.

1.49.4. Corrosion Identification

a. **Aluminum.**

(1) Look for a white-to-gray powdery metal. Check if it can be removed by using something softer than the metal part.

(2) Look to see if the part is slightly yellow. This is caused by an anodize coating used on some aluminum parts.

(3) Go to paragraph 1.49.15 for corrosion removal.

b. **Steel (ferrous alloys).**

(1) Look for rust. It should be reddish brown scaling or flaking on the surface.

(2) Steel is painted to prevent corrosion. Look for breaks in the painted surface.

(3) Check the part with a magnet if in doubt: if it holds, it is steel.

(4) Go to paragraph for 1.49.15 for corrosion removal.

c. **Magnesium.**

(1) If the part is not steel or aluminum (nose gearboxes, main transmission, tail rotor gearboxes, and generators) go to TM 1-1500-344-23 for information on positive identification.

(2) TM 1-1500-344-23 gives a chemical procedure that will identify the metal.

(3) Go to paragraph 1.49.15 for corrosion removal.

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1.49. CORROSION CONTROL/INSPECTION

1.49.5. General Information

Corrosion is the deterioration of a substance, usually a metal, because of a reaction with its environment. Corrosion reactions are said to be electrochemical because it involves the transfer of electrons. Four conditions must exist for corrosion to occur:

a. A metal known as the anode must be present, which is the corroding metal.

b. A dissimilar conductive material, the cathode which has less tendency to corrode.

c. A conductive liquid, the electrolyte, must be in contact with the anode and cathode to carry the electric current.

d. Electrical contact between the anode and cathode (dissimilar metals) must exist.

The elimination of any one of the above four conditions that create corrosion, will stop corrosive action.

1.49.6. Development of Corrosion

All corrosive attacks begin on the surface of metals, and if allowed to progress can penetrate into the metal. When corrosion products form, they often precipitate onto the corroding surface as a powdery deposit. This film of corrosion products may reduce the rate of corrosion, if the film acts like a barrier to electrolytes. Metals such as stainless steel and titanium may produce corrosion products, that if bound tight enough to the corroding metal, forms a passive film preventing further corrosion. When the corrosion product film is loose and porous, such as aluminum and magnesium, the electrolyte will penetrate and continue the corrosion process.

1.49.7. Types of Corrosion

a. **Uniform surface corrosion**

Uniform surface corrosion results from a direct chemical attack on a metal surface and involves only the metal surface. On a polished surface, this type of corrosion is first seen as a general dulling or etching of the surface and if the attack is allowed to continue, the surface becomes rough and possibly frosted in appearance. This type of corrosion appears uniform because the anodes and cathodes are very small and constantly shift from one area of the surface to another. An example is the etching of metals by acids. The discoloration or general dulling of metal created by exposure to elevated temperatures is not considered to be uniform surface corrosion.

b. **Pitting**

The most common corrosion of aluminum and magnesium alloys is pitting. It is first noticeable as a white or gray powdery deposit, similar to dust, which blotches the surface. When the deposit is cleaned away, tiny pits or holes can be seen in the surface. Pitting corrosion may also occur in other metal types or alloys. The combination of small active anodes to large passive cathodes causes severe pitting.

c. **Galvanic**

Galvanic corrosion occurs when different metals are in contact with each other and an electrolyte, such as salt water, is present. It is usually recognizable by the presence of a buildup of corrosion at the joint between the metals. Two dissimilar metals joined together form a galvanic couple if moisture and contamination are present.

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1.49. CORROSION CONTROL/INSPECTION

d. **Crevice**

Crevice corrosion occurs when the electrolyte has a different concentration from one area to another. This type of corrosion is also known as concentration cell corrosion. Electrolyte inside the crevice contains less oxygen and more metal ions than electrolyte just outside the crevice. As a result, the metal surfaces, even though they may be part of the same metal, than have different activities and corrosion occurs inside the crevice. This kind of corrosion also occurs when a surface is covered by a foreign material. There are three general types or crevice corrosion: (1) metal ion concentration cells, (2) oxygen concentration cells, and (3) active-passive cells.

e. **Intergranular**

Intergranular corrosion is an attack on the grain boundaries of the metal. It consists of quantities of individual grains, each having a clearly defined boundary, which chemically differs from the metal within the grain. Frequently the grain boundaries are anoxic to the metal within the grain. When in contact with an electrolyte, rapid corrosion occurs at the grain boundaries.

f. **Exfoliation**

Exfoliation is an advanced form of intergranular corrosion where the surface grains of a metal are lifted up by the force of expanding corrosion products occurring at the grain boundaries. The lifting up or swelling is visible evidence of exfoliation corrosion. Exfoliation occurs on extruded, rolled, wrought, and forged high strength aluminum and magnesium parts.

g. **Filiform**

Filiform corrosion is a special form of oxygen concentration cell corrosion or crevice corrosion which occurs on metal surfaces having an organic coating system. It is recognized by its characteristic wormlike trace for corrosion products beneath the paint film. Filiform occurs when the relative humidity or the air is between 78 percent and 90 percent, and when the surface is slightly acidic. It starts at breaks in the coating system, such as scratches and cracks around fasteners and seams, and proceeds underneath the coating, due to the diffusion of water vapor and oxygen from the air through the coating. Filiform corrosion can attack steel, magnesium, and aluminum surfaces and may lead to more serious corrosion in some locations. Filiform corrosion can be prevented by storing equipment and aircraft in an environment with a relative humidity below 70 percent, by using coating systems having a low rate of diffusion for oxygen and water vapors, by maintaining coatings in good condition, and by washing equipment and aircraft to remove acidic contaminants from the surface. Maintain coatings in good condition and apply corrosion preventive compounds when paint is damaged.

1.49.8. Corrosion and Mechanical Factors

a. Stress corrosion cracking is the intergranular cracking of a metal caused by the combined effects of constant tensile stress (internal of applied) and corrosion. Internal or residual stresses are produced by cold working, forming, and heat treatment operations during manufacture of a part and remain concealed in the part unless stress relief operations are used. Other hidden stresses are induced in parts when press or shrink fits are used and when slightly mismatched parts are clamped together with rivets and bolts. All these stresses add to those caused by applying normal loads to parts during operation. Metals have threshold stresses below which stress corrosion cracking will not occur. This threshold stress which varies from metal to metal, is different for different tempers of the same metal, and is different for each of the three directions in which stress can be applied.

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1.49. CORROSION CONTROL/INSPECTION

b. Associated hazards. Stress corrosion cracking is an extremely dangerous type of failure because it can occur at stress levels far below the rated strength of a metal, starting from what is thought to be a very minor corrosion pit. Parts can completely sever in s split second or they can crack slowly, and the rate of cracking is very unpredictable in operating service.

c. Causes. Specific environments have been identified which cause stress corrosion cracking of certain alloys. Salt solutions, sea water, and moist, salt-ladden air may cause stress corrosion cracking of heat-treatable aluminum alloys, stainless steels, and some titanium alloys. Magnesium alloys may stress corrode in moist air. Stress corrosion can be prevented by placing an insulating barrier between the metal and the corrosive environment by applying protective coatings and water displacing corrosion preventive compounds. Stress relief operations during fabrication of parts will help, because it lowers the stress level on the parts. Shot peening a metal increases resistance to stress corrosion cracking by creating compressive stresses on the surface, which must be overcome by an applied tensile stress before the surface sees any tension load.

d. Corrosion fatigue is the cracking of metals caused by the combined effects of cyclic stress and corrosion, and is very similar to stress corrosion cracking. No metal is immune to some reduction in its resistance to cyclic stressing if the metal is in a corrosive environment. Damage from fatigue corrosion is greater than the sum of the damage from both cyclic stresses and corrosion. Corrosion fatigue failure occurs in two stages. During the first stage, the combined action of corrosion and cyclic stress damages the metal by pitting and crack formation in the pitted area. The second stage is the continuation of crack propagation by a straight fatigue mode, in which the rate of cracking is controlled by: (a) stress concentration in the main cross section, and (b) the physical properties of the metal. Fracture of metal part due to fatigue corrosion occurs at a stress far below the fatigue limit, even though the amount of corrosion is unbelievably small. For this reason, protection of all parts subject to alternating stress is particularly important, even in environments that are only mildly corrosive. Preventive measures are the same as those given for stress corrosion cracking as stated above.

e. Fretting corrosion is special form of concentration cell corrosion, which occurs in combination with surface wear. The corrosion products increase the wear of the surface and the wear exposes more bare metal surface to be corroded. The overall effect is greater than the single effects of corrosion and wear added together. It has the general appearance of galling, in which chunks of metal are torn from the surface, with corrosion at the torn areas or ragged pits. This type of corrosion occurs on faying surfaces of close tolerance and on parts under high pressure in a corrosive environment when there is slight relative movement of the parts, such as that caused by vibration.

1.49.9. Corrosion and Composites

Composite materials do not corrode; however, they may accelerate corrosion on adjacent metal structures and attaching hardware due to galvanic effect. Graphite composites are made from carbon fibers which are electrically conductive, and one of the noble metals (gold, silver, mercury, platinum, palladium, iridium, and etc.) materials in the galvanic series. Special precautions must be exercised when metal parts are present with composite parts. Also many composites parts may have metal sandwiched between layers or composite at edges, holes, and attaching points. These metals, if exposed, may corrode and cause delamination.

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1.49. CORROSION CONTROL/INSPECTION

a. **Microbial Induced Corrosion**

Operations in high temperature and high humidity areas are susceptible to microbial attack. Bacteria living adjacent to metals, can cause corrosion by depleting the oxygen supply or by releasing corrosive products. Fungi may damage organic materials by retaining moisture on a metal surface and clogging drainage holes, and secreting corrosive fluids. Micro-organisms, when transferred from a hot/wet area to a dry/cold area, may become dormant and appear to die. Then, when returned to a hot/wet climate, the micro-organisms will again become active.

1.49.10. Corrosive Environments

a. **Moisture**

Moisture is present in the air and often contains contaminants such as chlorides, sulfates, and nitrates. Condensed moisture after it evaporates, will leave its contaminants on surfaces of the aircraft. Accumulations of moisture may result from cycles of warming and cooling, and drawn along poor bond lines by capillary action.

b. **Temperature/Climate**

Generally, corrosion will increase as temperatures rise, but a moderate increase may reduce corrosion by preventing condensation. Temperatures above 104 °F (40 °C) will inhibit mold and bacteria growth. Temperatures held at the lower end of the range will generally reduce the rate of corrosion. Warm, moist air, normally found in tropical climates tends to accelerate corrosion while cold, dry air normally found in artic climates tends to reduce corrosion rates. Corrosion does not occur in very dry conditions. Certain areas within an aircraft, such as the cockpit and air conditioned equipment bays, may be subjected to climatic dry air that has been cooled by air conditioners. This reduces its ability to hold moisture, and when ducted into interior area of the aircraft, can release sufficient moisture to accelerate corrosion.

c. **Salt**

Salt dissolved in water forms a strong electrolyte. Normal winds carry 10 to 100 pounds of sea salt per cubic mile of air. Since dissolved salts are strong electrolytes, salt water environments are highly corrosive to aircraft.

d. **Ozone**

Ozone is an active form or oxygen which is formed naturally during thunderstorms, by arcing in electrical devices, and by photochemical reactions in smog. When ozone is absorbed by electrolyte solutions in contact with metals, it increases the rate of corrosion.

e. **Sand/Dust**

Sand and dust are present in many areas, but particularly in industrial areas where they often contain tar products, ashes, and soot. Dust is also found in the tropic zones during times of little or not rainfall. Sand and dust are extreme problems in the deserts, since dry, powdery sand and dust are carried by the wind. During sandstorms, they can penetrate sealed equipment as well as many internal areas of airframes. Sand and dust are hygroscopic and, when present on internal or external surfaces of aircraft or electronic parts, can absorb and hold moisture. Dust from volcanic areas contain chlorides and sulfates, which are extremely corrosive in the presence of moisture. Although small amounts of sand or dust may be unnoticed by operation personnel they may be sufficient to promote corrosion.

f. **Insects/Birds**

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1.49. CORROSION CONTROL/INSPECTION – continued

Damage to aircraft and aircraft subsystems may be caused by insects, birds, and various small animals, especially in tropical environments. Equipment in storage is most susceptible to this type of attack, since animals may enter through vent holes or tears in packaging and sometimes build nests. Moisture absorbed by nest plus excretions from the animals may cause corrosion and deterioration that goes unnoticed until equipment is put to use.

g. **Environmental Areas**

NOTE

- To perform corrosion preventive maintenance procedures go to paragragraph 1.49.17.
- MIL-S-8802 or MIL-S-29574 will be used in lieu of primer in coastal and tropical areas as noted in procedures.

Desert	Intermediate	Coastal	Tropics
High daytime temperatures	Winter temperatures -25 to 59 °F (-32 to 15 °C)	High humidity	Humidty up to 100% at ambient air temperatures of 85 °F (29 C) and dew-points approaching 85 °F (29 °C)
High humidity	Summer temperatures 59 to 125 °F (15 to 52 °C)	High concentrations of salt	
Ultraviolet radiation	Humidity fluctuates between 5 and 100%	Within 30 miles of coast	
Dust	Most North American and European continents		

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1.49. CORROSION CONTROL/INSPECTION

1.49.11. Corrosion Preventative and Corrective Maintenance

NOTE

This plan provides Corrosion Prevention and Control for the AH-64A helicopter in high humidity, salt and sand environments which promote accelerated corrosion and reduce the life of the aircraft.

To effectively control corrosion, active participation of all Apache maintainers is required. To obtain this participation a corrosion control regime consistent with the Army aviation corrosion prevention and control policy as stated in TM 1-1500-328-23, Aeronautical Equipment Maintenance Management Policies and Procedures, must be employed.

This corrosion control regime requires a formal rinse, wash with reapplication of corrosion preventative compounds and inspection of corrosion prone areas procedure which is accomplished on a frequency based on calendar time adjusted for operating environment. The operating environment where corrosion is concerned has been divided into four types: Extremely severe, Severe, Moderate, and Slight. The amount of corrosion control effort required should be tailored to operator's environments.

If corrosion is detected, it must be repaired. The two Tri-Service Corrosion Control Manuals: TM 1-1500-343-23, Avionic Cleaning and Corrosion Prevention, and TM 1-1500-344-23, Tri-Service Aircraft Weapons System Cleaning and Corrosion Control provide general corrosion repair and prevention techniques which should be used to the fullest extent possible in maintaining the Apache. Another general manual, TM 55-1500-345-23, Painting and Marking for Army Aircraft, is used in the Apache Corrosion Prevention and Control Program.

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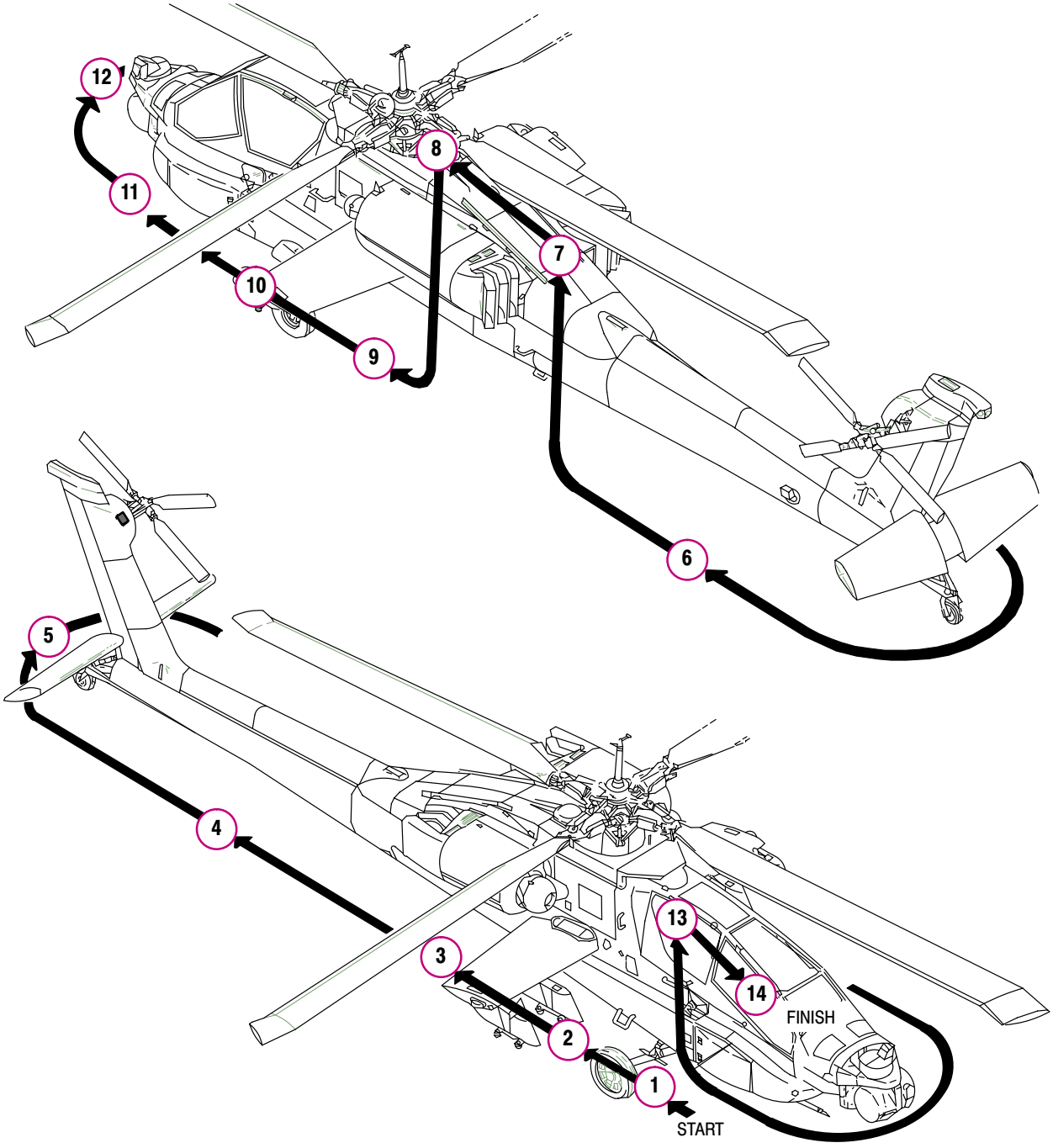
1.49. CORROSION CONTROL/INSPECTION

1.49.12. Aircraft Inspection Areas



AIRCRAFT INSPECTION AREAS M04-4492-1

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1.49. CORROSION CONTROL/INSPECTION – continued

Table I. Aircraft Inspection Areas

Area No.	Aircraft Location	Inspection Requirements
1	Fuselage – right side, forward	All surfaces, components, and equipment in forward avionics bay. Includes landing gear and search light.
2	Fuselage – right side, center	All surfaces, components, and equipment aft of crew station to engine nacelle. includes transmission deck, right nose gearbox, engine installation components, wing, and stores.
3	Engine nacelle – right	All surfaces, components, and equipment aft of auxiliary power unit (APU) exhaust duct. Includes lower nacelle aft electronics compartment, and infrared (IR) suppressor.
4	Fuselage – right side, aft	All surfaces, components, and equipment aft of auxiliary power unit (APU) exhaust duct and forward of intermediate gearbox. Includes hydraulic ground service panel and aft horizontal tail rotor drive shaft.
5	Tail section	All surfaces, components, and equipment aft of tail boom area. Includes horizontal stabilator, tail landing gear, intermediate and tail rotor gearboxes, aft vertical tail rotor drive shaft, and tail rotor.
6	Fuselage – left side, aft	All surfaces, components, and equipment forward of intermediate gearbox and aft of environmental control unit, (ENCU) exhaust duct.
7	Catwalk	All surfaces, components, and equipment in catwalk area. Includes shaft-driven compressor, forward tail rotor drive shaft, fire extinguisher containers, ENCU, and APU.
8	Main rotor mast	All surfaces, components, and equipment in the mast area. Includes main rotor, air data sensor, and upper controls (mixer).
9	Engine nacelle – left	All surfaces, components, and equipment forward of ENCU exhaust duct and aft of left nose gearbox. Includes IR suppressor, aft avionics compartment, and lower nacelle.
10	Fuselage – left side, center	All surfaces, components, and equipment forward of engine nacelle and aft of left forward avionics bay. Includes left transmission deck, wing and stores, nose gearbox, and engine installation components.
11	Fuselage – left side, forward	All surfaces, components, and equipment in forward avionics bay. Includes landing gear.
12	Nose section	All surfaces, components, and equipment on or under the helicopter nose. Includes target acquisition and designation system/pilot night vision system (TADS/PNVS) turret and area weapon.
13	Pilot station	All surfaces, components, and equipment in the pilot station. Includes windshields, landing gear brake control, canopy jettison system, lighting and indicator components, power and flight controls and instruments.
14	Copilot/gunner station (CPG)	All surfaces, components, and equipment in the CPG station. Includes windshields, landing gear brake control, canopy jettison system, lighting and indicator components, power and flight controls and instruments.

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1.49. CORROSION CONTROL/INSPECTION

1.49.13. Initial Cleaning and Inspection

a. Clean suspected area thoroughly using a clean cloth (item 54, App F) dampened with dry cleaning solvent (item 74, App F).

b. Inspect area using a 10X magnifying glass and flashlight.

(1) Examine edges of skin panels, rivet heads, and corrosion-prone areas. If there are blisters, bubbles, or other coating irregularities present, attempt to dislodge the paint by carefully scraping using a sharp, plastic tool.

(2) When corrosion is suspected, but no irregularities are present, apply a strip of masking tape (item 206, App F) over the suspected area and remove the tape with an abrupt lifting motion.

(3) Where paint is removed, inspect and determine extent of corrosion.

1.49.14. Degrees of Corrosion

a. **Light corrosion**

(1) Where the condition of the metal is characterized by discoloration and pitting to a depth of **0.001 INCH** (1 mil). This type of damage can normally be removed by light hand sanding.

b. **Moderate corrosion**

(1) Where the condition of the metal is characterized by blisters, evidence of scaling, of the coating or paint system, intergranular corrosion, and pitting to a depth of **0.001 INCH** (1 mil) to **0.010 INCH** (10 mils). This type of damage shall be removed by extensive hand sanding, light mechanical sanding, or by deoxidizing with a corrosion removing compound (item 64B, App F).

c. **Severe corrosion**

(1) Where the condition of the metal is characterized by blistering, evidence of scaling, flaking of the coating or paint system, intergranular corrosion, and pitting to a depth greater than **0.010 INCH** (10 mills). This type of damage shall be removed by extensive mechanical sanding, grinding, or by deoxidizing with a corrosion removing compound (item 64B, App F).

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1.49. CORROSION CONTROL/INSPECTION

d. **Corrosion-prone areas**

(1) Aft avionics bay.

(2) Control cables.

(3) Electrical connectors.

(4) Exhaust impingement areas.

(5) Fasteners.

(6) Faying surfaces and crevices.

(7) Hinges.

(8) Landing gear.

(9) Magnesium parts, such as magnesium housings.

(10) Spot-welded assemblies.

(11) Water entrapment areas.

1.49.15. Corrosion Removal

a. **Aluminum**

(1) Remove paint (TM 55-1500-345-23).

(2) Remove surface corrosion using either a stainless steel brush or Scotchbrite pads and dry cleaning solvent (item 74, App F) or deoxidize with corrosion removing compound (item 64B, App F).

(3) Apply corrosion removing compound (item 64B, App F) to metal surface.

(4) Allow area to soak for 5 to 10 minutes until corrosion is loosened or dissolved.

(5) Keep surface wet until all oxidation and corrosion are removed.

NOTE

Scrubbing with a stiff bristle brush will speed up corrosion removal.

(6) Rinse thoroughly using clean, potable water, and allow to dry at ambient temperature. Go to paragraph 1.49.16.

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1.49. CORROSION CONTROL/INSPECTION – continued

b. **Steel (Ferrous Alloys)**

(1) Remove loose surface corrosion using a stainless steel brush and dry cleaning solvent (item 74, App F).

(2) Abrade corroded surface using abrasive paper (item 133, App F).

(3) Apply corrosion removing compound (item 64B, App F). to corroded area using a swab or a brush (item 34, App F).

(4) Allow area to soak for 5 to 10 minutes until a bright, clean surface is produced.

(5) Rinse thoroughly using clean, potable water, and allow to dry at ambient temperature. Go to paragraph 1.49.16.

c. **Magnesium**

NOTE

TM 55-1500-345-23 should be referenced for proper identification of corrosion on magnesium parts. TM 55-1500-344-23 also gives a chemical procedure that will identify the metal.

(1) Remove surface corrosion using a nonmetallic, stiff, bristle brush and dry cleaning solvent (item 74, App F).

(2) Abrade corroded surface using aluminum oxide cloth (item 47, App F) to smooth and blend rough areas.

(3) Remove any remaining surface corrosion using a nonmetallic, stiff, bristle brush and dry cleaning solvent (item 74, App F).

(4) Mix chemical conversion coating (Dow 19) using chromium trioxide (item 41A, App F) and calcium sulfite (item 39A, App F) prior to application. Apply chemical conversion coating (Dow 19) to repaired surface as soon as cleaning solvent has evaporated.

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1.49. CORROSION CONTROL/INSPECTION

1.49.16. Corrosion Resistant Coatings

a. **Aluminum**

(1) Clean surface using dry cleaning solvent (item 74, App F).

(2) Apply a corrosion resistant coating (item 64A, App F) as soon as possible.

(3) Allow area to soak for three to five minutes until a light, yellow coating is produced.

(4) Rinse thoroughly using clean, potable water, and allow to dry at ambient temperature.

(5) Apply coatings as follows:

(a) Reapply organic coating that has been removed in accordance with TM 1-1500-344-23.

(b) Use epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F).

(c) Use topcoat for exterior. Use polyurethane coating (item 140B, App F).

(d) Use topcoat for interior of cockpit and LRU's. Use polyurethane coating (item 140A, App F).

(e) In the event coatings are not available, apply corrosion preventive compound (item 62A, App F) or corrosion preventive compound (item 61, App F) to the repaired area. Extend compound **0.5** to **1.0 INCH** (13 to 25 mm) beyond periphery of repair.

(f) Allow to dry at ambient temperature for about one hour.

b. **Steel (Ferrous Alloys)**

(1) For those applications requiring an organic coating to be reapplied it is recommended that primer (item 143, App F) be applied to bare metal within one hour after after corroded area has dried.

(2) Allow to dry at ambient temperature. If an organic coating is not to be applied and a protective coating is needed, apply corrosion preventive compound (item 62A, App F) or corrosion preventive compound (item 61, App F) to the repaired area. Extend compound **0.5** to **1.0 INCH** (13 to 25 mm) beyond periphery of repair.

c. **Magnesium**

(1) Mix chemical conversion coating using chromium trioxide (item 41A, App F) and calcium sulfite (item 39A, App F) prior to application. Apply chemical conversion coating (Dow 19 or equivalent), as soon as cleaning solvent has evaporated, and apply corrosion resistant coatings as follows:

(a) Reapply organic coating that has been removed in accordance with TM 1-1500-344-23.

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1.49. CORROSION CONTROL/INSPECTION

(b) Use epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F).

(c) Use topcoat for drive system components; gear boxes and main transmission polyurethane coating (item 140A, App F).

(b) If an organic coating is not to be applied and a protective coating is needed, apply corrosion preventive compound (item 62A, App F) to the repaired area. Extend compound **0.5** to **1.0 INCH** (13 to 25mm) beyond periphery of repair.

1.49.17. Aircraft Modification Procedures

CAUTION

When torque stripe is used, apply corrosion preventive compound (item 62A, App F). Do not apply MIL-S-8802 or MIL-S-29574. This applies for all aircraft modification procedures. All areas shall be cleaned prior to applying corrosion preventive compounds.

NOTE

- Use the following procedures on aircraft operating in extremely corrosive environment.
- Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) in lieu of primer in coastal areas.

a. **Forward Fuselage – right side (area 1)**

(1) Seal gap next to fuselage at R105 and pilot's exterior armor panel with sealing compound (item 170C, App F) or sealing compound (item 164, App F).

(2) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to door hinges and latches on access doors R90 and R115.

(3) Seal around static port brace and panel next to fuselage with sealing compound (item 170A, App F) or sealing compound (item 162, App F).

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1.49. CORROSION CONTROL/INSPECTION – continued

b. **Avionics Bay (area 1)**

(1) Apply corrosion preventive compound (item 64, App F) to electrical connectors followed by corrosion preventive compound (item 62B, App F) in accordance with TM 1-1500-343-23.

(2) Apply epoxy primer coating kit (item 76A, App F), epoxy primer coating kit (item 78A, App F), or corrosion preventive compound (item 62B, App F) to all bolt heads, nuts, exposed threads, mounting brackets, and fasteners.

c. **Landing Gear (area 1)**

(1) Apply sealing compound (item 161, App F), sealing compound (item 170A, App F), or epoxy primer coating kit (item 76B, App F) to all bolt heads, nuts, exposed threads, and metal connectors on shock strut.

(2) Apply hydraulic fluid (item 92, App F) to crash attenuation piston shafts. Use corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) as alternate. Wipe off excess with a clean dry cloth (item 54, App F).

(3) Seal wheel data tag, bolt heads, nuts, and exposed threads with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(4) Coat inside of trailing arm with corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F).

(5) Apply sealing compound (item 162, App F), sealing compound (item 170A, App F) or epoxy primer coating kit (item 76B, App F) to metal clamps on trailing arm and all unprotected exposed metal areas at upper end.

(6) Seal cross tube end cap with sealing compound (item 164, App F) or sealing compound (item 170C, App F).

d. **Search Light (area 1)**

(1) Coat all electrical contacts with corrosion preventive compound (item 64, App F) followed by corrosion preventive compound (item 62B, App F).

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1.49. CORROSION CONTROL/INSPECTION – continued

e. **Center Fuselage – right side (area 2)**

(1) Seal skin splice in front of access door R180 with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(2) Seal skin splice above access door R160 with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(3) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to R180 hinges and latches.

f. **Main Transmission Deck (area 2)**

(1) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to all bolt heads, nuts, exposed threads, retainers, control rod ends, lateral actuator, and linkages. Do not apply primer to bearings. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as alternate, if primer is not available.

(2) Apply corrosion preventive compound (item 64, App F) to all electrical connectors followed by corrosion preventive compound (item 62B, App F).

(3) Apply epoxy primer coating kit (item 76A, App F) to screw heads, seams, and mounting brackets on airspeed transducers. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as alternate, if primer is not available.

(4) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to screw heads, seams, and mounting brackets on hydraulic primary manifold hydraulic pressure transducer. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as alternate, if primer is not available.

g. **Nose Gearbox (area 2)**

(1) Apply corrosion preventive compound (item 64, App F) to all electrical connectors.

(2) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to latches on RN6.

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1.49. CORROSION CONTROL/INSPECTION – continued

h. **Wing (area 2)**

(1) Seal around anticollision light, navigation light, and formation light with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(2) Seal seams on top of wing with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(3) Seal wing mounting bolts with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(4) Apply corrosion preventive compound (item 63, App F) corrosion preventive compound (item 63A, App F) to hinge and latch on access door RW12.

i. **Pylon (area 2)**

(1) Apply corrosion preventive compound (item 64, App F) to all electrical connectors followed by corrosion preventive compound (item 62B, App F); apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to all hinges and latches.

(2) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to all bolt heads, nuts, exposed threads, hinges, and exposed metal areas. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as alternate, if primer is not available.

j. **Engine Nacelle – right (area 3)**

(1) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to hinges and latches on engine access doors RN1, RN3, RN4, and RN5.

(2) Apply corrosion preventive compound (item 62B, App F) to leveling jack RN1.

(3) Seal engine exhaust mounting backing at fuselage with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

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1.49. CORROSION CONTROL/INSPECTION – continued

k. **Electronics Compartment Bay (area 3)**

(1) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to hinges and latches on access door R295.

(2) Apply corrosion preventive compound (item 64, App F) to electrical connectors, followed by corrosion preventive compound (item 62B, App F).

l. **Fuselage – right side aft (area 4)**

(1) Seal two holes and skin splice at top right corner of access door R295 with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(2) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to hinges and latches on hydraulic access door R325, external power access door R345, and stowage compartment door R330.

(3) Seal tail rotor drive shaft hanger mounts where they attach to fuselage with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(4) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to all drive shaft hanger mount bolts. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as alternate, if primer is not available.

(5) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to tail rotor drive shaft couplings flanges and bolts under R410 and R475 fairing.

(6) Apply corrosion preventive compound (item 63A, App F) (fluid film) to all teflon clamps on hydraulic lines under R410 and R475 fairing.

m. **Tail Section (area 5)**

(1) Seal skin seams around vertical stabilizer mounting brackets with sealing compound (item 164, App F) or sealing compound (item 170C, App F).

(2) Apply sealing compound (item 162, App F) or sealing compound (item 170A, App F) to stabilizer mounting bolts and nuts.

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1.49. CORROSION CONTROL/INSPECTION – continued

(3) Seal around formation and navigation lights and on top of vertical stabilizer with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

n. **Horizontal Stabilator (area 5)**

(1) Seal mounting bolt hardware, servo attachment fittings, and mounting hardware with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(2) Apply corrosion preventive compound (item 64, App F) to all electrical connectors, followed by corrosion preventive compound (item 62B, App F).

(3) Fill Hi-Lok installation cavities (water traps) with RTV adhesive (item 16, App F).

o. **Tail Landing Gear (area 5)**

(1) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to bolt heads, nuts, and exposed threads at strut frame mount. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as alternate, if primer is not available.

(2) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to all wheel trailing arms and attaching bolt heads, nuts, and exposed threads. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as alternate, if primer is not available.

(3) Apply corrosion preventive compound (item 64, App F) to all electrical connectors, followed by corrosion preventive compound (item 62B, App F)

(4) Apply hydraulic fluid (item 92, App F) to crash attenuation piston shafts. Use corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) as alternate. Wipe off excess with a clean dry cloth (item 54, App F).

(5) Coat inside wheel axle with corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F).

p. **Intermediate gearbox (area 5)**

(1) Prime/seal exposed machined area (controls mounts) with epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F).

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1.49. CORROSION CONTROL/INSPECTION – continued

(2) Seal all bolt heads, nuts, exposed threads, fittings, and connectors with sealing compound (item 160, App F) or sealing compound (item 170A, App F).

(3) Fill bolt holes in gearbox with RTV adhesive (item 16, App F).

(4) Apply corrosion preventive compound (item 64, App F) to all electrical connectors, followed by corrosion preventive compound (item 62B, App F).

q. **Tail Rotor Gearbox (area 5)**

(1) Seal all bolt heads, nuts, exposed threads, fittings, and connectors with sealing compound (item 160, App F) or sealing compound (item 170A, App F).

(2) Fill bolt holes in gearbox with RTV adhesive (item 16, App F).

(3) Apply corrosion preventive compound (item 64, App F) to all electrical connectors, followed by corrosion preventive compound (item 62B, App F).

(4) Seal all gaps at base directional servo actuator with sealing compound (item 161, App F) or sealing compound (item 170C, App F).

r. **Fuselage – left side aft (area 6)**

(1) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to stowage compartment L330 door, hinge, latch, and fairing hinges on access doors R410 and R475.

(2) Seal around electrical connector J97 with sealing compound (item 160, App F) or sealing compound (item 170A, App F).

s. **Catwalk (area 8)**

(1) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to latches and hinges on equipment bay doors L325, T290L, T290R, T250L, and T250R.

(2) Apply corrosion preventive compound (item 64, App F) to all electrical connectors, followed by corrosion preventive compound (item 62B, App F).

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1.49. CORROSION CONTROL/INSPECTION – continued

(3) On ENCU temperature control unit, seal box edges and mounting screws with sealing compound (item 160, App F) or sealing compound (item 170A, App F).

(4) On hydraulic utility manifold hydraulic pressure transducers, seal around mounting surfaces and fasteners with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

t. **Main Rotor and Mast (area 8)**

(1) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to bolt heads, nuts, exposed threads, retainers, control rod ends, linkages, and exposed metal areas. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as alternate, if primer is not available.

(2) Apply coating of corrosion preventive compound (item 62, App F) or fill mast support base lightening holes with grease (item 88, App F) or petrolatum (item 138, App F). Install covers by applyng a thin coat of adhesive (item 2, App F) or adhesive (item 3, App F) on cover face and mast base. Seal caps with sealing compound (item 164, App F) or sealing compound (item 170C, App F).

u. **Engine Nacelle – (area 9)**

(1) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to hinge and latch on electronic access door L295.

(2) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to hinges and latches on engine access doors LN1, LN3, LN4, and LN5.

(3) Seal two holes and skin splice at top left over electrical equipment access door L295 with sealing compound (item 164, App F) or sealing compound (item 170C, App F).

(4) Seal engine exhaust mounting bracket at fuselage in front of hydraulic access door L325 with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(5) Apply corrosion preventive compound (item 62B, App F) to leveling jack LN1.

v. **Fuselage – left side center (area 10)**

(1) Seal wing mounting bolts with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

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1.49. CORROSION CONTROL/INSPECTION – continued

(2) Seal formation, anticollision, and navigation lights with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(3) If not ready present, add a **0.5 INCH** drain hole in lower surface of wing to fuselage fairing (approximately **1.5 INCHES** from the inboard edge, at lowest point).

(4) Apply corrosion preventive compound (item 64, App F) to all electrical connectors in pylon area, followed by corrosion preventive compound (item 62B, App F).

(5) Apply corrosion preventive compound (item 64, App F) to all electrical connectors in engine nose gearbox.

(6) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to hinges on access doors L190 and L210.

(7) Seal skin splice over L160 controls access with sealing compound (item 160, App F) or sealing compound (item 170A, App F).

w. **Fuselage – left side forward (area 11)**

(1) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to hinges and latches on doors L117 and L187.

(2) Apply sealing compound (item 162, App F) or sealing compound (item 170A, App F) to main landing gear shock strut, bolt heads, nuts, and exposed threads.

(3) Coat inside of trailing arm with corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F).

(4) Apply sealing compound (item 162, App F) or sealing compound (item 170A, App F) to metal clamps on trailing arm and all unprotected exposed metal areas at upper end.

(5) Seal main landing gear end cap with sealing compound (item 164, App F) or sealing compound (item 170C, App F).

(6) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to crash attenuation piston shafts. Wipe off excess with a clean dry cloth.

(7) Seal wheel data tag, bolt heads, nuts, and exposed threads with sealing compound (item 162, App F) or sealing compound (item 170A, App F).

(8) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to hinge and latch on avionics door.

(9) Apply corrosion preventive compound (item 64, App F), followed by corrosion preventive compound (item 62B, App F), to all electrical connectors in avionics areas.

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1.49. CORROSION CONTROL/INSPECTION – continued

(10) Seal pilot external armor plate with sealing compound (item 164, App F) or sealing compound (item 170A, App F).

(11) Seal around static port brace and panel adjacent to fuselage with sealing compound (item 162, App F) or sealing compound (item 170C, App F).

(12) Apply corrosion preventive compound (item 64, App F), followed by corrosion preventive compound (item 62B, App F) to all electrical connectors in access are L115.

x. **Nose Section (area 12)**

(1) Apply corrosion preventive compound (item 64, App F), followed by corrosion preventive compound (item 62B, App F), to all electrical connectors under access panels R40 and L40.

(2) Apply epoxy primer coating kit (item 76A, App F) or epoxy primer coating kit (item 78A, App F) to all bolt heads, nuts, exposed threads, mounting brackets, and fasteners. Use sealing compound (item 162, App F) or sealing compound (item 170A, App F) as an alternate, if primer is not available.

(2) Apply corrosion preventive compound (item 64, App F), followed by corrosion preventive compound (item 62B, App F), to all electrical connectors in the TADS/PNVS turret.

y. **Armament**

(1) Apply lubricating oil (item 119A, App F) or corrosion preventive compound (item 63A, App F) to all exposed metal areas.

z. **Pilot Station (area 13)**

(1) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to canopy door latch, hinges, and canopy support strut.

(2) Apply sealing compound (item 162, App F) or corrosion preventive compound (item 62B, App F) to seat attachment fittings and pins.

(3) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to armor swing plate hinges and latches.

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1.49. CORROSION CONTROL/INSPECTION

aa. **Copilot/Gunner Station (area 14)**

(1) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to canopy latch, hinges, and canopy support strut.

(2) Apply sealing compound (item 162, App F) or corrosion preventive compound (item 62B, App F) to seat attachment fittings and pins.

(3) Apply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to armor swing plate hinges and latches.

1.49.18. Aircraft Washing and Cleaning Procedures

CAUTION

High pressure (above 175 psi) cleaning shall not be used when washing and cleaning aircraft.

NOTE

This procedure is to be used on aircraft operating in corrosive environments. For standard or detailed aircraft cleaning procedures, refer to para 1.53.

a. **Frequency (minimum requirements)**

Environment	Fresh Water Rinse Frequency	Wash Frequency	Corrosion Inspection
Extreme severe (Tropics/Salt water)	Daily	7 Days	7 Days
Severe (Coastal)	7 Days	30 Days	30 Days
Moderate (Intermediate)	14 Days	60 Days	60 Days
Slight (Desert)	30 Days	120 Days	120 Days

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1.49. CORROSION CONTROL/INSPECTION – continued

b. **Rinsing Procedure**

(1) Rinse aircraft with a soft fan-spray pattern to avoid damage and water intrusion.

(2) Rinse external surfaces at a flow of 8 gallons (30 litters) per minute at a **20** to **25 PSI** (140 to 170 kPa) supply pressure.

(3) Direct water at an angle of 15 to 30 degrees from the surface.

(4) Reapply corrosion preventive compound (item 63, App F) on structural components, and corrosion preventive compound (item 64, App F) on electrical components after each rinse.

(5) Wipe out standing water on transmission deck.

(6) Ensure that there is not standing water in the tailboom.

c. **Washing Procedure**

(1) Rinse aircraft surface with fresh water to reduce skin temperature.

(2) Prepare cleaning compound (item 44, App F) or cleaning compound (item 44A, App F) in accordance with manufacturer's instructions. Apply from a bucket, spraying equipment, or foaming equipment. Scrub surfaces as necessary with aircraft cleaning kit or with a brush.

(3) Rinse the cleaner and loosened soil from aircraft surface with a fan spray nozzle directed at an angle between 15 and 30 degrees from the surface. Continue rinsing until all evidence of cleaner and soils have been removed from aircraft.

(4) Reapply corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) on structural components, and corrosion preventive compound (item 64, App F) on electrical components and avionics after each rinse, followed by corrosion preventive compound (item 62B, App F), if required.

(5) Wipe out standing water on transmission deck.

(6) Ensure that there is not standing water in the tailboom.

d. **Cleaning Wipe-Down**

(1) For component cleaning wipe-down, use corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) on structural components, and corrosion preventive compound (item 64, App F) on electrical and avionic components.

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1.49. CORROSION CONTROL/INSPECTION – continued

NOTE

Mechanical maintenance areas should be performed by 67R personnel and all electrical, armament, and avionics maintenance areas should be performed by 68X personnel.

Table II. Requirements for Cleaning Specific Areas and Components

Area or Component	Type of soil	Material	Directions	Cleaning Procedures
Exterior surfaces	Light soil	Cleaning compound (item 44, App F) or cleaning compound (item 44A, App F)	3 ounces per gallon	Apply cleaning compound (item 44, App F) or cleaning compound (item 44A, App F) with aircraft cleaning kit, or cleaning brush. Rinse with fan spray until cleaner and soils are removed.
	Oils	Cleaning compound (item 44A, App F)	3 ounces per gallon	Same as above.
	Heavy soil	Dry cleaning solvent (item 74, App F)	Dry cleaning	Preclean using brush or by wiping area with dry cleaning solvent (item 74, App F), then apply cleaner with foam generator, spray, sponge, or cloth. Allow to set up to 1 minute, then scrub and rinse.
		Cloth (item 51, App F)	Cotton cheesecloth	
		Cleaning compound (item 44A, App F)	3 ounces per gallon	
Cockpit	Dirt	Cleaning compound (item 44A, App F)	3 ounces per gallon	Remove loose dirt with vacuum cleaner. Wipe with cleaning compound (item 44A, App F), and rinse with fresh water on cloth.
Forward avionics	Oil	Dry cleaning solvent (item 74, App F)	Dry cleaning solvent	Remove loose dirt with vacuum cleaner. Wipe with cloth wet with dry cleaning solvent (item 74, App F). Wipe off excess solvent with clean cloth (item 51, App F).
		Cloth (item 51, App F)	Cotton cheesecloth	
	Dust	Cleaning compound (item 44A, App F)	3 ounces per gallon	Remove loose dirt with vacuum cleaner. Wipe with cloth wet with cleaning compound (item 44A, App F), and rinse with fresh water on cloth.

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1.49. CORROSION CONTROL/INSPECTION – continued

Table II. Requirements for Cleaning Specific Areas and Components – continued

Area or Component	Type of soil	Material	Directions	Cleaning Procedures
Plastic environmental	Light debris, dust	Dishwashing compound (item 72, App F) Cleaning compound (item 44A, App F)	1 ounce per gallon 3 ounces per gallon	Wipe with cloth wet with dishwashing compound (item 72, App F) or cleaning compound (item 44A, App F), and rinse with cloth wet with fresh water. Dry with clean cloth.
Tailboom interior (as required)	Dust, dirt, oil	Corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F)	Corrision preventive compound	Vacuum and wipe with clean cloth dampened with corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) with ventilation.
		Cleaning compound (item 44A, App F)	3 ounces per gallon	Alternate for poor ventilation.
Parts, instrument faces	Smudges	Dishwashing compound (item 72, App F)	1 ounce per gallon	Clean with detergent and rinse with cloth wet with fresh water.
		Cloth (item 54, App F)	Cloth flannel	Dry with clean cloth.
Elastomeric seals, boots	Dust, dirt, oil	Dishwashing compound (item 72, App F)	1 ounce per gallon	Clean with detergent and rinse with cloth wet with fresh water.
		Cloth (item 51, App F)	Cotton cheesecloth	Dry with clean cloth.
Fabric parts	Oils, spots	Dishwashing compound (item 72, App F)	1 ounce per gallon	Flush with fresh water. Rub gently with bare hands or clean cloth while applying fresh water. Dry with clean cloth damp with distilled or deionized water in a one-direction movement while applying light pressure.

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1.49. CORROSION CONTROL/INSPECTION – continued

Table II. Requirements for Cleaning Specific Areas and Components – continued

Area or Component	Type of soil	Material	Directions	Cleaning Procedures
Canopy exterior	Dust, dirt, salt	Dishwashing compound (item 72, App F)	1 ounce per gallon	Flush with fresh water. Rub gently with bare hands or clean cloth while applying fresh water. Dry with clean cloth damp with distilled or deionized water in a one-direction movement while applying light pressure.
Interior plastic	————	Dishwashing compound (item 72, App F)	1 ounce per gallon	Apply with clean cloth dampened with dishwashing compound (item 72, App F). Rinse with cloth dampened with fresh water.
		Cloth (item 54, App F)	Flannel cloth	Wipe with flannel cloth (item 54, App F) dampened with distilled water or deionized water in a one-direction movement.
Control cables, hoses	Dust, dirt, oil	Corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F)	Corrosion preventive compound	Wipe clean with a cloth dampened with corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F).
Landing gear, piston surfaces	Sand, dirt, salt	Hydraulic fluid (item 92, App F) Corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) as alternate	Hydraulic fluid Corrosion preventive compound	Apply hydraulic fluid (item 92, App F), to pistons. Wipe clean with corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) as an alternate.

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1.49. CORROSION CONTROL/INSPECTION – continued

Table II. Requirements for Cleaning Specific Areas and Components – continued

Area or Component	Type of soil	Material	Directions	Cleaning Procedures
Crash attenuation pistons	————————	Corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F)	Corrosion preventive compound	Wipe clean with corrosion preventive compound (item 63, App F).
Door hinges and locks	Dust, dirt, oil	Corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F)	Corrosion preventive compound	Apply corrosion preventive compound (item 63, App F) to surfaces as needed.
Wheels and brakes	Dust, dirt, salt	Cleaning compound (item 44A, App F)	3 ounces per gallon	Clean exposed areas with cleaning compound (item 44A, App F) using a brush. Rinse thoroughly with fresh water. Relubricate as required.

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1.49. CORROSION CONTROL/INSPECTION – continued

Table II. Requirements for Cleaning Specific Areas and Components – continued

Area or Component	Type of soil	Material	Directions	Cleaning Procedures
Main and tail rotor blades, swashplates and turret	Dust, salt, oil	Dishwashing compound (item 72, App F) Use corrosion preventive compount (item 63, App F) or corrosion preventive compount (item 63A, App F)	Rinse with fresh water	Apply with clean cloth dampened with dishwashing compound (item 72, App F). Rinse with cloth dampened with fresh water. Or as an alternate, apply a thin film of corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F) to a convenient sized area. Wipe clean with a cloth, and remove the corrosion preventive compound along with loosened soil and residue.
	Salt water	Corrosion preventive compound (item 63, App F) or Corrosion preventive compound (item 63A, App F)	Corrosion preventive compound	Flush with fresh water. Spray with corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F).
		Cloth (item 54, App F)	Flannel cloth	Remove excess with clean dry cloth (item 54, App F).
Aft avionics bay	Electrolytes deposits	Dishwashing compound (item 72, App F)	Rinse with fresh water	Apply with clean cloth dampened with dishwashing compound (item 72, App F). Rinse with cloth dampened with fresh water. Dry with a clean wiping cloth.
Fuselage bilge areas	Hydraulic fluid, dirt, salt water	Cleaning compound (item 44A, App F)	3 ounces per gallon	Vaccum and dry. Wipe area with a sponge dampened in cleaning compound (item 44A, App F). Rinse with sponge and fresh water. Wipe dry with clean cloth (item 54, App F).
Electrical connectors, avionics	Dust, dirt, oil, grease	Corrosion preventive compound (item 64, App F)	Corrosion preventive compound	Apply a thin film of corrosion preventive compound (item 64, App F) to component. To clean, wipe with a cloth to remove corrosion preventive compound and residue. For corrosion control and water displacement, let set for 5 minutes minimum.

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1.49. CORROSION CONTROL/INSPECTION – continued

Table II. Requirements for Cleaning Specific Areas and Components – continued

Area or Component	Type of soil	Material	Directions	Cleaning Procedures
Flight control rods, threads, jam nuts, washers, bolts	Corrosion and water intrusion	Corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F)	Corrosion preventive compound	Apply a thin film of corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 63A, App F).
Weapon turret	Sand, salt, oil	Cleaning compound (item 44A, App F)	3 ounces per gallon	Clean exposed areas with cleaning compound (item 44A, App F), rinse with fresh water,, and dry with clean cloth (item 54, App F).
		Lubricating oil (item 119A, App F) or corrosion preventive compound (item 63A, App F)	Lubricating oil, water displacing	Apply lubricating oil (item 119A, App F), and wipe off excess oil with dry clean cloth (item 54, App F). Use corrosion preventive compound (item 63A, App F) as an alternate.

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1.49. CORROSION CONTROL/INSPECTION – continued

Table III. Reapplication of CPC Compounds, Sealants, and Primers after Washing and Rinsing MIL-C-81309, Type II Corrosion preventive compound (item 63, App F) or Corrosion preventive compound (item 63A, App F).

Area	Location	Specifics
NOTE After washes and rinses, reapplication of CPC compounds, sealants, and primers shall be performed daily as specified in this table.		
1	Avionics bay	Apply to all hinges and latches in access door R90.
	Fuselage – right side, forward	Apply to door hinges and latches on access doors for pilot and copilot.
	Landing gear	Apply to crash attenuation piston shafts, and wipe off excess with a clean cloth.
		Apply to inside of trailing arm.
2	Fuselage – right side, center	Apply to hinges and latches on R180 access door.
	Wing	Apply to hinge and latch on access door RW12.
	Pylons	Apply to all hinges and latches.
3	Engine nacelle – right	Apply to hinges and latches on engine access doors RN1, RN2, RN3, RN4, RN5, and RN6.
4	Fuselage – right side, aft	Apply to hinge and latches on access door R295.
		Apply to hinges and latches on hydraulic access door R325, external power access door R345, and stowage compartment door R330.
5	Tail Section	Apply to crash attenuation piston shafts, and wipe off excess with a clean cloth.
		Apply to inside of wheel axle.
6	Fuselage – left side, aft	Apply to hinges and latches on stowage compartment door L330, doors R410, R475 and T32.
7	Catwalk	Apply to hinges and latches on equipment bay doors, L325, T290L, T290R, T250L, and T250R.
9	Engine nacelle – left	Apply to hinges and latches on electronic equipment door L295.
		Apply to hinges and latches on engine access doors LN1, LN2, LN3, LN4, LN5, L210 and L225.
10	Fuselage – left side, center	Apply to hinges and latches on access doors L190 and L210.
	Pylons	Apply to all hinges and latches.
11	Fuselage – left side, forward	Apply to hinges and latches on access doors L115, L117, and L187.
		Apply to hinge and latches on avionics door L90.
13	Pilot station	Apply to hinges, latch, and canopy support strut.
		Apply to armor swing plate hinges and latch.
14	Copilot/gunner station	Apply to hinges, latch, and canopy support strut.
		Apply to armor swing plate hinges and latch.

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1.49. CORROSION CONTROL/INSPECTION – continued

Application of MIL-C-81309, Type III Corrosion preventive compound (item 64, App F). If additional protection is needed, apply corrosion preventive compound (item 62B, App F) (cont).z

Area	Location	Specifics
1	Avionics bay	Apply to all electrical connectors on black boxes, and wire bundle clamps in access door R90.
	Searchlight	Apply to all electrical contacts.
2	Engine nose gearbox	Apply to all electrical connectors and wire bundle clamps.
	Pylons	Apply to all electrical connectors and wire bundle clamps.
	Transmission deck	Apply to all electrical connectors, wire bundle clamps, and black boxes.
4	Electronics equipment bay	Apply to all electrical connectors on black boxes, and wire bundle clamps in access door R295.
5	Horizontal stabilator	Apply to all electrical connectors.
	Tail landing gear	Apply to all electrical connectors.
	Intermediate gearbox	Apply to all electrical connectors and wire bundle clamps.
	Tail rotor gear box	Apply to all electrical connectors and wire bundle clamps.
7	Catwalk	Apply to all electrical connectors on black boxes, and wire bundle clamps.
10	Fuselage – left side, center	Apply to all electrical connectors and wire bundle clamps in access doors L90 and L210.
	Engine nose gearbox	Apply to all electrical connectors and wire bundle clamps.
	Pylons	Apply to all electrical connectors and wire bundle clamps.
11	Fuselage – left side, forward	Apply to all electrical connectors and wire bundle clamps in avionics bay (access doors L90, L115, L117, and L187.
12	Nose section	Apply to all electrical connectors on black boxes, and wire bundle clamps in access panel areas R40, L40, R60, and L60 when removing panels during routine inspection.
	TADS/PNVS turret	Apply to all electrical connectors and wire bundle clamps.

Application of epoxy primer coating kit (item 78A, App F) or epoxy primer coating kit (item 76A, App F) in desert and intermediate areas. Sealing with sealing compound (item 162, App F) or sealing compound (item 170A, App F) is optional.

NOTE: 1. Inspect, and reapply when there are visible cracks or loss of adhesion.

2. Where torque stripe is used, apply corrosion preventive compound (item 62B, App F).

Area	Location	Specifics
1	Main Landing gear	Apply epoxy primer coating kit (item 78A, App F) to wheel lug nuts,, then apply topcoat polyurethane coating (item 140B, App F).
2	Main transmission deck	Apply to all bolt heads, nuts, exposed threads, retainers, control rod ends, and linkages. Do not apply primer to bearings.
	Pylons	Apply to all bolt heads, nuts, and exposed threads.
4	Electronics equipment bay	Apply to all bolt heads, nuts, and exposed threads in access door R295.

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1.49. CORROSION CONTROL/INSPECTION – continued

5	Tail landing gear	Apply to all bolt heads, nuts, and exposed threads at strut frame mount.
		Apply to all bolt heads, nuts, and exposed threads on trailing arm and wheel.
		Apply epoxy primer coating kit (item 78A, App F) to wheel lug nuts, then apply topcoat polyurethane coating (item 140B, App F).
8	Main rotor and mast	Apply to all bolt heads, nuts, exposed threads, retainers, control rod ends, linkages, and exposed metal areas.
10	Landing gear	Apply epoxy primer coating kit (item 78A, App F) to wheel lug nuts, then apply topcoat polyurethane coating (item 140B, App F).
Application of sealing compound (item 162, App F) or sealing compound (item 170A, App F) in coastal and tropical areas. **NOTE**: 1. Inspect and reapply when there are visible cracks or loss of adhesion. 2. Where torque stripe is used, apply corrosion preventive compound (item 62B, App F).		
Area	Location	Specifics
1	Main Landing gear	Apply to all bolt heads, nuts, exposed threads, and metal connectors on shock strut.
		Apply to metal clamps on trailing arm and all unprotected, exposed metal areas at upper end.
2	Fuselage – right side, center	Apply to wing mounting bolts.
	Transmission deck	Apply to screw heads, seams, and mounting brackets on air speed transducer.
		Apply to screw heads, mounting brackets, and seams on both air speed transducers.
3	Engine nacelle – right	Apply corrosion preventive compound (item 62B, App F) to leveling jack RN1.
4	Fuselage – right side, aft	Apply to all tail rotor drive shaft hanger mount bolts.
		Apply to all tail rotor drive shaft coupling flanges and bolts.
5	Tail section	Apply to vertical stabilizer mounting bolts.
		Apply to horizontal stabilator mounting bolts and servo attachment fittings.
	Directional servo actuator	Seal cracks at base.
	Intermediate gearbox	Apply to all bolt heads, nuts, exposed threads, and fittings.
	Tail rotor gearbox	Apply to all bolt heads, nuts, exposed threads, and fittings.
9	Engine nacelle	Apply corrosion preventive compound (item 62B, App F) to leveling jack LN1.
10	Fuselage – left side, center	Apply to wing mounting bolts.
11	Fuselage – left side, forward	Apply to metal clamps on trailing arm and all unprotected, exposed metal areas at upper end.

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1.49. CORROSION CONTROL/INSPECTION – continued

13	Pilot station	Apply sealing compound (item 162, App F) to seat attachment fittings and pins; as an alternate, use corrosion preventive compound (item 62B, App F). Do not use MIL-S-29574 in cockpit areas.
14	Copilot/gunner	Apply sealing compound (item 162, App F) to seat attachment fittings and pins; as an alternate, use corrosion preventive compound (item 62B, App F). Do not use MIL-S-29574 in cockpit areas.

END OF TASK

1.50. BATTERY COMPARTMENT CLEANING

1.50.1. Description

This task covers: Cleaning.

1.50.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)

Materials/Parts:

Boric acid (item 33, App F)
Brush (item 34, App F)

Personnel Required:

67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
9.40	Battery removed

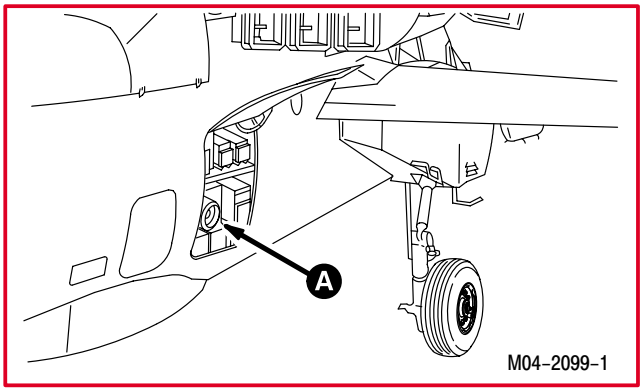
1.50.3. Cleaning

WARNING

Potassium hydroxide in the electrolyte of a nickel cadmium battery is very corrosive. When spilled on hands, clothing, or other material, flood the affected area immediately with cold water or boric acid solution. When the eyes are involved, wash them with a stream of water. When handling potassium hydroxide, faceshield, rubber gloves, and apron shall be worn. If injury occurs, seek medical aid.

CAUTION

Do not use water or steam on electrical equipment.



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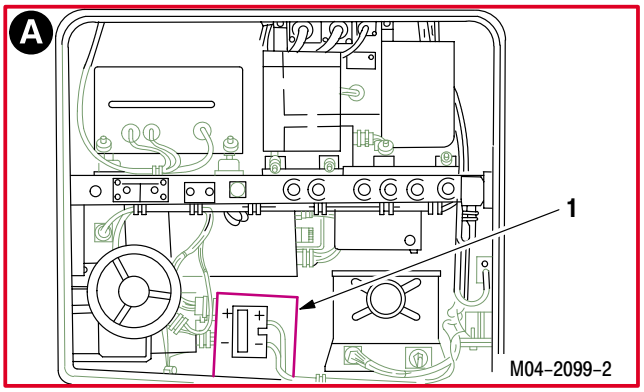
1.50. BATTERY COMPARTMENT CLEANING – continued

a. **Clean battery compartment (1).**

(1) Carefully neutralize spilled electrolyte by treating with 3 percent solution of boric acid in water. Use boric acid (item 33, App F).

(2) Apply solution with acid swabbing brush. Use brush (item 34, App F). Allow to remain on the surface 10 minutes. Discard brush in a suitable container.

(3) Remove neutralized electrolyte with a wet mop or sponge. Rinse area thoroughly with clean tap water.



b. **Install battery** (para 9.40)**.**

END OF TASK

1.51. BATTERY SERVICING

1.51.1. Description

This task covers: Servicing.

1.51.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

References:

TM 11-6140-203-14-2

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access door R295 opened

Personnel Required:

67R Attack Helicopter Repairer

1.51.3. Servicing

a. **Service battery** (TM 11-6140-203-14-2)**.**

b. **Secure access door R295** (para 2.2)**.**

END OF TASK

1.52. ENCU TURBINE SERVICING

1.52.1. Description

This task covers: Servicing.

1.52.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Chemical protective gloves (item 154, App H)
Hand oiler (item 220, App H)

Personnel Required:

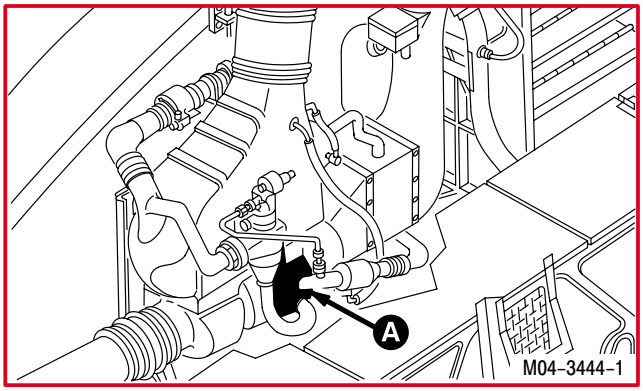
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Materials/Parts:

Packing (2)
Lubricating oil (item 118, App F) (below -25 °F)
Lubricating oil (item 119, App F) (above -25 °F)
Wire (item 225, App F)

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors T250L, T250R, T290L, T290R, and L325 opened
2.84	Center aft catwalk removed



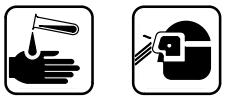
1.52.3. Servicing

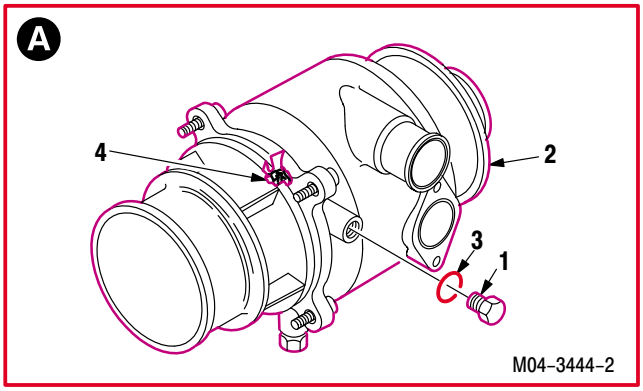
a. **Remove fill plug (1) from ENCU turbine (2).**

(1) Remove lockwire from plug (1).

(2) Remove plug (1) from turbine (2).

(3) Remove and discard packing (3) from plug (1).





b. **Service ENCU turbine (2) until cotton (4) will not absorb any more oil.** Use lubricating oil (item 118, App F) or lubricating oil (item 119, App F) and oiler.

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1.52. ENCU TURBINE SERVICING – continued

NOTE

ENCU turbine is fully serviced when excess oil can be drained.

c. **Drain excess oil from ENCU turbine (2).**

(1) Remove lockwire from drain plug (5).

(2) Remove drain plug (5) from turbine (2).

(3) Remove and discard packing (6) from plug (5).

(4) Drain excess oil from turbine (2).

d. **Install plug (5) on turbine (2).**

(1) Install new packing (6) on plug (5).

(2) Install plug (5) on turbine (2).

e. **Install plug (1) on turbine (2).**

(1) Install new packing (3) on plug (1).

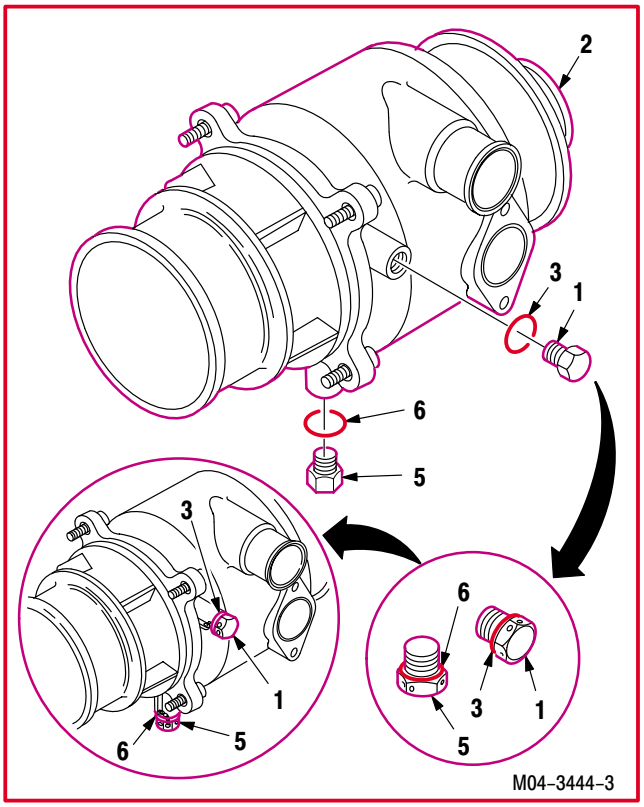
(2) Install plug (1) in turbine (2).

f. **Lockwire plug (5) and plug (1).** Use wire (item 225, App F).

g. **Inspect (QA).**

h. **Install center aft catwalk panel** (para 2.84)**.**

i. **Secure access doors T250L, T250R, T290L, T290R, and L325** (para 2.2)**.**



END OF TASK

1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES

1.53.1. Description

This task covers: General Cleaning/Washing Procedures. Preferred Washing Procedures. Alternate Cleaning Procedures. Wipe Down With Water Displacing Film. Specific Item, Area, and Component Cleaning. Aircraft Wash Frequency (specific conditions).

1.53.2. Initial Setup

Tools:

Light duty laboratory apron (item 27, App H)
Applicator bottle (item 42, App H)
Cleaning aircraft brush (item 43, App H)
Industrial faceshield (item 129, App H)
Chemical protective gloves (item 154, App H)
14-quart utility pail (item 222, App H)
Adjustable air filtering respirator (item 262, App H)

Materials/Parts:

Brush (item 34, App F)
Cleaning compound (item 44, App F)
Cloth (item 51, App F)
Cloth (item 52, App F)
Cloth (item 54, App F)
Cloth (item 56, App F)
Corrosion preventive compound (item 61, App F)
Corrosion preventive compound (item 62, App F)
Corrosion preventive compound (item 63, App F)
Corrosion preventive compound (item 64, App F)
Detergent (item 71, App F)
Dishwashing compound (item 72, App F)
Dry cleaning solvent (item 74, App F)
Hydraulic fluid (item 92, App F)
Isopropyl alcohol (item 106, App F)
Mat (item 121, App F)
Rain repellant (item 148, App F)
Sodium phosphate (item 188, App F)
Sponge (item 190, App F)

Personnel Required:

67R Attack Helicopter Repairer
Two persons to assist

References:

TM 1-1270-476-20
TM 1-1500-328-23
TM 1-1500-343-23
TM 1-1500-344-23
TM 1-1520-238-PM
TM 1-1520-238-T
TM 1-5855-265-20
TM 9-1090-208-23-1
TM 55-2835-208-23
TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

1.53.3. General Cleaning/Washing Procedures

CAUTION

- Use of high pressure wash on any part of this aircraft is prohibited.
- Do not rinse aircraft with a solid stream of water. Use a soft spray pattern to avoid damage and water intrusion.
- Water must not be directed at pitot tubes, static ports, gearboxes, fillers, and vents, etc. Critical areas shall be adequately protected (ground plugs, covers, etc.).
- Use low water flow pressure to avoid forcing water past static and dynamic seals. Avoid water intrusion into light fixtures, electrical components, antennas, etc.
- Washing of main rotor or tail rotor head requires a reapplication of corrosion preventive compound (item 63, App F) to designated areas.
- Use appropriate water flow and media which will not lead to scratching of the transparent sections of the canopy.

a. **Use a soft flow or spray pattern to dissolve, dislodge, and flush away visible salt encrustation as well as rinse the external surfaces.** A recommended flow of eight gallons per minute at approximately 25 PSI supply pressure is recommended.

b. **Direct water at an angle of 15 to 30 degrees from the surface.** Ensure that sufficient water flow is achieved on all surfaces.

c. **Rinsing sequence.**

NOTE

Preposition blades at approximately 45 degrees relationship to fuselage longitudinal center line to minimize water drainage into the main transmission deck area.

(1) Main rotor blades.

(2) Main rotor head (to include strap pack accessible areas).

(3) Main rotor fairing.

(4) Left side of center fuselage, left nacelle, and wing.

(5) Canopy and forward fuselage (top and sides).

(6) Right side of center fuselage, right nacelle, and wing.

(7) Forward and center fuselage belly.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

(8) Tail rotor blades, hub, and swashplate.

(9) Vertical stabilizer (from top down).

(10) Horizontal stabilator.

(11) Top and sides of tailboom.

(12) Tailboom belly.

d. **Finishing/Cleanup Steps.**

(1) Reapply corrosion preventive compound (item 64, App F), to electrical/electronic connectors, switches, and transducers after exposure to water wash.

(2) Wipe any standing water from the transmission deck.

(3) Wipe up any standing water inside the tail boom.

(4) Apply corrosion preventive compound (item 64, App F) to horizontal stabilator mount (para 2.113).

(5) Apply corrosion preventive compound (item 64, App F) to pylon rack pivot features (para 16.4).

1.53.4. Preferred Washing Procedures

CAUTION

Do not use abrasive mats (MIL-A-9962) for cleaning painted surfaces.

NOTE

- This procedure shall be used when fresh water is available for rinsing purposes.
- Dilute cleaning compound (item 44, App F) 1 part cleaner to 9 parts water.

a. **Rinse aircraft surfaces when necessary to reduce skin temperature.** Streaking will occur if cleaning solutions are allowed to run down hot painted surfaces.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

b. **Apply cleaning compound (item 44, App F) from a pail, spraying equipment, or foaming equipment.** Scrub surfaces when necessary with brush (fitted with a cleaning pad or sponge) or with a cleaning brush (item 34, App F).

c. **Rinse away the loosened soil and cleaner solution with freshwater.**

(1) For rinsing, a rubber-padded shut-off spray nozzle is recommended.

(2) Rinse the cleaner solution and loosened soil from aircraft surface with a fan spray nozzle, directed at an angle of 15 degrees to 30 degrees from the surface.

(3) Continue rinsing until all evidence of cleaner solution and soils have been removed from the aircraft.

d. **Refer to TABLE I for recommended cleaning sequence.**

1.53.5. Alternate Cleaning Procedures

NOTE

- This procedure is for use only when water is not available for rinsing, or when cold weather prevents the use of water.
- Dilute cleaning compound (item 44, App F) 1 part cleaner to 9 parts water.

a. **Using a applicator bottle, apply cleaning compound (item 44, App F) to exterior surfaces of the aircraft.** (No more than a few square feet at a time.)

b. **After 30 seconds, scrub, then wipe cleaner solution and loosened soil from the surface with a clean cloth.**

c. **Rinsing with a cloth wet with fresh water following the use of cleaning compound (item 44, App F) is desirable.**

d. **Rinse cleaned surfaces with fresh water when available.**

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

1.53.6. Wipe Down With Water Displacing Film

CAUTION

Do not spray corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 64, App F) on any transparent or optical surfaces or directly at any bearings or seals. Wiping the seals exposed surfaces with a clean cloth moistened with corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 64, App F) (as applicable) is an acceptable cleaning alternative.

a. **Apply a thin film of corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 64, App F) (as applicable) to a conveniently sized area.** (No more than a few square feet at a time.)

b. **Wipe area with a cloth to clean and remove the corrosion preventive compound (item 63, App F), or corrosion preventive compound (item 64, App F) (as applicable) along with loosened soil and/or oil residue.**

c. **When additional cleaning is required, a second coat of corrosion preventive compound (item 63, App F) or corrosion preventive compound (item 64, App F) (as applicable) may be applied and wiped off with a clean cloth.**

1.53.7. Specific Item, Area, and Component Cleaning

NOTE

- TABLE I designates the recommended sequence in descending order of cleaning for designated major item areas when the entire aircraft is involved.
- TABLE I also provides references for TABLE II cleaning instructions.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table I. Recommended Cleaning Sequence

Seq	Component	General Cleaning Instruction and Paragraph	Specific Cleaning Instruction Table II Item No.
1.	Engine		TM 55-2840-248-23
2.	APU		TM 55-2835-208-23
3.	Main rotor blades	Wipe down with water displacing compound (WDC)	23
4.	Main rotor hub assy	Wipe down with WDC	23
5.	Main rotor swashplate assy.	Wipe down with WDC	23
6.	Main transmission deck area	Wipe down with WDC	23
7.	Fuselage exterior, to include: center fuselage, nacelles, wings, etc.	Wash with cleaning compound	2, 3
8.	Canopy	See Table II	16
9.	Forward fuselage	Wash with cleaning compound	2, 3
10.	Aft fuselage	Wash with cleaning compound	2, 3
11.	Tail rotor blades	Wipe down with WDC	23
12.	Tail rotor hub and swashplate	Wipe down with WDC	23
13.	Vertical stabilizer	Wash with cleaning compound	2, 3
14.	Horizontal stabilator	Wash with cleaning compound	2, 3
15.	Tailboom exterior	Wash with cleaning compound	2, 3
16.	Tailboom interior	See Table II	23 or 25
17.	FABS interior	See Table II	9
18.	Interior spaces	See Table II	8 or 10
19.	Gun turret	Wipe down with WDC	23

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table I. Recommended Cleaning Sequence – continued

Seq	Component	General Cleaning Instruction and Paragraph	Specific Cleaning Instruction Table II Item No.
20.	Other A/C components/areas	See Table II	
21.	30mm gun		TM 9-1090-208-23-1

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
			 **WARNING**		
	If cleaning compound is splashed in eyes, rinse thoroughly with fresh water for 15 minutes and report to medical facility. Remove clothing saturated with cleaning compound immediately and flush exposed skin areas with fresh water.				
			CAUTION		
	Open all circuit breakers associated with battery power (TM 1-1520-238-T) prior to application of dry cleaning solvent (item 74, App F).				
1.	Painted exterior surfaces (to include fwd, ctr, and aft fuselage, wings, nacelles, stabilizer, stabilator, tailboom, FABs, kevlar fairings).	Light soils (dirt, dust, mud, salt, loose soot)	Cleaning compound (item 44, App F)	1 part cleaner in 9 parts water	Apply cleaning compound (item 44, App F) with foam generator, spray, sponge, soft brush, or cloth. Scrub (if necessary) and then rinse with fresh water and dry.
2.	(same as 1)	Moderate oils, (hydraulic fluids, lube oils, light preservatives)	Cleaning compound (item 44, App F)	1 part cleaner in 4 parts water	Apply cleaning compound (item 44, App F) with foam generator spray, sponge, soft brush, or cloth. Rub gently with a circular motion for up to 1 minute. Rinse with fresh water and dry.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
3.	(same as 1)	Heavy soils (carbonized oil, aged preservatives, grease, gun blast, and exhaust deposits)	Dry cleaning solvent (item 74, App F) Cloth (item 51, App F) Cleaning compound (item 44, App F)	 1 part cleaner in 1 part water	Pre-clean by wiping or brushing soiled area with dry cleaning solvent (item 74, App F). Then apply cleaning compound cleaning compound (item 44, App F) with foam generator, spray, sponge, or cloth. Allow the cleaner to dwell for up to one minute without scrubbing, then scrub for up to one minute. Rinse thoroughly, then dry. Do not allow cleaning solutions to dry on surfaces, or streaking will occur.
4.	Unpainted exterior surfaces	Gun blast residues, carbonized exhaust	Cleaning compound (item 44, App F) Mat (item 121, App F)	1 part cleaner in 4 parts water	Wet surface with fresh water. Apply cleaning compound (item 44, App F) and scrub briskly with mat (item 121, App F). Rinse with fresh water.
5.	Unpainted exterior surfaces	Gun blast residues, carbonized exhaust	Corrosion preventive compound (item 63, App F)		For stubborn deposits spray area with corrosion preventive compound (item 63, App F), then follow with brushing.
6.	Cockpit floor	Human or animal urine, feces	Cleaning compound (item 44, App F)	1 part cleaner in 9 parts water	Wash thoroughly with cleaning compound (item 44, App F) using a soft bristle brush, then rinse with fresh water.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
7.	Cockpit and compartments	Dirt, debris	Cleaning compound (item 44, App F)	1 part cleaner in 9 parts water	Remove loose dirt with vacuum cleaner. Wipe with cleaning compound (item 44, App F); rinse with fresh water on cloth.
	CAUTION • Open all circuit breakers associated with battery power (TM 1-1520-238-T) prior to application of dry cleaning solvent (item 74, App F). • Avoid use of compressed air to clean electronic equipment. Do not use abrasives on high pressure seals, breathers/vents.				
8.	Forward avionics bay (FAB)	Oil	Dry cleaning solvent (item 74, App F) Cloth (item 51, App F)		Remove loose dirt with vacuum cleaner. Wipe fiberglass with cloth saturated with dry cleaning solvent (item 74, App F). Wipe excess solvent with cloth (item 51, App F).
		Dust, dirt and debris	Cleaning compound (item 44, App F)	1 part cleaner in 9 parts water	Remove loose dirt with vacuum cleaner. Wipe with cleaning compound (item 44, App F); rinse with cloth wet with fresh water.
			Corrosion preventive compound (item 64, App F)		Wipe with cloth wet with corrosion preventive compound (item 64, App F).

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
9.	Cockpit interior	Dust, dirt mud, and light debris	Cleaning compound (item 44, App F) Detergent (item 71, App F)	1 part cleaner in 9 parts water 1 oz. in 1 gallon water	Use brush to loosen mud or debris on control pedals, floor, or other components and vacuum area. Wipe with cloth saturated in cleaning compound (item 44, App F) or detergent (item 71, App F) and follow with cloth wet with fresh water. Dry with clean cloth.
10.	Environmental control ducting	Light debris, dust, and grime	Cleaning compound (item 44, App F) Detergent (item 71, App F)	1 part cleaner in 9 parts water 1 oz. in 1 gallon water	Wipe with cloth saturated in cleaning compound (item 44, App F) or detergent (item 71, App F) and follow with cloth wet with fresh water. Dry with clean cloth.
11.	Tailboom interior, engine, APU and SDC compartments, hydraulic manifolds and gear box exteriors	Dust, dirt, oil, and debris	Cleaning compound (item 44, App F) Corrosion preventive compound (item 63, App F) (structural)	1 part cleaner in 4 parts water	Vacuum and then wipe with cloth wet with cleaning compound (item 44, App F). Wipe with cloth wet with fresh water. Dry with clean cloth and spray with corrosion preventive compound (item 63, App F) when area can be ventilated.
12.	Acrylic plastic parts, instrument faces (excluding canopies)	Light soil and smudges	Detergent (item 71, App F) Cloth (item 54, App F)	1 oz. in 1 gallon water	Wipe with cloth saturated in detergent (item 71, App F) and follow with fresh water rinse. Dry with clean cloth (item 54, App F).

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
13.	Elastomeric seals (boots and MLG strut to FAB seal)	Dust, dirt, oil, and grime	Detergent (item 71, App F) Cloth (item 51, App F)	1 oz. in 1 gallon water	Wipe with cloth saturated with detergent (item 71, App F) and follow with fresh water rinse. Dry with clean cloth (item 51, App F).
14.	Fabric parts, sound proofing, and upholstery	Light soil and oil spots	Detergent (item 71, App F) Cleaning compound (item 44, App F)	1 part in 16 parts water 1 part cleaner in 4 parts water	Remove loose dirt with vacuum cleaner. Apply detergent (item 71, App F) or cleaning compound (item 44, App F) with sponge and scrub briskly. Rinse with fresh water cloth. Allow area to dry. Raise nap by brushing.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
			WARNING **Do not use synthetic wiping cloths with flammable solvents having a flash point of 100 °F (38 °C) or less.**		
			CAUTION Remove rings, watches, or other hard objects from hands or wrists before washing transparent plastics. Personnel must also take precautions to prevent buttons, badges, or other hard objects from scratching surfaces. Do not use hard, dirty, or gritty cloth in cleaning and polishing transparent plastics. Wiping with such cloths can mar and scratch plastic surfaces. Do not use any chemical compounds unless specifically authorized for cleaning plastics. Do not rub dry plastic panels with dry cloth, which might scratch surface or create electrostatic charge that attracts dust. Do not use paper towels or similar products which are coarse and might scratch surface on light contact.		
15.	Canopy exterior (plastic and glass panels)	Dust, dirt, grime, salt spray, paint over spray, oil, grease	Cloth (item 54, App F) Dishwashing compound (item 72, App F) Isopropyl alcohol (item 106, App F) Rain repellant (item 148, App F) Cloth (item 56, App F)		Prepare a solution of 80% de-ionized or distilled water and 20% isopropyl alcohol. Mix 1/4 oz. of dishwashing compound (item 72, App F) per gallon of water/alcohol solution. If isopropyl alcohol is not available, use detergent and water only. Flush with fresh water to remove loose dirt. Spray cleaning solution on and rub gently with bare hand or clean cloth while applying fresh water.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
15. (cont)					Flush with fresh water and dry with clean cloth dampened in de-ionized or distilled water. Wipe in one direction applying light pressure. Wring out excessive water and continue. Polish dry with a fresh clean cloth. Apply rain repellant (item 148, App F) to cloth (item 56, App F). Apply repellent using small firm circular motion over entire area. Allow repellent to dry for 1 minute. Use a clean cloth (item 56, App F) to wipe the treated surface until excess repellent is removed.
16.	Interior plastic or glass panels	Dust, dirt, grime.	Sponge (item 190, App F) Isopropyl alcohol (item 106, App F) Cloth (item 54, App F) Dishwashing compound (item 72, App F)		Same procedure as item 15. Except stream of water is not practical. Use clean cloth or sponge for cleaning and wipe with clean cloth rinsed frequently in de-ionized or distilled water.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
17.	Control cables, hose, metallic braid	Dust, dirt, oil, grease	Corrosion preventive compound (item 64, App F) (avionics) Corrosion preventive compound (item 62, App F)		Wipe with clean cloth dampened in corrosion preventive compound (item 64, App F). Recoat cables (not hoses) with corrosion preventive compound (item 62, App F).
	CAUTION ● Open all circuit breakers associated with battery power (TM 1-1520-238-T) before applying of dry cleaning solvent (item 74, App F). ● Do not use corrosion preventive compound (item 62, App F) or corrosion preventive compound (item 61, App F) on micro-switches or exposed piston rod surfaces.				
18.	Door hinges, linkages, lock cylinder housings	Dust, dirt, oil, grease	Dry cleaning solvent (item 74, App F) Corrosion preventive compound (item 63, App F) Corrosion preventive compound (item 62, App F) Corrosion preventive compound (item 61, App F)		Brush surfaces as necessary with dry cleaning solvent (item 74, App F). Apply corrosion preventive compound (item 63, App F) to surfaces as necessary. Cover rod ends and springs with corrosion preventive compound (item 62, App F). Where lubrication is not required apply corrosion preventive compound (item 62, App F).

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
			CAUTION		
			• Open all circuit breakers associated with battery power (TM 1-1520-238-T) before applying of dry cleaning solvent (item 74, App F). • Protect tires from contact with dry cleaning solvent (item 74, App F) and cleaning compound (item 44, App F).		
19.	Landing gear	Dirt, grime, grease, hydraulic fluid, etc.	Dry cleaning solvent (item 74, App F) Cleaning compound (item 44, App F) Corrosion preventive compound (item 61, App F)	1 part cleaner in 4 parts water	Brush surfaces as necessary with dry cleaning solvent (item 74, App F). Alternate procedure: brush on dry cleaning solvent (item 74, App F) to loosen stubborn soil. Apply cleaning compound (item 44, App F), then brush and rinse. Note: corrosion preventive compound (item 61, App F) may be applied to provide a clear protective film.
			CAUTION		
			Wipe away from seal areas to prevent collection of soil at seal junction areas. Ensure piston surface is clean and completely lubricated but not dripping. If piston is dry, telescoping action of strut will force gritty particles into cylinder, causing leaks and eventual failure. Do not use aerosol dispensed fluid on hydraulic systems.		
			NOTE Crash attenuation features of the landing gear shock struts (lower exposed piston areas) should be wiped clean with corrosion preventive compound (item 63, App F) then lightly coated with corrosion preventive compound (item 62, App F).		

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
20.	Landing gear exposed piston surfaces	Sand, dirt, salt deposits, and other foreign particles	Hydraulic fluid (item 92, App F)		Clean exposed surfaces with clean cloth dampened with hydraulic fluid (item 92, App F). Take care not to scratch the surface. Wipe away from seals.
21.	Wheels and brakes	Oil, dirt, sand, and other foreign matter	Preferred: Cleaning compound (item 44, App F)	1 part cleaner in 4 parts water	Clean exposed areas with cleaning compound (item 44, App F) by brushing. Rinse thoroughly with fresh water. Relubricate as required (TM 1-1520-238-PM).
			Alternate: Corrosion preventive compound (item 63, App F)		Apply a thin film of corrosion preventive compound (item 63, App F) to a localized area. Wipe with a clean cloth to remove the corrosion preventive compound (item 63, App F) along with the loosened soil and or residue.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
			WARNING		
			• **Open all circuit breakers associated with battery power (TM 1-1520-238-T) prior to application of isopropyl alcohol (item 106, App F).** • **Do not use synthetic wiping cloth with flammable solvents such as isopropyl alcohol.**		
22.	Organic materials (plastics, paints)	Fungi (mold)	Isopropyl alcohol (item 106, App F) Cloth (item 51, App F)		Wipe with cloth (item 51, App F) wet with isopropyl alcohol (item 106, App F). To prevent recurring fungus growth, keep area dry and clean. Procedure does not apply to treatment of fuel system internal fungus attack.
23.	Helicopter blades, main and tail rotor heads, main and tail swashplates, turret	Grime, oil, grease, dust, water saturation Salt, salt water	Corrosion preventive compound (item 63, App F) Corrosion preventive compound (item 63, App F) Cloth (item 54, App F)		Apply a thin film of corrosion preventive compound (item 63, App F) to a localized area. Wipe with a cloth (item 54, App F) to remove the compound along with loosened soil and/or residue. Flush thoroughly with fresh water. Blow dry with clean compressed air. Spray with corrosion preventive compound (item 63, App F). Remove excess with cloth (item 54, App F) to avoid dust attraction.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
			WARNING		
			Never use a wire brush to clean a battery. Wear rubber gloves, an impermeable apron, and protective goggles when handling batteries.		
			CAUTION		
			• Nickel-cadmium batteries must not be exposed to acid or acid vapors. Battery electrolytes are extremely corrosive. Spilled electrolytes will be removed immediately. • Fumes from overheated electrolytes will spread to adjacent areas, causing rapid corrosion on unprotected surfaces.		
24.	Battery compartment	Nickel-cadmium battery electrolyte deposits (potassium hydroxide solution)	Sodium phosphate (item 188, App F) Corrosion preventive compound (item 64, App F)	6 oz. in 1 gallon water	Remove spilled electrolyte immediately by flushing with fresh water. Neutralize the area by sponging generously with sodium phosphate (item 188, App F). Brush with a fiber brush, then flush with fresh water. Dry with clean wiping cloths. Keep the cell vents open. Preserve compartment. Use corrosion preventive compound (item 64, App F). Do not paint or preserve batteries.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
25.	Fuselage bilge areas	Hydraulic fluid, water, dirt, metallic debris	Cleaning compound (item 44, App F) Sponge (item 190, App F) Dry cleaning solvent (item 74, App F)	1 part cleaner in 9 parts water	Vacuum clean liquids, debris, and dry. Wipe area with a sponge (item 190, App F) dampened with cleaning compound (item 44, App F). Rinse by sponging with freshwater. Wipe dry with a clean cloth. Wipe with cloth dampened with dry cleaning solvent (item 74, App F). Wipe dry with a clean cloth.
26.	Optical glass	Dust, grease, oil	Cloth (item 52, App F)	(TADS) (PNVS)	TM 1-1270-476-20 TM 1-5855-265-20

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES – continued

Table II. Cleaning of Specific Areas and Components – continued

Item No.	Area or Component	Type of Soil	Cleaning Agent or Compound & Nomenclature	Mixing Directions	Cleaning Procedures
		WARNING			
	Before cleaning electrical and avionic equipment, ensure electrical power is disconnected. Injury or death may occur. Material and procedures below are general. TM 55-1500-343-23 procedures shall be used as specified there in.				
27.	Electrical Connectors, Avionics Components, Electrical, and Avionics Equipment	Dust, dirt, other loose foreign matter, grease, oil smudges, light tarnish, light corrosion, water intrusion	Corrosion preventive compound (item 64, App F)		Apply a thin film of corrosion preventive compound (item 64, App F) to component. Wipe with a clean cloth to remove corrosion preventive compound (item 64, App F) along with soil and residue. For corrosion control and water displacement, let compound stand for at least 5 minutes before wiping off.
		Fungus	Cloth (item 51, App F)	(TM 1-1500-343-23)	
28.	Flight control rod end threads, jam nuts, lock washers, sliding bushings, bolts	Signs of light corrosion, water intrusion	Corrosion preventive compound (item 63, App F)		Apply a thin film of corrosion preventive compound (item 63, App F) using straw applicator. Wipe away excess to eliminate dust attraction.

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1.53. AIRCRAFT AND AIRCRAFT COMPONENT WASHING, CLEANING, AND FRESH WATER RINSE PROCEDURES

1.53.8. Aircraft Wash Frequency (specific conditions)

a. **The following cleaning frequency shall be applied for aircraft.**

(1) Cleaning will be accomplished after aircraft have been subjected to any of the following conditions:

(a) Spilled electrolyte or corrosive deposits around battery terminals and general vicinity of the battery area.

(b) Exposed to corrosive fire extinguishing materials.

(c) Exposed to salt water spray.

WARNING

- **Keep corrosion preventive compound MIL–C–81309 away from all sources of ignition. Avoid eye and skin contact. Avoid inhalation. This material will displace oxygen in enclosed spaces.**
- **Avoid eye or skin contact with general purpose preservative VVL–L–800. Avoid inhalation and ingestion.**
- **Avoid eye or skin contact with hydraulic fluid, MIL–H–83282. Avoid inhalation or ingestion. Use with adequate ventilation. Wash hands after handling.**

NOTE

- In the absence of the specific conditions noted above, the aircraft wash frequency will be in accordance with the guidance provided in Section VIII of TM 1-1500-328-23 and TM 1-1500-344-23, as supplemented by local installation/unit standard operating procedures.
- Frequent wipe down is recommended for actuating rods of hydraulic cylinders using MIL–H–83282 hydraulic fluid.

END OF TASK

1.54. ANTI-ICING, DE-ICING, AND DEFROSTING

1.54.1. Description

This task covers: De-icing Helicopter.

1.54.2. Initial Setup

Personnel Required:

67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

References:

TM 1-1500-204-23
TM 1-5855-265-20
TM 1-1270-476-20

CAUTION

- To prevent damage to engines, inlet and exhaust ducts shall be covered during de-ice procedure.
- To prevent loss of corrosion protection, avoid spraying parts coated with corrosion preventive compound.
- To prevent loss of lubrication, avoid spraying main rotor and tail rotor swashplate bearing areas.
- To avoid damage to optical surfaces, avoid spraying TADS/PNVS turret (TM 1-1270-476-20, TM 1-5855-265-20).

1.54.3. De-ice Helicopter

a. **Refer to TM 1-1500-204-23.**

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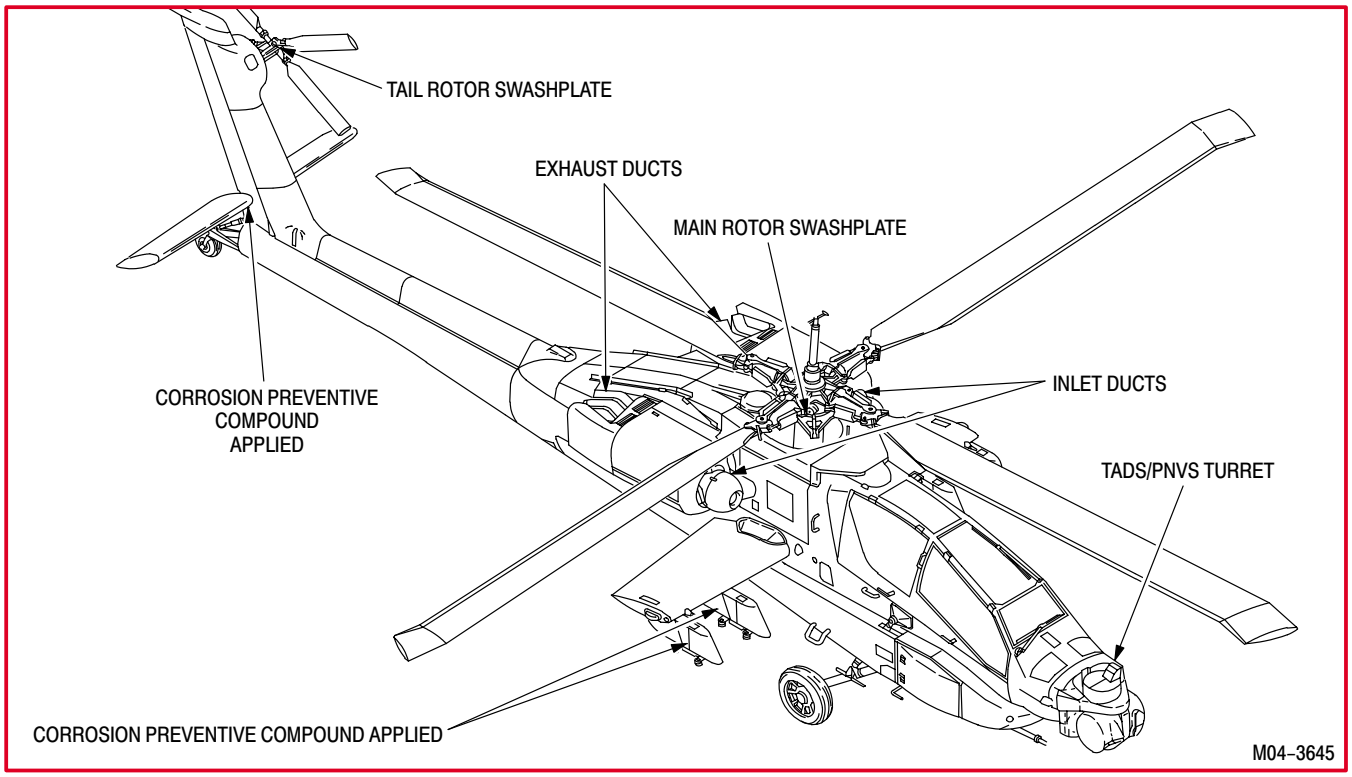
1.54. ANTI-ICING, DE-ICING, AND DEFROSTING – continued



END OF TASK

1.55. WARM-UP/DE-ICE OF ENGINE LOAD DEMAND SPINDLE (LDS) CABLES

1.55.1. Description

This task covers: Warm-up/De-ice of Engine Load Demand Spindle (LDS) Cables.

1.55.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Portable duct type heater (item 162, App H)
Aircraft power unit (item 232, App H)

References:

TM 1-1500-204-23

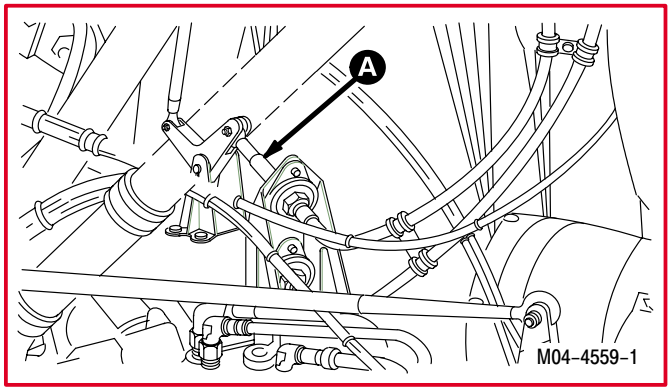
Personnel Required:

67R Attack Helicopter Repairer
One person to assist
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access panel L200 or R200 removed

1.55.3. Warm-Up/De-ice of Engine Load Demand Spindle (LDS) Cables



CAUTION

- Warm-up/De-ice of transmission deck area must be performed prior to APU/ aircraft operations.
- Do not apply heat to LDS cables above 300 °F (148 °C).

NOTE

This task is applicable for aircraft preflight in cold weather, 32 °F (0 °C) or less with Cablecraft LDS cables. Cablecraft cables are identified by black tubing exterior.

a. **In freezing temperatures, 32 °F (0 °C) or less, perform the following operational preflight**:

(1) Apply external heat to transmission deck area through access L200 or R200 using ducted heater (TM 1-1500-204-23) for a minimum of 20 minutes.

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1.55. WARM-UP/DE-ICE OF ENGINE LOAD DEMAND SPINDLE (LDS) CABLES – continued

b. **Apply external power - hydraulic (primary)** (para 1.72) **or operate APU** (para 1.74)**.**

c. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

CAUTION

If attempted cable movement in step d shows evidence of bending, bowing, or other distortion of the LDS bellcrank and/or cable support, remove power and perform step f.

d. **Slowly move pilot collective stick (1) approximately 2 inches and have observer verify movement of forward LDS cables (2).**

e. **If LDS cables (2) move freely, no further action is required.**

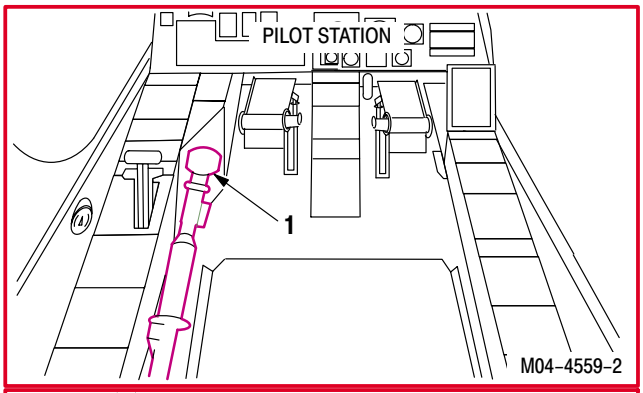
f. **If LDS cables (2) do not move, repeat steps a thru d with emphasis on de-icing LDS forward cables. LDS cables should feel warm to the touch. If cables do not move on second attempt, perform inspection and LDS rigging check** (para 4.184)**.**

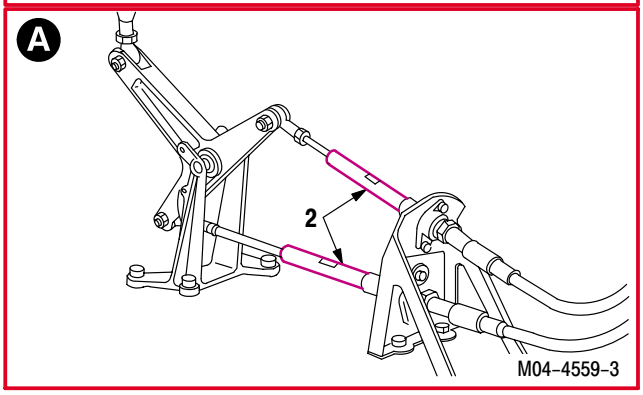
g. **Remove heater.**

h. **Remove external power – hydraulic (primary)** (para 1.72) **or shutdown APU** (para 1.74)**.**

i. **Inspect (QA).**

j. **Install access panel L200 or R200** (para 2.2)**.**





END OF TASK

SECTION IV. LUBRICATION

NOTE

All lubrication is done during servicing and maintenance.

END OF TASK

SECTION V. HANDLING, JACKING, MOORING, HOISTING, AND SLING LOADING

1.56. PILOT/COPILOT GUNNER STATION ACCESSING

1.56.1. Description

This task covers: Accessing.

1.56.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer

Equipment Conditions:

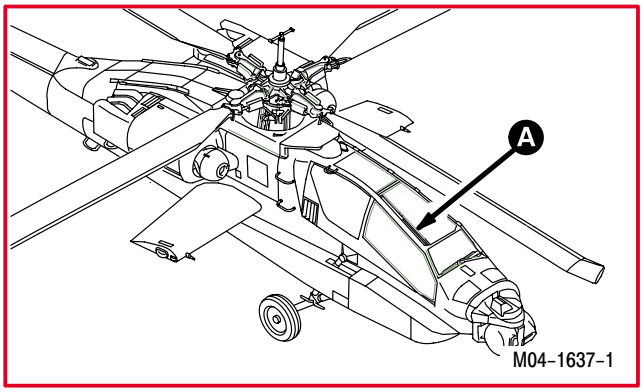
Ref	Condition
1.57	Helicopter safed

CAUTION

To prevent damage to shear pin activated decoupler (SPAD) shear pin in BUCS activated aircraft, do not force directional pedals and cyclic or collective sticks against any resistance.

NOTE

This task is typical for either pilot and/or copilot station accessing.

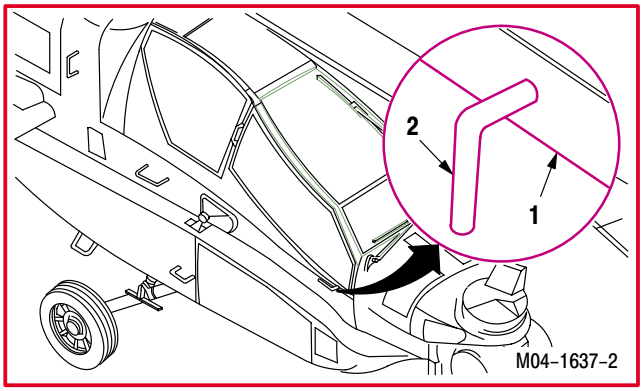


1.56.3. Accessing

a. **Open door (1) from outside.**

(1) Turn door handle (2) counterclockwise to **OPEN**.

(2) Lift door (1) up as far as it will go.



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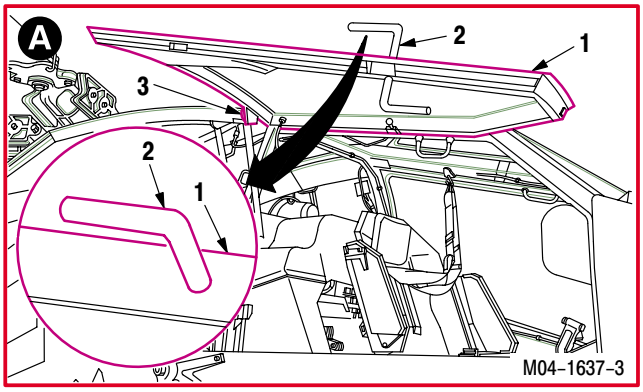
1.56. PILOT/COPILOT GUNNER STATION ACCESSING – continued

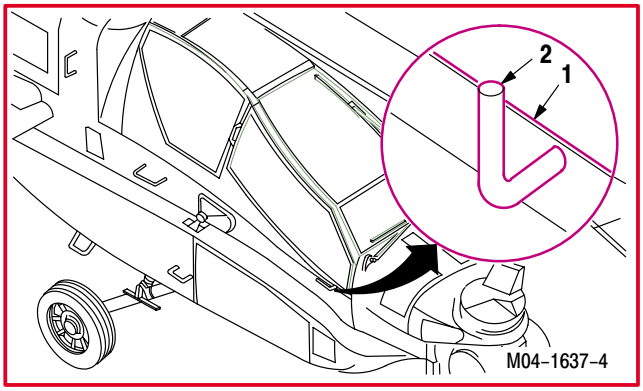
(3) With door (1) fully open, turn handle (2) clockwise to **CLOSED** position to engage strut detent (3).



b. **Close door (1) from outside.**

(1) Turn handle (2) counterclockwise to **OPEN** to release strut detent (3).

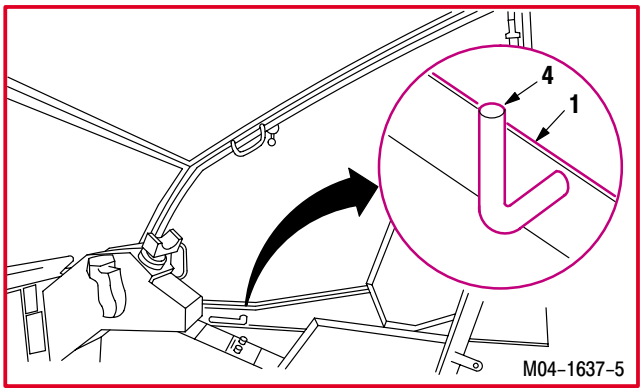
(2) Close door (1) fully and turn handle (2) clockwise to **CLOSED** to lock.



c. **Open door (1) from inside.**

(1) Turn door handle (4) clockwise to **OPEN**.

(2) Push door (1) up as far as it will go.



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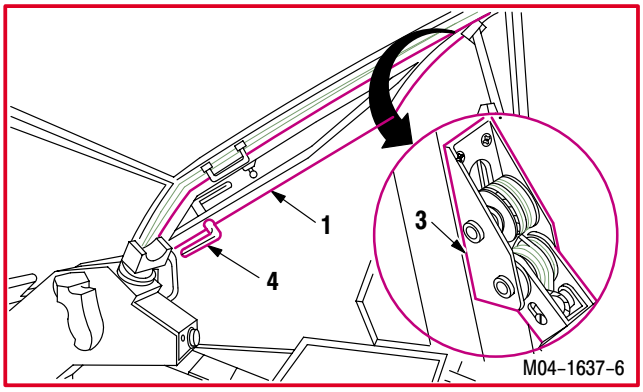
1.56. PILOT/COPILOT GUNNER STATION ACCESSING – continued

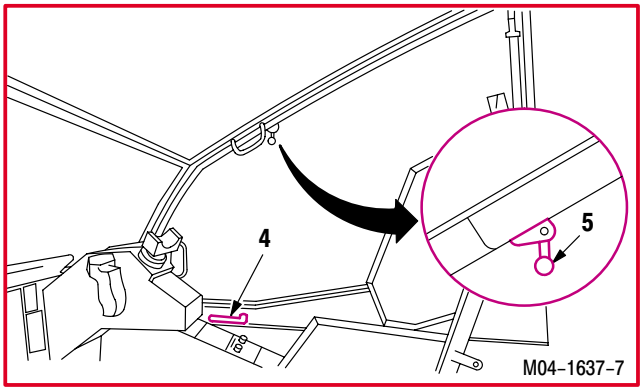
(3) With door (1) fully open, turn handle (4) counterclockwise to **CLOSED** position to engage strut detents (3).



d. **Close door (1) from inside.**

(1) Move strut release lever (5) to release detent (3).

(2) Fully close door (1) and turn handle (4) counterclockwise to **CLOSED**.



END OF TASK

1.57. HELICOPTER SAFETY PROCEDURES

1.57.1. Description

This task covers: External Safe. Pilot Station Safe. CPG Station Safe.

1.57.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft mooring tiedown kit (item 363, App H)

Personnel Required:

67R Attack Helicopter Repairer

CAUTION

- To prevent damage to the shear pin activated decoupler (SPAD) shear pins in BUCS activated aircraft, do not force direction pedals and cyclic or collective sticks against any resistance.
- The safety procedures contained herein are to be accomplished consecutively and completely.

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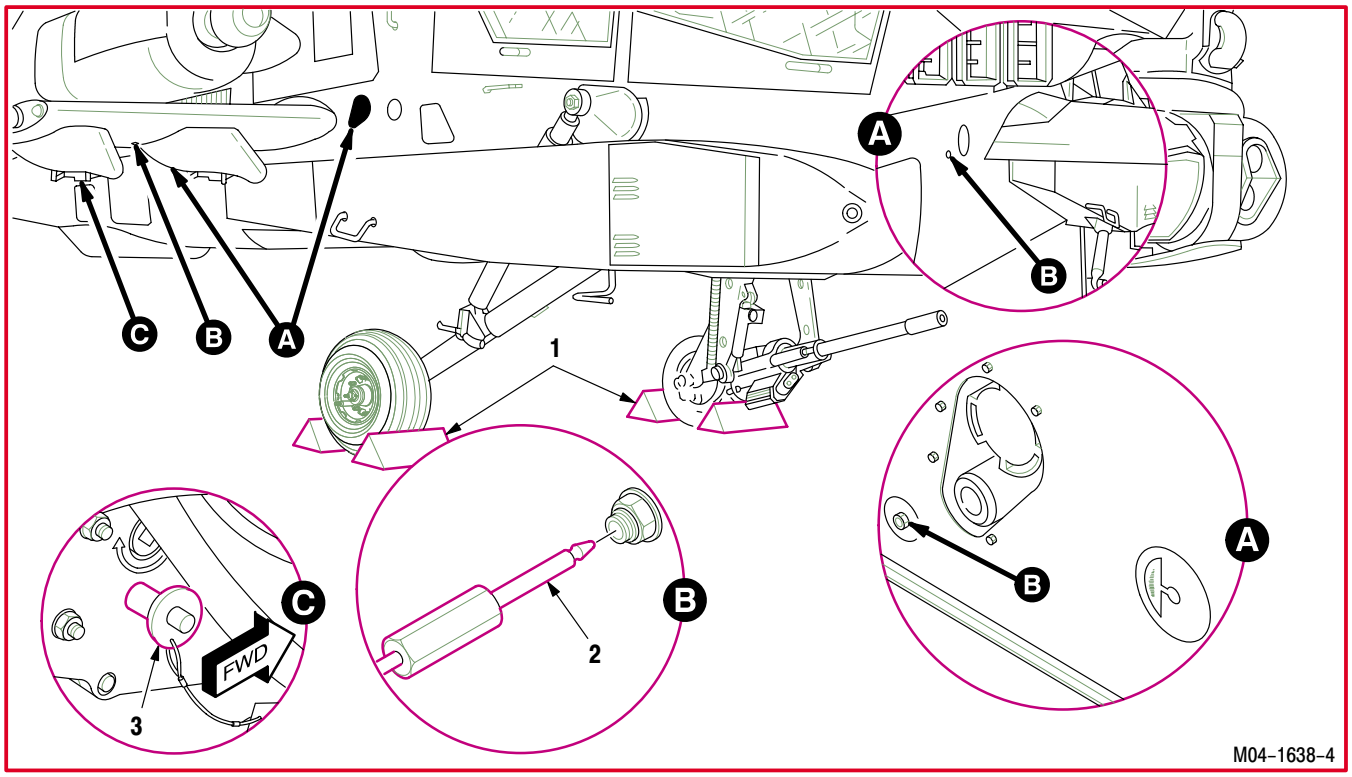
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.3. External Safe

NOTE

Ensure TADS is stowed before starting safe check.

Identification	Location	Procedure
Wheel chocks (1)	Main landing gear	Chock
Battery	Aft avionic bay	Disconnect battery (para 9.40)
Helicopter grounded (2) (4 places)	Right side of fuselage (2 places) and under right and left wing	Insert cable plug in receptacle
Pylon stores	Right side	Verify no stores
Pylon safety pin (3) (outboard side-2 places)	Right outboard pylon	Insert pin in hole
	Right inboard pylon	Insert pin in hole
Safe/arm switches	Launchers (if installed)	SAFE position

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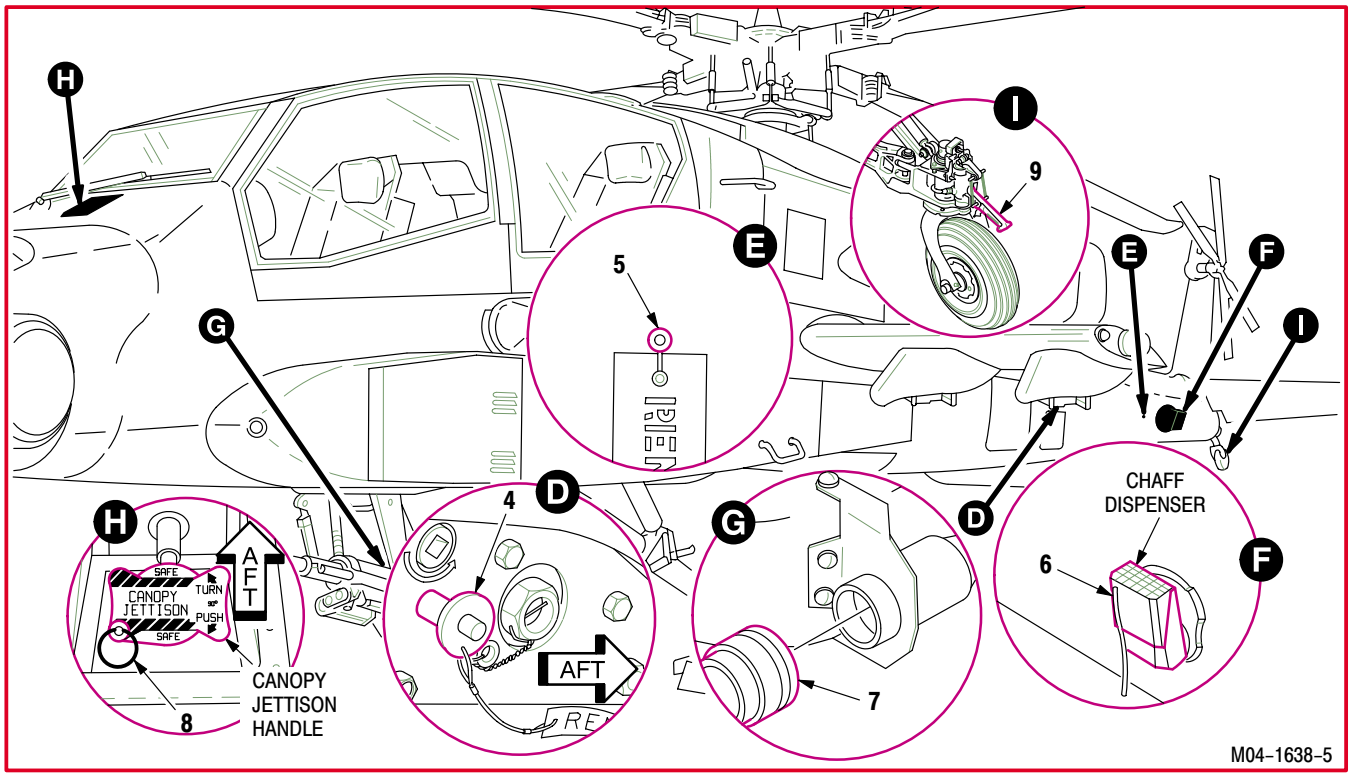
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.3 External Safe - continued

Identification	Location	Procedure
Pylon stores	Left side pylon	Verify no stores
Pylon safety pin (4) (outboard side-2 places)	Left outboard pylon Left inboard pylon	Insert pin in hole Insert pin in hole
Safe/arm switches	Launchers (if installed)	SAFE position
Chaff dispenser safety pin (5)	Forward of chaff dispenser (if installed)	Insert pin in hole
Chaff stores (6)	Chaff dispenser	Verify no stores
Area weapon electrical connector (7)	On turret	Disconnect; install cap
External canopy jettison handle safety pin (8)	Below center of CPG windshield	Open access door T50; insert pin in handle. Close door, leaving safety flag exposed.
Tail wheel lock (9)	Tail landing gear	Engage lock.

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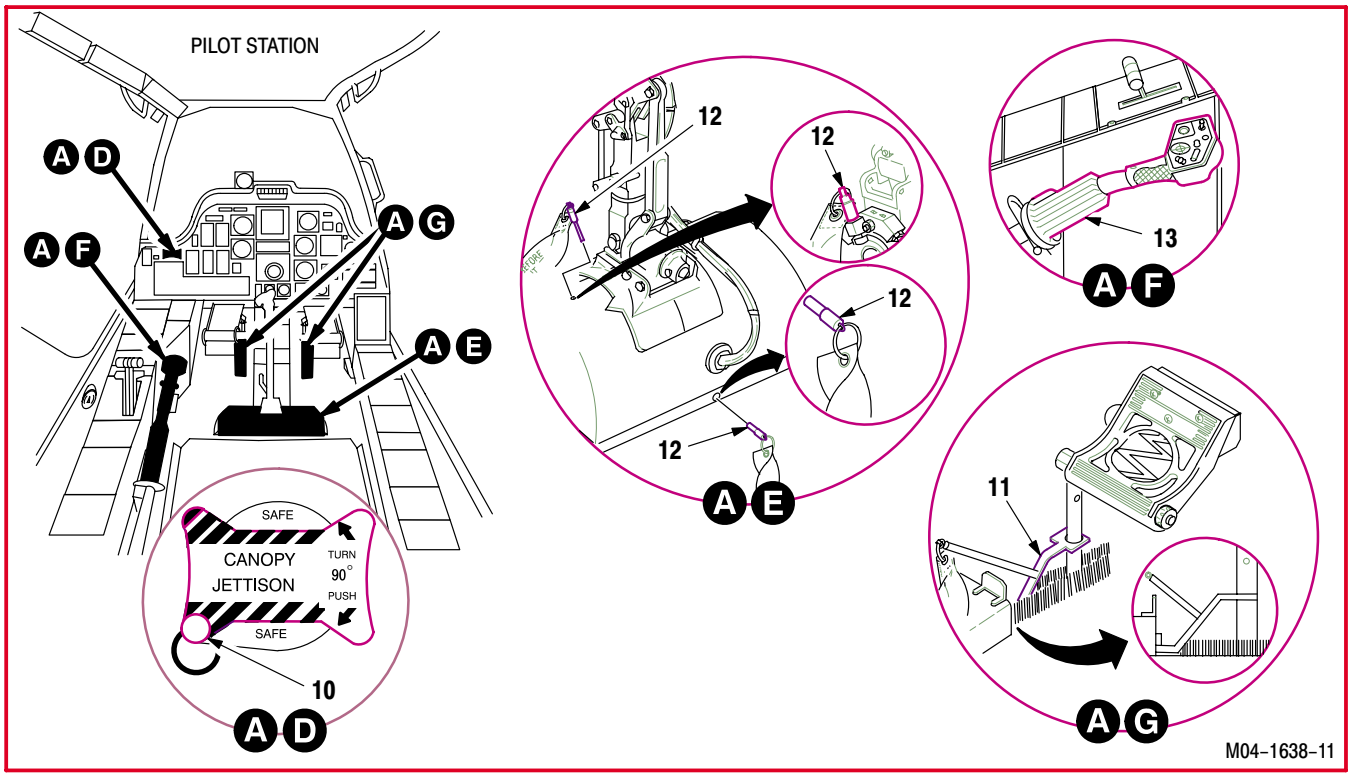
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.4. Pilot Station Safe

a. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

b. **Insert safety pin in pilot canopy jettison handle on instrument panel upper left side (10).**

NOTE

- Steps c, d, and e are for BUCS activated helicopters only.
- Apply hydraulic pressure to helicopter before installing or removing ground locks.

c. **Install tail rotor pedal ground locks (11).** Unlock the pedal adjust; move the pedals all the way forward insert locks through brushes and cutouts in floor and rest on shelf. Move pedals aft until fork tightly engages tail rotor pedal support assembly immediately below the skirt, lock the pedal adjust.

d. **Insert cyclic ground lock pins (12).**

e. **Position collective stick full down and apply full friction lock (13).**

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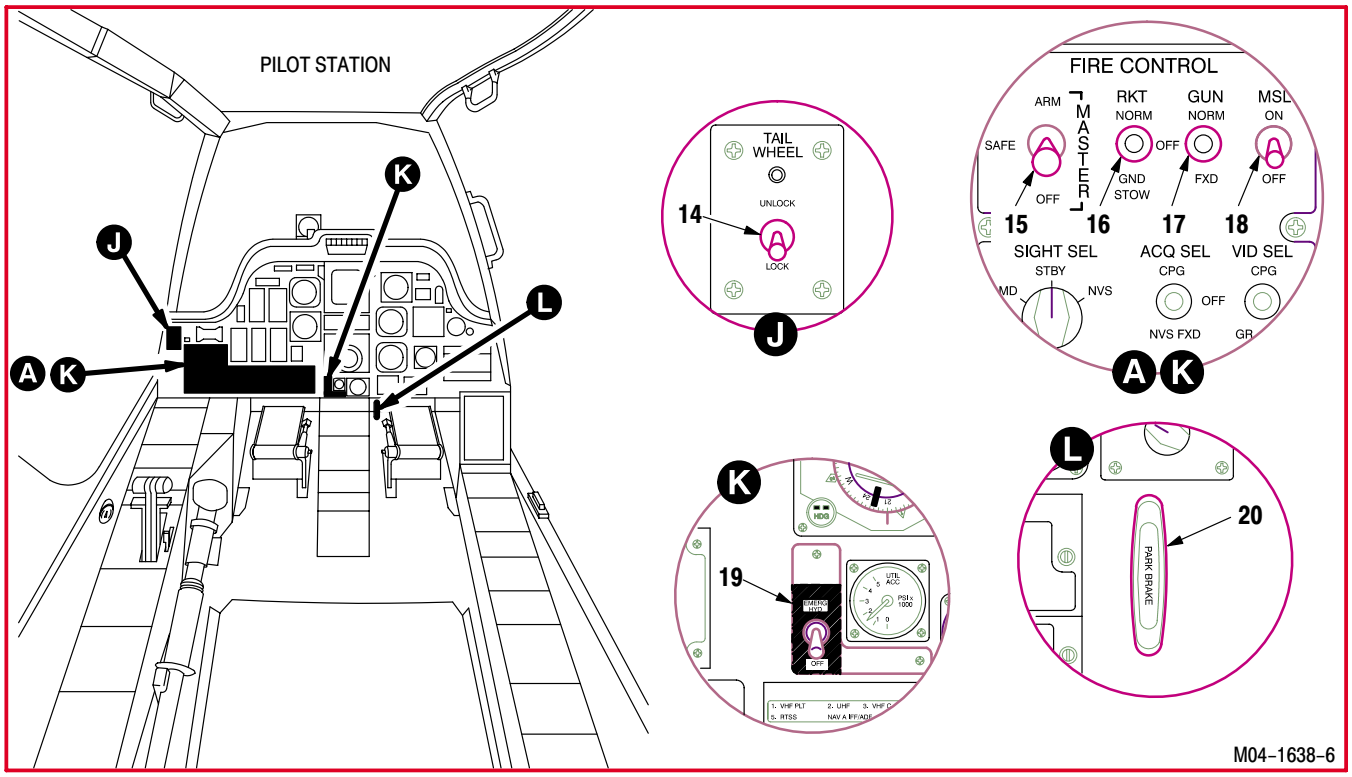
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.4 Pilot Station Safe - continued

f. **Set switch positions in pilot station:**

Identification	Location	Set To
(1) **Tailwheel** switch (14)	Left instrument panel	**LOCK**
(2) Pilot **FIRE CONTROL** panel		
(a) Master **ARM/SAFE** switch (15)	Left instrument panel	**OFF**
(b) **RKT** switch (16)	Left instrument panel	**OFF**
(c) **GUN** switch (17)	Left instrument panel	**OFF**
(d) **MSL** switch (18)	Left instrument panel	**OFF**
(3) Emergency hydraulic switch (19)	Center instrument panel	**OFF**
(4) Parking brake (20)	Lower right instrument panel	**Set parking brake**

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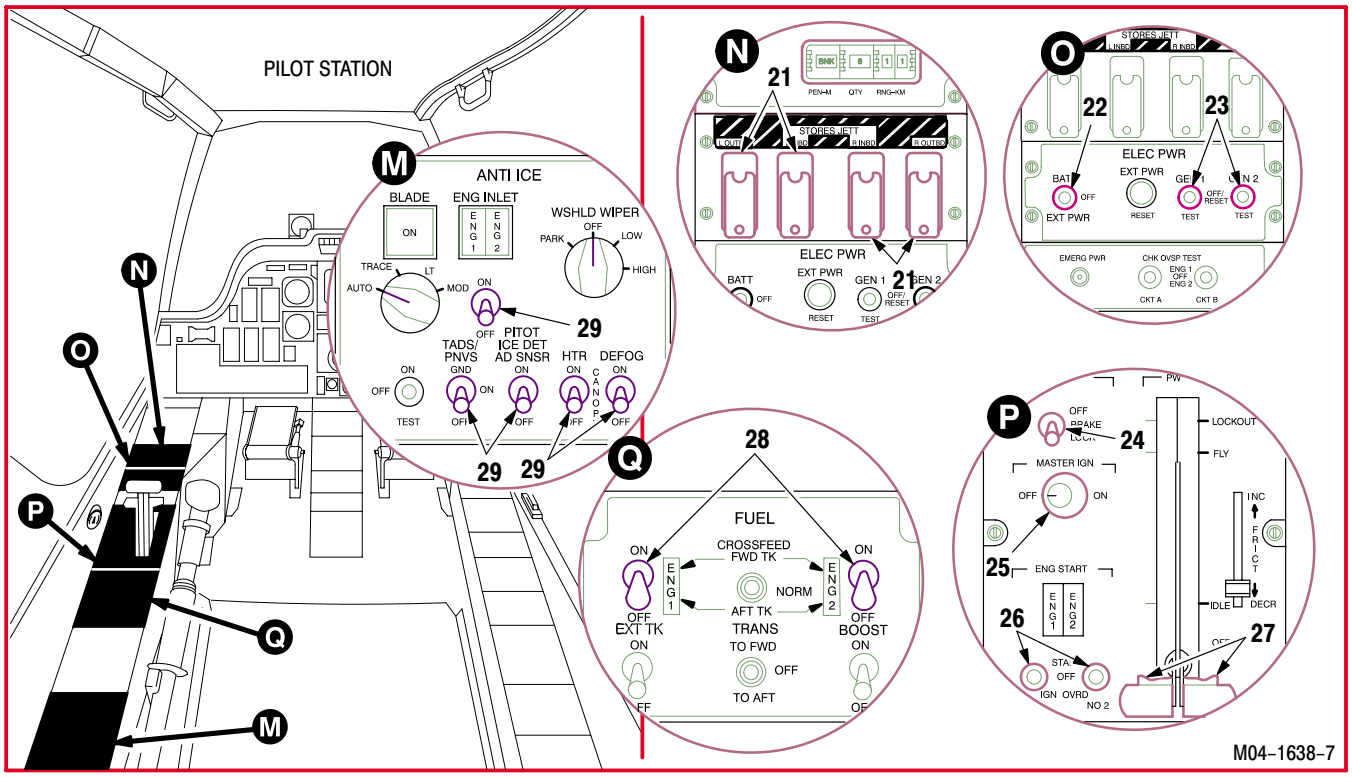
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.4 Pilot Station Safe - continued

Identification	Location	Set To
(5) Pilot left console		
(a) **L OUTBD, L INBD, R INBD, R OUTBD** (21)	**STORES JETT** panel	**OFF;** covers down
(b) **BATT/EXT PWR** (22)	**ELEC PWR** panel	**OFF**
(c) **GEN 1, GEN 2** switches (23)	**ELEC PWR** panel	**OFF**
(d) **RTR BRK** switch (24)	Pilot power quadrant	**LOCK**
(e) **MASTER IGN** switch (25)	Pilot power quadrant	**OFF**
(f) **ENG START ENG 1** switch **ENG START ENG 2** switch (26)	Pilot power quadrant	**OFF**
(g) **PWR** levers (27)	Pilot power lever panel	**OFF**
(h) **FUEL ENG 1** and **FUEL ENG 2** switch (28)	**FUEL** panel	**OFF**
(i) **ANTI-ICE** panel (29)	**ANTI-ICE** panel	**OFF**

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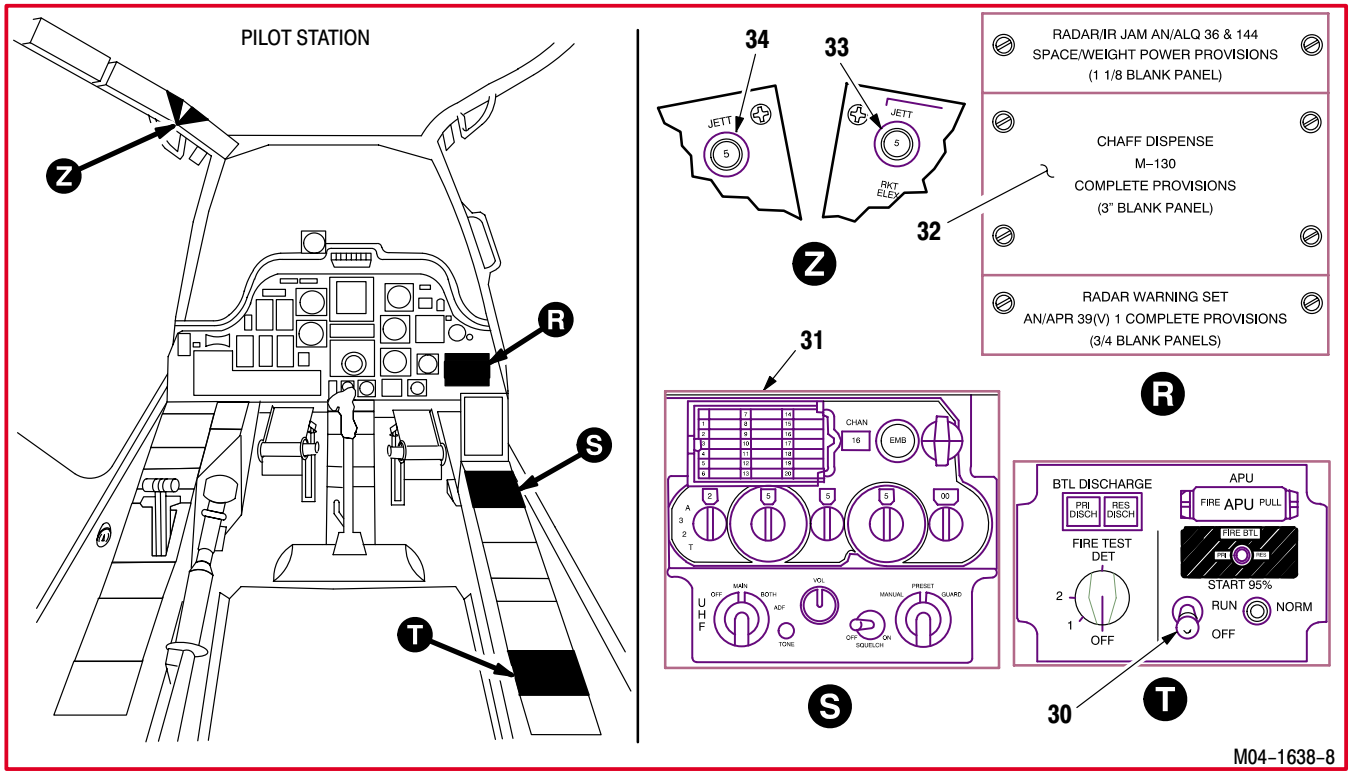
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.4 Pilot Station Safe - continued

Identification	Location	Set To
(6) Pilot right console		
(a) **APU** control switch (30)	**APU** panel	**OFF**
(b) Radios (31)	Right side console	Radios **OFF**
(c) Chaff dispenser (32)	Right instrument panel (if installed)	**SAFE**
(7) Pilot circuit breaker panel		

NOTE

All circuit breakers on pilot circuit breaker panel remain closed except as noted.

(a) **MISSION JETT** circuit breaker (33)	Forward circuit breaker panel	**MISSION JETT** circuit breaker open
(b) **JETT** circuit breaker (34)	Center circuit breaker panel	**JETT** circuit breaker open

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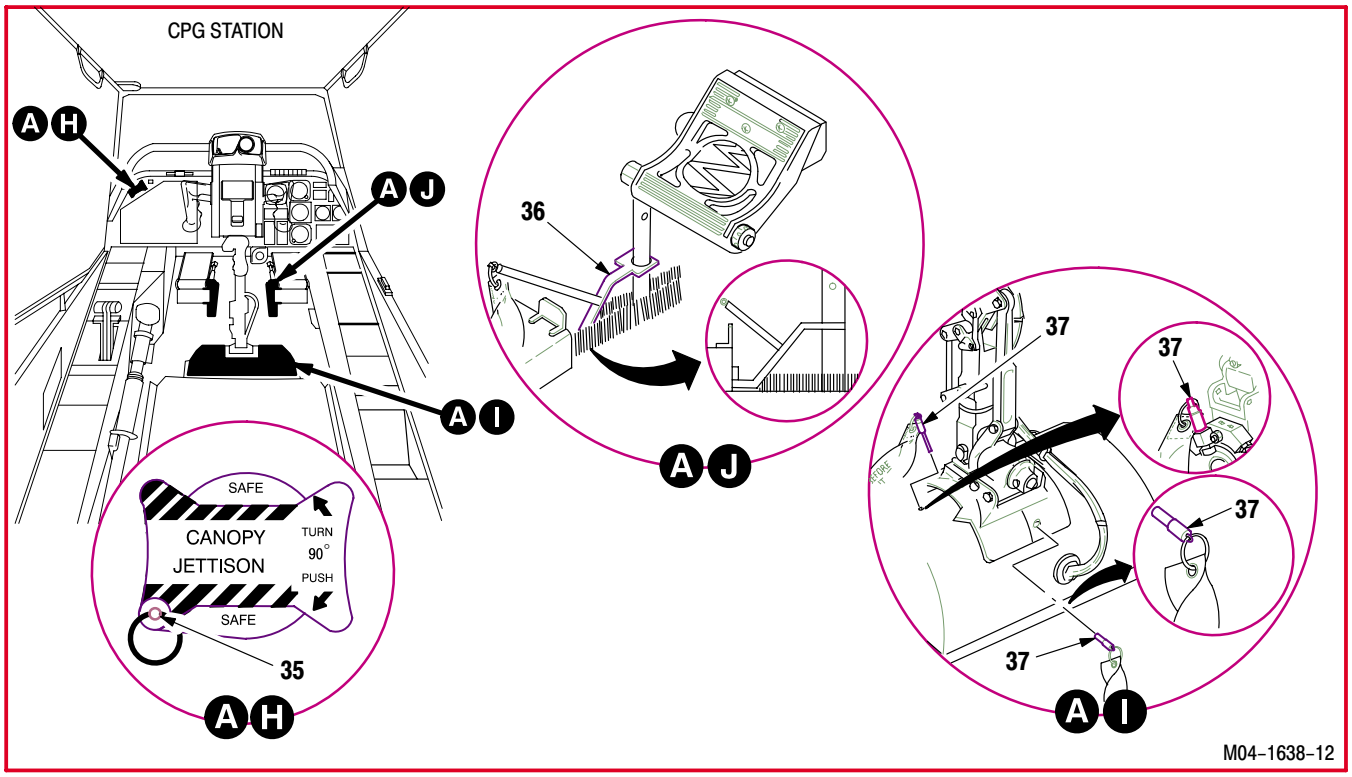
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.5. CPG Station Safe

a. **Enter CPG station** (para 1.56)**. Observe all safety precautions.**

b. **Insert safety pin in CPG canopy jettison handle on instrument panel upper left side (35).**

NOTE

- Steps c, and d are for BUCS activated helicopters only.
- Apply hydraulic pressure to helicopter before installing and removing ground locks.

c. **Install tail rotor pedal ground locks (36).** Unlock the pedal adjust; move the pedals all the way forward; insert locks through brushes and cutouts in floor and rest on shelf. Move pedals aft until fork tightly engages tail rotor pedal support assembly immediately below the skirt; lock the pedal adjust.

d. **Insert cyclic ground lock pins (37).**

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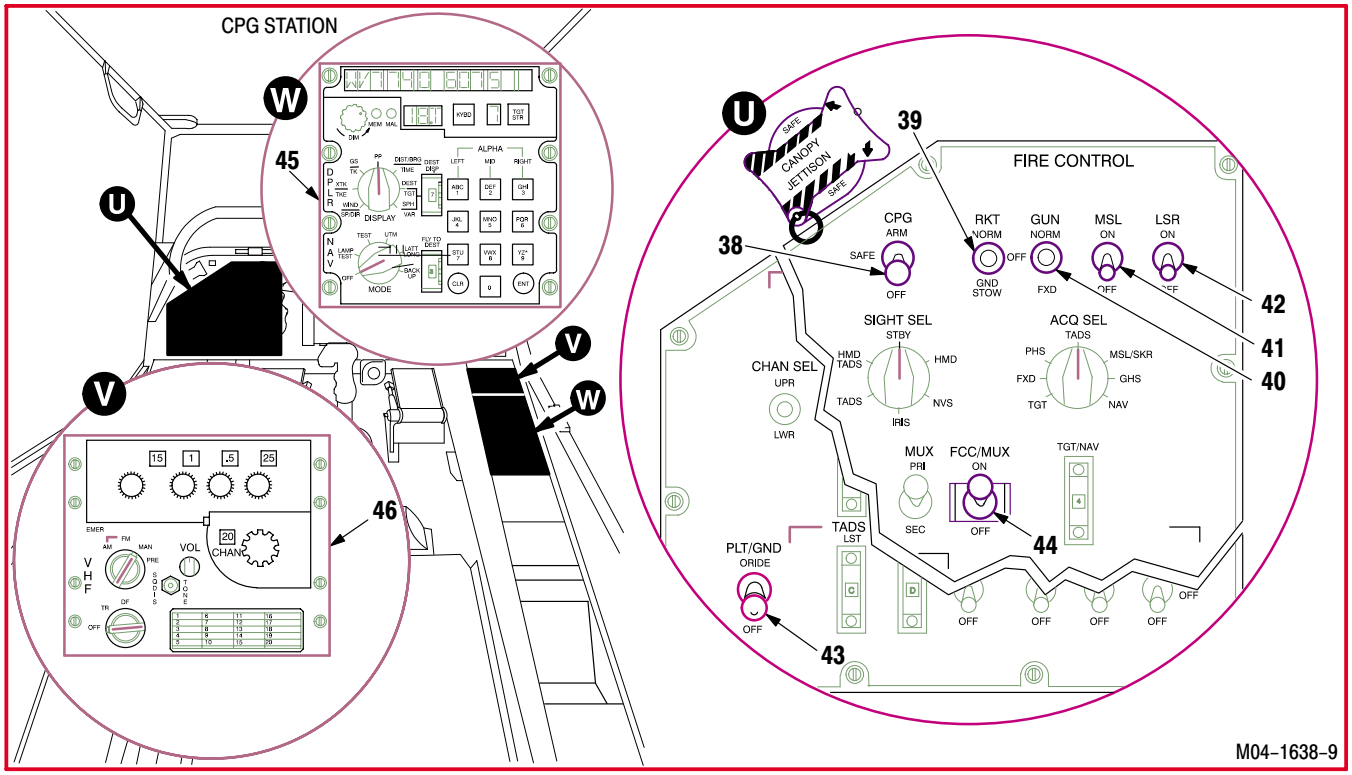
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.5 CPG Station Safe - continued

e. **Set switch positions in CPG station:**

Identification	Location	Set To
(1) CPG **FIRE CONTROL** panel		
(a) **CPG** (38)	**FIRE CONTROL** panel	**OFF**
(b) **RKT** switch (39)	**FIRE CONTROL** panel	**OFF**
(c) **GUN** switch (40)	**FIRE CONTROL** panel	**OFF**
(d) **MSL** switch (41)	**FIRE CONTROL** panel	**OFF**
(e) **LSR** switch (42)	**FIRE CONTROL** panel	**OFF**
(f) **PLT/GND ORIDE** switch (43)	**FIRE CONTROL** panel	**OFF**
(g) **FCC/MUX** switch (44)	**FIRE CONTROL** panel	**ON**
(2) CPG right console		
(a) Doppler/Navigation (45)	Right side console	**NAV MODE OFF**
(b) **VHF** radio (46)	Right side console	Radio **OFF**

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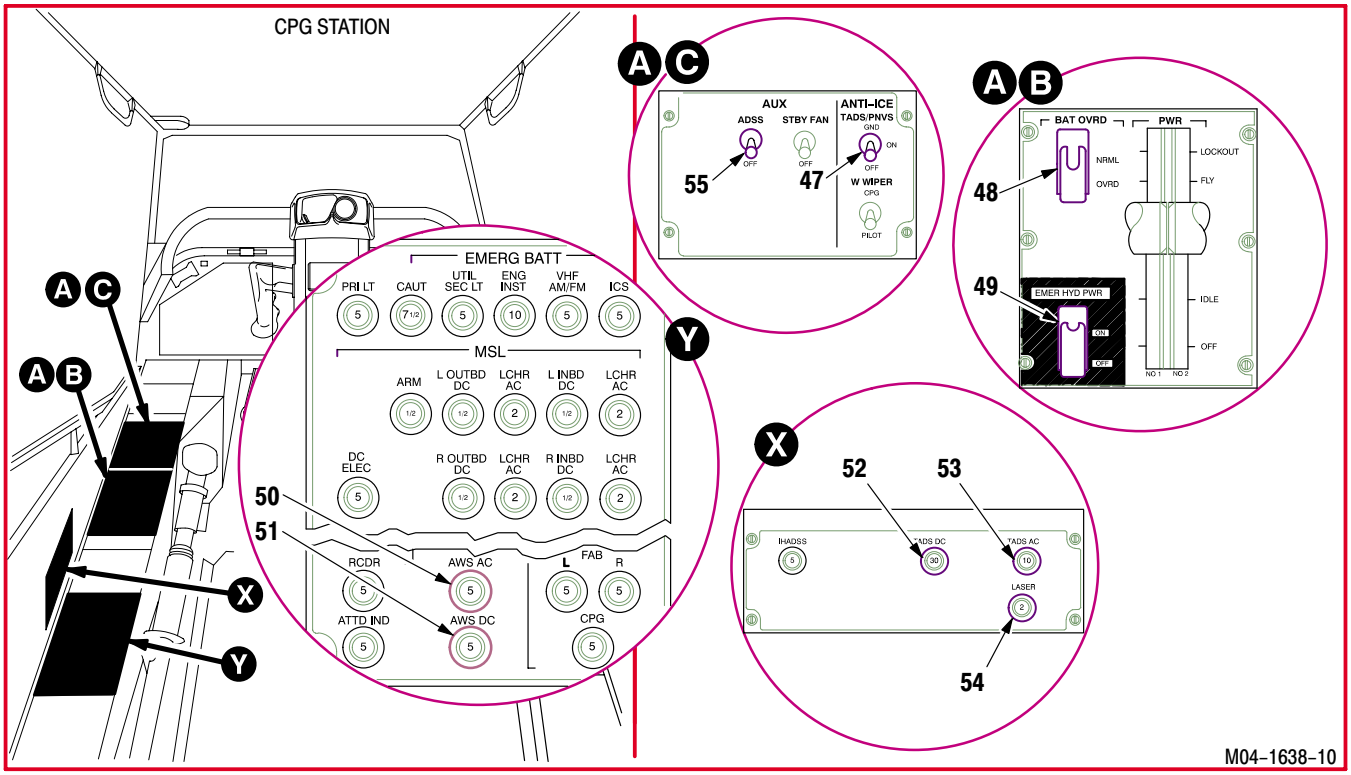
1.57. HELICOPTER SAFETY PROCEDURES – continued



1.57.5 CPG Station Safe - continued

Identification	Location	Set To
(3) CPG left console		
(a) **TADS/PNVS GND** switch (47)	**ANTI-ICE** panel	OFF
(b) **BAT OVRD** switch (48)	Power lever panel	**NRML**, cover down
(c) **EMER HYD PWR** switch (49)	Power lever panel	OFF, cover down

NOTE

All circuit breakers on CPG circuit breaker panels closed except as noted.

(d) **AWS AC** circuit breaker (50)	Circuit breaker panel	Open
(e) **AWS DC** circuit breaker (51)	Circuit breaker panel	Open
(f) **TADS DC** circuit breaker (52)	Circuit breaker panel	Open
(g) **TADS AC** circuit breaker (53)	Circuit breaker panel	Open
(h) **LASER** circuit breaker (54)	Circuit breaker panel	Open
(i) **ADSS** switch (55)	**AUX** panel	OFF

END OF TASK

1.58. ENGINE WASH

1.58.1. Description

This task covers: Washing.

1.58.2. Initial Setup

Tools:

Aircraft maintenance tool kit (item 371, App H)

References:

TM 55-2840-248-23

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors LN2 and RN2 doors removed

Personnel Required:

68B Aircraft Powerplant Repairer

1.58.3. Washing

a. **Perform engine wash** (TM 55-2840-248-23)**.**

b. **Install access doors LN2 and RN2** (para 2.2)**.**

END OF TASK

1.59. PROTECTIVE COVER INSTALLATION

1.59.1. Description

This task covers: Installation.

1.59.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft mooring tiedown kit (item 363, App H)

Personnel Required:

67R Attack Helicopter Repairer
Two persons to assist

References:

TM 1-5855-265-20
TM 1-1270-476-20

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors T250L, T250R, T290L, T290R, L325, and L330 opened

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1.59. PROTECTIVE COVER INSTALLATION – continued

1.59.3. Installation

a. **Install omnidirectional airspeed sensor protective cover (1).**

(1) Position one end of cover (1) on main rotor mast airspeed sensor.

(2) Extend bungee cords and secure other end of cover (1) on opposite end of sensor.

b. **Install main rotor mast aperture protective cover (2).**

(1) Position cover (2) forward portion around main rotor mast and over infrared antenna.

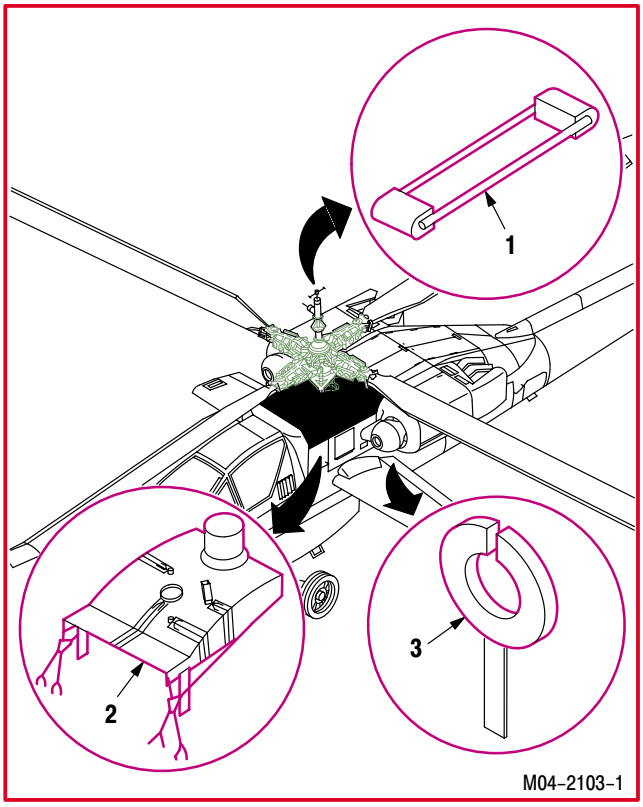
(2) Position aft portion of cover (2) around longitudinal bellcrank, lateral control links, and the main rotor mast. Tighten and tie collars around bellcrank, control links, and rotor mast.

(3) Engage hook-and-pile fastener at each collar. Tie down cover to left side step and handhold, and to right side handhold.

c. **Install engine air inlet protective shield (3).**

(1) Position each shield (3) on air inlet duct with streamer downward on forward side.

(2) Push shield (3) ring rearward into air inlet and around nose gearbox air inlet.



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1.59. PROTECTIVE COVER INSTALLATION – continued

d. **Install nose gearbox cooling air inlet protective shield (4).**

(1) Position each shield (4) into air inlet fairing.

e. **Install two pitot head protective covers (5).**

(1) Place two covers (5) on two pitot tubes.

(2) Fasten two covers (5) with hook-and-pile fasteners.

f. **Install aircraft canopy protective cover (6).**

(1) Position cover (6) on top of helicopter canopy and over canopy emergency door release.

(2) Separate cover (6) forward strap, extend it around fuselage, and secure loosely to enable further positioning of cover.

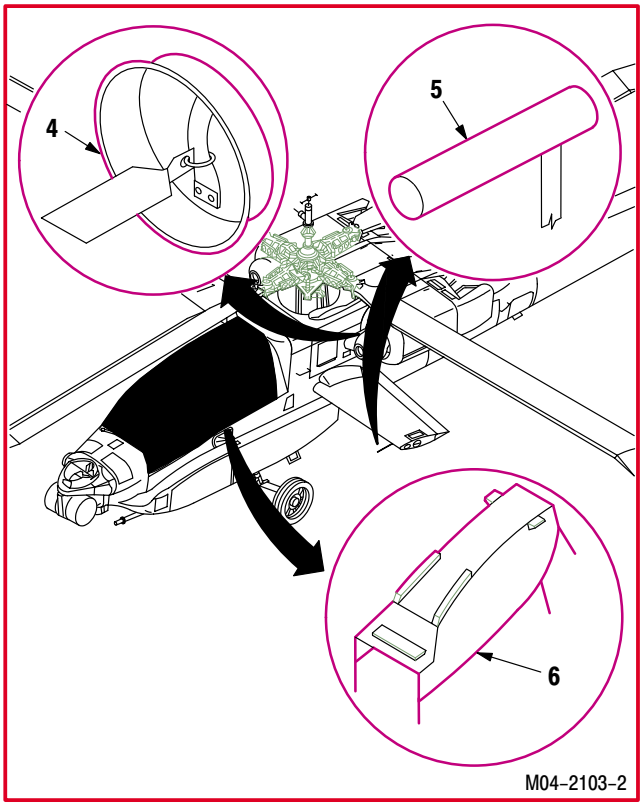
(3) Draw cover (6) left panel aft to engage cover boot to canopy handhold.

(4) Extend and secure cover (6) left panel straps to fuselage steps.

(5) Position cover (6) top panel to engage cutout and around IFF antenna.

(6) Position and secure cover (6) right aft panel with aft strap to vertical handhold and downward with a strap to step.

(7) To seal forward and aft panel overlaps, overlap canopy handhold through forward panel (with canopy handhold through forward panel cutout) and engage panel hook-and-pile fasteners.



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1.59. PROTECTIVE COVER INSTALLATION – continued

g. **If severe environmental conditions of icing or dust exists, or are expected, install gun muzzle cover (7).**

NOTE

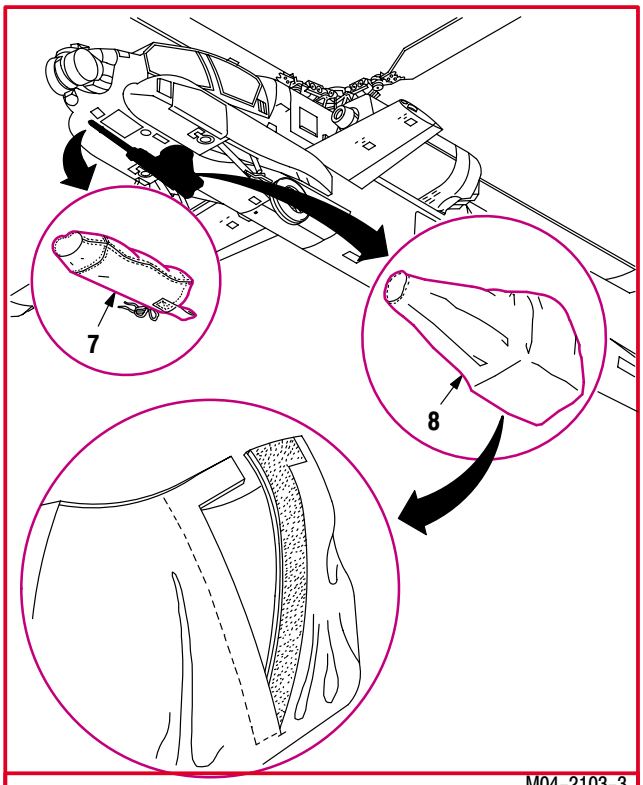
Gun muzzle cover may be fired through.

h. **Install area weapon/turret protective cover (8).**

(1) Open cover (8) hook-and-pile fastener.

(2) Pull cover (8) over weapon barrel and upward to enclose weapon and turret.

(3) Aline and secure hook-and-pile fastener on cover (8).



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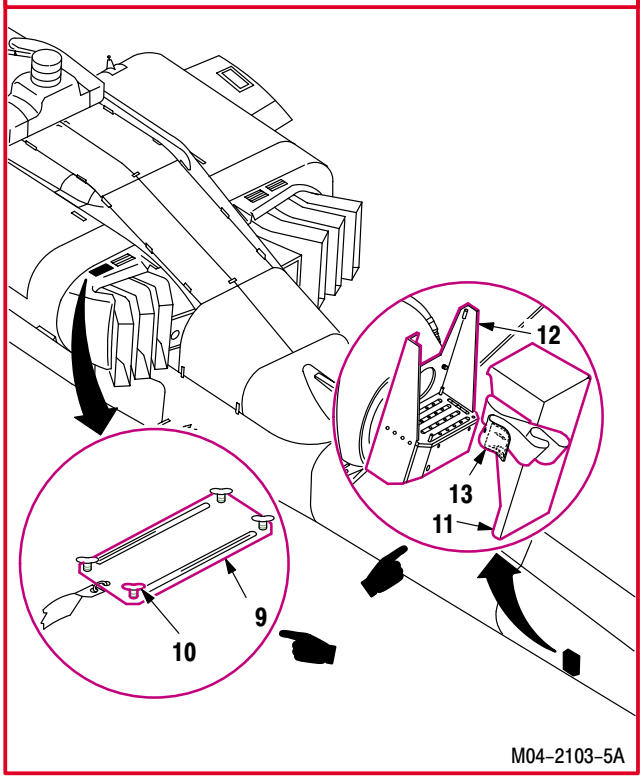
i. **Install four upper louver engine nacelle protective covers (9).**

(1) Position each cover (9) on structure.

(2) Secure with four stud fasteners (10) on each engine.

j. **Install chaff dispenser protection cover (11) on chaff dispenser (12).**

(1) Secure strap (13).



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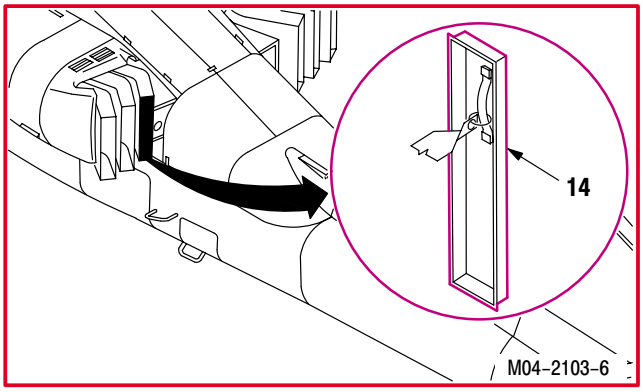
1.59. PROTECTIVE COVER INSTALLATION – continued

k. **Install six engine exhaust protective cover shields (14).**

(1) Position cover (14) into each of six engine exhaust nozzles and press into place.

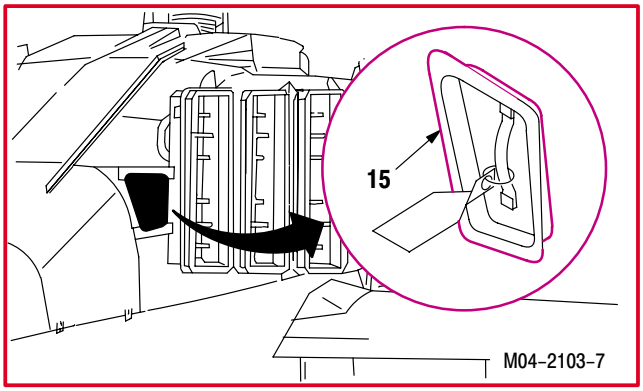
(2) Ensure each cover (14) is secure in engine exhaust nozzle.



l. **Install APU exhaust protective guard (15).**

(1) Position guard (15) in exhaust duct outlet.

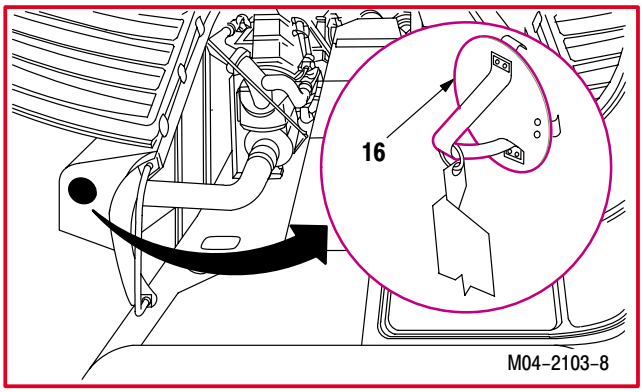
(2) Press edges of guard (15) to engage exhaust duct outlet.



m. **Install ENCU exhaust protective shield (16).**

(1) Position shield (16) with retainers facing exhaust port.

(2) Press shield (16) plate to engage, by friction contact, four retainers in exhaust port.



n. **Secure access doors T250L, T250R, T290L, T290R, L325, and L330** (para 2.2)**.**

o. **Install TADS nightside, dayside, and boresight window covers** (TM 1-1270-476-20)**.**

p. **Install TADS/PNVS protective cover** (TM 1-5855-265-20)**.**

q. **Install PNVS window cover** (TM 1-5855-265-20)**.**

END OF TASK

1.60. PROTECTIVE COVER REMOVAL

1.60.1. Description

This task covers: Removal.

1.60.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

References:

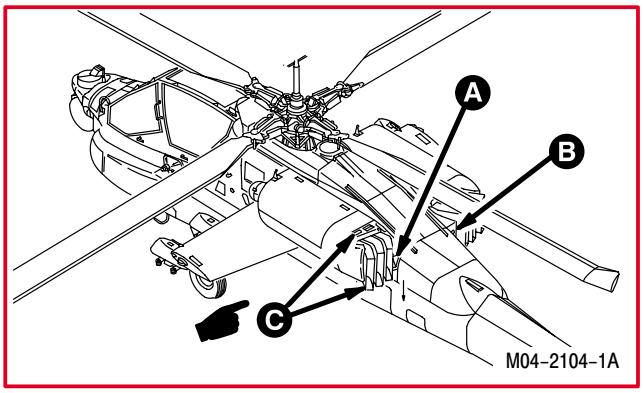
TM 1-5855-265-20
TM 1-1270-476-20

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors T250L, T250R, T290L, T290R, L325, and L330 opened

Personnel Required:

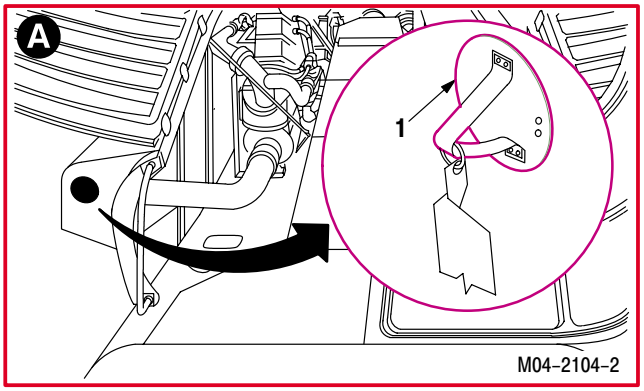
67R Attack Helicopter Repairer
Two persons to assist



1.60.3. Removal

a. **Remove ENCU exhaust protective shield (1).**

(1) Pull out on shield plate strap.



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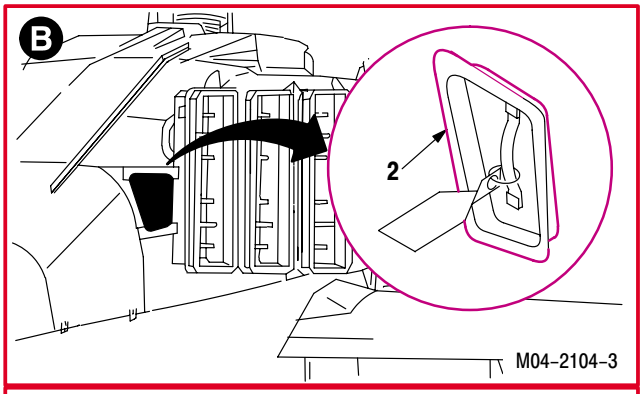
1.60. PROTECTIVE COVER REMOVAL – continued

b. **Remove APU exhaust protective shield (2).**

(1) Pull out on shield strap.



c. **Remove six engine exhaust protective guards (3).**

(1) Pull out on guard (3) strap.

(2) Remove three guards (3) from each engine.

d. **Remove four upper louver engine nacelle protective covers (4).**

(1) Loosen four stud fasteners (5).

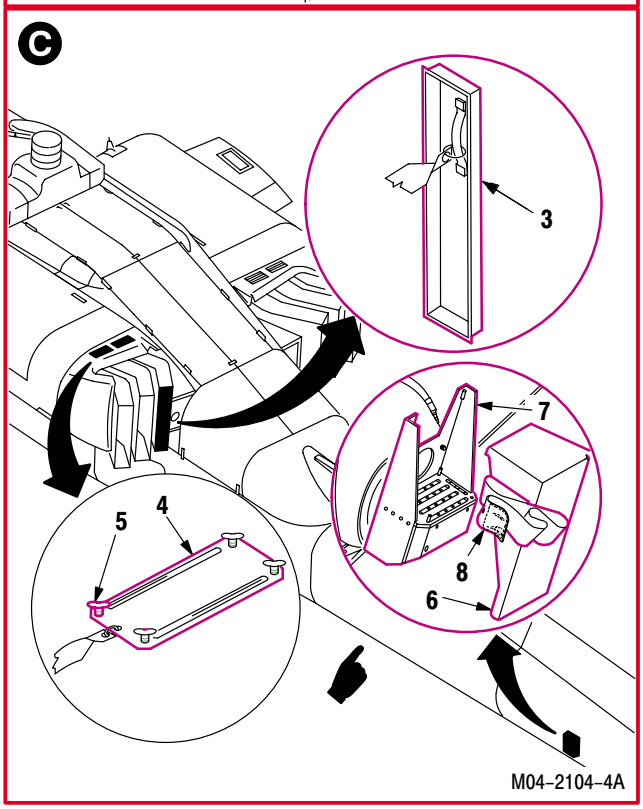
(2) Remove cover (4).

(3) Remove four protective covers.

e. **Remove chaff dispenser protection cover (6) from chaff dispenser (7).**

(1) Separate strap (8).

(2) Remove cover (6).



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1.60. PROTECTIVE COVER REMOVAL – continued

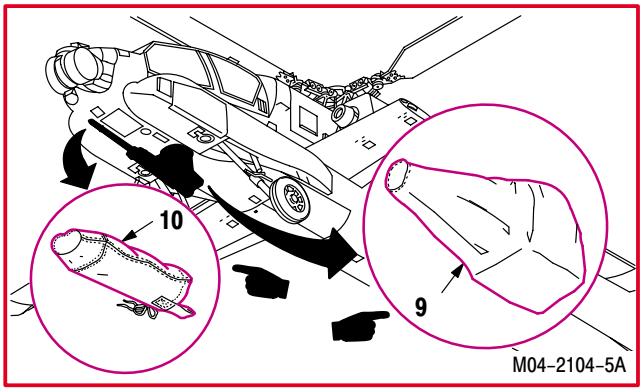
f. **Remove area weapon/turret protective cover (9).**

(1) Open cover (9) hook-and-pile fastener.

(2) Pull cover (9) from turret and weapon.

NOTE

Gun muzzle cover can be fired through.



g. **If severe environmental conditions of icing or dust exist or are expected, do not remove gun muzzle cover (10).**

h. **Remove helicopter canopy protective cover (11).**

(1) Open panel hook-and-pile fasteners on forward and aft panel overlaps.

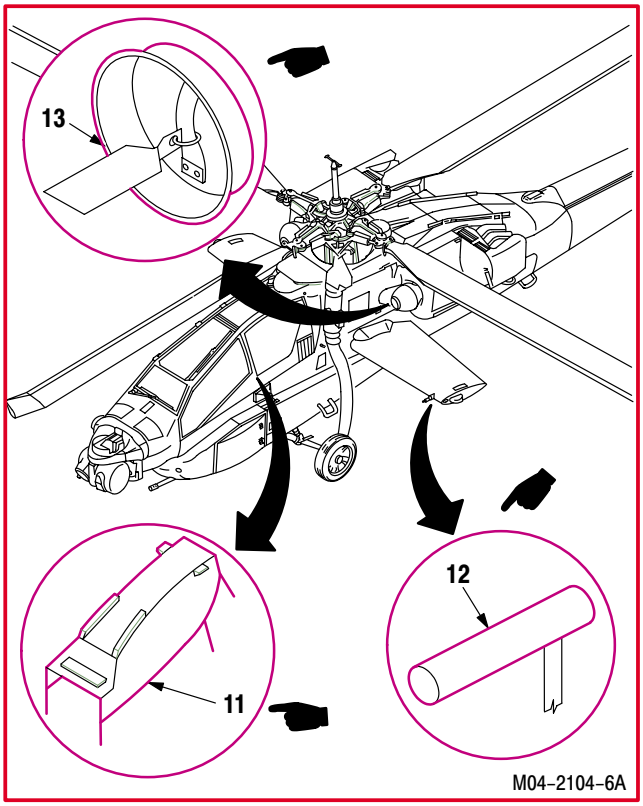
(2) Loosen right strap to vertical handhold.

(3) Loosen strap to step.

(4) Loosen left panel straps secured to fuselage steps.

(5) Loosen strap extended around fuselage.

(6) Remove cover (11) from top of helicopter.



i. **Remove two pitot head protective covers (12).**

(1) Loosen hook-and-pile fasteners.

(2) Remove pitot head protective cover (12) from left and right wing pitot tubes.

j. **Remove nose gearbox cooling air inlet protective shields (13).**

(1) Pull and remove strap from each shield (13).

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1.60. PROTECTIVE COVER REMOVAL – continued

k. **Remove engine air inlet protective shields (14).**

(1) Pull shield (14) to remove.

l. **Remove main rotor mast aperture protective cover (15).**

(1) Open hook-and-pile fasteners at each collar.

(2) Loosen left side strap in handhold.

(3) Loosen right side strap from handhold.

(4) Loosen collar around bellcrank, control links, and rotor mast.

(5) Remove cover (15) from helicopter.

m. **Remove omnidirectional airspeed protective cover (16).**

(1) Extend bungee cords. Remove cover (16) end from end of sensor.

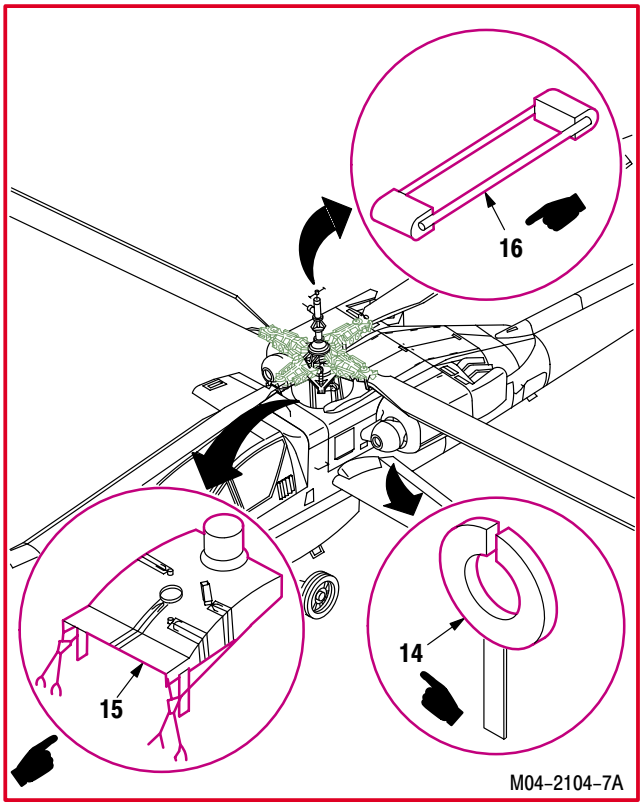
(2) Remove cover (16) from opposite end of sensor.

n. **Secure access doors T250L, T250R, T290L, T290R, L325, and L330** (para 2.2)**.**

o. **Remove TADS nightside, dayside, and boresight window covers** (TM 1-1270-476-20)**.**

p. **Remove TADS/PNVS protective cover** (TM 1-5855-265-20)**.**

q. **Remove PNVS window cover** (TM 1-5855-265-20)**.**



END OF TASK

1.61. PARKING BRAKES – SET/RELEASE

1.61.1. Description

This task covers: Set/Release.

1.61.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
#1 & #2 phillips offset screwdriver (item 276, App H)

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

Personnel Required:

67R Attack Helicopter Repairer

1.61.3. Set/Release

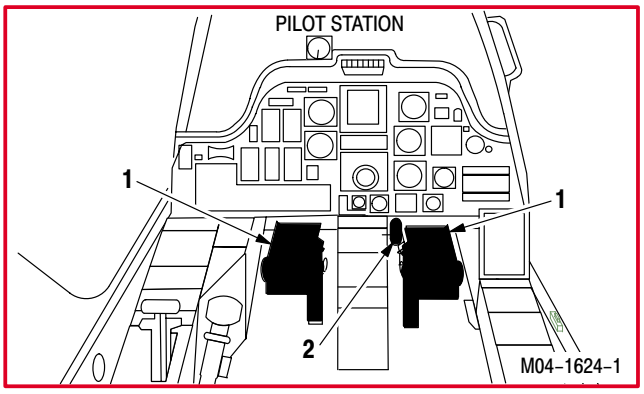
a. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

b. **Set parking brakes.**

(1) Press upper part of directional control pedals (1).

(2) Pull **PARK BRAKE** handle (2) until it engages.

(3) Release directional control pedals (1).



NOTE

PARK BRAKE handle will retract when parking brakes release. If parking brake is set when right MLG system is low on fluid, pressing pedals may not release parking brake. Go to step d if this should occur.

c. **Release parking brakes.**

(1) Press directional control pedals (1).

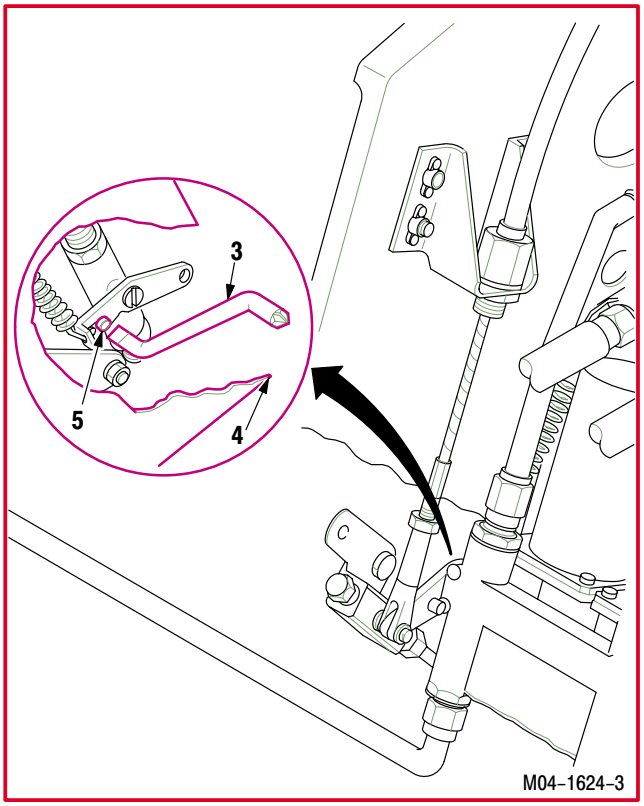
(2) Release directional control pedals (1).

GO TO NEXT PAGE

1.61. PARKING BRAKES – SET/RELEASE – continued

d. **Insert offset screwdriver blade (3) through right side of center console (4).**

(1) Push on parking brake lever lock pin (5) to release parking brake.



END OF TASK

1.62. ROTOR BRAKE - LOCK/UNLOCK

1.62.1. Description

This task covers: Unlock. Lock.

1.62.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer

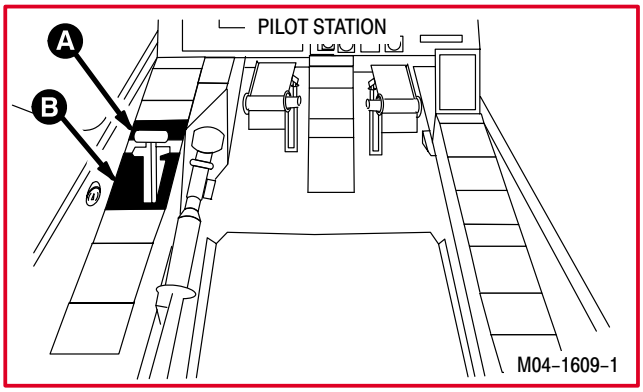
Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

1.62.3. Unlock

a. **Connect battery** (para 9.40)**.**

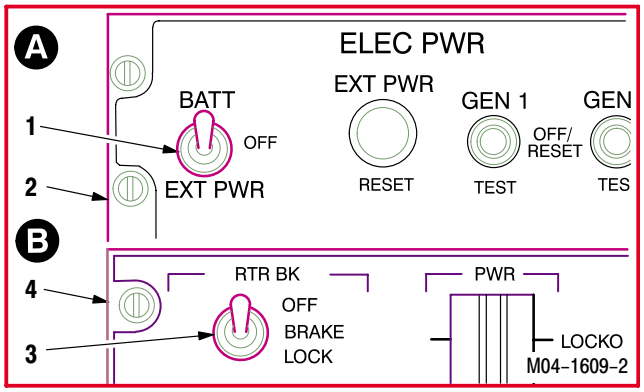
b. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**



c. **Unlock rotor brake.**

(1) Set **BATT/EXT PWR** switch (1) on **ELEC PWR** control panel (2) to **BATT**.

(2) Set **RTR BK** switch (3) on power quadrant (4) to **OFF**.



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1.62. ROTOR BRAKE - LOCK/UNLOCK – continued

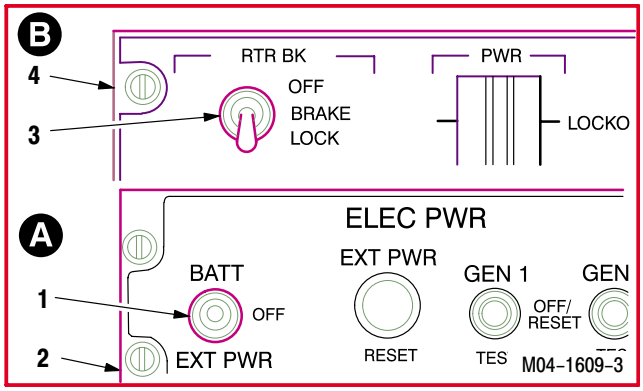
1.62.4. Lock

a. **Lock rotor brake.**

(1) Set **RTR BK** switch (3) on power quadrant (4) to **LOCK**.

(2) Set **BATT/EXT PWR** switch (1) on **ELEC PWR** control panel (2) to **OFF**.

b. **Disconnect battery** (para 9.40)**.**



END OF TASK

1.63. HELICOPTER – KNEEL/ERECT

NOTE

For kneel/erect system use, refer to TM 55-1520-238-S.

END OF TASK

1.64. GROUNDING

1.64.1. Description

This task covers: Grounding.

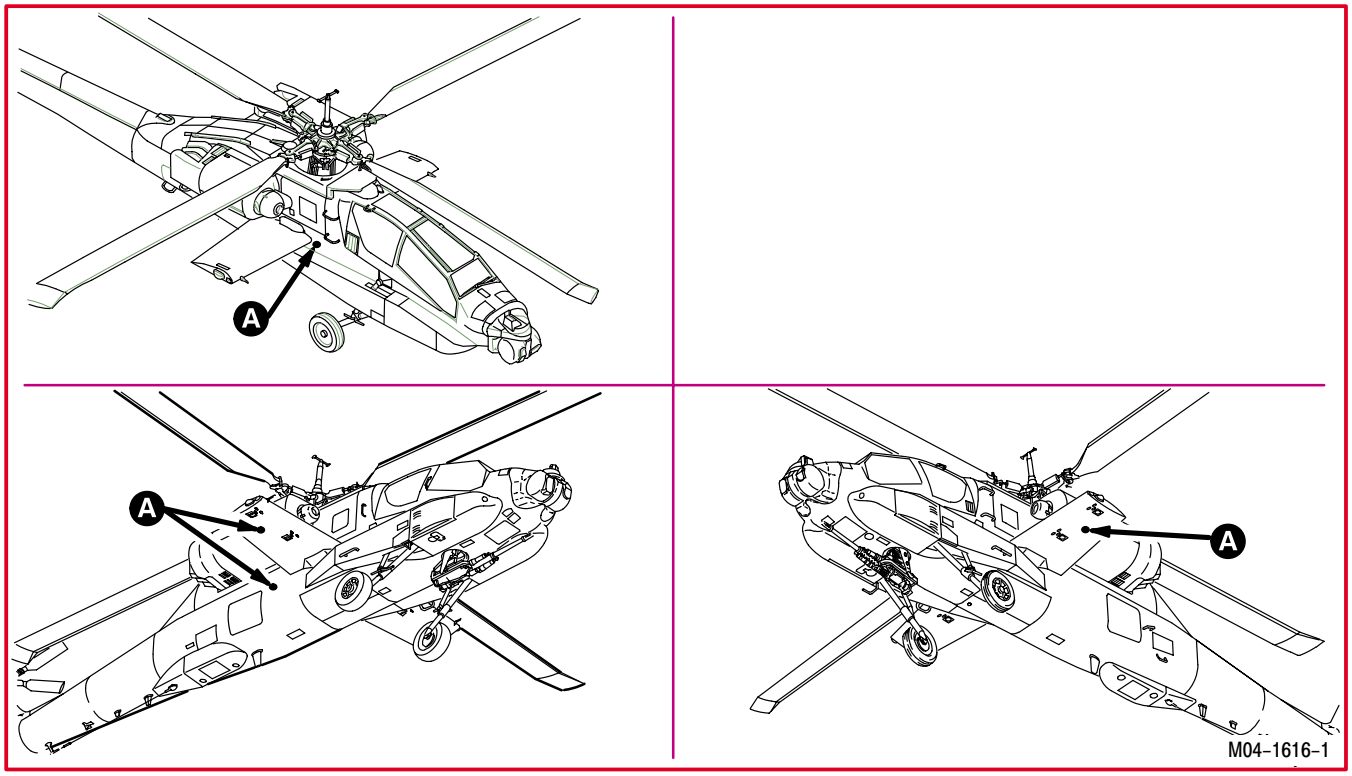
1.64.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

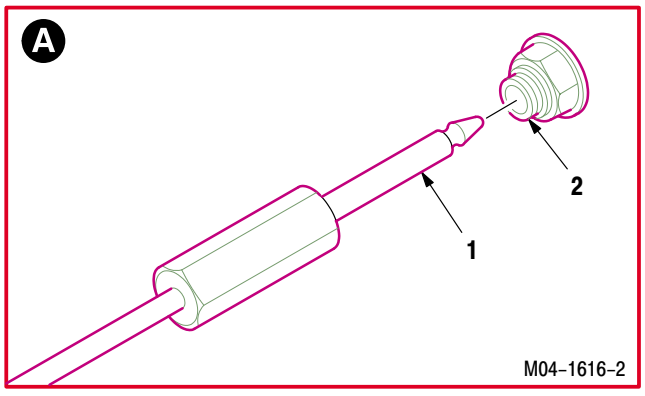
67R Attack Helicopter Repairer



1.64.3. Grounding

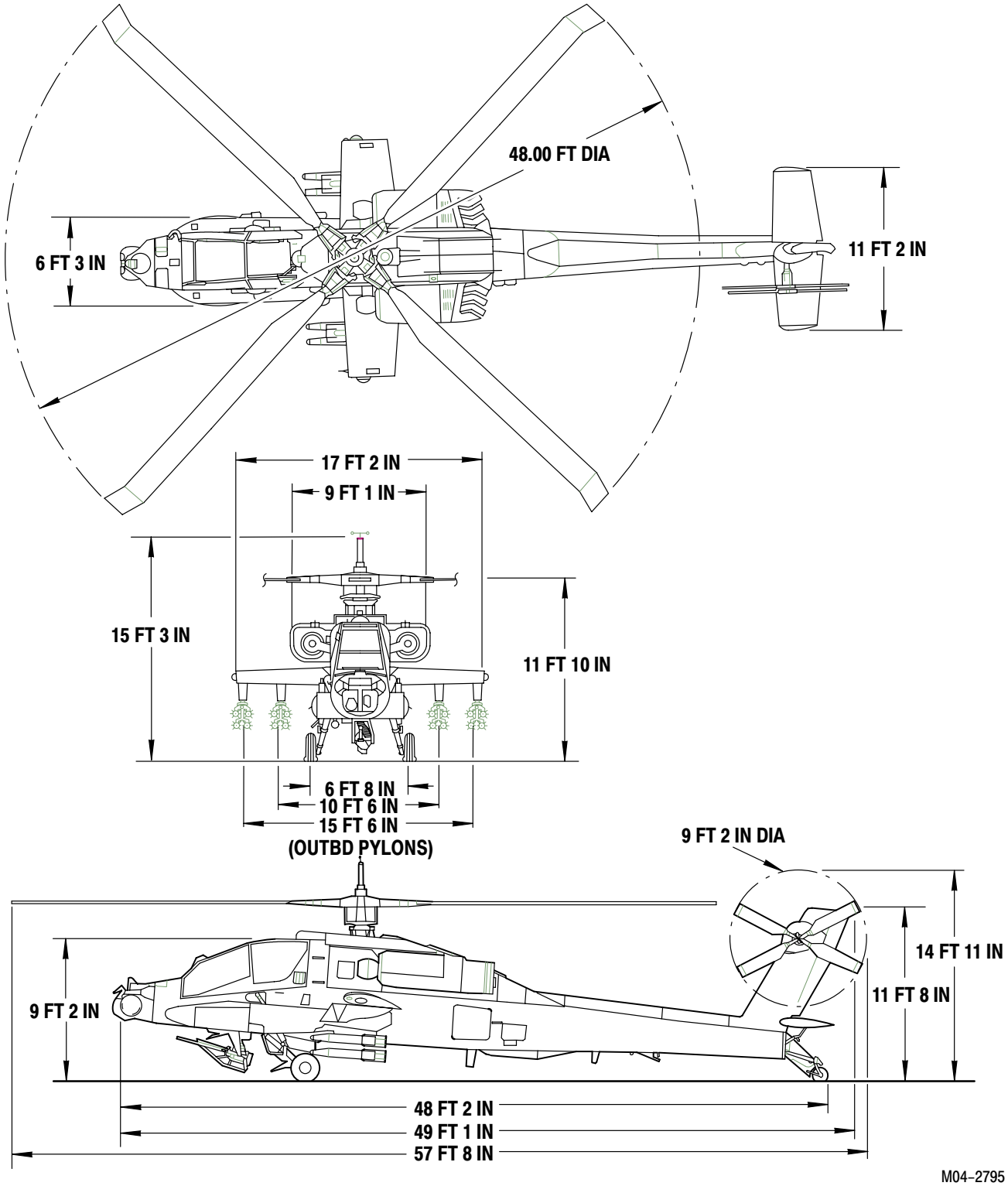
a. **To ground helicopter: insert grounding plug (1) into grounding receptacle (2).**

b. **To remove ground from helicopter: remove grounding plug (1) from grounding receptacle (2).**



END OF TASK

1.65. HELICOPTER DIMENSIONS



END OF TASK

1.66. HELICOPTER JACKING (TRIPOD JACKS AT THREE POINTS)

1.66.1. Description

This task covers: Jacking.

1.66.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Fuselage jack adapter (item 1, App H) (p/o item 391, App H) (2)
3-ton tripod hydraulic jack (item 184, App H)
5-ton aircraft landing gear jack (item 183, App H) (2)
Special tool kit (item 390, App H) (2)

Personnel Required:

67R Attack Helicopter Repairer
Three persons to assist

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
G.1	Plumb bob, bracket, and target installed

1.66.3. Jacking

WARNING

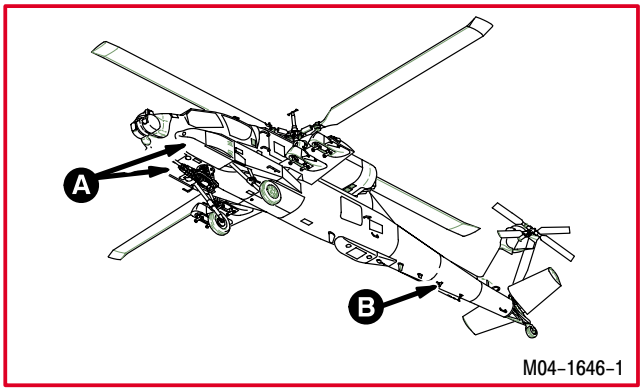
To prevent death or injury to personnel, jack helicopter evenly on a firm flat surface so that it stays level at all times. Helicopter is unstable on jacks. Do not jack helicopter if wind exceeds 15 mph. If injury occurs, seek medical aid.

CAUTION

- Area shall be roped off and warning signs **"HELICOPTER ON JACKS"** shall be displayed.
- Unauthorized personnel shall not be in or around helicopter while it is on jacks.
- Airframe structure damage can occur if stress panels are not in place before jacking. Ensure all stress panels are installed (para 2.6) and canopies are closed (para 1.56).
- A pound sign (#) after an access number indicates a stress panel that must be installed during jacking operations.

GO TO NEXT PAGE

1.66. HELICOPTER JACKING (TRIPOD JACKS AT THREE POINTS) – continued



a. **Install jack adapters (1) on brackets (2).**

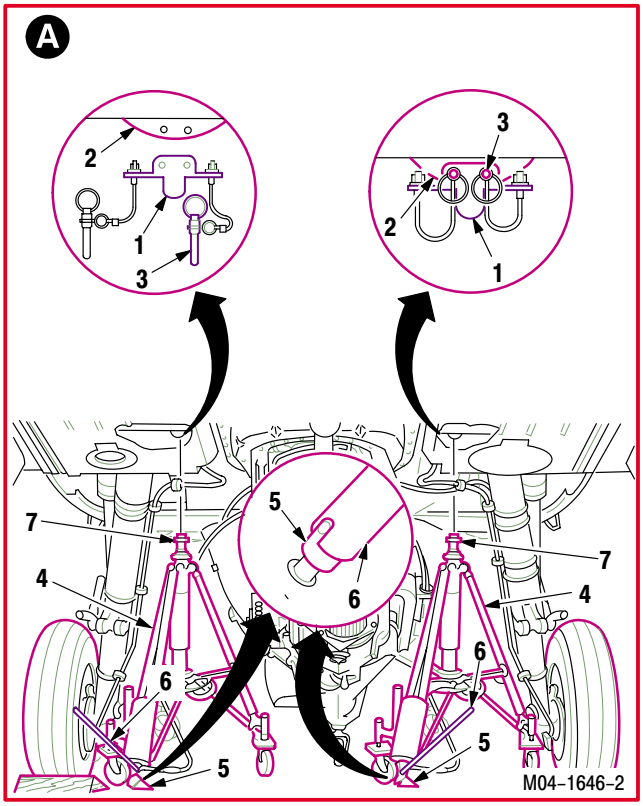
(1) Place adapters (1) on brackets (2).

(2) Insert pins (3) in holes of adapter (1) and brackets (2).

b. **Position two 5-ton tripod jacks (4) under adapters (1).** Use jacks.

(1) Turn two pressure valve screws (5) clockwise to close. Use jack handle (6).

(2) Pump handle (6) until ram (7) contacts adapter (1).

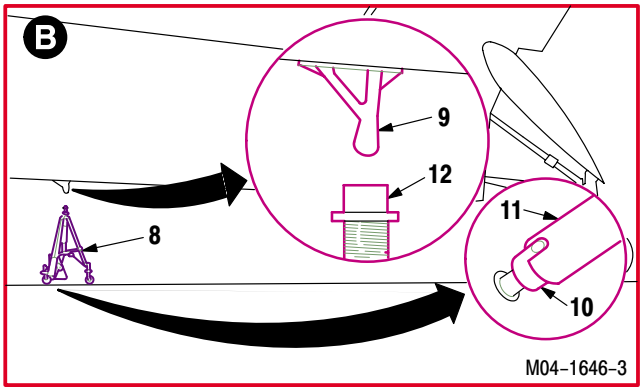


c. **Position 3-ton tripod jack (8) under tail boom jack pad (9).**

(1) Turn pressure valve screw (10) clockwise to close. Use jack handle (11).

(2) Pump handle (11) until ram (12) contacts pad (9).

d. **Release parking brake** (para 1.61)**.**



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1.66. HELICOPTER JACKING (TRIPOD JACKS AT THREE POINTS) – continued

e. **Remove wheel chocks (13).**

f. **Position one person to watch plumb bob** (para G.1) **and direct jack operators during jacking.**

NOTE

When plumb bob is not available use the protractor method (para 1.133).

g. **Raise helicopter slowly and evenly.**

(1) Raise jack (4) and (8) until tires (14) and (15) clear ground.

(2) Turn two lockrings (16) and (17) clockwise to maintain contact with shoulders of jacks (4) and (8).

h. **Perform maintenance task.**

i. **Position one person to watch plumb bob** (para G.1) **and direct jack operators during lowering.**

j. **Lower helicopter slowly and evenly.**

(1) Raise jacks (4) and (8) until lockrings (16) and (17) turn freely.

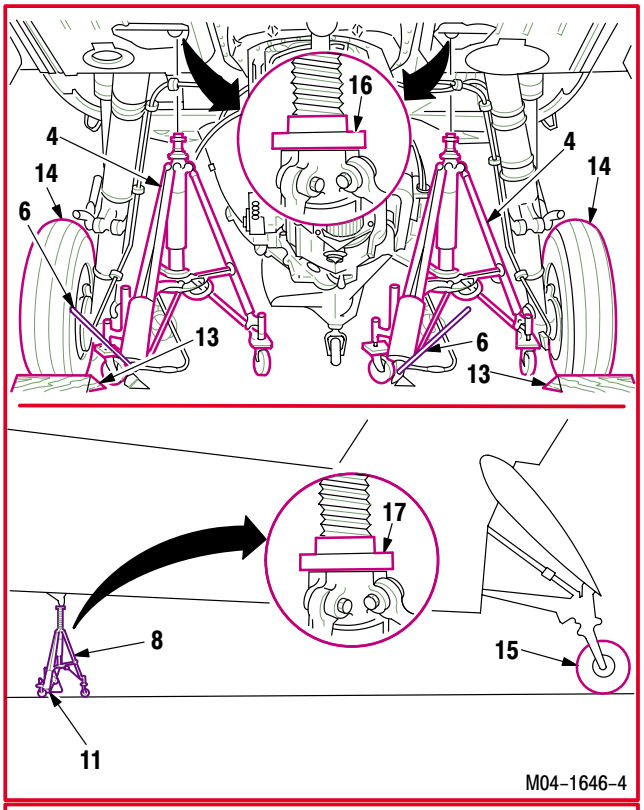
(2) Slowly release pressure. Turn pressure valve screws (5) and (10) counterclockwise. Use jack handles (6) and (11).

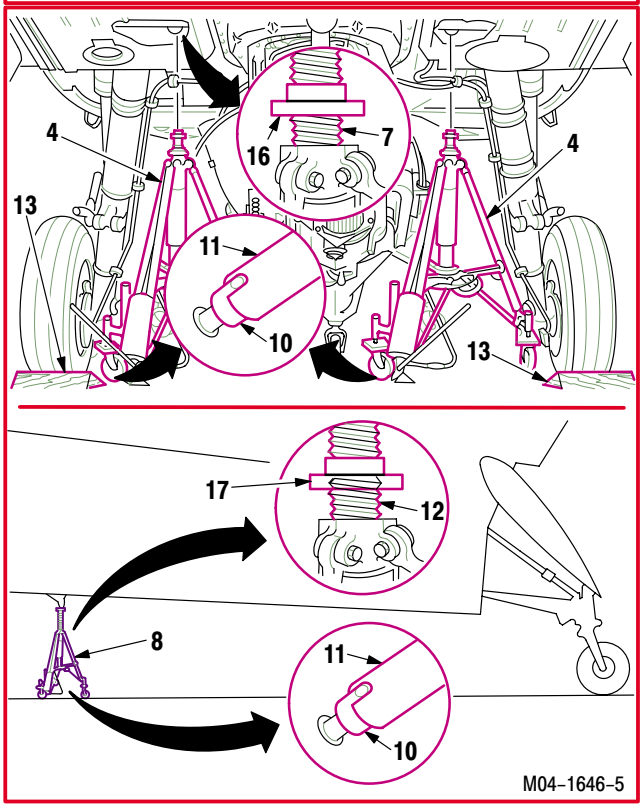
(3) Slowly turn lockrings (16) and (17) counterclockwise as rams (7) and (12) lower.

k. **Install wheel chocks (13).**

l. **Set parking brake** (para 1.61)**.**

m. **Remove jacks (4) and (8).**





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1.66. HELICOPTER JACKING (TRIPOD JACKS AT THREE POINTS) – continued

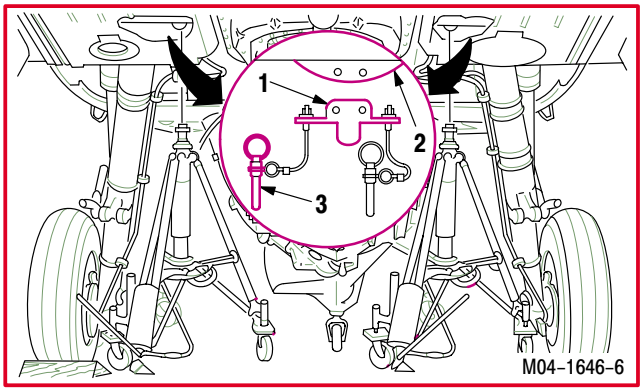
n. **Remove adapters (1) from brackets (2).**

(1) Remove pins (3) from adapters (1).

(2) Remove adapters (1) from brackets (2).

o. **Remove plumb bob, bracket, and target** (para G.1)**.**

p. **Remove rope and warning signs.**



END OF TASK

1.67. MAIN LANDING GEAR JACKING (AT ONE POINT)

1.67.1. Description

This task covers: Jacking.

1.67.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
5-ton aircraft landing gear jack (item 183, App H)

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

1.67.3. Jacking

WARNING

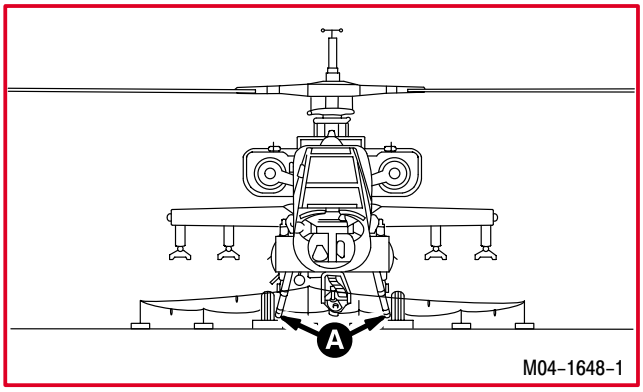
To prevent death or injury to personnel, jack helicopter evenly on a firm flat surface so that it stays level at all times. Helicopter is unstable on jacks. Do not jack helicopter if wind exceeds 15 mph. If injury occurs, seek medical aid.

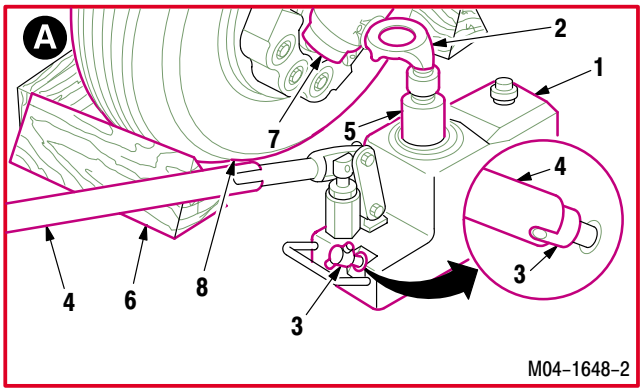
CAUTION

- Area shall be roped off and warning signs **"HELICOPTER ON JACKS"** shall be displayed.
- Unauthorized personnel shall not be in or around helicopter while it is on jacks.
- Airframe structural damage can occur if stress panels are not in place during jacking. Ensure all stress panels are installed (para 2.6) and canopies are closed (para 1.56).
- A pound sign (#) after an access number indicates a stress panel that must be installed during jacking operations.

GO TO NEXT PAGE

1.67. MAIN LANDING GEAR JACKING (AT ONE POINT) – continued





a. **Position jack (1) to either jack pad (2).**

   (1) Turn pressure valve screw (3) clockwise to close. Use jack handle (4).

   (2) Raise jack (1) until ram (5) contacts pad (2).

b. **Release parking brake** (para 1.61)**.**

c. **Remove wheel chocks (6).**

d. **Raise landing gear (7).**

   (1) Raise jack (1) until tire (8) clears ground.

e. **Perform maintenance task.**

f. **Slowly lower landing gear (7).**

   (1) Turn pressure valve screw (3) counterclockwise to open.

   (2) Use jack handle (4).

g. **Install wheel chock (6).**

h. **Set parking brake** (para 1.61)**.**

i. **Remove jack (1).**

j. **Remove rope and warning signs.**

END OF TASK

1.68. TAIL LANDING GEAR JACKING (AXLE JACK)

1.68.1. Description

This task covers: Jacking.

1.68.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
5-ton aircraft landing gear jack (item 183, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
3.27	Tail landing gear deflector removed

1.68.3. Jacking

WARNING

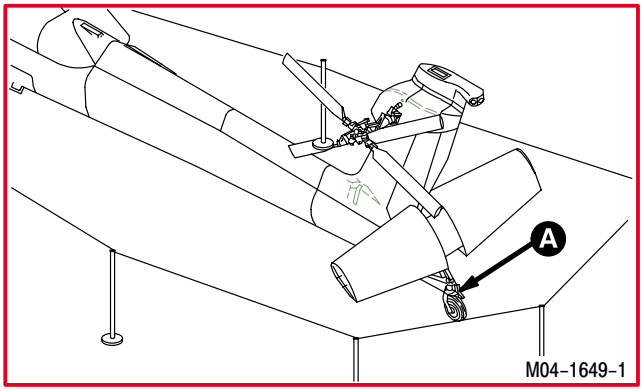
To prevent death or injury to personnel, jack helicopter evenly on a firm flat surface so that it stays level at all times. Helicopter is unstable on jacks. Do not jack helicopter if wind exceeds 15 mph. If injury occurs, seek medical aid.

CAUTION

- Area shall be roped off and warning signs **"HELICOPTER ON JACKS"** shall be displayed.
- Unauthorized persons shall not be in or around helicopter while it is on jacks.
- Airframe structural damage can occur if stress panels are not in place during jacking. Ensure all stress panels are installed and canopies are closed (para 2.6).
- A pound sign (#) after an access number indicates a stress panel that must be installed during jacking operations.

GO TO NEXT PAGE

1.68. TAIL LANDING GEAR JACKING (AXLE JACK) – continued



a. **Position jack (1) under pad (2).**

(1) Turn pressure valve screw (3) clockwise to close. Use jack handle (4).

(2) Raise jack (1) until ram (5) contacts pad (2).

b. **Raise tail landing gear slowly.**

(1) Raise jack (1) until tire (6) clears ground.

c. **Perform maintenance task.**

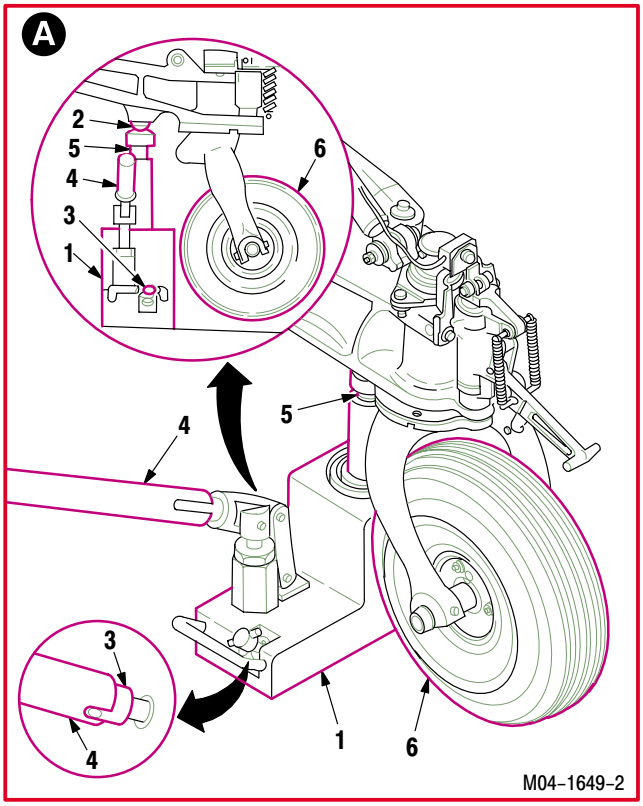
d. **Lower tail landing gear slowly.**

(1) Turn pressure valve screw (3) counterclockwise to open.

(2) Use jack handle (4).

e. **Remove jack (1).**

f. **Remove rope and warning signs.**



END OF TASK

1.69. TAIL LANDING GEAR JACKING (TRIPOD JACK)

1.69.1. Description

This task covers: Jacking.

1.69.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
3-ton tripod hydraulic jack (item 184, App H)

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

1.69.3. Jacking

WARNING

To prevent death or injury to personnel, jack helicopter evenly on a firm flat surface so that it stays level at all times. Helicopter is unstable on jacks. Do not jack helicopter if wind exceeds 15 mph. If injury occurs, seek medical aid.

CAUTION

- Area shall be roped off and warning signs **"HELICOPTER ON JACKS"** shall be displayed.
- Unauthorized personnel shall not be in or around helicopter while it is on jacks.
- Airframe structural damage can occur if stress panels are not in place during jacking. Ensure all stress panel are installed and canopies are closed (para 2.6).
- A pound sign (#) after an access number indicates a stress panel that must be installed during jacking operations.

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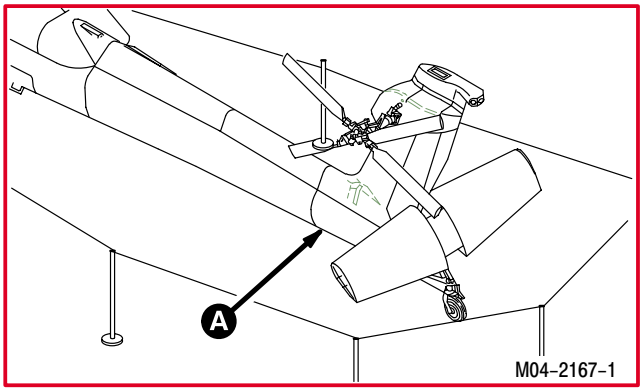
1.69. TAIL LANDING GEAR JACKING (TRIPOD JACK) – continued



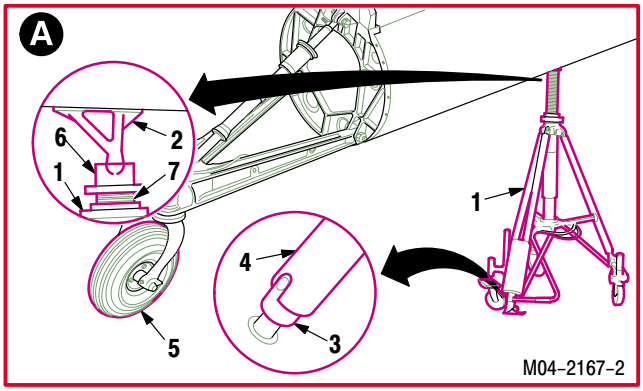
a. **Position jack (1) under pad (2).**

(1) Turn pressure valve screw (3) clockwise to close. Use jack handle (4).

b. **Raise tail boom slowly.**

(1) Raise jack (1) until tire (5) clears ground.

(2) Turn lockring (6) clockwise to maintain contact with shoulder of jack (1).

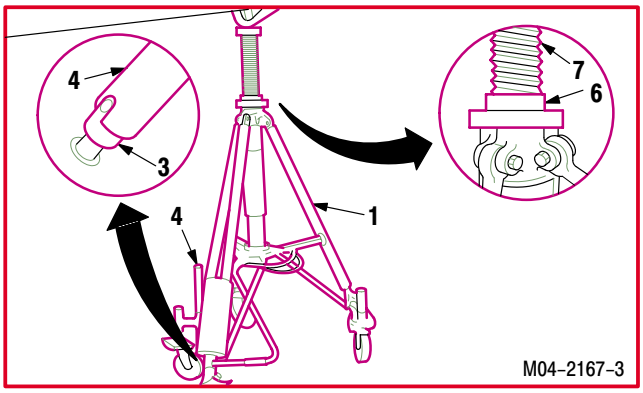


c. **Perform maintenance task.**

d. **Lower tail boom slowly.**

(1) Slowly turn lockring (6) counterclockwise as ram (7) lowers.

(2) Turn pressure valve (3) counterclockwise to open. Use jack handle (4).



e. **Remove jack (1).**

f. **Remove rope and warning signs.**

END OF TASK

1.70. EXTERNAL POWER APPLICATION – ELECTRICAL

1.70.1. Description

This task covers: Application.

1.70.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft power unit (item 232, App H)

Personnel Required:

67R Attack Helicopter Repairer

References:

TM 55-1730-229-12

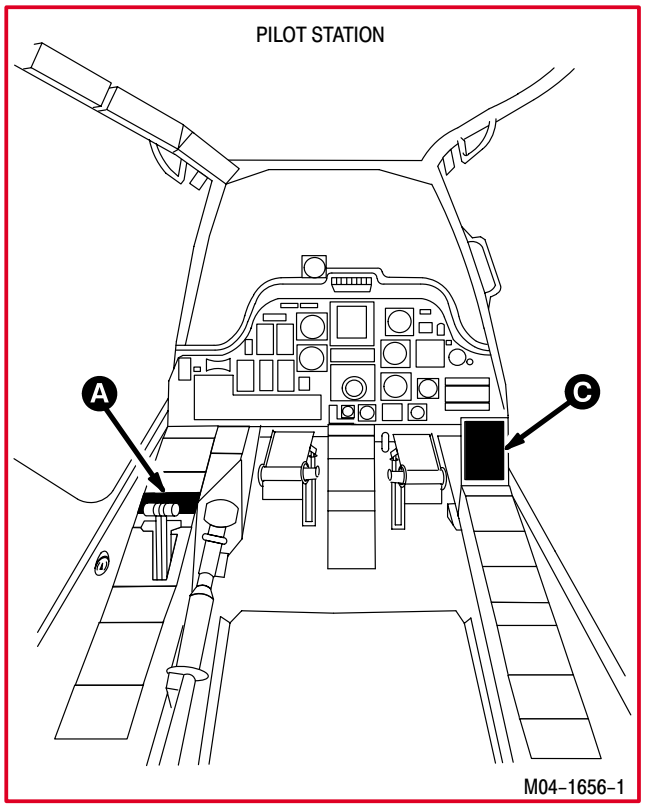
Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access door R345 opened

1.70.3. Application

CAUTION

Apply air if ambient air temperature is below 0 °F (-18 °C) or above 80 °F (27 °C). Failure to do so may cause avionics equipment damage.



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1.70. EXTERNAL POWER APPLICATION – ELECTRICAL – continued

CAUTION

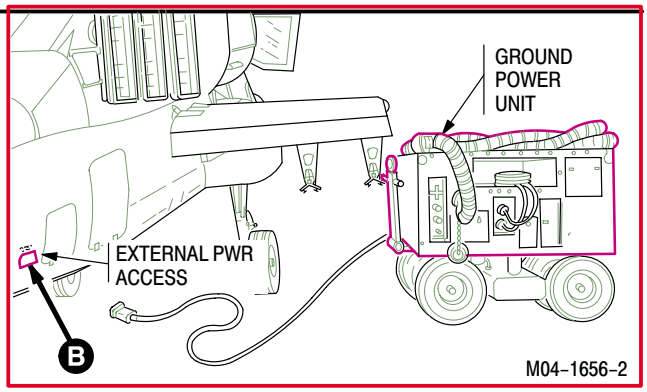
Do not put AGPU under a main rotor blade. Main rotor blade damage may occur from extreme heat of AGPU exhaust.

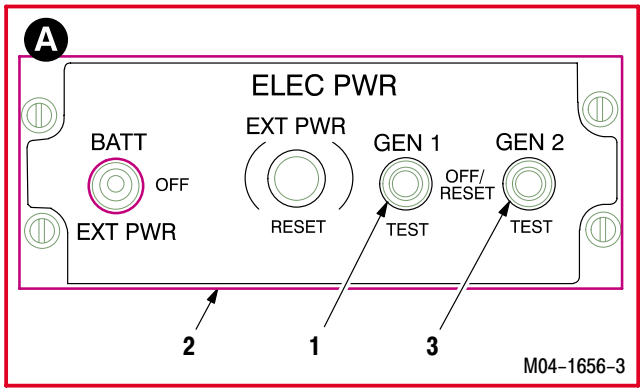
a. **Position AGPU parallel to right wing tip.**

b. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

c. **Set GEN 1 switch (1) on pilot ELEC PWR panel (2) to OFF/RESET.**

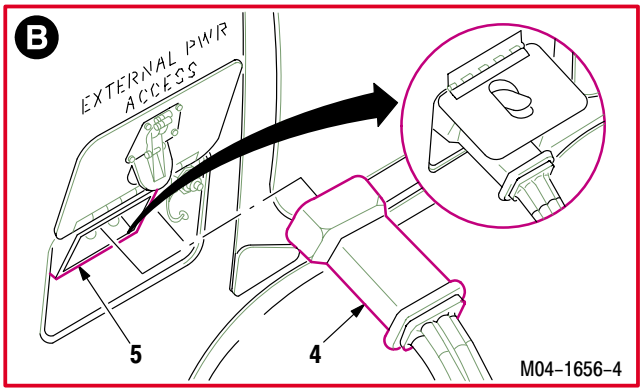
d. **Set GEN 2 switch (3) on pilot ELEC PWR panel (2) to OFF/RESET.**





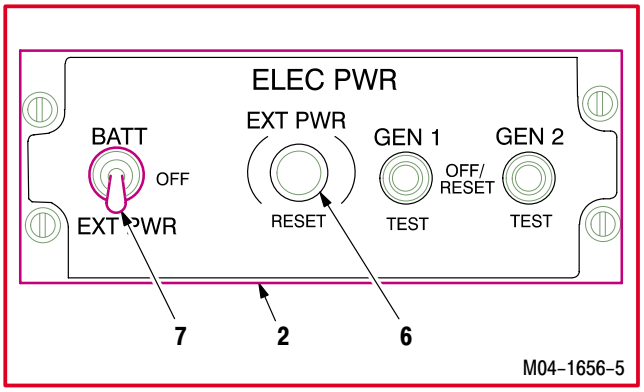
e. **Connect AGPU power cable (4) to EXTERNAL PWR ACCESS receptacle J14 (5).**

f. **Operate AGPU to supply power to helicopter** (TM 55-1730-229-12)**.**



g. **Press EXT PWR RESET button (6) on pilot ELEC PWR panel (2).**

h. **Set BATT/EXT PWR switch (7) on pilot ELEC PWR panel (2) to EXT PWR.**



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1.70. EXTERNAL POWER APPLICATION – ELECTRICAL – continued

i. **Verify GEN 1 and GEN 2 lights (8), CHARGER light (13) and EXT PWR light (9) on pilot caution/warning panel (10) are lighted.**

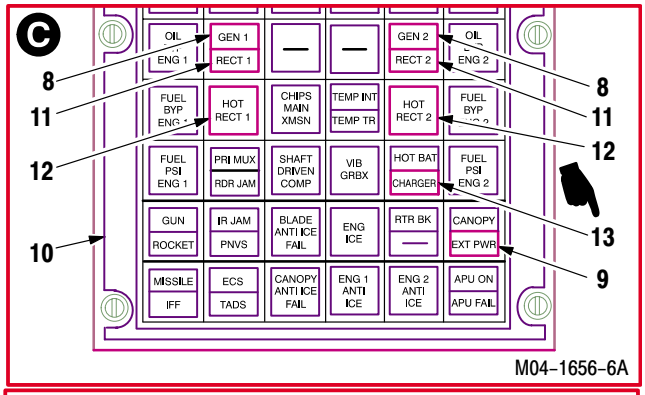
j. **Verify RECT 1 and RECT 2 lights (11) on pilot caution/warning panel (10) are not lighted.**

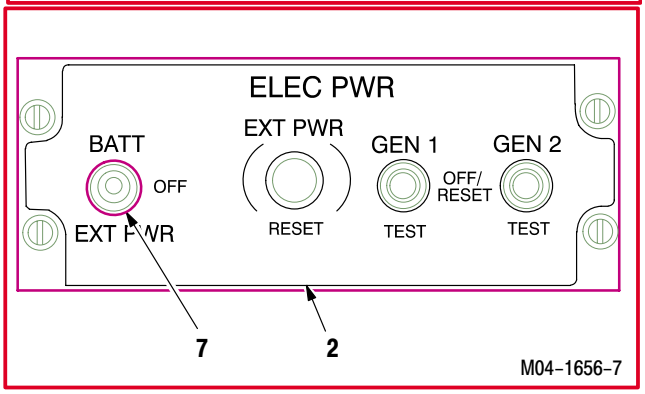
k. **Verify HOT RECT 1 and HOT RECT 2 lights (12) on pilot caution/warning panel are not lighted.**

l. **Perform maintenance task.**

m. **Set BATT/EXT PWR switch (7) on pilot ELEC PWR panel (2) to OFF.**

n. **Shut down AGPU** (TM 55-1730-229-12)**.**

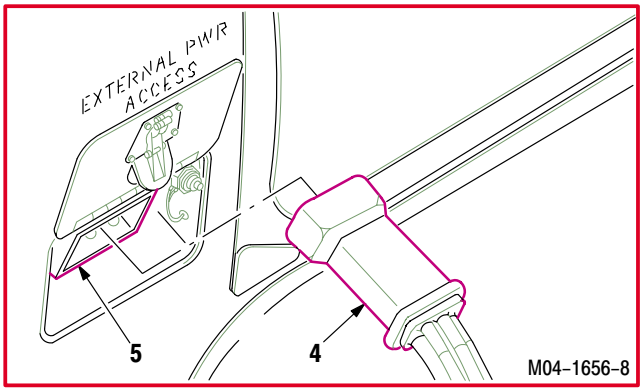




o. **Disconnect AGPU power cable (4) from EXTERNAL PWR ACCESS receptacle J14 (5).**

p. **Remove AGPU from work area.**

q. **Secure access door R345** (para 2.2)**.**



END OF TASK

1.71. EXTERNAL POWER APPLICATION – AIR

1.71.1. Description

This task covers: Application.

1.71.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft power unit (item 232, App H)

References:

TM 55-1730-229-12

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access door LN5 opened

Personnel Required:

67R Attack Helicopter Repairer

1.71.3. Application

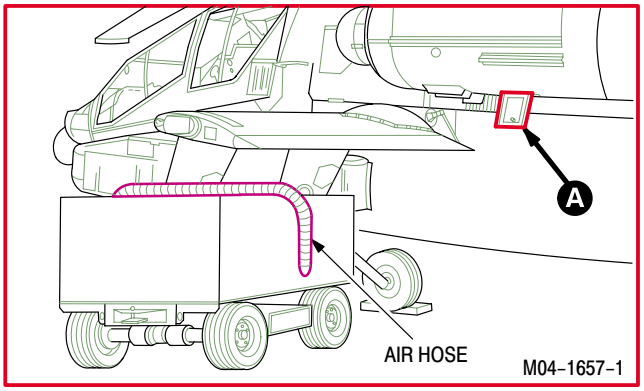
CAUTION

Do not put AGPU under a main rotor blade. Main rotor blade damage may occur from extreme heat of AGPU exhaust.

a. **Position AGPU near left wing tip.**

NOTE

The AGPU will provide 48 psi with no electrical load. Electrical load can be carried by AGPU together with air but large electrical loads should be avoided.



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1.71. EXTERNAL POWER APPLICATION – AIR – continued

b. **Connect coupling (1) of hose (2) to air nipple (3).**

c. **Operate AGPU to supply air** (TM 55-1730-229-12)**.**

d. **Perform maintenance task.**

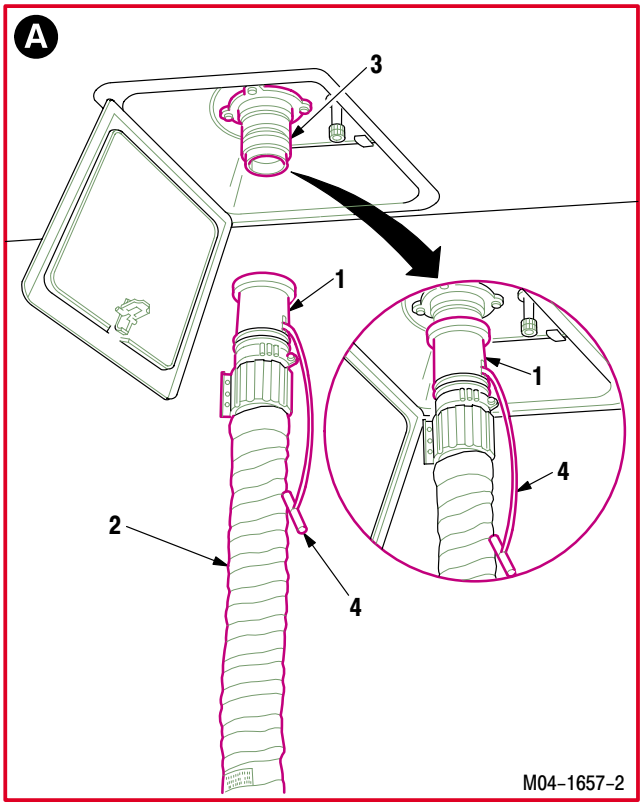
e. **Shut off air supply** (TM 55-1730-229-12)**.**

f. **Shut down AGPU** (TM 55-1730-229-12)**.**

g. **Disconnect hose (2).**

h. Pull release handle (4) on coupling (1) to remove hose (2) from air nipple (3).

i. **Secure access door LN5** (para 2.2)**.**



END OF TASK

1.72. EXTERNAL POWER APPLICATION – HYDRAULIC (PRIMARY)

1.72.1. Description

This task covers: Application.

1.72.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft power unit (item 232, App H)

Personnel Required:

67R Attack Helicopter Repairer

References:

TM 55-1730-229-12

Equipment Conditions:

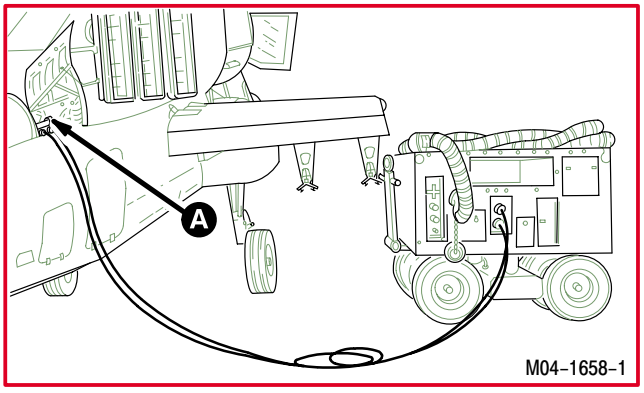
Ref	Condition
1.57	Helicopter safed
2.2	Access door R325 opened

1.72.3. Application

CAUTION

Do not put AGPU under a main rotor blade. Main rotor blade damage may occur from extreme heat of AGPU exhaust.

a. **Position AGPU parallel to right wing tip.**



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1.72. EXTERNAL POWER APPLICATION – HYDRAULIC (PRIMARY) – continued

b. **Connect AGPU return hose (1) to PRIMARY coupling (2).**

(1) Remove cap (3) from coupling (2).

(2) Turn coupling nut (4) clockwise until seated and locking teeth engage fully with teeth on coupling (2).

c. **Connect AGPU pressure hose (5) to PRIMARY coupling (6).**

(1) Remove cap (7) from coupling (6).

(2) Turn coupling nut (8) clockwise until seated and locking teeth engage fully with teeth on coupling (6).

d. **Connect battery** (para 9.40)**.**

e. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

f. **Set BATT/EXT PWR switch (9) on ELEC PWR control panel (10) to BATT.**

(1) If external power is applied (para 1.70), set **BATT/EXT PWR** switch (9) to **EXT PWR**.

WARNING

The hydraulic system is pressurized to 3000 psi. Be certain that trapped hydraulic pressure is released before loosening any connections. Failure to do so could result in death or serious injury. If injury occurs, seek medical aid.

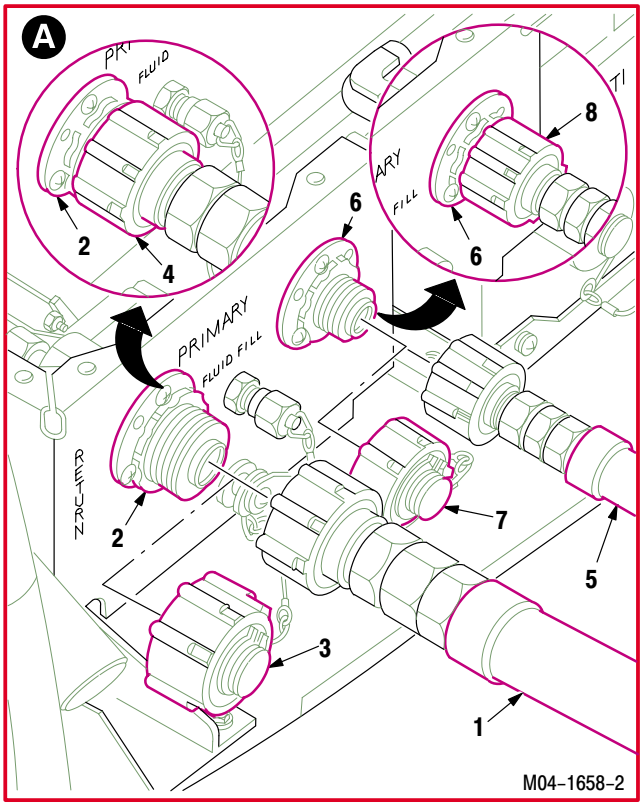
CAUTION

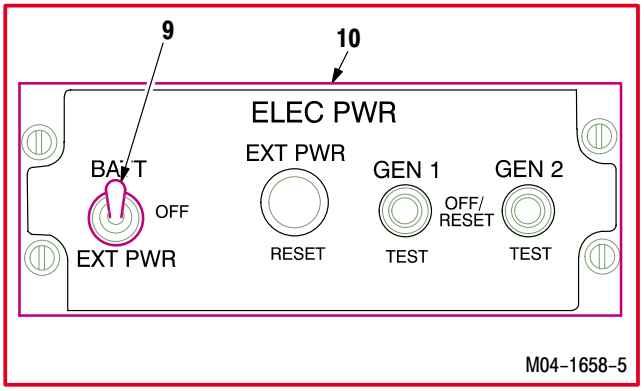
Do not exceed 3000 PSI or damage to hydraulic system and components may occur.

g. **Apply hydraulic pressure to helicopter** (TM 55-1730-229-12)**.**

(1) Adjust AGPU to 3000 psi output pressure.

h. **Perform maintenance task.**





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1.72. EXTERNAL POWER APPLICATION – HYDRAULIC (PRIMARY) – continued

NOTE

Disconnect AGPU hydraulic pressure and return hoses from ground service panel immediately after completion of maintenance task. This will prevent over servicing of hydraulic manifold.

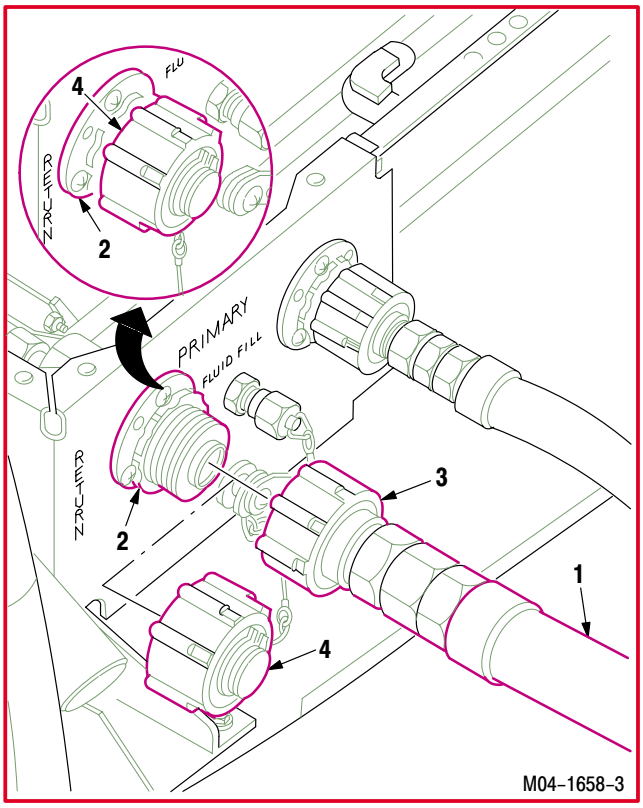
i. **Reduce AGPU pressure to 0 psi** (TM 55-1730-229-12)**.**

j. **Service primary hydraulic manifold reservoir** (para 1.34)**.**

k. **Disconnect AGPU return hose (1) from PRIMARY coupling (2).**

(1) Turn coupling nut (3) counterclockwise until it clears coupling (2).

(2) Install cap (4) on coupling (2).



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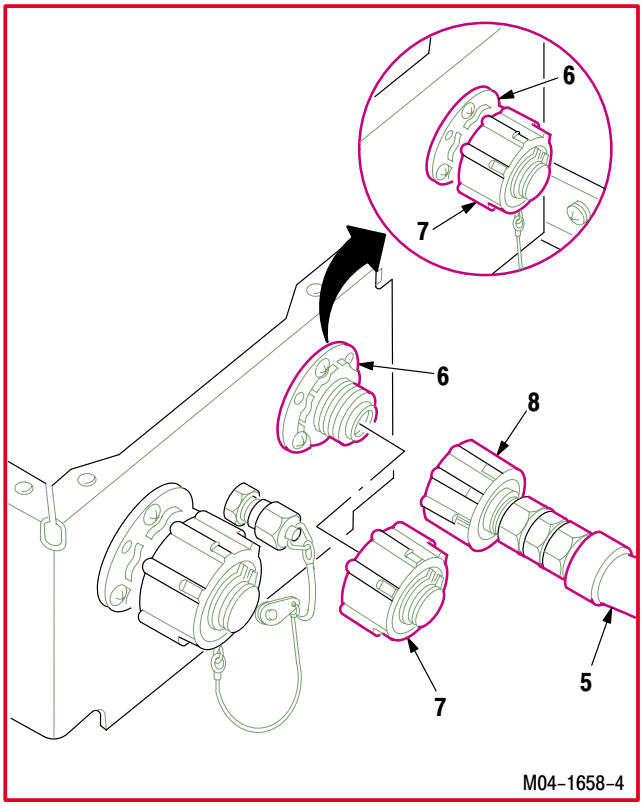
1.72. EXTERNAL POWER APPLICATION – HYDRAULIC (PRIMARY) – continued

l. **Disconnect AGPU pressure hose (5) from PRIMARY coupling (6).**

(1) Turn coupling nut (8) counterclockwise until it clears coupling (6).

(2) Install cap (7) on coupling (6).

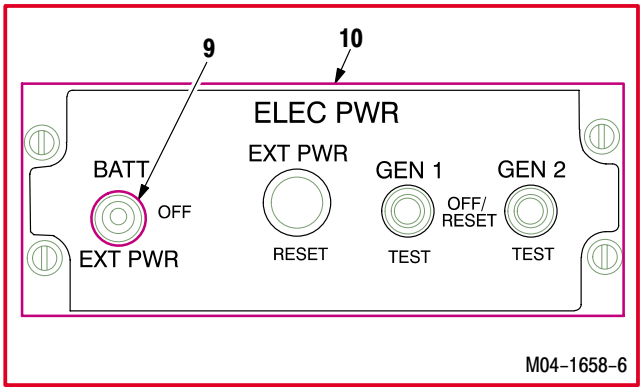
m. **Pressurize primary and utility hydraulic manifolds by applying external power – air** (para 1.71)**.**



n. **Set BATT/EXT PWR switch (9) on ELEC PWR control panel (10) to OFF.**

o. **Disconnect battery** (para 9.40)**.**

p. **Secure access door R325** (para 2.2)**.**



END OF TASK

1.73. EXTERNAL POWER APPLICATION – HYDRAULIC (UTILITY)

1.73.1. Description

This task covers: Application.

1.73.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft power unit (item 232, App H)

References:

TM 55-1730-229-12

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access door R325 opened

Personnel Required:

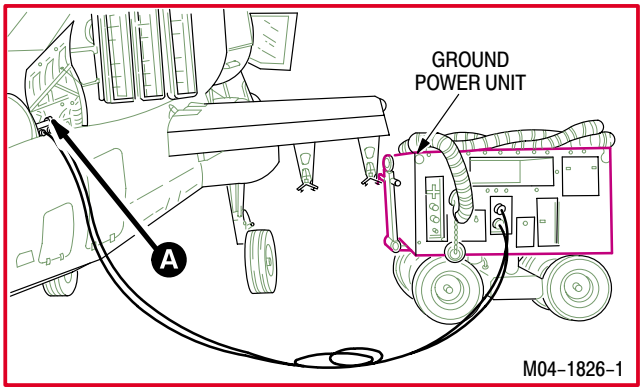
67R Attack Helicopter Repairer

1.73.3. Application

CAUTION

Do not put AGPU under a main rotor blade. Main rotor blade damage may occur from extreme heat of AGPU exhaust.

a. **Position AGPU parallel to right wing tip.**



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1.73. EXTERNAL POWER APPLICATION – HYDRAULIC (UTILITY) – continued

b. **Connect AGPU return hose (1) to UTILITY coupling (2).**

(1) Remove cap (3) from coupling (2).

(2) Turn coupling nut (4) clockwise until seated and locking teeth engage fully with teeth on coupling (2).

c. **Connect AGPU pressure hose (5) to UTILITY coupling (6).**

(1) Remove cap (7) from coupling (6).

(2) Turn coupling nut (8) clockwise until seated and locking teeth engage fully with teeth on coupling (6).

d. **Connect battery** (para 9.40)**.**

e. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

f. **Set BATT/EXT PWR switch (9) on ELEC PWR control panel (10) to BATT.**

(1) If external power is applied (para 1.70), set **BATT/EXT PWR** switch (9) to **EXT PWR**.

WARNING

The hydraulic system is pressurized to 3000 psi. Be certain that trapped hydraulic pressure is released before loosening any connections. Failure to do so could result in death or serious injury. If injury occurs, seek medical aid.

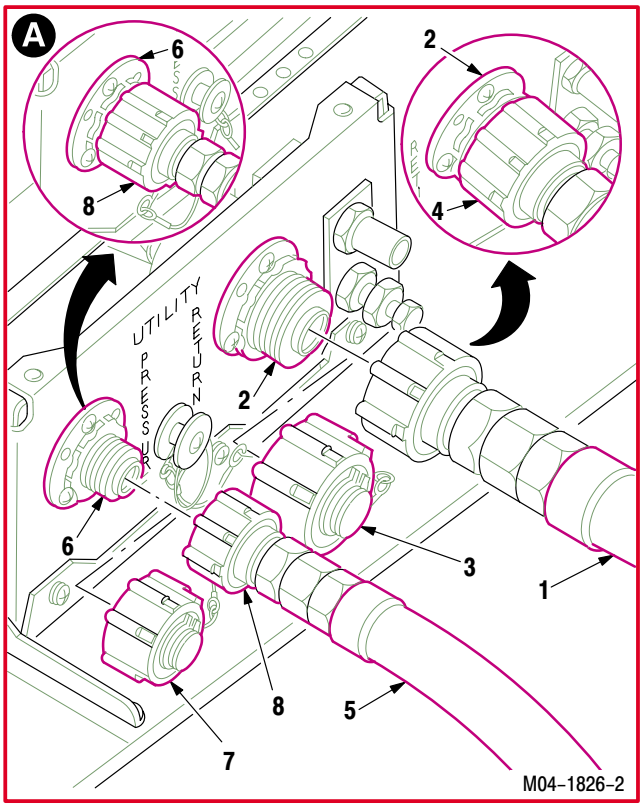
CAUTION

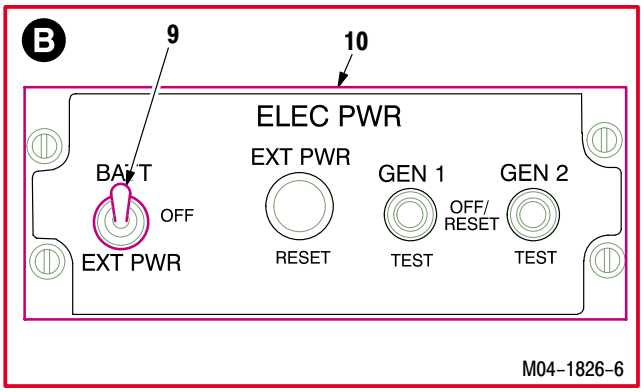
Do not exceed 3000 PSI or damage to hydraulic system and components may occur.

g. **Apply hydraulic pressure to helicopter** (TM 55-1730-229-12)**.**

(1) Adjust AGPU to 3000 psi output pressure.

h. **Perform maintenance task.**





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1.73. EXTERNAL POWER APPLICATION – HYDRAULIC (UTILITY) – continued

NOTE

Disconnect hydraulic AGPU pressure and return hose from ground service panel immediately after completion of maintenance task. This will prevent over servicing of hydraulic manifold.

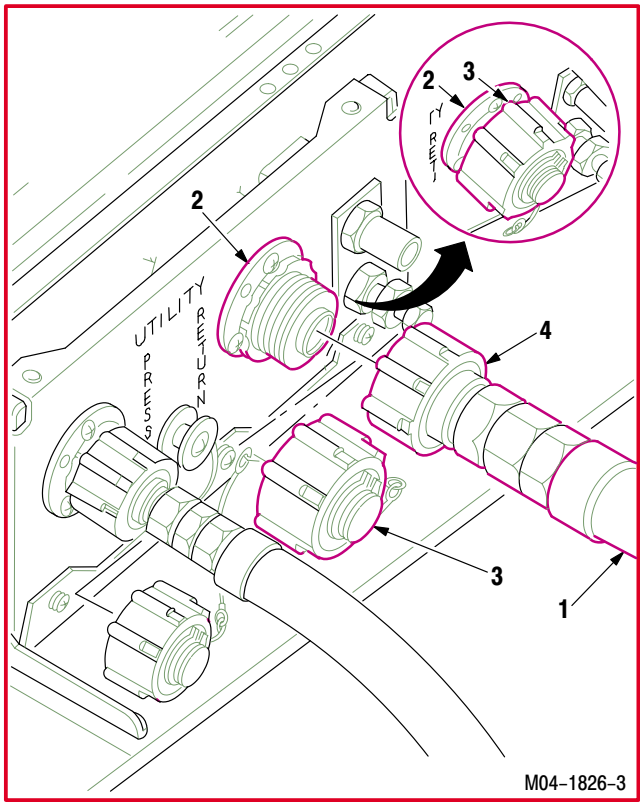
i. **Reduce AGPU hydraulic pressure to 0 psi** (TM 55-1730-229-12)**.**

j. **Service utility manifold reservoir** (para 1.34)**.**

k. **Disconnect AGPU return hose (1) from UTILITY coupling (2).**

(1) Turn coupling nut (4) counterclockwise until it clears coupling (2).

(2) Install cap (3) on coupling (2).



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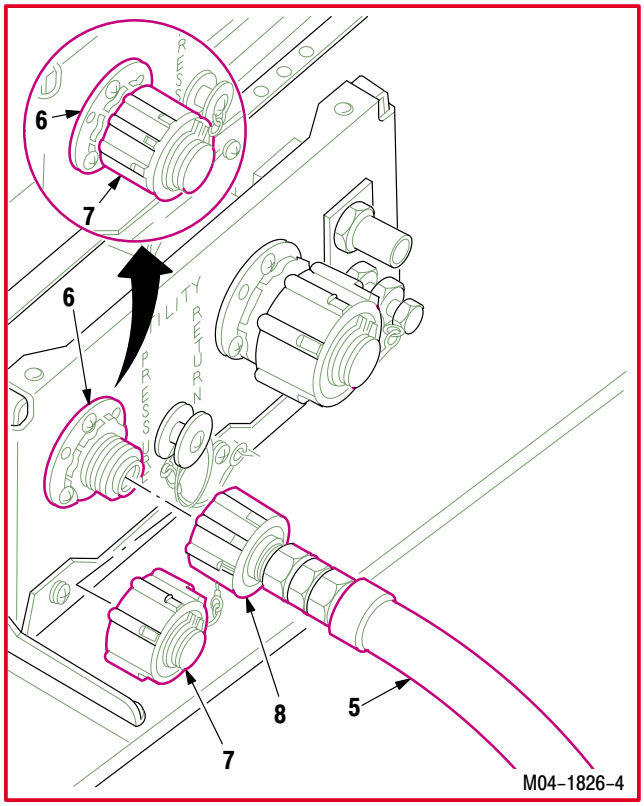
1.73. EXTERNAL POWER APPLICATION – HYDRAULIC (UTILITY) – continued

l. **Disconnect AGPU pressure hose (5) from utility coupling (6).**

(1) Turn coupling nut (8) counterclockwise until it clears coupling (6).

(2) Install cap (7) on coupling (6).

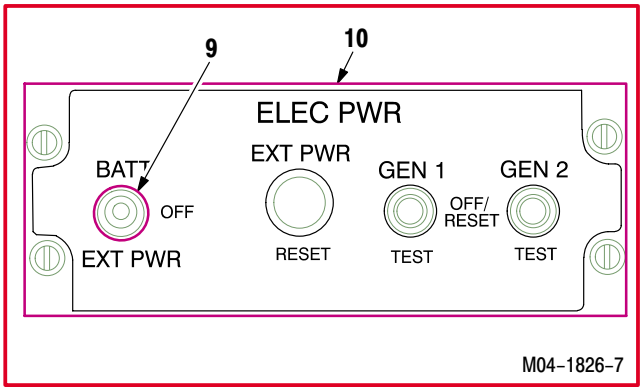
m. **Pressurize primary and utility hydraulic manifolds by applying external power – air** (para 1.71)**.**



n. **Set BATT/EXT PWR switch (9) on ELECT PWR control panel (10) to OFF.**

o. **Disconnect battery** (para 9.40)**.**

p. **Secure access door R325** (para 2.2)**.**



END OF TASK

1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER

1.74.1. Description

This task covers: Operating Instructions.

1.74.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

References:

TM 1-1270-476-20
TM 1-1520-238-T
TM 1-5855-265-20

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.134	Maintenance headset connected
TM 1-1520-238-T	Fuel system – visual check completed
1.13	Aft fuel tank level checked
9.40	Battery connected

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

CAUTION

Only certified personnel are authorized to operate the APU. Failure to comply could result in equipment damage.

1.74.3. Operating Instructions

a. **Verify correct main transmission oil level right sight indicator** (para 1.32)**.**

b. **Verify correct primary hydraulic fluid level** (para 1.34)**.**

c. **Open access door RN5** (para 2.2)**.**

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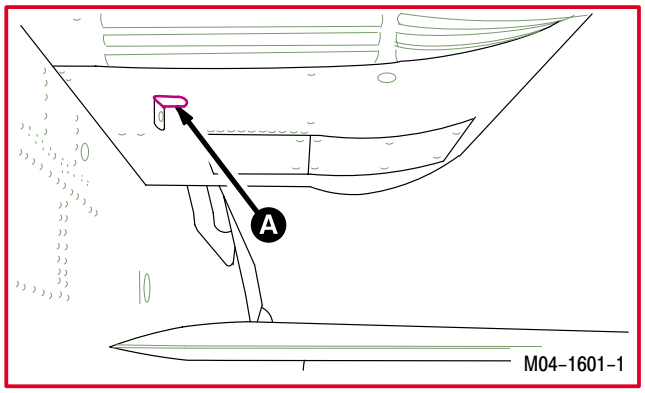
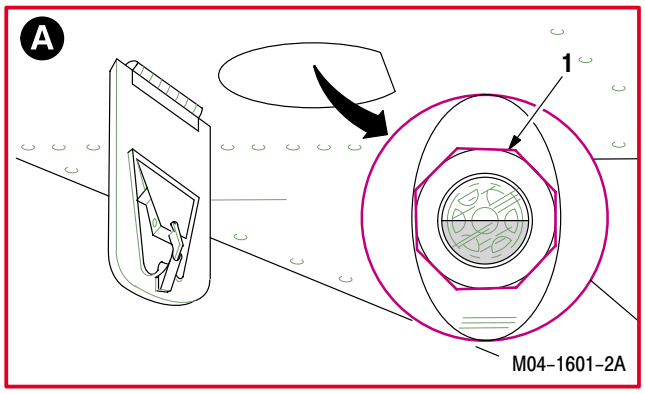
1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued



d. **Verify correct APU oil level.**

   (1) Use access at bottom right nacelle.

   (2) Indicator ball at gage (1) midpoint.



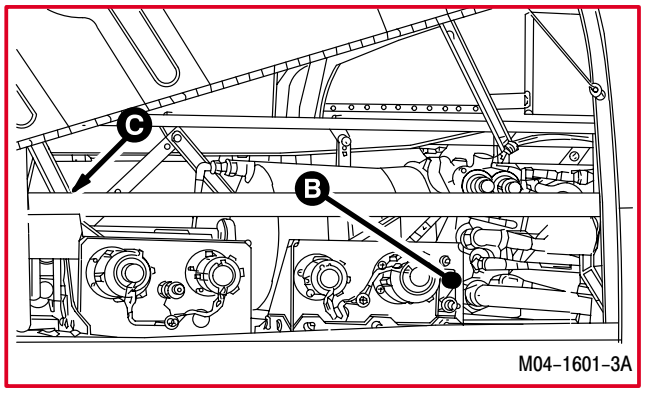
e. **Secure access door RN5** (para 2.2)**.**

f. **Open aft electronics equipment door R295, and close APU circuit breaker in aft avionics bay** (para 2.2)**.**

g. **Secure access door R295** (para 2.2)**.**

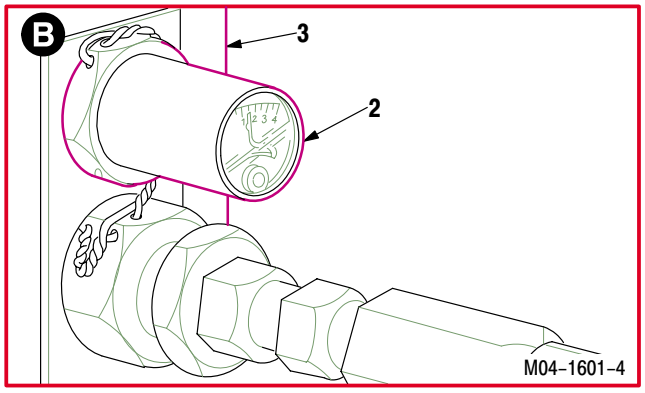
h. **Open access door R325** (para 2.2)**.**

i. **Verify correct utility hydraulic fluid level** (para 1.34)**.**



j. **Verify 3000 psi hydraulic pressure.**

   (1) Check utility pressure gage (2) on utility service panel (3) indicates between 2600 and 3000 psi.



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1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

CAUTION

Use of excessive force to actuate hydraulic hand pump could cause damage to helicopter components. If actuation of hand pump is stiff or 3000 psi cannot be accomplished, this may be an indication that the utility hydraulic accumulator requires nitrogen servicing (para 1.36).

(2) If pressure is below 2600 psi use hand pump to increase pressure to 3000 psi. If not, proceed to step k.

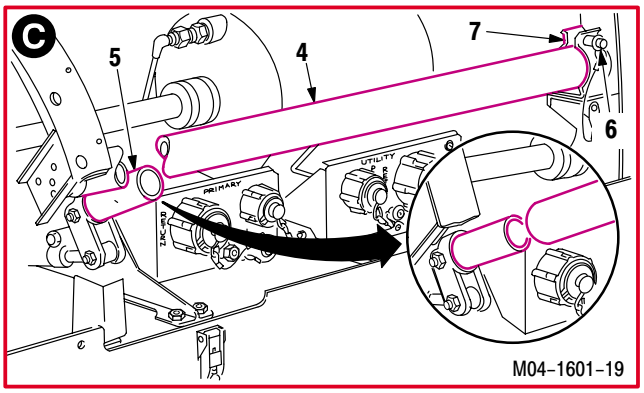
(a) Install pump handle (4) on bellcrank (5).

1 Remove retaining pin (6) from clip (7) and handle (4).

2 Slide handle (4) over bellcrank (5) and hand pump 2600 to 3000 psi.

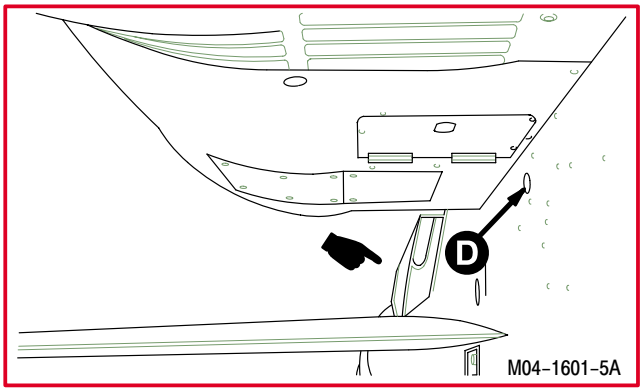
(b) Stow pump handle (4) in clip (7).

1 Install handle in clip (7) and insert retaining pin (6).



CAUTION

Ensure access door R325 is closed and secured before APU start up. Failure to comply could result in thermal damage to aircraft structure.

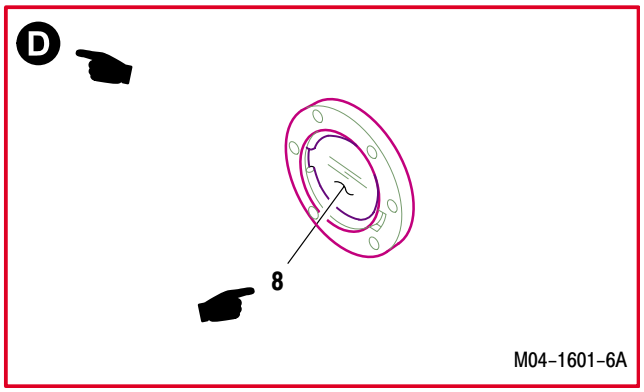


k. **Secure access door R325** (para 2.2)**.**

l. **Verify APU enclosure air inlet screen is clean of FOD** (para 15.42)**.**

m. **Verify fire extinguisher blow out indicator (8) is in place.**

(1) Check indicator (8) below left engine nacelle.



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1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

n. **Verify correct main transmission oil level left sight indicator** (para 1.32)**.**

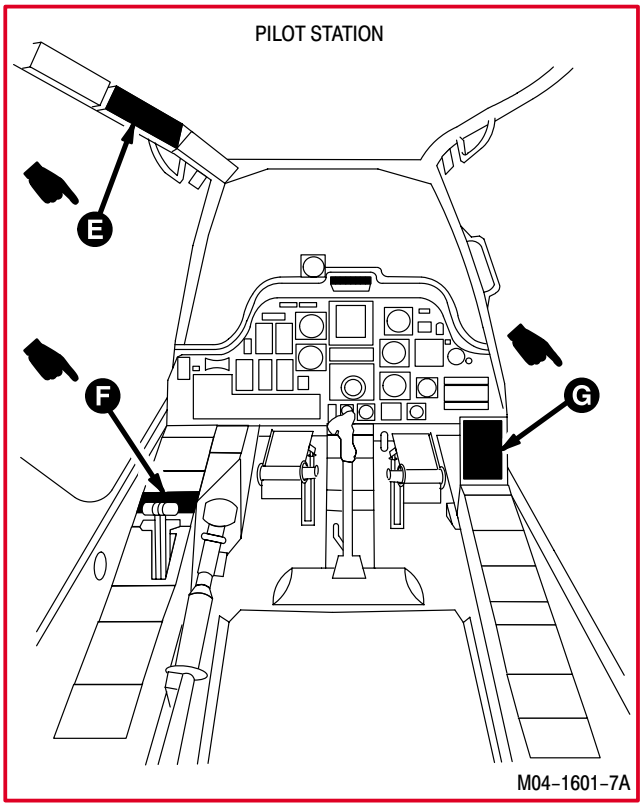
o. **Remove TADS window cover assembly** (TM 1-1270-476-20)**.**

p. **Remove PNVS window cover assembly** (TM 1-5855-265-20)**.**

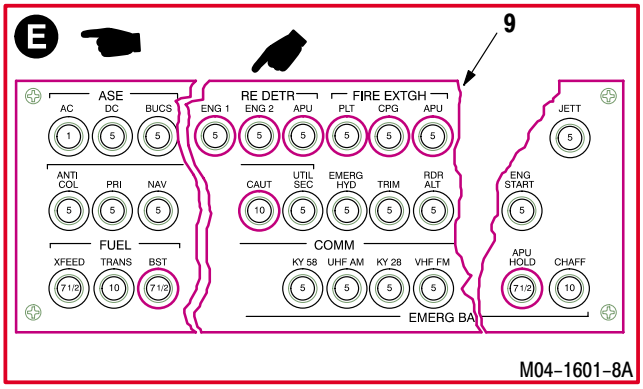
CAUTION

A qualified person shall be in pilot station to monitor instruments and fire warning system.

q. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**



r. **On pilot center circuit breaker panel (9), close FUEL BST, APU HOLD, LT CAUT, FIRE DETR ENG 1, FIRE DETR ENG 2, FIRE DETR APU, FIRE EXTGH PLT, FIRE EXTGH CPG, and FIRE EXTGH APU circuit breakers.**



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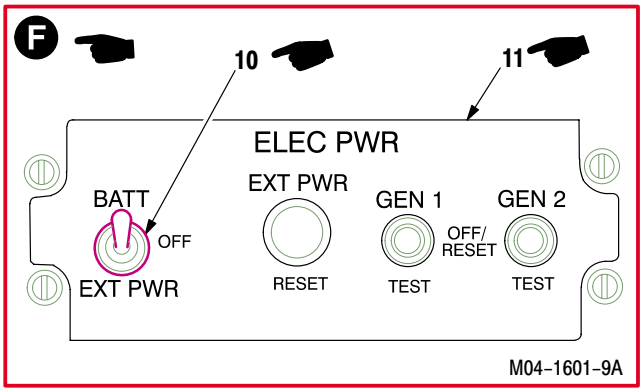
1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

CAUTION

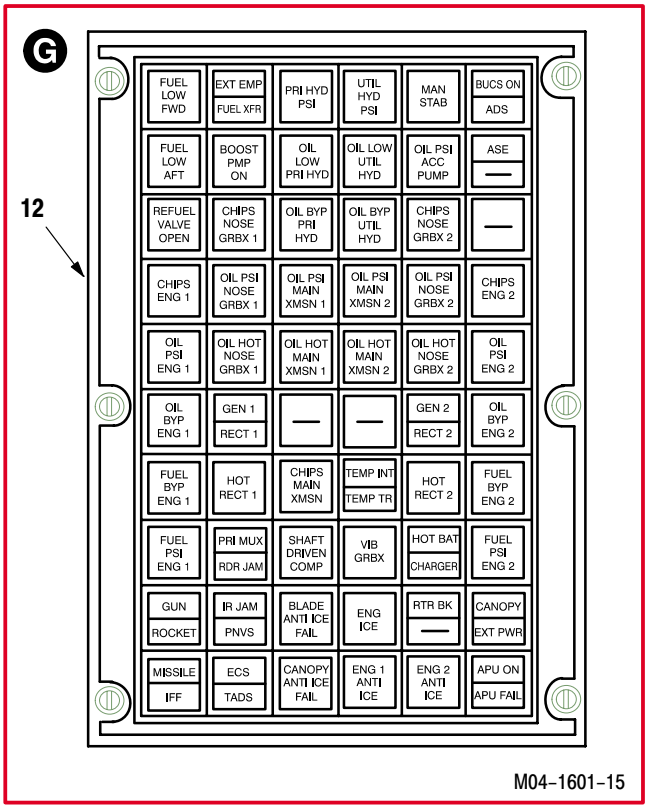
Ensure CPG and pilot engine fire pull handles, and pilot APU fire pull handle is pushed in. Failure to do so could result in accidental fire bottle discharge.

s. **Set BATT/EXT PWR switch (10) on pilot ELEC PWR panel (11) to BATT.**



t. **On the pilot caution/warning panel (12) check that the following segments illuminate:**

PRI HYD PSI	**UTIL HYD PSI**
MAN STAB	**OIL PSI ACC PUMP**
OIL PSI NOSE GRBX 1	**OIL PSI MAIN XMSN 1**
OIL PSI MAIN XMSN 2	**OIL PSI NOSE GRBX 2**
OIL PSI ENG 1	**OIL PSI ENG 2**
GEN 1/RECT 1	**GEN 2/RECT 2**
FUEL PSI ENG 1	**SHAFT DRIVEN COMP**
FUEL PSI ENG 2	**CANOPY (if open)**
ENG 1 ANTI–ICE	**ENG 2 ANTI ICE**



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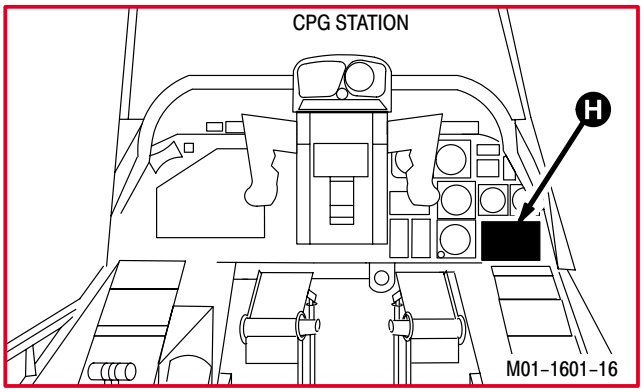
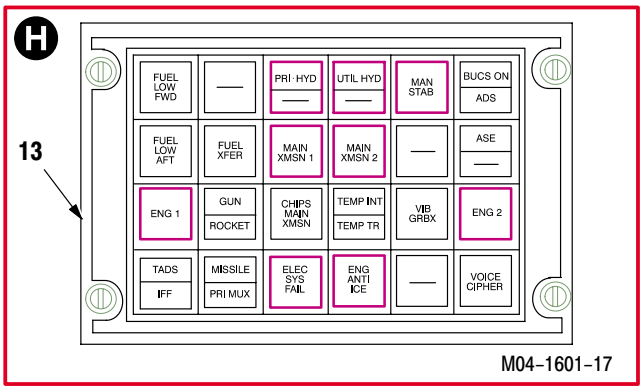
1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

u. **Enter CPG station** (para 1.56)**. Observe all safety precautions.**



v. **On the CPG caution/warning panel (13) check that the following segments illuminate:**

PRI-HYD	**UTIL HYD**
MAN STAB	**MAIN XMSN 1**
MAIN XMSN 2	**ENG 1**
ENG 2	**ELEC SYS FAIL**
ENG ANTI ICE	



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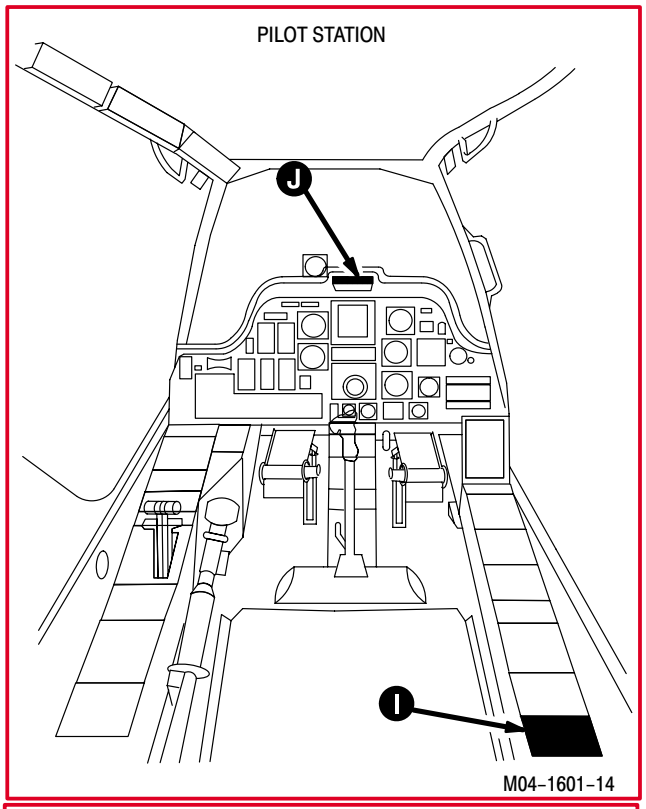
1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

CAUTION

Ensure fire bottle select switch **PRI/RES** is centered or fire bottle may discharge.



w. **Check APU fire detection system.**

(1) Set **FIRE TEST DET** switch (14) on APU fire test panel (15) to **1**.

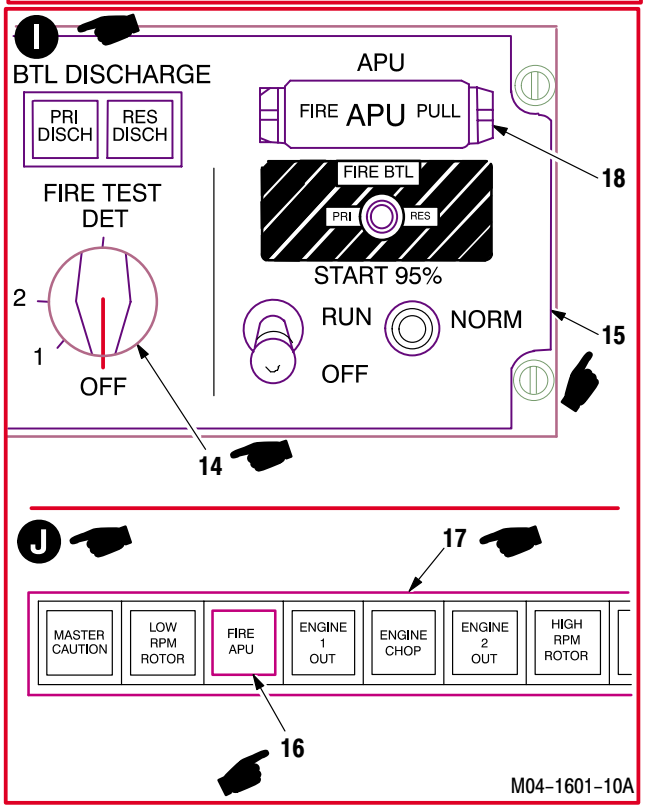
(2) Verify **FIRE APU** light (16) on master caution warning panel (17) is lighted.

(3) Verify **APU FIRE PULL** handle light (18) on APU fire test panel (15) is lighted.

(4) Set **FIRE TEST DET** switch (14) on APU fire test panel (15) to **2**.

(5) Verify **FIRE APU** light (16) and **APU FIRE PULL** light (18) are lighted.

(6) Set **FIRE TEST DET** switch (14) on APU fire test panel (15) to **OFF**.



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1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

WARNING

- **APU operation exceeds acceptable safe noise levels. Personnel working near or operating will wear approved ear protection to protect their hearing. Failure to comply could result in permanent hearing loss.**
- **To prevent accidental APU start, ensure that the APU circuit breaker in the AFT avionics bay and the APU HOLD circuit breaker on the pilot center circuit breaker panel are open when battery or external electrical power is attached to the helicopter and unqualified personnel are in and around the pilot crewstation.**
- **APU fires may go unnoticed by crew/operators in crewstations. Post a fire guard in continuous communication by the intercommunication system (ICS) with the crew/operators during APU run-up.**

CAUTION

- Do not attempt to use the **95 % NORM** switch when outside ambient air temperature is above –18° C (0° F). The viscosity of the hydraulic fluid and APU oil varies with surrounding climatic conditions of the region. If the **95% NORM** switch is used in warm climatic conditions, extreme mechanical stress is placed on the utility hydraulic accumulator shaft. Excessive wear loads are also placed on the power takeoff (PTO) clutch during sudden engagement which occurs during 95% norm operation, causing a decrease in the duty life of the dry friction clutch.
- If APU does not start, wait 30 seconds for combustion chamber to drain before attempting APU restart.

NOTE

APU RUN switch is spring loaded from **START** to **RUN**. Automatic starting will shut down if switch is operated improperly.

x. **Have assistant check vicinity of helicopter and warn personnel that APU is about to start. Wait for assistant to advise CLEAR FOR APU START through ICS.**

y. **Have assistant take position 10 feet to side of engine No. 2 exhaust with fire extinguisher.**

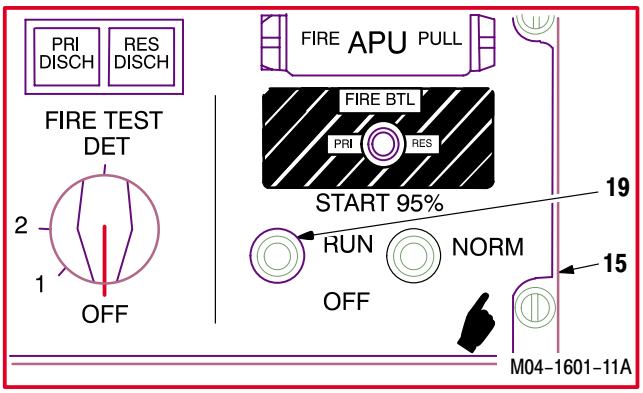
GO TO NEXT PAGE

1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

z. **Start APU.**

(1) On APU fire test panel (15), hold **RUN** switch (19) to **RUN** for 1 or 2 seconds, then to **START** for 1 or 2 seconds.

(2) Release switch (19).



NOTE

- APU is hydraulically started. If it does not start, hydraulic accumulator pressure may be too low.
- When the APU turbine rotor reaches 95% or greater of normal revolution per minute (rpm), the **APU ON** indicator on the pilot caution/warning panel lights.
- **APU FAIL** indicator on the caution/warning panel remains lit until APU oil pressure reaches normal operating pressure.

aa. **Verify APU ON indicator light (20) is lighted on pilot caution/warning panel (12).**

ab. **Turn on two generators.**

(1) Set **GEN 1** switch (21) to **TEST**.

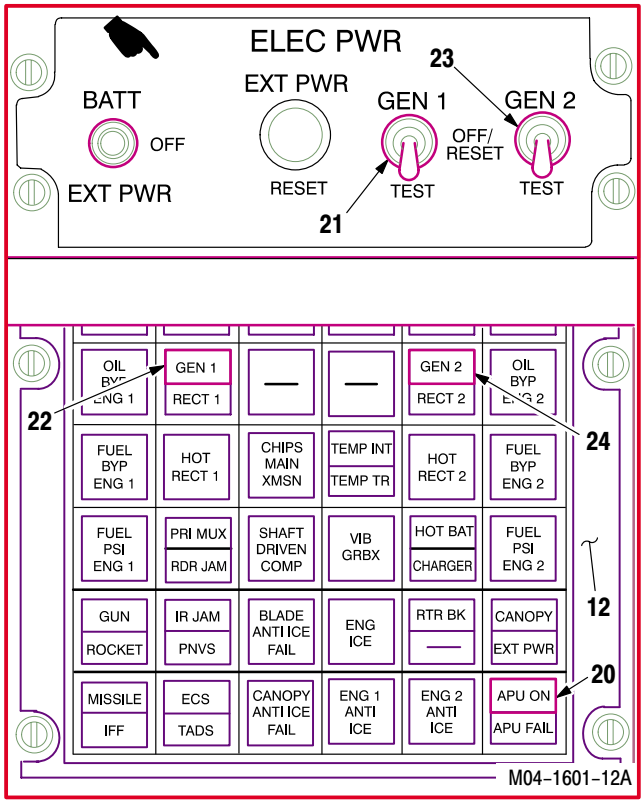
(2) Verify **GEN 1** light (22) on pilot caution/warning panel (18) is not lighted.

(3) Set **GEN 2** switch (23) to **TEST**.

(4) Verify **GEN 2** light (24) on pilot caution/warning light panel (12) is not lighted.

(5) Set switches (21) and (23) to **GEN 1** and **GEN 2**.

(6) Verify **GEN 1** light (22) and **GEN 2** light (24) are not lighted.



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1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

ac. **Verify switch positions on CPG FIRE CONTROL panel (25) and data entry keyboard (DEK) (26).**

(1) **MUX** switch (27) is set to **PRI**.

(2) **FCC/MUX** switch (28) is set to **ON**.

(3) **SYSTEM FC SYM GEN** switch (29) is set to **FC SYM GEN**.

(4) **SYSTEM TADS** switch (30) is set to **OFF**.

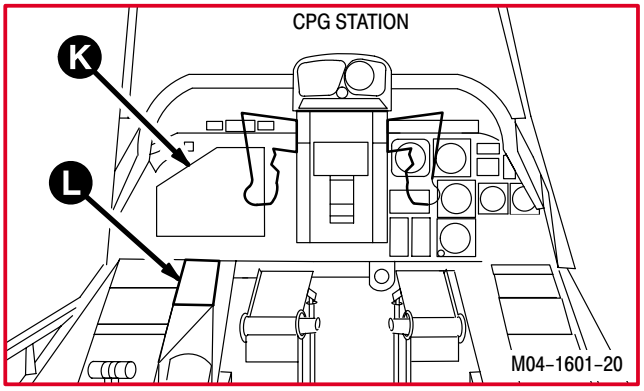
(5) **DATA ENTRY** switch is (31) set to **STBY** .

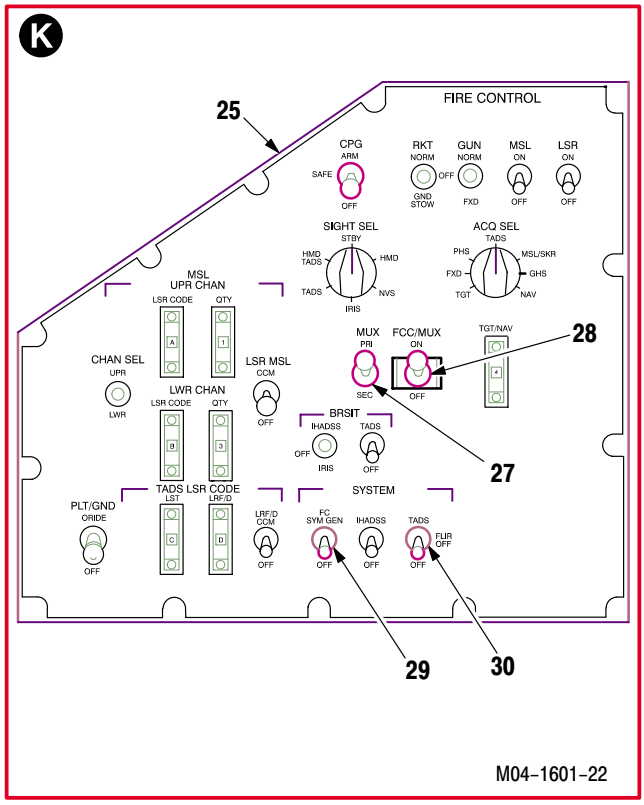
CAUTION

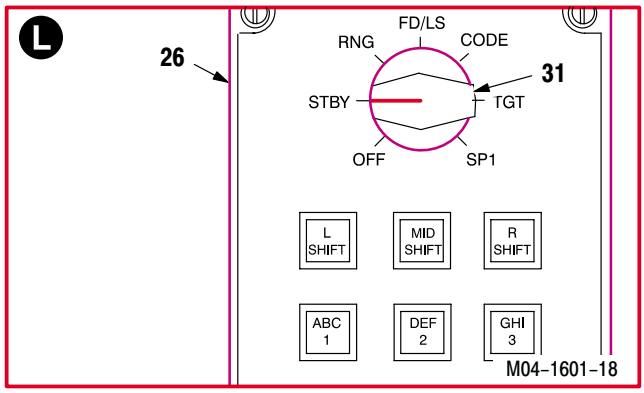
- If **XMSN 1** and **XMSN 2** temperature exceed 130°C (266°F), shut down APU. Allow the transmission fluid to cool for 30 minutes prior to resuming APU ground operations; or transmission fluid may be cooled by authorized personnel operating engine with turning rotor.
- Do not operate the APU for more than 5 minutes at a main transmission oil temperature of 120°C (248°F). Shut down APU to prevent damaging accessory gear box components.

NOTE

- The main transmission oil temperature and pressure can be viewed on the CPG heads out display (HOD) or any selected pilot/CPG crewstation video monitor.
- If ECS air temperature is very warm and cannot be adjusted with **TEMP** control, shutdown APU.







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1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

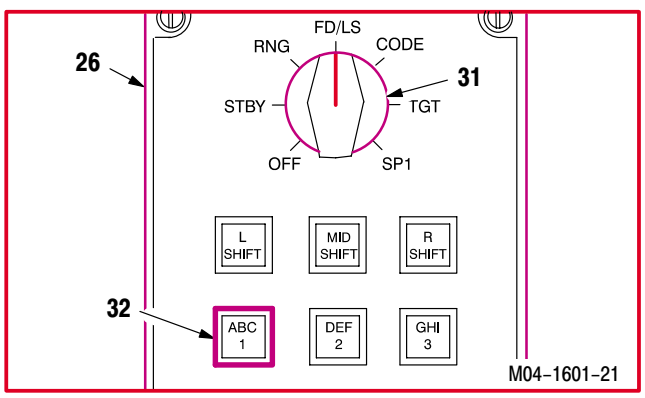
ad. **Monitor transmission oil temperature and pressure every 30 minutes** (or as required) **of APU operation.**

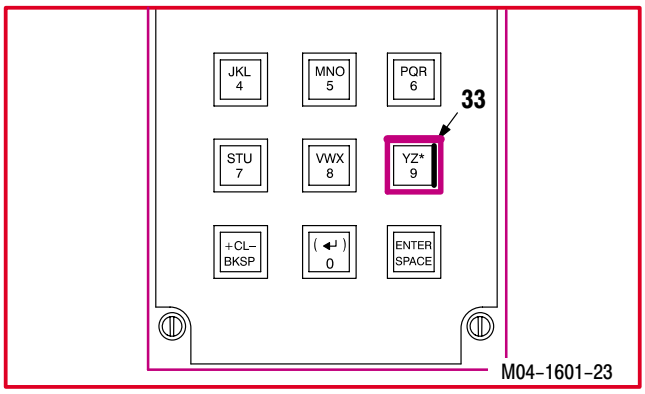
(1) Set **DATA ENTRY** switch (31) to **FD/LS**

(2) On DEK (26) press any key except **ENTER SPACE** or **SHIFT**.

(3) On DEK (26), press and release **ABC/1** (32) and **YZ*/9** (33) keys.

(4) To return to the maintenance FD/LS menu and abort the FD/LS transmission check, set **DATA ENTRY** switch (31) to **STBY** and repeat steps (1) and (2).





ae. **Perform maintenance task.**

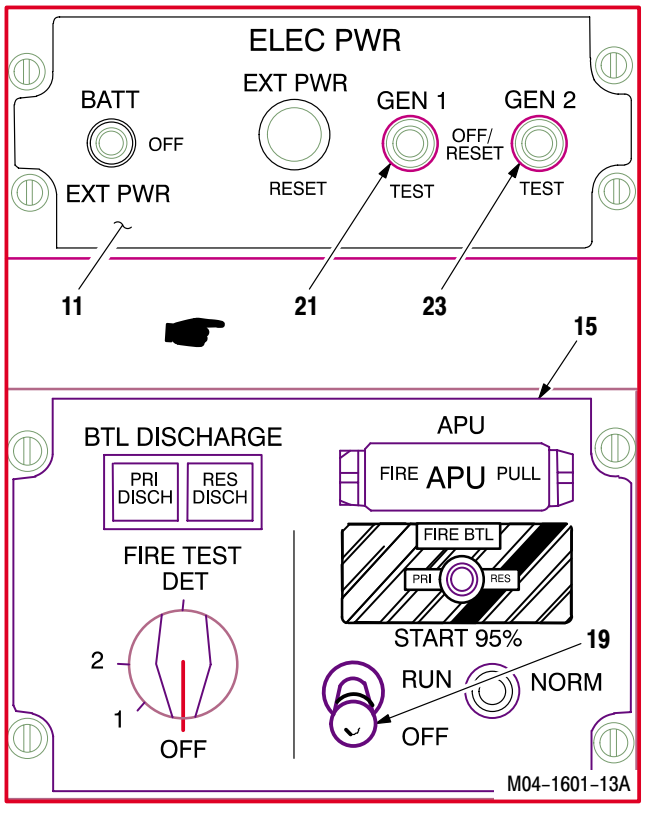
af. **Turn off two generators.**

(1) Set **GEN 1** switch (21) on **ELEC PWR** panel (11) to **OFF/RESET**.

(2) Set **GEN 2** switch (23) on **ELEC PWR** panel (11) to **OFF/RESET**.

CAUTION

The APU may be restarted after roll down (compressor comes to a complete stop). Wait 30 seconds for fuel to drain. The PTO clutch duty cycle allows two consecutive start attempts and then a 20 minute delay before the next start attempt. No more than three starts shall be allowed in a 1 hour period. Start attempts in which the clutch does not engage do not apply. Failure to comply could result in damage to the PTO clutch.



ag. **Turn off APU.**

(1) Set **RUN** switch (19) on APU fire test panel (15) to **OFF**.

NOTE

Allow APU to roll down before proceeding with the following procedures.

GO TO NEXT PAGE

1.74. APU OPERATING INSTRUCTIONS – USING BATTERY POWER – continued

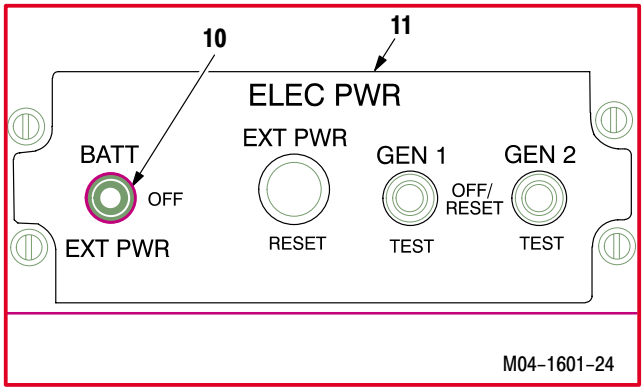
ah. **Set BATT/EXT PWR switch (10) on ELEC PWR panel (11) to OFF.**

ai. **Install PNVS window cover assembly** (TM 1-5855-265-20)**.**

aj. **Install TADS window cover assembly** (TM 1-1270-476-20)**.**

ak. **Disconnect battery** (para 9.40)**.**

al. **Disconnect and remove maintenance headset** (para 1.134)**.**



END OF TASK

1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER

1.76.1. Description

This task covers: Operating Instructions.

1.76.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

References:

TM 1-1270-476-20
TM 1-1520-238-T
TM 1-5855-265-20

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.134	Maintenance headset connected
TM 1-1520-238-T	Fuel system – visual check completed
1.73	External power – hydraulic (utility) applied

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

WARNING

APU will start with battery switch in OFF if battery is connected. Death or serious injury could result if APU starts. If injury occurs, seek medical aid.

CAUTION

Only certified personnel are authorized to operate the APU. Failure to comply could result in equipment damage.

1.76.3. Operating Instructions

a. **Verify correct main transmission oil level in right sight indicator** (para 1.32)**.**

b. **Verify correct primary hydraulic fluid level** (para 1.34)**.**

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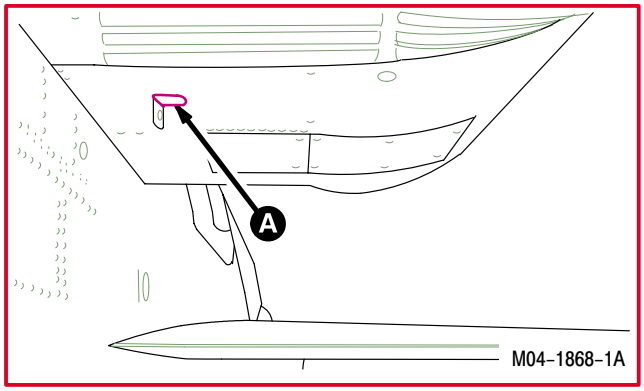
1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued

c. **Open access door RN5** (para 2.2)**.**

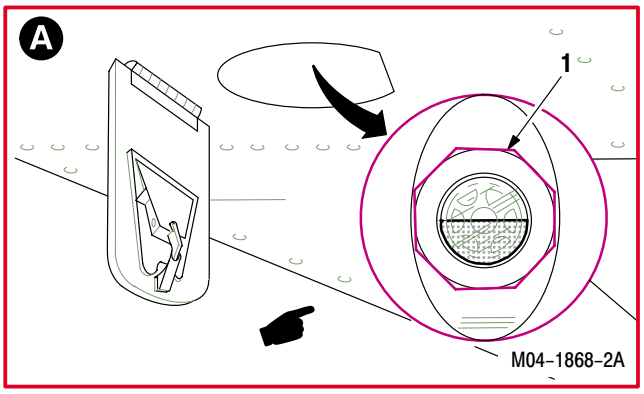


d. **Verify correct APU oil level.**

(1) Use access at bottom right nacelle.

(2) Indicator ball at gage (1) midpoint.

e. **Secure access door RN5** (para 2.2)**.**



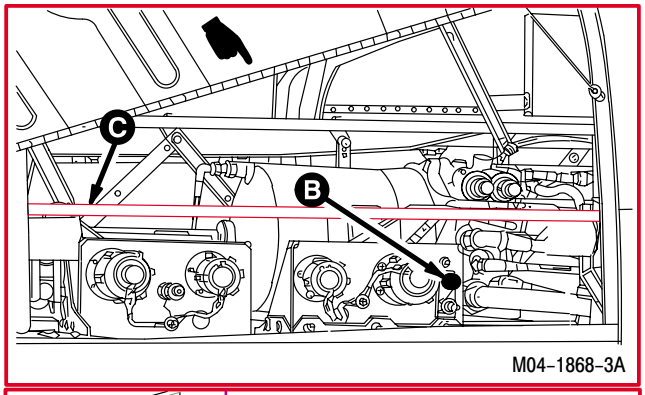
f. **Open access door R295** (para 2.2)**.**

g. **Close APU circuit breaker in aft avionics bay.**

h. **Secure access door R295** (para 2.2)**.**

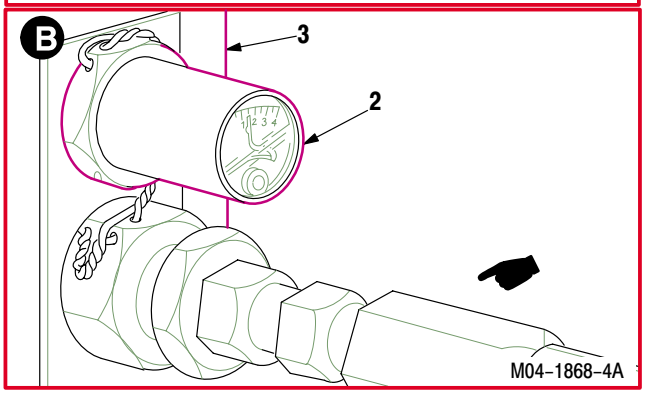
i. **Open access door R325** (para 2.2)**.**

j. **Verify correct utility hydraulic fluid level** (para 1.34)**.**



k. **Verify 3000 psi hydraulic pressure.**

(1) Check utility pressure gage (2) on utility service panel (3) indicates between 2600 and 3000 psi.



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1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued

CAUTION

Use of excessive force to actuate hydraulic hand pump could cause damage to helicopter components. If actuation of hand pump is stiff or 3000 psi cannot be accomplished, this may be an indication that the utility hydraulic accumulator requires nitrogen servicing (para 1.36).

(2) If pressure is below 2600 psi use hand pump to increase pressure to 3000 psi. If not, proceed to step l.

(a) Install pump handle (4) on bellcrank (5).

1 Remove retaining pin (6) and handle (4) from clip (7).

2 Slide handle (4) over bellcrank (5) and hand pump to 2600 to 3000 psi.

(b) Stow handle (4) in clip (7).

1 Install handle (4) in clip (7) and insert retaining pin (6).

CAUTION

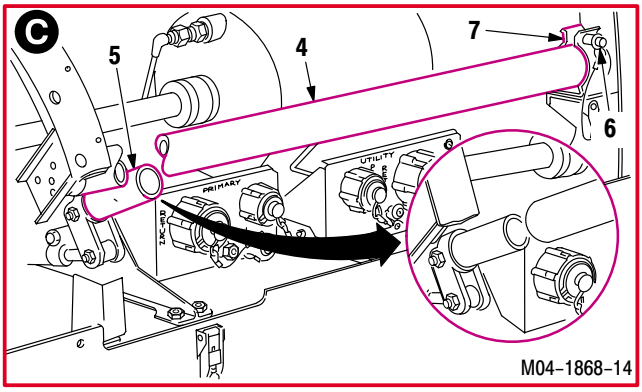
Ensure access door R325 is closed and secured before APU start up. Failure to comply could result in thermal damage to aircraft structure.

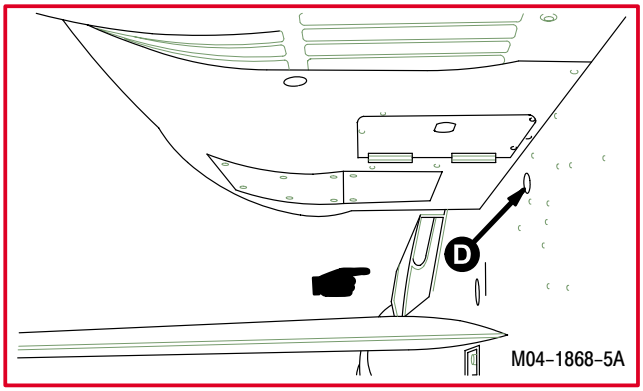
l. **Secure access door R325** (para 2.2)**.**

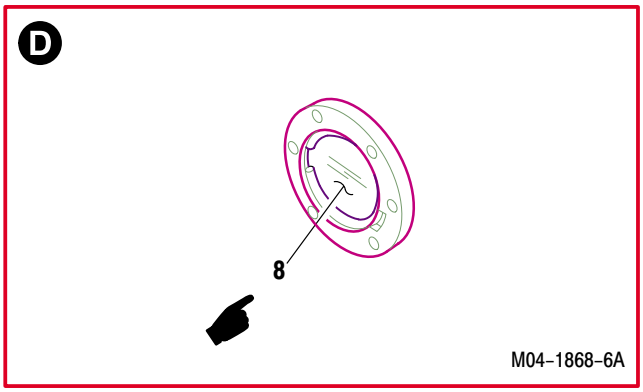
m. **Verify APU enclosure air inlet screen is clean of FOD** (para 15.42)**.**

n. **Verify fire extinguisher blowout indicator (8) is in place.**

(1) Check indicator (8) below left engine nacelle.







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1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued

o. **Verify correct main transmission oil level on left sight indicator** (para 1.32)**.**

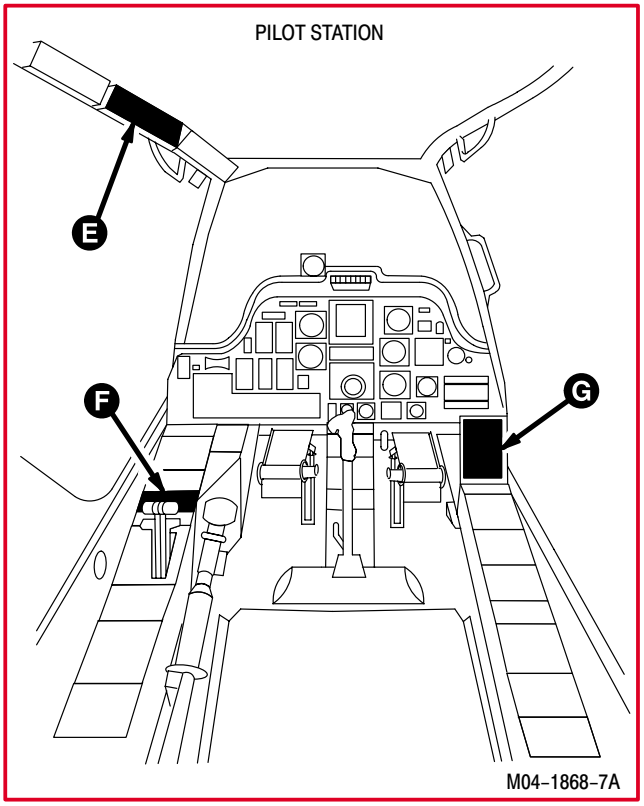
p. **Remove TADS window cover assembly** (TM 1-1270-476-20)**.**

q. **Remove PNVS window cover assembly** (TM 1-5855-265-20)**.**

CAUTION

A qualified person shall be in pilot station to monitor instruments and fire warning system.

r. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**

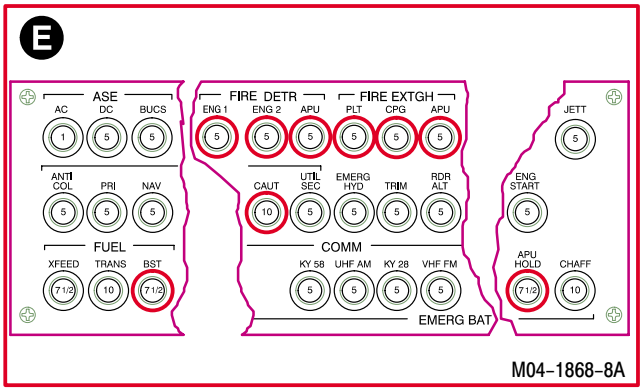


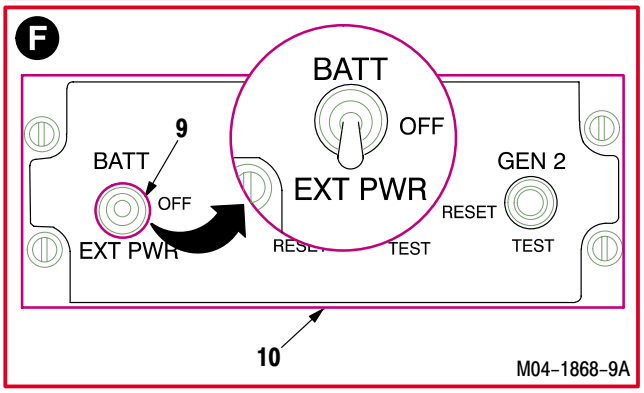
s. **On pilot center circuit breaker panel, close FUEL BST, APU HOLD, LT CAUT, FIRE DETR ENG 1, FIRE DETR ENG 2, FIRE DETR APU, FIRE EXTGH PLT, FIRE EXTGH CPG, and FIRE EXTGH APU circuit breakers.**

CAUTION

Ensure CPG and pilot engine fire pull handles and pilot APU fire handle is pushed in. Failure to do so could result in accidental fire bottle discharge.

t. **Set BATT/EXT PWR switch (9) on ELEC PWR control panel (10) to EXT PWR.**





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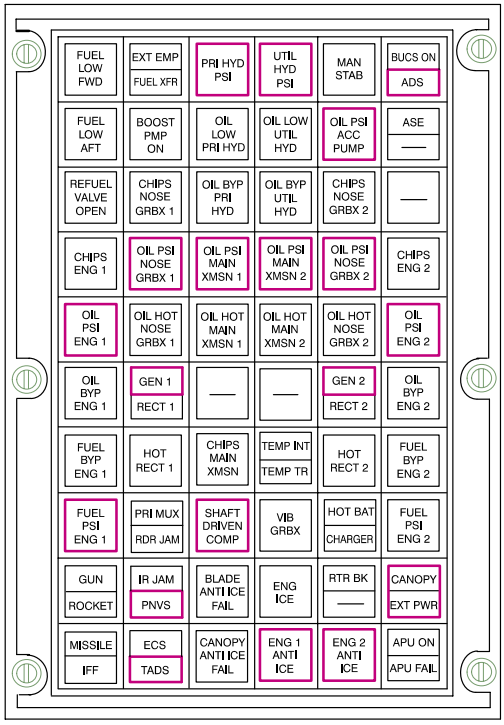
1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued

u. **On the pilot caution/warning panel check that the following segments illuminate:**

PRI HYD PSI	**UTIL HYD PSI**
ADS	**OIL PSI ACC PUMP**
OIL PSI NOSE GRBX 1	**OIL PSI MAIN XMSN 1**
OIL PSI MAIN XMSN 2	**OIL PSI NOSE GRBX 2**
OIL PSI ENG 1	**OIL PSI ENG 2**
GEN 1	**GEN 2**
FUEL PSI ENG 1	**SHAFT DRIVEN COMP**
PNVS	**CANOPY** (if open) **EXT PWR**
TADS	**ENG 1 ANTI-ICE**
ENG 2 ANTI-ICE	

G



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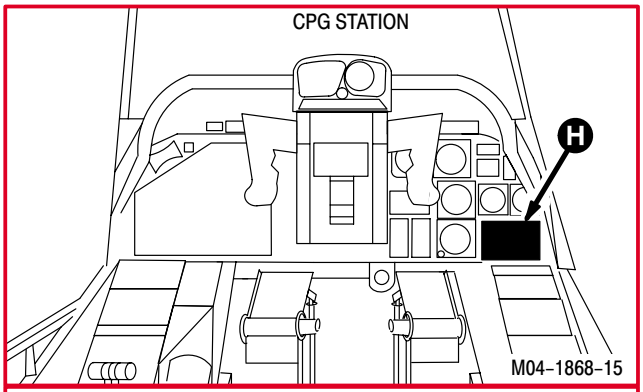
v. **Enter CPG station** (para 1.56)**. Observe all safety precautions.**



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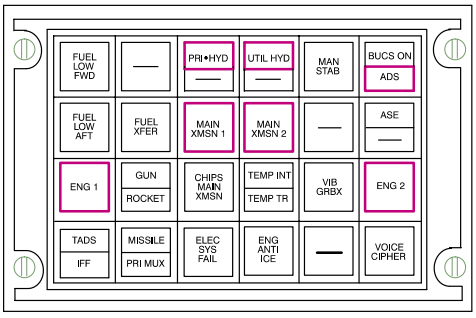
w. **On the CPG caution/warning panel check that the following segments illuminate:**

PRI HYD	**UTIL HYD**
MAIN XMSN 1	**MAIN XMSN 2**
ENG 1	**ENG 2**
ADS	

H



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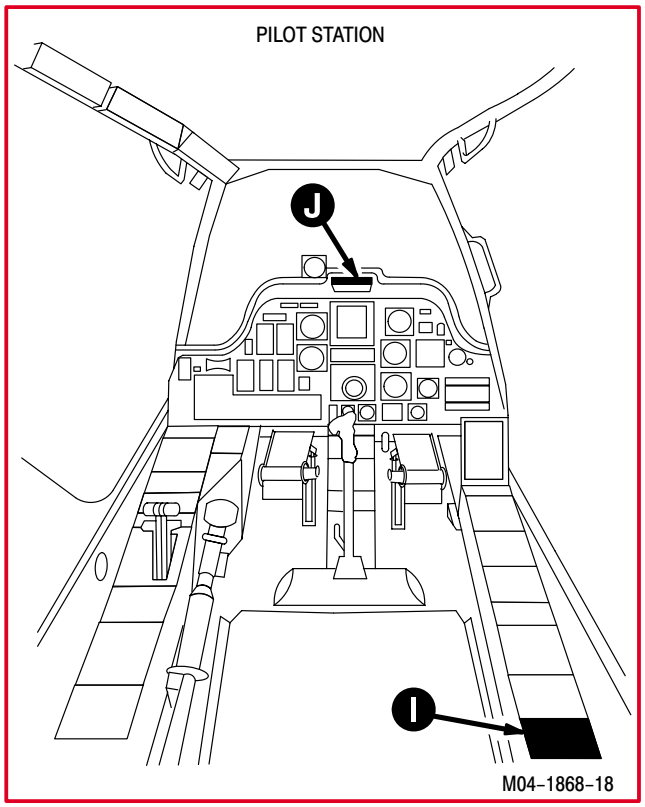
1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued



CAUTION

Ensure **FIRE BTL** select switch is centered between **PRI/RES** or fire bottle may discharge.

x. **Check APU fire detection system.**

(1) Set **FIRE TEST DET** switch (11) on APU fire test panel (12) to **1**.

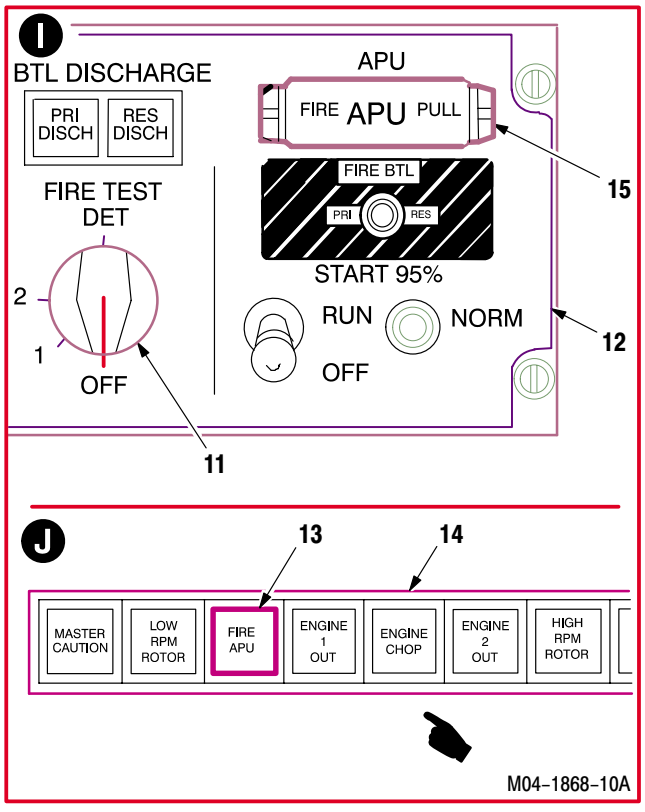
(2) Verify **FIRE APU** light (13) on pilot master caution panel (14) lights.

(3) Verify **APU FIRE PULL** handle light (15) on APU fire test panel (12) is lighted.

(4) Set **FIRE TEST DET** switch (11) on APU fire test panel (12) to **2**.

(5) Verify **FIRE APU** light (13) and **APU FIRE PULL** light (15) are lighted.

(6) Set **FIRE TEST DET** switch (11) on APU fire test panel (12) to **OFF**.



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1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued

WARNING

- **APU operation exceeds acceptable safe noise levels. Personnel working near or operating will wear approved ear protection to protect their hearing. Failure to comply could result in permanent hearing loss.**
- **To prevent accidental APU start, ensure that the APU circuit breaker in the AFT avionics bay and the APU HOLD circuit breaker on the pilot center circuit breaker panel are open when battery or external electrical power is attached to the helicopter and unqualified personnel are in and around the pilot crewstation.**
- **APU fires may go unnoticed by crew/operators in crewstations. Post a fire guard in continuous communication by the intercommunication system (ICS) with the crew/operators during APU run-up.**

CAUTION

- Do not attempt to use the **95% NORM** switch when outside ambient air temperature is above -18° C (0° F). The viscosity of the hydraulic fluid and APU oil varies with surrounding climatic conditions of the region. If the **95% NORM** switch is used in warm climatic conditions, extreme mechanical stress is placed on the utility hydraulic accumulator shaft. Excessive wear loads are also placed on the power takeoff (PTO) clutch during sudden engagement which occurs during 95% norm operation, causing a decrease in duty life of the dry friction clutch.
- If APU does not start, wait 30 seconds for combustion chamber to drain before attempting APU restart.

NOTE

APU RUN switch is spring loaded from **START** to **RUN**. Automatic starting will shut down if switch is operated improperly.

y. **Have assistant check vicinity of helicopter and warn personnel that APU is about to start. Wait for assistant to advise CLEAR FOR APU START through ICS.**

z. **Have assistant take position 10 feet to side of engine No. 2 exhaust with fire extinguisher.**

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1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued

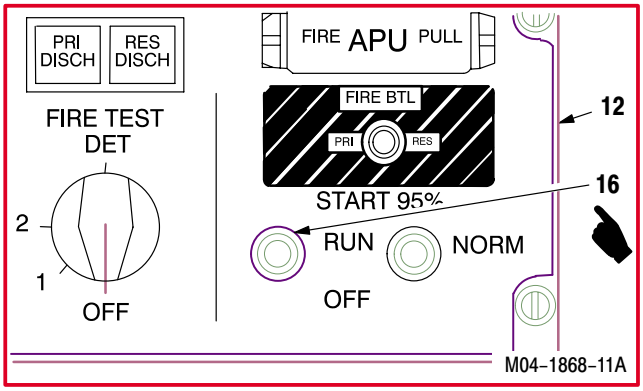
aa. **Start APU.**

(1) On APU fire test panel (12), hold **START/RUN** switch (16) to **RUN** for 1 or 2 seconds, then to **START** for 1 or 2 seconds.

(2) Release switch (16).

NOTE

- APU is hydraulically started. If it does not start, hydraulic accumulator pressure may be too low.
- When the APU turbine rotor reaches 95% or greater of normal revolutions per minute (rpm), the **APU ON** indicator on the pilot caution/warning panel lights.
- **APU FAIL** indicator on the caution/warning panel remains lighted until APU oil pressure reaches normal operating pressure.



ab. **Verify APU ON indicator light (17) is lighted on pilot caution/warning panel (18).**

ac. **Set BATT/EXT PWR switch (9) on ELEC PWR panel (10) to BATT.**

ad. **Turn on two generators.**

(1) Set **GEN 1** switch (19) to **TEST**.

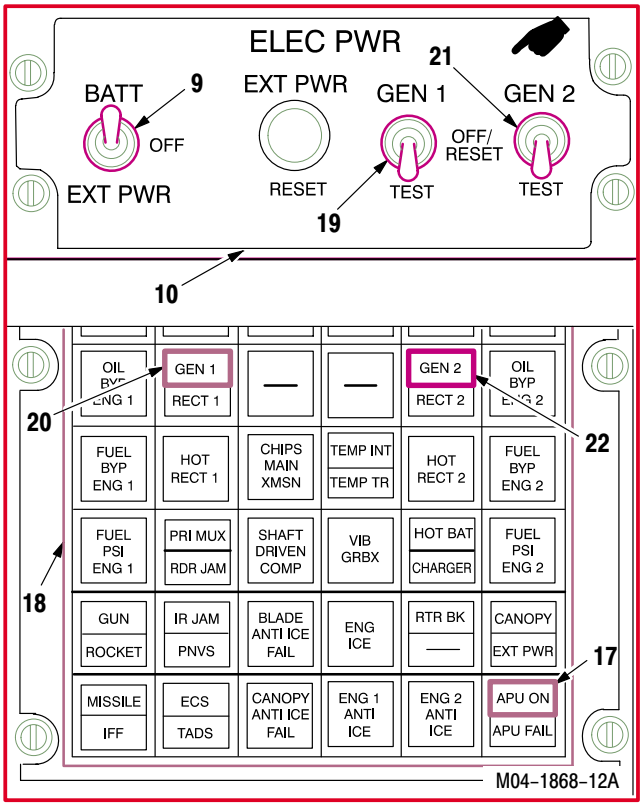
(2) Verify **GEN 1** light (20) on pilot caution/warning panel (18) is not lighted.

(3) Set **GEN 2** switch (21) to **TEST**.

(4) Verify **GEN 2** light (22) on pilot caution/warning panel (18) is not lighted.

(5) Set switches (19) and (21) to **GEN 1** and **GEN 2**.

(6) Verify **GEN 1** light (20) and **GEN 2** light (22) are not lighted.



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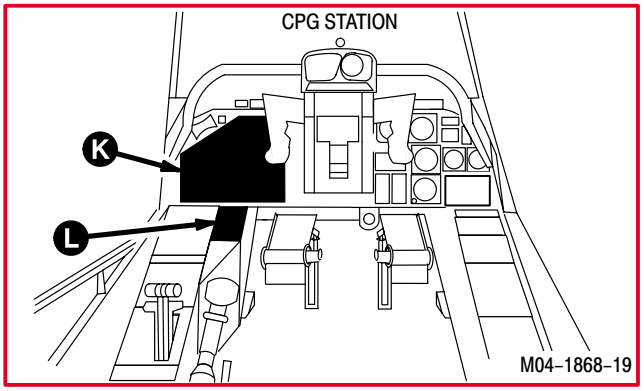
1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued



ae. **Verify switch positions on CPG FIRE CONTROL panel (23) and data entry keyboard (DEK) (24).**

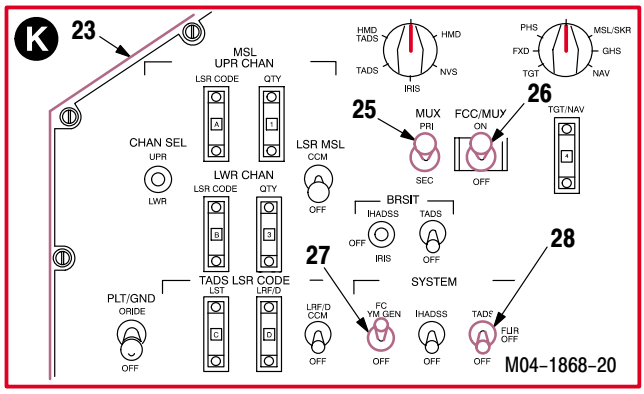
(1) **MUX** switch (25) is set to **PRI**.

(2) **FCC/MUX** switch (26) is set to **ON**.

(3) **SYSTEM FC SYM GEN** switch (27) is set to **FC SYM GEN**.

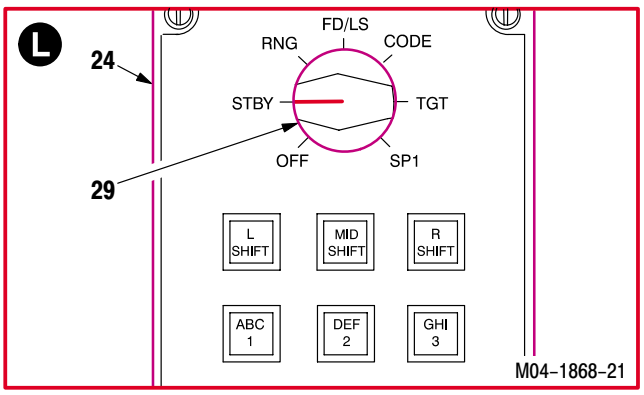
(4) **SYSTEM TADS** switch (28) is set to **OFF**.

(5) **DATA ENTRY** switch (29) is set to **STBY**.



CAUTION

- If **XMSN 1** and **XMSN 2** temperatures exceed 130° C (266° F), shut down APU. Allow the transmission fluid to cool for 30 minutes prior to resuming APU ground operations; or transmission fluid may be cooled by authorized personnel operating engine.
- Do not operate the APU for more than five minutes at a main transmission oil temperature of 120° C (248° F). Shut down APU to prevent damaging accessory gear box components.



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1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued

NOTE

- The main transmission oil temperature and pressure can be viewed on the CPG heads out display (HOD) or any selected pilot/CPG crew station video monitor.
- If ECS air temperature is very warm and cannot be adjusted with **TEMP** control, shutdown APU.

af. **Monitor transmission oil temperature and pressure every 30 minutes** (or as required) **of APU operation.**

(1) Set **DATA ENTRY** switch (29) to **FD/LS**.

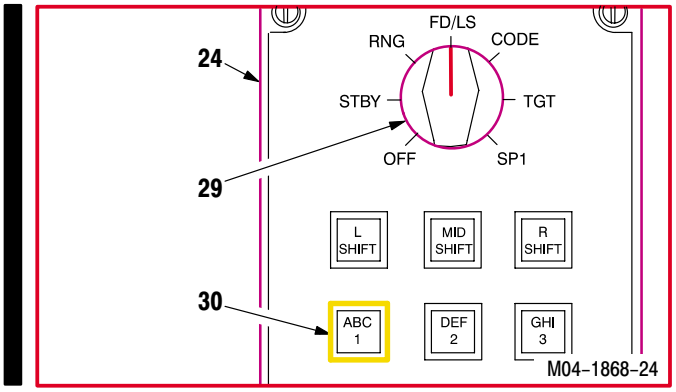
(2) On **DEK** (24) press any key except **ENTER SPACE** or **SHIFT**.

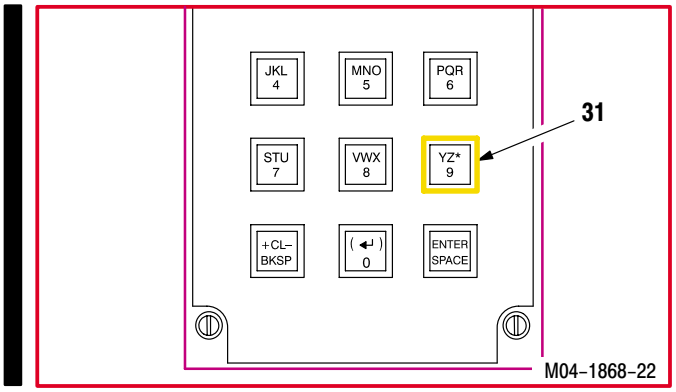
(3) On **DEK** (24) press and release **ABC/1** (30) and **YZ*/9** (31) keys.

(4) To return to the maintenance FD/LS menu and abort the FD/LS transmission check, set **DATA ENTRY** switch to **STBY** and repeat steps (1) and (2).

ag. **Remove external power – electrical** (para 1.70)**.**

ah. **Perform maintenance task.**





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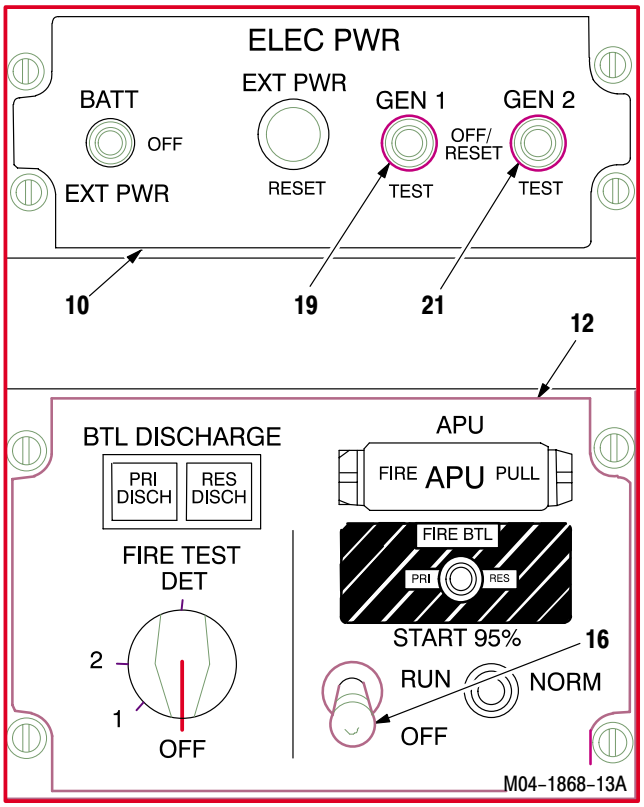
1.75. APU OPERATING INSTRUCTIONS – USING EXTERNAL POWER – continued

ai. **Turn off two generators.**

(1) Set **GEN 1** switch (19) on **ELEC PWR** panel (10) to **OFF/RESET**.

(2) Set **GEN 2** switch (21) on **ELEC PWR** panel (10) to **OFF/RESET**.



CAUTION

The APU may be restarted after roll down (compressor comes to a complete stop). Wait 30 seconds for fuel to drain. The PTO clutch duty cycle allows two consecutive start attempts and then a 20 minute delay before the next start attempt. No more than three starts shall be allowed in a one hour period. Start attempts in which the clutch does not engage do not apply. Failure to comply could result in damage to the PTO clutch.

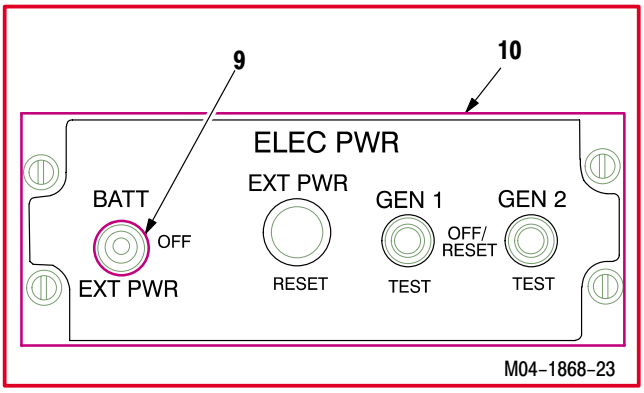
aj. **Turn off APU.**

(1) Set **RUN** switch (16) on panel (12) to **OFF**.

NOTE

Allow APU to roll down before proceeding with the following procedures.

ak. **Set BATT/EXT PWR switch (9) on ELEC PWR panel (10) to OFF.**



al. **Install PNVS window cover assembly** (TM 1-5855-265-20)**.**

am. **Install TADS window cover assembly** (TM 1-1270-476-20)**.**

an. **Remove external hydraulic power** (para 1.73)**.**

ao. **Disconnect and remove maintenance headset** (para 1.134)**.**

END OF TASK

1.76. MOORING – UNPAVED SURFACE

1.76.1. Description

This task covers: Mooring.

1.76.1. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft mooring tiedown kit (item 362, App H)
Tension adjuster assembly (item 26, App H)
Single leg chain assembly (item 62, App H)

Personnel Required:

67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors L115 and R115 opened
1.61	Brakes locked
1.59	Protective covering installed
1.106	Main rotor blades tiedown installed

1.76.1. Mooring

NOTE

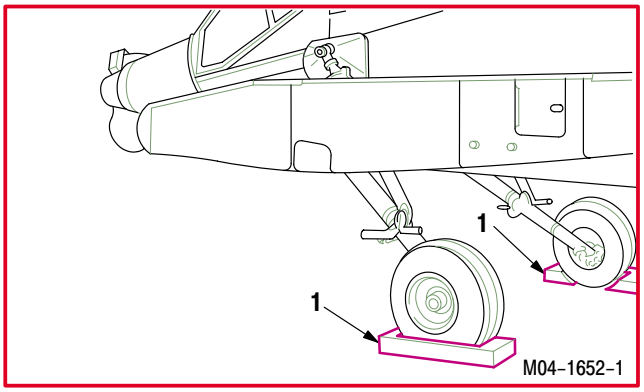
The mooring hardware is not considered flyaway equipment. All active mooring points shall be equipped with this hardware.

a. **Place wheel chocks (1) in place.**

b. **Remove six rope assemblies from mooring kit.**

NOTE

Mooring line should extend at a 45 degree angle from ground. Leave slack in mooring line to allow for expansion and contraction of mooring point.



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1.76. MOORING – UNPAVED SURFACE – continued

c. **Moor helicopter forward left side.**

(1) Attach mooring line (2) to ground mooring point (3).

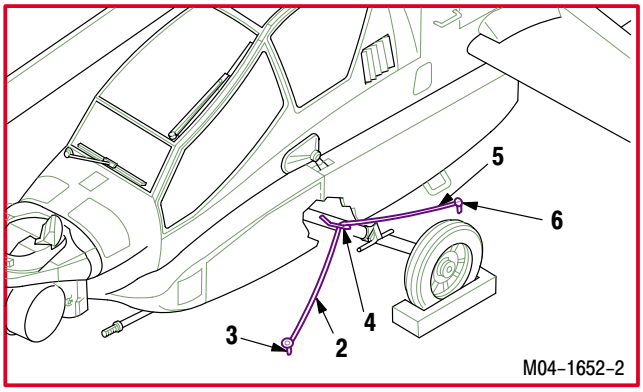
(2) Pass opposite end of mooring line (2) over the top of and through helicopter mooring point (4).

(3) Moor loose end to mooring point (4).

(4) Attach mooring line (5) to ground mooring point (6).

(5) Pass opposite end of mooring line (5) over the top of and through helicopter mooring point (4).

(6) Moor loose end to mooring point (4).



d. **Moor helicopter forward right side.**

(1) Attach mooring line (7) to ground mooring point (8).

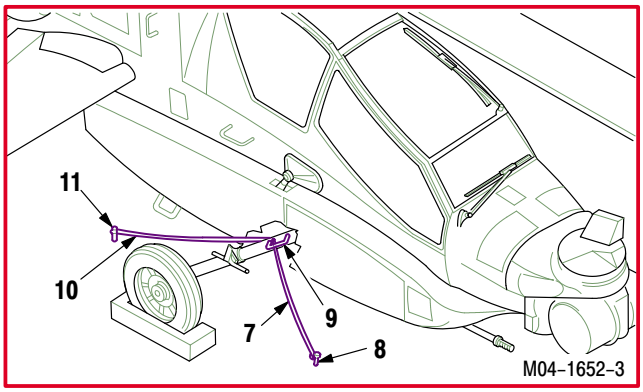
(2) Pass opposite end of mooring line (7) over the top of and through helicopter mooring point (9).

(3) Moor loose end to mooring point (9).

(4) Attach mooring line (10) to ground mooring point (11).

(5) Pass opposite end of mooring line (10) over the top of and through helicopter mooring point (9).

(6) Moor loose end to mooring point (9).



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1.76. MOORING – UNPAVED SURFACE – continued

e. **Moor helicopter right aft side.**

(1) Attach mooring line (12) to ground and mooring point (13).

(2) Pass opposite end of mooring line (12) through and around helicopter mooring point (14).

(3) Moor loose end to mooring point (14).

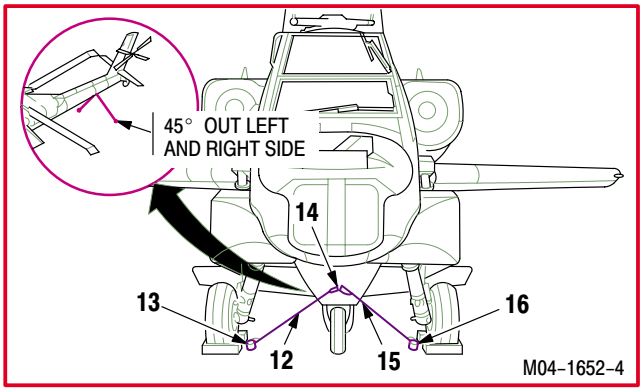
f. **Moor helicopter left aft side.**

(1) Attach mooring line (15) to ground mooring point (16).

(2) Pass opposite end of mooring line (15) through and around helicopter mooring point (14).

(3) Moor loose end to mooring point (13).

c. **Secure access doors L115 and R115** (para 2.2)**.**



END OF TASK

1.77. MOORING – PAVED SURFACE

1.77.1. Description

This task covers: Mooring.

1.77.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft mooring tiedown kit (item 362, App H)
Tension adjuster assembly (item 26, App H)
Single leg chain assembly (item 62, App H)

Personnel Required:

67R Attack Helicopter Repairer

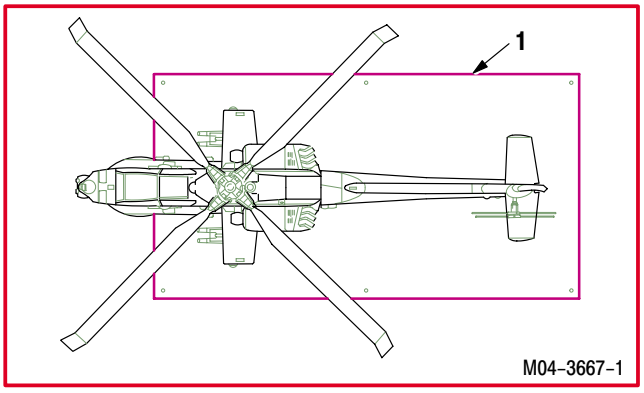
Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access doors L115 and R115 opened
1.61	Brakes locked
1.59	Protective covering installed
1.106	Main rotor blades tiedown installed

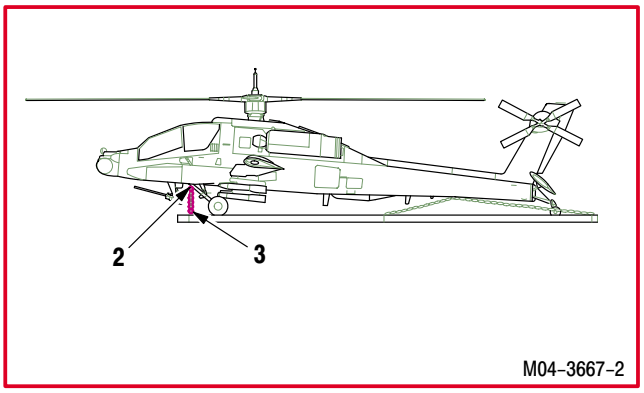
1.77.3. Mooring

a. **Position aircraft on mooring pad.**

(1) Position the aircraft on the mooring pad with the longitudinal centerline of the aircraft directly above and parallel to the longitudinal axis of the pad (1).



(2) Position the forward mooring rings (2), located on the main landing gear struts, directly in line laterally with the forward mooring points (3) on the pad (1).



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1.77. MOORING – PAVED SURFACE – continued

b. **Chain installation.**

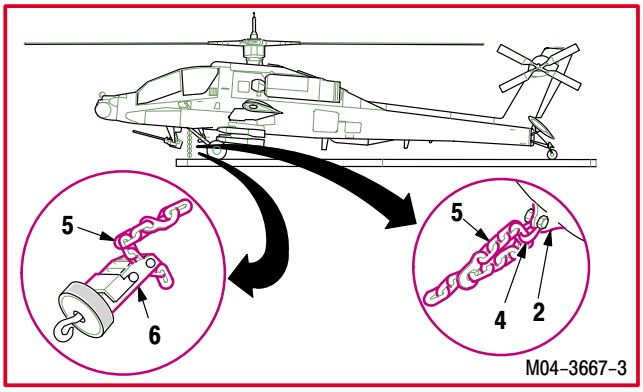
(1) Install the hooks (4) of the forward mooring chains (5) into the aircraft mooring rings (2).

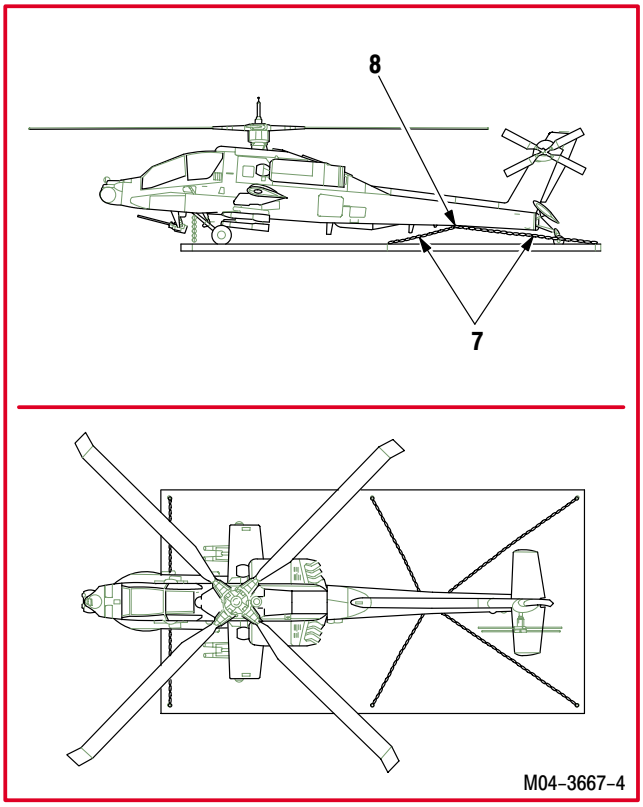
(2) Adjust the chains (5) with the chain adjuster (6). Mooring chains (5) and chain adjusters (6) are provided at each of the mooring points (3) on the mooring pad (1).

(3) Chains (5) should be adjusted to the point where slack has been removed.

(4) Repeat this procedure for the four aft mooring chains (7).

(5) All chains (7) will hook into the mooring ring (8) located on the lower surface of the tail-boom at F.S. 450.





END OF TASK

1.78. HELICOPTER TOWING

1.78.1. Description

This task covers: Helicopter Towing.

1.78.2. Initial Setup

Tools:

Aircraft towbar (item 395, App H)

Personnel Required:

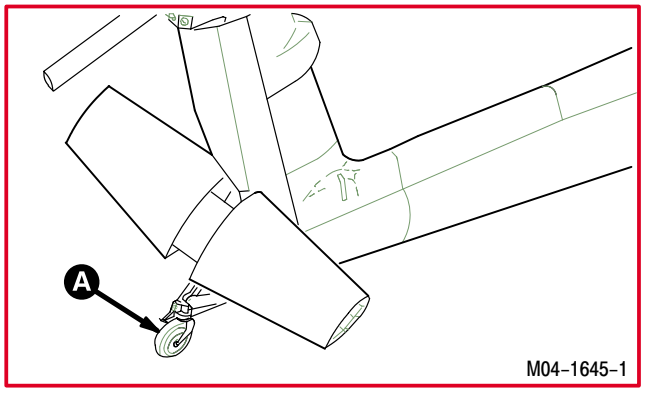
67R Attack Helicopter Repairer
Five persons to assist

References:

TM 1-1500-204-23

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed



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1.78. HELICOPTER TOWING – continued

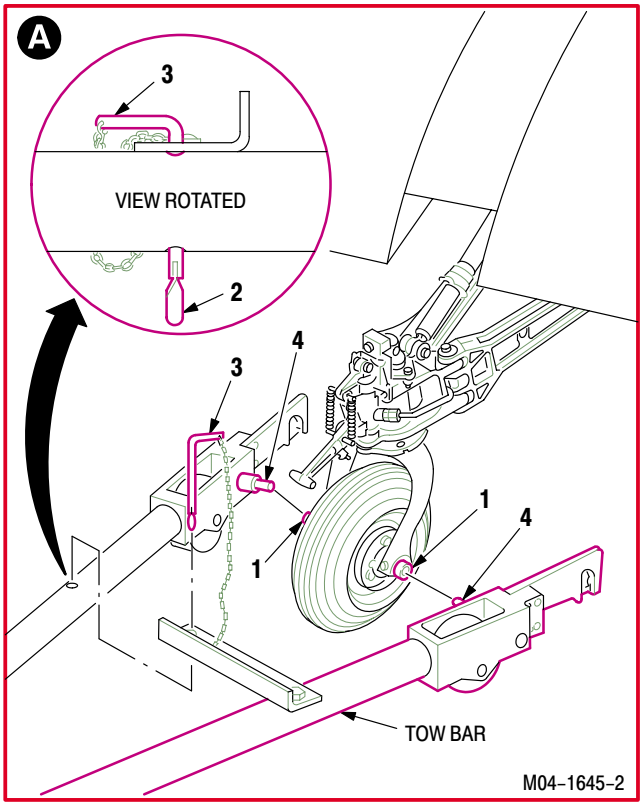
1.78.3. Helicopter Towing

a. **Connect towbar to tail wheel axle (1).**

(1) Aline release stop (2) with hole in towbar and pull release handle (3).

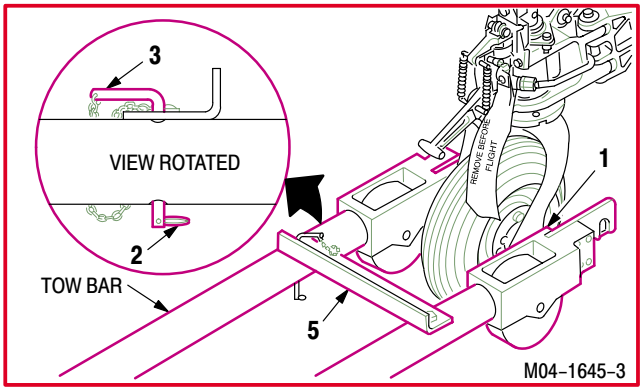
(2) Spread towbar and aline axle pins (4) with axle (1).

(3) Insert pins (4) in both ends of axle (1).



b. **Lock towbar to axle (1) by positioning locking plate (5) and inserting handle (3).**

c. **Lock release stop (2).**



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1.78. HELICOPTER TOWING – continued

d. **Unlock tail wheel actuator (6).**

(1) Push handle (7) down to release actuator locking pin (8).

(2) Visually check to make sure pin (8) is released.

(3) Install safety pin (9) in hole (10).

(4) Use towbar to slowly move tail wheel (11) laterally to ensure it moves freely.

e. **Connect towbar to tow vehicle.**

CAUTION

Stress panels must be installed before movement of aircraft. If stress panels are not installed, structural damage can occur.

NOTE

The helicopter has a turning radius of 38 feet, rotor diameter of 48 feet, and height of 15 feet, 3 inches.

f. **Tow helicopter to desired location** (TM 1-1500-204-23)**.**

g. **Disconnect towbar from tow vehicle.**

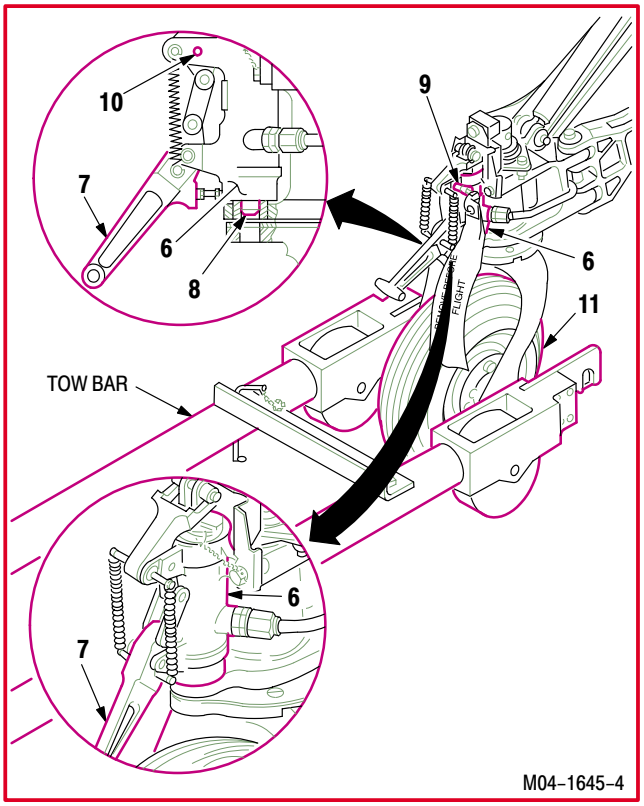
h. **Lock tail actuator (6).**

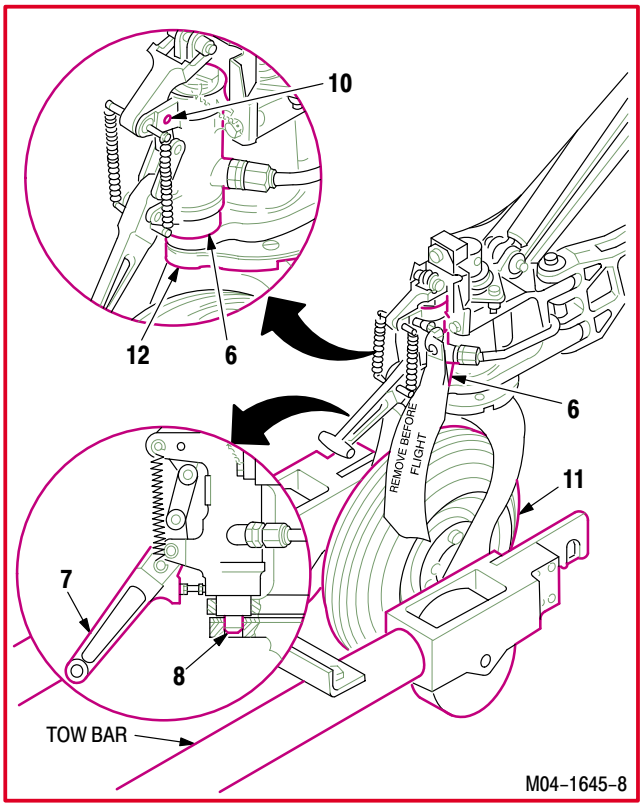
(1) Aline cam plate (12) with actuator (6) by alining tail wheel with helicopter centerline.

(2) Remove safety pin from hole (10).

(3) Pull handle (7) up. Set locking pin (8).

(4) Slowly move towbar from side to side to ensure pin (8) is seated.





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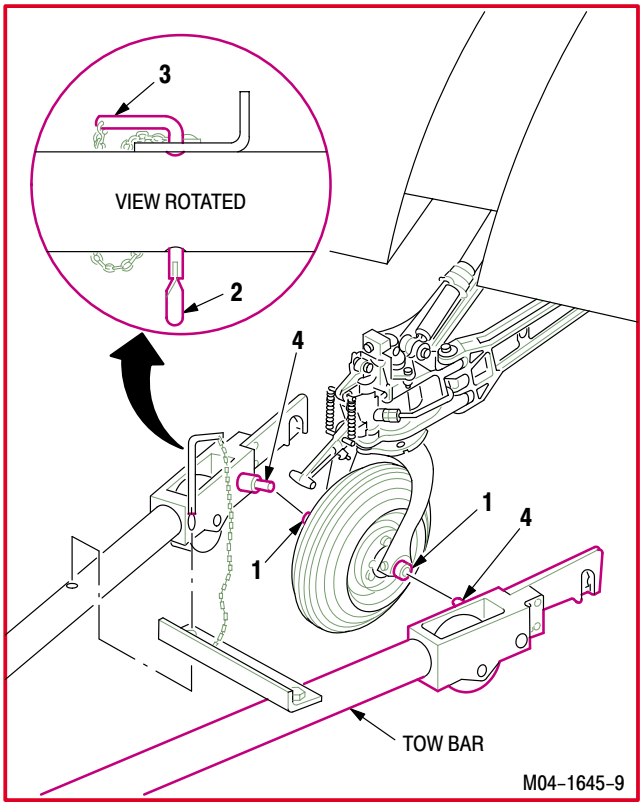
1.78. HELICOPTER TOWING – continued

i. **Remove towbar from helicopter.**

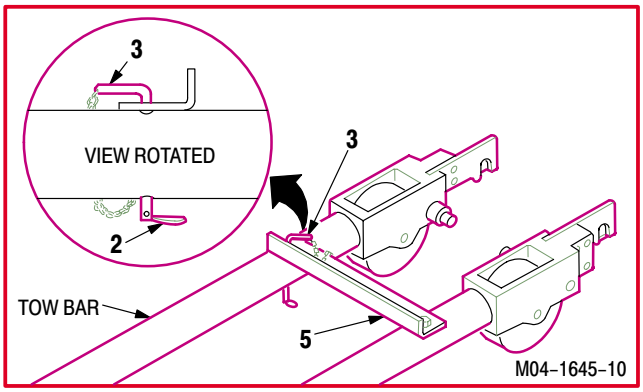
(1) Aline release stop (2) with hole in towbar. Pull release handle (3).

(2) Spread towbar to remove axle pins (4) from axle (1).



j. **Lock towbar by positioning locking plate (5) and inserting handle (3).**

(1) Lock release stop (2).



END OF TASK

1.79. AIR VEHICLE SLING INSTALLATION/REMOVAL

1.79.1. Description

This task covers: Installation. Removal.

1.79.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Air vehicle sling assembly (item 290, App H) (p/o item 194, App H)

Personnel Required:

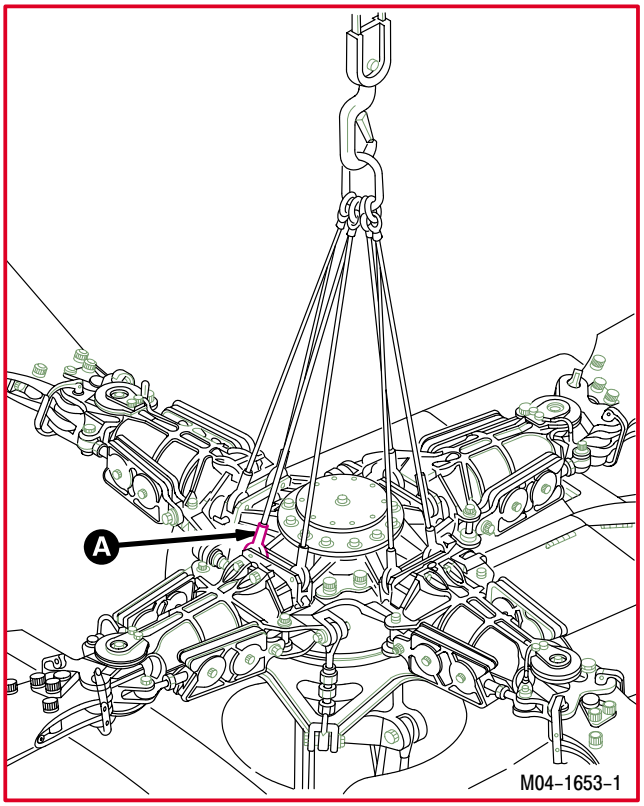
67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
6.90	Main rotor de-ice power distributor and air data system (ADS) removed

NOTE

This task is typical for all four sling mounting points.



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1.79. AIR VEHICLE SLING INSTALLATION/REMOVAL – continued

1.79.3. Installation

a. **Install air vehicle lifting sling (1) on main rotor head (2).**

(1) Aline holes in sling fitting (3) with hole in lifting lug (4).

(2) Install pin (5) in alined hole (typical four places).

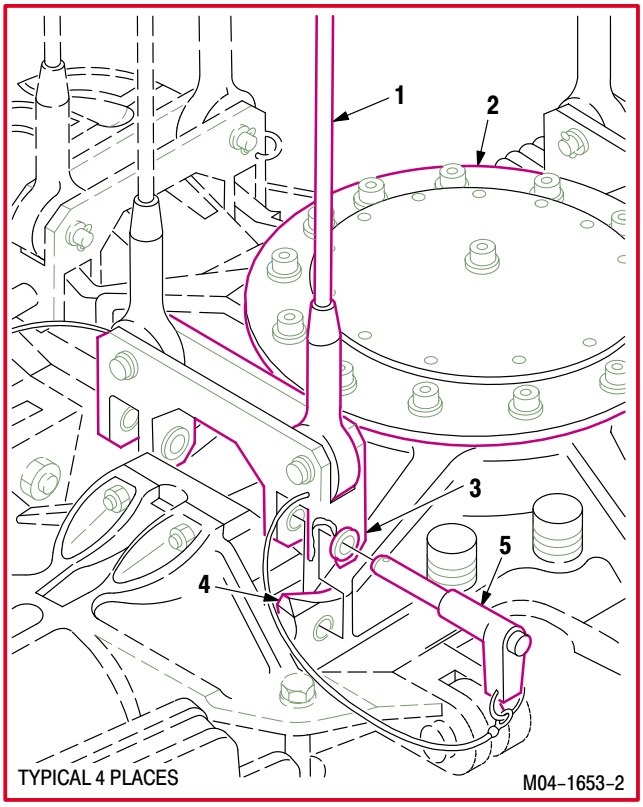
1.79.4. Removal

a. **Remove sling (1) from head (2).**

(1) Remove pin (5) from fitting (3) and lug (4) (typical four places).

(2) Remove sling (1) from head (2).

b. **Install main rotor de-ice power distributor and air data system (ADS)** (para 6.90)**.**



END OF TASK

1.80. HOISTING – MAINTENANCE CRANE

1.80.1. Description

This task covers:

1.81. Hoisting – Engine Removal
1.82. Hoisting – Engine Installation
1.83. Hoisting – Main Rotor Blade Removal
1.84. Hoisting – Main Rotor Blade Installation
1.85. Hoisting – Main Rotor Head Removal
1.86. Hoisting – Main Rotor Head Installation
1.87. Hoisting – Main Rotor Gearshaft Removal
1.88. Hoisting – Main Rotor Gearshaft Installation
1.89. Hoisting – Main Rotor Support (Static) Mast Removal
1.90. Hoisting – Main Rotor Support (Static) Mast Installation
1.91. Hoisting – Main Transmission Removal
1.92. Hoisting – Main Transmission Installation
1.93. Hoisting – Main Rotor Swashplate Removal
1.94. Hoisting – Main Rotor Swashplate Installation
1.95. Hoisting – APU Removal
1.96. Hoisting – APU Installation

1.80.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
Two persons to assist

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.97	Maintenance crane installed

NOTE

Pilot and CPG access doors must be closed for crane installation on right side.

GO TO CORRECT PARAGRAPH

1.81. HOISTING – ENGINE REMOVAL

1.81.1. Removal

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

a. **Install crane hook (1) on engine (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Aline arm (4) under main rotor blade positioned 90 degrees to helicopter.

(4) Aline hook (1) over lifting eye of sling (6). Ensure that lifting eye of sling is alined to hole 2.

(5) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

CAUTION

To prevent crossing of cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

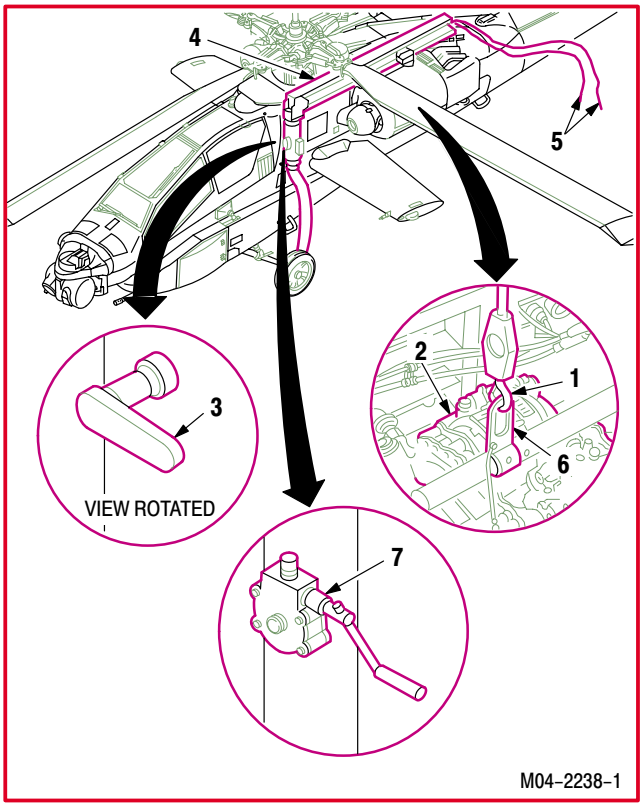
b. **Install hook (1) on engine (2).**

(1) Crank winch (7) to position hook (1) below lifting eye of sling (6).

(2) Snap hook (1) into lifting eye of sling (6).

(3) Crank winch (7) to remove cable slack.

(4) Tie two 10-foot tag lines to forward and aft ends of engine.



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1.81. HOISTING – ENGINE REMOVAL – continued

NOTE

Use tag lines to control engine position.

c. **Lift engine (2) from nacelle after disconnecting and demounting.**

(1) Crank winch (7) up until engine weight is off mounts.

(2) Perform engine removal (para 4.3).

(3) Crank winch (7) up to hoist engine (2) from nacelle.

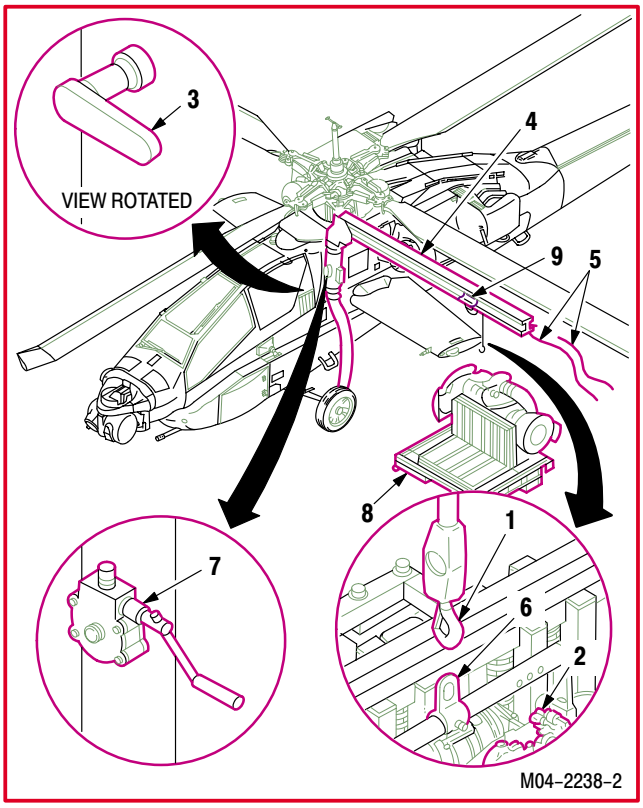
d. **Position engine handling adapter (8) in front of wing with empty side next to leading edge.**

e. **Position engine (2) over handling adapter (8).**

(1) Rotate handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use tag lines (5) to move boom arm (4). Turn arm (4) and rotor blade as needed to aline engine over adapter (8).

(3) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).



f. **Mount engine (2) on adapter (8).**

(1) Crank winch (7) down and slowly lower engine (2) on adapter (8).

(2) Crank winch (7) down to provide cable slack below lifting eye of sling (6).

(3) Unsnap hook (1) from lifting eye of sling (6).

g. **Retract hook (1).**

(1) Crank winch (7) to position hook (1) about 6 inches below boom sheave (9).

(2) Remove two 10-foot tag lines from forward and aft ends of engine.

END OF TASK

1.82. HOISTING – ENGINE INSTALLATION

1.82.1. Installation

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

a. **Position handling adapter (1) with engine parallel and next to wing leading edge.**

b. **Position crane hook (2) over installed engine sling.**

(1) Rotate crane handle (3) to the up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move crane boom arm (4).

(3) Turn arm (4) to aline hook (2) over lifting eye (6).

(4) Rotate handle (3) to down position to prevent lateral movement of crane boom arm (4).

CAUTION

To prevent crossing of cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

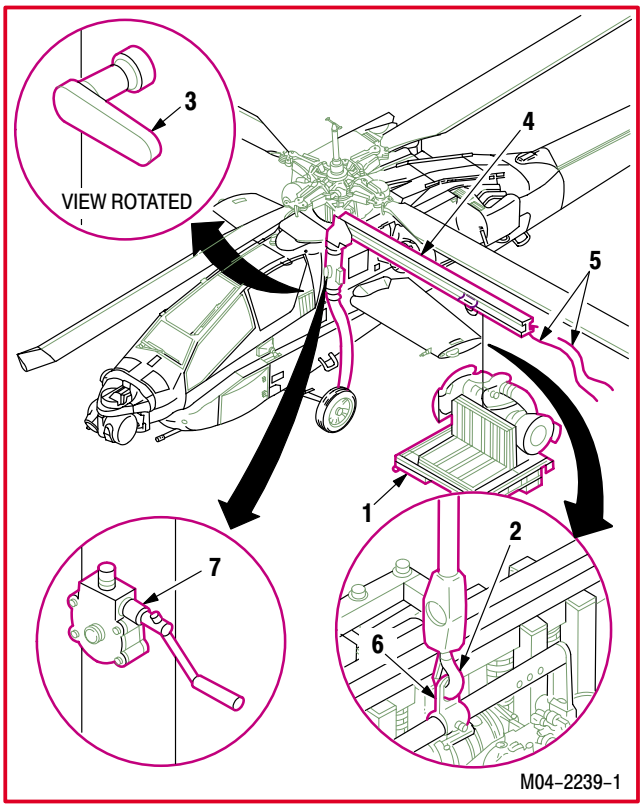
c. **Insert hook (2) into lifting eye (6).**

(1) Crank winch (7) to position hook (2) below lifting eye (6).

(2) Snap hook (2) into lifting eye (6).

(3) Crank winch (7) to remove cable slack.

(4) Tie two 10-foot tag lines to forward and aft ends of engine.



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1.82. HOISTING – ENGINE INSTALLATION – continued

NOTE

Use tag lines to control engine position.

d. **Lift engine from adapter (1).**

(1) Crank winch (7) up until engine weight is off mounts.

(2) Crank winch (7) up and hoist engine higher than top of nacelle.

e. **Position engine over nacelle.**

(1) Rotate handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use tag lines (5) to move crane boom arm (4). Turn crane boom arm (4) and main rotor blade as needed to position engine over nacelle.

(3) Rotate handle (3) to down position to prevent lateral movement of crane boom arm (4).

(4) Aline and hold engine forward and aft end positions.

f. **Lower engine into nacelle.**

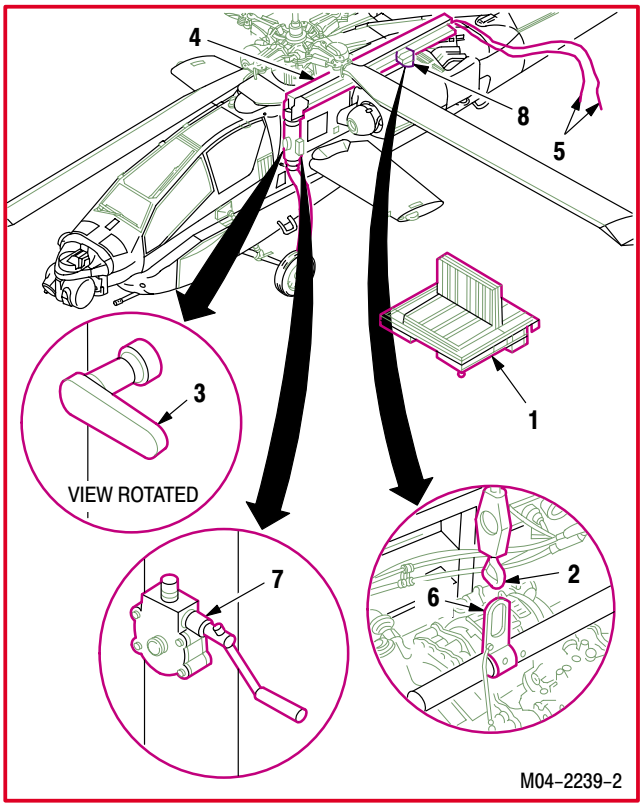
(1) Crank winch (7) down and slowly lower engine into nacelle.

(2) Mount engine in nacelle.

g. **Retract hook (2).**

(1) Unsnap crane hook (2) from lifting eye (6).

(2) Crank winch (7) to position hook (2) about 6 inches below boom sheave (8).



END OF TASK

1.83. HOISTING – MAIN ROTOR BLADE REMOVAL

1.83.1. Removal

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

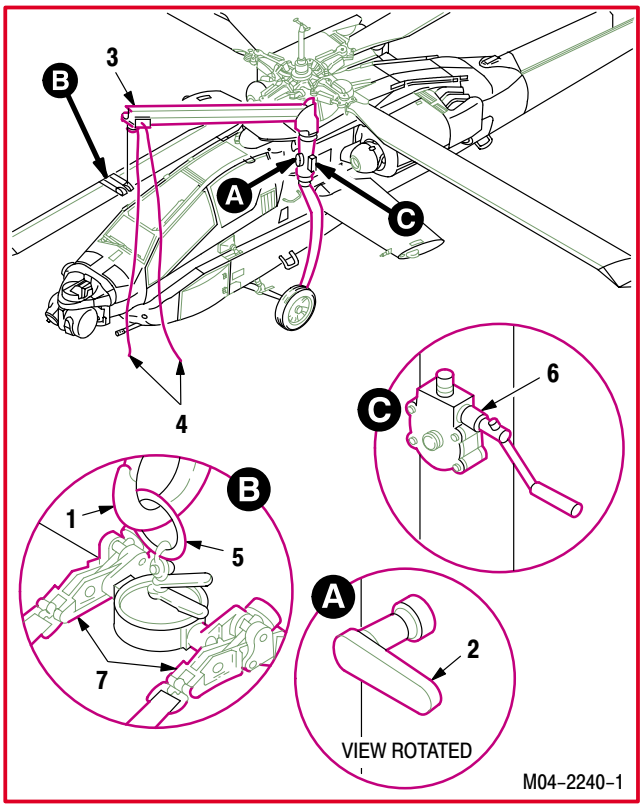
a. **Position crane hook (1) over installed blade sling.**

(1) Rotate crane handle (2) to up position to allow lateral movement of crane boom arm (3) (para 5.3).

(2) Use two tag lines (4) to move boom arm (3).

(3) Turn boom arm (3) to aline hook (1) over sling hoisting ring (5).

(4) Rotate handle (2) to down position to prevent lateral movement of boom arm (3).



WARNING

Lifting eye bolt on main rotor blade sling shall have no more than two visible threads above clamp handle prior to lifting blade. Failure to do so could result in hoisting injuries.

CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into hoisting ring (5).**

(1) Crank winch (6) to position hook (1) just above sling support frame (7).

(2) Snap hook (1) into ring (5).

(3) Crank winch (6) to remove cable slack.

GO TO NEXT PAGE

1.83. HOISTING – MAIN ROTOR BLADE REMOVAL – continued

NOTE

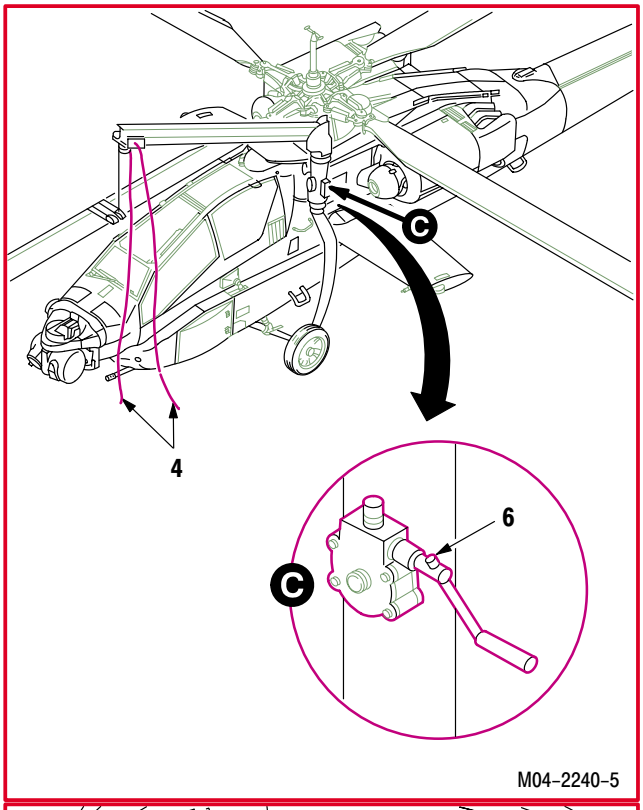
Use two tag lines and tiedown to control blade position.

c. **Install main rotor blade tiedown** (para 1.106)**.**

d. **Install tag lines to hub end of rotor blade.**

e. **Lift main rotor blade until weight is off main rotor head.**

(1) Crank winch (6) up to unload blade attaching pins.



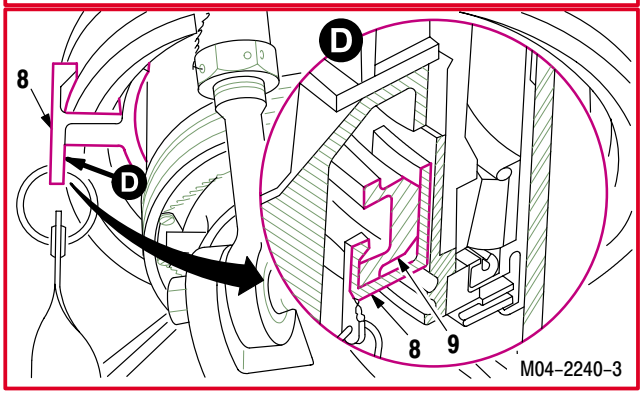
f. **Install droop stop wedges (8).**

(1) Equally space wedges (8) around droop stop ring (9).

(2) Push wedges (8) up until seated on ring (9).

WARNING

The main rotor blade could move after the pins are removed. A sudden blade movement could sever or crush your fingers or hand. Keep fingers and hands away from the lead lag link. If injury occurs, seek medical aid.

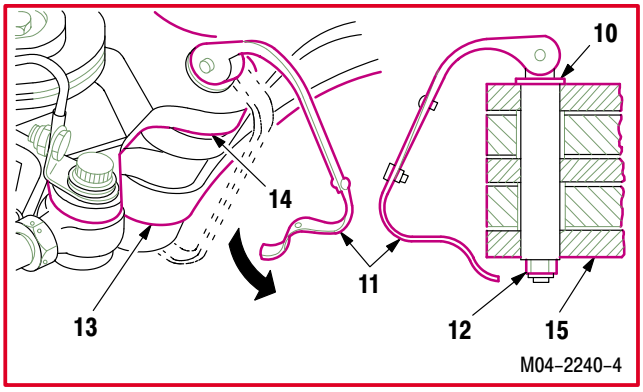


g. **Unlatch and remove attaching pins (10).**

(1) Push down on spring clip (11). Remove clip (11) from nut (12).

(2) Lift clip (11) to vertical.

(3) Move pin (10) up until it clears blade root (13) and lead lag link (14). Use crane to relieve tension on blade (15).



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1.83. HOISTING – MAIN ROTOR BLADE REMOVAL – continued

h. **Remove blade attaching pins (10).**

(1) Slide blade outward and hold clear of lead lag link.

(2) Crank winch (6) to position blade below main rotor head.

i. **Position blade over main rotor blade handling adapter (16).**

(1) Rotate handle (2) to up position.

(2) Use tag lines (4) to move crane boom arm (3).

(3) Turn arm (3) to aline blade over adapter (16).

(4) Rotate handle (2) to down position.

j. **Lower blade to handling adapter (16).**

(1) Crank winch (6) down and carefully lower blade on adapter (16).

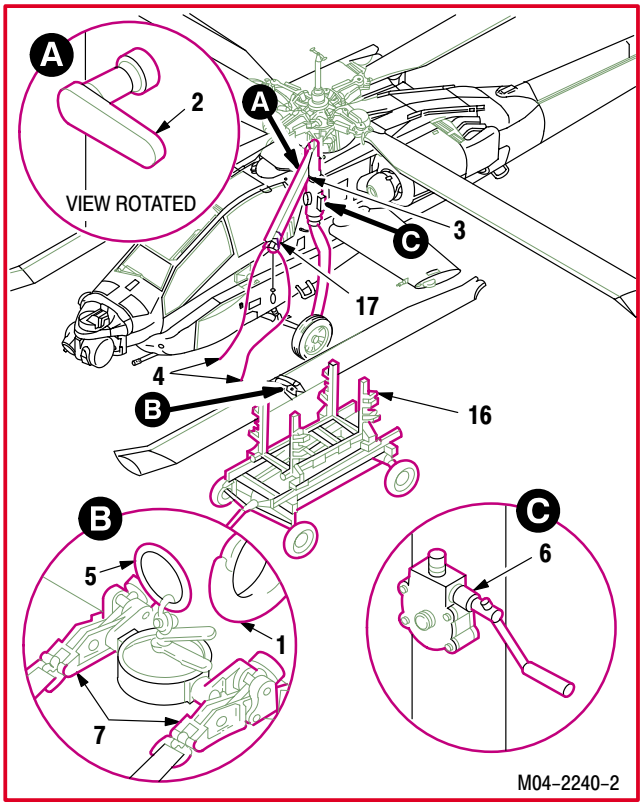
k. **Release tension on lifting cable.**

l. **Crank winch (6) to position hook (1) just above sling support frame (7).**

m. **Retract hook (1).**

(1) Unsnap hook (1) from ring (5).

(2) Crank winch (6) up to position hook (1) about 6 inches below boom sheaves (17).



END OF TASK

1.84. HOISTING – MAIN ROTOR BLADE INSTALLATION

1.84.1. Installation

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

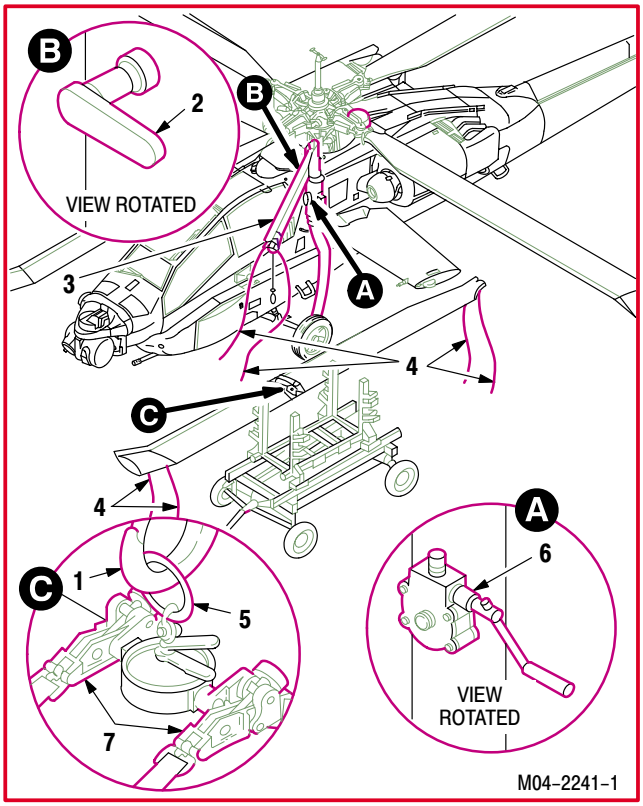
a. **Position crane hook (1) over installed blade sling.**

(1) Rotate crane handle (2) to up position to allow lateral movement of crane boom arm (3).

(2) Use two tag lines (4) to move boom arm (3).

(3) Turn boom arm (3) to aline hook (1) over sling hoisting ring (5).

(4) Rotate handle (2) to down position to prevent lateral movement of boom arm (3).



WARNING

Lifting eye bolt on main rotor blade sling shall have no more than two visible threads above clamp handle prior to lifting blade. Failure to do so could result in hoisting injuries.

CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into ring (5).**

(1) Crank winch (6) to position hook (1) just above sling support frame (7).

(2) Snap hook (1) into ring (5).

(3) Crank winch (6) to remove cable slack.

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1.84. HOISTING – MAIN ROTOR BLADE INSTALLATION – continued

NOTE

Use tag lines to control blade position.

c. **Tie 15-foot tag lines to inboard and outboard ends of blade.**

d. **Lift main rotor blade.**

(1) Crank winch (6) to hoist blade level with main rotor head (8).

e. **Position blade at main rotor head lead lag link (9).**

(1) Rotate handle (2) to up position to allow lateral movement of boom arm (3).

(2) Use two tag lines (4) to move crane boom arm (3). Turn boom arm (3) to aline blade root next to link (9).

(3) Rotate crane handle (2) to down position to prevent lateral movement of boom arm (3).

f. **Remove droop stop wedges.**

g. **Install blade attaching pins** (para 5.4)**.**

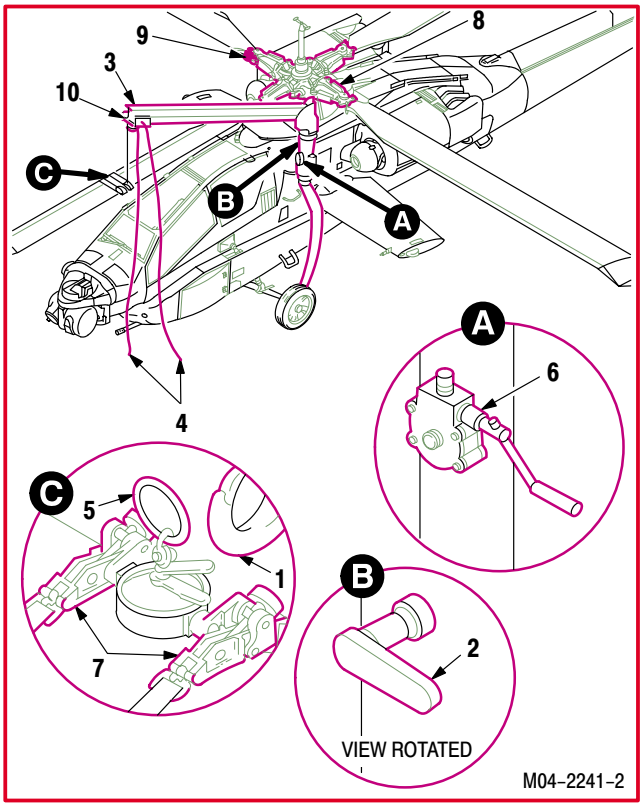
h. **Release tension on lifting cable (7).**

(1) Crank winch (6) to position hook (1) just above sling support frame (7).

i. **Retract hook (1).**

(1) Unsnap hook (1) from ring (5).

(2) Crank winch (6) to position hook (1) about 6 inches below boom sheave (10).



END OF TASK

1.85. HOISTING – MAIN ROTOR HEAD REMOVAL

1.85.1. Removal

WARNING

- **Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.**
- **Failure to install bearing retainer prior to hoisting operation may result in main rotor component damage or personnel injury. If injury occurs, seek medical aid.**

a. **Install rotor head puller/sling (1) on rotor head (2).**

(1) Position puller/sling (1) on top of head (2).

(2) Aline nutplates (3) with bolt holes in head (2).

(3) Install two captive bolts (4) through head (2) into nutplates (3).

(4) Tighten two captive bolts (4).

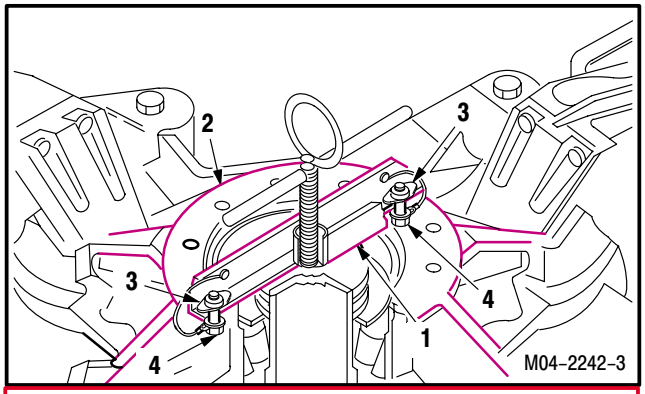
b. **Position crane hook (5) over installed puller/sling (1).**

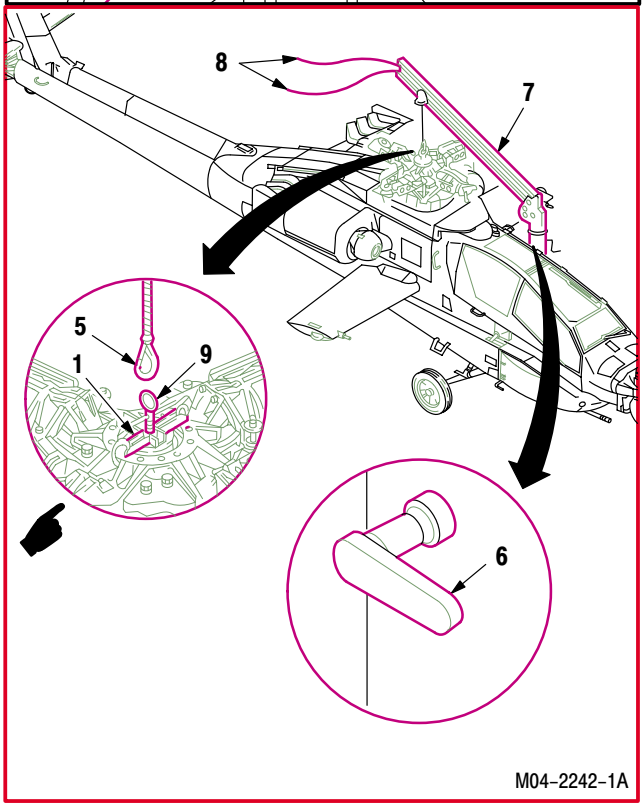
(1) Rotate crane handle (6) to up position to allow lateral movement of crane boom arm (7).

(2) Use two tag lines (8) to move boom arm (7).

(3) Turn boom arm (7) to aline hook (5) over puller/sling (1) lifting eye (9).

(4) Rotate handle (6) to down position to allow prevent movement of boom arm (7).





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1.85. HOISTING – MAIN ROTOR HEAD REMOVAL – continued

c. **Install bearing retainer (10) on head (2).**

(1) Install retainer (10) in bottom groove of head (2).

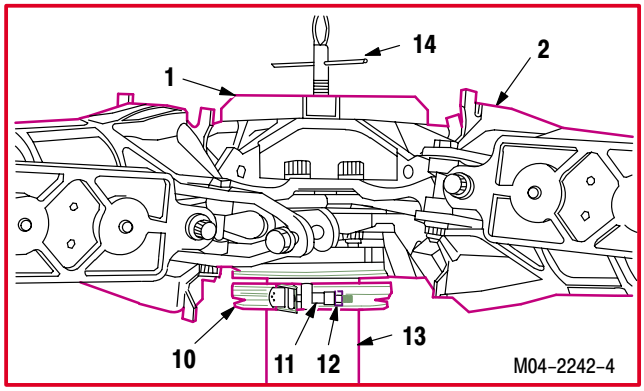
(2) Close retainer (10). Engage quick coupler (11).

(3) Tighten nut (12).

d. **Break head (2) loose from mast (13).**

(1) Turn jack handle (14) of puller/sling (1) clockwise until jack plate contacts mast (13).

(2) Continue to turn handle (14) until head (2) is loose from mast (13).



CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

e. **Insert hook (5) into lifting eye (9).**

(1) Crank winch (15) to position hook (5) below lifting eye (9).

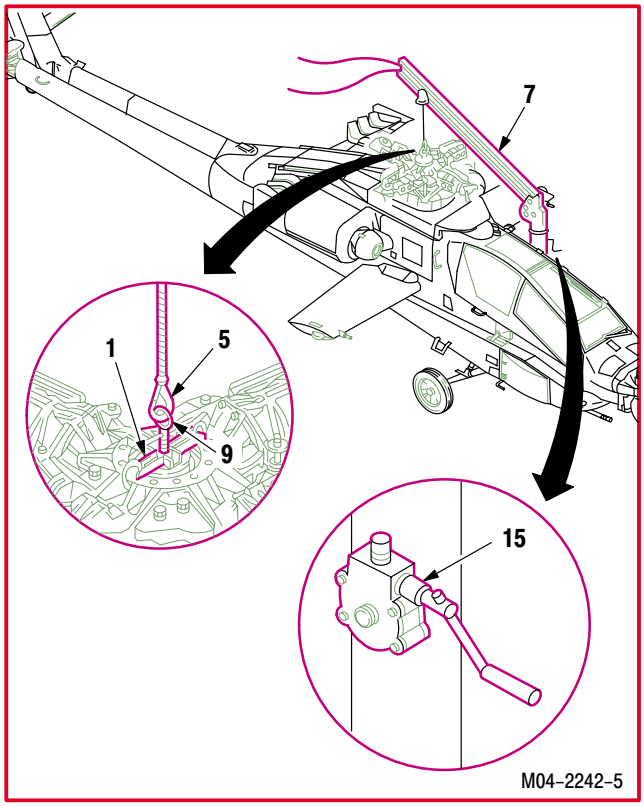
(2) Snap hook (5) into lifting eye (9).

(3) Crank winch (15) to remove cable slack.

NOTE

Use two tag lines to control rotor head position.

f. **Tie two 15-foot lines to opposite ends of rotor head.**



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1.85. HOISTING – MAIN ROTOR HEAD REMOVAL – continued

CAUTION

Plan to provide clearance during crane operation.

g. **Crank winch (15) up and hoist head (2) above static mast (16).**

h. **Position head (2) over main rotor head mount fixture (17).**

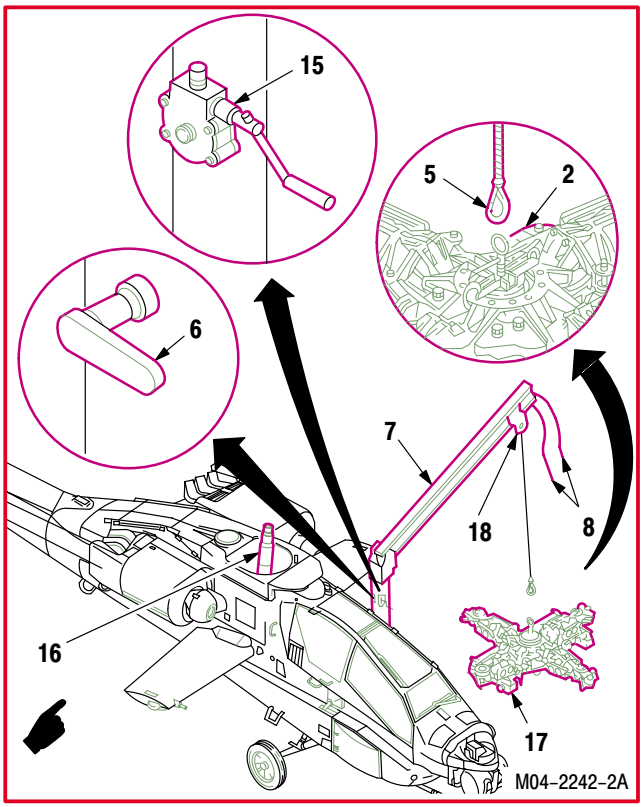
(1) Rotate head (2) to a position that will clear boom arm (7).

(2) Rotate handle (6) to up position to allow lateral movement of boom arm (7).

(3) Use two tag lines (8) to move boom arm (7). Turn boom arm (7) to aline head (2) over fixture (17).

(4) Rotate handle (6) to down position to prevent lateral movement of boom arm (7).

(5) Crank winch (15) down and slowly lower rotor head (2) on fixture (17).

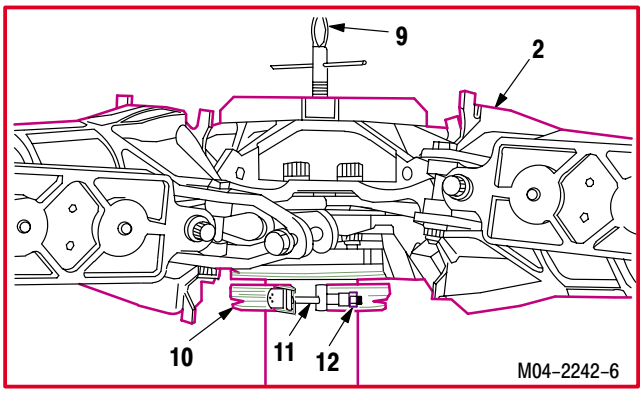


i. **Remove retainer (10) from head (2).**

(1) Loosen nut (12).

(2) Disengage quick coupler (11). Open retainer (10).

(3) Remove retainer (10) from bottom groove of head (2).



j. **Release tension on lifting cable after installing head (2) on fixture (17).**

(1) Crank winch (15) down to provide cable slack below eye (9).

k. **Retract hook (1).**

(1) Unsnap hook (5) from eye (9).

(2) Crank winch (15) up to position hook (5) about 6 inches below boom sheaves (18).

END OF TASK

1.86. HOISTING – MAIN ROTOR HEAD INSTALLATION

1.86.1. Installation

WARNING

- **Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.**
- **Failure to install bearing retainer prior to hoisting operation may result in main rotor component damage or personnel injury. If injury occurs, seek medical aid.**

a. **Install bearing retainer (1) on main rotor head (2).**

(1) Install retainer (1) in bottom groove of head (2).

(2) Close retainer (1). Engage quick coupler (3).

(3) Tighten nut (4).

b. **Position crane hook (5) over installed rotor head puller/sling.**

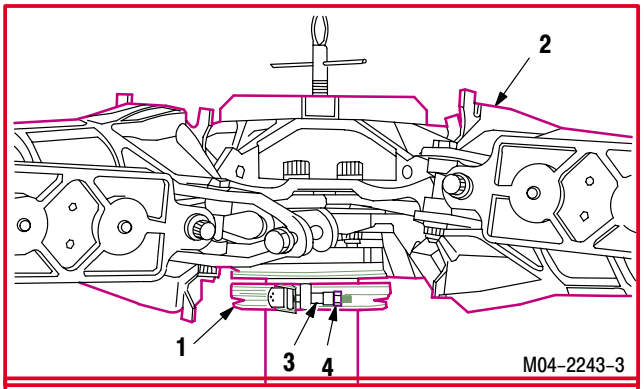
(1) Rotate crane handle (6) to up position to allow lateral movement of crane boom arm (7).

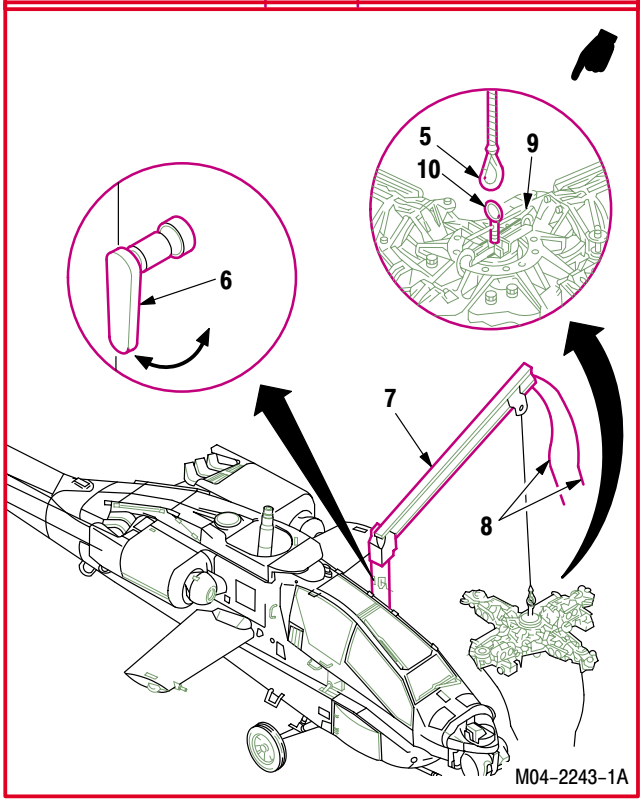
(2) Use tag lines (8) to move boom arm (7). Turn boom arm (7) to aline hook (5) over puller/sling (9) lifting eye (10).

(3) Rotate handle (6) to down position to prevent lateral movement of boom arm (7).

CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.





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1.86. HOISTING – MAIN ROTOR HEAD INSTALLATION – continued

c. **Insert hook (5) into lifting eye (10).**

(1) Crank winch (11) to position hook (5) below eye (10).

(2) Snap hook (5) into eye (10).

(3) Crank winch (11) to remove cable slack.

NOTE

Use tag lines to control rotor head.

d. **Tie two 15-foot tag lines to opposite ends of rotor head.**

e. **Lift head (2).**

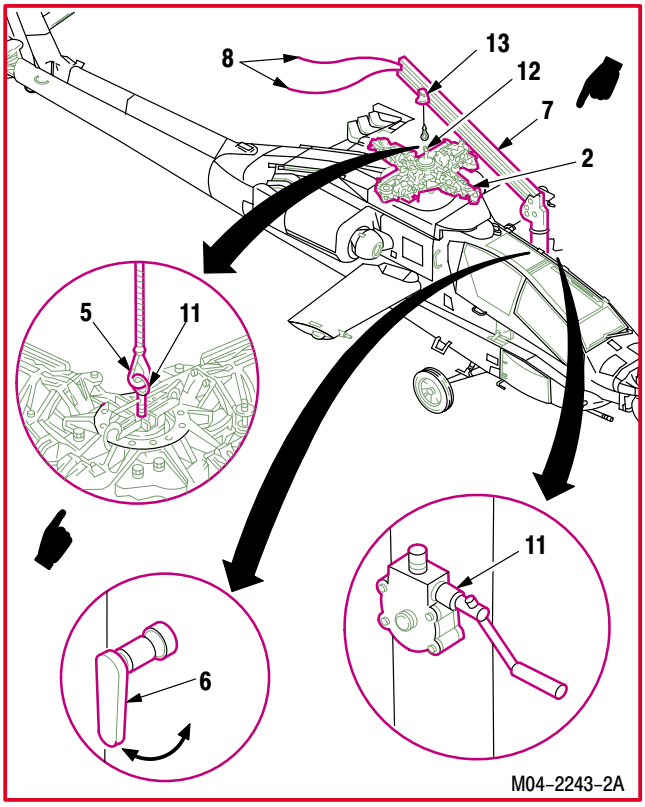
(1) Crank winch (11) to hoist head (2) higher than top of static mast (12).

f. **Position head (2) over static mast (12).**

(1) Rotate handle (6) to the up position to allow lateral movement of boom arm (7).

(2) Use two tag lines (8) to move boom arm (7). Turn boom arm (7) to aline head (2) over mast (12).

(3) Rotate handle (6) to the down position to prevent lateral movement of boom arm (7).



g. **Lower head (2) to mast (12).**

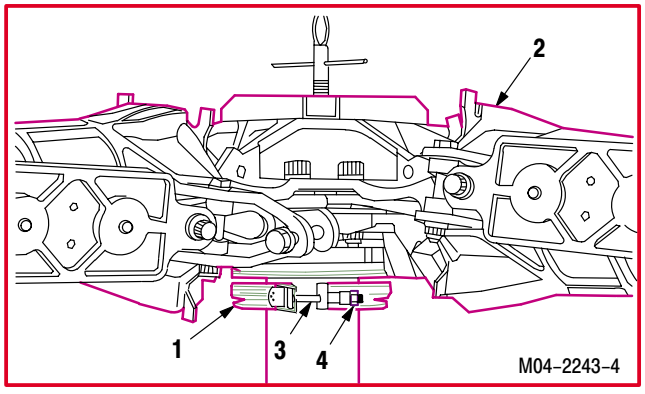
(1) Crank winch (11) and slowly lower head (2) to mast.

h. **Remove bearing retainer (1) from head (2).**

(1) Loosen nut (4).

(2) Disengage quick coupler (3). Open retainer (1).

(3) Remove retainer (1) from bottom groove of head (2).



i. **Release tension on lifting cable.**

(1) Crank winch (11) to provide cable slack below eye (10).

j. **Retract hook (5).**

(1) Unsnap hook (5) from eye (10).

(2) Crank winch (11) to position hook (5) about 6 inches below boom sheave (13).

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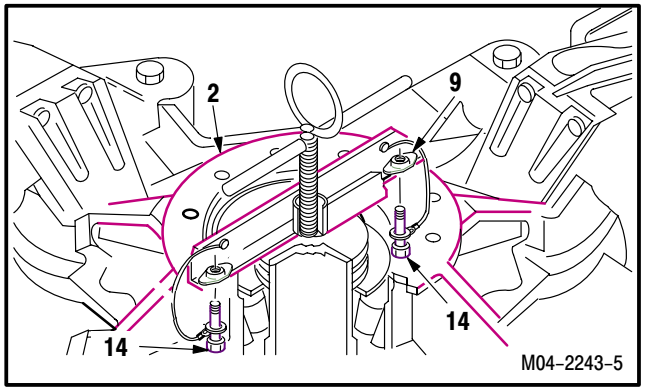
1.86. HOISTING – MAIN ROTOR HEAD INSTALLATION – continued

k. **Remove puller/sling (9) from head (2).**

(1) Remove two captive bolts (14) from puller/sling (9).

(2) Remove puller sling (9).



END OF TASK

1.87. HOISTING – MAIN ROTOR GEARSHAFT REMOVAL

1.87.1. Removal

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

a. **Position crane hook (1) over installed gearshaft sling (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move crane boom arm (4). Turn boom arm (4) to aline hook (1) over sling hoisting ring (6).

(3) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into ring (6).**

(1) Crank winch (7) to position hook (1) just above ring (6).

(2) Snap hook (1) into ring (6).

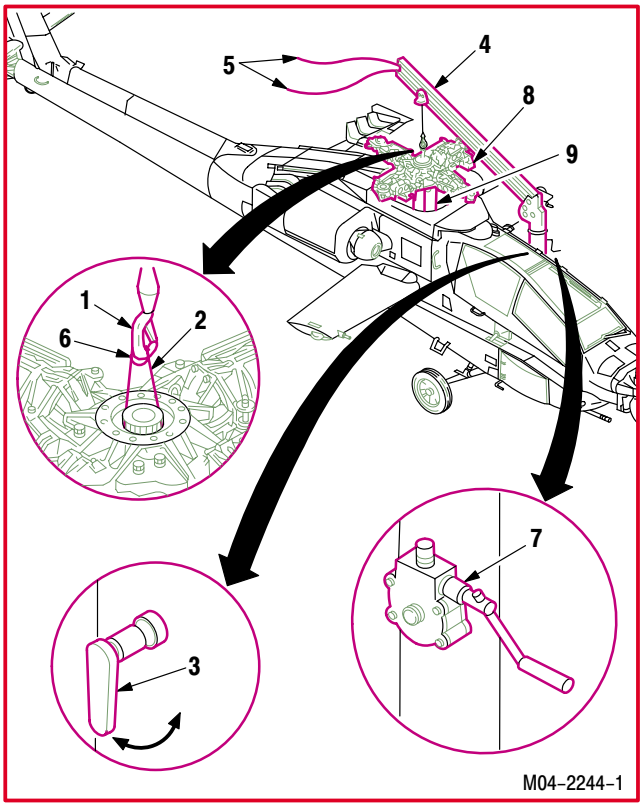
(3) Crank winch (7) up to remove cable slack.

c. **Lift main rotor gearshaft.**

(1) Crank winch (7) to hoist gearshaft just clear of main rotor head (8) and static mast (9).

NOTE

Use tag line to control gearshaft.



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1.87. HOISTING – MAIN ROTOR GEARSHAFT REMOVAL – continued

d. **Tie 20-foot tag line to bottom center of gearshaft.**

e. **Position main rotor gearshaft over main rotor gearshaft mount fixture (10).**

(1) Rotate handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline gearshaft over fixture (10).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

f. **Lower gearshaft to fixture (10).**

(1) Crank winch (7) and slowly lower gearshaft on fixture.

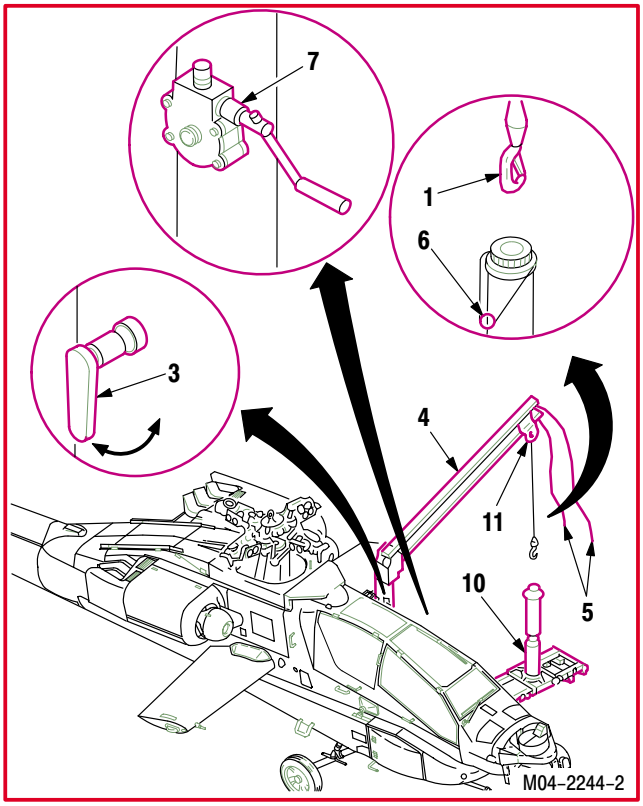
g. **Release tension on lifting cable.**

(1) Crank winch (7) down to position hook (1) below top of gearshaft.

h. **Retract hook (1).**

(1) Unsnap hook (1) from hoisting ring (6).

(2) Crank winch (7) to position hook (1) about 6 inches below boom sheave (11).



END OF TASK

1.88. HOISTING – MAIN ROTOR GEARSHAFT INSTALLATION

1.88.1. Installation

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

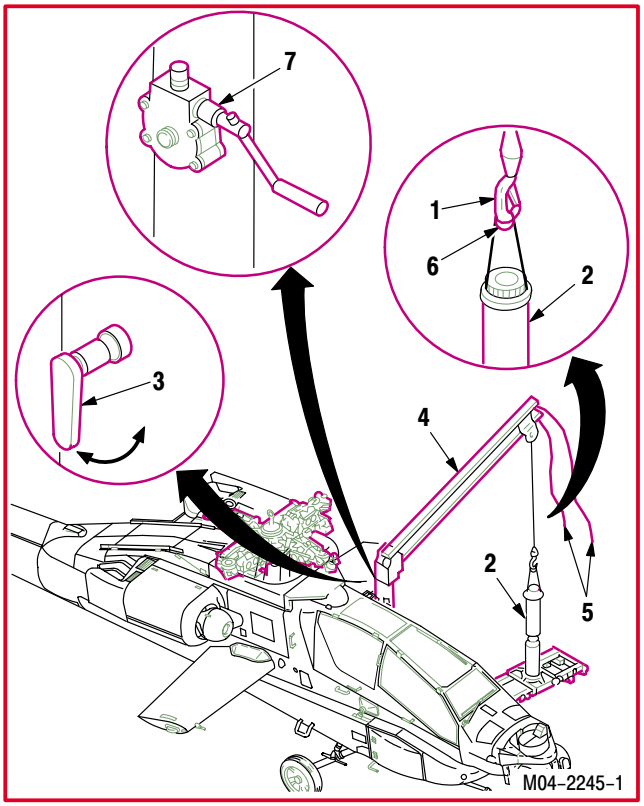
a. **Position crane hook (1) over installed main rotor gearshaft (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline hook (1) over sling hoisting ring (6).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).



CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) in ring (6).**

(1) Crank winch (7) to position hook (1) just above gearshaft (2).

(2) Snap hook (1) into ring (6).

(3) Crank winch (7) to remove cable slack.

(4) Tie 20-foot tag line to bottom center of gearshaft (2).

NOTE

Use tag line to control gearshaft.

GO TO NEXT PAGE

1.88. HOISTING – MAIN ROTOR GEARSHAFT INSTALLATION – continued

c. **Position gearshaft (2) over static mast (8).**

(1) Crank winch (7) to hoist gearshaft (2) higher than top of rotor head (9).

(2) Rotate handle (3) to up position to allow lateral movement of crane boom arm (4).

(3) Use two tag lines (5) to move boom arm (4). Turn boom arm (4) to aline gearshaft (2) over mast (8) on rotor head (9).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

d. **Install gearshaft (2) on mast (8).**

(1) Crank winch (7) down and carefully insert end of gearshaft (2) into mast (8).

(2) Remove tag lines from gearshaft (2).

(3) Insert gearshaft (2) on mast (8).

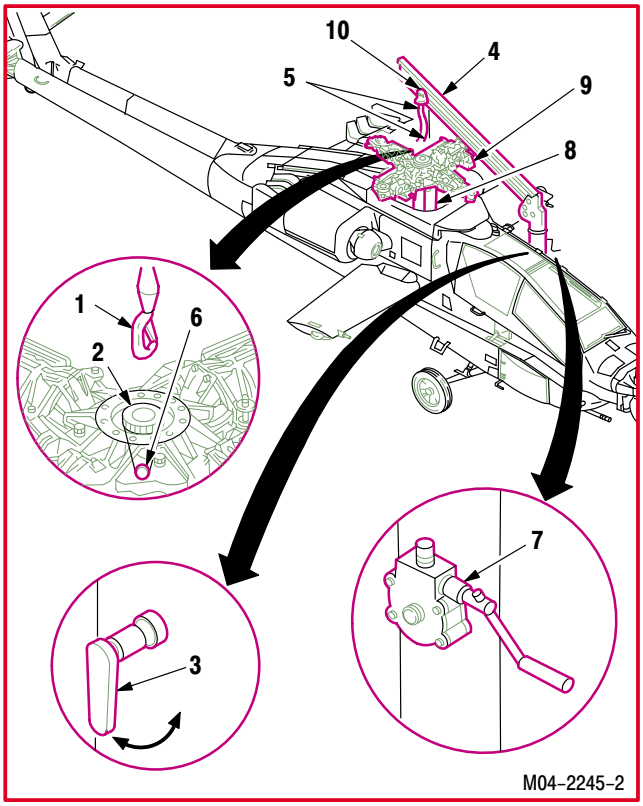
e. **Remove hook (1) from gearshaft (2).**

(1) Release tension on lifting cable. Crank winch (7) down to position hook (1) just above gearshaft (2).

(2) Unsnap hook (1) from ring (6).

f. **Retract hook (1).**

(1) Crank winch (7) to position hook (1) about 6 inches below boom sheave (10).



END OF TASK

1.89. HOISTING – MAIN ROTOR SUPPORT (STATIC) MAST REMOVAL

1.89.1. Removal

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

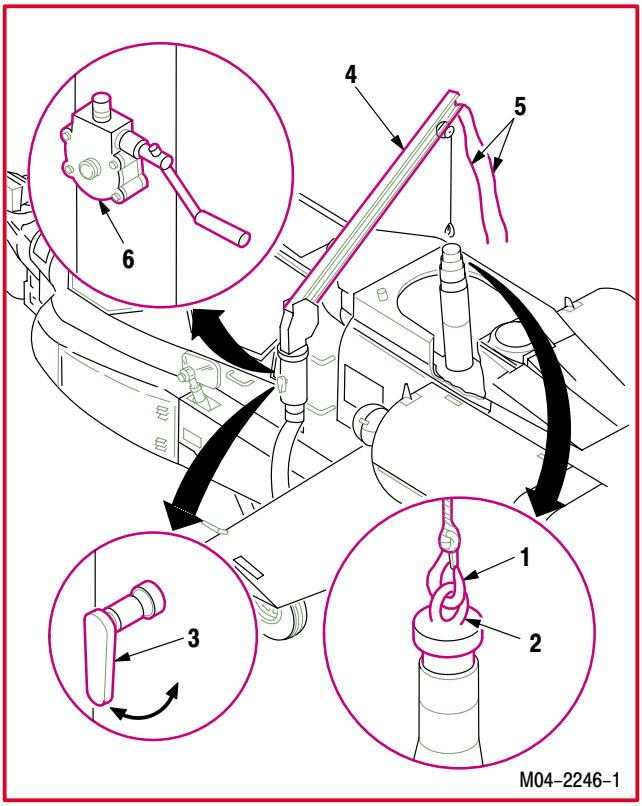
a. **Position crane hook (1) over installed mast lifting eye (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use tag lines (5) to move crane boom arm (4).

(3) Turn crane boom arm (4) to aline hook (1) over eye (2).

(4) Rotate handle (3) to down position to prevent lateral movement of crane boom arm (4).



CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into eye (2).**

(1) Crank winch (6) to position hook (1) below eye (2).

(2) Snap hook (1) into eye (2).

(3) Crank winch (6) to remove cable slack.

GO TO NEXT PAGE

1.89. HOISTING – MAIN ROTOR SUPPORT (STATIC) MAST REMOVAL – continued

NOTE

Use tag line to control mast.

c. **Attach tag line to mast.**

(1) Tie 20-foot line to bottom center of mast.

d. **Lift mast from support base after removing mast mounting nuts and washers.**

(1) Crank winch (6) to hoist mast (7) above upper fairing (8).

e. **Position mast (7) over unloading surface.**

(1) Rotate handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn arm (4) to aline mast (7) over level surface.

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

f. **Lower mast (7) to unloading surface.**

(1) Crank winch (6) down and slowly lower mast (7) to level surface.

g. **Release tension on lifting cable when static mast is secure.**

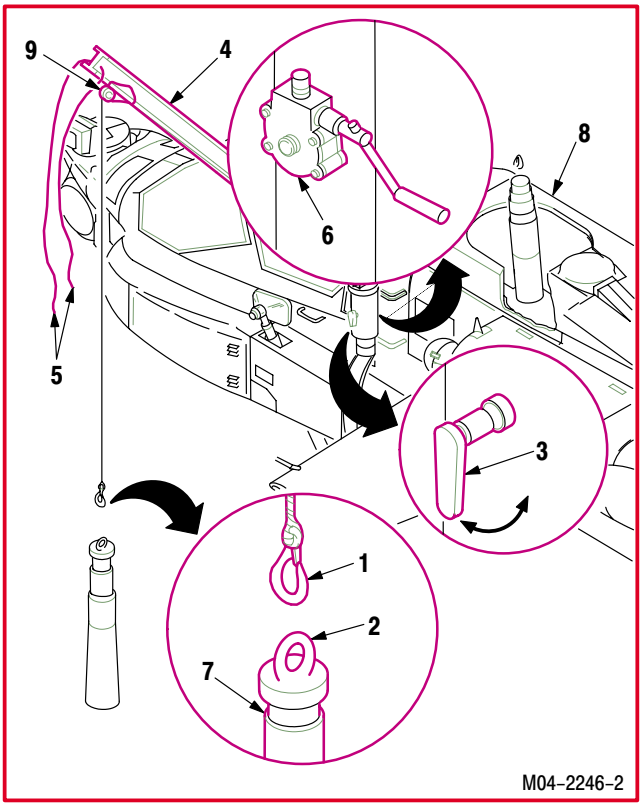
(1) Crank winch (6) down to position hook (1) below eye (2).

h. **Remove hook (1) from eye (2).**

(1) Unsnap hook (1) from eye (2).

i. **Retract crane hook (1).**

(1) Crank winch (6) up to position hook (1) about 6 inches below boom sheave (9).



END OF TASK

1.90. HOISTING – MAIN ROTOR SUPPORT (STATIC) MAST INSTALLATION

1.90.1. Installation

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

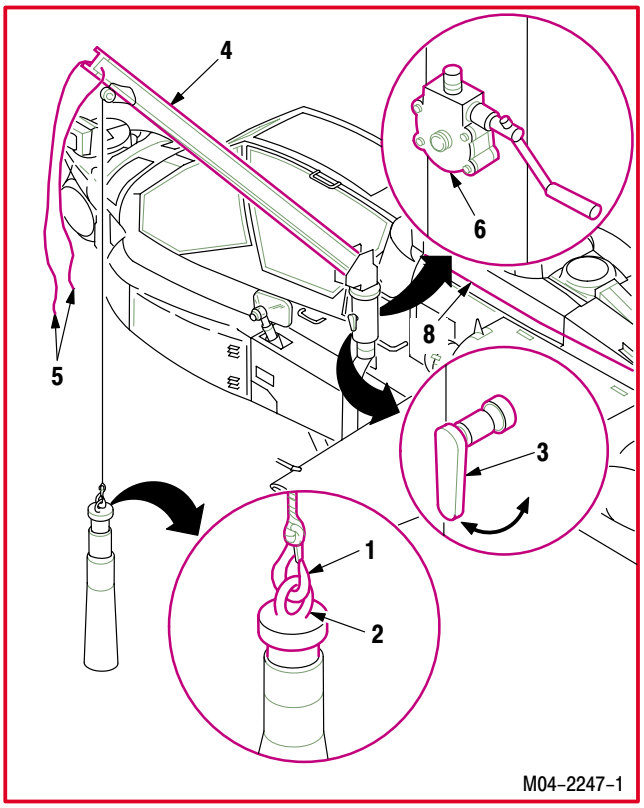
a. **Position crane hook (1) over installed static mast lifting eye (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline hook (1) over eye (2).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).



CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into eye (2).**

(1) Crank winch (6) to position hook (1) below eye (2).

(2) Snap hook (1) into eye (2).

(3) Crank winch (6) to remove cable slack.

GO TO NEXT PAGE

1.90. HOISTING – MAIN ROTOR SUPPORT (STATIC) MAST INSTALLATION – continued

NOTE

Use a tag line to control mast.

c. **Attach tag line to static mast.**

(1) Tie 20-foot line to bottom center of mast.

d. **Lift mast (7).**

(1) Crank winch (6) to hoist mast (7) higher than top of upper fairing (8).

e. **Position mast (7) over support base (9).**

(1) Rotate handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline mast (7) over base (9).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

f. **Lower mast to base (9).**

(1) Crank winch (6) down and slowly lower mast (7) on base.

g. **Install mast mounting washers and nuts** (para 6.97)**.**

h. **Release tension on lifting cable.**

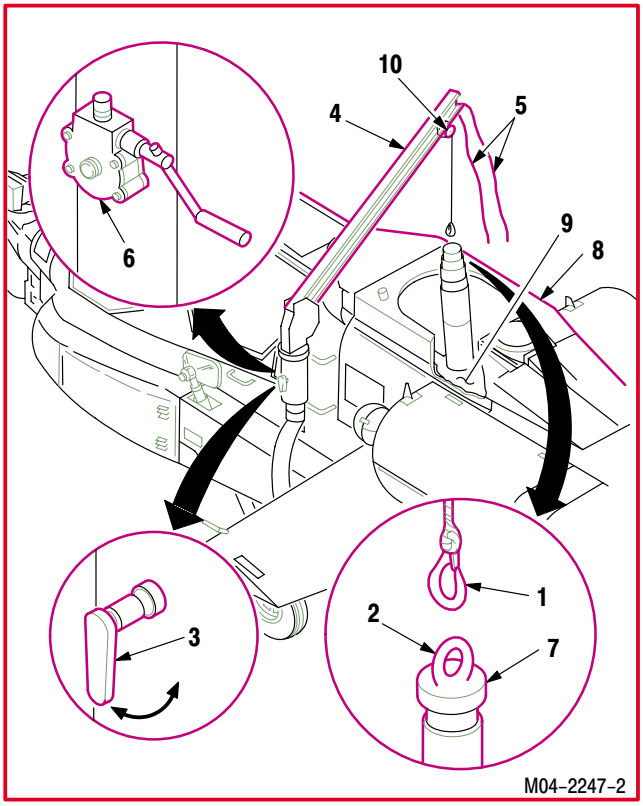
(1) Crank winch (6) to position hook (1) below eye (2).

i. **Remove hook (1) from eye (2).**

(1) Unsnap hook (1) from eye (2).

j. **Retract hook (1).**

(1) Crank winch (6) to position hook (1) about 6 inches below boom sheave (10).



END OF TASK

1.91. HOISTING - MAIN TRANSMISSION REMOVAL

1.91.1. Removal

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

a. **Position crane hook (1) over installed transmission sling (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline hook (1) over sling shackle (6).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

CAUTION

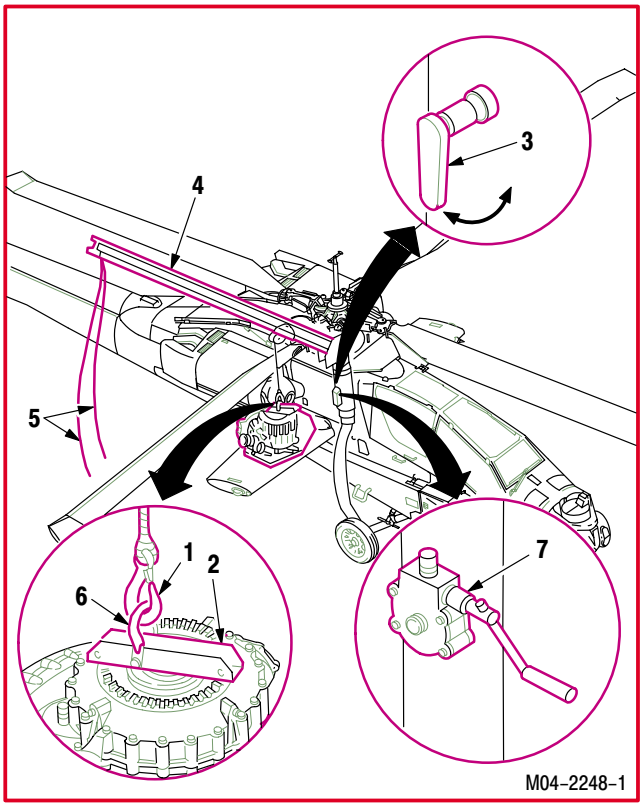
To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into shackle (6).**

(1) Crank winch (7) to position hook (1) below shackle (6).

(2) Snap hook (1) into shackle (6).

(3) Crank winch (7) to remove cable slack.



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1.91. HOISTING - MAIN TRANSMISSION REMOVAL – continued

NOTE

Use two tag lines to control transmission.

c. **Tie two10-foot lines to left and right sides of main transmission (8).**

d. **Lift transmission (8) from platform (9).**

(1) Crank winch (7) to hoist transmission above platform (9).

e. **Position transmission (8) over maintenance trailer (10).**

(1) Rotate handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline transmission (8) over bed of trailer (10).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

f. **Lower transmission (8) to maintenance trailer (10).**

(1) Crank winch (7) to slowly lower transmission (8) to trailer (10).

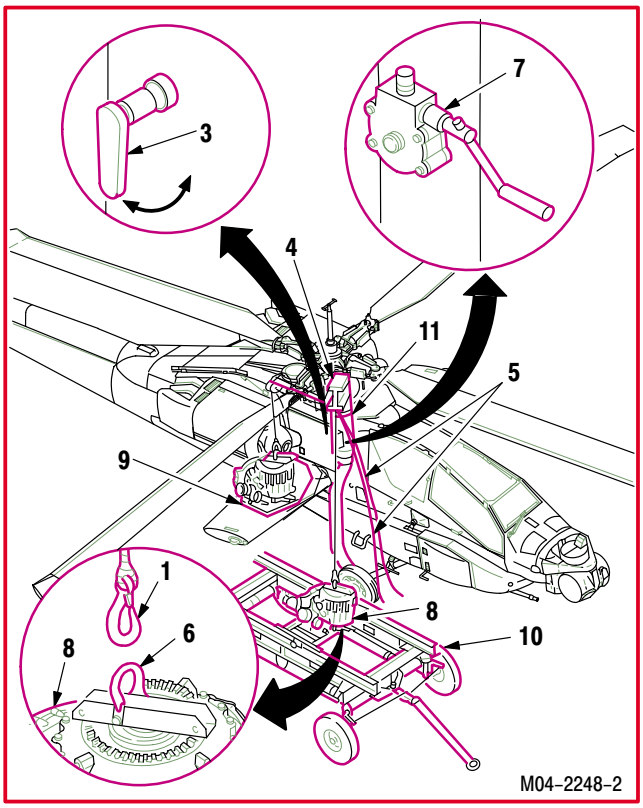
g. **Secure transmission (8) to trailer (10).**

(1) Crank winch (7) to provide cable slack below shackle (6).

h. **Retract hook (1).**

(1) Unsnap hook (1) from shackle (6).

(2) Crank winch (7) to position hook (1) about 6 inches below boom sheave (11).



END OF TASK

1.92. HOISTING – MAIN TRANSMISSION INSTALLATION

1.92.1. Installation

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

a. **Position crane hook (1) over installed transmission sling (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline hook (1) over sling shackle (6).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

CAUTION

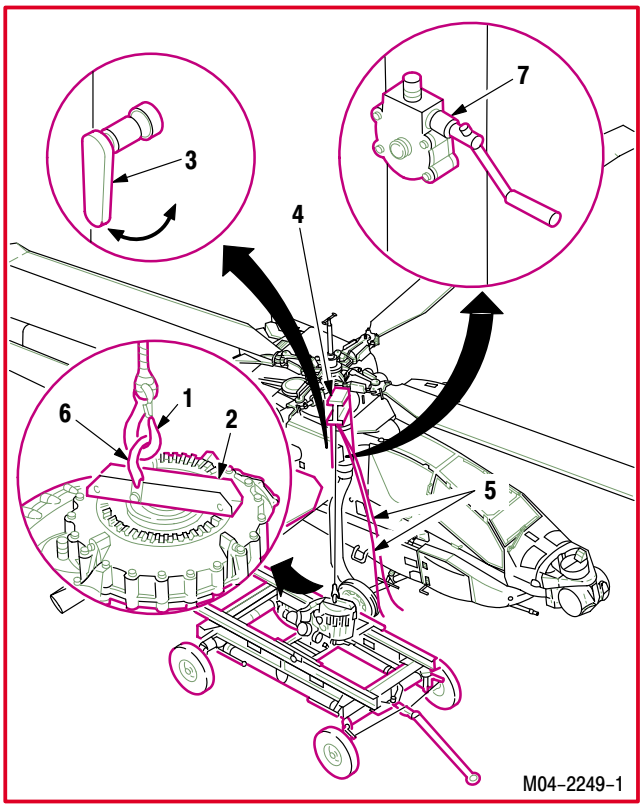
To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into shackle (6).**

(1) Crank winch (7) to position hook (1) below shackle (6).

(2) Snap hook (1) into shackle (6).

(3) Crank winch (7) to remove cable slack.



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1.92. HOISTING – MAIN TRANSMISSION INSTALLATION – continued

NOTE

Use tag lines to control transmission position.

c. **Tie two 10-foot lines to left and right sides of main transmission (8).**

d. **Lift transmission (8) from maintenance trailer (9).**

(1) Crank winch (7) to hoist transmission (8) higher than top of installed platform (10).

e. **Position transmission (8) over platform (10).**

(1) Rotate handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move boom arm (4). Turn boom arm (4) to position transmission (8) over platform (10).

(3) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

(4) Aline and hold positions of transmission (8) left and right input housings.

f. **Lower main transmission (8) to platform.**

(1) Crank winch (7) to slowly lower transmission (8) to platform (10).

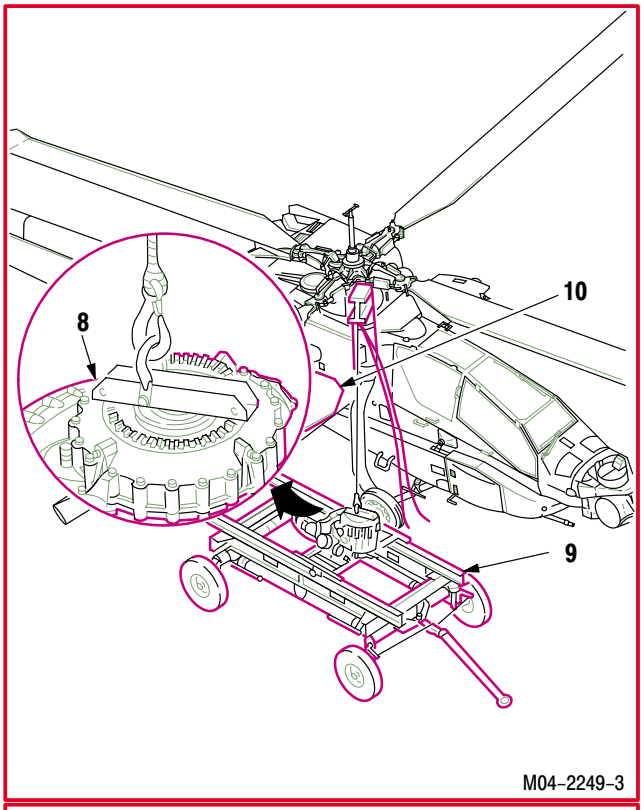
(2) Secure transmission (8) to platform (10).

g. **Crank winch (7) to provide cable slack below shackle (6).**

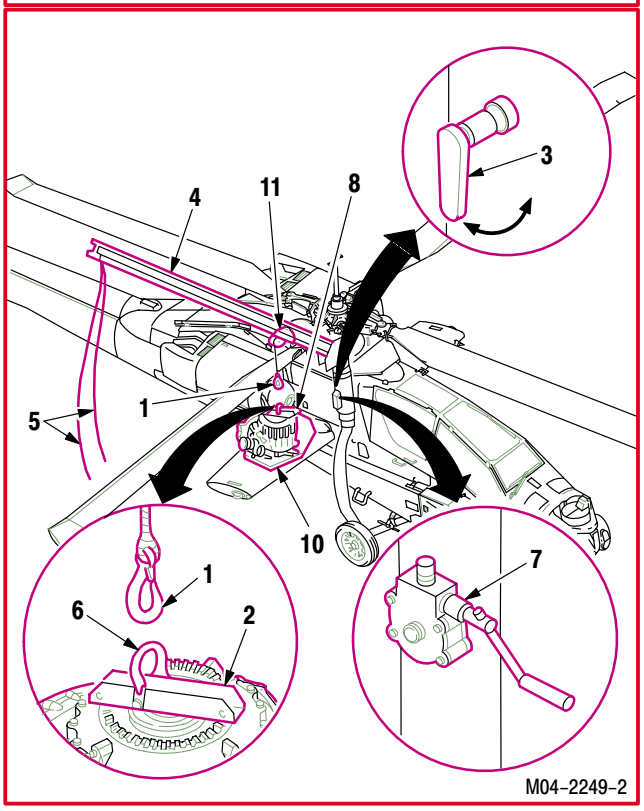
h. **Retract hook (1).**

(1) Unsnap hook (1) from shackle (6).

(2) Crank winch (7) to position hook (1) about 6 inches below boom sheave (11).



M04-2249-3



M04-2249-2

END OF TASK

1.93. HOISTING – MAIN ROTOR SWASHPLATE REMOVAL

1.93.1. Removal

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

a. **Position crane hook (1) over installed universal sling (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline hook (1) over sling lifting eye (6).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

CAUTION

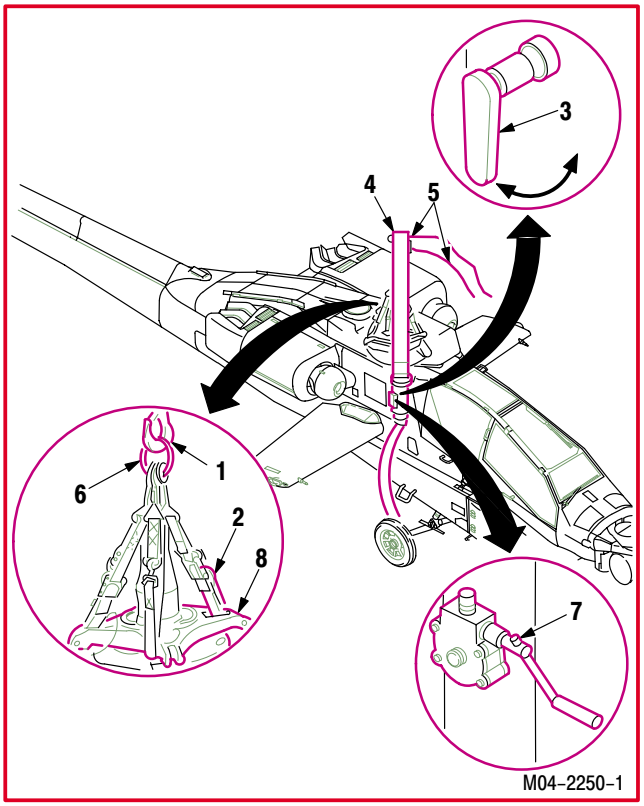
To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into eye (6).**

(1) Crank winch (7) down to position hook (1) just above top of main rotor swashplate (8).

(2) Snap hook (1) into eye (6).

(3) Crank winch (7) up to remove cable slack.



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1.93. HOISTING – MAIN ROTOR SWASHPLATE REMOVAL – continued

NOTE

- Secure disconnected control links.
- Use tag line to control swashplate.

c. **Tie 20-foot line to one open web of swashplate (8).**

d. **Lift swashplate (8) from static mast (9).**

(1) Crank winch (7) up and hoist swashplate (8) above mast (9).

e. **Position swashplate (8) over maintenance trailer (10).**

(1) Rotate handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline swashplate (8) over bed of trailer (10).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

f. **Crank winch (7) and slowly lower swashplate to trailer bed (10).**

(1) Secure swashplate (8) on trailer (10).

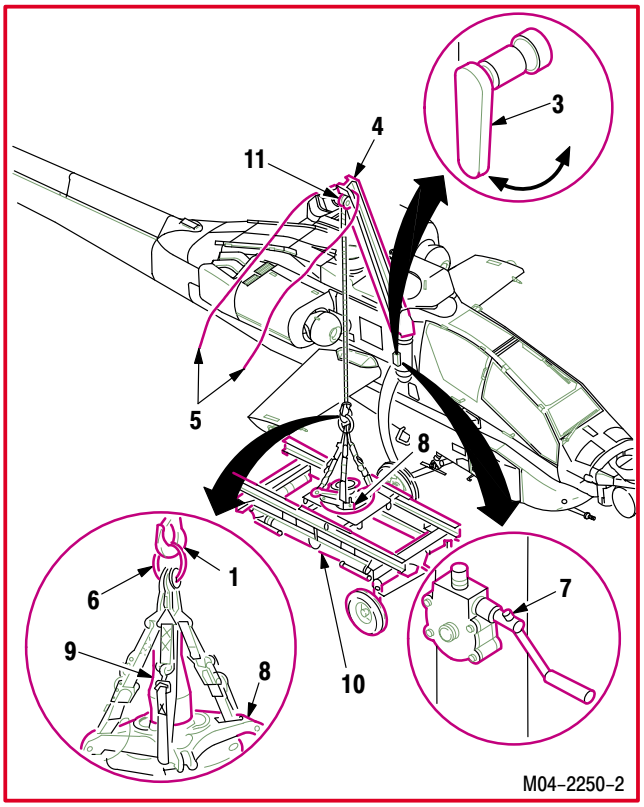
g. **Release tension on lifting cable.**

(1) Crank winch (7) to position hook (1) just above top of swashplate (8).

h. **Retract hook (1).**

(1) Remove hook (1) from eye (6).

(2) Crank winch (7) to position hook (1) about 6 inches below boom sheave (11).



END OF TASK

1.94. HOISTING – MAIN ROTOR SWASHPLATE INSTALLATION

1.94.1. Installation

WARNING

Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.

a. **Position crane hook (1) over installed universal sling (2).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline hook (1) over sling lifting eye (6).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

CAUTION

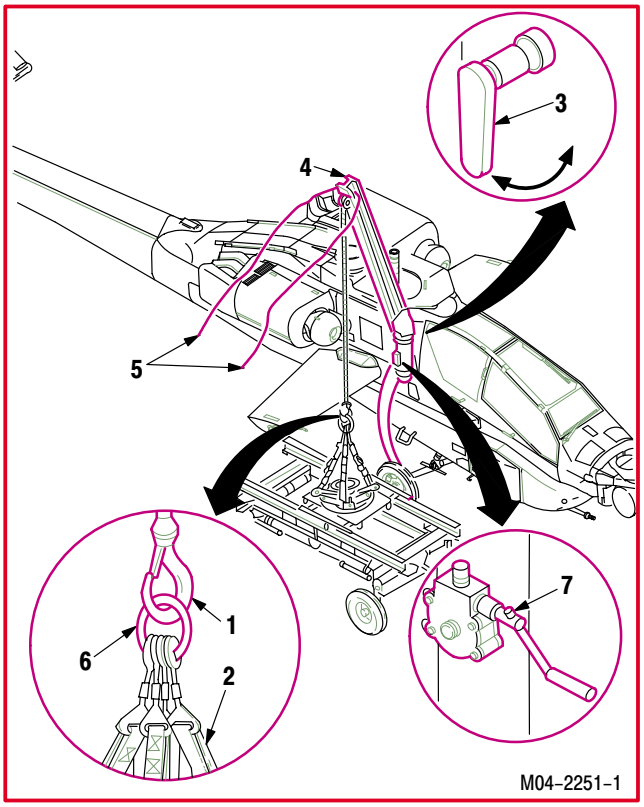
To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

b. **Insert hook (1) into eye (6).**

(1) Crank winch (7) to position hook (1) just above top of main rotor swashplate (8).

(2) Snap hook (1) into eye (6).

(3) Crank winch (7) up to remove cable slack.



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1.94. HOISTING – MAIN ROTOR SWASHPLATE INSTALLATION – continued

NOTE

Use tag line to control swashplate.

c. **Attach tag line to swashplate (8).**

(1) Tie 20-foot line to one open web of swashplate (8).

d. **Lift swashplate (8) from maintenance trailer (9).**

(1) Crank winch (7) to hoist swashplate (8) higher than top of static mast (10).

e. **Position swashplate (8) over mast (10).**

(1) Rotate crane handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move boom arm (4).

(3) Turn boom arm (4) to aline swashplate (8) over mast (10).

(4) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

f. **Lower swashplate (8) onto mast (10).**

(1) Crank winch (7) down and carefully lower swashplate (8) to mast (10).

g. **Connect control links to swashplate (8)** (para 11.56)**.**

h. **Release tension on lifting cable.**

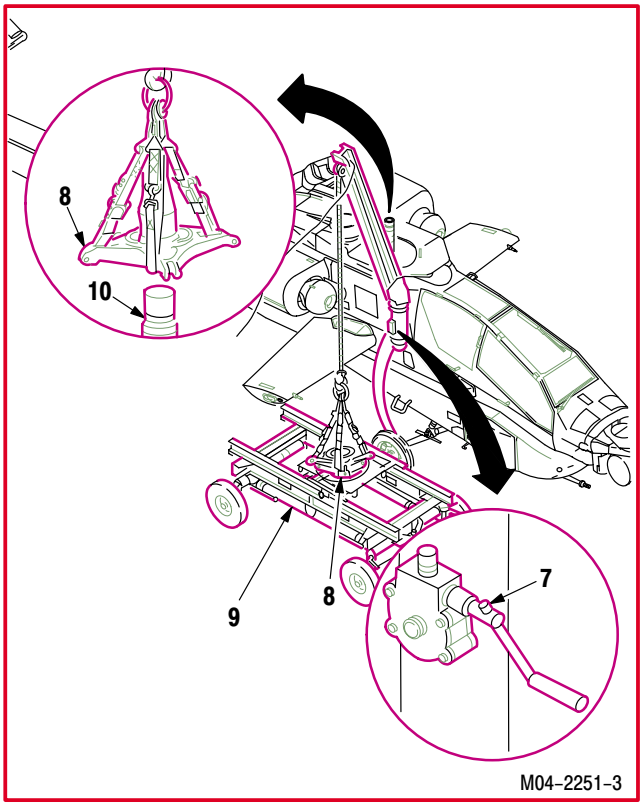
(1) Crank winch (7) to position hook (1) just above top of swashplate (10).

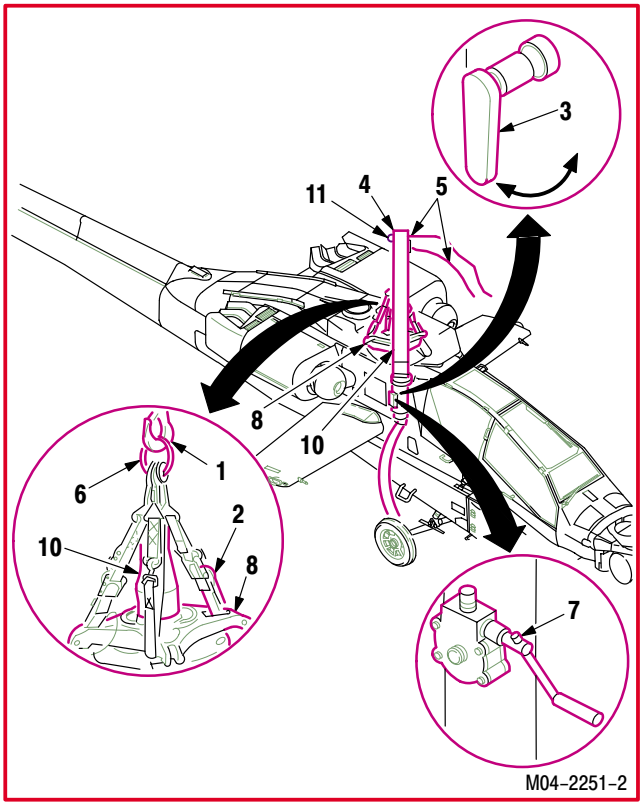
i. **Remove hook (1) from lifting eye (6).**

j. **Retract hook (1).**

(1) Crank winch (7) to position hook (1) about 6 inches below boom sheave (11).

END OF TASK





1.95. HOISTING – APU REMOVAL

1.95.1. Removal

WARNING

- **Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.**
- **Inspect APU lifting lug for damage, bends, or cracks. Failure of lifting lug can cause structural damage and injury to personnel. If an injury occurs, seek medical aid.**

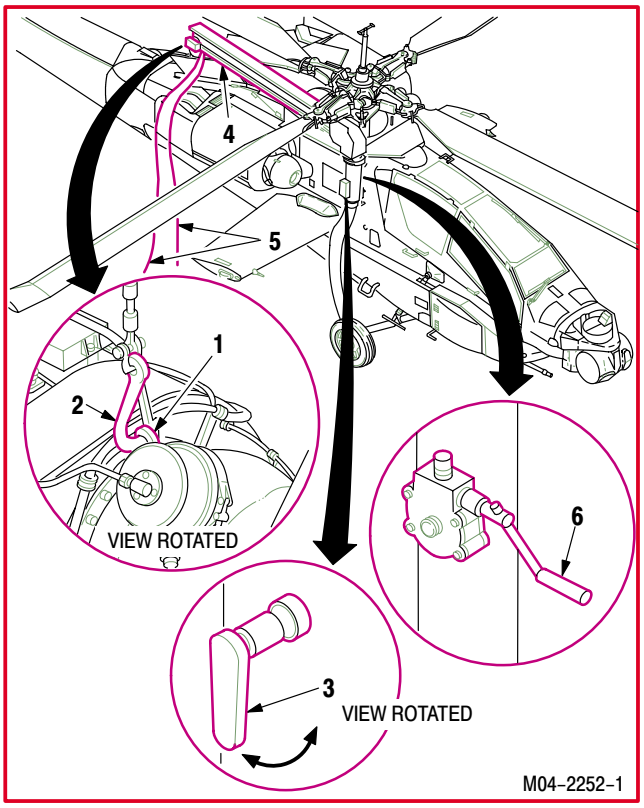
a. **Check APU lifting lug (1) for damage, bends, or cracks.**

b. **Position crane hook (2) over APU lug (1).**

(1) Rotate crane handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move arm (4). Turn boom arm (4) to aline hook (1) over lug (2).

(3) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).



CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

c. **Insert hook (2) into lug (1).**

(1) Crank winch (6) to position hook (2) below lug (1).

(2) Snap hook (2) into lug (1).

(3) Crank winch (6) to remove cable slack.

GO TO NEXT PAGE

1.95. HOISTING – APU REMOVAL – continued

NOTE

Use a tag line to control APU.

d. **Tie 20-foot lines to forward and aft ends of APU (7).**

e. **Lift APU (7) to relieve weight from APU mounts.**

f. **Lift APU (7) from equipment bay deck after disconnecting and demounting.**

(1) Crank winch (6) to hoist APU (7) above deck area access doors and fairing.

g. **Position APU (7) over workstand (8).**

(1) Rotate crane handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move arm (4). Turn boom arm (4) to aline APU over workstand (8).

(3) Rotate handle (3) to the down position to prevent lateral movement of boom arm (4).

h. **Crank winch (6) and slowly lower APU (7) to workstand (8).**

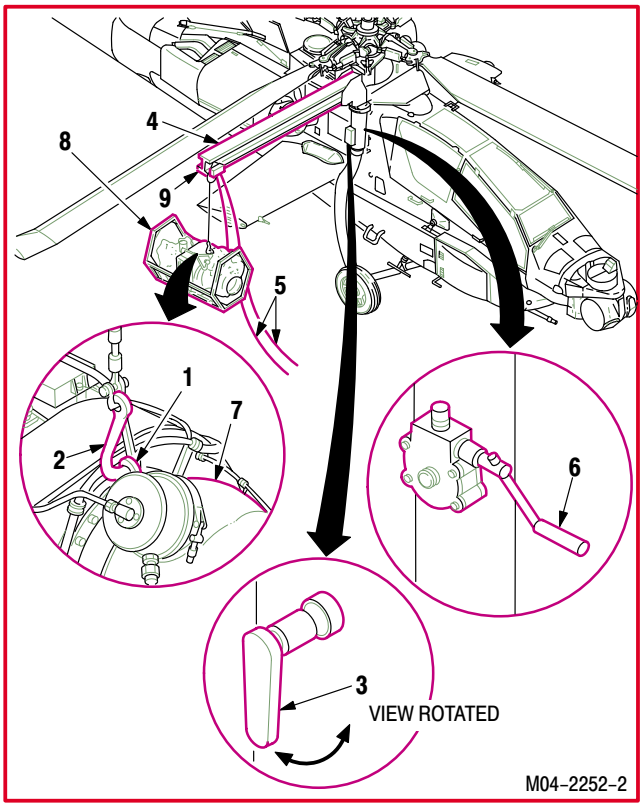
(1) Mount APU (7) on workstand (8).

i. **Crank winch (6) to provide cable slack below lug (1).**

j. **Retract hook (2).**

(1) Unsnap hook (2) from lug (1).

(2) Crank winch (6) to position hook (2) about 6 inches below boom sheave (9).



END OF TASK

1.96. HOISTING – APU INSTALLATION

1.96.1. Installation

WARNING

- **Hoisted components can cause injury or death if they fall. Keep away from hoisted components and loaded crane. If injury occurs, seek medical aid.**
- **Inspect APU lifting lug for damage, bends, or cracks. Failure of lifting lug can cause structural damage and personal injury. If an injury occurs, seek medical aid.**

a. **Check APU lug (1) for damage, bends, or cracks.**

b. **Position crane hook (2) over APU lifting lug (1).**

(1) Rotate crane handle (3) to up position to allow lateral movement of crane boom arm (4).

(2) Use two tag lines (5) to move arm (4). Turn boom arm (4) to aline hook (2) over lug (1).

(3) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

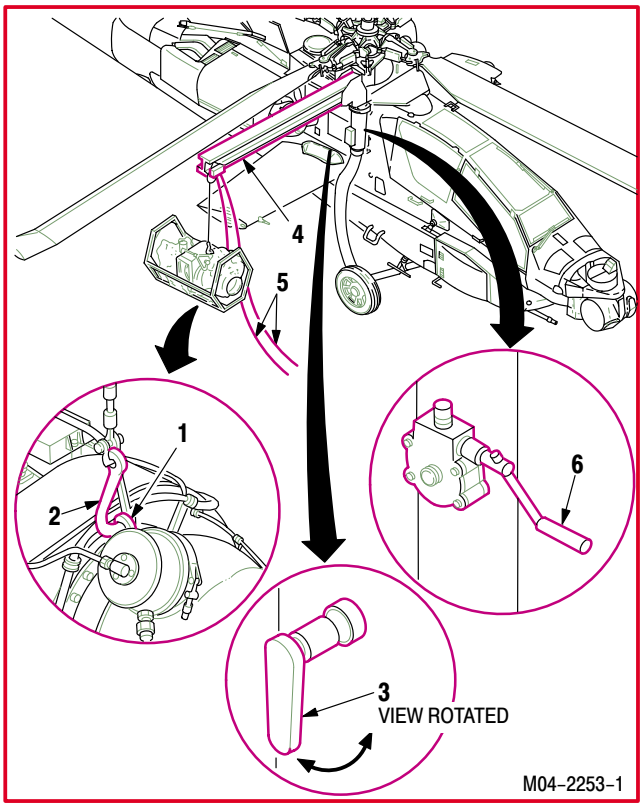
CAUTION

To prevent crossing cable on spool and damage to crank, tension must be applied when letting out or taking in cable.

c. **Insert hook (1) into lug (2).**

(1) Crank winch (6) to position hook (2) below lug (1).

(2) Snap hook (2) into lug (1).



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1.96. HOISTING – APU INSTALLATION – continued

NOTE

Use tag lines to control APU.

d. **Tie two 20-foot lines to forward and aft ends of APU (7).**

e. **Crank winch (6) up to relieve weight from APU mounts.**

f. **Lift APU (7) from APU workstand after de-mounting.**

(1) Crank winch (6) to hoist APU (7) higher than deck area access doors and fairing.

g. **Position APU (7) over equipment bay.**

(1) Rotate handle (3) to up position to allow lateral movement of boom arm (4).

(2) Use two tag lines (5) to move boom arm (4). Turn boom arm (4) to position APU over APU mounts on equipment deck.

(3) Rotate handle (3) to down position to prevent lateral movement of boom arm (4).

(4) Aline and hold positions of APU (7) forward and aft ends.

(5) Crank winch (6) down and slowly lower APU (7) to deck mounting surfaces.

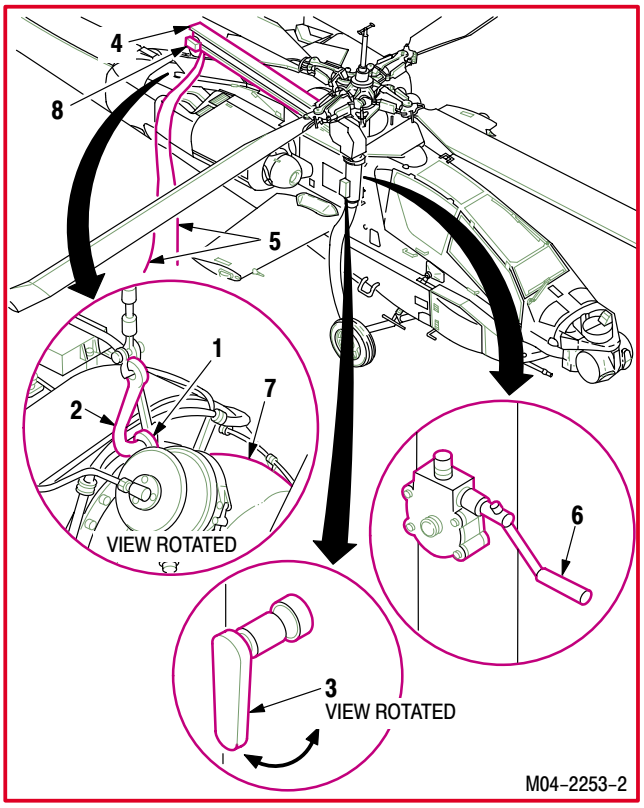
(6) Mount APU (7) on equipment deck.

h. **Crank winch (6) down to provide cable slack below lug (1).**

i. **Retract hook (2).**

(1) Unsnap hook (2) from lifting lug (1).

(2) Crank winch (6) up to position hook (2) about 6 inches below boom sheave (8).



END OF TASK

1.97. MAINTENANCE CRANE INSTALLATION

1.97.1. Description

This task covers: Removal from Stowage. Cleaning. Inspection. Installation.

1.97.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft mounted crane (item 69, App H)

Personnel Required:

67R Attack Helicopter Repairer
Two persons to assist
67R3F Attack Helicopter Repairer/Technical Inspector

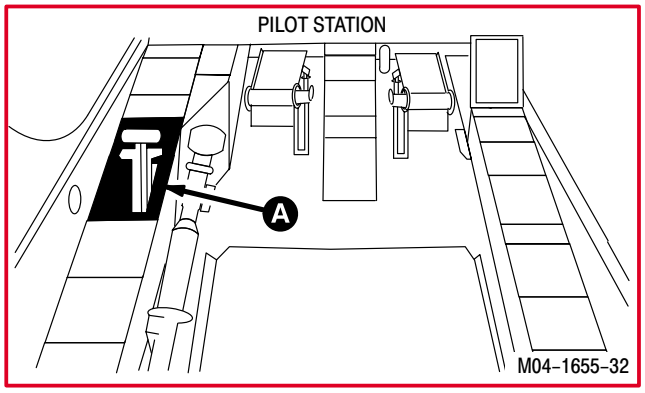
Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access door R295 opened

1.97.3. Removal from Stowage

a. **Connect battery** (para 9.40)**.**

b. **Enter pilot station** (para 1.56)**. Observe all safety precautions.**



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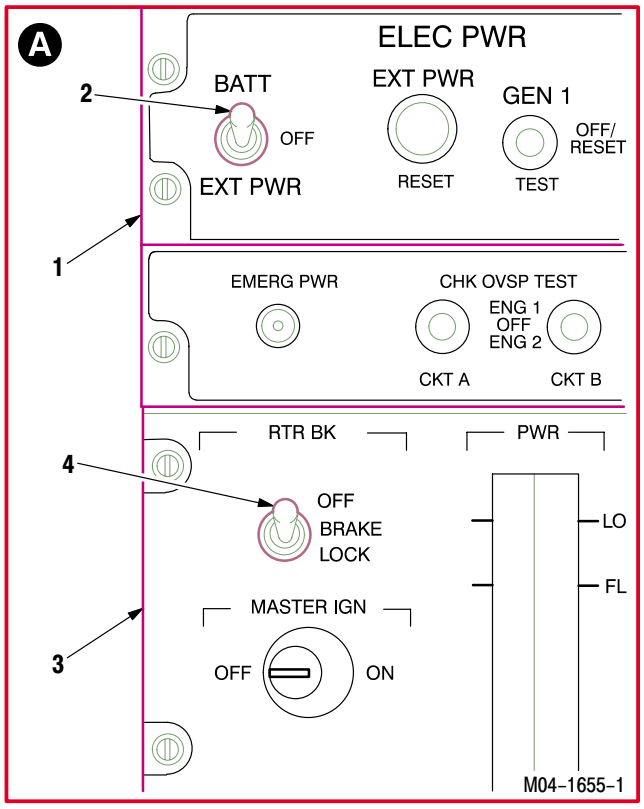
1.97. MAINTENANCE CRANE INSTALLATION – continued

c. **Set pilot ELEC PWR panel (1) BATT EXT PWR switch (2) to BATT.**

d. **Set pilots power lever quadrant (3) RTR BRK switch (4) to OFF.**

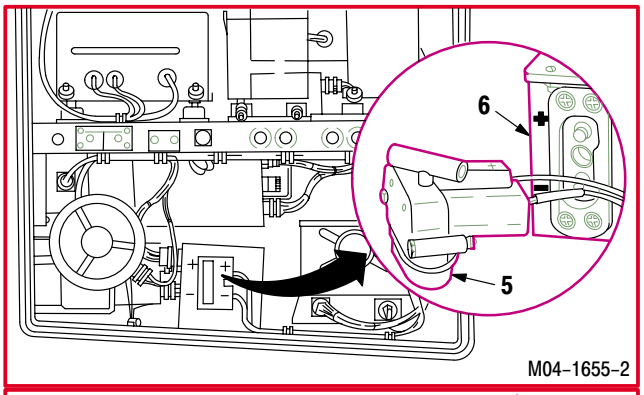
e. **Set BATT EXT PWR switch (2) to OFF.**



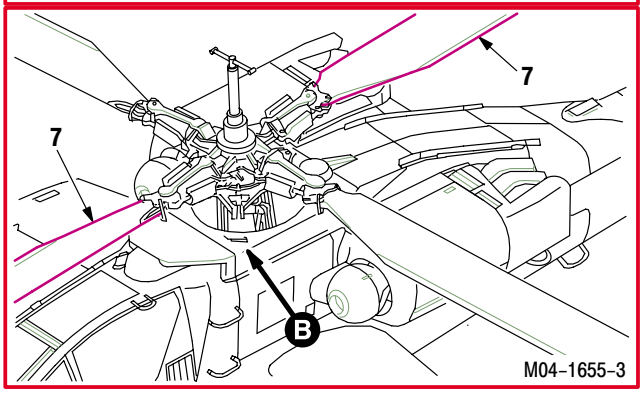
f. **Disconnect battery plug (5) from battery receptacle (6).**

NOTE

Pilot and CPG access doors must be closed for crane installation on right side.



g. **Aline two rotor blades (7) with longitudinal centerline of helicopter.**



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1.97. MAINTENANCE CRANE INSTALLATION – continued

h. **Disassemble stowed crane.**

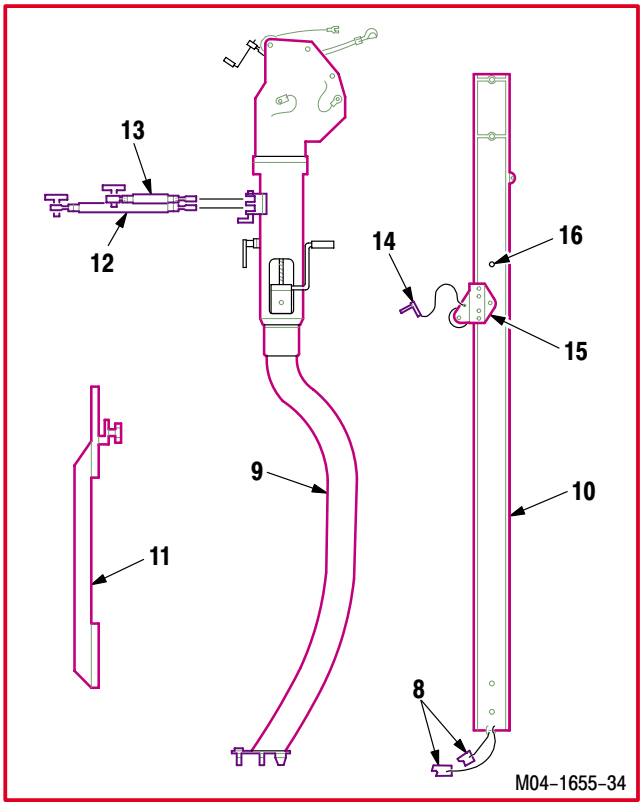
(1) Unwrap tag lines (8) from dogleg (9), boom arm (10), torque arm (11), long tierod (12), and short tierod (13).

(2) Remove quick-release pin (14) from boom sheave (15) and boom arm (10).

(3) Slide sheave (15) to aline with position 1 (16) on boom arm (10).

(4) Install pin (14) through sheave (15) and boom arm (10).

(5) Separate dogleg (9), boom arm (10), torque arm (11), long tierod (12), and short tierod (13).



1.97.4. Cleaning

a. **Wipe removed and attaching parts with a clean rag.**

1.97.5. Inspection

a. **Check boom arm for cracks and broken or missing components.**

b. **Check tag lines for fraying or loose installation of snap hooks.**

c. **Check sheave for binding or loose installation.**

d. **Check tierods for cracks and broken or missing parts.**

e. **Check dogleg for cracks, frayed foot tether, and broken or missing parts.**

f. **Check hoist for binding and cracks or missing parts.**

g. **Check wire rope for frayed or kinked wires.**

h. **Check boom hoist drum for binding and loose attachment.**

GO TO NEXT PAGE

1.97. MAINTENANCE CRANE INSTALLATION – continued

i. **Check boom line for fraying and missing shackle.**

j. **Check torque arm for loose or missing parts, loose or missing thread inserts, broken arm clamp, and broken or stripped torque handle.**

k. **Check all parts for corrosion** (para 1.49)**.**

1.97.6. Installation

a. **Install short tierod (13) in fuselage forward fitting (17).**

(1) Engage threads of T-handle (18) with threads in fitting (17).

(2) Tighten T-handle (18).

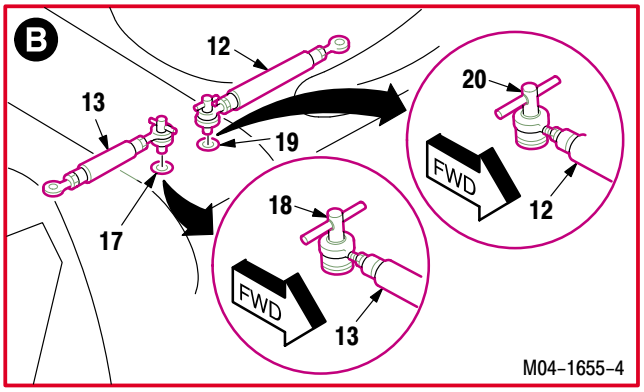
(3) Lay tierod (13) on fuselage.

b. **Install long tierod (12) in fuselage aft fitting (19).**

(1) Engage threads of T-handle (20) with threads in fitting (19).

(2) Tighten T-handle (20).

(3) Lay tierod (12) on fuselage.



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1.97. MAINTENANCE CRANE INSTALLATION – continued

WARNING

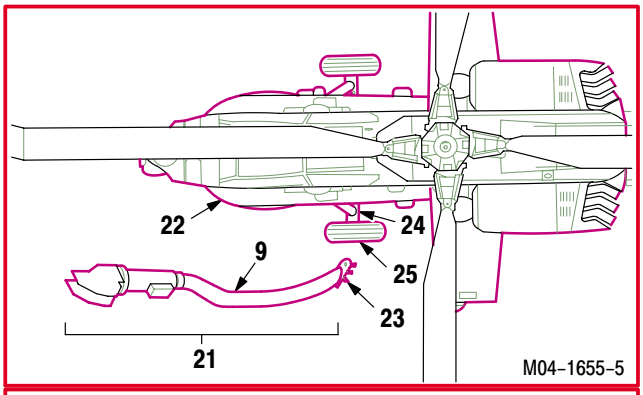
The vertical mast weighs 150 pounds. The mast must be securely supported with the mast foot cone kept in the jackpad during installation. Keep area clear of unnecessary personnel. If injury occurs, seek medical aid.

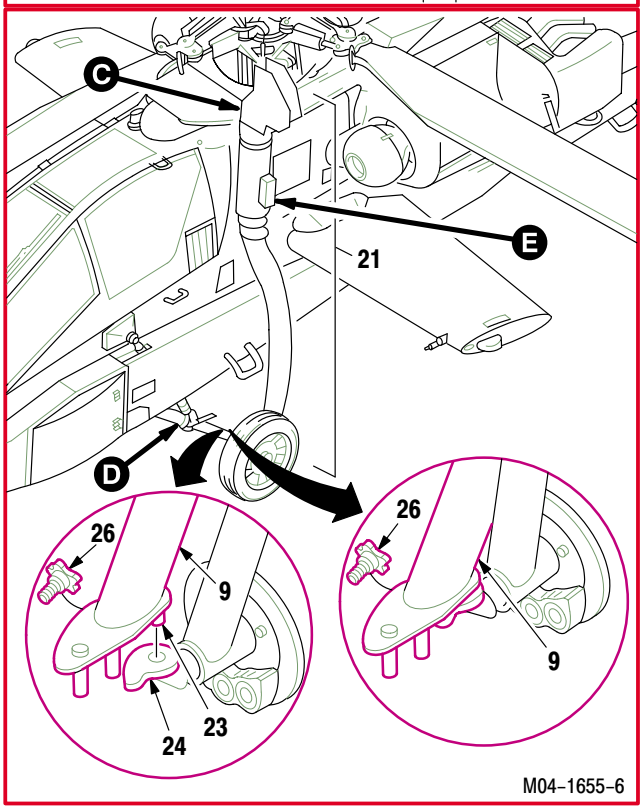
c. **Mount vertical mast (21) on helicopter.**

(1) Position mast (21) alongside forward avionics bay (22), with dogleg (9) outboard and foot cone (23) alined with jackpad (24) on main landing gear axle (25).

(2) Unscrew torque handle (26) from foot of dogleg (9).

(3) Raise mast (21) to vertical. Insert foot cone (23) into jackpad (24).

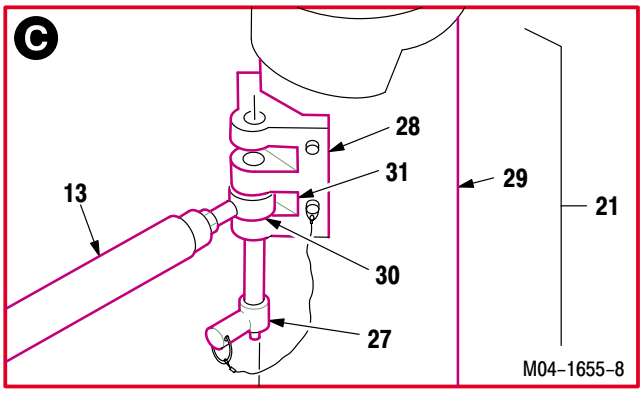




(4) Remove quick-release pin (27) from tie down block (28) on main leg (29).

(5) Place short tiedown rod-end (30) into bottom clevis (31) of block (28).

(6) Put pin (27) part way through block (28) and through rod-end (30), to secure short tiedown rod (13) to mast (21).



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1.97. MAINTENANCE CRANE INSTALLATION – continued

(7) Place long tiedown rod-end (32) into top clevis (33) of block (28).

(8) Complete installation of pin (27) through block (28) and rod-end (32) to secure long tiedown rod (12) to mast (21).

CAUTION

To prevent damage to jackpads or mast, torque handle and clamp screw must be tightened evenly.

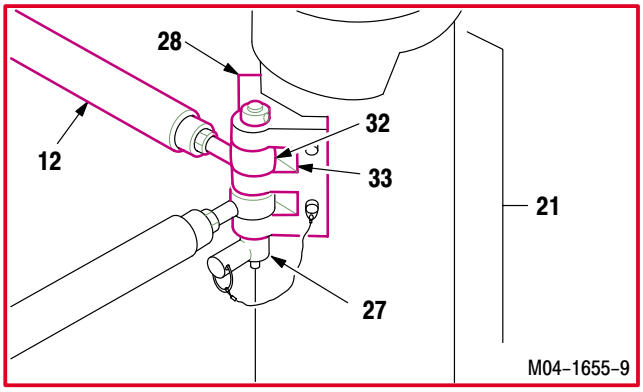
d. **Install arm (11) on mast (21) to hold jackpad (24).**

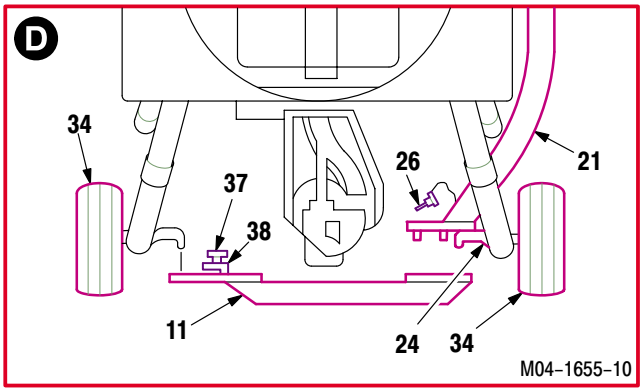
(1) Position arm (11) between main landing gear wheels (34). Make sure two large holes (35) with studs (36) are alined on bottom of mast.

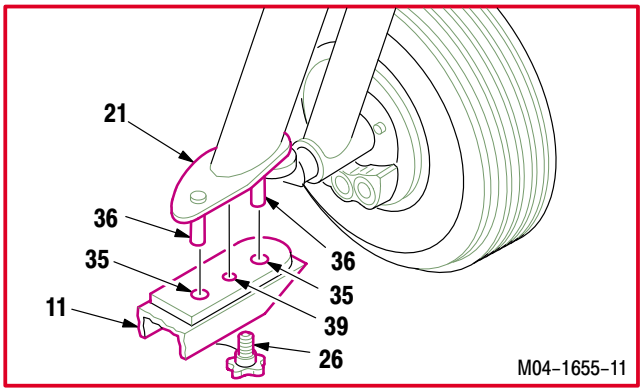
(2) Loosen clamp screw (37) to allow maximum free-play of clamp (38).

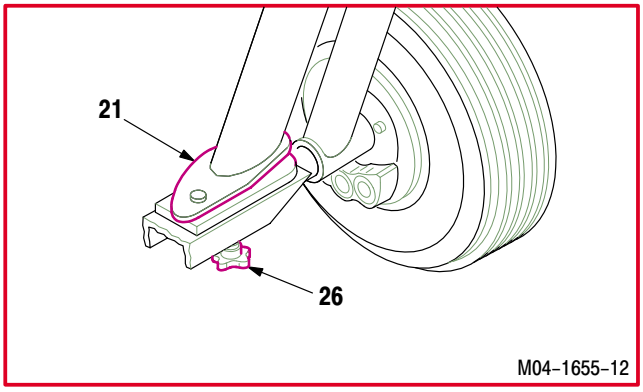
(3) Lift arm (11) to engage studs (36) with holes (35).

(4) Install torque handle (26) through center hole (39) of arm (11) to engage threads in bottom of mast (21). Do not tighten handle (26).









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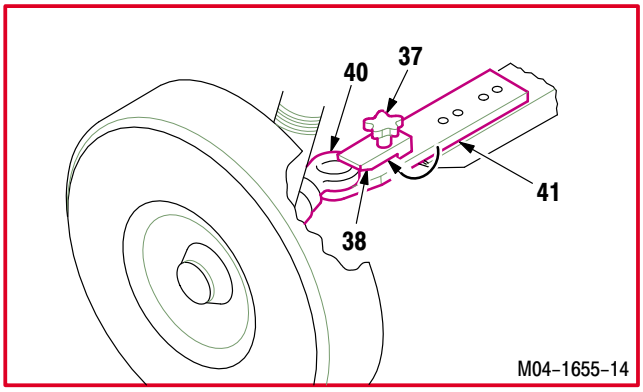
1.97. MAINTENANCE CRANE INSTALLATION – continued

(5) Engage opposite main landing gear jackpad (40) with hole in end plate (41).

(6) Swivel clamp (38) over jackpad (40).

(7) Engage threads of clamp screw (37) in end plate (41).

(8) Tighten clamp screw (37) and handle (26) evenly.



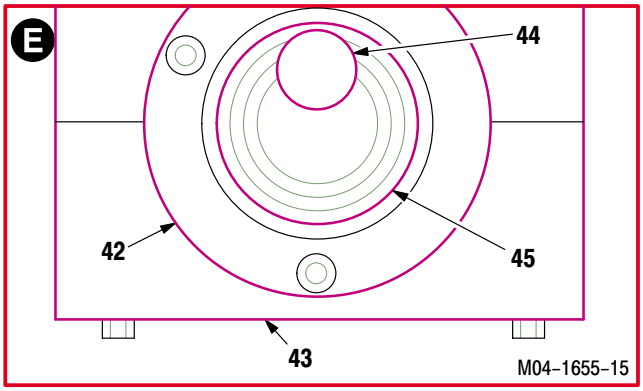
WARNING

The maintenance crane is unsafe to lift components if vertical mast is not within 3 degrees of vertical. Helicopter must be moved to a more level position.

e. **Check level (42) on winch gearbox (43) for mast vertical alinement.**

(1) Outer edge of air bubble (44) must be within 3 degrees indicator ring (45).

(2) Ground-handle helicopter to obtain mast vertical alinement within limits (para 1.78).



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1.97. MAINTENANCE CRANE INSTALLATION – continued

WARNING

The crane boom arm weighs 58 pounds and can cause injury to personnel if allowed to fall. Keep hands away from area between crane boom arm and elevation yoke. Keep area clear of unnecessary personnel. If injury occurs, seek medical aid.

f. **Install crane boom arm (10) on mast (21).**

(1) Move lift mechanism handle (46) up to unlock yoke (47).

(2) Swivel yoke (47) so open face is outboard.

(3) Move handle (46) down to lock yoke (47).

(4) Remove two quick-release pins (48) from yoke (47).

(5) Position pivot end of arm (10) in yoke (47) to aline boom hole X (49) with yoke hole A (50).

(6) Install one pin (48) through yoke holes A (50) and boom hole X (49).

(7) Move handle (46) up to unlock yoke (47).

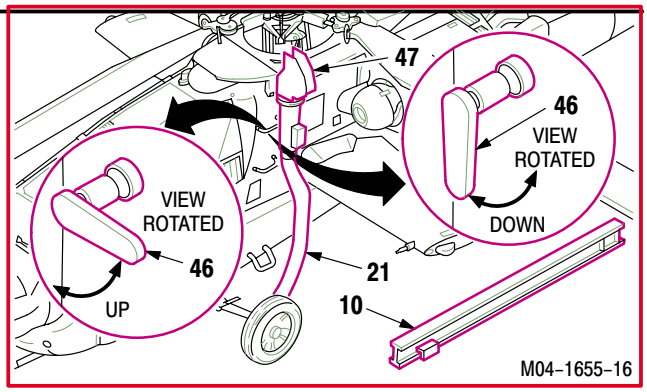
(8) Swing arm (10) forward (inboard) until end of arm is 1 foot from forward avionics bay (22).

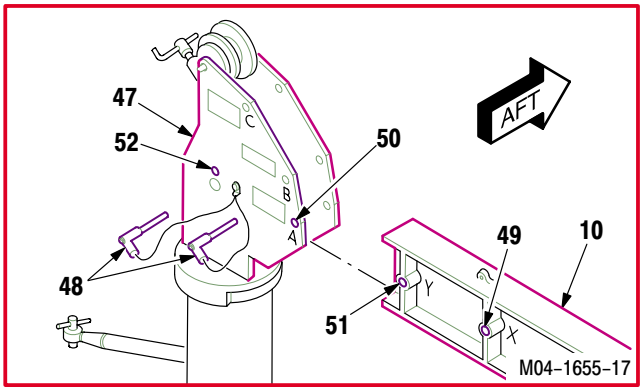
(9) Move handle (46) down to lock yoke (47).

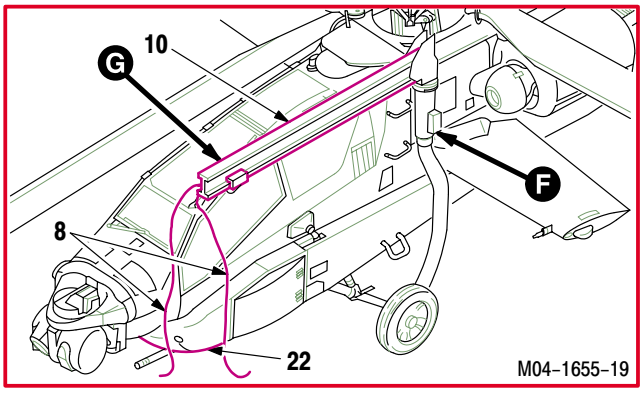
(10) Install two tag lines (8) on crane boom arm (10).

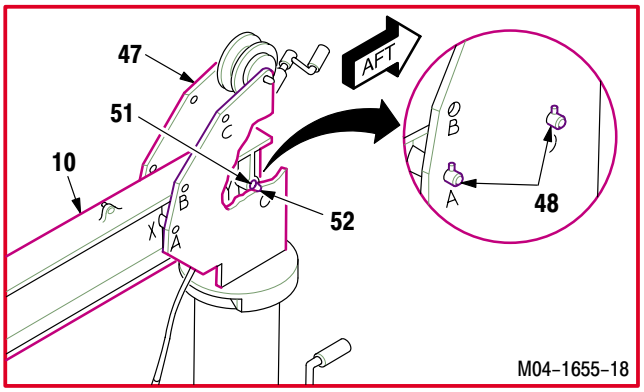
(11) Have assistant raise crane boom arm (10) to aline boom hole Y (51) with yoke holes O (52).

(12) Install remaining pins (48) through yoke holes O (52) and boom hole Y (51).









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1.97. MAINTENANCE CRANE INSTALLATION – continued

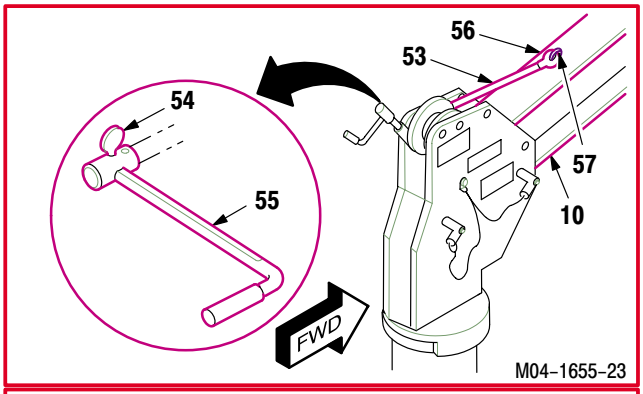
g. **Connect boom line (53) to arm (10).**

(1) Loosen thumbscrew (54). Extend winch handle (55). Tighten thumbscrew (54).

(2) Turn handle (55) to pull line (53) until shackle (56) reaches boom lifting eye (57).

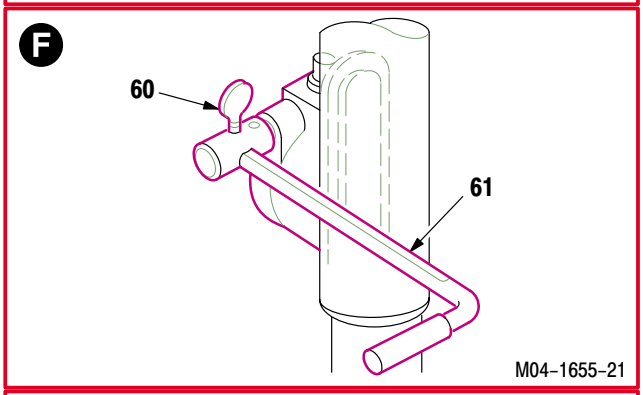
(3) Attach shackle (56) to eye (57).

(4) Turn handle (55) to take up slack in line (53).



h. **Install hoist wire rope (58) in cable sheave (59).**

(1) Loosen thumbscrew (60). Extend hoist winch handle (61). Tighten thumbscrew (60).



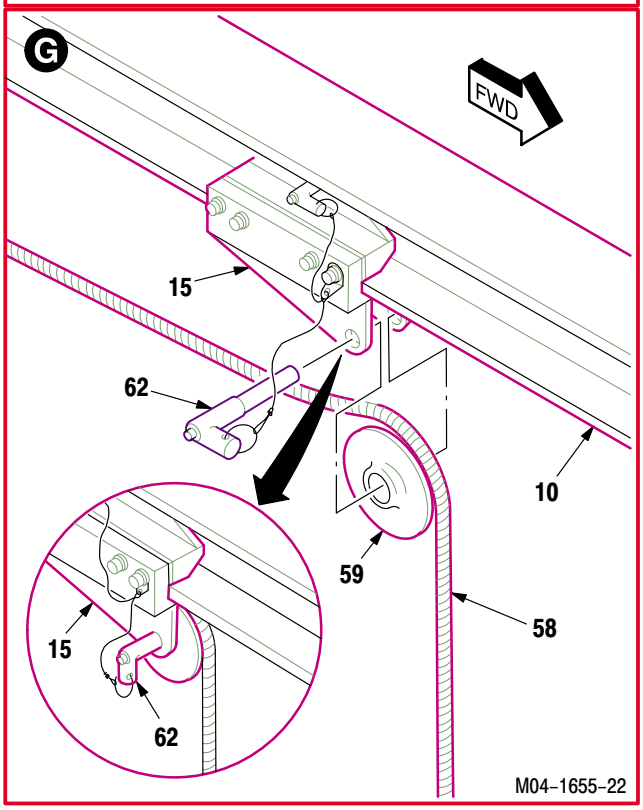
(2) Remove quick-release pin (62) from sheave (15) to release sheave (59).

(3) Turn handle (61). Pull wire rope (58) 2 feet beyond sheave (15).

(4) Place rope (58) in sheave (59).

(5) Position sheave (59) in sheave (15) to aline holes.

(6) Install pin (62) through sheave (15) and sheave (59).



i. **Inspect (QA).**

NOTE

Refer to paragraph 1.98 for maintenance crane adjustments.

END OF TASK

1.98. CRANE ADJUSTMENT – HOISTING

1.98.1. Description

This task covers:

1.99. Crane Adjustment – Engine Hoisting
1.100. Crane Adjustment – Main Rotor Blade Hoisting
1.101. Crane Adjustment – Main Rotor Head Hoisting
1.102. Crane Adjustment – Main Rotor Gearshaft, Support (Static) Mast, or Swashplate Hoisting
1.103. Crane Adjustment – Main Transmission Hoisting
1.104. Crane Adjustment – APU Hoisting

1.98.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
Two persons to assist

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
1.97	Maintenance crane installed

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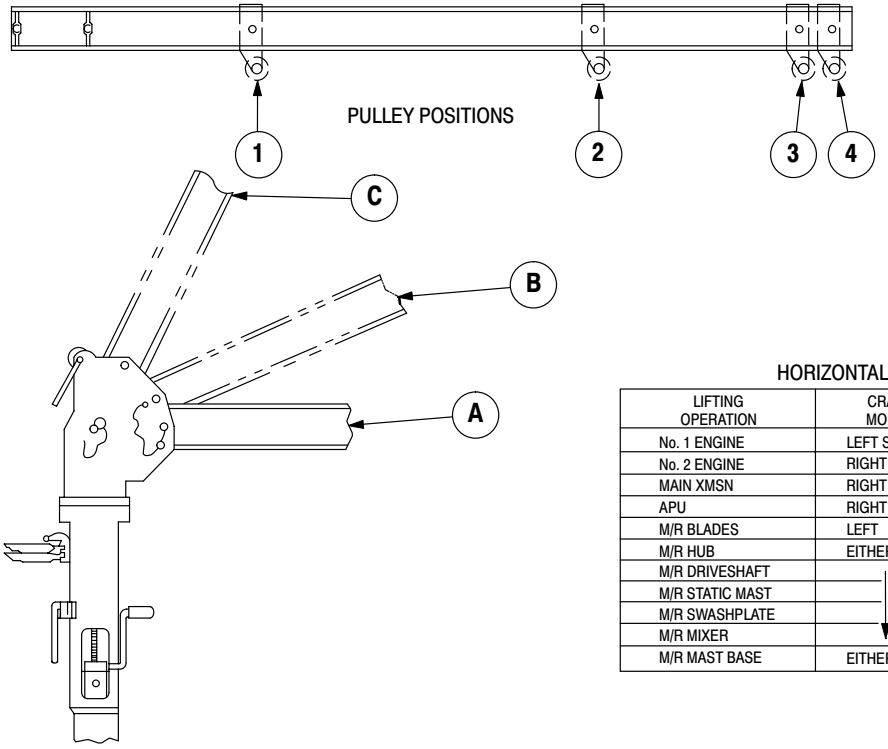
1.98. CRANE ADJUSTMENT – HOISTING



HORIZONTAL BOOM POSITIONS

LIFTING OPERATION	CRANE MOUNT	PULLEY POSITION	BOOM POSITION
No. 1 ENGINE	LEFT SIDE	2	A
No. 2 ENGINE	RIGHT	2	A
MAIN XMSN	RIGHT	1	A
APU	RIGHT	3	A
M/R BLADES	LEFT	4	B
M/R HUB	EITHER SIDE	4	C
M/R DRIVESHAFT	↓	4	C
M/R STATIC MAST	↓	4	C
M/R SWASHPLATE	↓	4	C
M/R MIXER	↓	4	C
M/R MAST BASE	EITHER SIDE	4	C

M04–2269

GO TO CORRECT PARAGRAPH

1.99. CRANE ADJUSTMENT – ENGINE HOISTING

1.99.1. Hoisting

a. **Move sheave (1) to position 2 on boom (2).**

(1) Move crane handle (3) up.

NOTE

Use tag lines to move boom.

(2) Turn boom (2) forward until it is about 1 foot out from side of fuselage.

(3) Move handle (3) down.

(4) Remove quick-release pin (4) from sheave (1) and boom (2).

(5) Slide sheave (1) on boom (2). Aline sheave hole (5) with boom position hole 2 (6).

(6) Install pin (4) through sheave (1) and boom (2).

b. **Adjust boom (2) to position A on elevation yoke (7).**

(1) Move handle (3) up.

(2) Turn boom (2) aft until it is 90 degrees from side of fuselage.

(3) Move handle (3) down.

(4) Crank winch (8) until quick-release pin (9) turns freely.

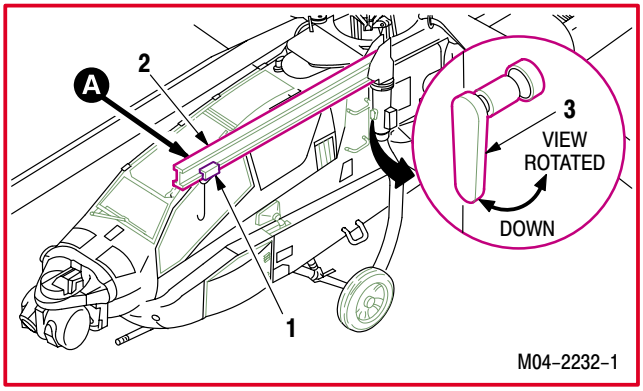
(5) Remove pin (9) from yoke (7) and boom (2).

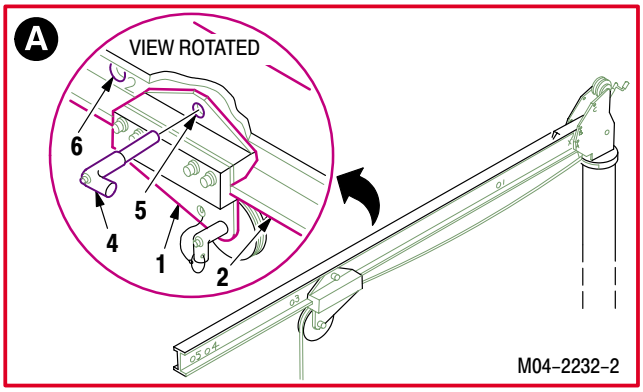
(6) Crank boom hoist drum (10) to aline boom X hole (11) with yoke position hole A (12).

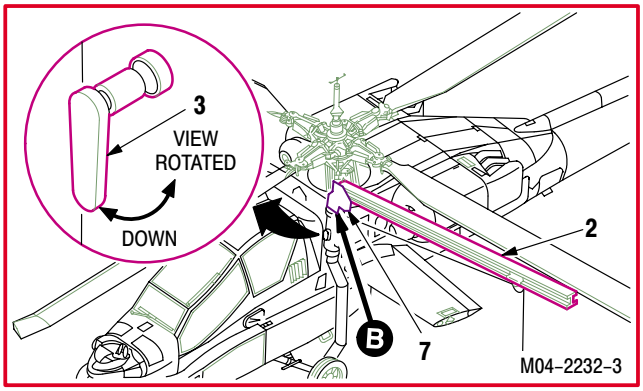
(7) Install pin (9) through yoke (7) and boom (2).

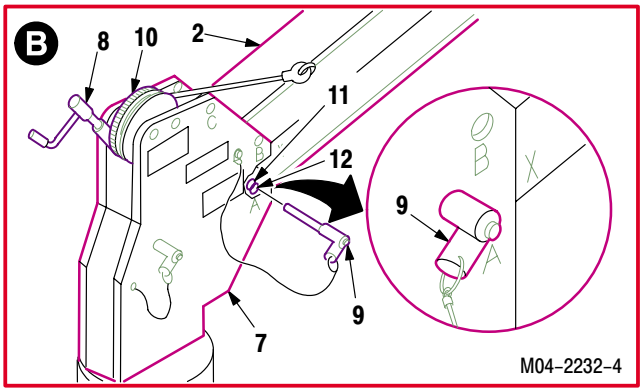
(8) Crank winch (8) to loosen boom lift line.

END OF TASK









1.100. CRANE ADJUSTMENT – MAIN ROTOR BLADE HOISTING

1.100.1. Hoisting

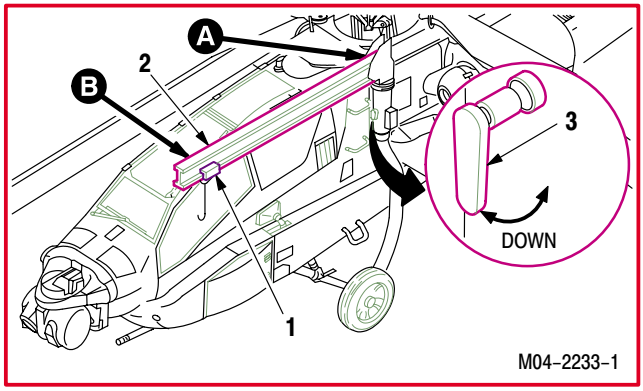
a. **Move sheave (1) to position 5 on boom (2).**

(1) Move crane handle (3) up.

NOTE

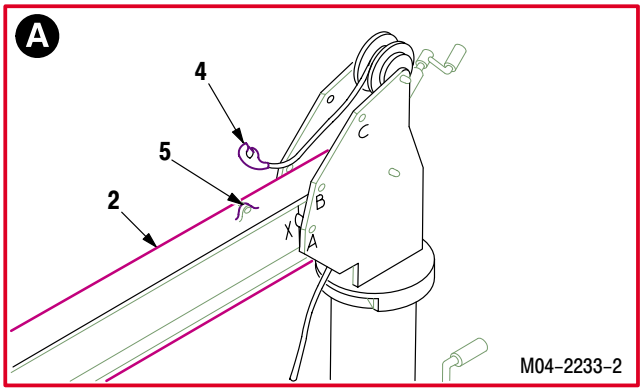
Use tag lines to move boom.

(2) Turn boom (2) forward until it is about 1 foot out from side of fuselage.



(3) Move handle (3) down.

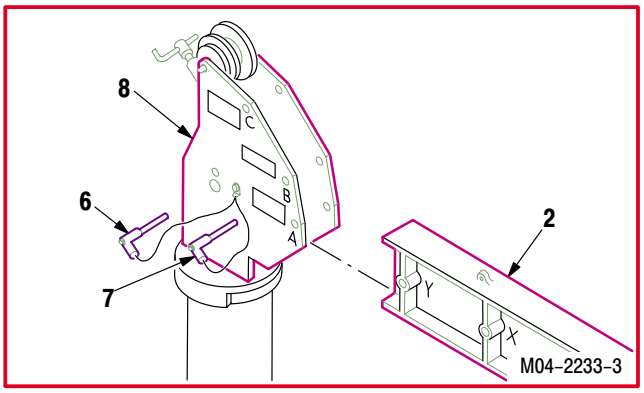
(4) Remove shackle (4) from eye (5).



(5) Lift boom (2) until quick-release pins (6) and (7) turn freely.

(6) Support boom (2). Remove pins (6) and (7) from yoke (8) and boom (2).

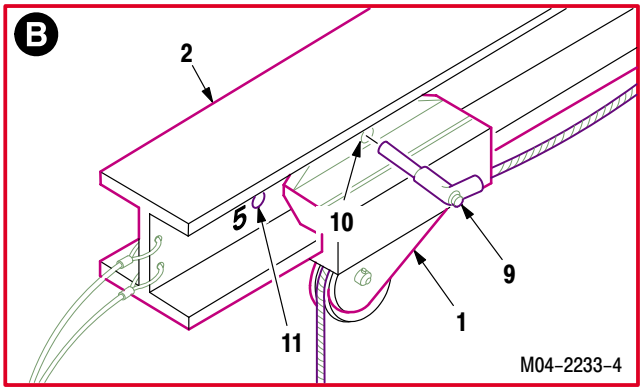
(7) Lower boom (2) to ground.



(8) Remove quick-release pin (9) from sheave (1) and boom (2).

(9) Slide sheave (1) on boom (2) to aline sheave hole (10) with boom position hole 5 (11).

(10) Install pin (9) through sheave (1) and boom (2).



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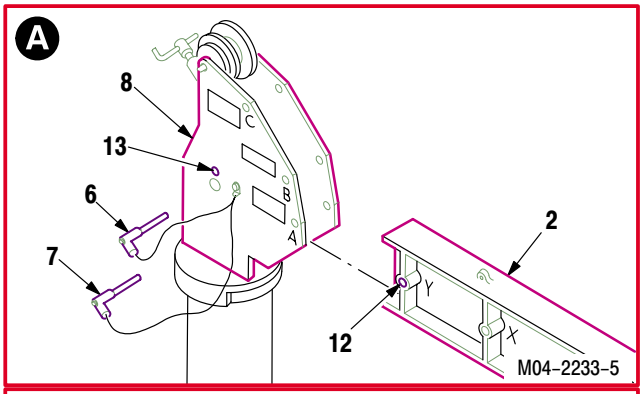
1.100. CRANE ADJUSTMENT – MAIN ROTOR BLADE HOISTING – continued

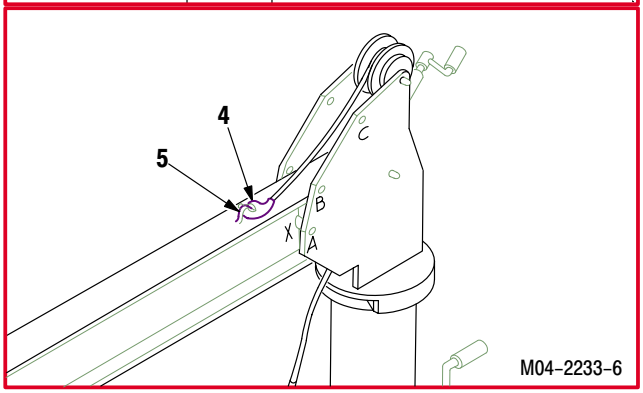
(11) Raise pivot end of boom (2) and slide into yoke (8).

(12) Aline arm pivot Y hole (12) with yoke pivot 0 hole (13).

(13) Install pin (6) through yoke (8) and boom (2).



(14) Install shackle (4) on eye (5).



b. **Adjust boom (2) to position B on yoke (8).**

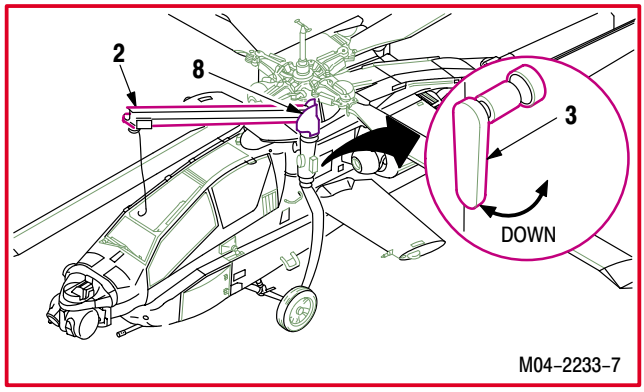
(1) Move handle (3) up.

NOTE

Use tag lines to move boom.

(2) Turn boom (2) aft until it is 90 degrees from side of fuselage.

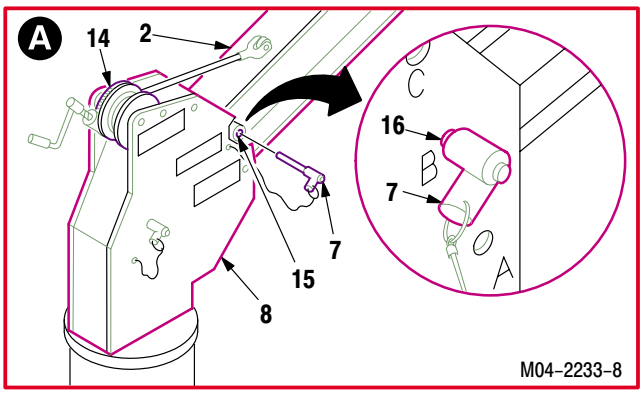
(3) Move handle (3) down.



(4) Crank boom hoist drum (14) to aline boom X hole (15) with yoke (8) position B hole (16).

(5) Install pin (7) through yoke (8) and boom (2).

(6) Crank boom hoist drum (14) to loosen boom line.



END OF TASK

1.101. CRANE ADJUSTMENT – MAIN ROTOR HEAD HOISTING

1.101.1. Hoisting

a. **Move sheave (1) to boom (2) position 3.**

(1) Move handle (3) up.

NOTE

Use tag lines to move boom.

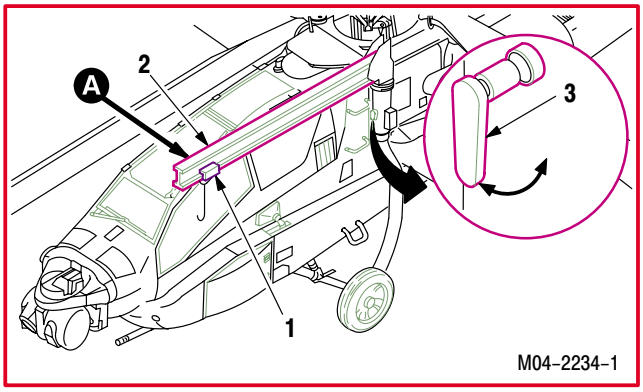
(2) Turn boom (2) forward until it is about 1 foot from side of fuselage.

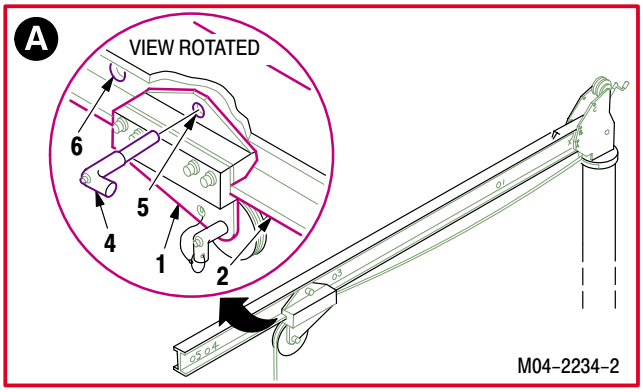
(3) Move handle (3) down.

(4) Remove pin (4) from sheave (1) and boom (2).

(5) Slide sheave (1) on boom (2). Aline sheave hole (5) with boom position 3 hole (6).

(6) Install pin (4) through sheave (1) and boom (2).





b. **Adjust boom (2) to yoke (7) position C.**

(1) Move handle (3) up.

(2) Turn boom (2) aft until boom is 90 degrees from side of fuselage.

(3) Move handle (3) down.

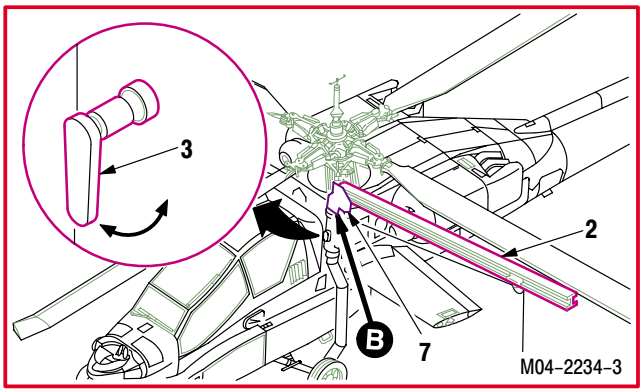
(4) Crank boom hoist drum (8) until pin (9) turns freely.

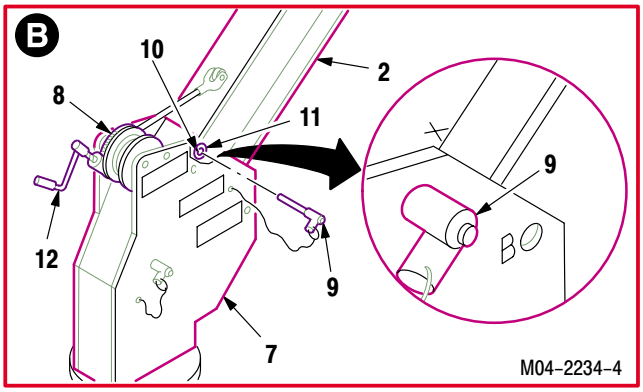
(5) Remove pin (9) from yoke (7) and boom (2).

(6) Crank boom hoist drum (8). Aline arm X hole (10) with yoke position hole C (11).

(7) Install pin (9) as far as it will go through yoke (7) and boom (2).

(8) Crank winch (12) to loosen boom line.





END OF TASK

1.102. CRANE ADJUSTMENT – MAIN ROTOR GEARSHAFT, SUPPORT (STATIC) MAST, OR SWASHPLATE HOISTING

1.102.1. Crane Adjustment

a. **Move sheave (1) to boom (2) position 4.**

(1) Move crane handle (3) up.

NOTE

Use tag lines to move boom.

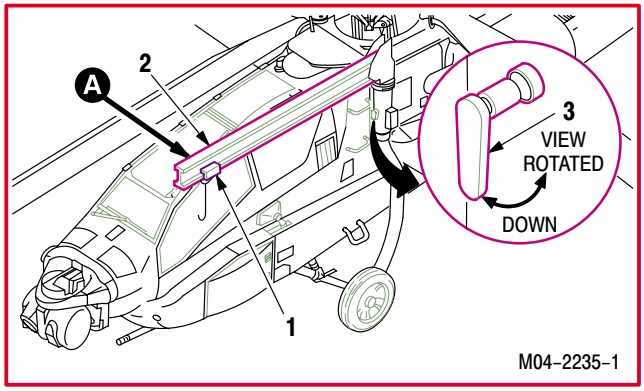
(2) Turn boom (2) forward until it is about 1 foot from side of fuselage.

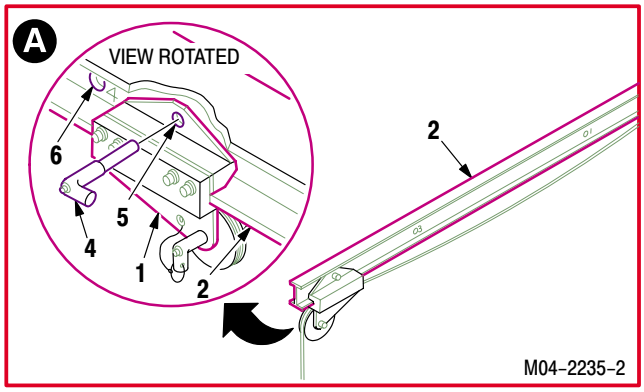
(3) Move handle (3) down.

(4) Remove quick-release pin (4) from sheave (1) and boom (2).

(5) Slide sheave (1) on boom (2). Aline sheave hole (5) with arm position hole 4 (6).

(6) Install pin (4) through sheave (1) and boom (2).





b. **Adjust boom (2) to yoke (7) on position C.**

(1) Move handle (3) up.

(2) Turn boom (2) aft until boom is 90 degrees from side of fuselage.

(3) Move handle (3) down.

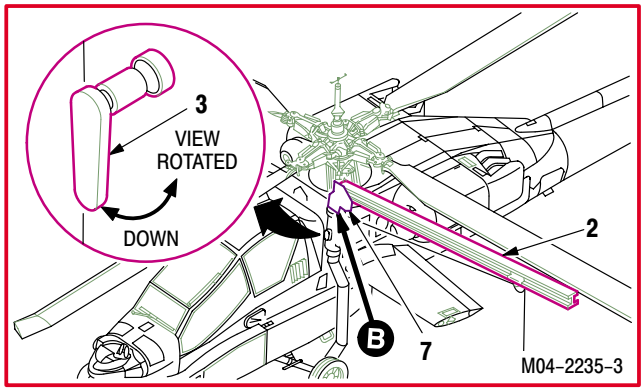
(4) Crank boom hoist drum (8) until quick-release pin (9) turns freely.

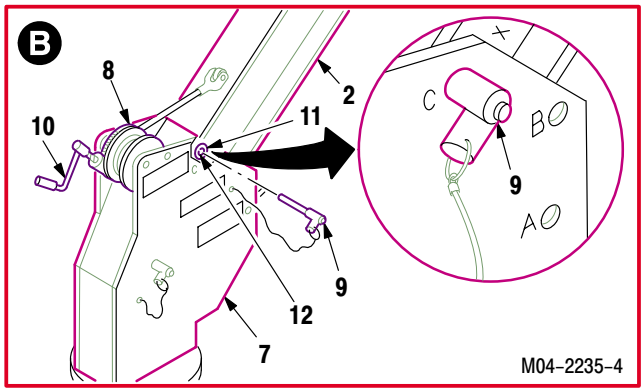
(5) Remove pin (9) from yoke (7) and boom (2).

(6) Crank winch (10). Aline boom (2) hole X (11) with yoke (7) position hole C (12).

(7) Install pin (9) through yoke (7) and boom (2).

(8) Crank boom hoist drum (8) to loosen boom line.





END OF TASK

1.103. CRANE ADJUSTMENT – MAIN TRANSMISSION HOISTING

1.103.1. Crane Adjustment

a. **Move sheave (1) to position 1 on boom (2).**

(1) Move crane handle (3) up.

NOTE

Use tag lines to move boom.

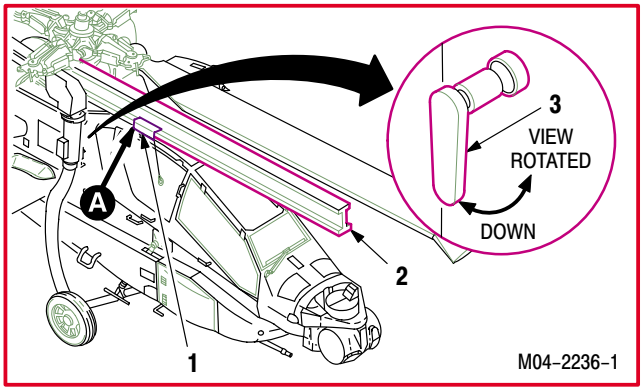
(2) Turn boom (2) forward until boom is about 1 foot from side of fuselage.

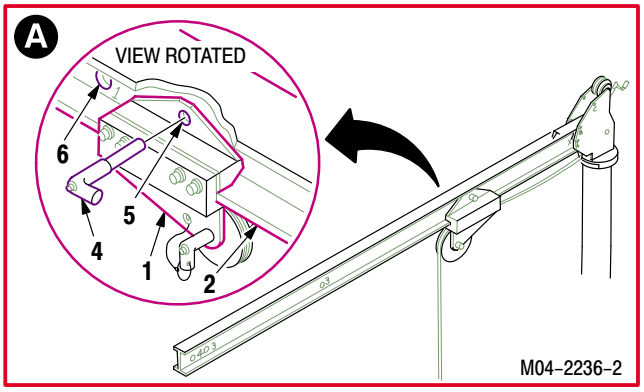
(3) Move handle (3) down.

(4) Remove quick-release pin (4) from sheave (1) and boom (2).

(5) Slide sheave (1) on boom (2). Aline sheave hole (5) with boom position hole 1 (6).

(6) Install pin (4) through sheave (1) and boom (2).





b. **Adjust boom (2) to yoke (7) position B.**

(1) Move handle (3) up.

(2) Turn boom (2) aft until it is 90 degrees from side of fuselage.

(3) Move handle (3) down.

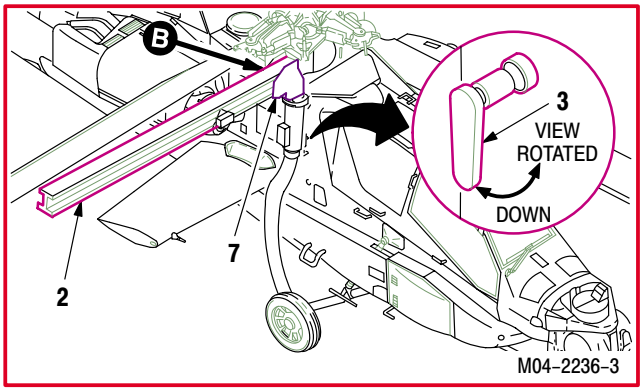
(4) Crank boom hoist drum (8) until pin (9) turns freely.

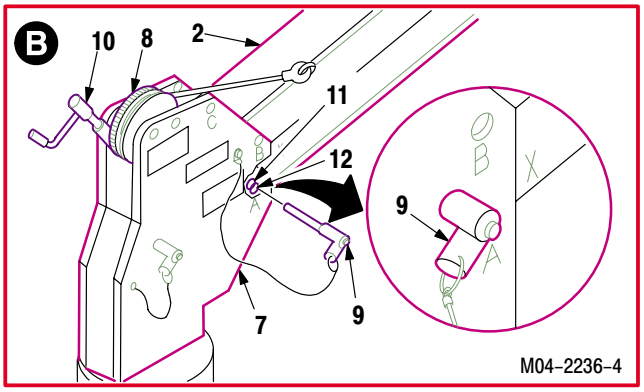
(5) Remove pin (9) from yoke (7) and boom (2).

(6) Crank winch (10). Aline boom hole X (11) with yoke position hole B (12).

(7) Install pin (9) through yoke (7) and boom (2).

(8) Crank boom hoist drum (8) to loosen boom line.





END OF TASK

1.104. CRANE ADJUSTMENT – APU HOISTING

1.104.1. Crane Adjustment

a. **Move sheave (1) to boom (2) position 4.**

(1) Move crane handle (3) up.

NOTE

Use tag lines to move boom.

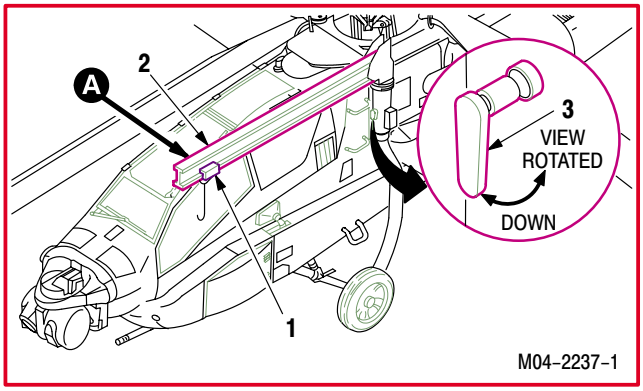
(2) Turn boom (2) forward until it is about 1 foot from side of fuselage.

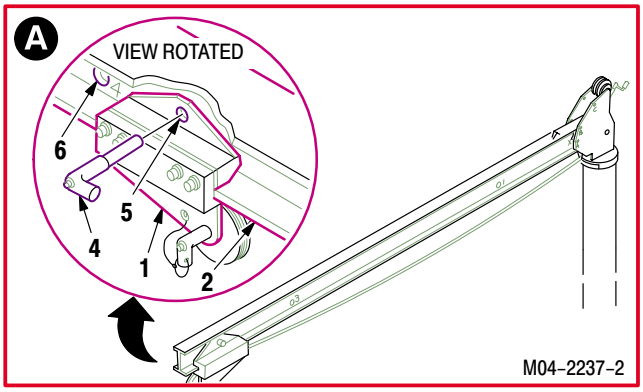
(3) Move handle (3) down.

(4) Remove quick-release pin (4) from sheave (1) and boom (2).

(5) Slide sheave (1) on boom (2). Aline sheave hole (5) with boom position hole 4 (6).

(6) Install pin (4) through sheave (1) and boom (2).





b. **Adjust boom (2) to yoke (7) position A.**

(1) Move handle (3) up.

(2) Turn boom (2) aft until it is 90 degrees from side of fuselage.

(3) Move handle (3) down.

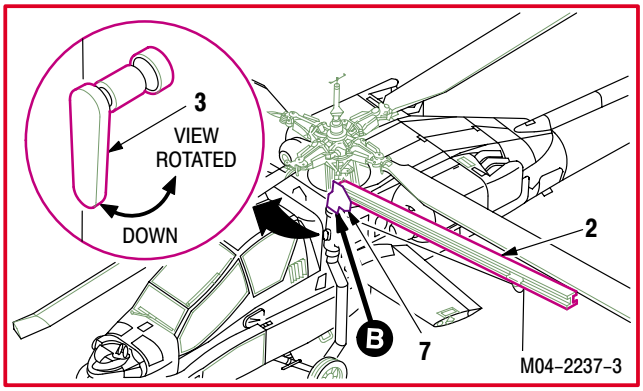
(4) Crank boom hoist drum (8) until quick-release pin (9) turns freely.

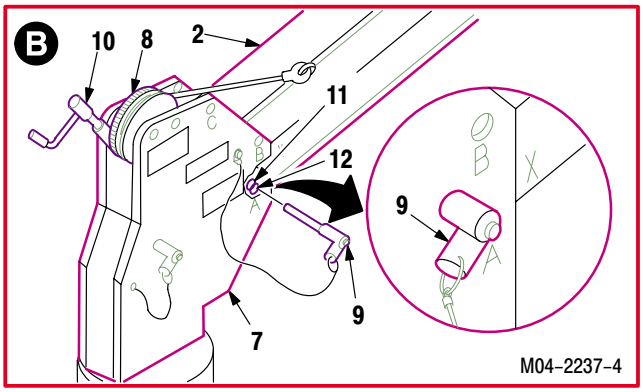
(5) Remove pin (9) from yoke (7) and boom (2).

(6) Crank winch (10). Aline boom hole X (11) with yoke position hole A (12).

(7) Install pin (9) through yoke (7) and boom (2).

(8) Crank boom hoist drum (8) to loosen boom line.





END OF TASK

1.105. MAINTENANCE CRANE REMOVAL

1.105.1. Description

This task covers: Removal From Helicopter. Stowage.

1.105.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
Two persons to assist

Equipment Conditions:

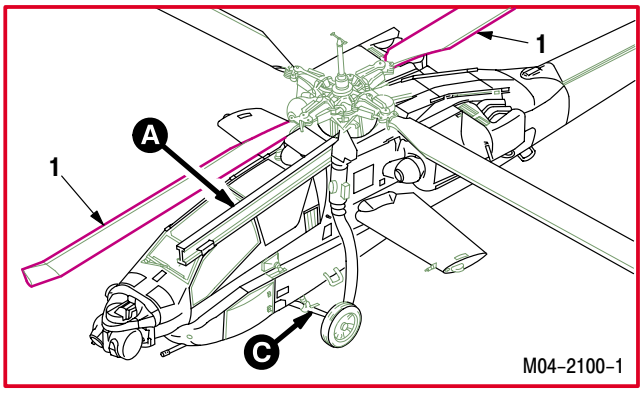
Ref	Condition
1.57	Helicopter safed
1.99	Engine hoisting crane adjusted

WARNING

- **The boom arm weighs 58 pounds and can cause injury to personnel if allowed to fall. Keep hands away from area between boom arm and elevation yoke. Keep area clear of unnecessary personnel. If injury occurs, seek medical aid.**
- **The vertical mast weighs 150 pounds. The mast must be securely supported with the mast foot cone kept on the jackpad until tierods are disconnected and personnel are ready to remove it. Keep work area clear of unnecessary personnel and removed components. If injury occurs, seek medical aid.**

1.105.3. Removal From Helicopter

a. **Aline two rotor blades (1) with helicopter longitudinal centerline.**



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1.105. MAINTENANCE CRANE REMOVAL – continued

b. **Remove wire rope (2) from cable sheave (3).**

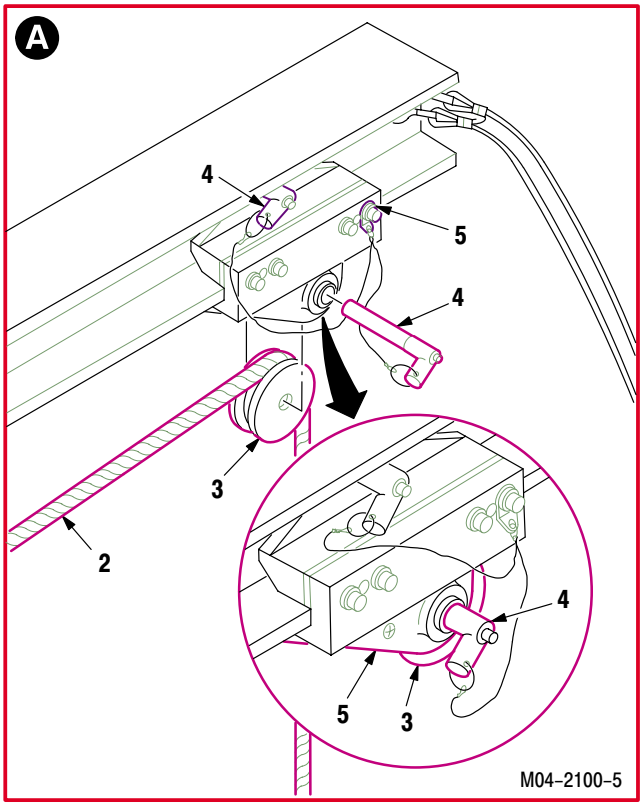
(1) Support sheave (3) and rope (2).

(2) Remove quick-release pin (4) from boom sheave (5) to release sheave (3).

(3) Remove rope (2) from sheave (3).

(4) Aline holes in sheave (3) with holes in sheave (5).

(5) Install pin (4) through sheave (5) and sheave (3).



CAUTION

To prevent damage to wire rope, keep tension on rope while operating hoist drum.

c. **Store wire rope (2) on hoist drum (6).**

(1) With assistant providing tension on wire rope (2), turn handle (7) to store rope on hoist drum (6) until hook (8) is 1 foot from vertical mast (9).

d. **Disconnect boom line (10) from crane boom arm (11).**

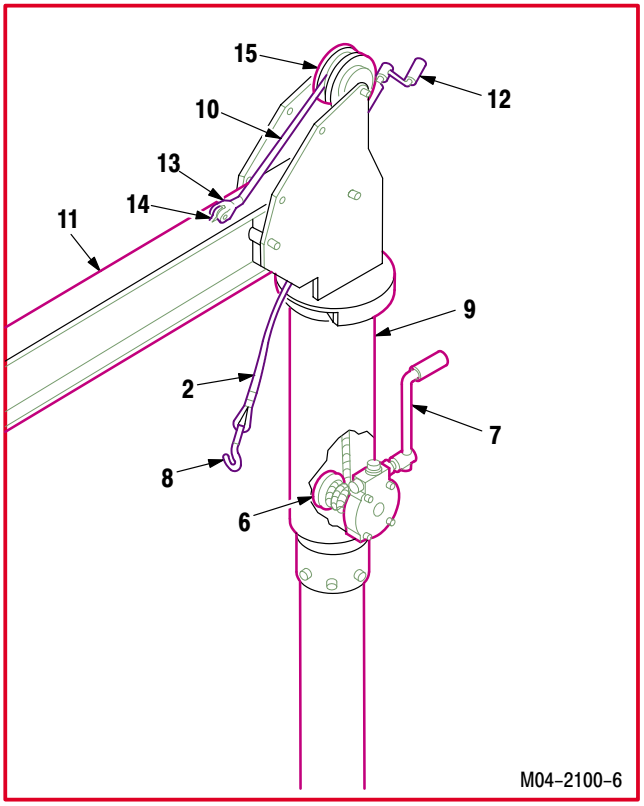
(1) Turn boom winch handle (12) to give slack in line (10).

(2) Disconnect shackle (13) from boom arm lifting eye (14).

(3) Secure shackle (13) on line (10).

e. **Store line (10) on boom hoist drum (15).**

(1) With assistant providing tension on boom line (10), turn handle (12) to store line on drum (15).



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1.105. MAINTENANCE CRANE REMOVAL – continued

f. **Remove arm (11) from elevation yoke (16).**

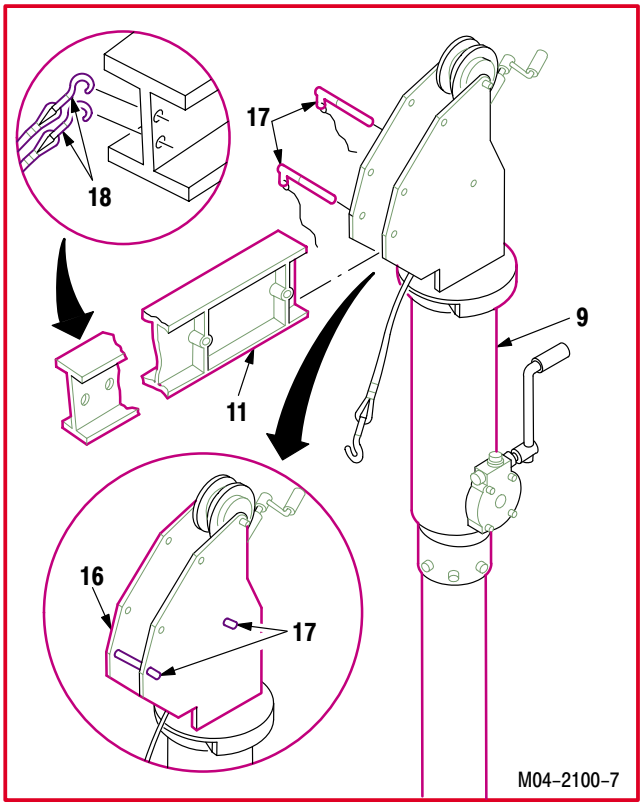
(1) With assistants supporting arm (11), remove two quick-release pins (17) from yoke (16) and arm (11).

(2) Remove arm (11) from yoke (16).

(3) Remove two tag lines (18) from arm (11).

(4) Set arm (11) and tag lines (18) away from work area.

(5) Reinstall two pins (17) through holes in yoke (16).



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1.105. MAINTENANCE CRANE REMOVAL – continued

CAUTION

To prevent damage to jackpads or vertical mast, torque arm must be supported while torque handle and clamp screw are loosened evenly.

g. **Remove support arm (19) from jackpad (20) and mast (9).**

(1) Have assistant support arm (19).

(2) Loosen clamp screw (21) and torque handle (22).

(3) Swivel clamp (23) away from jackpad (20).

(4) Remove handle (22) from bottom of mast (9).

(5) Remove support arm (19).

(6) Set support arm (19) with other removed crane components.

h. **Remove mast (9) from helicopter.**

(1) With assistants securely supporting mast (9), remove quick-release pin (24) from tie block (25).

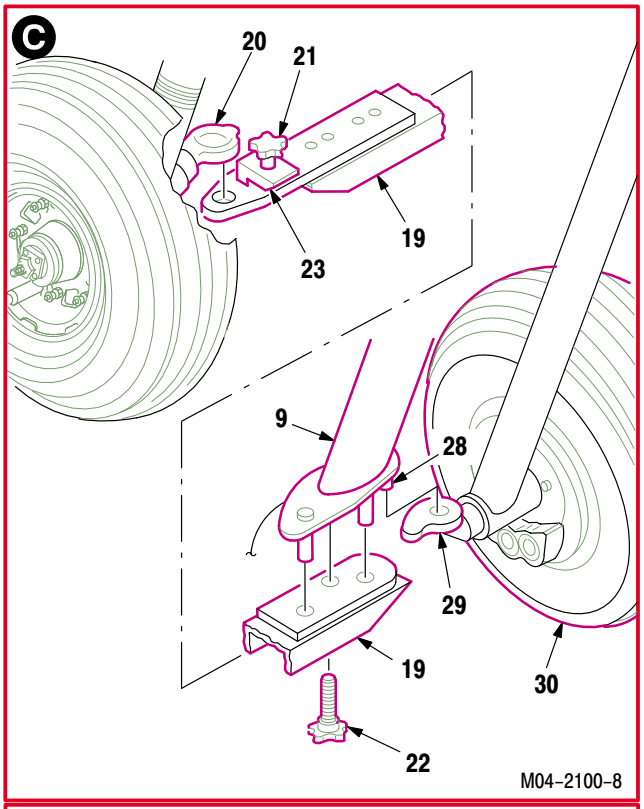
(2) Hold mast (9). Swing short tierod (26) and long tierod (27) out of tie block (25) to top of fuselage.

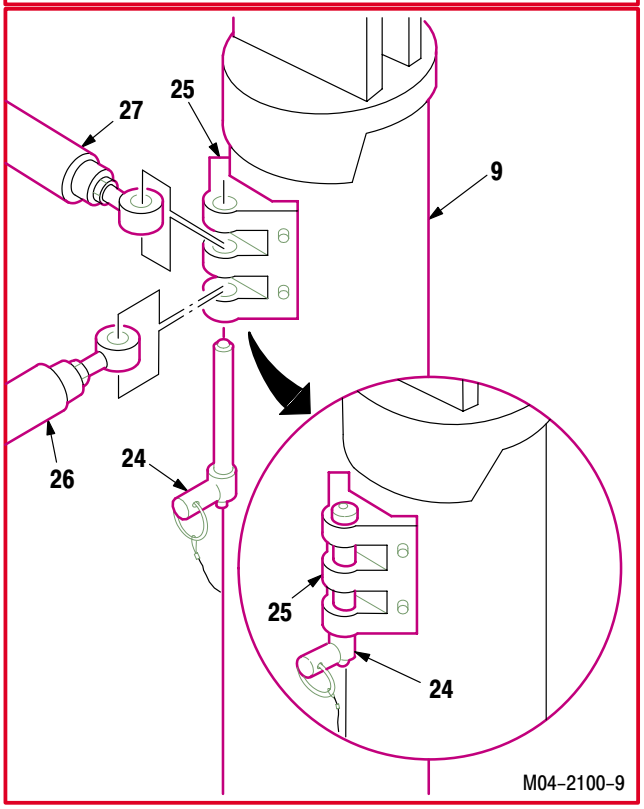
(3) Reinstall pin (24) in block (25).

(4) With all personnel lifting mast (9) together, lift foot cone (28) out of jackpad (29) and away from helicopter.

(5) Set foot of mast (9) down when it clears main landing gear wheel.

(6) Lower mast (9) (forward) to lay on ground alongside helicopter.





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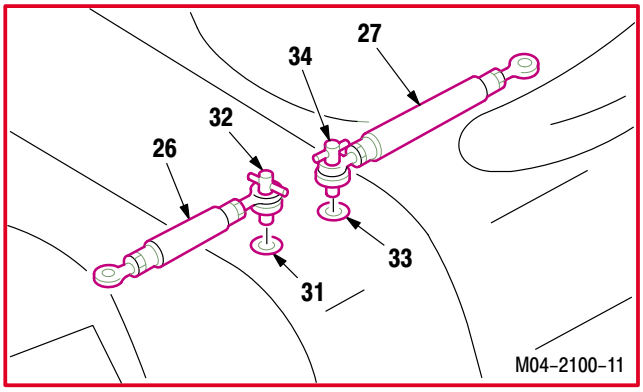
1.105. MAINTENANCE CRANE REMOVAL – continued

i. **Remove short tierod (26) from fuselage forward fitting (31).** Remove T-handle (32).

j. **Remove long tierod (27) from fuselage aft fitting (33).** Remove T-handle (34).



1.105.4. Stowage

a. **Retract two winch handles (35).**

(1) Loosen thumbscrew (36). Retract handle (35). Tighten thumbscrew.

(2) Repeat step a for other handle (35).

b. **Position yoke (16) with open side (37) alined with dogleg (38).**

(1) Move lift mechanism handle (39) up to unlock yoke (16).

(2) Turn yoke (16) so open side (37) alines with dogleg (38).

(3) Move handle (39) down to lock yoke (16).

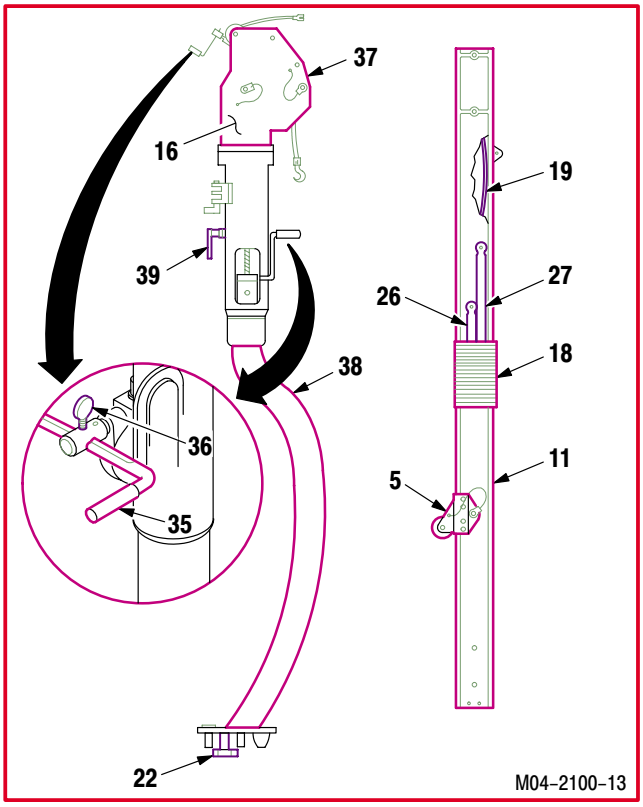
c. **Lay support arm (19) in arm (11) channel.**

d. **Lay short tierod (26) and long tierod (27) in opposite channel of arm (11).**

e. **Wrap tag lines (18) around arm (19), short tierod (26), long tierod (27), and arm (11).**

f. **Install handle (22) in bottom of dogleg (38).**

g. **Return maintenance crane to storage.**



END OF TASK

1.106. MAIN ROTOR BLADES TIEDOWN – INSTALLATION

1.106.1. Description

This task covers: Installation.

1.106.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft mooring tiedown kit (item 363, App H)
Fibrous rope (item 271, App H)

Personnel Required:

67R Attack Helicopter Repairer

References:

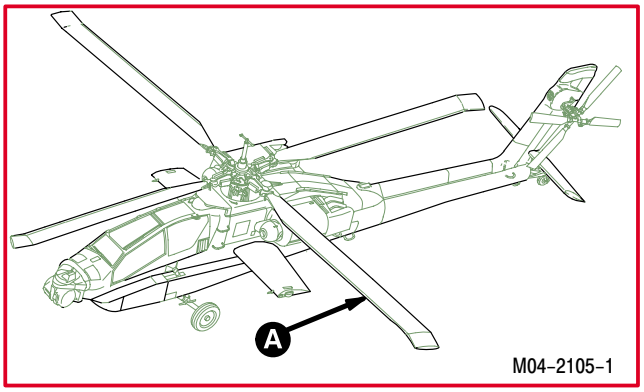
TM 1-1500-250-23

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

NOTE

This task describes forward and aft tiedown installation.



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1.106. MAIN ROTOR BLADES TIEDOWN – INSTALLATION – continued

1.106.3. Installation

NOTE

- Ensure that main rotor blade tiedown boot is in good repair and the two nylon end straps are securely attached.
- Ensure tiedown ropes are long enough to tie rotor blades to required locations (TM 1-1500-250-23).

a. **Install main rotor blades tiedown (1).**

(1) Extend tiedown pole (2). Attach pole (2) to tiedown bracket (3).

(2) Rotate tiedown pole lock (4) to maintain extension.

(3) Hold main rotor blade tiedown rope (5) to stabilize tiedown (1).

(4) Position tiedown (1) over end of rotor blade (6) trailing edge first.

(5) Remove tiedown pole (2) from tiedown bracket (3).

(6) Repeat steps a.(1) thru a.(5) for other three rotor blades.

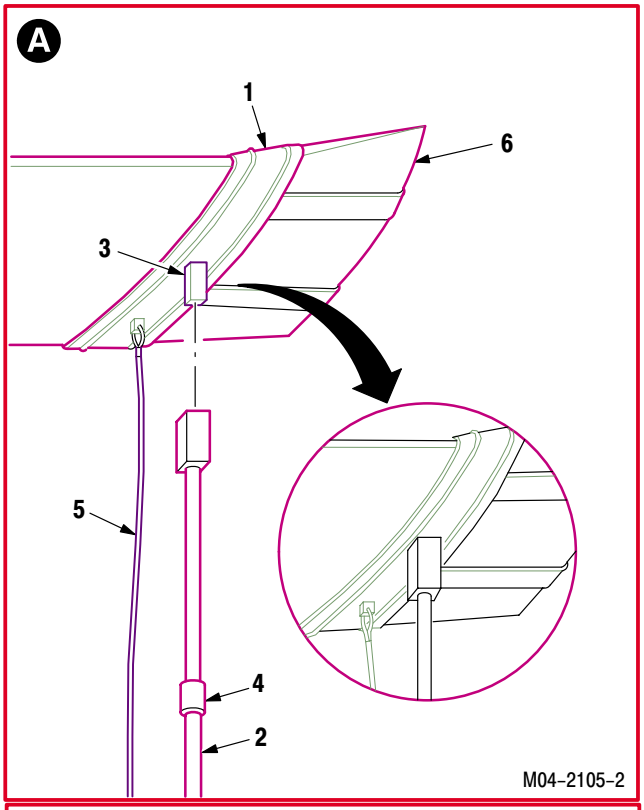
b. **Secure tiedown ropes (5) and (7).**

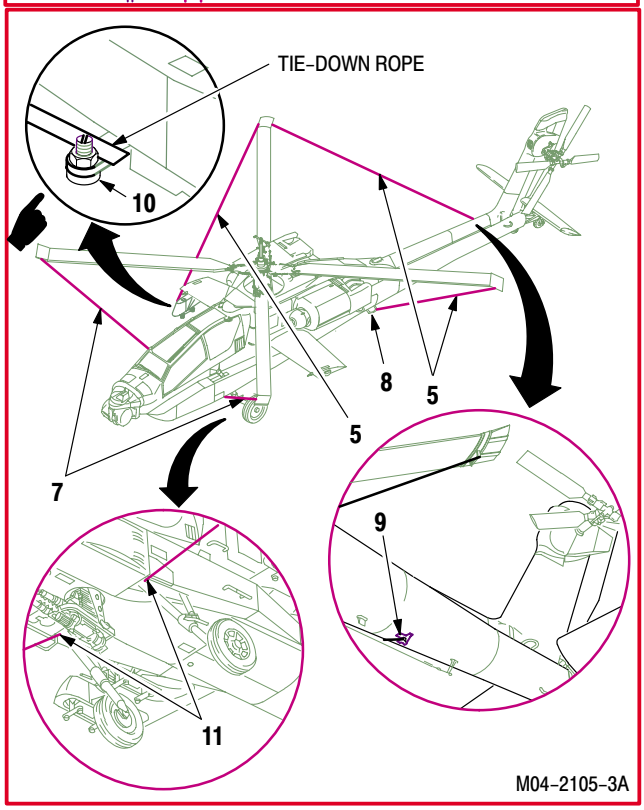
(1) Secure left aft tiedown rope (5) to catwalk step (8).

(2) Secure right aft tiedown rope (5) to aft jackpad (9).

(3) Secure a second right aft tiedown rope (5) to right outboard pylon rack sway restraint (10).

(4) Secure two tiedown ropes (7) to each forward landing gear mooring point (11).





END OF TASK

1.107. MAIN ROTOR BLADES TIEDOWN – REMOVAL

1.107.1. Description

This task covers: Removal.

1.107.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aircraft mooring tiedown kit (item 363, App H)

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

Personnel Required:

67R Attack Helicopter Repairer

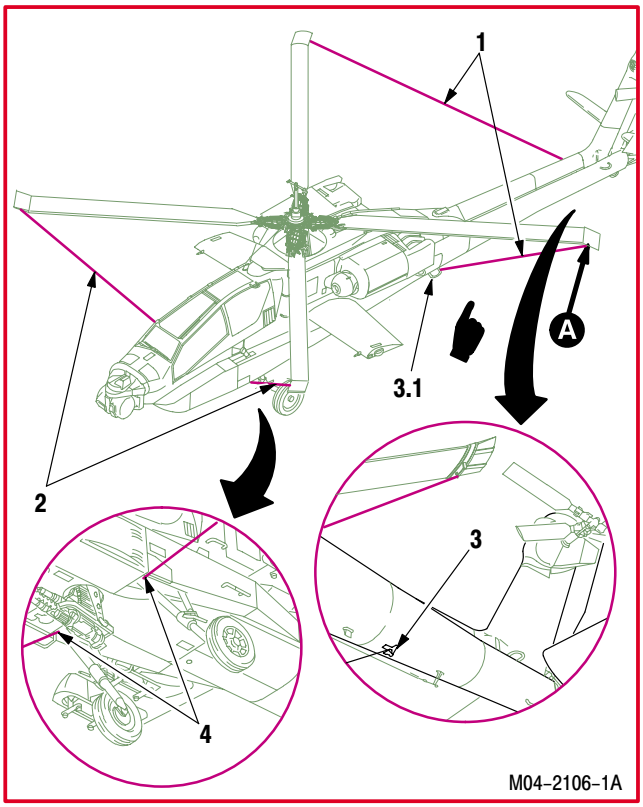
1.107.3. Removal

a. **Release main rotor blade tiedown ropes (1) and (2).**

(1) Release right aft tiedown rope (1) from aft jackpad (3).

(2) Release left aft tiedown rope (1) from catwalk step (3.1).

(3) Release two tiedown ropes (2) from each forward landing gear mooring point (4).



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1.107. MAIN ROTOR BLADES TIEDOWN – REMOVAL – continued

b. **Remove main rotor blade tiedown (5).**

(1) Extend tiedown pole (6). Attach pole (6) to tiedown bracket (7).

(2) Rotate tiedown pole lock (8) to maintain extension.

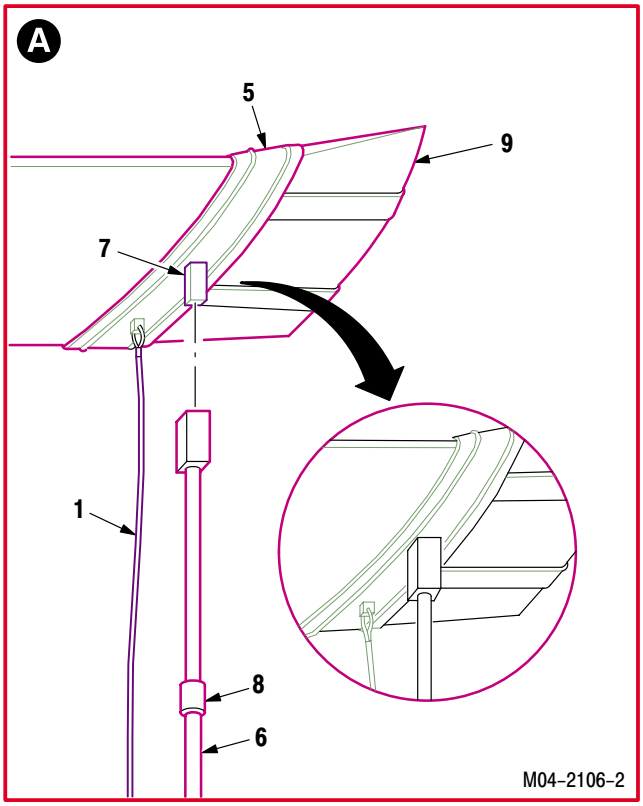
(3) Hold tiedown rope (1) to stabilize tiedown (5).

(4) Remove tiedown (5) from end of rotor blade (9).

(5) Remove pole (6) from tiedown bracket (7).

(6) Repeat steps b.(1) thru b.(5) for other three rotor blades.

c. **Stow pole (6) and tiedown (5) in flyaway kit in aft stowage bay.**



END OF TASK

1.108A. MAIN ROTOR TRACK AND BALANCE AVA KIT INSTALLATION

1.108A.1. Description

This task covers: Aircraft Preparation. Equipment Installation. Universal Tracking Device (UTD) Installation. SPU Bypass Installation Instructions. Night-Time Tracking Setup Instructions.

1.108A.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Helicopter rotor head balance and blade track run test equipment (item 353A, App H)
Aviation vibration analysis test set (item 354B, App H)
Maintenance platform (item 209, App H)

Materials/Parts:

Screw, machine NAS603–10P

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

1.108A.3. Aircraft Preparation

a. **Position main rotor blades.**

(1) Rotate main rotor head such that double interrupter is over magnetic pickup and mark blades as follows:

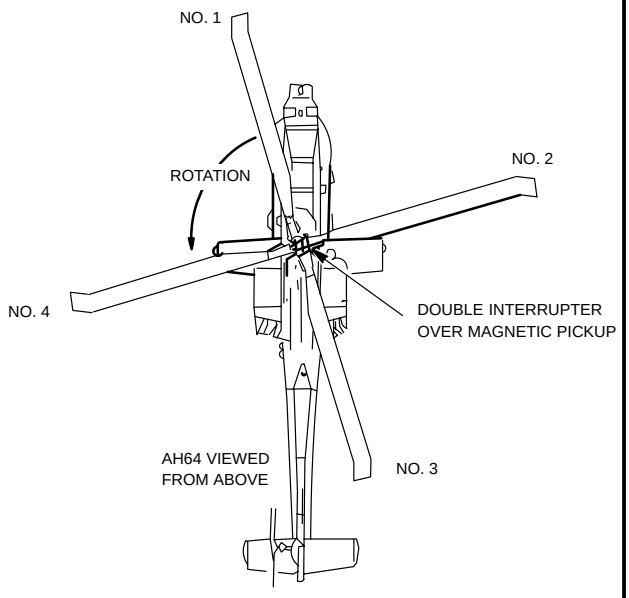
(a) Blade #1 is over nose of aircraft.

(b) Blade #2 is to the right as viewed from aft of aircraft.

(c) Blade #3 is over tailboom.

(d) Blade #4 is to the left as viewed from aft of aircraft.

(2) Mark blades accordingly.



TOP VIEW OF MAIN ROTOR BLADES

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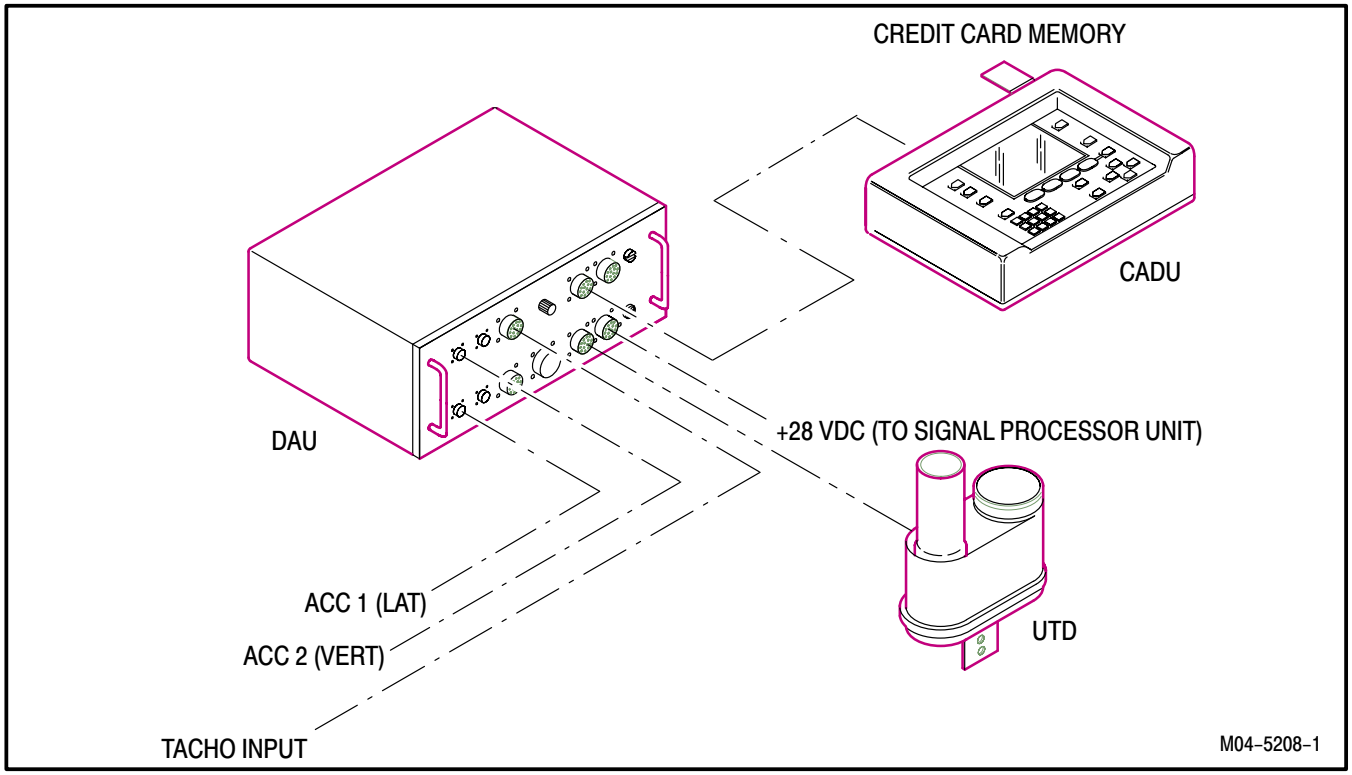
1.108A. MAIN ROTOR TRACK AND BALANCE AVA KIT INSTALLATION – continued



1.108A.4. Equipment Installation

a. **Enter CPG station** (para 1.56)**. Observe all safety precautions.**

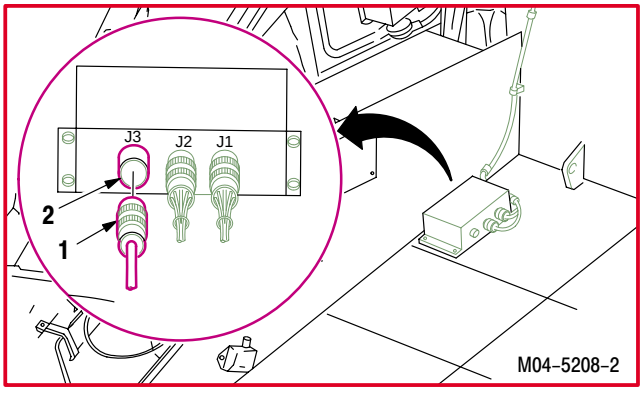
b. **Install Aviation Vibration Analysis Equipment (AVA).**

(1) Remove AVA blade tracking equipment from transport case. Check for possible damaged equipment and frayed cables.

(2) Place Data Acquisition Unit (DAU) on outboard side of copilot's left armor plate oriented such that the **ON/OFF** switch is forward with connectors facing up and secure DAU using canvas straps and D-rings.

(3) Attach AH-64-to-DAU cable (29304600) connector **P4** (1) to signal processing unit (SPU) receptacle **J3** (2) located beneath and to the right of copilot's seat.

(4) Route AH-64 to DAU cable behind copilot's seat and around to the DAU.



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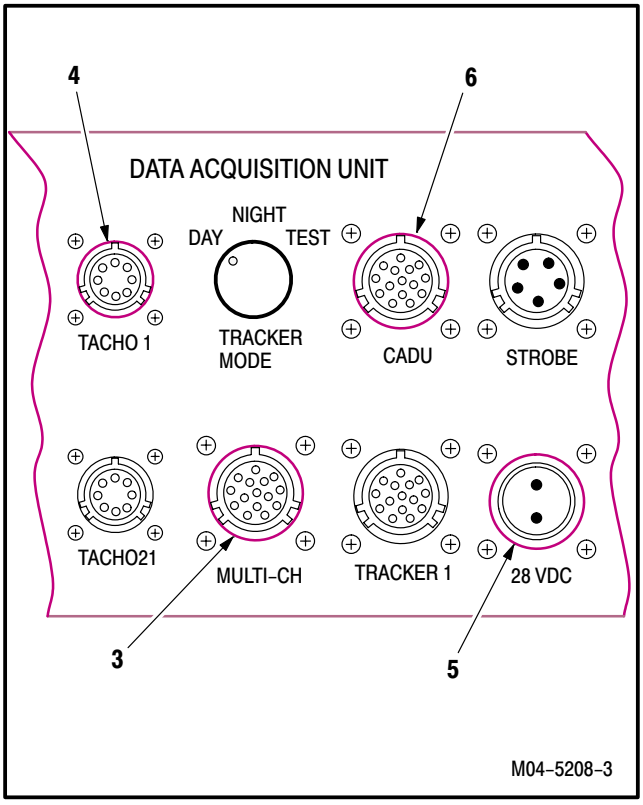
1.108A. MAIN ROTOR TRACK AND BALANCE AVA KIT INSTALLATION – continued

(5) Attach AH-64 to DAU cable terminations to DAU receptacles labeled **MULTI-CH** (3), **TACHO 1** (4), and **28 VDC** (5).

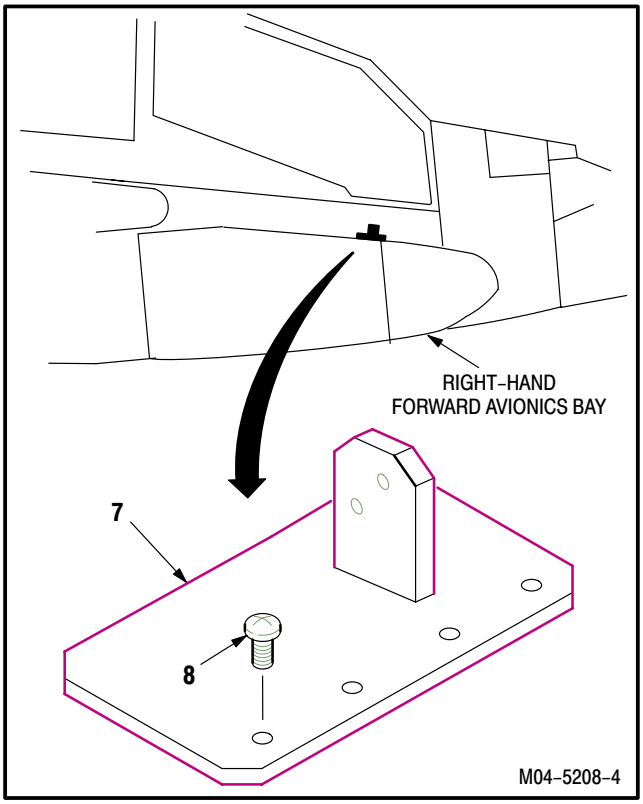
(6) Locate Control and Display Unit (CADU) in CPG cockpit. Attach CADU to DAU cable (29325601) to CADU and to DAU receptacle labeled **CADU** (6).



1.108A.5. Universal Tracking Device (UTD) Installation

a. **Remove four outside aircraft screws located at the top and all the way forward on right-hand (FAB). Retain screws for reinstallation.**

b. **Install UTD mounting bracket (7) to outboard edge of FAB with screws P/N NAS603-10P (8). Ensure screws extend a minimum of two threads.**



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1.108A. MAIN ROTOR TRACK AND BALANCE AVA KIT INSTALLATION – continued

NOTE

If UTD captive mounting bolts are lost or damaged, use NAS13005-14 bolts of suitable length as temporary replacements.

c. **Mount UTD (9) on inboard side of bracket (8), ensuring that night lens (red lens on UTD) is below the optical lens (clear lens).**

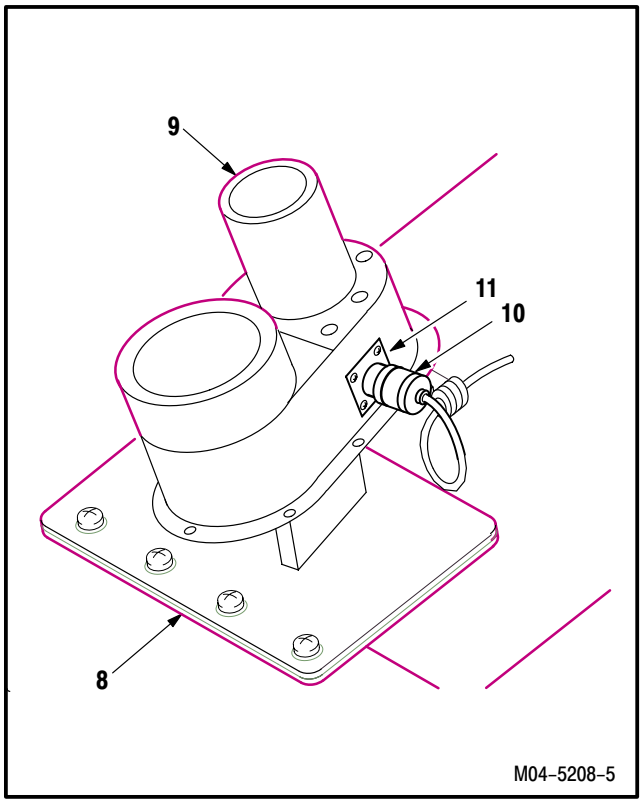
d. **Attach UTD cable (10) (29325701) to UTD receptacle (11) and route cable to CPG station.**

(1) Remove R40 access panel from nose of helicopter (para 2.2).

(2) Route UTD cable cable forward from mount towards front of FAB and then go up and through R40 access panel opening and under instrument panel to CPG station.

(3) Reinstall the R40 access panel (para 2.2).

(4) Route UTD cable along side of right hand console along with AH-64-DAU cable to DAU. Slack in cable can be stored in map holder near copilot's right elbow.



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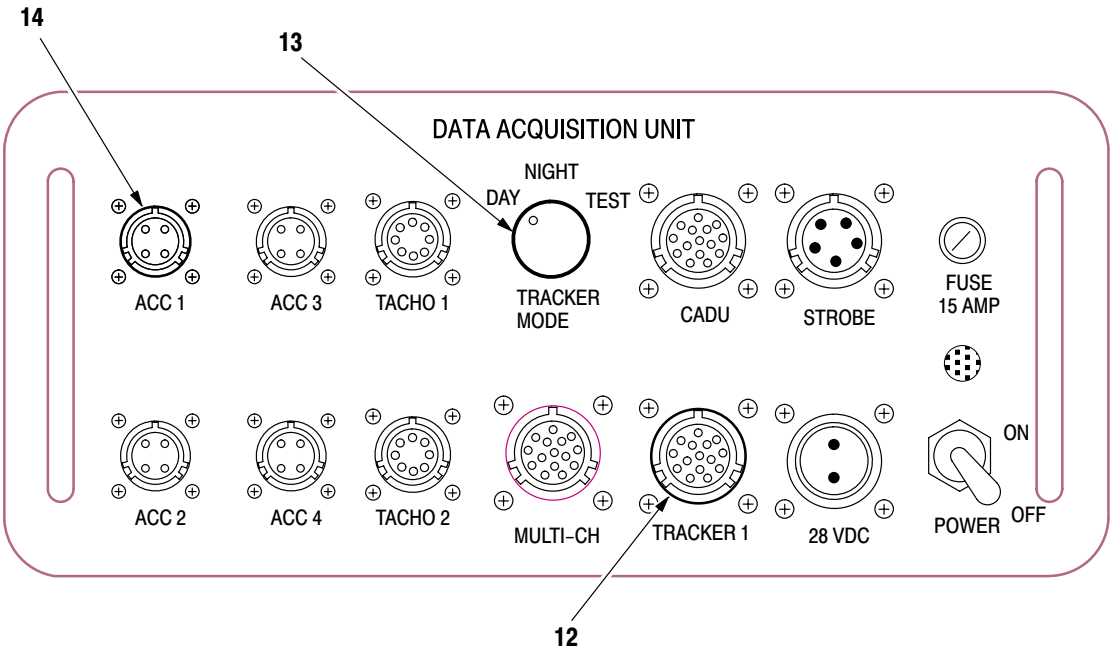
1.108A. MAIN ROTOR TRACK AND BALANCE AVA KIT INSTALLATION – continued



(5) Attach UTD cable to DAU receptacle labeled **TRACKER 1** (12).

NOTE

- If signal processing unit is suspected defective, go to subparagraph 1.108A.6.
- If night tracking is required, go to subparagraph 1.108A.7, otherwise go to to step (6).

(6) Ensure that **TRACKER MODE** switch on front of DAU is in **DAY** (13) position.

e. **Inspect (QA).**

f. **Perform main rotor track and balance maintenance operational check** (TM 1-1520-238-T)**.**

1.108A.6. SPU Bypass Installation Instructions

NOTE

This step provides instructions for bypassing the signal processing unit (SPU). This is done if SPU is defective.

a. **Detach connector from lateral accelerometer located above and to the rear of pilots head.**

b. **Attach accelerometer cable (29105600) to the lateral accelerometer.**

c. **Route cable to CPG station and attach to receptacle marked ACC1 (14) on DAU.**

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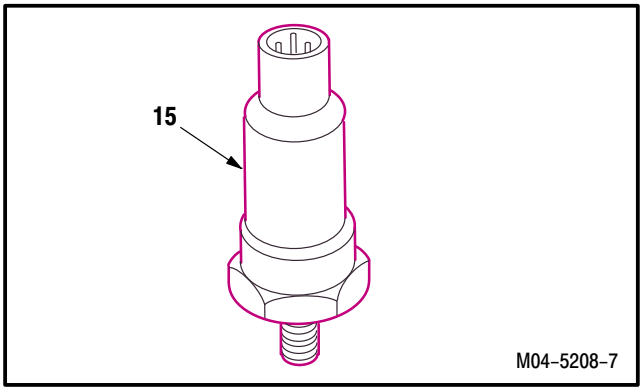
1.108A. MAIN ROTOR TRACK AND BALANCE AVA KIT INSTALLATION – continued

d. **Install vertical accelerometer (28110900) (15) on accelerometer mounting bracket (29313000).**

e. **Orient accelerometer vertically, with connector facing down and mount bracket on right-hand bulkhead panel near gunner's right knee, third screw down.**



f. **Attach accelerometer cable (29105605) to vertical accelerometer, and attach to DAU receptacle marked ACC 2 (16).**

CAUTION

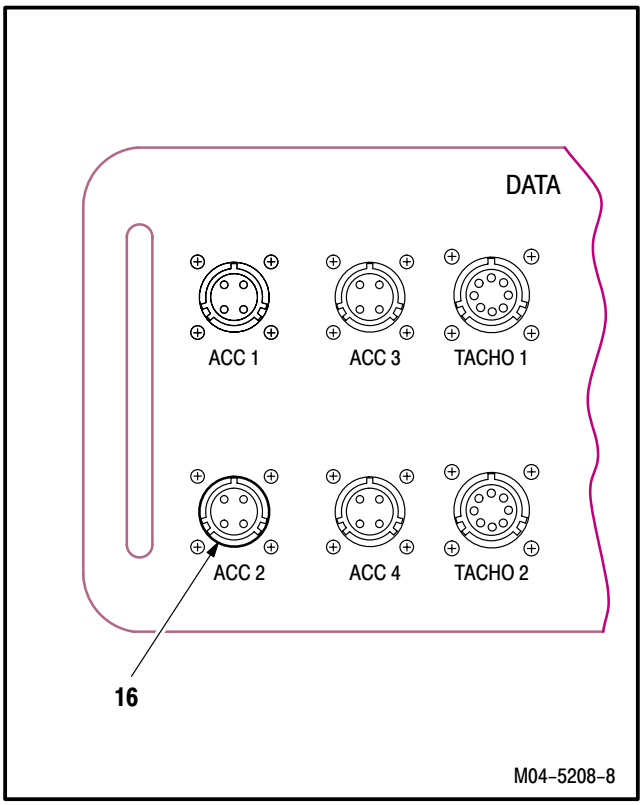
Do not secure disconnected cable in next procedure to any moving components which may interfere with flight controls.

g. **Detach existing cable from RPM sensor, and secure cable with a tie wrap to a convenient location.**

h. **Attach magnetic RPM sensor cable (2910543) to magnetic RPM sensor.**

(1) Route cable along wire bundle above R200 panel forward and secure to cable with wire ties. Go across front of transmission upper pylon and secure cable to wire bundle above L200 panel.

(2) Route cable through ventilation air intake panel on left side of aircraft. Route cable down left side of aircraft, securing to left upper hand hold and into emergency air vent. Route cable under transparent barrier's pass-thru tray to DAU in CPG station.



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1.108A. MAIN ROTOR TRACK AND BALANCE AVA KIT INSTALLATION – continued

i. **Detach previously attached connector from recptacle labeled TACHO 1.**

j. **Attach magnetic RPM sensor cable to DAU receptacle labeled TACHO 1 (4).**

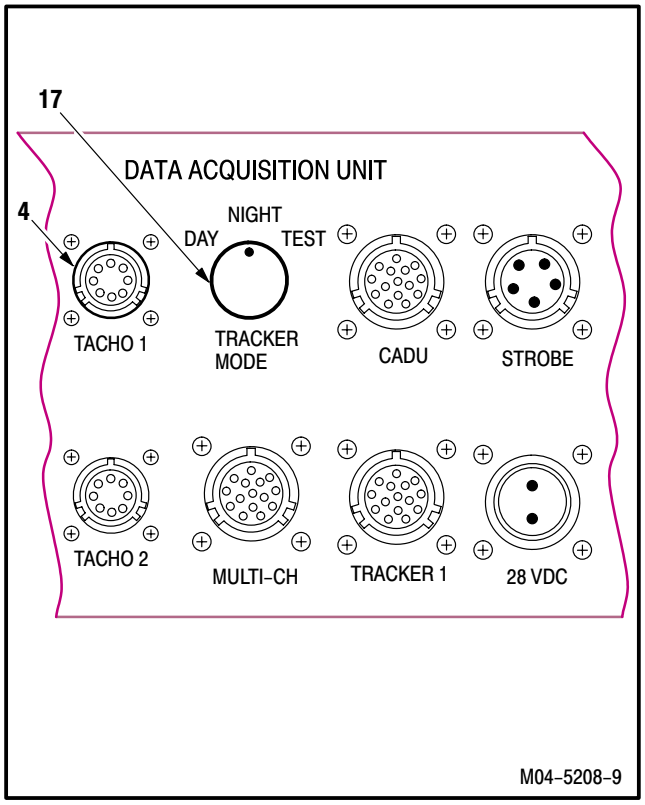
k. **If day time tracking is performed, ensure that TRACKER MODE switch on front of DAU is in DAY position. If night time tracking is performed, go to subparagraph 1.108A.7.**

l. **Inspect (QA).**

NOTE

For this installation, on the CADU, select ”Aircraft Type” as AH64NB, then operate the system as normal.

m. **Perform main rotor track and balance maintenance operational check** (TM 1-1520-238-T)**.**



1.108A.7. Night-Time Tracking Setup Instructions

NOTE

- The following steps are to be taken if night-time tracking is required. If no flights will be performed after dusk, proceed directly to tracking procedures (TM 1-1520-238-T).
- If SPU is found defective, go to subparagraph 1.108A.6.

a. **Ensure that TRACKER MODE switch onfront of DAU is in NIGHT (17) position.**

b. **Ensure that underside and trailing edge of all blades is a clean as possible. This is necessary for optimum adhesion of reflective tape.**

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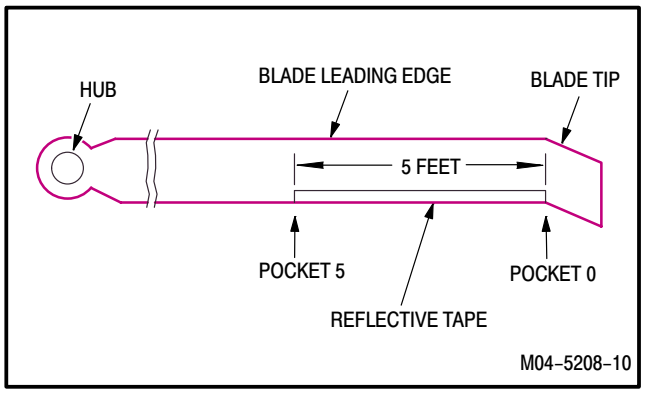
1.108A, MAIN ROTOR TRACK AND BALANCE AVA KIT INSTALLATION – continued

c. **Place a single, 5-feet strip of reflective tape on underside, trailing edge (on trim tab) of each blade from tab pocket #0 to tab pocket #5. Ensure that tape is smooth and as straight as possible using edge of blade as a reference.** Use maintenance platform.

d. **If verification of tape is desired, it can be viewed by holding a flashlight near your head and shining it at rotating blades. Any misplaced sections of tape will stand out.**

e. **Inspect (QA).**

f. **Perform main rotor track and balance maintenance operational check** (TM 1-1520-238-T)**.**



END OF TASK

1.109A. MAIN ROTOR TRACK AND BALANCE AVA KIT REMOVAL

1.109A.1. Description

This task covers: Removal.

1.109A.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Helicopter rotor head balance and blade track run test equipment (item 353A, App H)
Aviation vibration analysis test set (item 354B, App H)
Maintenance platform (item 209, App H)

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

1.109A.3. Removal

a. **Enter CPG station** (para 1.56)**. Observe all safety precautions.**

b. **Remove AVA equipment.**

(1) Detach the following connectors from DAU.

(a) Detach **TACHO 1** cable from DAU.

(b) Detach connector from DAU receptacle labeled **CADU**.

(c) Detach **MULTI-CH** cable from DAU.

(d) Detach **TRACKER 1** cable from DAU.

(e) Detach **28VDC** cable from DAU.

(f) If connected, detach **ACC 1** cable from DAU.

(g) If connected, detach **ACC 2** cable from DAU.

c. **Detach cable from CADU.**

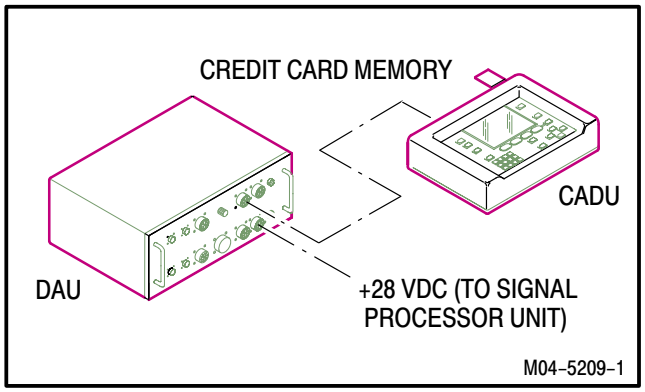
d. **Remove DAU, CADU, and cable disconnected from aircraft.**

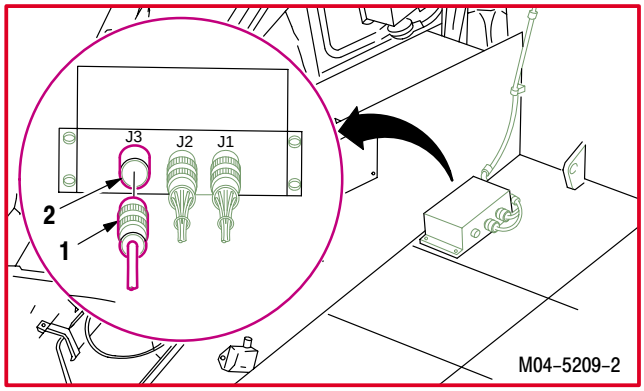
e. **Disconnect SPU.**

(1) Detach connector **P4** (1) from SPU receptacle **J3** (2).

(2) Install protective cap on SPU **J3** receptacle.

(3) Remove AH-64-to-DAU cable from aircraft.





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1.109A. MAIN ROTOR TRACK AND BALANCE AVA KIT REMOVAL – continued

f. **Remove UTD.**

(1) Detach UTD cable (3) from receptacle (4).

(2) Remove UTD bracket (5) from right hand forward avionics bay (FAB).

(a) Remove four screws (6) from bracket (5).

(b) Remove UTD (7) with bracket (5) from FAB.

(c) Remove UTD (7) from bracket (5).

(d) Reinstall previously removed screws in FAB fairing.

(e) Remove R40 panel (para 2.2).

(f) Remove UTD to DAU cable from CPG station.

(g) Install R40 panel (para 2.2).

g. **If SPU bypass procedure was performed, perform the following.**

(1) Detach DAU cable from lateral accelerometer and attach aircraft connector to lateral accelerometer.

(3) Detach connector from vertical accelerometer.

(4) Remove vertical accelerometer and mount bracket from aircraft.

(5) Remove vertical accelerometer from mount bracket.

(6) Remove DAU 29105600 and 28110900 cables from aircraft.

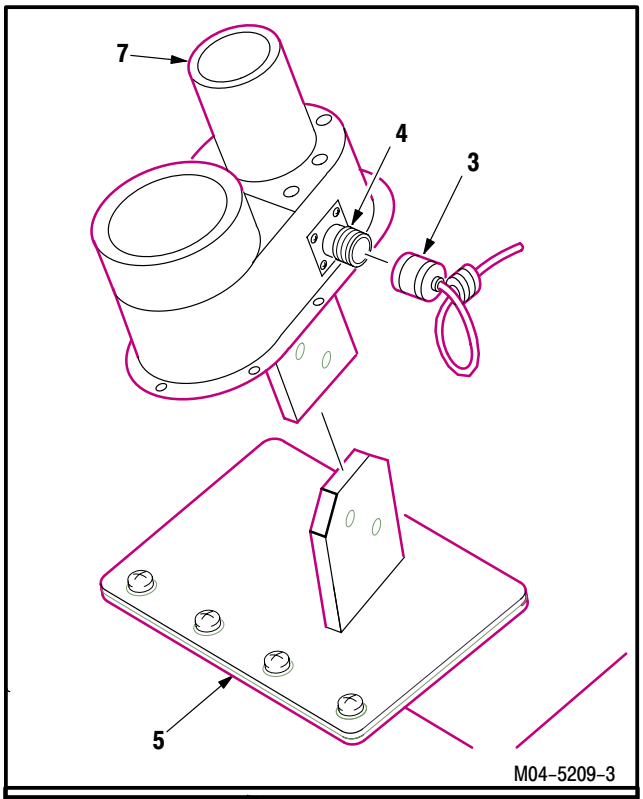
(7) Detach DAU to RPM sensor cable connector from RPM sensor and attach aircraft RPM sensor connector to RPM sensor.

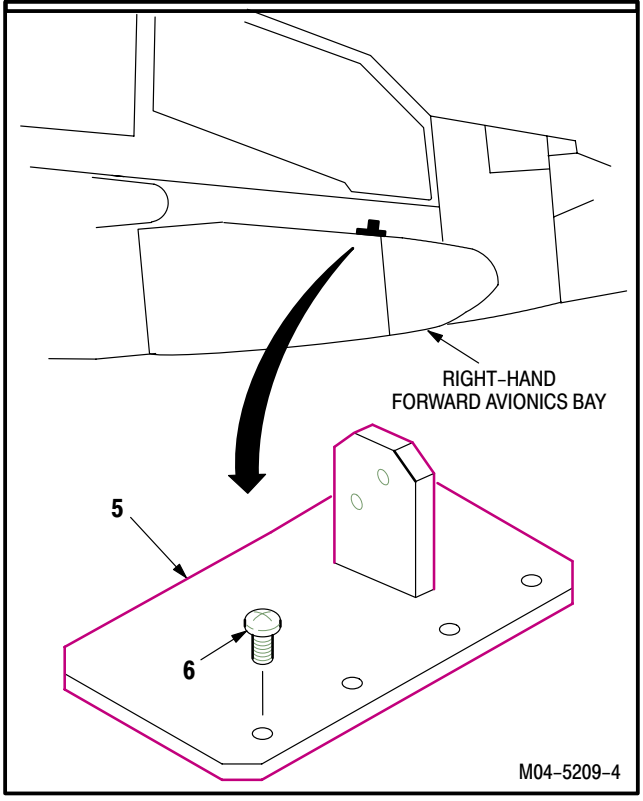
(9) Remove RPM sensor to DAU cable 2910543 from aircraft.

h. **If night-time tracking was performed, remove and discard reflective tape from main rotor blade trailing edge.**

i. **Stow all main rotor track and balance AVA equipment in accessory kit.**

j. **Inspect (QA).**





END OF TASK

1.110A. TAIL ROTOR BALANCE AVA KIT INSTALLATION

1.110A.1. Description

This task covers: Equipment Installation. Optical RPM Sensor Installation. Accelerometer Installation.

1.110A.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Aviation vibration analysis test set (item 354B, App H)
Blade balancing kit (item 28, App H)
Maintenance platform (item 209, App H)
30 - 200 inch-pound 1/4-inch drive click type torque wrench (item 436, App H)

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access fairing L540 removed

Materials/Parts:

Screw, machine NAS603-10P

1.110A.3. Equipment Installation

a. **Enter CPG station** (para 1.56)**. Observe all safety precautions.**

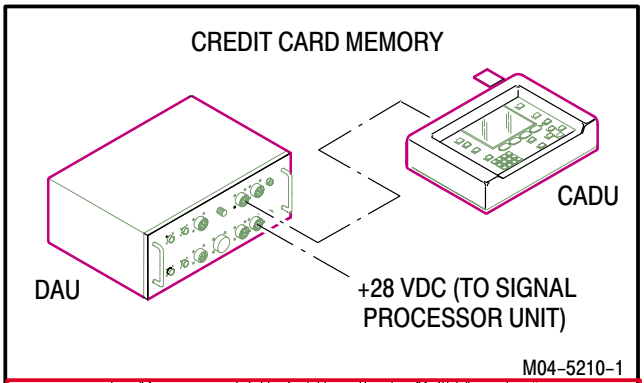
b. **Install Aviation Vibration Analysis equipment (AVA).**

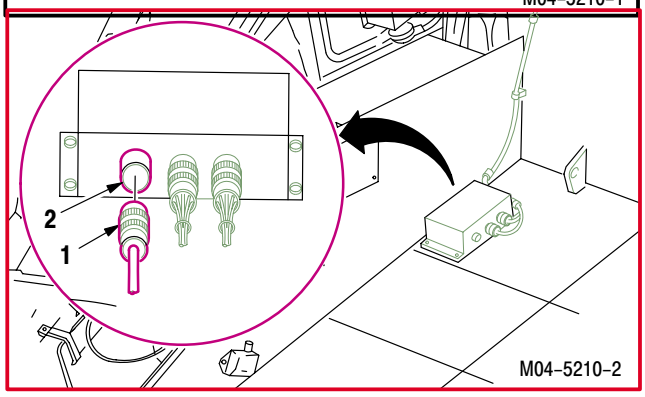
(1) Remove AVA tail rotor balancing equipment from transport case. Check for possible damaged equipment and frayed cables.

(2) Place Data Acquisition Unit (DAU) on outboard side of copilot's armor plate oriented such that the **ON/OFF** switch is forward with connectors facing up and secure DAU using canvas straps and D-rings.

(3) Attach AH-64-to-DAU cable (29304600) connector (1) to signal processing unit (SPU) receptacle (2) located beneath and to the right of copilot's seat.

(4) Route AH64-to-DAU cable behind copilot's seat and around to the DAU.





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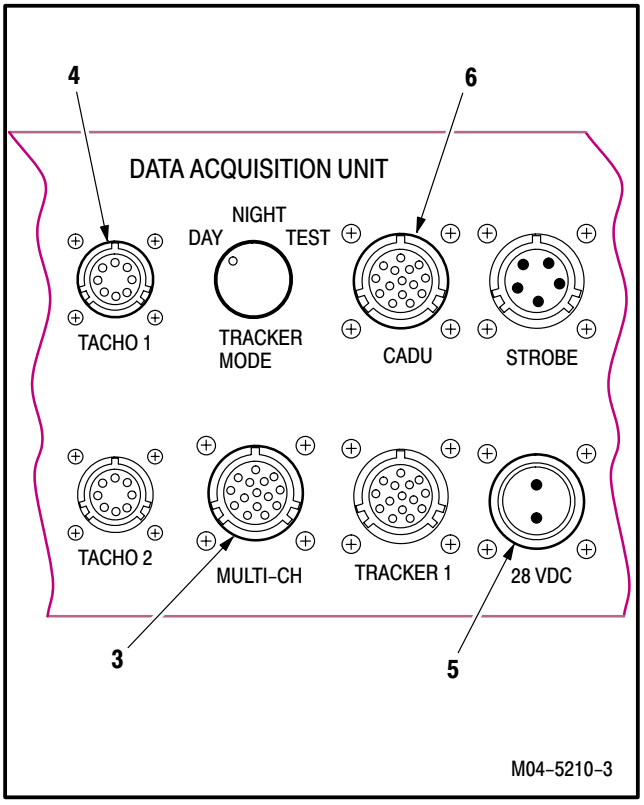
1.110A. TAIL ROTOR BALANCE AVA KIT INSTALLATION – continued

(5) Attach AH-64 to DAU cable terminations to DAU receptacles labeled **MULTI-CH** (3), **TACHO 1** (4), and **28 VDC** (5).

(6) Locate Control and Display Unit (CADU) in CPG cockpit. Connect CADU to DAU cable (29325601) to CADU and to DAU receptacle labeled **CADU** (6).



1.110A.4. Optical RPM Sensor Installation

a. **Install optical RPM sensor (7).** Use maintenance platform.

(1) Remove two airframe screws located on bottom and in center of tail rotor gearbox fairing. Retain screws for reinstallation.

(2) Mount optical RPM sensor mounting bracket (8) on vertical stabilizer (9) with arrow on bracket facing aft.

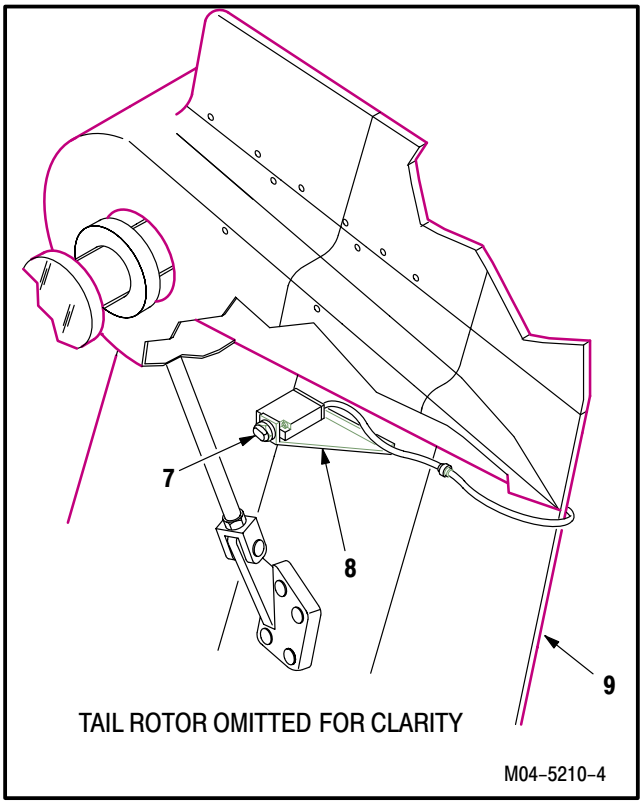
(3) Secure bracket (8) with screws PN NAS603-10P. Ensure to provide a minumum protrusion of two threads.

(4) Mount optical RPM sensor (7) on bracket (8).

NOTE

Cable will be routed to CPG station after tail rotor accelerometer is installed.

(5) Route cable around and down vertical stabilizer. Secure cable with clamps.



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1.110A. TAIL ROTOR BALANCE AVA KIT INSTALLATION – continued

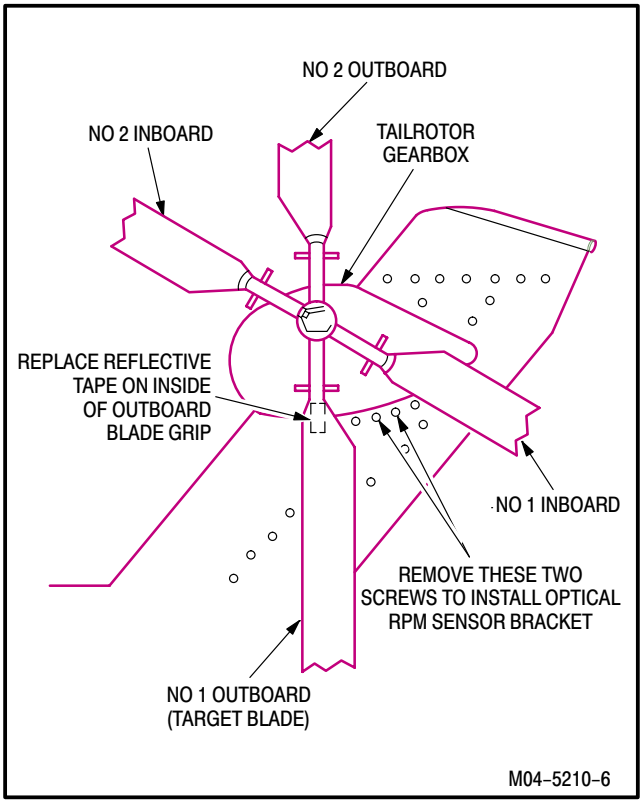
NOTE

If there is any unserviceable tape remaining from previous balance routines, it must be completely removed to ensure a clean and accurate tachometer signal to DAU.

(6) Place a single, 4-inch strip of reflective tape on either outboard blade, aligning the tape with the approximate location of the 5-degree beam from sensor. (Tape should be placed with span of blade.)

NOTE

Blade with reflective tape will be referred to in the AVA diagnostics as the #1 outboard blade. Rotate blades in the direction of rotation and next blade is #1 inboard, and next blade is #2 outboard, the next blade is #2 inboard.



1.110A.5. Accelerometer Installation

a. **Install accelerometer adapter bracket (11) on tail rotor gearbox (12).** Use maintenance platform. Torque nut (13) to **150 INCH-POUNDS**.

(1) Remove nut (13) from gearbox (12) at the 12:00 position.

(2) Install bracket (11) on gearbox (12) with nut (3).

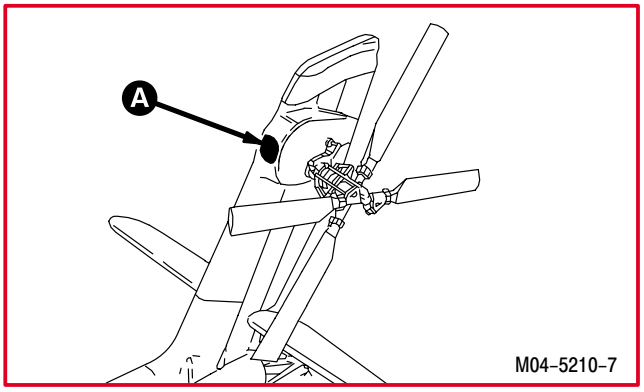
(3) Position bracket (11) so long axis of accelerometer (14) will be vertical.

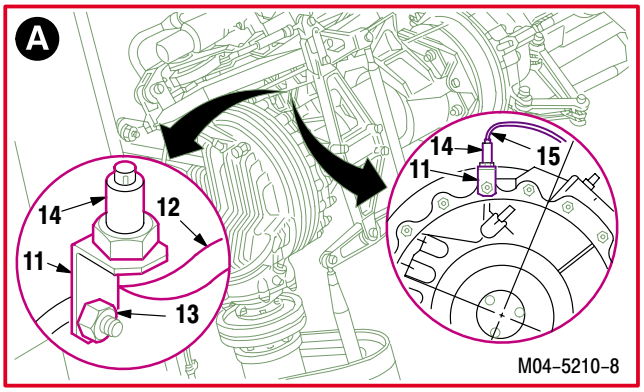
(4) Torque nut (13) to **150 INCH-POUNDS**. Use torque wrench.

b. **Inspect (QA).**

c. **Install accelerometer (14) on bracket (11).**

d. **Attach accelerometer cable connector (15) to accelerometer (14).**





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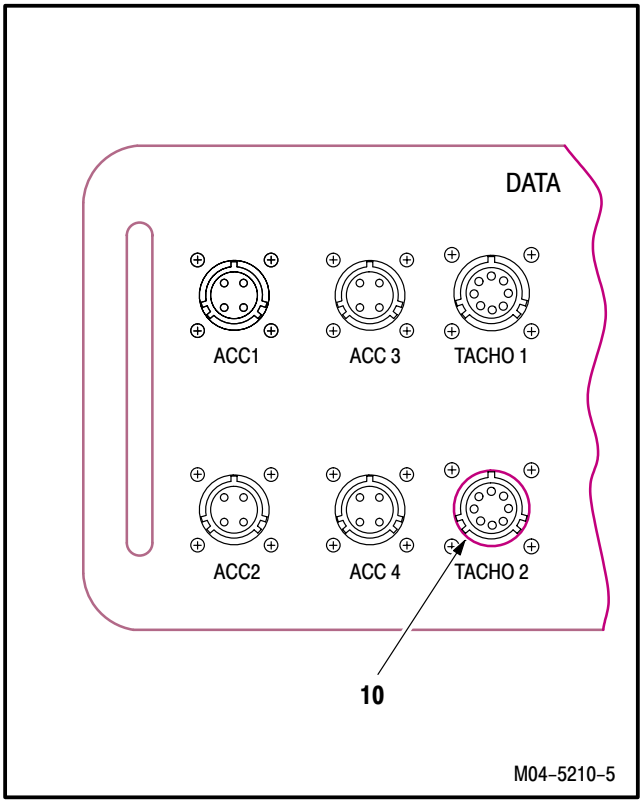
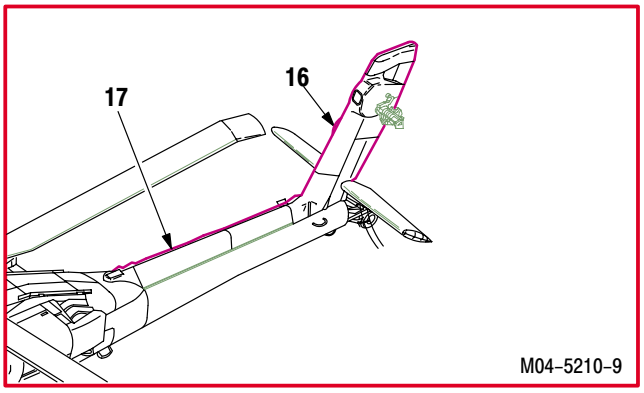
1.110A. TAIL ROTOR BALANCE AVA KIT INSTALLATION – continued

e. Attach optical sensor cable to DAU receptacle labled **TACHO 2** (10).



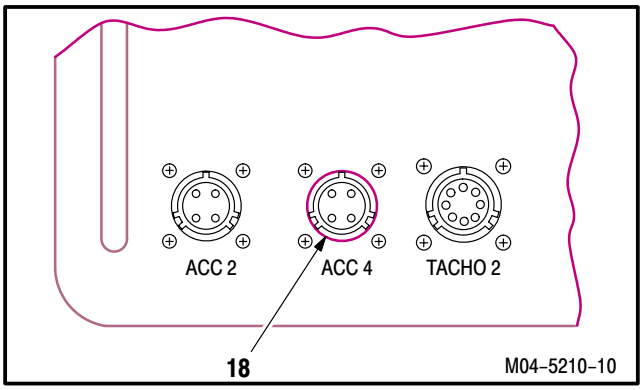
f. **Route and clamp accelerometer cable (16) down right side of vertical stabilizer and tail-boom with optical sensor cable (17) forward to DAU in CPG station.**



g. **Attach accelerometer cable to DAU receptacle labeled ACC 4 (18).**

h. **Remove maintenance platform.**

i. **Perform AVA tail rotor balance maintenance operational check** (TM 1-1520-238-T)**.**



END OF TASK

1.111A. TAIL ROTOR BALANCE AVA KIT REMOVAL

1.111A.1. Description

This task covers: Removal.

1.111A.2. Initial Setup

Tools:

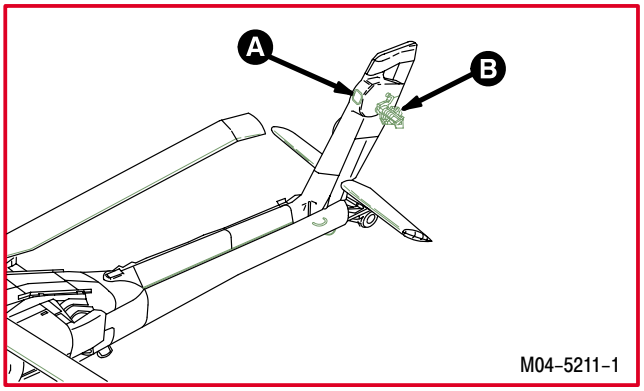
Aircraft mechanic's tool kit (item 376, App H)
Helicopter rotor head balance and blade tracking test equipment (item 354, App H)
Blade balancing kit (item 28, App H)
Maintenance platform (item 209, App H)
30 - 200 inch-pound 1/4-inch drive click type torque wrench (item 436, App H)

Personnel Required:

67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

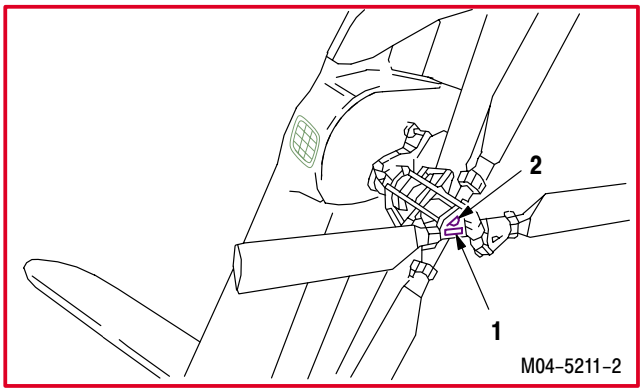
Equipment Conditions:

Ref	Condition
1.57	Helicopter safed



1.111A.3. Removal

a. **Remove reflective tape (1) from outboard tail rotor blade grip (2).** Use maintenance platform.



GO TO NEXT PAGE

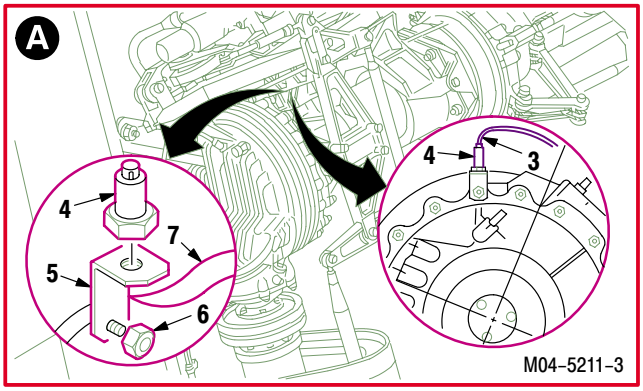
1.111A. TAIL ROTOR BALANCE AVA KIT REMOVAL – continued

b. **Detach accelerometer cable connector (3) from accelerometer (4).**

c. **Remove accelerometer (4) from accelerometer bracket (5).**

d. **Remove nut (6) and bracket (5) from tail rotor gearbox (7).**

e. **Install nut (6) and torque to 150 INCH-POUNDS.** Use torque wrench.



f. **Remove optical RPM sensor (8) from bracket (9).**

g. **Remove bracket (9) from vertical stabilizer (10).**

h. **Install screws previously removed.**

i. **Remove accelerometer and optical sensor cables.**

j. **Enter CPG station** (para 1.56)**. Observe all safety precautions.**

k. **Detach DAU connectors.**

(1) Detach **TACHO 1** cable from DAU.

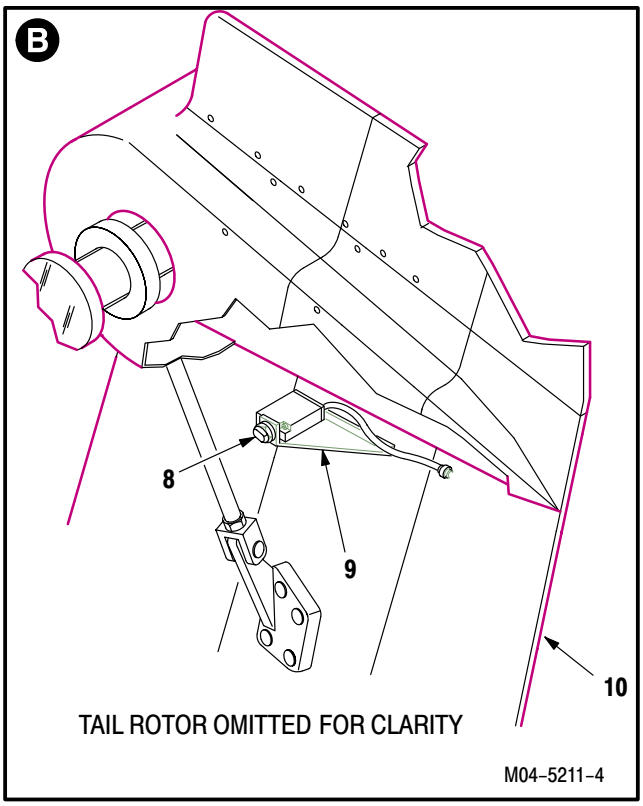
(2) Detach **TACHO 2** cable from DAU.

(3) Detach **ACC 4** cable from DAU.

(4) Detach connector from DAU receptacle labeled **CADU**.

(5) Detach **MULTI-CH** cable from DAU.

(6) Detach **28VDC** cable from DAU.



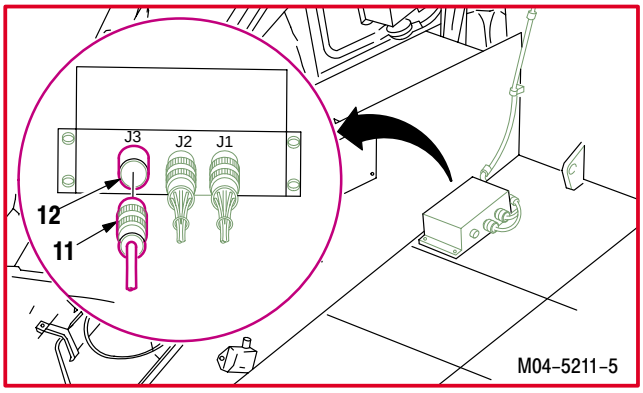
l. **Detach cable connector from CADU.**

m. **Remove DAU, CADU, and cable disconnected from aircraft.**

n. **Disconnect SPU.**

(1) Detach connector **P4** (11) from SPU receptacle **J3** (12).

(2) Install protective cap on receptacle **J3** (12).



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1.111A. TAIL ROTOR BALANCE AVA KIT REMOVAL – continued

o. **Stow all tail rotor balance equipment in helicopter rotor head balance and blade tracking test equipment.**

p. **Stow AVA Basic Kit Rotor Track and Balance equipment in kit container.**

q. **Install access fairing L540** (para 2.2)**.**

r. **Inspect (QA).**

s. **Remove maintenance platform.**

END OF TASK

1.112. MAIN ROTOR BLADE ADAPTER INSTALLATION

1.112.1. Description

This task covers: Installation.

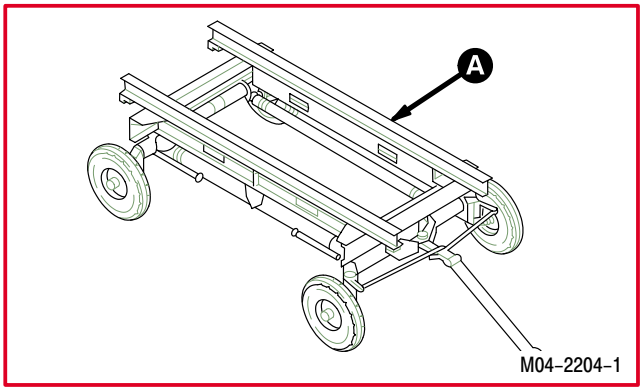
1.112.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Airframe adapter kit (item 25, App H)
Rail type trailer (item 396, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

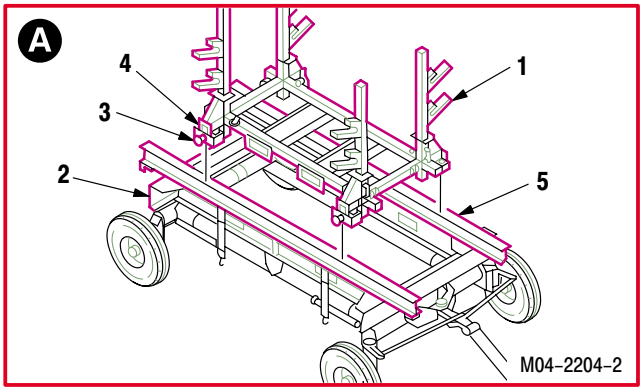


1.112.3. Installation

a. **Install main rotor blade adapter (1) on hoist trailer (2).**

(1) Position adapter (1) above trailer (2). Use hoist.

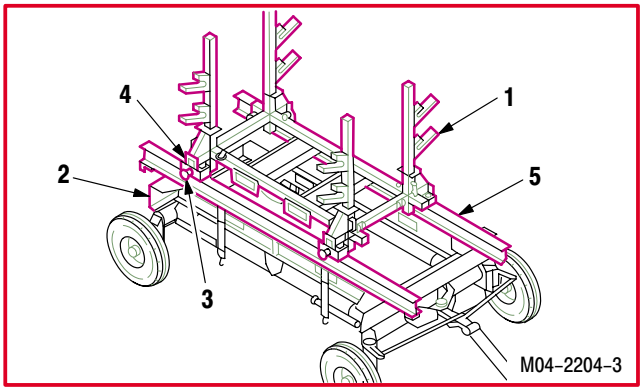
(2) Loosen four clamp knobs (3) to open four roller adapters (4).



(3) Lower adapter (1) until four roller adapters (4) seat on load rails (5).

(4) Tighten four clamp knobs (3) to lock roller adapters (4) on load rails (5).

(5) Move hoist clear of adapter (1) and trailer (2).



END OF TASK

1.113. MAIN ROTOR BLADE ADAPTER REMOVAL

1.113.1. Description

This task covers: Removal.

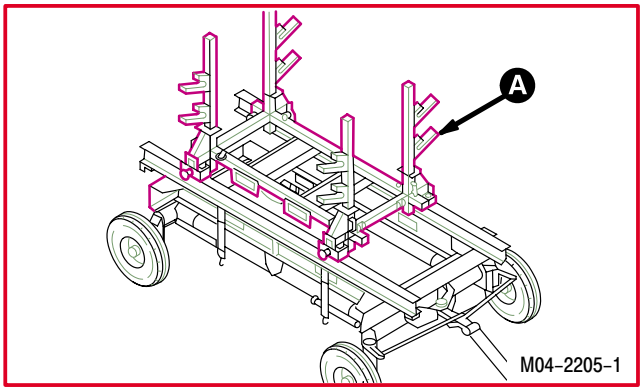
1.113.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

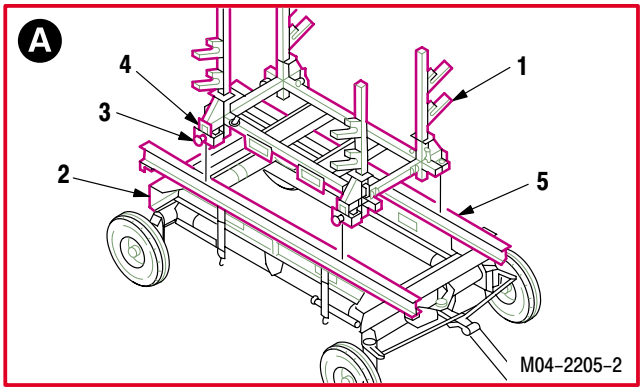


1.113.3. Removal

a. **Remove main rotor blade adapter (1) from maintenance trailer (2).**

(1) Loosen four clamp knobs (3) until roller adapters (4) are unlocked from load rails (5).

(2) Lift main rotor blade adapter (1) from maintenance trailer (2). Use hoist.



END OF TASK

1.114. MAIN TRANSMISSION FIXTURE INSTALLATION

1.114.1. Description

This task covers: Installation.

1.114.2. Initial Setup

Tools:

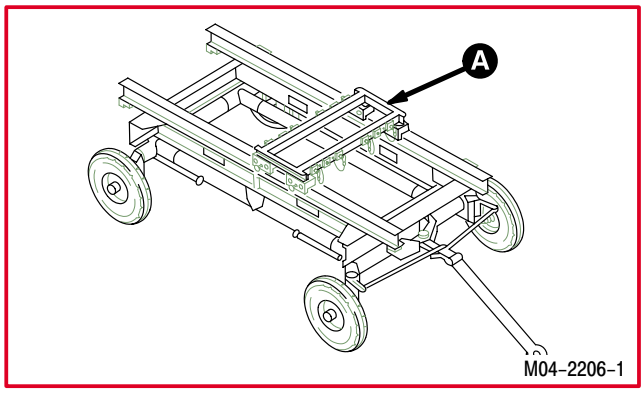
Aircraft mechanic's tool kit (item 376, App H)
Rail type trailer (item 396, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

Equipment Conditions:

Ref	Condition
1.122	Component fixture adapter installed



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1.114. MAIN TRANSMISSION FIXTURE INSTALLATION – continued

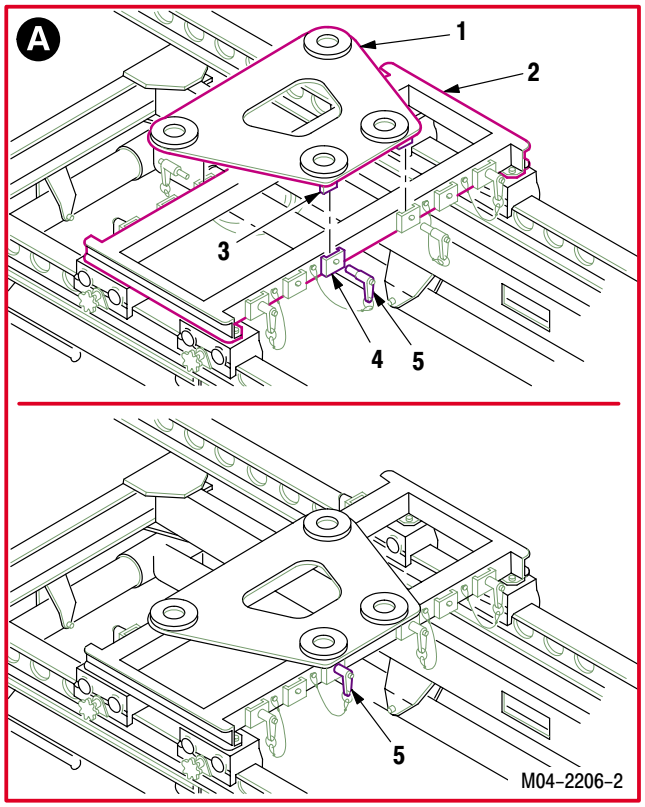
1.114.3. Installation

a. **Install main transmission fixture (1) on component fixture adapter (2).**

(1) Aline four lugs (3) with brackets (4).

(2) Insert four lugs (3) into brackets (4).

(3) Install four quick-release pins (5) through four brackets (4) and lugs (3).



END OF TASK

1.115. MAIN TRANSMISSION FIXTURE REMOVAL

1.115.1. Description

This task covers: Removal.

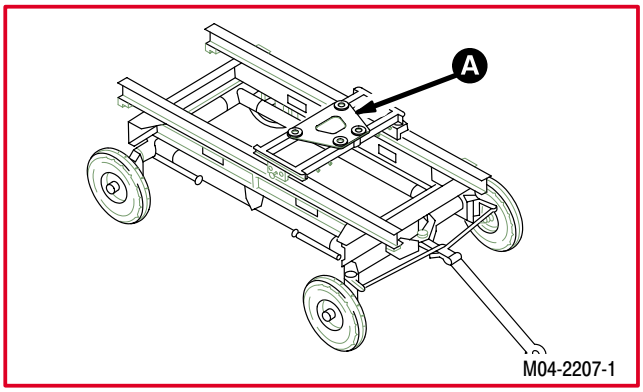
1.115.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist



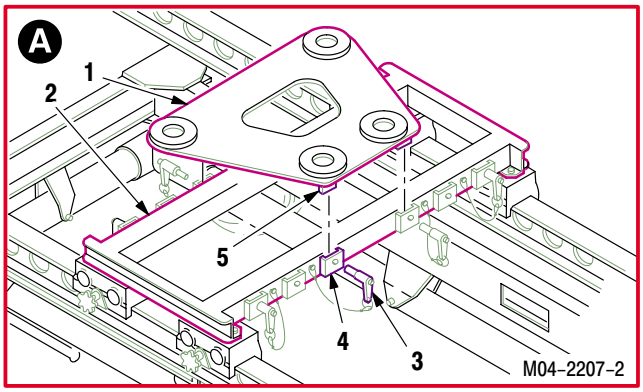
1.115.3. Removal

a. **Remove main transmission fixture (1) from component fixture adapter (2).**

(1) Remove four quick-release pins (3) from four brackets (4) and lugs (5).

(2) Lift main transmission fixture (1) from component adapter (2).

b. **Remove component fixture adapter (2)** (para 1.123)**.**



END OF TASK

1.116. MAIN ROTOR HEAD FIXTURE INSTALLATION

1.116.1. Description

This task covers: Installation.

1.116.2. Initial Setup

Tools:

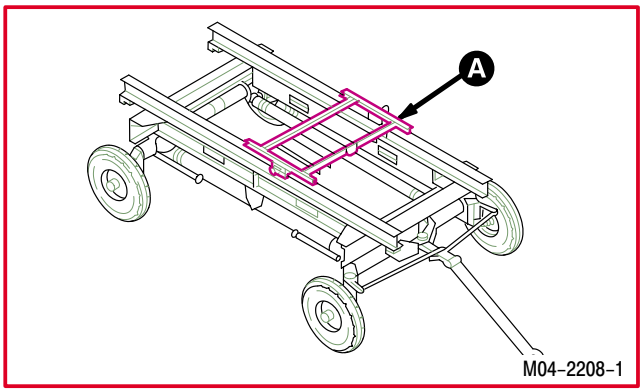
Aircraft mechanic's tool kit (item 376, App H)
Rail type trailer (item 396, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

Equipment Conditions:

Ref	Condition
1.122	Component fixture adapter installed



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1.116. MAIN ROTOR HEAD FIXTURE INSTALLATION – continued

1.116.3. Installation

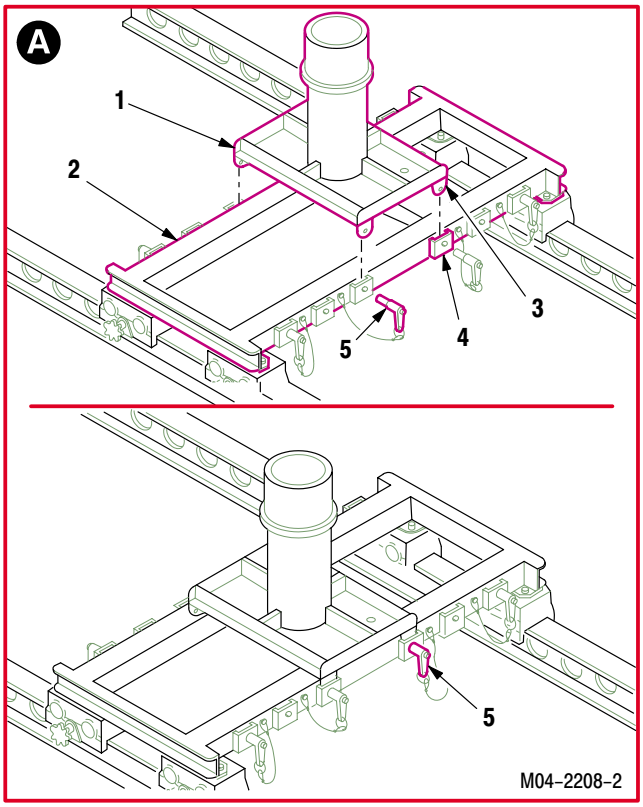
a. **Install main rotor head fixture (1) on component fixture adapter (2).**

(1) Aline four lugs (3) with four adapter brackets (4).

(2) Place head fixture (1) on component adapter (2).

(3) Insert four lugs (3) into adapter brackets (4).

(4) Install four quick-release pins (5) through four brackets (4) and lugs (3).



END OF TASK

1.117. MAIN ROTOR HEAD FIXTURE REMOVAL

1.117.1. Description

This task covers: Removal.

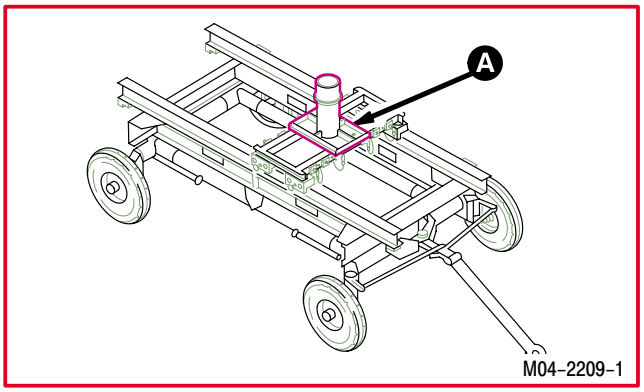
1.117.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist



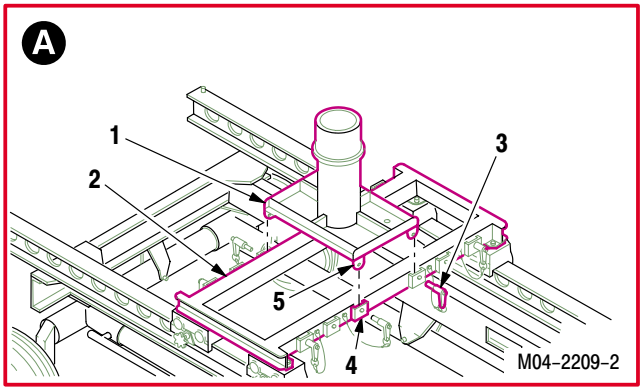
1.117.3. Removal

a. **Remove main rotor head fixture (1) from component fixture adapter (2).**

(1) Remove four quick-release pins (3) from four brackets (4) and lugs (5).

(2) Lift main rotor head fixture (1) from component adapter (2).

b. **Remove component fixture adapter (2)** (para 1.123)**.**



END OF TASK

1.118. MAIN ROTOR SWASHPLATE FIXTURE INSTALLATION

1.118.1. Description

This task covers: Installation.

1.118.2. Initial Setup

Tools:

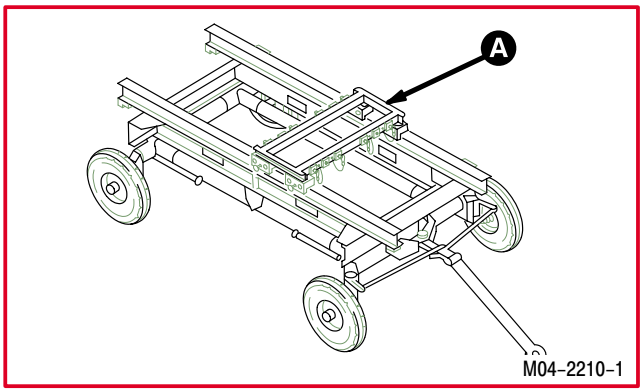
Aircraft mechanic's tool kit (item 376, App H)
Rail type trailer (item 396, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

Equipment Conditions:

Ref	Condition
1.122	Component fixture adapter installed



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1.118. MAIN ROTOR SWASHPLATE FIXTURE INSTALLATION – continued

1.118.3. Installation

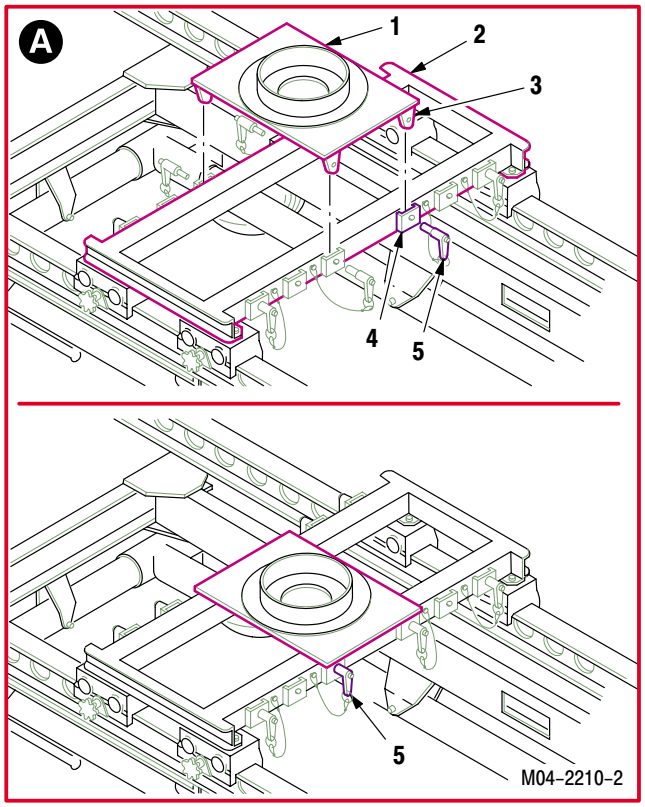
a. **Install main rotor swashplate fixture (1) on component fixture adapter (2).**

(1) Place fixture (1) on component adapter (2).

(2) Aline four lugs (3) with brackets (4).

(3) Insert four lugs (3) into four brackets (4).

(4) Install four quick-release pins (5) through four brackets (4) and lugs (3).



END OF TASK

1.119. MAIN ROTOR SWASHPLATE FIXTURE REMOVAL

1.119.1. Description

This task covers: Removal.

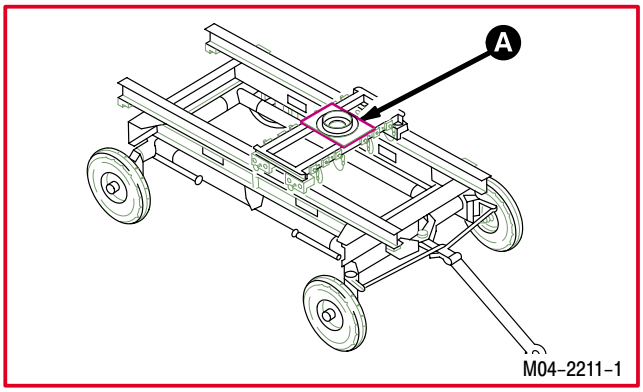
1.119.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

References:

67R Attack Helicopter Repairer
One person to assist



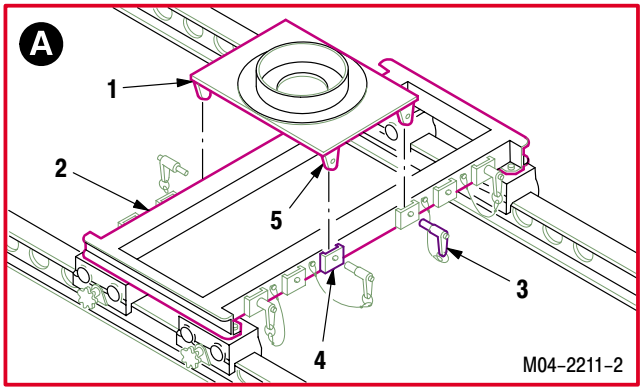
1.119.3. Removal

a. **Remove main rotor swashplate fixture (1) from component fixture adapter (2).**

(1) Remove four quick-release pins (3) from four brackets (4) and lugs (5).

(2) Remove fixture (1) from component adapter (2).

b. **Remove component fixture adapter (2)** (para 1.123)**.**



END OF TASK

1.120. CONTAINER TRANSPORT ADAPTER INSTALLATION

1.120.1. Description

This task covers: Installation.

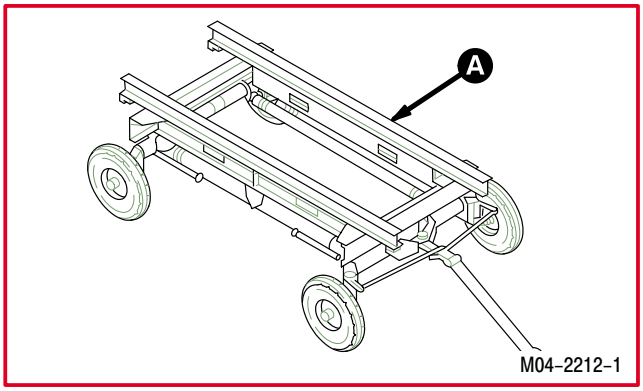
1.120.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Rail type trailer (item 396, App H)

Personnel Required:

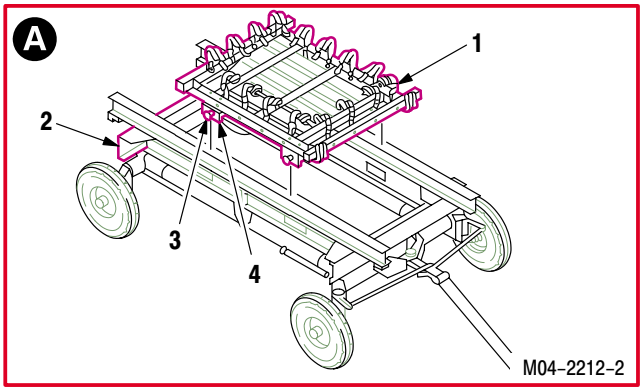
67R Attack Helicopter Repairer
Three persons to assist



1.120.3. Installation

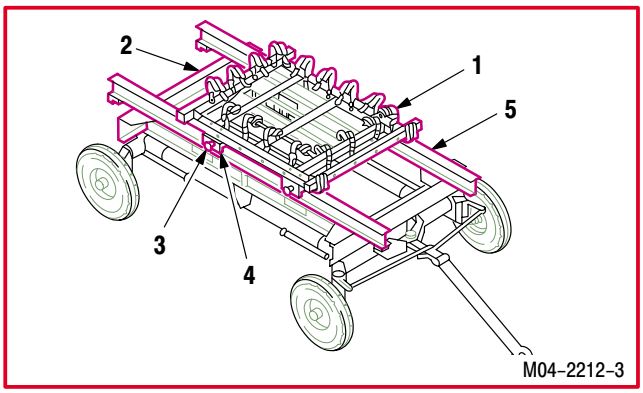
a. **Install container transport adapter (1) on hoist trailer (2).**

(1) Loosen four clamp knobs (3) until roller adapters (4) are completely open.



(2) Position adapter (1) on trailer (2) so roller adapters (4) ride on load rail (5).

(3) Tighten four knobs (3) to lock roller adapters (4) on rail (5).



END OF TASK

1.121. CONTAINER TRANSPORT ADAPTER REMOVAL

1.121.1. Description

This task covers: Removal.

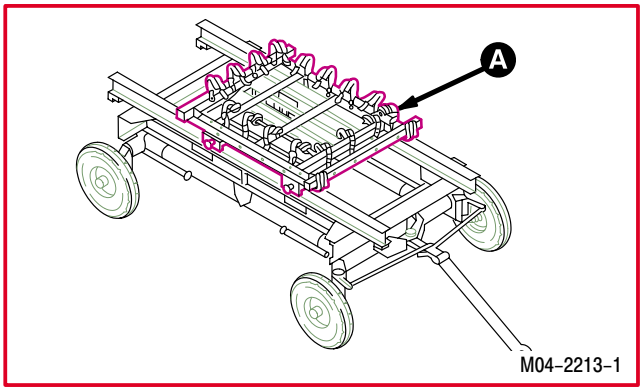
1.121.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
Three persons to assist

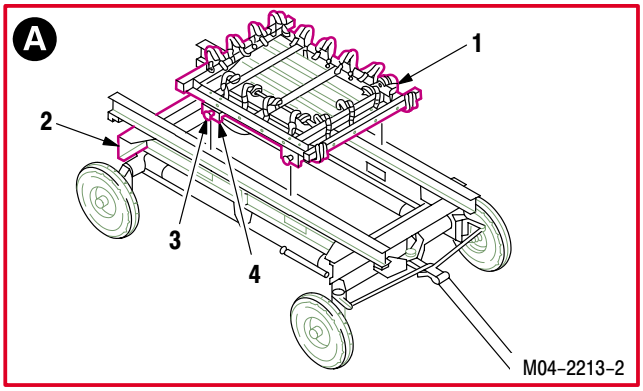


1.121.3. Removal

a. **Remove container transport adapter (1) from hoist trailer (2).**

(1) Loosen four clamp knobs (3) until roller adapters (4) are unlocked.

(2) Lift container transport adapter (1) from trailer (2). Use hoist.



END OF TASK

1.122. COMPONENT FIXTURE ADAPTER INSTALLATION

1.122.1. Description

This task covers: Installation.

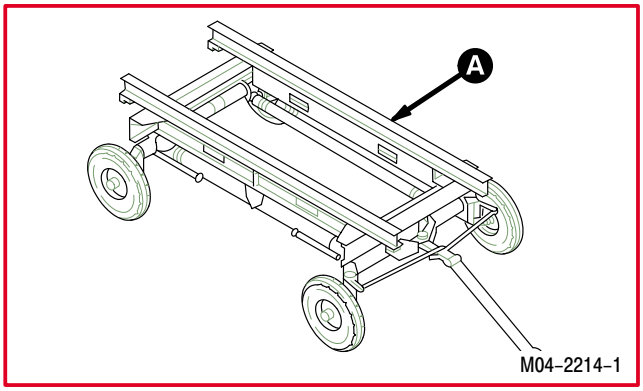
1.122.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Rail type trailer (item 396, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist



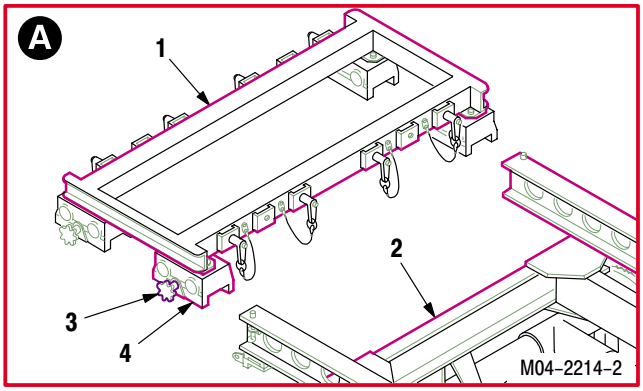
1.122.3. Installation

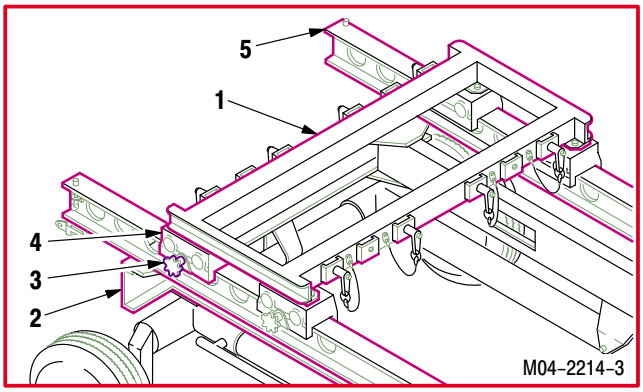
a. **Install component fixture adapter (1) on hoist trailer (2).**

(1) Loosen four clamp knobs (3) until roller adapters (4) are completely open.

(2) Position component adapter (1) on trailer (2) so roller adapters (4) ride on load rails (5).

(3) Tighten four clamp knobs (3) to lock roller adapters (4) on load rails (5).





END OF TASK

1.123. COMPONENT FIXTURE ADAPTER REMOVAL

1.123.1. Description

This task covers: Removal.

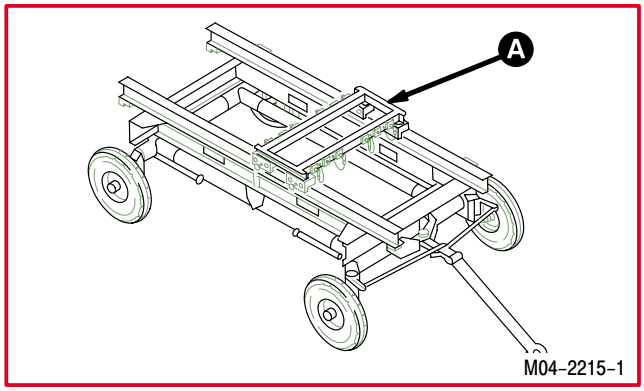
1.123.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

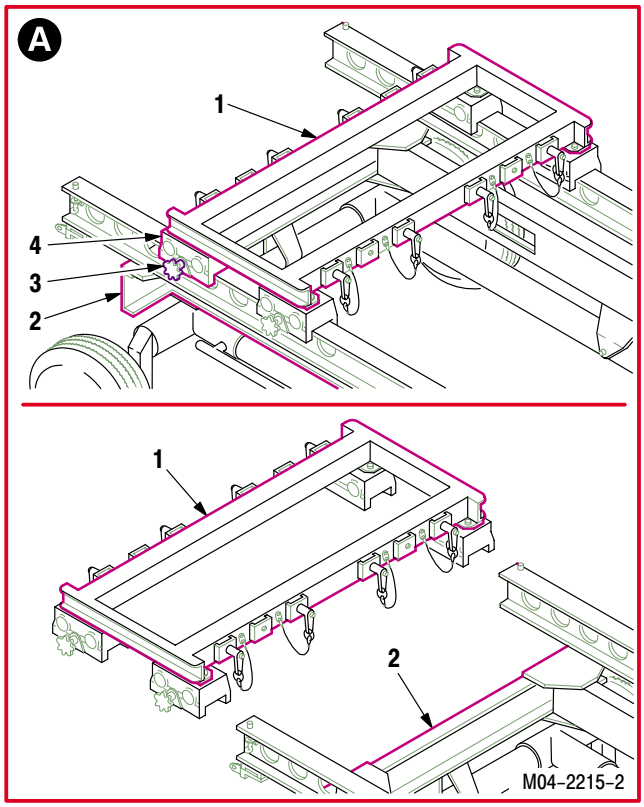


1.123.3. Removal

a. **Remove component fixture adapter (1) from hoist trailer (2).**

(1) Loosen four clamp knobs (3) until roller adapters (4) are unlocked.

(2) Remove component adapter (1) from trailer (2).



END OF TASK

1.124. ENVIRONMENTAL CONTROL UNIT AND NOSE GEARBOX FIXTURE INSTALLATION

1.124.1. Description

This task covers: Installation.

1.124.2. Initial Setup

Tools:

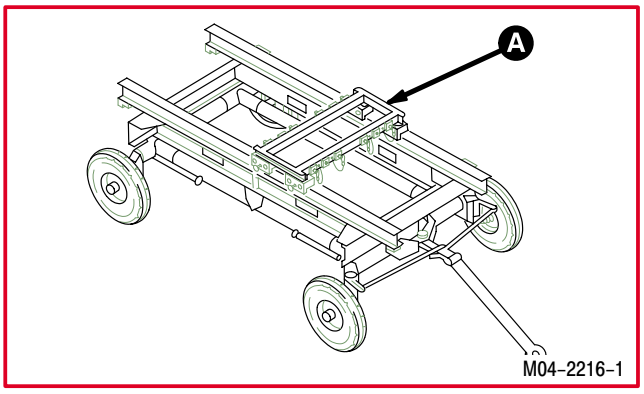
Aircraft mechanic's tool kit (item 376, App H)
Rail type trailer (item 396, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

Equipment Conditions:

Ref	Condition
1.122	Component fixture adapter installed



GO TO NEXT PAGE

1.124. ENVIRONMENTAL CONTROL UNIT AND NOSE GEARBOX FIXTURE INSTALLATION – continued

1.124.3. Installation

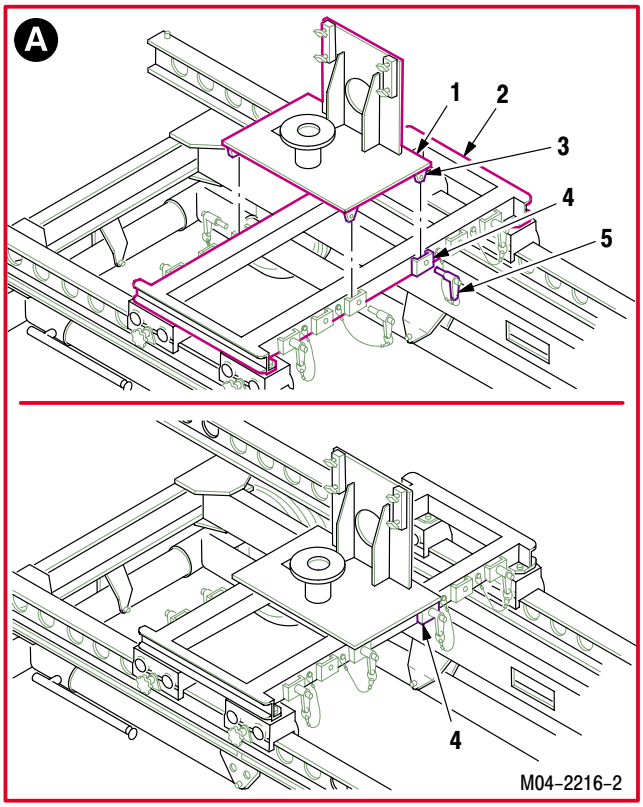
a. **Install environmental control unit and nose gearbox fixture (1) on component fixture adapter (2).**

(1) Place fixture (1) on component adapter (2).

(2) Aline four lugs (3) with four brackets (4).

(3) Insert four lugs (3) into four brackets (4).

(4) Install four quick-release pins (5) through four brackets (4) and lugs (3).



END OF TASK

1.125. ENVIRONMENTAL CONTROL UNIT AND NOSE GEARBOX FIXTURE REMOVAL

1.125.1. Description

This task covers: Removal.

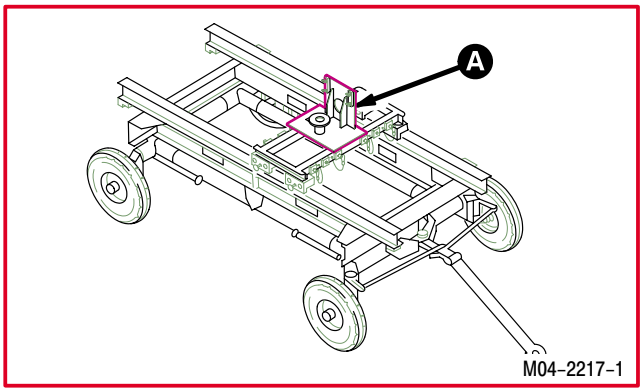
1.125.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist



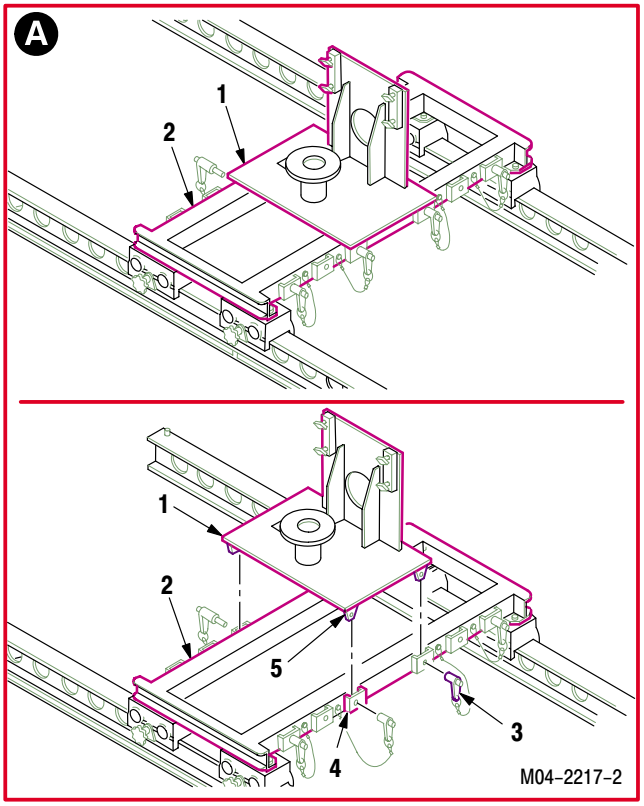
1.125.3. Removal

a. **Remove environmental control unit and nose gearbox fixture (1) from component fixture adapter (2).**

(1) Remove four quick-release pins (3) from four brackets (4) and lugs (5).

(2) Lift fixture (1) from component adapter (2).

b. **Remove component fixture adapter** (para 1.123)**.**



END OF TASK

1.126. INTERMEDIATE GEARBOX FIXTURE ADAPTER AND TAIL ROTOR GEARBOX FIXTURE INSTALLATION

1.126.1. Description

This task covers: Installation.

1.126.2. Initial Setup

Tools:

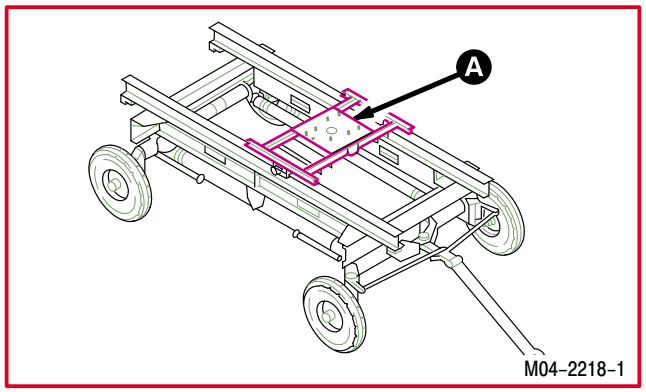
Aircraft mechanic's tool kit (item 376, App H)
Rail type trailer (item 396, App H)

Equipment Conditions:

Ref	Condition
1.122	Component fixture adapter installed

Personnel Required:

67R Attack Helicopter Repairer
One person to assist



1.126.3. Installation

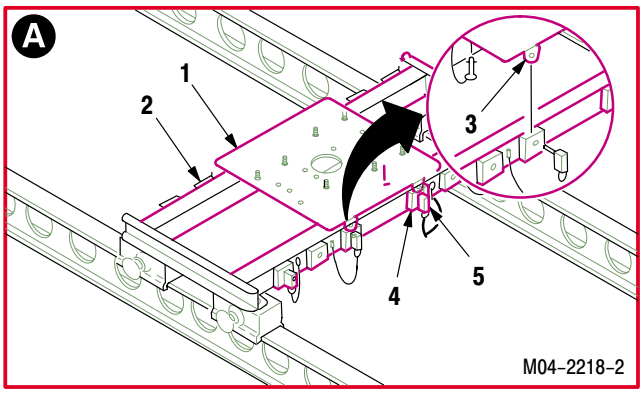
a. **Install fixture (1) on component fixture adapter (2).**

(1) Place fixture (1) on component adapter (2).

(2) Aline four lugs (3) with four brackets (4).

(3) Insert four lugs (3) into four brackets (4).

(4) Insert four quick-release pins (5) through brackets (4) and lugs (3).



GO TO NEXT PAGE

1.126. INTERMEDIATE GEARBOX FIXTURE ADAPTER AND TAIL ROTOR GEARBOX FIXTURE INSTALLATION – continued

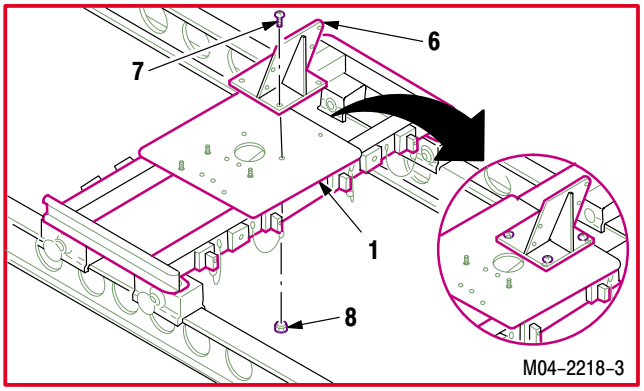
b. **Install intermediate gearbox fixture adapter (6) on fixture (1).**

(1) Aline mounting holes on adapter (6) with mounting holes on fixture (1).

(2) Install four screws (7) through mounting holes.

(3) Hold four screws (7).

(4) Install four nuts (8).



END OF TASK

1.127. INTERMEDIATE GEARBOX FIXTURE ADAPTER AND TAIL ROTOR GEARBOX FIXTURE REMOVAL

1.127.1. Description

This task covers: Removal.

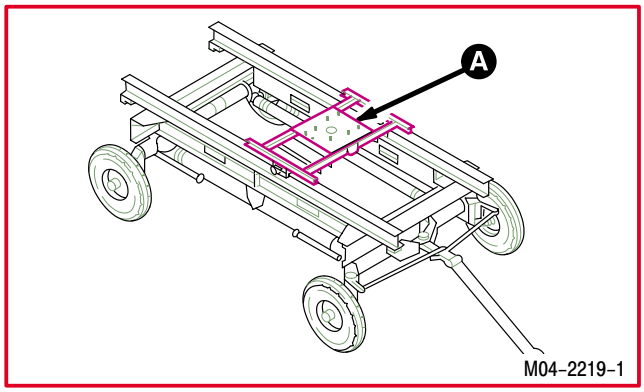
1.127.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

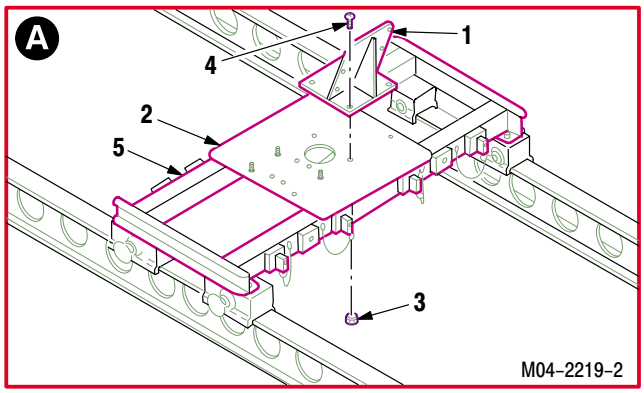


1.127.3. Removal

a. **Remove intermediate gearbox fixture adapter (1) from fixture (2).**

(1) Remove four nuts (3) and screws (4).

(2) Remove adapter (1) from fixture (2).

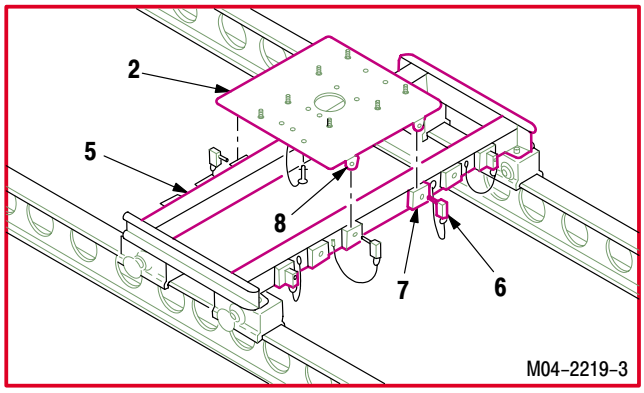


b. **Remove fixture (2) from component fixture adapter (5).**

(1) Remove four quick release pins (6) from four brackets (7) and lugs (8).

(2) Lift fixture (2) from component adapter (5).

c. **Remove component fixture adapter** (para 1.123)**.**



END OF TASK

1.128. MAIN ROTOR GEARSHAFT FIXTURE INSTALLATION

1.128.1. Description

This task covers: Installation.

1.128.2. Initial Setup

Tools:

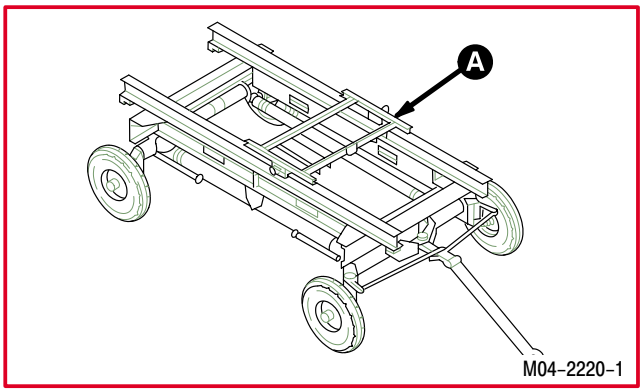
Aircraft mechanic's tool kit (item 376, App H)
Rail type trailer (item 396, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist

Equipment Conditions:

Ref	Condition
1.122	Component fixture adapter installed



GO TO NEXT PAGE

1.128. MAIN ROTOR GEARSHAFT FIXTURE INSTALLATION – continued

1.128.3. Installation

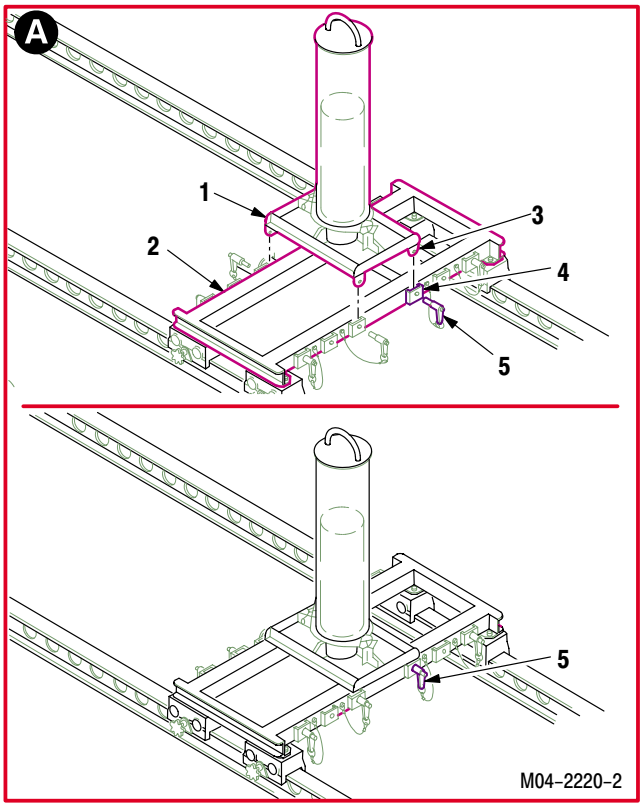
a. **Install main rotor gearshaft fixture (1) on component fixture adapter (2).**

(1) Place fixture (1) on component adapter (2).

(2) Aline four lugs (3) with four brackets (4).

(3) Insert four lugs (3) into four brackets (4).

(4) Install four quick-release pins (5) through four brackets (4) and lugs (3).



END OF TASK

1.129. MAIN ROTOR GEARSHAFT FIXTURE REMOVAL

1.129.1. Description

This task covers: Removal.

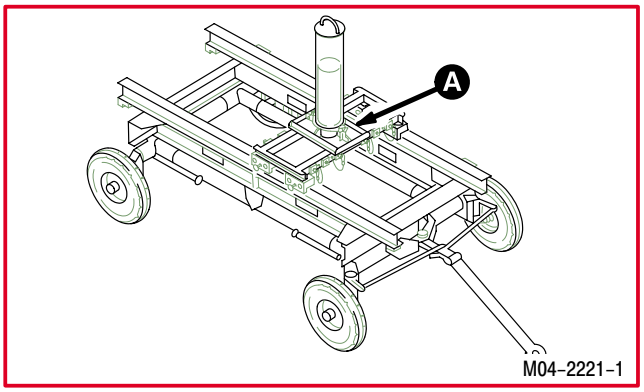
1.129.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

67R Attack Helicopter Repairer
One person to assist



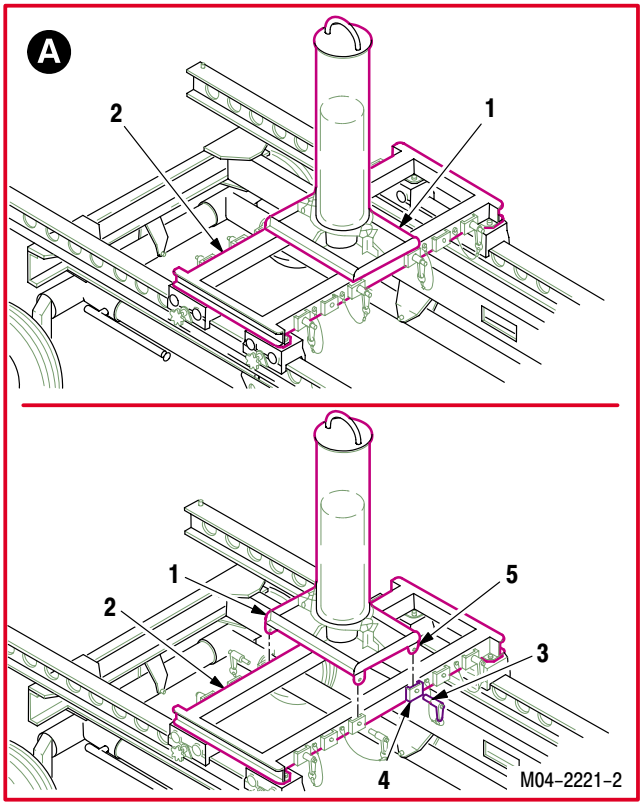
1.129.3. Removal

a. **Remove main rotor gearshaft fixture (1) from component fixture adapter (2).**

(1) Remove four quick-release pins (3) from four brackets (4) and lugs (5).

(2) Lift gearshaft fixture (1) from component adapter (2).

b. **Remove component fixture adapter (2)** (para 1.123)**.**



END OF TASK

1.130. ENGINE BUILDUP ADAPTER INSTALLATION

1.130.1. Description

This task covers: Installation.

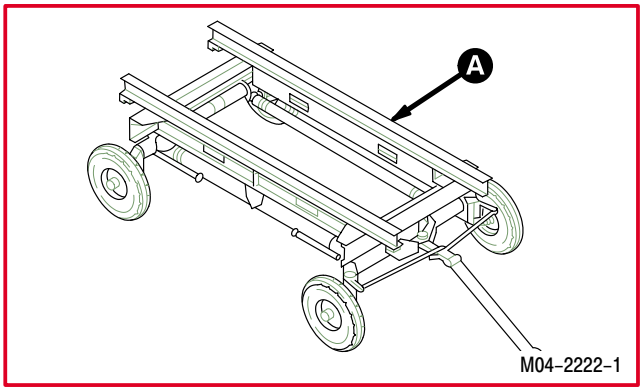
1.130.2. Initial Setup

Tools:

Aircraft maintenance tool kit (item 371, App H)
Rail type trailer (item 396, App H)

Personnel Required:

67R Attack Helicopter Repairer
Three persons to assist



1.130.3. Installation

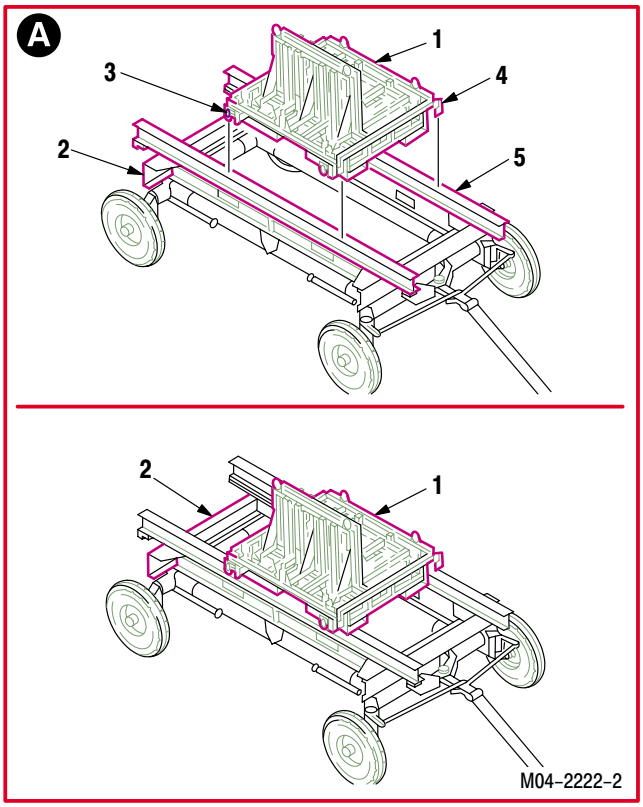
a. **Install engine buildup adapter (1) on maintenance trailer (2).**

(1) Loosen four clamp knobs (3) until four clamp adapters (4) are open.

(2) Position adapter (1) above trailer (2).

(3) Lower adapter (1) until clamp adapters (4) seat on load rails (5). Use hoist.

(4) Tighten four knobs (3) to lock four clamp adapters (4) on load rails (5).



END OF TASK

1.131. ENGINE BUILDUP ADAPTER REMOVAL

1.131.1. Description

This task covers: Removal.

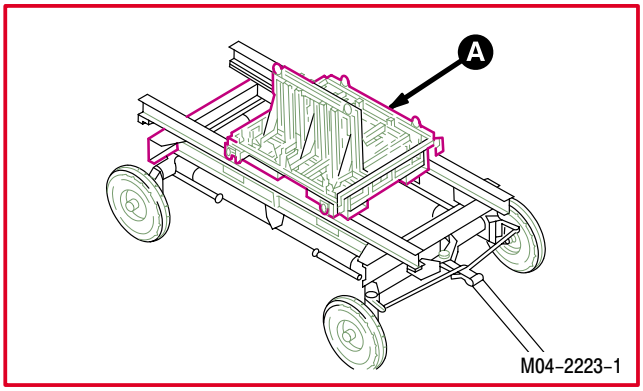
1.131.2. Initial Setup

Tools:

Aircraft maintenance tool kit (item 371, App H)

Personnel Required:

67R Attack Helicopter Repairer
Three persons to assist

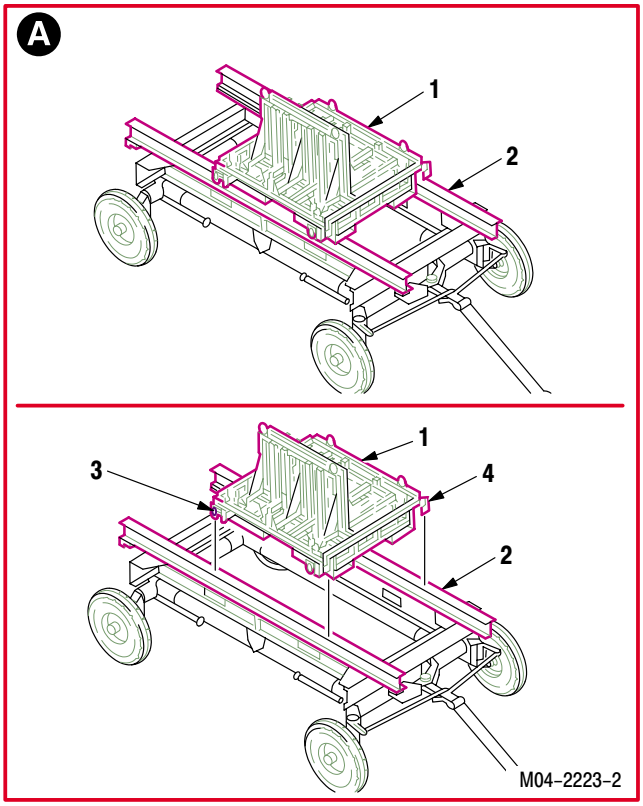


1.131.3. Removal

a. **Remove engine buildup adapter (1) from maintenance trailer (2).**

(1) Loosen four clamp knobs (3) until four clamp adapters (4) open.

(2) Lift adapter (1) clear of trailer (2). Use hoist.



END OF TASK

1.132. SQUAT SWITCH FIXTURE INSTALLATION/REMOVAL

1.132.1. Description

This task covers: Installation. Removal.

1.132.2. Initial Setup

Tools:

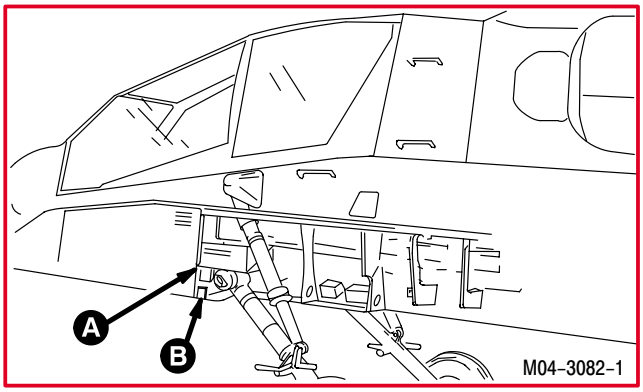
Aircraft maintenance tool kit (item 373, App H)
Squat switch fixture (Figure D-446, App D)

Personnel Required:

68X Armament/Electrical System Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Fairing L140 opened



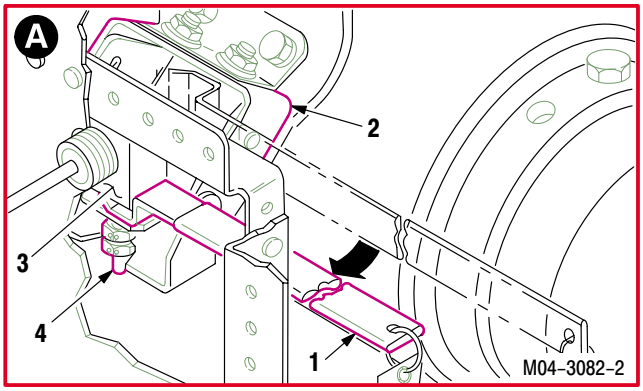
GO TO NEXT PAGE

1.132. SQUAT SWITCH FIXTURE INSTALLATION/REMOVAL – continued

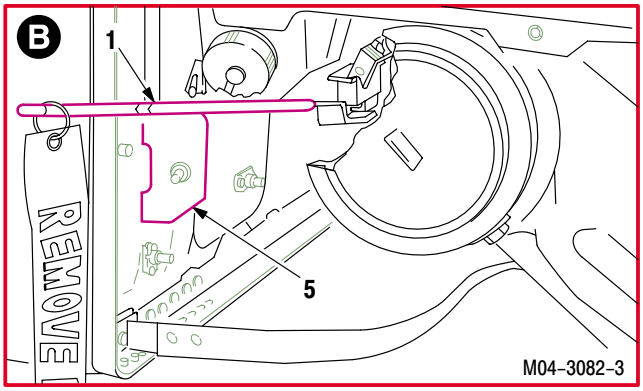
1.132.3. Installation

a. **Position bent end of fixture (1) inside of target bracket (2) just aft of squat switch (3)** (Figure D-446, App D)**.**

(1) Carefully slide fixture (1) between squat switch (3) and target (4).



(2) Rest handle of fixture (1) on pylon actuating switch bracket (5).



1.132.4. Removal

a. **Carefully slide fixture (1) aft from between squat switch (3) and target (4).**

b. **Secure fairing L140** (para 2.2)**.**

END OF TASK

1.133. POSITIONING HELICOPTER FOR DESIRED DECK ANGLE

1.133.1. Description

This task covers: Deck Angle Positioning.

1.133.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Protractor assembly (item 238, App H)

Personnel Required:

67R	Attack Helicopter Repairer One person to assist
67R3F	Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1500-204-23

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access panel L200 removed
1.66	Helicopter jacking (tripod jacks at three points)
	or
1.67	Main landing gear jacking (axle jack at one point)
	or
1.68	Tail landing gear jacking (axle jack)
	or
1.69	Tail landing gear jacking (tripod jack)

WARNING

To prevent death or injury to personnel, jack helicopter evenly on a firm, flat surface so that it stays level at all times. Helicopter is unstable on jacks. Do not jack helicopter if wind exceeds 15 mph. If injury occurs, seek medical aid.

CAUTION

- Area shall be roped off and warning signs **"HELICOPTER ON JACKS"** shall be displayed.
- Unauthorized personnel shall not be in or around helicopter while it is on jacks.

GO TO NEXT PAGE

1.133. POSITIONING HELICOPTER FOR DESIRED DECK ANGLE – continued

1.133.3. Deck Angle Positioning

a. **Jack helicopter to obtain correct deck angle** (para 1.66 thru para 1.69)**.**

(1) Position indicating surface (1) of protractor assembly (2) on deck (3) (TM 1-1500-204-23).

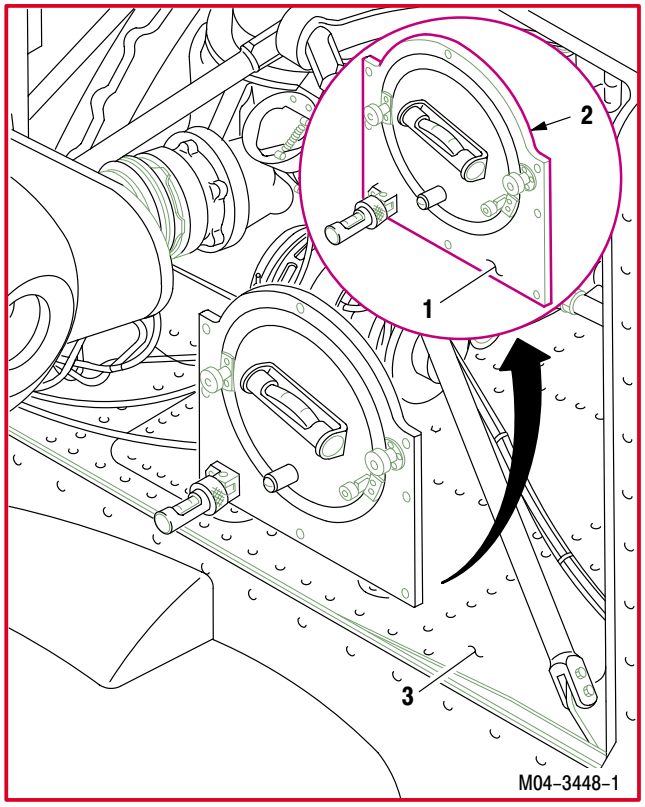
(2) Raise or lower jack slowly until desired deck angle is achieved.

b. **Inspect (QA).**

c. **Perform maintenance task.**

d. **Perform appropriate jacking procedure to remove jacks from helicopter** (para 1.66 thru para 1.72)**.**

e. **Install access panel L200** (para 2.2)**.**



END OF TASK

1.134. MAINTENANCE HEADSET CONNECT/DISCONNECT

1.134.1. Description

This task covers: Connecting/Disconnecting at Ground Service Panel. Connecting/Disconnecting in Pilot/CPG Station

1.134.2. Initial Setup

Tools:

Electrical cord assembly (item 68, App H)
Microphone headset (item 174, App H)
Intercommunication system adapter harness (figure D-463, App D)

Equipment Conditions:

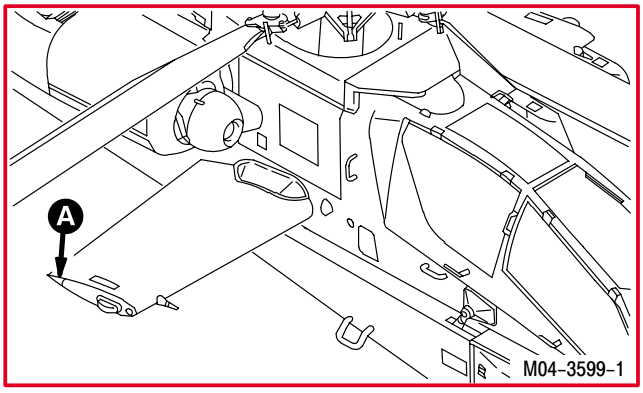
Ref	Condition
1.57	Helicopter safed
2.2	Access door LW12 or RW12 opened

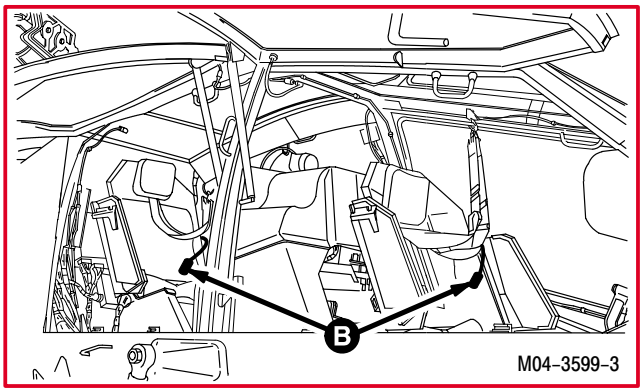
Personnel Required:

67R Attack Helicopter Repairer

NOTE

This task is typical for right and left wings or pilot and CPG cockpits.





GO TO NEXT PAGE

1.134. MAINTENANCE HEADSET CONNECT/DISCONNECT – continued

1.134.3. Connecting/Disconnecting at Ground Service Panel

a. **Connect headset (1) to ground service receptacle (2).**

(1) Connect headset connector (3) to cord assembly connector (4). Use cord assembly.

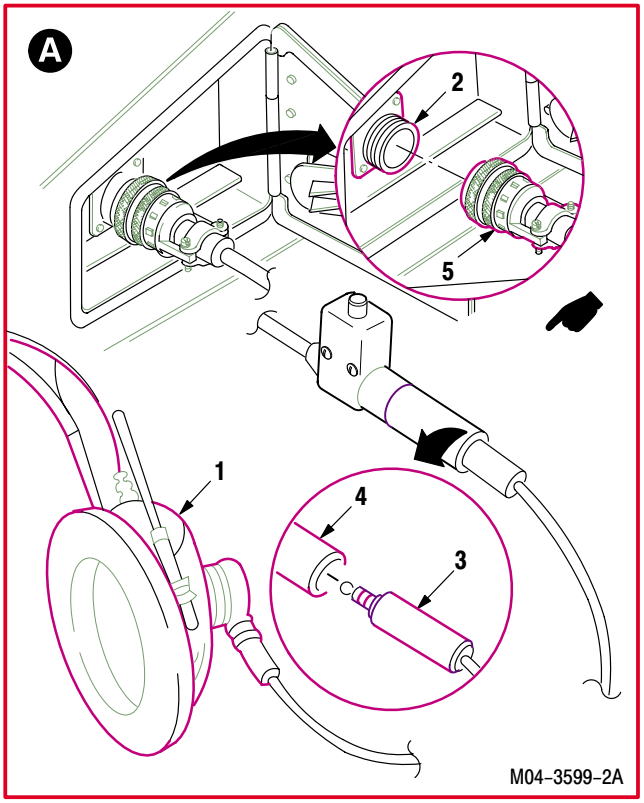
(2) Connect cord assembly connector P1 (5) to ground service receptacle (2).

b. **Disconnect headset connector (1) from ground service receptacle (2).**

(1) Disconnect headset connector (3) from cord assembly connector (4).

(2) Disconnect P1 (5) from ground service receptacle (2).

c. **Close access door LW12 or RW12** (para 2.2**).**



1.134.4. Connecting/Disconnecting in Pilot/CPG Station

a. **Enter crew station** (para 1.56)**. Observe all safety precautions.**

b. **Connect headset (1) to in-station receptacle (6).**

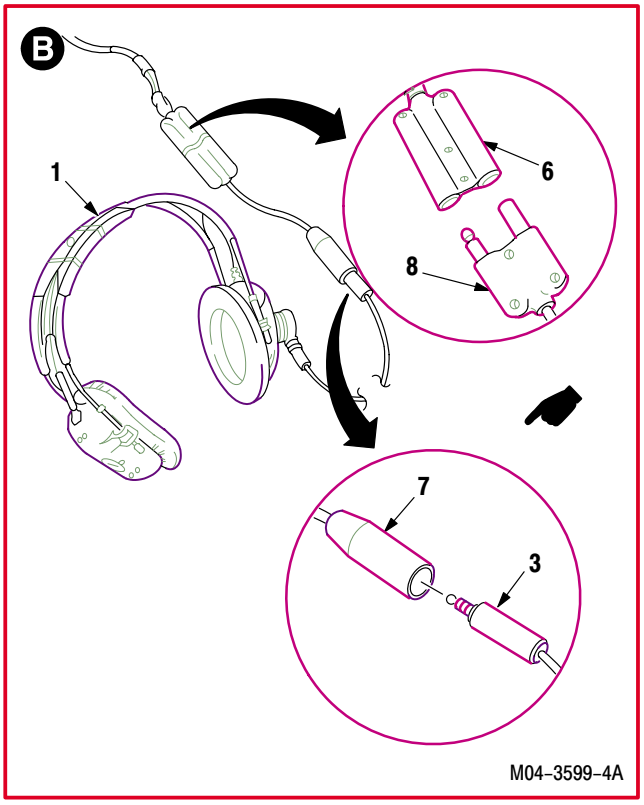
(1) Connect headset connector (3) to adapter harness connector (7). Use adapter harness.

(2) Connect adapter harness connector (8) to in-station receptacle (6).

c. **Disconnect headset (1) from in-station receptacle (6).**

(1) Disconnect headset connector (3) from adapter harness connector (7).

(2) Disconnect adapter harness connector (8) from in-station receptacle (6).



END OF TASK

SECTION VI. PREVENTIVE MAINTENANCE INSPECTIONS

1.135. INSPECTION REQUIREMENTS

a. Check helicopter at specific intervals.

b. Check helicopter parts and surrounding area every time you work on the part.

c. Checks are performed by aviation unit maintenance (AVUM) personnel. Aviation intermediate maintenance (AVIM) personnel are called in if needed.

d. There are three types of inspections:

Inspection	Publication	Interval
PHASED MAINTENANCE SERVICES	TM 1-1520-238-PMS	10 HOUR/14 DAY
PHASED MAINTENANCE	TM 1-1520-238-PM	After helicopter operated a specific number of hours.
SPECIAL	TM 1-1520-238-23 (Go to para 1.136)	After beyond-normal conditions (such as hard landings, overspeeds) and for safety equipment. After something unusual happens or by calendar time.

e. Inspections apply to all helicopters maintained with this manual. Equipment to be inspected may not be installed on your helicopter. If this is so, you do not have to do this inspection.

f. Your helicopter may go to another organization. Standards of serviceability for transfer of aircraft are in TM 1-1500-328-23.

END OF TASK

1.136. SPECIAL INSPECTIONS

a. Special inspections are extra inspections not described elsewhere in this manual or other manuals.

b. Special inspections do not follow helicopter regular inspection periods. Typical types of special inspections are:

SAFETY OF FLIGHT – Inspections to check for damage after hard landings, rotor stoppage, overspeed, etc.

CALENDAR – Inspections to be made after a number of days on items such as first aid kits, fire extinguishers, etc.

ENGINE – Engine inspections to be made on engines that are special or inspections based only on engine operating time.

c. Refer to DA PAM 738-751 for applicable forms, records, and worksheets.

d. Refer to paragraph 1.137 for the special inspection checksheet.

END OF TASK

1.137. SPECIAL INSPECTION CHECKLIST

a. The checksheets on the next pages can be copied and used for special inspections.

b. Complete all the information at the top of each page.

c. The area diagram will help you find the parts to be inspected. EXAMPLE: The inspection is in the tail area if there is 4 in the AREA No. column.

d. The SPECIAL INSPECTION No. column lists all inspections in numerical order.

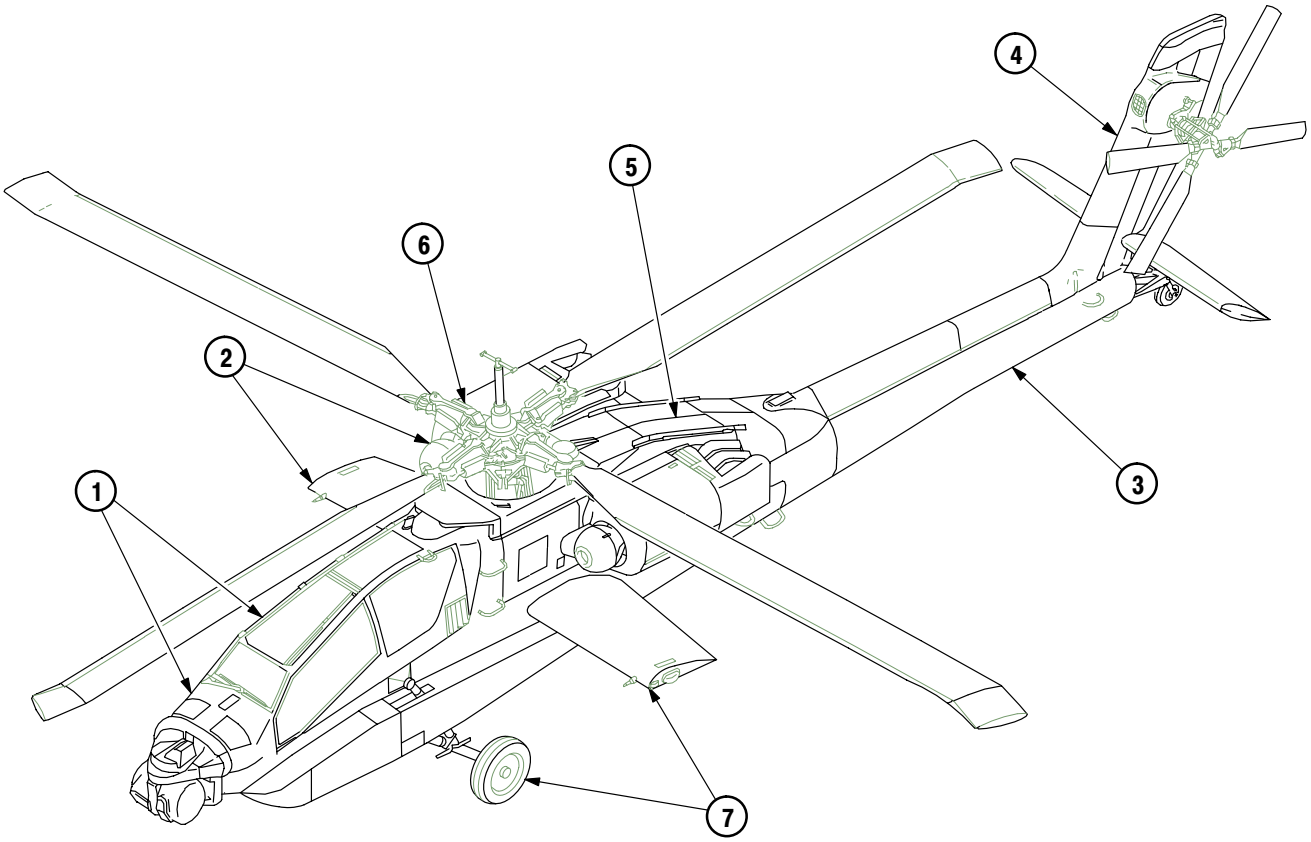
e. The REQUIREMENT EVERY column tells when the inspection is needed.

f. The ITEM column tells you what to do. It also tells where to go for additional information.

g. The STATUS column is used for helicopter records.

GO TO NEXT PAGE

1.137. SPECIAL INSPECTION CHECKLIST – continued



AREA NO. 1	CANOPY, CREW STATION, AVIONICS COMPARTMENTS, FORWARD FUSELAGE
AREA NO. 2	RIGHT FUSELAGE, WING, PYLONS, RIGHT MAIN LANDING GEAR, NO. 2 ENGINE AND NACELLE, BATTERY COMPARTMENT
AREA NO. 3	AFT FUSELAGE, TAIL ROTOR DRIVES AND CONTROLS
AREA NO. 4	STABILIZER, STABILATOR, TAIL WHEEL, TAIL ROTOR DRIVES AND CONTROLS
AREA NO. 5	AFT EQUIPMENT BAY (ALL EQUIPMENT)
AREA NO. 6	MAIN ROTOR AND CONTROLS
AREA NO. 7	LEFT FUSELAGE, WING, PYLONS, LEFT MAIN LANDING GEAR, NO. 1 ENGINE AND NACELLE, AMMO COMPARTMENT

M04–1918

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY / Item	Status
2	1	6 MONTHS Weight check portable fire extinguisher (TM 1-1500-204-23).	
1	2	12 MONTHS Check magnetic compasses for liquid discoloration and proper calibration (TM 1-1500-204-23).	
ALL	3	12 MONTHS Inventory helicopter (DA PAM 738-751).	
ALL	4	24 MONTHS Weigh helicopter (AR 95-1).	
2	5	100 HOURS/120 DAYS (WHICHEVER COMES FIRST) Remove and send aircraft batteries BB-564 and BB-664 to battery shop (AVIM) for servicing (TM 11-6140-203-23).	
2,4,5,6,7	6	25 HOURS (Aircraft Operating Time) Obtain oil samples (TB 43-0106) from: a. No. 1 engine nose gearbox b. No. 2 engine nose gearbox c. Main transmission d. Auxiliary Power Unit (APU) 50 HOURS (Aircraft Operating Time) Auxiliary Power Unit (APU). Inspect duplex vent and forward lip seal for grease. If present, remove grease and clean PTO clutch exterior. Record findings in aircraft log book. **NOTE** Grease will usually appear within 15 hours of operation after clutch replacement. If grease is noted after two consecutive inspections following initial finding, remove and replace PTO clutch and initiate category 1 deficiency report. 50 HOURS (Aircraft Operating Time) Auxiliary Power Unit (APU). Check clutch output housing bolts for proper torque (**50 INCH-POUNDS**). If proper torque does not exist, break existing torque and retorque bolts to **50 INCH-POUNDS**.	

GO TO NEXT PAGE

1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY / Item / Status
2	7	25 HOURS/30 DAYS (WHICHEVER COMES FIRST) Perform Preventive Maintenance Checks and Services (AVUM) on aircraft battery BB-564 (TM 11-6140-203-23). 50 HOURS/30 DAYS (WHICHEVER COMES FIRST) Perform Preventive Maintenance Checks and Services (AVUM) on aircraft battery BB-664 (TM 11-6140-203-23).
ALL	8	**CAUTION** Use of high pressure wash on any part of this aircraft is prohibited. AIRCRAFT SHALL BE CLEANED/WASHED (PER TABLE I) EVERY 45 DAYS (para 1.53). AIRCRAFT ENGAGED IN EXTENDED EXPOSURE OR LOW LEVEL OPERATIONS OVER BRACKISH OR SALT WATER SHALL REQUIRE A FRESH WATER RINSE (PER TABLE I) AT CONCLUSION OF EACH DAY'S OPERATION (para 1.53). AIRCRAFT STATIONED WITHIN TWO MILES OF BRACKISH OR SALT WATER SHALL REQUIRE A FRESH WATER RINSE EVERY 14 DAYS (para 1.53). **NOTE** A fresh water rinse is not to be considered as a substitute for the 45 day cleaning/washing requirement.
ALL	9	IF AIRCRAFT HAS BEEN OPERATED WITHIN 200 MILES OF VOLCANIC ACTIVITY Water wash engine internally (TM 55-2840-248-23).
ALL	10	Deleted

GO TO NEXT PAGE

1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,3,4,7	11	HARD LANDING		

If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23).

a. Main and tail landing gear wheels and tires:

(1) Check wheels for cracks or distortion. Use 10-power magnifier for crack check.

(2) Check tires for leakage, tears, and other damage.

(3) Check tire pressures.

b. Main and tail landing gear shock struts:

(1) Check for cracks or distortion. Use 10-power magnifier for crack check.

(2) Check for improper extension and seal damage (para 3.28). Raise landing gear clear of ground.

(3) Check fluid levels.

(4) Check strut charge pressures.

(5) Check strut hardware for torque stripe movement (if applied), cracks, distortion, or other stress damage.

c. Tail landing gear shock strut:

(1) Check for obviously collapsed condition or hydraulic fluid leakage.

(2) Check for expelled silicon rubber material around orifice at lower end of strut if strut appears normal.

(3) Replace tail landing gear shock strut (para 3.38) if strut is collapsed, leaking hydraulic fluid, or has silicon expelled around orifice.

(4) Jack tail boom (para 1.69) if no material is visible around orifice.

(5) Service upper piston if required (para 1.42).

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,3,4,7	11 (cont)		**NOTE** Tail boom must remain on jack while performing step (6).	
			(6) Measure overall length of strut from rod end to rod end after upper piston is properly serviced. Strut must measure **30.73** to **30.97 INCHES** with strut fully extended and properly pressurized.	
			(7) Replace tail landing gear shock strut if measurement taken is not satisfactory.	
			(8) Lower tail boom (para 1.68) if measurement taken is satisfactory.	
			d. Tail landing gear fork and main and tail landing gear trailing arms:	
			(1) Check for cracks, distortion, and loose mounting. Use 10-power magnifier for crack check.	
			(2) Check fork and arm hardware for torque stripe movement, cracks, distortion, and other stress damage.	
			e. Replace defective components if cracked, distorted, and other damage is evident at any point on wheels, landing gear struts, trailing arms, or tail fork.	
			f. Airframe in main landing gear area:	
			(1) Perform magnetic particle inspection (para 2.76).	
			(2) Check shafts and cross tube for cracks, distortion, and loose mounting.	
			(3) Check fuselage frame at FS 91.7, FS 105, FS 115, FS 125, FS 136, FS 144, and FS 154.3 for distortion and buckling.	
			(4) Check outer skins and pilot floor from FS 91.7 to FS 154.3 for buckling and sheared rivets.	
			g. Airframe in tail landing gear area:	
			(1) Check frame end bulkhead for distortion and buckling.	
			(2) Check bulkhead strut attach and trailing arm pivot lugs for cracks and distortion.	
			h. Tailboom:	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,3,4,7	11 (cont)		(1) Check outer skins from FS 370 to FS 547 for buckling and sheared rivets.	
			(2) Check stringers from FS 370 to FS 547 for cracks and buckling.	
			(3) Check fuselage frame from FS 370 to FS 531 for buckling.	
			i. Wing mounts:	
			(1) Remove ammunition flat pack.	
			(2) Check interior wing mount castings for cracks. Use 10-power magnifier and flashlight.	
			(3) Check exterior wing root areas for cracks and distortion.	
			j. Check pylon wing mounts in case of stores or pylon ground strike:	
			(1) Remove stores and pylons.	
			(2) Check pylon mounting areas under wings for cracks and distortion.	
			k. Engine mounts:	
			(1) Open access doors LN1, RN1, LN3, RN3, LN4, RN4, T250L, T250R, T290L, T290R, and L325.	
			(2) Check inboard engine mount support brackets for cracks or distortion.	
			(3) Check nacelle engine mounts for cracks or distortion.	
			(4) Secure access doors LN1, RN1, LN3, RN3, LN4, RN4, T250L, T250R, T290L, T290R, and L325.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,3,4,7	11 (cont)		l. Check main rotor droop stops for bending or distortion, especially in roller-to-pitch housing areas. m. TADS/PNVS mounts: (1) Remove TADS/PNVS turret (TM 1-1270-476-20). (2) Check support fittings for cracks, distortion, corrosion, and dirt. Use 10-power magnifier for crack check. (3) Check seals for deterioration, leakage and improper fit. (4) Check upper (brass) bushings for out-of-round condition or distortion. (5) Reinstall TADS/PNVS turret (TM 1-1270-476-20). n. Check lower wire strike cutter for bends, cracks, and alinement. Replace cutter if damaged. (para 2.195).	
6	12	MAIN ROTOR BLADE STRIKE	If cracks/delaminations are suspected, perform nondestructive inspection (TM 1-1520-264-23). a. Check full blade chord for strike damage from impact point to trailing edge. b. Check entire blade trailing edge for buckling. c. Carefully check all blade root end doublers and blade station 82 trailing edge bond joints for delamination. d. Check main rotor head for cracks or other damage, with special attention to: (1) Lead lag links and pitch housing in areas of lead lag link stops. (2) Strap packs: check for leading edge failures and trailing edge buckling. (3) Feathering bearing housings: check for cracked lugs.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
4	13	TAIL ROTOR BLADE STRIKE If cracks/delaminations are suspected, perform nondestructive inspection (TM 1-1520-264-23). a. Check full blade chord for strike damage from impact point to trailing edge. b. Check entire blade trailing edge for buckling. c. Check all root end doublers for delamination. d. Check tail rotor head and fork for cracks and other damage. e. Check tail rotor blade for improper feathering function.		
4,6	14	ROTOR OVERSPEED If cracks/delaminations are suspected, perform nondestructive inspection (TM 1-1520-264-23). 100% to 110%: No inspection required. 111% to 115%: a. Check main and tail rotor blades for root area cracks, delamination, and distortion. b. Check main and tail rotor heads for cracks or other damage. Give special attention to: (1) Straps packs: cracks, buckling, and edge failures. (2) Lead lag link: cracks and distortion. 116% to 119%: a. Remove main rotor blades. b. Remove tail rotor blades. c. Check main rotor blade pins and tail blade bolts for cracks or rotor deformation. d. Check main and tail rotor blades for root area cracks, delamination, and distortion.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
4,6	14 (cont)	e. Check main and tail rotor heads with special attention to: (1) Strap packs: cracks, buckling, and edge failures. (2) Blade mount areas: cracks and distortion. f. Install tail rotor blades. g. Install main rotor blades. Rotor speed greater than 119%: Replace main rotor and tail rotor heads and blades.		
2	15	AFTER EACH GRAVITY REFUELING OPERATION PN 7-117420021-3 fuel flapper valve installations: a. Leave filler ports open, after refueling. b. Pull firmly on chain to open flapper valve. c. Check flapper packing for damage and looseness. Use flashlight. d. Replace flapper valve if packing is damaged or dislodged. e. Close filler ports.		
6	16	250-HOUR PHASED INSPECTION Check ADS resilient mount for tears: a. Determine if damage extends through the mount if tear exists. Use feeler gage. Replace mount if tear extends through mount and 45 degrees around circumference. b. Check resilient mount at 125-hour intervals if tear is less than above limits. c. Continue inspection at 250-hour intervals if no tears exist.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,4,6,7	17	ENGINE OVERTORQUE OR ROTOR UNDERSPEED.		

If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23).

125% or below single-engine overtorque with engine failure - No inspection required.

125% or below single-engine overtorque without engine failure - No inspection required.

126% to 130% single-engine overtorque with engine failure:

a. Remove main transmission input drive shaft and couplings on overtorqued side. Check shaft, couplings, and all drive bolt holes for cracks, enlargement, deformation, and other indications of overstress.

b. Check overtorqued engine nose gearbox and main transmission for cracks or oil leakage.

c. Remove overtorqued engine nose gearbox oil filter and main transmission oil filter. Internally check each filter for metallic particles (chips). If chips are evident, perform the following steps:

(1) Take “hot” oil samples from engine nose gearbox and main transmission.

(2) Flush engine nose gearbox and main transmission.

(3) Flush main transmission (para 1.32).

(4) Ground run aircraft for a minimum of 15 minutes.

(5) Inspect engine nose gearbox and main transmission filters.

(6) If no chips are found, resample after approximately 5 flight hours.

126% to 130% single-engine overtorque without engine failure:

a. Perform steps a. thru c. listed for 126% to 130% overtorque with engine failure.

b. Check tail rotor drive shafts for cracks, deformation, and other indications of overstress.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,4,6,7	17 (cont)	Above 130% single-engine overtorque with engine failure:		

NOTE

Momentary 130% overtorque indication will normally be considered below 130%; a stabilized 130% overtorque indication will be considered above 130% for purposes of this special inspection.

a. Replace main transmission input drive shaft and couplings on overtorqued side.

b. Replace engine nose gearbox on overtorqued side.

c. Replace main transmission.

d. Check mounting system of overtorqued engine for loose hardware, brackets, mounts or links, and other indications of overstress.

e. Check tail rotor drive shafts for cracks, deformation, and other indications of overstress.

Above 130% single-engine overtorque without engine failure:

a. Perform steps a. thru e. listed for 130% or above overtorque with engine failure.

b. Check main rotor drive shaft and drive plate for cracks, distortion, and other indications of overstress.

c. Check main rotor strap packs for buckling and other indication of overstress.

d. Check main rotor blades for buckling at trailing edges.

e. Check main rotor damper attachment holes for looseness (hole enlargement). Replace damper, trunnion, and mounting hardware if hole enlargement is found.

f. Check tail rotor for buckling and looseness.

g. Replace tail rotor fork.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,4,6,7	17 (cont)	Below 115% dual-engine overtorque - No inspection required.		

115% to 130% dual-engine overtorque:

NOTE

Refer to special inspection 14 if dual-engine overtorque is accompanied by rotor overspeed.

a. Remove both main transmission input drive shafts and couplings. Check both shafts, couplings, and all drive bolt holes for cracks, enlargement, deformation, and other indications of overstress.

b. Check both engine nose gearboxes and main transmission for cracks or oil leakage.

c. Remove both engine nose gearbox oil filters and main transmission oil filters. Internally check each filter for metallic particles (chips). If chips are evident, perform the following steps:

(1) Take hot oil samples from engine nose gearboxes and main transmission.

(2) Flush engine nose gearbox.

(3) Flush main transmission (para 1.32).

(4) Ground run aircraft for a minimum of 15 minutes.

(5) Inspect engine nose gearbox and main transmission filters.

(6) If no chips are found, resample after approximately 5 flight hours.

d. Check main rotor drive shaft and drive plate for cracks, distortion, and other indications of overstress.

e. Check tail rotor drive shaft for cracks, deformation, and other indications of overstress.

f. Check main rotor strap packs for buckling and other indications of overstress.

g. Check main rotor blades for buckling at trailing edges.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,4,6,7	17 (cont)		h. Check main rotor damper attachment holes for looseness (hole enlargement). Replace damper, trunnion, and mounting hardware if hole enlargement is found.	
			i. Check tail rotor assembly for buckling and looseness.	
			Above 130% dual-engine overtorque:	
			a. Replace both main transmission input drive shaft and couplings.	
			b. Replace both engine nose gearboxes.	
			c. Replace main transmission.	
			d. Replace main rotor drive shaft.	
			e. Check main rotor drive plate for cracks, distortion, and other indications of overstress.	
			f. Check tail rotor drive shaft for cracks, deformation, and other indications of overstress.	
			g. Check main rotor strap packs for buckling and other indications of overstress.	
			h. Check main rotor blades for buckling at trailing edges.	
			i. Check main rotor damper attachment holes for looseness (hole enlargement). Replace damper, trunnion, and mounting hardware if hole enlargement is found.	
			j. Check tail rotor for buckling and looseness.	
			k. Replace tail rotor fork.	
			l. Check both engine mounting systems for loose hardware, brackets, mounts or links, and other indications of overstress.	
			m. Check main rotor mast base for looseness, cracks, deformed flange, and for loose and missing base nuts or PLI washers.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY / Item	Status
2,4,6,7	17 (cont)	Rotor underspeed (droop) below 90% with engine failure: a. Check tail rotor drive shafting for cracks, deformation, and other indications of overstress. b. Check main rotor strap packs for buckling and other indications of overstress. c. Check main rotor blades for buckling at trailing edges. d. Check main rotor damper attachment holes for looseness (hole enlargement). Replace damper, trunnion, and mounting hardware if hole enlargement is found. e. Check tail rotor for buckling or looseness.	
	18	Deleted.	
2,7	19	DAILY BEFORE FIRST ENGINE START OF DAY Check oil levels in engines No. 1 and No. 2. a. No further action required if engine oil level has not changed. b. Service to acceptable limits if engine oil has decreased. c. Check level of corresponding engine nose gearbox (NGB) if engine oil level has increased. (1) Ensure engine oil level is in limits and note conditions. (2) Quill shaft seal has failed if NGB oil level is low. Replace quill shaft within next 50 flight hours (para 6.36).	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
1	20	12 MONTHS (OR NEAREST PHASE INSPECTION)	Perform outside air temperature indicator functional check (TM 1-1500-204-23).	
2,4,6,7	21	IF HELICOPTER EXPERIENCES A SUDDEN STOPPAGE CAUSED BY:	If cracks/delaminations are suspected, perform nondestructive inspection (TM 1-1520-264-23). a. Blade striking an object b. Engine compressor stall c. Foreign object damage d. Main transmission seizure Main rotor blade: a. Check full blade chord for strike damage from impact point to trailing edge. b. Check entire blade trailing edge for buckling. c. Check all blade root end doublers and blade station 82 trailing edge bond joints for delamination. Head assembly main rotor: a. Check rotor head for cracks or other obvious damage. b. Check lead lag links and pitch housing in areas of lead lag link stops. c. Check strap packs for leading edge failures and trailing edge buckling. d. Check feathering bearing housings for cracked lugs. e. Check main rotor hub for distortion (crinkled paint) and elongated bolt holes. f. Check main rotor drive plate and upper spline coupling on main rotor drive shaft for damage. g. Check droop stop mechanism.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,4,6,7	21 (cont)		**NOTE** Replace main transmission, nose gearbox, input drive shaft, and couplings if excessive damage is noted to main transmission coupling. Engine: a. Check engine mounts for security, cracks, and misalinement. b. Check engine control linkage for bends, breaks, and improper operation. c. Check engine inlets for foreign objects and unusual noise. Tail rotor drive system: a. Check tail rotor blades for dents, nicks, scratches, separation of skin, buckling of trailing edge, and delamination of SPAR bond lines and root doubler bond. b. Check tail rotor drive fork, pitch links, swashplates, and pitch control bearing housing for damage. c. Check tail rotor transmission mounting flanges for cracks. d. Check tail rotor drive shaft and couplings for distortion and cracks. Tail rotor blades: a. Check tail rotor blades for dents, nicks, scratches, separation of skin, buckling of trailing edge, and delamination of SPAR bond lines and root doubler bond. b. Check tail rotor drive fork, pitch links, swashplates, and pitch control bearing housing for damage. c. Check tail rotor transmission mounting flanges for cracks. Transmission and nose gearboxes: a. Check chip detectors and lube oil filters for metal accumulation. b. Check main transmission couplings. c. Check tail rotor drive shaft and couplings for distortion and cracks.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY / Item	Status
5	22	AT EACH 125 FLIGHT HOURS Service ENCU cooling turbine lubrication (para 1.52).	
1	23	Deleted	
1	24	Deleted	
1	25	12 MONTHS Check pitot static system, altimeter, and airspeed indicator accuracy (TM 1-1500-204-23).	
4	26	50 FLIGHT HOURS a. Check for evidence of main rotor swashplate lower seal grease leakage, and ball bearing condition (para 11.5). b. After reaching 1750 swashplate hours or if any grease leakage is observed from the sealed bearing of the rotating swashplate, accomplish the following every 50 flight hours: (1) Disconnect lower ends of pitch links (4 places) from swashplate (para 11.14). Secure pitch links. (2) Disconnect lower ends of main and secondary scissors (1 place each) from swashplate (para 11.16 and para 11.18). Secure scissors. (3) Inspect for axial play between rotating and non-rotating swashplate. No discernable axial play allowed. (4) While rotating swashplate, check for ratchety or noisy operation. If either condition exists, replace swashplate. (5) If no irregularities are found, reconnect lower ends of main and secondary scissors (para 11.16 and para 11.18) and lower ends of pitch links (para 11.14).	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
4	26 (cont)		c. Inspect main rotor pitch change links for radial and axial play.	
			(1) Maximum allowable radial play is **0.014 INCH**.	
			(2) Maximum allowable axial play is **0.030 INCH**.	
			d. Inspect tail rotor pitch change links for radial and axial play.	
			(1) Maximum allowable radial play is:	
			(a) Large bearing – **0.011 INCH**.	
			(b) Small bearing – **0.006 INCH**.	
			(2) Maximum allowable axial play is:	
			(a) Large bearing – **0.020 INCH**.	
			(b) Small bearing – **0.014 INCH**.	
5	26A	50 FLIGHT HOURS	INSPECTION OF AUXILIARY POWER UNIT POWER TAKE-OFF CLUTCH (P/N 3886000-5).	
			a. Inspect duplex vent and forward lip seal for grease.	
			(1) If present, remove grease and clean PTO clutch exterior. Record findings on DA Form 2408-13-1.	
			NOTE Grease will usually appear within 15 hours of operation after clutch replacement. If grease is noted after two consecutive 50 flight hour inspections following the initial finding, remove and replace PTO clutch and initiate category 1 deficiency report. Wetness from the duplex vent is acceptable.	
			b. Check clutch housing bolts for proper torque.	
			(1) Torque bolts to **50 INCH POUNDS**.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
6	27	10 FLIGHT HOURS		

CHECK MAIN ROTOR STRAP PACK FOR THE FOLLOWING:

a. Perform inspection per step c. until one laminate is found discrepant.

b. A failed top or bottom laminate of strap pack assembly may be repaired unless a crack or failure of a laminate is detected within one inch of outboard shoe or inboard abrasion strip. If a crack is found, strap pack assembly is unserviceable.

NOTE

- Repair is not allowed for laminate failures under outboard or inboard shoes. Repair limits are defined in paragraph 5.36. Upon detection of any other discrepant laminate, strap pack assembly is unserviceable.
- Ensure that collective control stick is in mid position, cyclic stick is in neutral position, and swashplate is level/centered with respect to the aircraft.

c. Inspect accessible portion of each strap pack for cracked, buckled, broken, or horizontally displaced laminates. Use inspection mirror, flashlight, and tongue depressor.

d. If the inspection of step c. is not conclusive, remove main rotor blade (para 5.3) and reinspect per step c. Ensure strap pack is as flat as possible during inspection.

e. If the inspection of step d. is still not conclusive, remove pitch housing (para 5.25) and reinspect per step c. Measure horizontal displacement. Maximum allowable displacement is **0.020 INCH** or if any change in displacement exceeding **0.010 INCH** is detected between inspections.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
6	27 (cont)	CRITERIA FOR REPLACEMENT a. If one laminate, other than a previously trimmed top or bottom laminate is discrepant, strap pack assembly is unserviceable, but a one time flight to an adequate AH-64 maintenance facility is authorized. This flight shall not exceed two hours. b. If two laminates, other than a previously trimmed top or bottom laminate are discrepant, strap pack assembly is unserviceable and no flights are authorized.		
6	27A	20 FLIGHT HOURS PERFORM MAIN ROTOR STRAP PACK BORESCOPE INSPECTION: **NOTE** This inspection to be done in conjunction with special inspection #27. a. Perform borescope inspection (para 5.34A).		
5	27B	10 FLIGHT HOURS CHECK ENCU FILTER FOR CONTAMINATION: a. Clean ENCU filter element (para 13.12).		
	28	10 HOURS/14 DAY If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23). On PN 7-311310001-5, -7, -13, -15, -21, and -25 main transmission, accomplish the following: a. Remove access panels L200 and R200. b. Open access doors T250L, T250R, T290L, T290R, and L325. c. Thoroughly clean exteriors of main transmission cover and intermediate support. d. Check intermediate gear support left and right side gear covers (ears) and flange bolt hole bosses and webs for evidence of cracks or oil leakage. Use 5-power magnifier. e. Secure access doors T250L, T250R, T290L, T290R, and L325. f. Secure access panels L200 and R200.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.:			Date:	
Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2	29	10 HOURS/14 DAY		

On helicopter S/N 82-23355 thru 82-23365 and 83-23787 thru 83-23834, accomplish the following:

a. Open refueling access door R160.

b. Set REFUEL VALVE to OPEN position. Check that OPEN light illuminates. If light does not come on, perform fuel system MOC (TM 1-1520-238-T).

c. Remove cap from forward gravity filler port.

d. Remove access panel R200.

e. Remove filler neck access (round slotted) panel from transmission deck forward right side.

f. Check interior and exterior of filler neck assembly. Use inspection mirror and flashlight:

(1) Inspect for cracks in area of welded filler tube.

(2) Inspect for separation of lower flange from filler tube, and for sheared or missing tube flange rivets.

g. If any listed defect is evident and/or at the next phase inspection, replace filler neck assembly.

h. Set REFUEL VALVE switch to CLOSE. Check that OPEN light goes out.

i. Install access panels.

j. Secure refueling access door R160 and access panel R200.

k. Install filler cap.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
6	30	50 FLIGHT HOURS		

CHECK MAIN ROTOR PITCH HOUSING NUTS FOR THE FOLLOWING:

a. Check torque on 16 nuts using torque wrench set to **270 INCH-POUNDS**.

b. Check for proper bolt thread extension through nut. The allowable number of threads visible beyond the nut is no less than 1 1/2 and no more than 5 1/2.

c. If the torque is **270 INCH-POUNDS** or more and the number of visible threads are within allowable range, the inspection is complete. If either condition is not met, proceed to step d.

NOTE

Use only one washer under nut on lower pitch housing bolt (HS1446-6-20) and two washers under nut on upper pitch housing bolts (HS1446-6-28).

d. If only one bolt on a single pitch housing is less than **270 INCH-POUNDS**, replace nut, bolt, and washer(s) with new ones. Lubricate threads of bolts and nuts with lubricant (item NO TAG, App F). Torque nut(s) to **350 INCH-POUNDS**. Apply torque stripe.

e. If two or more bolts on a single pitch housing are less than **270 INCH-POUNDS**, check for possible damage to pitch housing and/or feather bearing assembly. If no damage is found, replace undertorqued nuts, bolts, and washers with new ones. Lubricate threads of bolts and nuts with lubricant (item NO TAG, App F). Torque nuts to **350 INCH-POUNDS**. Apply torque stripe.

f. If less than 1 1/2 or more than 5 1/2 threads can be seen beyond the nut(s), replace nut(s), bolt(s), and washer(s). Lubricate threads of new bolt(s), nut(s), and washer(s) with lubricant (item NO TAG, App F). Torque nut to **350 INCH-POUNDS.** Apply torque stripe.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
6	30 (cont)	INSPECT STRAP PACK BOLTS FOR CRACKS.		

If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23).

NOTE

Inspection may be conducted without removing the lead lag link.

a. Remove center bolt from lead lag link pin (para 5.32).

b. Check bolt for cracks. None allowed.

c. Install center bolt in lead lag link pin (para 5.32).

INSPECT LEAD LAG LINK TEFLON SLEEVE BEARINGS.

On lead lag links P/N 7-31141155-11 accomplish the following:

a. Remove main rotor blade lead lag link (para 5.33).

b. Inspect teflon sleeve bearing liner(s) for serviceable condition (para 5.33).

c. Check teflon sleeve bearing liner(s) for color.

(1) If teflon sleeve bearing liner(s) is brown or black no further action is required. Re-install link.

(2) If teflon sleeve bearing liner(s) have a milky white film reinspect every 50 flight hours.

d. Install main rotor blade lead lag link (para 5.33).

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
5	31	IF AIRCRAFT HAS BEEN OPERATED IN A LOOSE GRASS ENVIRONMENT a. Perform ENCU cleaning as required (para 1.48).		
ALL	32	AFTER KNOWN OR PROBABLE WIRE STRIKE If voids or delamination are suspected, perform nondestructive inspection (TM 1-1520-264-23). a. Check wire strike deflectors for bends, cracks, and alinement. Replace if damage is found. b. Check wire strike cutters for bends, cracks, and alinement. Replace if damage is found. c. Check mounting areas for cracks and deformation of structure and attaching fasteners. Repair if damage is found (TM 1-1500-204-23).		
ALL	33	AFTER KNOWN OR SUSPECTED LIGHTNING STRIKE If voids or delamination are suspected, perform nondestructive inspection (TM 1-1520-264-23). **NOTE** • Following a known or suspected lightning strike perform the following inspection and operational checks prior to next flight. • Lightning strike damage can be distinguished from other damage, such as gouging, denting, or erosion, because it normally appears as a blackened surface, pit, or hole with a burned rim. • Lightning is attracted to sharp objects. Pay close attention to protrusions, sharp corners, and outer surfaces, such as main and tail rotor tips and trailing edges, electrostatic dischargers, and antennas. a. PRELIMINARY LIGHTNING STRIKE INSPECTION REQUIREMENTS (1) Check surfaces of main rotor blades and main rotor hub assembly; including lead lag link joints, pitch housings, droop stop mechanisms, hub, dampers, controls, and swashplate assemblies for evidence of lightning damage.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
ALL	33 (cont)		(2) Check wire strike hardware (if applicable).	
			(3) Check main rotor blade electrostatic bonding cables and de-ice wire harnesses for burned insulation and/or damage.	
			(4) Check main rotor electrostatic discharge brushes and de-ice harness brush blocks for erosion and/or damage.	
			(5) Check main rotor mast for signs of arcing, pitting, and/or damage.	
			(6) Check surfaces of tail rotor blades and tail rotor assembly; including links, pitch horn, pitch change swashplate, hubs, forks, and control linkages for evidence of lightning damage.	
			(7) Check tail rotor electrostatic bonding cables and de-ice wire harnesses for burnt insulation and/or damage.	
			(8) Check tail rotor electrostatic discharge brushes and de-ice harness brush blocks for erosion and/or damage.	
			(9) Check flight controls for evidence of lightning damage. Check for freedom of movement of all flight controls.	
			(10) Check entire aircraft surface for burns, burn holes, burn streaks, paint discoloration, lost or eroded metal, torn metal, bulged or delaminated composite surface pits and punctures, no matter how slight.	
			(11) Check exposed electrical wiring, including wiring in TADS/PNVS avionics bays and under main rotor mast aperture fairing.	
			(12) Check all electrical, AFCS and avionic components, including antennas, for damage.	
			(13) Check all hydraulic components, including tubes, hoses, and fittings, for damage.	
			(14) Check gravity refueling ports, pressure refueling port, and fuel cell vents for evidence of arcing and/or damage.	
			(15) Check APU for damage.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
ALL	33 (cont)		(16) If no damage is found, do a complete operational check of the electrical, avionics and automatic flight control systems and all subsystems with electrical controls and/or wiring, (e.g. DASE, stabilator, rotor brake, cockpit control panels, engine fire detection and extinguishing systems, caution and advisory warning systems) and hydraulic systems. Check VSWR on all antenna systems and check the magnetic compass accuracy.	
			(17) If no damage was noted after completing a full operational check of the aircraft, then either the lightning energy was very low or there was a near miss and no further inspection is required.	
			(18) If any damage was noted, then refer to lightning damage inspection requirements.	
			(19) Tag all components being sent to depot with “LIGHTNING STRIKE.”	
			(20) Repair or replace damaged components per maintenance procedures. Discard all damaged hardware not covered under standard reclamation procedures.	
6			b. LIGHTNING DAMAGE INSPECTION REQUIREMENTS	
			c. MAIN ROTOR AND FLIGHT CONTROLS	
			(1) Remove each SPAD shear pin and cycle the mechanism to ensure proper operation.	
			(2) Replace any component showing evidence of lightning damage.	
			(3) Check entire top and bottom length of main rotor blades for the following:	
			NOTE If minor external damage is found, major internal damage may have occurred.	
			(a) Check entire blade length leading and trailing edge for burns, burn holes, burn streaks, paint discoloration, voids, delamination and puncture marks.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

6	33 (cont)	(b) Check tip cap attach screws and tab for burns or discoloration. (c) During blade removal, remove one expandable pin (blade attachment pin) at a time from blade root and check for discoloration. 1. If damage is found, replace expandable pin. 2. If damage is found, return blade to depot. (d) After blade removal, check for the following: 1. Check electrostatic bonding and de-ice wiring and hardware for damage. If damaged, replace components as required. 2. Remove lead lag link bushings and pin. Check for damage, discoloration and arc burns on parts. If damage is found, replace parts as required. 3. Check damper joints, damper attach holes, bushings and rod end bearings for arcing, pitting, and burn marks. If damaged is found, replace parts as required. 4. Remove pitch housing and inspect the housing and strap pack assembly for damage, arcing, and burn marks. If damaged is found, replace parts as required. 5. Check hub/mast electrostatic discharge brush holders for damage, arcing, discoloration and burn marks. 6. Remove and check upper mast bearing for arcing and damage. If damage is found, send rotor hub and bearings to depot for evaluation and damage assessment. 7. Remove pitch control rod bolt from swashplate and check upper and lower pitch control rod bearings for arcing. If damaged is found, replace control rod. 8. Check rotating scissors for damage. If damaged is found, replace scissors. 9. Disconnect servo control rods and check swashplate for proper rotation and cyclic and collective movement. Replace swashplate if rotating or stationary parts are damaged and if pitch control rod or damper attach bolts were damaged. 10. Check entire hub assembly for direct lightning attachment points.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
6	33 (cont)		(e) After main rotor blade lightning strike, remove damper and check the following: 1. Check damper attach bolts for arcing, pitting or burn marks. If damaged is found, replace bolts. 2. Check bearings for arcing, pitting or burn marks. If damaged is found, send damper to depot. 3. Check damper bracket lugs and bushings for arc damage. If damaged is found, send hub assembly to depot. (f) After blade lightning strike, check the following: 1. Check bearings, bushings and attach bolts of flight control rods, bellcranks, and levers between servo output rods and swashplate for burn marks. If burn marks are found, replace parts. 2. Check front and aft bellcrank support attach fittings for arc burns. If arc burns are found, replace bellcrank supports. (g) After any lightning strike, check primary servo input and output linkage bearings for arcing and burn marks. Fully extend pistons and check for roughness, pitting, or burn marks. If damaged is found, send servo to depot. d. MAIN TRANSMISSION AND DRIVE SHAFT (1) Check main gearbox mounting points, attach bolts and exposed portion of main rotor shaft for arcing or leakage. If damaged is found, remove main transmission and send to depot. (2) If any main rotor shaft component shows signs of lightning strike damage, remove main transmission and send to depot. (3) Check input drive shafts, gimbals, and support tubes for arcing or leakage. If damaged is found, send components to depot.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
4	33 (cont)	e. TAIL ROTOR SYSTEM		
		(1) Check entire inboard and outboard surfaces of tail rotor blades for the following:		
		(a) Entire blade length for burns, burn holes, burn streaks, arcing, paint discoloration, voids, and delaminations.		
		(b) Blade tip and trailing edge for arcing, burns, delamination and loose screws in tip cap.		
		(c) Leading edge and skin-to-horn joint for arc burns.		
		(2) Check the following on tail rotor system:		
		(a) Check de-ice wires for damage. If damage is found, replace.		
		(b) Remove blades and check strap pack, hub, teetering bearing, teetering bolt, fork, and fork drive shaft for damage, arcing, discoloration, and burn marks. If damage is found, return to depot.		
		(c) If damage is found, do the following:		
		1. Check pitch control rod end bearings, pitch change swashplate, hubs and fork. If damaged, return components to depot.		
		2. Check pitch rod attach bolts. If damage is found, replace bolts.		
		3. Check tail rotor mechanism by manually cycling to ensure proper operation.		
2,7		f. MAIN LANDING GEAR		
		(1) Check strut lower stage piston, axle, trailing arm, and attaching parts of main landing gear for damage. Check landing gear for proper servicing and leaks.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,7	33 (cont)		(2) If damage is found, remove main landing gear and perform the following: (a) Check trailing arm shock strut attach bolt and pivot at cross tube for arcing. If damaged, replace or repair parts as required. (b) Check ground wire (left side only) and bonding jumper from fuselage to drag beam for damage. If damaged, replace component as required. (c) Fully extend upper piston of shock strut and check for pitting. If damaged, send shock strut to depot. (d) Check tire rim for damage. If damage is found, replace rim.	
3,4			g. TAIL LANDING GEAR (1) Check tail landing gear for damage, proper dimensions, and leaks. (2) If damage is found, remove tail landing gear and perform the following: (a) Check yoke and landing gear shock strut attach bolts for arcing. If damaged, replace bolts. (b) Check inside diameter of yoke bushings for arc damage. (c) Check bearings in shock strut for arc damage. (d) Fully extend upper piston of shock strut and check for pitting and roughness. (e) If damaged, send tail landing gear to depot. (f) Check tire rim for damage. If damage is found, replace rim.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
4	33 (cont)	h. STABILATOR (1) Check surface of pivot joint, stabilator, and electrostatic dischargers for lightning strike damage. (2) If damaged, repair per maintenance procedures. (3) Remove stabilator and inspect attach bolts, bearings, attachment fittings, actuator attach bolts, and bearings for damage. If damage is found, send stabilator to depot. Replace attaching hardware as required.		
		i. VERTICAL STABILIZER (1) Check surface of vertical stabilizer, tip cap, radar warning antenna, tail light, position light, and trailing edge antenna. (2) If damaged, remove vertical stabilizer and perform the following: (a) Check for arcing at lower attach bolts and attach lug surfaces, stabilator pivot bushings, antenna attach surfaces, fairing attach surfaces, and skin. (b) If damaged, send vertical stabilizer to depot. (c) Replace attaching hardware as required.		
2,7		j. WING (1) Check surfaces of wing, electrostatic dischargers, wing tip, formation lights, and all pylons for damage. (2) If damage is found, check the following: (a) Check attach bolts for arcing. If damaged, replace bolts. (b) Check pylon mounts, attach lugs, and shear pin bushings. If damaged, send to depot.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2,7	33 (cont)		(c) Check electrostatic dischargers, internal wiring and connectors, hydraulic lines and fittings. If damaged, replace parts as required.	
			(d) Check lights. If damaged, replace as required.	
ALL			k. AIRFRAME STRUCTURE	
			(1) Check airframe skin surfaces and all attach points where assemblies or actuators have been removed for arcing or visible indication of lightning strike damage.	
			(2) Check all fairings and door interfaces.	
			(3) If damaged, return airframe to depot for repair (para 2.12).	
3,4			l. INTERMEDIATE AND TAIL ROTOR GEARBOXES AND DRIVE SHAFT	
			(1) Check intermediate and tail rotor gearboxes mounting points and attaching hardware for arcing or leakage. If damaged, remove gearbox and send to depot. Replace attaching hardware as required.	
			(2) If no visible damage was found on intermediate gearbox, but any one of the viscous damper bearings, hardware, or shafts adjacent to the gearbox are damaged, remove intermediate gearbox and send to depot.	
			(3) Check tail rotor drive shafts, couplings, and viscous damper bearings for arcing or leakage. If damaged, remove component and send to depot.	
			(4) If no visible damage was found on tail rotor gearbox, but there was evidence of lightning strike on the tail rotor, remove tail rotor gearbox and servo and send to depot.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
5	33 (cont)	m. OIL COOLER (1) Check oil cooler and fan for arcing or leakage. If damaged, remove damaged component and send to depot.		
2,7		n. ENGINE (1) Check engine compartments, input drive shafts and engine mounting points for signs of arcing. If damaged, replace damaged components. (2) Perform engine inspection (TM 55-2840-248-23). (3) If no visible damage was found, perform a full operational check. Perform complete functional check of all subsystems (TM 55-2840-248-23).		
5		o. APU (1) Check APU for damage. If damaged, send APU to depot. (2) If no visible damage was found, perform a full operational check. Perform a complete functional check (TM 1-1520-238-T).		
ALL		p. ELECTRICAL/FUEL (1) Check exposed electrical wiring, including wiring in TADS/PNVS, FABS compartments, and under main rotor pylon, for burns or chaffing. Repair or replace damaged wiring per TM 1-1500-204-23. (2) Check electrical, AFCS, and avionic components for damage. Remove and perform bench check on all damaged components. Replace all damaged components found during bench checks or inspections.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
ALL	33 (cont)		(3) Check gravity refueling ports, pressure refuel port, and fuel cell vents for arc burns. Replace any damaged component. During next refueling, check pressure refuel/defuel shutoff valves, and vent valve for proper operation.	
			(4) Perform continuity check on wiring to any damaged component. After installing a replacement component perform an operational check of the new component.	
1			q. SDC	
			(1) Check SDC and attaching hardware for arcing and leakage. If damaged, send SDC to depot. If no damage is found, perform operational check (TM 1-1520-238-T).	
2,7			r. EXTERNAL FUEL TANKS	
			(1) Check refueling port, air/fuel and electrical interfaces for arcing or burns.	
			(2) Check for any indication of damage to composite structure.	
			(3) If damage exceeds maximum allowable tolerances, the tank must be returned to the contractor.	
ALL			s. WIRE STRIKE	
			(1) Check wire strike hardware for damage.	
			(2) Check cutting edges and sharp protrusions for indication of damage. If damage is found, replace as required. Return damaged components to depot.	
2,4,7	34	30 DAYS		
			STABILATOR HINGE AND WEAPONS PYLON PIVOT	
			NOTE	
			Do not use corrosion preventive film on weapons pylons (teflon coated) pivot pins, part number 7-318000061-3.	
			Make a follow up application of corrosion preventive film and water displacing compound (para 2.114/para 16.4).	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
6	35	WHEN PRIMARY AND/OR UTILITY HYDRAULIC PRESSURE HAS BEEN AT 3400 PSI OR HIGHER FOR FIVE MINUTES OR MORE.		

a. Inspect the appropriate hydraulic system (primary/utility) for signs of overheated conditions.

WARNING

Do not touch any component that is suspected of being overheated until it has cooled. Overheated components can cause burns if they come in contact with skin. If burns occur, seek medical aid.

(1) Check hydraulic manifolds, actuators, pumps, etc. for high heat radiation.

(2) Check connectors associated with hydraulic components for melted potting compound.

(3) Check B nuts for melted torque stripes.

(4) Check all hydraulic components for heat induced discoloration.

b. Replace any component(s) displaying clear evidence of overheating.

c. Replace discrepant hydraulic pump (primary/utility) (para 7.4/para 7.58).

1	36	ANYTIME THE TADS/PNVS IS REMOVED INSPECT TADS/PNVS SUPPORT FITTINGS AND BUSHINGS.		

If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23).

a. Check support fittings for cracks, distortion, corrosion, and dirt. Use 10-power magnifier for crack check.

b. Check seals for deterioration, leakage, and improper fit.

c. Check upper (brass) bushings for out-of-round condition or distortion.

d. Replace discrepant bushings (para 2.46A).

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
5	37	125 FLIGHT HOURS, OR MORE OFTEN IF REQUIRED. INSPECT SHAFT DRIVEN COMPRESSOR AND CLEAN SDC TOTAL PRESSURE SENSE LINE FILTER AND SURGE VALVE PRESSURE FILTER. a. Remove shaft driven compressor (para 7.120). (1) Inspect SDC in accordance with (para 7.120) steps n, o, p, q, r, and s. b. Remove total pressure sense line and surge valve pressure filters (para 7.125). c. Clean total pressure sense line and surge valve pressure filters (para 1.47). d. Install total pressure sense line and surge valve pressure filters (para 7.125). e. Install SDC (para 7.121).		
5	38	10 HOURS/14 DAYS DURING DESERT OPERATIONS a. Replace aft avionics bay filter (para 16.35). b. Replace APU air filter (para 16.36).		
3,4	39	Deleted.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2	40	MONTHLY a. Spray corrosion preventive compound corrosion preventive compound (item 63, App F) or equivalent in to the air outlet of the fuel booster pump.		
4	41	50 FLIGHT HOURS TAILBOOM FRAME ASSEMBLY INSPECTION (FS 530 and FS 547) **NOTE** If cracks or workings rivets are confirmed during the following inspection, report defects immediately to local Apache LAR and U. S. Army Aviation and Missile Command (AMCOM), AMSAM-AR-EI-P-A (AH-64), DSN 897-4925 or Commercial 265-313-4925 DATA FAX is DSN 897-1874. Further flight is authorized only following incorporation of AMCOM approved repairs as directed by AMCOM Engineering. If cracks are found, submit a CAT I DR. If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23). a. Remove fairings L545 and R545 (para 2.2). b. Check the forward face of the FS 530 and FS 547 frame assemblies for cracks and/or working rivets. (1) Cracks found in the FS 530 frame initiating at the upper corners of the square central cutout will require visual inspection from the forward side at 10 HOUR/14 DAY intervals until the frame is replaced. Any of these cracks which propagate beyond the vertical stabilizer attachment assembly (7-311114160-11) must be reported and repaired per AMCOM approved repairs. (2) Cracks found in the FS 530 frame initiating at the lower corners of the square central cutout that are no longer than **1.0 INCH** will require daily visual inspection from the forward side until the approved repairs are accomplished. The cracks will be stop-drilled without affecting any structural members. The repair should be performed no later than the next scheduled phase inspection. After the repairs are accomplished, inspect at 10 HOUR/14 DAY intervals until the frame is replaced.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
			(3) Cracks found in the FS 547 frame no longer than **1.5 INCHES** at the 2L stringer attachment pocket (running at a 90° angle to the centerline of the stringer) will be inspected daily. Cracks at any other location or outside the above limits of the FS 547 frame require replacement per AMCOM approved repairs.	
			c. Check the entire length of stringers 2L and 2R (7-311114181-17 and -18) located under the vertical stabilizer captive mounts, for cracks or working rivets.	
			d. Check all additional stringers attached to the FS 530 and FS 547 frame assemblies, from approximately **6 INCHES** along the stringer to the attachment point of FS 530 and FS 547 for cracks.	
			e. Check fuselage exterior surfaces at, and adjacent to, FS 530 and FS 547 for cracks and working rivets.	
			f. Install fairings R545 and L545 (para 2.2).	
6	42	YEARLY		
		MAST SUPPORT BASE CORROSION INSPECTION AND SHEAR BOLT TORQUE CHECK.		
			a. Perform shear bolt/nut torque check (18 total).	
			(1) Apply **100 INCH-POUND** tightening torque on nut (HS4133-8) (para 6.97).	
			(2) If washer or nut turns or moves (by use of scribe), proceed to step (3), if not proceed to step b.	
			(3) If washer or nut turns, contact local Apache LAR and U. S. Army Aviation and Missile Command (AMCOM), AMSAM-AR-EI-P-A (AH-64), DSN 897-4925 or Commercial 265-313-4925 DATA FAX is DSN 897-1874.	
			b. Remove old adhesive and sealant, under four lightening hole covers, on top of mast support base (para 2.88).	
			c. Inspect upper portion of mast support base in areas around four lightening holes for corrosion (para 1.49).	
			(1) Remove surface corrosion (para 1.49).	
			(2) Inspect for pitting (para 2.88).	
			(a) If no pitting is found, go to step d.	
			(b) If pitting is within depth values (para 2.88), go to step d.	
			(c) If pitting exceeds depth values (para 2.88), go to step e.	

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
6	42 (cont)	d. Inspect wall and bottom areas of each lightening hole cavity using flashlight and mirror (para 2.88).		
		(1) Remove dirt, fluid, and debris to prepare surface for inspection (para 1.47).		
		(2) If no corrosion is observed, treat internal surfaces of four holes (para 1.49).		
		(3) If surface corrosion is observed, remove corrosion (para 2.88).		
		(4) Check for pitting on walls and bottom of lightening holes (para 2.88).		
		(a) If no pitting is observed, treat lightening hole areas (para 1.49).		
		(b) If pitting is observed, apply impression compound to all surfaces of each lightening hole (para 2.88).		
		e. Inspect impressions (para 2.88).		
		(1) If pits do not exceed depth values in (para 2.88), rework (para 2.88).		
		(2) If pits exceed the depth values in (para 2.88), replace mast support base (para 2.88).		
		(3) Submit a CAT I Deficiency Report.		
		f. Replace lightening hole covers (para 2.88).		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
3	43	Deleted.		
7	43A	125 FLIGHT HOURS APPLICABLE TO AIRCRAFT WITH SERIAL NUMBERS PRIOR TO 84–25351. MAGAZINE BAY AIRFRAME STRUCTURE INSPECTION. a. Remove ammunition bay door B200 (para 2.2). b. Remove ammo storage magazine (TM 9-1090-208-23-1). c. Using a flashlight and 10X magnifier, inspect the upper right corner of the FS 176 frame for cracks. If cracks are found, refer to paragraph h. and complete inspection. d. Check frame upper right side areas around holes as follows:		

Hole No.	Hole Dia. Right Side	Loction on Frame WL	Loction on Frame BL	Distance From Top
1	0.63	144	17	1.5
2	0.44	144	16.14	1.5
3	0.312	142.75	16	2.75
4	Remaining eight holes in upper RH aft side of frame. Do not remove grommets, anti-chafe material, or sealing compound.			

e. Using a flashlight and 10X magnifier inspect the upper left corner of FS 176 frame. Pay particular attention to the area around all holes. If cracks are found, refer to paragraph h. and complete inspection.

f. Using a flashlight and 10X magnifier, inspect the upper portion of the FS 176 frame cells between left BL 23.75 and right BL 23.75, and between WL 145.5 and 141.62. If cracks are found, refer to to paragraph h. and complete inspection.

g. Using a flashlight and 10X magnifier inspect the area of the No. 2 right/left hand stringer connection at BL 23.75, WL 145.5. If cracks are found, refer to paragraph h. and complete inspection.

h. If cracks are found, submit a CAT I DR.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
7	43A (cont)	i. Install ammo storage magazine (TM 9-1090-208-23-1). j. Install ammunition bay door B200 (para 2.2).		
3	43B	BEFORE EACH FLIGHT APPLICABLE TO AIRCRAFT WITH 1750 OR MORE FLIGHT HOURS WHICH HAVE NOT BEEN MODIFIED BY MWO 1-1520-238-50-32 OR BY CLOSURE OF THE SLOT AREA BETWEEN FS 370 AND 450. THE INSPECTION AREA BOUNDS THE NO. 2 LEFT HAND STRINGER BETWEEN FS 409 AND 476. INSPECTION PROCEDURES a. Inspect the skin surface over the No. 2 left hand stringer area of the slot on the upper left side of the tailboom from FS 409 to 476 before each flight. b. Concentrate on the skin surface over the No. 2 left hand stringer. Inspect for working rivets or skin cracking. c. If working rivets or skin cracking are found, refer to correction procedures. d. If no defects are found, aircraft is operational. Continue to perform the recurring inspection before each flight. The accumulated flight hours shall not exceed three (3) flight hours between inspections. e. This recurring inspection shall be performed until a doubler strap is installed or the slot area is closed between fuselage stations FS 370 and 450. f. Mark the skin inspection area using paint stripes to facilitate inspection. Put paint stripe at FS 408 and another at FS 477 on the area around the No. 2 left hand stringer.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
3	43B (cont)	CORRECTION PROCEDURES a. If skin cracks are found, inspect the No. 2L stringer inside fuselage. (1) Inspect the area of the stringer directly in line with the skin crack and the area 3 rivet rows forward and aft of the crack. (2) Perform a florescent penetrant inspection and use a 10X magnifier. (a) If stringer is cracked aircraft is non–operational until stringer is replaced. Submit a CAT I DR. (b) If no crack is found proceed to step (3). (3) Perform Eddy Current inspection. Contact technical POC. b. If working rivets are found, inspect the corresponding hole area in the No. 2L stringer inside the tailboom and check three adjacent fastener holes forward and aft. (1) Determine if the fastener can be moved by hand. If any are found loose, submit a CAT I DR. (2) Use 10X magnifier to inspect for No. 2L stringer cracks. (a) If crack is found, aircraft is non-operational until stringer is replaced. Submit a CAT I DR.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
5	43C	125 FLIGHT HOURS		

INSPECTION OF AUXILIARY POWER UNIT POWER TAKE-OFF CLUTCH (P/N 3886000-5) AND MOUNTING STRUTS.

a. Inspect PTO clutch (P/N 3886000-5).

(1) Remove anti-flail support and APU drive shaft (para 6.16).

NOTE

External grease leakage is most likely to be at the forward lip seal and duplex vent and will usually appear at the vent within the first 15 hours of operation of a new clutch. Do not confuse grease at the covered port with grease coming from the duplex vent. Grease from the duplex vent will migrate to the covered port area. Grease may vent through the duplex vent under certain conditions such as overfilling or operating under high temperatures, under these conditions, wipe grease away from the housing and perform APU MOC.

(2) Check APU PTO clutch for external oil or grease leaks.

NOTE

Grease discharge from the covered port at the bottom of the PTO clutch housing is not acceptable. This is an indication of internal leakage which will contaminate clutch surfaces. If grease discharge is noted at the covered port, the clutch assembly shall be replaced. Wetness from oil seepage at the covered port is acceptable.

(3) Check APU PTO clutch for grease discharge from the covered port. None allowed.

NOTE

Heat discoloration is usually confined to the duplex bearing housing area.

(4) Check APU PTO clutch for heat discoloration. None allowed.

(5) Check APU PTO clutch for cracks.

(a) If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23).

(6) Check APU PTO clutch for corrosion. None allowed.

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Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
5	43C (cont.)	b. Visually inspect the duplex bearing area. (1) Check the output bearing grease seal for damage or metal contamination. None allowed. (2) Manually rotate the clutch output shaft in both directions. The rotating motion should be smooth with no roughness or binding. A light amount of drag, caused by the shaft seal, is to be expected. c. Visually inspect the needle bearing area. (1) Remove the spiral retaining ring (M27426-3112D) from the inside of clutch output drive shaft. (2) Remove the aluminum plug (3886028-1) from the output shaft by inserting a suitable tool (allen wrench or equivalent) into the inner groove of the plug, and pull the plug straight out. Discard packing. Ensure plug is not damaged or lost. Retain plug for re-installation. (3) Inspect the inside of the bearing cavity for burnt, dry, or blackened grease. None allowed. (4) Inspect for the presence of metal particles or other contamination in the needle bearing cavity. None allowed. (5) Inspect for damage to the visible portion of the needle bearing and/or shaft. None allowed. (6) Rotate the output drive on the clutch while observing the needle bearing with a flashlight. If the output shaft does not rotate smoothly and the needle bearing and/or pilot shaft does not remain centered during rotation, replace the clutch assembly. (7) Inspect for signs of overheating, characterized by bluing or yellowing of the metal surface. None allowed.		

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
5	43C (cont.)		**CAUTION**	

Contamination of the bearings or failure to follow the prescribed procedures may cause premature failure of the needle bearings.

(8) Verify bearing cavity is properly packed with grease (item 87, App F). Pack grease approximately one half cubic inch (1CC) around inside diameter.

(9) Lightly lubricate new packing (M83248/1-113) with grease (item 87, App F) and install on plug (3886028-1).

(10) Install plug into the clutch output drive shaft.

(11) Install the spiral lock ring (M27426-3112D) and ensure that it has good positive engagement.

(12) Install anti-flail bracket and APU drive shaft (para 6.16). Check circumferential clearance.

(13) Perform an APU maintenance operational check (TM 1-1520-238-T). Check for oil leakage from the covered port with the APU running. Replace clutch if the oil leakage rate exceeds one drop per minute from the covered port.

d. Visually inspect clutch mounting pad (with PTO clutch installed) for cracks and corrosion. None allowed.

e. Inspect friction disk for wear.

(1) Remove one screw from name plate.

(2) Loosen remaining screw.

(3) Carefully rotate nameplate and gasket upward and secure remaining screw.

(4) Push disk backwards until it bottoms.

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
5	43C (cont)		**NOTE**	

Friction disk has four uniformly spaced radial grooves cut into its surface. Measurements must be taken in area between grooves.

(5) Replace clutch if gap between friction disk and plate will accept 9/64 inch socket head screw key.

(6) Loosen screw and carefully rotate nameplate and gasket back into position.

(7) Install removed screw into nameplate.

(8) Tighten two screws.

INSPECT APU MOUNTS

a. Inspect APU mounts for cracks, dents, distortion, loose bolts, and corrosion. None allowed.

NOTE

Particular attention must be given to welded joints.

(1) Inspect the entire length of each weld line for cracks and any other abnormalities (para 15.1). Use inspection mirror and flash light as required.

(2) Inspect all attachment lugs for cracks and looseness. None allowed.

(3) Inspect all attachment points for loose or missing hardware. All bushings must be in place and hardware must be properly torqued (para 15.31/para 15.32/para 15.33).

(4) Verify length of aft support strut (para 15.31).

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
6	43C (cont)	INSPECT STRAP PACK BOLTS FOR CRACKS.		

If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23).

NOTE

Inspection may be conducted without removing the lead lag link.

a. Remove center bolt from lead lag link pin (para 5.32).

b. Check bolt for cracks. None allowed.

c. Install center bolt in lead lag link pin (para 5.32).

INSPECT LEAD LAG LINK TEFLON SLEEVE BEARINGS.

On lead lag links P/N 7-31141155-11 accomplish the following:

a. Remove main rotor blade lead lag link (para 5.33).

b. Inspect teflon sleeve bearing liner(s) for serviceable condition (para 5.33).

c. Check teflon sleeve bearing liner(s) for color.

(1) If teflon sleeve bearing liner(s) is brown or black no further action is required. Re-install link.

(2) If teflon sleeve bearing liner(s) have a milky white film reinspect every 50 flight hours.

d. Install main rotor blade lead lag link (para 5.33).

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1.137. SPECIAL INSPECTION CHECKLIST – continued

Helicopter Serial No.: Date:

Area No.	Special Inspection No.	REQUIREMENT EVERY	Item	Status
2, 7	44	BEFORE EACH FLIGHT IF AIRCRAFT HAS AUXILIARY FUEL TANKS INSTALLED, CHECK PYLONS FOR THE FOLLOWING: a. Open pylon fairing P1 (para 2.2). b. Visually inspect the pylon rack yoke area of the pylon frame (where pylon rack hollow pin is installed), and the front and side plates of frame for cracks. None allowed. c. Slightly rock nose of auxiliary fuel tank back and forth to reveal cracks. d. If cracks are found, replace the pylon frame (para 16.22).		
3, 4	45	25 FLIGHT HOURS CHECK INTERMEDIATE AND TAIL ROTOR GEARBOXES FOR THE FOLLOWING: a. Check intermediate gearbox grease level (para 1.30) and service if necessary. b. Check tail rotor gearbox grease level (para 1.31) and service if necessary.		

END OF TASK

SECTION VII. OVERHAUL AND RETIREMENT SCHEDULE

1.138. OVERHAUL AND RETIREMENT SCHEDULE

a. The overhaul and retirement schedule lists parts that must be removed after specific operating times. The schedule gives the total operating hours after which the maintenance must be performed.

b. Parts can be removed during the inspection nearest the time before removal is due. Exceptions to this are in TM 1-1500-328-23.

c. The removed part is either overhauled or discarded when parts are replaced (retired).

d. The schedule has five headings:

PART NAME	– Name of the part. An asterisk (*) preceding the part name indicates an indentured subassembly.
PART NUMBER	– Number assigned to the part. Check TM 1-1520-238-23P for part numbers of replacement parts.
OVERHAUL INTERVAL HOURS	– Maximum operating time allowed on the part before it is to be overhauled.
OVERHAUL INTERVAL NOTES	– Covered by special inspection No. 27 (para 1.137).
RETIREMENT INTERVAL HOURS	– Maximum operating time allowed on the part before it is removed and condemned.
RETIREMENT INTERVAL NOTES	– All retirement life items will have a Demil Code of “L” and will be mutilated in accordance with DOD 4160.21-M-1, Defense Demilitarization manual and TM 1-1500-328-23, Aeronautical Equipment Maintenance Management Policies and Procedures.

e. Be sure to fill out all forms, records, and worksheets required by DA PAM 738-751 when replacing parts.

f. The following parts will be removed from service 1440 days after installation:

NOTE

A double asterisk (**) preceding the part name indicates overhaul and retirement schedule interval note 11 applies.

NOMENCLATURE	PART NUMBER
**Pitch Rod End	7-311511137-3
**Pitch Rod End	7-311511137-5
**Pitch Rod End	7-311511137-11
**Pitch Rod End	7-311511137-13
**Bearing, Plain Rod End	289330-1
**Bearing, Plain Rod End	289332-1
Support Assembly Mixer	7-211160040

g. Refer to Section VIII for management of cartridge and propellant actuated devices.

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Main Rotor Head Assembly	7-311411003-601	1,750			
	7-311411003-605	1,750			
	7-311411003-607	1,750			
	7-311411003-609	1,750			
	7-311411003-611	1,750			
	7-311411003-613	1,750			
	7-311411003-615	1,750			
	7-311411003-617	1,750			
	7-311411003-619	1,750			
* Bearing, Lower	7-114110011			91,400	
* Bearing, Upper	7-211411202			1,750	
	7-311411202			1,750	
	7-311411202-5			1,750	
	7-311411202-7			1,750	
* Plate, Upper	7-311411096			10,800	
	7-311411096-3			10,800	
* Plate, Lower	7-311411080			10,800	
	7-311411080-7			10,800	
* Lower Shoe Assembly	7-311411088			13,000	
	7-311411088-7			13,000	
	7-311411088-9			13,000	
* Hub Subassembly	7-311411015			13,000	
	7-311411015-3			13,000	
	7-311411015-5			13,000	
	7-311411015-7			13,000	
* Lead Lag Damper	7-311411110			8,700	
	7-311411110-3			8,700	
	7-311411110-5			8,700	
	7-311411110-7			8,700	
* Rod End, Damper	7-211411186-5			7,100	
* Trunnion Damper	7-311411187			6,500	
* Trunnion Attachment Bolts	NAS1312-33			7,100	2
	NAS1312-38H			7,100	
	NAS1312-66			7,100	
	NAS6612-33			7,100	
	NAS6612-38H			7,100	
	NAS6612-66			7,100	

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Stretched Strap	7-311411146-5		1	4,500	
	7-311411146-7		1	4,500	
* Lead Lag Link Assembly	7-311411155		1	5,200	
	7-311411155-5		1	5,200	
	7-311411155-9		1	5,200	
	7-311411155-11		1	5,200	
* Feathering Bearing	7-311411193		1	7,100	
	7-311411193-11		1	7,100	
	7-311411193-15		1	7,100	
* Pitch Housing	7-311411215		1	5,300	
	7-311411215-7		1	5,300	
	7-311411215-11		1	5,300	
	7-311411215-13		1	5,300	
	7-311411215-15		1	5,300	
M/R Hub Retention Nut	7-311411102			22,500	
	7-311411102-3			22,500	
	7-311411102-5			22,500	
Main Rotor Blade	7-311412000			4,700	
	7-311412000-3			4,700	
	7-311412000-5			4,700	
* Swept Tip	7-311412035-3			18,000	
Main Rotor Attach Pin	ABC.6625			8,800	
	SL54005			8,800	
	53460-3			2,350	
Tail Rotor Fork Assembly	7-211421008-7			4,700	
	7-211421008-9			4,700	
	7-211421008-11			4,700	
Tail Rotor Hub	7-211421037-3			22,000	
	7-211421037-7			22,000	

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Tail Rotor Strap Assembly	7-211421035-5			18,000	
	7-211421035-7			18,000	
Tail Rotor Blade Assembly	7-311422050-3			4,600	
	7-311422050-5			4,600	
	7-311422050-7			4,600	
	7-311422050-9			4,600	
Main Transmission Assembly	7-311310001-5	1,000		4,500	
	7-311310001-9			4,500	
	7-311310001-13	1,000		4,500	
	7-311310001-17			4,500	
	7-311310001-21	1,000		4,500	
	7-311310001-23			4,500	
	7-311310001-25	1,000		4,500	
	7-311310001-27			4,500	
	7-311210001-29	1,000		4,500	
	7-311310001-31	1,000		4,500	
	7-311310001-33			4,500	
	7-311310001-35			4,500	
	7-311310001-37			4,500	
	7-311310001-39			4,500	
	7-311310001-41			4,500	
	7-311310001-43			4,500	
* Clutch Assembly	7-311310003	1,000		4,500	
	7-311310003-3	1,000		4,500	
	7-311310003-7	1,000		4,500	
	7-311310003-9	1,000		4,500	
Main Rotor Drive Shaft	7-211350021			5,400	1
	7-211350021-3			5,400	1
Main Rotor Drive Plate	7-211310098-5			5,400	
	7-211310098-7			5,400	
	7-211310098-9			5,400	
	7-211310098-11			5,400	
Nose Gearbox Assembly, LH	7-311320001-3			4,500	
	7-311320001-5			4,500	
* Quill Shaft Assembly	7-211320093			4,500	
Nose Gearbox Assembly, RH	7-311320001-4			4,500	
	7-311320001-6			4,500	

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Intermediate Gearbox Assembly	7-311330001			4,500	
	7-311330001-3			4,500	
	7-311330001-5			4,500	
* Drive Flange	7-311330025-5			4,500	
Tail Rotor Gearbox	7-311340001			4,500	
	7-311340001-3			4,500	
	7-311340001-5			4,500	
	7-311340001-7			4,500	
Tail Rotor Static Support	7-311340027			4,500	
	7-311340027-3			4,500	
Clutch, APU	3886000-5	500	2		
Shaft, APU	7-211350009			4,500	
Hanger Bearing, Fwd	7-311350008	2,500		39,700	
	7-311350008-3	2,500		8,800	
	7-311350008-5	2,500		8,800	
Hanger Bearing, Aft	7-211350007	2,500		39,700	
	7-211350007-3	2,500		8,800	
	7-211350007-5	2,500		8,800	

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Main Rotor Actuator	7-311820011			22,500	
	7-311820011-3			22,500	
	7-311820011-5			22,500	
	7-311820011-7			22,500	
	7-311820011-9			22,500	
	7-311820011-11			22,500	
	7-311820011-13			22,500	
	7-311820011-15			22,500	
	7-311820011-XY			22,500	
	7-311820011-XYW			22,500	
	7-311820011-3XY			22,500	
	7-311820012			22,500	
	7-311820012-3			22,500	
	7-311820012-5			22,500	
	7-311820012-7			22,500	
	7-311820012-9			22,500	
	7-311820012-11			22,500	
	7-311820012-13			22,500	
	7-311820012-15			22,500	
	7-311820012-XY			22,500	
	7-311820012-XYW			22,500	
	7-311820012-3XY			22,500	
Tail Rotor Actuator	7-311820014			18,000	
	7-311820014-3			18,000	
	7-311820014-5			18,000	
	7-311820014-7			18,000	
	7-311820014-9			18,000	
	7-311820014-XY			18,000	
	7-311820014-XYW			18,000	
Pitch Rod End	7-311511137-23			22,500	
	7-311511137-25			22,500	
	7-311511137-31			22,500	
	7-311511137-33			22,500	
Bearing, Plain Rod End	289332-5			22,500	
Shaft Driven Compressor	7-211710013-9	3,000			
	7-211710013-11	3,000			
	7-211710013-13	3,000			
	7-211710013-15	3,000			
	7-211710013-17	3,000			
	7-211710013-19	3,000			

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Main Rotor Swashplate	7-311511101			20,800	
	7-311511101-7			20,800	
	7-311511101-13			11,800	
	7-311511101-17			4,500	
	7-311511101-19			4,500	
	7-311511101-23			4,500	
M/R Swashplate Bearing	7-311511103			2,250	10
	7-311511103-3			2,250	10
	7-311511103-5			2,250	10
M/R Lower Bearing Retainer	7-211511105-9			22,500	
	7-211511105-11			11,800	
M/R Non-Rotating Swashplate	7-311511107			18,500	
M/R Rotating Swashplate	7-311511102			22,500	
M/R Upper Bearing Retainer	7-211511104-7			22,500	
	7-211511104-9			22,500	
M/R Pitch Link Assembly	7-311511135			22,500	
	7-311311135-3			22,500	
	7-311311135-5			22,500	
	7-311311135-7			22,500	
M/R Scissors Assembly	7-311511158-3			22,400	
	7-311511158-5			22,400	
Tail Rotor Swashplate Assembly	7-311527038-7	250			
	7-311527038-9	250			
	7-311527038-11	250			
	7-311527038-13	250			
	7-311527038-15	1,500			3
	7-311527038-17	1,500			3
	7-311527038-19	1,500			3
	7-311527038-601	250			
	7-311527038-603	250			
	7-311527038-901	1,500			3

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
T/R Pitch Link Assembly	7-311527035-3			22,500	
	7-311527035-5			22,500	
	7-311527035-25			22,500	
	7-311527035-27			22,500	
	7-311527035-29			22,500	
	7-311527035-31			22,500	
	7-311527035-41			22,500	
	7-311527035-43			22,500	
T/R Scissors Link Assembly	7-311527009			22,500	
	7-311527009-5			22,500	
T/R Control Support Bracket	7-311525065			5,300	
T/R Gearbox Studs	HS5155-0377			18,600	4
T/R Actuator Support Assembly	7-311525062			18,000	
	7-311525062-3			18,000	
	7-311525062-5			18,000	
	7-311525062-7			18,000	
	7-311525062-9			18,000	
	7-311525062-11			18,000	
	7-311525062-15			7,800	
	7-311525062-19			7,800	
T/R Directional Bellcrank	7-311525063			18,000	
	7-311520563-3			18,000	
	7-311520563-7			18,000	
	7-311520563-13			7,800	
	7-311520563-17			7,800	
T/R Link Assembly	7-311525064			18,000	
	7-311525064-5			18,000	
	7-311525064-11			7,800	
	7-311525064-21			7,800	
Support Assembly Mixer	7-211160040-5			20,800	
	7-211160040-7			20,800	
Collective Bellcrank	7-311511117			20,800	
	7-311511117-5			20,800	
	7-311511117-7			20,800	
	7-311511117-9			20,800	
	7-311511117-11			20,800	
	7-311511117-13			20,800	

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Lateral Bellcrank	7-311511123			22,500	
	7-311511123-5			22,500	
	7-311511123-9			22,500	
	7-311511123-13			22,500	
	7-311511123-17			22,500	
Aft Longitudinal Bellcrank	7-311511125			20,000	
	7-311511125-5			20,000	
	7-311511125-9			20,000	
	7-311511125-13			20,000	
	7-311511125-17			20,000	
Fwd Longitudinal Bellcrank	7-311511127			20,000	
	7-311511127-5			20,000	
Longitudinal Link	7-311511130			21,600	
	7-311511130-5			21,600	
	7-311511130-9			21,600	
	7-311511130-15			21,600	
Bolt, Mixer Pivot Support	7-311160044			20,500	
	7-311160044-3			20,500	
Bolt, Self-Locking, Rotor Cont.	7-211511133			20,800	
	7-211511133-3			20,800	
Bolt, Lateral Bellcrank Support	7-211511134			20,800	
	7-211511134-3			20,800	
Longitudinal Torque Link Assembly	7-311511181			20,100	
	7-311511181-35			20,100	
	7-311511181-39			20,100	
	7-311511181-43			20,100	
Lateral Link	7-311511182			22,500	
	7-311511182-5			22,500	
	7-311511182-11			22,500	
	7-311511182-17			22,500	
Bolt, Aft Long Bellcrank Support	7-211511209			20,000	
	7-211511209-3			20,000	
Bolt, Torque Link Support	7-211511211			20,000	
	7-211511211-3			20,000	

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Longitudinal Actuator Support	7-311511175			20,000	
	7-311511175-5			20,000	
	7-311511175-7			20,000	
	7-311511175-11			10,100	
	7-311511175-15			10,100	
	7-311511175-17			10,100	
Collective Actuator Support Assy	7-311511176			20,800	
	7-311511176-5			18,600	
	7-311511176-7			18,600	
Lateral Actuator Support	7-311511139			20,000	
	7-311511139-3			20,000	
	7-311511139-5			4,500	
	7-311511139-7			4,500	
	7-311511139-9			4,500	
Stabilator Actuator	7-311D10018			22,500	
	7-311D10018-3			22,500	
Stabilator Fitting	7-311D10023				5
	7-311D10023-3			22,500	
Mast M/R Support	7-311160020			5,300	
	7-311160020-5			5,300	
Mast Base M/R Support	7-311160035			5,300	
Base Assembly, Mast Support	7-311160030			5,330	
	7-311160030-7			5,330	
Strut, Fwd Center, LH	7-311160055-1			8,050	
Strut, Fwd Center, RH	7-311160055-2			5,240	
Strut, Fwd Side, LH	7-311160060-1			5,240	
Strut, Fwd Side, RH	7-311160060-2			5,240	
Strut, Aft Side, LH	7-311160070-1			12,800	

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Strut, Aft Side, RH	7-311160070-2			21,200	
Strut, Aft Center, LH	7-311160085-1			5,240	
Strut, Aft Center, RH	7-311160085-2			5,240	
Spar Box Assembly, Vert Stab	7-311122601 7-311122601-29 7-311122601-31 7-311122601-33			4,500 4,500 4,500 4,500	6
Stabilator Assembly	7-311123600			21,200	7
Wing Assembly, LH	7-311130200-1 7-311130200-601			22,500 22,500	8
Wing Assembly, RH	7-311130200-2 7-311130200-602			22,500 22,500	
Tail Rotor Brace, Fwd	7-311340185-3 7-311340185-11			17,900 17,900	
Tail Rotor Brace, Aft	7-311340185-5 7-311340185-13			17,900 17,900	
Stabilator Actuator Fitting Assembly	7-311114201			6,020	
Stabilator Actuator Fitting	7-311123622			6,020	
Eng Mount Spt, Fwd Inbd	7-311670131 7-311670131-3			22,500 22,500	
Eng Mount Spt, Inbd, Fwd	7-211671010-601			22,500	9
Rod Assy, Primary Spt Eng Mount	7-211670105-3			22,400	
Eng Mount Fitting Lower, Fwd	7-311670014-3			22,400	

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

Part Name	Part Number	Overhaul Interval Hours	Overhaul Interval Notes	Retirement Interval Hours	Retirement Interval Notes
Spt Assy, Eng Mount, Aft	7-311670117			2,500	
	7-311670117-3			2,500	
	7-311670117-11			2,500	
	7-311670117-13			2,500	
	7-311670117-21			4,500	
	7-311670117-23			4,500	
Engine Mount V-Link, Aft	7-311670024			4,500	
Spt Assy, Fwd Eng Mount, LH	7-311113290-3			17,700	
Spt Assy, Fwd Eng Mount, RH	7-311113290-5			17,700	
Spt Assy, Fwd Eng Mount	7-311113292			17,700	
Spt Assy, Aft Eng Mount, LH	7-311113128-3			22,500	
Spt Assy, Aft Eng Mount, RH	7-311113128-4			22,500	
Standpipe, ADS	7-319720011			4,500	
Drive Plate Cover	7-319720014			4,500	
Flexible Support	7-319720015			4,500	
Bearing Housing	7-319720018			4,500	
Bearing	7-319720020			4,500	
Support Housing	7-319720022			4,500	
Power Dist M/R De-Ice	7-311A10025			198,000	
	7-311A10025-3			198,000	
Adapter	7-319720026			4,500	
Soft Mount	7-319720027			3,500	
Shaft Assembly	7-319720028			4,500	
	7-319720028-5			4,500	

Refer to Section VIII for Cartridge and Propellant Actuated Devices

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1.138. OVERHAUL AND RETIREMENT SCHEDULE – continued

NOTE

Overhaul Interval Notes:

1. Covered by special inspection No. 27 in paragraph 1.137 and paragraph 5.1 step e, AVUM/AVIM Manual for Army AH-64A Helicopter.

2. Overhaul interval hours are measured from the time of the last bearing replacement performed by the Allied Signal contract team or from the last complete depot overhaul, whichever is lower.

Retirement Interval Notes:

1. Reduce the current retirement life of 5,400 hours to 1,750 hours on Fenn manufactured main rotor drive shafts (P/N 7-211350021 and P/N 7-211350021-3) marked with serial numbers 0052220001 through 0052220357, 1103 through 1111, and FM0253 through FM0263. All other main rotor drive shafts not having the above Fenn serial numbers will retain the retirement life of 5,400 hours.

2. Located on main rotor head assembly drawing 7-311411003 (all bolt dash numbers).

3. See AMSAT-R-EIA (70-62b) Interim Statement of Airworthiness Qualification for AH-64A Helicopter.

4. Included in the T/R output shaft, P/N 7-311340092.

5. Remove from service 1440 days after installation.

6. Includes spar assembly P/N 7-311122604, which includes spar cap P/N 7-311122605.

7. Includes spars P/N 7-311123602, 7-311123605, and 7-311123606.

8. Includes wing spars P/N 7-311130221 and 7-311130251.

9. Includes fitting P/N 7-211671011 and cap P/N 7-211671022.

10. Bearing retirement life under discussion between MDHS and ATCOM engineering. Contact AMSAT-R-EIA, DSN 693-1679 or commercial (314) 263-1679 for disposition instructions before removal. Special inspection No. 26 (para 1.137) remains applicable every 50 hours. Beginning at 1750 hours and each 50 hour inspection thereafter, mandatory rotational inspection of the swashplate with pitch links removed will be added to this special inspection.

11. Magnetic particle inspect 1440 days after installation (TM 55-1500-335-23). Any evidence of cracking or corrosion is cause for rejection. Parts not showing evidence of cracks or corrosion may be reinstalled and used for an additional 180 days.

END OF TASK

SECTION VIII. CARTRIDGE AND PROPELLANT ACTUATED DEVICES

1.139. CARTRIDGE AND PROPELLANT ACTUATED DEVICES

a. **The following list of item are Class V ammunition items and should be managed in accordance with chapter 11, DA PAM 710-2-1.**

b. **Shelf life/Service Life (Retirement Interval) will be in accordance with TB 9-1300-385, MUNITIONS RESTRICTED OR SUSPENDED. Changes to Shelf and Service life appear in Ammunition Supplemental Notices between quarterly revisions. This Manual is updated biannually, request for this document will be referred to Commander, AMCCOM, ATTN: AMSMC-QAS, Rock Island, IL 61299-6000.**

c. **Shelf life. The total period of time, beginning the date of manufacture/cure/assembly that an item may remain in the combined wholesale (including manufacture) and retail storage system and still remain suitable for issue to, and use by end user (shelf life is not to be confused with service life which is a measurement of anticipated total in-use time).**

d. **Parts can be removed during the inspection nearest the time before removal is due. Exceptions to this are in TM 1-1500-328-23.**

e. **Continued operation of the Canopy Removal System (CRS) beyond established retirement life of P/N 7-311112017-31 (1377-MS90) and P/N 7-311112017-37 (1377-MS93) is allowed providing each crewmember is equipped with a survival knife P/N MIL-K-8662E, NSN 7340-00-098-4327.**

f. **The computed item replacement, installation date, and lot number shall be recorded on DA form 2408-18 for each installed item.**

g. **Be sure to fill out all forms, records, and worksheets required by DA PAM 738-751 when replacing parts.**

h. **Unserviceable item shall be tagged with NSN, installation date, removal date, reason for removal, lot number, helicopter type/model and serial number, and aviation unit designation, and returned to the supporting ammunition supply activity in the container to transport the replacement item.**

i. **The listing has four headings:**

NOMENCLATURE	– Name of the part.
PART NUMBER	– Number assigned to the part. Check TM 1-1520-238-23P for part numbers of replacement parts.
NSN	– National Stock Number assigned to the part. Reference TM 1-1520-238-23P.
DODAC	– Department of Defense Ammunition Code. Indicates type of Ammunition and Packaging. Ref DOD Ammo Codes HD bk, SB708-3

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1.139. CARTRIDGE AND PROPELLANT ACTUATED DEVICES – continued

Nomenclature	Part Number	NSN	DODAC
Initiator, Cartridge MT06 (3 per)	7-311112017-39 51207-3 51207-7 6260964	1377-01-269-6496	1377-MT06
Severance Device (CA) MS90, Cord, Det	7-311112017-31 51135-1 6260906-1	1377-01-186-9899	1377-MS90
Replaced by Thin Line Explosive SP03, Cord, Det	7-311112017-49	1377-01-356-7842	1377-SP03
Severance Device (CA) MS91, Cord, Det	7-311112017-33 51135-2 6260906-2	1377-01-186-9900	1377-MS91
Severance Device (CA) MS93, Cord, Det	7-311112017-37 51135-4 6260906-4	1377-01-186-9902	1377-MS93
Replaced by Thin Line Explosive SP02, Cord, Det	7-311112017-47	1377-01-356-7841	1377-SP02
Severance Device (CA) MS89, Cord, Det	7-311112017-43 51135-5 6260906-5	1377-01-170-5260	1377-MS89
Severance Device (CA) MS92, Cord, Det	7-311112017-35 51135-7 6260906-7	1377-01-186-9901	1377-MS92
Severance Device (FWD) MS94, Cord, Det	7-311112017-5 51388-1 6260965-1	1377-01-184-6112	1377-MS94
Severance Device (AFT) MS95, Cord, Det	7-311112017-7 51390-1 6260965-3	1377-01-184-6113	1377-MS95
Severance Device (P) MS96, Cord, Det	7-311112017-11 51391-1 6260965-4	1377-01-185-8908	1377-MS96
Severance Assembly (CPG) MS97, Cord, Det	7-311112017-9 51389-1 6260965-2	1377-01-187-4477	1377-MS97

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1.139. CARTRIDGE AND PROPELLANT ACTUATED DEVICES – continued

Nomenclature	Part Number	NSN	DODAC
Cartridge, Fire Extinguisher MH92 (6 per) May only be used on HTL Model Fire Extinguishers	30903824-1 1512AS105	1377-01-185-2622	1377-MH92
Cartridge, Impulse MD66 (4 per)	5184850	1377-01-063-3164	1377-MD66
Severance Device MS88, Cord, Det	7-311112017-29 51134-35 6260905-35	1377-01-186-9898	1377-MS88
Severance Device MS83, Cord, Det	7-311112017-27 51134-45 6260905-45	1377-01-170-5261	1377-MS83
Severance Device MS84, Cord, Det	7-311112017-25 51134-57 6260905-57	1377-01-170-5262	1377-MS84
Severance Device MS85, Cord, Det	7-311112017-23 51134-55 6260905-55	1377-01-170-5263	1377-MS85
Severance Device MS86, Cord, Det	7-311112017-21 51134-23 6260905-23	1377-01-170-5264	1377-MS86
Severance Device MS87, Cord, Det	7-311112017-19 51134-49 6260905-49	1377-01-170-5265	1377-MS87
Severance Device MS80, Cord, Det	7-311112017-17 51134-47 6260905-47	1377-01-170-5244	1377-MS80
Severance Device (CA) MS81, Cord, Det	7-311112017-15 51134-53 6260905-53	1377-01-170-5245	1377-MS81
Severance Device (CA) MS82, Cord, Det	7-311112017-13 51134-51 6260905-51	1377-01-170-5246	1377-MS82

END OF TASK

SECTION IX. FLIGHT SAFETY PARTS PROGRAM

1.140. FLIGHT SAFETY PARTS PROGRAM

a. A flight safety part (FSP) is defined as any part, assembly, or installation whose failure, malfunction, or absence could cause loss of aircraft, serious damage to aircraft, death of crewmembers, or serious injury to crewmembers.

b. A Critical characteristic is defined as any feature throughout the life cycle of a FSP, such as a dimension, tolerance, finish, material or assembly, manufacturing process, inspection process, operation, field maintenance requirement, depot overhaul requirement, or other feature that if nonconforming, missing, or degraded, could cause failure or malfunction of a FSP.

c. The following list identifies parts and assemblies under the flight safety parts program. Throughout the maintenance tasks, FLIGHT SAFETY PARTS warnings appear emphasizing that these parts require special handling during maintenance.

d. The list has two headings:

Part Number – Number assigned to the part. Refer to TM 1-1520-238-23P for part numbers of replacement parts.

Nomenclature – Name of the part.

Part Number	Nomenclature
Airframe Components	
7-211160040-7	Support Assembly, Rotor
7-311160020-5	Mast, Main Rotor Support
7-311160035-7	Mast Base
7-311160044-3	Bolt, Mixer Support
7-311210100-3	Main Landing Gear Subassembly – Kneeling
7-311210100-4	Main Landing Gear Subassembly – Kneeling
7-311340185-11	Strut, Tail Rotor
7-311340185-13	Strut, Tail Rotor

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1.140. FLIGHT SAFETY PARTS PROGRAM – continued

Part Number	Nomenclature
Drive System Components	
7-113100029-3	Gear, Spur
7-113100121-3	Nut, Planet Carrier, Main Transmission
7-113100141-3	Spindle, Main Transmission
7-211310027-3	Gear Cluster
7-211310035-3	Gearshaft, Multiple
7-211310039-5	Gear, Helical, Tail Rotor Output
7-211330021-5	Gear, Bevel
7-211330023-5	Gear, Helical
7-211340021-5	Gear, Spiral Bevel Pinion
7-211340023-5	Gear, Helical
7-211350004-3	Coupling, Tail Rotor
7-211350005-3	Shaft and Carrier Assembly
7-211350006-5	Shaft Assembly, Tail Rotor
7-211350007-5	Bearing Unit, Ball
7-211350021-3	Gearshaft, Spur
7-211350027-3	Shaft, Shouldered
7-311310016-3	Carrier, Hub
7-311310025-3	Gear, Helical
7-311340011-9	Assembly, Housing, Tail Rotor, Gearbox
7-311340012-5	Cover, Gearbox, Tail Rotor
7-311340027-3	Support, Static, Gear
7-311350008-5	Bearing Unit, Ball

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1.140. FLIGHT SAFETY PARTS PROGRAM – continued

Part Number	Nomenclature
Flight Control System Components	
7-211511133-3	Bolt, Self-Locking
7-211511134-3	Bolt, Rotor Controls
7-211511209-3	Bolt, Internally Relieved
7-211511211-3	Bolt, Self-Locking
7-311511102-11	Swashplate, Control
7-311511103-5	Bearing, Ball, Annular
7-311511107-13	Swashplate Assembly
7-311511117-13	Bellcrank Assembly
7-311511123-17	Bellcrank Assembly
7-311511125-17	Bellcrank Assembly
7-311511127-7	Bellcrank Assembly
7-311511130-15	Connecting Link, Rigid
7-311511136-9	Barrel, Adjustable Pitch Link
7-311511137-31	Rod End Assembly
7-311511137-33	Rod End Assembly
7-311511139-9	Bracket Assembly, Actuator
7-311511175-17	Bracket Assembly, Actuator
7-311511175-19	Bracket Assembly, Actuator
7-311511181-43	Connecting Link
7-311511182-17	Link Assembly, Main Rotor
7-311511186-19	Bracket Assembly, Collective
7-311525062-19	Support Assembly, Tail Rotor
7-311525063-17	Bellcrank Assembly

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1.140. FLIGHT SAFETY PARTS PROGRAM – continued

Part Number	Nomenclature
Flight Control System Components (continued)	
7-311525064-21	Lever, Remote Control
7-311527003-13	Swashplate, Control
7-311527016-7	Bearing Housing, Tail Rotor Rotating
7-311527016-9	Bearing Housing, Tail Rotor Rotating
7-311527035-41	Connecting Link, Rigid
7-311527035-43	Connecting Link, Rigid
7-311527069-3	Bearing Set – Swashplate
Hydraulic System Components	
289300-1019 (7-311820011-13)	Servocylinder
289300-1021 (7-311820011-15)	Servocylinder Assembly
308900-1015 (7-311820012-13)	Servocylinder
308900-1017 (7-311820012-15)	Servocylinder Assembly
289400-1009 (7-311820014-7)	Servocylinder
289400-1011 (7-311820014-9)	Servocylinder Assembly
Rotor Components	
7-311411015-7	Main Rotor Hub
7-311411155-5	Connecting Link, Rigid
7-211411185-3	Pin, Blade, Main Rotor
7-211411199-3	Pin Assembly, Link, Rotor
7-211421008-11	Fork Assembly, Tail Rotor
7-211421035-7	Strap Assembly, Tail Rotor
7-211421037-7	Hub, Tail Rotor
7-311411009-5	Main Rotor Hub
7-311411045-3	Stud Plain

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1.140. FLIGHT SAFETY PARTS PROGRAM – continued

Part Number	Nomenclature
Rotor Components (continued)	
7-311411080-7	Plate Assembly, Hub, Main
7-311411088-9	Shoe Assembly, Main Rotor
7-311411096-3	Load Plate, Hub, Main
7-311411102-3	Nut – Hub Retention Main Rotor
7-311411102-5	Nut, Plain, Round
7-311411146-7	Strap Assembly, Main Rotor
7-311411193-15	Bearing Assembly, Rotor
7-311411202-5	Bearing, Roller, Tape
7-311411215-15	Housing Assembly, Pitch
7-311412000-5	Blade, Rotary Wing
7-311412000-3	Blade, Rotary Wing
7-311422030-7	Bracket, Eye, Rotating
7-311422050-9	Blade, Rotary Rudder

END OF TASK

GLOSSARY

SECTION I. ABBREVIATIONS

This section lists abbreviations and acronyms peculiar to the helicopter. Other abbreviations and acronyms are in MIL-STD-12.

AC . . . . . alternating current

acc . . . . . accessory

acft genl . . . . . aircraft general

ACM . . . . . automatic control module

actr . . . . . actuator

ADS . . . . . air data system

ADP . . . . . air data processor

al aly . . . . . aluminum alloy

Alcd . . . . . Alclad (aluminum)

AGPU . . . . . Aviation ground power unit

ANSI . . . . . American National Standards Institute

Appx . . . . . appendix

APU . . . . . auxiliary power unit

aux . . . . . auxiliary

AVIM . . . . . aviation intermediate maintenance

AVUM . . . . . aviation unit maintenance

AWS . . . . . area weapon system

batt . . . . . battery

bksp . . . . . backspace

BL . . . . . buttline

brk sys . . . . . brake system

BRU . . . . . boresight reticle unit

bst . . . . . boost

BUCS . . . . . backup control system

C . . . . . Celsius

CDU . . . . . control display unit, computer display unit

col . . . . . collision

con . . . . . contactor

cm . . . . . centimeter

CPG . . . . . copilot/gunner

CRT . . . . . cathode ray tube

CRS . . . . . course selector

DAP . . . . . display adjust panel

DASEC . . . . . digital automatic stabilization equipment computer

DC . . . . . direct current

dest . . . . . destination

DEU . . . . . display electronics unit

DLTU . . . . . data link terminal unit

DNS . . . . . doppler navigation system

DPLR . . . . . doppler

dr sft . . . . . drive shaft

DS . . . . . drive system

DVO . . . . . direct view optics

E/emp . . . . . empty

EADI . . . . . electronic attitude director indicator

ECS . . . . . environmental control system

EETF . . . . . electronic equipment test facility

ENCU . . . . . environmental control unit

eng instr . . . . . engine instrument

EOW . . . . . engine out warning

ESDS . . . . . electrostatic discharge sensitive

EU . . . . . electronic unit

F . . . . . Fahrenheit

FCC . . . . . fire control computer

FCIC . . . . . fire control interface components

FCP . . . . . fire control panel

FD/LS . . . . . fault detection/location system

flt instr . . . . . flight instrument

FLIR . . . . . forward looking infrared radar

FOD . . . . . foreign object damage

FS . . . . . fuselage station

FSC . . . . . fuel signal conditioner

FSP . . . . . flight safety part

g . . . . . force of gravity

GB . . . . . gearbox

GCU . . . . . generator control unit

GFE . . . . . Government furnished equipment

GPU . . . . . ground power unit

GRY SC . . . . . gray scale

GS . . . . . ground stud

HARS . . . . . heading attitude reference system

HDU . . . . . helmet display unit

hg . . . . . mercury

HMD . . . . . helmet mounted display

HMS . . . . . helmet mounted sight

HMU . . . . . hydromechanical unit

HUD . . . . . heads up display

hyd/pneu sys . . . . . hydraulic/pneumatic system

Hz . . . . . Hertz

ICU . . . . . integrated control unit

ident . . . . . identify/identity

IFF . . . . . identification friend or foe

IGB . . . . . intermediate gearbox

IHADSS . . . . . integrated helmet and display sight system

IHU . . . . . integrated helmet unit

ILT . . . . . indicating light transmitting

IS . . . . . instrument system

J . . . . . jack

Jett . . . . . jettison

kHz . . . . . kilohertz

km . . . . . kilometer

LDNS . . . . . lightweight doppler navigational system

LDS . . . . . load demand spindle

LGS . . . . . landing gear system

LH . . . . . left-hand

LRU . . . . . line replaceable unit

LSR . . . . . laser

LVDT . . . . . linear variable differential transducer

MAC . . . . . maintenance allocation chart

mHz . . . . . megahertz

misc instr . . . . . miscellaneous instrument

MLG . . . . . main landing gear

mm . . . . . millimeter

mn xmsn . . . . . main transmission

MOC . . . . . maintenance operational check

M/R . . . . . main rotor

MRTU . . . . . multiplexer remote terminal unit

MTC . . . . . mass termination connectors

MTOE . . . . . modified table of organization and equipment

MUX . . . . . multiplex

Nav Instr . . . . . navigation Instrument

Ng . . . . . engine gas generator rpm

NGB . . . . . engine nose gearbox

ninety degree grbx . . . . . tail rotor gearbox

N_P . . . . . engine turbine speed

N_R . . . . . engine rotor rpm

NS . . . . . nose

NSN . . . . . National Stock Number

NVS . . . . . night vision

OAT . . . . . outside air temperature

ORT . . . . . optical relay tube

P . . . . . plug

PAS . . . . . pressurized air system

PAS . . . . . power available spindle

PM . . . . . phase maintenance

PMS . . . . . preventive maintenance service

PNVS . . . . . pilot night vision system

pos . . . . . position

pri hyd sys . . . . . primary hydraulic system

PRI LTS . . . . . primary lights

PYL . . . . . pylon

QAA . . . . . quick attach assembly

RAI . . . . . remote attitude indicator

rcpt . . . . . receptacle

res . . . . . reserve

RH . . . . . right-hand

RPSTL . . . . . repair parts and special tools list
rtr sys . . . . . rotor system
RTSS . . . . . remote transmit select switch
SAI . . . . . standby attitude indicator
SDC . . . . . shaft driven compressor
SDC . . . . . signal data converter
SDCC . . . . . signal data converter computer
SDD . . . . . selectable digital display
SEU . . . . . sight electronics unit
SPAD . . . . . shear pin activated decoupler
SPR . . . . . single-point refueling
SPT . . . . . support
SSU . . . . . sensor surveying unit
SRU . . . . . shop replaceable unit
STAB . . . . . stabilator
SYM GEN . . . . . symbol generator
SV . . . . . sight visor
T . . . . . to
TB . . . . . terminal board
TADS . . . . . target acquisition and designation sight
TGT . . . . . turbine gas temperature
THIR . . . . . ten hour/fourteen day inspection requirements
TI . . . . . technical inspector
TK1-E . . . . . Tank No. 1-Empty
TK2-E . . . . . Tank No. 2-Empty
TK1-F . . . . . Tank No. 1-Full
TK2-F . . . . . Tank No. 2-Full
TMDE . . . . . test, measurement, and diagnostic equipment
T/R . . . . . tail rotor

TSEC . . . . . transmitter security

TV/IR . . . . . television/infrared radar

U/M . . . . . unit of measure

VDU . . . . . video display unit

vlv . . . . . valve

VSI . . . . . vertical speed indicator

WL . . . . . waterline

wpr . . . . . wiper

wshld . . . . . windshield

XDCR . . . . . transducer

XFEED . . . . . crossfeed

XFER/Trans . . . . . transfer

XK . . . . . relay

XFMR . . . . . transformer

XMTR . . . . . transmitter

XMSN . . . . . transmission

SECTION II. DEFINITION OF UNUSUAL TERMS

A

Abrasive – Rough (sandpaper, emery paper, file, etc.).

Access – Entrance or opening through which to reach equipment.

Actuated – Moved or put into action.

Aft – Rear.

ALCLAD – Bonded plating on aluminum sheet.

Aline – To position an item or mark to line up with another.

Ambient – Surrounding atmosphere.

Amplifier – Increases sound, light, etc.

Anvil – Hard-faced surface upon which something is hammered or pressed.

Applicable – Relative to, matching, associated with, connected.

Ascent – Upward movement.

Audible – Sound that can be heard.

Audio – Sound reproduction.

Augment – To increase, make more of, to add.

Auxiliary – Extra or reserve unit or source.

B

Bay – A place on the helicopter that houses systems, parts, or components.

Binds – Does not move freely.

Bulkhead – Wall that separates bays or compartments.

Bus – A point that receives many electrical connections either for grounding or carrying a signal to further points.

Bushing – A round, removable part inserted in an opening to limit size, eliminate abrasion on parts passing through it, or to serve as a guide.

Buttline – Distance left or right of the helicopter centerline.

C

Clevis – A U-shaped part with ends drilled to hold controls.

Compartment – An enclosed part of the helicopter.

Component – Parts of an assembly, circuit, or system.

Configuration – The way or shape something is built or put together.

Contact – When two objects touch.

Continuity – Uninterrupted series of power, functions, or signals.

Contracted – Made smaller.

Corrosion – Decay of metal caused by weather, water, temperature, chemical action, etc.

Coupling – Connector or connection joining two parts.

D

Detector – A device that seeks and finds heat (fire, signals, etc.).

Detent – Notch or groove that holds one part to another.

Diaphragm – A thin, flexible disk.

Diffuser – Scatters. Deflects air or energy in several directions.

Duckbill – Shop term for pliers with broad flat jaws.

Duct – Tube that directs flow of air or exhaust.

E

Eductor – An injector-type device for mixing two fluids.

Elongated – Made longer.

Empennage – The stabilator and vertical stabilizer.

Energized – To start power.

Environment – The air around us.

Expendable – Can be discarded after use.

External – Outside or outer.

Extractor – A device for removing something.

F

Fairing – A cover made to streamline a surface.

Flange – An angled or raised portion of a part; usually for fastening or fitting to another part.

Flexible – Easily bent or shaped.

Flow Rate – Amount of liquid, gas, or air passing a specific point in a measured amount of time.

Forward – Toward the front of the helicopter.

Fragment – Small particle or piece.

Friction – When two objects or surfaces rub together.

Fuselage Station – Distance from a point in front of the helicopter.

G

Galling – Transfer of metal from one surface to another surface by welding and breakaway of particles during sliding friction contact.

Glazing (Glazed) – Appearance of being covered by a glassy film.

H

Hoist – To raise by mechanical means. The machine to do so.

Horizontal – Parallel to the horizon or a baseline (across).

Housing – An enclosure in which mechanisms function.

I

Impact – Two or more objects coming together with force.

Inboard – Toward the center of the helicopter.

Initial – The first.

Inlet – An opening for intake of air, gas, or fluid.

Interchangeable – Can be used in place of a similar item to do the same job.

Isolate – To separate one item from others.

J

K

L

Lateral – Coming from the side.

Longitudinal – With the length, or lengthwise dimension.

M

Manifold – A housing with two or more openings to collect and direct flow of liquid, air, or gas.

Mate – To join two items.

Mode – A particular way, manner, angle, condition, or arrangement of operation.

Mount – To attach in proper position.

N

Nomenclature – Name of an item. May include serial numbers or other information.

O

Obstruction – Something in the way. An interference.

Orifice – An opening through which something may pass.

Outboard – Outward and away from the center of the helicopter.

Outlet – A point from which something is allowed to exit.

Overboard – To go out of or away from the helicopter.

P

Particle – A very small (sometimes microscopic) part of something.

Pitch – Up-and-down movement. Blade angle in relation to horizontal or vertical.

Pivot – A shaft, pin, or part on which something turns or revolves.

Port – An opening to allow flow or venting of air, liquid, or gas.

Primary – The main or principal one.

Proximity – Near, or within close range.

Q

R

Remote – A considerable distance away but in communication range.

Retaining – Describes a device or part that holds or restrains.

S

Scoring – Lines, grooves, or scratches worn into a surface.

Seat – Special surface or recess in which a part functions or rests. To place a part on that surface or recess.

Secondary – Subordinate. Not first in order of importance or function.

Sequence – The order in which things occur or are done.

Shim – A thin piece of material used to fill in space between parts for support, leveling, or adjustment.

Stable – Steady, dependable, not subject to changing course.

Stability – Steadiness, dependability.

Standby – A device or system ready for operational use but held in reserve.

Station – Positions on the helicopter measured from a point in front of the nose.

Surge – Sudden rise.

Swivel – To rotate in place.

System – A group of parts working together.

T

Torque – Measurement of the tightness of threaded hardware. A torque wrench is used to measure (and control) the tightness of bolts, screws, nuts,etc.

Troubleshooting – Steps to locate and correct problems in systems.

U

Union – A point of connection where items are joined.

Utility – Serves for general, rather than special, use.

V

Vertical – Straight up and down; 90 degrees to the horizon.

W

Waterline – Distance from a point below the helicopter parallel to the fuselage center line.

X

Y

Z

ALPHABETICAL INDEX

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army

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● U.S. GOVERNMENT PRINTING OFFICE: 1994-555-121/80108

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@avma27.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.

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG **WITH THIS PUBLICATION?**

THEN . . . JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

SSG John Doe
F Troop 5th Cav. 1st Training Bldg.
Fort Knox, Kentucky 12345-6789

DATE SENT

20 October 1990

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 55-1520-238-S	30 September 1990	Preparation for Shipment FOR Army Model AH-64A Helicopters

BE EXACT . . . PIN–POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2–60	2–26, 151			T.M. references should be TM 55-1520-238 S, not TM 55-1500-238-S
2–68		2–30		Support AFT FUS STA 430 should read Support AFT FUS STA 450.

SAMPLE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SP4 John Doe (805) 555-1234

SIGN HERE

John Doe

DA FORM 1 JUL 79 2028-2

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OFFICIAL BUSINESS

COMMANDER
U.S. ARMY AVIATION AND MISSILE COMMAND
ATTN: AMSAM-MMC-MA-NP
REDSTONE ARSENAL, AL 35898-5230

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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 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 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 milliliters = .34 fl. ounces
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	6.452	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: 072826-009