

**TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL**

VOLUME 7 OF 9

PART 2 OF 2

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

**CHAPTER 11
FLIGHT CONTROLS
PART 2**

**AUTOMATIC STABILIZATION
EQUIPMENT MAINTENANCE**

**DIRECTIONAL CONTROL SYSTEM
MAINTENANCE**

**FLIGHT CONTROLS RIGGING
MAINTENANCE**

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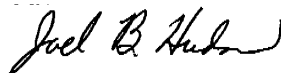
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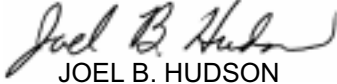
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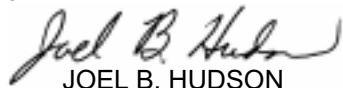
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CHAPTER 11 FLIGHT CONTROL SYSTEM PART 2 OF 2

CHAPTER OVERVIEW

Chapter 11 contains the maintenance instructions for the flight control system. Flight control system description, operation, and troubleshooting information is contained in TM 1-1520-238-T.

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SECTION III. AUTOMATIC STABILIZATION EQUIPMENT MAINTENANCE

11.190. AUTOMATIC STABILIZATION EQUIPMENT (ASE) INSPECTION

11.190.1. Description

This task covers: Inspection.

11.190.2. Initial Setup

Tools:

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

References:

TM 55-1500-322-24

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

11.190.3. Inspection

- a. **Check components for damage and mounting security.**
- b. **Check for loose, missing, or damaged mounting hardware.**
- c. **Check wire bundles for chafing, loose mounting, and broken or missing wire ties.**
- d. **Check wiring for cracked, broken, or burned insulation.**
- e. **Check connectors and receptacles for loose attachment.**
- f. **Check switches for cracked or broken knobs and loose mounting.**
- g. **Check LVDT rod ends for play.** None allowed.
- h. **Check LVDTs for nicks, cracks, and gouges.** None allowed.

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11.190. AUTOMATIC STABILIZATION EQUIPMENT (ASE) INSPECTION – continued

i. Bushings and bearings.

NOTE

- Maximum allowable damage limits are given in (TM 55-1500-322-24).
- Replace excessively worn bushing(s) and/or bearing(s) (para 11.4).

(1) Maximum allowable wear limits:

- (a) Radial play with bolt in bushing or bearing inside diameter **0.004 INCH**.
- (b) Radial play with sliding bushing in flanged inside diameter **0.004 INCH**.
- (c) Radial play in ball bearing **0.002 INCH**.
- (d) Radial play of Teflon bearing **0.006 INCH**.
- (e) Radial play in control rod end bearing **0.001 INCH**.
- (f) Axial play in Teflon bearing **0.016 INCH**.
- (g) Axial play in control rod end bearing **0.009 INCH**.

END OF TASK

11.191. ASE PANEL REMOVAL/INSTALLATION

11.191.1. Description

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

11.191.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
L-style socket head key set (item 187, App H)

Personnel Required:

68X Armament/Electrical System Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

References:

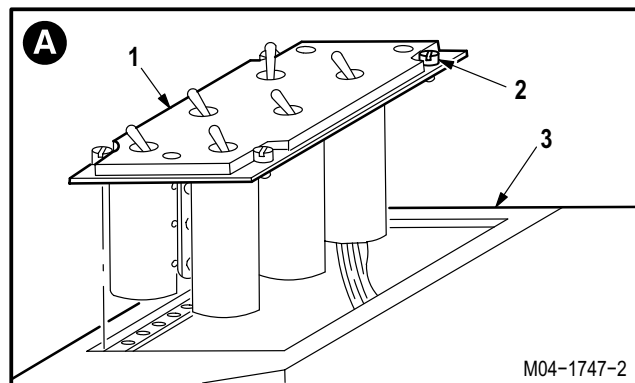
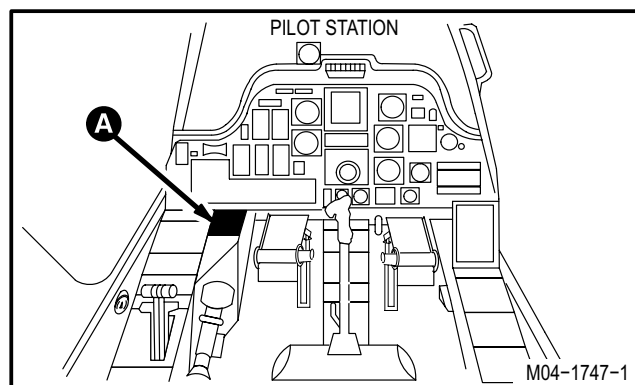
TM 1-1520-238-T

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

11.191.3. Removal

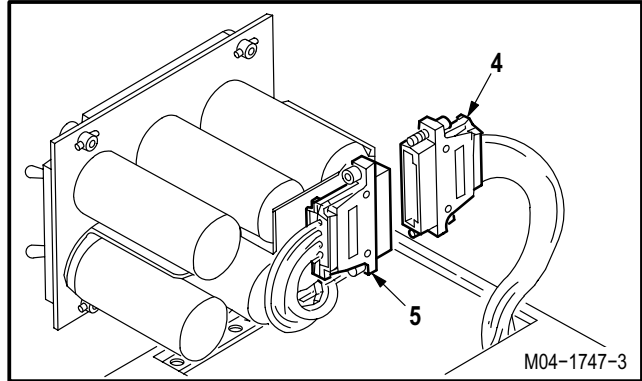
- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**
- c. **On pilot fire control panel, place PNVS switch in ON position.**
- d. **Remove ASE panel (1).**
 - (1) Unlock four turnlock fasteners (2).
 - (2) Remove panel (1) from console (3).



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11.191. ASE PANEL REMOVAL/INSTALLATION – continued

- e. **Detach connector P170 (4) from receptacle (A137)J1 (5).** Use socket head key set.



11.191.4. Cleaning

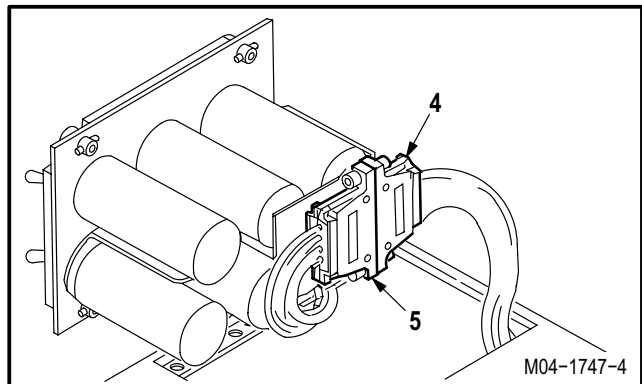
- a. **Wipe removed and attaching parts with a clean rag.**

11.191.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

11.191.6. Installation

- a. **Attach connector P170 (4) to receptacle (A137)J1 (5).** Use socket head key set.



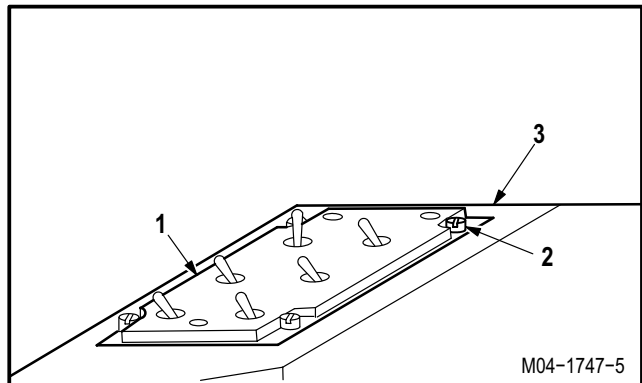
- b. **Install ASE panel (1).**

- (1) Position panel (1) in console (3).
- (2) Lock four turnlock fasteners (2).

- c. **Place PNVS switch in OFF position.**

- d. **Inspect (QA).**

- e. **Perform DASE maintenance operational check** (TM 1-1520-238-T).



END OF TASK

11.192. ASE PANEL LIGHT INDICATING PANEL REMOVAL/INSTALLATION (AVIM)

11.192.1. Description

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

11.192.2. Initial Setup**Tools:**

Electrical tool kit (item 378, App H)

Personnel Required:

68X Armament/Electrical System Repairer
 68X3F Armament/Electrical System Repairer/
 Technical Inspector

NOTE

The ASE panel task can be performed on or off aircraft.

11.192.3. Removal

- a. **Remove light indicating panel (A137)DS1 (1) from ASE panel (2).**

(1) Remove three screws (3).

(2) Remove panel (1).

11.192.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.192.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

11.192.6. Installation

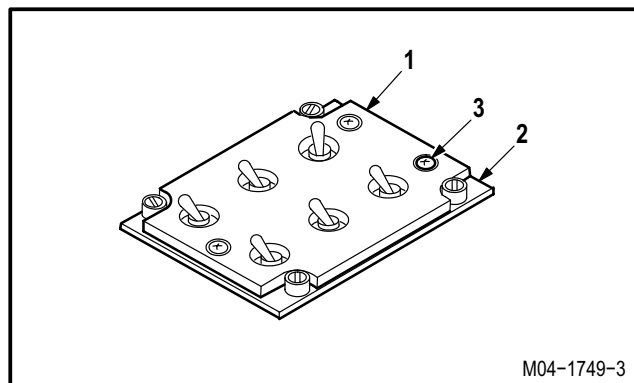
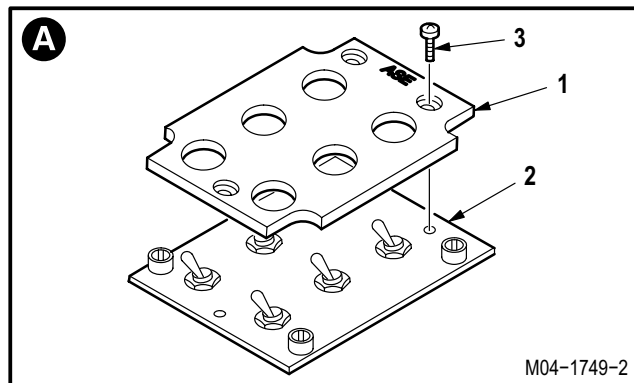
- a. **Install panel (1) on panel (2).**

(1) Position panel (1) on panel (2).

(2) Install three screws (3).

- b. **Inspect (QA).**

END OF TASK



11.193. ASE PANEL SWITCH REPLACEMENT (AVIM)

11.193.1. Description

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

11.193.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
 Light duty laboratory apron (item 27, App H)
 Chemical protective gloves (item 154, App H)
 Adjustable air filtering respirator (item 262, App H)

Materials/Parts:

Brush (item 34, App F)
 Sealing compound (item 167, App F)

Personnel Required:

68X Armament/Electrical System Repairer
 68X3F Armament/Electrical System Repairer/
 Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
11.192	ASE panel light indicating panel removed

NOTE

This task is typical of ASE panel mounted switches. The number of wires attached to each switch will differ.

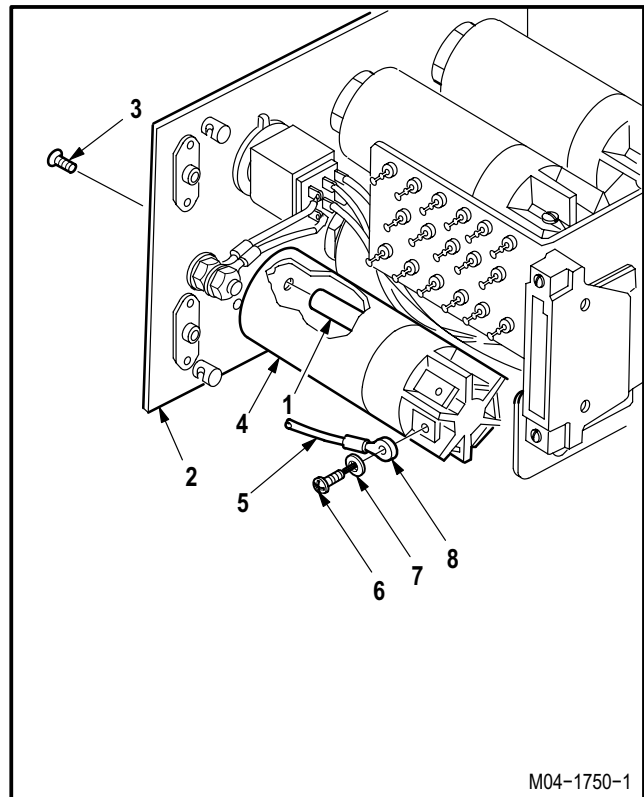
11.193.3. Removal

a. Remove connector and post assembly (1) from ASE panel (2).

- (1) Remove three screws (3).
- (2) Position connector and post assembly (1) so that switch (4) is accessible.

b. Detach wires (5) from switch (4).

- (1) Identify wires (5) on switch (4).
- (2) Remove five screws (6), lockwashers (7), and terminal lugs (8).



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11.193. ASE PANEL SWITCH REPLACEMENT (AVIM) – continued

c. Remove switch (4) from panel (2).

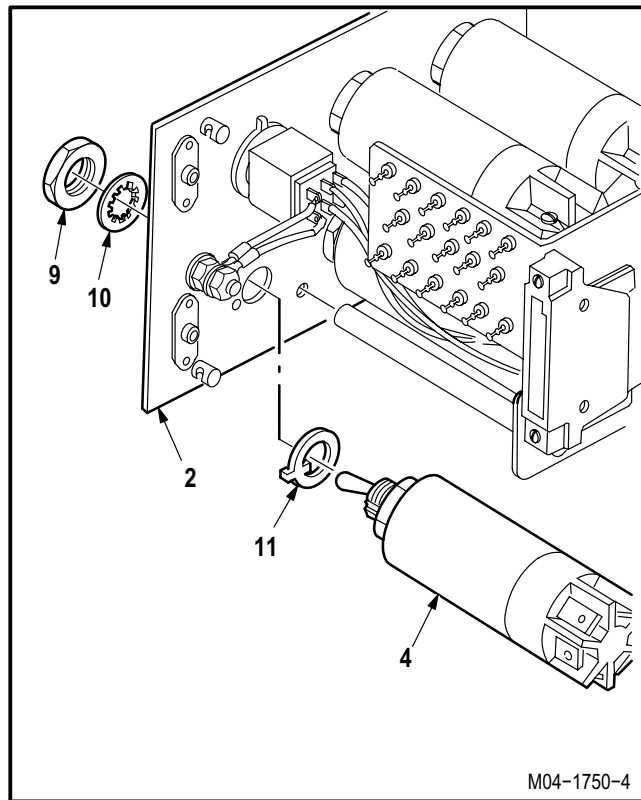
- (1) Remove nut (9) and lockwasher (10).
- (2) Remove switch (4) and lockring (11).

11.193.4. Cleaning

- a. Wipe removed and attaching parts with a clean rag.**

11.193.5. Inspection

- a. Check removed and attaching parts for damage (para 11.190).**
- b. Check removed and attaching parts for corrosion (para 1.49).**



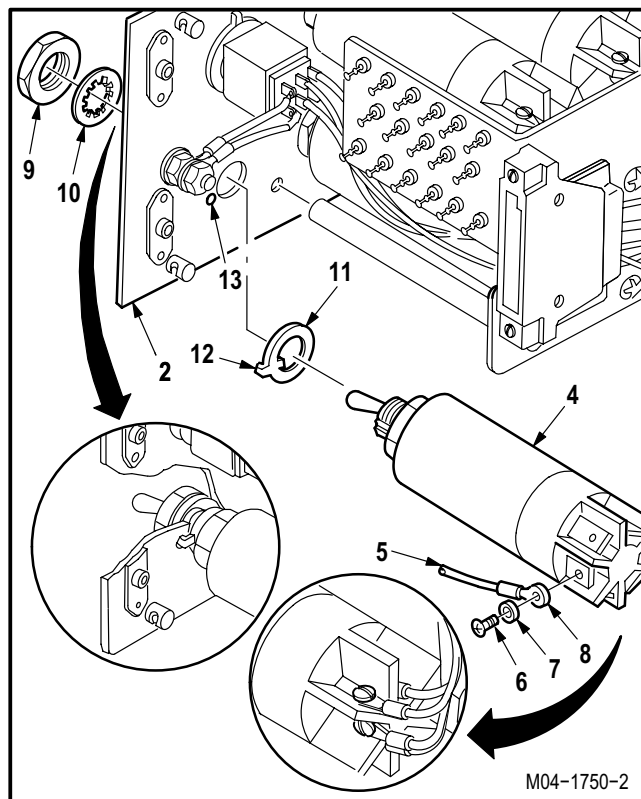
11.193.6. Installation

a. Install switch (4) on panel (2).

- (1) Install lockring (11) and switch so that tab (12) seats in locator hole (13).
- (2) Install lockwasher (10) and nut (9).

b. Attach wires (5) to switch (4).

- (1) Install five identified terminal lugs (8), lockwashers (7), and screws (6).



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11.193. ASE PANEL SWITCH REPLACEMENT (AVIM) – continued

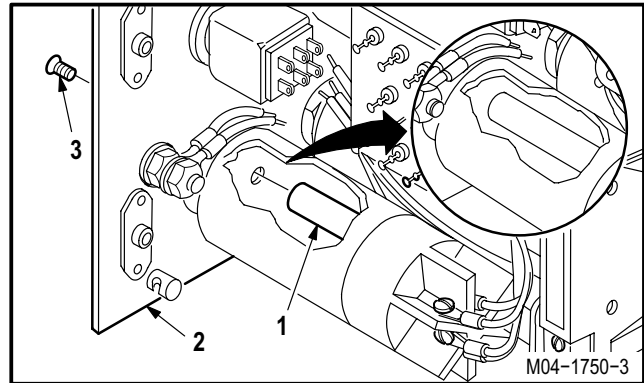


c. **Install connector and post assembly (1) on panel (2).**

- (1) Coat threads of screws (3) with sealing compound. Use sealing compound (item 167, App F) and brush (item 34, App F).
- (2) Install three screws (3) through panel (2) into connector and post assembly (1).

d. **Inspect (QA).**

e. **Install ASE panel light indicating panel (para 11.192).**



END OF TASK

11.194. ASE PANEL BUCS TST SWITCH REPLACEMENT (AVIM)

11.194.1. Description

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

11.194.2. Initial Setup

Tools:

- Electrical tool kit (item 378, App H)
- Light duty laboratory apron (item 27, App H)
- Heat protective gloves (item 155, App H)
- Adjustable air filtering respirator (item 262, App H)
- 5-watt electric soldering iron (item 333, App H)

References:

TM 55-1500-323-24

Materials/Parts:

Solder (item 189, App F)

Personnel Required:

- 68X Armament/Electrical System Repairer
- 68X3F Armament/Electrical System Repairer/
Technical Inspector

Equipment Conditions:

Ref	Condition
11.192	ASE panel light indicating panel removed

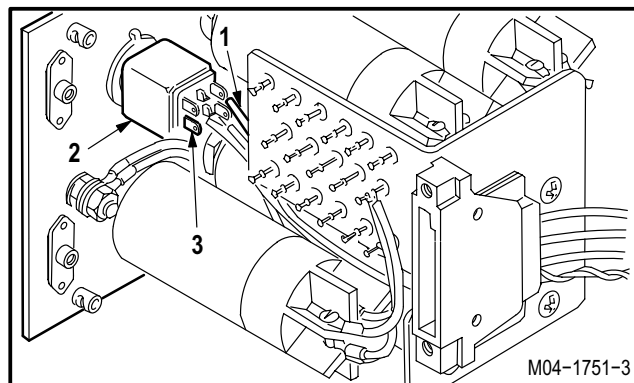
11.194.3. Removal



Soldering iron can cause severe burns to personnel and start fires. Observe all safety precautions when using soldering iron. If injury occurs, seek medical aid.

a. **Desolder wires (1) from switch (2).**

- (1) Identify and desolder wires (1) from six terminals (3). Use soldering iron (TM 55-1500-323-24).

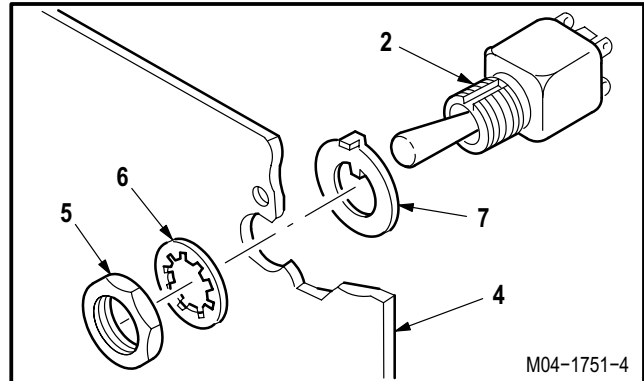


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11.194. ASE PANEL BUCS TST SWITCH REPLACEMENT (AVIM) – continued

b. Remove switch (2) from ASE panel (4).

- (1) Remove nut (5) and lockwasher (6).
- (2) Remove switch (2) and lockring (7) from panel (4).



11.194.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

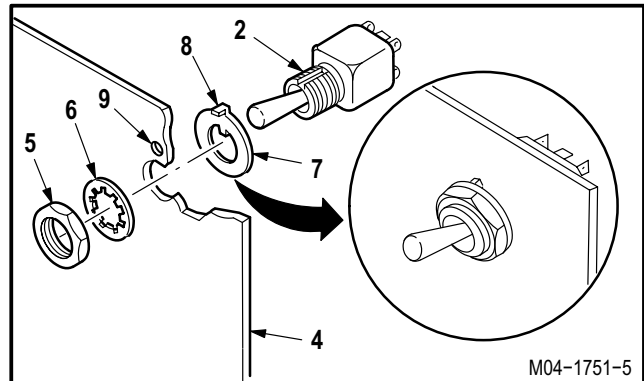
11.194.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

11.194.6. Installation

a. Install switch (2) on panel (4).

- (1) Install switch (2) through lockring (7) and panel (4) so that tab (8) seats in locator hole (9).
- (2) Install lockwasher (6) and nut (5).



GO TO NEXT PAGE

11.194. ASE PANEL BUCS TST SWITCH REPLACEMENT (AVIM) – continued

**WARNING**

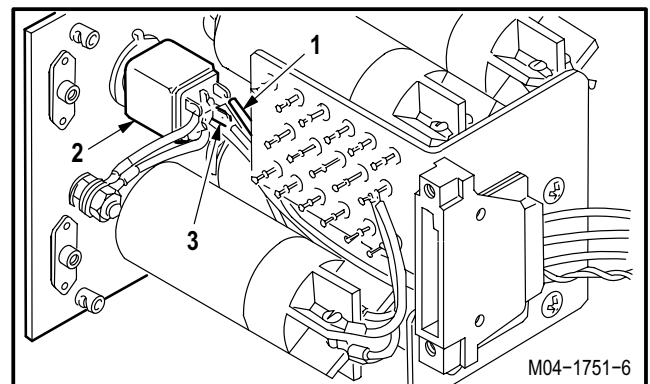
Soldering iron can cause severe burns to personnel and start fires. Observe all safety precautions when using soldering iron. If injury occurs, seek medical aid.

b. Attach wires (1) to switch (2).

- (1) Solder identified wires (1) on six terminals (3). Use soldering iron and solder (item 189, App F) (TM 55-1500-323-24).

c. Inspect (QA).

- d. **Install ASE panel light indicating panel** (para 11.192).



END OF TASK

11.195. ASE PANEL CIRCUIT CARD ASSEMBLY (CCA) REPLACEMENT (AVIM)

11.195.1. Description

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

11.195.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
Light duty laboratory apron (item 27, App H)
Heat protective gloves (item 155, App H)
Adjustable air filtering respirator (item 262, App H)
5-watt electric soldering iron (item 333, App H)

Materials/Parts:

Solder (item 189, App F)

Personnel Required:

68X Armament/Electrical System Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

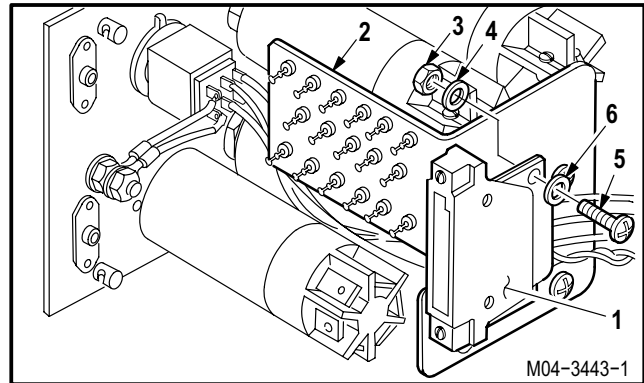
References:

TM 55-1500-323-24

11.195.3. Removal

a. Remove receptacle J1 (1) from ASE panel circuit card assembly (2).

- (1) Remove two nuts (3) and washers (4).
- (2) Remove two screws (5) and washers (6).
- (3) Remove receptacle J1 (1) from card (2).



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11.195. ASE PANEL CIRCUIT CARD ASSEMBLY (CCA) REPLACEMENT (AVIM) – continued

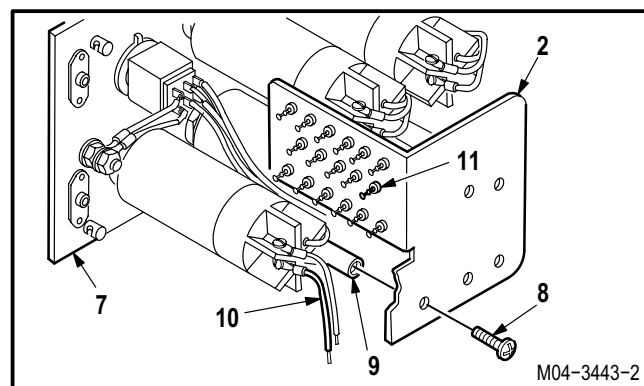


WARNING

Soldering iron can cause severe burns to personnel and start fires. Observe all safety precautions when using soldering iron. If injury occurs, seek medical aid.

b. Remove card (2) from panel (7).

- (1) Identify and desolder wires (10) from circuit card terminals (11). Use soldering iron (TM 55-1500-323-24).
- (2) Remove three screws (8) from three posts (9).
- (3) Remove card (2) from panel (7).



11.195.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.195.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

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11.195. ASE PANEL CIRCUIT CARD ASSEMBLY (CCA) REPLACEMENT (AVIM) – continued

11.195.6. Installation

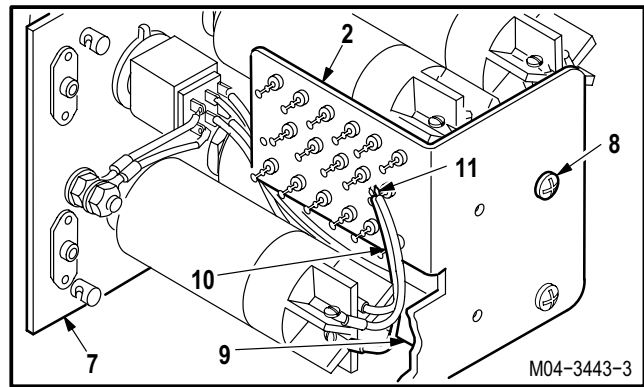


WARNING

Soldering iron can cause severe burns to personnel and start fires. Observe all safety precautions when using soldering iron. If injury occurs, seek medical aid.

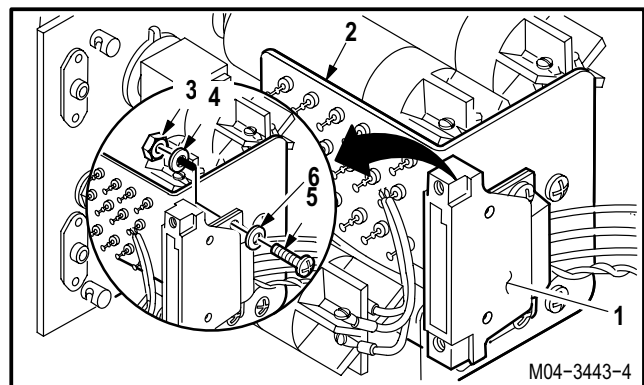
a. **Install card (2) on panel (7).**

- (1) Solder identified wires (10) to terminals (11). Use soldering iron and solder (item 189, App F) (TM 55-1500-323-24).
- (2) Aline card (2) with three posts (9).
- (3) Install three screws (8) through card (2) into posts (9).



b. **Install receptacle J1 (1) on panel card (2)**

- (1) Aline holes of receptacle J1 (1) with holes on card (2).
- (2) Install two screws (5) through washers (6), connector (1), and card (2).
- (3) Install two washers (4) and nuts (3).



c. **Inspect (QA).**

END OF TASK

11.196. CPG DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.196.1. Description

This task covers: Removal. Cleaning. Inspection.

11.196.2. Initial Setup

Tools:

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

References:

TM 55-1500-323-24

Equipment Conditions:

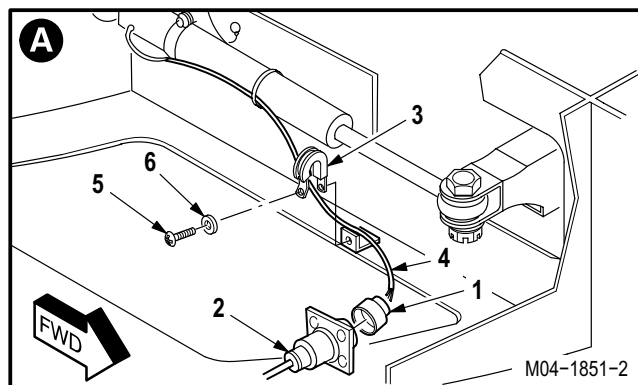
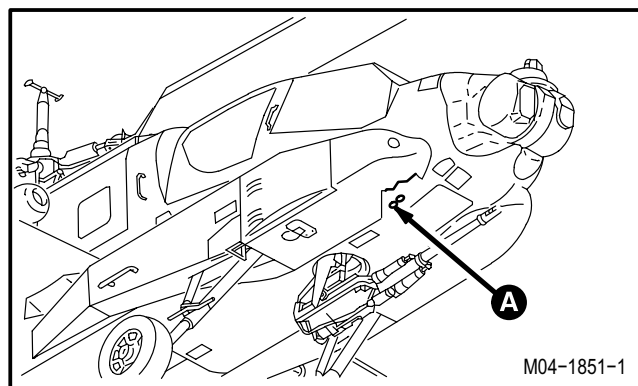
Ref	Condition
1.57	Helicopter safed
2.2	Access door B65R removed; covers B80R and B85R removed; fairing R60 removed

Personnel Required:

67R Attack Helicopter Repairer

11.196.3. Removal

- a. **Enter pilot station (para 1.56). Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**
- c. **Detach connector P235 (1) from receptacle J235 (2).**
- d. **Remove clamp (3) from LVDT wire harness (4).**
 - (1) Remove screw (5) and washer (6).
 - (2) Remove clamp (3) from wire harness (4).
- e. **Remove connector (1) from wire harness (4), if required (TM 55-1500-323-24).**



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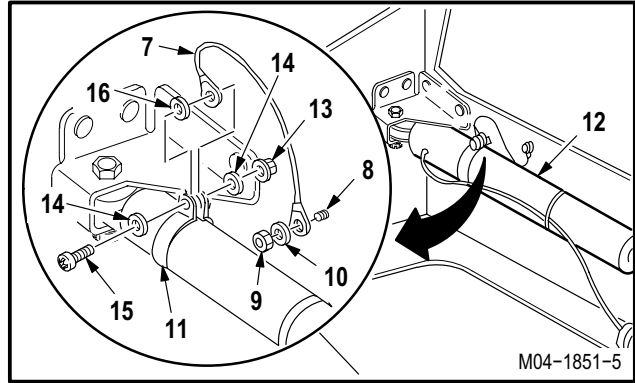
11.196. CPG DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

NOTE

On BUCS-equipped aircraft, an electrical lead will be attached to LVDT.

f. Remove electrical lead (7) from ground stud (8).

- (1) Remove sealant.
- (2) Remove nut (9) and washer (10).
- (3) Remove lead (7) from stud (8).

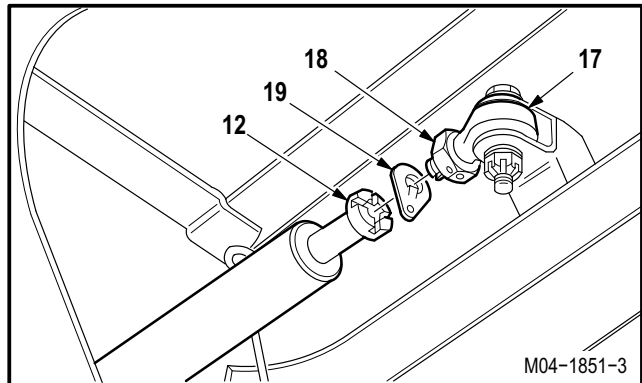


g. Remove clamp (11) from LVDT (12).

- (1) Remove nut (13) and washer (14).
- (2) Remove bolt (15), washer (14), lead (7), and washer (16).
- (3) Remove clamp (11) from LVDT (12).

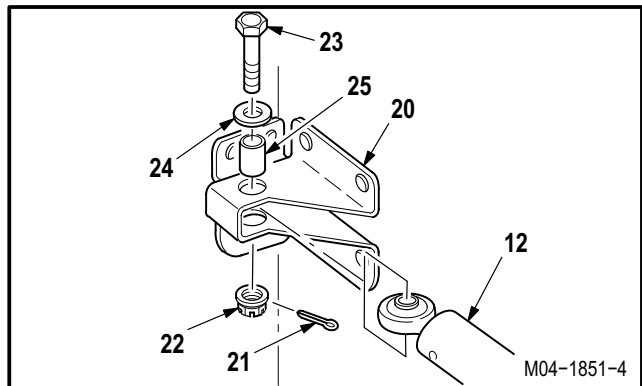
h. Remove LVDT (12) from rod end (17).

- (1) Remove lockwire.
- (2) Loosen nut (18).
- (3) Remove LVDT (12) from rod end (17).
- (4) Remove keywasher (19).



i. Remove LVDT (12) from bracket (20).

- (1) Remove and discard cotter pin (21).
- (2) Remove nut (22).
- (3) Remove bolt (23), washer (24), and bushing (25).
- (4) Remove LVDT (12).



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11.196. CPG DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.196.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.196.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

END OF TASK

11.197. CPG DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION

11.197.1. Description

This task covers: Installation.

11.197.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Electrical tool kit (item 378, App H)
Light duty laboratory apron (item 27, App H)
Chemical protective gloves (item 154, App H)
Adjustable air filtering respirator (item 262, App H)
0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Materials/Parts:

Cotter pin
Sealing compound (item 175, App F)
Wire (item 222, App F)

Personnel Required:

67R Attack Helicopter Repairer
68X Armament/Electrical System Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T
TM 55-1500-323-24

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

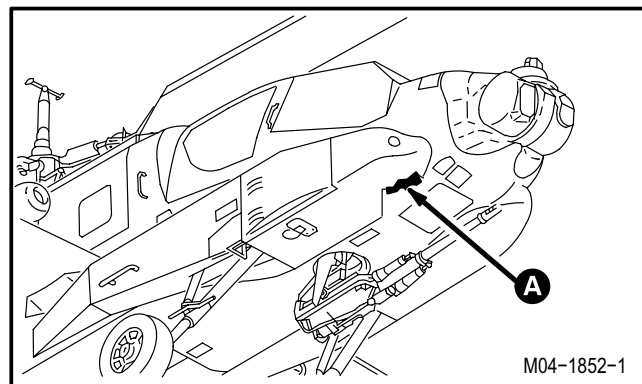
11.197.3. Installation

WARNING

Installation of an LVDT that has not been EMI hardened in a BUCS equipped aircraft may result in uncommanded flight control movement. This may cause possible loss of aircraft.

CAUTION

To prevent FOD from attaching and sticking to the shaft, do not remove the position shaft from the LVDT body during installation.



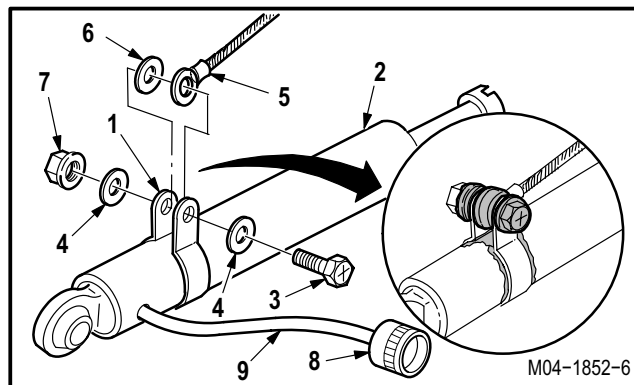
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11.197. CPG DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued



a. Install clamp (1) on LVDT (2).

- (1) Position clamp (1) on LVDT (2).
- (2) Install bolt (3) through washer (4), one ear of clamp (1), electrical lead (5), washer (6), and other ear of clamp (1).
- (3) Install washer (4) and nut (7).
- (4) Apply sealing compound to clamp (1), bolt (3), washers (4), lead (5), washer (6), and nut (7). Use sealing compound (item 175, App F).



b. Install connector (8) on LVDT wire harness (9), if required.

- (1) Cut wire harness (9) length to **14.0 INCHES**.
- (2) Use Table 1 to install connector (8) on wire harness (9) (TM 55-1500-323-24).

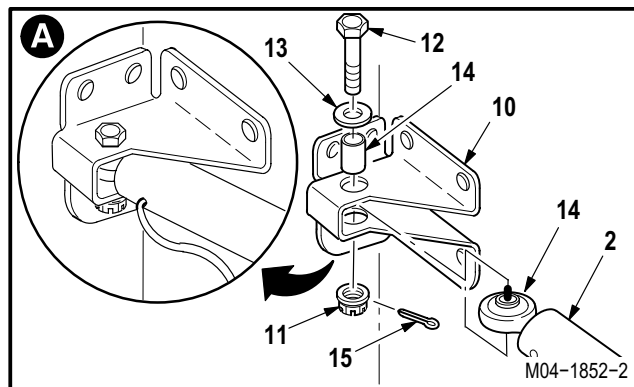
TABLE 1

<u>LVDT WIRE HARNESS</u>	<u>CONNECTOR</u>
WHITE	PIN 1
BLUE	PIN 2
GREEN	PIN 3
ORANGE	PIN 4

M04-1852-8

c. Install LVDT (2) on bracket (10). Torque nut (11) 14 to 18 INCH-POUNDS.

- (1) Aline LVDT (2) with bracket (10).
- (2) Install bolt (12) through washer (13), bushing (14), bracket (10), and LVDT (2).
- (3) Check fit of self-retaining bolt (12) (para 11.1).
- (4) Install nut (11). Torque nut (11) to **14 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS**.
- (6) Install new cotter pin (15).

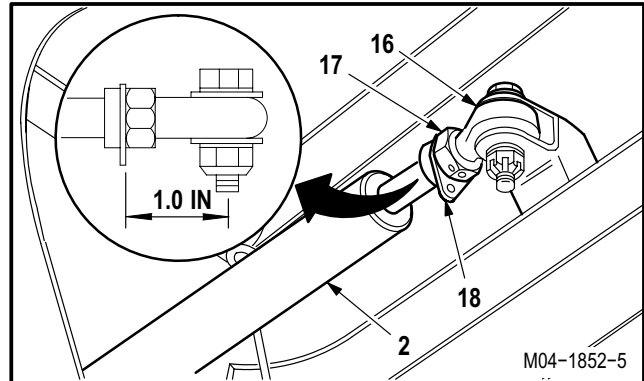


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11.197. CPG DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

d. Install LVDT (2) on rod end (16).

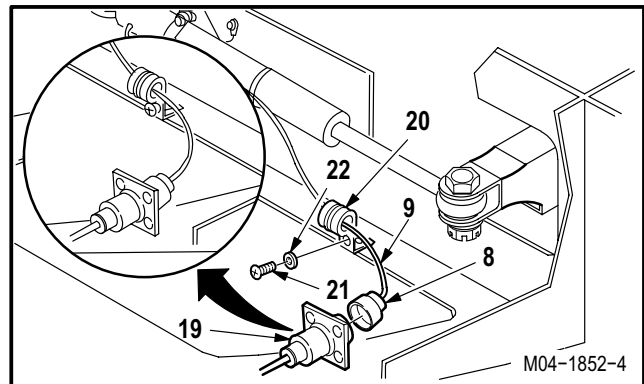
- (1) Install nut (17) and keywasher (18) on rod end (16).
- (2) Install LVDT (2) on rod end (16).
- (3) Measure **1.0 INCH** between center of rod end (16) and keywasher (18).
- (4) Tighten nut (17).
- (5) Lockwire keywasher (18) to nut (17). Use wire (item 222, App F).



e. Install CPG directional SPAD -9 rig pin (para 11.293).

f. Attach connector P235 (8) to receptacle J235 (19).

- (1) Install clamp (20) on wire harness (9).
- (2) Install screw (21) and washer (22).
- (3) Attach connector P235 (8) to receptacle J235 (19).

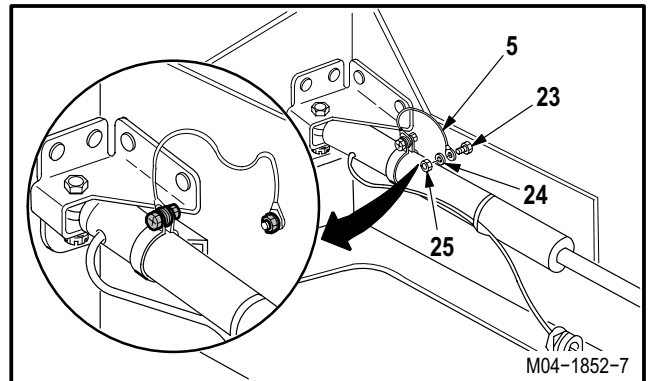


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11.197. CPG DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

g. Install electrical lead (5) on ground stud (23).

- (1) Position lead (5) on stud (23).
- (2) Install washer (24) and nut (25).
- (3) Apply sealing compound to nut (25). Use sealing compound (item 175, App F).

h. Adjust LVDT null (para 11.216).**i. Remove CPG directional SPAD -9 rig pin (para 11.293).****j. Inspect (QA).****k. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).****l. Install access door B65R; install covers B80R and B85R; install fairing R60 (para 2.2).****m. Inspect (QA).**

END OF TASK

11.198. CPG LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.198.1. Description

This task covers: Removal. Cleaning. Inspection.

11.198.2. Initial Setup

Tools:

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

References:

TM 55-1500-323-24

Equipment Conditions:

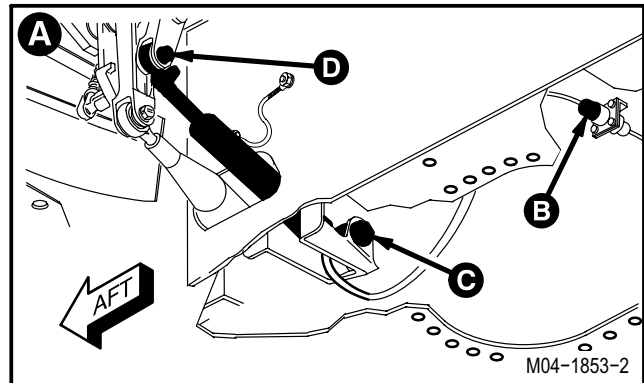
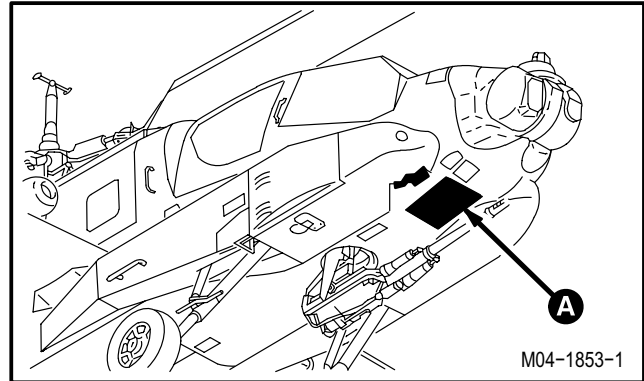
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access doors B60 and B65L removed

Personnel Required:

67R Attack Helicopter Repairer

11.198.3. Removal

- a. **Enter pilot station (para 1.56). Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**



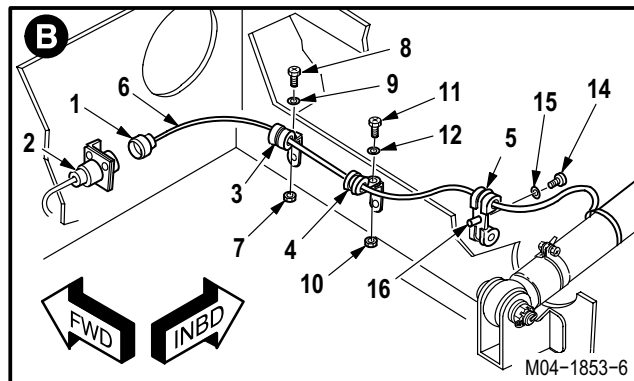
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11.198. CPG LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

c. **Detach connector P237 (1) from receptacle J237 (2).**

d. **Remove clamps (3), (4), and (5) from LVDT wire harness (6).**

- (1) Remove nut (7) from screw (8).
- (2) Remove screw (8) and washer (9) from clamp (3).
- (3) Remove nut (10) from screw (11).
- (4) Remove screw (11) and washer (12) from clamp (4).
- (5) Remove screw (14), washer (15), and spacer (16) from clamp (5).
- (6) Remove clamps (3), (4), and (5).



e. **Remove connector (1) from wire harness (6), if required (TM 55-1500-323-24).**

NOTE

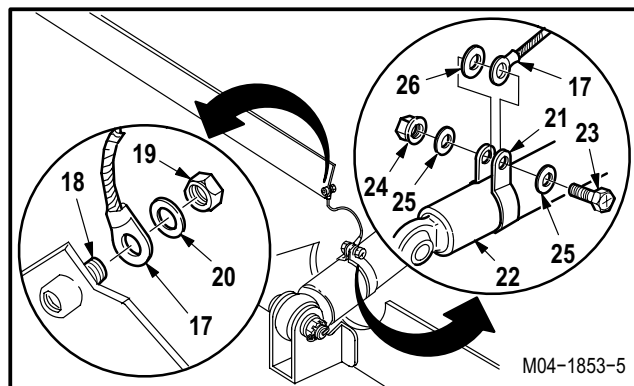
On BUCS-equipped aircraft, an electrical lead will be attached to LVDT.

f. **Remove electrical lead (17) from ground stud (18).**

- (1) Remove nut (19) and washer (20).
- (2) Remove lead (17) from stud (18).

g. **Remove clamp (21) from LVDT (22).**

- (1) Remove nut (24) and washer (25).
- (2) Remove bolt (23), washer (25), lead (17), and washer (26).
- (3) Remove clamp (21) from LVDT (22).

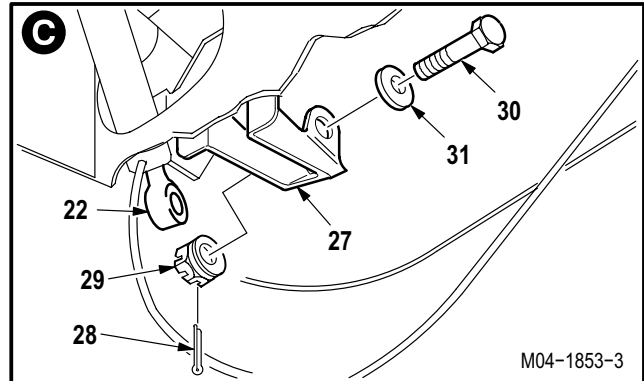


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11.198. CPG LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

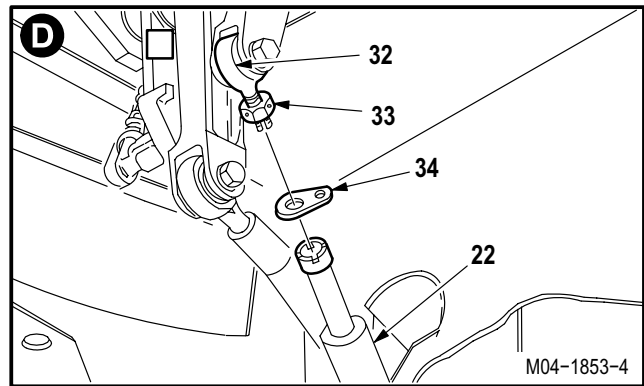
h. Remove LVDT (22) from bracket (27).

- (1) Remove and discard cotter pin (28).
- (2) Remove nut (29).
- (3) Remove bolt (30) and washer (31).



i. Remove LVDT (22) from rod end (32).

- (1) Remove lockwire.
- (2) Loosen nut (33).
- (3) Remove LVDT (22) from rod end (32).
- (4) Remove keywasher (34).



11.198.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.198.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

END OF TASK

11.199. CPG LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION

11.199.1. Description

This task covers: Installation.

11.199.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Electrical tool kit (item 378, App H)
 0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

References:

TM 1-1520-238-T
 TM 55-1500-323-24

Materials/Parts:

Cotter pin
 Wire (item 222, App F)

Personnel Required:

67R Attack Helicopter Repairer
 68X Armament/Electrical System Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

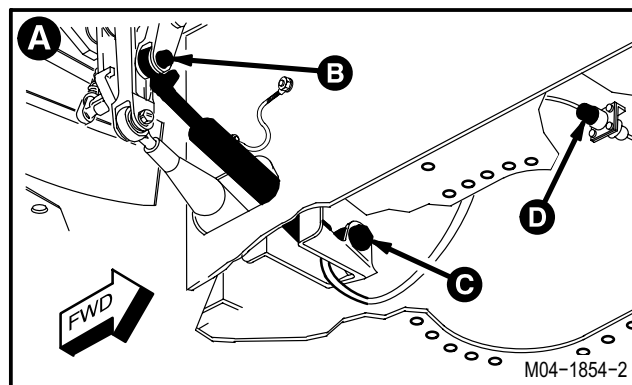
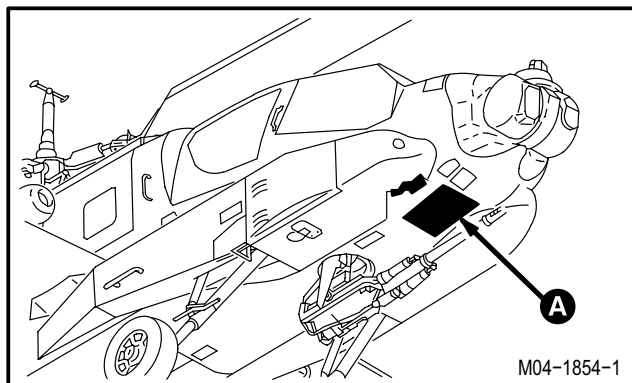
11.199.3. Installation

WARNING

Installation of an LVDT that has not been EMI hardened in a BUCS-equipped aircraft may result in uncommanded flight control movement. This may cause loss of aircraft.

CAUTION

To prevent FOD from attaching and sticking to the shaft, do not remove position shaft from LVDT body during installation.

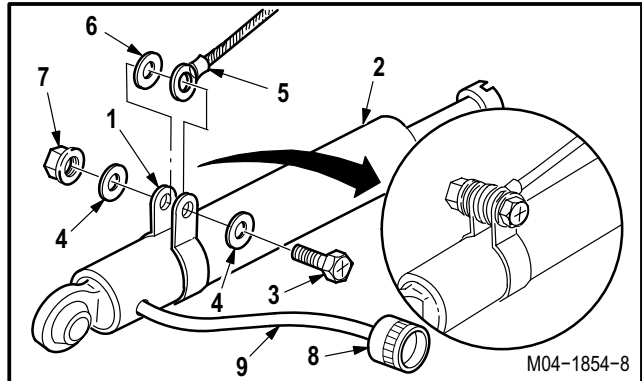


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11.199. CPG LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

a. Install clamp (1) on LVDT (2).

- (1) Position clamp (1) on LVDT (2).
- (2) Install bolt (3) through washer (4), one ear of clamp (1), electrical lead (5), washer (6) and other ear of clamp (1).
- (3) Install washer (4) and nut (7) on bolt (3).



b. Install connector (8) on LVDT wire harness (9), if required.

- (1) Cut wire harness (9) length to **15.5 INCHES**.
- (2) Use Table 1 to install connector (8) on wire harness (9) (TM 55-1500-323-24).

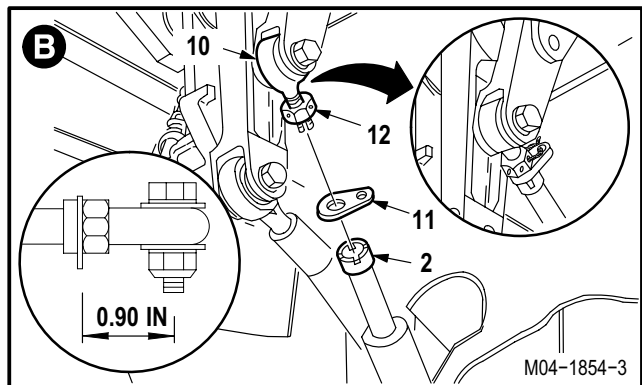
TABLE 1

<u>LVDT WIRE HARNESS</u>	<u>CONNECTOR</u>
WHITE	PIN 1
BLUE	PIN 2
GREEN	PIN 3
ORANGE	PIN 4

M04-1854-9

c. Install LVDT (2) on rod end (10).

- (1) Position keywasher (11) on rod end (10).
- (2) Install LVDT (2) on rod end (10).
- (3) Measure **0.90 INCH** between center of rod end (10) and keywasher (11).
- (4) Tighten nut (12).
- (5) Lockwire keywasher (11) to nut (12). Use wire (item 222, App F).

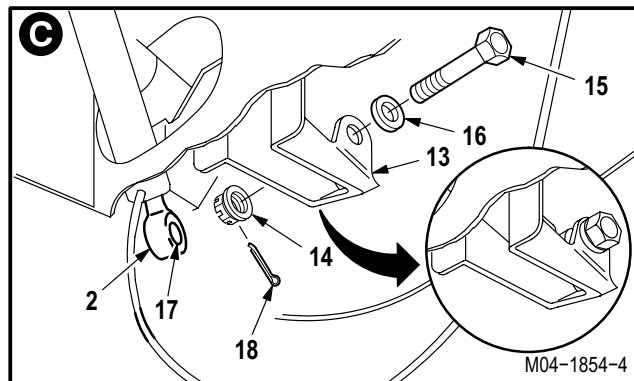


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11.199. CPG LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

d. **Install LVDT (2) on bracket (13).** Torque nut (14) **14 to 18 INCH-POUNDS.**

- (1) Aline LVDT (2) with bracket (13).
- (2) Install bolt (15) through washer (16), bracket (13), and bearing (17).
- (3) Check fit of self-retaining bolt (15) (para 11.1).
- (4) Install nut (14). Torque nut (14) to **14 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS.**
- (6) Install new cotter pin (18).



e. **Install CPG cyclic stick -5 rig pin (para 11.289).**

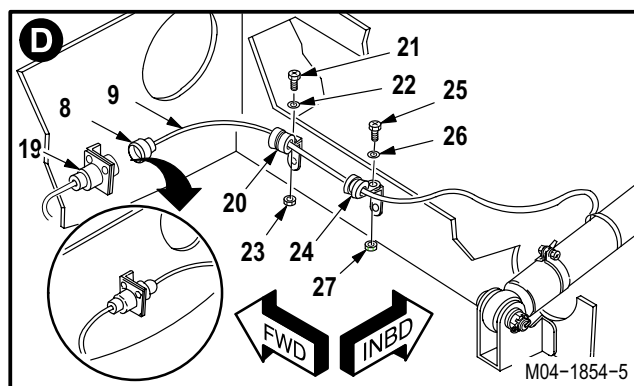
f. **Attach connector P237 (8) to receptacle J237 (19).**

g. **Install clamp (20) on wire harness (9).**

- (1) Install screw (21) through washer (22) into clamp (20).
- (2) Install nut (23) on screw (21).

h. **Install clamp (24) on wire harness (9).**

- (1) Install screw (25) through washer (26) into clamp (24).
- (2) Install nut (27) on screw (25).

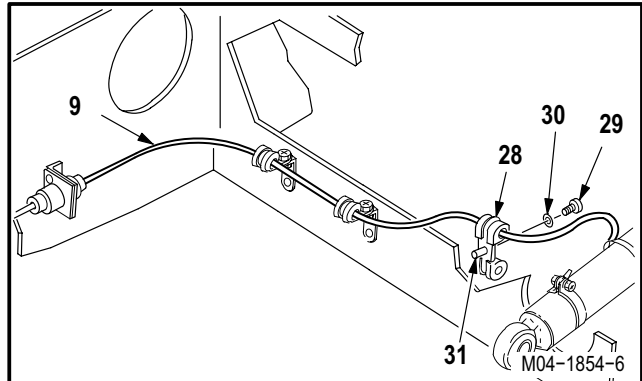


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11.199. CPG LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

i. Install clamp (28) on harness (9).

- (1) Install screw (29) through washer (30), clamp (28), and spacer (31).



j. Install lead (5) on ground stud (32).

- (1) Position lead (5) on stud (32).
- (2) Install washer (33) and nut (34).

k. Adjust LVDT null (para 11.216).

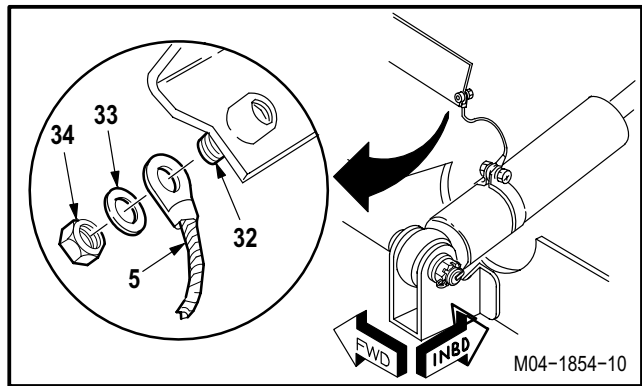
l. Remove CPG cyclic stick -5 rig pin (para 11.289).

m. Inspect (QA).

n. Perform lateral flight control rigging maintenance operational check (TM 1-1520-238-T).

o. Install access doors B60 and B65L (para 2.2).

p. Inspect (QA).



END OF TASK

11.200. CPG LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.200.1. Description

This task covers: Removal. Cleaning. Inspection.

11.200.2. Initial Setup

Tools:

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

References:

TM 55-1500-323-24

Equipment Conditions:

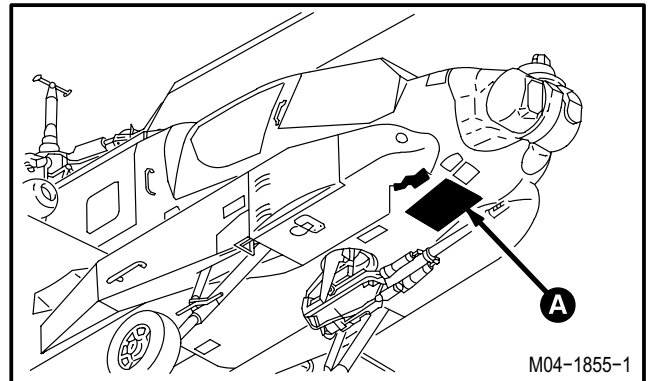
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access door B75R removed

Personnel Required:

67R Attack Helicopter Repairer

11.200.3. Removal

- a. **Enter pilot station (para 1.56). Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**



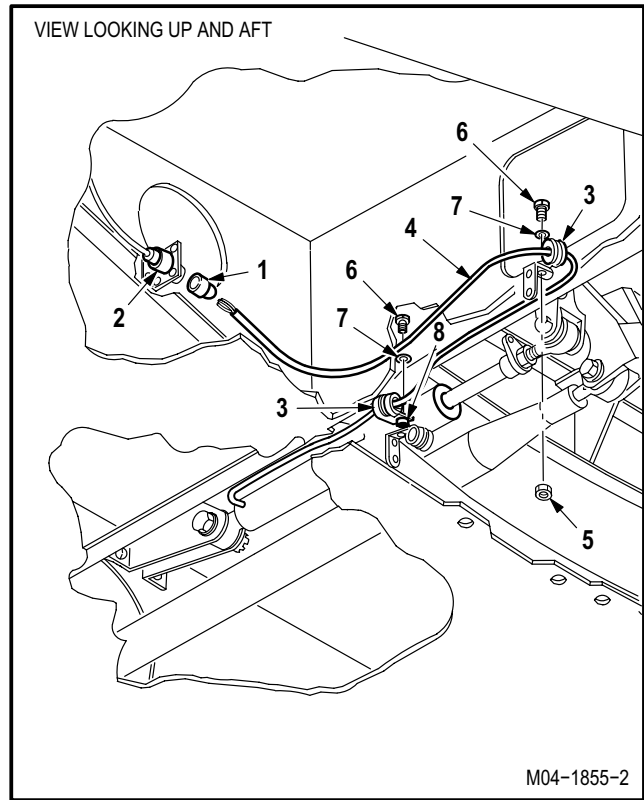
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11.200. CPG LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

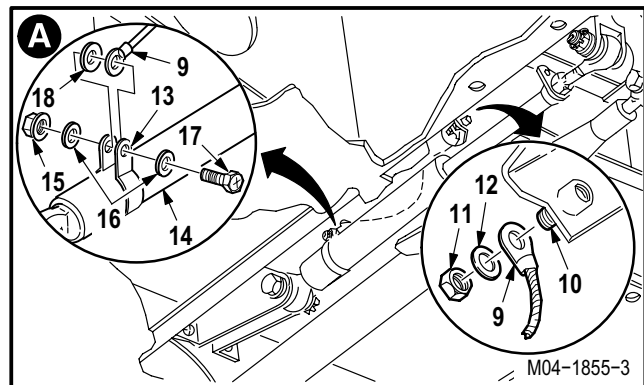
- c. **Detach connector P236 (1) from receptacle J236 (2).**
- d. **Remove two clamps (3) from LVDT wire harness (4).**
 - (1) Remove nut (5), two screws (6), washers (7), and spacer (8) from two clamps (3).
 - (2) Remove two clamps (3).
- e. **Remove connector (1) from wire harness (4), if required (TM 55-1500-323-24).**

NOTE

On BUCS-equipped aircraft, an electrical lead will be attached to LVDT.



- f. **Remove electrical lead (9) from ground stud (10).**
 - (1) Remove nut (11) and washer (12).
 - (2) Remove lead (9) from stud (10).
- g. **Remove clamp (13) from LVDT (14).**
 - (1) Remove nut (15) and washer (16).
 - (2) Remove bolt (17), washer (16), lead (9), and washer (18).
 - (3) Remove clamp (13) from LVDT (14).



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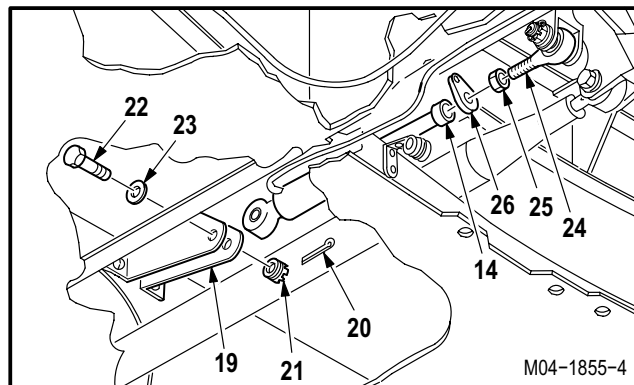
11.200. CPG LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

h. Remove LVDT (14) from bracket (19).

- (1) Remove and discard cotter pin (20).
- (2) Remove nut (21).
- (3) Remove bolt (22) and washer (23).

i. Remove LVDT (14) from rod end (24).

- (1) Remove lockwire.
- (2) Loosen nut (25).
- (3) Remove LVDT (14) from rod end (24).
- (4) Remove keywasher (26).


11.200.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.200.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

END OF TASK

11.201. CPG LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION

11.201.1. Description

This task covers: Installation.

11.201.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Electrical tool kit (item 378, App H)
0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

References:

TM 1-1520-238-T
TM 55-1500-323-24

Materials/Parts:

Cotter pin
Wire (item 222, App F)

Personnel Required:

67R Attack Helicopter Repairer
68X Armament/Electrical System Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

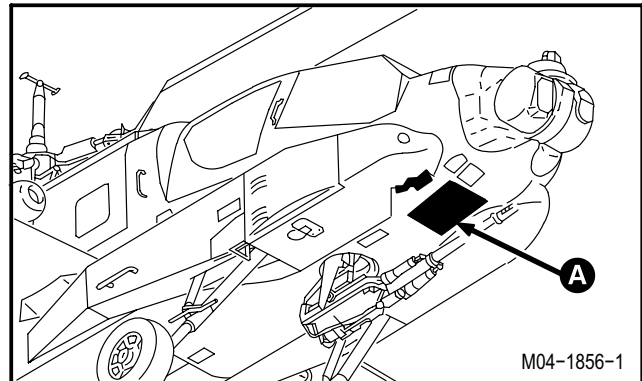
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

WARNING

Installation of an LVDT that has not been EMI hardened in a BUCS-equipped aircraft may result in uncommanded flight control movement. This may cause possible loss of aircraft.

CAUTION

To prevent FOD from attaching and sticking to the shaft, do not remove the position shaft from the LVDT body during installation.



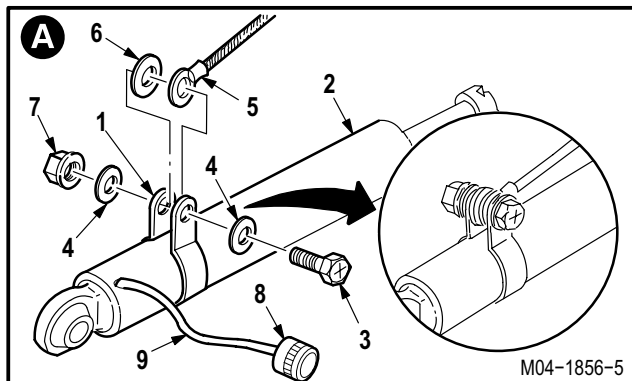
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11.201. CPG LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

11.201.3. Installation

a. Install clamp (1) on LVDT (2).

- (1) Position clamp (1) on LVDT (2).
- (2) Install bolt (3) through washer (4), one ear of clamp (1), electrical lead (5), washer (6), and other ear of clamp (1).
- (3) Install washer (4) and nut (7).



b. Install connector (8) on LVDT wire harness (9), if required.

- (1) Cut wire harness (9) length to **28.0 INCHES**.
- (2) Use Table 1 to install connector (8) on wire harness (9) (TM 55-1500-323-24).

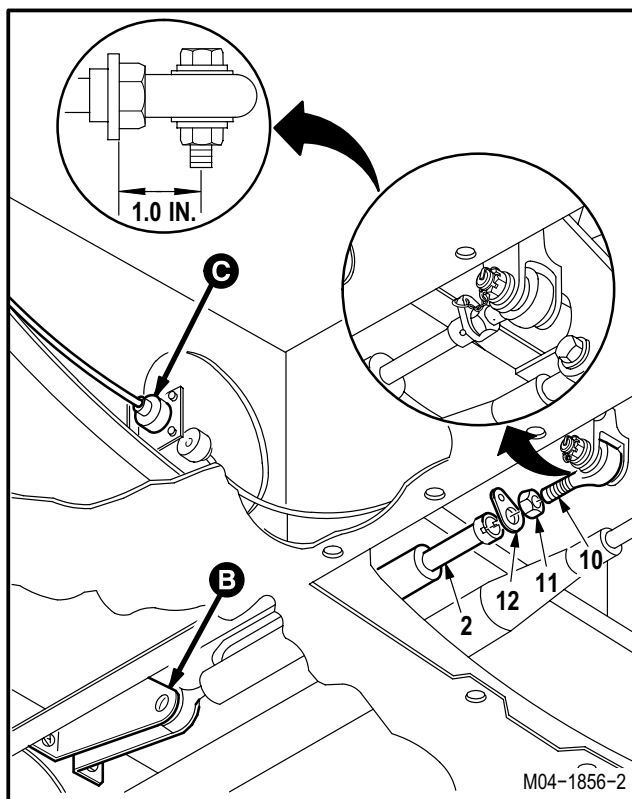
TABLE 1

<u>LVDT WIRE HARNESS</u>	<u>CONNECTOR</u>
WHITE	PIN 1
BLUE	PIN 2
GREEN	PIN 3
ORANGE	PIN 4

M04-1856-6

c. Install LVDT (2) on rod end (10).

- (1) Install nut (11) and keywasher (12) on rod end (10).
- (2) Install LVDT (2) on rod end (10).
- (3) Measure **1.0 INCH** between center of rod end (10) and keywasher (12).
- (4) Tighten nut (11).
- (5) Lockwire keywasher (12) to nut (11). Use wire (item 222, App F).

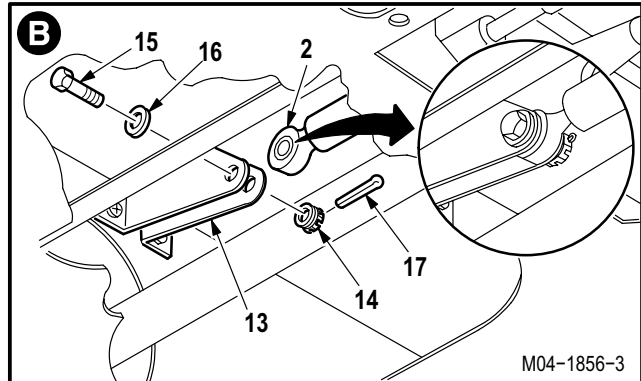


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11.201. CPG LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

d. **Install LVDT (2) on bracket (13).** Torque nut (14) **14 to 18 INCH-POUNDS.**

- (1) Aline LVDT (2) with bracket (13).
- (2) Install bolt (15) through washer (16), bracket (13), and LVDT (2).
- (3) Check fit of self-retaining bolt (15) (para 11.1).
- (4) Install nut (14). Torque nut (14) to **14 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS.**
- (6) Install new cotter pin (17).

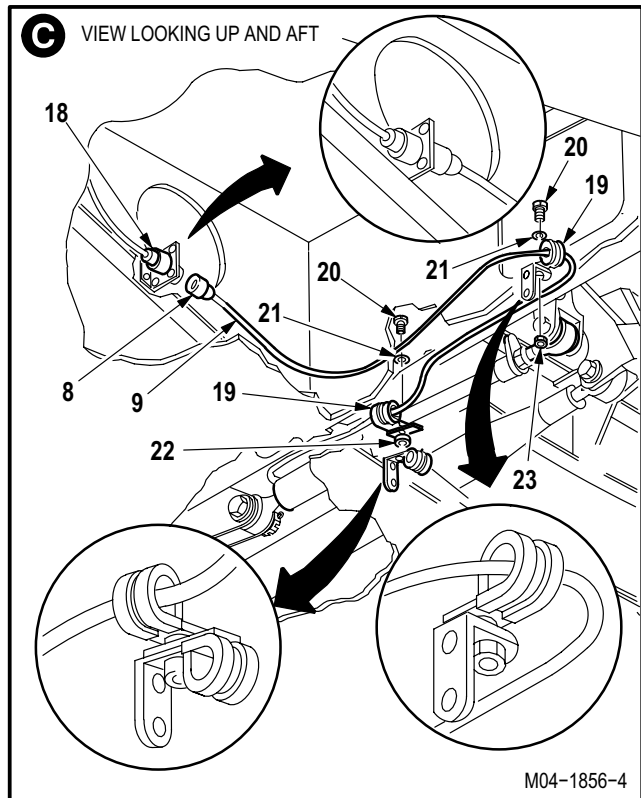


e. **Install CPG cyclic stick -9 rig pin (para 11.285).**

f. **Attach connector P236 (8) to receptacle J236 (18).**

g. **Install two clamps (19) on wire harness (9).**

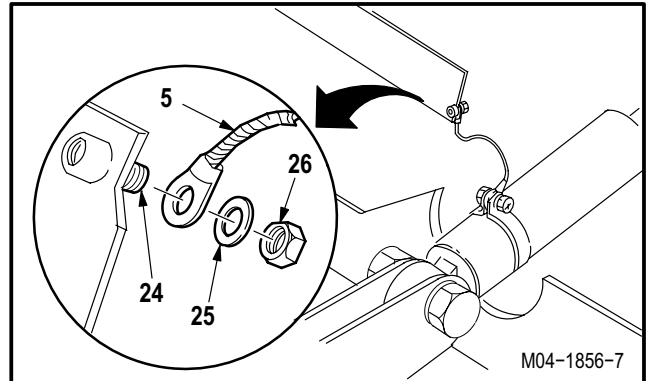
- (1) Install screw (20) through washer (21), clamp (19), and spacer (22).
- (2) Install screw (20) through washer (21), clamp (19), and nut (23).



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11.201. CPG LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

- h. **Install lead (5) on ground stud (24).**
 - (1) Position lead (5) on stud (24).
 - (2) Install washer (25) and nut (26).
- i. **Adjust LVDT null** (para 11.216).
- j. **Remove CPG cyclic stick -9 rig pin** (para 11.285).
- k. **Inspect (QA).**
- l. **Perform longitudinal flight control rigging maintenance operational check** (TM 1-1520-238-T).
- m. **Install access door B75R** (para 2.2).
- n. **Inspect (QA).**



END OF TASK

11.202. CPG COLLECTIVE STICK POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ROD END REPLACEMENT

11.202.1. Description

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

11.202.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.203	CPG collective control position LVDT removed

Materials/Parts:

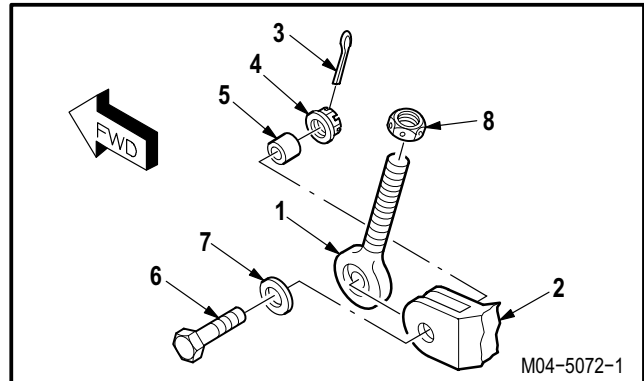
Cotter pin

11.202.3. Removal

a. **Remove LVDT rod end bearing (1) from bracket (2).**

- (1) Remove and discard cotter pin (3)
- (2) Remove nut (4) and bushing (5).
- (3) Remove bolt (6) and washer (7).
- (4) Remove rod end (1) from bracket (2).

b. **Remove jam nut (8) from rod end (1).**



11.202.4. Cleaning

a. **Wipe removed and attaching parts with a clean rag.**

11.202.5. Inspection

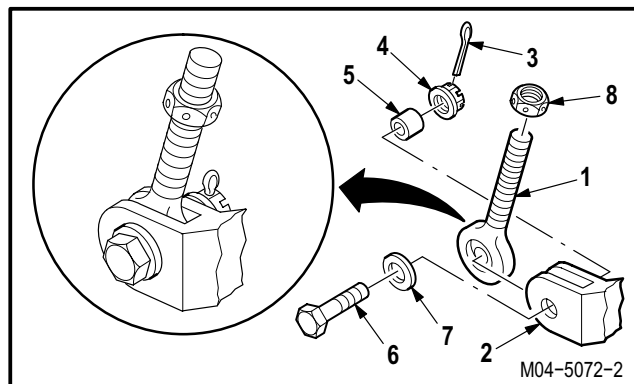
- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

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**11.202. CPG COLLECTIVE STICK POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT)
ROD END REPLACEMENT – continued**

11.202.6. Installation

- a. **Install jam nut (8) on rod end (1).**
- b. **Install LVDT rod end bearing (1) on bracket (2).**
Torque nut (4) **14 to 18 INCH-POUNDS**.
 - (1) Aline rod end (1) with bracket (2).
 - (2) Install bolt (6) through washer (7), bracket (2), rod end (1) and bushing (5).
 - (3) Check fit of self-retaining bolt (6) (para 11.1).
 - (4) Install nut (4) on bolt (6). Torque nut (4) to **14 INCH-POUNDS**. Use torque wrench.
 - (5) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS**.
 - (6) Install new cotter pin (3).
- c. **Inspect (QA).**
- d. **Install CPG collective control position LVDT**
(para 11.204).



END OF TASK

11.203. CPG COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.203.1. Description

This task covers: Removal. Cleaning. Inspection.

11.203.2. Initial Setup

Tools:

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

References:

TM 55-1500-323-24

Equipment Conditions:

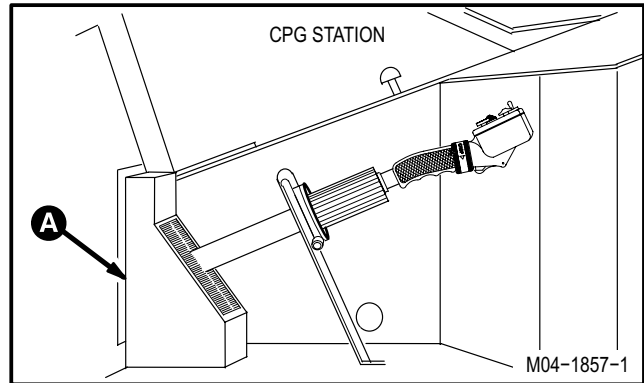
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.44	Collective stick cover removed

Personnel Required:

67R Attack Helicopter Repairer

11.203.3. Removal

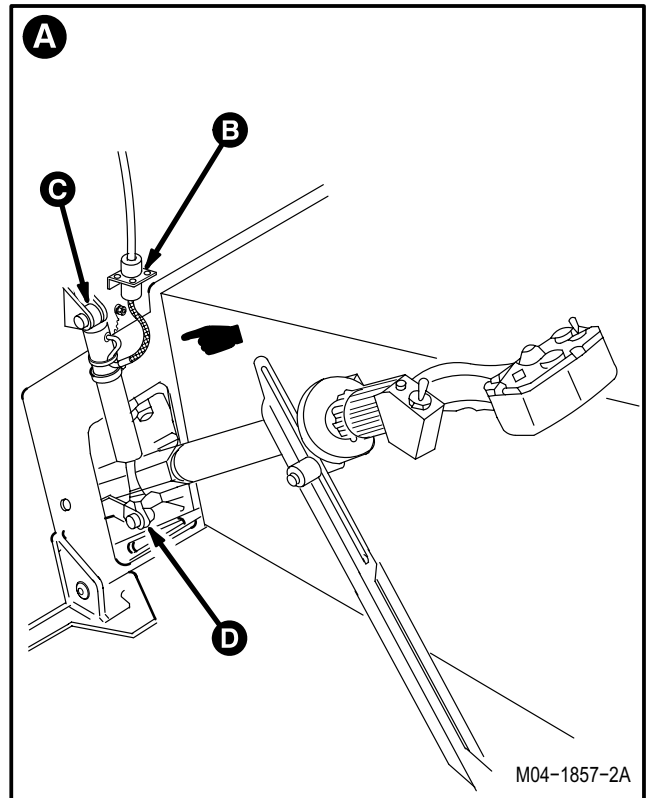
- a. **Enter pilot station (para 1.56). Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**



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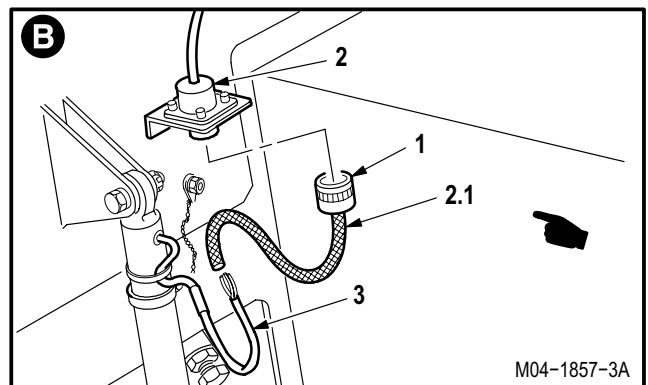
11.203. CPG COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

- c. Enter CPG station (para 1.56). Observe all safety precautions.



- d. Detach connector P234 (1) from receptacle J234 (2).

- e. Remove and retain connector (1) and braided shielding (2.1) from LVDT wire harness (3), if required (TM 55-1500-323-24).



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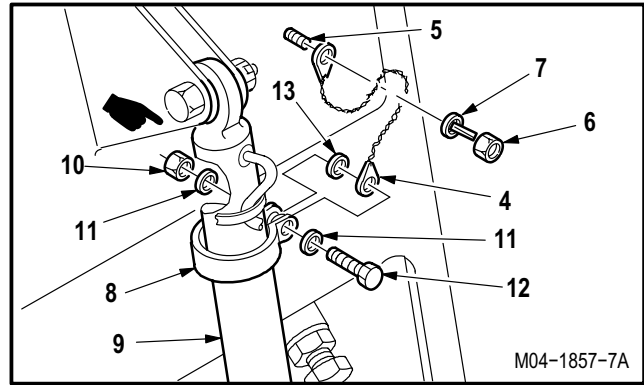
11.203. CPG COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

NOTE

On BUCS-equipped aircraft, an electrical lead will be attached to LVDT.

f. Remove electrical lead (4) from ground stud (5).

- (1) Remove sealant.
- (2) Remove nut (6) and washer (7).
- (3) Remove lead (4) from stud (5).

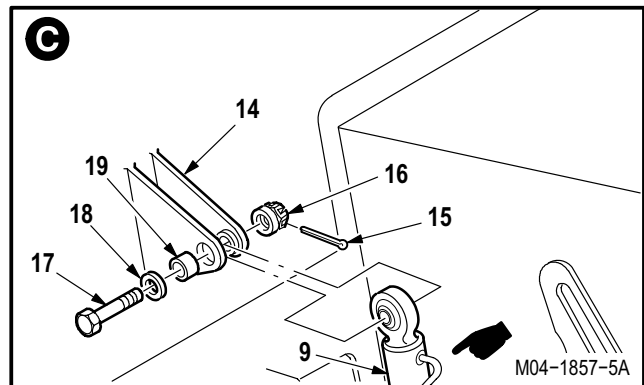


g. Remove clamp (8) from LVDT (9).

- (1) Remove nut (10) and washer (11).
- (2) Remove bolt (12), washer (11), lead (4), and washer (13).
- (3) Remove clamp (8) from LVDT (9).

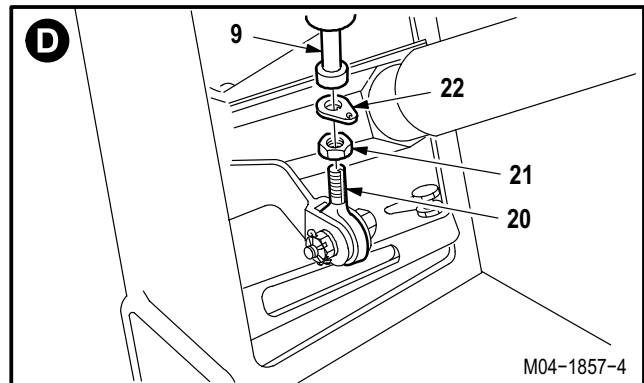
h. Remove LVDT (9) from bracket (14).

- (1) Remove sealant.
- (2) Remove and discard cotter pin (15).
- (3) Remove nut (16).
- (4) Remove bolt (17), washer (18), and bushing (19).



i. Remove LVDT (9) from rod end (20).

- (1) Remove lockwire.
- (2) Loosen nut (21).
- (3) Remove LVDT (9) from rod end (20).
- (4) Remove keywasher (22).



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11.203. CPG COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.203.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.203.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

END OF TASK

11.204. CPG COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION

11.204.1. Description

This task covers: Installation.

11.204.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical tool kit (item 378, App H)
- Light duty laboratory apron (item 27, App H)
- Chemical protective gloves (item 154, App H)
- Adjustable air filtering respirator (item 262, App H)
- 0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Materials/Parts:

- Cotter pin
- Sealing compound (item 175, App F)
- Strap (item 193, App F)
- Wire (item 222, App F)

Personnel Required:

- 67R Attack Helicopter Repairer
- 68X Armament/Electrical System Repairer
- 67R3F Attack Helicopter Repairer/Technical Inspector

References:

- TM 1-1520-238-T
- TM 55-1500-323-24

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

11.204.3. Installation

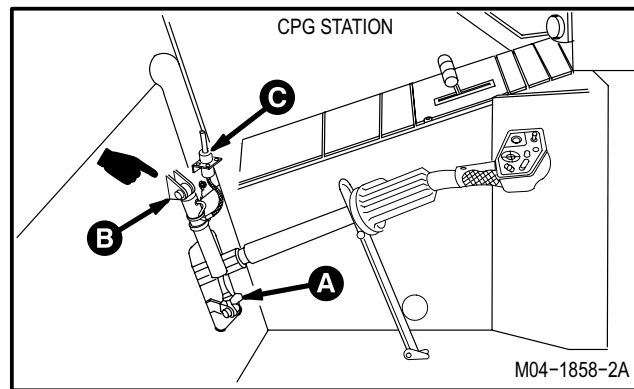


Installation of an LVDT that has not been EMI hardened in a BUCS-equipped aircraft may result in uncommanded flight control movement. This may cause loss of aircraft.



To prevent FOD from attaching and sticking to the shaft, do not remove the position shaft from the LVDT body during installation.

- a. Enter CPG station (para 1.56). Observe all safety precautions.



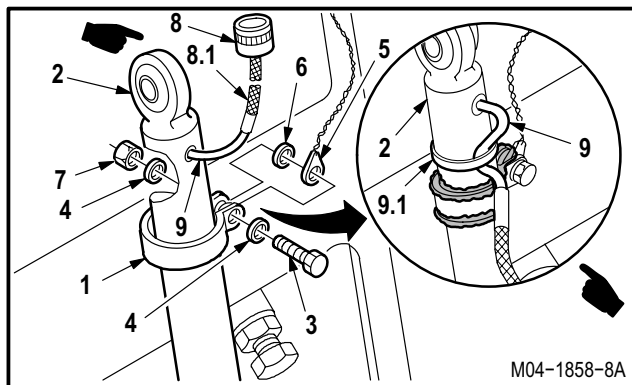
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11.204. CPG COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued



b. Install clamp (1) on LVDT (2).

- (1) Position clamp (1) on LVDT (2).
- (2) Install bolt (3) through washer (4), one ear of clamp (1), electrical lead (5), washer (6), and other ear of clamp (1).
- (3) Install washer (4) and nut (7).
- (4) Apply sealing compound to clamp (1), bolt (3), washers (4), lead (5), washer (6), and nut (7). Use sealing compound (item 175, App F).



c. Install connector (8) and braided shielding (8.1) on LVDT wire harness (9), if required.

- (1) Cut wire harness (9) length to **10.0 INCHES**.
- (2) Install braided shielding (8.1) to wire harness (TM 55-1500-323-24). Start **2.0 INCHES** from LVDT (2) body.
- (3) Use Table 1 to install connector (8) on wire harness (9) (TM 55-1500-323-24).
- (4) Install braided shielding (8.1) on connector (8).
- (5) Secure wire harness (9) to LVDT (2) body.
 - (a) Create service loop on wire harness (9).
 - (b) Secure wire harness (9) with strap (9.1). Use strap (item 193, App F).

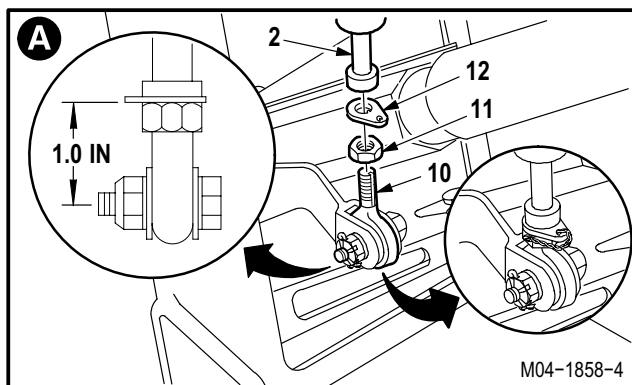
TABLE 1

LVDT WIRE HARNESS	CONNECTOR
WHITE	PIN 1
BLUE	PIN 2
GREEN	PIN 3
ORANGE	PIN 4

M04-1858-9

d. Install LVDT (2) on rod end (10).

- (1) Install nut (11) and keywasher (12) on rod end (10).
- (2) Install LVDT (2) on rod end (10).
- (3) Measure **1.0 INCH** between center of rod end (10) and keywasher (12).
- (4) Tighten nut (11).
- (5) Lockwire keywasher (12) to nut (11). Use wire (item 222, App F).

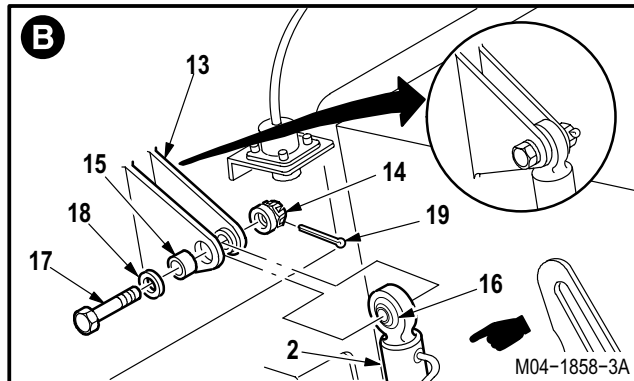


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11.204. CPG COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

e. **Install LVDT (2) on bracket (13).** Torque nut (14) **14 to 18 INCH-POUNDS.**

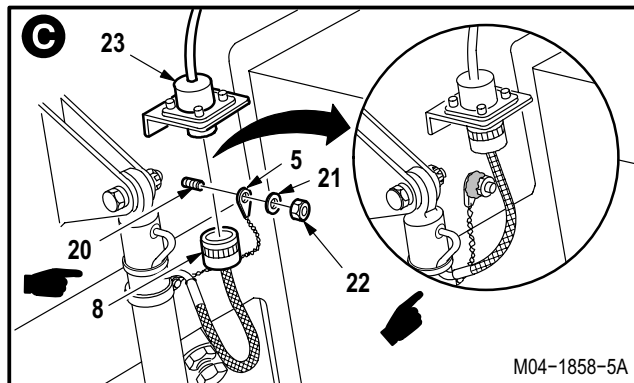
- (1) Aline LVDT (2) with bracket (13).
- (2) Install bushing (15) in bracket (13) and rod end (16).
- (3) Install bolt (17) through washer (18), bushing (15), bracket (13), and rod end (16).
- (4) Check fit of self-retaining bolt (17) (para 11.1).
- (5) Install nut (14). Torque nut (14) to **14 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS.**
- (7) Install new cotter pin (19).



f. **Install CPG collective stick -3 rig pin** (para 11.281).

g. **Install lead (5) on ground stud (20).**

- (1) Position lead (5) on stud (20).
- (2) Install washer (21) and nut (22).
- (3) Apply sealing compound to nut (22), washer (21), lead (5), and stud (20). Use sealing compound (item 175, App F).



h. **Attach connector P234 (8) to receptacle J234 (23).**

i. **Adjust LVDT null** (para 11.216).

j. **Remove CPG collective stick -3 rig pin** (para 11.281).

k. **Inspect (QA).**

l. **Install collective stick cover** (para 11.44).

m. **Perform collective flight control rigging operational check** (TM 1-1520-238-T).

END OF TASK

11.205. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR REMOVAL/INSTALLATION

11.205.1. Description

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

11.205.2. Initial Setup

Tools:

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

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.44	Pilot collective stick cover removed

Materials/Parts:

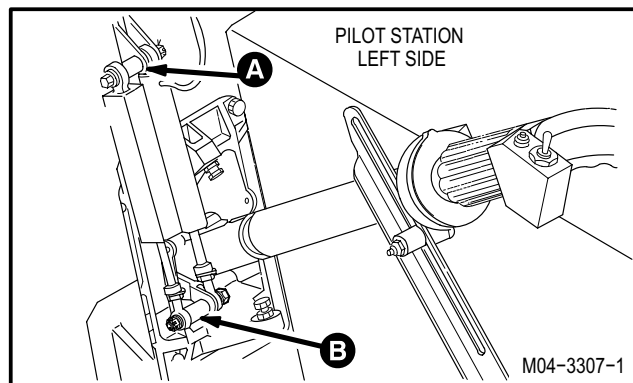
Washers (as required)

WARNING

Installation of a variable resistor that has not been EMI hardened in a BUCS-equipped aircraft may result in un-commanded flight control movement. This may cause loss of aircraft.

11.205.3. Removal

- a. Enter pilot station (para 1.56). Observe all safety precautions.
- b. On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.
- c. Detach variable resistor cable connector P1121 (1) from receptacle (A656) J1 (2).

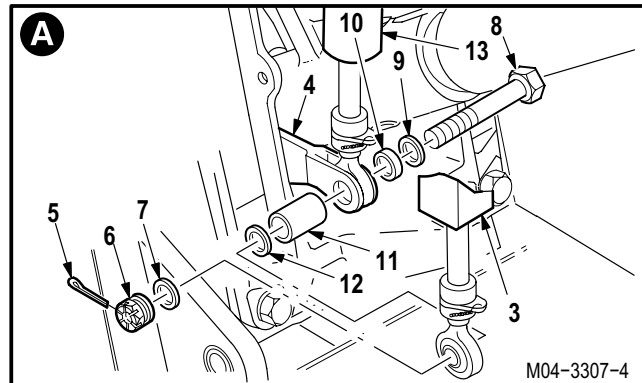


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11.205. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR REMOVAL/INSTALLATION – continued

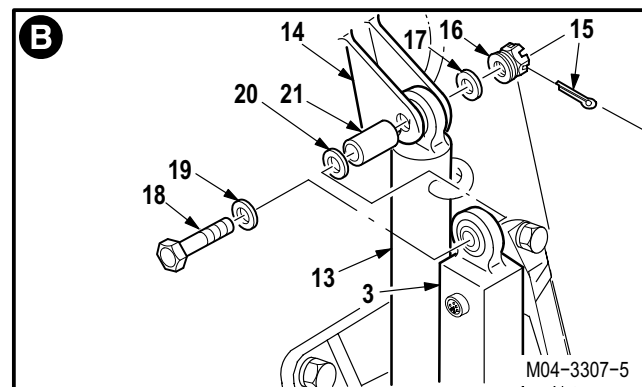
d. Remove variable resistor (3) from arm (4).

- (1) Remove and discard cotter pin (5).
- (2) Remove nut (6), washer (7), bolt (8), washer (9) (if installed) bushing (10), spacer (11), washer (12) (if installed), and resistor (3).
- (3) Slide bolt (8) back through washer (9), bushing (10), arm (4), LVDT (13), spacer (11), washer (12), washer (7), and nut (6).



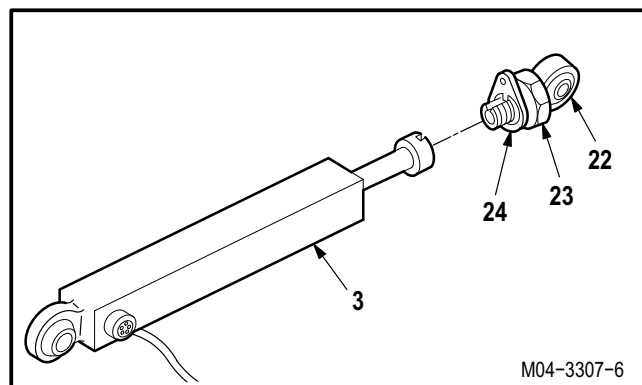
e. Remove resistor (3) from bracket (14).

- (1) Remove and discard cotter pin (15).
- (2) Remove nut (16), washer (17), bolt (18), washer (19) (if installed), resistor (3), washer (20) (if installed), spacer (21), and LVDT (13).
- (3) Slide bolt (18) back through washer (19), washer (20), spacer (21), bracket (14), LVDT (13), washer (17), and nut (16).



f. Remove rod end bearing (22) from resistor (3).

- (1) Remove lockwire from nut (23) and keywasher (24).
- (2) Hold rod end (22). Loosen nut (23).
- (3) Remove rod end (22), nut (23), and keywasher (24) from resistor (3).



11.205.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.205.5. Inspection

- a. **Check for cracked and broken wires.** None allowed.
- b. **Check removed and attaching parts for cracks.** None allowed.

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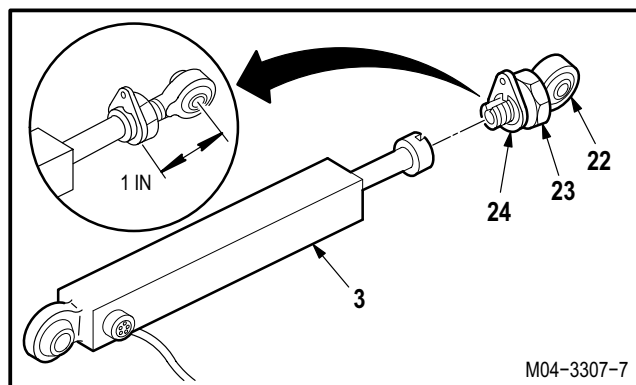
11.205. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR REMOVAL/INSTALLATION – continued

- c. **Check removed and attaching parts for damage** (para 11.190).
- d. **Check removed and attaching parts for corrosion** (para 1.49).
- e. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- f. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

11.205.6. Installation

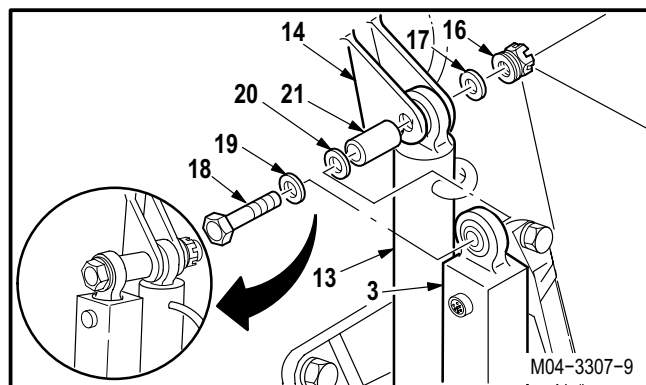
a. **Install rod end bearing (22) on resistor (3).**

- (1) Install rod end (22), nut (23), and key-washer (24) on resistor (3).
- (2) Adjust rod end (22) to **1 INCH** between center of hole in bearing and keywasher (24).
- (3) Tighten nut (23).



b. **Install resistor (3) on bracket (14).**

- (1) Remove nut (16), washer (17), bolt (18), washer (19) (if installed), washer (20) (if installed), and spacer (21) from bracket (14).
- (2) Aline resistor (3) with bracket (14).
- (3) Install bolt (18) through washer (19), resistor (3), washer (20), spacer (21), bracket (14), LVDT (13), washer (17), and nut (16).



NOTE

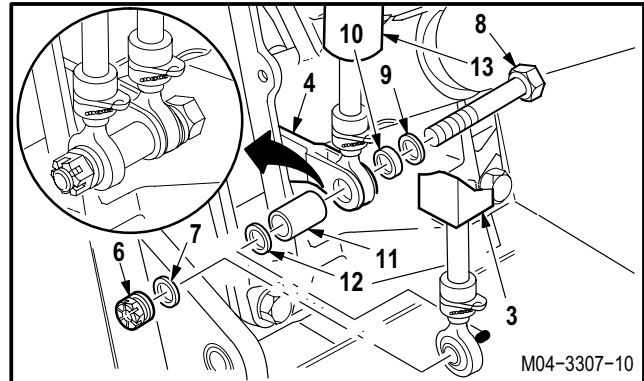
Torque procedures will be performed during pilot collective control position linear variable differential transducer (LDVT) installation.

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11.205. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR REMOVAL/INSTALLATION – continued

c. Install resistor (3) on arm (4).

- (1) Remove nut (6), washer (7), bolt (8), washer (9) (if installed), bushing (10), spacer (11), and washer (12) (if installed).
- (2) Aline resistor (3) with arm (4).
- (3) Install bolt (8) through washer (9), bushing (10), arm (4), LVDT (13), spacer (11), washer (12), resistor (3), washer (7), and nut (6).



NOTE

Torque procedures will be performed during pilot collective control position linear variable differential transducer (LVDT) installation.

d. Inspect (QA).

e. Perform pilot collective position linear variable differential transducer (LVDT) alignment (para 11.216).

f. Perform pilot collective control variable resistor adjustment (para 11.206).

g. Install pilot collective stick cover (para 11.44).

END OF TASK

11.206. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR ADJUSTMENT

11.206.1. Description

This task covers: Adjustment.

11.206.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
 Aircraft mechanic's tool kit (item 376, App H)
 Multimeter (item 215, App H)
 Rigging pin set (item 224, App H) (p/o item 390, App H)

Materials/Parts:

Cotter pin
 Wire (item 222, App F)

Personnel Required:

68X	Armament/Electrical System Repairer
67R	Attack Helicopter Repairer
67R3F	Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
1.72	External hydraulic power applied
2.2	Access panels LN4 and RN4 opened
11.44	Pilot collective stick cover removed

11.206.3. Adjustment



To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



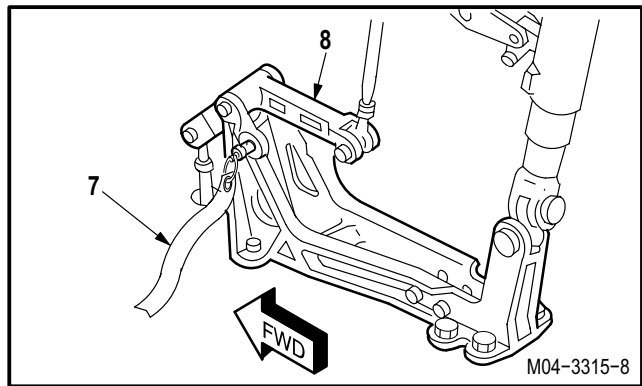
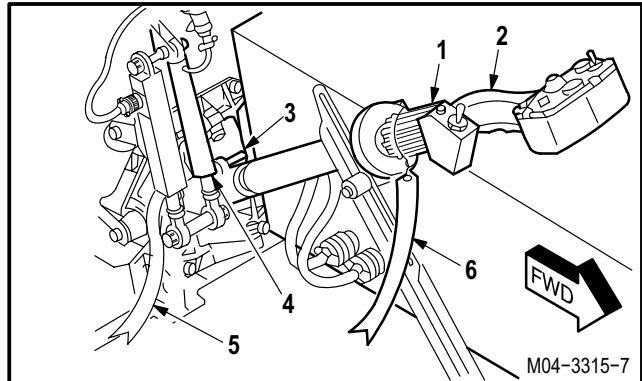
To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**

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11.206. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR ADJUSTMENT – continued

- c. Rotate friction lock (1) on pilot collective stick (2) to ZERO.
- d. Slowly move pilot collective stick (2) to align rig pin hole (3) with collective stick housing rig pin hole (4).
- e. Install -3 rig pin (5).
- f. Install collective stick warning flag (6) on pilot collective stick (2).
- g. Install -9 rig pin (7) in F.S. 165 bellcrank (8).



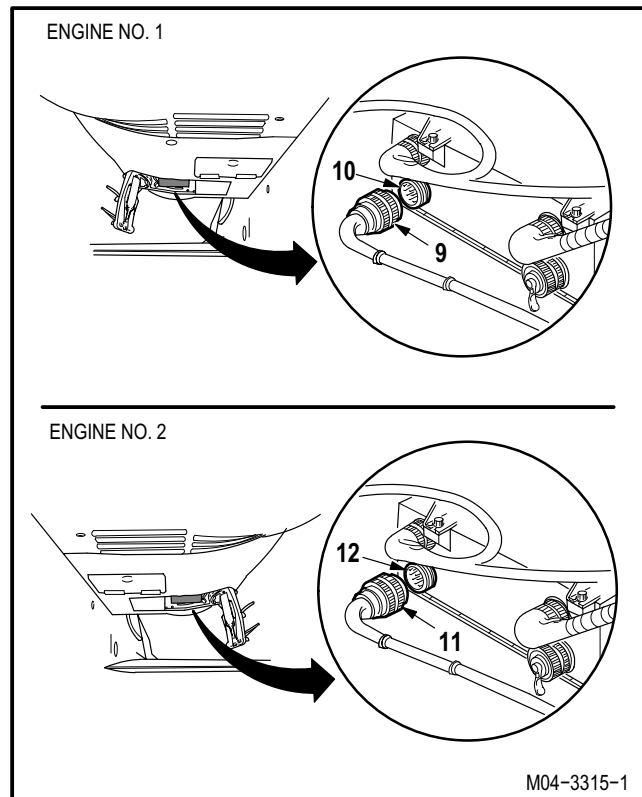
CAUTION

During adjustments of rod end locknut, restrain rod end to prevent damage to bearing race.

- h. Detach connector P41 (9) from No. 1 engine electronic control unit (ECU) receptacle E1 (10).
- i. Detach connector P42 (11) from No. 2 engine ECU receptacle E1 (12).
- j. Set multimeter to 20K OHMS. Use multimeter.
- k. Record resistance between pins 4 and 13 at connector P41 (9).
- l. Record resistance between pins 4 and 13 at connector P42 (11).
- m. To find peak resistance, add step k and step l resistances and divide by two.

NOTE

Peak resistance shall be **8.2K to 9.1K OHMS**. If peak resistance is not **8.2K to 9.1K OHMS**, go to step n, if peak resistance is **8.2K to 9.1K OHMS** go to step o.

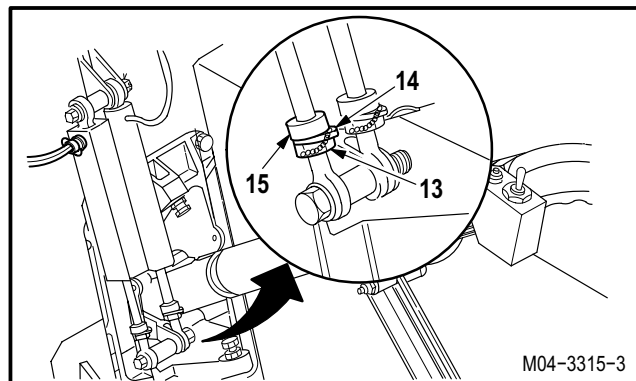


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11.206. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR ADJUSTMENT – continued

n. **Repeat steps k. through m. while observing multimeter.** Adjust resistor shaft (15) length to obtain **8.2K to 9.1 K OHMS**.

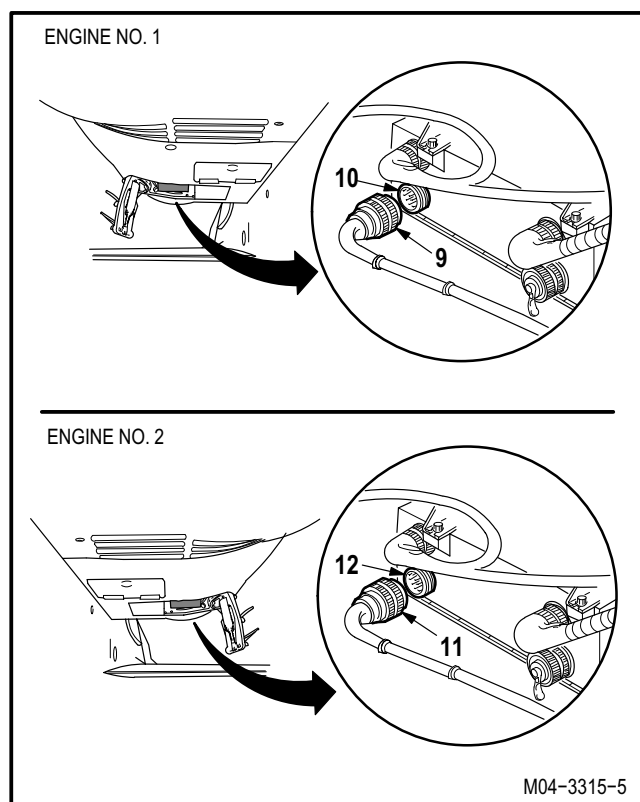
- (1) Loosen locknut (13) to free keywasher (14).
- (2) Adjust resistor shaft (15) length to obtain **8.2K to 9.1K OHMS**.
- (3) Tighten locknut (13), being careful not to disturb shaft (15) adjustment.
- (4) Verify peak resistance value found in step n.(2) is maintained ± 25 OHMS.
- (5) Lockwire locknut (13) to keywasher (14). Use wire (item 222, App F).



o. **Attach connector P41 (9) to receptacle E1 (10).**

p. **Attach connector P42 (11) to receptacle E1 (12).**

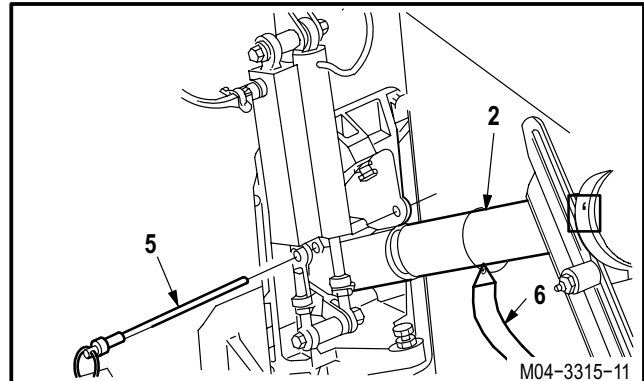
q. **Inspect (QA).**



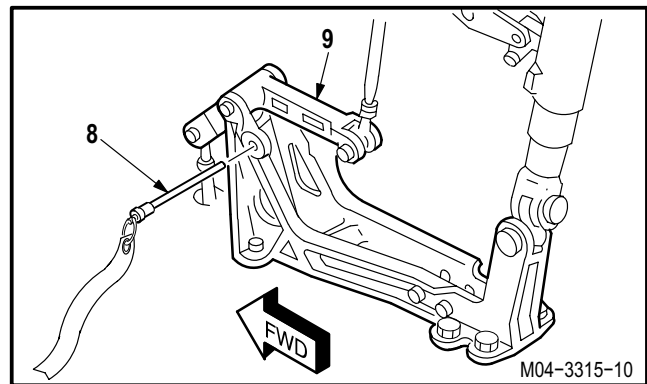
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11.206. PILOT COLLECTIVE CONTROL VARIABLE RESISTOR ADJUSTMENT – continued

- r. Remove collective -3 rig pin (5).
- s. Remove collective stick warning flag (6) from pilot collective stick (2).



- t. Remove -9 rig pin (8) from F.S. 165 bellcrank (9).
- u. Remove external hydraulic power (para 1.72).
- v. Install pilot collective stick cover (para 11.44).
- w. Secure access panels LN4 and RN4 (para 2.2).



END OF TASK

11.207. PILOT COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.207.1. Description

This task covers: Removal. Cleaning. Inspection.

11.207.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Electrical tool kit (item 378, App H)

References:

TM 55-1500-323-24

Equipment Conditions:

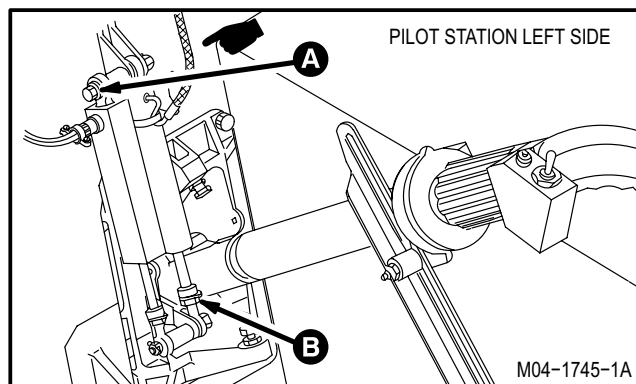
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.44	Pilot collective stick cover removed

Personnel Required:

67R	Attack Helicopter Repairer
68X	Armament/Electrical System Repairer

11.207.3. Removal

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**



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11.207. PILOT COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

c. Detach connector P230 (1) from receptacle J230 (2).

d. Detach connector P1121 (3) from receptacle (A656)J1 (4).

NOTE

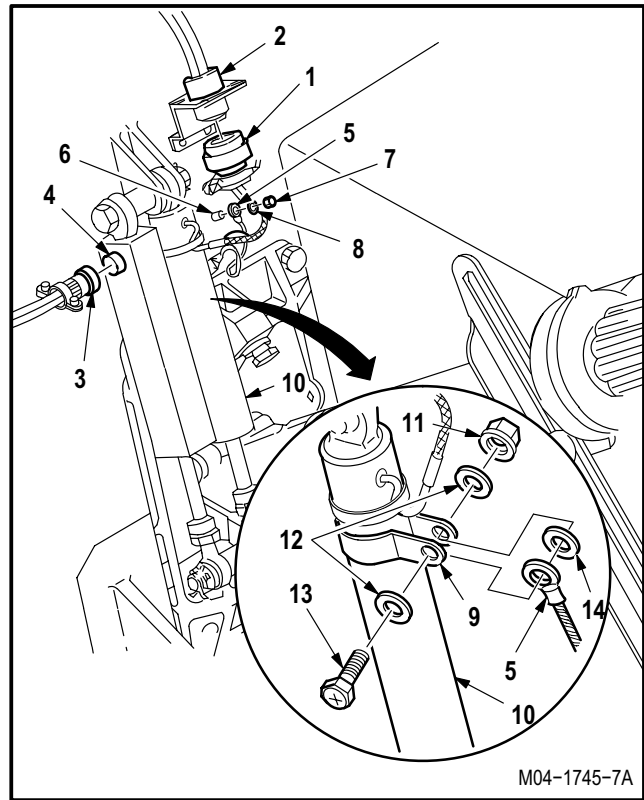
On BUCS-equipped aircraft, an electrical lead will be attached to LVDT.

e. Remove electrical lead (5) from ground stud (6).

- (1) Remove sealant.
- (2) Remove nut (7) and washer (8).
- (3) Remove lead (5) from stud (6).

f. Remove clamp (9) from LVDT (10).

- (1) Remove sealant.
- (2) Remove nut (11) and washer (12).
- (3) Remove bolt (13), washer (12), lead (5), and washer (14).
- (4) Remove clamp (9) from LVDT (10).



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11.207. PILOT COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

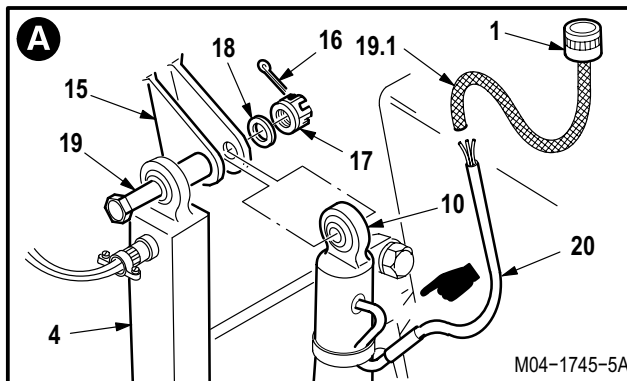
g. Remove LVDT (10) from bracket (15).

- (1) Remove and discard cotter pin (16).
- (2) Remove nut (17) and washer (18).
- (3) Slowly slide bolt (19) to clear bracket (15).

NOTE

Do not remove potentiometer.

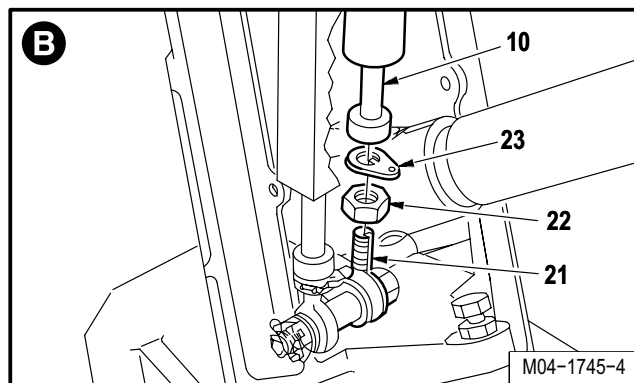
- (4) Remove LVDT (10).
- (5) Slide bolt (19) back through bracket (15).
- (6) Install washer (18) and nut (17) to hold potentiometer (4) in place.



h. Remove and retain connector (1) and braided shielding (19.1) from LVDT wire harness (20), if required (TM 55-1500-323-24).

i. Remove LVDT (10) from rod end (21).

- (1) Remove lockwire.
- (2) Loosen nut (22).
- (3) Remove LVDT (10) from rod end (21).
- (4) Remove keywasher (23).



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11.207. PILOT COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.207.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.207.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check bracket bushing for damage** (para 11.4).
- d. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- e. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

END OF TASK

11.208. PILOT COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION

nm

11.208.1. Description

This task covers: Installation.

11.208.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical tool kit (item 378, App H)
- Light duty laboratory apron (item 27, App H)
- Chemical protective gloves (item 154, App H)
- Adjustable air filtering respirator (item 262, App H)
- 0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Materials/Parts:

- Cotter pin (2)
- Washer (as required)
- Sealing compound (item 175, App F)
- Strap (item 193, App F)

Personnel Required:

- 67R Attack Helicopter Repairer
- 68X Armament/Electrical System Repairer
- 67R3F Attack Helicopter Repairer/Technical Inspector

References:

- TM 1-1520-238-T
- TM 55-1500-323-24

Equipment Conditions:

- | <u>Ref</u> | <u>Condition</u> |
|------------|------------------|
| 1.57 | Helicopter safed |

WARNING

Installation of an LVDT that has not been EMI hardened in a BUCS-equipped aircraft may result in uncommanded flight control movement. This may cause loss of aircraft.

CAUTION

To prevent FOD from attaching and sticking to the shaft, do not remove the position shaft from the LVDT body during installation.

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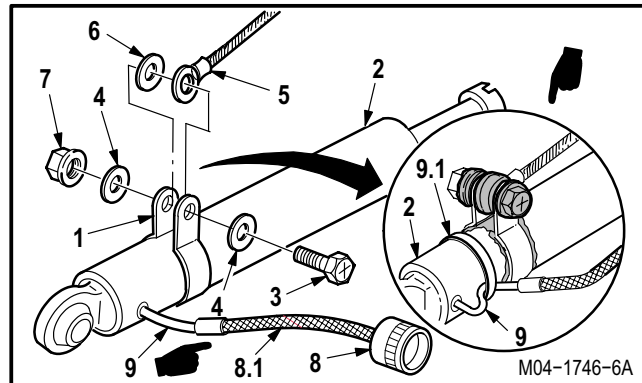
11.208. PILOT COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

11.208.3. Installation



a. Install clamp (1) on LVDT (2).

- (1) Position clamp (1) on LVDT (2).
- (2) Install bolt (3) through washer (4), one ear of clamp (1), electrical lead (5), washer (6), and other ear of clamp (1).
- (3) Install washer (4) and nut (7).
- (4) Apply sealing compound around clamp (1), bolt (3), washers (4), lead (5), washer (6), and nut (7). Use sealing compound (item 175, App F).



b. Install connector (8) and braided shielding (8.1) on LVDT wire harness (9), if required.

- (1) Cut wire harness (9) length to **10.0 INCHES**.
- (2) Install braided shielding (8.1) to wire harness (TM 55-1500-323-24). Start **2.0 INCHES** from LVDT (2) body.
- (3) Use Table 1 to install connector (8) on wire harness (9) (TM 55-1500-323-24).
- (4) Install braided shielding (8.1) on connector (8).
- (5) Secure wire harness (9) to LVDT (2) body.
 - (a) Create service loop on wire harness (9).
 - (b) Secure wire harness (9) with strap (9.1). Use strap (item 193, App F).

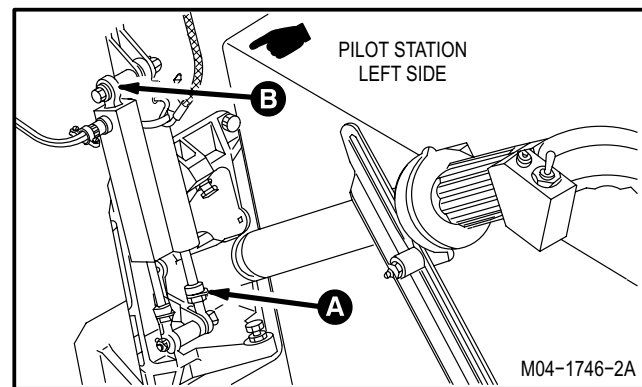


TABLE 1

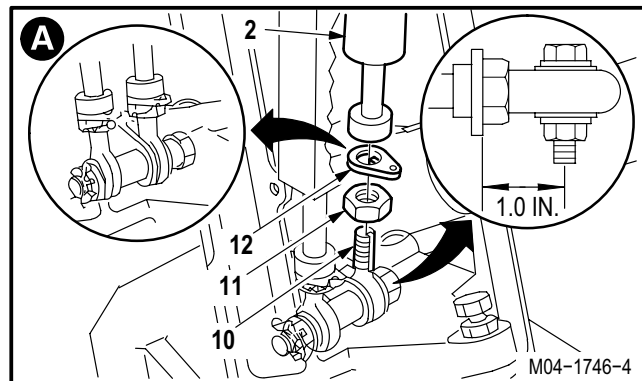
<u>LVDT WIRE HARNESS</u>	<u>CONNECTOR</u>
WHITE	PIN 1
BLUE	PIN 2
GREEN	PIN 3
ORANGE	PIN 4

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

d. Install LVDT (2) on rod end (10).

- (1) Install nut (11) and keywasher (12) on rod end (10).
- (2) Install LVDT (2) on rod end (10).
- (3) Measure **1.0 INCH** between center of rod end (10) and keywasher (12).
- (4) Tighten nut (11).



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11.208. PILOT COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

CAUTION

To prevent damage to self-retaining bolt, depress retention device fully when installing bolt.

e. Install LVDT (2) on bracket (13).

- (1) Remove nut (14) and washer (15).
- (2) Slowly slide bolt (16) to clear bracket (13).
- (3) Aline LVDT (2) with bracket (13).
- (4) Install bolt (16) through LVDT (2).

NOTE

Do not install cotter pin.

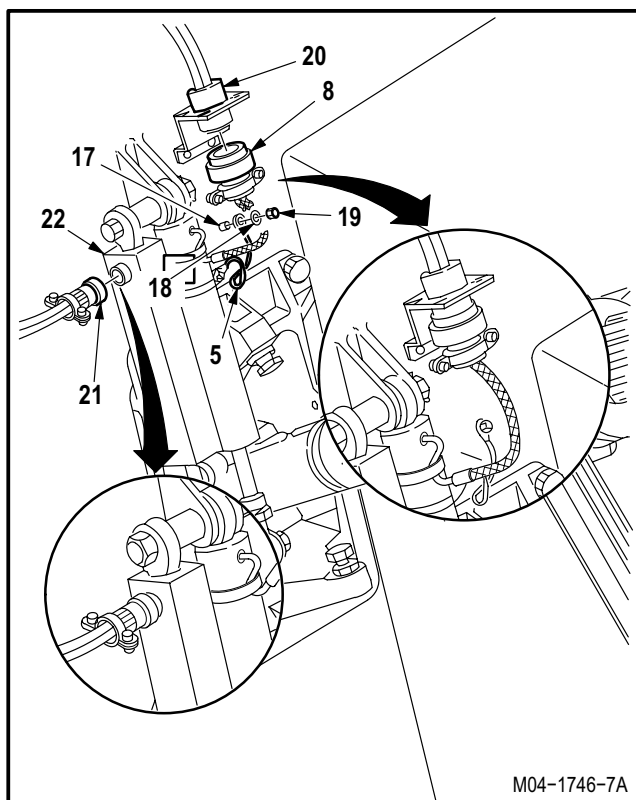
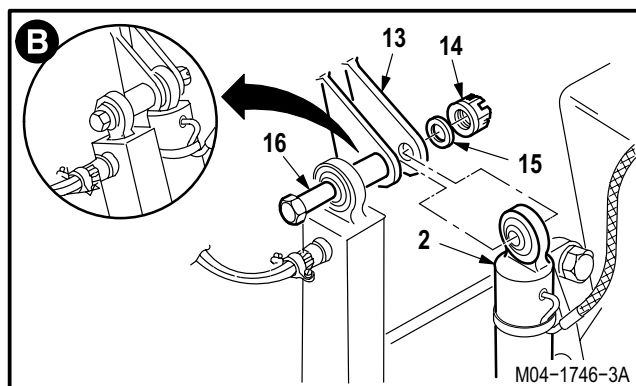
- (5) Install washer (15) and nut (14) finger-tight.

f. Install lead (5) on ground stud (17).

- (1) Position lead (5) on stud (17).
- (2) Install washer (18) and nut (19).
- (3) Apply sealing compound to nut (19), washer (18), and lead (5). Use sealing compound (item 175, App F).

g. Attach connector P230 (8) to receptacle J230 (20).

h. Attach connector P1121 (21) to receptacle (A656)J1 (22).



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11.208. PILOT COLLECTIVE CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

i. **Check alinement of potentiometer (22).** Torque two nuts (14) **14 to 18 INCH-POUNDS**.

- (1) Measure distance between inboard edge of support (23) and outboard side of potentiometer (24). Distance equals **0.09 INCH**.
- (2) Measure distance between inboard edge of support (23) and middle of potentiometer (25). Distance equals **0.59 INCH**.
- (3) If required measurements in steps (1) and (2) are obtained, go to step (6).
- (4) If measurements in steps (1) and (2) are not obtained, adjust washer stackups and re-perform step i.
- (5) Check fit of self-retaining bolt (16) (para 11.1).
- (6) Tighten nut (14). Torque nut (14) to **14 INCH-POUNDS**. Use torque wrench.
- (7) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS**.
- (8) Install new cotter pin (26).

j. **Install pilot collective stick -3 rig pin** (para 11.281).

k. **Adjust LVDT null** (para 11.216).

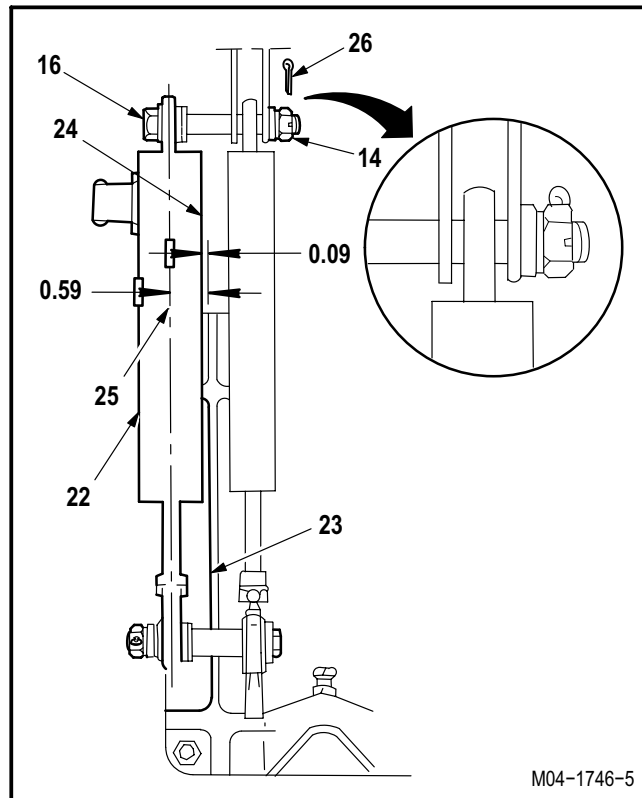
l. **Perform pilot collective control variable resistor adjustment** (para 11.206).

m. **Remove pilot collective stick -3 rig pin** (para 11.281).

n. **Inspect (QA).**

o. **Install pilot collective stick cover** (para 11.44).

p. **Perform collective flight control rigging maintenance operational check** (TM 1-1520-238-T).



END OF TASK

11.209. PILOT COLLECTIVE STICK POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) AND VARIABLE RESISTOR ROD END REPLACEMENT

11.209.1. Description

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

11.209.2. Initial Setup

Tools:

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

Personnel Required:

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

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
11.207	Pilot collective control position LVDT removed
11.205	Pilot collective control variable resistor removed

11.209.3. Removal

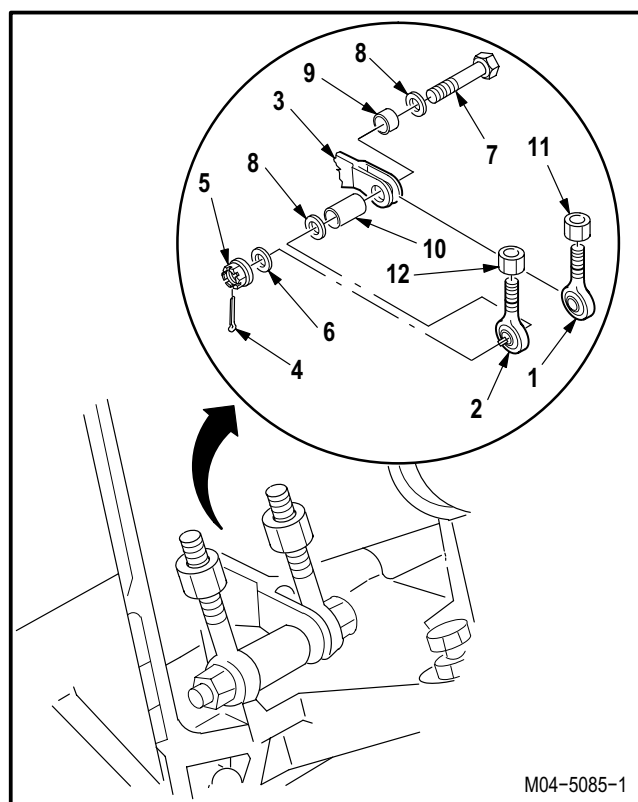
a. Remove LVDT rod end (1) and variable resistor rod end (2) from bracket (3).

- (1) Remove and discard cotter pin (4)
- (2) Remove nut (5) and washer (6).
- (3) Remove bolt (7), washers (8) (if installed), bushing (9), spacer (10) and washers (8) (if installed).
- (4) Remove rod ends (1) and (2).

b. Remove jam nuts (11) and (12) from rod ends (1) and (2).

11.209.4. Cleaning

a. Wipe removed and attaching parts with a clean rag.



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11.209. PILOT COLLECTIVE STICK POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) AND VARIABLE RESISTOR ROD END REPLACEMENT – continued

11.209.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

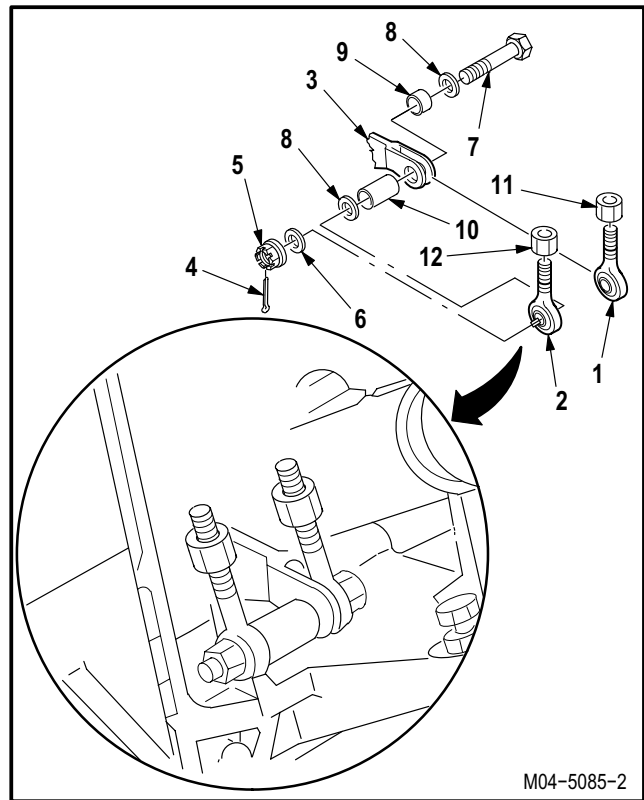
11.209.6. Installation

- a. **Install jam nuts (11) and (12) on rod ends (1) and (2).**
- b. **Install LVDT rod end bearing (1) and variable resistor rod end bearing (2) on bracket (3).**

- (1) Aline rod ends (1) and (2) with bracket (3).
- (2) Install bolt (7) through washers (8) (as required), bushing (9), bracket (3), rod end (1), spacer (10), washers (8) (as required), and rod end (2).
- (3) Check fit of self-retaining bolt (7) (para 11.1).
- (4) Install nut (5) and washer (6) on bolt (7).

NOTE

Torque procedures will be performed during pilot collective control position linear variable differential transducer (LDVT) installation.



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**11.209. PILOT COLLECTIVE STICK POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT)
AND VARIABLE RESISTOR ROD END REPLACEMENT – continued**

- c. **Inspect (QA).**
- d. **Install pilot collective variable resistor** (para 11.205).
- e. **Install pilot collective control position LVDT** (para 11.204).

END OF TASK

11.210. PILOT DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.210.1. Description

This task covers: Removal. Cleaning. Inspection.

11.210.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Electrical tool kit (item 378, App H)

References:

TM 9-1090-208-23
TM 55-1500-323-24

Equipment Conditions:

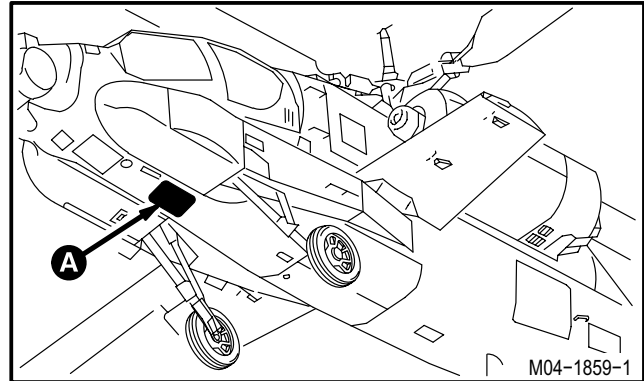
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
TM 9-1090-208-23	Area weapon, turret, and flex chute removed

Personnel Required:

67R Attack Helicopter Repairer
68X Armament/Electrical System Repairer

11.210.3. Removal

- a. **Enter pilot station (para 1.56). Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**



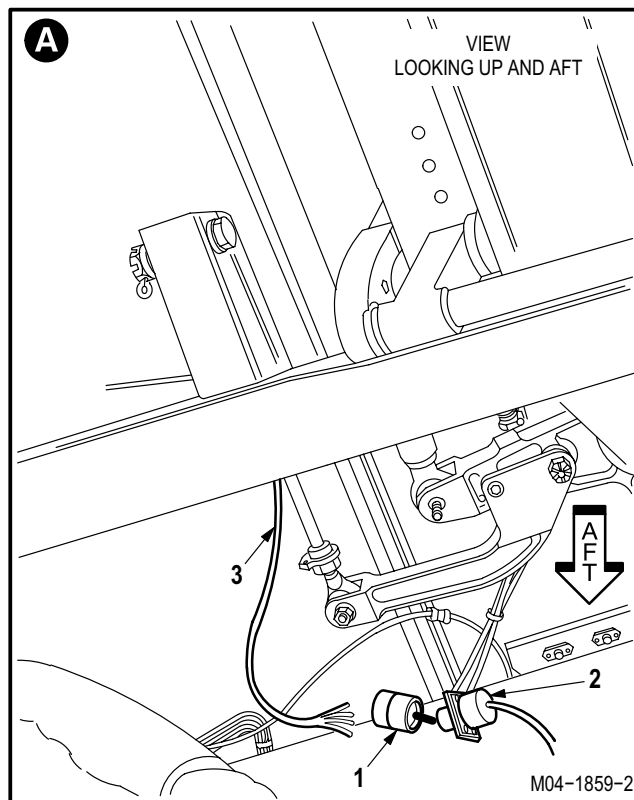
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11.210. PILOT DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

NOTE

On BUCS-equipped aircraft, an electrical lead will be attached to LVDT.

- c. **Detach connector P231 (1) from receptacle J231 (2).**
- d. **Remove connector (1) from LVDT wire harness (3), if required (TM 55-1500-323-24).**

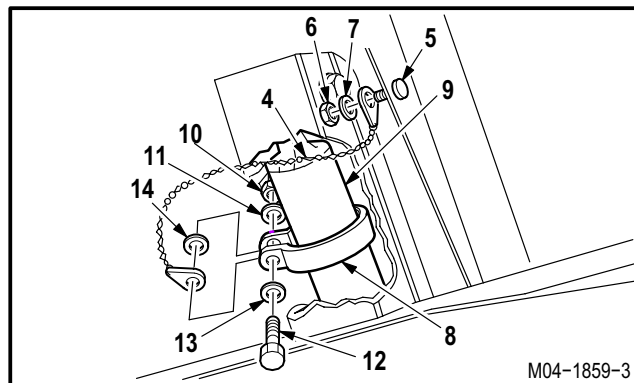


- e. **Remove electrical lead (4) from ground stud (5).**

- (1) Remove nut (6) and washer (7).
- (2) Remove lead (4) from stud (5).

- f. **Remove clamp (8) from LVDT (9).**

- (1) Remove nut (10) and washer (11).
- (2) Remove bolt (12), washer (13), lead (4), and washer (14).
- (3) Remove clamp (8) from LVDT (9).



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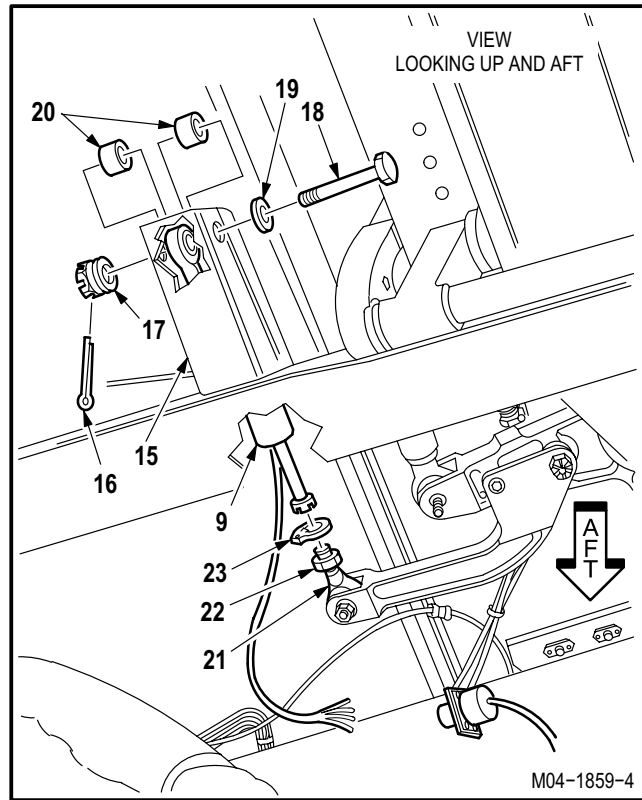
11.210. PILOT DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

g. Remove LVDT (9) from bracket (15).

- (1) Remove and discard cotter pin (16).
- (2) Remove nut (17).
- (3) Remove bolt (18), washer (19), and two bushings (20).

h. Remove LVDT (9) from rod end (21).

- (1) Remove lockwire.
- (2) Loosen nut (22).
- (3) Remove LVDT (9) from rod end (21).
- (4) Remove keywasher (23).



11.210.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.210.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

END OF TASK

11.211. PILOT DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION

11.211.1. Description

This task covers: Installation.

11.211.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Electrical tool kit (item 378, App H)
 0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Personnel Required:

67R Attack Helicopter Repairer
 68X Armament/Electrical System Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T
 TM 9-1090-208-23
 TM 55-1500-323-24

Materials/Parts:

Cotter pin
 Wire (item 222, App F)

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

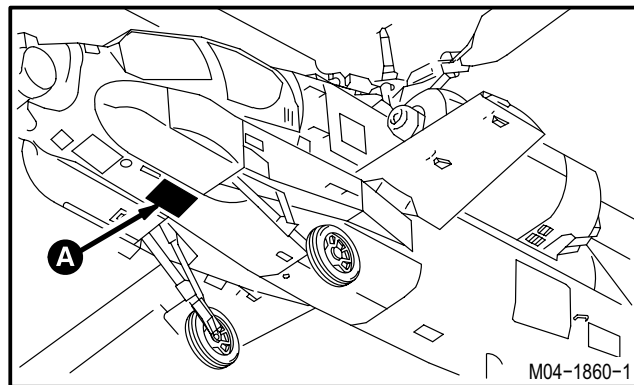
11.211.3. Installation

WARNING

Installation of an LVDT that has not been EMI hardened in a BUCS-equipped aircraft may result in un-commanded flight control movement. This may cause loss of aircraft.

CAUTION

To prevent FOD from attaching and sticking to the shaft, do not remove the position shaft from the LVDT body during installation.

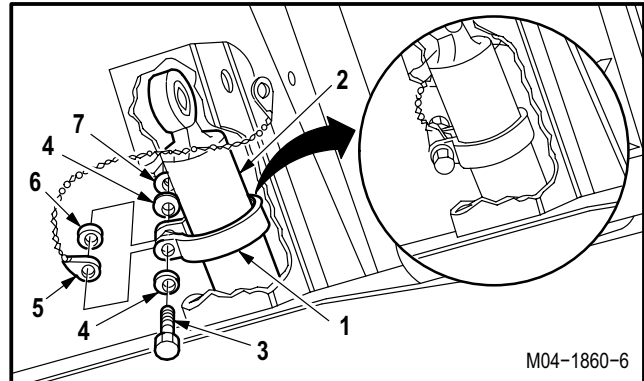


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11.211. PILOT DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

a. Install clamp (1) on LVDT (2).

- (1) Position clamp (1) on LVDT (2).
- (2) Install bolt (3) through washer (4), one ear of clamp (1), electrical lead (5), washer (6), and other ear of clamp (1).
- (3) Install washer (4) and nut (7).



b. Install connector (8) on LVDT wire harness (9), if required.

- (1) Cut wire harness (9) length to **19.0 INCHES**.
- (2) Use Table 1 to install connector (8) on wire harness (9) (TM 55-1500-323-24).

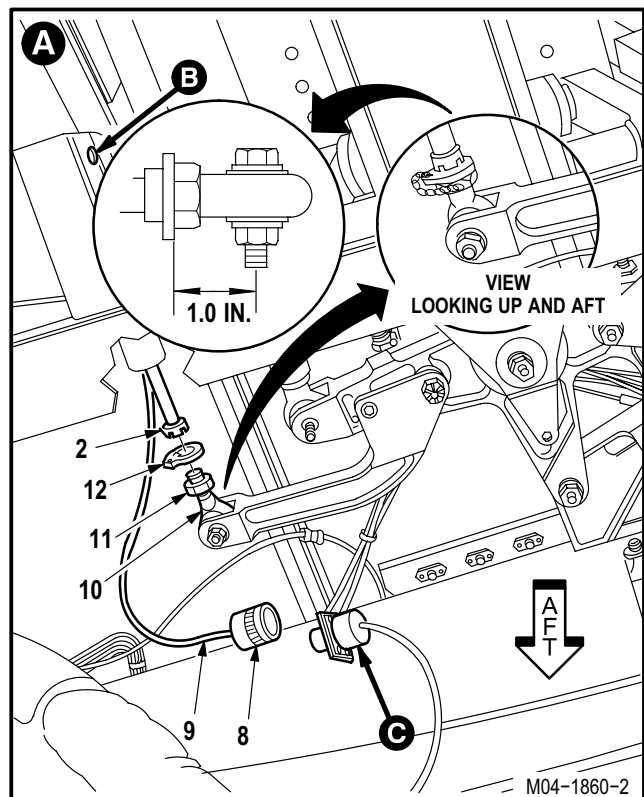
TABLE 1

<u>LVDT WIRE HARNESS</u>	<u>CONNECTOR</u>
WHITE	PIN 1
BLUE	PIN 2
GREEN	PIN 3
ORANGE	PIN 4

M04-1860-7

c. Install LVDT (2) on rod end (10).

- (1) Install nut (11) and keywasher (12) on rod end (10).
- (2) Install LVDT (2) on rod end (10).
- (3) Measure **1.0 INCH** between center of rod end (10) and keywasher (12).
- (4) Tighten nut (11).
- (5) Lockwire keywasher (12) to nut (11). Use wire (item 222, App F).

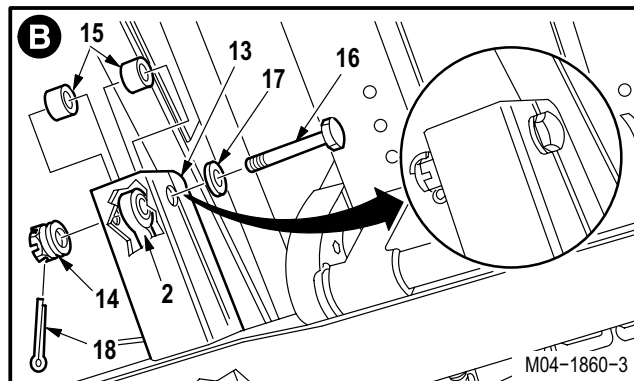


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11.211. PILOT DIRECTIONAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

d. **Install LVDT (2) on bracket (13).** Torque nut (14) **14 to 18 INCH-POUNDS.**

- (1) Aline LVDT (2) with bracket (13).
- (2) Install two bushings (15).
- (3) Install bolt (16) through washer (17), bracket (13), bushing (15), LVDT (2), bushing (15), and other side of bracket (13).
- (4) Check fit of self-retaining bolt (16) (para 11.1).
- (5) Install nut (14). Torque nut (14) to **14 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS.**
- (7) Install new cotter pin (18).



e. **Install pilot directional SPAD -9 rig pin** (para 11.293).

f. **Attach connector P231 (8) to receptacle J231 (19).**

g. **Install lead (5) on ground stud (20).**

- (1) Position lead (5) on stud (20).
- (2) Install washer (21) and nut (22).

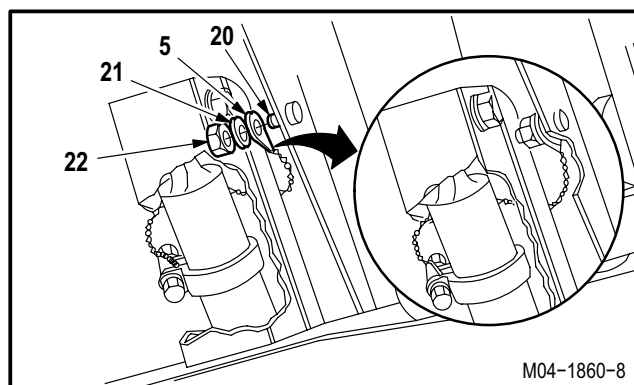
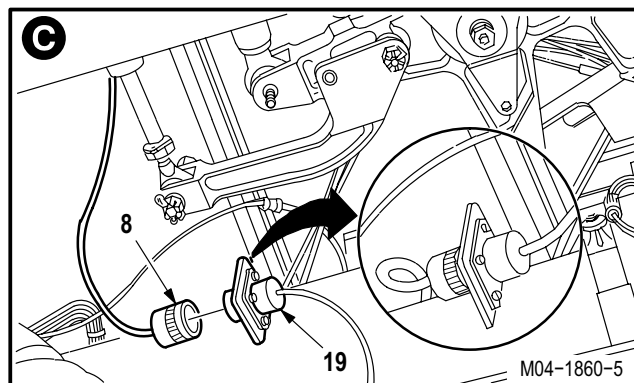
h. **Adjust LVDT null** (para 11.216).

i. **Remove pilot directional SPAD -9 rig pin** (para 11.293).

j. **Inspect (QA).**

k. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).

l. **Install flex chute, turret, and area weapon** (TM 9-1090-208-23).



END OF TASK

11.212. PILOT LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.212.1. Description

This task covers: Removal. Cleaning. Inspection.

11.212.2. Initial Setup

Tools:

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

References:

TM 55-1500-323-24

Equipment Conditions:

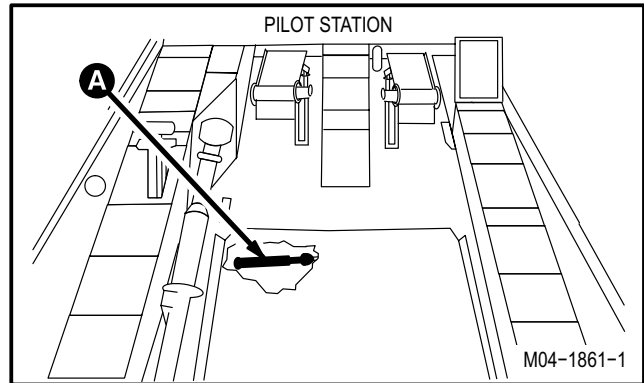
Ref	Condition
1.57	Helicopter safed
11.54	Pilot cyclic stick housing removed

Personnel Required:

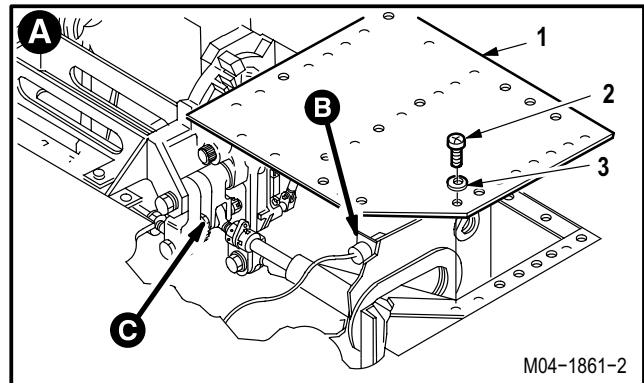
67R Attack Helicopter Repairer

11.212.3. Removal

- a. **Enter pilot station (para 1.56). Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**



- c. **Remove access cover (1).**
(1) Remove 33 screws (2) and washers (3).



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11.212. PILOT LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

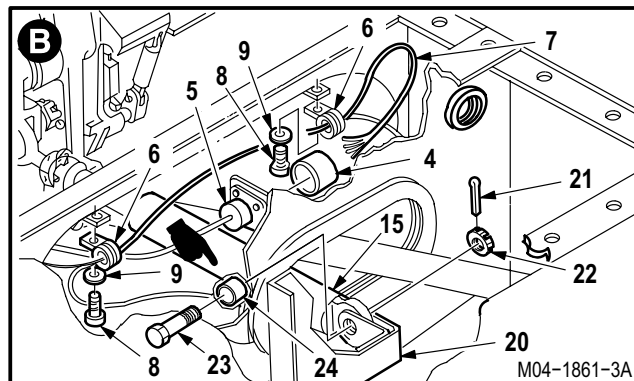
d. **Detach connector P233 (4) from receptacle J233 (5).**

e. **Remove two clamps (6) from LVDT wire harness (7).**

(1) Remove two screws (8) and washers (9) from clamps (6).

(2) Remove two clamps (6) from wire harness (7).

f. **Remove connector (4) from wire harness (7), if required (TM 55-1500-323-24).**



NOTE

On BUCS-equipped aircraft, an electrical lead will be attached to LVDT.

g. **Remove electrical lead (10) from ground stud (11).**

(1) Remove nut (12) and washer (13).

(2) Remove lead (10) from stud (11).

h. **Remove clamp (14) from LVDT (15).**

(1) Remove nut (16) and washer (17).

(2) Remove bolt (18), washer (17), lead (10), and washer (17).

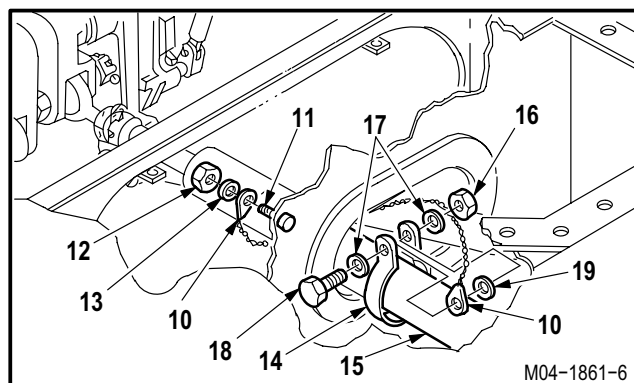
(3) Remove clamp (14) from LVDT (15).

i. **Remove LVDT (15) from bracket (20).**

(1) Remove and discard cotter pin (21).

(2) Remove nut (22).

(3) Remove bolt (23) and bushing (24).

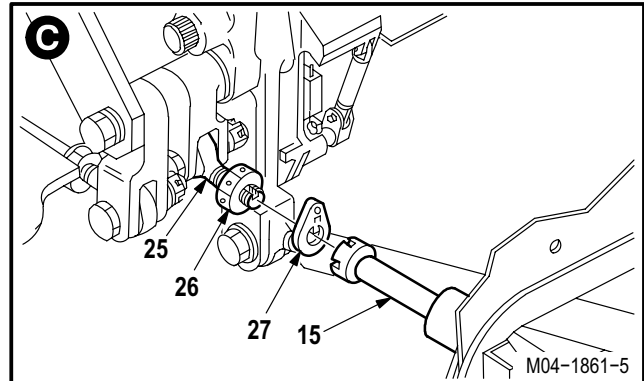


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11.212. PILOT LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

j. Remove LVDT (15) from rod end (25).

- (1) Remove lockwire.
- (2) Loosen nut (26).
- (3) Remove LVDT (15) from rod end (25).
- (4) Remove keywasher (27).



11.212.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.212.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

END OF TASK

11.213. PILOT LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION

11.213.1. Description

This task covers: Installation.

11.213.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Electrical tool kit (item 378, App H)
 0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

References:

TM 1-1520-238-T
 TM 55-1500-323-24

Materials/Parts:

Cotter pin
 Wire (item 222, App F)

Personnel Required:

67R Attack Helicopter Repairer
 68X Armament/Electrical System Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

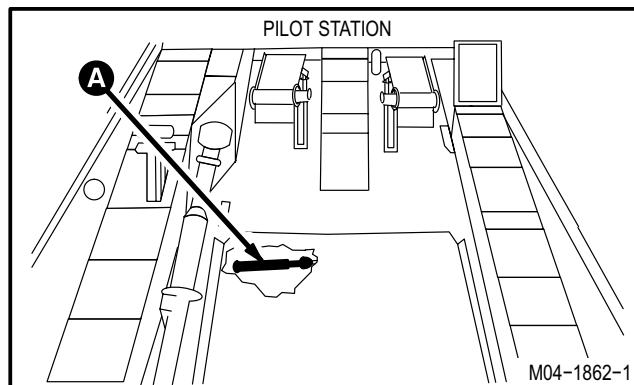
Ref	Condition
1.57	Helicopter safed

WARNING

Installation of an LVDT that has not been EMI hardened in a BUCS-equipped aircraft may result in un-commanded flight control movement. This may cause loss of aircraft.

CAUTION

To prevent FOD from attaching and sticking to the shaft, do not remove the position shaft from the LVDT body during installation.



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11.213. PILOT LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

11.213.3. Installation

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

b. **Install clamp (1) on LVDT (2).**

- (1) Position clamp (1) on LVDT (2).
- (2) Install bolt (3) through washer (4), one ear of clamp (1), electrical lead (5), washer (6), and other ear of clamp (1).
- (3) Install washer (4) and nut (7).

c. **Install connector (8) on LVDT wire harness (9), if required.**

- (1) Cut wire harness (9) length to **15.5 INCHES**.
- (2) Use Table 1 to install connector (8) on wire harness (9) (TM 55-1500-323-24).

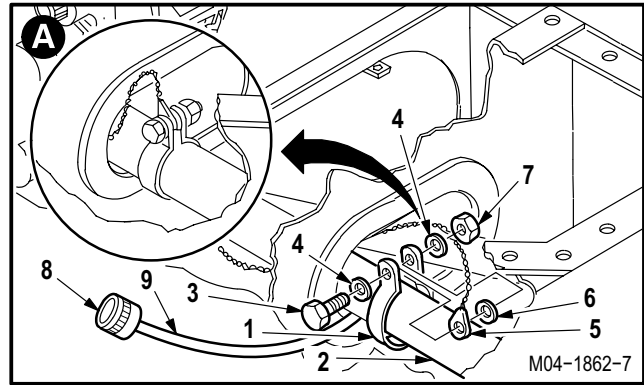


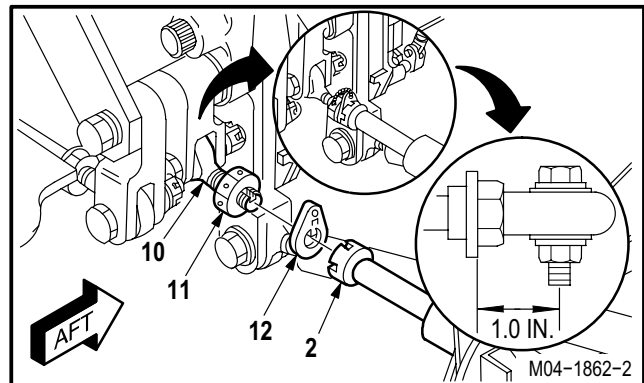
TABLE 1

<u>LVDT WIRE HARNESS</u>	<u>CONNECTOR</u>
WHITE	PIN 1
BLUE	PIN 2
GREEN	PIN 3
ORANGE	PIN 4

M04-1862-8

d. **Install LVDT (2) on rod end (10).**

- (1) Install nut (11) and keywasher (12) on rod end (10).
- (2) Install LVDT (2) on rod end (10).
- (3) Measure **1.0 INCH** between center of rod end (10) and keywasher (12).
- (4) Tighten nut (11).
- (5) Lockwire keywasher (12) to nut (11). Use wire (item 222, App F).

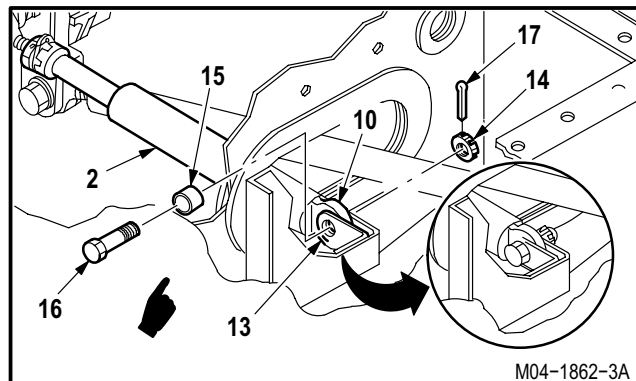


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11.213. PILOT LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

e. **Install LVDT (2) on bracket (13).** Torque nut (14) **14 to 18 INCH-POUNDS.**

- (1) Aline LVDT (2) with bracket (13).
- (2) Install bushing (15) in bracket (13).
- (3) Install bolt (16) through bushing (15), rod end (10), and bracket (13).
- (4) Check fit of self-retaining bolt (16) (para 11.1).
- (5) Install nut (14). Torque nut (14) to **14 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS.**
- (7) Install new cotter pin (17).



f. **Install pilot cyclic stick -5 rig pin (para 11.289).**

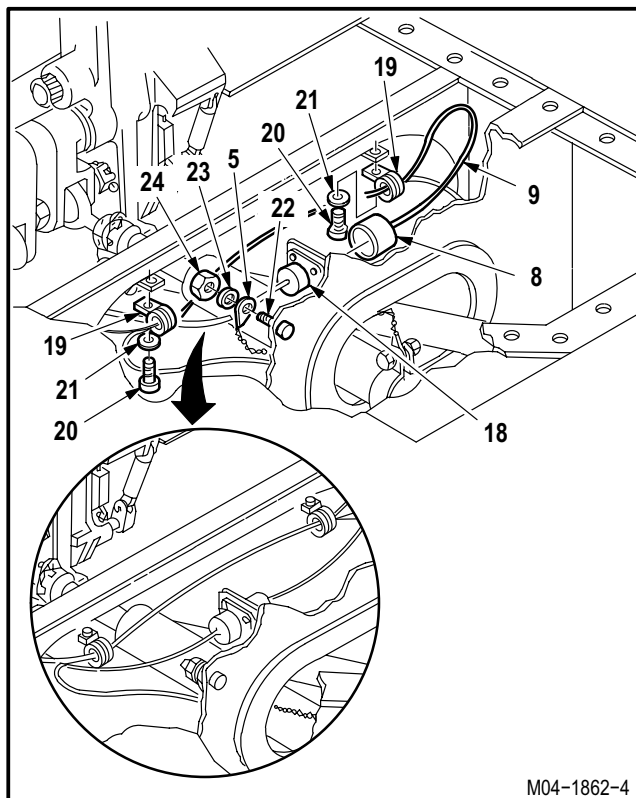
g. **Attach connector P233 (8) to receptacle J233 (18).**

h. **Install two clamps (19) on wire harness (9).**

- (1) Install two screws (20) through washers (21) and clamps (19).

i. **Install lead (5) on ground stud (22).**

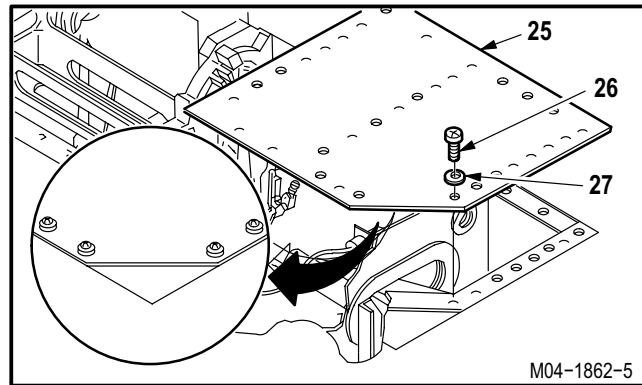
- (1) Install washer (23) and nut (24).



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**11.213. PILOT LATERAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT)
INSTALLATION – continued**

- j. **Adjust LVDT null** (para 11.216).
- k. **Remove pilot cyclic stick -5 rig pin** (para 11.289).
- l. **Inspect (QA).**
- m. **Perform lateral flight control rigging maintenance operational check** (TM 1-1520-238-T).
- n. **Install access cover (25).**
 - (1) Install 33 screws (26) and washers (27).
- o. **Install pilot cyclic stick housing** (para 11.55).



END OF TASK

11.214. PILOT LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL

11.214.1. Description

This task covers: Removal. Cleaning. Inspection.

11.214.2. Initial Setup

Tools:

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

References:

TM 55-1500-323-24

Equipment Conditions:

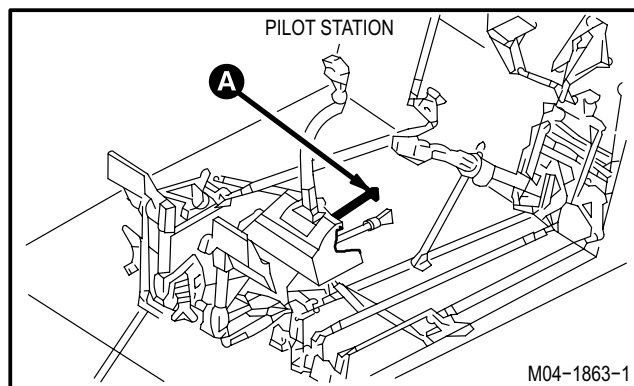
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.161	Pilot seat removed
11.46	Pilot cyclic stick cover removed

Personnel Required:

67R Attack Helicopter Repairer

11.214.3. Removal

- a. **Enter pilot station (para 1.56). Observe all safety precautions.**
- b. **On pilot center circuit breaker panel, open ASE AC, DC, and BUCS circuit breakers.**

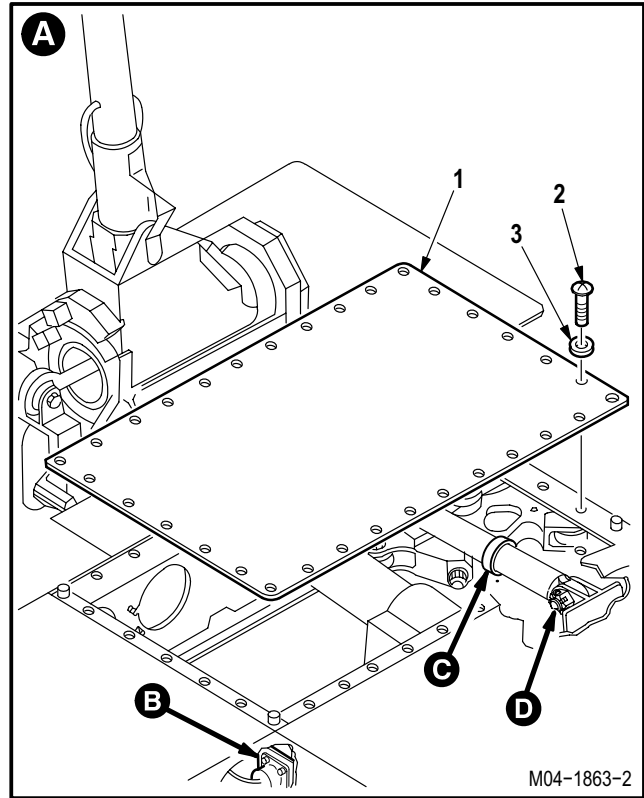


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11.214. PILOT LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

c. Remove access cover (1).

- (1) Remove 28 screws (2) and washers (3).

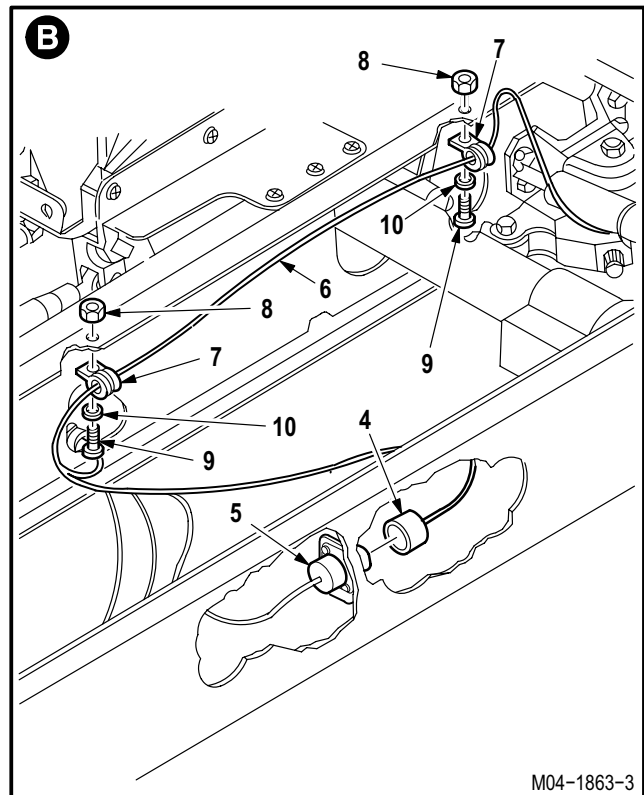


d. Detach connector P232 (4) from receptacle J232 (5).

e. Remove connector (4) from LVDT wire harness (6), if required (TM 55-1500-323-24).

f. Remove two clamps (7) from wire harness (6).

- (1) Remove two nuts (8), screws (9), and washers (10) from clamps (7).
- (2) Remove two clamps (7) from wire harness (6).



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11.214. PILOT LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

NOTE

On BUCS-equipped aircraft, an electrical lead will be attached to LVDT.

g. Remove electrical lead (11) from ground stud (12).

- (1) Remove nut (13) and washer (14).

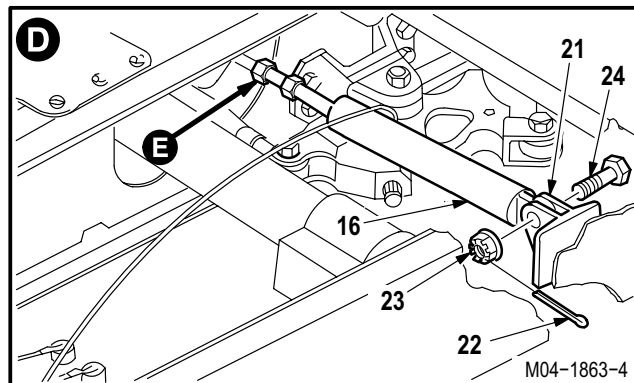
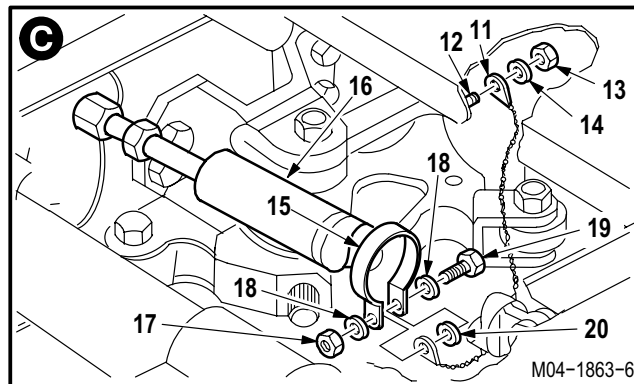
h. Remove clamp (15) from LVDT (16).

- (1) Remove nut (17) and washer (18).
 (2) Remove bolt (19), washer (18), lead (11), and washer (20).

- (3) Remove clamp (15) from LVDT (16).

i. Remove LVDT (16) from bracket (21).

- (1) Remove and discard cotter pin (22).
 (2) Remove nut (23).
 (3) Remove bolt (24).

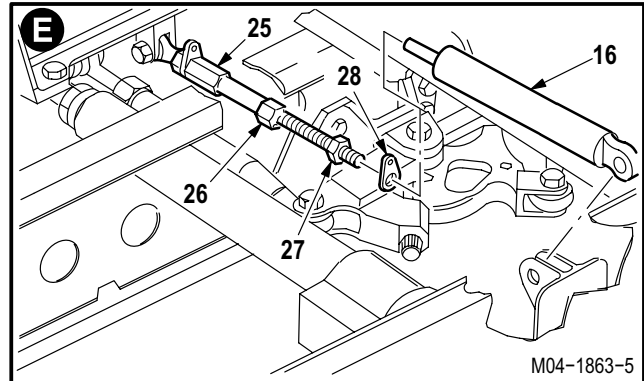


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11.214. PILOT LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) REMOVAL – continued

j. Remove LVDT (16) from extension (25).

- (1) Remove lockwire.
- (2) Hold extension (25) at wrench flats (26).
- (3) Loosen nut (27).
- (4) Remove LVDT (16) from extension (25).
- (5) Remove keywasher (28).



11.214.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.214.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.5).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.5).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

END OF TASK

11.215. PILOT LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION

11.215.1. Description

This task covers: Installation.

11.215.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Electrical tool kit (item 378, App H)
 0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Personnel Required:

67R Attack Helicopter Repairer
 68X Armament/Electrical System Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T
 TM 55-1500-323-24

Materials/Parts:

Cotter pin
 Wire (item 222, App F)

Equipment Conditions:

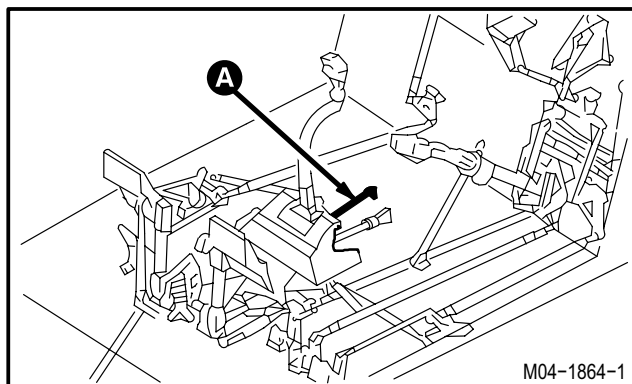
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

WARNING

Installation of an LVDT that has not been EMI hardened in a BUCS-equipped aircraft may result in un-commanded flight control movement. This may cause loss of aircraft.

CAUTION

To prevent FOD from attaching and sticking to the shaft, do not remove the position shaft from the LVDT body during installation.



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11.215. PILOT LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

11.215.3. Installation

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

b. **Install clamp (1) on LVDT (2).**

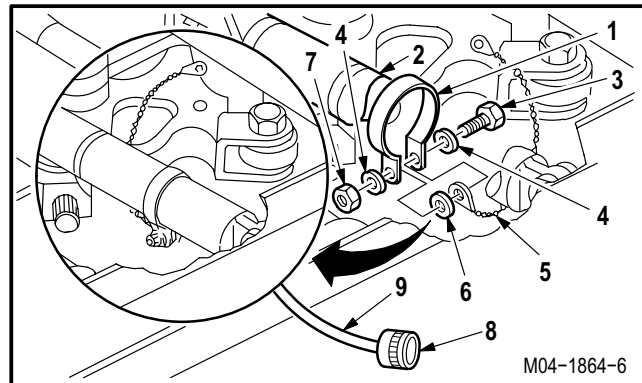
- (1) Position clamp (1) on LVDT (2).
- (2) Install bolt (3) through washer (4), one ear of clamp (1), electrical lead (5), washer (6), and other ear of clamp (1).
- (3) Install washer (4) and nut (7).

c. **Install connector (8) on LVDT wire harness (9), if required.**

- (1) Cut wire harness (9) length to **15.5 INCHES**.
- (2) Use Table 1 to install connector (8) on wire harness (9) (TM 55-1500-323-24).

d. **Install LVDT (2) on extension (10).**

- (1) Position nut (11) and keywasher (12) on extension (10).
- (2) Install LVDT (2) on extension (10).
- (2.1) Remove lockwire from nut (13.1). Loosen nut (13.1).
- (3) Adjust LVDT (2) until aft face of keywasher (13.2) is **1.00 INCH** from center of rod end bolt (13.3).
- (3.1) Adjust LVDT (2) until forward end of extension (10) is **5.08 ±0.02 INCHES** from aft face of keywasher (12).
- (4) Hold extension (10) at wrench flats (13).
- (5) Tighten nuts (11) and (13.1).
- (6) Lockwire nut (11) to keywasher (12) and nut (13.1) to keywasher (13.2). Use wire (item 222, App F).

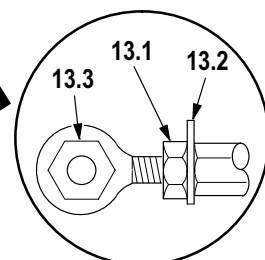
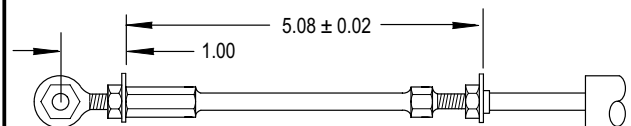
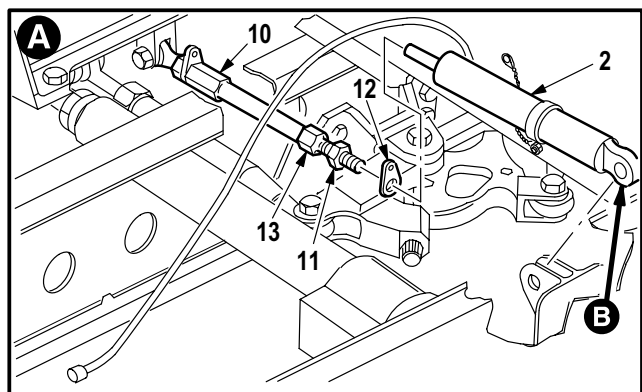


M04-1864-6

TABLE 1

LVDT WIRE HARNESS	CONNECTOR
WHITE	PIN 1
BLUE	PIN 2
GREEN	PIN 3
ORANGE	PIN 4

M04-1864-7



M04-1864-2A

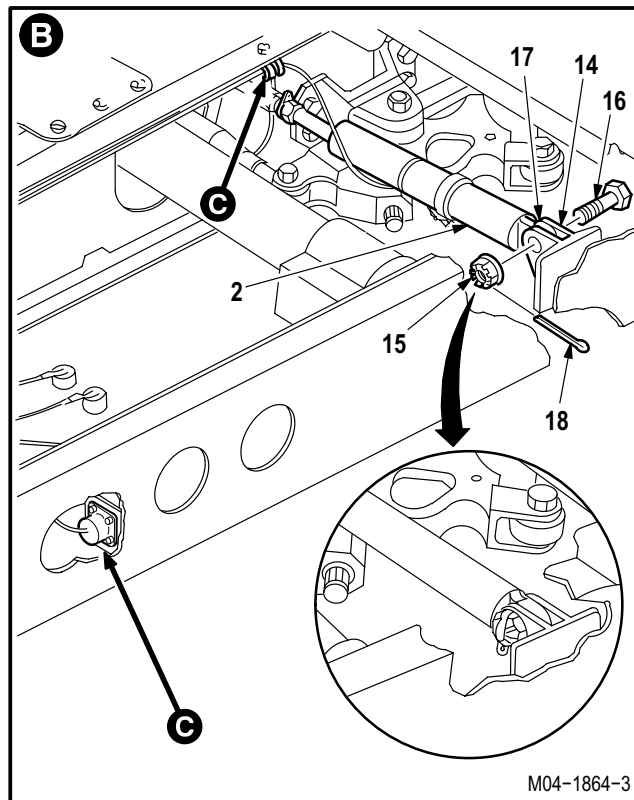
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11.215. PILOT LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

e. **Install LVDT (2) on bracket (14). Torque nut (15) 14 to 18 INCH-POUNDS.**

- (1) Aline LVDT (2) with bracket (14).
- (2) Install bolt (16) through bracket (14) and rod end (17) on LVDT (2).
- (3) Check fit of self-retaining bolt (16) (para 11.1).
- (4) Install nut (15). Torque nut (15) to **14 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **18 INCH-POUNDS**.
- (6) Install new cotter pin (18).

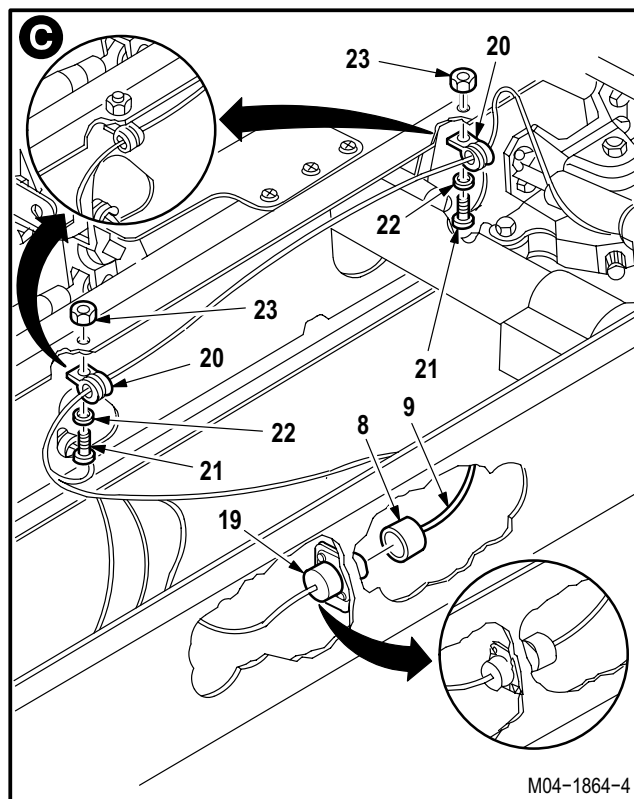
f. **Install pilot cyclic stick -9 rig pin (para 11.285).**



g. **Attach connector P232 (8) to receptacle J232 (19).**

h. **Install two clamps (20) on wire harness (9).**

- (1) Install two screws (21) through washers (22) and clamps (20).
- (2) Install two nuts (23).



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11.215. PILOT LONGITUDINAL CONTROL POSITION LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) INSTALLATION – continued

i. Install lead (5) on ground stud (24).

- (1) Position lead (5) on stud (24).
- (2) Install washer (25) and nut (26).

j. Adjust LVDT null (para 11.216).

k. Remove pilot cyclic stick -9 rig pin (para 11.285).

l. Inspect (QA).

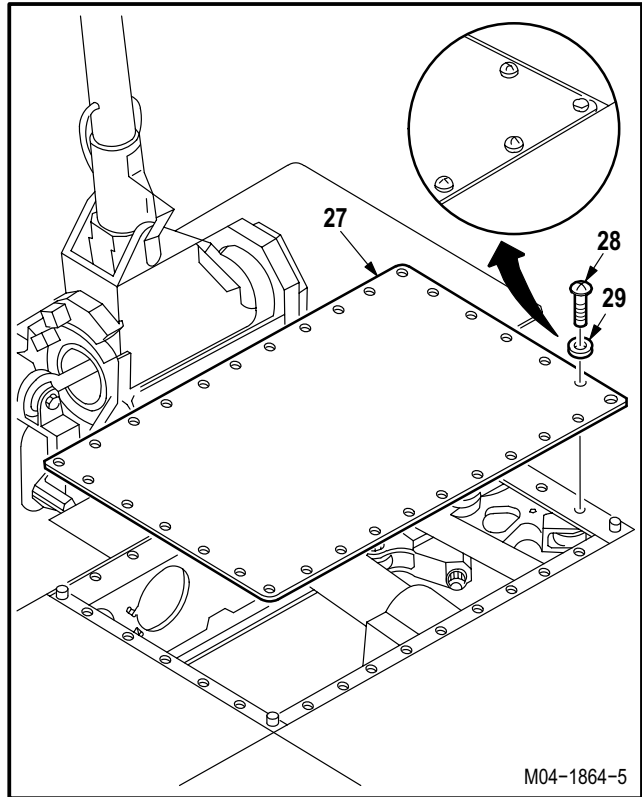
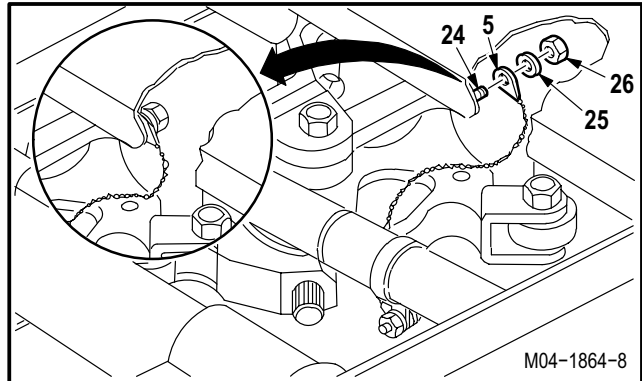
m. Perform longitudinal flight control rigging maintenance operational check (TM 1-1520-238-T).

n. Install access panel (27).

- (1) Install 28 washers (29) and screws (28).

o. Install pilot seat (para 2.161).

p. Install pilot cyclic stick cover (para 11.46).



END OF TASK

11.216. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT

11.216.1. Description

This task covers: Adjustment.

11.216.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
 Multimeter (item 215, App H)
 Aircraft power unit (item 232, App H)
 Flight control rigging kit (item 267, App H)
 0 - 75 inch-pound 1/4-inch drive dial indicator torque wrench (item 446, App H)

Materials/Parts:

Wire (item 222, App F)

Personnel Required:

68X Armament/Electrical System Repairer
 68X3F Armament/Electrical System Repairer/
 Technical Inspector

References:

TM 1-1520-238-T
 TM 55-1500-323-24

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
1.70	External electrical power applied
TM 1-1520-238-T	Flight controls rigging operational check for desired system performed
1.72	External primary hydraulic power connected

11.216.3. Adjustment

- a. **Apply external primary hydraulic power** (para 1.72).
- b. **Install rig pins as required.**
 - (1) To adjust collective LVDT; install rig pins (TM 1-1520-238-T).
 - (2) Adjust longitudinal LVDT; install rig pins (TM 1-1520-238-T).
 - (3) Adjust lateral LVDT; install rig pins (TM 1-1520-238-T).
 - (4) Adjust directional LVDT; install rig pins (TM 1-1520-238-T).
- c. **Remove external primary hydraulic power** (para 1.72).
- d. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- e. **Open ASE DC circuit breaker on pilot center circuit breaker panel.**

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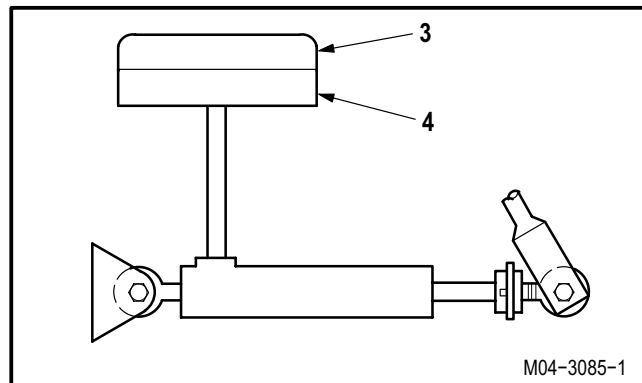
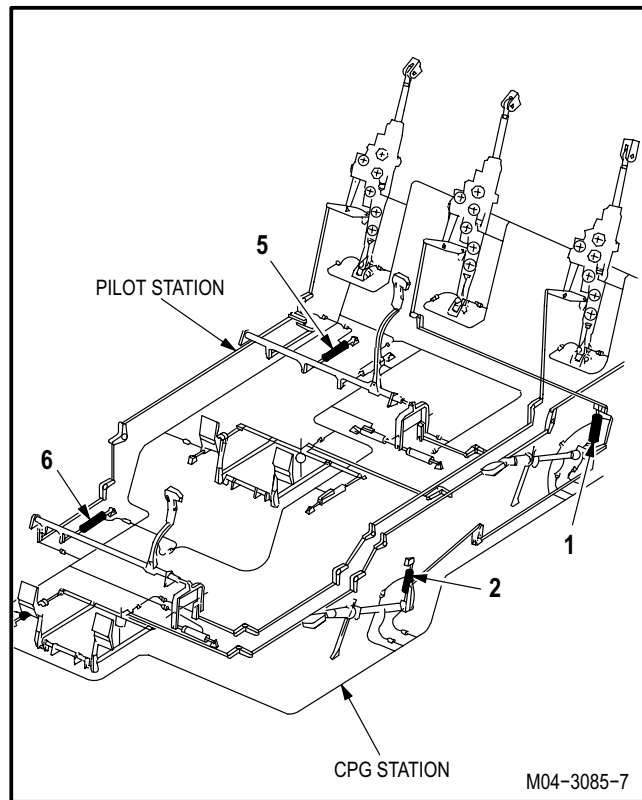
11.216. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT – continued

WARNING

Turn off power before disconnecting or reconnecting wires and connectors. High current VDC 28 and/or 115 VAC is present. Failure to do so could result in death or serious injury. If injury occurs, seek medical aid.

f. Check for 26 VAC at the corresponding LVDT.

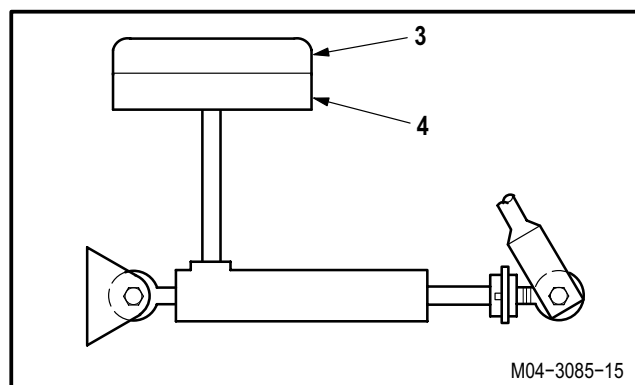
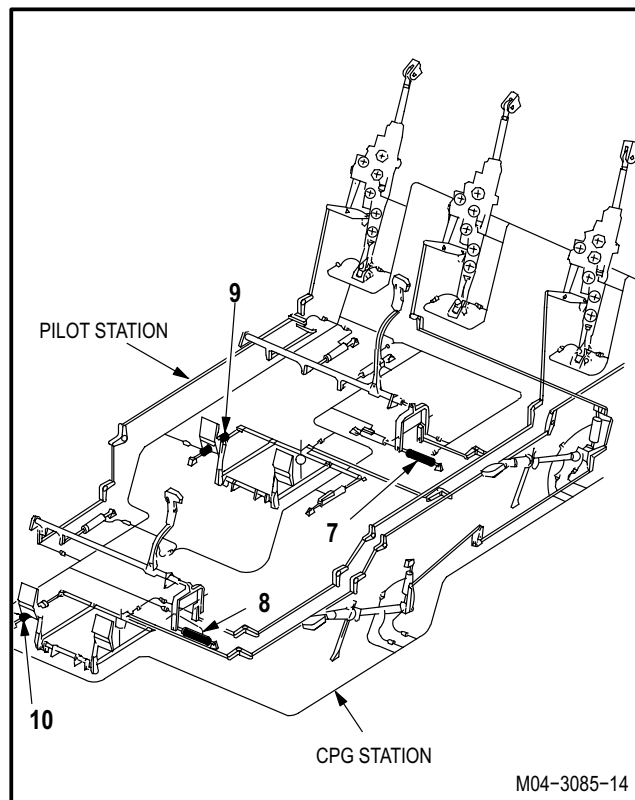
- (1) To check for 26 VAC at pilot collective LVDT (1) or CPG collective LVDT (2):
 - (a) Detach connector P230 (3) from receptacle J230 (4) or connector P234 (3) from receptacle J234 (4).
 - (b) Check for 26 VAC at the corresponding LVDT connector pins (para 11.217, Table 5). Use multimeter (TM 55-1500-323-24).
- (2) To check for 26 VAC at pilot longitudinal LVDT (5) or CPG longitudinal LVDT (6):
 - (a) Detach connector P232 (3) from receptacle J232 (4) or connector P236 (3) from receptacle J236 (4).
 - (b) Check for 26 VAC at the corresponding LVDT connector pins (para 11.217, Table 5). Use multimeter (TM 55-1500-323-24).



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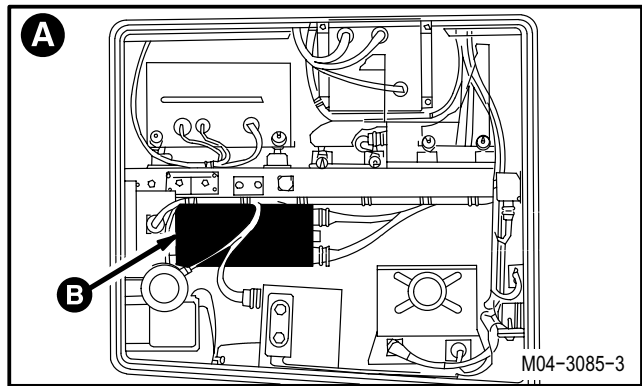
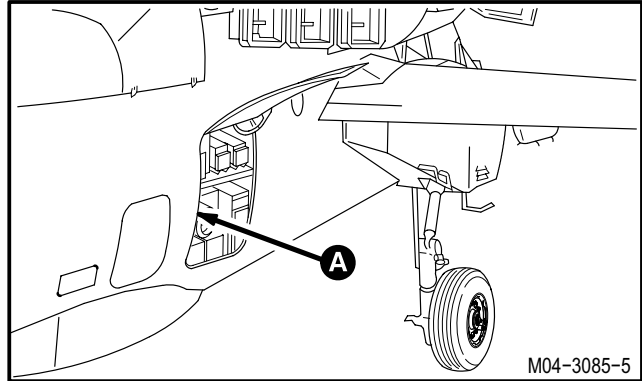
11.216. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT – continued

- (3) To check for 26 VAC at pilot lateral LVDT (7) or CPG lateral LVDT (8):
- (a) Detach connector P233 (3) from receptacle J233 (4) or connector P237 (3) from receptacle J237 (4).
 - (b) Check for 26 VAC at the corresponding LVDT connector pins (para 11.217, Table 5). Use multimeter (TM 55-1500-323-24).
- (4) To check for 26 VAC at pilot directional LVDT (9) or CPG directional LVDT (10):
- (a) Detach connector P231 (3) from receptacle J231 (4) or connector P235 (3) from receptacle J235 (4).
 - (b) Check for 26 VAC at corresponding LVDT connector pins (para 11.217, Table 5). Use multimeter (TM 55-1500-323-24).



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11.216. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT – continued

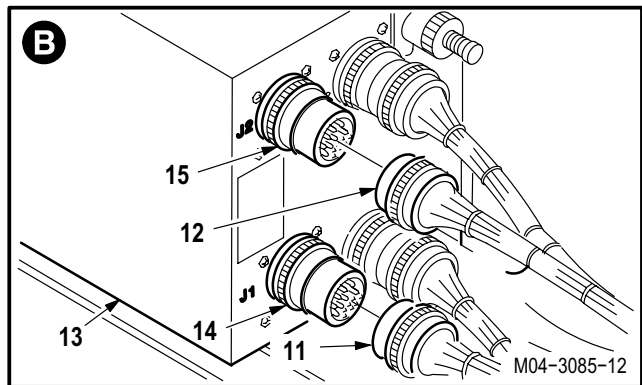


NOTE

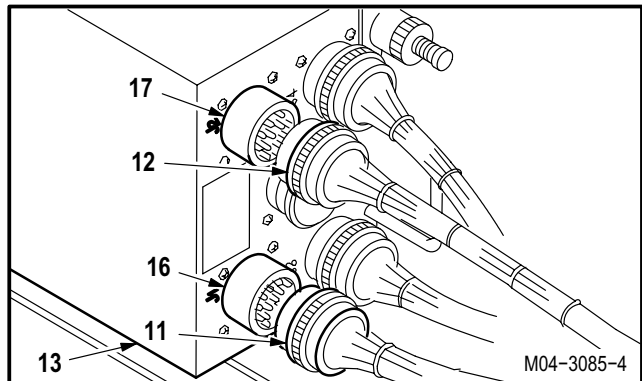
If filter adapters are installed, go to step g.(1). If filter adapters are not installed, go to step g.(2).

g. Detach connectors P688 (11) and P686 (12) from DASE computer (13).

(1) Detach connector P688 (11) from filter adapter A708 (14) and connector P686 (12) from filter adapter A707 (15) on DASE computer (13).



(2) Detach connector P688 (11) from connector J1 (16) and connector P686 (12) from connector J2 (17) on DASE computer (13).



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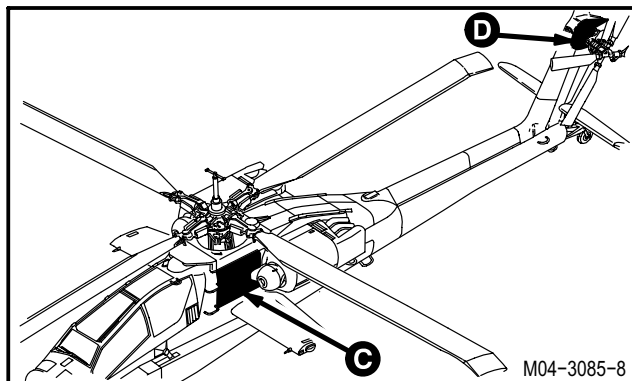
11.216. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT – continued

- h. Check for null of less than 0.05 volt RMS at corresponding servocylinder RAM LVDT connector pins (para 11.217, Table 1).

(1) Record indication.

- i. If voltage in step h. is less than 0.05 volt RMS, go to step n.

- j. Apply external primary hydraulic power (para 1.72).



WARNING

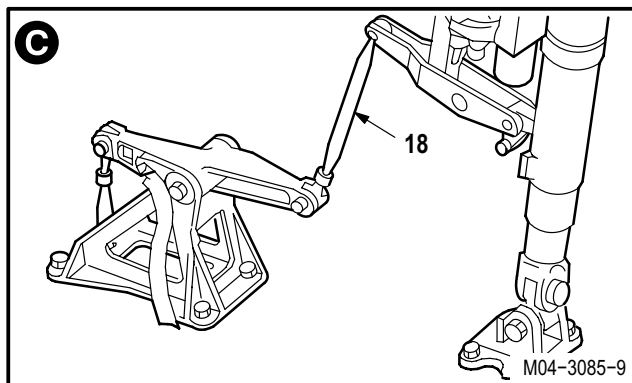
To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.

- k. Manually move push-pull rod (18) or (19) of the corresponding servocylinder to obtain null of less than 0.05 volt RMS. Use multimeter.

(1) Record new indication.

- l. Remove external primary hydraulic power (para 1.72).

- m. If null of less than 0.05 volt RMS cannot be obtained, adjust rod (18) or (19) rod end to lowest DVM indication (null) less than 0.05 volt RMS (para 11.2).

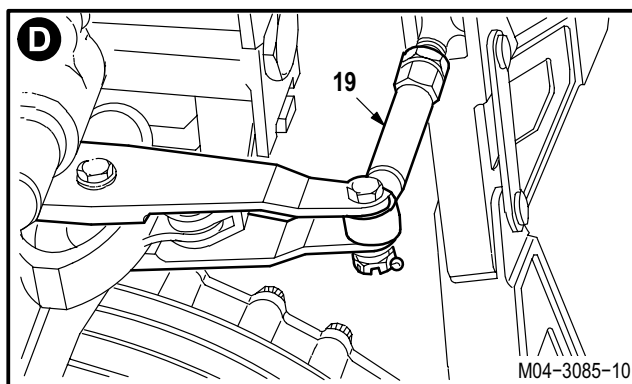


- n. Check for less than 0.150 volt RMS at corresponding servocylinder LVDT connector pins (para 11.217, Table 4).

- o. If voltage is not present, replace servocylinder.

(1) To replace collective servocylinder, go to paragraph(s) 7.41 and 7.42.

(2) To replace longitudinal servocylinder, go to paragraph(s) 7.47 and 7.48.



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11.216. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT – continued

(3) To replace lateral servocylinder, go to paragraph(s) 7.44 and 7.45.

(4) To replace directional servocylinder, go to paragraphs(s) 7.32 and 7.33.

p. **Check for null of less than 0.100 volt RMS at the corresponding LVDT connector pins** (para 11.217, Table 2-PLT or Table 3-CPG).

(1) If LVDT requires adjustment, go to step q.

(2) If no adjustment is necessary, go to step s.

q. **Adjust LVDT (20) to achieve null of approximate indication recorded in step h or k.** Torque nut (21) to **35 INCH-POUNDS**.

(1) Remove lockwire from nut (21) on LVDT (20).

(2) Loosen nut (21) until keywasher (22) is clear of LVDT rod end recess (23).

(3) Rotate LVDT rod (24) clockwise or counter-clockwise until null approximates indication recorded in step h or k.

(4) Null is not to exceed **0.100 volt RMS**.

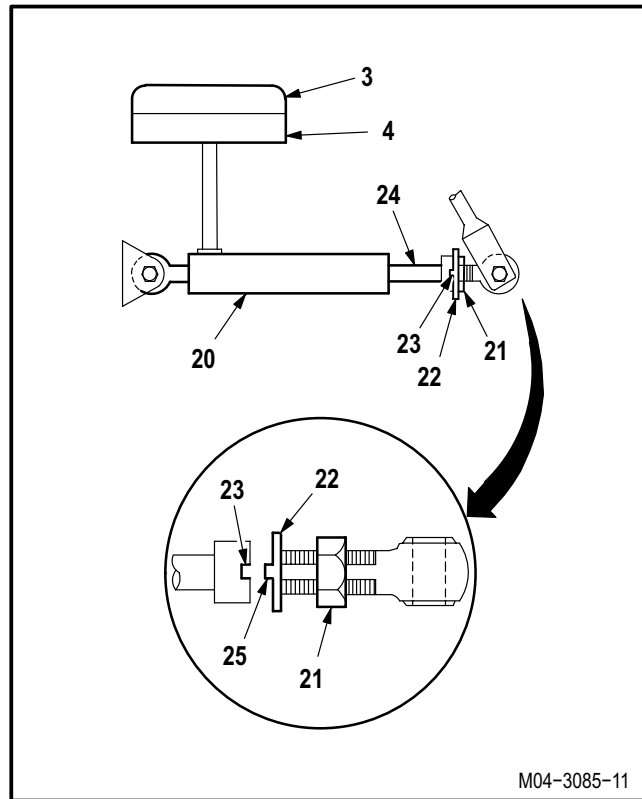
(5) Aline tab (25) of lockwasher (22) with LVDT rod end recess (23).

(6) Torque nut (21) to **35 INCH-POUNDS**. Use torque wrench.

(7) Lockwire nut (21) to keywasher (22). Use wire (item 222, App F).

r. **Recheck null indication.**

(1) If null indication exceeds **0.100 volt RMS**, repeat steps p. thru r.



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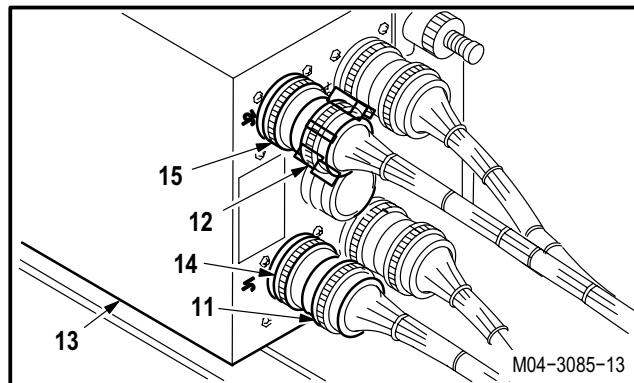
11.216. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT – continued

NOTE

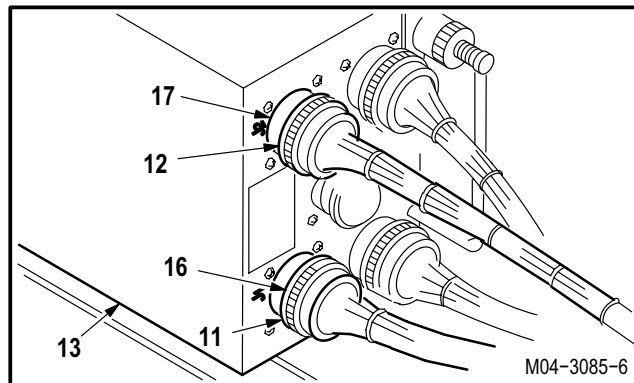
If filter adapters are installed, go to step s.(1). If filter adapters are not installed, go to step s.(2).

- s. **Attach connectors P688 (11) and P686 (12) to receptacles (14) and (15) on DASE computer (13).**

(1) Attach connector P686 (12) to filter adapter A707 (17) and connector P688 (11) to filter adapter A708 (16) on DASE computer (13).



(2) Attach connector P686 (12) to connector J2 (15) and connector P688 (11) to connector J1 (14) on DASE computer (13).



- t. **Inspect (QA).**
- u. **External primary hydraulic power disconnected** (para 1.72).
- v. **Remove rig pins as required** (TM 1-1520-238-T).
- w. **Inspect (QA).**
- x. **Perform DASE maintenance operational check** (TM 1-1520-238-T).

END OF TASK

11.217. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT CRITERIA

- a. **The linear variable differential transducer (LVDT) adjustment criteria provide connector views and pin locations for the null adjustment of the LVDT for each axis of the flight controls.**

(1) The connector views and pin locations are presented in tabular form:

Table 1. Provides connector view and pins required for null adjustment of the servocylinder RAM LVDTs.

Table 2. Provides connector view and pins required for null adjustment of the pilot stick/pedal LVDTs.

Table 3. Provides connector view and pins required for null adjustment of the CPG stick/pedal LVDTs.

Table 4. Provides connector view and pins required for voltage check of the servocylinder SCAS LVDTs.

Table 5. Provides connector view and pins required for voltage check of the pilot and CPG stick/pedal LVDTs.

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11.217. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT CRITERIA – continued

TABLE 1

CONNECTOR VIEW	AXIS	COMPONENT	PLUG	PINS
	PITCH	LONG SERVOCYLINDER LVDT (RAM)	P688 P686	36, 37. 42, 43
	ROLL	LAT SERVOCYLINDER LVDT (RAM)	P688 P686	39, 40, 44, 45
	YAW	DIR SERVOCYLINDER LVDT (RAM)	P688 P686	42, 43, 46, 47
	COLLECTIVE	COLL SERVOCYLINDER LVDT (RAM)	P688 P686	45, 46, 57, 58

TABLE 2

CONNECTOR VIEW	AXIS	COMPONENT	PLUG	PINS
	PITCH	STICK LVDT	P688	8, 15
	ROLL	STICK LVDT	P688	9, 10
	YAW	PEDAL LVDT	P688	17, 18
	COLLECTIVE	STICK LVDT	P688	20, 21

TABLE 3

CONNECTOR VIEW	AXIS	COMPONENT	PLUG	PINS
	PITCH	STICK LVDT	P686	26, 27
	ROLL	STICK LVDT	P686	36, 37
	YAW	PEDAL LVDT	P686	40, 41
	COLLECTIVE	STICK LVDT	P686	38, 39

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11.217. LINEAR VARIABLE DIFFERENTIAL TRANSDUCER (LVDT) ADJUSTMENT CRITERIA – continued

TABLE 4

CONNECTOR VIEW	AXIS	COMPONENT	PLUG	PINS
	PITCH	LONG SERVOCYLINDER SCAS LVDT	P688	23, 24
	ROLL	LAT SERVOCYLINDER SCAS LVDT	P688	25, 26
	YAW	DIR SERVOCYLINDER SCAS LVDT	P688	27, 28
	COLLECTIVE	COLL SERVOCYLINDER SCAS LVDT	P688	29, 30

TABLE 5

CONNECTOR VIEW	AXIS	COMPONENT	PLUG	PINS
	PITCH	PLT LONG LVDT CPG LONG LVDT	P232 P236	A, B A, B
	ROLL	PLT LAT LVDT CPG LAT LVDT	P233 P237	A, B A, B
	YAW	PLT DIR LVDT CPG DIR LVDT	P231 P235	A, B A, B
	COLLECTIVE	PLT COLL LVDT CPG COLL LVDT	P230 P234	A, B A, B

M04-3493-2A

END OF TASK

**11.218. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER
REMOVAL/INSTALLATION**

11.218.1. Description

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

11.218.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
Ohmmeter (item 218, App H)

References:

TM 1-1520-238-T
TM 55-1500-323-24

Personnel Required:

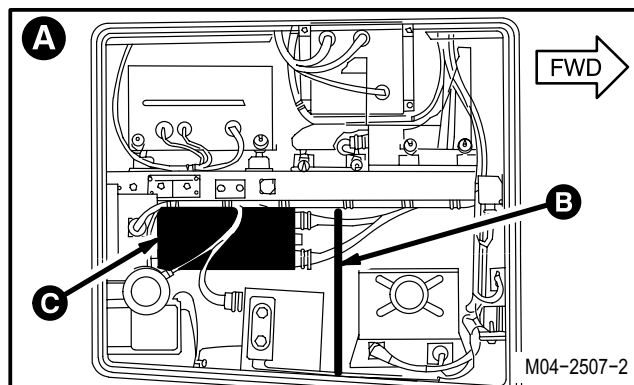
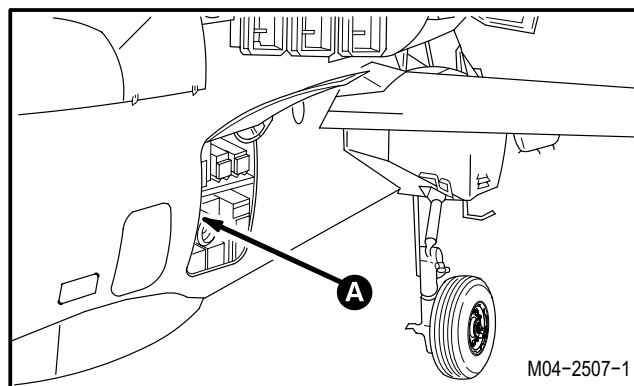
68X Armament/Electrical System Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access door R295 opened

11.218.3. Removal

- a. **Enter CPG station (para 1.56). Observe all safety precautions.**
- b. **On CPG left console circuit breaker panel, open seven MUX circuit breakers.**



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**11.218. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER
REMOVAL/INSTALLATION – continued**

c. Remove baffle assembly (1) from intercostal (2).

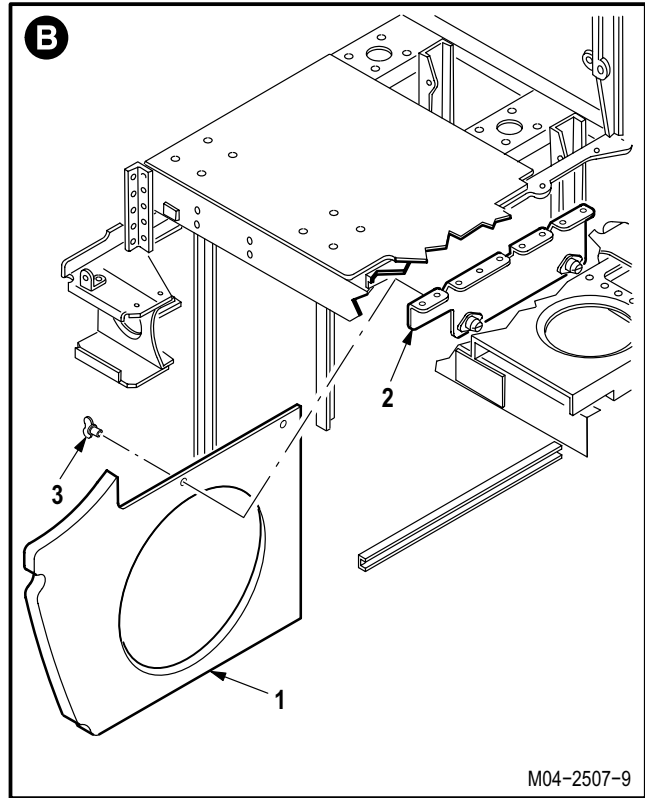
- (1) Loosen two turnlock fasteners (3).
- (2) Remove baffle (1).

CAUTION

On BUCS-equipped aircraft, filter adapters must be installed with 7-211D00005-21 or 7-211D00005-23 DASE computer only. Failure to do so may result in uncommanded flight control movement. This may cause loss of aircraft.

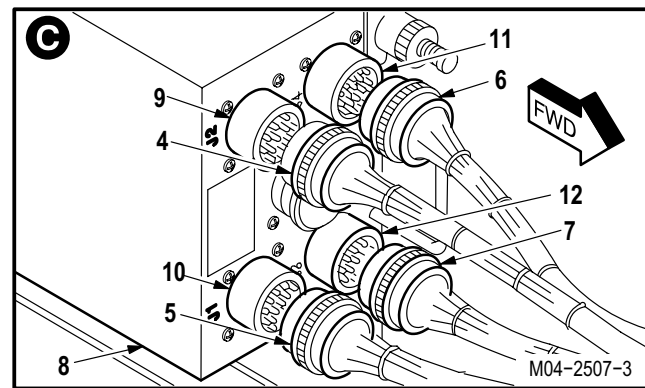
NOTE

If filter adapters are installed, go to step e. If not, go to step d.



d. Detach connectors (4), (5), (6), and (7) from DASE computer (8).

- (1) Detach connector P686 (4) from receptacle J2 (9).
- (2) Detach connector P688 (5) from receptacle J1 (10).
- (3) Detach connector P683 (6) from receptacle J4 (11).
- (4) Detach connector P682 (7) from receptacle J3 (12).

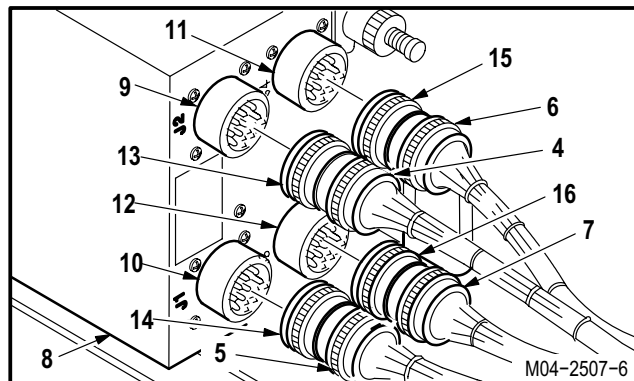


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11.218. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER REMOVAL/INSTALLATION – continued

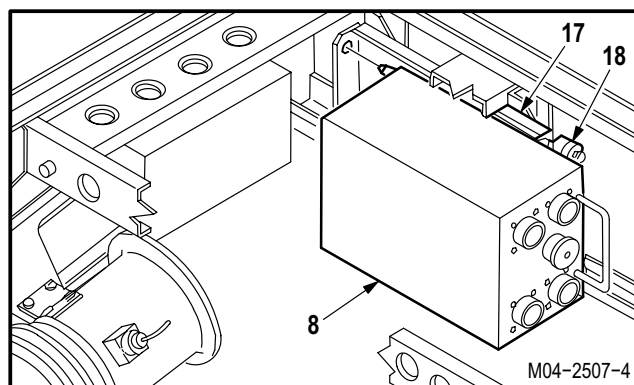
e. **Detach filters (13), (14), (15), and (16) from DASE computer (8).**

- (1) Detach filter A707 (13) from receptacle J2 (9).
- (2) Detach filter A708 (14) from receptacle J1 (10).
- (3) Detach filter A706 (15) from receptacle J4 (11).
- (4) Detach filter A705 (16) from receptacle J3 (12).



f. **Remove DASE computer (8) from mounting tray (17).**

- (1) Loosen two fasteners (18).
- (2) Remove DASE computer (8).



11.218.4. Cleaning

a. **Wipe removed and attaching parts with a clean rag.**

11.218.5. Inspection

- a. **Check mounting tray for cracks.** None allowed.
- b. **Check mounting tray for loose or missing hardware.** None allowed.
- c. **Check removed and attaching parts for damage** (para 11.190).
- d. **Check removed and attaching parts for corrosion** (para 1.49).
- e. **Check for cracked and broken wires** (para 11.190).

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**11.218. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER
REMOVAL/INSTALLATION – continued**

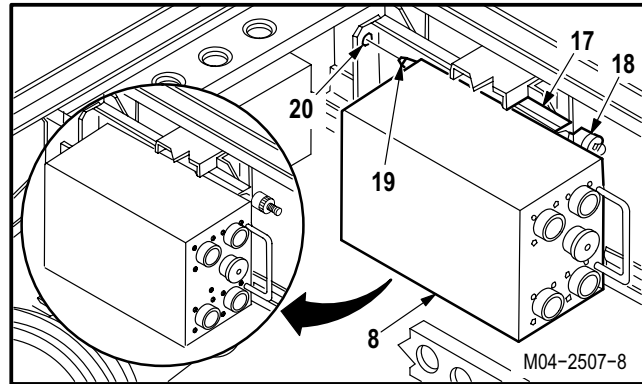
11.218.6. Installation

a. Install DASE computer (8).

- (1) Aline guide pins (19) with holes (20) in tray (17).
- (2) Slide computer (8) in place.
- (3) Tighten two fasteners (18).

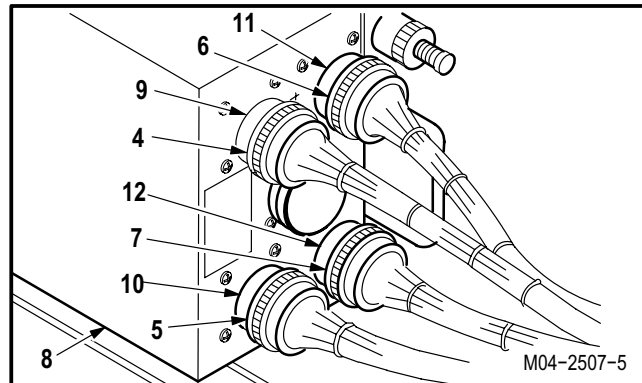
NOTE

If filter adapters are installed, go to step c.
If not, go to step b.



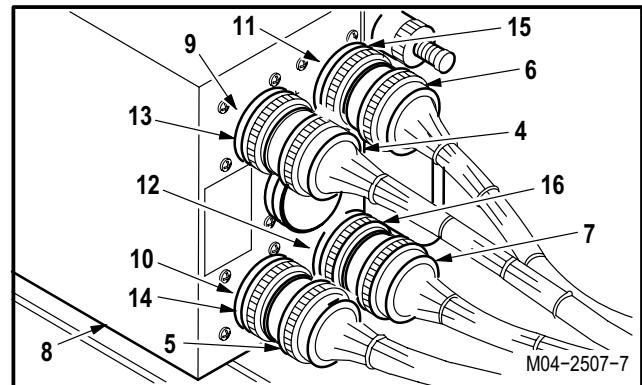
b. Attach connectors (4), (5), (6), and (7) to DASE computer (8).

- (1) Attach connector P686 (4) to receptacle J2 (9).
- (2) Attach connector P688 (5) to receptacle J1 (10).
- (3) Attach connector P683 (6) to receptacle J4 (11).
- (4) Attach connector P682 (7) to receptacle J3 (12).



c. Attach filters (13), (14), (15), and (16) to DASE computer (8).

- (1) Attach filter A707 (13) to receptacle J2 (9).
- (2) Attach filter A708 (14) to receptacle J1 (10).
- (3) Attach filter A706 (15) to receptacle J4 (11).
- (4) Attach filter A705 (16) to receptacle J3 (12).



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**11.218. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER
REMOVAL/INSTALLATION – continued**

NOTE

If aircraft is BUCS equipped, go to step d.
If not, go to step e.

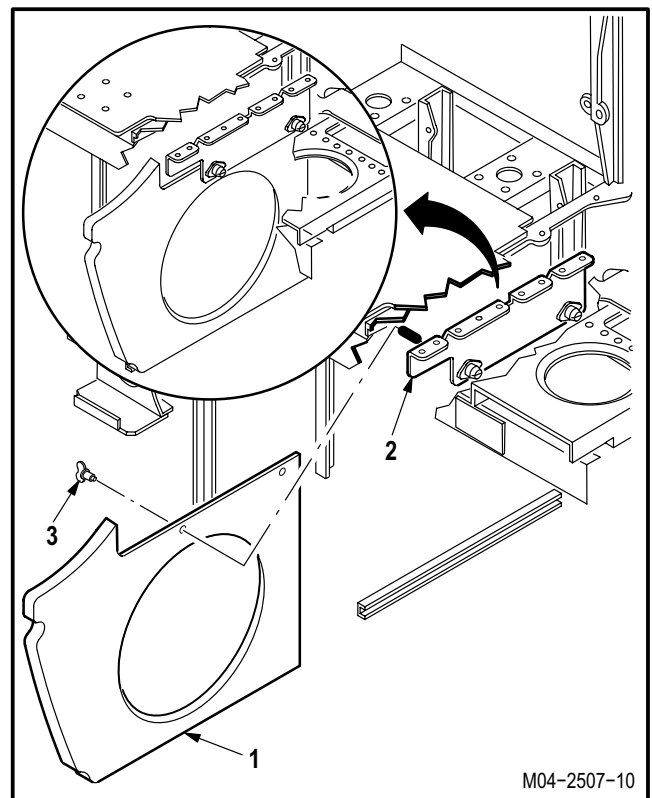
d. Perform electrical bond check on electrical leads.

(1) Bond shall be **0.1 OHMS** or less. Use ohmmeter (TM 55-1500-323-24).

e. Install baffle (1) on intercostal (2).

(1) Aline baffle (1) with intercostal (2).

(2) Tighten two turnlock fasteners (3).

f. Inspect (QA).**g. Perform DASE maintenance operational check (TM 1-1520-238-T).****h. Secure access door R295 (para 2.2).**

END OF TASK

11.219. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER COVER REMOVAL/INSTALLATION (AVIM)

11.219.1. Description

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

11.219.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)

Personnel Required:

68X Armament/Electrical System Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

Materials/Parts:

Cloth (item 52, App F)

References:

TM 1-1500-204-23

11.219.3. Removal

- a. **Remove DASE computer top cover (1) or bottom cover (2).**

(1) Loosen 10 captive screws (3) on cover (1) or cover (2).

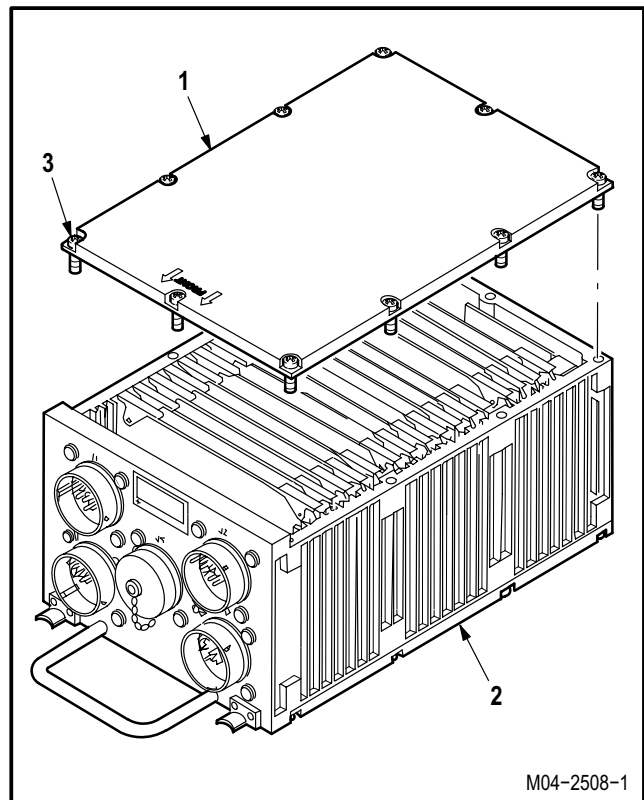
(2) Remove DASE cover (1) or (2) from DASE.

11.219.4. Cleaning

- a. **Wipe DASE computer covers with a clean cloth.** Use cloth (item 52, App F).

11.219.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check DASE computer covers for cracks.** None allowed.
- d. **Check covers for damaged or missing seals.** Repair (para 11.220).
- e. **Check covers for damaged or missing captive screws** (TM 1-1500-204-23).



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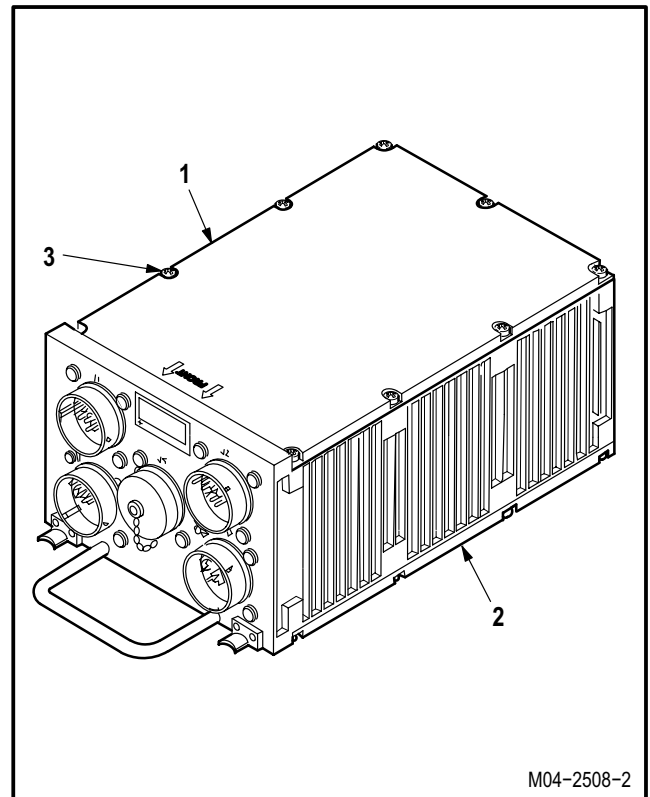
**11.219. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER COVER
REMOVAL/INSTALLATION (AVIM) – continued**

f. Check covers for damage.

- (1) Damage not to exceed **25 percent** of cover and **20 percent** of material thickness after repair.

11.219.6. Installation**a. Install DASE cover (1) or cover (2).**

- (1) Aline cover (1) or (2) with screw holes on DASE.
- (2) Tighten 10 captive screws (3) on cover (1) or (2).

b. Inspect (QA).

END OF TASK

11.220. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER COVER SEAL REPLACEMENT (AVIM)

11.220.1. Description

This task covers: Removal. Cleaning. Installation.

11.220.2. 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)
- 1 1/4-inch blade putty knife (item 199, App H)
- Adjustable air filtering respirator (item 262, App H)

Personnel Required:

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

Materials/Parts:

- Adhesive (item 11, App F)
- Adhesive (item 20, App F)
- Cloth (item 52, App F)
- Methyl ethyl ketone (item 124, App F)

Equipment Conditions:

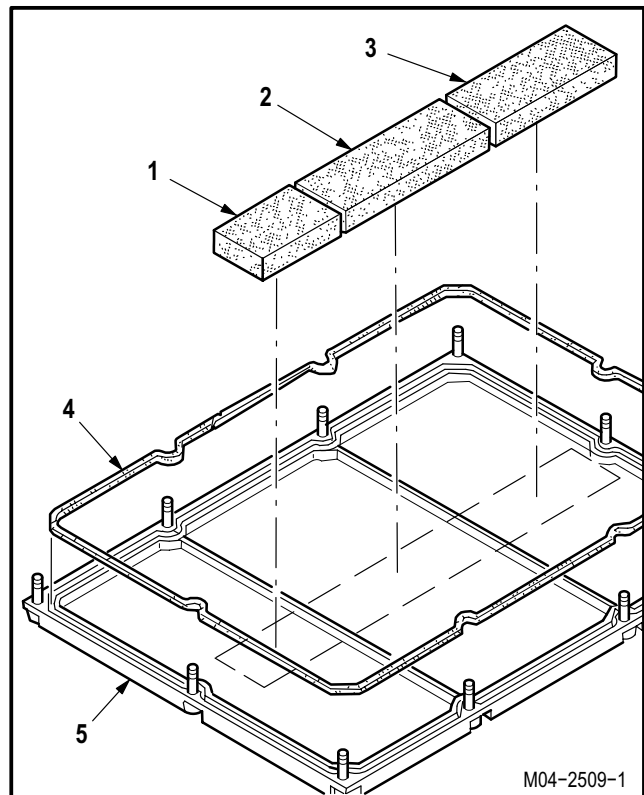
<u>Ref</u>	<u>Condition</u>
11.219	DASE computer top or bottom cover removed

11.220.3. Removal

NOTE

Identify position of top cover seals prior to removal.

- a. Remove DASE computer top cover seals (1), (2), (3), and (4) from top cover (5) by scraping with putty knife.



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11.220. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER COVER SEAL REPLACEMENT (AVIM) – continued

- b. Remove DASE computer bottom cover seal (6) from bottom cover (7) by scraping with putty knife.

11.220.4. Cleaning



- a. Remove residual adhesive.

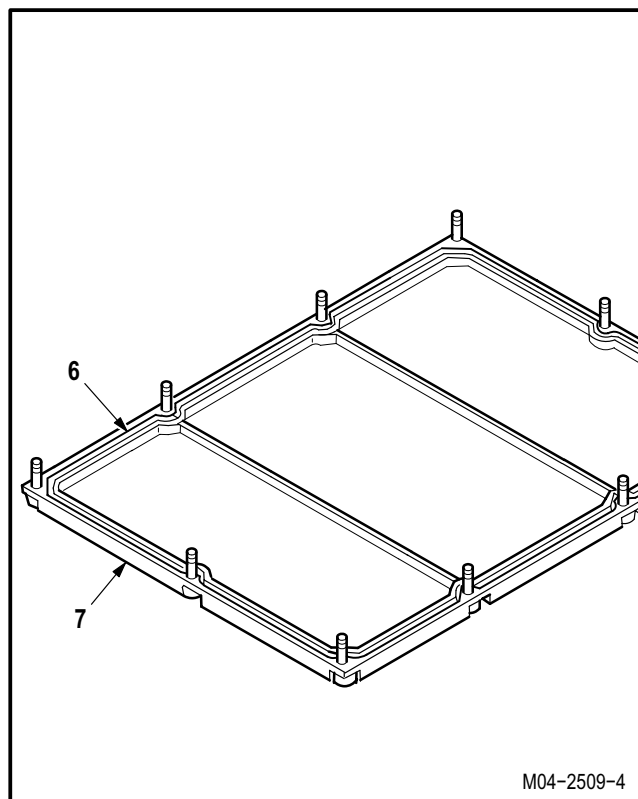
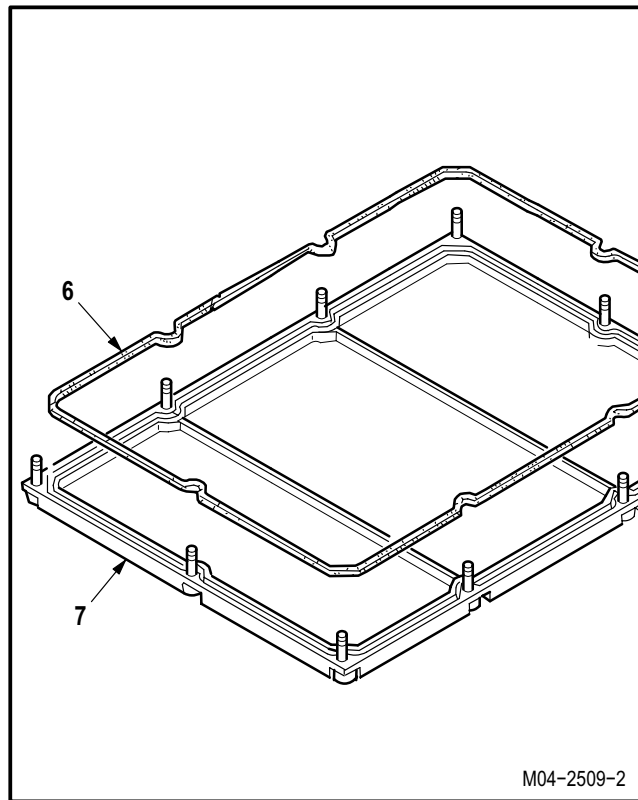
- (1) Wipe top or bottom cover with a clean cloth and methyl ethyl ketone. Use cloth (item 52, App F) and methyl ethyl ketone (item 124, App F).

11.220.5. Installation



- a. Install DASE computer cover seal (6) on bottom cover (7).

- (1) Apply adhesive sparingly to back surface of seal (6). Use adhesive (item 20, App F).
- (2) Mount seal (6) on cover (7).
- (3) Splice at slight angle on any straight side of cover (7).
- (4) Allow adhesive to cure as per manufacturers instructions.



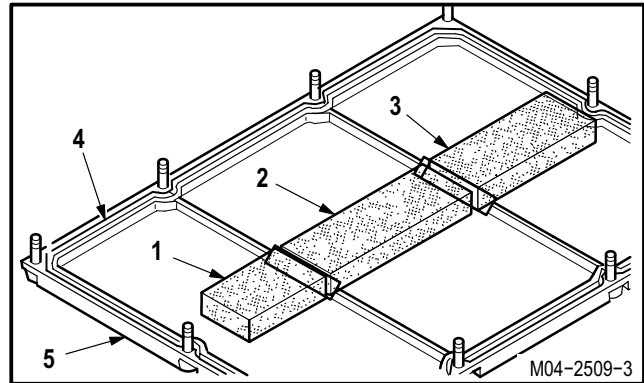
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11.220. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER COVER SEAL REPLACEMENT (AVIM) – continued



b. Install DASE computer seals (1), (2), (3), and (4) on cover (5).

- (1) Apply adhesive sparingly to back surface of seals (1), (2), and (3). and (4) Use adhesive (item 11, App F).
- (2) Mount seals (1), (2), and (3) in original position on cover (5).
- (3) Mount seal (4) on cover (5).
 - (a) Splice at slight angle on any straight side of cover (5).
- (4) Allow adhesive to cure as per manufacturers instructions.



c. Inspect (QA).

d. Install DASE top or bottom computer covers (para 11.219).

END OF TASK

**11.221. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER CIRCUIT CARD
REMOVAL/INSTALLATION (AVIM)**

11.221.1. Description

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

11.221.2. Initial setup**Tools:**

Electrical tool kit (item 378, App H)
 PC shunt bar (item 223, App H)
 Large wrist grounding strap (item 346, App H)

Materials/Parts:

Cloth (item 52, App F)
 Shipping and storage bag (item 182, App F)

Personnel Required:

68X	Armament/Electrical System Repairer
68X3F	Armament/Electrical System Repairer/ Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
11.219	DASE computer top cover removed

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**11.221. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER CIRCUIT CARD
REMOVAL/INSTALLATION (AVIM) – continued**

11.221.3. Removal

- a. **Locate DASE Circuit Card Assembly (CCA) to be removed by reference listing in cover.**

CAUTION

To prevent damage to electrostatic sensitive devices, wear grounding strap when handling CCA.

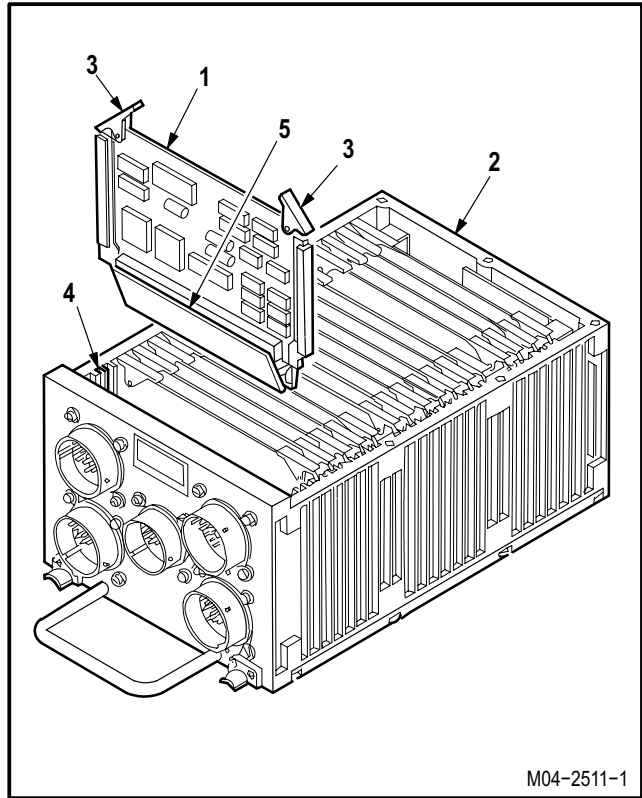
- b. **Remove CCA (1) from chassis (2).**
 - (1) Lift up and out on both card extractors (3).
 - (2) Grasp CCA (1) at top.
 - (3) Lift CCA from chassis card guides (4).

- c. **Attach shunt bar (5).**

CAUTION

To prevent damage to electrostatic sensitive devices, CCA must be housed in a conductive container during storage with discharger installed.

- d. **Store CCA (1) in storage bag.** Use shipping and storage bag (item 182, App F).



11.221.4. Cleaning

- a. **Wipe chassis card guides with a clean cloth.** Use cloth (item 52, App F).

11.221.5. Inspection

- a. **Check motherboard connector for debris.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.190).
- c. **Check removed and attaching parts for corrosion** (para 1.49).

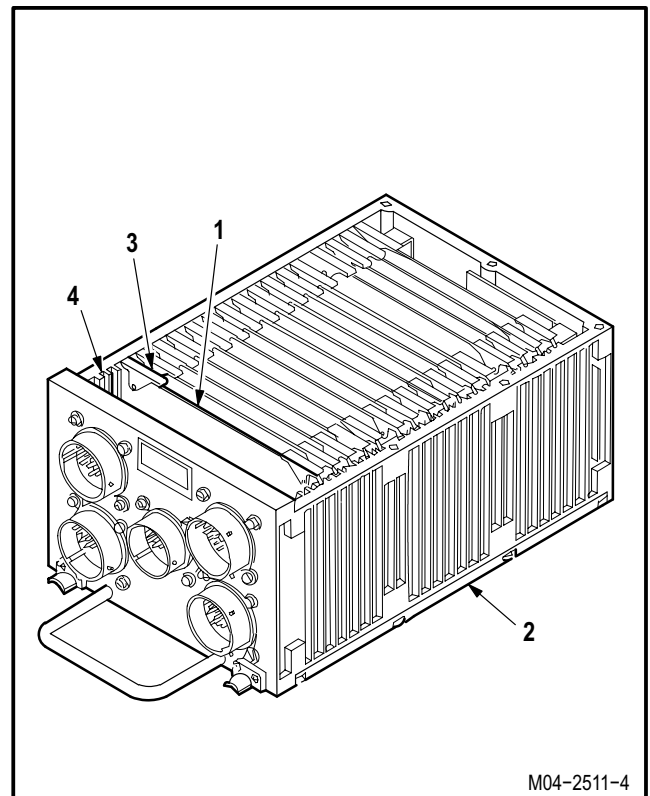
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**11.221. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER CIRCUIT CARD
REMOVAL/INSTALLATION (AVIM) – continued**

11.221.6. Installation**CAUTION**

To prevent damage to electrostatic sensitive devices, wear grounding strap when handling CCA.

- a. **Remove CCA (1) from storage bag.**
- b. **Remove shunt bar (5).**
- c. **Install CCA (1) in chassis (2) from reference listing in cover.**
 - (1) Slide CCA (1) into card guides (4).
 - (2) Seat CCA (1) by pressing down on both card extractors (3).
- d. **Inspect (QA).**
- e. **Install DASE computer top cover** (para 11.219).



END OF TASK

**11.222. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER POWER SUPPLY
REMOVAL/INSTALLATION (AVIM)**

11.222.1. Description

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

11.222.2. Initial setup

Tools:

Electrical tool kit (item 378, App H)
PC shunt bar (item 223, App H)
Large wrist grounding strap (item 346, App H)

Materials/Parts:

Cloth (item 52, App F)
Shipping and storage bag (item 182, App F)

Personnel Required:

68X Armament/Electrical System Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

Equipment Conditions:

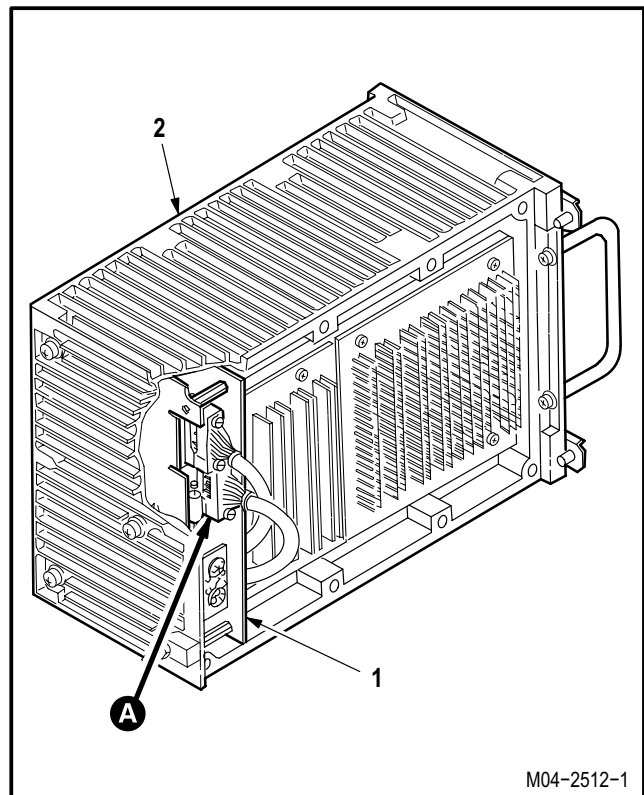
<u>Ref</u>	<u>Condition</u>
11.219	DASE computer top cover removed

11.222.3. Removal

CAUTION

To prevent damage to electrostatic sensitive devices, wear grounding strap when handling power supply.

- a. **Remove power supply (1) from DASE computer (2).**

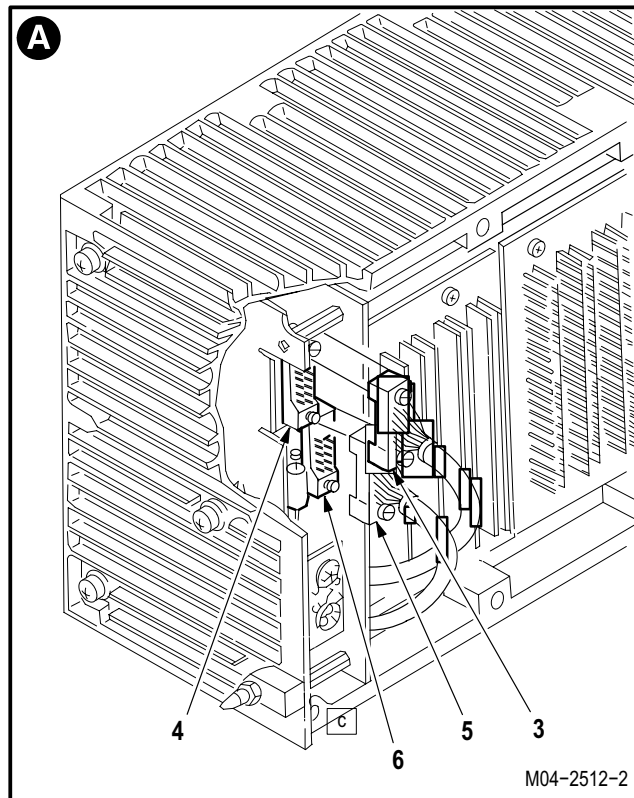


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11.222. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER POWER SUPPLY REMOVAL/INSTALLATION (AVIM) – continued

- (1) Detach connector P6 (3) from receptacle J6 (4).
- (2) Detach connector P7 (5) from receptacle J7 (6).

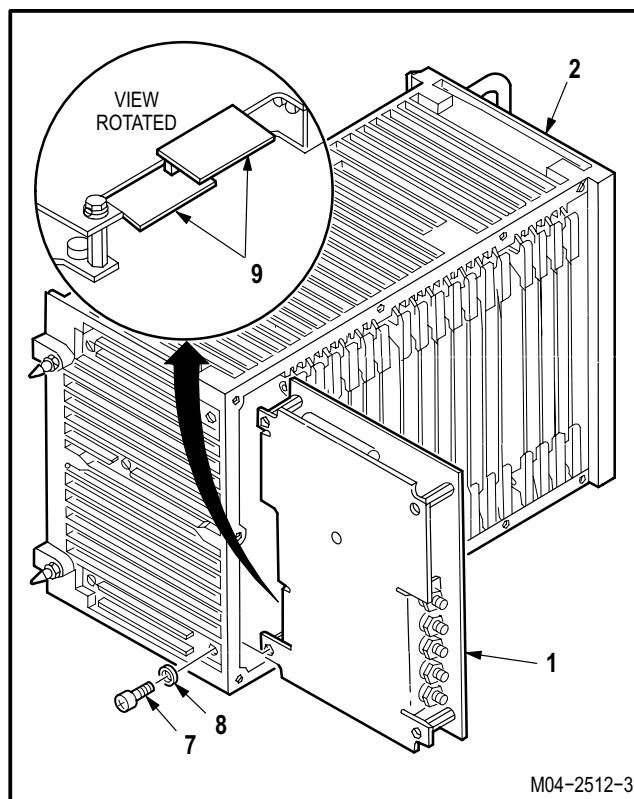


- (3) Remove five screws (7) and washers (8).
- (4) Slide power supply (1) from top of DASE (2).

- b. **Attach shunt bar (9).**
- c. **Store power supply (1) in storage bag.** Use shipping and storage bag (item 182, App F).

11.222.4. Cleaning

- a. **Wipe power supply with a clean cloth.** Use cloth (item 52, App F).



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**11.222. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) COMPUTER POWER SUPPLY
REMOVAL/INSTALLATION (AVIM) – continued**

11.222.5. Inspection

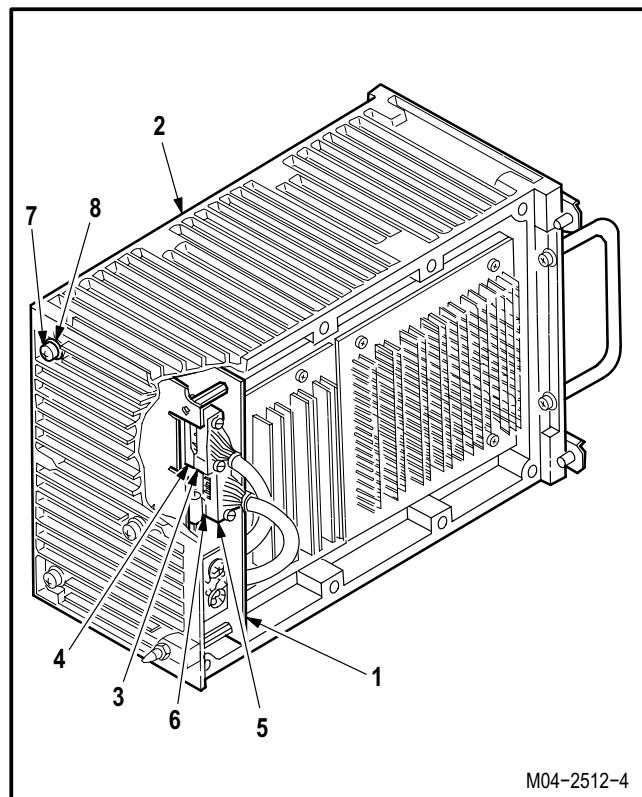
- a. **Check for cracked and broken wires.** None allowed.
- b. **Check removed and attaching parts for damage.** None allowed.
- c. **Check removed and attaching parts for corrosion** (para 1.49).

11.222.6. Installation

CAUTION

To prevent damage to electrostatic devices, wear grounding strap when handling power supply.

- a. **Remove power supply (1) from storage bag.**
- b. **Remove shunt bar (9).**
- c. **Install power supply (1).**
 - (1) Slide power supply (1) into top of DASE (2).
 - (2) Install five washers (8) and screws (7).
 - (3) Attach connector P6 (3) to receptacle J6 (4).
 - (4) Attach connector P7 (5) to receptacle J7 (6).
- d. **Inspect (QA).**
- e. **Install DASE computer top cover** (para 11.219).



END OF TASK

11.223. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) ELECTRICAL EQUIPMENT CHASSIS REPLACEMENT (AVIM)

11.223.1. Description

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

11.223.2. Initial setup

Tools:

Electrical tool kit (item 378, App H)

Materials/Parts:

Sealing compound (item 168, App F)

Equipment Conditions:

Personnel Required:

68X Armament/Electrical System Repairer
 68X3F Armament/Electrical System Repairer/
 Technical Inspector

Ref	Condition
11.219	Covers removed
11.221	Circuit cards removed
11.222	Power supply removed

11.223.3. Removal

a. Remove handle (1) from electrical chassis (2).

(1) Remove two screws (3), lockwashers (4), and washers (5).

(2) Remove handle (1).

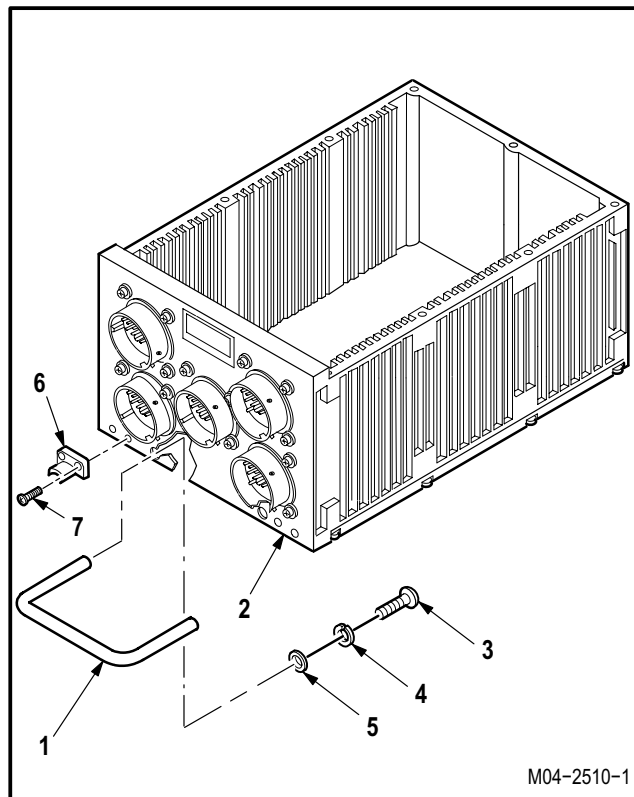
b. Remove two mount hooks (6) from chassis (2).

(1) Remove four screws (7) from hooks (6).

(2) Remove hooks (6).

11.223.4. Cleaning

a. Clean removed and attaching parts (para 1.47).



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11.223. DIGITAL AUTOMATIC STABILIZATION EQUIPMENT (DASE) ELECTRICAL EQUIPMENT CHASSIS REPLACEMENT (AVIM) – continued

11.223.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

11.223.6. Installation



a. **Install two mount hooks (6) on chassis (2).**

- (1) Aline two hooks (6) on chassis (2).
- (2) Apply sealing compound on threads of four screws (7). Use sealing compound (item 168, App F).
- (3) Install four screws (7).

b. **Install handle (1) on chassis (2).**

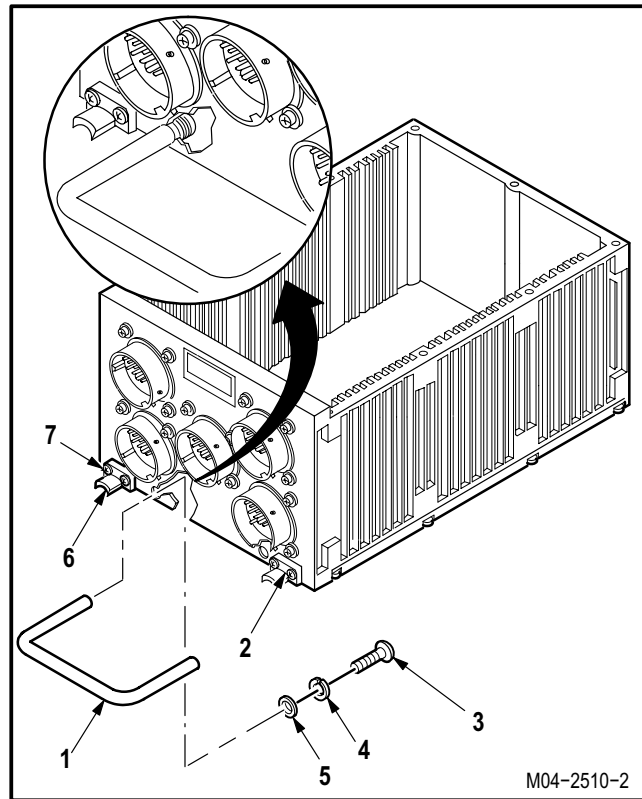
- (1) Aline handle (1) on chassis (2).
- (2) Apply sealing compound on threads of two screws (3). Use sealing compound (item 168, App F).
- (3) Install two screws (3), lockwashers (4), and washers (5).

c. **Install power supply** (para 11.222).

d. **Install circuit cards** (para 11.221).

e. **Inspect (QA).**

f. **Install covers** (para 11.219).



END OF TASK

11.224. STABILATOR ACTUATOR REMOVAL/INSTALLATION

11.224.1. Description

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

11.224.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Flight control rigging kit (item 267, App H)
 30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

References:

- TM 1-1520-238-T
- TM 1-1520-238-MTF

Materials/Parts:

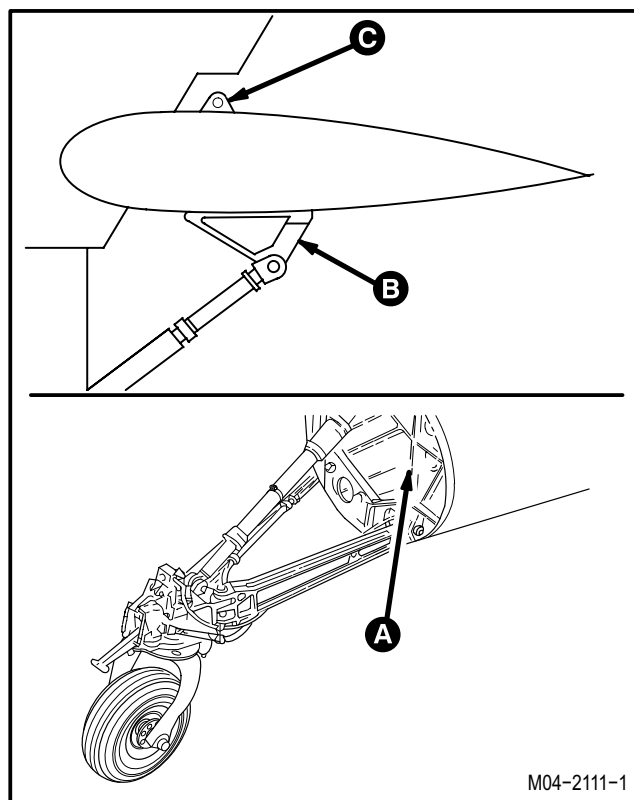
Cotter pin (2)

Personnel Required:

- 67R Attack Helicopter Repairer
Two persons to assist
- 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access covers L545 and R545 removed

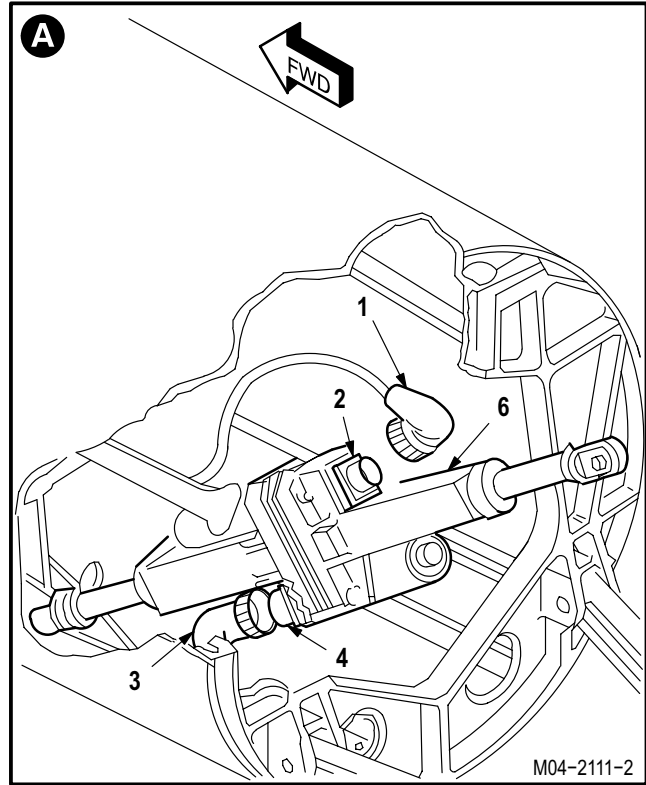


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11.224. STABILATOR ACTUATOR REMOVAL/INSTALLATION – continued

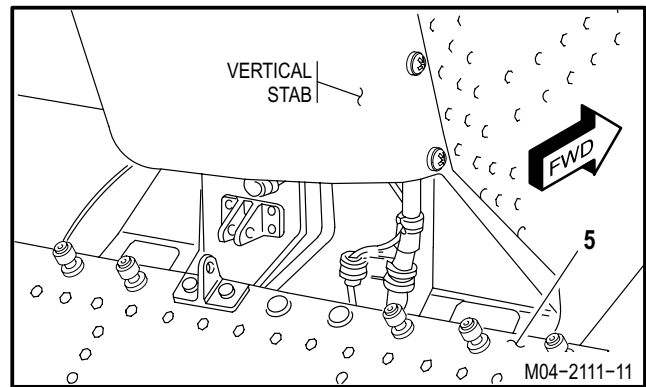
11.224.3. Removal

- a. Detach connector P995 (1) from receptacle J995 (2).
- b. Detach connector P996 (3) from receptacle J996 (4).



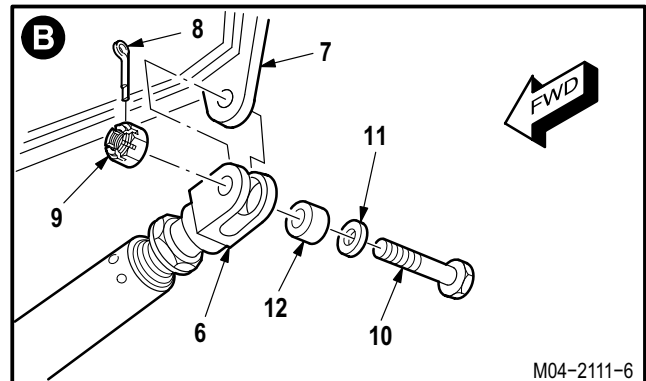
- c. Hold stabilator (5) in place to take weight off actuator (6).

(1) One person support on each side.



- d. Remove actuator (6) from stabilator fitting (7).

- (1) Remove and discard cotter pin (8).
- (2) Remove nut (9).
- (3) Remove bolt (10), washer (11), and bushing (12).

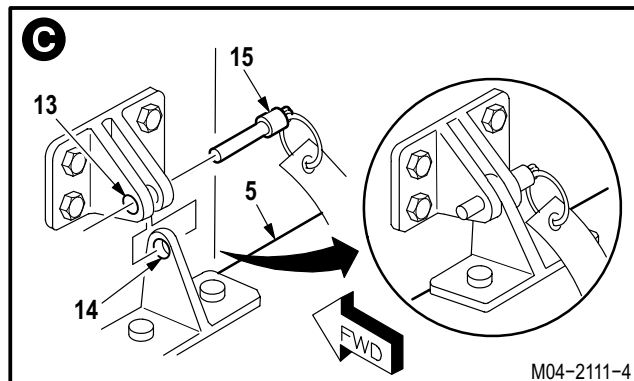


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11.224. STABILATOR ACTUATOR REMOVAL/INSTALLATION – continued

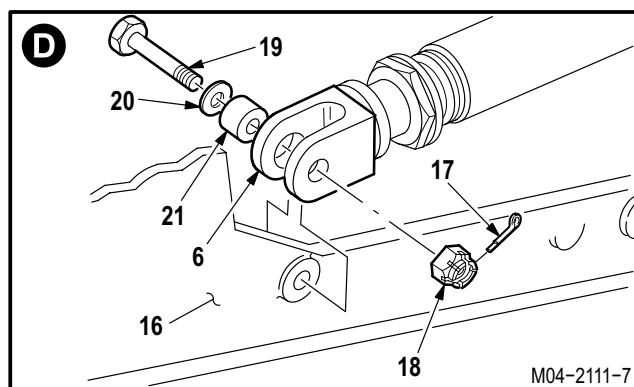
e. Lock stabilator (5) in up position.

- (1) Move stabilator (5) up until rig pin holes (13) and (14) are alined.
- (2) Install -9 rig pin (15) in alined holes (13) and (14).



f. Remove actuator (6) from airframe (16).

- (1) Remove and discard cotter pin (17).
- (2) Remove nut (18).
- (3) Remove bolt (19), washer (20), and bushing (21).



11.224.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.224.5. Inspection

- a. **Check all removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.190).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.224. STABILATOR ACTUATOR REMOVAL/INSTALLATION – continued

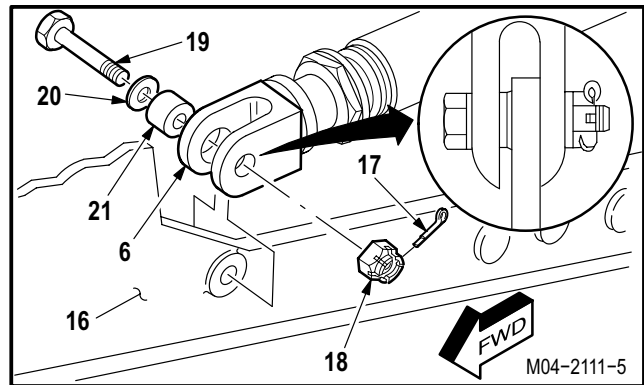
11.224.6. Installation

NOTE

- Actuator must be installed with mating bolt heads up and aft. Receptacle J995 to be up and J996 to be down.
- Install attaching hardware so that bolt head and washer are on inboard side. Bushing may be on bolt head or nut side, depending on actuator adjustment.

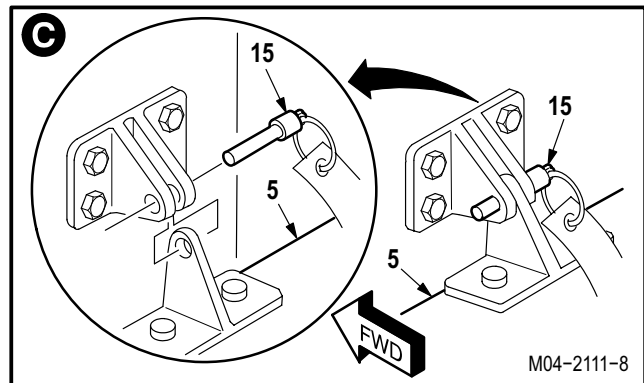
a. Install actuator (6) on airframe (16). Torque nut (18) 95 to 110 INCH-POUNDS.

- (1) Aline actuator (6) with airframe (16).
- (2) Position bushing (21).
- (3) Install bushing (21) through inboard side of actuator (6).
- (4) Install bolt (19) through washer (20), bushing (21), inboard side of actuator (6), and airframe (16).
- (5) Check fit of self-retaining bolt (19) (para 11.1).
- (6) Install nut (18) on bolt (19). Torque nut (18) to **95 INCH-POUNDS**. Use torque wrench.
- (7) Increase torque to aline cotter pin hole, but do not exceed **110 INCH-POUNDS**.
- (8) Install new cotter pin (17).



b. Remove -9 rig pin (15) from stabilator (5).

- (1) One person support stabilator (5) on each side.
- (2) Remove -9 rig pin (15).
- (3) Hold stabilator (5) horizontal.



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11.224. STABILATOR ACTUATOR REMOVAL/INSTALLATION – continued

NOTE

Install attaching hardware so that bolt head and washer are on inboard side. Bushing may be on bolt head or nut side, depending on actuator adjustment.

c. Install actuator (6) on fitting (7). Torque nut (9) 95 to 110 INCH-POUNDS.

- (1) Aline actuator (6) with fitting (7).
- (2) Install bushing (12) in actuator (6).
- (3) Install bolt (10) through washer (11) and bushing (12) from inboard side of actuator (6).
- (4) Check fit of self-retaining bolt (10) (para 11.1).
- (5) Install nut (9) on bolt (10). Torque nut (9) to **95 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **110 INCH-POUNDS**.
- (7) Install new cotter pin (8).

d. Attach connector P995 (1) to receptacle J995 (2).

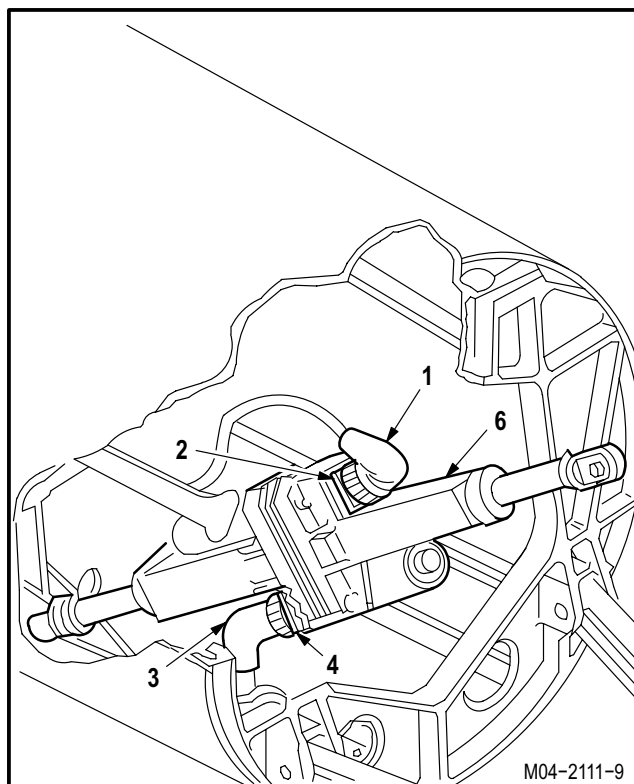
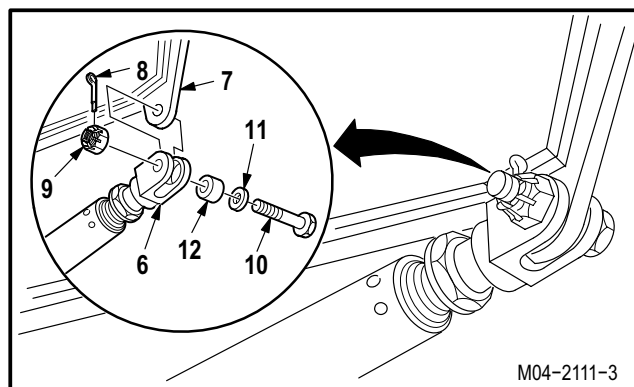
e. Attach connector P996 (3) to receptacle J996 (4).

f. Inspect (QA).

g. Perform stabilator maintenance operational check (TM 1-1520-238-T).

h. Install access covers L545 and R545 (para 2.2).

i. Perform a limited maintenance test flight for the stabilator actuator (TM 1-1520-238-MTF).



END OF TASK

11.225. STABILATOR ACTUATOR DISASSEMBLY/ASSEMBLY

11.225.1. Description

This task covers: Disassembly. Cleaning. Inspection. Assembly.

11.225.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
Light duty laboratory apron (item 27, App H)
1 1/8 x 3/8-inch drive open end socket wrench crowfoot attachment (item 90, App H)
Chemical protective gloves (item 154, App H)
Adjustable air filtering respirator (item 262, App H)
1 & 1 1/8-inch open end wrench (item 417, App H)
0 - 600 inch-pound 3/8-inch drive dial indicator torque wrench (item 447, App H)

Materials/Parts:

■ Cotter pin (4)
Corrosion preventive compound (item 63, App F)
Sealing compound (item 158A, App F)
Wire (item 226, App F)

Personnel Required:

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

References:

TM 1-1500-204-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.224	Stabilator actuator removed

NOTE

This task is typical for either end of the stabilator actuator.

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11.225. STABILATOR ACTUATOR DISASSEMBLY/ASSEMBLY – continued

11.225.3. Disassembly

a. **Measure and record distance between key-washer (1) and base of clevis (2) on actuator (3).**

b. **Remove clevis (2) from actuator (3).**

(1) Remove lockwire.

(2) Hold clevis (2) and loosen nut (4). Use open end wrench.

(3) Hold actuator (3). Remove clevis (2) and key-washer (1). Use open end wrench.

(4) Remove nut (4) from clevis (2).

c. **Remove actuator (3) from actuator (5).**

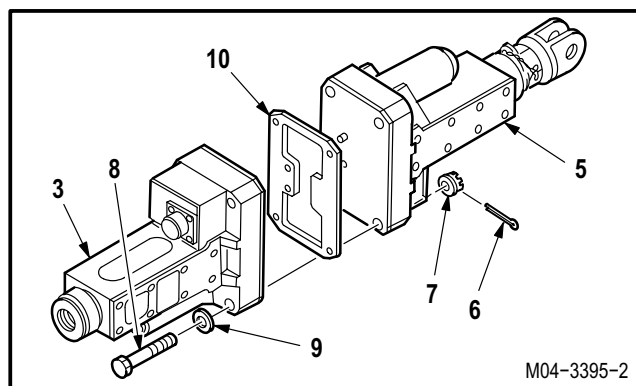
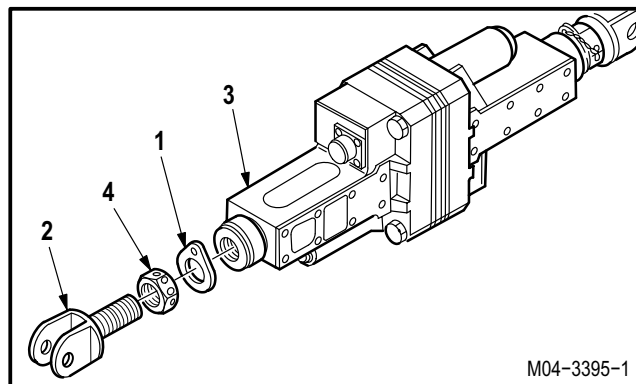
(1) Remove and discard four cotter pins (6).

(2) Remove four nuts (7).

(3) Remove four bolts (8) and washers (9).

(4) Pull actuator (3) and actuator (5) apart.

(5) Remove spacer (10).



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11.225. STABILATOR ACTUATOR DISASSEMBLY/ASSEMBLY

11.225.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**
- b. **Clean actuators** (para 1.47).

11.225.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.190).
- c. **Check removed and attaching parts for corrosion** (para 1.49).
- d. **Check nut for stripped threads.** None allowed.
- e. **Check actuators for damaged connectors** (TM 1-1500-204-23).
- f. **Check interior of removed actuators for evidence of water intrusion and/or corrosion.**
 - (1) Replace actuator if interior markings indicate water has been or is being trapped in housing.
- g. **Check actuator mounting surfaces for scratches or damaged surfaces.**
 - (1) If any scratch extends from outer edge of the mounting area to inner edge and is **0.010 INCH** or greater in depth, replace actuator.
 - (2) If mounting surface has damage which exceeds **0.040 INCH** from the outer edge between mounting holes, replace actuator.
 - (3) If mounting surface has damage which exceeds **0.075 INCH** radially beyond each mounting hole, replace actuator.
- h. **Check mounting surface for flatness by placing a straight edge across the mounting holes and passing a thin metal shim feeler gage between the straight edge and mounting surface.**
 - (1) Measure all four areas between the mounting holes. If there is a void of **0.010 INCH** or greater, replace actuator.

GO TO NEXT PAGE

11.225. STABILATOR ACTUATOR DISASSEMBLY/ASSEMBLY – continued

11.225.6. Assembly

CAUTION

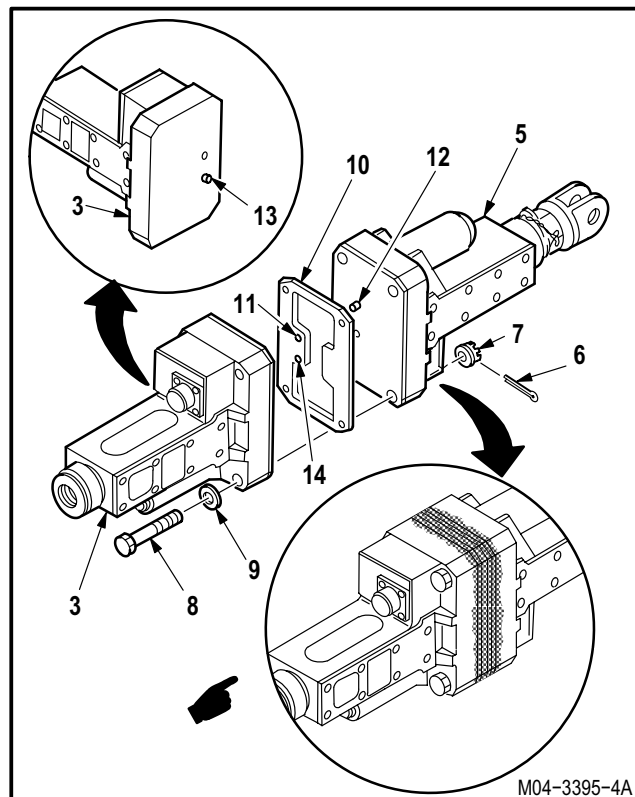
Ensure all actuator components are completely dry before assembly.

a. Install spacer (10) on actuator (5).

- (1) Aline hole (11) in spacer (10) with locating pin (12) on actuator (5).
- (2) Install spacer (10) on actuator (5).

**b. Assemble two actuators (3) and (5).**

- (1) Aline locating pin (13) on actuator (3) with locating hole (14) in spacer (10).
- (2) Place actuators (3) and (5) together.
- (3) Install four bolts (8) through washers (9) and actuators (3) and (5).
- (4) Install four nuts (7).
- (5) Install four new cotter pins (6).
- (6) Apply sealant to mating surfaces of actuators (3) and (5). Use sealant (item 158A, App F).



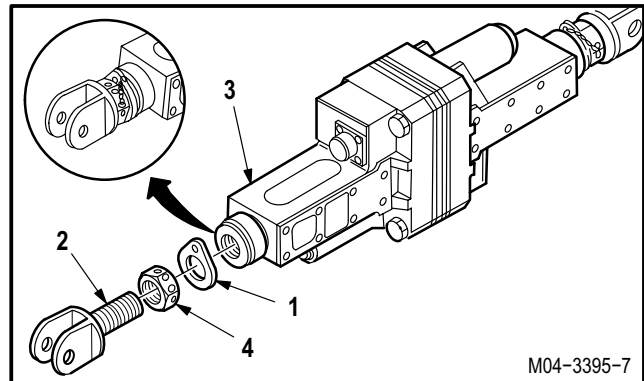
- c. Apply corrosion preventive compound to threads of clevis prior to re-assembly.** Use Corrosion preventive compound (item 63, App F).

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11.225. STABILATOR ACTUATOR DISASSEMBLY/ASSEMBLY – continued

d. Install and adjust clevis (2) on actuator (3).
Torque nut (4) to **300 INCH-POUNDS**.

- (1) Hand tighten nut (4) on clevis (2).
- (2) Install keywasher (1) on clevis (2).
- (3) Install clevis (2) in actuator (3) until distance between keywasher (1) and base of clevis (2) matches previously recorded measurement.
- (4) Hold clevis (2). Use open end wrench.
- (5) Torque nut (4) to **300 INCH-POUNDS**. Use torque wrench and crowfoot.



e. Inspect (QA).

f. Lockwire nut (4) to keywasher (1). Use wire (item 226, App F).

g. Inspect (QA).

h. Install stabilator actuator (para 11.224).

END OF TASK

11.226. STABILATOR CONTROLLER REMOVAL

11.226.1. Description

This task covers: Removal. Cleaning. Inspection.

11.226.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)

Personnel Required:

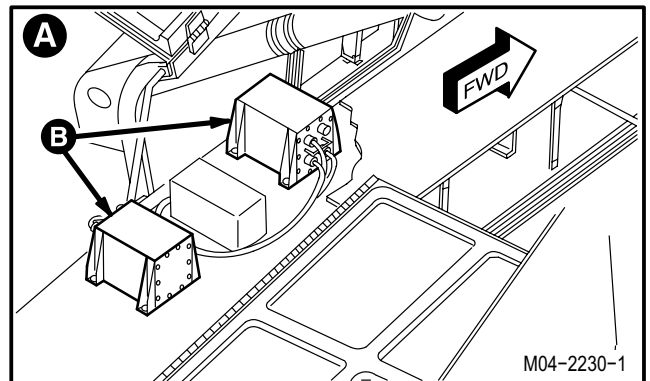
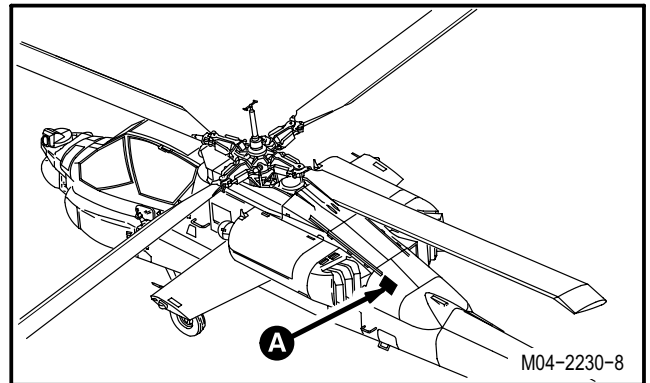
68X Armament/Electrical System Repairer

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access doors T290L, T290R, and L325 opened

NOTE

This task is typical for either No. 1 (aft) or No. 2 (forward) controller.



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11.226. STABILATOR CONTROLLER REMOVAL – continued

11.226.3. Removal

a. Detach connectors from controller (1).

- (1) Controller No. 1.
 - (a) Detach connector P985 (2) from receptacle J1 (3).
 - (b) Detach connector P986 (4) from receptacle J2 (5).
 - (c) Detach connector P987 (6) from receptacle J3 (7).

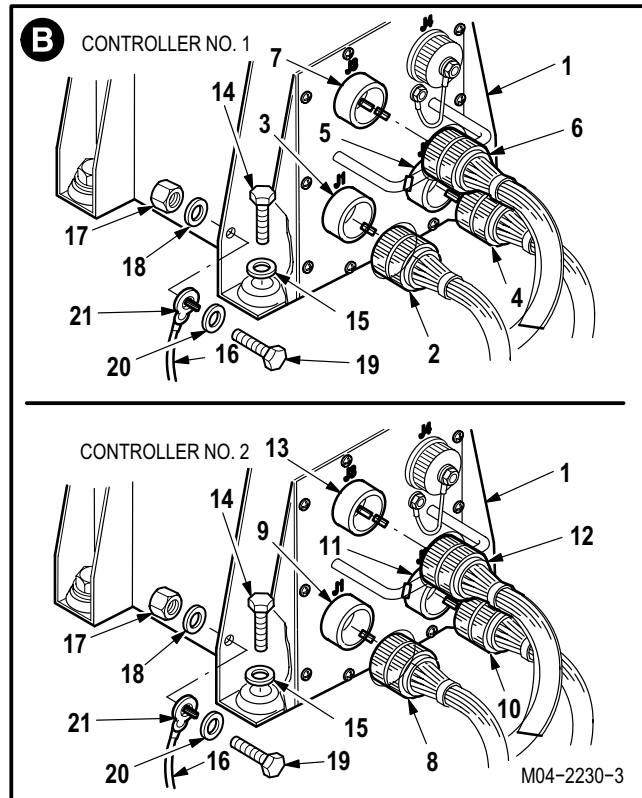
- (2) Controller No. 2.
 - (a) Detach connector P989 (8) from receptacle J1 (9).
 - (b) Detach connector P990 (10) from receptacle J2 (11).
 - (c) Detach connector P991 (12) from receptacle J3 (13).

b. Detach ground wire (16).

- (1) Remove nut (17) and washer (18).
- (2) Remove bolt (19), washer (20), and lug (21).

c. Remove controller (1).

- (1) Remove four bolts (14) and washers (15).
- (2) Lift controller (1) from helicopter.



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11.226. STABILATOR CONTROLLER REMOVAL

11.226.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.226.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

END OF TASK

11.227. STABILATOR CONTROLLER INSTALLATION

11.227.1. Description

This task covers: Installation.

11.227.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)

Personnel Required:

68X Armament/Electrical System Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

References:

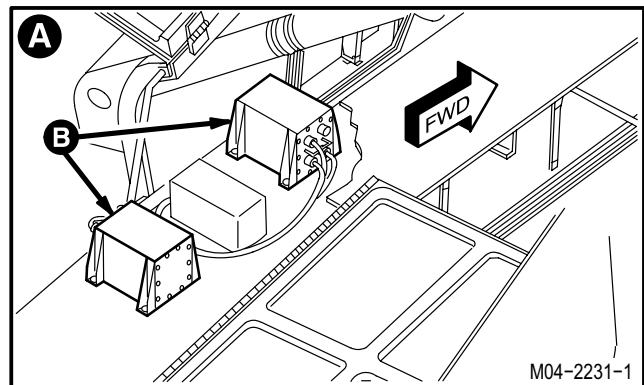
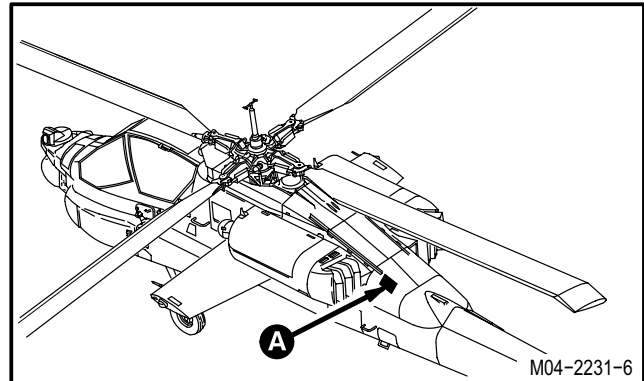
TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

NOTE

This task is typical for either No. 1 (aft) or No. 2 (forward) controller.



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11.227. STABILATOR CONTROLLER INSTALLATION – continued

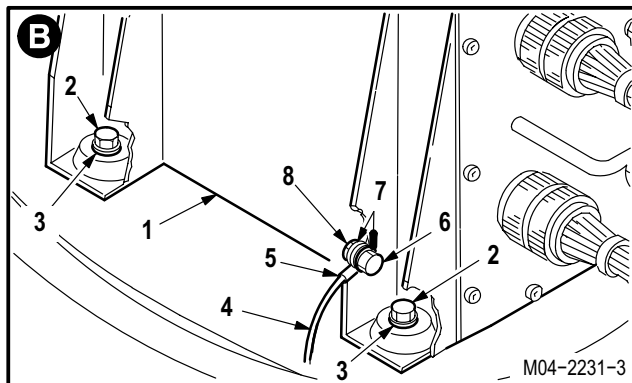
11.227.3. Installation

a. Install controller (1).

- (1) Install four bolts (2) and washers (3).

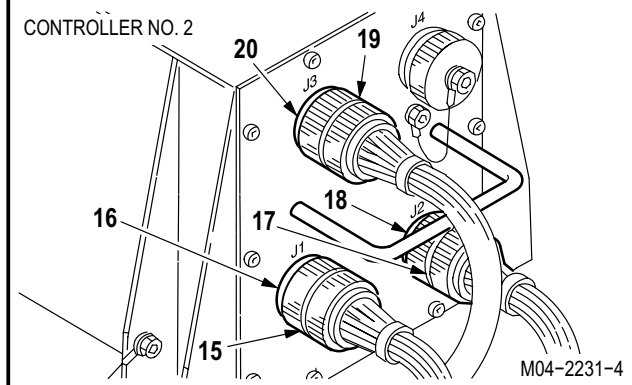
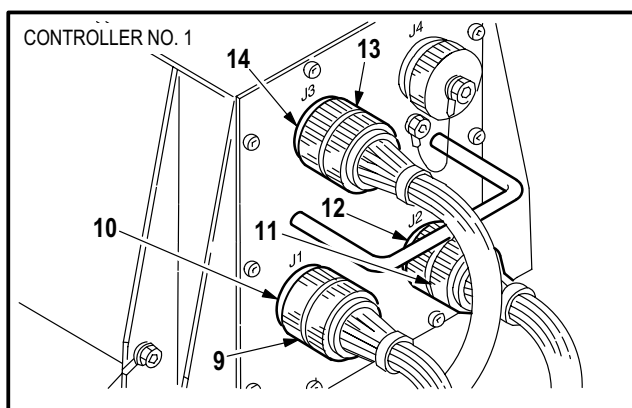
b. Attach ground wire (4).

- (1) Aline lug (5) with controller (1).
- (2) Install bolt (6) through washer (7), lug (5), and controller (1).
- (3) Install washer (7) and nut (8) on bolt (6).



c. Attach connectors to controller (1).

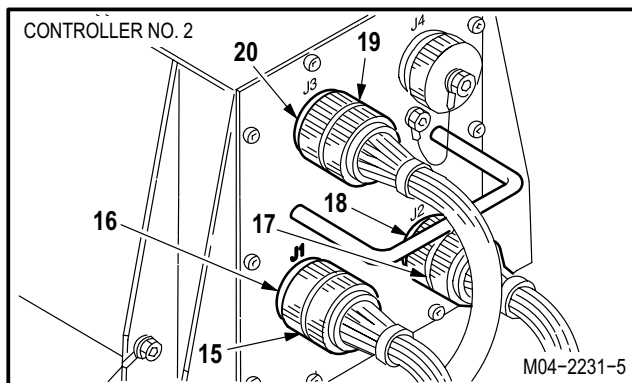
- (1) Controller No. 1.
 - (a) Attach connector P985 (9) to receptacle J1 (10).
 - (b) Attach connector P986 (11) to receptacle J2 (12).
 - (c) Attach connector P987 (13) to receptacle J3 (14).
- (2) Controller No. 2.
 - (a) Attach connector P989 (15) to receptacle J1 (16).
 - (b) Attach connector P990 (17) to receptacle J2 (18).
 - (c) Attach connector P991 (19) to receptacle J3 (20).



d. Inspect (QA).

e. Perform stabilator maintenance operational check (TM 1-1520-238-T).

f. Secure access doors T290L, T290R, and L325 (para 2.2).



END OF TASK

11.228. STABILATOR CONTROLLER CIRCUIT CARD ASSEMBLY (CCA) REMOVAL/INSTALLATION (AVIM)

11.228.1. Description

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

11.228.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
8-inch electrostatic discharger (item 108, App H)
Large wrist grounding strap (item 346, App H)
1 - 100 inch-ounce 1/4-inch hexagon drive click type torque wrench (item 437, App H)

Personnel Required:

68X Armament/Electrical System Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

Materials/Parts:

Cloth (item 52, App F)
Shipping and storage bag (item 183, App F)

References:

TM 11-6625-3085-12
TM 55-1500-323-24

NOTE

This task is typical for circuit cards A1 thru A4.

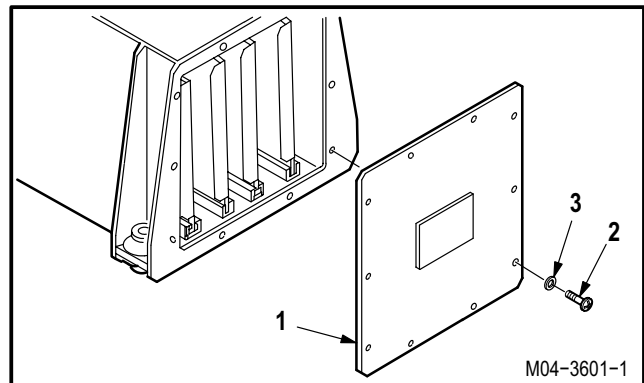
11.228.3. Removal

CAUTION

To prevent damage to electrostatic sensitive devices, wear ground strap when handling Circuit Card Assembly (CCA).

a. Remove control cover (1).

- (1) Remove 10 screws (2) and washers (3).



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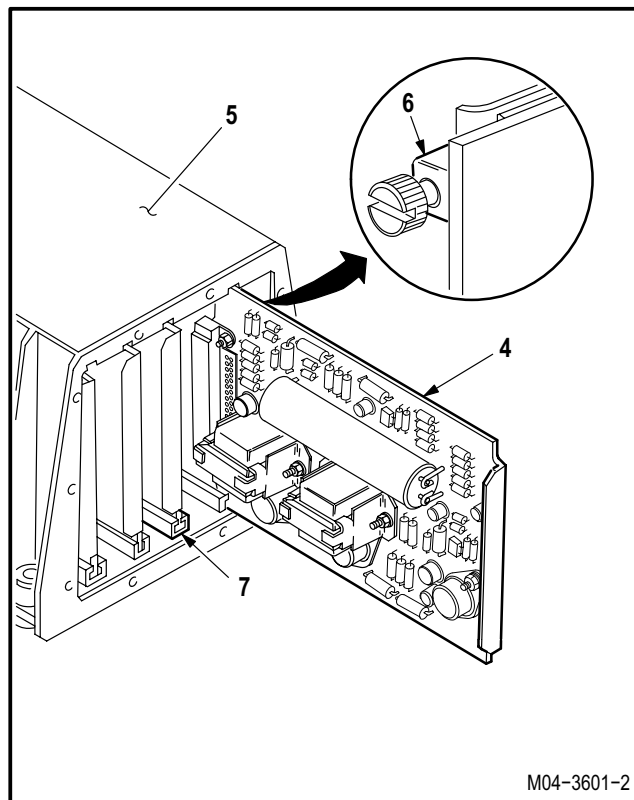
11.228. STABILATOR CONTROLLER CIRCUIT CARD ASSEMBLY (CCA) REMOVAL/INSTALLATION (AVIM) – continued

CAUTION

To prevent damage to electrostatic sensitive devices, CCA must be housed in a conductive container during storage with discharger installed.

b. Remove applicable CCA (4) from stabilator controller (5).

- (1) Locate CCA (4) to be replaced.
- (2) Loosen locking screws (6) on card guides (7).
- (3) Pull CCA (4) from controller (5).
- (4) Install discharger (8) on CCA (4). Use discharger.
- (5) Store CCA (4) in storage bag. Use shipping and storage bag (item 183, App F).

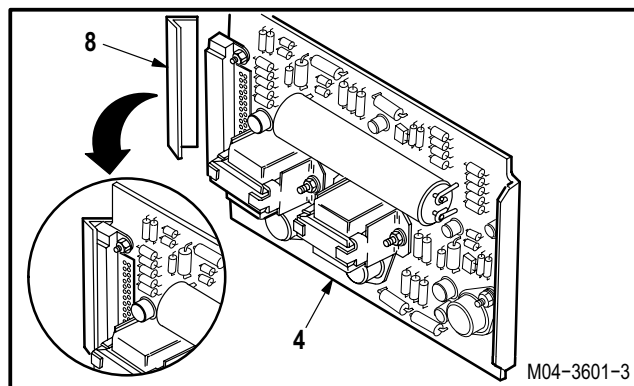


11.228.4. Cleaning

- a. **Wipe CCA card guide with a clean cloth.** Use cloth (item 52, App F).

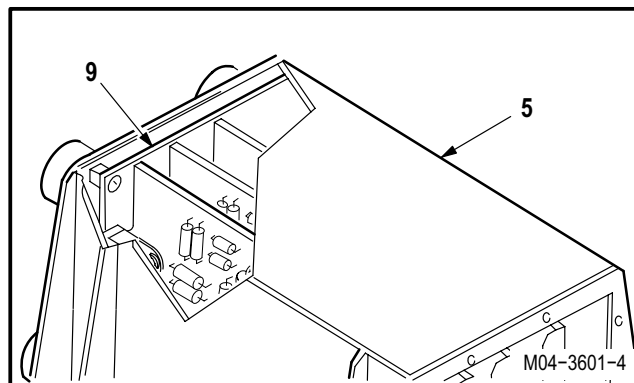
11.228.5. Inspection

- a. **Check connectors for bent or broken pins** (TM 55-1500-323-24).
- b. **Check removed and attaching parts for cracks.** None allowed.
- c. **Check removed and attaching parts for damage** (para 11.190).
- d. **Check removed and attaching parts for corrosion** (para 1.49).



11.228.6. Repair

- a. **Repair controller (5) by replacing interconnect CCA (9)** (para 11.229).



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11.228. STABILATOR CONTROLLER CIRCUIT CARD ASSEMBLY (CCA) REMOVAL/INSTALLATION (AVIM) – continued

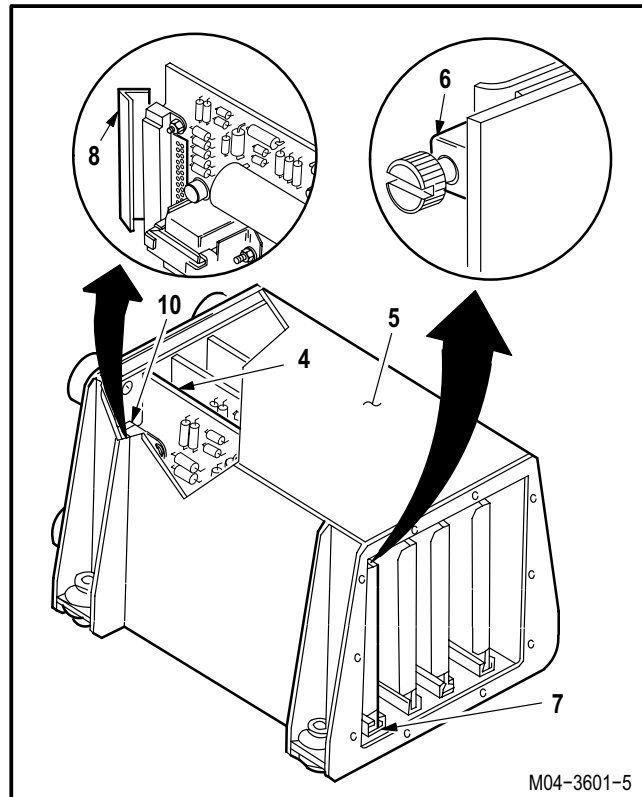
11.228.7. Installation

a. **Attach grounding strap.**

b. **Install CCA (4) in controller (5). Torque locking screws (6) 20 INCH-OUNCES.**

- (1) Remove CCA (4) from storage bag.
- (2) Remove discharger (8).
- (3) Place CCA (4) in appropriate card guide (7).
- (4) Install CCA (4) in controller (5) until seated in appropriate connector (10).
- (5) Torque locking screws (6) **20 INCH-OUNCES**. Use torque wrench.

c. **Inspect (QA).**

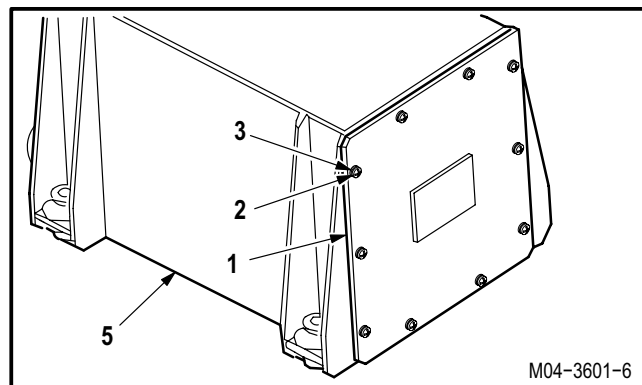


d. **Install cover (1). Torque 10 screws (2) 56 INCH-OUNCES.**

- (1) Position cover (1) on control unit (5).
- (2) Install 10 screws (2) and washers (3).
- (3) Torque 10 screws (2) **56 INCH-OUNCES**. Use torque wrench.

e. **Inspect (QA).**

f. **Perform appropriate functional test (TM 11-6625-3085-12).**



END OF TASK

11.229. STABILATOR CONTROLLER INTERCONNECT CIRCUIT CARD ASSEMBLY (CCA) REMOVAL/INSTALLATION (AVIM)

11.229.1. Description

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

11.229.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
 Light duty laboratory apron (item 27, App H)
 #1 phillips screwdriver bit (item 35, App H)
 Chemical protective gloves (item 154, App H)
 Adjustable air filtering respirator (item 262, App H)
 1 - 100 inch-ounce 1/4-inch hexagon drive click type
 torque wrench (item 437, App H)

Materials/Parts:

Sealing compound primer (item 146, App F)
 Sealing compound (item 169, App F)

Personnel Required:

68X Armament/Electrical System Repairer
 68X3F Armament/Electrical System Repairer/
 Technical Inspector

Equipment Conditions:

Ref	Condition
11.228	Stabilator controller CCA A1 thru A4 removed

11.229.3. Removal

- a. **Remove electronic retaining plate (1) and interconnect circuit card assembly (2) from stabilator controller (3).**

(1) Remove 10 screws (4) and washers (5).

- b. **Remove circuit card (2) from plate (1).**

(1) Remove cover (6) from receptacle J4 (7).

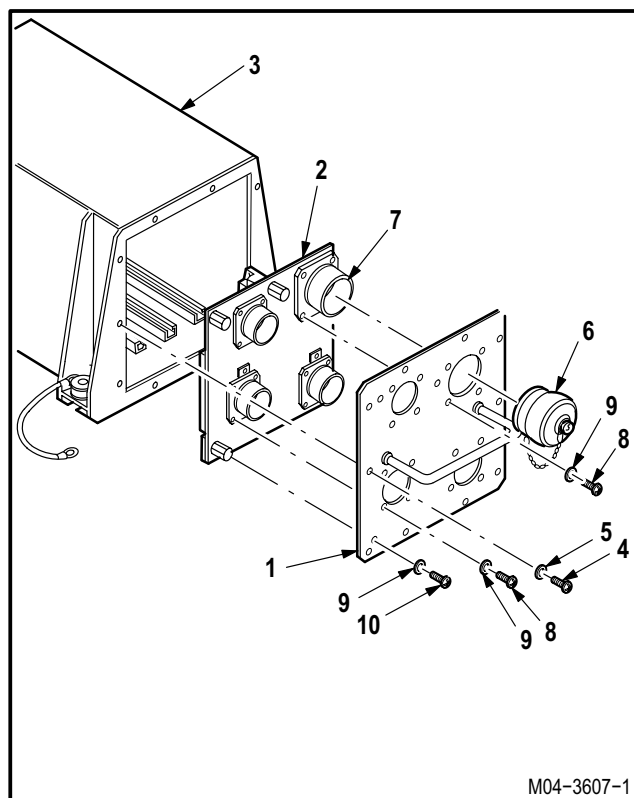
(2) Remove 16 screws (8) and washers (9).

(3) Remove four screws (10) and washers (9).

(4) Separate circuit card (2) from plate (1).

11.229.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**



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**11.229. STABILATOR CONTROLLER INTERCONNECT CIRCUIT CARD ASSEMBLY (CCA)
REMOVAL/INSTALLATION (AVIM) – continued**

11.229.5. Inspection

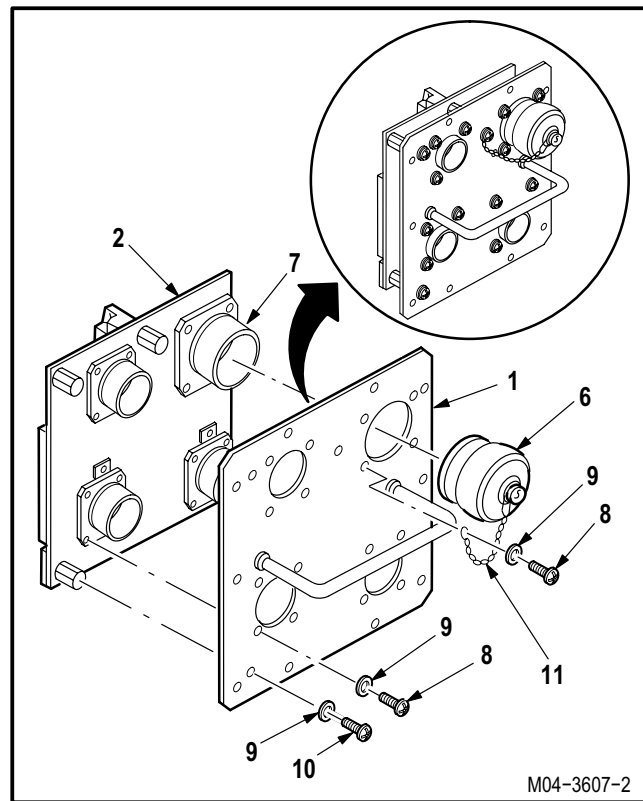
- a. **Check removed and attaching parts for damage** (para 11.190).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

11.229.6. Installation



- a. **Attach circuit card (2) to retaining plate (1).** Torque 4 screws (10) and 16 screws (8) **48 to 54 INCH-OUNCES**.

- (1) Apply a uniform coat of sealing compound primer to threads of four screws (10). Use sealing compound primer (item 146, App F).
- (2) Apply a uniform coat of sealing compound primer to threads of four screws (10). Use sealing compound (item 169, App F).
- (3) Allow to air dry **40 MINUTES**.
- (4) Position retaining plate (1) on circuit card (2).
- (5) Install four screws (10) and washers (9).
- (6) Install one screw (8) through washer (9) and chain (11) in plate (1).
- (7) Install 15 screws (8) and washers (9).
- (8) Torque 4 screws (10) and 16 screws (8) **48 to 54 INCH-OUNCES**. Use torque wrench.
- (9) Install cover (6) on receptacle J4 (7).



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**11.229. STABILATOR CONTROLLER INTERCONNECT CIRCUIT CARD ASSEMBLY (CCA)
REMOVAL/INSTALLATION (AVIM) – continued**

b. **Inspect (QA).**

c. **Install plate (1) and circuit card (2) in controller (3). Torque 10 screws (4) 48 to 54 INCH-OUNCES.**

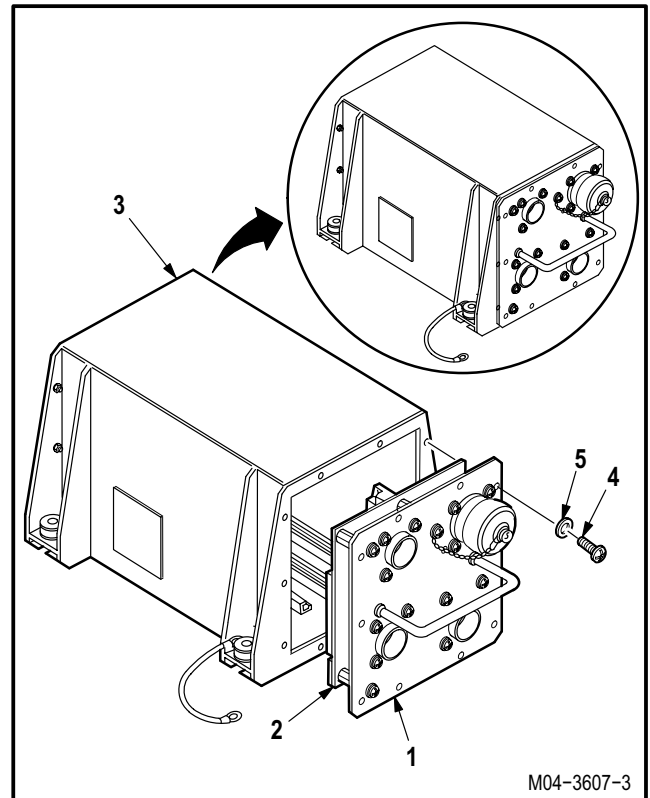
(1) Position plate (1) and circuit card (2) on controller (3).

(2) Install 10 screws (4) and washers (5).

(3) Torque 10 screws **48 to 54 INCH-OUNCES**.
Use torque wrench.

d. **Inspect (QA).**

e. **Install stabilator controller CCA A1 thru A4**
(para 11.228).



END OF TASK

11.230. STABILATOR CONTROLLER ELECTRICAL CHASSIS REPAIR (AVIM)

11.230.1. Description

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

11.230.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
Airframe repairman's tool kit (item 377, App H)
Electronic equipment maintenance kit (item 208, App H)
Light duty laboratory apron (item 27, App H)
0.0015 - 0.0250-inch thickness gage (item 152, App H)
Chemical protective gloves (item 154, App H)
Heat protective gloves (item 155, App H)
Precision oven (item 221, App H)
Adjustable air filtering respirator (item 262, App H)
1 - 100 inch-ounce 1/4-inch hexagon drive click type torque wrench (item 437, App H)

Materials/Parts:

Adhesive film (item 24, App F)
Alcohol (item 25, App F)
Cloth (item 52, App F)

Personnel Required:

68X Armament/Electrical System Repairer
68G Aircraft Structural Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

References:

TM 1-1500-204-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
11.228	Stabilator controller circuit card assemblies (CCA) removed
11.229	Stabilator controller interconnect circuit card assembly (CCA) removed

NOTE

This task is typical for all stabilator controller electrical chassis cardholders.

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11.230. STABILATOR CONTROLLER ELECTRICAL CHASSIS REPAIR (AVIM) – continued

11.230.3. Removal

- a. **Remove electrical card holder (1) from top plate (2) or bottom plate (3).**

(1) Remove four rivets (4) from plate (2) or (3) (TM 1-1500-204-23).

(2) Remove adhesive film from under holder (1).

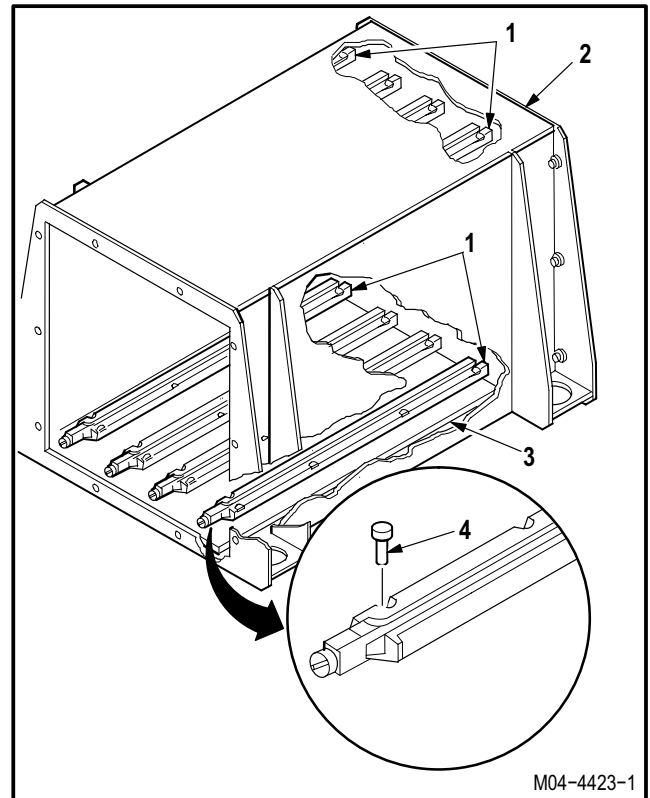
(3) Remove holder (1) from plate (2) or (3).

11.230.4. Cleaning

- a. **Clean adhesive residue and dust from plate.** Use cloth (item 52, App F) and alcohol (item 25, App F).

11.230.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.190).
- c. **Check removed and attaching parts for corrosion** (para 1.49).



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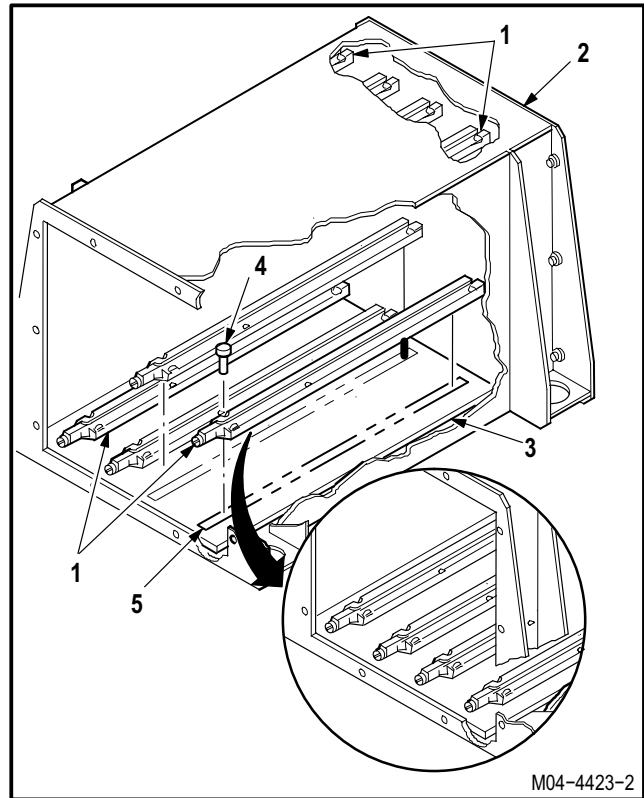
11.230. STABILATOR CONTROLLER ELECTRICAL CHASSIS REPAIR (AVIM) – continued

11.230.6. Installation



a. Install holder (1) on plate (2) or (3).

- (1) Apply adhesive film (5) on holder mounting area of plate (2) or (3). Use adhesive film (item 24, App F).
- (2) Ensuring a visible adhesive flow is present on both sides of holder (1), install holder (1) on film (5).
- (3) Apply a pressure of 15 to 50 psi to holder (1). Use appropriate shot bag from electronic equipment maintenance kit.
- (4) While maintaining a pressure of 15 to 50 psi, cure adhesive at 350 °F (177 °C) for **2 HOURS**, then cool to 150 °F (66 °C) or less. Use oven.
- (5) Install four rivets (4) on plate (2) or (3) (TM 1-1500-204-23).



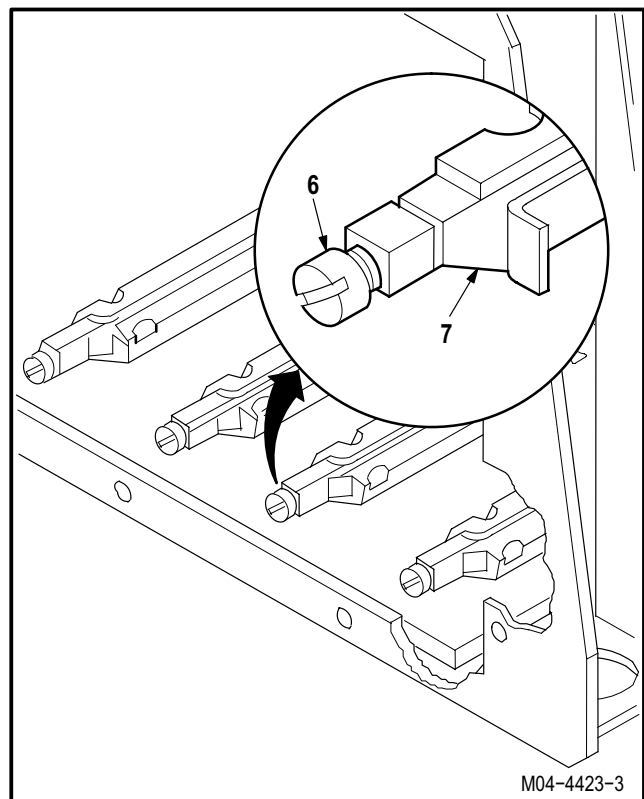
b. Adjust locking screw (6).

- (1) Place **0.045 ±0.001 INCH** thickness gage in circuit card track (7) of holder (1). Use thickness gage.
- (2) Torque screw (6) to **20 INCH-OUNCES**. Use torque wrench.
- (3) Remove thickness gage from track (7).

c. Inspect (QA).

d. Install stabilator controller interconnect CCA (para 11.229).

e. Install stabilator controller CCA (para 11.228).



END OF TASK

11.231. STABILATOR POSITION TRANSDUCER REMOVAL/INSTALLATION

11.231.1. Description

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

11.231.2. Initial Setup

Tools:

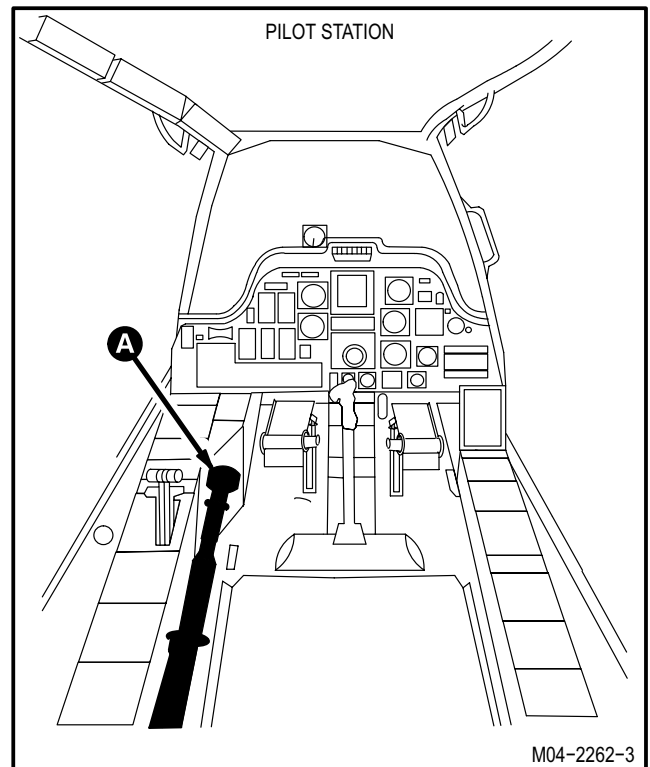
- Electrical tool kit (item 378, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access cover R545 removed
1.70	External electrical power connected

Personnel Required:

- 68X Armament/Electrical System Repairer
One person to assist
- 67R3F Attack Helicopter Repairer/Technical
Inspector



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11.231. STABILATOR POSITION TRANSDUCER REMOVAL/INSTALLATION – continued

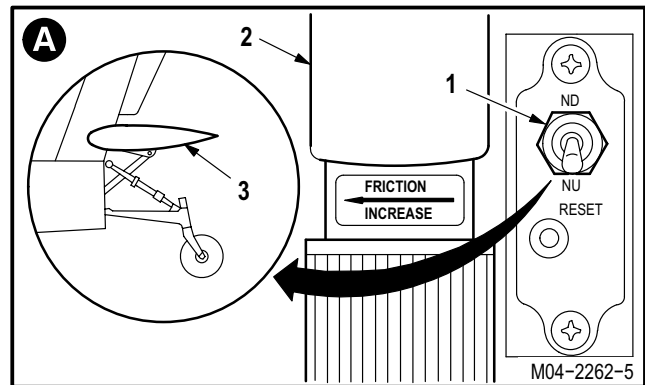
11.231.3. Removal

- a. **Enter pilot station (para 1.56). Observe all safety precautions.**
- b. **One person stationed at left wing tip for communications.** Use headset and cord assembly.

WARNING

Movement of horizontal stabilator can cause injury to personal. Do not actuate horizontal stabilator during maintenance. If injury occurs, seek medical aid.

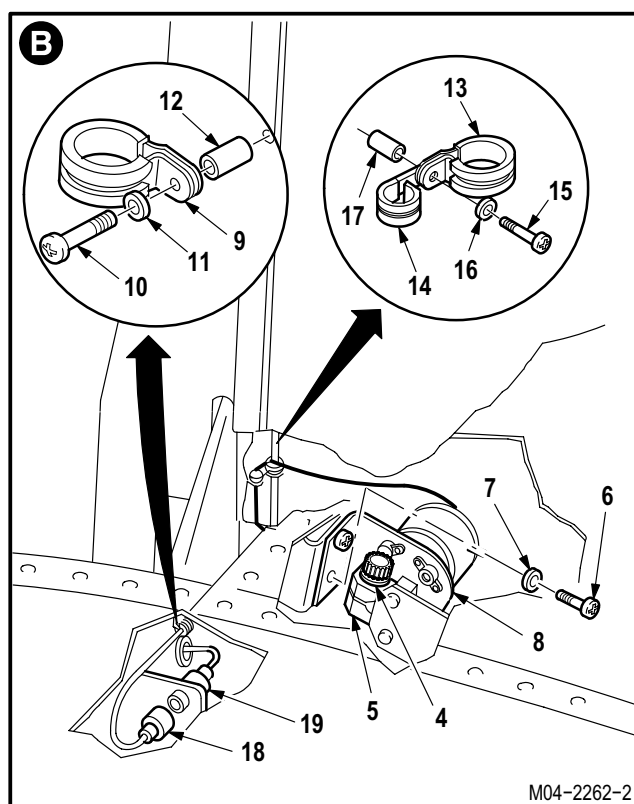
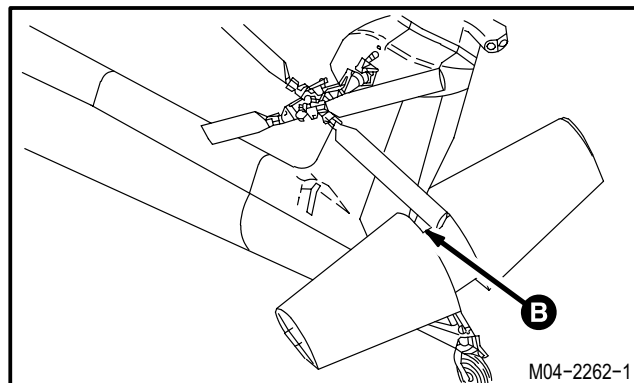
- c. **On pilot aft circuit breaker panel, close STAB circuit breakers MAN DC.**
- d. **On pilot aft circuit breaker panel, open STAB circuit breakers AUTO DC and AUTO AC.**
- e. **Apply external electrical power (para 1.70).**
- f. **Hold stabilator switch (1) on pilot collective stick (2) to NU (nose up) until trailing edge of stabilator (3) is full up.**
- g. **Remove external electrical power (para 1.70).**
- h. **On pilot aft circuit breaker panel, open STAB circuit breakers MAN DC and MAN AC.**



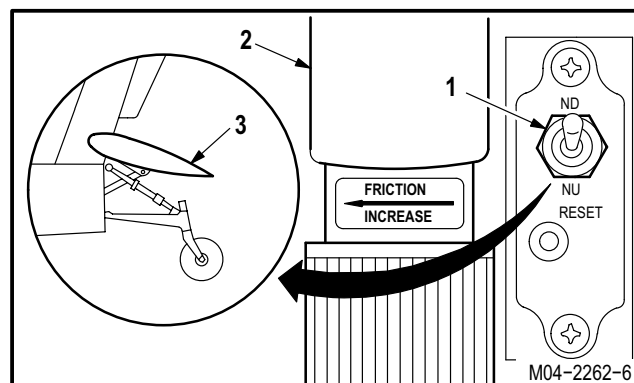
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11.231. STABILATOR POSITION TRANSDUCER REMOVAL/INSTALLATION – continued

- i. Loosen bolt (4) on sensor clamp (5).
- j. Remove lower screw (6) and washer (7) from transducer mounting bracket (8).
- k. Remove clamp (9).
 - (1) Remove screw (10), washer (11), and spacer (12).
- l. Remove two clamps (13) and (14).
 - (1) Remove screw (15), washer (16), and spacer (17).
- m. Detach transducer connector P1076 (18) from receptacle J1076 (19).
- n. On pilot aft circuit breaker panel, close STAB circuit breakers MAN DC and MAN AC.



- o. Apply external electrical power (para 1.70).
- p. On pilot collective stick (2), hold stabilator switch (1) to ND (nose down) until trailing edge of stabilator (3) is full down.
- q. Remove external electrical power (para 1.70).
- r. On pilot aft circuit breaker panel, open STAB circuit breakers MAN DC and MAN AC.



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11.231. STABILATOR POSITION TRANSDUCER REMOVAL/INSTALLATION – continued

s. **Remove upper screw (20) and washer (21) from bracket (8).**

t. **Remove transducer (22) from bracket (8).**

(1) Remove four screws (23).

11.231.4. Cleaning

a. **Wipe transducer mounting bracket and installation area with a clean rag.**

11.231.5. Inspection

a. **Check removed and attaching parts for damage (para 11.190).**

b. **Check removed and attaching parts for corrosion (para 1.49).**

11.231.6. Installation

a. **Install transducer (22) on bracket (8).**

(1) Install four screws (23).

b. **Install transducer (22) with bracket (8) on stabilator (3).**

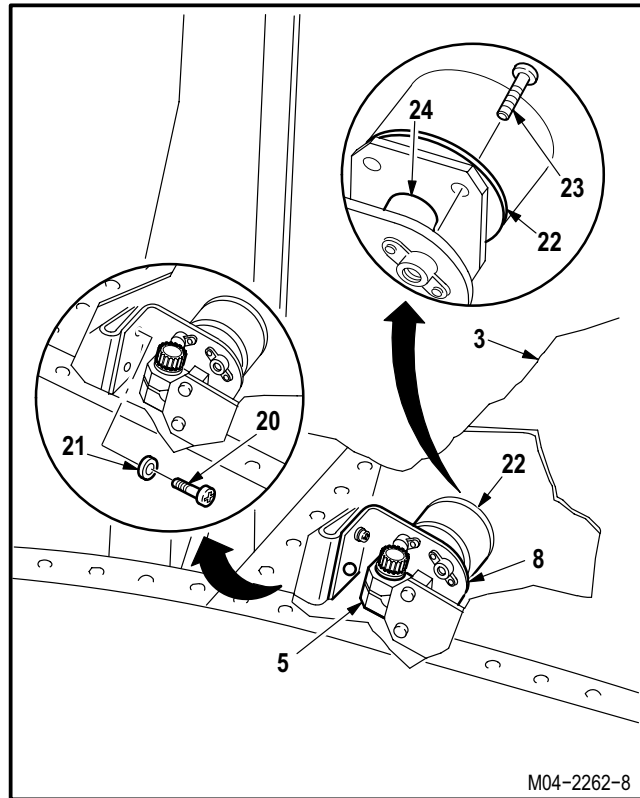
(1) Ensure transducer shaft (24) goes through hole in clamp (5).

c. **Install transducer mounting bracket (8) to stabilator (3).**

(1) Install upper screw (20) and washer (21).

d. **On pilot aft circuit breaker panel, close STAB circuit breaker MAN DC and MAN AC.**

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

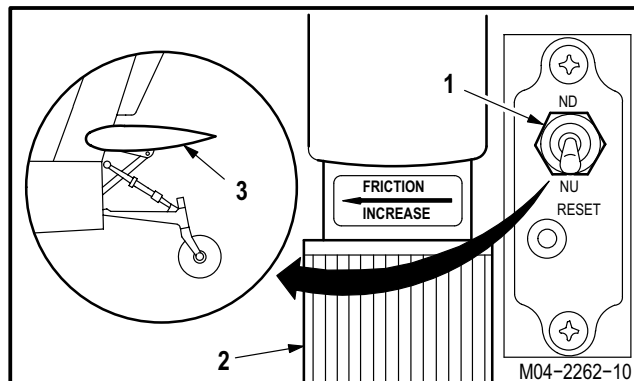


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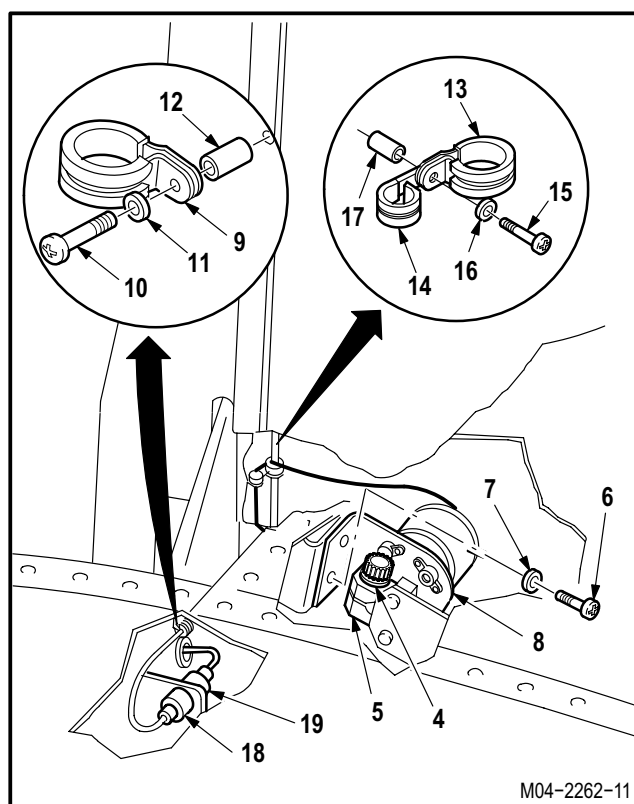
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11.231. STABILATOR POSITION TRANSDUCER REMOVAL/INSTALLATION – continued

- f. On pilot collective stick (2), hold stabilator switch (1) to NU (nose up) position until trailing edge of stabilator (3) is full up.
- g. Remove external electrical power (para 1.70).
- h. On pilot aft circuit breaker panel, open STAB circuit breaker MAN DC and MAN AC.



- i. Secure bracket (8) to stabilator.
 - (1) Install lower screw (6) and washer (7).
- j. Install clamp (9).
 - (1) Install screw (10) through washer (11), clamp (9), and spacer (12).



- k. Install two clamps (13) and (14).
 - (1) Install screw (15) through washer (16), clamps (13) and (14), and spacer (17).
 - (2) Tighten screw (15).
- l. Tighten bolt (4) on clamp (5).
- m. Attach transducer connector P1076 (18) to receptacle J1076 (19).
- n. On pilot aft circuit breaker panel, close STAB circuit breakers MAN DC and MAN AC.
- o. Perform rigging horizontal stabilator (para 11.298).
- p. Inspect (QA).
- q. Install access cover R545 (para 2.2).

END OF TASK

SECTION IV. DIRECTIONAL CONTROL SYSTEM MAINTENANCE

11.232. DIRECTIONAL CONTROL SYSTEM INSPECTION

11.232.1. Description

This task covers: Inspection. Tailrotor Swashplate Inspection. -15, -17, -19 and -901 Swashplate Inspection Procedure Prior to Installation. -15, -17, -19 And -901 Swashplate Inspection (10 Hour/14 Day Inspection Criteria). -15, -17, -19 and -901 Swashplate Inspection (Phase Inspection Criteria).

11.232.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 0.001 - 0.200-inch dial indicator (item 176, App H)
 0.0 - 10.0-pound weighing scale (item 272, App H)
 Light duty laboratory apron (item 27, App H)
 Chemical protective gloves (item 154, App H)
 Adjustable air filtering respirator (item 262, App H)

Personnel Required:

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

References:

TM 1-1500-204-23
 ■ TM 1-1520-264-23
 TM 55-1500-322-24

Materials/Parts:

■ Cloth (item 51, App F)
 Cloth (item 52, App F)
 ■ Methyl propyl ketone (item 125A, App F)
 Pad (item 130, App F)

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

11.232.3. Inspection

a. **General.**

- (1) Dents, gouges, scratches, or corrosion in control rods, bellcranks, brackets, supports, idlers, and other components:
 - (a) Damage in lug component bore within 1 and 1/2 times bore diameter is not to exceed 10 percent of material thickness or **0.040 INCH**, whichever is less.
 - (b) Damage in bulkhead or deck attachment area is not to exceed 25 percent of item area and no more than 20 percent of material thickness after repair.
- (2) Cracks in control rods, bellcranks, brackets, supports, idlers, and other components.
 - (a) If cracks are suspected, perform nondestructive inspection (TM 1-1520-264-23).

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11.232. DIRECTIONAL CONTROL SYSTEM INSPECTION – continued

b. Control rods.**NOTE**

Replace excessively worn bearing(s) (para 11.2 or 11.3).

- (1) Straightness must be within **0.030 INCH**.
- (2) Damage depth is not to exceed **0.010 INCH** or 10 percent of wall thickness, whichever is less.
- (3) Damage length must not exceed **1.0 INCH**.
- (4) Scratches and gouges not to exceed 1/3 circumference of the rod after repair.
- (5) Refer to TM 1-1500-204-23 for additional limits.

c. Drive links (scissors).

- (1) Load-bearing maximum allowable axial play **0.030 INCH** measured at the elbow joint.

d. Bushings and bearings.**NOTE**

- Maximum allowable damage limits (TM 55-1500-322-24).
- Replace excessively worn bushing(s) and/or bearing(s) (para 11.4).

- (1) Radial play with bolt in bushing or bearing inside diameter **0.004 INCH**.
- (2) Radial play with sliding bushing in flanged inside diameter **0.004 INCH**.
- (3) Radial play in ball bearing **0.002 INCH**.
- (4) Radial play of Teflon bearing **0.006 INCH**.
- (5) Serviceability of non-rotating swashplate inboard and outboard sleeve bearings. Inspect for debonding, folding, tearing, and wear through to metal. None allowed.
- (6) Measure non-rotating swashplate inboard and outboard sleeve bearings for serviceability. Measure ID four places equally spaced, both liner bearings.
 - (a) Reconditioned or in-service liner bearing ID is limited to **4.752 INCHES** minimum and **4.767 INCHES** maximum.

e. Tail rotor pitch link assembly.

- (1) Check pitch link assembly for gouges and scratches (para 11.277).
- (2) Maximum allowable radial play – **0.011 INCH** (large bearing), **0.006 INCH** (small bearing).
- (3) Maximum allowable axial play – **0.020 INCH** (large bearing), **0.014 INCH** (small bearing).

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11.232. DIRECTIONAL CONTROL SYSTEM INSPECTION – continued

WARNING

-9, -11, and -13 swashplates are not to be used and are to be immediately removed. If found, a Category 1 QDR should be issued.

f. **Swashplate.**

- (1) Bolt holes maximum allowable elongation **0.002 INCH**.
- (2) Nicks and scratches to **0.030 INCH** maximum depth must be blended out.
- (3) Rod end tang nicks and scratches to **0.015 INCH** maximum depth must be blended out.

NOTE

New swashplate bearings have a tendency to purge grease in the initial hours of operation until the grease is evenly distributed within the bearing. This purging can also be the result of operations in high ambient temperatures.

- (4) The following procedure is to be used for assessing grease purging from the 7-311527038-15, -17, -19, and -901 T/R swashplates.
 - (a) A small amount of grease purging from the swashplate is normal on new swashplate bearings for the first 50 flight hours.
 - (b) After the accrual of 50 flight hours, no excessive grease leakage is permitted except for an occasional light trace; significantly less than a new, zero time bearing.
 - (c) If after the initial 50 flight hour period, grease is expelled in significant quantities (evidence on surrounding components), remove and replace the T/R swashplate. Replace the swashplate assembly in accordance with para 11.262.

g. **Feel spring cartridge.**

- (1) Dents, gouges, scratches, nicks, wear, or corrosion not to exceed a depth of 10 percent of the material thickness after repair.
- (2) Radial play spherical rod end bearing not to exceed **0.006 INCH**.
- (3) Radial play of ball bearing not to exceed **0.002 INCH**.
- (4) Check for proper torque and safety of nut on shaft and rod end bearing.
- (5) Check for proper backlash and safety of cartridge cap.

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11.232. DIRECTIONAL CONTROL SYSTEM INSPECTION – continued

11.232.4. Tail Rotor Swashplate Inspection**a. Perform tail rotor swashplate inspection.**

(1) Visually check the non-rotating swashplate clevis lugs for any evidence of cracking, especially in the areas of the six attaching bolts.

(a) If separation is present, rebond or replace washer (para 11.262).

(2) Non-rotating swashplate inboard and outboard sleeve bearing inspection.

(a) If swashplate assembly has not been removed, disconnect nonrotating swashplate from bellcrank (para 11.262). Move swashplate axially on static mast.

(b) Inspect the static mast for unusual local discoloration, scratches, or discontinuity in the finish on the static mast where the swashplate inner and outer sleeve bearings travel.



(c) If this is noted, wipe the static mast with a cheese cloth (item 51, App F) and methyl propyl ketone (item 125A, App F).

(d) Remove swashplate assembly (para 11.262). Inspect non-rotating swashplate inboard and outboard sleeve bearings for liner debonding, folding, tearing, or wear through to metal.

(e) Measure non-rotating swashplate inboard and outboard sleeve bearings inside diameter at 3 places 60 degrees apart. Replace non-rotating swashplate if measurement is greater than **4.767 INCHES** in diameter.

(f) Clean inboard and outboard sleeve bearings by lightly scrubbing bearing surfaces. Use pad (item 130, App F).

(g) Wipe inboard and outboard sleeve bearings surfaces to remove any pad residue with cheese cloth (item 51, App F) and methyl propyl ketone (item 125A, App F).

(h) Reinstall swashplate assembly (para 11.262).

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11.232. DIRECTIONAL CONTROL SYSTEM INSPECTION – continued

NOTE

New swashplate bearings, have a tendency to purge grease in the initial hours of operation until the grease is evenly distributed within the bearing. This purging can also be the result of operations in high temperatures.

- (3) The following procedure is to be used for assessing grease purging from the 7-311527038-15, -17, -19, and -901 tail rotor swashplates.
 - (a) A small amount of grease purging from the swashplate is normal on new swashplate bearings for the first 50 flight hours.
 - (b) After accrual of 50 flight hours, no excessive grease leakage is permitted except for an occasional light trace; significantly less than a new, zero time bearing.
 - (c) If after the initial 50 flight hour period, grease is expelled in significant quantities (evidence on surrounding components), remove and replace the tail rotor swashplate. Replace the swashplate assembly (para 11.262).

b. Inspect tail rotor swashplate prior to removal for noisy or ratchety condition.

- (1) Tail rotor blade inspection.
 - (a) Perform inspection of tail rotor blade bearings for pitch change force (para 5.51).
- (2) Non-rotating swashplate inboard and outboard sleeve bearing inspection.
 - (a) Perform sleeve bearing inspection (para 11.232.4).

c. If these inspections are acceptable, reattach non-rotating swashplate to the bellcrank (para 11.262) and pitch control links to pitch horn (para 5.54).**CAUTION**

To avoid damage to clevis and bellcrank, do not allow swashplate assembly to creep inboard and contact the bellcrank while rotating swashplate.

11.232.5. -15, -17, -19, and -901 Swashplate Inspection Procedure Prior to Installation

- a. **Remove tail rotor de-ice brush block from tail rotor swashplate** (para 11.262).
- b. **Rotate the swashplate with a firm and constant rotational motion in one direction (preferably the direction of blade rotation) a minimum of six full 360 degree rotations.**
 - (1) Initially the bearing may exhibit a roughness and/or a ratchety feeling along with some apparent binding.

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11.232. DIRECTIONAL CONTROL SYSTEM INSPECTION – continued

- (2) Due to the close tolerance buildup of this bearing, coupled with the grease viscosity (temperature dependant), the initial roughness, ratchety feeling, and binding may not entirely diminish with subsequent rotations. This is not cause for rejection.
- (3) Obvious severe ratcheting, or binding and/or a metallic grinding is cause for rejection of the swashplate (para 11.262).

■ **c. Install tail rotor de-ice brush block in tail rotor swashplate** (para 11.262).

11.232.6. -15, -17, -19, and -901 Swashplate Inspection (10 Hour/14 Day Inspection Criteria)

a. **Check swashplate for smooth, quiet bearing rotation.** (This inspection requires no disassembly.)

- (1) Visually check outboard swashplate bearing seal for deterioration, contamination, or metal fragments.
 - (a) If seal is damaged or missing and/or metal fragments are present, replace swashplate assembly (para 11.262).
- (2) Using hydraulic accumulator pressure, move the pedals slowly full right, then full left to verify that the swashplate moves smoothly along the gearbox static mast. (Requires two people – one to cycle the controls and an observer).
 - (a) Leave pedals in the full left position.
- (3) Check the swashplate bearing for smoothness of operation, without binding, ratcheting, or chattering during full travel.
- (4) Small amount of grease expelling from the swashplate and wetness appearing on the outside surface of the seal are normal.
- (5) Seal surface requires small amount of grease/oil to lubricate itself and prevent dryness and excessive heat generation.

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11.232. DIRECTIONAL CONTROL SYSTEM INSPECTION

11.232.7. -15, -17, -19, and -901 Swashplate Inspection (Phase Inspection Criteria).

a. **Visually check outboard swashplate bearing seal for deterioration, contamination, or metal fragments.**

- (1) If seal is damaged or missing and/or metal fragments are present, replace swashplate assembly (para 11.262).

b. **Remove tail rotor de-ice brush block from tail rotor swashplate** (para 11.262).

■ c. **Disconnect non-rotating swashplate from bellcrank** (para 11.262).

d. **Check bellcrank/clevis attachment holes for elongation.**

- (1) Maximum allowable elongation is **0.002 INCH**.
- (2) Maximum allowable clevis lug ID **0.4385 INCH** (typical, 4 places).
- (3) Maximum oversize or out-of-round bushing ID **0.313 INCH** (typical, 2 places).

NOTE

- The inspection is to provide for repeated rotation of the swashplate, thereby allowing the grease to flow throughout the bearing. It is the nature of this new bearing to feel somewhat rough and sound noisy until the grease has been distributed.
 - Under no circumstances rotate the swashplate in opposing directions. This purges the grease out of the cage openings in the bearing, causing the balls to impact the cage walls which will produce a noisy and rough feel. Usually a few rotations of the bearing will smooth out grease buildup in the raceways of the bearing.
 - A slow light rotation of the swashplate will produce the same "ball-to-cage effect". This will give the bearing a rough or ratchety feel. Rotating the swashplate with a firm and quicker motion should alleviate this occurrence.
- e. **Rotate the stationary swashplate with a firm and constant rotation in one direction only (the direction of blade rotation).**
- (1) Perform this a minimum of six full 360 degree rotations.

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11.232. DIRECTIONAL CONTROL SYSTEM INSPECTION – continued

f. Check the swashplate bearing for smoothness of operation.

- (1) Repeat this rotational procedure to verify discrepancies if there is intermittent binding, ratcheting, chattering, or grinding.
- (2) If a second check does not dispel the irregularities, replace the swashplate (para 11.262).

g. Perform tail rotor swashplate inspection (step 11.232.4).**NOTE**

This completes the inspection requirements for the swashplate. A swashplate that passes this inspection can remain in service.

h. Connect non-rotating swashplate to bellcrank (para 11.262).**i. Install tail rotor de-ice brush block in tail rotor swashplate (para 11.262).**

END OF TASK

**11.233. PILOT DIRECTIONAL CONTROL PEDAL AND PEDAL SKIRT
REMOVAL/INSTALLATION**

11.233.1. Description

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

11.233.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
9-inch x 1/2-inch drive hinged socket wrench handle
(item 171, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (2)

Personnel Required:

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

Equipment Conditions:

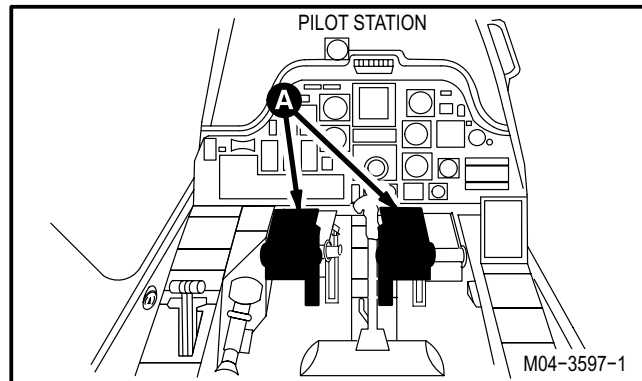
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

NOTE

The following task is typical for left and right directional pedals except as noted.

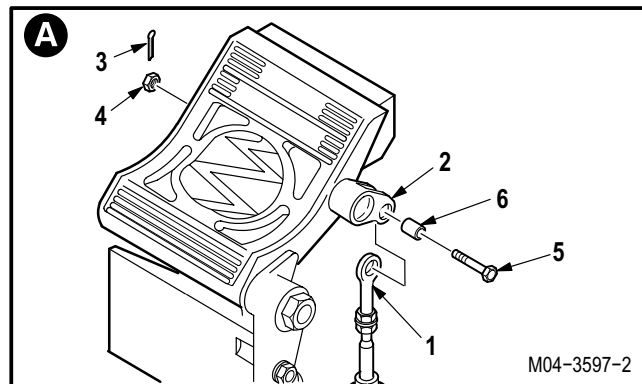
11.233.3. Removal

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



- b. **Remove master cylinder rod end (1) from pedal clevis (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove self-locking nut (4).
- (3) Remove close tolerance bolt (5) and sleeve bushing (6).
- (4) Remove rod end (1).



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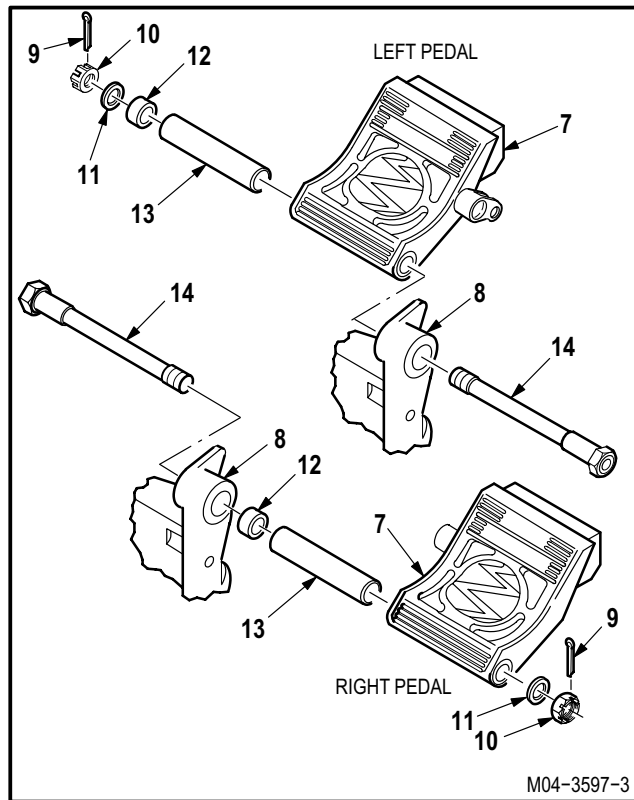
**11.233. PILOT DIRECTIONAL CONTROL PEDAL AND PEDAL SKIRT
REMOVAL/INSTALLATION – continued**

c. Remove pedal (7) from pedal skirt (8).

- (1) Remove and discard cotter pin (9).
- (2) Remove nut (10), washer (11), and pedal (7). Use hinged handle.
- (3) Remove ball bearing (12) and sleeve spacer (13) from pedal (7).
- (4) Remove bolt (14) from skirt (8).

d. Remove skirt (8) from pivot support (15).

- (1) Remove two self-locking nuts (16) and washers (17).
- (2) Remove two shear bolts (18).
- (3) Remove skirt (8).

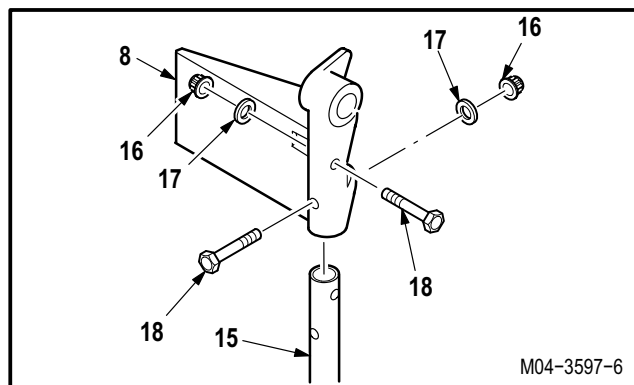


11.233.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.233.5. Inspection

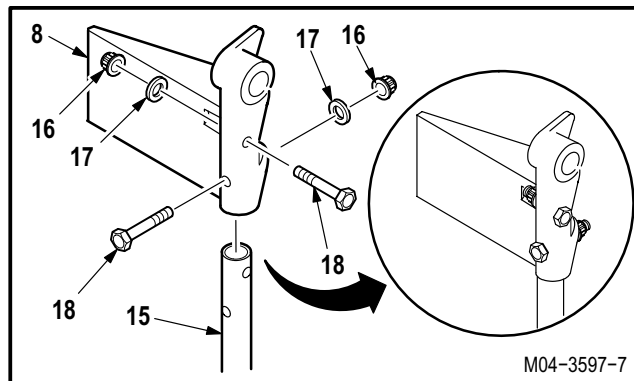
- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).



11.233.6. Installation

a. Install skirt (8) on support (15).

- (1) Position skirt (8) on support (15).
- (2) Install two bolts (18) through skirt (8) and support (15).
- (3) Install two washers (17) and nuts (16).

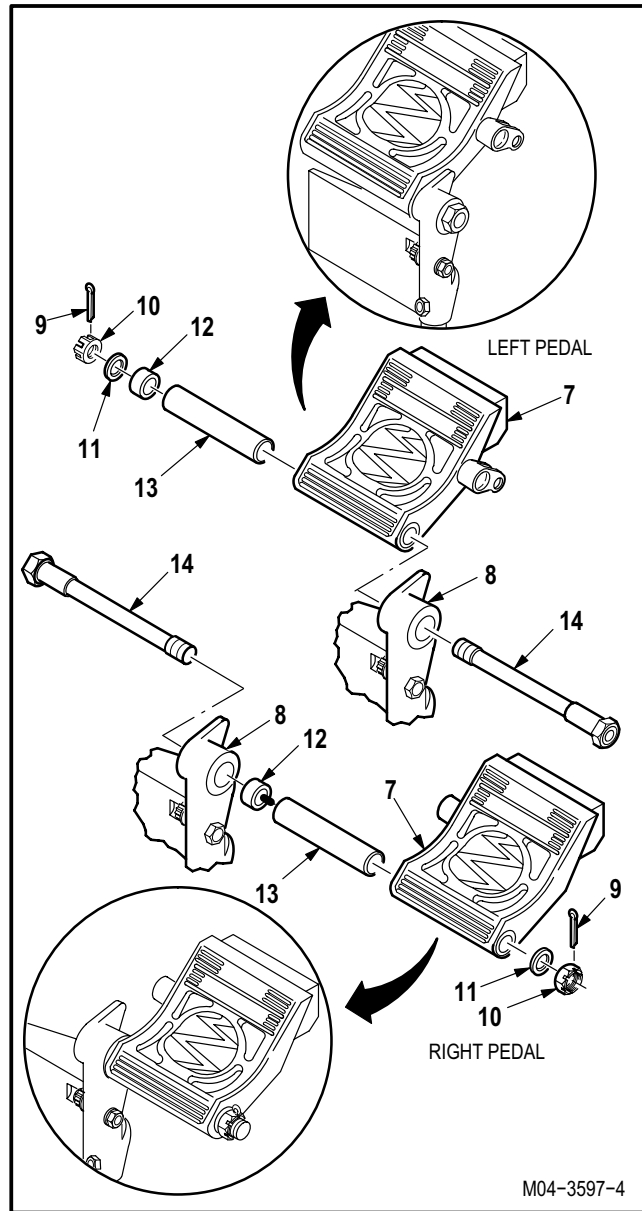


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**11.233. PILOT DIRECTIONAL CONTROL PEDAL AND PEDAL SKIRT
REMOVAL/INSTALLATION – continued**

b. Install pedal (7) on skirt (8).

- (1) Install spacer (13) and bearing (12) in pedal (7).
- (2) Position pedal (7) on skirt (8).
- (3) Install bolt (14) through skirt (8) and pedal (7).
- (4) Install washer (11) and nut (10). Use hinged handle.
- (5) Tighten nut (10) to aline cotter pin holes.
- (6) Install new cotter pin (9).

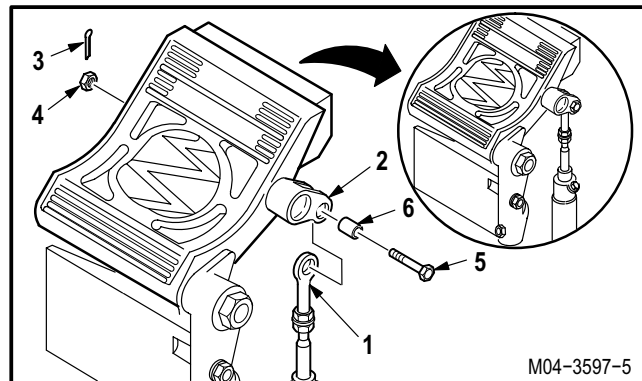


c. Install rod end (1) on clevis (2).

- (1) Position rod end (1) in clevis (2).
- (2) Install bushing (6) in clevis (2).
- (3) Install bolt (5) through bushing (6) from in-board side.
- (4) Install nut (4).
- (5) Tighten nut (4) to aline cotter pin holes.
- (6) Install new cotter pin (3).

d. Inspect (QA).

e. Perform flight control system maintenance operational check (TM 1-1520-238-T).



END OF TASK

**11.234. PILOT DIRECTIONAL CONTROL PEDAL PIVOT SUPPORT ASSEMBLY
REMOVAL/INSTALLATION**

11.234.1. Description

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

11.234.2. 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)
- Adjustable air filtering respirator (item 262, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)
- 0 - 600 inch-pound 3/8-inch drive dial indicator torque wrench (item 447, App H)

Materials/Parts:

- Cotter pin (2)
- Sealing compound (item 176, App F)

Personnel Required:

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

References:

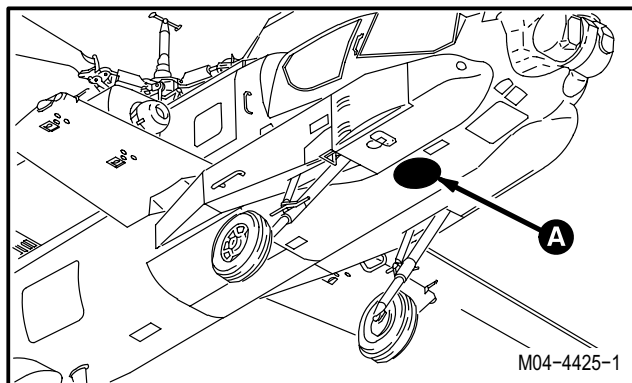
TM 9-1090-208-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57 11.233	Helicopter safed Pilot directional control pedal removed
TM 9-1090-208-23	Area weapon, turret, and flex chute removed

NOTE

This task is typical for left and right directional pedal pivot supports.



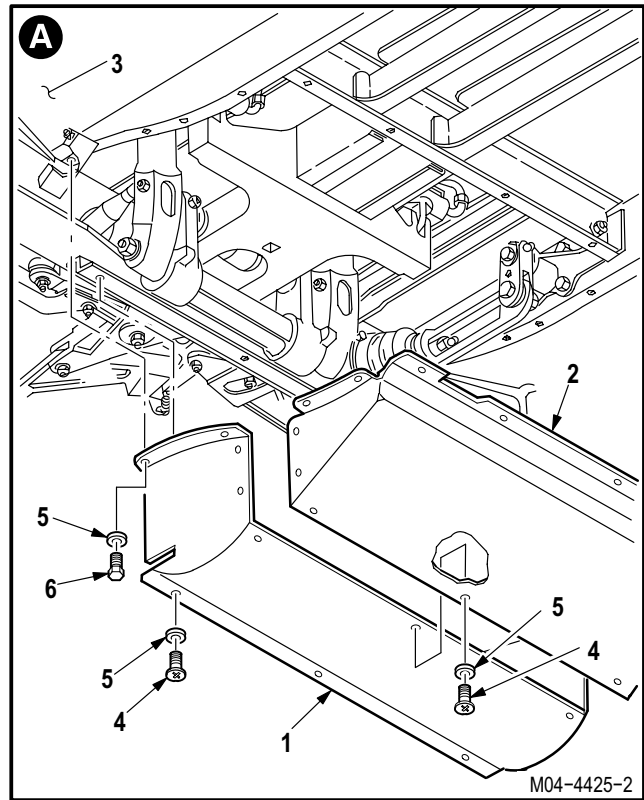
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**11.234. PILOT DIRECTIONAL CONTROL PEDAL PIVOT SUPPORT ASSEMBLY
REMOVAL/INSTALLATION – continued**

11.234.3. Removal

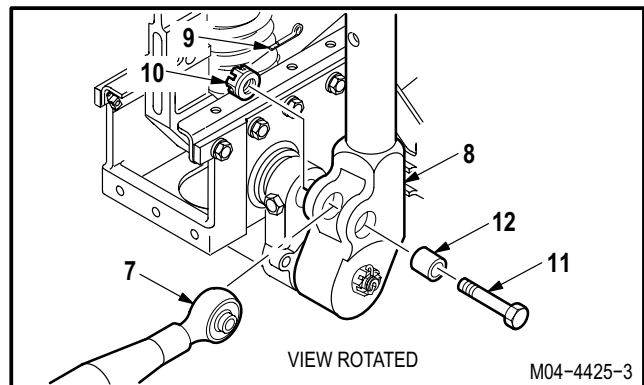
a. Remove covers (1) and (2) from airframe (3).

- (1) Remove 15 screws (4) and washers (5).
- (2) Remove bolt (6) and washer (5).
- (3) Remove cover (1).
- (4) Remove nine screws (4) and washers (5).
- (5) Remove cover (2).



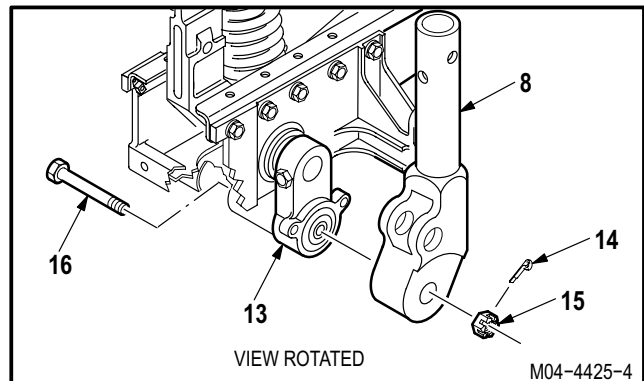
b. Remove rod (7) from pedal pivot support assembly (8).

- (1) Remove and discard cotter pin (9).
- (2) Remove nut (10).
- (3) Remove bolt (11) and bushing (12) from support (8) and rod (7).
- (4) Remove rod (7).



c. Remove support (8) from pedal crank (13).

- (1) Remove and discard cotter pin (14).
- (2) Remove nut (15).
- (3) Remove bolt (16).
- (4) Remove support (8).



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**11.234. PILOT DIRECTIONAL CONTROL PEDAL PIVOT SUPPORT ASSEMBLY
REMOVAL/INSTALLATION – continued**

11.234.4. Cleaning

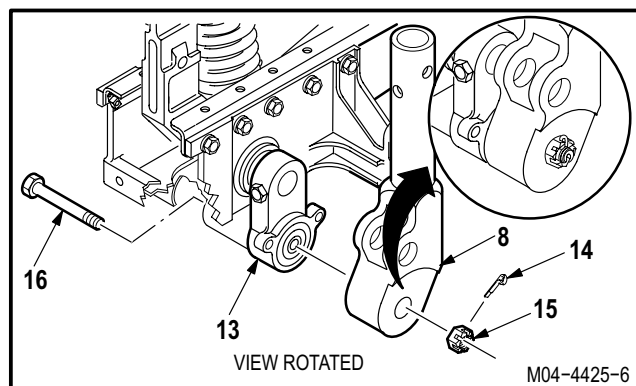
- a. **Wipe removed and attaching parts with a clean rag.**
- b. **Remove sealing compound from covers** (para 1.47).

11.234.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

11.234.6. Installation

- a. **Install support (8) on crank (13).** Torque nut (15) **180 to 300 INCH-POUNDS.**
 - (1) Aline support (8) with crank (13).
 - (2) Install bolt (16) through crank (13) and support (8).
 - (3) Check fit of self-retaining bolt (16) (para 11.1).
 - (4) Install nut (15). Torque nut (15) to **180 INCH-POUNDS.** Use torque wrench.
 - (5) Increase torque to aline cotter pin hole, but do not exceed **300 INCH-POUNDS.**
 - (6) Install new cotter pin (14).

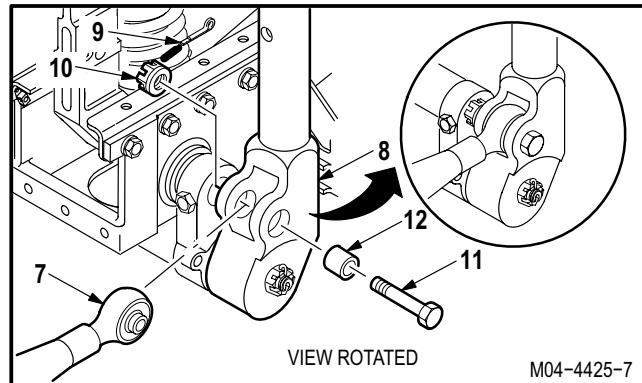


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**11.234. PILOT DIRECTIONAL CONTROL PEDAL PIVOT SUPPORT ASSEMBLY
REMOVAL/INSTALLATION – continued**

b. **Install rod (7) on support (8).** Torque nut (10) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (7) with support (8).
- (2) Install bolt (11) through bushing (12), support (8), and rod (7).
- (3) Check fit of self-retaining bolt (11) (para 11.1).
- (4) Install nut (10). Torque nut (10) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install new cotter pin (9).

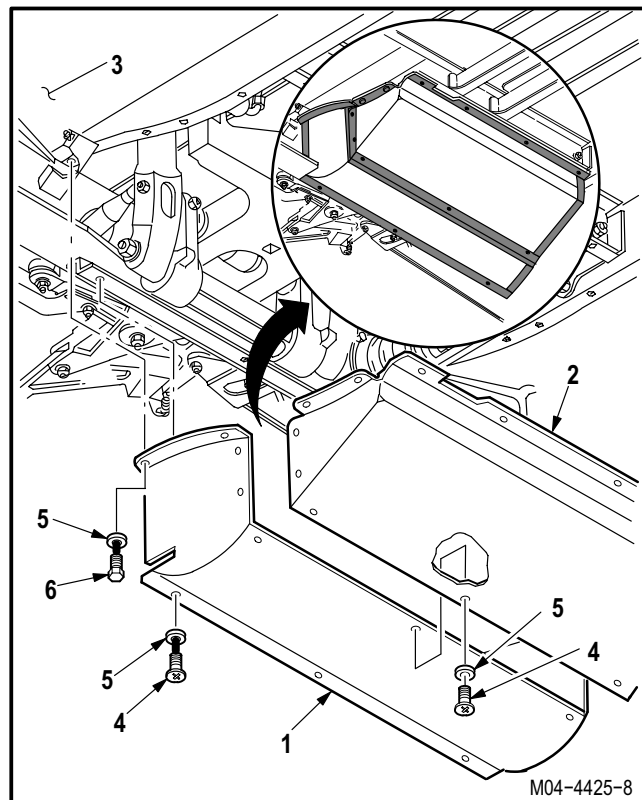


c. **Inspect (QA).**



d. **Install covers (1) and (2) on airframe (3).**

- (1) Aline cover (2) with airframe (3).
- (2) Install nine screws (4) and washers (5).
- (3) Aline cover (1) with cover (2) and airframe (3).
- (4) Install bolt (6) and washer (5).
- (5) Install 15 screws (4) and washers (5).
- (6) Apply sealing compound to faying surface of covers (1) and (2). Use sealing compound (item 176, App F).



e. **Inspect (QA).**

f. **Install pilot directional control pedal** (para 11.233).

g. **Install flex chute, turret, and area weapon** (TM 9-1090-208-23).

END OF TASK

**11.235. PILOT DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY
REMOVAL/INSTALLATION**

11.235.1. Description

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

11.235.2. Initial Setup

Tools:

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

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (3)

Personnel Required:

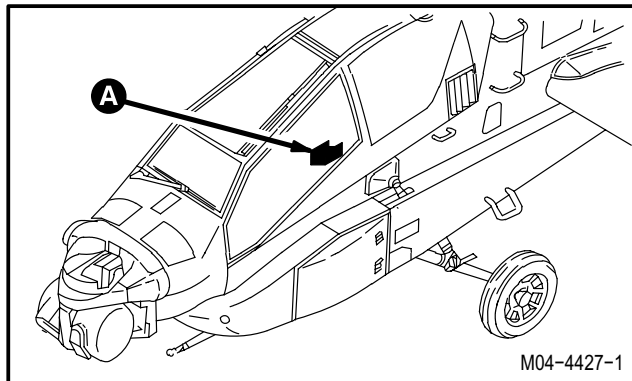
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical
Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed

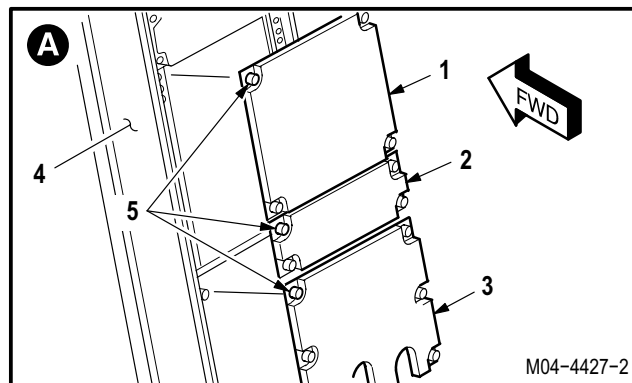
11.235.3. Removal

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



- b. **Remove panels (1), (2), and (3) from center console (4).**

- (1) Unlock fourteen fasteners (5) attaching panels (1), (2), and (3) to center console (4).
- (2) Remove panels (1), (2), and (3).



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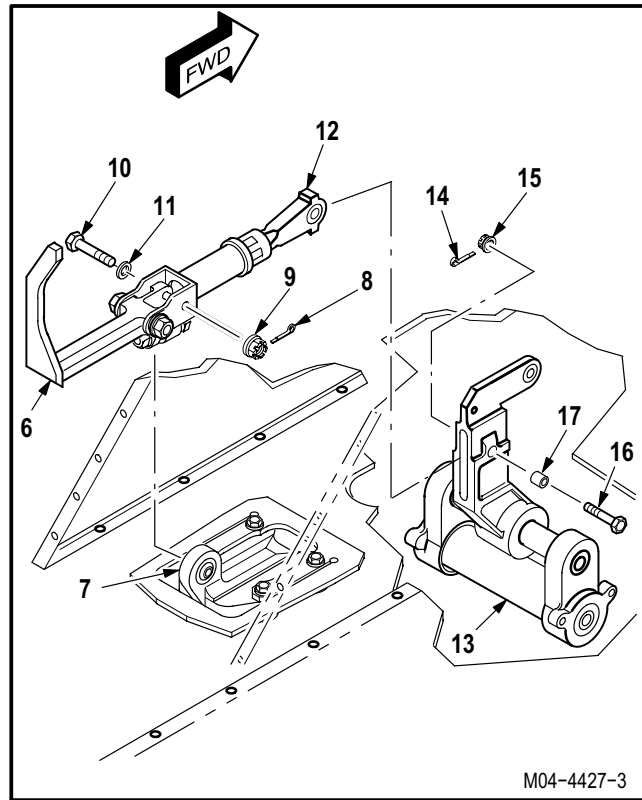
**11.235. PILOT DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY
REMOVAL/INSTALLATION – continued**

c. Remove pedal release handle (6) from pedal support (7).

- (1) Remove and discard cotter pin (8).
- (2) Remove nut (9).
- (3) Remove bolt (10) and washer (11) from handle (6) and pedal support (7).
- (4) Remove handle (6).

d. Remove shaft (12) from pedal adjust crank (13).

- (1) Remove and discard cotter pin (14).
- (2) Remove nut (15).
- (3) Remove bolt (16) and bushing (17) from crank (13) and shaft (12).
- (4) Remove shaft (12).



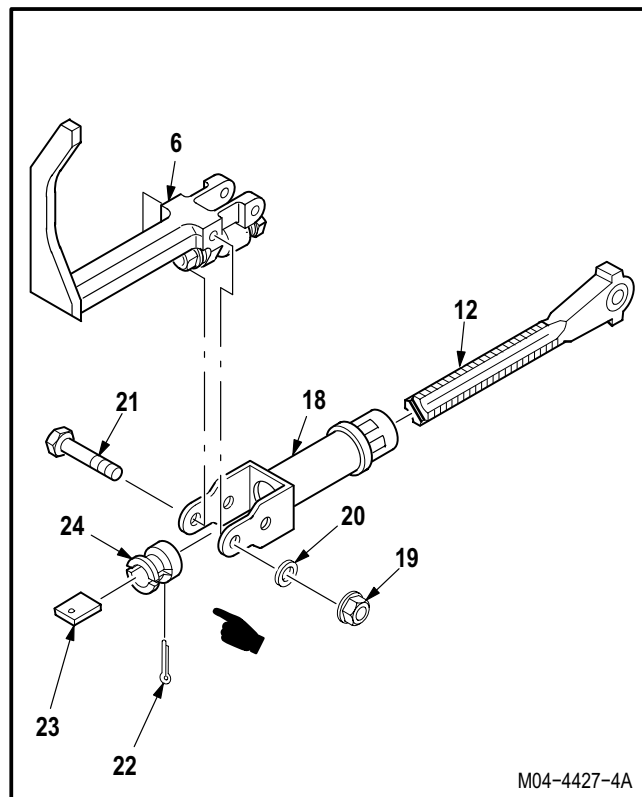
M04-4427-3

e. Remove handle (6) from pedal release nut (18).

- (1) Remove nut (19) and washer (20).
- (2) Remove bolt (21) from handle (6).
- (3) Remove handle (6).

f. Remove shaft (12) from release nut (18).

- (1) Remove and discard cotter pin (22) from pedal adjust safety key (23).
- (2) Remove key (23) and pedal rigging nut (24) from shaft (12).
- (3) Remove shaft (12).



M04-4427-4A

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**11.235. PILOT DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY
REMOVAL/INSTALLATION – continued**

11.235.4. Cleaning

- a. **Clean removed and attaching parts or surfaces** (para 1.47).

11.235.5. Inspection

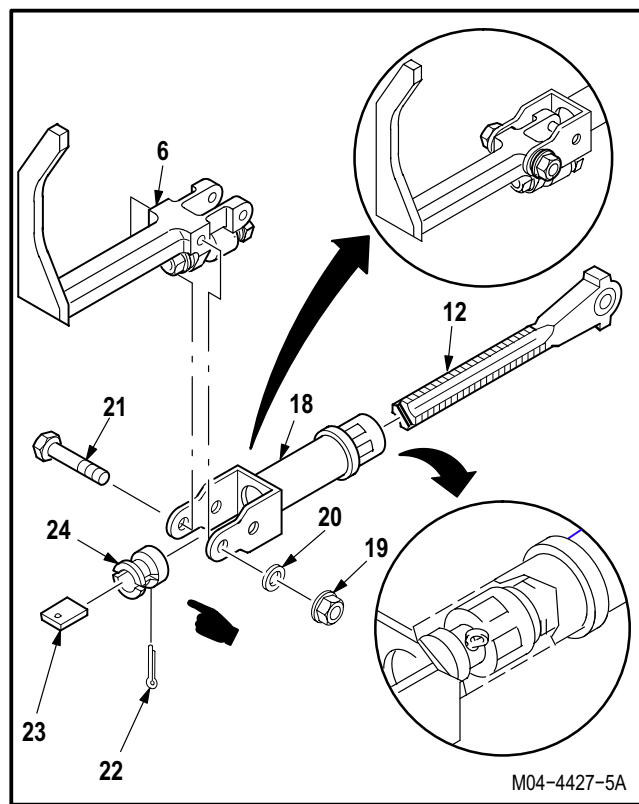
- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).
- d. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- e. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

11.235.6. Installationa. **Install shaft (12) on release nut (18).**

- (1) Install shaft (12) on release nut (18).
- (2) Install rigging nut (24) on shaft (12).
- (3) Rig shaft to mid rig (para 11.280).
- (4) Install key (23) in rigging nut (24).
- (5) Install new cotter pin (22) in key (23).

b. **Install handle (6) on release nut (18).**

- (1) Aline handle (6) with release nut (18).
- (2) Install bolt (21) through release nut (18) and handle (6).
- (3) Install washer (20) and nut (19).

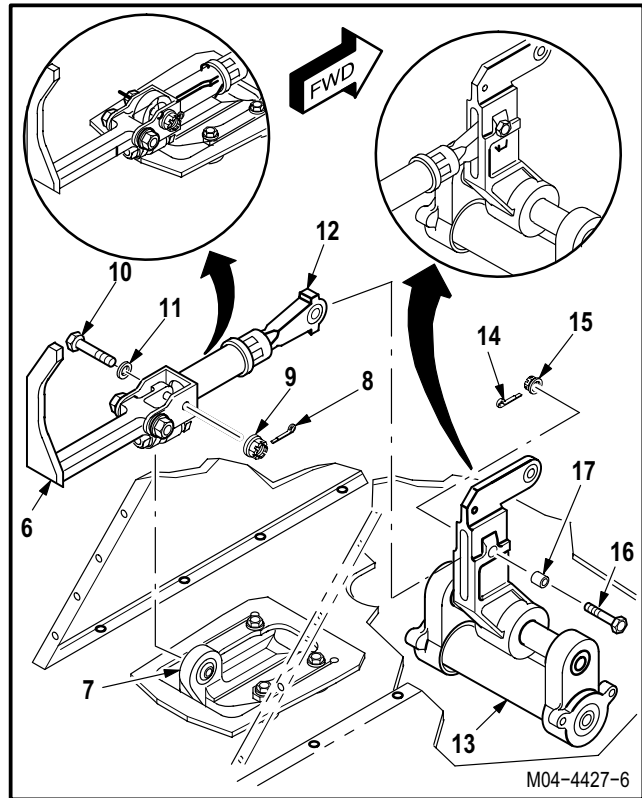


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**11.235. PILOT DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY
REMOVAL/INSTALLATION – continued**

c. Install shaft (12) on crank (13).

- (1) Aline shaft (12) with crank (13).
- (2) Install bolt (16) and bushing (17) through shaft (12) and crank (13).
- (3) Check fit of self-retaining bolt (16) (para 11.1).
- (4) Install nut (15).
- (5) Install new cotter pin (14).



d. Install handle (6) on pedal support (7).

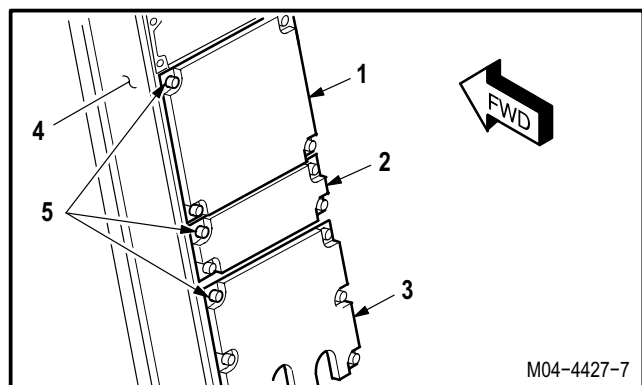
- (1) Aline handle (6) with pedal support (7).
- (2) Install bolt (10) through washer (11), handle (6), and pedal support (7).
- (3) Check fit of self-retaining bolt (10) (para 11.1).
- (4) Install nut (9).
- (5) Install new cotter pin (8).

e. Inspect (QA).

f. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).

g. Install panels (1), (2), and (3) on console (4).

- (1) Aline panels (1), (2), and (3) with console (4).
- (2) Secure 14 fasteners (5) attaching panels (1), (2), and (3) to console (4).



END OF TASK

**11.236. PILOT DIRECTIONAL CONTROL PEDAL HOUSING ASSEMBLY
REMOVAL/INSTALLATION**

11.236.1. Description

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

11.236.2. Initial Setup

Tools:

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

Personnel Required:

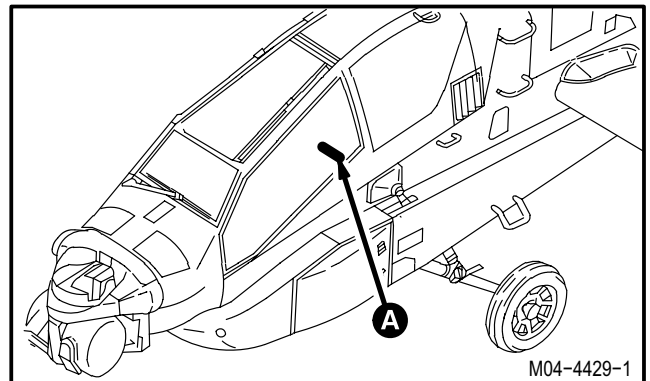
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical
Inspector

References:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57 TM 9-1090-208-23	Helicopter safed Area weapon, turret, and flex chute removed
3.56	Pilot brake master cylinders removed
11.235	Pilot directional control pedal release shaft removed
11.234	Pilot directional control pedal pivot supports removed



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**11.236. PILOT DIRECTIONAL CONTROL PEDAL HOUSING ASSEMBLY
REMOVAL/INSTALLATION – continued**

11.236.3. Removal

a. **Remove pedal housing assembly (1) from air-frame (2).**

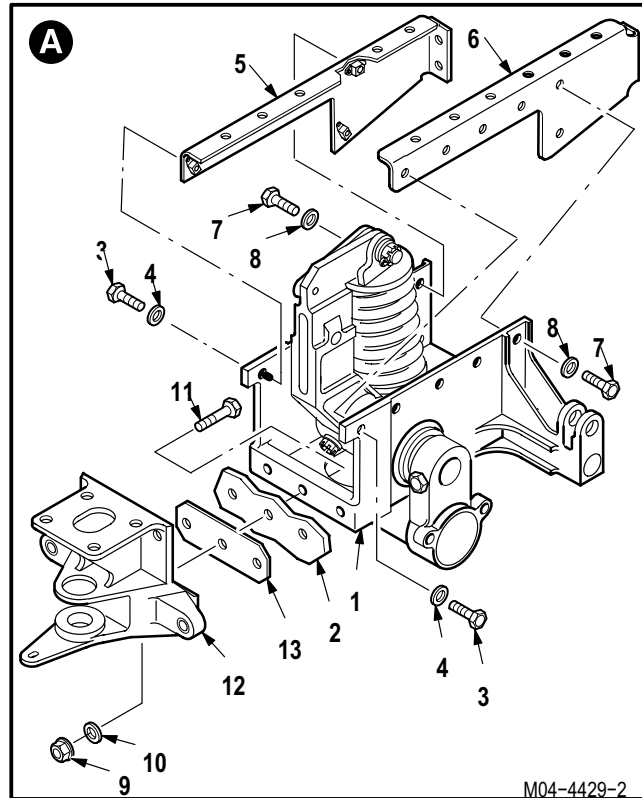
- (1) Remove two bolts (3) and washers (4) from housing (1) and braces (5) and (6).
- (2) Remove 10 bolts (7) and washers (8) from housing (1) and braces (5) and (6).
- (3) Remove three nuts (9) and washers (10) from bolts (11).
- (4) Remove three bolts (11) from bracket (12), spacer (13), airframe (2), and housing (1).
- (5) Remove housing (1).

11.236.4. Cleaning

a. **Wipe removed and attaching parts with a clean rag.**

11.236.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).



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11.236. PILOT DIRECTIONAL CONTROL PEDAL HOUSING ASSEMBLY REMOVAL/INSTALLATION – continued

11.236.6. Installation

a. **Install housing (1) on airframe (2).**

- (1) Aline housing (1) with airframe (2).
- (2) Install three bolts (11) through housing (1), airframe (2), spacer (13), and bracket (12).
- (3) Install three washers (10) and nuts (9).
- (4) Install 10 bolts (7) through washers (8), housing (1) and braces (6) and (5).
- (5) Install two bolts (3) through washers (4), housing (1), and braces (6) and (5).

b. **Inspect (QA).**

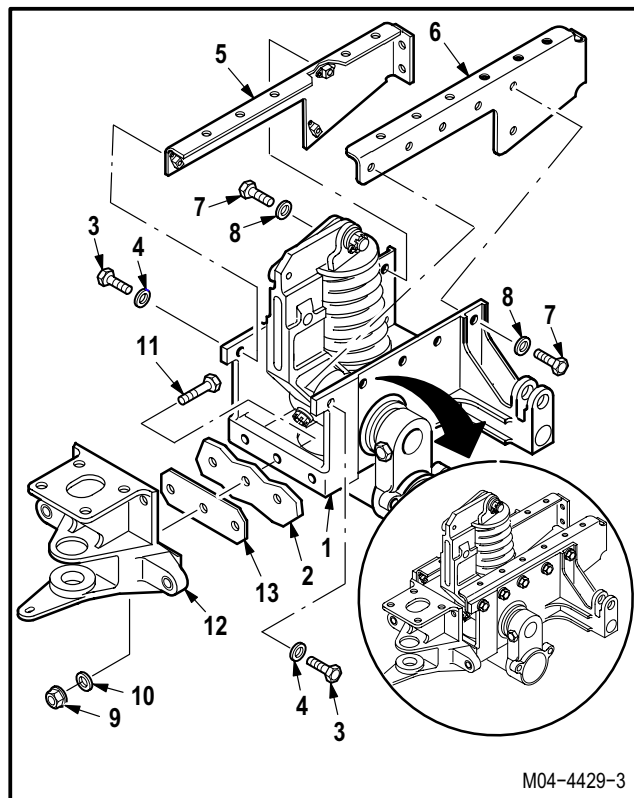
c. **Install pilot directional control pedal pivot supports** (para 11.234).

d. **Install pilot directional control pedal release shaft** (para 11.235).

e. **Install pilot brake master cylinders** (para 3.56).

f. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).

g. **Install flex chute, turret, and area weapon** (TM 9-1090-208-23).



END OF TASK

11.237. DIRECTIONAL CONTROL PEDAL ADJUST SPRING REMOVAL/INSTALLATION

11.237.1. Description

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

11.237.2. Initial Setup

Tools:

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

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
11.236	Pilot directional control pedal housing removed
	or
11.243	CPG directional control pedal housing assembly removed

Materials/Parts:

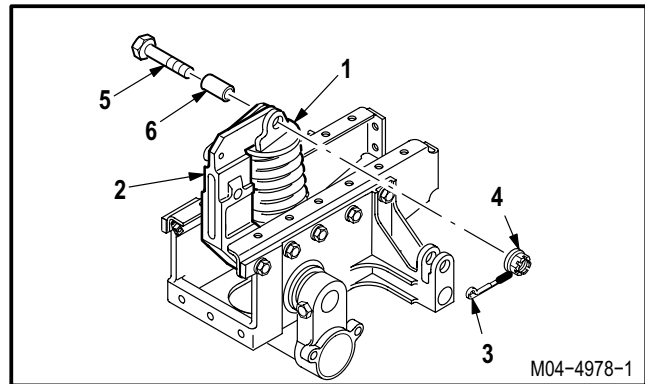
Cotter pin (2)

NOTE

This task is typical for pilot or CPG directional control pedal adjust spring.

11.237.3. Removal

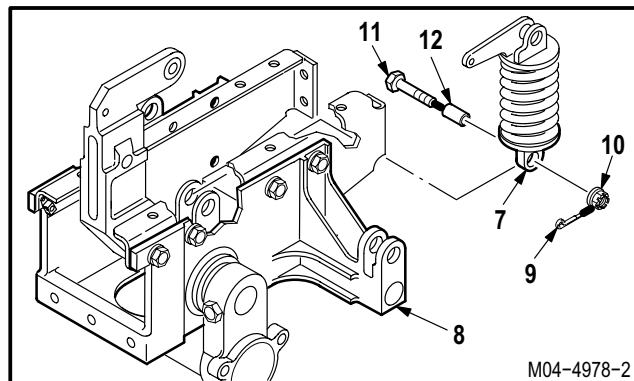
- a. **Remove upper pedal adjust spring (1) from adjusting crank (2).**
 - (1) Remove and discard cotter pin (3).
 - (2) Remove nut (4).
 - (3) Remove bolt (5) and bushing (6) from spring (1) and crank (2).



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11.237. DIRECTIONAL CONTROL PEDAL ADJUST SPRING REMOVAL/INSTALLATION – continued**b. Remove pedal adjust return spring (7) from housing (8).**

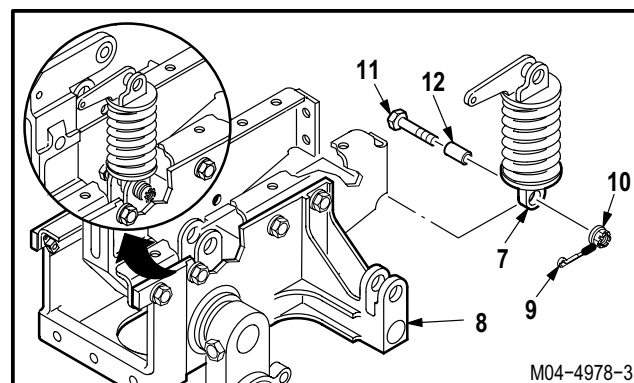
- (1) Remove and discard cotter pin (9).
- (2) Remove nut (10).
- (3) Remove bolt (11) and bushing (12) from housing (8) and spring (7).
- (4) Remove spring (7).

**11.237.4. Cleaning****a. Wipe removed and attaching parts with a clean rag.****11.237.5. Inspection**

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).
- d. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- e. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

11.237.6. Installation**a. Install spring (7) on housing (8).**

- (1) Aline spring (7) on housing (8).
- (2) Install bolt (11) through bushing (12), housing (8), and spring (7).
- (3) Install nut (10).
- (4) Install new cotter pin (9).

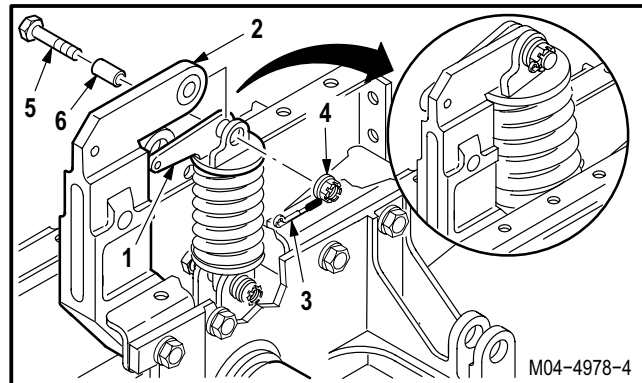


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11.237. DIRECTIONAL CONTROL PEDAL ADJUST SPRING REMOVAL/INSTALLATION – continued

b. Connect spring (1) to adjusting crank (2).

- (1) Install bolt (5) through bushing (6), spring (1), and crank (2).
- (2) Install nut (4) on bolt (5).
- (3) Install new cotter pin (3).



c. Inspect (QA).

d. Install pilot directional pedal housing, if removed (para 11.236).

e. Install CPG directional control pedal housing, if removed (para 11.243).

END OF TASK

11.238. DIRECTIONAL CONTROL PEDAL ADJUSTING CRANK ASSEMBLY REMOVAL/INSTALLATION (AVIM)

11.238.1. Description

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

11.238.2. Initial Setup

Tools:

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

Materials/Parts:

Cotter pin (3)

Personnel Required:

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

NOTE

Directional bellcrank, crank, and shaft are a matched set.

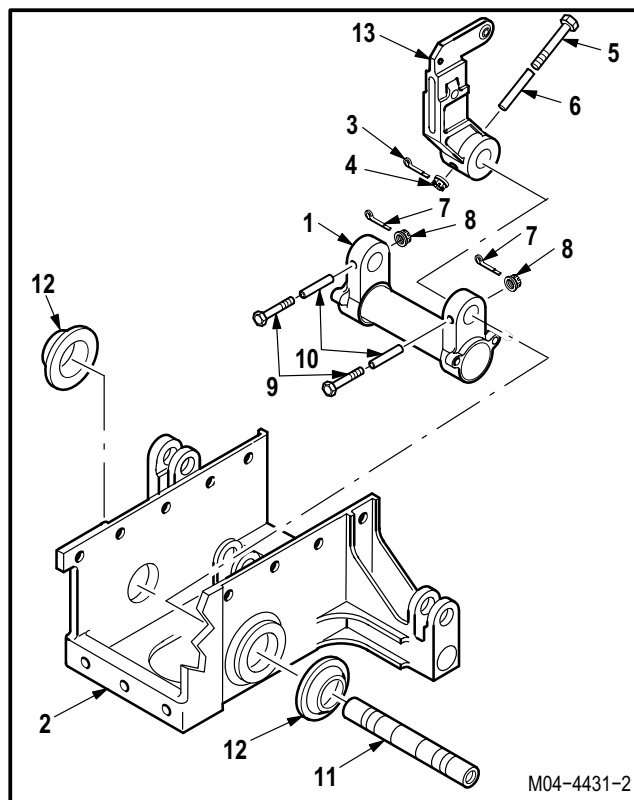
11.238.3. Removal

a. Remove directional control pedal adjusting crank assembly (1) from pedal housing (2).

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4).
- (3) Remove bolt (5) and bushing (6) from bellcrank (13), and shaft (11).
- (4) Remove and discard two cotter pins (7).
- (5) Remove two nuts (8).
- (6) Remove two bolts (9) and bushings (10) from crank (1).
- (7) Remove torque shaft (11), two torque bearing spacers (12), bellcrank (13), and crank (1).

11.238.4. Cleaning

- a. Clean removed and attaching parts (para 1.47).



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11.238. DIRECTIONAL CONTROL PEDAL ADJUSTING CRANK ASSEMBLY REMOVAL/INSTALLATION (AVIM) – continued

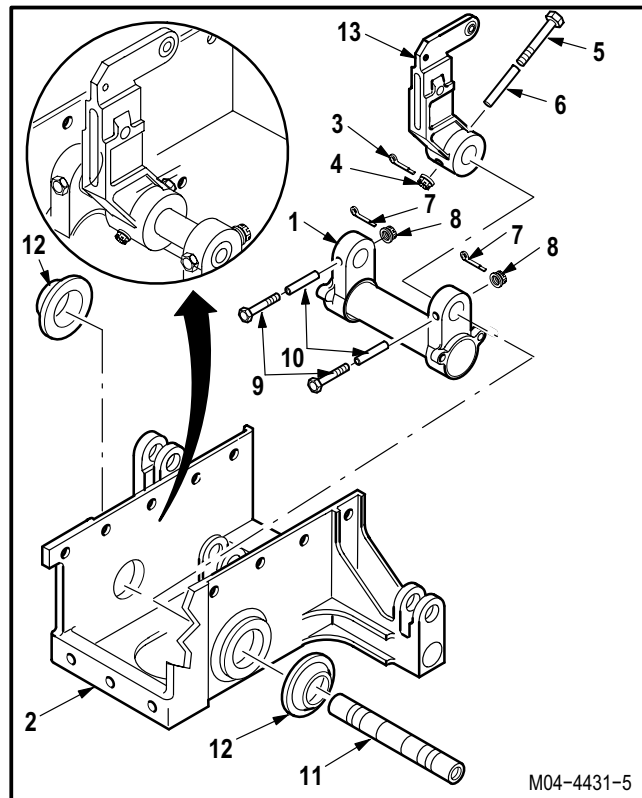
11.238.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).
- d. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- e. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).
- f. **Check threaded holes for crossed, stripped, and flattened threads.** None allowed.

11.238.6. Installation

a. **Install crank (1) on housing (2).**

- (1) Aline crank (1) and bellcrank (13) on housing (2).
- (2) Install two torque bearing spacers (12) between housing (2) and crank (1).
- (3) Install shaft (11) through housing (2), spacers (12), and crank (1).
- (4) Install two bolts (9) and bushings (10) through crank (1) and shaft (11).
- (5) Install two nuts (8).
- (6) Install two new cotter pins (7).
- (7) Install bolt (5) through bushing (6), bellcrank (13), and shaft (11).
- (8) Install nut (4).
- (9) Install new cotter pin (3).



b. **Inspect (QA).**

END OF TASK

11.239. CPG DIRECTIONAL CONTROL PEDAL AND PEDAL SKIRT REMOVAL/INSTALLATION

11.239.1. Description

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

11.239.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 9-inch x 1/2-inch drive hinged socket wrench handle
 (item 171, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (2)

Personnel Required:

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

Equipment Conditions:

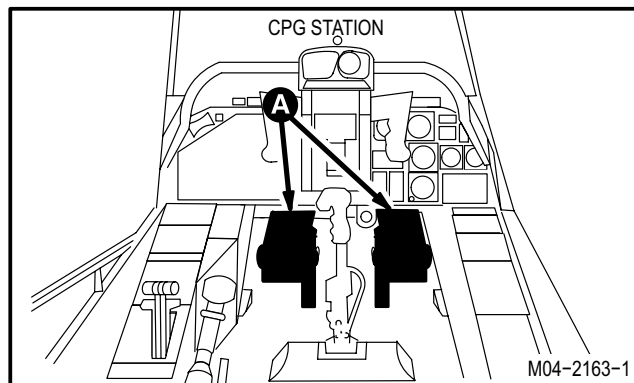
Ref	Condition
1.57	Helicopter safed

NOTE

The following task is typical for left and right directional pedals except as noted.

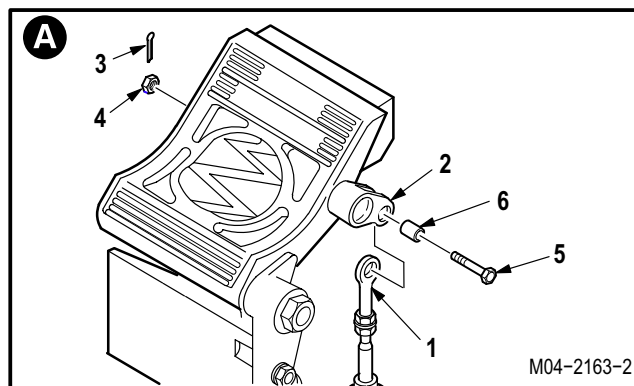
11.239.3. Removal

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



b. **Remove master cylinder rod end (1) from pedal clevis (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove self-locking nut (4).
- (3) Remove close tolerance bolt (5) and sleeve bushing (6).
- (4) Remove rod end (1).



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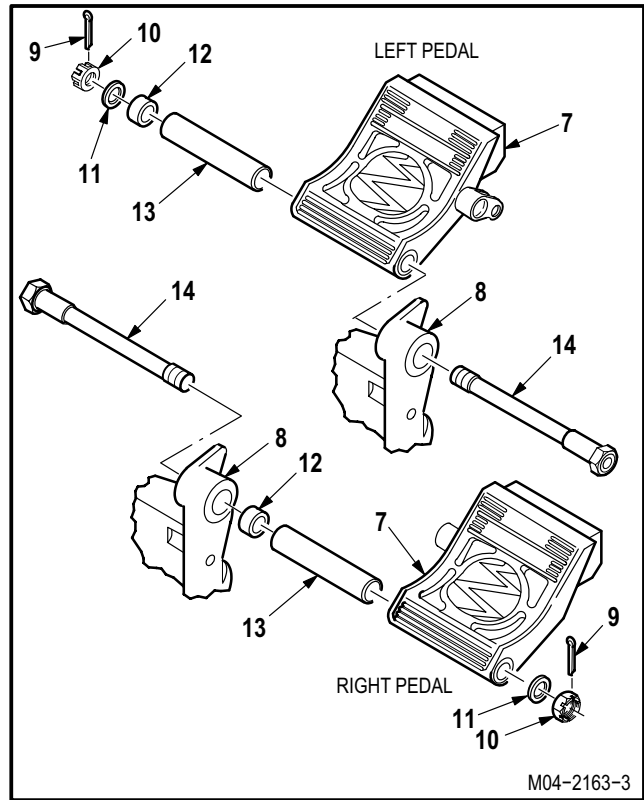
11.239. CPG DIRECTIONAL CONTROL PEDAL AND PEDAL SKIRT REMOVAL/INSTALLATION – continued

c. Remove pedal (7) from pedal skirt (8).

- (1) Remove and discard cotter pin (9).
- (2) Remove nut (10), washer (11), and pedal (7). Use hinged handle.
- (3) Remove ball bearing (12) and sleeve spacer (13) from pedal (7).
- (4) Remove bolt (14) from skirt (8).

d. Remove skirt (8) from pivot support (15).

- (1) Remove two self-locking nuts (16) and washers (17).
- (2) Remove two shear bolts (18).
- (3) Remove skirt (8).

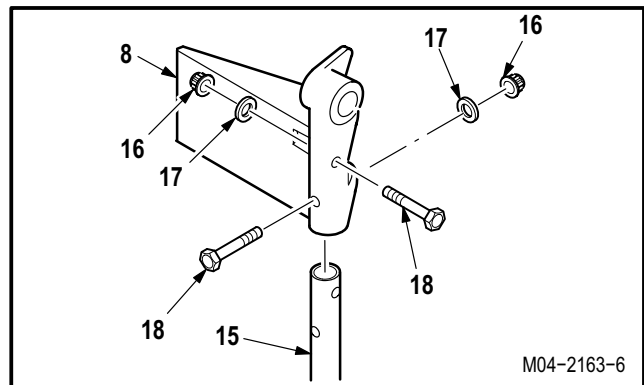


11.239.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.239.5. Inspection

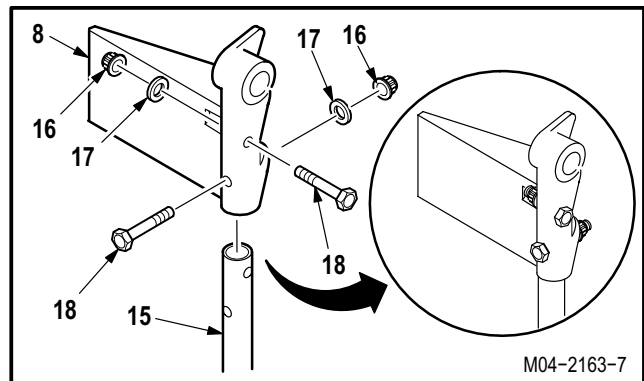
- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).



11.239.6. Installation

a. Install skirt (8) on support (15).

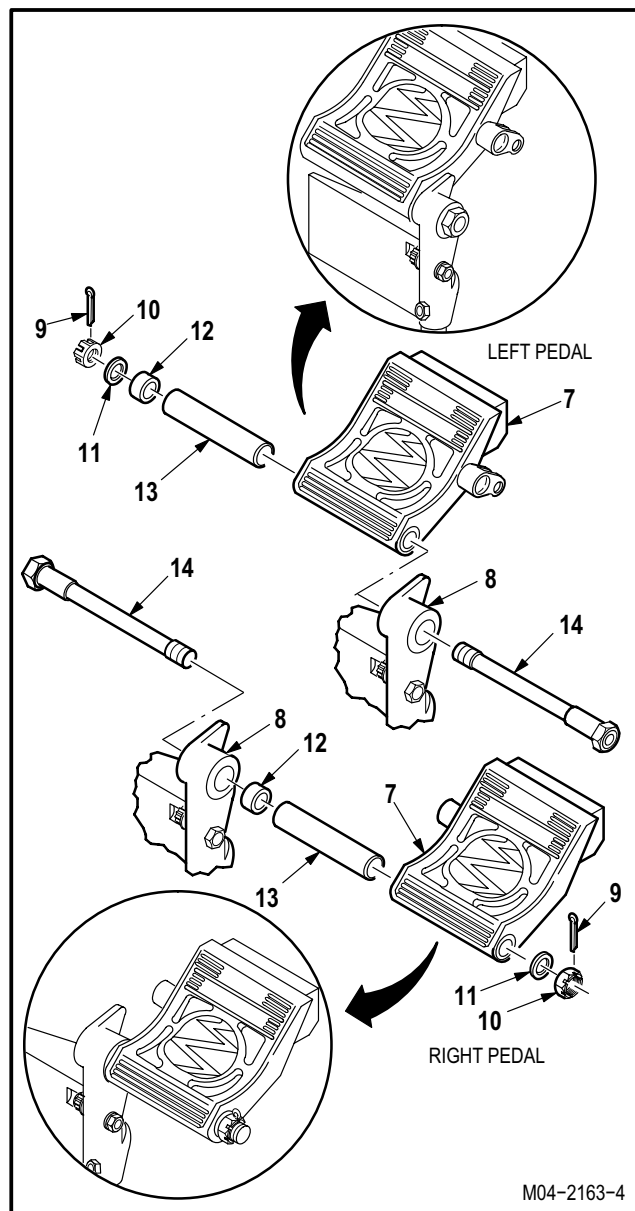
- (1) Position skirt (8) on support (15).
- (2) Install two bolts (18) through skirt (8) and support (15).
- (3) Install two washers (17) and nuts (16).



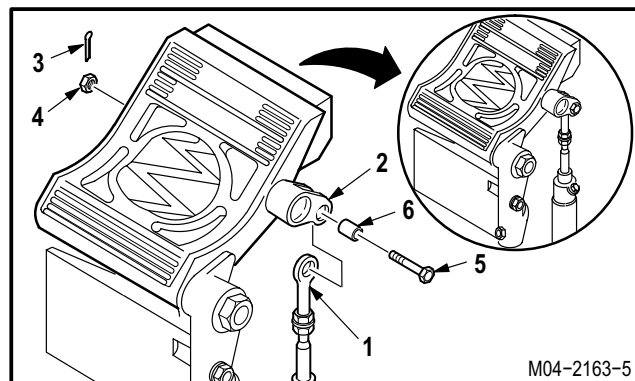
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11.239. CPG DIRECTIONAL CONTROL PEDAL AND PEDAL SKIRT REMOVAL/INSTALLATION – continued**b. Install pedal (7) on skirt (8).**

- (1) Install spacer (13) and bearing (12) in pedal (7).
- (2) Position pedal (7) on skirt (8).
- (3) Install bolt (14) through skirt (8) and pedal (7).
- (4) Install washer (11) and nut (10). Use hinged handle.
- (5) Tighten nut (10) to align cotter pin hole.
- (6) Install new cotter pin (9).

**c. Install rod end (1) on clevis (2).**

- (1) Position rod end (1) in clevis (2).
- (2) Install bushing (6) in clevis (2).
- (3) Install bolt (5) through bushing (6) from in-board side.
- (4) Install nut (4).
- (5) Tighten nut (4) to align cotter pin hole.
- (6) Install new cotter pin (3).

d. Inspect (QA).**e. Perform flight control system maintenance operational check (TM 1-1520-238-T).**

END OF TASK

11.240. CPG DIRECTIONAL CONTROL PEDAL WEIGHT REMOVAL/INSTALLATION

11.240.1. Description

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

11.240.2. 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)
- 4-ounce hand sealant gun (item 159, App H)
- Adjustable air filtering respirator (item 262, App H)
- 30 - 150 inch-pound 3/8-inch drive click type torque wrench (item 441, App H)
- 0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Materials/Parts:

- Sealing compound (item 175, App F)

Personnel Required:

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

Equipment Conditions:

- | <u>Ref</u> | <u>Condition</u> |
|------------|------------------|
| 1.57 | Helicopter safed |
-

NOTE

This task is typical for left and right directional pedals.

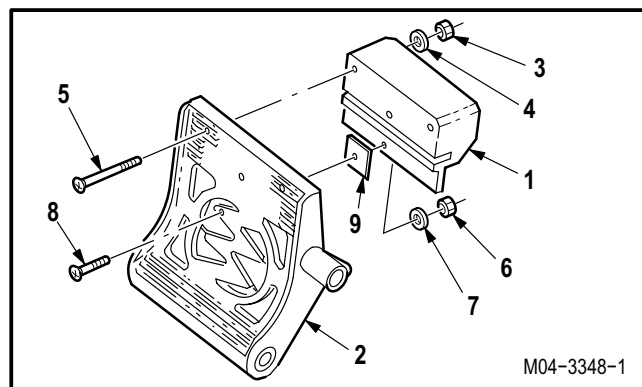
11.240.3. Removal

a. **Remove weight (1) from pedal (2).**

- (1) Remove three nuts (3), washers (4), and screws (5).
- (2) Remove nut (6), washer (7), screw (8), weight (1), and shim (9) from pedal (2).
- (3) Remove weight (1).

11.240.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**
- b. **Remove sealant residue from pedal (para 1.47).**



GO TO NEXT PAGE

11.240. CPG DIRECTIONAL CONTROL PEDAL WEIGHT REMOVAL/INSTALLATION – continued

11.240.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

11.240.6. Installation

- a. **Install weight (1) on pedal (2).** Torque three screws (5) to **70 INCH-POUNDS**. Torque one screw (8) to **20 INCH-POUNDS**.

(1) Peel or add shims (9) (if necessary) to fill void between weight (1) and pedal (2).

(2) Apply sealing compound in void between weight (1) and pedal (2). Use sealant gun and sealing compound (item 175, App F).

(3) Aline shim (9) and weight (1) on pedal (2).

(4) Install screw (8) through pedal (2), shim (9), weight (1), washer (7), and nut (6).

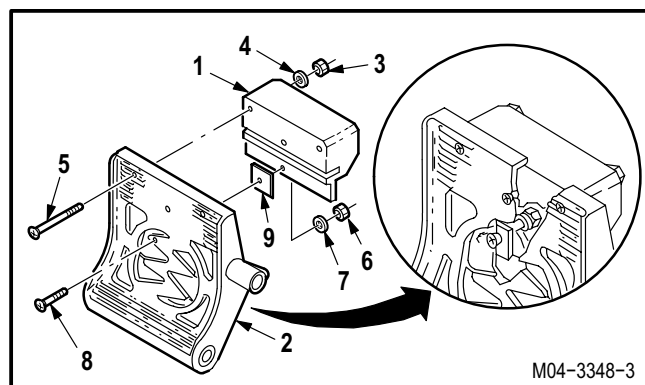
(5) Install three screws (5), washers (4), and nuts (3).

(6) Torque screw (8) to **20 INCH-POUNDS**. Use torque wrench.

(7) Torque three screws (5) to **70 INCH-POUNDS**. Use torque wrench.

- b. **Inspect (QA).**

- c. **Install CPG directional pedal** (para 11.239).



END OF TASK

**11.241. CPG DIRECTIONAL CONTROL PEDAL PIVOT SUPPORT ASSEMBLY
REMOVAL/INSTALLATION**

11.241.1. Description

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

11.241.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
10 - 50 inch-pound 1/4-inch drive click type torque
wrench (item 434, App H)
0 - 600 inch-pound 3/8-inch drive dial indicator torque
wrench (item 447, App H)

Materials/Parts:

Cotter pin (2)

Personnel Required:

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

References:

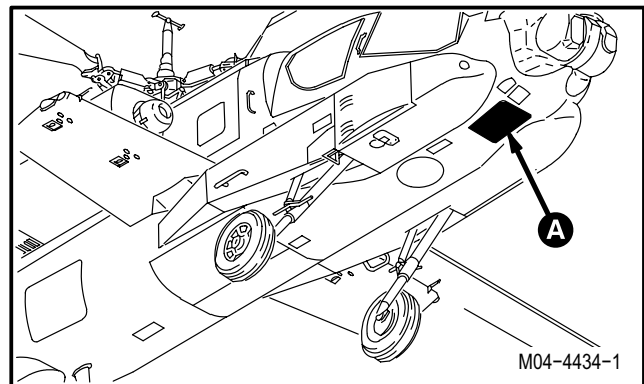
TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.239	CPG directional control pedal removed
2.2	Access door B60 removed

NOTE

This task is typical for either left or right
directional pedal pivot supports.

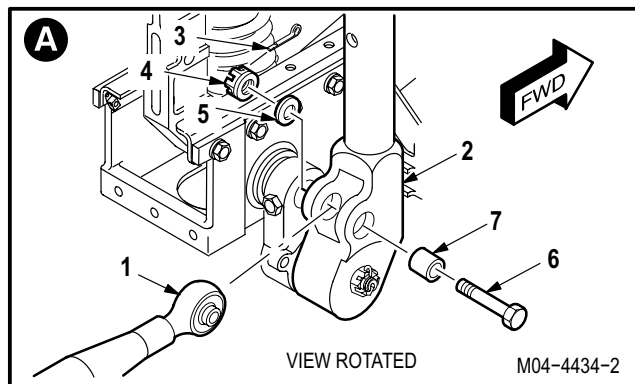


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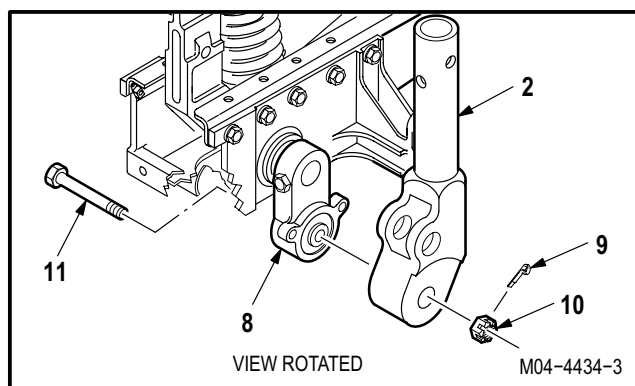
**11.241. CPG DIRECTIONAL CONTROL PEDAL PIVOT SUPPORT ASSEMBLY
REMOVAL/INSTALLATION – continued**

11.241.3. Removal**a. Remove rod (1) from pedal pivot support assembly (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4) and washer (5).
- (3) Remove bolt (6) and bushing (7) from support (2) and rod (1).

**b. Remove support (2) from pedal crank (8).**

- (1) Remove and discard cotter pin (9).
- (2) Remove nut (10) and bolt (11).
- (3) Remove support (2).

**11.241.4. Cleaning****a. Wipe removed and attaching parts with a clean rag.****11.241.5. Inspection**

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

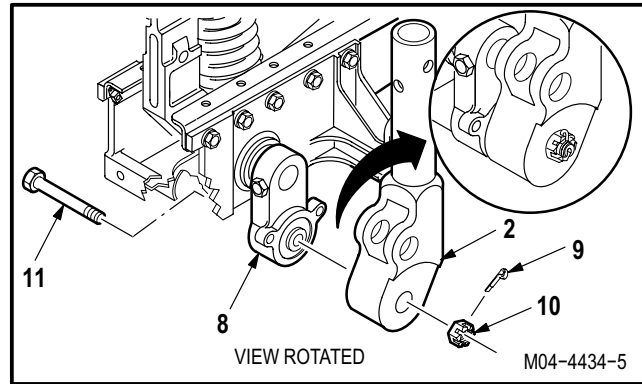
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**11.241. CPG DIRECTIONAL CONTROL PEDAL PIVOT SUPPORT ASSEMBLY
REMOVAL/INSTALLATION – continued**

11.241.6. Installation

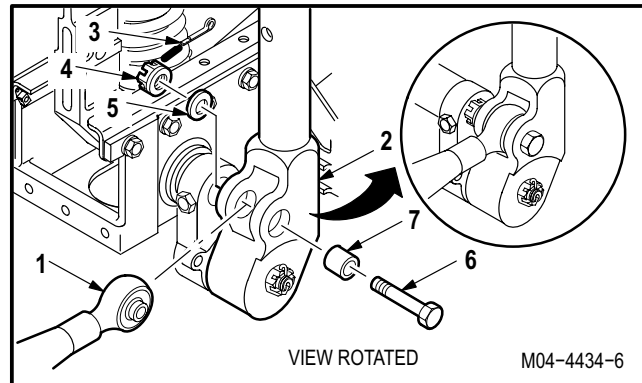
a. **Install support (2) on crank (8).** Torque nut (10) **180 to 300 INCH-POUNDS.**

- (1) Aline support (2) with crank (8).
- (2) Install bolt (11).
- (3) Check fit of self-retaining bolt (11) (para 11.1).
- (4) Install nut (10). Torque nut (10) to **180 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **300 INCH-POUNDS.**
- (6) Install new cotter pin (9).



b. **Install rod (1) on support (2).** Torque nut (4) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (1) with support (2).
- (2) Install bolt (6) through bushing (7), support (2), and rod (1).
- (3) Check fit of self-retaining bolt (6) (para 11.1).
- (4) Install washer (5) and nut (4). Torque nut (4) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install new cotter pin (3).



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**11.241. CPG DIRECTIONAL CONTROL PEDAL PIVOT SUPPORT ASSEMBLY
REMOVAL/INSTALLATION – continued**

- c. **Inspect (QA).**
- d. **Install CPG directional control pedal** (para 11.239).
- e. **Perform flight control system maintenance operational check** (TM 1-1520-238-T).
- f. **Install access door B60** (para 2.2).
- g. **Inspect (QA).**

END OF TASK

**11.242. CPG DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY
REMOVAL/INSTALLATION**

11.242.1. Description

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

11.242.2. Initial Setup

Tools:

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

References:

TM 1-1520-238-T

Materials/Parts:

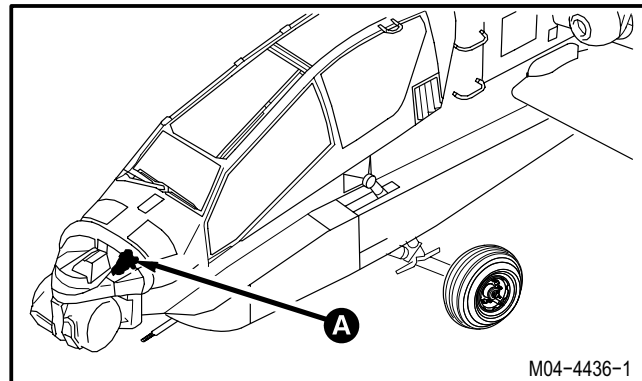
Cotter pin (3)

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed



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11.242. CPG DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY REMOVAL/INSTALLATION – continued

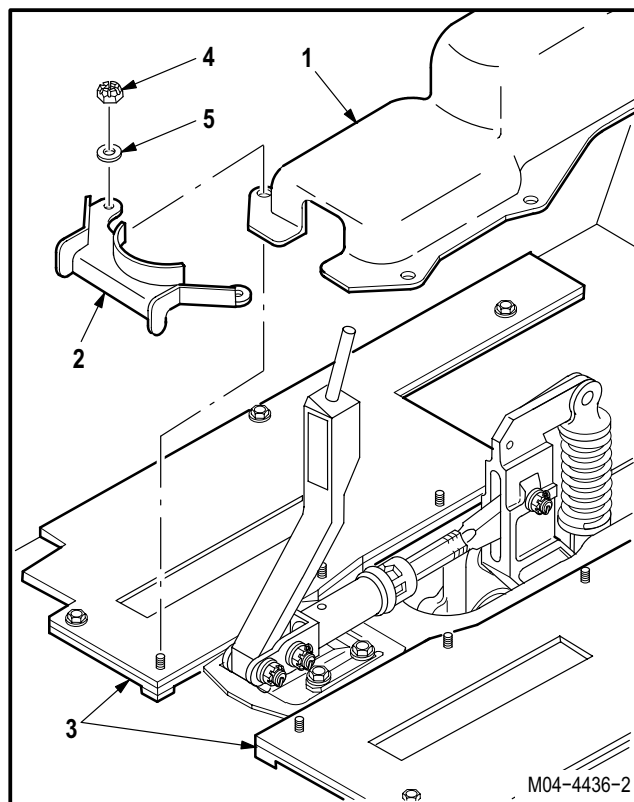
11.242.3. Removal

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

b. **Remove pedal adjust cover (1) and shield (2) from armor panels (3).**

(1) Remove six nuts (4) and washers (5) from panels (3).

(2) Remove cover (1) and shield (2).



c. **Remove pedal release handle (6) from pedal support (7).**

(1) Remove and discard cotter pin (8).

(2) Remove nut (9).

(3) Remove bolt (11) and washer (10) from handle (6) and pedal support (7).

(4) Remove handle (6).

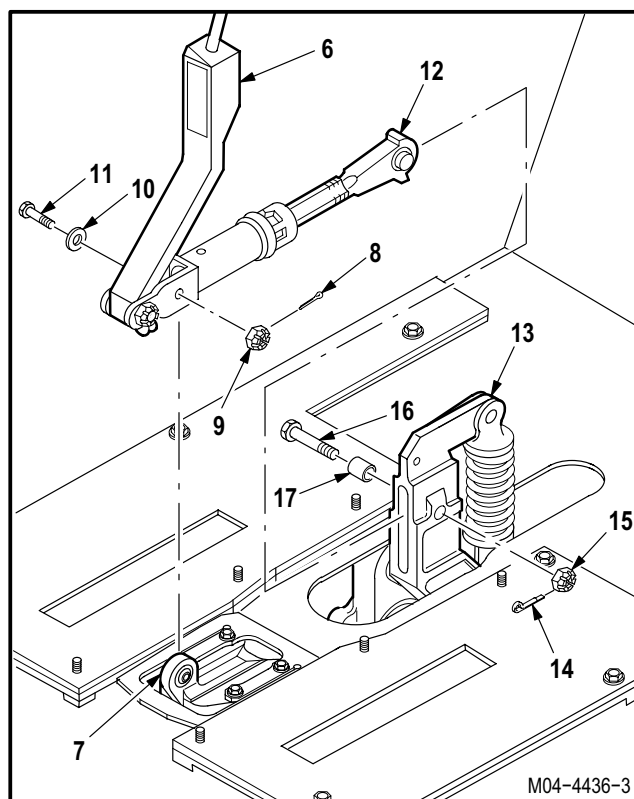
d. **Remove shaft (12) from pedal adjust crank (13).**

(1) Remove and discard cotter pin (14).

(2) Remove nut (15).

(3) Remove bolt (16) and bushing (17) from shaft (12).

(4) Remove shaft (12) and crank (13).



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**11.242. CPG DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY
REMOVAL/INSTALLATION – continued**

e. Remove handle (6) from pedal release nut (18).

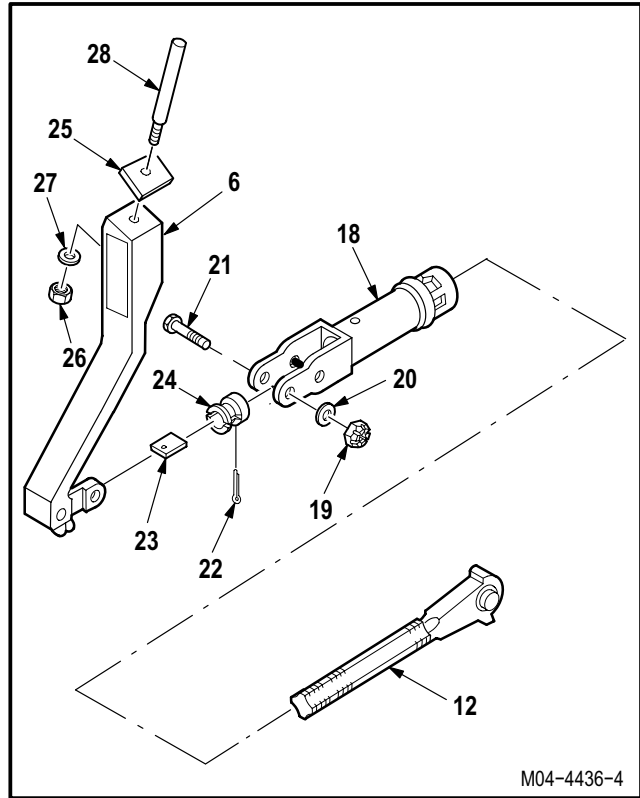
- (1) Remove nut (19) and washer (20).
- (2) Remove bolt (21) from handle (6).
- (3) Remove handle (6).

f. Remove shaft (12) from release nut (18).

- (1) Remove and discard cotter pin (22) from pedal adjust safety key (23).
- (2) Remove key (23) and pedal rigging nut (24) from shaft (12).
- (3) Remove shaft (12).

g. Remove pedal handle pad (25) from handle (6).

- (1) Remove nut (26) and washer (27) from handle assembly extension (28).
- (2) Remove extension (28).
- (3) Remove pad (25).



11.242.4. Cleaning

a. Wipe removed and attaching parts with a clean rag.

11.242.5. Inspection

- a. Check removed and attaching parts for cracks.** None allowed.
- b. Check removed and attaching parts for damage** (para 11.232).
- c. Check removed and attaching parts for corrosion** (para 1.49).
- d. Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- e. Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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**11.242. CPG DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY
REMOVAL/INSTALLATION – continued**

11.242.6. Installation**a. Install pad (25).**

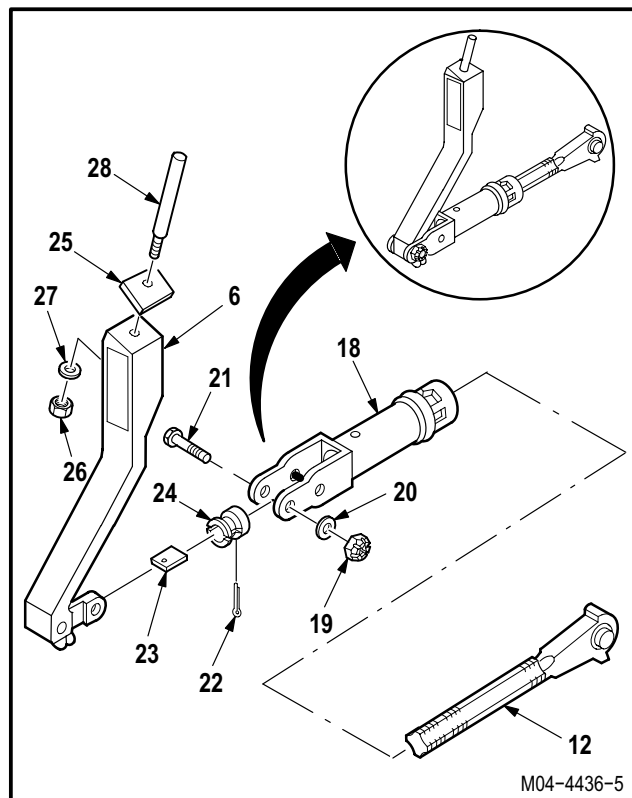
- (1) Position pad (25) on handle (6).
- (2) Install extension (28) through pad (25) and handle (6).
- (3) Install washer (27) and nut (26) on extension (28).

b. Install shaft (12) on release nut (18).

- (1) Install shaft (12) on release nut (18).
- (2) Install rigging nut (24) on shaft (12).
- (3) Rig shaft to mid rig (para 11.280).
- (4) Install key (23) in rigging nut (24).
- (5) Install new cotter pin (22) in key (23).

c. Install handle (6) on release nut (18).

- (1) Aline handle (6) with release nut (18).
- (2) Install bolt (21) through release nut (18) and handle (6).
- (3) Install washer (20) and nut (19).

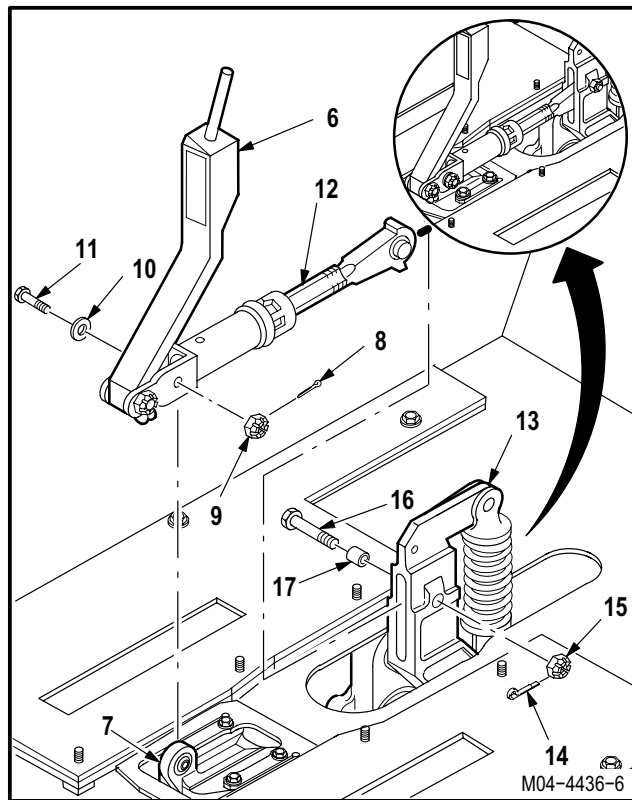


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**11.242. CPG DIRECTIONAL CONTROL PEDAL RELEASE SHAFT ASSEMBLY
REMOVAL/INSTALLATION – continued**

d. Install shaft (12) on crank (13).

- (1) Aline shaft (12) with crank (13).
- (2) Install bolt (16) and bushing (17) through shaft (12) and crank (13).
- (3) Check fit of self-retaining bolt (16) (para 11.1).
- (4) Install nut (15).
- (5) Install new cotter pin (14).



e. Install handle (6) on support (7).

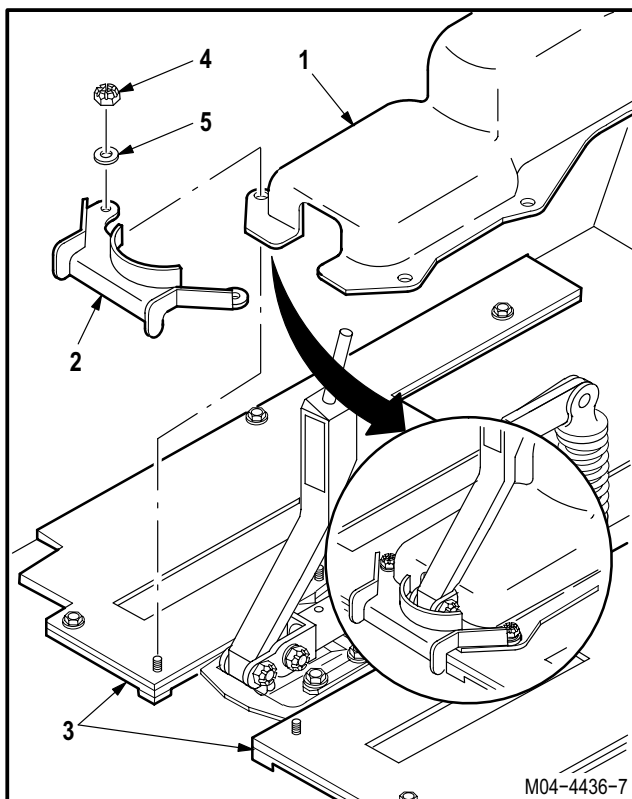
- (1) Aline handle (6) with support (7).
- (2) Install bolt (11) through washer (10), handle (6), and pedal support (7).
- (3) Check fit of self-retaining bolt (11) (para 11.1).
- (4) Install nut (9).
- (5) Install new cotter pin (8).

f. Install cover (1) and shield (2) on panels (3).

- (1) Aline cover (1) and shield (2) with panels (3).
- (2) Install six nuts (4) and washers (5) on panels (3).

g. Inspect (QA).

h. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).



END OF TASK

**11.243. CPG DIRECTIONAL CONTROL PEDAL HOUSING ASSEMBLY
REMOVAL/INSTALLATION**

11.243.1. Description

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

11.243.2. Initial Setup

Tools:

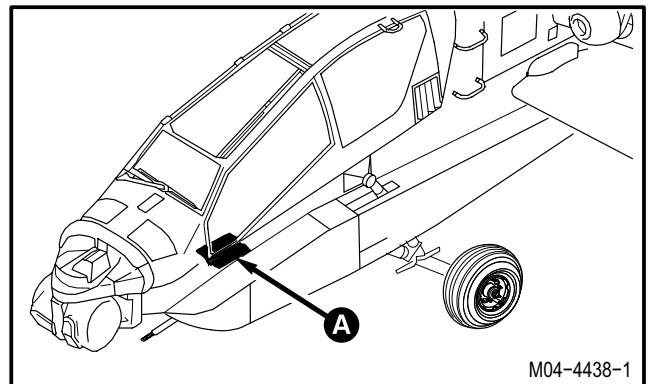
Aircraft mechanic's tool kit (item 376, App H)

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access door B60 removed
3.57	CPG brake master cylinders removed
11.242	CPG directional control pedal release shaft removed
11.241	CPG directional control pedal pivot supports removed



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**11.243. CPG DIRECTIONAL CONTROL PEDAL HOUSING ASSEMBLY
REMOVAL/INSTALLATION – continued**

11.243.3. Removal

a. **Remove pedal housing assembly (1) from support (2).**

- (1) Remove seven bolts (3) and washers (4) from housing (1) and support (2).
- (2) Remove seven bolts (5), washers (6), and bushings (7) from housing (1) and support (2).
- (3) Remove housing (1).

11.243.4. Cleaning

a. **Wipe removed and attaching parts with a clean rag.**

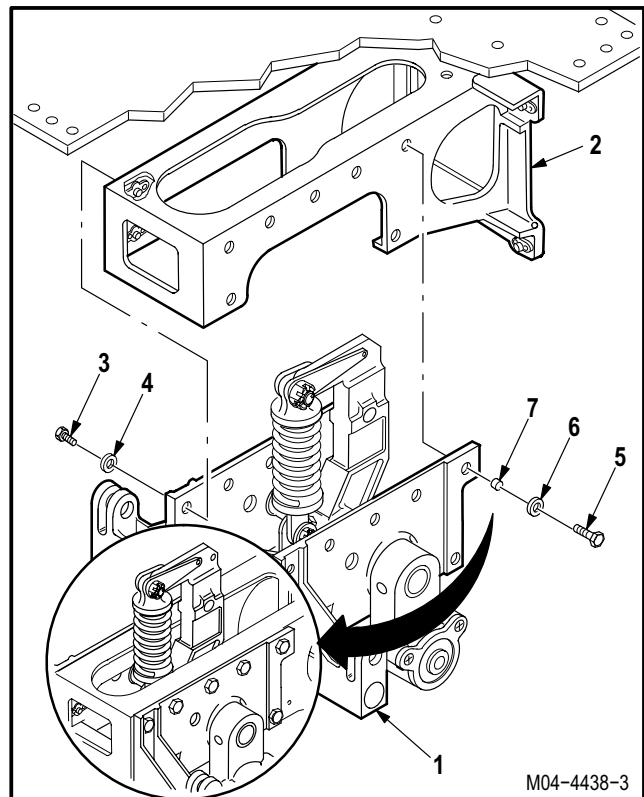
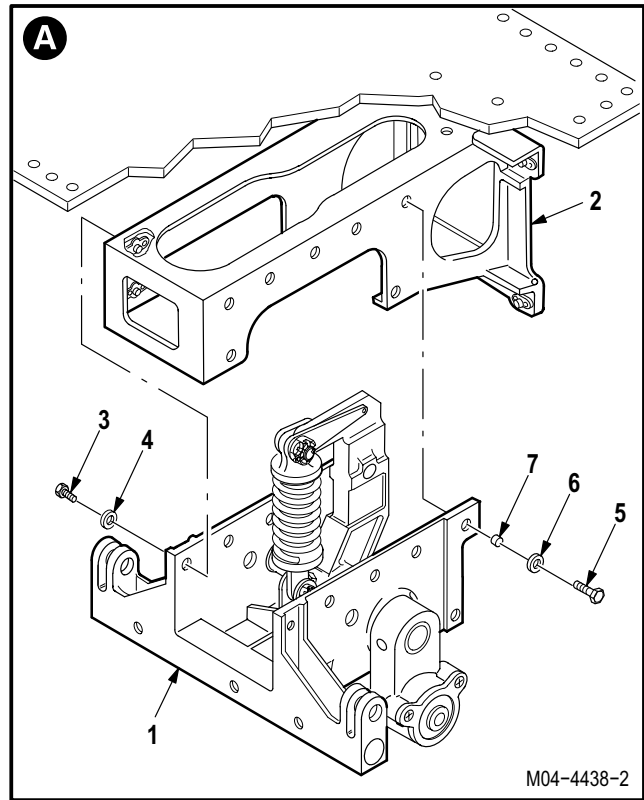
11.243.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

11.243.6. Installation

a. **Install housing (1) on support (2).**

- (1) Aline housing (1) with support (2).
- (2) Install seven bolts (5) through washers (6), bushings (7), housing (1), and support (2).
- (3) Install seven bolts (3) through washers (4), housing (1), and support (2).



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**11.243. CPG DIRECTIONAL CONTROL PEDAL HOUSING ASSEMBLY
REMOVAL/INSTALLATION – continued**

- b. **Inspect (QA).**
- c. **Install CPG directional control pedal pivot supports** (para 11.241).
- d. **Install CPG directional control pedal release shaft** (para 11.242).
- e. **Install CPG brake master cylinders** (para 3.57).
- f. **Install access door B60** (para 2.2).
- g. **Inspect (QA).**

END OF TASK

**11.244. CPG LEFT OR RIGHT DIRECTIONAL CONTROL PEDAL PROTECTIVE COVER
REMOVAL/INSTALLATION**

11.244.1. Description

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

11.244.2. Initial Setup

Tools:

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

Personnel Required:

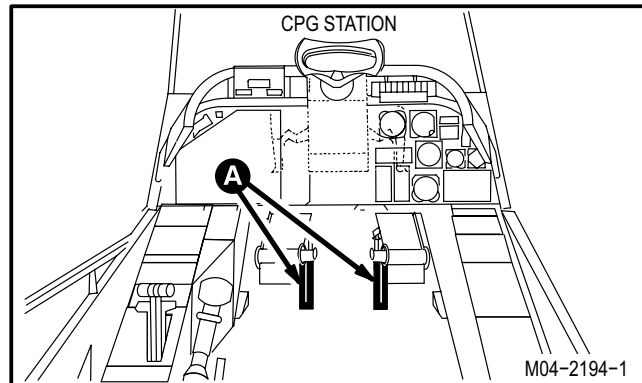
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical
Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.183	Scuff plates removed

NOTE

This task is typical for either left or right covers.



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**11.244. CPG LEFT OR RIGHT DIRECTIONAL CONTROL PEDAL PROTECTIVE COVER
REMOVAL/INSTALLATION – continued**

11.244.3. Removal

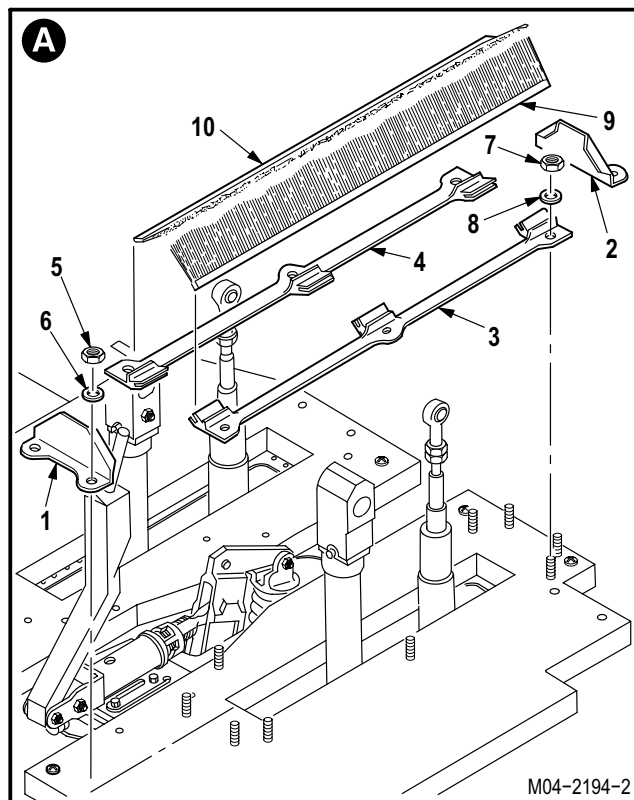
- a. **Enter CPG station** (para 1.56). **Observe all safety precautions.**
- b. **Remove closures (1) and (2) and retainers (3) and (4).**
 - (1) Remove four nuts (5) and washers (6).
 - (2) Remove six nuts (7) and washers (8).
- c. **Remove brushes (9) and (10) from retainers (3) and (4).**

11.244.4. Cleaning

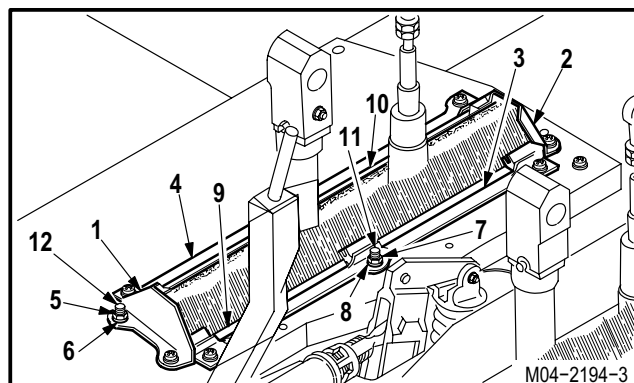
- a. **Wipe removed and attaching parts with a clean rag.**

11.244.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).

**11.244.6. Installation**

- a. **Install brushes (9) and (10) in retainers (3) and (4).**
- b. **Install retainers (3) and (4) and closures (1) and (2).**
 - (1) Install six washers (8) and nuts (7) on studs (11).
 - (2) Install four washers (6) and nuts (5) on studs (12).
- c. **Install scuff plates** (para 2.183).
- d. **Inspect (QA).**



END OF TASK

**11.244A. PILOT LEFT OR RIGHT DIRECTIONAL CONTROL PEDAL PROTECTIVE COVER
REMOVAL/INSTALLATION**

11.244A.1. Description

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

11.244A.2. Initial Setup

Tools:

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

Personnel Required:

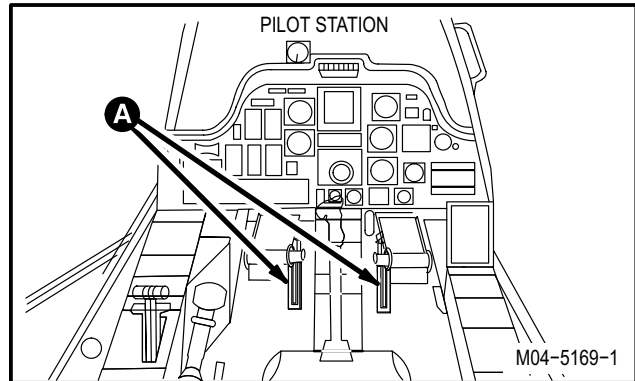
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical
Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.182	Scuff plates removed

NOTE

This task is typical for either left or right covers.



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11.244A. PILOT LEFT OR RIGHT DIRECTIONAL CONTROL PEDAL PROTECTIVE COVER REMOVAL/INSTALLATION – continued

11.244A.3. Removal

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **Remove closures (1) and (2) and retainers (3) and (4).**
 - (1) Remove four screws (5) and washers (6).
 - (2) Remove six screws (7) and washers (8).
- c. **Remove brushes (9) and (10) from retainers (3) and (4).**

11.244A.4. Cleaning

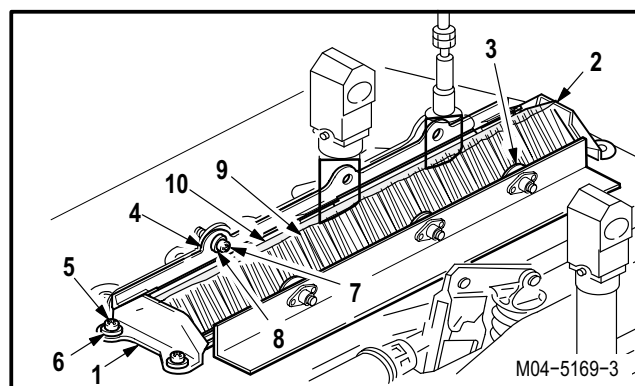
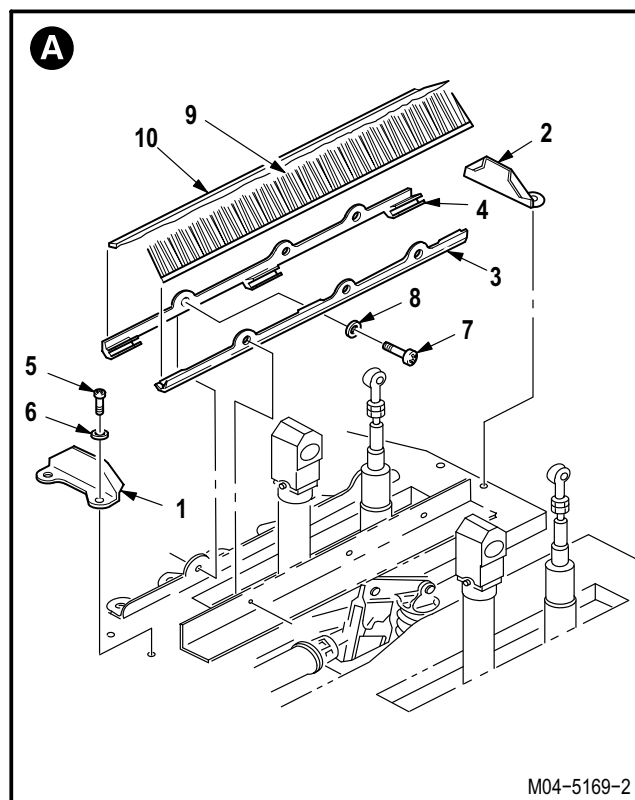
- a. **Wipe removed and attaching parts with a clean rag.**

11.244A.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).

11.244A.6. Installation

- a. **Install brushes (9) and (10) in retainers (3) and (4).**
- b. **Install retainers (3) and (4) and closures (1) and (2).**
 - (1) Install six screws (7) and washers (8) in retainers (3) and (4).
 - (2) Install four screws (5) and washers (6) in closures (1) and (2).
- c. **Install scuff plates** (para 2.182).
- d. **Inspect (QA).**



END OF TASK

11.245. DIRECTIONAL F.S. 199.25 BELLCRANK REMOVAL

11.245.1. Description

This task covers: Removal. Cleaning. Inspection.

11.245.2. Initial Setup

Tools:

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

Personnel Required:

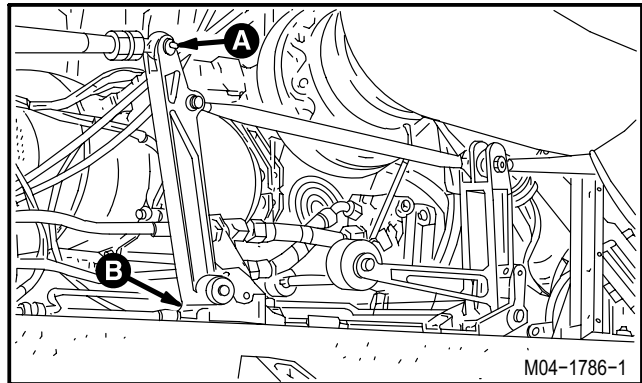
67R Attack Helicopter Repairer

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panel L200 removed



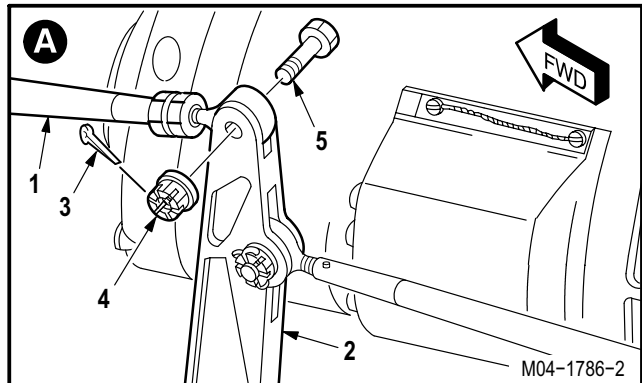
To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



11.245.3. Removal

a. Remove forward push-pull rod (1) from directional control bellcrank (2).

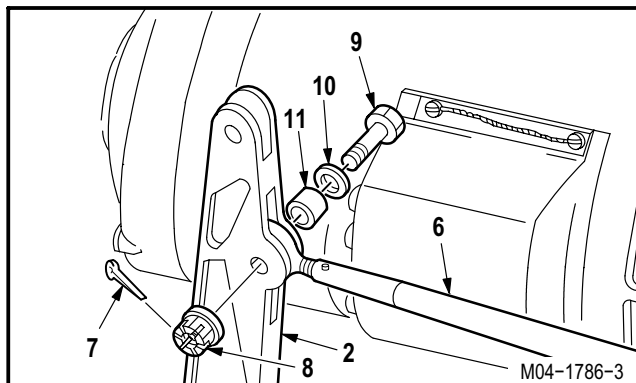
- (1) Remove and discard cotter pin (3).
- (2) Remove self-locking nut (4).
- (3) Remove close tolerance bolt (5).
- (4) Remove rod (1).



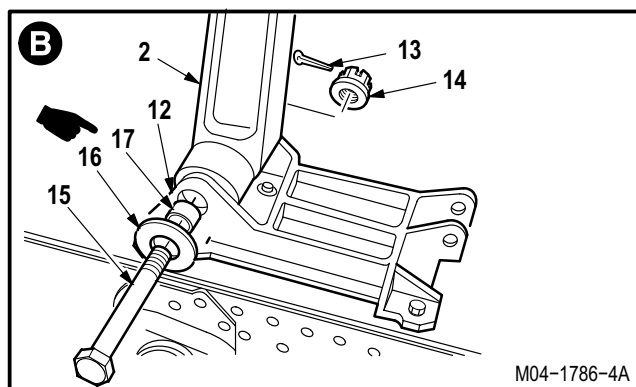
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11.245. DIRECTIONAL F.S. 199.25 BELLCRANK REMOVAL – continued**b. Remove aft push-pull rod (6) from bellcrank (2).**

- (1) Remove and discard cotter pin (7).
- (2) Remove self-locking nut (8).
- (3) Remove close tolerance bolt (9), washer (10), and sleeve bushing (11) from rod (6) and bellcrank (2).

**c. Remove bellcrank (2) from bracket (12).**

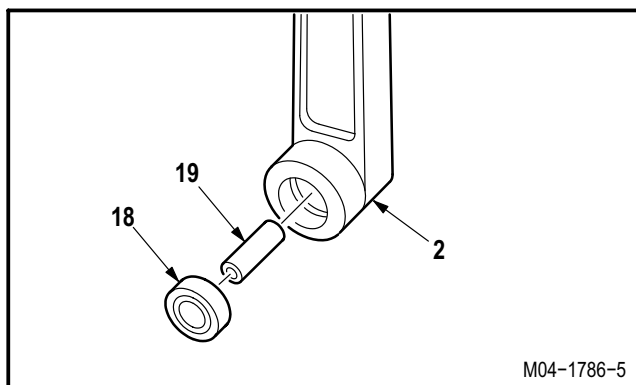
- (1) Remove and discard cotter pin (13).
- (2) Remove self-locking nut (14).
- (3) Remove close tolerance bolt (15), washer (16) and sleeve bushing (17).
- (4) Remove bellcrank (2).

**d. Remove ball bearing (18) and sleeve spacer (19) from bellcrank (2).****11.245.4. Cleaning**

- a. **Wipe removed and attaching parts with a clean rag.**

11.245.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).



END OF TASK

11.246. DIRECTIONAL F.S. 199.25 BELLCRANK INSTALLATION

11.246.1. Description

This task covers: Installation.

11.246.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- 1/4 x 1 7/16 dowel (item 109, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (3)

Personnel Required:

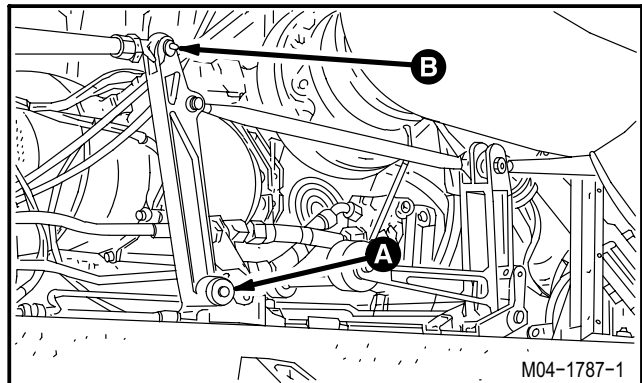
- 67R Attack Helicopter Repairer
- 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

WARNING

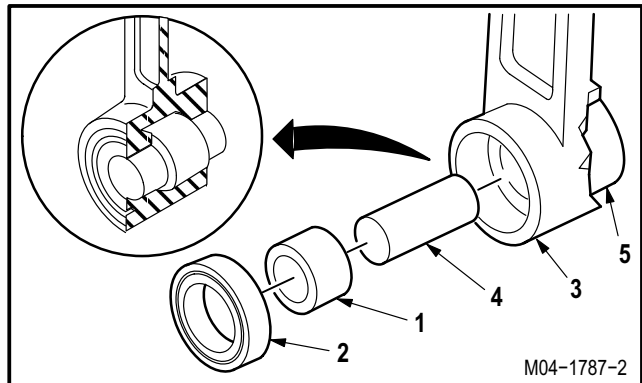
To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



11.246.3. Installation

a. **Install sleeve spacer (1) and ball bearing (2) on directional control bellcrank (3).**

- (1) Insert dowel (4) in hub of bellcrank (3) through staked ball bearing (5). Use dowel.
- (2) Install spacer (1) over dowel (4) and in bellcrank (3).
- (3) Aline bearing (2) with dowel (4).
- (4) Install bearing (2) in bellcrank (3).



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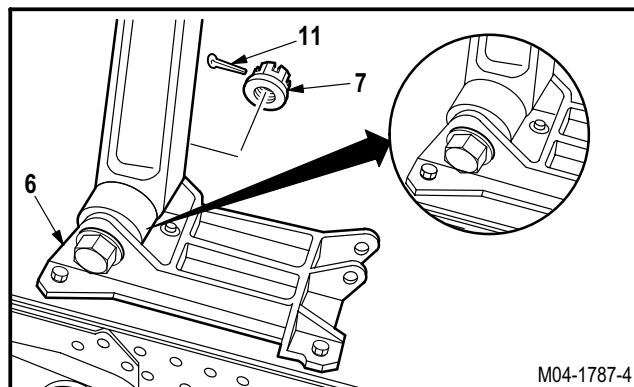
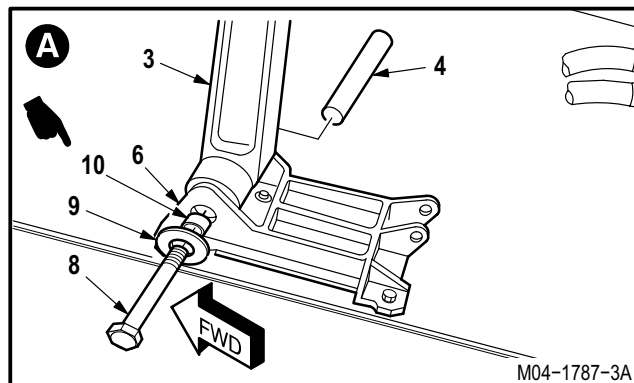
11.246. DIRECTIONAL F.S. 199.25 BELLCRANK INSTALLATION – continued

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

b. **Install bellcrank (3) on bracket (6).** Torque self-locking nut (7) **30 to 40 INCH-POUNDS**.

- (1) Aline bellcrank (3) with bracket (6).
- (2) Install close tolerance bolt (8) washer (9), sleeve bushing (10) bracket (6) and bellcrank (3).
- (3) Remove dowel (4) from bellcrank (3).
- (4) Check fit of self-retaining bolt (9) (para 11.1).
- (5) Install nut (7). Torque nut (7) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (11).

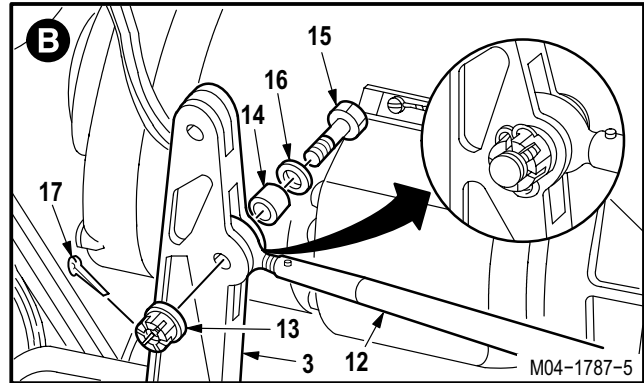


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11.246. DIRECTIONAL F.S. 199.25 BELLCRANK INSTALLATION – continued

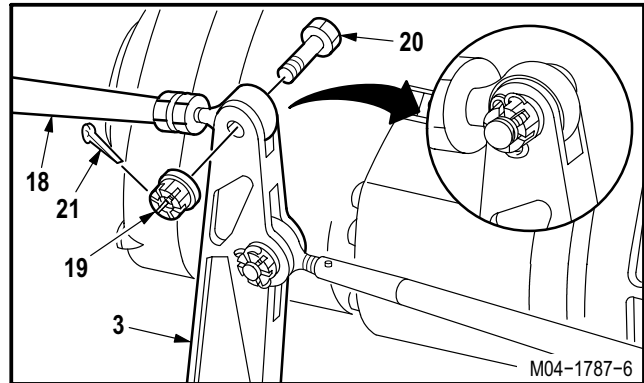
c. Install aft push-pull rod (12) on bellcrank (3). Torque nut (13) 30 to 40 INCH-POUNDS.

- (1) Aline rod (12) with bellcrank (3).
- (2) Install sleeve bushing (14) in bellcrank (3).
- (3) Install bolt (15) through washer (16), bushing (14), bellcrank (3), and rod (12).
- (4) Check fit of self-retaining bolt (15) (para 11.1).
- (5) Install nut (13). Torque nut (13) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (17).



d. Install forward push-pull rod (18) on bellcrank (3). Torque self-locking nut (19) 30 to 40 INCH-POUNDS.

- (1) Aline rod (18) with bellcrank (3).
- (2) Install close tolerance bolt (20) through bellcrank (3) and rod (18).
- (3) Check fit of self-retaining bolt (21) (para 11.1).
- (4) Install nut (19). Torque nut (19) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (21).



e. Inspect (QA).

f. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).

g. Install access panel L200 (para 2.2).

END OF TASK

11.247. DIRECTIONAL F.S. 199.25 PUSH-PULL ROD REMOVAL/INSTALLATION

11.247.1. Description

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

11.247.2. Initial Setup**Tools:**

Aircraft mechanic's tool kit (item 376, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque
 wrench (item 434, App H)

Materials/Parts:

Cotter pin (2)

Personnel Required:

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

References:

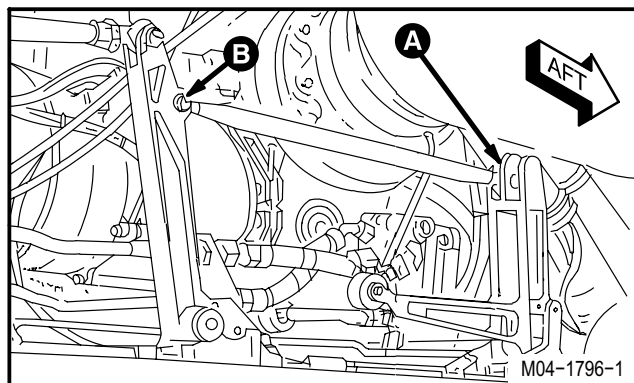
TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panel L200 removed

WARNING

To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



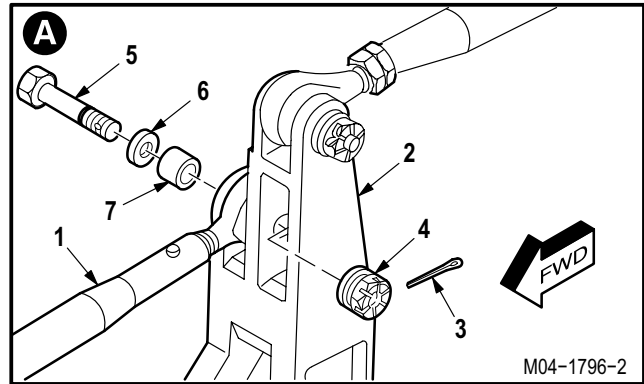
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11.247. DIRECTIONAL F.S. 199.25 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

11.247.3. Removal

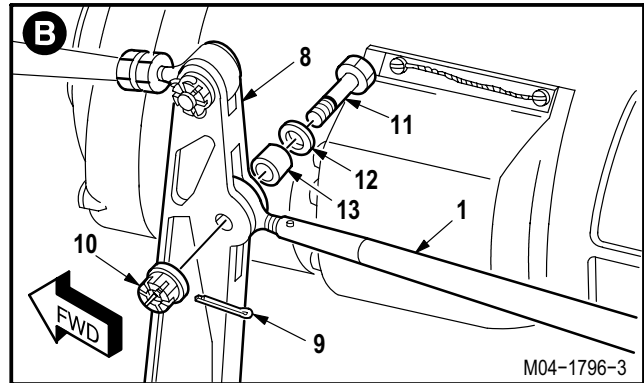
a. **Remove directional control push-pull rod (1) from aft bellcrank (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove self-locking nut (4).
- (3) Remove close tolerance bolt (5), washer (6), and sleeve bushing (7).



b. **Remove rod (1) from forward bellcrank (8).**

- (1) Remove and discard cotter pin (9).
- (2) Remove self-locking nut (10).
- (3) Remove close tolerance bolt (11), washer (12), and sleeve bushing (13).
- (4) Remove rod (1).



11.247.4. Cleaning

a. **Wipe removed and attaching parts with a clean rag.**

11.247.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.247. DIRECTIONAL F.S. 199.25 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

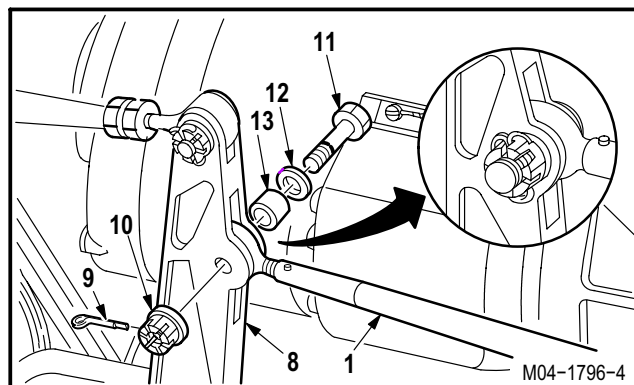
11.247.6. Installation

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

- a. **Install rod (1) on forward bellcrank (8).** Torque nut (10) **30 to 40 INCH-POUNDS**.

- (1) Aline rod (1) with bellcrank (8).
- (2) Install bushing (13) in bellcrank (8).
- (3) Install bolt (11) through washer (12), bushing (13), bellcrank (8), and rod (1).
- (4) Check fit of self-retaining bolt (11) (para 11.1).
- (5) Install nut (10). Torque nut (10) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (9).

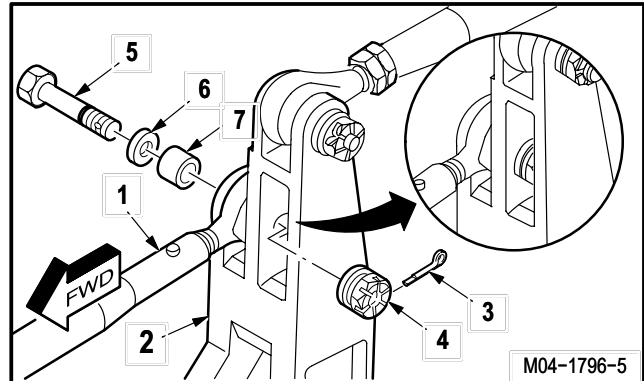


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11.247. DIRECTIONAL F.S. 199.25 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

b. **Install rod (1) on aft bellcrank (2).** Torque nut (4) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (1) with bellcrank (2).
- (2) Install bushing (7) in bellcrank (2).
- (3) Install bolt (5) through washer (6), bushing (7), bellcrank (2), and rod (1).
- (4) Check fit of self-retaining bolt (5) (para 11.1).
- (5) Install nut (4). Torque nut (4) to **30 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (7) Install new cotter pin (3).



c. **Inspect (QA).**

d. **Perform directional flight control rigging operational check** (TM 1-1520-238-T).

e. **Install access panel L200** (para 2.2).

END OF TASK

11.248. DIRECTIONAL F.S. 199.25 TAIL ROTOR FITTING REMOVAL/INSTALLATION

11.248.1. Description

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

11.248.2. Initial Setup

Tools:

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

References:

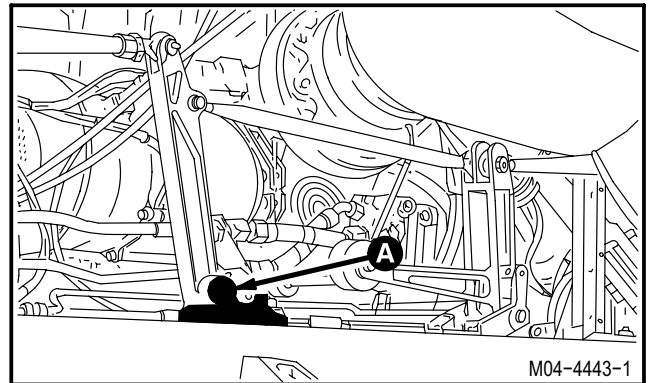
TM 1-1520-238-T

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.245	F.S. 199.25 bellcrank removed



M04-4443-1

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11.248. DIRECTIONAL F.S. 199.25 TAIL ROTOR FITTING REMOVAL/INSTALLATION – continued

11.248.3. Removal

a. **Remove bracket (1) from fitting (2).**

(1) Remove two nuts (3) and washers (4) from screws (5).

(2) Remove two screws (5) from fitting (2).

b. **Remove fitting (2) from transmission deck (6).**

(1) Remove two bolts (7) and washers (8).

(2) Remove bolt (9) and washer (10).

(3) Remove fitting (2).

11.248.4. Cleaning

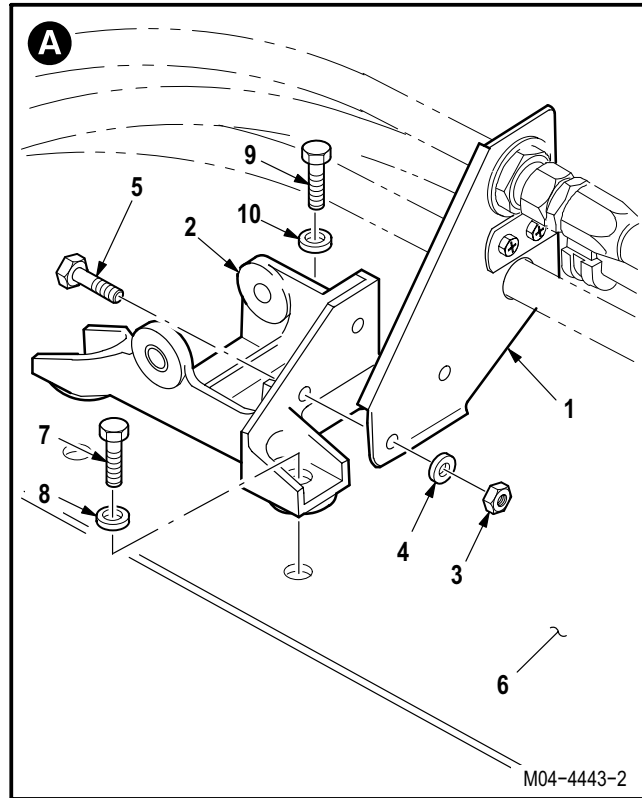
a. **Clean removed and attaching parts or surfaces** (para 1.47).

11.248.5. Inspection

a. **Check removed and attaching parts for cracks.** None allowed.

b. **Check removed and attaching parts for damage** (para 11.232).

c. **Check removed and attaching parts for corrosion** (para 1.49).



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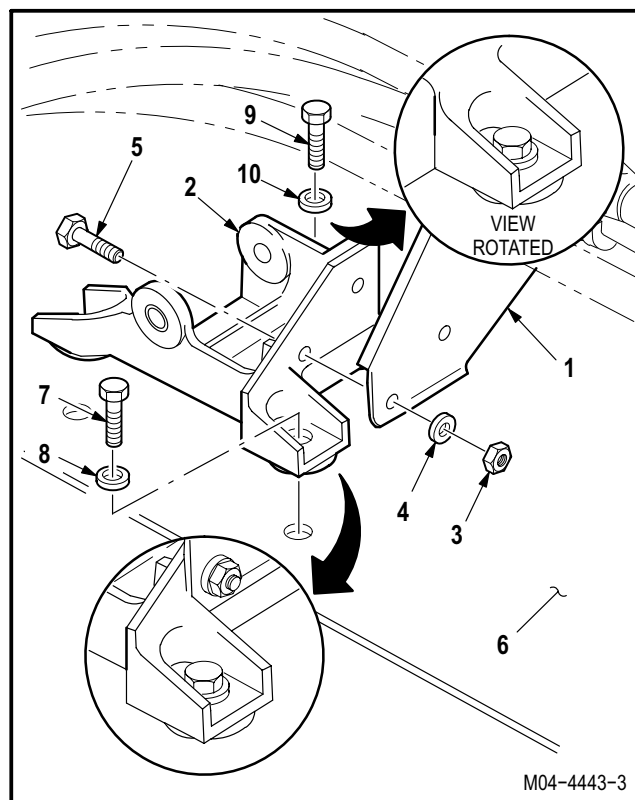
11.248. DIRECTIONAL F.S. 199.25 TAIL ROTOR FITTING REMOVAL/INSTALLATION – continued

11.248.6. Installation**a. Install fitting (2) on transmission deck (6).**

- (1) Position fitting (2) on deck (6).
- (2) Install two bolts (7) and washers (8) through fitting (2).
- (3) Install bolt (9) and washer (10) through fitting (2).

b. Install bracket (1) on fitting (2).

- (1) Aline bracket (1) with fitting (2).
- (2) Install two screws (5) through fitting (2) and bracket (1).
- (3) Install two washers (4) and nuts (3).

c. Inspect (QA).**d. Install F.S. 199.25 bellcrank (para 11.246).**

END OF TASK

11.249. DIRECTIONAL F.S. 216.25 BELLCRANK REMOVAL

11.249.1. Description

This task covers: Removal. Cleaning. Inspection.

11.249.2. Initial Setup

Tools:

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

Personnel Required:

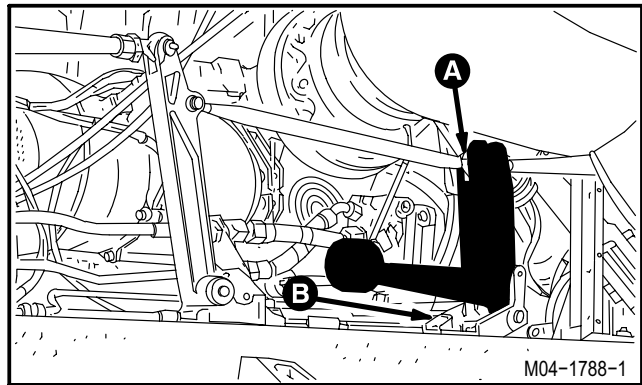
67R Attack Helicopter Repairer

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access panel L200 removed

WARNING

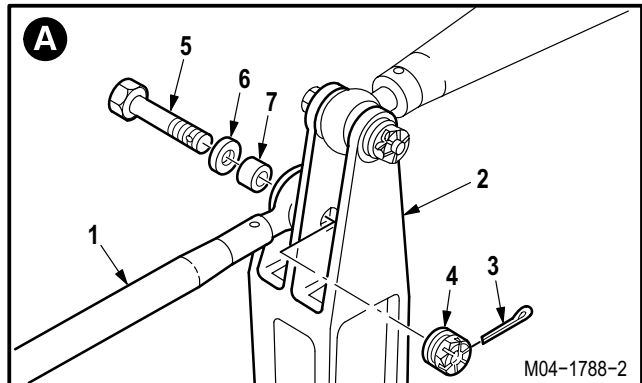
To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



11.249.3. Removal

a. Remove forward push-pull rod (1) from directional control bellcrank (2).

- (1) Remove and discard cotter pin (3).
- (2) Remove self-locking nut (4).
- (3) Remove close tolerance bolt (5), washer (6), and sleeve bushing (7).
- (4) Remove rod (1).

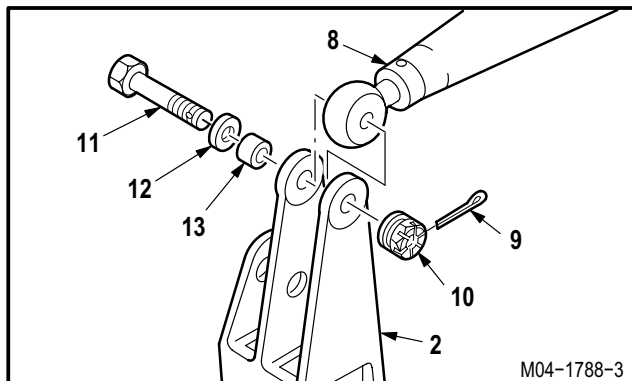


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11.249. DIRECTIONAL F.S. 216.25 BELLCRANK REMOVAL – continued

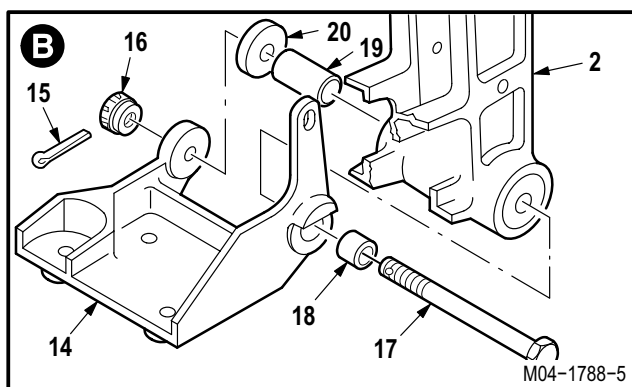
b. Remove aft push-pull rod (8) from bellcrank (2).

- (1) Remove and discard cotter pin (9).
- (2) Remove self-locking nut (10).
- (3) Remove close tolerance bolt (11), washer (12), and sleeve bushing (13).



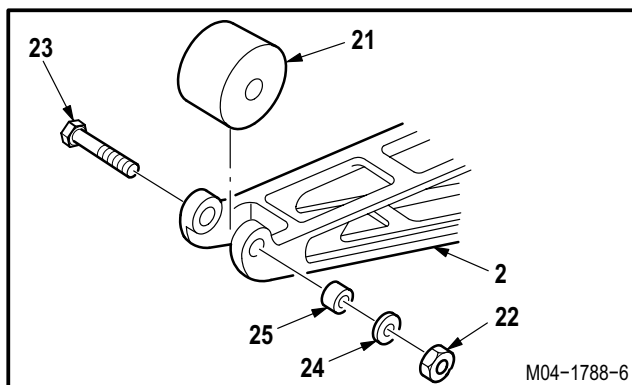
c. Remove bellcrank (2) from bracket (14).

- (1) Remove and discard cotter pin (15).
- (2) Remove self-locking nut (16).
- (3) Remove close tolerance bolt (17), sleeve bushing (18), and internal spacer (19) and bearing (20).



d. Remove counterbalance weight (21) from bellcrank (2).

- (1) Remove self-locking nut (22).
- (2) Remove shear bolt (23), washer (24), sleeve bushing (25), and weight (21).



11.249.4. Cleaning

a. Wipe removed and attaching parts with a clean rag.

11.249.5. Inspection

- a. Check removed and attaching parts for damage (para 11.232).
- b. Check removed and attaching parts for corrosion (para 1.49).
- c. Check all installed bushing(s) and/or bearing(s) for wear (para 11.232).
- d. Check all removed bushing(s) and/or bearing(s) for wear (para 11.4).

END OF TASK

11.250. DIRECTIONAL F.S. 216.25 BELLCRANK INSTALLATION

11.250.1. Description

This task covers: Installation.

11.250.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (3)

Personnel Required:

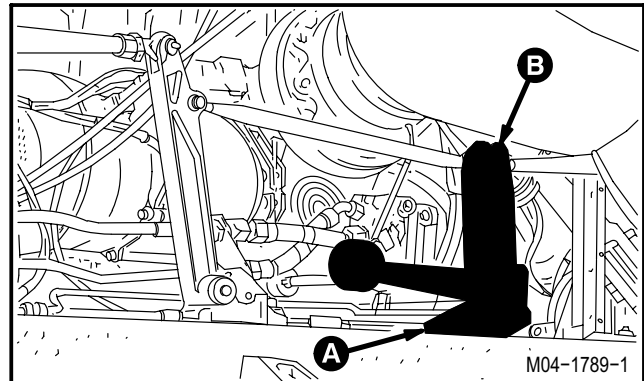
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

WARNING

To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



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11.250. DIRECTIONAL F.S. 216.25 BELLCRANK INSTALLATION – continued

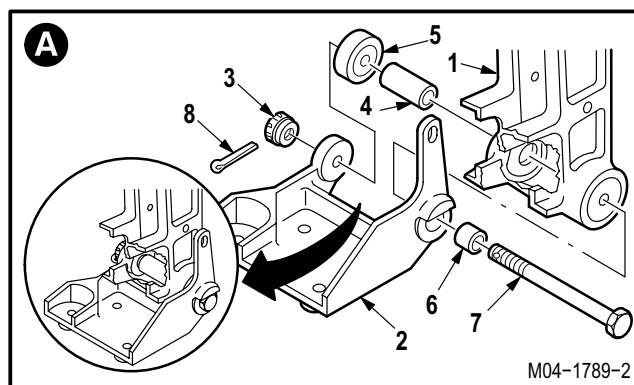
11.250.3. Installation

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

a. **Install directional control bellcrank (1) on bracket (2).** Torque nut (3) **30 to 40 INCH-POUNDS**.

- (1) Position spacer (4) and bearing (5) in bellcrank (1).
- (2) Align bellcrank (1) with bracket (2).
- (3) Install bushing (6) in bellcrank (1).
- (4) Install bolt (7) through bellcrank (1), bushing (6), spacer (4), and bracket (2).
- (5) Check fit of self-retaining bolt (7) (para 11.1).
- (6) Install nut (3). Torque nut (3) to **30 INCH-POUNDS**. Use torque wrench.
- (7) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (8) Install new cotter pin (8).

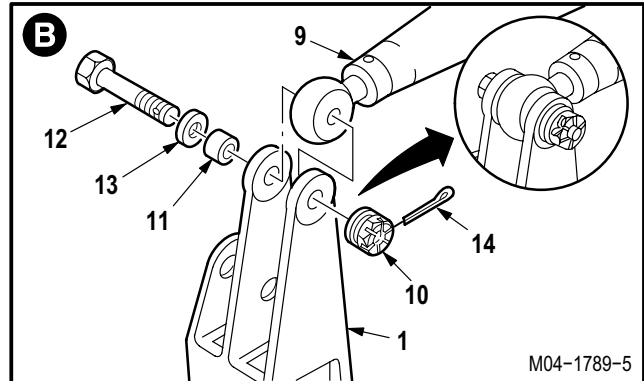


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11.250. DIRECTIONAL F.S. 216.25 BELLCRANK INSTALLATION – continued

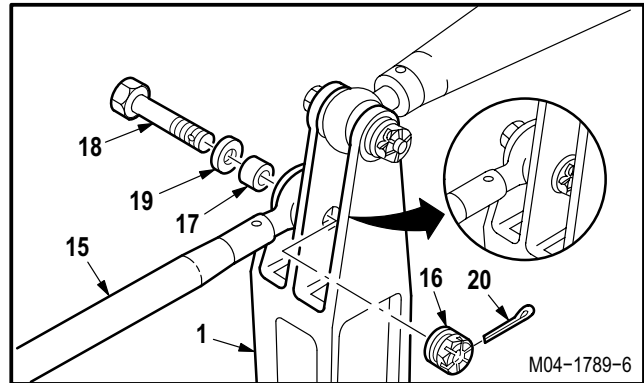
b. Install aft push-pull rod (9) on bellcrank (1). Torque nut (10) 30 to 40 INCH-POUNDS.

- (1) Position rod (9) in bellcrank (1).
- (2) Install bushing (11) in bellcrank (1).
- (3) Install bolt (12) through washer (13), bushing (11), bellcrank (1), and rod (9).
- (4) Check fit of self-retaining bolt (12) (para 11.1).
- (5) Install nut (10). Torque nut (10) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (14).



c. Install forward push-pull rod (15) on bellcrank (1). Torque nut (16) 30 to 40 INCH-POUNDS.

- (1) Position rod (15) in bellcrank (1).
- (2) Install bushing (17) in bellcrank (1).
- (3) Install bolt (18) through washer (19), bushing (17), bellcrank (1), and rod (15).
- (4) Check fit of self-retaining bolt (18) (para 11.1).
- (5) Install nut (16). Torque nut (16) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (20).

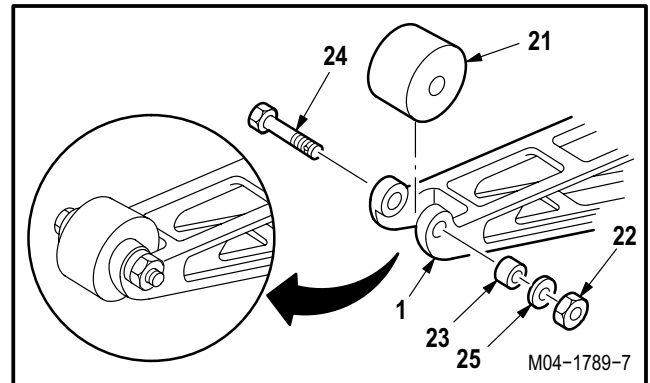


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11.250. DIRECTIONAL F.S. 216.25 BELLCRANK INSTALLATION – continued

d. Install counterbalance weight (21) on bellcrank (1).

- (1) Position weight (21) in bellcrank (1).
- (2) Install bushing (23) in bellcrank (1).
- (3) Install bolt (24) through bellcrank (1), weight (21), and bushing (23).
- (4) Install washer (25) and nut (22).

**e. Inspect (QA).****f. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).****g. Install access panel L200 (para 2.2).**

END OF TASK

11.251. DIRECTIONAL F.S. 216.25 BELLCRANK BRACKET REMOVAL/INSTALLATION

11.251.1. Description

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

11.251.2. Initial Setup

Tools:

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

Personnel Required:

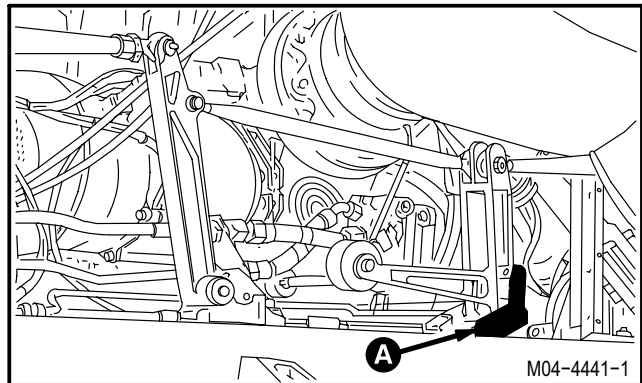
67R Attack Helicopter Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.249	Directional F.S. 216.25 bellcrank removed



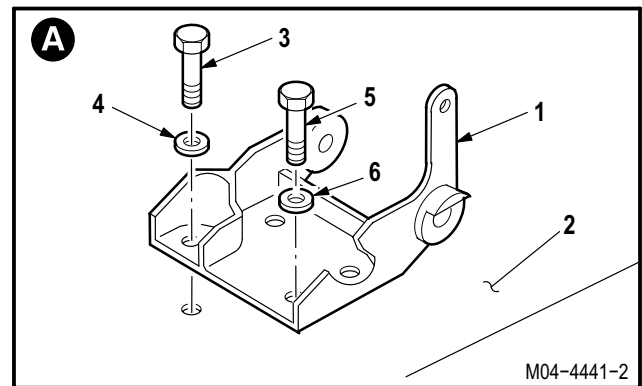
To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



11.251.3. Removal

a. **Remove bracket (1) from deck (2).**

- (1) Remove two bolts (3) and washers (4) from bracket (1).
- (2) Remove two bolts (5) and washers (6) from bracket (1).
- (3) Remove bracket (1).



GO TO NEXT PAGE

11.251. DIRECTIONAL F.S. 216.25 BELLCRANK BRACKET REMOVAL/INSTALLATION – continued

11.251.4. Cleaning

- a. **Clean bracket mounting location** (para 1.47).

11.251.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).

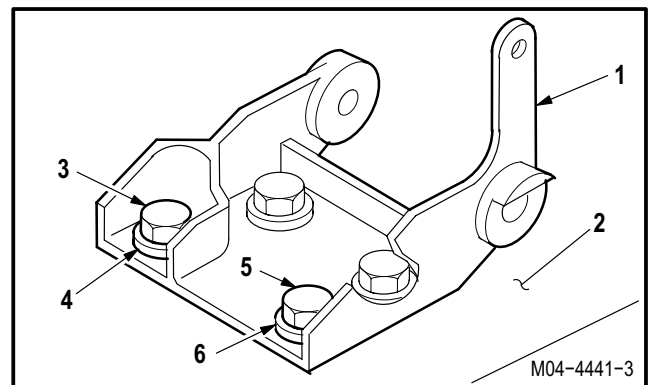
11.251.6. Installation

- a. **Install bracket (1) on deck (2).**

- (1) Aline bracket (1) with deck (2).
- (2) Install two bolts (3) and washers (4) through bracket (1) into deck (2).
- (3) Install two bolts (5) and washers (6) through bracket (1) into deck (2).

- b. **Inspect (QA).**

- c. **Install directional F.S. 216.25 bellcrank** (para 11.250).



END OF TASK

11.252. DIRECTIONAL F.S. 216.25 PUSH-PULL ROD REMOVAL/INSTALLATION

11.252.1. Description

This task covers: Removal. Cleaning. Inspection. Installation

11.252.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Flight control rigging kit (item 267, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (2)

Equipment Conditions:

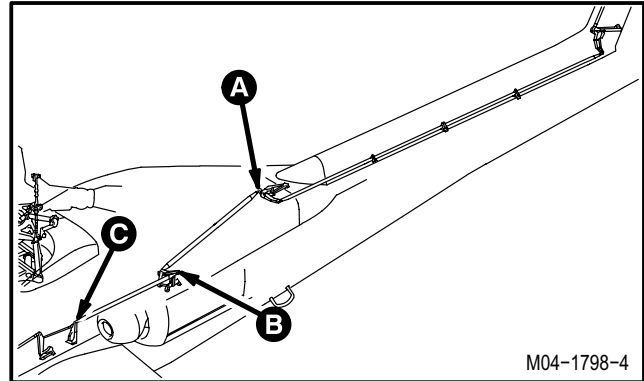
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panel L200 removed
1.72	External primary hydraulic power applied
2.84	Catwalk center section removed

Personnel Required:

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



To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



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11.252. DIRECTIONAL F.S. 216.25 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

11.252.3. Removal

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

- a. **Install -9 rig pin (1) in directional F.S. 348 bellcrank (2) and bracket (3).** Use flight control rigging kit.

(1) Locate bellcrank (2) and bracket (3).

NOTE

If rig pin hole in bellcrank does not align with mid-stroke hole in bracket, slowly move controls to align holes.

(2) Install -9 rig pin (1) through bracket (3) and bellcrank (2).

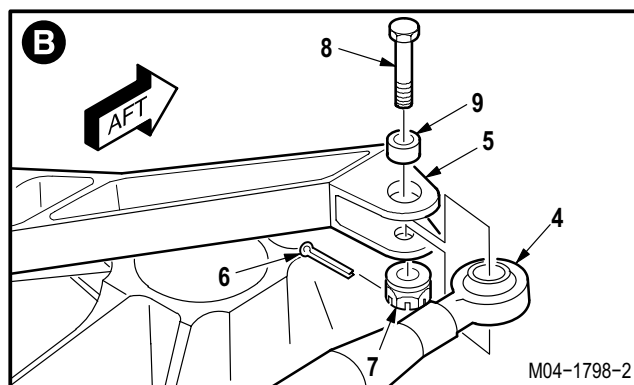
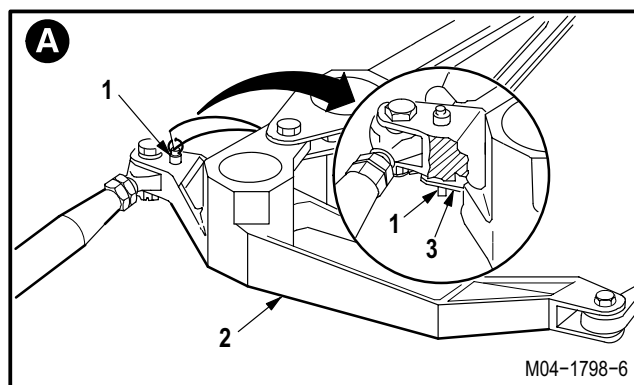
- b. **Remove external hydraulic power** (para 1.72).

- c. **Remove aft end of directional push-pull rod (4) from F.S. 275 bellcrank (5).**

(1) Remove and discard cotter pin (6).

(2) Remove self-locking nut (7).

(3) Remove close tolerance bolt (8) and sleeve bushing (9) from bellcrank (5).



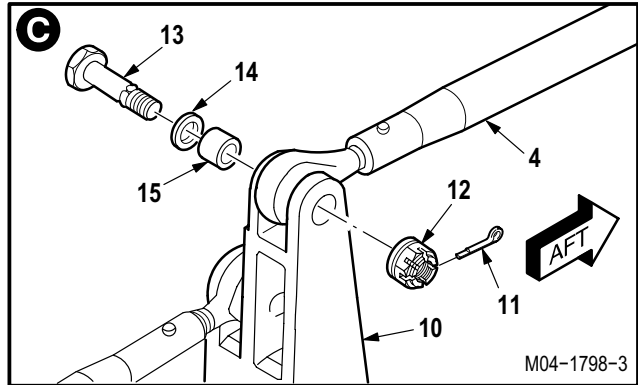
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11.252. DIRECTIONAL F.S. 216.25 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

d. Remove forward end of rod (4) from F.S. 216.25 bellcrank (10).

- (1) Remove and discard cotter pin (11).
- (2) Remove self-locking nut (12).
- (3) Remove close tolerance bolt (13), washer (14), and sleeve bushing (15) from bellcrank (10).

e. Pull rod (4) out through access door L200 opening.



11.252.4. Cleaning

a. Wipe removed and attaching parts with a clean rag.

11.252.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.252. DIRECTIONAL F.S. 216.25 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

11.252.6. Installation

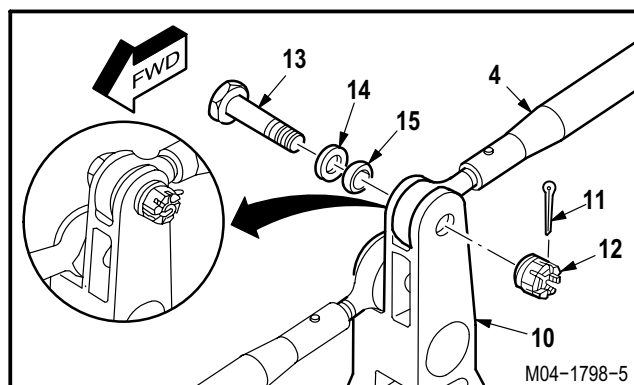
CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

a. **Insert directional control push-pull rod (4) through access door L200 opening.**

b. **Install forward end of rod (4) on bellcrank (10). Torque nut (12) 30 to 40 INCH-POUNDS.**

- (1) Aline rod (4) with bellcrank (10).
- (2) Install bolt (13) through washer (14), bushing (15), bellcrank (10), and rod (4).
- (3) Check fit of self-retaining bolt (13) (para 11.1).
- (4) Install nut (12). Torque nut (12) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (11).

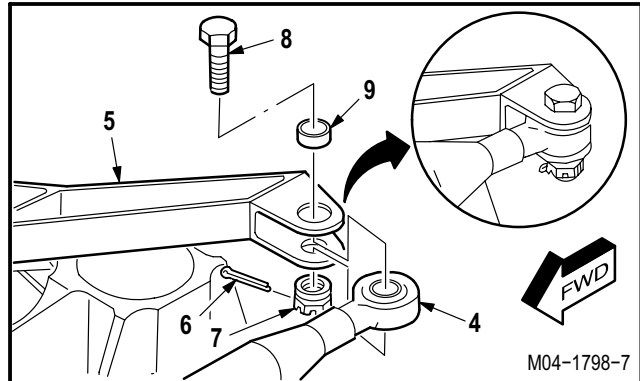


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11.252. DIRECTIONAL F.S. 216.25 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

c. **Install aft end of rod (4) on bellcrank (5).**
Torque nut (7) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (4) with bellcrank (5).
- (2) Install bolt (8) through bushing (9), bellcrank (5), and rod (4).
- (3) Check fit of self-retaining bolt (8) (para 11.1).
- (4) Install nut (7). Torque nut (7) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install new cotter pin (6).



d. **Remove -9 rig pin (1) from directional F.S. 348 bellcrank (2) and bracket (3).**

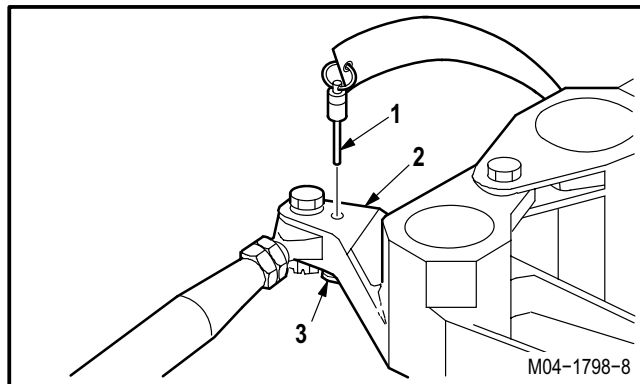
e. **Inspect (QA).**

f. **Install catwalk center section** (para 2.84).

g. **Install access panel L200** (para 2.2).

h. **Remove external primary hydraulic power** (para 1.72).

i. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).



END OF TASK

11.253. TAIL ROTOR CONTROL BRACKET REMOVAL/INSTALLATION

11.253.1. Description

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

11.253.2. 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)
- Adjustable air filtering respirator (item 262, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Sealing compound (item 178, App F)

Personnel Required:

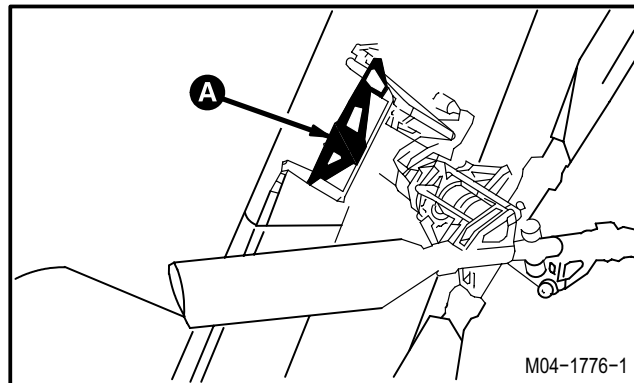
- 67R Attack Helicopter Repairer
- 67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.271	Directional control F.S. 534 push-pull rod removed
11.272	Directional control F.S. 542 bellcrank removed
11.270	Directional control F.S. 534 bellcrank removed



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11.253. TAIL ROTOR CONTROL BRACKET REMOVAL/INSTALLATION – continued

11.253.3. Removal

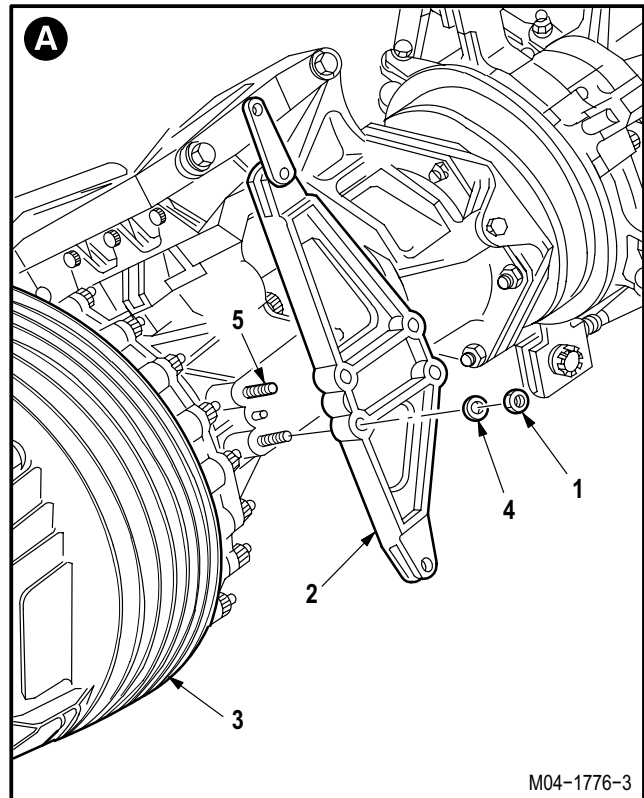
- a. **Remove sealing compound from four nuts (1).**
- b. **Remove bracket (2) from tail rotor gearbox (3).**
 - (1) Remove four nuts (1) and washers (4).
 - (2) Remove bracket (2) from studs (5).

11.253.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.253.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).



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11.253. TAIL ROTOR CONTROL BRACKET REMOVAL/INSTALLATION – continued

11.253.6. Installation

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

- a. **Install bracket (2) on tail rotor gearbox (3).** Torque four self-locking nuts (1) to **40 INCH-POUNDS**.

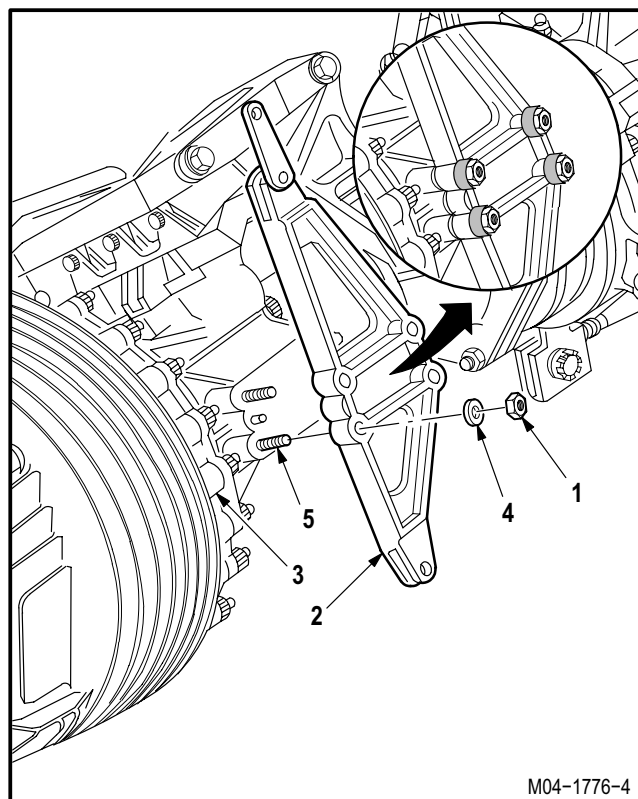
- (1) Position bracket (2) on studs (5).
- (2) Install four washers (4) and nuts (1).
- (3) Torque four nuts (1) to **40 INCH-POUNDS**. Use torque wrench.
- (4) Apply sealing compound to four nuts (1) and washers (4). Use sealing compound (item 178, App F).

- b. **Inspect (QA).**

- c. **Install directional F.S. 534 bellcrank** (para 11.270).

- d. **Install directional F.S. 542 bellcrank** (para 11.272).

- e. **Install directional F.S. 534 push-pull rod** (para 11.271).



END OF TASK

11.254. DIRECTIONAL F.S. 275 BELLCRANK REMOVAL/INSTALLATION

11.254.1. Description

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

11.254.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (4)

Personnel Required:

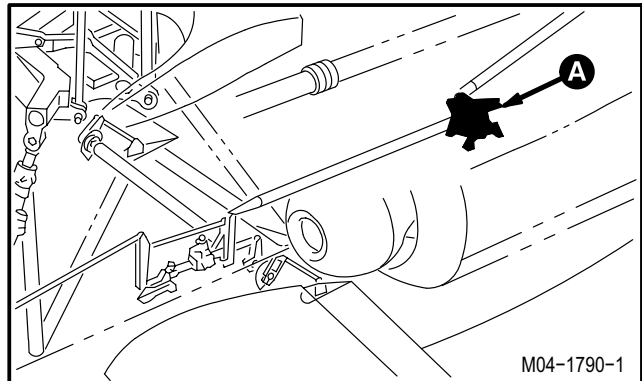
67R Attack Helicopter Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.84	Catwalk center section removed



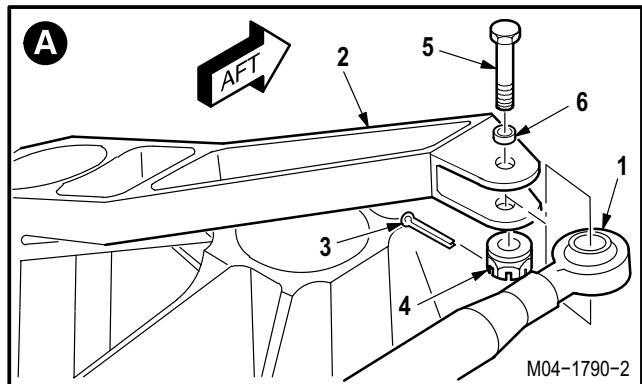
To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



11.254.3. Removal

a. **Remove forward push-pull rod (1) from directional bellcrank (2).**

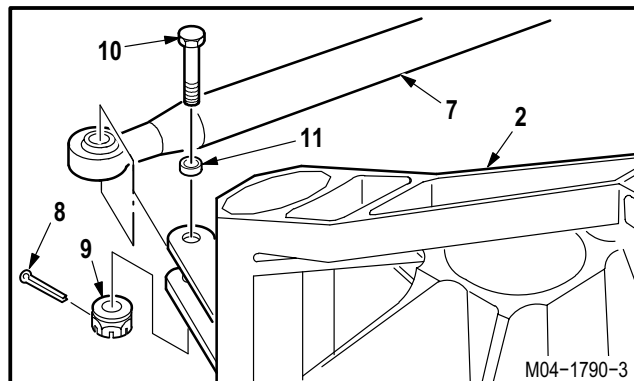
- (1) Remove and discard cotter pin (3).
- (2) Remove self-locking nut (4) from close tolerance bolt (5).
- (3) Remove bolt (5) and bushing (6) from bellcrank (2) and rod (1).
- (4) Remove rod (1).



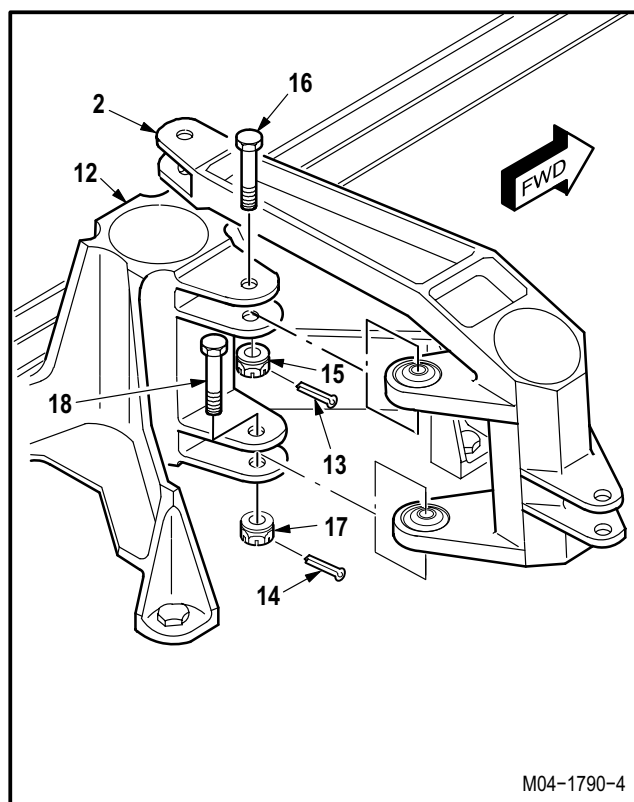
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11.254. DIRECTIONAL F.S. 275 BELLCRANK REMOVAL/INSTALLATION – continued**b. Remove aft push-pull rod (7) from bellcrank (2).**

- (1) Remove and discard cotter pin (8).
- (2) Remove self-locking nut (9) from close tolerance bolt (10).
- (3) Remove bolt (10) and bushing (11) from bellcrank (2) and rod (7).
- (4) Remove rod (7).

**c. Remove bellcrank (2) from bracket (12).**

- (1) Remove and discard cotter pins (13) and (14).
- (2) Remove self-locking nut (15) from close tolerance bolt (16).
- (3) Remove self-locking nut (17) from close tolerance bolt (18).
- (4) Remove two bolts (16) and (18) from bellcrank (2) and bracket (12).
- (5) Remove bellcrank (2).

**11.254.4. Cleaning**

- a. **Wipe removed and attaching parts with a clean rag.**

11.254.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.254. DIRECTIONAL F.S. 275 BELLCRANK REMOVAL/INSTALLATION – continued

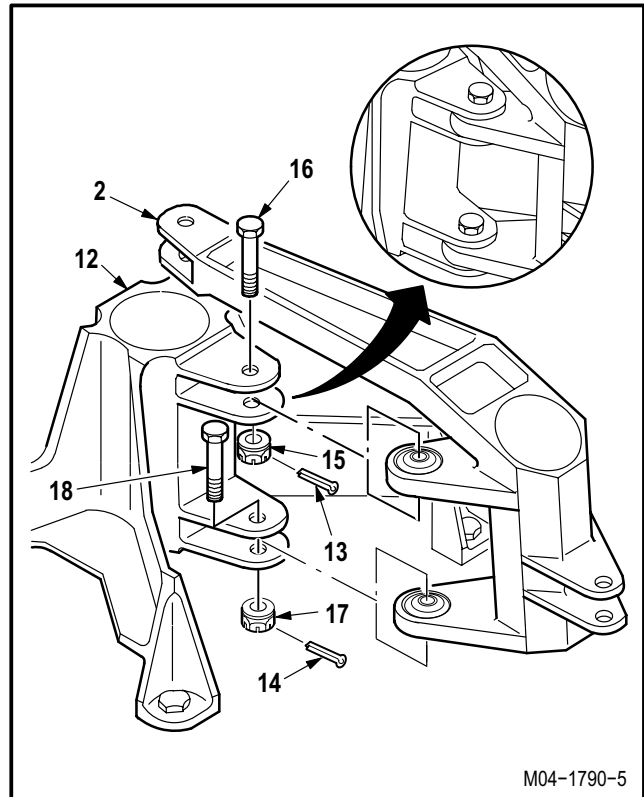
11.254.6. Installation

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

a. **Install bellcrank (2) on bracket (12).** Torque nuts (15) and (17) **30 to 40 INCH-POUNDS.**

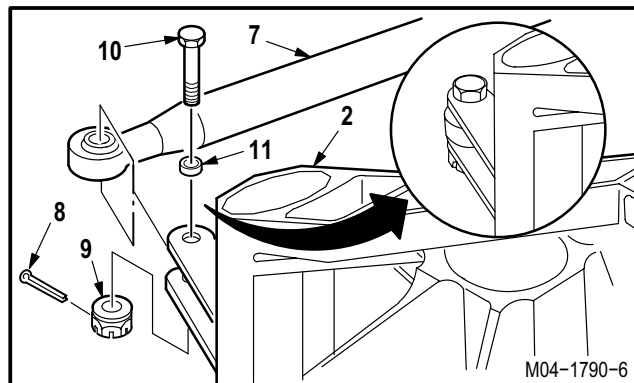
- (1) Aline bellcrank (2) with bracket (12).
- (2) Install bolt (16) through bracket (12) and bellcrank (2).
- (3) Install bolt (18) through bracket (12) and bellcrank (2).
- (4) Check fit of self-retaining bolts (16) and (18) (para 11.1).
- (5) Install nuts (15) and (17). Torque nuts (15) and (17) to **30 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (7) Install two new cotter pins (13) and (14).



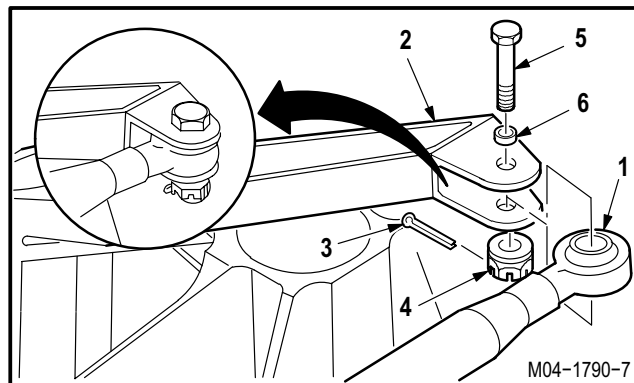
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11.254. DIRECTIONAL F.S. 275 BELLCRANK REMOVAL/INSTALLATION – continued**b. Install aft push-pull rod (7) on bellcrank (2). Torque nut (9) 30 to 40 INCH-POUNDS.**

- (1) Aline rod (7) with bellcrank (2).
- (2) Install bolt (10) through bushing (11), bellcrank (2), and rod (7).
- (3) Check fit of self-retaining bolt (10) (para 11.1).
- (4) Install nut (9). Torque nut (9) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (8).

**c. Install forward push-pull rod (1) on bellcrank (2). Torque nut (4) 30 to 40 INCH-POUNDS.**

- (1) Aline rod (1) with bellcrank (2).
- (2) Install bolt (5) through bushing (6), bellcrank (2), and rod (1).
- (3) Check fit of self-retaining bolt (5) (para 11.1).
- (4) Install nut (4). Torque nut (4) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (3).

**d. Inspect (QA).****e. Install catwalk center section (para 2.84).****f. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).**

END OF TASK

11.255. DIRECTIONAL F.S. 275 ROTOR CONTROL BRACKET REMOVAL/INSTALLATION

11.255.1. Description

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

11.255.2. 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:

Sealing compound (item 174, App F)

Personnel Required:

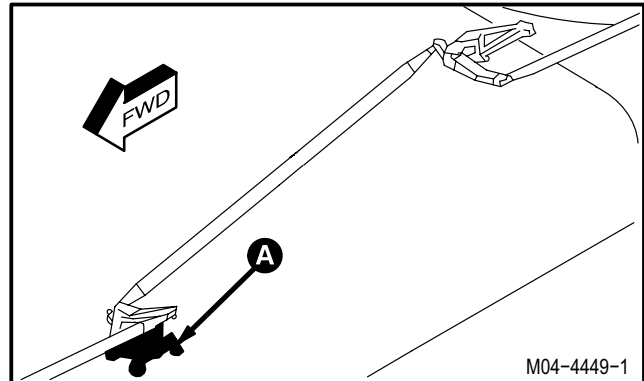
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.254	Directional F.S. 275 bellcrank removed

WARNING

To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



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11.255. DIRECTIONAL F.S. 275 ROTOR CONTROL BRACKET REMOVAL/INSTALLATION – continued

11.255.3. Removal

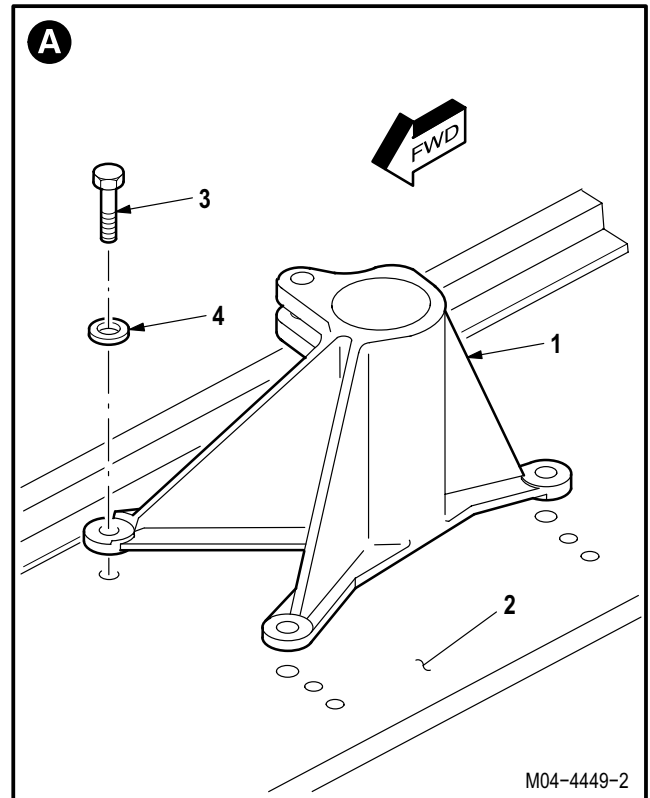
- a. **Remove sealing compound from faying surface of bracket (1).**
- b. **Remove bracket (1) from deck (2).**
 - (1) Remove four bolts (3) and washers (4).
 - (2) Remove bracket (1).

11.255.4. Cleaning

- a. **Clean removed and attaching parts (para 1.47).**

11.255.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).



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11.255. DIRECTIONAL F.S. 275 ROTOR CONTROL BRACKET REMOVAL/INSTALLATION – continued

11.255.6. Installation



a. **Install bracket (1) on deck (2).** Torque four bolts (3) to **80 INCH-POUNDS**.

(1) Position bracket (1) on deck (2).

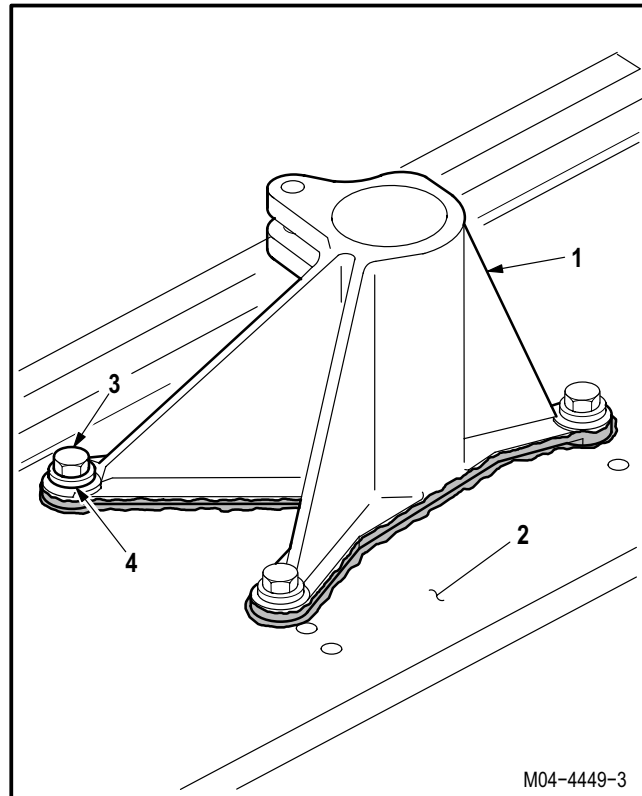
(2) Install four bolts (3) and washers (4).

(3) Torque four bolts (3) to **80 INCH-POUNDS**.
Use torque wrench.

(4) Apply sealing compound to faying surface of bracket (1). Use sealing compound (item 174, App F).

b. **Inspect (QA).**

c. **Install directional F.S. 275 bellcrank** (para 11.254).



END OF TASK

11.256. DIRECTIONAL F.S. 275 PUSH-PULL ROD REMOVAL/INSTALLATION

11.256.1. Description

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

11.256.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Flight control rigging kit (item 267, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (2)

Equipment Conditions:

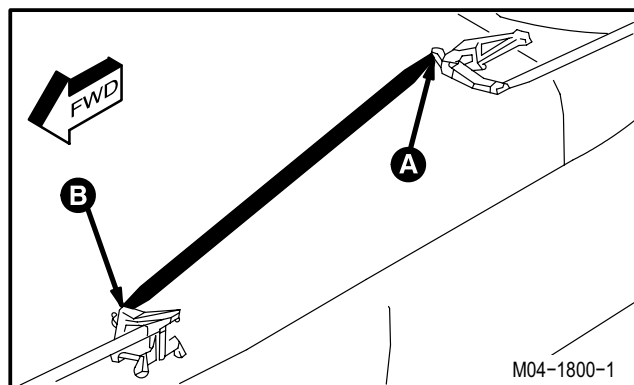
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access doors T250L, T250R, T290L, T250R, and L325 opened; fairing T355 removed
1.72	External primary hydraulic power applied

Personnel Required:

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



To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



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11.256. DIRECTIONAL F.S. 275 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

11.256.3. Removal

CAUTION

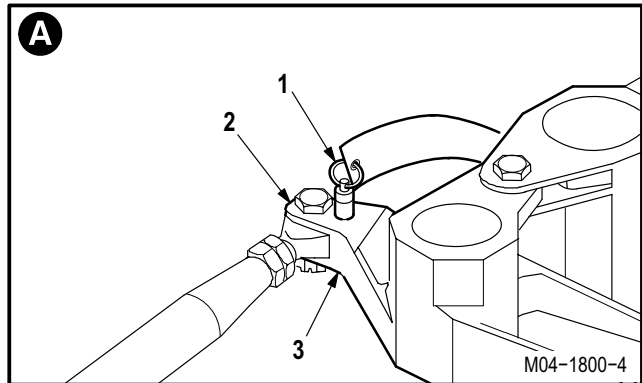
To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

a. Install -9 rig pin (1) in directional F.S. 348 bellcrank (2) and bracket (3).

- (1) Locate bellcrank (2) and bracket (3).
- (2) Install -9 rig pin (1) in bellcrank (2) and bracket (3). Use flight control rigging kit.

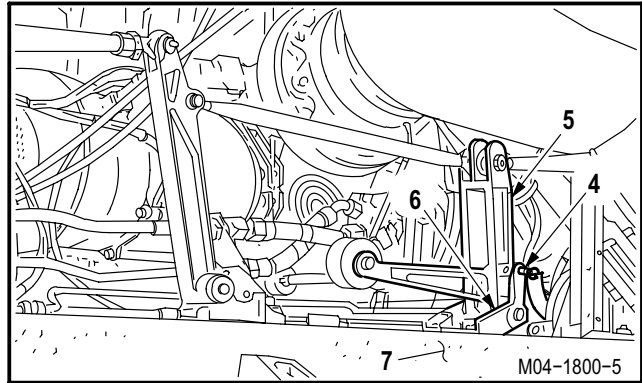
NOTE

If pin hole in bellcrank is not alined with hole in bracket, slowly move controls to aline holes.



b. Install -5 rig pin (4) in directional F.S. 216.25 bellcrank (5) and bracket (6).

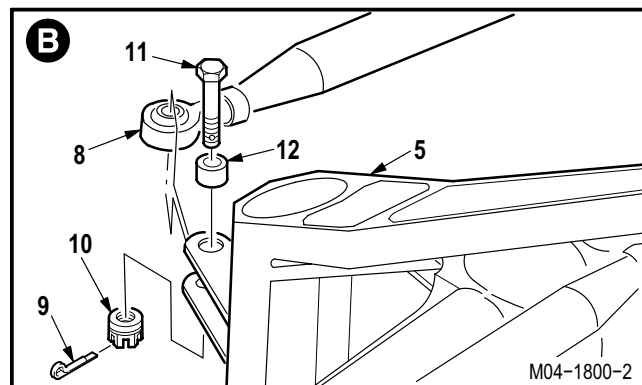
- (1) Locate bellcrank (5) and bracket (6) on main deck (7).
- (2) Install -5 rig pin (4) in bellcrank (5) and bracket (6).



c. Remove external hydraulic power (para 1.72).

d. Remove directional control push-pull rod (8) from forward bellcrank (5).

- (1) Remove and discard cotter pin (9).
- (2) Remove nut (10).
- (3) Remove bolt (11).
- (4) Remove bushing (12).

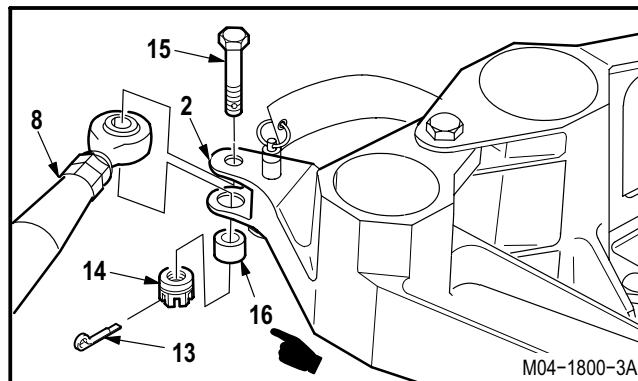


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11.256. DIRECTIONAL F.S. 275 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

e. Remove rod (8) from aft bellcrank (2).

- (1) Remove and discard cotter pin (13).
- (2) Remove nut (14).
- (3) Remove bolt (15).
- (4) Remove bushing (16).

f. Slide rod (8) aft to remove from aircraft.**11.256.4. Cleaning**

- a. **Wipe removed and attaching parts with a clean rag.**

11.256.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.256. DIRECTIONAL F.S. 275 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

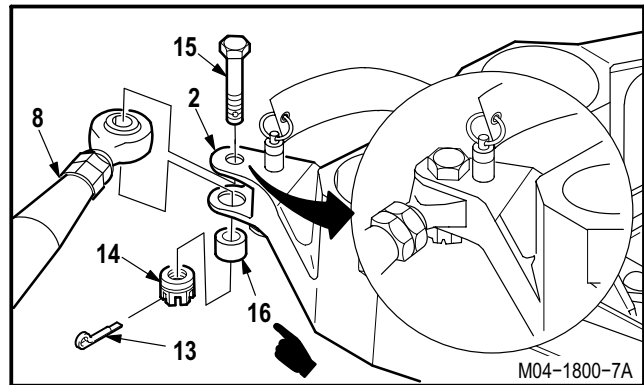
11.256.6. Installation

CAUTION

To prevent damage to flight control system components, do not use force to align push-pull rod with bellcrank.

a. **Install adjustable end of directional control rod (8) on aft bellcrank (2). Torque nut (14) 30 to 40 INCH-POUNDS.**

- (1) Aline rod (8) with bellcrank (2).
- (2) Install bushing (16).
- (3) Install bolt (15) through bellcrank (2), rod (8), and bushing (16).
- (4) Check fit of self-retaining bolt (15) (para 11.1).
- (5) Install nut (14). Torque nut (14) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (13).

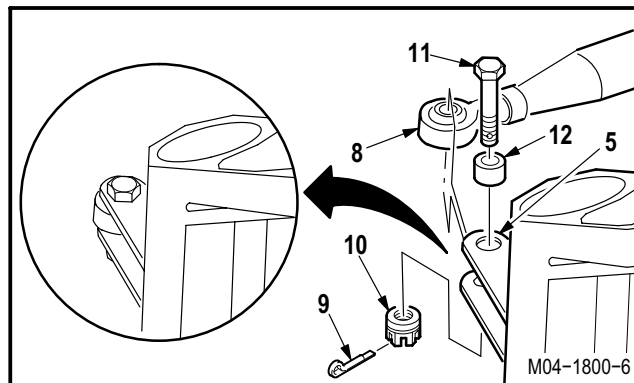


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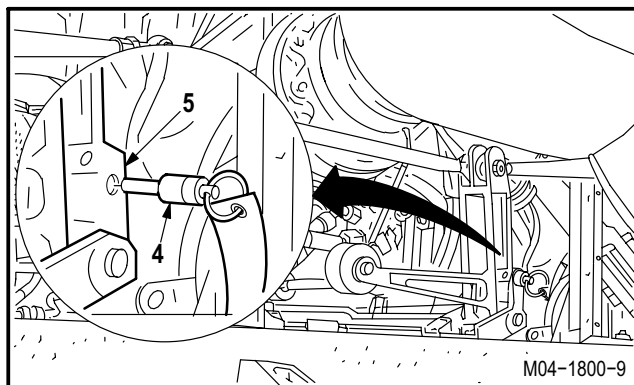
11.256. DIRECTIONAL F.S. 275 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

- b. **Install nonadjustable end of directional F.S. 275 push-pull rod (8) on forward bellcrank (5). Torque nut (10) 30 to 40 INCH-POUNDS.**

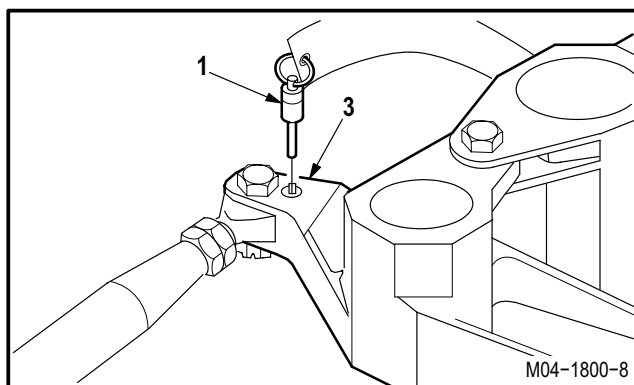
- (1) Aline rod (8) with bellcrank (5).
- (2) Install bushing (12).
- (3) Install bolt (11) through bushing (12), bellcrank (5), and rod (8).
- (4) Check fit of self-retaining bolt (11) (para 11.1).
- (5) Install nut (10). Torque nut (10) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (9).



- c. **Remove -5 rig pin (4) from bellcrank (5).**



- d. **Remove -9 rig pin (1) from bellcrank (3).**
- e. **Inspect (QA).**
- f. **Perform directional flight control rigging operational check (TM 1-1520-238-T).**
- g. **Secure access doors T250L, T250R, T290L, T290R, and L325; install fairing T355 (para 2.2).**



END OF TASK

11.257. DIRECTIONAL F.S. 348 BELLCRANK REMOVAL/INSTALLATION

11.257.1. Description

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

11.257.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (4)

Personnel Required:

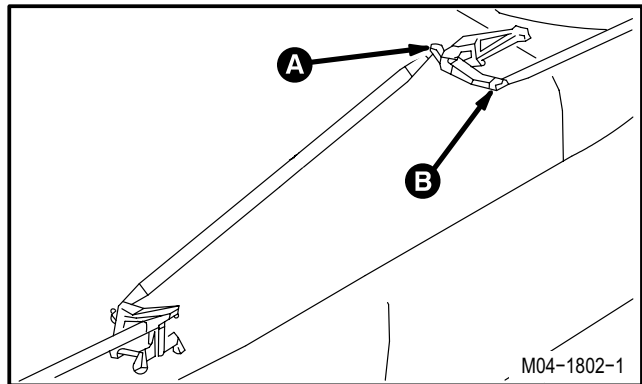
67R Attack Helicopter Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access fairings T325 and T355 removed



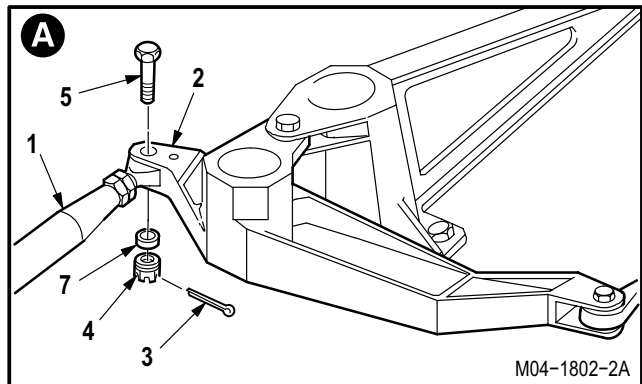
To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



11.257.3. Removal

a. Remove forward push-pull rod (1) from directional bellcrank (2).

- (1) Remove and discard cotter pin (3).
- (2) Remove self-locking nut (4).
- (3) Remove close tolerance bolt (5) and sleeve bushing (7).
- (4) Remove rod (1).

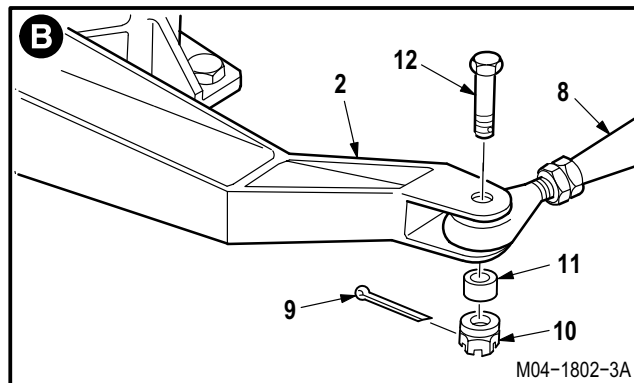


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11.257. DIRECTIONAL F.S. 348 BELLCRANK REMOVAL/INSTALLATION – continued

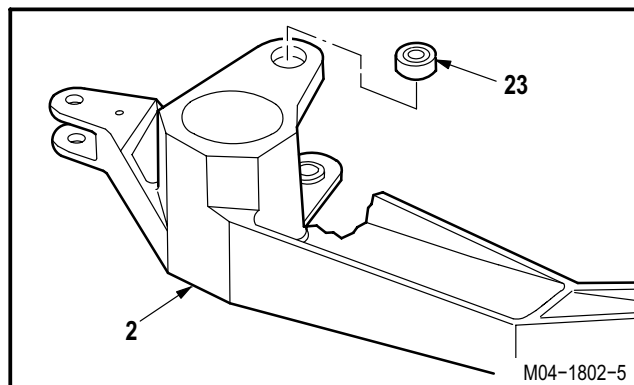
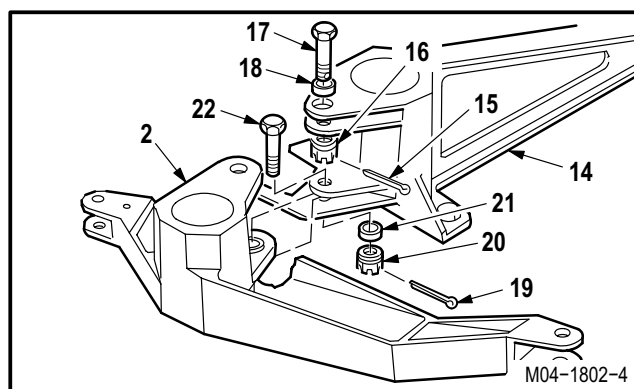
b. Remove aft push-pull rod (8) from bellcrank (2).

- (1) Remove and discard cotter pin (9).
- (2) Remove self-locking nut (10) and sleeve bushing (11).
- (3) Remove close tolerance bolt (12).
- (4) Remove rod (8).



c. Remove bellcrank (2) from bracket (14).

- (1) Remove and discard cotter pin (15).
- (2) Remove self-locking nut (16).
- (3) Remove close tolerance bolt (17) and sleeve bushing (18).
- (4) Remove and discard cotter pin (19).
- (5) Remove self-locking nut (20) and sleeve bushing (21).
- (6) Remove close tolerance bolt (22).
- (7) Remove bellcrank (2).
- (8) Remove ball bearing (23) from bellcrank (2).



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11.257. DIRECTIONAL F.S. 348 BELLCRANK REMOVAL/INSTALLATION – continued

11.257.4. Cleaning

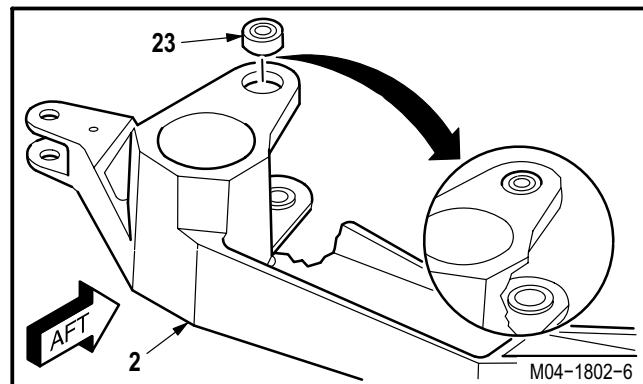
- a. **Wipe removed and attaching parts with a clean rag.**

11.257.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check removed and attaching parts for damage** (para 11.232).
- d. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- e. **Check bearing(s) and/or bushing(s) for excessive wear** (para 11.4).

11.257.6. Installation

- a. **Install bearing (23) in directional bellcrank (2).**



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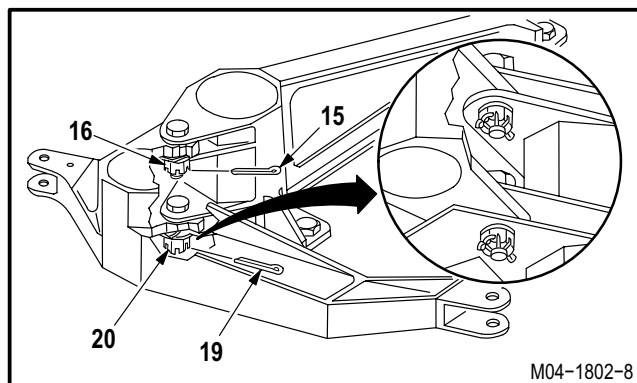
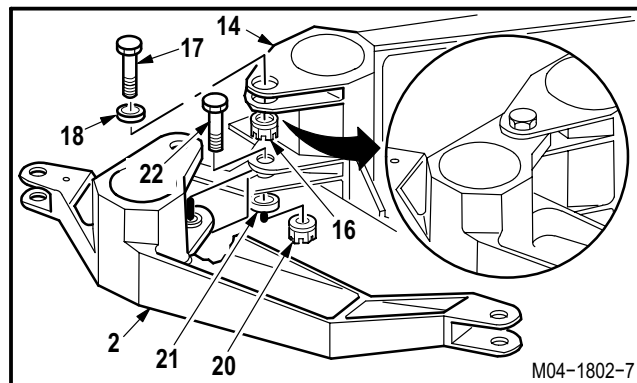
11.257. DIRECTIONAL F.S. 348 BELLCRANK REMOVAL/INSTALLATION – continued

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

- b. **Install bellcrank (2) on bracket (14).** Torque nuts (16) and (20) **30 to 40 INCH-POUNDS**.

- (1) Aline bellcrank (2) with bracket (14).
- (2) Install bolt (17) through bushing (18), bracket (14), and bellcrank (2).
- (3) Check fit of self-retaining bolt (17) (para 11.1).
- (4) Install nut (16).
- (5) Install bolt (22) through bracket (14), bellcrank (2), and bushing (21).
- (6) Check fit of self-retaining bolt (22) (para 11.1).
- (7) Install nut (20).
- (8) Torque nuts (16) and (20) to **30 INCH-POUNDS**. Use torque wrench.
- (9) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (10) Install new cotter pins (15) and (19).

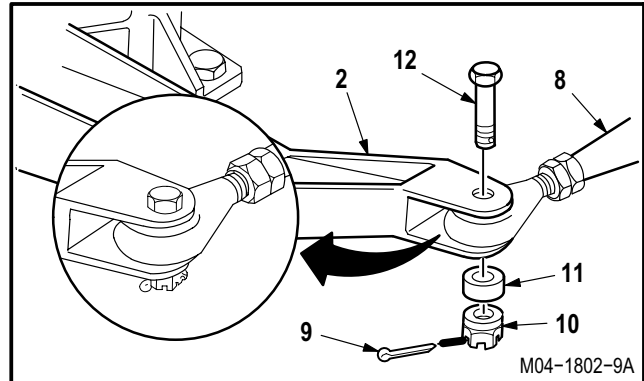


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11.257. DIRECTIONAL F.S. 348 BELLCRANK REMOVAL/INSTALLATION – continued

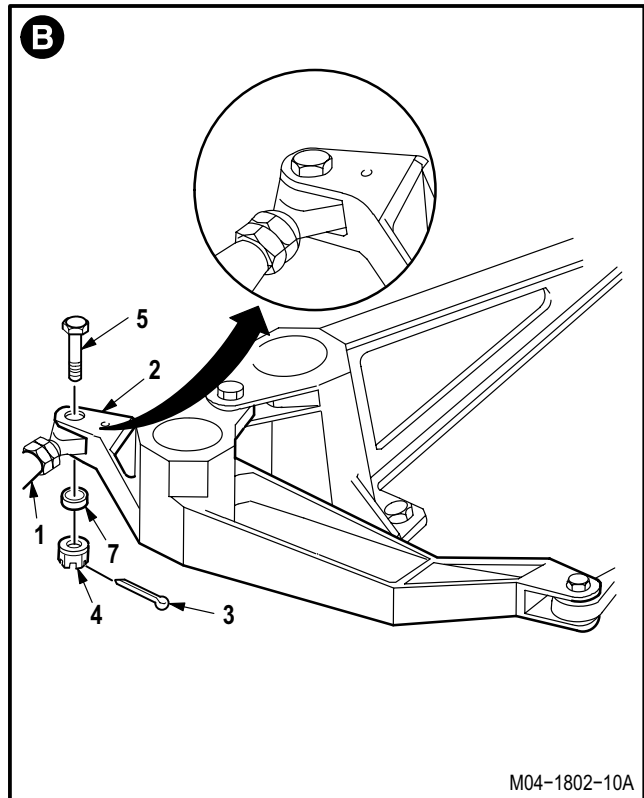
c. **Install aft push-pull rod (8) on bellcrank (2).**
Torque nut (10) **30 to 40 INCH-POUNDS**.

- (1) Aline rod (8) with bellcrank (2).
- (2) Install bolt (12) through bellcrank (2), rod (8), and bushing (11).
- (3) Check fit of self-retaining bolt (12) (para 11.1).
- (4) Install nut (10). Torque nut (10) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (9).



d. **Install forward push-pull rod (1) on bellcrank (2).** Torque nut (4) **30 to 40 INCH-POUNDS**.

- (1) Aline rod (1) with bellcrank (2).
- (2) Install bolt (5) through bellcrank (2), rod (1), and bushing (7).
- (3) Check fit of self-retaining bolt (5) (para 11.1).
- (4) Install nut (4). Torque nut (4) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (3).



e. **Inspect (QA).**

f. **Perform directional flight control rigging operational check** (TM 1-1520-238-T).

g. **Install access fairings T325 and T355** (para 2.2).

END OF TASK

11.258. DIRECTIONAL F.S. 348 TAIL ROTOR BRACKET REMOVAL/INSTALLATION

11.258.1. Description

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

11.258.2. 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)
- Adjustable air filtering respirator (item 262, App H)
- 30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

Materials/Parts:

- Sealing compound (item 174, App F)

Personnel Required:

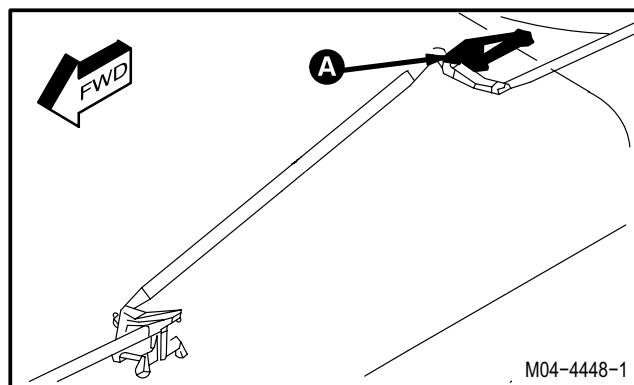
- 67R Attack Helicopter Repairer
- 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.257	F.S. 348 bellcrank removed



To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



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11.258. DIRECTIONAL F.S. 348 TAIL ROTOR BRACKET REMOVAL/INSTALLATION – continued

11.258.3. Removal

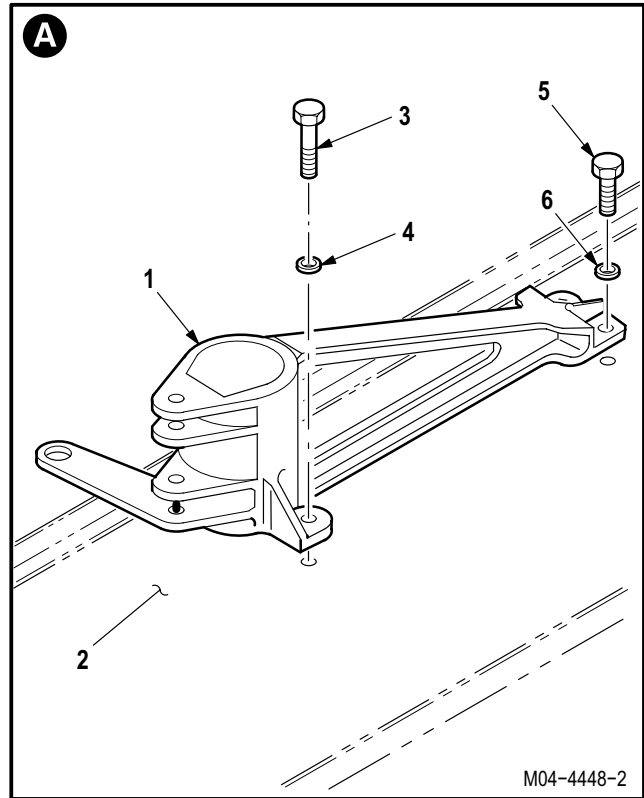
- a. **Remove sealing compound from faying surface of bracket (1).**
- b. **Remove bracket (1) from deck (2).**
 - (1) Remove two bolts (3) and washers (4).
 - (2) Remove two bolts (5) and washers (6).
 - (3) Remove bracket (1).

11.258.4. Cleaning

- a. **Clean removed and attaching parts (para 1.47).**

11.258.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).



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11.258. DIRECTIONAL F.S. 348 TAIL ROTOR BRACKET REMOVAL/INSTALLATION – continued

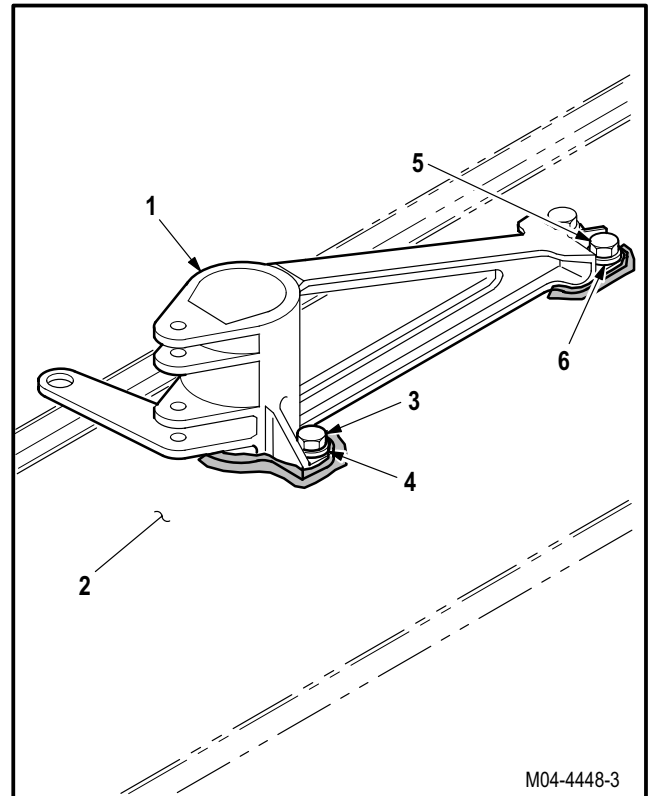
11.258.6. Installation

- a. **Install bracket (1) on deck (2).** Torque two bolts (3) and two bolts (5) to **80 INCH-POUNDS**.

- (1) Position bracket (1) on deck (2).
- (2) Install two bolts (3) and washers (4).
- (3) Install two bolts (5) and washers (6).
- (4) Torque two bolts (3) and two bolts (5) to **80 INCH-POUNDS**. Use torque wrench.
- (5) Apply sealing compound to faying surface of bracket (1). Use sealing compound (item 174, App F).

- b. **Inspect (QA).**

- c. **Install F.S. 348 bellcrank** (para 11.257).



M04-4448-3

END OF TASK

11.259. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES REMOVAL

11.259.1. Description

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

11.259.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Light duty laboratory apron (item 27, App H)
- 0.000 - 0.125-inch dial indicator depth gage (item 145, App H)
- Chemical protective gloves (item 154, App H)
- Heat protective gloves (item 155, App H)
- Electric gun type heater (item 163, App H)
- Adjustable air filtering respirator (item 262, App H)
- Flight control rigging kit (item 267, App H)

Materials/Parts:

- Adhesive (item 3, App F)
- Cloth (item 52, App F)
- Methyl ethyl ketone (item 124, App F)
- Sealing compound (item 177, App F)

Personnel Required:

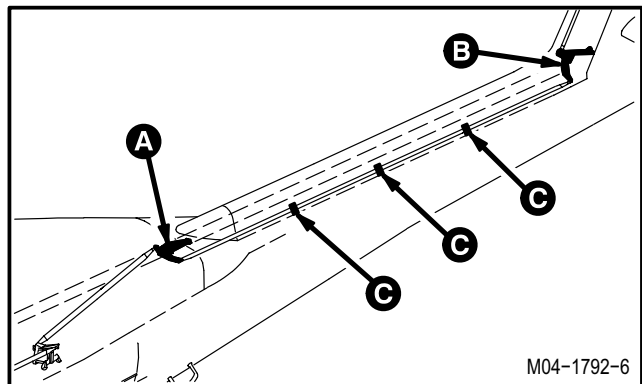
- 67R Attack Helicopter Repairer
- 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairings T355 and L510 removed; access fairings R410 and R475 opened
1.72	External primary hydraulic power applied



To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.



M04-1792-6

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11.259. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES REMOVAL

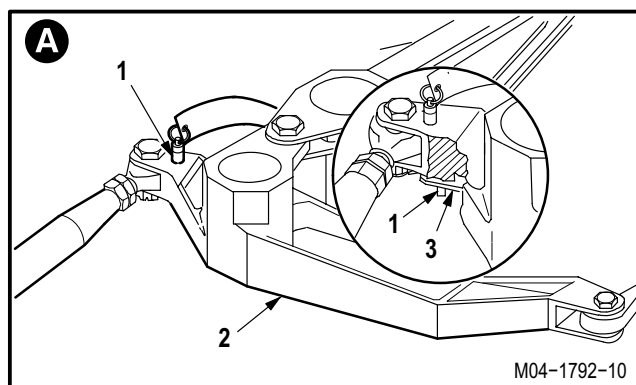
11.259.3. Removal

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

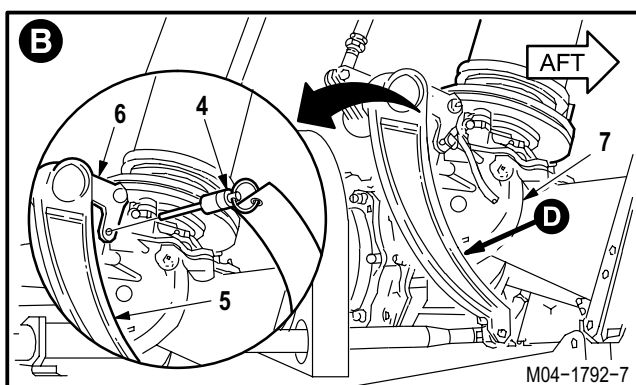
a. **Install -9 rig pin (1) in directional F.S. 216.25 bellcrank (2) and bracket (3).**

- (1) Locate bellcrank (2) and bracket (3).
- (2) If rig pin hole in bellcrank (2) is not alined with hole in bracket (3), slowly move controls to aline holes.
- (3) Install -9 rig pin (1) through bracket (3) and bellcrank (2).



b. **Install -9 rig pin (4) in directional F.S. 520 bellcrank (5) and bracket (6).**

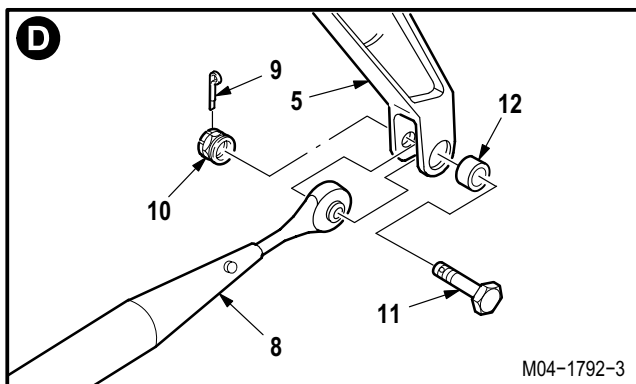
- (1) Locate bellcrank (5) and bracket (6) on intermediate gearbox (7).
- (2) Install -9 rig pin (4) through bracket (6) and bellcrank (5).



c. **Remove external hydraulic power (para 1.72).**

d. **Remove aft end of F.S. 348 push-pull rod (8) from bellcrank (5).**

- (1) Remove and discard cotter pin (9).
- (2) Remove nut (10).
- (3) Remove bolt (11) and bushing (12).



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11.259. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES REMOVAL – continued

e. Remove forward end of rod (8) from bellcrank (13).

- (1) Remove and discard cotter pin (14).
- (2) Remove nut (15).
- (3) Remove bolt (16) and bushing (18).

f. Pull rod (8) forward until aft end is clear.

g. Remove three guides (19) from guide mounts (20).

- (1) Remove six bolts (21) and washers (22), from inboard side of guide mounts (20).
- (2) Remove three bolts (23) and washers (24), from outboard side of guide mounts (20) while lifting rod (8) until guides (19) are removed.

h. Remove rod (8) with three guides (19), and washers (24.1), if installed, from helicopter.

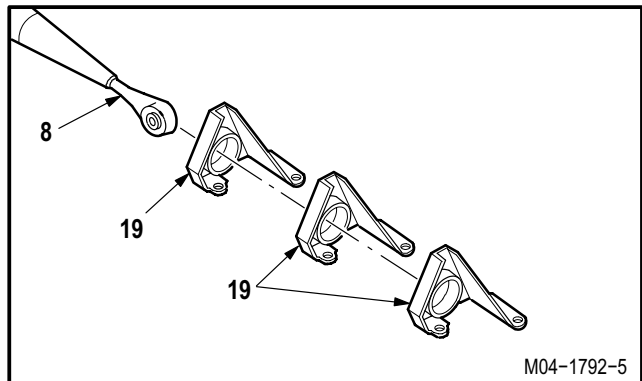
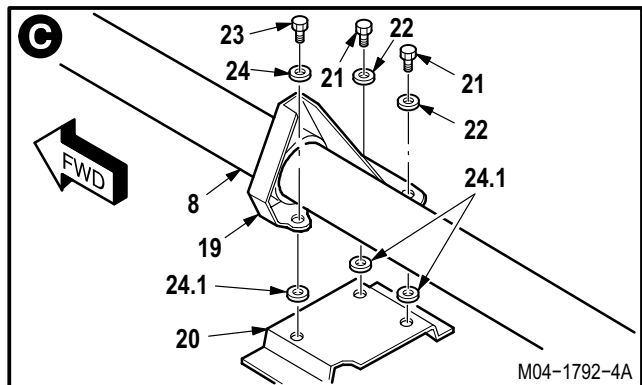
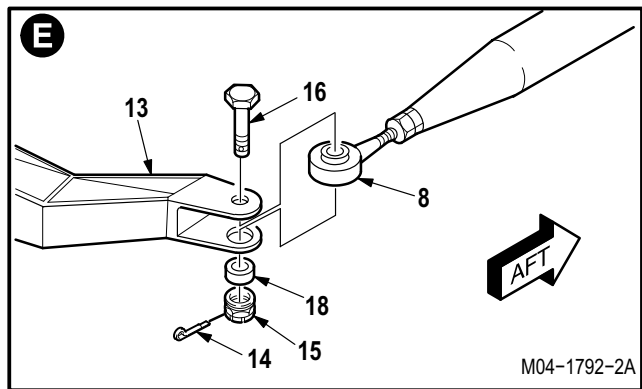
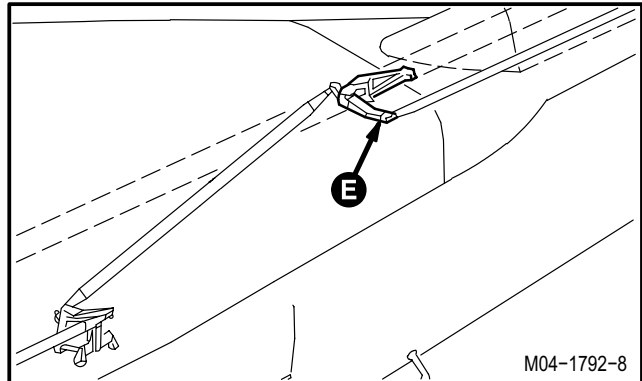
i. Remove three guides (19) from rod (8).

11.259.4. Cleaning

a. Wipe removed and attaching parts with a clean rag.

11.259.5. Inspection

- a. Check removed and attaching parts for damage (para 11.232).
- b. Check removed and attaching parts for corrosion (para 1.49).
- c. Check all installed bushing(s) and/or bearing(s) for wear (para 11.232).
- d. Check all removed bushing(s) and/or bearing(s) for wear (para 11.4).



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11.259. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES REMOVAL – continued

e. Check sleeves bonded to push-pull rod at guide interface areas for proper adhesion to push-pull rod, damage, and excessive wear.

- (1) Visually check sleeves for areas that show no wear.
- (2) Using the sleeve area that shows no wear as the “zero” reference point, check entire length of sleeves for damage or wear.
 - (a) Damage or wear not to exceed **0.005 INCH**. Use depth gage.
 - (b) Repair if sleeves are worn, damaged, or not properly bonded to push-pull rod.

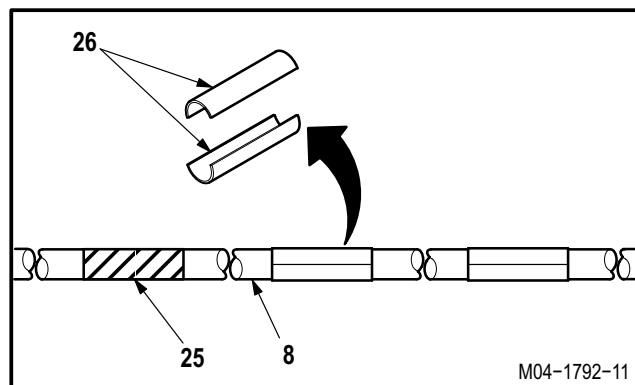
11.259.6. Repair

NOTE

This repair is typical for all sleeves.

a. Prepare rod (8) sleeve mounting area (25) for repair.

- (1) Remove sleeves (26) from rod (8) if necessary. Use heater.
- (2) Remove all sealant from rod (8) sleeve mounting surface (25). Use methyl ethyl ketone (item 124, App F) and cloth (item 52, App F).
- (3) Dry push-pull rod sleeve mounting surface (25). Use cloth (item 52, App F).



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11.259. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES REMOVAL – continued



b. Repair rod (8) by replacing sleeves (26).

- (1) Locate sleeves (26) on rod (8).

NOTE

- The following dimensions will be used to locate the sleeves on the push-pull rod. All dimensions are measured from the end of the push-pull rod (end which contains the nonadjustable rod end) to the sleeve edge: Sleeve 1 **42.22 ±.06 INCHES**; Sleeve 2 **82.16 ±.06 INCHES**, Sleeve 3 **122.16 ±.06 INCHES**

- Adhesive will not extend beyond the outside diameter of the sleeves at all bonded joints.

- (2) Bond sleeves (26) to rod (8). Use adhesive (item 3, App F).
- (3) Allow adhesive to cure **24 HOURS**.

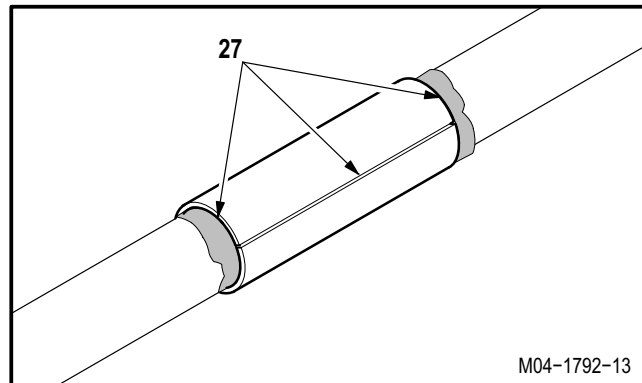
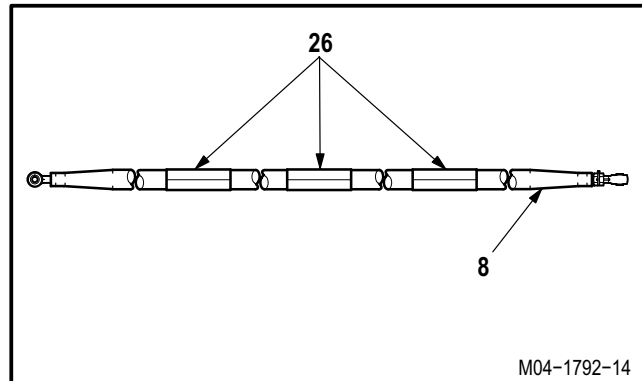
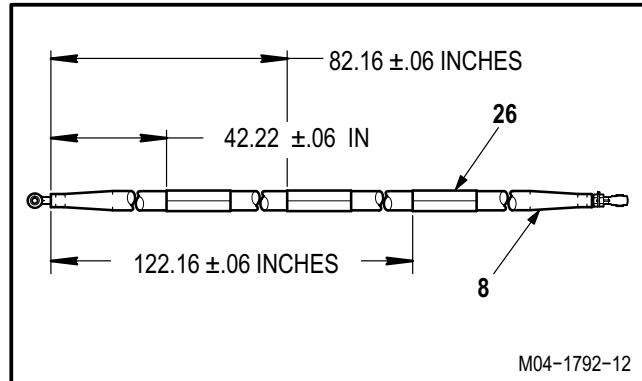
NOTE

Sealant will not extend beyond the outside diameter of the sleeves.

- (4) Seal all sleeve edges (27). Use sealing compound (item 177, App F).

c. Inspect (QA).

d. Install access fairings T355 and L510; secure fairings R410 and R475 (para 2.2).



END OF TASK

11.260. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES INSTALLATION

11.260.1. Description

This task covers: Installation.

11.260.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (2)

Personnel Required:

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

Equipment Conditions:

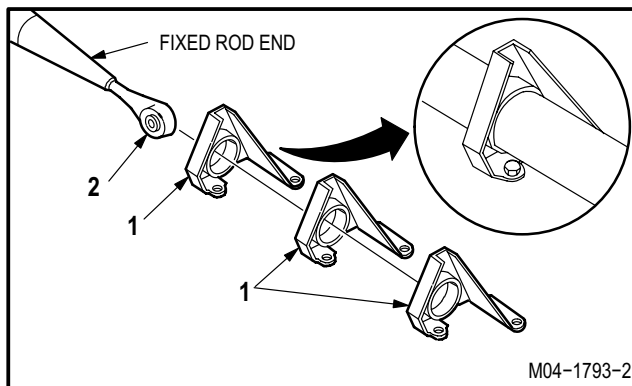
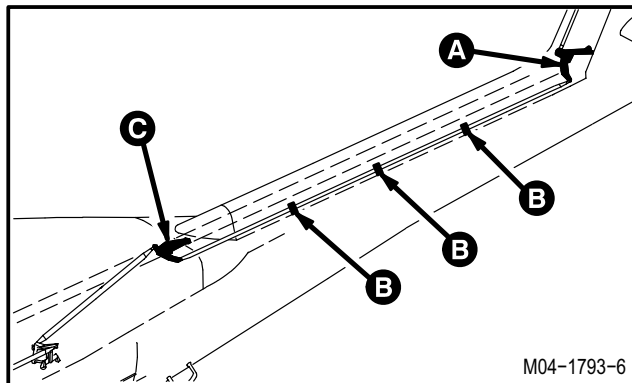
Ref	Condition
1.57	Helicopter safed



To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.

11.260.3. Installation

- a. Position three guides (1) on directional F.S. 348 push-pull rod (2).



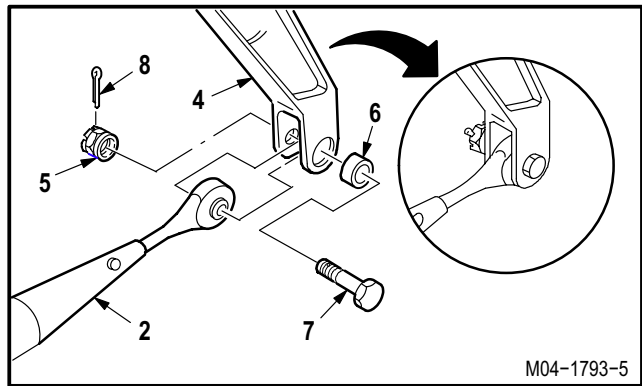
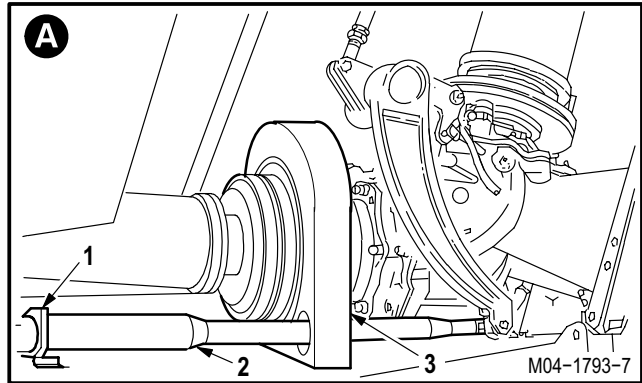
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11.260. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES INSTALLATION – continued

b. Position rod (2) with guides (1) along tail boom through diffuser (3) with adjustable end forward.

c. Install rod (2) on aft bellcrank (4). Torque nut (5) **30 to 40 INCH-POUNDS**.

- (1) Position rod (2) in bellcrank (4).
- (2) Install bushing (6).
- (3) Install bolt (7) through bushing (6), bellcrank (4), and rod (2).
- (4) Check fit of self-retaining bolt (7) (para 11.1).
- (5) Install nut (5). Torque nut (5) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install cotter pin (8).

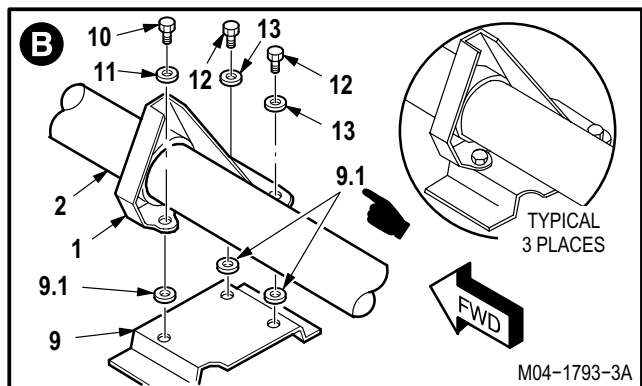


NOTE

Washers in any combination up to **0.138 INCH** thick between guide and mount shall be added to eliminate push rod binding. Keep washer quantity at a minimum by replacing two **0.016 INCH** washers with one **0.032 INCH** washer and two **0.032 INCH** washers with one **0.064 INCH** washer. Washer combination shall be the same at three bolt locations. Bolt length can be increased a maximum two lengths to allow for washers.

d. Install three guides (1) on three guide mounts (9).

- (1) Align three guides (1) and washers (9.1), if required, with guide mounts (9).
- (2) Install three bolts (10) through washers (11), guides (1), washers (9.1), if required, and out-board side of guide mounts (9).
- (3) Install six bolts (12) through washers (13), guides (1), washers (9.1), if required, and in-board side of guide mounts (9).



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11.260. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES INSTALLATION – continued

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

e. **Install adjustable end of rod (2) on forward bellcrank (14).** Torque nut (15) **30 to 40 INCH-POUNDS.**

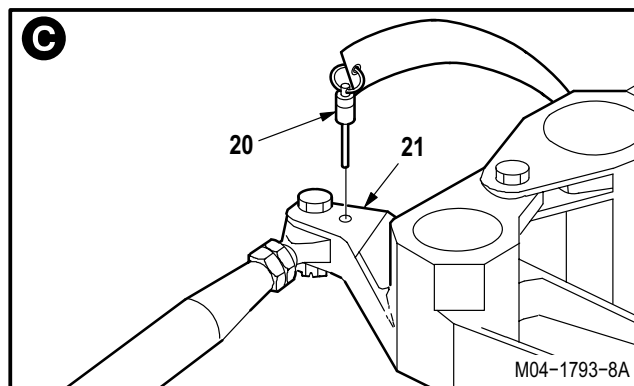
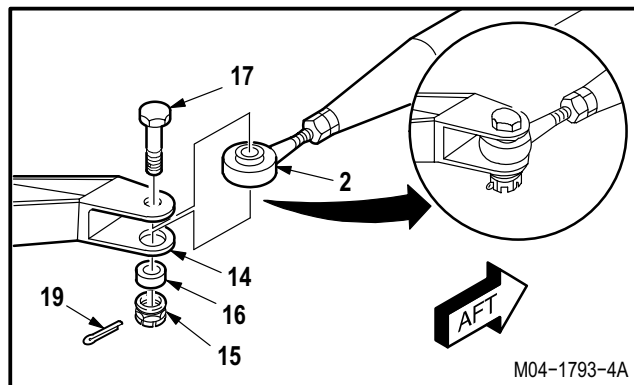
- (1) Position rod (2) in bellcrank (14).
- (2) Install bushing (16).
- (3) Install bolt (17) through bellcrank (14), rod (2), and bushing (16).

NOTE

If bolt holes do not align, adjust F.S. 348 push-pull rod (para 11.2).

- (4) Check fit of self-retaining bolt (17) (para 11.1).
- (5) Install nut (15). Torque nut (15) to **30 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (7) Install new cotter pin (19).

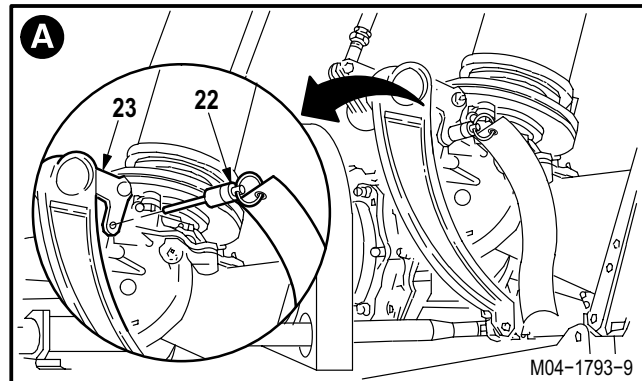
f. **Remove -9 rig pin (20) from bellcrank (21).**



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11.260. DIRECTIONAL F.S. 348 PUSH-PULL ROD WITH GUIDES INSTALLATION – continued

- g. Remove -9 rig pin (22) from bellcrank (23).
- h. Inspect (QA).
- i. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).
- j. Install access fairings T355 and L510; secure fairings R410 and R475 (para 2.2).



END OF TASK

**11.261. DIRECTIONAL SERVOCYLINDER SUPPORT AND SUPPORT BRACKET
REMOVAL/INSTALLATION**

11.261.1. Description

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

11.261.2. 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)
 Adjustable air filtering respirator (item 262, App H)
 30 - 150 inch-pound 1/4-inch drive click type torque
 wrench (item 435, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Laminated washers (as required)
 Sealing compound (item 178, App F)

Equipment Conditions:

Personnel Required:

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

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
7.32	Directional servocylinder removed
11.265	Tail rotor bellcrank link removed



FLIGHT SAFETY PART

- **The support assembly is a flight safety part. Failure to follow maintenance instructions may result in serious injury or death of crewmembers and/or serious damage to the helicopter.**
- **Heat treated condition of the directional servocylinder support is critical. This part must be protected from unscheduled heating and external impact during inspection and other handling.**

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**11.261. DIRECTIONAL SERVOCYLINDER SUPPORT AND SUPPORT BRACKET
REMOVAL/INSTALLATION – continued**

11.261.3. Removal

- a. Remove sealing compound from three nuts (1) and bolts (2).
- b. Remove directional servocylinder support (3) from support bracket (4).

- (1) Remove three nuts (1) and bushings (5).
- (2) Remove three bolts (2) and washers (6).

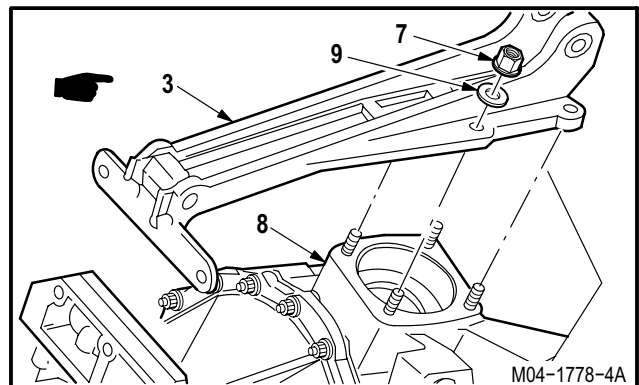
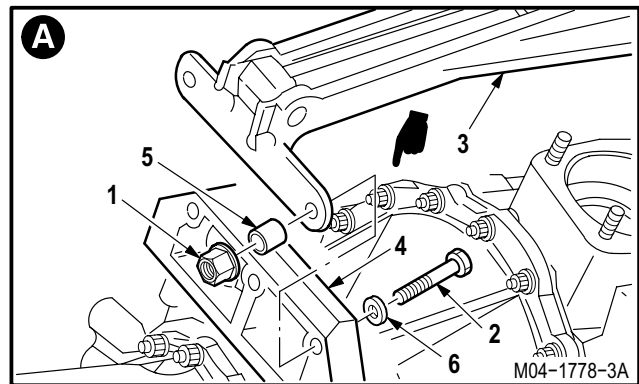
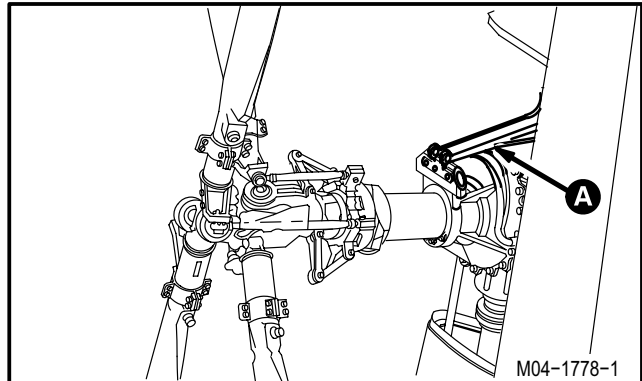
- c. Remove sealing compound from four nuts (7) and faying surface of support (3).

- d. Remove support (3) from tail rotor gearbox (8).

- (1) Remove four nuts (7) and washers (9).
- (2) Remove support (3) from gearbox (8).

NOTE

If support bracket removal is not required, go to paragraph 11.261.4.



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**11.261. DIRECTIONAL SERVOCYLINDER SUPPORT AND SUPPORT BRACKET
REMOVAL/INSTALLATION – continued**

e. Remove bracket (4) from gearbox (8).

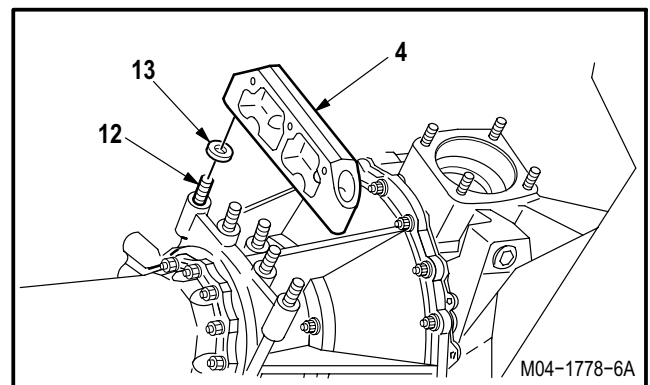
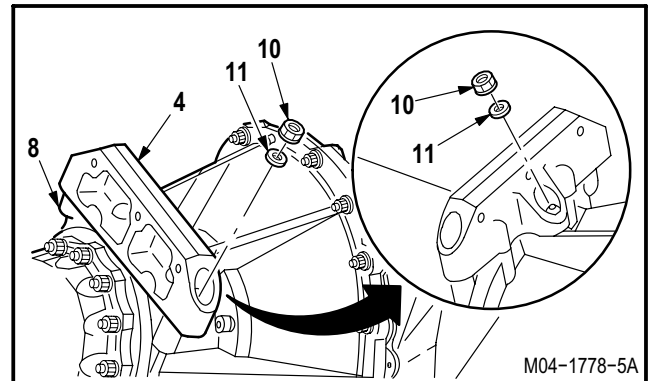
- (1) Remove three nuts (10) and washers (11) from studs (12).
- (2) Remove bracket (4).
- (3) Remove installed laminated washer(s) (13).

11.261.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.261.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).



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**11.261. DIRECTIONAL SERVOCYLINDER SUPPORT AND SUPPORT BRACKET
REMOVAL/INSTALLATION – continued**

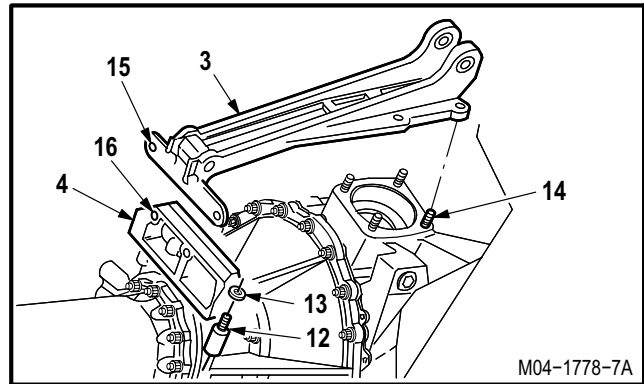
11.261.6. Installation

NOTE

If support bracket was not removed, go to step c.

a. Check support bracket (4) and directional servocylinder support (3) for proper fit.

- (1) Position bracket (4) on studs (12).
- (2) Position support (3) on four gearbox studs (14).
- (3) Check that the three holes (15) of support (3) are alined with three holes (16) of bracket (4).
- (4) If support (3) and bracket (4) are alined, remove support (3) and go to step b.



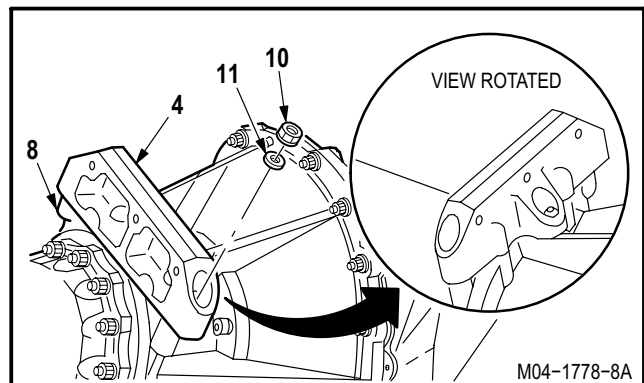
NOTE

When shimming bracket, do not install shim more than **0.219 INCH** thick.

- (5) Position three laminated washers (13) on studs (12).
- (6) If support (3) and bracket (4) are not alined, peel or add additional laminated washers (13) to obtain proper fit.
- (7) Perform steps (1) thru (6) until proper fit is obtained.

b. Install bracket (4) on gearbox (8).

- (1) Position bracket (4) on gearbox (8).
- (2) Install three washers (11) and nuts (10).



GO TO NEXT PAGE

11.261. DIRECTIONAL SERVOCYLINDER SUPPORT AND SUPPORT BRACKET REMOVAL/INSTALLATION – continued



c. **Install support (3) on bracket (4) and gearbox (8). Torque three nuts (1) and four nuts (7) to 120 INCH-POUNDS.**

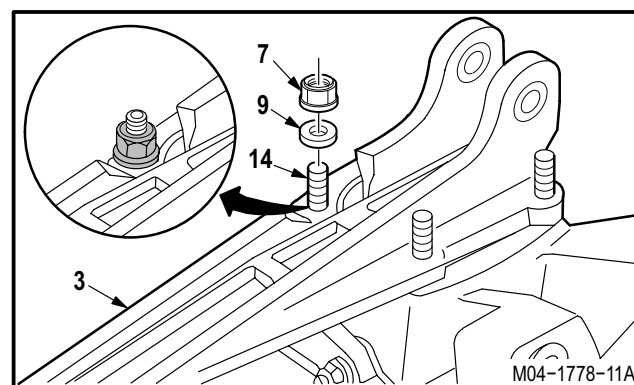
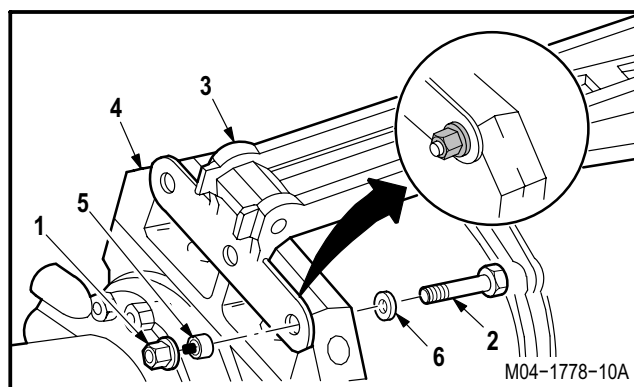
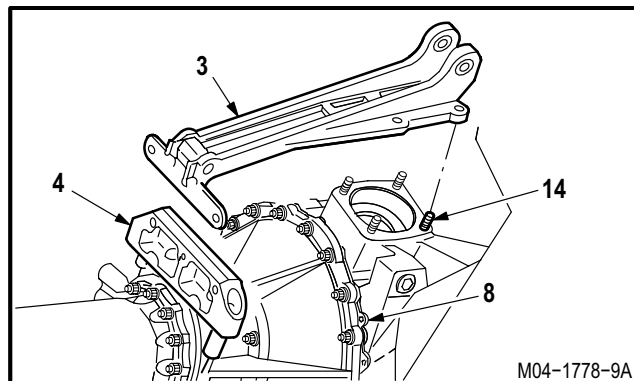
- (1) Position support (3) on four gearbox studs (14) and align with bracket (4).
- (2) Install three bushings (5) in support (3).
- (3) Install three bolts (2) through washers (6), bracket (4), bushings (5), and support (3).
- (4) Install three nuts (1).
- (5) Install four washers (9) and nuts (7) on gearbox studs (14).
- (6) Torque three nuts (1) and four nuts (7) to **120 INCH-POUNDS**. Use torque wrench.
- (7) Apply sealing compound to heads of three bolts (2), and nuts (1). Use sealing compound (item 178, App F).
- (8) Apply sealing compound to four nuts (7) and washers (9). Use sealing compound (item 178, App F).
- (9) Fill gaps and coat exposed faying surfaces around support (3). Use sealing compound (item 178, App F).

d. **Inspect (QA).**

e. **Install tail rotor bellcrank link** (para 11.265).

f. **Install directional servocylinder** (para 7.33).

g. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).



END OF TASK

11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION

11.262.1. Description

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

11.262.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical tool kit (item 378, App H)
- Light duty laboratory apron (item 27, App H)
- Chemical protective gloves (item 154, App H)
- Edge grip sheet metal holder (item 165, App H)
- Camloc slotted jaw slip jointing pliers (item 229, App H)
- Adjustable air filtering respirator (item 262, App H)
- 30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)

Materials/Parts:

- Bolt, 5/16
- Cotter pin (2)
- Gasket (as required)
- Adhesive (item 2, App F)
- Adhesive (item 7, App F)
- Cloth (item 52, App F)
- Cushioning material (item 68, App F)
- Methyl propyl ketone (item 125A, App F)
- Pad (item 130, App F)
- Primer coating (item 147, App F)
- Tape (item 207, App F)

Personnel Required:

- 67R Attack Helicopter Repairer
- 68X Armament/Electrical System Repairer
- 68X3F Armament/Electrical System Repairer/
Technical Inspector

References:

- TM 1-1520-238-T
- TM 55-1500-323-24
- TM 55-1500-345-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
5.60	Tail rotor head removed
11.277	Tail rotor pitch links removed
11.274	Tail rotor drive links removed

NOTE

Control force of tail rotor swashplate must be checked prior to removal of swashplate for noisy or rachety condition (para 11.232).

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11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued

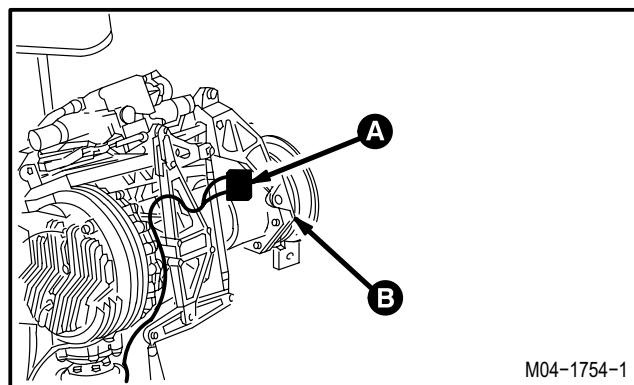
11.262.3. Removal

CAUTION

- To prevent damage to brushes, shunts, and springs, ensure that brush block assembly is not dropped or handled roughly.
- Protect brush block with cushioning material and tape to prevent shock damage and contamination.

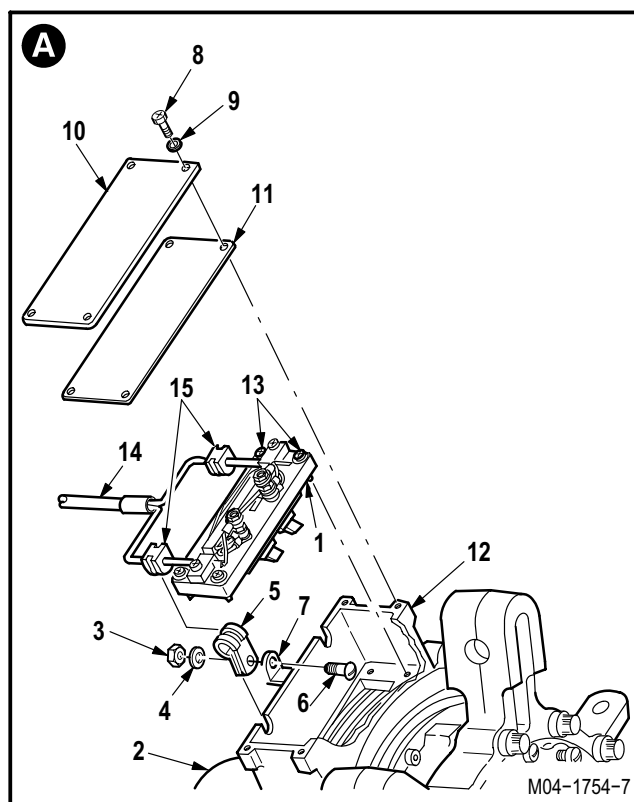
NOTE

- Four screws securing brush block to housing are captive screws.
- Convoluted covering on wire harness may lose flexibility if crushed or kinked.



a. **Remove tail rotor de-ice brush block (1) from tail rotor swashplate (2).**

- (1) Remove nut (3), washer (4), clamp (5), and screw (6) from bracket (7).
- (2) Remove four screws (8) and washers (9) from cover (10).
- (3) Remove cover (10) and gasket (11) from housing (12).
- (4) Loosen four captive screws (13) on brush block (1).
- (5) Remove brush block (1) with de-ice wire harness (14) and grommets (15) attached from swashplate (2).
- (6) Protect brush block (1) and harness (14). Use cushioning material (item 68, App F) and tape (item 207, App F). Store brush block with aircraft. Do not remove.



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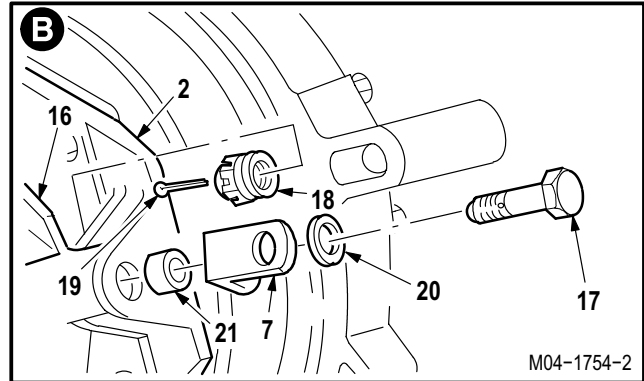
11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued

NOTE

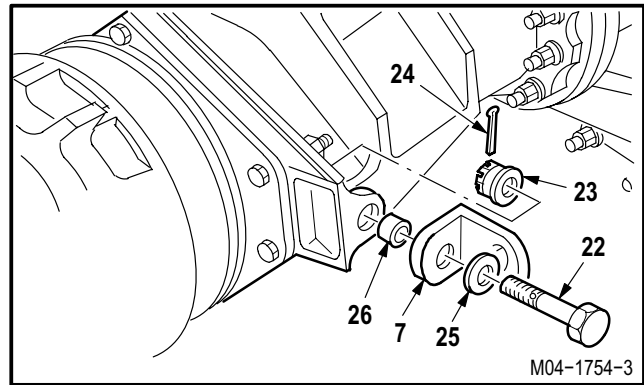
For replacement of tail rotor swashplate assembly, wire harness is not removed with swashplate.

b. Remove swashplate (2) from bellcrank (16).

- (1) Remove sealant from bolt (17) and nut (18).
- (2) Remove and discard cotter pin (19).
- (3) Remove nut (18).
- (4) Remove bolt (17), washer (20), bracket (7), and bushing (21).



- (5) Remove sealant from bolt (22) and nut (23) on opposite side of swashplate (2).
- (6) Remove and discard cotter pin (24).
- (7) Remove nut (23).
- (8) Remove bolt (22), washer (25), bracket (7), and bushing (26).



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11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued

CAUTION

Forward bearing in bellcrank is a floating bearing that could fall out when swashplate is removed.

c. Remove swashplate (2).

- (1) Pull swashplate (2) clear of tail rotor static mast (27).

11.262.4. Cleaning

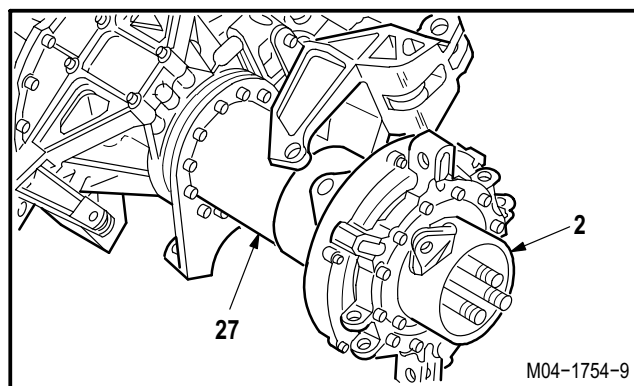
- a. Clean removed and attaching parts** (para 1.47).

11.262.5. Inspection

- a. Check removed and attaching parts for damage** (para 11.232).
- b. Check removed and attaching parts for corrosion** (para 1.49).
- c. Check swashplate for smooth, quiet bearing rotation** (para 11.232).
- d. Check tail rotor static mast for discoloration** (para 6.132).
- e. Check washer bonded to clevis for excessive wear and/or proper adhesion to clevis.**

- (1) Repair if worn or not properly adhered to clevis (para 11.262).

- f. Check tail rotor swashplate de-ice connectors for broken wires, bent or broken connector pins, and cracked or burned insulation** (TM 55-1500-323-24).



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11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued

11.262.6. Repair

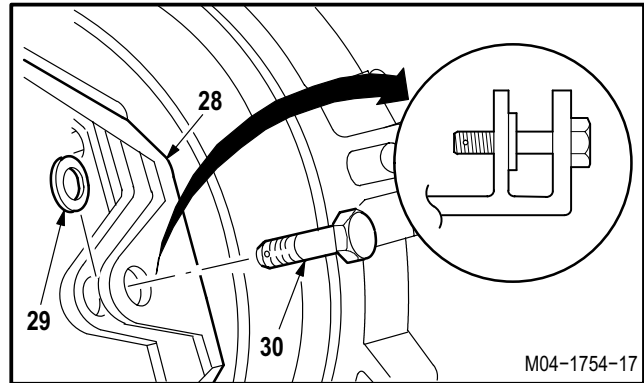


NOTE

This repair is typical for either swashplate ring clevis.

a. **Prepare clevis (28) mounting surface for repair.**

- (1) Remove washer (29) from clevis (28), if necessary.
- (2) Remove all sealant from clevis (28) mounting surface. Use methyl propyl ketone (item 125A, App F) and pad (item 130, App F).
- (3) Dry clevis (28) mounting surface with a clean cloth. Use cloth (item 52, App F).



b. **Repair clevis (28) by replacing washer (29).**

- (1) Mount washer (29) between and on inboard clevis (28). Use adhesive (item 2, App F).
- (2) Insert 5/16-inch bolt (30) through clevis (28) and washer (29).
- (3) Clamp washer (29) to clevis (28). Use camloc pliers and sheet metal holder.
- (4) Remove bolt (30).
- (5) Allow adhesive to cure **24 HOURS**.

c. **Prepare and paint surface of clevis** (TM 55-1500-345-23).

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11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued

11.262.7. Installation**WARNING**

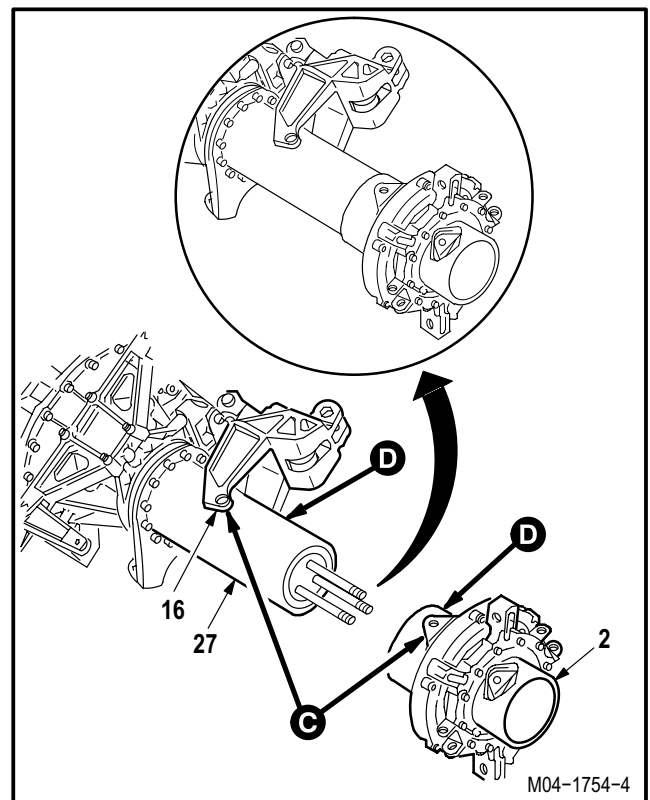
-9, -11, and -13 swashplates are not to be used and should be immediately removed. If found, a Category 1 QDR should be issued.

CAUTION

Forward bearing in bellcrank is a floating bearing that could fall out when swashplate is installed.

a. **Position swashplate (2) on tail rotor static mast (27).**

- (1) Aline swashplate (2) with bellcrank (16).



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11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued

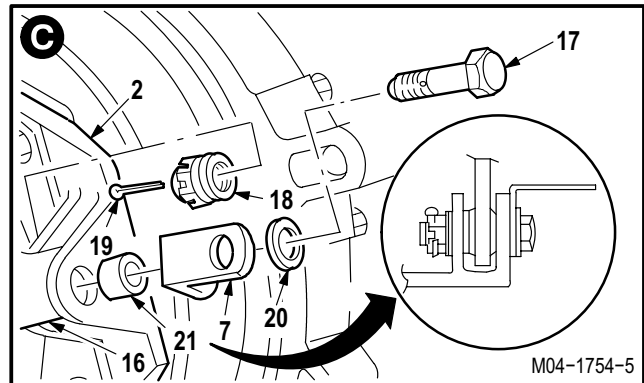


NOTE

To prevent bolt from binding within the clevis, ensure clevis bore is free of foreign material before connecting swashplate to bellcrank.

d. **Install swashplate (2) on bellcrank (16).** Torque nut (18) **65 to 85 INCH-POUNDS**.

- (1) Install bushing (21) in swashplate (2).
- (2) Check fit of self-retaining bolt (17) (para 11.1).
- (3) Apply primer to bolt (17). Use primer coating (item 147, App F).
 - (a) Do not apply primer on threads.
 - (b) Install wet.
- (4) Install bolt (17) through washer (20), bracket (7), bushing (21), swashplate (2), and bellcrank (16).
- (5) Install nut (18).
- (6) Torque nut (18) to **65 INCH-POUNDS**. Use torque wrench.
- (7) Increase torque to align cotter pin hole, but do not exceed **85 INCH-POUNDS**.
- (8) Install new cotter pin (19).
- (9) Apply adhesive to bolt (17) and nut (18). Use adhesive (item 7, App F).



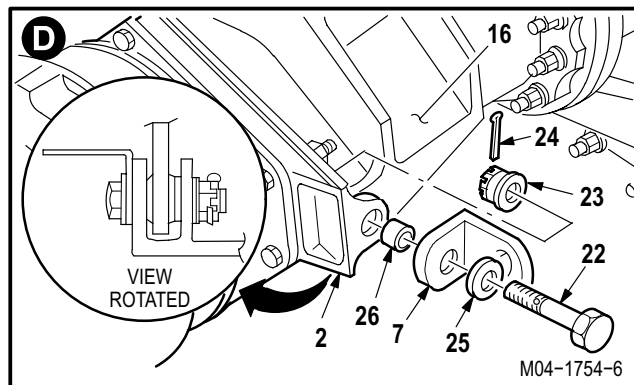
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11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued



e. **Install opposite side of swashplate (2) on bell-crank (16).** Torque nut (23) **65 to 85 INCH-POUNDS**.

- (1) Install bushing (26) in swashplate (2).
- (2) Check fit of self-retaining bolt (22) (para 11.1).
- (3) Apply primer to bolt (22). Use primer coating (item 147, App F).
 - (a) Do not apply primer on threads.
 - (b) Install wet.
- (4) Install bolt (22) through washer (25), bracket (7), bushing (26), swashplate (2), and bell-crank (16).
- (5) Install nut (23). Torque nut (23) to **65 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **85 INCH-POUNDS**.
- (7) Install new cotter pin (24).
- (8) Apply adhesive to bolts (22) and nut (23). Use adhesive (item 7, App F).



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11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued

CAUTION

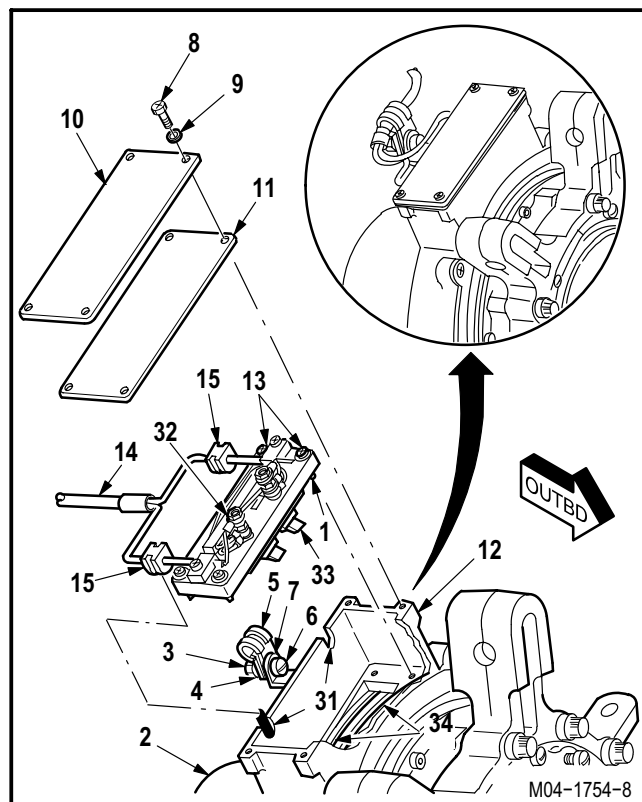
To prevent damage to brushes, shunts, and springs, ensure that brush block assembly is not dropped, or handled roughly.

NOTE

Convuluted covering on wire harness may lose flexibility if crushed or kinked.

f. **Install brush block (1) in swashplate (2).**

- (1) Aline two grommets (15) flat-side up, with slots (31) in housing (12).
- (2) Position brush block (1) with terminal stacks-ups (32) outboard, and brushes (33) alined with slip ring grooves (34).
- (3) Gently lower brush block (1) into housing (12).
- (4) Slide two grommets (15) into slots (31).
- (5) Tighten four captive screws (13) to secure brush block (1) in housing (12).
- (6) Position gasket (11) on housing (12) to aline holes.
- (7) Position cover (10) on gasket (11) and housing (12).
- (8) Install four screws (8) through washers (9), cover (10), and gasket (11) into housing (12).
- (9) Position clamp (5) around harness (14) to aline hole in bracket (7).
- (10) Install screw (6) through clamp (5), bracket (7), and washer (4).
- (11) Install nut (3) on screw (6).



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11.262. TAIL ROTOR SWASHPLATE REMOVAL/INSTALLATION – continued

- g. **Inspect (QA).**
- h. **Install tail rotor head** (para 5.61).
- i. **Install tail rotor drive links** (para 11.275).
- j. **Install tail rotor pitch links** (para 11.277).
- k. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).
- l. **Perform rotor blade de-ice maintenance operational check** (TM 1-1520-238-T).

END OF TASK

11.263. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK REMOVAL

11.263.1. Description

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

11.263.2. Initial Setup

Tools:

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

Personnel Required:

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

Materials/Parts:

Adhesive (item 3A, App F).
 Cloth (item 52, App F)
 Methyl ethyl ketone (item 124, App F)
 Pad (item 130, App F).

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.276	Tail rotor electrical leads removed, as required

WARNING

FLIGHT SAFETY PART

- **The tail rotor swashplate control bellcrank assembly is a flight safety part. Failure to follow maintenance instructions may result in serious injury or death of crewmembers and/or serious damage to the helicopter.**
- **Heat treated condition of the tail rotor swashplate control bellcrank assembly is critical. This part must be protected from unscheduled heating and external impact during inspection and other handling.**
- **To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.**

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

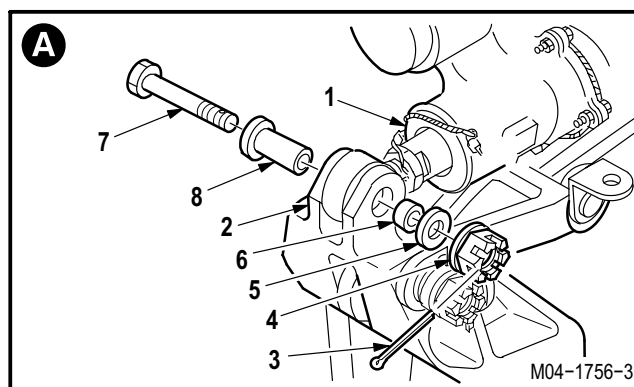
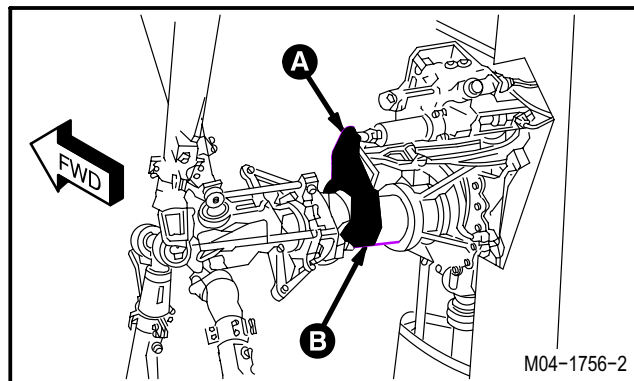
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11.263. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK REMOVAL – continued

11.263.3. Removal

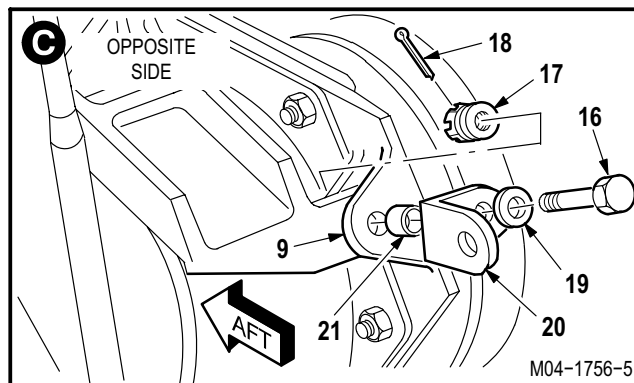
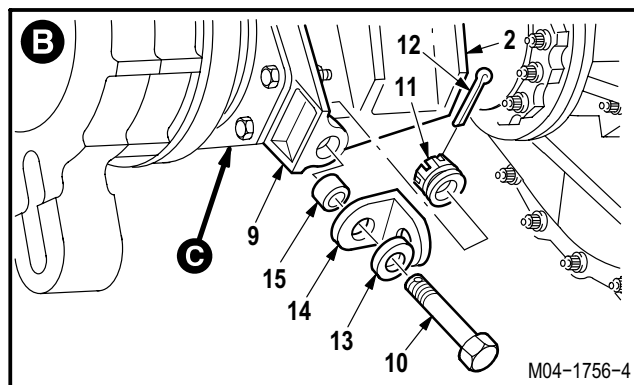
a. Disconnect directional servocylinder (1) from bellcrank (2).

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4), washer (5), and bushing (6).
- (3) Remove bolt (7) and pin (8).



b. Remove bellcrank (2) from swashplate (9).

- (1) Remove sealing compound from bolt (10) and nut (11).
- (2) Remove and discard cotter pin (12).
- (3) Remove nut (11).
- (4) Remove bolt (10), washer (13), bracket (14), and bushing (15).
- (5) To disconnect opposite side of swashplate (9), remove sealant from bolt (16) and nut (17).
- (6) Remove and discard cotter pin (18).
- (7) Remove nut (17).
- (8) Remove bolt (16), washer (19), bracket (20), and bushing (21).

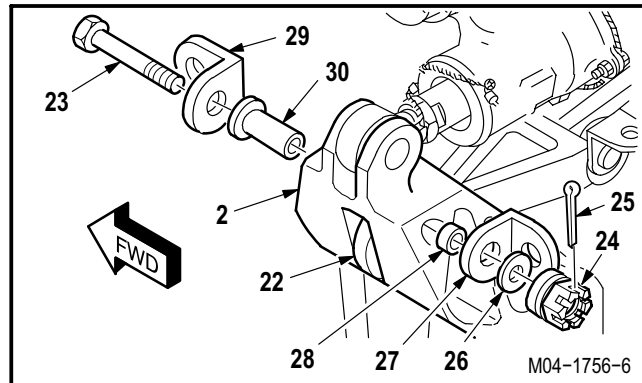


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11.263. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK REMOVAL – continued

c. Remove bellcrank (2) from link (22).

- (1) Remove sealing compound from bolt (23) and nut (24).
- (2) Remove and discard cotter pin (25).
- (3) Remove nut (24), washer (26), bracket (27), and bushing (28).
- (4) Remove bolt (23), bracket (29), and pin (30).



CAUTION

Forward bearing is a floating bearing and could fall out when bellcrank is removed from swashplate.

d. Remove bellcrank (2).

11.263.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.263.5. Inspection

- a. **Check bellcrank and attaching points for cracks and elongated bolt holes.**

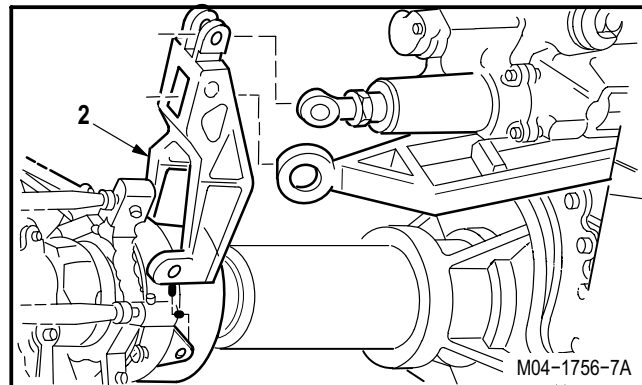
- (1) Bolt hole maximum allowable elongation is **0.002 INCH**.
- (2) With bellcrank removed, swashplate maximum allowable radial play is **0.002 INCH**.
- (3) Bearing maximum allowable radial play is **0.006 INCH**.
- (4) Bearing maximum allowable axial play is **0.014 INCH**.

- b. **Check removed and attaching parts for damage** (para 11.232).

- c. **Check removed and attaching parts for corrosion** (para 1.49).

- d. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).

- e. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).



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11.263. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK REMOVAL – continued

- f. **Check swashplate clevis ring washer for excessive wear and/or proper adhesion to clevis.**

(1) Repair if worn or not properly adhered to clevis (para 11.262).

- g. **Check swashplate clevis nonmetallic bumper for excessive wear and/or proper adhesion to clevis.**

(1) Repair if worn or not properly adhered to clevis (para 11.263).

11.263.6. Repair

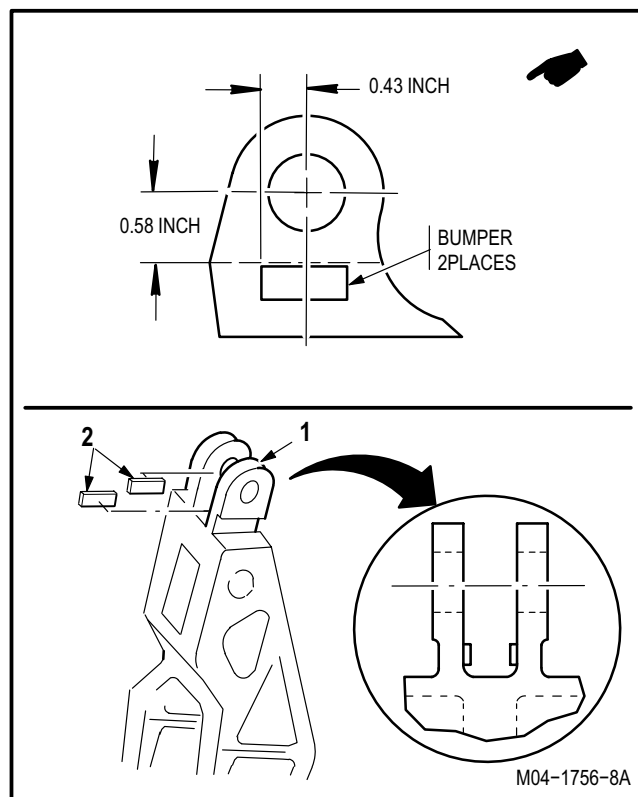
NOTE

This repair is typical for either swashplate clevis bumper.

- a. **Fabricate new bumper (D-442.11, Appx D).**
- b. **Prepare clevis (1) mounting surface for repair.**
- (1) Remove bumper (2) from clevis (1).
 - (2) Remove all sealant from clevis (1) mounting surface. Use methyl ethyl ketone (item 124, App F) and pad (item 130, App F).
 - (3) Dry clevis (1) mounting surface with a clean cloth. Use cloth (item 52, App F).



- c. **Repair clevis (1) by replacing bumper (2).**
- (1) Mount bumper (2) between and on inboard clevis (1). Use adhesive (item 3A, App F).
 - (2) Clamp bumper (2) to clevis (1). Use camloc pliers and sheet metal holder.
- d. **Allow adhesive to cure 12 HOURS at ambient temperature or cure 1.5 HOURS at 135 °F (57 °C).**
- e. **Inspect (QA).**



END OF TASK

11.264. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK INSTALLATION

11.264.1. Description

This task covers: Installation.

11.264.2. 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)
Industrial goggles (item 156, App H)
Adjustable air filtering respirator (item 262, App H)
30 - 150 inch-pound 1/4-inch drive click type torque wrench (item 435, App H)
0 - 600 inch-pound 3/8-inch drive dial indicator torque wrench (item 447, App H)

Personnel Required:

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

References:

TM 1-1520-238-T

Materials/Parts:

■ Cotter pin (4)
Adhesive (item 7, App F)
Primer coating (item 147, App F)

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

WARNING

FLIGHT SAFETY PART

- **The tail rotor swashplate control bellcrank assembly is a flight safety part. Failure to follow maintenance instructions may result in serious injury or death of crewmembers and/or serious damage to the helicopter.**
- **Heat treated condition of the tail rotor swashplate control bellcrank assembly is critical. This part must be protected from unscheduled heating and external impact during inspection and other handling.**
- **To prevent injury, maintenance personnel shall be warned before moving controls. If injury occurs, seek medical aid.**

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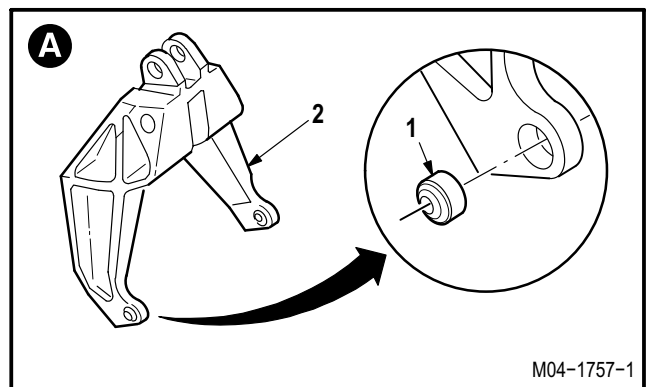
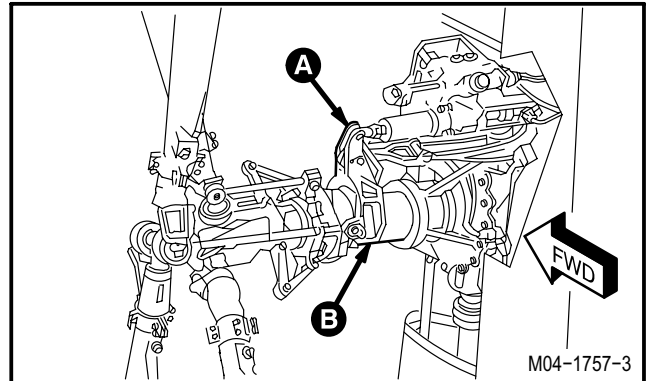
11.264. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK INSTALLATION – continued

11.264.3. Installation

NOTE

This bearing is a floating bearing.

- a. Install bearing (1) in bellcrank (2).



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11.264. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK INSTALLATION – continued

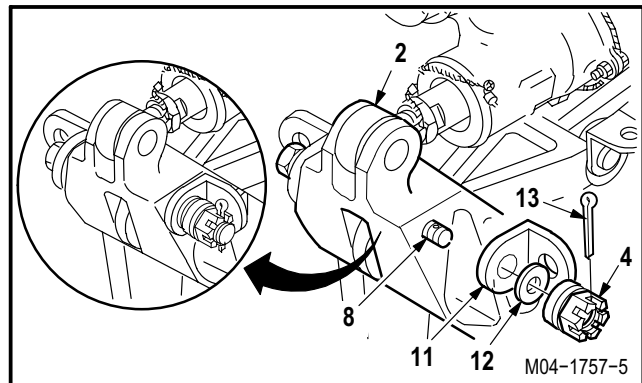
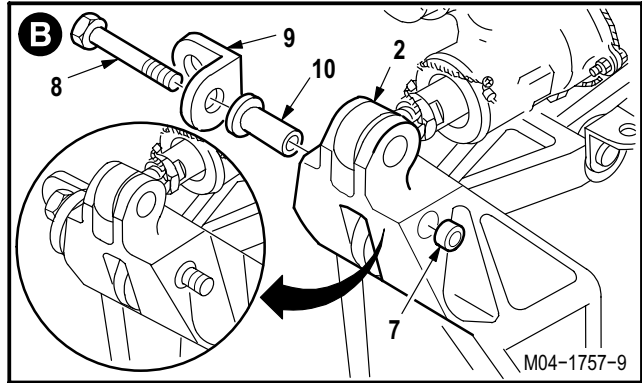
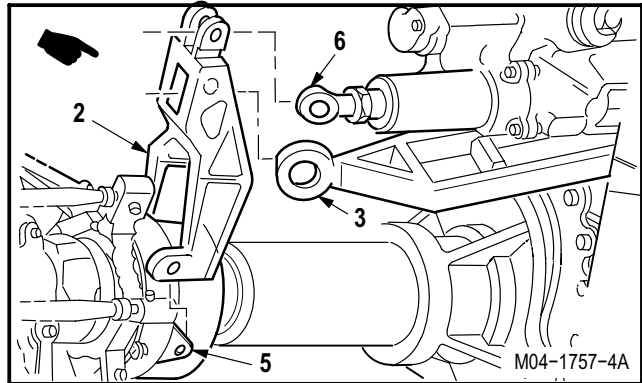


CAUTION

Forward bearing is a floating bearing and could fall out when bellcrank is installed on swashplate.

b. **Install bellcrank (2) on link (3).** Torque nut (4) **85 to 115 INCH-POUNDS.**

- (1) Aline bellcrank (2) with link (3), swashplate (5), and servocylinder (6).
- (2) Position link (3) in bellcrank (2).
- (3) Install bushing (7) in aft side of bellcrank (2).
- (4) Install bolt (8) through bracket (9) and pin (10).
- (5) Install bolt (8) with bracket (9) and pin (10) in forward side of bellcrank (2).
- (6) Check fit of self-retaining bolt (8) (para 11.1).
- (7) Install bracket (11), washer (12), and nut (4) on bolt (8).
- (8) Torque nut (4) to **85 INCH-POUNDS.** Use torque wrench.
- (9) Increase torque to aline cotter pin hole, but do not exceed **115 INCH-POUNDS.**
- (10) Install new cotter pin (13).
- (11) Apply primer to exposed surface of bolt (8), washer (12), and nut (4). Use primer coating (item 147, App F).
- (12) Allow primer **30 MINUTES** to cure.



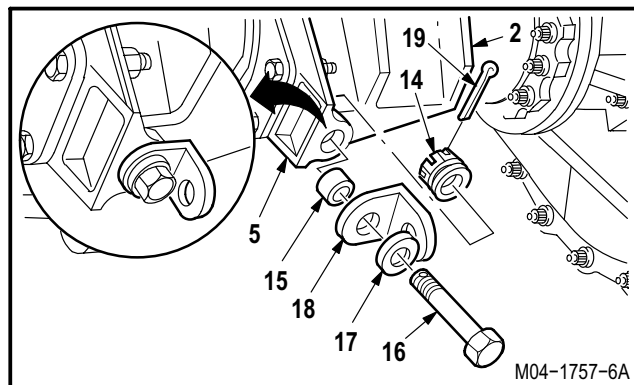
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11.264. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK INSTALLATION – continued



c. **Install aft side of bellcrank (2) on swashplate (5). Torque nut (14) 65 to 85 INCH-POUNDS.**

- (1) Install bushing (15) in swashplate (5).
- (2) Check fit of self-retaining bolt (16) (para 11.1).
- (3) Apply primer to bolt (16). Use primer coating (item 147, App F).
 - (a) Do not apply primer on threads.
 - (b) Install wet.
- (4) Install bolt (16) through washer (17), bracket (18), bushing (15), swashplate (5), and bellcrank (2).
- (5) Install nut (14). Torque nut (14) to **65 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **85 INCH-POUNDS**.
- (6) Install new cotter pin (19).
- (8) Apply adhesive to bolt (16) and nut (14). Use adhesive (item 7, App F).



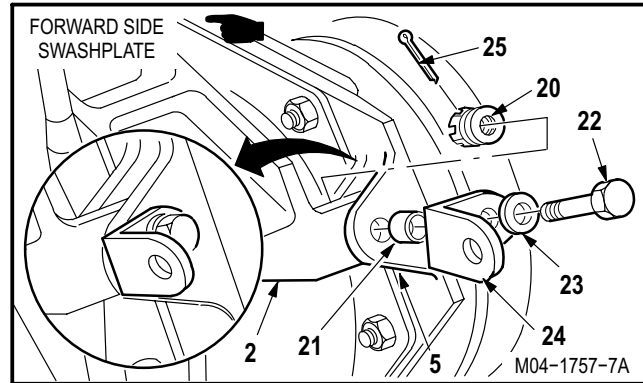
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11.264. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK INSTALLATION – continued



d. Install forward side of bellcrank (2) on swashplate (5). Torque nut (20) **65 to 85 INCH-POUNDS**.

- (1) Install bushing (21) in swashplate (5).
- (2) Check fit of self-retaining bolt (22) (para 11.1).
- (3) Apply primer to bolt (22). Use primer coating (item 147, App F).
 - (a) Do not apply primer on threads.
 - (b) Install wet.
- (4) Install bolt (22) through washer (23), bracket (24), bushing (21), swashplate (5), and bellcrank (2).
- (5) Install nut (20). Torque nut (20) to **65 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **85 INCH-POUNDS**.
- (7) Install new cotter pin (25).
- (8) Apply adhesive to bolt (22) and nut (20). Use adhesive (item 7, App F).

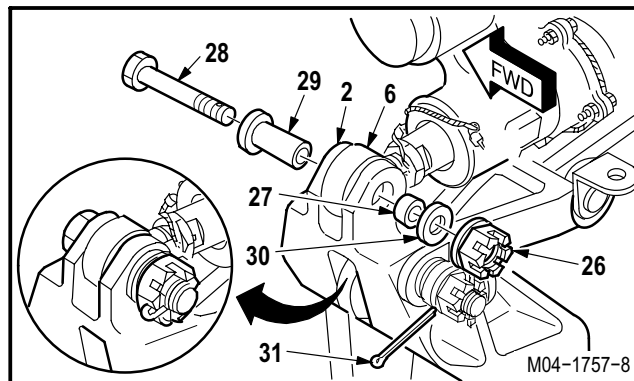


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11.264. TAIL ROTOR SWASHPLATE CONTROL BELLCRANK INSTALLATION – continued

e. **Install bellcrank (2) on servocylinder (6).**
Torque nut (26) **225 to 285 INCH-POUNDS.**

- (1) Position servocylinder (6) in clevis of bellcrank (2).
- (2) Install bolt (28) through pin (29).
- (3) Install bolt (28) with pin (29) in bellcrank (2).
- (4) Check fit of self-retaining bolt (28) (para 11.1).
- (5) Install bushing (27) in aft side of bellcrank (2).
- (6) Install washer (30) and nut (26) on bolt (28).
- (7) Torque nut (26) to **225 INCH-POUNDS.** Use torque wrench.
- (8) Increase torque to align cotter pin hole, but do not exceed **285 INCH-POUNDS.**
- (9) Install new cotter pin (31).
- (10) Apply primer to exposed surface of bolt (28), washer (30), and nut (26). Use primer coating (item 147, App F).
- (11) Allow primer **30 MINUTES** to cure.



f. **Inspect (QA).**

g. **Install tail rotor electrical leads** (para 11.276).

h. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).

END OF TASK

11.265. TAIL ROTOR BELLCRANK LINK REMOVAL/INSTALLATION

11.265.1. Description

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

11.265.2. 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)
 Adjustable air filtering respirator (item 262, App H)
 0 - 600 inch-pound 3/8-inch drive dial indicator torque wrench (item 447, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin
 Sealing compound (item 178, App F)

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairing L530 removed
11.263	Tail rotor swashplate control bellcrank removed

Personnel Required:

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



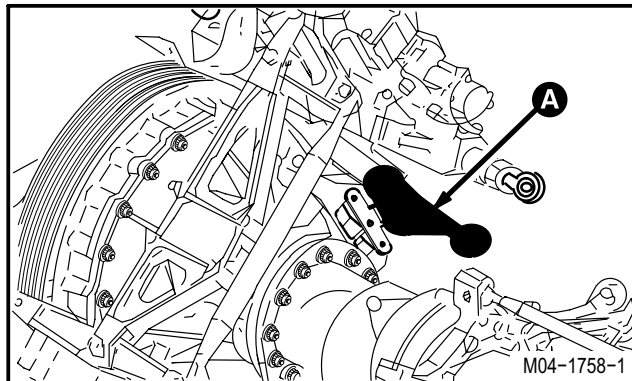
FLIGHT SAFETY PART

- **The tail rotor bellcrank link and/or components of the link are flight safety parts. Failure to follow maintenance instructions may result in serious injury or death of crewmembers and/or serious damage to the helicopter.**
- **Heat treated condition of the tail rotor bellcrank link is critical to its serviceability. Any indication of heat oxidizing (discoloration), where visually detectable, requires replacement of the part. This part must be protected from unscheduled heating and external impact during inspection and handling procedures.**

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11.265. TAIL ROTOR BELLCRANK LINK REMOVAL/INSTALLATION – continued

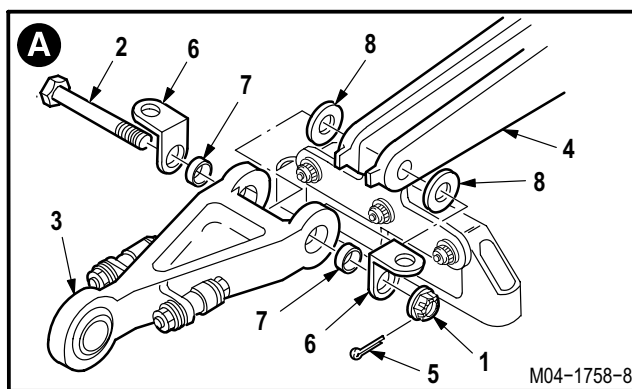
11.265.3. Removal



a. **Remove sealing compound from nut (1) and bolt (2).**

b. **Remove link (3) from support (4).**

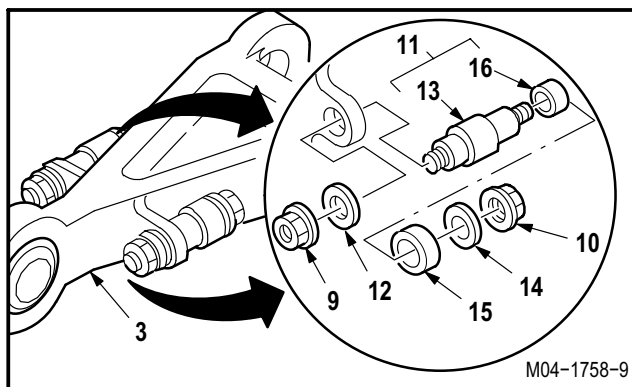
- (1) Remove and discard cotter pin (5).
- (2) Remove nut (1).
- (3) Remove bolt (2), two brackets (6), bushings (7), and washers (8).



c. **Remove sealing compound from two nuts (9) and two nuts (10).**

d. **Remove two roller pins (11) from link (3).**

- (1) Remove nut (9) and washer (12) from pin (13).
- (2) Remove pin (13) from link (3).
- (3) Remove nut (10) and washer (14) from pin (13).
- (4) Remove roller (15) and bearing (16) from pin (13).



11.265.4. Cleaning

a. **Clean removed and attaching parts (para 1.47).**

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11.265. TAIL ROTOR BELLCRANK LINK REMOVAL/INSTALLATION – continued

11.265.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).
- e. **Check bearing for binding or wear.**
 - (1) Maximum allowable radial play is **0.011 INCH**.
 - (2) Maximum allowable axial play is **0.020 INCH**.

11.265.6. Repair

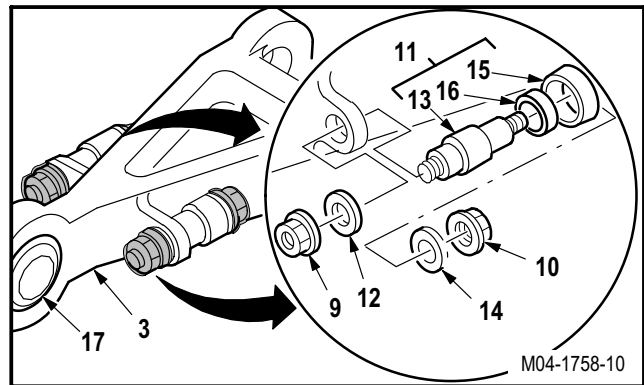
- a. **Replace worn bearings** (para 11.4).

11.265.7. Installation



- a. **Install two roller pins (11) on link (3).**

- (1) Slide bearing (16) and roller (15) on pin (13).
- (2) Hold pin (13). Install washer (14) and nut (10).
- (3) Install pin (13) on link (3) with roller (15) away from self-aligning bearing (17).
- (4) Hold pin (13). Install washer (12) and nut (9).
- (5) Apply sealing compound to two nuts (10) and two nuts (9). Use sealing compound (item 178, App F).

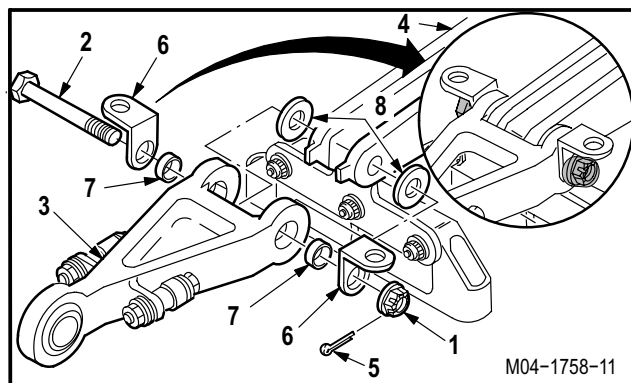


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11.265. TAIL ROTOR BELLCRANK LINK REMOVAL/INSTALLATION – continued

b. Install link (3) on support (4). Torque nut (1) 225 to 285 INCH-POUNDS.

- (1) Aline link (3) with support (4).
- (2) Install two bushings (7) in link (3).
- (3) Install bolt (2) through bracket (6), bushing (7), link (3), washer (8), support (4), washer (8), bushing (7), and bracket (6).
- (4) Check fit of self-retaining bolt (2) (para 11.1).
- (5) Install nut (1). Torque nut (1) to **225 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **285 INCH-POUNDS**.
- (7) Install new cotter pin (5).
- (8) Apply sealing compound to head of bolt (2) and nut (1). Use sealing compound (item 178, App F).


c. Inspect (QA).
d. Install tail rotor swashplate control bellcrank
(para 11.264).

e. Install access fairing L530 (para 2.2).

f. Perform directional flight control rigging maintenance operational check
(TM 1-1520-238-T).

END OF TASK

11.266. TAIL ROTOR CONNECTING LINK REMOVAL/INSTALLATION

11.266.1. Description

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

11.266.2. 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)
Adjustable air filtering respirator (item 262, App H)
10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin (2)
Corrosion preventive compound (item 62, App F)
■ Primer coating (item 147, App F)
Sealing compound (item 178, App F)

Personnel Required:

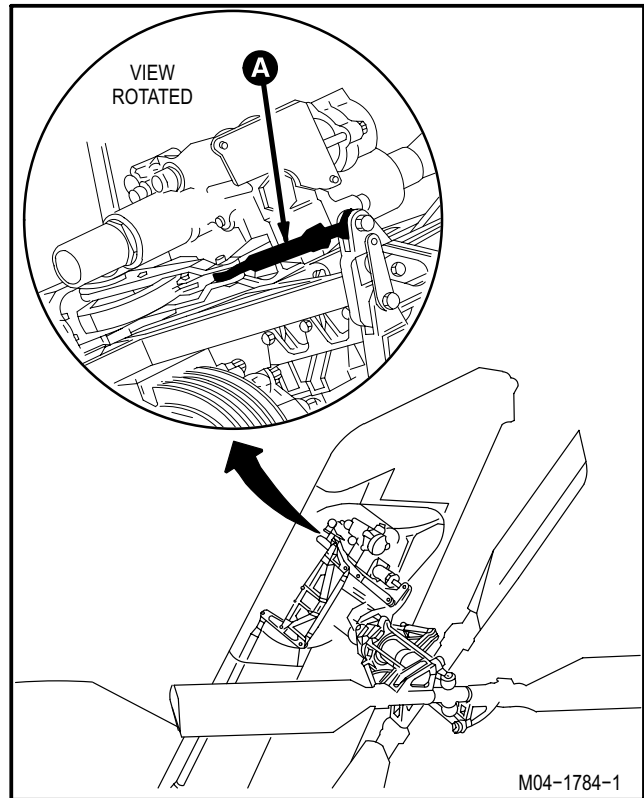
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairings L530 and L540 removed



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11.266. TAIL ROTOR CONNECTING LINK REMOVAL/INSTALLATION – continued

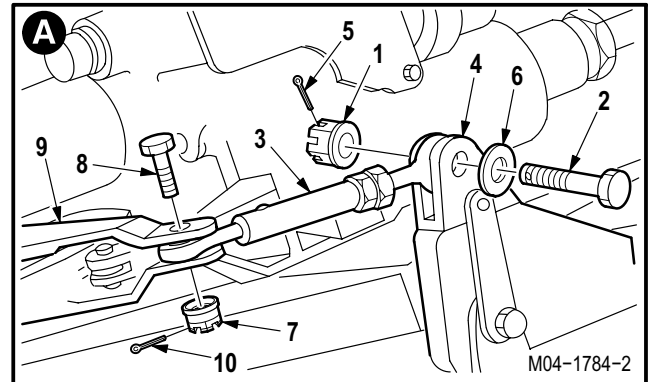
11.266.3. Removal

- a. **Remove sealing compound from nut (1) and bolt (2).**
- b. **Remove tail rotor connecting link (3) from bellcrank (4).**

- (1) Remove and discard cotter pin (5).
- (2) Remove nut (1).
- (3) Remove bolt (2) and washer (6).
- (4) Remove connecting link (3) from bellcrank (4).

- c. **Remove sealing compound from nut (7) and bolt (8).**
- d. **Remove tail rotor connecting link (3) from ser-vocylinder (9).**

- (1) Remove and discard cotter pin (10).
- (2) Remove nut (7).
- (3) Remove bolt (8).
- (4) Remove connecting link (3).

**11.266.4. Cleaning**

- a. **Clean removed and attaching parts** (para 1.47).

11.266.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.266. TAIL ROTOR CONNECTING LINK REMOVAL/INSTALLATION – continued

11.266.6. Installation

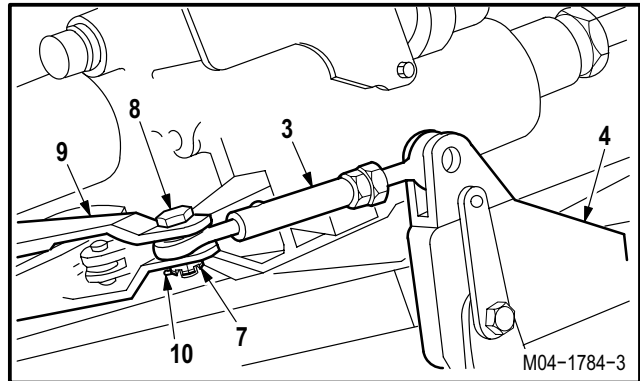


CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

a. **Install tail rotor connecting link (3) on servocylinder (9). Torque nut (7) 30 to 40 INCH-POUNDS.**

- (1) Install link (3) with adjustable end towards bellcrank (4) on servocylinder (9).
- (2) Apply primer to bolt (8). Use primer coating (item 147, App F).
 - (a) Do not apply primer on threads.
 - (b) Install wet.
- (3) Install bolt (8).
- (4) Check fit of self-retaining bolt (8) (para 11.1).
- (5) Install nut (7). Torque nut (7) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (10).
- (8) Apply primer to threads only of bolt (8). Use primer coating (item 147, App F).
- (9) Allow primer **30 MINUTES** to cure.
- (10) Apply corrosion preventive compound to threads of bolt (8). Use corrosion preventive compound (item 62, App F).

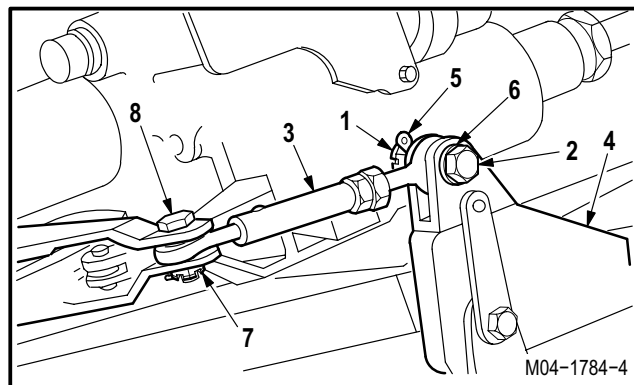


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11.266. TAIL ROTOR CONNECTING LINK REMOVAL/INSTALLATION – continued


b. Install adjustable end of tail rotor connecting link (3) on bellcrank (4). Torque nut (1) 30 to 40 INCH-POUNDS.

- (1) Aline link (3) with bellcrank (4).
- (2) Apply primer to bolt (2). Use primer coating (item 147, App F).
 - (a) Do not apply primer on threads.
 - (b) Install wet.
- (3) Install bolt (2).
- (4) Check fit of self-retaining bolt (2) (para 11.1).
- (5) Install nut (1). Torque nut (1) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install new cotter pin (5).
- (8) Apply primer to threads only of bolt (2). Use primer coating (item 147, App F).
- (9) Allow primer **30 MINUTES** to cure.


NOTE

Do not apply sealing compound to spherical bearings.

- (10) Apply sealing compound to head of bolts (2) and (8) and nuts (1) and (7). Use sealing compound (item 178, App F).
- c. **Inspect (QA).**
 - d. **Perform directional flight control rigging operational check** (TM 1-1520-238-T).
 - e. **Install access fairings L530 and L540** (para 2.2).

END OF TASK

11.267. DIRECTIONAL F.S. 520 BELLCRANK REMOVAL/INSTALLATION

11.267.1. Description

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

11.267.2. 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)
Adjustable air filtering respirator (item 262, App H)
10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin (4)
Sealing compound (item 178, App F)

Personnel Required:

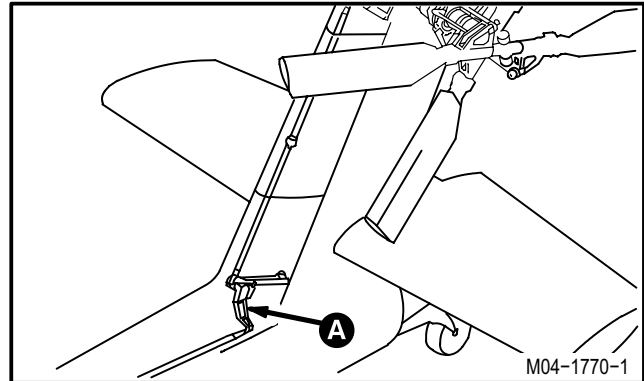
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairing L510 removed



GO TO NEXT PAGE

11.267. DIRECTIONAL F.S. 520 BELLCRANK REMOVAL/INSTALLATION – continued

11.267.3. Removal

a. **Remove sealing compound from nut (1) and bolt (2).**

b. **Remove lower push-pull rod (3) from bellcrank (4).**

(1) Remove and discard cotter pin (5).

(2) Remove nut (1).

(3) Remove bolt (2) and bushing (6).

c. **Remove sealing compound from nut (7) and bolt (8).**

d. **Remove upper push-pull rod (9) from bellcrank (4).**

(1) Remove and discard cotter pin (10).

(2) Remove nut (7).

(3) Remove bolt (8) and bushing (11).

e. **Remove sealing compound from two nuts (12) and bolts (13).**

f. **Remove bellcrank (4) from bracket (14).**

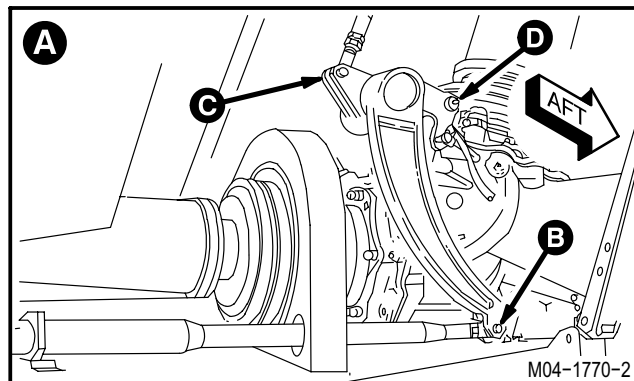
(1) Remove and discard two cotter pins (15).

(2) Remove two nuts (12).

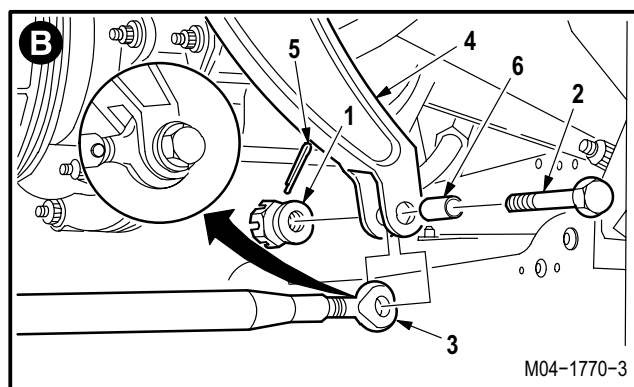
(3) Remove two bolts (13) and bushings (16) from bellcrank (4).

(4) Remove bellcrank (4).

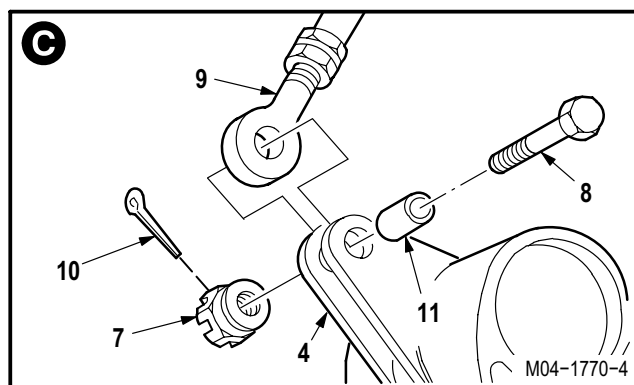
g. **Remove bearing (17) from bracket (14).**



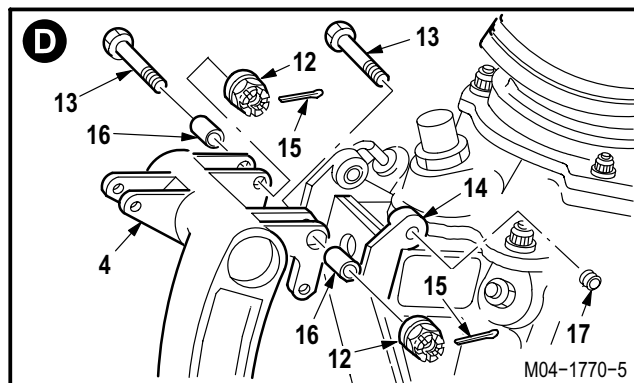
M04-1770-2



M04-1770-3



M04-1770-4



M04-1770-5

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11.267. DIRECTIONAL F.S. 520 BELLCRANK REMOVAL/INSTALLATION – continued

11.267.4. Cleaning

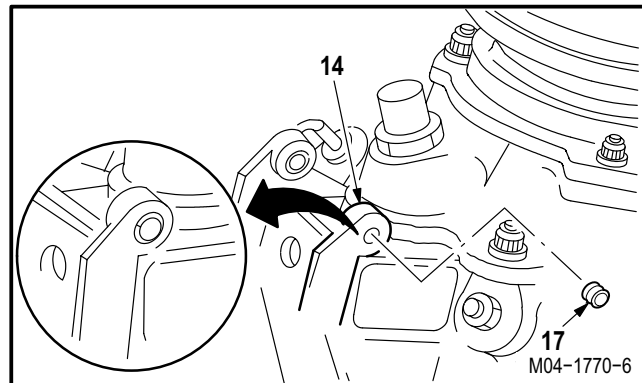
- a. **Clean removed and attaching parts** (para 1.47).

11.267.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

11.267.6. Installation

- a. **Install bearing (17) in bracket (14).**



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11.267. DIRECTIONAL F.S. 520 BELLCRANK REMOVAL/INSTALLATION – continued

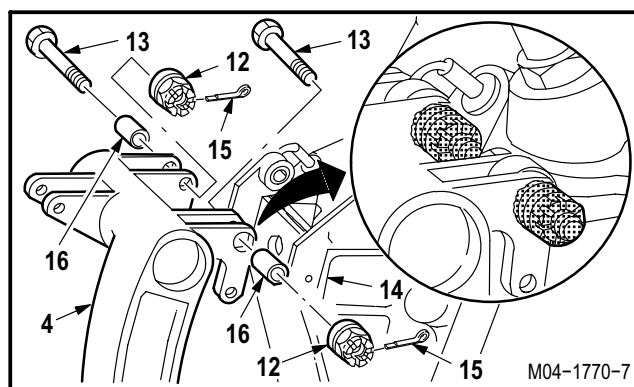


CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

b. **Install bellcrank (4) on bracket (14).** Torque two nuts (12) **30 to 40 INCH-POUNDS**.

- (1) Aline bellcrank (4) with bracket (14).
- (2) Install two bushings (16).
- (3) Install two bolts (13) through bushings (16), bellcrank (4), and bracket (14).
- (4) Check fit of self-retaining bolts (13) (para 11.1).
- (5) Install two nuts (12). Torque nuts (12) to **30 INCH-POUNDS**. Use torque wrench.
- (6) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (7) Install two new cotter pins (15).
- (8) Apply sealing compound to heads of two bolts (13) and nuts (12). Use sealing compound (item 178, App F).

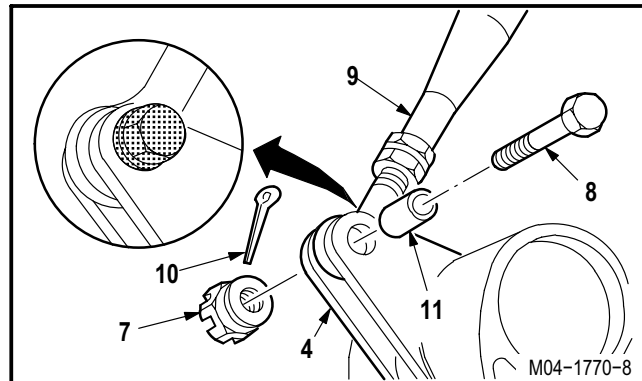


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11.267. DIRECTIONAL F.S. 520 BELLCRANK REMOVAL/INSTALLATION – continued

c. **Install rod (9) on bellcrank (4).** Torque nut (7) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (9) with bellcrank (4).
- (2) Install bushing (11).
- (3) Install bolt (8) through bushing (11), bellcrank (4), and rod (9).
- (4) Check fit of self-retaining bolt (8) (para 11.1).
- (5) Install nut (7). Torque nut (7) to **30 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (7) Install new cotter pin (10).



NOTE

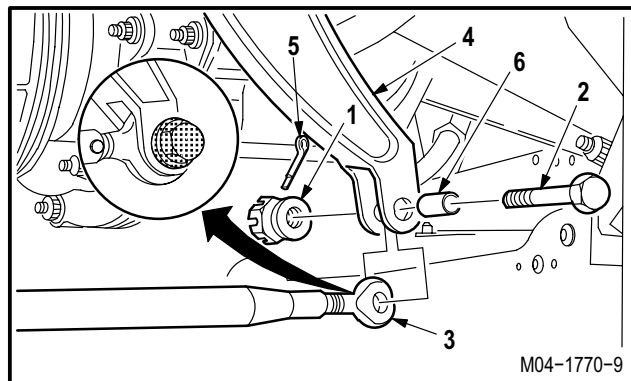
Do not apply sealing compound to spherical bearing.

- (8) Apply sealing compound to head of bolt (8) and nut (7). Use sealing compound (item 178, App F).

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11.267. DIRECTIONAL F.S. 520 BELLCRANK REMOVAL/INSTALLATION – continued**d. Install rod (3) on bellcrank (4). Torque nut (1) 30 to 40 INCH-POUNDS.**

- (1) Aline rod (3) with bellcrank (4).
- (2) Install bushing (6).
- (3) Install bolt (2) through bushing (6), bellcrank (4), and rod (3).
- (4) Check fit of self-retaining bolt (2) (para 11.1).
- (5) Install nut (1) on bolt (2).
- (6) Torque nut (1) to **30 INCH-POUNDS**. Use torque wrench.
- (7) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (8) Install new cotter pin (5).

**NOTE**

Do not apply sealing compound to spherical bearing.

- (9) Apply sealing compound to head of bolt (2) and nut (1). Use sealing compound (item 178, App F).

e. Inspect (QA).

- f. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).

g. Install access fairing L510 (para 2.2).

END OF TASK

11.268. DIRECTIONAL F.S. 520 BELLCRANK BRACKET REMOVAL/INSTALLATION

11.268.1. Description

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

11.268.2. 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)
Adjustable air filtering respirator (item 262, App H)

Personnel Required:

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

References:

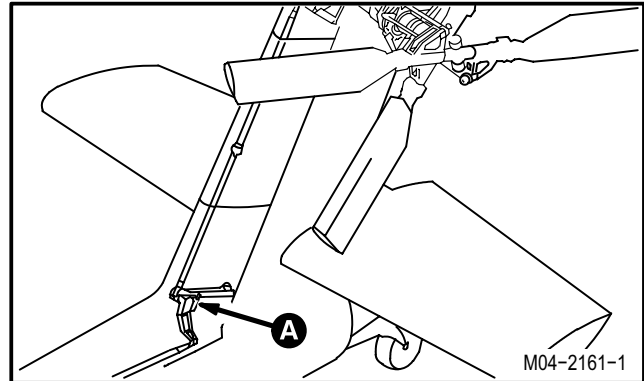
TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.267	Directional F.S. 520 bellcrank removed

Materials/Parts:

Sealing compound (item 178, App F)



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11.268. DIRECTIONAL F.S. 520 BELLCRANK BRACKET REMOVAL/INSTALLATION – continued

11.268.3. Removal

- a. **Remove sealing compound from four nuts (1).**
- b. **Remove F.S. 520 bellcrank bracket (2) from intermediate gearbox (3).**

(1) Remove four nuts (1) and washers (4).

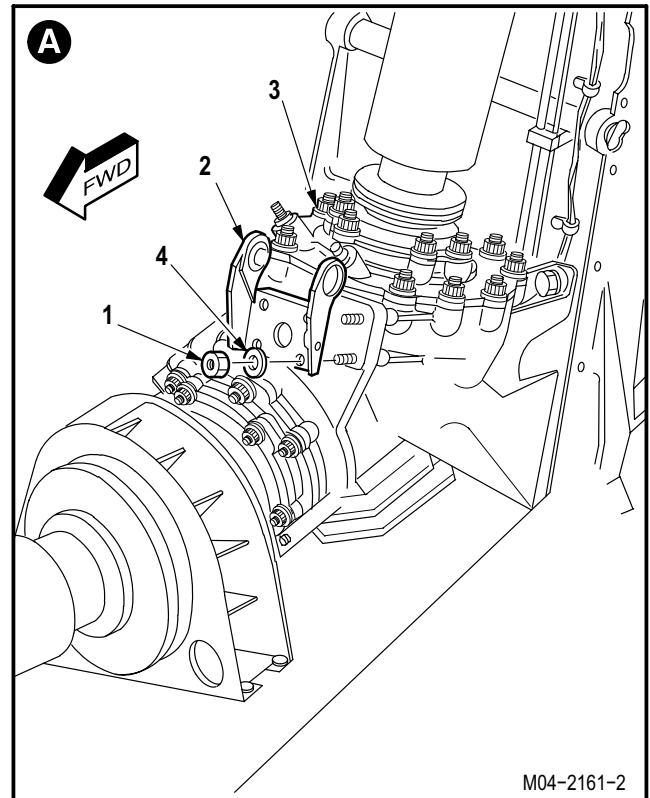
(2) Remove bracket (2).

11.268.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.268.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).



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11.268. DIRECTIONAL F.S. 520 BELLCRANK BRACKET REMOVAL/INSTALLATION – continued

11.268.6. Installation



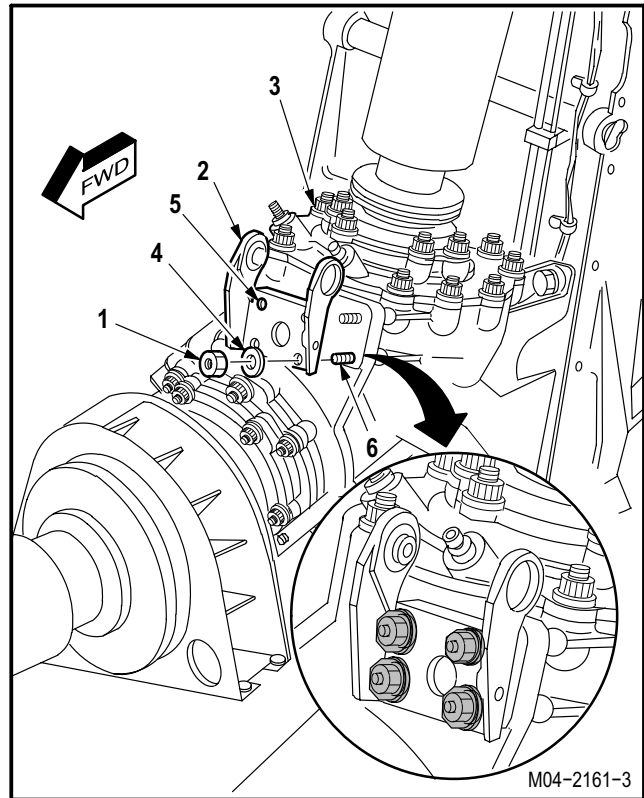
a. Install F.S. 520 bellcrank bracket (2) on intermediate gearbox (3).

- (1) Aline holes (5) with studs (6).
- (2) Slide bracket (2) over studs (6).
- (3) Install four washers (4) and nuts (1).
- (4) Apply sealing compound to four nuts (1) and washers (4). Use sealing compound (item 178, App F).

b. Inspect (QA).

c. Install directional F.S. 520 bellcrank (para 11.267).

d. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).



END OF TASK

11.269. DIRECTIONAL F.S. 520 PUSH-PULL ROD REMOVAL/INSTALLATION

11.269.1. Description

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

11.269.2. 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)
 Adjustable air filtering respirator (item 262, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque
 wrench (item 434, App H)

Materials/Parts:

Cotter pin (2)
 Sealing compound (item 178, App F)

Personnel Required:

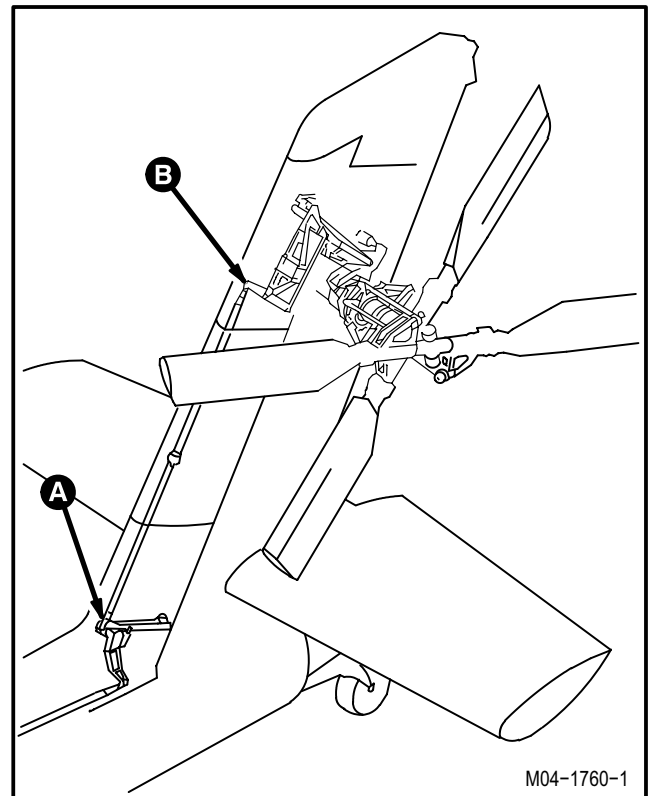
67R Attack Helicopter Repairer
 67R3F Attack Helicopter Repairer/Technical
 Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairings L510 and L530 removed



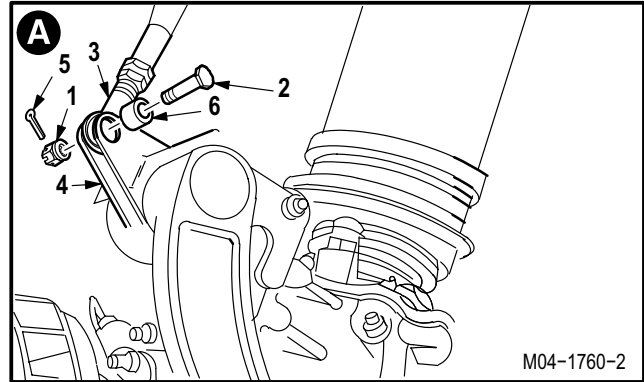
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11.269. DIRECTIONAL F.S. 520 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

11.269.3. Removal

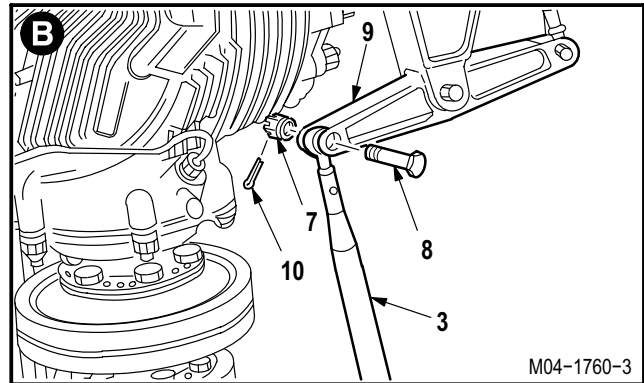
- a. **Remove sealing compound from nut (1) and bolt (2).**
- b. **Remove push-pull rod (3) from lower bell-crank (4).**

- (1) Remove and discard cotter pin (5).
- (2) Remove nut (1).
- (3) Remove bolt (2) and bushing (6).



- c. **Remove sealing compound from nut (7) and bolt (8).**
- d. **Remove rod (3) from upper bellcrank (9).**

- (1) Remove and discard cotter pin (10).
- (2) Remove nut (7).
- (3) Remove bolt (8).
- (4) Remove rod (3).



11.269.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.269.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.269. DIRECTIONAL F.S. 520 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

11.269.6. Installation

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.



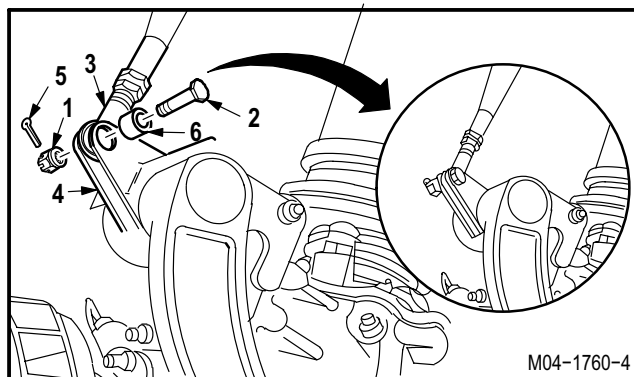
- a. **Install adjustable end of push-pull rod (3) on lower bellcrank (4). Torque nut (1) 30 to 40 INCH-POUNDS.**

- (1) Aline rod (3) with bellcrank (4).
- (2) Install bolt (2) through bushing (6), bellcrank (4) and rod (3).
- (3) Check fit of self-retaining bolt (2) (para 11.1).
- (4) Install nut (1). Torque nut (1) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (5).

NOTE

Do not apply sealing compound to spherical bearing.

- (7) Apply sealing compound to head of bolt (2) and nut (1). Use sealing compound (item 178, App F).

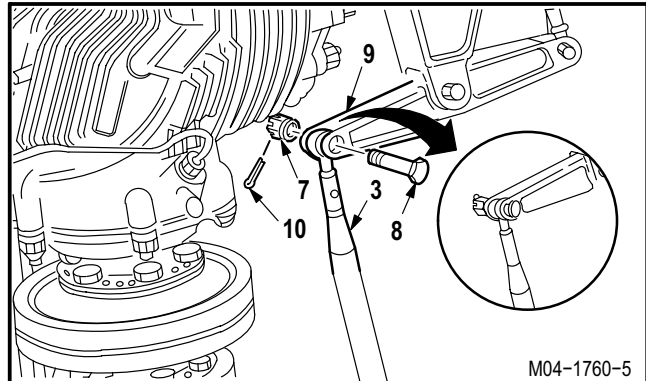


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11.269. DIRECTIONAL F.S. 520 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

b. **Install rod (3) on upper bellcrank (9).** Torque nut (7) **30 to 40 INCH-POUNDS**.

- (1) Aline rod (3) with bellcrank (9).
- (2) Install bolt (8) through bellcrank (9) and rod (3).
- (3) Check fit of self-retaining bolt (8) (para 11.1).
- (4) Install nut (7). Torque nut (7) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (10).



NOTE

Do not apply sealing compound to spherical bearing.

- (7) Apply sealing compound to head of bolt (8) and nut (7). Use sealing compound (item 178, App F).

c. **Inspect (QA).**

d. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).

e. **Install access fairings L510 and L530** (para 2.2).

END OF TASK

11.270. DIRECTIONAL F.S. 534 BELLCRANK REMOVAL/INSTALLATION

11.270.1. Description

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

11.270.2. 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)
 Adjustable air filtering respirator (item 262, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin (3)
 Sealing compound (item 178, App F)

Personnel Required:

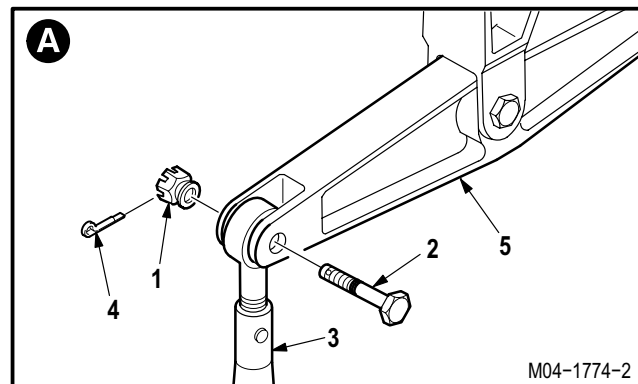
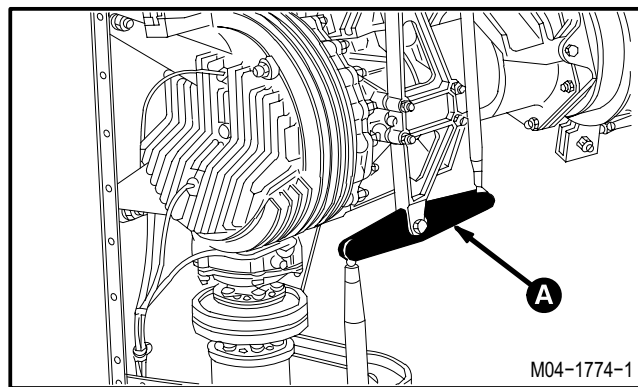
67R Attack Helicopter Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairings L510, L530, and L540 removed

11.270.3. Removal

- a. **Remove sealing compound from nut (1) and bolt (2).**
- b. **Remove lower push-pull rod (3).**
 - (1) Remove and discard cotter pin (4).
 - (2) Remove nut (1).
 - (3) Remove bolt (2) from bellcrank (5) and rod (3).



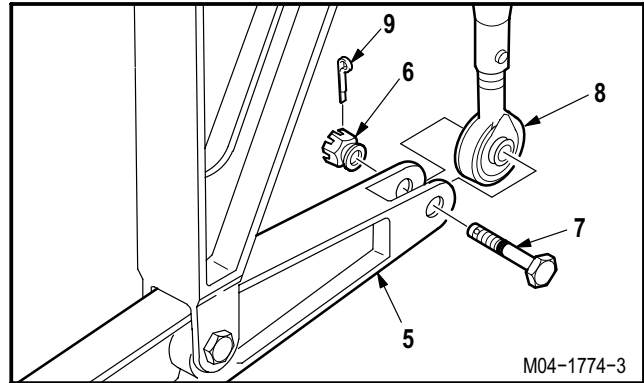
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11.270. DIRECTIONAL F.S. 534 BELLCRANK REMOVAL/INSTALLATION – continued

c. **Remove sealing compound from nut (6) and bolt (7).**

d. **Remove upper push-pull rod (8).**

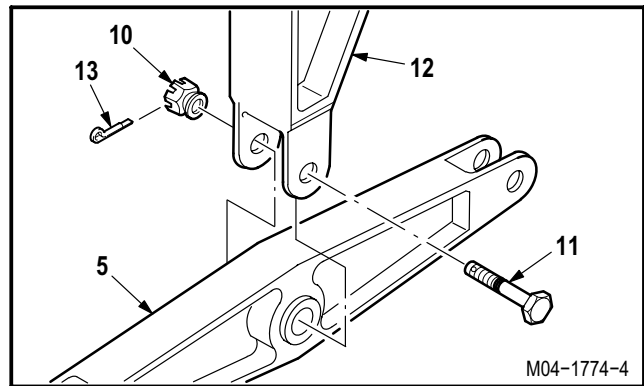
- (1) Remove and discard cotter pin (9).
- (2) Remove nut (6).
- (3) Remove bolt (7) from bellcrank (5) and rod (8).



e. **Remove sealing compound from nut (10) and bolt (11).**

f. **Remove bellcrank (5) from bracket (12).**

- (1) Remove and discard cotter pin (13).
- (2) Remove nut (10).
- (3) Remove bolt (11) from bellcrank (5) and bracket (12).



11.270.4. Cleaning

a. **Clean removed and attaching parts** (para 1.47).

11.270.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.270. DIRECTIONAL F.S. 534 BELLCRANK REMOVAL/INSTALLATION

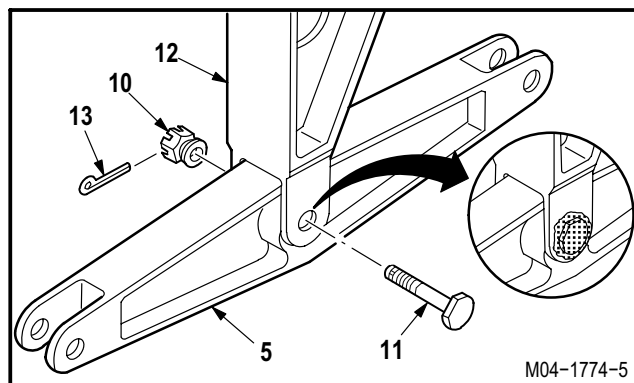
11.270.6. Installation

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

- a. **Install bellcrank (5) on bracket (12).** Torque nut (10) **30 to 40 INCH-POUNDS.**

- (1) Aline bellcrank (5) with bracket (12).
- (2) Install bolt (11) through bellcrank (5) and bracket (12).
- (3) Check fit of self-retaining bolt (11) (para 11.1).
- (4) Install nut (10). Torque nut (10) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install cotter pin (13).
- (7) Apply sealing compound to head of bolt (11) and nut (10). Use sealing compound (item 178, App F).

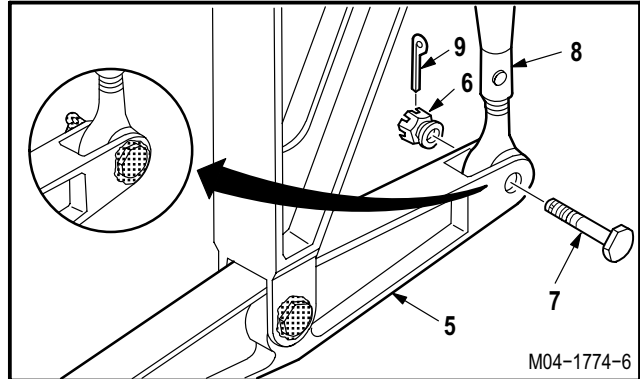


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11.270. DIRECTIONAL F.S. 534 BELLCRANK REMOVAL/INSTALLATION – continued

b. **Install upper push-pull rod (8).** Torque nut (6) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (8) with bellcrank (5).
- (2) Install bolt (7) through bellcrank (5) and rod (8).
- (3) Check fit of self-retaining bolt (7) (para 11.1).
- (4) Install nut (6). Torque nut (6) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install new cotter pin (9).



NOTE

Do not apply sealing compound to spherical bearing.

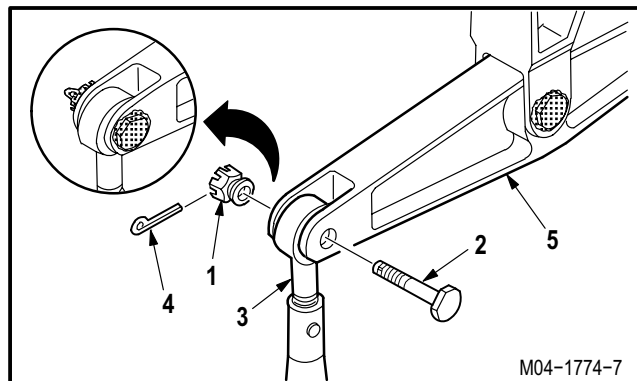
- (7) Apply sealing compound to head of bolt (7) and nut (6). Use sealing compound (item 178, App F).

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11.270. DIRECTIONAL F.S. 534 BELLCRANK REMOVAL/INSTALLATION – continued

c. **Install lower push-pull rod (3).** Torque nut (1) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (3) with bellcrank (5).
- (2) Install bolt (2) through bellcrank (5) and rod (3).
- (3) Check fit of self-retaining bolt (2) (para 11.1).
- (4) Install nut (1). Torque nut (1) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install new cotter pin (4).

**NOTE**

Do not apply sealing compound to spherical bearing.

- (7) Apply sealing compound to head of bolt (2) and nut (1). Use sealing compound (item 178, App F).
- d. **Inspect (QA).**
- e. **Perform directional flight control rigging operational check** (TM 1-1520-238-T).
- f. **Install access fairings L510, L530, and L540** (para 2.2).

END OF TASK

11.271. DIRECTIONAL F.S. 534 PUSH-PULL ROD REMOVAL/INSTALLATION

11.271.1. Description

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

11.271.2. 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)
Adjustable air filtering respirator (item 262, App H)
10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin (2)
Sealing compound (item 178, App F)

Personnel Required:

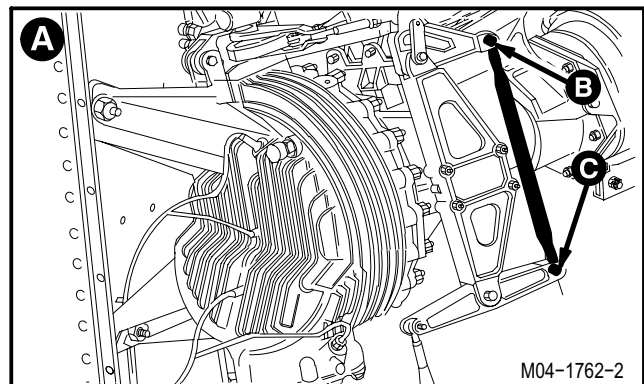
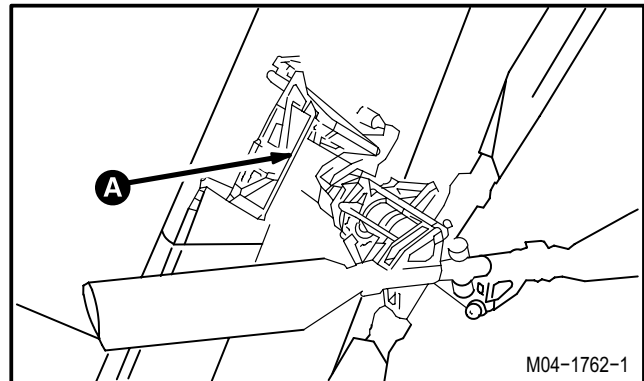
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairings L530 and L540 removed



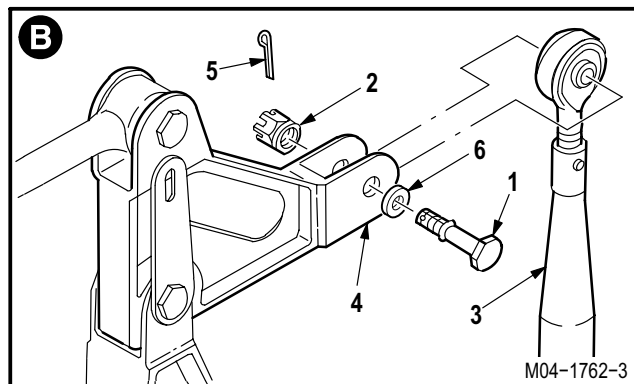
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11.271. DIRECTIONAL F.S. 534 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

11.271.3. Removal

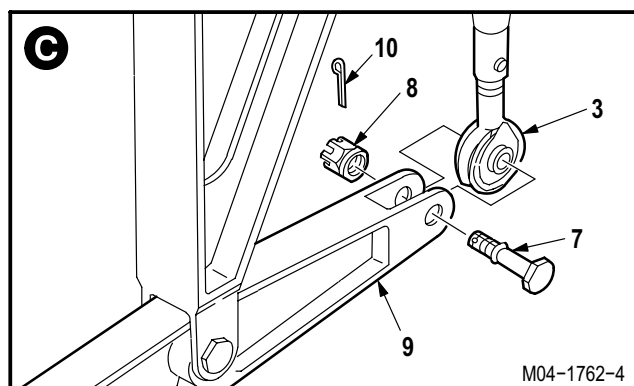
- a. **Remove sealing compound from bolt (1) and nut (2).**
- b. **Remove push-pull rod (3) from upper bellcrank (4).**

- (1) Remove and discard cotter pin (5).
- (2) Remove nut (2).
- (3) Remove bolt (1) and washer (6).



- c. **Remove sealing compound from bolt (7) and nut (8).**
- d. **Remove rod (3) from lower bellcrank (9).**

- (1) Remove and discard cotter pin (10).
- (2) Remove nut (8).
- (3) Remove bolt (7).
- (4) Remove rod (3).

**11.271.4. Cleaning**

- a. **Clean removed and attaching parts** (para 1.47).

11.271.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.271. DIRECTIONAL F.S. 534 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

11.271.6. Installation

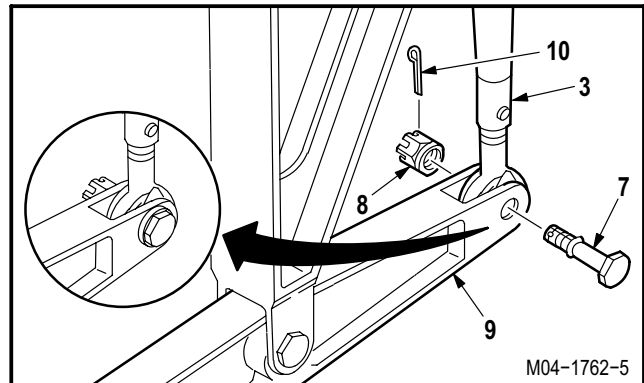


CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

a. **Install push-pull rod (3) on lower bellcrank (9).**
Torque nut (8) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (3) with bellcrank (9).
- (2) Install bolt (7) through bellcrank (9) and rod (3).
- (3) Check fit of self-retaining bolt (7) (para 11.1).
- (4) Install nut (8). Torque nut (8) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install new cotter pin (10).



NOTE

Do not apply sealing compound to spherical bearing.

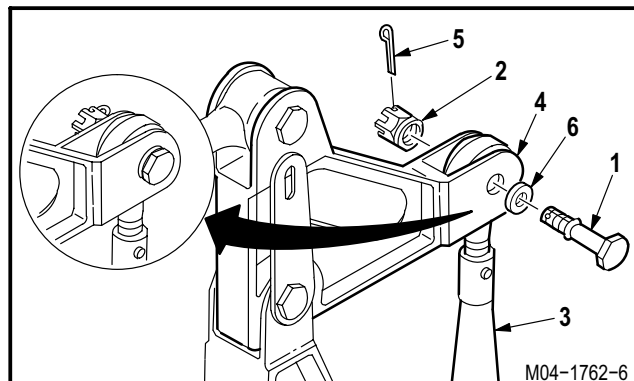
- (7) Apply sealing compound to head of bolt (8) and nut (7). Use sealing compound (item 178, App F).

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11.271. DIRECTIONAL F.S. 534 PUSH-PULL ROD REMOVAL/INSTALLATION – continued

b. **Install rod (3) on upper bellcrank (4).** Torque nut (2) **30 to 40 INCH-POUNDS**.

- (1) Aline rod (3) with bellcrank (4).
- (2) Install bolt (1) through washer (6), bellcrank (4), and rod (3).
- (3) Check fit of self-retaining bolt (1) (para 11.1).
- (4) Install nut (2). Torque nut (2) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (5).

**NOTE**

Do not apply sealing compound to spherical bearing.

- (7) Apply sealing compound to head of bolt (1) and nut (2). Use sealing compound (item 178, App F).

c. **Inspect (QA).**

d. **Perform directional flight control rigging operational check** (TM 1-1520-238-T).

e. **Install access fairings L530 and L540** (para 2.2).

END OF TASK

11.272. DIRECTIONAL F.S. 542 BELLCRANK REMOVAL/INSTALLATION

11.272.1. Description

This task covers: Removal. Cleaning. Inspection. Installation

11.272.2. 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)
Adjustable air filtering respirator (item 262, App H)
10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin (2)
Sealing compound (item 178, App F)

Personnel Required:

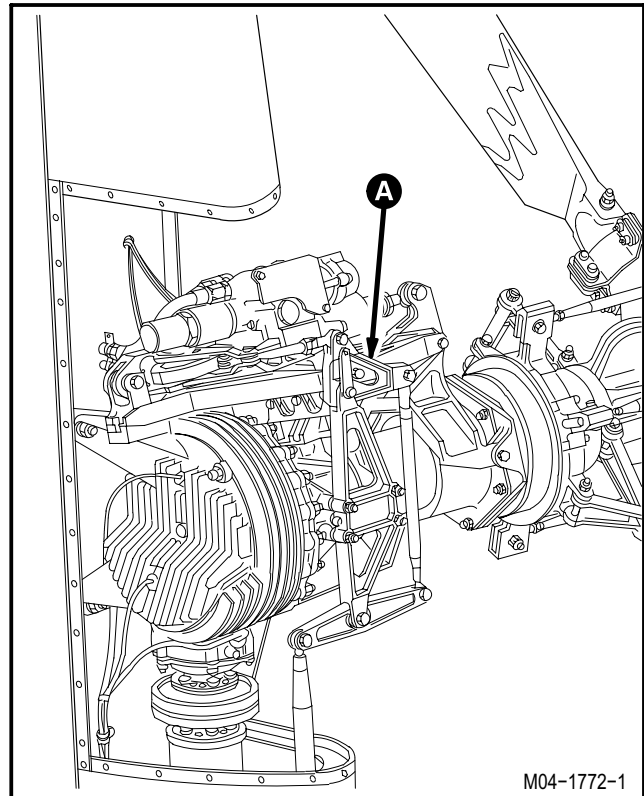
67R Attack Helicopter Repairer
67R3F Attack Helicopter Repairer/Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairings L530 and L540 removed



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11.272. DIRECTIONAL F.S. 542 BELLCRANK REMOVAL/INSTALLATION – continued

11.272.3. Removal

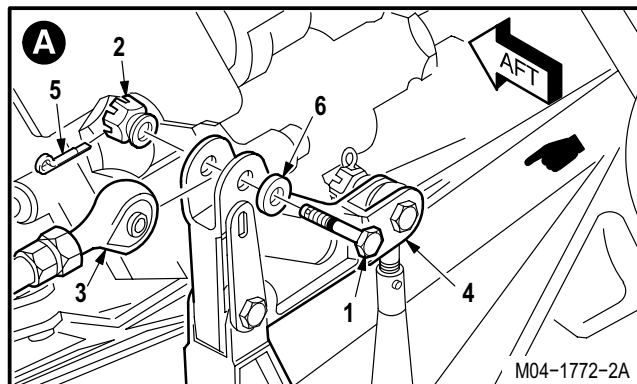
a. **Remove sealing compound from bolt (1) and nut (2).**

b. **Remove connecting link (3) from bellcrank (4).**

(1) Remove and discard cotter pin (5).

(2) Remove nut (2).

(3) Remove bolt (1) and washer (6).



c. **Remove sealing compound from bolt (7) and nut (8).**

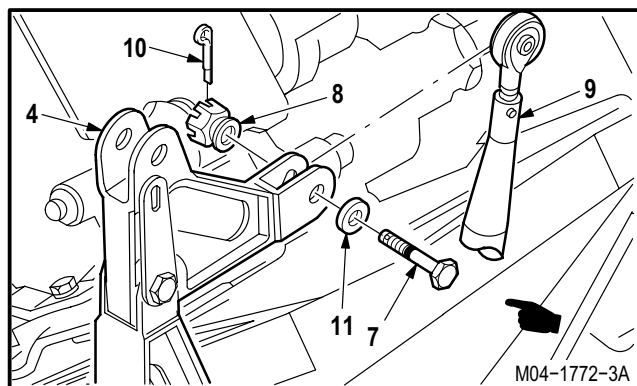
d. **Remove rod (9) from bellcrank (4).**

(1) Remove and discard cotter pin (10).

(2) Remove nut (8).

(3) Remove bolt (7) and washer (11).

(4) Remove rod (9).



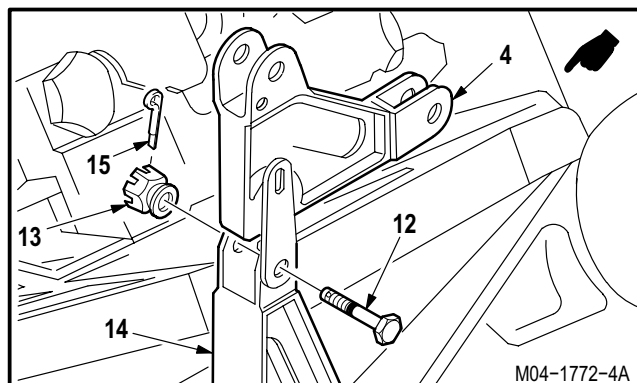
e. **Remove sealing compound from bolt (12) and nut (13).**

f. **Remove bellcrank (4) from bracket (14).**

(1) Remove and discard cotter pin (15).

(2) Remove nut (13).

(3) Remove bolt (12).



GO TO NEXT PAGE

11.272. DIRECTIONAL F.S. 542 BELLCRANK REMOVAL/INSTALLATION – continued

11.272.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.272.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check all installed bushing(s) and/or bearing(s) for wear** (para 11.232).
- d. **Check all removed bushing(s) and/or bearing(s) for wear** (para 11.4).

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11.272. DIRECTIONAL F.S. 542 BELLCRANK REMOVAL/INSTALLATION – continued

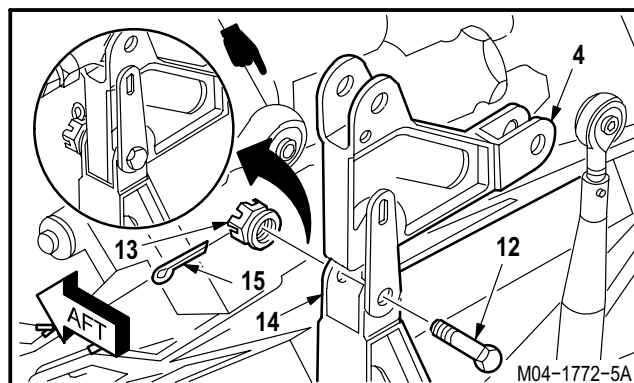
11.272.6. Installation

CAUTION

To prevent damage to flight control system components, do not use force to align bellcrank with bracket or to align push-pull rod with bellcrank.

- a. **Install bellcrank (4) on bracket (14).** Torque nut (13) **30 to 40 INCH-POUNDS.**

- (1) Align bellcrank (4) with bracket (14).
- (2) Install bolt (12) through bracket (14) and bellcrank (4).
- (3) Check fit of self-retaining bolt (12) (para 11.1).
- (4) Install nut (13). Torque nut (13) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install cotter pin (15).

**NOTE**

Do not apply sealing compound to spherical bearing.

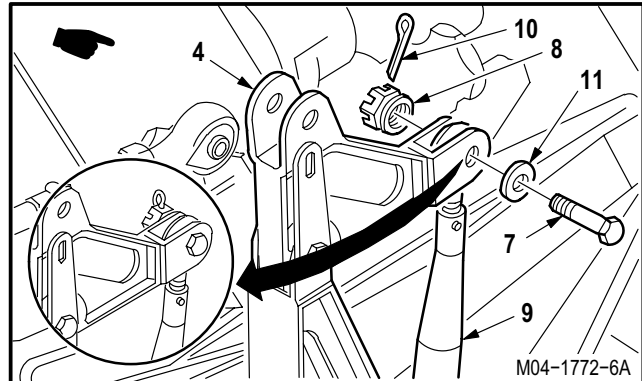
- (7) Apply sealing compound to head of bolt (12) and nut (13). Use sealing compound (item 178, App F).

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11.272. DIRECTIONAL F.S. 542 BELLCRANK REMOVAL/INSTALLATION – continued

b. **Install rod (9) on bellcrank (4).** Torque nut (8) **30 to 40 INCH-POUNDS.**

- (1) Aline rod (9) with bellcrank (4).
- (2) Install bolt (7) through washer (11), bellcrank (4), and rod (9).
- (3) Check fit of self-retaining bolt (7) (para 11.1).
- (4) Install nut (8). Torque nut (8) to **30 INCH-POUNDS.** Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (6) Install new cotter pin (10).



NOTE

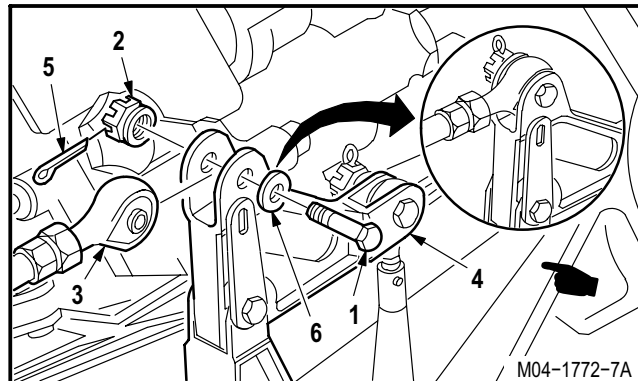
Do not apply sealing compound to spherical bearing.

- (7) Apply sealing compound to head of bolt (7) and nut (8). Use sealing compound (item 178, App F).

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11.272. DIRECTIONAL F.S. 542 BELLCRANK REMOVAL/INSTALLATION – continued**c. Install connecting link (3) on bellcrank (4).
Torque nut (2) 30 to 40 INCH-POUNDS.**

- (1) Aline link (3) with bellcrank (4).
- (2) Install bolt (1) through washer (6), bellcrank (4), and link (3).
- (3) Check fit of self-retaining bolt (1) (para 11.1).
- (4) Install nut (2). Torque nut (2) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (5).

**NOTE**

Do not apply sealing compound to spherical bearing.

- (7) Apply sealing compound to head of bolt (1) and nut (2). Use sealing compound (item 178, App F).

d. Inspect (QA).**e. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).****f. Install access fairings L530 and L540 (para 2.2).**

END OF TASK

11.273. DIRECTIONAL PUSH-PULL ROD GUIDE DISASSEMBLY/ASSEMBLY

11.273.1. Description

This task covers: Disassembly. Cleaning. Inspection. Repair. Assembly.

11.273.2. Initial Setup

Tools:

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

References:

TM 1-1500-204-23

Materials/Parts:

Grommet

Personnel Required:

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

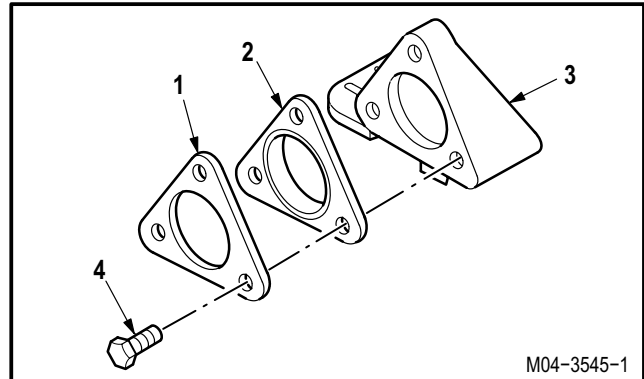
Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
11.259	Directional push-pull rod guides removed

11.273.3. Disassembly

a. **Remove metal gasket (1) and grommet (2) from guide (3).**

- (1) Remove three bolts (4).
- (2) Remove gasket (1) and grommet (2).
- (3) Discard grommet (2).



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11.273. DIRECTIONAL PUSH-PULL ROD GUIDE DISASSEMBLY/ASSEMBLY – continued

11.273.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

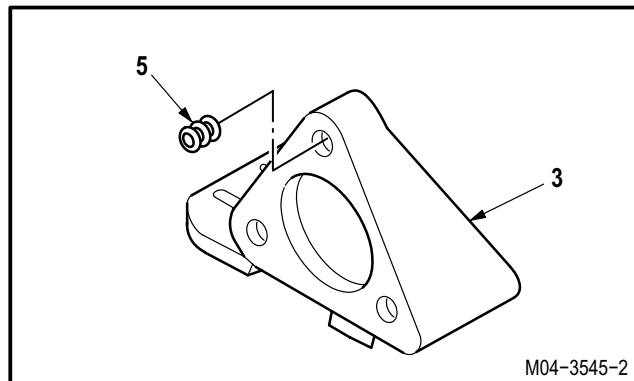
11.273.5. Inspection

- a. **Check removed and attaching parts for damage** (para 11.232).
- b. **Check removed and attaching parts for corrosion** (para 1.49).
- c. **Check bolts and inserts for damage** (TM 1-1500-204-23).

11.273.6. Repair**NOTE**

Threaded inserts may protrude a maximum of **0.035 INCH** beyond face of guide.

- a. **Repair guide (3) by replacing inserts (5)** (TM 1-1500-204-23).

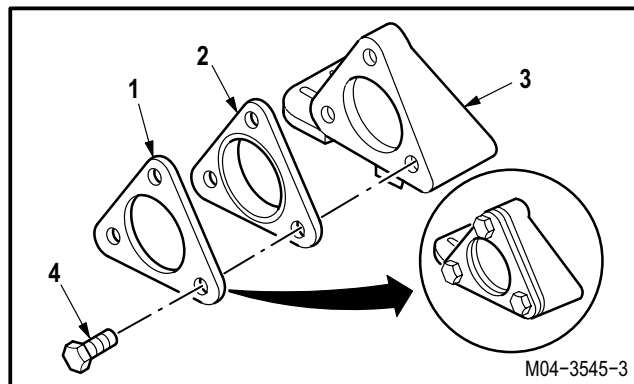
11.273.7. Assembly

- a. **Install new grommet (2) and gasket (1) on guide (3).**

- (1) Position grommet (2) and gasket (1) to align with holes on guide (3).
- (2) Install three bolts (4) through gasket (1) and grommet (2) on guide (3).

- b. **Inspect (QA).**

- c. **Install directional push-pull rod guides** (para 11.260).



END OF TASK

11.274. TAIL ROTOR DRIVE LINK REMOVAL

11.274.1. Description

This task covers: Removal. Cleaning. Inspection.

11.274.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
0.300 - 24/0 - 24-inch inside/outside vernier caliper
(item 54, App H)

Materials/Parts:

■ Mat (item 122, App F)

Personnel Required:

67R Attack Helicopter Repairer

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

WARNING

- **Heat-treated condition of the tail rotor drive link is critical to its serviceability. Any indication of heat oxidizing (discoloration), where visually detectable, requires replacement of the part. This part must be protected from unscheduled heating and external impact during inspection and handling procedures.**
- **Shot-peened surface on tail rotor drive link is critical. This part shall be replaced or have the peening restored if surface has had peening removed by wear or other cause. It also must be protected from unscheduled heating and external impact during inspection and any other handling procedures.**

NOTE

This task is typical for both drive links.

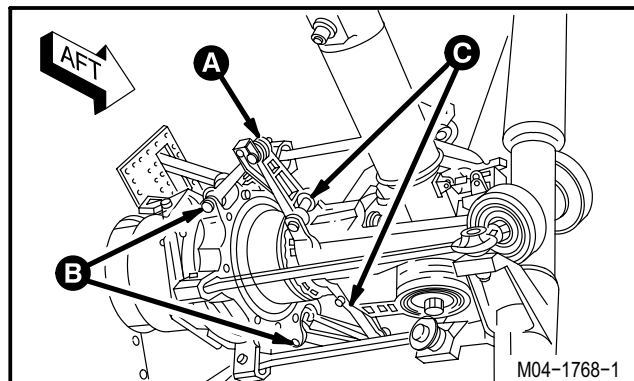
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11.274. TAIL ROTOR DRIVE LINK REMOVAL – continued

11.274.3. Removal

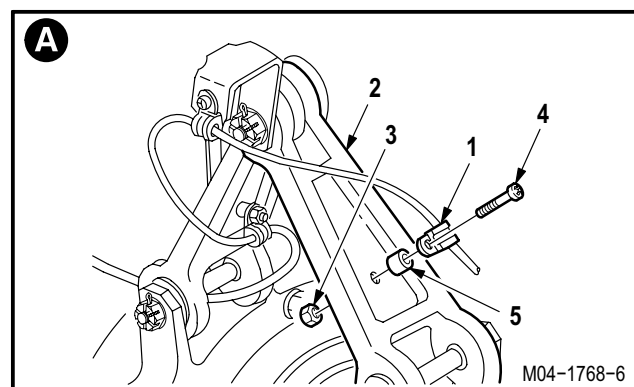
a. Remove harness clamp (1) from drive link (2).

- (1) Remove nut (3) from screw (4).
- (2) Remove screw (4) and spacer (5) from link (2).



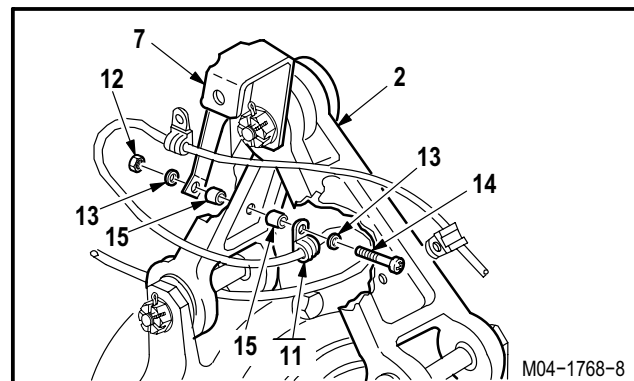
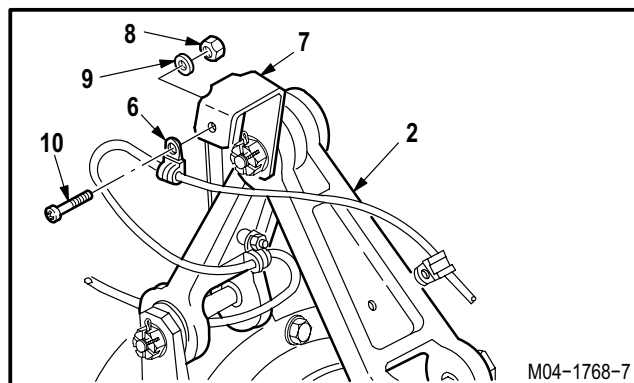
b. Remove harness clamp (6) from wire guide bracket (7).

- (1) Remove nut (8) and washer (9) from screw (10).
- (2) Remove screw (10) and clamp (6) from bracket (7).



c. Remove harness clamp (11) from link (2).

- (1) Remove nut (12) and washer, (13) from screw (14).
- (2) Remove screw (14), washer (13), clamp (11), spacer (15) and spacer (15) from link (2) and bracket (7).



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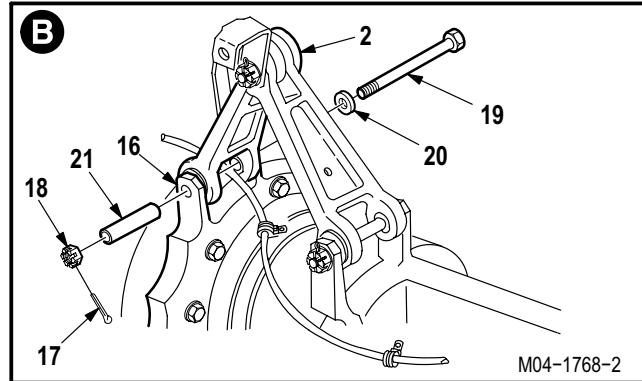
11.274. TAIL ROTOR DRIVE LINK REMOVAL – continued

CAUTION

Bushings can only be removed as depicted on nut side. Do not attempt to drive bushing out from bolt head side. Damage can occur to tail rotor swashplate bushing.

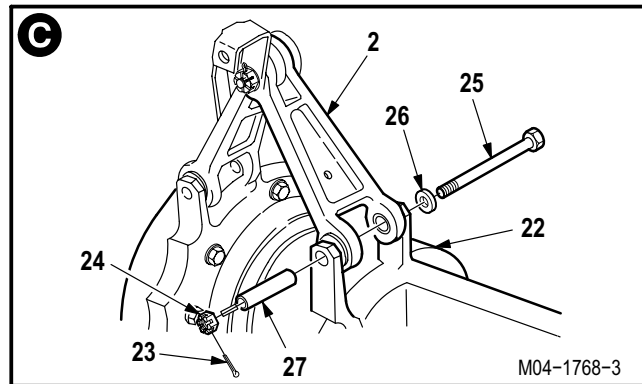
d. **Remove link (2) from swashplate (16).**

- (1) Remove and discard cotter pin (17).
- (2) Remove nut (18).
- (3) Remove bolt (19), washer (20), and bushing (21).



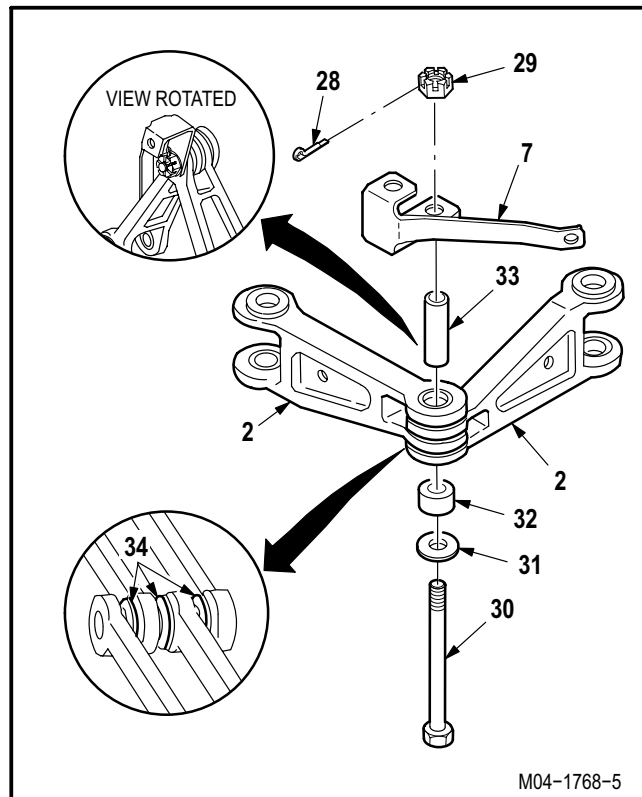
e. **Remove link (2) from fork (22).**

- (1) Remove and discard cotter pin (23).
- (2) Remove nut (24).
- (3) Remove bolt (25), washer (26), and bushing (27).



f. **Separate links (2) (two places).**

- (1) Remove and discard cotter pin (28).
- (2) Remove nut (29) and bracket (7).
- (3) Remove bolt (30), washer (31), spacer (32), bushing (33), and three spacers (34).



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11.274. TAIL ROTOR DRIVE LINK REMOVAL – continued

11.274.4. Cleaning

- a. **Wipe removed and attaching parts with a clean rag.**

11.274.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check all removed parts and attaching parts for corrosion** (para 1.49).
- d. **Check wire guides, wire guide spacers, and spacers for scoring, nicks, or scratches.** None allowed.
- e. **Check bearing bore for elongation and surrounding area for scratches, cracks, and wear** (para 11.232).
- f. **Check link for bends, scratches and gouges: not to exceed 0.020 INCH in depth and 0.070 INCH in length for an area 3 INCHES inboard of either rod end bearing; 0.003 INCH in depth and 0.010 INCH in length for the midspan of link after blending.** Use mat (item 122, App F).

END OF TASK

11.275. TAIL ROTOR DRIVE LINK INSTALLATION

11.275.1. Description

This task covers: Installation.

11.275.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
10 - 50 inch-pound 1/4-inch drive click type torque
wrench (item 434, App H)

References:

TM 1-1520-238-T

Materials/Parts:

Cotter pin (4)

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

WARNING

- **Heat-treated condition of the tail rotor drive link is critical to its serviceability. Any indication of heat oxidizing (discoloration), where visually detectable, requires- replacement of the part. This part must be protected from unscheduled heating and external impact during inspection and handling procedures.**
- **Shot-peened surface on tail rotor drive link is critical. This part shall be replaced or have the peening restored if surface has had peening removed by wear or other cause. It also must be protected from unscheduled heating and external impact during inspection and any other handling procedures.**

NOTE

- This task is typical for installation of either tail rotor drive link.
- If this task is being performed for one drive link, install parts in reverse order of removal.
- Drive links are installed in same direction as swashplate rotation.

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11.275. TAIL ROTOR DRIVE LINK INSTALLATION – continued

11.275.3. Installation

NOTE

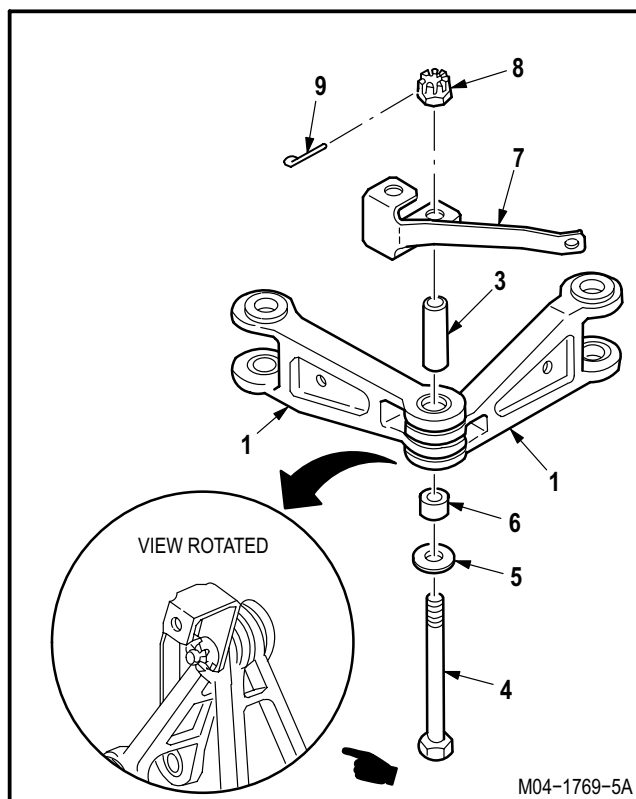
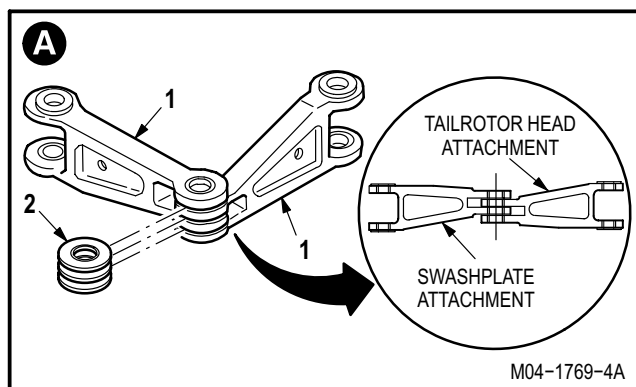
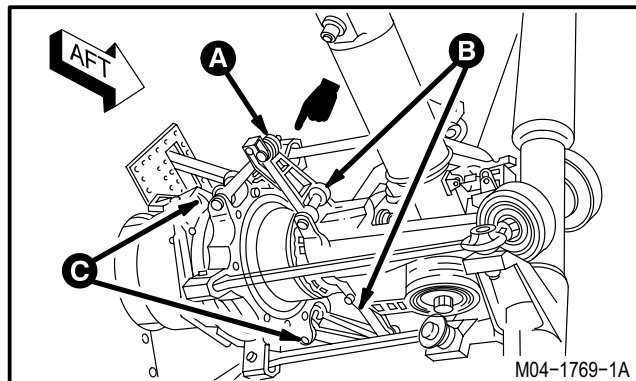
- The primary drive link has three spacers installed at link flanges, with small spacer under bolt head; opposite side (secondary drive link) does not have spacers at link flanges and has large spacer at bolt head.
- Assemble drive links with flat sides of links opposite of each other.

a. Install two drive links (1). Torque nut (8) 30 to 40 INCH-POUNDS.

- (1) Aline flanges at narrow end of links (1).
- (2) Install three drive link spacers (2) between flanges of links (1).

- (3) Install sleeve bushing (3) through flanges of links (1).
- (4) Install bolt (4) through washer (5), small sleeve spacer (6), links (1), and bushing (3).
- (5) Install wire guide bracket (7) on bolt (4).
- (6) Check fit of self-retaining bolt (4) (para 11.1).
- (7) Install self-locking nut (8). Torque nut (8) to **30 INCH-POUNDS**. Use torque wrench.
- (8) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.

- (9) Verify axial play (para 11.232).
- (10) Install new cotter pin (9).

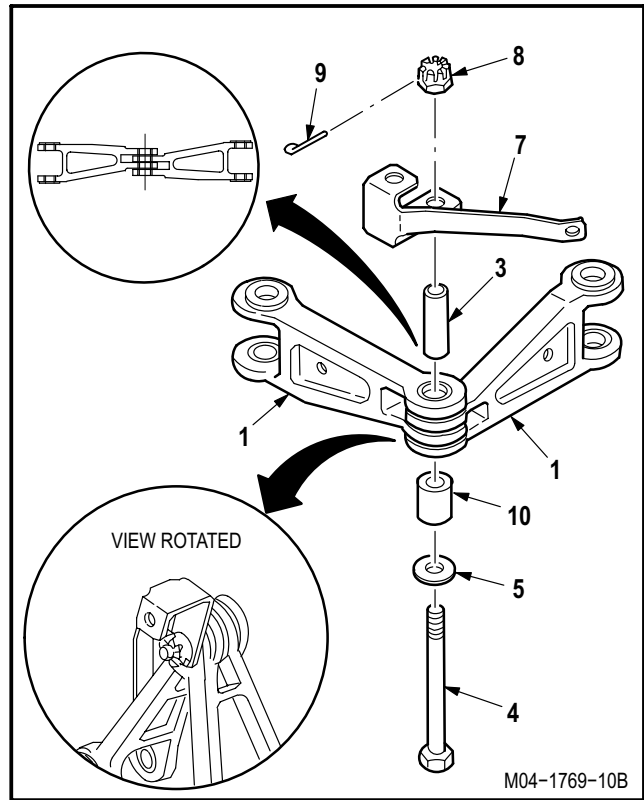


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11.275. TAIL ROTOR DRIVE LINK INSTALLATION – continued

b. **Install opposite side of links (1).** Torque nut (8) **30 to 40 INCH-POUNDS.**

- (1) Aline flanges at narrow end of links (1).
- (2) Install sleeve bushing (3) through flanges of links (1).
- (3) Install bolt (4) through washer (5), large spacer (10), links (1), and bushing (3).
- (4) Install bracket (7) on bolt (4).
- (5) Install self-locking nut (8). Torque nut (8) to **30 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (7) Verify axial play (para 11.232).
- (8) Install new cotter pin (9).



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11.275. TAIL ROTOR DRIVE LINK INSTALLATION – continued

CAUTION

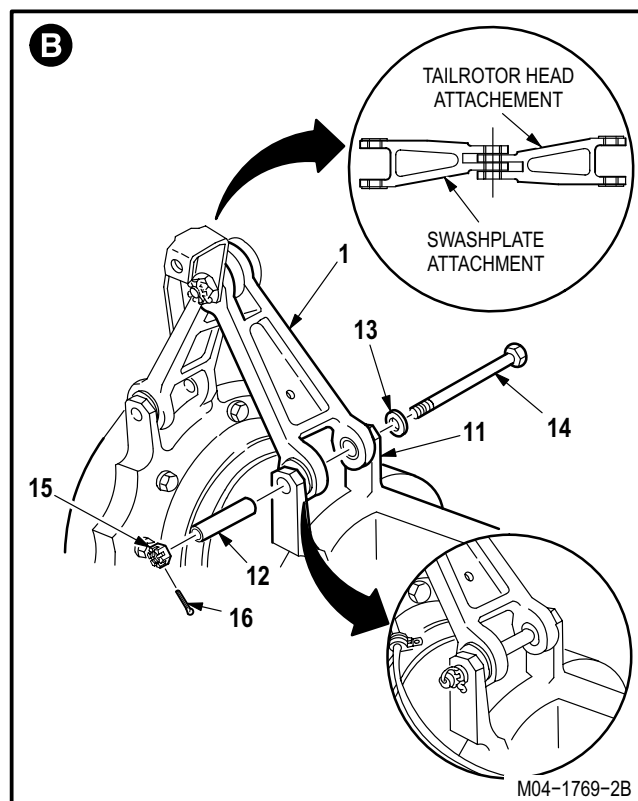
Ensure drive links are installed so that two lugs of the outboard link drive the inboard link. Failure to install the drive link correctly can result in damage or failure of one or both drive links.

NOTE

Washer must always be installed on the side of the fork with the small hole.

c. Install link (1) on fork (11). Torque nut (15) 30 to 40 INCH-POUNDS.

- (1) Aline link (1) with fork (11).
- (2) Install sleeve bushing (12) through fork (11) and link (1).
- (3) Install washer (13) and shear bolt (14) with head of bolt facing direction of rotation.
- (4) Install self-locking nut (15). Torque nut (15) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (16).

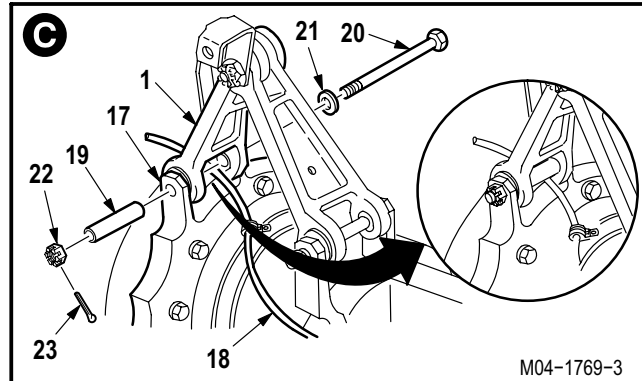


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11.275. TAIL ROTOR DRIVE LINK INSTALLATION – continued

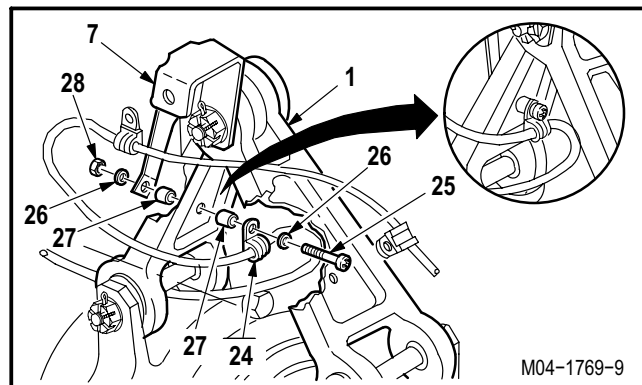
d. **Install link (1) on swashplate (17).** Torque nut (22) **30 to 40 INCH-POUNDS.**

- (1) Position de-ice wire harness (18) between swashplate ends of link (1).
- (2) Aline link (1) with swashplate (17).
- (3) Install sleeve bushing (19) through swashplate (17) and link (1) and over harness (18).
- (4) Install shear bolt (20) through washer (21), swashplate (17), link (1), and sleeve bushing (19).
- (5) Check fit of self-retaining bolt (20) (para 11.1).
- (6) Install self-locking nut (22). Torque nut (22) to **30 INCH-POUNDS.** Use torque wrench.
- (7) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS.**
- (8) Install new cotter pin (23).



e. **Install harness loop clamp (24) on links (1).**

- (1) Install screw (25) through washer (26), clamp (24), sleeve spacer (27), link (1), sleeve spacer (27), and bracket (7).
- (2) Install washer (26) and self-locking nut (28).

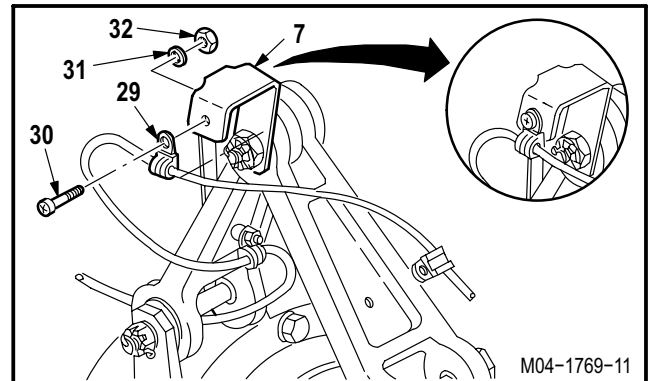


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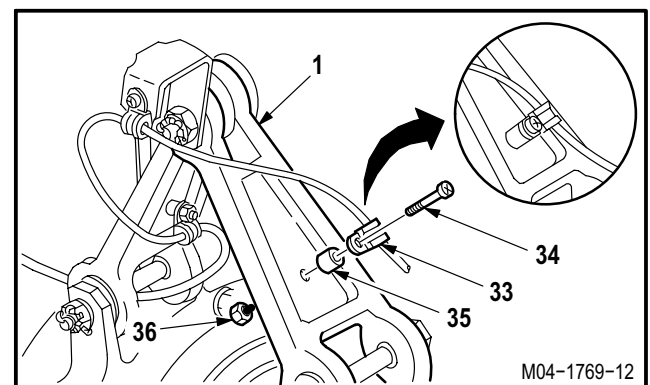
11.275. TAIL ROTOR DRIVE LINK INSTALLATION – continued

f. Install harness loop clamp (29) on wire guide bracket (7).

- (1) Install screw (30) through clamp (29) and bracket (7).
- (2) Install washer (31) and self-locking nut (32).


g. Install harness loop clamp (33) on link (1).

- (1) Install screw (34) through clamp (33), sleeve spacer (35), and link (1).
- (2) Install self-locking nut (36).


h. Inspect (QA).
i. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).

END OF TASK

11.276. TAIL ROTOR ELECTRICAL LEAD REMOVAL/INSTALLATION

11.276.1. Description

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

11.276.2. 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)
Aircraft maintenance platform (item 211, App H)
Adjustable air filtering respirator (item 262, App H)
0 - 30 inch-pound 1/4-inch drive dial indicator torque wrench (item 445, App H)

Personnel Required:

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

References:

TM 55-1500-323-24

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairing L540 removed

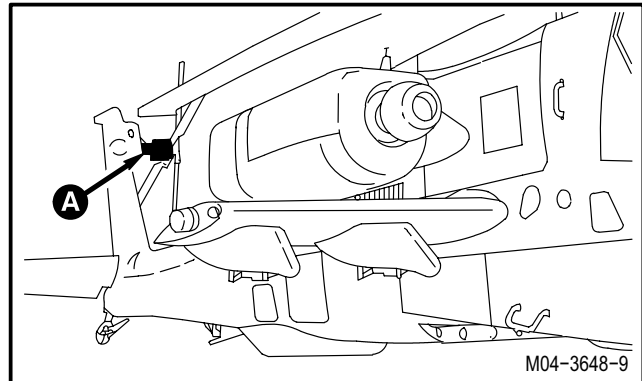
Materials/Parts:

■ Corrosion preventive compound (item 62A, App F)

WARNING

FLIGHT SAFETY PART

The tail rotor is a flight safety part. Failure to follow maintenance instructions may result in injury or death of crewmembers and/or serious damage to the helicopter.



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11.276. TAIL ROTOR ELECTRICAL LEAD REMOVAL/INSTALLATION – continued

11.276.3. Removal

NOTE

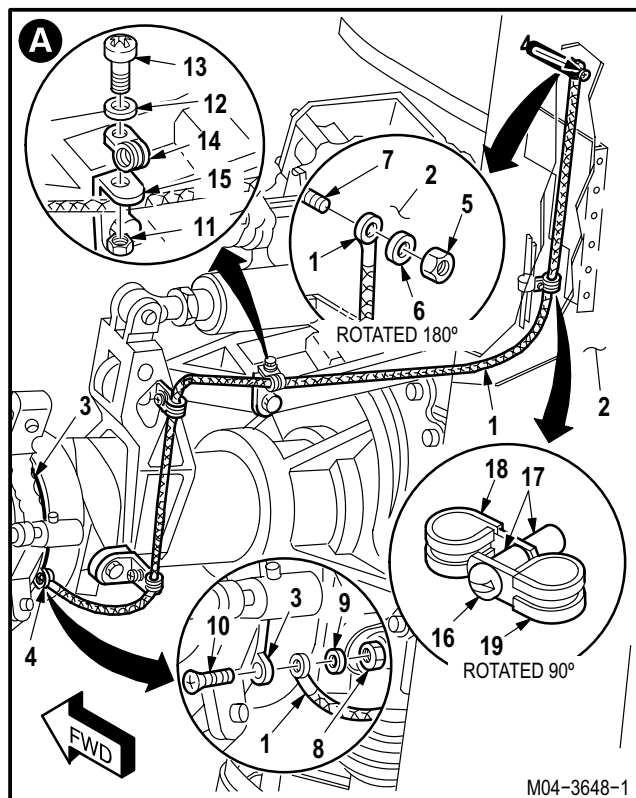
If lead will be replaced, remove clamps from jumper.

a. **Remove electrical lead (1) from vertical stabilizer (2) and swashplate (3).** Use maintenance platform.

- (1) Remove corrosion preventive compound from lead terminal ends (4).
- (2) Remove nut (5) and washer (6) from stud (7).
- (3) Remove nut (8), washer (9), and screw (10) from attach point on swashplate (3).
- (4) Remove three nuts (11), screws (13), washers (12), and clamps (14) from brackets (15).
- (5) Remove screw (16), spacers (17), and clamps (18) and (19).
- (6) Remove lead (1).

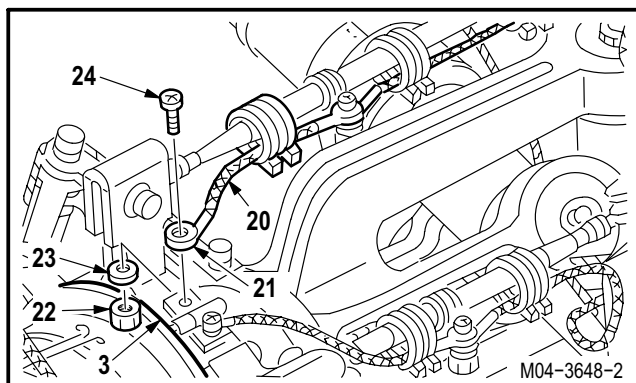
NOTE

Steps b. through d. apply to the remaining leads outboard of the tail rotor swashplate.



b. **Remove lead (20) from swashplate (3).**

- (1) Remove corrosion preventive compound from lead terminal end (21).
- (2) Remove nut (22), washer (23), and screw (24).

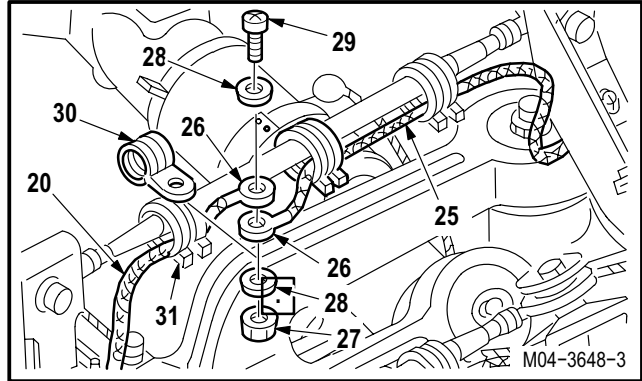


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11.276. TAIL ROTOR ELECTRICAL LEAD REMOVAL/INSTALLATION – continued

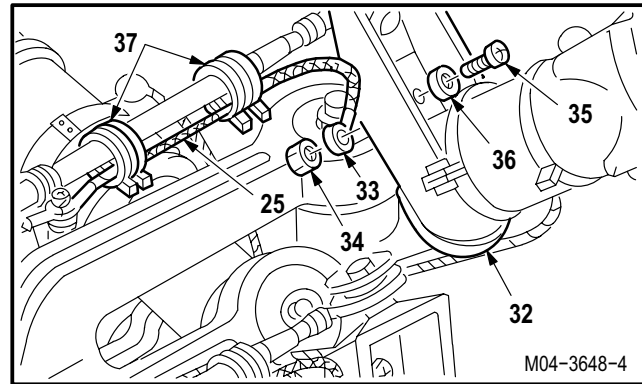
c. Remove lead (20) from lead (25).

- (1) Remove corrosion preventive compound from lead terminal ends (26).
- (2) Remove nut (27), washer (28), screw (29), and clamp (30).
- (3) Remove strap (31) and lead (20).



d. Remove lead (25) from pitch horn (32).

- (1) Remove corrosion preventive compound from lead terminal end (33).
- (2) Remove nut (34), screw (35), and washer (36).
- (3) Remove two straps (37) and lead (25).



11.276.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.276.5. Inspection

- a. **Check leads for broken wires and missing terminal ends.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).

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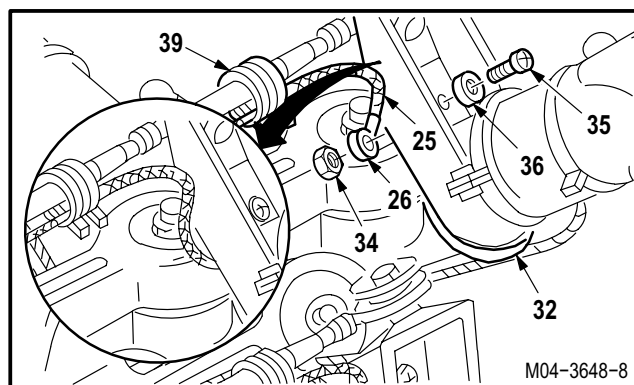
11.276. TAIL ROTOR ELECTRICAL LEAD REMOVAL/INSTALLATION – continued

11.276.6. Installation**NOTE**

For proper preparation of bonding surface on pitch horn for jumper (if installed), refer to TM 55-1500-323-24.

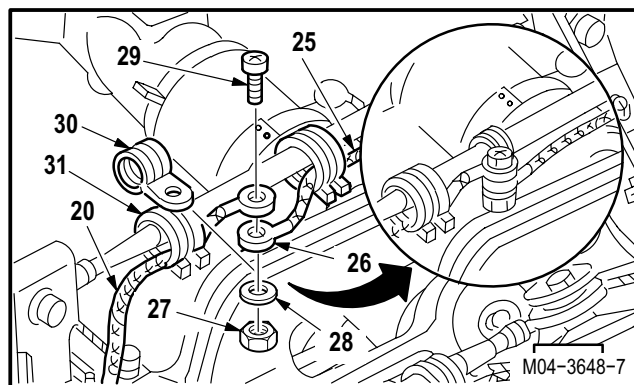
- a. **Install lead (25) to pitch horn (32).** Torque nut (34) to **25 INCH-POUNDS**.

- (1) Position lead end (26) on pitch horn (32).
- (2) Install screw (35), washer (36), and nut (34). Torque nut (34) to **25 INCH-POUNDS**. Use torque wrench.
- (3) Install two straps (39).
- (4) Apply corrosion preventive compound to lead end (26) attach point. Use corrosion preventive compound (item 62A, App F).



- b. **Install lead (20) to lead (25).** Torque nut (27) to **25 INCH-POUNDS**.

- (1) Install clamp (30).
- (2) Install screw (29) through lead (20), clamp (30), and terminal end (26).
- (3) Install washer (28), and nut (27).
- (4) Torque nut (27) to **25 INCH-POUNDS**. Use torque wrench.
- (5) Install strap (31).
- (6) Apply corrosion preventive compound to terminal ends and raw material around clamp (30). Use corrosion preventive compound (item 62A, App F).

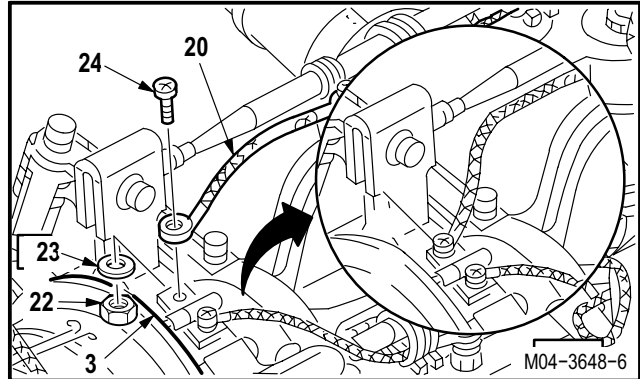


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11.276. TAIL ROTOR ELECTRICAL LEAD REMOVAL/INSTALLATION – continued

c. **Install lead (20) on swashplate (3).** Torque nut (22) to **25 INCH-POUNDS**.

- (1) Position lead (20) on swashplate (3).
- (2) Install screw (24), washer (23), and nut (22). Torque nut (22) to **25 INCH-POUNDS**. Use torque wrench.
- (3) Apply corrosion preventive compound to lead (20) attach point. Use corrosion preventive compound (item 62A, App F).

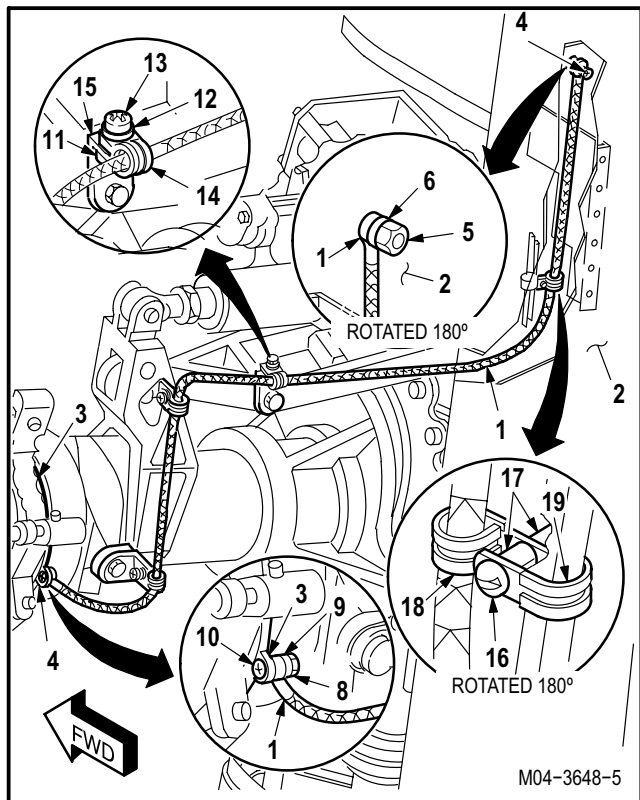


NOTE

If lead has been replaced, install clamps on jumper.

d. **Install lead (1) between vertical stabilizer (2) and swashplate (3).** Torque nuts (5) and (10) to **25 INCH-POUNDS**.

- (1) Position lead (1) at attaching point in vertical stabilizer (2).
- (2) Install washer (6) and nut (5). Torque nut (5) to **25 INCH-POUNDS**. Use torque wrench.
- (3) Route lead (1) to swashplate (3) attachment point.
- (4) Install spacer (17), clamp (18), spacer (17), clamp (19), and screw (16).
- (5) Attach lead (1) to three brackets (15) with clamps (14), screws (13), washers (12), and nuts (11).
- (6) Position lead (1) on swashplate (3). Install screw (10), washer (9), and nut (8). Torque nut (8) to **25 INCH-POUNDS**. Use torque wrench.
- (7) Apply corrosion preventive compound to both attaching points (4). Use corrosion preventive compound (item 62A, App F).



e. **Inspect (QA).**

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

END OF TASK

11.276A. TAIL ROTOR ELECTRICAL BRUSH AND BRUSH HOLDER REMOVAL/INSTALLATION

11.276A.1. Description

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

11.276A.2. Initial Setup

Tools:

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

References:

TM 55-1500-323-24

Materials/Parts:

Electrical brush (2)

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.276	Remove tail rotor electrical lead

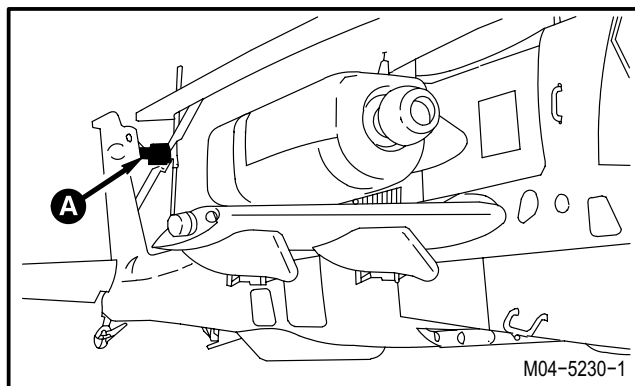
WARNING

FLIGHT SAFETY PART

The tail rotor is a flight safety part. Failure to follow maintenance instructions may result in injury or death of crewmembers and/or serious damage to the helicopter.

NOTE

This task is typical for upper and lower electrical brush and brush holders.



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11.276A. TAIL ROTOR ELECTRICAL BRUSH AND BRUSH HOLDER REMOVAL/INSTALLATION – continued

11.276A.3. Removal

- a. **Remove electrical brush (1) from brush holder (2).**

(1) Remove set screw (3) from brush holder (2).

(2) Remove electrical brush (1) from brush holder (2). Discard electrical brush (1).

11.276A.4. Cleaning

- a. **Clean removed and attaching parts** (para 1.47).

11.276A.5. Inspection

- a. **Check set screw for damaged threads and worn key flats.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).

11.276A.6. Installation

NOTE

For proper preparation of bonding surface on pitch horn for brush holder, refer to TM 55-1500-323-24.

- a. **Install electrical brush (1) in brush holder (2).**

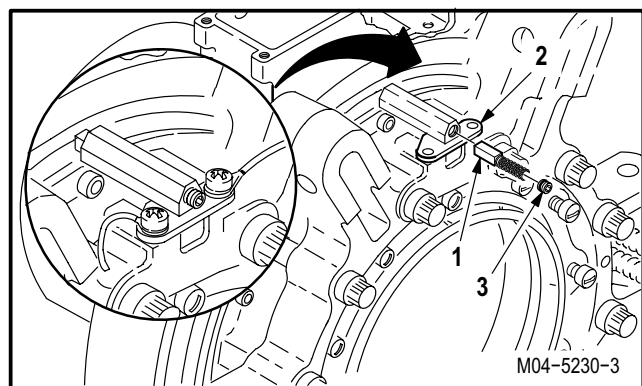
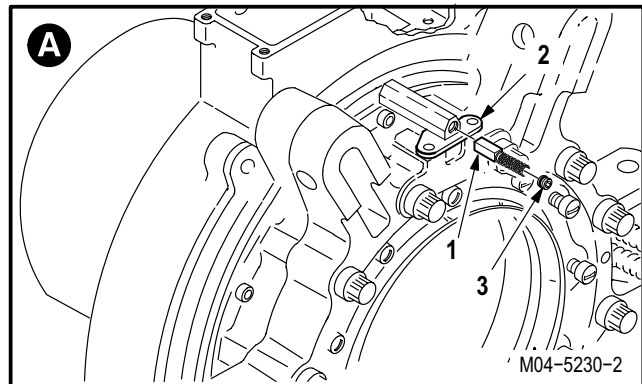
(1) Insert new brush (1) into brush holder (2).

(2) Install set screw (3) into brush holder (2). Turn set screw four **360°** turns.

- b. **Inspect (QA).**

c. **Install tail rotor electrical lead** (para 11.276).

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



END OF TASK

11.277. TAIL ROTOR PITCH LINK REMOVAL/INSTALLATION

11.277.1. Description

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

11.277.2. 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)
- Adjustable air filtering respirator (item 262, App H)
- 30 - 150 inch-pound 3/8-inch drive click type torque wrench (item 441, App H)
- 0 - 600 inch-pound 3/8-inch drive dial indicator torque wrench (item 447, App H) torque wrench

Materials/Parts:

- Cotter pin (2)
- Epoxy primer coating kit (item 78, App F)

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
11.276	Tail rotor electrical leads removed



FLIGHT SAFETY PART

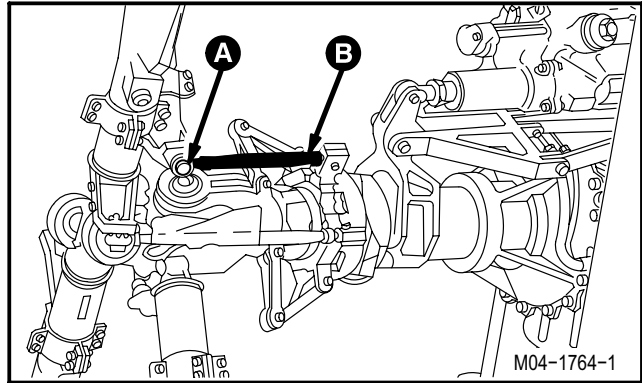
- **The tail rotor pitch link assembly and/or components of the pitch link assembly are flight safety parts. Failure to follow maintenance instructions may result in serious injury or death of crewmembers and/or serious damage to the helicopter.**
- **Heat treated condition of the tail rotor pitch link assembly and/or components of the pitch link assembly is critical to its serviceability. Any indication of heat oxidizing (discoloration), where visually detectable, requires replacement of the part. This part must be protected from unscheduled heating and external impact during inspection and handling procedures.**

NOTE

This task is typical for all four pitch links.

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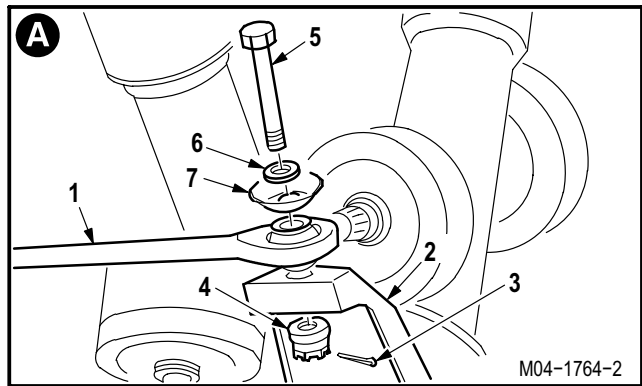
11.277. TAIL ROTOR PITCH LINK REMOVAL/INSTALLATION – continued



11.277.3. Removal

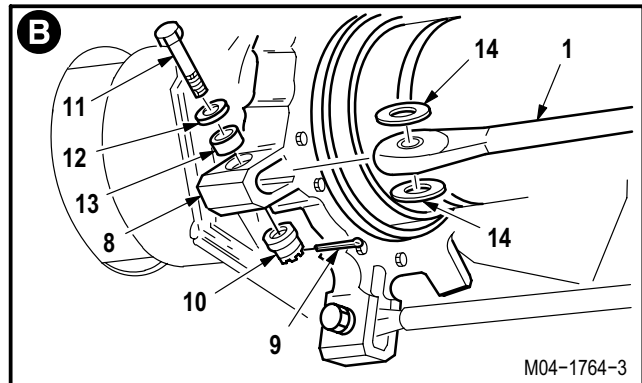
a. Remove pitch link (1) from pitch horn (2).

- (1) Remove epoxy primer from nut (4) and bolt (5).
- (2) Remove and discard cotter pin (3).
- (3) Remove nut (4).
- (4) Remove bolt (5), washer (6), and safety washer (7).



b. Remove link (1) from swashplate (8).

- (1) Remove and discard cotter pin (9).
- (2) Remove nut (10).
- (3) Remove bolt (11), washer (12), bushing (13), and two washers (14).



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11.277. TAIL ROTOR PITCH LINK REMOVAL/INSTALLATION – continued

11.277.4. Cleaning

- a. **Wipe attaching surfaces of pitch link with a clean rag.**
- b. **Clean epoxy primer from surface of pitch link (para 1.47).**

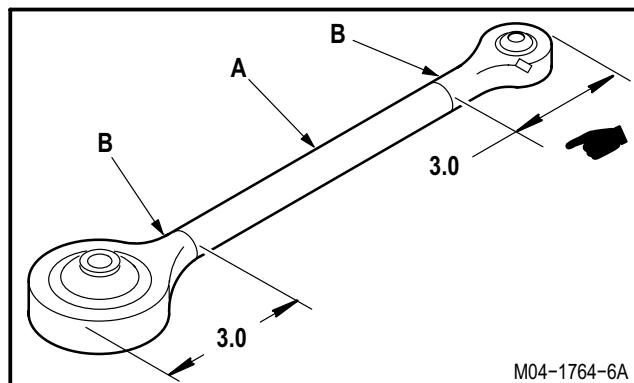
11.277.5. Inspection

- a. **Check removed and attaching parts for damage (para 11.232).**
- b. **Check removed and attaching parts for corrosion (para 1.49).**
- c. **Check all installed bushing(s) and/or bearing(s) for wear (para 11.232).**
- d. **Check all removed bushing(s) and/or bearing(s) for wear (para 11.4).**
- e. **Check links for bends, scratches, or gouges.**

- (1) **Scratches and gouges not to exceed 0.020 INCH deep and 0.070 INCH long for the area 3 INCHES inboard of either end of link (area B); 0.003 INCH deep and 0.010 INCH long for the midspan of the link (area A).**

11.277.6. Repair

- a. **Repair pitch links damaged in excess of inspection criteria by replacing pitch link.**
- b. **Repair pitch link bearings which do not meet inspection criteria by replacing bearings (para 11.4).**
- c. **Blend damaged areas to a minimum 20:1 ratio.**



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11.277. TAIL ROTOR PITCH LINK REMOVAL/INSTALLATION – continued

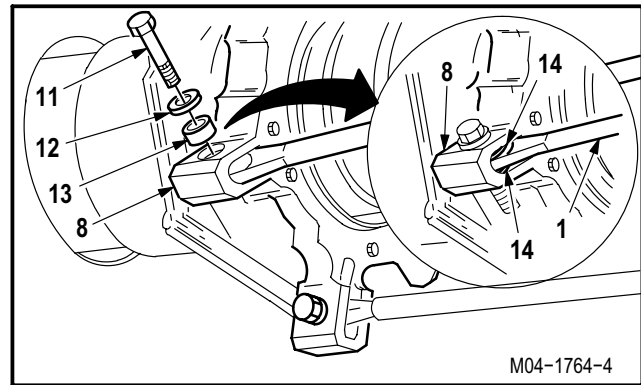
11.277.7. Installation

NOTE

Install long links between outboard pitch horns and swashplate. Install short links between inboard blade pitch horns and swashplate. Install bolt heads in rotor rotation direction.

a. **Install link (1) on swashplate (8).** Torque nut (10) **85 to 115 INCH-POUNDS.**

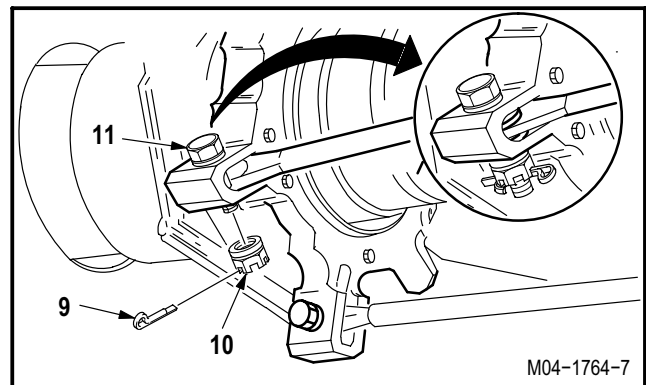
- (1) Aline small end of link (1) with swashplate (8).
- (2) Install bushing (13) in swashplate (8).
- (3) Install bolt (11) through washer (12), bushing (13), washer (14), link (1), washer (14), and swashplate (8).



NOTE

The maximum thickness for washer stackup is **0.126 INCH** for pitch link connection to swashplate.

- (4) Check fit of self-retaining bolt (11) (para 11.1).
- (5) Install nut (10). Torque nut (10) to **85 INCH-POUNDS.** Use torque wrench.
- (6) Increase torque to aline cotter pin hole, but do not exceed **115 INCH-POUNDS.**
- (7) Install new cotter pin (9).



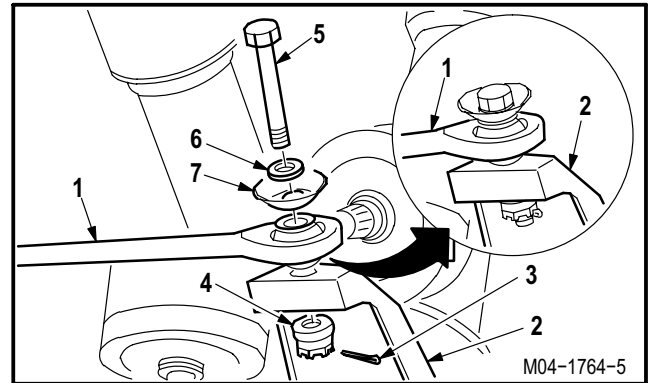
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11.277. TAIL ROTOR PITCH LINK REMOVAL/INSTALLATION – continued



b. **Install pitch link (1) on pitch horn (2).** Torque nut (4) **225 to 285 INCH-POUNDS**.

- (1) Aline link (1) with horn (2).
- (2) Install bolt (5) through washer (6), safety washer (7), link (1), and horn (2).
- (3) Check fit of self-retaining bolt (5) (para 11.1).
- (4) Install nut (4). Torque nut (4) to **225 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **285 INCH-POUNDS**.
- (6) Install new cotter pin (3).
- (7) Apply primer to bolt head (5) and nut (4). Use epoxy primer coating kit (item 78, App F).



c. **Inspect (QA).**

d. **Install tail rotor electrical leads** (para 11.276).

END OF TASK

11.278. TAIL ROTOR DE-ICE BRUSH BLOCK REMOVAL/INSTALLATION

11.278.1. Description

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

11.278.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
Light duty laboratory apron (item 27, App H)
Chemical protective gloves (item 154, App H)
Ohmmeter (item 218, App H)
Adjustable air filtering respirator (item 262, App H)

Materials/Parts:

Enamel (item 74A, App F)

Personnel Required:

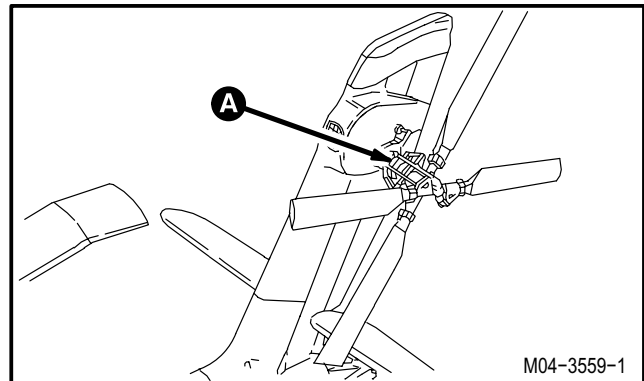
68X Armament/Electrical System Repairer
68X3F Armament/Electrical System Repairer/
Technical Inspector

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed



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11.278. TAIL ROTOR DE-ICE BRUSH BLOCK REMOVAL/INSTALLATION – continued

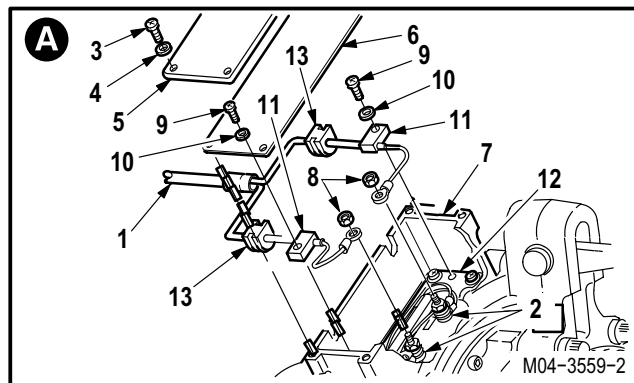
11.278.3. Removal

CAUTION

To prevent damage to brush block, ensure terminal stackups do not turn while removing nuts.

a. **Identify and remove two de-ice wire leads (1) from brush block terminal stackups (2).**

- (1) Remove four screws (3) and washers (4) from cover (5).
- (2) Remove cover (5) and gasket (6) from housing (7).
- (3) Remove sealant from stackups (2).
- (4) Hold stackups (2) and remove two nuts (8).
- (5) Remove two screws (9), washers (10), and lead holders (11) from block (12).
- (6) Remove two leads (1) with grommets (13) from housing (7).



CAUTION

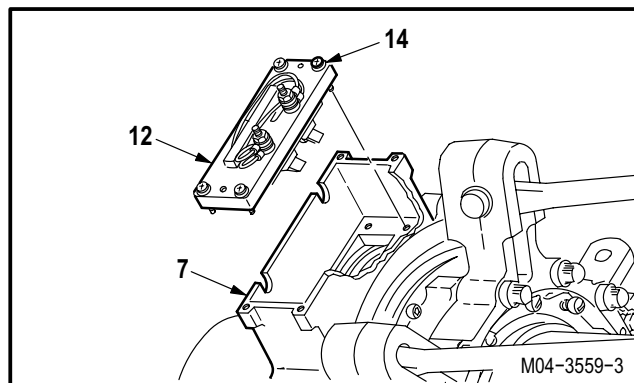
Handle brush block with care. Brushes, springs, and wiring on brush block may be damaged if accidentally dropped or handled roughly.

NOTE

Screws attaching brush block to housing are captive screws.

b. **Remove brush block (12) from housing (7).**

- (1) Loosen four captive screws (14) on block (12).
- (2) Remove block (12).



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11.278. TAIL ROTOR DE-ICE BRUSH BLOCK REMOVAL/INSTALLATION – continued

11.278.4. Cleaning

- a. **Clean removed and attaching parts or surfaces** (para 1.47).

11.278.5. Inspection

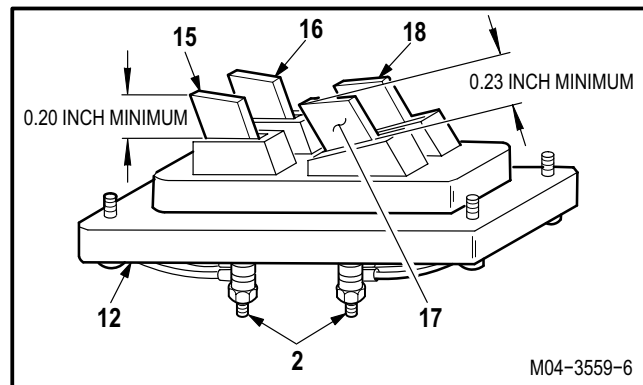
- a. **Check cover and gasket for cracks, tears, or cuts.** None allowed.
- b. **Check swashplate attaching points for cracks, nicks, and scratches** (para 11.232).
- c. **Check removed and attaching parts for corrosion** (para 1.49).

NOTE

Brush wear is measured from edge of brush retainer to high point of brush.

- d. **Check brushes (15), (16), (17), and (18) for wear.**

- (1) Hold brush block (12) upside down with stackups (2) on near side.
- (2) Check two forward brushes (15) and (16) for minimum extension of more than **0.20 INCH**.
- (3) Check two aft brushes (17) and (18) for minimum extension of more than **0.23 INCH**.



- e. **Check brushes (15), (16), (17), and (18) for cracks.** None allowed.

- f. **Check block (12) for broken springs.**

- (1) Hold block (12) upside down.
- (2) Gently depress brushes (15), (16), (17), and (18), and check that internal spring returns it its original position.
- (3) If spring is broken, replace brush block.

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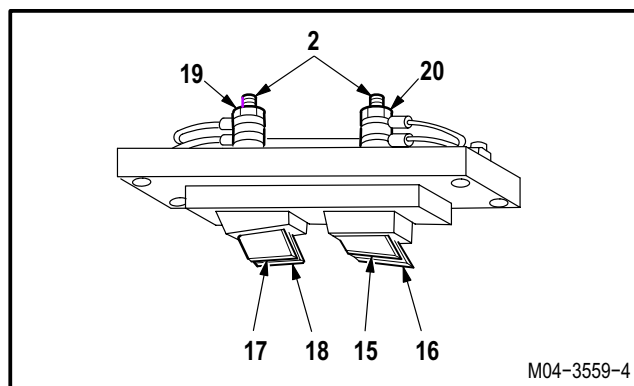
11.278. TAIL ROTOR DE-ICE BRUSH BLOCK REMOVAL/INSTALLATION – continued

CAUTION

To prevent damage to de-ice equipment, resistance of tail rotor de-ice brushes must not exceed **0.0059 OHMS**.

- g. **Check circuit resistance between stackups (2) and brushes (15), (16), (17), and (18).** Use ohmmeter.

- (1) If circuit resistance exceeds 0.0059 ohms, replace brush and shunt (para 11.279).
 - (a) Check resistance between forward terminal (19) and brush (17).
 - (b) Check resistance between forward terminal (19) and brush (15).
 - (c) Check resistance between aft terminal (20) and brush (18).
 - (d) Check resistance between aft terminal (20) and brush (16).

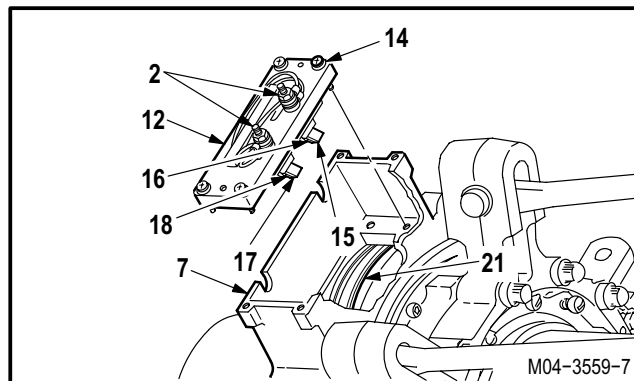

11.278.6. Installation

CAUTION

Handle brush block with care. Brushes, springs, and wiring on brush block may be damaged if brush block is accidentally dropped or handled roughly.

- a. **Install brush block (12) in housing (7).**

- (1) Position block (12) in housing (7) with stackups (2) facing outboard and brushes (15), (16), (17), and (18) aligned with grooves in tail rotor de-ice slip ring (21).
- (2) Install four captive screws (14) in housing (7).



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11.278. TAIL ROTOR DE-ICE BRUSH BLOCK REMOVAL/INSTALLATION – continued



CAUTION

To prevent damage to brush block, ensure terminal stackups do not turn while installing nuts.

- b. **Identify and install two leads (1) on stackups (2).**

NOTE

When installing de-ice leads in housing, ensure that grommets are securely seated in housing grommet slots and that flat sides of grommets are facing up.

- (1) Position leads (1) with grommets (13) on housing (7).
- (2) Install two screws (9) through washers (10) and lead holders (11) into block (12).
- (3) Position leads (1) on stackups (2).
- (4) Hold stackups (2) and install two nuts (8).
- (5) Coat stackups (2) with sealant. Use enamel (item 74A, App F).

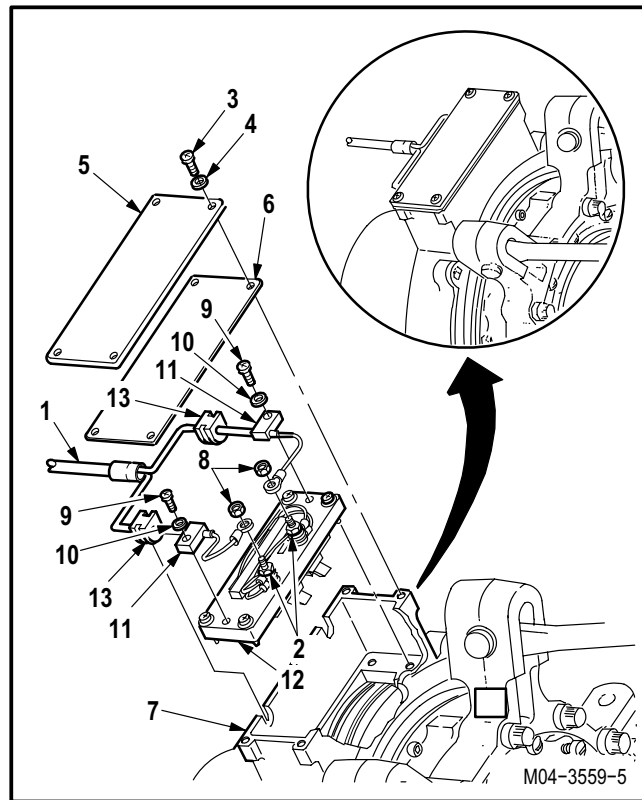
- c. **Inspect (QA)**

- d. **Install cover (5) and gasket (6) on housing (7).**

- (1) Position cover (5) and gasket (6) on housing (7).
- (2) Install four screws (3) through washers (4), cover (5) and gasket (6) into housing (7).

- e. **Inspect (QA).**

- f. **Perform rotor blades de-ice maintenance operational check (TM 1-1520-238-T).**



END OF TASK

11.279. TAIL ROTOR DE-ICE BRUSH AND SHUNT REPLACEMENT (AVIM)

11.279.1. Description

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

11.279.2. Initial Setup

Tools:

Electrical tool kit (item 378, App H)
 Aircraft mechanic's tool kit (item 376, App H)
 Light duty laboratory apron (item 27, App H)
 Heat protective gloves (item 155, App H)
 Adjustable air filtering respirator (item 262, App H)
 25-watt electric soldering iron (item 332, App H)

Personnel Required:

67R Attack Helicopter Repairer
 68X Armament/Electrical System Repairer
 67R3F Attack Helicopter Repairer/Technical Inspector

Materials/Parts:

Nut
 Spacer
 Terminal lug
 Washer
 Brush (item 34, App F)
 Cushioning material (item 68, App F)
 Plastic strip (item 139, App F)
 Solder (item 189, App F)
 Tape (item 207, App F)

References:

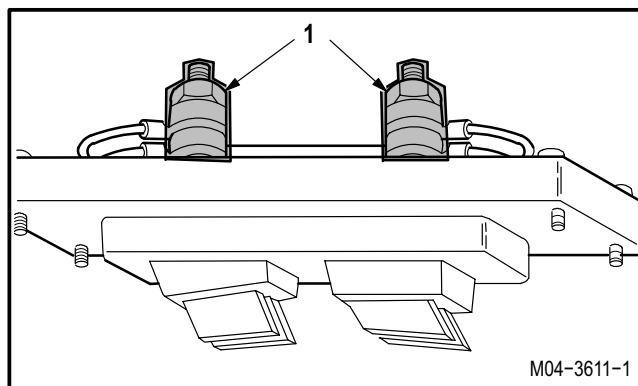
TM 55-1500-323-24

NOTE

This task is typical for all brush and shunt assemblies on tail rotor de-ice brush block.

11.279.3. Removal

- a. **Remove sealant from terminal stack-up (1)** (para 1.47).



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11.279. TAIL ROTOR DE-ICE BRUSH AND SHUNT REPLACEMENT (AVIM) – continued



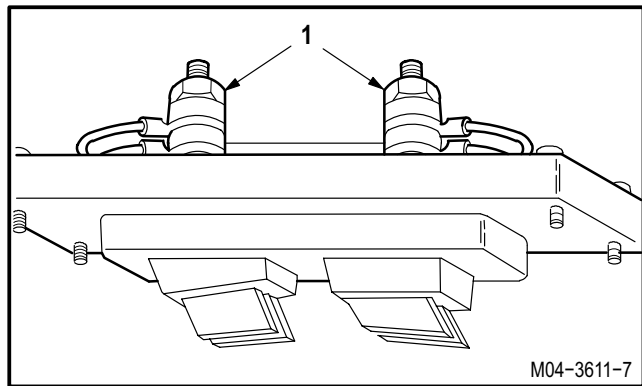
WARNING

Soldering gun can cause severe burns to personnel and start fires. Observe all safety precautions when using soldering gun. If injury occurs, seek medical aid.

- b. Remove solder from terminal stack-up (1). Use soldering iron (TM 55-1500-323-24).

CAUTION

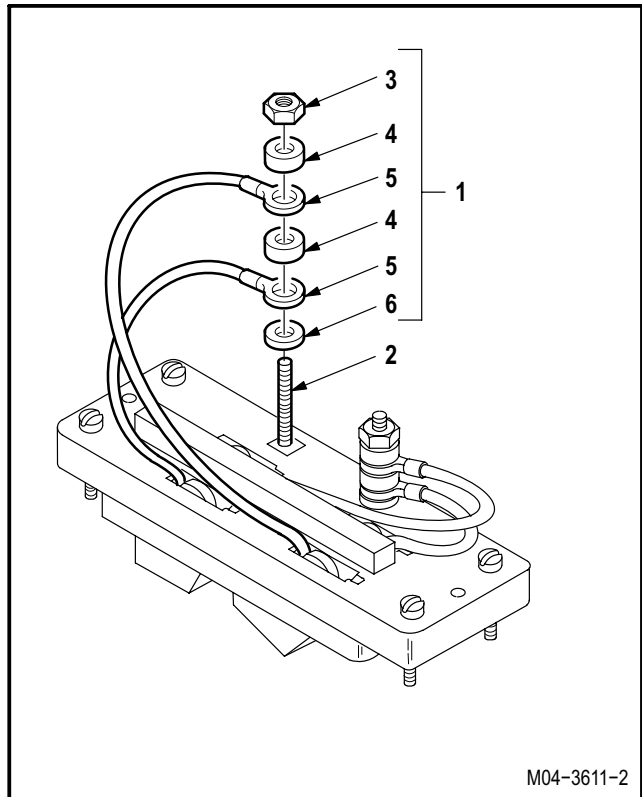
To prevent damage to brush block, ensure terminal stack-up does not turn while removing nut.



M04-3611-7

- c. Remove stack-up (1) from terminal (2).

- (1) Hold stack-up (1).
- (2) Remove and discard nut (3).
- (3) Remove and discard top spacer (4).
- (4) Remove top lug (5).
- (5) Remove and discard bottom spacer (4).
- (6) Remove bottom lug (5).
- (7) Remove and discard washer (6).



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11.279. TAIL ROTOR DE-ICE BRUSH AND SHUNT REPLACEMENT (AVIM) – continued

CAUTION

Brush block springs are fragile and are not replaceable. To prevent damage, springs must be kept free of dirt, oil, and other contaminants and must not snap down in empty brush holder.

NOTE

Do not discard brush and shunt after removal.

d. **Remove brush and shunt (7) from brush holder (8).**

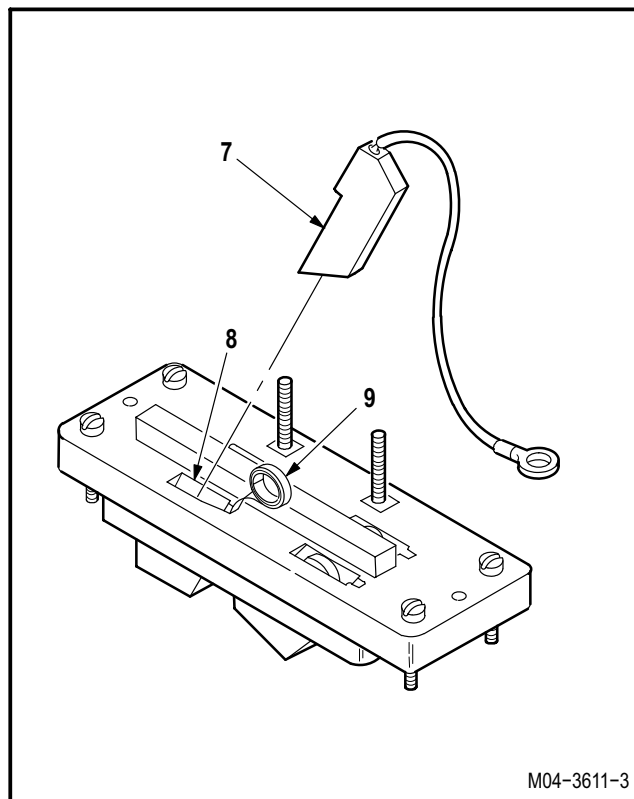
- (1) Push brush (7) up to expose spring (9).
- (2) Hold spring (9). Remove brush (7) from holder (8).
- (3) Gently lower spring (9) into empty holder (8).

11.279.4. Cleaning

- a. **Clean removed and attaching parts or surfaces** (para 1.47).

11.279.5. Inspection

- a. **Check removed and attaching parts for cracks.** None allowed.
- b. **Check removed and attaching parts for damage** (para 11.232).
- c. **Check brush block for missing hardware.** Replace missing hardware.



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11.279. TAIL ROTOR DE-ICE BRUSH AND SHUNT REPLACEMENT (AVIM) – continued

11.279.6. Installation

CAUTION

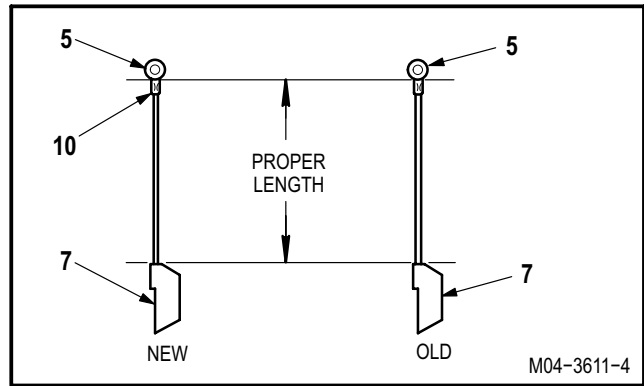
Brush and shunt assembly is fragile and must be handled with care. Brush may be damaged if accidentally dropped or handled roughly.

NOTE

New shunt must be cut to length to allow free movement of brush in brush holder. Use old shunt to determine proper length.

a. Install new lug (5) on new brush and shunt (7).

- (1) Cut new shunt (7) to proper length.
- (2) Coat end of insulation (10) with plastic. Use brush (item 34, App F) and plastic strip (item 139, App F).
- (3) Install new lug (5) on shunt (7) (TM 55-1500-323-24).



CAUTION

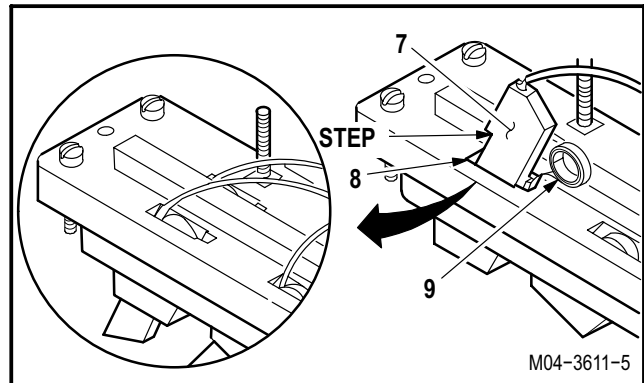
To prevent damage to tail rotor de-ice components, ensure that springs remain clean and undamaged during assembly.

NOTE

Install new brush with step facing away from spring.

b. Install new brush and shunt (7) in holder (8).

- (1) Gently displace spring (9) to clear holder (8).
- (2) Install new brush (7) in holder (8).
- (3) Lower spring (9) to contact brush (7).



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11.279. TAIL ROTOR DE-ICE BRUSH AND SHUNT REPLACEMENT (AVIM) – continued

- c. Check all brushes for proper extension (para 11.278).



WARNING

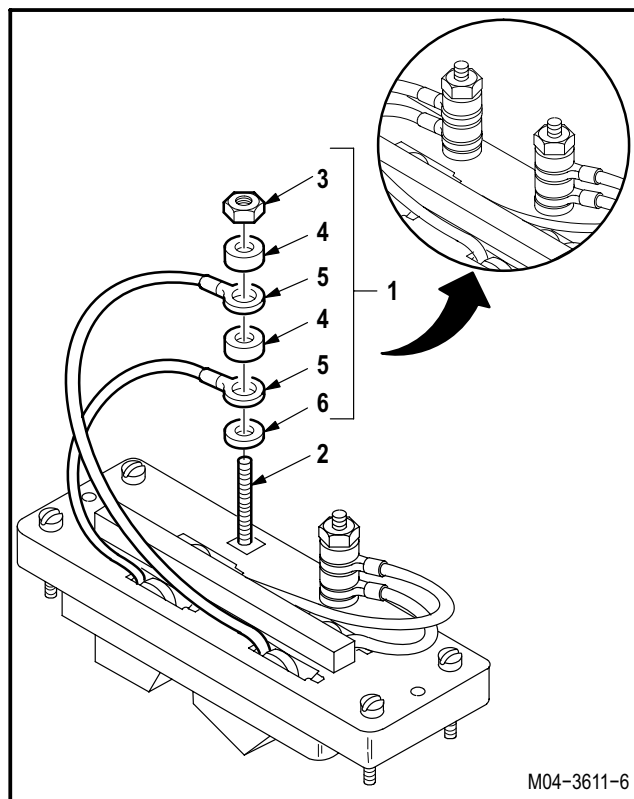
Soldering gun can cause severe burns to personnel and start fires. Observe all safety precautions when using soldering gun. If injury occurs, seek medical aid.

CAUTION

- To prevent damage to de-ice system components, ensure that shunts are connected to proper terminal.
- To prevent damage to brush block, ensure terminal does not turn while installing nut.

- d. **Install stack-up (1) on terminal (2).**

- (1) Install new washer (6).
- (2) Install bottom lug (5).
- (3) Install new bottom spacer (4).
- (4) Install top lug (5).
- (5) Install new top spacer (4).
- (6) Hold stack-up (1) and install new nut (3).
- (7) Check for proper resistance (para 11.278).
- (8) Apply solder (item 189, App F) to stack-up (1). Use soldering iron and solder (item 189, App F) (TM 55-1500-323-24).



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11.279. TAIL ROTOR DE-ICE BRUSH AND SHUNT REPLACEMENT (AVIM) – continued

e. **Inspect (QA).**

f. **Protect brush block assembly from damage and contamination.**

- (1) Wrap brush block assembly with cushioning material and tape. Use cushioning material (item 68, App F) and tape (item 207, App F).

END OF TASK

SECTION V. FLIGHT CONTROLS RIGGING MAINTENANCE

11.280. RIGGING FLIGHT CONTROLS

11.280.1. Description

This task covers: Rigging.

11.280.2. Initial Setup

Personnel Required:

67R Attack Helicopter Repairer

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

11.280.3. Rigging

a. To rig collective flight control system, perform the following paragraphs in order:

- 11.281 Rigging collective flight controls between pilot and CPG collective sticks.
- 11.282 Rigging collective flight controls between pilot collective stick and collective servocylinder.
- 11.283 Rigging pilot and CPG collective stick stop bolts.
- 11.284 Rigging collective upper flight controls.

b. To rig longitudinal flight control system, perform the following paragraphs in order:

- 11.285 Rigging longitudinal flight controls between pilot and CPG cyclic sticks.
- 11.286 Rigging longitudinal flight controls between pilot cyclic stick and longitudinal servocylinder.
- 11.287 Rigging pilot and CPG longitudinal cyclic stick stop bolts.
- 11.288 Rigging upper longitudinal flight controls.

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11.280. RIGGING FLIGHT CONTROLS – continued

c. To rig lateral flight control system, perform the following paragraphs in order:

- 11.289 Rigging lateral flight controls between pilot and CPG cyclic sticks.
- 11.290 Rigging lateral flight controls between pilot cyclic stick and lateral servocylinder.
- 11.291 Rigging pilot and CPG lateral cyclic stick stop bolts.
- 11.292 Rigging upper lateral flight controls.

d. To rig directional flight control system, perform the following paragraphs in order:

- 11.293 Rigging directional flight controls between pilot and CPG pedals.
- 11.294 Rigging directional flight controls between pilot pedals and directional servocylinder.
- 11.295 Rigging pilot and CPG directional pedal stop bolts.
- 11.296 Rigging tail rotor directional flight controls.

END OF TASK

11.281. RIGGING COLLECTIVE FLIGHT CONTROLS BETWEEN PILOT AND CPG COLLECTIVE STICKS

11.281.1. Description

This task covers: Rigging.

11.281.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Flight control rigging kit (item 267, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin

Personnel Required:

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

References:

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

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access panel R200 removed
11.44	Pilot and CPG collective stick covers removed

CAUTION

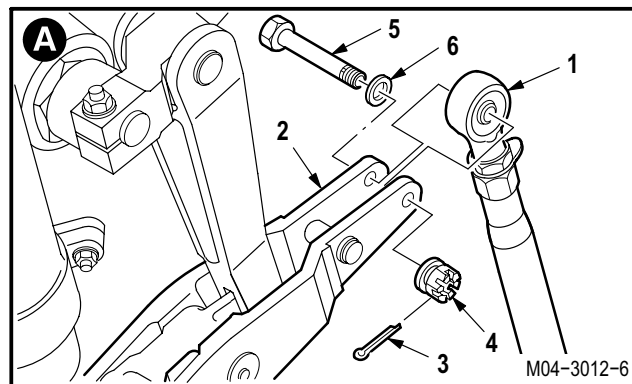
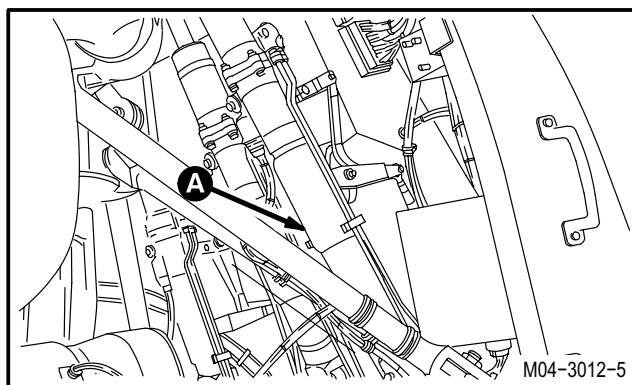
To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls.

11.281.3. Rigging

a. **Remove F.S. 165 rod end (1) from collective servocylinder input linkage (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4) from bolt (5).
- (3) Remove bolt (5) and washer (6).

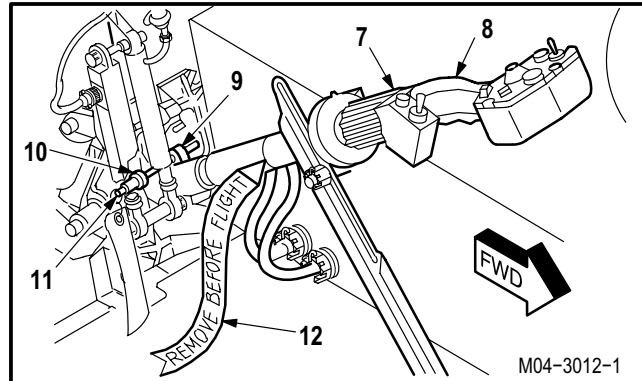
b. **Enter pilot station** (para 1.56). **Observe all safety precautions.**



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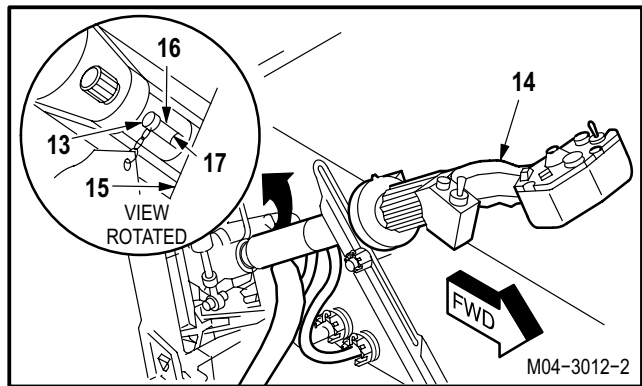
11.281. RIGGING COLLECTIVE FLIGHT CONTROLS BETWEEN PILOT AND CPG COLLECTIVE STICKS – continued

- c. Rotate friction lock (7) on pilot collective stick (8) to ZERO.
- d. Slowly move pilot collective stick (8) to align rig pin hole (9) with collective stick housing rig pin hole (10).
- e. Install -3 rig pin (11). Use flight control rigging kit.
- f. Install collective stick warning flag (12) on stick (8). Use flight control rigging kit.
- g. Enter CPG station (para 1.56). Observe all safety precautions.



- h. Install -3 rig pin (13) in CPG collective stick (14) and housing (15). Use flight control rigging kit.

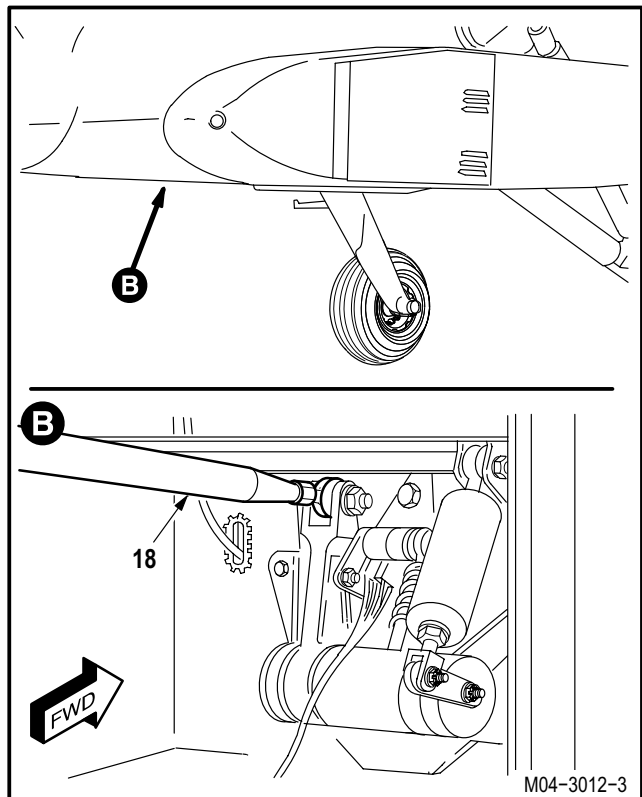
- (1) If CPG collective stick rig pin slot (16) and collective housing hole (17) are not aligned, remove gun turret assembly (TM 9-1090-208-23).
- (2) Adjust forward end of collective F.S. 96 push-pull rod (18) (para 11.2) to align rig pin slot (16) and hole (17).



NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable).

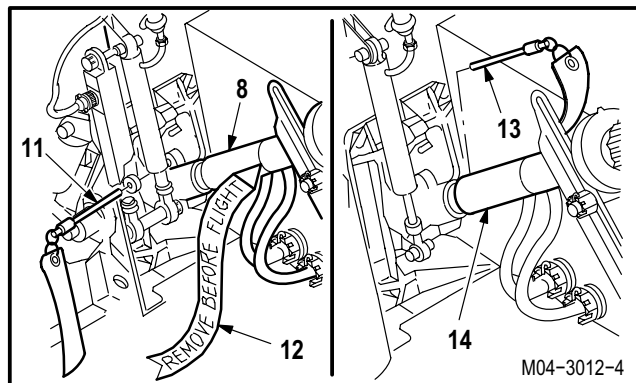
- i. Verify drop-fit of -3 rig pins (11) and (13).



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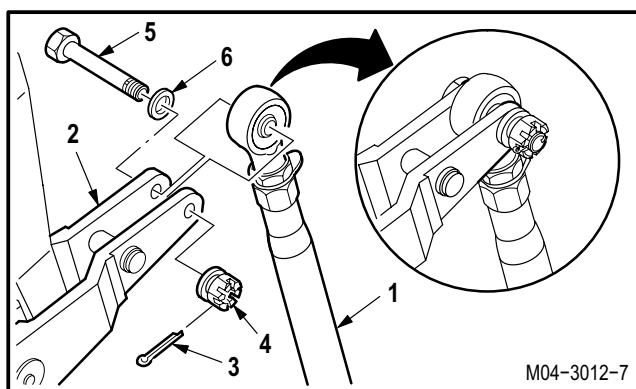
11.281. RIGGING COLLECTIVE FLIGHT CONTROLS BETWEEN PILOT AND CPG COLLECTIVE STICKS – continued

- j. Remove -3 rig pin (13) from CPG collective stick (14).
- k. Install CPG collective stick cover (para 11.44).
- l. Remove -3 rig pin (11) from pilot collective stick (8).
- m. Install pilot collective stick cover (para 11.44).



- n. Install F.S. 165 rod end (1) on input linkage (2). Torque nut (4) 30 to 40 INCH-POUNDS.

- (1) Install bolt (5) through washer (6), input linkage (2), and rod end (1).
- (2) Check fit of self-retaining bolt (5) (para 11.1).
- (3) Install nut (4) on bolt (5).
- (4) Hold bolt (5). Torque nut (4) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (3).



- o. Remove collective stick warning flag (12).
- p. Inspect (QA).
- q. Install gun turret assembly (TM 9-1090-208-23), if removed.
- r. Install access panel R200 (para 2.2).
- s. Perform collective flight control rigging maintenance operational check (TM 1-1520-238-T).

END OF TASK

11.282. RIGGING COLLECTIVE FLIGHT CONTROLS BETWEEN PILOT COLLECTIVE STICK AND COLLECTIVE SERVOCYLINDER

11.282.1. Description

This task covers: Rigging.

11.282.2. Initial setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

- Cotter pin

Personnel Required:

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

References:

- TM 1-1520-238-T

Equipment Conditions:

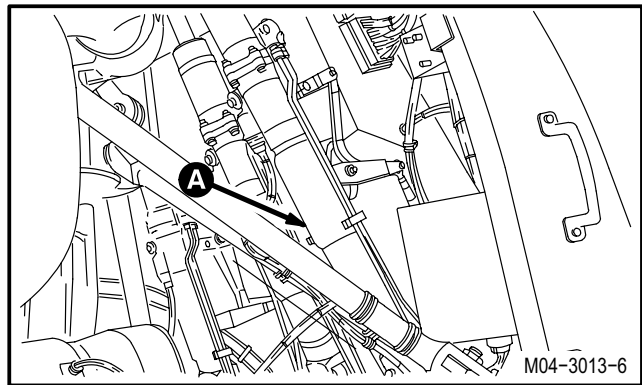
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
1.72	External primary hydraulic power connected
11.44	Pilot collective stick cover removed
11.281	Collective flight controls between pilot and CPG collective sticks rigged
1.134	Maintenance headset connected

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.



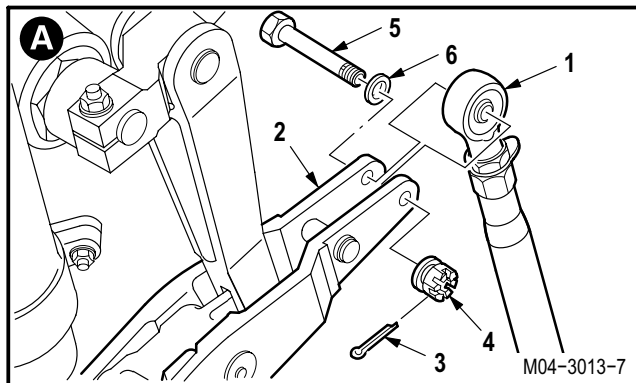
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11.282. RIGGING COLLECTIVE FLIGHT CONTROLS BETWEEN PILOT COLLECTIVE STICK AND COLLECTIVE SERVOCYLINDER – continued

11.282.3. Rigging

a. **Remove F.S. 165 rod end (1) from collective servocylinder input linkage (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4) from bolt (5).
- (3) Remove bolt (5) and washer (6).
- (4) Secure rod end (1) to prevent damage when controls are moved.

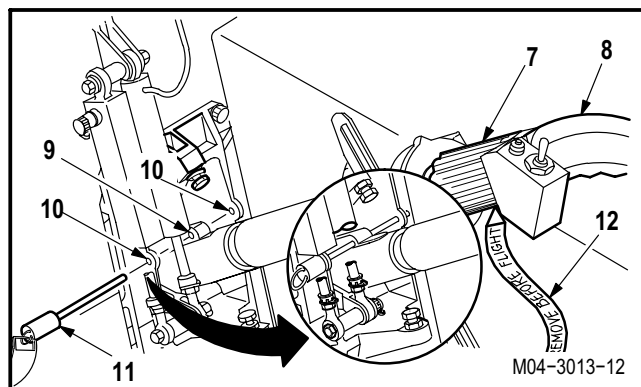


b. **Enter pilot station (para 1.56). Observe all safety precautions.**

c. **Rotate friction lock (7) counterclockwise on pilot collective stick (8) to ZERO.**

d. **Slowly move pilot collective stick (8) to align rig pin hole (9) with collective stick housing rig pin hole (10).**

e. **Install -3 rig pin (11).** Use flight control rigging kit.



f. **Install collective stick warning flag (12) on pilot collective stick (8).** Use flight control rigging kit.

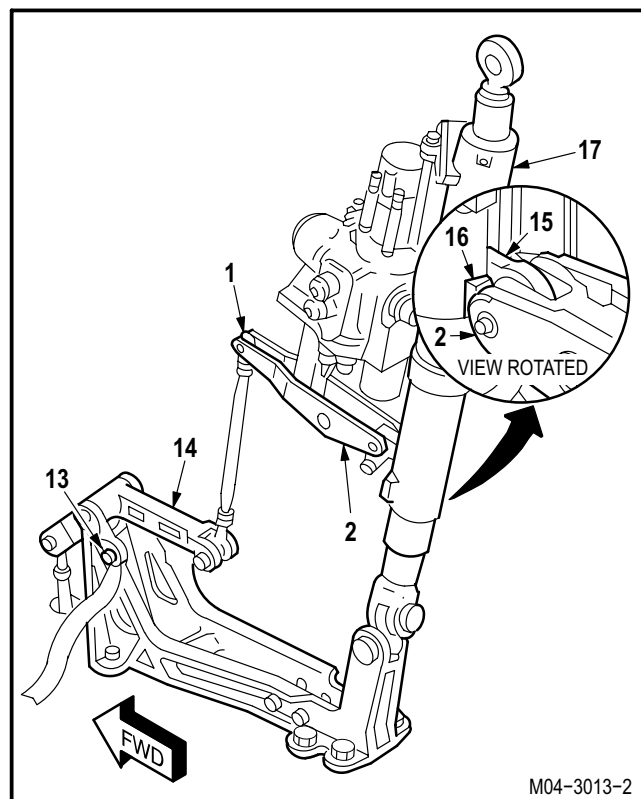
g. **Apply external hydraulic power to aircraft (para 1.72).**

h. **Install -9 rig pin (13) in F.S. 165 bellcrank (14).** Use flight control rigging kit.

i. **Slowly move collective servocylinder input linkage (2) to align lower lever (15) with upper edge of boss (16) on servocylinder body (17).**

j. **Check that holes in input linkage (2) align with F.S. 165 push-pull rod end (1).**

- (1) If holes in input linkage (2) do not align with rod end (1), adjust rod end (1) on upper end of F.S. 165 push-pull rod to align holes in input linkage (2) (para 11.2).
- (2) If holes in input linkage (2) align with rod end (1), go to next step.



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11.282. RIGGING COLLECTIVE FLIGHT CONTROLS BETWEEN PILOT COLLECTIVE STICK AND COLLECTIVE SERVOCYLINDER – continued

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

k. **Verify drop-fit of rig pins (11) and (13).**

l. **Install F.S. 165 rod end (1) on input linkage (2). Torque nut (4) 30 to 40 INCH-POUNDS.**

(1) Install bolt (5) through washer (6), input linkage (2) and rod end (1).

(2) Check fit of self-retaining bolt (5) (para 11.1).

(3) Install nut (4).

(4) Hold bolt (5). Torque nut (4) to **30 INCH-POUNDS**. Use torque wrench.

(5) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.

(6) Install new cotter pin (3).

m. **Remove -3 rig pin (11) from collective stick (8) and -9 rig pin (13) from F.S. 165 bellcrank (14).**

n. **Remove collective stick warning flag (12).**

o. **Inspect (QA).**

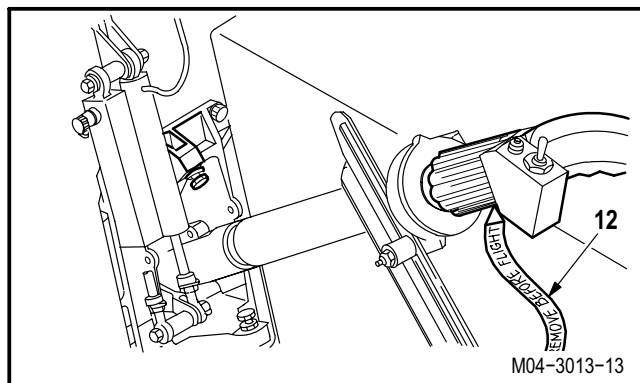
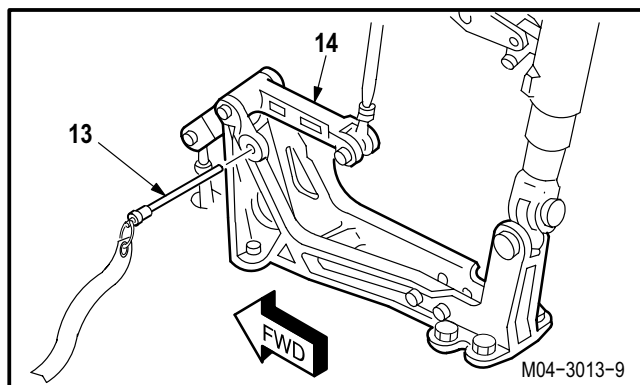
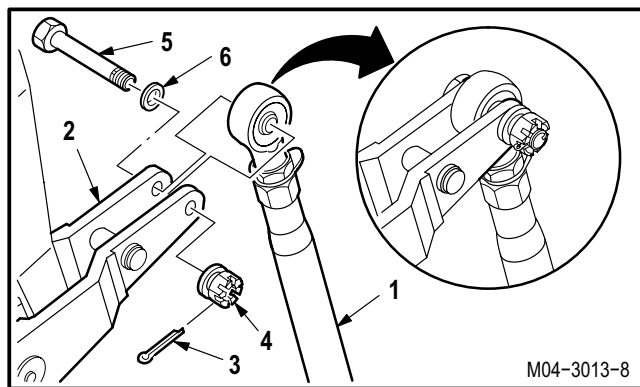
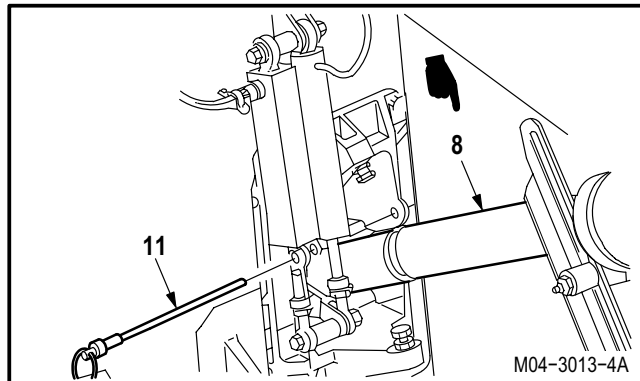
p. **Perform collective flight control rigging maintenance operational check (TM 1-1520-238-T).**

q. **Disconnect maintenance headset (para 1.134).**

r. **Install pilot collective cover (para 11.44).**

s. **Install access panels L200 and R200 (para 2.2).**

t. **Remove external hydraulic power from aircraft (para 1.72).**



END OF TASK

11.283. RIGGING PILOT AND CPG COLLECTIVE STICK STOP BOLTS

11.283.1. Description

This task covers: Rigging.

11.283.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- 0.300 - 24/0 - 24-inch inside/outside vernier caliper (item 54, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)

Materials/Parts:

- Wire (item 221, App F)
- Wire (item 224, 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:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
1.72	External primary hydraulic power applied
11.44	Pilot and CPG collective stick covers removed
11.281	Collective flight controls between pilot and CPG collective sticks rigged
11.282	Collective flight controls between pilot collective stick and collective servocylinder rigged
1.134	Maintenance headset connected

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

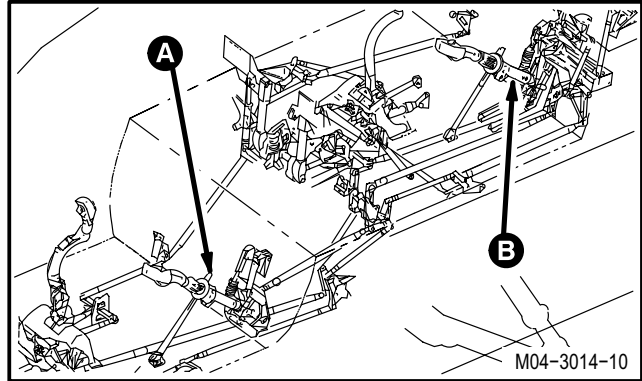
To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

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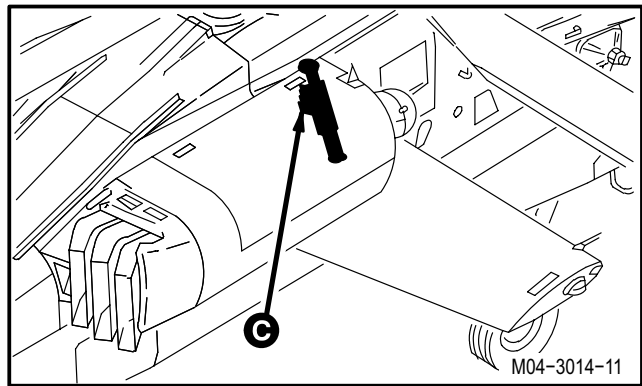
11.283. RIGGING PILOT AND CPG COLLECTIVE STICK STOP BOLTS – continued

11.283.3. Rigging

- a. Enter CPG and pilot stations (para 1.56). Observe all safety precautions.



- b. Rotate friction lock (1) counterclockwise on CPG collective stick (2) to ZERO.

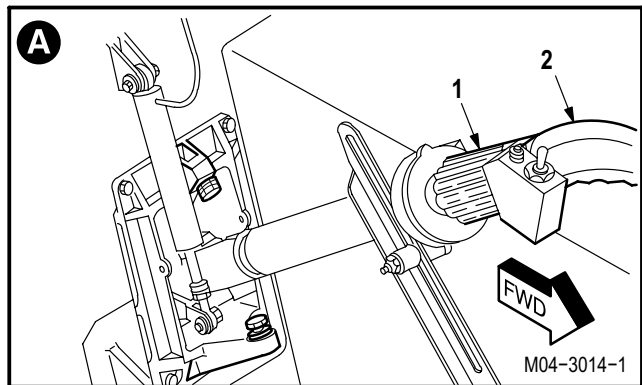


- c. Rotate friction lock (3) counterclockwise on pilot collective stick (4) to ZERO.

- d. Slowly move pilot collective stick (4) to align rig pin hole (5) in collective stick (4) with rig pin hole (6) in housing (7).

- e. Install -3 rig pin (8). Use flight control rigging kit.

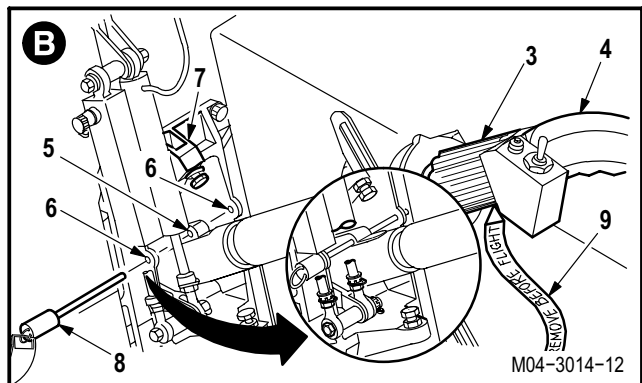
- f. Install pilot collective warning flag (9). Use flight control rigging kit.



NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

- g. Verify drop-fit of rig pin (8).



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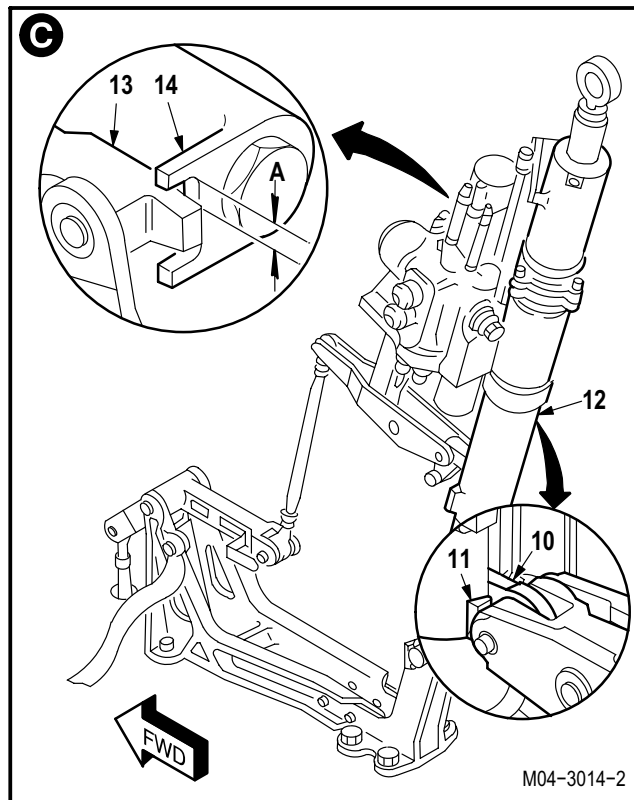
11.283. RIGGING PILOT AND CPG COLLECTIVE STICK STOP BOLTS – continued

h. Check that collective servocylinder lower lever (10) is alined with upper edge of boss (11) on servocylinder (12).

- (1) If lower lever (10) is not alined with upper edge of boss (11) on servocylinder (12), rig controls between pilot collective stick and collective servocylinder (para 11.282).
- (2) If lower lever (10) is alined with upper edge of boss (11) on servocylinder (12), go to next step.

i. Measure and record distance between valve arm (13) and collective servocylinder stop bolt (14).

- (1) This is measurement A. Use caliper.

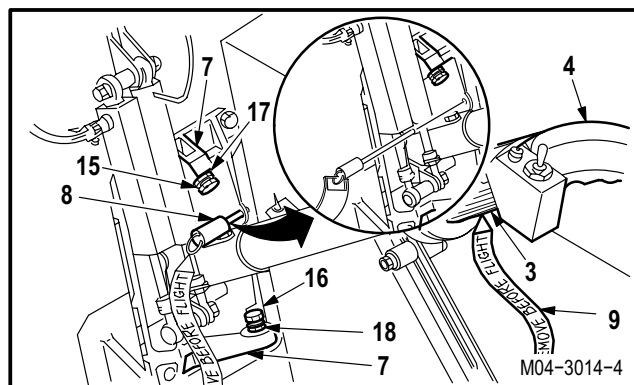


j. Remove -3 rig pin (8) from stick (4) and housing (7).

k. Remove pilot collective warning flag (9).

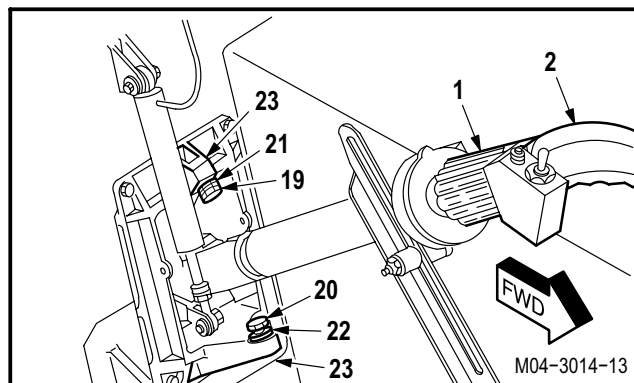
l. Back off pilot collective stick up limit stop bolt (15) and down limit stop bolt (16).

- (1) Remove lockwire.
- (2) Loosen jam nuts (17) and (18).
- (3) Turn bolts (15) and (16) into housing (7).



m. Back off CPG collective stick up-limit stop bolt (19) and down limit stop bolt (20).

- (1) Remove lockwire.
- (2) Loosen jam nuts (21) and (22).
- (3) Turn stop bolts (19) and (20) into housing (23).



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11.283. RIGGING PILOT AND CPG COLLECTIVE STICK STOP BOLTS – continued

n. **Observe collective servocylinder piston (24) travel.**

o. **Fully retract piston (24) by slowly pulling up on pilot collective stick (4).**

(1) Slowly pull up on stick (4) until piston (24) is fully retracted.

(2) Stop moving stick (4). Rotate friction lock (3) clockwise to hold stick in position.

p. **Measure and record distance between valve arm (13) and collective servocylinder stop bolt (14).**

(1) This is measurement B. Use caliper.

(2) If difference between measurements A and B is more than **0.030 INCH**, slowly lower stick (4) until difference between measurement A and measurement B is less than **0.030 INCH**.

(3) If the difference between measurements A and B is less than **0.030 INCH** go to step q.

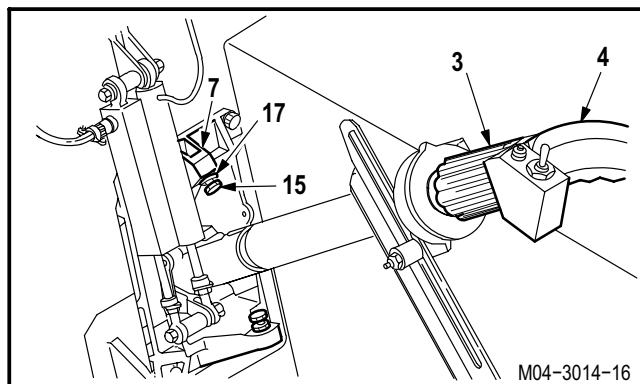
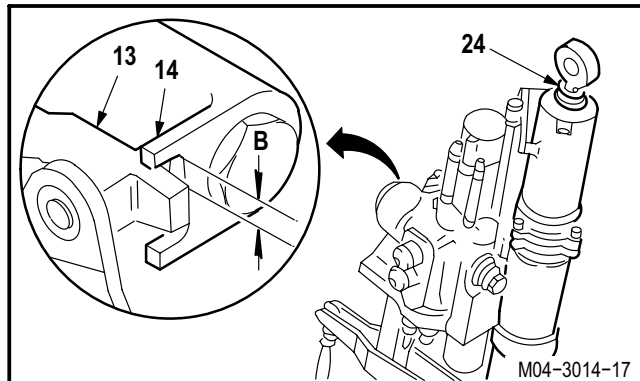
(4) Use friction lock (3) on pilot collective stick (4) to hold stick in position.

q. **Adjust pilot collective stick up limit stop bolt (15) to contact stick (4).**

(1) Rotate stop bolt (15) counterclockwise until it contacts stick (4).

(2) Hold stop bolt (15). Tighten jam nut (17).

(3) Lockwire stop bolt (15) to jam nut (17) and housing (7). Use wire (item 224, App F).

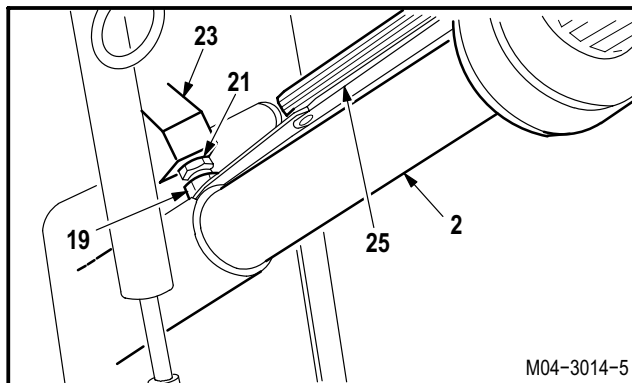


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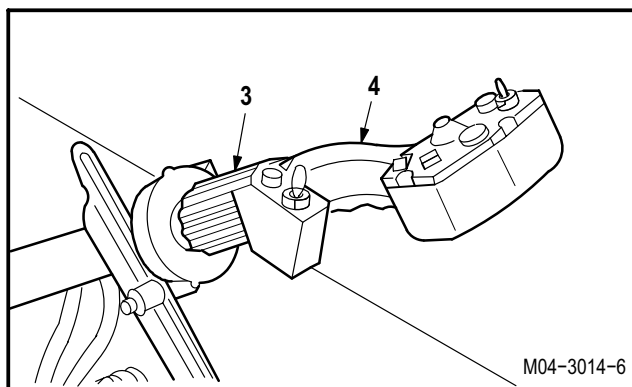
11.283. RIGGING PILOT AND CPG COLLECTIVE STICK STOP BOLTS – continued

r. **Adjust CPG collective stick up limit stop bolt (19) for a 0.020 INCH gap between head of bolt (19) and stick (2).**

- (1) With pilot stick (4) held in the full up position, place **0.020 INCH** thickness gage (25) against CPG stick (2).
- (2) Rotate up limit stop bolt (19) counterclockwise, until it contacts thickness gage (25).
- (3) Hold stop bolt (19). Tighten jam nut (21).
- (4) Lockwire stop bolt (19) to jam nut (21) and housing (23). Use wire (item 221, App F).



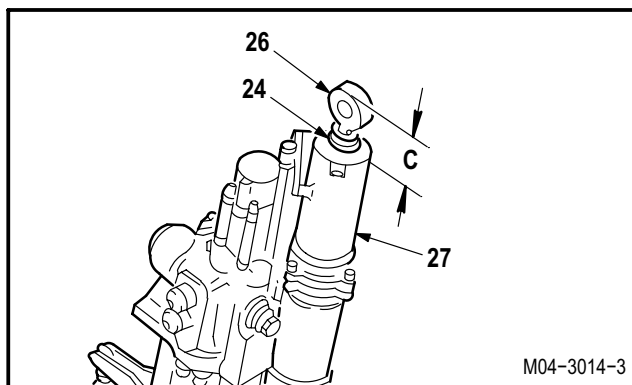
s. **Rotate friction lock (3) on pilot collective stick (4) to ZERO.**



t. **Measure and record distance between actuator rod end (26) and end of actuator piston housing (27).**

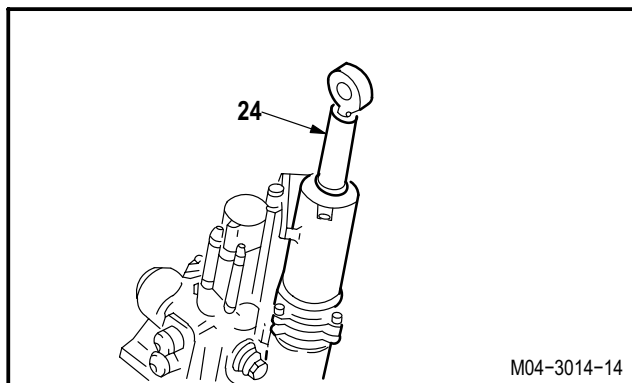
- (1) This is measurement C. Use caliper.

u. **Observe collective servocylinder piston (24) travel.**



v. **Fully extend piston (24) by slowly lowering pilot collective stick (4).**

- (1) Slowly lower pilot collective stick (4) until piston (24) is fully extended.
- (2) Stop moving stick (4). Rotate friction lock (3) counterclockwise to hold stick (4) in position.

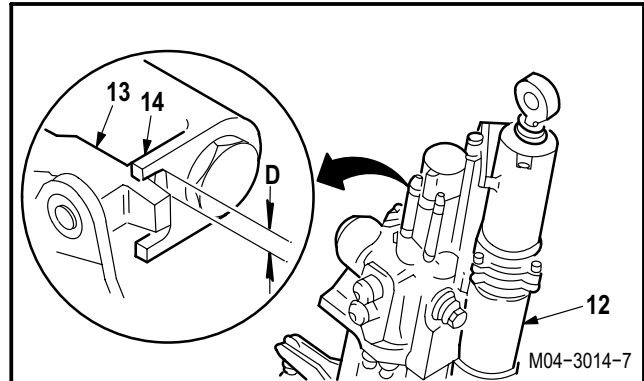


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11.283. RIGGING PILOT AND CPG COLLECTIVE STICK STOP BOLTS – continued

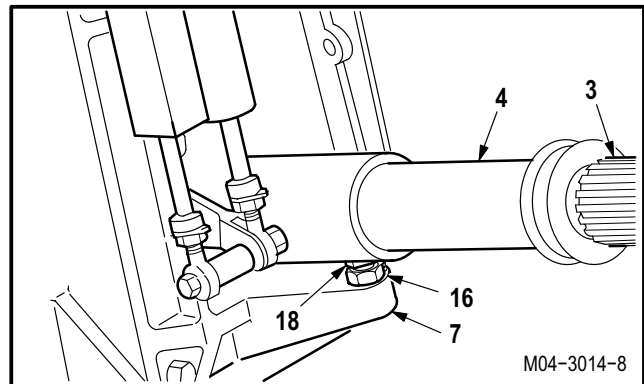
w. **Measure and record distance between valve arm (13) and stop bolt (14) on collective servo-cylinder (12).**

- (1) This is measurement D. Use caliper.
- (2) If the difference between measurements A and D is more than **0.030 INCH**, slowly raise stick (4) until difference between measurement A and measurement D is less than **0.030 INCH**.
- (3) If the difference between measurements A and D is less than **0.030 INCH** go to step x.
- (4) Use friction lock (3) on pilot collective stick (4) to hold stick in position.



x. **Adjust pilot collective stick down limit stop bolt (16) to contact stick (4).**

- (1) Rotate stop bolt (16) counterclockwise, until it contacts stick (4).
- (2) Hold stop bolt (16). Tighten jam nut (18).
- (3) Lockwire stop bolt (16) to jam nut (18) and housing (7). Use wire (item 224, App F).

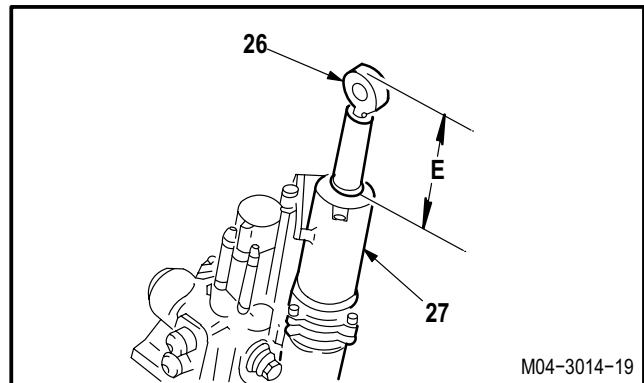


y. **Measure distance between actuator rod end (26) and end of actuator piston housing (27).**

- (1) This is measurement E. Use caliper.
- (2) Difference between measurements C and E is piston travel, difference between measurements C and E shall be **3.50 to 3.56 INCHES**.

NOTE

If difference between measurements C and E is **3.50 to 3.56 INCHES**, proceed to step z. If difference between measurements C and E is not **3.50 to 3.56 INCHES**, proceed to step y.(3).



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11.283. RIGGING PILOT AND CPG COLLECTIVE STICK STOP BOLTS – continued

(3) If difference between measurements C and E is not **3.50 to 3.56 INCHES**, rig controls between pilot collective stick and collective servocylinder (para 11.282).

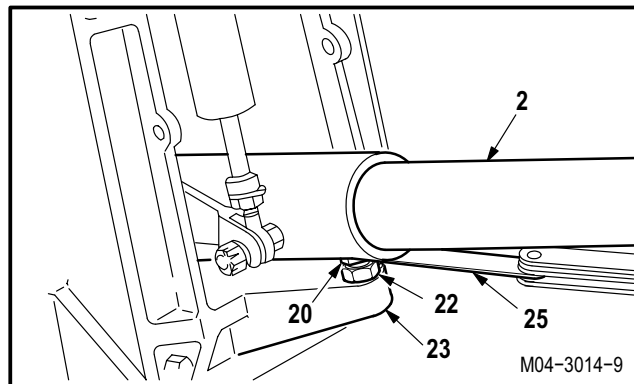
z. Adjust CPG collective stick down limit stop bolt (20) for a 0.020 INCH gap between head of bolt (20) and stick (2).

(1) With pilot stick held in the full down position, place **0.020 INCH** thickness gage (25) against CPG stick (2).

(2) Rotate down limit stop bolt (20) counterclockwise until it contacts thickness gage (25).

(3) Hold bolt (20). Tighten nut (22).

(4) Lockwire bolt (20) to nut (22) and housing (23). Use wire (item 224, App F).



aa. Inspect (QA).

ab. Perform collective flight control rigging maintenance operational check (TM 1-1520-238-T).

ac. Disconnect maintenance headset (para 1.134).

ad. Remove pilot collective warning flag (9).

ae. Remove external hydraulic power from aircraft (para 1.72).

af. Install pilot and CPG collective stick covers (para 11.44).

ag. Install access panels L200 and R200 (para 2.2).

END OF TASK

11.284. RIGGING COLLECTIVE UPPER FLIGHT CONTROLS

11.284.1. Description

This task covers: Rigging.

11.284.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
11.44	Pilot collective stick cover removed
1.72	External primary hydraulic power applied
11.281	Collective flight controls between pilot and CPG collective sticks rigged
11.282	Collective flight controls between pilot collective stick and collective servocylinder rigged
11.283	Pilot and CPG collective stick stop bolts rigged
1.134	Maintenance headset connected

Personnel Required:

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



Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.



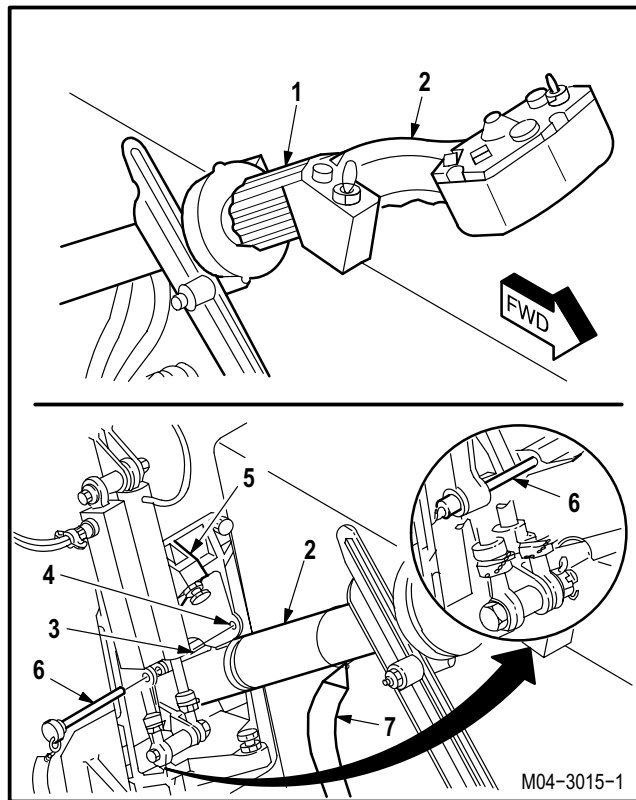
To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

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11.284. RIGGING COLLECTIVE UPPER FLIGHT CONTROLS – continued

11.284.3. Rigging

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **Rotate friction lock (1) counterclockwise on pilot collective stick (2) to ZERO.**
- c. **Slowly move pilot collective stick (2) to align rig pin hole (3) in collective stick (2) with rig pin hole (4) in housing (5).**
- d. **Install -3 rig pin (6).** Use flight control rigging kit.
- e. **Install pilot collective warning flag (7).** Use flight control rigging kit.

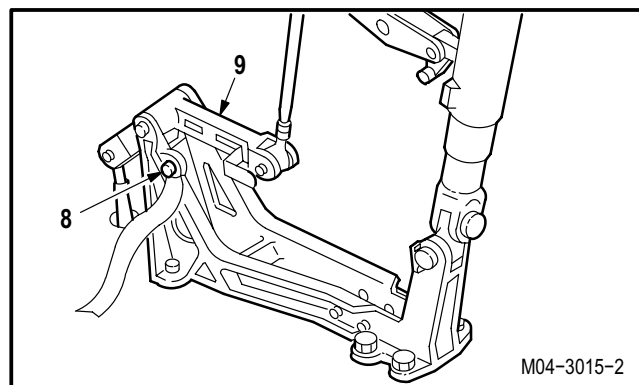


- f. **Install -9 rig pin (8) in collective F.S. 165 bell-crank (9).** Use flight control rigging kit.
 - (1) If -9 rig pin (8) cannot be installed, rig collective flight controls between pilot collective stick and collective servocylinder (para 11.282).
 - (2) If -9 rig pin (8) can be installed, go to next step.

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

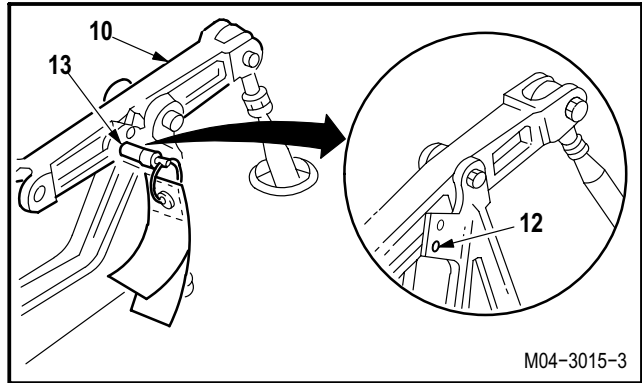
- g. **Verify drop-fit of -3 rig pin (6) and -9 rig pin (8).**



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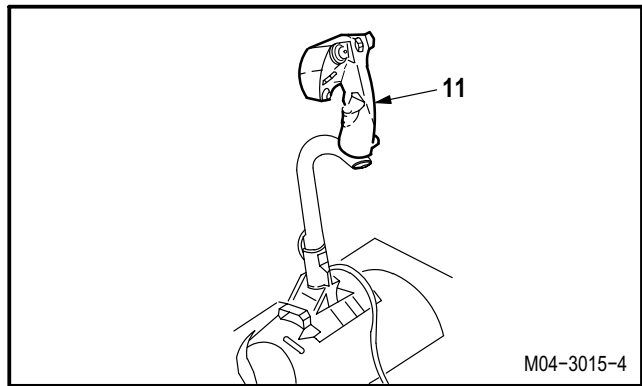
11.284. RIGGING COLLECTIVE UPPER FLIGHT CONTROLS – continued

h. Observe longitudinal cyclic F.S. 165 bellcrank (10).



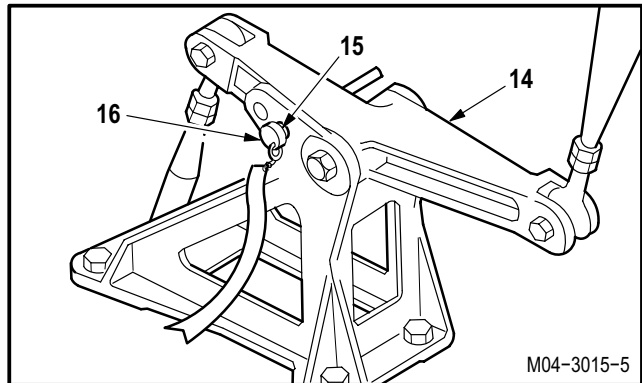
i. Slowly move pilot cyclic stick (11) to align level swashplate rig pin holes (12) in F.S. 165 bellcrank (10).

j. Install -5 rig pin (13) in longitudinal F.S. 165 bellcrank (10) at level swashplate position (11).



k. Observe lateral cyclic F.S. 165 bellcrank (14).

l. Slowly move pilot cyclic stick (11) to align level swashplate rig pin holes (15) in lateral F.S. 165 bellcrank (14).



m. Install -5 rig pin (16) in lateral F.S. 165 bellcrank (14) at level swashplate position (15).

NOTE

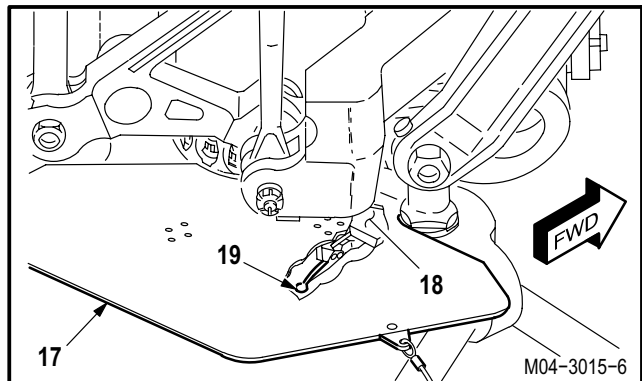
Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

n. Verify drop-fit of -5 rig pins (13) and (16).

o. Install main rotor rigging plate (17) on right side of mast base (18).

(1) Install rigging plate (17) on top of right side of mast base (18). Use flight control rigging kit.

(2) Fasten clamps (19) under plate (17).

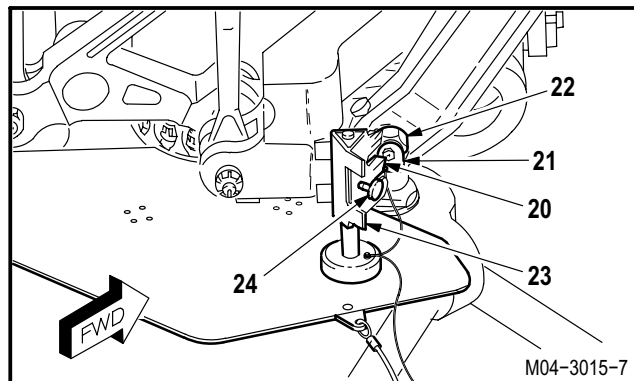


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11.284. RIGGING COLLECTIVE UPPER FLIGHT CONTROLS – continued

p. Adjust BASIC DIM pointer (20) to align with center point of alinement tool (21).

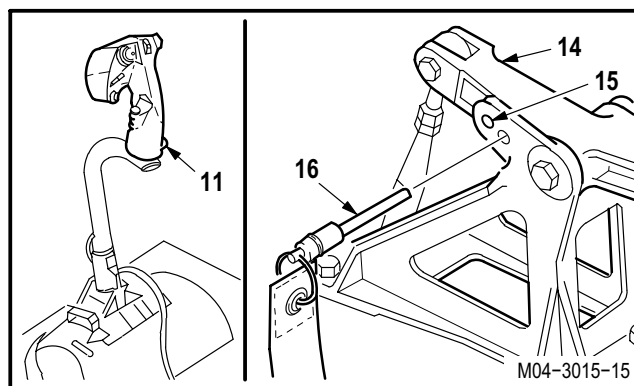
- (1) Install large end of alinement tool (21) in head of mixer support bolt (22) and hold.
- (2) Install rigging fixture (23) next to alinement tool (21).
- (3) Loosen thumbscrew (24) and align BASIC DIM pointer (20) with center point of alinement tool (21).
- (4) Tighten thumbscrew (24).
- (5) Remove alinement tool (21) and rigging fixture (23).



q. Remove -5 rig pin (16) from lateral F.S. 165 bellcrank (14).

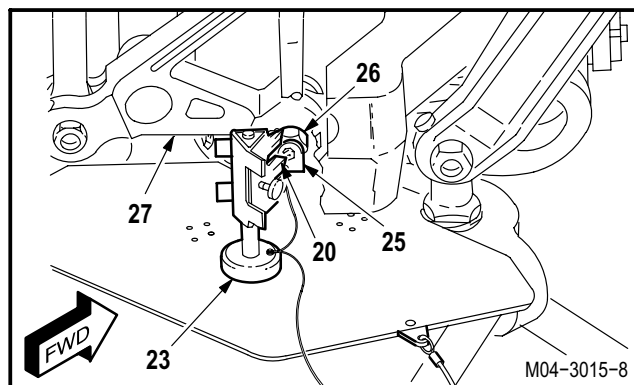
CAUTION

To prevent damage, be sure rigging fixture is clear of mixer assembly when moving flight controls.



r. Check that BASIC DIM pointer (20) aligns with center point on alinement tool (25).

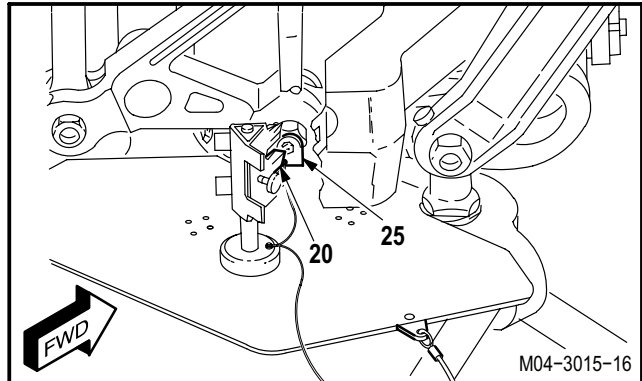
- (1) Slowly move pilot cyclic stick (11) full left until it contacts stops.
- (2) Install alinement tool (25) in forward bolt head (26) of aft longitudinal bellcrank (27).
- (3) Install rigging fixture (23) next to alinement tool (25).
- (4) Move pilot cyclic stick (11) to align level swashplate rig pin holes (15) in lateral F.S. 165 bellcrank (14).
- (5) Install -5 rig pin (16) in F.S. 165 bellcrank (14) at level swashplate position (15).



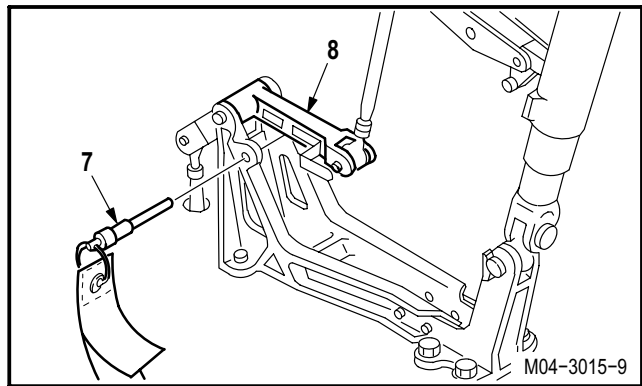
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11.284. RIGGING COLLECTIVE UPPER FLIGHT CONTROLS – continued

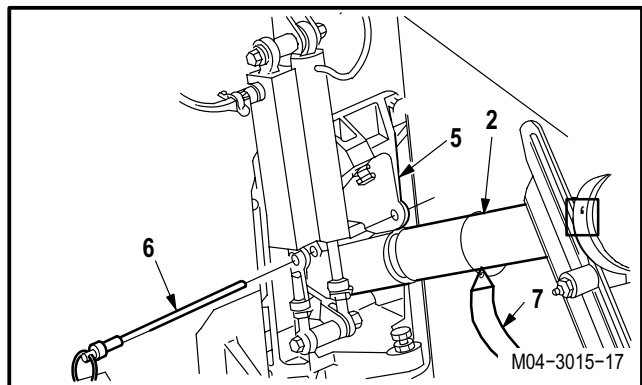
- (6) Check that BASIC DIM pointer (20) aligns with center point on alinement tool (25) ± 0.030 INCH.
- (7) If BASIC DIM pointer (20) does not align with center point on alinement tool (25) ± 0.030 INCH, adjust collective servocylinder rod end (para 11.297).
- (8) If BASIC DIM pointer (20) aligns with center point on tool (25), go to next step.



- s. Remove -9 rig pin (8) from collective F.S. 165 bellcrank (9).



- t. Remove -3 rig pin (6) from collective stick (2).
- u. Remove pilot collective warning flag (7).



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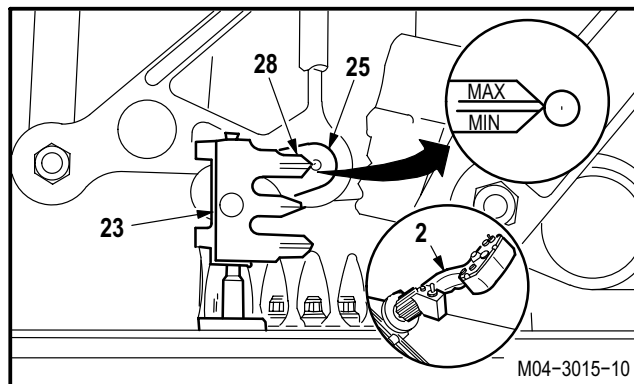
11.284. RIGGING COLLECTIVE UPPER FLIGHT CONTROLS – continued

CAUTION

To prevent damage, be sure rigging fixture is clear of mixer assembly when moving flight controls.

- v. **Slowly pull pilot collective stick (2) up until it stops.**
- w. **Check that center point of alinement tool (25) aligns with collective UP pointer (28) on rigging fixture (23).**

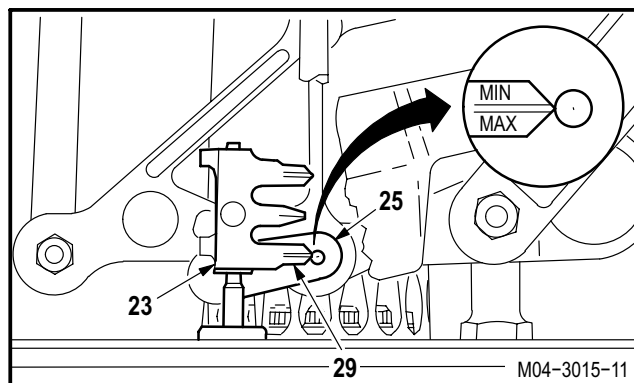
- (1) If center point of alinement tool (25) does not fall between **MIN** and **MAX** marks on collective UP pointer (28), check pilot and CPG collective stick stop bolts rigging (para 11.283).
- (2) If center point of alinement tool (25) falls between **MIN** and **MAX** marks on collective UP pointer (28), go to next step.

**CAUTION**

To prevent damage, be sure rigging fixture is clear of mixer assembly when moving flight controls.

- x. **Slowly push pilot collective stick (2) down until it stops.**
- y. **Check that center point of alinement tool (25) aligns with collective DOWN pointer (29) on rigging fixture (23).**

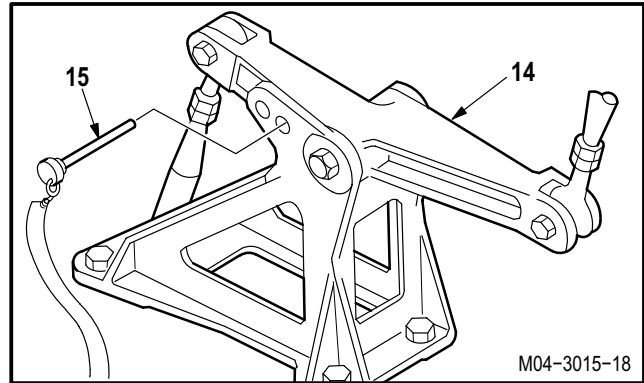
- (1) If center point of alinement tool (25) does not fall between **MIN** and **MAX** marks on collective DOWN pointer (29), check pilot and CPG collective stick stop bolts rigging (para 11.283).
- (2) If center point of alinement tool (25) falls between **MIN** and **MAX** marks on collective DOWN pointer (29), go to next step.



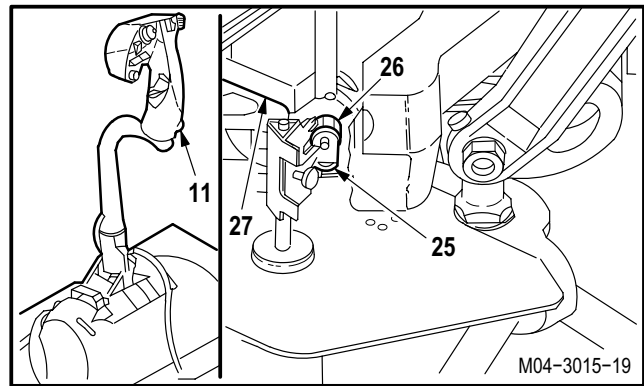
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11.284. RIGGING COLLECTIVE UPPER FLIGHT CONTROLS – continued

z. Remove -5 rig pin (16) from lateral F.S. 165 bellcrank (14).

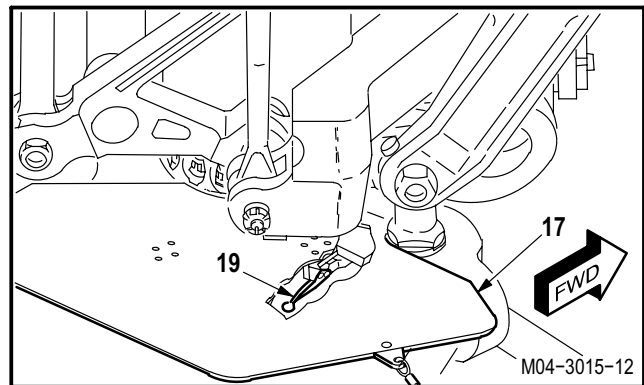


aa. Remove alignment tool (25) from forward bolt head (26) of aft longitudinal bellcrank (27) by deflecting pilot cyclic stick (11) full left.

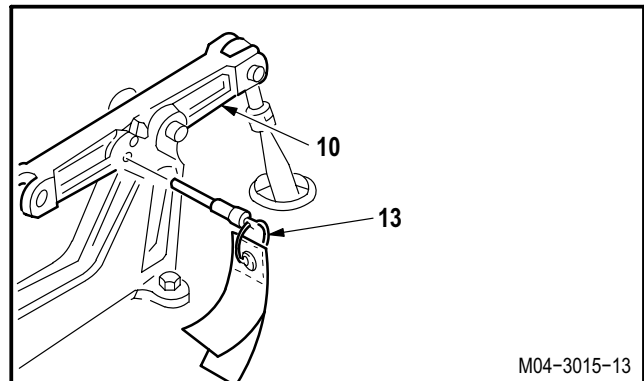


ab. Remove main rotor rigging plate (17).

- (1) Unfasten clamps (19).
- (2) Remove plate (17).



ac. Remove -5 rig pin (13) at longitudinal F.S. 165 bellcrank (10).



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11.284. RIGGING COLLECTIVE UPPER FLIGHT CONTROLS – continued

ad. **Inspect (QA).**

ae. **Check collective controls for freedom of movement and 0.0625 INCH clearance between control rod, bellcranks, and structure.**

(1) Slowly move collective stick (2) to full up; check for freedom of movement and clearance of **0.0625 INCH** between control rods and bellcranks and structure.

(2) If clearance is not **0.0625 INCH**, go to step w.(1).

(3) Slowly move collective stick (2) to full down; check for freedom of movement and clearance of **0.0625 INCH** between control rods, bellcranks, and structure.

(4) If clearance is not **0.0625 INCH** go to step y.(1).

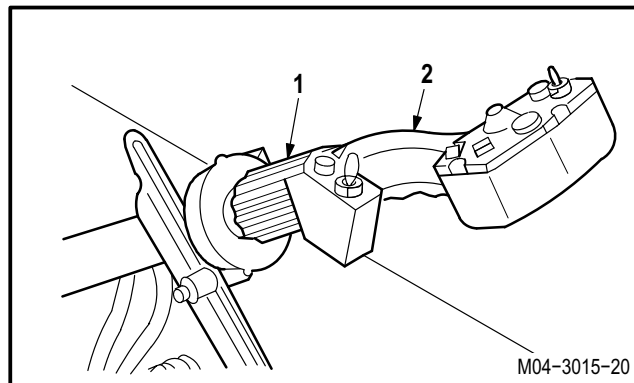
af. **Perform collective flight control rigging maintenance operational check (TM 1-1520-238-T).**

ag. **Disconnect maintenance headset (para 1.134).**

ah. **Install pilot collective stick cover (para 11.44).**

ai. **Remove external hydraulic power from aircraft (para 1.72).**

aj. **Install access panels R200 and L200 (para 2.2).**



END OF TASK

11.285. RIGGING LONGITUDINAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS

11.285.1. Description

This task covers: Rigging.

11.285.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Flight control rigging kit (item 267, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin

Personnel Required:

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

References:

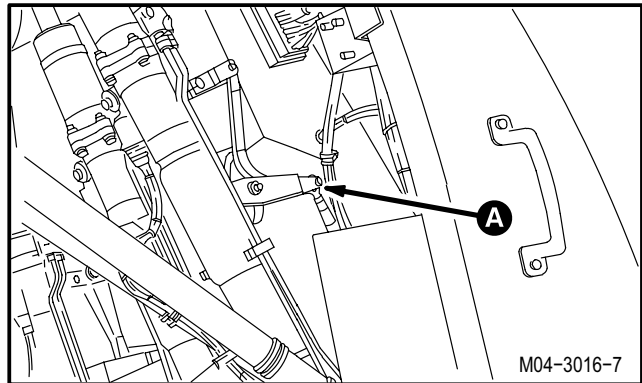
TM 1-1520-238-T
 TM 9-1090-208-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panel L200 and R200 removed
2.2	Access cover B85R removed (if required)
11.46	Pilot cyclic stick cover removed
11.65	CPG cyclic stick cover removed
TM 9-1090-208-23	Gun turret assembly removed

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls.



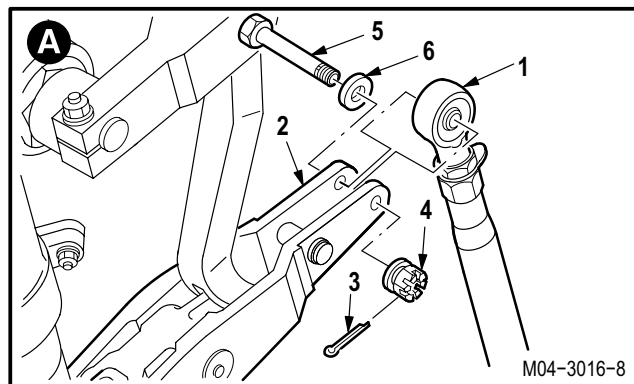
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11.285. RIGGING LONGITUDINAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS – continued

11.285.3. Rigging

- a. **Remove F.S. 165 rod end (1) from longitudinal servocylinder input lever (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4).
- (3) Remove bolt (5) and washer (6).

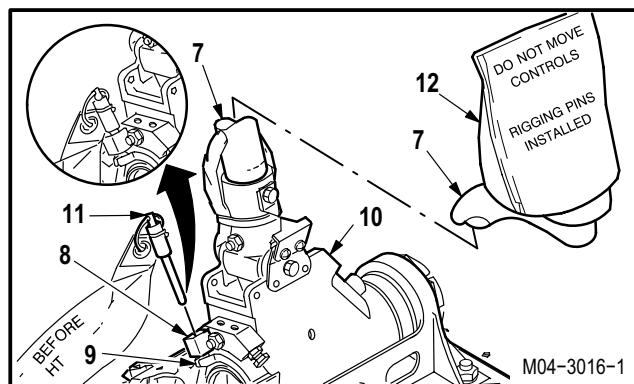


- b. **Enter pilot station (para 1.56). Observe all safety precautions.**

- c. **Slowly move pilot cyclic stick (7) to align longitudinal rig pin hole (8) with rig pin hole (9) in pilot cyclic stick base (10).**

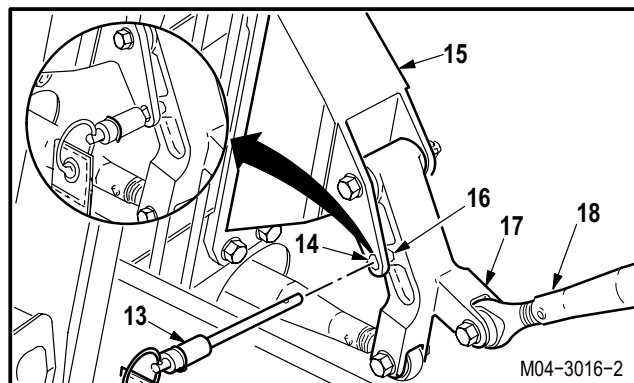
- d. **Install -9 rig pin (11) in rig pin hole (8) in cyclic stick base (10).** Use flight control rigging kit.

- e. **Install cyclic stick warning cover (12).** Use flight control rigging kit.



- f. **Install -9 rig pin (13) through rig pin holes (14) in bracket (15) and rig pin hole (16) in F.S. 97 bellcrank (17).** Use flight control rigging kit.

- (1) If -9 rig pin (13) cannot be installed, adjust aft end of F.S. 97 push-pull rod (18) to align rig pin holes (14) and (16) (para 11.2).
- (2) Install -9 rig pin (13).



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11.285. RIGGING LONGITUDINAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS – continued

g. Install -9 rig pin (19) through rig pin holes (20) and (21) in CPG cyclic stick base (22). Use flight control rigging kit.

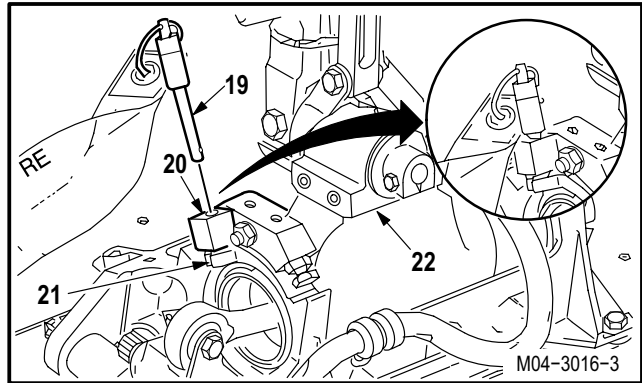
(1) If -9 rig pin (19) cannot be installed, adjust forward end of F.S. 83 push-pull rod (23) to align rig pin holes (20) and (21) (para 11.2).

NOTE

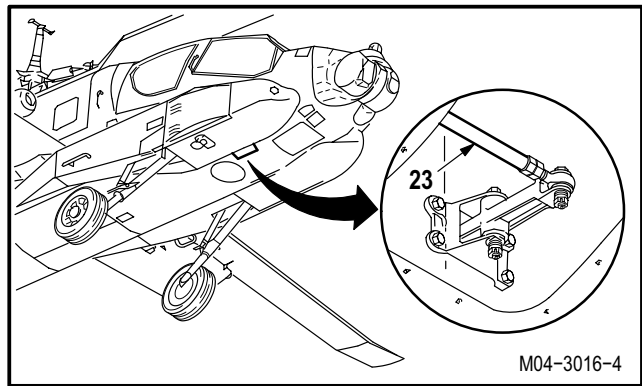
Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

h. Verify drop-fit of rig pins (11), (13), and (19).

i. Remove -9 rig pin (19) from CPG cyclic stick base (22).

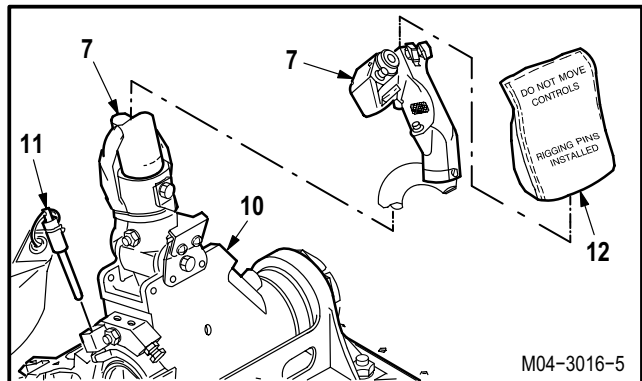
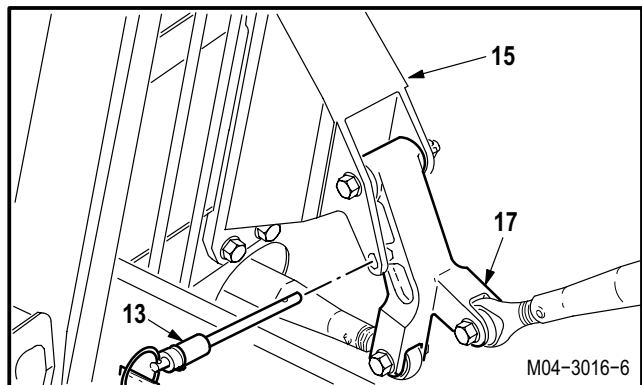


j. Remove -9 rig pin (13) from F.S. 97 bellcrank (17) and bracket (15).



k. Remove -9 rig pin (11) from pilot cyclic stick base (10) of stick (7).

l. Remove pilot cyclic stick warning cover (12).



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11.285. RIGGING LONGITUDINAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS – continued

m. **Install F.S. 165 rod end (1) on input lever (2).**
Torque nut (4) **30 to 40 INCH-POUNDS.**

(1) Install bolt (5) through washer (6), input lever (2), and rod end (1).

(2) Check fit of self-retaining bolt (5) (para 11.1).

(3) Install nut (4). Torque nut (4) to **30 INCH-POUNDS.** Use torque wrench.

(4) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS.**

(5) Install new cotter pin (3).

n. **Inspect (QA).**

o. **Secure access cover B85R** (para 2.2), **if removed.**

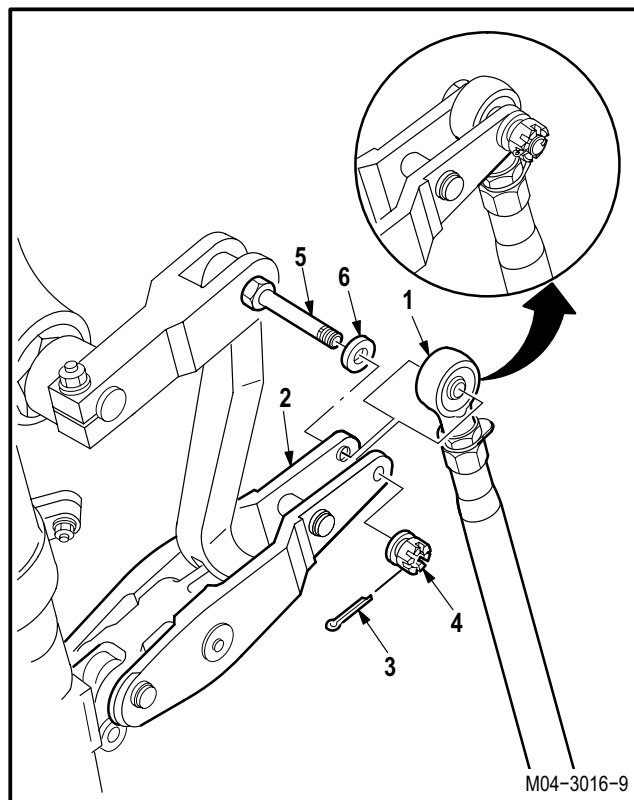
p. **Perform longitudinal (cyclic) flight control rigging maintenance operational check** (TM 1-1520-238-T).

q. **Install pilot cyclic stick cover** (para 11.46).

r. **Install CPG cyclic stick cover** (para 11.65).

s. **Install access panels L200 and R200** (para 2.2).

t. **Install gun turret assembly** (TM 9-1090-208-23).



END OF TASK

11.286. RIGGING LONGITUDINAL FLIGHT CONTROLS BETWEEN PILOT CYCLIC STICK AND LONGITUDINAL SERVOCYLINDER

11.286.1. Description

This task covers: Rigging.

11.286.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

- Cotter pin

Personnel Required:

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

References:

- TM 1-1520-238-T

Equipment Conditions:

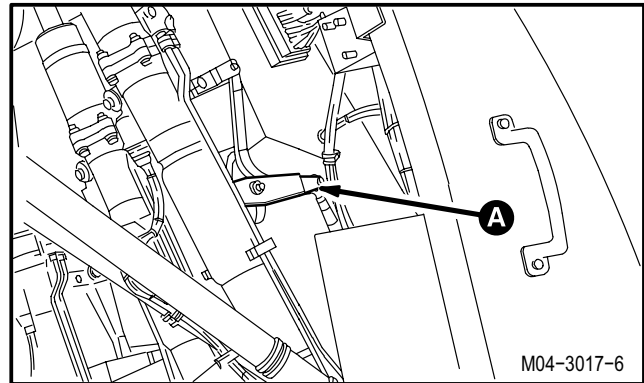
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
1.72	External primary hydraulic power connected
11.46	Pilot cyclic stick cover removed
11.285	Longitudinal flight controls between pilot and CPG cyclic sticks rigged
1.134	Maintenance headset connected

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.



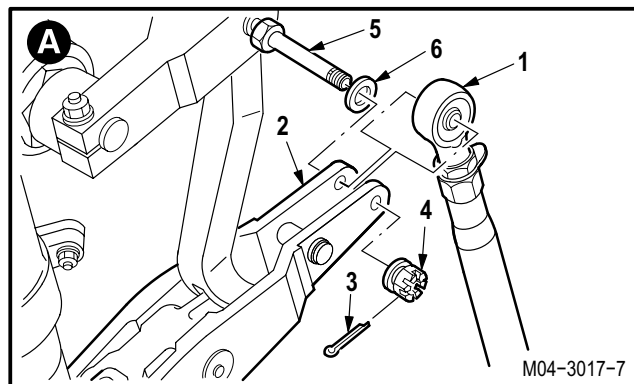
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11.286. RIGGING LONGITUDINAL FLIGHT CONTROLS BETWEEN PILOT CYCLIC STICK AND LONGITUDINAL SERVOCYLINDER – continued

11.286.3. Rigging

a. Remove F.S. 165 rod end (1) from longitudinal servocylinder input lever (2).

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4).
- (3) Remove bolt (5) and washer (6).

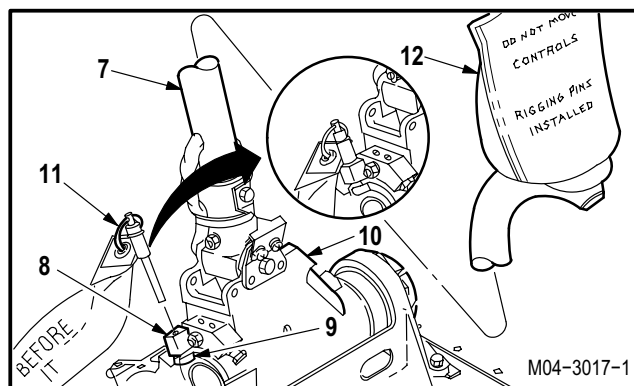


b. Enter pilot station (para 1.56). Observe all safety precautions.

c. Slowly move pilot cyclic stick (7) to align longitudinal rig pin hole (8) with rig pin hole (9) in pilot cyclic stick base (10).

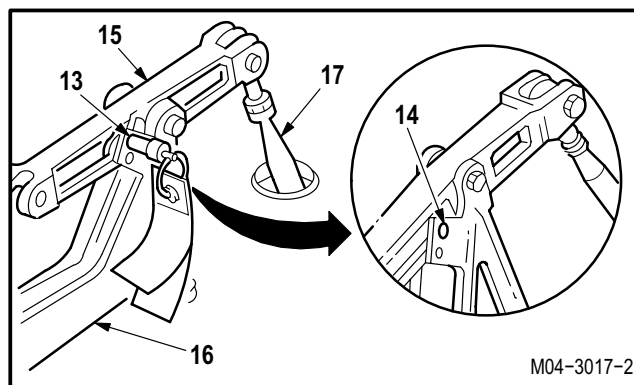
d. Install -9 rig pin (11) in rig pin holes (8) and (9) in cyclic stick base (10). Use flight control rigging kit.

e. Install cyclic stick warning cover (12). Use flight control rigging kit.



f. Install -9 rig pin (13) in midstroke rig pin hole (14) in longitudinal F.S. 165 bellcrank (15) and bracket (16). Use flight control rigging kit.

- (1) If -9 rig pin (13) cannot be installed, adjust top end of F.S. 160 push-pull rod (17) to align rig pin holes (14) (para 11.2).
- (2) Install -9 rig pin (13).



NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

g. Verify drop fit of rig pins (11) and (13).

h. Apply external hydraulic power to aircraft (para 1.72).

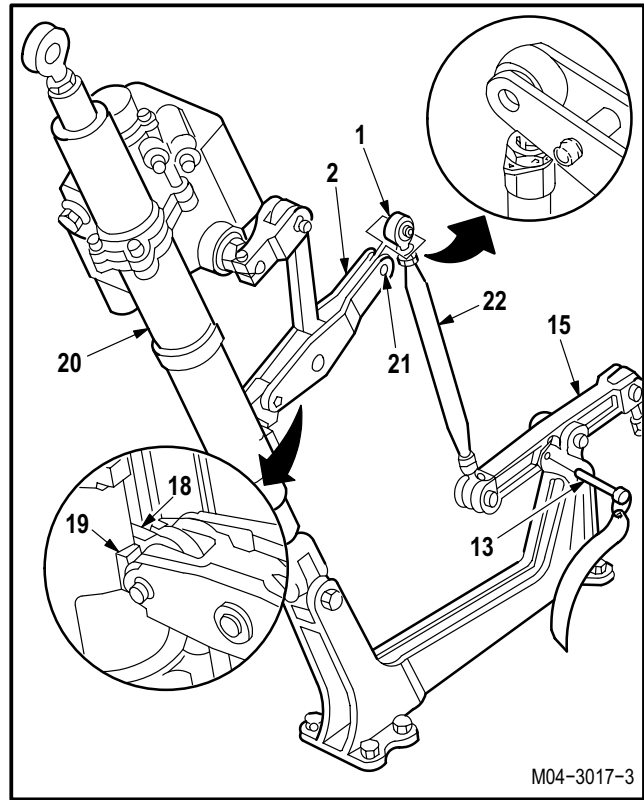
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11.286. RIGGING LONGITUDINAL FLIGHT CONTROLS BETWEEN PILOT CYCLIC STICK AND LONGITUDINAL SERVOCYLINDER – continued

i. Slowly move longitudinal servocylinder input lever (2) to align lower lever (18) with upper edge of boss (19) on servocylinder body (20).

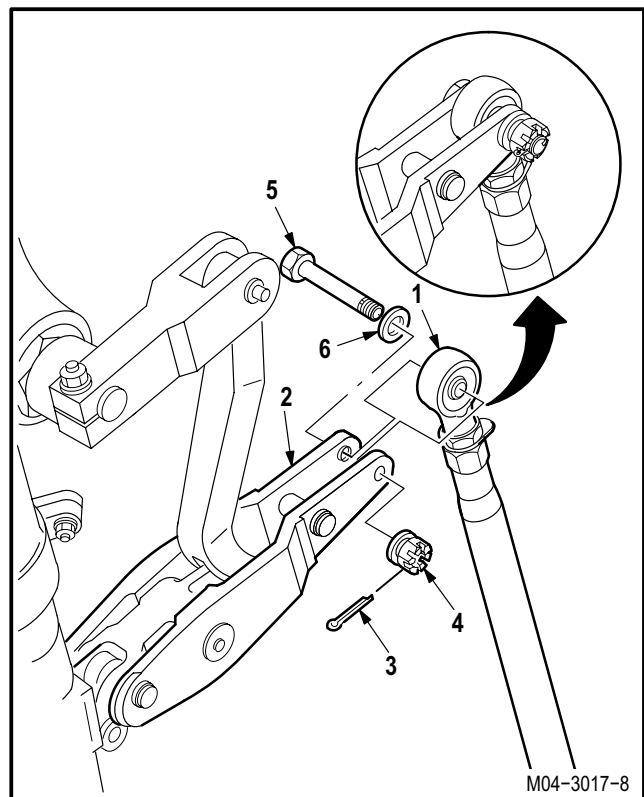
j. Check that holes (21) in input lever (2) align with F.S. 165 push-pull rod end (1).

- (1) If holes in input lever (2) do not align with rod end (1), adjust upper end of F.S. 165 push-pull rod (22) rod end (1) to align holes (para 11.2).
- (2) If holes in input lever (2) align with rod end (1) go to next step.



k. Install F.S. 165 rod end (1) on input lever (2). Torque nut (4) 30 to 40 INCH-POUNDS.

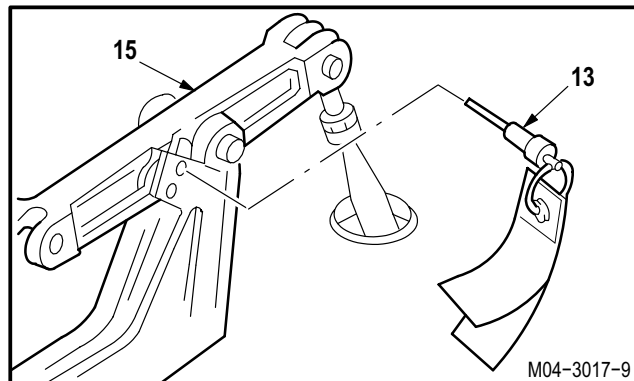
- (1) Install bolt (5) through washer (6), arm (2), and rod end (1).
- (2) Check fit of self-retaining bolt (5) (para 11.1).
- (3) Install nut (4). Torque nut (4) to **30 INCH-POUNDS**. Use torque wrench.
- (4) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (5) Install new cotter pin (3).



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11.286. RIGGING LONGITUDINAL FLIGHT CONTROLS BETWEEN PILOT CYCLIC STICK AND LONGITUDINAL SERVOCYLINDER – continued

- l. Remove -9 rig pin (13) from F.S. 165 longitudinal bellcrank (15).



- m. Remove -9 rig pin (11) from pilot cyclic stick base (10).

- n. Inspect (QA).

- o. Perform longitudinal flight control rigging maintenance operational check (TM 1-1520-238-T).

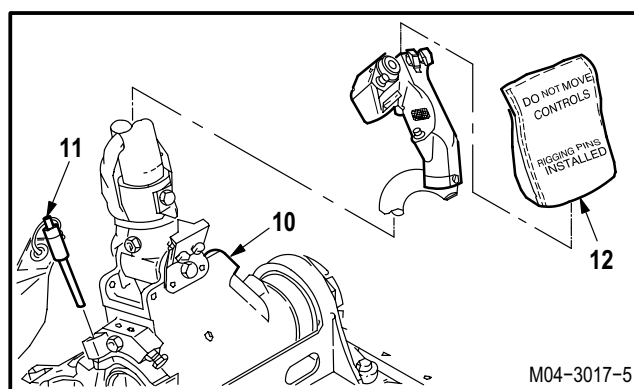
- p. Disconnect maintenance headset (para 1.134).

- q. Remove cyclic stick warning cover (12).

- r. Install pilot cyclic stick cover (para 11.46).

- s. Remove external hydraulic power from aircraft (para 1.72).

- t. Install access panels L200 and R200 (para 2.2).



END OF TASK

11.287. RIGGING PILOT AND CPG LONGITUDINAL CYCLIC STICK STOP BOLTS

11.287.1. Description

This task covers: Rigging.

11.287.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- 0.300 - 24/0 - 24-inch inside/outside vernier caliper (item 54, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)

Materials/Parts:

- Wire (item 224, 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:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
1.72	External primary hydraulic power applied
11.46	Pilot cyclic stick cover removed
11.65	CPG cyclic stick cover removed
11.285	Longitudinal flight controls between pilot and CPG cyclic stick rigged
11.286	Longitudinal flight controls between pilot cyclic stick and longitudinal servocylinder rigged
1.134	Maintenance headset connected



Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.



To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

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11.287. RIGGING PILOT AND CPG LONGITUDINAL CYCLIC STICK STOP BOLTS – continued

11.287.3. Rigging

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **Slowly move pilot cyclic stick (1) to align longitudinal rig pin holes (2) and (3) in cyclic stick base (4).**
- c. **Install -9 rig pin (5).** Use flight control rigging kit.

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

- d. **Verify drop fit of -9 rig pin (5).**
- e. **Check that lower lever (6) on longitudinal servocylinder (7) is aligned with upper edge of boss (8) on servocylinder (7).**

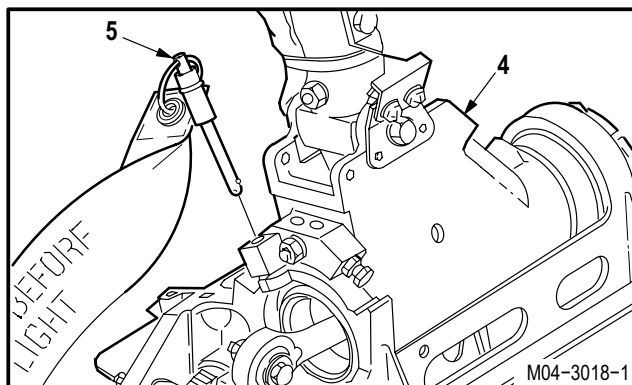
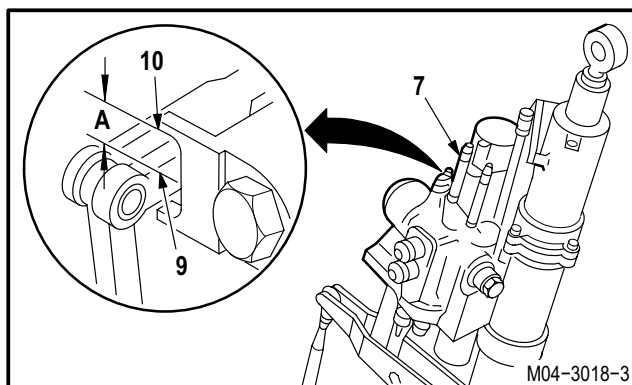
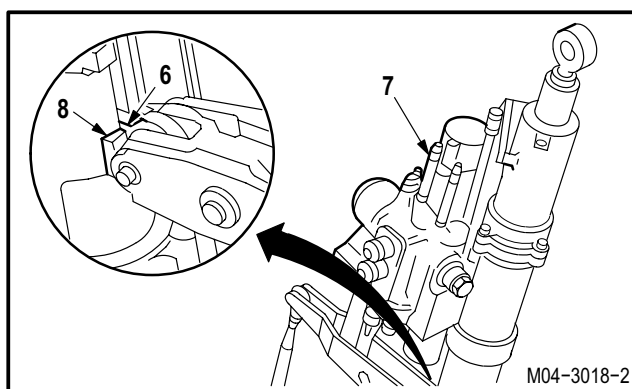
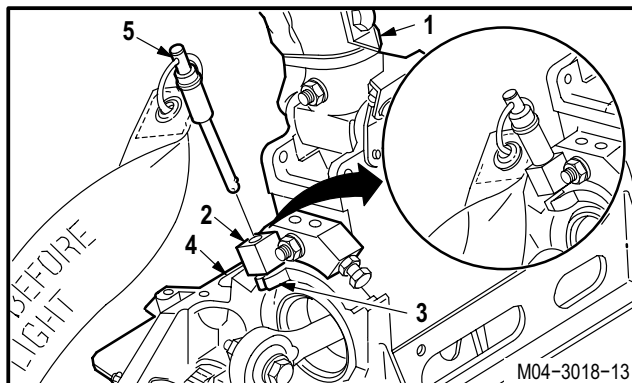
(1) If lower lever (6) does not align with upper edge of boss (8), rig longitudinal flight controls between pilot cyclic stick and longitudinal servocylinder (para 11.286).

(2) If lower lever (6) is aligned with upper edge of boss (8), go to next step.

- f. **Measure distance between valve arm (9) and stop bolt (10) on servocylinder (7).**

(1) This is measurement A. Use caliper.

- g. **Remove -9 rig pin (5) from base (4).**

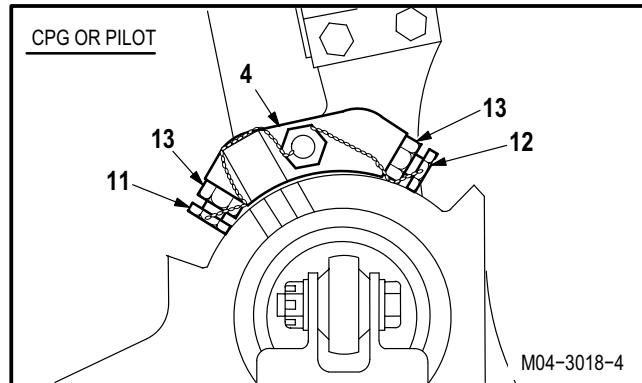


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11.287. RIGGING PILOT AND CPG LONGITUDINAL CYCLIC STICK STOP BOLTS – continued

h. Back off pilot forward cyclic limit stop bolt (11) and aft limit stop bolt (12).

- (1) Remove lockwire.
- (2) Loosen two jam nuts (13).
- (3) Turn stop bolts (11) and (12) into base (4).



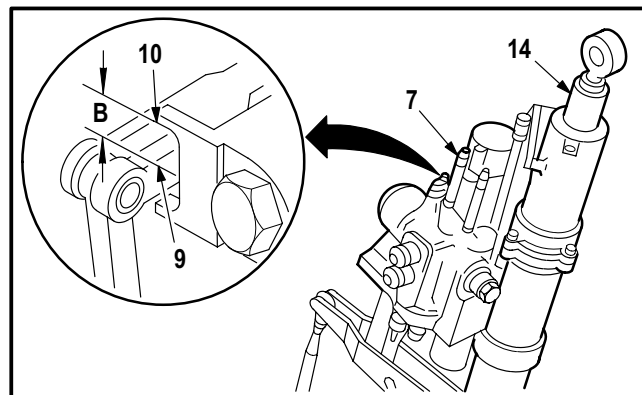
i. Back off CPG forward cyclic limit stop bolt (11) and aft limit stop bolt (12).

- (1) Remove lockwire.
- (2) Loosen two jam nuts (13).
- (3) Turn stop bolts (11) and (12) into base (4).

j. Observe longitudinal servocylinder piston (14) travel.

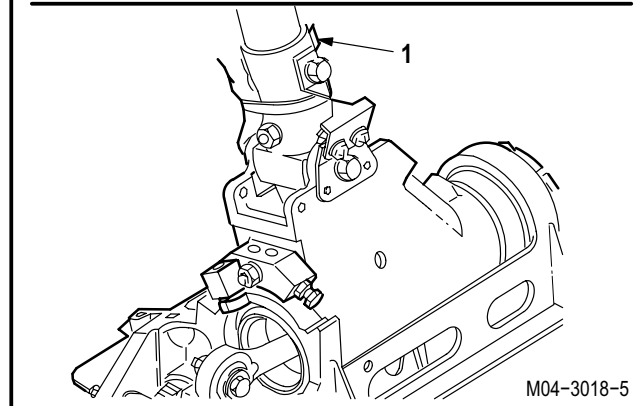
k. Fully retract piston (14) by slowly pushing forward on stick (1).

- (1) Slowly push forward on stick (1) until piston (14) is fully retracted.
- (2) Hold stick (1) in this position.



l. Measure and record distance between valve arm (9) and stop bolt (10) on servocylinder (7).

- (1) This is measurement B. Use caliper.
- (2) If difference between measurement A and measurement B is more than **0.030 INCH** pull cyclic stick (1) slowly aft until difference between measurement A and measurement B is less than **0.030 INCH**.
- (3) Hold stick (1) in this position.

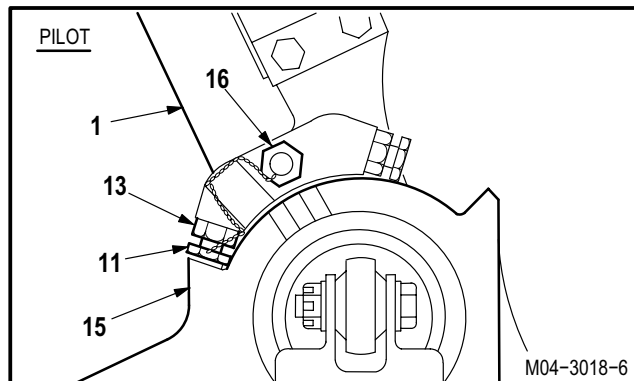


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11.287. RIGGING PILOT AND CPG LONGITUDINAL CYCLIC STICK STOP BOLTS – continued

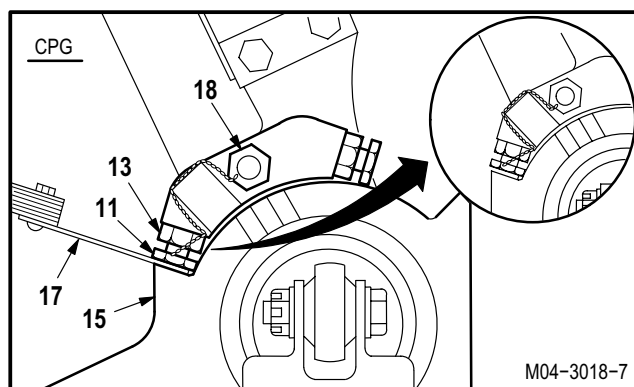
m. Adjust pilot cyclic stick (1) forward limit stop bolt (11) to contact housing (15).

- (1) Slowly adjust stop bolt (11) counterclockwise until it contacts housing (15).
- (2) Hold stop bolt (11). Tighten jam nut (13).
- (3) Lockwire stop bolt (11) to jam nut (13) and jam nut (16). Use wire (item 224, App F).



n. Adjust CPG cyclic stick forward stop bolt (11) to contact 0.020 INCH thickness gage (17) held between CPG cyclic housing (15) and forward stop bolt (11).

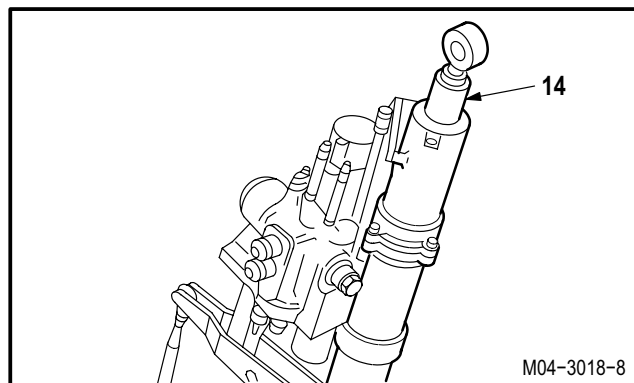
- (1) Hold pilot cyclic stick (1) against forward stop bolt (11).
- (2) Hold **0.020 INCH** thickness gage (17) against CPG cyclic housing (15).
- (3) Slowly adjust forward stop bolt (11) counterclockwise until it contacts gage (17) against housing (15).
- (4) Hold stop bolt (11). Tighten jam nut (13).
- (5) Lockwire stop bolt (11) to jam nut (13) and jam nut (18). Use wire (item 224, App F).



o. Observe longitudinal servocylinder piston (14) travel.

p. Fully extend piston (14) by slowly pulling aft on pilot cyclic stick (1).

- (1) Slowly pull aft on stick (1) until piston (14) is fully extended.
- (2) Hold stick (1) in this position.

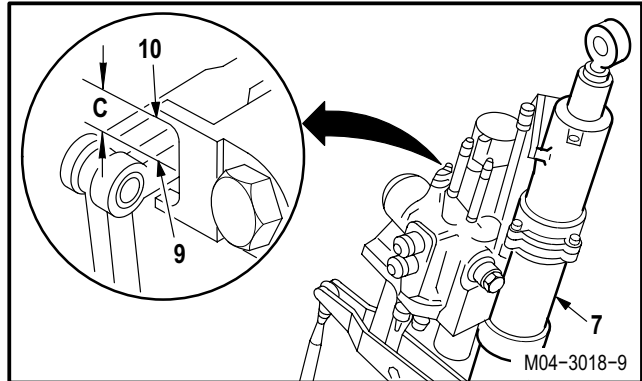


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11.287. RIGGING PILOT AND CPG LONGITUDINAL CYCLIC STICK STOP BOLTS – continued

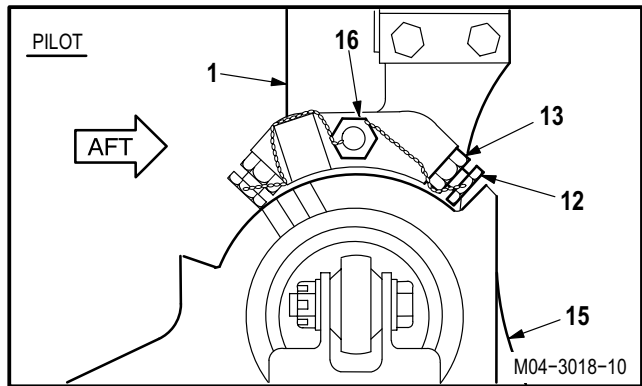
q. Measure and record distance between valve arm (9) and stop bolt (10) on servocylinder (7).

- (1) This is measurement C. Use caliper.
- (2) If difference between measurement A and measurement C is more than **0.030 INCH** slowly push cyclic stick (1) forward until difference between measurement A and measurement C is less than **0.030 INCH**.
- (3) Hold stick (1) in this position and go to next step.



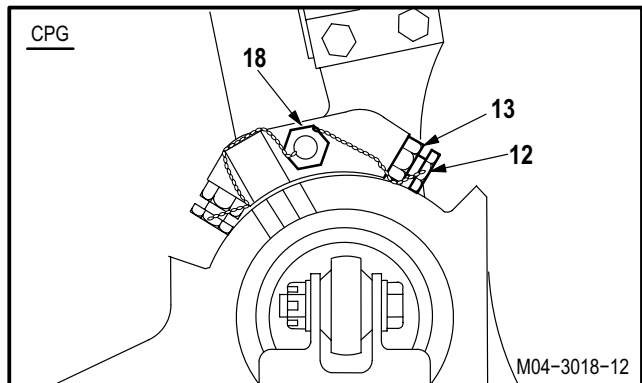
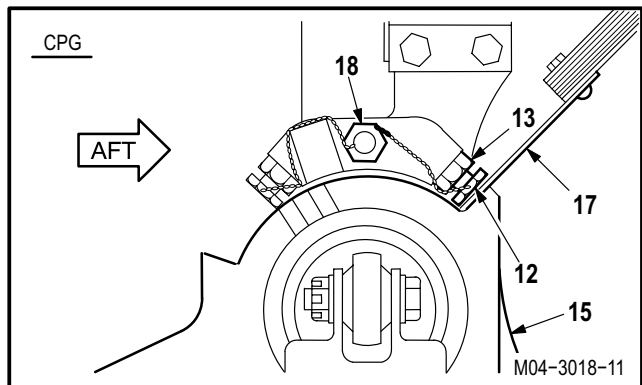
r. Adjust pilot cyclic stick aft limit stop bolt (12) to contact housing (15).

- (1) Slowly turn stop bolt (12) counterclockwise until it contacts housing (15).
- (2) Hold stop bolt (12). Tighten jam nut (13).
- (3) Lockwire stop bolt (12) to jam nut (13) and jam nut (16). Use wire (item 224, App F).



s. Adjust CPG cyclic aft limit stop bolt (12) to contact 0.020 INCH thickness gage (17) held between CPG cyclic housing (15) and aft stop bolt (12).

- (1) Hold pilot cyclic stick (1) against aft stop bolt (12).
- (2) Hold **0.020 INCH** thickness gage (17) against CPG cyclic housing (15).
- (3) Slowly adjust aft stop bolt (12) counterclockwise until it contacts gage (17) against housing (15).
- (4) Hold stop bolt (12). Tighten jam nut (13).
- (5) Lockwire stop bolt (12) to jam nut (13) and jam nut (18). Use wire (item 224, App F).



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11.287. RIGGING PILOT AND CPG LONGITUDINAL CYCLIC STICK STOP BOLTS – continued

- t. **Inspect (QA).**
- u. **Perform longitudinal (cyclic) flight control rigging maintenance operational check (TM 1-1520-238-T).**
- v. **Disconnect maintenance headset (para 1.134).**
- w. **Remove external hydraulic power from aircraft (para 1.72).**
- x. **Install pilot cyclic stick cover (para 11.46).**
- y. **Install CPG cyclic stick cover (para 11.65).**
- z. **Install access panels L200 and R200 (para 2.2).**

END OF TASK

11.288. RIGGING UPPER LONGITUDINAL FLIGHT CONTROLS

11.288.1. Description

This task covers: Rigging.

11.288.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Flight control rigging kit (item 267, App H)

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
1.72	External primary hydraulic power applied
11.285	Longitudinal flight controls between pilot and CPG cyclic stick rigged
11.286	Longitudinal flight controls between pilot cyclic stick and longitudinal servocylinder rigged
11.287	Pilot and CPG longitudinal cyclic stick stop bolts rigged
1.134	Maintenance headset connected

Personnel Required:

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

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

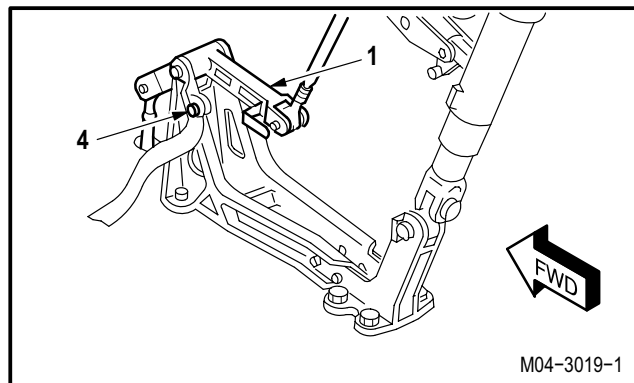
To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

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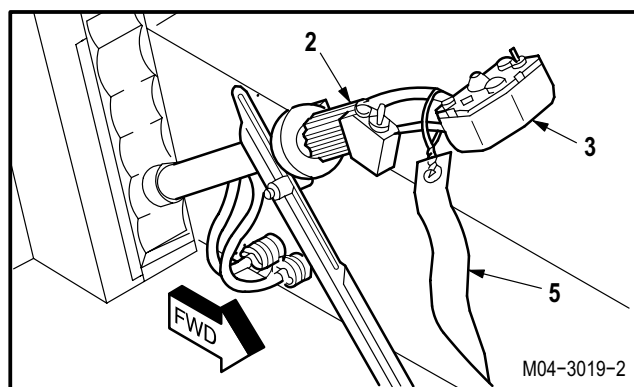
11.288. RIGGING UPPER LONGITUDINAL FLIGHT CONTROLS – continued

11.288.3. Rigging

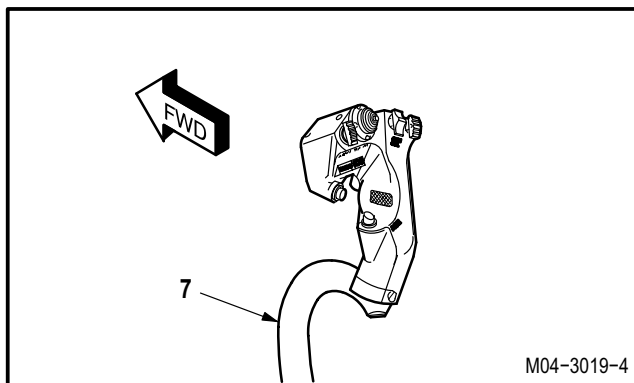
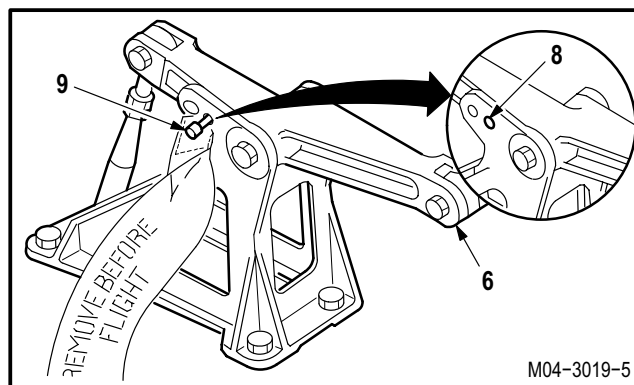
- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **Observe collective F.S. 165 bellcrank (1).**



- c. **Rotate friction lock (2) on pilot collective stick (3) to ZERO.**
- d. **Slowly move pilot collective stick (2) to align rig pin holes in collective F.S. 165 bellcrank (1).**
- e. **Install -9 rig pin (4).** Use flight control rigging kit.
- f. **Install collective stick warning flags (5).** Use flight control rigging kit.



- g. **Observe lateral F.S. 165 bellcrank (6).**
- h. **Slowly move pilot cyclic stick (7) to align level swashplate rig pin holes (8) in lateral F.S. 165 bellcrank (6).**
- i. **Install -5 rig pin (9) in bellcrank (6) at level swashplate position (8).** Use flight control rigging kit.



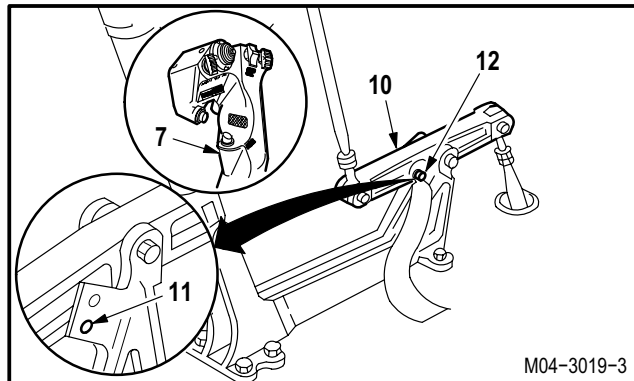
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11.288. RIGGING UPPER LONGITUDINAL FLIGHT CONTROLS – continued

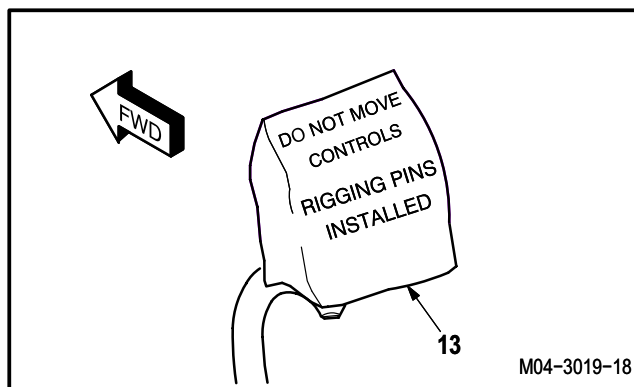
- j. Observe longitudinal F.S. 165 bellcrank (10).
- k. Slowly move pilot cyclic stick (7) to aline level swashplate rig pin holes (11) in bellcrank (10).
- l. Install -5 rig pin (12) in bellcrank (10) at level swashplate position (11). Use flight control rigging kit.

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

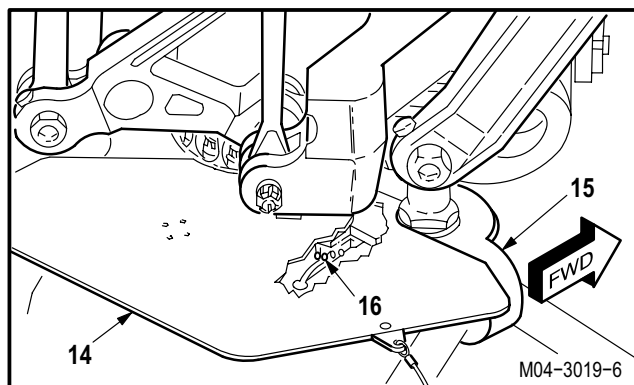


- m. Verify drop-fit of -5 rig pins (12) and (9), and -9 rig pin (4).
- n. Install cyclic (7) warning covers (13). Use flight control rigging kit.



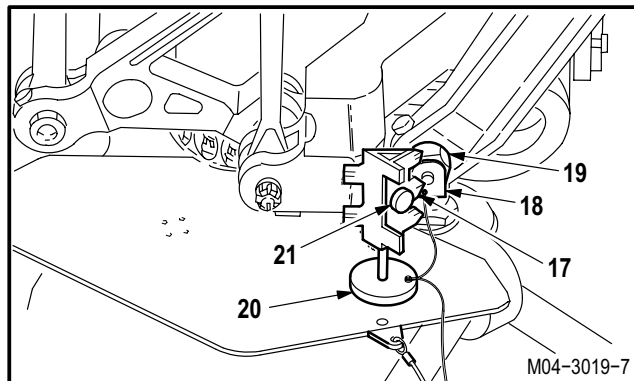
- o. Install main rotor rigging plate (14) on mast base (15).

- (1) Install rigging plate (14) on top of right side of mast base (15). Use flight control rigging kit.
- (2) Fasten clamps (16) under plate (14).



- p. Adjust BASIC DIM pointer (17) to aline with center point of alinement tool (18).

- (1) Install large end of alinement tool (18) in head of mixer support bolt (19) and hold.
- (2) Install rigging fixture (20) next to alinement tool (18).
- (3) Loosen thumbscrew (21) and aline BASIC DIM pointer (17) with center point of alinement tool (18).
- (4) Tighten thumbscrew (21).
- (5) Remove alinement tool (18) and rigging fixture (20).

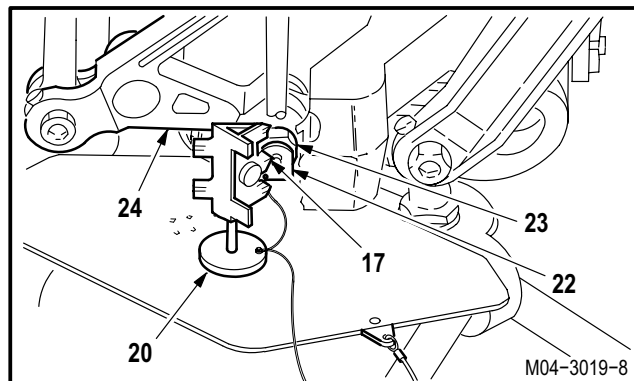


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11.288. RIGGING UPPER LONGITUDINAL FLIGHT CONTROLS – continued

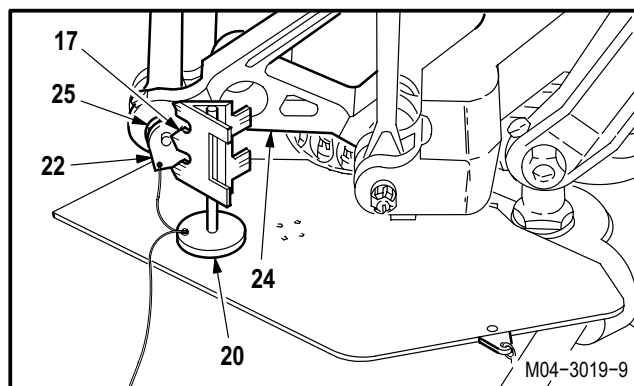
q. **Check that BASIC DIM pointer (17) alines with center point of alinement tool (22).**

- (1) Install alinement tool (22) in forward bolt head (23) of longitudinal bellcrank (24).
- (2) Place rigging fixture (20) next to alinement tool (22).
- (3) If BASIC DIM pointer (17) does not aline with center point of alinement tool (22), adjust collective servocylinder rod end (para 11.297).
- (4) If BASIC DIM pointer (17) alines with center point of alinement tool (22), go to next step.
- (5) Remove alinement tool (22) and rigging fixture (20).

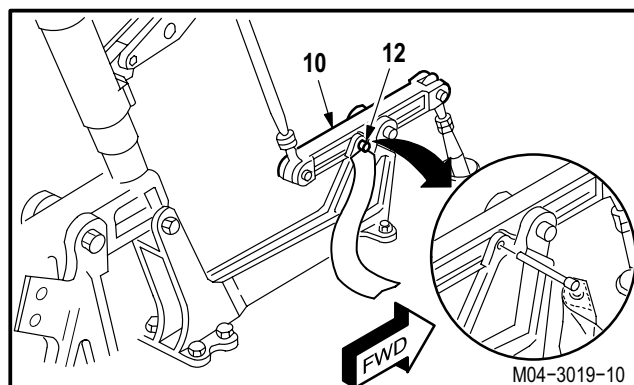


r. **Check that BASIC DIM pointer (17) alines with center point of alinement tool (22).**

- (1) Install alinement tool (22) in aft bolt head (25) of longitudinal bellcrank (24).
- (2) Place rigging fixture (20) next to alinement tool (22).
- (3) If BASIC DIM pointer (17) does not aline with center point of alinement tool (22), adjust longitudinal servocylinder rod end (para 11.297).
- (4) If BASIC DIM pointer (17) alines with center point of alinement tool (22), go to next step.
- (5) Remove rigging fixture (20).



s. **Remove -5 rig pin (12) from longitudinal F.S. 165 bellcrank (10).**



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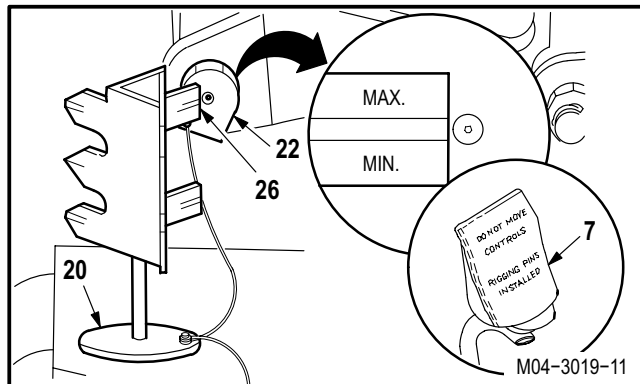
11.288. RIGGING UPPER LONGITUDINAL FLIGHT CONTROLS – continued

CAUTION

To prevent damage, be sure rigging fixture is clear of mixer assembly when moving flight controls.

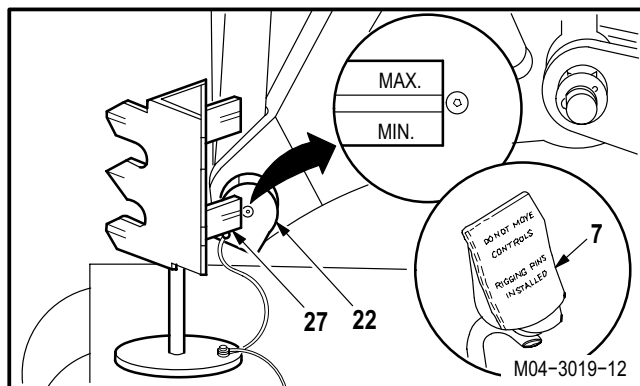
t. **Check that center point of alinement tool (22) is between MIN and MAX marks on cyclic FWD pointer (26).**

- (1) Slowly push pilot cyclic stick (7) forward until it stops.
- (2) Place rigging fixture (20) next to alinement tool (22).
- (3) If center point of alinement tool (22) is not between **MIN** and **MAX** marks on **FWD** pointer (26), adjust pilot and CPG cyclic stick stops (para 11.287).
- (4) If center point of alinement tool (22) is between **MIN** and **MAX** marks on **FWD** pointer (26) go to next step.



u. **Check that center point of alinement tool (22) is between MIN and MAX marks on cyclic AFT pointer (27).**

- (1) Slowly pull pilot cyclic stick (7) aft until it stops.
- (2) If center point of alinement tool (22) is not between **MIN** and **MAX** marks on **AFT** pointer (27), adjust pilot and CPG cyclic stick stops (para 11.287).
- (3) If center point of alinement tool (22) is between **MIN** and **MAX** marks on **AFT** pointer (27), go to next step.
- (4) Remove alinement tool (22) and rigging fixture (20).

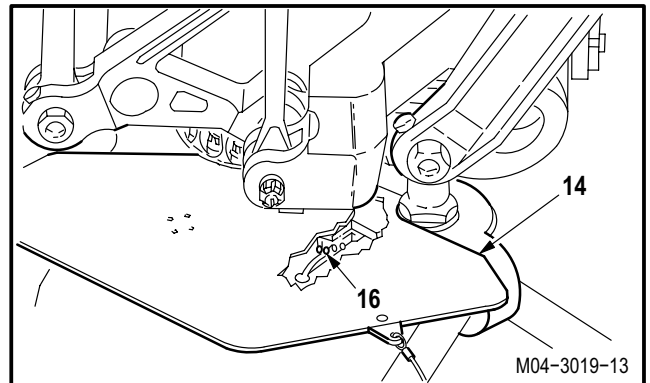


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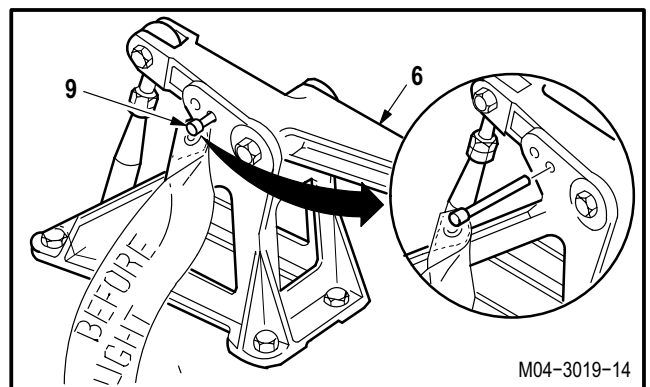
11.288. RIGGING UPPER LONGITUDINAL FLIGHT CONTROLS – continued

v. Remove main rotor rigging plate (14).

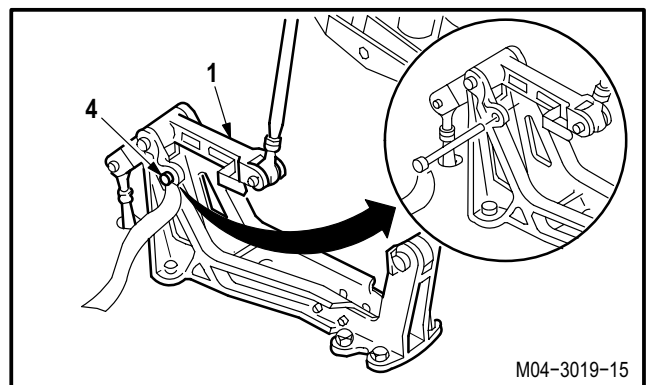
- (1) Unfasten clamps (16).
- (2) Remove plate (14).



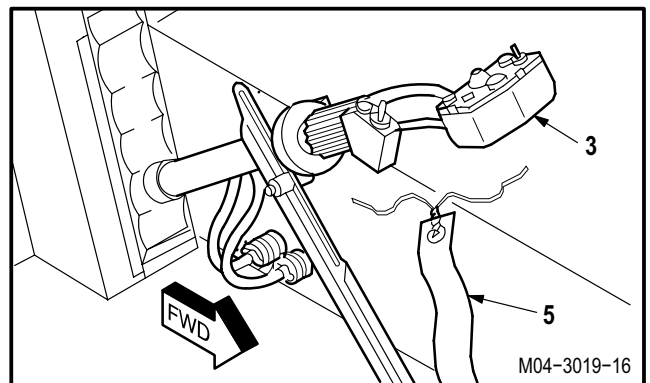
w. Remove -5 rig pin (9) from lateral F.S. 165 bellcrank (6).



x. Remove -9 rig pin (4) from collective F.S. 165 bellcrank (1).



y. Remove collective stick (3) warning flags (5).



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11.288. RIGGING UPPER LONGITUDINAL FLIGHT CONTROLS – continued

z. Remove cyclic sticks (7) warning covers (13).

aa. Check longitudinal controls for freedom of movement and 0.0625 INCH clearance between control rods, bellcranks, and structure.

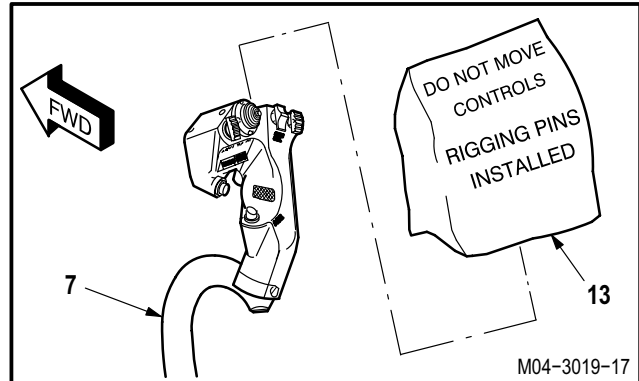
- (1) Slowly move cyclic stick (7) full forward, check for freedom of movement and minimum **0.0625 INCH** clearance between control rods, bellcranks, and structure.
- (2) Slowly move cyclic stick (7) full aft, check for freedom of movement and minimum **0.0625 INCH** clearance between control rods, bellcranks, and structure.
- (3) If clearance is not minimum **0.0625 INCH**, go to step u.(2).
- (4) If clearance is minimum **0.0625 INCH**, go to next step.

ab. Disconnect maintenance headset (para 1.134).

ac. Remove external hydraulic power from aircraft (para 1.72).

ad. Inspect (QA).

ae. Install access panels L200 and R200 (para 2.2).



END OF TASK

11.289. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS

11.289.1. Description

This task covers: Rigging.

11.289.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, App H)
 Flight control rigging kit (item 267, App H)
 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin

Personnel Required:

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

References:

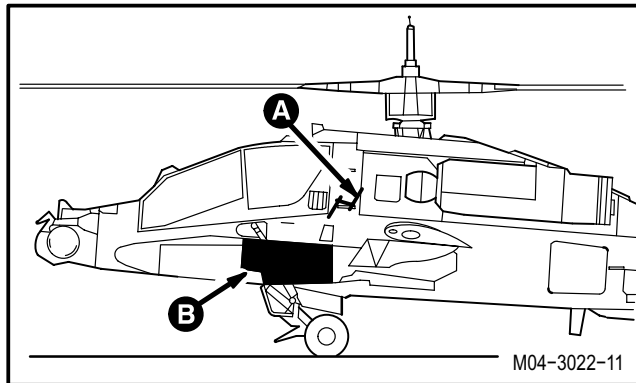
TM 1-1520-238-T
 TM 9-1090-208-23

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panel L200 removed
2.2	Remove access door B60 (if required)
11.46	Pilot cyclic stick cover removed
11.65	CPG cyclic stick cover removed
TM 9-1090-208-23	Gun turret assembly removed
TM 9-1090-208-23	Ammunition feeder forward of left main landing gear leg disconnected

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls.



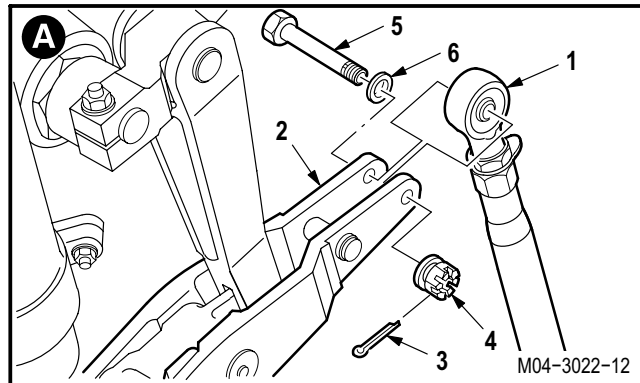
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11.289. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS – continued

11.289.3. Rigging

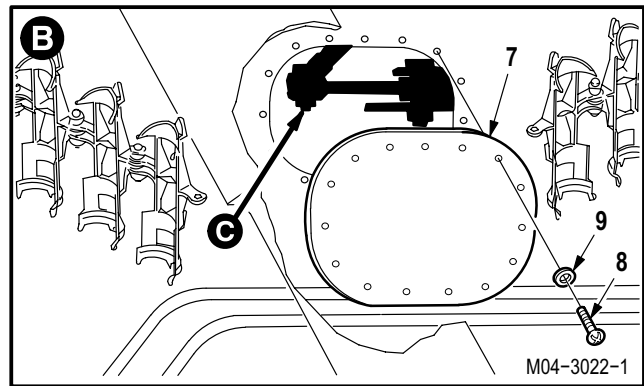
a. **Remove F. S. 165 rod end (1) from lateral servocylinder input linkage (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4) from bolt (5).
- (3) Remove bolt (5) and washer (6).



b. **Remove lateral decoupler access door (7).**

- (1) Remove 15 screws (8) and washers (9).
- (2) Remove door (7).

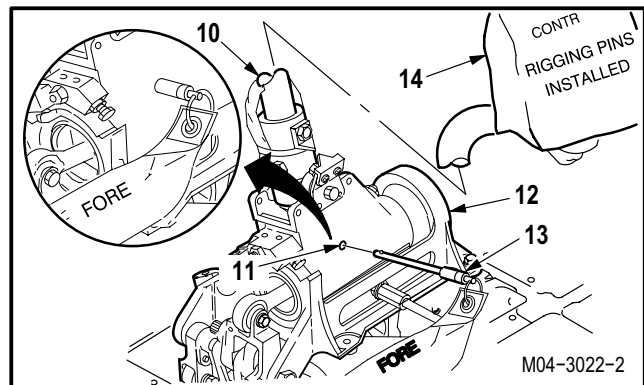


c. **Enter pilot station (para 1.56). Observe all safety precautions.**

d. **Slowly move pilot cyclic stick (10) to align lateral rig pin holes (11) in pilot cyclic stick support (12).**

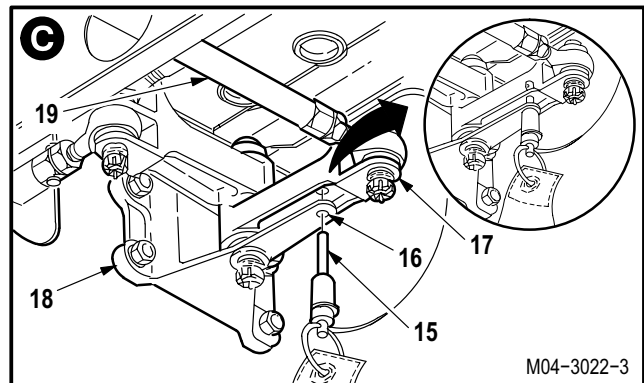
e. **Install -5 rig pin (13) in rig pin holes (11) in support (12).** Use flight control rigging kit.

f. **Install cyclic stick warning covers (14).** Use flight control rigging kit.



g. **Install -9 rig pin (15) in rig pin holes (16) of lateral F.S. 133 bellcrank (17) and bracket (18).** Use flight control rigging kit.

- (1) If -9 rig pin (15) cannot be installed, adjust aft end of lateral F.S. 133 push-pull rod (19) to align rig pin holes (16) (para 11.2).
- (2) Install -9 rig pin (15).



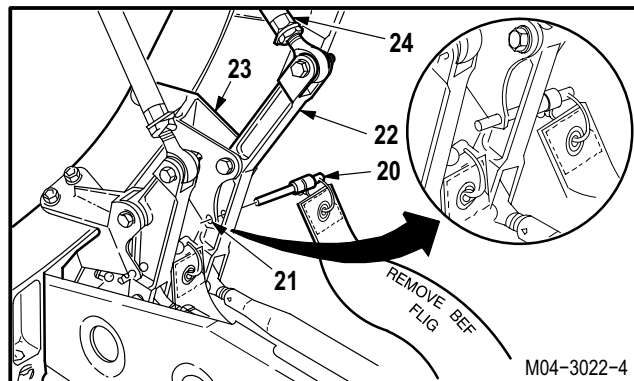
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11.289. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS – continued

h. **Install -9 rig pin (20) in rig pin holes (21) of lateral F.S. 111 bellcrank (22) and bracket (23).** Use flight control rigging kit.

(1) If -9 rig pin (20) cannot be installed, adjust forward end of F.S. 111 push-pull rod (24) to align rig pin holes (21) (para 11.2).

(2) Install -9 rig pin (20).

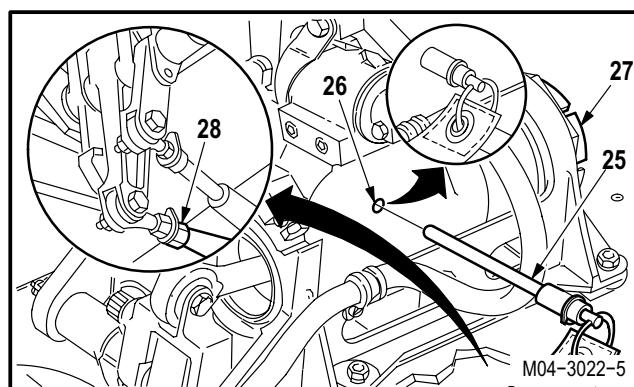


i. **Enter CPG station (para 1.56). Observe all safety precautions.**

j. **Install -5 rig pin (25) into rig pin holes (26) in CPG cyclic stick support (27).** Use flight control rigging kit.

(1) If -5 rig pin (25) cannot be installed, adjust forward end of lateral F.S. 65 push-pull rod (28) to align rig pin holes (26) (para 11.2).

(2) Install -5 rig pin (25).

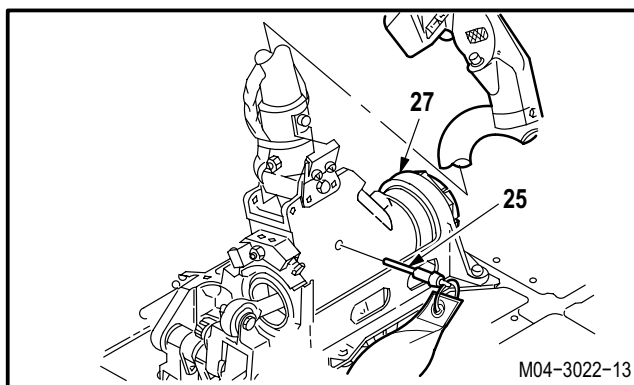


NOTE

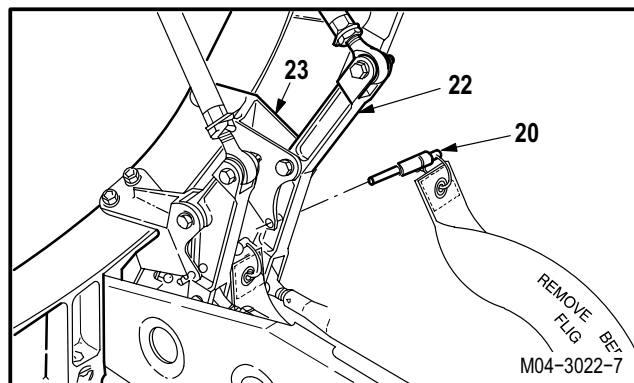
Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

k. **Verify drop fit of rig pins (13), (15) (20), (25).**

l. **Remove -5 rig pin (25) from CPG cyclic stick support (27).**



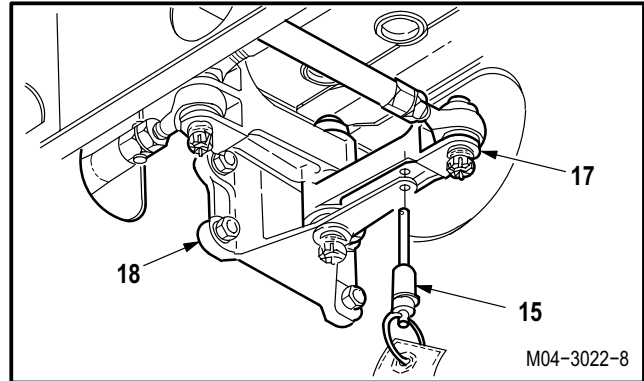
m. **Remove -9 rig pin (20) from lateral F.S. 111 bellcrank (22) and bracket (23).**



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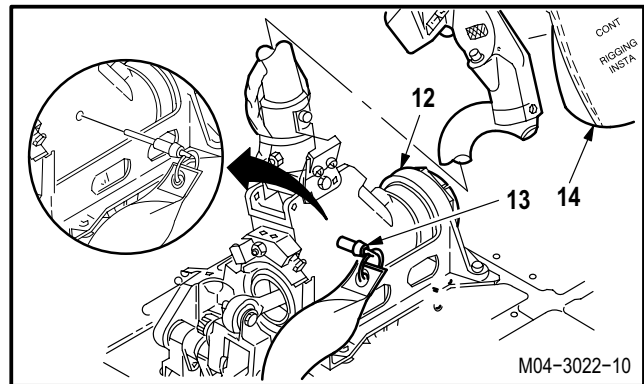
11.289. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS – continued

- n. Remove -9 rig pin (15) from lateral F.S. 133 bellcrank (17) and bracket (18).



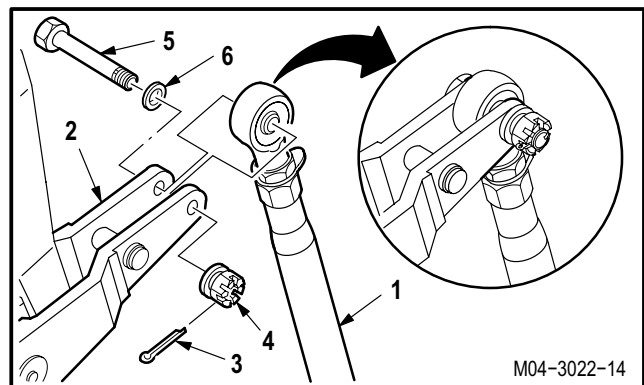
- o. Remove -5 rig pin (13) from pilot cyclic stick support (12).

- p. Remove cyclic stick warning covers (14).



- q. Install F.S. 165 rod end (1) on input linkage (2). Torque nut (4) 30 to 40 INCH-POUNDS.

- (1) Install bolt (5) through washer (6), input linkage (2), and rod end (1).
- (2) Check fit of self-retaining bolt (5) (para 11.1).
- (3) Install nut (4) on bolt (5).
- (4) Torque nut (4) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to aline cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (3).



- r. Inspect (QA).

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11.289. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT AND CPG CYCLIC STICKS – continued

s. **Install lateral decoupler access door (7).**

(1) Install 15 screws (8) and washers (9).

t. **Inspect (QA).**

u. **Connect ammunition feeder**
(TM 9-1090-208-23).

v. **Perform lateral (cyclic) flight control rigging maintenance operational check**
(TM 1-1520-238-T).

w. **Install pilot cyclic stick cover** (para 11.46).

x. **Install CPG cyclic stick cover** (para 11.65).

y. **Inspect (QA).**

z. **Install gun turret assembly**
(TM 9-1090-208-23).

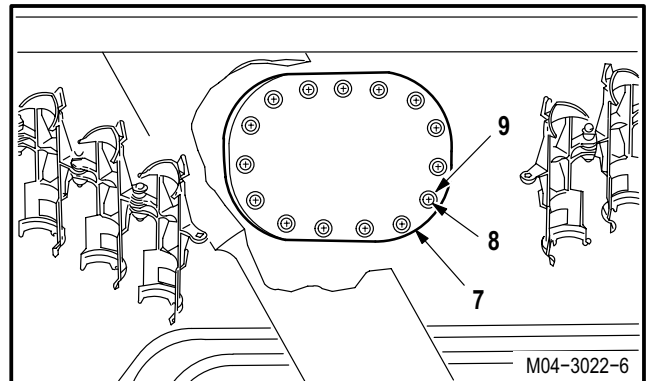
aa. **Perform area weapon system maintenance operational check** (TM 9-1090-208-23).

ab. **Inspect (QA).**

ac. **Install access door L200** (para 2.2).

ad. **Install access door B60, if removed** (para 2.2).

ae. **Inspect (QA).**



END OF TASK

11.290. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT CYCLIC STICK AND LATERAL SERVOCYLINDER

11.290.1. Description

This task covers: Rigging.

11.290.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

- Cotter pin

Personnel Required:

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

References:

- TM 1-1520-238-T

Equipment Conditions:

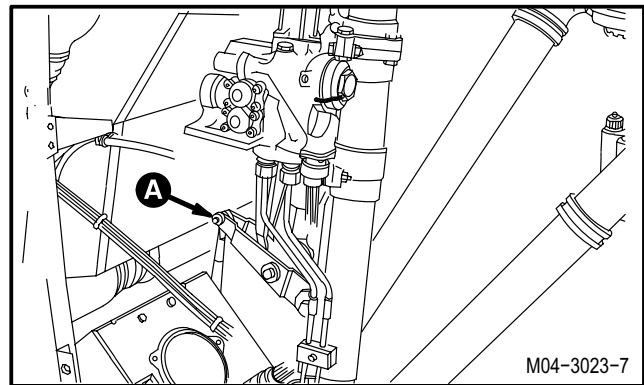
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
1.72	External primary hydraulic power connected
11.46	Pilot cyclic stick cover removed
11.289	Lateral flight controls between pilot and CPG cyclic sticks rigged
1.134	Maintenance headset connected

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.



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11.290. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT CYCLIC STICK AND LATERAL SERVOCYLINDER – continued

11.290.3. Rigging

a. **Remove F.S. 165 rod end (1) from lateral servo-cylinder input linkage (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4).
- (3) Remove bolt (5) and washer (6).

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

c. **Slowly move pilot cyclic stick (7) to align lateral rig pin holes (8) in cyclic stick support (9).**

d. **Install -5 rig pin (10) in holes (8).** Use flight control rigging kit.

e. **Install cyclic stick warning covers (11).** Use flight control rigging kit.

f. **Apply external hydraulic power to aircraft (para 1.72).**

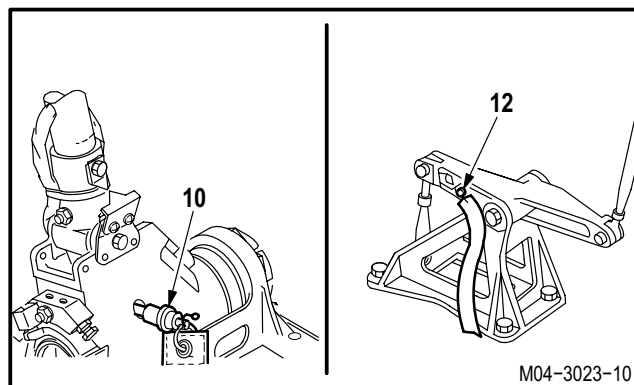
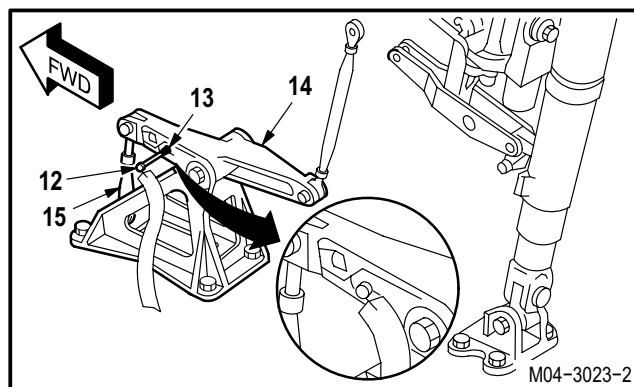
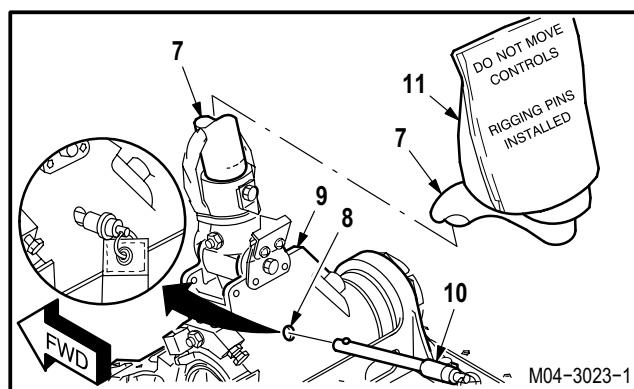
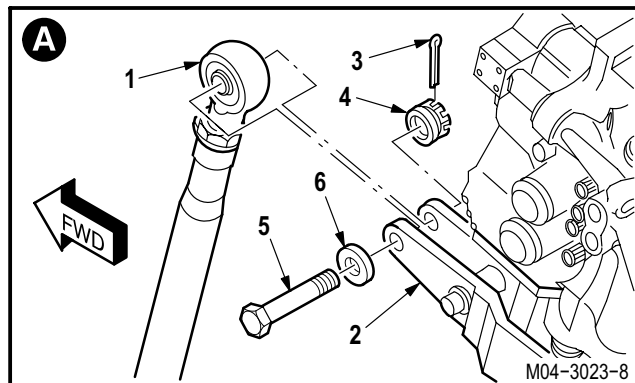
g. **Install -9 rig pin (12) in midstroke rig pin holes (13) on lateral F.S. 165 bellcrank (14).** Use flight control rigging kit.

- (1) If -9 rig pin (12) cannot be installed, adjust upper end of F.S. 159 push-pull rod (15) to align rig pin holes (13) (para 11.2).
- (2) Install -9 rig pin (12).

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

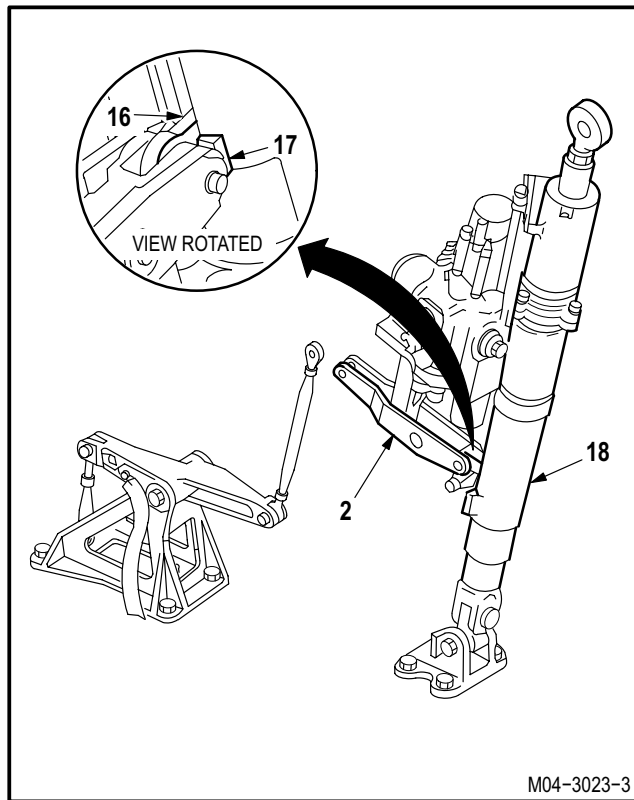
h. **Verify drop-fit of rig pins (10) and (12).**



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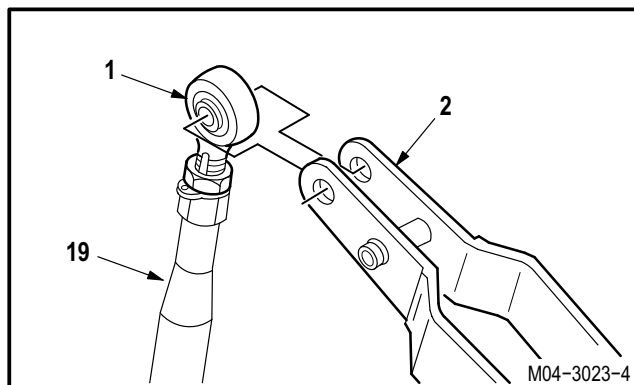
11.290. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT CYCLIC STICK AND LATERAL SERVOCYLINDER – continued

- i. Slowly move lateral servocylinder input linkage (2) to align lower lever (16) with upper edge of boss (17) on servocylinder body (18).



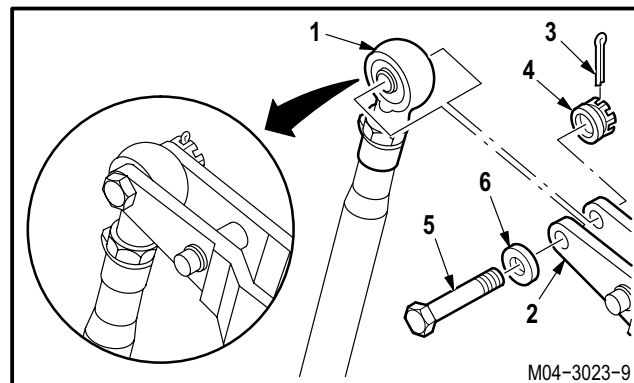
- j. Check that holes in input linkage (2) align with lateral F.S. 165 push-pull rod end (1).

- (1) If holes in input linkage (2) do not align with rod end (1), adjust rod end of F.S. 165 push-pull rod (19) (para 11.2).
- (2) If holes in input linkage (2) align with rod end (1), go to next step.



- k. Install rod end (1) on input linkage (2). Torque nut (4) **30 to 40 INCH-POUNDS**.

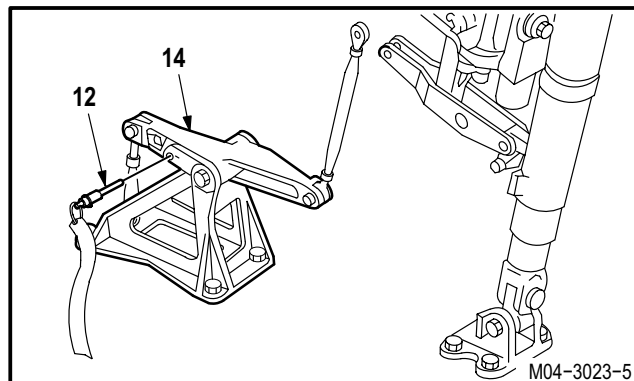
- (1) Install bolt (5) through washer (6), input linkage (2), and rod end (1).
- (2) Check fit of self-retaining bolt (5) (para 11.1).
- (3) Install nut (4) on bolt (5).
- (4) Torque nut (4) to **30 INCH-POUNDS**. Use torque wrench.
- (5) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (6) Install new cotter pin (3).



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11.290. RIGGING LATERAL FLIGHT CONTROLS BETWEEN PILOT CYCLIC STICK AND LATERAL SERVOCYLINDER – continued

- l. Remove -9 rig pin (12) from lateral F.S. 165 bellcrank (14).



- m. Remove -5 rig pin (10) from cyclic stick support rig pin hole (8).

- n. Remove cyclic stick warning covers (11).

- o. Inspect (QA).

- p. Perform lateral (cyclic) flight control rigging maintenance operational check (TM 1-1520-238-T).

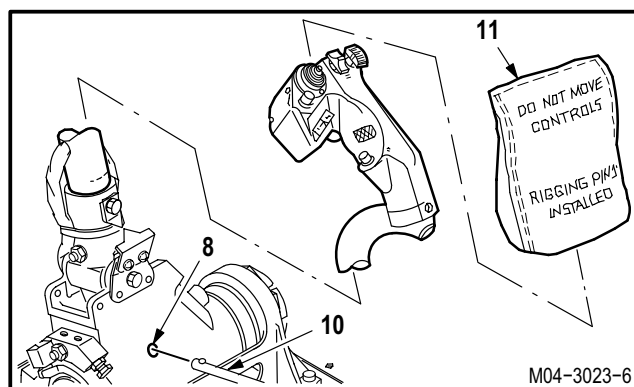
- q. Disconnect maintenance headset (para 1.134).

- r. Install pilot cyclic stick cover (para 11.46).

- s. Inspect (QA).

- t. Remove external hydraulic power from aircraft (para 1.72).

- u. Install access panels L200 and R200 (para 2.2).



END OF TASK

11.291. RIGGING PILOT AND CPG LATERAL CYCLIC STICK STOP BOLTS

11.291.1. Description

This task covers: Rigging.

11.291.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- 0.300 - 24/0 - 24-inch inside/outside vernier caliper (item 54, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)

Materials/Parts:

- Wire (item 224, 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:

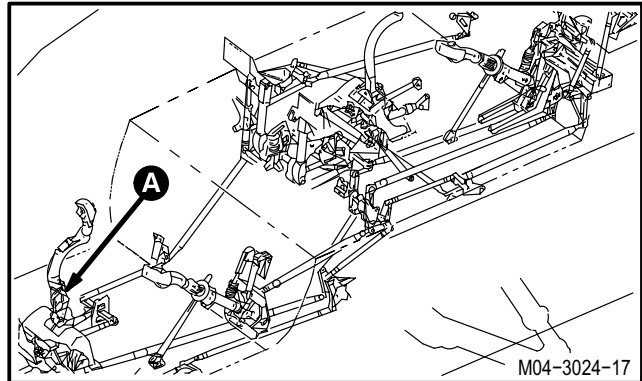
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
1.72	External primary hydraulic power applied
11.46	Pilot cyclic stick cover removed
11.65	CPG cyclic stick cover removed
11.289	Lateral flight controls between pilot and CPG cyclic sticks rigged
11.290	Lateral flight controls between cyclic stick and lateral servocylinder rigged
1.134	Maintenance headset connected

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.



GO TO NEXT PAGE

11.291. RIGGING PILOT AND CPG LATERAL CYCLIC STICK STOP BOLTS – continued

11.291.3. Rigging

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **Slowly move pilot cyclic stick (1) to align lateral rig pin holes (2) in cyclic stick support (3).**
- c. **Install -5 rig pin (4) in pilot cyclic stick support (3).** Use flight control rigging kit.

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

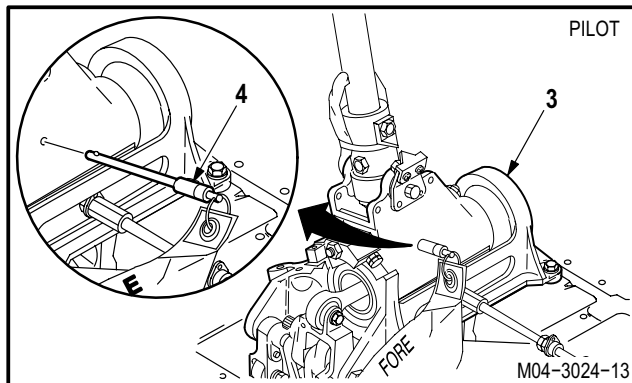
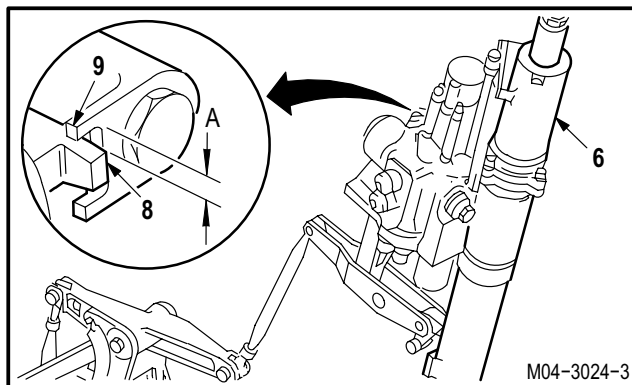
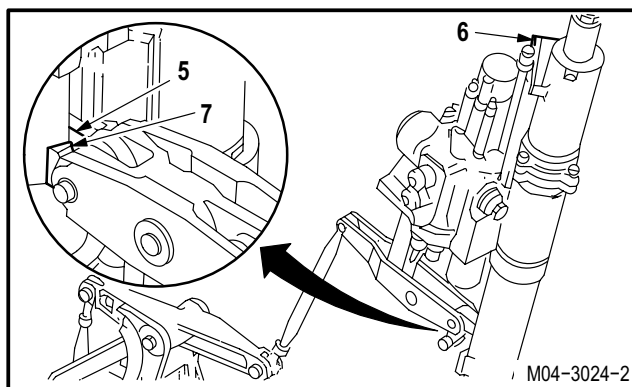
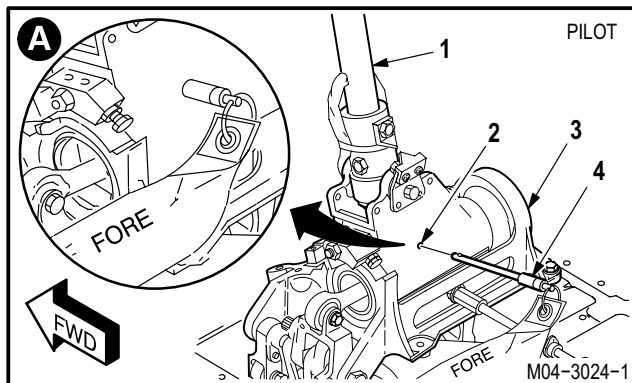
- d. **Verify drop-fit of rig pin (4).**
- e. **Check that lower lever (5) on lateral servocylinder (6) is aligned with upper edge of boss (7) on servocylinder body.**

- (1) If lower lever (5) is not aligned with upper edge of boss (7) on servocylinder (6), rig lateral controls between pilot stick and lateral servocylinder (para 11.290).
- (2) If lower lever (5) is aligned with upper edge of boss (7) on servocylinder (6), go to next step.

- f. **Measure and record distance between valve arm (8) and stop bolt (9) on lateral servocylinder (6).**

- (1) This is measurement A. Use caliper.

- g. **Remove -5 rig pin (4) from pilot cyclic stick support (3).**

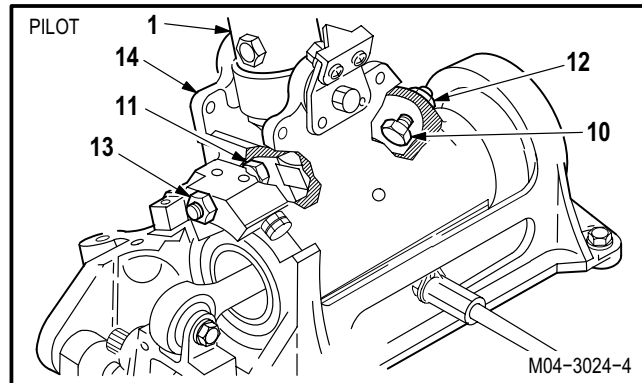


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11.291. RIGGING PILOT AND CPG LATERAL CYCLIC STICK STOP BOLTS – continued

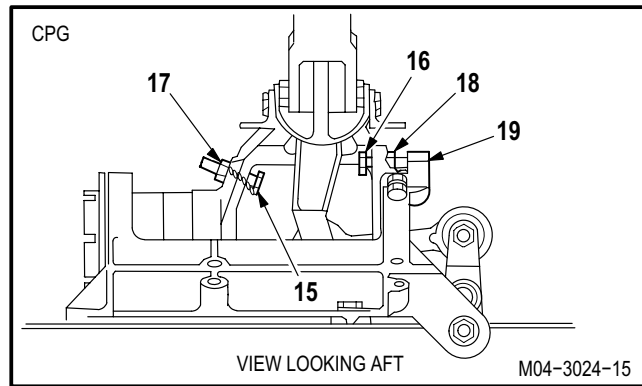
h. Back off pilot cyclic stick (1) left limit stop bolt (10) and right limit stop bolt (11).

- (1) Remove lockwire.
- (2) Loosen jam nuts (12) and (13).
- (3) Turn stop bolts (10) and (11) into housing (14).



i. Back off CPG cyclic stick left limit stop bolt (15) and right limit stop bolt (16).

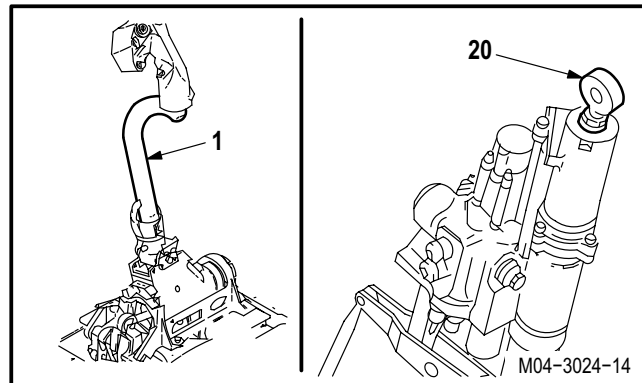
- (1) Remove lockwire.
- (2) Loosen jam nuts (17) and (18).
- (3) Turn stop bolts (15) and (16) into housing (19).



j. Observe lateral servocylinder piston (20) travel.

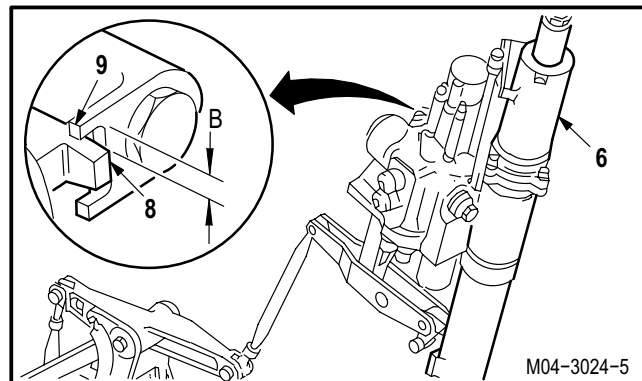
k. Fully retract piston (20) by slowly moving pilot cyclic stick (1) left.

- (1) Slowly push left on stick (1) until piston (20) is fully retracted.
- (2) Hold stick (1) in this position.



l. Measure and record distance between valve arm (8) and stop bolt (9) on lateral servocylinder (6).

- (1) This is measurement B. Use caliper.
- (2) If difference between measurements A and B is more than **0.030 INCH**, move cyclic stick (1) slowly right until difference between measurement A and measurement B is less than **0.030 INCH**.
- (3) If difference between measurements A and B is less than **0.030 INCH** go to next step.
- (4) Hold stick (1) in this position.

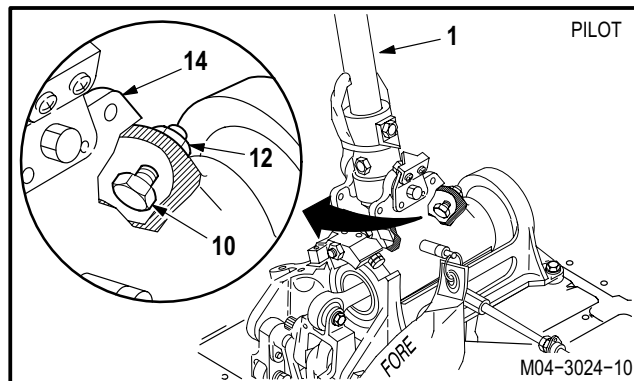


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11.291. RIGGING PILOT AND CPG LATERAL CYCLIC STICK STOP BOLTS – continued

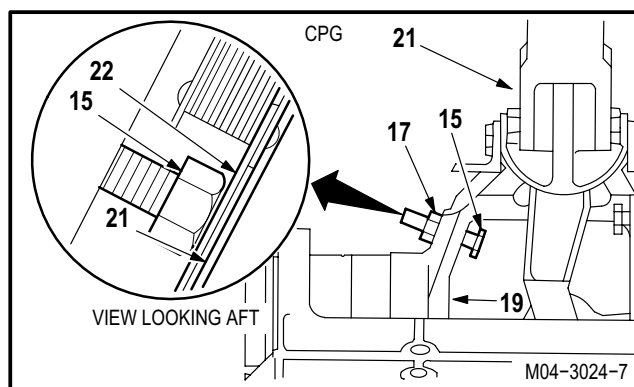
m. Adjust pilot cyclic stick left limit stop bolt (10) to contact stick (1).

- (1) Rotate stop bolt (10) counterclockwise until it contacts stick (1).
- (2) Hold stop bolt (10). Tighten jam nut (12).
- (3) Lockwire jam nut (12) to housing (14). Use wire (item 224, App F).



n. Adjust CPG cyclic stick left stop bolt (15) for a 0.020 INCH gap between head of bolt (15) and stick (21).

- (1) Hold pilot cyclic stick (1) against left limit stop bolt (10).
- (2) Hold **0.020 INCH** thickness gage (22) against CPG stick (21) at bolt (15) contact area.
- (3) Rotate left limit stop bolt (15) counterclockwise until it contact thickness gage (22).
- (4) Hold stop bolt (15). Tighten jam nut (17).
- (5) Lockwire jam nut (17) to housing (19). Use wire (item 224, App F).

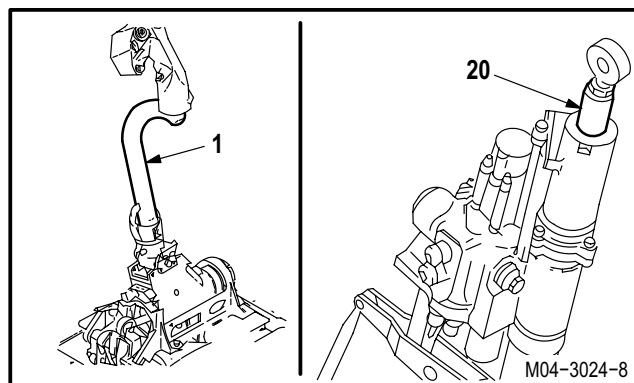


o. Inspect (QA).

p. Observe lateral servocylinder piston (20) travel.

q. Fully extend piston (20) by slowly moving pilot cyclic stick (1) right.

- (1) Slowly move stick (1) right until piston (20) is fully extended.
- (2) Hold stick (1) in this position.

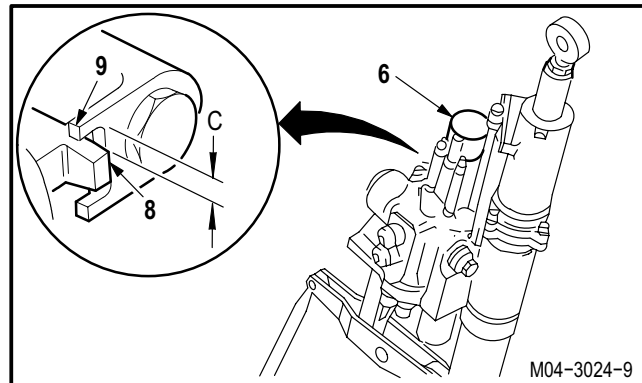


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11.291. RIGGING PILOT AND CPG LATERAL CYCLIC STICK STOP BOLTS – continued

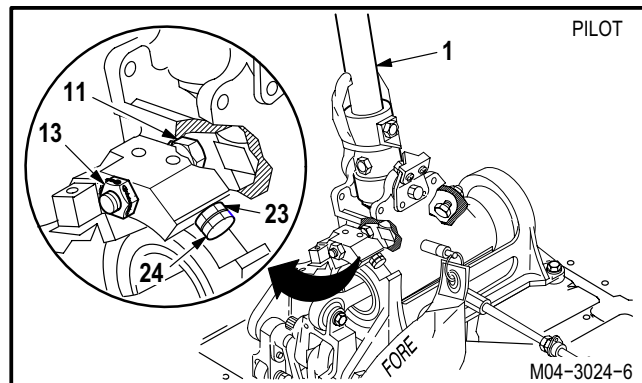
r. Measure and record distance between valve arm (8) and stop bolt (9) on lateral servocylinder (6).

- (1) This is measurement C. Use caliper.
- (2) If difference between measurements A and C is more than **0.030 INCH**, move pilot cyclic stick (1) slowly left until difference between measurement A and measurement C is less than **0.030 INCH**.
- (3) If difference between measurements A and C is less than **0.030 INCH** go to next step.
- (4) Hold stick (1) in this position.



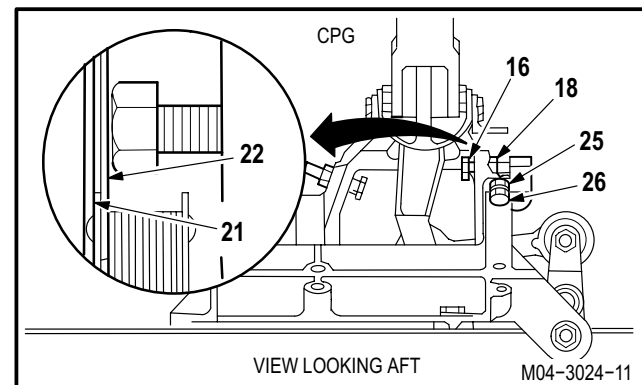
s. Adjust pilot cyclic stick right limit stop bolt (11) to contact stick (1).

- (1) Rotate right limit stop bolt (11) counterclockwise until it contacts stick (1).
- (2) Hold stop bolt (11). Tighten jam nut (13).
- (3) Lockwire jam nut (13) to jam nut (23) and stop bolt (24). Use wire (item 224, App F).



t. Adjust CPG cyclic stick right stop bolt (16) for a 0.020 INCH gap between head of bolt (16) and stick (21).

- (1) Hold pilot cyclic stick against right limit stop bolt (11).
- (2) Hold **0.020 INCH** thickness gage (22) against CPG stick (21) at bolt (16) contact area.
- (3) Rotate right limit stop bolt (16) counterclockwise until it contacts thickness gage (22).
- (4) Hold stop bolt (16). Tighten jam nut (18).
- (5) Lockwire jam nut (18) to jam nut (25) and stop bolt (26). Use wire (item 224, App F).



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11.291. RIGGING PILOT AND CPG LATERAL CYCLIC STICK STOP BOLTS – continued

- u. **Inspect (QA).**
- v. **Perform lateral (cyclic) flight control rigging operational check** (TM 1-1520-238-T).
- w. **Disconnect maintenance headset** (para 1.134).
- x. **Remove external hydraulic power from aircraft** (para 1.72).
- y. **Install pilot cyclic stick cover** (para 11.46).
- z. **Install CPG cyclic stick cover** (para 11.65).
- aa. **Install access panels L200 and R200** (para 2.2).

END OF TASK

11.292. RIGGING UPPER LATERAL FLIGHT CONTROLS

11.292.1. Description

This task covers: Rigging.

11.292.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)
- Main rotor mixer rigging alinement tool, 7-311511100-81601 (Figure D-474, App D)

References:

TM 1-1520-238-T

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels L200 and R200 removed
1.72	External primary hydraulic power applied
11.289	Lateral flight controls between pilot and CPG cyclic sticks rigged
11.290	Lateral flight controls between pilot cyclic stick and lateral servocylinder rigged
11.291	Pilot and CPG lateral cyclic stick stop bolts rigged
1.134	Maintenance headset connected

Personnel Required:

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

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

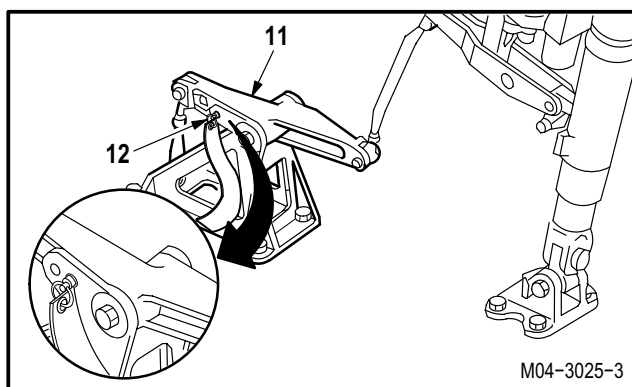
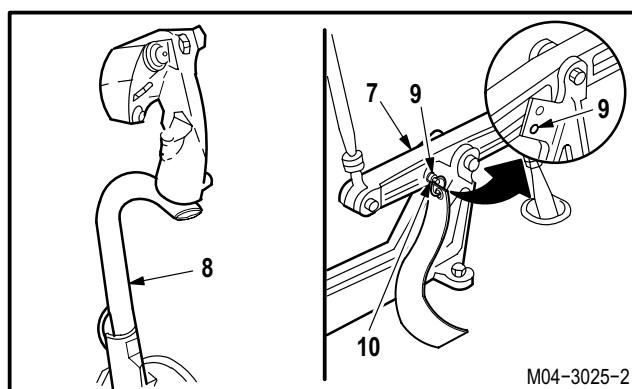
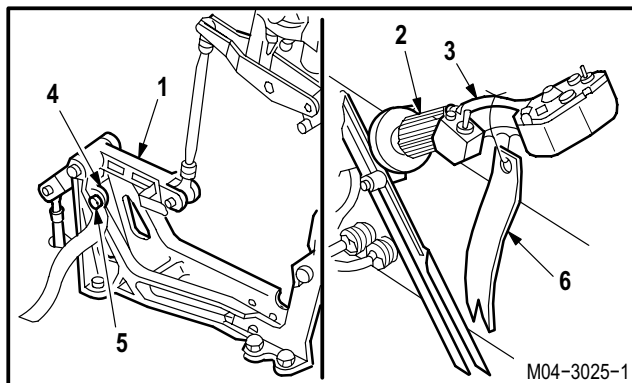
To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

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11.292. RIGGING UPPER LATERAL FLIGHT CONTROLS – continued

11.292.3. Rigging

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **Observe collective F.S. 165 bellcrank (1).**
- c. **Rotate friction lock (2) on pilot collective stick (3) to ZERO.**
- d. **Slowly move pilot collective stick (3) to aline rig pin holes (4) in collective F.S. 165 bellcrank (1).**
- e. **Install -9 rig pin (5).** Use flight control rigging kit.
- f. **Install collective stick warning flags (6).** Use flight control rigging kit.
- g. **Observe longitudinal F.S. 165 bellcrank (7).**
- h. **Slowly move pilot cyclic stick (8) to aline level swashplate rig pin holes (9) with longitudinal F.S. 165 bellcrank (7).**
- i. **Install -5 rig pin (10) at level swashplate position (9).** Use flight control rigging kit.
- j. **Observe lateral F.S. 165 bellcrank (11).**
- k. **Slowly move pilot cyclic stick (8) to aline level swashplate rig pin holes with lateral F.S. 165 bellcrank (11).**
- l. **Install -5 rig pin (12) at level swashplate position.** Use flight control rigging kit.

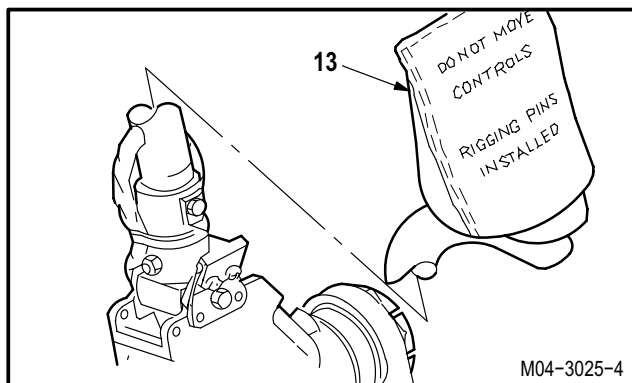


- m. **Install cyclic stick warning covers (13).**

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

- n. **Verify drop-fit of -9 rig pin (5) and -5 rig pins (10) and (12).**

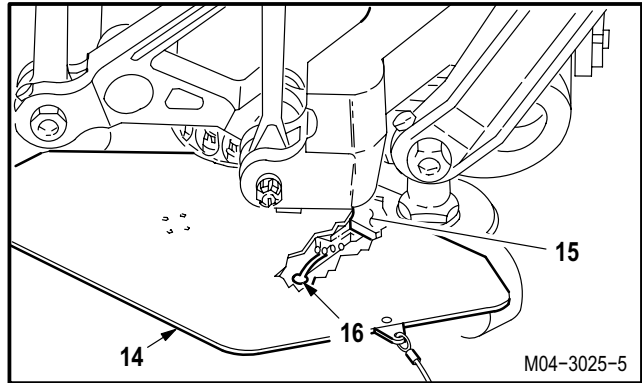


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11.292. RIGGING UPPER LATERAL FLIGHT CONTROLS – continued

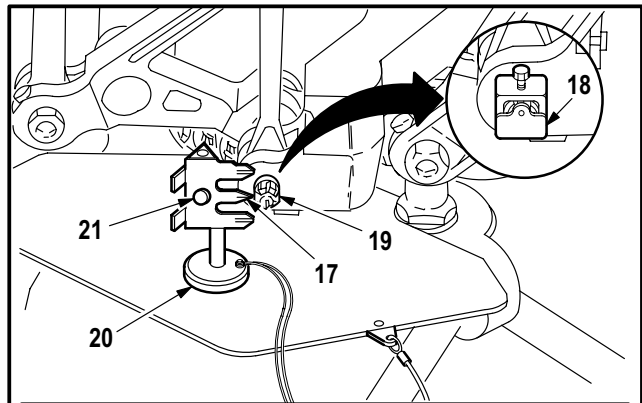
o. **Install main rotor rigging plate (14) on right side of mast base (15).**

- (1) Install rigging plate (14) on top of right side of mast base (15). Use flight control rigging kit.
- (2) Fasten clamps (16) under plate (14).



p. **Adjust BASIC DIM pointer (17) to align with center of main rotor mixer alignment tool (18).**

- (1) Install large end of alignment tool (18) in lateral link bolt (19) and hold.
- (2) Install rigging fixture (20) next to alignment tool (18). Use alignment tool (Figure D-474, App D).
- (3) Loosen thumbscrew (21) and adjust **BASIC DIM** pointer (17) with center point of alignment tool (18).
- (4) Tighten thumbscrew (21).
- (5) Mark shaft of fixture (20), using base of pointer (17) as a reference. Use pencil.

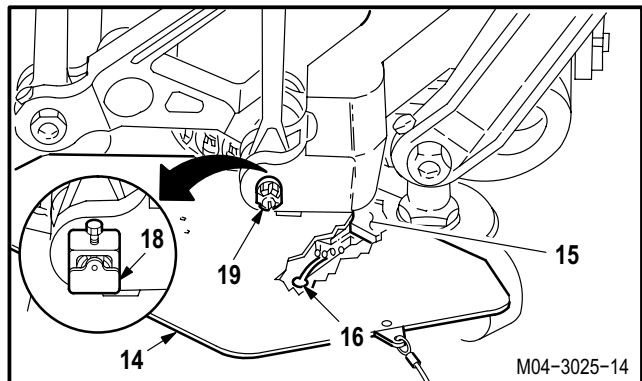
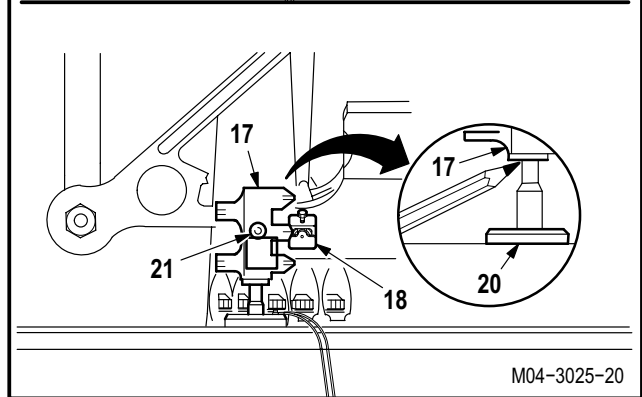


q. **Remove rigging fixture (20) from main rotor rigging plate (14).**

r. **Remove alignment tool (18) from lateral link bolt (19).**

s. **Remove main rotor rigging plate (14) from right side of mast base (15).**

- (1) Loosen clamps (16).
- (2) Remove plate (14).



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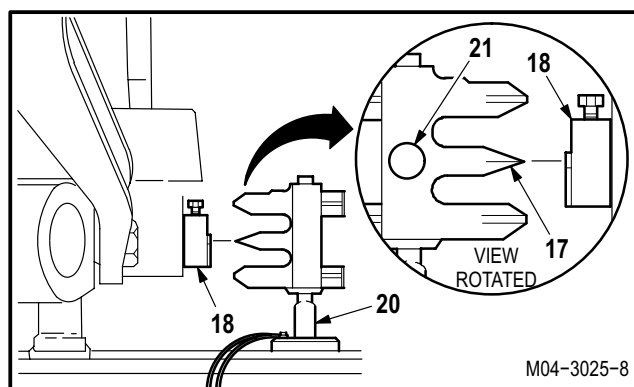
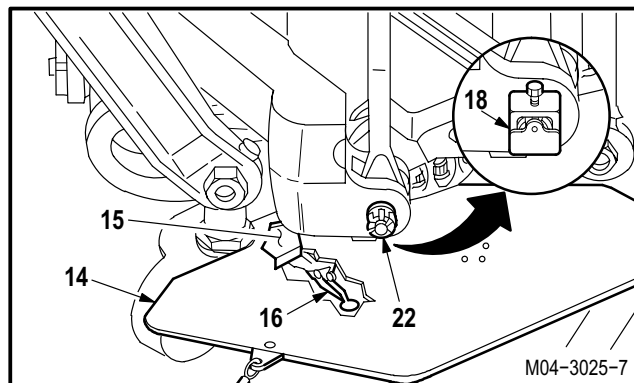
11.292. RIGGING UPPER LATERAL FLIGHT CONTROLS – continued

t. Install main rigging plate (14) on left side of mast base (15).

- (1) Position rigging plate (14) on top of left side of mast base (15).
- (2) Fasten clamps (16) under plate (14).

u. Check that BASIC DIM pointer (17) aligns with center of alinement tool (18).

- (1) Install alinement tool (18) on lateral link bolt (22).
- (2) Place rigging fixture (20) next to alinement tool (18). Use alinement tool (Figure D-474, App D).
- (3) If **BASIC DIM** pointer (17) aligns with center of alinement tool (18), go to step u. (7).
- (4) If **BASIC DIM** pointer (17) does not align with center of alinement tool (18), perform steps u.(5) thru u.(11), then adjust lateral servocylinder rod end (para 11.297).
- (5) Loosen thumbscrew (21) and adjust **BASIC DIM** pointer (17) with center point of alinement tool (18).
- (6) Tighten thumbscrew (21) and mark shaft of fixture (20), using base of pointer (17) as a reference. Use pencil.
- (7) Remove rigging fixture (20) from main rotor rigging plate (14).
- (8) Loosen thumbscrew (21).
- (9) Measure and record distance between pencil marks on fixture.
- (10) Divide measurement by 2. Record to determine adjustment dimension.
- (11) Mark shaft of fixture (20) at dimension indicated in step u.(10). Reset pointer (17) on shaft to this mark and tighten thumbscrew (21).



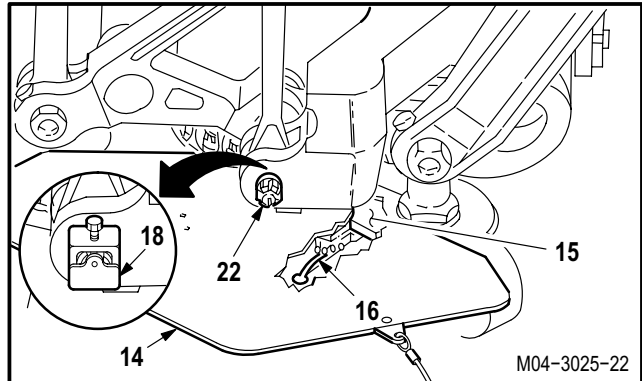
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11.292. RIGGING UPPER LATERAL FLIGHT CONTROLS – continued

v. Remove alinement tool (18) from lateral link bolt (22).

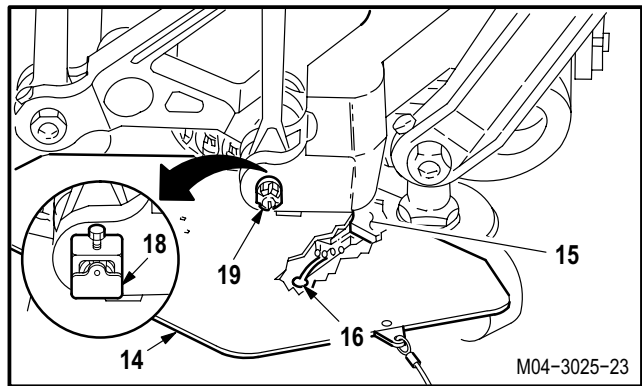
w. Remove main rotor rigging plate (14) from left side of mast base (15).

- (1) Unfasten clamps (16) under plate (14).
- (2) Remove plate (14) from base (15).



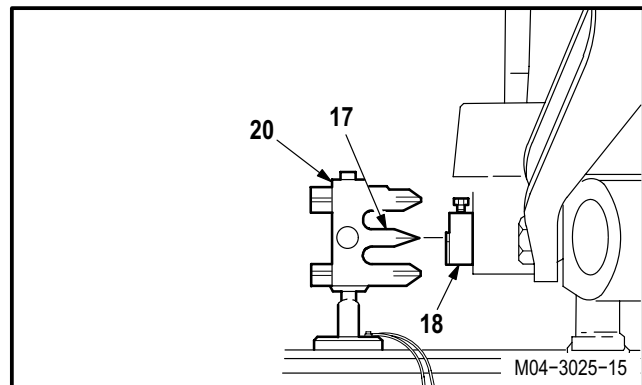
x. Install main rotor rigging plate (14) on right side of mast base (15).

- (1) Position rigging plate (14) on top of right side of mast base (15). Use flight control rigging kit.
- (2) Fasten clamps (16) under plate (14).

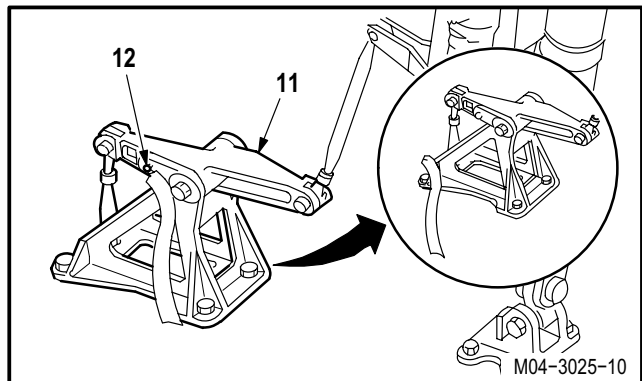


y. Check that BASIC DIM pointer (17) alines with center of alinement tool (18).

- (1) Install alinement tool (18) on lateral link bolt (19). Use alinement tool (Figure D-474, App D).
- (2) Place rigging fixture (20) next to alinement tool (18).
- (3) If **BASIC DIM** pointer (17) alines with center of alinement tool (18) go to step z.
- (4) If **BASIC DIM** pointer (17) does not aline with center of alinement tool (18) repeat steps q. thru y.



z. Remove -5 rig pin (12) from lateral F.S. 165 bellcrank (11).



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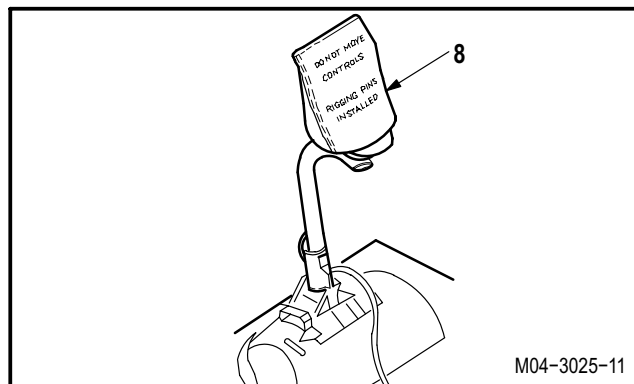
11.292. RIGGING UPPER LATERAL FLIGHT CONTROLS – continued

CAUTION

To prevent damage, be sure rigging fixture is clear of mixer assembly when moving flight controls.

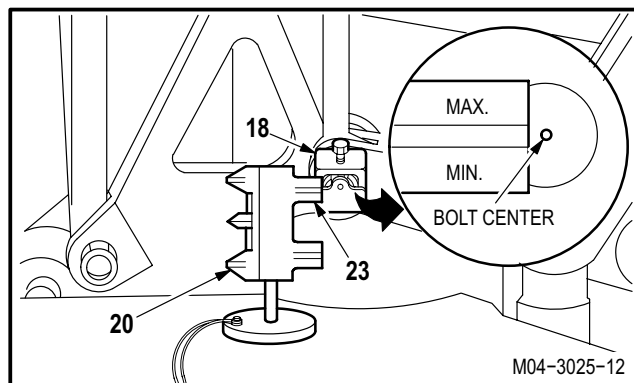
aa. **Slowly move pilot cyclic stick (8) full left until it contacts stop.**

- (1) Hold stick (8) in this position.



ab. **Check that center point of alinement tool (18) aligns with lateral full left pointer (23) on rigging fixture (20).**

- (1) If center point of alinement tool (18) falls between **MIN** and **MAX** marks on full left pointer (23), go to step ac.
- (2) If center point of alinement tool (18) does not fall between **MIN** and **MAX** marks on full left pointer (23), rig lateral stick stop bolts (para 11.291).



CAUTION

To prevent damage, be sure rigging fixture is clear of mixer assembly when moving flight controls.

ac. **Slowly move pilot cyclic stick (8) full right until it contacts stop.**

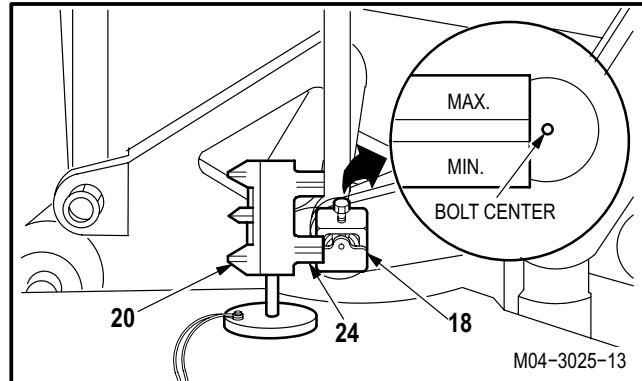
- (1) Hold stick (8) in this position.

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11.292. RIGGING UPPER LATERAL FLIGHT CONTROLS – continued

ad. Check that center point of alinement tool (18) aligns with lateral full right pointer (24) on rigging fixture (20).

- (1) If center point of alinement tool (18) falls between **MIN** and **MAX** marks on full right pointer (24), go to step ae.
- (2) If center point of alinement tool (18) does not fall between **MIN** and **MAX** marks on full right pointer (24), rig lateral stick stop bolts (para 11.291).

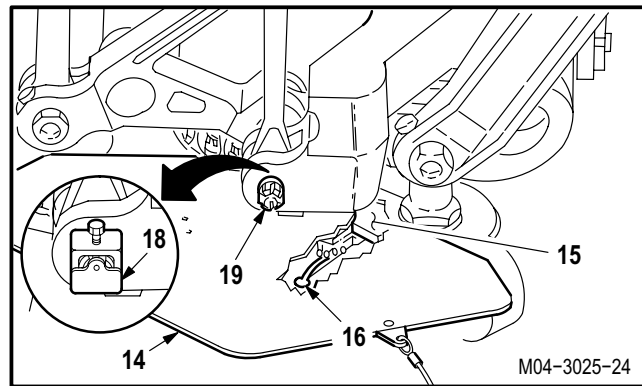


ae. Remove rigging fixture (20) from main rotor rigging plate (14).

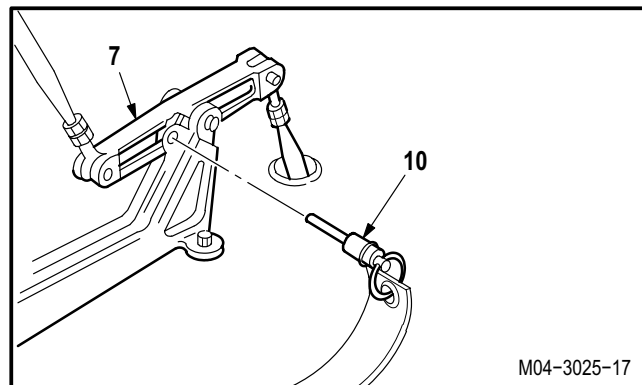
af. Remove alinement tool (18) from lateral link bolt (19).

ag. Remove main rotor rigging plate (14) from right side of mast base (15).

- (1) Loosen clamps (16).
- (2) Remove plate (14).

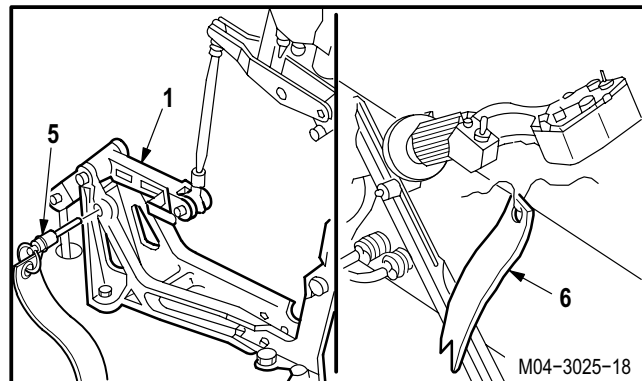


ah. Remove -5 rig pin (10) from F.S. 165 longitudinal bellcrank (7).



ai. Remove -9 rig pin (5) from collective F.S. 165 bellcrank (1).

aj. Remove collective stick warning flags (6).



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11.292. RIGGING UPPER LATERAL FLIGHT CONTROLS – continued

ak. **Check lateral controls for freedom of movement and 0.0625 INCH clearance between control rods, bellcranks and structure.**

- (1) Slowly move cyclic stick to full right; check for freedom of movement and **0.0625 INCH** clearance between rods, bellcranks, and structure.
- (2) If clearance is not **0.0625 INCH**, go back to step ac.
- (3) Slowly move cyclic stick to full left; check for freedom of movement and **0.0625 INCH** clearance between rods, bellcranks and structure. Use caliper.
- (4) If clearance is not **0.0625 INCH**, go back to step aa.

al. **Inspect (QA).**

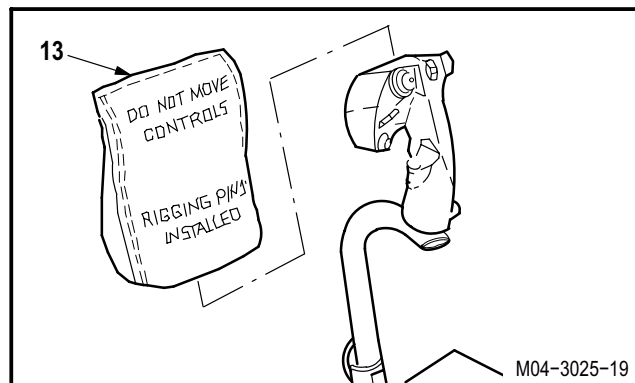
am. **Perform lateral (cyclic) flight control rigging maintenance operational check (TM 1-1520-238-T).**

an. **Disconnect maintenance headset (para 1.134).**

ao. **Remove cyclic covers (13).**

ap. **Remove primary hydraulic external power from aircraft (para 1.72).**

aq. **Install access panels L200 and R200 (para 2.2).**



END OF TASK

11.293. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT AND CPG PEDALS

11.293.1. Description

This task covers: Rigging.

11.293.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Flight control rigging kit (item 267, App H)
- Microphone headset (item 174, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

Cotter pin

Personnel Required:

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

References:

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

Equipment Conditions:

Ref	Condition
1.57	Helicopter safed
2.2	Access door B60 opened and fairing L540 removed
TM 9-1090-208-23	Gun turret assembly removed
1.134	Maintenance headset connected

CAUTION

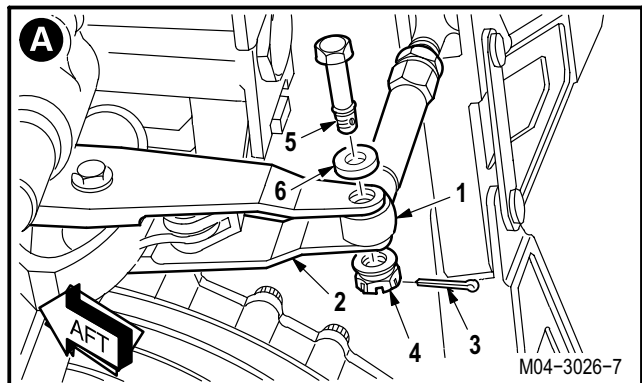
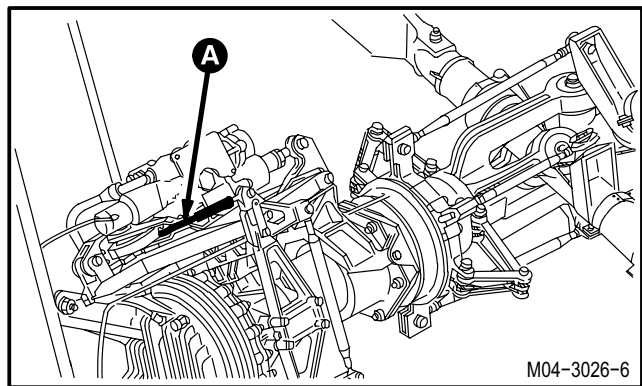
To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.

11.293.3. Rigging

- a. **Remove F.S. 542 rod end (1) from directional servocylinder input linkage (2).**

- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4) from bolt (5).
- (3) Remove bolt (5) and washer (6).

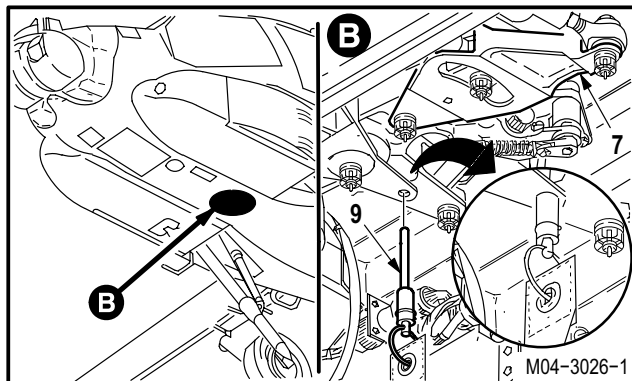
- b. **Enter pilot station (para 1.56). Observe all safety precautions.**



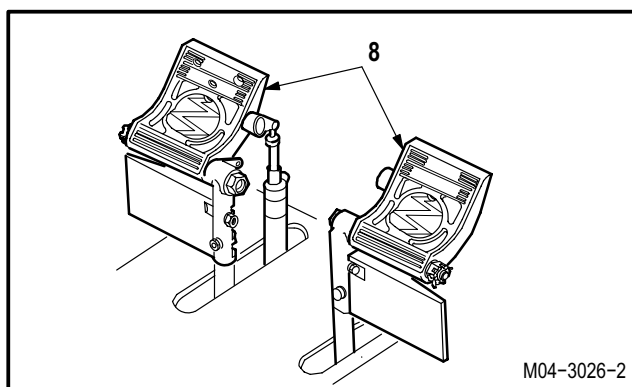
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11.293. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT AND CPG PEDALS – continued

c. Observe pilot directional SPAD (7).

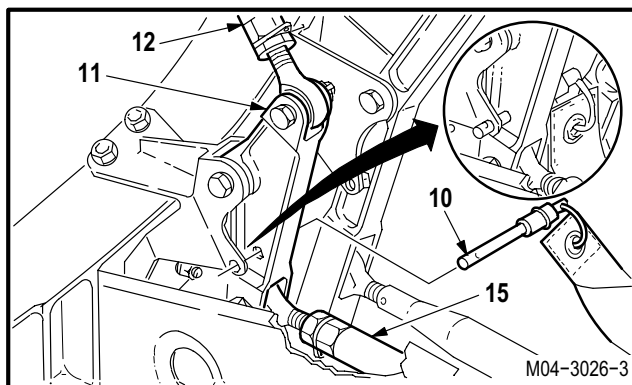


d. Slowly move pilot directional pedals (8) to align rig pin holes in SPAD (7).



e. Install -9 rig pin (9) in SPAD (7). Use flight control rigging kit.

f. Install -9 rig pin (10) in directional F.S. 110 bellcrank (11). Use flight control rigging kit.



(1) If -9 rig pin (10) can not be installed, adjust forward end of F.S. 110 push-pull rod (12) to align rig pin holes (para 11.2).

(2) Install -9 rig pin (10).

g. Install -9 rig pin (13) in CPG SPAD (14). Use flight control rigging kit.

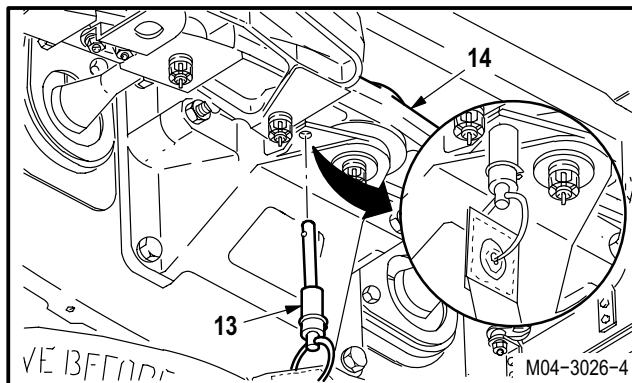
(1) If -9 rig pin (13) cannot be installed, adjust aft end of F.S. 59 push-pull rod (15) to align rig pin holes (para 11.2).

(2) Install -9 rig pin (13).

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

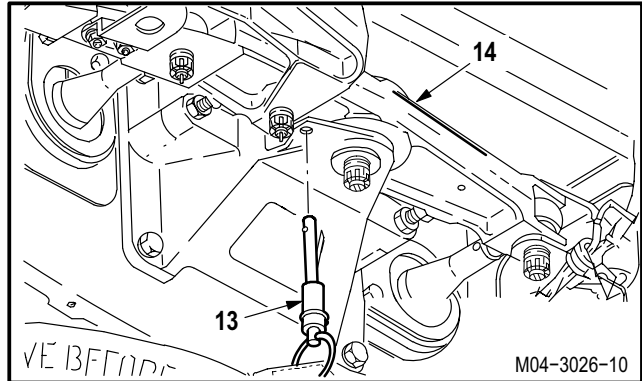
h. Verify drop fit of -9 rig pins (9), (10), and (13).



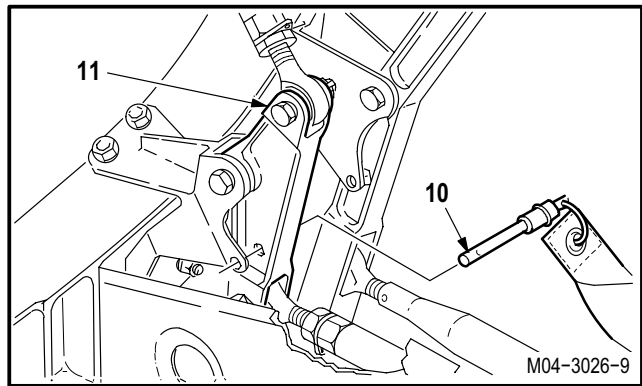
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11.293. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT AND CPG PEDALS – continued

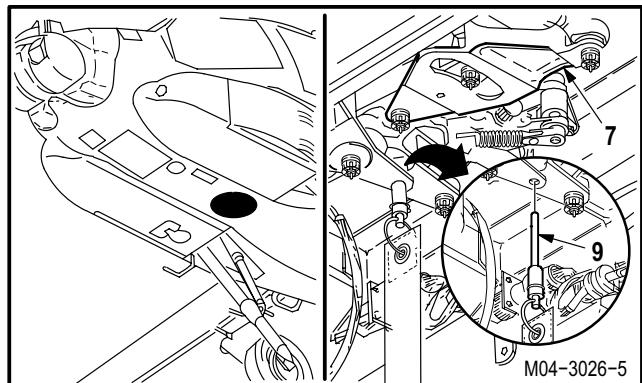
i. Remove -9 rig pin (13) from CPG SPAD (14).



j. Remove -9 rig pin (10) from directional F.S. 110 bellcrank (11).

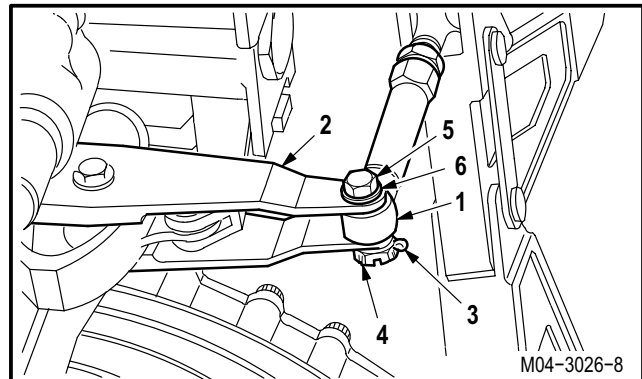


k. Remove -9 rig pin (9) from SPAD (7).



l. Install F.S. 542 rod end (1) on directional servocylinder input linkage (2). Torque nut (4) **30 to 40 INCH-POUNDS**.

- (1) Install bolt (5) through washer (6), input linkage (2) and rod end (1).
- (2) Check fit of self-retaining bolt (5) (para 11.1).
- (3) Install nut (4). Torque nut (4) to **30 INCH-POUNDS**. Use torque wrench.
- (4) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS**.
- (5) Install new cotter pin (3).



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11.293. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT AND CPG PEDALS – continued

- m. **Inspect (QA).**
- n. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).
- o. **Disconnect maintenance headset** (para 1.134).
- p. **Install gun turret assembly** (TM 9-1090-208-23).
- q. **Install access door B60 and fairing L540** (para 2.2).
- r. **Inspect (QA).**

END OF TASK

11.294. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT PEDALS AND DIRECTIONAL SERVOCYLINDER

11.294.1. Description

This task covers: Rigging.

11.294.2. Initial setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)

Materials/Parts:

- Cotter pin

Personnel Required:

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

References:

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

Equipment Conditions:

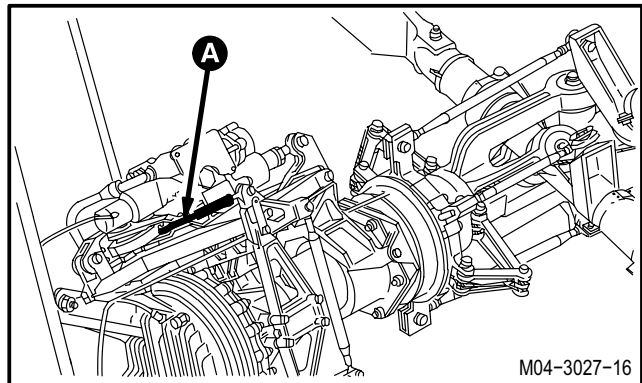
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.3	Access fairings L510, L540, and access panel L200 removed; access door L325 opened
1.72	External primary external hydraulic power connected
TM 9-1090-208-23	Gun turret assembly removed
11.293	Directional flight controls between pilot and CPG pedals rigged
1.134	Maintenance headset connected

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

To prevent damage to flight control system components, do not use force if binding or roughness occurs while moving controls with hydraulic power.



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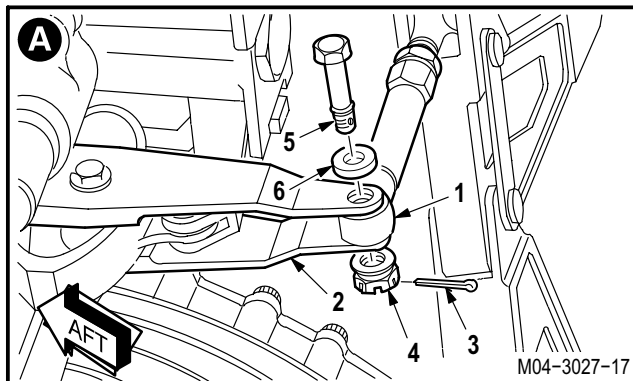
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11.294. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT PEDALS AND DIRECTIONAL SERVOCYLINDER – continued

11.294.3. Rigging

a. **Remove F.S. 542 rod end (1) from directional servocylinder input linkage (2).**

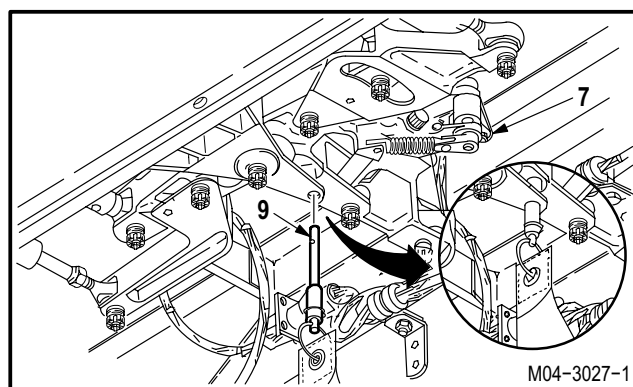
- (1) Remove and discard cotter pin (3).
- (2) Remove nut (4) from bolt (5).
- (3) Remove bolt (5) and washer (6).



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

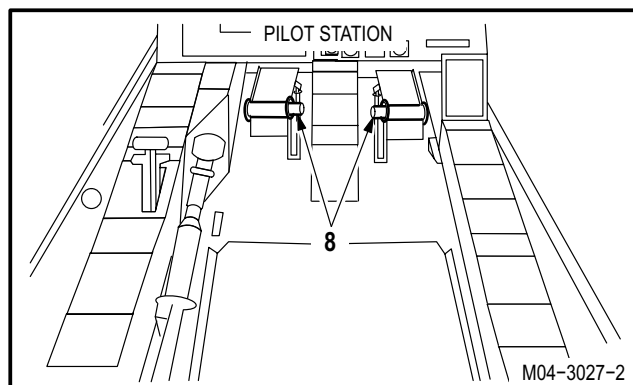
c. **Apply external hydraulic power to aircraft (para 1.72).**

d. **Observe pilot directional SPAD (7).**



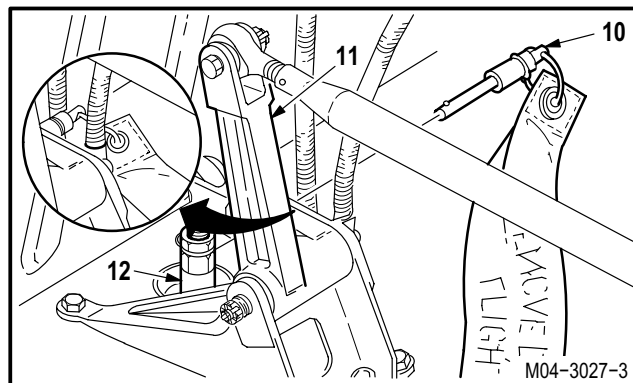
e. **Slowly move pilot directional pedals (8) to aline rig pin holes in SPAD (7).**

f. **Install -9 rig pin (9) in SPAD (7).** Use flight control rigging kit.



g. **Install -9 rig pin (10) in directional F.S. 164 bellcrank (11).** Use flight control rigging kit.

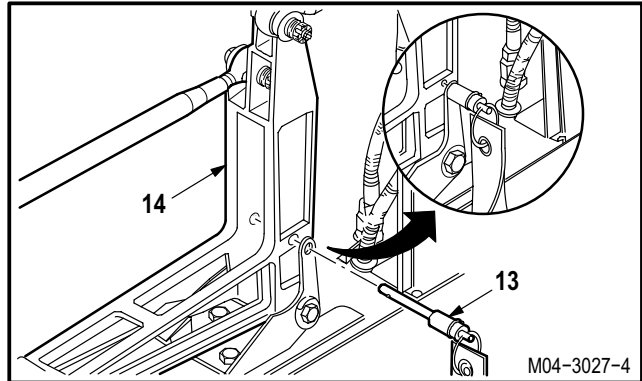
- (1) If -9 rig pin (10) cannot be installed, adjust upper end of F.S. 160 push-pull rod (12) to aline rig pin holes (para 11.2).
- (2) Install -9 rig pin (10).



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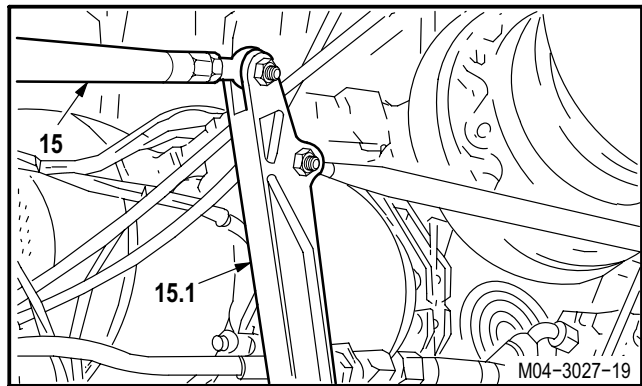
11.294. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT PEDALS AND DIRECTIONAL SERVOCYLINDER – continued

h. Install -5 rig pin (13) in directional F.S. 215 bellcrank (14). Use flight control rigging kit.



(1) If -5 rig pin (13) cannot be installed, adjust aft end of F.S. 199 push-pull rod (15) on bellcrank F.S. 199 (15.1) to align rig pin holes (para 11.2).

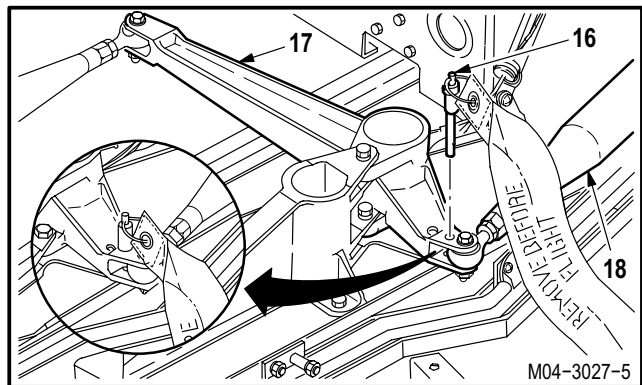
(2) Install -5 rig pin (13).



i. Install -9 rig pin (16) in directional F.S. 348 bellcrank (17). Use flight control rigging kit.

(1) If -9 rig pin (16) cannot be installed, adjust aft end of F.S. 275 push-pull rod (18) to align rig pin holes (para 11.2).

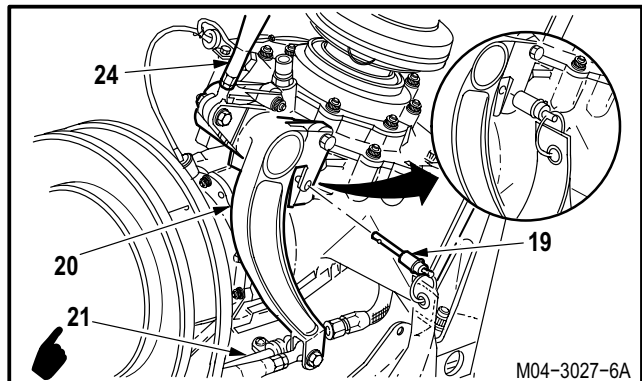
(2) Install -9 rig pin (16).



j. Install -9 rig pin (19) in directional F.S. 520 bellcrank (20). Use flight control rigging kit.

(1) If -9 rig pin (19) cannot be installed, adjust forward end of F.S. 348 push-pull rod (21) to align rig pin holes (para 11.2).

(2) Install -9 rig pin (19).



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11.294. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT PEDALS AND DIRECTIONAL SERVOCYLINDER – continued

k. **Install -9 rig pin (22) in directional F.S. 542 bellcrank (23).** Use flight control rigging kit.

(1) If -9 rig pin (22) cannot be installed, adjust lower end of F.S. 520 push-pull rod (24) to align rig pin holes (para 11.2).

(2) Install -9 rig pin (22).

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

l. **Verify drop fit of -5 rig pins (13), and -9 rig pins (9), (10), (16), (19), and (22).**

m. **Slowly move directional servocylinder input linkage (2) to align lower lever (25) with upper edge of boss (26) on servocylinder body.**

n. **Check that holes (27) in input linkage (2) align with F.S. 542 rod end (1).**

(1) If lever arm holes (27) do not align with F.S. 542 rod end (1), adjust end of push pull rod (28) rod end (28.1) to align holes (27) (para 11.2).

(2) If holes (27) align with rod end (1), go to next step.

o. **Install F.S. 542 rod end (1) on directional servocylinder input linkage (2).** Torque nut (4) **30 to 40 INCH-POUNDS.**

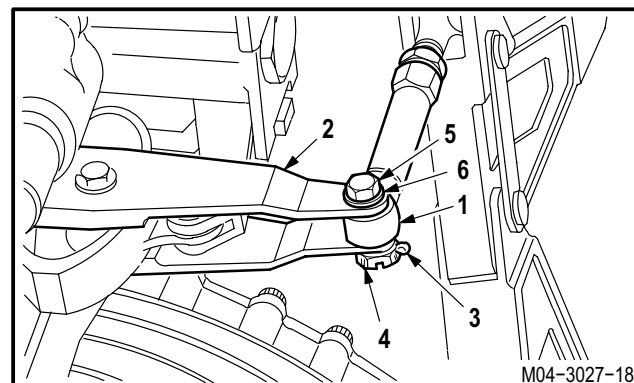
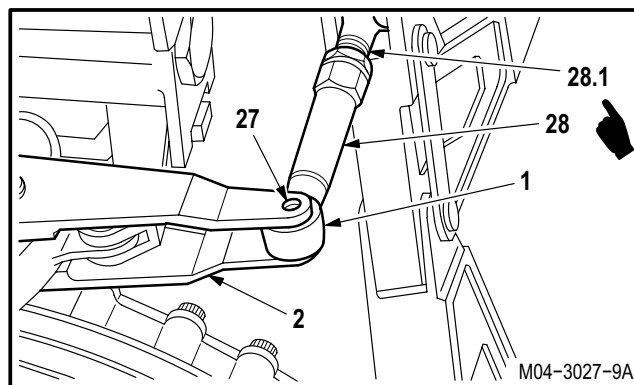
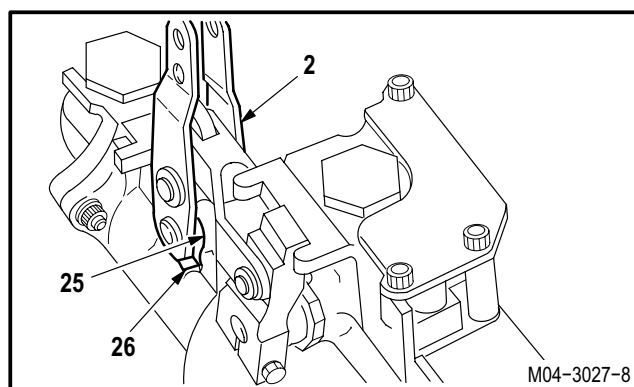
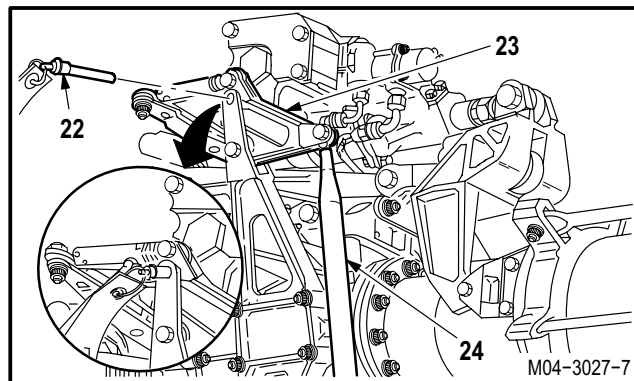
(1) Install bolt (5) through washer (6), input linkage (2) and rod end (1).

(2) Check fit of self-retaining bolt (5) (para 11.1).

(3) Install nut (4). Torque nut (4) to **30 INCH-POUNDS.** Use torque wrench.

(4) Increase torque to align cotter pin hole, but do not exceed **40 INCH-POUNDS.**

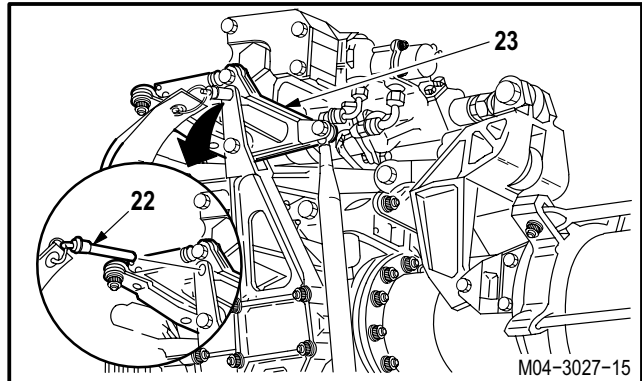
(5) Install new cotter pin (3).



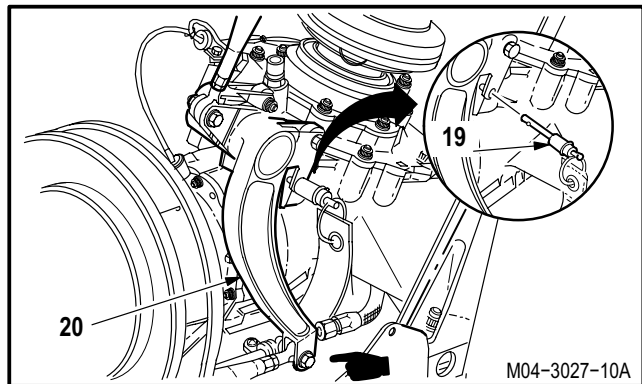
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11.294. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT PEDALS AND DIRECTIONAL SERVOCYLINDER – continued

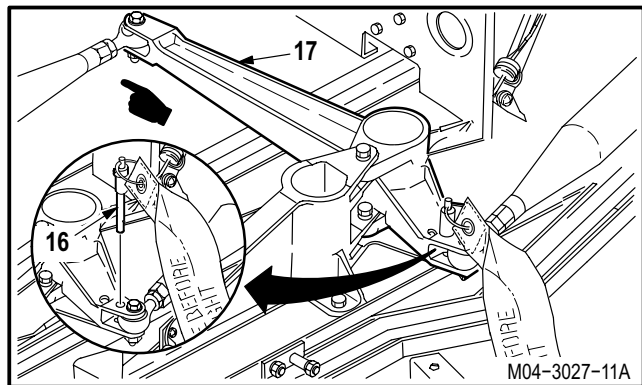
- p. Remove -9 rig pin (22) from directional F.S. 542 bellcrank (23).



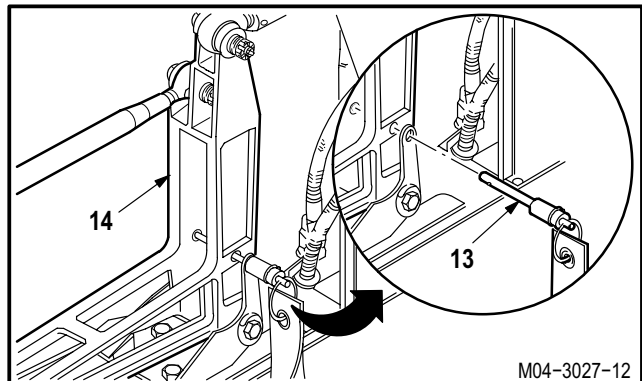
- q. Remove -9 rig pin (19) from directional F.S. 520 bellcrank (20).



- r. Remove -9 rig pin (16) from directional F.S. 348 bellcrank (17).



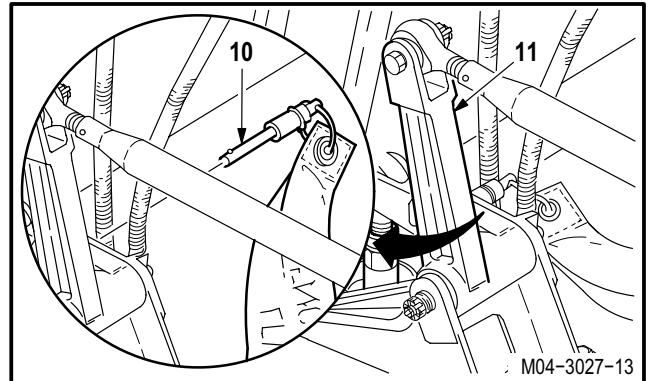
- s. Remove -5 rig pin (13) from directional F.S. 215 bellcrank (14).



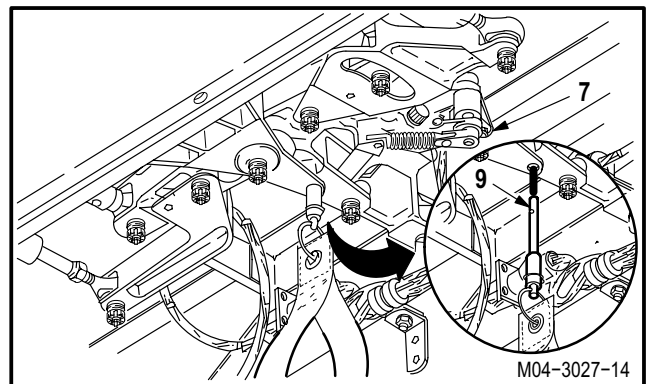
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11.294. RIGGING DIRECTIONAL FLIGHT CONTROLS BETWEEN PILOT PEDALS AND DIRECTIONAL SERVOCYLINDER – continued

- t. Remove -9 rig pin (10) from directional F.S. 164 bellcrank (11).



- u. Remove -9 rig pin (9) from SPAD (7).
- v. Inspect (QA).
- w. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).
- x. Disconnect maintenance headset (para 1.134).
- y. Remove external hydraulic power from aircraft (para 1.72).
- z. Install gun turret assembly (TM 9-1090-208-23).
- aa. Inspect (QA).
- ab. Install access fairings L510 and L540 and access panel L200; secure door L325 (para 2.2).



END OF TASK

11.295. RIGGING PILOT AND CPG DIRECTIONAL PEDAL STOP BOLTS

11.295.1. Description

This task covers: Rigging.

11.295.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- 0.300 - 24/0 - 24-inch inside/outside vernier caliper (item 54, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)

Materials/Parts:

- Wire (item 224, App F)

Personnel Required:

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

References:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panels B60, L200, and L540 removed
1.72	External primary hydraulic power applied
TM 9-1090-208-23	Gun turret assembly removed
11.293	Directional flight controls between pilot and CPG pedals rigged
11.294	Directional flight controls between pilot pedals and directional servocylinder rigged
1.134	Maintenance headset connected



Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.



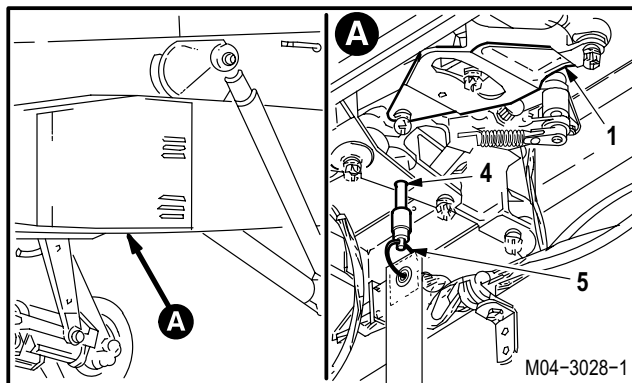
To prevent damage to flight control system, do not use force if binding or roughness occurs while moving controls with hydraulic power.

GO TO NEXT PAGE

11.295. RIGGING PILOT AND CPG DIRECTIONAL PEDAL STOP BOLTS – continued

11.295.3. Rigging

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **Observe pilot directional SPAD (1).**
- c. **Slowly move pilot directional pedals (2) and (3) to align rig pin holes (4) in SPAD (1).**

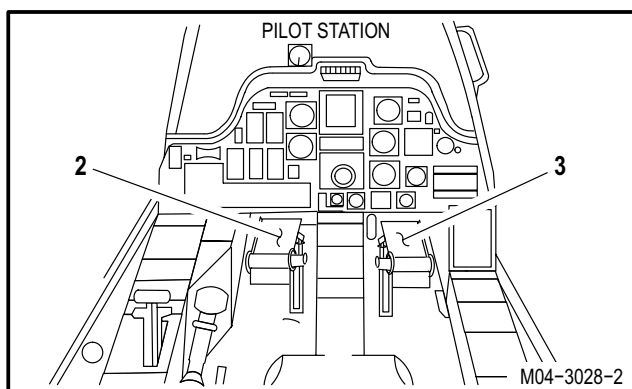


- d. **Install -9 rig pin (5) in SPAD (1).** Use flight control rigging kit.

NOTE

Rig pins installed must be a drop-fit condition in holes. (A slight drag of rig pin is acceptable.)

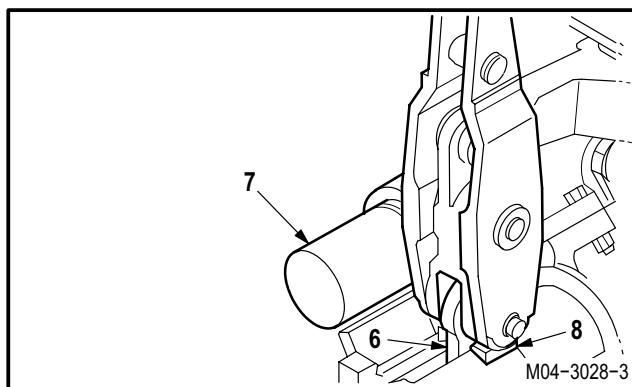
- e. **Verify drop-fit of -9 rig pin (5).**



- f. **Check that lower lever (6) on directional servocylinder (7) is aligned with upper edge of boss (8) on servocylinder body.**

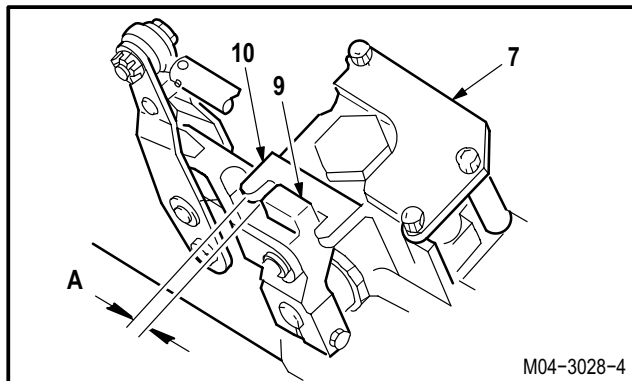
(1) If lever (6) is not aligned with upper edge of boss (8), rig directional flight controls between pilot pedal and directional servocylinder (para 11.294).

(2) If lever (6) is aligned with upper edge of boss (8), go to next step.



- g. **Measure and record distance between valve arm (9) and stop bolt (10) on servocylinder (7).**

(1) This is measurement A. Use caliper.



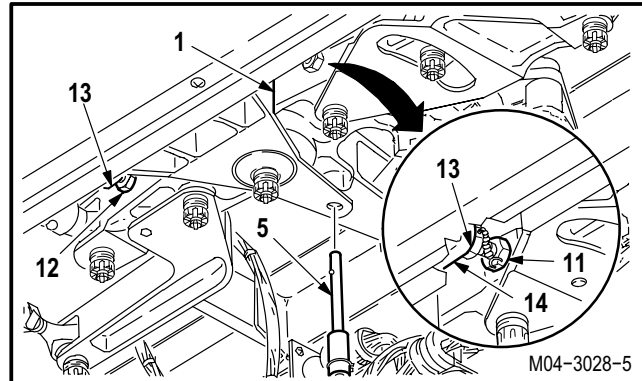
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11.295. RIGGING PILOT AND CPG DIRECTIONAL PEDAL STOP BOLTS – continued

h. Remove -9 rig pin (5) from SPAD (1).

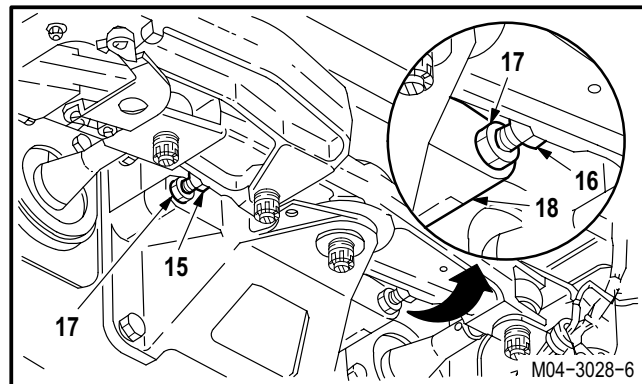
i. Back off pilot directional pedals left limit stop bolt (11) and right limit stop bolt (12).

- (1) Remove lockwire from bolts (11) and (12).
- (2) Loosen nut (13) and turn stop bolt (11) clockwise into bracket (14).
- (3) Loosen nut (13) and turn stop bolt (12) clockwise into bracket (14).



j. Back off CPG directional pedals left limit stop bolt (15) and right limit stop bolt (16).

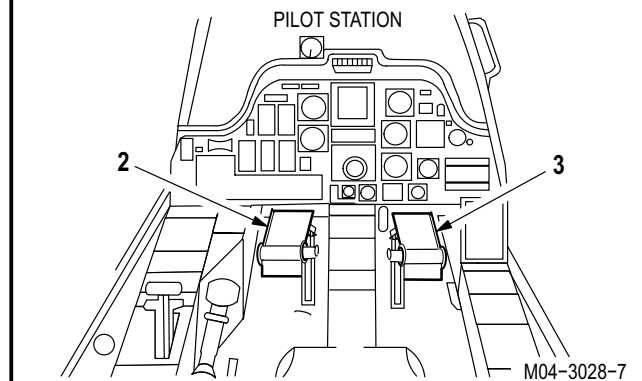
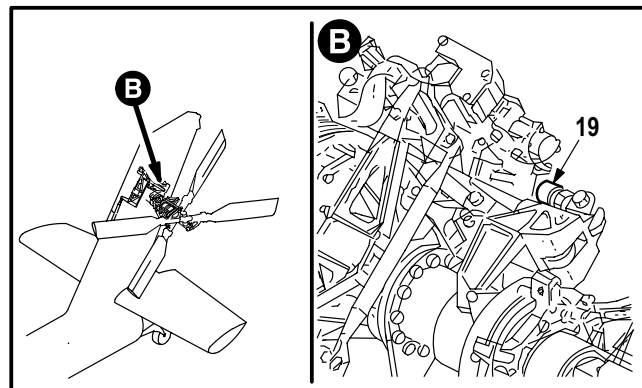
- (1) Remove lockwire from bolts (15) and (16).
- (2) Loosen nut (17) and turn stop bolt (15) clockwise into bracket (18).
- (3) Loosen nut (17) and turn stop bolt (16) clockwise into bracket (18).



k. Observe directional servocylinder piston (19) travel.

l. Fully retract piston (19) by slowly moving pilot right pedal (3) forward.

- (1) Slowly push pedal (3) forward until piston (19) is fully retracted.
- (2) Hold pedals (2) and (3) in this position.

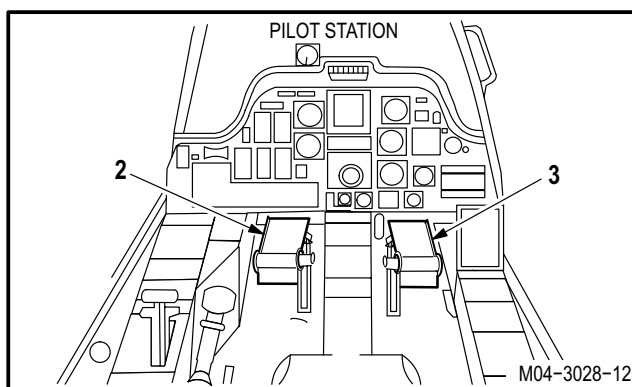
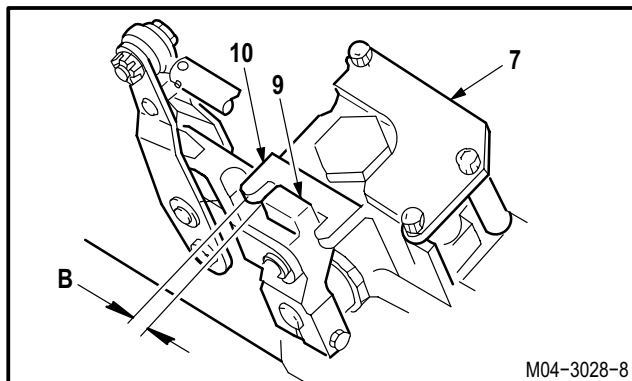


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11.295. RIGGING PILOT AND CPG DIRECTIONAL PEDAL STOP BOLTS – continued

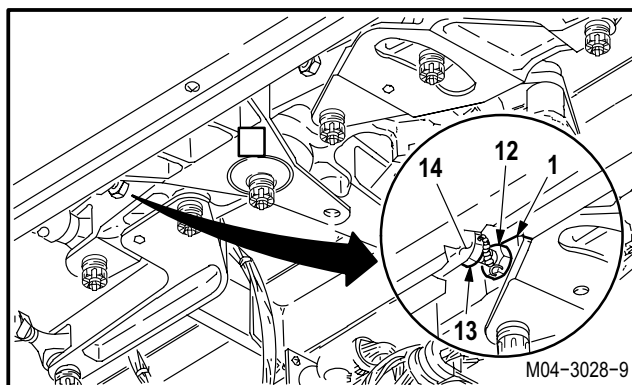
m. Measure and record distance between valve arm (9) and stop bolt (10) on servocylinder (7).

- (1) This is measurement B. Use caliper.
- (2) If difference between measurement A and B is more than **0.030 INCH**, move pilot left pedal (2) forward until difference between measurement A and measurement B is less than **0.030 INCH**.
- (3) If difference between measurements A and B is less than **0.030 INCH** go to next step.
- (4) Hold pedals (2) and (3) in this position.



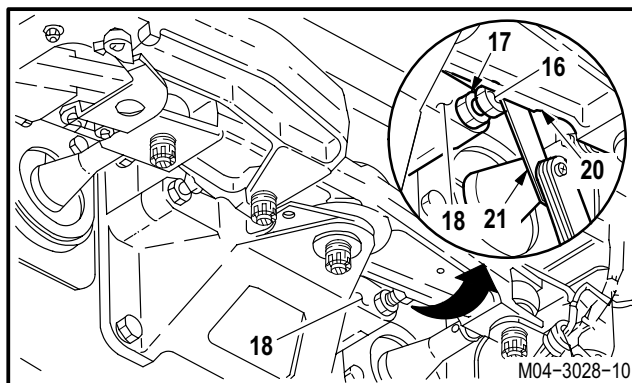
n. Adjust bolt (12) to contact SPAD (1).

- (1) Rotate bolt (12) counterclockwise to contact SPAD (1).
- (2) Hold bolt (12). Tighten nut (13).
- (3) Lockwire stop bolt (12) to nut (13), and bracket (14). Use wire (item 224, App F).



o. Adjust bolt (16) for a 0.020 INCH gap between bolt (16) and CPG SPAD (20).

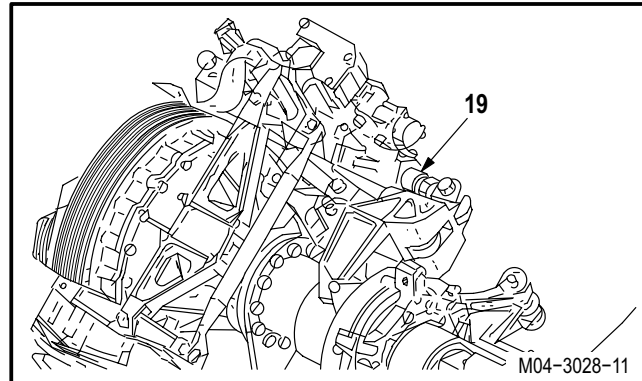
- (1) Hold pedal (3) forward to maintain contact between SPAD (1) and bolt (12).
- (2) Hold **0.020 INCH** thickness gage (21) against CPG SPAD (20).
- (3) Rotate bolt (16) counterclockwise until it contacts gage (21) held against SPAD (20).
- (4) Hold bolt (16). Tighten nut (17).
- (5) Lockwire stop bolt (16) to nut (17) and bracket (18). Use wire (item 224, App F).



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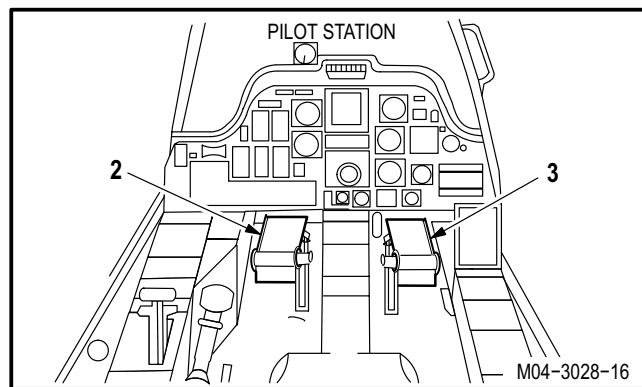
11.295. RIGGING PILOT AND CPG DIRECTIONAL PEDAL STOP BOLTS – continued

p. Observe piston (19) travel.



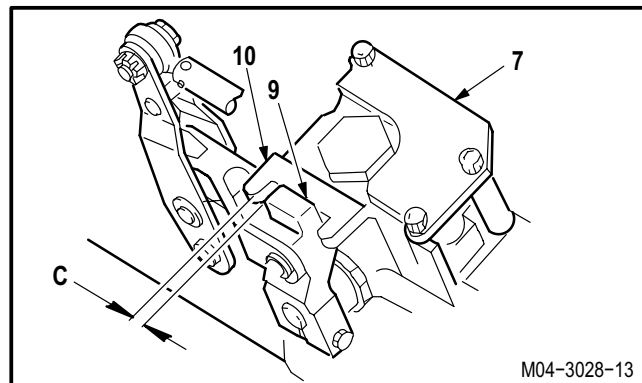
q. Fully extend piston (19) by slowly pushing pilot left pedal (2) forward.

- (1) Slowly push pedal (2) forward until piston (19) is fully extended.
- (2) Hold pedal (2) in this position.



r. Measure and record distance between valve arm (9) and stop bolt (10) on servocylinder (7).

- (1) This is measurement C. Use caliper.
- (2) If difference between measurements A and C is more than **0.270 INCH**, move pedal (3) forward until difference between measurement A and measurement B is between **0.210** and **0.270 INCH**.
- (3) If difference between measurements A and C is less than **0.210 INCH**, move pedal (2) forward until difference between measurement A and measurement C is between **0.210** and **0.270 INCH**.
- (4) If difference between measurements A and C is between **0.210** and **0.270 INCH** go to next step.
- (5) Hold pedals (2) and (3) in this position.

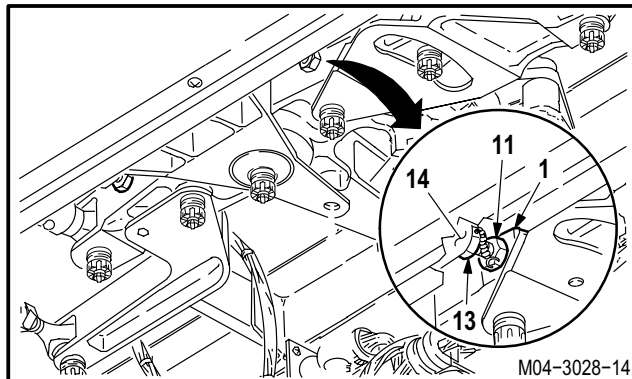


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11.295. RIGGING PILOT AND CPG DIRECTIONAL PEDAL STOP BOLTS – continued

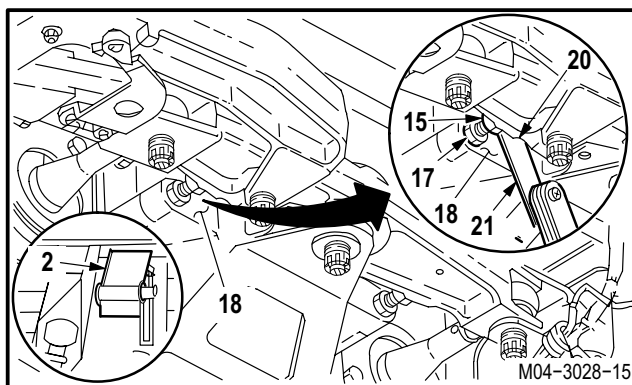
s. Adjust bolt (11) to contact SPAD (1).

- (1) Rotate bolt (11) out of bracket (14) until it contacts SPAD (1).
- (2) Hold bolt (11). Tighten nut (13).
- (3) Lockwire bolt (11) to nut (13) and bracket (14). Use wire (item 224, App F).



t. Adjust CPG left limit stop bolt (15) for a 0.020 INCH gap between bolt (15) and CPG SPAD (20).

- (1) Hold pedal (2) forward to maintain contact between SPAD (20) and bolt (15).
- (2) Hold 0.020 INCH thickness gage (21) against SPAD (20).
- (3) Rotate bolt (15) counterclockwise until it contacts gage (21) held against SPAD (20).
- (4) Hold bolt (15). Tighten nut (17).
- (5) Lockwire stop bolt (15) to nut (17) and bracket (18). Use wire (item 224, App F).



u. Inspect (QA).

v. Perform directional flight control rigging maintenance operational check (TM 1-1520-238-T).

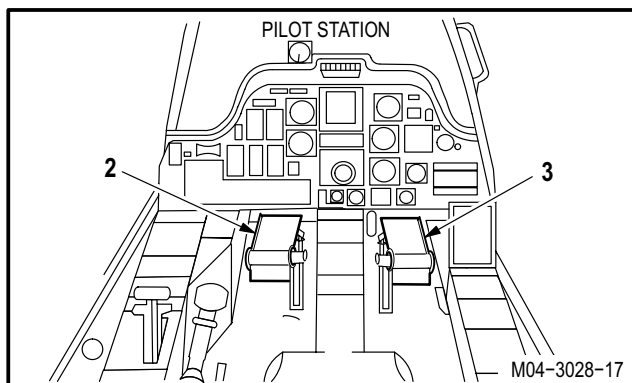
w. Disconnect maintenance headset (para 1.134).

x. Remove external hydraulic power from aircraft (para 1.72).

y. Install gun turret assembly (TM 9-1090-208-23).

z. Install access panels B60, L200, and L540 (para 2.2).

aa. Inspect (QA).



END OF TASK

11.296. RIGGING TAIL ROTOR DIRECTIONAL FLIGHT CONTROLS

11.296.1. Description

This task covers: Rigging.

11.296.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- Electrical cord assembly (item 68, App H)
- Microphone headset (item 174, App H)
- Aircraft power unit (item 232, App H)
- Flight control rigging kit (item 267, App H)

Personnel Required:

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

References:

TM 1-1520-238-T

Equipment Conditions:

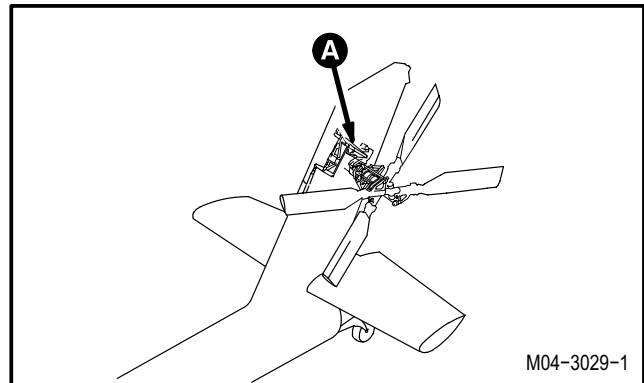
<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access fairings L540 and L546 removed
1.72	External primary hydraulic power applied
11.293	Directional flight controls between pilot and CPG pedals rigged
11.294	Directional flight controls between pilot pedals and directional servocylinder rigged
11.295	Pilot and CPG directional pedal stop bolts rigged
1.134	Maintenance headset connected

WARNING

Maintenance personnel must be warned verbally prior to moving the collective or cyclic stick. Any control activated can result in sudden blade movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

CAUTION

To prevent damage to flight control system, do not use force if binding or roughness occurs while moving controls with hydraulic power.



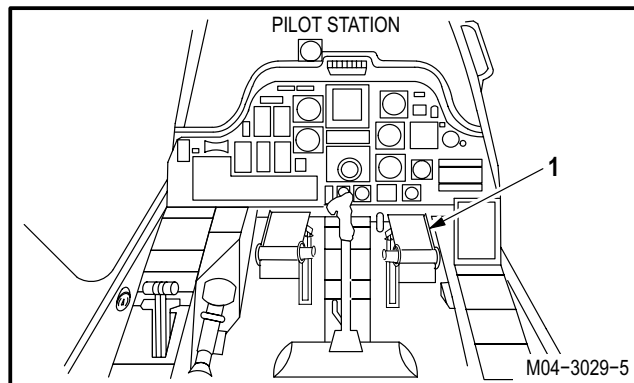
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11.296. RIGGING TAIL ROTOR DIRECTIONAL FLIGHT CONTROLS – continued

11.296.3. Rigging

- a. **Enter pilot station** (para 1.56). **Observe all safety precautions.**
- b. **Move pilot right directional pedal (1) forward until it contacts stops.**

(1) Hold pedal (1) in this position.



- c. **Check that rigging tool (2) contacts mast base (3) and aligns with de-ice housing (4).**

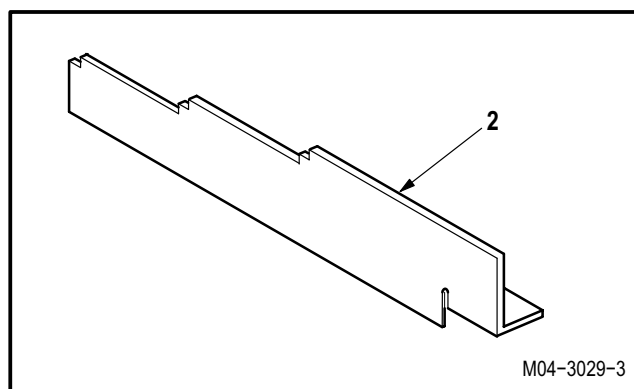
(1) Install rigging tool (2) between tail rotor gearbox mast base (3) and swashplate de-ice housing (4). Use flight control rigging kit.

(2) Hold rigging tool (2) firmly against mast base (3).

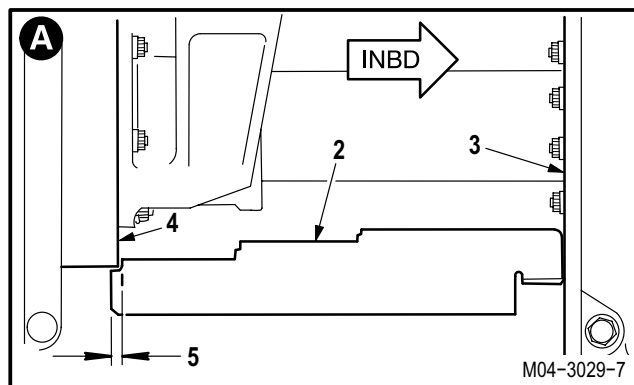
(3) Check that inboard edge of de-ice housing (4) falls within right pedal position limitations (5) specified on rigging tool (2).

(4) If inboard edge of de-ice housing (4) does not align within limits (5), adjust directional servo-cylinder rod end (para 11.297).

(5) If inboard edge of de-ice housing (4) aligns within limits (5), go to next step.

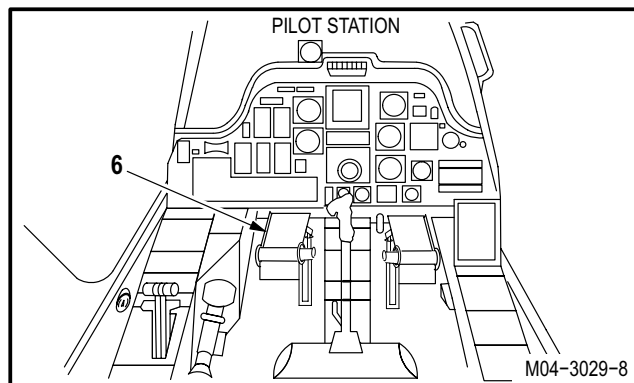


- d. **Remove rigging tool (2) from between tail rotor gearbox mast base (3) and swashplate de-ice housing (4).**



- e. **Move pilot left directional pedal (6) forward until it contacts stop.**

(1) Hold pedal (6) in this position.

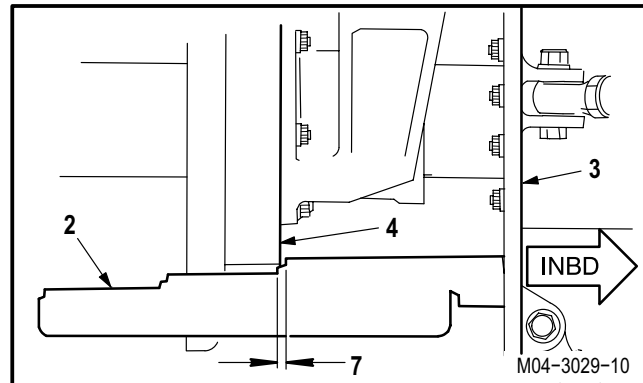


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11.296. RIGGING TAIL ROTOR DIRECTIONAL FLIGHT CONTROLS – continued

f. Check that rigging tool (2) contacts mast base (3) and aligns with de-ice housing (4).

- (1) Install rigging tool (2) between tail rotor gearbox mast base (3) and swashplate de-ice housing (4). Use flight control rigging kit.
- (2) Hold rigging tool (2) firmly against mast base (3).
- (3) Check that inboard edge of de-ice housing (4) falls within left pedal position limitations (7) specified on rigging tool (2).
- (4) If inboard edge of de-ice housing (4) does not align within limits (7), adjust directional servocylinder rod end (para 11.297).
- (5) If adjustment is made to obtain left pedal limits, repeat step b and c.
- (6) If left and right pedal limits cannot be obtained by adjusting directional servocylinder rod end, check rigging of pilot and CPG directional pedal stop bolts (para 11.295).
- (7) If inboard edge of de-ice housing (4) aligns within limits (7), go to next step.



g. Remove rigging tool (2) from between tail rotor gearbox mast base (3) and swashplate de-ice housing (4).

h. Inspect (QA).

i. Check tail rotor directional controls for freedom of movement and 0.0625 INCH clearance between control rods, bellcranks, and structure.

- (1) Slowly move left pedal full down; check for freedom of movement and **0.0625 INCH** clearance between rods, bellcranks, and structure.
- (2) Slowly move right pedal full down; check for freedom of movement and **0.0625 INCH** clearance between rods, bellcranks, and structure.

GO TO NEXT PAGE

11.296. RIGGING TAIL ROTOR DIRECTIONAL FLIGHT CONTROLS – continued

- j. **Inspect (QA).**
- k. **Perform directional flight control rigging maintenance operational check** (TM 1-1520-238-T).
- l. **Disconnect maintenance headset** (para 1.134).
- m. **Remove external primary hydraulic power** (para 1.72).
- n. **Install access fairings L540 and L546** (para 2.2).

END OF TASK

11.297. SERVOCYLINDER ROD END ADJUSTMENT

11.297.1. Description

This task covers: Adjustment.

11.297.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- 0.300 - 24/0 - 24-inch inside/outside vernier caliper (item 54, App H)
- 1 1/8 x 1/2-inch drive open end box socket wrench crowfoot attachment (item 75, App H)
- 15/16 x 3/8-inch drive open end box socket wrench crowfoot attachment (item 80, App H)
- Flight control rigging kit (item 267, App H)
- 0 - 175 foot-pound 1/2-inch drive dial indicator torque wrench (item 444, App H)

Materials/Parts:

Wire (item 225, App F)

Personnel Required:

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

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed

WARNING

- **Failure to follow maintenance instructions may result in serious injury or death of crewmembers and/or serious damage to the helicopter. If injury occurs, seek medical aid.**
- **To provide enough thread engagement to maintain safe flight, the distance between center of rod end and end of servocylinder piston must not exceed 3.06 INCHES.**

CAUTION

To prevent breakdown of cylinder piston rings, rotation of piston is limited to 90 degrees during rigging and installation. Adjustments are made by turning rod end, not piston.

NOTE

- To adjust collective servocylinder rod end, go to paragraph 11.297.3.
- To adjust longitudinal servocylinder rod end, go to paragraph 11.297.4.
- To adjust lateral servocylinder rod end, go to paragraph 11.297.5.
- To adjust directional servocylinder rod end, go to paragraph 11.297.6.

GO TO NEXT PAGE

11.297. SERVOCYLINDER ROD END ADJUSTMENT – continued

11.297.3. Adjust Collective Servocylinder Rod End

- a. **Install -9 rig pin (1) in F.S. 165 collective bellcrank (2).** Use flight control rigging kit.
- b. **Measure and record distance between top of collective servocylinder housing (3) and bottom of locknut (4).**

(1) This is measurement A. Use caliper.

- c. **Remove -9 rig pin (1) from F.S. 165 collective bellcrank (2).**

- d. **Move pilot collective stick (5) to align BASIC DIM pointer (para 11.284).**

- e. **Measure and record distance between top of housing (3) and bottom of locknut (4).**

(1) This is measurement B. Use caliper.

- f. **Remove servocylinder rod end (6) from collective mixer bellcrank (7) (para 7.41).**

- g. **Loosen locknut (4).**

(1) Remove lockwire.

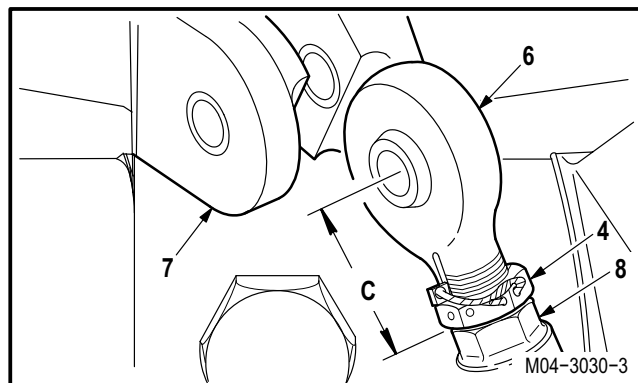
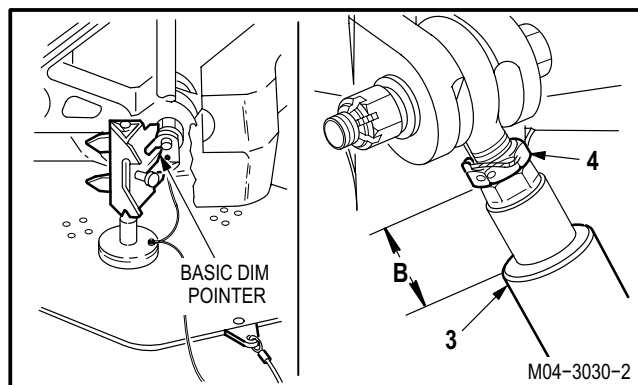
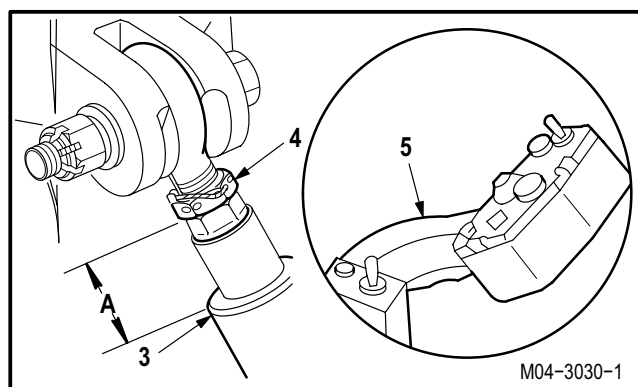
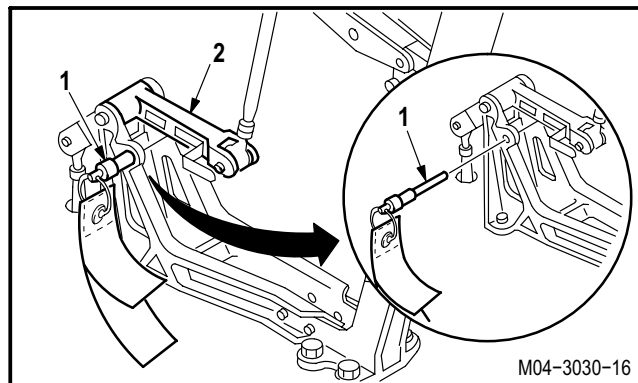
- h. **Measure and record distance between top of piston (8) and center of rod end (6).**

(1) This is measurement C. Use caliper.

- i. **Adjust rod end (6) by turning it in or out of piston (8).**

(1) If measurement A is larger than measurement B, turn rod end (6) into piston (8). Shorten measurement C an amount equal to difference between measurements A and B.

(2) If measurement A is smaller than measurement B, turn rod end (6) out of piston (8). Lengthen measurement C an amount equal to difference between measurements A and B.



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11.297. SERVOCYLINDER ROD END ADJUSTMENT – continued

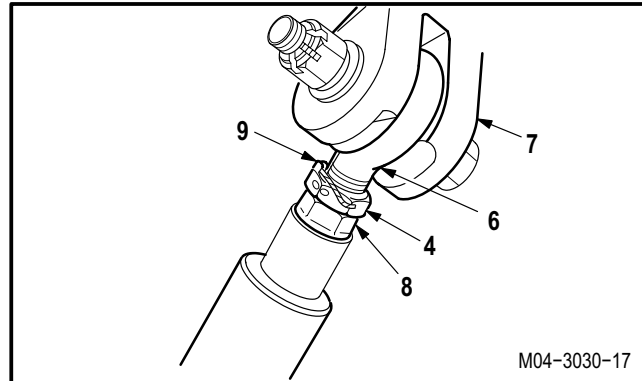
j. **Install servocylinder rod end (6) on collective mixer bellcrank (7) (para 7.41).**

k. **Torque nut (4) to 77 FOOT-POUNDS.**

(1) Hold piston rod (8). Use crowfoot.

(2) Torque nut (4) to **77 FOOT-POUNDS**. Use torque wrench.

(3) Lockwire nut (4) to lock (9). Use wire (item 225, App F).



l. **Inspect (QA).**

m. **Continue collective upper flight controls rigging (para 11.284).**

GO TO NEXT PAGE

11.297. SERVOCYLINDER ROD END ADJUSTMENT – continued

11.297.4. Adjust Longitudinal Servocylinder Rod End

a. **Install -9 rig pin (10) in longitudinal F.S. 165 bellcrank (11).** Use flight control rigging kit.

b. **Measure and record distance between top of longitudinal servocylinder housing (12) and bottom of locknut (13).**

(1) This is measurement D. Use caliper.

c. **Remove -9 rig pin (10) from longitudinal F.S. 165 bellcrank (11).**

d. **Move pilot cyclic stick (14) to align BASIC DIM pointer (para 11.288).**

e. **Measure and record distance between top of housing (12) and bottom of locknut (13).**

(1) This is measurement E. Use caliper.

f. **Remove servocylinder rod end (15) from longitudinal mixer bellcrank (16) (para 7.47).**

g. **Loosen lock nut (13).**

(1) Remove lockwire.

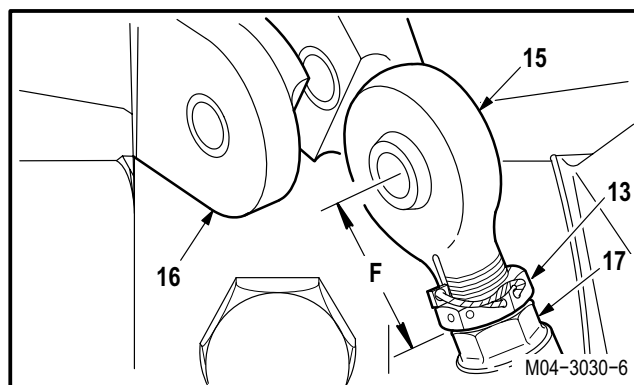
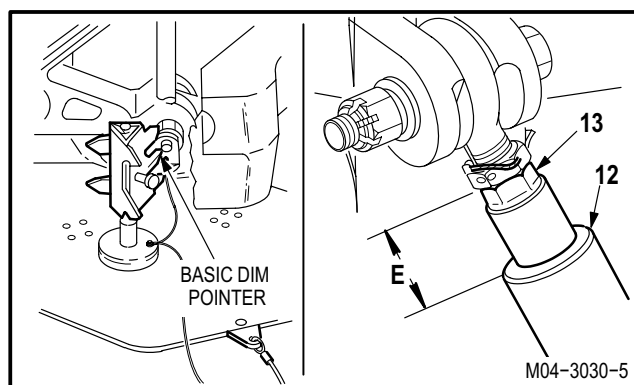
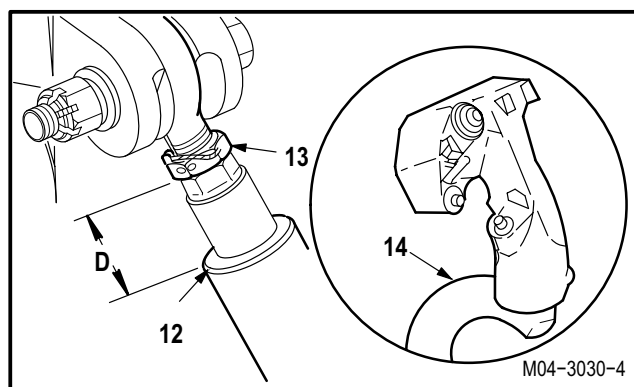
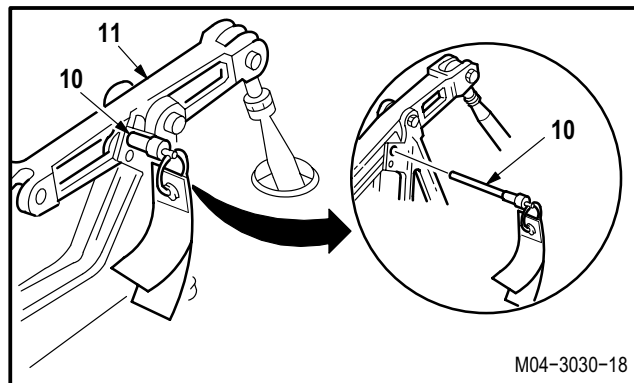
h. **Measure and record distance between top of piston (17) and center of rod end (15).**

(1) This is measurement F. Use caliper.

i. **Adjust rod end (15) by turning in or out of piston (17).**

(1) If measurement D is larger than measurement E, turn rod end (15) into piston (17). Shorten measurement F an amount equal to difference between measurements D and E.

(2) If measurement D is smaller than measurement E, turn rod end (15) out of piston (17). Lengthen measurement F an amount equal to difference between measurements D and E.



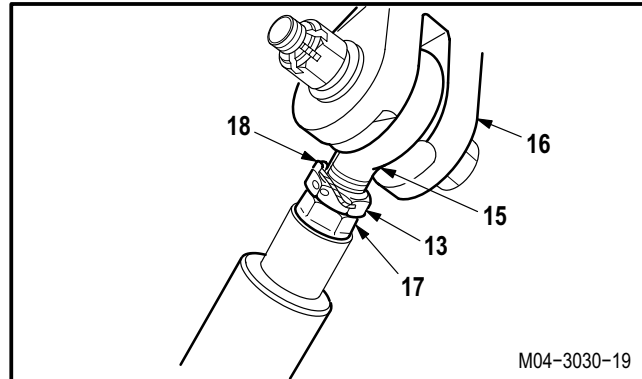
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11.297. SERVOCYLINDER ROD END ADJUSTMENT – continued

j. **Install servocylinder rod end (15) on longitudinal mixer bellcrank (16) (para 7.47).**

k. **Torque nut (13) to 77 FOOT-POUNDS.**

- (1) Hold piston rod (17). Use crowfoot.
- (2) Torque nut (13) to **77 FOOT-POUNDS**. Use torque wrench.
- (3) Lockwire nut (13) to lock (18). Use wire (item 225, App F).



l. **Inspect (QA).**

m. **Continue rigging longitudinal upper flight control (para 11.288).**

GO TO NEXT PAGE

11.297. SERVOCYLINDER ROD END ADJUSTMENT – continued

11.297.5. Adjust Lateral Servocylinder Rod End

- a. Install -9 rig pin (19) in lateral F.S. 165 bellcrank (20). Use flight control rigging kit.
- b. Measure and record distance between top lateral servocylinder housing (21) and bottom of locknut (22).

(1) This is measurement G. Use caliper.

- c. Remove -9 rig pin (19) from lateral F.S. 165 bellcrank (20).

- d. Move pilot cyclic stick (14) to align BASIC DIM pointer (para 11.292).

- e. Measure and record distance between top of housing (21) and bottom of locknut (22).

(1) This is measurement H. Use caliper.

- f. Remove servocylinder rod end (23) from lateral mixer bellcrank (24) (para 7.44).

- g. Loosen lock nut (22).

(1) Remove lockwire.

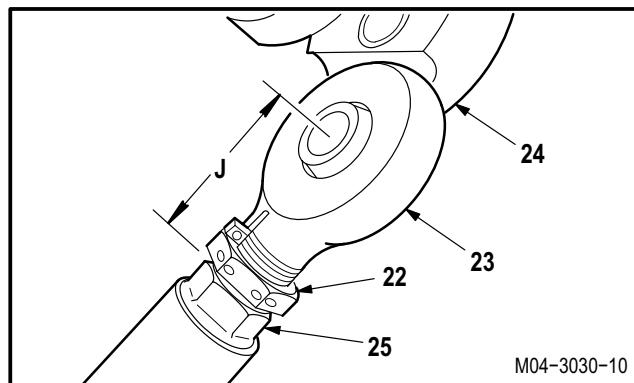
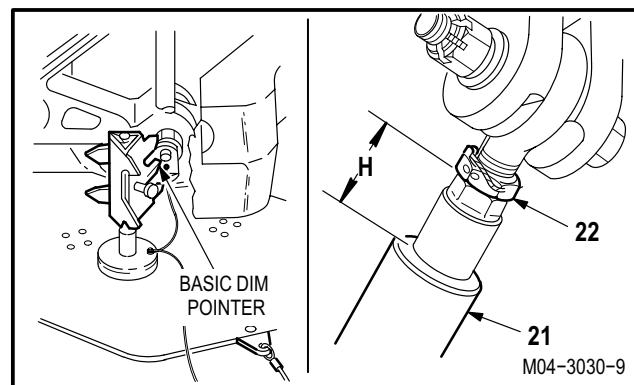
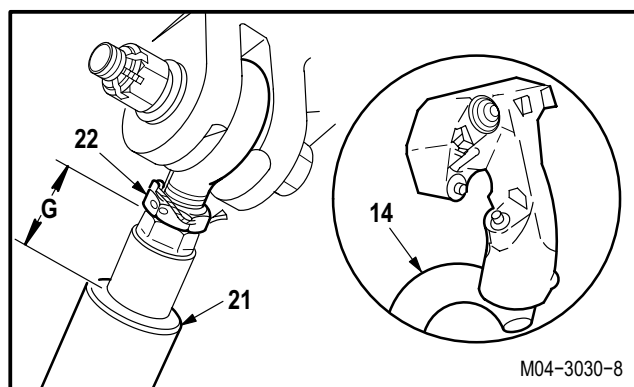
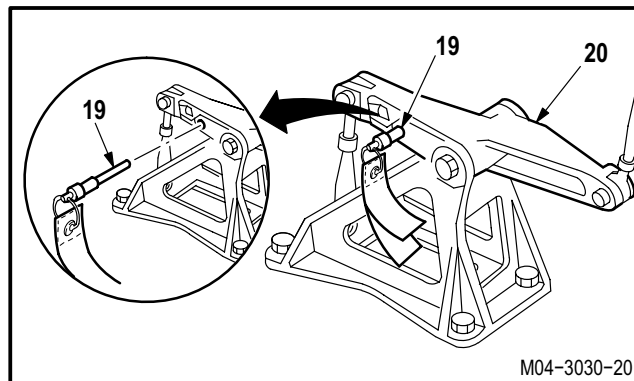
- h. Measure and record distance between top of piston (25) and center of rod end (23).

(1) This is measurement J. Use caliper.

- i. Adjust rod end (23) by turning in or out piston (25).

(1) If measurement G is larger than measurement H, turn rod end (23) into piston (25). Shorten measurement J an amount equal to difference between measurements G and H.

(2) If measurement G is smaller than measurement H, turn rod end (23) out of piston (25). Lengthen measurement J an amount equal to difference between measurements G and H.



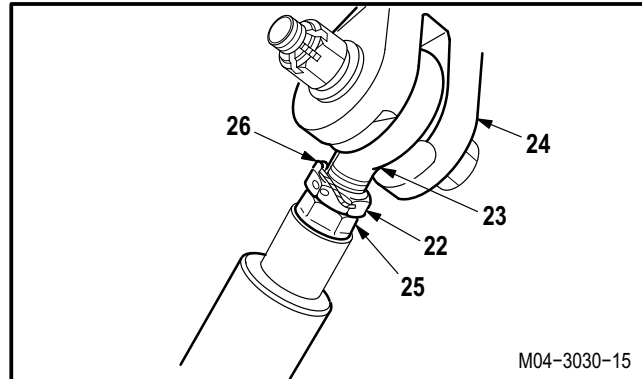
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11.297. SERVOCYLINDER ROD END ADJUSTMENT – continued

j. **Install servocylinder rod end (23) on lateral mixer bellcrank (24)** (para 7.45).

k. **Torque nut (22) to 77 FOOT-POUNDS.**

- (1) Hold piston rod (25). Use crowfoot.
- (2) Torque nut (22) to **77 FOOT-POUNDS**. Use torque wrench.
- (3) Lockwire nut (22) to lock (26). Use wire (item 225, App F).



l. **Inspect (QA).**

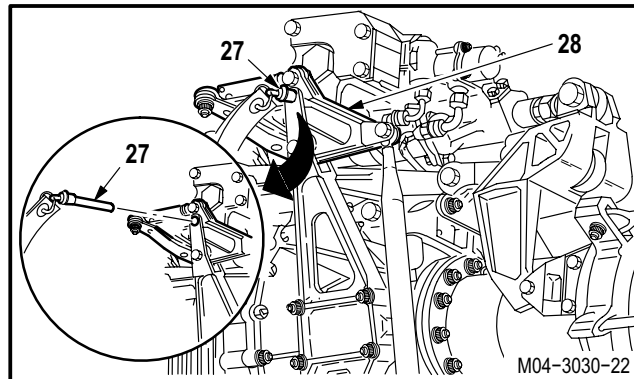
m. **Continue rigging lateral upper flight controls** (para 11.292).

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11.297. SERVOCYLINDER ROD END ADJUSTMENT – continued

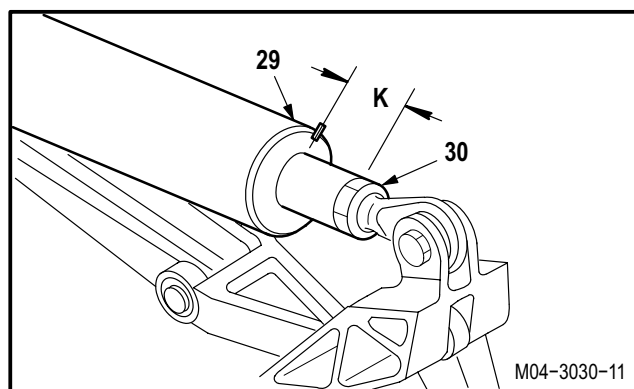
11.297.6. Adjust Directional Rod End

- a. **Install -9 rig pin (27) in directional F.S. 542 bellcrank (28).** Use flight control rigging kit.



- b. **Measure and record distance between top of directional servocylinder housing (29) and bottom of locknut (30)**

(1) This is measurement K. Use caliper.

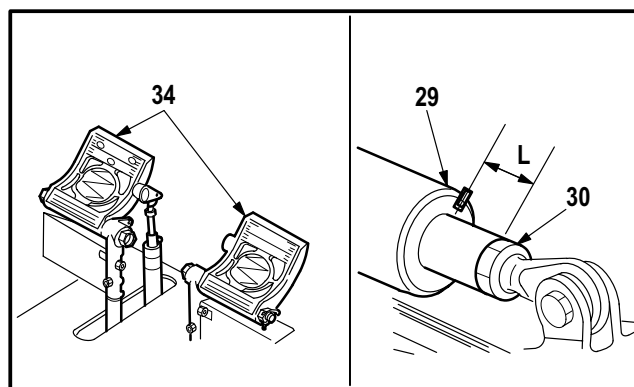


- c. **Remove -9 rig pin (27) from directional F.S. 542 bellcrank (28).**

- d. **Install tool (31) between base (32) and housing (33).** Use flight control rigging kit

(1) Check that tool (31) contacts base (32) and aligns with housing (33).

(2) Hold tool (31) firmly against base (32).

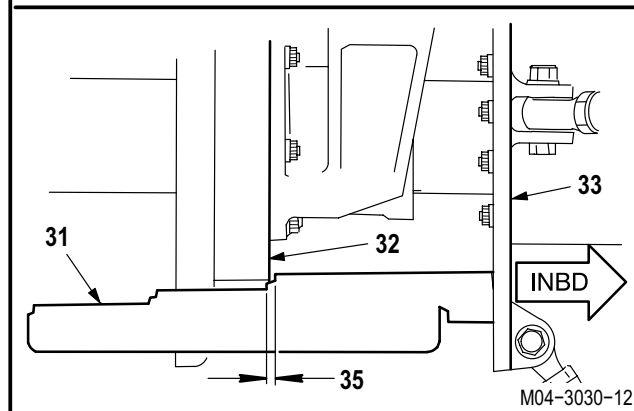


- e. **Move pilot directional pedals (34) to ensure inboard edge of base (32) falls within mid pedal position limitations (35) specified on tool (31).**

- f. **Measure and record distance between top of servocylinder housing (29) and bottom of locknut (30).**

(1) This is measurement L. Use caliper.

- g. **Remove tool (31) from base (32) and housing (33).**



GO TO NEXT PAGE

11.297. SERVOCYLINDER ROD END ADJUSTMENT – continued

h. Remove servocylinder rod end (36) from directional bellcrank (37) (para 7.32).

i. Loosen locknut (30).

(1) Remove lockwire.

j. Measure and record distance between top of piston (38) and center of rod end (36).

(1) This is measurement M. Use caliper.

k. Adjust rod end (36) by turning in or out of piston (38).

(1) If measurement K is larger than measurement L, turn rod end (36) into piston (38). Shorten measurement M an amount equal to difference between measurements K and L.

(2) If measurement K is smaller than measurement L, turn rod end (36) out of piston (38). Lengthen measurement M an amount equal to difference between measurements K and L.

l. Install servocylinder rod end (36) on directional bellcrank (37) (para 7.33).

m. Torque nut (30) to 77 FOOT-POUNDS.

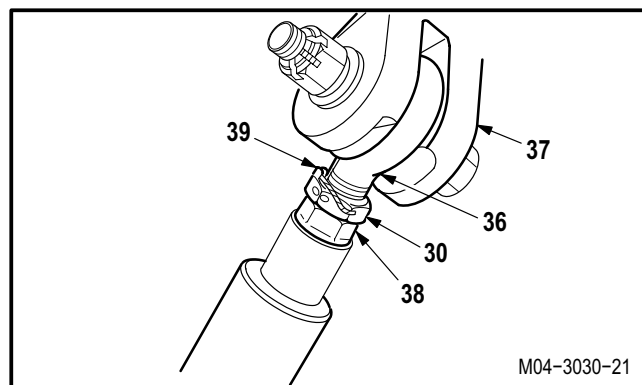
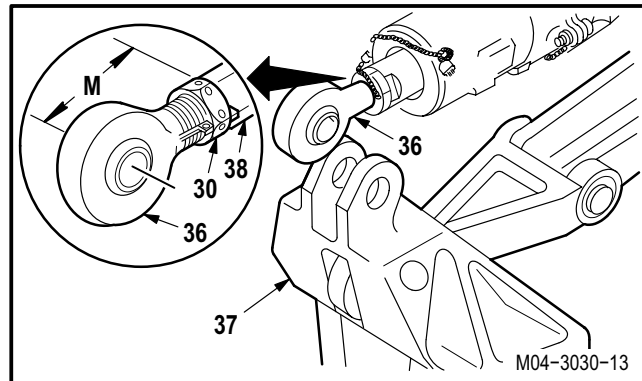
(1) Hold piston rod (38). Use crowfoot.

(2) Torque nut (30) to 77 FOOT-POUNDS. Use torque wrench.

(3) Lockwire nut (30) to lock (39). Use wire (item 225, App F).

n. Inspect (QA).

o. Continue rigging directional upper flight controls (para 11.296).



END OF TASK

11.298. RIGGING HORIZONTAL STABILATOR

11.298.1. Description

This task covers: Rigging.

11.298.2. Initial Setup

Tools:

- Aircraft mechanic's tool kit (item 376, App H)
- 1 1/8 x 3/8-inch drive open end socket wrench crowfoot attachment (item 90, App H)
- Aircraft power unit (item 232, App H)
- Protractor fixture (item 233, App H)
- Protractor assembly (item 238, App H)
- Flight control rigging kit (item 267, App H)
- 10 - 50 inch-pound 1/4-inch drive click type torque wrench (item 434, App H)
- 0 - 600 inch-pound 3/8-inch drive dial indicator torque wrench (item 447, App H)

Materials/Parts:

- Wire (item 224, App F)
- Corrosion preventive compound (item 62A, 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:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access panel R200 removed; covers L545 and R545 removed
1.70	Electrical power connected
1.134	Maintenance headset connected



Maintenance personnel must be warned verbally prior to moving the flight controls. Any control activated can result in movement that can sever or crush fingers or hands. If injury occurs, seek medical aid.

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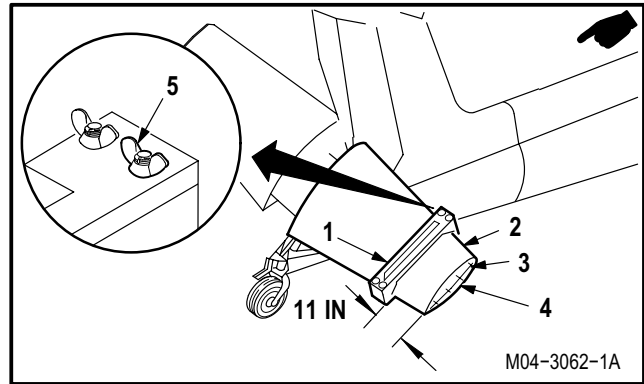
11.298. RIGGING HORIZONTAL STABILATOR – continued

11.298.3. Rigging

a. Install protractor fixture (1) on horizontal stabilator (2).

(1) Position fixture (1) on stabilator (2) **11 INCHES** inboard of seam (3) formed by the right tip cap (4) and stabilator (2). Use protractor fixture.

(2) Tighten four wing nuts (5) on fixture (1).



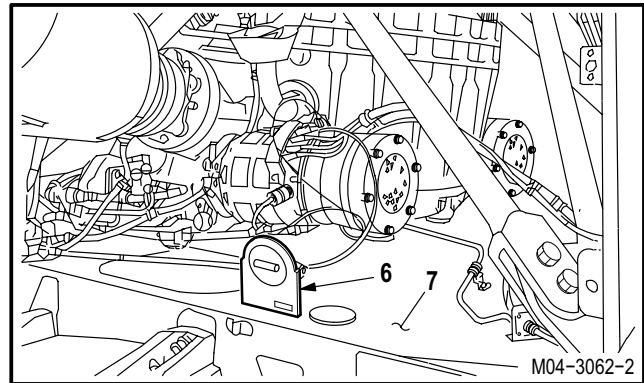
b. Set protractor assembly (6) for reference zero point.

(1) Place protractor assembly (6) on transmission deck (7). Use protractor assembly.

(2) Aline body of protractor assembly (6) with longitudinal axis of helicopter.

(3) Adjust protractor assembly (6) for zero. This setting is to be used as a reference point.

(4) Remove zeroed protractor assembly (6).



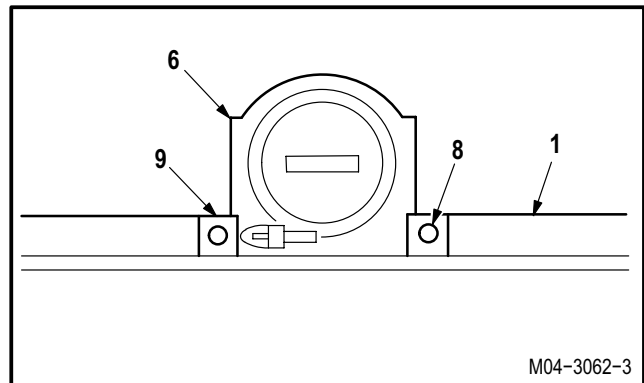
c. Attach zeroed protractor assembly (6) to protractor fixture (1).

(1) Loosen two thumbscrews (8) that attach clamping blocks (9) to protractor fixture (1).

(2) Place zeroed protractor assembly (6) between blocks (9) and protractor fixture (1).

(3) Ensure that bottom of protractor assembly (6) is flat against protractor fixture (1).

(4) Tighten two thumbscrews (8).



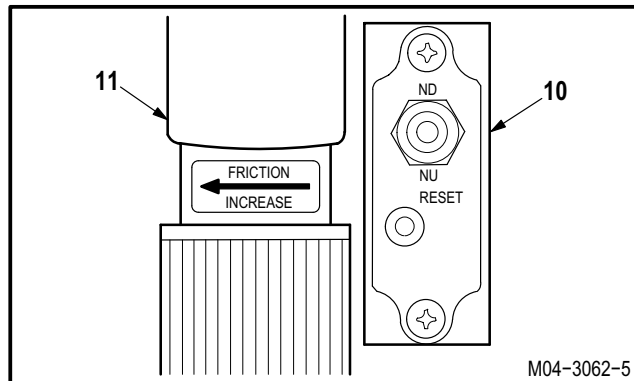
d. Apply external power to aircraft (para 1.70).

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11.298. RIGGING HORIZONTAL STABILATOR – continued

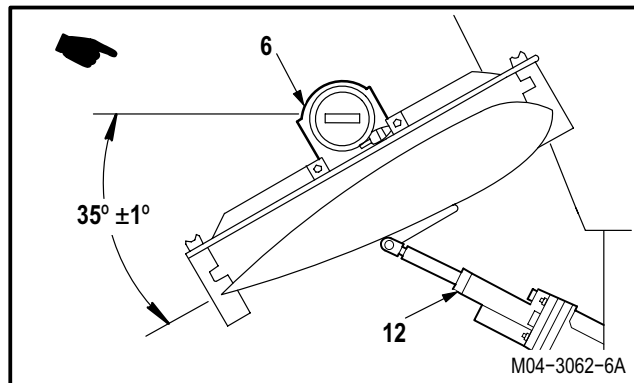
e. On pilot aft circuit breaker panel, ensure STAB MAN DC and STAB MAN AC circuit breakers are closed.

f. Using stabilator manual control (10) on pilot collective stick (11), actuate stabilator to full trailing down ND position.



g. Determine stabilator angle from protractor assembly (6).

- (1) This angle must be 34 to 36 degrees.
- (2) If angle is 34 to 36 degrees go to step n.
- (3) If angle is not 34 to 36 degrees go to next step.



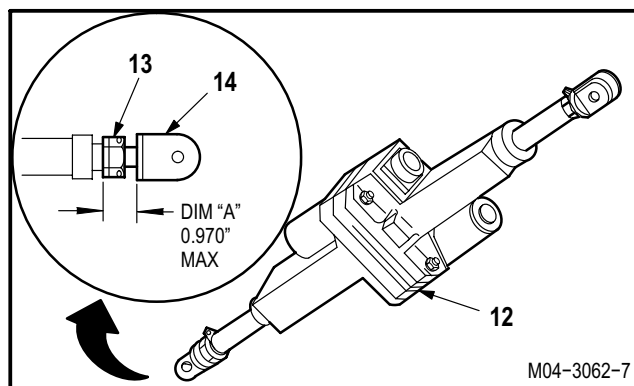
h. Remove external power from aircraft (para 1.70).

i. Adjust stabilator actuator (12) to obtain 34 to 36 degrees ND.

- (1) Remove actuator (12) from helicopter (para 11.224).

CAUTION

Dimension A, between bottom of nut (13) and bottom of rod end (14), must not exceed **0.970 INCH**.



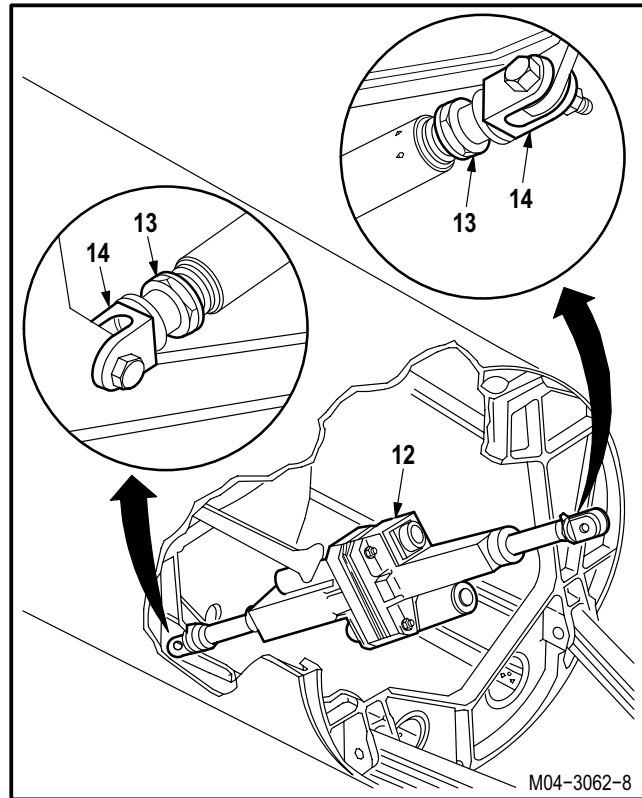
NOTE

- Adjust both actuator rod ends equally.
- Adjust rod ends in 1/2 turn increments.

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11.298. RIGGING HORIZONTAL STABILATOR – continued

- (2) Remove lockwire from two locknuts (13).
- (3) Hold two rod ends (14). Loosen two locknuts (13). Use crowfoot.
- (4) If stabilator angle was too small, turn both rod ends (14) clockwise 1/2 turn.
- (5) If stabilator angle was too large, turn both rod ends (14) counterclockwise 1/2 turn.
- (6) Ensure dimension A limits, between bottom of nut (13) and bottom top of rod end (14), does exceed **0.970 INCH**.
- (7) If dimension A exceeds **0.970 INCH**, replace actuator (12) (para 11.224).
- (8) Temporarily install actuator (12) using attaching bolts only (para 11.224).

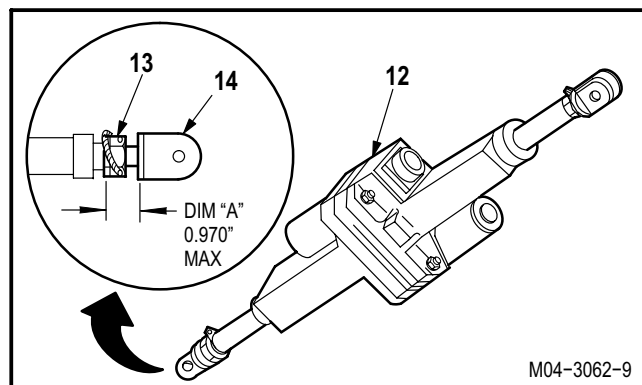


j. Check that stabilator angle is 34 to 36 degrees.

- (1) If angle is still not **34 to 36 degrees**, repeat step i.
- (a) If angle is **34 to 36 degrees**, go to step k.

k. Torque two nuts (13) to 300 INCH-POUNDS.

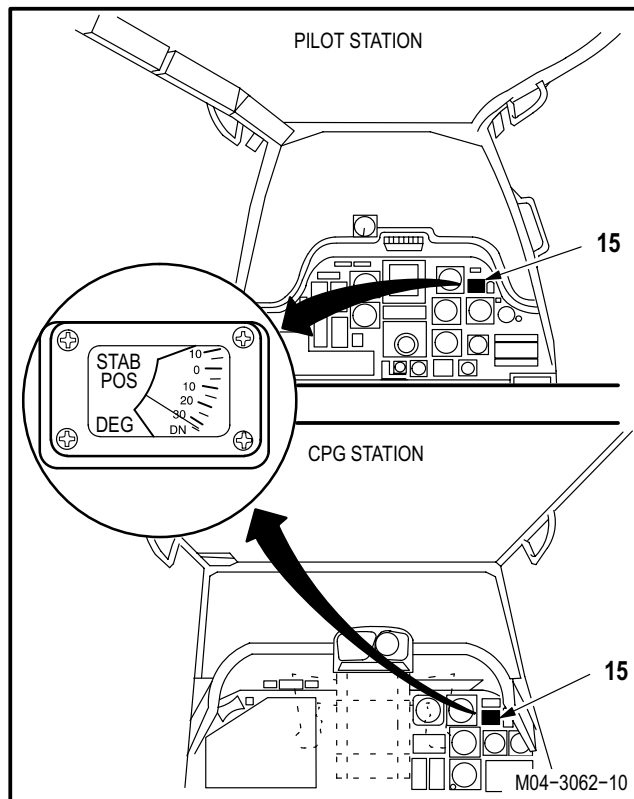
- (1) Without moving rod ends (14), remove actuator (12) from helicopter (para 11.224).
- (2) Hold two rod ends (14).
- (3) Torque two nuts (13) to **300 INCH-POUNDS**. Use torque wrench and crowfoot.
- (4) Lockwire two nuts (13). Use wire (item 224, App F).
- (5) After final adjustment of rod ends (14) apply corrosion preventive compound (item 62A, App F) on all exposed threads, nuts, lockwashers and safety wire.



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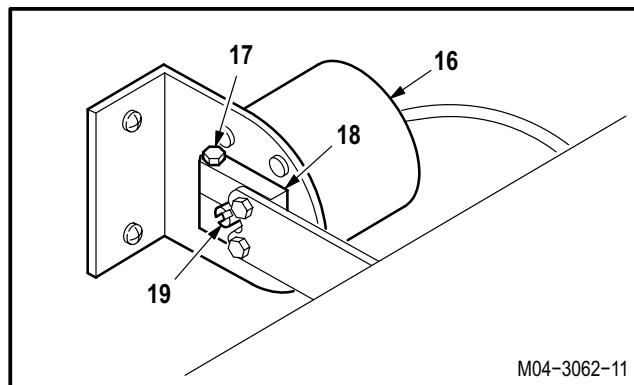
11.298. RIGGING HORIZONTAL STABILATOR – continued

- l. Install actuator (12) in helicopter (para 11.224).
- m. Apply external power to aircraft (para 1.70).
- n. Verify that pilot and CPG stabilator position indicators (15) indicate 34 to 36 degrees.
 - (1) If indicators are in limits, go to step p.
 - (2) If indicators are not in limits, go to next step.



- o. Adjust position transducer (16) to obtain 34 to 36 degrees on pilot and CPG indicators (15). Torque bolt (17) to 33 INCH-POUNDS.

- (1) Loosen bolt (17) on sensor clamp (18).
- (2) Adjust transducer (16) by turning shaft (19) until cockpit indicators (15) indicate 34 to 36 degrees.

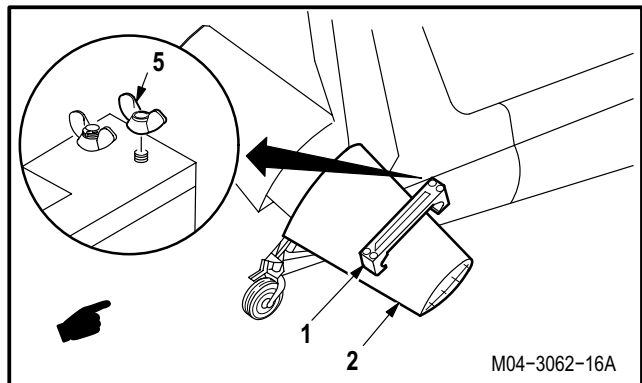
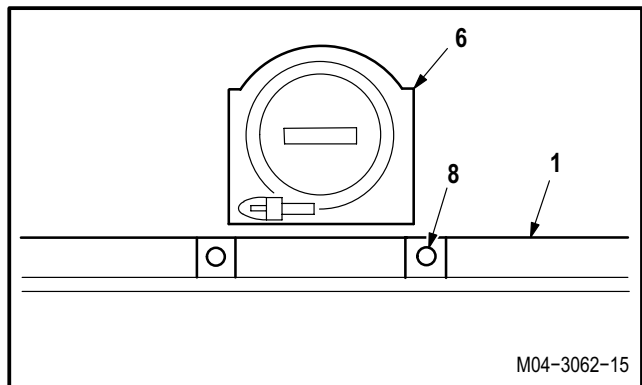
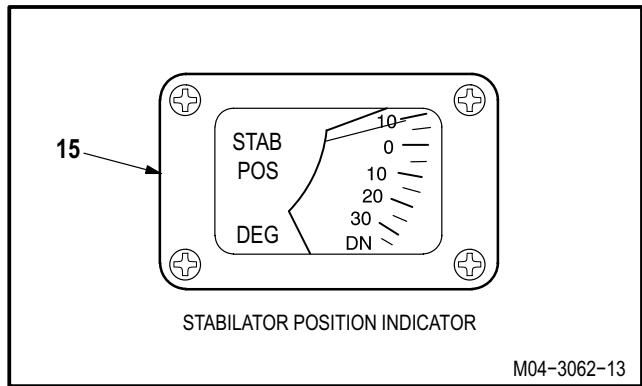
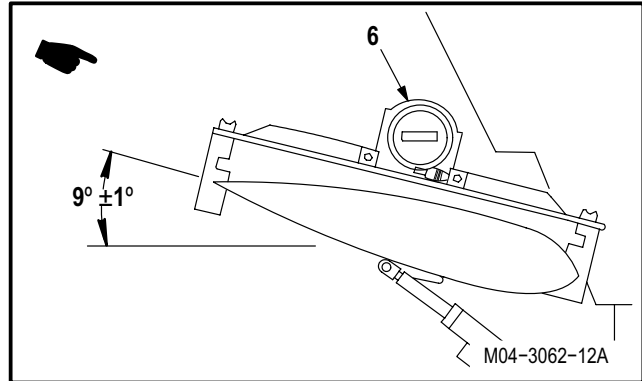


- (3) Hold shaft (19). Torque bolt (17) on sensor clamp (18) to 33 INCH-POUNDS. Use torque wrench.
- (4) If unable to adjust within limits, replace transducer (16) (para 11.231).
- (5) If CPG indicator does not indicate within 2 degrees of pilot indicator, troubleshoot stabilator system (TM 1-1520-238-T).

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11.298. RIGGING HORIZONTAL STABILATOR – continued

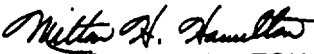
- p. Actuate stabilator to full NU position.
- q. Check that stabilator NU angle is 8 to 10 degrees on protractor assembly (6).
 - (1) If angle is not within limits, replace actuator (para 11.224).
- r. Check that both pilot and CPG indicator (15) indicate 9 ± 2 degrees.
 - (1) If indicators are not within limits, replace position transducer (para 11.231).
- s. On pilot aft circuit breaker panel, open STAB MAN DC and STAB MAN AC circuit breakers.
- t. Remove external power from aircraft (para 1.70).
- u. Remove protractor assembly (6) from fixture (1).
 - (1) Loosen two thumbscrews (8).
 - (2) Remove protractor assembly (6) from protractor fixture (1).
 - (3) Tighten two thumbscrews (8).
- v. Remove protractor fixture (1) from stabilator (2).
 - (1) Loosen four wing nuts (5). Remove fixture (1).
- w. Inspect (QA).
- x. Install access panel R200; install covers L545 and R545 (para 2.2).
- y. Disconnect maintenance headset (para 1.134).
- z. Perform stabilator maintenance operational check (TM 1-1520-238-T).



END OF TASK

By Order of the Secretary of the Army:

Official:


MILTON H. HAMILTON
*Administrative Assistant to the
Secretary of the Army*
06993

GORDON R. SULLIVAN
*General, United States Army
Chief of Staff*

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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
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PUBLICATION DATE

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AVUM/AVIM Manual for AH-64 Helicopter

BE EXACT PIN-POINT WHERE IT IS

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
6	2-1 a		
B1		4-3	

In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.

Callout 16 in figure 4-3 is pointed at a bolt. In key to figure 4-3, item 16 is called a shim. Please correct one or the other

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JOHN DOE, PFC (268) 317-7111

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JOHN DOE *John Doe*



THEN ... JOT DOWN THE DOPE ABOUT IT ON THIS FORM, CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

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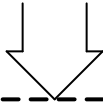
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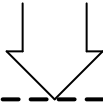
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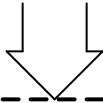
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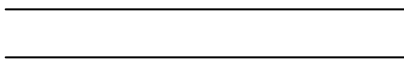
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The Metric System and Equivalents

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

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
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 $\frac{5}{9}$ (after subtracting 32) Celsius temperature ° C

