

TECHNICAL MANUAL
AVIATION UNIT AND INTERMEDIATE
MAINTENANCE MANUAL
VOLUME 3 OF 9
HELICOPTER, ATTACK,
AH-64A APACHE
(NSN 1520-01-106-9519)
(EIC: RHA)

CHAPTER 4
POWER PLANTS

CHAPTER 5
ROTORS

ENGINES TEARDOWN/BUILDUP

COOLING SYSTEM
MAINTENANCE

AIR SYSTEM MAINTENANCE

NACELLES MAINTENANCE

ENGINES MAINTENANCE

EXHAUST SYSTEM
MAINTENANCE

IGNITION SYSTEM MAINTENANCE

POWER CONTROLS
MAINTENANCE

MAIN ROTOR BLADE
MAINTENANCE

MAIN ROTOR HEAD
MAINTENANCE

TAIL ROTOR MAINTENANCE

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HEADQUARTERS, DEPARTMENT OF THE ARMY
16 MAY 1994

CHAPTER 4 POWER PLANTS

CHAPTER OVERVIEW

Chapter 4 contains the maintenance instructions for the power plant. Power plant description, operation, and troubleshooting information is contained in TM 1-1520-238-T.

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SECTION I. ENGINES TEARDOWN/BUILDUP

4.1. ENGINE CLEANING

Refer to TM 55-2840-248-23 for engine cleaning.

4.2. ENGINE INSPECTION

4.2.1. Description

This task covers: Inspection.

4.2.2. Initial Setup

Tools:

Aircraft mechanic's tool kit (item 376, 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)
 0 - 75 inch-pound 1/4-inch drive dial indicator torque wrench (item 446, App H)

References:

TM 1-1500-204-23
 TM 55-1500-322-24
 TM 55-1500-323-24
 TM 55-2840-248-23

Materials/Parts:

- Methyl ethyl ketone (item 124, App F)
- Sealing compound (item 167, 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 panels removed, as necessary

4.2.3. Inspection

- a. **Check engine tubes, hoses, and fittings for cracks, nicks, scratches, chafing, and dents.**
 - (1) No cracks allowed.
 - (2) If depth of defect can be measured on fuel carrying tubes, replace tube. No damage allowed.
 - (3) On non-fuel-carrying tubes nicks, scratches, and chafing not to exceed **0.005 INCH** are repairable if repair has not been previously done in same area.
 - (4) On straight or curved sections of tubing with a bend radius larger than twice the tube OD, replace tubing with dents larger than 20 percent of tube OD.
 - (5) On curved tubing with a bend radius less than twice tube OD, replace tubing with dents larger than 10 percent of tube OD.
- b. **Check hoses for kinks and buckling.** None allowed.
- c. **Check brackets and support clips for cracks** (TM 1-1500-204-23).

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4.2. ENGINE INSPECTION - continued

- d. **Check for fuel or oil leaks.** None allowed.
- e. **Check for loose, broken, or missing nuts and bolts.** None allowed.
- f. **Check quick-release pins in hydromechanical unit (HMU) and anti-ice and start valve linkage for proper engagement** (TM 55-2840-248-23).
- g. **Check fuel and oil filters for indication of impending bypass.** If impending bypass button is popped, replace filter (TM 55-2840-248-23).
- h. **Check engine mounts for cracks and voids.** None allowed.
- i. **Check engines and attaching hardware for corrosion** (para 1.49).
- j. **Check engine mount bearings** (TM 55-1500-322-24).
 - (1) Axial play. Not applicable.
 - (2) Radial play **0.0035 INCH** max.
- k. **Refer to TM 55-2840-248-23 for repair limits on engine components.**
- l. **Check electrical connectors for corroded, bent, broken, loose, or missing pins.** Check wire harnesses for chafing and loose mounting (TM 55-1500-323-24).
- m. **Check access panels** (para 2.2).
- n. **Check engine turbine case for cracks, and loose or broken third stage nozzle bolts** (TM 55-2840-248-23).
- o. **Engine air inlet and seal inspection.**
 - (1) Dents within **1.0 INCH** of the leading edge of the inlet, local dents not deviating from contour more than **0.020 INCH** and less than **1.50 SQUARE-INCHES** are acceptable. Areas further than **1.0 INCH** from the leading edge of the inlet having local dents not deviating **0.030 INCH** from contour and less than **0.50 SQUARE-INCHES** are acceptable.
 - (2) Rubber Seal. Rips or tears less than **0.25 INCH** in length and no closer than **2.0 INCHES** apart, and no material missing are acceptable.
 - (3) Bulkhead. All cracks must be repaired (TM 1-1500-204-23). Dents less than **0.30 INCH** in depth and less than **0.50 SQUARE-INCHES** are acceptable.

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4.2. ENGINE INSPECTION - continued



p. **Aft inboard engine mount and aft lower engine mount pins and bushings inspection.**

- (1) Perform visual inspection of aft inboard engine mount and aft lower engine mount pins.
- (2) Check for lanyard wrap up.
 - (a) If lanyard wrap up has occurred, clean and apply torque stripes across edge of bushing and adjacent area of bellcrank. Apply torque stripes on both sides of aft engine mount. Use sealing compound (item 167, App F). Inspect torque stripes prior to each flight for 10 flight hours to determine if bushings are rotating with respect to the bellcrank. If bushing rotates perform corrective action in step q.
 - (b) If lanyard wrap has not occurred no further maintenance action is required.
- (3) Perform torque check of mount pin lock mechanism.
 - (a) Unlock pin.
 - (b) With no weight on pin, note minimum torque required to engage lock mechanism. Use torque wrench.
 - (c) If torque required to lock pin is not **55 to 100 INCH-POUNDS**, replace pin.



q. **Corrective action for aft inboard engine mount and aft lower engine mount pins and bushings.**

- (1) Support engine as necessary and remove support pins from aft inboard and aft lower engine mount (para 4.6 No. 1 engine or para 4.10 No. 2 engine) (para 4.5 No. 1 engine or para 4.9 No. 2 engine).
- (2) Remove the aft inboard mount/aft lower mount (para 4.29).
- (3) Remove two bushings from engine aft inboard mount/aft lower mount (para 4.56).
 - (a) Clean OD of bushings and bore of bellcrank with methyl ethyl ketone (item 124, App F) and clean cloth.
 - (b) Check bushings for cracks and gouges. No cracks allowed. Gouges shall not exceed **0.031 INCH** depth either longitudinal or circular.
 - (c) Install two bushings in engine aft inboard mount/aft lower mount (para 4.56).

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4.2. ENGINE INSPECTION - continued

- (4) Reinstall engine mounts (para 4.31).
- (5) Reinstall support pin in aft lower engine mount (para 4.50 No. 1 engine or 4.54 No. 2 engine).
- (6) Reinstall support pin in aft inboard engine mount (para 4.51 No. 1 engine or 4.55 No. 2 engine).
- (7) Apply torque stripe per step p(2)(a).
- (8) Monitor support pin and aft engine mount bushings for 10 flight hours to ensure bushing rotation has been corrected. If bushings continue to rotate, replace bushings.

END OF TASK

4.3. NO. 1 ENGINE REMOVAL

4.3.1. Description

This task covers: Removal.

4.4. No. 1 or No. 2 Engine Removal - Pilot Station

4.5. No. 1 Engine Removal - Upper Disconnection

4.6. No. 1 Engine Removal - Lower Disconnection

4.7. No. 1 Engine Removal - Remove from Helicopter

4.3.2. Initial Setup

Tools:

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

Airframe adapter kit (item 25, App H)

Aircraft power unit (item 232, App H)

Engine lifting sling (item 291, App H)

Personnel Required:

67R Attack Helicopter Repairer
Two persons to assist

Equipment Conditions:

<u>Ref</u>	<u>Condition</u>
1.57	Helicopter safed
2.2	Access doors LN1, LN3, and LN4 opened
6.2	No. 1 drive shaft removed
1.22	Fuel system vented
1.97	Maintenance crane installed

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4.4. NO. 1 OR NO. 2 ENGINE REMOVAL - PILOT STATION

4.4.1. Description

This task covers: Removal.

4.4.2. Initial Setup

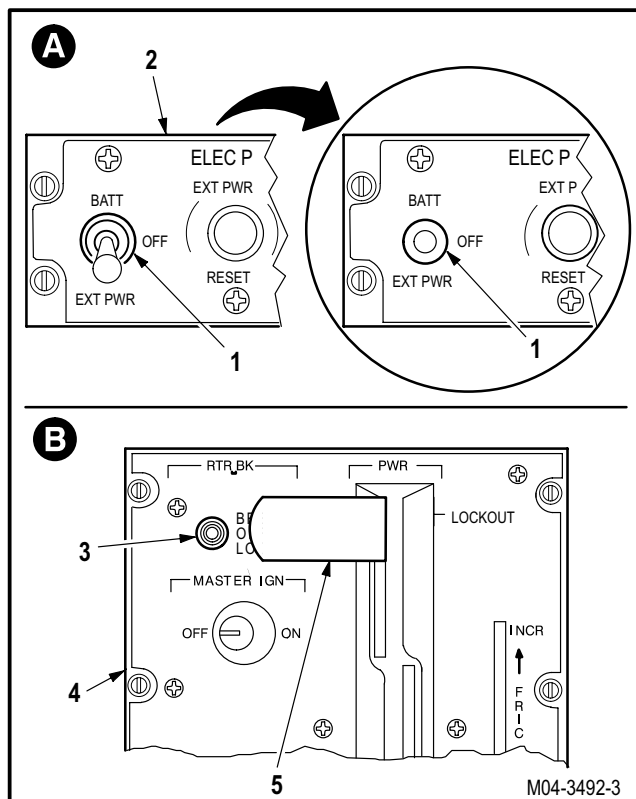
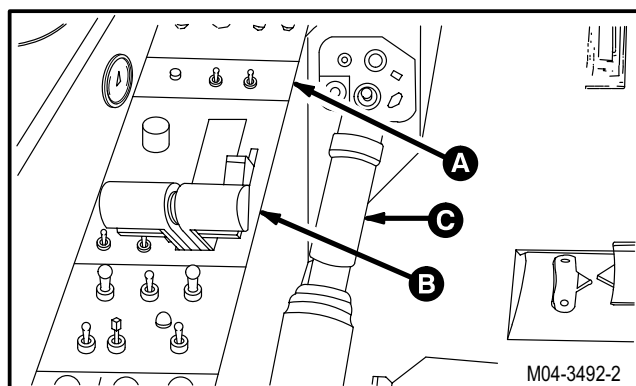
Equipment Conditions:

Ref Condition

4.3 No. 1 engine removal

4.4.3. Removal

- a. **Apply electrical (para 1.70) and hydraulic (para 1.73) power to helicopter. Observe all safety precautions.**
- b. **Enter pilot station (para 1.56). Observe all safety precautions.**
- c. **Set ELEC PWR control switch (1) on ELEC PWR check panel (2) to EXT PWR.**
- d. **Set RTR BK switch (3) on power quadrant panel (4) to OFF.**
- e. **Set switch (1) on panel (2) to OFF.**
- f. **Set applicable (No. 1 or No. 2) power lever (5) on panel (4) to LOCKOUT.**



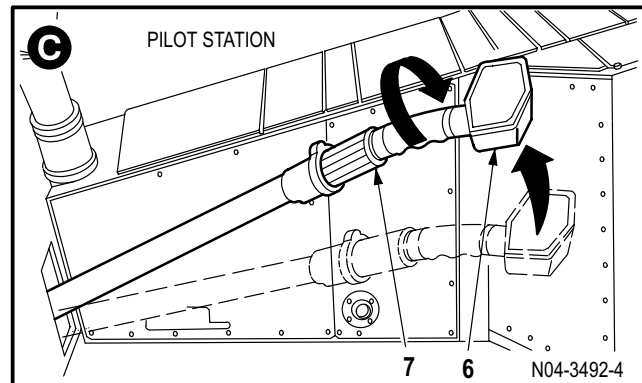
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4.4. NO. 1 OR NO. 2 ENGINE REMOVAL - PILOT STATION - continued

g. Move collective stick (6) to full up position.

(1) Rotate flight gear handle (7) counterclockwise to lock.

h. Remove electrical (para 1.70) and hydraulic (para 1.73) power from helicopter.



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4.5. NO. 1 ENGINE REMOVAL - UPPER DISCONNECTION

4.5.1. Description

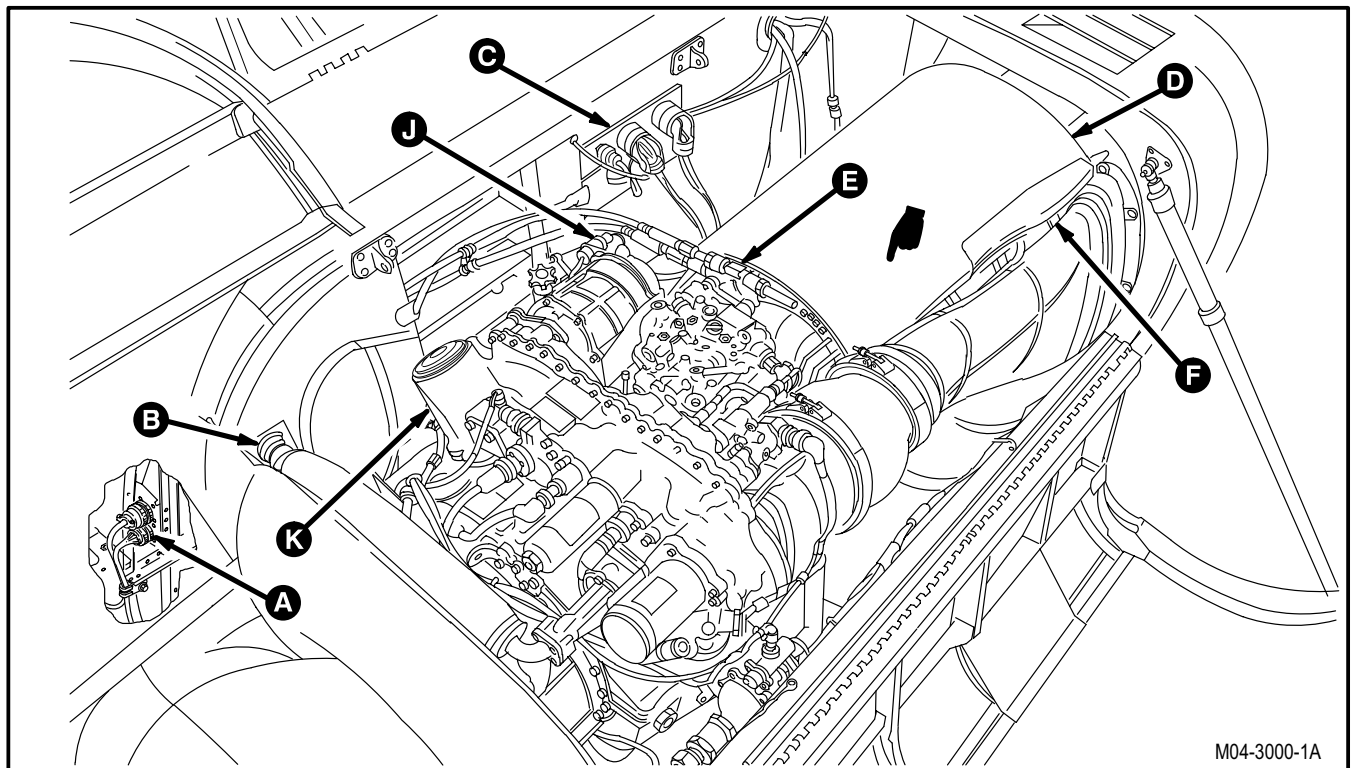
This task covers: Removal.

4.5.2. Initial Setup

Equipment Conditions:

Ref Condition

4.3 No. 1 engine removal



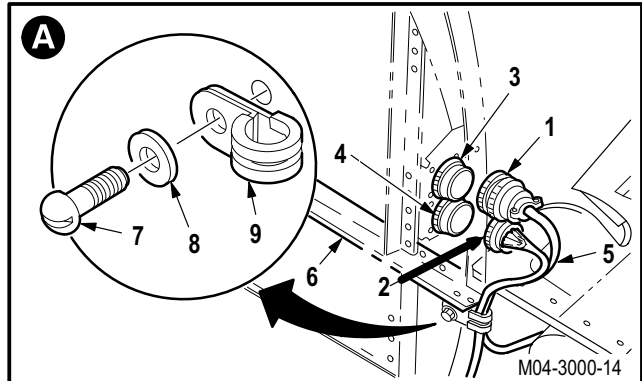
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4.5. NO. 1 ENGINE REMOVAL - UPPER DISCONNECTION - continued

4.5.3. Removal

a. Detach connectors P61 (1) and P47 (2).

- (1) Detach connector P61 (1) from receptacle J61 (3).
- (2) Detach connector P47 (2) from receptacle J47 (4).

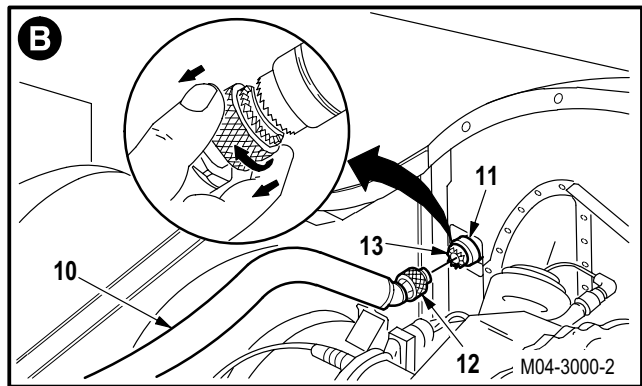


b. Remove wire harness (5) from airframe (6).

- (1) Remove screw (7), washer (8), and clamp (9).
- (2) Remove clamp (9) from wire harness (5).

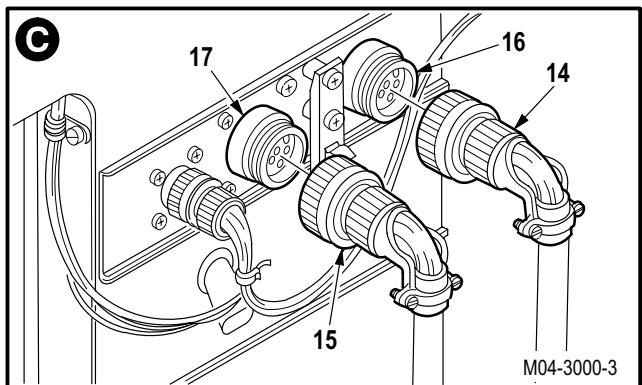
c. Remove fuel hose (10) from breakaway valve (11).

- (1) To release locking teeth, slide ratchet sleeve (12) away from adapter (13).
- (2) Turn sleeve (12) counterclockwise until free.



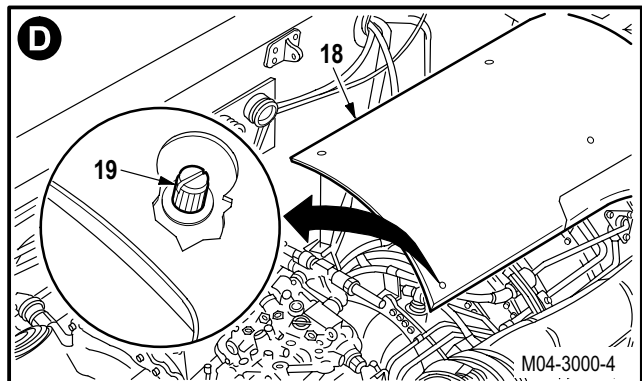
d. Detach connectors P21 (14) and P23 (15).

- (1) Detach connector P21 (14) from receptacle J21 (16).
- (2) Detach connector P23 (15) from receptacle J23 (17).



e. Remove engine shroud (18).

- (1) Release four turnlock fasteners (19).



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