

**TECHNICAL MANUAL**

**AVIATION UNIT AND AVIATION  
INTERMEDIATE MAINTENANCE MANUAL**

**CH-47D HELICOPTER**

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

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**CHANGE  
NO. 1**

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

Aviation Unit and Aviation Intermediate  
Maintenance Manual

**CH-47D HELICOPTER**

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

TM 55-1520-240-23-5, 19 September 2002, is changed as follows:

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

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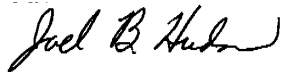
2. Retain this sheet in front of the manual for reference purposes.

TM 55-1520-240-23-5

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By Order of the Secretary of the Army:

Official:



**JOEL B. HUDSON**

Administrative Assistant to the  
Secretary of the Army

0320908

**PETER J. SCHOOMAKER**

General, United States Army

Chief of Staff

**DISTRIBUTION:**

To be distributed in accordance with Initial Distribution Number (IDN) 311199, requirements for TM 55-1520-240-23-5.

## WARNING AND FIRST AID DATA

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

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

**WARNING**

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

**CAUTION**

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

**NOTE**

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

**WARNING**

### Cleaning Solvents

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

Saturated clothing should be removed immediately.

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

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

**WARNING**

### Electrical and Electronic Equipment Maintenance

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

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

**WARNING**

### **Dangerous Static Charges**

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

**WARNING**

### **Dangerous Voltages at Antenna Terminals**

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

**WARNING**

### **Poisonous Carbon Monoxide Fumes**

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

**WARNING**

### **Corrosive Battery Electrolyte (Potassium Hydroxide)**

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

Contact with skin or eyes will cause burns.

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

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

**WARNING**

### **Explosive Battery Hazard**

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

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

**WARNING****Electrolyte Contamination**

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

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

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

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

**WARNING****Acids and Alkalines**

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

Rust stripper is an alkaline solution.

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

**WARNING****Windshield Rain Repellent**

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

Wash hands with soap and water after handling repellent.

**WARNING****Antiseize Compounds**

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

Wear protective clothing. Wash thoroughly after using.

**WARNING**

### **Paints, Varnishes, Dopes, Thinners, and Lubricants**

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

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

**WARNING**

### **Epoxy Resins, Cements, and Adhesives**

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

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

**WARNING**

### **Radiation Hazard**

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

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

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

**WARNING**

### **Fire Extinguishing Agents**

Monobromotrifluoromethane ( $\text{CF}_3\text{Br}$ ) is highly volatile but is not easily detected by smell, it is not toxic, but reduces oxygen available for proper breathing.

If liquid  $\text{CF}_3\text{Br}$  contacts skin, it can cause frostbite or low temperature burns.

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



**WARNING****Noise**

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

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

**WARNING****FOD**

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

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

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

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

Use only with adequate ventilation.

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

Remove saturated clothing immediately.

Do not smoke when handling fuel.

Do not take internally.

Store in approved, metal safety containers.

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

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

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

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

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

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

**WARNING**

### **Lifting Components With Hoist**

Lifting or hoisting of components shall only be done by designated personnel.  
The load capacity rating shall be clearly marked on hoist. Do not exceed load rating.  
Inspection and testing for cracks or defects in hoist system shall be performed on a regular basis.  
Before lifting, alert personnel in immediate areas.  
Before lifting, balance the load.  
Do not stand under load while it is being moved from one area to another on a hoist.  
Do not stand under load to do maintenance work.

**WARNING**

### **Hydraulic Pressures**

High pressures used in testing hydraulic components can cause line rupture or component failure.  
Only qualified personnel shall operate, service, and maintain hydraulic test equipment.  
Use heavy plastic shielding at least 5/8 inch thick when applying pressures over 250 psi to prevent injury to personnel.

**WARNING**

### **Hydraulic Fluid**

Hydraulic fluid is toxic. It can irritate skin and eyes and cause burns. When fluid is decomposed by heating, it releases toxic gases.  
Avoid inhaling. Use only with adequate ventilation. If prolonged contact with mist is likely, wear an appropriate respirator.  
Avoid contact with skin, eyes, or clothing. Wear rubber gloves if handling liquid.  
In case of contact with skin, immediately wash skin with soap and water. In case of contact with eyes, flush them immediately with clear water and get medical attention.  
If liquid is swallowed, do not induce vomiting; get immediate medical attention.

**WARNING**

### **Compressed Air**

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

Use eye protection to prevent injury to personnel.

**WARNING**

### **Flare Dispenser**

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

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

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

**WARNING**

### **Maintenance Platforms/Workstands**

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

**WARNING**

### **Black Light Inspection Eyewear**

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

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

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

**WARNING**

### **Cadmium-Plated Tools**

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

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

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



# LIST OF EFFECTIVE PAGES

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

Dates of issue for original and changed pages are:

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Change 1           30 September 2003

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**AVIATION UNIT AND AVIATION  
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CH-47D HELICOPTER**

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

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

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





# **CHAPTER 6**

# **DRIVE SYSTEM**

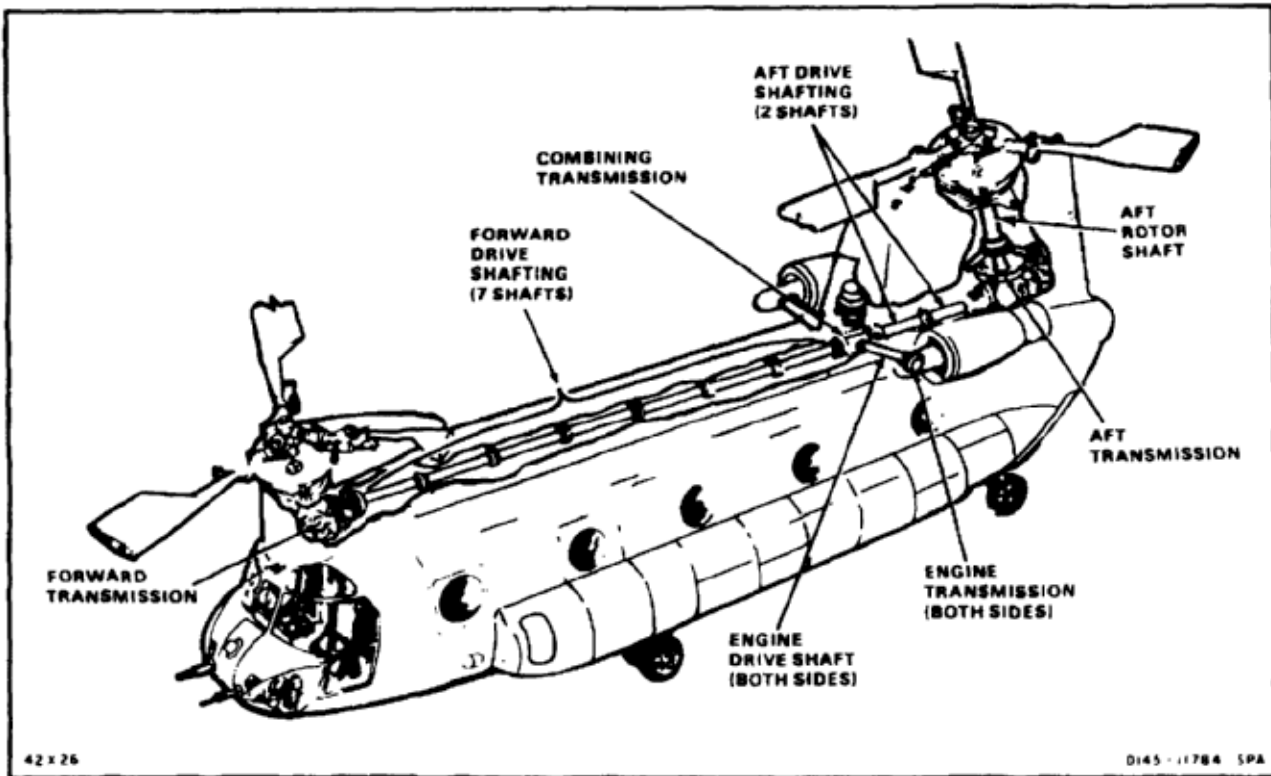
## **SECTION I**

## **DRIVE SYSTEM DESCRIPTION AND OPERATION**

The drive system delivers torque from the engines to the rotary-wing heads and blades. It also drives the ac generators and pumps for the flight control and utility hydraulic systems.

The drive system consists of five transmissions, drive shafting to connect the transmissions, and an aft rotor shaft:

1. An engine transmission is mounted on the front of each of the two engines. Torque is transmitted from the engine to the transmission by a splined quill shaft.
2. Output torque from each engine transmission is delivered through an engine drive shaft to the combining transmission. The combining transmission combines the torque from both engines and transmits it to a forward transmission and an aft transmission through drive shafting.
3. The forward transmission is splined directly to the rotary-wing head to drive the forward rotor blades.
4. The aft transmission drives a separate vertical aft rotor shaft. This shaft is splined to the aft rotary-wing head to drive the aft rotor blades.
5. The forward drive shafting consists of seven aluminum tubes joined by flexible adapter assemblies. The tubes are referred to as No. 1 thru No. 7, beginning at the forward end of the shafting. The shafting is supported in a bearing at each adapter assembly by two rubber and metal mounts.
6. The aft drive shafting consists of two aluminum tubes joined by a flexible adapter assembly. The tubes are referred to as No. 8 (forward) and No. 9 (aft). The shafting is supported in a bearing at the adapter assembly by two rubber and metal mounts.



**FORWARD DRIVE SHAFTING**

The forward drive shafting transmits torque from the combining transmission to the forward transmission. It consists of seven shafts coupled by six adapter assemblies.

The shafts are numbered 1 thru 7, beginning with the forward shaft.

Shafts 1 thru 6 consist of an aluminum tube with an adapter riveted to each end. The forward adapter is a three-cornered aluminum forging. The aft adapter is a steel forging with external splines and internal threads. Shafts No. 2 thru 6 are identical and interchangeable.

The adapter assemblies between shafts consist of a pack of flexible steel plates bolted to a three-fingered steel adapter. Each adapter is held in a bearing and support assembly. The assemblies are internally splined to mate with the external splines on the shaft aft adapters. Each adapter assembly is indexed to its mating shaft and balanced as a unit with the shaft.

Shaft No. 7 is an aluminum tube with a three-cornered aluminum adapter riveted to each end.

The shafting is carried on the helicopter structure on two elastomeric mounts at each of the six bearing and support assemblies.

Separate adapter assemblies couple the shafting to the forward and combining transmissions. Access to the shafting is through covers on the top of the fuselage.

**AFT DRIVE SHAFTING**

The aft drive shafting transmits torque from the combining transmission to the aft transmission. It consists of two individual shafts coupled by an adapter assembly.

The two shafts are numbered 8 (forward) and 9 (aft), to continue the numbering of the forward drive shafting.

Shaft No. 8 consists of an aluminum tube with an adapter riveted to each end. The forward adapter is a three-cornered aluminum forging. The aft adapter is a steel forging with external splines and internal threads.

The adapter assembly consists of a pack of flexible steel plates bolted to a three-fingered steel adapter. The assembly is held in a bearing and support assembly that is internally splined to mate with the external splines on the aft adapter of shaft No. 8. The adapter assembly is indexed to shaft No. 8 and balanced as a unit with the shaft.

Shaft No. 9 is an aluminum tube with a three-cornered aluminum adapter riveted to each end.

The shafting is carried on the helicopter structure on two elastomeric mounts at the bearing and support assembly.

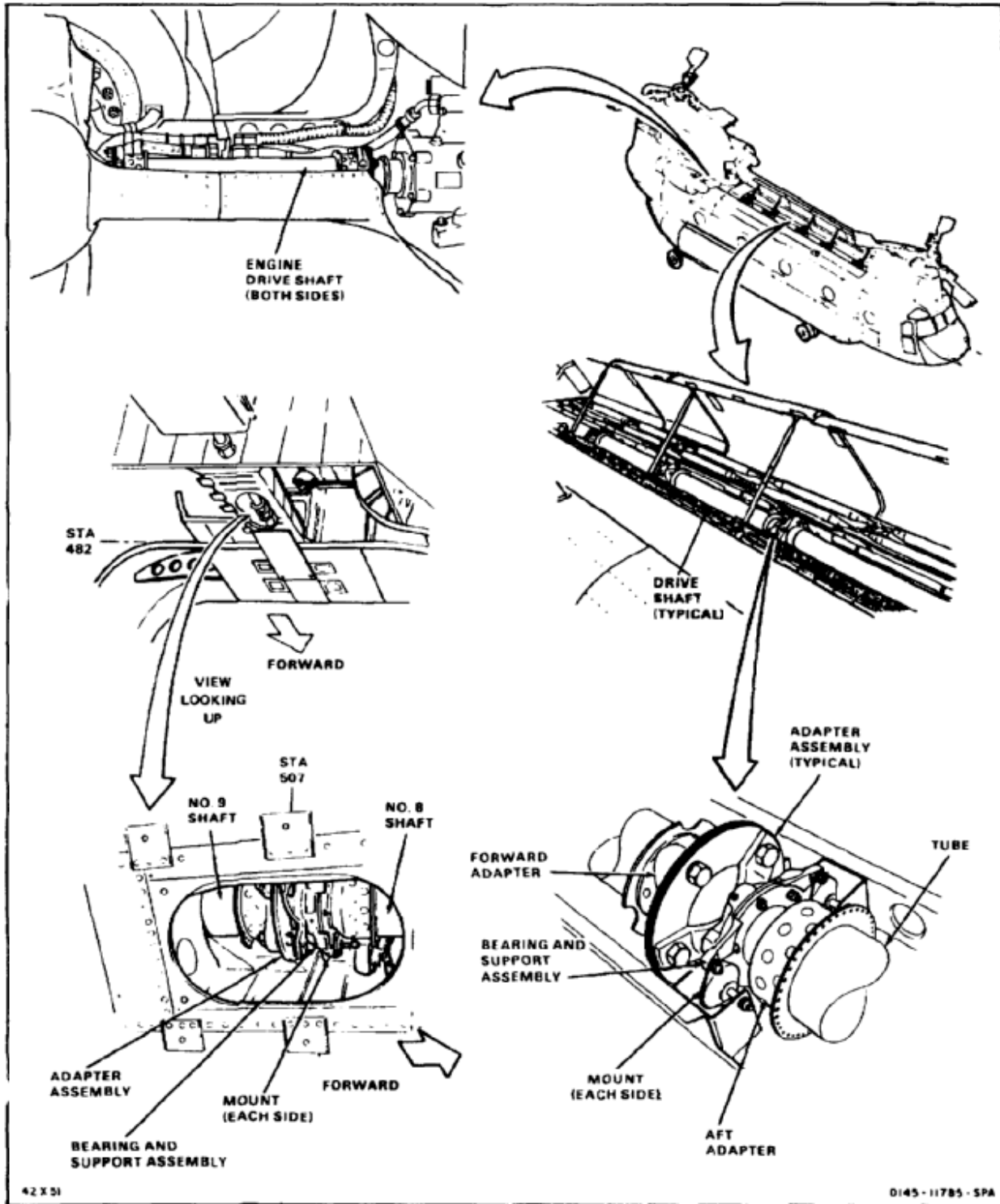
Separate adapter assemblies couple the shafting to the combining and aft transmissions. Access to the shafting is from inside the cabin.

**ENGINE DRIVE SHAFTS**

An engine drive shaft transmits torque from each engine transmission to the combining transmission. On helicopters without **51** the shaft consists of an aluminum tube with a three-cornered aluminum adapter riveted to each end. On helicopters with **51**, it is a one-piece aluminum shaft with flanged ends.

Each shaft is connected to the transmissions by an adapter assembly at each end. Each of the three-piece riveted shafts is serial numbered and dynamically balanced as a unit with the two adapter assemblies. One-piece shafts are balanced separately from their adapters and are separately replaceable.

Access to each shaft is through a fairing between the engine transmission and combining transmission.



**FORWARD TRANSMISSION**

The forward transmission receives input torque from the combining transmission through the forward drive shafting. It transmits it directly to the forward rotary-wing head and blades through an integral shaft.

A slider shaft is mounted around the integral shaft and bolted to the top of the transmission. It provides the bearing surface for swashplate motion.

An integral spur gear at the bottom of the transmission provides power to drive a pump for the flight control hydraulic system.

The transmission is bolted to structure directly above the cockpit. It is part of a package that can be removed and installed as an assembly. In addition to the transmission, the package includes the rotary-wing head and head controls, a weather-protective cover, and two flight control bellcranks. Access to the top of the transmission is through hinged work platforms at each side of the forward transmission fairing. Access to the bottom of the transmission is through a removable drip pan.

**Lubrication System**

The forward transmission is lubricated with oil from a sump at the bottom of the transmission. Oil is circulated by main and auxiliary pumps mounted on the bottom of the transmission. The main pump is externally mounted. The auxiliary pump is covered by the sump.

The lubrication system is monitored and protected by the following:

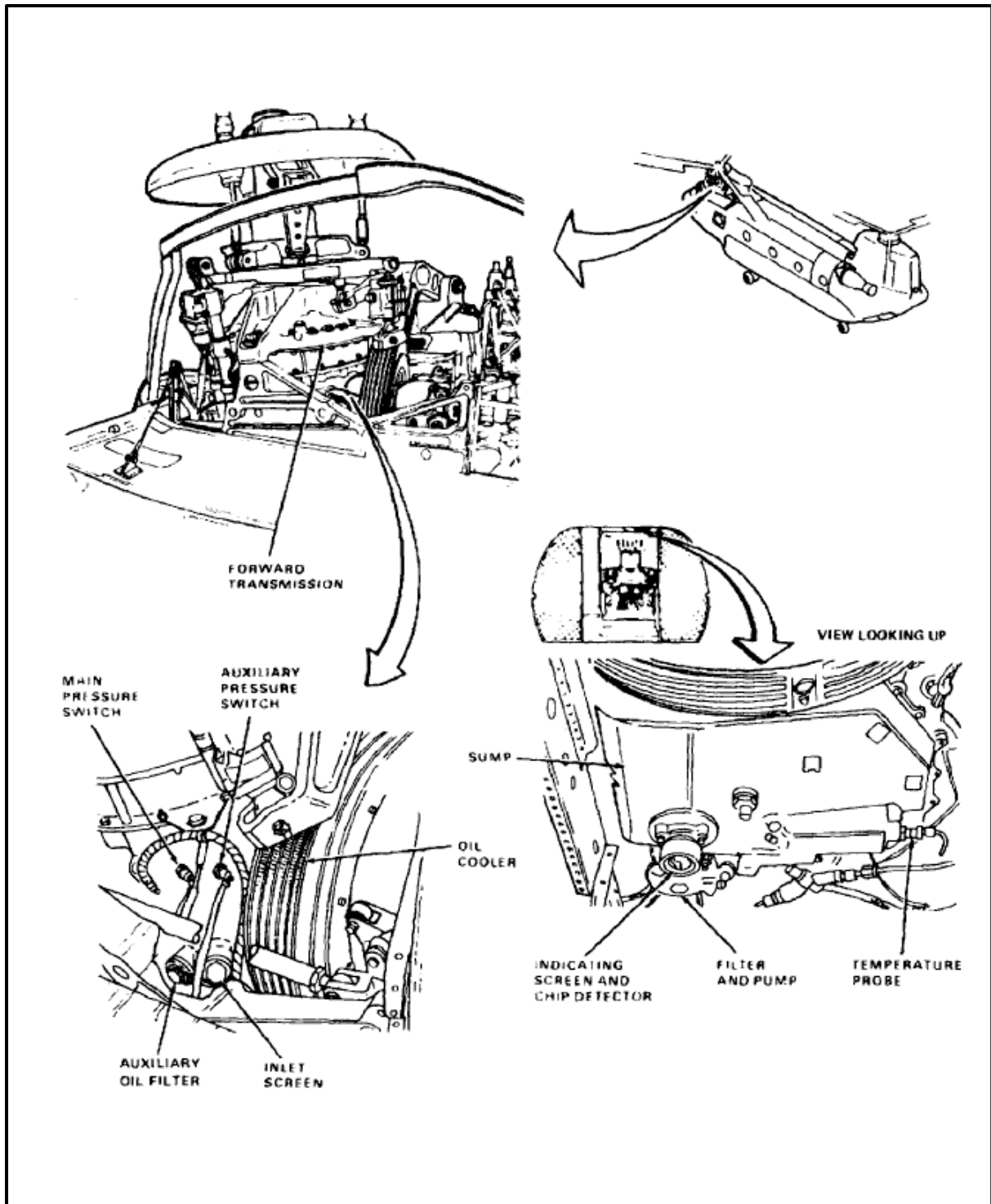
- A combined indicating screen and chip detector and temperature sensor on the sump.

- A pump inlet screen inside the sump.

- A main filter inside the main pump.

- Main and auxiliary pressure switches, an auxiliary filter, and an inlet screen on the left side of the transmission.

Hot oil from the transmission passes through a circular oil cooler mounted on the aft end of the transmission. The oil is cooled by air forced through the cooler by an impeller. The impeller fits within the cooler and is splined to the transmission input shaft.



**COMBINING TRANSMISSION**

The combining transmission receives input torque from the two engine transmissions through the engine drive shafts. It combines the torque and transmits it to the forward and aft drive shafting through output shafts.

The transmission is bolted to the airframe in the lower forward part of the pylon. Access is through hinged fairings at the forward end of the pylon.

**Lubrication System**

The combining transmission contains an integrated lubrication system that supplies the combining transmission and both engine transmissions.

Oil for the system is contained in a sump bolted to the top of the transmission. The sump is divided into three sections, one for the combining transmission and one for each of the two engine transmissions. Oil is circulated by a main and an auxiliary oil pump inside the transmission.

The lubrication system is monitored and protected by the following:

Two debris detection screens and a chip detector at the lower forward end of the transmission. With **37**, a chip burnoff system lets the chip detector burn off light fuzz and similar normal debris before it activates indicators on the master caution and maintenance panels.

An inlet screen and a main filter on the sump cover.

A temperature probe at the forward end of the sump.

An auxiliary filter and a pressure switch at the forward end of the transmission.

Hot oil from the transmission passes through a circular oil cooler mounted on the sump cover under oil coolers for the left and right engine transmission. The oil is cooled by a fan that pulls air through the coolers. The fan is driven by a vertical shaft that is driven by a gear on the aft output shaft of the transmission.

**ENGINE TRANSMISSION**

The engine transmissions turn the direction of engine torque **90°** to direct it towards the combining transmission.

A one-way clutch in each transmission allows the drive system to overrun the engines during autorotation or a sudden reduction in engine rpm. Each of the two engine transmissions is the same except for the location of some external parts. Either transmission can be converted to one for the opposite side by exchanging the location of these parts.

**Lubrication System**

Each engine transmission is lubricated by oil from a section of the combining transmission sump. Oil is delivered to each transmission by a separate oil pump in the combining transmission.

Oil is carried between the combining transmission and each engine by two external oil hoses. A vent hose carries oil vapor from the transmission to the combining transmission sump.

The lubrication system is monitored and protected by the following for each engine transmission:

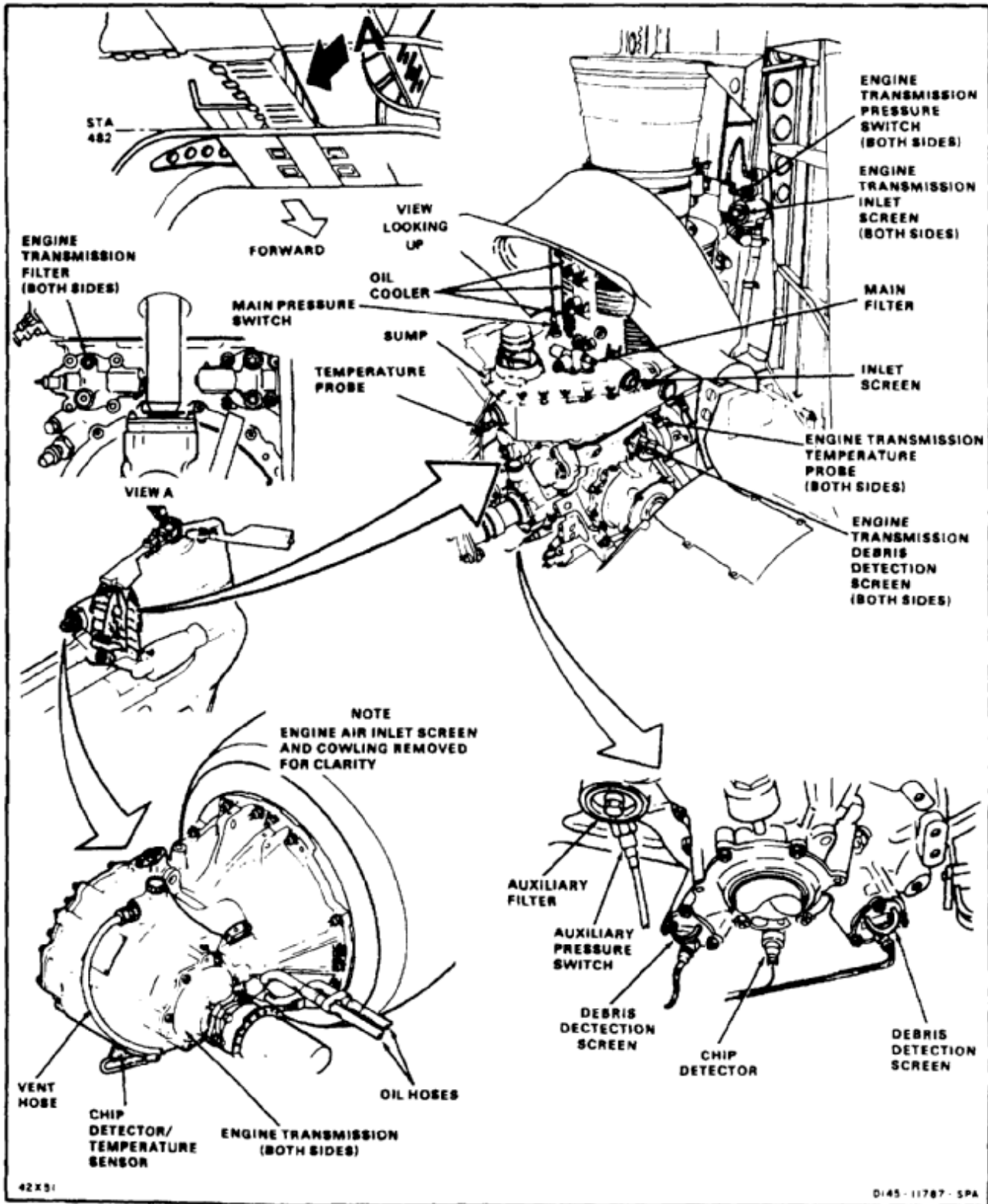
A temperature probe and a debris detection screen on the side of the combining transmission.

A main filter on the back of the combining transmission.

An inlet screen and a pressure switch on the airframe above and aft of the combining transmission. With **37**, the combined detector and switch is replaced by a separate chip detector and plugstat. They are part of a chip burnoff system that lets the chip detector burn off light fuzz and similar normal debris before it activates indicators on the master caution and maintenance panels.

A combined chip detector and overtemperature switch at the bottom of the engine transmission.

Hot oil from each engine transmission is cooled in a separate oil cooler mounted on the combining transmission sump cover.





**AFT TRANSMISSION**

The aft transmission receives input torque from the combining transmission through the aft drive shafting. It transmits torque to the aft rotor shaft through a splined connection.

Spur gears in the transmission provide power to drive pumps for the flight control and utility hydraulic systems and two ac generators.

The transmission is mounted above the ramp area of cabin at the base of the pylon. Access is through hinged baffles and a removable drip tray at the bottom of the transmission.

**AFT ROTOR SHAFT**

The aft rotor shaft is splined to the top of the aft transmission. It transmits input torque from the transmission to the aft rotary-wing head and rotor blades. The shaft turns in a bearing that is part of a support bolted to the pylon structure.

A slider shaft is mounted on the rotor shaft and bolted to the support. It provides the bearing surface for aft swashplate motion.

**Lubrication System**

Hot oil from the aft transmission and rotor shaft passes through a circular oil cooler mounted on the aft end of the transmission. The oil is cooled by a fan that pulls air through the cooler. The fan is driven by the transmission through a splined shaft.

Oil is circulated by main and auxiliary pumps. The main pump is at the aft end of the transmission. The auxiliary pump is at the bottom of the transmission, covered by the sump.

The lubrication system is monitored and protected by the following:

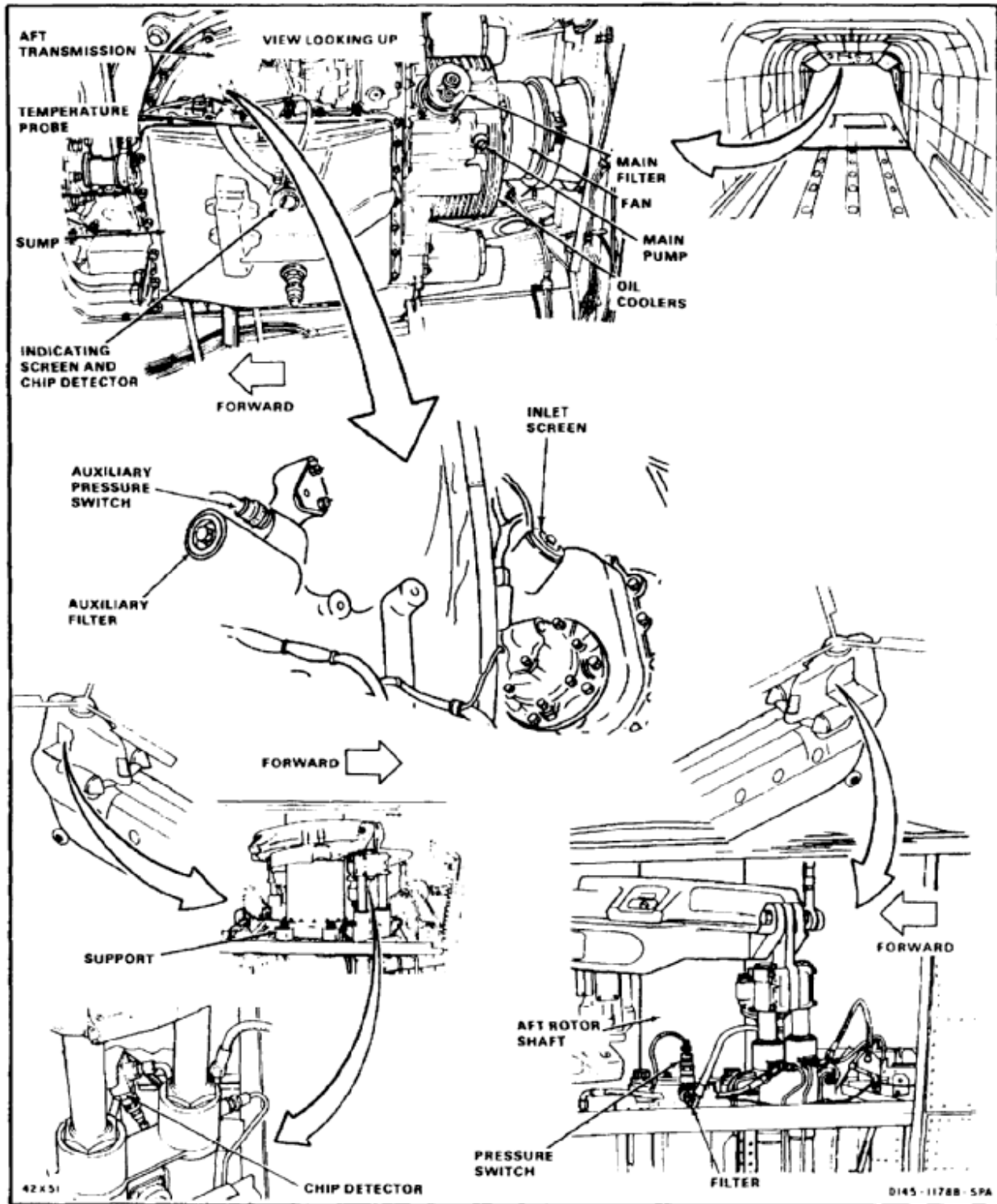
A combined indicating screen and chip detector, and a temperature sensor on the aft transmission sump. With **37**, a chip burnoff system lets the chip detector burn off light fuzz and similar normal debris before it activates indicators on the master caution and maintenance panels.

An inlet screen inside the aft transmission sump.

Main and auxiliary pressure switches, a main inlet screen and an auxiliary filter on the left side of the aft transmission.

A main filter at the aft left of the aft transmission.

In addition, the condition of oil at the aft rotor shaft bearing is monitored by a chip detector, a pressure switch, and a filter in the shaft support.



END OF TASK

## SECTION II DRIVE SHAFTING

## INITIAL SETUP

**Applicable Configurations:**

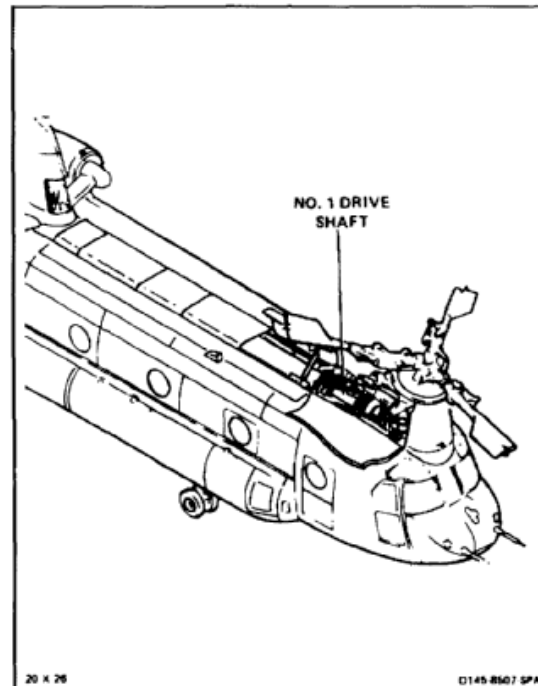
All

**Tools:**

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

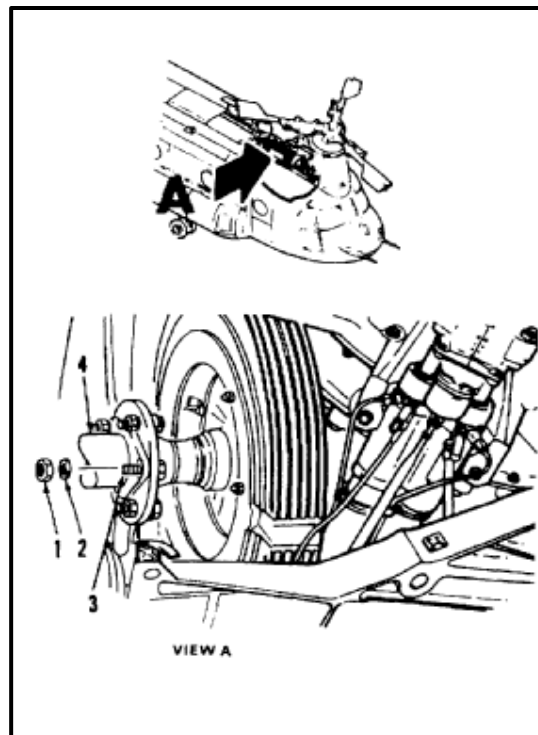
**Materials:**Barrier Material (E80)  
Cloths (E120)**Personnel Required:**

Medium Helicopter Repairer (2)

**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Transmission Drip Pan Removed (Task 2-3)  
Forward Transmission Aft Fairing Removed (Task 2-63)  
Forward Transmission Oil Cooler Air Inlet Duct Removed (Task 6-121)  
No. 2 Drive Shaft Removed (Task 6-3)

Do not allow bolts to turn, if bolts turn, bolts and plates can be damaged.

1. Remove nuts (1) and washers (2) from three bolts (3) at forward end of shaft (4). During removal, hold head of bolts with a wrench. Do not remove bolts at this time.



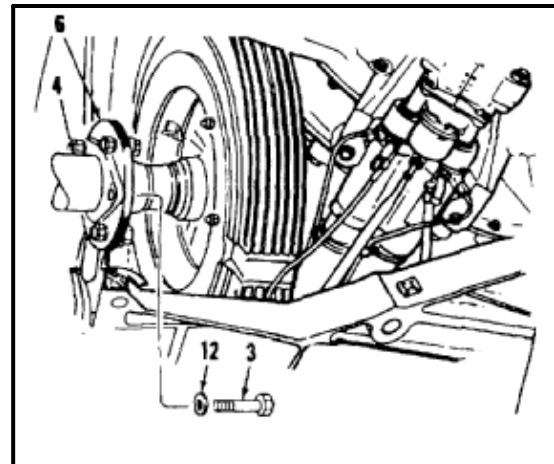
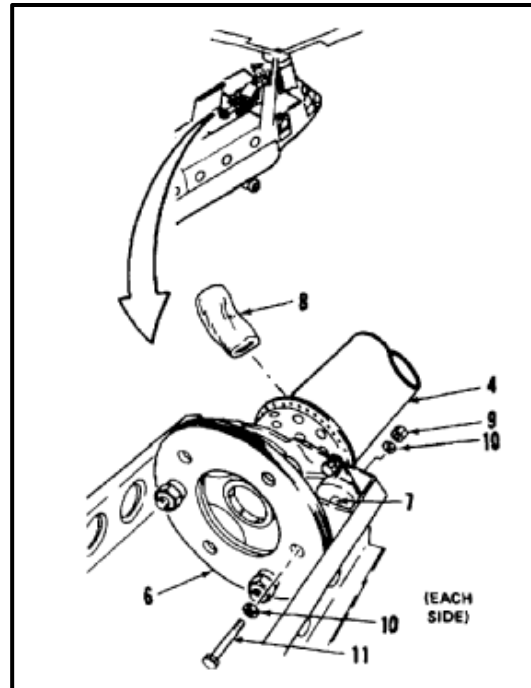
**WARNING**

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.

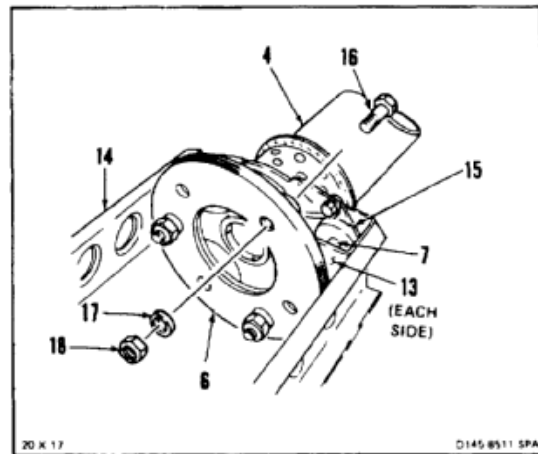
**NOTE**

Remove bolt from mount at each side of adapter assembly in same way. Right side shown here.

2. Rotate shaft (4) to align one of the bolt holes in adapter assembly (6) with mount bushing (7).
3. Support shaft (4) with cloths (E120) or barrier material (E80) (8).
4. Remove nut (9), washers (10), and bushing bolt (11). Remove bolt through bolt hole in adapter assembly (6). Use socket and extension.
5. Remove three bolts (3) and special washers (12) from shaft (4) and forward transmission adapter assembly (6).



6. Lift adapter assembly (6) out of two brackets (13). With aid of helper, withdraw shaft (4) from helicopter structure (14). Remove shaft from helicopter.
7. If shaft (4) is being replaced, remove bushing (7) from mount (15) on each side of adapter assembly (6). Install bolt (16), special washer (17) and nut (18) in adapter assembly.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

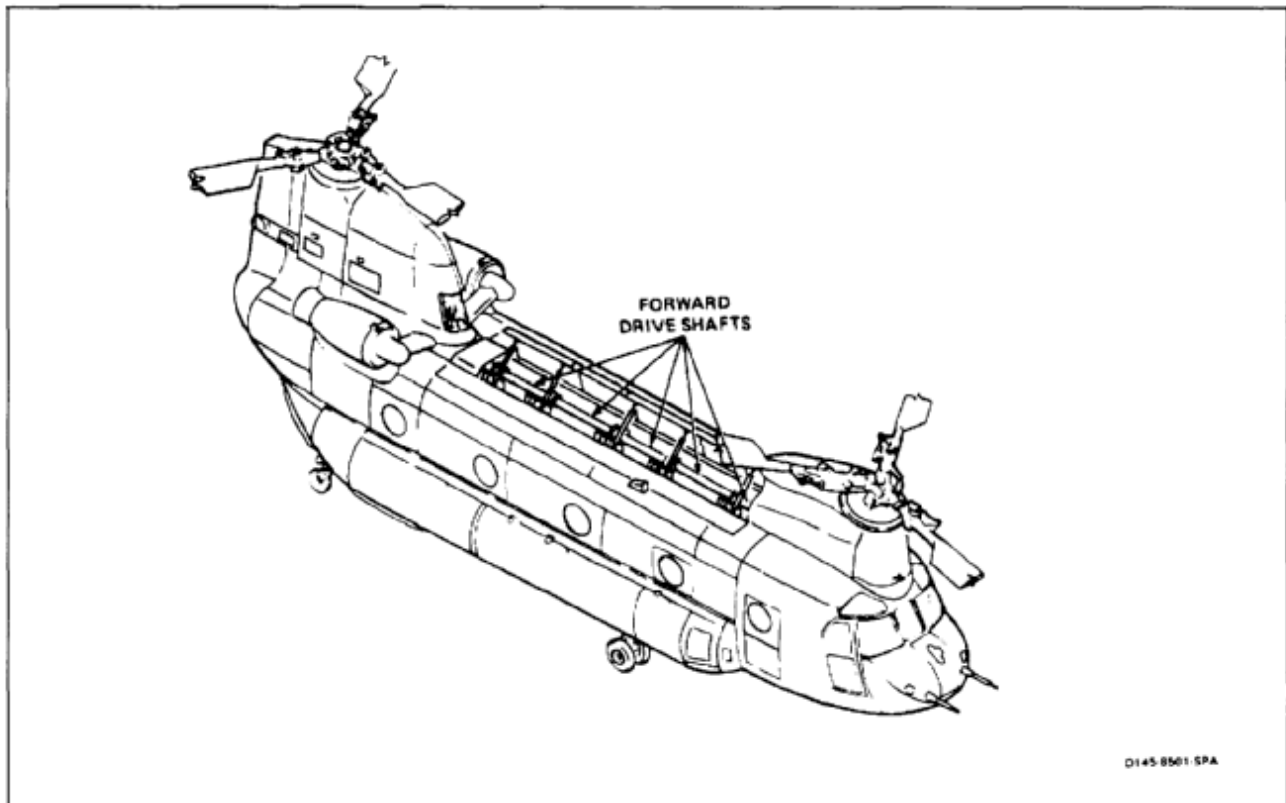
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

**Materials:**Barrier Material (E80)  
Cloths (E120)**Personnel Required:**

Medium Helicopter Repairer (2)

**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Drive Shaft Tunnel Access Covers Open,  
As Needed (Task 2-2)  
Remove Cabin Tunnel Smoke Baffle (Task 2-170.1)**General Safety Instructions:****WARNING**

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.



**NOTE**

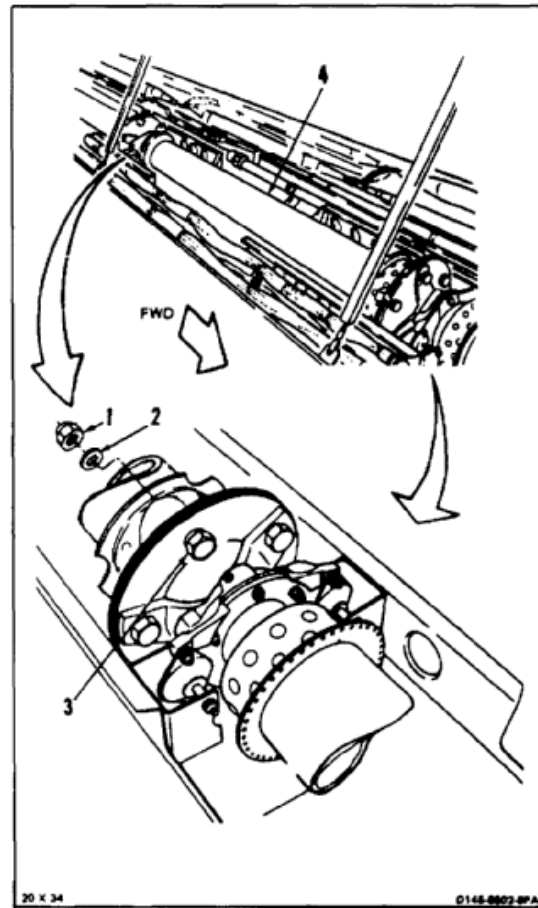
Remove any of shafts No. 2 thru No. 6 in same way. Typical shaft shown here.

**REMOVE END NUTS**



Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.

1. Remove nuts (1) and washers (2) from three bolts (3) at each end of shaft (4). During removal, hold head of bolts with wrench. Do not remove bolts at this time.

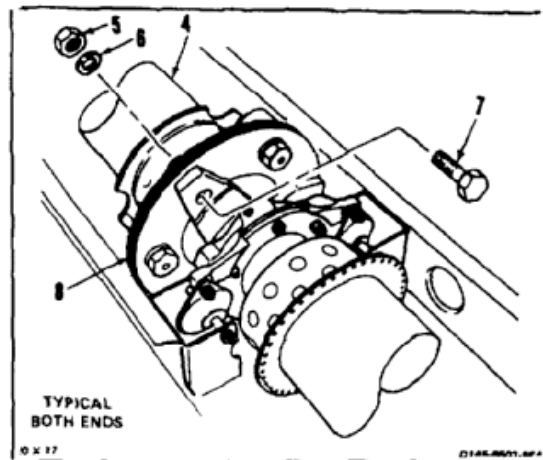


Do not allow bolts to turn. If bolts turn, bolts and adapter assembly can be damaged.

**NOTE**

If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

2. Remove one nut (5), special washer (6), and bolt (7) from adapter assembly (8) at each end of shaft (4). During removal, hold head of bolts with wrench.



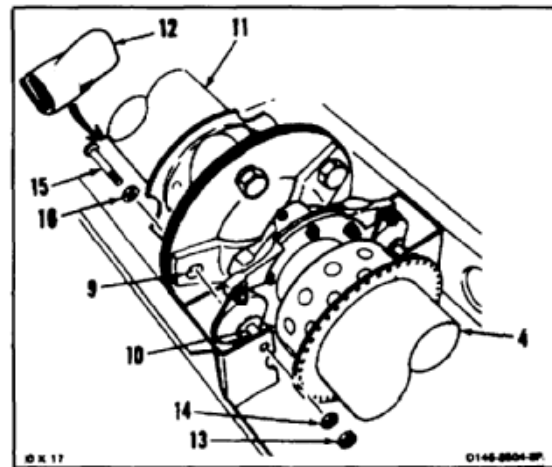


**REMOVE MOUNT BOLTS****NOTE**

Remove bolt from mount at each side of adapter assembly in same way. Right mount shown here.

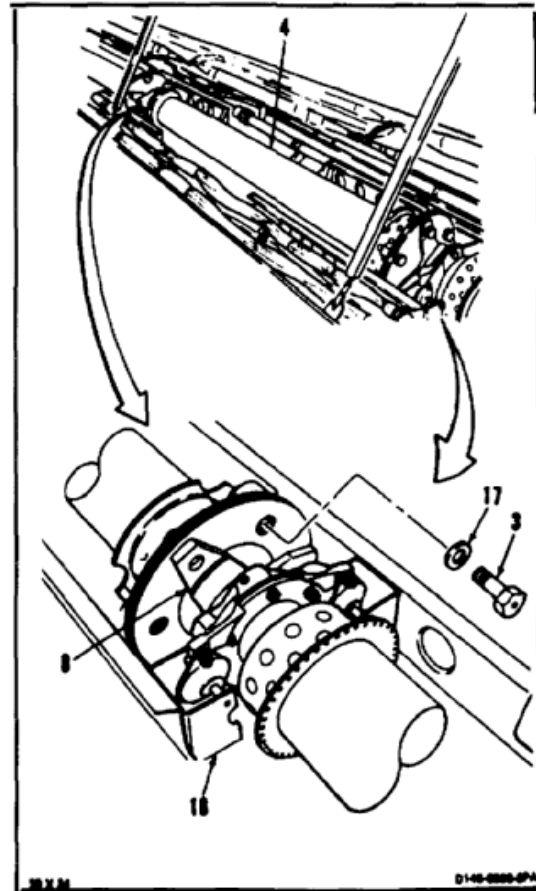
All shafts must be rotated as a unit to keep blades in phase.

3. Rotate shaft (4) to align bolt hole (9) with mount bushing (10).
4. Support shaft (11) with pad (12) of cloths (E120) or barrier material (E80).
5. Remove nut (13) and washer (14) from bushing bolt (15). Remove bushing bolt and washer (9) through bolt hole (9). Use socket and extension.

**REMOVE SHAFT****NOTE**

All shafts must be rotated as a unit to keep blades in phase.

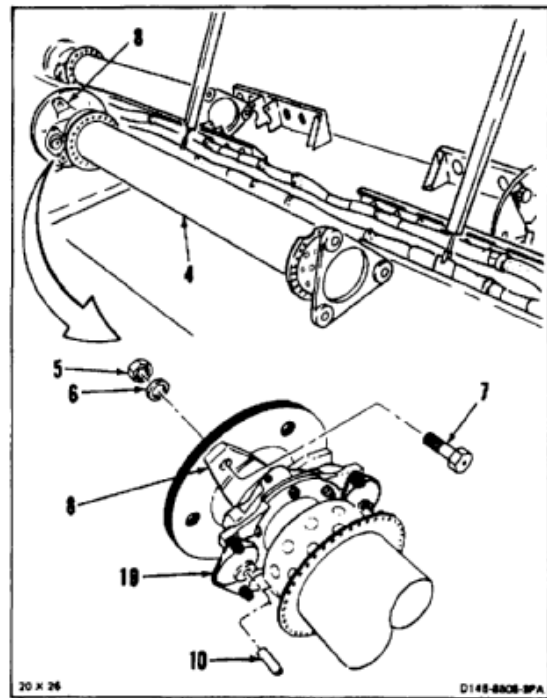
6. Rotate shaft (4) to position two bolt holes in adapter assemblies (8) at top of shaft.
7. Remove three bolts (3) and special washers (17) from each end of shaft (4).
8. With aid of helper, lift shaft (4) from brackets (18). Remove shaft.



9. If shaft (4) is being replaced, install bolt (7), special washer (6) and nut (5) in adapter assembly (8). Remove bushing (10) from mount (19) on each side of adapter assembly.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

**6-4 REMOVE NO. 7 DRIVE SHAFT**

6-4

**INITIAL SETUP****Applicable Configurations:**

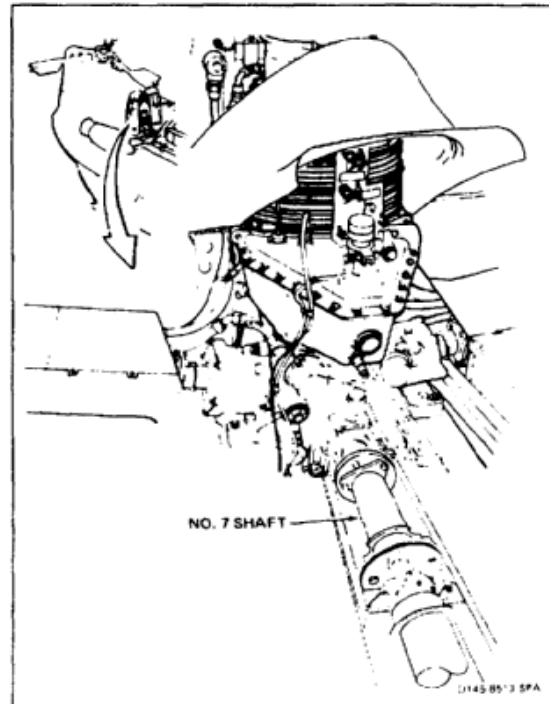
All

**Tools:**

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

**Materials:**Barrier Material (E80)  
Cloths (E120)**Personnel Required:**

Medium Helicopter Repairer (2)

**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Pylon Hinged Fairing Open (Task 2-2)  
Pylon Lower Fairing Raised (Task 2-2)  
Forward Drive Shaft Tunnel No. 6 Access Cover  
Open (Task 2-2)  
Remove Cabin Tunnel Smoke Baffle (Task 2-170.1)

Do not allow bolts to turn. If bolts turn, bolts and adapter assembly can be damaged.

**NOTE**

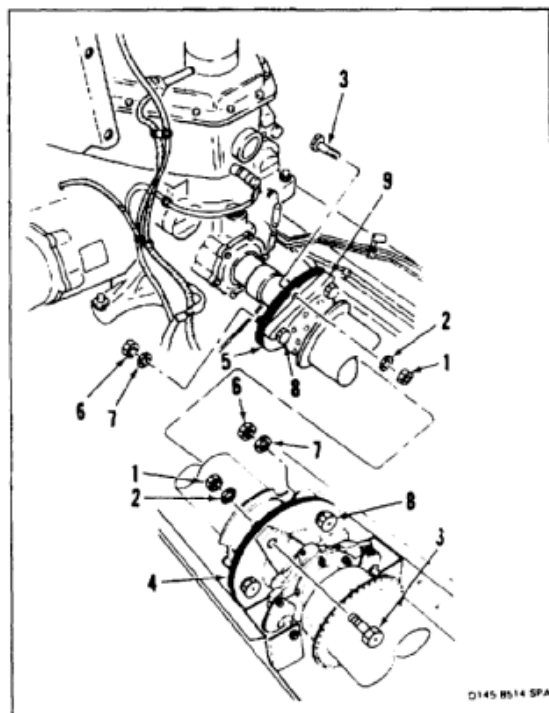
If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

1. Remove one nut (1), special washer (2), and bolt (3) from adapter assemblies (4 and 5). During removal, hold head of bolts with wrench.



Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.

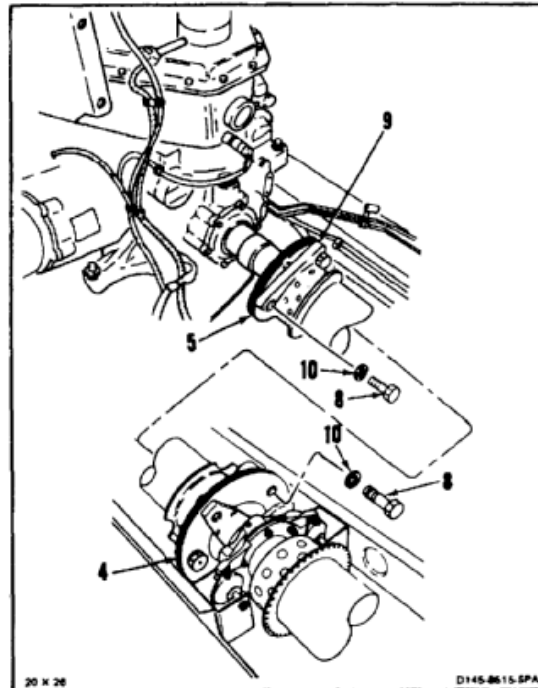
2. Remove three nuts (6) and washers (7) from bolts (8) at each end of shaft (9). During removal, hold head of bolts with wrench. Do not remove bolts at this time.



**NOTE**

All shafts must be rotated as a unit to keep blades in phase.

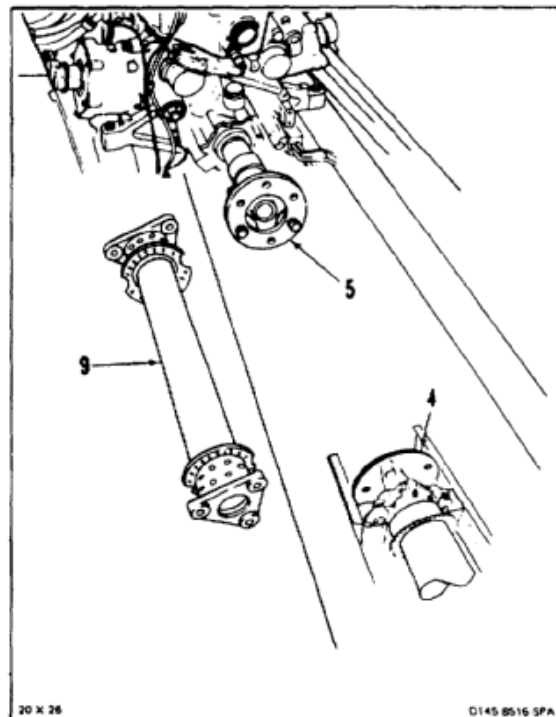
3. Rotate shaft (9) to position two bolt holes in adapter assemblies (4 and 5) at top of shaft.
4. Support shaft (9) with cloths (E120) or barrier material (E80).
5. Remove three bolts (8) and washers (10) from each end of shaft (9).



6. With aid of helper lift shaft (9) from between adapter assemblies (4 and 5). Remove shaft.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

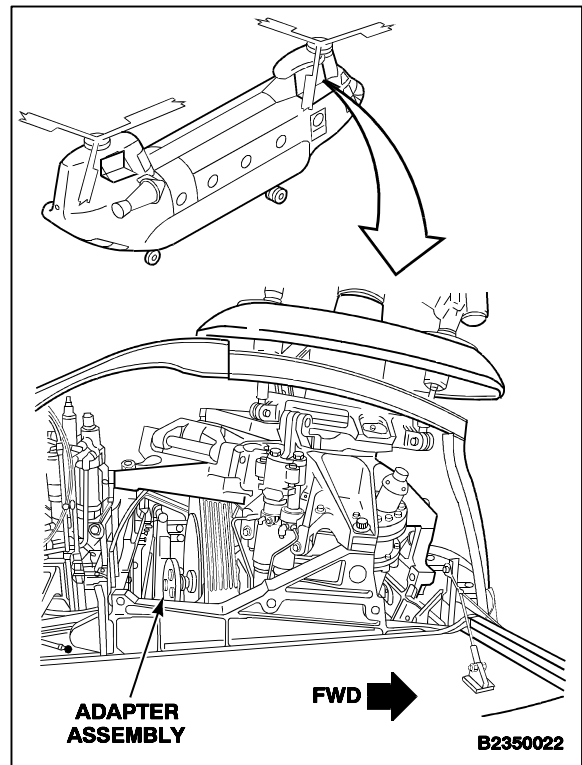
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

**Personnel Required:**

CH-47 Helicopter Repairer

**Equipment Condition:**

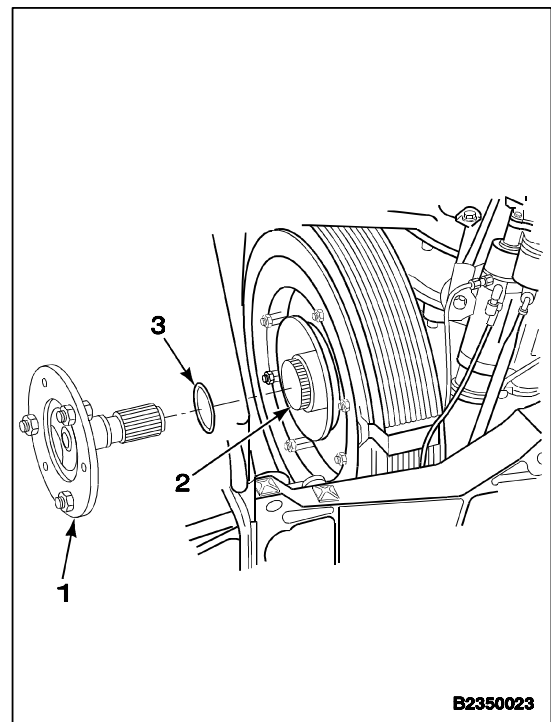
- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Forward Transmission Right Fairing Open (Task 2-2)
- Oil Cooler Air Inlet Duct Removed (Task 6-121)
- No. 1 and No. 2 Drive Shafts Removed (Tasks 6-2 and 6-3)



**NOTE**

If more than one bolt is loosened or removed from the adapter assembly, the adapter assembly must be rebalanced.

1. Remove adapter assembly (1) from transmission input shaft (2).
2. Remove packing (3) from adapter assembly (1).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Wood Dowel, 1 Inch x 18 Inches

**Materials:**

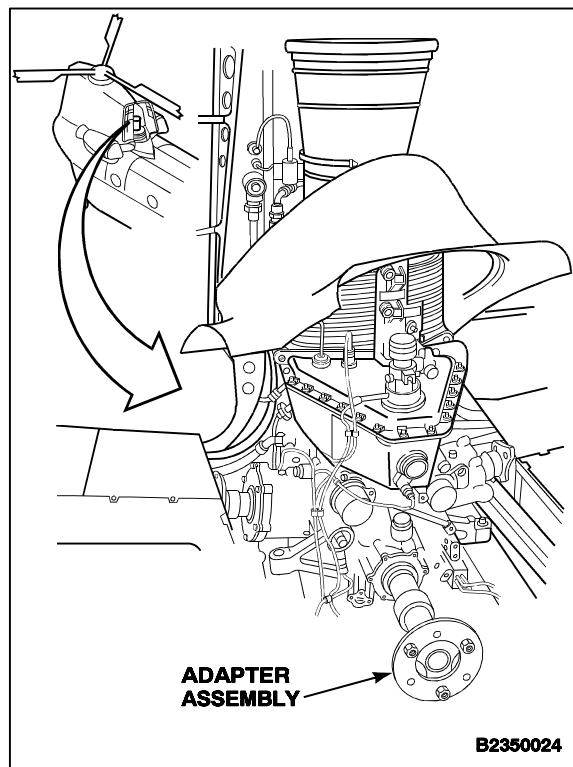
Cloth, Cleaning (E120)  
Dry Cleaning Solvent (E162)  
Gloves (E184.1)  
Goggles (E473)

**Personnel Required:**

CH-47 Helicopter Repairer

**Equipment Condition:**

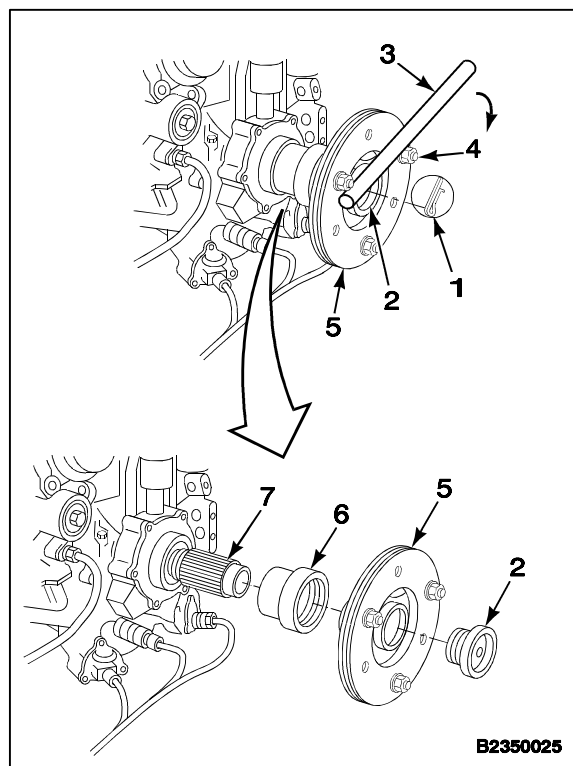
Battery Disconnected  
Electrical Power Off  
Aft Pylon Access Doors Open (Task 2-2)  
Aft Pylon Lower Fairing Open (Task 2-2)  
No. 7 Drive Shaft Removed (Task 6-4)



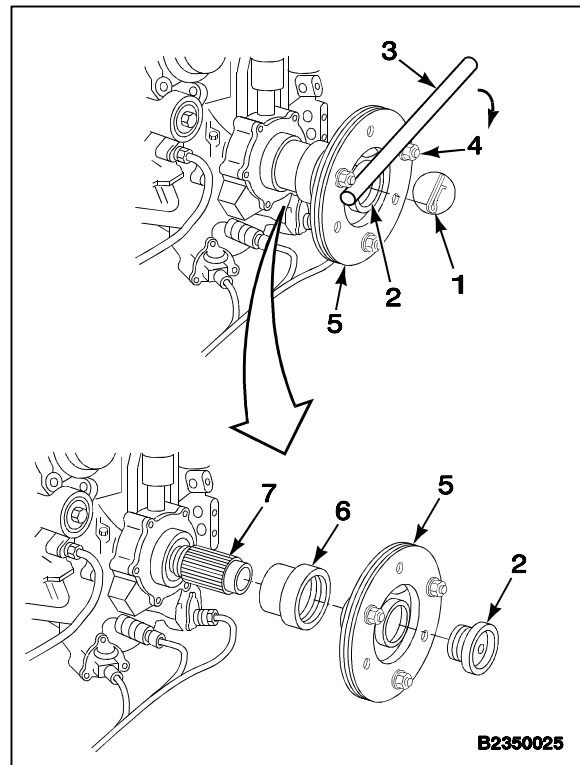
1. Remove locking (1) from retainer (2).
2. Place wood dowel (3) across nuts (4) as shown. Hold dowel to keep adapter assembly (5) from turning. Remove retainer (2).
3. Remove adapter assembly (5) and retainer (6) from output shaft (7).

**WARNING**

Dry cleaning solvent is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated areas, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.



4. Clean splines of output shaft (7) using dry cleaning solvent (E162) and cloths (E120). Wear gloves (E184.1).
5. Inspect splines on output shaft (7) for wear. If wear is evident, proceed as follows:
  - a. Place a straightedge (6 inch metal ruler or equivalent) along the length of the spline, with the ruler spanning the worn area.
  - b. Using a feeler gauge, measure the depth of wear below the face of the spline.
  - c. If spline wear exceeds **0.005 inch**, replace combining transmission.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK





## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Technical Inspection Tool Kit, NSN 5180-00-323-5114  
 Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4962  
 4X Magnifying Glass

**Materials:**

Abrasive Paper (E15)

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

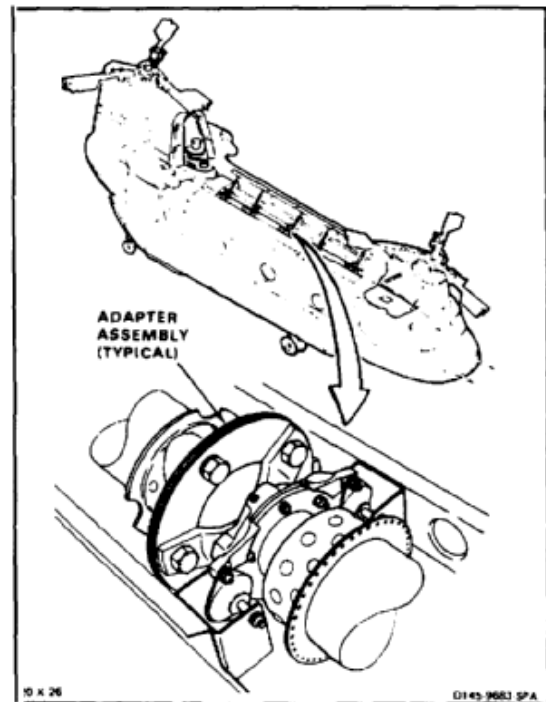
TM 1-1520-253-23

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Forward Drive Shaft Tunnel Access Covers Open  
 (Task 2-2)  
 Forward Transmission Fairing Work Platforms Open  
 (Task 2-2)  
 Aft Pylon Doors Open (Task 2-2)  
 Aft Pylon Lower Fairing Open (Task 2-2)

**General Safety Instructions:****WARNING**

Keep clear of turning rotor blades  
 when rotating adapter assembly.  
 Turning blades can injure personnel.



**NOTE**

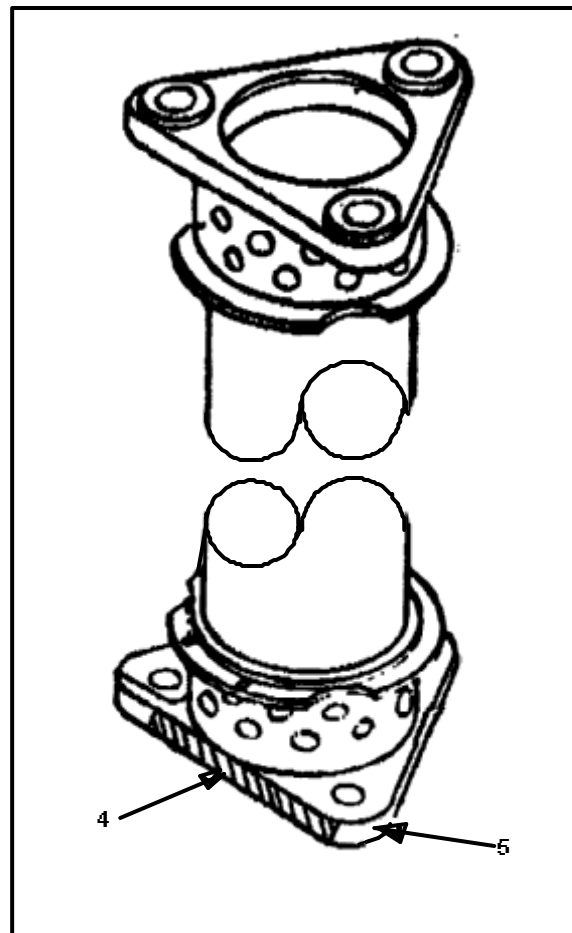
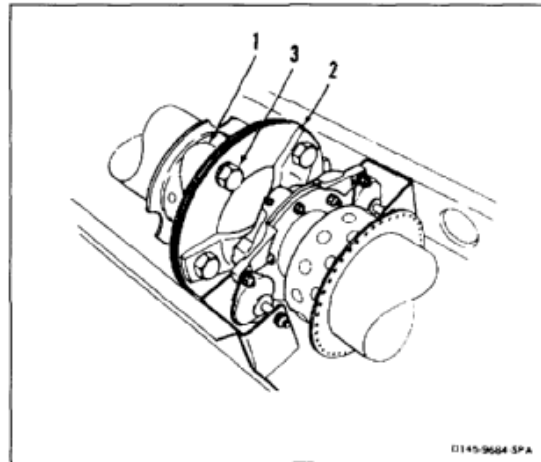
Inspect all adapter assemblies in same way. Typical assembly shown.

Use magnifying glass to inspect.

Rotate adapter assembly as needed for complete check.

If more than one bolt is loosened or removed from adapter assembly, the adapter assembly must be rebalanced.

1. Inspect adapter (1) and plates (2) for cracks. Pay special attention to areas around bolts (3). There shall be no cracks. If a crack is suspected in adapter or plate, refer to TM 1-1520-253-23.
2. Inspect adapter (1) as follows:
  - a. Nicks, gouges, score marks and scratches that do not exceed **0.010 inch** in depth on adapter surfaces between lugs (4), including balancing flanges can be blended per Task 6-11.
  - b. Nicks, gouges, score marks and scratches that do not exceed **0.020 inch** in depth on adapter, adjacent to the bolt hole outer lug surfaces (5) can be blended per Task 6-11.
  - c. Light damage such as nicks, score marks, and scratches on the adapter external surfaces that do not exceed **0.005 inch** in depth (except for the bolt holes) can be blended per Task 6-11.
3. Inspect plates (2). There shall be no sharp dents or distorting. There shall be no nicks on inside edge. Feel for nicks with pointed scribe.
4. Inspect outside edge of plates (2) for light scratches, fretting corrosion or nicks. Repair damage (Task 6-11). Use abrasive paper (E15).

**FOLLOW-ON MAINTENANCE:**

- Close aft pylon lower fairing (Task 2-2).
- Close aft pylon doors (Task 2-2).
- Close forward transmission fairing work platforms (Task 2-2).
- Close forward drive shaft tunnel access covers (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

None

**Materials:**

Dry Cleaning Solvent (E162)

Grease (E190.1)

Cloth (E120)

Gloves (E186)

Abrasive Pad (E2)

**Parts:**

Packing

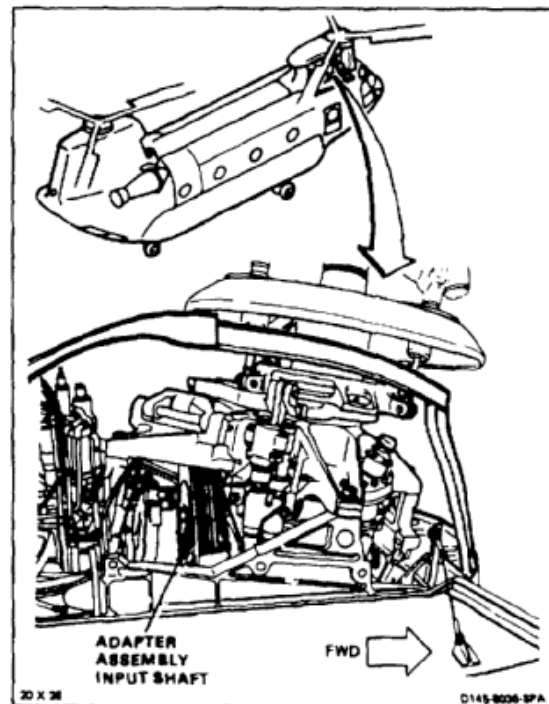
**Personnel Required:**

Medium Helicopter Repairer

Inspector

**References:**

TM 55-1520-240-23P



**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

If more than one bolt is loosened or removed from the adapter assembly, the adapter assembly must be rebalanced.

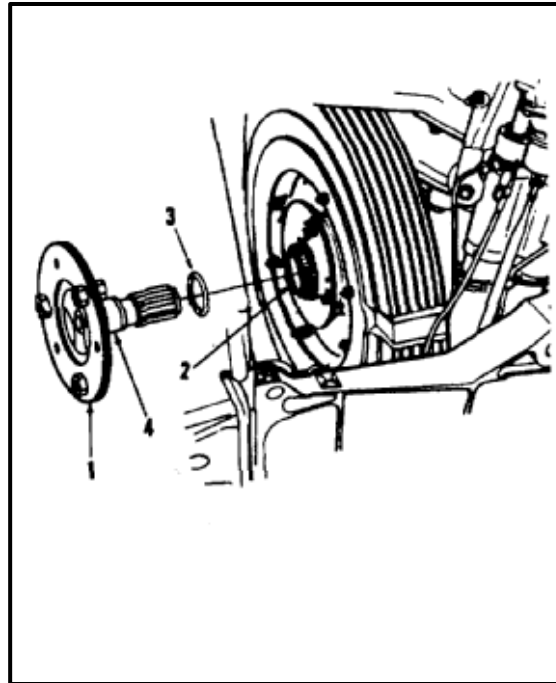
1. Clean splines of adapter assembly (1) and input shaft (2). Use dry cleaning solvent (E162) and clean cloths (E120). Using abrasive pad (E2) thoroughly remove any fretting corrosion from adapter surface (4) and mating surface of input shaft. Wear gloves (E186).
2. Coat packing (3) with grease (E190.1). Install packing on adapter assembly (1).

**INSPECT**

3. Pack splines of input shaft (2) and adapter assembly (1) with grease (E190.1).
4. Completely cover adapter surface (4) with grease (E190.1).
5. Install adapter assembly (1) in input shaft (2). Make sure assembly is fully seated. Wipe off excess grease with cloth (E120).

**FOLLOW-ON MAINTENANCE:**

Install No. 1 and No. 2 drive shafts (Tasks 6-17 and 6-18).  
 Phase rotary-wing blades (Task 6-28).  
 Install forward transmission oil cooler air inlet duct (Task 6-122).  
 Close forward transmission right fairing (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Torque Wrench, 700 to 1600 Inch-Pounds  
Wood Dowel, 1 Inch x 18 Inches

**Materials:**

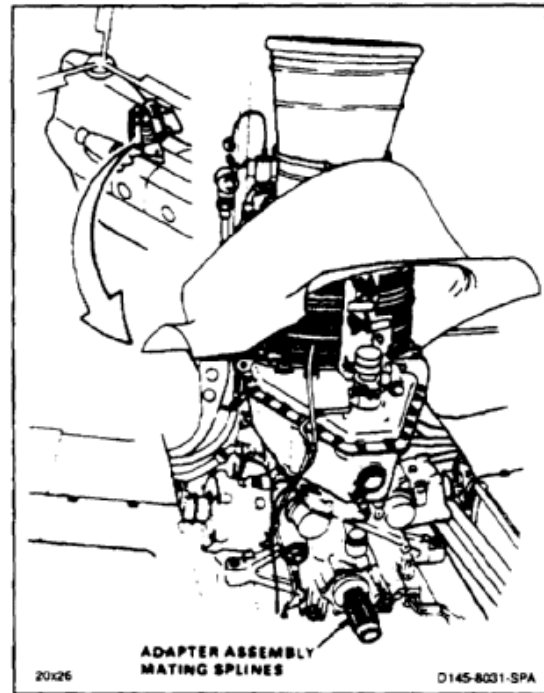
Dry Cleaning Solvent (E162)  
Cloths (E120)  
Grease (E190.1)  
Gloves (E186)

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

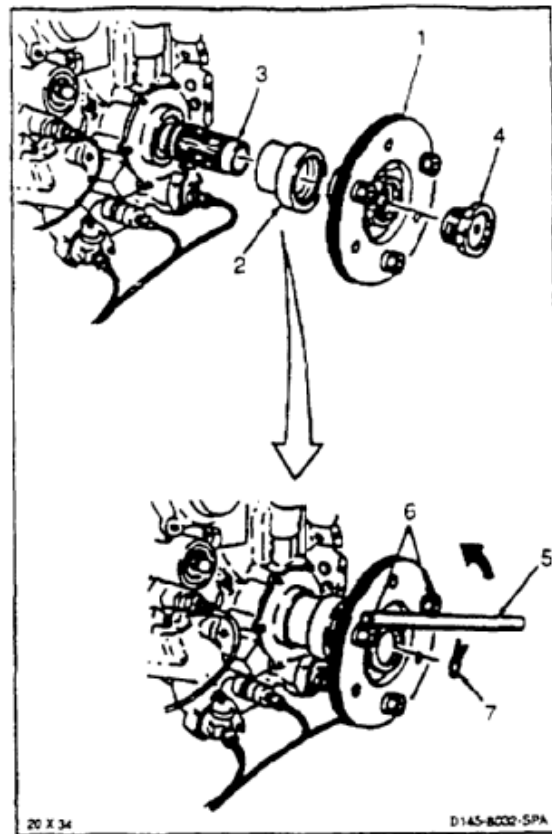
TM 55-1520-240-23P  
Task 6-20



**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

1. Clean splines of adapter assembly (1), retainer (2), and output shaft (3). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
2. If adapter assembly (1) is either removed or replaced, align drive shafting (Task 6-20).
3. Pack splines of adapter assembly (1), retainer (2), and output shaft (3) with grease (E190.1).
4. Install retainer (2) and adapter assembly (1) on output shaft (3). Wipe off excess grease with cloths (E120).
5. Coat thread of retainer (4) with grease (E190.1). Install retainer.
6. Place wood dowel (5) across nuts (6) as shown. Hold dowel to keep adapter assembly (1) from turning. Torque retainer to **825 inch-pounds**.
7. Continue tightening retainer (4) to align holes in retainer (4) and adapter assembly (1). Install lockring (7). Lockring shall protrude at least **0.06 inch** through adapter assembly (1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install No. 7 drive shaft (Task 6-19).
- Phase rotary-wing blades (Task 6-28).
- Close aft pylon lower fairing (Task 2-2).
- Close aft pylon access doors (Task 2-2)

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Technical Inspection Tool Kit, NSN 5180-00-323-5114  
 Machinist's Scriber, NSN 5120-00-221-7063  
 Light Source

**Materials:**

Acetone (E20)  
 Epoxy Primer (E292)

**Personnel Required:**

Inspector

**References:**

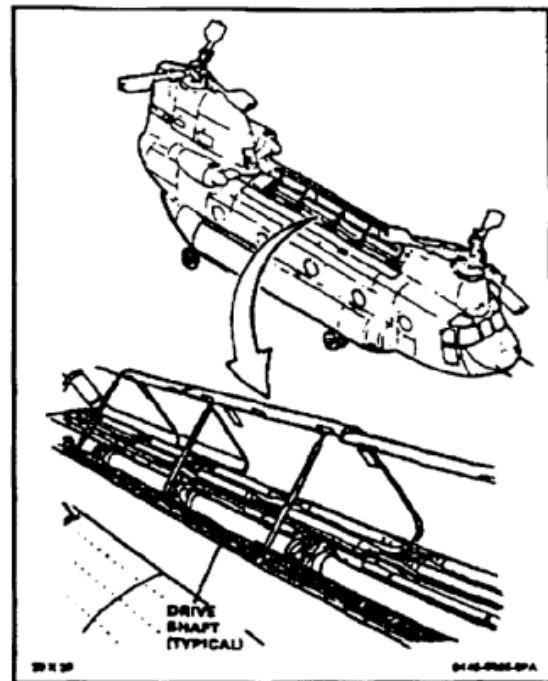
TM 1-1500-335-23  
 TM 1-1520-253-23

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Drive Shaft Tunnel Access Covers Open (Task 2-2)

**General Safety Instructions:****WARNING**

Keep clear of turning rotor blades when rotating drive shaft. Turning blades can injure personnel.



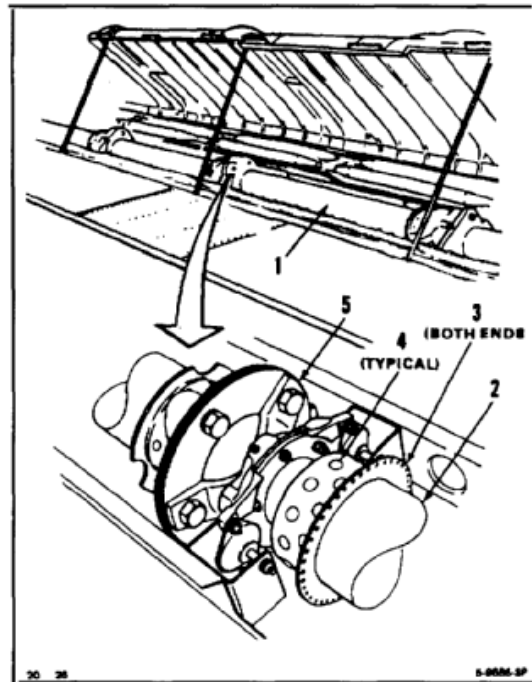
**NOTE**

Inspect all drive shafts in same way.  
Typical shaft shown.

Rotate shaft as needed to do a  
complete check.

Tube and adapter are balanced  
together. If one is damaged, both  
must be replaced.

1. Inspect shaft (1) for damage listed below. There shall be no such damage.
  - a. No cracks in tube (2) allowed. If a crack is suspected in drive shaft tube, refer to TM 1-1520-253-23.
  - b. No dents in tube (2) more than **1 inch** diameter or **0.040 inch** deep allowed.
  - c. No two allowable dents shall be closer than **4.50 inches**.
  - d. No more than one allowable dent around the circumference of tube (2) at any one point.
  - e. No dent within **1.25 inches** of end flange (3).
  - f. Loose or cracked rivets (4) at ends of tube.

**NOTE**

Adapters have a shotpeened surface.  
Damage cannot be repaired.

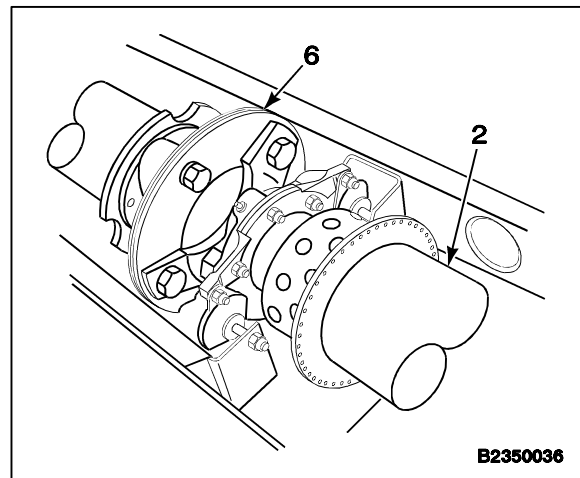
- g. Cracks, nicks, scratches, or gouges in adapter (5). Use a five power magnifying glass to check. If a crack is suspected in drive shaft adapter, refer to TM 1-1520-253-23.



- h. Cracks in plates (6). Use a **5X** magnifying glass to check. If a crack is suspected in drive shaft plate, refer to TM 1-1520-253-23.
- i. Nicks on inside edge of plates (6). Use a pointed scribe to check.
- j. Cracks, nicks, scratches, or gouges in dents in tube (2). Use a **3X to 5X** magnifying glass for inspection. If a crack is suspected in drive shaft tube, refer to TM 1-1520-253-23.

**NOTE**

Vibro-engraved factory markings on tube are allowed.



B2350036

- k. Inspect for corrosion. If found, perform Task 6-10.1.
2. Inspect for nicks, scratches, or gouges in tube (2) and plates (6). Repair damage (Task 6-11).
  3. Visually inspect tubes (2) for circumferential scoring. Observe following limits:
    - a. Depth after blending: **0.010 inch** maximum.
    - b. Length after blending: **2.0 inches** maximum.
    - c. Width after blending: **0.40 inch** maximum.
    - d. Minimum distance from adapter rivets is: **7 inches** each end.
    - e. Minimum axial distance between circumferential scoring repair is **4.5 inches**.
    - f. Maximum of one circumferential scoring repair around tube OD at any one point.

4. Check for free movement of each shock mount (7) on spacer (8). Replace nicked, scored, or gouged spacers.
5. Check shock mounts (7) as follows:



Do not use screwdrivers to displace shaft. They may slip and damage elastomer.

- a. Displace shaft in vicinity of mounts (7) laterally and vertically by hand pressure.
- b. While shaft assembly is displaced, inspect for tears in elastomer (9).
- c. Displace the shaft axially and radially by hand. Inspect for excessive play or binding between mount bushing (10) and spacer (8).
- d. Any tear in elastomer (9) over **1/4 inch** long (including separation of elastomer from inner face of bushing (10)) is cause for rejection of mount. Tears usually occur at **6 o'clock** position on mount (7).
- e. Excessive radial movement or irregularities interfering with free axial movement between bushing (10) and spacer (8) noted during the inspection process requires removal of mount (7) and spacer for detailed inspection and measurement as follows:

**NOTE**

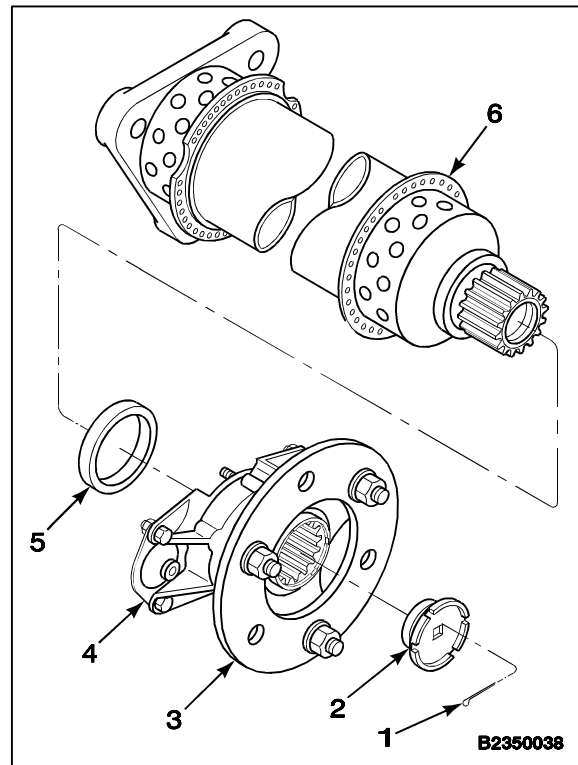
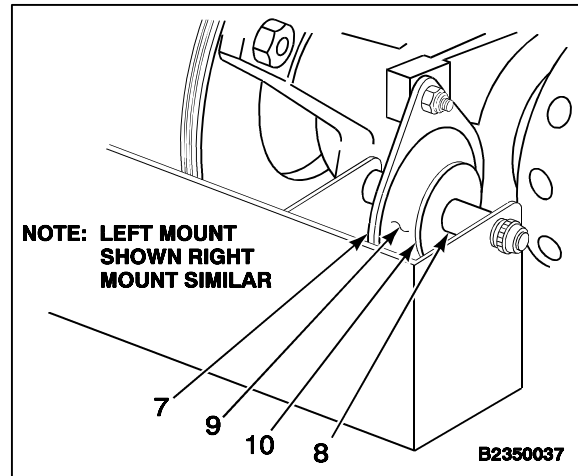
Measurements shall be taken at 3 locations of equal distance along length of part.

- (1) Spacer — Replace if OD is worn to less than **0.432 inch**.
- (2) Mount — Replace if ID of bushing (10) is more than **0.441 inch**.

**NOTE**

The following inspection is required when the drive shaft retainer nut (2) cotter pin (1) is missing.

6. Remove the affected shaft assembly from the aircraft (Task 6-2, 6-3, 6-4, or 6-21).
7. Check the torque on the retainer nut (2) in the tightening direction. If the torque is **1500 inch-pounds** or greater, replace the cotter pin (1) and reinstall the drive shaft assembly (Task 6-17, 6-18, 6-19, or 6-29).



8. If the retainer nut (2) torque is less than **1500 inch-pounds**.
  - a. Disassemble the drive shaft (Task 6-12).
  - b. Inspect spacer (5) for wear. Replace the spacer if length is less than **0.60 inch**.
  - c. Inspect drive splines in the adapter assembly (3) and on the drive shaft (6) for wear. Replace the shaft assembly if the spline wear step exceeds **0.005 inch**.

9. Check clearance between any aircraft non rotating structure (pay particular attention to the shaft mounting brackets) and the rotating sync shafts are at least **.25 inch**.

**NOTE**

Move the sync shaft by hand as far forward and aft as possible while making check as clearance may be reduced by shaft rivets.

- a. Rotate sync shaft at least **one full revolution** while checking to ensure minimum clearance of **.25 inch** is obtained.
- b. If clearance is **.25 inch** or less, go to step 10.
- c. If clearance is more than **.25 inch**, no further action is required.

**NOTE**

As damage to the sync shafts may occur if correction procedures are done with sync shaft installed, it is recommended the sync shafts be removed.

10. Mark mounting bracket at place where clearance will be obtained.



Minimum distance from the edge of the mounting bolt hole to the edge of the bracket shall be no less than **.244 inch**.

11. File/grind excess material required to obtain the required **.25 inch** clearance between sync shaft and the bracket edge.

12. Deburr and remove all metal shavings.

**WARNING**

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

13. Clean exposed areas of the mounting bracket with acetone (E20).

**WARNING**

Epoxy primer (E292) is extremely flammable and very toxic. Protective clothing or body suit with respirator and eye protection is required if material is to be applied by spraying. Avoid inhaling. Use only in well-ventilated areas. Avoid contact with skin, eyes, or clothing. Keep away from heat, spark, or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

14. Apply MIL-P-23377 primer (E292) to the bare metal surfaces of bracket.

15. Install sync shaft (if removed).

16. Repeat step 9.

**FOLLOW-ON MAINTENANCE:**

Close drive shaft tunnel access covers (Task 2-2).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Aircraft Maintenance Tool Kit, NSN 5180-00-323-5114
- Light Source
- Torque Wrench, 30-1520 Inch-Pounds
- Torque Wrench, 700-1600 Inch-Pounds
- Bucket, 4 Gallon

**Materials:**

- Tape (E385.1)
- Brush (E85.2)
- Alcohol (E64)
- Cloth, Cleaning (E120)
- Gloves (E184.1)
- Grease (E190)
- Antiseize Compound (E75)
- Cleaning Compound (E117.1)
- Dry Cleaning Solvent (E162)
- Goggles (E473)

**Personnel Required:**

- CH-47 Helicopter Repairer
- Inspector

**Parts:**

- Cotter Pin

**References:**

- Task 6-2
- Task 6-3
- Task 6-11
- Task 6-12
- Task 6-21
- TM 1-1500-335-23
- TM 55-1520-240-23P

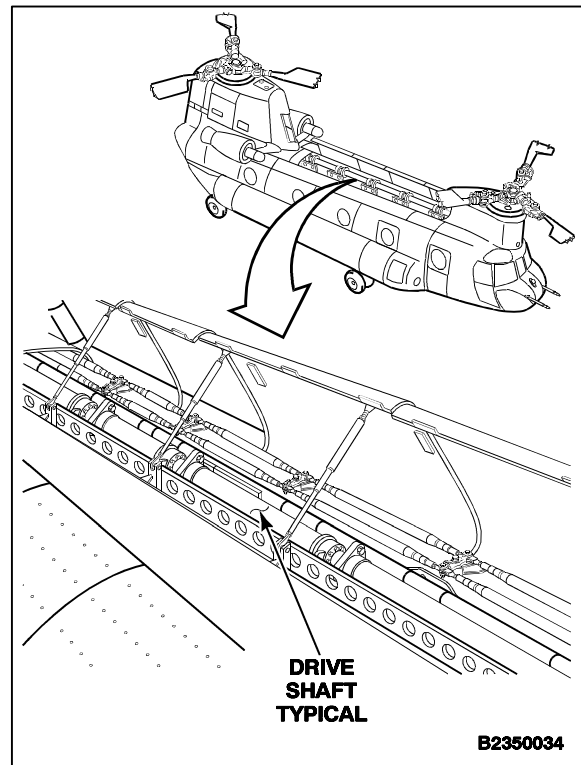
**Equipment Condition:**

Off Aircraft

**General Safety Instructions:**

**WARNING**

Alcohol (E64) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



**WARNING**

Antiseize compound (E75) can form toxic vapors if exposed to flame. Use in a well-ventilated area, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

Inspect all drive shafts in the same way. Typical shaft shown.

Rotate shaft as needed to complete check.

Tube and adapter are balanced together. If one is damaged, both must be replaced.

1. Inspect shaft (1) for damage listed below. There shall be no such damage.
  - a. Cracks in tube (2).
  - b. Dents in tube (2) more than **1 inch** diameter or **0.040 inch** deep.
  - c. Distance between any two dents less than **4.5 inches**.
  - d. More than one dent around tube (2) at any one point.
  - e. Distance between end flange (3) and any dent less than **1.25 inches**.
  - f. Loose or cracked rivets (4) at ends of tube.

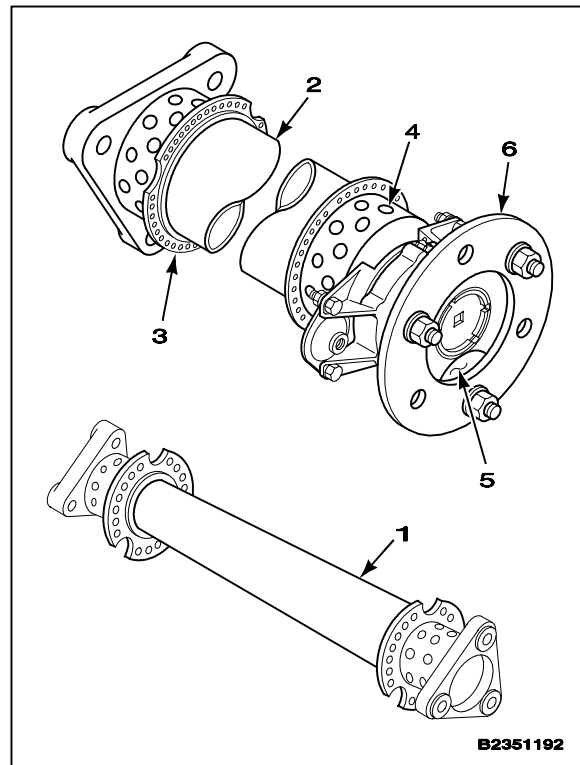
**NOTE**

Adapters have a shotpeened surface. Damage cannot be repaired.

- g. Cracks, nicks, scratches, or gouges in adapter (5). Use a **5X** magnifying glass to check.
- h. Cracks in plates (6). Use **5X** magnifying glass to check.
- i. Nicks on inside edge of plates (6). Use a pointed scribe to check.
- j. Cracks, nicks, scratches or gouges in dents in tube (2). Use Fluorescent Inspection to check (TM 1-1500-335-23).
- k. Inspect for corrosion. If no corrosion is found, perform only steps 2 and 3.

**NOTE**

Vibro-engraved factory markings on tube are allowed.

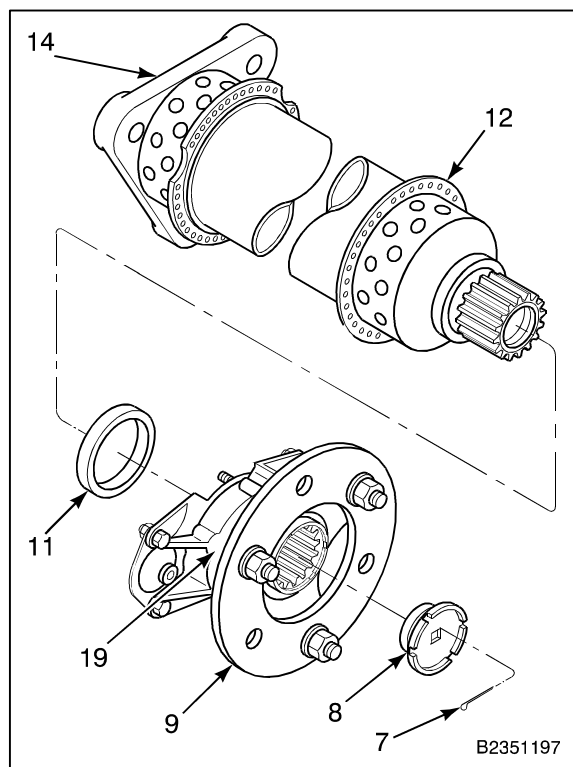


2. Inspect for nicks, scratches, or gouges in tube (2) or plates (6). Repair damage (Task 6-11).
3. Visually inspect tubes (2) for circumferential scoring. Observe following limits:
  - a. Depth after blending: **0.010 inch** maximum.
  - b. Length after blending: **2.0 inches** maximum.
  - c. Width after blending: **0.40 inch** maximum.
  - d. Minimum distance from adapter rivets is: **7 inches**, each end.
  - e. Minimum axial distance between circumferential scoring repairs is **4.5 inches**.
  - f. Maximum of one circumferential scoring repair around tube outer diameter (OD) at any one point.

**NOTE**

This inspection pertains only to the No. 1 thru No. 6 and No. 8 drive shafts.

4. Remove cotter pin (7) and retainer (8) from adapter assembly.
5. Remove adapter assembly (10), and spacer (11) from drive shaft assembly (12) (Task 6-12).



**DRIVE SHAFT CLEANING, PRIMARY METHOD**

6. Clean drive shafts (12) as follows:

**NOTE**

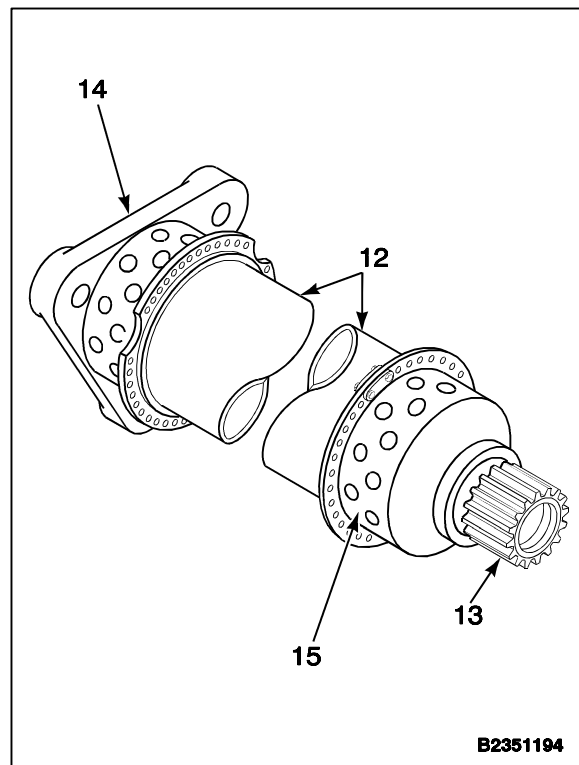
Drive shaft must be thoroughly clean before corrosion inspection can be accomplished.

- a. Submerge spline adapter end (13) of drive shaft (12) into a bucket containing **9 inches** of solvent (E162). Wear gloves (E184.1).
- b. Attach brush (E85.2) to wooden handle. Use tape (E385.1).
- c. Insert brush through hole in the aluminum adapter end (14) of drive shaft (12).
- d. Scrub interior section of spline adapter end (13) and riveted portion of the drive shaft (15).
- e. Scrub exterior section of spline adapter end (13) and riveted portion of the drive shaft (15). Use brush (E85.2).
- f. Continue scrubbing until drive shaft is clean enough for inspection.
- g. Drain and rinse solvent from drive shaft (12). Use alcohol (E64). Wear gloves (E184.1). Allow the shaft to air dry.

**NOTE**

Compressed air can be used to speed up the drying process.

- h. If dirt/grease was not adequately removed from drive shaft (12), clean drive shaft using alternate cleaning method (step 7).
- i. If dirt/grease was adequately removed from drive shaft (12), inspect drive shaft for corrosion (step 8).



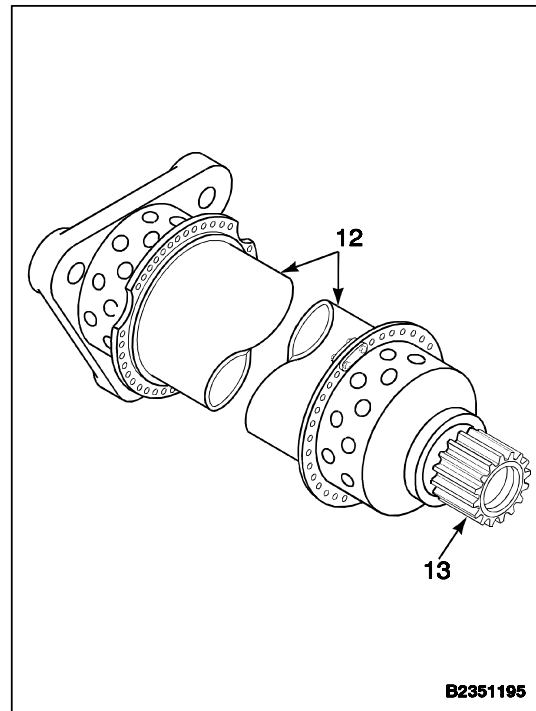
**DRIVE SHAFT CLEANING, ALTERNATE METHOD**

7. Clean drive shafts (12) as follows:

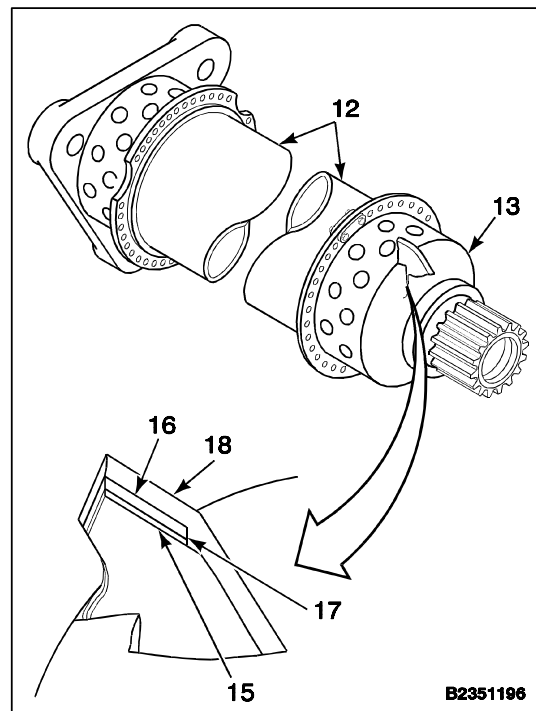
**NOTE**

Drive shaft must be thoroughly clean before corrosion inspection can be accomplished.

- a. Submerge spline adapter end (13) of drive shaft (12) into a bucket containing **9 inches** of a **10 percent** solution of cleaning compound (E117.1) and water. Wear gloves (E184.1).
- b. Repeat steps 6b thru 6f.
- c. Drain and rinse shaft with water. Final rinse with alcohol (E64). Wear gloves (E184.1). Allow shaft (12) to air dry.
- d. If dirt/grease was not adequately removed from drive shaft (12), re-clean drive shaft (step 7).
- e. If dirt/grease was adequately removed from drive shaft (12), inspect drive shaft for corrosion (step 8).



8. Inspect drive shaft for corrosion as follows:
  - a. Insert light source at both ends of drive shaft (12).
  - b. Insert inspection mirror in spline adapter end (13).
  - c. Inspect internal surfaces of spline adapter end (13) and drive shaft (12).
  - d. Inspect inside diameter of drive shaft adapters riveted area (15).
  - e. Inspect end of aluminum shaft edge (16), next to the internal shoulder (17) of the steel adapter (18).
  - f. Replace drive shaft (12) if any corrosion or exfoliation is found.
9. Inspect splines for corrosion:
  - a. Corrosion/pitting shall not exceed **0.02 inch** in depth and/or cover more than **25 percent** of total area of spline (13).

**FOLLOW-ON MAINTENANCE:**

- Install No. 1 drive shaft (Task 6-17).
- Install No. 2 thru No. 6 drive shaft (Task 6-18).
- Install aft drive shafting (Task 6-29).
- Assemble drive shaft (Task 6-16).

END OF TASK



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Dial Indicating Depth Gage 643J

**Materials:**

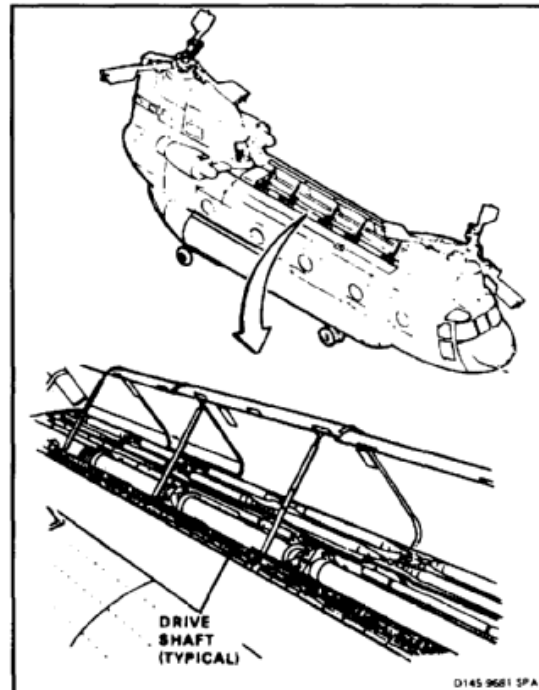
Abrasive Paper (E15)  
Epoxy Primer (E292 or E293)

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Drive Shaft Tunnel Access Covers Open  
(Task 2-2)



**NOTE**

Repair all drive shafts in the same way. A typical shaft is shown.

1. Remove light scratches, corrosion and nicks from outside edge of plates (1).
2. Blend out nicks, scratches and gouges on the face of plates (1) with abrasive paper (E15). Do not go deeper than **0.001 inch**.
3. Blend out scratches, nicks, and gouges on tube (2) with abrasive paper (E15). Do not go deeper than **0.010 inch**. Keep a blend radius of at least **1/2 inch**. Maximum blend area is **0.80 square-inch**.

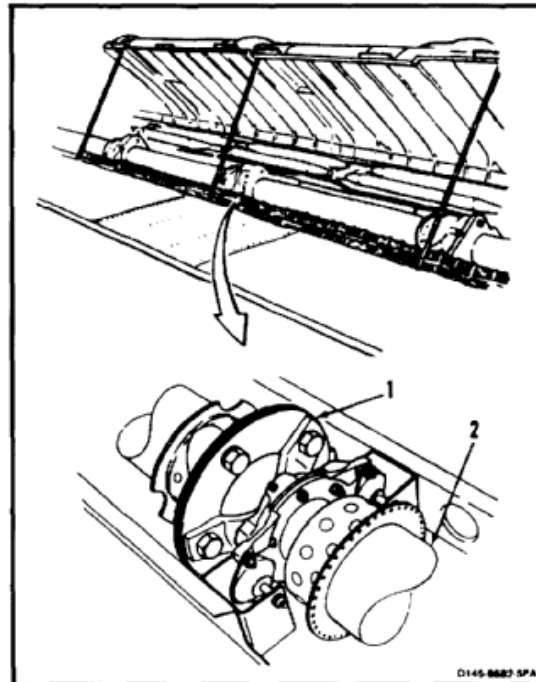
**INSPECT****WARNING**

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

4. Touch up tube (2) as needed with epoxy primer (E292 or E293).

**FOLLOW-ON MAINTENANCE:**

Close forward drive shaft tunnel access doors (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Tool Kit, NSN 5180-00-323-5267  
Heat Lamp

**Materials:**

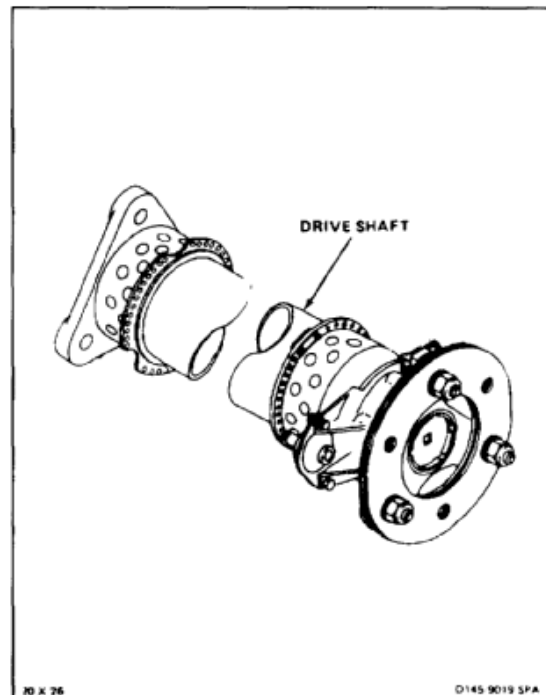
Temperature Indicating Strips (E413)

**Personnel Required:**

Aircraft Powertrain Repairer

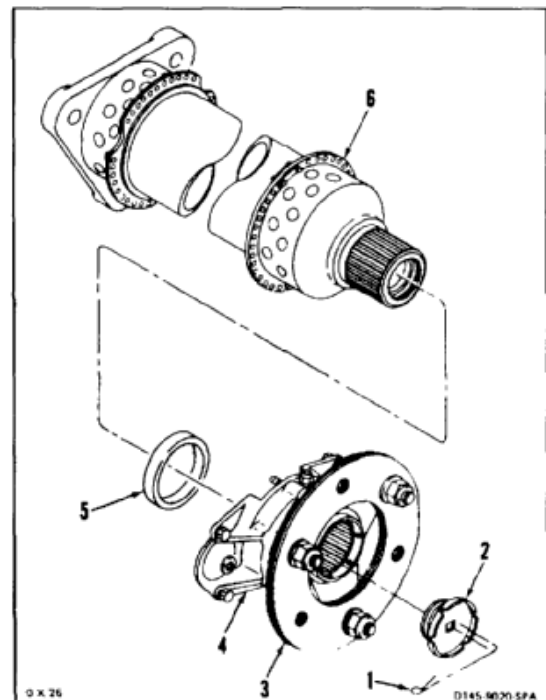
**Equipment Condition:**

Off Helicopter Task

**NOTE**

Disassembly procedure is for No. 1 thru No. 6 and No. 8 drive shafts. Typical shaft shown here.

1. Remove cotter pin (1). Remove retainer (2).
2. Remove adapter assembly (3), bearing support (4) and spacer (5) from drive shaft (6).

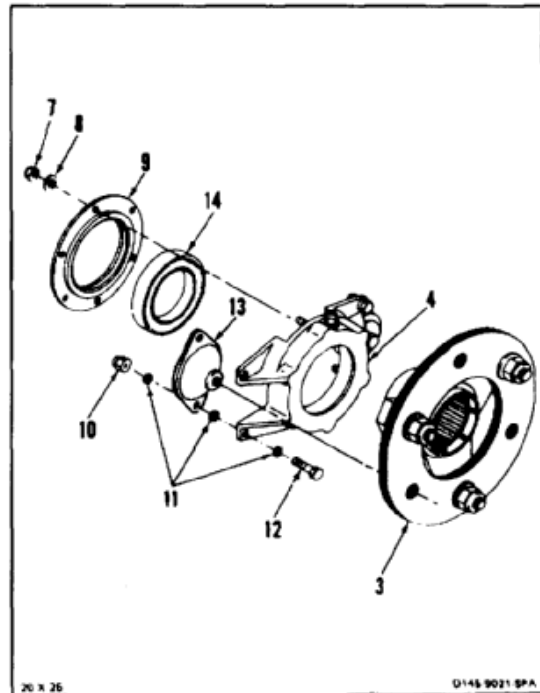


3. Remove six nuts (7), and washers (8) from bearing retainer (9). Remove retainer.
4. Remove bearing support (4) from adapter assembly (3).



Do not put pressure on inner race of bearing to remove bearing. Damage to bearing can occur.

5. Remove two nuts (10), six washers (11) and two bolts (12) from mount (13) on each side of bearing support (4). Remove mounts.
6. Remove bearing (14) from bearing support (4). If bearing does not remove easily, heat support to **175°F (80°C)**. Use heat lamp. Monitor temperature with temperature indicating strips (E413).



**FOLLOW ON MAINTENANCE:**

None

END OF TASK

**6-13 INSPECT REMOVED DRIVE SHAFT MOUNT AND BUSHINGS****6-13****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Micrometer Caliper Set GGG-C-105  
Telescoping Gage Set GGG-C-17, Type III, Class 2

**Materials:**

None

1. Check mount (1) for swollen or torn rubber and unbending of rubber from metal. There shall be no swelling or unbonding. There shall be no tears more than **0.25 inch** long.
2. Measure diameter of bushing hole (2) in mount (1). Diameter shall not be more than **0.441 inch**. Measure outside diameter of bushing (3). Diameter shall not be less than **0.432 inch**.

**Personnel Required:**

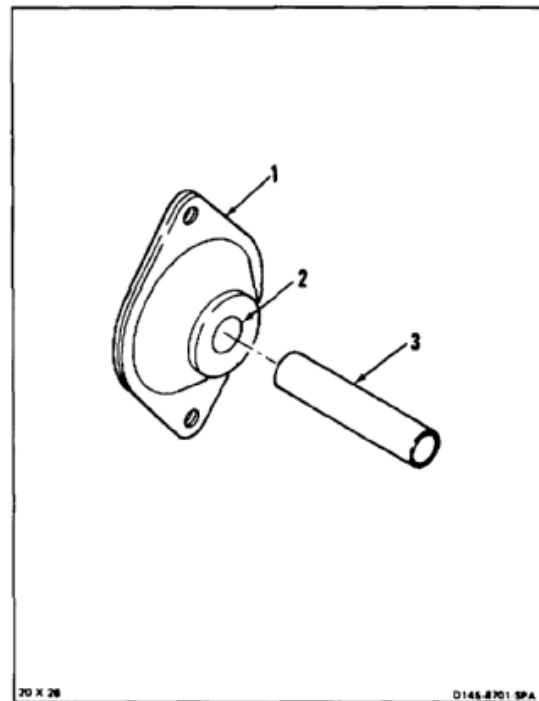
Medium Helicopter Repairer

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Off Helicopter Task

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Cloths (E120) or  
Barrier Material (E80)

**Personnel Required:**

Medium Helicopter Repairer (2)

**References:**

TM 55-1520-240-23P

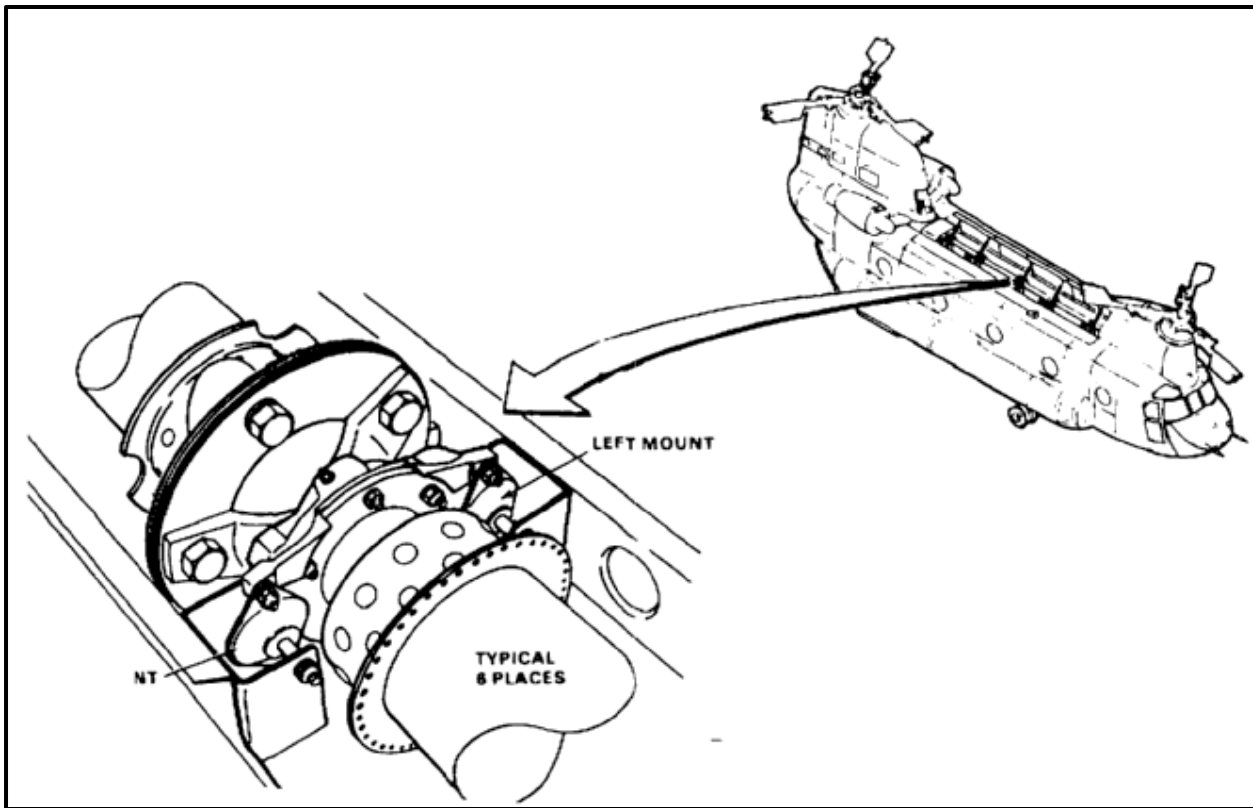
**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Forward Drive Shaft Tunnel Access Covers Open (Task 2-2)
- Forward Transmission Aft Fairing Removed (If Removing Forward Mounts) (Task 2-63)

**General Safety Instructions:**

**WARNING**

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.



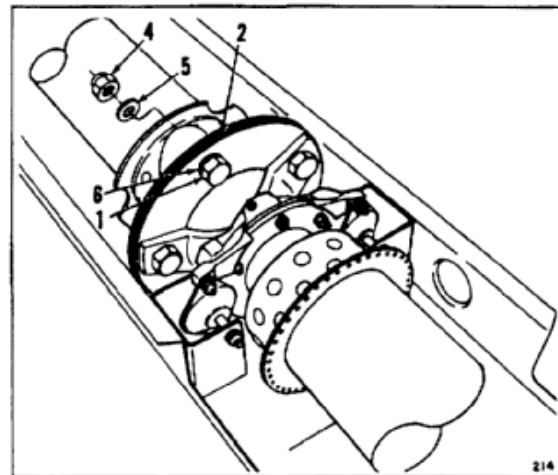
**CAUTION**

Do not allow bolt to turn. If bolt turns, it can damage bolt and plates.

**NOTE**

Remove left or right mount at any of six places in same way. Typical right mount is shown here.

1. Hold head of one bolt (1) in plates (2). Keep bolt from turning and remove nut (4) and special washer (5). Remove bolt and special washer (6).

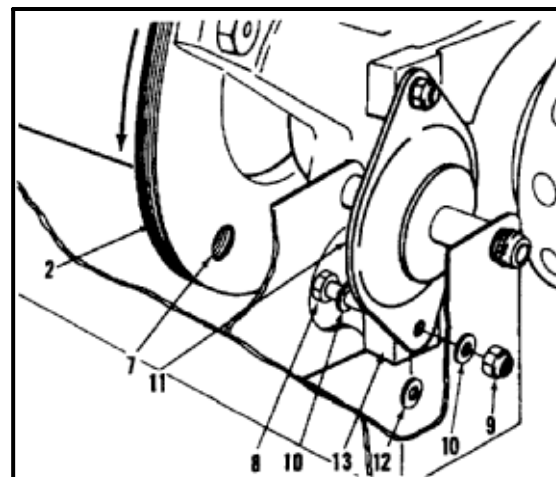


2. Rotate plates (2) to align hole (7) with lower of two mounting bolts (8).

**NOTE**

Reach lower bolt on drive shaft mount through bolt hole in plates. Use socket and extension.

3. Remove nut (9), two washers (10), and bolt (8) from top and bottom of mount (11). Remove thin washer (12) from between mount and support (13).

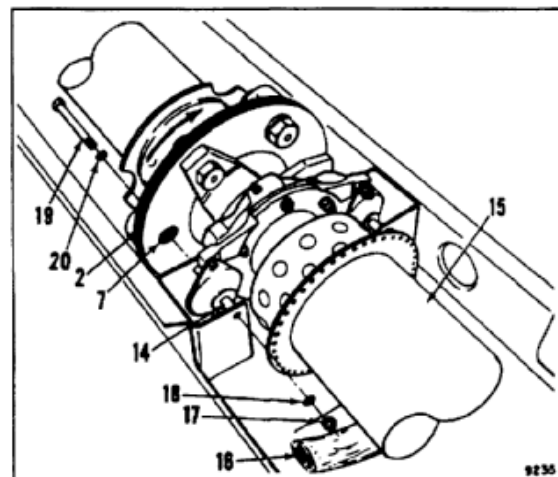


4. Rotate plates (2) to align hole (7) with mount bushing (14).
5. Support shaft (15) with cloths (E120) or barrier material (E80) (16).

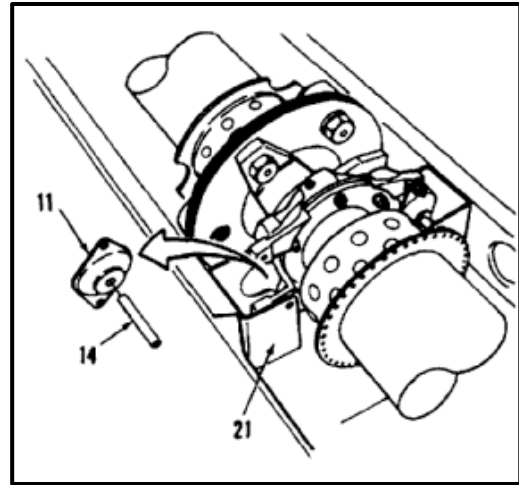
**NOTE**

Reach center bolt on mount through bolt hole in plates. Use socket and extension.

6. Remove nut (17) and washer (18) from bushing bolt (19). Remove bolt and washer (20).



7. Remove mount (11) and bushing (14) from bracket (21).
8. Remove bushing (14) from mount (11).

***FOLLOW-ON MAINTENANCE:***

None

END OF TASK



## INITIAL SETUP

**General Safety Instructions:****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Torque Wrench, 100 to 750 Inch-Pounds  
 Torque Wrench, 0 to 600 Foot-Pounds

**Materials:**

Oil (E254)

**Personnel Required:**

Medium Helicopter Repairer (2)  
 Inspector

**References:**

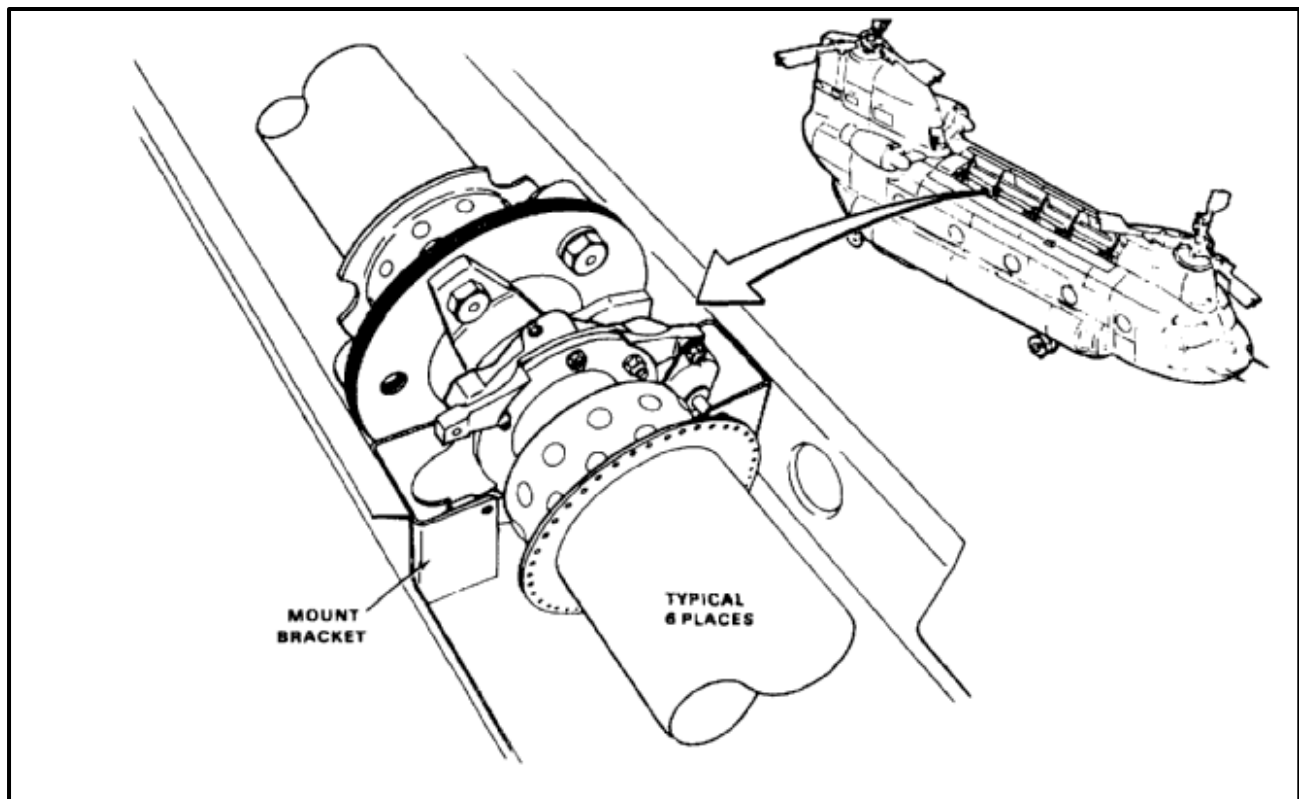
TM 55-1520-240-23P

**WARNING**

Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.



**NOTE**

Install left or right mount at any of six places in same way. Typical right mount is shown here.

1. Install bushing (1) in mount (2).

**NOTE**

There are two types of mount and bushing assemblies used. Helicopters with **1** and those modified by attrition have improved mount and bushing assemblies. Be sure to install matching part number mounts and bushings on both sides of shaft.

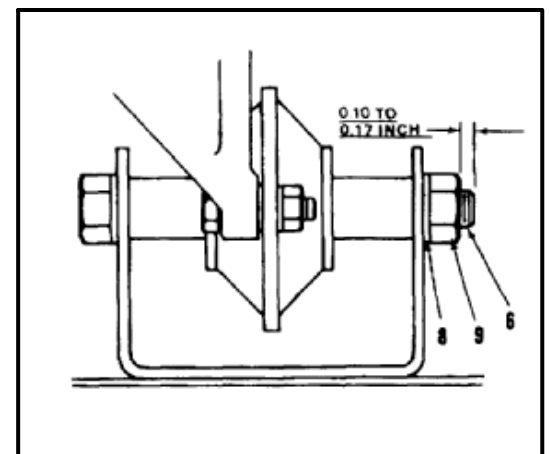
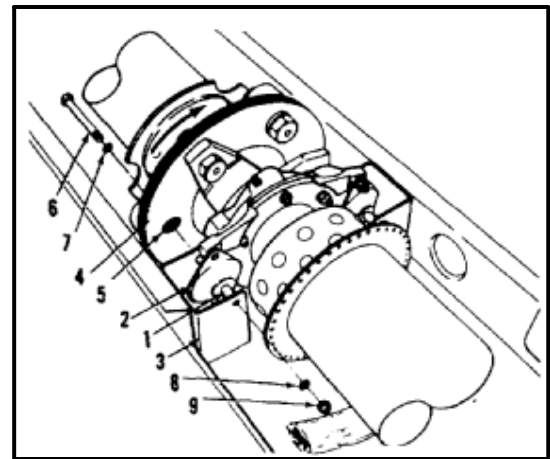
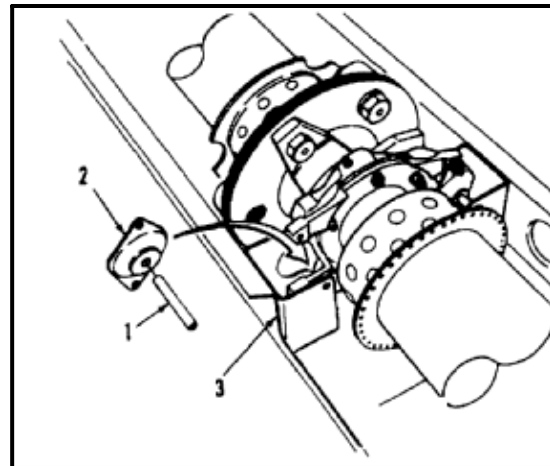
2. Position mount (2) with bushing (1), into bracket (3).
3. Rotate plates (4) to align bolt hole (5) with bushing (1).

**NOTE**

Reach center bolt hole in mount through bolt holes in plate. Use socket and extension.

4. Coat thread of bolt (6) with oil (E254). Install bolt and washer (7) through bracket (3) and bushing (1).
5. Install washer (8) and nut (9). Torque nut to **155 inch-pounds**.

6. Check bolt (6). There shall be **0.10 to 0.17 inch** of bolt extending through nut (9). Install another washer (8) or thinner washer, if needed.

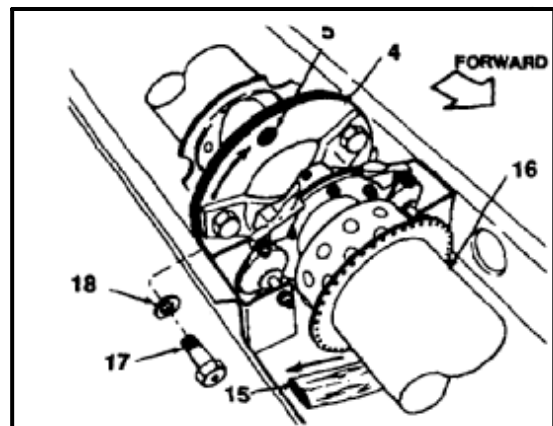
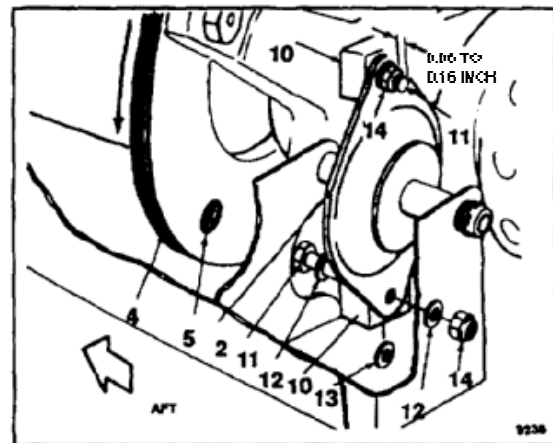


7. Rotate plates (4) to align hole (5) with lower of two mounting bolt holes in support (10).

**NOTE**

Reach lower bolt holes in mount through bolt hole in plates. Use socket and extension.

8. Install two bolts (11), four washers (12), two thin washers (13), and two nuts (14) through mount (2) and upper and lower supports (10). Install bolts with head aft. Install thin washer between support and mount. Torque bolts to **30 to 35 inch-pounds**.
9. Check bolts (11). There shall be **0.06 to 0.16 inch** of bolt threads extending through nut (14). Install another washer (12) or a thinner washer (13) if needed.
10. Remove cloths or barrier material (15) from under shaft (16).
11. Rotate plates (4) to position hole (5) on top.
12. Coat thread of bolt (17) with oil (E254). Install bolt (head forward) and special washer (18) through plates (4).



13. Install washer (19) and nut (20).

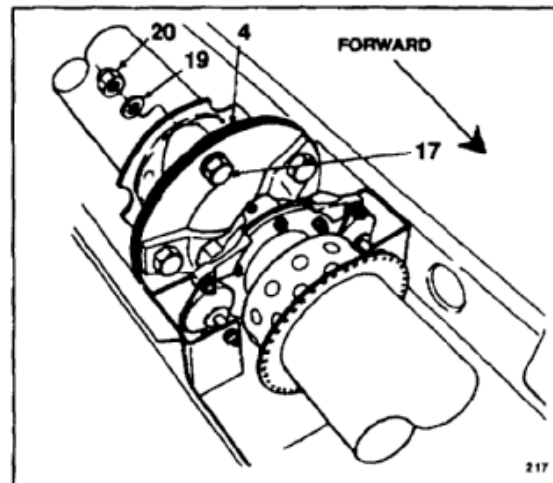


Do not allow bolt to turn when torquing nuts. If bolt turns, it can damage bolt and plates.

14. Hold head of bolt (17) with wrench. Check nut (20) for friction torque of at least **24 inch-pounds**. If nut does not meet torque, replace it.
15. Torque nuts (20) to **1000 to 1100 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Close forward drive shaft tunnel access doors (Task 2-2).
- Install forward transmission fairing (if removed) (Task 2-67).
- Perform vibration check (TM 1-6625-724-13&P).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Tool Kit, NSN 5280-00-323-5267  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Torque Wrench, 700 to 1600 Inch-Pounds  
 Aluminum Tube, 3 Inch ID, 1/8 Inch Thick Wall, 1 to  
 6 Inches Long  
 Arbor Press

**Materials:**

Grease (E190)  
 Antiseize Compound (E75)  
 Cloths (E120)

**Parts:**

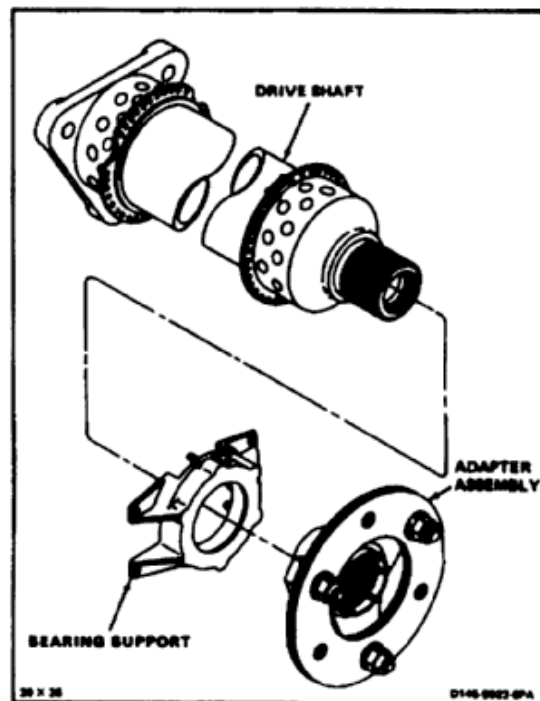
Cotter Pin

**Personnel Required:**

Aircraft Powertrain Repairer  
 Inspector

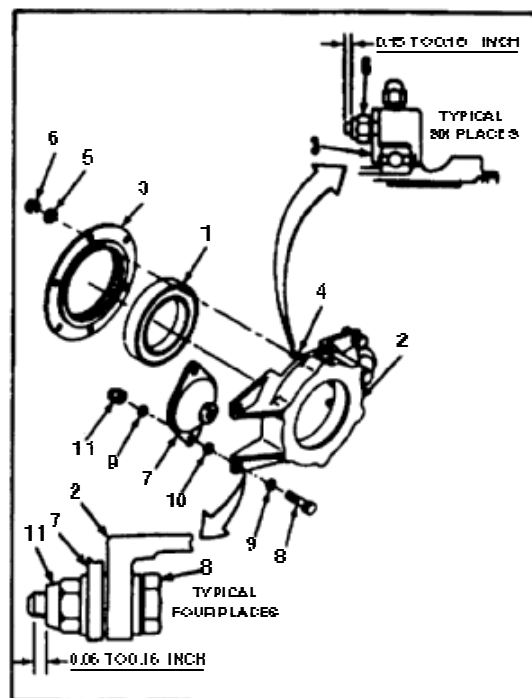
**References:**

TM 55-1520-240-23P

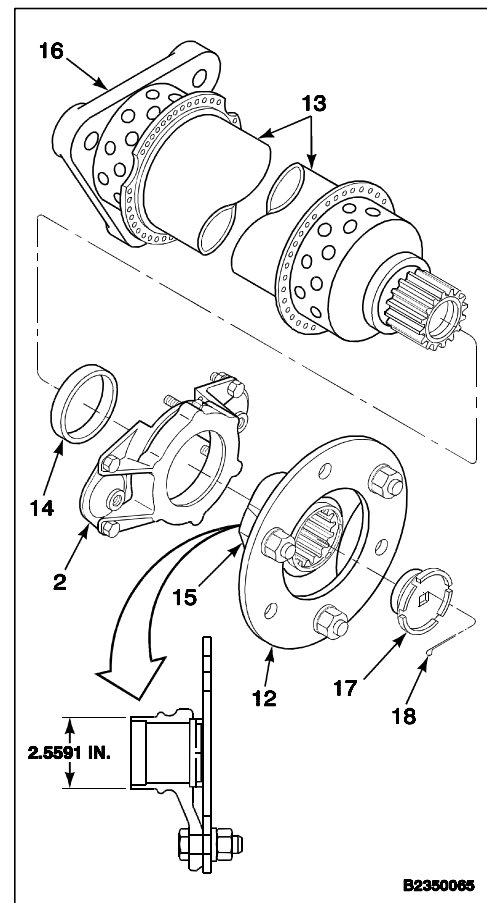
**NOTE**

Assembly procedure is for No. 1 thru No. 6 and No. 8 drive shafts. Typical shaft shown here.

1. Pack bearing (1) with grease (E190).
2. Install bearing (1) in bearing support (2). Use aluminum tube as a tool. Make sure bearing seats firmly in support.
3. Install bearing retainer (3) on six studs (4) of bearing support (2). Smooth side of retainer shall face out.
4. Install six washers (5) and nuts (6). Torque nuts to **60 inch-pounds**. Check studs (4). There shall be **0.15 to 0.18 inch** of stud extending through nut.
5. Position mount (7) on each side of support (2). Install bolt (8), two washers (9), thin washer (10) and nut (11) two places on each mount. Torque nuts to **35 inch-pounds**.
6. Check bolts (8). There shall be **0.06 to 0.16 inch** of bolt extending through each nut (11).



7. Clean the splines of adapter assembly (12) and shaft (13). Visually inspect splines for wear steps. Wear step on any spline shall not exceed **0.005 inch**.
8. Install bearing support (2) on adapter assembly (12). Use arbor press and aluminum tube.
9. Check that length of spacer (14) is at least **0.60 inch**. If replacement is necessary, only a steel spacer shall be used. Check with a magnet.



- 10. Install spacer (11) on adapter assembly (9).

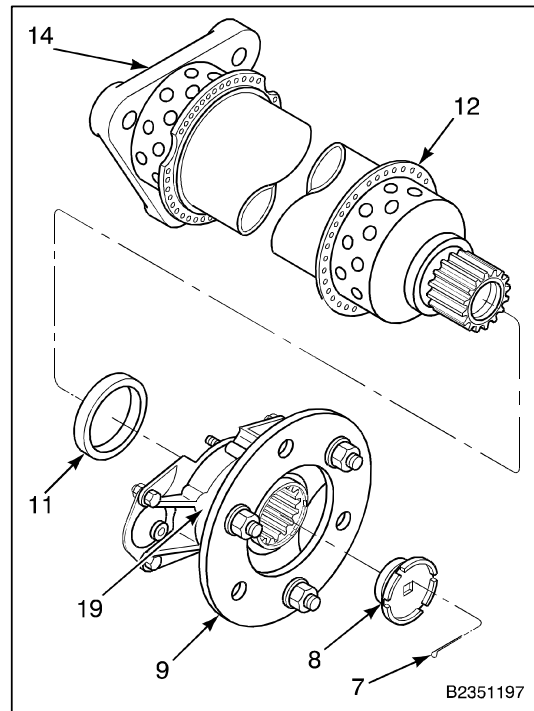
**NOTE**

If adapter assembly and shaft assembly does not have the same serial number, they must be returned to depot facility for balancing.

- 11. Check that adapter assembly (9) and drive shaft assembly (12) have the same vibro-engraved or stenciled serial number. If stenciled serial number is not readable, check that the vibro-engraved serial number in the adapter assembly and drive shaft assembly match with serial number recorded in DA FORM 2410 or 2408-16.

- 12. Apply a light coat of grease (E190) to splines of adapter assembly (9) and drive shaft assembly (12). Wipe off excess grease with cloth (E120). Wear gloves (E184.1).

- 13. Align leg (19) marked as number 1 on adapter assembly (9) with leg marked as number 2 on the drive shaft (12) adapter flange (14). Install adapter assembly (9) on the splines of drive shaft assembly (12).



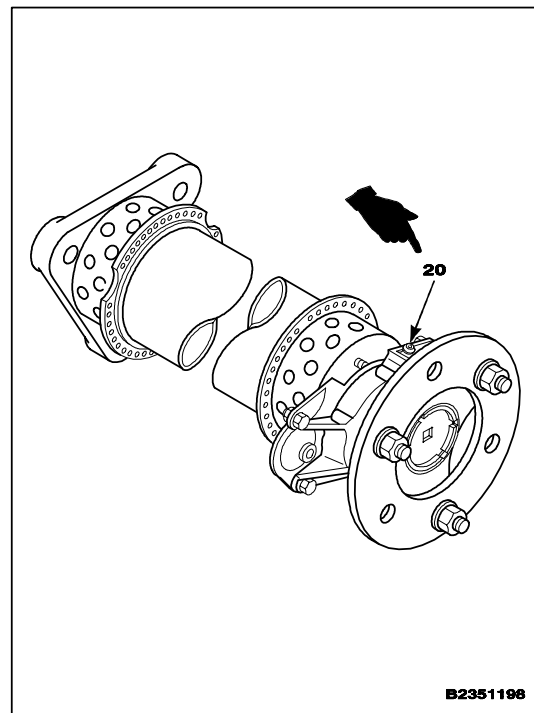
**NOTE**

If new retainer assembly is not available, a used retainer assembly may be used, provided the two nylon inserts are present.

- 14. Check retainer assembly (8) for presence of two nylon self-locking inserts. Coat threads of retainer assembly with antiseize compound (E75). Wear gloves (E184.1). Install retainer assembly in drive shaft assembly (12). Check for a run on torque of at least **60 inch-pounds** for a used retainer assembly or **180 inch-pounds** for a new retainer assembly.

- 15. Torque retainer assembly (8) to **1500 inch-pounds**. Continue to tighten retainer assembly until slot in retainer aligns with holes in the adapter assembly (9). Install cotter pin (7), with head on the inside of the retainer assembly (8).

- 16. Add grease (E190) at fitting (20).



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 100 to 150 Inch-Pounds  
 Torque Wrench, 700 to 1600 Inch-Pounds

**Materials:**

Oil (E254)

**Personnel Required:**

Medium Helicopter Repairer (2)  
 Inspector

**References:**

TM 55-1520-240-23P

**General Safety Instructions:**



Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

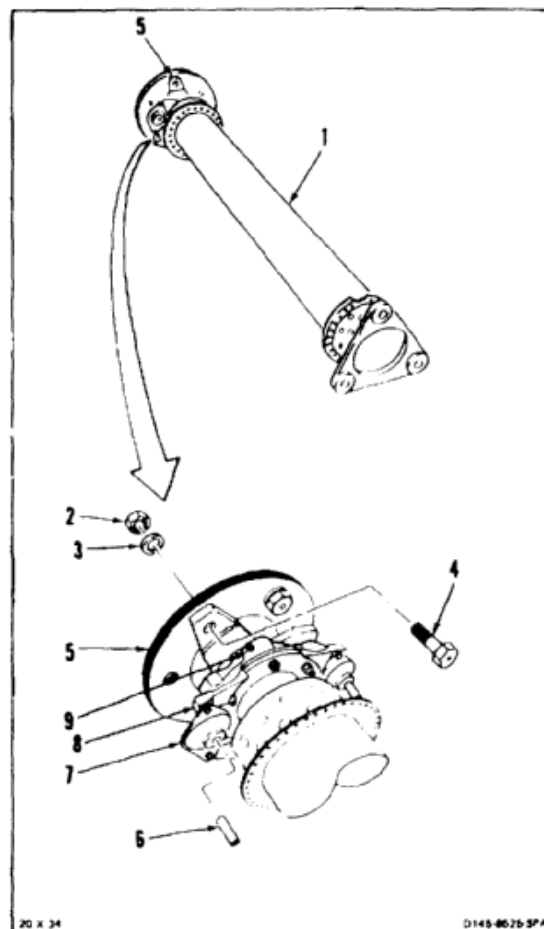
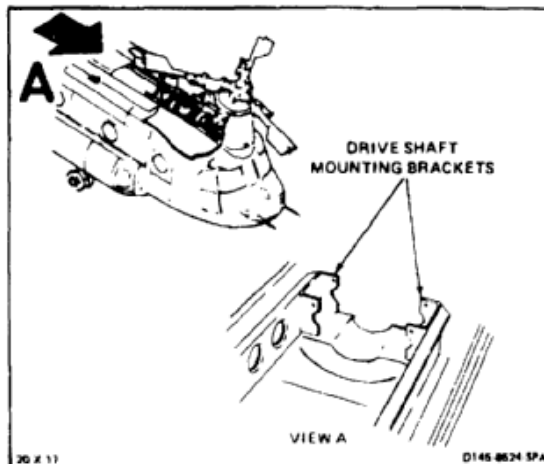


Do not allow bolt to turn. If bolt turns, bolt and plates can be damaged.

1. If a replacement shaft (1) is being installed, remove one nut (2), washer (3), and bolt (4) from adapter assembly (5). During removal, hold head of bolt with wrench. Install bushing (6) on mount (7) at each side of adapter assembly.
2. Turn bearing support housing (8) so that grease fitting (9) faces up.



Check to insure the correct part number drive shaft is installed.



3. With aid of helper, position shaft (1) in structure (10) against forward transmission adapter (11). Install two mount bushings (6) in brackets (12).
4. Coat thread of three bolts (13) with oil (E254). Install bolts, head forward, special washers (14), washers (15), and nuts (16) at forward end of shaft (1).

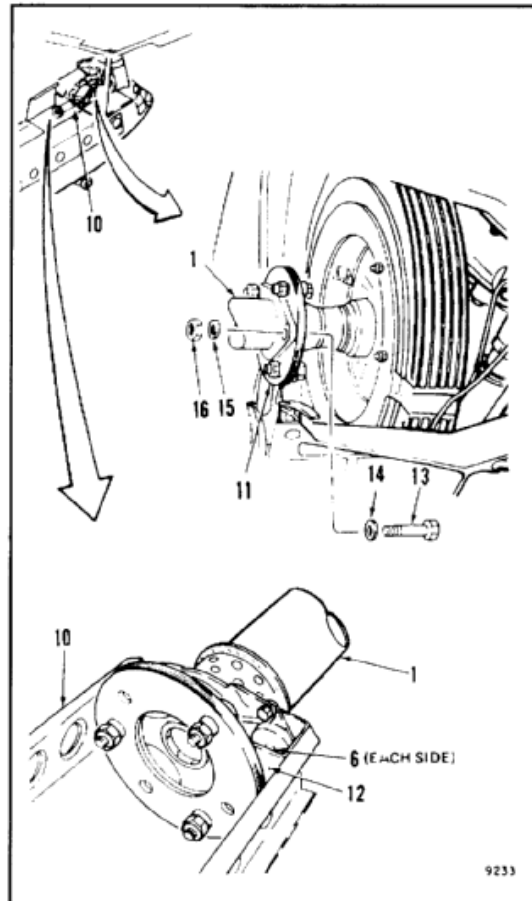
**CAUTION**

Do not allow bolts to turn when torquing nuts. If bolts turn, bolts and plates can be damaged.

**NOTE**

If nuts do not meet friction torque, they must be replaced.

5. Hold head of bolts (13) with wrench. Check nuts (16) for friction torque of at least **24 inch-pounds**.
6. Torque nuts to **1000 to 1100 inch-pounds**.





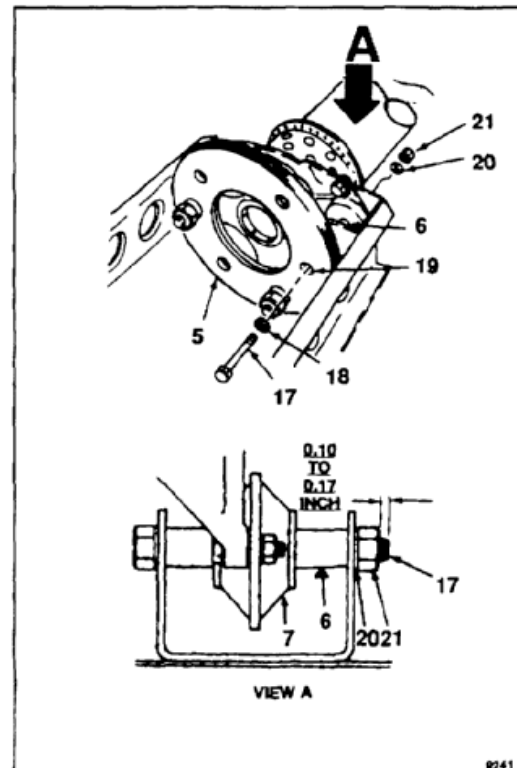


Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.

#### NOTE

Install bolt in mount at each side of shaft in same way. Right mount shown here.

7. Rotate shaft to align one of the bolt holes in adapter assembly (5) with mount bushing (6).
8. Coat thread of bolt (17) with oil (E254). Install bolt and washer (18) through bolt hole (19) into bushing (6). Use socket and extension.
9. Install washer (20) and nut (21). Torque nut to **150 to 160 inch-pounds**.
10. Check bolt (17). There shall be **0.10 to 0.17 inch** of bolt extending through nut (21). Install another washer (20) or a thinner washer if needed.
11. Check mount (7) for freedom of motion on bushing (6). There shall be no binding.



#### INSPECT

#### FOLLOW-ON MAINTENANCE:

- Inspect forward drive shaft (Task 6-10).
- Install No. 2 drive shaft (Task 6-18).
- Check rotary-wing blade phasing (Task 6-27.1).
- Install forward transmission aft fairing (Task 2-68).
- Close forward drive shaft tunnel access cover (Task 2-2).
- Perform vibration test.

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Torque Wrench, 100 to 750 Inch-Pounds
- Torque Wrench, 700 to 1600 Inch-Pounds

**Materials:**

Oil (E254)

**Personnel Required:**

- Medium Helicopter Repairer (2)
- Inspector

**References:**

TM 55-1520-240-23P

**General Safety Instructions:**

**WARNING**

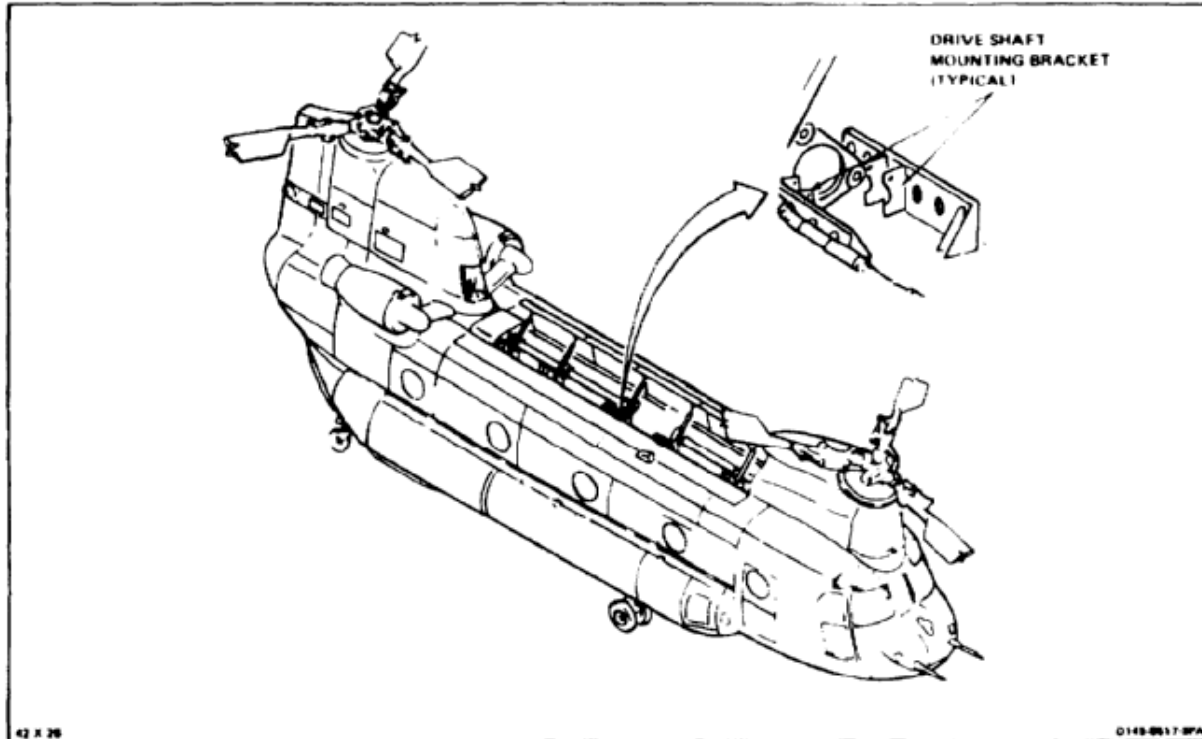
Rotor blades will turn when shaft rotates. Turning blades can injure personnel. Keep clear of blades as they turn.

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Check to insure the correct part number drive shaft is installed.



**NOTE**

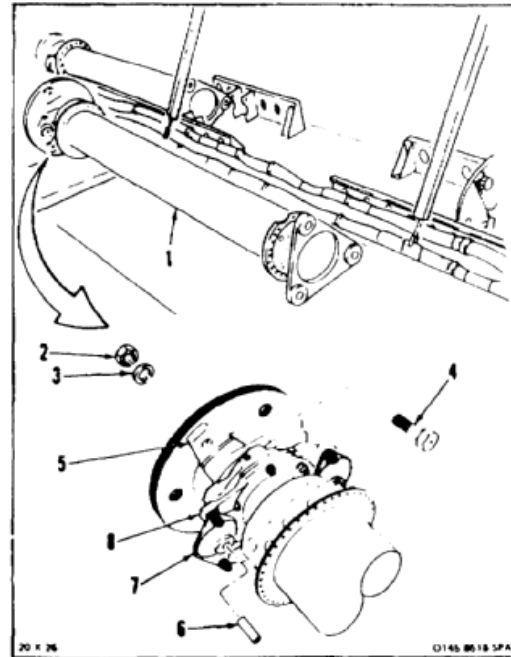
Install shaft No. 2 thru No. 6 in same way. Typical shaft shown here.

**INSTALL SHAFT**



Do not allow bolt to turn. If bolt turns, bolt and plates can be damaged.

1. If a replacement shaft (1) is being installed, remove one nut (2), washer (3), and bolt (4) from adapter assembly (5). During removal, hold head of bolt with wrench. Install bushing (6) on mount (7) at each side of support housing (8).

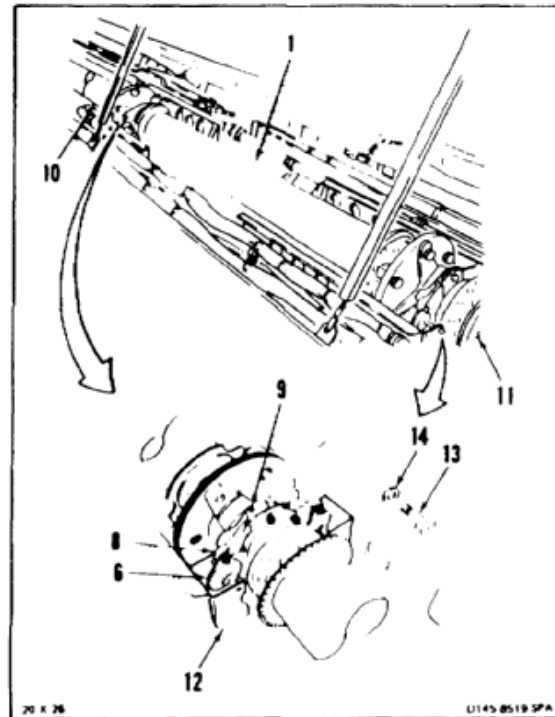


2. Turn bearing support housing (8) so that grease fitting (9) faces up.

**NOTE**

Do not disturb alignment of installed shafts. This keeps forward and aft rotor blades in phase.

3. With aid of helper, position shaft (1) between installed shafts (10 and 11). with two mount bushings (6) in brackets (12).
4. Coat thread of six bolts (13) with oil (E254). Install three bolts, head forward, and special washers (14) at each end of shaft (1).



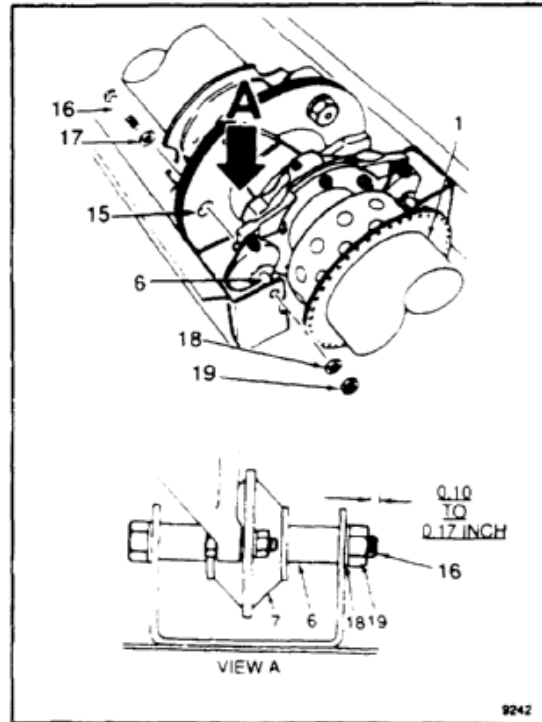
**INSTALL MOUNT BOLTS**

**NOTE**

Install bolt in mount at each side of shaft in same way. Right mount shown here.

All shafts must be rotated as a unit to keep rotor blades in phase.

5. Rotate shaft (1) to align bolt hole (15) with mount bushing (6).
6. Coat thread of bolt (16) with oil (E254). Install bolt and washer (17) bolt hole (15) into bushing (6). Use socket and extension.
7. Install washer (18 and 19). Torque nut to **150 to 160 inch-pounds**.
8. Check bolt (16). There shall be **0.10 to 0.17 inch** of bolt threads extending through nut (19). Install another washer (18) or a thinner washer if needed.
9. Check mount (7) for freedom of motion on bushing (6). There shall be no binding.
10. If all forward shafting is now installed, check that mount (7) between shafts 3 and 4 is centered on bushing (6) within **±0.06 inch**. If it is not, align shafting (Task 6-20).



**INSTALL END BOLTS**

11. Install washers (20) and nuts (21) on three bolts (13) at each end of shaft.

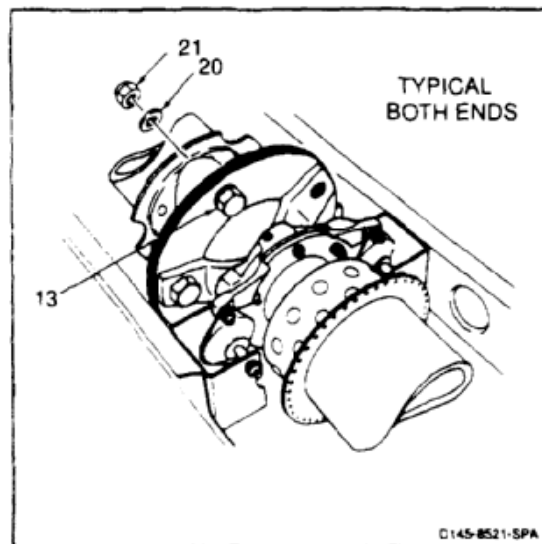


Do not allow bolts to turn when torquing nuts. If bolts turn, bolts and plates can be damaged.

**NOTE**

If nuts do not meet friction torque, they must be replaced.

12. Hold head of bolts (13) with wrench. Check nuts for friction torque of at least **24 inch-pounds**.
13. Torque nuts to **1000 to 1100 inch-pounds**.



14. Coat two adapter assembly bolts (4) with oil (E254). Install bolts, special washers (3), and nuts (2).

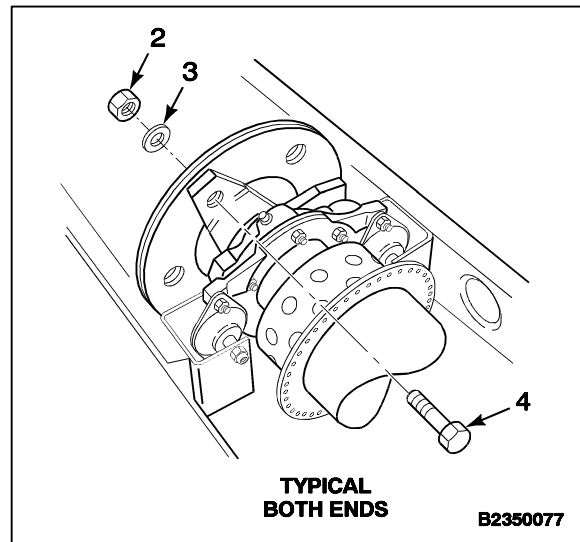


Do not allow bolts to turn when torquing nuts, if bolts turn, bolts and adapter assembly can be damaged.

**NOTE**

If nuts do not meet friction torque, they must be replaced.

15. Hold head of bolts (4) with wrench. Check nuts for friction torque of at least **24 inch-pounds**.
16. Torque nuts to **1000-1100 inch-pounds**.



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

- Inspect forward drive shaft (Task 6-10).
- Check rotary-wing blade phasing (Task 6-27.1).
- Close forward drive shaft tunnel access covers (Task 2-2).
- Install cabin tunnel smoke baffle (Task 2-170.1).
- Perform ground run (TM 1-1520-240-10).
- Perform vibration check (TM 1-6625-724-13&P).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30-150 Inch-Pounds  
 Torque Wrench, 700-1600 Inch-Pounds

**Materials:**

Oil (E254/E254.1)

**Personnel Required:**

CH-47 Helicopter Repairer (2)  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Align Forward Drive Shafting (Task 6-20)  
 Install Combining Transmission Forward Adapter  
 Assembly (Task 6-9)

**General Safety Instructions:**

**WARNING**

Oil (E254/E254.1) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

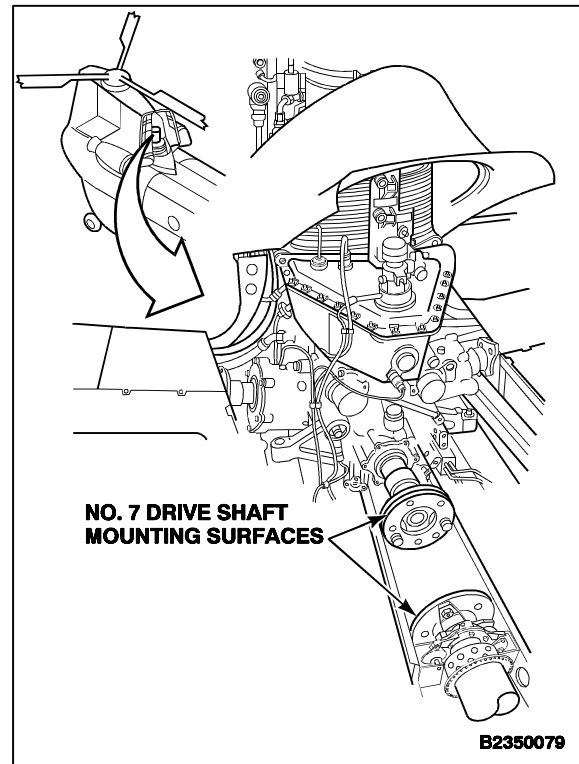
**WARNING**

Oil (E254/E254.1) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

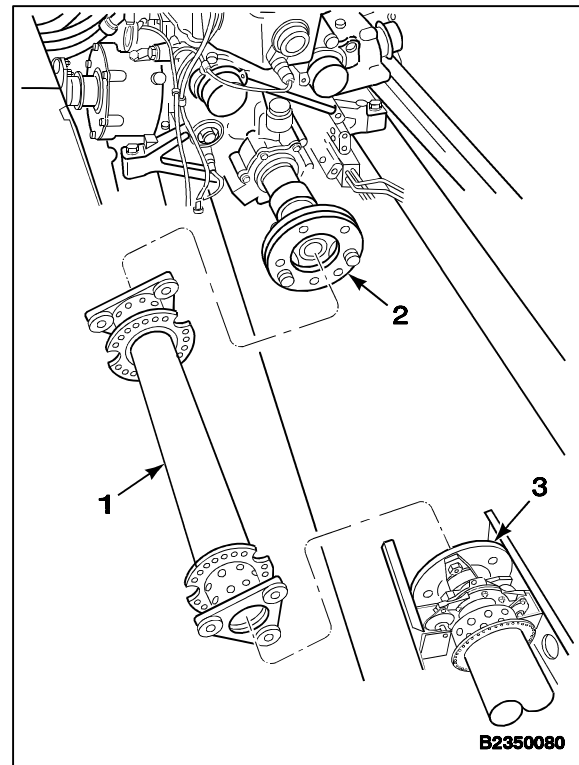
**NOTE**

Do not disturb alignment of installed adapter assembly and shaft. This keeps forward and aft rotor blades in phase.

1. With aid of helper, position shaft (1) between combining transmission adapter assembly (2) and No. 6 drive shaft (3).



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B2350080

**NOTE**

Special washers are installed against adapter assemblies.

- Coat thread of six bolts (4) with oil (E254/E254.1). Install three bolts, head forward, special washers (5), washers (6), and nuts (7) at each end of shaft (1).



Do not allow bolts to turn when torquing nuts. If bolts turn, bolts and plates can be damaged.

**NOTE**

If nuts do not meet friction torque, they must be replaced.

- Hold head of bolts (4) with wrench. Check nuts for friction torque of at least **24 inch-pounds**.
- Torque nuts to **1000-1100 inch-pounds**.
- Coat two adapter assembly bolts (8) with oil (E254/E254.1). Install bolts, special washers (9), and nuts (10).



Do not allow bolts to turn when torquing nuts. If bolts turn, bolts and adapter assembly can be damaged.

**NOTE**

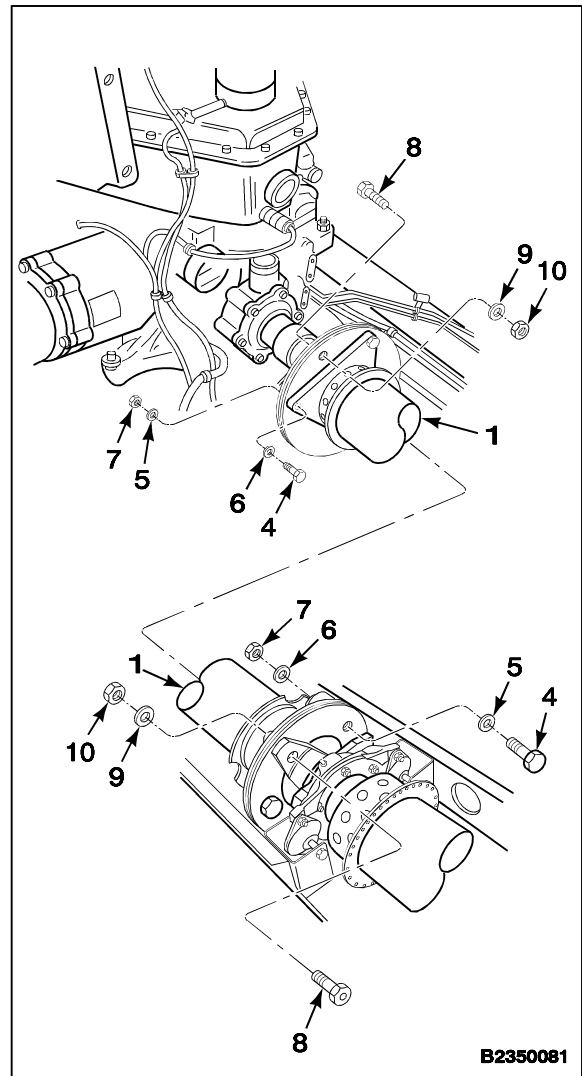
If nuts do not meet friction torque, they must be replaced.

- Hold head of bolts (8) with wrench. Check nuts for friction torque of at least **24 inch-pounds**.
- Torque nuts to **1000-1100 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Check rotary-wing blade phasing (Task 6-27.1).
- Close forward drive shaft tunnel No. 6 drive shaft cover (Task 2-2).
- Close pylon lower fairing (Task 2-2).
- Close pylon hinged fairing (Task 2-2).
- Install cabin tunnel smoke baffle (Task 2-170.1).
- Perform a combining transmission oil cooler fan vibration check (TM 1-6625-724-13&P).

END OF TASK



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Torque Wrench, 700-1600 Inch-Pounds

**Materials:**

Dry Cleaning Solvent (E162)  
Cloth, Cleaning (E120)  
Gloves (E186)  
Grease (E190.1)  
Goggles (E473)

**Personnel Required:**

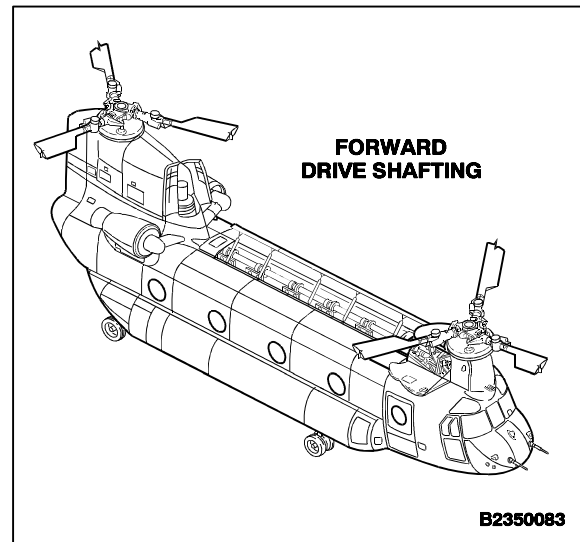
CH-47 Helicopter Repairer  
Inspector

**References:**

Task 6-9  
Task 6-19  
TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Pylon Hinged Fairing Open (Task 2-2)  
Pylon Lower Fairing Raised (Task 2-2)  
No. 7 Drive Shaft Removed (Task 6-4)  
Combining Transmission Forward Adapter Assembly  
Removed (Task 6-6)  
Forward Drive Shaft Tunnel Access Covers Open  
(Task 2-2)

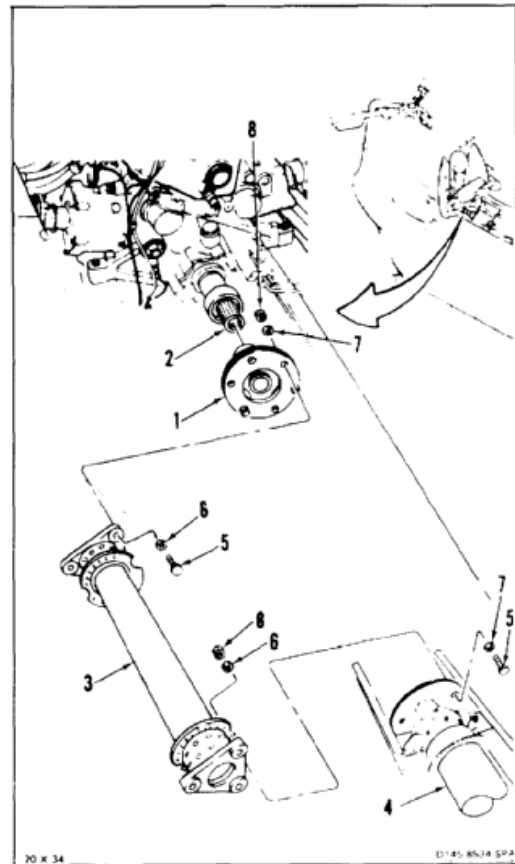




**NOTE**

Do not change position of combining transmission output shaft or No. 6 drive shaft. If positions are changed, rotary-wing blades will be put out of phase.

1. Install adapter assembly (1) on combining transmission forward output shaft (2).
2. Position No. 7 drive shaft (3) between No. 6 drive shaft (4) and adapter assembly (1). Temporarily install shaft with one bolt (5), washer (6), special washer (7) and nut (8) at each end.



3. Check position of mount (9) on bushing (10) on either side between No. 3 drive shaft (11) and No. 4 drive shaft (12). Mount shall be centered on bushing so that dimension A is within  $\pm 0.06$  inch of dimension B. Move entire drive shafting assembly (13) forward or aft as needed to position mount.

**WARNING**

**FLIGHT SAFETY PARTS**

These are installation critical flight safety parts. All aspects of their assembly and installation must be ensured.

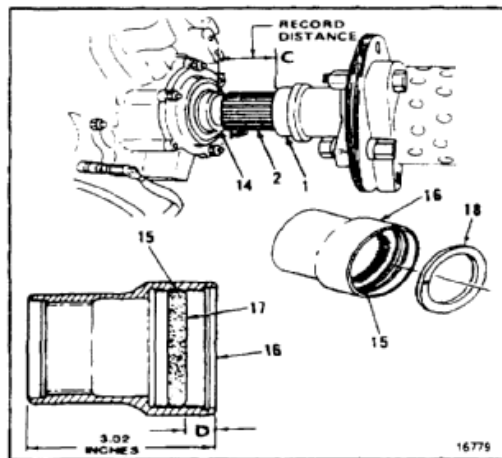
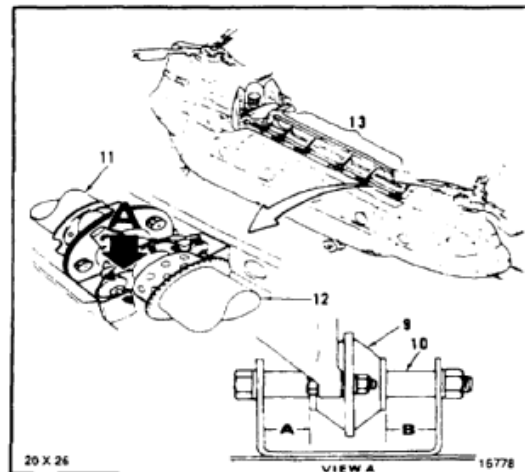
Ensure dimension 'C' is measured and dimension 'D' is calculated from dimension 'C' and recorded.

Ensure threaded ring (15) is installed on retainer (16) at a distance of dimension 'D' from end of retainer.

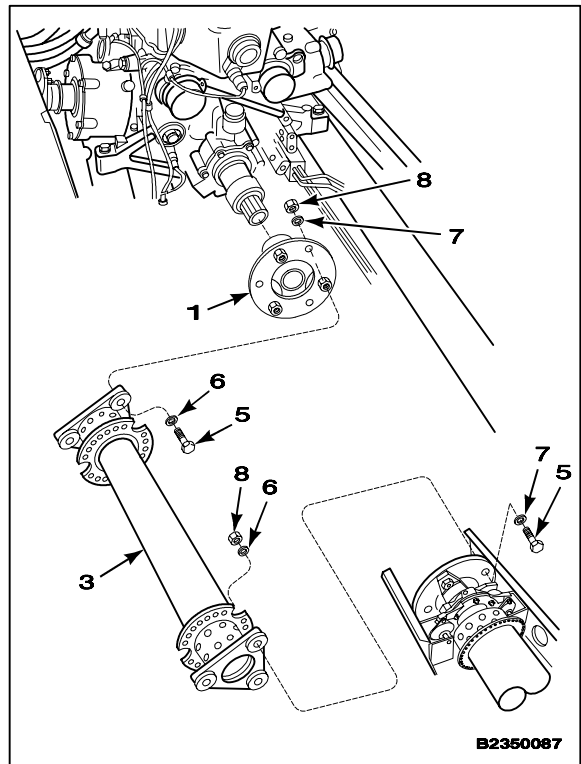
**NOTE**

Not installing threaded ring (15) on retainer (16) will allow forward drive shafting to float excessively. This could result in increased loading of aircraft components.

4. Measure distance between aft end of adapter assembly (1) and forward face of shoulder (14) on combining transmission output shaft (2). Use a steel rule. Record measurement as dimension C.
5. Subtract dimension C of step 4 from **3.00 inches**. Record this measurement as dimension D. Adjust threaded ring (15) so that distance from the end of retainer (16) to ring face (17) equals dimension D.
6. Install retaining ring (18).



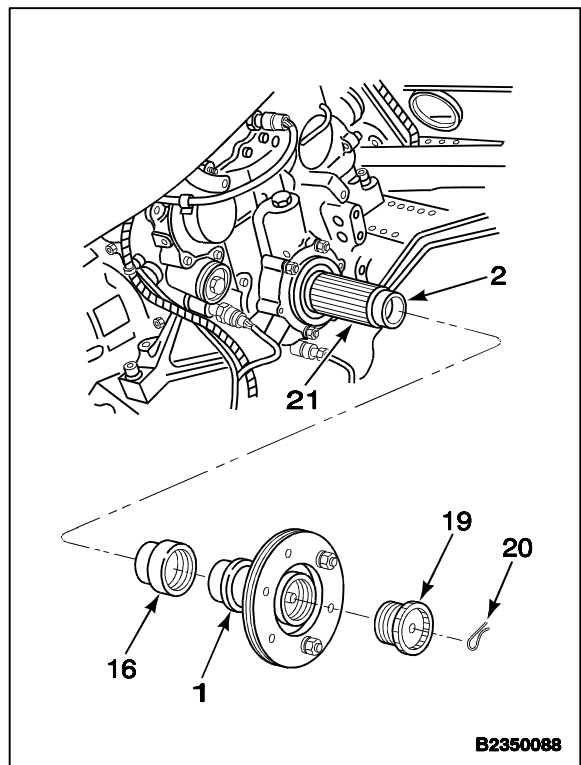
7. Remove nuts (8), washers (6 and 7), and bolts (5) from both ends of shaft (3). Remove shaft.
8. Remove adapter assembly (1).



**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

- 8.1. Clean splines of adapter assembly (1), retainer (16), and output shaft (2). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
- 8.2. Pack splines of adapter assembly (1), retainer (16), and output shaft (2) with grease (E190.1). Wipe off excess grease with cloths (E120).
9. Install adapter assembly (1) with retainer (16) on splines (3) of output shaft (2). Then install retainer (19) and lockring (20). (Task 6-9).
10. Install No. 7 drive shaft (3) (Task 6-19).



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

- Close pylon lower fairing (Task 2-2).
- Close pylon hinged fairing (Task 2-2).
- Perform ground run (TM 1-1520-240-10).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Workstand (2)

**Materials:**

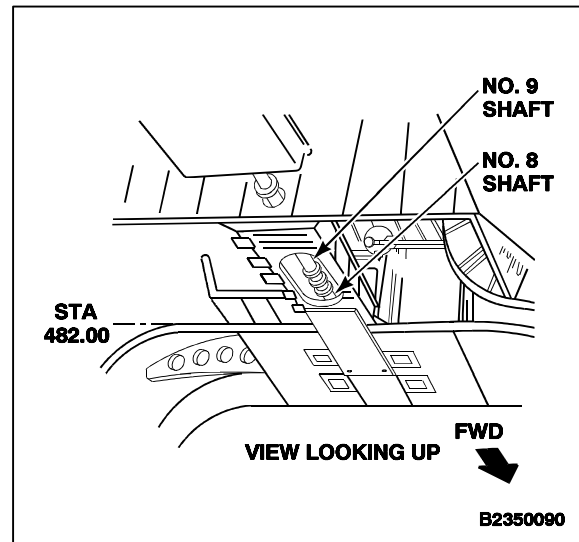
None

**Personnel Required:**

CH-47 Helicopter Repairer (2)

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Aft Drive Shaft Access Panel Open (Task 2-2)
- Cargo Ramp Open and Level (Task 2-2)
- Baffles Under Aft Transmission Open (Task 2-2)
- Aft Transmission Drip Pan Removed (Task 2-3)
- Aft Pylon Doors Open (Task 2-2)
- Aft Pylon Lower Fairing Open (Task 2-2)



**REMOVE NO. 9 SHAFT**



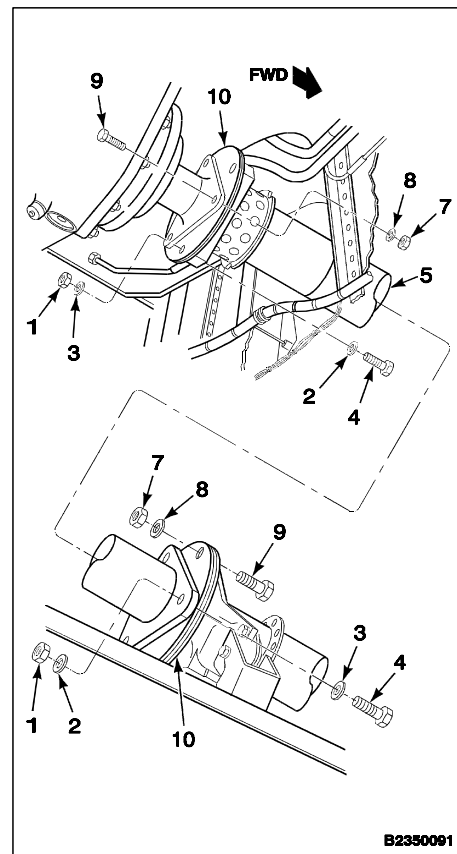
Do not allow bolts to turn when removing nuts. If bolts turn, damage to bolts and plates can result.

1. Remove nuts (1), washers (2), or special washers (3), and three bolts (4) at each end of No. 9 shaft (5). During removal, have helper hold head of bolts with wrench (6).



If more than one bolt on adapter assembly is removed, assembly will have to be balanced.

2. Remove one nut (7), special washer (8), and bolt (9) from adapter assembly (10) at each end of shaft (5) for clearance. During removal, have helper hold bolts.
3. Remove shaft (5).



**REMOVE NO. 8 SHAFT WITHOUT 48**



Do not allow bolts to turn while removing nuts. If bolts turn, damage to bolts and plates can result.

**NOTE**

Helper reaches bolts from top of helicopter.

4. Remove three nuts (11) and washers (12) from three bolts (13) that secure No. 8 shaft (14) to adapter assembly (15) aft of combining transmission (16). During removal, have helper hold head of bolts with wrench. Do not remove bolts at this time.

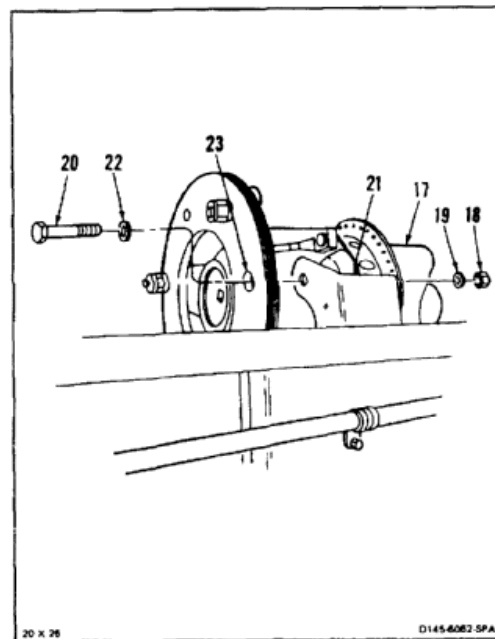
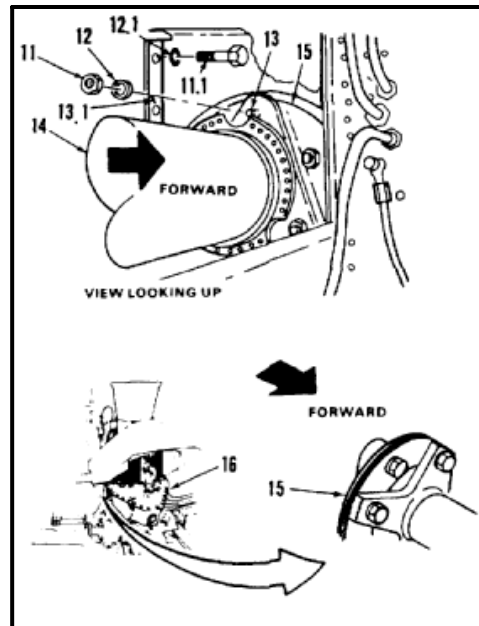
**REMOVE NO. 8 SHAFT WITH 48**

- 4.1. Remove eight bolts (11.1) and washers (12.1) from baffle (13.1). Remove baffle.
5. Have helper support shaft (17). Remove nut (18) and washer (19) from bolt (20). Work through bracket (21) at each side of shaft.

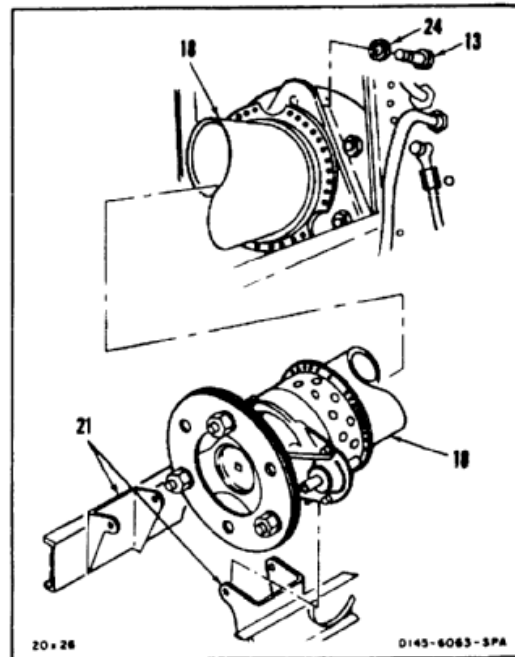
**NOTE**

Rotate shaft as needed to align hole with bolts.

6. Remove two bolts (20) and washers (22) through one of three holes (23).



7. Remove three bolts (13) and special washers (24).
8. Lift shaft (18) out of brackets (21). Remove shaft.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

- Cloth, Cleaning (E120)
- Dry Cleaning Solvent (E162)
- Gloves (E184.1)
- Goggles (E473)

**Personnel Required:**

CH-47 Helicopter Repairer (2)

**Equipment Condition:**

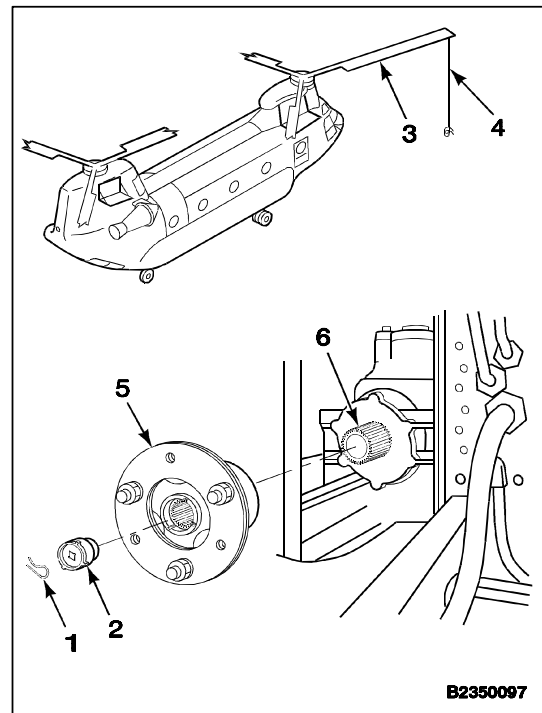
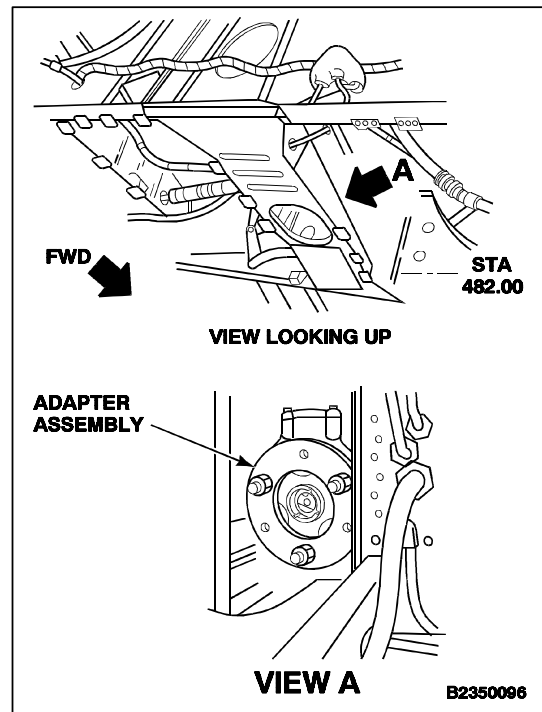
- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Aft Drive Shafting Removed (Task 6-21)
- Tiedown Line Installed on One Forward Rotor Blade (Task 1-26)

1. Remove lockring (1) from retainer (2).
2. Have helper hold rotor blade (3) in position with tiedown line (4).
3. Remove retainer (2) from adapter assembly (5).
4. Remove adapter assembly (5) from output shaft (6).

**WARNING**

Dry cleaning solvent is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated areas, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

5. Clean splines of output shaft (6) using dry cleaning solvent (E162) and cloths (E120). Wear gloves (E184.1).
6. Inspect splines on output shaft (6) for wear. If wear is evident, proceed as follows:
  - a. Place a straightedge (**6 inch** metal ruler or equivalent) along the length of the spline, with the ruler spanning the worn area.



- b. Using a feeler gauge, measure the depth of wear below the face of the spline.
- c. If spline wear exceeds **0.005 inch**, replace combining transmission.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

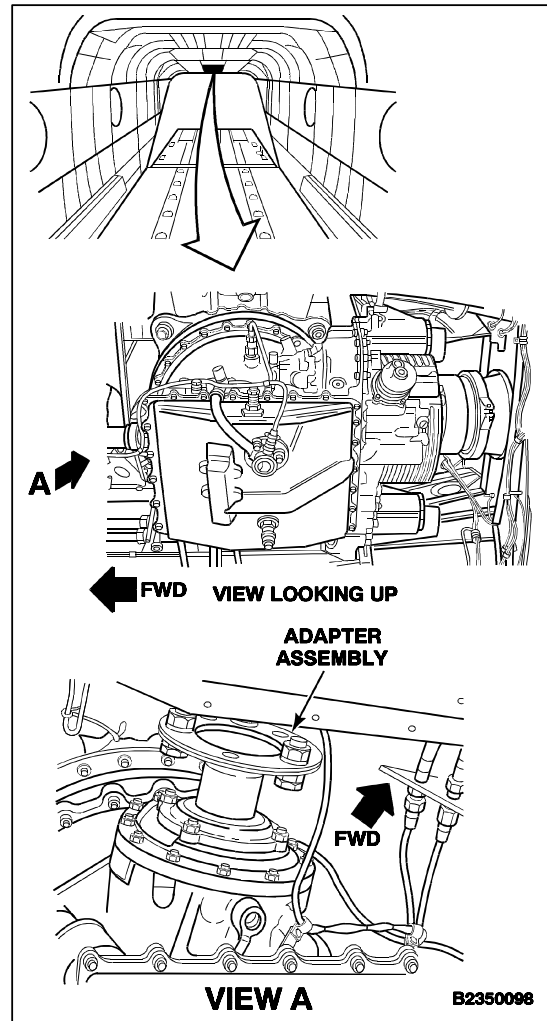
None

**Personnel Required:**

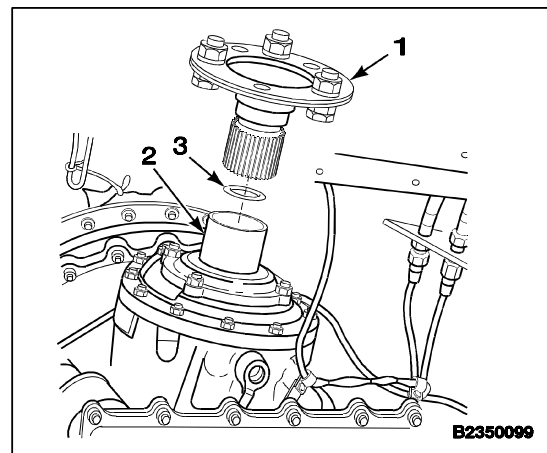
- CH-47 Helicopter Repairer

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Cargo Ramp Open and Level (Task 2-2)
- Baffles Under Aft Transmission Open (Task 2-2)
- Aft Transmission Drip Pan Removed (Task 2-3)
- No. 9 Drive Shaft Removed (Task 6-21)



1. Remove adapter assembly (1) from transmission input shaft (2). Do not disturb position of input shaft.
2. Remove packing (3) from adapter assembly (1).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK



## INITIAL SETUP

**Applicable Configurations:**

All

**Too/s:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Torque Wrench, 700 to 1600 Inch-Pounds  
Workstand

**Materials:**

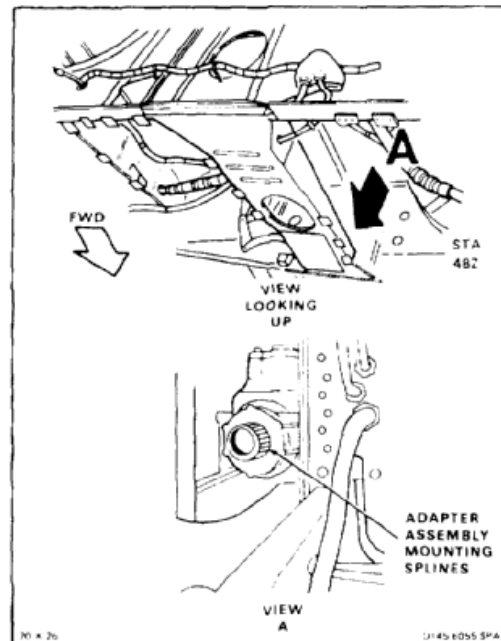
Dry Cleaning Solvent (E162)  
Grease (E190.1)  
Cloths (E120)  
Gloves (E186)  
Grease (E75)

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

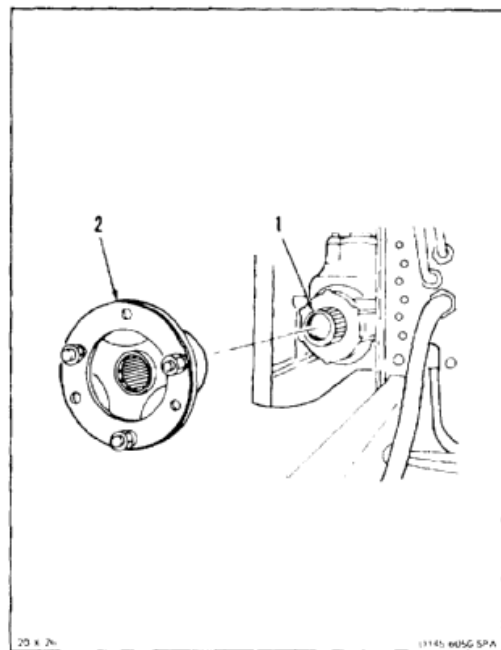
**References:**

TM 55-1520-240-23P

**WARNING**

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

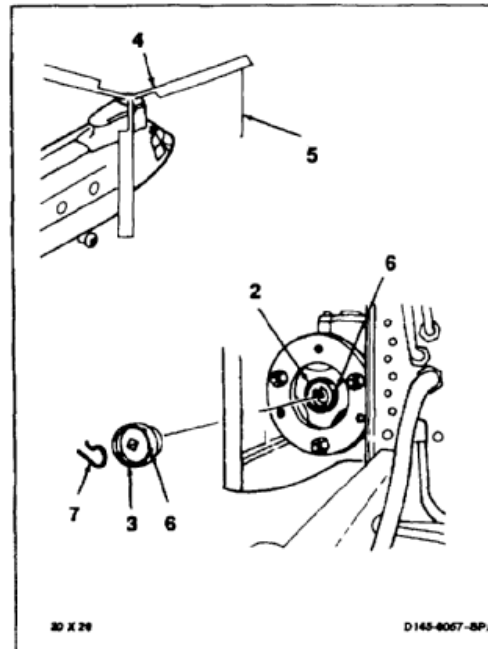
1. Clean splines on aft output shaft (1) and adapter assembly (2). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186) and goggles.
2. Pack splines on shaft (1) and adapter assembly (2) with grease (E190.1).
3. Install adapter assembly (2) on shaft (1). Wipe off excess grease with cloths (E120).



**6-24 INSTALL COMBINING TRANSMISSION AFT OUTPUT SHAFT ADAPTER ASSEMBLY (Continued)**

6-24

4. Coat thread of retainer (3) with grease (E190.1).
5. Have helper hold rotor blade (4) in position with tiedown line (5).
6. Install retainer (3) in adapter assembly (2). Torque retainer to **825 inch-pounds** continue torquing to align holes (6) in retainer (3) and adapter assembly (2).
7. Install locking (7). Check that locking protrudes through adapter assembly (2) at least **0.060 inch**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install aft drive shafting (Task 6-29).
- Remove tiedown line from rotor blade (Task 1-26).
- Perform ground run (TM 55-1520-240-10).

END OF TASK

6-70

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Workstand

**Materials:**

Dry Cleaning Solvent (E162)

Grease (E190.1)

Cloths (E120)

Gloves (E186)

**Parts:**

Packing

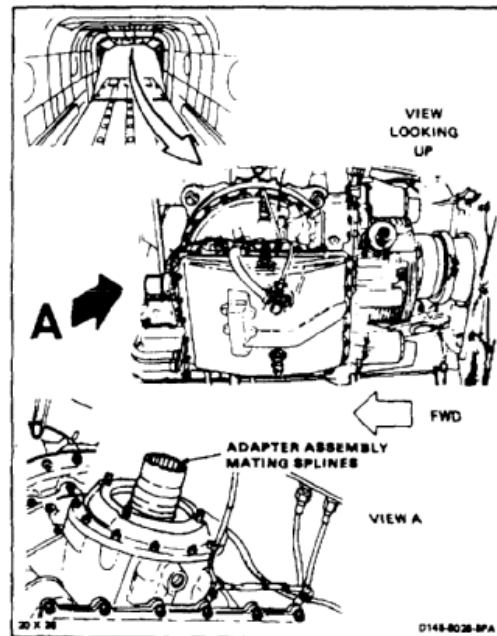
**Personnel Required:**

Medium Helicopter Repairer

Inspector

**References:**

TM 55-1520-240-23P



**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

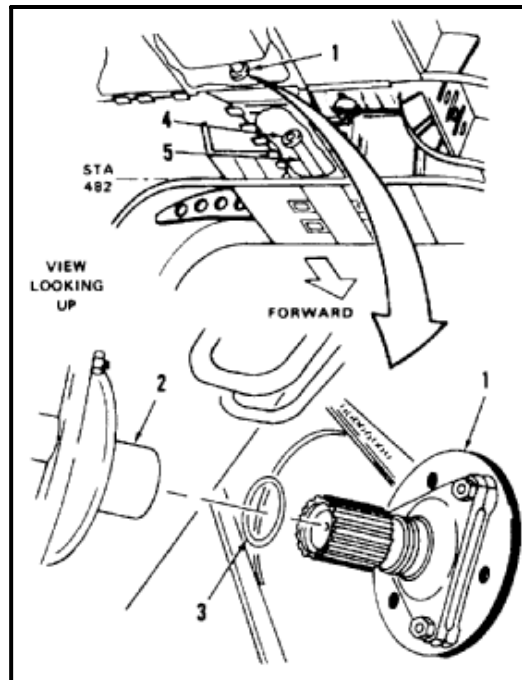
1. Clean splines of adapter assembly (1) and input shaft (2). Use dry cleaning solvent (E162) and clean cloths (E120). Use gloves (E186).
2. Coat packing (3) with grease (E190.1). Install packing on adapter assembly (1).

**INSPECT**

3. Pack splines of input shaft (2) and adapter assembly (1) with grease (E190.1).
4. Align adapter assembly (1) with adapter assembly (4) of No. 8 drive shaft (5). Install adapter assembly in input shaft (2). Make sure assembly is fully seated. Do not disturb position of input shaft (2) or No. 8 drive shaft.
5. Wipe off excess grease with cloths (E120).

**FOLLOW-ON MAINTENANCE:**

Phase rotor blades (Task 6-28).  
 Install No. 9 drive shaft (Task 6-29).  
 Install aft transmission drip tray (Task 2-3).  
 Close baffles under aft transmission (Task 2-2).  
 Close cargo ramp (Task 2-2).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
Workstand

**Materials:**

None

**Personnel Required:**

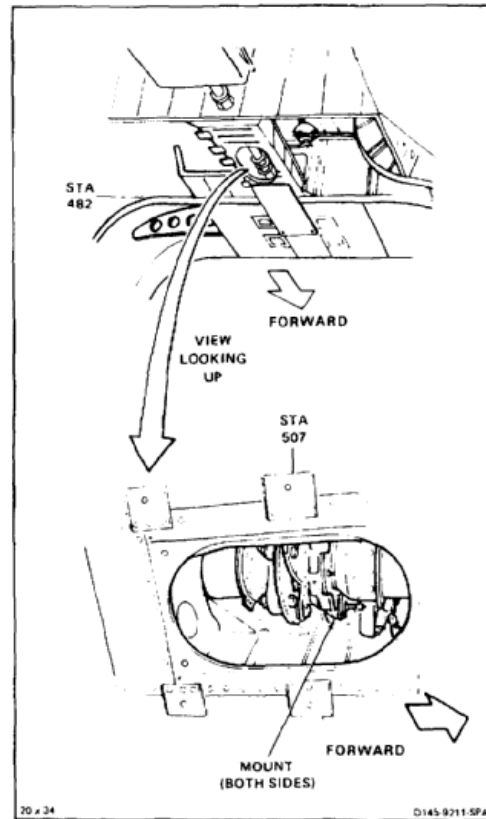
Medium Helicopter Repairer (2)

**References:**

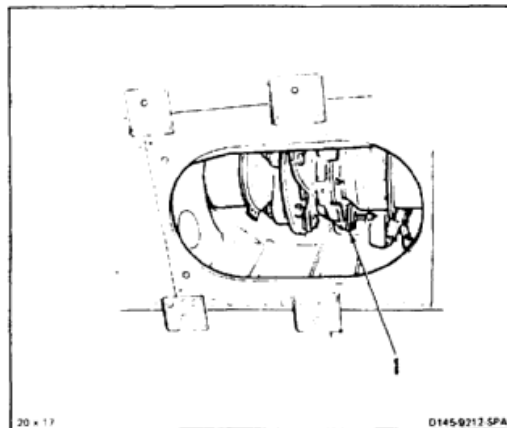
Task 6-14

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Aft Drive Shaft Access Panel Open (Task 2-2)



1. Remove either mount (1) in same way as forward drive shaft mount (Task 6-14).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Torque Wrench, 0 to 150 Inch-Pounds
- Torque Wrench, 100 to 750 Inch-Pounds
- Torque Wrench, 0 to 600 Foot-Pounds
- Workstand

**Materials:**

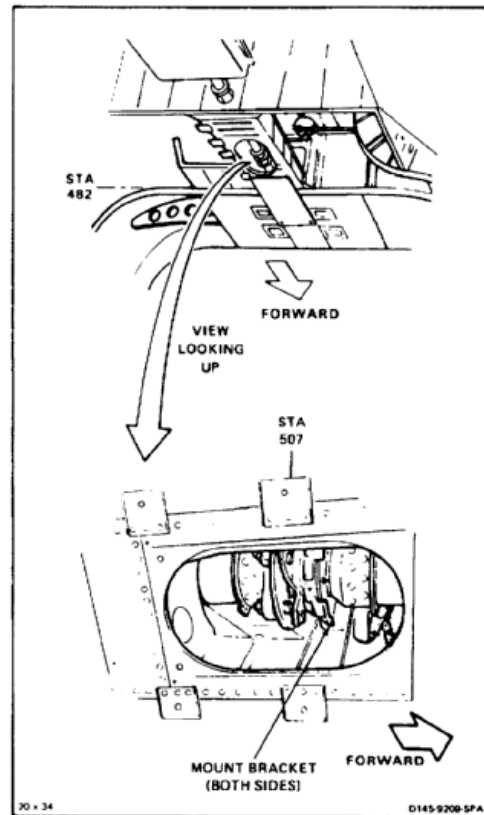
None

**Personnel Required:**

- Medium Helicopter Repairer (2)
- Inspector

**References:**

Task 6-15

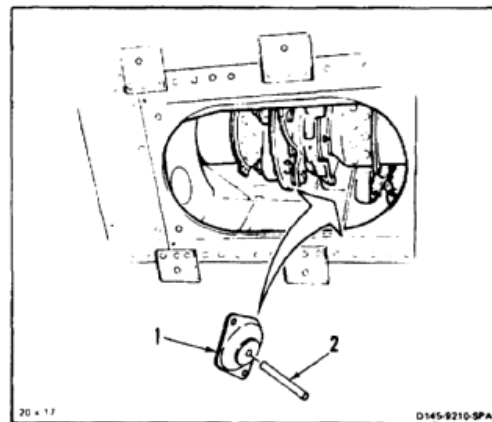


1. Install left or right mount (1), with bushing (2), in same way as forward drive shaft mount (Task 6-15).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Close aft drive shaft access panel (Task 2-2).



END OF TASK

---

**6-27.1 CHECK ROTARY-WING BLADE PHASING**

---

6-27.1

**INITIAL SETUP*****Applicable Configurations:***

All

***Tools:***

Aircraft Mechanic's Tool Kit, NSN 51 80-00-3234692  
Phasing Block (2) (APP E-5)

***Materials:***

None

***Personnel Required:***

Medium Helicopter Repairer (2)  
Inspector

***References:***

None

***Equipment Condition:***

Forward Transmission Fairing Left Work Platform  
Open (Task 2-2)  
Aft Pylon Right Work Platform Open (Task 2-2)  
Tiedown Line Installed On One Forward and One Aft  
Blade (Task 1-26)

***General Safety Instructions:*****WARNING**

Improper phasing can result in injury  
to personnel and serious damage to  
helicopter.

**CAUTION**

Make sure forward and aft blades do not collide. Damage to blades can result.

1. Rotate rotary wing heads (1 and 2) to position one blade forward on each head.

**WARNING**

Use only swiveling actuators to phase blades. Do not use pivoting actuators. Improper phasing will result.

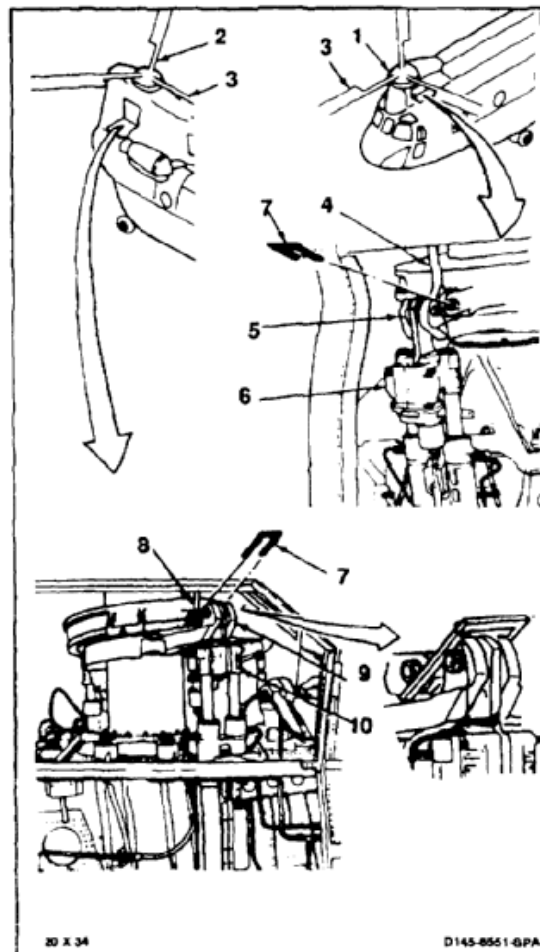
**NOTE**

Swiveling actuator is on left side of forward head and right side of aft head.

2. Have helper rotate blades to align one forward pitch link (4) with upper mounting lug (5) of swiveling actuator (6). Install phasing block (7) around link and lug. Check that one blade (3) still points forward. Maintain forward phasing block in this position.
3. Install phasing block (7) around aft pitch link (8) and upper mounting lug (9) on swiveling actuator. Check that one blade (3) still points forward.
4. If you cannot install both phasing blocks (7) aircraft rotor system must be re-phased (Task 6-28). If both phasing blocks (7) are installed properly proceed to step 5.
5. Remove two phasing blocks (7) forward and aft.
6. Rotate blades three complete revolutions in the leading direction. Check phasing by installing two phasing blocks as in steps 2 and 3. Remove blocks.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close forward transmission fairing left work platform (Task 2-2).  
 Close aft pylon work platform (Task 2-2).  
 Remove tiedown lines from rotary-wing blades (Task 1-26).



END OF TASK



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Phasing Block (2) (APP E-5)

**Materials:**

None

**Personnel Required:**

CH-47 Helicopter Repairer (2)  
 Inspector

**References:**

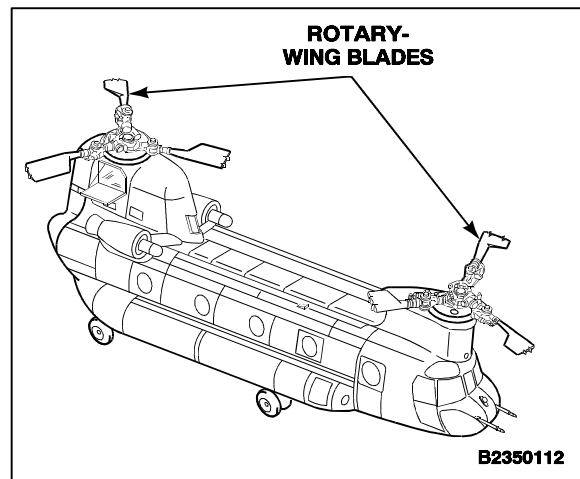
Task 6-29

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 No. 9 Drive Shaft Removed (Task 6-21)  
 Tiedown Line Installed on One Forward and One Aft  
 Blade (Task 1-26)  
 Forward Transmission Fairing Left Work Platform  
 Open (Task 2-2)  
 Aft Pylon Right Work Platform Open (Task 2-2)

**General Safety Instructions:****WARNING**

Improper phasing can result in injury  
 to personnel and serious damage to  
 helicopter.





Make sure forward and aft blades do not collide. Damage to blades can result.

1. Rotate forward and aft rotary-wing heads (1 and 2) to position the same color blade forward on each head.

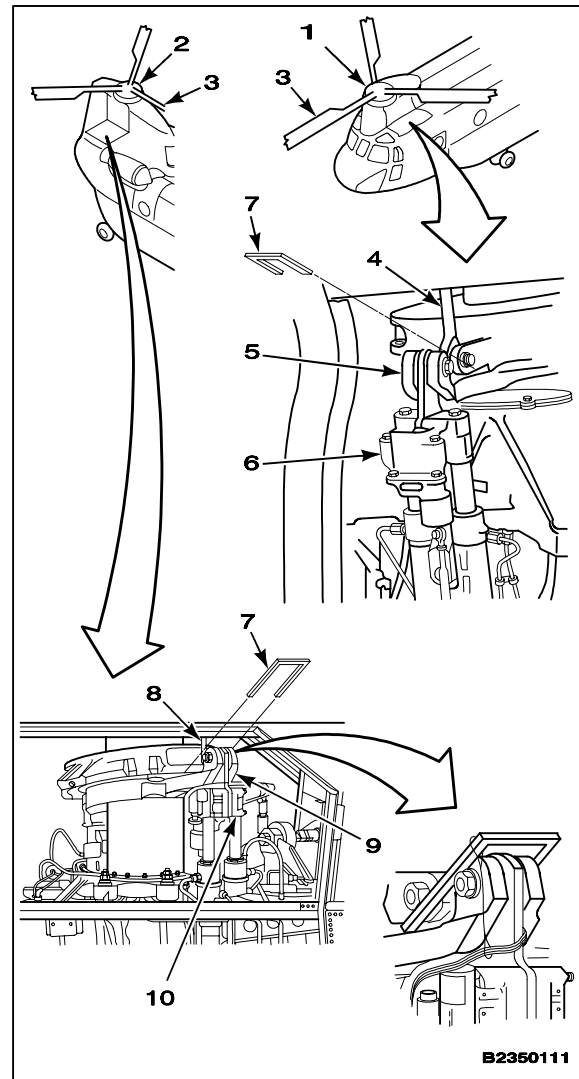


Use only swiveling actuators to phase blades. Do not use pivoting actuators. Improper phasing will result.

**NOTE**

Swiveling actuator is on left side of forward head and right side of aft head.

2. Have helper rotate forward blades to align one forward pitch link (4) with upper mounting lug (5) of swiveling actuator (6). Install phasing block (7) around link and lug. Check that one blade (3) still points forward.
3. Have helper rotate aft blades to align one aft pitch link (8) with upper mounting lug (9) of swiveling actuator (10). Install phasing block (7) around link and lug. Check that one blade (3) still points forward.



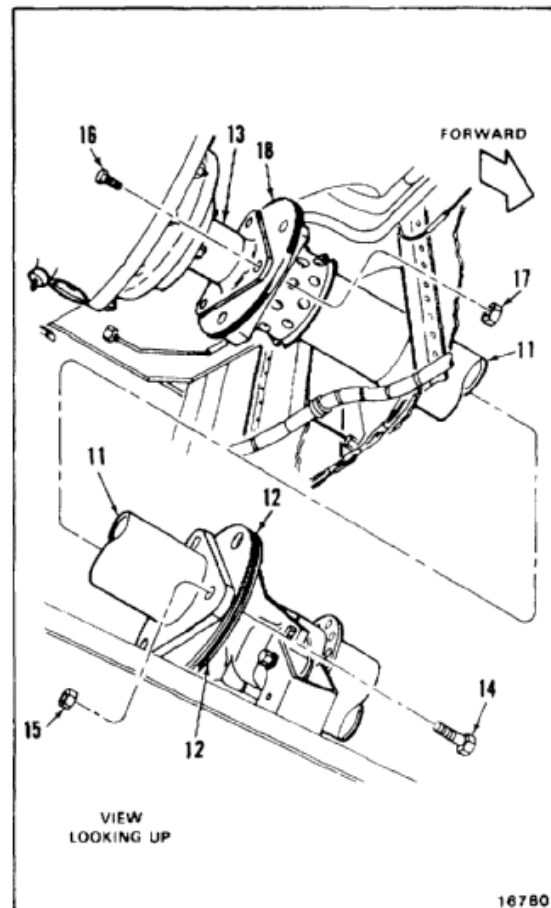
B2350111

4. Temporarily install No. 9 drive shaft as follows:
  - a. Have helper support shaft (11) between No. 8 shaft adapter assembly (12) and aft transmission adapter (13).
  - b. Loosely install two bolts (14) and nuts (15) through adapter assembly (12) and forward end of shaft (11).

**NOTE**

If No. 9 shaft and aft transmission adapter do not line up, the adapter must be removed and rotated until alignment is obtained.

- c. Loosely install two bolts (16) and nuts (17) through adapter (13) and No. 9 shaft adapter (18).
5. Remove two phasing blocks of step 2.
6. Rotate blades three complete revolutions in the leading direction. Check phasing by installing two phasing blocks as in steps 2 and 3. Remove blocks.
7. Permanently install No. 9 drive shaft (Task 6-29).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Close forward transmission fairing left work platform (Task 2-2).
- Close aft pylon work platform (Task 2-2).
- Remove tiedown lines from rotary-wing blades (Task 1-26).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Workstand (2)  
 Torque Wrench, 100 to 750 Inch-Pounds  
 Torque Wrench, 700 to 1600 Inch-Pounds

**Materials:**

Oil (E254)

**Parts:**

Washers

**Personnel Required:**

Medium Helicopter Repairer (2)  
 Inspector

**References:**

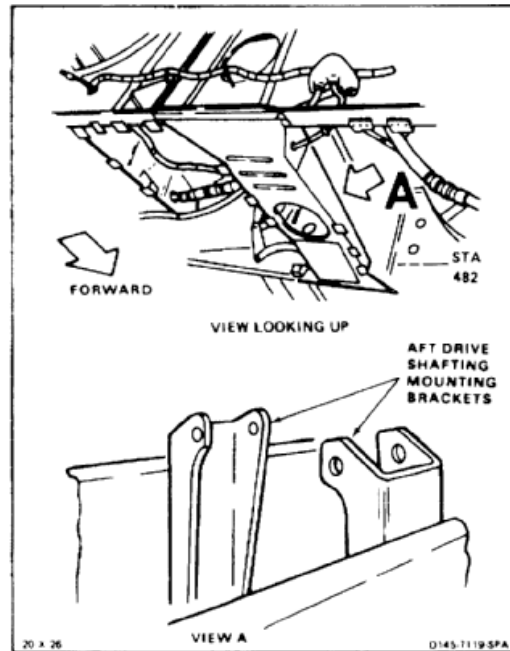
TM 55-1520-240-23P  
 Task 6-28

**General Safety Instructions:****WARNING**

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

**WARNING**

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.



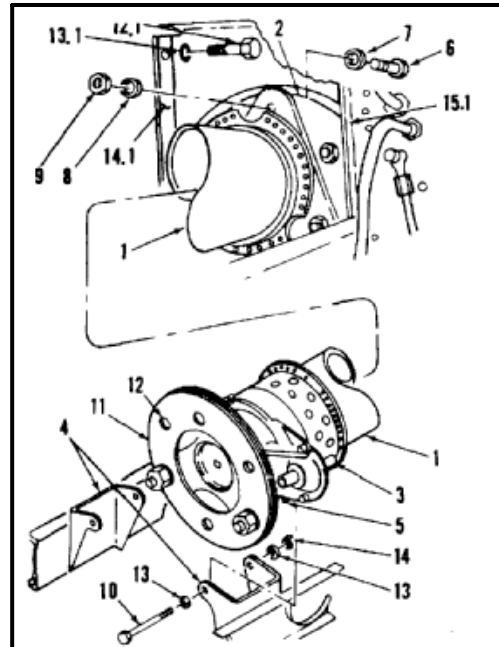
**INSTALL NO. 8 SHAFT WITHOUT 48**

1. Position shaft (1) against combining transmission adapter assembly (2). Position two bushings (3) in brackets (4). Check that grease fitting (5) points down.
2. Have helper support shaft (1). Coat thread of three bolts (6) with oil (E254). Install bolts, head forward, and special washers (7) through adapter assembly (2) and shaft. Loosely install three washers (8) and nuts (9).
3. Coat thread of two bushing bolts (10) with oil (E254). Turn adapter assembly (11) as needed to align holes (12) in adapter assembly with bushings (3). Install two bolts (10) and washers (13) through bushing on each side of shaft.
4. Install washers (13) and nuts (14) on two bolts (10). Torque nuts to **155 inch-pounds**.

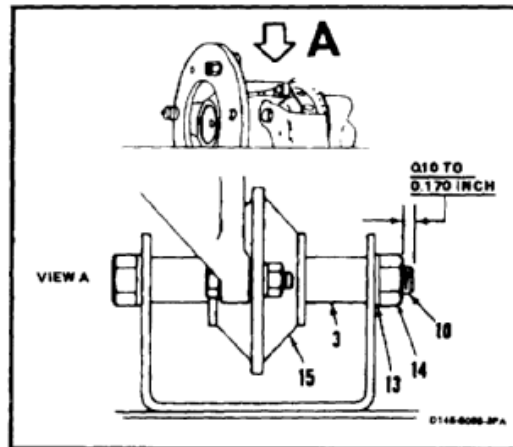
**INSTALL NO. 8 SHAFT WITH 48****WARNING**

Failure to install shielding baffle could cause debris generated as a result of a combiner transmission cooler fan/drive shaft failure becoming lodged between No. 8 or No. 9 drive shafts and adjacent structure causing damage to the shafts.

- 4.1. Position baffle assembly (14.1) against stiffeners (15.1). Install eight bolts (12.1) and washers (13.1). Torque bolts to **25 inch-pounds**.
- 4.2. Ensure that a minimum of **1 inch** clearance is between baffle assembly and drive shaft assembly.



5. Check bolts (10). There shall be **0.10 to 0.17 inch** of bolt threads extending through nut (14). Install another washer (13) or a thinner washer if needed.
6. Check mounts (15) for freedom of motion on bushings (3). There shall be no binding of mounts on bushings.



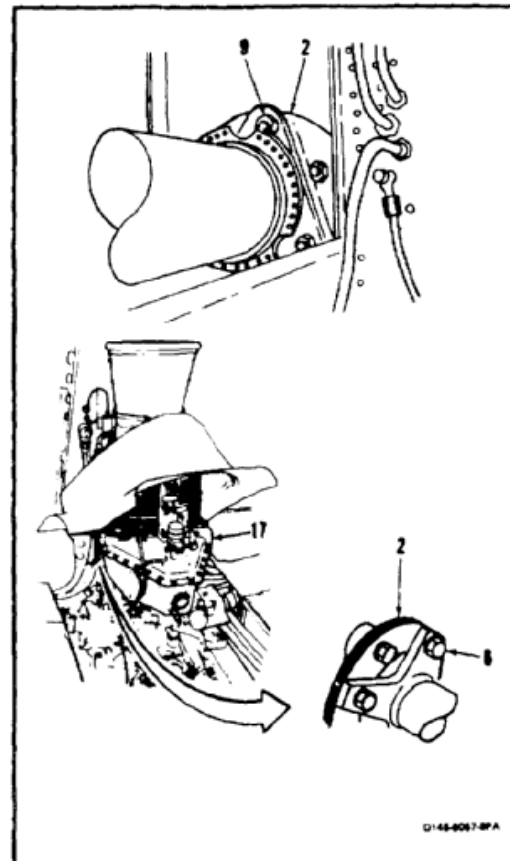
**CAUTION**

Do not allow bolts to turn when torquing nuts. If bolts turn, damage to bolts and plates can result.

**NOTE**

Helper reaches bolts from top of helicopter.

7. Have helper hold head of three bolts (6) at adapter assembly (2) aft of combining transmission (17) with wrench. Check nuts for friction torque of at least **24 inch-pounds**.
8. Torque nuts (9) to **1000 to 1100 inch-pounds**.
- 8.1. Phase rotor blades (Task 6-28).



**INSTALL NO. 9 SHAFT****NOTE**

If position of adapter assemblies is changed, rotor blades will have to be phased again.

9. Have helper support No. 9 shaft (18). Remove two bolts (19) inserted during phasing. Do not disturb positions of adapter assemblies (12 and 20).
10. Coat thread of six bolts (19) with oil (E254). Install three bolts, heads forward, and special washers (21) through adapter assembly (12) and shaft (18). Install three bolts, heads forward, and washers (22) through shaft (18) and adapter assembly (20).
11. Loosely install three washers (22) and nuts (23) on forward bolts (19). Loosely install three special washers (21) and nuts (23) on aft bolts.
12. Coat thread of two bolts (24) with oil (E254). Install bolts, heads away from each other, through adapter assemblies (12 and 20). Install special washer (21) and nut (23) on each bolt.

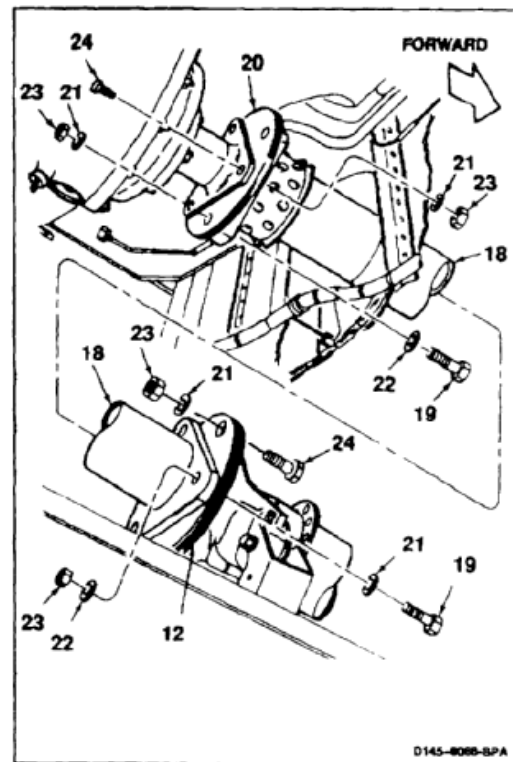


Do not let bolts turn. If bolts turn, damage to bolts and plates can result.

13. Have helper hold head of six bolts (19) and two bolts (24) with wrench. Torque eight nuts (23) to **1000 to 1100 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install aft transmission drip tray (Task 2-3).
- Close baffles under aft transmission (Task 2-2).
- Close aft drive shaft access panel (Task 2-2).
- Close aft pylon lower fairing (Task 2-2).
- Close aft pylon doors (Task 2-2).
- Close cargo ramp (Task 2-2).
- Perform a combining transmission oil cooler fan vibration check (TM 1-6625-724-13&P).
- Perform ground run (TM 55-1520-240-10).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

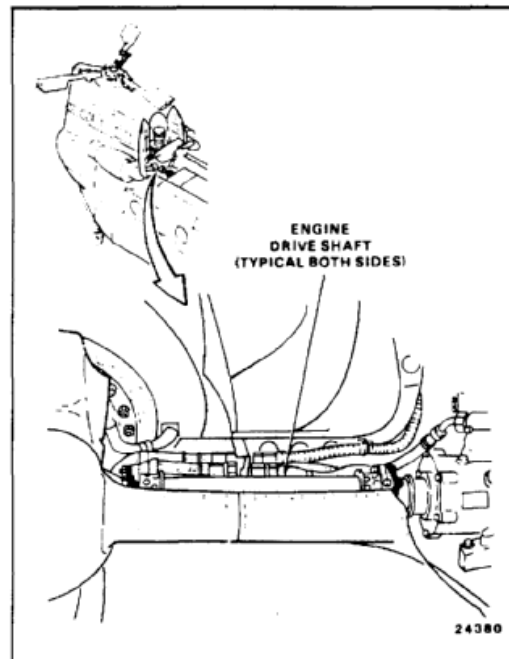
All

**Tools:**

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

**Materials:**Cloths (E120)  
Barrier Material (E80)**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Pylon Hinged Fairing Open (Task 2-2)  
Pylon Lower Fairing Raised (Task 2-2)  
Engine Drive Shaft Access Cover Removed (Task 2-2)  
Engine Air Inlet Screens Removed (Task 4-65)  
Engine Transmission Fairing Access Cover Open  
(Task 2-2)



**NOTE**

Remove left or right engine drive shaft in same way. Right shaft shown here.

Removal of one-piece and riveted shafts is similar. Differences are noted in text. Riveted shaft shown here.

**REMOVE SHAFT**



Open end wrenches or open end torque wrench adapters/spanners are not to be used for torque checks and/or removal and installation of hardware. Damage to drive shaft can result.



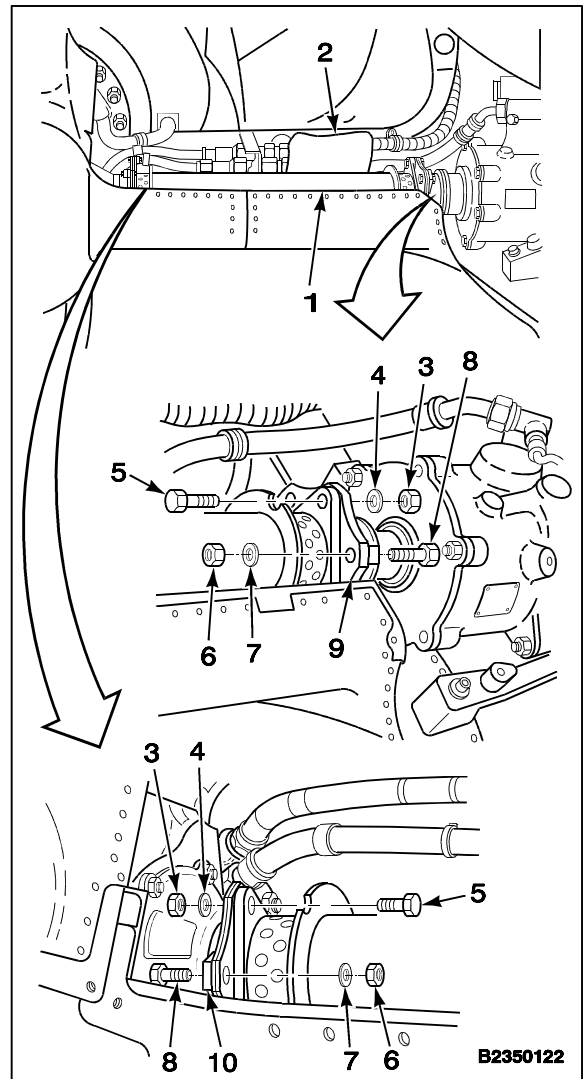
Prior to removal of any engine drive shaft or adapter from shafts, components are to be indexed. Damage to drive shaft can result.

1. Support shaft (1) with pad (2) of barrier material (E80) or cloths (E120).



Do not allow bolts to turn. If bolts turn, bolts and plates can be damaged.

2. Remove three nuts (3), washers (4), and bolts (5) from each end of shaft (1). During removal, hold head of bolts with wrench.



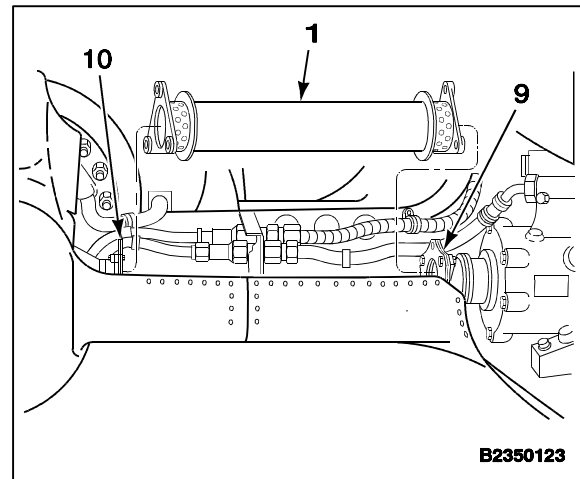


Do not allow bolts to turn. If bolt turns, bolts and adapter assemblies can be damaged.

#### NOTE

If more than one bolt is removed from each adapter assembly, assembly will have to be balanced.

3. Remove one nut (6), washer (7), and bolt (8) from adapter assembly (9 and 10) at each end of shaft (1). During removal, hold head of bolts with wrench.



Exercise extreme caution while lifting the drive shaft clear of the aircraft. Nicking and denting the drive shaft or adapters may result in the need to replace damaged components.

4. Lift shaft (1) from between adapter assemblies (9 and 10). Remove shaft.
5. If shaft (1) will be reinstalled, go to Follow-On Maintenance. If a riveted shaft will be replaced, go to step 6 and step 7.

#### NOTE

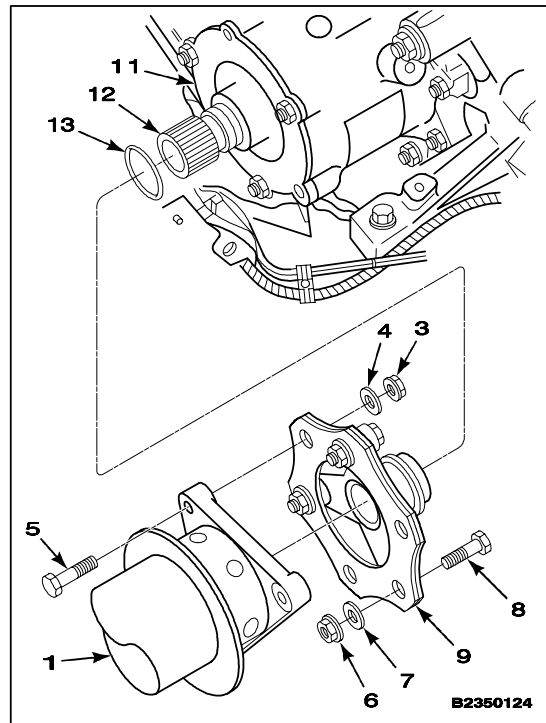
A one-piece shaft can be replaced independently, without matching adapters.

**REMOVE ADAPTER ASSEMBLIES**

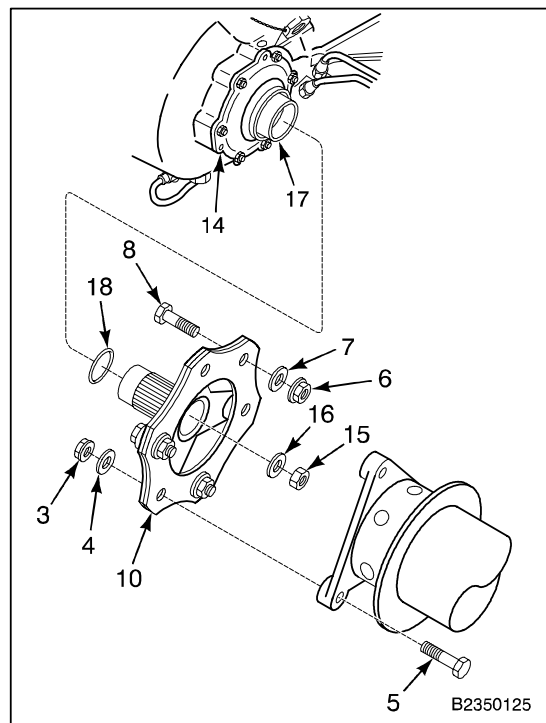
**NOTE**

On shafts (Without **51**), shaft and adapter assemblies are balanced together and have the same serial number. If any one must be replaced, all three must be replaced as a unit. On shafts (With **51**), shaft and their adapters may be replaced individually.

6. Remove adapter assembly (9) from combining transmission (11) as follows:
  - a. Pull adapter assembly (9) from splines of input shaft (12).
  - b. Remove packing (13) from shaft (12).
  - c. Loosely install bolt (8), washer (7), and nut (6) on adapter assembly (9).
  - d. If a riveted shaft (1) has been removed, loosely install adapter assembly (9) on drive shaft with three bolts (5), washers (4), and nuts (3).



7. Remove adapter assembly (10) from engine transmission (14) as follows:
  - a. Remove nut (15) and washer (16).
  - b. Pull adapter assembly (10) from splines of output shaft (17). Remove packing (18) from adapter assembly.
  - c. Loosely install bolt (8), washer (7), and nut (6) on adapter assembly (10).
  - d. If a riveted shaft (1) has been removed, loosely install adapter assembly (10) on drive shaft with three bolts (5), washers (4), and nuts (3).



**FOLLOW-ON MAINTENANCE:**

Inspect engine drive shaft (Task 6-30.3).

**Task 6-30.1 deleted.**

END OF TASK



**6-30.2 INSPECT ONE-PIECE ENGINE DRIVE SHAFT (INSTALLED)**

6-30.2

**INITIAL SETUP****Applicable Configurations:**With **51****Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4962  
 Technical Inspection Tool Kit, NSN 5180-00-323-5114  
 Torque Wrench, 100 to 750 Inch-Pounds

**Materials:**

Cloths (E120)

**Personnel Required:**

Medium Helicopter Inspector

**References:**

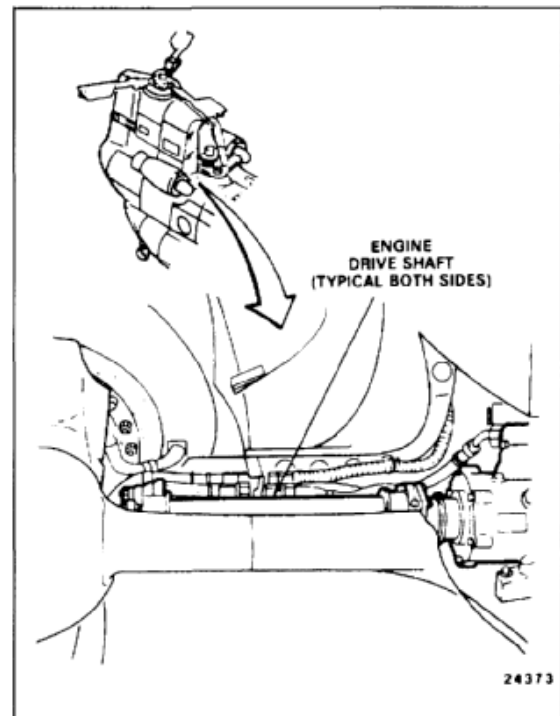
TM 1-1500-335-23  
 Task 6-30  
 Task 6-31.1  
 Task 6-32  
 TM 1-1520-253-23

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Access Doors Open (Task 2-2)  
 Pylon Lower Fairing Open (Task 2-2)  
 Engine Drive Shaft Access Cover Removed (Task 2-2)  
 Engine Air Inlet Screens Removed (Task 4-65)  
 Engine Transmission Fairing Access Cover Open  
 (Task 2-2)

**General Safety Instructions:****WARNING**

Keep clear of turning rotor blades  
 when rotating drive shaft. Turning  
 blades can injure personnel.



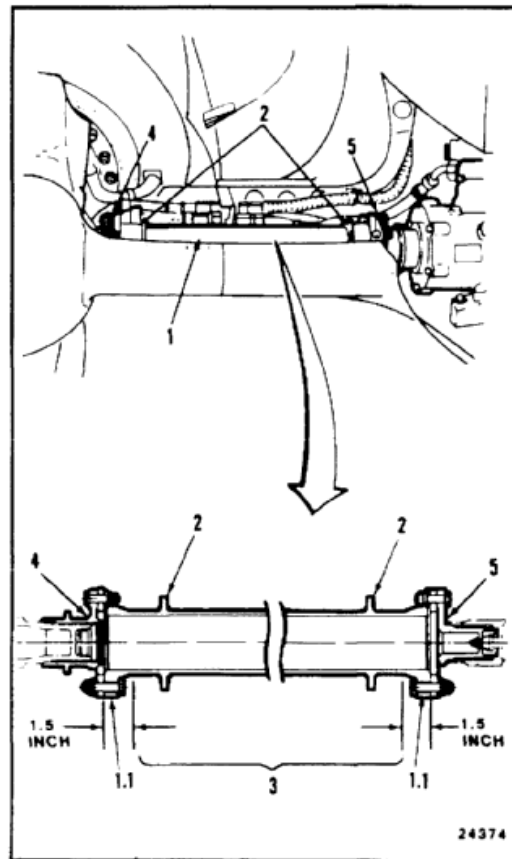
**NOTE**

Inspect left or right drive shaft in same way. Right shaft shown.

Rotate shaft as needed to do a complete check.

Shaft and adapter assemblies are balanced separately. If any one is damaged, it may be replaced individually.

1. Inspect for damage listed below. Use a 3X to 5X power magnifying glass for inspection. If cracks are suspected, use local dye-penetrant inspection (TM 1-1500-335-23) to verify cracks..
  - a. Cracks or dents on any areas of shaft (1). If cracks or dents are found, replace the shaft (Tasks 6-30 and 6-32). If a crack is suspected in one piece engine drive shaft, refer to TM 1-1520-253-23.
  - b. Nicks, scratches, or gouges in outer **1.5 inches** of each end of shaft. If defects are found, replace the shaft, except as noted in step 1c.
  - c. Nicks and gouges up to **0.025 inch** on the outer diameter of the shaft lug ears (1.1). Blend out defects (Task 6-31.1). If defects greater than **0.025 inch** are found, replace the shaft.
  - d. Nicks, scratches, and gouges on center section (3) of shaft, including balance flanges (2). Blend out defects (Task 6-31.1).
  - e. Cracks, nicks, scratches, or gouges in adapters (4 and 5). Use a 3X to 5X power magnifying glass check. Replace any cracked adapter assemblies (Task 6-30 and Task 6-32). Remove any nicks, scratches or gouges by polishing (Task 6-31.1). If a crack is suspected in adapter, refer to TM 1-1520-253-23.



**6-30.2 INSPECT ONE-PIECE ENGINE DRIVE SHAFT (INSTALLED) (Continued)**

2. Inspect adapter areas for damage listed below:

- a. Cracks, nicks, or gouges in visually accessible areas of plates (6). Use a 3X to 5X power magnifying glass to check. Repair light scuffs, nicks, or scratches (Task 6-31.1). Replace adapter assemblies with cracks, nicks or gouges in plates deeper than **0.001 inch** (Tasks 6-30 and 6-32). If a crack is suspected in plate, refer to TM 1-1520-253-23.
- b. Nicks on inside edges of plates (6). Use a pointed scribe to check. If nicks are found, replace adapter assemblies.

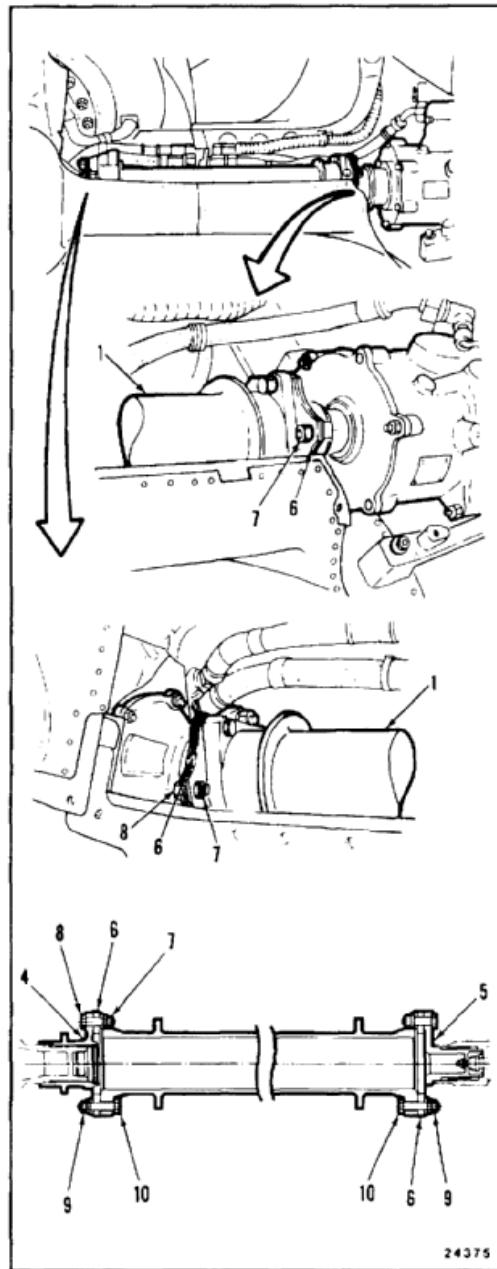


Do not allow bolts to turn. If bolts turn, the bolts and plates or adapter can be damaged. Only one bolt may be loose at a time or you lose balance.

- c. Cracked or loose nuts (7) and bolts (8). Cracked or loose nuts (9) and bolts (10). Replace cracked nuts and bolts.

3. Check torque on nuts (7) at each adapter assembly (4 and 5). Torque shall be at **440 inch-pounds**.

- a. If torque is less than **440 inch-pounds** in more than one location per adapter assembly, replace the adapter assembly and attaching hardware (Tasks 6-30 and 6-32).
- b. If torque is less than **440 inch-pounds** at only one location per adapter assembly, check plates (6) in the area of loose bolt (8) for cracks. If cracks are found, replace affected adapter assembly and attaching hardware (Tasks 6-30 and 6-32). If plates are acceptable, torque nut to **440 inch-pounds**.
- c. If a nut or bolt fails during torquing, replace the adapter assembly and attaching hardware (Tasks 6-30 and 6-32).





Do not allow bolts to turn. If bolts turn, the bolts and plates or adapter can be damaged.

4. Check torque on nuts (9) at each end of shaft (1). Torque shall be **440 inch-pounds**.
  - a. If torque is less than **440 inch-pounds** in more than one location at either end of shaft, replace the adapter assembly and attaching hardware (Tasks 6-30 and 6-32).
  - b. If torque is less than **440 inch-pounds** in only one location at either end of shaft, check plates (6) in the area of loose bolt (10) for cracks. If cracks are found, replace the affected adapter assembly and attaching hardware (Tasks 6-30 and 6-32). If plates are acceptable, torque the nut or nuts to **440 inch-pounds**.
  - c. If a nut or bolt fails during torquing, replace that nut or bolt (Tasks 6-30 and 6-32).

***FOLLOW-ON MAINTENANCE:***

Close engine transmission fairing access cover (Task 2-2).

Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon hinged fairing (Task 2-2).

Install engine air inlet screen (Task 4-76).

END OF TASK



**6-30.3 INSPECT ONE-PIECE ENGINE DRIVE SHAFT (REMOVED)**

6-30.3

**INITIAL SETUP****Applicable Configurations:**With **51****Tools:**

Technical Inspection Tool Kit, NSN 5180-00-323-5114  
Torque Wrench, 100 to 750 Inch-Pounds

**Materials:**

Cloths (E120)

**Personnel Required:**

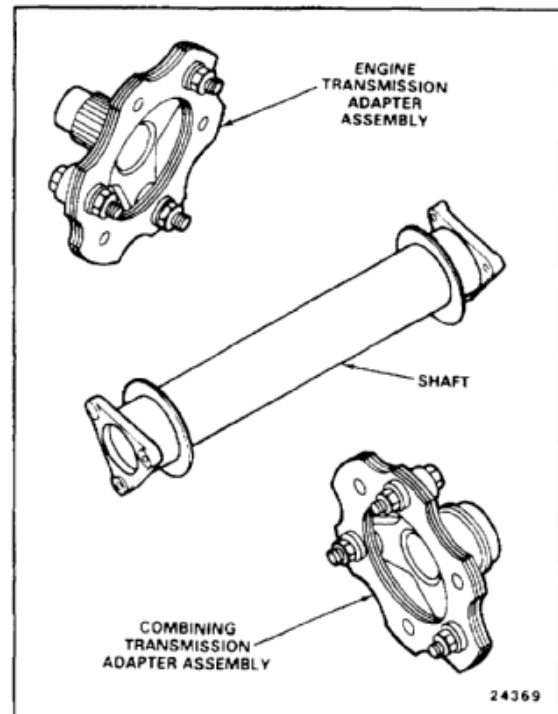
Medium Helicopter Inspector

**References:**

TM 1-1500-335-23  
TM 1-1520-253-23  
Task 6-30.2  
Task 6-31.2

**Equipment Condition:**

Off Helicopter Task

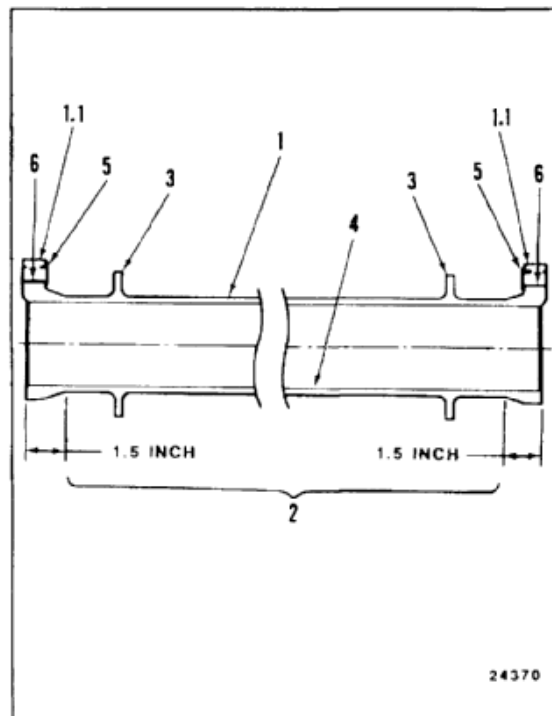


**NOTE**

Inspect left or right drive shaft in same way.

Shaft and adapter assemblies are balanced separately. If any one is damaged, it may be replaced individually.

1. Inspect for damage listed below. Use a 3X to 5X power magnifying glass for inspection. If cracks are suspected, use local dye-penetrant inspection (TM 1-1500-335-23) to verify cracks.
  - a. Cracks or dents on any areas of shaft (1). If cracks or dents are found, replace the shaft. If a crack is suspected in one piece engine drive shaft, refer to TM 1-1520-253-23.
  - b. Nicks, scratches, or gouges in outer **1.5 inches** of each end of shaft. If defects are found, replace the shaft, except as noted in step 1c.
  - c. Nicks and gouges up to **0.025 inch** in depth on the outer diameter of the shaft lug ears (1.1). Blend out defects (Task 6-31.2). If defects greater than **0.025 inch** are found, replace the shaft.
  - d. Nicks, scratches, and gouges on center section (2) of shaft, including balance flanges (3). Blend out defects (Task 6-31.2).
2. Check for corrosion or wear on inside surface (4) of shaft, lug bushings (5), and lug bores (6). Replace a shaft with corrosion or wear in these areas.



## 6-30.3 INSPECT ONE-PIECE ENGINE DRIVE SHAFT (REMOVED) (Continued)

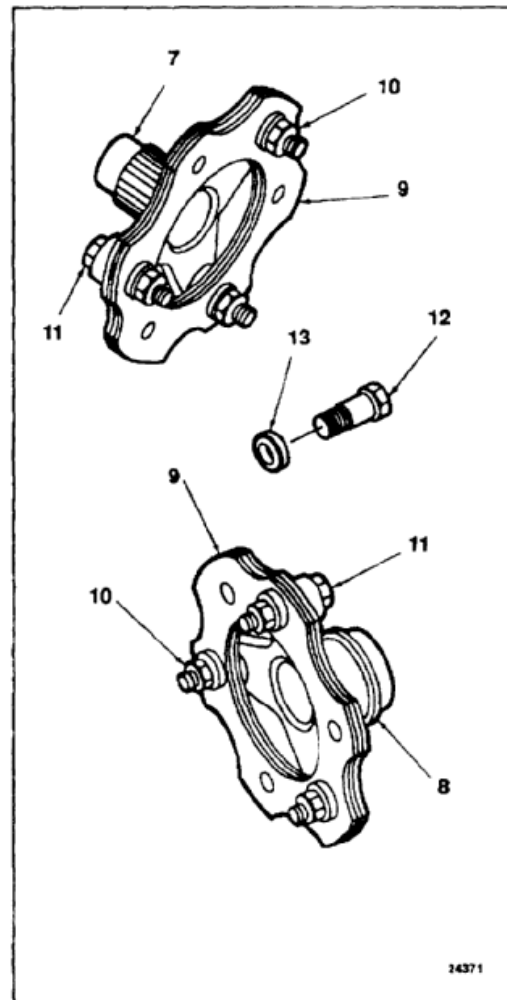
6-30.3

3. Inspect adapters (7 and 8) for cracks, nicks, scratches, or gouges. Use a 3X to 5X power magnifying glass for inspection. Replace any cracked adapter assemblies. Remove any nicks, scratches, or gouges by polishing (Task 6-31.2).



Do not loosen or remove more than one bolt from the adapters at the same time during inspection. Adapters are balanced assemblies and requires replacement if more than one bolt is loosened or removed.

4. Inspect adapter plates and attaching hardware for damage listed below:
- Cracks nicks or gouges in visually accessible areas of plates (9). Use a 3X to 5X power magnifying glass to check. Give particular attention to surfaces at exposed bolt holes. Repair light scuffs, nicks, or scratches (Task 6-31.2). Normal adapter face or washer contact pattern is permissible. Replace adapter assemblies with any cracks. Replace adapter assemblies with scratches, nicks, or gouges in plates deeper than **0.001 inch**. If cracks are suspected in adapter plate, refer to TM 1-1520-253-23.
  - Nicks on inside edges of plates (9). Use a pointed scribe to check. Replace nicked adapter assemblies.
  - Cracked nuts (10) and bolts (11). Replace cracked nuts and bolts.
  - Thread damage, fretting, gouges, wear steps, and circumferential scoring on shaft attaching bolts (12). If defects are found, refer to Task 6-31.2.
  - Nicks, gouges, and fretting on bevel washers (13). If defects are found, refer to Task 6-31.2.



**NOTE**

One nut and bolt assembly (removed during shaft removal) will be loosely installed on each adapter assembly.

5. Check torque on two torqued nuts (10) at each adapter assembly (7 and 8). Torque shall be at least **440 inch-pounds**.
  - a. If torque is less than **440 inch-pounds** at any of the checked locations, replace that adapter assembly and attaching hardware.
  - b. If a nut or bolt fails during the torque check, replace the adapter assembly and attaching hardware.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

**INITIAL SETUP****Applicable Configurations:**Without **51****Tools:**

Dial Indicating Depth Gage

**Materials:**

Cloths (E120)  
 Abrasive Pads (E2)  
 Epoxy Primer (E292 or E293)  
 Gloves (E184.1)

**Personnel Required:**

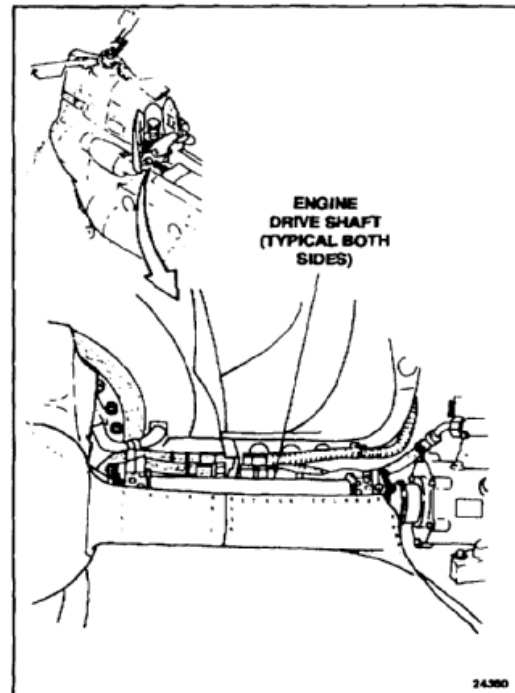
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Access Doors Open (Task 2-2)  
 Pylon Lower Fairing Open (Task 2-2)  
 Engine Drive Shaft Access Cover Removed (Task 2-2)  
 Engine Air Inlet Screens Removed (Task 4-65)  
 Engine Transmission Fairing Access Cover Open  
 (Task 2-2)



**NOTE**

Repair a left or right engine drive shaft in same way. Right shaft shown.

1. Remove light scratches, corrosion, and nicks from outside edge of plates (1 and 2). Do not go deeper than **0.001 inch**.
2. Blend out nicks, scratches, and gouges on face of plates (1 and 2). Use abrasive pads (E2). Do not go deeper than **0.001 inch**.
3. Blend out scratches, nicks, and gouges on tube (3) with abrasive pads (E2). Do not go deeper than **0.010 inch**. Keep a blend radius of at least **0.5 inch**.
4. Remove nicks, scratches, or gouges on adapters (4) by light hand polishing. Use abrasive pads (E2). Do not go deeper than **0.001 inch**. Reject shaft assemblies if defects cannot be removed by polishing.

**INSPECT****WARNING**

Epoxy primer (E292 or E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from at or open flame. Avoid contact he skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

5. Touch up tube (3) as needed with two coats of epoxy primer (E292 or E293). Touch up adapters (4) with epoxy primer (E292 or E293). Wear gloves (E184.1).

**FOLLOW-ON MAINTENANCE:**

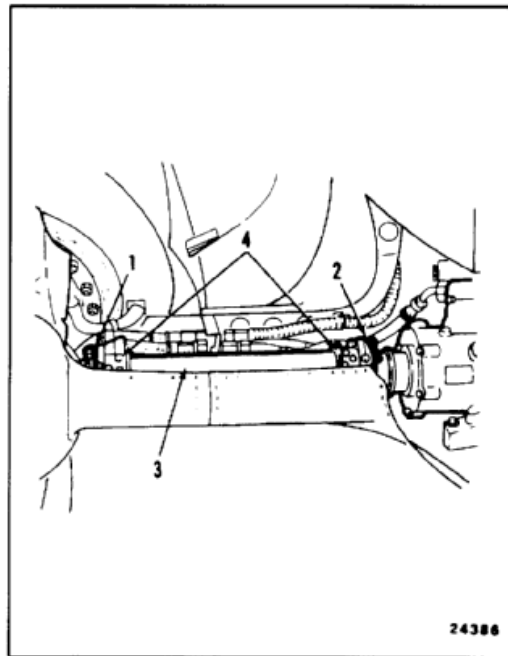
Close engine transmission fairing access cover (Task 2-2).

Install engine air inlet screens (Task 4-79).

Install engine drive shaft access cover (Task 2-2).

Close pylon lower fairing (Task 2-2).

Close pylon access doors (Task 2-2).



END OF TASK

**6-31.1 REPAIR ONE-PIECE ENGINE DRIVE SHAFT (INSTALLED)**

6-31.1

**INITIAL SETUP****Applicable Configurations:**With **51****Tools:**

Dial Indicating Depth Gauge

**Materials:**

Cloths (E120)  
 Abrasive Pads (E2)  
 Epoxy Primer (E292 or E293)  
 Epoxy Topcoat (E166)  
 Gloves (E186)  
 Emery Cloth (E125)

**Personnel Required:**

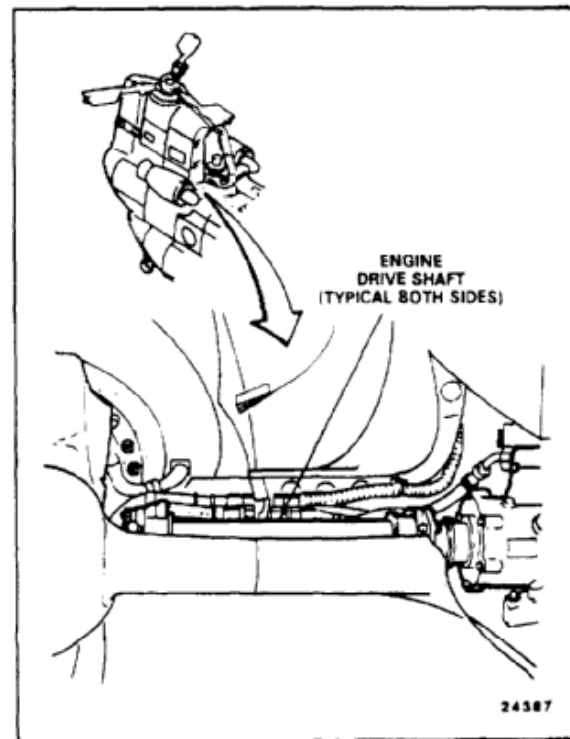
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Access Doors Open (Task 2-2)  
 Pylon Lower Fairing Open (Task 2-2)  
 Engine Drive Shaft Access Cover Removed (Task 2-2)  
 Engine Air Inlet Screens Removed (Task 4-65)  
 Engine Transmission Fairing Access Cover Open  
 (Task 2-2)



**NOTE**

Repair left or right engine drive shaft in same way. Right shaft shown.

1. Blend out nicks, scratches, and gouges on center section (3) of shaft (1), including balance flanges (2). Use abrasive pads (E2). Do not go deeper than **0.010 inch**. Keep a blend radius of at least **0.5 inch**. The blend area shall not exceed **3.14 square-inches** (the area of a 2 inch circle).
2. Blend out nicks, scratches, and gouges on outside diameter of lugs (3.1). Use emery cloth (E125). Do not go deeper than **0.025 inch**.
3. Remove nicks, scratches, or gouges on adapters (4 and 5) by light hand polishing. Use abrasive pads (E2). Do not go deeper than **0.001 inch**. Replace adapter assemblies if defects cannot be removed by polishing.
4. Remove light scratches, corrosion, and nicks from outside edge and face of plates bolted to adapters (4 and 5). Use abrasive pads (E2). Do not go deeper than **0.001 inch**.

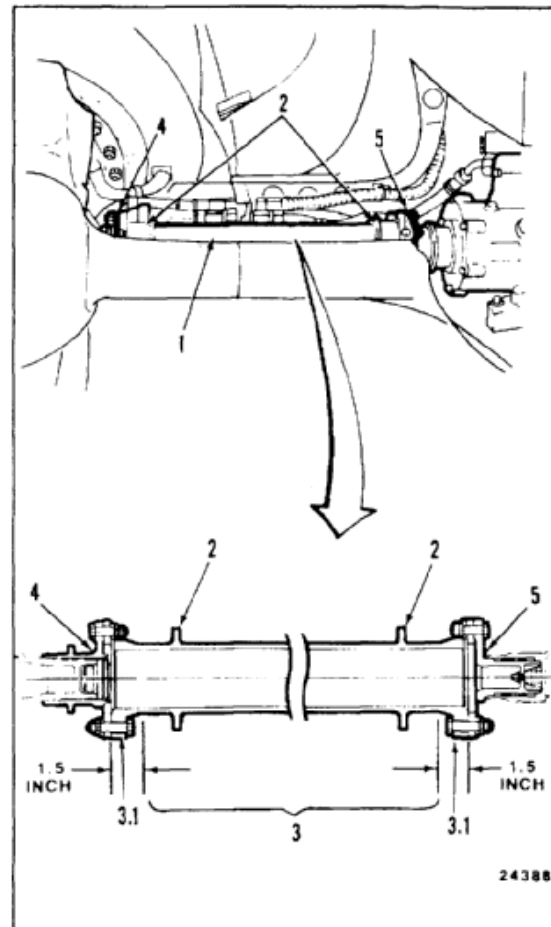
**INSPECT****WARNING**

Epoxy primer (E292 or E293) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

5. Touch up shaft (1) as needed with two coats of epoxy primer (E292 or E293). Touch up adapters (4 and 5) with epoxy primer (E292 or E293) and epoxy topcoat (E166). Wear gloves (E186).

**FOLLOW-ON MAINTENANCE:**

Close engine transmission fairing access cover (Task 2-2).  
 Install engine air inlet screens (Task 4-79).  
 Install engine drive shaft access cover (Task 2-2).  
 Close pylon lower fairing (Task 2-2).  
 Close pylon access doors (Task 2-2).



END OF TASK



**6-31.2 REPAIR ONE-PIECE ENGINE DRIVE SHAFT (REMOVED)**

6-31.2

**INITIAL SETUP****Applicable Configurations:**With **51****Tools:**

Dial Indicating Depth Gauge

**Materials:**

Cloths (E120)  
Abrasive Pads (E2)  
Epoxy Primer (E292 or E293)  
Epoxy Topcoat (E166)  
Gloves (E186)  
Emery Cloth (E125)

**Personnel Required:**

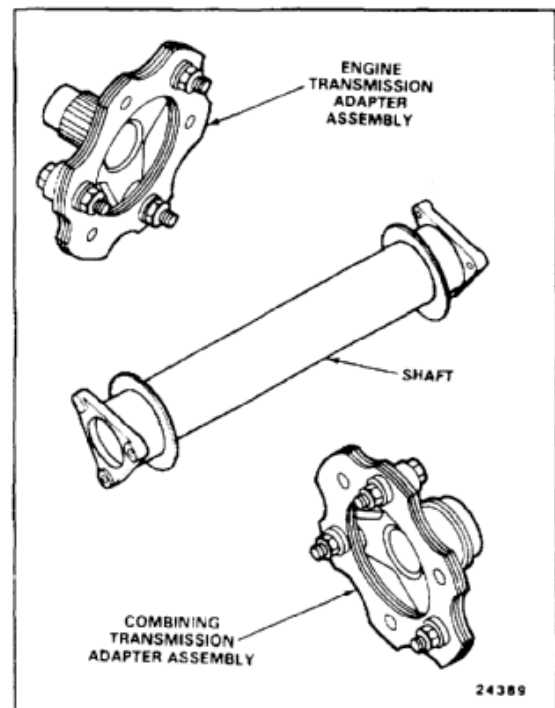
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

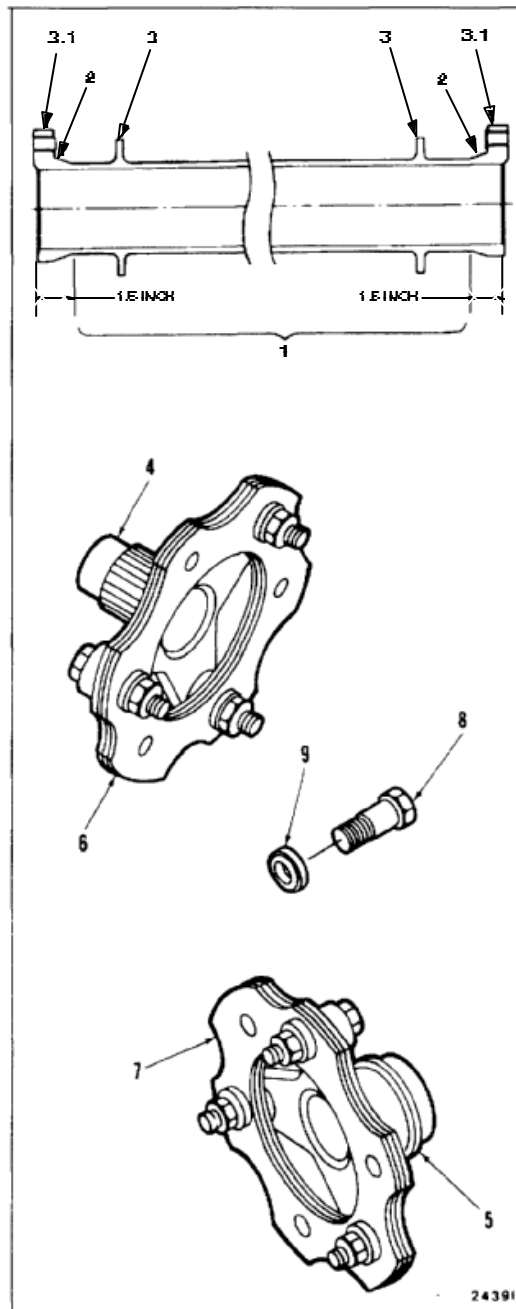
Off Helicopter Task



**NOTE**

Repair left or right engine drive shaft in same way.

1. Blend out nicks, scratches, and gouges on center section (1) of shaft (2), including balance flanges (3). Use abrasive pads (E2). Do not go deeper than **0.010 inch**. Keep a blend radius of at least **0.5 inch**. Blend area shall not exceed **3.14 square-inches** (the area of a 2 inch circle).
2. Blend out nicks, scratches, and gouges on outside diameter of lugs (3.1). Use emery cloth (E125). Do not go deeper than **0.025 inch**.
3. Remove nicks, scratches, or gouges on adapters (4 and 5) by light hand polishing. Use abrasive pads (E2). Do not go deeper than **0.001 inch**. Replace adapter assemblies if defects cannot be removed by polishing.
4. Remove light scratches, corrosion, and nicks from outside edge and face of plates (6 and 7). Use abrasive pads (E2). Do not go deeper than **0.001 inch**.
5. Remove thread damage, light fretting, gouges, wear steps, and scoring on bolts (8) by light hand polishing. Use abrasive pads (E2). Replace bolts if defects cannot be removed by polishing.
6. Remove nicks, gouges, and fretting on bevel washers (9) by light hand polishing. Use abrasive pads (E2). Replace washers if defects cannot be removed by polishing.



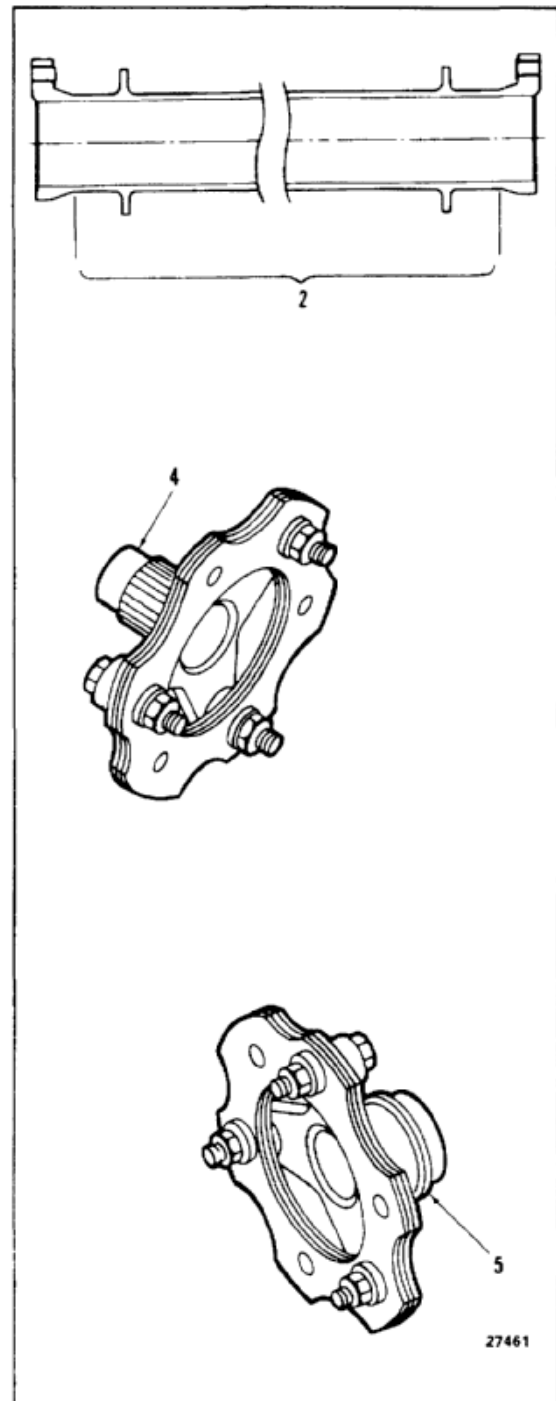
**INSPECT****WARNING**

Epoxy primer (E292 or E293) is flammable and toxic. Avoid inhaling. Use only with adequate ventilation, away from heat or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

7. Touch up shaft (2) as needed with two coats of epoxy primer (E292 or E293). Touch up adapters (4 and 5), on polished areas only, with epoxy primer (E292 or E293) and epoxy topcoat (E166). Wear gloves (E186).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Torque Wrench, 100 to 750 Inch-Pounds

**Materials:**

Cloths (E120)  
 Grease (E190.1)  
 Oil (E254)  
 Gloves (E186)  
 Dry Cleaning Solvent (E162)

**Parts:**

Packing

**Personnel Required:**

Medium Helicopter Repairer (2)  
 Inspector

**References:**

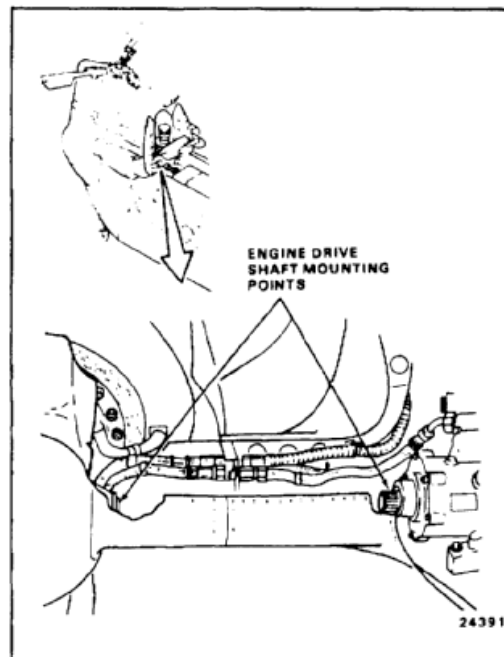
TM 55-1520-240-23P

**General Safety Instructions:****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

Refer to Task 1-91 (notes F and G) to ensure certain serial numbered engine cross shaft adapter assemblies (P/N 145D5300-16 and 145D5300-17) have not exceeded finite life.



**NOTE**

Install left or right engine drive shaft in same way. Right shaft shown here.

Installation of one-piece and riveted shafts is similar. Differences are noted text. Riveted shaft shown here.

**INSTALL ADAPTER ASSEMBLIES**

**WARNING**

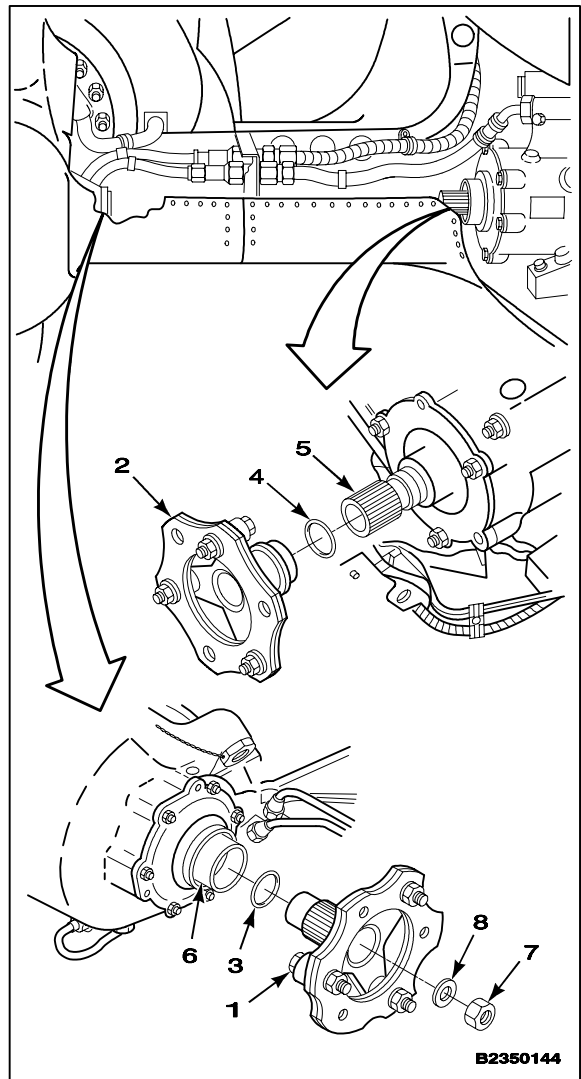
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

On shafts (Without **51**), shaft and adapter assemblies are balanced together and have the same serial number. If any one is replaced, all three must be replaced as a unit.

On shafts (With **51**), shaft and adapter assemblies may be replaced individually.

1. Clean splines of adapter assemblies (1 and 2), combining transmission input shaft (5), and engine transmission output shaft (6). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Pack all splines with grease (E190.1).
2. Coat packing (4) with grease (E190.1). Install packing on combining transmission input shaft (5).
3. Coat packing (3) with grease (E190.1). Install packing on adapter assembly (1).
4. Install adapter assembly (2) on combining transmission input shaft (5). Wipe off excess grease with cloths (E120).



5. Install adapter assembly (1) in engine transmission output shaft (6). Wipe off excess grease with cloths (E120).

**NOTE**

If nut does not meet friction torque, nut must be replaced.

6. Coat thread of nut (7) with grease (E190.1). Wear gloves (E186). Install washer (8) and nut in adapter assembly (1). Check nut (7) for friction torque of a least **7 inch-pounds**. Torque nut to **120 inch-pounds**.

**INSTALL SHAFT**



Open-end wrenches or open-end torque wrench adapters/spanners are not to be used for torque checks and/or removal and installation of hardware. Damage to drive shaft can result.



Exercise extreme caution while lifting the drive shaft into the aircraft. Nicking and denting the drive shaft or adapter may result in the need to replace damaged components. Support shaft while installing to prevent damage to adapters or shafts.

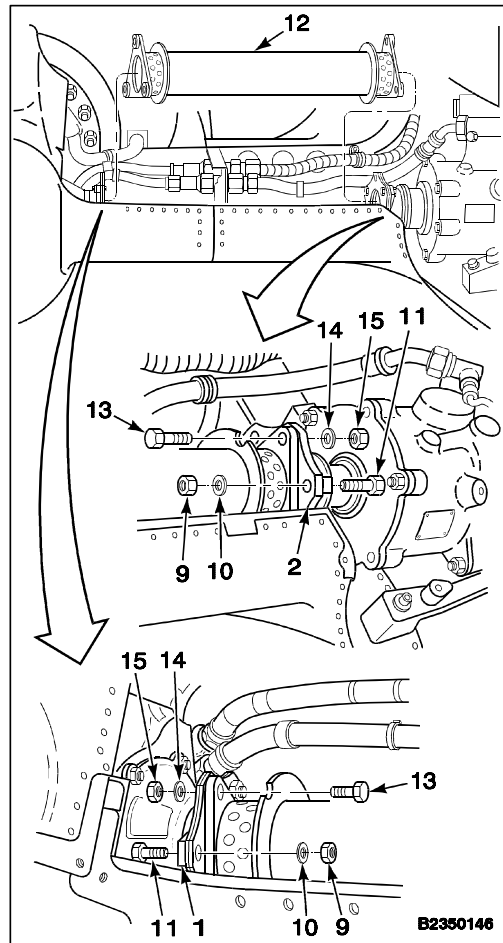
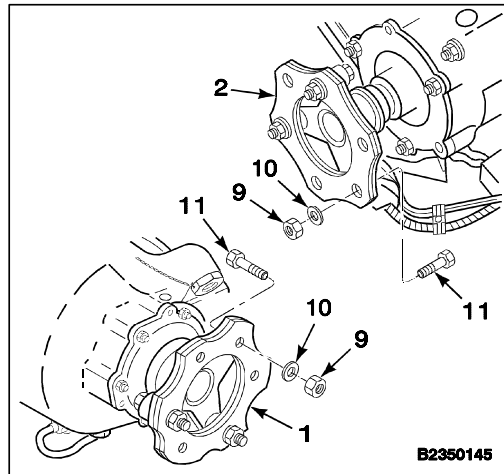


Do not allow bolt to turn. If bolt turns, bolt and adapter assembly can be damaged.

**NOTE**

If installing previously removed adapter assemblies, remove the loosely installed nut and bolt from each.

7. Remove one nut (9), washer (10), and bolt (11) from each of two adapter assemblies (1 and 2). During removal, hold head of bolt with wrench. Do not let bolt turn when removing nut.
8. Position shaft (12) between adapter assemblies (1 and 2). On shafts (Without **51**), check that leg of shaft marked 2 is between legs of combining transmission adapter assembly (1) marked 1 and 3 and leg of shaft marked 5 is between legs of engine transmission adapter assembly (2) marked 4 and 6.
9. Coat thread of six bolts (13) with oil (E254). Install three bolts, washers (14), and nuts (15) at each end of shaft (12). Bolt heads shall face each other.
10. Coat thread of two bolts (11) with oil (E254). Install one bolt, washer (10), and nut (9) in each adapter assembly (1 and 2). Bolt heads shall face away from each other. Wear gloves (E186).



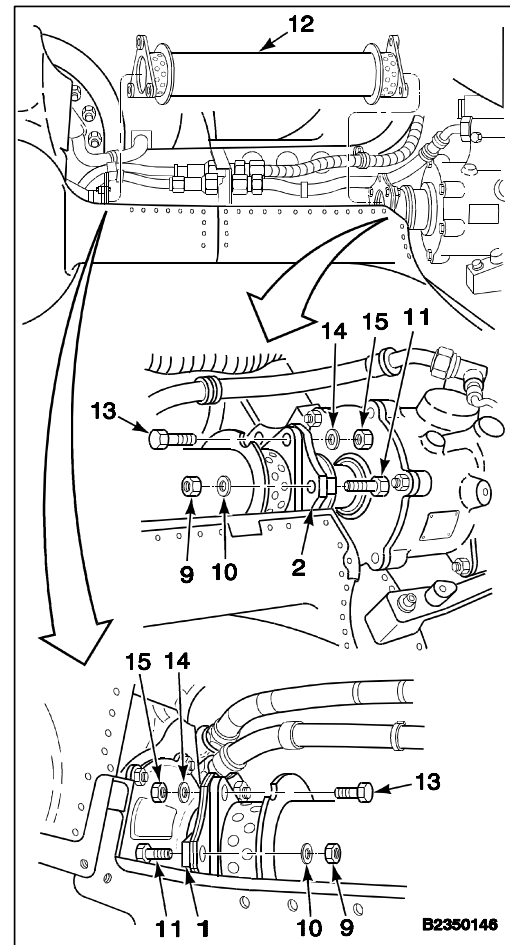


Do not allow bolts to turn. If bolts turn, bolts, plates, or adapter assembly can be damaged.

#### NOTE

If nuts do not meet friction torque, they must be replaced.

11. Hold head of bolts (11 and 13) with wrench. Check nuts (9 and 15) for friction torque of at least **10 inch-pounds**. Torque nuts to **440 inch-pounds**. After both adapter assemblies have been installed, ensure that the adapter assembly nuts (9) (3 nuts per adapter assembly) are torqued to **440 inch-pounds**.



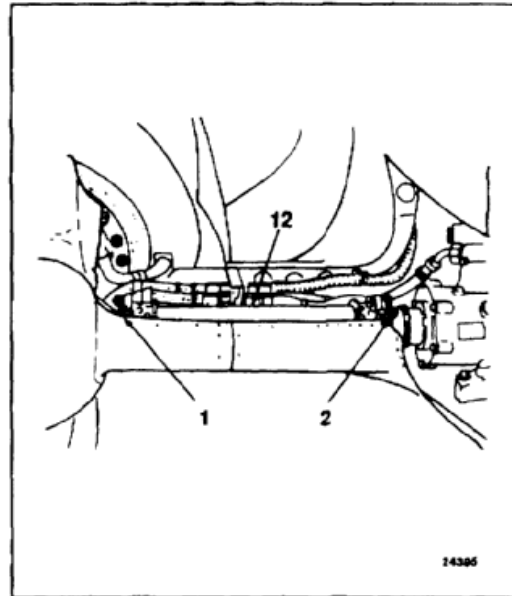




12. Have helper rotate blades to turn shaft (12) at least one full turn. Check that there is at least **0.125 inch** clearance between shaft and adapters (1 and 2) and the surrounding structure. Check for at least **0.5 inch** clearance to hoses and wires.

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Close engine transmission fairing access cover (Task 2-2).
- Install engine drive shaft access cover (Task 2-2).
- Close pylon lower fairing (Task 2-2).
- Close pylon hinged fairing (Task 2-2).
- Install engine air inlet screen (Task 4-76).
- Perform combining transmission oil cooler fan vibration check (TM 1-6625-724-13&P).
- Perform ground run (TM 55-1520-240-10).
- Check torque on all nuts after first flight (Task 6-30.2).



END OF TASK



**SECTION III**  
**FORWARD ROTARY-WING DRIVE TRANSMISSION**

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 14 Quart (2)

**Materials:**

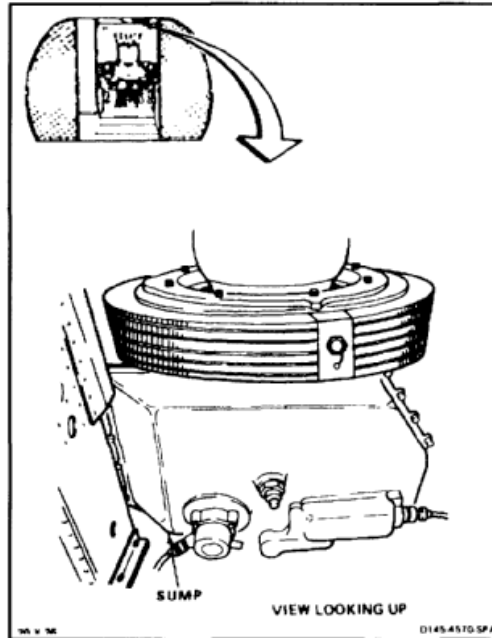
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

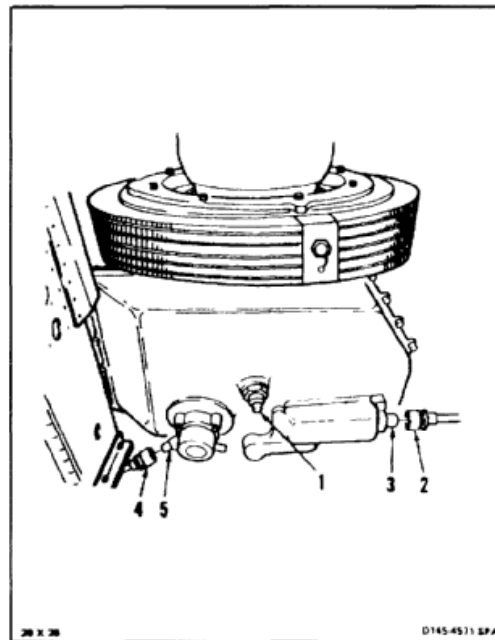
Forward Transmission Drip Pan Removed (Task 2-3)



**NOTE**

Sump holds about **23 quarts** of oil.

1. Push in drain valve (1), twist, and pull. Let oil drain into containers. Push in valve and twist it to close.
2. Disconnect connector (2) from temperature bulb receptacle (3). Disconnect connector (4) from chip detector receptacle (5).



**6-33 REMOVE FORWARD TRANSMISSION SUMP (Continued)**

6-33

3. Remove 23 nuts (6) and washers (7). Remove seven bolts (8) and washers (7).



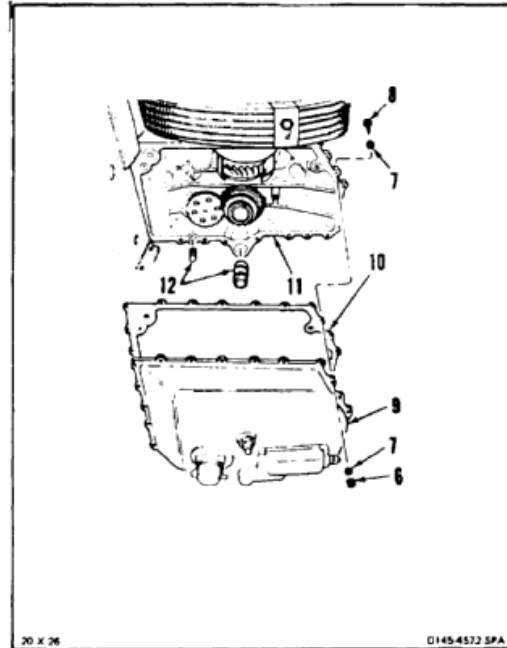
Be careful not to damage gasket seal when lowering sump.

4. Lower and remove sump (9) and gasket seal (10) from transmission (11).
5. Remove gasket seal from sump.

**NOTE**

Tubes may stay in sump or in transmission.

6. If two oil transfer tubes (12) are in transmission (10), remove them. Install tubes in sump (9).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Airframe Repairer's Tool Kit, NSN 5180-00-323-4876  
Open End Wrench, 1-3/8 Inch

**Materials:**

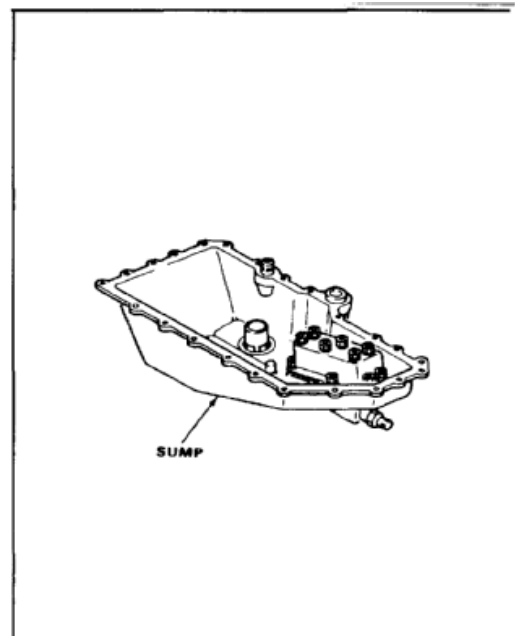
None

**Personnel Required:**

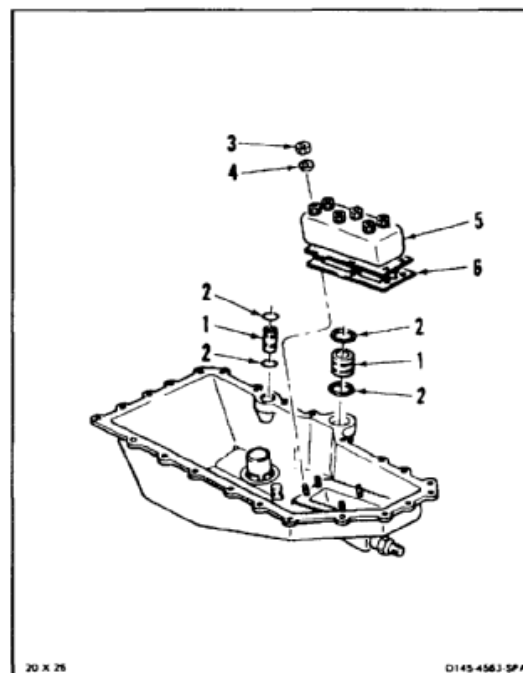
Aircraft Structure Repairer

**Equipment Condition:**

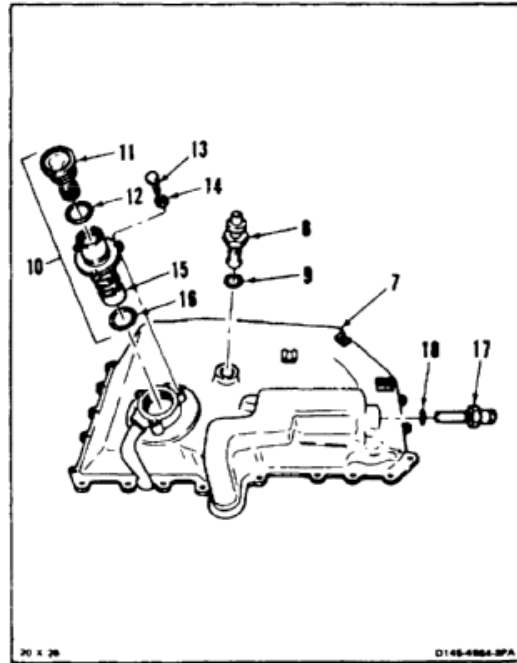
Off Helicopter Task  
Forward Transmission Sump Removed (Task 6-33)



1. Remove two oil transfer tubes (1) and four packings (2).
2. Remove six nuts (3) and washers (4) from oil inlet screen (5). Remove screen and gasket seal (6).



3. Turn sump (7) over **180°**. Remove lockwire from drain valve (8). Remove drain valve and packing (9).
4. Remove detection screen and chip detector (10) as follows:
  - a. Push in cap (11), twist to left, and pull to remove cap and packing (12).
  - b. Remove lockwire from three bolts (13). Remove bolts and washers (14). Remove housing (15) and packing (16).
5. Remove lockwire from temperature bulb (17). Remove temperature bulb and packing (18).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Airframe Repairers Tool Kit, NSN 5180-00-323-4876  
 Shot Bags or Equivalent  
 Gram Scale, 100 Gram Capacity  
 Tee, 1/4 Inch  
 Source of Vacuum  
 Infrared Lamp, 140° to 160°F

**Materials:**

Abrasive Paper, 120 Grit (E7)  
 Abrasive Paper, 280 Grit (E10)  
 Kevlar Fabric, Style 285 or 281 (E209)  
 Wood Spatula (E424)  
 Polyethylene Cup (E157)  
 Brush (E86)  
 Teflon Tape (E399)  
 Adhesive (E47)  
 Hardener (E192)  
 Gloves (E184.1)  
 Acetone (E20)  
 Peel Ply (E270)  
 Epoxy Primer (E292 or E293)  
 Epoxy Coating (E137)  
 Methyl-Ethyl-Ketone (E244)  
 Black Lacquer (E462)  
 Polyurethane Paint (E285.1)  
 Cloths (E120)  
 Teflon Impregnated Fabric (E170)  
 Temperature Indicating Strips (E413)

**Personnel Required:**

Aircraft Structure Repairer  
 Inspector

**Equipment Condition:**

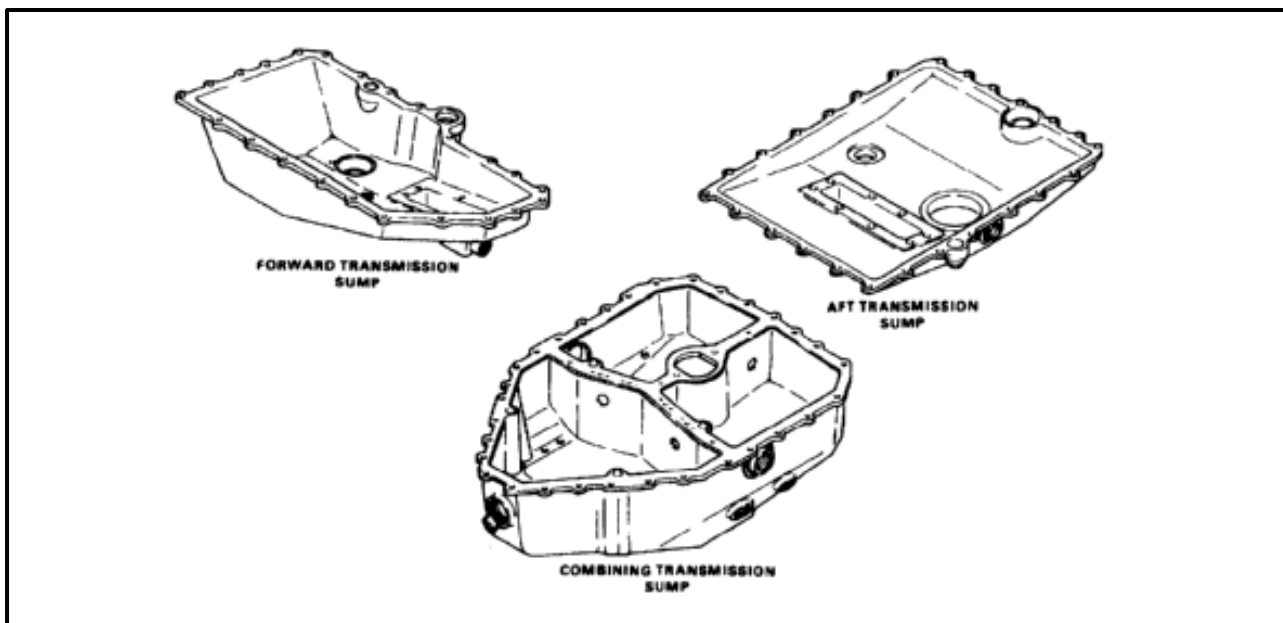
Off Helicopter Task

**General Safety Instructions:****WARNING**

Acetone (E20) is extremely flammable. It can be toxic. It can irritate skin and cause burns. Use only in a well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

Epoxy resin adhesive (E47) is toxic. It can irritate skin and cause burns. Avoid contact with skin, eyes, and clothing. Do not inhale. Use only with adequate ventilation. Keep away from heat, sparks, or open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

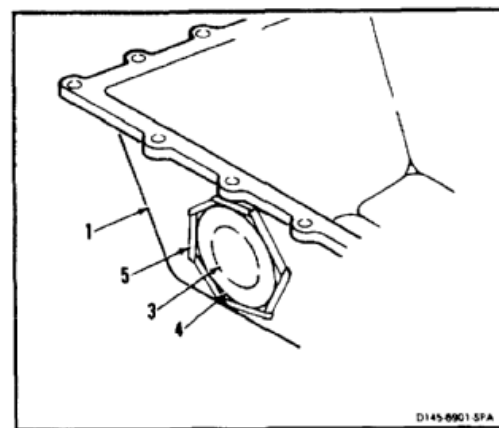
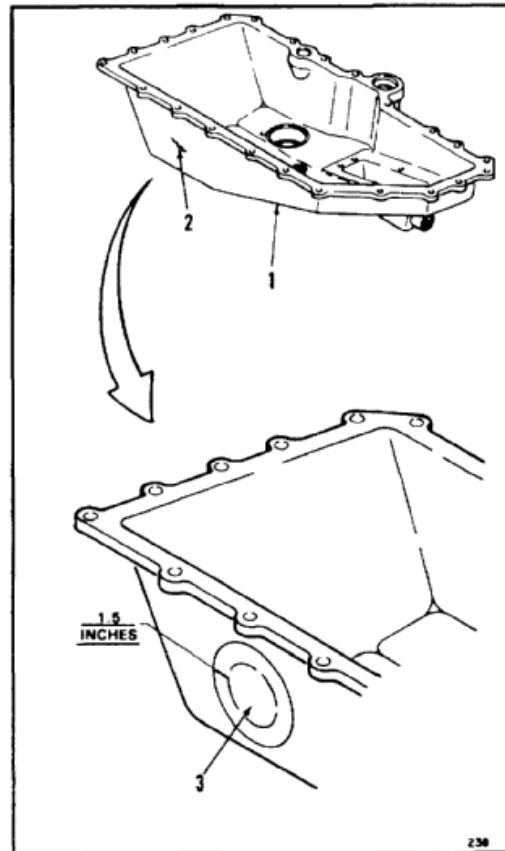




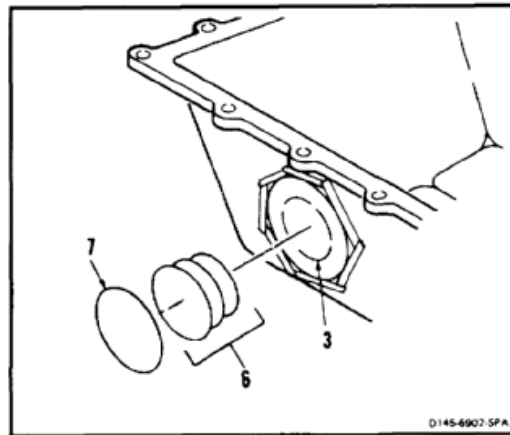
**NOTE**

Procedure is same to repair sump from forward, aft, or combining transmission. Typical repair of forward transmission sump shown here.

1. Inspect sump (1) for extent of damage. If damage is not through the sump, go to step 2. If damage goes through the sump, no repair is allowed.
  2. Clean sump (1) for **3 inches** beyond damage (2). Use acetone (E20) and cloths (E120). Wear gloves (E184.1).
  3. File or sand damage (2) down to undamaged area with file or abrasive paper (E7). File or sand damaged area (3) to a round or oval shape. Taper depth of area to the outside surface of sump (1).
  4. Clean sump (1) for **1.5 inches** beyond damaged area (3). Use acetone (E20) and cloths (E120). Wear gloves (E184.1).
  5. Measure depth of damaged area (3). Record depth to nearest **0.01 inch**. If depth is more than **0.090 inch**, no repair is allowed.
6. Cover sump (1) around cleaned area (4) with Teflon tape (E399) (5).



7. Cut one patch of Kevlar fabric (E209) (6) for each **0.01 inch** depth recorded in step 4. Cut to shape of damaged area (3). Cut pieces to overlap and match taper of shape. Cut another piece (7) to extend beyond damaged area **1 inch** in all directions.
8. Place fabric patches (6) in damaged area (3). Trim to fit. Check that top piece (7) overlaps area **1 inch** in all directions.
9. Remove pieces (6 and 7) from sump (1).



10. Measure **50 grams** of resin (E47) and **6 grams** of hardener (E192).



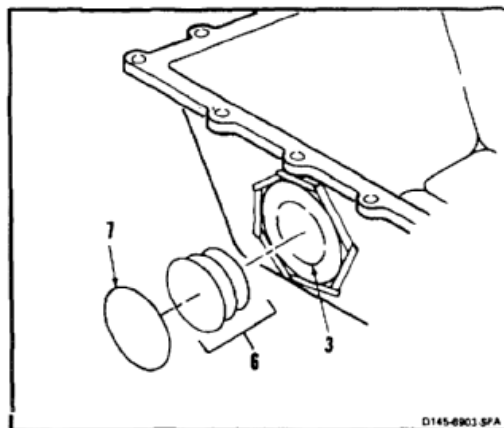
Do not use styrofoam cup. Resin melts styrofoam.

11. Mix resin (E47) with hardener (E192). Use polyethylene cup (E157) and wood spatula (E424). Wear gloves (E184.1).

#### NOTE

Working life of resin mixture is about **1 hour**.

12. Coat damaged area (3) with resin mixture. Use brush (E86).
13. Beginning with smallest patch of fabric (6), coat each patch with resin mixture and set it in damaged area (3). Check that each patch overlaps the patch below. Last patch (7) shall overlap repair area **1 inch** in all directions.



14. Check that repair is slightly higher than surface of sump (1). Add more pieces of fabric under top patch (7), if needed.
15. Cover repair and cleaned area (4) with peel ply (E270) (8). Cover peel ply with Teflon-impregnated fabric (E170) (9).
16. Place weight on repair area to provide **2 to 3 psi** pressure. Use shot bags or equivalent.



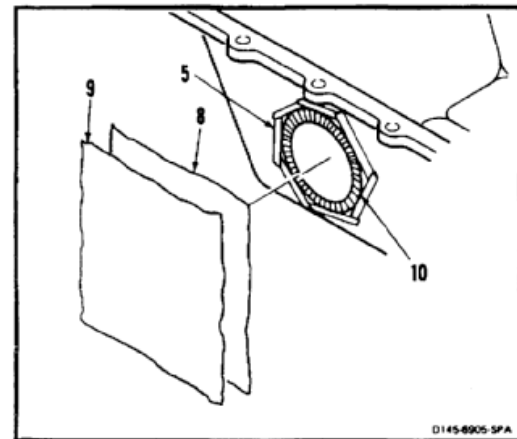
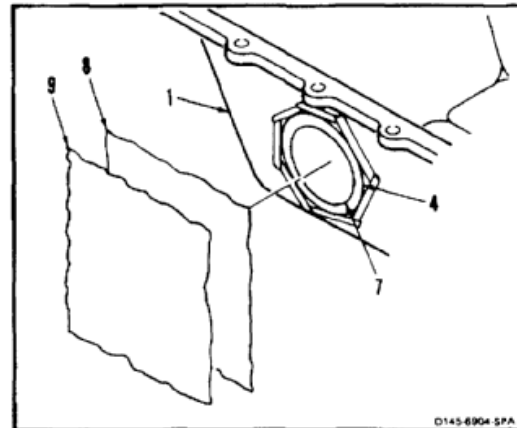
If temperature exceeds **180°F (80°C)**, sump can be damaged.

17. Cure resin at **140° to 160°F (60° to 70°C) for 2 hours**. Use infrared lamp and temperature indicating strips (E413).
18. Remove weight, Teflon-impregnated fabric (9) and peel ply (8). Remove Teflon tape (5).
19. Sand squeezeout (10) until repair area is smooth. Use abrasive paper (E7).



Protective gloves (E184.1) shall be worn during the remainder of this task; otherwise, personal injury could result.

20. Clean the repair area with acetone (E20) and clean cloths (E120). Wear gloves (E184.1).
21. Sand the repair area with abrasive paper (E10). Clean the area with acetone (E20) and clean cloths (E120).
22. Apply one coat of epoxy primer (E292 or E293). Allow the primer to dry.
23. If the sump is from a forward or aft transmission, apply two coats of epoxy coating (E166). Allow the coating to dry.
24. If the sump is from a combining transmission, finish the repair area with two coats of black lacquer (E462) or polyurethane (E285.1), as determined by the following:
  - a. Apply methyl-ethyl-ketone (MEK) (E244) to a small area of the topcoat near the area to be refinished. Use brush (E86).
  - b. Wipe the area. If the topcoat wipes away, use lacquer (E462). If the topcoat is unaffected, use polyurethane (E285.1).



#### FOLLOW-ON MAINTENANCE:

None

#### INSPECT

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Airframe Repairer's Tool Kit, NSN 5180-00-323-4876  
 Torque Wrench, 5 to 50 Inch-Pounds  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Deep Socket, 1-3/8 Inch  
 Source of Low-Pressure Compressed Air

**Materials:**

Lockwire (E231)  
 Dry Cleaning Solvent (E162)  
 Gloves (E186)  
 Cloths (E120)  
 Oil (E254)

**Parts:**

Packings

**Personnel Required:**

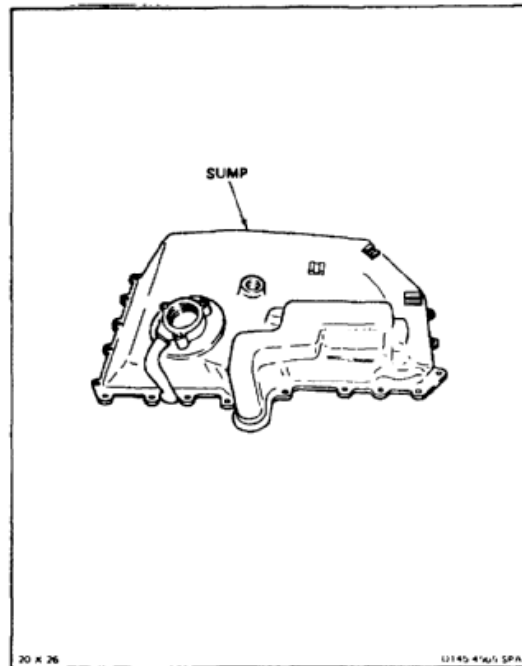
Aircraft Structure Repairer  
 Inspector

**References:**

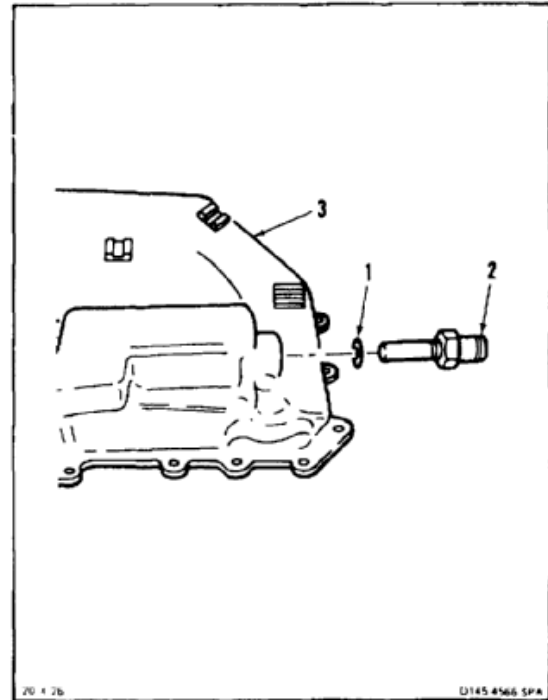
TM 55-1520-240-23P

**General Safety Instructions:****WARNING**

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



1. Install packing (1) on temperature probe (2). Install probe in sump (3). Torque probe to **75 inch-pounds**.
2. Lockwire probe (2) to sump (3). Use lockwire (E231).



3. If cap (4) and housing (5) are joined, push cap into housing, twist, and pull to remove cap from housing. Remove packing (6) from cap.

**NOTE**

If cap and housing are new, cleaning is not needed.

4. Clean cap (4) and housing (5) with solvent (E162) and clean cloths (E120). Wear gloves (E186).
5. Install packing (7) on housing (5). Install housing (5) in sump (3). Install three bolts (8) and washers (9). Torque bolts to **60 inch-pounds**.
6. Lockwire three bolts (8) together. Use lockwire (E231).
7. Install packing (6) on cap (4).
8. Press center of cap (4) in and install cap and packing (6) in housing (5). Push in cap until center snaps out flush with outside of housing.

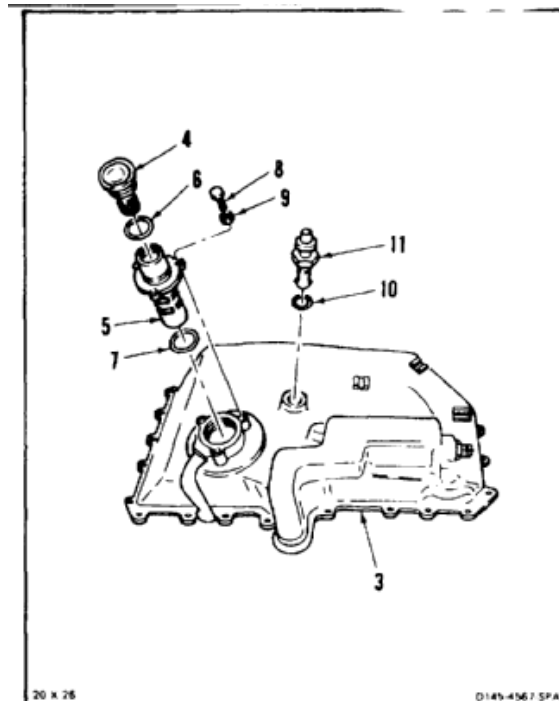
**WARNING**

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

**WARNING**

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

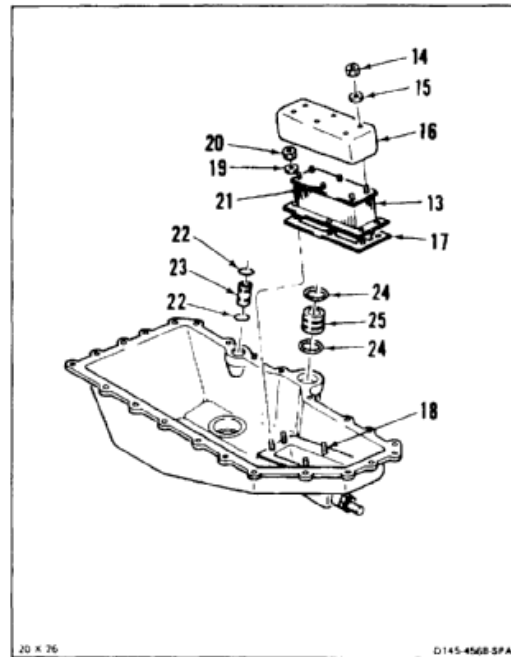
9. Coat packing (10) and thread of drain valve (11) with oil (E254). Install packing on valve. Install valve sump (3). Torque valve to **75 inch-pounds**.
10. Lockwire drain valve (11) to sump (3) with lockwire (E231).
11. Turn sump (3) over **180°**.



**NOTE**

If screen is new, cleaning is not needed.

12. Clean inlet screen (13) as follows:
  - a. Remove six nuts (14) and washers (15). Remove cap (16).
  - b. Clean inlet screen (13) with solvent (E162) and clean cloths (E120). Dry screen with compressed air. Wear goggles.
13. Install gasket seal (17) and inlet screen (13) on six studs (18). Install six washers (19) and nuts (20). Torque nuts to **20 inch-pounds**.
14. If cap (16) was removed, install cap on six studs (21). Install six washers (15) and nuts (14). Torque nuts to **20 inch-pounds**.
15. Install two packings (22) on transfer tube (23). Install transfer tube.
16. Install two packings (24) on transfer tube (25). Install transfer tube.

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

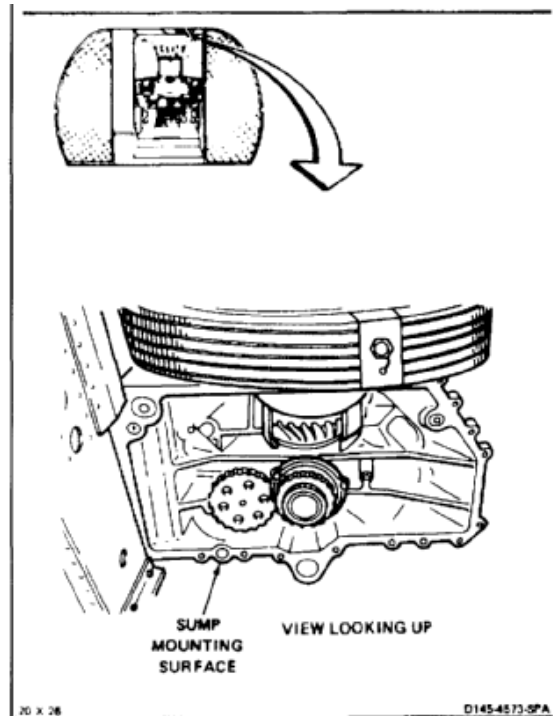
None

**Personnel Required:**

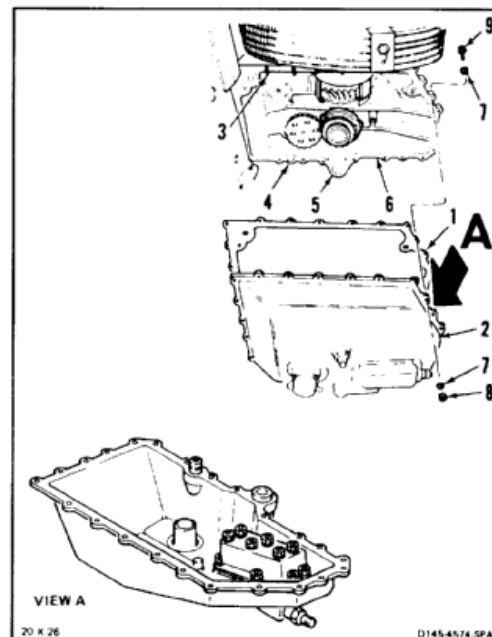
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P



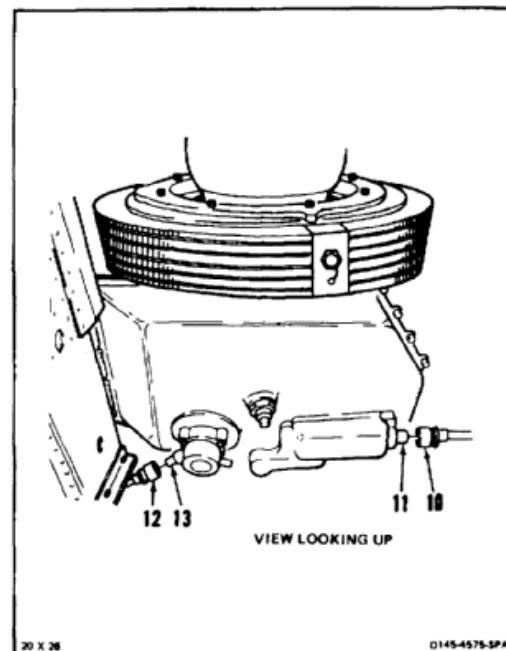
1. Position gasket seal (1) on sump (2).
2. Align sump (2) and gasket seal (1) with 16 studs (3) and two transfer tube ports (4 and 5).
3. Position sump and seal against transmission (6). Install 16 washers (7) and nuts (8), finger tight, on studs (3).
4. Install seven bolts (9) and washers (7) through transmission (1) and sump (2). Install seven washers (7) and nuts (8) on bolts.
5. Torque 23 nuts (8) to **60 inch-pounds**.





6. Connect connector (10) to temperature bulb receptacle (11). Connect connector (12) to chip detector receptacle (13).

**INSPECT**



**FOLLOW-ON MAINTENANCE:**

- Service forward transmission (Task 1-54).
- Perform ground run (TM 55-1520-240-10).
- Install forward transmission drip pan (Task 2-3).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Dry Cleaning Solvent (E162)

Cloth (E120)

Brush (E86)

Gloves (E186)

**Personnel Required:**Medium Helicopter Repairer  
Inspector**References:**

Task 6-108

TM 55-1520-240-23P

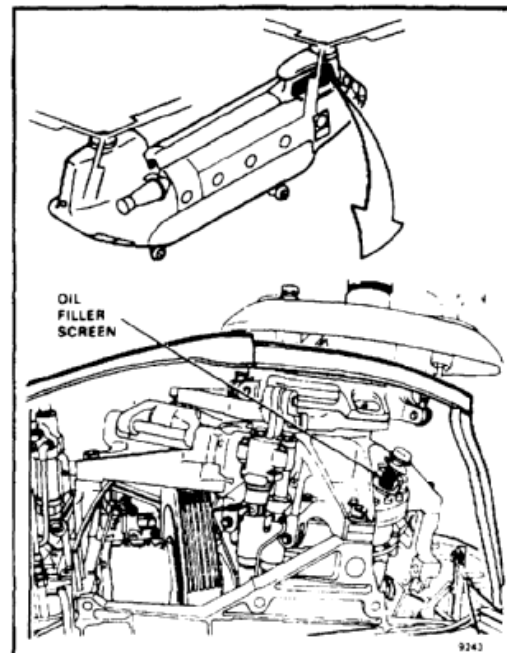
**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

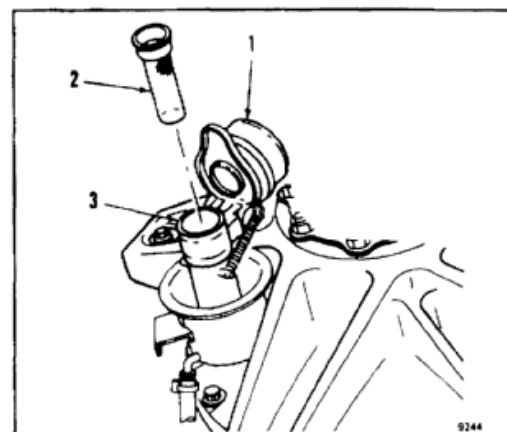
Forward Transmission Fairing Right Work Platform

Open (Task 2-2)

**WARNING**

Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.

1. Open cap assembly (1). Remove screen (2) from neck of filler.
2. Close cap assembly (1).



**6-37.1 CLEAN AND INSPECT FORWARD TRANSMISSION OIL FILLER SCREEN (Continued)**

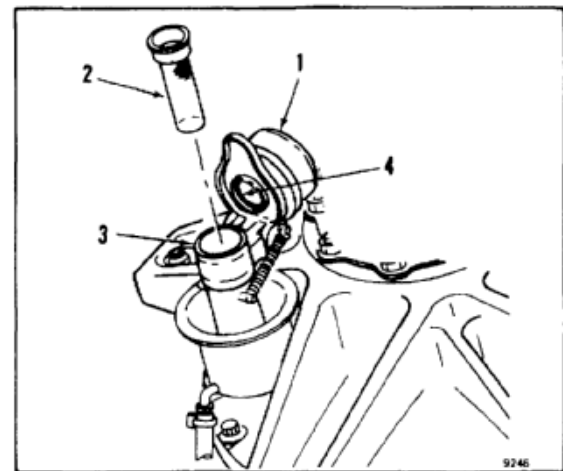
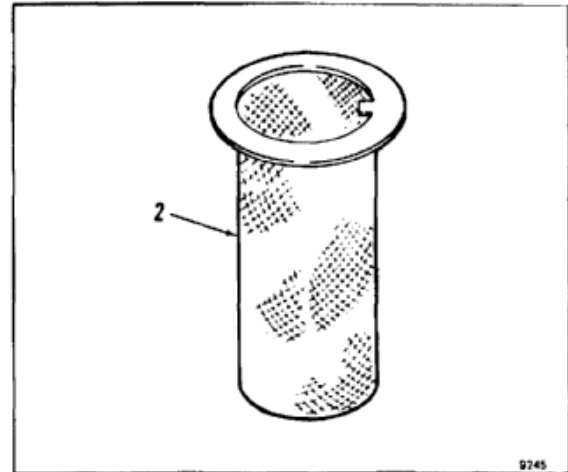
6-37.1

3. Check screen (2) for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

**WARNING**

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

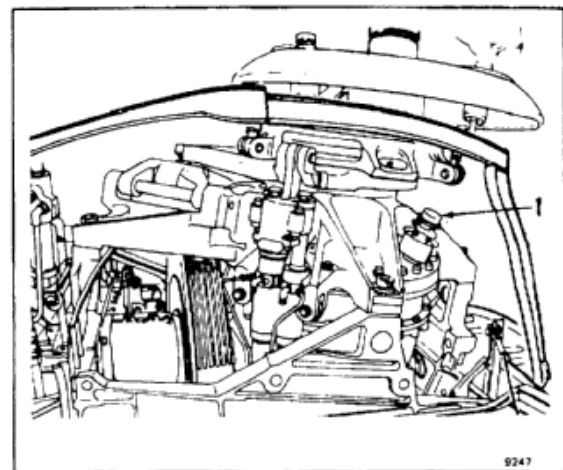
4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. Inspect screen (2) for tears. There shall be no tears.
6. Open cap assembly (1). Install screen (2) in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.



8. Close cap assembly (1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close aft pylon doors (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Barrier Material (E80)

Masking Tape (E380)

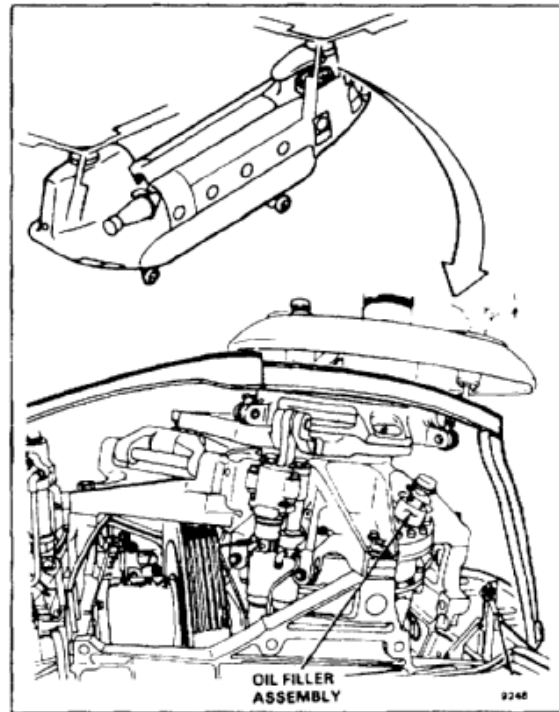
**Personnel Required:**

Medium Helicopter Repairer

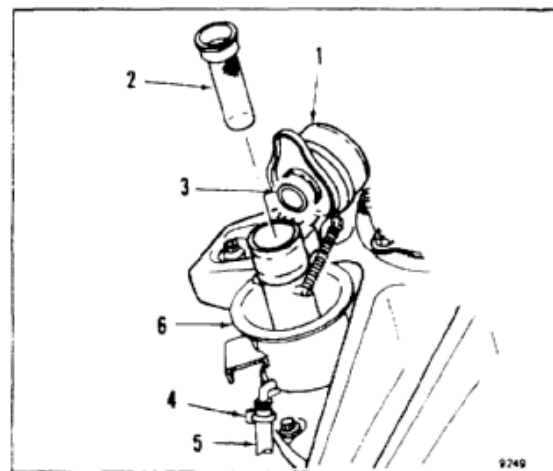
**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

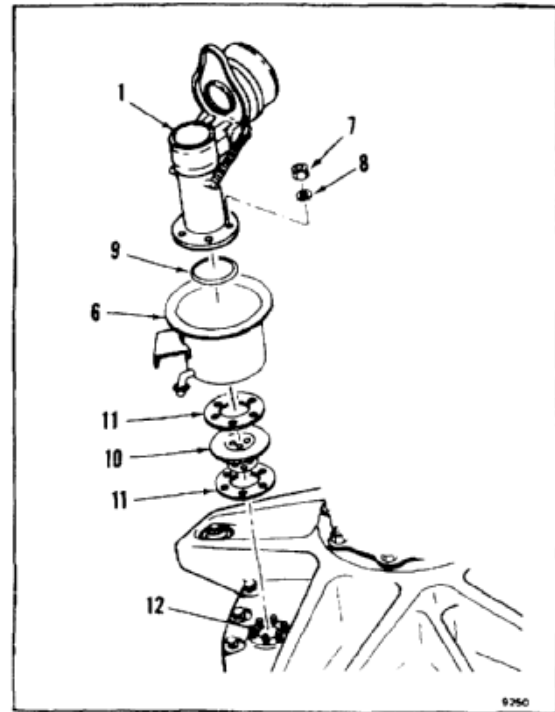
Forward Transmission Fairing Right Work Platform  
Open (Task 2-2)

1. Open cap assembly (1). Remove screen (2). Remove packing (3) from underside of cap.
2. Loosen clamp (4). Remove hose (5) and clamp from cup (6).



**6-37.2 REMOVE FORWARD TRANSMISSION OIL FILLER ASSEMBLY (Continued)****6-37.2**

3. Remove six nuts (7) and washers (8) from inside cup (6). Remove cap assembly (1) and packing (9).
4. Remove cup (6), baffle (10), and two gaskets (11).
5. Cover cavity (12) with barrier material (E80) and masking tape (E380).

***FOLLOW-ON MAINTENANCE:***

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Torque Wrench, 5 to 50 Inch-Pounds

**Materials:**

None

**Parts:**

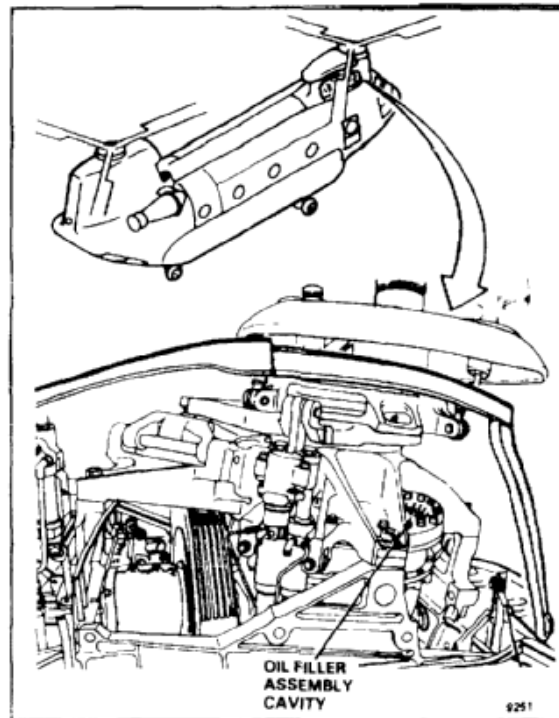
Packing

**Personnel Required:**

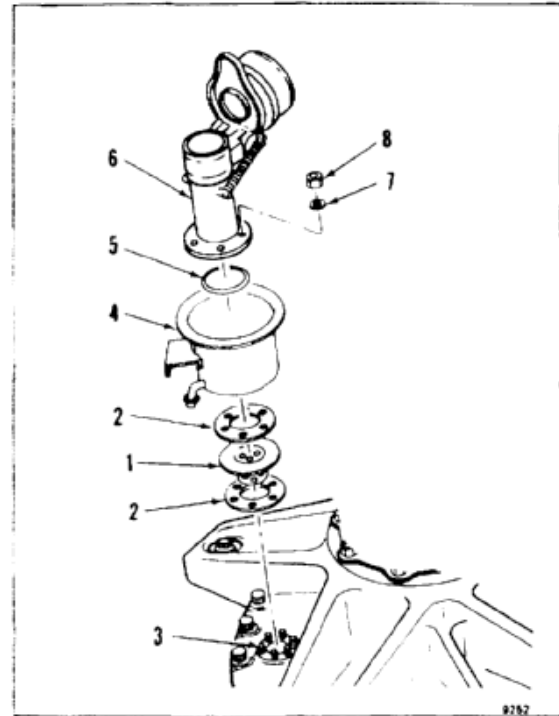
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

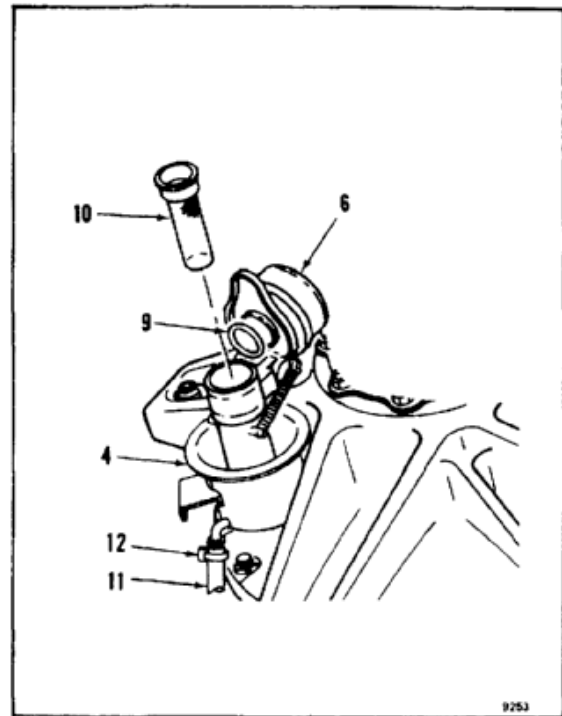


1. Place baffle (1), with flange up, between two gaskets (2). Install baffle and gaskets on studs (3).
2. Install cup (4) on studs (3).
3. Install packing (5) on bottom of cap assembly (6). Install cap assembly, with packing, on studs (3).
4. Install six washers (7) and nuts (8) on studs (3). Torque nuts to **20 inch-pounds**.



**6-37.3 INSTALL FORWARD TRANSMISSION OIL FILLER ASSEMBLY (Continued)****6-37.3**

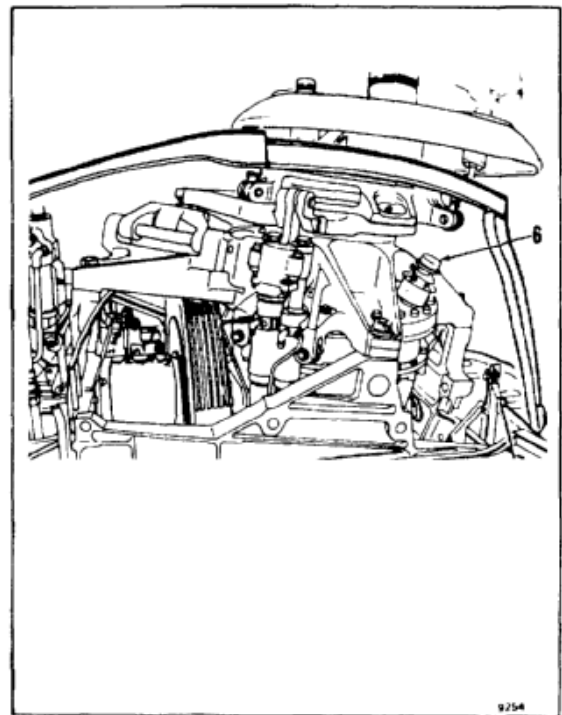
5. Open cap assembly (6). Install packing (9) on bottom of cap.
6. Install screen (10) in neck of cap assembly (6).
7. Install hose (11) on cup (4). Tighten clamp (12).



8. Close cap assembly (6).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close forward transmission right fairing (Task 2-2).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

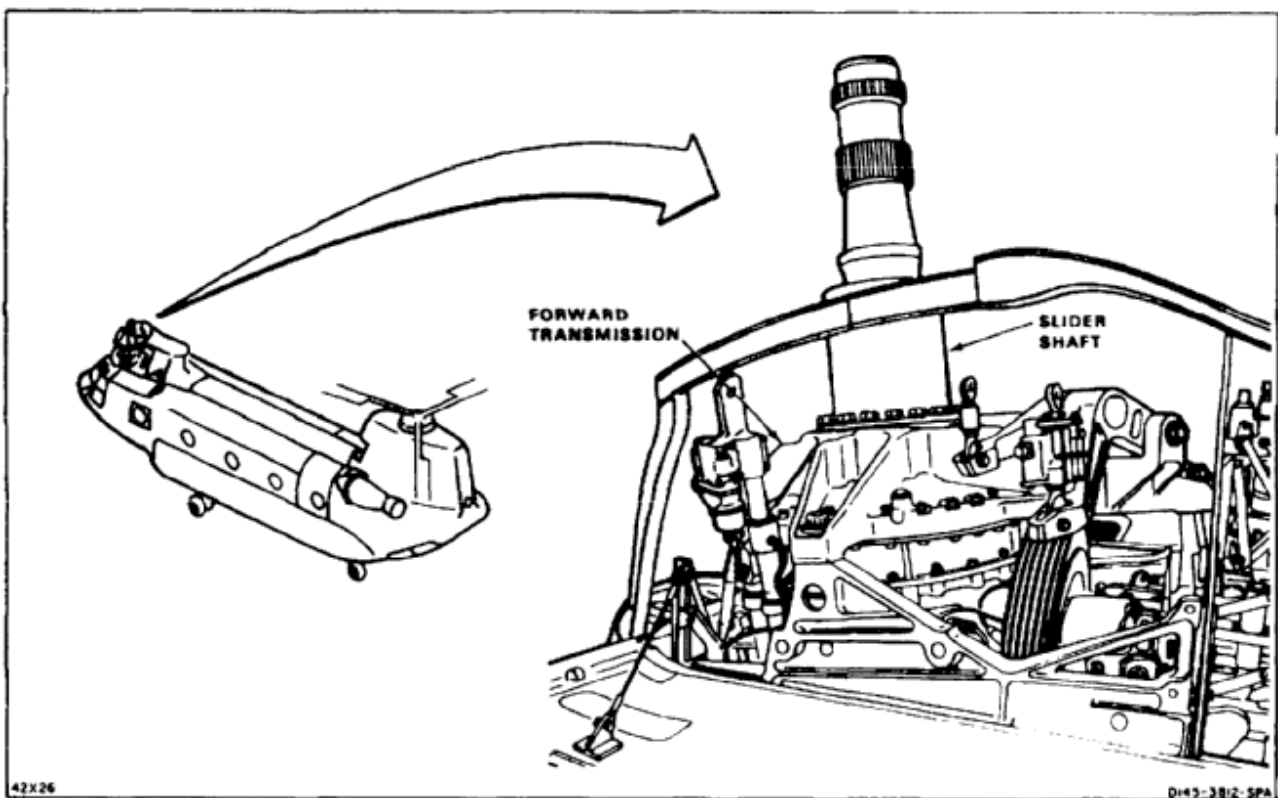
Barrier Material (E81)  
Tape (E388)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Rotary-Wing Blades Removed (Task 5-64)  
Forward Rotary-Wing Head Removed (Task 5-8)  
Forward Cover, Links, and Drive Arms Removed (Task 6-47)  
Forward Swashplate Removed (Task 6-47)  
Helicopter in Clean and Sheltered Area





**CAUTION**

Removing slider shaft exposes transmission parts to contamination. Do this task only in a clean, sheltered area; otherwise, transmission can be damaged.

1. Remove 8 nuts (1) and washers (2) from base of slider shaft (3).

**CAUTION**

Do not scratch polished surface. Handle slider shaft carefully.

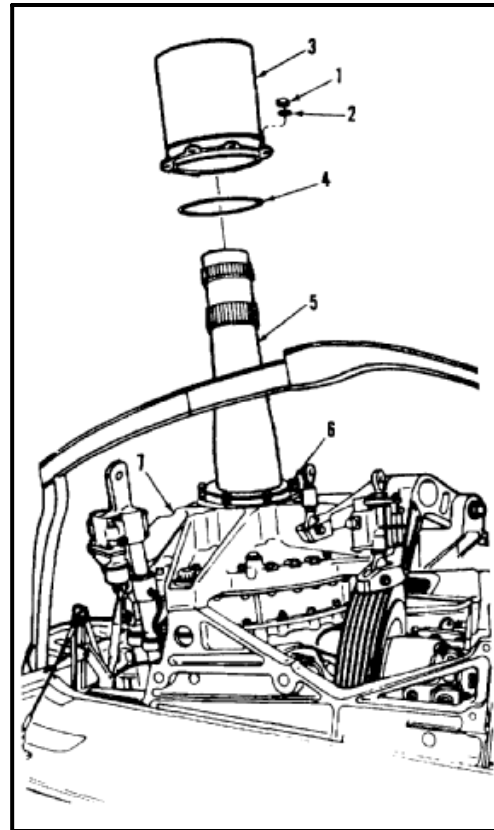
**NOTE**

Packing may come off with shaft or stay with transmission.

2. Lift slider shaft (3), with packing (4), from shaft (5).
3. Cover opening (6) into transmission (7). Use barrier material (E81) and tape (E388).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Dial Indicating Gage 643J  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123)  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Gloves (E184.1)  
Acetic Acid (E21)  
Alodine Powder (E65)  
Epoxy Primer (E292 or E293)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

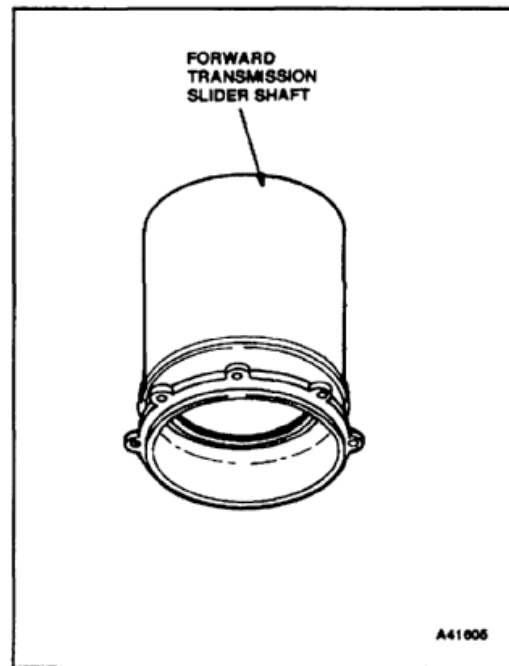
Off Helicopter Task

**General Safety Instructions:****WARNING**

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

**CAUTION**

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

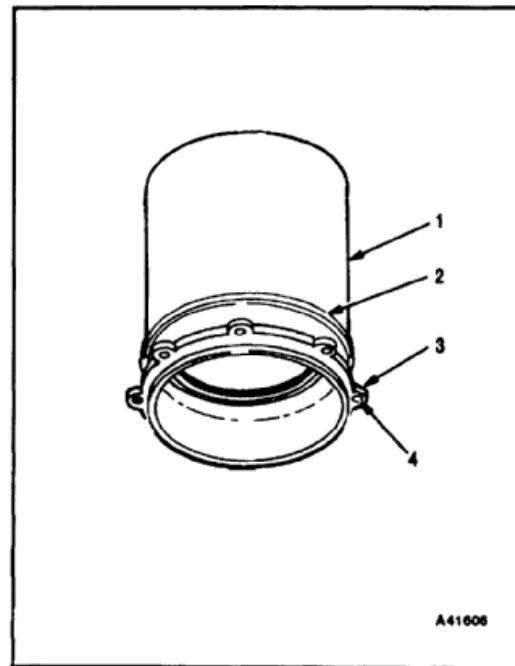


1. Clean oil and grease from slider shaft (1). Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. Inspect surface of slider shaft (1) for nicks, scratches, and minor pitting or corrosion of coating. Observe the following definitions:
  - a. Nick — A surface indentation with a sharp crease at the bottom. Surface finish is not broken. Caused by pressure or impact from a hard object with a sharp edge.
  - b. Scratch — A light, narrow mark on the surface. Surface finish is broken, but not removed. Caused by a hard, sharp particle moving across the surface.
  - c. Pit — A small irregular cavity where material is removed from the surface. Usually caused by corrosion. Pits are usually dark in appearance.
  - d. Corrosion — A broken or pitted surface, discolored around the edge. Corrosion is caused by chemical action.
3. Note extent and location of damage:

**NOTE**

Limits in this step refer to depth of damage after rework.

- a. Depth of damage above flange (2) (bearing surface) shall not be more than **0.020 inch**. Depth of damage below flange shall not be more than **0.025 inch**.
- b. Damage shall not extend from shaft surface to mounting flange (3).
- c. Damage on mounting flange (3) shall not be closer than **1.00 inch** to any mounting hole (4).

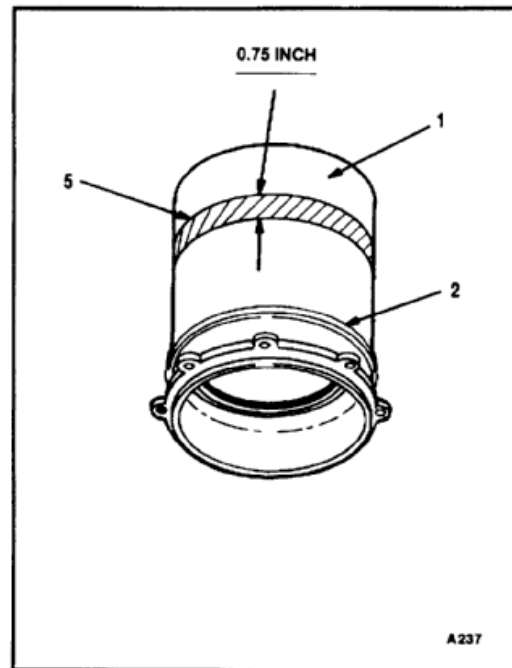


- d. The sum of length plus width of any one damaged area shall not be more than **1.25 inches**.
- e. Distance between two damaged areas shall not be less than half the length of the larger area.
- f. In that part of shaft (1) above flange (2), there shall be no more than 20 damaged areas in any **0.75 inch** wide band (5) around shaft (1). There shall be no more than five damaged areas in any quarter-section of the band. The total of length plus width of all five areas shall not be more than **5.5 inches**.
- g. There shall be no more than 75 damaged areas over entire shaft (1).
- h. Damaged areas may exceed the above limits to include wear over the total surface of the slider above the flange provided maximum depth of damage does not exceed **0.008 inch**.
4. Fluorescent inspect damaged area to check for cracks. (Refer to TM 1-1500-335-23.) There shall be no cracks. If a crack is suspected in forward transmission slider shaft, refer to TM 1-1520-253-23.
5. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 3.
6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. Acid etch the reworked area as follows:

**WARNING**

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

- a. Prepare a solution of **3 parts** acetic acid (E21) to **7 parts** water. Wear gloves (E184.1) and goggles.
- b. Swab the area with solution for **2 minutes**. Use gauze sponges (E184).
- c. Rinse the area with cold water.



**6-38.1 REPAIR FORWARD TRANSMISSION SLIDER SHAFT (Continued)**

6-38.1

8. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If a crack is suspected in forward transmission slider shaft, refer to TM 1-1520-253-23.

9. Apply surface treatment to reworked area as follows:

- a. Clean area with naphtha (E245) and clean cloths (E120). Let the area air dry.

**WARNING**

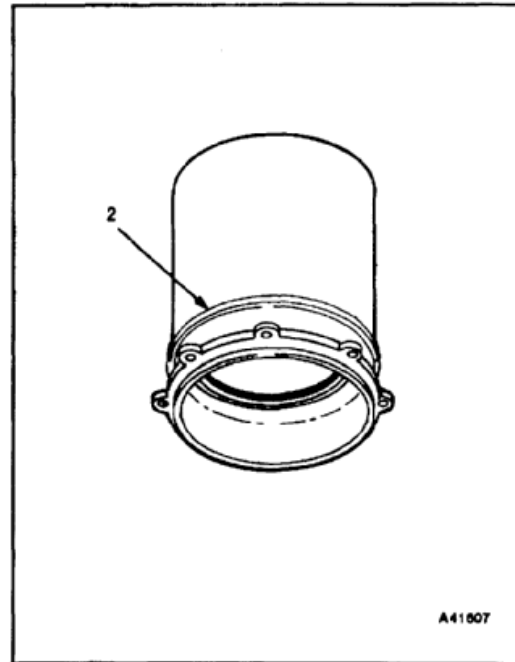
Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**.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

- b. Swab solution of alodine powder (E65) in water on area. Swab for **2 to 5 minutes**. Use gauze sponges (E184).
- c. Rinse the area with cold water. Let air dry.

**WARNING**

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

- d. If reworked area is below flange (2), apply epoxy primer (E292 or E293). Wear gloves (E184.1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

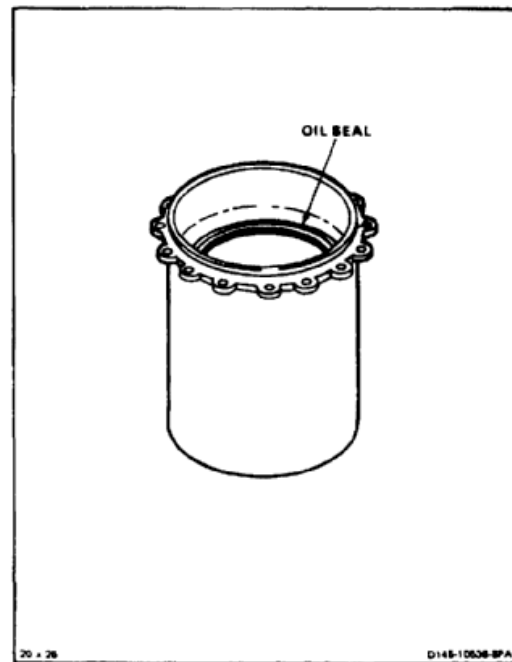
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

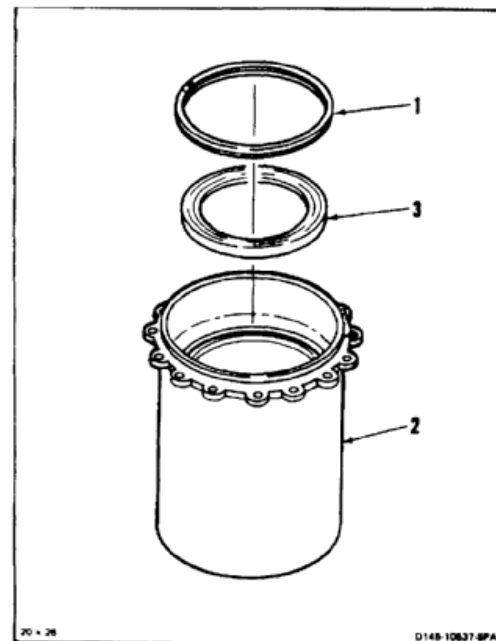
Off Helicopter Task



1. Remove retaining ring (1) from inside slider shaft (2).
2. Remove seal (3).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-134

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Aluminum Drift, 8-1/2 Inches OD, 1/4 Inch Thick Wall
- Gun Heater
- Pyrometer

**Materials:**

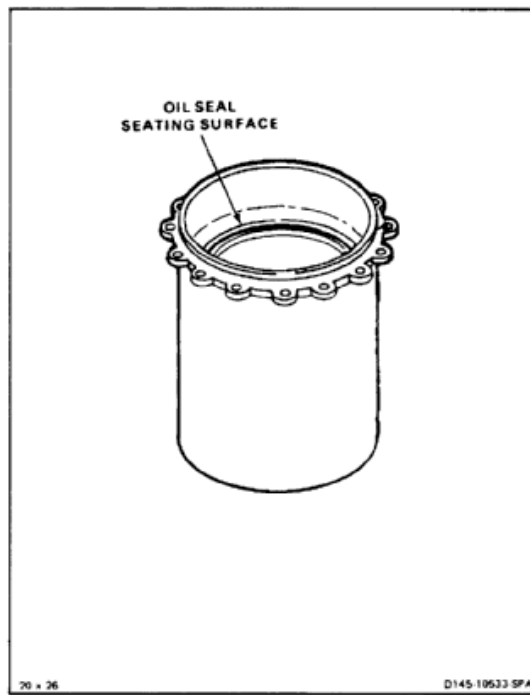
- Acetone (E20)
- Cloths (E120)
- Gloves (E186)
- Grease (E190)
- Kevlar Gloves (E187)

**Personnel Required:**

- Medium Helicopter Repairer
- Inspector

**References:**

TM 55-1520-240-23P



**WARNING**

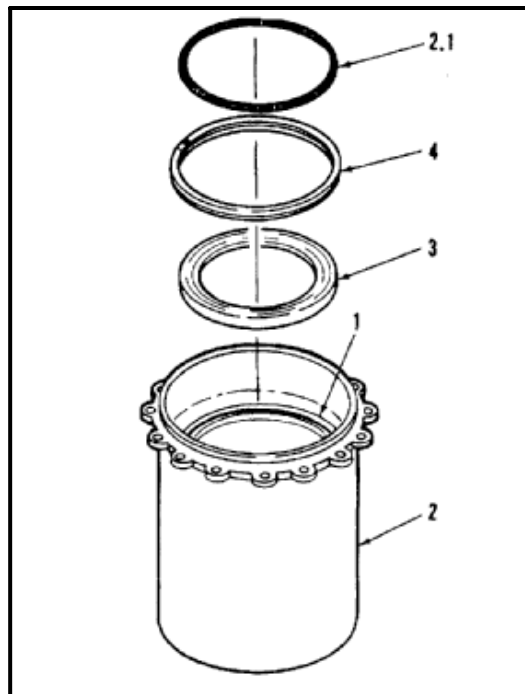
Acetone (E20) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

1. Clean seal seating surface (1) inside slider shaft (2). Use acetone (E20) and cloths (E120). Wear gloves (E186).
  - 1.1. Remove and discard spring (2.1) from within seal (3).

**WARNING**

Wear Kevlar gloves when handling heated parts.

2. Heat seal seating surface (1) to **230° to 250°F (110° to 120°C)**. Use a gun-type heater and a pyrometer. Wear Kevlar gloves (E187).
3. Install seal (3) in slider shaft (2), flat side down. Use drift.
4. Install retaining ring (4).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Grease (E190)

**Parts:**

Packing

**Personnel Required:**

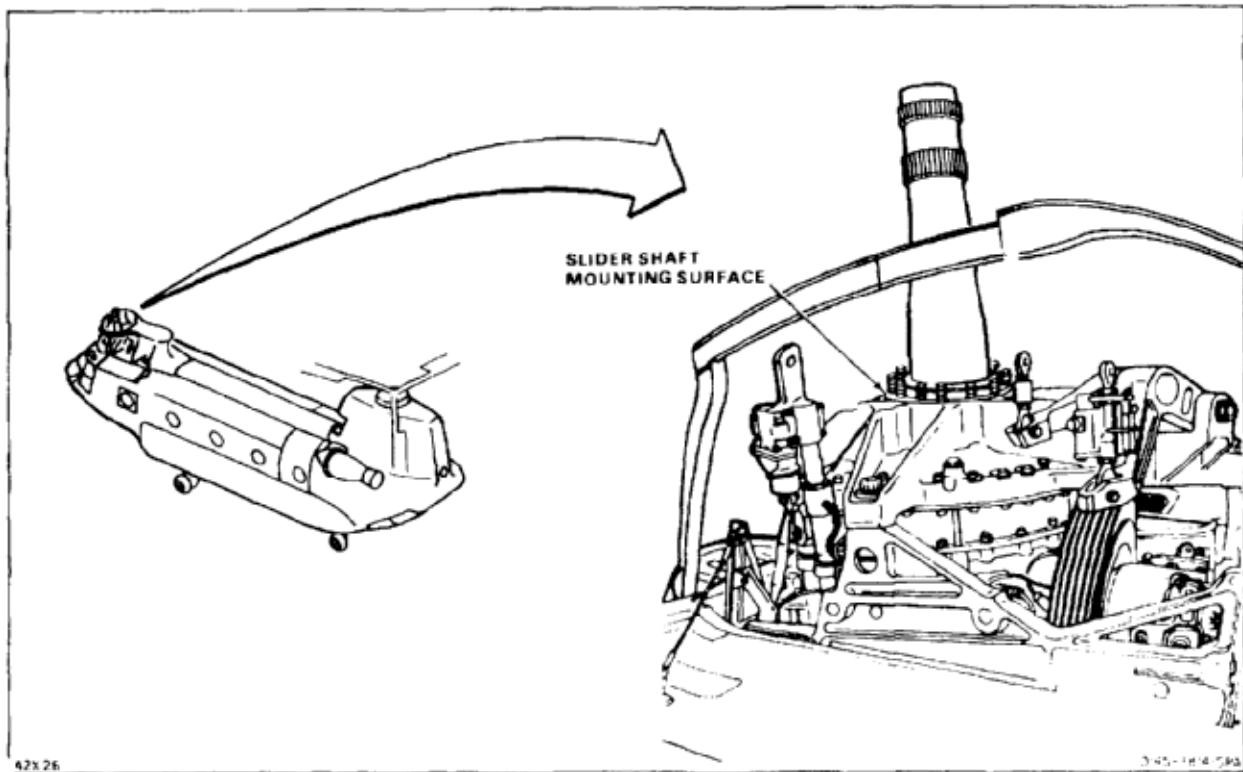
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Helicopter in Clean and Sheltered Work Area



42X 26

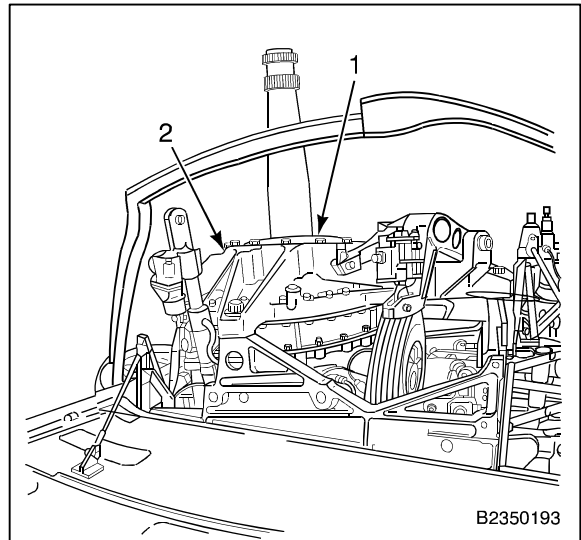
3-45-184 583





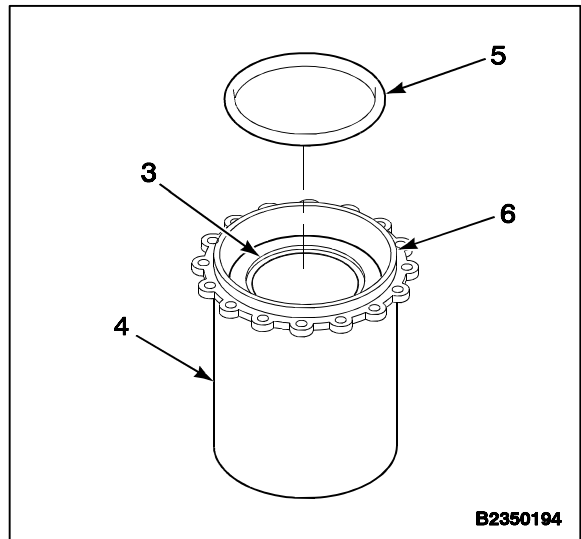
Installing a slider shaft exposes transmission parts to contamination. Do this task only in a clean, sheltered area; otherwise, transmission can be damaged.

1. Remove barrier material from opening (1) in transmission (2).

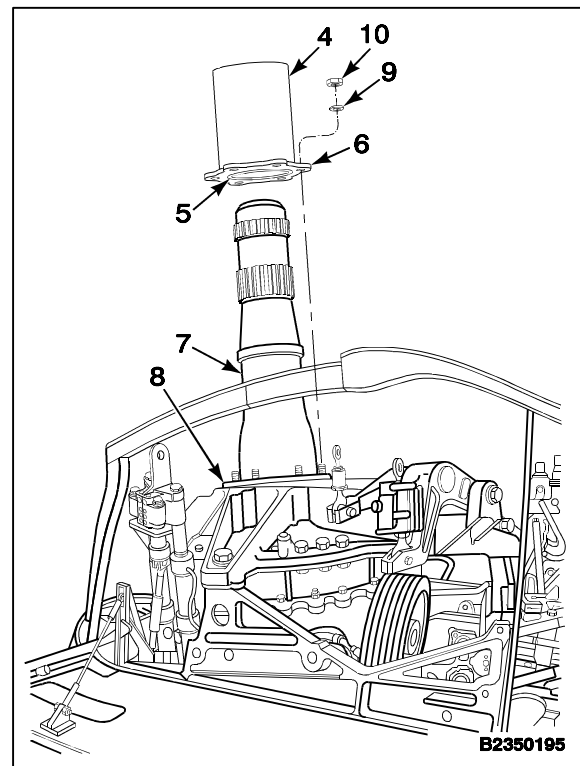


Do not scratch polished surface. Handle slider shaft carefully.

2. Pack grease (E190) between lips of seal (3) on inside of slider shaft (4).
3. Install packing (5) around flange (6).



4. Apply a light coat of grease (E190) to the thread of 8 studs (8).
5. Lower slider shaft (4), with flange (6) down, over rotor shaft (7). Position slider shaft on 8 studs (8). Make sure packing (5) stays on flange.
6. Install 8 washers (9) and nuts (10). Torque the nuts to **60 inch-pounds**.



### **INSPECT**

### **FOLLOW-ON MAINTENANCE:**

- Install forward washplate (Task 5-132).
- Install forward cover, links, and drive arms (Task 6-50).
- Install forward rotor head (Task 5-9).
- Install forward rotor blades (Task 5-84).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
1/4-28 Bolt, At Least One Inch Long (3)

**Materials:**

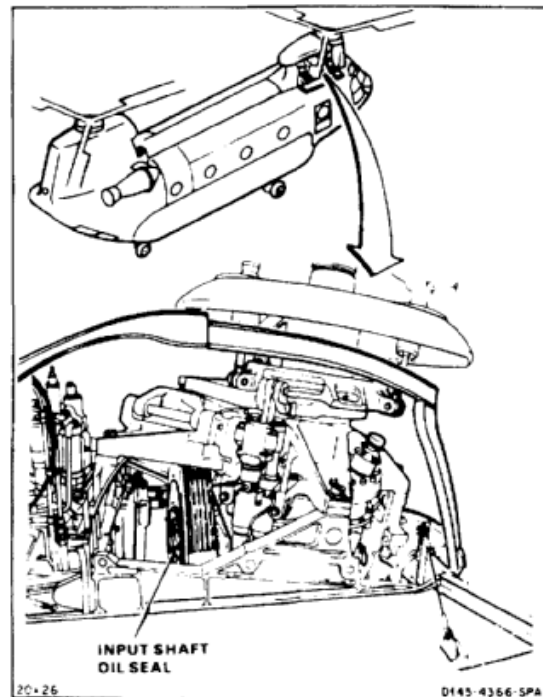
None

**Personnel Required:**

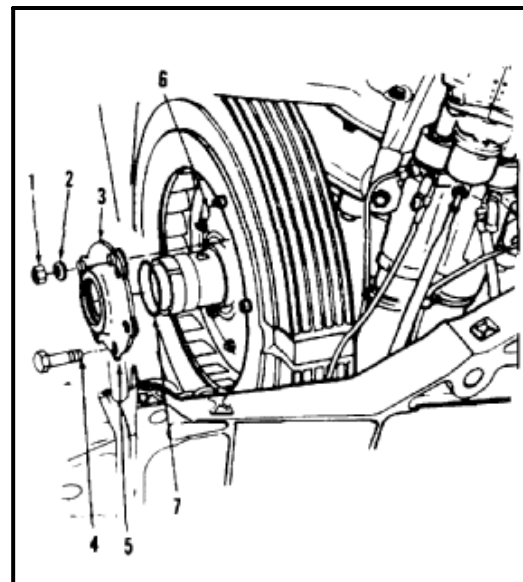
Medium Helicopter Repairer

**Equipment Condition:**

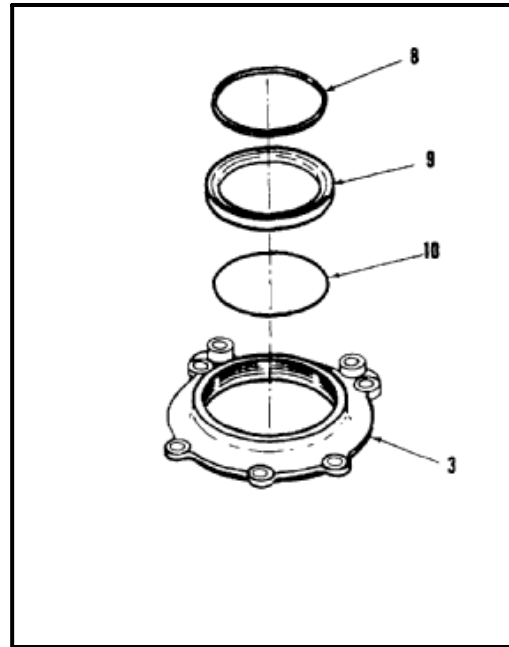
Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Transmission Fairing Opened (Task 2-2)  
Oil Cooler Air Inlet Duct Removed (Task 6-121)  
No. 1 and No. 2 Drive Shafts Removed (Tasks 6-2  
and 6-3)  
Oil Cooler Shroud Removed (Task 6-115)  
Oil Cooler Impeller Removed (Task 6-117)



1. Remove four nuts (1) and washers (2) from retainer (3).
2. Install three 1/4-28 bolts (4) in threaded holes (5). Turn bolts to back retainer (3) away from transmission (6).
3. Remove packing (7) from retainer (3).



4. Remove retaining ring (8) from retainer (3).  
Remove seal (9) and packing (10).



***FOLLOW-ON MAINTENANCE:***

None

END OF TASK

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Aluminum Tube, 4-1/4 Inch OD, 1/8 Inch Wall  
 Thickness, 1 to 6 Inches Long  
 Gun Heater  
 Pyrometer  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Gloves (E186)  
 Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Kevlar Gloves (E187)

**Parts:**

Packings

**Personnel Required:**

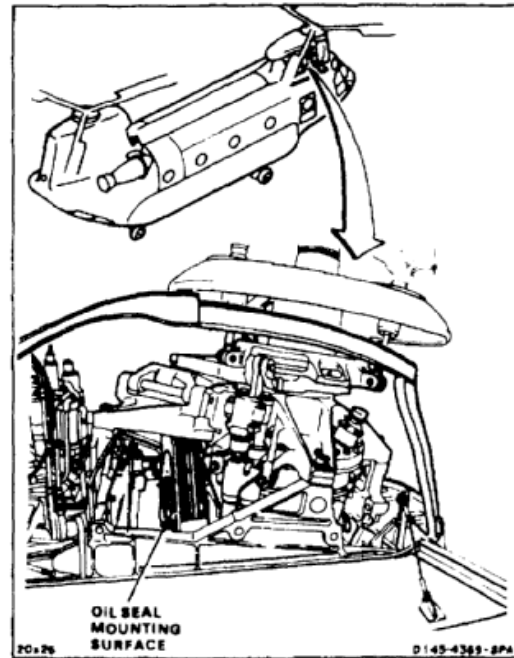
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**General Safety Instructions:****WARNING**

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



1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

**WARNING**

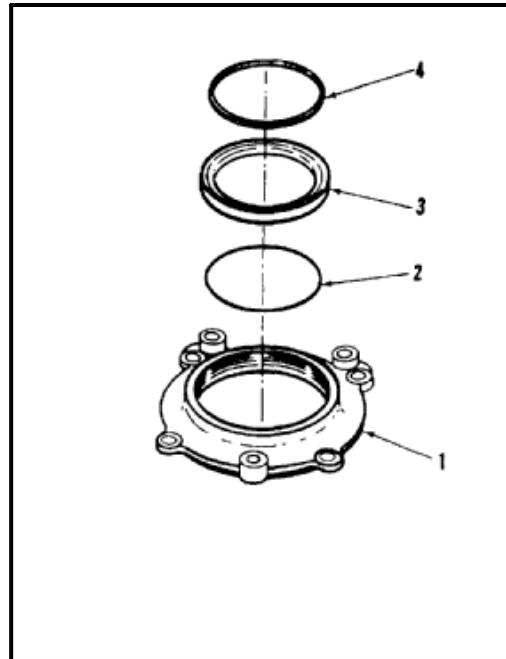
Wear Kevlar gloves when handling hot retainer. Hot retainer can burn hands.

**CAUTION**

Do not heat retainer over **250°F (120°C)**. Damage can occur.

2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Use gun heater. Wear Kevlar gloves (E187). Measure temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. Install seal (3) in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4) in retainer (1).

**INSPECT**



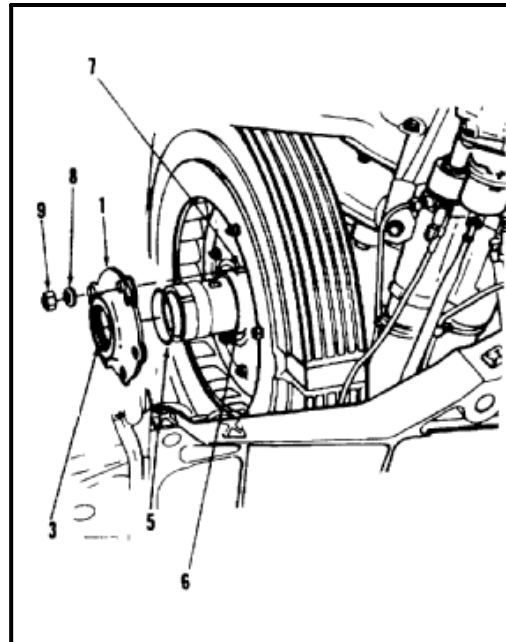
6. Install packing (5) in retainer (1).



If seal and shaft are not clean and dry, leakage can occur.

7. Clean mating surface of shaft (6) with dry cleaning solvent (E137). Wipe seal (3) with clean cloth (E120).
8. Install retainer (1) on four studs (7).
9. Install four washers (8) and nuts (9). Torque nuts to **60 inch-pounds**.

**INSPECT**



**FOLLOW-ON MAINTENANCE:**

- Install oil cooler impeller (Task 6-118).  
 Install oil cooler shroud (Task 6-116).  
 Install No. 1 and No. 2 drive shafts (Tasks 6-17 and 6-18).  
 Install oil cooler air inlet duct (Task 6-122).  
 Close forward transmission fairing (Task 2-2).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267

**Materials:**

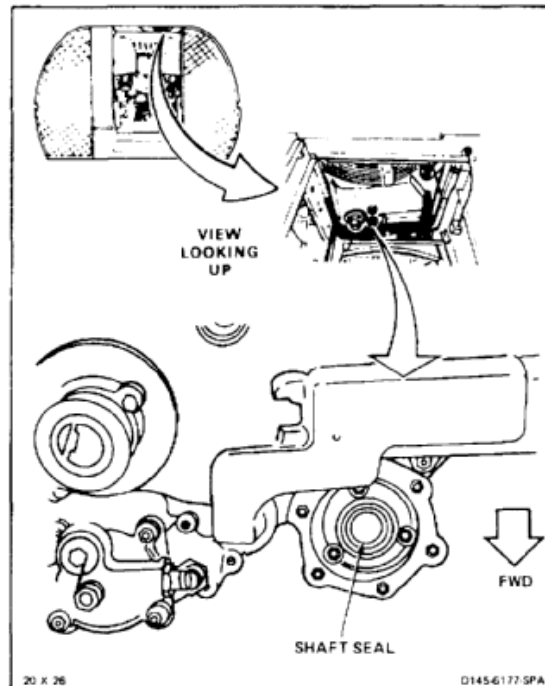
None

**Personnel Required:**

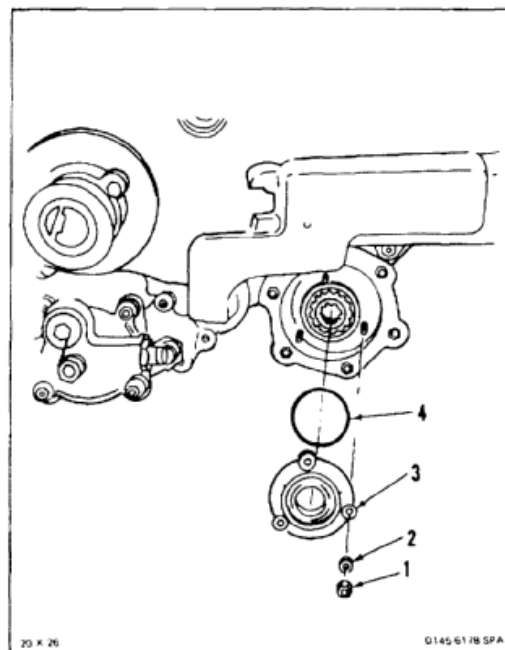
Aircraft Powertrain Repairer

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Forward Transmission Drip Pan Removed (Task 2-3)
- No. 1 Flight Control Hydraulic Pump Removed (Task 7-22)



1. Remove three nuts (1) and washers (2) from retainer (3). Remove retainer and packing (4).

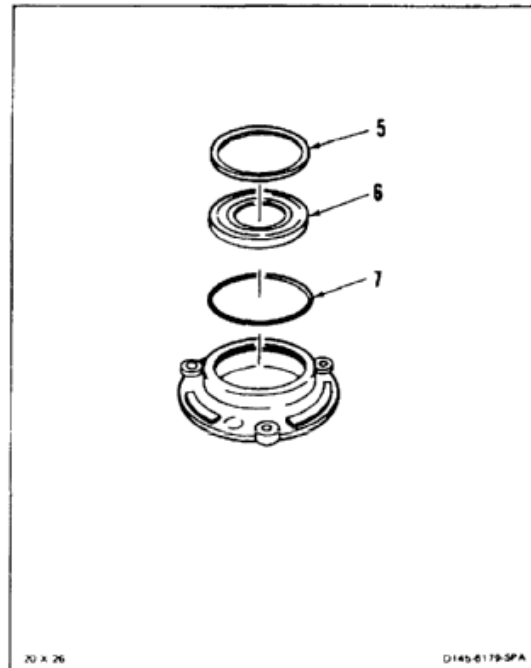




**6-44 REMOVE NO. 1 FLIGHT CONTROL HYDRAULIC PUMP DRIVE SHAFT SEAL (Continued)**

6-44

2. Remove retaining ring (5). Remove seal (6).
3. Remove packing (7).

***FOLLOW-ON MAINTENANCE:***

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Aluminum Tube, 2 Inch OD, 1/8 Inch Wall Thickness,  
1 to 6 Inches Long  
Gun Heater  
Pyrometer  
Torque Wrench, 5 to 50 Inch-Pounds

**Materials:**

Dry Cleaning Solvent (E162)  
Cloths (E120)  
Oil (E254)  
Grease (E190)  
Gloves (E186)  
Kevlar Gloves (E187)

**Parts:**

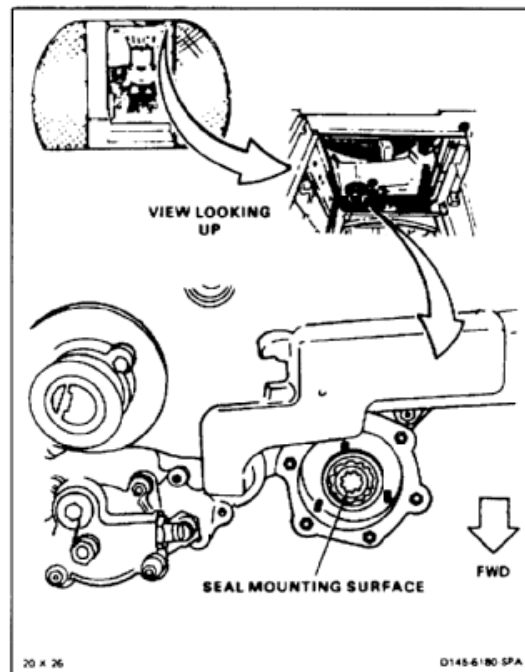
Packings

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 55-1520-240-23P



**WARNING**

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

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

**WARNING**

Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.

**CAUTION**

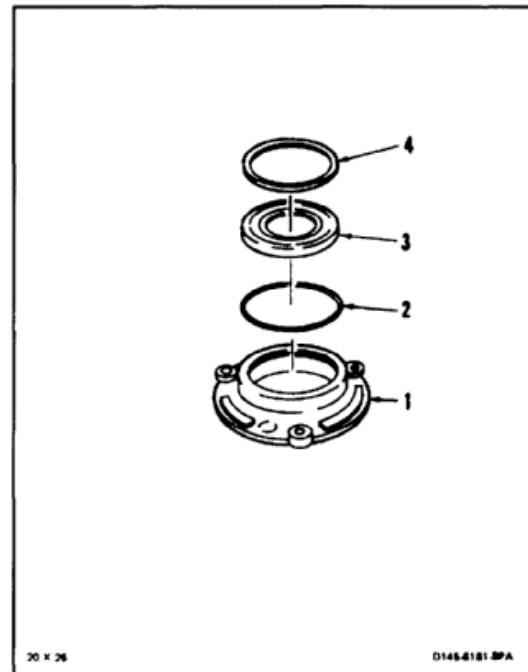
Do not heat retainer over **250°F (120°C)**. Heat can damage metal.

2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater and pyrometer. Wear Kevlar gloves (E187).

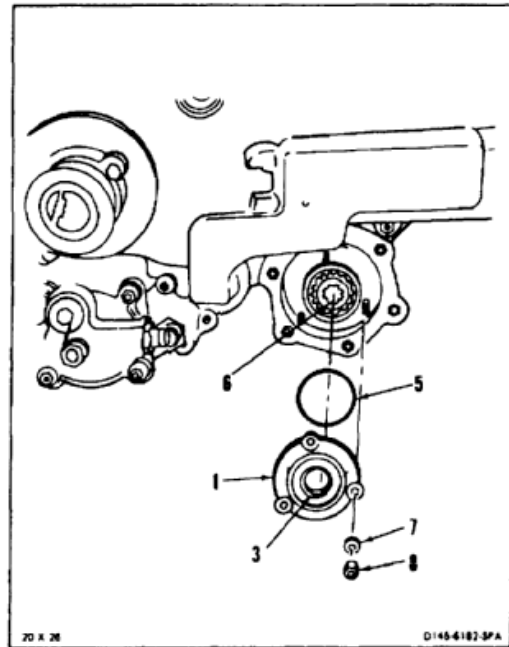
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

3. Coat packing (2) with oil (E254). Install packing in retainer (1).
4. Install seal (3) in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). Install retainer (1) on shaft.
8. Install three washers (7) and nuts (8). Torque nuts to **20 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install No. 1 flight control hydraulic pump (Task 7-27).
- Install forward transmission drip pan (Task 2-3).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Open End Wrench, 1 Inch  
 Container, 2 Quart  
 Work Hoist  
 Hoisting Eye (T32)  
 Torque Pack (T23) or Torque Applicator Pack (T2)  
 Torque Reactor Assembly (T159)  
 Tee Handle (T161)  
 Socket Adapter (T93) (Used With T2)  
 Transportation Trailer 2000  
 Roller Adapter 2550 (4)  
 Forward Transmission Adapter (T15)  
 Rope Guide Lines

**Materials:**

Dry Cleaning Solvent (E162)  
 Cloths (E120)

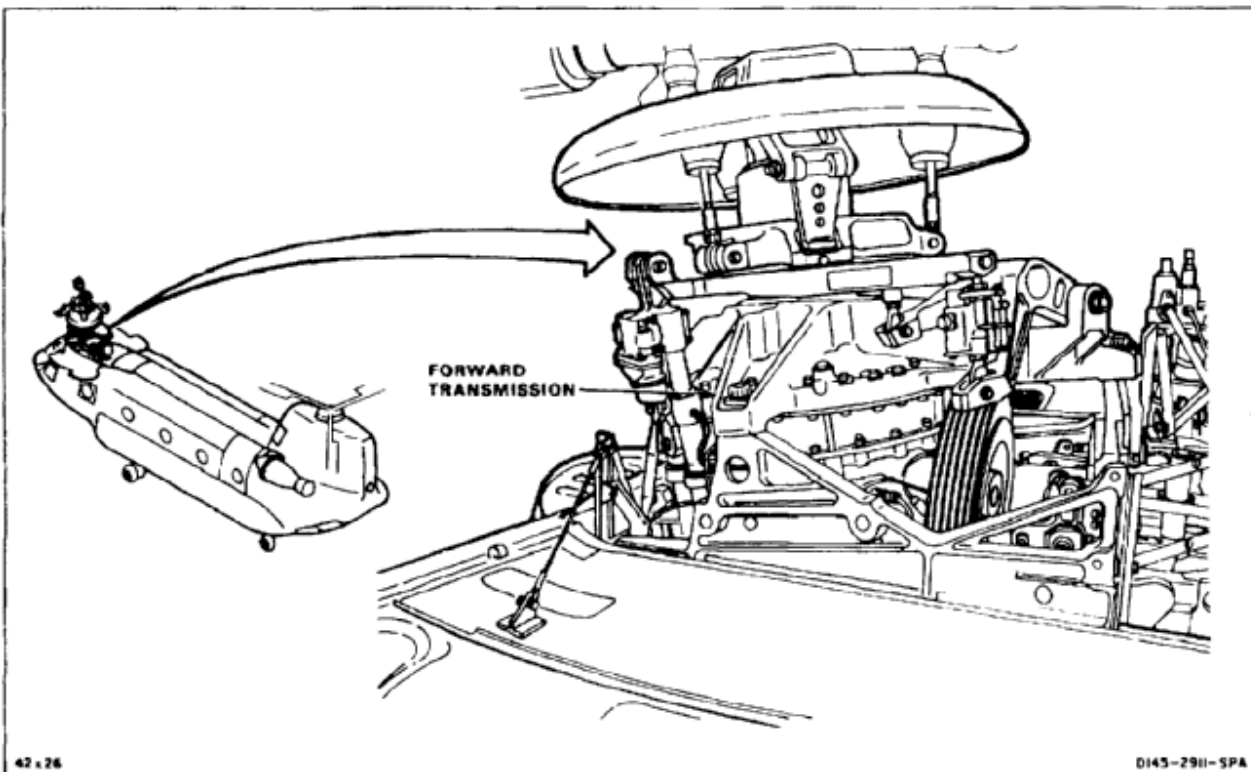
Gloves (E186)  
 Paper Tags (E264)

**Personnel Required:**

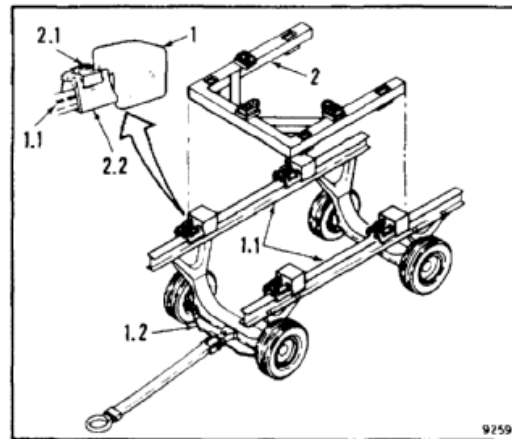
Medium Helicopter Repairer (3)

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Hydraulic Power Off  
 Forward Transmission Drip Pan Removed (Task 2-3)  
 Forward Rotary-Wing Blades Removed (Task 5-64)  
 Forward Transmission Fairing Removed (Task 2-62 and 2-63)  
 Forward Transmission Oil Cooler Air Inlet Duct Removed (Task 6-121)  
 No. 1 and No. 2 Drive Shafts Removed (Tasks 6-2 and 6-3)  
 Forward Transmission Adapter Assembly Removed (Task 6-5)  
 Both Forward Connecting Links Removed (Task 11-194)

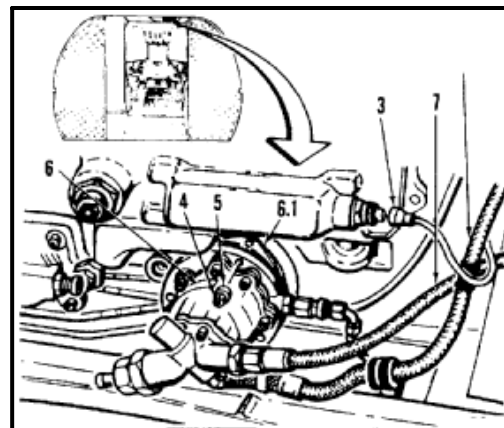


1. Fit four roller adapters (1) on two rails (1.1) of trailer (1.2).
- 1.1. With aid of helper, position adapter (2) on roller adapters (1).
- 1.2. Turn fitting (2.1) of each roller adapter (1) clockwise until clamp (2.2) fits tightly against rail (1.1).

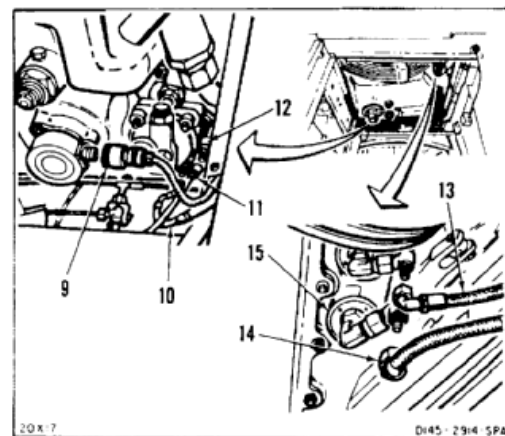


**DISCONNECT LOWER POINTS**

2. Disconnect oil temperature connector (3).
3. Remove four mounting nuts (4) and washers (5) from hydraulic pump (6).
4. Disconnect pump (6), with gasket (6.1), by pulling pump straight down. Pump shall hang by hoses (7 and 8).

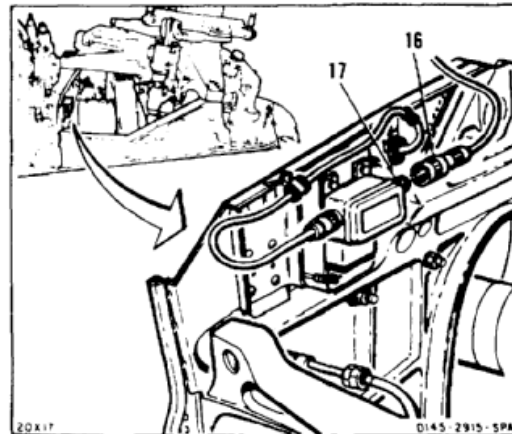


5. Disconnect chip detector plug (9).
6. Disconnect hoses (10 and 11) from left servocylinder (12). Let fluid drain into container.
7. Disconnect hoses (13 and 14) from right servocylinder (15). Drain fluid into container.

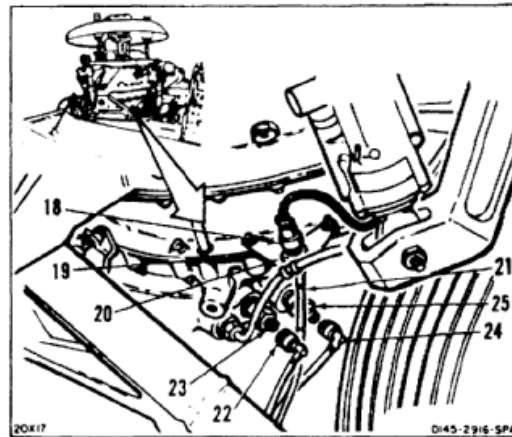


**DISCONNECT UPPER POINTS**

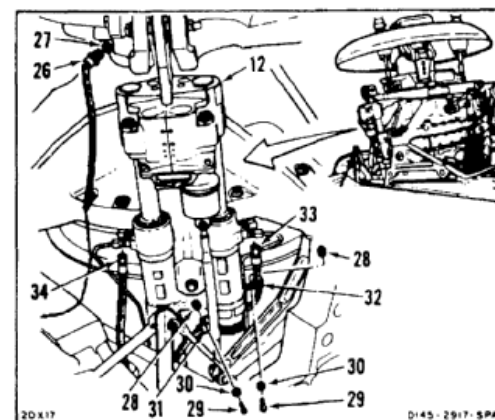
8. Disconnect connector (16) from signal conditioner (17).



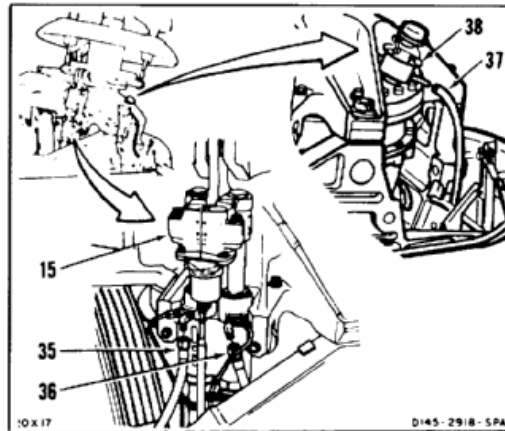
9. Disconnect connector (18) at bracket (19).  
 10. Remove nut (20). Remove electrical connector (21) from bracket (19).  
 11. Tag and disconnect electrical connector (22) from MAIN PRESS. SW (23).  
 12. Tag and disconnect electrical connector (24) from AUX PRESS. SW (25).



13. Remove lockwire from electrical connector (26). Disconnect connector from phase detector (27).  
 14. Remove nut (28), screw (29) and washer (30) from clamps (31 and 32) on hose (33) at left servocylinder (12).  
 15. Disconnect hoses (33 and 34) from servocylinder (12).

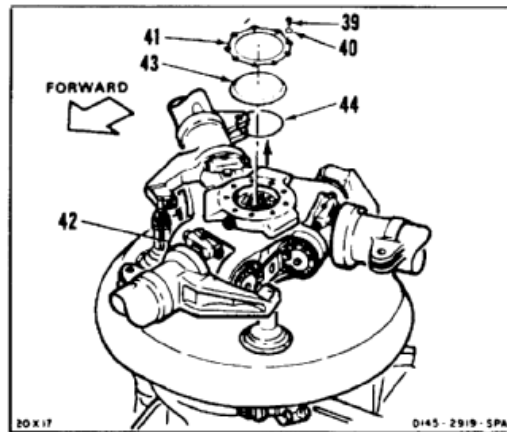


16. Disconnect hoses (35 and 36) from right servocylinder (15). Drain fluid into container.
17. Disconnect hose (37) from oil drain cup (38).



**CONNECT HOIST**

18. Remove nine screws (39) and washers (40) from retainer (41) on rotary-wing head (42). Remove retainer, cover (43), and packing (44).





**WARNING**

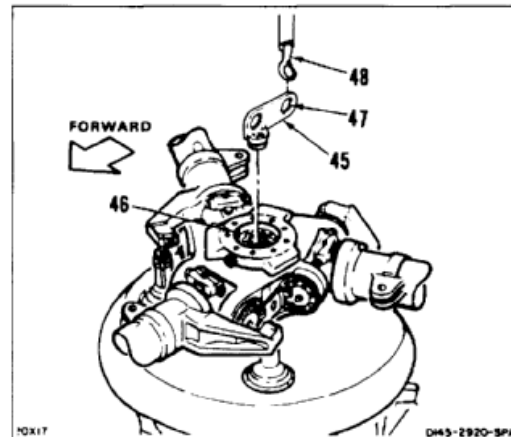
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

19. Check thread of hoisting eye (T32) (45) and shaft (46). Threads shall be clean and undamaged. If needed, clean with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

**NOTE**

Hoisting eye (T32) must trail aft to keep transmission at proper angle during hoisting.

20. Install hoisting eye (T32) (45) on shaft (46) so that FWD XMSN hole (47) trails aft.
21. Connect work hoist hook (48) to FWD XMSN hole (47) of hoisting eye (T32) (45). Raise hoist to take up slack in chain. Do not apply tension.

**REMOVE BOLTS****NOTE**

Socket assembly, torque applicator and reactor are part of torque reactor assembly (T159).

Whenever one or more forward transmission mounting bolts are removed, all four bolts must be removed and reinstalled (Task 6-51).

22. Loosen left bolt (49) as follows:
- Install socket assembly (49.1) on left bolt (49).
  - Install torque applicator (50) over square drive of socket assembly (49.1) with large hole aft of assembly. Note THIS SIDE UP on applicator.
  - Install sleeve (50.1) on aft end of applicator (50). Insert two pins (50.2) through sleeve and adapter.
  - Install aft end of sleeve (50.1) in center block (50.3) of reactor (51). Install socket at end of reactor on aft bolt (51.1).
  - Install pin (51.2) through center block (50.3) and applicator (50).
  - Set selector (51.3) at bottom of torque pack (T23) (52) to NUT OFF.
  - Install torque pack (T23) (52) on square drive of socket assembly (49.1). Turn pack so that two pins (52.1) on bottom fit holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

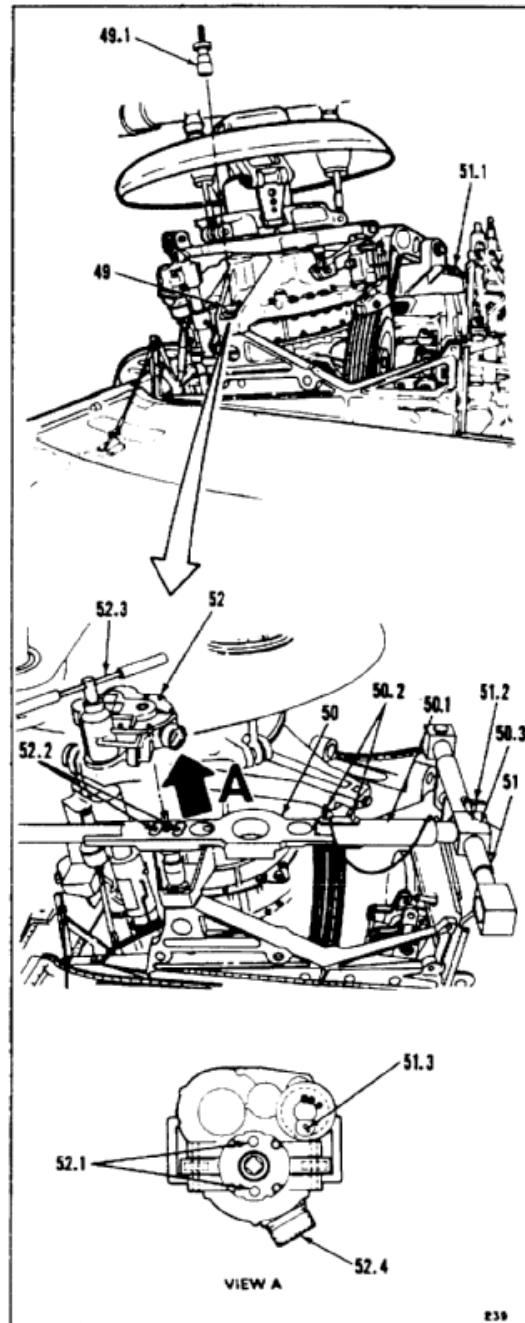
**WARNING**

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

**CAUTION**

If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.

- Set selector switch on tee handle (T161) (52.3) to OFF. Install handle on torque pack (T23) (52). Turn handle counterclockwise until torque is broken.
- Set switch on handle (T161) (52.3) to ON. Turn handle clockwise until indicator (52.4) reads **0** and torque pack is loose.
- Remove torque pack (52) and torque reactor assembly (T159).
- Take sleeve (50.1) off applicator (50).
- Do not remove left bolt (49).



22.1. Loosen aft bolt (51.1) as follows:

- a. Install socket assembly (49.1) on aft bolt (51.1).
- b. Install torque applicator (50) over square drive of socket assembly (49.1) with large hole at left of assembly. Observe THIS SIDE UP stamping on applicator.
- c. Install left end of applicator (50) in end block of reactor (51). Install socket at end of reactor on left bolt (49).
- d. Install pin (51.2) through end of reactor (51) and applicator (50).

**WARNING**

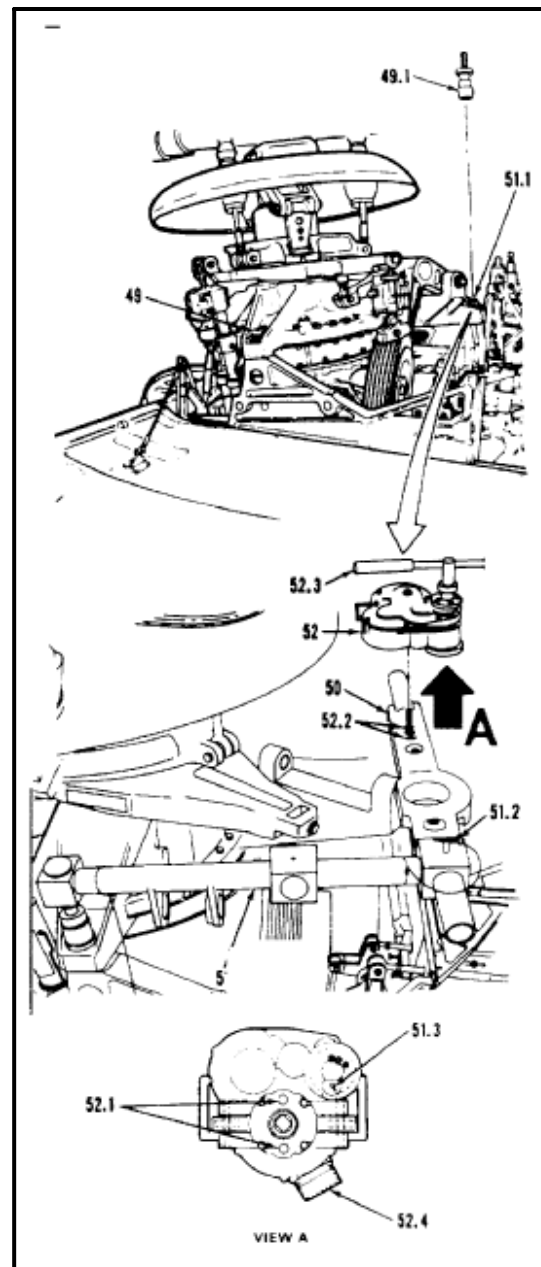
Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

- e. Check that ratchet selector (51.3) at bottom of torque pack (T23) (52) is set to NUT OFF.
- f. Install torque pack (T23) (52) on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

**CAUTION**

If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.

- g. Set selector switch on tee handle (T161) (52.3) to OFF. Install handle on torque pack (T23) (52). Turn handle counterclockwise until torque is broken.
- h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until torque indicator (52.4) reads **0** and torque pack is loose.
- i. Remove torque pack (52) and torque reactor assembly (T159).
- j. Do not remove aft bolt (51.1).



22.2. Loosen right bolt (52.5) as follows:

- a. Install socket assembly (49.1) on right bolt (52.5).
- b. Install torque applicator (50) over square drive of socket assembly (49.1) with large hole forward of assembly. Observe THIS SIDE UP stamping on applicator.
- c. Install forward end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on forward bolt (52.6).
- d. Install pin (51.2) through center block (50.1) and applicator (50).

**WARNING**

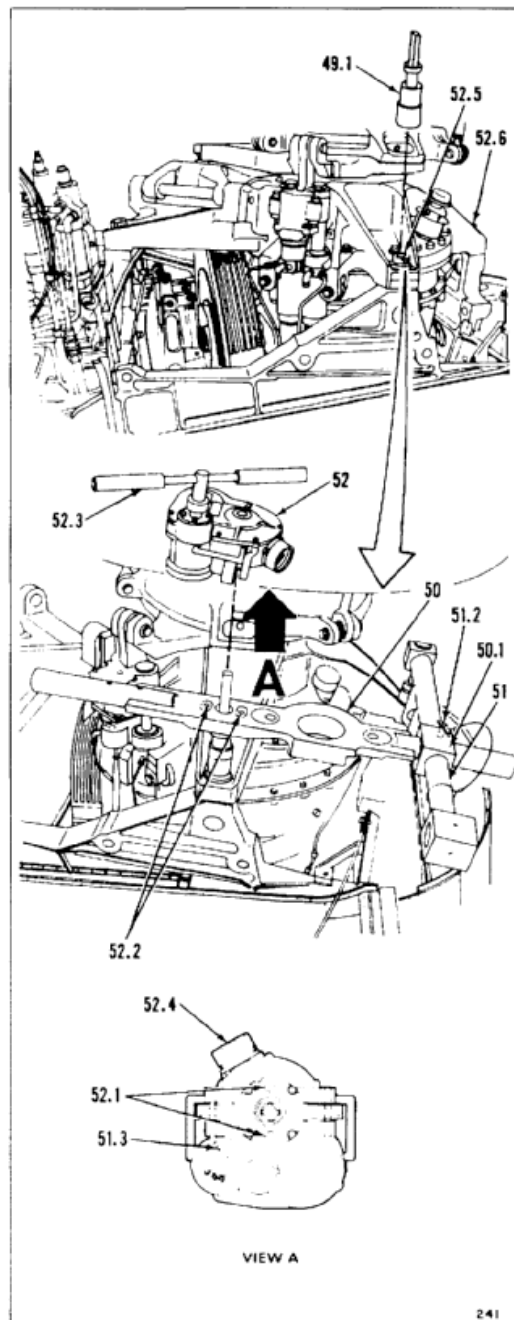
Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

- e. Check that ratchet selector (51.3) at bottom of torque pack (T23) (52) is set to NUT OFF.
- f. Install torque pack (T23) (52) on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3).

**CAUTION**

If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.

- g. Set selector switch on tee handle (T161) (52.3) to OFF. Turn handle counterclockwise until torque is broken.
- h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until indicator (52.4) reads **0** and torque pack is loose.
- i. Remove torque pack (52) and torque reactor assembly (T159).
- j. Do not remove right bolt (52.5).



22.3. Loosen forward bolt (52.6) as follows:

- a. Install socket assembly (49.1) on forward bolt (52.6).
- b. Install torque applicator (50) over square drive of socket assembly (49.1) with large hole at right of assembly. Observe THIS SIDE UP stamping on applicator.
- c. Install right end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on right bolt (52.5).
- d. Install pin (51.2) through center block (50.1) and applicator (50).

**WARNING**

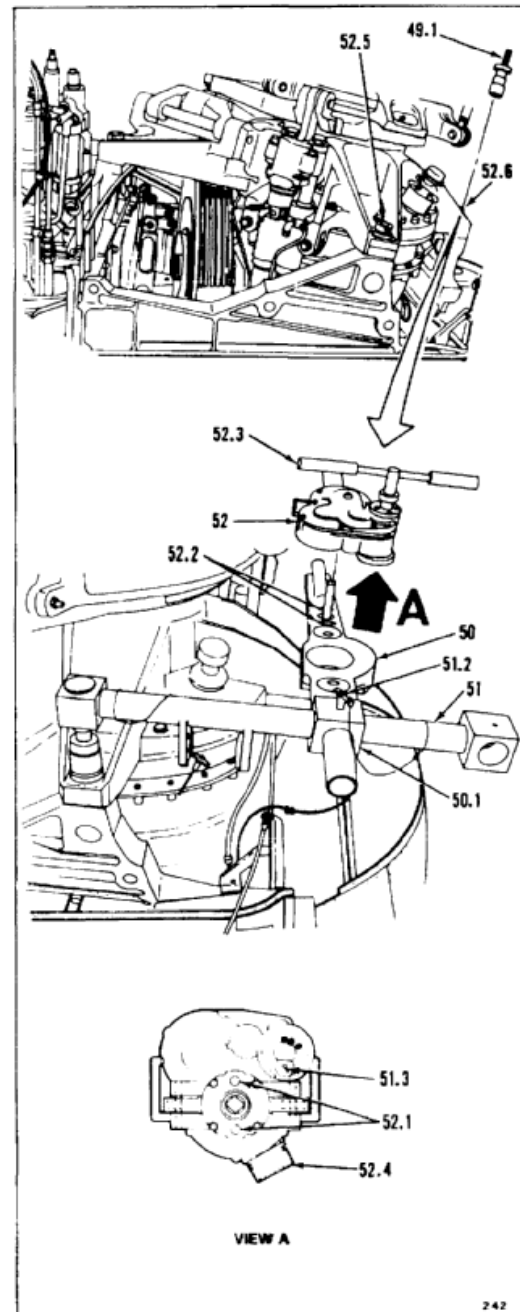
Make sure ratchet selector is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

- e. Check that ratchet selector (51.3) at bottom of torque pack (T23) (52) is set to NUT OFF.
- f. Install torque pack (T23) (52) on square drive of socket assembly (49.1). Rotate pack so that two pins (52.1) on bottom fit into holes (52.2) in applicator (50). Use tee handle (T161) (52.3) if necessary.

**CAUTION**

If handle cannot be turned, and torque indicator needle enters red zone, do not continue. Torque is beyond limits of torque pack. Use alternate method to remove bolt.

- g. Set selector switch on tee handle (T161) (52.3) to OFF. Turn handle counterclockwise until torque is broken.
- h. Set selector switch on tee handle (T161) (52.3) to ON. Turn handle clockwise until torque indicator (52.4) reads **0** and torque pack is loose.
- i. Remove torque pack (52) and torque reactor assembly (T159).
- j. Go to step 22.8.

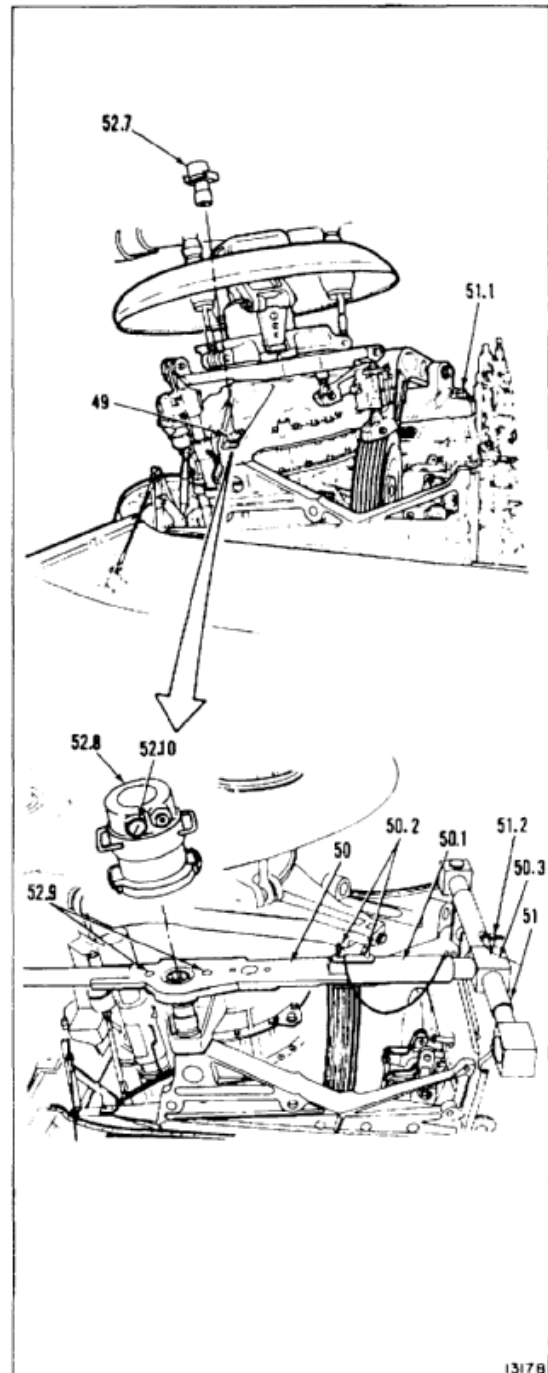


**REMOVE BOLTS (ALTERNATE METHOD)****NOTE**

Torque applicator and reactor are part of torque reactor assembly (T159).

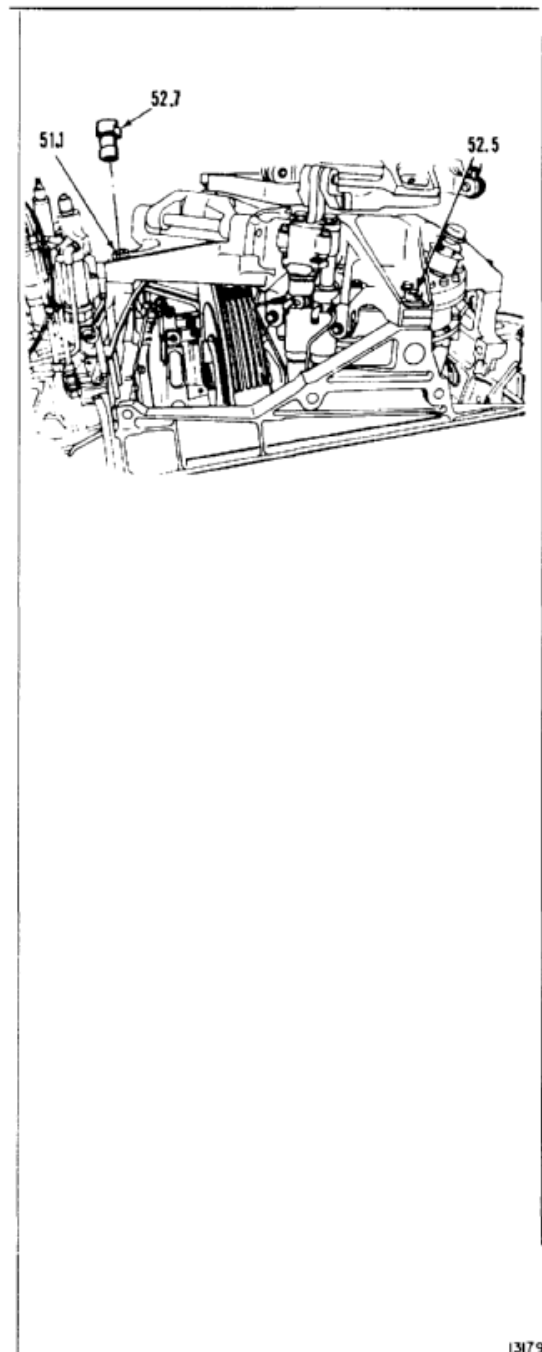
## 22.4. Loosen left bolt (49) as follows:

- a. Install socket adapter (T93) (52.7) on left bolt (49).
- b. Install torque applicator (50) with large hole over drive of socket adapter (T93) (52.7). Observe THIS SIDE UP stamping on applicator.
- c. Install sleeve (50.1) on aft of applicator (50). Insert two pins (50.2) through sleeve and adapter.
- d. Install aft end of sleeve (50.1) in center block (50.3) of reactor (51). Install socket at end of reactor on aft bolt (51.1).
- e. Install pin (51.2) through center block (50.3) and applicator (50).
- f. Install torque applicator pack (T2) (52.8) on drive of socket adapter (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.
- g. Install speed handle on torque pack (T2) (52.8). Turn handle counterclockwise until torque is broken.
- h. Turn speed handle clockwise until torque indicator (52.10) reads **0** and torque pack is loose.
- i. Remove torque pack (52.8) and torque reactor assembly (T159).
- j. Remove sleeve (50.1) from applicator (50).
- k. Do not remove left bolt (49).



22.5. Loosen aft bolt (51.1) as follows:

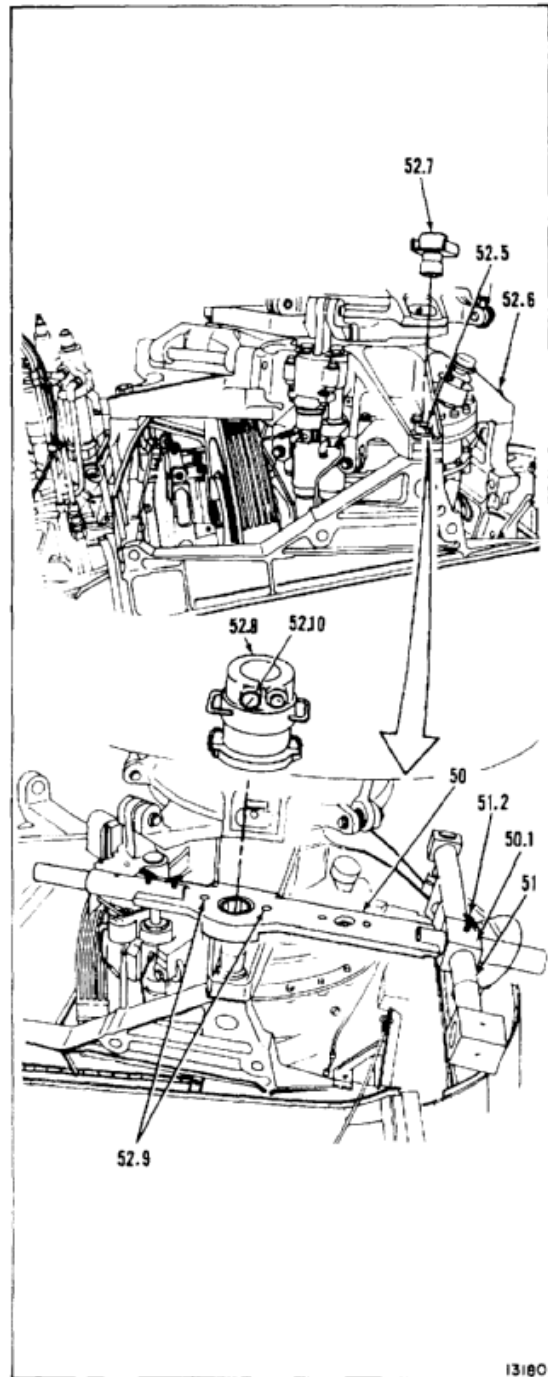
- a. Install socket adapter (T93) (52.7) on aft bolt (51.1).
- b. Install torque applicator (50) with large hole over drive of socket adapter (52.7). Observe THIS SIDE UP stamping on applicator.
- c. Install left end of applicator (50) in end block of reactor (51). Install socket at end of reactor on right bolt (52.5).
- d. Install pin (51.2) through end block of reactor (51) and applicator (50).
- e. Install torque applicator pack (T2) (52.8) on drive of socket adapter (T93) (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.
- f. Install speed handle on torque pack (T2) (52.8). Turn handle counterclockwise until torque is broken.
- g. Turn speed handle clockwise until torque indicator (52.10) reads **0** and torque pack is loose.
- h. Remove torque pack (52.8) and torque reactor assembly (T159).
- i. Do not remove aft bolt (51.1).



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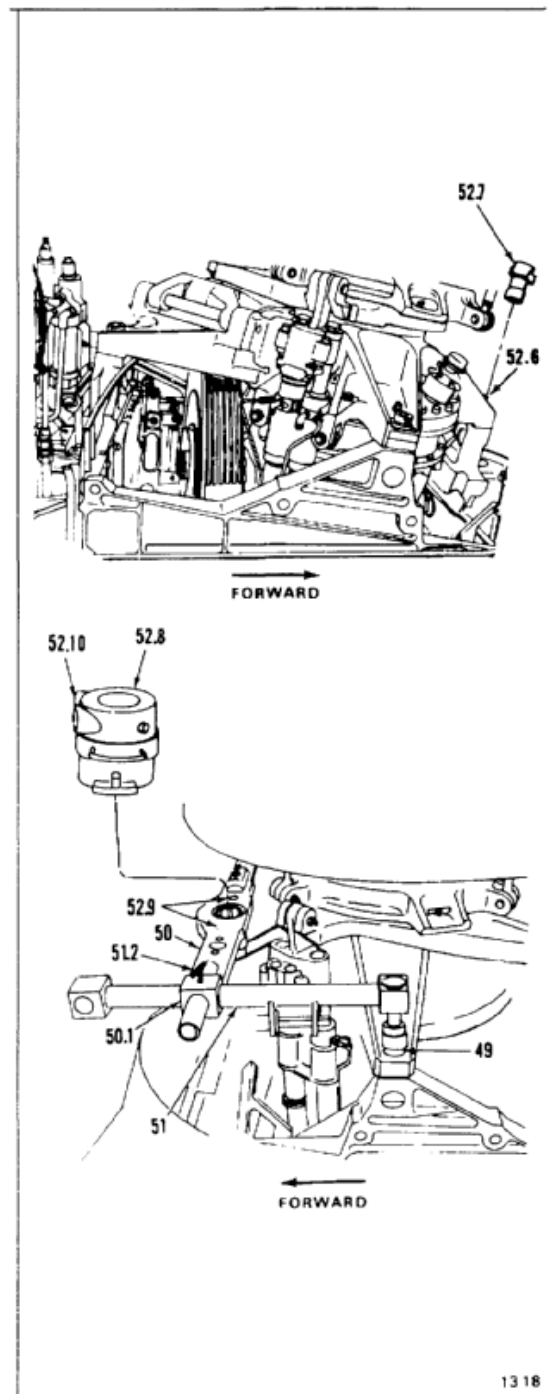
22.6. Loosen right bolt (52.5) as follows:

- a. Install socket adapter (T93) (52.7) on right bolt (52.5).
- b. Install torque applicator (50) over square drive of socket adapter (T93) (52.7). Observe THIS SIDE UP stamping on applicator.
- c. Install forward end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on forward bolt (52.6).
- d. Install pin (51.2) through center block (50.1) and applicator (50).
- e. Install torque applicator pack (T2) (52.8) on drive of socket adapter (52.7). Rotate pack so that two pins (52.1) on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.
- f. Turn speed handle counterclockwise until torque is broken.
- g. Turn speed handle clockwise until indicator (52.10) reads **0** and torque pack is loose.
- h. Remove torque pack (52.8) and torque reactor assembly (T159).
- i. Do not remove right bolt (52.5).

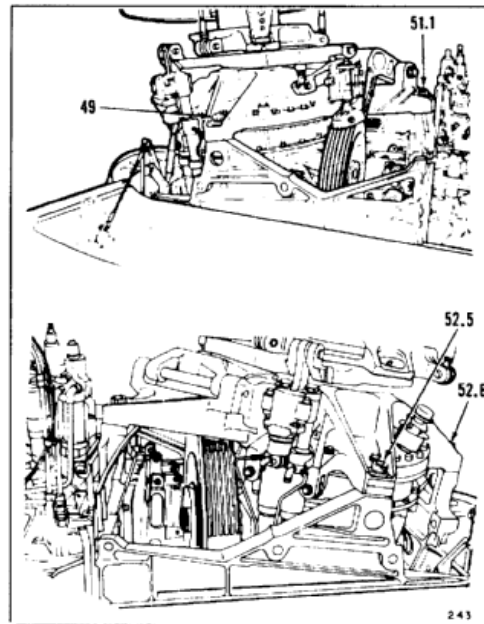




- 22.7. Loosen forward bolt (52.6) as follows:
- Install socket adapter (T93) (52.7) on forward bolt (52.6).
  - Install torque applicator (50) with large hole over drive of socket adapter (52.7). Observe THIS SIDE UP stamping on applicator.
  - Install right end of applicator (50) in center block (50.1) of reactor (51). Install socket at end of reactor on left bolt (49).
  - Install pin (51.2) through center block (50.1) and applicator (50).
  - Install torque pack (T23) (52) on drive of socket adapter (52.7). Rotate pack so that two pins on bottom fit into holes (52.9) in applicator (50). Use socket wrench speed handle.
  - Turn speed handle counterclockwise until torque is broken.
  - Turn speed handle clockwise until torque indicator (52.10) reads **0** and torque pack is loose.
  - Remove torque pack (52.8) and torque reactor assembly (T159).



22.8. Remove bolts (49, 51.1, 52.5, and 52.6).



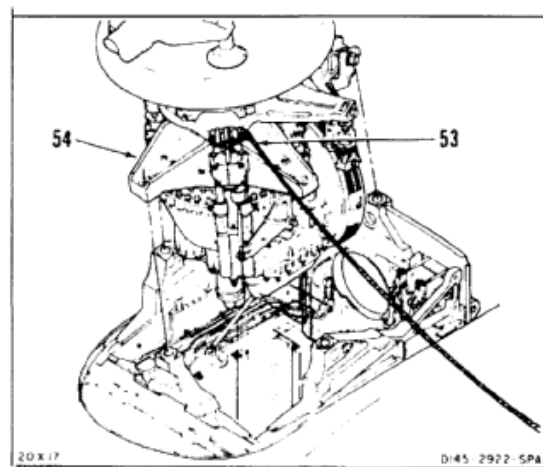
23. Attach a rope guide line (53) to each side of transmission (54).

**WARNING**

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

24. Slowly raise transmission (54) about **1 inch**. Check that all wires, hoses, and links between transmission and helicopter have been disconnected.

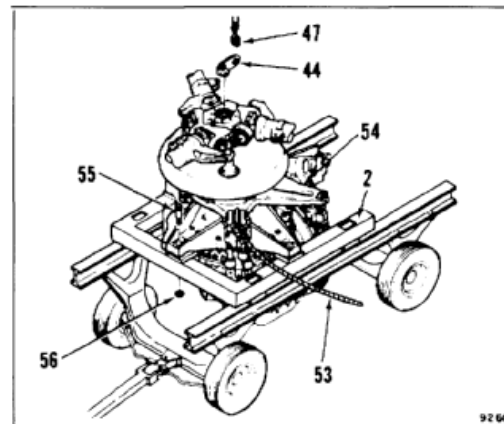
25. Lift transmission (54) out of helicopter. Have helpers guide transmission with rope guide lines (53).



**6-46 REMOVE FORWARD TRANSMISSION PACKAGE (Continued)**

6-46

26. Lower and position transmission (54) onto adapter (T15) (2). Install three bolts (55) and nuts (56).
27. Remove rope guide lines (53).
28. Remove work hoist hook (47) from hoisting eye (44). Remove eye.

***FOLLOW-ON MAINTENANCE:***

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Rotor Head Controls Sling (T14)  
 Hoist  
 Wrench, 1-1/16 Inch  
 Wrench, 1-7/16 Inch  
 Aluminum Bar, 1/2 Inch Diameter x 17 Inches Long

**Materials:**

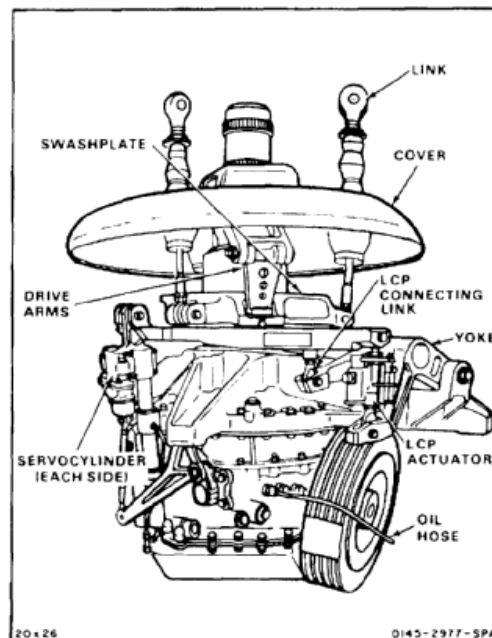
Tape (E388)  
 Lockwire (E231)

**Personnel Required:**

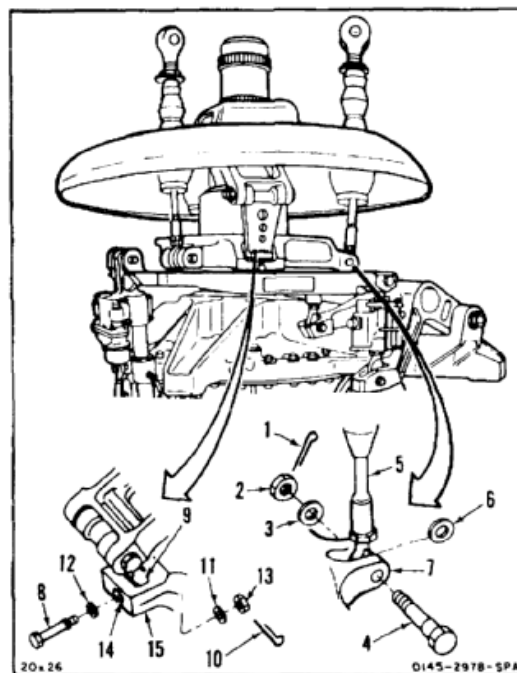
Medium Helicopter Repairer (3)

**Equipment Condition:**

Off Helicopter Task  
 Rotary-Wing Head Removed (Task 5-8)

**REMOVE COVER, LINKS, AND DRIVE ARMS**

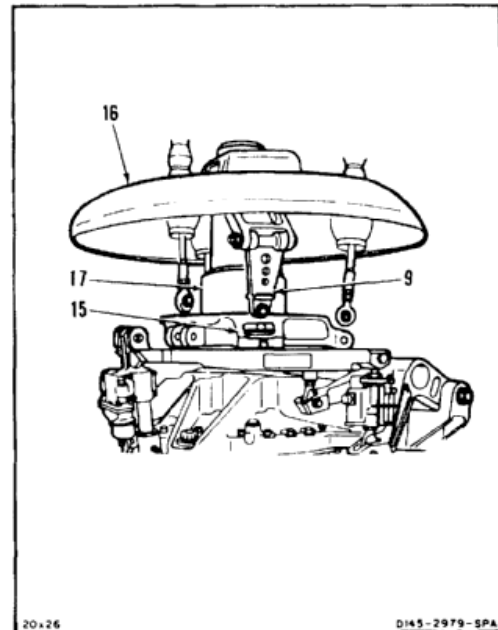
1. Remove cotter pin (1), nut (2), washer (3), and bolt (4) from each of three pitch links (5). Remove three links and limiters (6) from swashplate lugs (7).
2. Remove lockwire from bolt (8) in lower drive arm (9). Remove cotter pin (10), bolt, washers (11 and 12) and nut (13). Check that bushing (14) remains in swashplate lug (15). Keep bushing in lug with lockwire (E231).



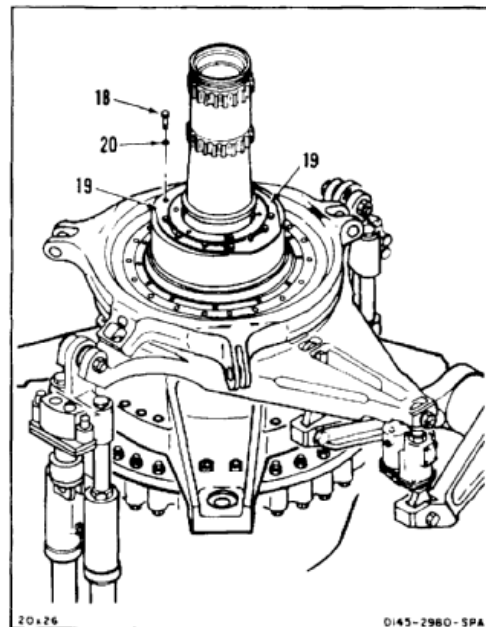
**CAUTION**

If arm hits slider shaft, shaft can be damaged.

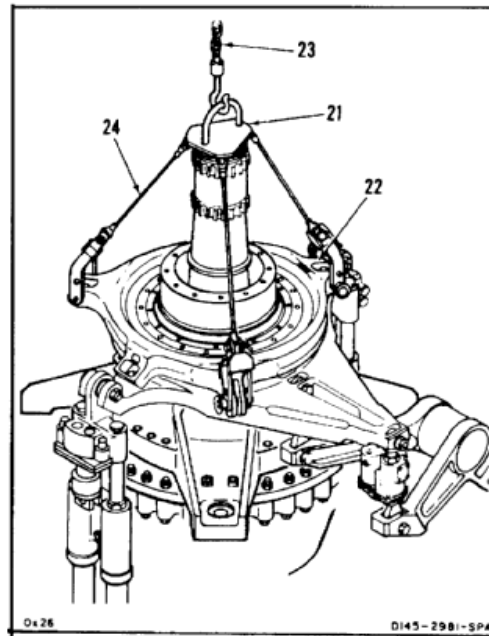
3. Have two helpers slowly lift cover (16). As cover is lifted, pull lower drive arm (9) out of swashplate lug (15). Hold arm to keep it from hitting slider shaft (17).

**REMOVE SWASHPLATE**

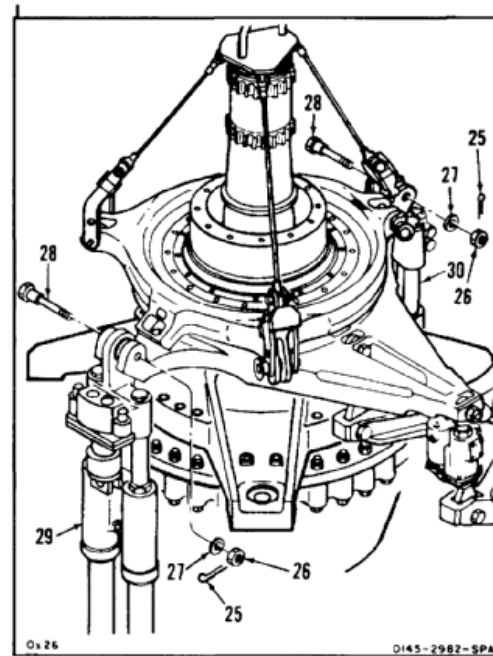
4. Remove lockwire from six bolts (18) on each half of seal (19). Remove 12 bolts and washers (20). Remove both halves of seal.



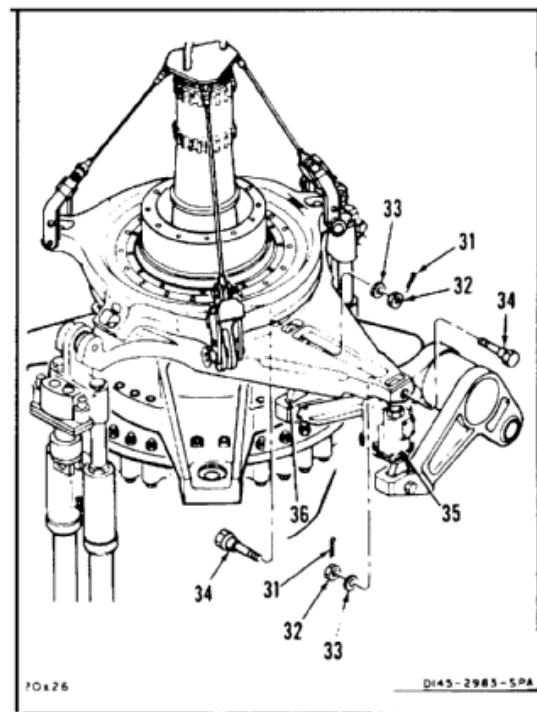
5. Attach sling (T14) (21) to three lugs (22). Attach work hoist chain (23) to sling. Raise hoist to take up slack from sling cables (24). Do not put tension on sling.



6. Remove cotter pin (25), nut (26), washer (27), and bolt (28) from upper end of both servocylinders (29 and 30).



7. Remove cotter pins (31), nuts (32), washers (33), and bolts (34) from actuator (35) and link (36).

**WARNING**

Swashplate is heavy and can injure personnel if it drops. Swashplate must be supported by hoist and moved carefully to prevent injury to personnel.

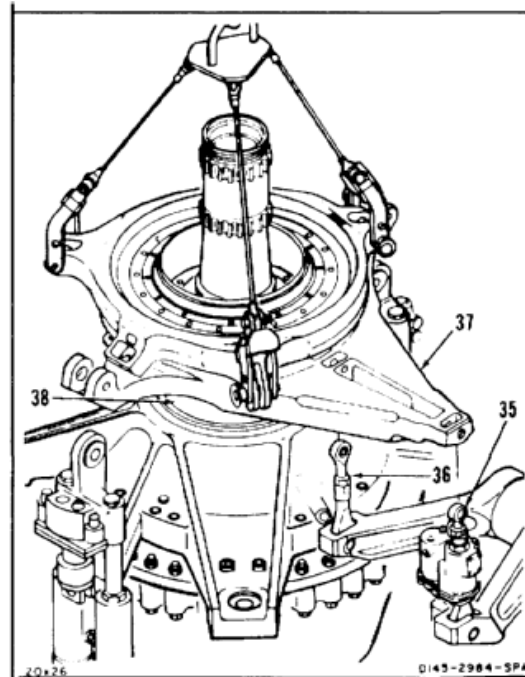
**CAUTION**

If actuator or link twist or fall, they can be damaged or cause damage to other components.

**CAUTION**

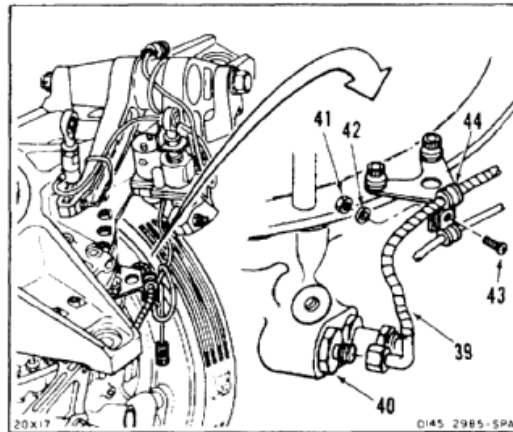
If bearing hits or binds on slider shaft, bearing surfaces can be damaged.

8. Lift swashplate (37) from shaft (38). Do not let actuator (35) or link (36) twist or fall. Do not let swashplate hit or bind on shaft.



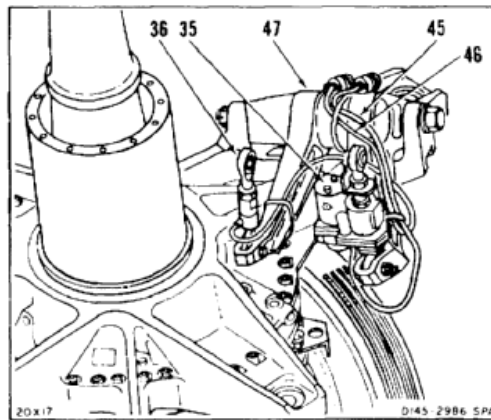
**REMOVE TRANSDUCER OIL HOSE**

9. Disconnect oil hose (39) from reducer (40).
10. Remove nut (41), washer (42), and screw (43) from clamp (44).
11. Remove hose (39) with clamp (44).

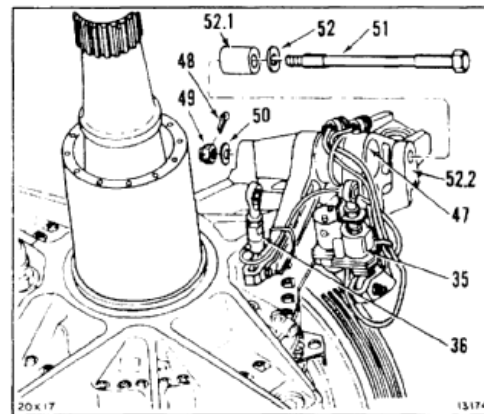


**REMOVE YOKE**

12. Secure cables (45 and 46) away from actuator (35) and link (36). Tape them to yoke (47). Use tape (E388).



13. Remove cotter pin (48), nut (49), and washer (50) from shaft (51).
14. Remove shaft (51) and washer (52). Use an aluminum bar. Do not pry on shaft.
- 14.1. Remove slider bushing (52.1) from lug (52.2)
15. Remove yoke (47) with actuator (35) and link (36).





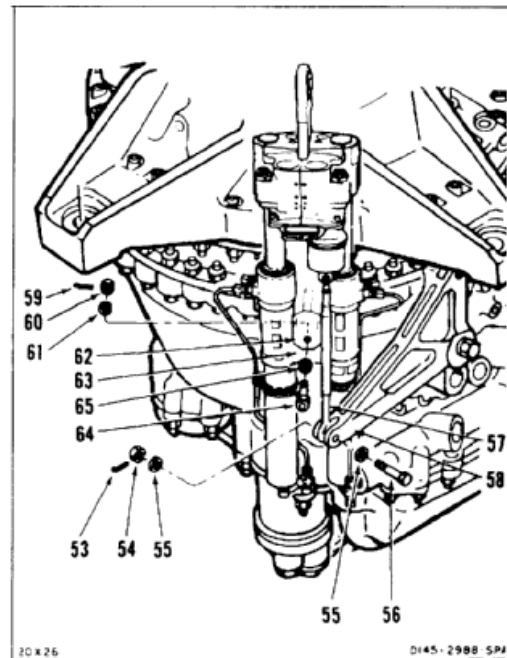
**REMOVE SWIVELING SERVOCYLINDER**

16. Remove cotter pin (53), nut (54), two washers (55), and bolt (56) from lower end of link (57).
17. Disconnect link (57) from bellcrank (58).



Do not bend tubes on servocylinder during removal.

18. Remove cotter pin (59), nut (60), and washer (61) from back of lug (62).
19. Have helper support servocylinder (63). Remove bolt (64) and washer (65). Lower and remove servocylinder from lug (62).

**REMOVE PIVOTING SERVOCYLINDER**

20. Remove cotter pin (66), nut (67), two washers (68), and bolt (69) from lower end of link (70).
21. Disconnect link (70) from bellcrank (71).

**NOTE**

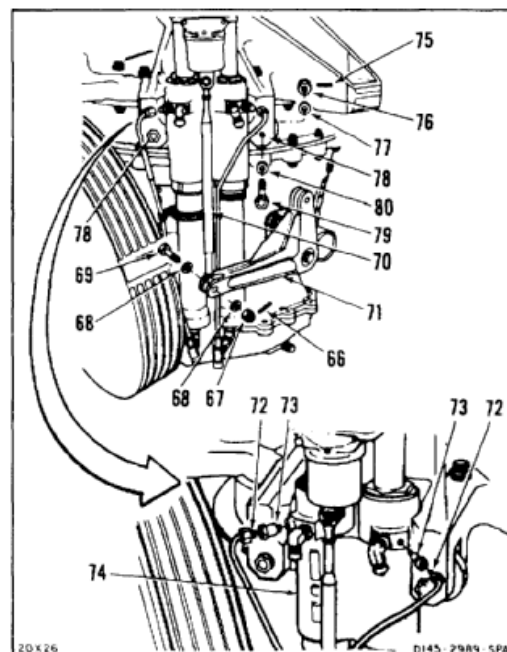
Check valves must be removed for clearance.

22. Disconnect two tubes (72) from check valves (73).
23. Remove check valves (73) from servocylinder (74).



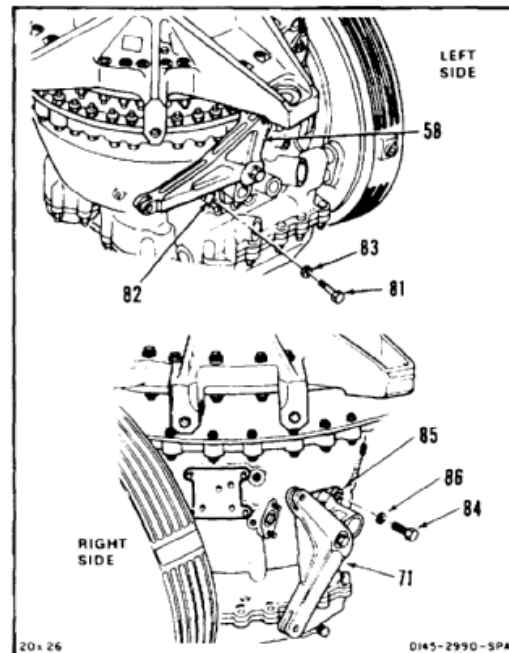
Do not bend tubes on servocylinder during removal.

24. Remove cotter pins (75), nuts (76) and washers (77) from back of two lugs (78).
25. Have helper support servocylinder (74). Remove bolts (79) and washers (80). Lower and remove servocylinder from lugs (78).
26. Install check valves (73) in servocylinder (74). Connect tubes (72) to check valves.



**REMOVE BELLCRANKS**

27. Remove lockwire from four bolts (81) on left bellcrank support (82). Remove bolts and washers (83). Remove support and bellcrank (58).
28. Remove lockwire from four bolts (84) on right bellcrank support (85). Remove bolts and washers (86). Remove support and bellcrank (71).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-170

## INITIAL SETUP

**WARNING****Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Barrier Material (E80)  
Masking Tape (E388)  
Gloves (E184.1)  
Acetic Acid (E21)  
Alodine Powder (E65)  
Chromic Acid (E114)  
Calcium Sulphate (E91)  
Epoxy Primer (E292 or E293)  
Epoxy Topcoat (E166)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

**General Safety Instructions:****WARNING**

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

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

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

**WARNING**

Epoxy primer (E292 or E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing, in case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. Clean oil and grease from the damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. Check extent and location of damage on cover (1) and housing (2):

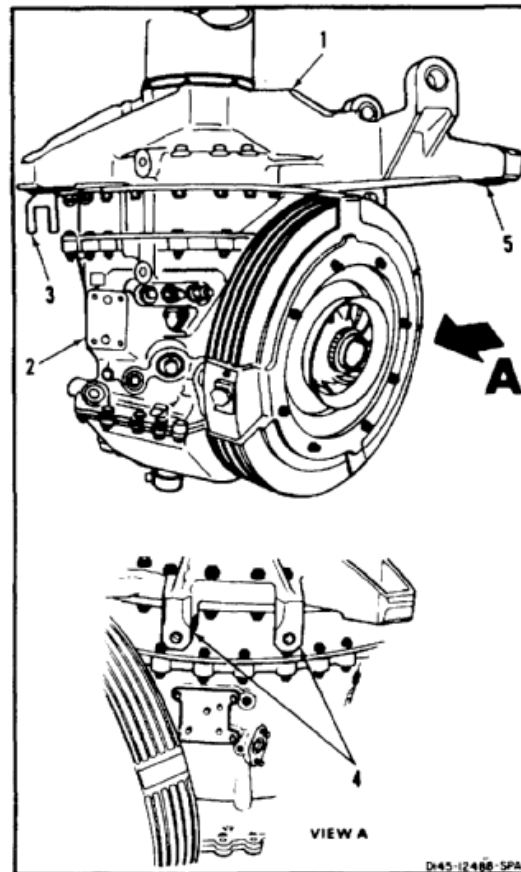
**NOTE**

Refer to Task 6-35 for repairs to the sump.

**NOTE**

Limits in this step refer to extent of damage after rework.

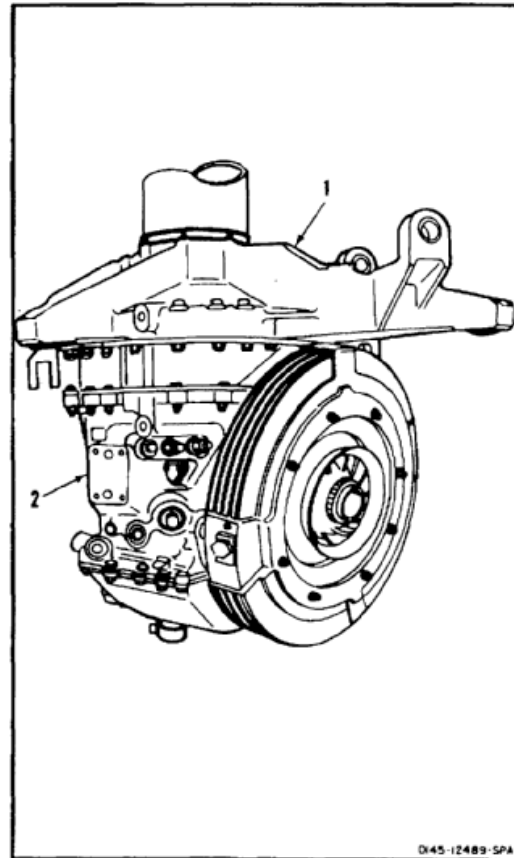
- a. Depth of damage shall not be more than **0.025 inch**. Depth of damage on actuator lugs (3 and 4) shall not be more than **0.015 inch**.
  - b. Damage shall not extend over more than one surface or enter any radius.
  - c. Damage shall not be closer than **1.00 inch** to any mounting hole (5).
3. Fluorescent inspect damaged area to check for cracks. (Refer to TM 1-1500-335-23.) There shall be no cracks. If a crack is suspected in forward transmission outside surface, refer to TM 1-1520-253-23.
  4. Cover moving parts near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
  5. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
  6. Smooth the blended area with crocus cloth (E122). Do not leave any sharp edges.



**WARNING**

Gloves (E184.1) shall be worn during the remainder of this task; otherwise, personal injury could result.

7. Acid etch the reworked area as follows:
  - a. Prepare a solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E184.1) and goggles.
  - b. Swab the area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse the area with cold water.
8. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If a crack is suspected in forward transmission outside surface, refer to TM 1-1520-253-23.
9. Apply surface treatment to the reworked area as follows:
  - a. Clean the area with naphtha (E245) and clean cloths. Let the area air dry.
  - b. If the area is on cover (1), swab solution of alodine powder (E65) in water on area. Swab for **2 to 5 minutes**. Use gauze sponges (E184). Wear gloves (E184.1). Rinse the area with cold water and let air dry.
  - c. If the area is on housing (2), swab on solution of chromic acid (E114) and calcium sulphate (E91). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse the area with cold water and let air dry.
10. Apply epoxy primer (E292 or E293) to the reworked area. Let air dry for **2 hours**.
11. Apply epoxy topcoat (E166).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Hoisting Eye (T32)  
 Work Hoist  
 Shipping Container (T74)  
 Container, 14 Quart (2)  
 Torque Wrench, 30 to 150 Foot-Pounds

**Materials:**

Fingerprint Remover (E175)  
 Cloths (E120)  
 Dry Cleaning Solvent (E162)  
 Gloves (E186)  
 Swabbing Brush (E86)  
 Corrosion Preventive Compound (E153 or E154)  
 Desiccant (E160), 16-Unit Bag (8)  
 Barrier Material (E81)  
 Tape (E388)

**Personnel Required:**

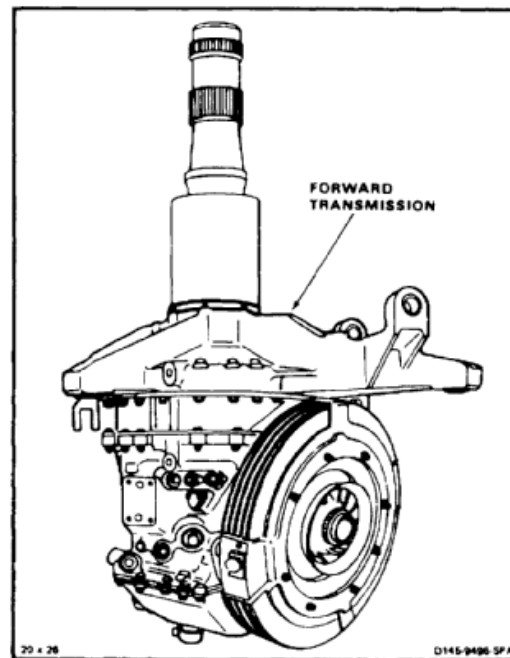
Medium Helicopter Repairer (2)  
 Inspector

**References:**

DA PAM 738-751  
 TB 55-8100-200-25  
 TB 750-126

**Equipment Condition:**

Off Helicopter Task  
 Forward Transmission Disassembled (Task 6-47)

**General Safety Instructions:****WARNING**

Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

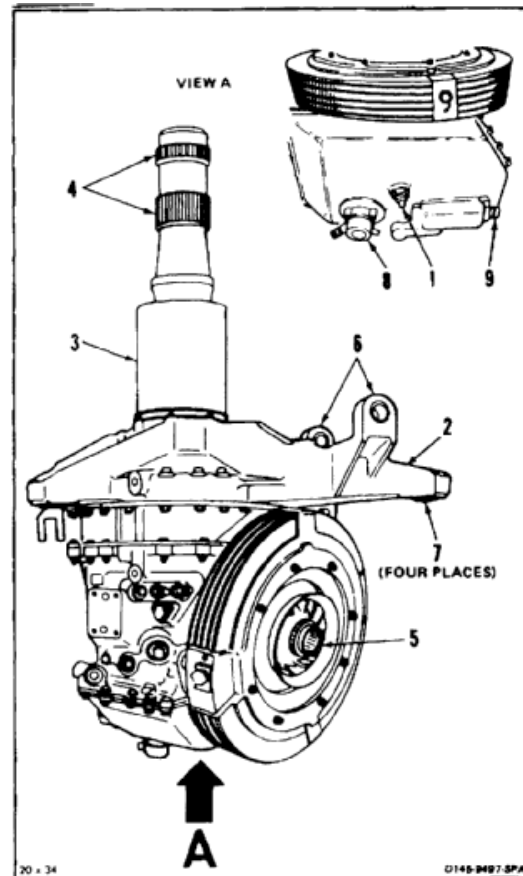
Sump holds about **28 quarts** of oil.

1. Push in drain valve (1), twist it, and pull. Let oil drain into containers. Push in valve, twist it, and pull down to close.
2. Clean all surfaces of transmission (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
3. Clean slider shaft (3), rotor shaft splines (4), input shaft splines (5) and bushings (6 and 7). Use fingerprint remover (E175) and clean cloths (E120).

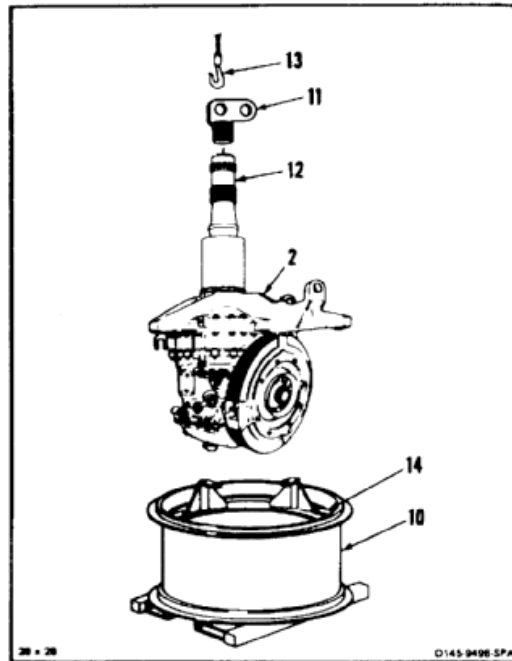


Touching unpainted surfaces with bare fingers can cause corrosion.

4. Put on gloves (E186). Gloves shall be worn for the rest of this task.
5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. Coat slider shaft (3), rotor shaft splines (4), input shaft splines (5), and bushings (6 and 7) with corrosion-preventive compound (E153 or E154). Use cloth (E120) to coat shaft. Use swabbing brush (E86) to coat splines and bushings.
7. Cover slider shaft (3), splines (4 and 5), and bushings (6 and 7) with barrier material (E81) and tape (E388).
8. Cover indicating screen (8), electrical connectors (9) and drain valve (1) with barrier material (E81) and tape (E388).

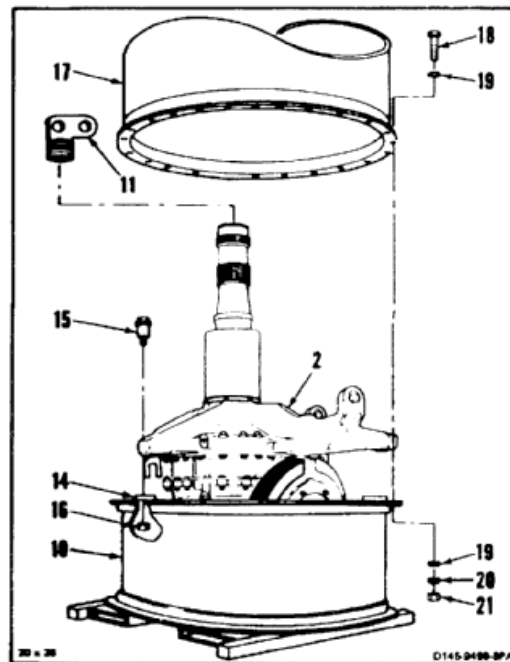


9. Install transmission (2) in shipping container (T74) (10) as follows:
  - a. Inspect and prepare container (10) (TB 55-8100-200-25).
  - b. Install hoisting eye (T32) (11) in top of shaft (12). Connect work hoist hook (13) to eye marked AFT SHAFT.
  - c. With aid of helper, place transmission (2) in container (174) (10). Align it with four mounting brackets (14).
  - d. Remove hoisting eye (11) from transmission (2).
  - e. Secure transmission (2) to container mounting brackets (14) with four bolts (15) and nuts (16). Torque nuts to **55 foot-pounds**.
  - f. Prepare required maintenance forms and records (DA PAM 738-751 and TB 750-126).
  - g. Put eight 16-unit bags of desiccant (E160) into container (10).



**INSPECT**

- h. Install cover (17) on container (10). install bolts (18), washers (19), split washers (20), and nuts (21) at 24 places.
- i. Tighten nuts (21) at **3, 6, 9, and 12 o'clock**. Tighten nuts at **2, 4, 8, and 10 o'clock**. Tighten remaining nuts.





10. Remove plug (22) from cover (17).
11. Connect air test line (23) to cover (17).



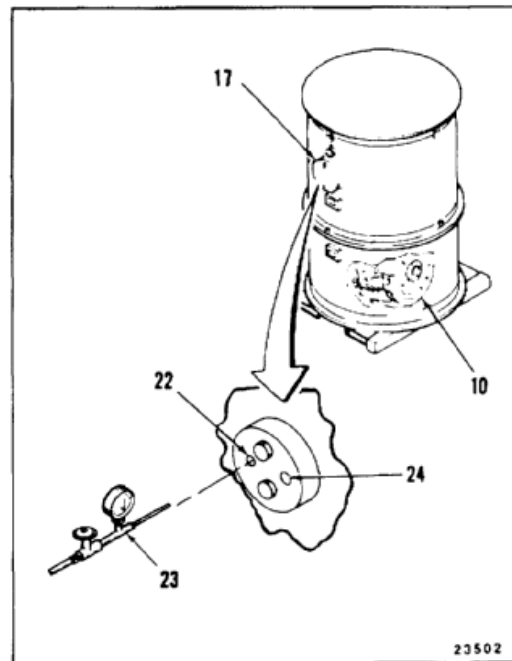
Low pressure air supply must be used. Exceeding test pressure can damage container.

12. Pressurize container (10) to **3 psi** max. Check container for leaks. Container must hold **3 psi for 1 hour**.



Be careful when releasing air under pressure, wear goggles. Personal injury can result.

13. Push pressure relief valve (24) until pressure in container (10) is **0 psi**.
14. Disconnect air line (23) from cover (17).
15. Install plug (22) in cover (17).



23502

#### **FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Hoisting Eye (T32)  
 Work Hoist  
 Container, 14 Quart

**Materials:**

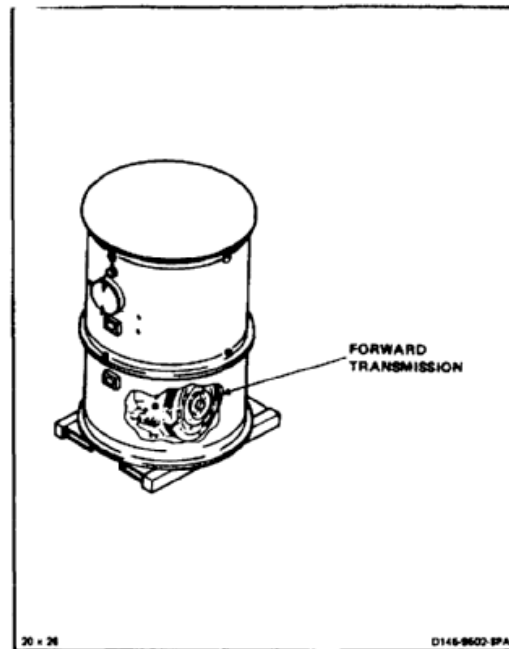
Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Gloves (E186)

**Personnel Required:**

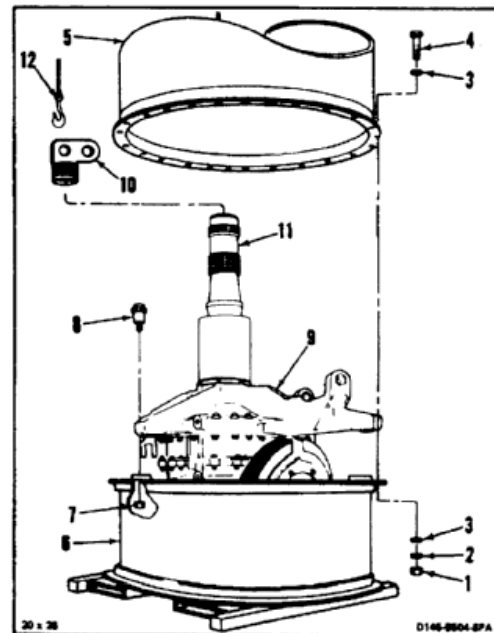
Medium Helicopter Repairer (2)  
 Inspector

**Equipment Condition:**

Off Helicopter Task



1. Remove 24 nuts (1) washers (2 and 3) and bolts (4) from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. Remove four nuts (7) and bolts (8) from transmission (9).
4. Install hoisting eye (T32) (10) in rotor shaft (11). Connect work hoist hook (12) to eye marked AFT SHAFT.
5. With aid of helper, lift transmission (9) from container (6).
6. Set transmission (9) down on bench or workstand. Remove hoisting eye (T32) (10).
7. Install four bolts (8) and nuts (7) in container (6).
8. Install cover (5). Install 24 bolts (4), washers (3), split washers (2) and nuts (1).



9. Remove all tape and barrier material from transmission (9).

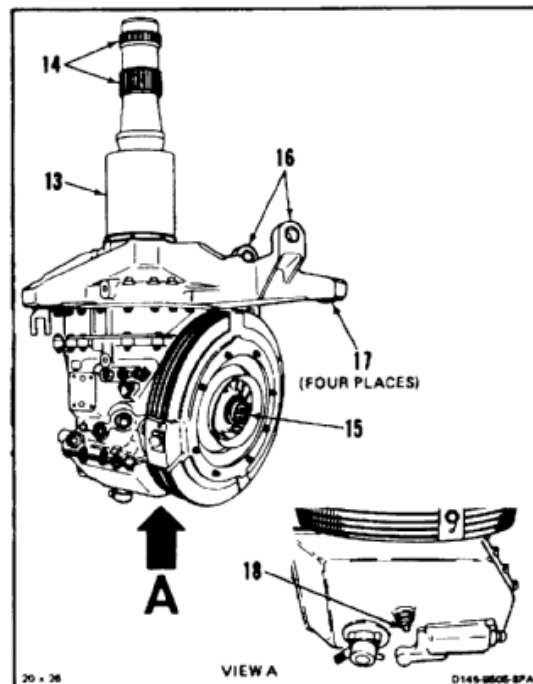
**WARNING**

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

**CAUTION**

Touching splines with bare fingers can cause corrosion.

10. Remove corrosion preventive compound from slider shaft (13), rotor shaft splines (14), input shaft splines (15), and bushings (16 and 17). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
11. Push in drain valve (18), twist it, and pull. Let residual oil drain into container. Push in valve, twist it, and pull down to close.



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Assemble forward transmission (Task 6-50).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Rotor Head Controls Sling (T14)  
 Work Hoist  
 Wrench, 1-1/16 Inch  
 Wrench, 1-7/16 Inch  
 Torque Wrench, 5 to 50 Inch-Pounds  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Torque Wrench, 150 to 750 Inch-Pounds

**Materials:**

Lockwire (E231)  
 Antiseize Compound (E75)  
 Grease (E190)  
 Brush (E86)  
 Cloth (E120)  
 Dry Cleaning Solvent (E162)  
 Oil (E253, E254, or E254.1)

**Parts:**

Cotter Pins

**Personnel Required:**

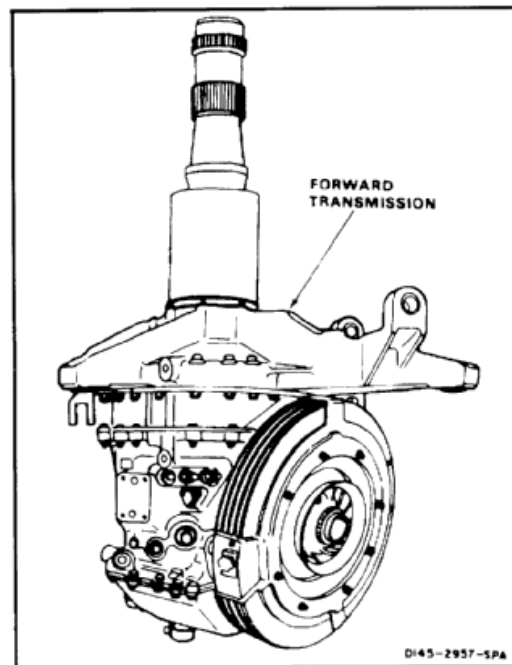
Medium Helicopter Repairer (3)  
 Inspector

**References:**

TM 1-1500-204-23  
 TM 55-1520-240-23P  
 Task 6-129  
 Task 11-212

**General Safety Instructions:****WARNING**

Antiseize compound (E75) can form toxic vapors if exposed to flame. Use only with adequate ventilation, away from open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



**INSTALL BELLCRANKS****WARNING****FLIGHT SAFETY PARTS**

This is an installation critical flight safety part. All aspects of its assembly and installation must be insured at each joint connection and mounting to the transmission assembly.

Ensure that bushings and dowel pins are properly installed.

Ensure mounting bolts attaching support to the transmission are properly torqued and lockwired.

Ensure proper attaching hardware (impedance type bolt, nut and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pin.

Loose attachments within flight control primary linkage will degrade aircraft control, missing components will cause loss of control.

1. Position left bellcrank (1) and support (2).
2. Install four bolts (3) and washers (4). Torque bolts to **190 inch-pounds**. Lockwire bolts on each side of support in pairs. Use lockwire (E231).

**WARNING****FLIGHT SAFETY PARTS**

This is an installation critical flight safety part. All aspects of its assembly and installation must be insured at each joint connection and mounting to the transmission assembly.

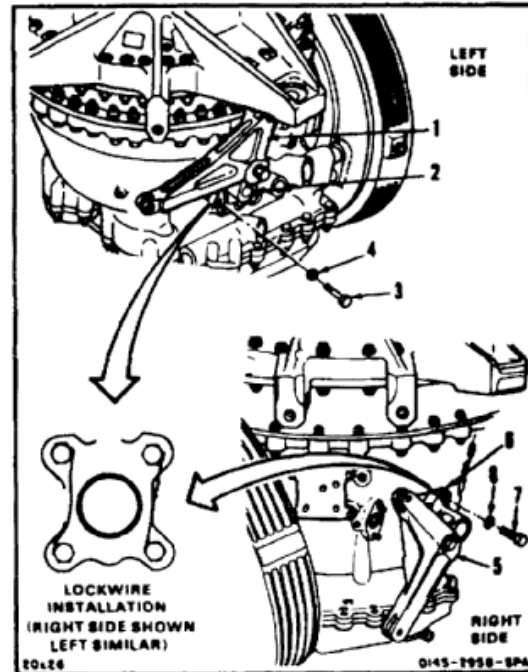
Ensure that bushings and dowel pins are properly installed.

Ensure mounting bolts attaching support to the transmission are properly torqued and lockwired.

Ensure proper attaching hardware (impedance type bolt, nut and washers) is installed including verification of bolt head orientation, torque, and installation of cotter pin.

Loose attachments within flight control primary linkage will degrade aircraft control, missing components will cause loss of control.

3. Position right bellcrank (5) and support (6).
4. Install four bolts (7) and washers (8). Torque bolts to **190 inch-pounds**. Lockwire bolts on each side of support in pairs. Use lockwire (E231).



**INSTALL PIVOTING SERVOCYLINDER****CAUTION**

Do not band tubes on servocylinder during removal of check valves.

**NOTE**

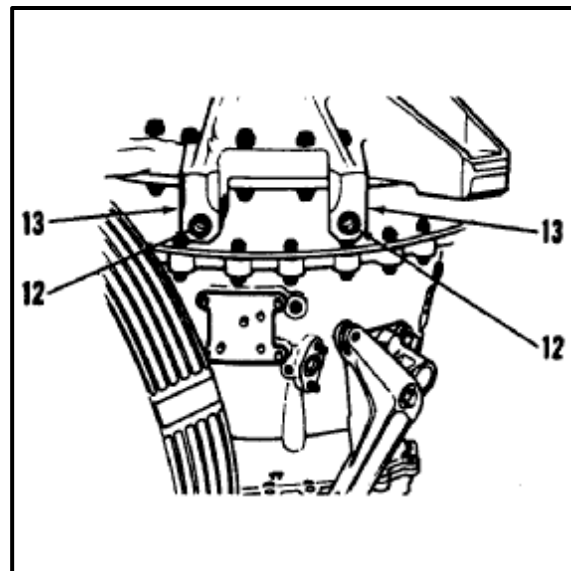
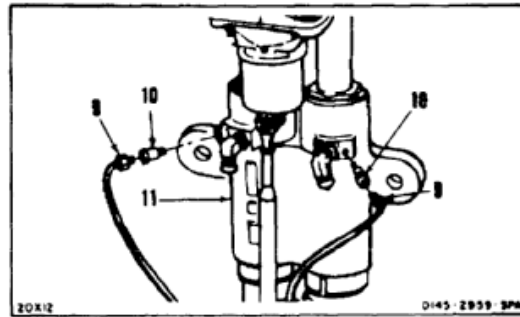
Check valves must be removed for clearance.

5. Disconnect two tubes (9) from check valves (10). Remove check valves from servocylinder (11).

**WARNING**

If bushings are not installed, loss of helicopter, personal injury or loss of life can result.

6. Check that bushings (12) are securely installed in both inboard and outboard lugs (13). Check that bushings in outboard lugs do not protrude beyond inner or outer faces of lugs. If either one does, do not use transmission.



7. Have helper position servocylinder (11) between lugs (13).

**WARNING**

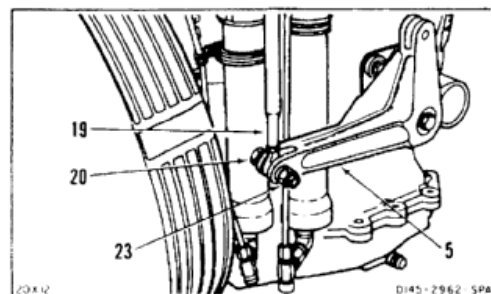
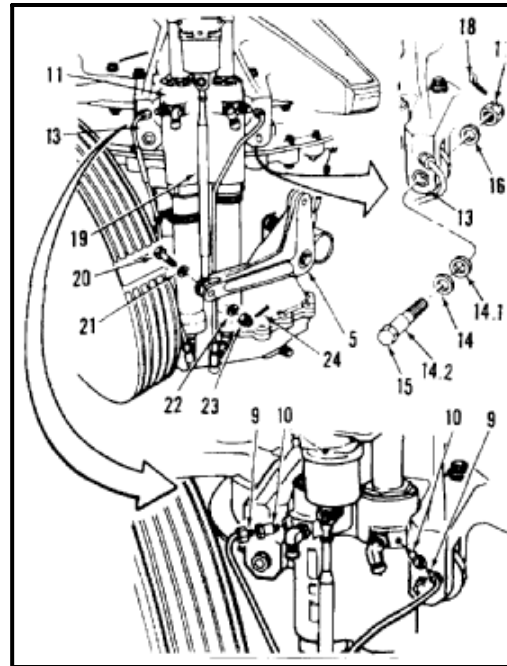
Make sure slip fit bushings are installed on shanks of bolts; otherwise, personal injury, loss of life, or loss of helicopter can result.

**NOTE**

Install countersunk washers with countersink against bolthead.

Two washers may be used under nut to install cotter pin.

8. Check that countersunk washer (14), washer (14.1) and slip fit bushing (14.2) are installed on shank of each bolt (15). Install bolts through lugs (13). Install one or two washers (16) and nut (17) on each bolt.
9. Torque bolts (15) to **320 to 720 inch-pounds**. Install cotter pins (18).
10. Install two check valves (10). Connect tubes (9) to valves.
11. Position link (19) in bellcrank (5).
12. Install bolt (20), head inboard, steel washer (21) under bolt head, aluminum washer (22), and nut (23). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (24).
13. Check link (19) and bellcrank (5). There shall be no axial looseness between them.
14. Check bolt (20) and nut (23). Torque needed to turn bolt and nut shall be at least **10 inch-pounds**.



**INSTALL SWIVELING SERVOCYLINDER****WARNING**

If slip bushing is not installed, loss of helicopter, personal injury or loss of life can result.

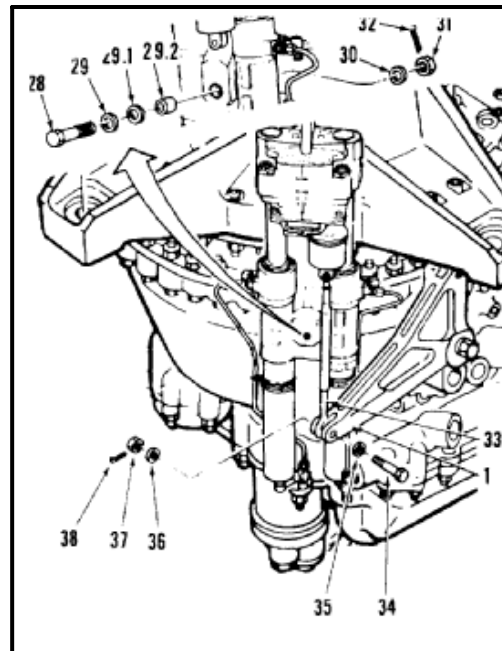
15. Check that bushings (25) are installed in lugs (26).

**NOTE**

Two washers may be installed under nut to allow for cotter pin installation.

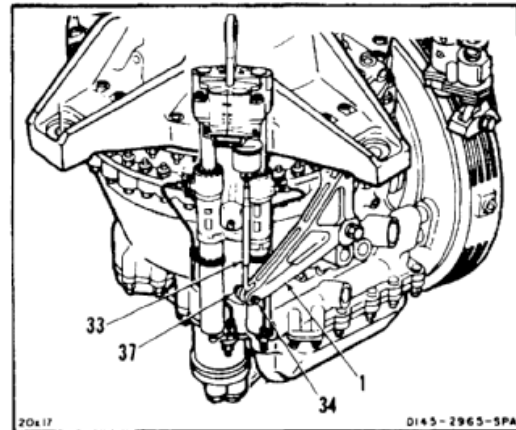
Install countersunk washers with countersink against bolthead.

16. Have helper position servocylinder (27) in lug (26).
17. Install bolt (28) with countersunk washer (29), washer (29.1) and slip bushing (29.2) through lugs (26). Install one or two washers (30) and nut (31) on bolt.
- 17.1. Torque bolt (28) to **320 to 720 inch-pounds**. Install cotter pin (32).
18. Position link (33) in bellcrank (1).
19. Install bolt (34), head outboard, steel washer (35) under bolthead, aluminum washer (36), and nut (37). Torque nut to **30 to 45 inch-pounds**. Install cotter pin (38).



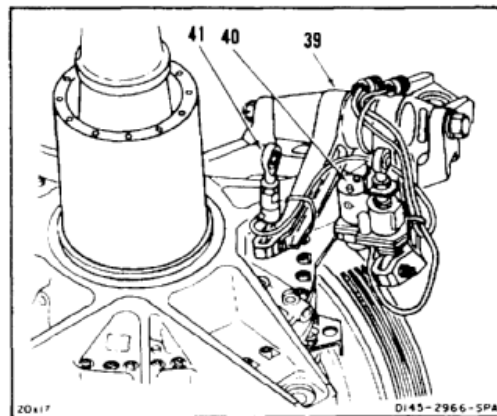


20. Check link (33) and bellcrank (1). There shall be no axial looseness between them.
21. Check bolt (34) and nut (37). Torque needed to turn bolt and nut shall be at least **10 inch-pounds**.



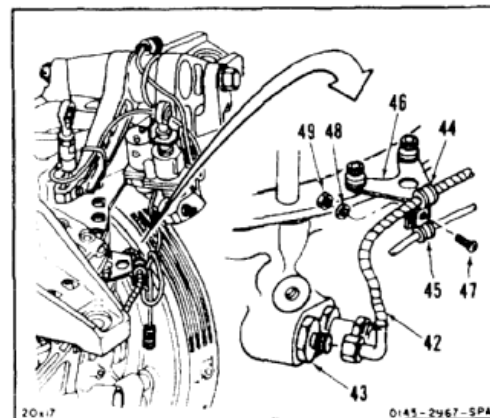
### INSTALL YOKE

22. Install yoke (39) with actuator (40) and link (41) (Task 11-217).



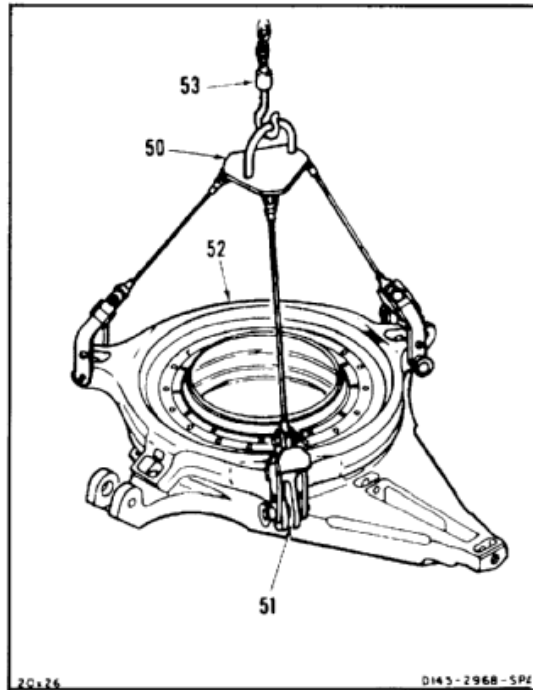
### INSTALL TRANSDUCER OIL HOSE

23. Connect oil hose (42) to reducer (43).
24. Connect hose clamp (44) and cable clamp (45) to bracket (46). Install screw (47), washer (48), and nut (49).



**INSTALL SWASHPLATE**

- 25. Attach sling (T14) (50) to three lugs (51) on swashplate (52). Attach work hoist chain (53) to sling (T14).



**WARNING**

Swashplate is heavy and can injure personnel if it drops. Swashplate must be supported by hoist and moved carefully to prevent injury to personnel.

**CAUTION**

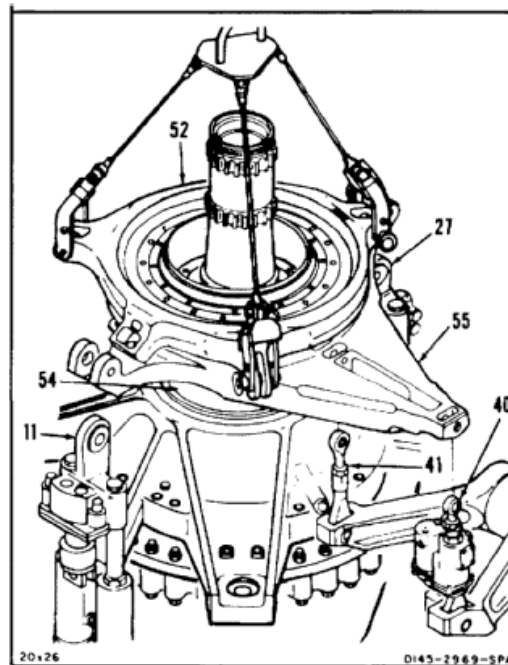
If swashplate hits or binds on slider shaft, shaft or swashplate bearings can be damaged.

- 26. Have helper lower swashplate (52) over slider shaft (54). Do not let swashplate hit or bind on shaft.

**CAUTION**

If actuator or link are twisted, they can be damaged.

- 27. Align lower ring (55) with actuator (40), link (41), and two servocylinders (11 and 27). Do not twist actuator or link.



**CAUTION**

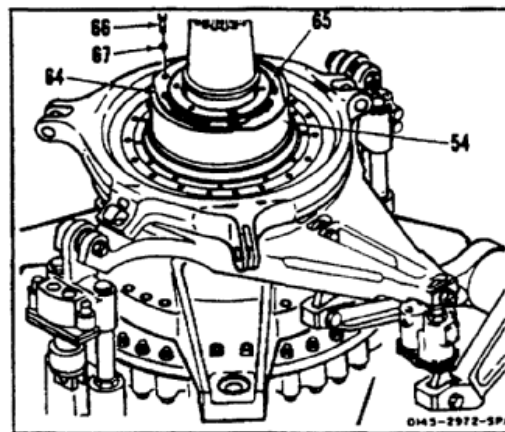
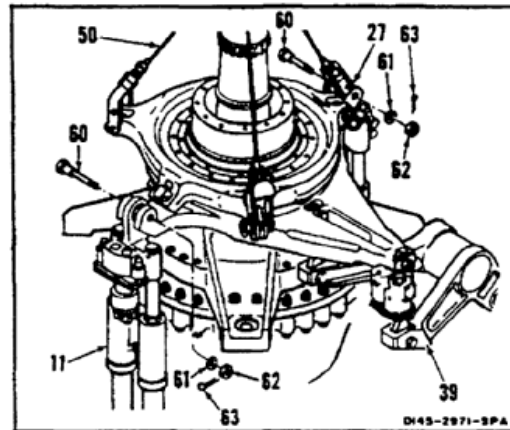
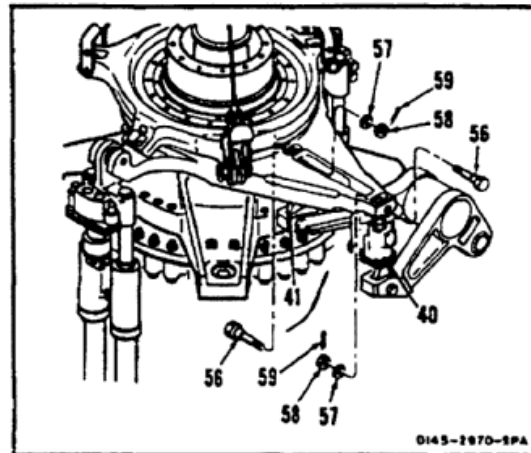
Using standard bolts could result in bolt failure. Damage to parts can result.

28. Coat bushing of special bolts (56) with antiseize compound (E75). Do not coat thread.
29. Install two special bolts (56), with heads away from each other, washers (57), and nuts (58) through upper ends of actuator (40) and link (41). Torque the nuts to **400 to 660 inch-pounds**. Install cotter pin (59). Add a thin washer under the nut if needed to install the cotter pin.
30. Coat bushing of special bolts (60) with antiseize compound (E75). Do not coat thread.
31. Install two special bolts (60), heads away from yoke (39), washers (61), and nuts (62) in servocylinders (11 and 27). Torque the nuts to **400 to 600 inch-pounds**. Install cotter pin (63). Add a thin washer under the nut if needed to install the cotter pin.
32. Remove sling (T14) (50).

**WARNING**

Oil (E253, E254, or E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

33. Position seal halves (64 and 65) on shaft (54). Apply a light coat of oil (E253, E254, or E254.1) to the thread of 12 bolts (66). Install the bolts and washers (67). Ensure that a minimum clearance of **0.050 inch** exists between the rubber seal and the surface of the rotor shaft. If a minimum clearance does not exist, move seal (64 or 65) radially as far away from the shaft as possible and recheck clearance. Torque the bolts to **60 inch-pounds**.
34. Lockwire six bolts (66) on each half of seal (64) in two groups of three bolts each. Use lockwire (E231).



**INSTALL COVER, LINKS, AND DRIVE ARMS**

**WARNING**

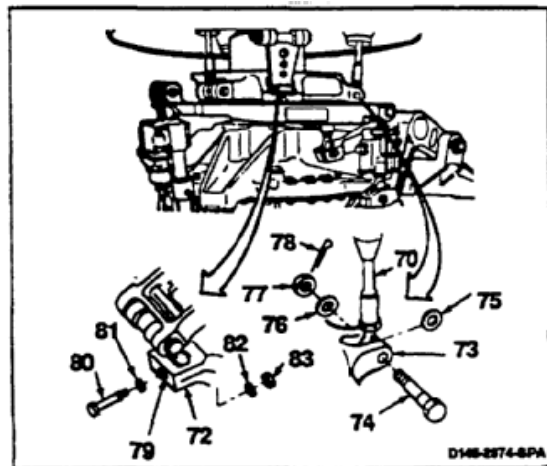
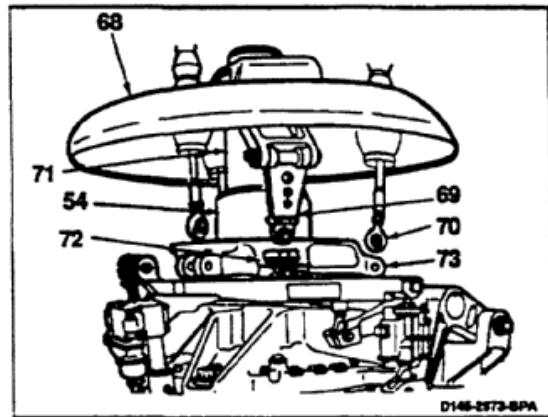
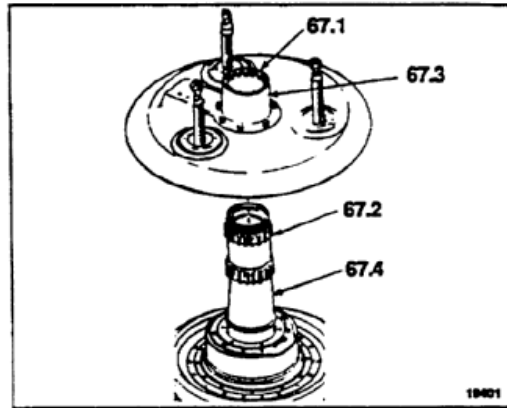
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

- 34.1. Clean splines (67.1 and 67.2) of drive collar (67.3) and shaft (67.4). Use solvent (E162) and cloths (E120).
- 34.2. Apply a thick coat of grease (E190) to splines (67.1 and 67.2). Use brush (E86). Make sure splines are full of grease.

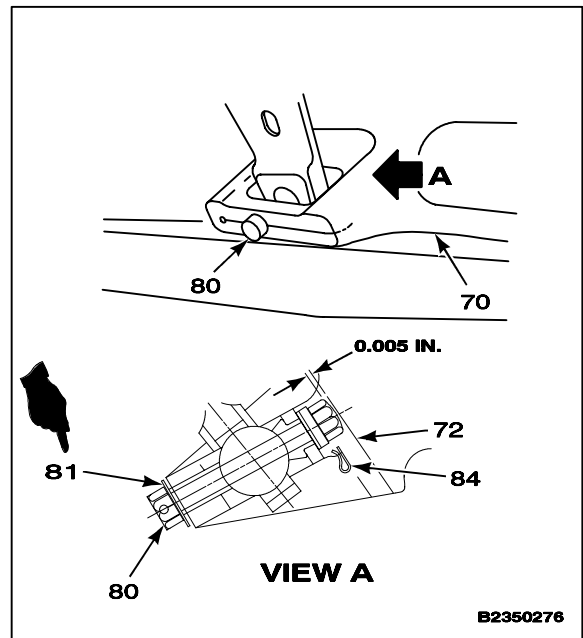
**CAUTION**

If arm hits slider shaft, shaft can be damaged.

- 35. Have two helpers lower cover (68), with lower drive arm (69) and three links (70) attached, over rotor shaft (71). Do not let drive arm hit slider shaft (54).
- 36. Position drive arm (69) in swashplate lug (72) marked FWD ROTOR. Position three links (70) in lugs (73).
- 37. Install each of three links (70) as follows:
  - a. Coat bushing of bolt (74) with antiseize compound (E75). Do not coat thread.
  - b. Install limiter (75) between link (70) and lug (73), flat side against lug.
  - c. Install bolt (74), washer (76), and nut (77). Torque nut to **400 to 660 inch-pounds**. Install cotter pin (78).
- 38. Check that bushing (79) is installed in lug (72).
- 39. Install bolt (80), thin washer (81), washer (62) and nut (83). Torque bolt to **190 to 270 inch-pounds** as needed for cotter pin alignments.



- 40. Check clearance between end of bolt (80) and inside of lug (72). Clearance shall be at least **0.005 inch**. Add washers (81) under bolthead as needed.
- 41. Install cotter pin (84) in bolt (80). Lockwire bolt to hole in right side of lug (72). Use lockwire (E231).



**RETORQUE AUXILIARY OIL FILTER**

- 42. Remove lockwire from auxiliary oil filter (86).

**NOTE**

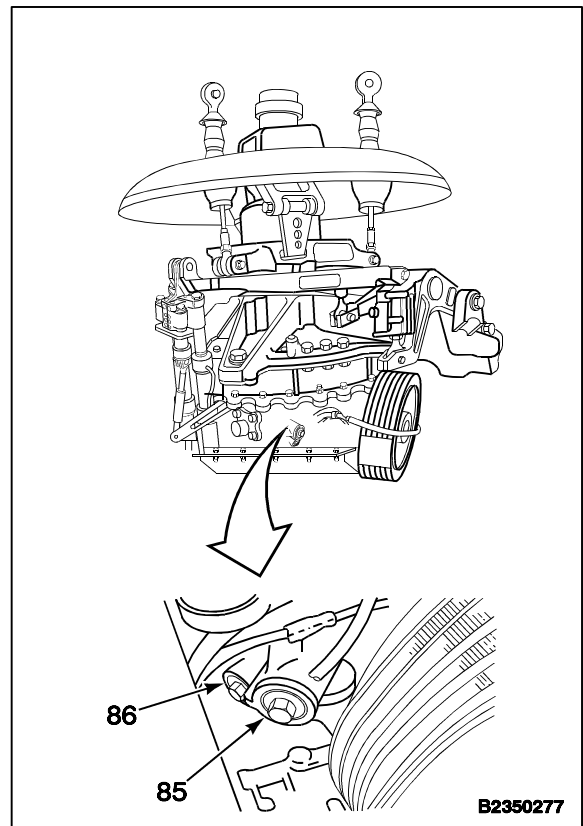
Do not remove filter.

- 43. Check wrenching flats on filter (86). If they are damaged, replace filter (Task 6-129).
- 44. Loosen filter (86) **1/2 turn**. Torque filter to **80 inch-pounds**.
- 45. Lockwire filter (86) to inlet screen (85). Use lockwire (E231).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

- Inspect servocylinders (Task 7-123).
- Install rotary-wing head (Task 5-9).
- Inspect forward and aft rotor shaft splines (Task 6-68).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Hoisting Eye (T32)
- Work Hoist
- Torque Pack (T23)
- Torque Reactor Assembly (T159)
- Tee Handle (T161)
- Open-End Wrench, 1 Inch
- Rope Guide Lines
- Torque Wrench, 5-50 Inch-Pounds
- Torque Wrench, 30-150 Inch-Pounds

**Materials:**

- Lockwire (E229)
- Grease (E190)
- Crocus Cloth (E122)

**Personnel Required:**

- CH-47 Helicopter Repairer (3)
- Inspector

**References:**

TM 55-1520-240-23P

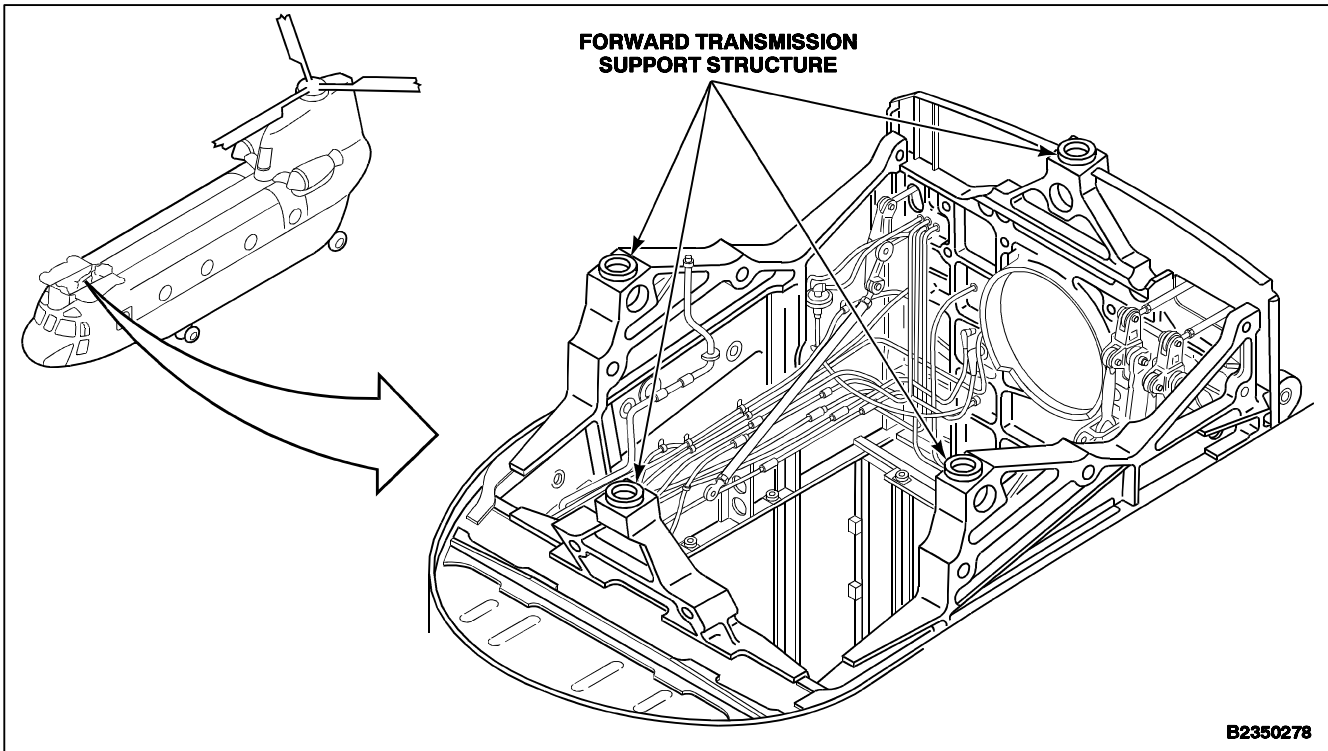
**General Safety Instructions:**

**WARNING**

Make sure ratchet selector on torque pack is set to NUT ON before applying torque. Changing ratchet setting with torque applied can damage unit and can cause injury to personnel.

**WARNING**

Do not install pumps with serial numbers V534 through V598. ASAM 96-08 directed removal of these pumps. If found, these pumps are to be removed from service and returned for rework. If the lubrication pump has a "RW" suffix to the pump serial number, the pump has been reworked and is acceptable for use.



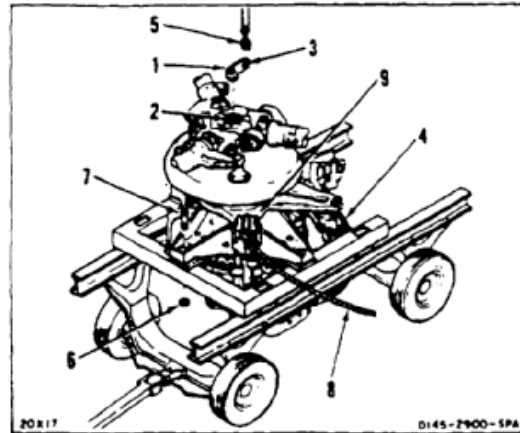
**MOUNT TRANSMISSION**

Check the forward or aft transmission Serial numbers for a "MG". A "MG" after the serial number is required on the forward and aft transmissions for non restrictive flight.

**NOTE**

Hoisting eye must trail aft to keep transmission at proper angle for installation.

1. Install hoisting eye (T32) (1) in shaft (2) so that FWD XMSN hole (3) points toward oil cooler (4).
2. Connect work hoist (5) to FWD XMSN hole (3) of hoisting eye (T32) (11).
3. Remove three nuts (6) and bolts (7).
4. Attach two rope guide lines (8) to transmission (9).



**WARNING**

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

5. Raise transmission (9) and center it over support structure (10). Check that hoisting eye (T32) (1) points aft. Have helpers guide transmission with guide lines (8).

**WARNING****FLIGHT SAFETY PARTS**

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

Ensure transmission is suspended **1 inch** above structure when installing each of the bolts (14). This will help provide proper alignment of the transmission and reduce possible scoring of bolt shank.

After transmission is lowered on to structure, ensure each bolt (14) is torqued to **885 foot-pounds**. Proper torquing of the bolts (14) ensures proper distribution of flight loads through the structure.

If the torque requirements are not met, the bolts (14) can disengage and allow the transmission to separate from the aircraft structure.

**NOTE**

While lowering transmission, turn it as needed for clearance.

6. Carefully lower transmission (9). Have helpers align mounting hole (11) in each of four lugs (12) with hole (13) in structure (10). Keep lugs about **1 inch** off structure.

**NOTE**

Refer to Task 1-13, step 8, for re-use of barrel nuts.

Before installing the forward transmission assembly in the aircraft, inspect the four mounting bolts (14) for skip or continuous spiral score marks on the bolt shank outside diameters. Scoring is acceptable provided that the score marks are not greater than **0.005 inch** deep and/or no wider than **0.060 inch** wide. Any raised material must be lightly polished. Use crocus cloth (E122) to remove the material from the bolt shanks. Also inspect the four bushings (11.1) in the transmission cover and the four bushings (13.2) in the structure for score marks and burrs. Lightly polish, use crocus cloth (E122) to remove any raised material.

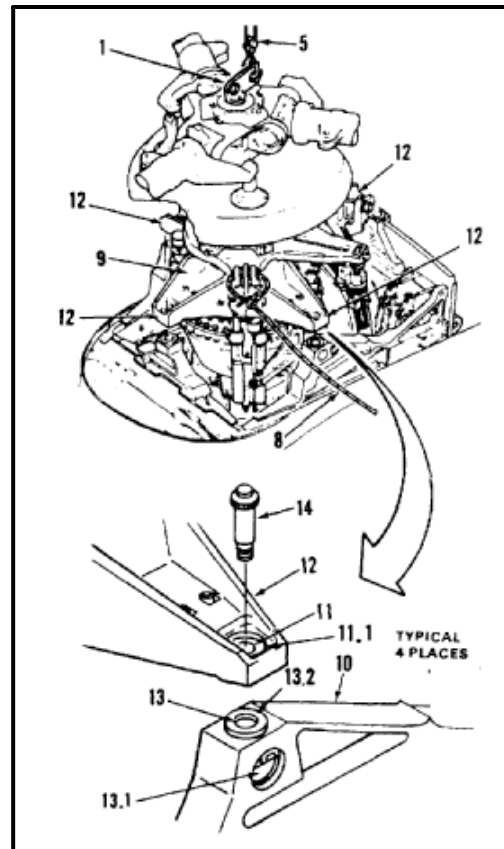


7. Coat shank and thread of four mounting bolts (14) with grease (E190). Install four mounting bolts in mounting holes (11). Use bolts as guide pins to center holes (11) in lugs (12) with holes (13) and barrel nut (13.1) in structure (10).



Do not force bolts. If bolts cannot be installed by hand, transmission and structure are not aligned. Bolts can be damaged.

8. Have helpers tighten each bolt (14) at least **7 turns** by hand while slowly lowering transmission (9). Shift transmission as needed for alignment. When bolts are tight, relax tension on hoist (5). Remove lines (8).



**TORQUE BOLTS****NOTE**

Socket assembly, torque applicator, and reactor are part of torque reactor assembly (T159).

9. Torque left bolt (14) as follows:
  - a. Install socket assembly (14.1) on left bolt (14).
  - b. Install torque applicator (15) over square drive of socket assembly (14.1) with large hole aft of assembly. Observe THIS SIDE UP stamping on applicator.
  - c. Install sleeve (15.1) on aft end of applicator (15). Insert two pins (15.2) through sleeve and adapter.
  - d. Install aft end of sleeve (15.1) in center block (15.3) of reactor (16). Install socket at end of reactor on aft bolt (16.1).
  - e. Install pin (16.2) through center block (15.3) and applicator (15).
  - f. Set ratchet selector (16.3) at bottom of torque pack (T23) (16.4) to NUT ON.
  - g. Install torque pack (T23) (16.4) on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into two holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

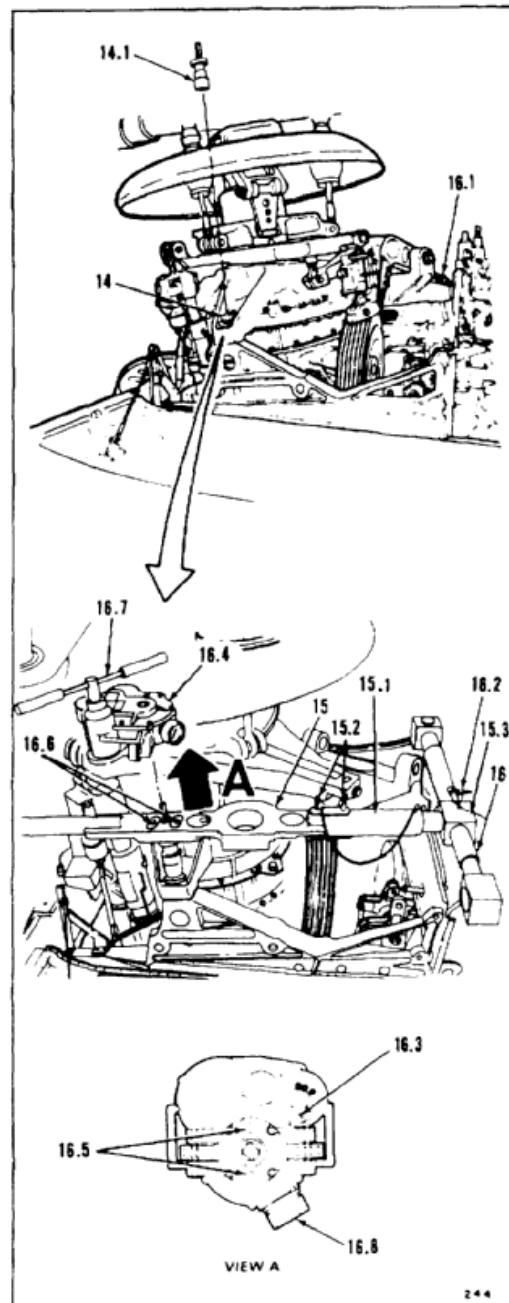
**WARNING**

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can personnel.

**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

- h. Set tee handle (T161) (16.7) to ON. Turn handle clockwise until indicator (16.8) reads **885 foot-pounds**.
- i. Set tee handle (T161) (16.7) to OFF. Turn handle counterclockwise until indicator (16.8) reads **0**. Check that torque pack (T23) (16.4) is loose on bolt (14).
- j. Remove torque pack (16.4) and torque reactor assembly (T159).
- k. Remove sleeve (15.1) from applicator (15).



- 9.1. Torque aft bolt (16.1) as follows:
- Install socket assembly (14.1) on aft bolt (16.1).
  - Install torque applicator (15) over square drive of socket assembly (14.1) with large hole at left of assembly. Observe THIS SIDE UP stamping on applicator.
  - Install left end of applicator (15) in end block (16.9) of reactor (16). Install socket at end of reactor on left bolt (14).
  - Install pin (16.2) through end block (16.9) and applicator (15).
  - Check that ratchet selector (15.4) on torque pack (T23) (16.4) is set to NUT ON.
  - Install torque pack (T23) (16.4) on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use handle (T161) (16.7).

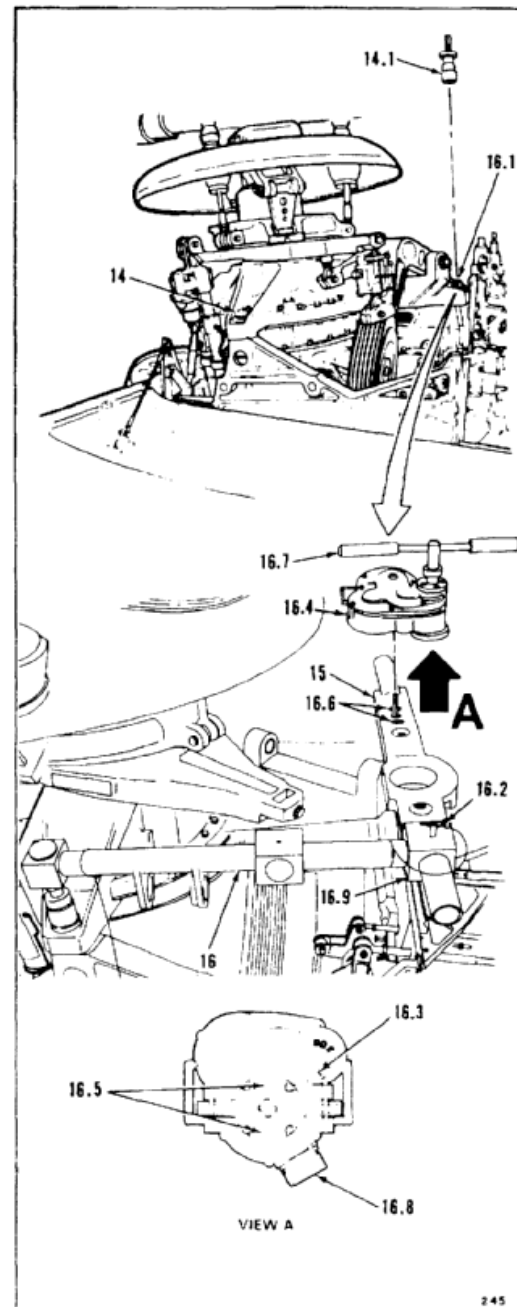
**WARNING**

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

- Set tee handle (T161) (16.7) to ON. Turn handle clockwise until indicator (16.8) reads **885 foot-pounds**.
- Set tee handle (T161) (16.7) to OFF. Turn handle (16.7) counterclockwise until indicator (16.8) reads **0**. Check that torque pack (T23) (16.4) is loose on bolt (16.1).
- Remove torque pack (16.4) and torque reactor assembly (T159).



- 9.2. Torque right bolt (17) as follows:
- a. Install socket assembly (14.1) on right bolt (17).
  - b. Install torque applicator (15) over square drive of socket assembly (14.1) with large hole forward of assembly. Observe THIS SIDE UP stamping on applicator.
  - c. Install forward end of applicator (15) in center block (15.3) of reactor (16). Install socket at end of reactor on forward bolt (18).
  - d. Install pin (16.2) through center block (15.3) and applicator (15).
  - e. Check that ratchet selector (16.3) on torque pack (T23) (16.4) is set to NUT ON.
  - f. Install torque pack (T23) (16.4) on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

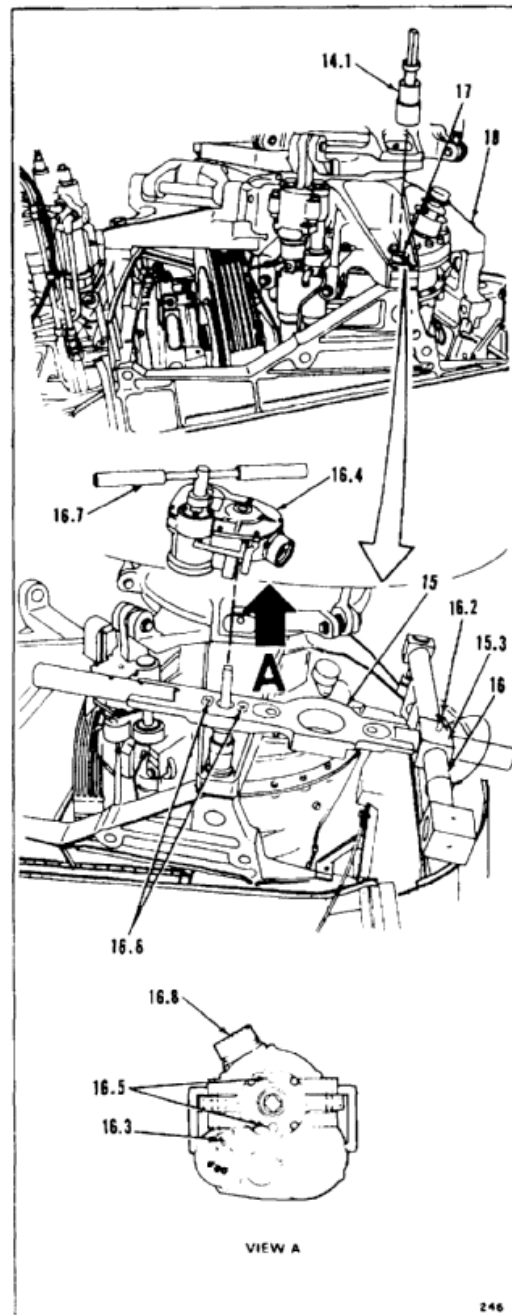
**WARNING**

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

- g. Set tee handle (T161) (16.7) to ON. Turn handle clockwise until indicator (16.8) reads **885 foot-pounds**.
- h. Set tee handle (T161) (16.7) to OFF. Turn handle counterclockwise until indicator (16.8) reads **0**. Check that torque pack (T23) (16.4) is loose on bolt (17).
- i. Remove torque pack (16.4) and torque reactor assembly (T159).



9.3. Torque forward bolt (18) as follows:

- a. Install socket assembly (14.1) on forward bolt (18).
- b. Install torque applicator (15) over square drive of socket assembly (14.1) with large hole at right of assembly. Observe THIS SIDE UP stamping on applicator.
- c. Install right end of applicator (15) in center block (15.1) of reactor (16). Install socket at end of reactor on right bolt (17).
- d. Install pin (16.2) through center block (15.3) and applicator (15).
- e. Check that ratchet selector (16.3) on torque pack (T23) (16.4) is set to NUT ON.
- f. Install torque pack (T23) (16.4) on square drive of socket assembly (14.1). Rotate pack so that two pins (16.5) on bottom fit into holes (16.6) in applicator (15). Use tee handle (T161) (16.7).

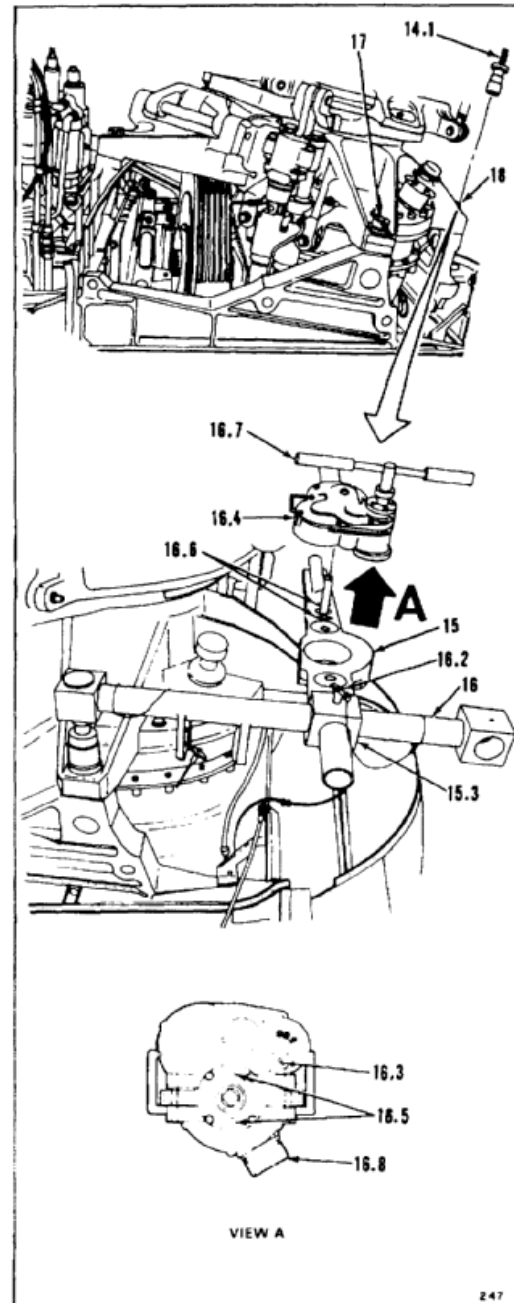
**WARNING**

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

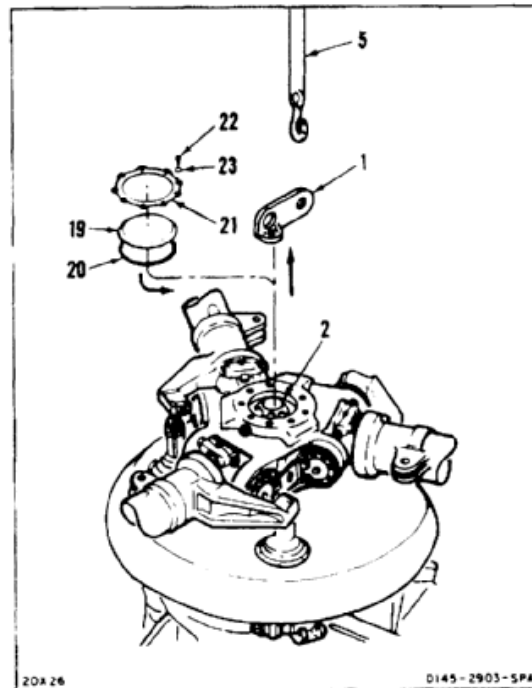
**NOTE**

Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

- g. Set tee handle (T161) (16.7) to ON. Turn handle clockwise until indicator (16.8) reads **885 foot-pounds**.
- h. Set tee handle (T161) (16.7) to OFF. Turn handle counterclockwise until indicator (16.8) reads **0**. Check that torque pack (T23) (16.4) is loose on bolt (18).
- i. Remove torque pack (16.4) and torque reactor assembly (T159).

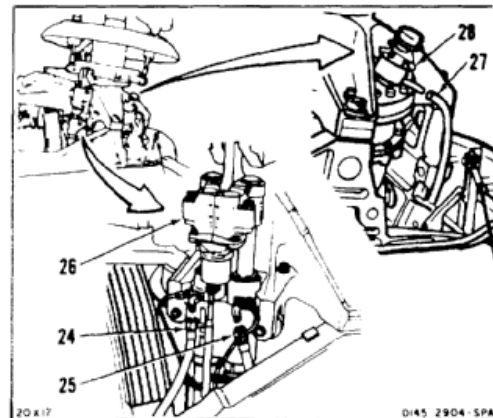


10. Remove work hoist hook (5) from hoisting eye (T32) (1). Remove eye.
11. Position hub nut cover (19), packing (20) and retainer (21) over shaft (2). Install nine screws (22) and washers (23). Torque screws to **20 inch-pounds**.

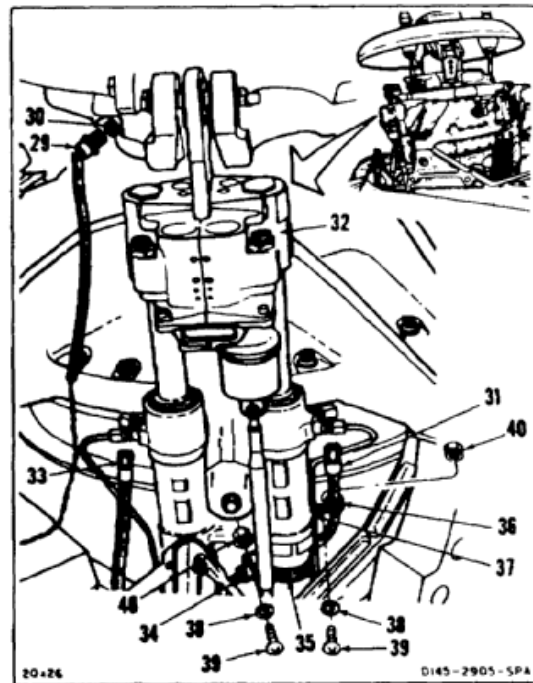


**CONNECT UPPER POINTS**

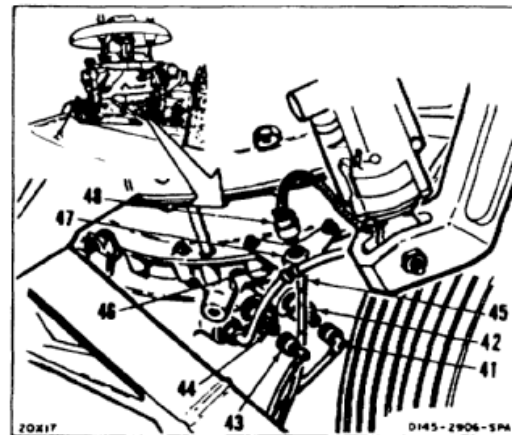
12. Connect hoses (24 and 25) to right servocylinder (26).
13. Connect hose (27) to oil drain cup (28).



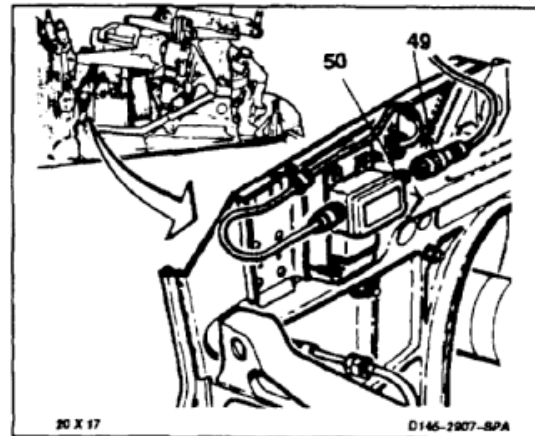
14. Connect electrical connector (29) to phase detector (30). Lockwire connector to detector. Use lockwire (E229).
15. Pass hose (31) behind right side of left servocylinder (32) as shown. Connect hoses (31 and 33) to left servocylinder.
16. Clamp hose (31) to servocylinder (32) by connecting clamp (34) to clamp (35) and clamp (36) to clamp (37). Use two screws (38), washers (39), and nuts (40).



17. Connect electrical connector (41) to AUX PRESS SW (42). Remove tag.
18. Connect electrical connector (43) to MAIN PRESS SW (44). Remove tag.
19. Install electrical connector (45) on bracket (46) from underneath. Secure with nut (47). Lockwire nut to bracket with lockwire (E229).
20. Connect electrical connector (48) to connector (45) at bracket (46).



21. Connect electrical connector (49) to signal conditioner (50).



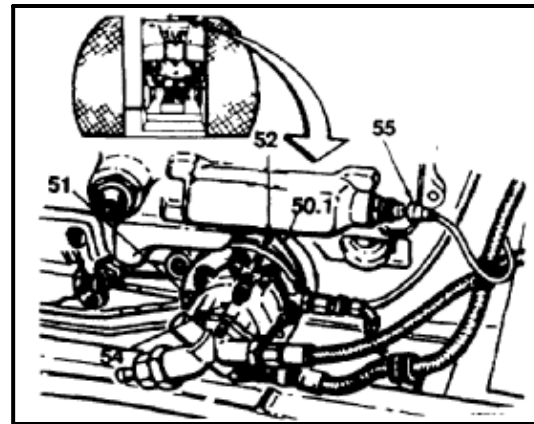
**CONNECT LOWER POINTS**

22. Install gasket (50.1) and pump (51) over studs (52) and nuts (54).
23. Torque nuts (54) to **85 inch-pounds**.

**NOTE**

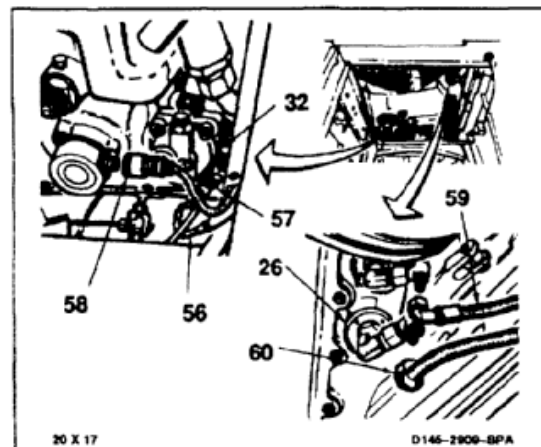
Torque on nuts (54) must be checked for **85 inch-pounds** after the first flight. Do not back off nuts before torquing.

24. Connect oil temperature connector (55).



25. Connect hoses (56 and 57) to left servocylinder (32).
26. Connect chip detector connector (58).
27. Connect hoses (59 and 60) to right servocylinder (26).

**INSPECT**





***FOLLOW-ON MAINTENANCE:***

Install forward connecting links (Task 11-195).  
Install forward transmission adapter assembly (Task 6-8).  
Install No. 1 and No. 2 drive shafts (Tasks 6-17 and 6-18).  
Install forward transmission oil cooler air inlet duct (Task 6-122).  
Install forward transmission fairing (Task 2-67 and 2-68).  
Install rotary-wing blades (Task 5-84).  
Service transmission (Task 1-54).  
Perform ground run (TM 55-1520-240-10).  
Install forward transmission drip pan (Task 2-3).  
Perform neutral rig check (Task 11-33).  
Bleed flight control hydraulic system (Task 7-16).  
Perform after-maintenance special inspection (Task 1-92).  
Check torque on hydraulic pump mounting nuts after first flight (step 23).

END OF TASK



**SECTION IV**  
**AFT ROTARY-WING DRIVE SHAFT**

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

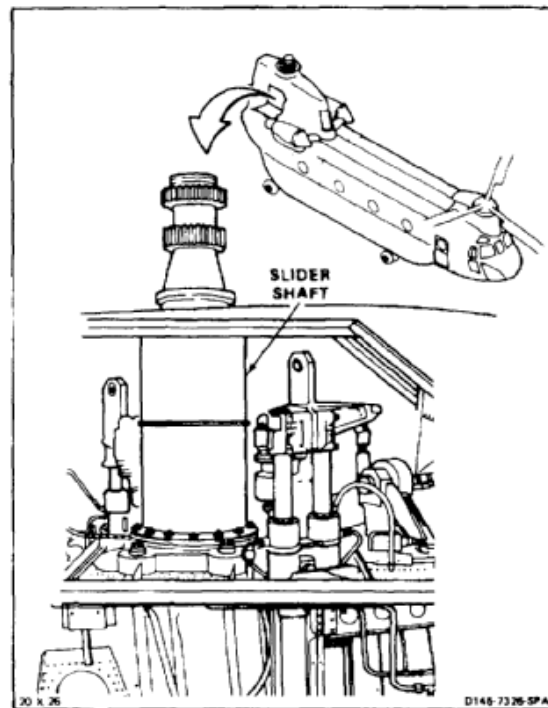
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

**Materials:**Barrier Material (E81)  
Tape (E388)**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Aft Pylon Work Platforms Open (Task 2-2)  
 Aft Rotary-Wing Blades Removed (Task 5-64)  
 Aft Rotary-Wing Head Removed (Task 5-8)  
 Aft Weather-Protective Cover Removed (Task 5-136)  
 Aft Drive Collar Removed (Task 5-100)  
 Aft Drive Arms Removed (Task 5-101)  
 Aft Swashplate Removed (Task 5-117)



1. Remove 16 nuts (1) and washers (2) from base of slider shaft (3).

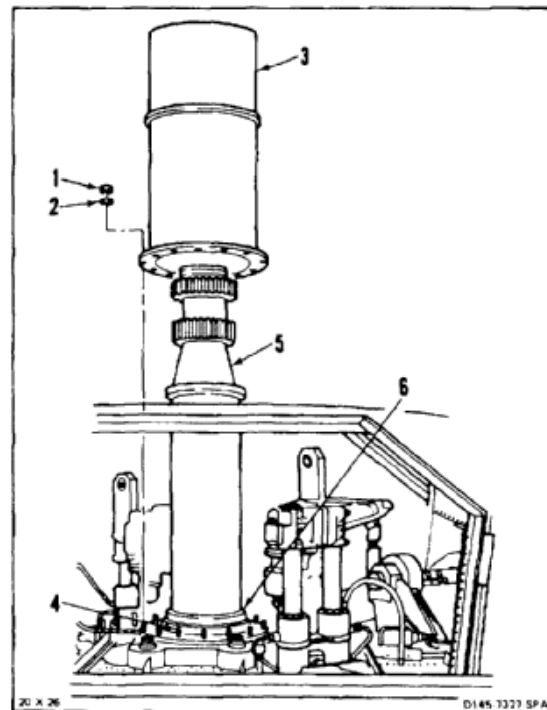


Handle slider shaft carefully. Polished surface is easily damaged.

2. Lift slider shaft (3) from support (4). Strike side of slider shaft with hand or soft-faced mallet while lifting as needed to loosen shaft. Remove shaft from aft rotor shaft (5).
3. Cover exposed seal (6) with barrier material (E81) and tape (E388).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Dial Indicating Gage 643J  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Gloves (E184.1)  
Acetic Acid (E21)  
Alodine Power (E65)  
Epoxy Primer (E292 or E293)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

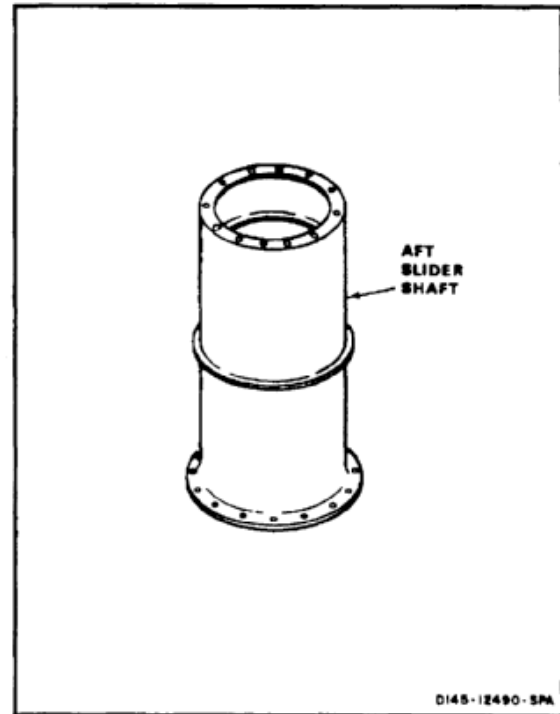
Off Helicopter Task

**General Safety Instructions:****WARNING**

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

**CAUTION**

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

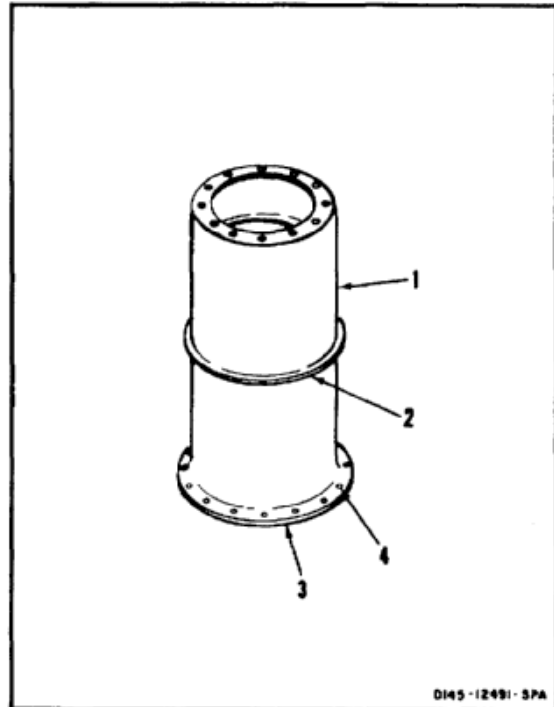


1. Clean oil and grease from slider shaft (1). Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. Inspect surface of slider shaft (1) for nicks, scratches, and minor pitting or corrosion of coating. Observe the following definitions:
  - a. Nick — A surface indentation with a sharp crease at the bottom. Surface finish is not broken. Caused by pressure or impact from a hard object with a sharp edge.
  - b. Scratch — A light, narrow mark on the surface. Surface finish is broken, but not removed. Caused by a hard, sharp particle moving across the surface.
  - c. Pit — A small irregular cavity where material is removed from the surface. Usually caused by corrosion. Pits are usually dark in appearance.
  - d. Corrosion — A broken or pitted surface, discolored around the edge. Corrosion is caused by chemical action.
3. Note extent and location of damage:

**NOTE**

Limits in this step refer to depth of damage after rework.

- a. Depth of damage above flange (2) (bearing surface) shall not be more than **0.020 inch**. Depth of damage below flange shall not be more than **0.025 inch**.
- b. Damage shall not extend from shaft surface to mounting flange (3).
- c. Damage on mounting flange (3) shall not be closer than **1.00 inch** to any mounting hole (4).



## 6-52.1 REPAIR AFT SLIDER SHAFT (Continued)

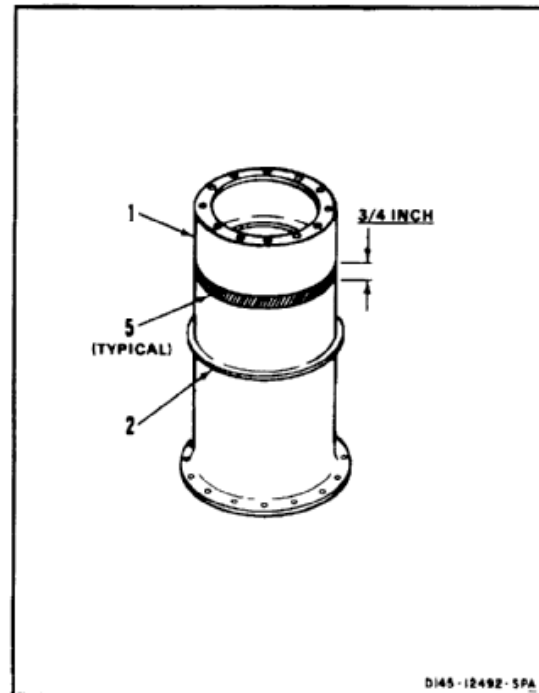
6-52.1

- d. Sum of length plus width of any one damaged area shall not be more than **1-1/4 inches**.
  - e. Distance between two damaged areas shall not be less than half the length of the larger area.
  - f. In that part of shaft (1) above flange (2), there shall be no more than 20 damaged areas in any **3/4 inch** wide band (5) around shaft (1). There shall be no more than five damaged areas in any quarter-section of the band. The total of length plus width of all five areas shall not be more than **5-1/2 inches**.
  - g. There shall be no more than 75 damaged areas over entire shaft (1).
  - h. Damaged areas may exceed the above limits to include wear over the total surface of the slider above the flange provided maximum depth of damage does not exceed **0.008 inch**.
4. Fluorescent inspect damaged area to check for cracks. (Refer to TM 1-1500-335-23.) There shall be no cracks. If a crack is suspected in aft transmission slider shaft, refer to TM 1-1520-253-23.
  5. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 3.
  6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
  7. Acid etch the reworked area as follows:

**WARNING**

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

- a. Prepare a solution of **3 parts** acetic acid (E21) to **7 parts** water. Wear gloves (E184.1) and goggles.
- b. Swab the area with solution for **2 minutes**. Use gauze sponges (E184).
- c. Rinse the area with cold water.



8. Fluorescent inspect the reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If a crack is suspected in aft transmission slider shaft, refer to TM 1-1520-253-23.
9. Apply surface treatment to the reworked area as follows:
  - a. Clean the area with naphtha (E245) and clean cloths (E120). Let the area air dry. Wear gloves (E184.1).

**WARNING**

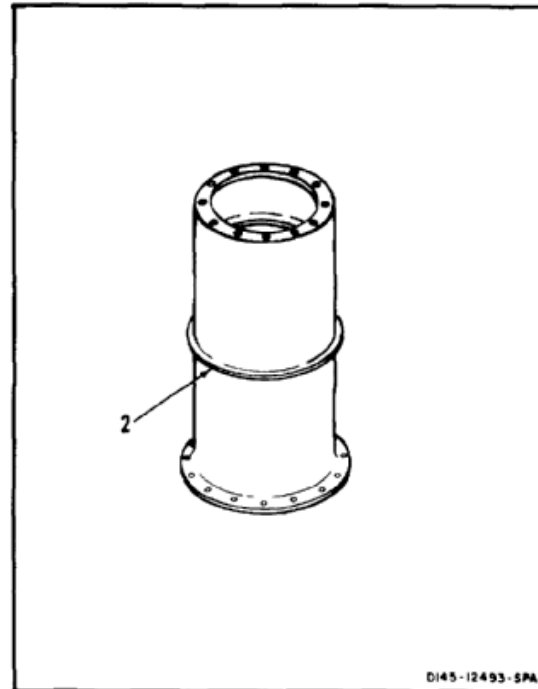
Alodine powder (E65) is an oxidizer. Discard cloths which contain this material in a separate container. If discarded with cloths contaminated with acetone, MEK, or other organic solvents, combustion can result. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**.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

- b. Swab solution of alodine powder (E65) in water on the area. Swab for **2 to 5 minutes**. Use gauze sponges (E184). Wear gloves (E184.1).
- c. Rinse the area with cold water. Let air dry.

**WARNING**

Epoxy primer (E292 and E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing, in case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

- d. If the reworked area is below flange (2), apply epoxy primer (E292 or E293). Wear gloves (E184.1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK



**6-53 REMOVE AFT ROTOR SHAFT UPPER SEAL (AVIM)**

6-53

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Work Hoist  
 Hoisting Eye (T32)  
 Wood Plank, 2 Inches x 4 Inches x 36 Inches  
 Phenolic Wedge  
 Gun Heater  
 Pyrometer

**Materials:**

Cloths (E120)  
 Dry Cleaning Solvent (E162)  
 Gloves (E184.1)  
 Kevlar Gloves (E187)

**Personnel Required:**

Medium Helicopter Repairer  
 Aircraft Powertrain Repairer

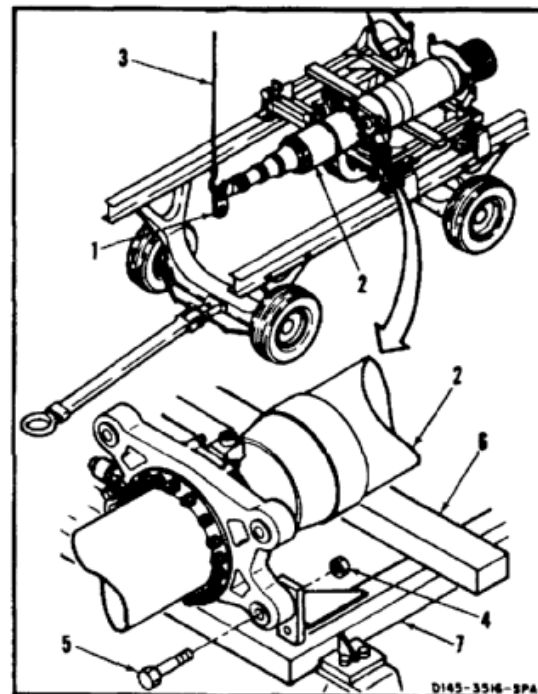
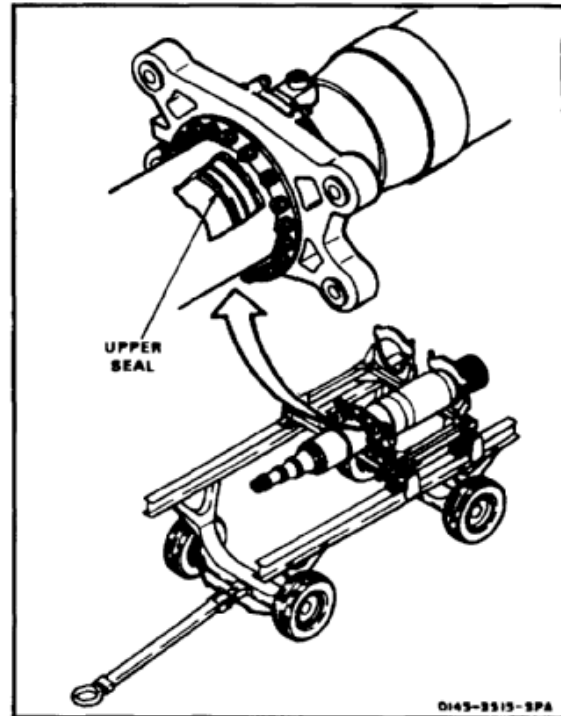
**Equipment Condition:**

Off Helicopter Task  
 Aft Rotor Shaft Installed Horizontally in Adapter (T18)

**General Safety Instructions:****WARNING**

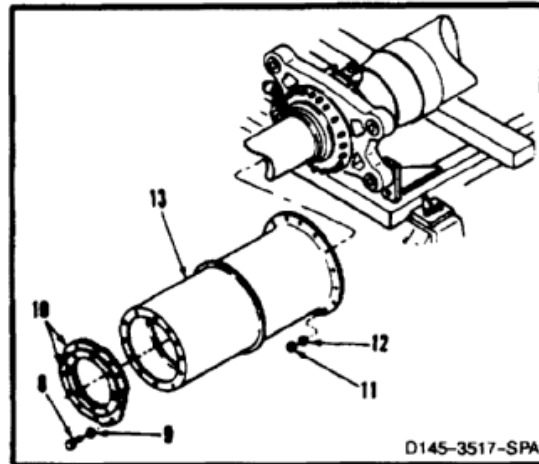
Wear Kevlar gloves (E187) when handling heated parts.

1. Install hoisting eye (T32) (1) in shaft (2).
2. Connect hoist cable (3) to eye of hoisting eye (T32) (1) marked AFT SHAFT. Have helper raise hoist to remove slack from cable.
3. Remove two nuts (4) and bolts (5).
4. Have helper lift shaft (2) enough to insert wood plank (6) between shaft and adapter (T18) (7).
5. Have helper lower shaft (2) on plank (6).
6. Remove hoist cable (3) and hoisting eye (T32) (1).



**REMOVE SLIDER SHAFT**

7. Remove lockwire, from 12 bolts (8). Remove bolts end washers (9).
8. Remove both halves of seal (10).
9. Remove 16 nuts (11) and washers (12).
10. Remove slider shaft (13). If needed, heat base of slider shaft to **230° to 250°F (110° to 120°C)**. Use a heat gun and measure temperature with a pyrometer. If needed, use a phenolic wedge to lift the shaft.

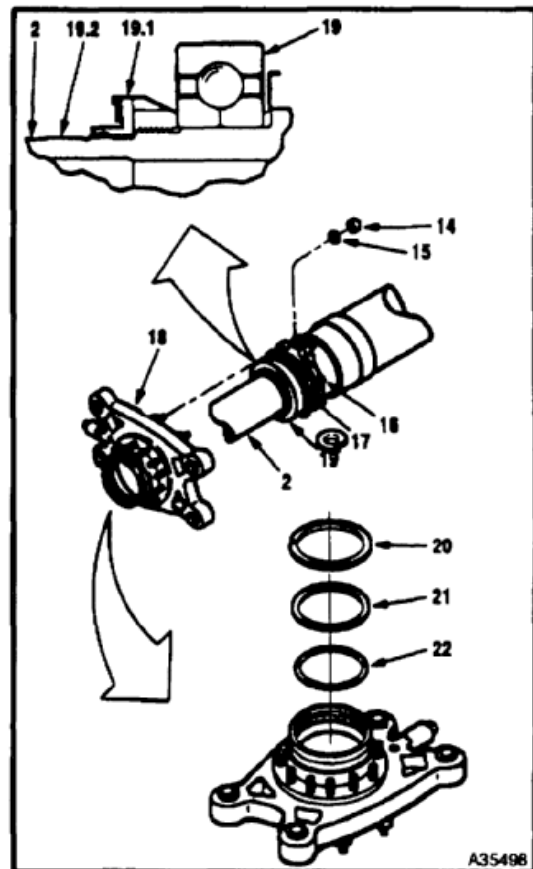
**REMOVE SEAL**

11. Remove 10 nuts (14) and washers (15) from bearing retainer (16). Pull retainer and packing (17) away from support (18).
12. Remove support (18) from bearing (19). Use a soft-faced mallet. If needed, heat support to **230° to 250°F (110° to 120°C)**. Use a heat gun and measure temperature with pyrometer.
13. Slide support (18) from shaft (2).

**WARNING**

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

- 13.1. Clean shaft (2) in the area above bearing locknut (19.1). Use cloths (E120) and dry cleaning solvent (E162). Wear gloves (E184.1).
- 13.2. Examine shaft (2) in the area of seal contact for a wear groove (19.2). If there is a groove deeper than **0.005 inch**, reject the shaft.
14. Remove retaining ring (20).
15. Remove seal (21).
16. Remove packing (22).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Oven (250°F) or Gun-Type Heater  
 Pyrometer  
 Brass or Aluminum Drift  
 Hoisting Eye (T32)  
 Work Hoist  
 Source of Low Pressure Compressed Air  
 Container, 2 Quart  
 Adapter (T18)  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Torque Wrench, 150 to 750 Inch-Pounds  
 Stop Watch

**Materials:**

Gloves (E186)  
 Oil (E254)  
 Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Lockwire (E231)  
 Kevlar Gloves (E187)

**Parts:**

Packings  
 Seal

**Personnel Required:**

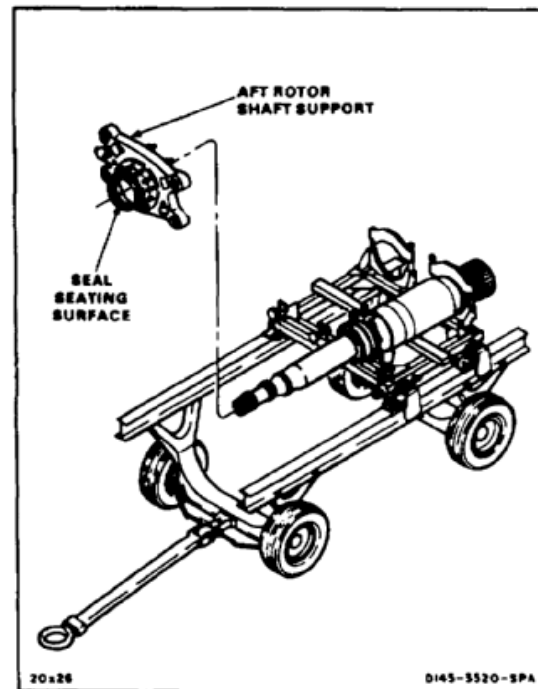
Medium Helicopter Repairer  
 Aircraft Powertrain Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**General Safety Instructions:****WARNING**

Wear Kevlar gloves when handling heated parts.



**INSTALL SEAL****WARNING**

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

1. Clean support (1) with dry cleaning solvent (E162) and cloths (E120). Make sure seal seat (2) and packing groove (3) are clean. Use goggles and wear gloves (E186).

**CAUTION**

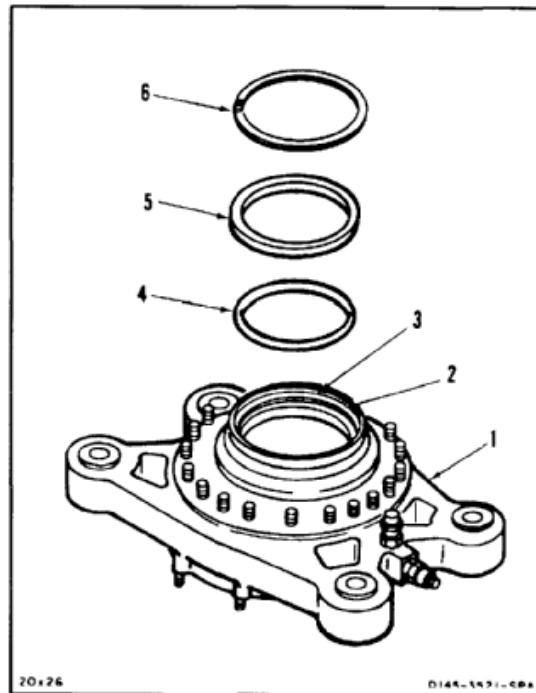
Do not heat support over **250°F (120°C)**. Damage to support can occur.

2. Heat seal seat (2) to **230° to 250°F (110° to 120°C)**. Use heat gun and measure temperature with pyrometer.

**WARNING**

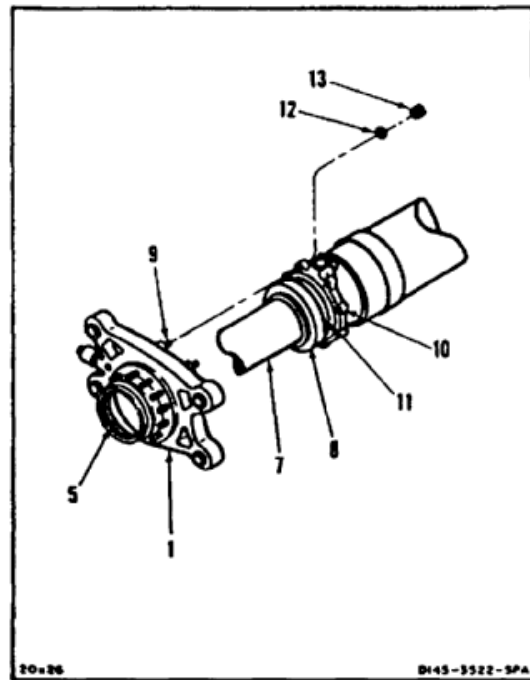
Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

3. Coat packing (4) with oil (E254). Install packing in support (1).
4. Coat outside of seal (5) with oil (E254). Install seal, seal side up, in support (1). Use drift.
5. Install retaining ring (6).

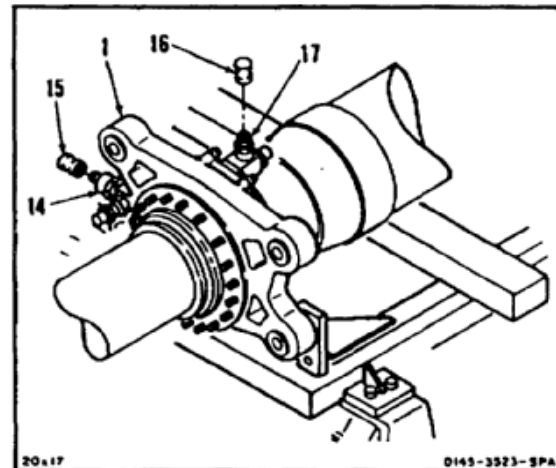


**INSTALL SUPPORT**

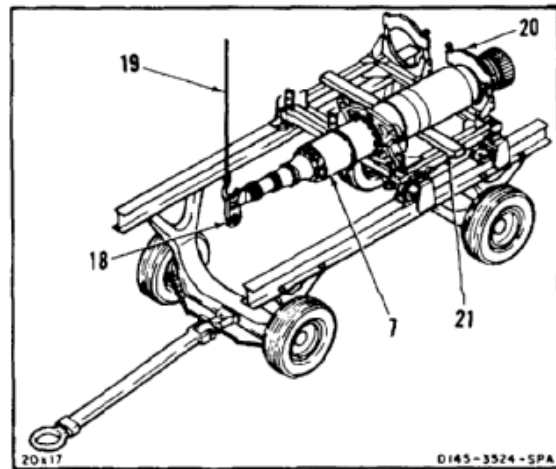
6. Lubricate packing (11) with oil (E254) and install on bearing retainer (10).
- 6.1. Coat lip of seal (5) with oil (E254). Install support (1) over rotor shaft (7) and on bearing (8). Use soft-faced mallet.
7. Coat thread of 10 studs (9) on support (1) with oil (E254).
8. Coat shaft (7) between bearing (8) and bearing retainer (10) with oil (E254).
9. Position bearing retainer (10) and packing (11) on support (1). Install 10 washers (12) and nuts (13). Torque nuts to **175 inch-pounds**.

**CHECK SEAL**

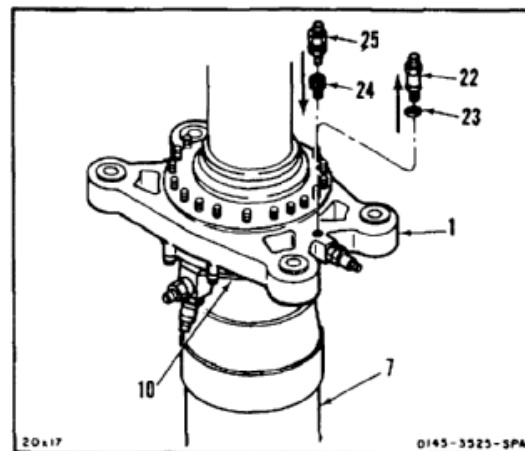
10. Turn support (1) to position filter (14) as high as possible.
11. Remove cap (15) from filter (14). Remove cap (16) from drain port (17).
12. Add oil (E254) through drain port (17) until oil flows from filter (14).
13. Install cap (15) on filter (14). Install cap (16) on drain port (17).



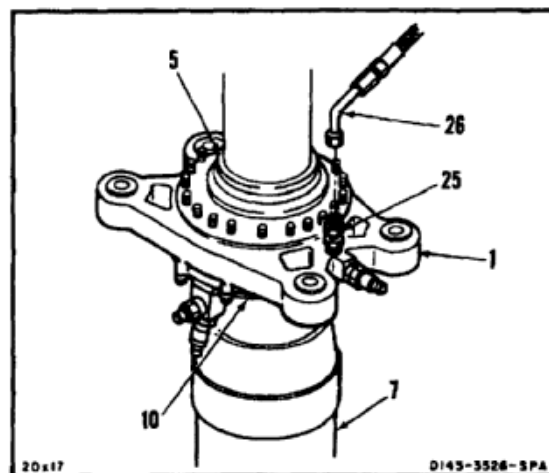
14. Install hoisting eye (T32) (18) on shaft (7).
15. Connect hoist cable (19) to eye of hoisting eye (T32) (18) marked AFT SHAFT. Have helper raise hoist to remove slack from cable.
16. Release clamp (20). Remove plank (21).



17. Have helper raise shaft (7) to vertical. After **5 minutes**, check bottom of bearing retainer (10) for leaks. There shall be no leaks.
18. Remove lockwire from pressure switch (22). Remove pressure switch and packing (23).
19. Install adapter (24) in housing (1). Install air charging valve (25) in adapter.



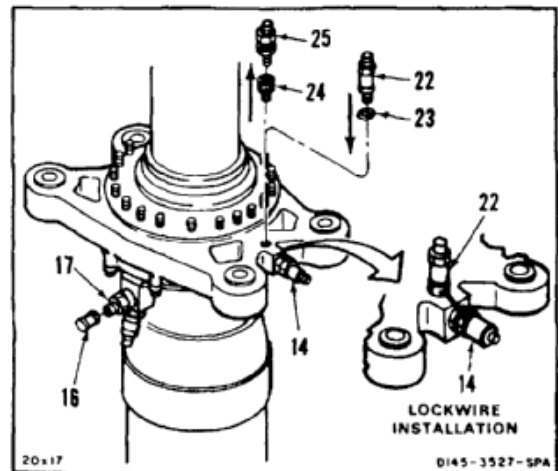
20. Connect air chuck (26) to valve (25). Apply **3 psi** air pressure to valve. Hold support (1) and turn shaft (7) one full turn. Wait **5 minutes**.
21. Turn shaft (7) another full turn. Wait **5 minutes**.
22. Check bottom of bearing retainer (10) for leaks. There shall be no leaks.
23. Check air pressure in support (1). If pressure drops from **3 psi**, check seal (5) installation.



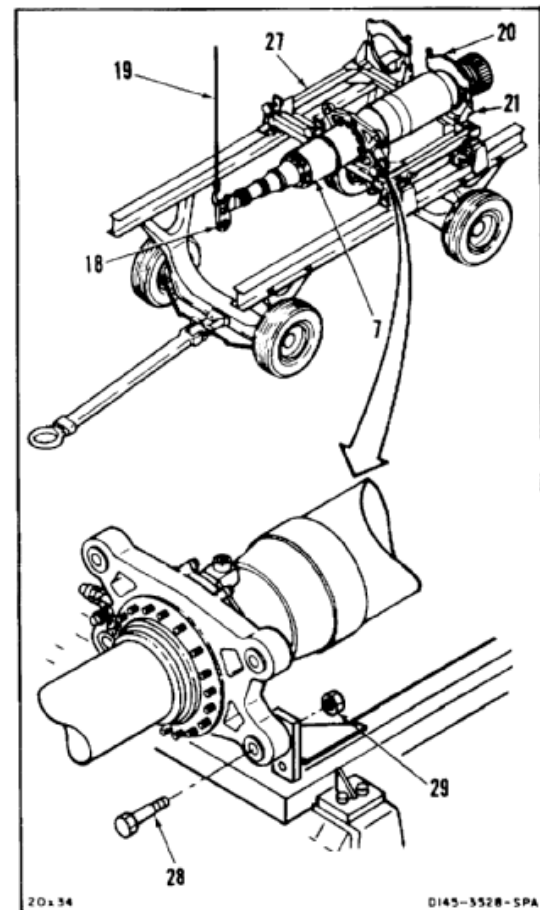
## 6-54 INSTALL AFT ROTOR SHAFT UPPER SEAL (AVIM) (Continued)

6-54

24. Remove air charging valve (25) and adapter (24).
25. Remove cap (16) from drain port (17). Let oil drain. Use container for oil. Install cap.
26. Coat packing (23) and thread of pressure switch (22) with oil (E254). Install packing and switch.
27. Torque switch (22) to **75 inch-pounds**. Lockwire switch to filter (14). Use lockwire (E231).

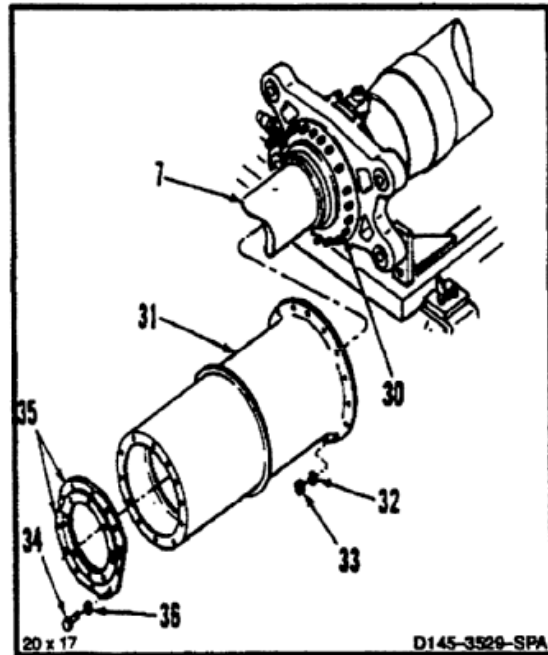


28. Install shaft (7) in adapter (T18) (27). Tighten clamp (20).
29. Install two bolts (28) and nuts (29).
30. Remove hoist cable (19) and hoisting eye (T32) (18).

**INSPECT**

**INSTALL SLIDER SHAFT**

31. Coat 16 studs (30) with oil (E254).
32. Install slider shaft (31) over rotor shaft (7) and on studs (30). If needed, heat base of slider shaft to **230° to 250°F (110° to 120°C)**. Use heat gun and measure temperature with pyrometer.
33. Install 16 washers (32) and nuts (33). Torque nuts to **120 inch-pounds**.
34. Coat 12 bolts (34) with oil (E254).
35. Position two halves of seal (35) on shaft (31). Install 12 washers (36) and bolts (34). Ensure that a minimum clearance of **0.050 inch** exists between the rubber seal (35) and the surface of the rotor shaft (31). If a minimum clearance does not exist, move seal (35) radially as far away from the shaft (31) as possible and recheck clearance. Torque bolts to **60 inch-pounds**. Lockwire bolts (34). Use lockwire (E278).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-216



INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-3234692  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

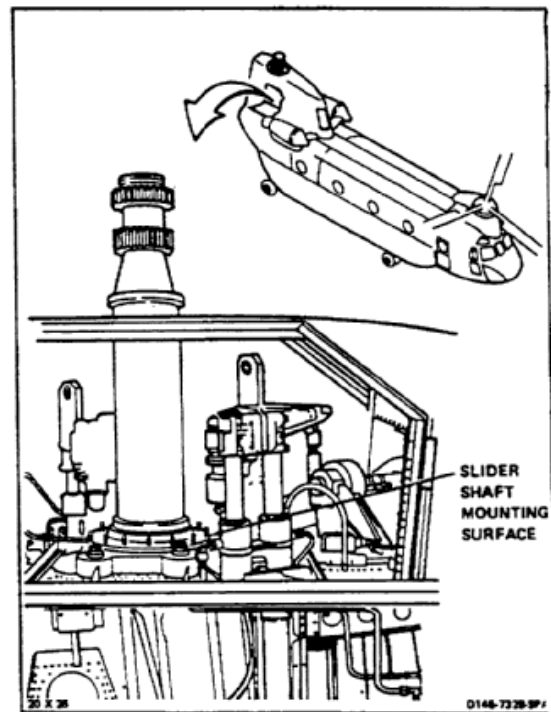
Oil (E254)

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P



1. Remove tape and barrier material from around seal (1).



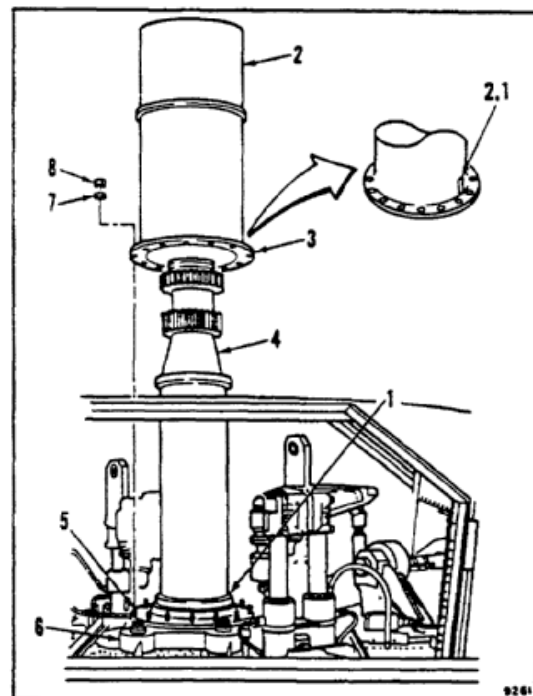
Handle aft slider shaft carefully.  
Polished surface is easily damaged.

2. Position slider shaft (2) with drain hole (2.1) forward. Lower slider shaft, flange (3) down, over rotor shaft (4). Position slider shaft on 16 studs (5). Tap top of slider shaft with soft-faced mallet as needed to seat shaft on housing (6).



Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

3. Coat studs (5) with oil (E254). Install four washers (7) and nuts (8) **90°** apart. Tighten nuts evenly to seat shaft (2). Do not torque nuts.
4. Install remaining 12 washers (7) and nuts (8). Torque all 16 nuts to **120 inch-pounds**.



***INSPECT***

***FOLLOW-ON MAINTENANCE:***

- Install aft swashplate (Task 5-133).
- Install aft drive arms (Task 5-112).
- Install aft drive collar (Task 5-111).
- Install aft weather-protective cover (Task 5-138).
- Install aft rotary-wing head (Task 5-9).
- Install aft rotary-wing blades (Task 5-84).
- Close aft pylon work platforms (Task 2-2).

END OF TASK

6-56 REMOVE AFT ROTOR SHAFT THROUGH TOP OF PYLON

6-56

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692
- Hoist Capable of Lifting 500 Pounds
- Hoisting Eye (T32)
- Socket, 1 Inch, 3/4 Inch Drive
- Breaker Bar, 3/4 Inch Drive

**Materials:**

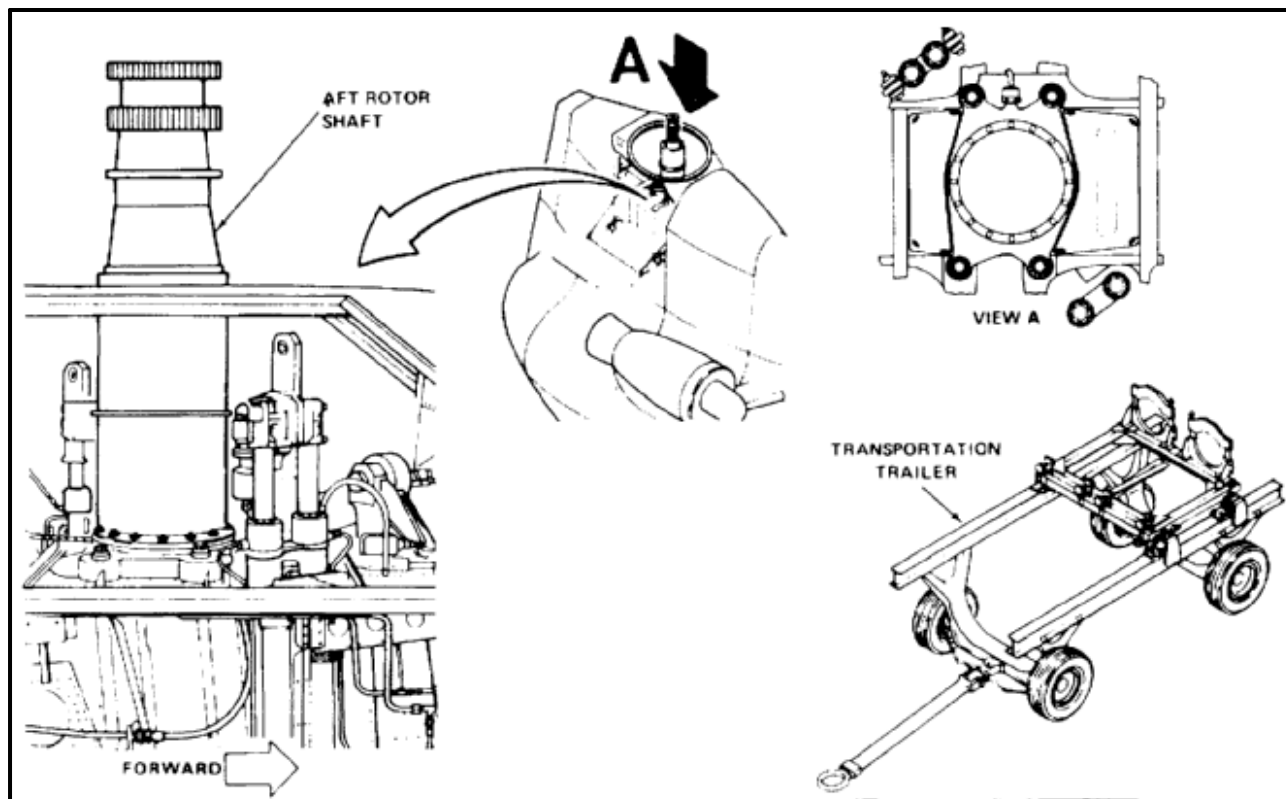
- Barrier Material (E81)
- Tape (E388)

**Personnel Required:**

Medium Helicopter Repairer (3)

**Equipment Condition:**

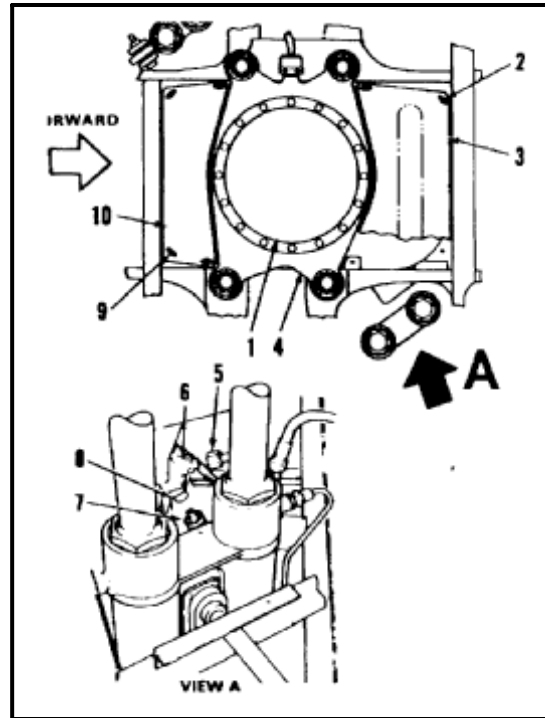
- Pylon Work Platforms Open (Task 2-2)
- Rotary-Wing Blades Removed (Task 5-64)
- Rotary-Wing Head Removed (Task 5-8)
- Weather-Protective Cover Removed (Task 5-136)
- Drive Collar Removed (Task 5-100)
- Drive Arms Removed (Task 5-101)
- Swashplate Removed (Task 5-116)
- Adapter (T18) Installed on Transportation Trailer 2000



**NOTE**

If there is not enough overhead clearance or hoist height, lower shaft through pylon (Task 6-57).

1. Cover slider shaft (1) with barrier material (E81) and tape (E388).
2. Loosen four turnlock fasteners (2) on access panel (3) forward of bearing support (4). Remove panel.
3. Disconnect hose (5) from union (6). Disconnect connector (7) from chip detector (8).
4. Loosen four turnlock fasteners (9) on access panel (10) aft of bearing support (4). Remove panel.



5. Disconnect hose (11) from filter (12). Disconnect connector (13) from pressure transmitter (14).
6. Install hoisting eye (T32) (15) in top of rotor shaft (16).

**NOTE**

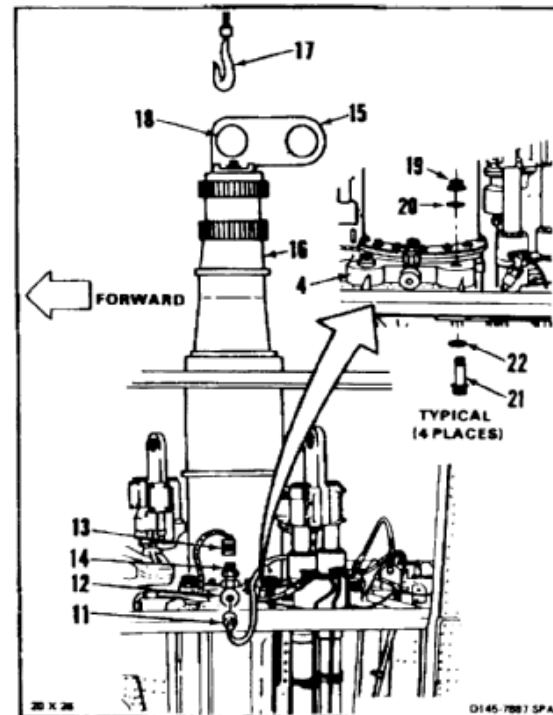
AFT SHAFT hole must be used for proper shaft alignment during removal.

7. Connect hoist hook (17) to AFT SHAFT hole (18) of hoisting eye (T32) (15). Raise hoist to take up slack. Do not apply tension.



If bolts are not removed, thread can be damaged and bolt holes scored during shaft removal.

8. Remove nuts (19) and washers (20) from four bolts (21) on bearing support (4). Remove bolts and washers (22).



9. Tie rope guide line (23) around rotor shaft (16).

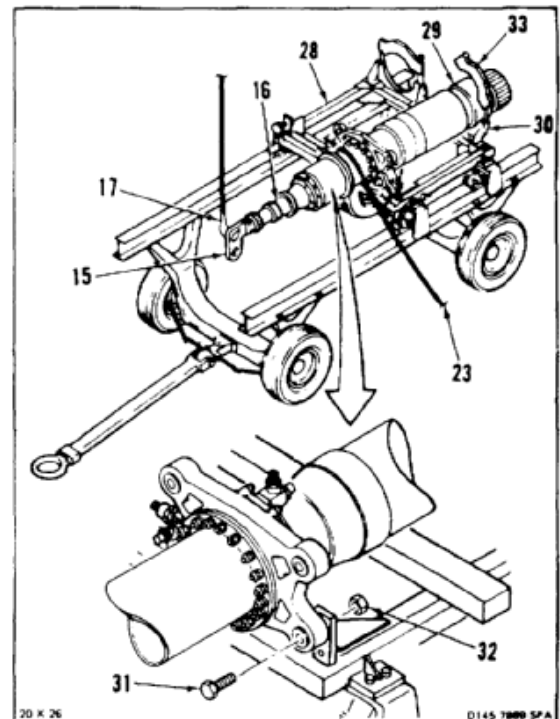
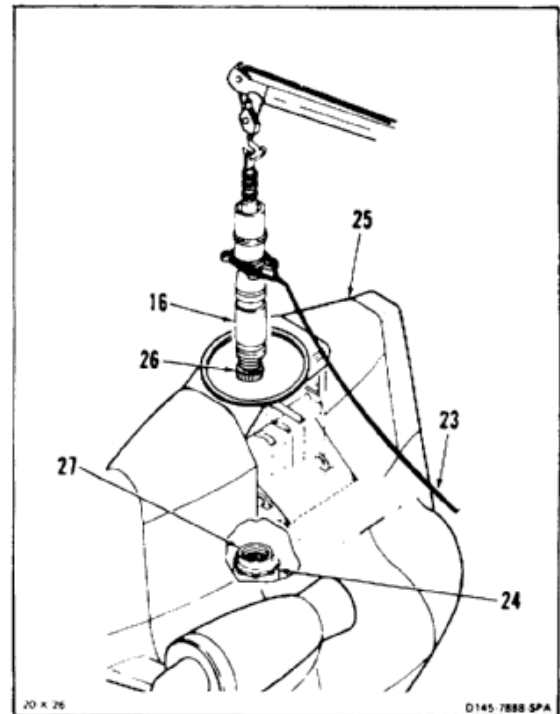
**WARNING**

Rotor shaft is heavy and can injure personnel if it drops. Shaft must be supported by hoist and moved carefully to prevent injury to personnel.

**CAUTION**

If rotor shaft is not lifted straight out of transmission, shaft splines can damage seal in transmission.

10. Lift rotor shaft (16) straight up and out of transmission (24) and pylon (25). Cover splines (26) with barrier material (E81) and tape (E388).
11. Cover opening (27) in top of aft transmission (28). Use barrier material (E81) and tape (E388).
12. Lower rotor shaft (16) to adapter (T18) (28). Install shaft in adapter as follows:
- Align lower ring (29) with plate (30). Lower shaft (4) to position ring in plate.
  - Continue lowering shaft (16) to adapter (T18) (28). Install two bolts (31) and nuts (32).
  - Install clamp (33) over ring (29).
13. Remove hoist hook (17) from hoisting eye (T32) (15). Remove eye.
14. Remove rope guide line (23).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Hoist Capable of Lifting 500 Pounds
- Hoisting Eye (T32)
- Socket, 1 Inch, 3/4 Inch Drive
- Breaker Bar, 3/4 Inch Drive

**Materials:**

- Barrier Material (E81)
- Tape (E388)

**Personnel Required:**

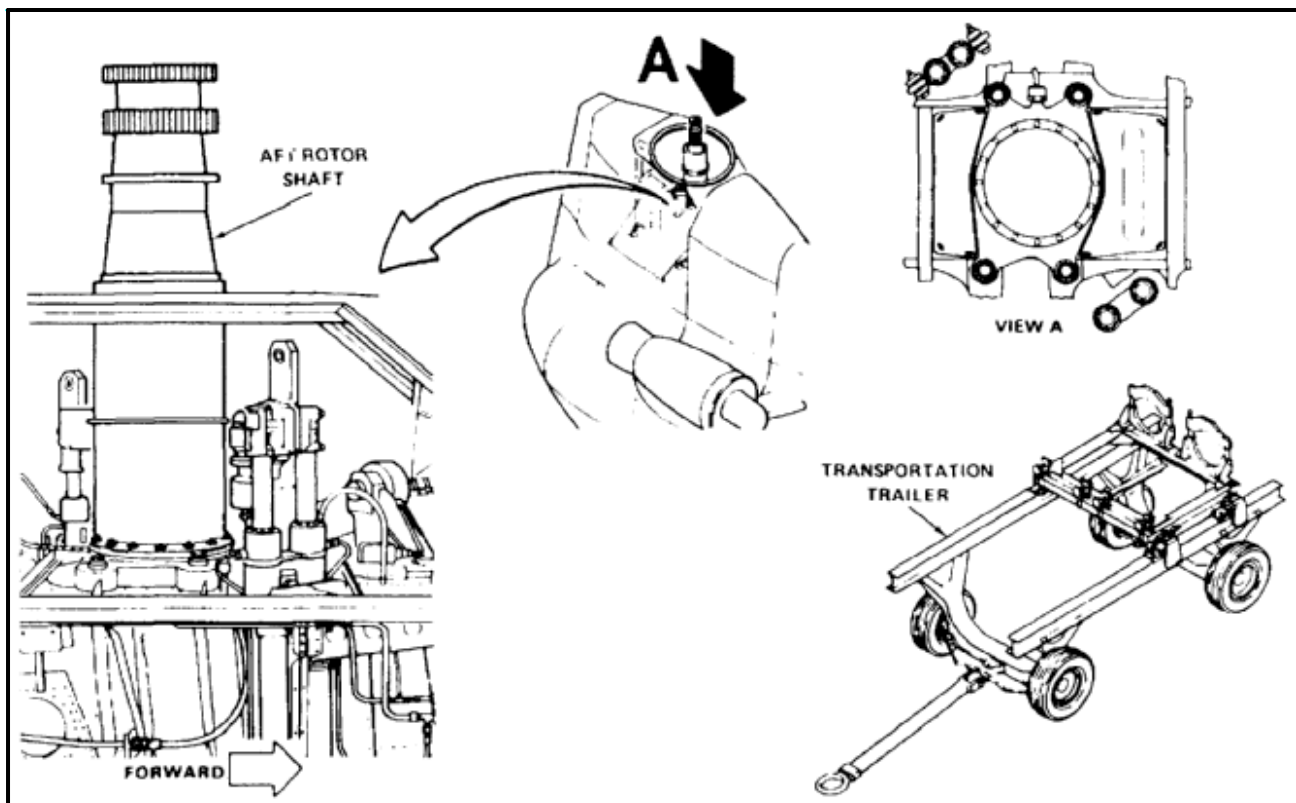
Medium Helicopter Repairer (3)

**References:**

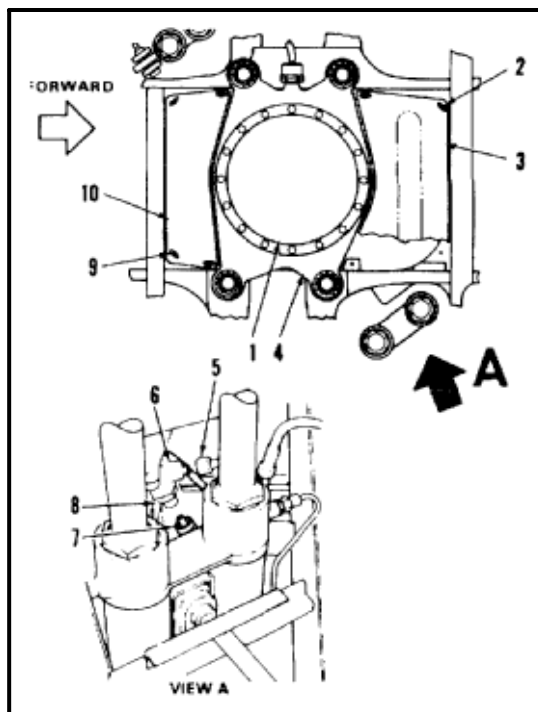
TM 55-1520-240-10

**Equipment Condition:**

- Pylon Work Platforms Open (Task 2-2)
- Rotary-Wing Blades Removed (Task 5-64)
- Rotary-Wing Head Removed (Task 5-8)
- Weather-Protective Cover Removed (Task 5-136)
- Aft Drive Collar Removed (Task 5-100)
- Aft Drive Arms Removed (Task 5-101)
- Aft Swashplate Removed (Task 5-116)
- Aft Transmission Removed (Task 6-92)
- Adapter (T18) Installed on Transportation Trailer 2000
- Cargo Ramp Open (Task 2-2)



1. Cover slider shaft (1) with barrier material (E81) and tape (E388).
2. Loosen four turnlock fasteners (2) on access panel (3) forward of bearing support (4). Remove panel.
3. Disconnect hose (5) from union (6). Disconnect connector (7) from chip detector (8).
4. Loosen four turnlock fasteners (9) on access panel (10) aft of bearing support (4). Remove panel.



5. Disconnect hose (11) from filter (12). Disconnect connector (13) from pressure transmitter (14).
6. Install hoisting eye (T32) (15) in top of rotor shaft (16).

**NOTE**

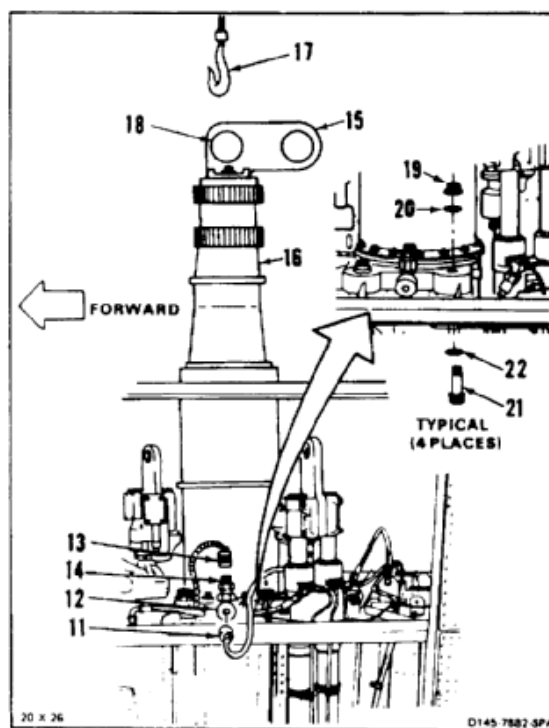
AFT SHAFT hole must be used for proper shaft alignment during removal.

7. Connect hoist hook (17) to AFT SHAFT hole (18) of hoisting eye (T32) (15). Raise hoist to take up slack. Do not apply tension.

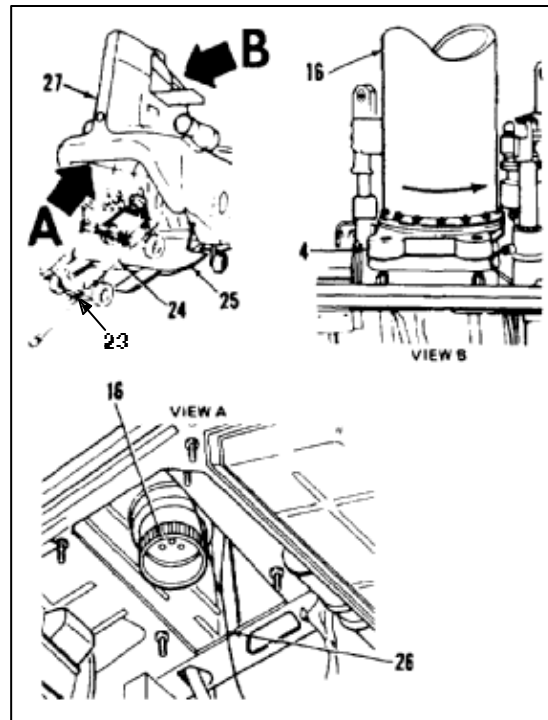


If bolts are not removed, thread can be damaged and bolt holes scored during shaft removal.

8. Remove nuts (19) and washers (20) from four bolts (21) on bearing support (4). Remove bolts and washers (22).



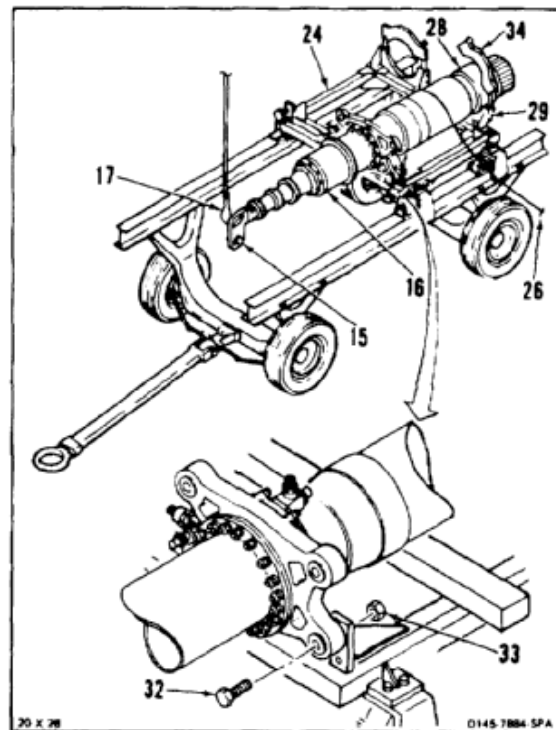
9. Position transportation trailer 2000 (23) with adapter (T18) (24) on cargo ramp (25). Raise ramp to level with hand pump (Task 2-2).
10. Tie rope guide line (26) around bottom of shaft (16).
11. Raise shaft (16) about **2 inches**. Rotate bearing support (4) **90°**.
12. Lower shaft (16) through pylon (27) to adapter (T18) (24).



13. Install rotor shaft (16) in adaptor (T18) (24) as follows:
  - a. Align lower ring (28) with plate (29). Lower shaft (16) to position ring in plate.
  - b. Continue lowering shaft (16) to adapter (T18) (24). Install two bolts (30) and nuts (31).
  - c. Install clamp (32) over ring (28).
14. Remove hoist hook (17) from hoisting eye (T32) (15). Remove eye.
15. Remove rope guide line (26). Lower cargo ramp (25) to ground with hand pump (Task 2-2).
16. Remove shaft (16) from helicopter.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

None

**Materials:**

Cloth (E135)  
 Acetone (E19)  
 Cloth, Emery (E126)  
 Oil (E250 or Equiv.)

**Personnel Required:**

Inspector

**References:**

Task 6-52.1  
 TM 1-1520-253-23

**Equipment Condition:**

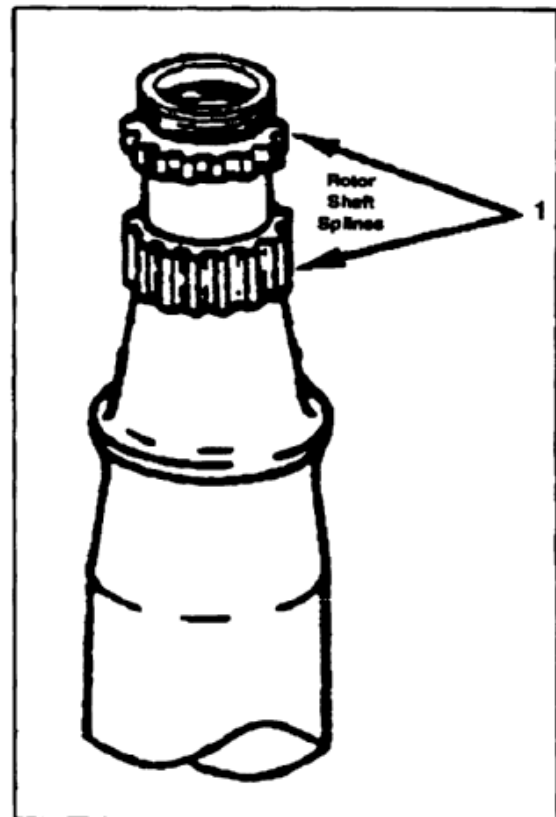
As Required

1. Check splines (2) for damage. There shall be no damage.
2. Check splines (1) for damage as follows: (These inspections apply to the forward and aft rotor shaft splines.)

**WARNING**

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

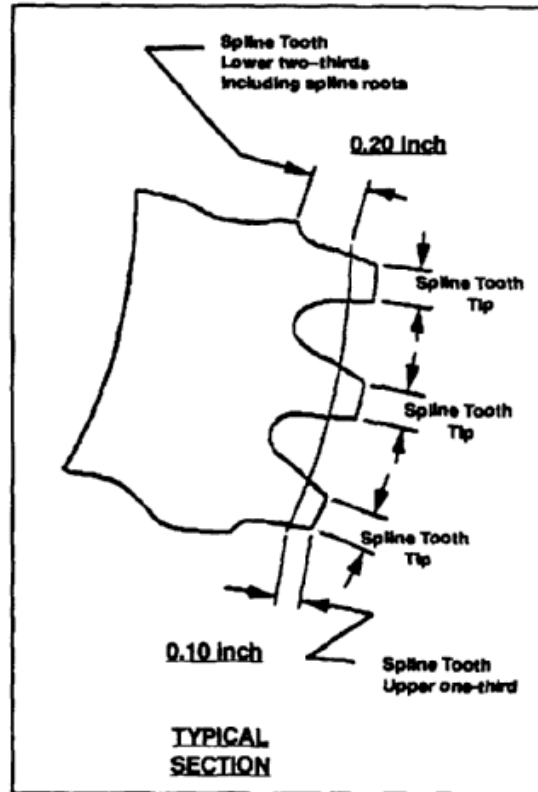
- a. Clean the forward and/or aft rotor shaft splines and adjacent surfaces, using a clean cloth (E135) moistened with acetone (E19).
- b. Visually examine the forward and/or aft rotor shaft external splines for damage caused by wear, scoring, nicks, gouges, dings, scratches, and corrosion to the following criteria:
  - (1) Cadmium plate depletion. Any amount of cadmium plating missing is allowable and is not cause for removal from service.
  - (2) Light surface corrosion. Light surface corrosion over any amount of the spline surfaces may be removed by lightly hand polishing with 500 or higher grit paper (E126) wet with oil (E250 or equiv.).
  - (3) Nicks, scratches, dings, wear steps, and pitting corrosion. When evaluating the above defects, the location of the condition on the spline teeth must be considered prior to any polishing and/or removal.



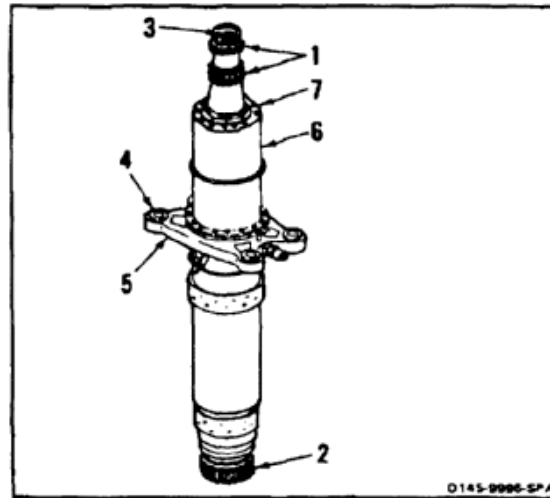
**NOTE**

The sensitivity to damage of the spline teeth differs among the three areas. The spline tooth lower two thirds, including spline roots, is the highest loaded and most sensitive of the three areas. The spline tooth upper one third is less sensitive than the lower two thirds. The spline tooth tips are the least sensitive of the three areas.

- (a) Spline tooth lower two thirds including spline roots (reference **0.20 inch**). No pitting corrosion, nicks or scratches are allowed in this area. A light visual indication of wear or wear step is permitted provided it does not exceed **0.0010 inch** depth.
- (b) Spline tooth upper one third (reference **0.10 inch**). Nicks, dings, or scratches are allowed in this area up to a depth of **0.0020 inch**. No pitting corrosion is allowed that exceeds **0.0010 inch**. Lightly blend nicks, dings, scratches, and pitting corrosion.
- (c) Spline tooth tips. Pitting corrosion, nicks, dings, or scratches are allowed in this area up to a depth of **0.010 inch**. Lightly blend and polish tip.



- 2.1. Inspect fwd rotor shaft for cracks. If a crack is suspected, refer to TM 1-1520-253-23.
- 3. Check thread (3) for damage. There shall be no damage.
- 4. Inspect bushings (4) at top and bottom of four mounting holes in support (5). There shall be no cracks, wear, or other damage.
- 5. Check support (5) for oil leakage. There shall be no oil.
- 5.1. Inspect aft rotor shaft for cracks. If a crack is suspected, refer to TM 1-1520-253-23.
- 6. Inspect slider shaft (6) for damage. Damage shall not exceed the limits specified in Task 6-52.1.
- 7. Inspect seal. Ensure that a minimum clearance of **0.050 inch** between the rubber seal and the surface of the rotor shaft. If a minimum clearance does not exist between the shaft and seal, inspect the seal for deterioration and damage. There shall be no damage.



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J

**Materials:**Crocus Cloth (E122)  
Cloths (E120)**Personnel Required:**Medium Helicopter Repairer  
Inspector**References:**

TM 1-1500-204-23

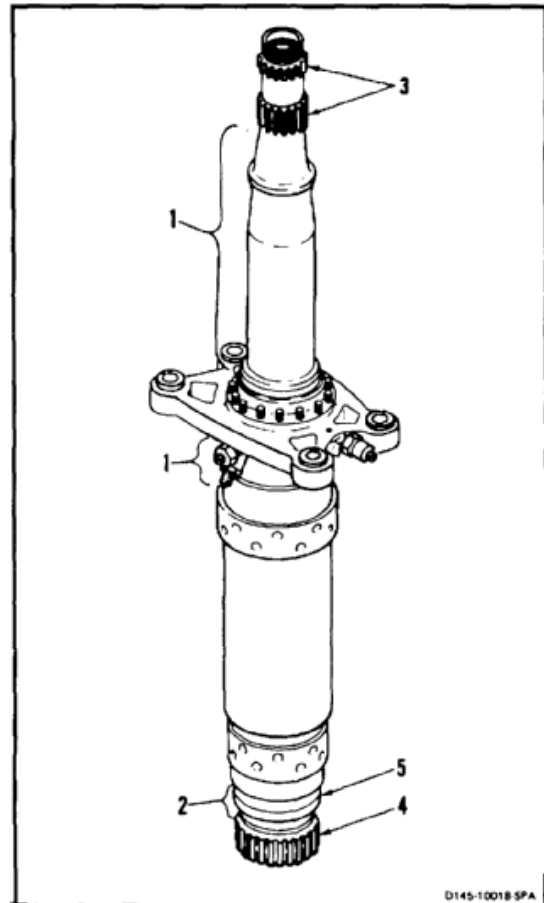
**Equipment Condition:**Off Helicopter Task  
Slider Shaft Removed (Task 6-53)

1. Remove nicks and scratches on rotor shaft with crocus cloth (E122). Observe the following limits on upper shaft (1) and lower shaft (2):

**NOTE**

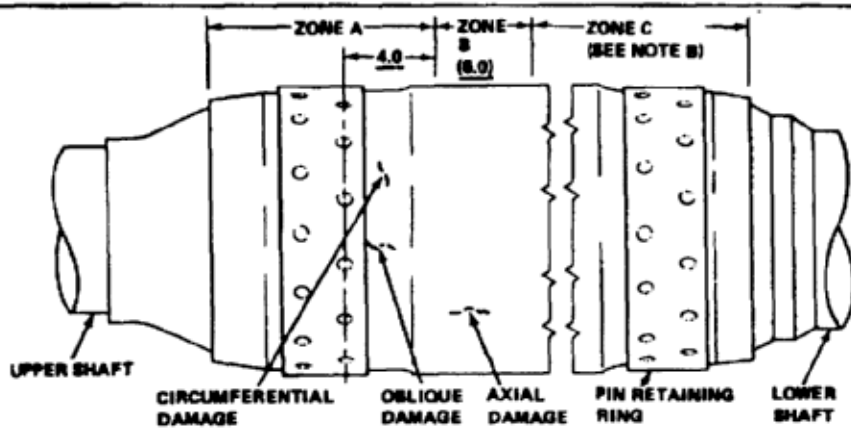
Limits for center section of shaft are in step 3.

- a. Blending shall not be more than **0.040 inch** deep.
  - b. Blending shall clear fasteners by a distance at least equal to fastener diameter.
  - c. Blending shall not extend into a radius.
  - d. Blending shall not be done to splines (3 and 4).
  - e. No blending is allowed on seal mating surface (5).
2. Remove corrosion on splines (3 and 4) (TM 1-1500-204-23).



D145-10018 SPA

3. Blend out damage to enter section as shown.



DAMAGE LIMITATIONS FOR ZONE A

	CIRCUMFERENTIAL AND OBLIQUE DAMAGE	AXIAL DAMAGE
MAXIMUM DEPTH AFTER BLENDING	0.005	0.010
MINIMUM WIDTH AFTER BLENDING	0.10	0.14
MAXIMUM WIDTH AFTER BLENDING	0.30	0.50
MINIMUM BLEND RADIUS	0.25	0.25

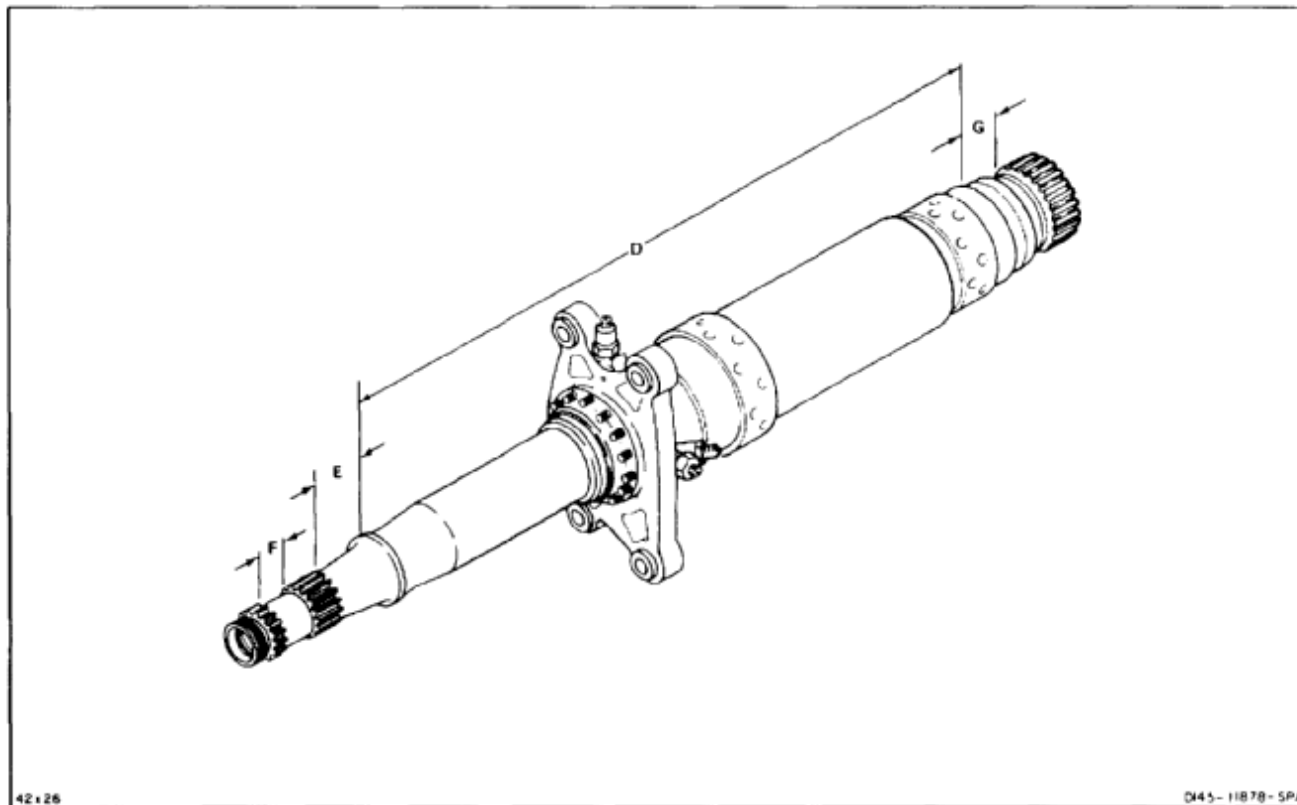
DAMAGE LIMITATIONS FOR ZONE B

	CIRCUMFERENTIAL AND OBLIQUE DAMAGE	AXIAL DAMAGE
MAXIMUM DEPTH AFTER BLENDING	0.010	0.015
MINIMUM WIDTH AFTER BLENDING	0.14	0.17
MAXIMUM WIDTH AFTER BLENDING	0.5	0.5
MINIMUM BLEND RADIUS	0.25	0.25

NOTES

- A. ALL DIMENSIONS ARE IN INCHES
- B. DAMAGE IN ZONE C MUST NOT EXCEED A DEPTH OF 0.040 AFTER BLENDING

4. Touch up blended areas as shown:



BLEND AREA	MATERIAL	REFERENCE INSTRUCTION
D	One coat wash primer (E302)	MIL-C-8507
	Two coats zinc chromate primer (E291)	MIL-P-6808
E and F	Cadmium plate	MIL-STD-865 Bake at <b>260° to 290°F (125° to 145°C)</b> for <b>23 hours within 2 hours</b> after plating
	One coat wash primer (E302)	MIL-C-8507
	Two coats epoxy primer (E292.1)	MIL-P-85582
	One coat epoxy top coat, color #16081, engine gray (E166)	MIL-C-22750
G	Instant gun blue, Formula 44-40 (E457)	Manufacturer's Instructions

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Barrier Material (E80)  
Masking Tape (E388)  
Gloves (E184.1)  
Acetic Acid (E21)  
Epoxy Primer (E292 or E293)  
Chromic Acid (E114)  
Calcium Sulphate (E91)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

**General Safety Instructions:****WARNING**

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

**WARNING**

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

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

**CAUTION**

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

**NOTE**

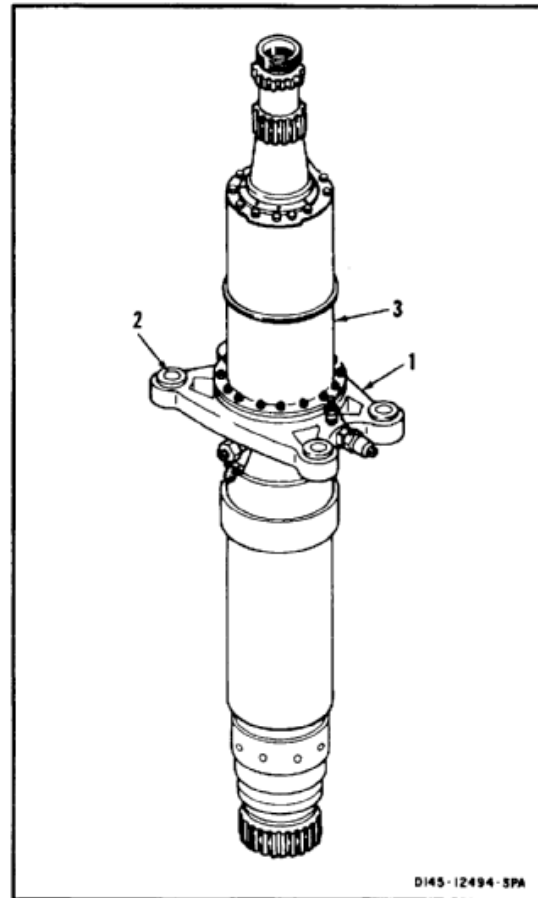
Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. Clean oil and grease from damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. Check extent and location of damage on support (1).

**NOTE**

Limits in this step refer to the extent of damage after rework.

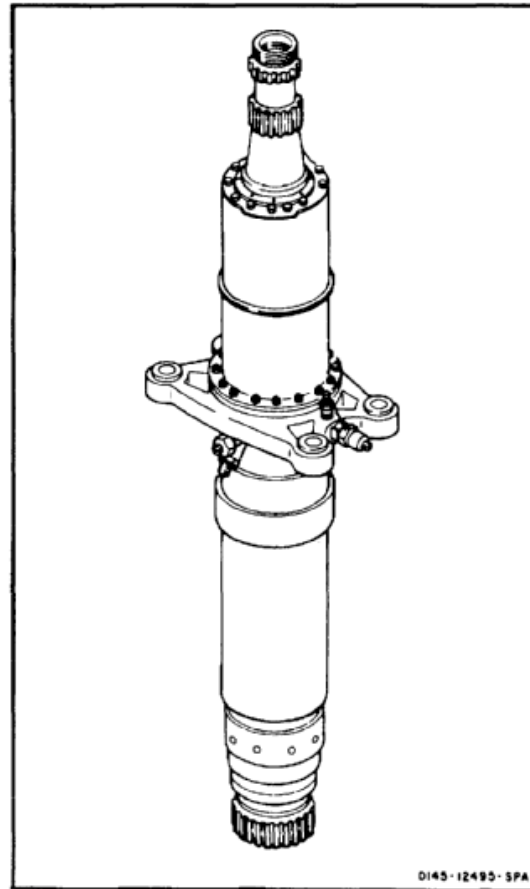
- a. Depth of damage shall not be more than **0.025 inch**.
  - b. Damage shall not extend over more than one surface or enter any radius.
  - c. Damage shall not be closer than **1.00 inch** to any mounting hole.
3. Fluorescent inspect the damaged area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If crack is suspected in aft rotor shaft support, refer to TM 1-1520-253-23.
  4. Protect slider shaft (3) near the damaged area from abrasive grit. Use barrier material (E80) and tape (E388).
  5. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
  6. Smooth the blended area with crocus cloth (E122). Do not leave any sharp edges.



**WARNING**

Protective gloves (E184.1) shall be worn for the remainder of the task. Otherwise, personal injury could occur.

7. Acid etch the reworked area as follows:
  - a. Prepare a solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E184.1) and goggles.
  - b. Swab the area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse the area with cold water.
8. Fluorescent inspect the reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. Alternate inspection method is the eddy current inspection method. If crack is suspected in aft rotor shaft support, refer to TM 1-1520-253-23.
9. Apply surface treatment to the reworked area as follows:
  - a. Clean the area with naphtha (E245) and clean cloths. Let the area air dry.
  - b. Swab on solution of chromic acid (E114) and calcium sulphate (E91). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse the area with cold water and let air dry.
10. Apply epoxy primer (E292 or E293) to the reworked area.

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK



**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Hoisting Eye (T32)  
 Work Hoist  
 Shipping Container (T1)  
 Container, 2 Quart

**Materials:**

Fingerprint Remover (E175)  
 Cloths (E120)  
 Dry Cleaning Solvent (E162)  
 Gloves (E186)  
 Swabbing Brush (E86)  
 Corrosion Preventive Compound (E153 or E154)  
 Oil (E255)  
 Barrier Material (E81)  
 Masking Tape (E388)  
 Desiccant (E160), 16-Unit Bag

**Personnel Required:**

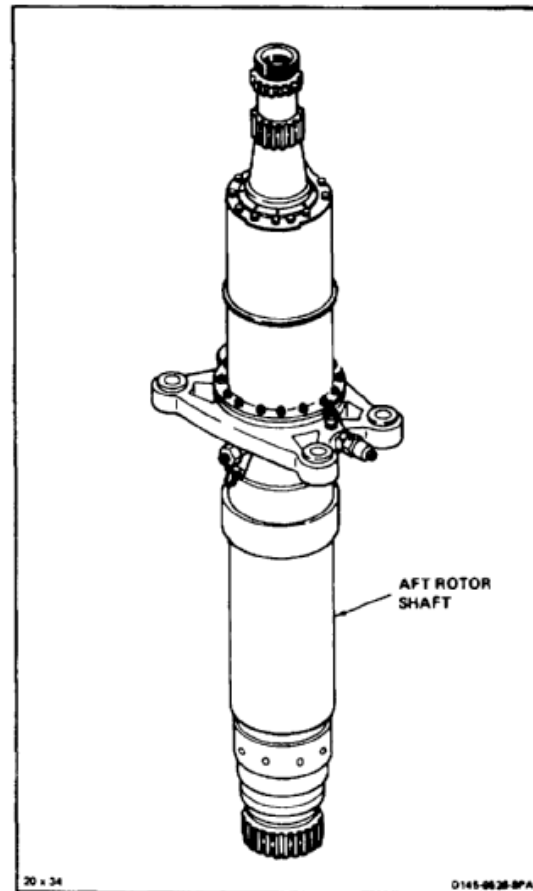
Medium Helicopter Repairer (2)  
 Inspector

**References:**

DA PAM 738-751  
 TB 55-8100-200-25  
 TB 750-126

**Equipment Condition:**

Off Helicopter Task

**General Safety Instructions:****WARNING**

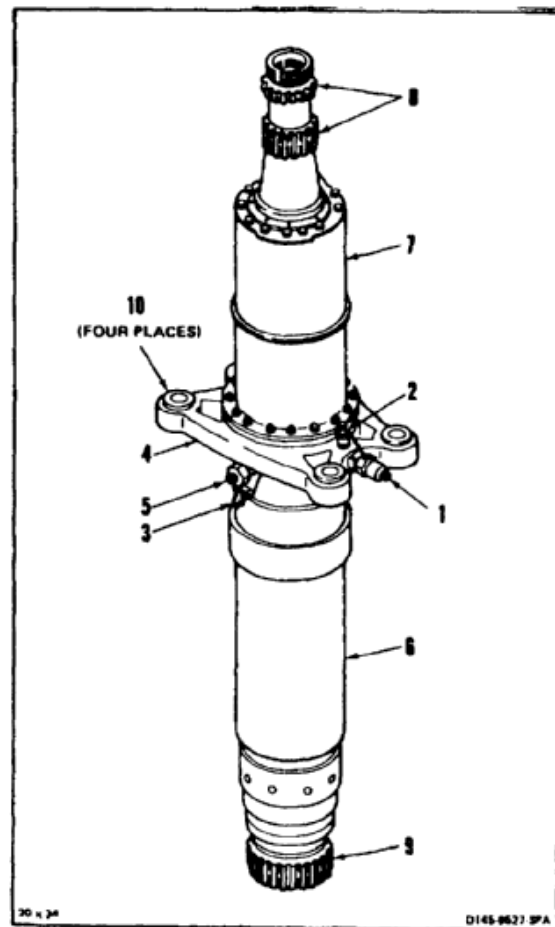
Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flames. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

1. Install caps on filter (1), pressure switch (2), and chip detector (3).
2. Fill support housing (4) with oil (E255) through union (5). Cap union.
  - a. Rotate housing (4) around shaft (6) three times to spread oil inside housing.
  - b. Remove cap from union (5). Drain oil from housing (4). Install cap on union.
3. Clean all surfaces of rotor shaft (6). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles. Wear gloves for the rest of this task.
4. Clean slider shaft (7), rotor head splines (8), transmission splines (9) and four bushings (10). Use fingerprint remover (E175) and clean cloths (E120).

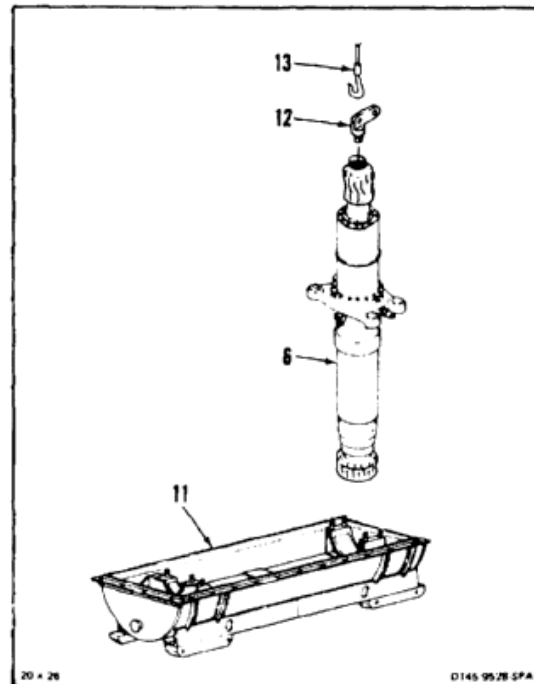
**CAUTION**

Touching unpainted surfaces with bare fingers can cause corrosion.

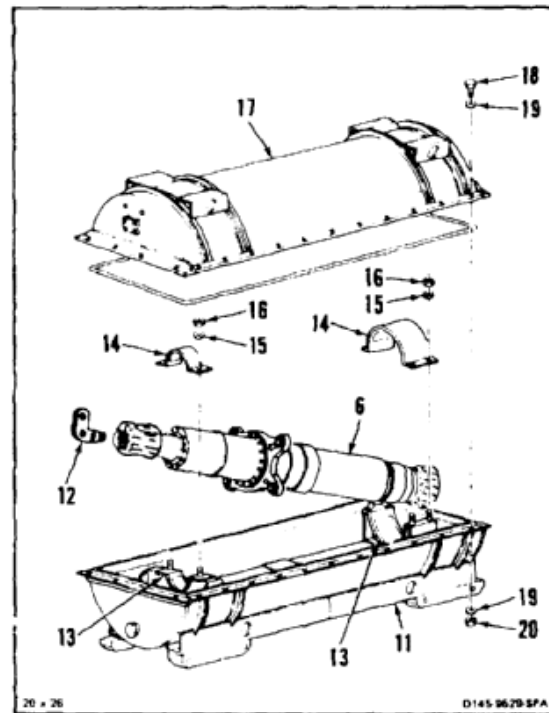
5. Put on gloves (E186). Gloves shall be worn for the rest of this task.
6. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
7. Coat slider shaft (7), splines (8 and 9), and bushings (10) with corrosion-preventive compound (E153 or E154). Use cloth (E120) to coat shaft. Use swabbing brush (E86) to coat splines and bushings.
8. Cover slider shaft (7), splines (8 and 9), and four bushings (10) with barrier material (E81) and tape (E388).
9. Cover filter (1), pressure switch (2), and chip detector (3), with barrier material (E51) and tape (E388).



10. Install rotor shaft (6) in shipping container (T1) (11) as follows:
- Inspect and prepare container (11) (TB 55-8100-200-25).
  - Install hoisting eye (12) in top of shaft (6). Connect work hoist hook (13) to eye marked AFT SHAFT.
  - With aid of helper, lower shaft (6) into container (T1) (11).



- Remove hoisting eye (12) from shaft (6). With aid of helper, lower shaft into two pads (13).
- Install two clamps (14) over shaft (6). Install six washers (15) and nuts (16).
- Prepare required maintenance forms and records (DA PAM 738-751 and TB 750-126).
- Put four 16-unit bags of desiccant (E160) into container (T1) (11).
- Install cover (17) on container (T1) (11). Install bolt (18), two washers (19), and nut (20) at 30 places.



11. Remove plug (21) from cover (17).
12. Connect air test line (22) to cover (17).



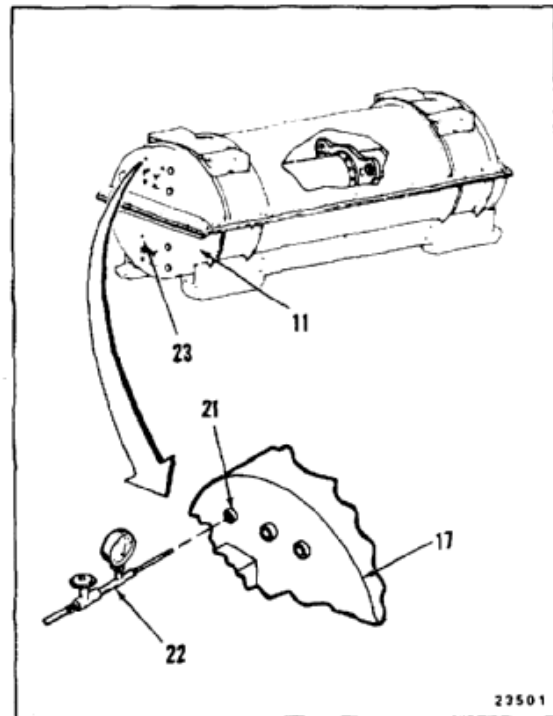
Low pressure air supply must be used. Exceeding test pressure can damage container.

13. Pressurize container (11) to **3 psi** max. Check container for leaks. Container must hold **3 psi** for 1 hour.



Be careful when releasing air under pressure, wear goggles. Personal injury can result.

14. Push pressure relief valve (23) until pressure in container (11) is **0 psi**.
15. Disconnect air line (22) from cover (17).
16. Install plug (21) in cover (17).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## 6-61 REMOVE AFT ROTOR SHAFT FROM STORAGE

6-61

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Hoisting Eye (T32)  
 Work Hoist

**Materials:**

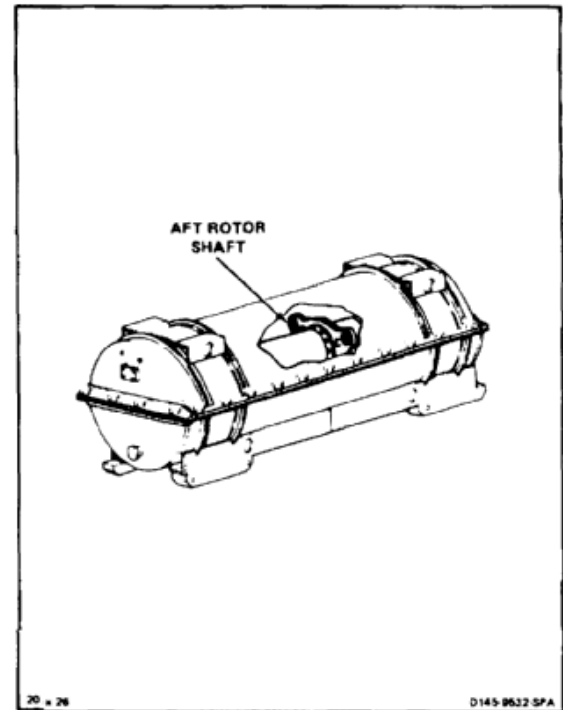
Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Gloves (E186)

**Personnel Required:**

Medium Helicopter Repairer (2)  
 Inspector

**Equipment Condition:**

Off Helicopter Task

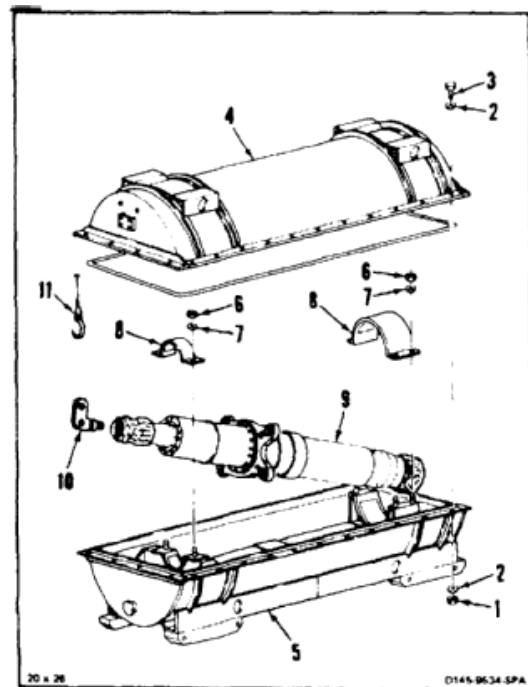


1. Remove nut (1), two washers (2), and bolt (3) from 30 places around cover (4).
2. Remove and discard desiccant bags from inside container (5).
3. Remove six nuts (6) and washers (7) from two clamps (8). Remove clamps.
4. With aid of helper, raise top end of shaft (9) from container (5). Install hoisting eye (T32) (10) in shaft.



If bottom of shaft hits container,  
 covered splines can be damaged.

5. Connect work hoist hook (11) to eye of hoisting eye (10) marked AFT SHAFT. Lift shaft from container. Do not let bottom of shaft (9) hit container (5).
6. Set shaft (9) down on bench or workstand. Remove hoisting eye (T32) (3).
7. Install two clamps (8) in container (5). Install six washers (7) and nuts (6).
8. Install cover (4). Install bolt (3), two washers (2), and nut (1) at 30 places around cover.



9. Remove all tape and barrier material from shaft (9).

**WARNING**

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

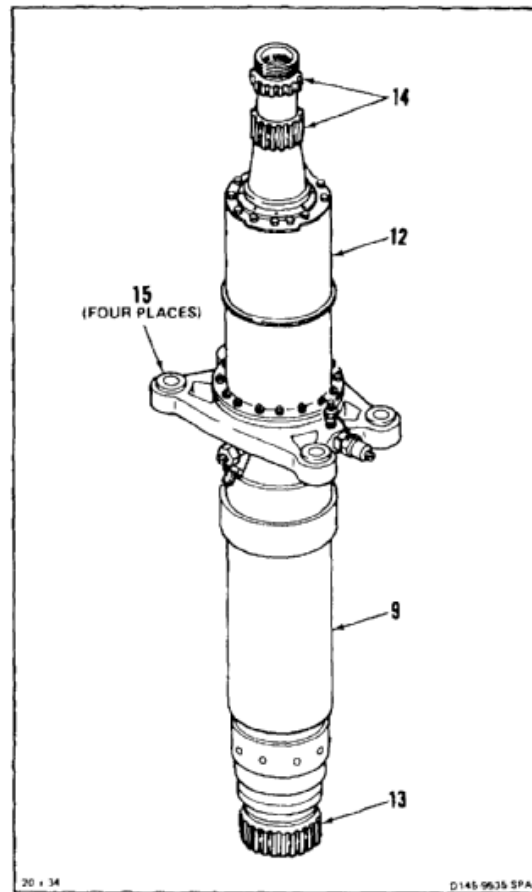
**CAUTION**

Touching splines with bare fingers can cause corrosion.

10. Remove corrosion-preventive compound from slider shaft (12), transmission splines (13), rotor head splines (14), and four bushings (15). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.

**INSPECT****FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## 6-62 INSTALL AFT ROTOR SHAFT THROUGH TOP OF PYLON

6-62

## INITIAL SETUP

**Applicable Configurations**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Hoisting Eye (T32)  
 Hoist Capable of Lifting 500 Pounds  
 Socket, 1 Inch, 3/4 Inch Drive  
 Torque Wrench, 100 to 750 Foot-Pounds  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

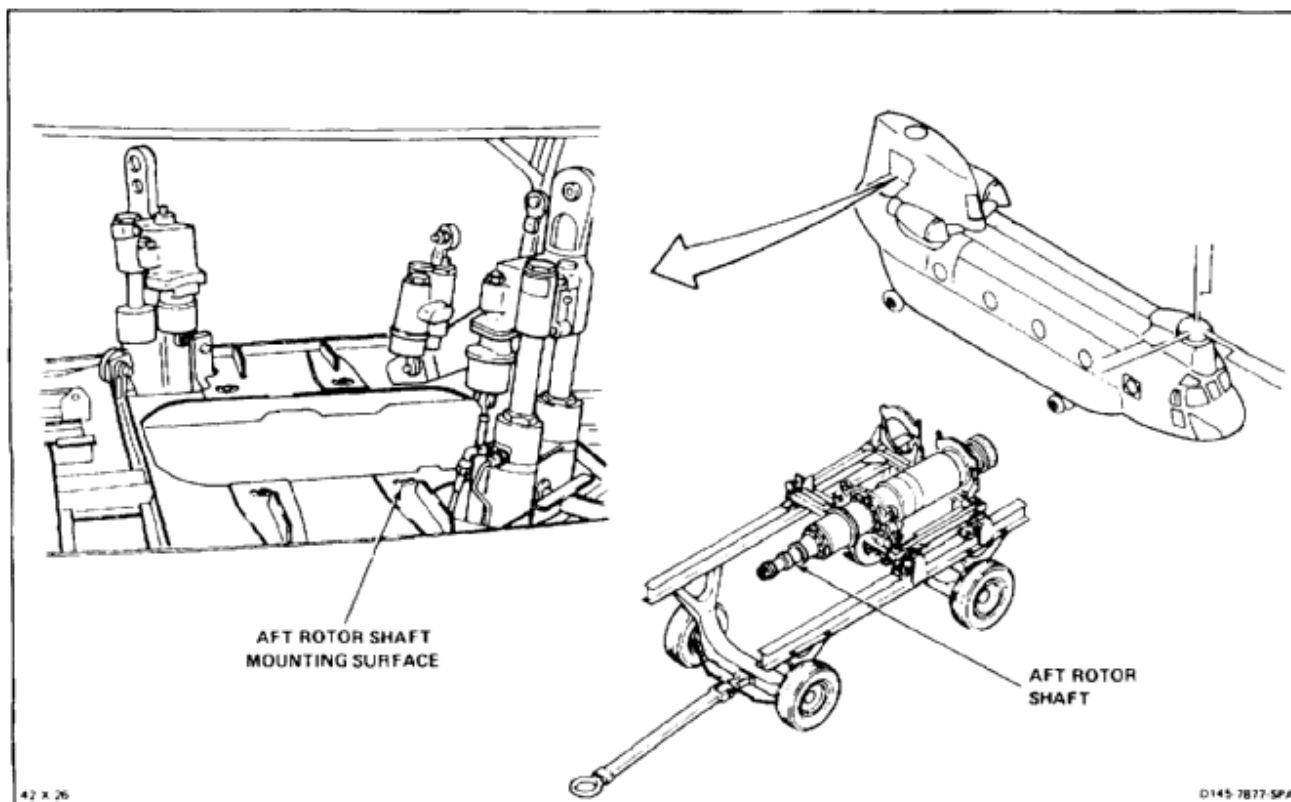
Oil (E254)

**Personnel Required:**

Medium Helicopter Repairer (3)  
 Inspector

**References:**

TM 55-1520-240-23P



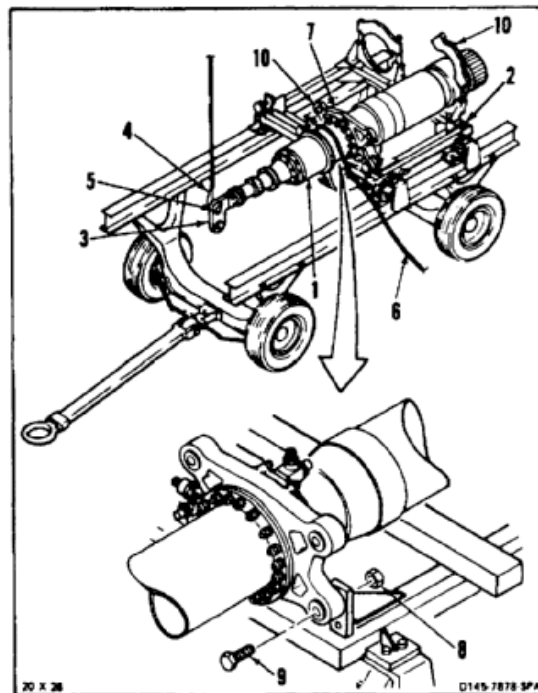
1. Remove rotor shaft (1) from adapter (2) as follows:

- a. Install hoisting eye (T32) (3) in top of shaft (1).

**NOTE**

AFT SHAFT hole must be used for proper shaft alignment during installation.

- b. Connect hoist hook (4) to AFT SHAFT hole (5) of hoisting eye (T32) (3). Raise hoist to take up slack. Do not apply tension.
- c. Attach rope guide line (6) to shaft (1), above bearing support (7).
- d. Remove two nuts (8) and bolts (9). Release clamp (10). Raise hoist to lift shaft (1) out of adapter (2).



**WARNING**

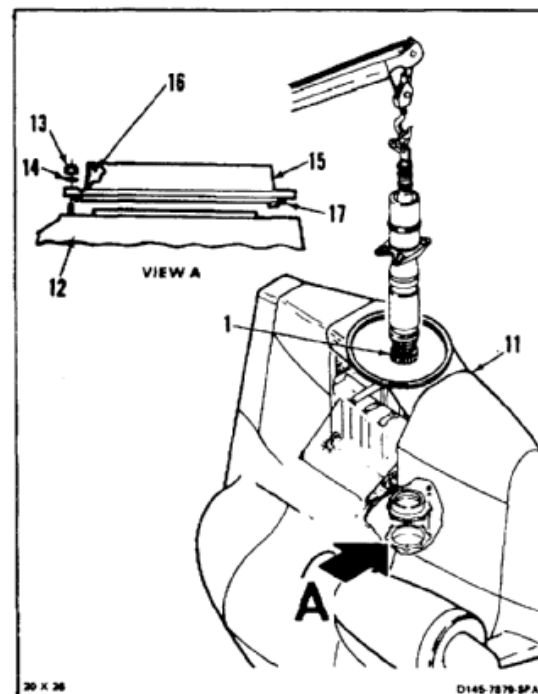
Rotor shaft is heavy and can injure personnel if it drops. Shaft must be supported by hoist and moved carefully to prevent injury to personnel.

2. Position shaft (1) above center of pylon (11).
3. Remove tape and barrier material from top of aft transmission (12). Remove ten nuts (13) and washers (14) from seal retainer (15). Remove seal retainer.
4. Check seal retainer (15), seal (16), and packing (17) for damage. There shall be no damage.
5. If applied, remove tape and barrier material from bottom of shaft (1).

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

6. Coat seal (16) and mating surface of shaft (1) with oil (E254).





**CAUTION**

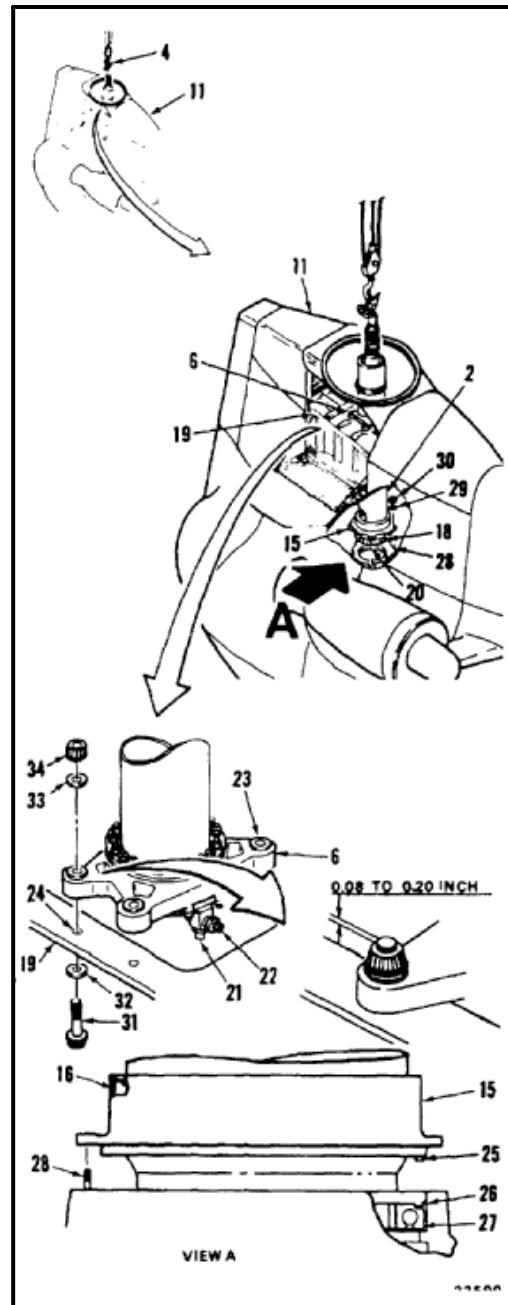
Be careful when handling seal. Seal is easy to damage.

7. Install seal retainer (15) on bottom of shaft (2).
8. Coat splines (18) with oil (E254).
9. Lower shaft (2) through pylon (11) and structure (19). Align shaft splines (18) with transmission splines (20).
10. Turn bearing support (6) so that chip detector (21) and union (22) point forward. Align four mounting holes (23) in support with holes (24) in structure (19).
11. Align tab (25) on retainer (15) with slot (26) on bearing outer race (27). Align retainer with ten studs (28) on transmission (12).
12. Lower shaft (2) into transmission (12) until retainer (15) is seated on top of transmission. Install ten washers (29) and nuts (30) on studs (28). Torque nuts to **60 inch-pounds**.
13. Coat thread of four mounting bolts (31) with oil (E254). Install countersunk washer (32) on each bolt, with countersink against bolt head.

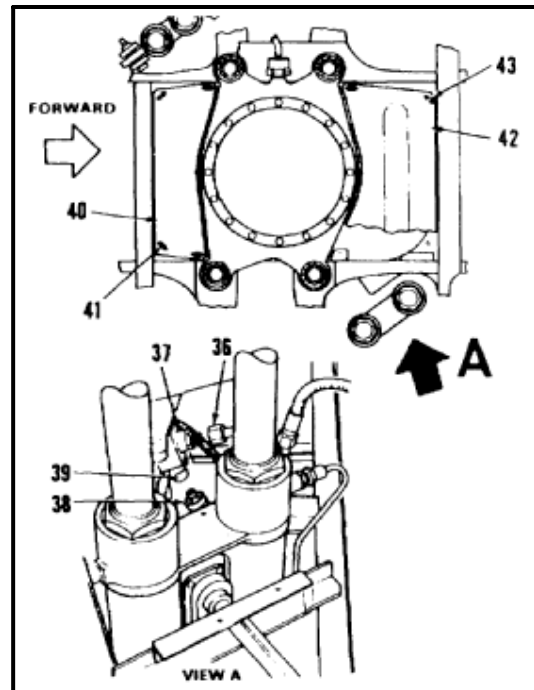
**NOTE**

Refer to Task 1-13, step 8, for re-use of self-locking nuts.

14. Install four bolts (31), from bottom, through structure (19) and bearing support (6). Install four washers (33) and nuts (34). When nuts are installed at least three turns, release tension on hook (4).
15. Torque four nuts (34) to **375 foot-pounds**. Check each bolt (31). Bolts shall extend **0.08 to 0.20 inch** through nuts (34). Use washers (33) of different thicknesses, as needed.



16. Connect drain hose (36) to union (37). Connect connector (38) to chip detector (39).
17. Install access panel (40). Tighten four turnlock fasteners (41). Install access panel (42) Tighten four turnlock fasteners (43).

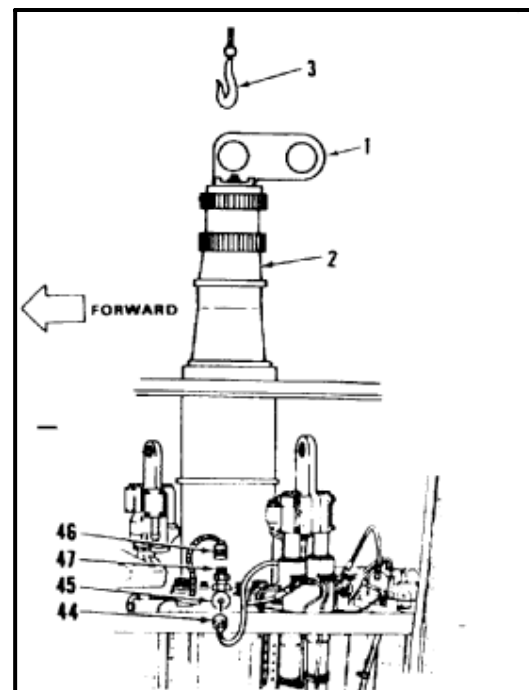


18. Connect pressure hose (44) to filter (45). Connect connector (46) to oil pressure switch (47).
19. Remove hook (3) and hoisting eye (1) from top of shaft (2).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

- Install swashplate (Task 5-133).
- Install drive arms (Task 5-112).
- Install drive collar (Task 5-111).
- Install weather-protective cover (Task 5-138).
- Install rotary-wing head (Task 5-9).
- Check vertical pin angle (Task 11-58).
- Install rotary-wing blades (Task 5-84).
- Phase rotary-wing system (Task 6-28).
- Perform operational check of aft rotor shaft chip detector (TM 55-1520-240-T).
- Close pylon work platforms (Task 2-2).
- Service aft transmission with oil (Task 1-54).
- Perform a ground run (TM 55-1520-240-10).



END OF TASK

**6-63 INSTALL AFT ROTOR SHAFT THROUGH CABIN**

6-63

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
Hoisting Eye (T32)  
Hoist Capable of Lifting 500 Pounds  
Socket, 1 Inch, 3/4 Inch Drive  
Torque Wrench, 100 to 750 Foot-Pounds  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

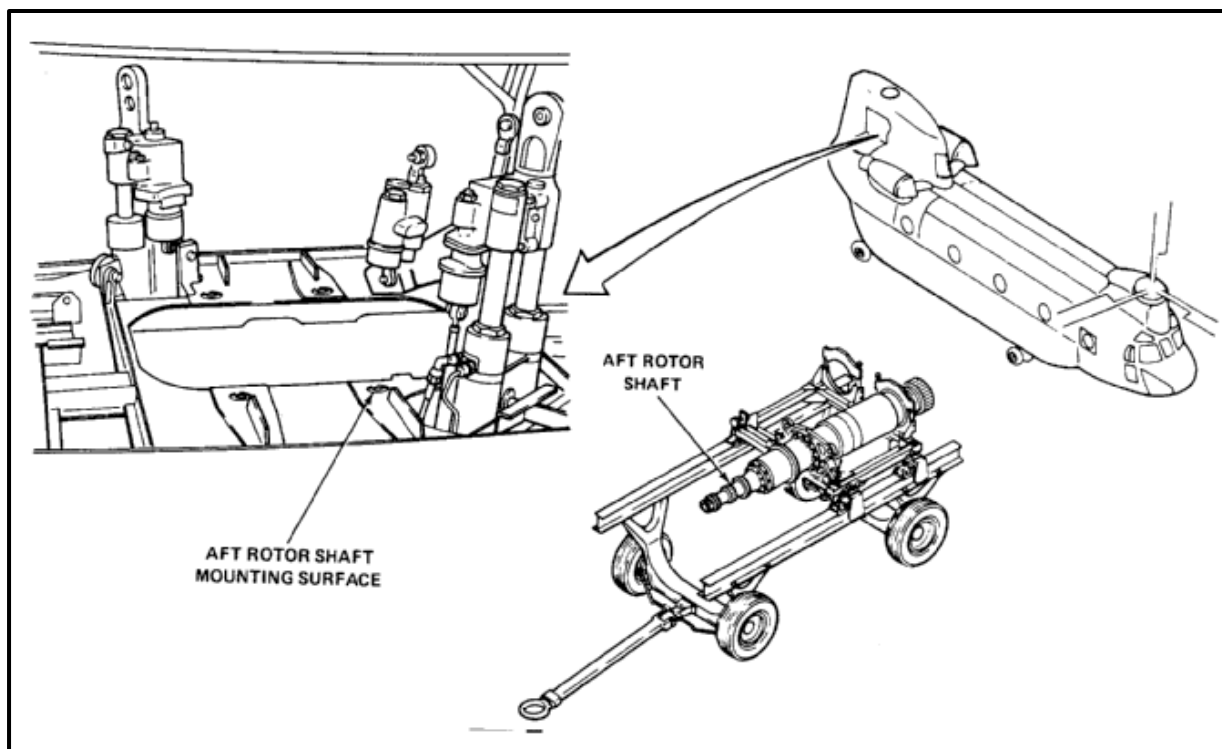
Oil (E254)

**Personnel Required:**

Medium Helicopter Repairer (3)  
Inspector

**References:**

TM 55-1520-240-23P  
Task 2-2

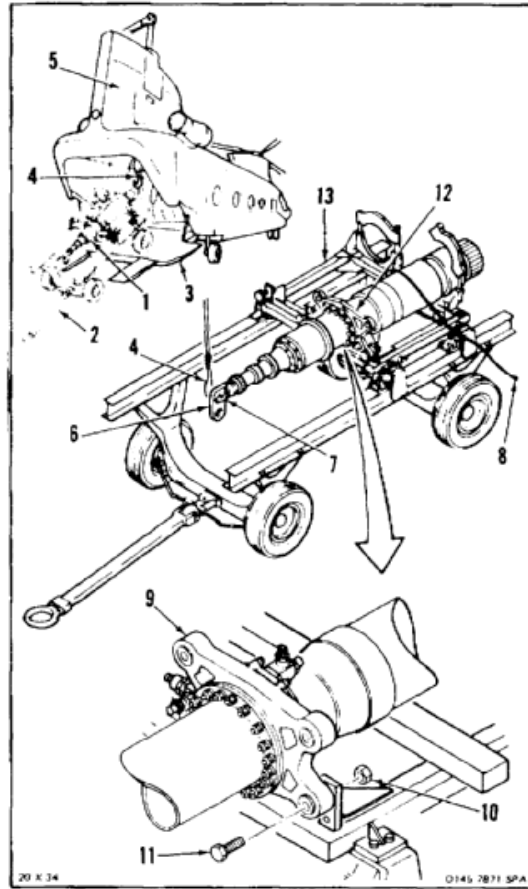


1. Position rotor shaft (1), in transportation trailer 2000 (2), on cargo ramp (3). Raise cargo ramp to level (Task 2-2).
2. Lower work hoist hook (4) through pylon (5) to rotor shaft (1).
3. Install hoisting eye (T32) (6) in top of shaft (1).

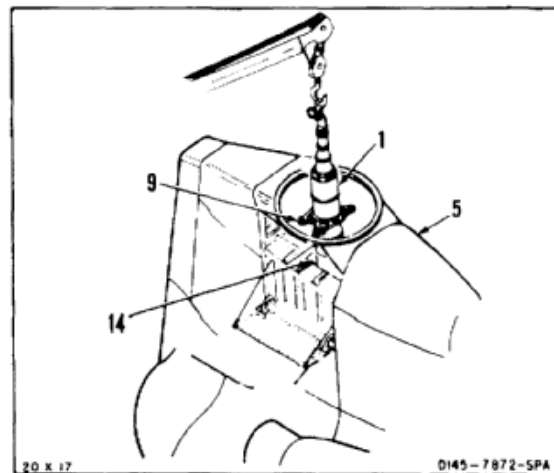
**NOTE**

AFT SHAFT hole must be used for proper shaft alignment during installation.

4. Connect hoist hook (4) to AFT SHAFT hole (7) of hoisting eye (T32) (6). Raise hoist to take up slack. Do not apply tension.
5. Attach rope guide line (8) to shaft (1) below bearing support (9).
6. Remove two nuts (10) and bolts (11). Release clamp (12). Raise hoist to lift shaft (1) out of adapter (13).



7. Turn bearing support (9) so that it fits through hole (14) in pylon (5).
8. Raise shaft (1) so that bearing support (9) is above hole (14).

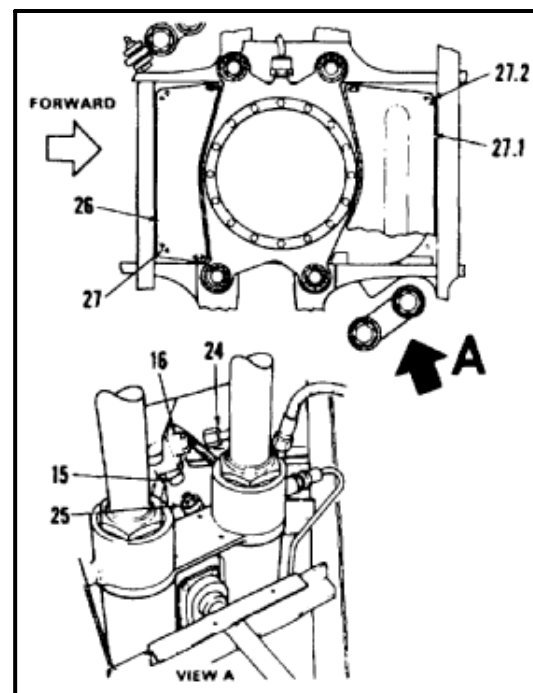
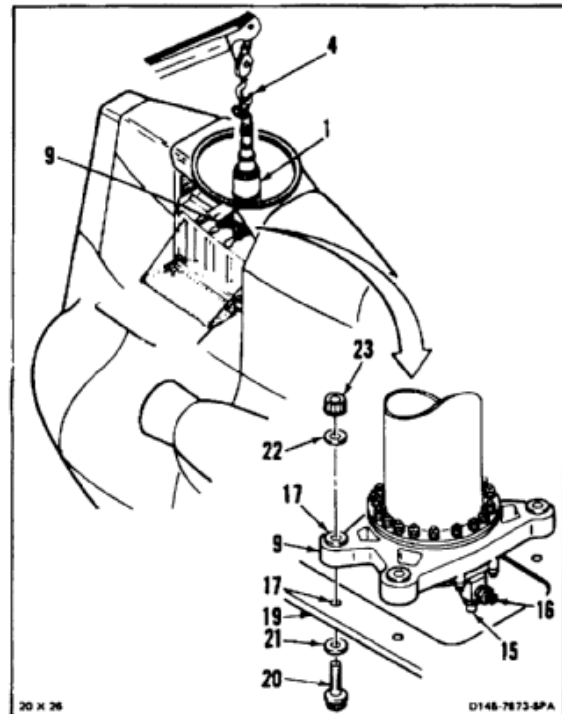


9. Turn bearing support (9) so that chip detector (15) and union (16) point forward. Align four mounting holes (17) in support (9) with holes (18) in structure (19).
10. Lower shaft (1) until bearing support (9) rests on structure (19).

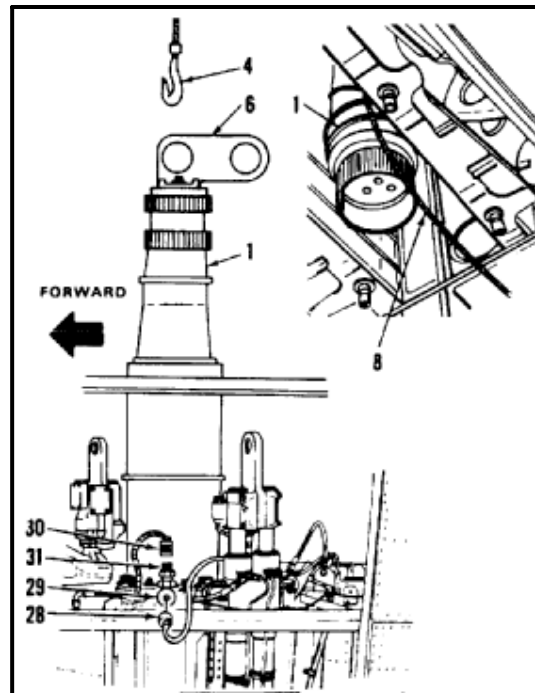
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

11. Coat thread of four mounting bolts (20) with oil (E254). Install countersunk washer (21) on each bolt, with countersink against bolt head.
12. Install four bolts (20), from bottom, through structure (19) and bearing support (9). Install four washers (22) and nuts (23). When nuts are installed at least three turns, release tension on hook (4).
13. Torque four nuts (23) to **375 foot-pounds** Check each bolt (20). Bolts shall extend **0.08 to 0.20 inch** through nuts (23). Use washers (22) of different thickness as needed.
14. Connect drain hose (24) to union (16). Connect connector (25) to chip detector (15).
15. Install access panel (26). Tighten four turnlock fasteners (27). Install access panel (27.1). Tighten four turnlock fasteners (27.2).



16. Connect pressure hose (28) to filter (29).  
Connect connector (30) to oil pressure switch (31).
17. Remove hook (4) and hoisting eye (6) from top of shaft (1).
18. Remove rope guide line (8) from around bottom of rotor shaft (1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install aft transmission (Task 6-97).
- Service aft transmission with oil (Task 1-54).
- Install swashplate (Task 5-133).
- Install drive arms (Task 5-112).
- Install drive collar (Task 5-111).
- Install weather-protective cover (Task 5-138).
- Install rotary-wing head (Task 5-9).
- Check vertical pin angle (Task 11-58).
- Install rotary-wing blades (Task 5-84).
- Phase rotary-wing system (Task 6-28).
- Perform operational check of aft rotor shaft chip detector (TM 55-1520-240-T).
- Close pylon work platforms (Task 2-2).
- Perform a ground run (TM 55-1520-240-10).

END OF TASK

**SECTION V**  
**ENGINE COMBINING TRANSMISSION**

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
1/4-28 Bolt, At Least One Inch Long (3)

**Materials:**

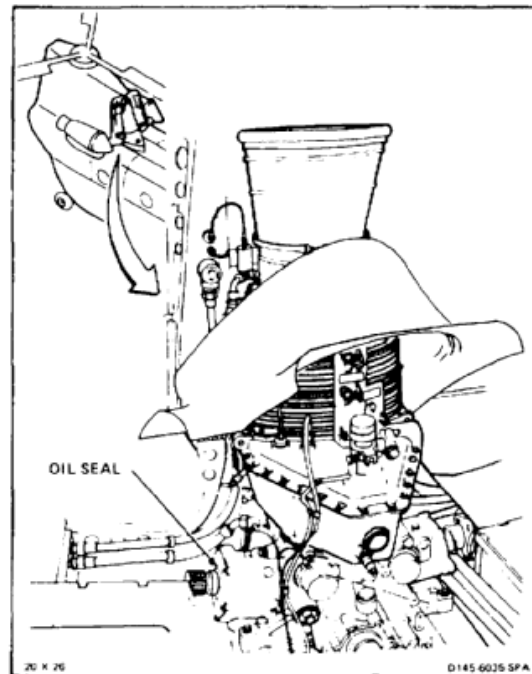
None

**Personnel Required:**

Aircraft Powertrain Repairer

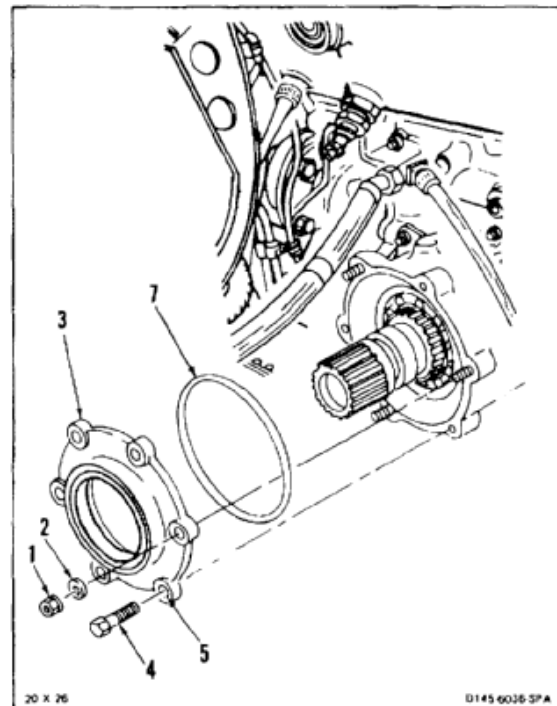
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Pylon Hinged Fairing Open (Task 2-2)  
Pylon Lower Fairing Open (Task 2-2)  
Engine Drive Shaft and Combining Transmission  
Adapter Assembly Removed (Task 6-30)

**NOTE**

Procedure is same to remove seal from left or right input shaft. Removal of left shaft seal is shown here.

1. Remove three nuts (1) and washers (2) from retainer (3).
2. Install three 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).



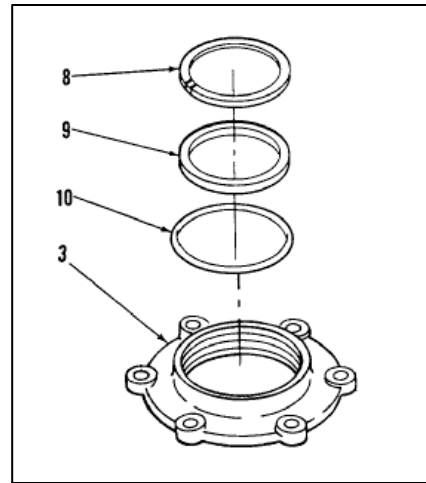


**6-64 REMOVE COMBINING TRANSMISSION INPUT SHAFT OIL SEAL (Continued)****6-64**

4. Remove retaining ring (8) from retainer (3).  
Remove seal (9) and packing (10).

***FOLLOW-ON MAINTENANCE:***

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Gun Heater  
Pyrometer  
Aluminum Tube, 3 Inch OD, 1/8 Inch-Thick Wall, 1  
to 6 Inches Long  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Gloves (E186)  
Dry Cleaning Solvent (E162)  
Cloths (E120)  
Oil (E254)  
Kevlar Gloves (E187)

**Parts:**

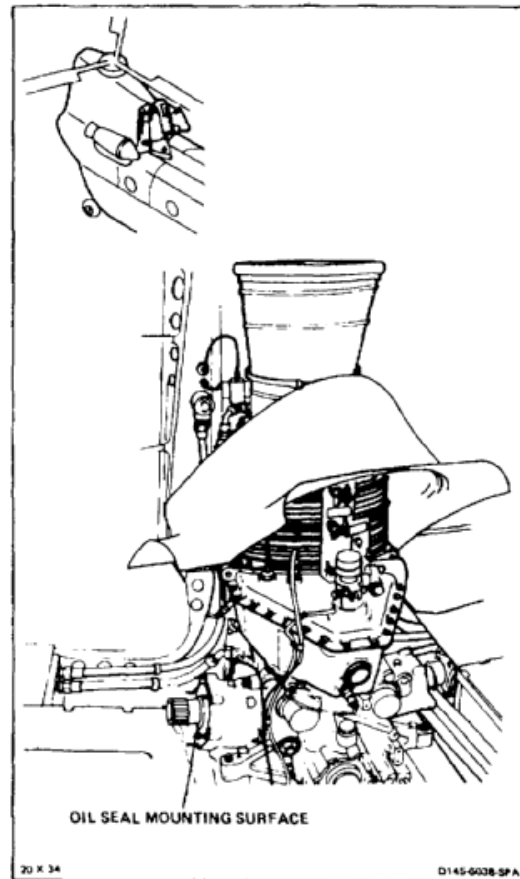
Packings

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

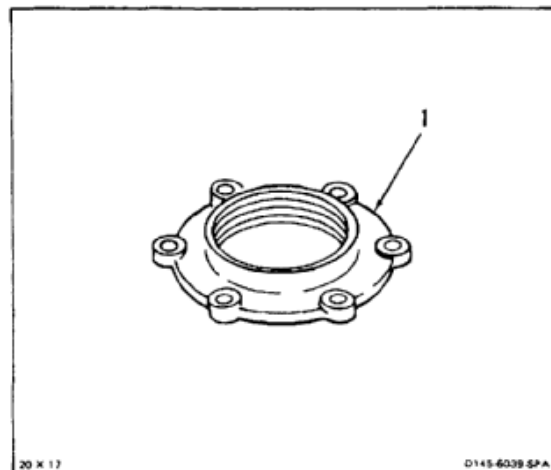
**References:**

TM 55-1520-240-23P

**WARNING**

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

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).



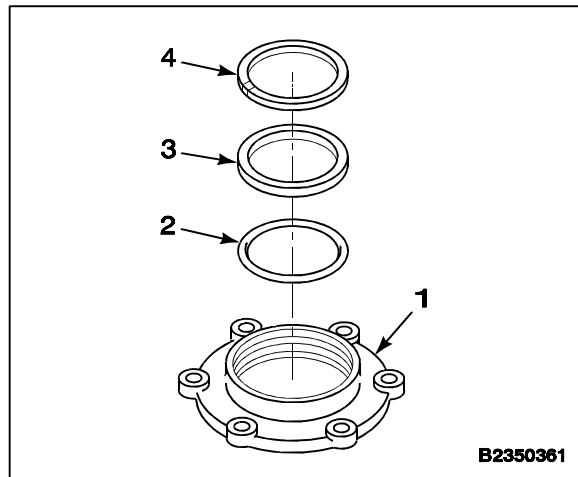
**WARNING**

Wear Kevlar gloves when handling hot retainer. Hot retainer can cause burns.

**CAUTION**

Do not heat retainer over **250°F (120°C)**. Metal can be damaged.

2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. Install seal (3) in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



B2350361

**NOTE**

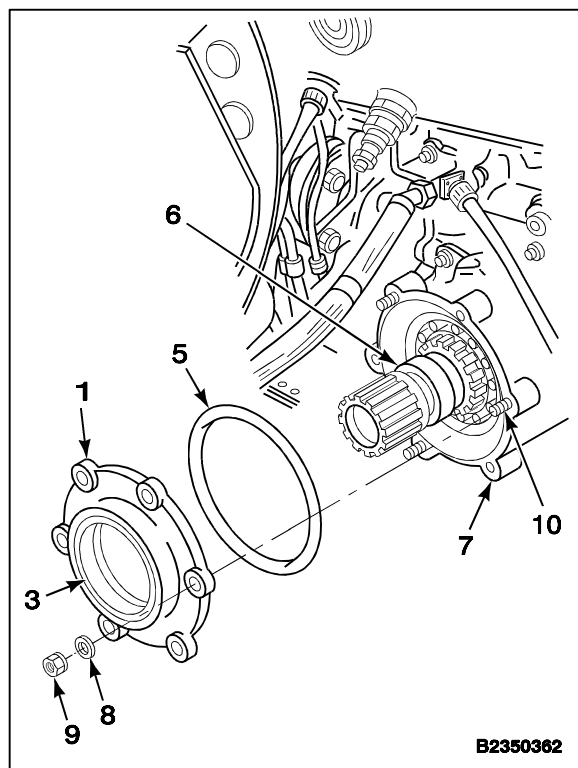
Procedure is same to install retainer on left or right input shaft. Installation on left shaft is shown here.

6. Coat packing (5) with oil (E254). Install packing on retainer (1).

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). Install retainer (1) on transmission (7).
8. Install three washers (8) and nuts (9) on studs (10). Torque nuts to **70-85 inch-pounds**.



B2350362

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

- Install combining transmission adapter assembly and engine drive shaft (Task 6-32).
- Close pylon lower fairing (Task 2-2).
- Close pylon hinged fairing (Task 2-2).

END OF TASK



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
1/4-28 Bolt, At Least One Inch Long (2)

**Materials:**

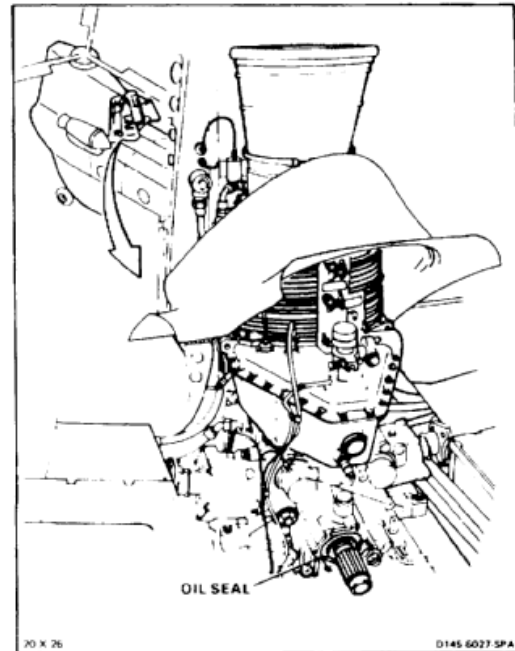
None

**Personnel Required:**

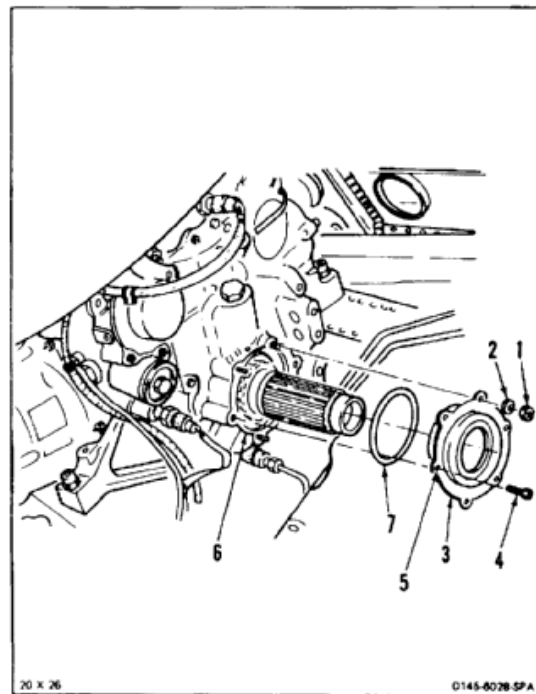
Aircraft Powertrain Repairer

**Equipment Condition:**

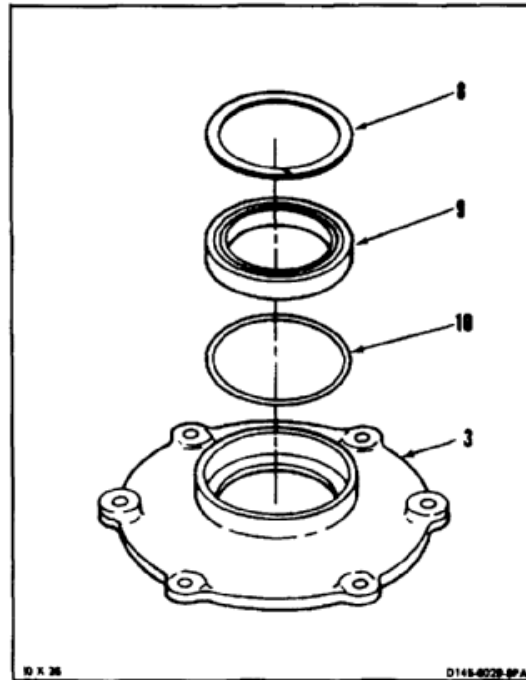
Battery Disconnected (Task 1-39)  
Electrical Power Off  
Aft Pylon Doors Open (Task 2-2)  
Aft Pylon Lower Fairing Open (Task 2-2)  
No. 7 Drive Shaft Removed (Task 6-4)  
Combining Transmission Forward Adapter Assembly  
Removed (Task 6-5)



1. Remove four nuts (1) and washers (2) from retainer (3).
2. Install two 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).



4. Remove retaining ring (8) from retainer (3).  
Remove seal (9) and packing (10).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-254

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Gun Heater  
Pyrometer  
Aluminum Tube, 3-1/2 Inch OD, 1/8 Inch-Thick Wall, 1  
to 6 Inches Long  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Gloves (E186)  
Dry Cleaning Solvent (E162)  
Cloths (E120)  
Oil (E254)  
Kevlar Gloves (E187)

**Parts:**

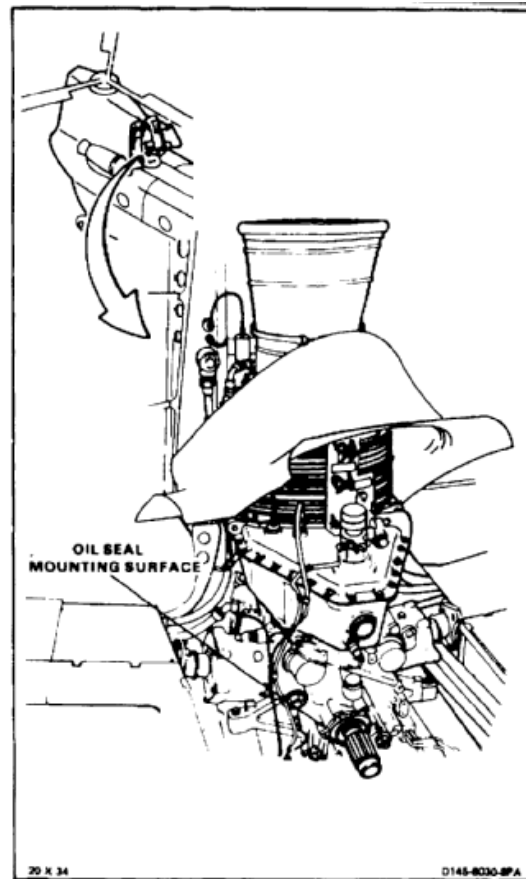
Packings

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

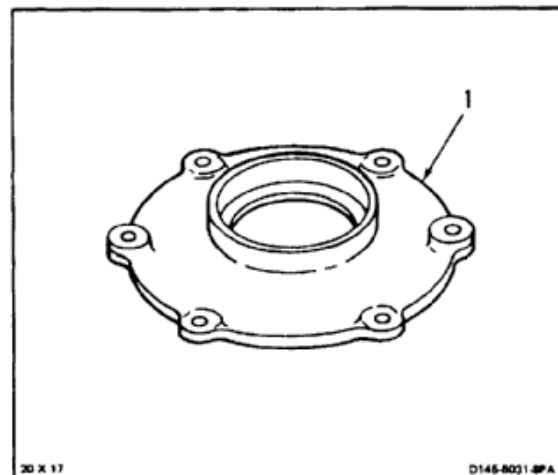
**References:**

TM 55-1520-240-23P

**WARNING**

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

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).



**WARNING**

Wear Kevlar gloves when handling hot retainer. Hot retainer can cause burns.

**CAUTION**

Do not heat retainer over **250°F (120°C)**. Metal can be damaged.

2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. Install seal (3) in retainer (1)' flat side up. Use aluminum tube.
5. Install retaining ring (4).

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). Install retainer (1) on transmission (7).
8. Install four washers (8) and nuts (9) on studs (10). Torque nuts to **60 inch-pounds**.

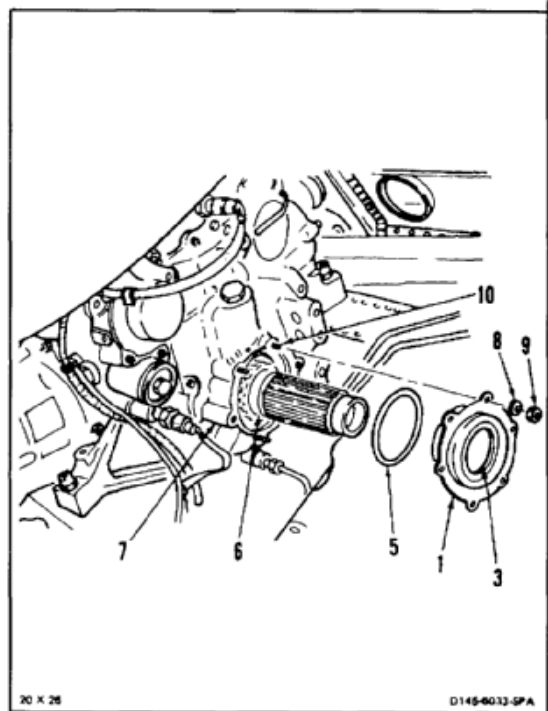
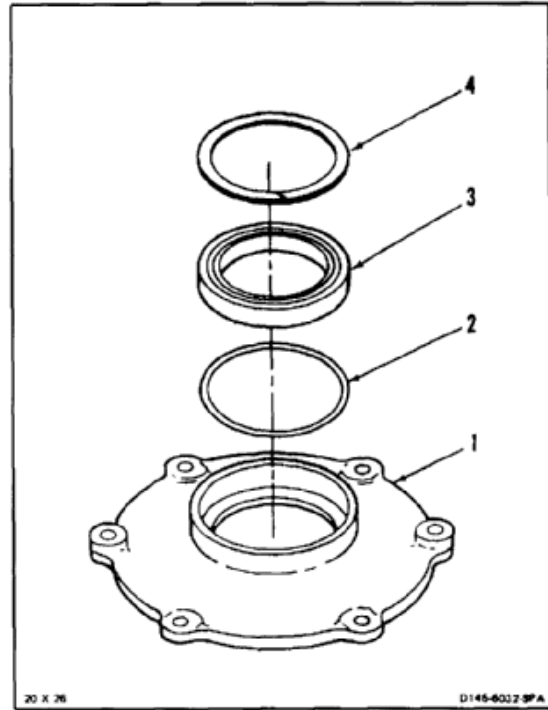
**INSPECT****FOLLOW-ON MAINTENANCE:**

Install combining transmission forward adapter assembly (Task 6-8).

Install No. 7 drive shaft (Task 6-19).

Close aft pylon lower fairing (Task 2-2).

Perform ground run (TM 55-1520-240-10).



END OF TASK



INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Powertrain Repairer's Tool Kit, NSN 5180-00-003-5267
- 1/4-28 Bolt, At Least One Inch Long (2)

**Materials:**

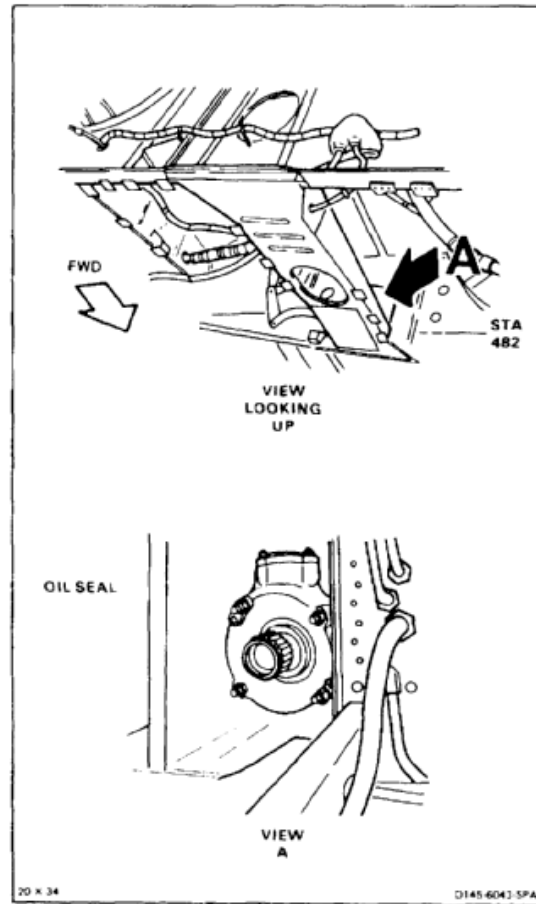
None

**Personnel Required:**

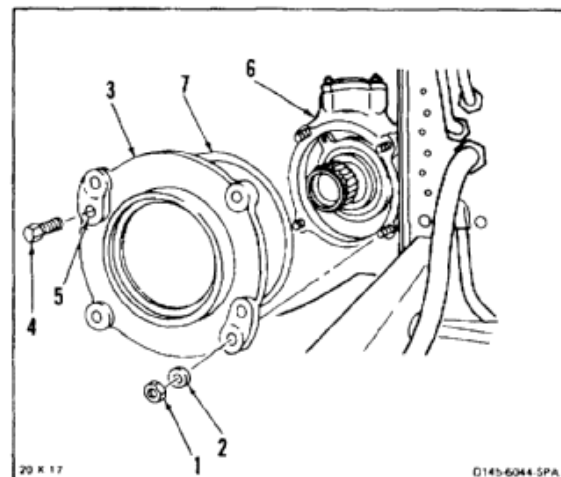
Aircraft Powertrain Repairer

**Equipment Condition:**

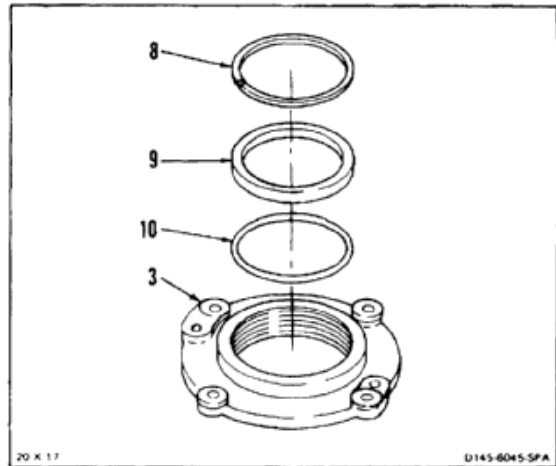
- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Aft Drive Shafting Removed (Task 6-21)
- Combining Transmission Aft Adapter Assembly Removed (Task 6-22)



1. Remove four nuts (1) and washers (2) from retainer (3).
2. Install two 1/4-28 bolts (4) in holes (5). Turn bolts to jack retainer (3) off transmission (6).
3. Remove packing (7) from retainer (3).



4. Remove retaining ring (8) from retainer (3).  
Remove seal (9) and packing (10).



***FOLLOW-ON MAINTENANCE:***

None

END OF TASK

**6-258**

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Gun Heater  
Pyrometer  
Aluminum Tube, 3-1/2 Inch OD, 1/8 Inch-Thick Wall, 1  
to 6 Inches Long  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Gloves (E186)  
Dry Cleaning Solvent (E162)  
Cloths (E120)  
Oil (E254)  
Kevlar Gloves (E187)

**Parts:**

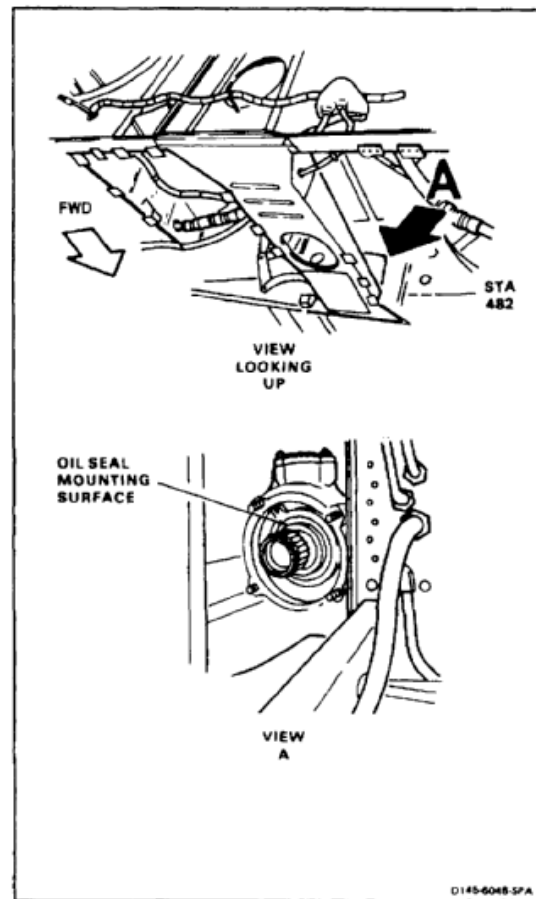
Packings

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

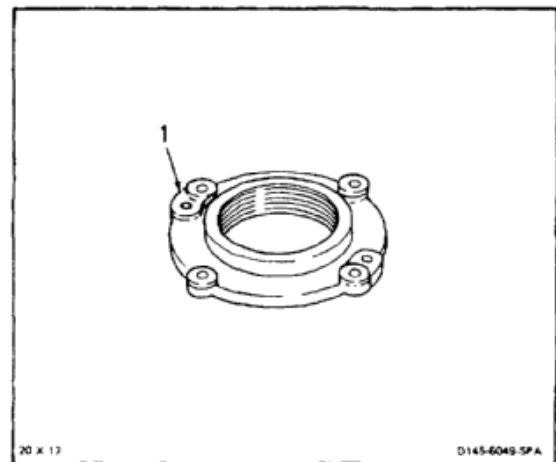
**References:**

TM 55-1520-240-23P

**WARNING**

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

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186) and goggles.



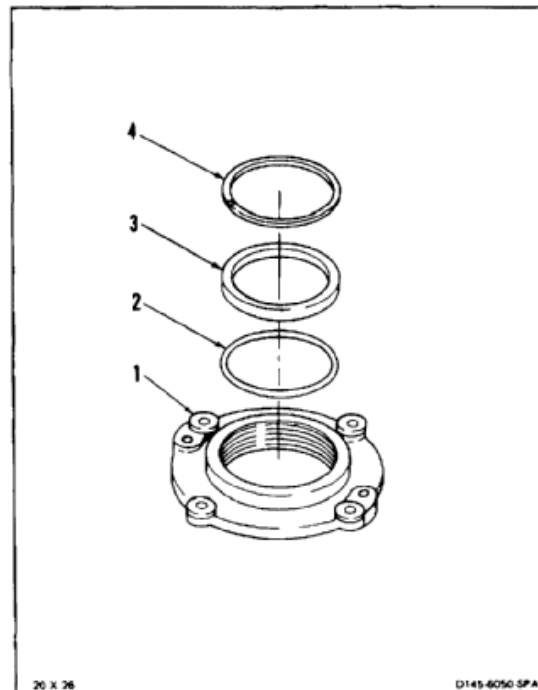
**WARNING**

Wear Kevlar gloves when handling hot retainer. Injury to hands can occur.

**CAUTION**

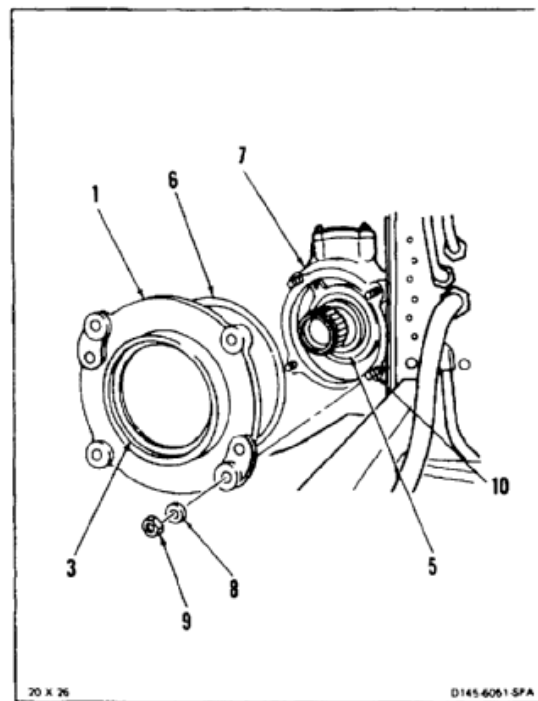
Do not heat retainer over **250°F (120°C)**. Metal can be damaged.

2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. Install seal (3) in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

6. Coat packing (5) with oil (E254). Install packing on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). Install retainer (1) on transmission (7).
8. Install four washers (8) and nuts (9) on studs (10). Torque nuts to **60 inch-pounds**.

**INSPECT**

***FOLLOW-ON MAINTENANCE:***

Install combining transmission aft adapter assembly  
(Task 6-24).

Install aft drive shafting (Task 6-29).

Perform ground run (TM 55-1520-240-10).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Workstand

**Materials:**

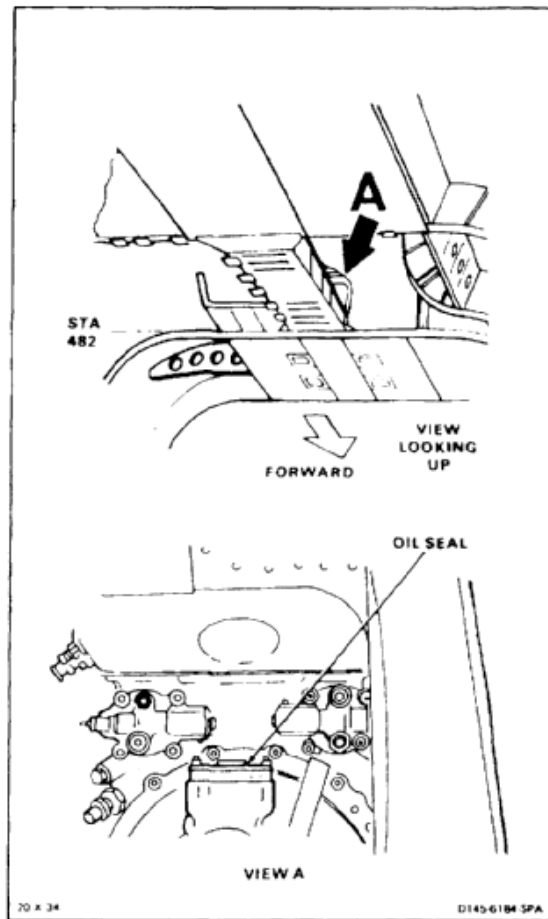
None

**Personnel Required:**

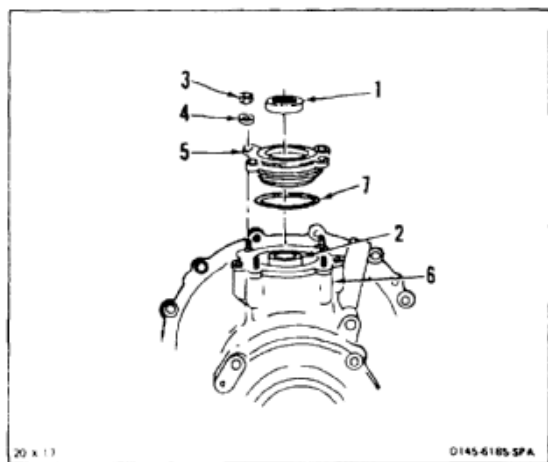
Aircraft Powertrain Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Oil Cooler, Fan and Drive Shaft Removed (Task  
6-182)  
Cargo Ramp Open and Level (Task 2-2)



1. Remove snubber (1) from end of shaft (2).
2. Remove four nuts (3) and washers (4) from seal retainer (5). Pry retainer off transmission (6).
3. Remove packing (7) from retainer (5).



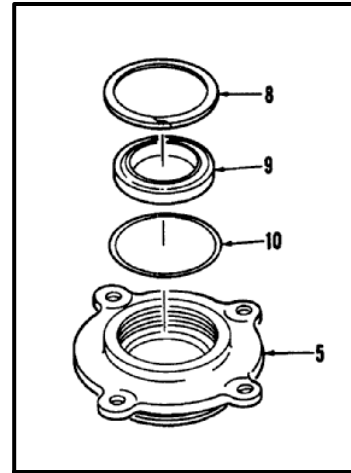
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**6-70 REMOVE COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL (Continued)**

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6-70

4. Remove retaining ring (8) from retainer (5).  
Remove seal (9) and packing (10).

***FOLLOW-ON MAINTENANCE:***

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Gun Heater  
Pyrometer  
Aluminum Tube, 2 Inch OD, 1/8 Inch-Thick Wall, 1  
to 6 Inches Long  
Torque Wrench, 30 to 150 Inch-Pounds  
Workstand

**Materials:**

Gloves (E186)  
Dry Cleaning Solvent (E162)  
Cloths (E120)  
Oil (E254)  
Grease (E190)  
Kevlar Gloves (E187)

**Parts:**

Packing

**Personnel Required:**

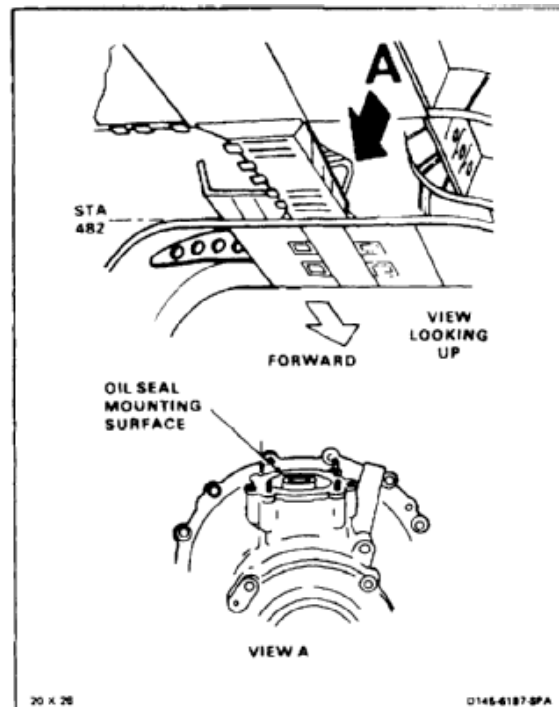
Aircraft Powertrain Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Inspect Snubber (Task 6-185)





**6-71 INSTALL COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT SEAL (Continued)**

6-71

**WARNING**

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

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

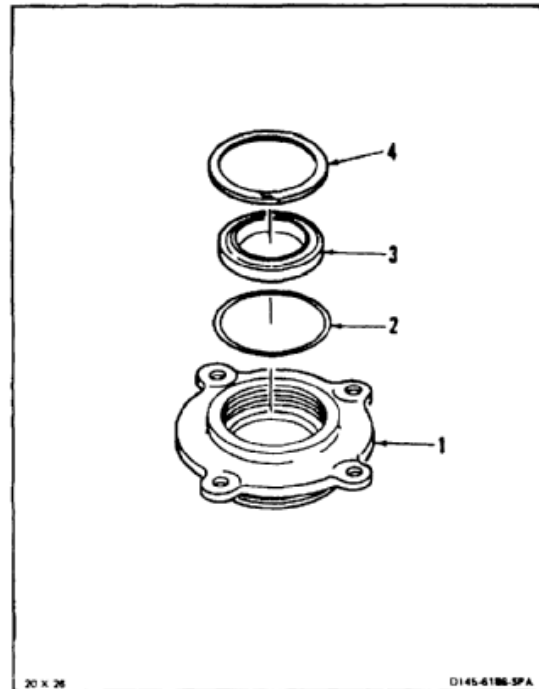
**WARNING**

Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.

**CAUTION**

Do not heat retainer over **250°F (120°C)**. Metal can be damaged.

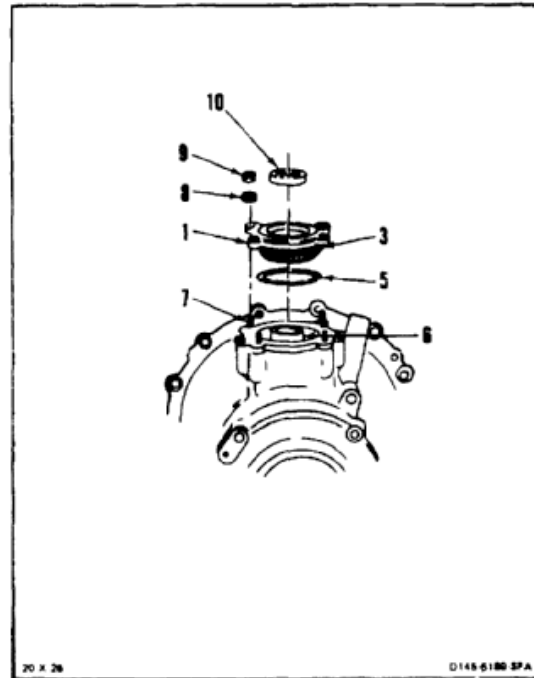
2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater and pyrometer.
3. Install packing (2) in retainer (1).
4. Install seal (3) in retainer (1), flat side up. Use aluminum tube to seat seal.
5. Install retaining ring (4).



**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

6. Coat packing (5) with oil (E254). Install packing (5) on retainer (1).
7. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (6). Install retainer (1) on four studs (7).
8. Install four washers (8) and nuts (9) on studs (7). Torque nuts to **60 inch-pounds**.
9. Install snubber (10) on end of shaft (6).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install oil cooler fan and drive shaft (Task 6-186).  
Close cargo ramp (Task 2-2).

END OF TASK

**6-71.1 CLEAN AND INSPECT COMBINING TRANSMISSION OIL FILLER SCREEN**

6-71.1

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Dry Cleaning Solvent (E162)

Cloth (E120)

Brush (E86)

Gloves (E186)

**Personnel Required:**Medium Helicopter Repairer  
Inspector**References:**

Task 6-108

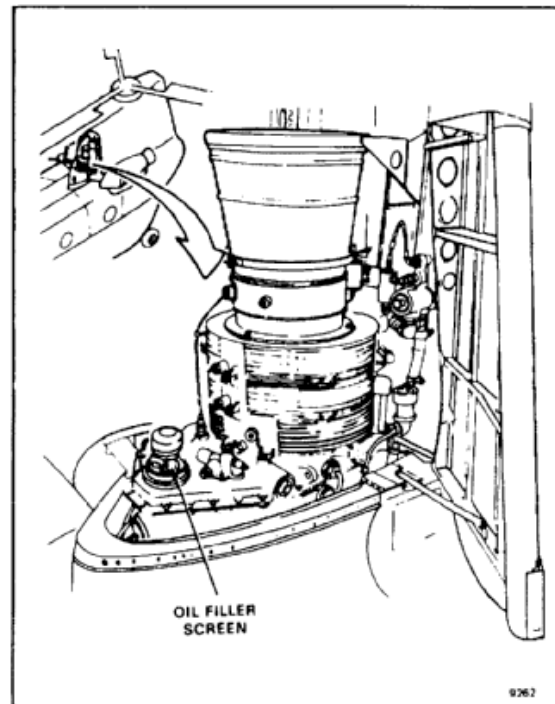
TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)

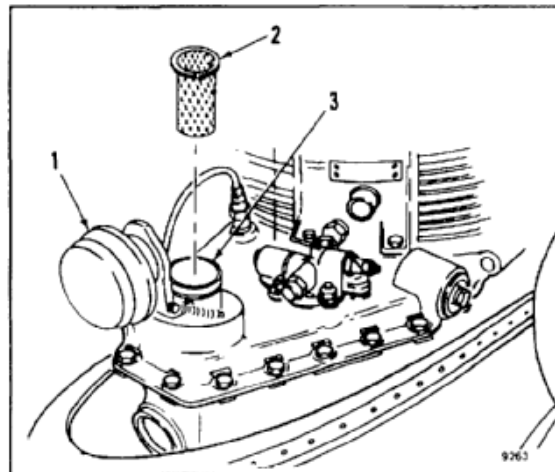
Electrical Power Off

Aft Pylon Access Doors Open (Task 2-2)

**WARNING**

Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.

1. Open cap assembly (1). Remove screen (2) from neck (3) of filler.
2. Close cap assembly (1).

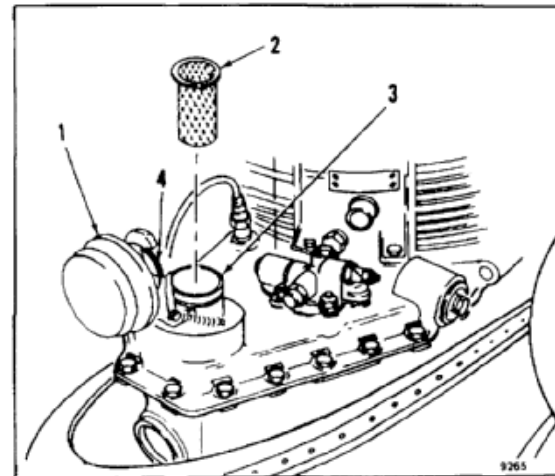
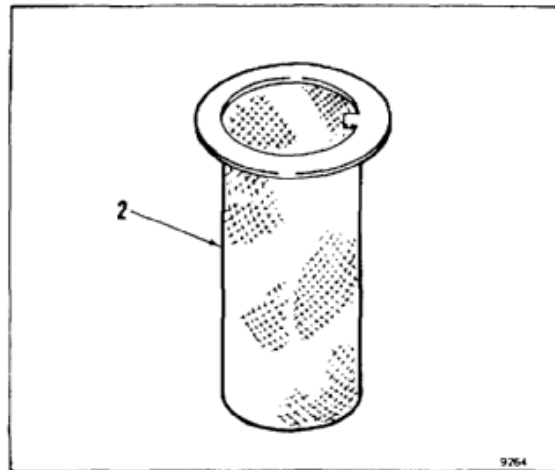


3. Check screen (2) for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

**WARNING**

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

4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. Inspect screen (2) for tears. There shall be no tears.
6. Open cap assembly (1). Install screen (2) in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.

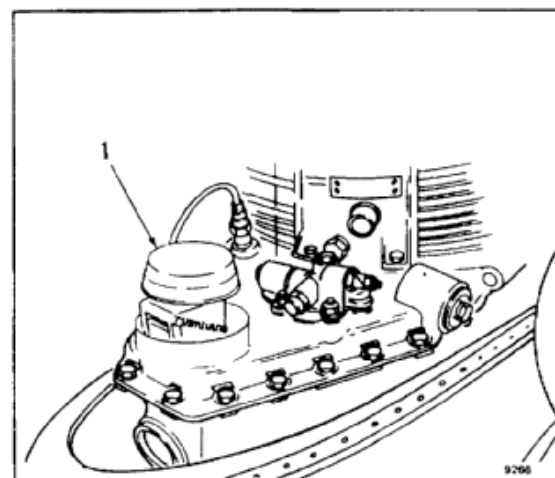


8. Close cap assembly (1).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Close aft pylon doors (Task 2-2).



END OF TASK

**6-71.2 REMOVE COMBINING TRANSMISSION OIL FILLER ASSEMBLY**

6-71.2

**INITIAL SETUP****Applicable Configurations:**

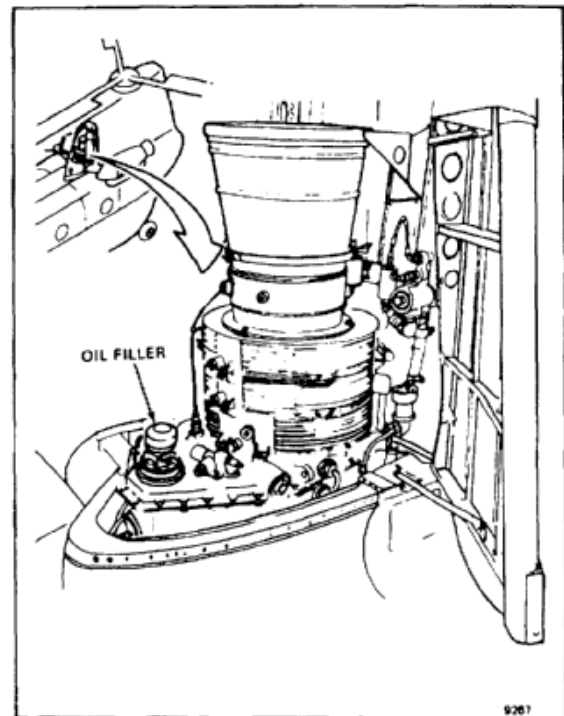
All

**Tools:**

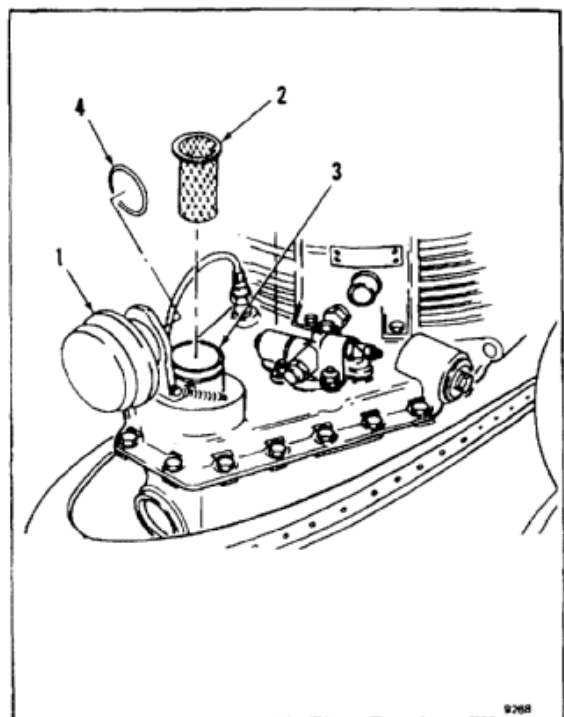
Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**Barrier Material (E80)  
Masking Tape (E388)**Personnel Required:**

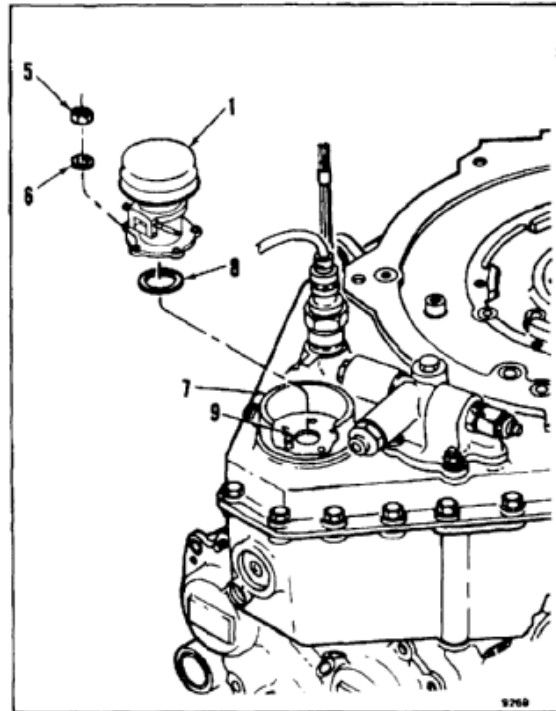
Medium Helicopter Repairer

**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Aft Pylon Access Doors Open (Task 2-2)

1. Open cap assembly (1). Remove screen (2) from neck (3). Remove packing (4) from underside of cap assembly.



2. Remove five nuts (5) and washers (6) from inside scupper (7). Remove cap assembly (1) and packing (8).
3. Cover cavity (9) with barrier material (E80) and masking tape (E388).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-270

**6-71.3 INSTALL COMBINING TRANSMISSION OIL FILLER ASSEMBLY****6-71.3****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

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

**Materials:**

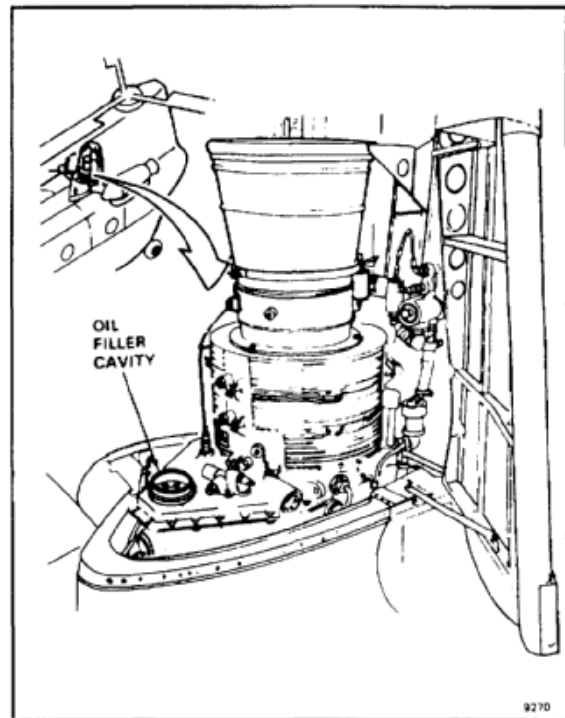
None

**Personnel Required:**

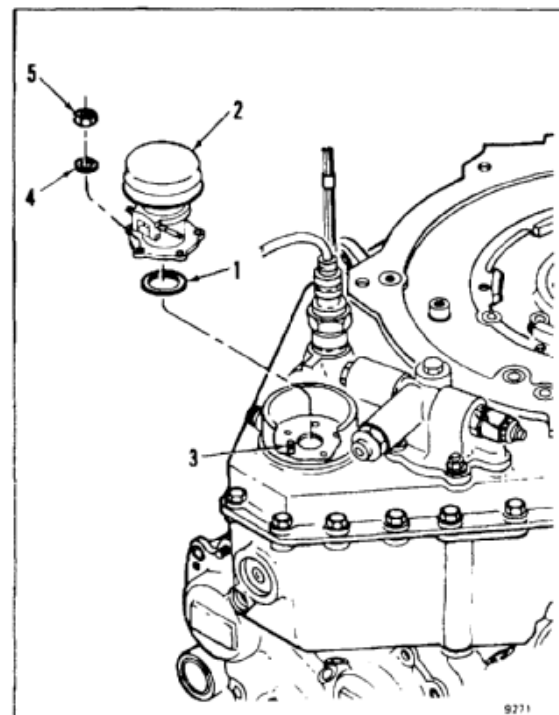
Medium Helicopter Repairer  
Inspector

**References:**

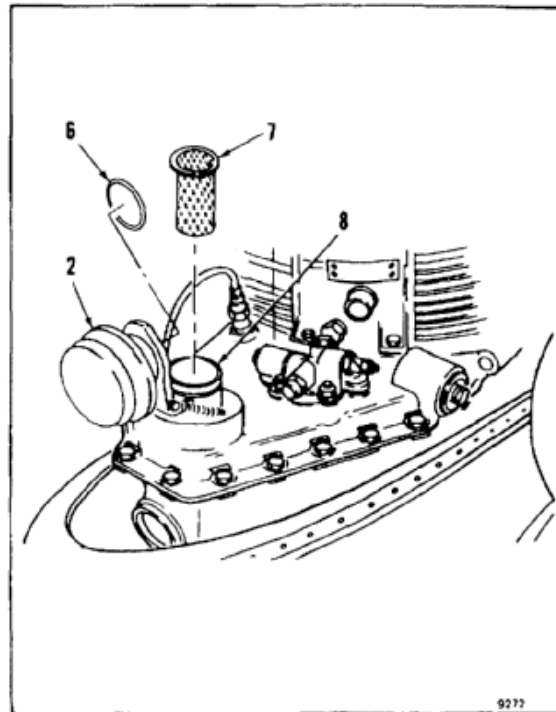
TM 55-1520-240-23P



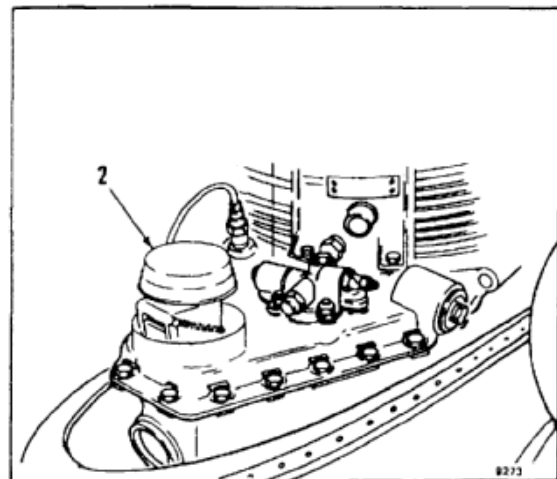
1. Install packing (1) on bottom of cap assembly (2). Install cap assembly, with packing, on studs (3).
2. Install five washers (4) and nuts (5). Torque nuts to **60 inch-pounds**.



3. Open cap assembly (2). Install packing (6) on bottom of cap.
4. Install screen (7) in neck (8).



5. Close cap assembly (2).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close aft pylon doors (Task 2-2).

END OF TASK

**6-272**



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart  
 Open End Wrench, 1-1/2 Inch  
 Open End Wrench, 1-1/8 Inch  
 Work Hoist, 2000 Pound Capacity  
 Sling (T34)  
 Rope Guide Line (2)

**Materials:**

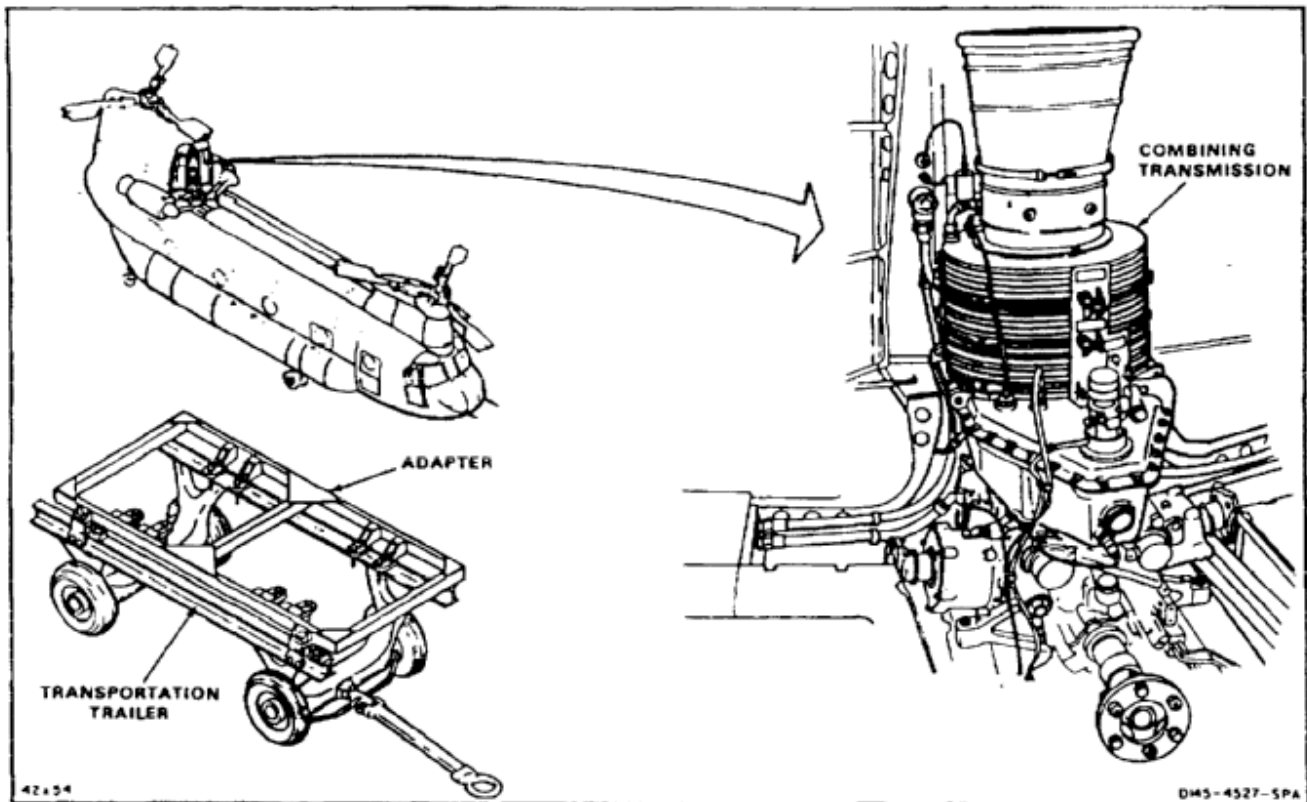
Paper Tags (E264)

**Personnel Required:**

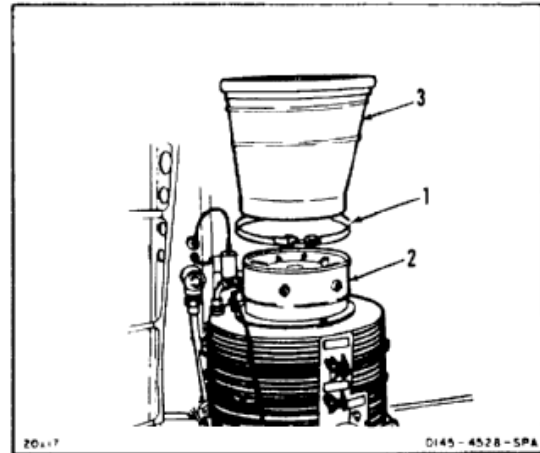
Medium Helicopter Repairer (2)

**Equipment Condition:**

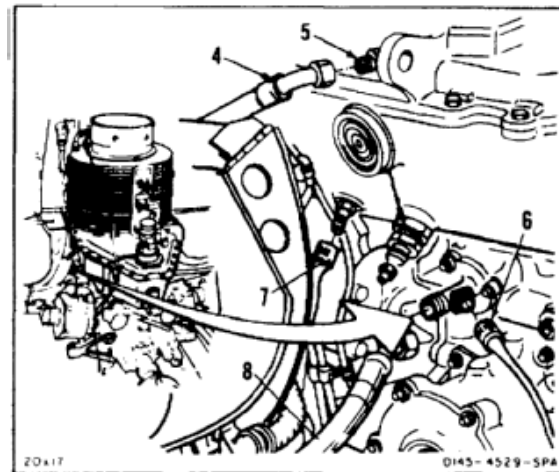
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Hydraulic Power Off  
 Aft Pylon Door Open (Task 2-2)  
 Aft Pylon Lower Fairing Removed (Task 2-284)  
 Left and Right Transmission Shafts and Combining  
 Transmission Adapter Assembly Removed (Task  
 6-30)  
 No. 7 Forward Drive Shaft Removed (Task 6-4)  
 Adapter (T20) Installed on Transportation Trailer 2000  
 (Task 2-140)



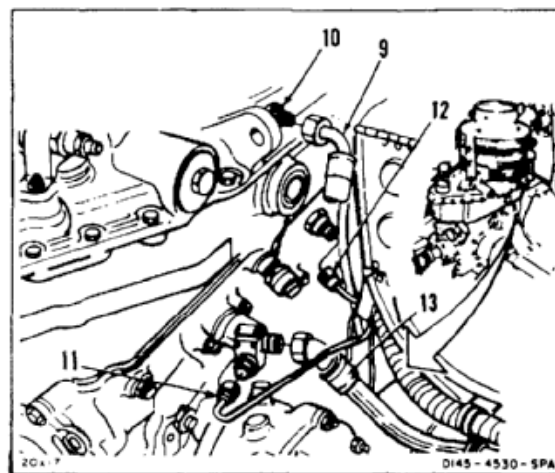
1. Loosen clamp (1) around fan (2) and duct (3). Remove duct.



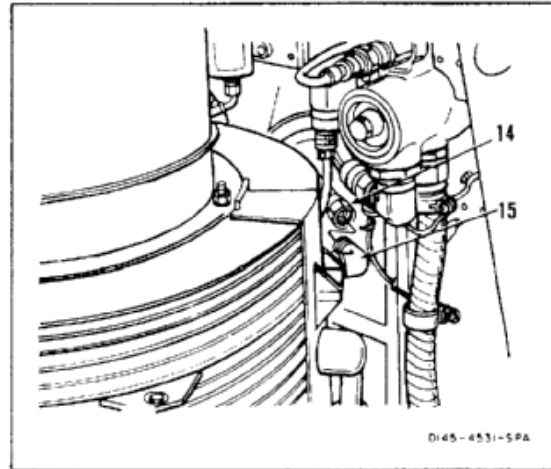
2. Remove breather hose (4) from reducer (5).
3. Tag and disconnect connector (6). Tag and disconnect connector (7).
4. Disconnect oil hose (8). Cap hose quickly to prevent oil loss. Use container to catch spilled oil.



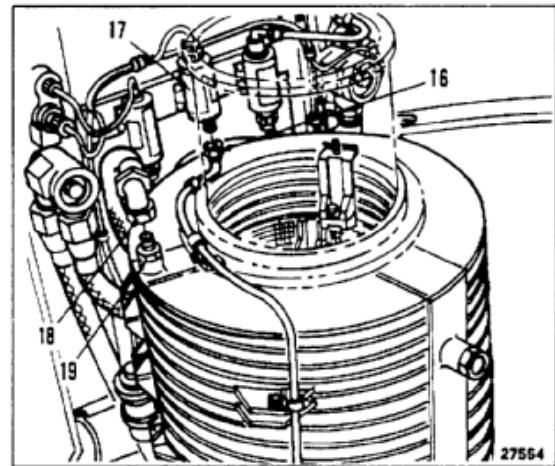
5. Remove breather hose (9) from reducer (10).
6. Tag and disconnect connector (11). Tag and disconnect connector (12).
7. Disconnect oil hose (13). Cap hose quickly to prevent oil loss. Use container to catch spilled oil.



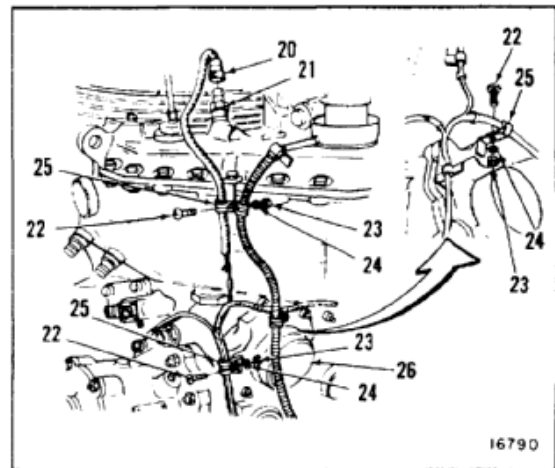
8. Tag and disconnect oil hose (14) from elbow (15).



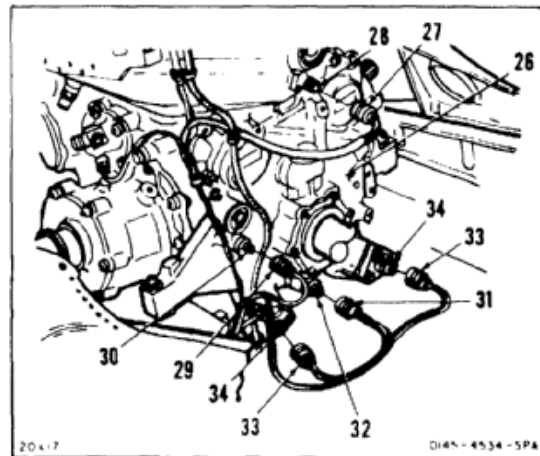
9. Disconnect oil hose (16) from transducer (17).
10. Tag and disconnect oil hose (18) from reducer (19).



11. Tag and disconnect connector (20) from COMB PRESS SWITCH — MAIN receptacle (21).
12. Remove screws (22), nuts (23), and washers (24) from clamps (25) at 3 places. Disconnect clamps from transmission (26).
13. Loosely install screws (22), washers (24), and nuts (23) on the clamps (25).



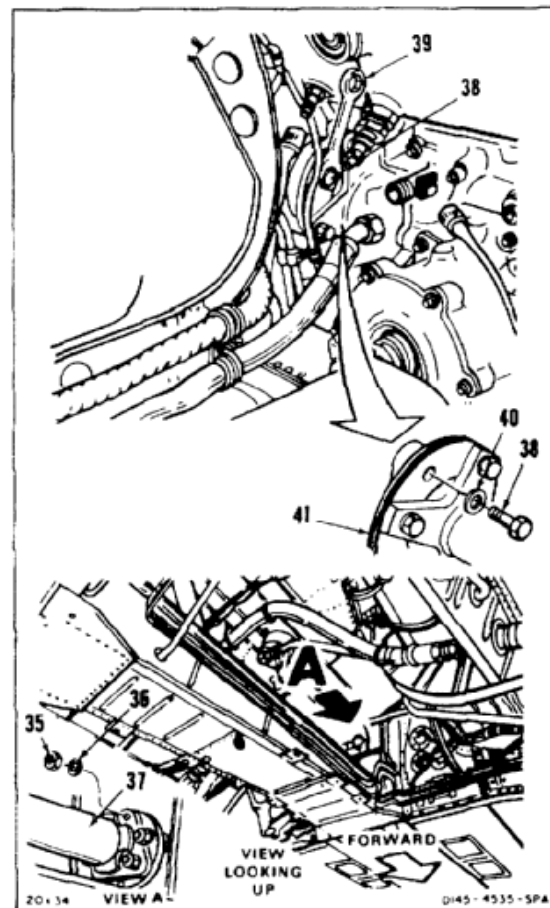
14. Tag and disconnect connector (27) from COMB XMSN TEMP BULB receptacle (28) at front of transmission (26).
15. Tag and disconnect connector (29) from COMB PRESS SWITCH — AUX receptacle (30).
16. Tag and disconnect connector (31) from COM CHIP DETECTOR receptacle (32).
17. Tag and disconnect connectors (33) from COMB DEBRIS SCREEN receptacles (34).



**CAUTION**

If bolt turns, it can damage adapter assembly.

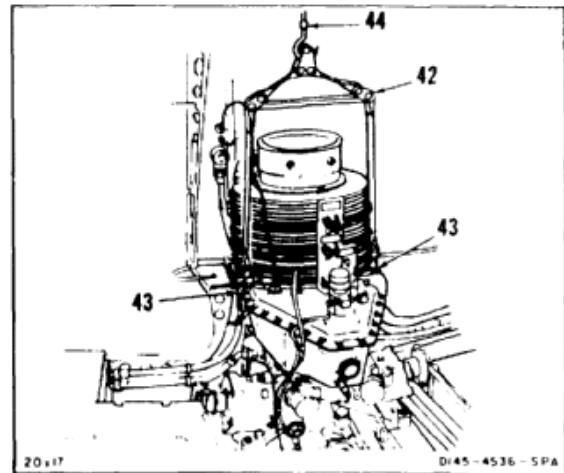
18. Hold bolts (38) with wrench (39) to keep bolts from turning. Remove three nuts (35) and washers (36) from aft drive shaft (37) inside helicopter.
19. Remove three bolts (38) and special washers (40) from adapter assembly (41).



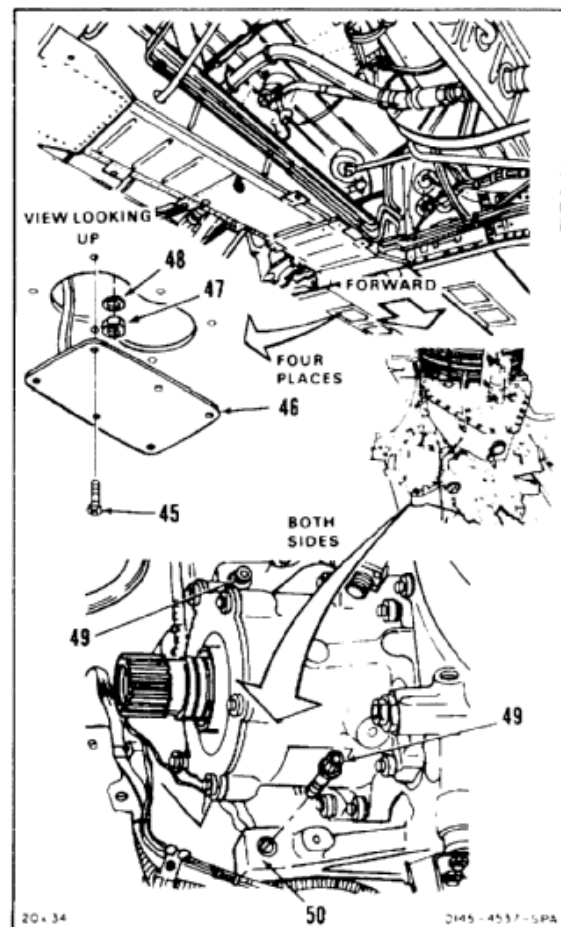
## 6-72 REMOVE COMBINING TRANSMISSION (Continued)

6-72

20. Connect sling (T34) (42) to two hoisting eyes (43). Connect hoist hook (44) to sling.
21. Raise hoist hook (44) to remove slack from sling (T34) (42). Do not put tension on sling.



22. Remove 24 screws (45) and four access panels (46) from cabin ceiling.
23. Remove four mounting nuts (47) and washers (48).
24. Remove four bolts (49) from mounting lugs (50).

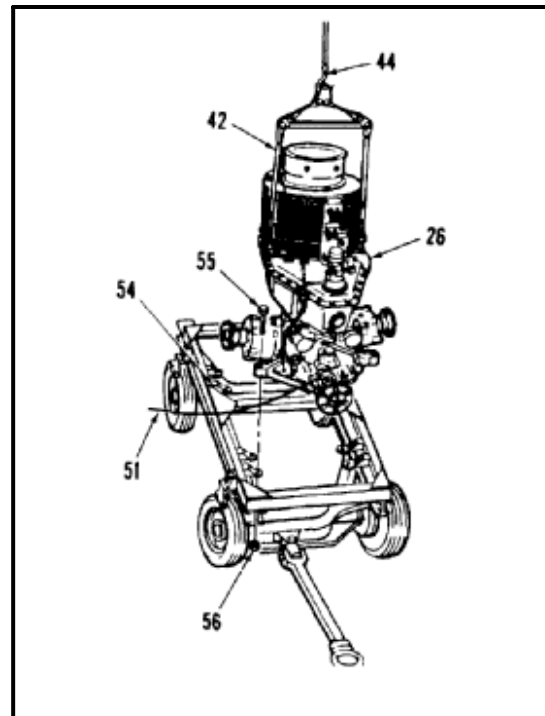
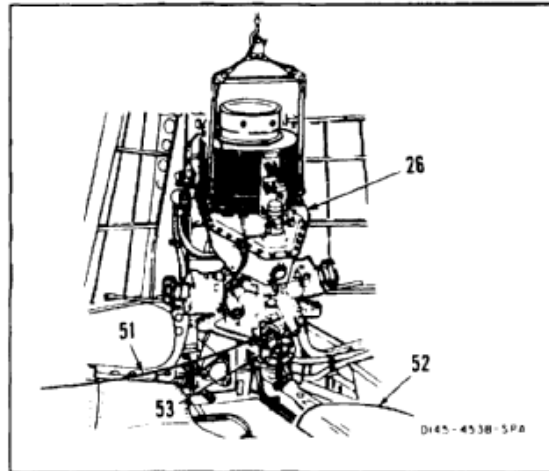


25. Slowly raise transmission (26) **1 inch**. Check that all wires and hoses between transmission and helicopter have been disconnected.
26. Attach rope guide line (51) to each side of transmission (26).

**WARNING**

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

27. With aid of helper, raise transmission (26) up and away from helicopter. Turn transmission as needed for clearance. Raise and lower access door (52) as needed to clear adapter assembly (53).
28. Lower transmission (26) onto adapter (T20) (54). Install four bolts (55) and nuts (56).
29. Remove hoist cable (44) and sling (42). Remove guide lines (51).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
Wood Dowel, 1 Inch x 18 Inches

**Materials:**

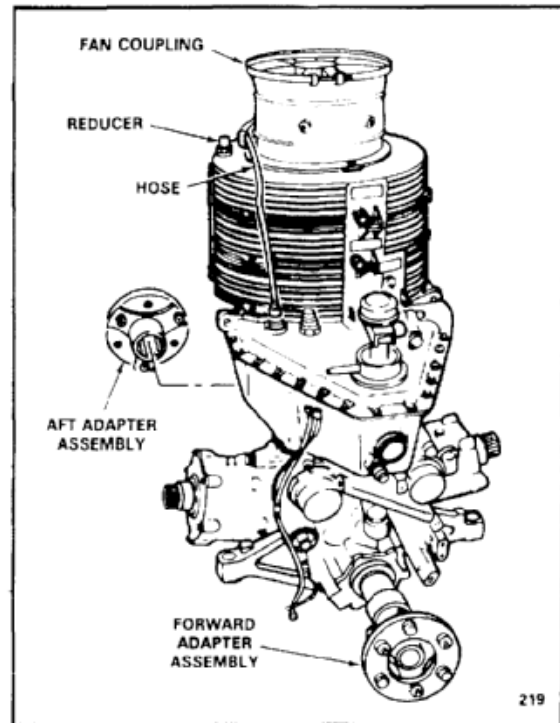
None

**Personnel Required:**

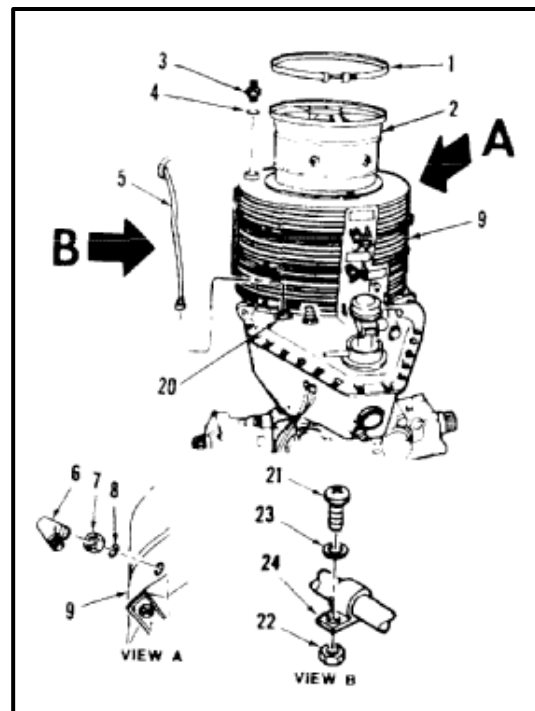
Medium Helicopter Repairer (2)

**Equipment Condition:**

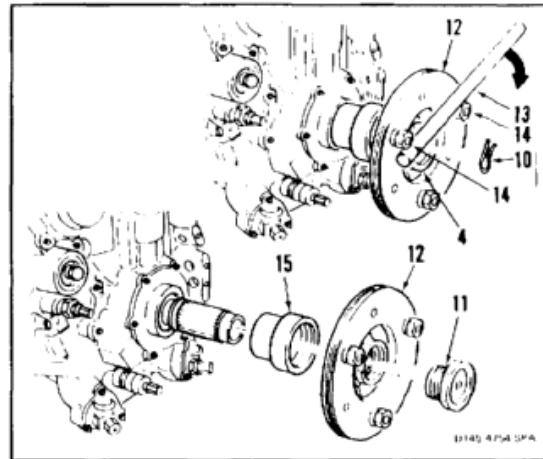
Off Helicopter Task



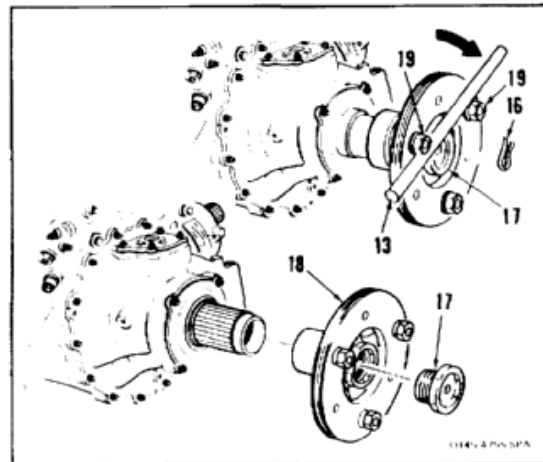
1. Remove coupling (1) from around top of fan (2).
2. Remove reducer (3) and packing (4) from oil cooler (9).
3. Remove elbow (6), nut (7), and packing (8) from oil cooler (9).
- 3.1. Disconnect oil hose (5) from reducer (20).
- 3.2. Remove screws (21), nuts (22), and washers (23) from clamps (24), at two places.
- 3.3. Disconnect clamps (24) from oil cooler (9).
- 3.4. Loosely install screws (21), washers (23), and nuts (13) on clamps (24).



4. Remove lockring (10) from retainer (11) at forward output shaft adapter assembly (12).
5. Place wood dowel (13) across nuts (14) as shown. Hold dowel to keep adapter assembly (12) from turning. Remove retainer (11).
6. Remove adapter assembly (12) and retainer (15).



7. Remove lockring (16) from retainer (17) at aft output shaft adapter assembly (18).
8. Place wood dowel (13) across nuts (19) as shown. Hold dowel to keep adapter assembly (18) from turning. Remove retainer (17).
9. Remove adapter assembly (18).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK



## INITIAL SETUP

*General Safety Instructions:***Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J  
Goggles  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Barrier Material (E80)  
Masking Tape (E388)  
Brush (E86)  
Gloves (E184.1)  
Acetic Acid (E21)  
Chromic Acid (E114)  
Calcium Sulphate (E91)  
Methyl-Ethyl-Ketone (E244)  
Epoxy Primer (E292 or E293)  
Black Polyurethane Paint (E285.1)  
Black Lacquer Topcoat (E462)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

MIL-C-53072  
SAE-AMS-M-3171  
TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

**WARNING**

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

**WARNING**

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

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

**CAUTION**

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.

**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. Clean oil and grease from damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. Check the extent and location of damage on housing (1) and sump cover (2).

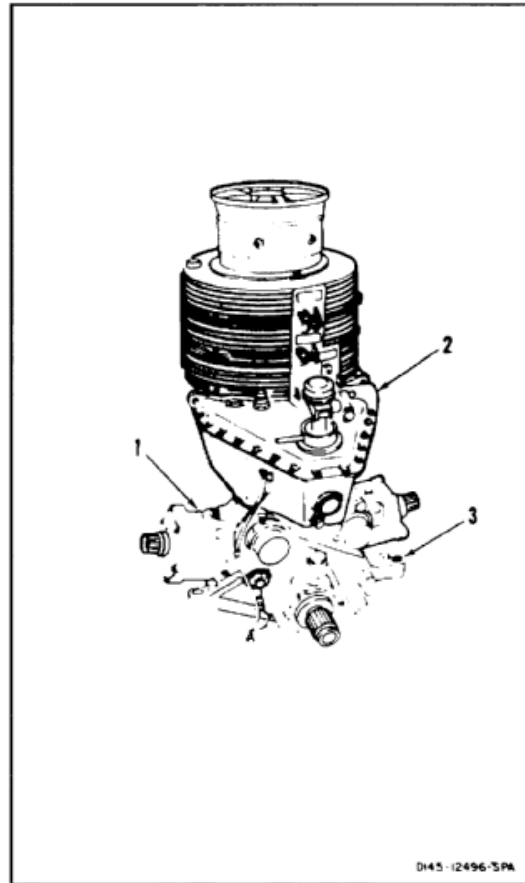
**NOTE**

Refer to Task 6-35 for repairs to sump.

**NOTE**

Limits in this step refer to the extent of damage after rework.

- a. Depth of damage shall not be more than **0.025 inch**.
  - b. Damage shall not extend over more than one surface or enter any radius.
  - c. Damage shall not be closer than **1.00 inch** to any mounting hole (3).
3. Fluorescent inspect damaged area to check for cracks. (Refer to TM 1-1500-335-23.) There shall be no cracks. If a crack is suspected in the combining transmission outside surface, refer to TM 1-1520-253-23.
  4. Cover moving parts near the damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
  5. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
  6. Smooth the blended area with crocus cloth (E122). Do not leave any sharp edges.



**WARNING**

Protective gloves (E184.1) shall be worn for the remainder of this task. Otherwise, personal injury could occur.

7. Acid etch the reworked area as follows:
  - a. Prepare a solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E184.1) and goggles.
  - b. Swab area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse the area with cold water.
8. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If a crack is suspected in the combining transmission outside surface, refer to TM 1-1520-253-23.
9. Apply surface treatment to reworked area as follows:
  - a. Clean the area with naphtha (E245) and clean cloths. Let the area air dry.
  - b. Swab on solution of chromic acid (E114) and calcium sulphate (E91). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse the area with cold water and let air dry.

**NOTE**

Priming and painting shall be done per MIL-C-53072.

10. Apply one coat of epoxy primer (E292 or E293) to the reworked area. Let air dry for **2 hours**.
11. Finish the reworked area with two coats of black lacquer (E462) or polyurethane (E285.1) as determined by the following:
  - a. Apply methyl-ethyl-ketone (MEK) (E244) to a small area of the existing topcoat near the area to be finished. Use brush (E86).
  - b. Wipe the area. If the topcoat wipes away, use lacquer (E462). If the topcoat is unaffected, use polyurethane (E285.1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Sling (T34)  
 Work Hoist  
 Shipping Container (T36)  
 Container, 14 Quart (3)  
 Torque Wrench, 0 to 500 Foot-Pounds  
 Hose, 3/4 Inch ID, 24 Inches Long

**Materials:**

Fingerprint Remover (E175)  
 Cloths (E120)  
 Dry Cleaning Solvent (E162)  
 Gloves (E186)  
 Swabbing Brush (E86)  
 Corrosion Preventive Compound (E153 or E154)  
 Barrier Material (E81)  
 Masking Tape (E388)  
 Dessicant (E160), 16-Unit Bag (2)

**Personnel Required:**

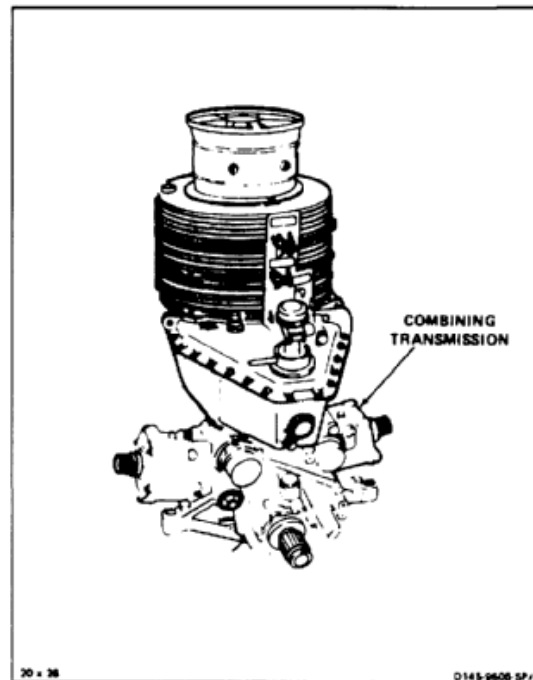
Medium Helicopter Repairer (2)  
 Inspector

**References:**

DA PAM 738-751  
 TB 55-8100-200-25  
 TB 750-126

**Equipment Condition:**

Off Helicopter Task  
 Combining Transmission Disassembled (Task 6-73)

**General Safety Instructions:****WARNING**

Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

1. Drain oil from each of three compartments of sump (1) as follows:

**NOTE**

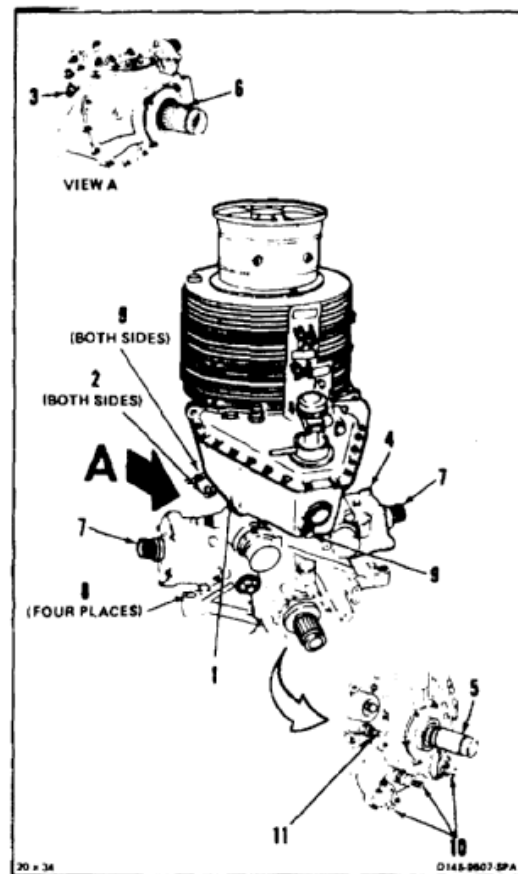
Sump holds a total of about **33 quarts** of oil.

- a. Install hose on drain valve (2 or 3). Push in drain valve, twist it, and pull. Let oil drain into containers.
  - b. Push in valve (2 or 3), twist it, and pull to close. Remove hose.
2. Put on gloves (E186). Gloves shall be worn for the rest of this task.
  3. Clean all surfaces of transmission (4). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
  4. Clean forward output shaft splines (5), aft output shaft splines (6), input shaft splines (7), and four bushings (8). Use fingerprint remover (E175) and clean cloths (E120).

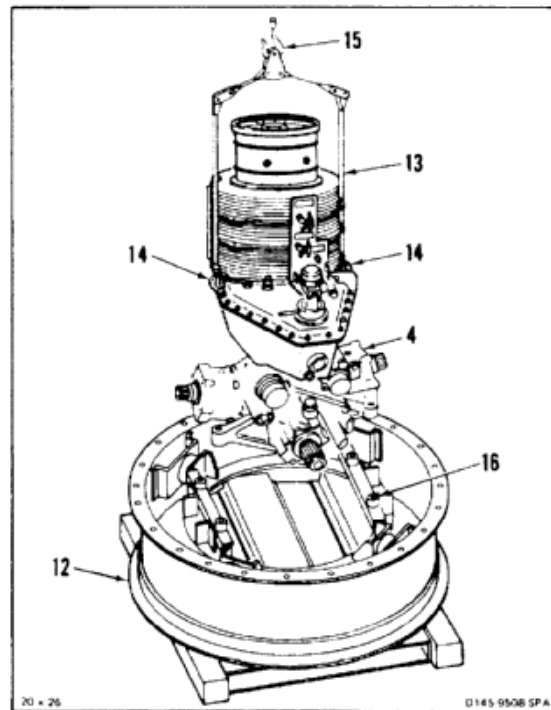


Touching unpainted surfaces with bare fingers can cause corrosion.

5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. Coat splines (5, 6, and 7) and four bushings (8) with corrosion-preventive compound (E153 or E154). Use swabbing brush (E67).
7. Cover splines (5, 6, and 7) and bushings (8) with barrier material (E81) and tape (E388).
8. Cover three drain valves (2 and 3), three temperature probes (9), and electrical connectors (10 and 11) with barrier material (E81) and tape (E388).



9. Install transmission (4) in shipping container (T36) (12) as follows:
  - a. Inspect and prepare container (T36) (12) (TB 55-8100-200-25).
  - b. Connect sling (T34) (13) to two lifting lugs (14). Connect work hoist hook (15) to sling.
  - c. With aid of helper, lift transmission (4) into container (T36) (12). Align with four mounting brackets (16).
  - d. Remove sling (T34) (13).

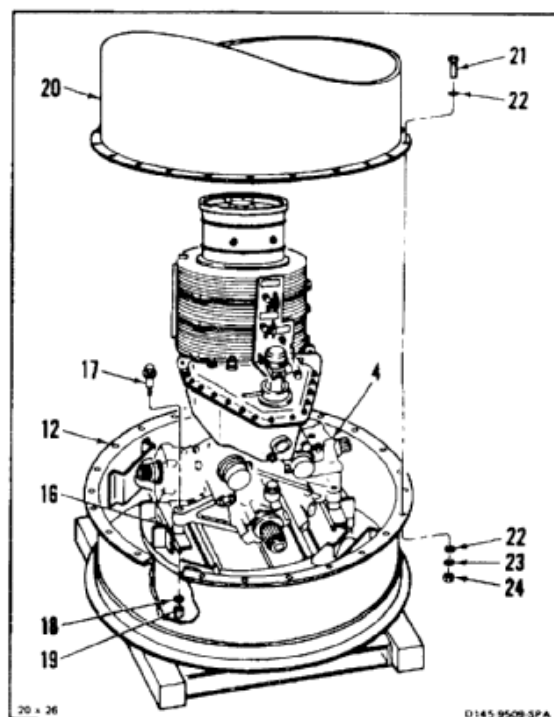


- e. Secure transmission (4) to container mounting brackets (16) with four bolts (17), washers (18), and nuts (19). Torque nuts to **55 foot-pounds**.
- f. Prepare required maintenance forms and reports (DA PAM 738-751 and TB 750-126).
- g. Put two 16-unit bags of desiccant (E160) into containers (T36) (12).

**INSPECT**

- h. Install cover (20) on container (T36) (12). Install bolts (21), washers (22), split washer (23), and nut (24) at 24 places.
- i. Torque nuts (24) at **3, 6, 9, and 12 o'clock to 275 inch-pounds**. Torque nuts at **2, 4, 8, and 12 o'clock to 275 inch-pounds**. Torque remaining nuts to **275 inch-pounds**.

**INSPECT**



10. Remove plug (25) from cover (20).
11. Connect air test line (26) to cover (20).



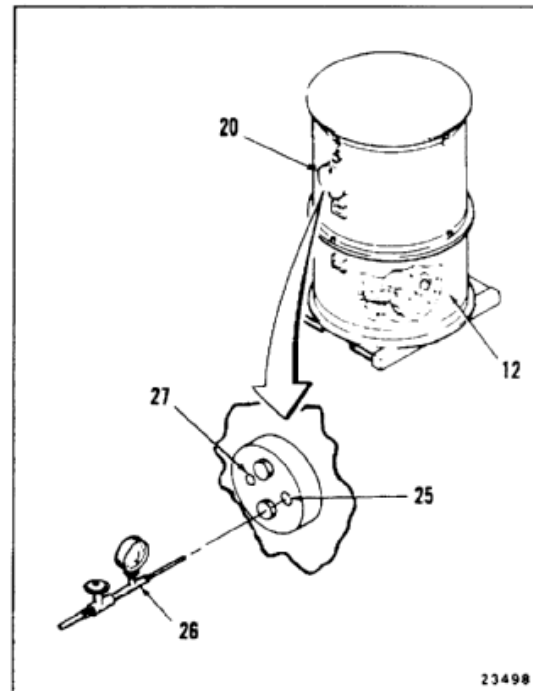
Low pressure air supply must be used. Exceeding test pressure can damage container.

12. Pressurize container (12) to **3 psi** max. Check container for leaks. Container must hold **3 psi for 1 hour**.



Be careful when releasing air under pressure, wear goggles. Personal injury can result.

13. Push pressure relief valve (27) until pressure in container (12) is **0 psi**.
14. Disconnect air line (26) from cover (20).
15. Install plug (25) in cover (20).



#### ***FOLLOW-ON MAINTENANCE:***

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Sling (T34)  
 Work Hoist  
 Container, 2 Quart  
 Workstand (T20)

**Materials:**

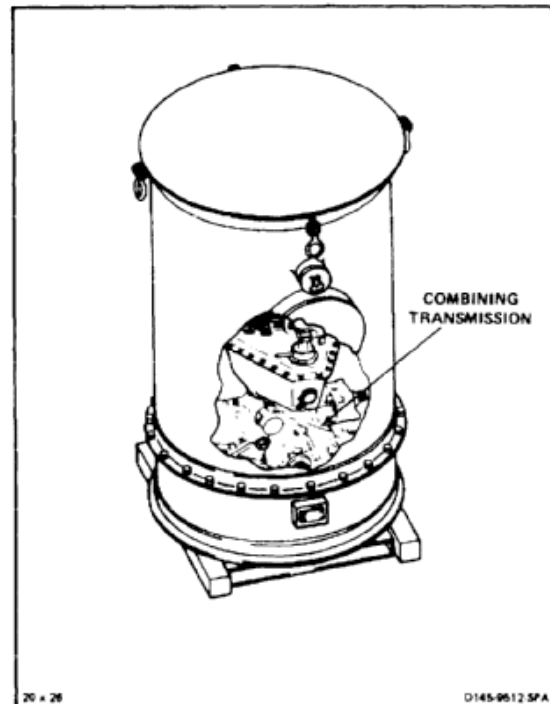
Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Gloves (E186)

**Personnel Required:**

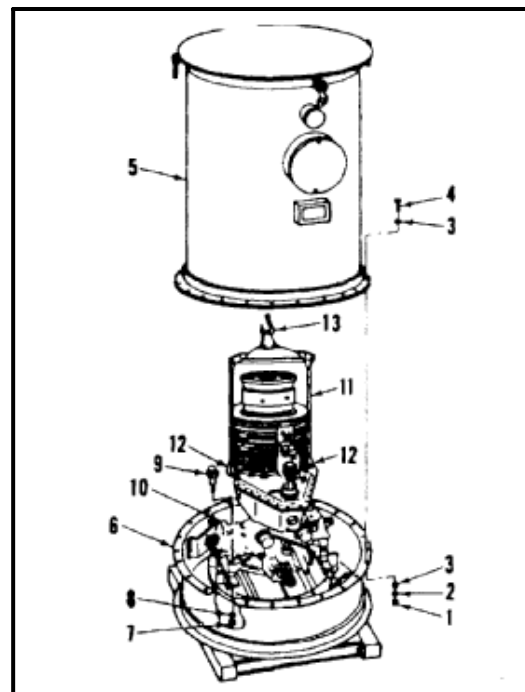
Medium Helicopter Repairer (2)  
 Inspector

**Equipment Condition:**

Off Helicopter Task



1. Remove 24 nuts (1), washers (2 and 3), and bolts (4) from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. Remove four nuts (7), washers (8), and bolts (9) from transmission (10).
4. Connect sling (T34) (11) to two lugs (12). Connect work hoist (13) to sling.
5. With aid of helper, carefully lift transmission (10) from container (6).
6. Set transmission (10) down on workstand (T20). Remove sling (T34) (11).
7. Install four bolts (9), washers (8), and nuts (7) in container (6).
8. Install cover (5). Install 24 bolts (4), washers (3), split washers (2) and nuts (1).





9. Remove all tape and barrier material from transmission (10).

**WARNING**

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

**CAUTION**

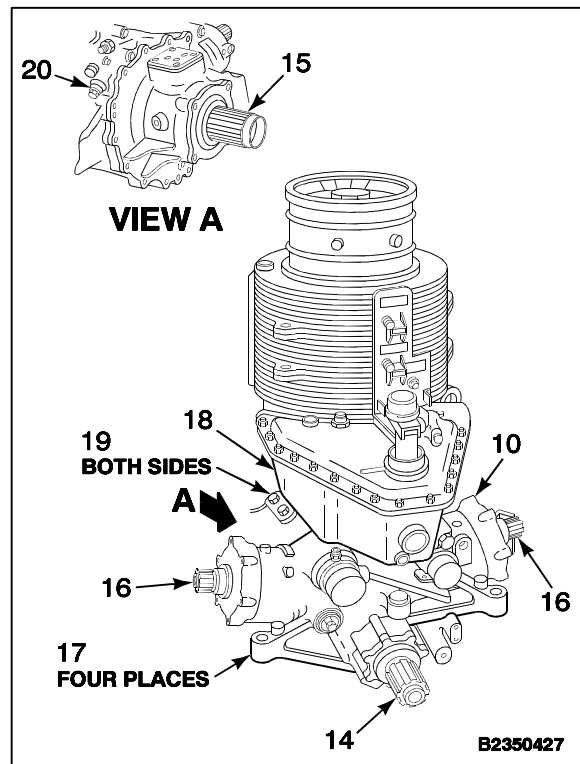
Touching splines with bare fingers can cause corrosion.

10. Remove corrosion-preventive compound from forward output shaft splines (14), aft output shaft splines (15), input shaft splines (16) and four bushings (17). Use dry cleaning solvent (E162) and clean cloth (E120). Wear goggles (E473) and gloves (E186).
11. Drain residual oil from each of three compartments of sump (18) as follows:
- Install hose on drain valve (19 or 20). Push in drain valve, twist it, and pull. Let oil drain into container.
  - Push in valve (19 or 20), twist it, and pull to close.

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Assemble combining transmission (Task 6-76).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 700-1600 Inch-Pounds  
 Wood Dowel, 1 Inch x 18 Inches

**Materials:**

Dry Cleaning Solvent (E162)  
 Cloth, Cleaning (E120)  
 Grease (E190.1)  
 Gloves (E186)  
 Goggles (E473)

**Parts:**

Packings

**Personnel Required:**

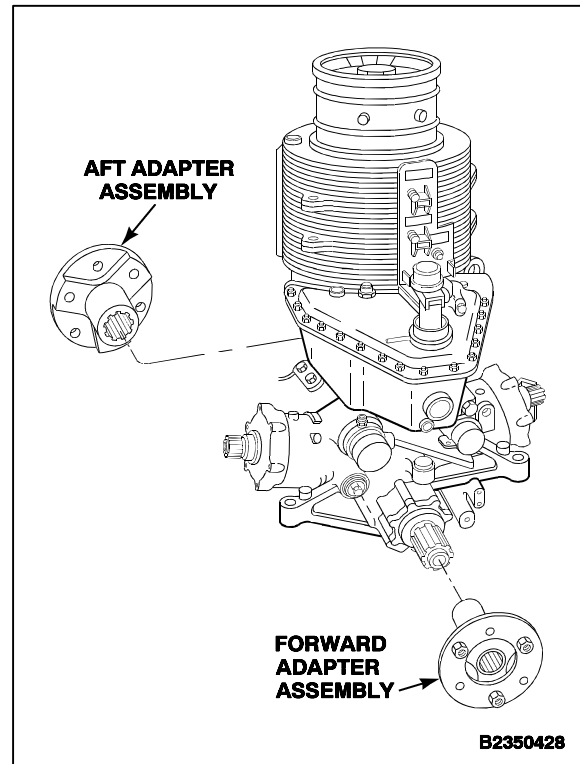
CH-47 Helicopter Repairer (2)  
 Inspector

**References:**

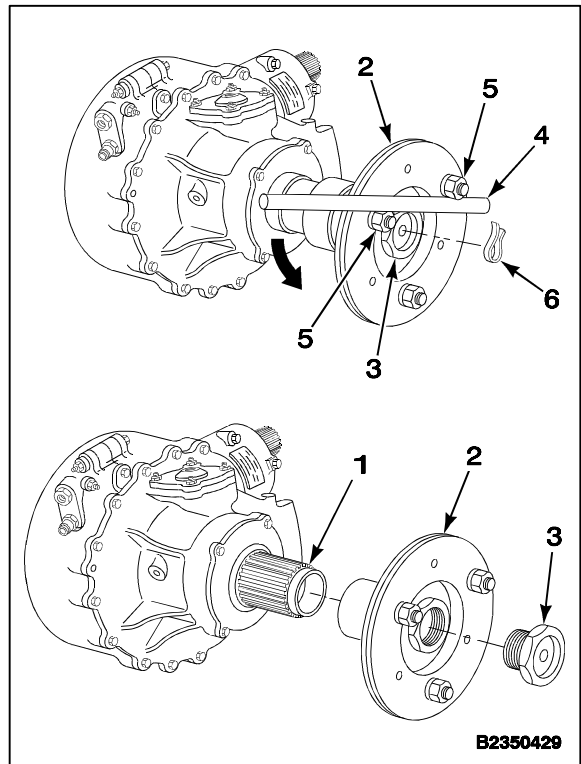
TM 55-1520-240-23P

**General Safety Instructions:****WARNING**

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



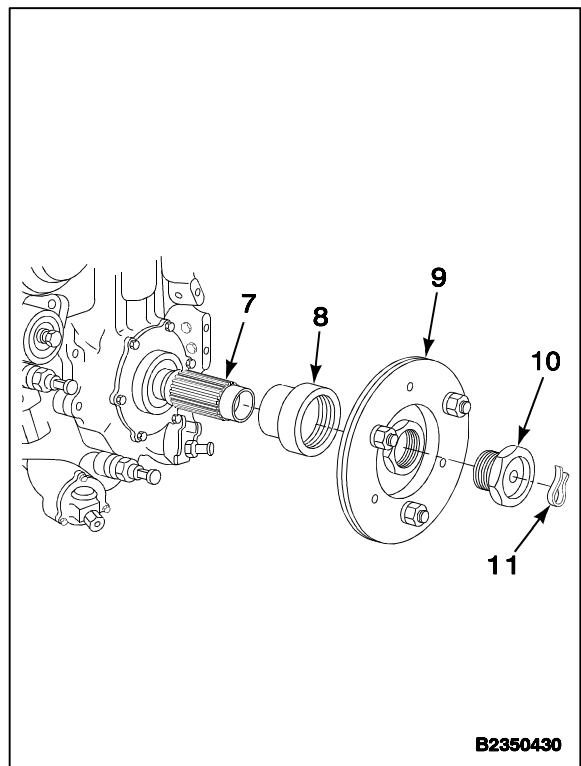
1. Clean splines on aft output shaft (1) and adapter assembly (2). Use dry cleaning solvent (E162) and clean cloth (E120). Wear gloves (E186) and goggles (E473).
2. Pack splines on output shaft (1) and adapter assembly (2) with grease (E190.1).
3. Install adapter assembly (2) on output shaft (1). Wipe off excess grease with cloths (E120).
4. Coat thread of retainer (3) with grease (E190.1). Install retainer.
5. Place wood dowel (4) across nuts (5) as shown. Hold dowel to keep adapter assembly (2) from turning. Torque retainer (3) to **825 inch-pounds**. Continue tightening to align holes in retainer and adapter assembly.
6. Install lockring (6). Check that lockring protrudes through adapter assembly (2) at least **0.060 inch**.



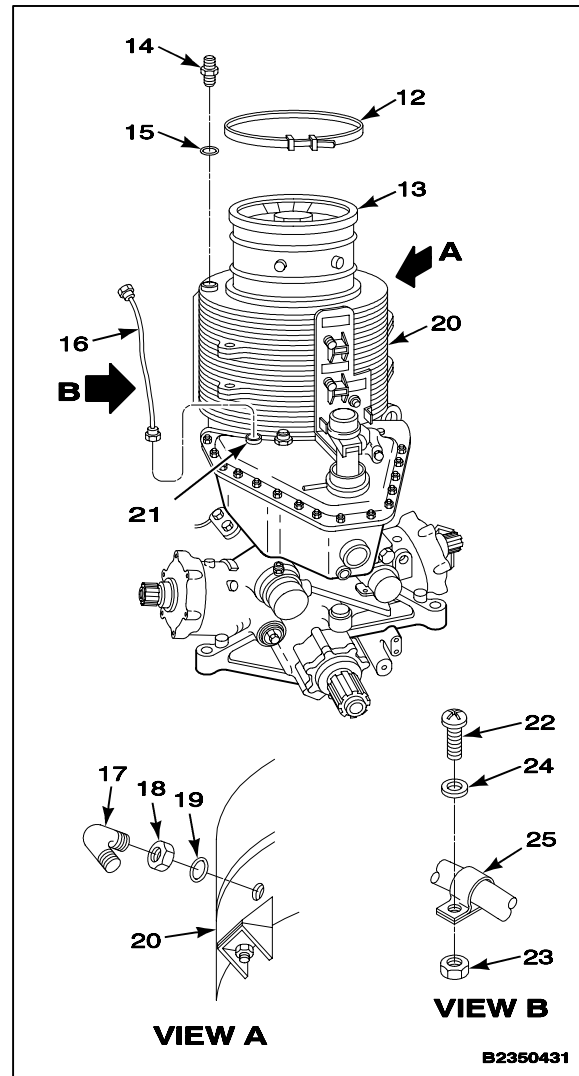
7. Clean splines on forward output shaft (7), retainer (8), and adapter assembly (9). Use solvent (E162) and clean cloth (E120). Wear gloves (E186) and goggles (E473).
8. Pack splines on shaft (7), retainer (8), and adapter assembly (9) with grease (E190.1).
9. Install retainer (8) and adapter assembly (9) on shaft (7). Wipe off excess grease with cloth (E120).
10. Loosely install retainer (10) to align holes in retainer and adapter assembly (9). Install lockring (11).

**NOTE**

Adapter assembly is adjusted and torqued during sync shaft installation.



11. Install coupling (12) around top of fan (13).
12. Install reducer (14) and packing (15) in oil cooler (20).
13. Install elbow (17), nut (18), and packing (19) on oil cooler (20). Elbow shall point down and aft.
- 13.1. Connect oil hose (16) to transducer (21).
- 13.2. Install clamps (25) on oil hose (16).
- 13.3. Install screws (22), nuts (23), and washers (24) in clamps (25) at two places.
- 13.4. Connect clamps (25) to oil cooler (20).



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Open End Wrench, 1-1/2 Inch  
 Open End Wrench, 1-1/4 Inch  
 Container, 2 Quart  
 Hoist, 2000 Pound Capacity  
 Sling (T34)  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Torque Wrench, 700 to 1600 Inch-Pounds  
 Rope Guide Lines (2)

**Materials:**

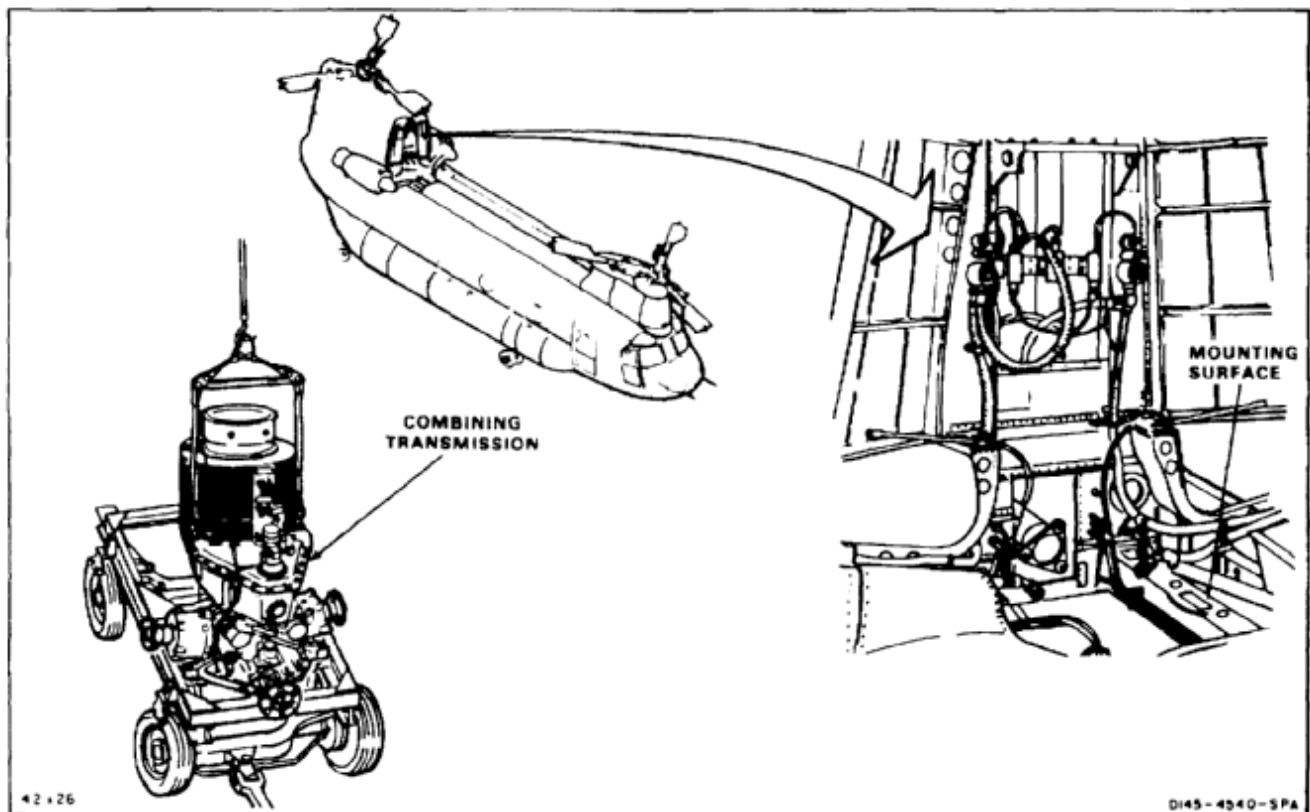
Sealant (E336)  
 Oil (E254)  
 Cloths (E120)  
 Gloves (E186)

**Personnel Required:**

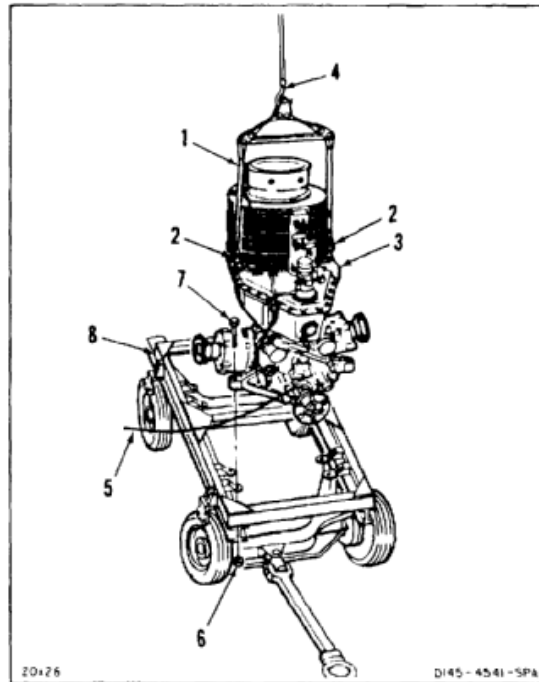
Medium Helicopter Repairer (2)  
 Inspector

**References:**

TM 55-1520-240-23P



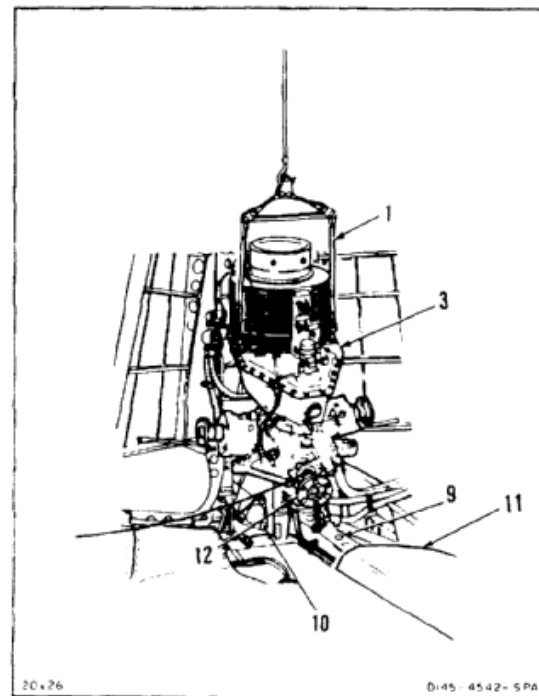
1. Connect sling (T34) (1) to two hoisting eyes (2) on transmission (3). Connect hoist hook (4) to sling (T34).
2. Attach rope guide line (5) to each side of transmission (3).
3. Remove four nuts (6) and bolts (7). Raise transmission (3) from adapter (8).



**WARNING**

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

4. Raise transmission (3) to helicopter. Align it with four mounting holes (9) and aft shaft (10).
5. With aid of helper, lower transmission (3) to four mounting holes (9). Raise and lower access door (11) as needed to clear adapter assembly (12). Keep tension on sling (T34) (1).



6. Coat four bolts (13) with oil (E254). Install bolts in mounting lugs (14).

**NOTE**

Refer to Task 1-13, step 8, for re-use of self-locking nuts.

7. Install four washers (15) and nuts (16) at cabin ceiling. When nuts are installed at least three turns, release tension from sling (T34) (1).

**CAUTION**

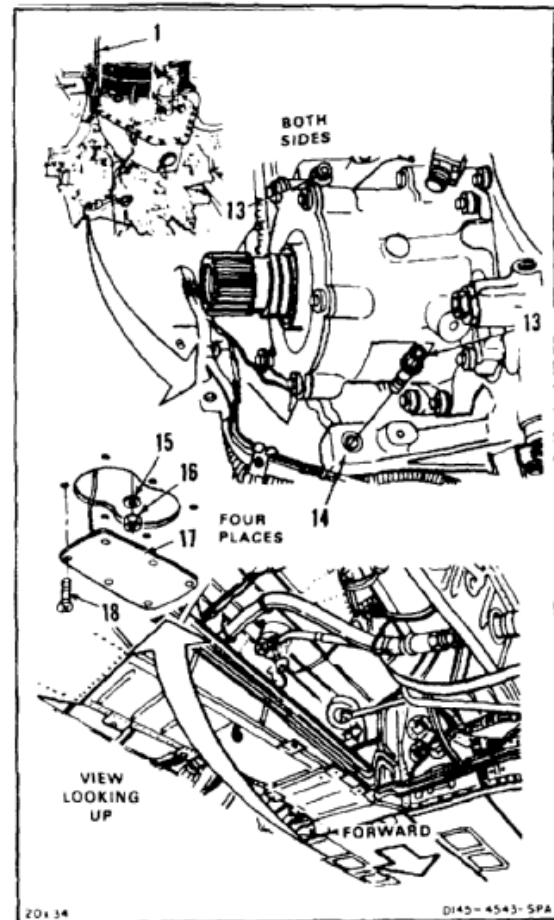
Do not over torque nuts. Too much torque can damage nuts or bolts.

8. Torque four nuts (16) to **725 inch-pounds**. Check each bolt (13). Bolt shall extend **0.08 to 0.12 inch** through nut. Use washers (15) of different thickness as needed.

**INSPECT****WARNING**

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

9. From inside, install four access panels (17) and 24 screws (18). Seal panels with sealant (E336). Wear gloves (E186) and goggles.



**WARNING**

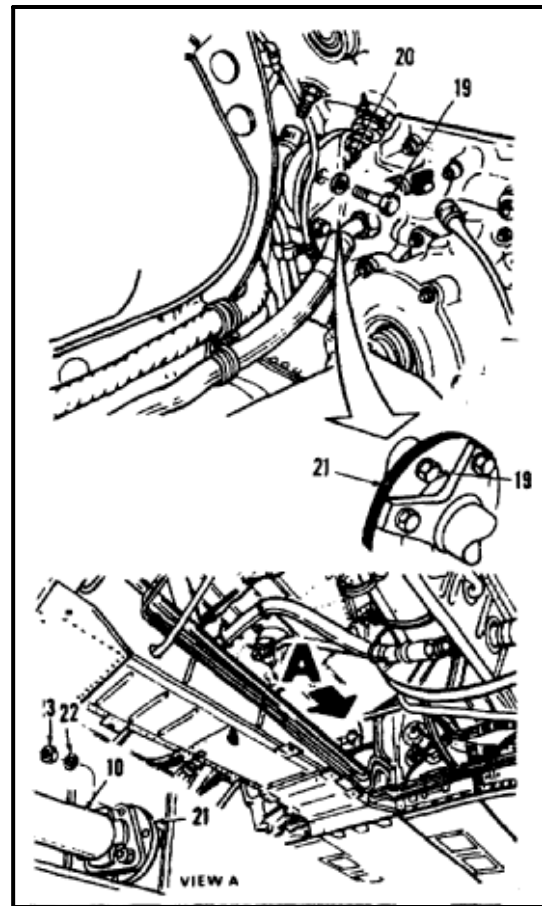
Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

10. Coat three bolts (19) with oil (E254). Install three bolts and special washers (20) through aft adapter assembly (21) and shaft (10). Install three washers (22) and nuts (23).

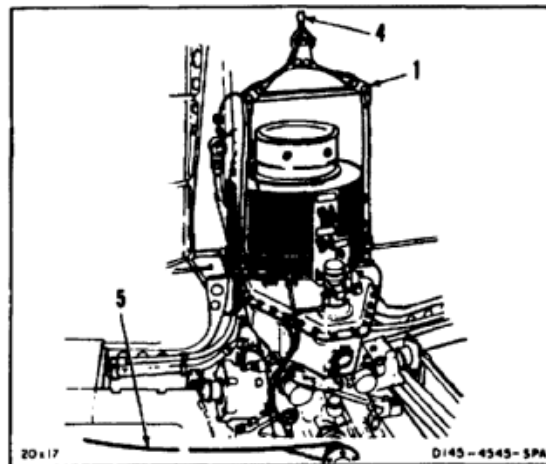
**CAUTION**

Do not allow bolt to turn. If bolt turns, it can damage bolt and plates.

11. Hold bolts (19) to keep bolts from turning. Torque nuts (23) to **1050 inch-pounds**.

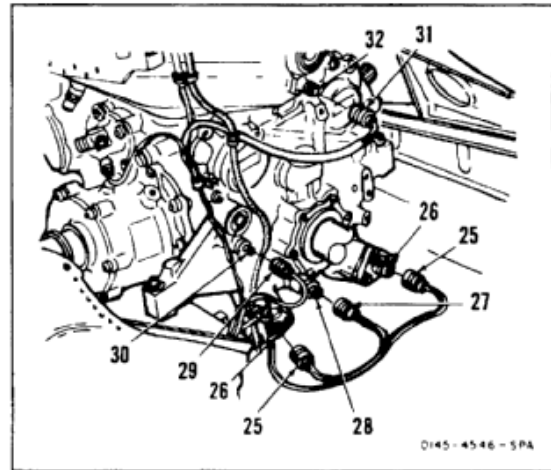


12. Remove hoist hook (4) and sling (1). Remove two rope guide lines (5).

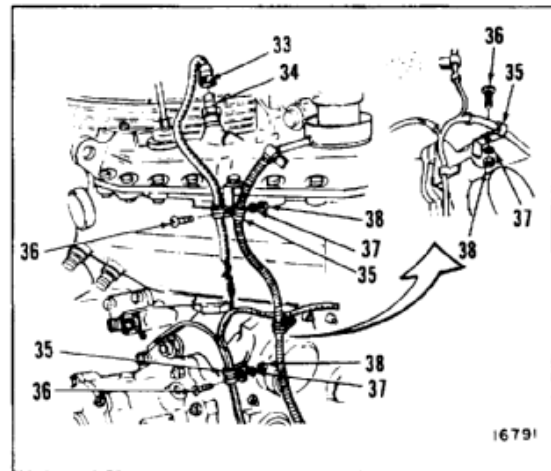




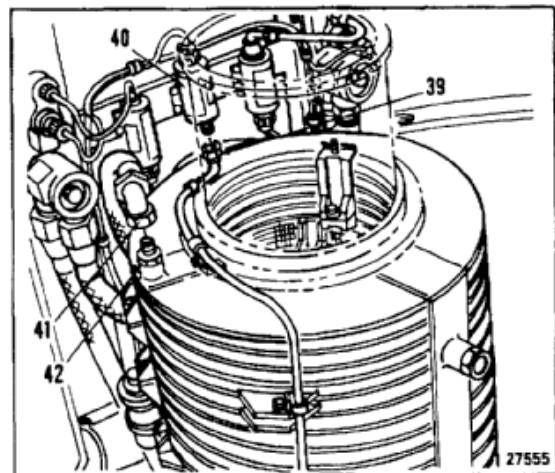
13. Connect two connectors (25) to COMB DEBRIS SCREEN receptacles (26).
14. Connect connector (27) to COMP CHIP DETECTOR receptacle (28).
15. Connect connector (29) to COMB PRESS SWITCH-AUX receptacle (30).
16. Connect connector (31) to COMB XMSN TEMP BULB receptacle (32).



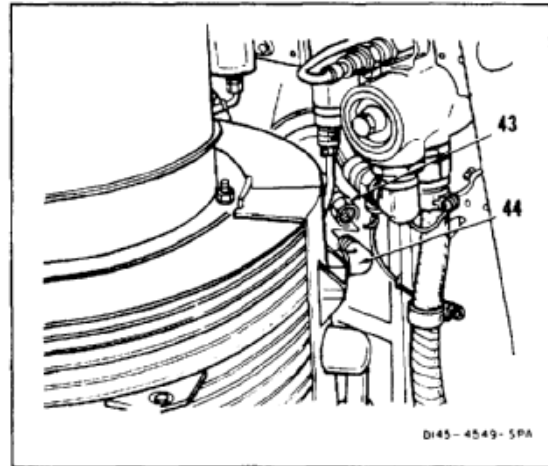
17. Connect electrical connector (33) to COMB PRESS SWITCH-MAIN receptacle (34).
18. Connect clamps (35) with screws (36), washers (37), and nuts (38) at three places.



19. Connect oil hose (39) to transducer (40).
20. Connect oil hose (41) to reducer (42). Remove and discard tag.



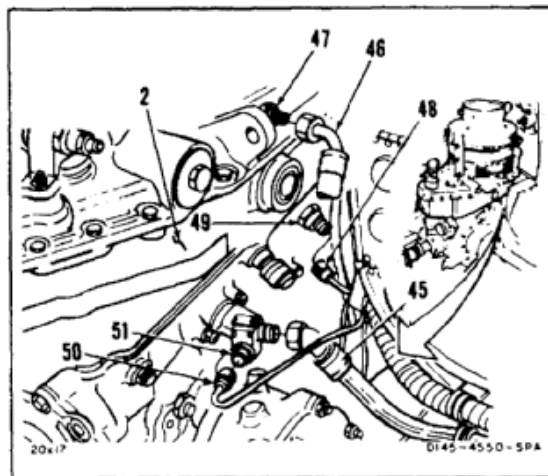
21. Connect oil hose (43) to elbow (44). Remove and discard tag.



**NOTE**

Connect hose quickly to prevent oil loss.

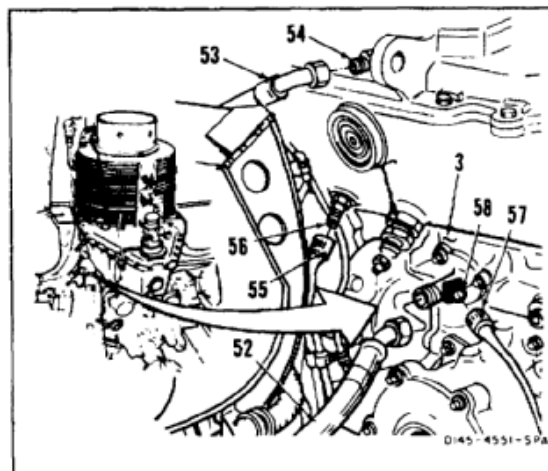
22. Remove cap and connect oil hose (45) to left side of transmission (2). Use container to catch spilled oil.
23. Connect breather hose (46) to reducer (47).
24. Connect connector (48) to LH ENGINE XMSN TEMP BULB receptacle (49). Connect connector (50) to LH ENG XMSN INDICATING SCREEN receptacle (51).



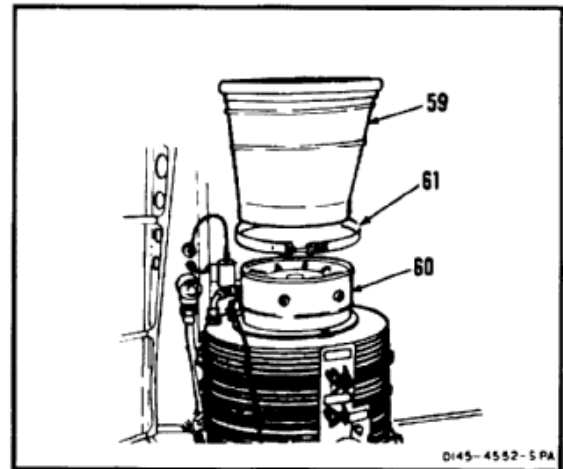
**NOTE**

Connect hose quickly to prevent oil loss.

25. Remove cap and connect oil hose (52) to right side of transmission (3). Use container to catch spilled oil.
26. Connect breather hose (53) to reducer (54).
27. Connect connector (55) to RH ENGINE XMSN TEMP BULB receptacle (56). Connect connector (57) to RH ENG XMSN INDICATING SCREEN receptacle (58).



28. Install duct (59) on fan (60).
29. Coat thread of clamp (61) with oil (E254). Install clamp around duct (59) and fan (60). Torque clamp to **35 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install aft drive shafting (Task 6-29).
- Align forward drive shafting (Task 6-20).
- Phase rotary-wing blades (Task 6-28).
- Install left and right engine shaft and combining transmission adapter assembly (Task 6-32).
- Install aft pylon lower fairing (Task 2-2).
- Remove, inspect, and install debris detection screens (Tasks 6-174, 6-175, and 6-176).
- Service transmission (Task 1-54).
- Close aft pylon doors (Task 2-2).
- Perform a combining transmission oil cooler fan vibration check (TM 1-6625-724-13&P).
- Perform ground run (TM 55-1520-240-10).

END OF TASK



**SECTION VI**  
**AFT ROTARY-WING DRIVE TRANSMISSION**

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 14 Quart (3)

**Materials:**

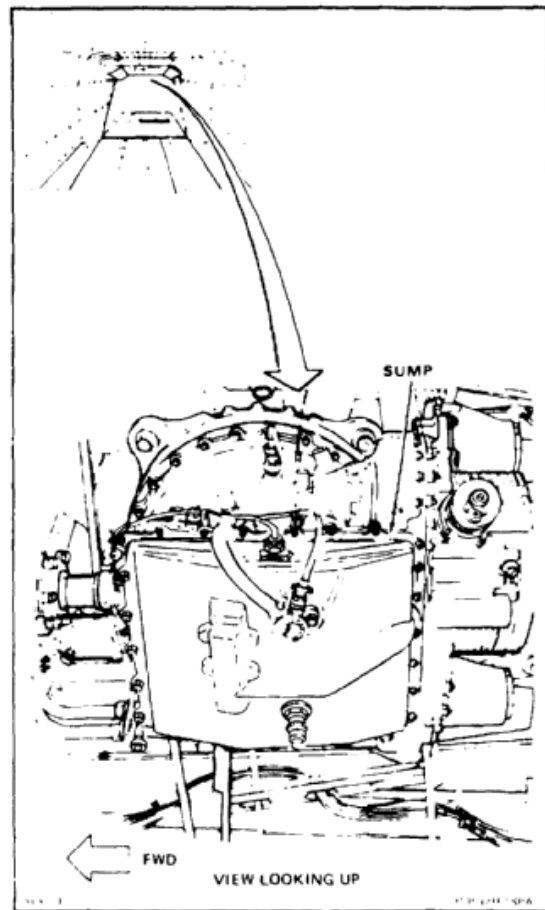
None

**Personnel Required:**

Medium Helicopter Repairer

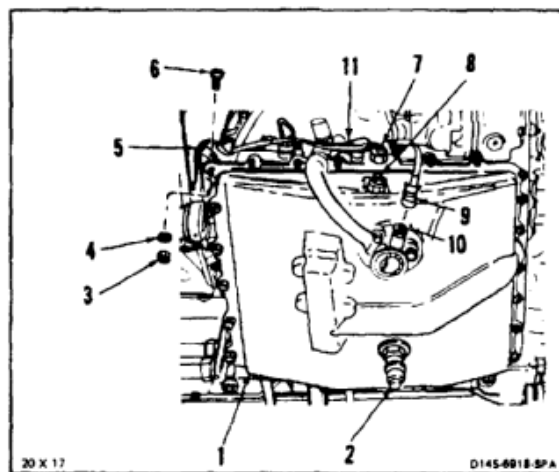
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Baffles Under Aft Transmission Open (Task 2-2)  
 Aft Transmission Drip Tray Removed (Task 2-3)  
 Cargo Ramp Open and Level (Task 2-2)

**NOTE**

Sump holds about **30 quarts** of oil.

1. Position container under sump (1).
2. Push in drain valve (2), twist it, and pull. Let oil drain into container. Push in valve, twist it, and pull down to close.
3. Remove nuts (3), washers (4), wire clamp plates (5), and bolts (6) from three places at left and forward edges of sump (1).
4. Disconnect connector (7) from temperature probe receptacle (8). Disconnect connector (9) from chip detector receptacle (10). Secure wires (11) above sump (1).



5. Remove 21 nuts (3) and washers (4) from around sump (1). Remove 14 bolts (6) and washers (12).



Be careful not to damage gasket seal when lowering sump.

**NOTE**

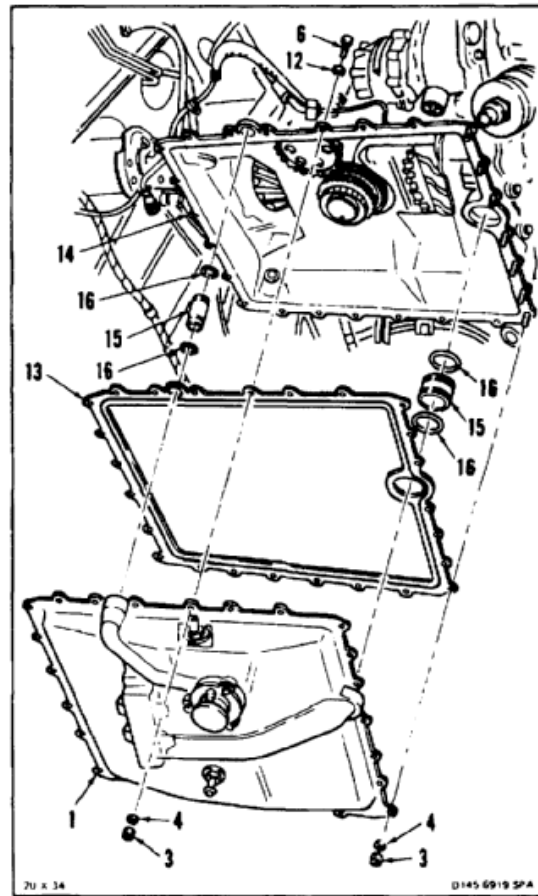
Do not tilt sump. Oil can spill.

6. Lower and remove sump (1) and gasket seal (13) from transmission (14).

**NOTE**

Tubes may stay in sump or transmission.

7. If two oil transfer tubes (15) and packings (16) remain in transmission (14), remove them. Install in sump (1).
8. Drain oil from sump (1).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Airframe Repairer's Tool Kit, NSN 5180-00-323-4876  
Open End Wrench, 1-3/8 Inch

**Materials:**

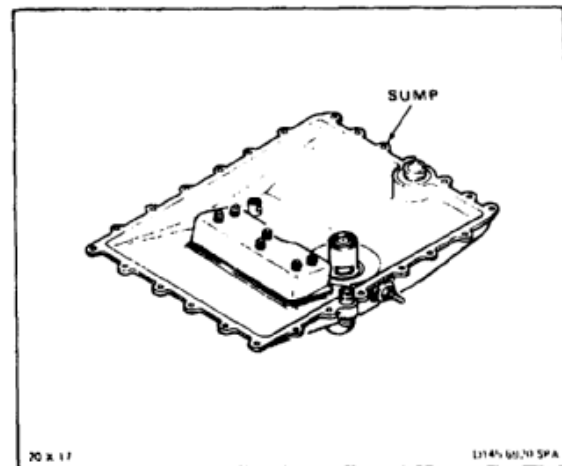
None

**Personnel**

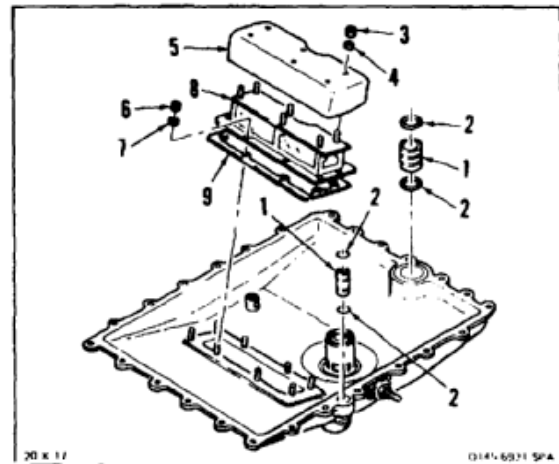
Aircraft Structure Repairer

**Equipment Condition:**

Off Helicopter Task



1. Remove two oil transfer tubes (1) and four packings (2).
2. Remove six nuts (3) and washers (4) from screen cap (5). Remove cap.
3. Remove eight nuts (6) and washers (7) from inlet screen (8). Remove screen and gasket seal (9).

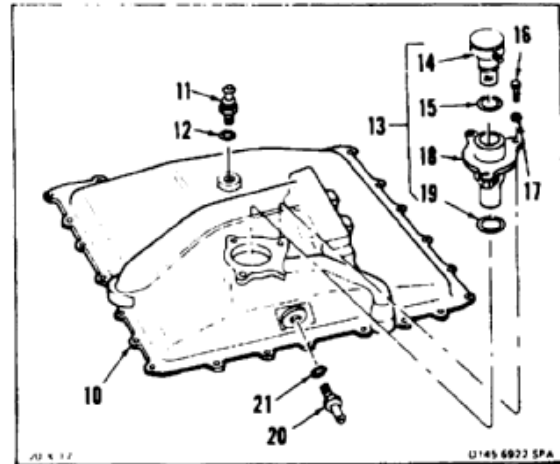




**6-79 DISASSEMBLE AFT TRANSMISSION SUMP (Continued)**

6-79

4. Turn sump (10) over **180°**. Remove lockwire from drain valve (11). Remove drain valve and packing (12).
5. Remove detection screen and chip detector (13) as follows:
  - a. Push in cap (14), twist to left, and pull to remove cap and packing (15).
  - b. Remove lockwire from three bolts (16). Remove bolts and washers (17).
  - c. Remove housing (18) and packing (19).
6. Remove lockwire from temperature probe (20). Remove temperature probe and packing (21).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Airframe Repairer's Tool Kit, NSN 5180-00-323-4876  
 Deep Socket, 1-3/8 Inch  
 Torque Wrench, 5 to 50 Inch-Pounds  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Source of Low-Pressure Compressed Air

**Materials:**

Lockwire (E231)  
 Dry Cleaning Solvent (E162)  
 Gloves (E186)  
 Cloths (E120)  
 Oil (E254)

**Parts:**

Packings

**Personnel Required:**

Aircraft Structure Repairer  
 Inspector

**References:**

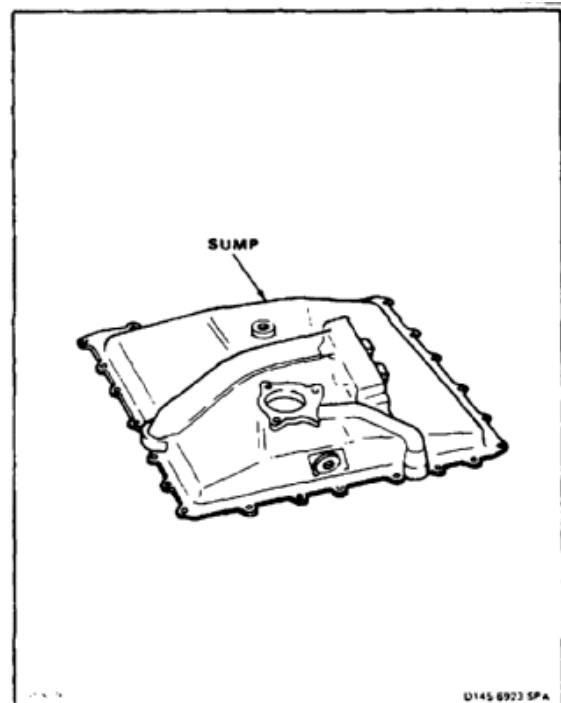
TM 55-1520-240-23P

**General Safety Instructions:****WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes. Use goggles when using low pressure compressed air.

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

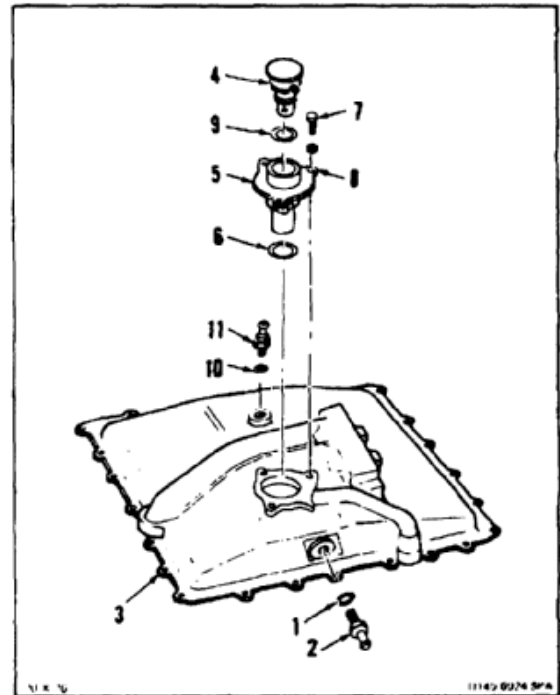


1. Coat packing (1) and thread of temperature probe (2) with oil (E254). Install packing on probe. Install temperature probe in sump (3). Torque probe to **75 inch-pounds**.
2. Lockwire probe (2) to sump (3). Use lockwire (E231).
3. If cap (4) and housing (5) are joined, push cap into housing, twist, and pull. Remove cap from housing.

**NOTE**

If cap and housing are new, cleaning is not needed.

4. Clean cap (4) and housing (5). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
5. Install packing (6) on housing (5). Install housing in sump (3). Install three bolts (7) and washers (8). Torque bolts to **60 inch-pounds**.
6. Lockwire three bolts (7) together. Use lockwire (E231).
7. Press center of cap (4) in. Install cap and packing (9) in housing (5). Push in cap until center snaps out flush with outside of housing.
8. Coat packing (10) and thread of drain valve (11) with oil (E254). Install packing on valve. Install drain valve in sump (3). Torque valve to **75 inch-pounds**.
9. Lockwire drain valve (11) to sump (3). Use lockwire (E231).



**INSPECT**

10. Turn sump (3) over **180°**.

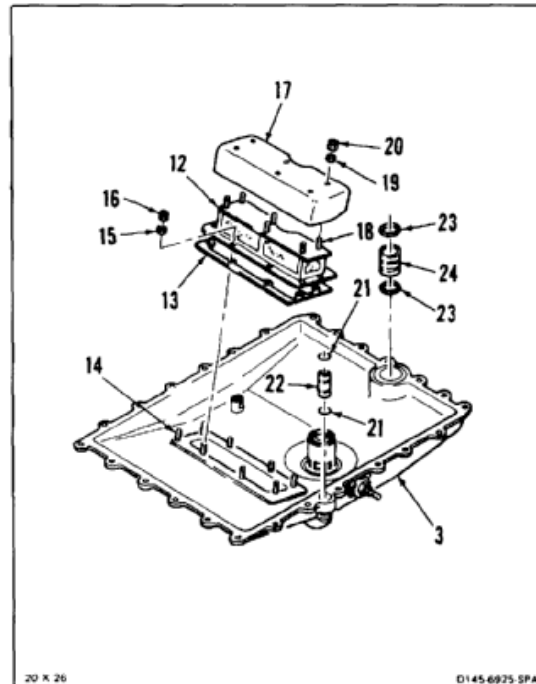
**WARNING**

Do not use more than **30 psi** compressed air for cleaning. Debris propelled under pressure can cause injury to eyes. Use source of compressed air under **30 psi** and eye protection to prevent injury to personnel.

**NOTE**

If screen is new, cleaning is not needed.

11. Clean inlet screen (12) with dry cleaning solvent (E162) and cloths (E120). Dry screen with compressed air. Wear gloves (E186) and goggles.
12. Install gasket seal (13) and inlet screen (12) on eight studs (14). Install eight washers (15) and nuts (16). Torque nuts to **20 inch-pounds**.
13. Install screen cap (17) on six studs (18). Install six washers (19) and nuts (20). Torque nuts to **20 inch-pounds**.
14. Install two packings (21) on transfer tube (22). Install transfer tube in sump (3).
15. Install two packings (23) on transfer tube (24). Install transfer tube in sump (3).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

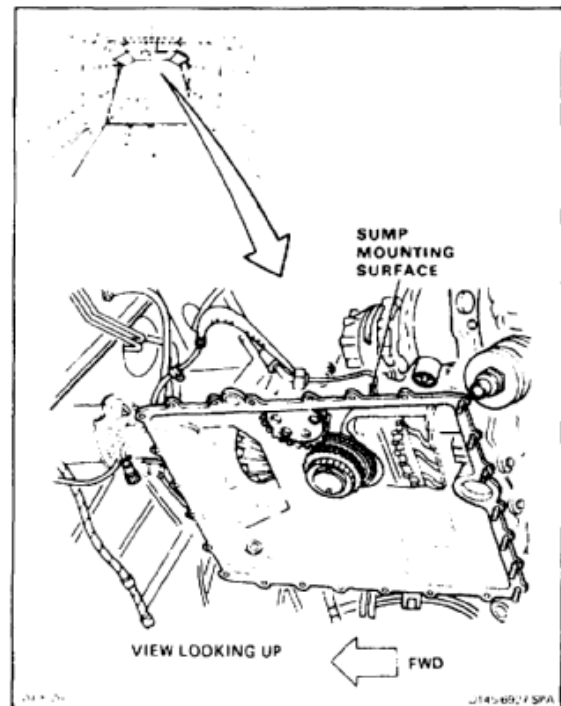
None

**Personnel Required:**

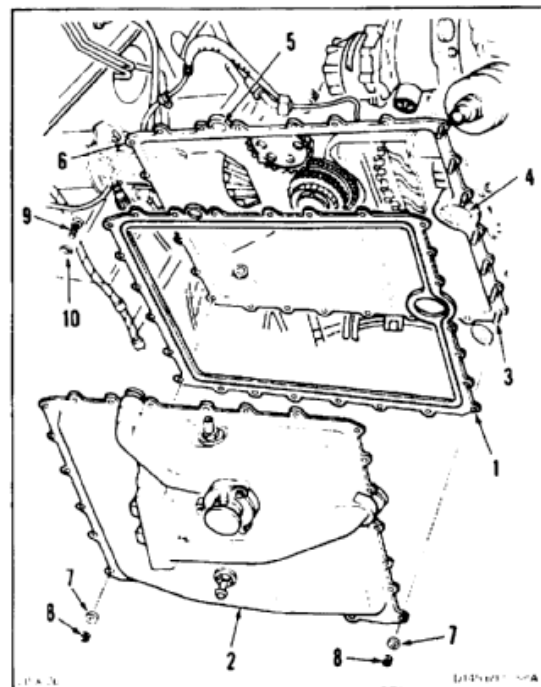
Medium Helicopter Repairer (2)  
Inspector

**References:**

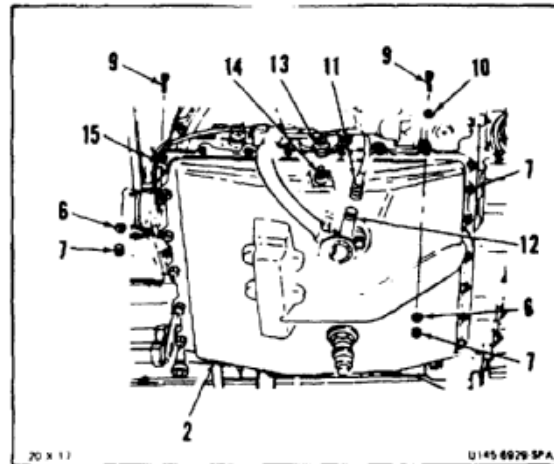
TM 55-1520-240-23P



1. Position gasket seal (1) on sump (2).
2. Align sump (2) and gasket seal (1) with seven studs (3) and two transfer tube ports (4 and 5).
3. Position sump (2) and seal (1) against transmission (6). Install seven washers (7) and nuts (8) finger-tight on studs (3). Install bolt (9), washers (10 and 7) and nut (8) finger-tight at right forward corner of sump.



4.    Connect connector (11) to chip detector receptacle (12). Connect connector (13) to temperature probe receptacle (14).
5.    Install bolts (9), wire clamp plates (15), washers (6) and nuts (7) at three places at forward and left edges of sump (2).
6.    Install bolts (9), washers (10 and 6) and nuts (7) at 13 places around sump (2).
7.    Torque 24 nuts (7) to **60 inch-pounds**.

***INSPECT******FOLLOW-ON MAINTENANCE:***

Service aft transmission (Task 1-54).  
Perform ground run (TM 55-1520-240-10).  
Install aft transmission drip tray (Task 2-3).  
Close baffles under aft transmission (Task 2-2).  
Close cargo ramp (Task 2-2).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Dry Cleaning Solvent (E162)

Cloth (E120)

Brush (E86)

Gloves (E186)

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

Task 6-108

TM 55-1520-240-23P

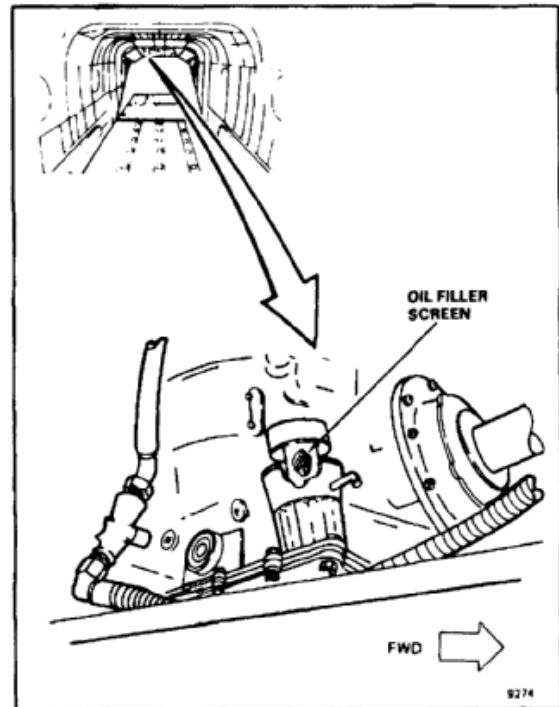
**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

Right Baffle Under Aft Transmission Open (Task 2-2)

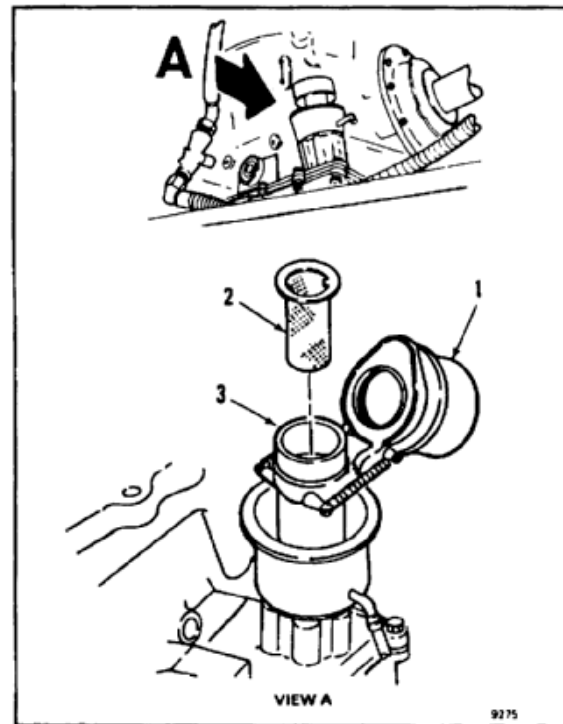
Cargo Ramp Open and Level (Task 2-2)



**WARNING**

Take precautions to ensure that the transmission is not serviced with the screen removed. Foreign matter could enter the oil system.

1. Open cap assembly (1). Remove screen (2) from neck (3).
2. Close cap assembly (1).

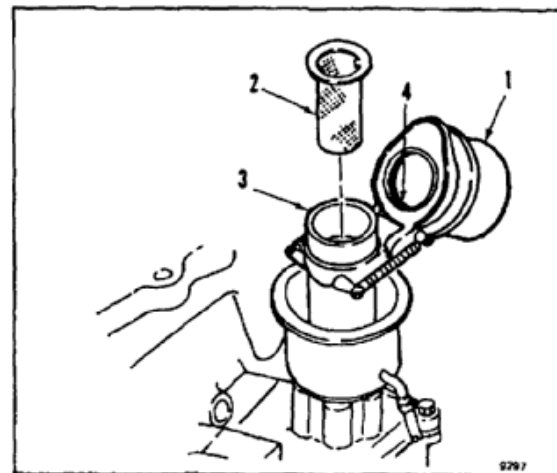
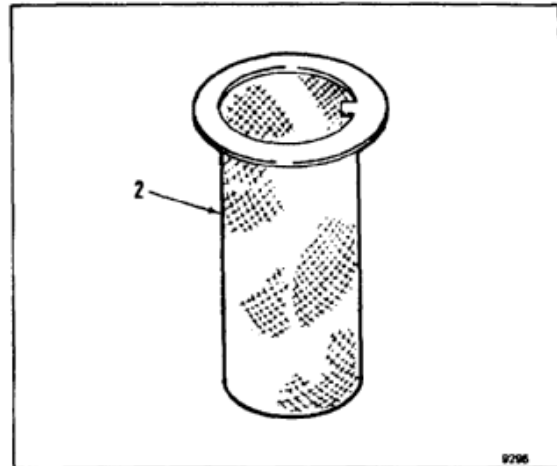


3. Check screen (2) for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

**WARNING**

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

4. Clean screen (2) with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
5. Inspect screen (2) for tears. There shall be no tears.
6. Open cap assembly (1). Install screen (2) in neck (3) of filler.
7. Check packing (4) on underside of cap assembly (1) for condition. There shall be no cuts or nicks.

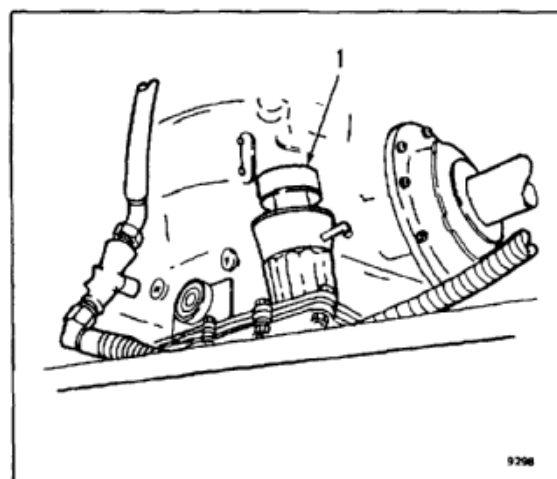


8. Close cap assembly (1).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Close right baffle under aft transmission (Task 2-2).  
Close cargo ramp (Task 2-2).



END OF TASK



INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
Workstand

**Materials:**

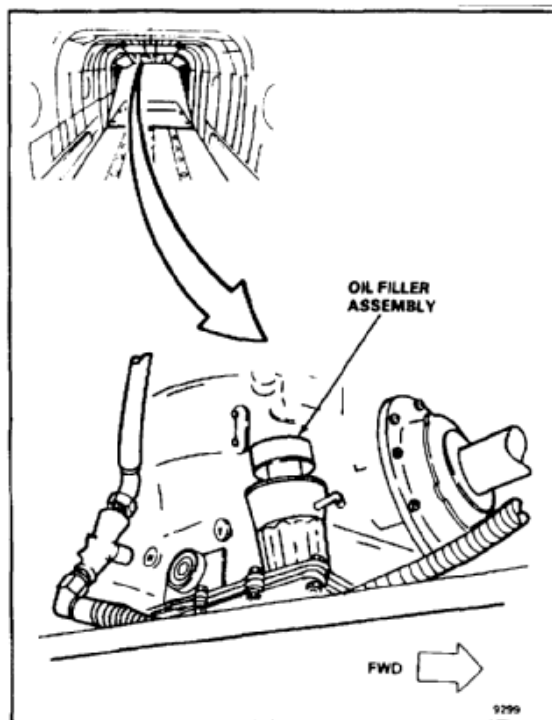
Barrier Material (E80)  
Masking Tape (E388)

**Personnel Required:**

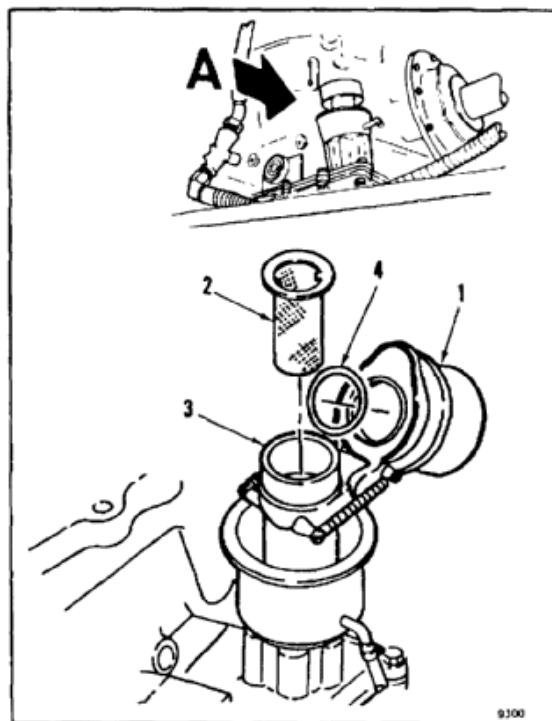
Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Right Baffle Under Aft Transmission Open (Task 2-2)  
Cargo Ramp Open and Level (Task 2-2)



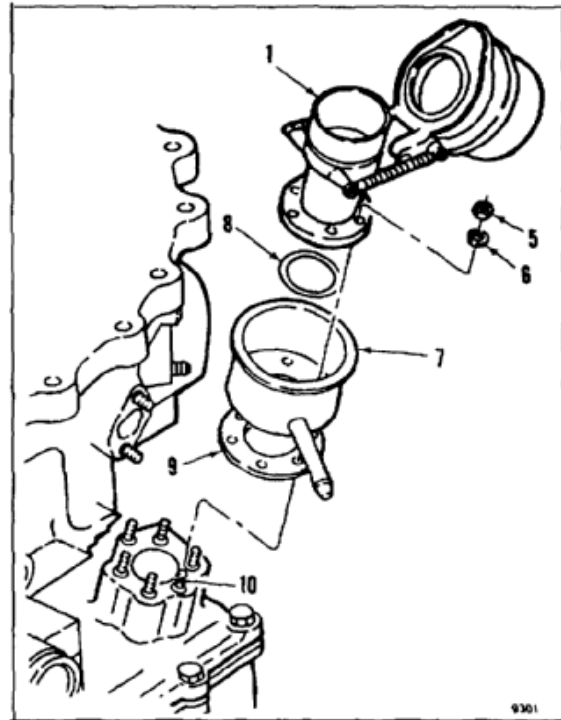
1. Open cap assembly (1). Remove screen (2) from neck (3). Remove packing (4) from underside of cap.



2. Remove six nuts (5) and washers (6) from inside cup (7). Remove cap assembly (1) and packing (8).
3. Remove cup and gasket (9).
4. Cover cavity (10) with barrier material (E80) and masking tape (E388).

***FOLLOW-ON MAINTENANCE:***

None



END OF TASK

## 6-81.3 INSTALL AFT TRANSMISSION OIL FILLER ASSEMBLY

6-81.3

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 5 to 50 Inch-Pounds  
 Workstand

**Materials:**

None

**Parts:**

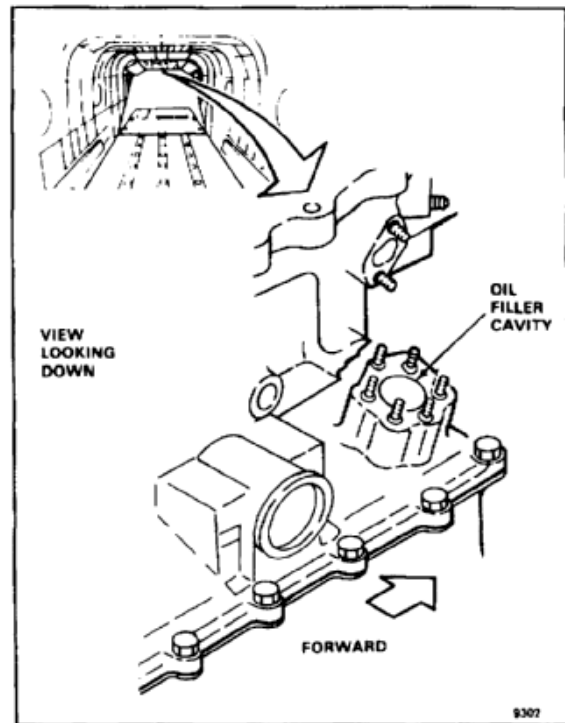
Packing

**Personnel Required:**

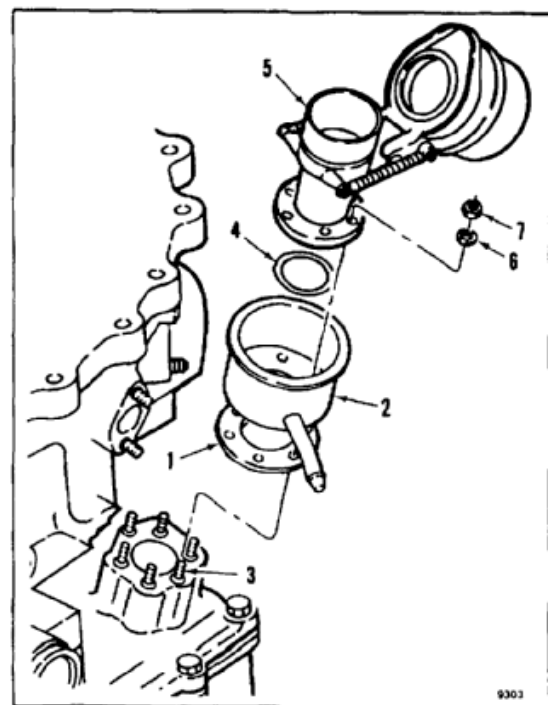
Medium Helicopter Repairer  
 Inspector

**References:**

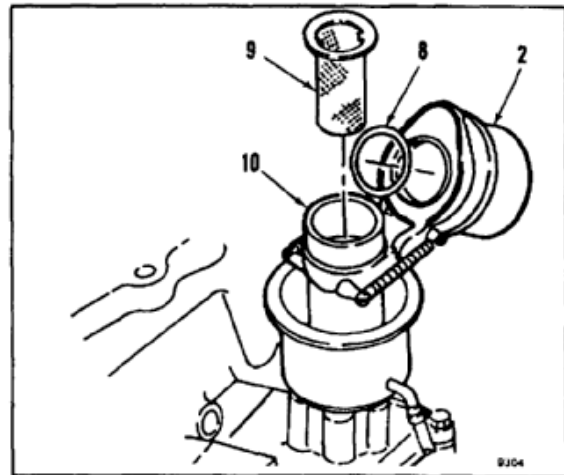
TM 55-1520-240-23P



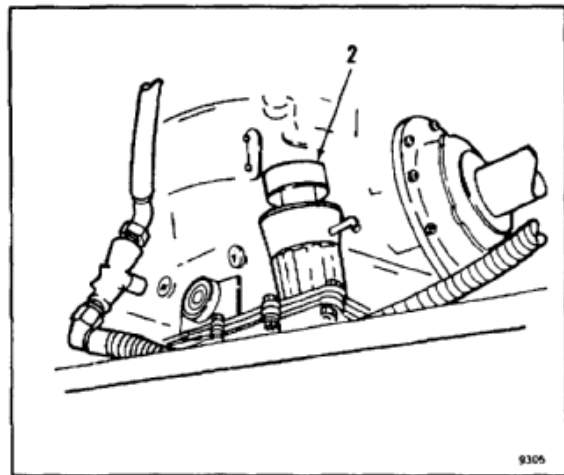
1. Install gasket (1) and cup (2) on six studs (3).
2. Install packing (4) on bottom of cap assembly (5).  
Install cap assembly on studs (3).
3. Install six washers (6) and nuts (7) on studs (3).  
Torque nuts to **20 inch-pounds**.



4. Open cap assembly (5). Install packing (8) on bottom of cap.
5. Install screen (9) in neck (10).



6. Close cap assembly (5).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Close right baffle under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Workstand  
1/4-28 Bolt, At Least One Inch Long (3)

**Materials:**

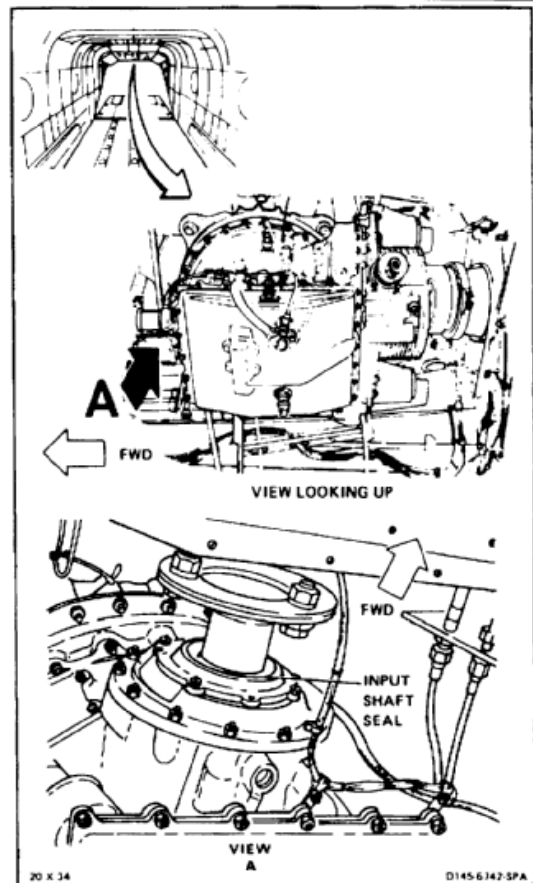
None

**Personnel Required:**

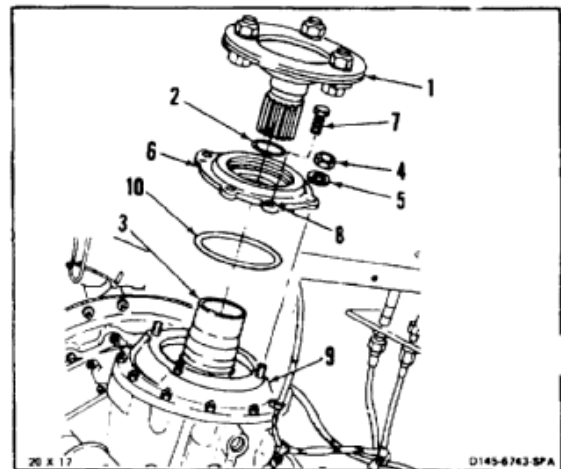
Aircraft Powertrain Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Cargo Ramp Open and Level (Task 2-2)  
Baffles Under Aft Transmission Open (Task 2-2)  
Aft Transmission Drip Tray Removed (Task 2-3)  
No. 9 Drive Shaft Removed (Task 6-21)



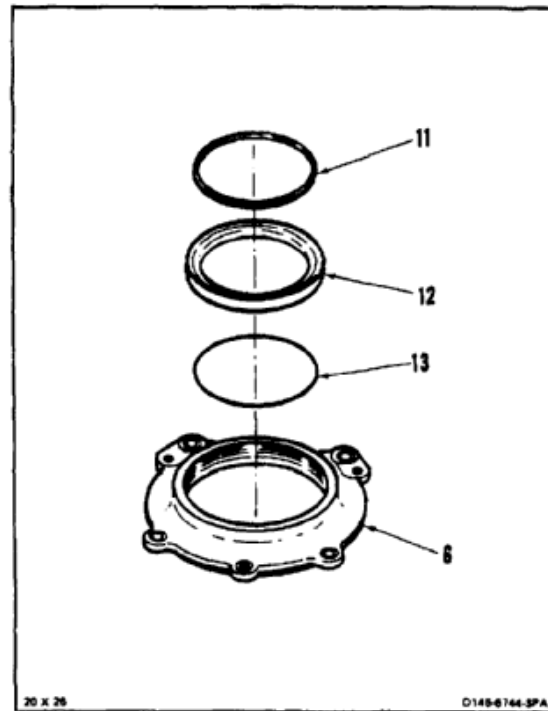
1. Remove adapter assembly (1) and packing (2) from input shaft (3). Do not disturb position of input shaft.
2. Remove four nuts (4) and washers (5) from retainer (6).
3. Install three 1/4-28 bolts (7) in threaded holes (8). Turn bolts to jack retainer (6) off transmission (9).
4. Remove packing (10) from retainer (6).



5. Remove retaining ring (11) from retainer (6).  
Remove seal (12) and packing (13).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-318

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Gun Heater  
Pyrometer  
Aluminum Tube, 4-1/2 Inch OD, 1/4 Inch Wall  
Thickness, 1 to 6 Inches Long  
Torque Wrench, 30 to 150 Inch-Pounds  
Workstand

**Materials:**

Gloves (E186)  
Dry Cleaning Solvent (E162)  
Cloths (E120)  
Oil (E254)  
Kevlar Gloves (E187)

**Parts:**

Packings

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

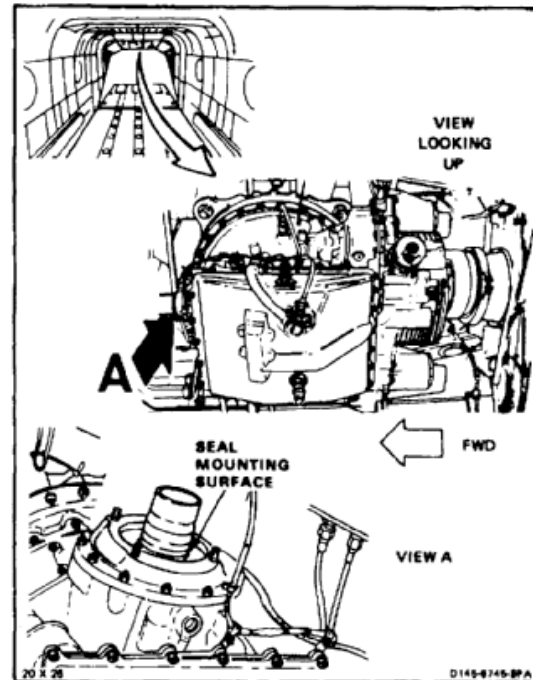
TM 55-1520-240-23P

**General Safety Instructions:****WARNING**

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

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.



1. Clean seal retainer (1). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

**WARNING**

Wear Kevlar gloves when handling hot retainer. Hot metal can burn hands.

**CAUTION**

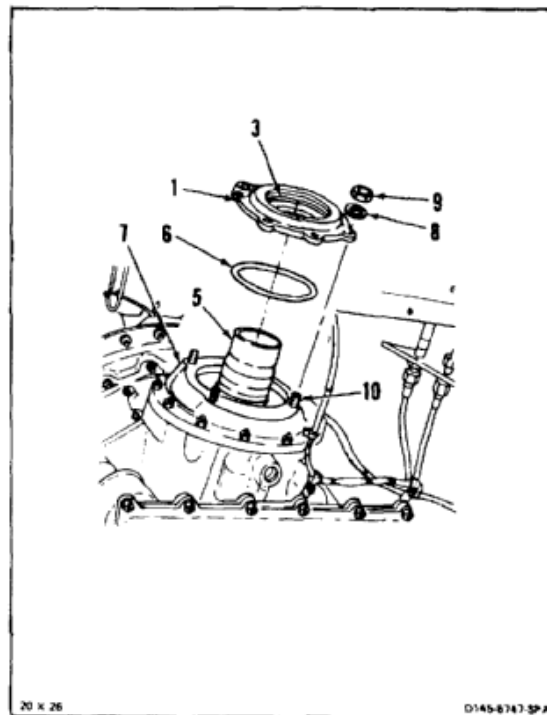
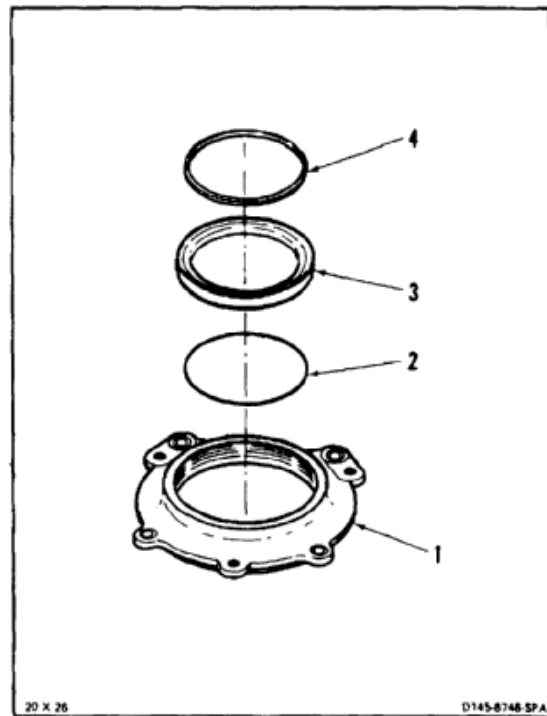
Do not heat retainer over **250°F (120°C)**. Damage to metal can occur.

2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Wear Kevlar gloves (E187). Use gun-type heater. Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. Install seal (3) in retainer (1), flat side up. Use aluminum tube to seat seal.
5. Install retaining ring (4).
6. Install packing (5) on retainer (1).

**NOTE**

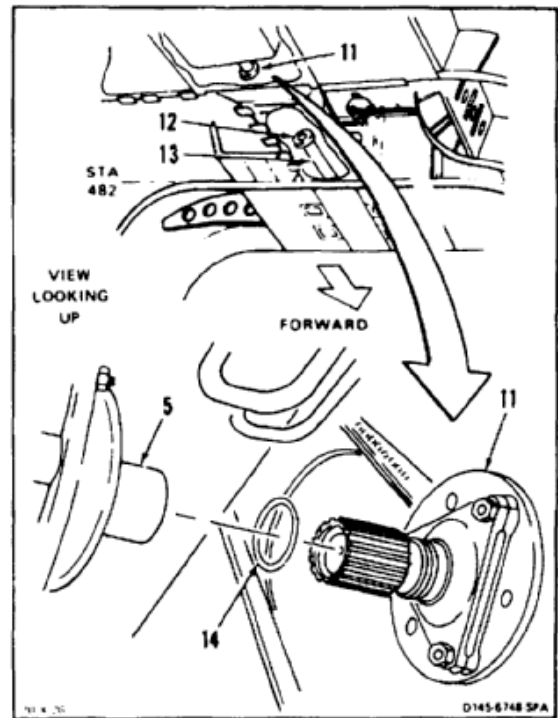
If seal and shaft are not clean and dry, leakage can occur.

7. Clean seal mating surface of shaft (6) with dry cleaning solvent (E162). Wipe seal (3) with clean cloth (E120). Wear gloves (E186).
8. Install retainer (1) on transmission (7). Do not disturb position of input shaft (5).
9. Install four washers (8) and nuts (9) on studs (10). Torque nuts to **60 inch-pounds**.





10. Align adapter assembly (11) with adapter assembly (12) of No. 8 drive shaft (13). Install adapter assembly (11) and packing (14) on input shaft (5). Do not disturb position of input shaft or No. 8 drive shaft.



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

- Install No. 9 drive shaft (Task 6-29).
- Perform ground run (TM 55-1520-240-10).
- Install aft transmission drip tray (Task 2-3).
- Close baffles under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267  
 Awl  
 Workstand  
 Self-Tapping Screw, No. 6 (2)

**Materials:**

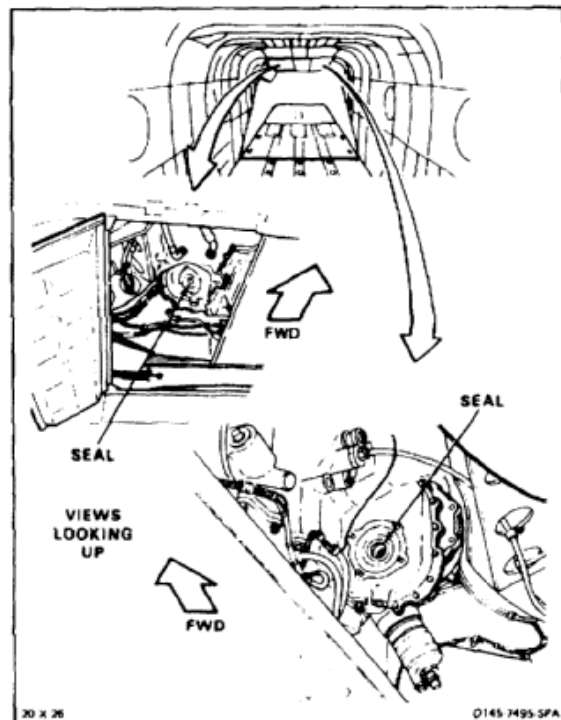
Lockwire (E232)

**Personnel Required:**

Aircraft Powertrain Repairer

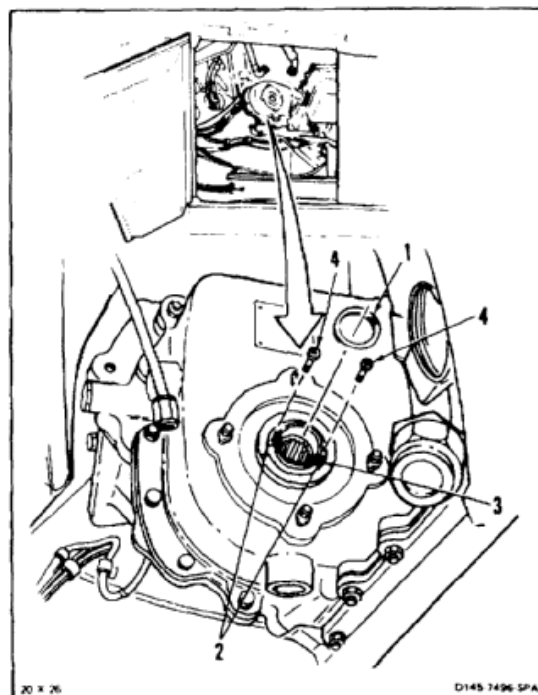
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Cargo Ramp Open and Level (Task 2-2)  
 Left or Right Baffle Under Aft Transmission Open  
 (Task 2-2)  
 Flight Control Hydraulic System Pump (Left Side) or  
 Utility Hydraulic System (Right Side) Removed  
 (Task 7-22 or 7-150)

**NOTE**

Remove pump drive shaft seal from left or right side of transmission in same way. Right side shown here.

1. Remove retaining ring (1).
2. Punch two holes (2), **180°** apart, in metal casing of seal (3). Use an awl.
3. Screw a No. 6 self-tapping screw (4) securely in each of two holes (2). Do not tighten head of screw against seal (3).



**6-84 REMOVE HYDRAULIC PUMP DRIVE SHAFT SEAL FROM AFT TRANSMISSION (Continued)**

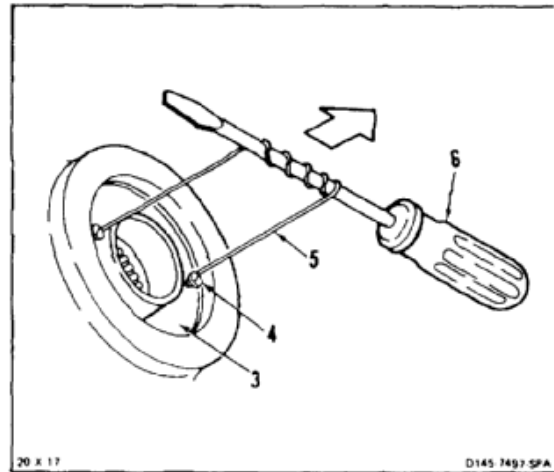
6-84

4. Cut a piece of lockwire (5) about **24 inches** long. Use lockwire (E232). Wrap ends of lockwire under heads of two screws (4).



Prying against transmission or drive shaft will cause damage.

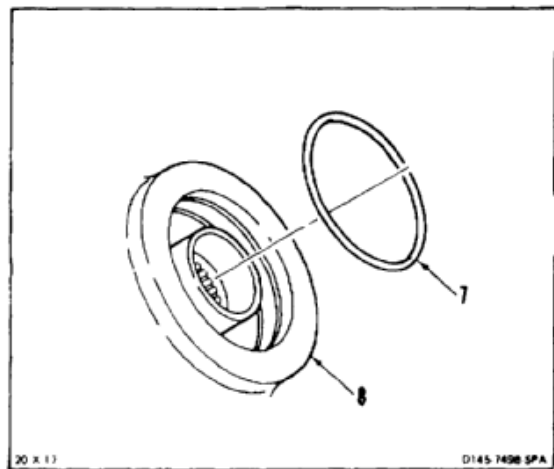
5. Loop lockwire around a tool (6), such as screwdriver or wrench extension. Remove seal (3) by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. Remove packing (7) from transmission (8).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267  
 Gun Heater  
 Pyrometer  
 Aluminum Tube, 2 Inch OD, 1/8 Inch Thick Wall, 1  
 to 6 Inches Long  
 Workstand

**Materials:**

Gloves (E186)  
 Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Oil (E254)  
 Kevlar Gloves (E187)

**Parts:**

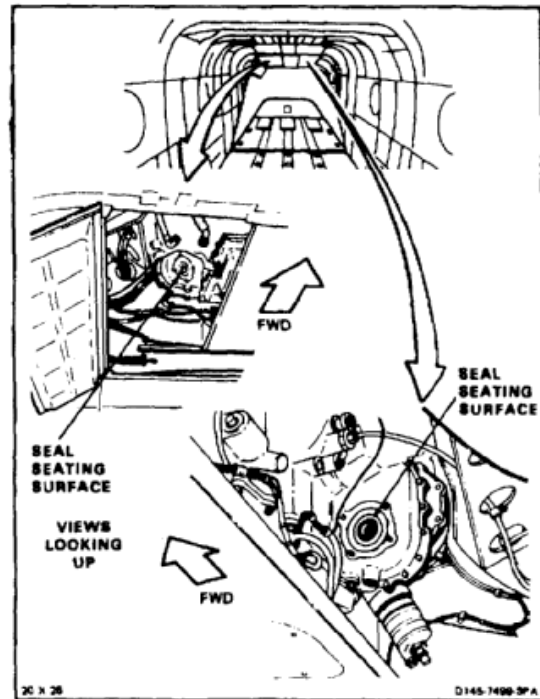
Packing

**Personnel Required:**

Aircraft Powertrain Repairer  
 Inspector

**References:**

TM 55-1520-240-23P



**WARNING**

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

**NOTE**

Install pump drive shaft seal on left or right side of transmission in same way. Right side shown here.

1. Clean seal seating area of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

**WARNING**

Wear Kevlar gloves when working around heated area. Hot metal can burn hands.

**CAUTION**

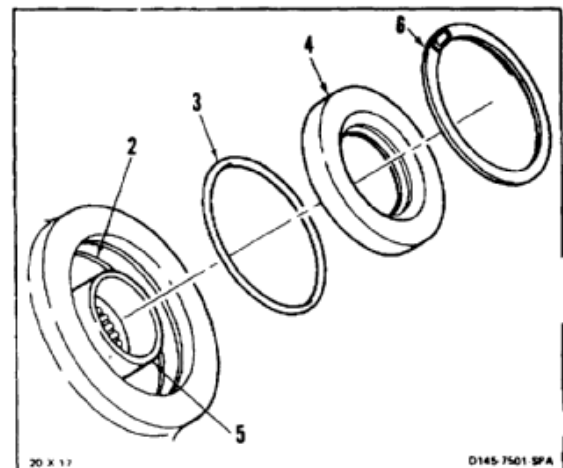
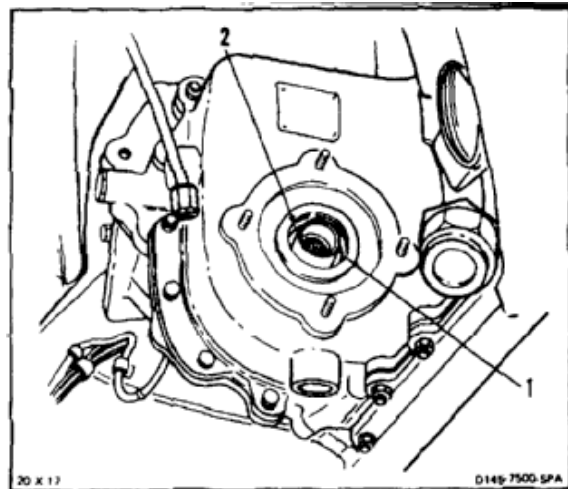
Do not heat transmission over **250°F (120°C)**. Metal can be damaged.

2. Heat seal seating area (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

3. Coat packing (3) with oil (E254). Install packing in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). Install seal on drive shaft, flat side out. Use aluminum tube to seat seal.
5. Install retaining ring (6).



***INSPECT***

***FOLLOW-ON MAINTENANCE:***

Install flight control hydraulic pump (left side) or utility system hydraulic pump (right side) (Task 7-27 or 7-151).

Close left or right baffle under aft transmission (Task 2-2).

Close cargo ramp (Task 2-2).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
- Awl
- Workstand
- Self-Tapping Screw, No. 6 (2)

**Materials:**

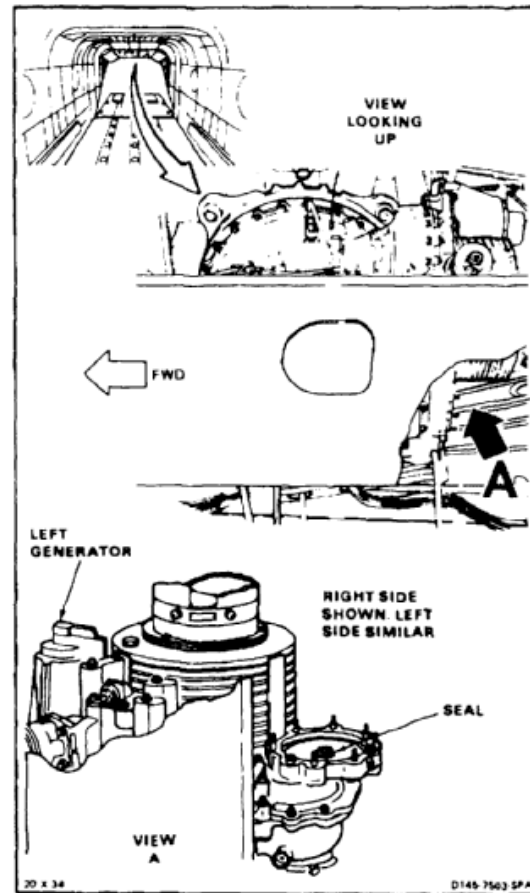
Lockwire (E232)

**Personnel Required:**

Aircraft Powertrain Repairer

**Equipment Condition:**

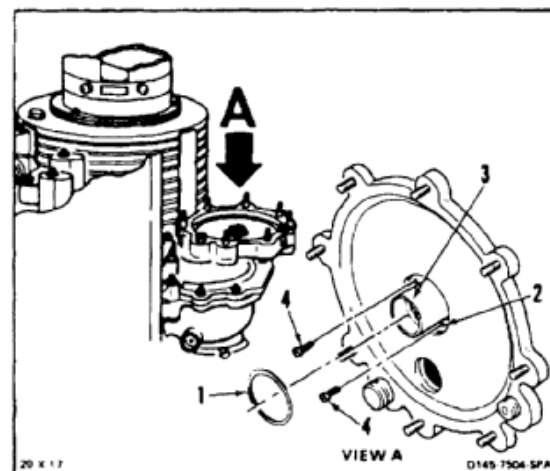
- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Cargo Ramp Open and Level (Task 2-2)
- Left or Right Baffle Under Aft Transmission Open (Task 2-2)
- Left or Right Generator Removed (Task 9-31)



**NOTE**

Remove generator drive shaft from left or right side of transmission in same way. Right side shown here.

1. Remove retaining ring (1).
2. Punch two holes (2), **180°** apart, in metal casing of seal (3) Use an awl.
3. Screw a No. 6 self-tapping screw (4) securely in each of two holes (2). Do not tighten head of screw against seal (3).

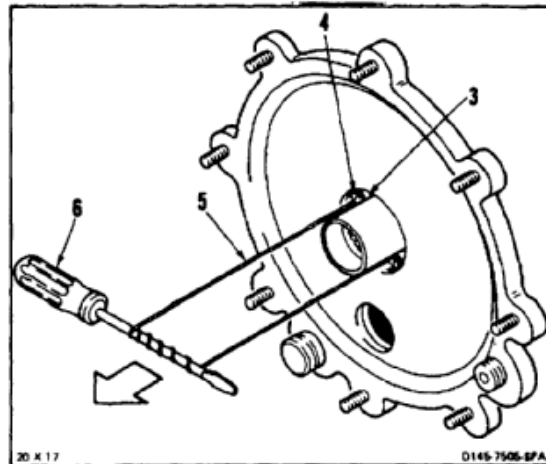


4. Cut a piece of lockwire (E232) (5) about **24 inches** long. Wrap ends of lockwire under heads of two screws (4).



Prying against transmission or drive shaft will cause damage.

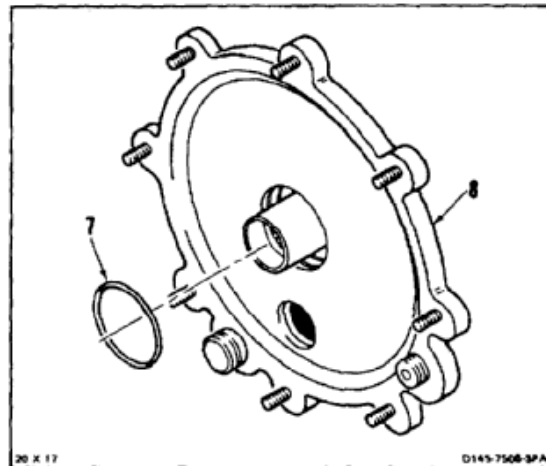
5. Loop lockwire around a tool (6), such as screwdriver or wrench extension. Remove seal (3) by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. Remove packing (7) from transmission.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-328



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267  
 Gun Heater  
 Pyrometer  
 Aluminum Tube, 2 Inch OD, 1/8 Inch Thick Wall, 1  
 to 6 Inches Long  
 Workstand

**Materials:**

Gloves (E186)  
 Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Oil (E254)  
 Kevlar Gloves (E187)

**Parts:**

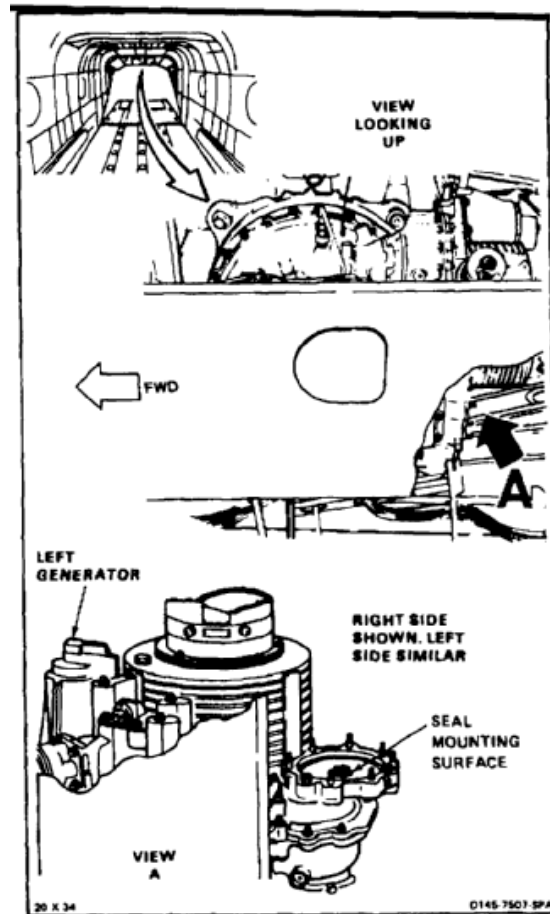
Packing

**Personnel Required:**

Aircraft Powertrain Repairer  
 Inspector

**References:**

TM 55-1520-240-23P



**WARNING**

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

**NOTE**

Install generator drive shaft seal on left or right side of transmission in same way. Right side shown here.

1. Clean seal seating area of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186).

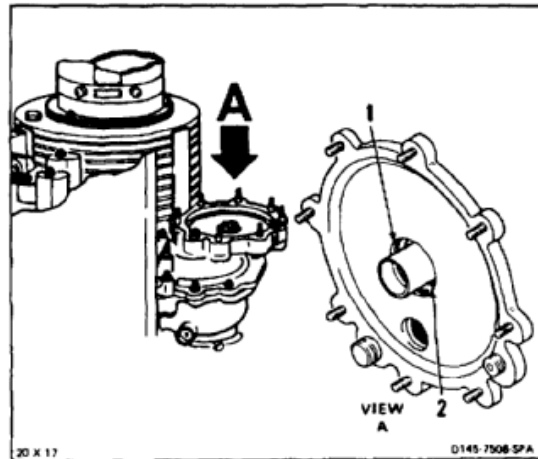
**WARNING**

Wear Kevlar gloves when working around heated area. Hot metal can burn hands.

**CAUTION**

Do not heat transmission over **250°F (120°C)**. Metal can be damaged.

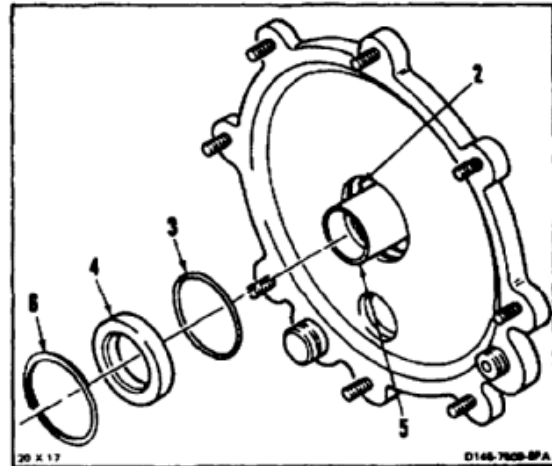
2. Heat seal seating area (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.



**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

3. Coat packing (3) with oil (E254). Install packing in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). Install seal on drive shaft, seal side out. Use aluminum tube to seat seal.
5. Install retaining ring (6).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install left or right generator (Task 9-32).
- Service aft transmission (Task 1-54).
- Close left or right baffle under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267  
 Awl  
 Workstand  
 Self-Tapping Screw, No. 6 (2)

**Materials:**

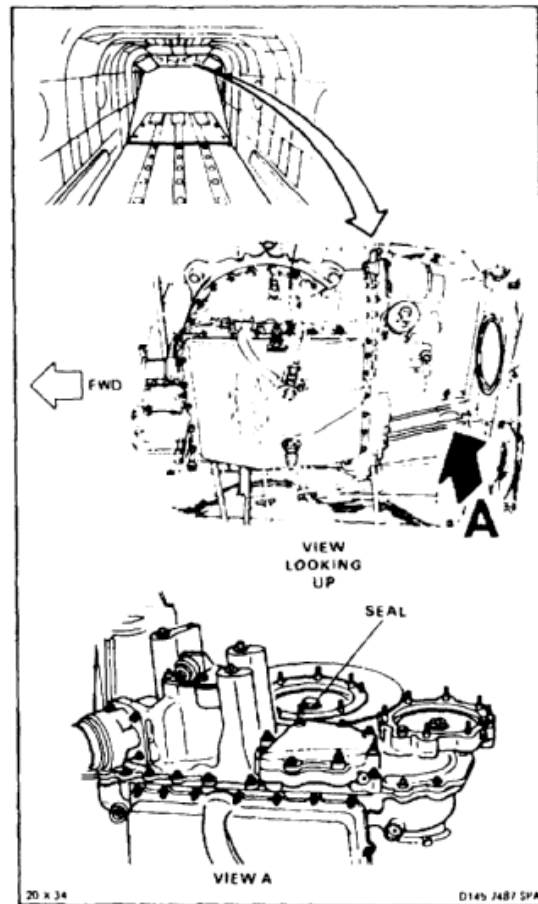
Lockwire (E232)

**Personnel Required:**

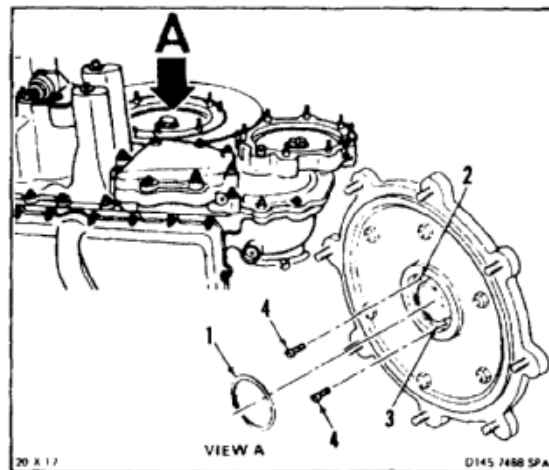
Aircraft Powertrain Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Cargo Ramp Open and Level (Task 2-2)  
 Baffles Under Aft Transmission Open (Task 2-2)  
 Aft Transmission Drip Tray Removed (Task 2-3)  
 Aft Transmission Oil Cooler Removed (Task 6-145)



1. Remove retaining ring (1).
2. Punch two holes (2), **180°** apart, in metal casing of seal (3). Use an awl.
3. Screw a No. 6 self-tapping screw (4) securely in each of two holes (2). Do not tighten head of screw against seal (3).

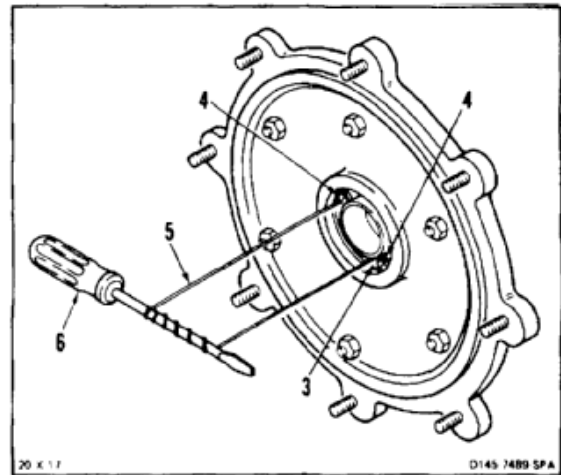


4. Cut a piece of lockwire (5) about **24 inches** long. Use lockwire (E232). Wrap ends of lockwire under heads of two screws (4).



Prying against transmission or drive shaft will cause damage.

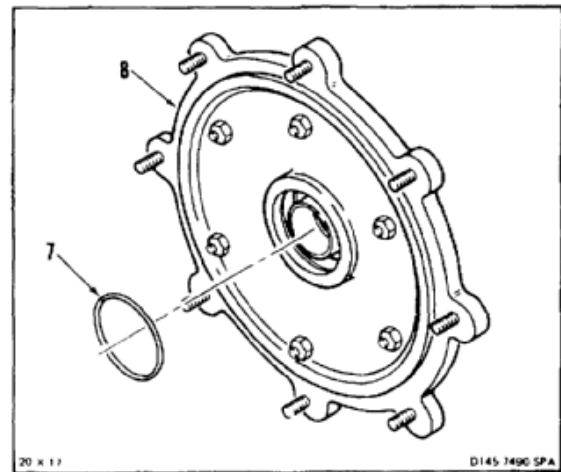
5. Loop lockwire around a tool (6), such as screwdriver or wrench extension. Remove seal (3) by pulling straight out on tool. Do not pry against transmission or drive shaft.



6. Remove packing (7) from transmission.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267
- Gun Heater
- Pyrometer
- Aluminum Tube, 2 Inch OD, 1/8 Inch Thick Wall, 1 to 6 Inches Long
- Workstand

**Materials:**

- Gloves (E186)
- Dry Cleaning Solvent (E162)
- Cloths (E120)
- Oil (E254)
- Kevlar Gloves (E187)

**Parts:**

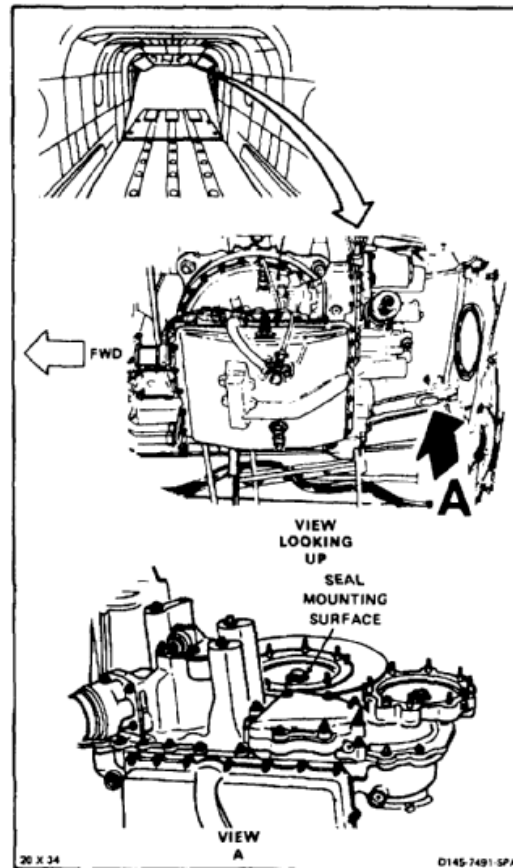
- Packing

**Personnel Required:**

- Aircraft Powertrain Repairer
- Inspector

**References:**

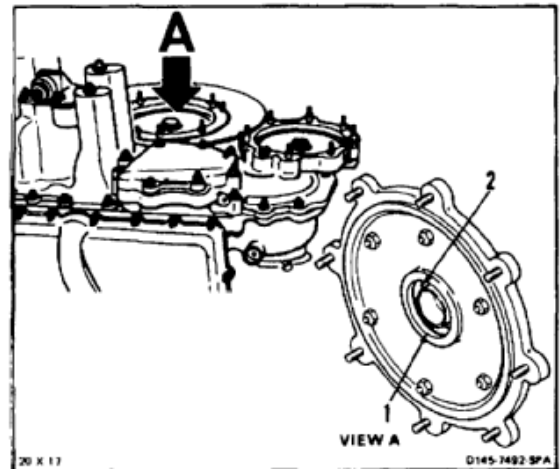
- TM 55-1520-240-23P



**WARNING**

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

1. Clean seal seating area of transmission (1) and packing groove (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.

**WARNING**

Wear Kevlar gloves when working around heated area. Hot metal can burn hands.

**CAUTION**

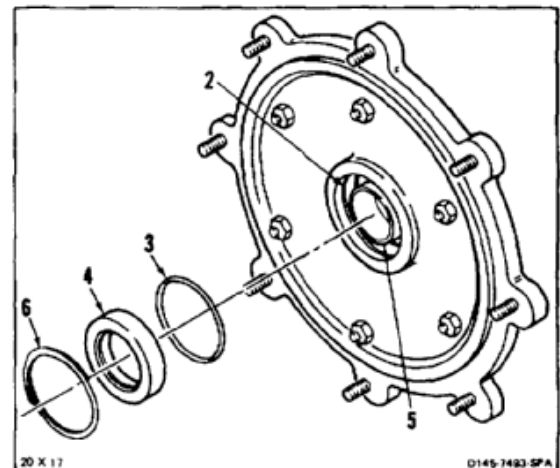
Do not heat transmission over **250°F (120°C)**. Metal can be damaged.

2. Heat seal seating area (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

3. Coat packing (3) with oil (E254). Install packing in groove (2).
4. Coat lip of seal (4) and sealing surface of drive shaft (5) with oil (E254). Install seal on drive shaft, seal side out. Use aluminum tube to seat seal.
5. Install retaining ring (6).



***INSPECT***

***FOLLOW-ON MAINTENANCE:***

- Install aft transmission oil cooler (Task 6-146).
- Service aft transmission (Task 1-54).
- Install aft transmission drip tray (Task 2-3).
- Close baffles under aft transmission (Task 2-2).

END OF TASK



**6-90 REMOVE AFT TRANSMISSION ROTOR SHAFT SEAL****6-90****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267  
Hoist (T3)

**Materials:**

Barrier Material (E81)  
Tape (E388)

**Personnel Required:**

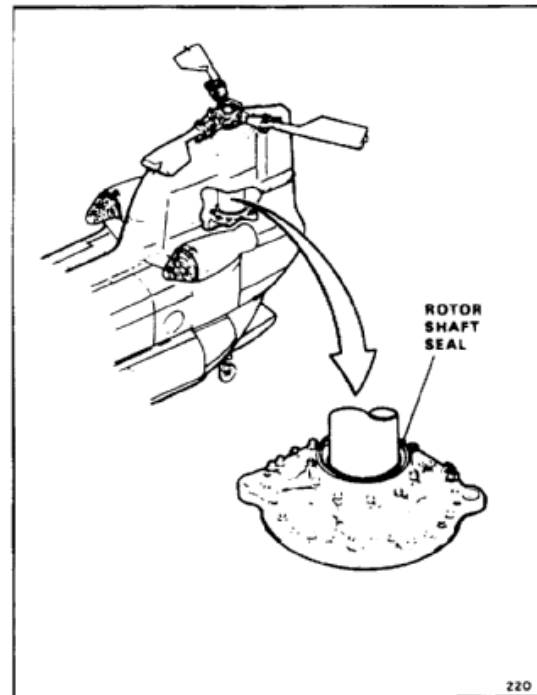
Aircraft Powertrain Repairer

**References:**

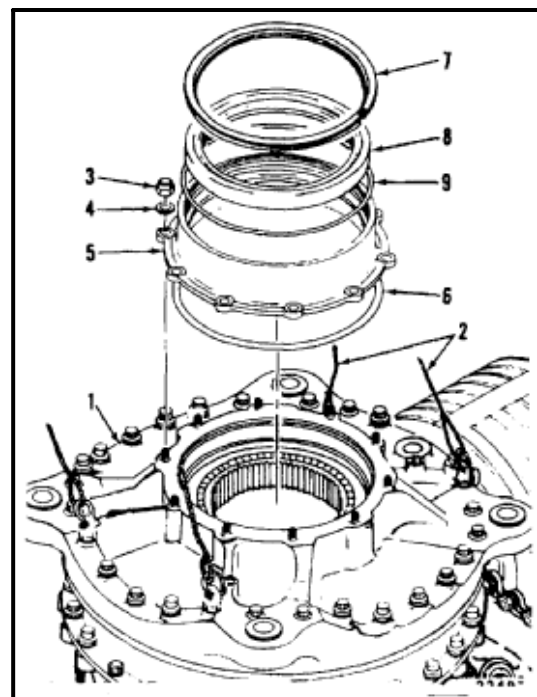
Task 6-92

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Baffles Under Aft Transmission Open (Task 2-2)  
Aft Transmission Drip Tray Removed (Task 2-3)  
Cargo Ramp Open and Level (Task 2-2)



1. Lower aft transmission (1) into cabin with hoist kit (T3) (Task 6-92, steps 1 thru 31). Keep tension on four cables (2).
2. Remove 10 nuts (3) and washers (4) from seal retainer (5).
3. Remove seal retainer (5) and packing (6).
4. Cover opening into transmission (1). Use barrier material (E81) and tape (E388).
5. Remove retaining ring (7) from seal retainer (5).
6. Remove seal (8) and packing (9).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Powertrain Tool Kit, NSN 5180-00-003-5267  
 Gun Heater  
 Pyrometer  
 Wood Plank, 2 Inches x 4 Inches x 12 Inches  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Acetone (E20)  
 Epoxy Primer (E292 or E292.1)  
 Thinner (E415 or E419)  
 Dry Cleaning Solvent (E162)  
 Sealant (E336)  
 Cloths (E120)  
 Oil (E253, E254, or E254.1)  
 Grease (E190)  
 Gloves (E184.1)  
 Kevlar Gloves (E187)

**Parts:**

Packings

**Personnel Required:**

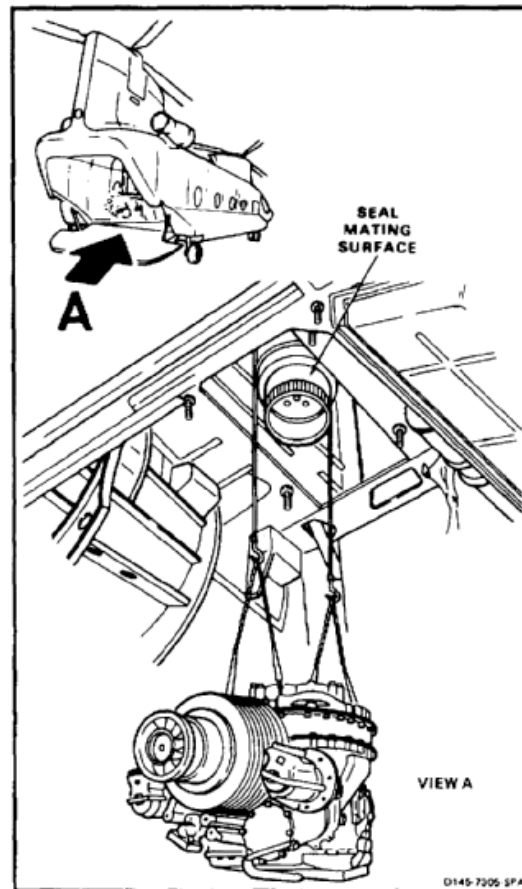
Aircraft Powertrain Repairer  
 Inspector

**References:**

TM 55-1520-240-23P  
 Task 6-97

**General Safety Instructions:****WARNING**

Oil (E253, E254, or E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



1. Finish seal retainer (1), the metal part of seal (2), and retaining ring (3) as follows:

**WARNING**

The materials used in this step are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

If refinishing materials are not available, seal the retainer installation after assembly as in step 6.

- a. Clean parts with acetone (E20) and cloths (E120). Wear gloves (E184.1).
- b. Wet aged primed surfaces with thinner (E415 or E419). Allow to air dry for no more than **four hours**.
- c. Apply two coats of epoxy primer (E292 or E292.1). Allow to dry.
- d. Apply two coats of epoxy topcoat (E166).

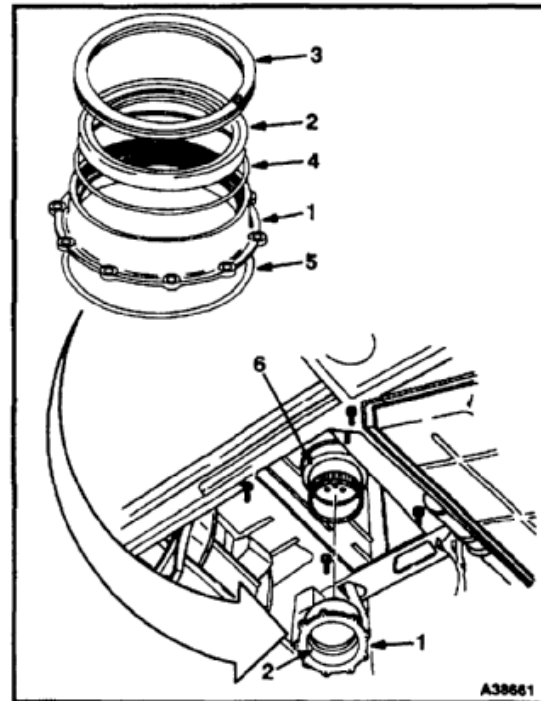
**WARNING**

Wear Kevlar gloves (E187) when handling hot retainer. Hot metal can burn hands.

**CAUTION**

Do not heat retainer over **250°F (120°C)**. Metal can be damaged.

2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Use a gun-type heater and pyrometer. Wear gloves (E187).
3. Install packing (4) in retainer (1).
4. Install seal (2) in retainer (1), flat side up. Use a wood plank and mallet to seat the seal.
5. Install retaining ring (3).



6. If retainer installation components were not finished in step 1, seal the installation as follows:

**WARNING**

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

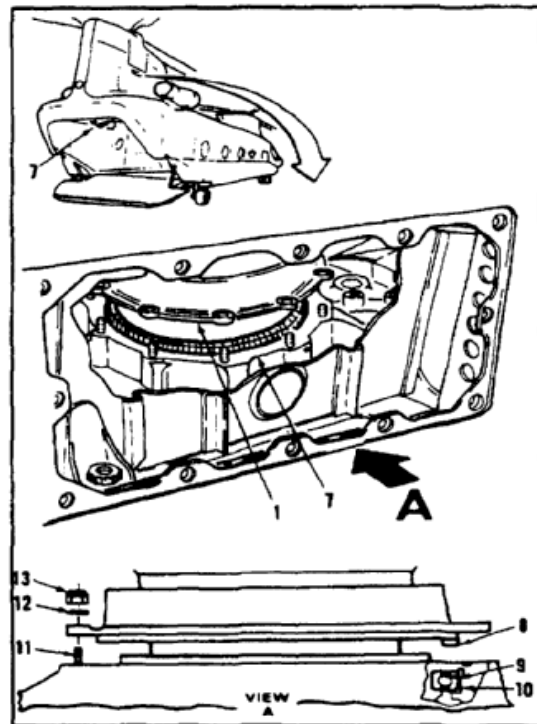
- a. Clean exposed top surfaces of the retainer (1), seal (2) and retaining ring (3). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E184.1).
  - b. Cover retaining ring (3) with a heavy bead of sealant (E336) from the upper edge of retainer (1) to the upper surface of seal (2).
7. Install packing (5) on bottom of retainer (1).
  8. Lightly coat lip of seal (2) with grease (E190) to prevent corrosion.
  9. Lightly coat the mating surface of rotor shaft (6) with oil (E253, E254, or E254.1).
  10. Install seal retainer (1) on rotor shaft (6). Be careful not to damage seal (2).

11. Remove tape and barrier material from aft transmission (7). Install aft transmission (Task 6-97).

**NOTE**

Reach the seal retainer through open aft transmission access doors on each side of the aft pylon.

12. Align tab (8) on seal retainer (1) with slot (9) in outer race of bearing (10) in aft transmission (7). Install seal retainer on 10 studs (11).
13. Apply a light coat of oil (E253, E254, or E254.1) to the thread of studs (11). Install 10 washers (11) and nuts (12). Torque the nuts to **70 to 85 inch-pounds** (wet).



D145-7308-SPA

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Perform a ground run (TM 55-1520-240-10).
- Install transmission access doors on aft pylon (both sides) (Task 2-2).
- Install aft transmission drip tray (Task 2-3).
- Close baffles under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK

**6-92 REMOVE AFT TRANSMISSION**

6-92

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Aft Rotor Shaft Securing Device (T50)  
 Hoist Kit (T85)  
 Handling Sling (T163) (Used with (T85) as Alternate Sling)  
 Socket, 1-5/16 Inch  
 Aft Transmission Torque Adapter (T160)  
 Torque Pack (T23)  
 Tee Handle (T161)  
 Aft Transmission Adapter (T17)  
 Transportation Trailer 2000  
 Roller Adapter 2550 (4)  
 Workstand (2)

**Materials:**

Twine (E433)  
 Barrier Material (E80)  
 Masking Tape (E388)  
 Paper Tags (E264)

**Personnel Required:**

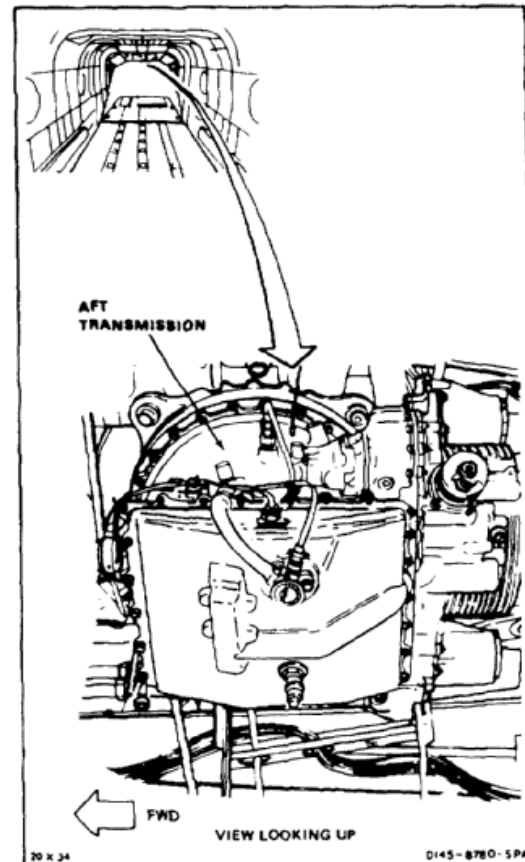
Medium Helicopter Repairer (5)

**References:**

Task 2-2

**Equipment Condition:**

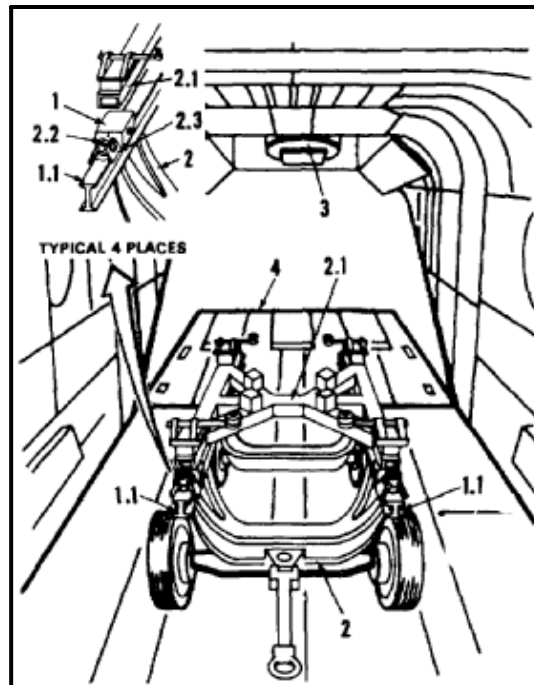
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Cargo Ramp Open (Task 2-2)  
 Baffles Under Aft Transmission Open (Task 2-2)  
 Aft Transmission Drip Tray Removed (Task 2-3)  
 Aft Pylon Access Doors to Generators and  
 Transmission Removed (Both Sides) (Task 2-2)  
 No. 9 Aft Drive Shaft Removed (Task 6-21)  
 Aft Transmission Adapter Assembly Removed (Task  
 6-23)  
 Aft Rotor Pitch Links Disconnected (Task 5-97)  
 Aft Servocylinder Safety Blocks Installed (Task 11-28)



**WARNING**

Trailer may turn over while off loading from aircraft if the T17 adapter is not positioned with the transmission between the forward and rear axles.

1. Fit four roller adapters (1) over two rails (1.1) of trailer (2).
- 1.1. With aid of helper, position adapter (T17) (2.1) on roller adapters (1).
- 1.2. Turn fitting (2.2) of each roller adapter (1) clockwise until clamp (2.3) fits tightly against rail (1.1).
2. Position trailer (2) in cabin forward of aft transmission (3).
3. Raise cargo ramp (4) to level (Task 2-2).



**INSTALL AFT ROTOR SHAFT SECURING DEVICE (T50)**

**CAUTION**

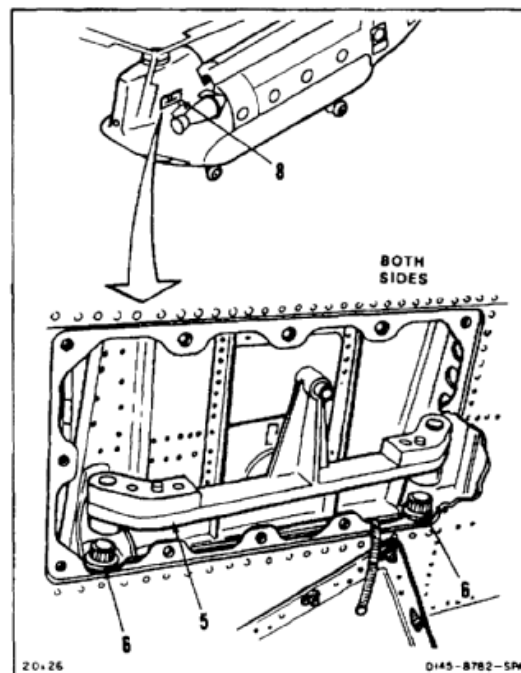
Do not turn rotor blades while securing device is installed. Rotor shaft can be damaged.

**NOTE**

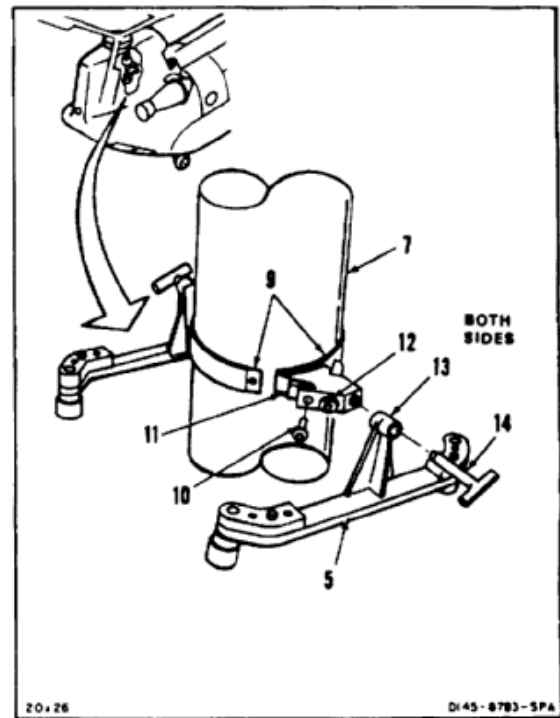
It may be necessary to use an additional person to assist in installing securing device (T50) through transmission access holes in pylon.

Adapter bars are marked LEFT SIDE and RIGHT SIDE. They are not interchangeable.

4. Install two adapter bars (5) on transmission mounting nuts (6) at each side of rotor shaft (7). Work through access hole (8) at each side of helicopter.



5. Install two clamps (9) around rotor shaft (7). Secure them to each other with pins (10) through plates (11).
6. With aid of helper, loosely secure clamps (9) to shaft (7) by tightening two knobs (12). Slide clamp assemblies down shaft to align with uprights (13) on two adapter bars (5). Install pins (14) through uprights and plates (11).
7. Tighten clamps (9) around shaft (7) with two knobs (12).



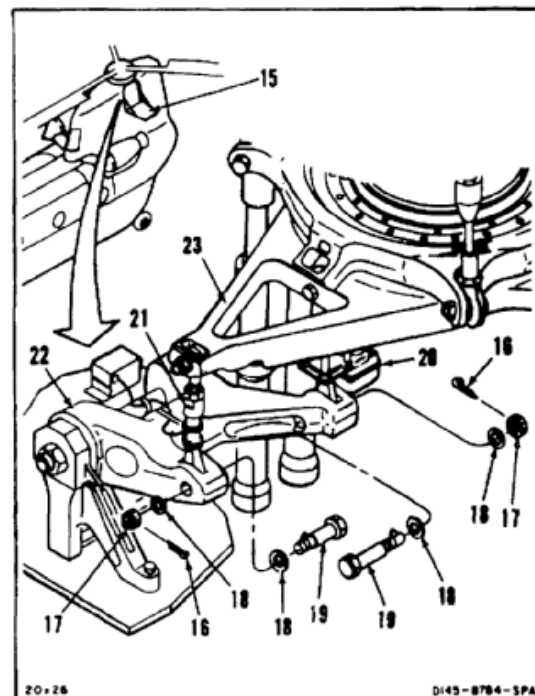
**INSTALL HOIST KIT**

8. Open aft pylon left and right work platforms (15) (Task 2-2).

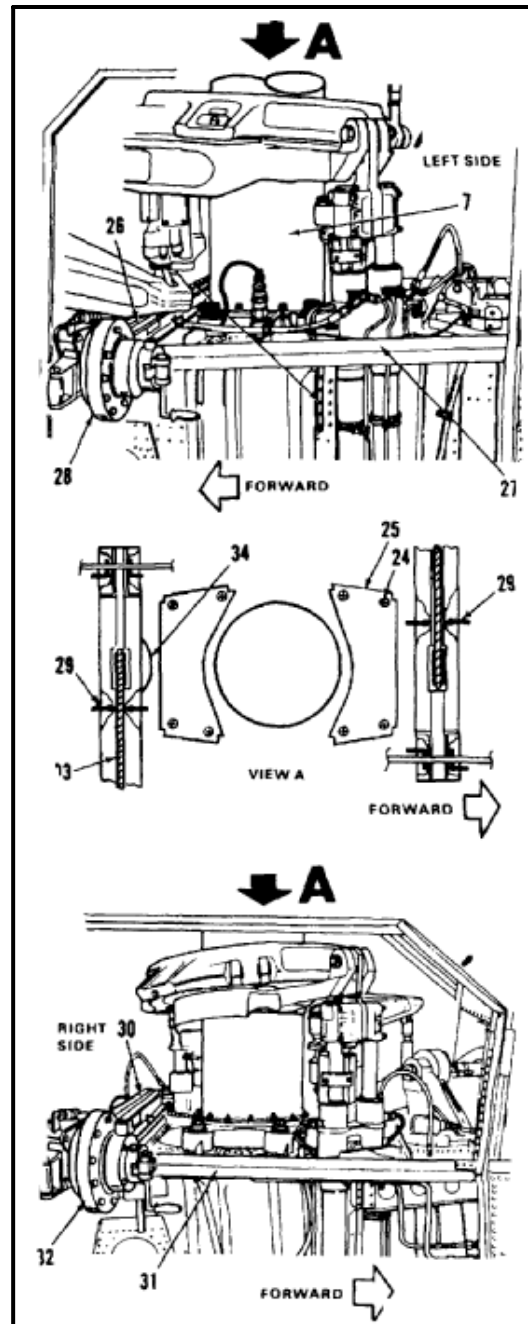
**NOTE**

Yoke must be disconnected for forward hoist and beam assembly clearance.

9. Remove cotter pins (16), nuts (17), washers (18), and bolts (19) from lower end of actuator (20) and link (21). Disconnect actuator and link from yoke (22). Remove actuator from swashplate yoke (23).
10. Tie yoke (22) to swashplate yoke (23). Use twine (E433).



11. Release four fasteners (24) on plate (25). Remove plate.
12. Install beam assembly (26) on aft pylon structure (27) forward of rotor shaft (7), with hoist (28) at left. Install four pins (29) through beam and structure.
13. Install beam assembly (30) on aft pylon structure (31) aft of rotor shaft (7), with hoist (32) at right. Install four pins (29) through beam and structure. Lower cable (33) through hole (34).
14. With aid of helper, operate two hoists (28 and 32) to lower cables (33) to top of transmission (3).

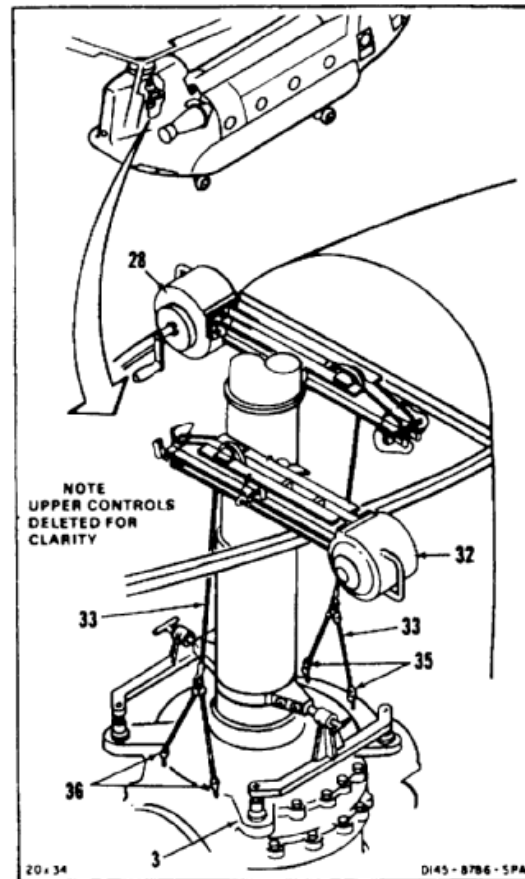




**NOTE**

Reach forward hoist eyes from cabin.  
Reach aft hoist eyes from generator access holes on each side of pylon.

15. Connect cables (33) of forward hoist (28) to two forward hoist eyes (35) on transmission (3). Connect cables of aft hoist (32) to two aft hoist eyes (36) on transmission.
16. Operate hoists (28 and 32) to remove slack from cables (33). Do not apply tension.

**DISCONNECT TRANSMISSION****NOTE**

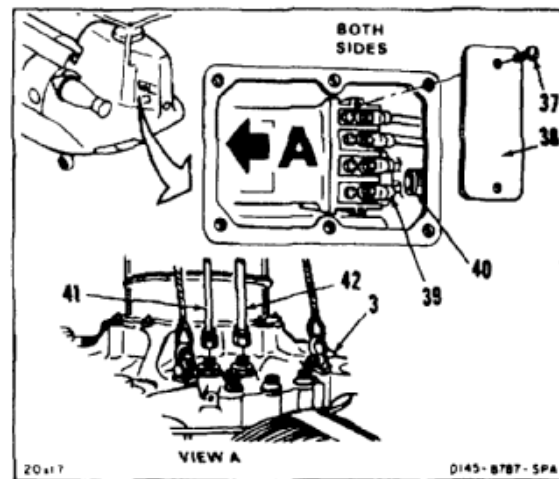
Disconnect wires from two generators in same way. Reach generator connections through access holes on each side of pylon.

17. Remove two screws (37) from cover plate (38). Remove plate.
18. Tag and disconnect four wires (39) and connector (40).

**NOTE**

Route oil hoses through generator access holes.

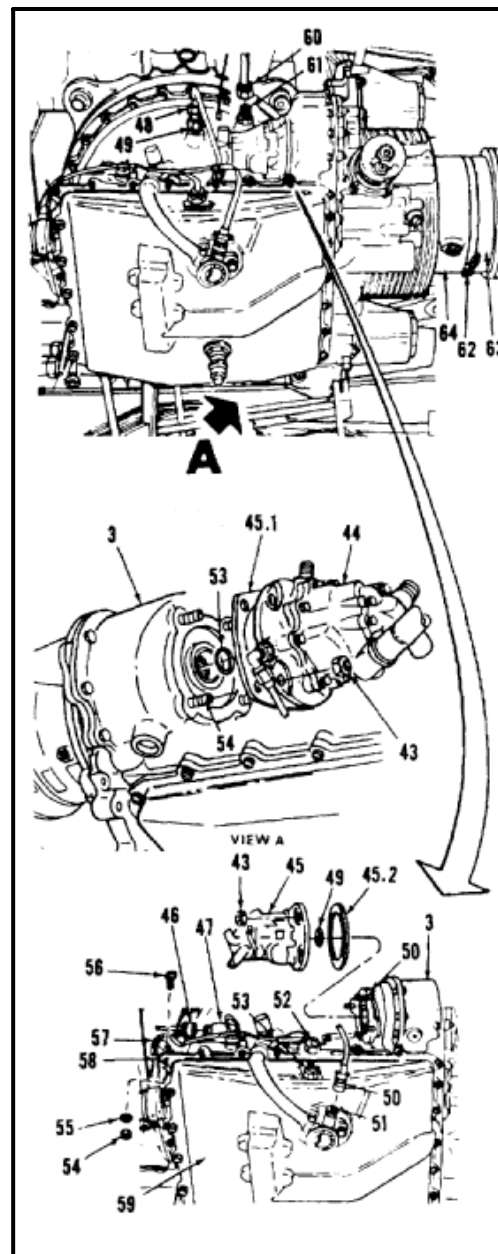
19. Disconnect two oil hoses (41 and 42) from top of transmission (3).



**CAUTION**

Do not kink hoses when handling pumps.

20. Remove four nuts (43) from two hydraulic pumps (44 and 45). Remove pumps, with gaskets (45.1 and 45.2), from transmission (3). Tie pumps to each side of cabin with twine (E433).
21. Tag and disconnect electrical connector (46) from auxiliary oil pressure switch (47). Tag and disconnect electrical connector (48) from main oil pressure switch (49).
22. Tag and disconnect electrical connector (50) from indicating screen and chip detector (51). Tag and disconnect electrical connector (52) from temperature bulb (53).
23. Remove nuts (54), washers (55), and screws (56) from four clamps (57). Tie wires (58) away from sump (59).
24. Disconnect oil hose (60) from adapter (61).
25. Loosen clamp (62) at duct (63). Slide clamp and duct aft, away from oil cooler fan (64).



**REMOVE NUTS**

**NOTE**

Torque shaft and torque adapter are part of torque adapter assembly (T160).

To avoid binding during transmission removal, centerline of adapter shall be directly under or slightly left of transmission centerline.

- 26. Install torque adapter (65) between structure (66) at sta. 534 and structure (67) at sta. 594. Flat side of base (68) shall face aft. Center adapter under transmission (3) and tighten four hand knobs (69). Make sure centerline of adapter is not right of transmission centerline.

**WARNING**

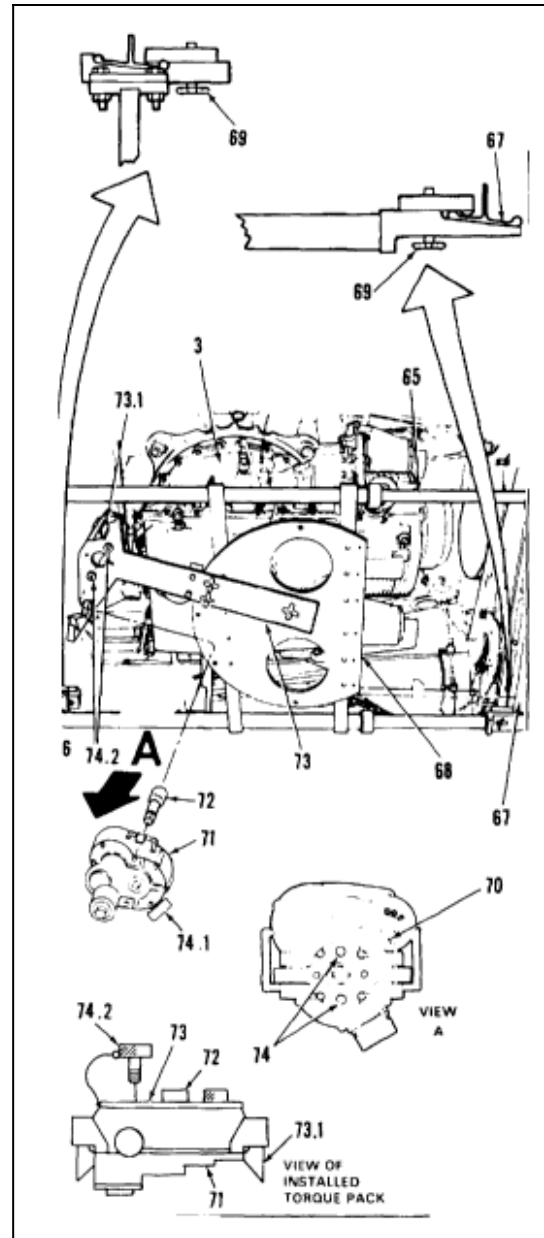
Make sure ratchet selector on torque pack is set to NUT OFF before applying torque. Changing ratchet settings with torque applied can damage unit and cause injury to personnel.

- 27. Set ratchet selector (70) on torque pack (T23) (71) to NUT OFF.

**NOTE**

Adapter is part of torque pack (T23).

- 28. Install adapter (72) in torque pack (T23) (71). Install torque pack on support (73) with two hooks (73.1). Make sure two pins (74) on bottom of torque pack engage holes in support. Check that torque indicator (74.1) faces aft and inboard.
- 28.1. Secure torque pack (71) to support (73). Use two thumb screws (74.2).



29. Loosen each of four transmission mounting nuts (75) as follows:

**NOTE**

Removal of forward left nut shown here.

- a. Loosen knob (75.1).
- b. If loosening a forward nut (75), position support (73) directly under nut to be loosened. If loosening an aft nut, position support straight out to side of nut to be loosened. Install and tighten two knob assemblies (76) through support and base plate (68).
- c. Tighten knob (75.1).

**NOTE**

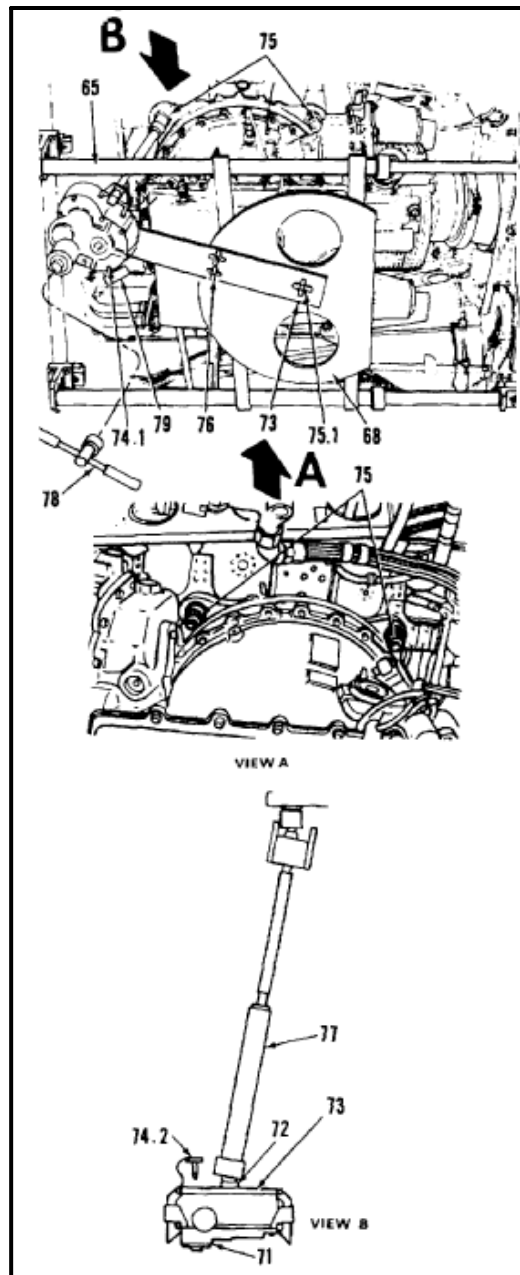
Torque shaft is spring-loaded and compresses for installation.

- d. Place one end of torque shaft (77) on nut (75). Place other end on adapter shaft (72).

**WARNING**

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

- e. Set selector switch on tee handle (T161) (78) to OFF. Install tee handle on torque pack (T23) (71). Turn handle counterclockwise until torque is broken.
  - f. Set selector switch on tee handle (78) to ON. Turn handle clockwise until torque indicator (74.1) reads 0 and torque pack (71) is loose.
  - g. Remove torque shaft (77).
- 29.1. Loosen thumb screws (74.2) and release hooks (73.1). Remove torque pack (71) from support (73).
- 29.2. Remove torque adapter (65) from helicopter structure.
- 29.3. Remove four nuts (75).



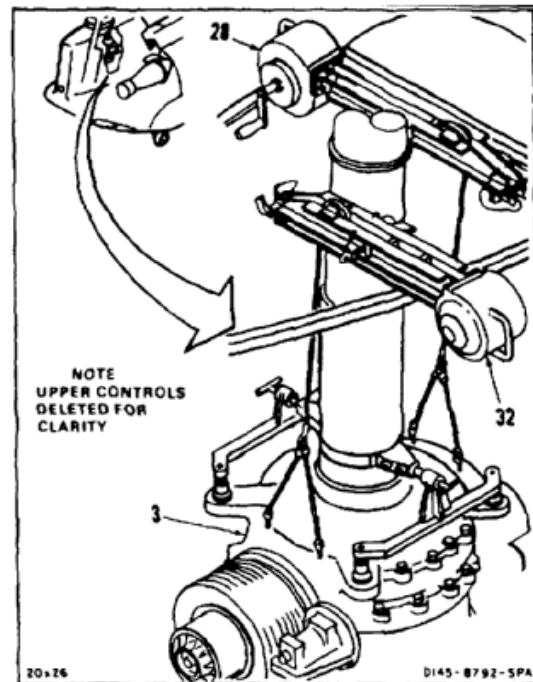
**REMOVE TRANSMISSION**

30. Station helpers in cabin to guide transmission (3).

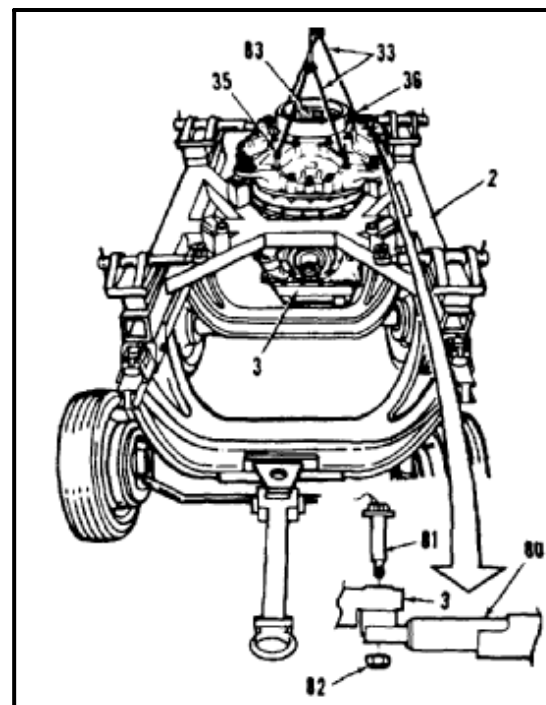


If transmission is not kept tilted forward  $4^{\circ}$ , rotor shaft splines can bind within transmission. Damage can result.

31. Have helpers operate two hoists (28 and 32) to slowly lower transmission (3). Keep transmission tilted forward  $4^{\circ}$  during lowering.



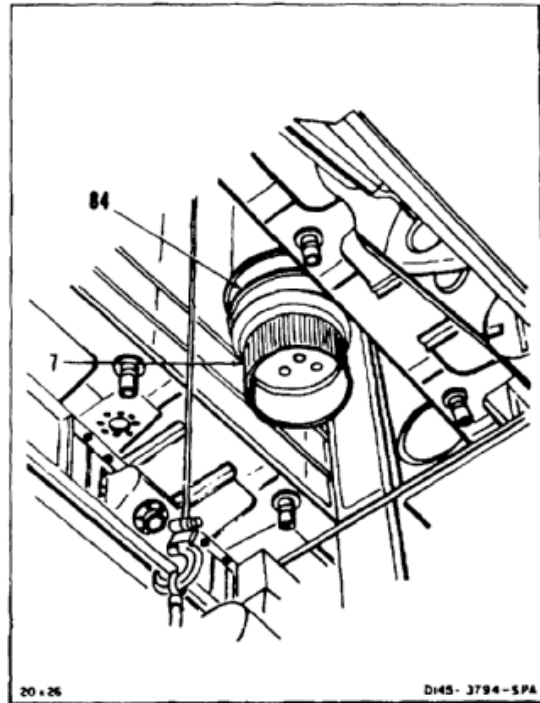
32. Slide back two mount arms (80) on adapter (2). Lower transmission (3) on adapter. Extend two arms.
33. Install four bolts (81) in transmission (3) and adapter. Install nuts (82).
34. Disconnect cables (33) from hoist eyes (35 and 36).
35. Cover transmission cavity (83) with barrier material (E80) and tape (E388).
36. Remove transmission (3) from helicopter.



37. Cover splines (84) of rotor shaft (7) with barrier material (E80) and tape (E388).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-350

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Barrier Material (E81)

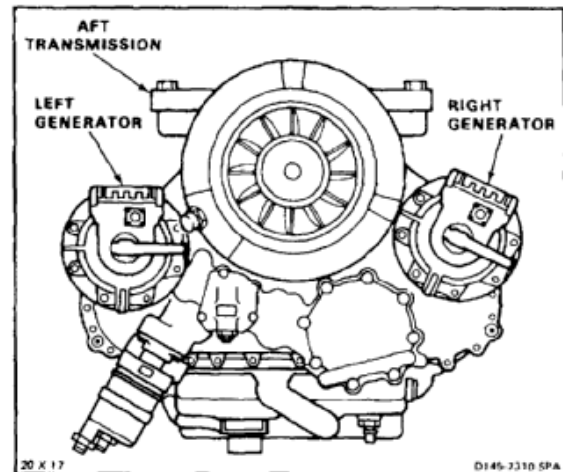
Tape (E388)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Off Helicopter Task

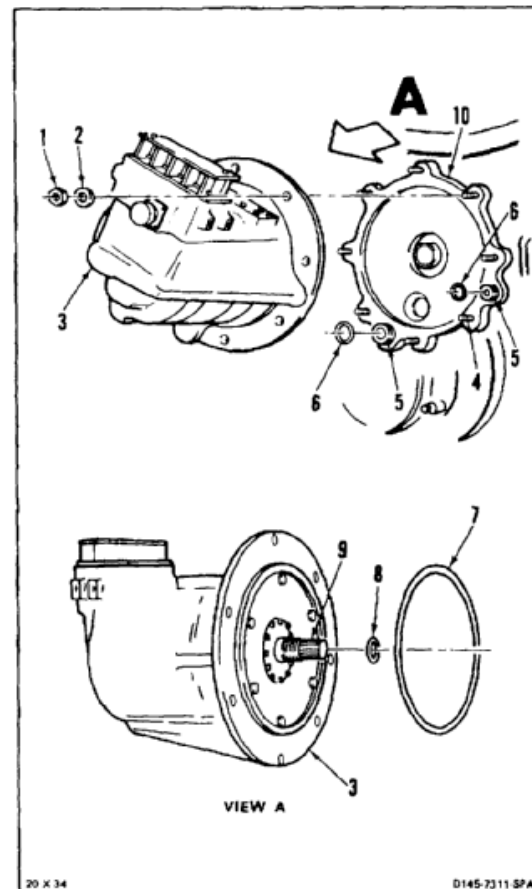
**NOTE**

Remove left and right generator from aft transmission in same way. Right generator shown here.

1. Remove eight nuts (1) and washers (2) from generator (3).
2. Pull generator (3) from eight studs (4) and two transfer tubes (5). Remove generator.
3. Remove packings (6) from two oil transfer tubes (5). Remove packing (7) from generator (3). Remove packing (8) from generator drive shaft (9).
4. Cover mounting pad (10), including two transfer tubes (5), with barrier material (E81) and tape (E388).
5. Repeat steps 1 thru 4 for left generator.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**General Safety Instructions:****Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J  
Goggles  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Barrier Material (E80)  
Masking Tape (E388)  
Gloves (E186)  
Acetic Acid (E21)  
Alodine Powder (E65)  
Chromic Acid (E114)  
Calcium Sulphate (E91)  
Epoxy Primer (E293)  
Epoxy Topcoat (E166)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

**WARNING**

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

**WARNING**

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

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

**WARNING**

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.



**NOTE**

Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. Clean oil and grease from damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. Check extent and location of damage on cover (1) and housing (2).

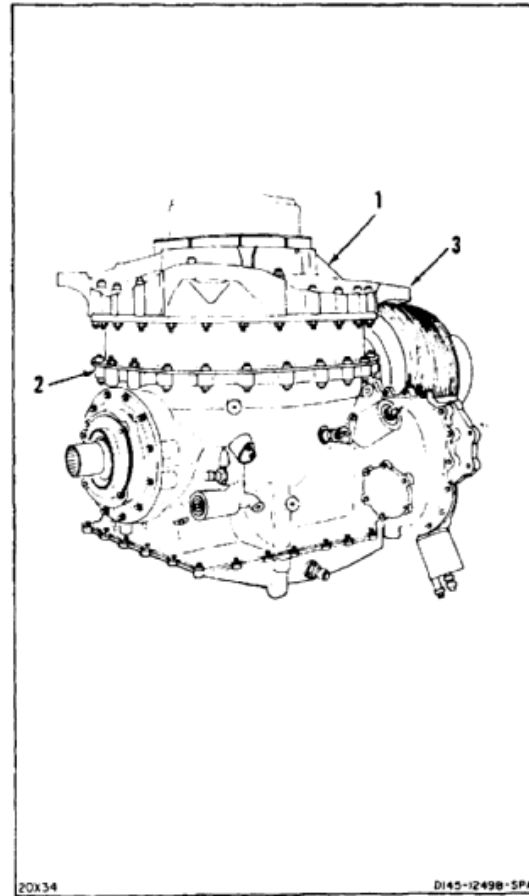
**NOTE**

Refer to Task 6-35 for repairs to sump.

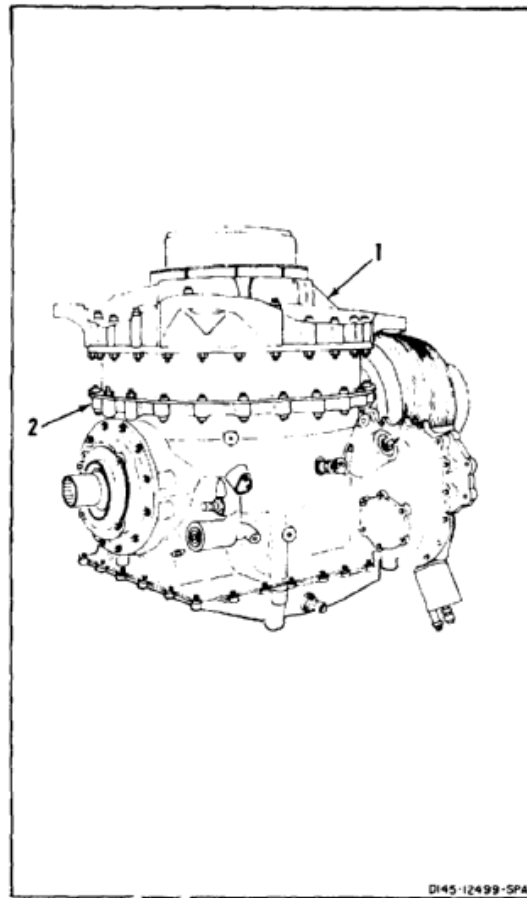
**NOTE**

Limits in this step refer to extent of damage after rework.

- a. Depth of damage shall not be more than **0.025 inch**.
  - b. Damage shall not extend over more than one surface or enter any radius.
  - c. Damage shall not be closer than **1.00 inch** to any mounting hole (3).
3. Fluorescent inspect damaged area to check for cracks (TM 55-1500-323-23). There shall be no cracks. If crack is suspected in aft transmission outside surface, refer to TM 1-1520-253-23.
  4. Cover moving parts near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
  5. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.



6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. Acid etch reworked area as follows:
  - a. Prepare a solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E186) and goggles.
  - b. Swab area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse area with cold water.
8. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If crack is suspected in aft transmission outside surface, refer to TM 1-1520-253-23.
9. Apply surface treatment to reworked area as follows:
  - a. Clean area with naphtha (E245) and clean cloths. Wear gloves (E186). Let area air dry.
  - b. If area is on cover (1), swab solution of alodine powder (E65) in water on area. Swab for **2 to 5 minutes**. Use gauze sponges (E184). Rinse area with cold water and let air dry. Wear gloves (E186).
  - c. If area is on housing (2), swab on solution of chromic acid (E114) and calcium sulphate (E91). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse area with cold water and let air dry. Wear gloves (E186).
10. Apply epoxy primer (E293) to reworked area. Let air dry for **2 hours**. Wear gloves (E186).
11. Apply epoxy topcoat (E166). Wear gloves (E186).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Sling 114E5119-2 (p/o T3)  
 Work Hoist  
 Shipping Container (T37)  
 Container, 14 Quart (3)  
 Torque Wrench, 0 to 500 Foot-Pounds

**Materials:**

Fingerprint Remover (E175)  
 Cloths (E120)  
 Dry Cleaning Solvent (E162)  
 Gloves (E186)  
 Swabbing Brush (E86)  
 Corrosion Preventive Compound (E153 or E154)  
 Barrier Material (E81)  
 Masking Tape (E388)  
 Desiccant (E160), 16-Unit Bag (5)  
 Tarpaulin (E410) or Plastic Sheet (E279)

**Personnel Required:**

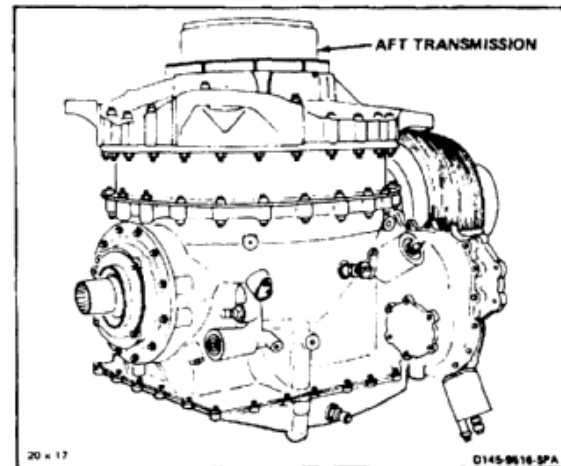
Medium Helicopter Repairer (2)  
 Inspector

**References:**

TB 55-8100-200-25  
 TB 750-126  
 DA PAM 738-751

**Equipment Condition:**

Off Helicopter Task  
 Aft Transmission Disassembled (Task 6-93)

**General Safety Instructions:****WARNING**

Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

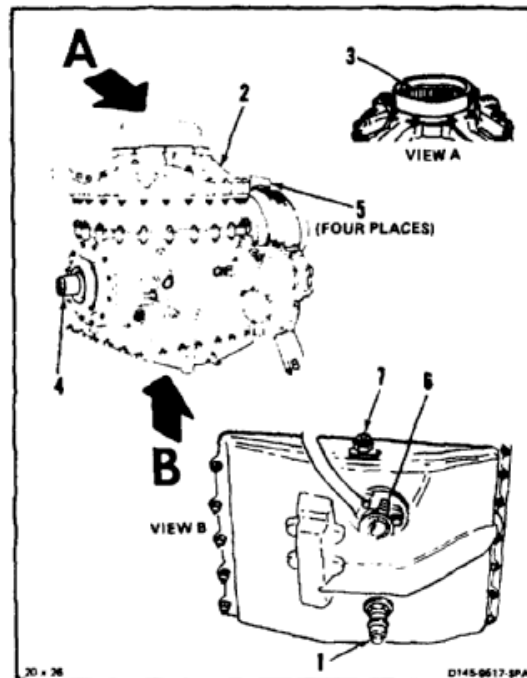
Sump holds about **30 quarts** of oil.

1. Push in drain valve (1), twist it, and pull. Let oil drain into containers. Push in valve, twist it, and pull down to close.
2. Clean all surfaces of transmission (2). Use dry cleaning solvent (E162) and clean cloths (E120). Wear goggles.
3. Clean rotor shaft splines (3), input shaft splines (4) and four bushings (5). Use fingerprint remover (E175) and clean cloths (E120).



Touching unpainted surfaces with bare fingers can cause corrosion.

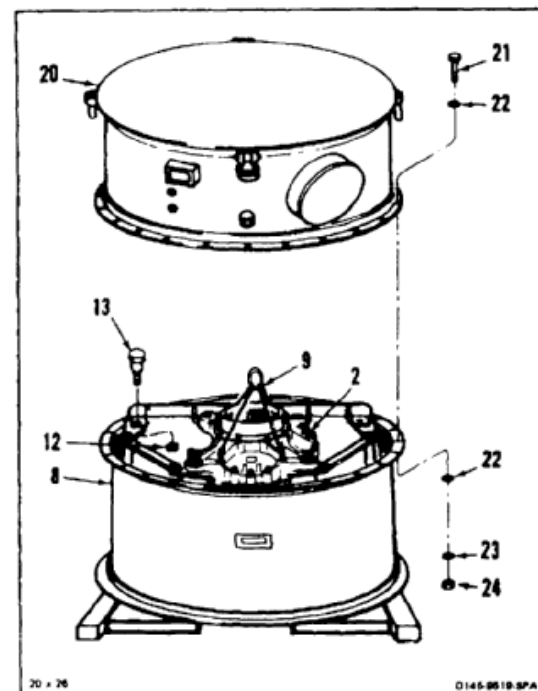
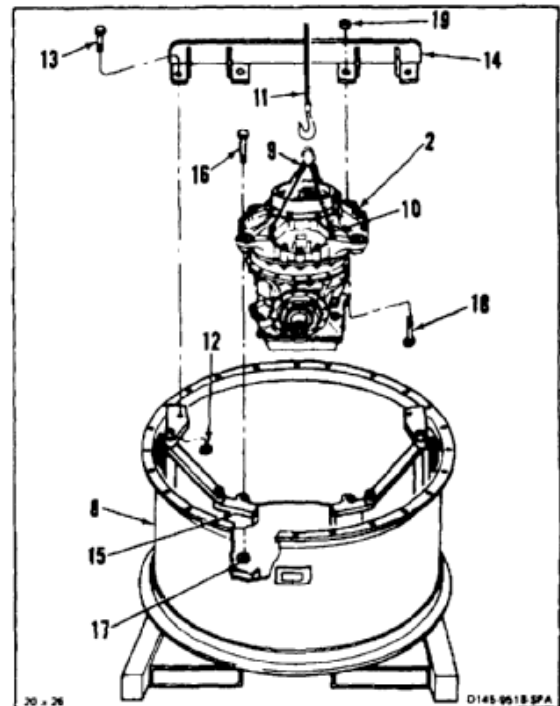
4. Put on gloves (E186). Gloves shall be worn for the rest of this task.
5. Wipe surfaces cleaned with fingerprint remover with dry cleaning solvent (E162) and clean cloths (E120).
6. Coat rotor shaft splines (3), input shaft splines (4), and four bushings (5) with corrosion preventive compound (E153 or E154).
7. Cover splines (3 and 4) and bushings (5) with barrier material (E81) and tape (E388).
8. Cover indicating screen (6), electrical connector (7) and drain valve (1) with barrier material (E81) and tape (E388).



9. Install transmission (2) in shipping container (T37) (8) as follows:
  - a. Inspect and prepare container (8) (TB 55-8100-200-25).
  - b. Connect sling (T163) (9) to four lugs (10). Connect work hoist chain (11) to sling.
  - c. Remove two nuts (12) and bolts (13) from support bar (14). Remove support bar from container (8).
  - d. With aid of helper, lift transmission (2) into container (137) (8). Align it with two mounting brackets (15).
  - e. Install support bar (14) on container (8) over transmission (2). Install two bolts (13) and nuts (12). Torque nuts to **55 foot-pounds**.
  - f. Install two bolts (16) and nuts (17) through brackets (15) of forward end of transmission. Install two bolts (18) and nuts (19) through support bar (14) at aft end of transmission (2). Torque all nuts to **55 foot-pounds**.
  - g. Remove sling (T163) (9) from transmission (2).
  - h. Install two bolts (13) and nuts (12) through support bar (14). Torque nuts to **55 foot-pounds**.
  - i. Prepare required maintenance forms and reports (DA PAM 738-751 and TB 750-126).
  - j. Put five 16-unit bags of desiccant (E160) into container (T37) (8).

**INSPECT**

- k. Install cover (20) on container (T37) (8). Install bolt (21), two washers (22), split washer (23), and nut (24) at 24 places.
- l. Torque nuts (19) at **3, 6, 9, and 12 o'clock to 275 inch-pounds**. Torque nuts at **2, 4, 8, and 12 o'clock**. Torque remaining nuts.



10. Remove plug (25) from cover (20).
11. Connect air test line (26) to cover (20).

**CAUTION**

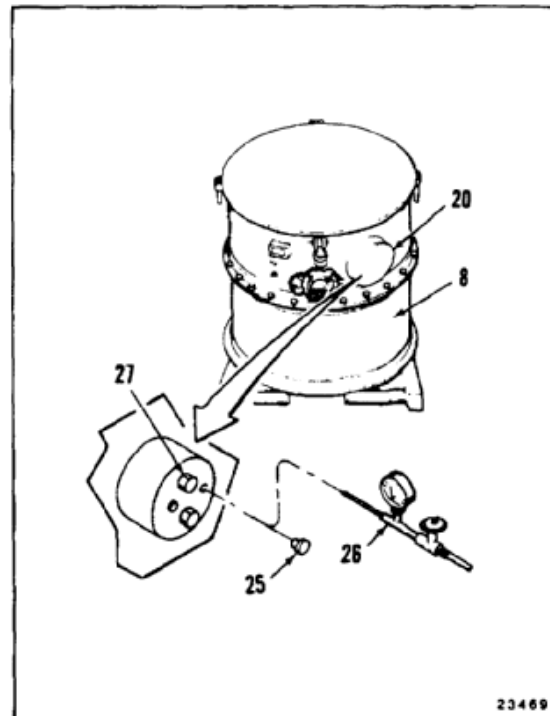
Low pressure air supply must be used. Exceeding test pressure can damage container.

12. Pressurize container (8) to **3 psi** max. Check container for leaks. Container must hold **3 psi** for **1 hour**.

**WARNING**

Be careful when releasing air under pressure, wear goggles. Personal injury can result.

13. Push pressure relief valve (27) until pressure in container (8) is **0 psi**.
14. Disconnect air line (26) from cover (20).
15. Install plug (25) in cover (20).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692
- Sling (T163)
- Work Hoist
- Container, 14 Quart

**Materials:**

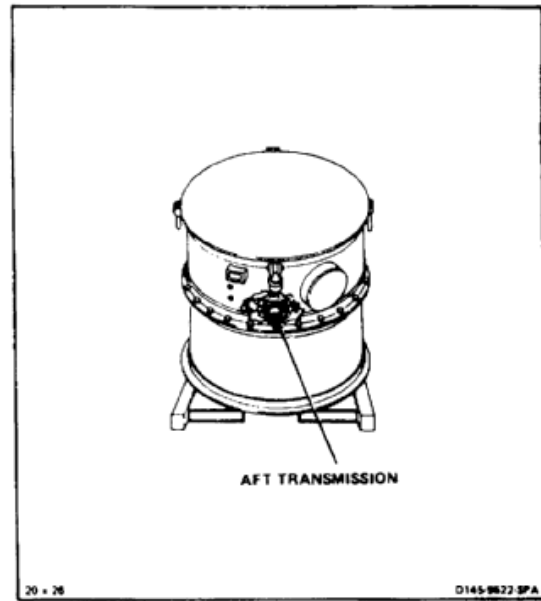
- Dry Cleaning Solvent (E162)
- Cloths (E120)
- Gloves (E186)

**Personnel Required:**

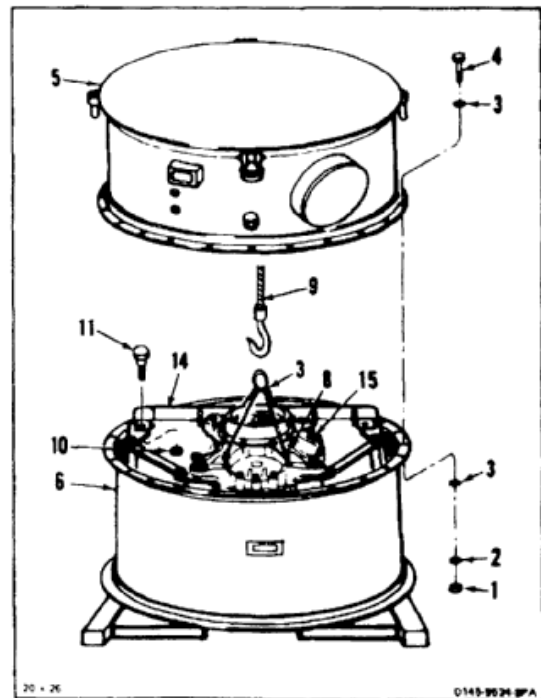
- Medium Helicopter Repairer (4)
- Inspector

**Equipment Condition:**

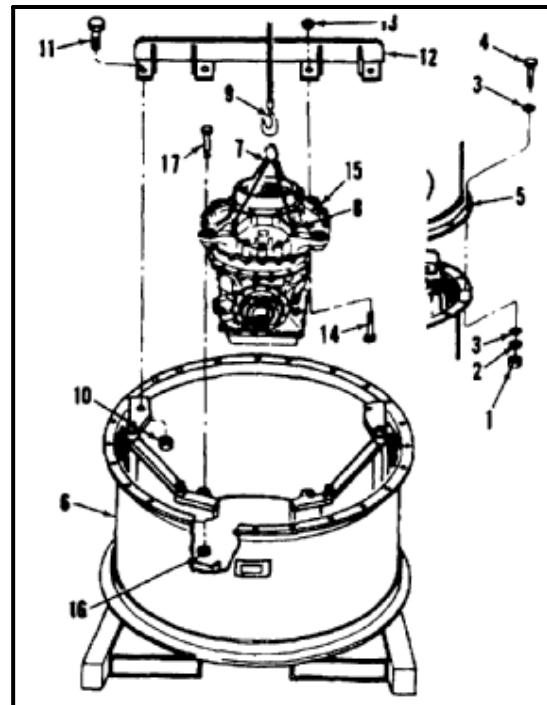
Off Helicopter Task



1. Remove 24 nuts (1), washers (2 and 3), and bolts (4) from cover (5). Remove cover.
2. Remove and discard desiccant bags from container (6).
3. Connect sling (T163) (7) to four lugs (8). Connect work hoist hook (9) to sling.
4. Remove two nuts (10) and bolts (11) from support bar (12).



5. Remove two nuts (13) and bolts (14) from transmission (15) and support bar (12). Remove support bar.
6. Remove two nuts (16) and bolts (17) from forward end of transmission (15).
7. With aid of helper, carefully lift transmission (15) from container (6).
8. Set transmission (15) down on bench or workstand. Remove work hoist hook (9) and sling (7).
9. Install support bar (12) on container (6) with bolts (11) and nuts (10). Install bolts (14) and nuts (13) in bar.
10. Install cover (5). Install bolts (4), washers (3), split washers (2), and nuts (1) at 24 places.





11. Remove all tape and barrier material from transmission (15).

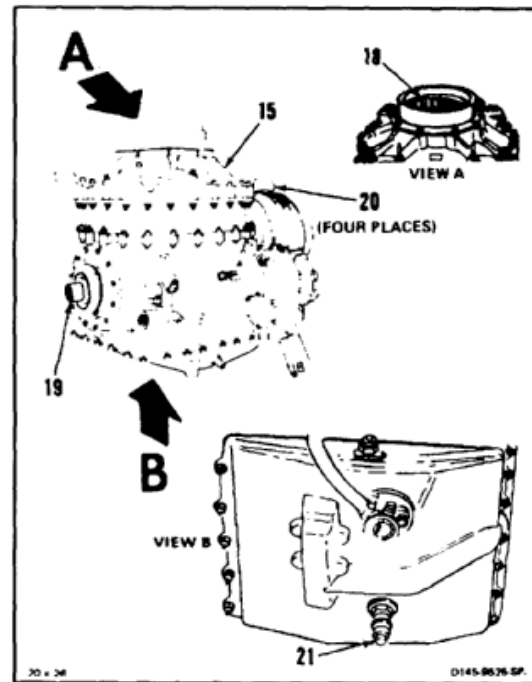
**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flames. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Touching splines with bare fingers can cause corrosion.

12. Remove corrosion preventive compound from rotor shaft splines (18), input shaft splines (19), and four bushings (20). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
13. Push in drain valve (21), twist it, and pull. Let residual oil drain into container. Push in valve, twist it, and pull down to close.



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Assemble aft transmission (Task 6-96).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Oil (E254)  
Lockwire (E231)

**Parts:**

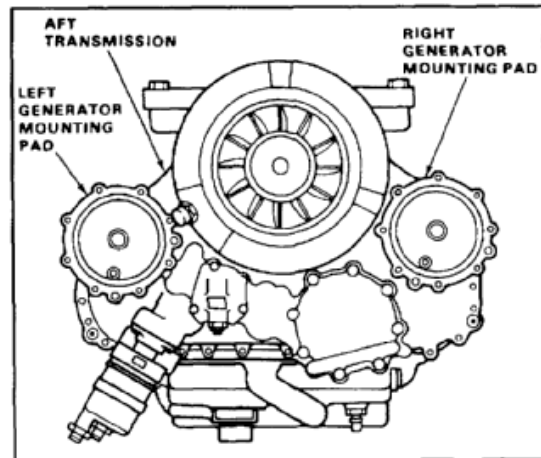
Packings

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P  
Task 6-154

**NOTE**

Install left and right generator from aft transmission in same way. Right generator shown here.

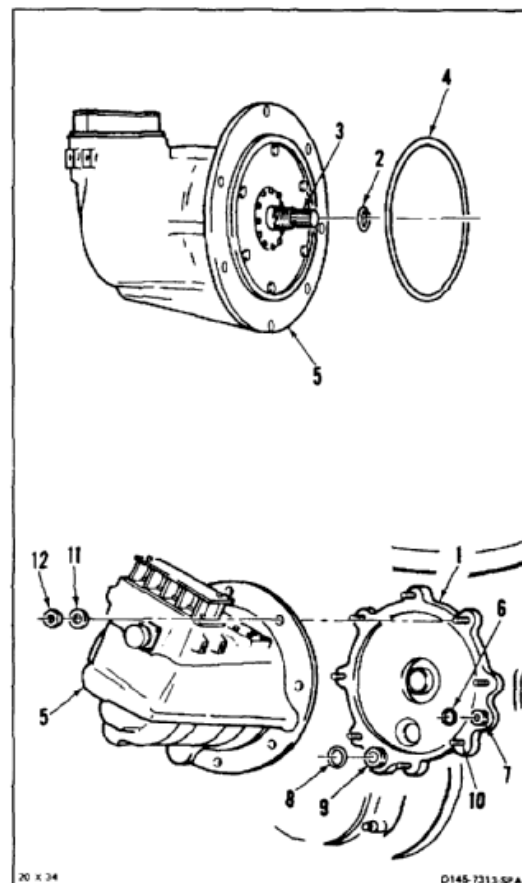
New transmissions have cover plates over mounting pads.

1. If applied, remove tape and barrier material from mounting pad (1).
2. Install packing (2) on generator drive shaft (3). Install packing (4) on generator (5). Install packing (6) on transfer tube (7). Install packing (8) on transfer tube (9).

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

3. Coat eight studs (10) with oil (E254). Align generator (5) with eight studs and two transfer tubes (7 and 9). Install generator on mounting pad (1).
4. Install eight washers (11) and nuts (2). Torque nuts to **120 inch-pounds**.
5. Repeat steps 1 thru 4 for left generator.



6. Retorque auxiliary oil filter (13) as follows:

- a. Remove lockwire from filter (13).

**NOTE**

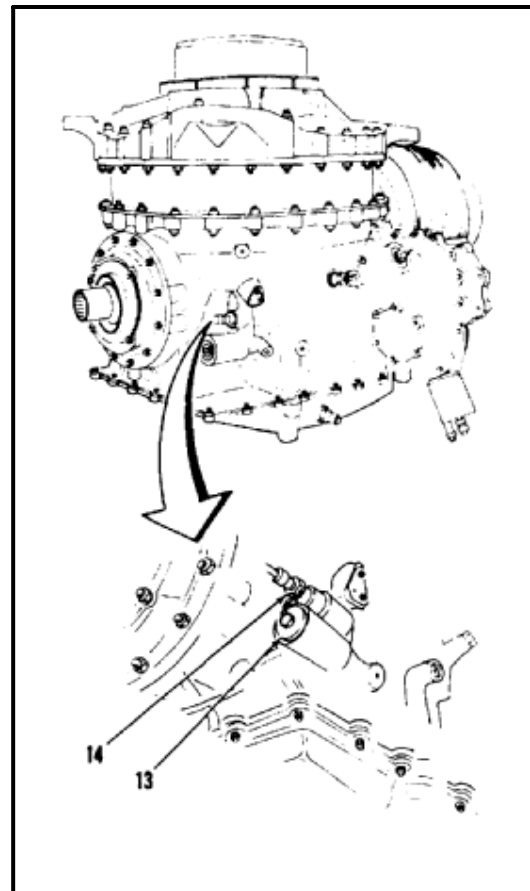
Do not remove filter.

- b. Check wrenching flats on filter (13). If they are damaged, replace filter (Task 6-154).
- c. Loosen filter (13) **1/2 turn**. Torque filter to **80 inch-pounds**.
- d. Lockwire filter (13) to auxiliary oil pressure switch (14). Use lockwire (E231).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Socket, 15/16 Inch  
 Aft Transmission Torque Adapter (T160)  
 Torque Pack (T23)  
 Tee Handle (T161)  
 Torque Wrench, 700 to 1600 Inch-Pounds  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Workstand (2)

**Materials:**

Oil (E254)  
 Grease (E190)  
 Barrier Material (E80)

**Parts:**

Nuts (4)

**Personnel Required:**

Medium Helicopter Repairer (5)  
 Inspector

**References:**

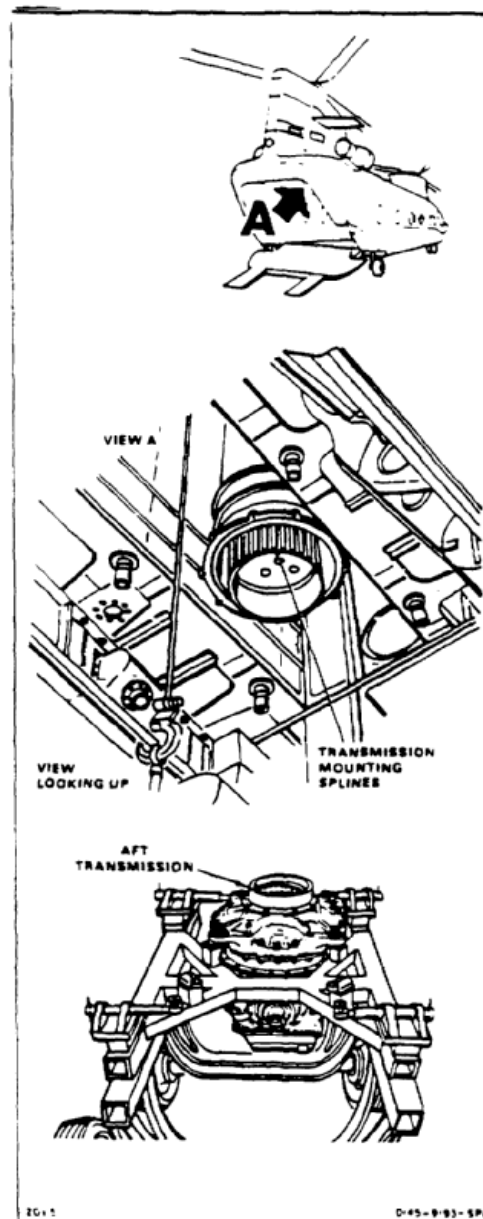
TB 1-1520-240-20-75  
 Task 1-13  
 Task 2-2



Inspect the Aft Transmission serial number prior to installation, for the following serial numbers: A9-129FC and A9-132. Those serial numbered transmissions were improperly shimmed. If located, please notify the CH-47 PM Office, Logistics Division, at DSN 897-4289/4690 or Commercial (256) 313-4289/4690 for disposition instructions.



Check the forward or aft transmission serial numbers for a "MG". A "MG" after the serial number is required on the forward and aft transmissions for non-restrictive flights.



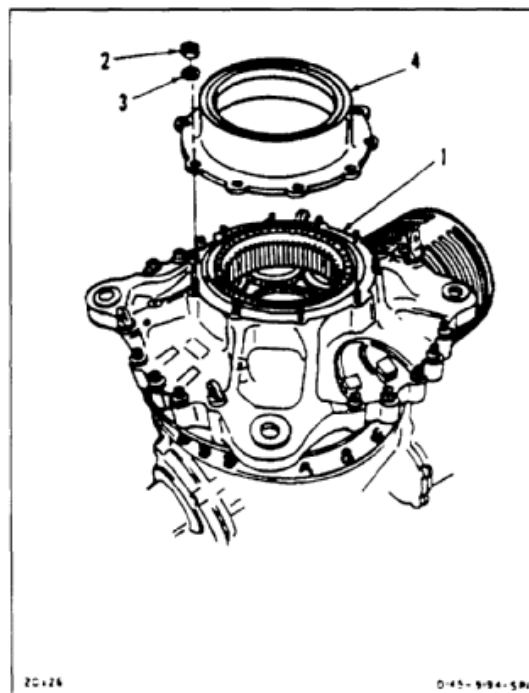
**INSTALL TRANSMISSION**

1. Position transmission (1) in cabin of helicopter. Raise cargo ramp level with ground (Task 2-2).



If debris enters transmission, damage can result.

2. Remove ten nuts (2) and washers (3) from seal retainer (4). Remove retainer. Cover opening in transmission (1) with barrier material (E80).

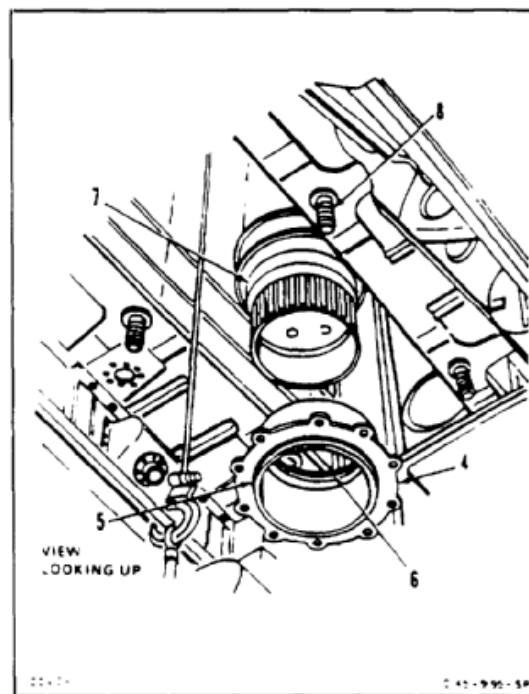


3. Check packing (5) around bottom of retainer (4) for cuts. It shall have no cuts.



Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

4. Coat lip of seal (6) and mating surface of rotor shaft (7) with oil (E254). Coat splines of shaft with oil (E254).
5. Install seal retainer (4) on rotor shaft (7). Be careful not to damage seal (6).
6. Coat thread of four bolts (8) with oil (E254).

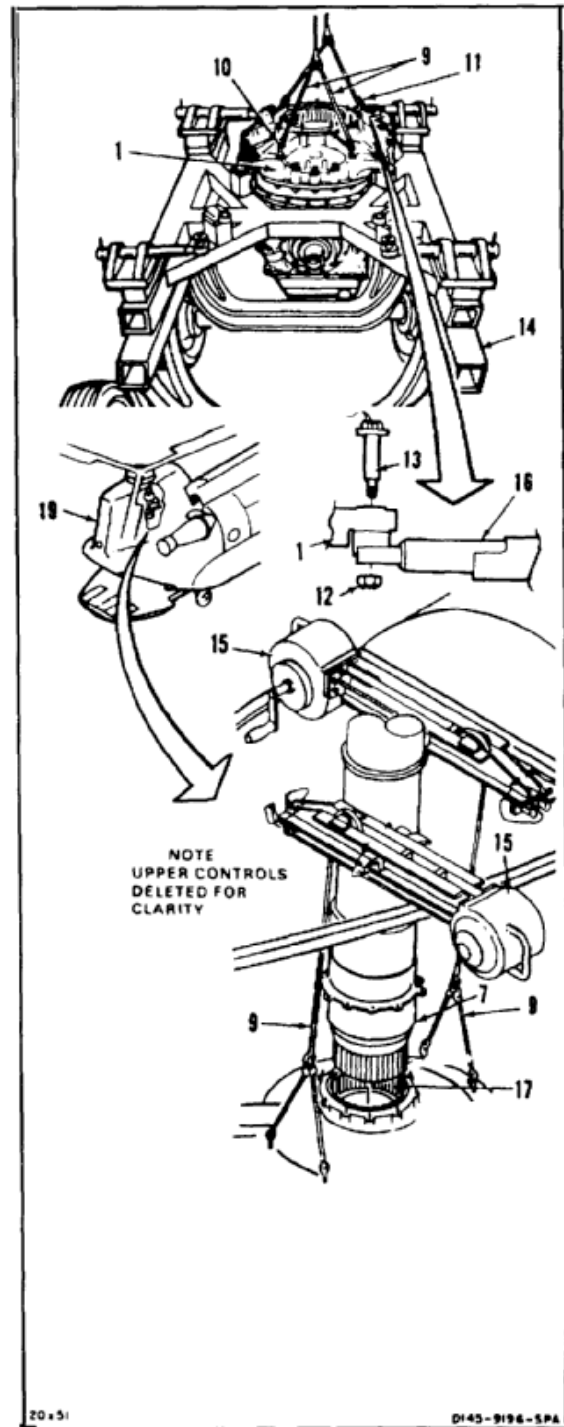


7. Connect two forward sling cables (9) to forward lifting lugs (10) on transmission (1). Connect two aft sling cables to aft lugs (11).
8. Remove barrier material from top of transmission (1). Remove four nuts (12) and bolts (13) holding transmission (1) to adapter (14).
9. Have helpers operate two hoists (15) to lift transmission (1) off adapter (14).
10. Push back two mount assemblies (16) on adapter.

**CAUTION**

If transmission is not kept at  $4^{\circ}$  angle, rotor shaft splines can bind in transmission. Damage can result.

11. Have helpers operate two hoists (15) to lift transmission (1) to rotor shaft (7). Keep transmission at  $4^{\circ}$  forward tilt angle.
12. Mate transmission splines (17) with splines of rotor shaft (7).



**INSTALL NUTS**

13. Align four mounting holes in transmission (1) with bolts (8). Have helpers raise transmission over bolts.

**NOTE**

Refer to Task 1-13, step 8, for re-use of self-locking nuts.

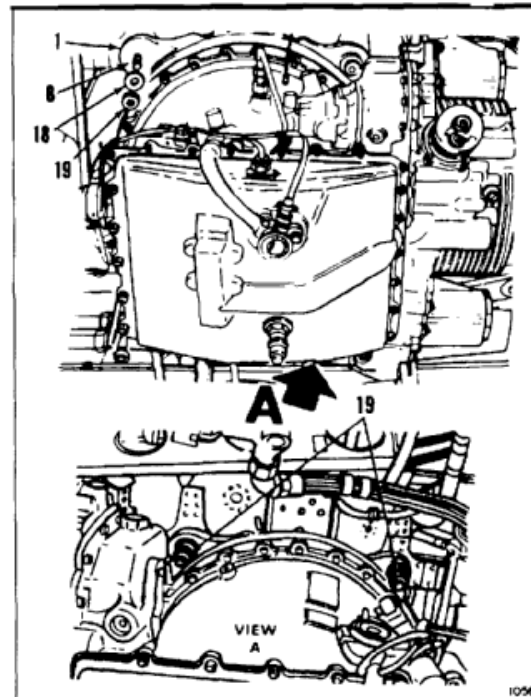
14. Install four chamfered washers (18) and new nuts (19) on bolts (8). Tighten nuts as much as possible with socket wrench handle.

**WARNING****FLIGHT SAFETY PARTS**

This is an installation critical flight safety part. All aspects of its assembly and installation must be ensured.

After the four nuts (19) are tightened to the bolts (8) with a socket wrench, ensure the four nuts (19) are torqued to **620 foot-pounds** to the bolts (8). This ensures proper distribution of flight loads through the structure.

If the torque requirements are not met, the bolts (8) can disengage and allow the transmission to separate from the aircraft structure.



**TORQUE NUTS**

**NOTE**

Torque shaft and torque adapter are part of torque adapter assembly (T160).

To avoid binding during transmission installation, centerline of adapter shall be directly under or slightly left of transmission centerline.

15. Install torque adapter (19) between structure (20) at sta. 534 and structure (20.1) at sta. 594. Flat side of base plate (21) shall face aft. Center adapter under transmission (1) and tighten four hand knobs (21.1). Make sure centerline of adapter is not right of transmission centerline.

**WARNING**

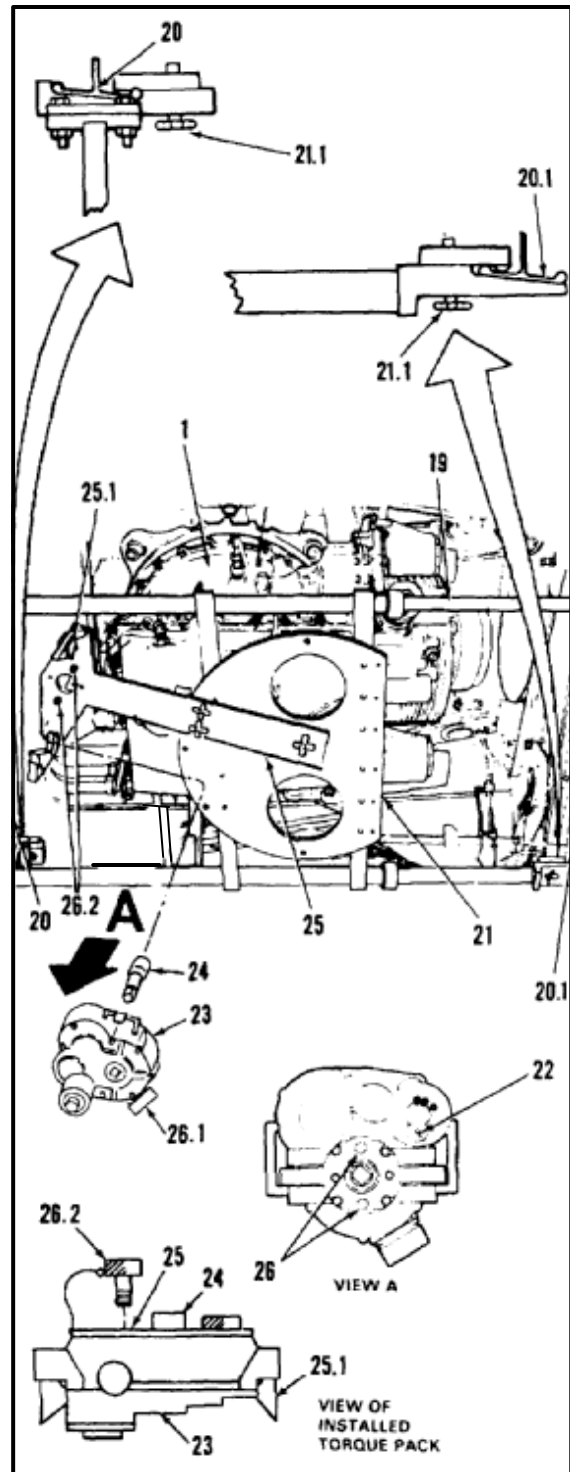
Make sure ratchet selector on torque pack is set to NUT ON before applying torque. Changing ratchet settings with torque applied can damage unit and cause injury to personnel.

- 15.1. Set ratchet selector (22) on torque pack (T23) (23) to NUT ON.

**NOTE**

Adapter is part of torque pack (23).

- 15.2. Install adapter (24) in torque pack (T23) (23). Install torque pack on support (25) with two hooks (25.1). Make sure two pins (26) on bottom of torque pack engage holes in support. Check that torque indicator (26.1) faces aft and inboard.
- 15.3. Secure torque pack (23) to support (25). Use two thumb screws (26.2).





16. Torque each of four transmission mounting nuts (27) as follows:

**NOTE**

Torquing of forward left nut shown here.

- a. Loosen knob (27.1).
- b. If torquing a forward nut (27), position support (25) directly under nut to be torqued. If torquing an aft nut, position support straight out to side of nut to be torqued. Install and tighten two knob assemblies (28) through support (25) and base plate (21).
- c. Tighten knob (27.1).

**NOTE**

Torque shaft is spring-loaded and compresses for installation.

- d. Place one end of torque shaft (28.1) on adapter shaft (24). Place other end on nut (27).

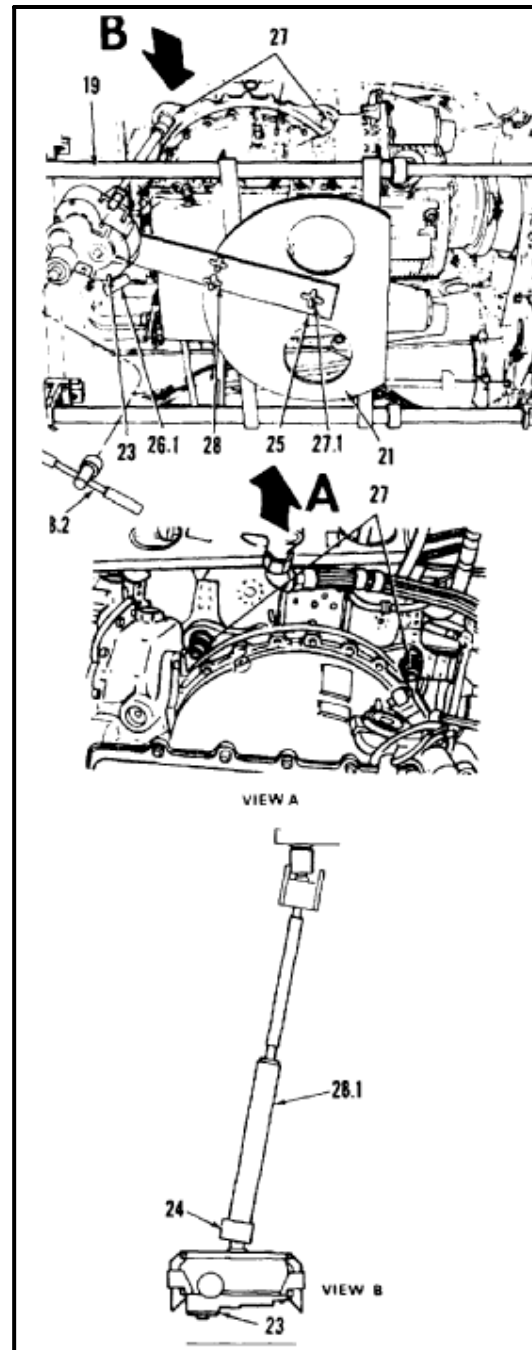
**WARNING**

Be sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Moving selector with load on torque pack can damage unit and injure personnel.

**NOTE**

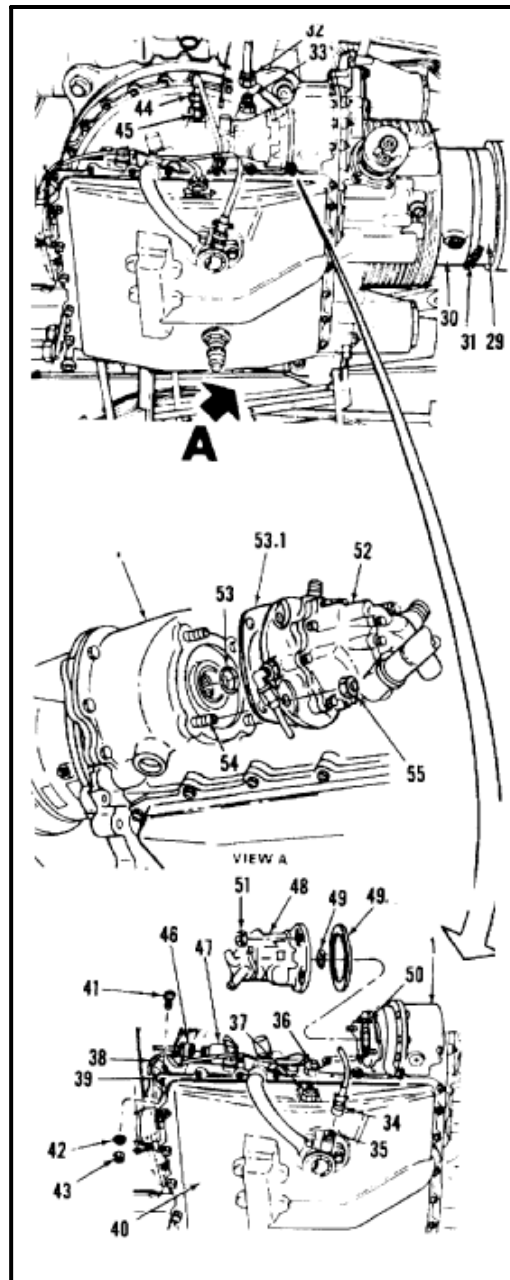
Input force must be maintained at handle to obtain accurate torque reading on torque pack indicator.

- e. Set tee handle (T161) (28.2) to ON. Install handle on torque pack (T23) (23). Turn handle clockwise until indicator (26.1) reads **620 foot-pounds**. Set tee handle to OFF. Turn handle counterclockwise until torque indicator reads 0 and torque pack (23) is loose.
  - f. Remove torque shaft (28.1).
- 16.1. Remove torque pack (23) from support (25).
- 16.2. Remove torque adapter (19) from helicopter structure.



**CONNECT TRANSMISSION**

17. Slide exhaust duct (29) forward against fan (30). Coat thread of clamp (31) with oil (E254). Install clamp around duct and fan. Torque clamp to **35 inch-pounds**.
18. Connect oil hose (32) to adapter (33).
19. Connect electrical connector (34) to indicating screen and chip detector (35). Connect electrical connector (36) to temperature bulb (37). Install four clamps (38) to clips (39) on sump (40) with screws (41), washers (42), and nuts (43).
20. Connect electrical connector (44) to main oil pressure switch (45). Connect electrical connector (46) to auxiliary oil pressure switch (47).



**CAUTION**

Do not kink hoses when handling pump.

21. Pack splines of flight control hydraulic pump (48) and mating splines in transmission (1) with grease (E190). Install pump, with packing (49), and gasket (49.1), on four studs (50). Install nuts (51). Torque nuts to **85 inch-pounds**.

**CAUTION**

Do not kink hoses when handling pump.

**NOTE**

Hydraulic pump P/N 938555 (145HS100-3) is no longer the correct configuration after completion of ECP D213 and turnaround program (TB 1-1520-240-20-75). The correct P/N is 145HS100-4.

22. Pack splines of utility hydraulic system pump (52) and mating splines in transmission (1) with grease (E190). Install pump, with packing (53) and gasket (53.1), on four studs (54). Install nuts (55). Torque nuts to **85 inch-pounds**.

**NOTE**

Torque on nuts (51 and 55) must be checked for **85 inch-pounds** after the first flight. Do not back off nuts before checking torque.

**NOTE**

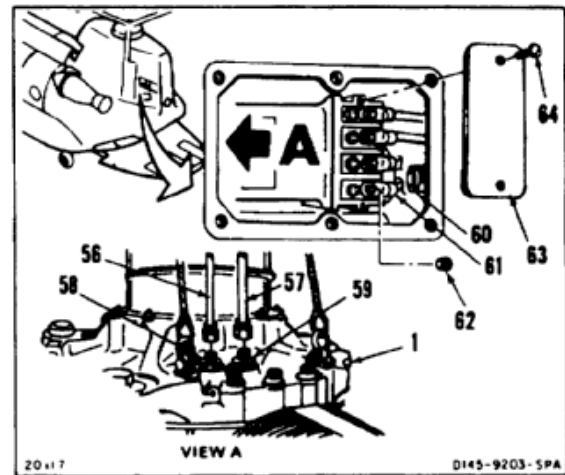
Oil hoses are reached through generator access holes on each side of pylon.

23. Connect two oil hoses (56 and 57) to reducers (58 and 59) on top of transmission (1).

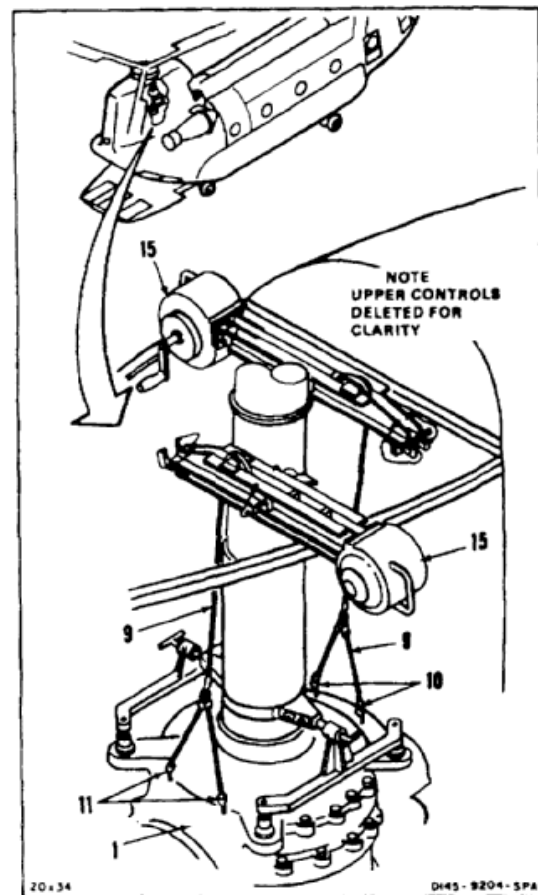
**NOTE**

Connect wires to left and right generator in same way. Connections are reached through access holes on each side of pylon.

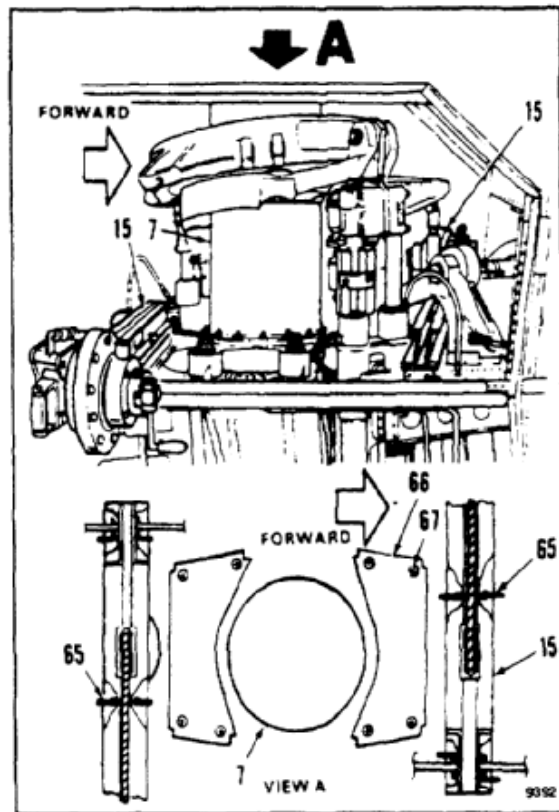
24. Connect electrical connector (60) to generator. Connect four wires (61) to generator with nuts (62). Install cover plate (63) with two screws (64).

**REMOVE HOIST KIT**

25. Working from cabin, disconnect cables (9) of forward hoist (15) from two forward lifting lugs (10) on transmission (1). Working from side of pylon, disconnect cables of aft hoist from two aft lifting lugs (11) on transmission (1).
26. Have helpers operate two hoists (15) to raise cables (9).



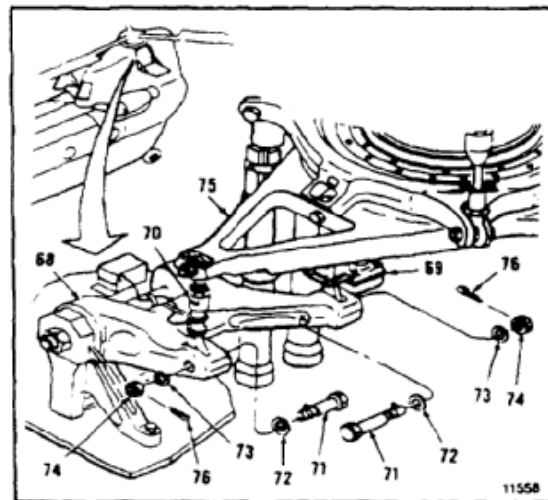
27. Release four pins (65) from each hoist (15).  
Remove two hoists.
28. Install cover plate (66) forward of rotor shaft (7).  
Tighten four turnlock fasteners (67).



**NOTE**

Long bolt goes through fixed link.

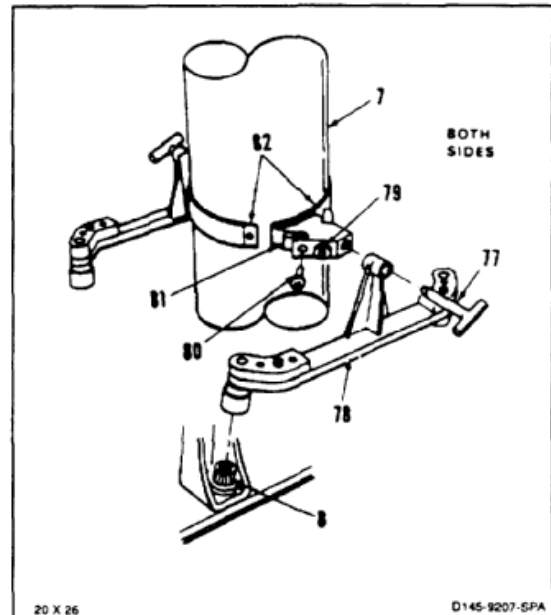
29. Untie yoke (68). Install actuator (69) and link (70) in yoke. Install two bolts (71), heads facing each other, recessed washers (72), with recess toward bolt head, washers (73), and nuts (74).
30. Install actuator (69) in swashplate yoke (75).
31. Torque nuts (74) to **660 to 780 inch-pounds**. Do not exceed **1400 inch-pounds** for cotter pin alignment. Install cotter pins (76).



**REMOVE AFT ROTOR SHAFT SECURING DEVICE****NOTE**

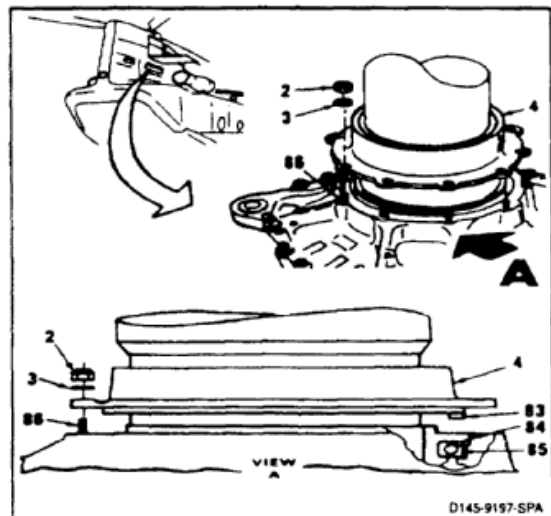
Securing device is removed with aid of helper through access holes in pylon.

32. Remove pins (77) from each side of rotor shaft (7). Remove two adapter bars (78) from bolts (8).
33. Loosen two knobs (79). Remove pins (80) from plates (81). Remove two clamps (82).

**INSTALL SEAL RETAINER****NOTE**

Seal retainer is reached through open aft transmission access doors on each side of aft pylon.

34. Align tab (83) on seal retainer (4) with slot (84) in outer race of bearing (85). Install seal retainer on studs (86).
35. Install 10 washers (3) and nuts (2). Torque nuts to **70 to 85 inch-pounds** (wet).



**INSPECT****FOLLOW-ON MAINTENANCE:**

Remove aft servocylinder safety blocks (Task 11-29).  
Connect aft rotor pitch links (Task 5-99).  
Install aft transmission adapter assembly (Task 6-25).  
Phase rotary-wing blades (Task 6-28).  
Install No. 9 drive shaft (Task 6-29).  
Install aft pylon access doors to generators and transmission (Task 2-2).  
Service aft transmission (Task 1-54).  
Close aft pylon left and right work platforms (Task 2-2).  
Install aft transmission drip tray (Task 2-3).  
Close baffles under aft transmission (Task 2-2).  
Close cargo ramp (Task 2-2).  
Perform ground run (TM 55-1520-240-10).  
Retorque hydraulic pump mounting nuts after first flight (step 22).  
Retorque transmission mounting nuts after **25 flight hours**.

END OF TASK

**SECTION VII**  
**ENGINE TRANSMISSION**

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267

**Materials:**

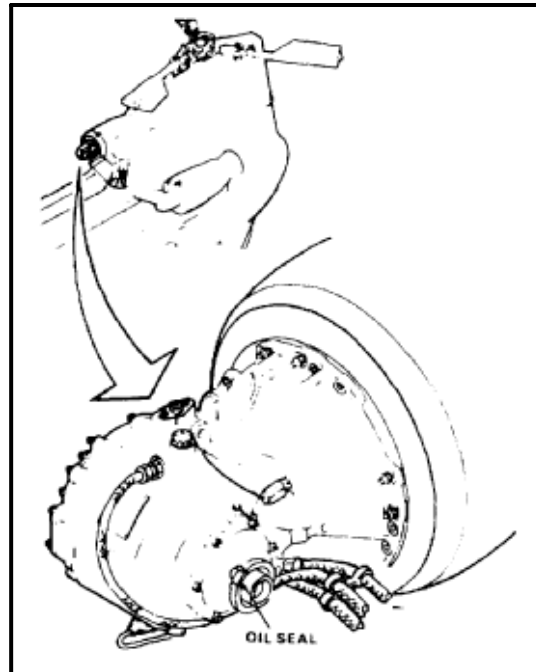
None

**Personnel Required:**

Aircraft Powertrain Repairer

**Equipment Condition:**

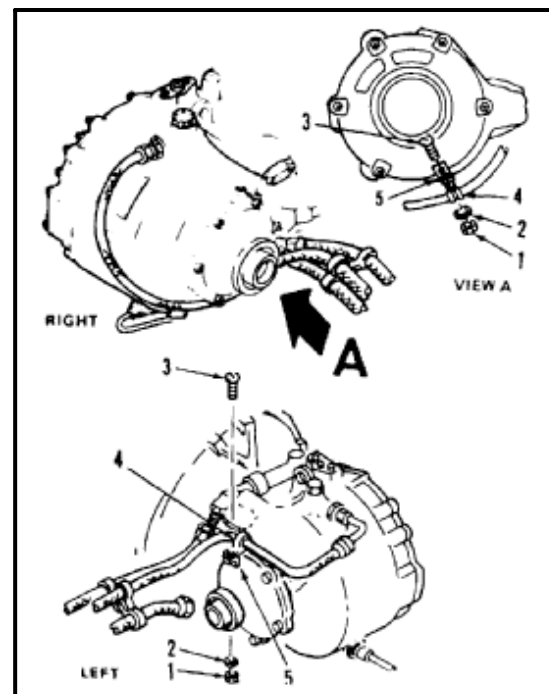
Battery Disconnected (Task 1-39)  
Electrical Power Off  
Engine Air Inlet Screen Removed (Task 4-65)  
Engine Transmission Fairing Removed (Task 4-70)  
Pylon Hinged Fairing Open (Task 2-2)  
Pylon Lower Fairing Open (Task 2-2)  
Engine Drive Shaft and Engine Transmission Adapter  
Assembly Removed (Task 6-30)

**NOTE**

Procedure is similar to remove seal from left or right transmission. Removal of right transmission seal is shown here.

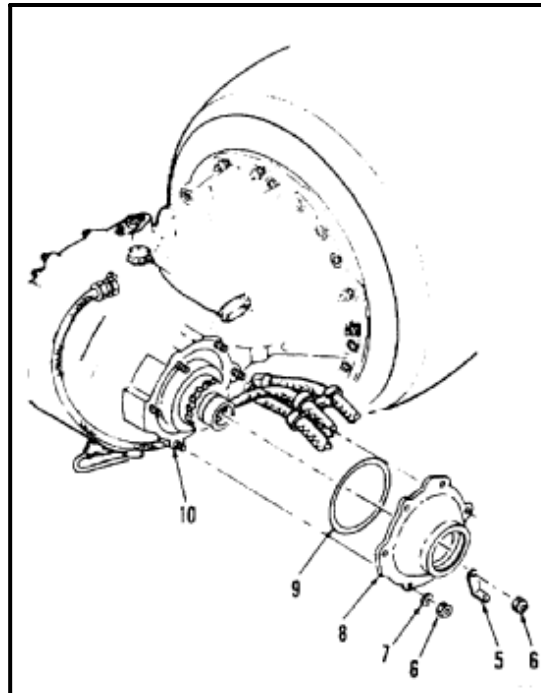
Breather hose on left transmission is held by one clamp. Hose on right transmission is held by two clamps.

1. Remove nut (1), washer (2), screw (3), and hose clamp (4) from clip (5).





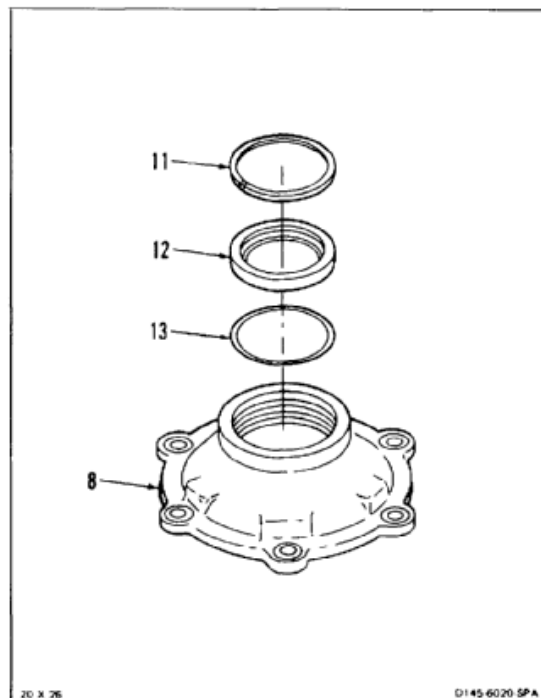
2. Remove six nuts (6), five washers (7), and clip from retainer (8).
3. Remove retainer (8) and packing (9) from transmission (10).



4. Remove retaining ring (11). Remove seal (12) and packing (13) from retainer (8).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Repairer's Tool Kit, NSN  
5180-00-003-5267  
Gun-Type Heater  
Pyrometer  
Aluminum Tube, 3 Inch OD, 1/8 Inch-Thick Wall, 1  
to 6 Inches Long  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Gloves (E186)  
Dry Cleaning Solvent (E162)  
Cloths (E120)  
Oil (E254)  
Kevlar Gloves (E187)

**Parts:**

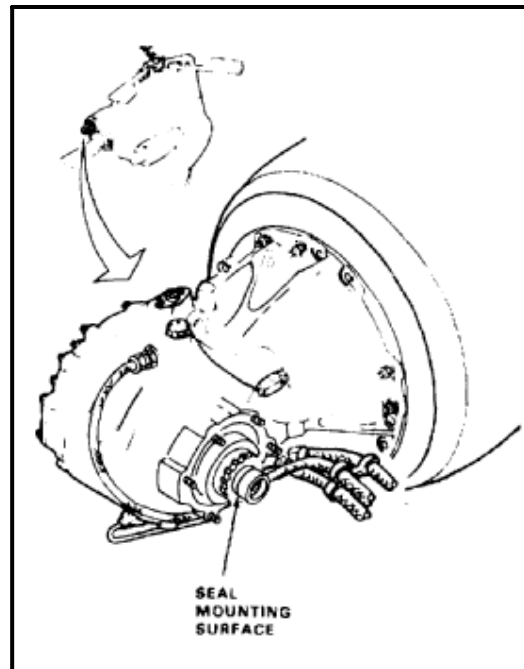
Packings

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 55-1520-240-23P



**WARNING**

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

1. Clean seal retainer (1). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).

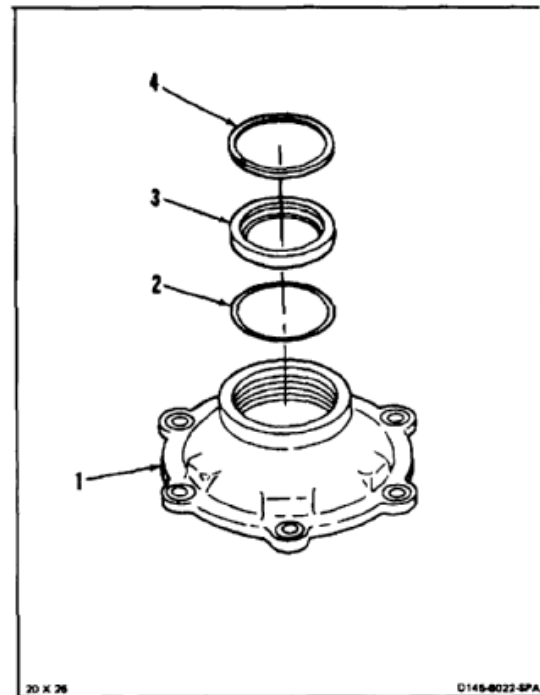
**WARNING**

Wear Kevlar gloves (E187) when handling hot retainer.

**CAUTION**

Do not heat retainer over **250°F (120°C)**.

2. Heat retainer (1) to **230° to 250°F (110° to 120°C)**. Use gun-type heater. Wear Kevlar gloves (E187). Check temperature with pyrometer.
3. Install packing (2) in retainer (1).
4. Install seal (3) in retainer (1), flat side up. Use aluminum tube.
5. Install retaining ring (4).



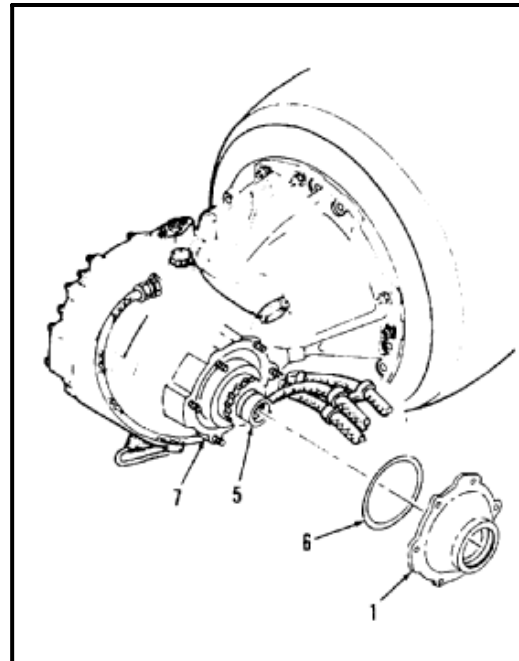
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

Procedure is similar to install retainer on left or right transmission. Installation on right transmission is shown here. Differences are noted in steps.

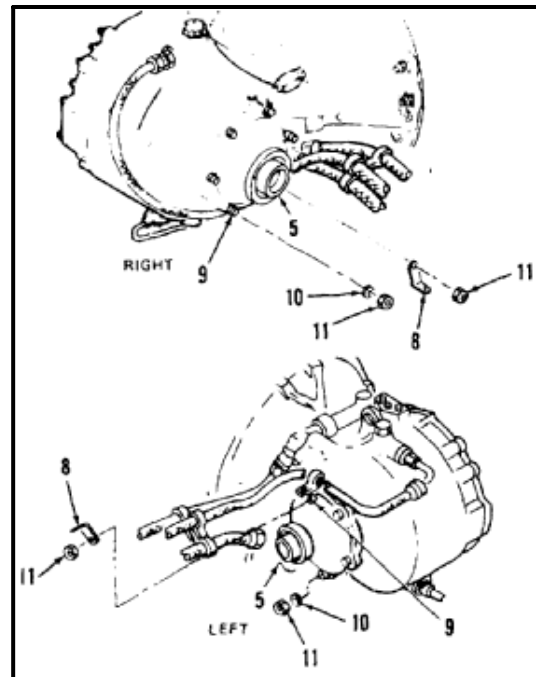
6. Apply light coat of grease (E190) to lip of seal (3). Apply light coat of oil (E254) to surface of shaft (5). Install retainer (1) and packing (6) on transmission (7).



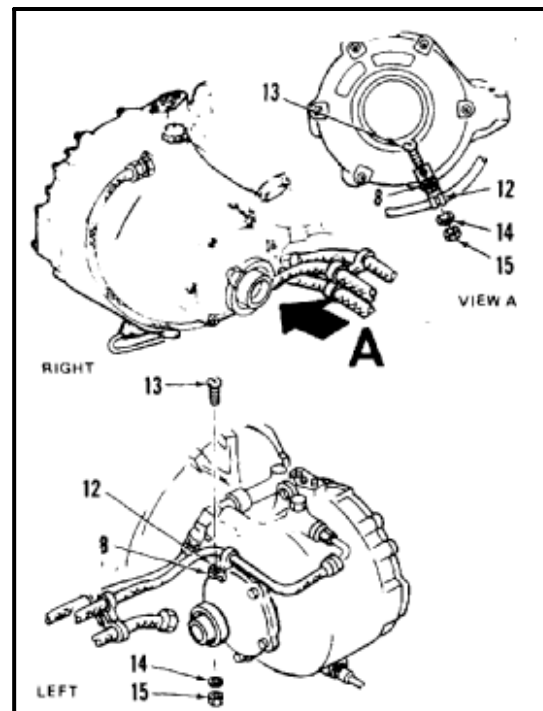
**6-99 INSTALL ENGINE TRANSMISSION OUTPUT SHAFT OIL SEAL (Continued)**

6-99

7. Install clip (8) on stud (9). On left transmission, install clip at **11 o'clock** position. On right transmission, install clip at **5 o'clock** position.
8. Install five washers (10) on studs (9) that have no clip (8).
9. Install six nuts (11). Check that clips (8) point away from center of shaft (5). Torque nuts to **60 inch-pounds**.



10. Install hose clamp (12) on clip (8). Install screw (13), washer (14), and nut (15).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install engine transmission adapter assembly and engine drive shaft (Task 6-32).  
 Close pylon lower fairing (Task 2-2).  
 Close pylon hinged fairing (Task 2-2).  
 Install engine transmission fairing (Task 4-73).  
 Install engine air inlet screen (Task 4-76).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5160-00-323-4692

**Materials:**

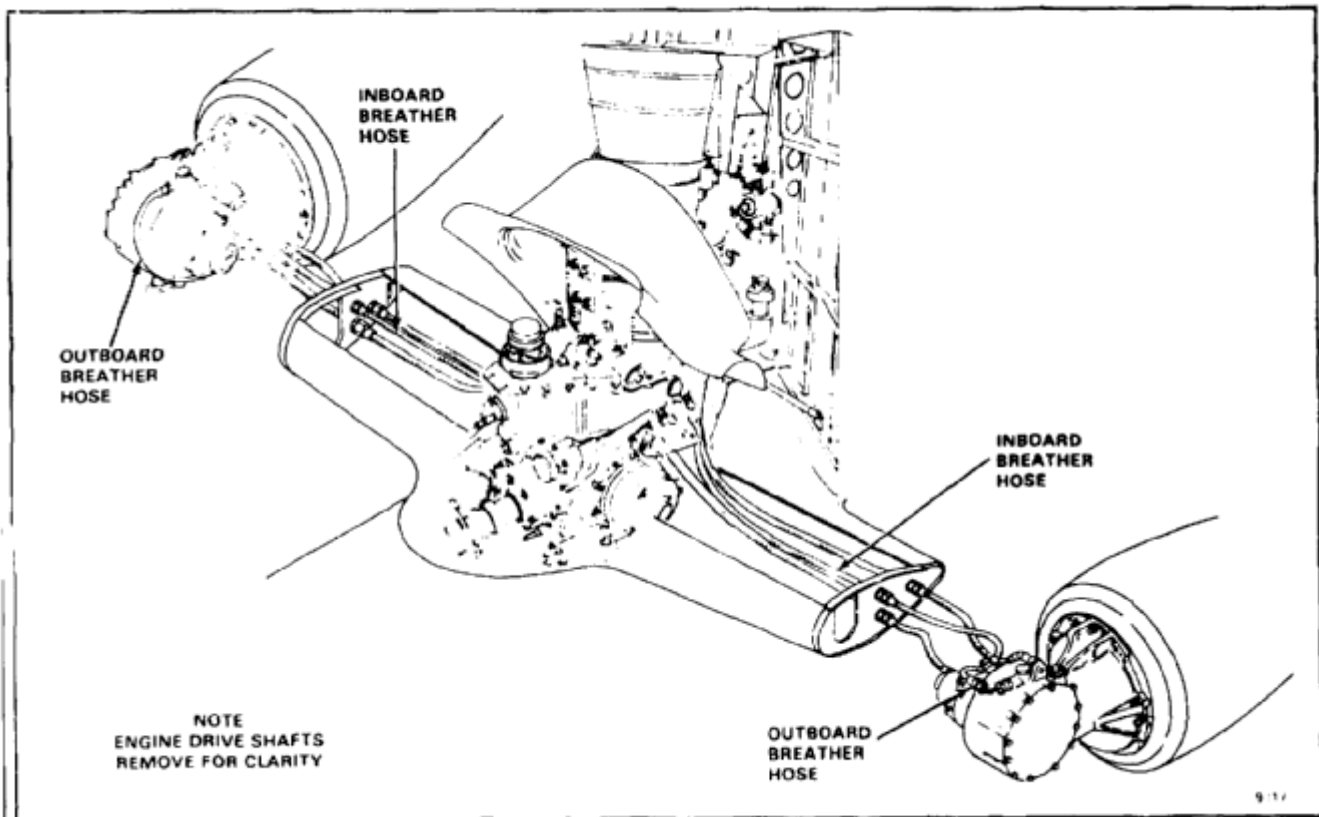
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Pylon Access Doors Open (Task 2-2)
- Pylon Lower Fairing Open (Task 2-2)
- Engine Drive Shaft Access Cover Removed (Task 2-2)
- Engine Air Inlet Screens Removed (Task 4-65)
- Engine Transmission Fairing Removed (Task 4-70)

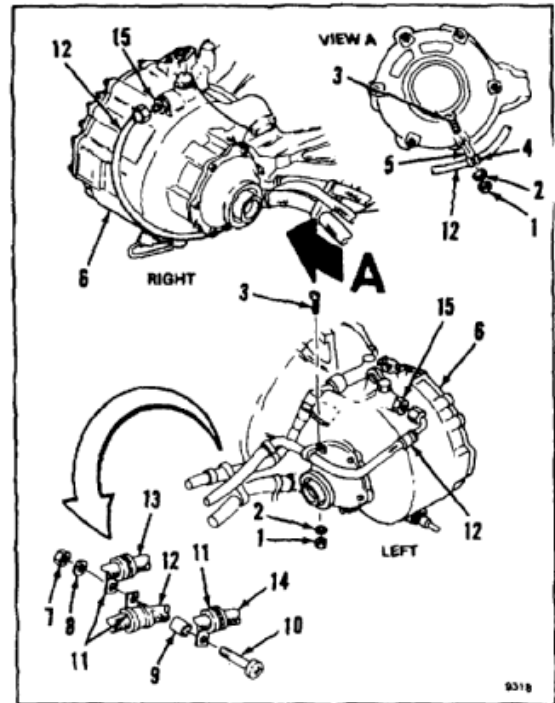


**NOTE**

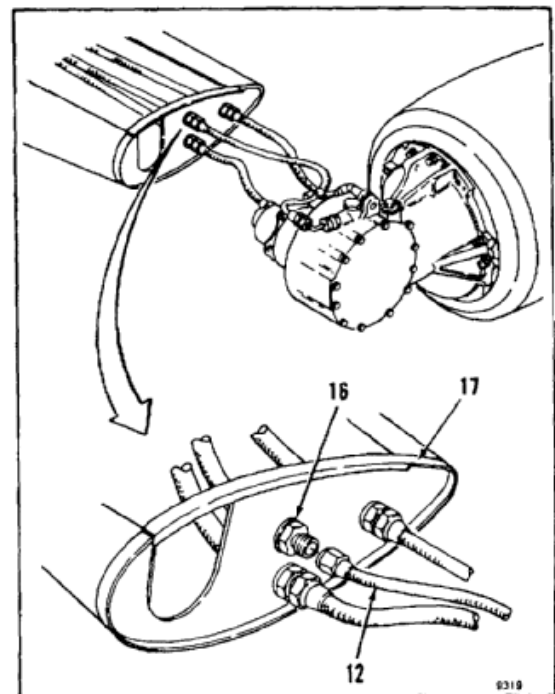
Removal of left or right hose assemblies is similar.

**REMOVE OUTBOARD HOSE**

1. Remove nut (1), washer (2), and screw (3) from clamp (4). Remove clamp from clip (5) on engine transmission (6).
2. Remove nut (7), washer (8), spacer (9), and screw (10) from clamps (11). Lift breather hose (12) clear of hoses (13 and 14).
3. Disconnect hose (12) from reducer (15) at engine transmission (6).



4. Disconnect hose (12) from union (16) at bulkhead (17).
5. Remove hose (12).

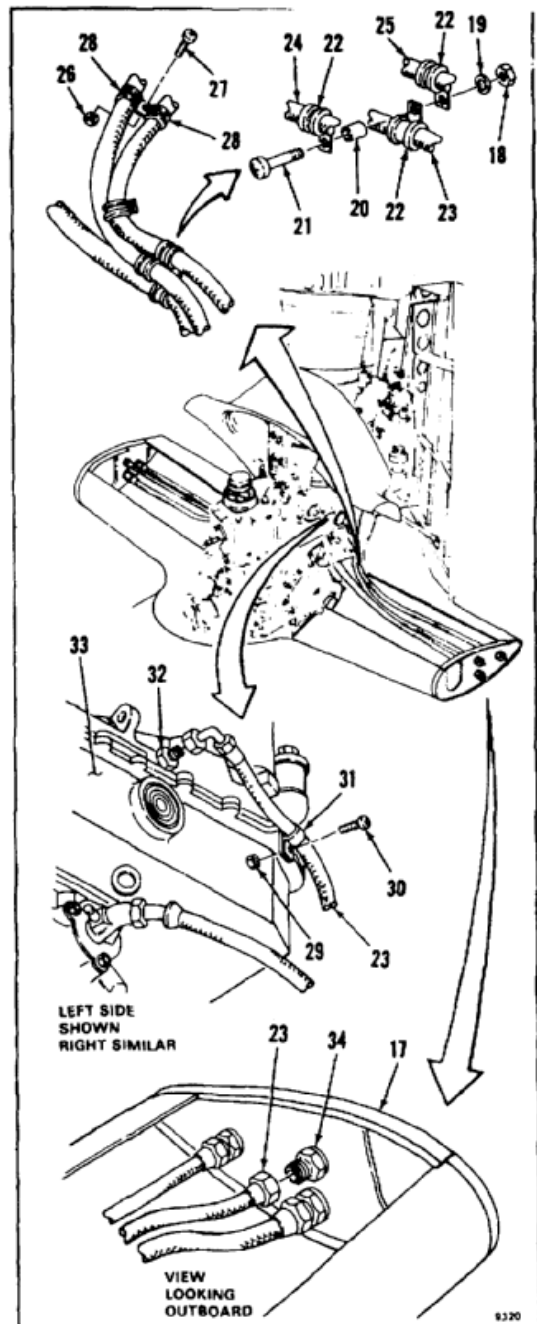


**REMOVE INBOARD HOSE**

6. Remove nut (18), washer (19), spacer (20), and screw (21) from clamps (22). Lift breather hose (23) clear of hoses (24 and 25).
7. Remove nut (26) and screw (27) from clamps (28).
8. Remove nut (29) and screw (30) from clamp (31).
9. Disconnect hose (23) from reducer (32) at combining transmission (33).
10. Disconnect hose (23) from union (34) at bulkhead (17).
11. Remove hose (23).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-384



6-99.2 INSTALL ENGINE TRANSMISSION BREATHER HOSE ASSEMBLIES

6-99.2

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

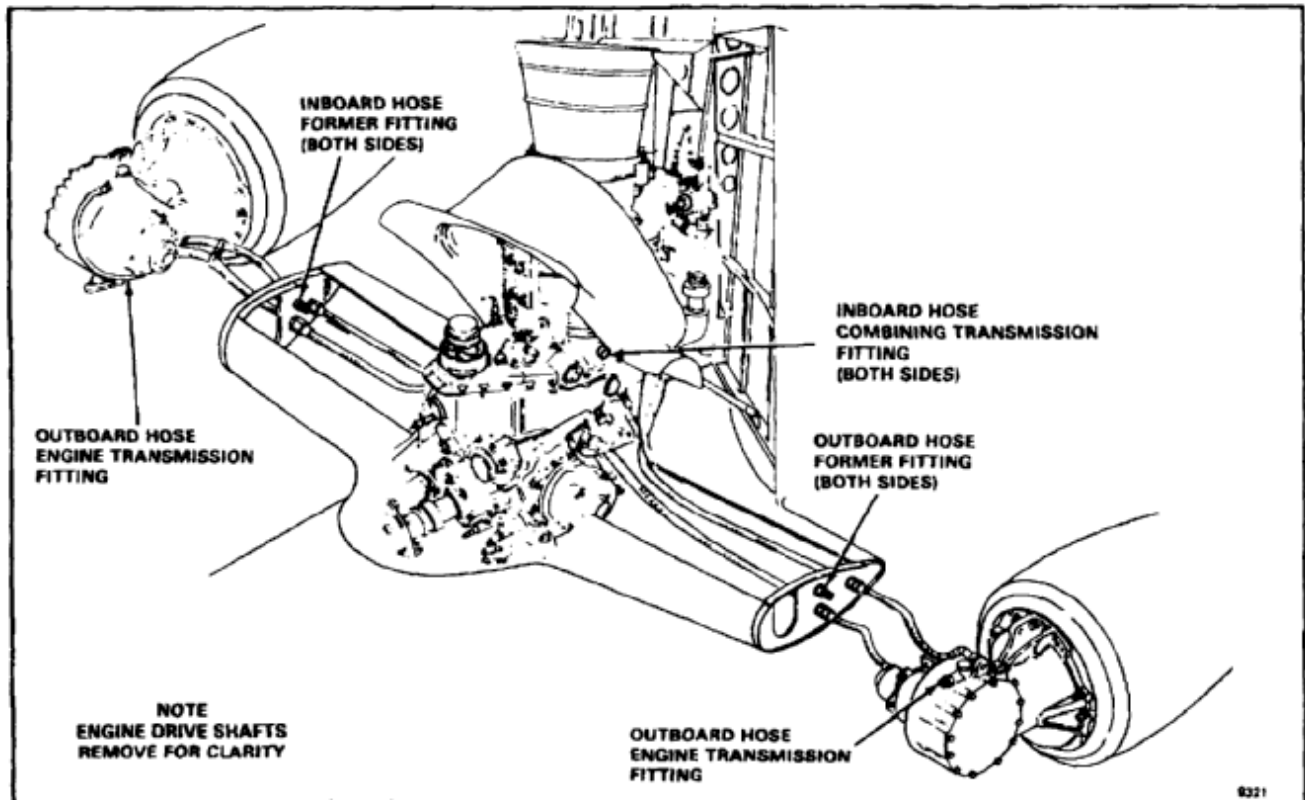
Oil (E253 or E254)

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P



**NOTE**

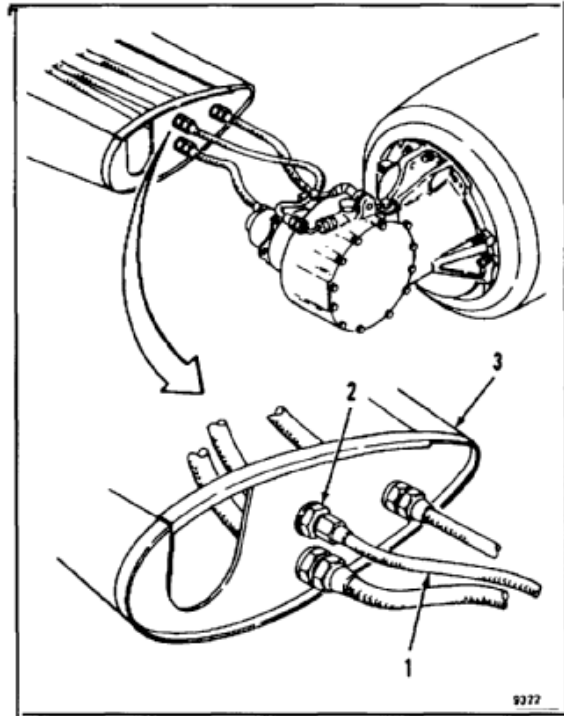
Installation of left or right hose assemblies is similar.

**INSTALL OUTBOARD HOSE**

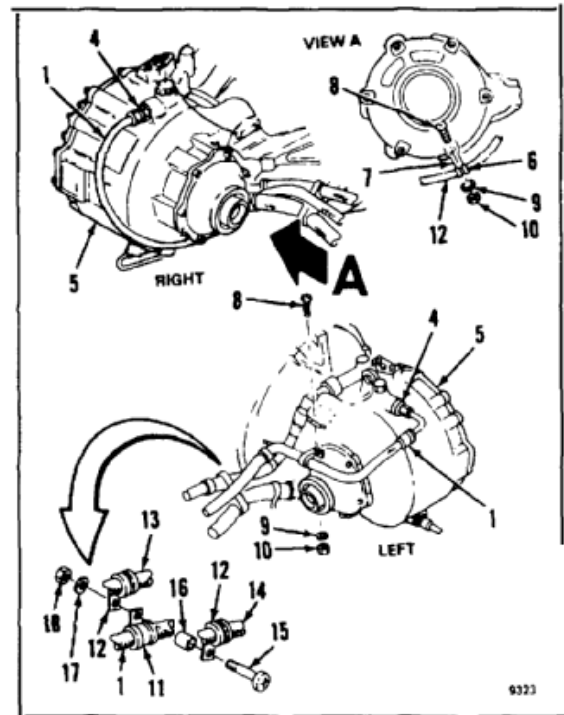
**WARNING**

Oil (E253/E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

1. Coat thread at ends of hose (2) with oil (E253 or E254).
2. Connect hose (1) to union (2) at bulkhead (3).



3. Connect hose (1) to reducer (4) at engine transmission (5).
4. Align clamp (6) with clip (7) on engine transmission (5). Install screw (8), washer (9), and nut (10).
5. Align clamp (11) on breather hose (1) with clamps (12) on hoses (13 and 14). Install screw (15), spacer (16), washer (17), and nut (18).



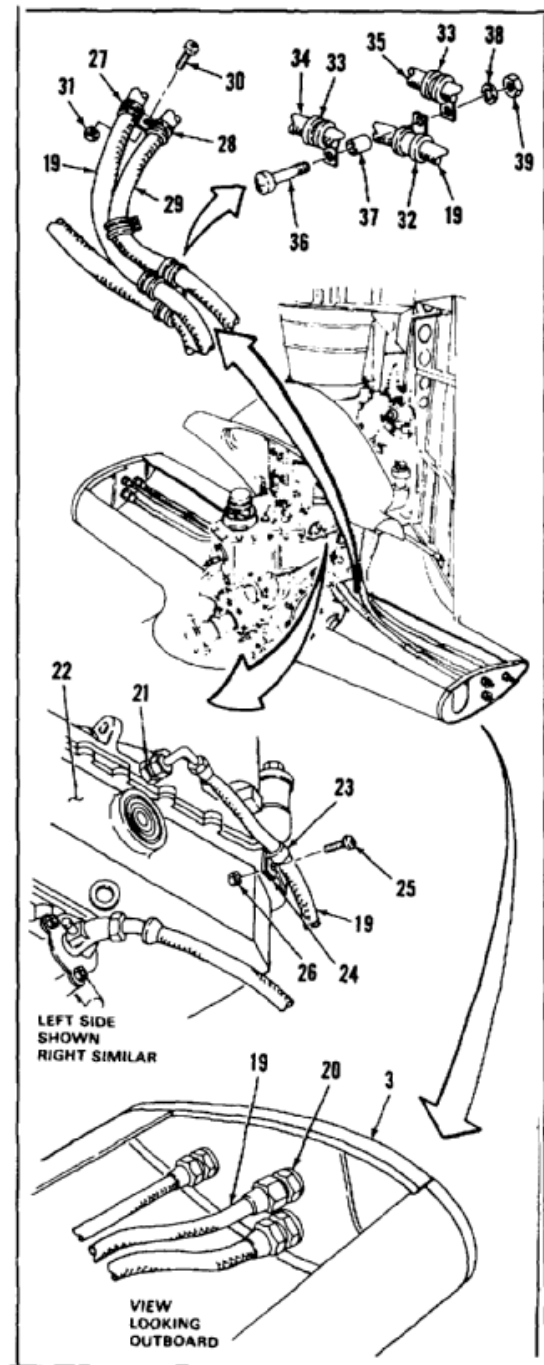
**INSTALL INBOARD HOSE****WARNING**

Oil (E253/E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

6. Coat thread at ends of hose (19) with oil (E253 or E254).
7. Connect hose (19) to union (20) at bulkhead (3).
8. Connect hose (19) to reducer (21) at combining transmission (22).
9. Align clamp (23) with clip (24) on combining transmission (22). Install screw (25) and nut (26).
10. Align clamp (27) on breather hose (19) with clamp (28) on hose (29). Install screw (30) and nut (31).
11. Align clamp (32) on breather hose (19) with clamps (33) on hoses (34 and 35). Install screw (36), spacer (37), washer (38), and nut (39).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close pylon lower fairing (Task 2-2).  
 Install engine transmission fairing (Task 4-73).  
 Install engine air inlet screen (Task 4-76).  
 Close engine drive shaft access cover (Task 2-2).  
 Service engine transmission (Task 1-54).  
 Close pylon access doors (Task 2-2).  
 Perform ground run (TM 55-1520-240-10).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Open End Wrench, 1-1/2 Inch
- Open End Wrench, 1-1/8 Inch
- Container, 2 Quart

**Materials:**

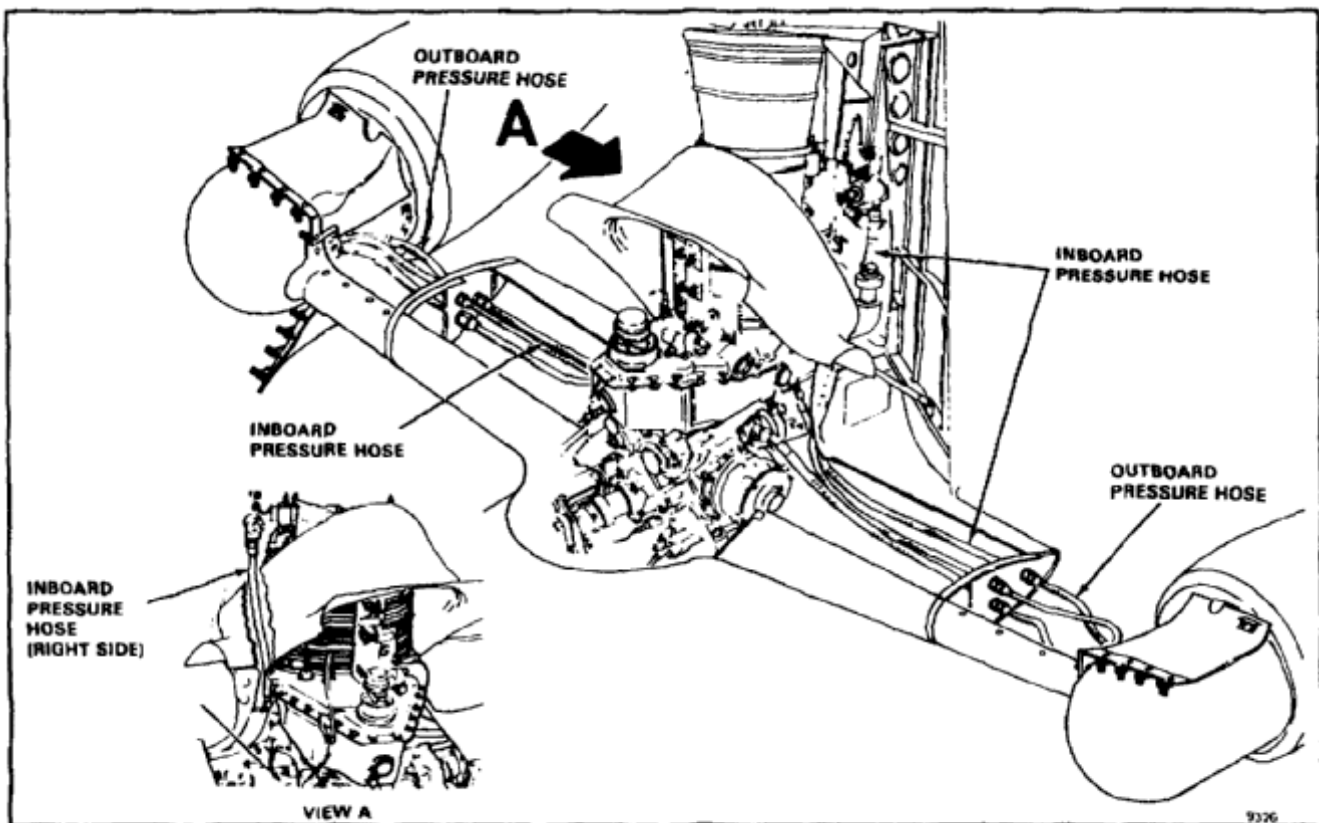
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Pylon Access Doors Open (Task 2-2)
- Pylon Lower Fairing Open (Task 2-2)
- Engine Drive Shaft Access Cover Removed (Task 2-2)
- Engine Air Inlet Screen Removed (Task 4-65)
- Engine Transmission Fairing Access Cover Open (Task 2-2)

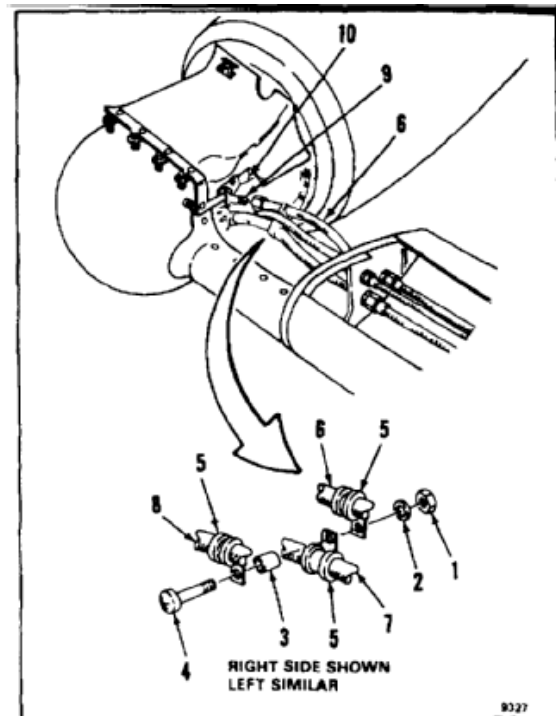


**NOTE**

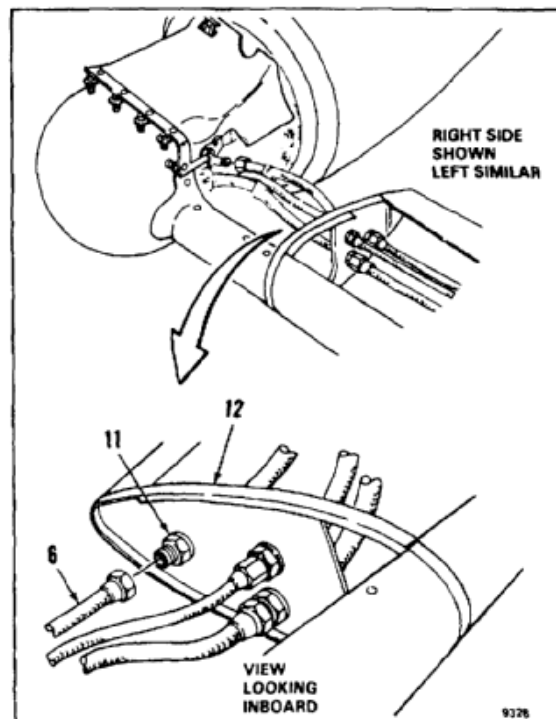
Removal of left or right hose assemblies is similar.

**REMOVE OUTBOARD HOSE**

1. Remove nut (1), washer (2), spacer (3), and screw (4) from clamps (5). Lift pressure hose (6) clear of hoses (7 and 8).
2. Disconnect pressure hose (6) from reducer (9) at engine transmission (10). Support hose to prevent oil spillage.

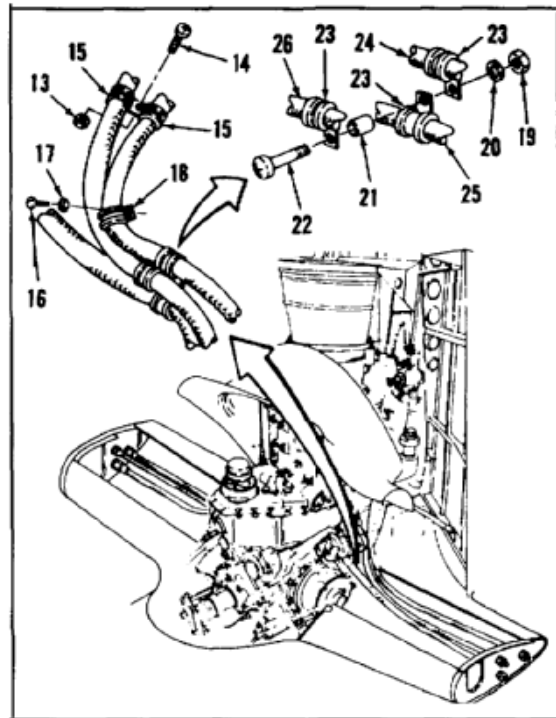


3. Disconnect pressure hose (6) from union (11) at bulkhead (12). Drain oil into container.
4. Remove hose (6).

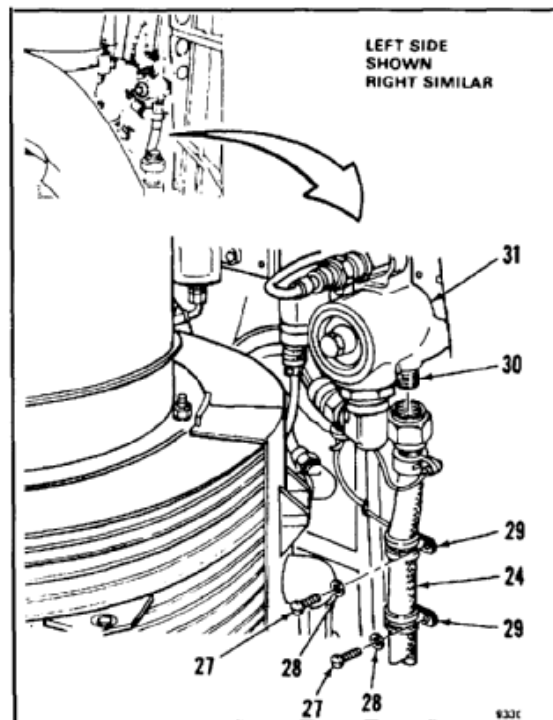


**REMOVE INBOARD HOSES**

5. Remove nut (13) and screw (14) from clamps (15).
6. Remove screw (16) and washer (17) from clamp (18).
7. Remove nut (19), washer (20), spacer (21), and screw (22) from clamps (23). Lift pressure hose (24) clear of hoses (25 and 26).



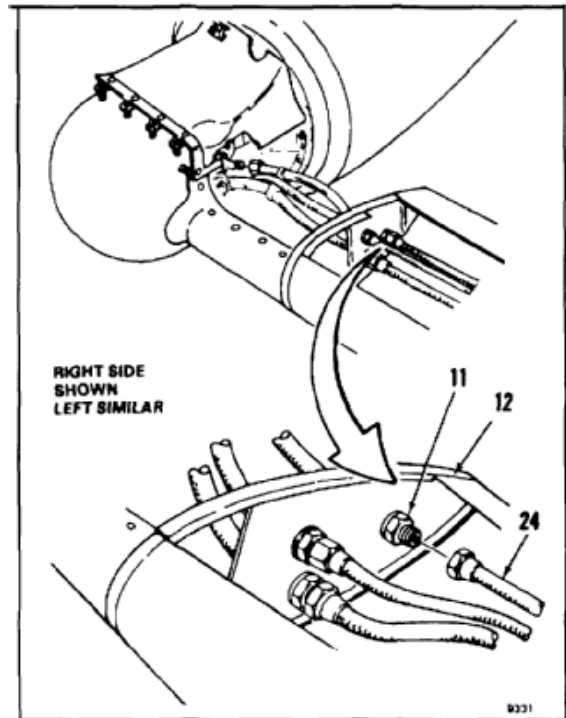
8. Remove screws (27) and washers (28) from two clamps (29).
9. Disconnect hose (24) from reducer (30) at pressure transmitter (31). Support hose to prevent oil spillage.



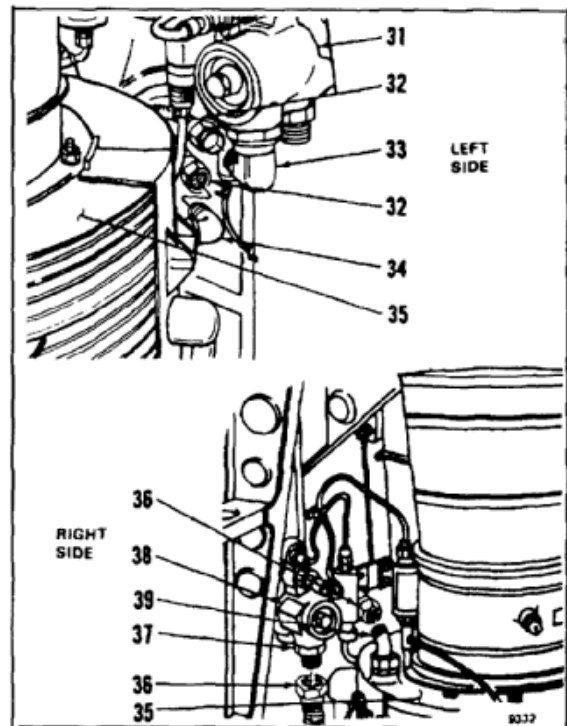
**6-99.3 REMOVE ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued)**

6-99.3

10. Disconnect hose (24) from union (11) at bulkhead (12). Drain oil into container.
11. Remove hose (24).



12. On left side, disconnect hose (32) from elbow (33) at pressure transmitter (31). Support hose to prevent oil spillage.
13. Disconnect hose (32) from elbow (34) at oil cooler assembly (35). Drain oil into container.
14. Remove hose (32).
15. On right side, disconnect hose (36) from reducer (37) at pressure transmitter (38). Support hose to prevent oil spillage.
16. Disconnect hose (36) from reducer (39) at oil cooler assembly (35). Drain oil into container.
17. Remove hose (36).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Open End Wrench, 1-1/2 Inch
- Open End Wrench, 1-1/8 Inch

**Materials:**

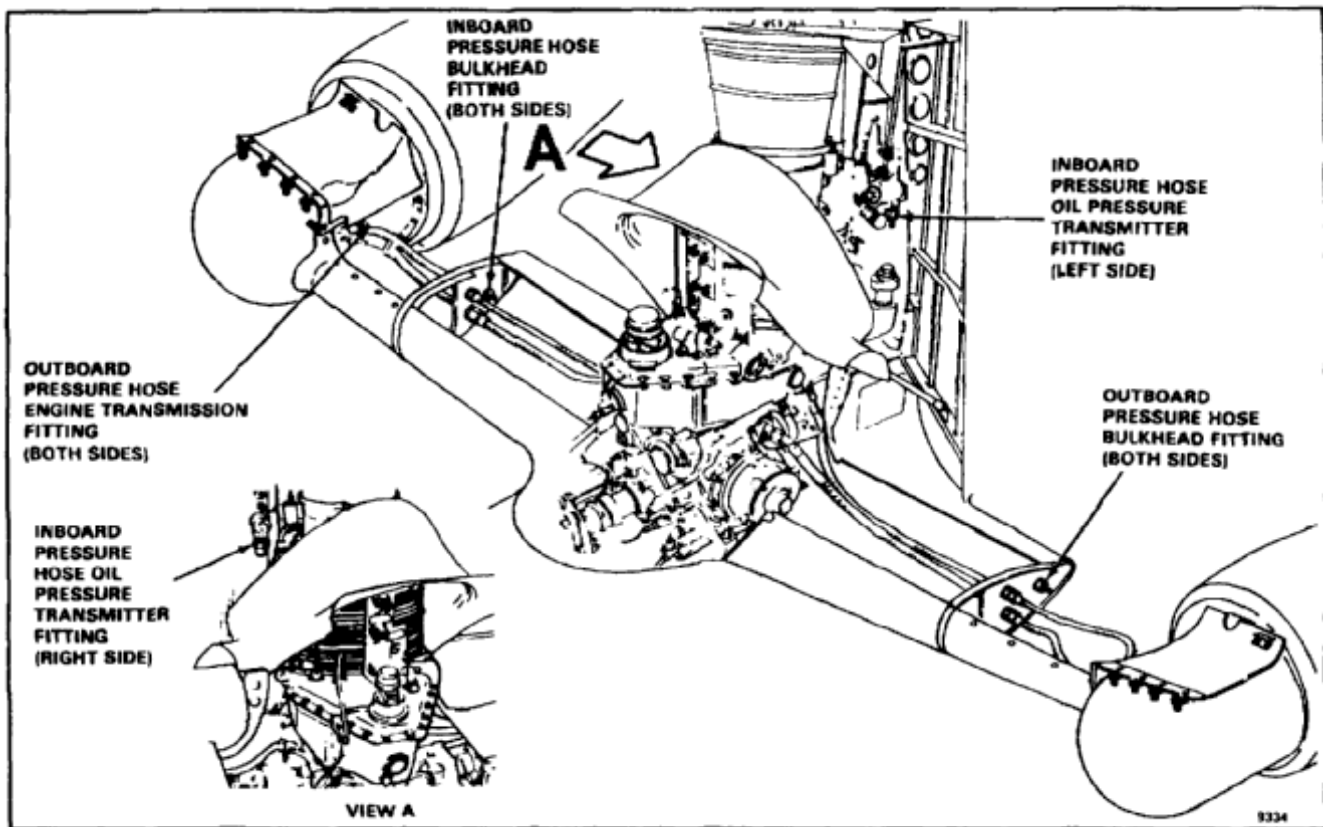
Oil (E253 or E254)

**Personnel Required:**

- Medium Helicopter Repairer
- Inspector

**References:**

TM 55-1520-240-23P





**NOTE**

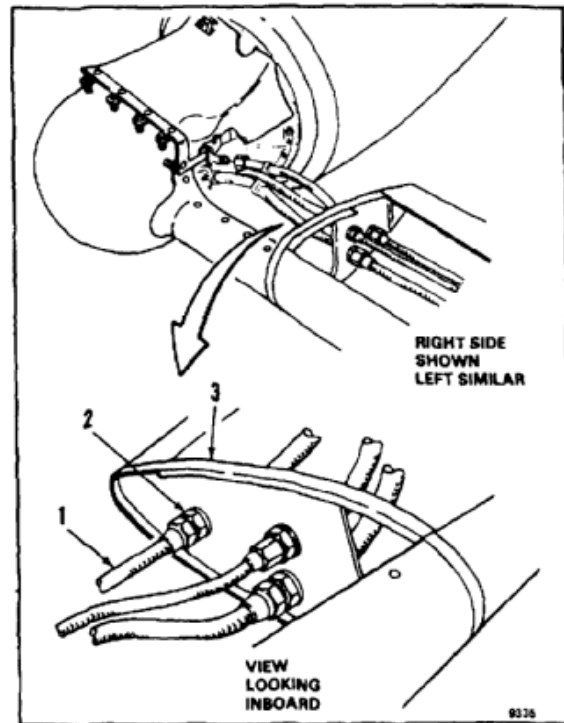
Installation of left or right hose assemblies is similar.

**INSTALL OUTBOARD HOSE**

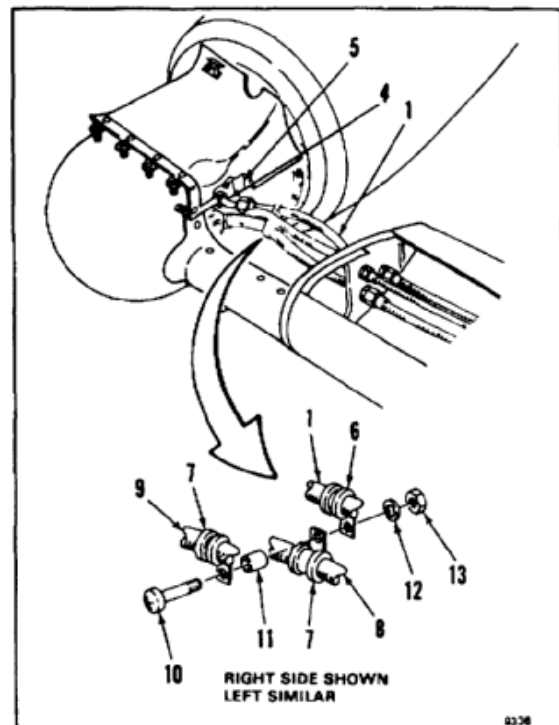
**WARNING**

Oil (E253/E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

1. Coat thread at ends of hose (1) with oil (E253 or E254).
2. Connect hose (1) to union (2) at bulkhead (3).

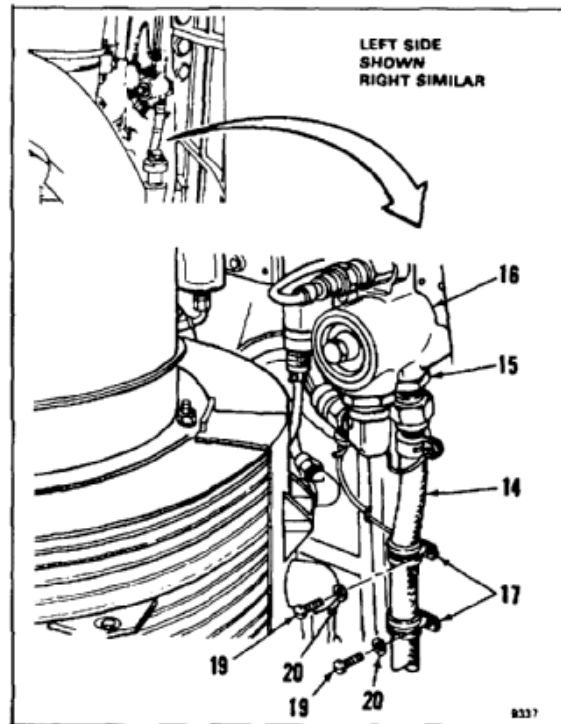


3. Connect hose (1) to reducer (4) at engine transmission (5).
4. Align clamp (6) on pressure hose (1) with clamp (7) on hoses (8 and 9). Install screw (10), spacer (11), washer (12), and nut (13).

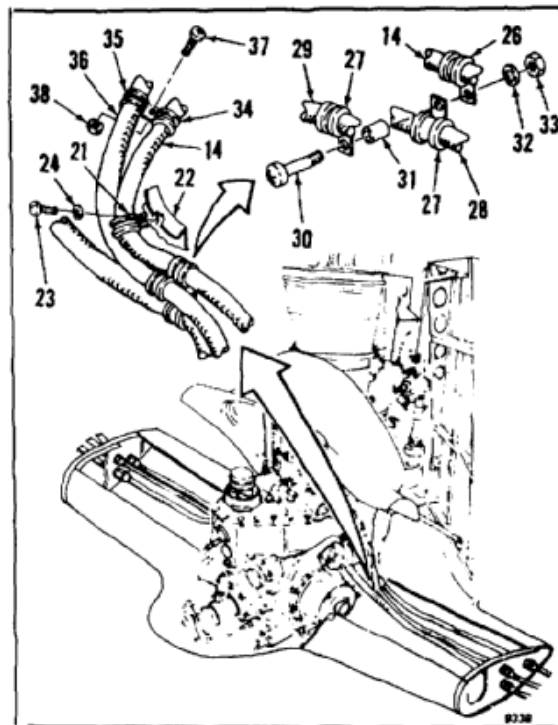


**INSTALL INBOARD HOSES**

5. Coat thread at ends of hose (14) with oil (E253 or E254).
6. Connect hose (14) to reducer (15) at pressure transmitter (16).
7. Align two clamps (17) on pressure hose (14) with airframe structure (18). Install screws (19) and washers (20).



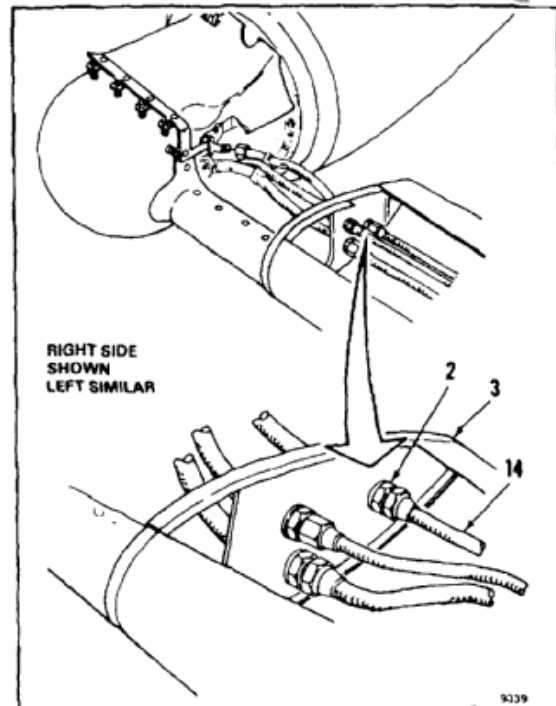
8. Align clamp (21) on pressure hose (14) with airframe structure (22). Install screw (23) and washer (24).
9. Align clamp (26) on pressure hose (14) with clamps (27) on hoses (28 and 29). Install screw (30), spacer (31), washer (32), and nut (33).
10. Align clamp (34) on pressure hose (14) with clamp (35) on hose (36). Install screw (37) and nut (38).



**6-99.4 INSTALL ENGINE TRANSMISSION PRESSURE HOSE ASSEMBLIES (Continued)**

6-99.4

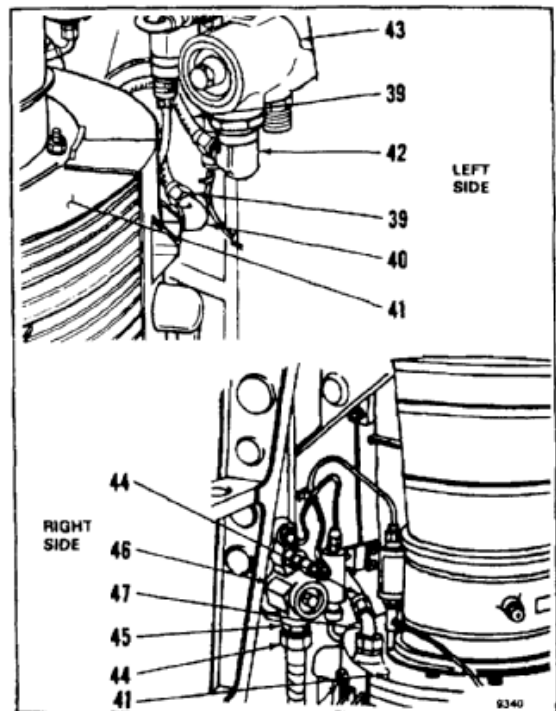
11. Connect hose (14) to union (2) at bulkhead (3).



12. On left side, connect hose (39) to elbow (40) at oil cooler assembly (41). Connect hose to elbow (42) at pressure transmitter (43).
13. On right side, connect hose (44) to reducer (45) at pressure transmitter (46). Connect hose to reducer (47) at oil cooler assembly (41).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close engine transmission fairing covers (Task 2-2).  
 Install engine air inlet screen (Task 4-76).  
 Install engine drive shaft access cover (Task 2-2).  
 Close pylon lower fairing (Task 2-2).  
 Close pylon access doors (Task 2-2).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Open End Wrench, 1-1/8 Inch
- Open End Wrench, 1-1/2 Inch
- Container, 2 Quart

**Materials:**

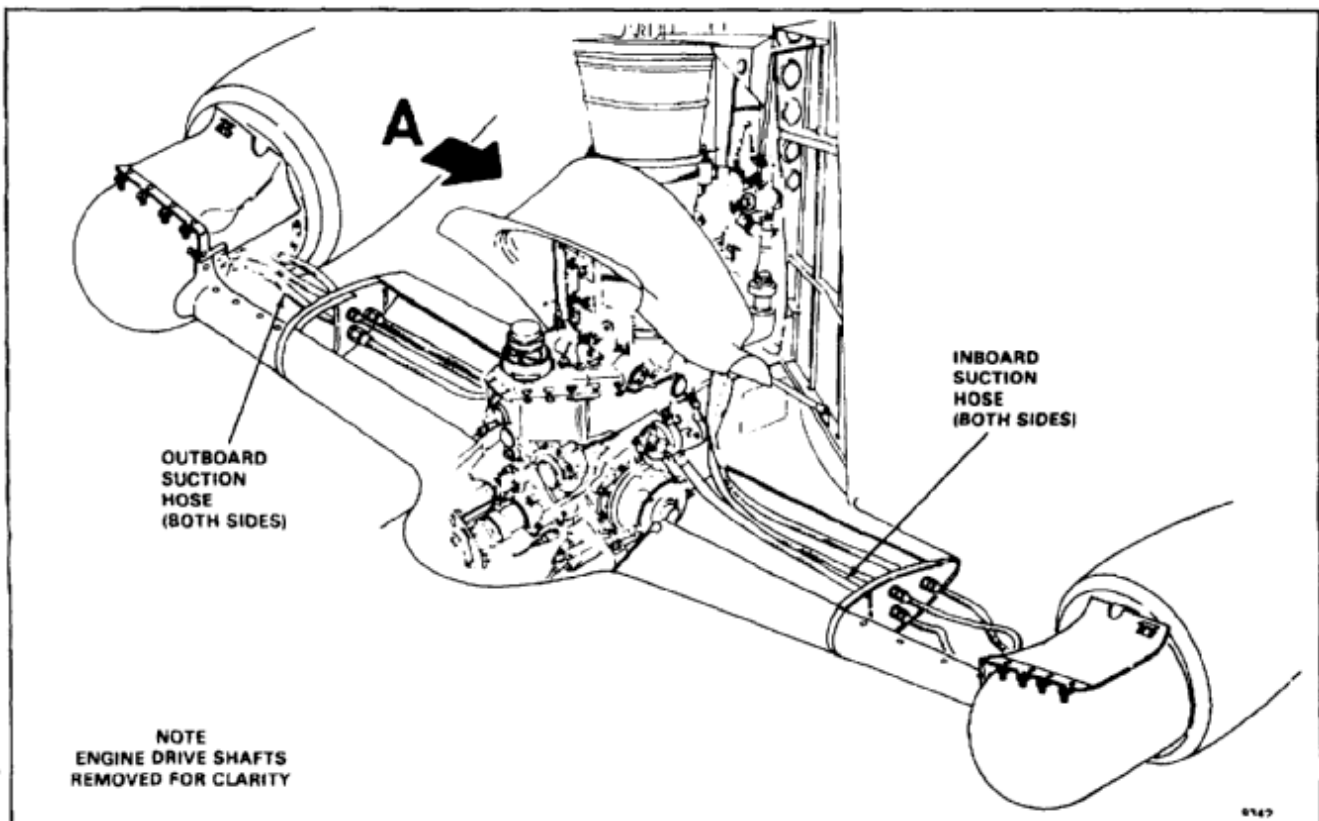
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Pylon Access Doors Open (Task 2-2)
- Pylon Lower Fairing Open (Task 2-2)
- Engine Drive Shaft Access Cover Removed (Task 2-2)
- Engine Air Inlet Screens Removed (Task 4-65)
- Engine Transmission Fairing Access Cover Open (Task 2-2)

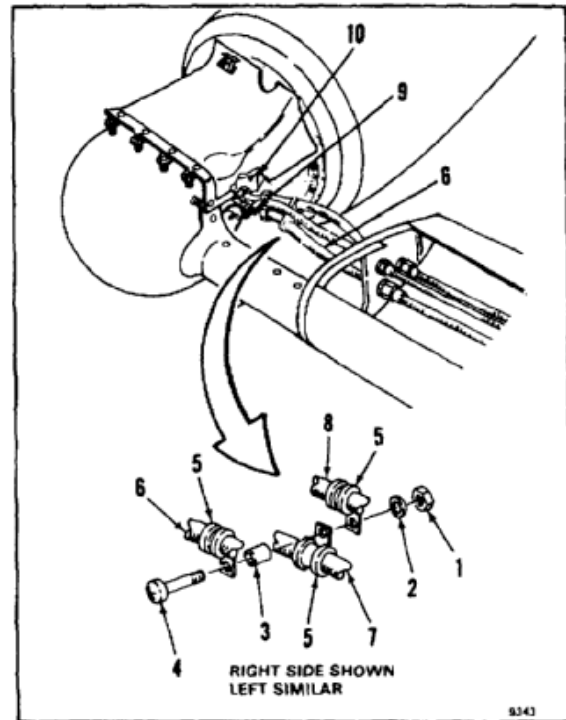


**NOTE**

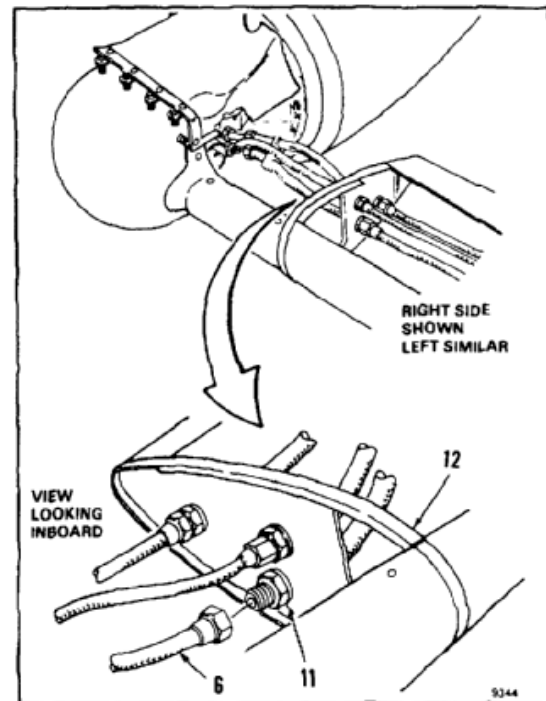
Removal of left or right hose assembly is similar.

**REMOVE OUTBOARD HOSE**

1. Remove nut (1), washer (2), spacer (3), and screw (4) from clamp (5). Lift suction hose (6) clear of hoses (7 and 8).
2. Disconnect suction hose (6) from reducer (9) at engine transmission (10). Support hose to prevent oil spillage.



3. Disconnect suction hose (6) from union (11) at bulkhead (12). Drain oil into container.
4. Remove hose (6).

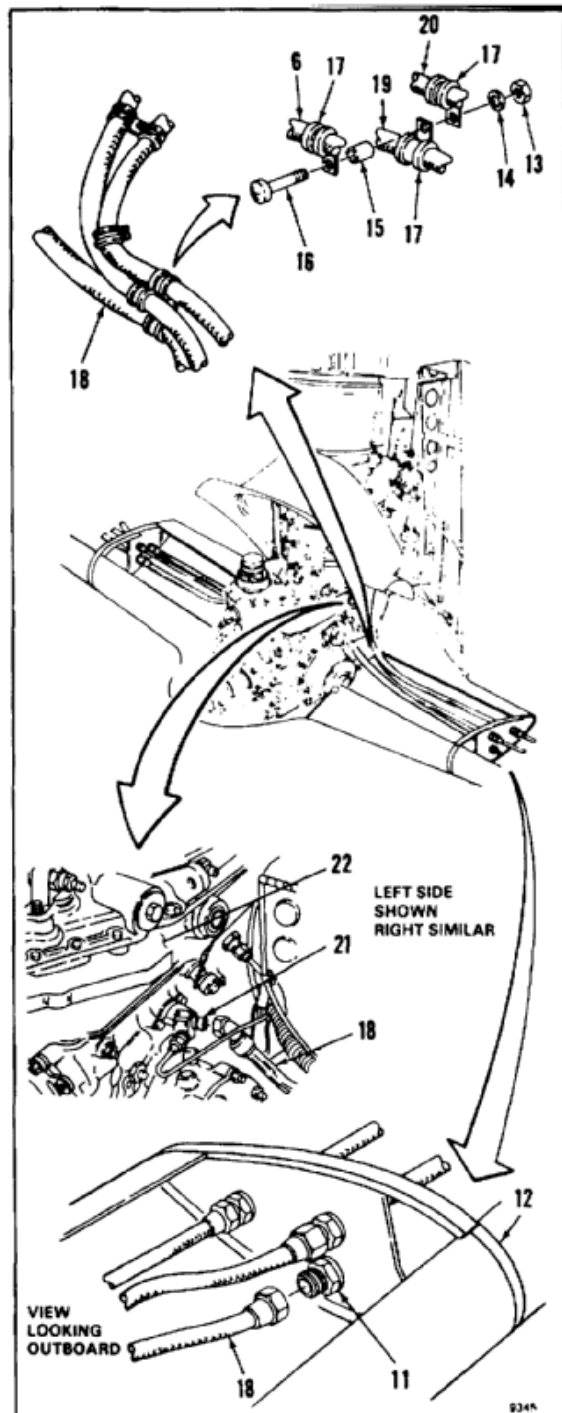


**REMOVE INBOARD HOSE**

5. Remove nut (13), washer (14), spacer (15) and screw (16) from clamps (17). Lift suction hose (18) clear of hoses (19 and 20).
6. Disconnect hose (18) from debris detection screen (21) at combining transmission (22).
7. Disconnect hose (18) from union (11) at bulkhead (12).
8. Remove hose (18).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-398

6-99.6 INSTALL ENGINE TRANSMISSION SUCTION HOSE ASSEMBLIES

6-99.6

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Open End Wrench, 1-1/8 Inch
- Open End Wrench, 1-1/2 Inch

**Materials:**

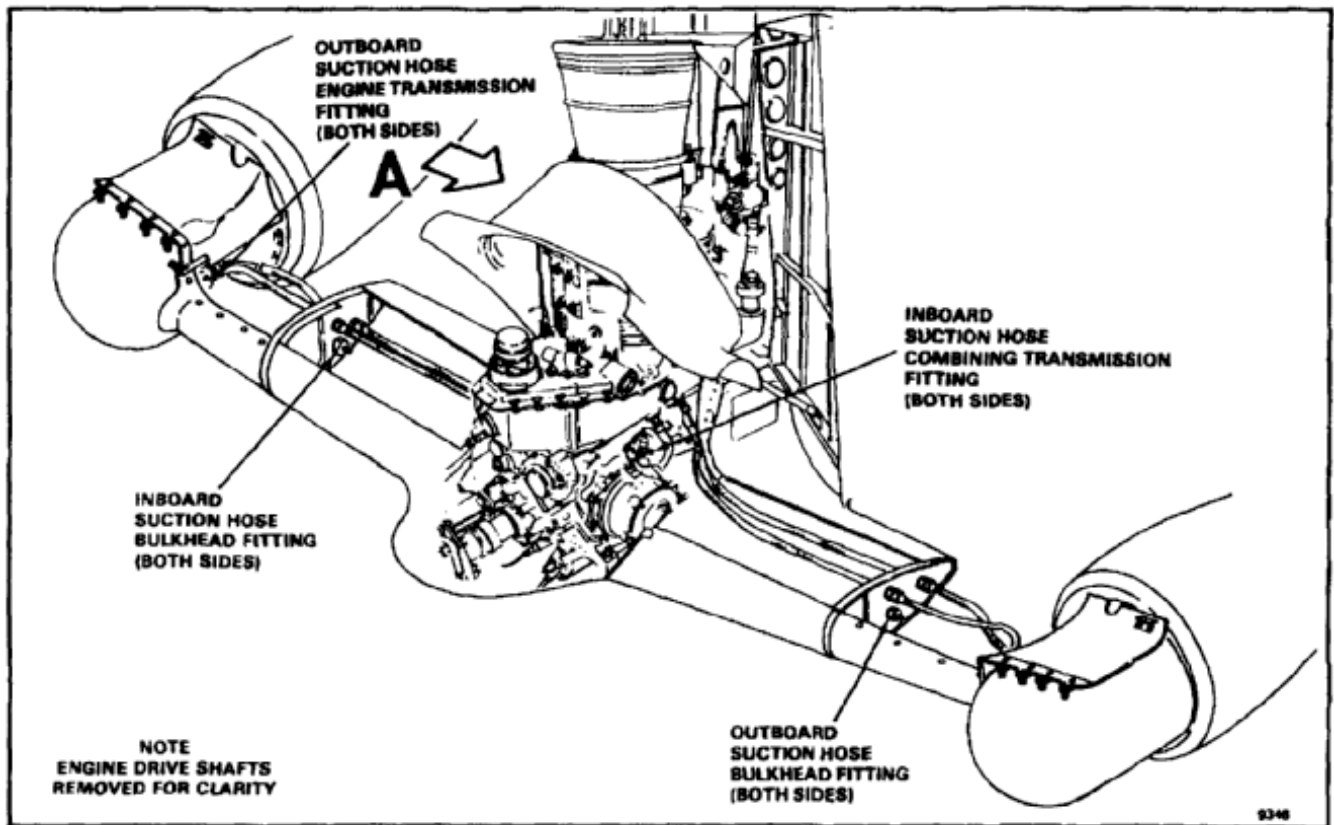
Oil (E253 or E254)

**Personnel Required:**

- Medium Helicopter Repairer
- Inspector

**References:**

TM 55-1520-240-23P



9346

**NOTE**

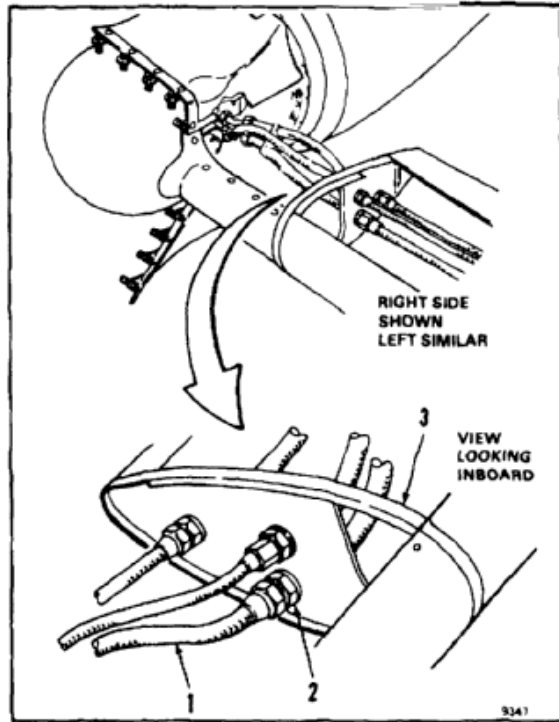
Installation of left or right hose assemblies is similar.

**INSTALL OUTBOARD HOSE**

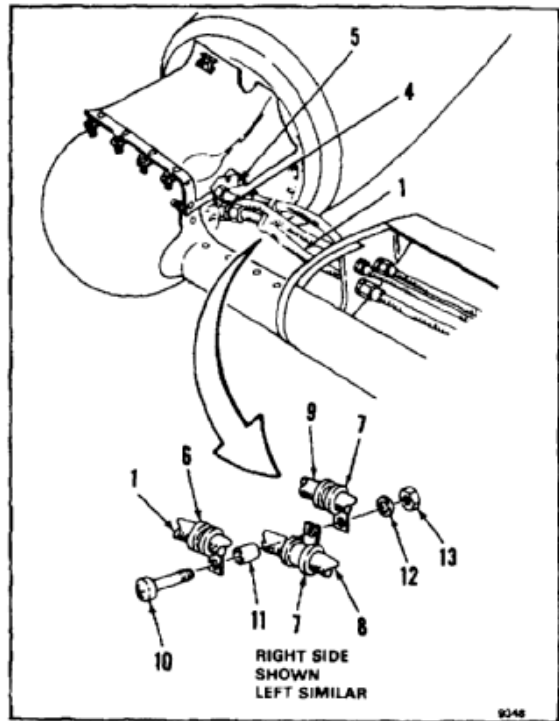
**WARNING**

Oil (E253/E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

1. Coat thread at ends of hose (1) with oil (E253 or E254).
2. Connect hose (1) to union (2) at bulkhead (3).



3. Connect hose (1) to reducer (4) at engine transmission (5).
4. Align clamp (6) on suction hose (1) with clamps (7) on hoses (8 and 9). Install screw (10), spacer (11), washer (12), and nut (13).



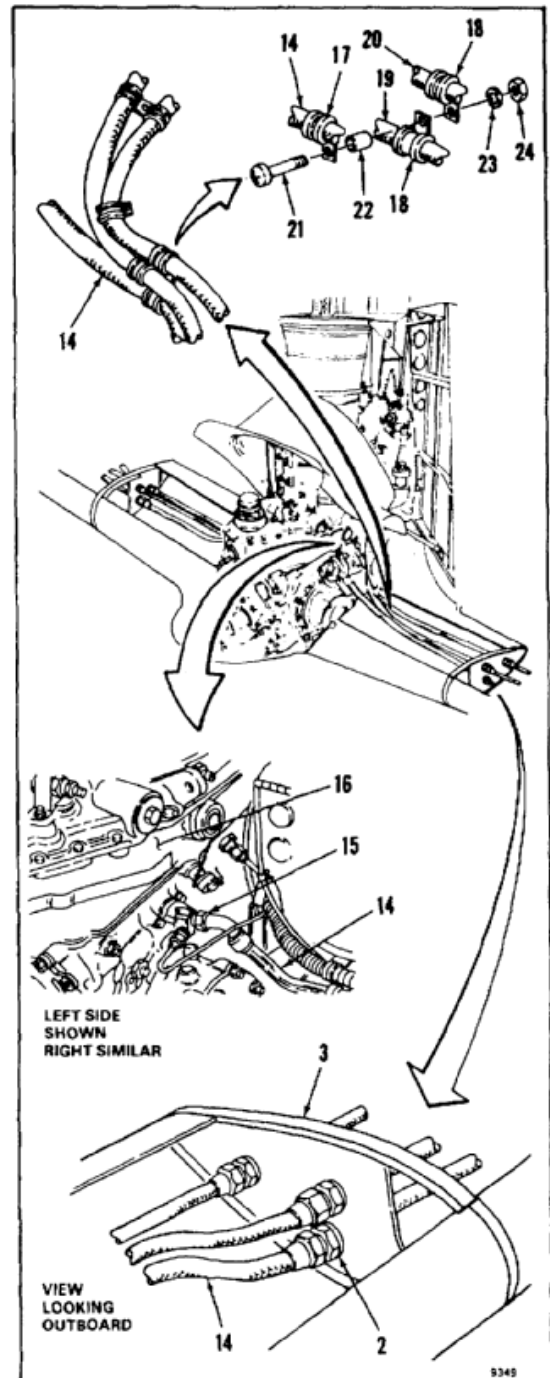


**INSTALL INBOARD HOSE**

5. Coat thread at ends of hose (14) with oil (E253 or E254).
6. Connect hose (14) to union (2) at bulkhead (3).
7. Connect hose (14) to debris detection screen (15) at combining transmission (16).
8. Align clamp (17) on suction hose (14) with clamps (18) on hoses (19 and 20). Install screw (21), spacer (22), washer (23), and nut (24).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Close engine transmission fairing access cover (Task 2-2).
- Install engine air inlet screen (Task 4-76).
- Install engine drive shaft access cover (Task 2-2).
- Close pylon lower fairing (Task 2-2).
- Close pylon access doors (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Container, 2 Quart  
Sling (T3)  
Hoist  
Open End Wrench, 1-1/4 Inch  
Open End Wrench, 1-1/2 Inch  
Rope Guide Line  
Padded Support

**Materials:**

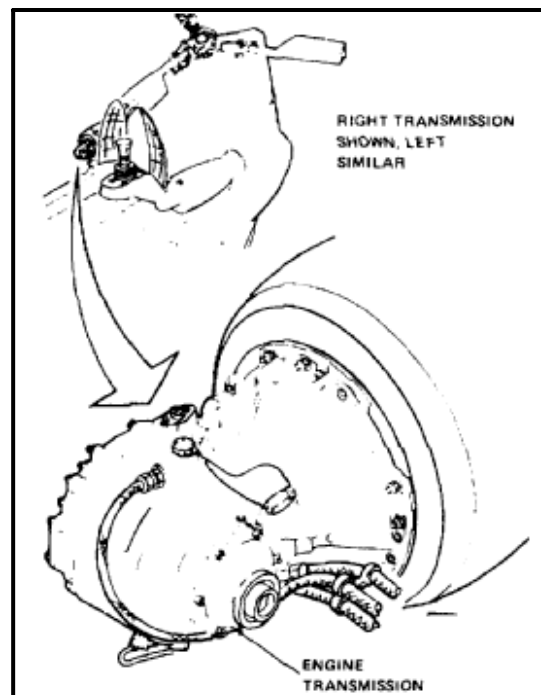
Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer (2)

**Equipment Condition:**

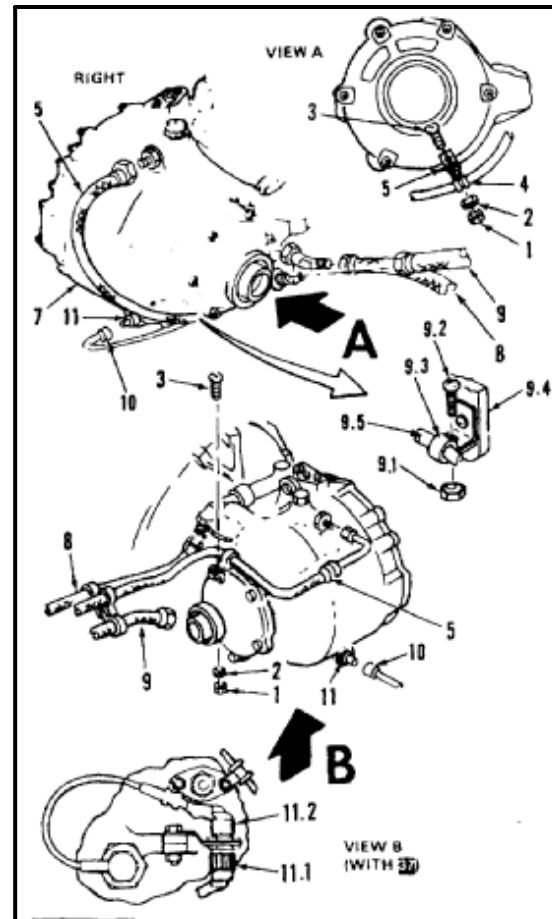
Battery Disconnected (Task 1-39)  
Electrical Power Off  
Engine Air Inlet Screen Removed (Task 4-65)  
Engine Transmission Fairing Removed (Task 4-70)  
Pylon Hinged Fairing Open (Task 2-2)  
Engine Drive Shaft and Engine Transmission Adapter  
Assembly Removed (Task 6-30)



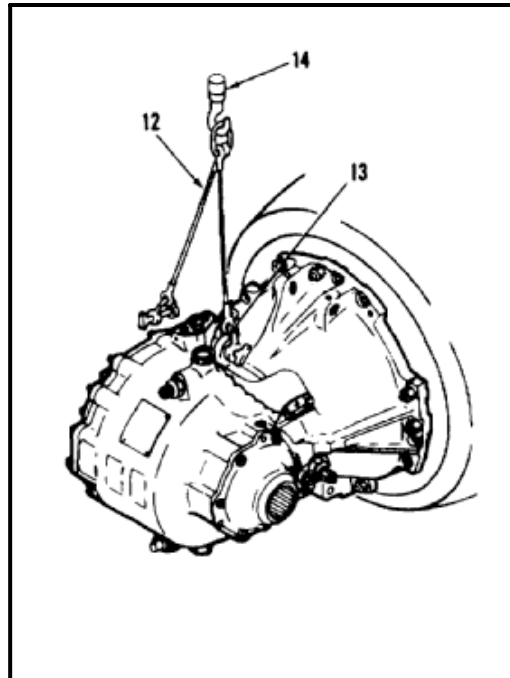
**NOTE**

Procedure is similar to remove left or right transmission. Right transmission is shown here. Differences are noted in steps.

1. Remove nut (1), washers (2), and screw (3) from clamp (4) connecting hose (5) to clip (6).
2. Disconnect hose (5) from transmission (7).
3. Disconnect two oil hoses (8 and 9) from transmission (7). Drain oil into container.
- 3.1. Remove nut (9.1) and screw (9.2) from clamp (9.3) at lower lifting lug (9.4). Release temperature and chip detector wire (9.5).
4. Disconnect connector (10) from temperature and chip detector (11).
- 4.1. With **37**, disconnect connector (11.1) from chip detector connector (11.2).



5. Connect sling (T3) (12) to lifting lug (13). Connect hoist hook (14) to sling (T3).
6. Have helper raise hoist hook (14) to take up slack in sling (T3) (12). Do not apply tension to sling.



7. Attach guide line (15) around transmission (7).
8. Remove eight nuts (16) and washers (17) from studs (18). Discard nuts.

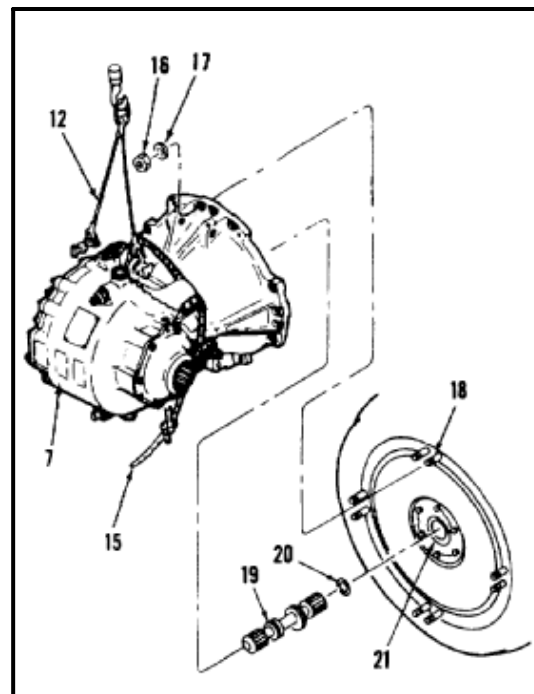
**WARNING**

Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

9. Remove transmission (7) from studs (18) and quill shaft (19). Lower transmission to padded support. Remove sling (T3) (12).
10. Remove quill shaft (19). Remove packing (20) from engine (21).
11. Wipe up spilled oil. Use cloths (E120).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

**6-101 INSPECT ENGINE TRANSMISSION QUILL SHAFT****6-101****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

None

**Materials:**

Oil (E254.1)  
 Scotch Brite (E2)  
 Paper (E11)

**Personnel Required:**

Inspector

**References:**

TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

1. Visually check quill shaft (1) for:
  - a. **CRACKS AND/OR DISTORTION.** There shall be no such damage. If a crack is suspected in engine transmission quill shaft, refer to TM 1-1520-253-23.
  - b. **LOSS OF SILIVER PLATING.** Acceptable, except if loose silver plate is present, lightly polish with scotch brite (E2) or equivalent to remove, no touch-up required.
  - c. **SCRATCHES, NICKS, DENTS -**
    - (1) Deeper than **0.010 inch** into steel. There shall be no such damage.
  - d. **LOCAL DAMAGE TO TOP LANDS AND EDGES (CHIPPING, DENTS) FROM INSTALLATION AND/OR REMOVAL OF ENGINE TRANSMISSIONS.**
    - (1) Deeper than **0.010 inch** into steel. There shall be no such damage.
    - (2) **0.010 inch** or less into steel. Polish and blend with oil (E254.1) and abrasive paper (E11) (no coarser than 320 paper) to remove any sharp edges and polish bottom to a smooth surface.
3. Visually check snubber (2) for cracks, missing pieces, and/or distortion. There shall be no such damage.

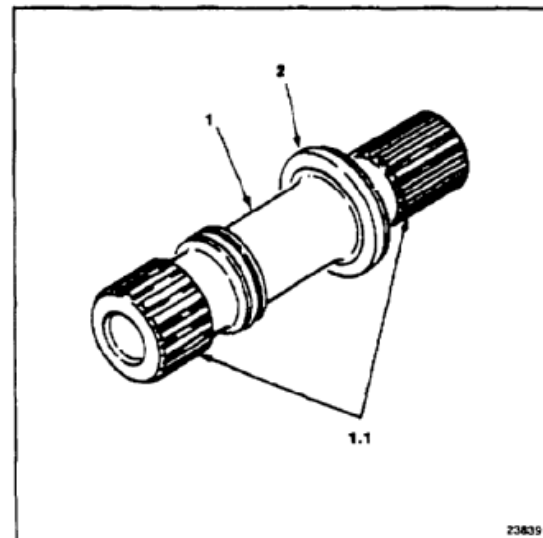
**WARNING**

Oil (E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

- (2) **0.010 inch** or less into steel. Polish and blend with oil (E254.1) and abrasive paper (E11) (no coarser than 320 paper) to remove any sharp edges and polish bottom to a smooth surface.

## 2. Visually check quill shaft splines (1.1) as follows:

- a. **CRACKS AND/OR DISTORTION.** There shall be no such damage.
- b. **LOSS OF SILIVER PLATING.** Acceptable, except if loose silver plate is present, lightly polish with scotch brite (E2) or equivalent to remove, no touch-up required.
- c. **CHECK FOR WEAR STEP.** Replace if worn more than **0.010 inch**.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

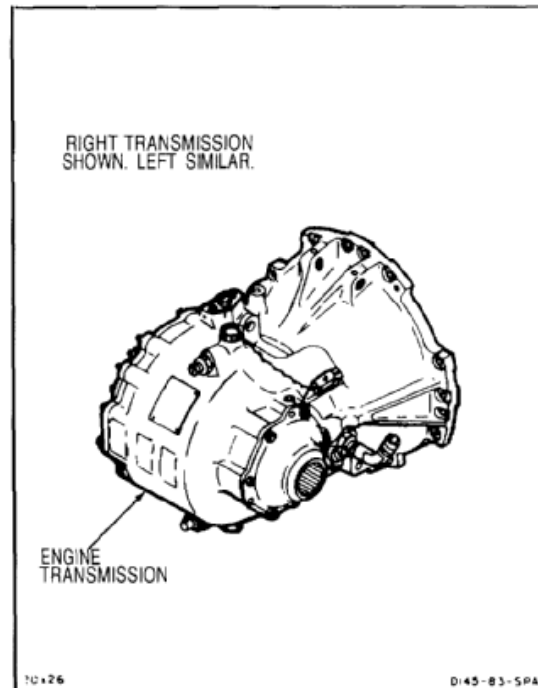
None

**Personnel Required:**

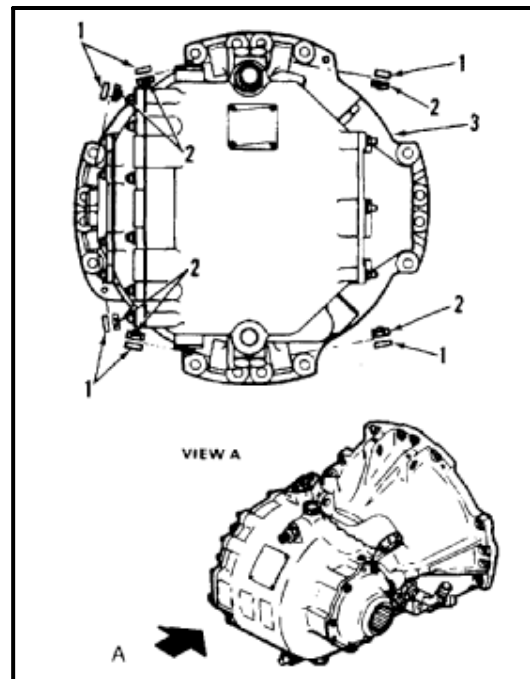
Medium Helicopter Repairer

**Equipment Condition:**

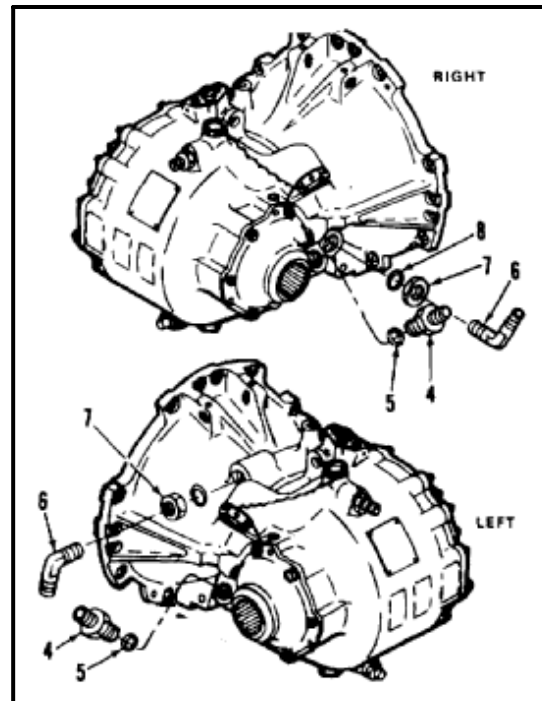
Off Helicopter Task



1. Check that six barrel nuts (1) and retainers (2) are secure in transmission (3) and properly aligned.



2. Remove union (4) and packing (5).
3. Remove elbow (6), nut (7), and packing (8).

***FOLLOW-ON MAINTENANCE:***

None

END OF TASK

## INITIAL SETUP

**General Safety Instructions:****Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J  
Goggles  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Barrier Material (E80)  
Masking Tape (E388)  
Gloves (E186)  
Acetic Acid (E21)  
Chromic Acid (E114)  
Calcium Sulphate (E91)  
Epoxy Primer (E293)  
Epoxy Topcoat (E166)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

**WARNING**

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

**WARNING**

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.



**NOTE**

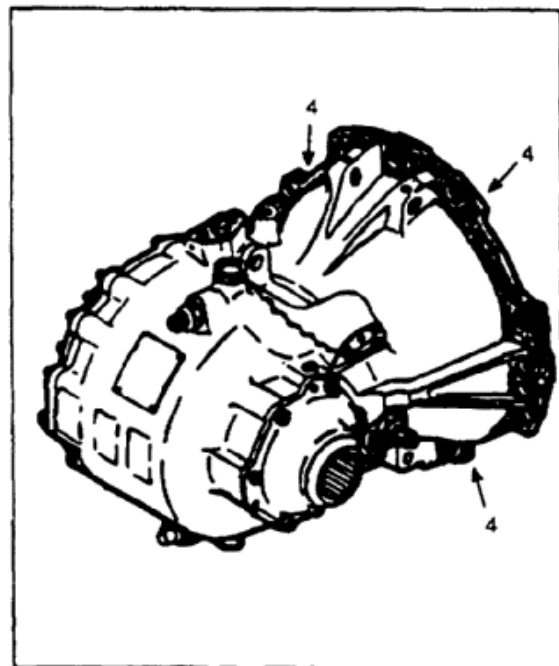
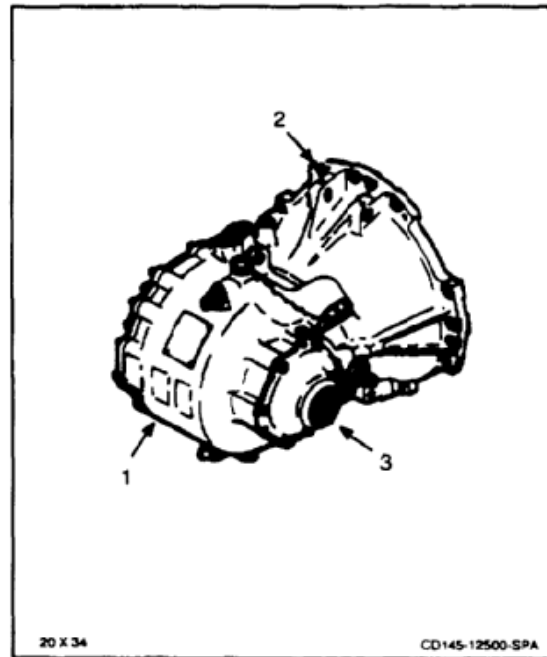
Reparable damage is limited to scratches, nicks, gouges, and minor corrosion.

1. Clean oil and grease from damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. Check extent and location of damage on housing (1).

**NOTE**

Limits in this step refer to extent of damage after rework.

- a. Depth of damage shall not be more than **0.025 inch**.
- b. Damage shall not extend over more than one surface or enter any radius.
- c. Damage shall not be closer than **1.00 inch** to any mounting hole (2).
- d. Check mounting flange (4) as follows:
  - (1) Damage shall not exceed **0.060 inch** in the flanged area (4) of the mounting holes.
  - (2) Damage cannot extend over more than one surface.
  - (3) Damage can exist anywhere on the mounting flange, except inside any of the mounting holes or in recessed area for the mounting washers.
3. Fluorescent inspect damaged area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If crack is suspected in aft engine transmission outside surface, refer to TM 1-1520-253-23.
4. Cover output splines (3) near damaged area to keep out abrasive grit. Use barrier material (E80) and tape (E388).
5. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.



6. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.
7. Acid etch reworked area as follows:
  - a. Prepare a solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E186) and goggles.
  - b. Swab area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse area with cold water.
8. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks.
9. Apply surface treatment to reworked area as follows:
  - a. Clean area with naphtha (E245) and clean cloths. Wear gloves (E186). Let area air dry.
  - b. Swab on solution of chromic acid (E114) and calcium sulphate (E91). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse area with cold water and let air dry.
10. Apply epoxy primer (E293) to reworked area. Let air dry for **2 hours**.
11. Apply epoxy topcoat (E166).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Handling Sling (T3)  
 Work Hoist  
 Shipping Container (T38)

**Materials:**

Fingerprint Remover (E175)  
 Cloths (E120)  
 Dry Cleaning Solvent (E162)  
 Gloves (E186)  
 Swabbing Brush (E86)  
 Corrosion Preventive Compound (E153 or E154)  
 Barrier Material (E81)  
 Masking Tape (E388)  
 Desiccant (E160), 16-Unit Bag (9)  
 Tarpaulin (E410) or Plastic Sheet (E279)

**Personnel Required:**

Medium Helicopter Repairer (2)  
 Inspector

**References:**

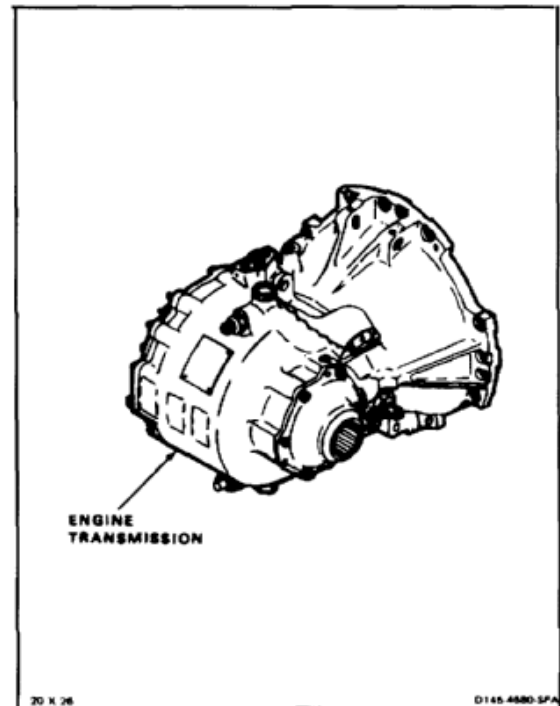
TB 55-8100-200-25

**Equipment Condition:**

Off Helicopter Task  
 Transmission Disassembled (Task 6-102)

**General Safety Instructions:****WARNING**

Dry cleaning solvent (E162), fingerprint remover (E175) and corrosion-preventive compound (E153 or E154) are flammable and toxic. They can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

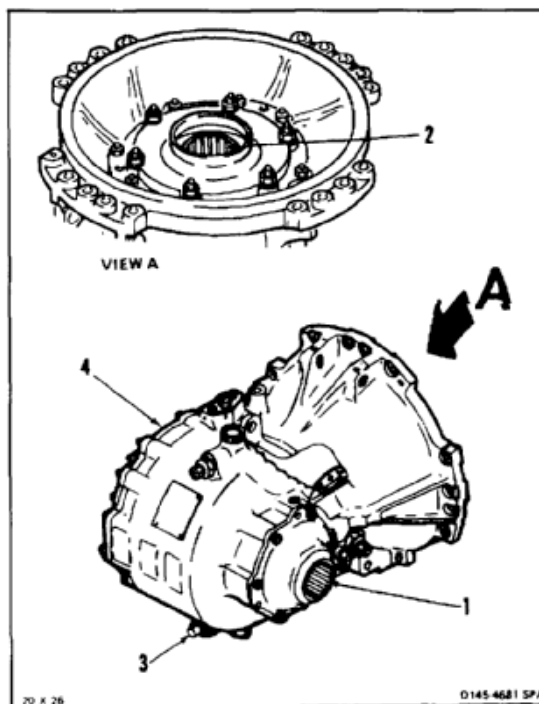


1. Clean splines (1 and 2). Use clean cloths (E120) damp with fingerprint remover (E175). Wear gloves (E186).
2. Remove film left by fingerprint remover with clean cloths (E120) damp with solvent (E162). Use goggles for eyes. Dry splines with clean dry cloths.

**CAUTION**

Touching splines with bare fingers can cause corrosion.

3. Coat splines (1 and 2) with corrosion preventive compound (E153 or E154). Wear gloves (E186) and use swabbing brush (E86).
4. Cover splines (1 and 2) and electrical receptacle (3). Use barrier material (E81) and tape (E388).
5. Clean outside of transmission (4). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.



**NOTE**

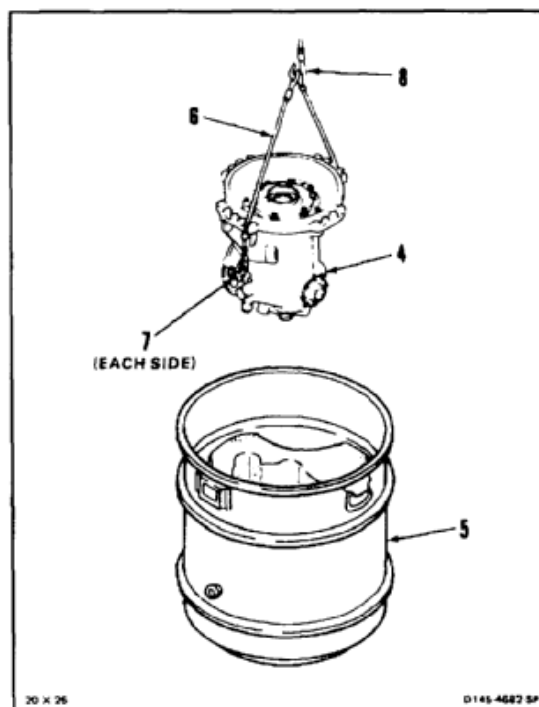
If shipping container is not available, go to step 7.

6. Install transmission in shipping container (T38) (5) as follows:
  - a. Inspect and prepare container (T38) (5) (TB 55-8100-200-25).
  - b. Install sling (T3) (6) on lugs (7). Connect hoist (8) to sling.

**NOTE**

Have helper guide transmission into container.

- c. Lift transmission (4) into container (T38) (5). Remove sling (6).
- d. Put nine 16-unit bags of desiccant (E160) in container (T38) (5).



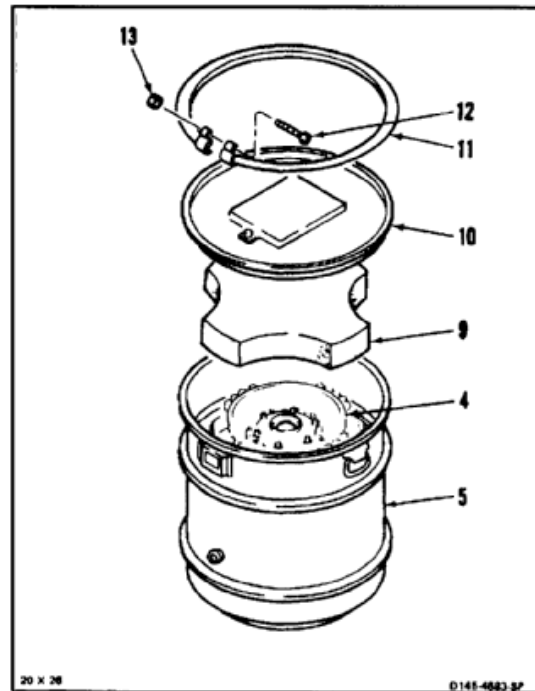
**NOTE**

Transmission is supported in container by molded cushioning. No mounting bolts are needed.

- e. Install cushioning material (9) over transmission (4) in container (T38) (5).
- f. Install cover (10) and ring (11). Secure with bolt (12) and nut (13).
- g. Go to Follow-On Maintenance.

**NOTE**

Bag is only for short-term storage. install transmission in shipping container (T38) as soon as possible.

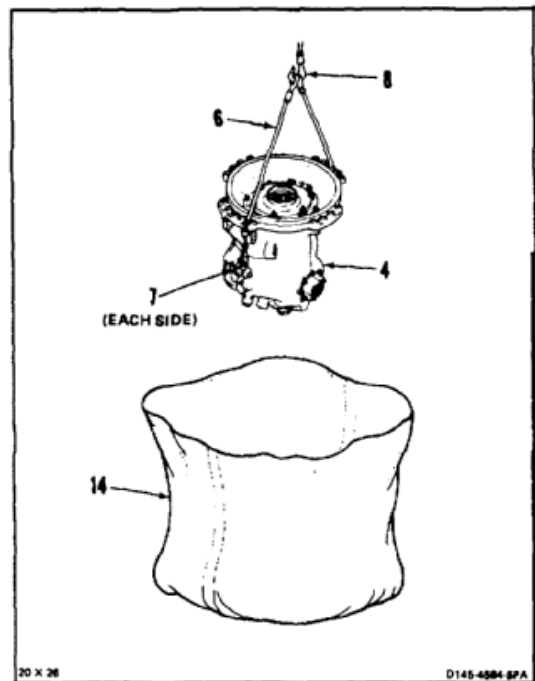


- 7. If shipping container (T38) is not available, make storage bag (14). Use barrier material (E81) and tape (E388). Make bag about **40 inches** high and **60 inches** around.
- 8. Install sling (T3) (6) on lugs (7). Connect hoist (8) to sling.

**NOTE**

Have helper guide transmission into bag.

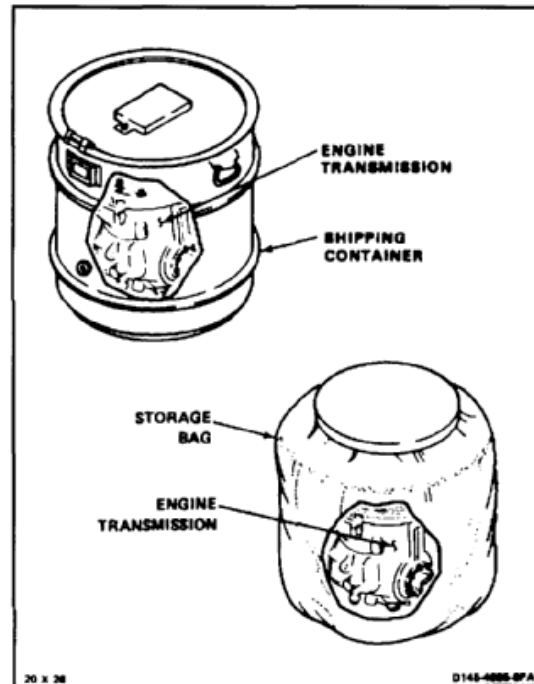
- 9. Lift transmission (4) into bag (14). Remove sling (6).
- 10. Put nine 16-unit bags of desiccant (E160) (14). Seal bag with tape (E388).
- 11. Store transmission (4) indoors, if possible. If stored outdoors, keep transmission off ground. Cover with tarpaulin (E410) or plastic sheet (E279).



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-414

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4962
- Handling Sling (T3)
- Work Hoist

**Materials:**

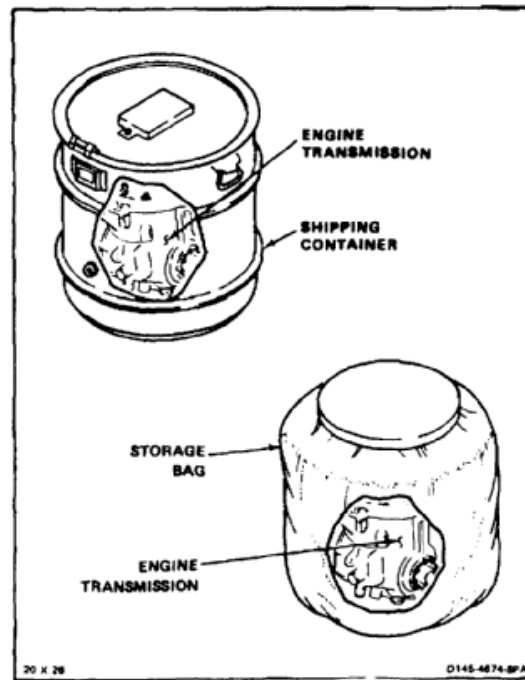
- Dry Cleaning Solvent (E162)
- Cloths (E120)
- Gloves (E186)

**Personnel Required:**

- Medium Helicopter Repairer (2)
- Inspector

**Equipment Condition:**

- Off Helicopter Task
- Engine Transmission Prepared for Shipment or Storage (Task 6-103)



**NOTE**

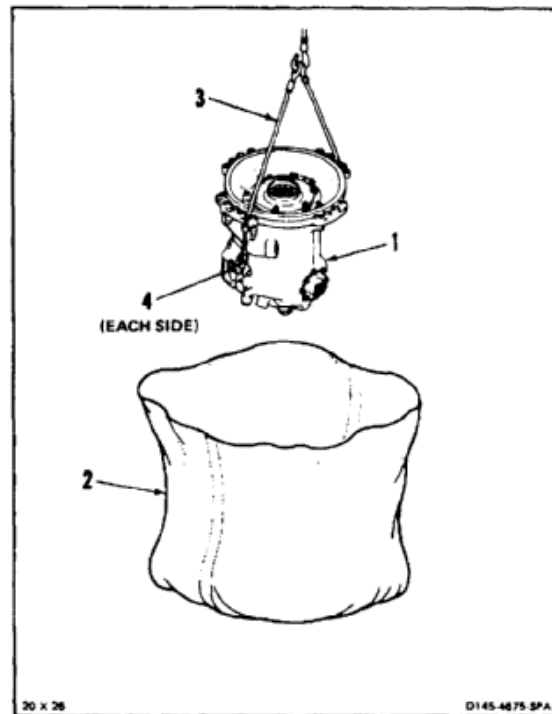
If transmission is stored in storage bag, perform steps 1, 3, and 4. If transmission is stored in shipping container, perform steps 2 thru 4.

1. Remove transmission (1) from storage bag (2) as follows:
  - a. Cut open bag (2). Remove and discard desiccant bags.
  - b. Install sling (T3) (3) on lugs (4). Using work hoist, carefully lift transmission (1) from bag (2).

**NOTE**

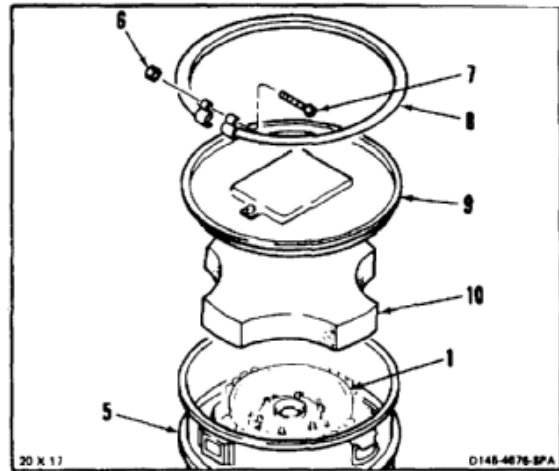
Have helper guide transmission when removing from bag.

- c. Set transmission (1) down on bench or workstand. Remove sling (3) from lugs (4).
- d. Go to step 3.



2. Remove transmission (1) from shipping container (T38) (5) as follows:

- a. Remove nut (6) and bolt (7) from ring (8). Remove ring and cover (9) from container (T38) (5).
- b. Remove cushioning material (10).
- c. Remove and discard desiccant bags.



**NOTE**

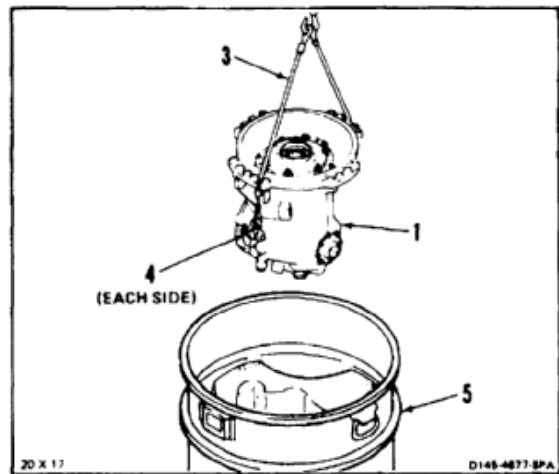
Have helper guide transmission when removing from storage.

- d. Install sling (T3) (3) on lugs (4). Using work hoist, carefully lift transmission (1) from container (T38) (5).

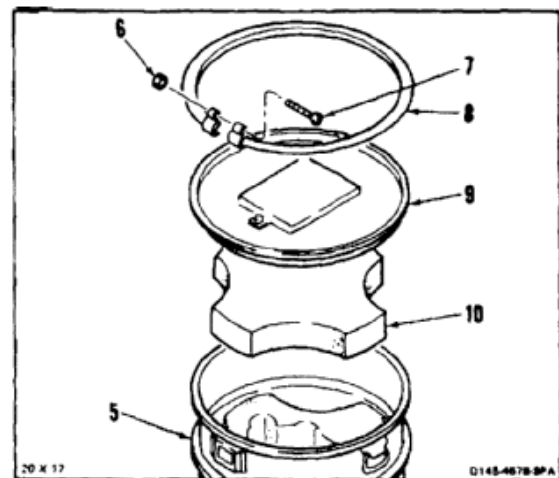
**NOTE**

Have helper guide transmission when removing from storage.

- e. Set transmission down on bench or workstand. Remove sling (3) from lugs (4).



- f. Insert cushioning material (10) in container (T38) (5).
- g. Install cover (9) and ring (8). Secure with bolt (7) and nut (6).





3. Remove barrier material from splines (11 and 12) and electrical connector (13).

**WARNING**

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

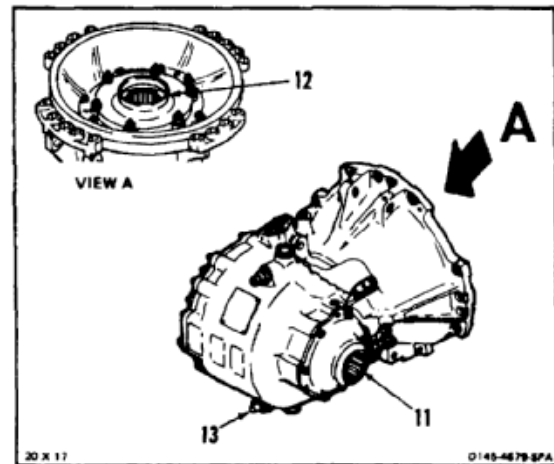
**CAUTION**

Touching splines with bare fingers can cause corrosion.

4. Remove corrosion-preventive compound from splines (11 and 12). Use cloth (E120) damp with solvent (E162). Wear gloves (E186) and goggles.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Assemble (build up) transmission (Task 6-105 or 6-106).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Source of Low-Pressure Compressed Air

**Materials:**

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

**Parts:**

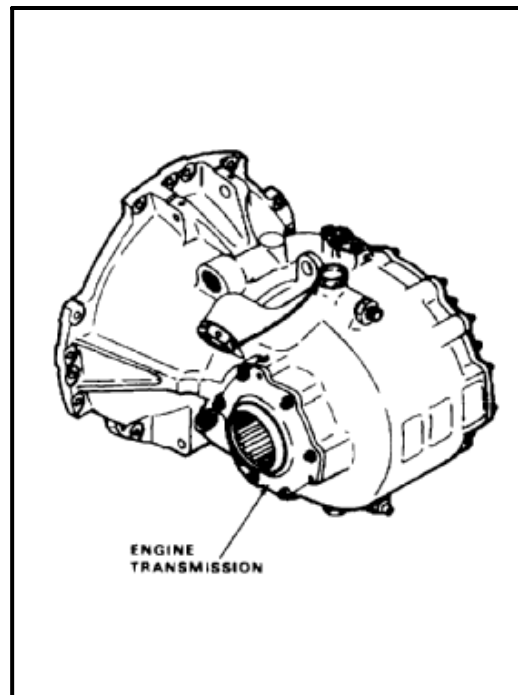
Preformed Packings

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

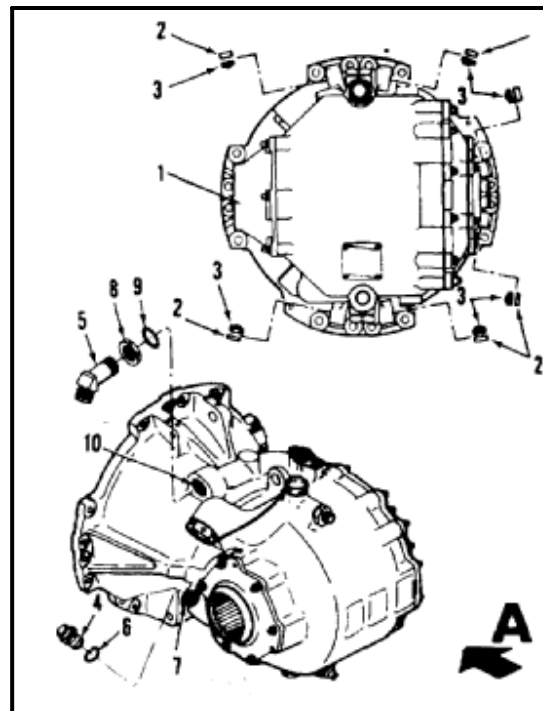


1. Position transmission with output shaft (1) facing left.
2. Check that barrel nuts (2) and retainers (3) are securely installed.

**WARNING**

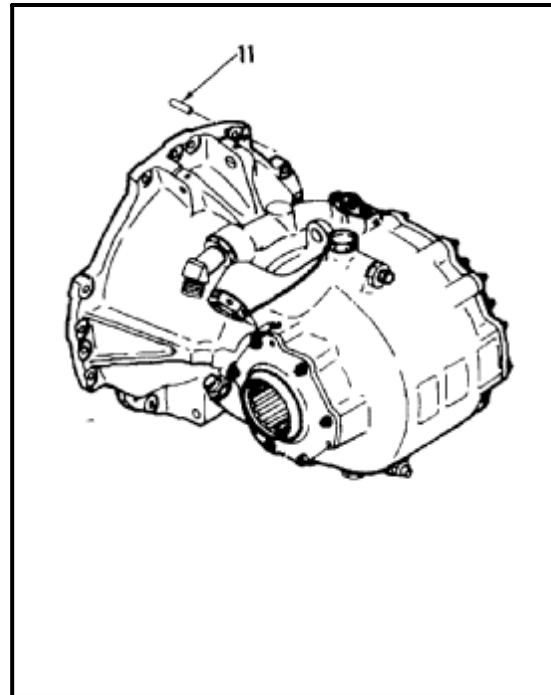
Dry cleaning solvent (E162) is flammable and gives off toxic fumes. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

3. Clean union (4) and elbow (5). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry with low pressure compressed air.
4. Install union (4) and packing (6) in port (7).
5. Install nut (8) on elbow (5). Install elbow and packing (9) in port (10), with elbow pointing down.



6. Install dowel pin (11).

**INSPECT**



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Source of Low Pressure Compressed Air  
 Modified Socket (APP E)

**Materials:**

Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Lockwire (E231)  
 Gloves (E186)

**Parts:**

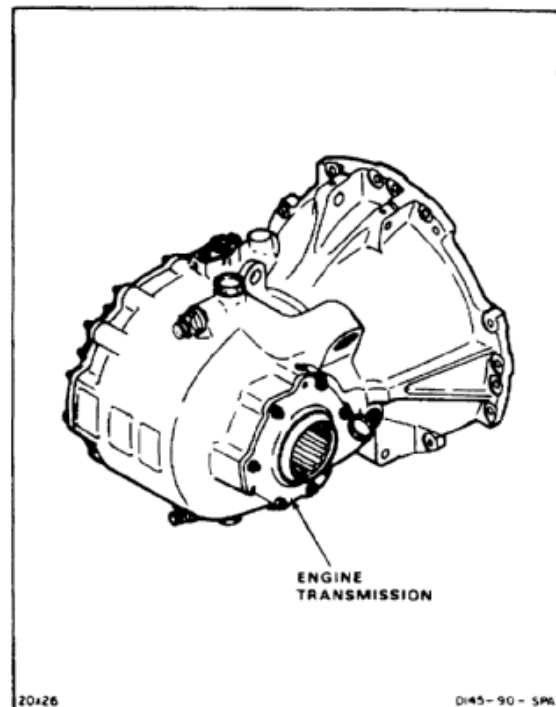
Prefomed Packings

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

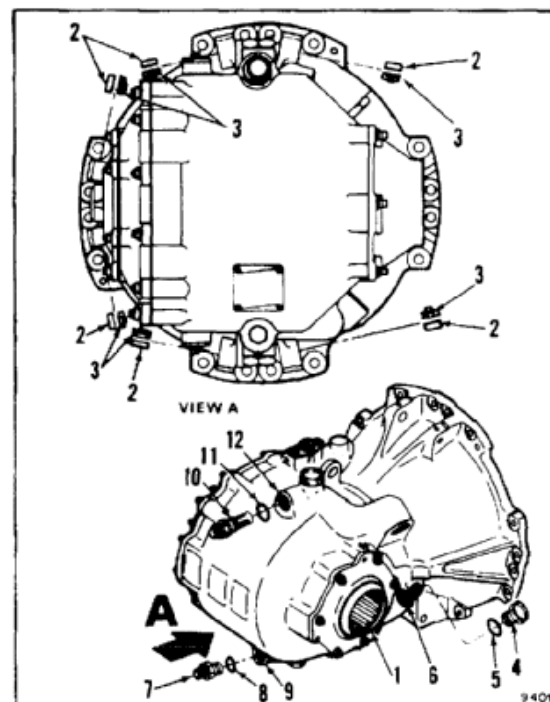
**References:**

TM 55-1520-240-23P  
 Task 6-208.1  
 Task 6-208.2

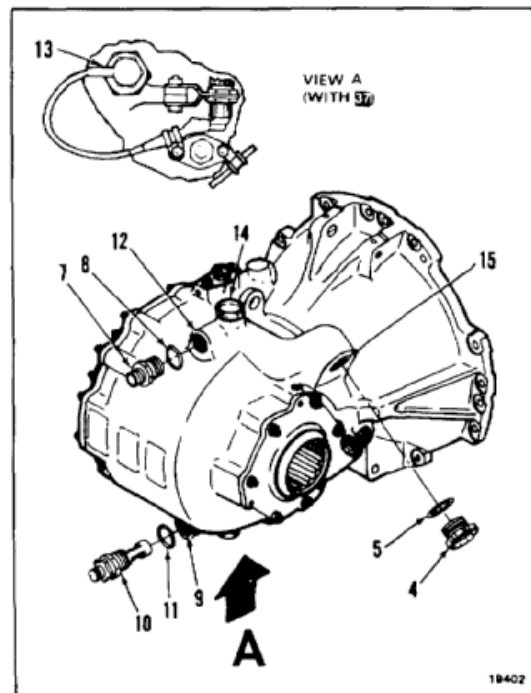
**NOTE**

New or rebuilt transmissions are received as left. If a left transmission is received, but a right transmission is being installed, perform steps 1 thru 5; otherwise begin with step 6.

1. Position transmission with output shaft (1) facing right.
2. Check that barrel nuts (2) and retainers (3) are securely installed.
3. Remove lockwire from plug (4). Remove plug and packing (5) from port (6).
4. Remove union (7) and packing (8) from port (9) at bottom of transmission.
5. Remove chip detector/temperature sensor (10) and packing (11) from port (12) at top of transmission. Use modified socket (APP E).



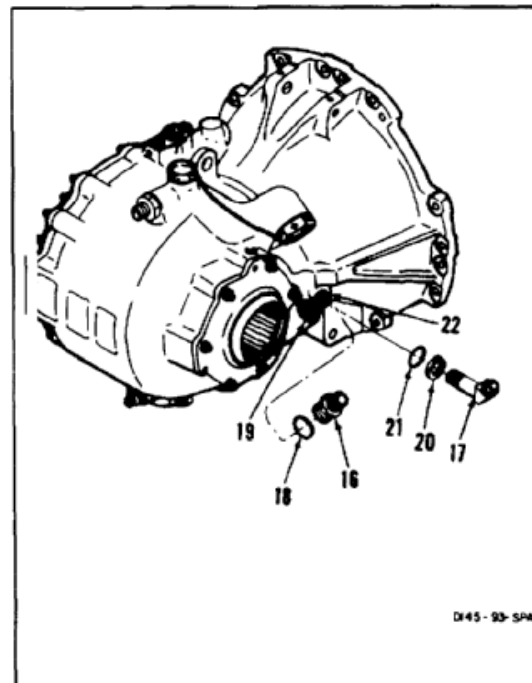
6. Install reducer (7) and packing (8) in port (12). Torque reducer to **90 inch-pounds**.
- 6.1. With **37**, remove chip detector assembly (13) from top of transmission (Task 6-208.1). Install assembly in place of drain plug (14) (Task 6-208.2). Install drain plug at top of transmission. Torque to **90 inch-pounds**.
7. Install chip detector/temperature sensor (10) and packing (11) in port (9). Use modified socket (APP E57). Torque chip detector to **90 inch-pounds**. Lockwire chip detector to plug (14) with lockwire (E231).
8. Install plug (4) and packing (5) in port (15). Lockwire plug (4) to plug (14) with lockwire (E231).



**WARNING**

Dry cleaning solvent (E162) is flammable and gives off toxic fumes. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

9. Clean union (16) and elbow (17). Use dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry with low pressure compressed air.
10. Install union (16) and packing (18) in port (19).
11. Install nut (20) on elbow (17). Install elbow and packing (21) in port (22) with elbow pointing up.

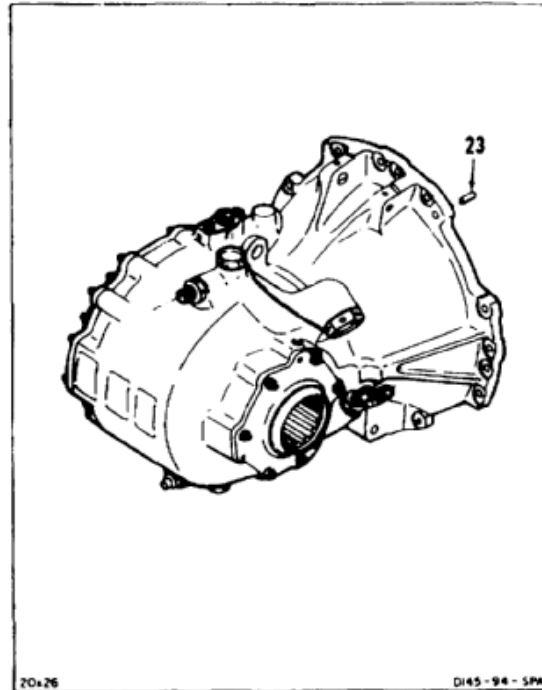


12. Install pin (23).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 100 to 750 Inch-pounds  
 Sling (T34)  
 Hoist  
 Open End Wrench, 1-1/4 Inches  
 Open End Wrench, 1-1/2 Inches  
 Rope Guide Line

**Materials:**

Oil (E254)  
 Epoxy Primer (E292)

**Parts:**

Packing

**Personnel Required:**

Medium Helicopter Repairer (2)  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Engine Transmission Quill Shaft Inspected (Task  
 6-101)



Do not install engine transmissions that have a prefix letter of 'P' in the input pinion spiral bevel gearshaft (145D6301) and spiral bevel gearshaft (145D6302) serial numbers. These transmissions are considered unserviceable.

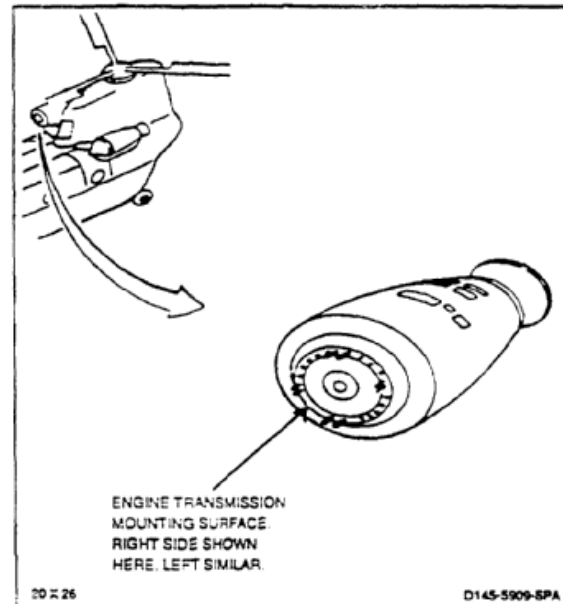


If bolts are not removed from locations (2 or 3) on engine, damage to components can result. Modified engines have cover plates or internal wrenching plugs installed at locations (2 and 3).

**NOTE**

Procedure is similar to install left or right transmission. Right transmission is shown here. Differences are notes in steps.

Ensure there is a coating of epoxy primer (E292) between the mounting holes of the engine transmission and the mounting hardware (8 studs and washers). A coating of epoxy primer (E292) shall exist in the mounting holes and the recessed washer area of the engine transmission, over the surface of the eight washers and over the unthreaded surface of the studs. No parts shall be installed while primer is wet.



1. Check to see if there are bolts installed on engine (1) at locations (2 and 3). If so, remove bolt at (2) for right installation. Remove bolt at (3) for left installation.
2. Install packing (4) on engine (1).

**WARNING**

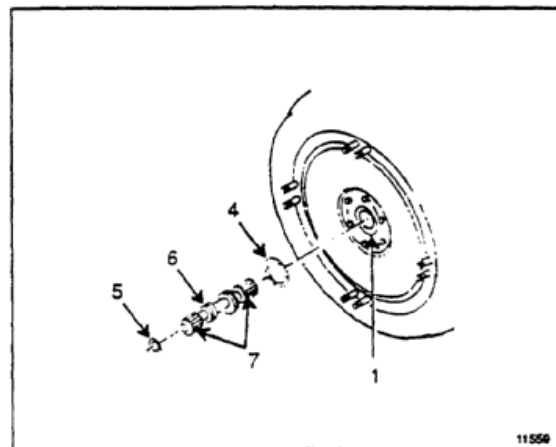
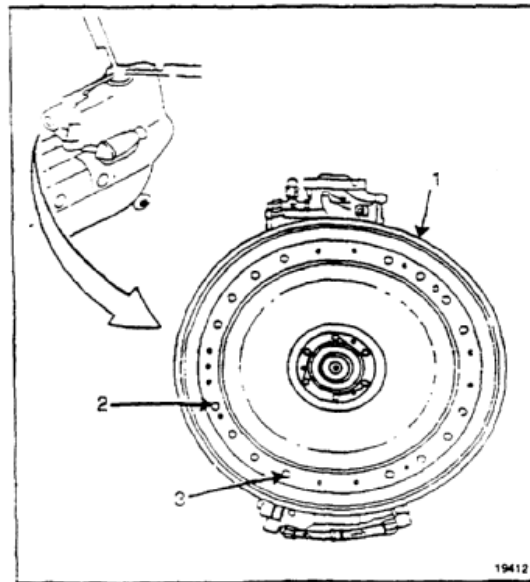
Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

3. Coat packing (5) with oil (E254). Install packing on quill shaft (6).

**CAUTION**

Do not use grease on quill shaft splines. Grease will contaminate transmission oil.

4. Coat splines (7) on both ends of quill shaft (6) with oil (E254). Install shaft in engine (1).

**INSPECT**



5. Connect sling (T34) (8) to lifting lug (9). Connect work hoist hook (10) to sling (T34).

**WARNING**

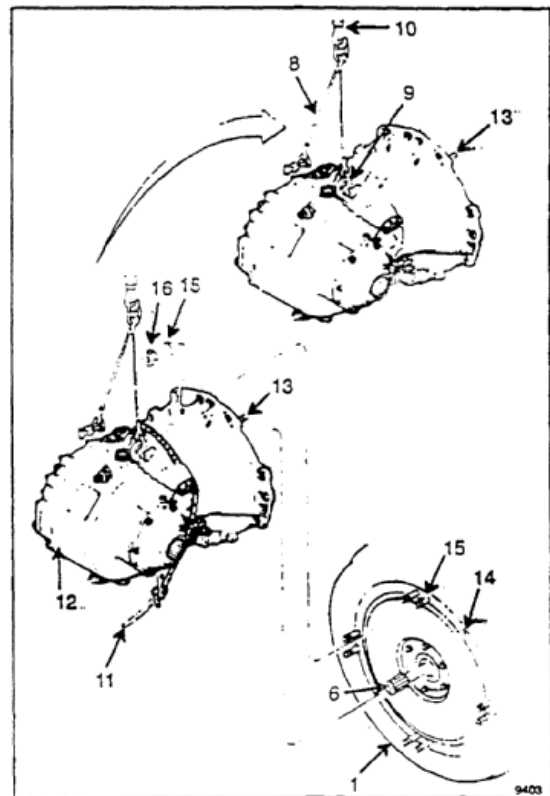
Transmission is heavy and can injure personnel if it drops. Transmission must be supported by hoist and moved carefully to prevent injury to personnel.

6. Attach guide line (11) to transmission (12).
7. Have helper raise hoist hook (10) to align transmission (12) with engine (1). Use guide line (11) to guide transmission. Align dowel pin (13) with hole (14) in engine.

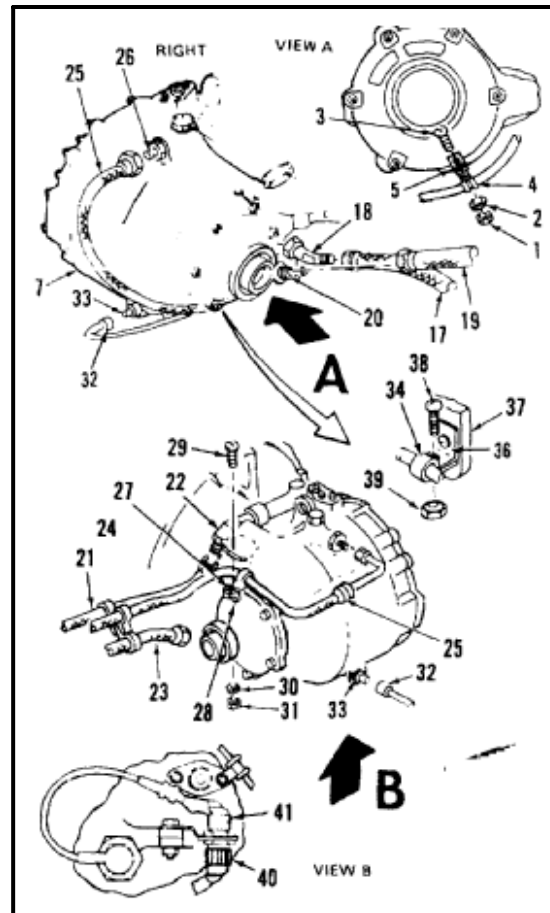
**NOTE**

Dowel pin hole is at **1 o'clock** position on engine.

8. Install transmission (12) on quill shaft (6) and 8 studs (15). Make sure dowel pin (13) aligns in engine hole (14).
9. Install eight washers (15) and nuts (16). Lubricate all threads with oil (E254). Torque nuts to **300 to 330 inch-pounds**.
10. Remove work hoist hook (10) from sling (T34) (8). Remove sling from lifting lug (9). Remove guide line (11).



11. On right installation, connect hose (17) to elbow (18). Connect hose (19) to reducer (20).
12. On left installation, connect hose (21) to elbow (22). Connect hose (23) to reducer (24).
13. Connect breather hose (25) to reducer (26). Torque to **75 inch-pounds**.
14. Install breather hose clamp (27) on clip (28) with screw (29), washer (30), and nut (31).
15. Connect connector (32) to temperature and chip detector (33).
16. Position clamp (34) with temperature and chip detector wiring (35) against clip (36) on lower lifting lug (37). Install screw (38) and nut (39).
17. With **37**, connect connector (40) to chip detector connector (41).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install engine transmission adapter assembly and engine drive shaft (Task 6-32).
- Close pylon hinged fairing (Task 2-2).
- Install engine transmission fairing (Task 4-73).
- Install engine air inlet screen (Task 4-76).
- Service engine transmission (Task 1-54).
- Perform ground run (TM 55-1520-240-10).

END OF TASK

**SECTION VIII**  
**OIL SYSTEMS**

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Magnet  
Magnifying Glass, 12 Power

**Materials:**

None

**Personnel Required:**

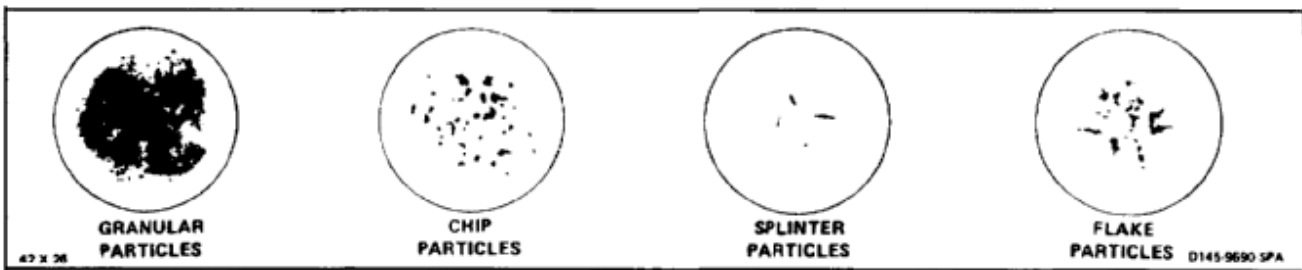
Inspector

**Equipment Condition:**

Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
  - a. Separate steel particles. Use a magnet.
  - b. Identify and separate remaining particles by visual inspection.
  - c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

MATERIAL	DESCRIPTION	ACTION REQUIRED
Steel	Fine, hair-like fuzz particles	Normal wear. No action required
	Limited amount of splinters, flakes, or granular particles	Possible failure. Perform serviceability check (Task 6-112)
	Thin flakes up to <b>1/16 inch</b> in diameter and <b>1/4 inch</b> long, maximum of 10 flakes	Perform serviceability check (Task 6-112)
Aluminum or magnesium	Massive amount of splinters, flakes, or granular particles	Failure. Replace transmission (Tasks 6-46 and 6-51)
	Granular particles	Perform serviceability check (Task 6-112)
Copper, bronze, or silver	Massive amount of granular particles or chip particles.	Failure. Replace transmission (Tasks 6-46 and 6-51).
	Limited amount of granular particles	Possible indication of bearing cage wear. Perform serviceability check (Task 6-112)
Fiberglass	Massive amount of granular particles or chip particles	Failure. Replace transmission (Tasks 6-46 and 6-51)
	Granular or fibrous particles	Perform serviceability check (Task 6-112)



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Flashlight

**Materials:**

None

**Personnel Required:**

Medium Helicopter Repairer

**References:**

TM 55-1520-240-10

**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

Helicopter on Level Surface

**WARNING**

Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgement must be used when determining allowable leakage.

**CAUTION**

The maximum allowable leakage rate, static, or dynamic, from any oil seal in the transmission is **20 drops (one cubic centimeter) per hour**. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.

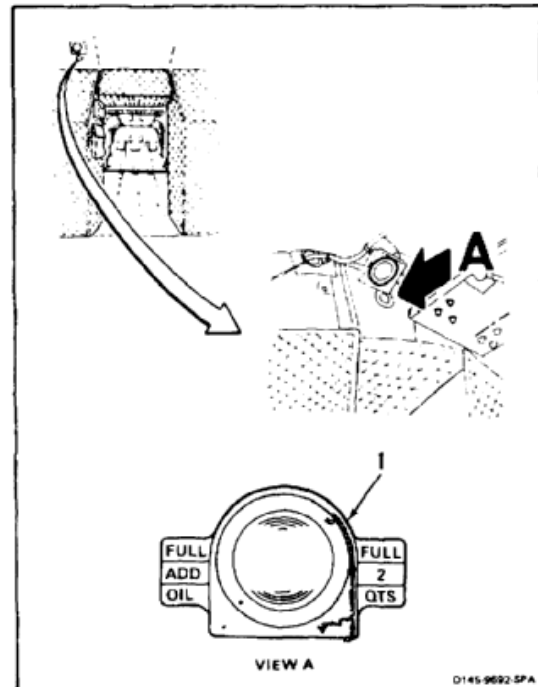
**NOTE**

If engines have not been operated within the past **30 minutes**, perform a **5 minute** ground run (TM 55-1520-240-10).

Check sight gage (1) from cockpit to determine oil level. Oil level shall be between the **FULL** and **ADD OIL** lines after a **2 hour** flight.

**FOLLOW-ON MAINTENANCE:**

Service forward transmission, if needed (Task 1-54).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Container, 14 Quart (2)  
Hose, 3/4 Inch ID, 36 Inches Long

**Materials:**

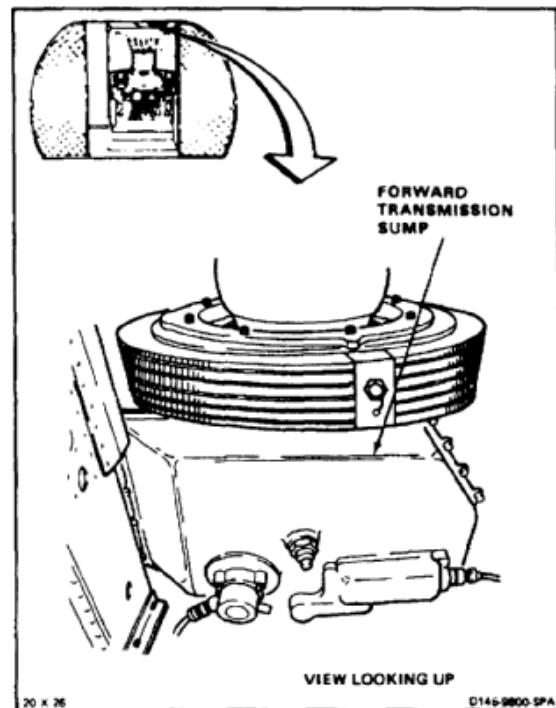
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

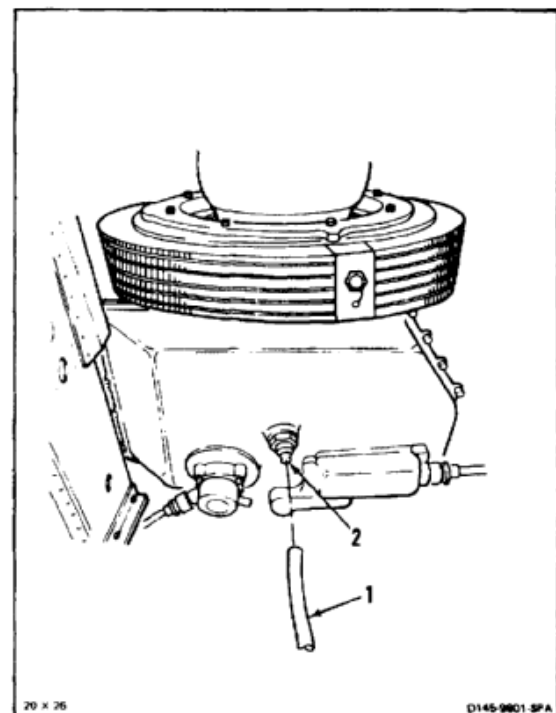
Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Transmission Drip Pan Removed (Task 2-3)

**NOTE**Sump holds about **23 quarts** of oil.

1. Connect hose (1) to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. Let oil drain into container.
3. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.

**FOLLOW-ON MAINTENANCE:**

Install forward transmission drip pan (Task 2-2).



END OF TASK

6-430

## INITIAL SETUP

**Applicable Configurations:**

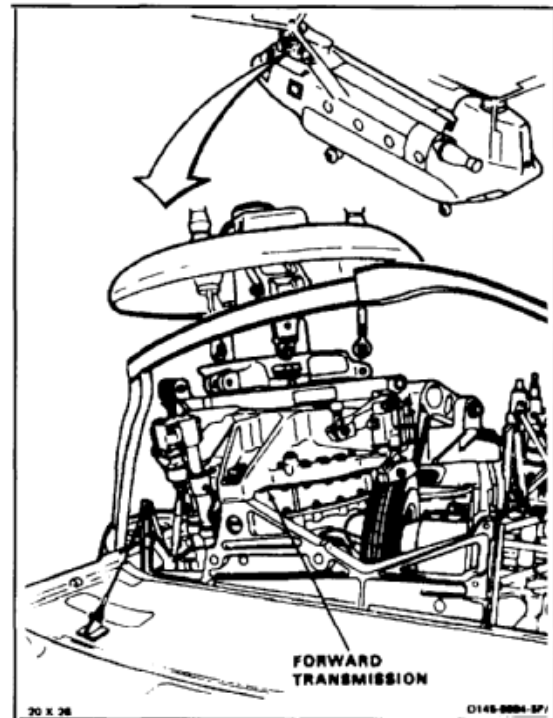
All

**Tools:**

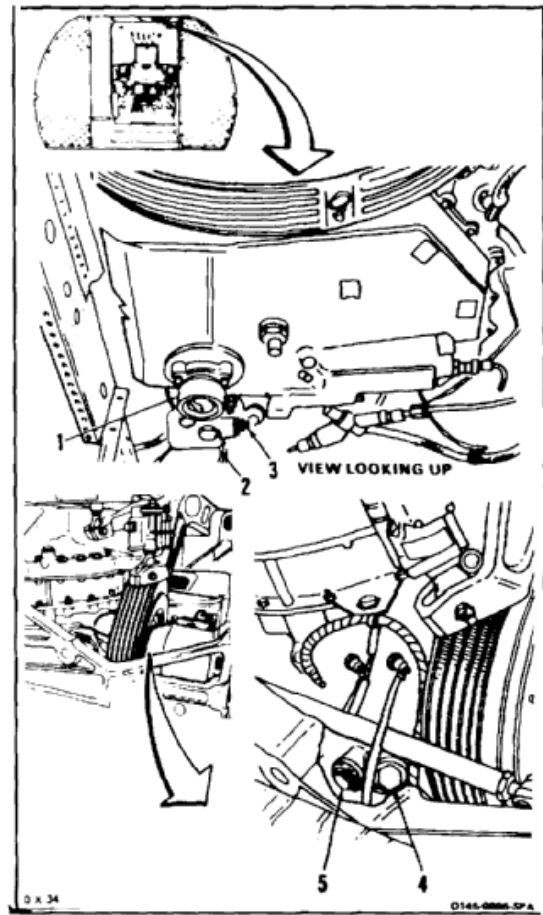
Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

None

**Personnel Required:**Medium Helicopter Repairer  
Rotary-Wing Aviator (2)**References:**Task 1-54  
Task 6-110  
Task 6-123  
Task 6-129  
Task 6-130  
Task 6-132  
Task 6-133  
Task 6-134  
TM 55-1520-240-10**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Transmission Drip Pan Removed (Task 2-3)

1. Drain oil from forward transmission (Task 6-110).
2. Remove and clean debris detection screen cap (1) (Task 6-133). Install cap (Task 6-134).
3. Replace main oil filter element (2) (Task 6-123). Note position of indicator button (3).
4. If indicator button (3) was extended, replace inlet screen (4) (Tasks 6-130 and 6-132).
5. Replace auxiliary oil filter (5) (Task 6-129).
6. Service forward transmission with oil (Task 1-54).
7. Have pilot perform ground run (TM 55-1520-240-10). When forward transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. Repeat steps 1 thru 6.



#### **FOLLOW-ON MAINTENANCE:**

Install forward transmission drip pan (Task 2-3).

END OF TASK

6-432



## INITIAL SETUP

**Applicable Configurations:**

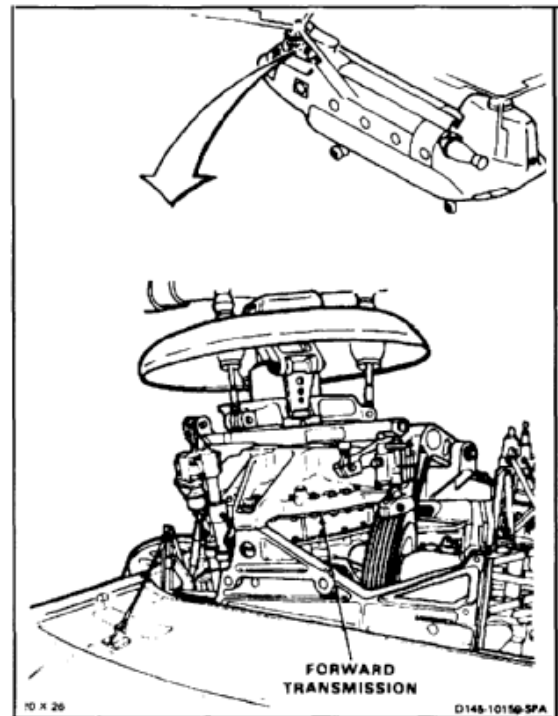
All

**Tools:**

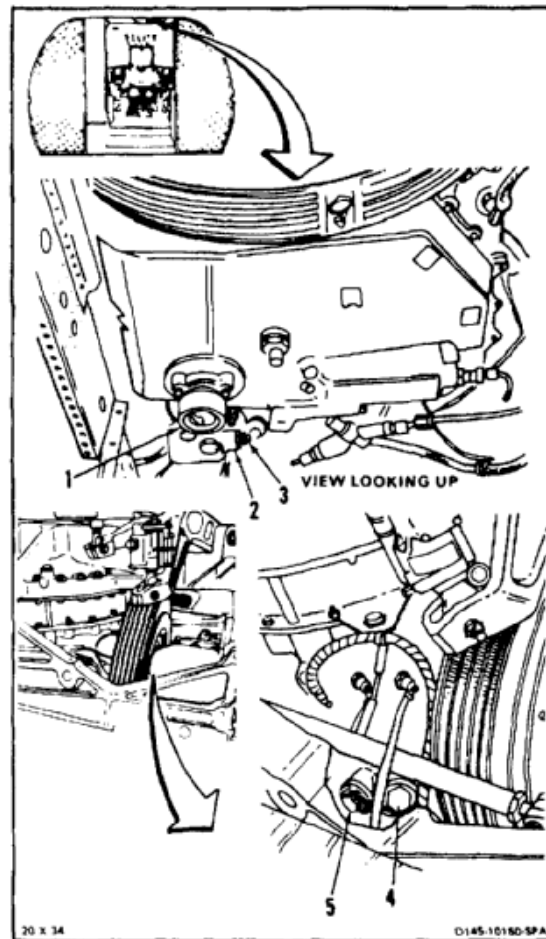
Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Cheesecloth (E112)

**Personnel Required:**Medium Helicopter Repairer  
Rotary-Wing Aviator (2)**References:**Task 1-5  
Task 6-46  
Task 6-51  
Task 6-110  
Task 6-111  
Task 6-123  
Task 6-129  
Task 6-130  
Task 6-131  
Task 6-132  
Task 6-133  
Task 6-134  
TM 55-1520-240-10**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Transmission Drip Pan Removed (Task 2-3)  
Forward Transmission Fairing Left Work Platform  
Open (Task 2-2)

1. Drain oil through cheesecloth (E112) or similar filter material (Task 6-110). Check for debris.
2. Remove and clean debris detection screen cap (1) (Task 6-133). Install cap (Task 6-134).
3. Replace element in main oil filter (2) (Task 6-123). Note position of indicator button (3). If button is extended, remove and inspect inlet screen (4) (Tasks 6-130 and 6-131). Install screen (Task 6-132).
4. Replace auxiliary oil filter (5) (Task 6-129).
5. Service transmission (Task 1-54).
6. Have pilot perform ground run for **1 hour** at normal rotor rpm (TM 55-1520-240-10). If forward transmission oil pressure or temperature changes abnormally or if debris screen or chip detector light comes on, have pilot shut down helicopter. Check for cause.
7. Drain oil through cheesecloth (E112) or similar filter material (Task 6-110). Check for debris.
8. Remove, inspect, and clean debris screen cap (1) (Task 6-133). Install cap (Task 6-134).
9. Remove element in main oil filter (2). If element contains debris or filter button (3) was extended, replace with new element (Task 6-123).
10. If element in filter (2) contains debris and filter button (3) was also extended, remove, inspect, and install inlet screen (4) (Tasks 6-130, 6-131, and 6-132).
11. Replace auxiliary oil filter (5) (Task 6-129).
12. If quantity and size of particles obtained from oil filters (2 and 4) and cap (1) have not decreased by at least **30 percent** from original amount, replace forward transmission (Tasks 6-46 and 6-51).
13. If quantity and size of particles obtained from oil filters (2 and 4) and cap (1) have decreased by **30 percent** or more, repeat steps 1 thru 11. If any debris is obtained, replace forward transmission (Tasks 6-46 and 6-51).



#### **FOLLOW-ON MAINTENANCE:**

- Close forward transmission fairing left work platform (Task 2-2).
- Install forward transmission drip pan (Task 2-3).

END OF TASK

**6-112.1 REPLACE FORWARD TRANSMISSION OIL COOLER BYPASS VALVE**

6-112.1

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart  
 Socket, 1-1/2 Inch

**Materials:**

Lockwire (E231)  
 Oil (E254)  
 Cloths (E120)

**Parts:**

Packings (2)

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

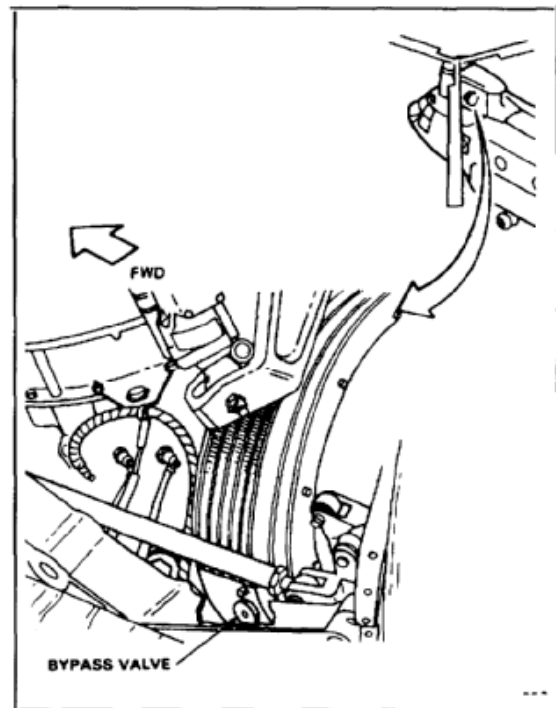
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Left Forward Transmission Fairing Open (Task 2-2)  
 Forward Transmission Drip Pan Removed (Task 2-3)

**General Safety Instructions:****WARNING**

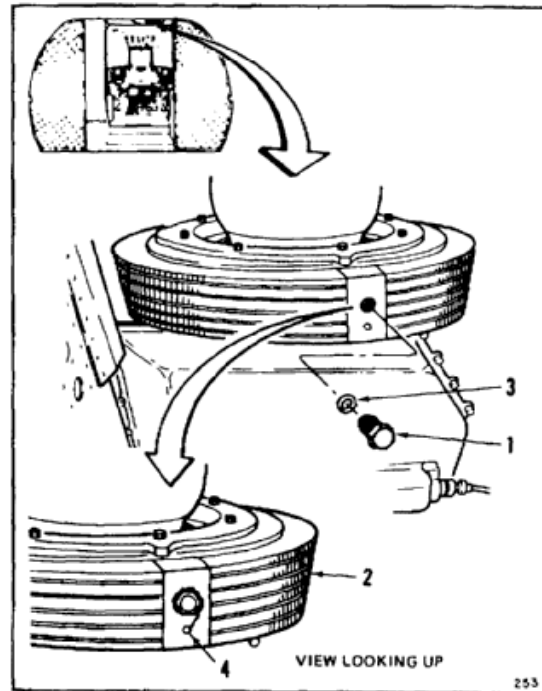
Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.



**DRAIN OIL COOLER**

1. Remove lockwire from drain plug (1). Remove plug from oil cooler (2). Drain oil into container.
2. Remove packing (3) from plug (1).
3. Install packing (3) on drain plug (1). Install drain plug. Lockwire plug to nipple (4). Use lockwire (E231).

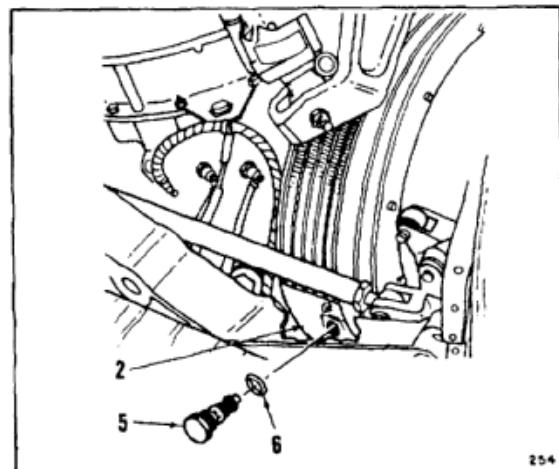


**REMOVE VALVE**

**NOTE**

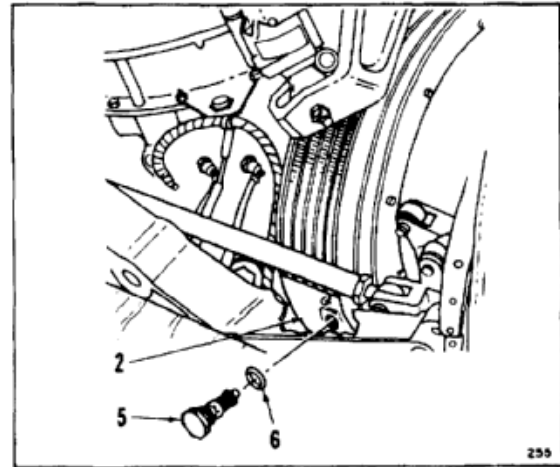
Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). Remove valve from oil cooler (2). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).



**6-112.1 REPLACE FORWARD TRANSMISSION OIL COOLER BYPASS VALVE (Continued)****6-112.1****INSTALL VALVE**

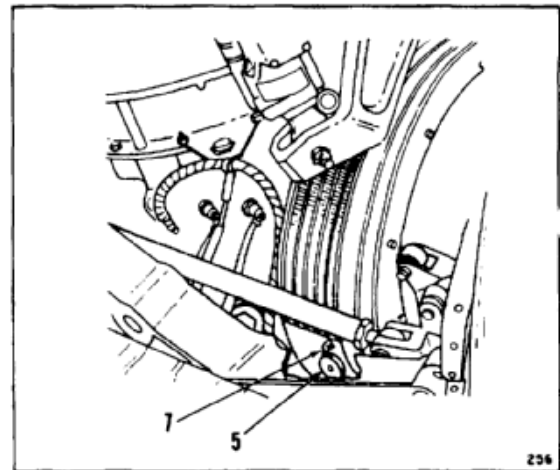
6. Coat packing (6) and thread of bypass valve (5) with oil (E254). Install packing on valve.
7. Install valve (5) in oil cooler (2). Torque valve to **80 inch-pounds**.



8. Lockwire valve (5) to nipple (7). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install forward transmission drip pan (Task 2-3).  
 Close left forward transmission fairing (Task 2-2).  
 Service forward transmission (Task 1-54).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart  
 Wrench, 1 Inch  
 Rawhide Mallet

**Materials:**

None

**Parts:**

Packing

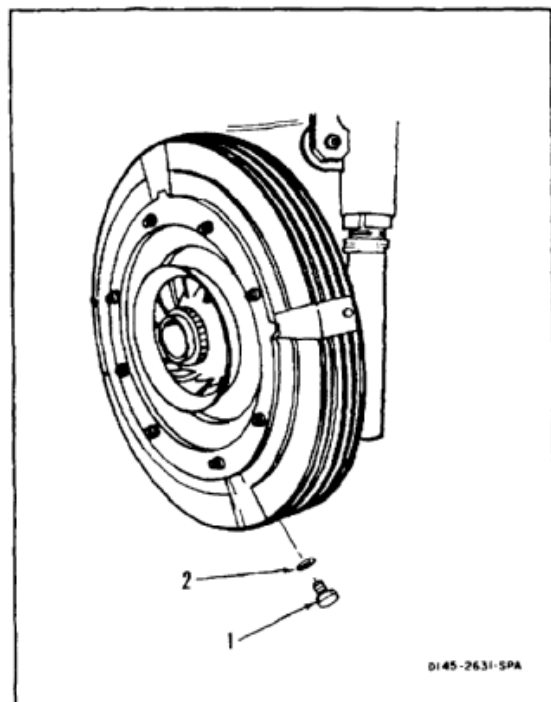
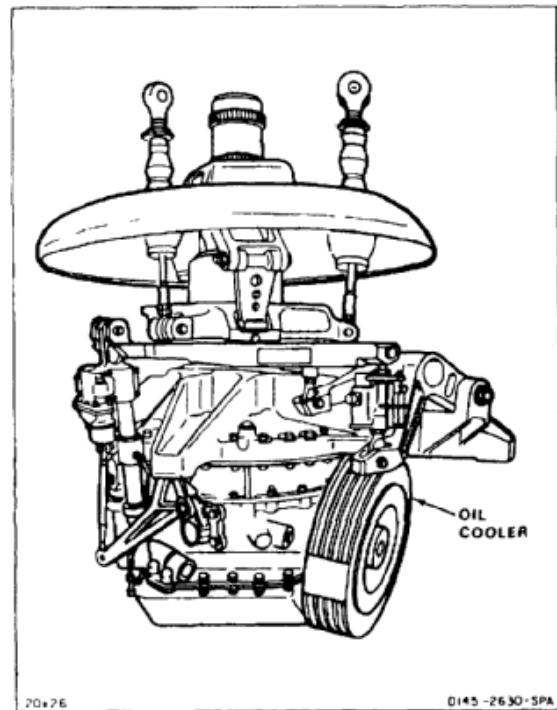
**Personnel Required:**

Medium Helicopter Repairer (2)

**Equipment Condition:**

Off Helicopter Task  
 Forward Transmission Removed (Task 6-46)

1. Remove lockwire from drain plug (1). Remove plug and packing (2). Drain oil into container.
2. Install plug (1) and packing (2). Torque plug to **80 inch-pounds**.



3. Remove eight nuts (3) and washers (4) from studs (5).

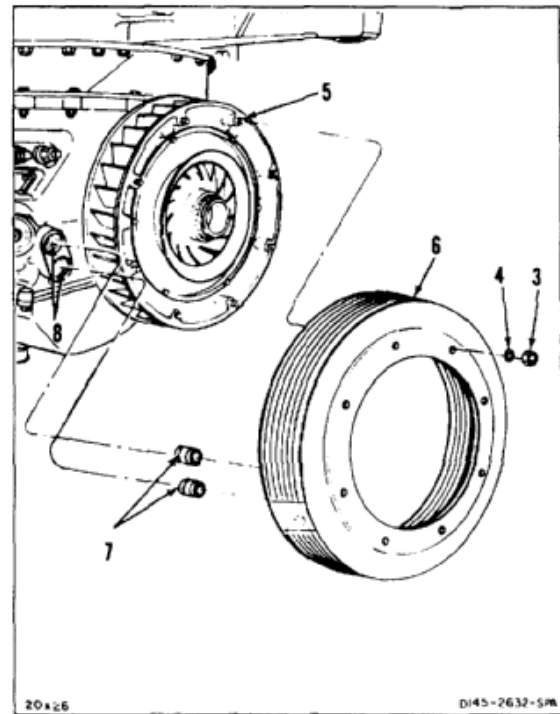


Do not damage oil transfer tubes when removing cooler.

**NOTE**

Transfer tubes may come off with cooler or stay in transmission.

4. Loosen cooler (6) with rawhide mallet. With aid of helper, pull cooler straight back from studs (5). Drain oil into container.
5. If tubes (7) come out with cooler (6), remove tubes from cooler. Install tubes in transmission ports (8).



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J  
Goggles  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E13) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Gloves (E186)  
Acetic Acid (E21)  
Alodine Powder (E65)  
Epoxy Primer (E293)  
Epoxy Topcoat (E166)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23

**Equipment Condition:**

Off Helicopter Task

**General Safety Instructions:****WARNING**

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

**WARNING**

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

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

**WARNING**

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Do not wear photogray glasses when fluorescent inspecting. They reduce ability to see cracks.



**NOTE**

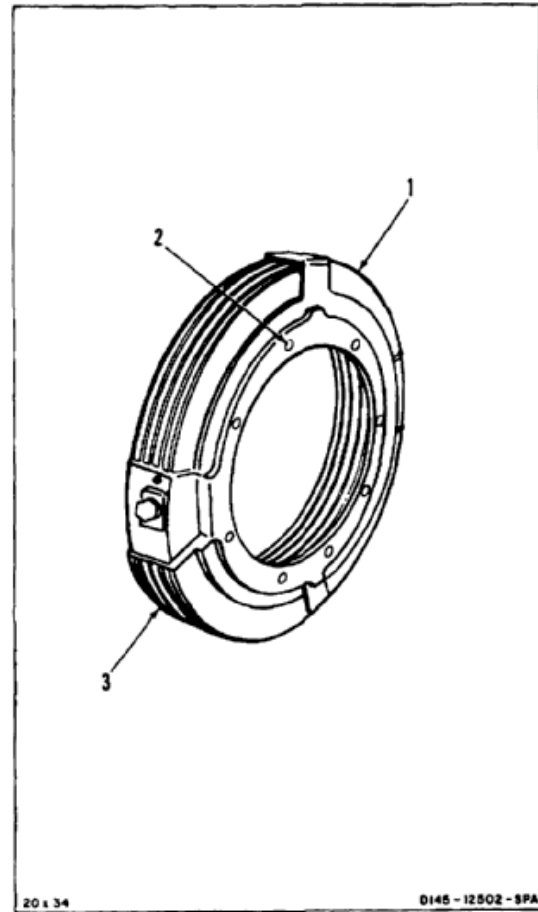
Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. Clean oil and grease from damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. Check extent and location of damage on cooler (1).

**NOTE**

Dimensions in this step refer to extent of damage after rework.

- a. Depth of damage shall not be more than **0.060 inch**.
  - b. Damage shall not extend over more than one surface or enter any radius.
  - c. Damage shall not be closer than **1.00 inch** to any mounting hole (2).
  - d. More than **3 inches** of fins (3) shall not be crushed beyond straightening.
  - e. If any fin (3) is bent more than **30°**, straighten it.
3. Fluorescent inspect damaged area to check for cracks (TM 1-1500-335-23). There shall be no cracks.
  4. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
  5. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.



6. Acid etch reworked area as follows:
  - a. Prepare solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E186) and goggles.
  - b. Swab area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse area with cold water.
7. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks.
8. Clean reworked area with naphtha (E245) and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. Swab on solution of alodine powder (E65) and water. Use gauze sponges (E184). Swab for **2 to 5 minutes**. Rinse area with cold water and let air dry.
10. Apply epoxy primer (E293) to reworked area. Let air dry for **2 hours**.
11. Apply epoxy topcoat (E166).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Gloves (E186)  
 Lockwire (E230)

**Parts:**

Packings

**Personnel Required:**

Medium Helicopter Repairer (2)  
 Inspector

**References:**

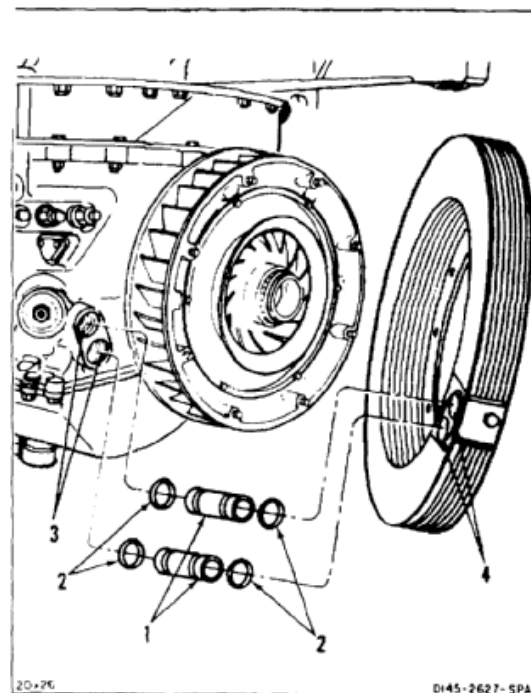
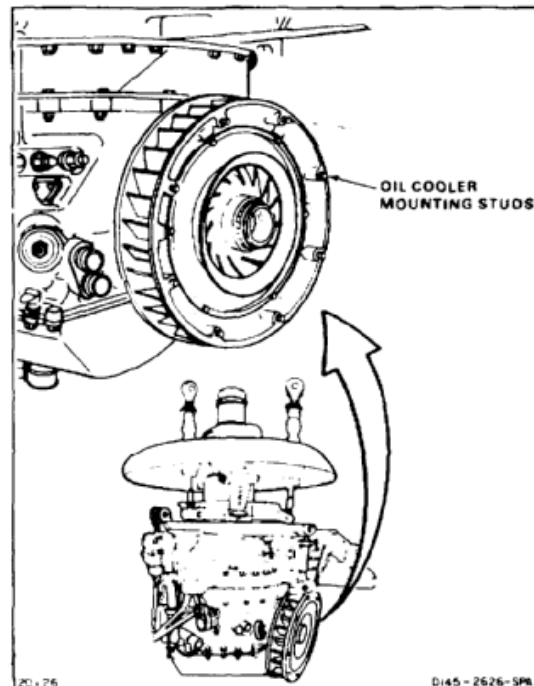
TM 55-1520-240-23P

1. Remove two oil transfer tubes (1) and four packings (2) from transmission ports (3).

**WARNING**

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

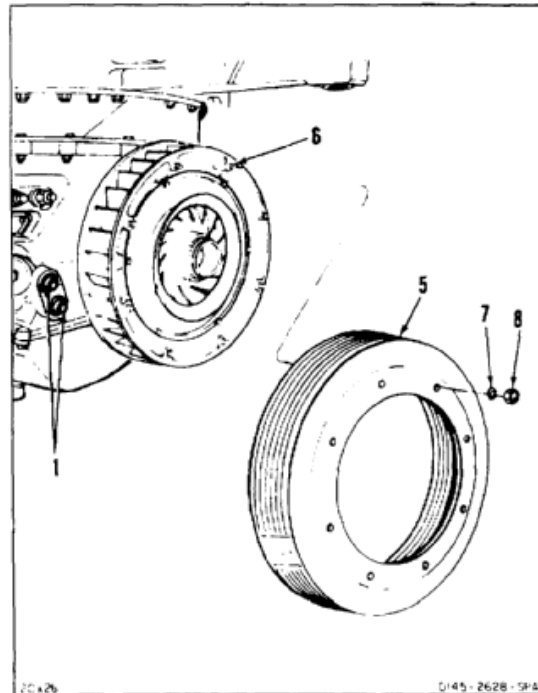
2. Clean transmission ports (3) and cooler ports (4). Use solvent (E162) and cloths (E120). Wear gloves (E186).
3. Install transfer tubes (1) and packings (2) in transmission ports (3).



**CAUTION**

Transfer tubes can be damaged if cooler is not aligned.

4. Align cooler (5) with eight studs (6) and two transfer tubes (1). Install cooler on studs and tubes. Use rawhide mallet.
5. Install eight washers (7) and nuts (8) on studs (6). Torque nuts to **60 inch-pounds**.

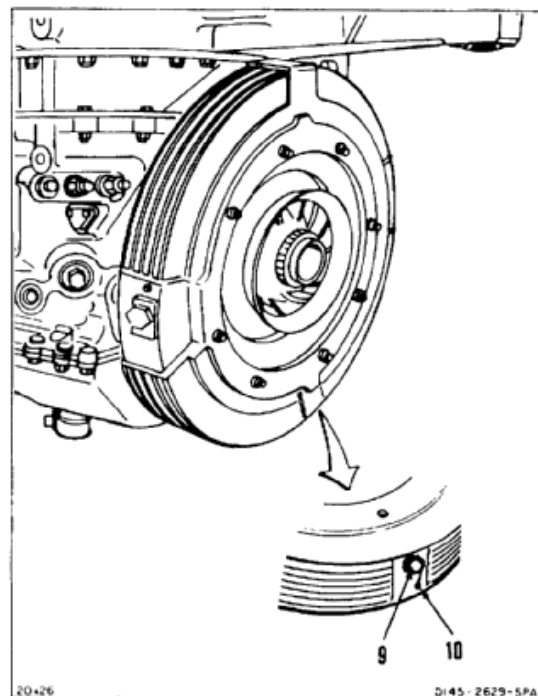


6. Lockwire drain plug (9) to nipple (10), if required. Use lockwire (E230).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-444

## INITIAL SETUP

**WARNING****Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J  
Goggles

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Barrier Material (E80)  
Masking Tape (E388)  
Gloves (E186)  
Acetic Acid (E21)  
Chromic Acid (E114)  
Calcium Sulphate (E91)  
Epoxy Primer (E293)  
Epoxy Topcoat (E166)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23

**Equipment Condition:**

Off Helicopter Task

**General Safety Instructions:****WARNING**

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

Acetic acid (E21) is combustible and toxic. Chromic acid (E114) is extremely toxic. Both can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.

**NOTE**

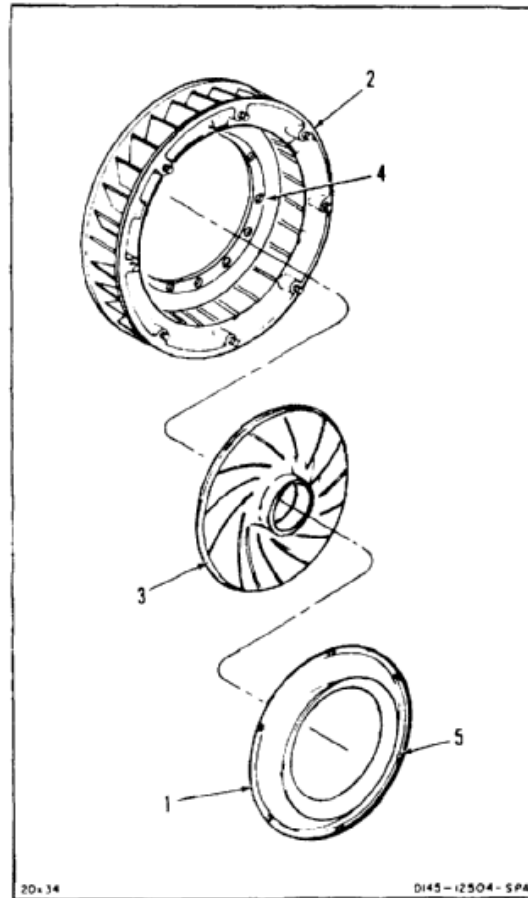
Reparable damage is limited to scratches, nicks, gouges and minor corrosion.

1. Clean oil and grease from damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. Check location and extent of damage on fan parts.

**NOTE**

Dimensions in this step refer to extent of damage after rework.

- a. Depth of damage on shroud (1) and diffuser (2) shall not be more than **0.025 inch**.
  - b. Depth of damage on impeller (3) shall not be more than **0.015 inch**. There shall be no more than four damaged areas on one impeller blade.
  - c. Damage shall not extend over more than one surface or enter any radius.
  - d. Damage shall not be closer than **1.00 inch** to any mounting hole (4).
3. Fluorescent inspect damaged area to check for cracks (TM 1-1500-335-23). There shall be no cracks.
  4. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe limits of step 2.
  5. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.



**6-114.1 REPAIR FORWARD TRANSMISSION OIL COOLER FAN ASSEMBLY (Continued)****6-114.1**

6. Acid etch reworked area as follows:
  - a. Prepare solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E186) and goggles.
  - b. Swab area with solution for **3 minutes**. Use gauze sponges (E184).
  - c. Rinse area with cold water.
7. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks.
8. Clean reworked area with naphtha (E246) and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. Swab on solution of chromic acid (E114) and calcium sulphate (E191). Swab until metal becomes dull gold to brown. Use gauze sponges (E184). Rinse area with cold water and let air dry.
10. Apply epoxy primer (E293) to reworked area. Let air dry for **12 hours**.
11. Apply epoxy topcoat (E166).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

None

**Personnel Required:**

Medium Helicopter Repairer

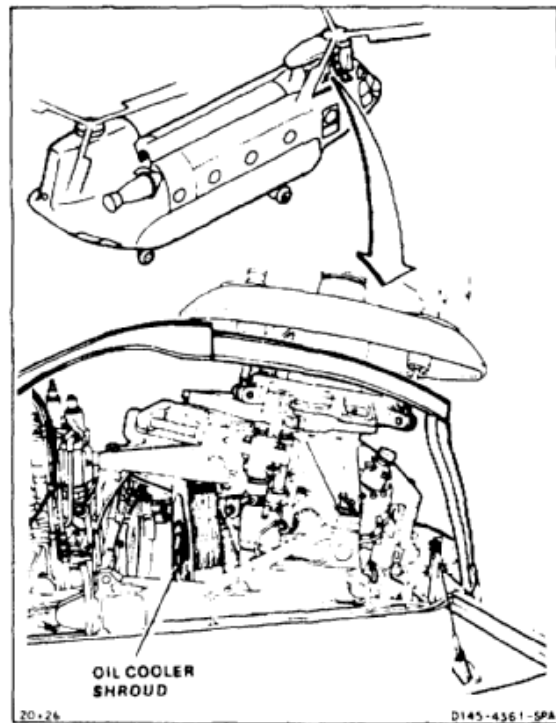
**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

Forward Transmission Fairing Open (Task 2-2)

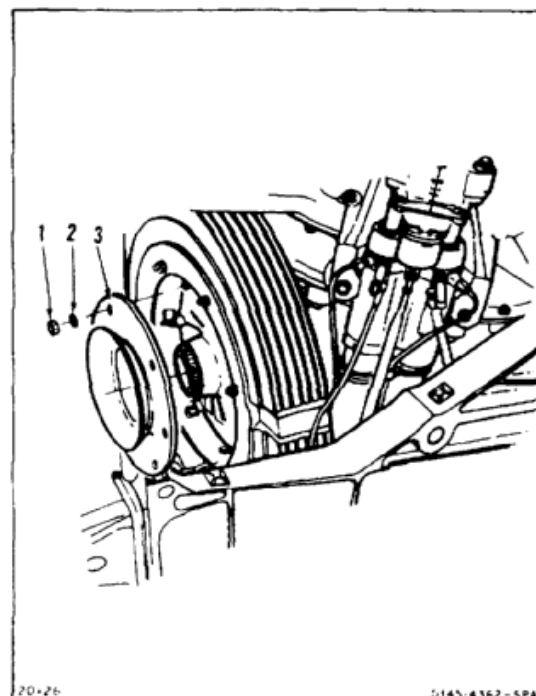
Oil Cooler Air Inlet Duct Removed (Task 6-121)

No. 1 and No. 2 Drive Shafts Removed (Tasks 6-2  
and 6-3)

1. Remove six nuts (1) and washers (2) from around shroud (3).
2. Remove shroud (3).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-448



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

None

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

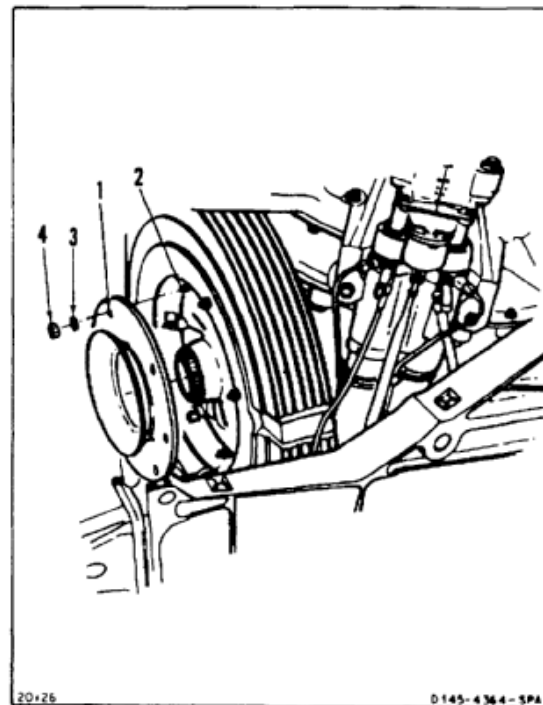
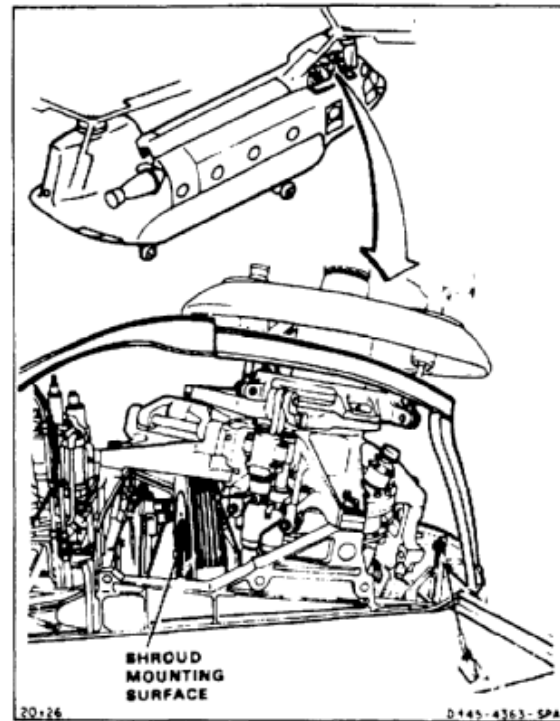
**NOTE**

Fan set shroud P/N 145DS106-7 (723104A), impeller P/N 145DS106-8 (723102A), and diffuser P/N 145DS106-9 (730737) manufactured by Sundstrand must be used as a set and the parts are not individually interchangeable with the equivalent fan set shroud P/N 145DS106-11 (40926-1), impeller P/N 145DS106-12 (40927-1), and diffuser P/N 145DS106-13 (40928-1) manufactured by Noah Howden.

1. Install shroud (1) on six studs (2).
2. Install six washers (3) and nuts, (4). Torque nuts to **60 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install No. 1 and No. 2 drive shafts (Tasks 6-17 and 6-18).  
Install oil cooler air inlet duct (Task 6-122).  
Close forward transmission fairing (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Spanner Wrench  
 Wood Plank, 2 Inches x 4 Inches x 36 Inches  
 Forward Transmission Input Shaft Adapter Assembly

**Materials:**

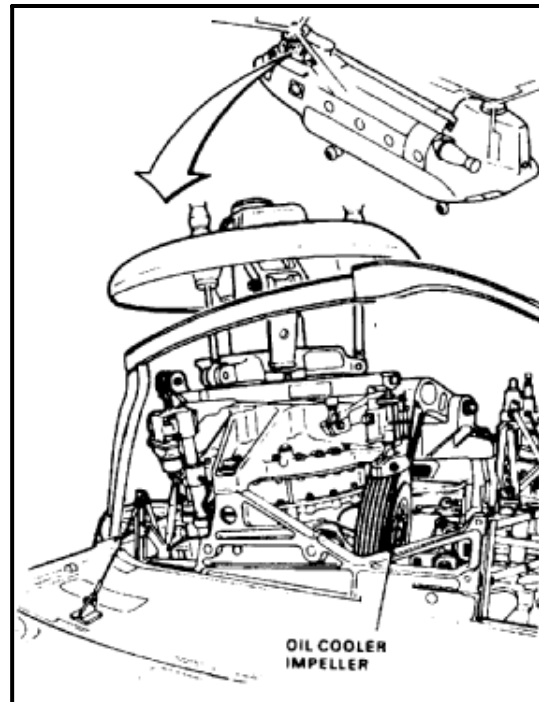
None

**Personnel Required:**

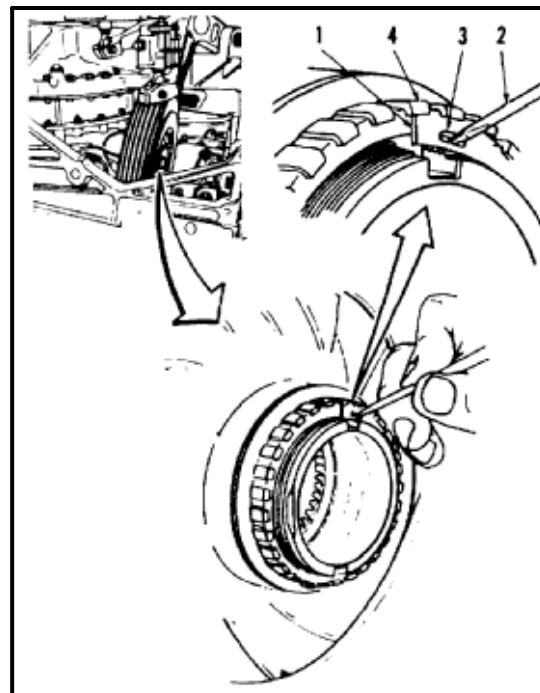
Medium Helicopter Repairer (2)

**Equipment Condition:**

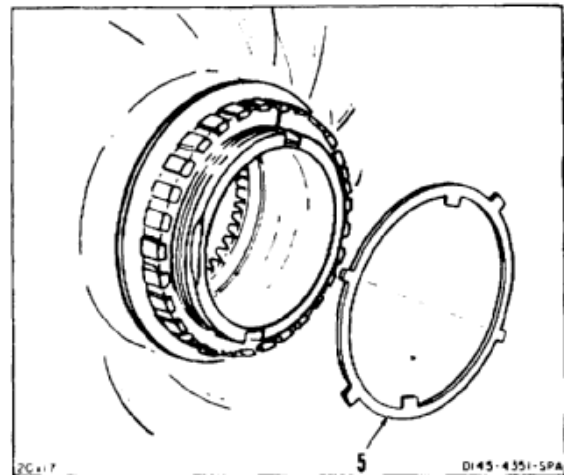
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Forward Transmission Fairings Open (Task 2-2)  
 Oil Cooler Air Inlet Duct Removed (Task 6-121)  
 Oil Cooler Fan Shroud Removed (Task 6-115)  
 Forward Transmission Adapter Assembly Removed  
 (Task 6-5)



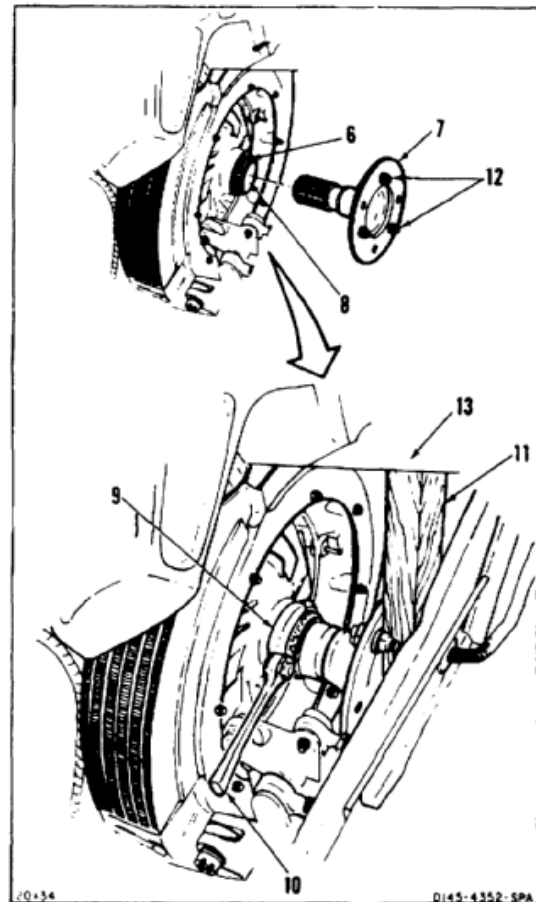
1. Remove retaining ring (1) as follows:
  - a. Insert screwdriver (2) in slot (3).
  - b. Pull down on ring (1) to free it from teeth of locknut (4).
  - c. Peel entire length of ring (1) from under locknut (4).



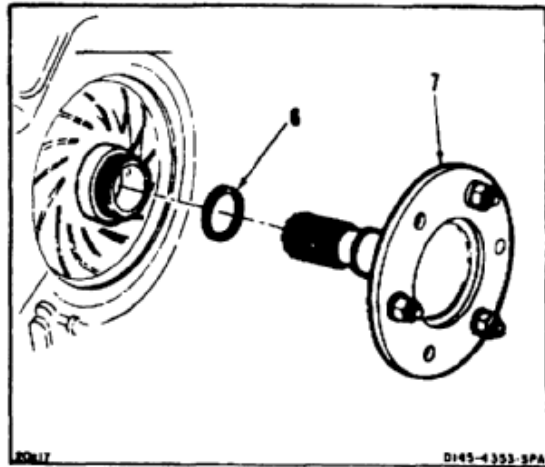
2. Remove tangwasher (5).



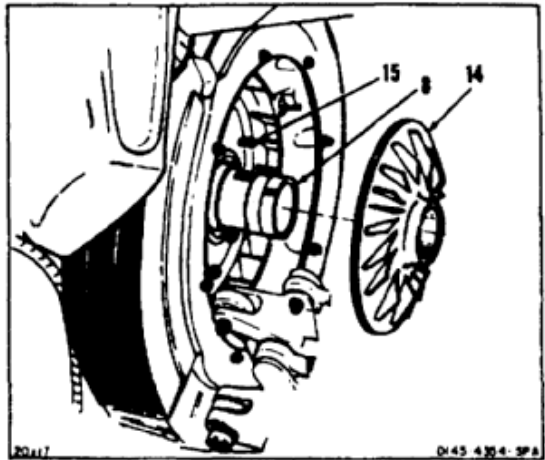
3. Loosen locknut (6) as follows:
- Install adapter assembly (7) in input shaft (8).
  - Install spanner wrench (9) and socket drive (10) on locknut (6).
  - Have helper place wood plank (11) across nuts (12) as shown.
  - Have helper brace plank (11) against transmission lug (13) to keep adapter assembly (7) from turning. Loosen locknut (6).
  - Remove spanner wrench (9), socket drive (10), and wood plank (11).



4. Remove adapter assembly (7). Remove locknut (6).



5. Pull and remove impeller (14) from shaft (8). Remove key (15) from shaft.



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-452

**6-117.1 INSPECT FORWARD TRANSMISSION OIL COOLER IMPELLER****6-117.1****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Technical Inspection Tool Kit, NSN 5180-00-323-5114  
 Torque Wrench, 100 to 500 Foot-Pounds

**Materials:**

None

**Personnel Required:**

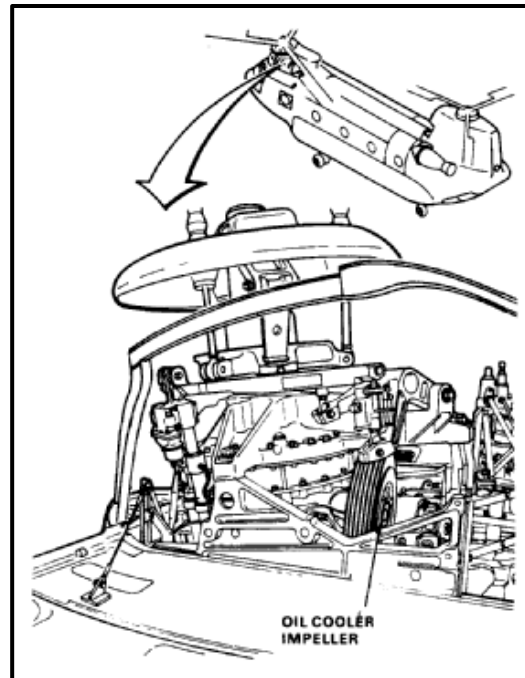
Medium Helicopter Repairer (2)  
 Inspector

**References:**

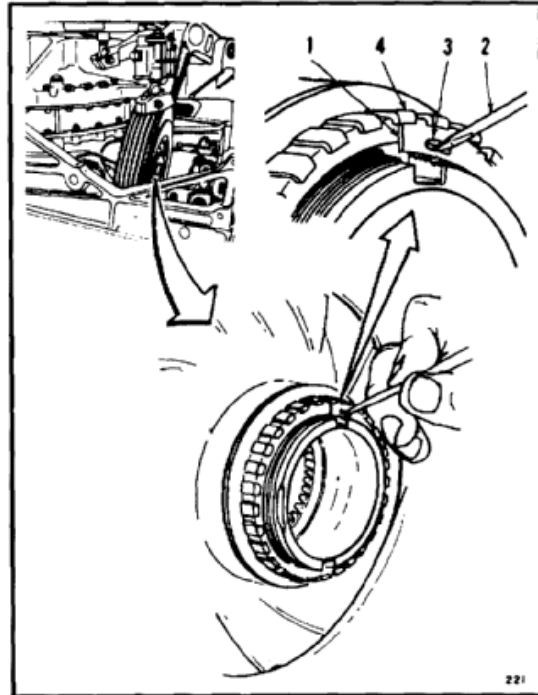
Task 6-117  
 Task 6-118  
 TM 1-1520-253-23

**Equipment Condition:**

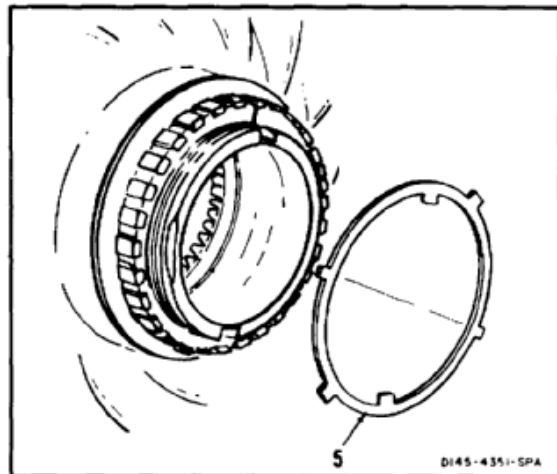
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Forward Transmission Fairings Open (Task 2-2)  
 Oil Cooler Air Inlet Duct Removed (Task 6-121)  
 Oil Cooler Fan Shroud Removed (Task 6-115)  
 Forward Transmission Adapter Assembly Removed  
 (Task 6-5)



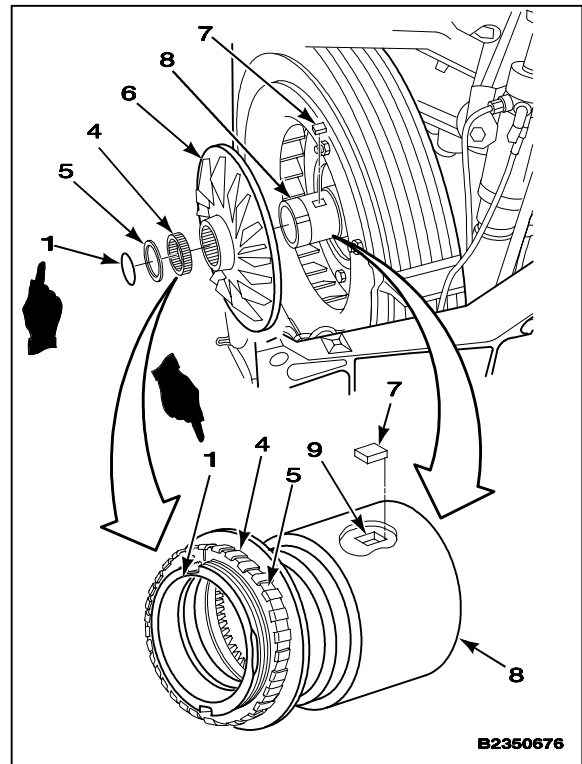
1. Remove retaining ring (1) as follows:
  - a. Insert screwdriver (2) in slot (3).
  - b. Pull down on retaining ring (1) to free it from teeth of locknut (4).
  - c. Peel entire length of retaining ring (1) from under locknut (4).



2. Remove tangwasher (5).



3. Inspect locknut (4) as follows:
  - a. Grasp the locknut (4) and check it for hand tightness in the off direction.
  - b. If locknut (4) can be turned by hand, remove locknut (4), impeller (6) and key (7) from shaft (8) (Task 6-117).
  - c. Inspect key (7), locknut (4), tangwasher (5), impeller key slot (9), face of the impeller key slot (9), and face of the impeller (6) that contacts the locknut (4) for wear. If wear exceeds **0.005 inch**, replace affected items.
  - d. Inspect the impeller key slot (9) in the shaft for wear. If wear exceeds **0.010 inch**, replace the transmission.
  - e. If locknut (4) cannot be turned by hand, torque check nut to **180-230 foot-pounds** and install tangwasher (5) and retaining ring (1). (Refer to steps 4 and 5, Task 6-118.)
4. If crack is suspected in forward transmission oil cooler impellar, refer to TM 1-1520-253-23.



#### **FOLLOW-ON MAINTENANCE:**

- Install forward transmission adapter assembly (Task 6-8).
- Install oil cooler fan shroud (Task 6-116).
- Install oil cooler air inlet duct (Task 2-122).
- Close forward transmission fairings (Task 2-2).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Spanner Wrench
- Torque Wrench, 0-600 Foot-Pounds
- Socket Wrench Adapter, 1/2 Inch Square Male End, 3/4 Inch Square Female End
- Wood Plank, 2 Inches x 4 Inches x 36 Inches
- Forward Transmission Input Shaft Adapter Assembly
- Rawhide Mallet

**Materials:**

Oil (E254)

**Personnel Required:**

- CH-47 Helicopter Repairer (2)
- Inspector

**References:**

TM 55-1520-240-23P

**General Safety Instructions:**

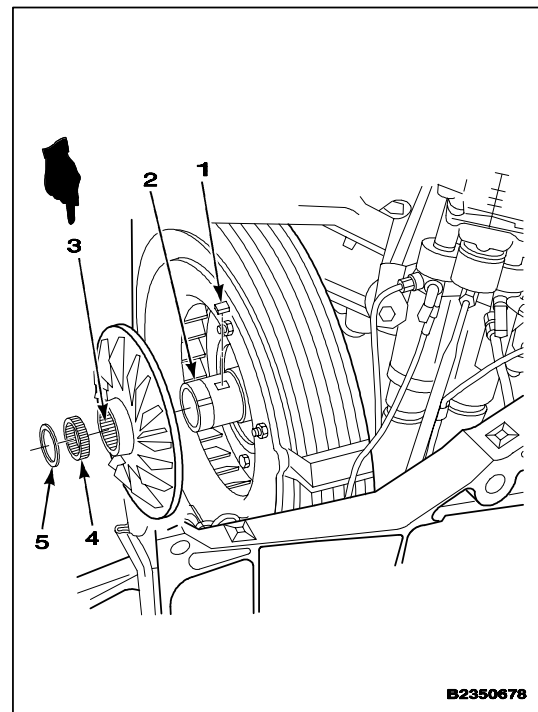
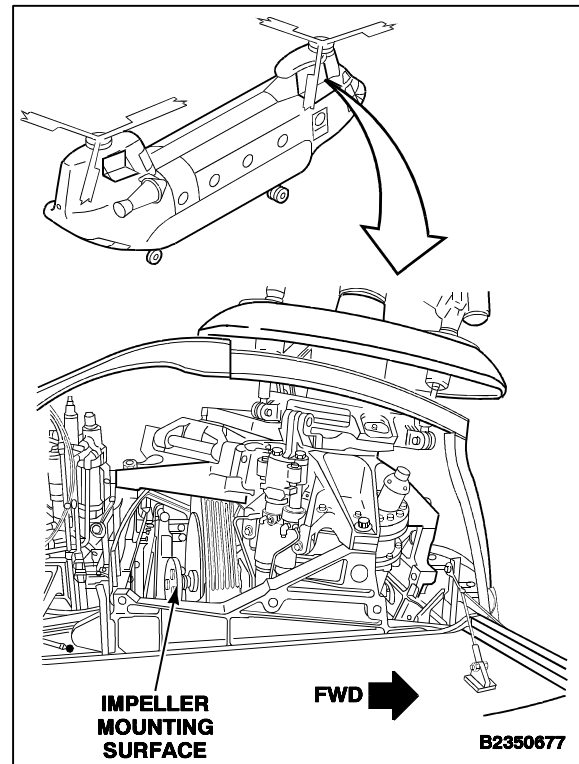
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

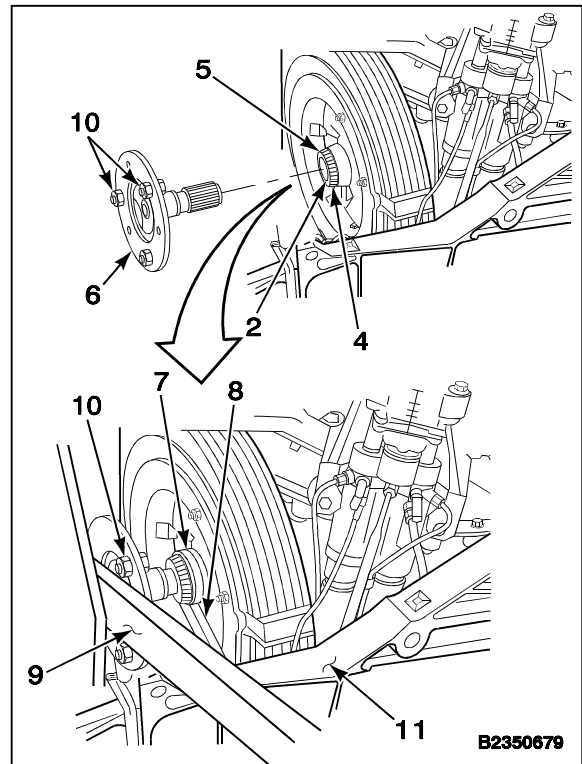
Fan set shroud P/N 145DS106-7 (723104A), impeller P/N 145DS106-8 (723104A), and diffuser P/N 145DS106-9 (730737) manufactured by Sundstrand must be used as a set and the parts are not individually interchangeable with the equivalent fan set shroud P/N 145DS106-11 (40926-1), impeller P/N 145DS106-13 (40927-1), and diffuser P/N 145DS106-12 (40928-1) manufactured by Noah Howden.

1. Coat bore of impeller (3), key (1), and input shaft (2) with oil (E254). Install key in shaft. Align impeller with key. Install impeller on shaft. Use mallet.
2. Apply light coat of oil (E254) to thread of locknut (4). Install locknut loosely on shaft (2). **DO NOT USE GREASE.**
3. Position tangwasher (5) over shaft (2).





4. Torque locknut (4) and install tangwasher (5) as follows:
  - a. Install adapter assembly (6) in input shaft (2).
  - b. Install spanner wrench (7) and torque wrench (8) on locknut (4).
  - c. Have helper place wood plank (9) across nuts (10) as shown.
  - d. Have helper brace plank (9) against structure (11) to keep adapter assembly (6) from turning. Torque locknut (4) to **180 foot-pounds**.
  - e. Install tangwasher (5) on locknut (4). If tangs do not align with slots in nut, rotate tangwasher **180°** and install.
  - f. If tangs do not align, increase torque on locknut (4) in small steps until tangs align. Do not torque over **230 foot-pounds**.
  - g. Remove adapter assembly (6), spanner wrench (7), torque wrench (8), and wood plank (9).

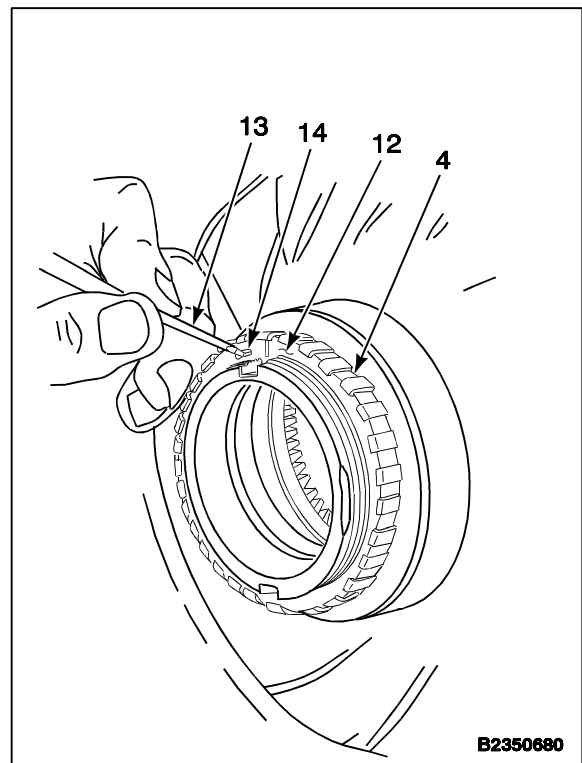


5. Install retaining ring (12) as follows:
  - a. Install end of retaining ring (12) under teeth of locknut (4).
  - b. Install entire length of retaining ring (12) under teeth of locknut (4). Compress end of ring as needed to install under locknut. Use thin screwdriver (13) inserted in slot (14).
  - c. Insert edge of screwdriver (13) in slot (14) and push retaining ring (12) clockwise. Ring shall expand under teeth of locknut (4) to lock.

### INSPECT

### FOLLOW-ON MAINTENANCE:

- Install oil cooler fan shroud (Task 6-116).
- Install forward transmission adapter assembly (Task 6-8).
- Install No. 1 and No. 2 drive shaft (Tasks 6-17 and 6-18).
- Install oil cooler air inlet duct (Task 6-122).
- Close forward transmission fairings (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Spanner Wrench  
Wood Plank, 2 Inches x 4 Inches x 36 Inches  
Forward Transmission Input Shaft Adapter Assembly

**Materials:**

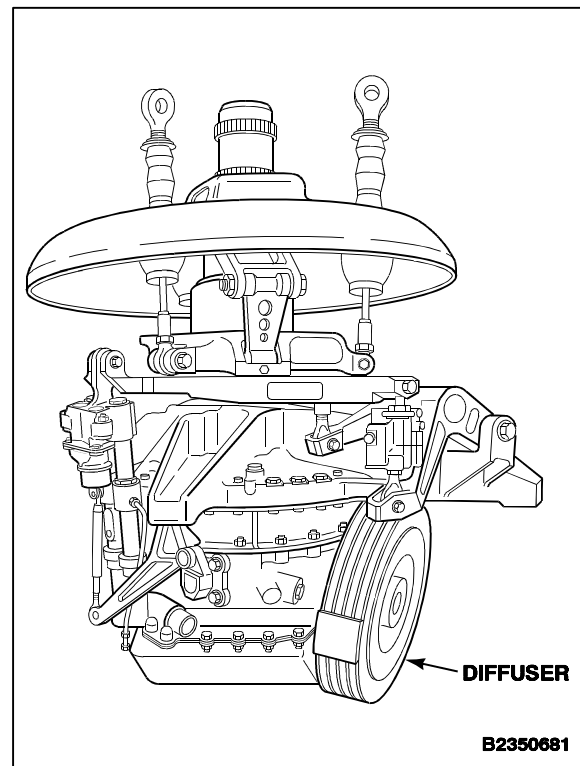
None

**Personnel Required:**

CH-47 Helicopter Repairer (2)

**Equipment Condition:**

Off Helicopter Task  
Oil Cooler Removed (Task 6-113)  
Oil Cooler Shroud Removed (Task 6-115)  
Oil Cooler Impeller Removed (Task 6-117)



Steps 1 thru 5 and associated graphics have been deleted.

Pages 6-459 and 6-460 have been deleted.

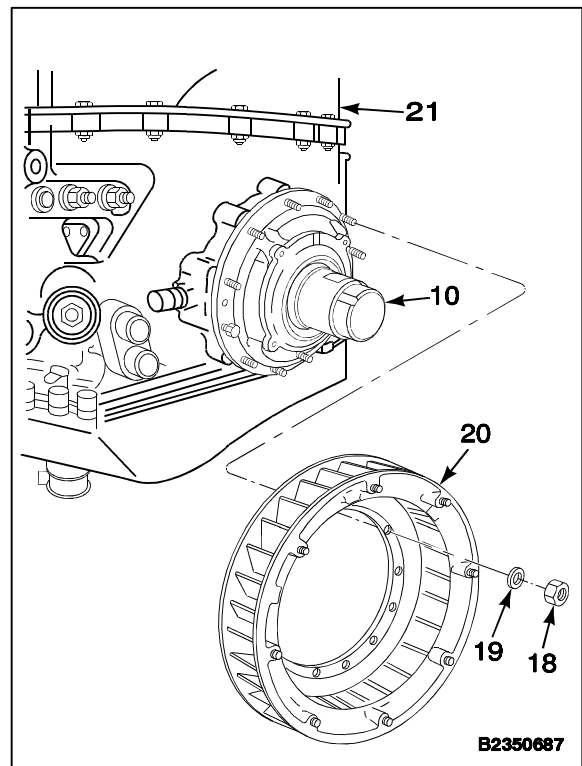
**DELETED**

6. Remove 12 nuts (18) and washers (19) from diffuser (20). Remove diffuser.



Input shaft can fall out if washer and nut are not installed. Damage to input shaft will result. Install at least one washer (19) and nut (18) to hold input shaft (10) in transmission (21).

7. Install at least one washer (19) and nut (18) to hold input shaft (10) in transmission (21).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Spanner Wrench
- Torque Wrench, 30-150 Inch-Pounds
- Torque Wrench, 150-750 Inch-Pounds
- Torque Wrench, 0-600 Foot-Pounds
- Wood Plank, 2 Inches x 4 Inches x 36 Inches
- Forward Transmission Input Shaft Adapter Assembly
- Rawhide Mallet

**Materials:**

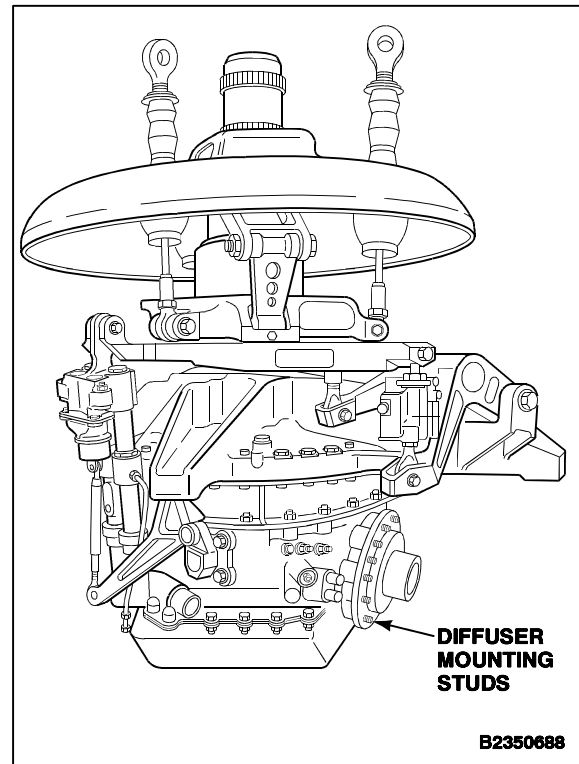
- Grease (E190)
- Oil (E254)
- Gloves (E186)

**Personnel Required:**

- CH-47 Helicopter Repairer (2)
- Inspector

**References:**

TM 55-1520-240-23P



**INSTALL DIFFUSER**

**NOTE**

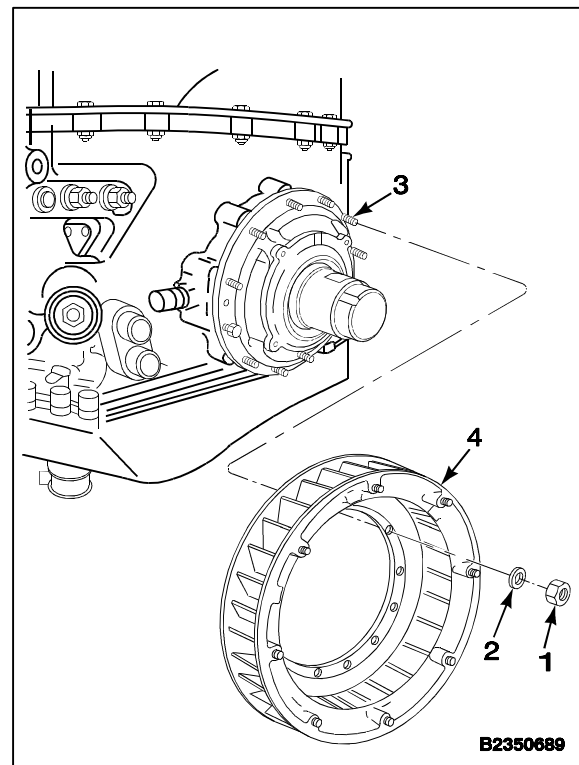
Fan set shroud P/N 145DS106-7 (723104A), impeller P/N 145DS106-9 (730737), and diffuser P/N 145DS106-8 (723102A) manufactured by Sundstrand must be used as a set and the parts are not individually interchangeable with the equivalent fan set shroud P/N 145DS106-11 (40926-1), impeller P/N 145DS106-13 (40928-1) and diffuser P/N 145DS106-12 (40927-1) manufactured by Noah Howden.

1. Remove nuts (1) and washers (2) from studs (3).

**NOTE**

Studs are not equally spaced. Diffuser fits on studs only one way.

2. Install diffuser (4) on studs (3). Install 12 washers (2) and nuts (1). Torque nuts to **170 inch-pounds**.



**INSPECT**

**INSTALL IMPELLER**

3. Coat bore of impeller (5), key (6), and input shaft (7) with oil (E254). Align impeller with key. Install impeller over input shaft. Use mallet.

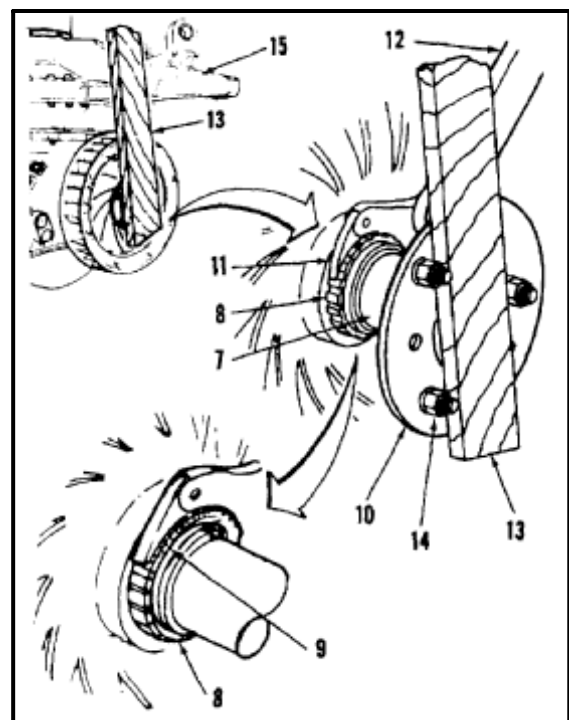
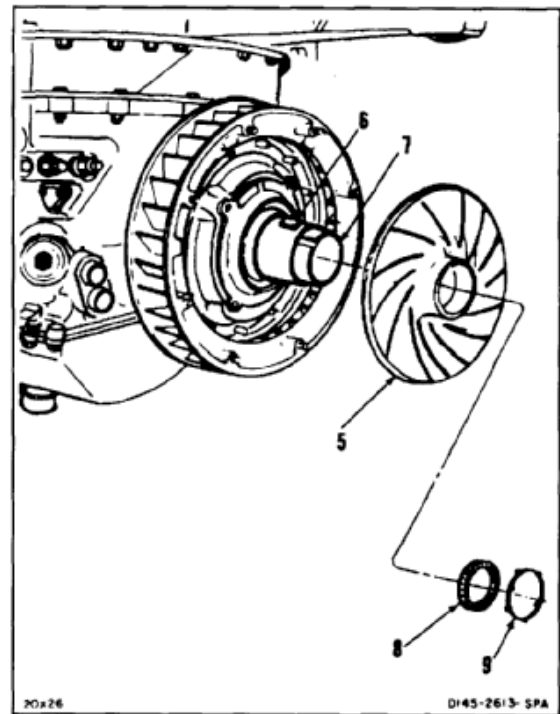
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

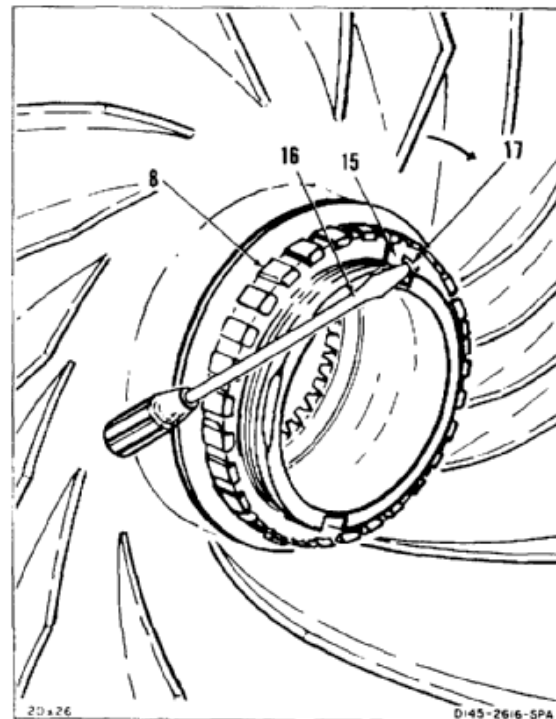
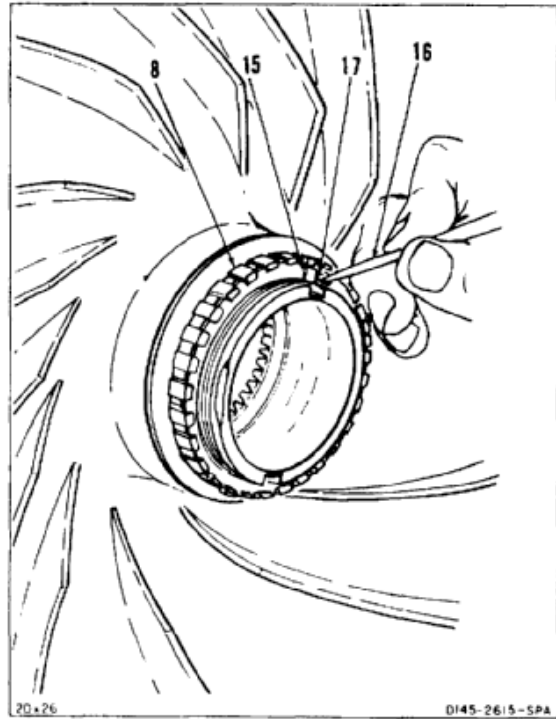
**NOTE**

Use only oil (E254) on locknut thread. Do not use grease.

4. Apply light coat of oil (E254) to thread of locknut (8). Wear gloves (E186). Loosely install locknut on shaft (7). **DO NOT USE GREASE.**
5. Position tangwasher (9) over shaft (7).
6. Torque locknut (8) and install tangwasher (9) as follows:
- Install adapter assembly (10) in input shaft (7).
  - Install spanner (11) and torque wrench (12) on locknut (8).
  - Place wood plank (13) across nuts (14) as shown.
  - Brace plank (13) against transmission lug (15) to keep adapter assembly (10) from turning. Torque locknut (8) to **180 foot-pounds**.
  - Install tangwasher (9) on locknut (8). If tangs do not align with slots in nut, rotate tangwasher **180°** and install.
  - If tangs do not align, increase torque on locknut (8) in small steps until tangs align. Do not torque over **230 foot-pounds**.
  - Remove adapter and plate assembly (10).

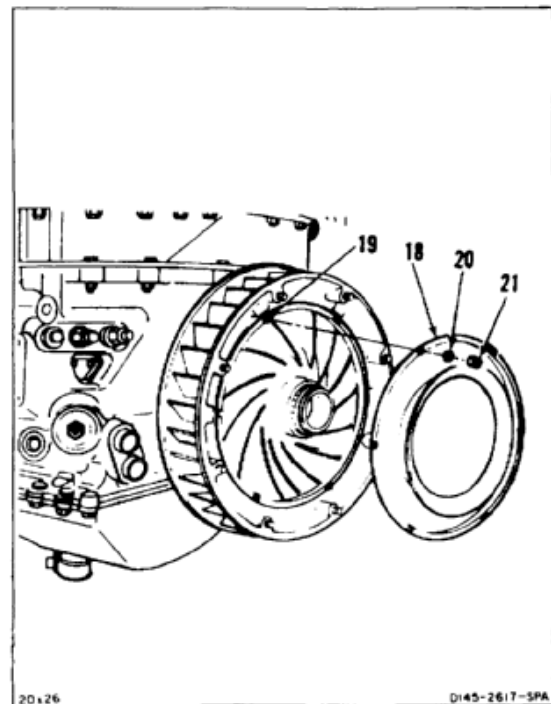


7. Install retaining ring (15) as follows:
- Install end of retaining ring (15) under teeth of locknut (8).
  - Install entire length of retaining ring (15) under teeth of locknut (8). Compress end of ring as needed to install under locknut. Use thin screwdriver (16) inserted in slot (17).
  - Install edge of screwdriver (16) in slot (17) and push retaining ring (15) clockwise. Ring shall expand under teeth of locknut (8) to lock.

**INSPECT**

**INSTALL SHROUD**

8. Install shroud (18) on six studs (19). Install six washers (20) and nuts (21). Torque nuts to **60 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install oil cooler (Task 6-114).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

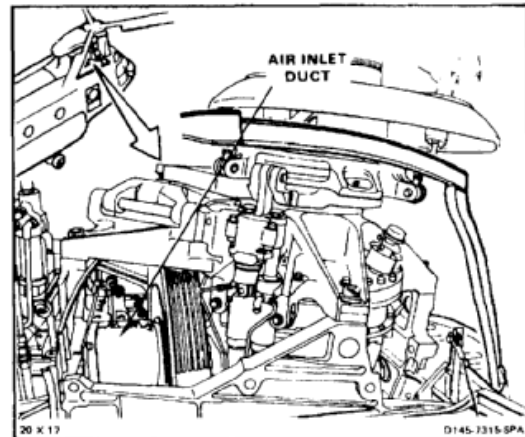
None

**Personnel Required:**

Medium Helicopter Repairer

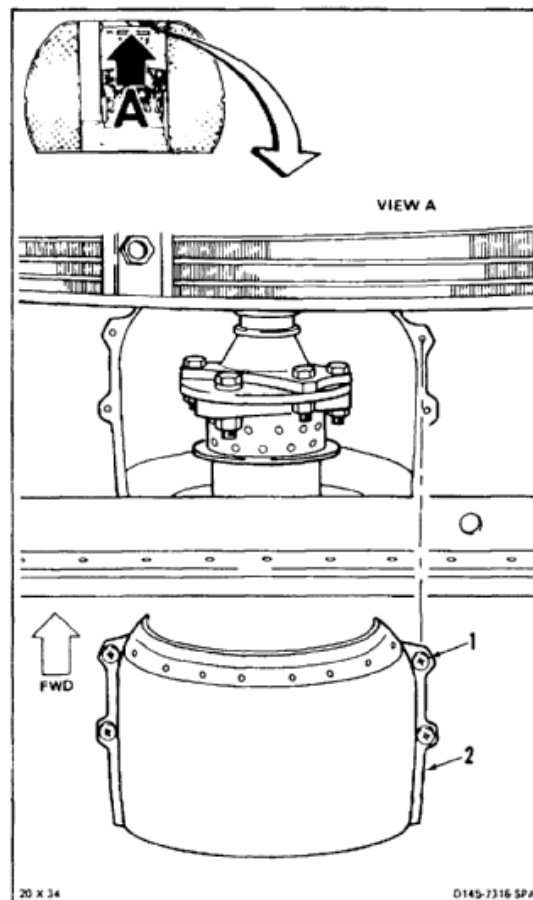
**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Forward Transmission Drip Pan Removed (Task 2-3)
- Forward Transmission Fairing Work Platforms Open (Task 2-2)



**REMOVE BOTTOM SEGMENT**

1. Loosen two turnlock fasteners (1) at each side of bottom segment (2).
2. Remove segment (2).



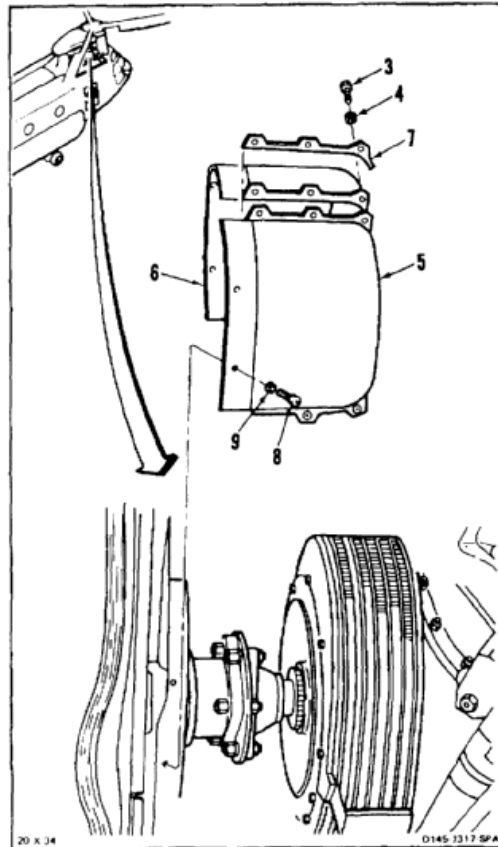


**REMOVE TOP SEGMENTS**

3. Remove three bolts (3) and washers (4) connecting right segment (5) and left segment (6). Remove shims (7).
4. Remove four bolts (8) and washers (9) from aft end of segments (5 and 6).
5. Remove segments (5 and 6).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Drill Motor  
 Twist Drill, 7/32 Inch

**Materials:**

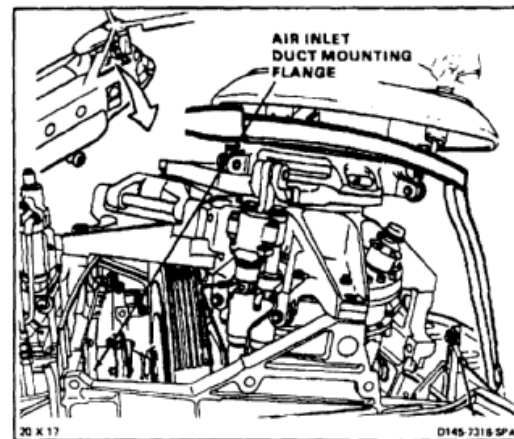
Marking Pencil (E271)

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector  
 Aircraft Structural Repairer

**References:**

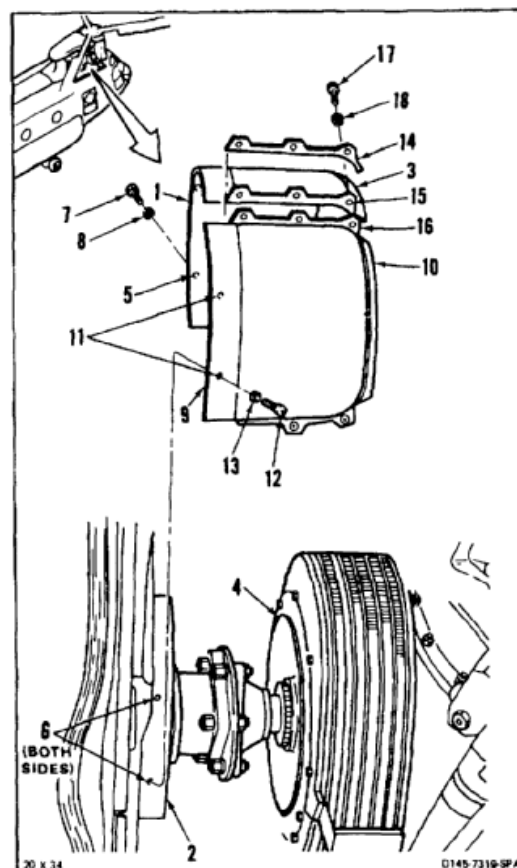
TM 55-1520-240-23P

**NOTE**

If installing a new duct, go to step 7.

**INSTALL REMOVED TOP SEGMENTS**

1. Position top left segment (1) on airframe mounting flange (2) with seal (3) against shroud (4). Align two holes (5) in segment with holes (6) on left side of flange (2). Loosely install two bolts (7) and washers (8).
2. Position top right segment (9) on airframe mounting flange (2) with seal (10) against shroud (4). Align two holes (11) in segment with holes (6) on right side of flange (2). Loosely install two bolts (12) and washers (13).
3. Install shims (14) between mating flanges (15 and 16). Install three bolts (17) and washers (18).
4. Tighten four bolts (7 and 12).

**INSPECT**

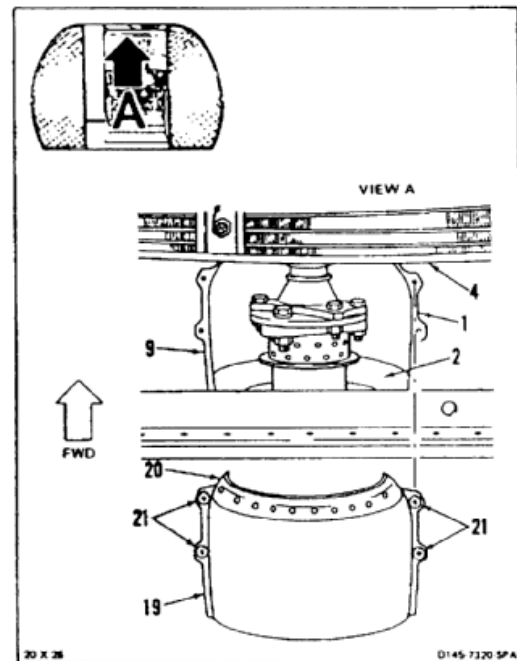
**INSTALL REMOVED DUCT BOTTOM SEGMENT**

Failure to install the duct around the airframe mounting flange may cause damage to the duct, oil cooler, or drive shafting.

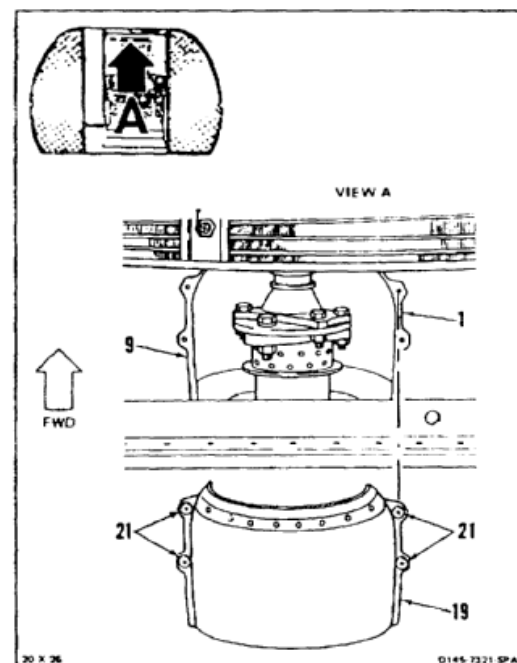
5. Position bottom segment (19) around airframe mounting flange (2) with seal (20) against shroud (4). Install segment on top left segment (1) and top right segment (9) with four fasteners (21).

**INSPECT**

6. Go to Follow-On Maintenance.

**INSTALL NEW DUCT**

7. Loosely assemble three segments (1, 9, and 19) around airframe mounting flange (2). Install bottom segment (19) on top segments (1 and 9) with four fasteners (21).

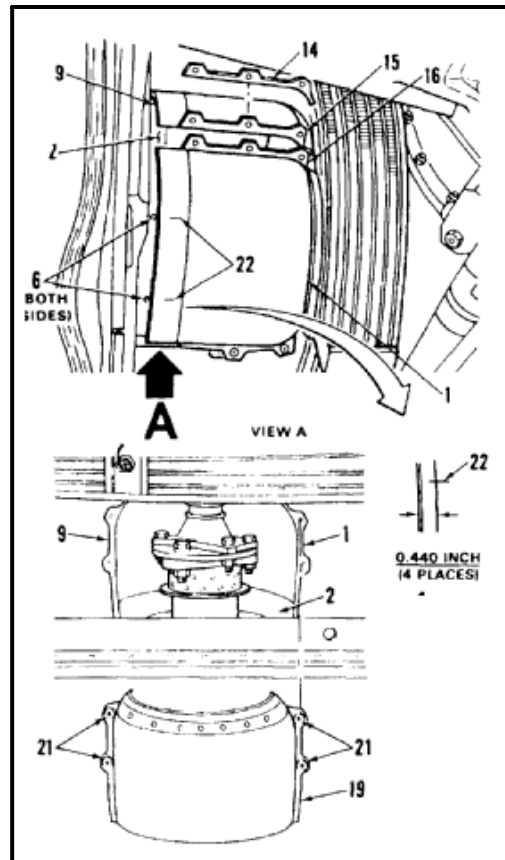


8. Position three segments (1, 9, and 19) so that flanges (15 and 16) of segments (1 and 9) point straight up. Install enough shims (14) between flanges to give a snug fit of three segments against mounting flange (2).

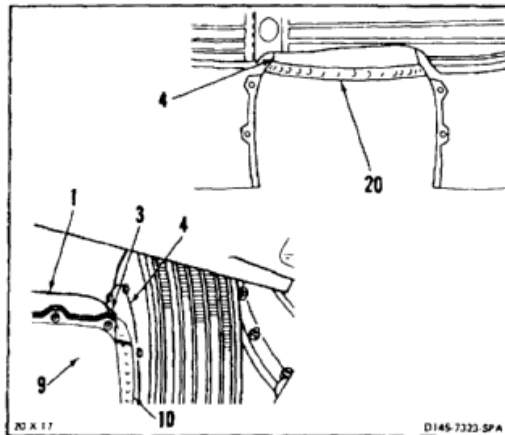
**NOTE**

About five shims are needed for snug fit.

9. Move three segments (1, 9, and 19) forward just enough to uncover four mounting holes (6) in mounting flange (2). Make sure flanges (15 and 16) point straight up. Mark centerline (22) of four holes on segments (1 and 9) with pencil (E271).
10. Release four fasteners (21). Remove three segments (1, 9, and 19).
11. Measure **0.440 inch** in from edge of two top sections (1 and 9) at each pencil mark (22). Drill one **0.220 inch** hole at that point on each mark.
12. Position three segments (1, 9, and 19) around mounting flange (2). Fasten bottom segment (19) to two top segments (1 and 9) with four fasteners (21).

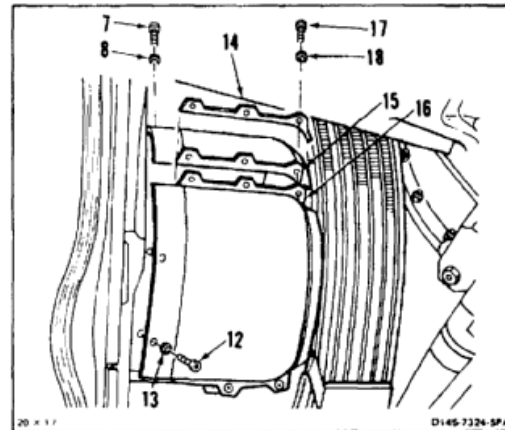


13. Check that seals (3, 10, and 20) at forward end of three segments (1, 9, and 19) fit against shroud (4) and do not overlap. Trim seals as needed. Gap between seals shall not exceed **0.06 inch**.



**6-122 INSTALL FORWARD TRANSMISSION OIL COOLER AIR INLET DUCT (Continued)****6-122**

14. Install shims (14) between flanges (15 and 16). Install three bolts (17) and washers (18).
15. Install two bolts (7) and washers (8). Install two bolts (12) and washers (13).
16. Inspect the rear edge of forward transmission oil cooler air inlet duct for wear and chaffing. If chaffing exists, trim rear edge of duct to obtain sufficient clearance.

**INSPECT****FOLLOW-ON MAINTENANCE.**

- Close forward transmission fairing work platforms (Task 2-2).
- Install forward transmission drip pan (Task 2-3).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4962  
 Container, 2 Quart  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Lockwire (E230)  
 Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Gloves (E186)  
 Lubricating Oil (E253, E254, or E254.1)

**Parts:**

Packings  
 Filter Element

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Forward Transmission Drip Pan Removed (Task 2-3)

**General Safety Instructions:**



Oil (E253, E254, or E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

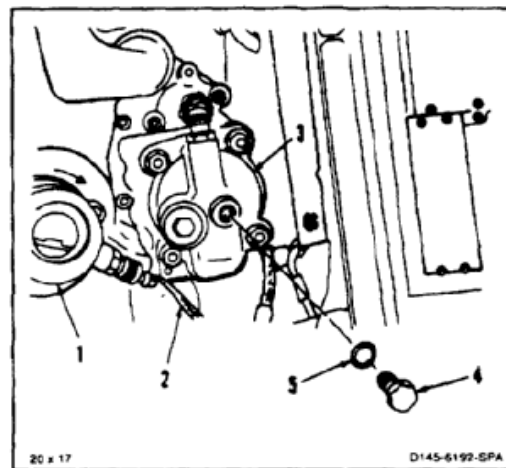
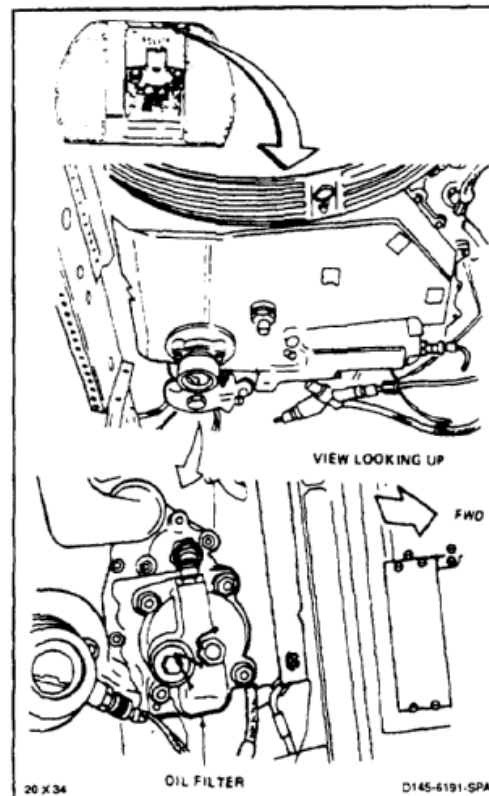
**REMOVE ELEMENT**

**NOTE**

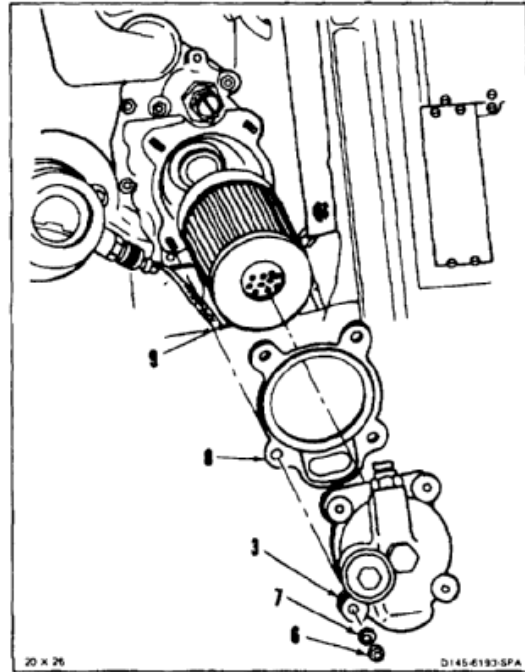
Filter housing holds about **1 pint**.

1. Turn detection screen cap (1) to move wire (2) away from filter housing (3).

2. Remove lockwire from drain plug (4). Remove plug and packing (5). Drain oil. Use container to catch oil.
3. Loosely install drain plug (4) and packing (5) in housing (3).



4. Remove four nuts (6) and washers (7). Remove housing (3), gasket seal (8), and element (9).
5. Check outside of element (9) for debris. If there is debris, perform a serviceability check of the forward transmission (Task 6-112).

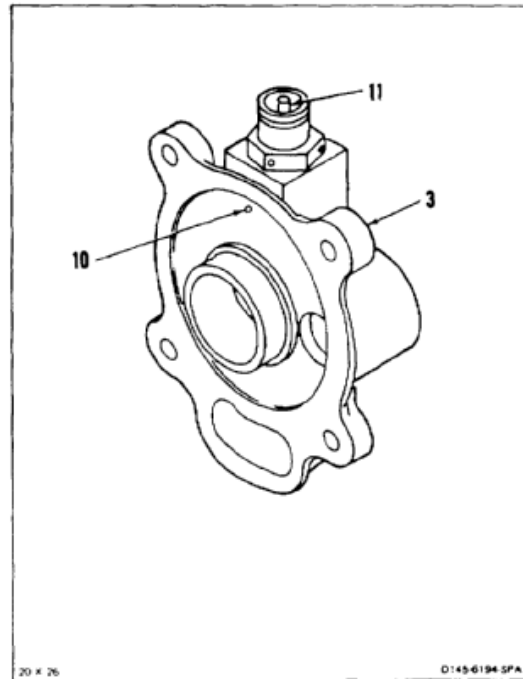


### INSTALL ELEMENT

#### WARNING

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

6. Clean inside of housing (3) with solvent (E162) and clean cloths (E120). Wear gloves (E186). Check that hole (10) is free of debris.
7. Hold housing (3) so that indicating button (11) points straight up. Push in button to lock it down.



**NOTE**

Packings are supplied with element.  
Do not reuse removed element.

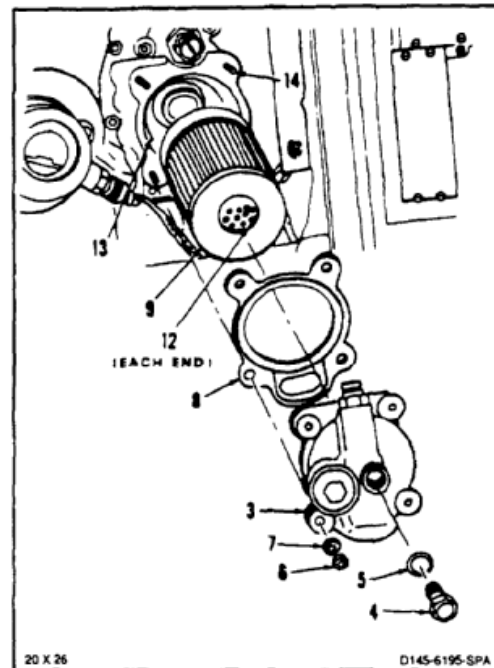
**NOTE**

Lubricate threads of self-locking nuts prior to torquing and lubricate packings prior to installation. Use oil (E253, E254, or E254.1).

8. Install element (9), with packings (12), in pump (13).
9. Install gasket seal (8) and housing (3) on four studs (14). Install four washers (7) and nuts (6). Torque nuts to **70 to 85 inch-pounds** (wet).
10. If housing (3) is not a replacement, remove drain plug (4) and packing (5). Install plug and new packing. Lockwire plug to housing (3). Use lockwire (E230).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service forward transmission (Task 1-54).  
Install forward transmission drip pan (Task 2-3).



END OF TASK

6-474



**6-123.1 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR**

6-123.1

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
Container, 2 Quart

**Materials:**

Lockwire (E231)

**Parts:**

Packings

**Personnel Required:**

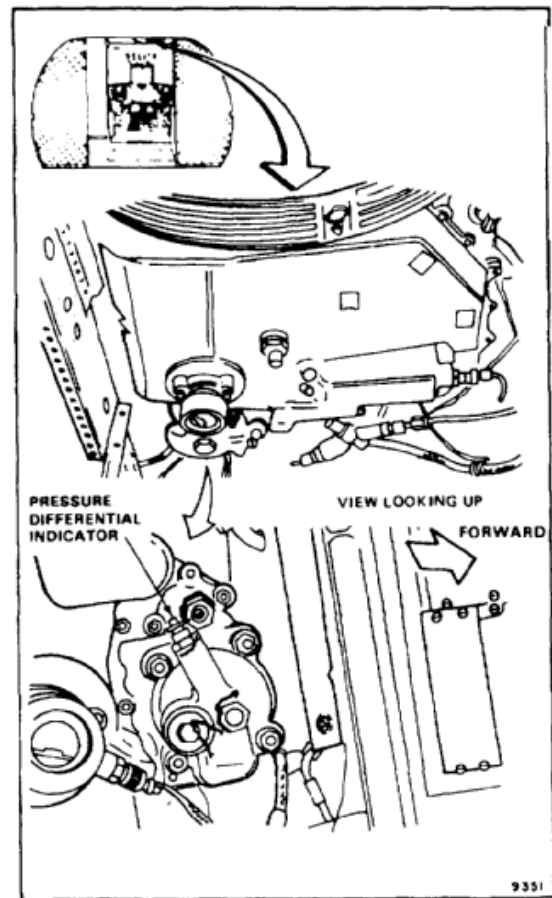
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

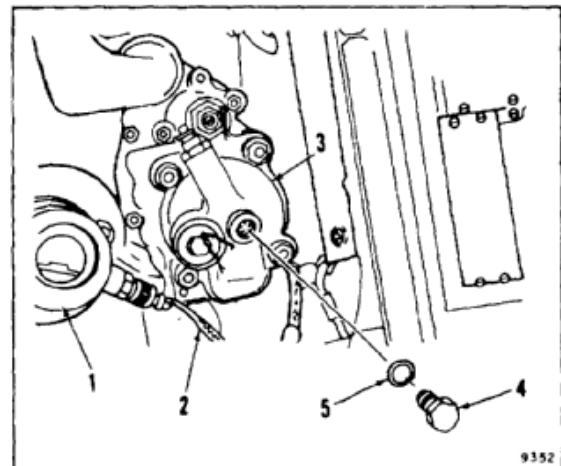
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Forward Transmission Drip Pan Removed (Task 2-3)

**DRAIN OIL****NOTE**

Filter housing holds about **1 pint**.

1. Turn detection screen cap (1) to move wire (2) away from filter housing (3).
2. Remove lockwire from drain plug (4). Remove plug and packing (5). Drain oil. Use container to catch oil.
3. Install drain plug (4) and packing (5) in housing (3). Torque to **80 inch-pounds**. Lockwire plug to housing. Use lockwire (E231).



**6-123.1 REPLACE FORWARD TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued)**

6-123.1

4. Lockwire plug (4) to housing (3). Use lockwire (E231).

**REMOVE INDICATOR**

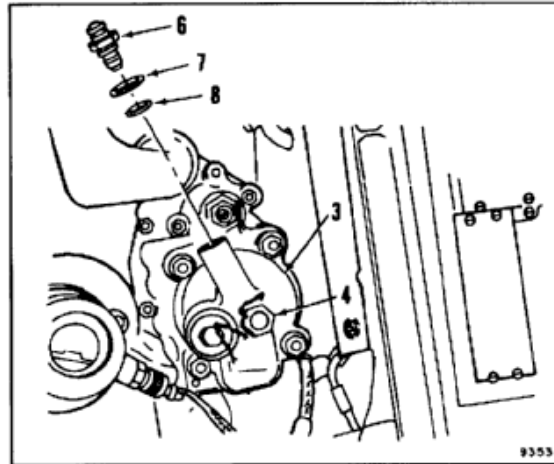
5. Remove lockwire from pressure differential indicator (6). Remove indicator from housing (3).
6. Remove two packings (7 and 8) from indicator (6).

**INSTALL INDICATOR**

7. Install two packings (7 and 8) on indicator (6).
8. Hold indicator (6) so that button (9) points up. Check that button is pushed in and locked.
9. Install indicator (6) in housing (3).
10. Lockwire indicator (6) to housing (3). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service forward transmission (Task 1-54).  
Install forward transmission drip pan (Task 2-3).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Bolt, 1/4-24, 1-1/4 Inch Thread Length (2)

**Materials:**

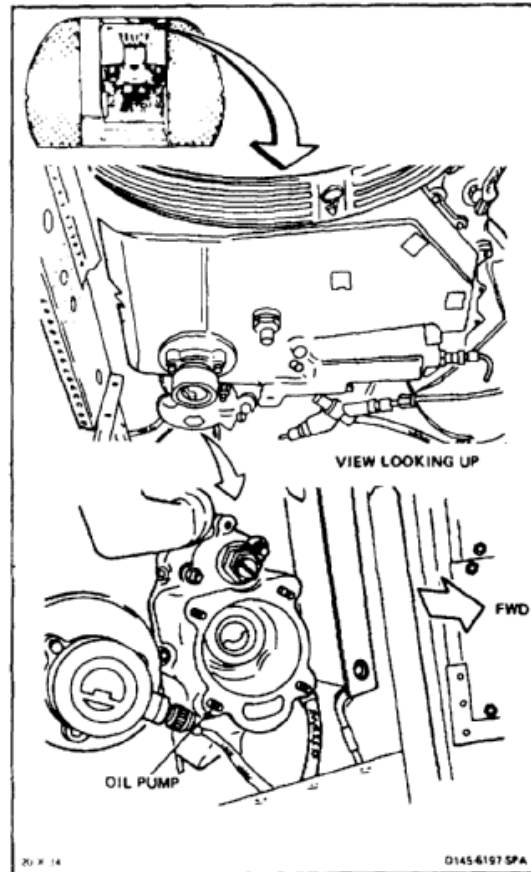
None

**Personnel Required:**

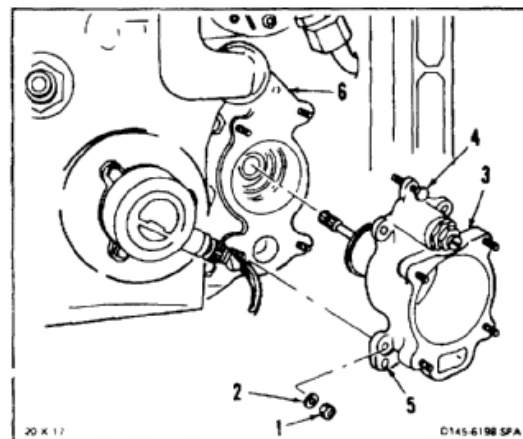
Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Forward Transmission Drip Pan Removed (Task 2-3)  
 Oil Filter Element Removed (Task 6-123)



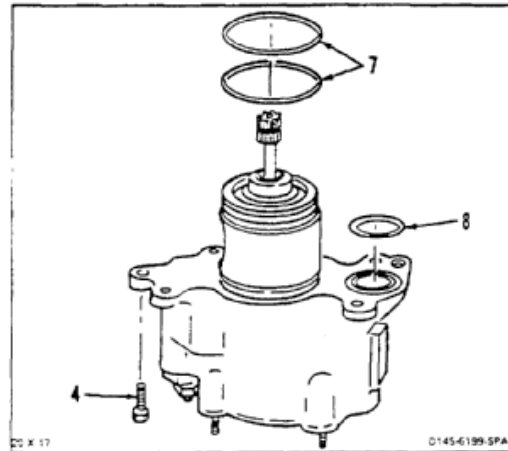
1. Remove four nuts (1) and washers (2) from pump (3).
2. Install two 1/4-24 bolts (4) in two mounting flange holes (5). Turn bolts to jack pump out of transmission (6). Remove pump.



3. Remove two bolts (4). Remove two packings (7) and packing (8).

***FOLLOW-ON MAINTENANCE:***

None



END OF TASK

**6-478**

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Lubricating Oil (E253, E254, or E254.1)

**Parts:**

Packings

**Personnel Required:**

Medium Helicopter Repairer (2)  
Inspector

**References:**

TM 55-1 520-240-23P

**Equipment Condition:**

Tiedown Line Installed on One Forward Blade (Task 1-26)

**General Safety Instructions:**

**WARNING**

Oil (E253, E254, or E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

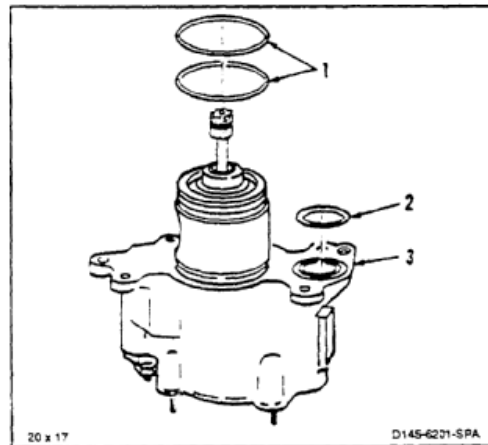
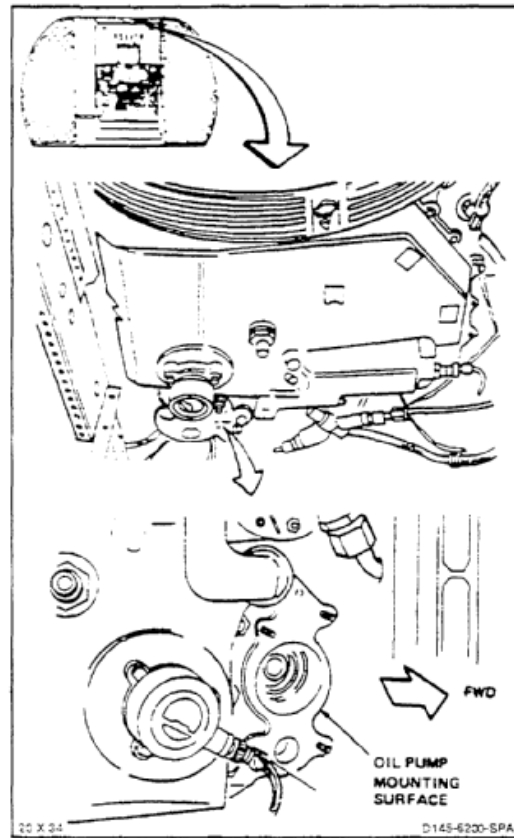
**WARNING**

Do not install pumps with serial numbers V534 through V598. ASAM 96-08 directed removal of these pumps. If found, these pumps are to be removed from service and returned for rework.

**INSTALL PUMP**

**NOTE**

Lubricate threads of self-locking nuts prior to torquing and lubricate packings prior to installation. Use oil (E253, E254, or E254.1).



1. Install two packings (1) and packing (2) in pump (3).

**NOTE**

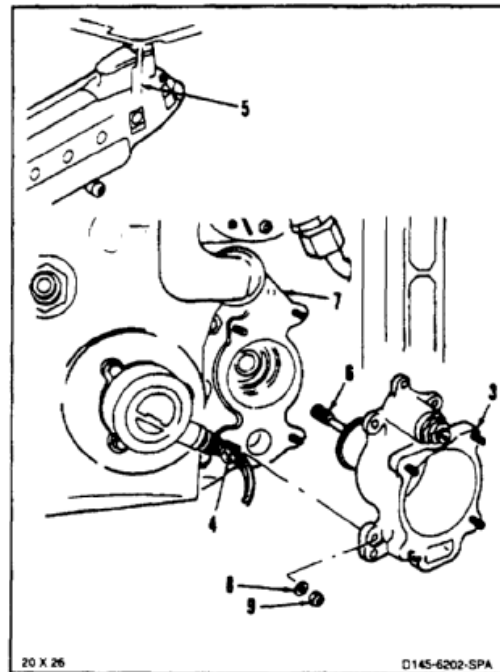
If pump binds during installation, it may be necessary to remove it and start again. Use soft-faced mallet to release a binding pump.

2. Install pump (3) slowly and carefully on four studs (4). Have helper turn blade (5) as needed during installation so that splined shaft (6) can be installed in transmission (7).

**NOTE**

It may be necessary to draw pump against transmission with nuts before installing washers and nuts.

3. Install four washers (8) and nuts (9). Torque nuts to **70 to 85 inch-pounds** (wet).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install oil filter element (Task 6-123).
- Service forward transmission (Task 1-54).
- Perform ground run (TM 55-1520-240-10).
- Install forward transmission drip pan (Task 2-3).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Lockwire (E230)

**Personnel Required:**

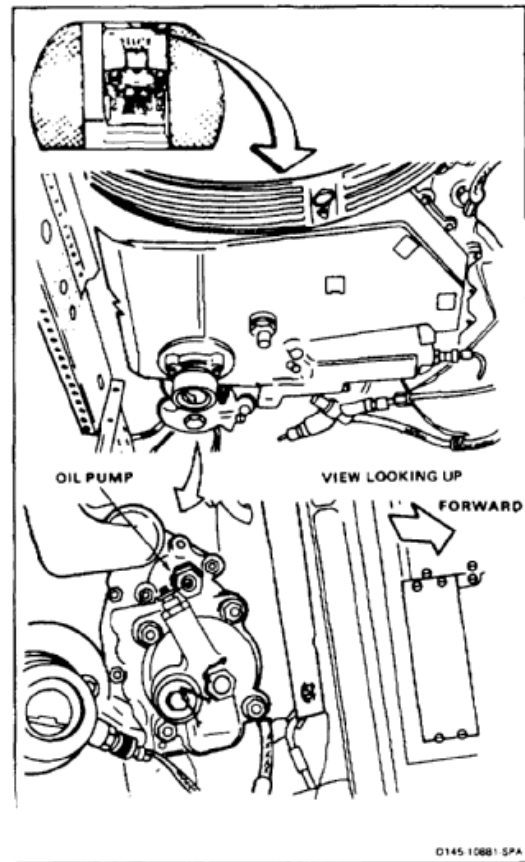
Medium Helicopter Repairer  
 Inspector  
 Army Rotary-Wing Aviator (2)

**References:**

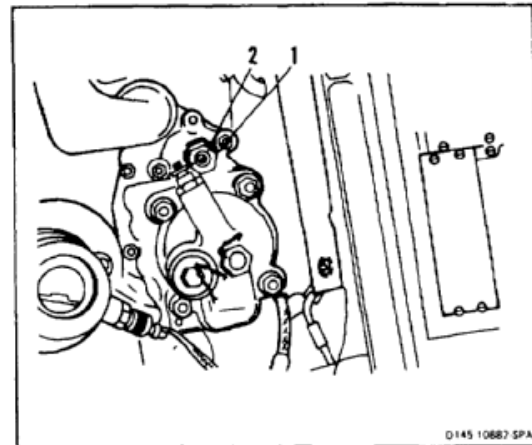
TM 55-1520-240-10

**Equipment Condition:**

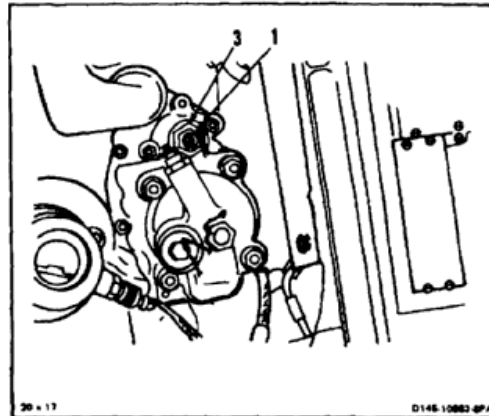
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Forward Transmission Drip Pan Removed (Task 2-3)



1. Remove lockwire from locknut (1). Hold setscrew (2) from turning and loosen locknut.
2. Turn setscrew (2) no more than **1/4 turn** to adjust transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is **40 to 70 psi**.
3. Hold setscrew (2). Torque locknut (1) to **60 inch-pounds**.



4. Have pilot perform ground run at **100 percent** rotor rpm until transmission temperature and pressure stabilize. Record forward transmission oil pressure.
5. If oil pressure is **40 to 70 psi**, go to step 6. If oil pressure is not **40 to 70 psi**, repeat task.
6. Lockwire locknut (1) to retaining nut (3). Use lockwire (E230).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install forward transmission drip pan (Task 2-3).

END OF TASK



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Tool Kit, NSN 5180-00-323-5267  
 Bolt, 1/4-28, 3 Inches Long (2)

**Materials:**

None

**Personnel Required:**

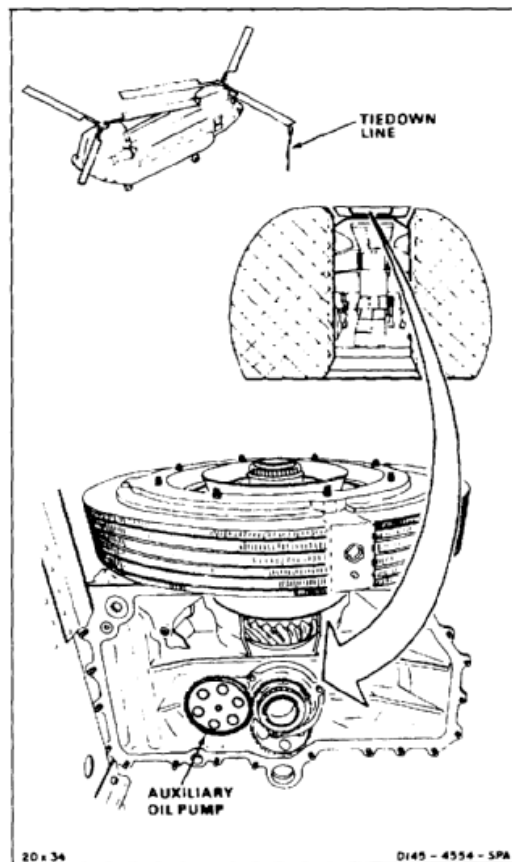
Aircraft Powertrain Repairer (2)

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Forward Transmission Drip Pan Removed (Task 2-3)  
 Forward Transmission Sump Removed (Task 6-33)  
 Tiedown Line Installed On One Forward Blade (Task 1-26)

**General Safety Instructions:****WARNING**

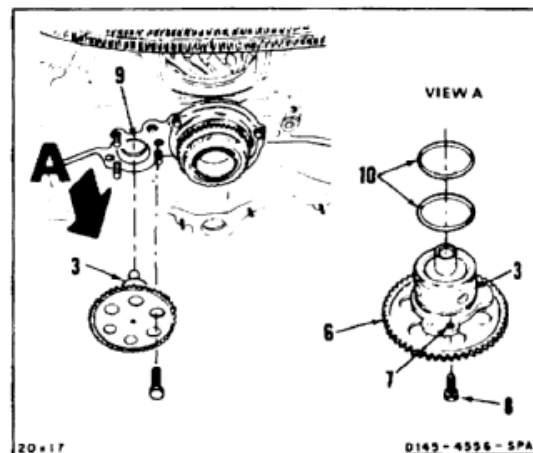
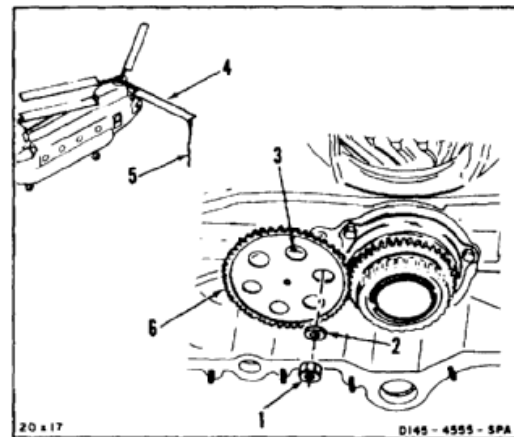
Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.



**WARNING**

Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.

1. Remove three nuts (1) and washers (2) from pump (3). Have helper pull blade (4) around with tiedown line (5) as needed to align access holes in drive gear (6) with nuts.
2. Align access holes in drive gear (6) with two threaded holes (7) in pump (3). Install 1/4-28 bolt (8) in each hole. Threaded length of bolts shall be at least **2-1/2 inches**.
3. Turn bolts (8) until they bottom against transmission (9). Continue turning bolts one turn at a time to jack pump (3) out of transmission. Remove pump.
4. Remove two bolts (8) and packings (10) from pump (3).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-484

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Tool Kit, NSN 5180-00-323-5267  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

None

**Parts:**

Packings

**Personnel Required:**

Aircraft Powertrain Repairer (2)  
Inspector

**References:**

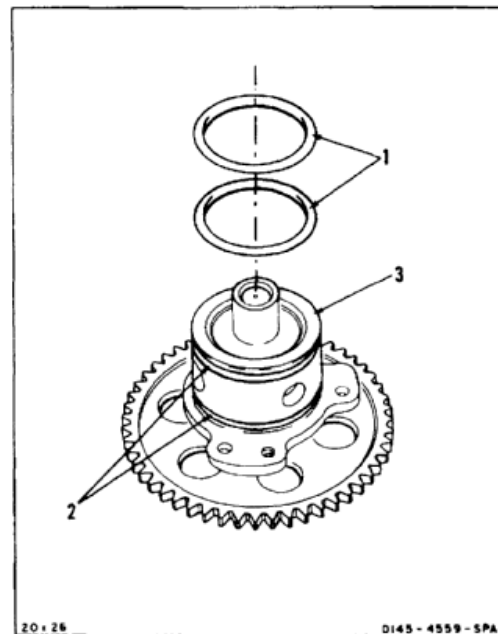
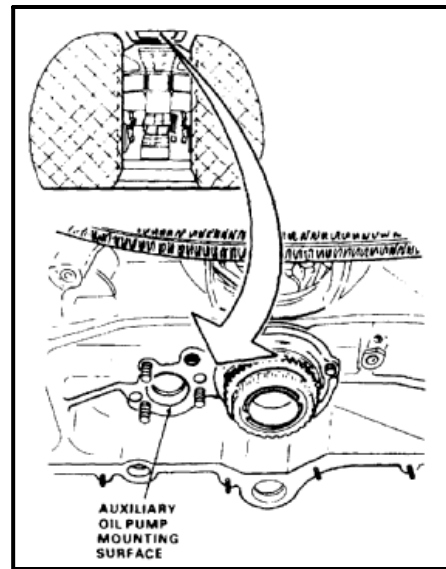
TM 55-1520-240-23P

**General Safety Instructions:**



Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.

1. Install packings (1) in grooves (2) of pump (3).



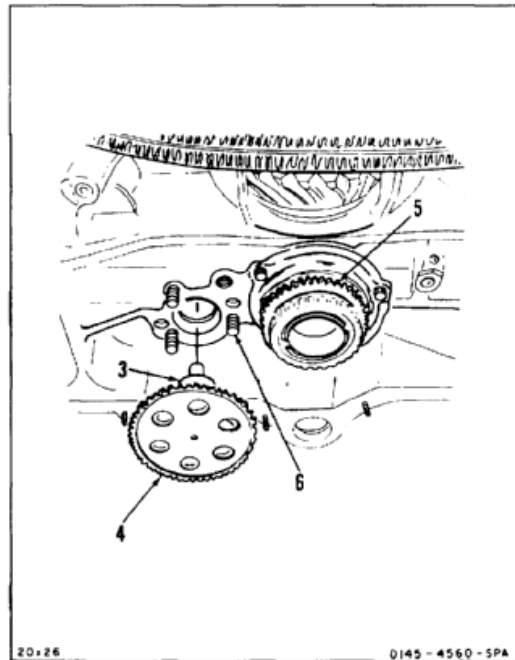
**WARNING**

Keep fingers away from drive gear if blades are turned. Turning gear can cause injury to personnel.

**CAUTION**

If drive gear teeth do not align with drive gear, pump can be damaged.

- Align teeth of pump drive gear (4) with teeth of transmission drive gear (5). Install pump (3) on three studs (6).

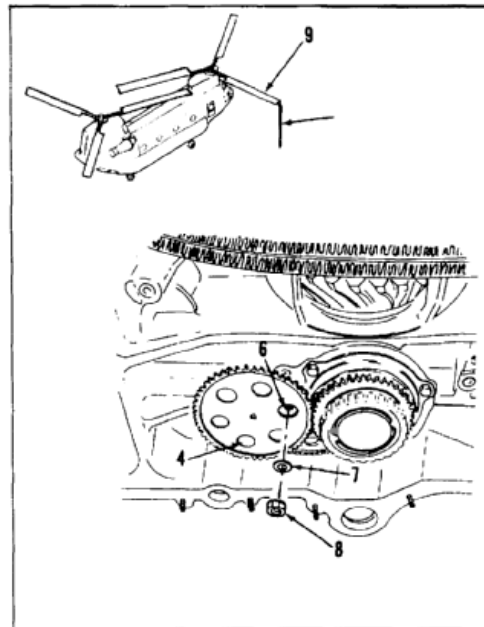
**WARNING**

Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.

- Install three washers (7) and nuts (8). Have helper pull blade (9) around with tiedown line (10) as needed to align access holes in drive gear (4) with studs (6). Torque nuts to **60 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install forward transmission sump (Task 6-37).  
 Install forward transmission drip pan (Task 2-3).  
 Service forward transmission (Task 1-54.)  
 Remove tiedown line from forward blade (Task 1-26).  
 Perform operational check (TM 55-1520-240-10).



END OF TASK

6-486

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Lockwire (E231)  
 Oil (E254)

**Parts:**

Packing  
 Filter

**Personnel Required:**

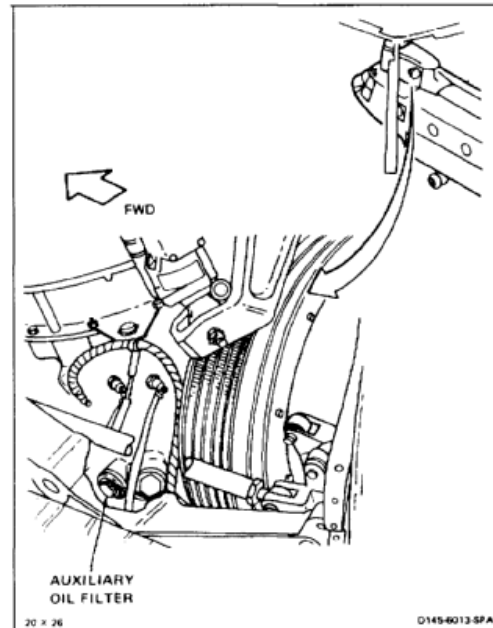
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Left Forward Transmission Fairing Open (Task 2-2)

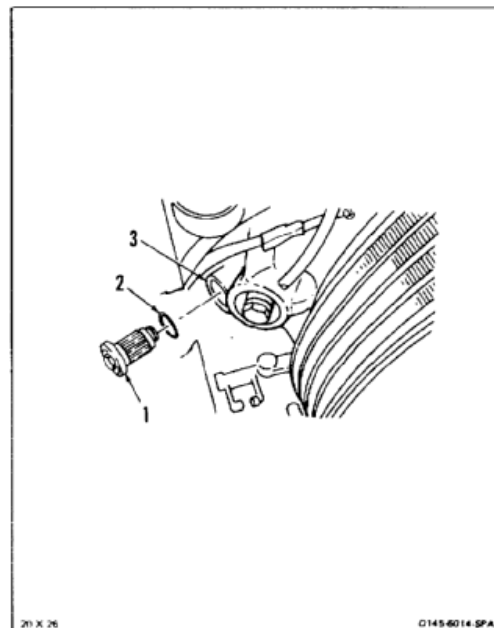
**REMOVE FILTER**

1. Remove lockwire from filter (1).



Do not let debris enter transmission cavity. Damage can result.

2. Remove filter (1) and packing (2) from transmission (3). Catch spilled oil in container.
3. Check outside of filter (1) for debris. If there is debris, perform a serviceability check of the forward transmission (Task 6-112).



**INSTALL FILTER****NOTE**

Do not reuse removed filter. Filter is supplied with one packing installed.

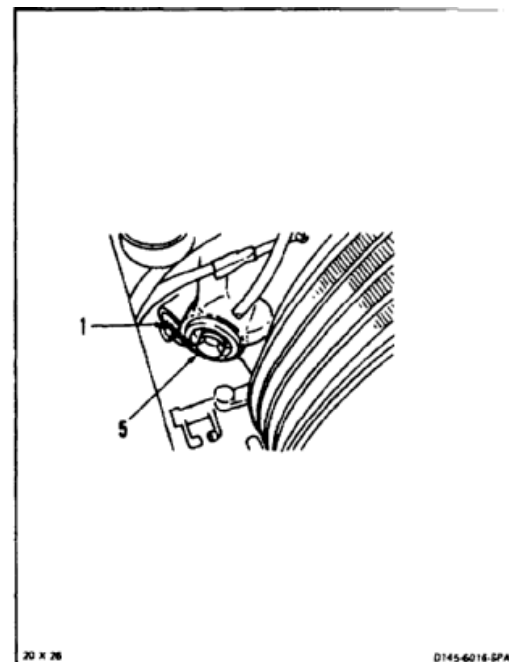
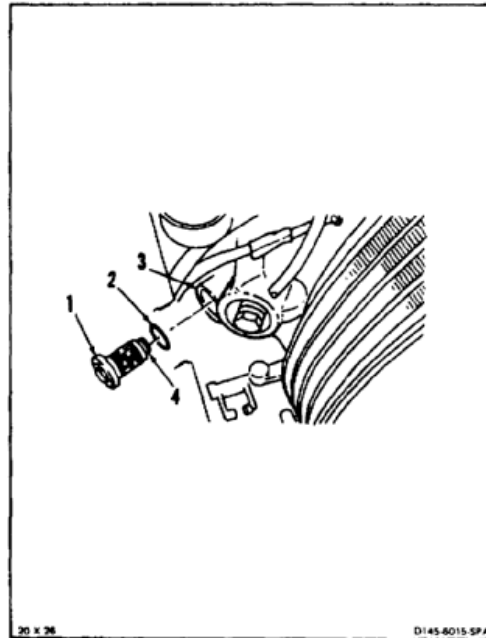
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

4. Coat packings (2 and 4) and thread of new filter (1) with oil (E254).
5. Install filter (1) and packing (2) in transmission (3). Torque filter to **80 inch-pounds**.
6. Lockwire filter (1) to inlet screen (5). Use lockwire (E230).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close left forward transmission fairing (Task 2-2).



END OF TASK

6-488

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Socket, 1 Inch  
 Container, 2 Quart

**Materials:**

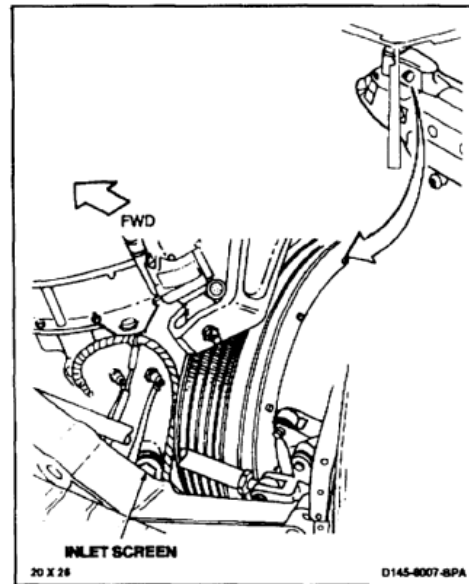
Barrier Material (E80)  
 Tape (E388)  
 Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Left Forward Transmission Fairing Open (Task 2-2)

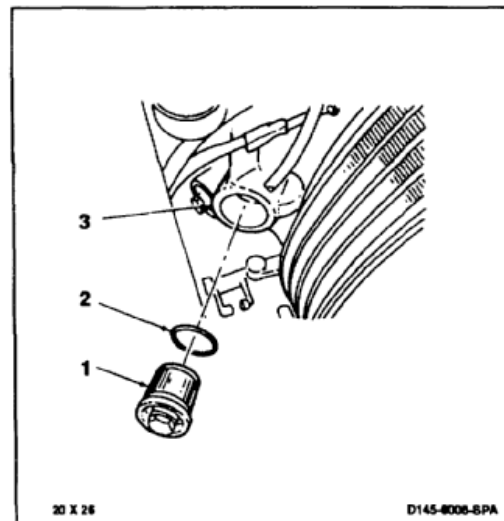


1. Remove lockwire from inlet screen (1).



Do not let debris enter transmission.  
 Damage can result.

2. Remove screen (1) and packing (2) from transmission cavity (3). Catch spilled oil in container. Use cloths (E120) for spilled fluid.
3. Check outside of screen (1) for debris. If there is debris, perform a serviceability check of the forward transmission (Task 6-112).
4. Make sure no debris remains within cavity (3). Cover cavity with barrier material (E80) and tape (E388).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

None

**Materials:**

Brush (E86)

1. Check screen (1) for bits of metal and other debris. If debris is found, reject screen. Retain all debris for contamination analysis (Task 6-108).
2. Inspect screen (1) for tears. There shall be no tears.

**Personnel Required:**

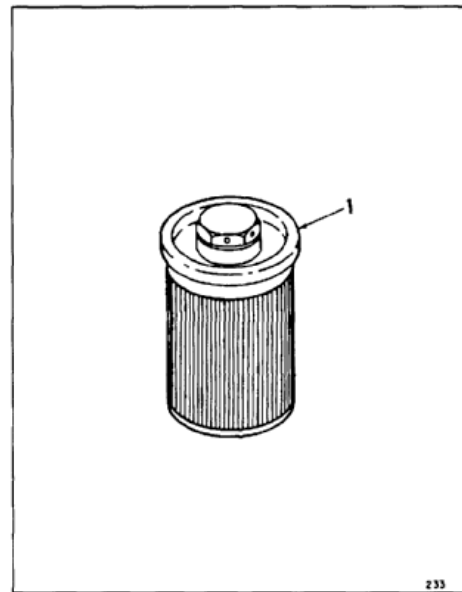
Medium Helicopter Repairer

**References:**

Task 6-108

**Equipment Condition:**

Off Helicopter Task

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

**6-490**



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Socket, 1 Inch

**Materials:**

Oil (E254)  
 Lockwire (E232)

**Parts:**

Packing

**Personnel Required:**

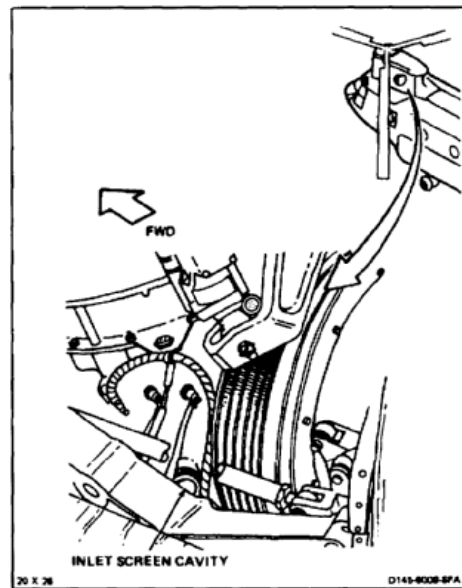
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

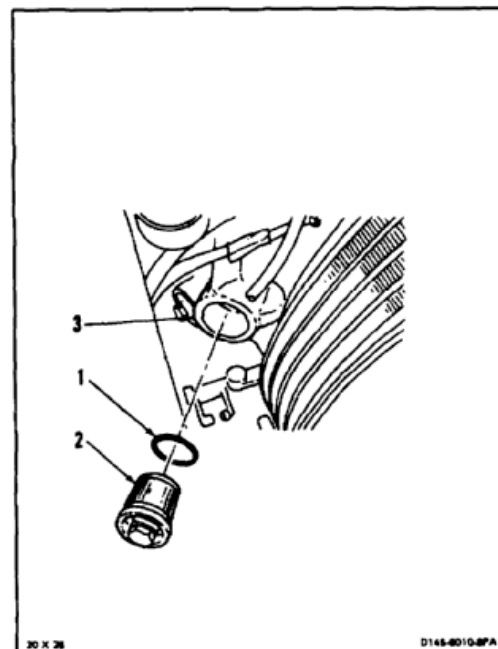
**Equipment Condition:**

Inlet Screen Inspected (Task 6-131)

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

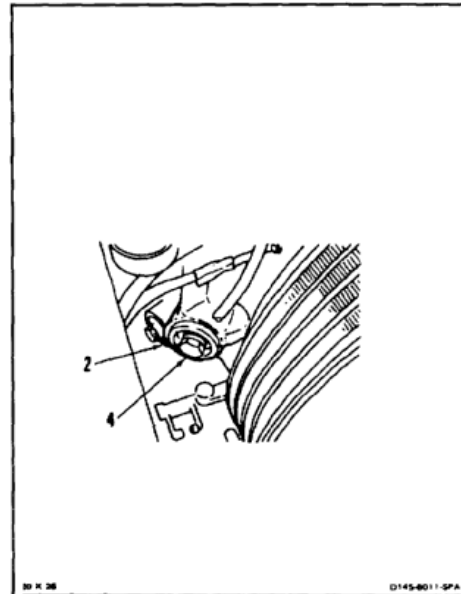
1. Coat packing (1) and thread of screen (2) with oil (E254).
2. Install screen (2) and packing (1) in transmission cavity (3). Torque screen to **80 inch-pounds**.



- Lockwire screen (2) to auxiliary oil filter (4). Use lockwire (E232).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close left forward transmission fairing (Task 2-2).



END OF TASK

**6-492**

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart (Cap Removal Only)  
 Container, 14 Quart (Cap and Housing Removal)

**Materials:**

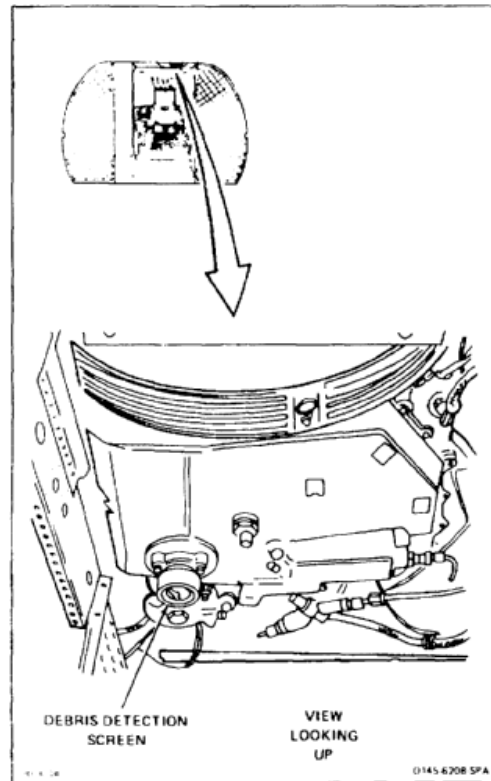
Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Forward Transmission Drip Pan Access Cover  
 Removed (Cap Removal Only) (Task 2-3)  
 Forward Transmission Drip Pan Removed (Cap and  
 Housing Removal) (Task 2-3)

**REMOVE CAP**

1. Disconnect connector (1) from cap receptacle (2).

**NOTE**

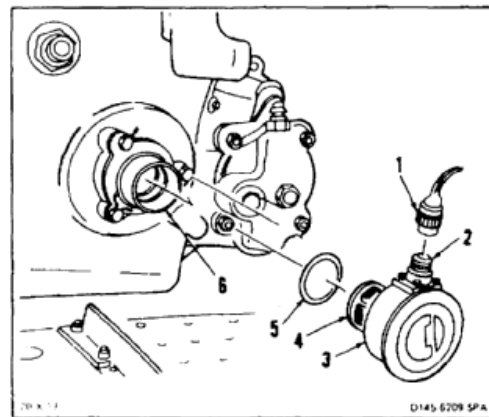
Cap holds **2 to 3 ounces** of oil.

2. Hold container under can (3). Push in center of cap and pull down cap to remove cap screen (4) and packing (5). Drain oil. Use container to catch oil.

**NOTE**

Screen is part of cap.

3. Filter drained oil through cloth (E120). Check cloth and screen (4) for debris. Retain debris for contamination analysis (Task 6-108).
4. If housing (6) will not be removed, omit steps 5 thru 7.



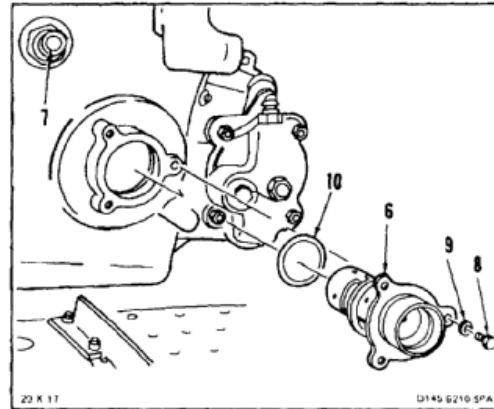
**REMOVE HOUSING****NOTE**

Sump holds about **28 quarts** of oil.

5. Push in drain valve (7), twist and pull. Drain oil. Use container to catch oil. Push in valve and twist to close.
6. Remove lockwire from three bolts (8). Remove three bolts and washers (9).
7. Remove housing (6) and packing (10).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-494

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Lockwire (E231)

**Parts:**

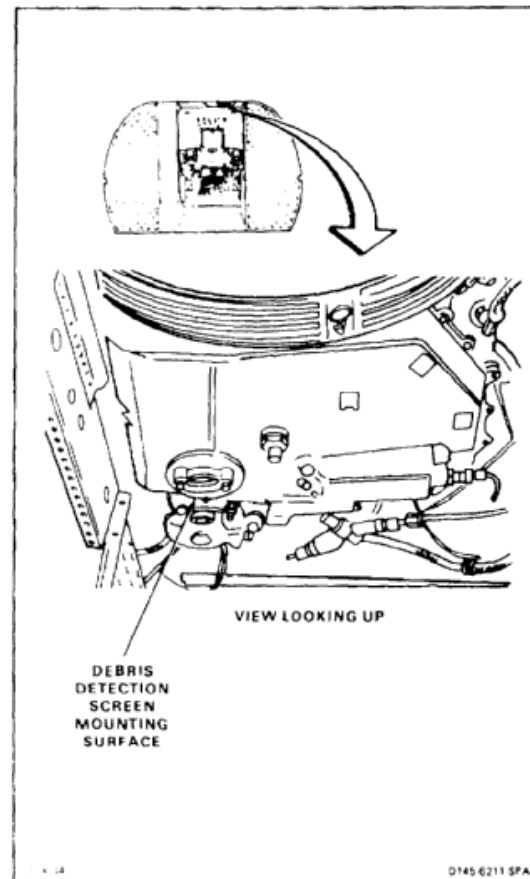
Packings

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

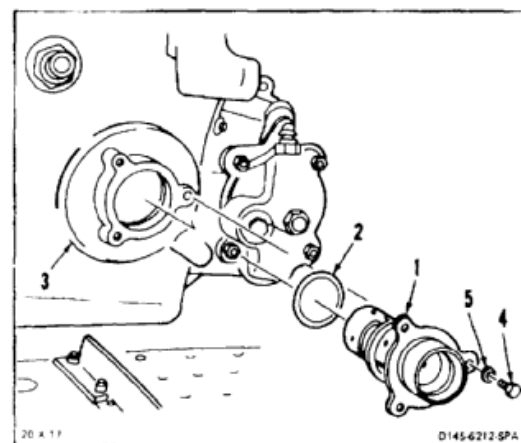
TM 55-1520-240-23P  
TM 55-1520-240-T

**NOTE**

If only cap is being installed, go to step 4.

**INSTALL HOUSING**

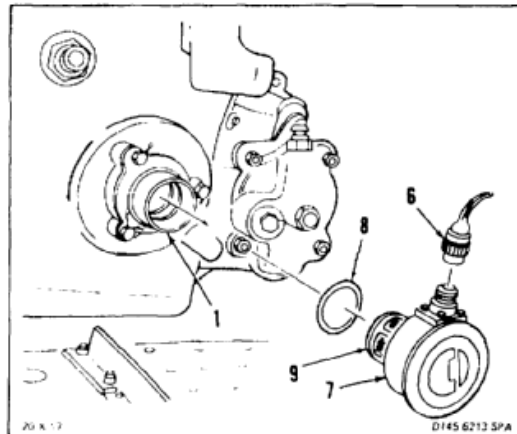
1. Install housing (1) and packing (2) in sump.
2. Install three bolts (4) and washers (5). Torque bolts to **60 inch-pounds**.
3. Lockwire three bolts (4) together. Use lockwire (E231).

**INSPECT**

**INSTALL CAP****NOTE**

Screen is part of cap.

4. Connect electrical connector (6) to cap (7).
5. Perform operational check of forward transmission debris detection system (TM 55-1520-240-T).
6. Install packing (8) on screen (9).
7. Press in center of cap (7). Install cap and screen (9) in housing (1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install forward transmission drip pan access cover (cap only installed) (Task 2-2).
- Install forward transmission drip pan (cap and housing installed) (Task 2-3).
- Service forward transmission (Task 1-54).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
 Spanner Wrench  
 Container, 14 Quart (3)  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Oil (E254)  
 Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

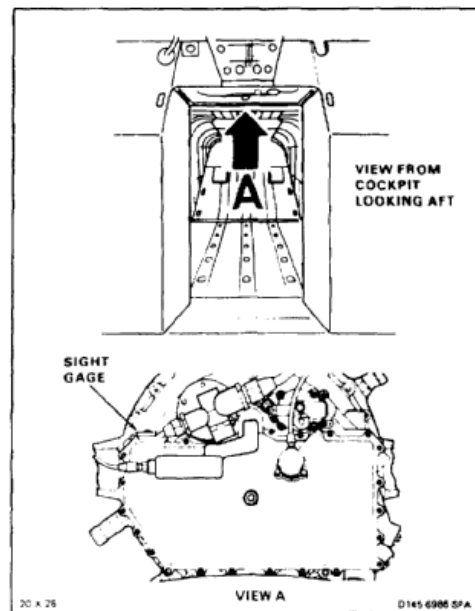
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

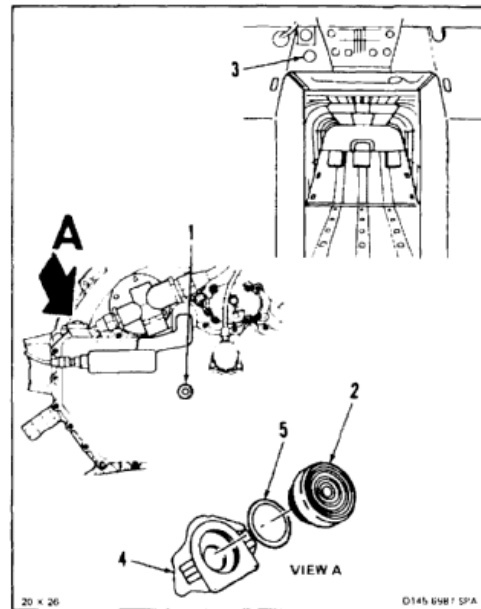
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Hydraulic Power Off  
 Forward Transmission Drip Pan Removed (Task 2-3)



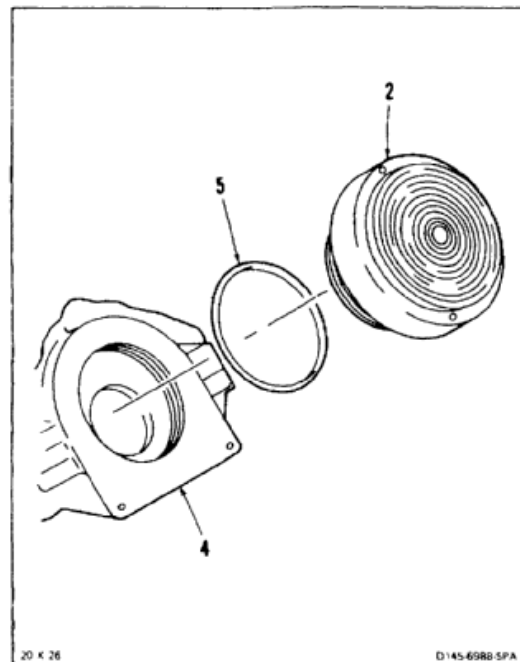
**REMOVE SIGHT GAGE****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

1. Position containers under sump drain valve (1).
2. Push in drain valve (1), twist, and pull. Drain oil into container until oil level is below sight gage (2). View oil level from cockpit through access hole (3).
3. Close drain valve (1) by pushing it in and twisting it.
4. Remove lockwire from sight gage (2). Remove gage from transmission (4). Use spanner wrench.
5. Remove packing (5) from sight gage (2).

**INSTALL SIGHT GAGE**

6. Coat packing (5) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. Install sight gage (2) in transmission (4). Use spanner wrench. Torque gage to **80 inch-pounds**.



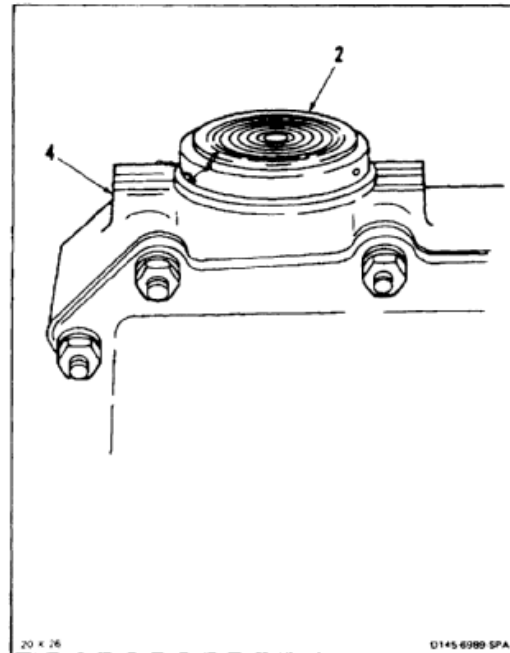


8. Lockwire sight gage (2) to transmission (4). Use lockwire (E231).

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Service forward transmission (Task 1-54).  
Install forward transmission drip pan (Task 2-3).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Magnet  
Magnifying Glass, 12 Power

**Materials:**

None

**Personnel Required:**

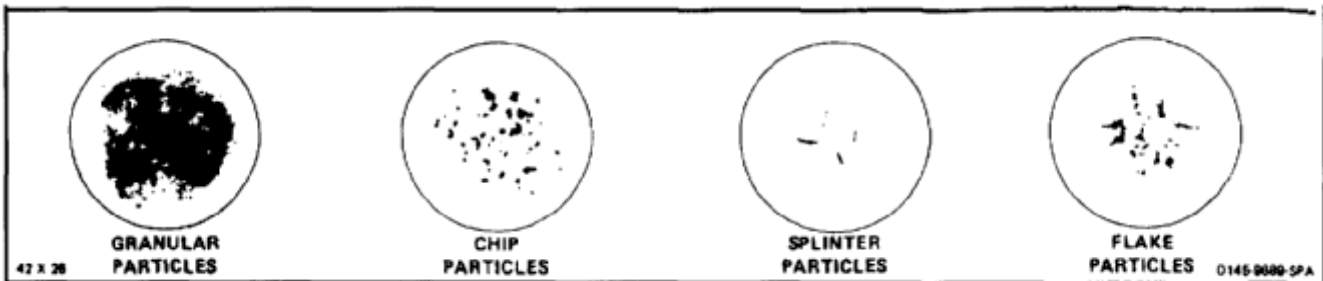
Inspector

**Equipment Condition:**

Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
  - a. Separate steel particles. Use a magnet.
  - b. Identify and separate remaining particles by visual inspection.
  - c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

MATERIAL	DESCRIPTION	ACTION REQUIRED
Steel	Fine, hair-like fuzz particles	Normal wear. No action required
	Limited amount of splinters, flakes, or granular particles	Possible failure. Perform serviceability check (Task 6-140)
	Thin flakes up to <b>1/16 inch</b> in diameter and <b>1/4 inch</b> long, maximum of 10 flakes	Perform serviceability check (Task 6-140)
	Massive amount of splinters, flakes, or granular particles	Failure. Replace transmission (Task 6-92 and Task 6-97) or aft rotor shaft (Tasks 6-56 and 6-62)
Aluminum or magnesium	Granular particles	Perform serviceability check (Task 6-140)
	Massive amounts of splinters, flakes or granular particles.	Failure. Replace transmission (Tasks 6-92 and 6-97) or aft rotor shaft (Tasks 6-56 and 6-62)
Copper, bronze, or silver	Limited amount of granular particles	Possible indication of bearing cage wear. Perform serviceability check (Task 6-140)
	Massive amount of granular particles or chip particles	Failure. Replace transmission (Tasks 6-92 and 6-97) or aft rotor shaft (Tasks 6-56 and 6-62)
Fiberglass	Granular or fibrous particles	Perform serviceability check (Task 6-140)



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**Flashlight  
Workstand**Materials:**

None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Helicopter On Level Surface  
Right Baffle Under Aft Transmission Open (Task 1-2)**WARNING**

Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgment must be used when determining allowable leakage.

**CAUTION**

The maximum allowable leakage rate, static or dynamic, from any oil seal in the transmission is **20 drops (one cubic centimeter) per hour**. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.

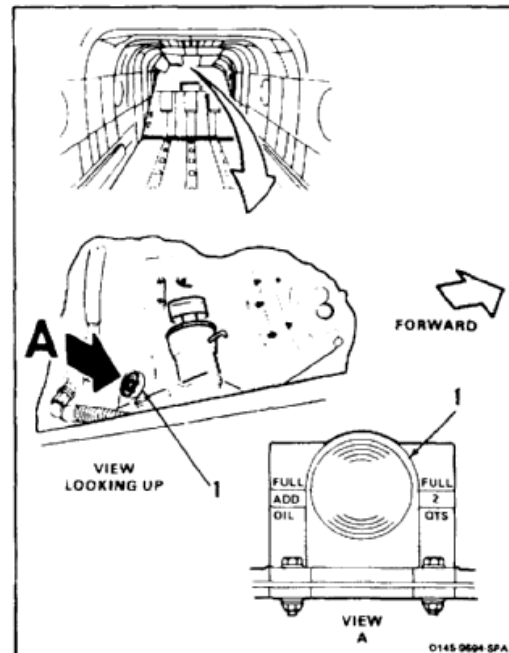
**NOTE**

If engines have not been operated for **30 minutes** or more, perform a **5 minute** ground run (TM 55-1520-240-10).

1. Check sight gage (1) to determine oil level. Oil level shall be between the FULL and ADD OIL lines after a **2 hour** flight.

**FOLLOW-ON MAINTENANCE:**

Service aft transmission (Task 1-54).  
Close baffle under aft transmission (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Container, 14 Quart (3)  
Hose, 1 Inch ID, 36 Inches Long

**Materials:**

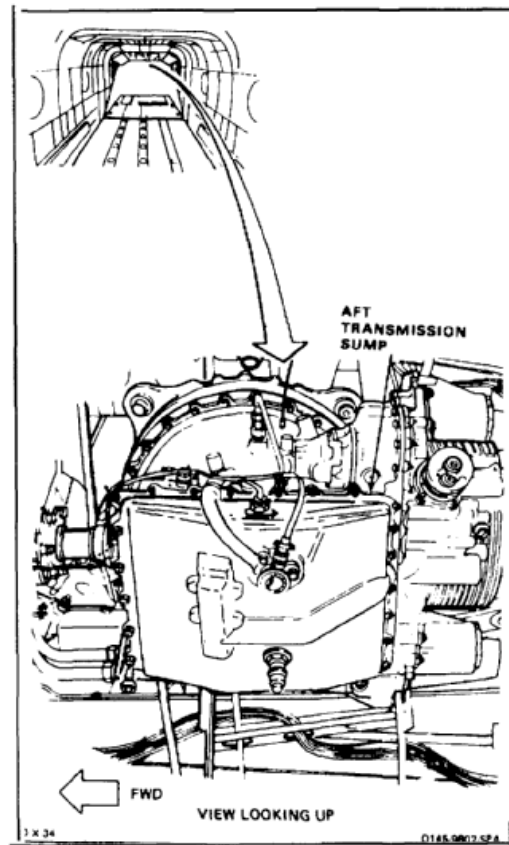
None

**Personnel Required:**

Medium Helicopter Repairer

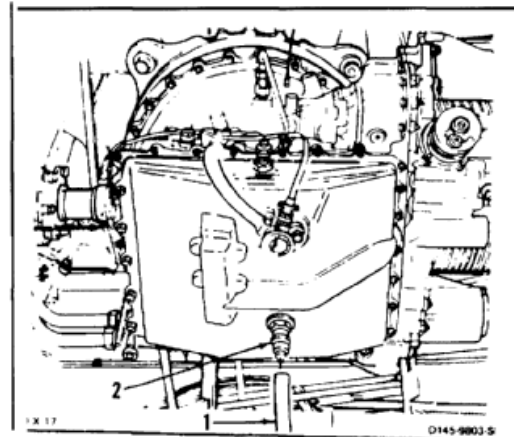
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Baffles Under Aft Transmission Open (Task 2-2)  
Aft Transmission Drip Tray Removed (Task 2-3)  
Cargo Ramp Open and Level (Task 2-2)

**NOTE**

Sump holds about **30 quarts** of oil.

1. Connect hose (1) to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. Let oil drain into container.
3. Push in drain valve (2), twist it, and pull down. Remove hose (1) from valve.

**FOLLOW-ON MAINTENANCE:**

Install aft transmission drip tray (Task 2-3).  
Close baffles under aft transmission (Task 2-2).  
Close cargo ramp (Task 2-2).

END OF TASK

6-502

## INITIAL SETUP

**Applicable Configurations:**

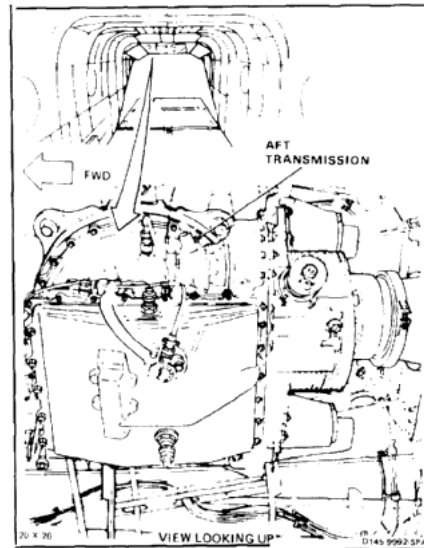
All

**Tools:**

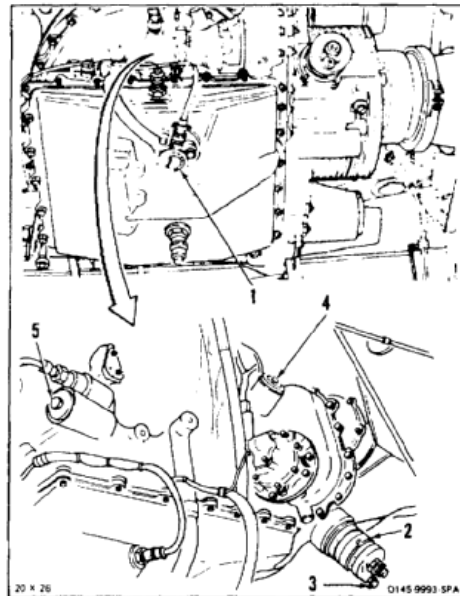
Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

None

**Personnel Required:**Medium Helicopter Repairer  
Rotary-Wing Aviator (2)**References:**Task 1-54  
Task 6-138  
Task 6-148  
Task 6-154  
Task 6-155  
Task 6-156  
Task 6-157  
Task 6-158  
TM 55-1520-240-10**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Baffles Under Aft Transmission Open (Task 2-2)  
Aft Transmission Drip Tray Removed (Task 2-3)  
Cargo Ramp Open and Level (Task 2-2)

1. Drain oil from aft transmission (Task 6-138).
2. Remove and clean debris detection screen cap (1) (Task 6-157). Install cap (Task 6-158).
3. Replace main oil filter element (2) (Task 6-148). Note position of indicator button (3).
4. If indicator button (3) was extended, replace inlet screens (4) (Tasks 6-155 and 6-156).
5. Replace auxiliary oil filter (5) (Task 6-154).
6. Service aft transmission with oil (Task 1-54).
7. Have pilot perform ground run (TM 55-1520-240-10). When aft transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. Repeat steps 1 thru 6.

***FOLLOW-ON MAINTENANCE:***

Install aft transmission drip tray (Task 2-3).  
Close baffles under aft transmission (Task 2-2).  
Close cargo ramp (Task 2-2).

END OF TASK

6-504

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Cheesecloth (E112)

**Personnel Required:**

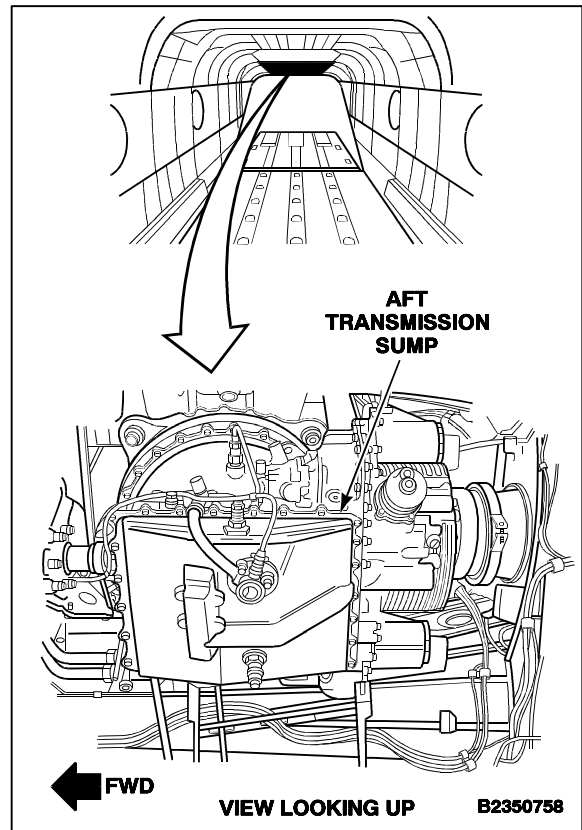
CH-47 Helicopter Repairer  
Rotary-Wing Aviator (2)

**References:**

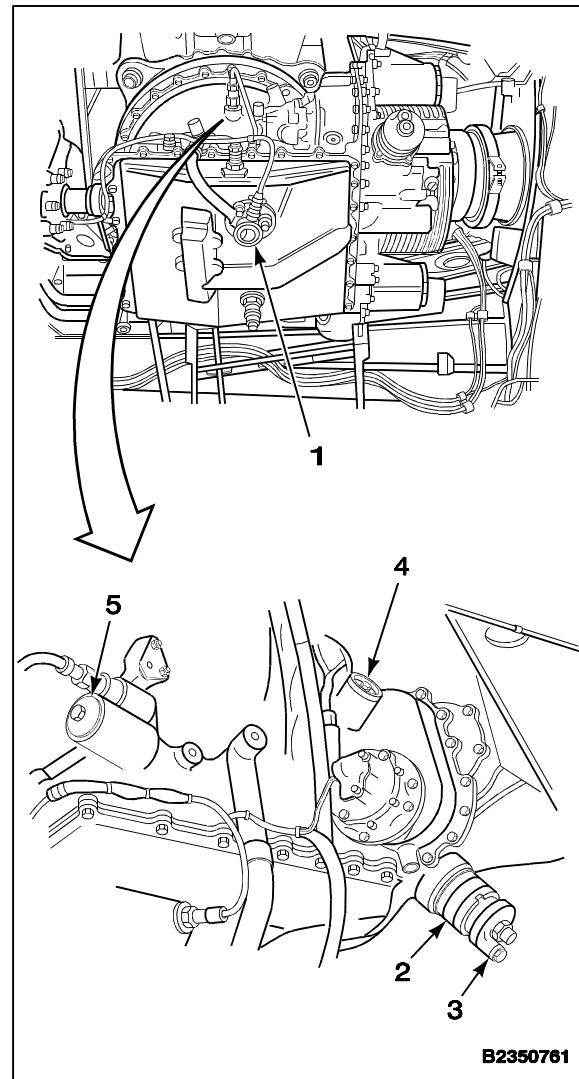
Task 1-54  
Task 6-92  
Task 6-97  
Task 6-131  
Task 6-138  
Task 6-148  
Tasks 6-154 thru 6-158  
TM 1-1520-240-10

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Baffles Under Aft Transmission Open (Task 2-2)  
Aft Transmission Drip Pan Removed (Task 2-3)  
Cargo Ramp Open and Level (Task 2-2)



1. Drain oil through cheesecloth (E112) or similar filter material (Task 6-138). Check for debris.
2. Remove and clean debris detection screen cap (1) (Task 6-157). Install cap (Task 6-158).
3. Replace element in main oil filter (2) (Task 6-148). Note position of indicator button (3). If button is extended, remove and inspect inlet screen (4) (Tasks 6-157 and 6-131). Install screen (Task 6-156).
4. Replace auxiliary oil filter (5) (Task 6-154).
5. Service transmission (Task 1-54).
6. Have pilot perform ground run for **1 hour** at normal rotor rpm (TM 1-1520-240-10). If forward transmission oil pressure or temperature changes abnormally or if debris screen or chip detector light comes on, have pilot shut down helicopter. Check for cause.
7. Drain oil through cheesecloth (E112) or similar filter material (Task 6-138). Check for debris.
8. Remove, inspect, and clean debris screen cap (1) (Task 6-157). Install cap (Task 6-158).
9. Remove element in main oil filter (2). If element contains debris or filter button (3) was extended, replace with new element (Task 6-148).
10. If element in filter (2) contains debris and filter button (3) was also extend, remove, inspect, and install inlet screen (4) (Tasks 6-155, 6-131, and 6-156).
11. Replace auxiliary oil filter (5) (Task 6-154).
12. If quantity and size of particles obtained from oil filters (2 and 5) and cap (1) have not decreased by at least **30 percent** from original amount, replace aft transmission (Tasks 6-92 and 6-97).
13. If quantity and size of particles obtained from oil filters (2 and 5) and cap (1) have decreased by **30 percent** or more, repeat steps 1 thru 11. If any debris is obtained replace aft transmission (Tasks 6-92 and 6-97).



**FOLLOW-ON MAINTENANCE:**

- Close cargo ramp (Task 2-2).
- Install aft transmission drip pan (Task 2-3).
- Close baffles under aft transmission (Task 2-2).

END OF TASK



**6-141 REMOVE AFT TRANSMISSION OIL COOLER FAN**

6-141

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

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

**Materials:**

None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

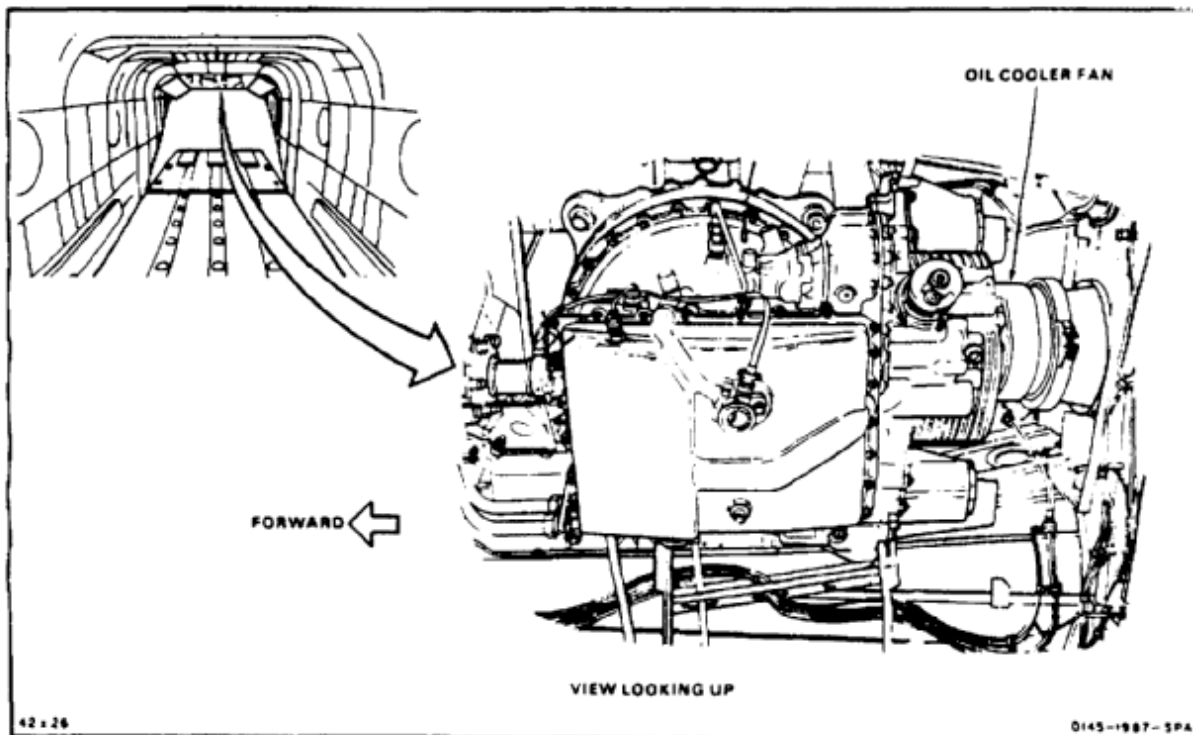
Battery Disconnected (Task 1-39)

Electrical Power Off

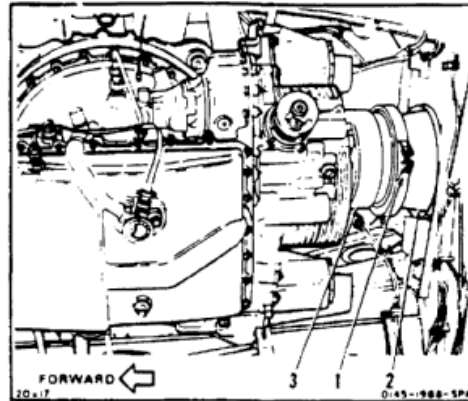
Cargo Ramp Open and Level (Task 2-2)

Baffles Under Aft Transmission Open (Task 2-2)

Aft Transmission Drip Tray Removed (Task 2-3)



1. Loosen clamp (1) securing duct (2) to fan (3). Slide duct and clamp aft, off fan.

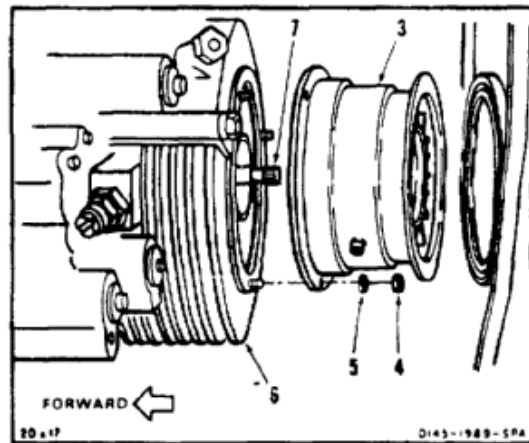


2. Remove four nuts (4) and washers (5) from fan (3). Pull fan (3) away from cooler (6) until shaft (7) can be seen.

**NOTE**

Fan cannot be removed if shaft comes out with fan.

3. Remove fan (3) from shaft (7). Make sure shaft does not come out with fan. If needed, push shaft back into cooler (6).

**FOLLOW-ON MAINTENANCE:**

None

Tasks 6-142, 6-142.1, and 6-143 deleted.

END OF TASK

6-508

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Hand Lubricating Gun  
 Torque Wrench, 5 to 50 Inch-Pounds  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Torque Wrench, 150-750 Inch-Pounds

**Materials:**

Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Grease (E190)  
 Grease (E190.1)  
 Oil (E254)  
 Gloves (E186)

**Parts:**

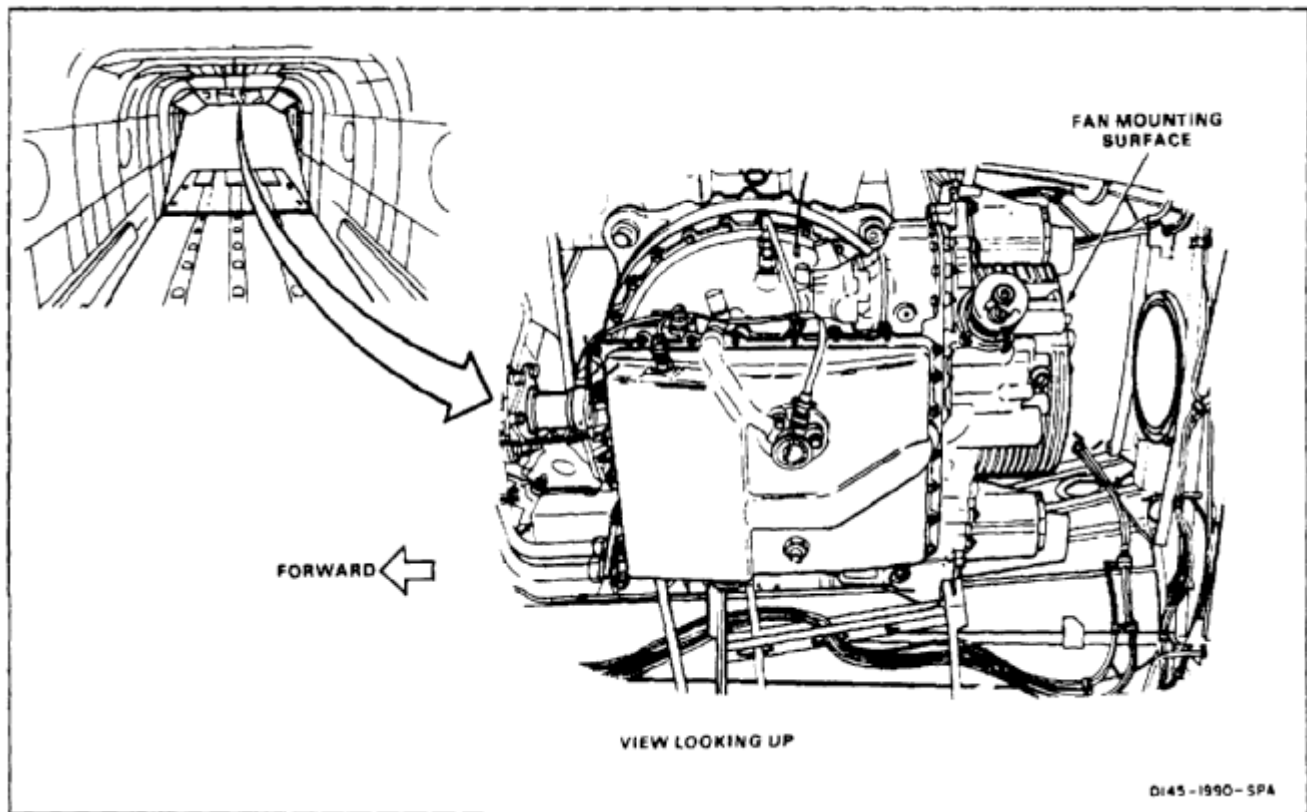
Packings

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P



1. Check the torque of the fan retaining nut (1). Torque nut to **400 inch-pounds**.



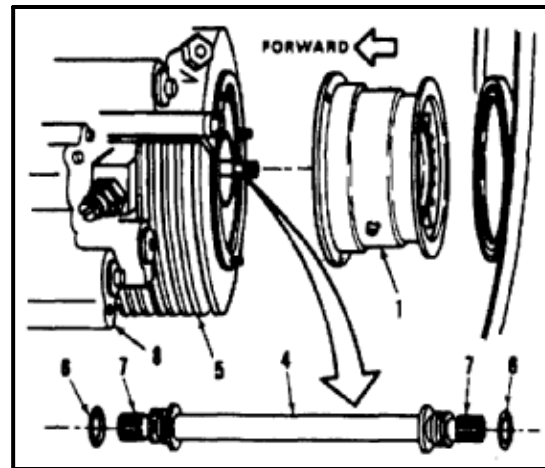
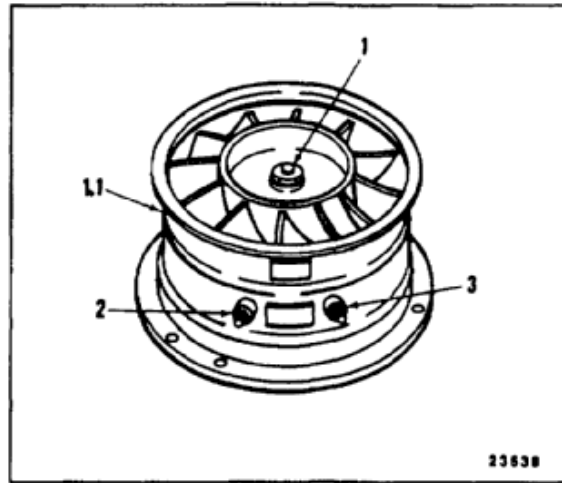
Do not overgrease. Do not block vent fitting (3). Stop grease application as soon as clean grease comes out of vent fitting.

- 1.1. Apply grease (E190) to fan (1.1) at fitting (2) until clean grease comes out vent (3). Use hand lubricating gun.
2. Remove drive shaft (4) from oil cooler (5). Remove packings (6) from each end of shaft.



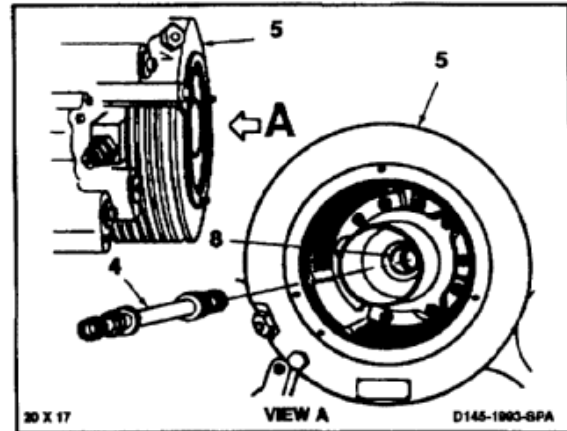
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

3. Clean splines (7) at both ends of shaft (4). Use solvent (E162) and clean cloths (E120). Wear gloves (E186).
- 3.1. Inspect splines (7) on drive shaft (4) for wear. If splines are worn, proceed as follows:
  - a. Place a **6 inch** metal ruler or equivalent straightedge along the length of splines (7), with ruler spanning worn area.
  - b. Measure the depth of wear below the face of the spline. Use a feeler gage.
  - c. If spline wear at fan end exceeds **0.020 inch**, replace drive shaft (4) and fan (1.1).
  - d. If spline wear at transmission end exceeds **0.020 inch**, perform steps 6 thru 9. Replace aft transmission (8). (Refer to Tasks 6-92 and 6-97.)
  - e. The **0.020 inch** maximum wear is with no raised material on both ends of the quill shaft's flange. If raised material is found, remove the material by hand, polishing the affected area with an oil wet scotchbrite pad. Remove a minimum amount of material. Do not exceed **0.020 inch** maximum depth.

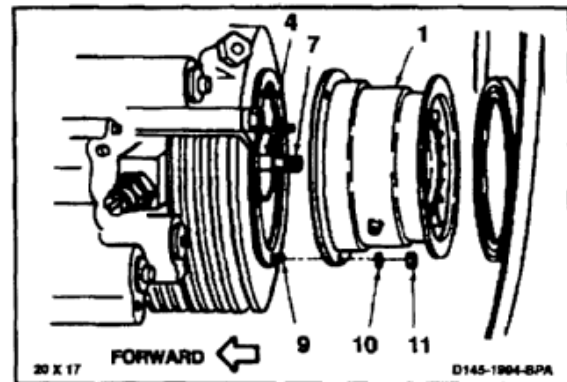


- f. If wear is less than **0.020 inch**, all parts are satisfactory for continued use.
4. Install packings (6) on each end of shaft (4).
5. Pack splines (7) and mating splines in transmission (8) and fan (1.1) with grease (E190.1).

- Install shaft (4) in transmission splines (8) within oil cooler (5).



- Install fan (1) on splines (7) of shaft (4).
- Rotate fan (1) to align mounting holes with fur mounting studs (9). Install fan on studs.
- Install four washers (10) and nuts (11). Torque nuts to **80 inch-pounds**.

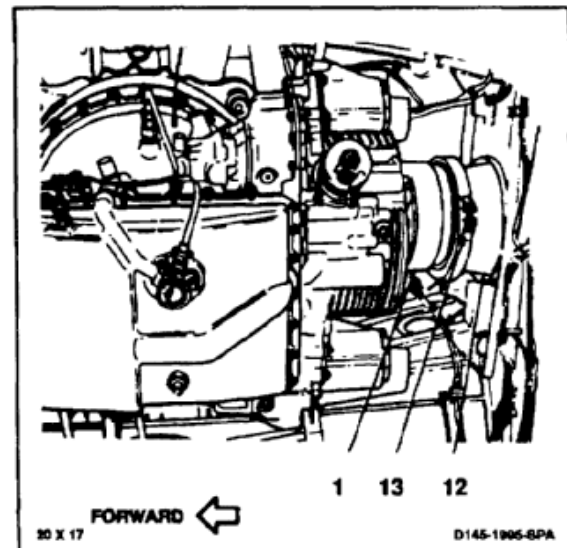


- Slide exhaust (12) forward against fan (1).

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

- Coat thread of clamp (13) with oil (E254). Install clamp around duct (12) and fan (1). Torque clamp to **35 inch-pounds**.



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Perform aft transmission fan vibration analysis (TM 1-6625-724-13&P).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 14 Quart  
 Socket, 1-1/2 Inch

**Materials:**

Lockwire (E231)  
 Oil (E254)  
 Cloths (E120)

**Parts:**

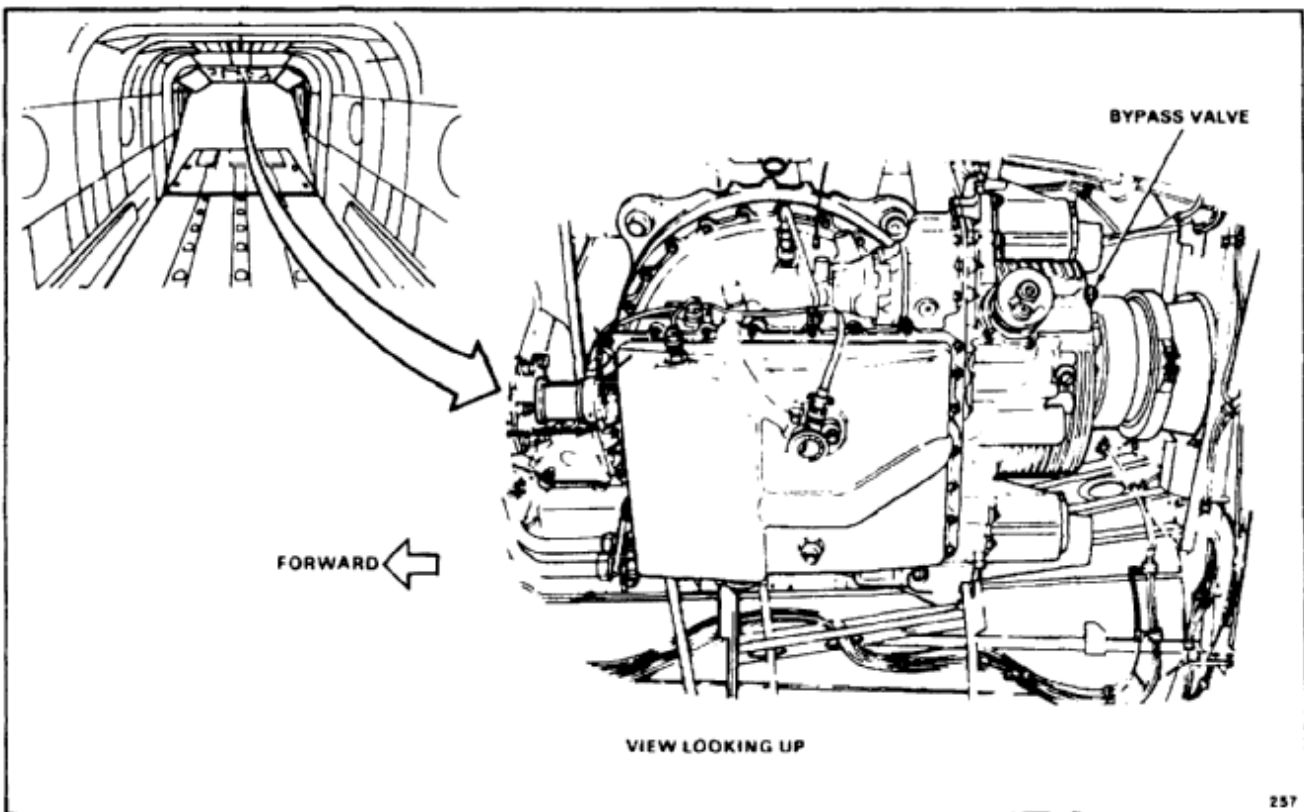
Packing (2)

**Personnel Required,:**

Medium Helicopter Repairer  
 Inspector

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Cargo Ramp Open and Level (Task 2-2)  
 Baffles Under Aft Transmission Open (Task 2-2)  
 Aft Transmission Drip Tray Removed (Task 2-3)



**DRAIN OIL COOLER**

1. Remove lockwire from drain plug (1) and bypass valve (2). Remove drain plug from oil cooler (3). Drain oil into container.
2. Remove packing (4) from drain plug (1).
3. Install packing (4) on drain plug (1). Install plug in cooler (3). Torque plug to **80 inch-pounds**.

**REMOVE VALVE****NOTE**

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove bypass valve (2) from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (5) from valve (2).

**INSTALL VALVE****WARNING**

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

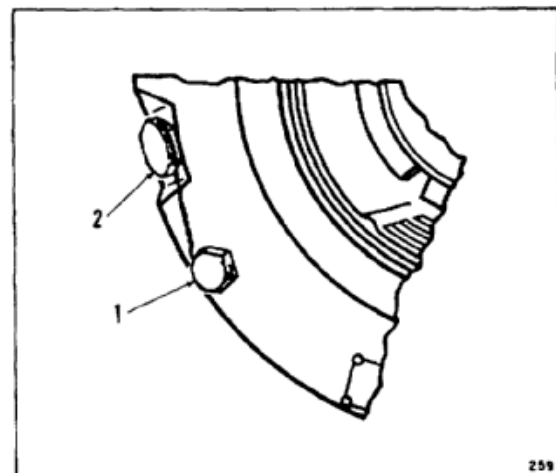
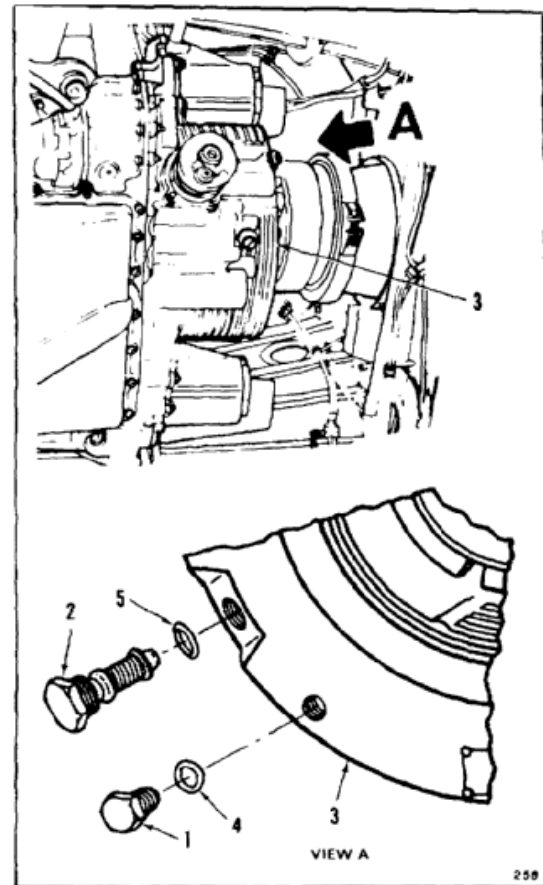
**WARNING**

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

6. Coat packing (5) and thread of bypass valve (2) with oil (E254). Install packing on valve.
7. Install valve (2) in oil cooler (3). Torque valve to **80 inch-pounds**.
8. Lockwire valve (2) to drain plug (1). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service aft transmission (Task 1-54).  
Install aft transmission drip tray (Task 2-3).  
Close baffles under aft transmission (Task 2-2).  
Close cargo ramp (Task 2-2).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart  
 Wrench, 1 Inch

**Materials:**

Marking Pencil (E271)  
 Twine (E433)

**Parts:**

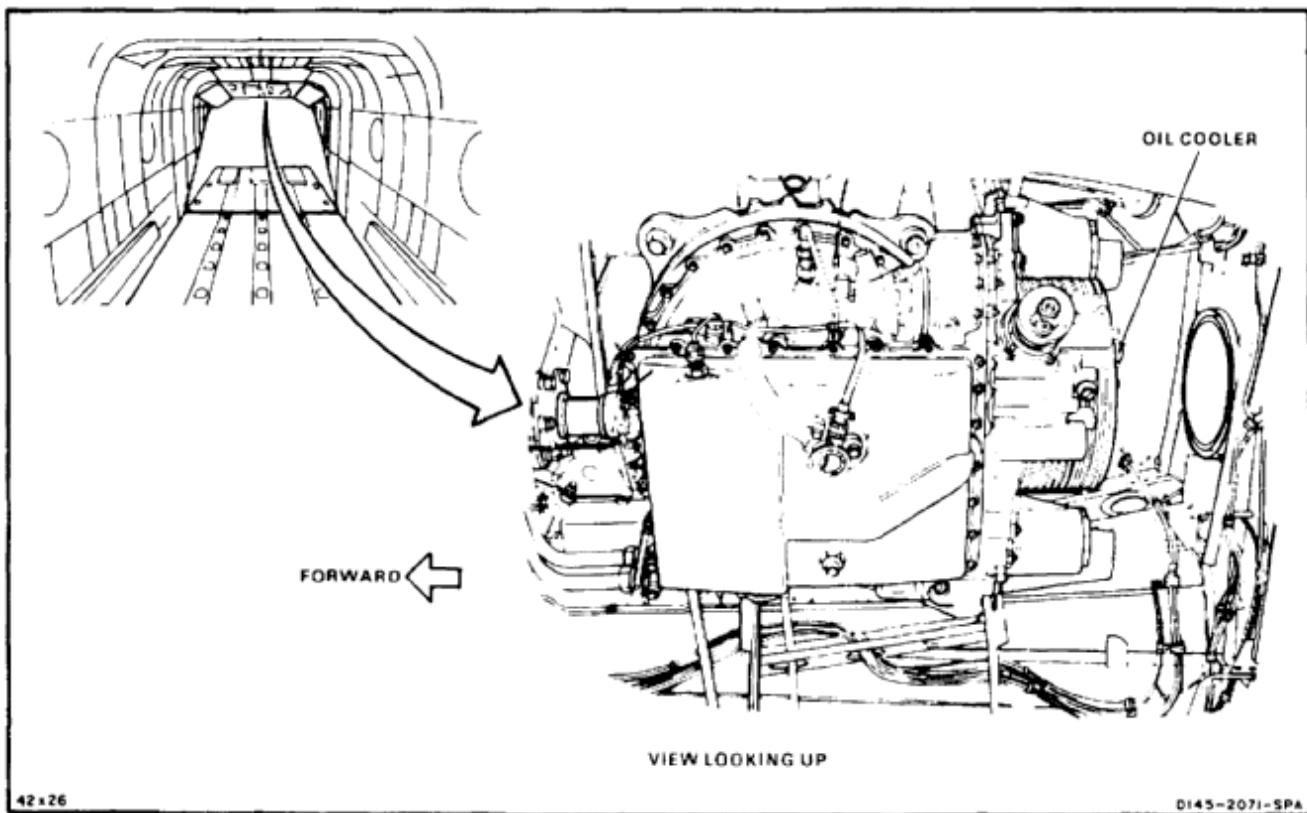
Packing

**Personnel Required:**

Medium Helicopter Repairer (2)

**Equipment Condition:**

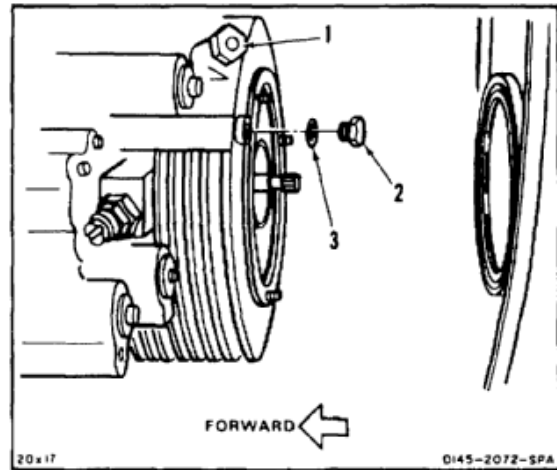
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Aft Transmission Oil Cooler Fan Removed (Task 6-141)





6-145 REMOVE AFT TRANSMISSION OIL COOLER (Continued)

1. Remove lockwire from plug (1) and drain plug (2). Remove drain plug and packing (3). Drain oil into container.
2. Install plug (2) and packing (3).

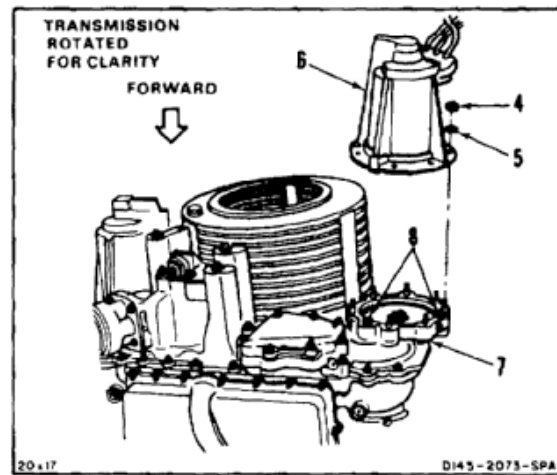


3. Remove eight nuts (4) and washers (5) from No. 2 ac generator (6).

**CAUTION**

Do not damage oil transfer tubes when removing generator.

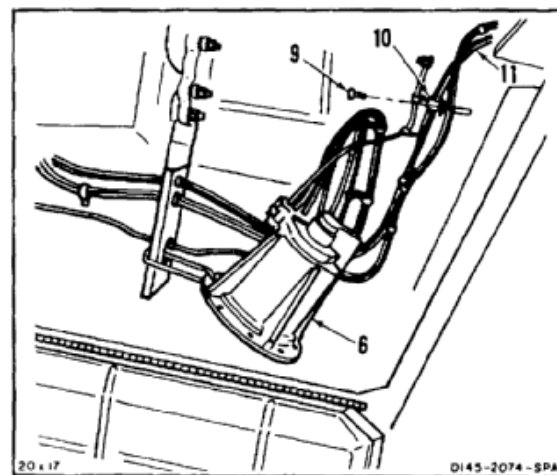
4. Pull generator (6) straight back from transmission (7) and two oil transfer tubes (8).



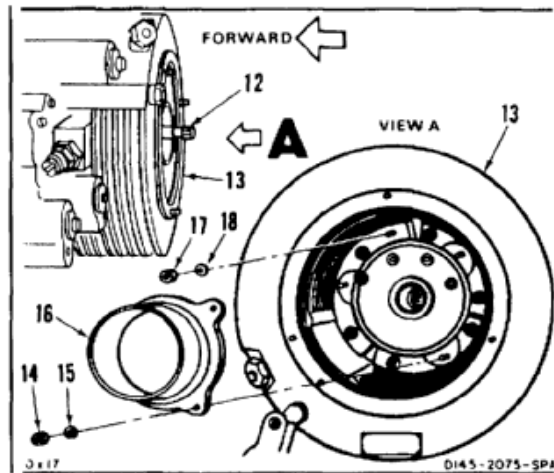
**CAUTION**

Wiring can be damaged if generator is not supported.

5. Tie generator (6) to structure at side of helicopter. Use twine (E433).
6. Remove screw (9). Disconnect clamp (10). Move bundle (11) back for clearance.



7. Remove fan drive shaft (12) from oil cooler (13).
8. Remove three nuts (14) and washers (15) from baffle (16). Remove baffle.
9. Remove seven nuts (17) and washers (18).



10. If cooler (13) will be reinstalled, draw an alignment mark (19) on cooler and transmission (8). Use marking pencil (E271).



Transfer tubes can be damaged if oil cooler is not supported during removal. Cooler weighs **35 pounds**.

11. With aid of helper, pull cooler (13) straight back from transmission (8) to clear oil transfer tubes (20). Cap tubes or plug ports as needed to contain oil in cooler.

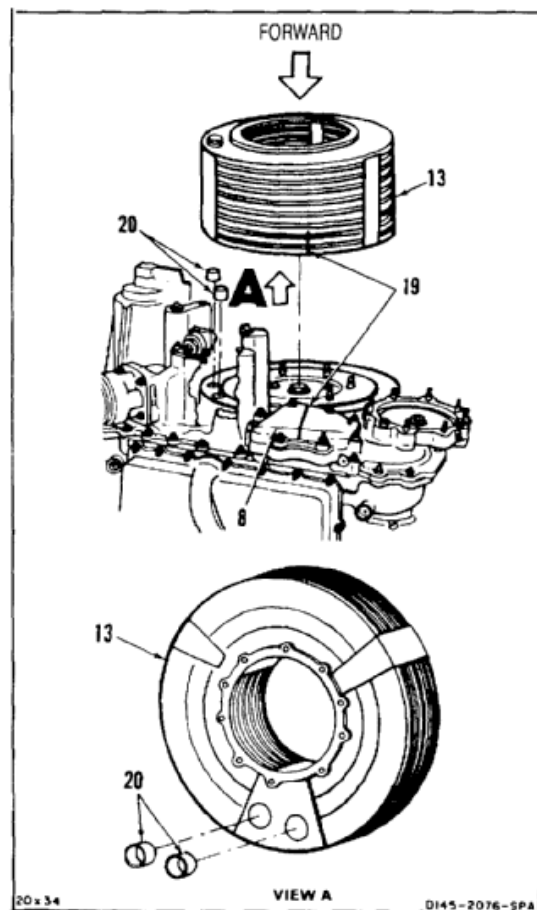
**NOTE**

Tubes may stay in cooler or transmission.

12. Guide cooler (13) aft and to right, away from transmission (8).
13. If tubes (20) remained in transmission (8), remove them. Install tubes in cooler (13).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gauge 643J  
 Fluorescent Penetrant Method  
 Eddy Current Inspection Method

**Materials:**

Naphtha (E245)  
 Emery Cloth (E123) or Abrasive Paper (E13) or  
 Crocus Cloth (E122)  
 Cloth, Cleaning (E120)  
 Gauze Sponges (E184)  
 Gloves (E184.1)  
 Acetic Acid (E21)  
 Alodine Powder (E65)  
 Epoxy Primer (E292 or E293)  
 Epoxy Coating (E166)  
 Goggles (E473)

**Personnel Required:**

Aircraft Powertrain Repairer  
 Inspector

**References:**

TM 1-1500-335-23  
 TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

**General Safety Instructions:****WARNING**

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

**WARNING**

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

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

**WARNING**

Epoxy primer (E292 or E293) and epoxy coating (E166) are flammable and toxic. They can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.

**NOTE**

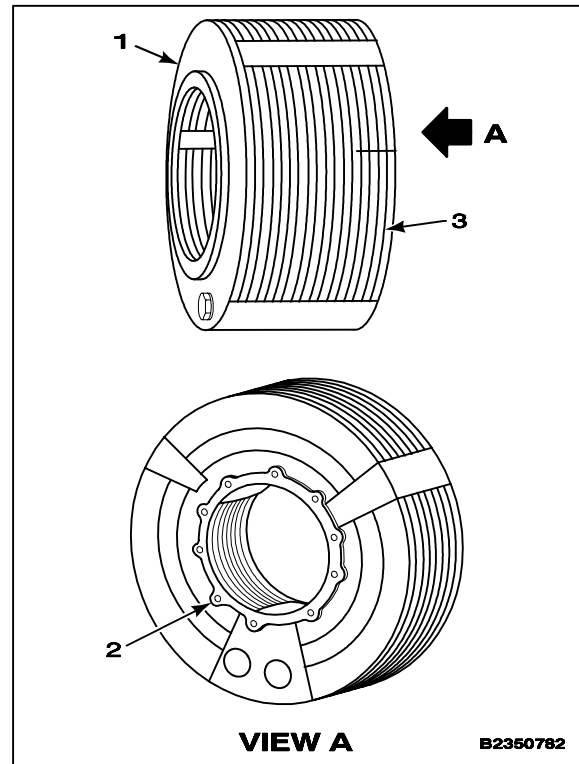
Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. Clean oil and grease from the damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. Check extent and location of damage on cooler (1).

**NOTE**

Dimensions in this step refer to extent of damage after rework.

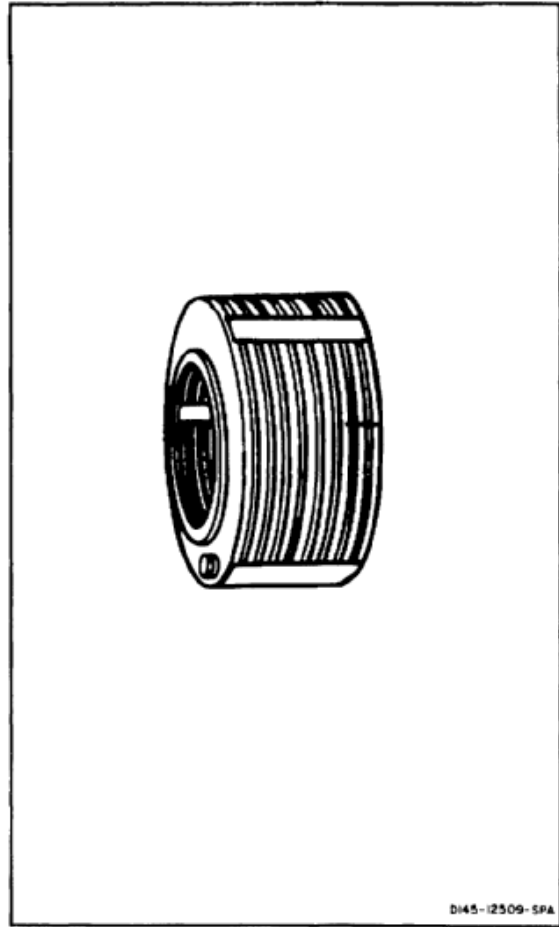
- a. Depth of damage shall not be more than **0.060 inch**.
  - b. Damage shall not extend over more than one surface or enter any radius.
  - c. Damage shall not be closer than **1.00 inch** to any mounting hole (2).
  - d. More than **3 inches** of fins (3) shall not be crushed beyond straightening.
  - e. If any fin is bent more than **30°**, straighten it.
3. Fluorescent inspect damaged area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If crack is suspected in aft transmission oil cooler outside, refer to TM 1-1520-253-23.
  4. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
  5. Smooth the blended area with crocus cloth (E122). Do not leave any sharp edges.



**WARNING**

Wear gloves (E184.1) during the remainder of this task; otherwise, personal injury could result.

6. Acid etch the reworked area as follows:
  - a. Prepare a solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E184.1) and goggles.
  - b. Swab the area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse the area with cold water.
7. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. Alternate inspection method is the eddy current inspection method. If crack is suspected in aft transmission oil cooler outside, refer to TM 1-1520-253-23.
8. Clean the reworked area with naphtha (E245) and clean cloths (E120). Let the area air dry.
9. Swab on solution of alodine powder (E65) and water. Use gauze sponges (E184). Swab for **2 to 5 minutes**. Rinse the area with cold water and let air dry.
10. Apply epoxy primer (E292 or E293) to the reworked area. Let air dry for **2 hours**.
11. Apply epoxy topcoat (E166) .

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Lockwire (E231)

**Parts:**

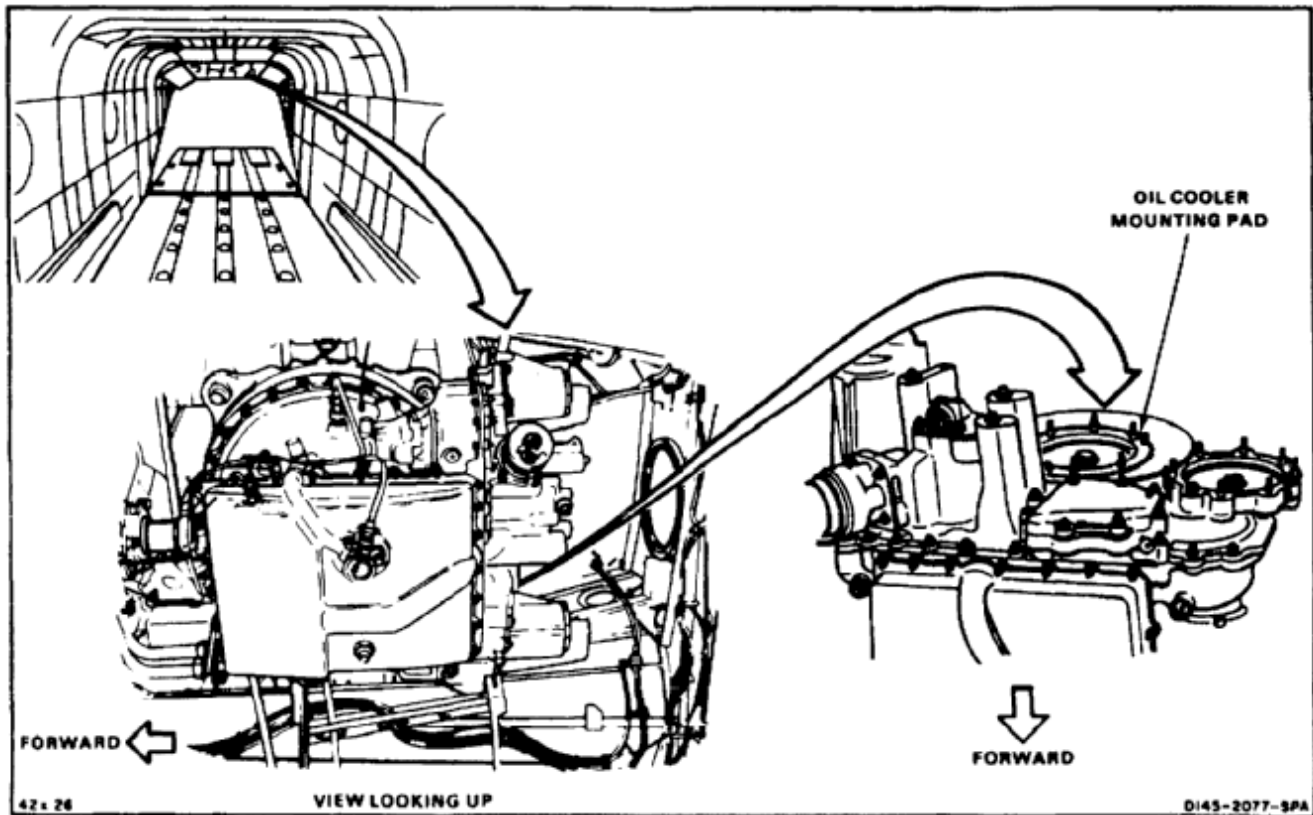
Packings

**Personnel Required:**

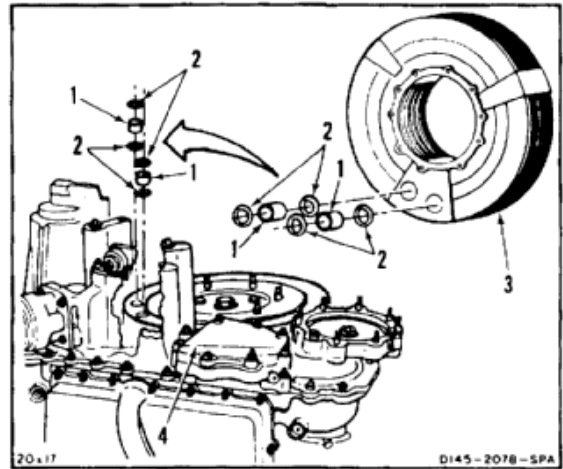
Medium Helicopter  
Inspector

**References:**

TM 55-1520-240-23P



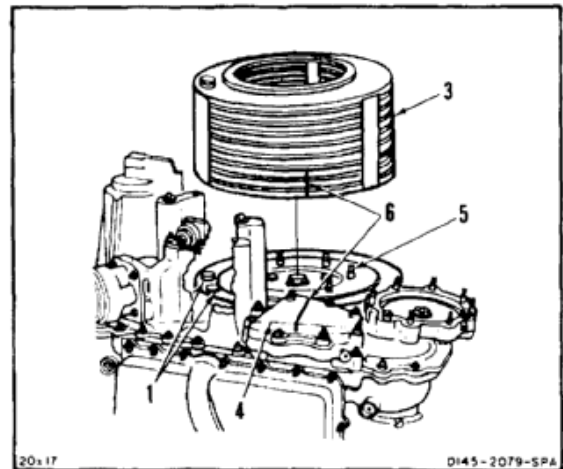
1. Remove two oil transfer tubes (1) and packings (2) from cooler (3). Install two oil transfer tubes and packings transmission (4).



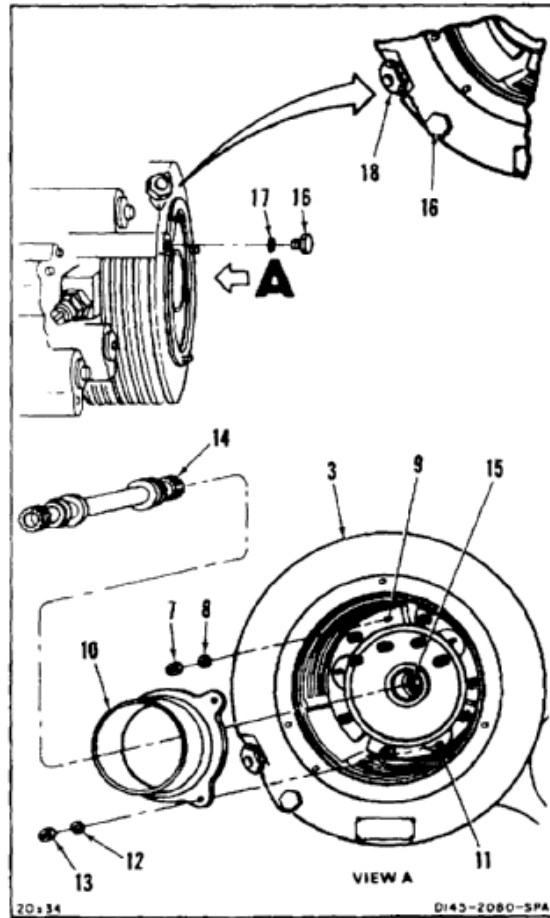
**CAUTION**

Transfer tubes can be damaged if cooler is not aligned.

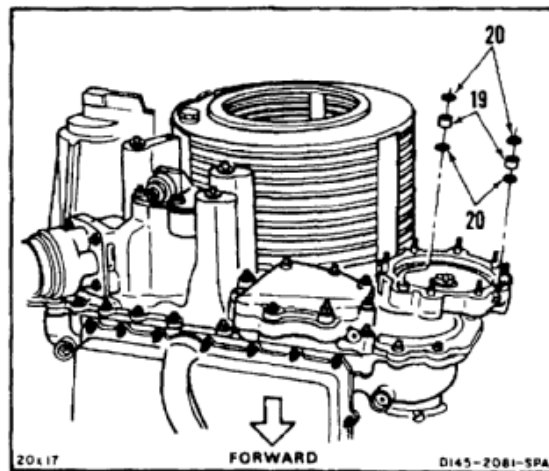
2. Position cooler (3) against transmission (4) with aid of helper. Align cooler with tubes (1), studs (5), and alignment marks (6) (if applied). Install cooler on studs and tubes.



3. Install seven washers (7) and nuts (8) on short studs (9). Torque nuts to **60 inch-pounds**.
4. Install baffle (10) on three long studs (11). Install washers (12) and nuts (13) on studs. Torque nuts to **60 inch-pounds**.
5. Install fan drive shaft (14) in transmission splines (15).
6. If cooler (3) is not a replacement remove drain plug (16) and packing (17). Install plug and new packing. Lockwire drain plug to plug (18) with lockwire (E231).



7. Remove two oil transfer tubes (19) and four packings (20). Install tubes and new packings.

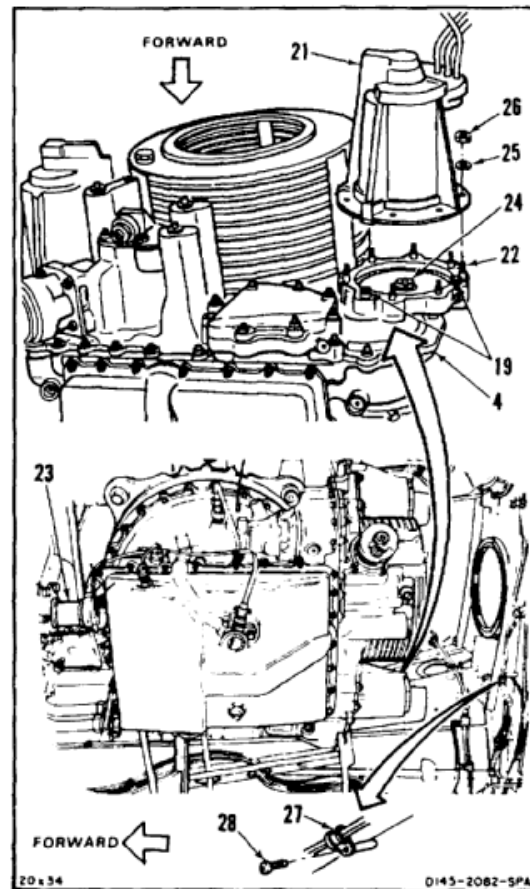




8. Release generator (21) from stowed position. Align generator with studs (22) and transfer tubes (19). Position generator on transmission (4).
9. If needed, turn adapter and plate assembly (23) to align splines (24) with generator (21).
10. Install eight washers (25) and nuts (26). Torque nuts to **120 inch-pounds**.
11. Connect clamp (27) with screw (28).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install aft transmission oil cooler fan (Task 6-144).  
Service aft transmission (Task 1-54).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Workstand

**Materials:**

None

**Personnel Required:**

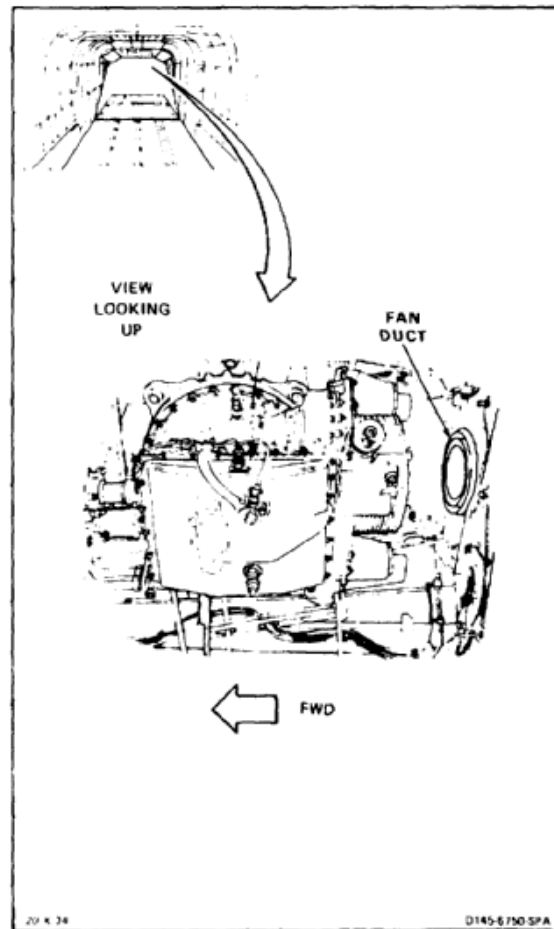
Medium Helicopter Repairer

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Cargo Ramp Open and Level (Task 2-2)
- Baffles Under Aft Transmission Open (Task 2-2)
- Aft Transmission Drip Pan Removed (Task 2-3)
- Aft Transmission Oil Cooler Fan Removed (Task 6-141)

**REMOVE DUCT**

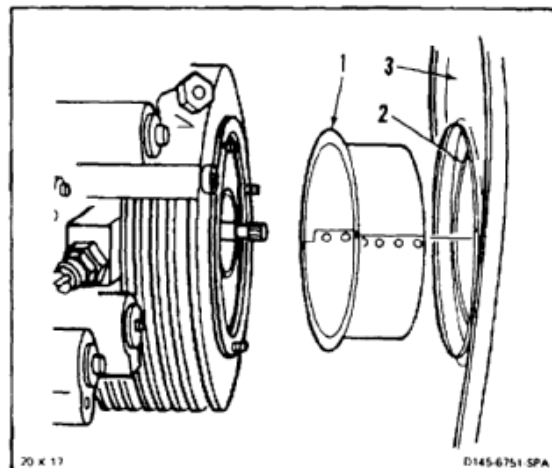
1. Pull duct (1) out of seal (2) at bulkhead (3). Remove duct.

**INSTALL DUCT**

2. Install duct (1), flared end forward, into seal (2) until flared end is against seal.

**FOLLOW-ON MAINTENANCE:**

- Install oil cooler fan (Task 6-144).
- Install aft transmission drip tray (Task 2-3).
- Close baffles under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).



END OF TASK

6-524

**6-148 REPLACE AFT TRANSMISSION MAIN OIL FILTER**

6-148

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Container, 2 Quart

**Materials:**

Dry Cleaning Solvent (E162)  
Cloths (E120)  
Oil (E254)  
Lockwire (E231)  
Gloves (E186)

**Parts:**

Packings  
Filter

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

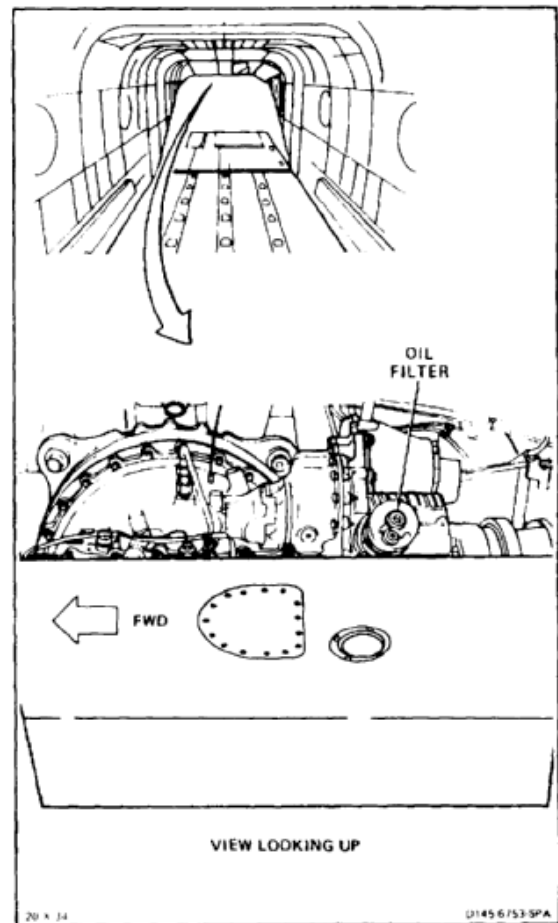
Battery Disconnected (Task 1-39)  
Electrical Power Off  
Cargo Ramp Open and Level (Task 2-2)  
Left Baffle Under Aft Transmission Open (Task 2-2)

**General Safety Instructions:****WARNING**

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

**WARNING**

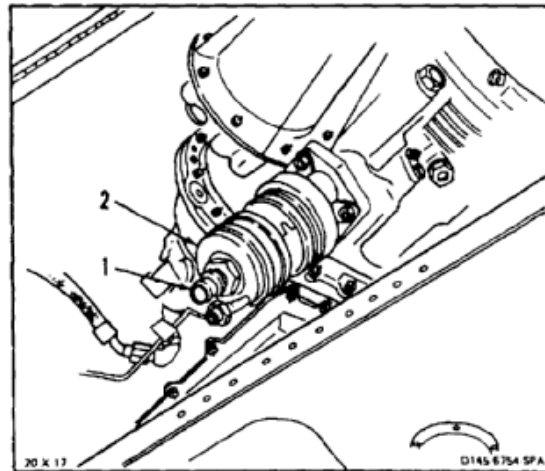
Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.



**REMOVE FILTER****NOTE**

Filter bowl holds about **1 pint** of oil.

1. Hold container under drain valve (1) of filter bowl (2). Push in and twist drain valve. Drain oil into container.

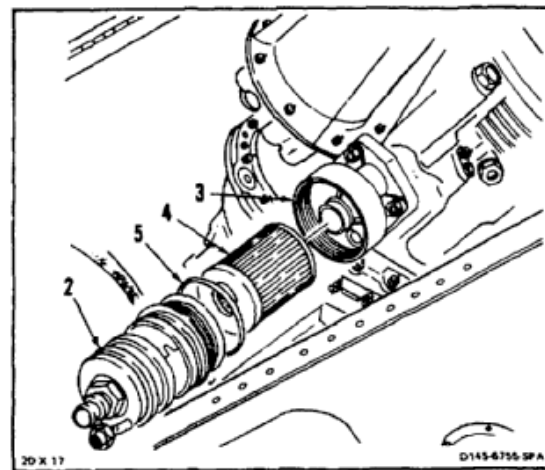


2. Remove lockwire from filter bowl (2). Remove bowl from housing (3).

**NOTE**

Filter may come out with bowl or stay in housing.

3. Remove filter (4) from bowl (2) or housing (3). Inspect filter for debris. If debris is found, perform a contamination analysis (Task 6-108).
4. Remove packing (5) from bowl (2).
5. Wipe inside of housing (3) clean. Use cloth (E120) damp with dry cleaning solvent (E162). Wear gloves (E186) and goggles.
6. Pour out any oil from bowl (2). Check bottom of bowl. If bowl contains deposits, go to step 7. If there is only a film of oil, with no deposits, go to step 11.



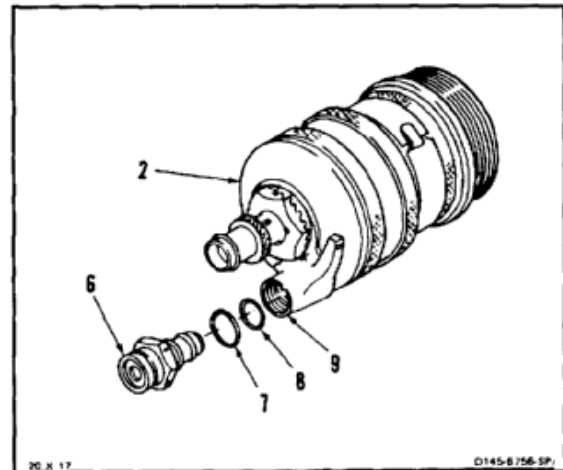
**CLEAN BOWL**

7. Remove lockwire from pressure differential indicator (6). Remove indicator. Remove two packings (7 and 8) from indicator.
8. Flush bowl (2) with dry cleaning solvent (E162). Remove deposits with cloth (E120) damp with solvent (E162). Wear gloves (E186) and goggles.

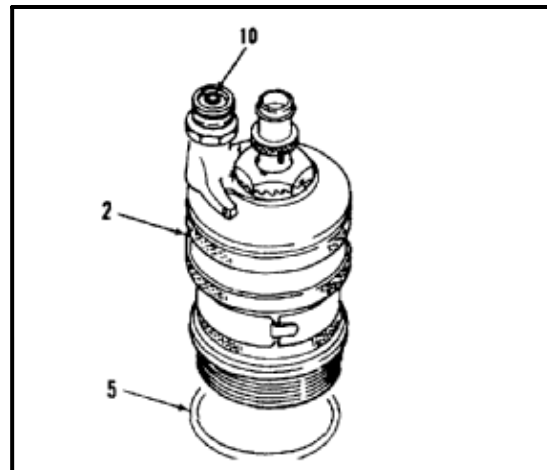


Rigid tool could break and block holes.

9. Check that two holes in wall of indicator cavity (9) are clear. Use lockwire (E231). Do not use a rigid tool such as a drill bit.
10. Install two packings (7 and 8) on indicator (6). Install indicator in bowl (2). Lockwire indicator to bowl. Use lockwire (E231).

**INSTALL FILTER**

11. Position bowl (2) so that indicator button (10) points straight up. Push in button to lock it down.
12. Install packing (5) on bowl (2).



**NOTE**

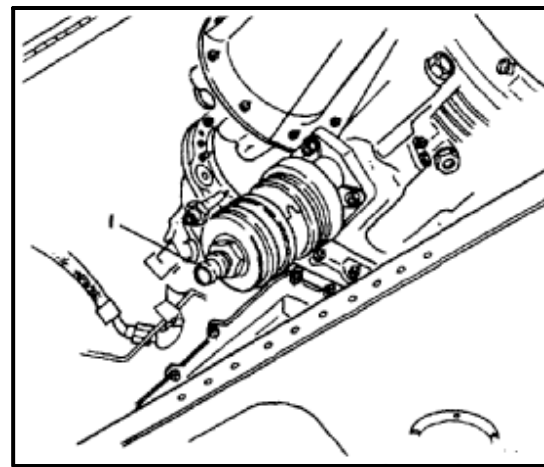
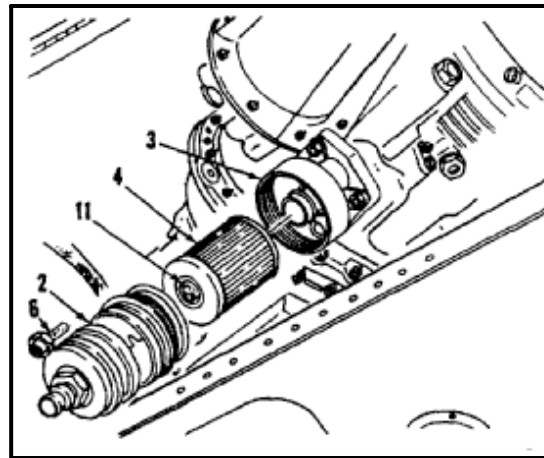
Do not install a used filter.

13. Check for packing (11) at each end of filter (4), install new filter in bowl (2).

**NOTE**

After tightening the filter bowl, the pressure indicator may be in any position as long as the indicator does not touch the drip pan at any point. If it does touch the drip pan, replace the filter bowl.

14. Install bowl (2) and filter (4) in housing (3). Tighten bowl by hand until it bottoms. Lockwire bowl to housing. Use lockwire (E231).
15. Make sure drain valve (1) is closed.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service aft transmission (Task 1-54).  
 Perform ground run (TM 55-1520-240-10).  
 Close left baffle under aft transmission (Task 2-2).  
 Close cargo ramp (Task 2-2).

END OF TASK

**6-148.1 REPLACE AFT TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR**

6-148.1

**INITIAL SETUP**

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
Container, 2 Quart

**Materials:**

Lockwire (E231)

**Parts:**

Packings

**Personnel Required:**

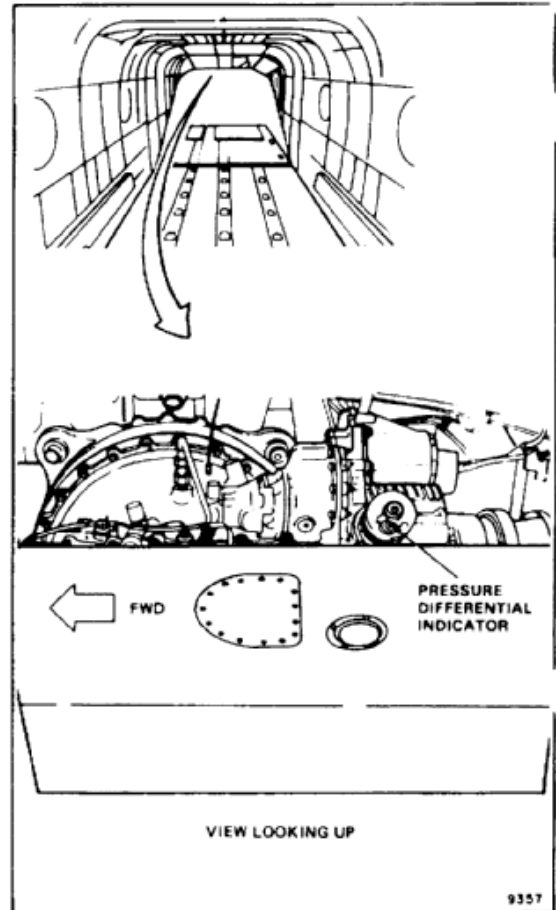
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Cargo Ramp Open and Level (Task 2-2)  
Left Baffle Under Aft Transmission Open (Task 2-2)

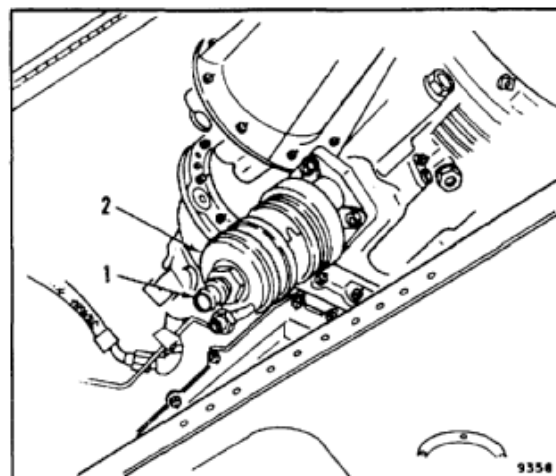


**DRAIN OIL**

**NOTE**

Filter bowl holds about **1 pint** of oil.

1. Hold container under drain valve (1) of filter bowl (2). Push in and twist drain valve. Drain oil into container.
2. Close drain valve (1).

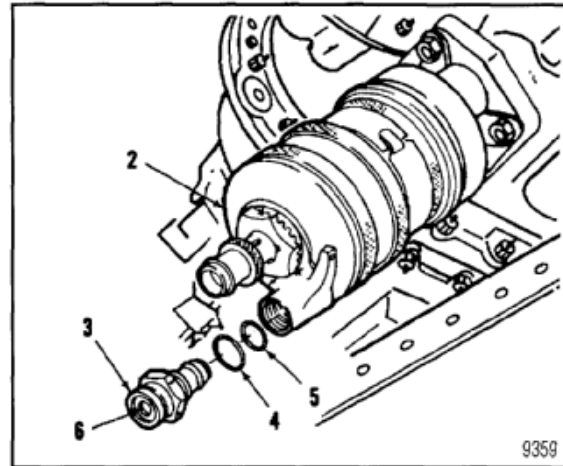


**REMOVE INDICATOR**

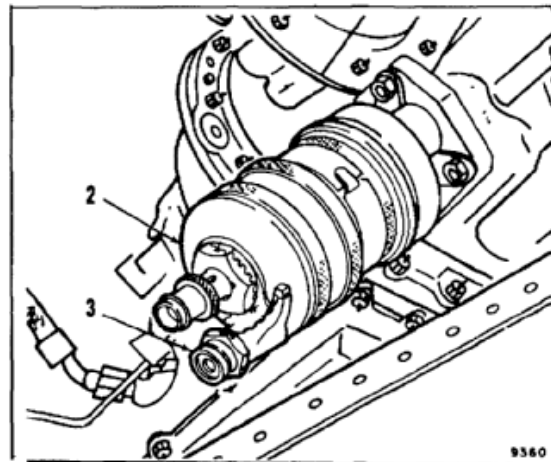
3. Remove lockwire from pressure differential indicator (3). Remove indicator from filter bowl (2).
4. Remove two packings (4 and 5) from indicator (3).

**INSTALL INDICATOR**

5. Install two packings (4 and 5) on indicator (3).
6. Hold indicator (3) so that button (6) points up. Check that button is pushed in and locked.
7. Install indicator (3) in bowl (2).



8. Lockwire indicator (3) to filter bowl (2). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Service aft transmission (Task 1-54).
- Close left baffle under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK



## 6-149 REMOVE AFT TRANSMISSION MAIN OIL PUMP

6-149

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Bolt, 1/4-28, 3 Inches Long, 1-1/2 Inch  
 Thread Length (2)  
 Workstand  
 Container, 2 Quart

**Materials:**

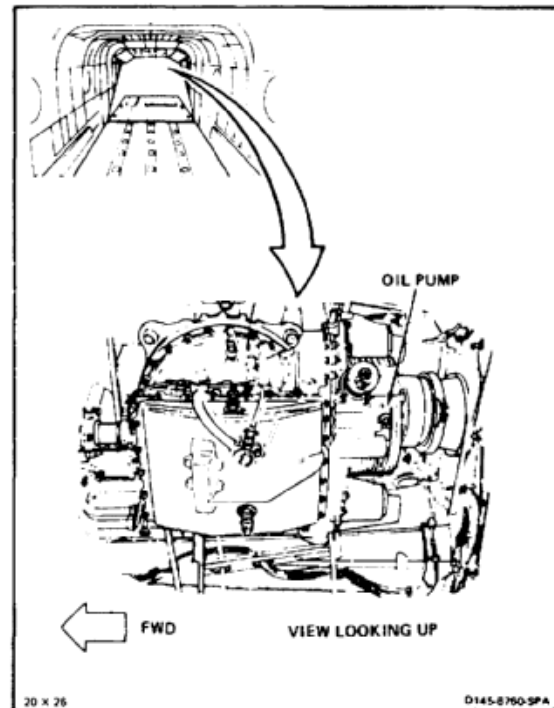
None

**Personnel Required:**

Medium Helicopter Repairer (2)

**Equipment Condition:**

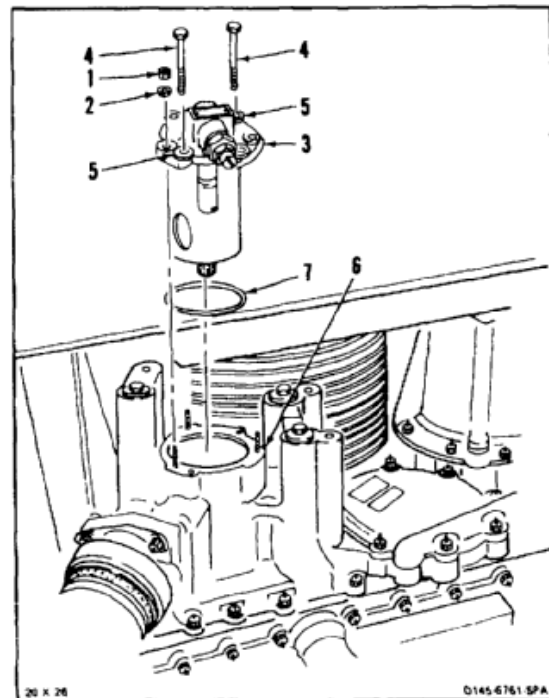
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Baffles Under Aft Transmission Open (Task 2-2)  
 Aft Transmission Drip Tray Removed (Task 2-3)  
 Cargo Ramp Open and Level (Task 2-2)



1. Remove three nuts (1) and washers (2) from pump (3).
2. Install two 1/4-28 bolts (4) in holes (5) in end of pump (3). Threaded length of bolts shall be at least **1-1/2 inches**.
3. Turn bolts (4) to jack pump (3) out of transmission (6). Remove pump. Use container to catch spilled oil.
4. Remove bolts (4) and packing (7) from pump (3).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

None

**Parts:**

Packing

**Personnel Required:**

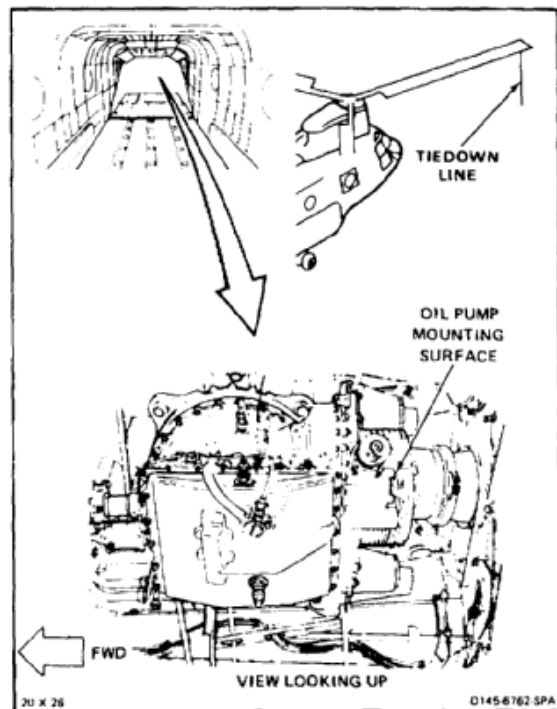
Medium Helicopter Repairer (2)  
Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Tiedown Line Installed On One Forward Blade (Task  
1-26)



1. Install packing (1) on pump (2).

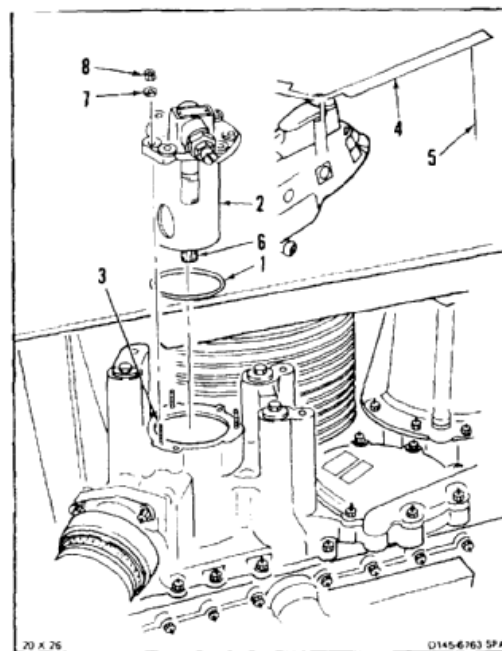
**WARNING**

Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.

2. Install pump (2) slowly and carefully on three studs (3). Have helper pull blade (4) around with tiedown line (5) as needed to align splines in transmission with splines of pump drive shaft (6).
3. Install three washers (7) and nuts (8) on studs (3). Torque nuts to **60 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service aft transmission with oil (Task 1-54).  
Install aft transmission drip tray (Task 2-3).  
Close baffles under aft transmission (Task 2-2).  
Close cargo ramp (Task 2-2).



END OF TASK

6-532

**6-151 ADJUST AFT TRANSMISSION MAIN OIL PUMP****6-151****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Lockwire (E230)

**Personnel Required:**

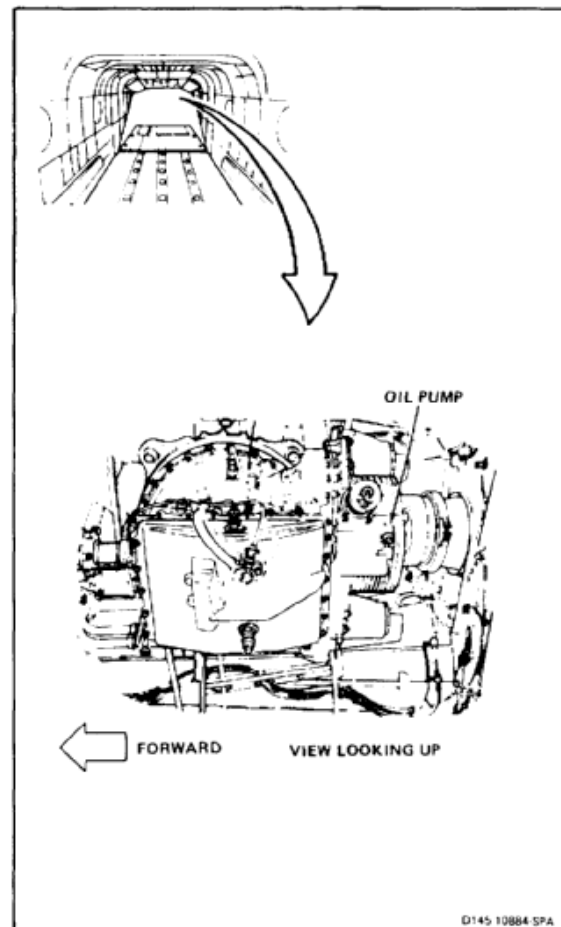
Medium Helicopter Repairer  
 Inspector  
 Army Rotary-Wing Aviator (2)

**References:**

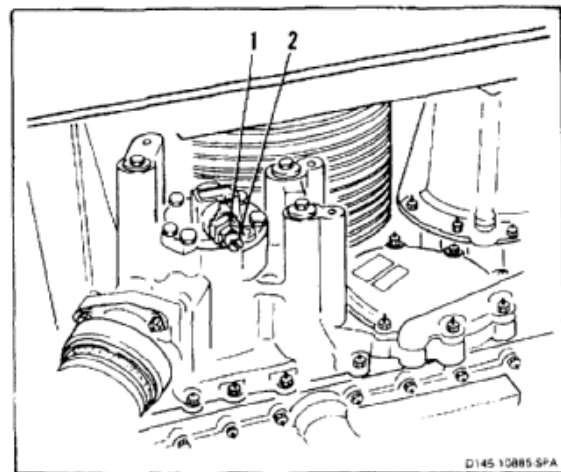
TM 55-1520-240-10

**Equipment Condition:**

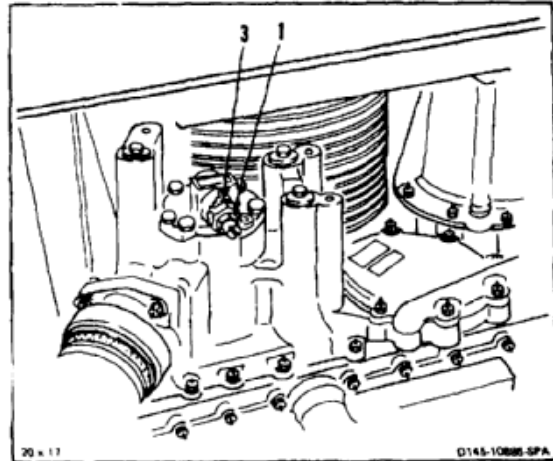
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Baffles Under Aft Transmission Open (Task 2-2)  
 Aft Transmission Drip Tray Removed (Task 2-3)  
 Cargo Ramp Open and Level (Task 2-2)



1. Remove lockwire from locknut (1). Hold setscrew (2) and loosen locknut.
2. Turn setscrew (2) no more than **1/4 turn** to adjust transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is **40 to 70 psi**.
3. Hold setscrew (2). Torque locknut (1) to **60 inch-pounds**.



4. Have pilot perform ground run at **100 percent** rotor rpm until transmission temperature and pressure stabilize. Record aft transmission oil pressure.
5. If oil pressure **40 to 70 psi**, go to step 6. If pressure is not **40 to 70 psi**, repeat task.
6. Lockwire locknut (1) to retaining nut (3). Use lockwire (E230).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install aft transmission drip tray (Task 2-3).
- Close baffles under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK

**6-152 REMOVE AFT TRANSMISSION AUXILIARY OIL PUMP****6-152****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Powertrain Tool Kit, NSN 5180-00-323-5267  
 1/4-28 Bolt, 3 Inches Long, 1-1/2 Inch Thread Length  
 (2)

**Materials:**

None

**Personnel Required:**

Medium Helicopter Repairer  
 Powertrain Repairer

**Equipment Condition:**

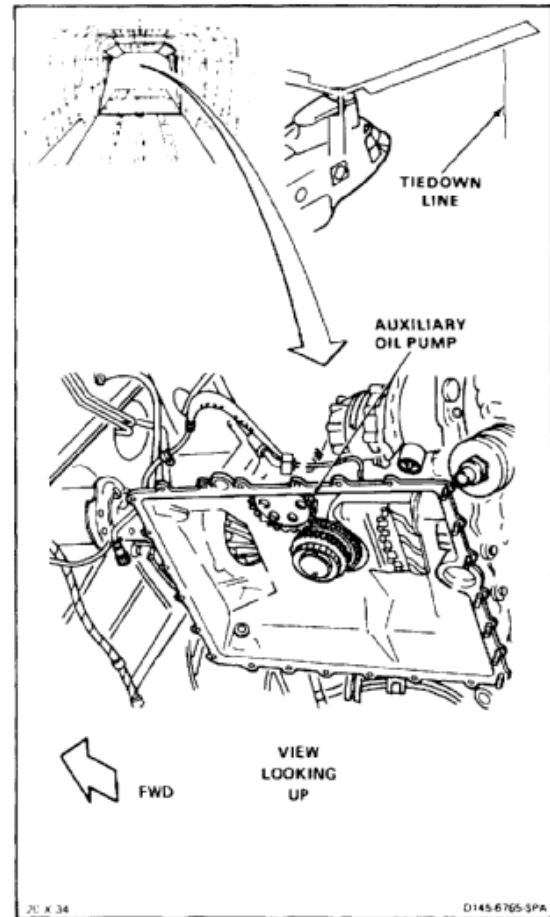
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Cargo Ramp Open and Level (Task 2-2)  
 Baffles Under Aft Transmission Open (Task 2-2)  
 Aft Transmission Drip Tray Removed (Task 2-3)  
 Aft Transmission Sump Removed (Task 6-78)  
 Tiedown Line Installed On One Forward Blade (Task  
 1-26)

**General Safety Instructions:****WARNING**

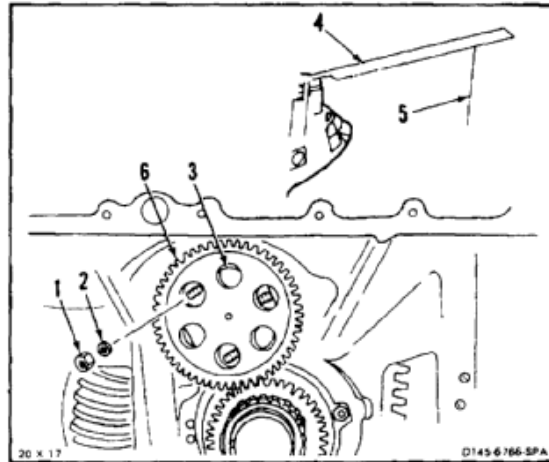
Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.

**WARNING**

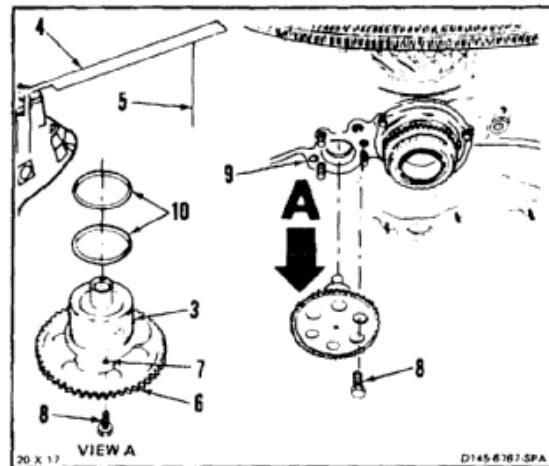
Keep fingers away from drive gear as blades are turned. Turning gear can cause injury to personnel.



1. Remove three nuts (1) and washers (2) from pump (3). Have helper pull blade (4) around with tiedown line (5) as needed to align access holes in drive gear (6) with nuts.



2. Have helper pull blade (4) around with tiedown line (5) as needed to align access holes in drive gear (6) with two extra holes (7) in pump (3). Install 1/4-28 bolt (8) in each hole. Threaded length of bolts shall be at least **1-1/2 inches**.
3. Turn bolts (8) to jack pump (3) out of transmission (9). Remove pump.
4. Remove two bolts (8) and two packings (10) from pump (3).



#### **FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-536

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Powertrain Tool Kit, NSN 5180-00-323-5267  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

None

**Parts:**

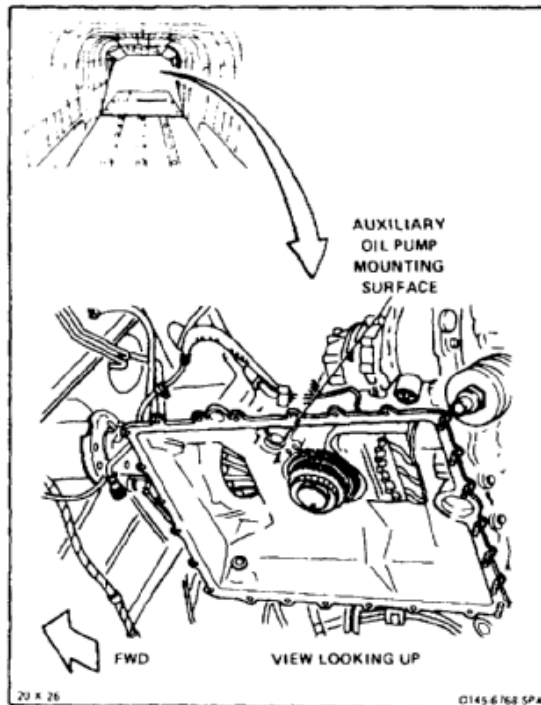
Packings

**Personnel Required:**

Medium Helicopter Repairer (2)  
Powertrain Repairer  
Inspector

**References:**

TM 55-1520-240-23P

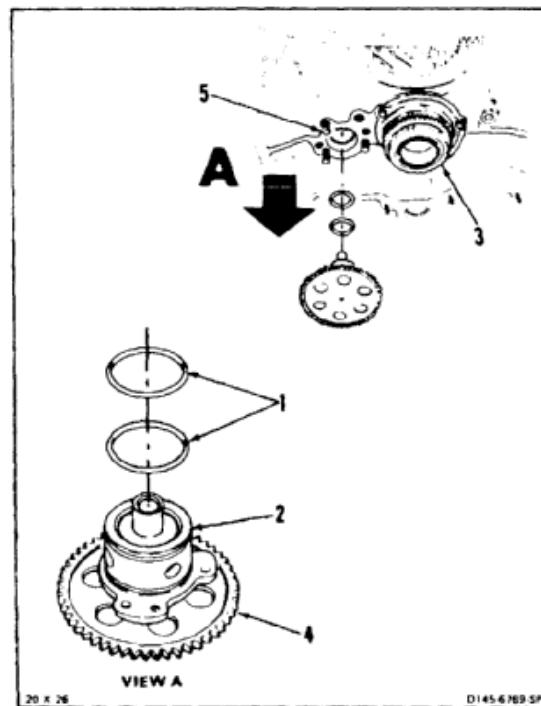


1. Install two packings (1) on pump (2).



If drive gear teeth do not align with drive gear, pump can be damaged.

2. Align teeth of pump drive gear (3) with teeth of transmission drive gear (4). Install pump (2) on three studs (5).



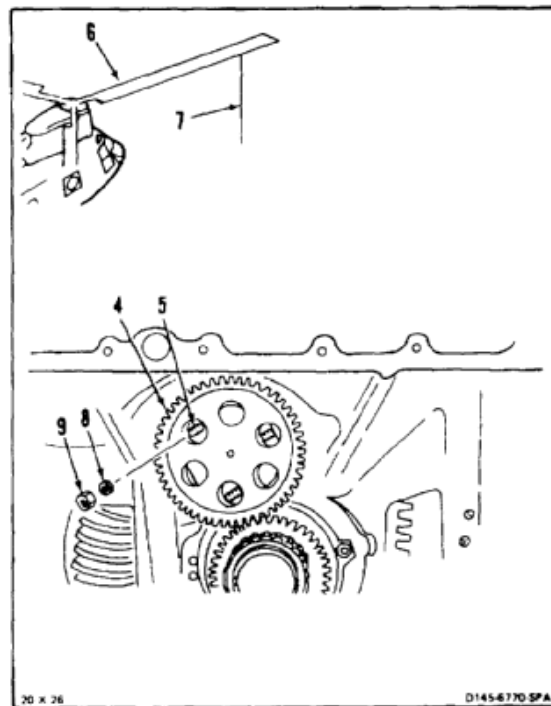
**WARNING**

Rotary-wing blades can seriously injure personnel. Make sure area around helicopter is clear of personnel before turning blades.

**WARNING**

Keep fingers away from drive gear as blades are turned. Turning gear can injure personnel.

3. Have helper pull blade (6) around with tiedown line (7) as needed to align access holes in drive gear (4) with three studs (5). Install three washers (8) and nuts (9). Torque nuts to **60 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install aft transmission sump (Task 6-81).
- Install aft transmission drip tray (Task 2-3).
- Close baffles under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK



**INITIAL SETUP**

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692
- Container, 2 Quart
- Torque Wrench, 0 to 150 Inch-Pounds
- Workstand

**Materials:**

- Oil (E254)
- Lockwire (E231)

**Parts:**

- Packing
- Filter

**Personnel Required:**

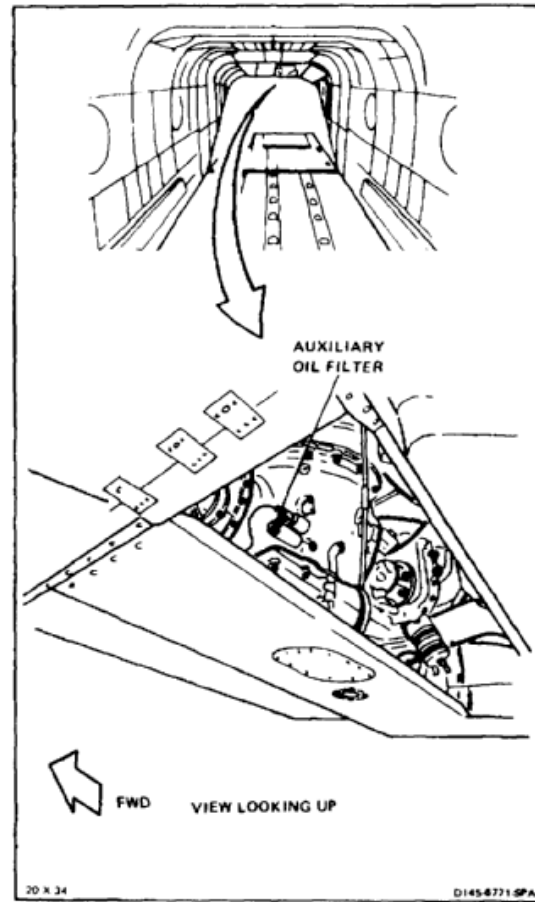
- Medium Helicopter Repairer
- Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Left Baffle Under Aft Transmission Open (Task 2-2)
- Cargo Ramp Open and Level (Task 2-2)



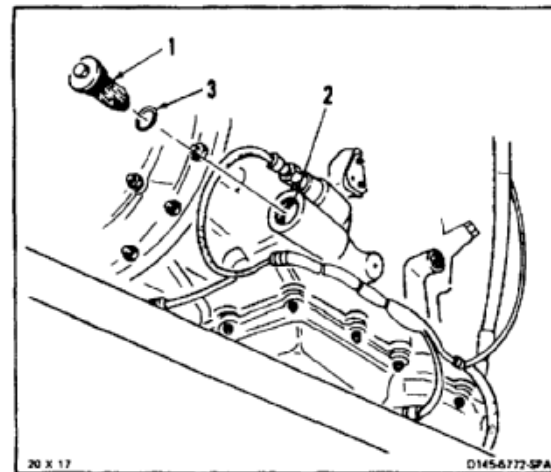
**REMOVE FILTER**

1. Remove lockwire from filter (1).



Do not let debris enter transmission.  
Damage can result.

2. Remove filter (1) from transmission cavity (2). Catch spilled oil in container. Remove packing (3) from filter.



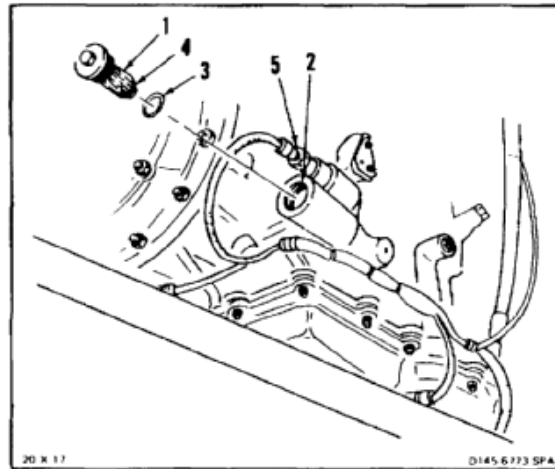
**INSTALL FILTER****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

**NOTE**

Filter is supplied with one packing installed. Do not install a used filter.

3. Coat packings (3 and 4) and thread of new filter (1) with oil (E254).
4. Install filter (1) and packing (3) in transmission cavity (2). Torque filter to **80 inch-pounds**.
5. Lockwire filter (1) to auxiliary oil pressure switch (5). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close baffle under aft transmission (Task 2-2).  
Close cargo ramp (Task 2-2).

END OF TASK

6-540

**6-155 REMOVE AFT TRANSMISSION MAIN INLET SCREEN**

6-155

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
 Socket, 1 Inch  
 Workstand

**Materials:**

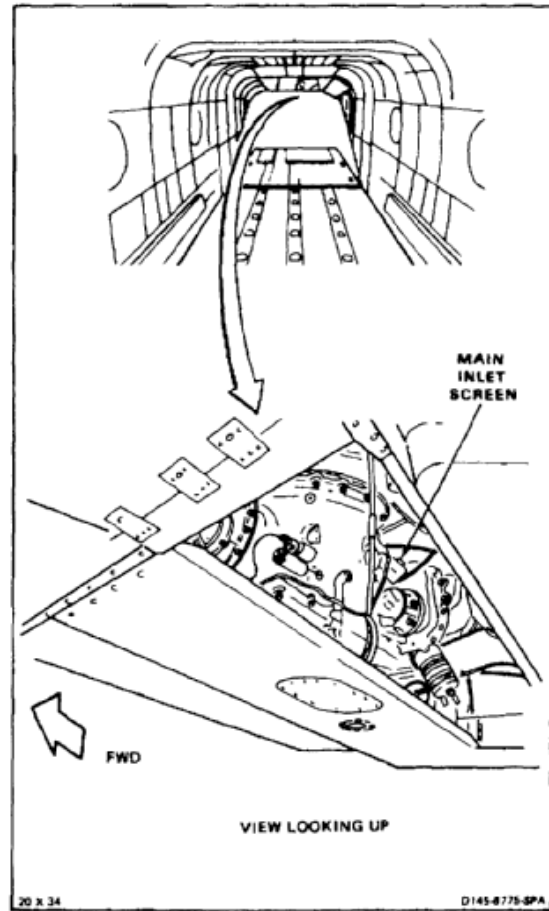
Barrier Material (E80)  
 Masking Tape (E388)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Left Baffle Under Aft Transmission Open (Task 2-2)  
 Cargo Ramp Open and Level (Task 2-2)



1. Remove lockwire from screen (1).

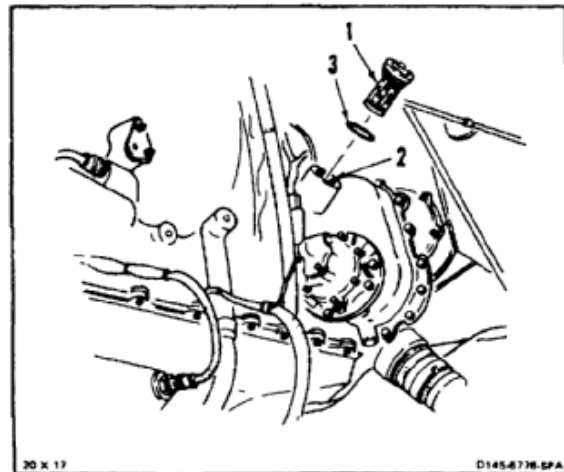


Do not let debris enter transmission.  
 Damage can result.

2. Remove screen (1) from transmission cavity (2). Cover cavity with barrier material (E80) and tape (E388).
3. Remove packing (3) from screen (1).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Socket, 1 Inch  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Workstand

**Materials:**

Oil (E254)  
 Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

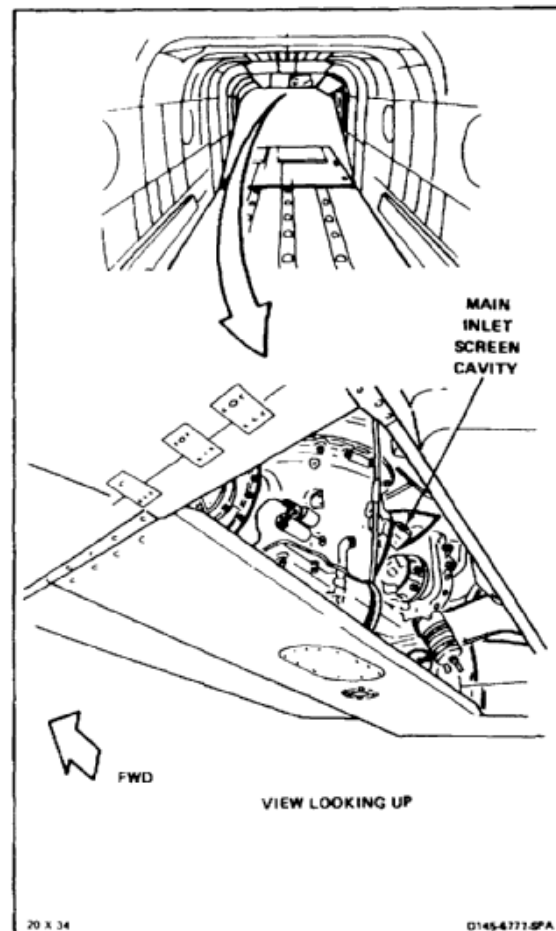
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

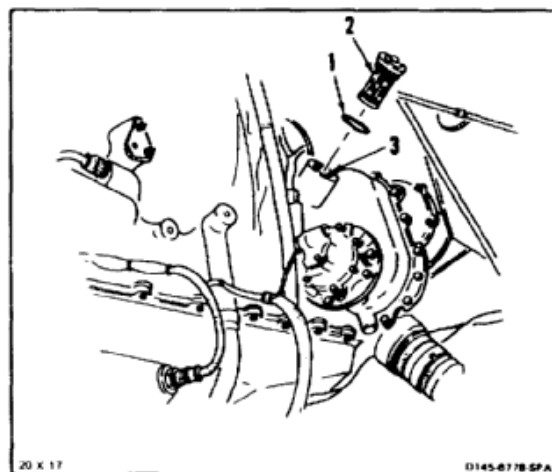
**Equipment Condition:**

Aft Transmission Main Inlet Screen Inspected (Task  
 6-131)

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

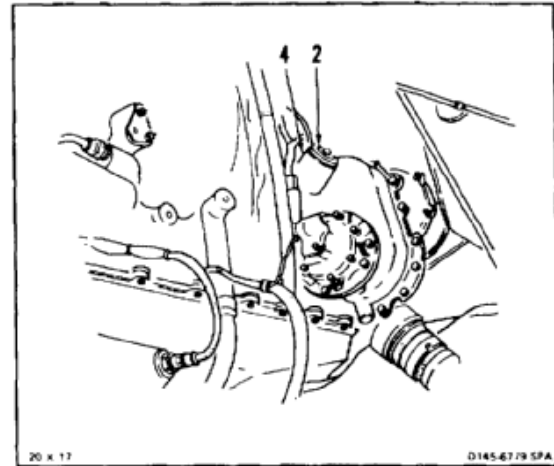
1. Coat packing (1) and thread of screen (2) with oil (E254). Install packing on screen.
2. Remove tape and barrier material from transmission cavity (3).
3. Install screen (2) in cavity (3). Torque screen to **80 inch-pounds**.



4. Lockwire screen (2) to transmission (4). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close left baffle under aft transmission (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart (Cap Removed Only)  
 Container, 14 Quart (3) (Cap and Housing Removal)

**Materials:**

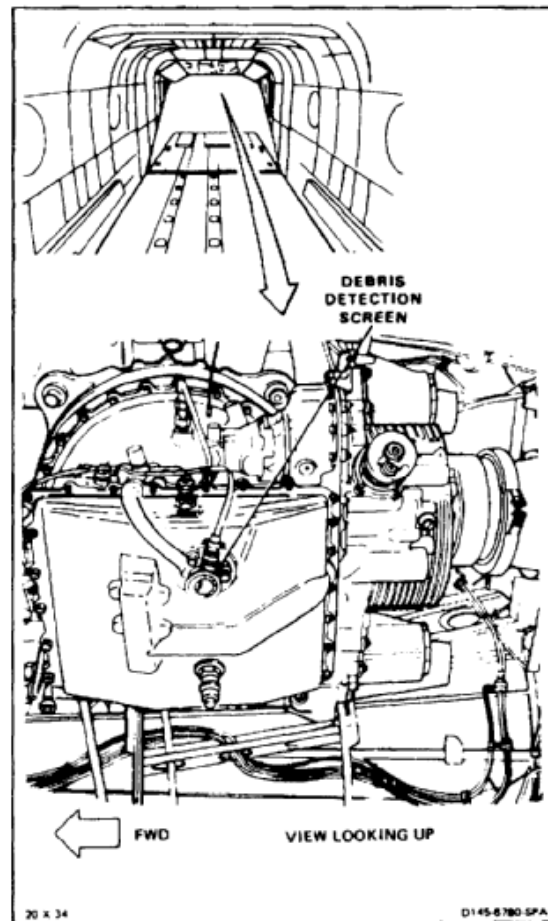
Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Aft Transmission Drip Tray Access Panel Removed  
 (Cap Removal Only) (Task 2-3)  
 Baffles Under Transmission Open (Cap and Housing  
 Removal) (Task 2-2)  
 Aft Transmission Drip Tray Removed (Cap and  
 Housing Removal) (Task 2-3)

**REMOVE CAP**

1. Disconnect electrical connector (1) from cap receptacle (2).

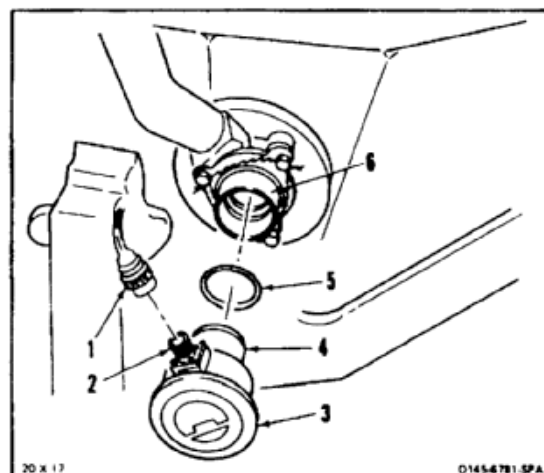
**NOTE**Cap holds **2 to 3 ounces** of oil.

2. Hold container under cap (3). Push in center of cap and pull down cap to remove cap, screen (4), and packing (5). Drain oil into container.

**NOTE**

Screen is part of cap.

3. Filter drained oil through cloth (E120). Check cloth and screen (4) for debris. Retain debris for contamination analysis (Task 6-108).
4. If housing (6) will not be removed, go to Follow-On Maintenance.



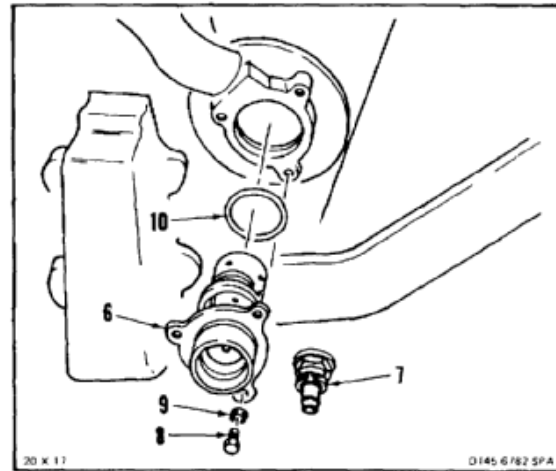
**REMOVE HOUSING****NOTE**

Sump holds about **30 quarts** of oil.

5. Push in drain valve (7), twist, and pull. Drain oil into container. Push in valve and twist to close.
6. Remove lockwire from three bolts (8). Remove three bolts and washers (9).
7. Remove housing (6) and packing (10).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Lockwire (E231)

**Parts:**

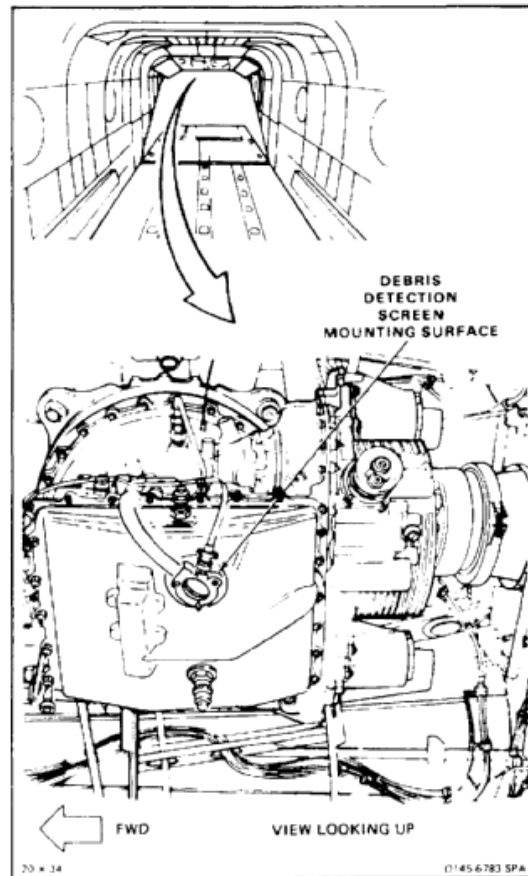
Packings

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P  
TM 55-1520-240-T

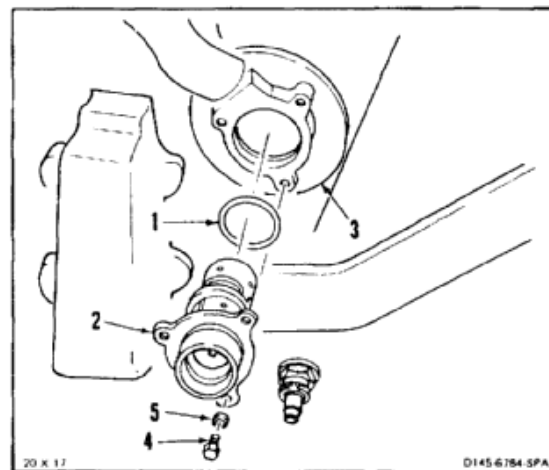


**NOTE**

If only cap is being installed, go to step 4.

**INSTALL HOUSING**

1. Install packing (1) on housing (2). Install housing in sump (3).
2. Install three bolts (4) and washers (5). Torque bolts to **60 inch-pounds**.
3. Lockwire three bolts (4) together. Use lockwire (E231).

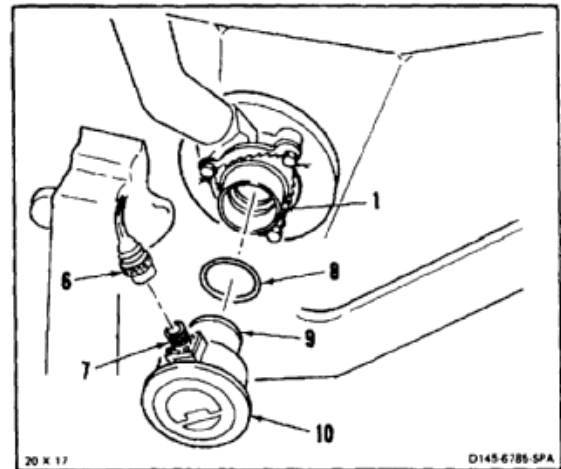




**INSTALL CAP****NOTE**

Screen is part of cap.

4. Connect electrical connector (6) to receptacle (7).
5. Perform operational check of aft transmission debris detection system (TM 55-1520-240-T).
6. Install packing (8) on screen (9).
7. Press in center of cap (10). Install cap and screen (9) in housing (1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Service aft transmission (Task 1-54).
- Install aft transmission drip tray access cover (cap only installed) (Task 2-3).
- Install aft transmission drip tray (cap and housing installed) (Task 2-3).
- Close baffles under aft transmission (cap and housing installed) (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Workstand  
Container, 2 Quart

**Materials:**

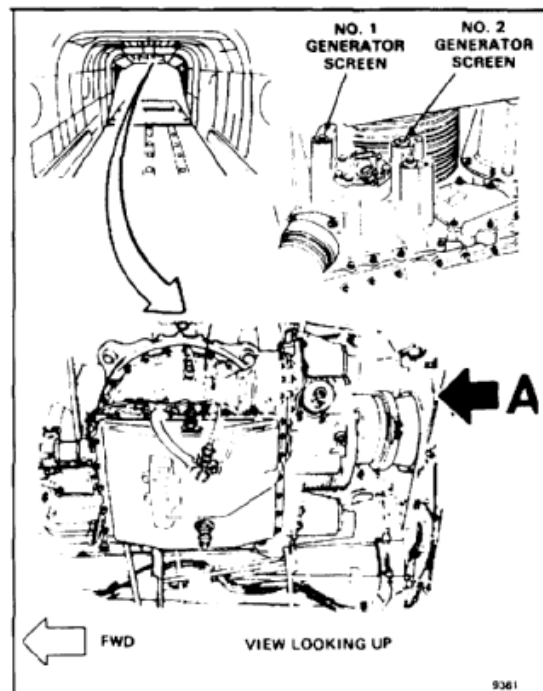
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Baffles Under Aft Transmission Open (Task 2-2)  
Aft Transmission Drip Tray Removed (Task 2-3)  
Cargo Ramp Open and Level (Task 2-2)

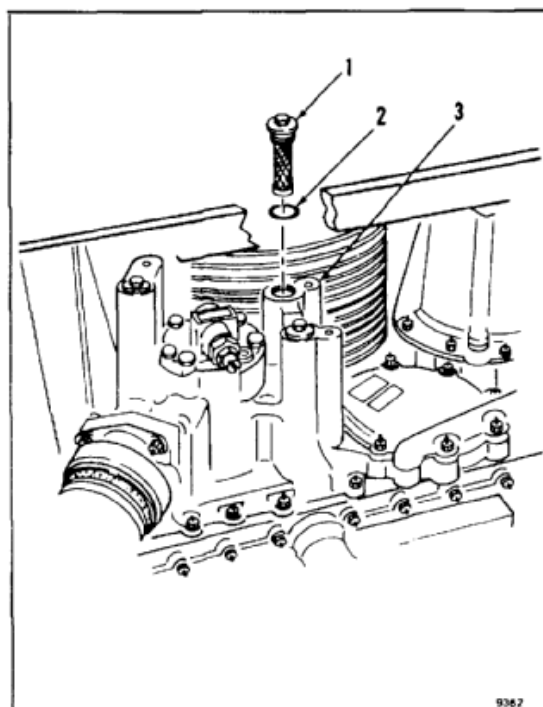
**NOTE**

Procedure is same to remove No. 1 or No. 2 generator oil outlet screen. No. 2 generator screen shown here.

1. Remove lockwire from screen (1).
2. Remove screen (1) and packing (2) from transmission (3). Catch spilled oil in container.

**FOLLOW-ON MAINTENANCE:**

If screen was removed following generator failure, inspect screen (Task 6-158.2).



END OF TASK

6-548

**6-158.2 INSPECT GENERATOR OIL OUTLET SCREENS****6-158.2****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

None

**Materials:**

Brush (E86)

**Personnel Required:**

Medium Helicopter Repairer

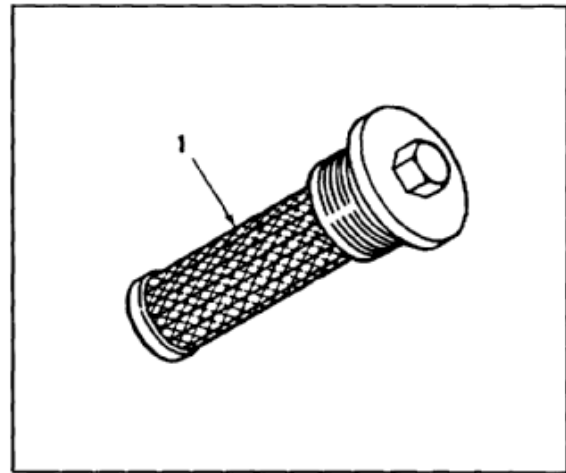
**References:**

Task 6-108

**Equipment Condition:**

Off Helicopter Task

1. Check screen (1) for bits of metal and other debris. Retain all debris for contamination analysis (Task 6-108). If debris is found, reject screen.
2. Inspect screen (1) for tears. There shall be no tears.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Oil (E254)  
Lockwire (E232)

**Parts:**

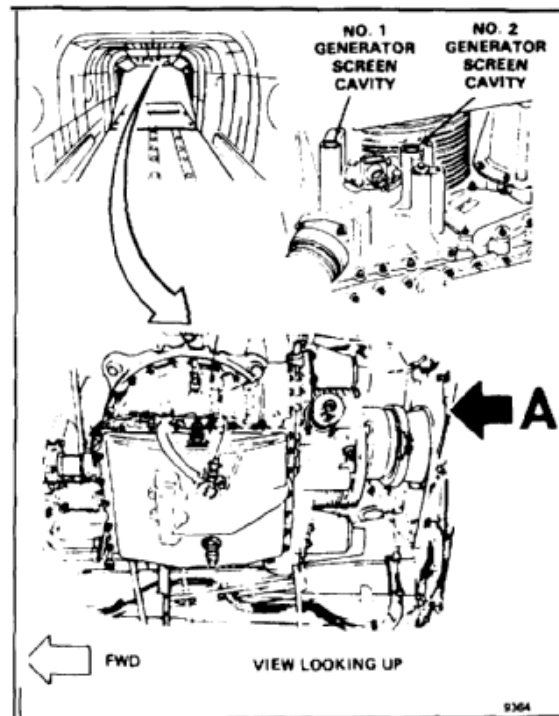
Packing

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

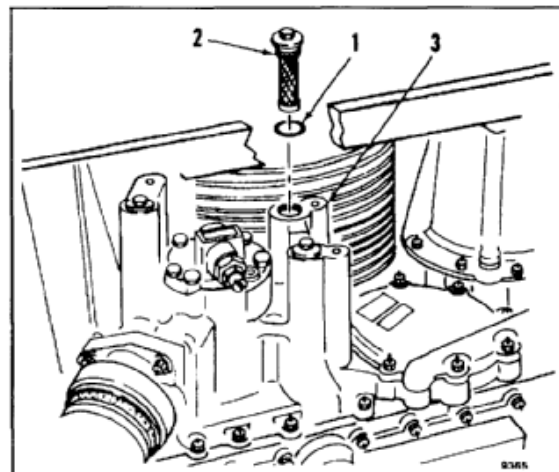
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

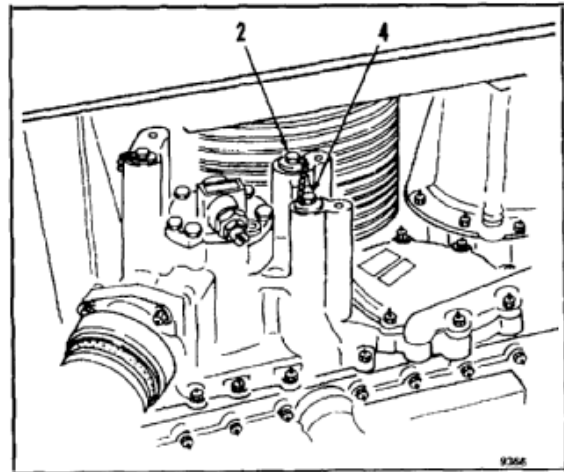
**NOTE**

Procedure is same to install No. 1 or No. 2 generator oil outlet screen. No. 2 generator screen shown here.

1. Coat packing (1) and thread of screen (2) with oil (E254).
2. Install packing (1) on screen (2). Install screen in transmission (3). Torque screen to **80 inch-pounds**.



3. Lockwire screen (2) to spare screen housing (4).



***FOLLOW-ON MAINTENANCE:***

- Service aft transmission with oil (Task 1-54).
- Install aft transmission drip tray (Task 2-3).
- Close baffles under aft transmission (Task 2-2).
- Close cargo ramp (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 14 Quart  
 Spanner Wrench  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Lockwire (E231)  
 Oil (E254)

**Parts:**

Packing

**Personnel Required:**

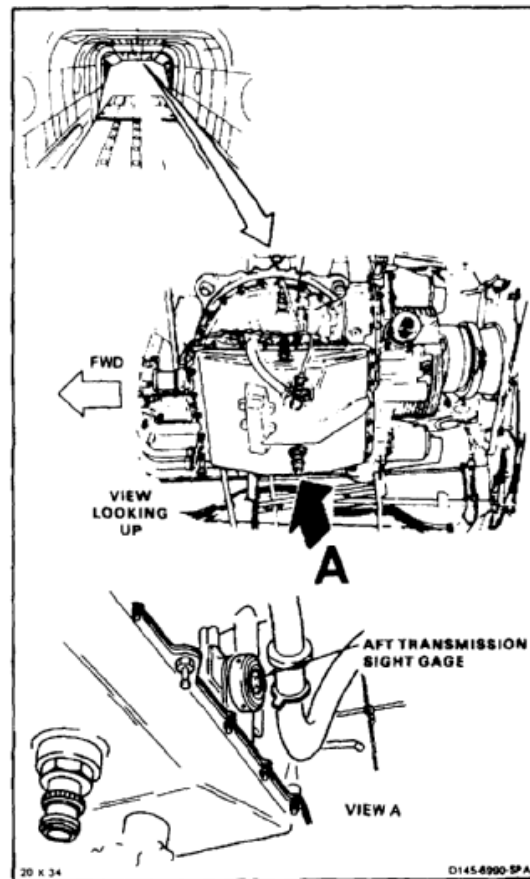
Medium Helicopter Repairer  
 Inspector

**References:**

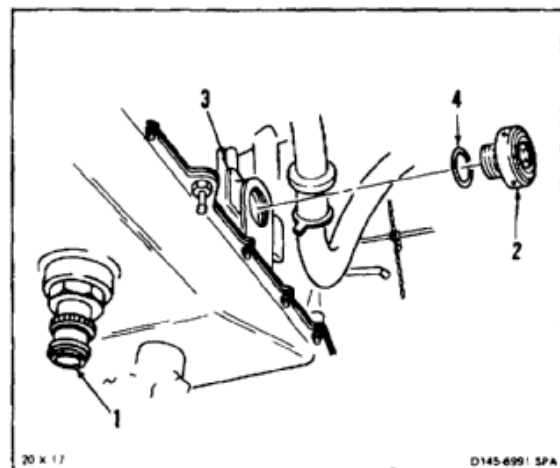
TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Cargo Ramp Open and Level (Task 2-2)  
 Right Baffle Under Aft Transmission Open (Task 2-2)

**REMOVE SIGHT GAGE**

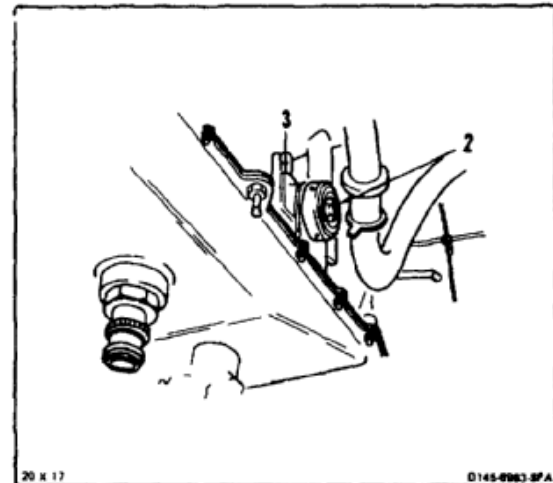
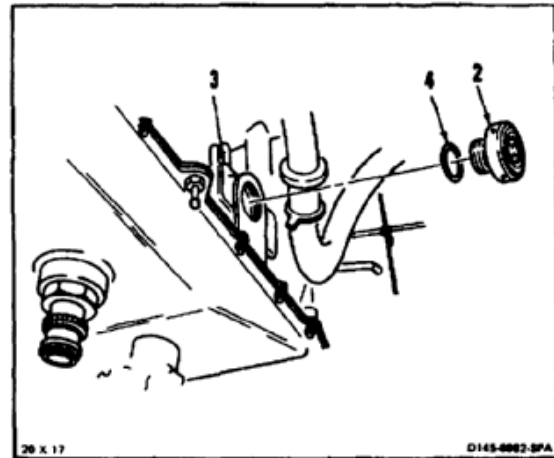
1. Position container under sump drain valve (1).
2. Push in drain valve (1), twist and pull. Drain oil into container until oil level is below sight gage (2).
3. Close valve (1) by pushing it in and twisting it.
4. Remove lockwire from sight gage (2). Remove gage from transmission (3). Use spanner wrench.
5. Remove packing (4) from sight gage (2).



**INSTALL SIGHT GAGE****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

6. Coat packing (4) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. Install sight gage (2) in transmission (3). Use spanner wrench. Torque gage to **80 inch-pounds**.
8. Lockwire gage (2) to transmission (3). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service aft transmission (Task 1-54).  
 Close right baffle under aft transmission (Task 2-2).  
 Close cargo ramp (Task 2-2).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-232-4692

**Materials:**

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

**Parts:**

Packing

**Personnel Required:**

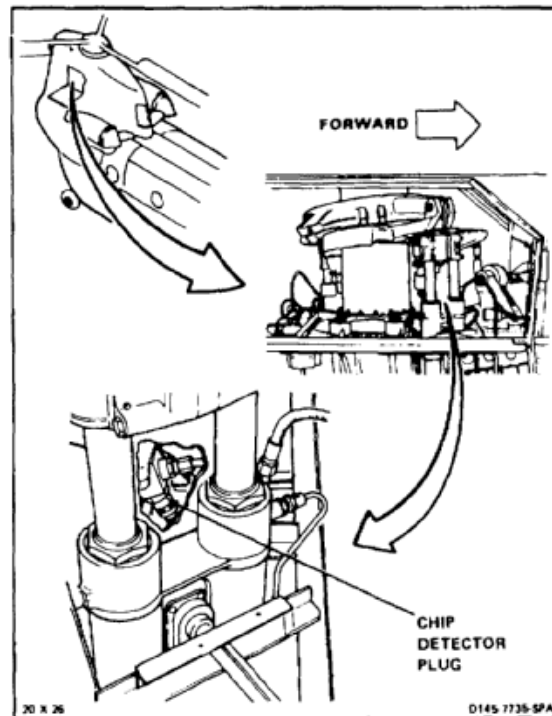
Medium Helicopter Repairer  
Inspector

**References:**

- TM 55-1520-240-23P
- TM 55-1520-240-T
- Task 6-108

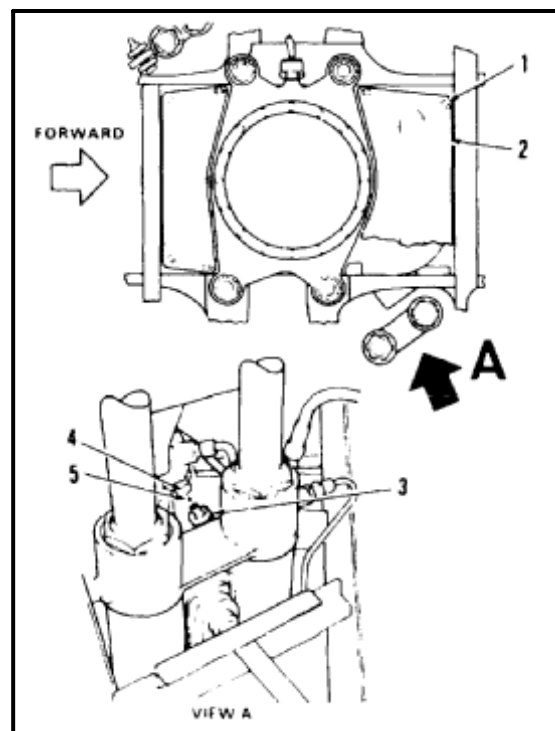
**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Aft Pylon Right Work Platform Open (Task 2-2)



**REMOVE PLUG**

1. Loosen four turnlock fasteners (1) on access panel (2). Remove panel.
2. Push in chip detector plug (3) and turn it counterclockwise. Remove plug from chip detector body (4).
3. Remove packing (5) from plug (3).





**6-160 REMOVE, INSTALL AND INSPECT AFT ROTOR SHAFT CHIP DETECTOR PLUG (Continued)**

6-160

**INSPECT PLUG****NOTE**

Some metal fuzz on tip of plug is normal.

4. Check tip (6) of plug (3) for chips. Save chips for contamination analysis (Task 6-108).

**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

5. Clean tip (6) with dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186). Dry tip.
6. Perform operational check of plug (3) (TM 55-1520-240-T).

**INSTALL PLUG**

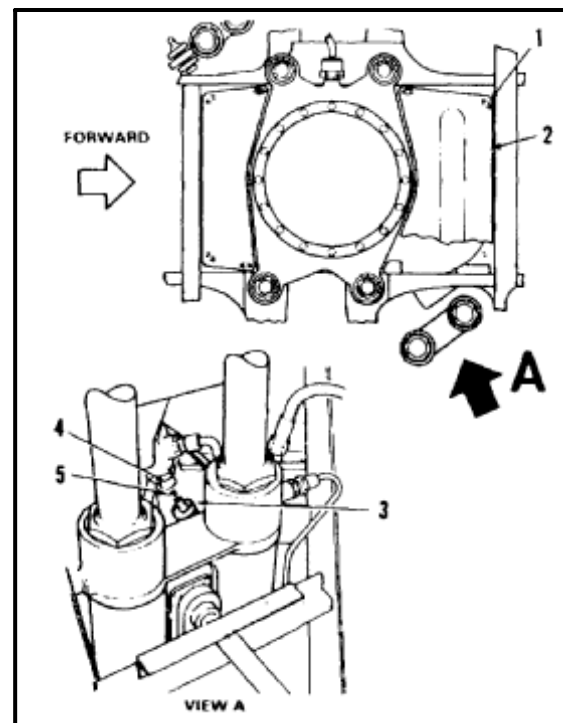
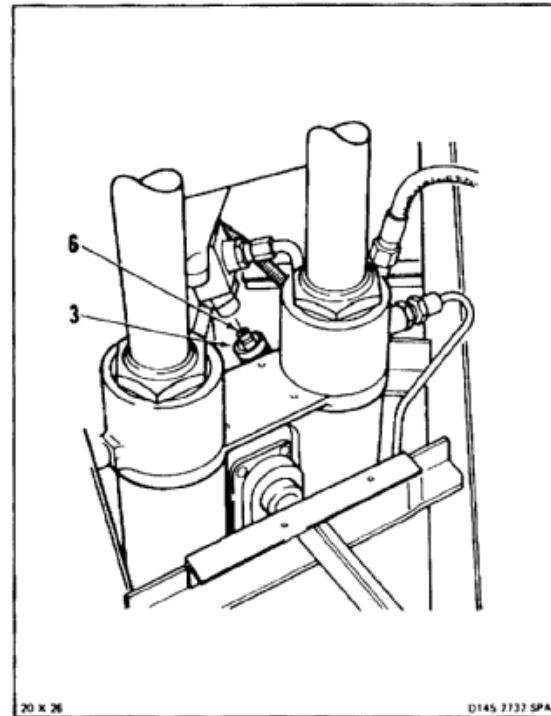
7. Install packing (5) on plug (3).
8. Install plug (3) in chip detector body (4). Push in and turn plug clockwise to lock it.

**INSPECT**

9. Install access panel (2). Tighten four turnlock fasteners (1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close aft pylon right work platform (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Open End Wrench, 1-1/4 Inch

**Materials:**

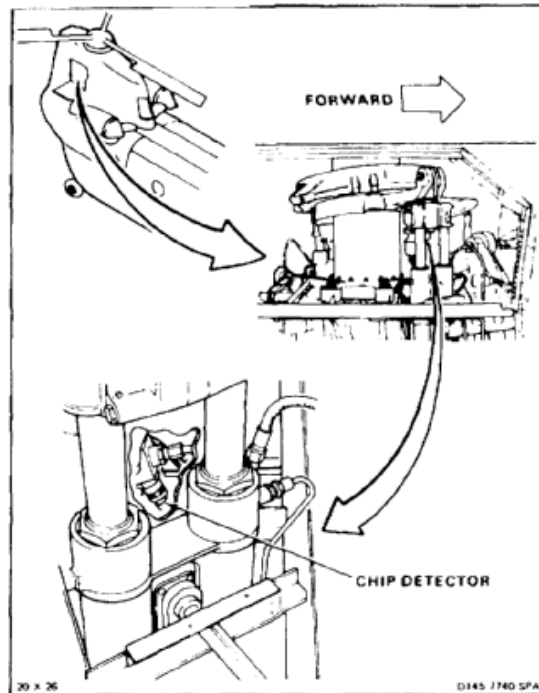
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

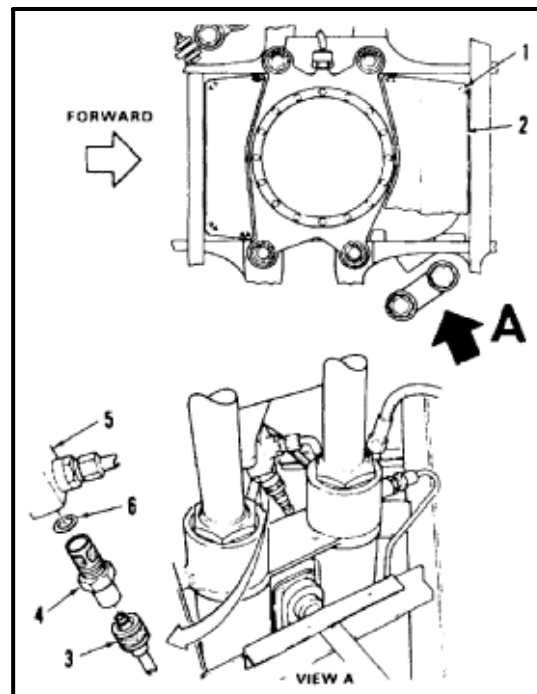
Battery Disconnected (Task 1-39)  
Electrical Power Off  
Aft Pylon Right Work Platform Open (Task 2-2)



1. Loosen four turnlock fasteners (1) on access panel (2). Remove panel.
2. Disconnect electrical connector (3).
3. Remove lockwire from body of chip detector (4). Remove chip detector from bearing support (5).
4. Remove packing (6) from chip detector (4).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-556

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Crowfoot Attachment, 1-1/4 Inch  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Oil (E254)  
 Lockwire (E231)

**Parts:**

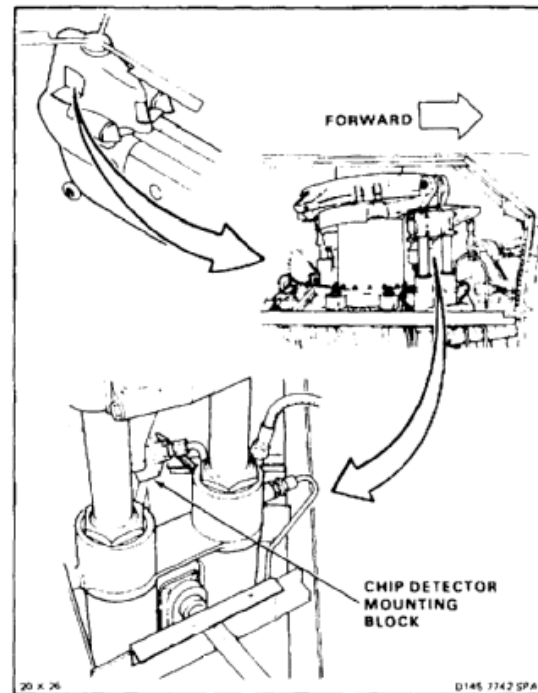
Packings

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

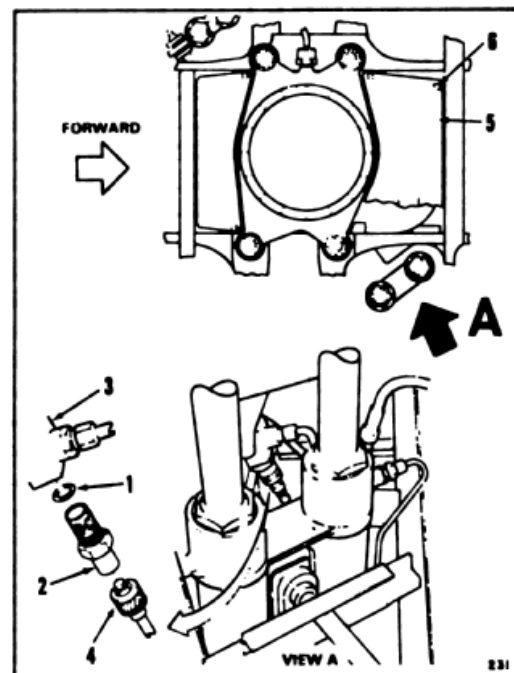
**References:**

TM 55-1520-240-23P  
 TM 55-1520-240-T

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

1. Coat packing (1) and thread of chip detector (2) with oil (E254).
2. Install chip detector (2) in bearing support (3). Torque to **80 inch-pounds**.
3. Lockwire chip detector (2) to bearing support (3). Use lockwire (E231).
4. Connect electrical connector (4).
5. Perform operational check of aft rotor shaft chip detector plug. (Refer to TM 55-1520-240-T.)
6. Install access panel (5). Tighten four turnlock fasteners (6).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close aft pylon right work platform (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Wrench, 1-3/4 Inch

**Materials:**

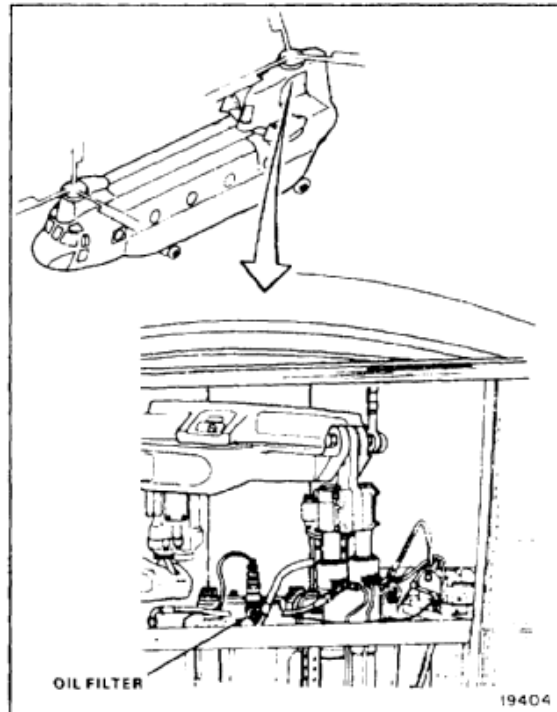
Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

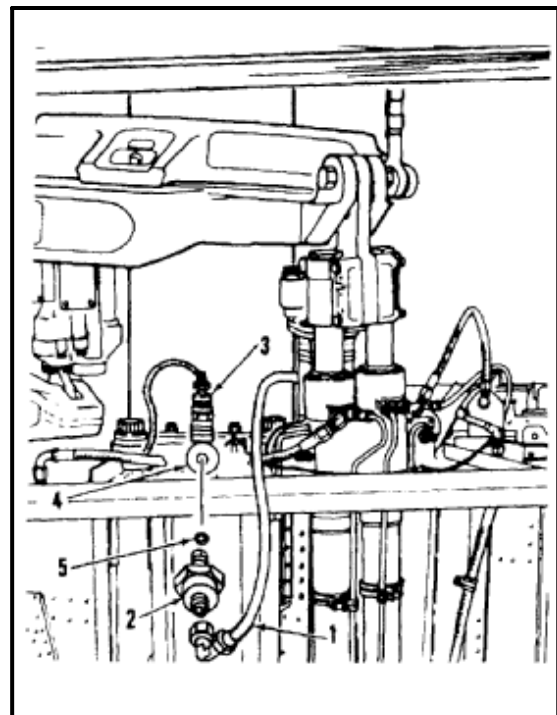
Battery Disconnected (Task 1-39)  
Electrical Power Off  
Aft Pylon Left Work Platform Open (Task 2-2)



1. Disconnect oil hose (1) from oil filter (2). Use cloths (E120) to absorb spillage.
2. Remove lockwire from between oil filter (2) and oil pressure switch (3). Remove filter from bearing support (4).
3. Remove packing (5) from filter (2).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-558

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Wrench, 1-3/4 Inch (2)  
Source of Low-Pressure Compressed Air

**Materials:**

Dry Cleaning Solvent (E162)  
Brush (E86)  
Gloves (E186)  
Lockwire (E231)  
Goggles

**Parts:**

Packing

**Personnel Required:**

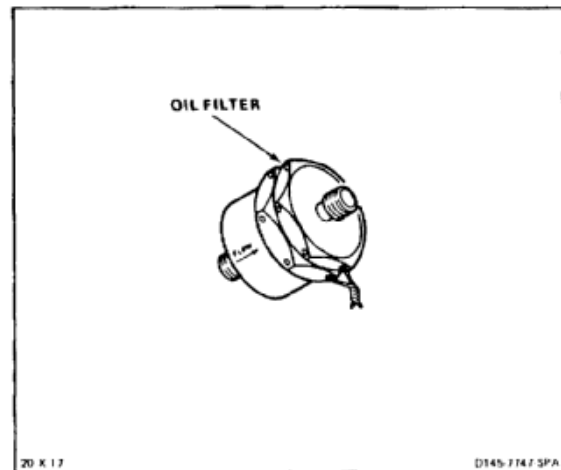
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Off Helicopter Task



1. Remove lockwire. Remove housing (1) from plug (2). Remove packing (3) from plug.
2. Remove strainer element (4) from housing (1).
3. Check strainer element (4) for metal particles. Save particles for contamination analysis (Task 6-108).

**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with plenty of water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

Do not use more than **30 psi** compressed air for cleaning purposes. Debris propelled under pressure can cause injury to eyes. Use source of compressed air under **30 psi** and eye protection to prevent injury to personnel.

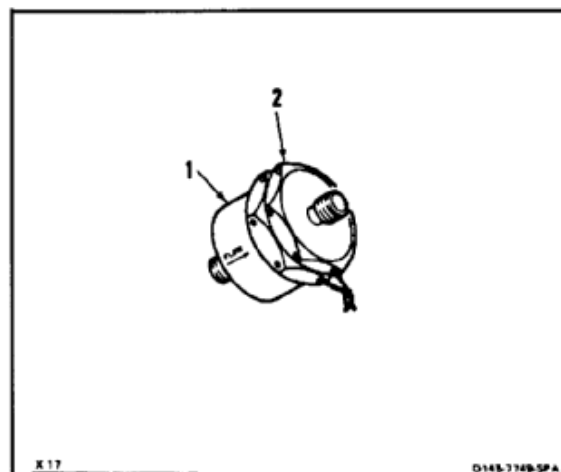
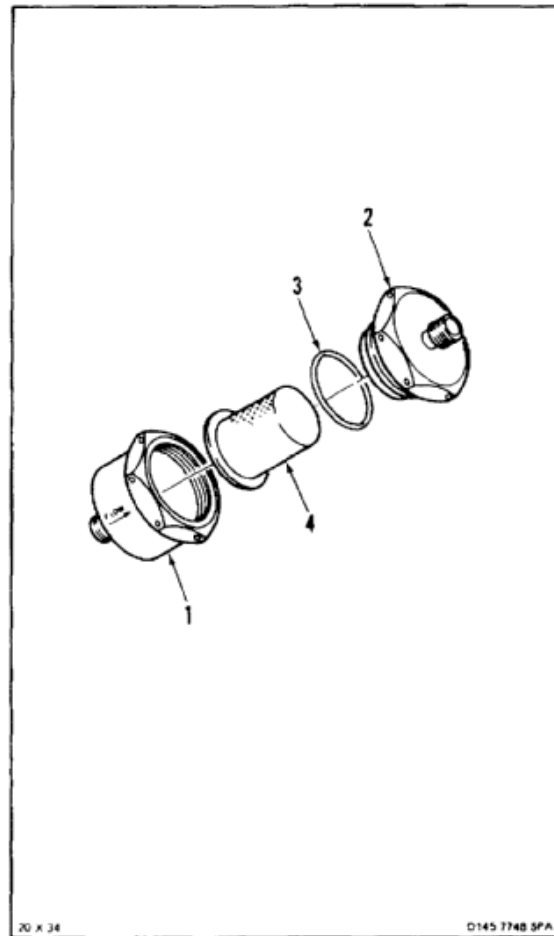
4. Clean housing (1), plug (2), and strainer element (4). Use dry cleaning solvent (E162) and brush (E86). Dry with low-pressure compressed air. Wear gloves (E186).
5. Inspect housing (1), plug (2), and strainer (4) for damage. There shall be no damage.
6. Install packing (3) on plug (2).
7. Install strainer element (4) in housing (1). Install housing on plug (2).
8. Lockwire housing (1) to plug (2). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-560



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Crowfoot Attachment, 1-3/4 Inch  
 Torque Wrench, 5 to 50 Inch-Pounds

**Materials:**

Oil (E254)  
 Lockwire (E231)

**Parts:**

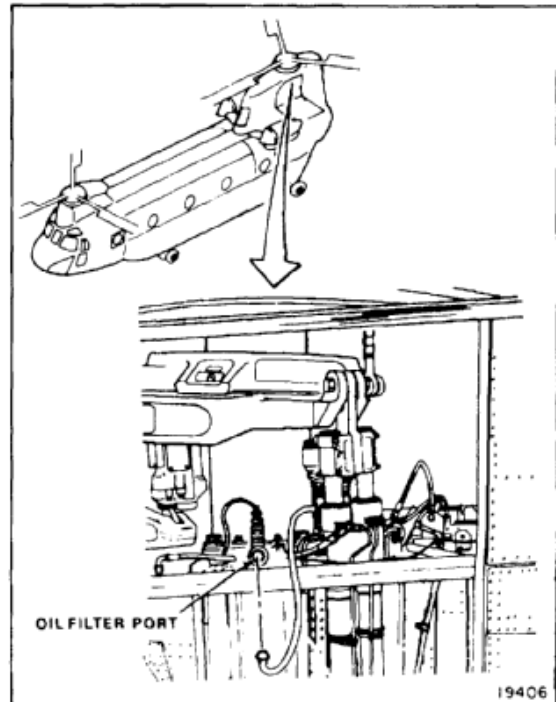
Packing

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**WARNING**

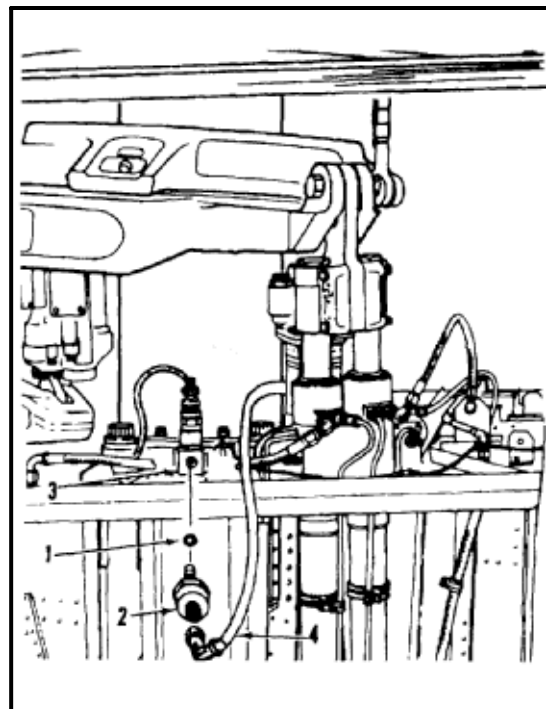
Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

1. Coat packing (1) and thread of oil filter (2) with oil (E254).
2. Install filter (2) in bearing support (3). Torque filter to **20 inch-pounds**.

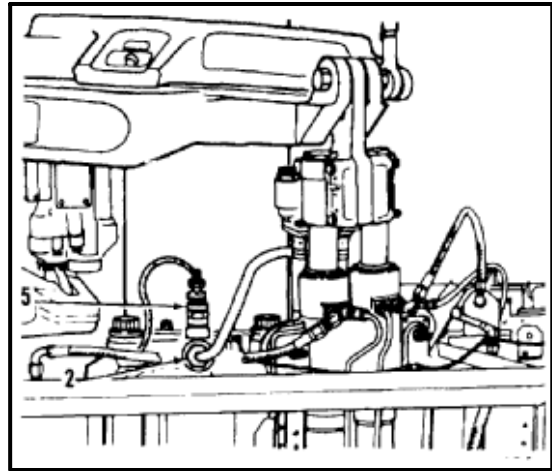
**WARNING**

Make sure oil hose is routed to clear servocylinder when servocylinder is fully compressed.

3. Connect oil hose (4) to filter (2).



4. Lockwire oil filter (2) to oil pressure switch (5).  
Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close aft pylon right work platform (Task 2-2).

END OF TASK

6-562



INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Magnet  
Magnifying Glass, 12 Power

**Materials:**

None

**Personnel Required:**

Inspector

**Equipment Condition:**

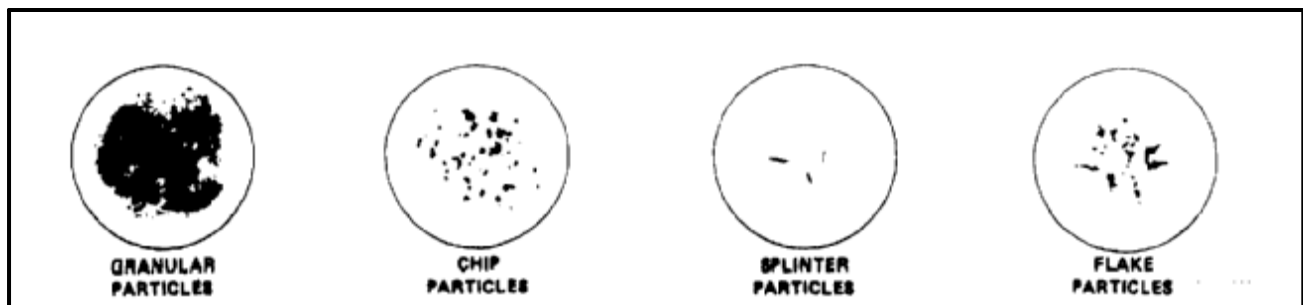
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
  - a. Separate steel particles. Use a magnet.
  - b. Identify and separate remaining particles by visual inspection.
  - c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

**FOLLOW-ON MAINTENANCE:**

None

MATERIAL	DESCRIPTION	ACTION REQUIRED
Steel	Fine, hair-like fuzz particles	Normal wear. No action required
	Limited amount of splinters, flakes, or granular particles	Possible failure. Perform serviceability check (Task 6-170)
	Thin flakes up to <b>1/16 inch</b> in diameter and <b>1/4 inch</b> long, maximum of 10 flakes	Perform serviceability check (Task 6-170)
Aluminum or magnesium	Massive amount of splinters, flakes, or granular particles	Failure. Replace transmission (Tasks 6-72 and 6-77)
	Granular particles	Perform serviceability check (Task 6-170)
Copper, bronze, or silver	Massive amount of splinters, flakes or granular particles.	Failure. Replace transmission (Tasks 6-72 and 6-77)
	Limited amount of granular particles	Possible indication of bearing cage wear. Perform serviceability check (Task 6-170)
Fiberglass	Massive amount of granular particles or chip particles	Failure. Replace transmission (Tasks 6-72 and 6-77)
	Granular or fibrous particles	Perform serviceability check (Task 6-170)



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

None

**Materials:**

None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

Helicopter On Level Surface

Pylon Access Doors Open (Task 2-2)

**WARNING**

Prolonged oil leakage can damage finish and create a work hazard by making the fuselage slippery. It can also affect other systems in the helicopter. Therefore, good judgment must be used when determining allowable leakage.

**CAUTION**

The maximum allowable leakage rate, static or dynamic, from any oil seal in the transmission is **20 drops (one cubic centimeter) per hour**. If this limit is exceeded, the cause of the leakage shall be corrected by repair or replacement.

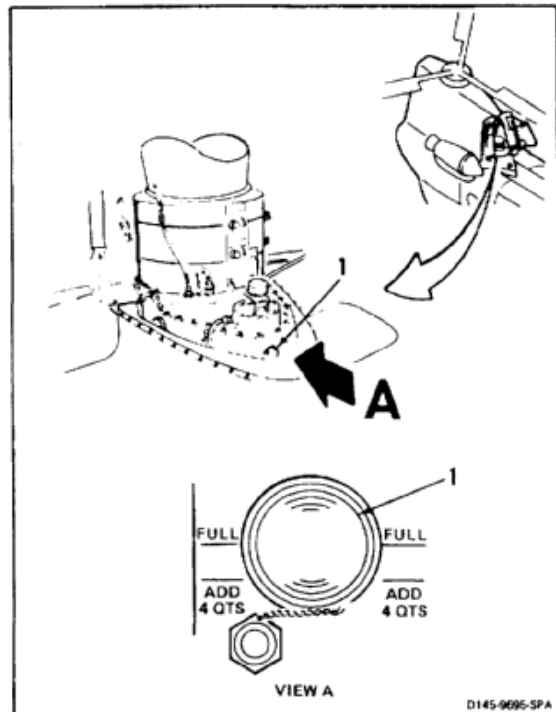
**NOTE**

If engines have not been operated within the past **30 minutes**, perform a **5 minute** ground run (TM 55-1520-240-10).

Check sight gage (1) to determine oil level. Oil level shall be between the FULL and ADD 4 QTS lines after a **2 hour** flight.

**FOLLOW-ON MAINTENANCE:**

Service combining transmission.  
Close pylon access door (Task 2-2).



END OF TASK

6-564

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Container, 14 Quart (2)  
 Hose, 1 Inch ID, 36 Inches Long  
 Workstand

**Materials:**

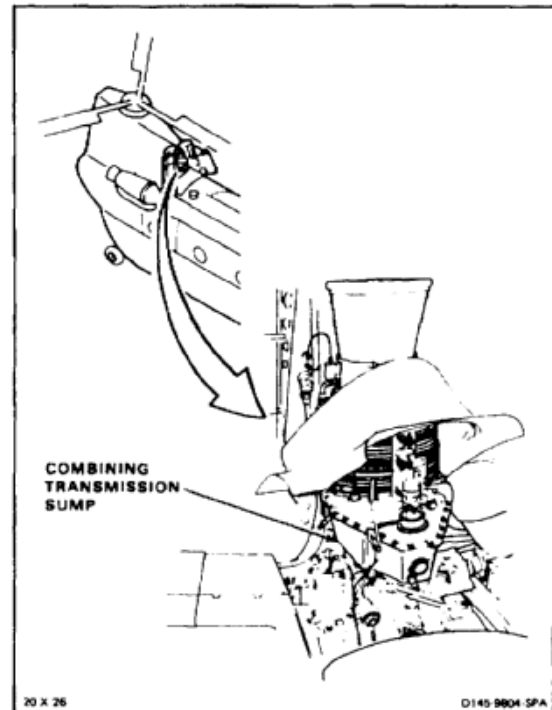
None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Access Doors Open (Task 2-2)  
 Pylon Lower Fairing Open (Task 2-2)

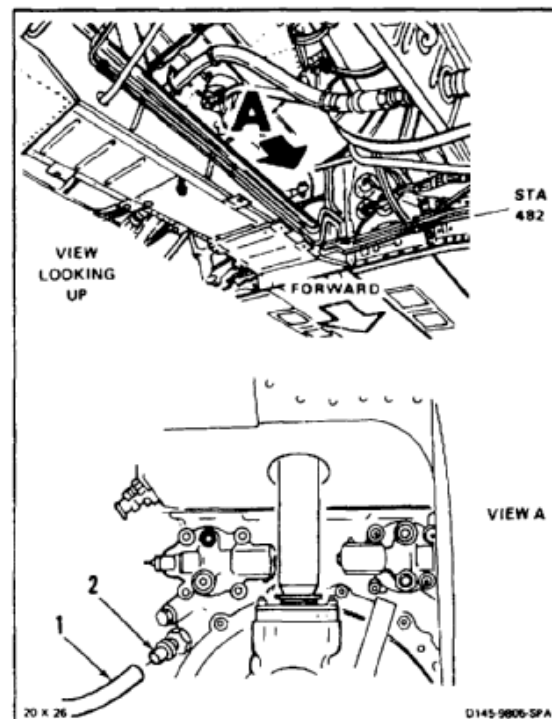
**NOTE**

Combining transmission sump is divided into three compartments. One is for the combining transmission. The other two are for each engine transmission.

**DRAIN COMBINING TRANSMISSION COMPARTMENT****NOTE**

Combining transmission compartment holds about **23 quarts** of oil.

1. From inside cabin, connect hose (1) to drain valve (2). Direct end of hose into container.
2. Push in drain valve (2), twist it, and pull. Let oil drain into container.
3. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.

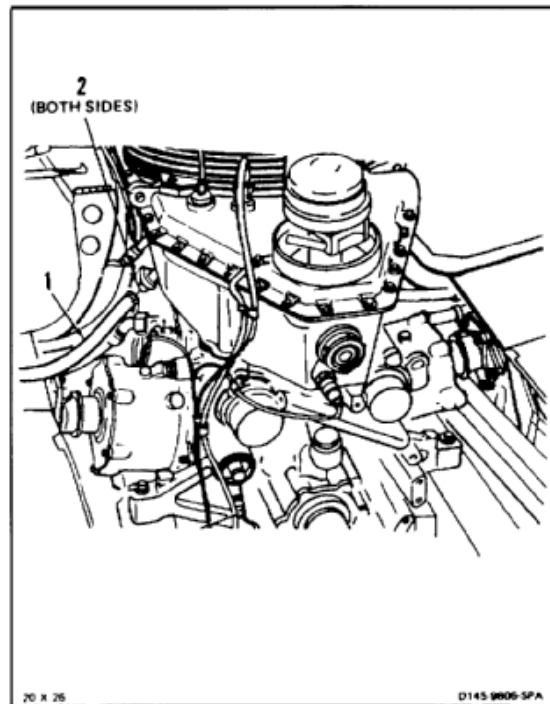


**DRAIN ENGINE TRANSMISSION COMPARTMENT****NOTE**

Drain either engine transmission compartment in same way. Right compartment shown.

Each compartment holds about **5 quarts** of oil.

4. Connect hose (1) to drain valve (2). Direct end of hose into container.
5. Push in drain valve (2), twist it, and pull. Let oil drain into container.
6. Push in drain valve (2), twist it, and pull down to close. Remove hose (1) from valve.

**FOLLOW-ON MAINTENANCE:**

- Close pylon lower fairing (Task 2-2).
- Close pylon access doors (Task 2-2).

END OF TASK

6-566

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

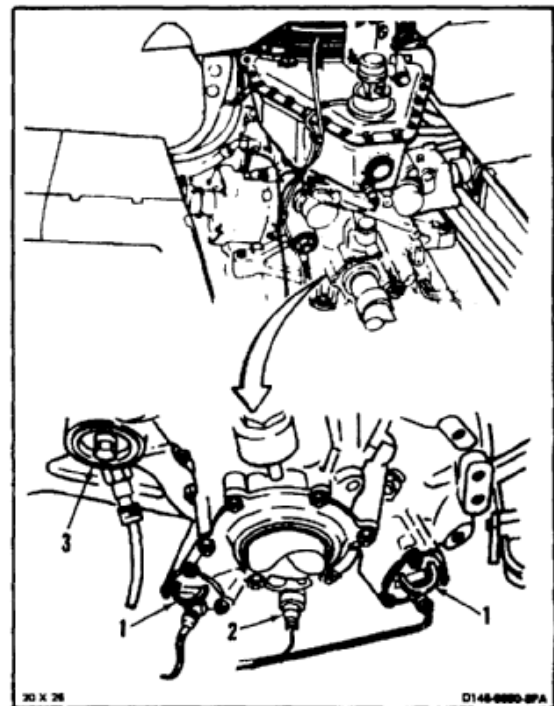
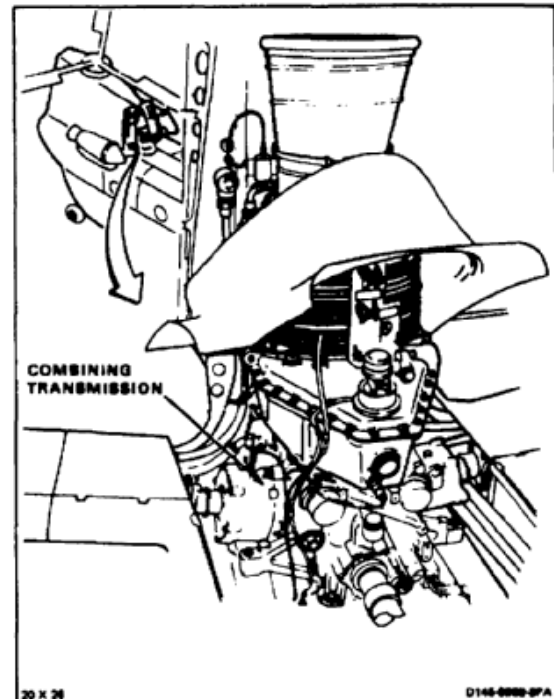
Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

None

**Personnel Required:**Medium Helicopter Repairer  
Rotary-Wing Aviator (2)**References:**Task 1-54  
Task 6-168  
Task 6-171  
Task 6-173  
Task 6-174  
Task 6-175  
Task 6-176  
Task 6-178  
Task 6-180  
Task 6-181**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Pylon Access Doors Open (Task 2-2)  
Pylon Lower Fairing Open (Task 2-2)

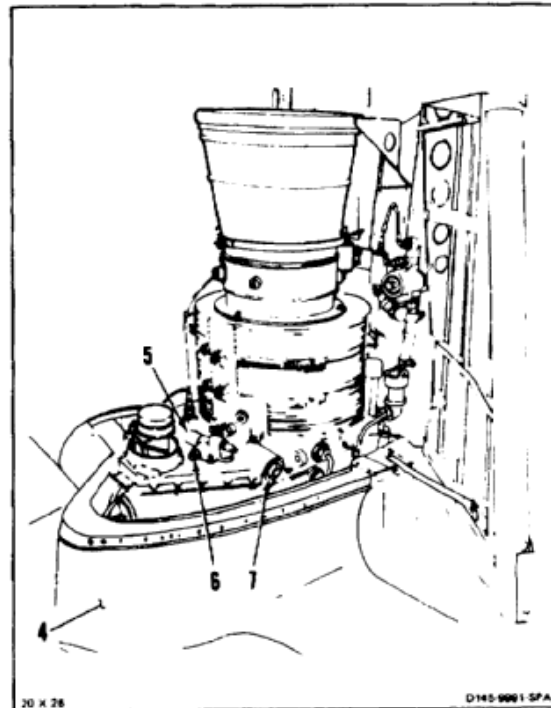
1. Drain oil from combining transmission (Task 6-168).
2. Remove, inspect, and clean two debris detection screens (1) (Tasks 6-174 and 6-175). Install screens (Task 6-176).
3. Inspect chip detector (2) (Task 6-178).
4. Replace auxiliary oil filter (3) (Task 6-173).



5. Close pylon lower fairing (4) (Task 2-2).
6. Replace main oil filter element (5) (Task 6-171). Note position of indicator button (6).
7. If indicator button (6) was extended, replace inlet screen (7) (Tasks 6-180 and 6-181).
8. Service combining transmission with oil (Task 1-54).
9. Have pilot perform ground run (TM 55-1520-240-10). When combining transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
10. Repeat steps 1 thru 8.

**FOLLOW-ON MAINTENANCE:**

Close pylon access doors (Task 2-2).



END OF TASK

6-568

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

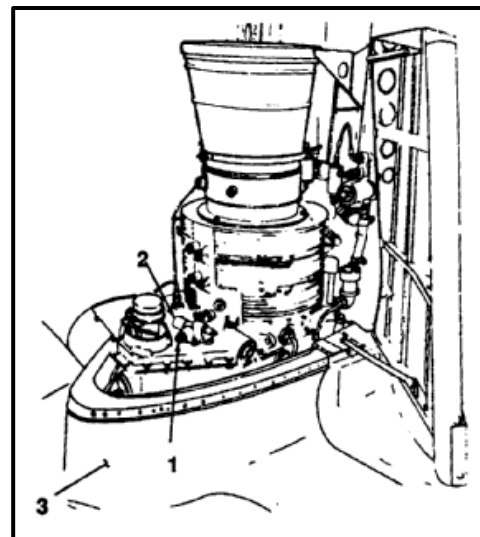
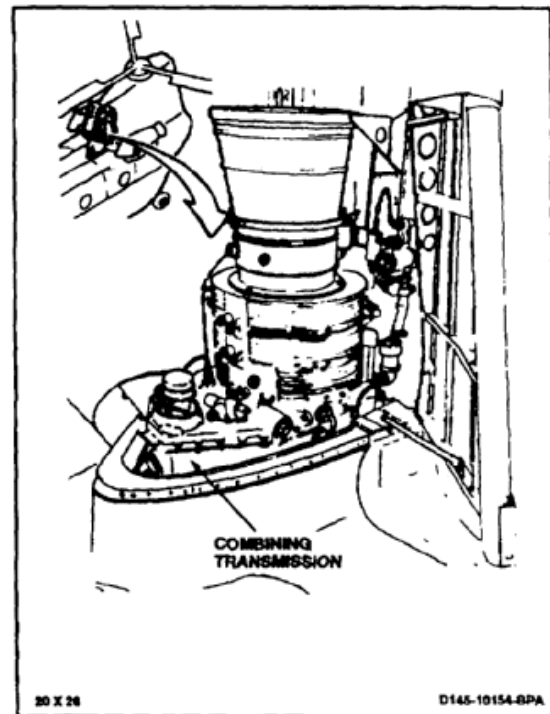
Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Cheesecloth (E112)

**Personnel Required:**Medium Helicopter Repairer  
Rotary-Wing Aviator (2)**Reference:**Task 2-2  
Task 6-72  
Task 6-77  
Task 6-168  
Task 6-169  
Task 6-171  
Task 6-173  
Task 6-174  
Task 6-175  
Task 6-176  
Task 6-178  
TM 55-1520-240-10**Equipment Condition:**Battery Disconnected (Task 1-36)  
Electrical Power Off  
Pylon Access Doors Open (Task 2-2)

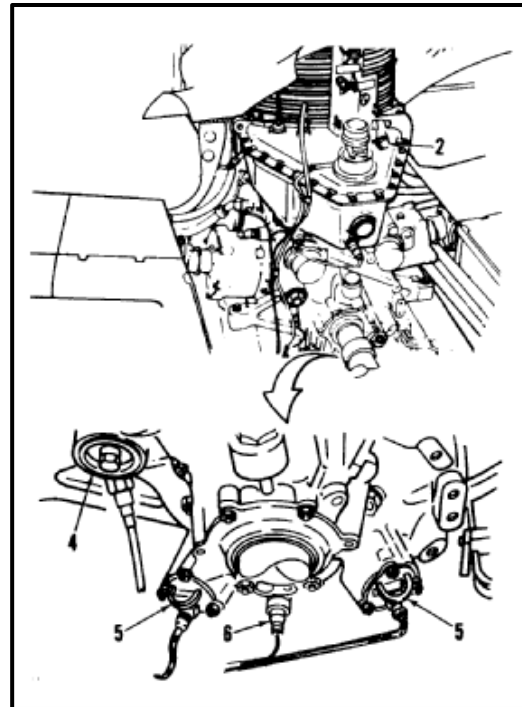
1. Complete steps 1 thru 8 of Task 6-169.
2. Have pilot perform ground run for **1 hour** at normal rotor rpm (TM 55-1520-240-10). If combining transmission oil temperature or pressure changes abnormally during operation, have pilot shut down helicopter. Check for cause of change.
3. Drain oil through cheesecloth (E112) or similar filter material (Task 6-168). Check for contamination.
4. Note if oil filter indicator button (1) is extended. If button is extended, go to step 5. If button is not extended, go to step 8.
5. Replace element in main oil filter (2) (Task 6-171).
6. Open pylon lower fairing (3) (Task 2-2).



7. Replace auxiliary oil filter (4) (Task 6-173).
8. Remove, inspect, and clean two debris detection screens (5) (Tasks 6-174 and 6-175). Install screens (Task 6-176).
9. Inspect chip detector (6) (Task 6-178).
10. If quantity and size of particles obtained from filters (2 and 4), screens (5) and chip detector (6) have not decreased by at least **30 percent** from original amount, replace combining transmission (Tasks 6-72 and 6-77).
11. If quantity and size of particles obtained from filters (2 and 4), screens (5) and chip detector (6) have decreased by **30 percent** or more, repeat steps 1 thru 9. If any more debris is obtained, replace combining transmission (Tasks 6-72 and 6-77).

**FOLLOW-ON MAINTENANCE:**

- Close pylon lower fairing (Task 2-2).
- Close pylon access doors (Task 2-2).



END OF TASK



**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Container, 2 Quart

**Materials:**

Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Oil (E254)  
 Lockwire (E231)  
 Gloves (E186)

**Parts:**

Filter Element  
 Packing

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

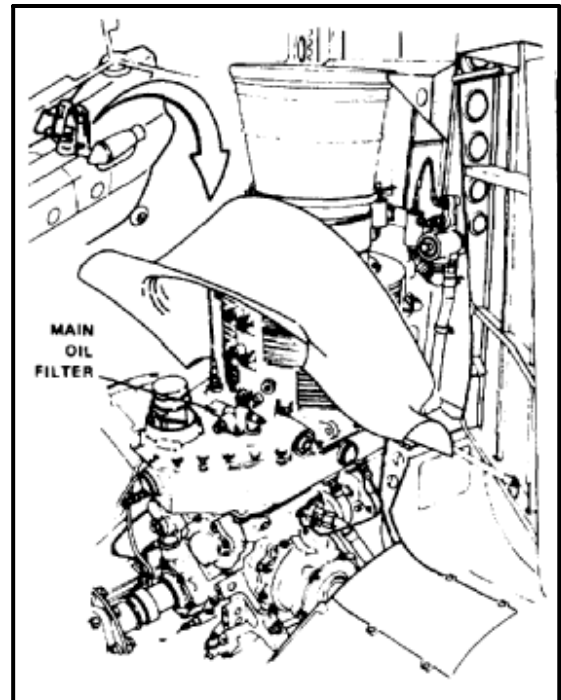
TM 55-1520-240-23P  
 Task 2-2

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Aft Pylon Doors Open (Task 2-2)  
 Aft Pylon Lower Fairing Open (Task 2-2)

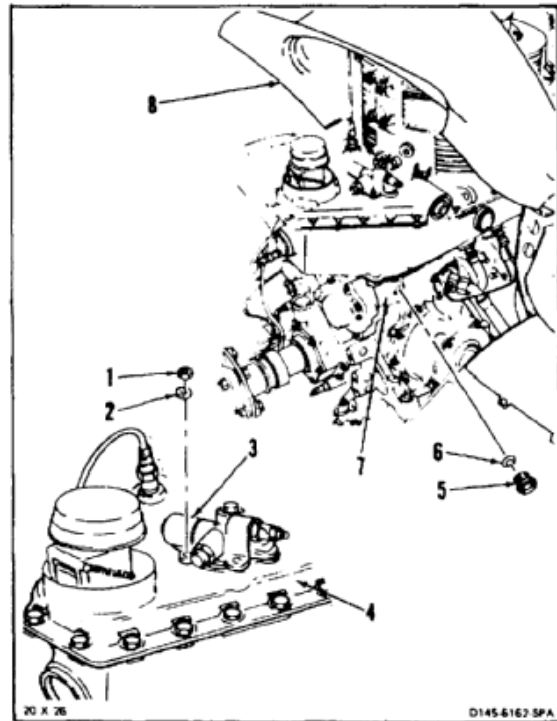
**General Safety Instructions:****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

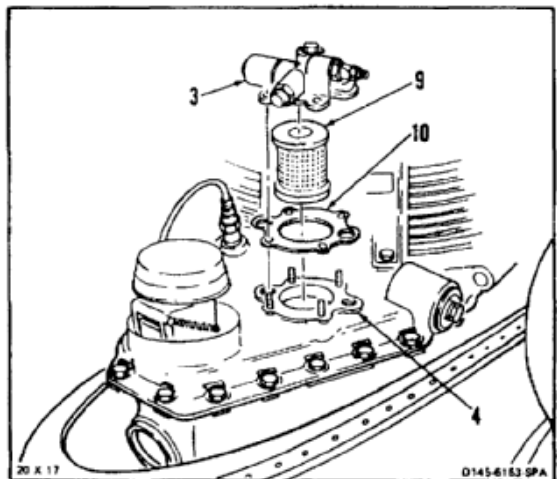


**DRAIN OIL**

1. Remove four nuts (1) and washers (2) from filter housing (3). Loosen housing on sump cover (4).
2. Remove lockwire from drain plug (5). Remove plug and packing (6). Drain oil into container.
3. Install packing (6) on plug (5). Install plug. Torque plug to **45 inch-pounds**. Lockwire plug to transmission (7) with lockwire (E231).
4. Close aft pylon lower fairing (8) (Task 2-2).

**REMOVE FILTER ELEMENT**

5. Remove housing (3), element (9), and gasket seal (10) from sump cover (4).
6. Remove element (9) from housing (3).



**INSTALL FILTER ELEMENT****WARNING**

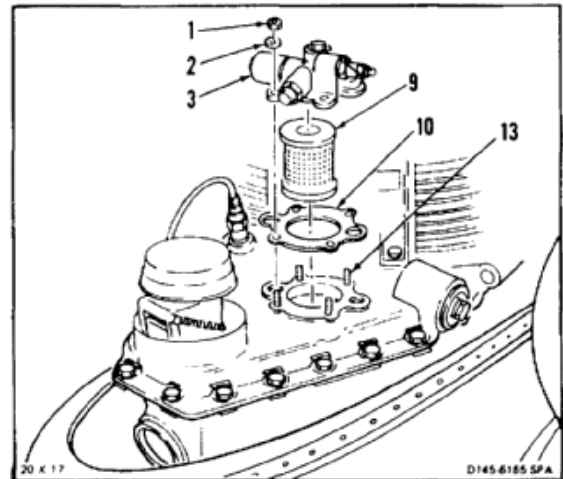
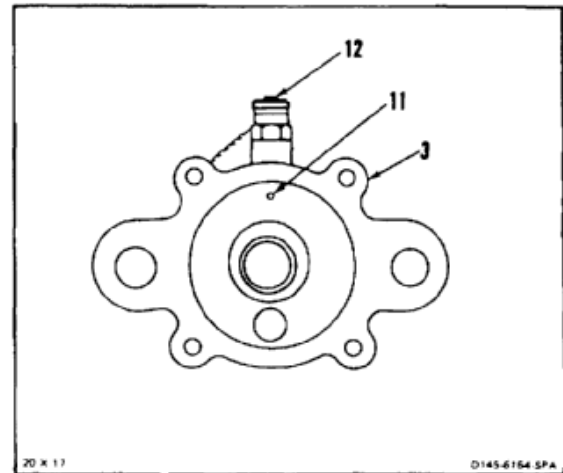
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

7. Clean inside of housing (3) with dry cleaning solvent (E162) and cloths (E120). Check that hole (11) is free of debris. Wear gloves (E186).
8. Hold housing (3) with indicating button (12) up. Push down button until it locks.

**NOTE**

Do not reuse removed element.

9. Install new element (9) in housing (3).
10. Install gasket seal (10) and housing (3) on four studs (13). Install four washers (2) and nuts (1). Torque nuts to **60 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service combining transmission (Task 1-54).  
Close aft pylon doors (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

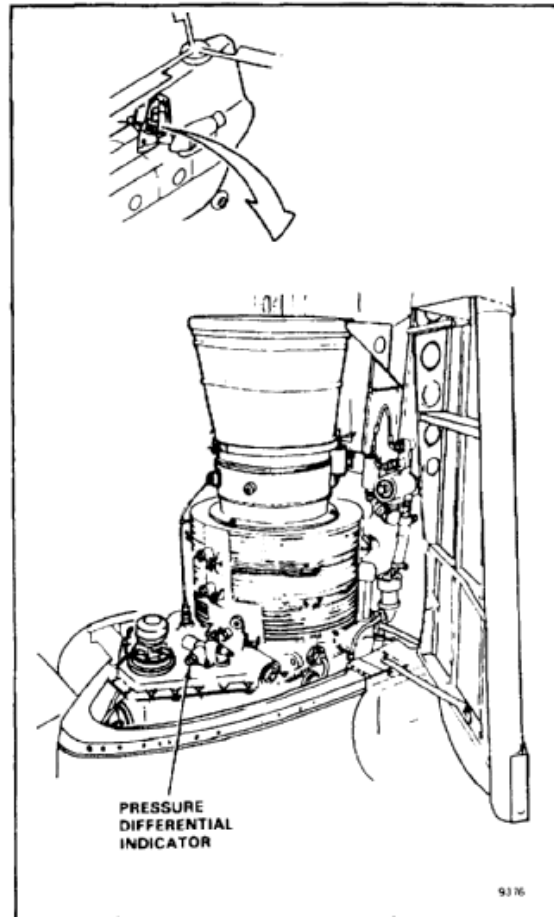
Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692

**Materials:**

Lockwire (E231)

**Personnel Required:**Medium Helicopter Repairer  
Inspector**References:**

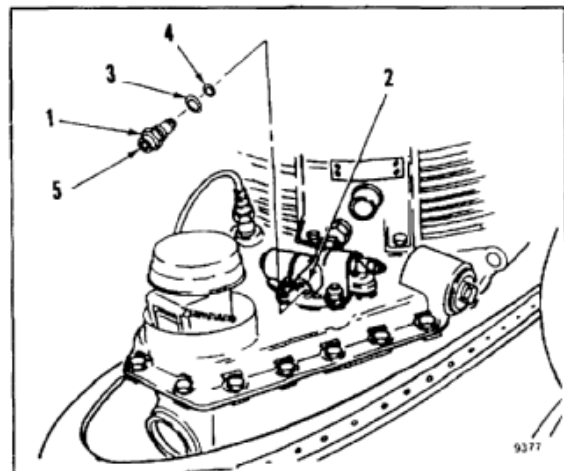
TM 55-1520-240-23P

**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Pylon Access Doors Open (Task 2-2)**REMOVE INDICATOR**

1. Remove lockwire from pressure differential indicator (1). Remove indicator from housing (2).
2. Remove two packings (3 and 4) from indicator (1).

**INSTALL INDICATOR**

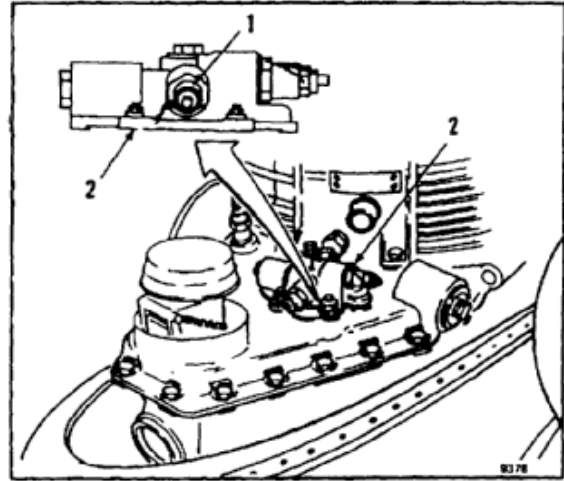
3. Install two packings (3 and 4) on indicator (1).
4. Hold indicator (1) so that button (5) points up. Check that button is pushed in and locked.
5. Install indicator (1) in housing (2).



**6-171.1 REPLACE COMBINING TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued)**

6-171.1

6. Lockwire indicator (1) to housing (2). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close pylon access doors (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Lockwire (E230)

**Personnel Required:**

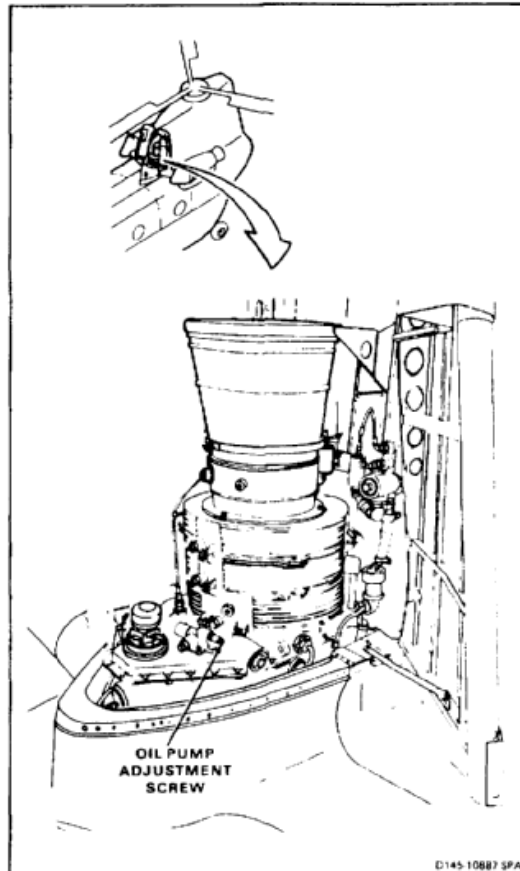
Medium Helicopter Repairer  
 Inspector  
 Army Rotary-Wing Aviator (2)

**References:**

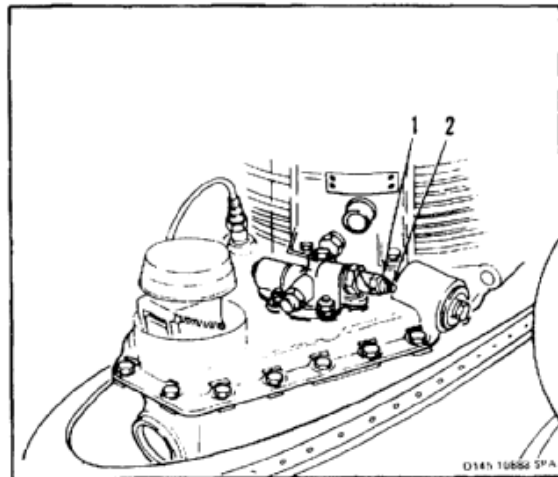
TM 55-1520-240-10

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Access Doors Open (Task 2-2)



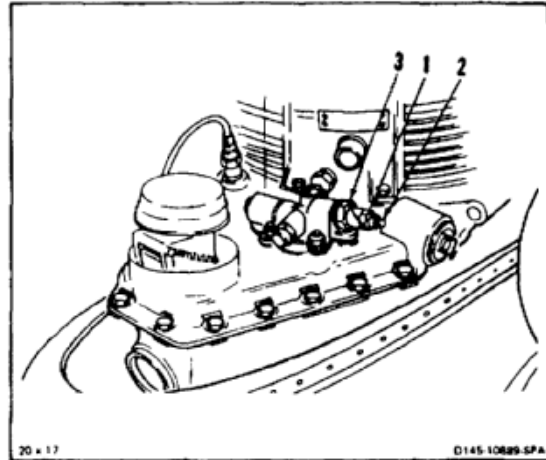
1. Remove lockwire from locknut (1) and setscrew (2). Hold setscrew from turning and loosen locknut.
2. Turn setscrew (2) no more than **1/4 turn** to adjust transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is **40 to 70 psi**.
3. Hold setscrew (2) from turning. Torque locknut (1) to **60 inch-pounds**.



**6-172 ADJUST COMBINING TRANSMISSION MAIN OIL PUMP (Continued)**

6-172

4. Have pilot perform ground run at **100 percent** rotor rpm until combining transmission oil temperature and pressure stabilize. Record oil pressure.
5. If oil pressure is **40 to 70 psi**, go to step 6. If pressure is not **40 to 70 psi**, repeat task.
6. Lockwire locknut (1) and setscrew (2) to retaining nut (3). Use lockwire (E230).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close pylon access doors (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Lockwire (E231)  
 Oil (E254)

**Parts:**

Packing  
 Filter

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P  
 Task 6-108

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Hinged Fairing Open (Task 2-2)  
 Pylon Low Fairing Open (Task 2-2)

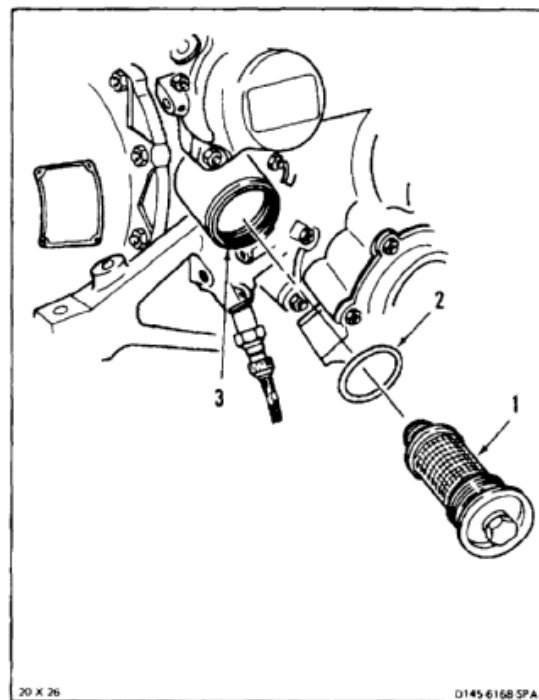
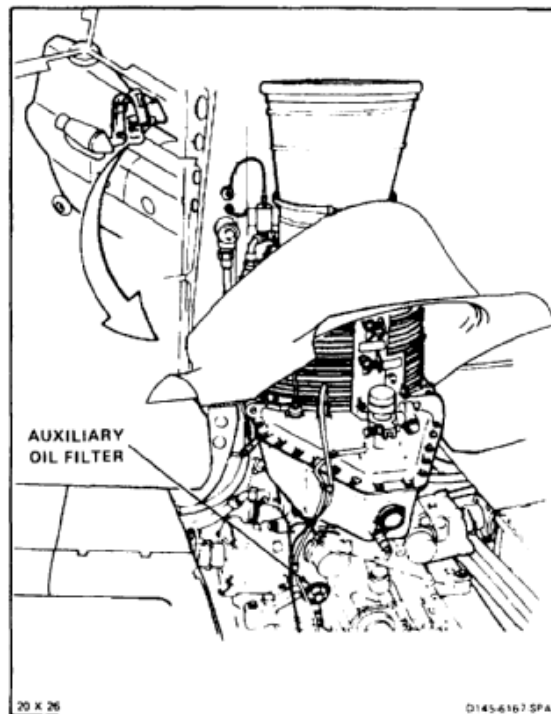
**REMOVE FILTER**

1. Remove lockwire from filter (1).



Do not let debris enter transmission cavity. Damage can result.

2. Remove filter (1) and packing (2) from transmission cavity (3). Use container to catch spilled oil.
3. Check filter (1) for debris. Retain debris for contamination analysis (Task 6-108).





**INSTALL FILTER****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

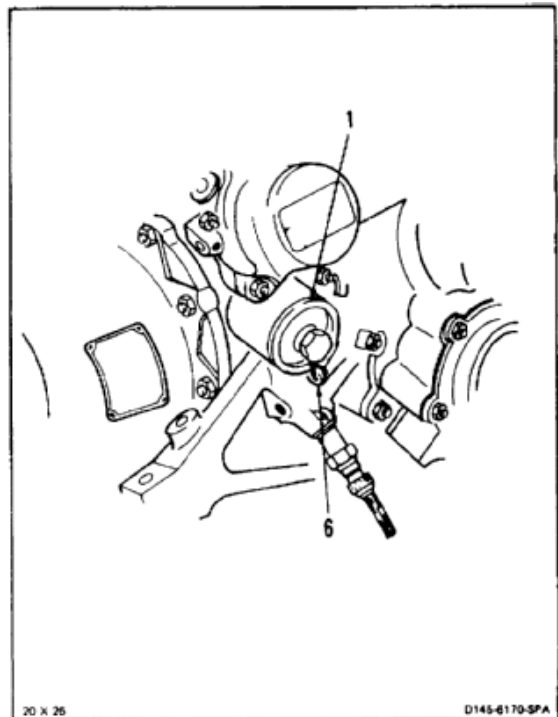
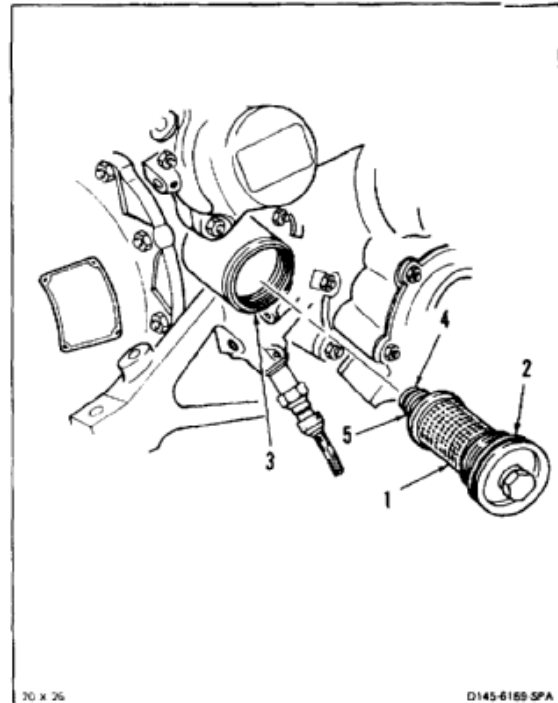
**NOTE**

Filter is supplied with two packings installed.

4. Coat packings (2, 4, and 5) and thread of filter (1) with oil (E254).
5. Install filter (1) and packing (2) in transmission cavity (3). Torque filter to **80 inch-pounds**.
6. Lockwire filter (1) to transmission lug (6) lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service combining transmission (Task 1-54).  
Close aft pylon lower fairing (Task 2-2).  
Close aft pylon doors (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

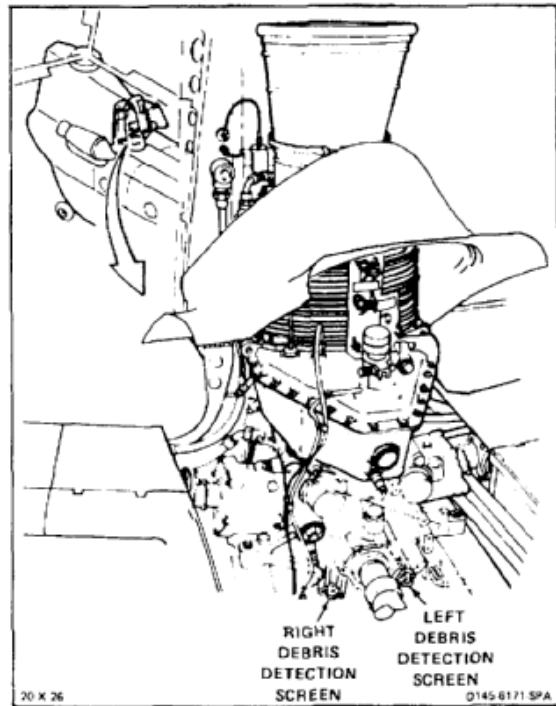
**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

Pylon Hinged Fairing Open (Task 2-2)

Pylon Lower Fairing Open (Task 2-2)

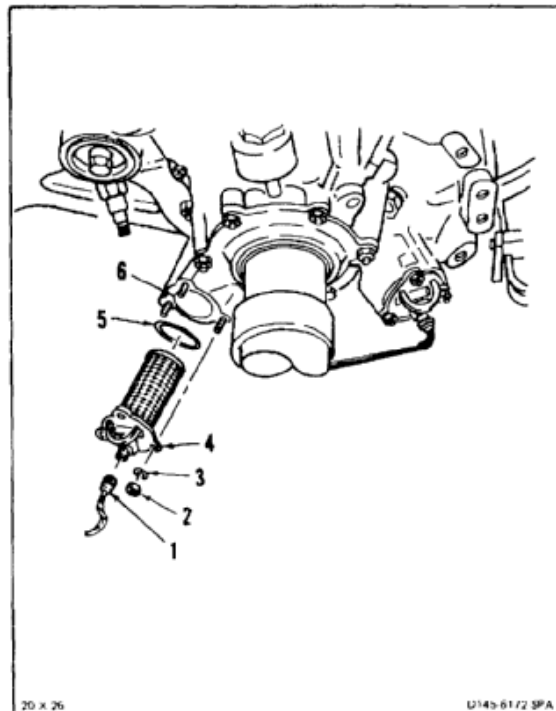
**NOTE**

Procedure is same to remove left or right screen. Removal of right screen is shown here.

1. Disconnect electrical connector (1).
2. Remove three nuts (2) and washers (3).
3. Place cloths (E120) under screen (4) to absorb spilled oil. Remove screen and packing (5) from transmission cavity (6).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-580

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Goggles

**Materials:**

Dry Cleaning Solvent (E162)

Cloth (E120)

Brush (E86)

Gloves (E186)

**Personnel Required:**

Medium Helicopter Repairer

**References:**

Task 6-108

**Equipment Condition:**

Off Helicopter Task

1. Check screen (1) for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108).

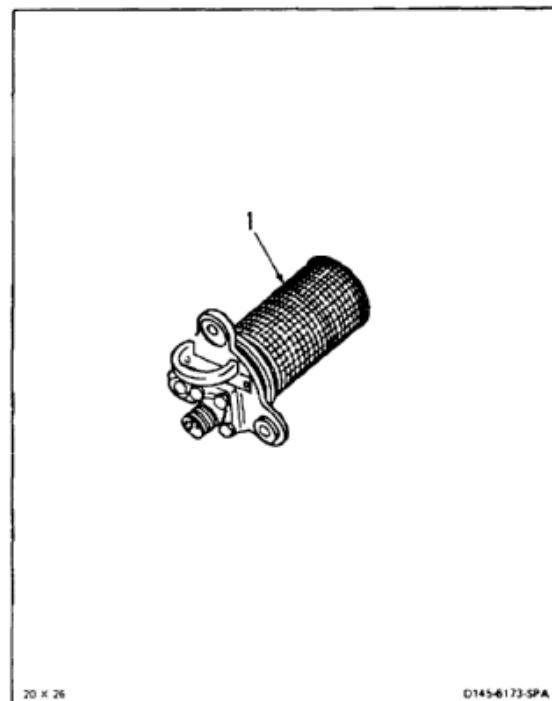
**WARNING**

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

2. Clean screen with solvent (E162) and brush (E86). Wear gloves (E186) and goggles. Dry with cloth (E120) or let air dry.
3. Inspect screen (1) for tears. There shall be no tears.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

None

**Parts:**

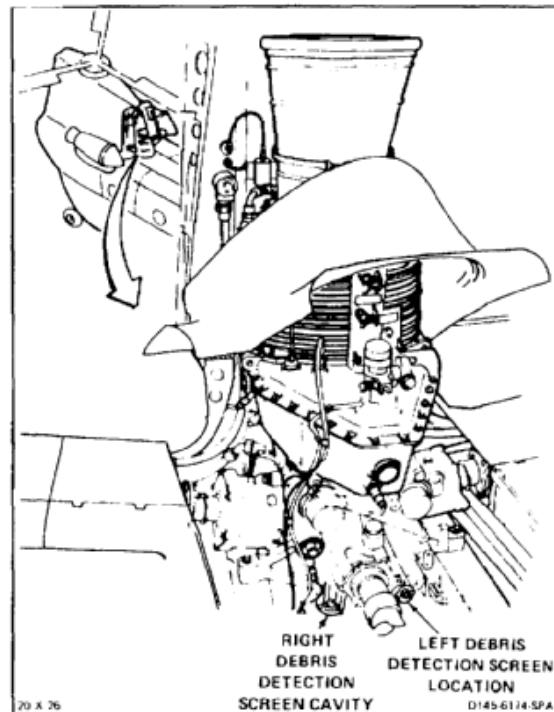
Packing

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P  
TM 55-1520-240-T

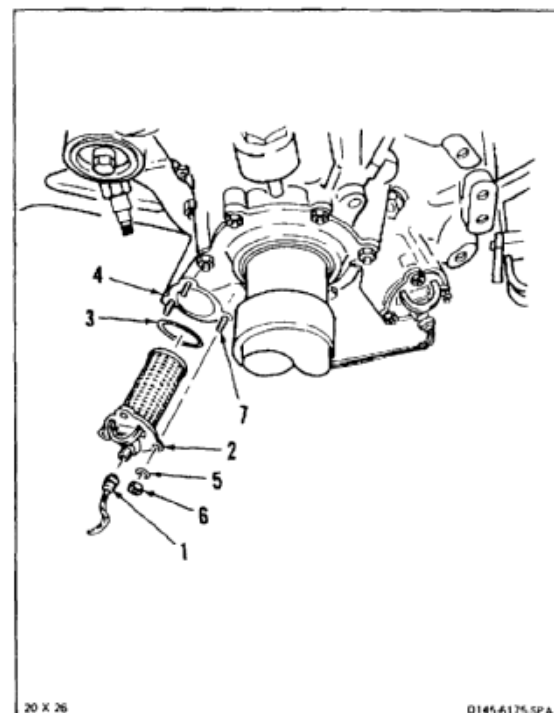
**NOTE**

Procedure is same to install left or right screen. Installation of right screen shown here.

1. Connect electrical connector (1) to screen (2).
2. Perform operational check of engine transmission debris detection system (TM 55-1520-240-T).
3. Install packing (3) on screen (2). Install screen in transmission cavity (4).
4. Install three washers (5) and nuts (6) on studs (1). Torque nuts to **60 inch-pounds**.

**FOLLOW-ON MAINTENANCE:**

Close pylon lower fairing (Task 2-2).  
Close pylon hinged fairing (Task 2-2).



END OF TASK

6-582

**6-177 REMOVE COMBINING TRANSMISSION CHIP DETECTOR**

6-177

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

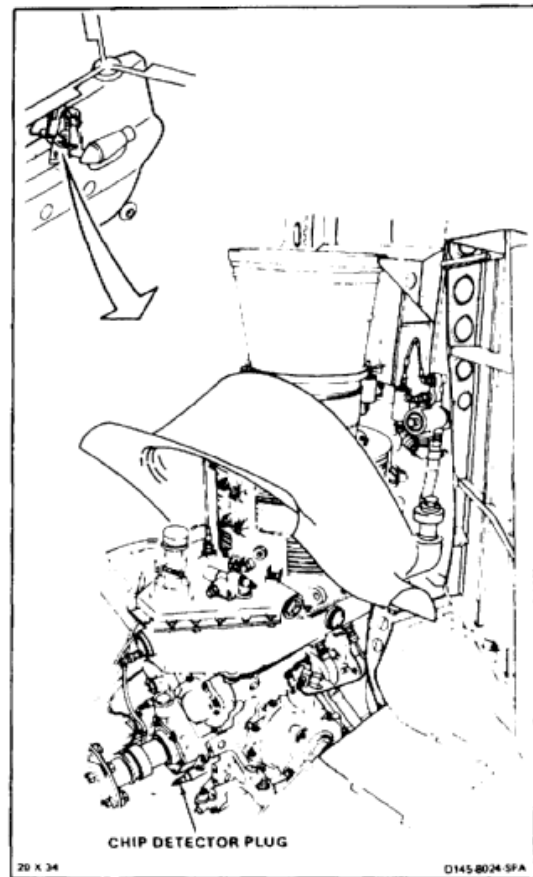
**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

Aft Pylon Doors Open (Task 2-2)

Aft Pylon Lower Fairing Open (Task 2-2)



1. Disconnect electrical connector (1) from chip detector (2). Remove lockwire.
2. Position cloths under chip detector (2) to absorb oil spillage.

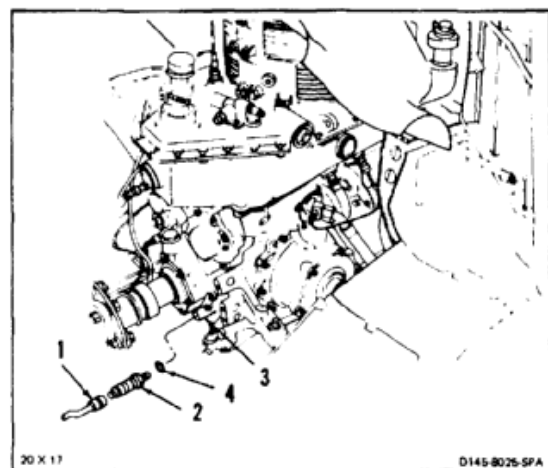
**NOTE**

When detector is removed, oil will drain from port. Plug port quickly to prevent oil drainage.

3. Remove chip detector (2). Quickly plug port (3) to stop oil drainage.
4. Remove packing (4) from chip detector (2).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

None

**Materials:**

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

**Parts:**

Packing

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

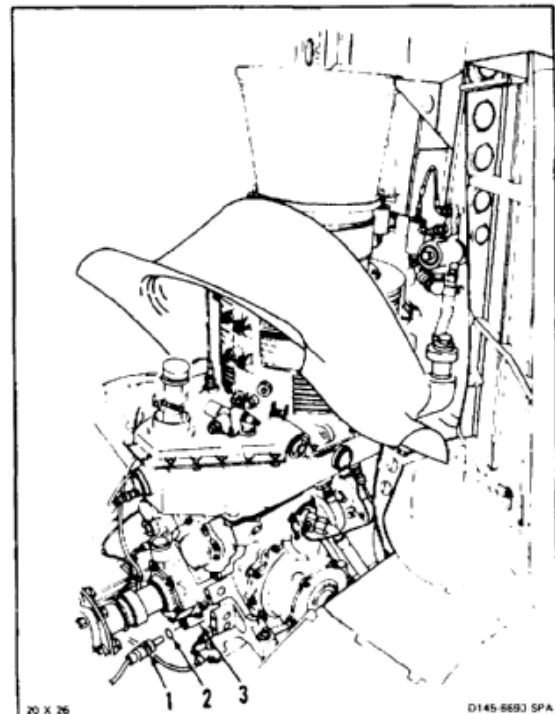
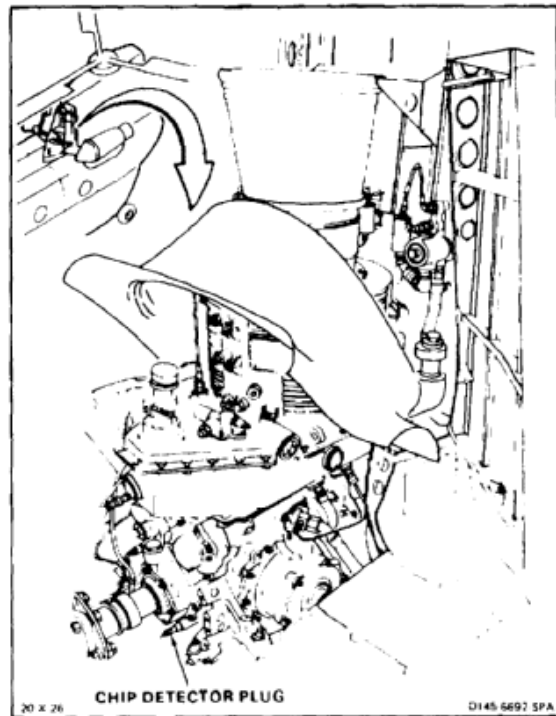
TM 55-1520-240-23P  
TM 55-1520-240-T  
Task 6-108

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Aft Pylon Access Doors Open (Task 2-2)  
Aft Pylon Lower Fairing Open (Task 2-2)

**REMOVE PLUG**

1. Push in chip detector plug (1) and turn it counterclockwise. Remove plug and packing (2) from chip detector body (3).



**6-178 REMOVE, INSTALL AND INSPECT COMBINING TRANSMISSION CHIP DETECTOR PLUG (Continued)**

6-178

**INSPECT PLUG****NOTE**

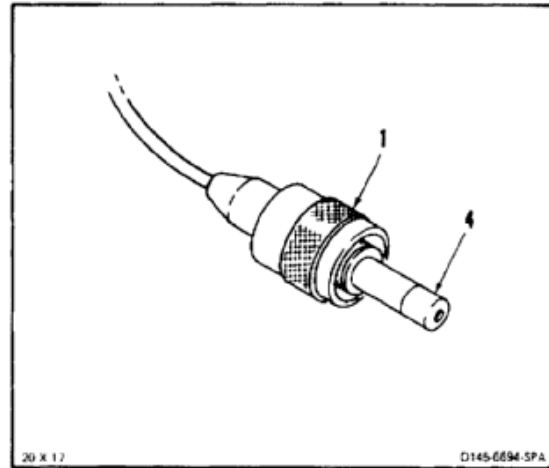
Some metal fuzz on tip of plug is normal.

- Check tip (4) on plug (1) for chips. Save chips for contamination analysis (Task 6-108).

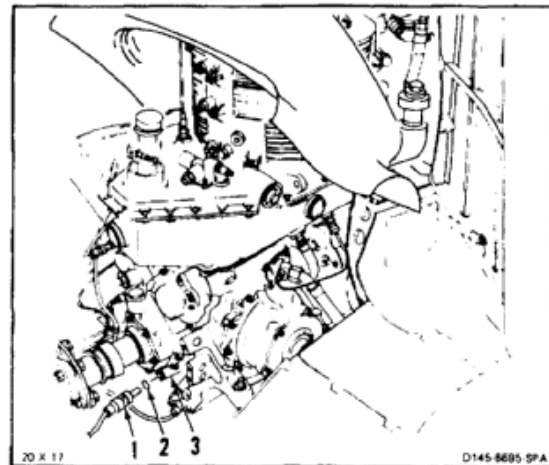
**WARNING**

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

- Clean tip (4) with dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186). Dry tip.
- Perform operational check of combining transmission chip detector system (TM 55-1520-240-T).

**INSTALL PLUG**

- Install plug (1) and packing (2) in chip detector body (3). Push in and turn plug clockwise to lock.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close aft pylon lower fairing (Task 2-2).  
Close aft pylon access doors (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Lockwire (E231)  
Oil (E254)

**Parts:**

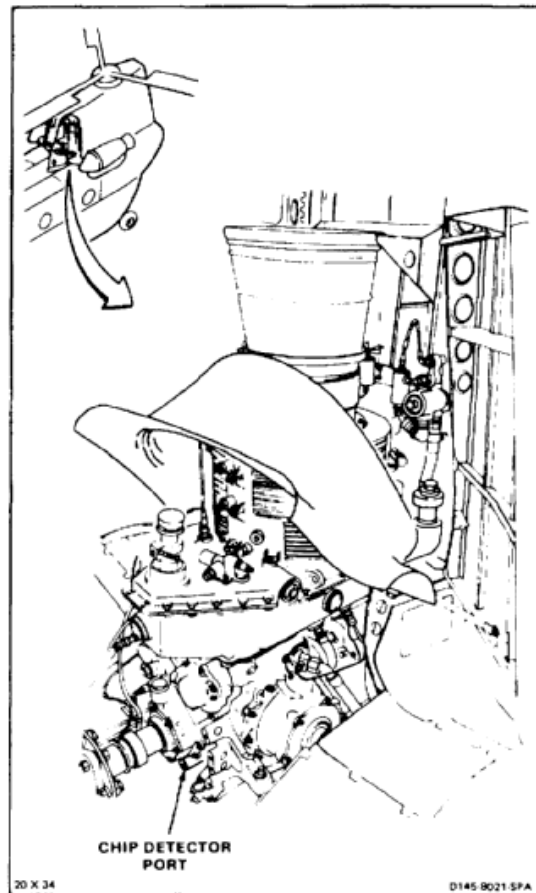
Packing

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

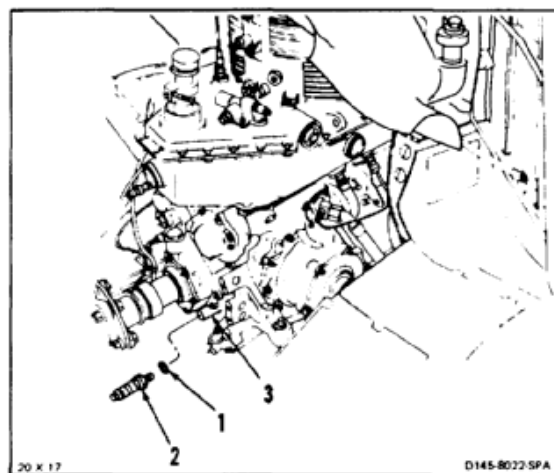
**References:**

TM 55-1520-240-23P

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

1. Coat packing (1) and thread of chip detector (2) with oil (E254). Install packing on chip detector.
2. Install chip detector (2) in transmission port (3). Torque chip detector to **80 inch-pounds**.

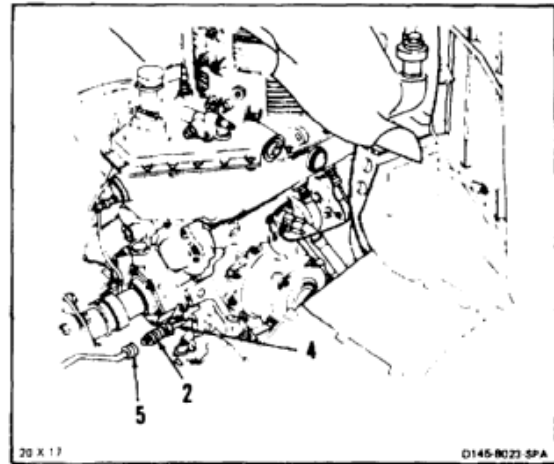




**6-179 INSTALL COMBINING TRANSMISSION CHIP DETECTOR (Continued)**

6-179

3. Lockwire chip detector (2) to transmission (4).  
Use lockwire (E231).
4. Connect electrical connector (5).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Close aft pylon lower fairing (Task 2-2).
- Close aft pylon access doors (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

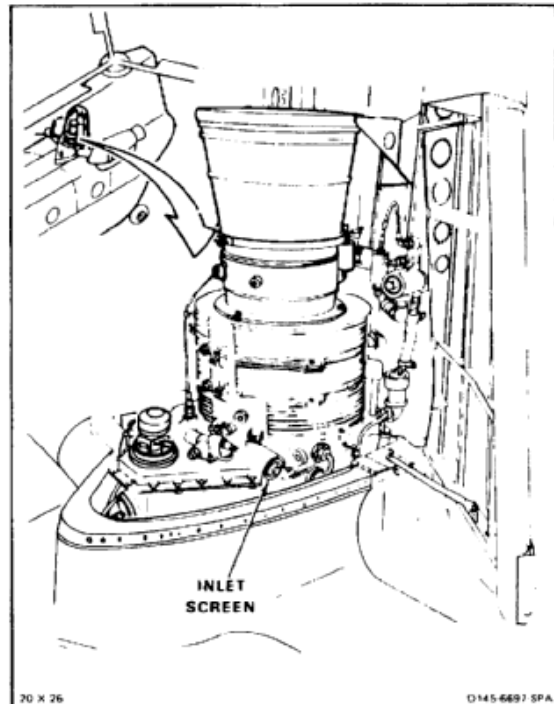
Barrier Material (E80)  
 Masking Tape (E388)  
 Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Aft Pylon Access Doors Open (Task 2-2)  
 Aft Pylon Lower Fairing Open (Task 2-2)



1. Remove lockwire from inlet screen (1).

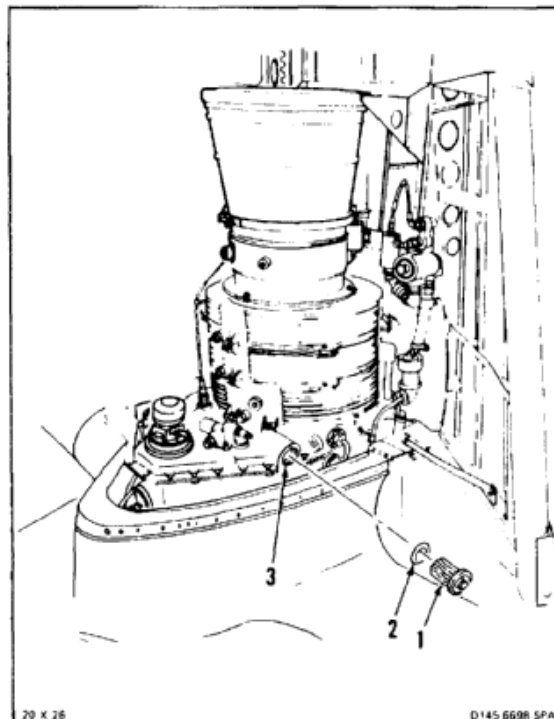


Do not let debris enter transmission cavity. Damage can result.

2. Remove screen (1) and packing (2) from transmission cavity (3). Use cloths (E120) to catch spilled oil.
3. Cover cavity (3) with barrier material (E80) and tape (E388).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-588

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Oil (E254)  
Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

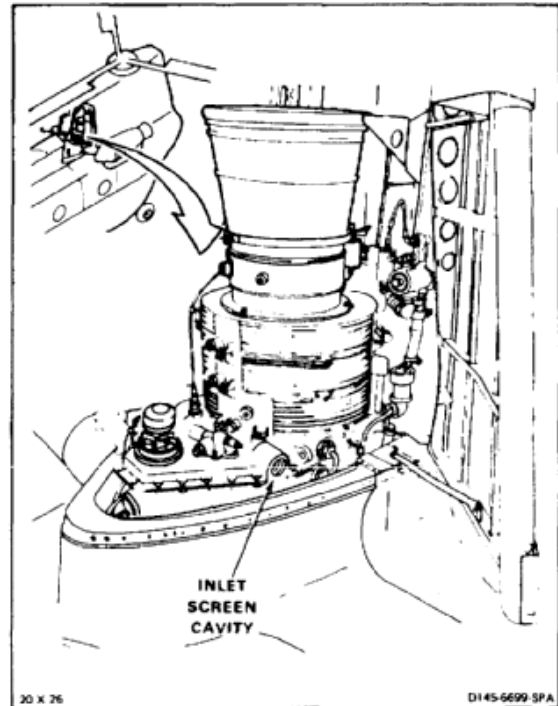
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

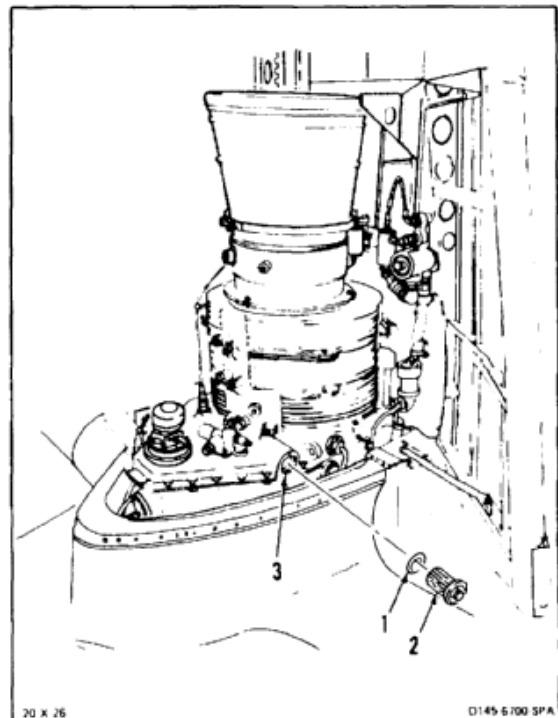
**Equipment Condition:**

Inlet Screen Inspected (Task 6-131)

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

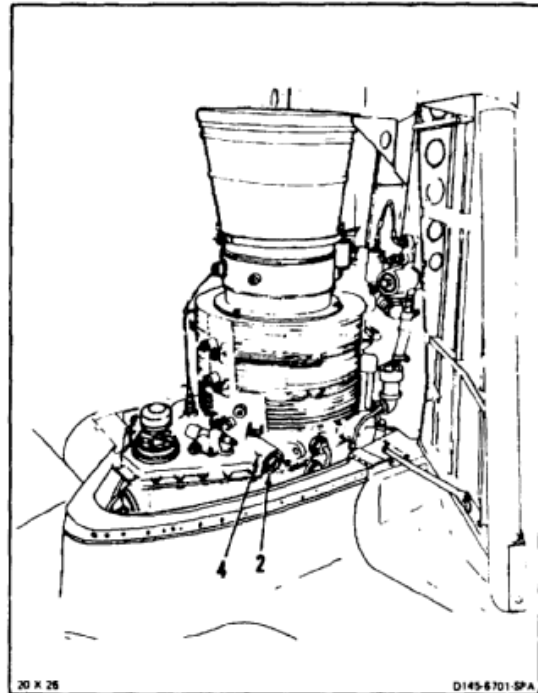
1. Coat packing (1) and thread of inlet screen (2) with oil (E254). Install packing on screen.
2. Install screen (2) in transmission cavity (3). Torque screen to **80 inch-pounds**.



- Lockwire screen (2) to transmission (4). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close aft pylon access doors (Task 2-2).



END OF TASK

6-590

**6-181.1 REPLACE COMBINING TRANSMISSION OIL COOLER BYPASS VALVE****6-181.1****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
 Wrench, 1 Inch  
 Open End Wrench, 1-1/2 Inch  
 Container, 2 Quart (2)  
 Hose, 1 Inch ID, 36 Inches Long  
 Funnel

**Materials:**

Cloths (E120)  
 Lockwire (E231)  
 Oil (E254)

**Parts:**

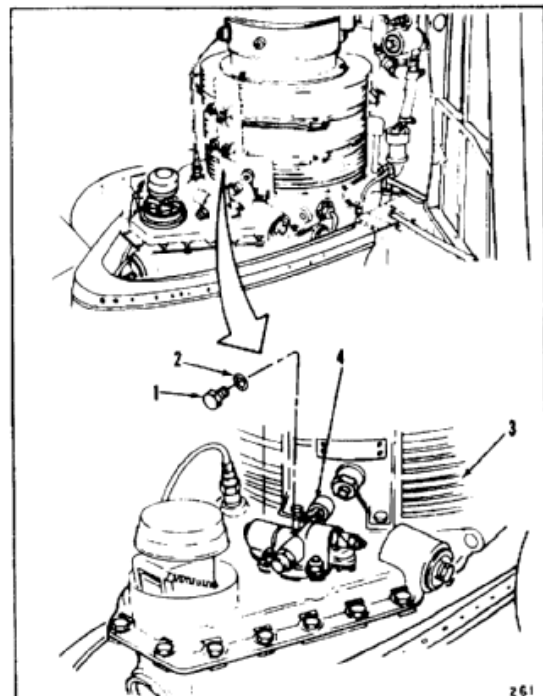
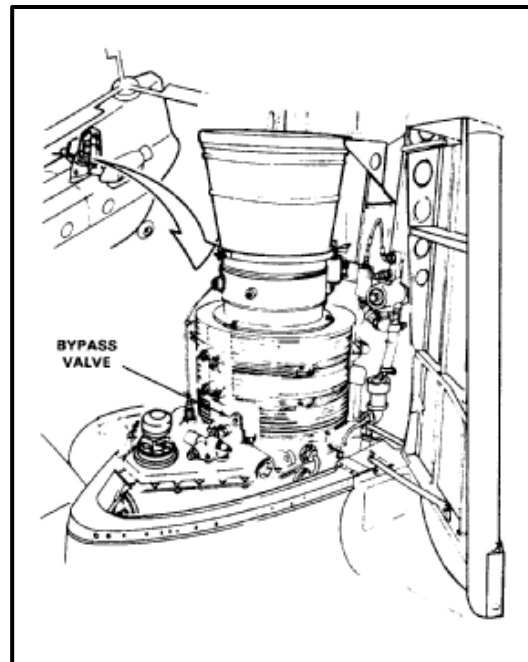
Packings (2)

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Hinged Fairing Open (Task 2-2)

**DRAIN OIL COOLER**

1. Remove lockwire from drain plug (1).
2. Remove drain plug (1) and packing (2) from oil cooler (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
3. Install drain plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).

**REMOVE BYPASS VALVE****NOTE**

Do not let oil spill on fins of oil cooler.  
Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). Remove valve from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).

**INSTALL VALVE****WARNING**

Oil (E253 or E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

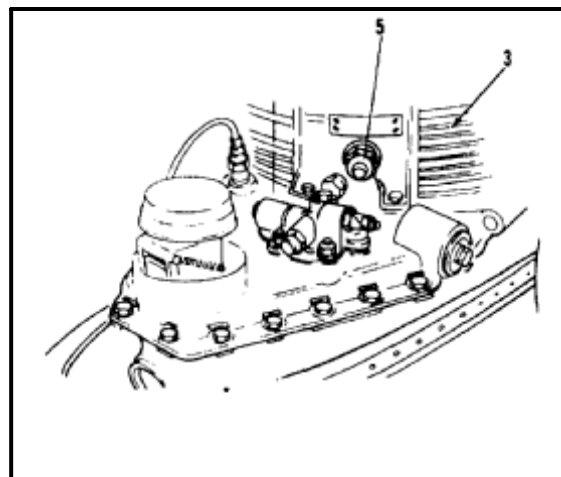
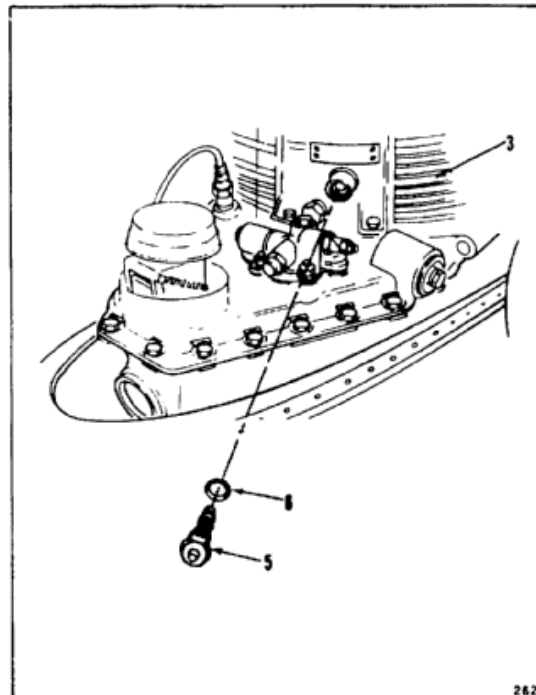
**WARNING**

Oil (E253 or E254) gives off fumes that can cause injury to personnel.  
Use oil in a well-ventilated area.

6. Coat packing (6) and thread of bypass valve (5) with oil (E254). Install packing on valve.
7. Install valve (5) in oil cooler (3). Torque valve to **80 inch-pounds**.
8. Lockwire valve (5) to oil cooler (3). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service combining transmission (Task 1-54).  
Close aft pylon doors (Task 2-2).



END OF TASK

**6-181.2 INSPECT AND REPAIR COMBINING TRANSMISSION OIL COOLER FAN EXHAUST DUCT 6-181.2****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Oil (E254)

**Parts:**

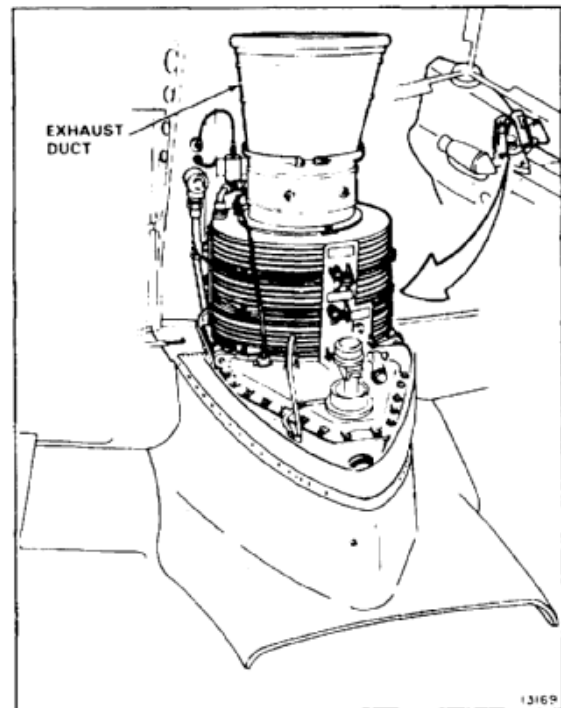
Rivets  
Washers  
Seal (APP E-56)

**Personnel Required:**

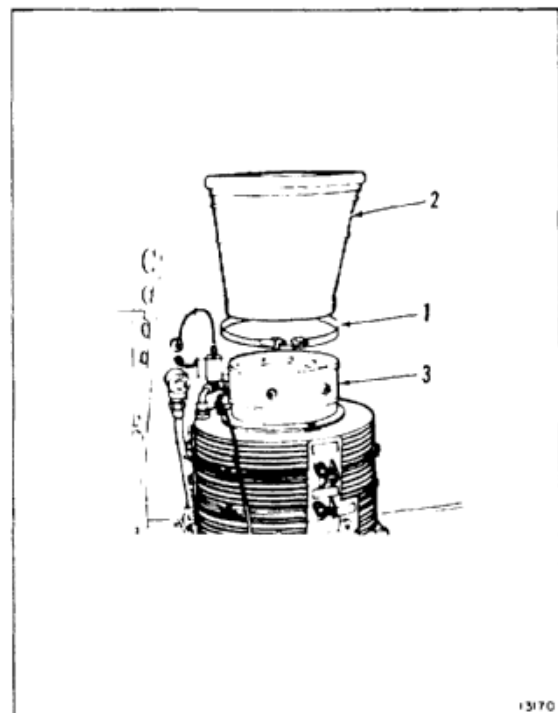
Aircraft Structural Repairer

**Equipment Condition:**

Battery Disconnected  
Electrical Power Off  
Pylon Hinged Fairing Open (Task 2-2)

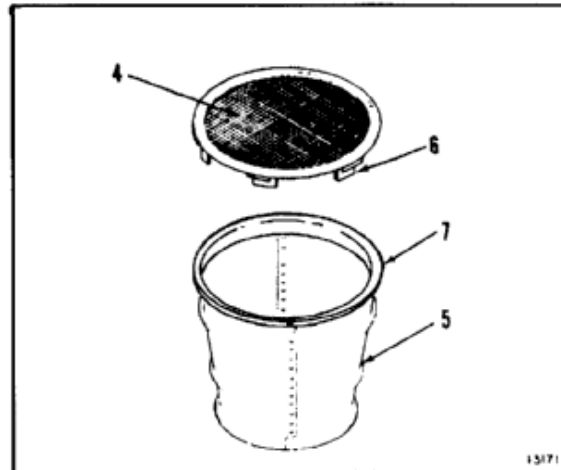
**REMOVE DUCT ASSEMBLY**

1. Loosen clamp (1) securing duct assembly (2) to fan (3).
2. Remove duct assembly (2) and clamp (1).



**INSPECT DUCT ASSEMBLY**

3. Lift screen (4) out of duct assembly (5).
4. Check screen (4) for holes and tears. Check clips (6) for cracks and looseness. There shall be no such damage.
5. Check seal (7). Seal shall be flexible, with no rips.
6. Check duct assembly (5) for holes, tears, and cracks that go all the way through the duct. There shall be no such damage.

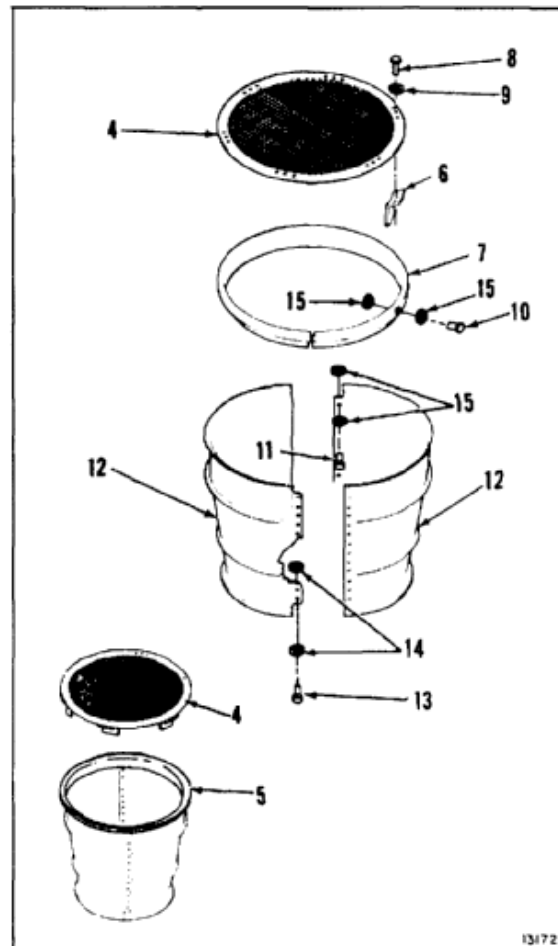


**REPAIR DUCT ASSEMBLY**

**NOTE**

Repair of duct is limited to replacement of parts.

7. Remove any of six clips (6) from screen (4) by drilling out rivets (8). Install new clips with new rivets and washers (9).
8. Remove seal (7) by drilling out rivets (10 and 11).
9. Separate duct halves (12) by drilling out rivets (13) at both ends of halves.
10. Join duct halves (12) with rivets (13) and washers (14). Use one washer under head and one under tail of each rivet.
11. Install new seal (E-56) (7). Use rivets (10 and 11) and washers (15). Use one washer under head and one under tail of each rivet.
12. Install screen (4) on duct assembly (5).





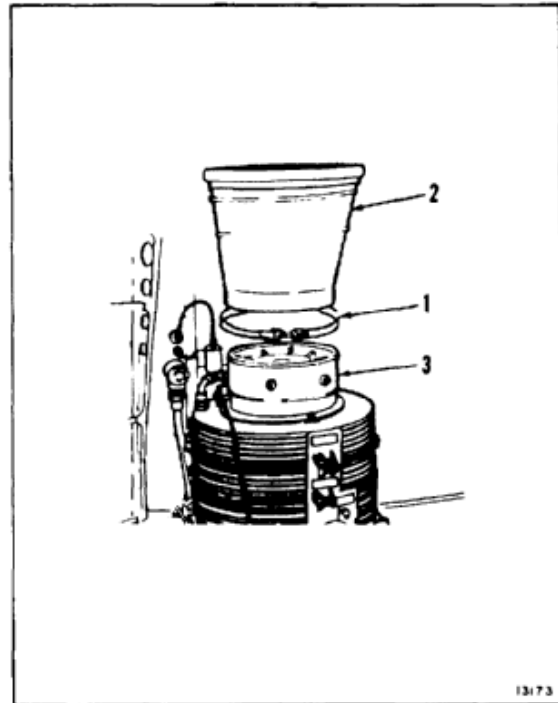
**6-181.2 INSPECT AND REPAIR COMBINING TRANSMISSION OIL COOLER FAN EXHAUST  
DUCT (Continued)**

6-181.2

**INSTALL DUCT ASSEMBLY****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

13. Coat thread of clamp (1) with oil (E254). Install clamp (1) around bottom of duct assembly (2).
14. Install duct assembly on fan (3). Torque clamp to **35 inch-pounds**.

**FOLLOW-ON MAINTENANCE:**

Close pylon hinged fairing (Task 2-2).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

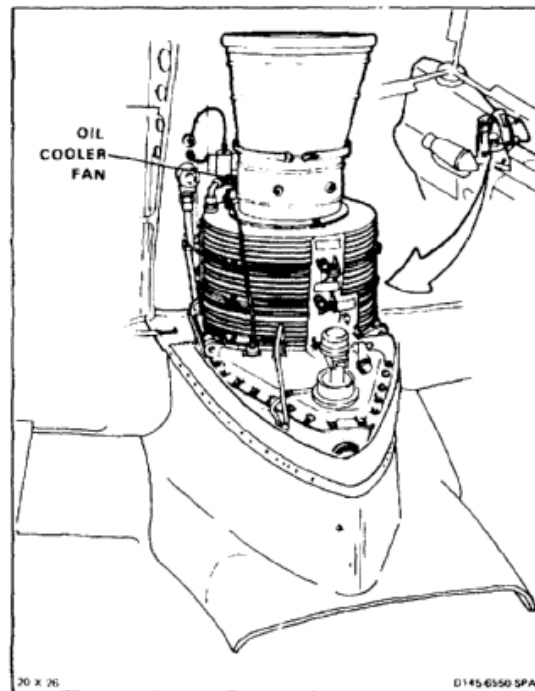
None

**Personnel Required:**

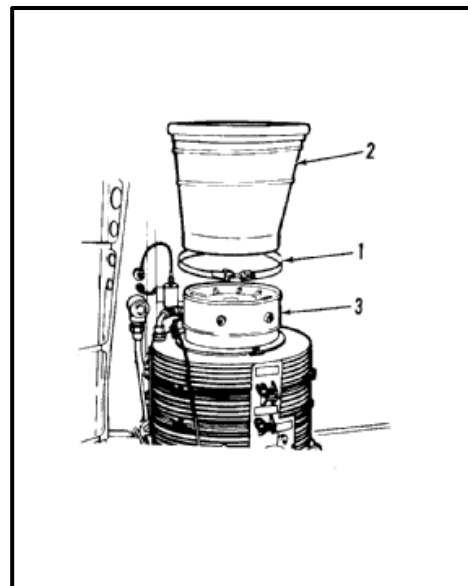
Medium Helicopter Repairer

**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Pylon Hinged Fairing Open (Task 2-2)



1. Loosen clamp (1) securing duct (2) to fan (3).
2. Remove duct (2) and clamp (1).



- Remove four nuts (4), washers (5), and bracket (6) from fan (3).

**NOTE**

The drive shaft may come out with the fan or stay in the transmission. The shaft is about **30 inches** long.

- Lift fan (3) straight up until drive shaft (7) clears cooler (8). Remove shaft from baffle (9) or fan. Identify the upper end of the drive shaft with tape or marker.
- On helicopters (Without **66**), remove two packings (10) from shaft (7).

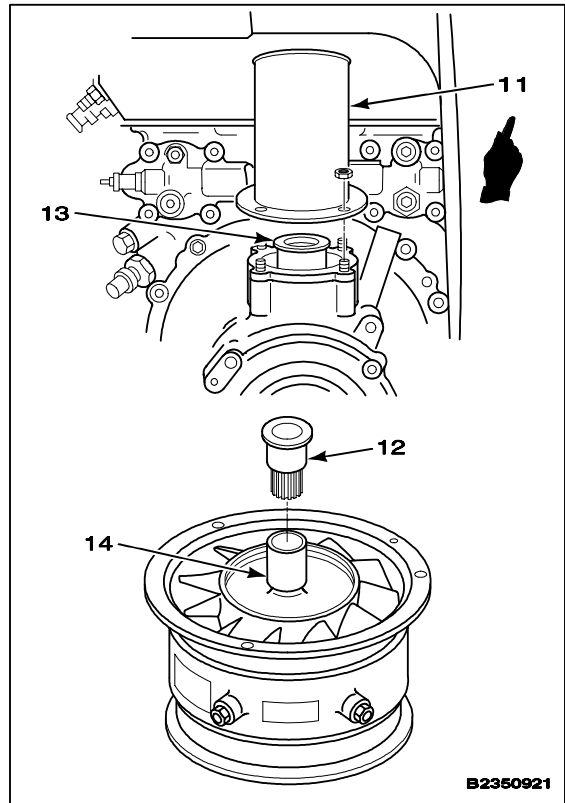
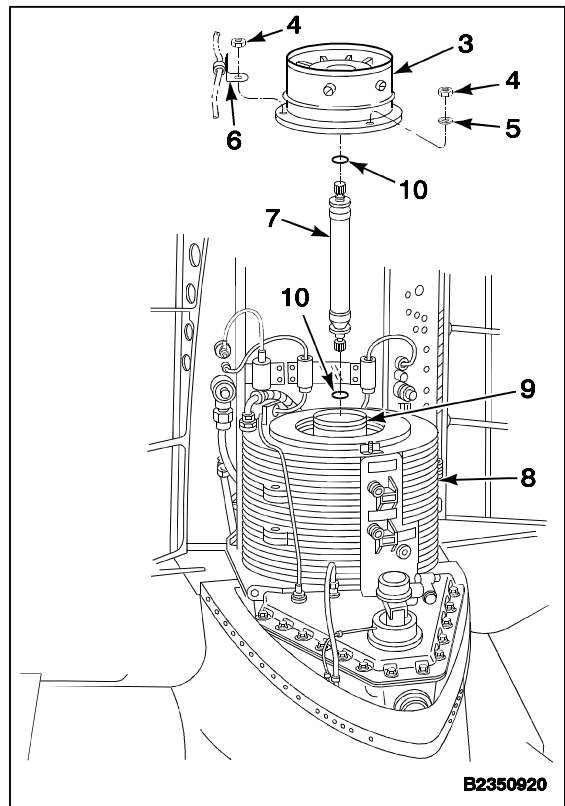


After removal of retaining shield, reinstall nuts on studs to hold the transmission gear cartridge in place. Tighten nuts not to exceed **60 inch-pounds**.

- Remove retaining shield (11) (Task 6-184).
- Remove adapters (12) from the splines of drive gear (13) and fan shaft (14).

**FOLLOW-ON MAINTENANCE:**

Inspect combining transmission oil cooler fan assembly and fan drive shaft (Task 6-182.1).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Torque Wrench, 30-150 Inch-Pounds
- Dial Indicator
- Gauge, P/N SK33330-018
- 10X Magnifying Glass

**Materials:**

- Dry Cleaning Solvent (E162)
- Cloth, Cleaning (E120)
- Gloves (E186)
- Oil (E253, E254, or E254.1)
- Marking Pencil (E271)
- Goggles (E473)

**Parts:**

Packings

**Personnel Required:**

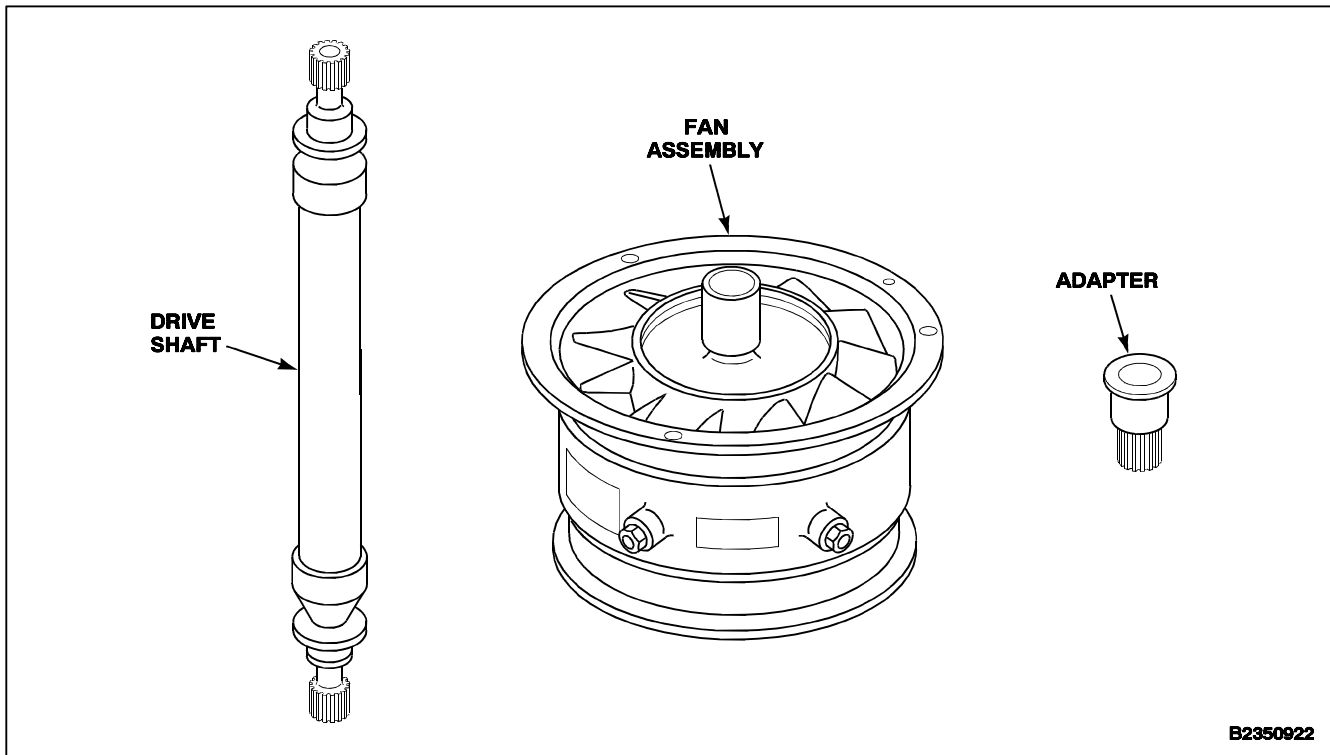
CH-47 Helicopter Repairer  
Inspector

**References:**

- Task 6-72
- Task 6-77
- Task 6-186
- TM 55-1520-240-23P

**Equipment Condition:**

Combining Transmission Oil Cooler Fan and Shaft  
Removed (Task 6-182)



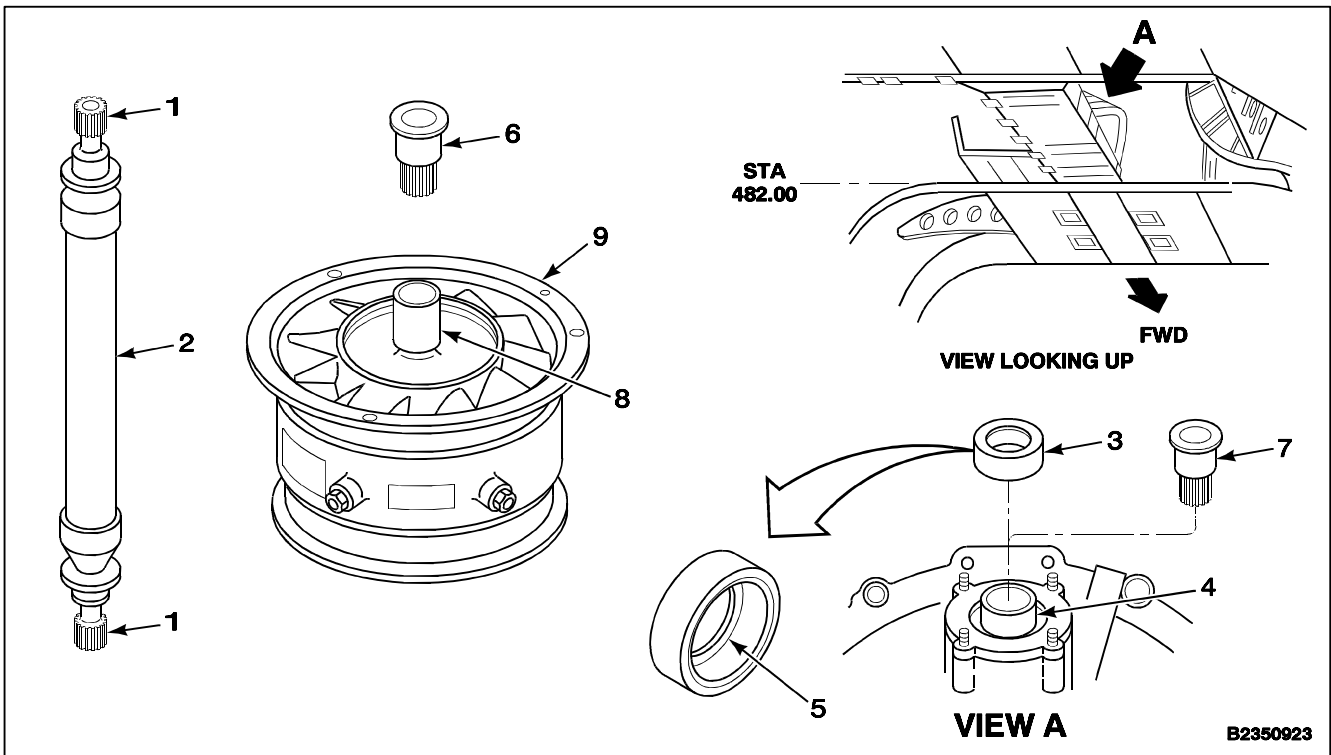
**INSPECT DRIVE SHAFT HELICOPTER (WITHOUT 66)**

1. Inspect splines (1) at each end of drive shaft (2) for wear. If wear is evident, proceed as follows:
  - a. Place a straightedge (6 inch metal ruler or equivalent) along the length of the spline, with the ruler spanning the worn area.
  - b. Using a feeler gauge, measure the depth of wear below the face of the spline.
  - c. If upper spline wear exceeds **0.015 inch**, replace the drive shaft and fan assembly.
- 1.1. Using **10X** magnifying glass, visually inspect the aluminum fan shaft tube for cracks extending from under the steel adapters. No cracks allowed.



Do not use tools to check for looseness on the jo-bolts. Damage to the shaft will result.

- 1.2. Inspect jo-bolts that attach the adapters to the fan shaft tube for looseness. Attempt to turn the bolts by hand only. If any jo-bolts are loose, replace fan shaft.
- 1.3. Perform a check of the combining transmission output gear spline wear using spline wear (GO-NO-GO) gauge, P/N SK33330-018. Insert the spline gauge into the output gear where the cooling fan shaft normally fits. If the gauge does not fit, transmission is serviceable. If the gauge fits, (partially or completely), replace combining transmission.
- 1.4. Perform a check of the fan assembly input gear spline wear using spline wear (GO-NO-GO) gauge, P/N SK33330-018. Insert the spline gauge into the input gear of the fan where the cooling fan shaft normally fits. If the gauge does not fit, cooling fan is serviceable. If the gauge fits, (partially or completely), replace cooling fan.

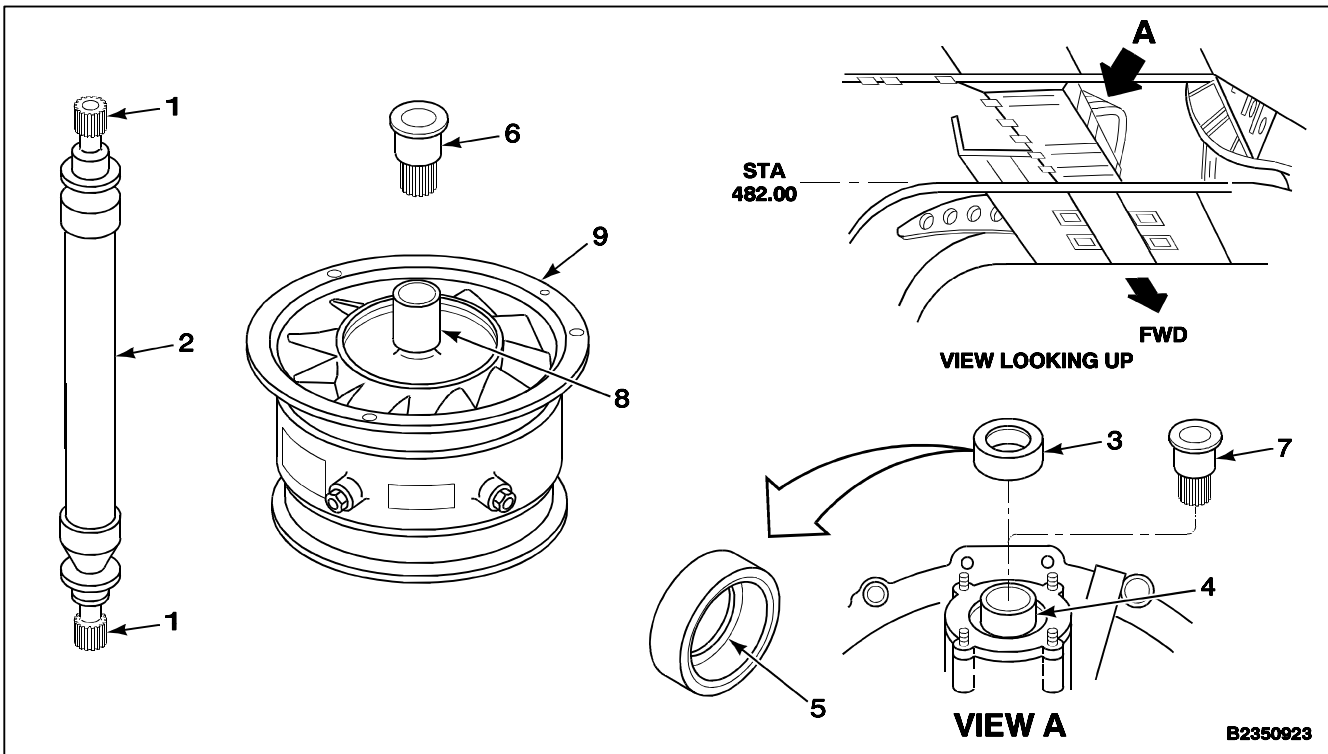


**INSPECT SNUBBER HELICOPTER (WITHOUT 66)**

2. Inspect snubber (3) as follows:
  - a. Lift the snubber from around the end of transmission gear (4).
  - b. Check the snubber for cuts, tears, and erosion of seating surface (5). There shall be no such damages.
  - c. Install the snubber over the end of transmission gear (4). Make sure the snubber is fully seated.

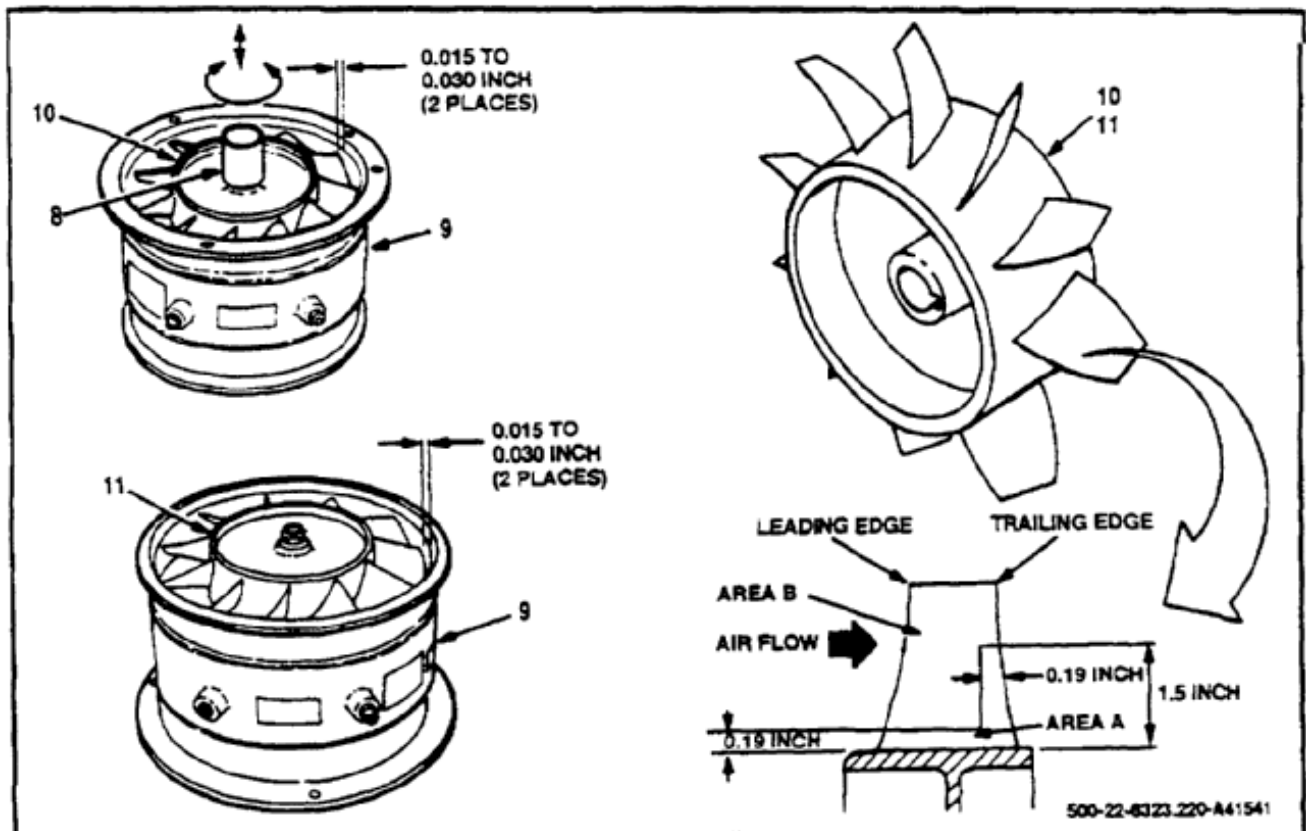
**INSPECT ADAPTERS HELICOPTER (WITH 66)**

3. No inspection is required of adapters on helicopter (With 66). Fan adapter (6) requires no inspection, and transmission adapter (7) is replaced at each phase inspection.



**INSPECT FAN ASSEMBLY**

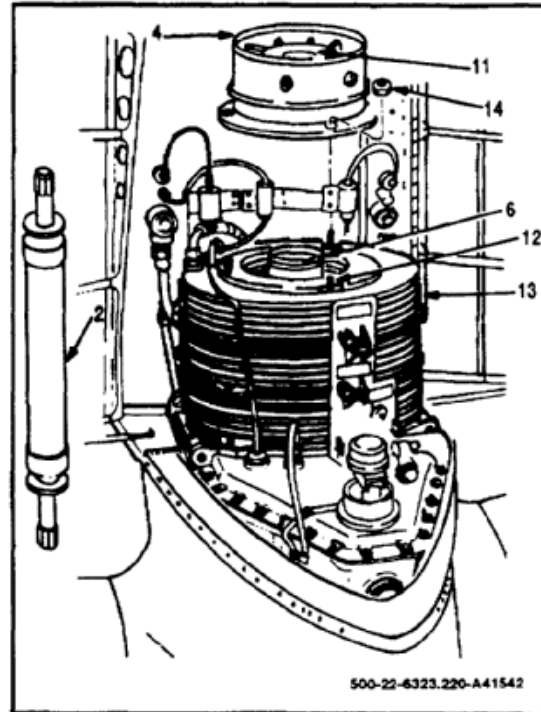
4. Turn fan shaft (8) by hand several turns. There shall be no binding or noise. Look for evidence of overheating, discoloration, paint blistering, or vane tip contact on housing (9).
5. Try to rotate one impeller (10 or 11) with respect to the other by securing one impeller to the housing and rotating the other impeller by hand. No rotational looseness is allowed.
6. Try to move shaft (8) up and down. Free play shall not exceed **0.010 inch**.
7. Measure the gap between the vanes of impeller (10 or 11) and the inside of housing (98) at two places as follows:
  - a. Place two index marks **180°** apart on the housing flange. Use a marking pencil (E271). Also, index two impeller vanes approximately **180°** apart.
  - b. Move the impeller radially as far as possible toward one index mark on the housing. Holding impeller in place, measure gap between indexed vane tips and the inside of the housing at each index mark. Gaps shall be **0.015 to 0.030 inch**.
  - c. Move the impeller radially as far as possible in the opposite direction toward the other index mark. Holding the impeller in place, measure the gap between the same vanes and the inside of the housing at each index mark.
  - d. Subtract the gaps measured in step b from the gaps measured at the same index marks in step c. The largest of these two values indicates the radial play of the impeller and shall not exceed **0.004 inch**.
  - e. If radial play is less than **0.004 inch**, repeat steps a thru d for the other impeller.
8. Examine impellers (10 and 11) for damage:
  - a. In area A, dents, gouges, and chips to **0.010 inch** are allowed.
  - b. In area B, dents, gouges, and chips to **0.030 inch** are allowed.
  - c. Uniform erosion is allowed over the entire blade. Such erosion is seen as a smooth transition from silver (magnesium) to tan (anodize) to yellow (primer) to black (topcoat).



**WARNING**

Oil (E253/E254/E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

9. Coat four studs (12) on oil cooler (13) with oil (E253, E254, or E254.1). Install fan assembly (4) on the studs without drive shaft (2).
10. Install nuts (14) on studs (12). Torque the nuts to **5 to 15 inch-pounds** above run-on torque.
11. Slowly rotate fan impeller assembly (15) to ensure clearance with baffle (6). No rubbing or binding is allowed.
12. Remove nuts (14). Remove fan assembly (4) from oil cooler (12).

**FOLLOW-ON MAINTENANCE:**

Install combining transmission oil cooler fan and shaft (Task 6-186.1).

Tasks 6-183 and 6-183.1 deleted.

END OF TASK

6-602



**6-184 COMBINING TRANSMISSION OIL COOLER FAN DRIVE SHAFT RETAINING SHIELD REPLACEMENT**

**INITIAL SETUP**

**Applicable Configurations:**

Helicopters With Retaining Shield Installed

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

Oil (E253, E254, or E254.1)

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

Task 6-186  
TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Oil Cooler Fan and Drive Shaft Removed (Task 6-182)

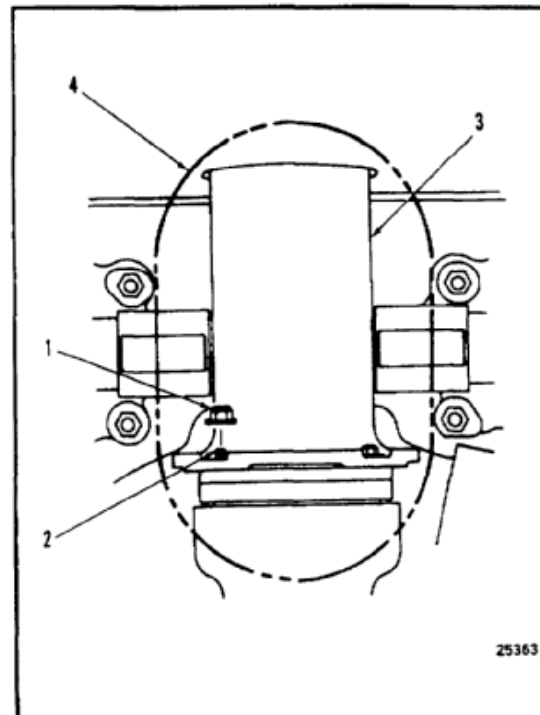
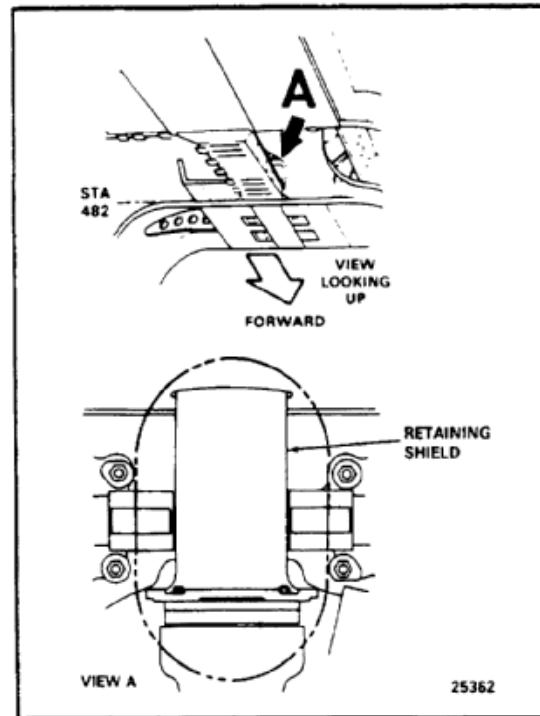
**General Safety Instructions:**

**WARNING**

Oil (E253, E254, or E254.1) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**REMOVE**

1. Remove nuts (1) from four studs (2).
2. Lift retaining shield (3) from studs (2). Carefully withdraw shield from cavity in sump (4).



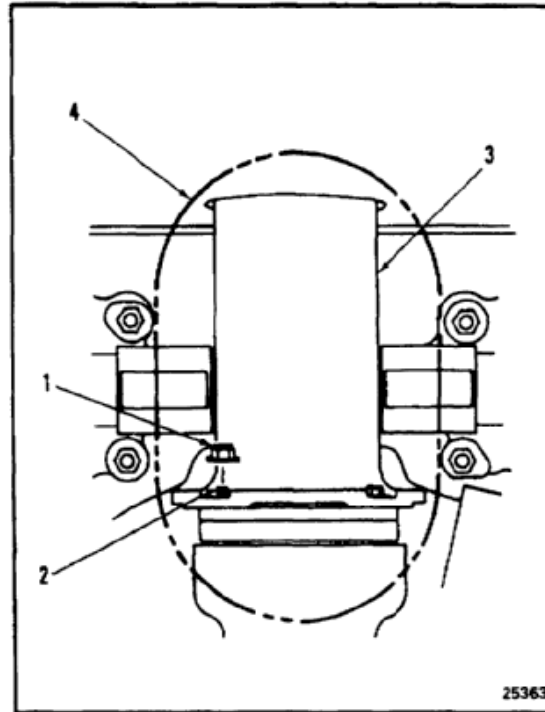
**INSTALLATION**

3. On helicopters without **66**, install shield (3) during the installation of the combining transmission oil cooler fan and drive shaft (Task 6-186).
4. On helicopters with **66**, install shield (3) as follows:

**WARNING**

Oil (E253, E254, or E254.1) is toxic. It can irritate skin and cause burns. Avoid contact with skin, eyes, or clothing. Do not inhale. Use only with adequate ventilation. Keep away from heat, sparks, and open flame. In case of contact, flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

- a. Coat the thread of studs (2) with oil (E253, E254, or E254.1).
- b. Install shield (3) into the cavity in sump (4) and lower it onto studs (2). Keep the beveled end of the shield flange facing forward.
- c. Install four nuts (1) on studs (2). On previously used nuts, check for run-on torque of **10 to 15 inch-pounds**.
- d. Torque nuts (1) to **80 inch-pounds**. Check that studs (2) protrude through the nuts at least two threads after nuts are torqued.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-604

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

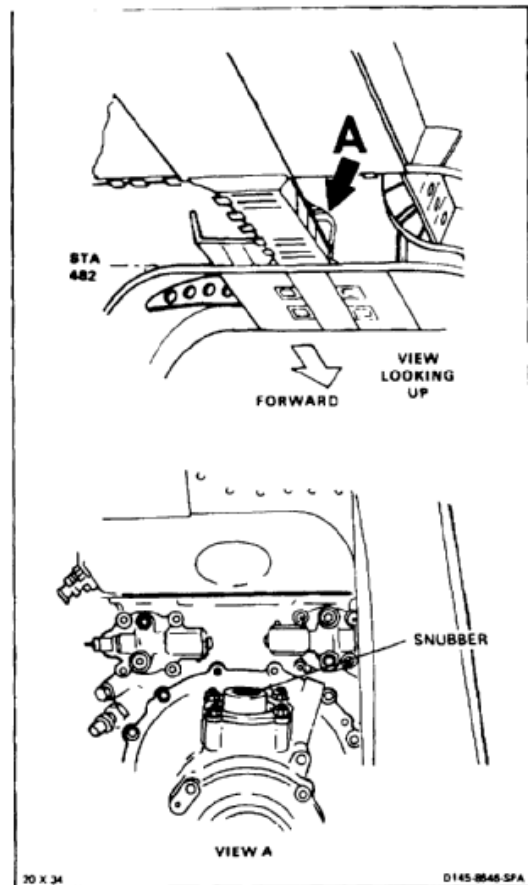
Workstand

**Materials:**

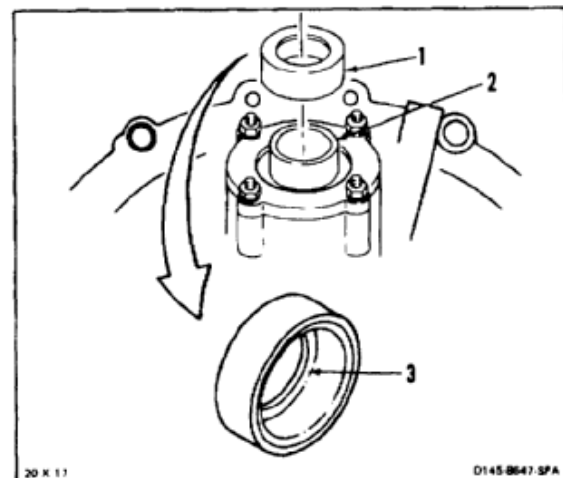
None

**Personnel Required:**Medium Helicopter Repairer  
Inspector**References:**

TM 55-1520-240-23P

**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Combining Transmission Oil Cooler Fan and Drive  
Shaft Removed (Task 6-182)  
Cargo Ramp Open and Level (Task 2-2)

1. Lift snubber (1) from around end of output shaft (2).
2. Check snubber (1) for cuts, tears, and erosion of seating surface (3). There shall be no such damage.
3. Install snubber (1) over end of output shaft (2). Make sure snubber is fully seated.

**INSPECT****FOLLOW-ON MAINTENANCE:**Install combining transmission oil cooler fan drive  
shaft and fan (Task 6-186).  
Close cargo ramp (Task 2-2).

END OF TASK

**INITIAL SETUP**

**Applicable Configurations:**

Helicopters Without **66**

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Torque Wrench, 0 to 150 Inch-Pounds
- Hand Lubricating Gun
- Rawhide Mallet
- Wood Blocks

**Materials:**

- Dry Cleaning Solvent (E162)
- Cloths (E120)
- Grease (E190)
- Grease (E190.1)
- Gloves (E186)
- Oil (E253, E254, or E254.1)

**Parts:**

- Packings

**Personnel Required:**

- Medium Helicopter Repairer
- Inspector

**References:**

TM 55-1520-240-23P

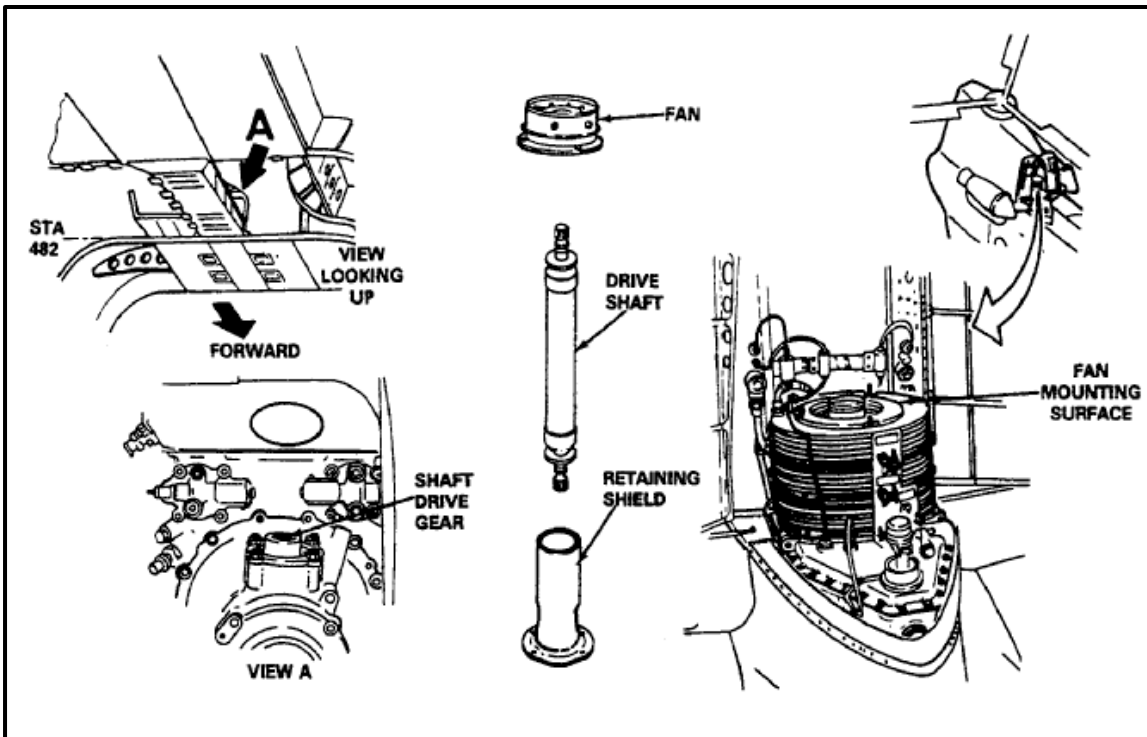
**Equipment Condition:**

- Inspect Combining Transmission Oil Cooler Fan Drive Shaft Snubber (Task 6-185)
- Inspect Combining Transmission Oil Cooler Fan Assembly and Fan Drive Shaft (Task 6-182.1)

**General Safety Instructions:**

**WARNING**

Oil (E253, E254, and E254.1) is toxic. It can irritate skin and cause burns. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



**6-186 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 145D5319-3 OR  
-5 (Continued)**

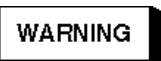
6-186

1. With retaining nut (1) of fan (2) facing up, set fan (2) on firm surface.



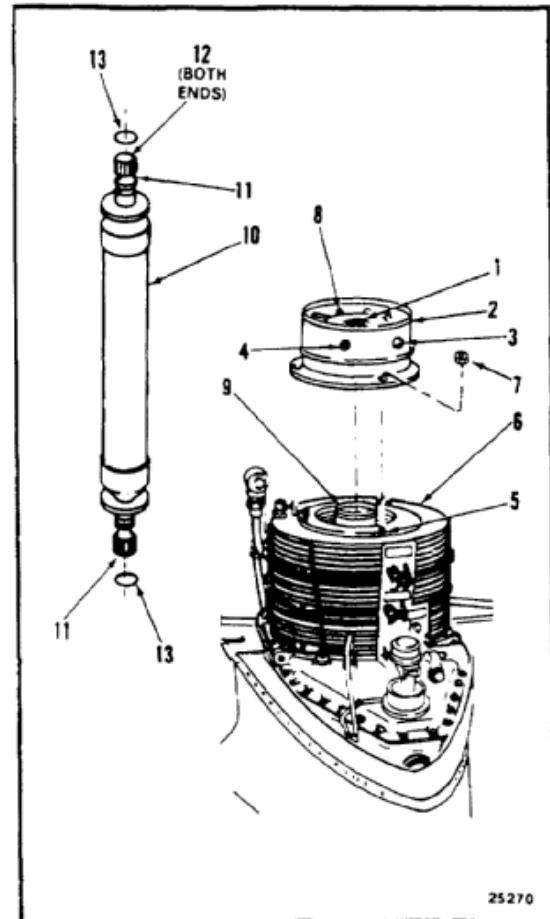
Overgreasing can damage the fan.

2. Pump grease (E190) into grease fitting (3) of fan (2) until grease comes out of vent fitting (4). Do not overgrease fan.
3. Coat four studs (5) on oil cooler (6) with oil (E253, E254, or E254.1). Install fan (2) on studs.
4. Install nuts (7) on studs (5). Torque nuts to **5 to 15 inch-pounds** above run-on torque.
5. Slowly rotate fan impeller assembly (8). Check that the lower impeller does not rub against baffle (9).
6. Check for gaps between flange of fan (2) and oil cooler (6). Use a feeler gage. Record the width and mark the location of any gaps.
7. Remove nuts (7) from studs (5). Remove fan (2) from cooler (6).
8. Prepare shaft (10) for installation as follows:

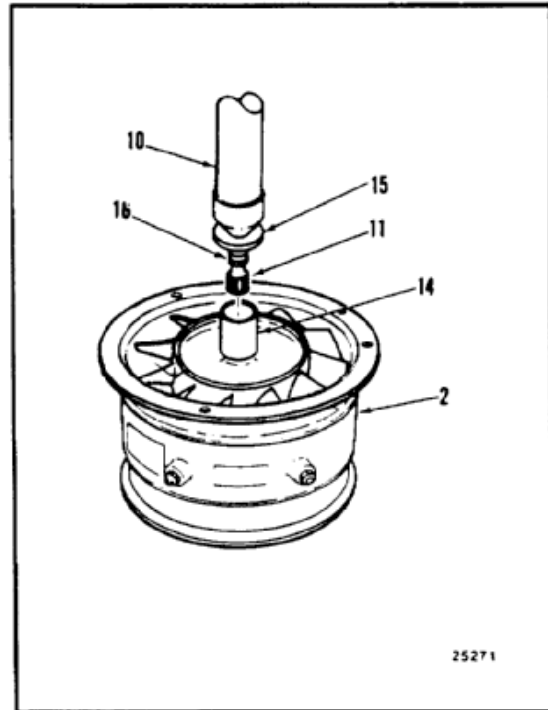


Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

- a. Clean splines (11) at each end of the shaft. Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.
- b. Check that a plug (12) is in each end of the shaft.
- c. If installed, remove packing (13) from each end of the shaft. Retain packings.



- d. Turn fan (2) upside down. Half-fill the splined cavity in fan shaft (14) on the underside of the fan with grease (E190.1).
- e. Insert shaft (10) into splined cavity of fan shaft (14) until fully seated. Wipe off excess grease from around shaft and fan. Check that shaft balance flange (15) seats against end of fan shaft (14).
- f. Slowly remove shaft (10) from fan. Do not disturb the grease on the shaft. Remove grease from the outside diameter of fan shaft (14) and from between packing groove (16) and balance flange (15) of the shaft. Do not disturb grease in the splined cavity of fan shaft (14) or between the packing groove and splines (11) of shaft (10).

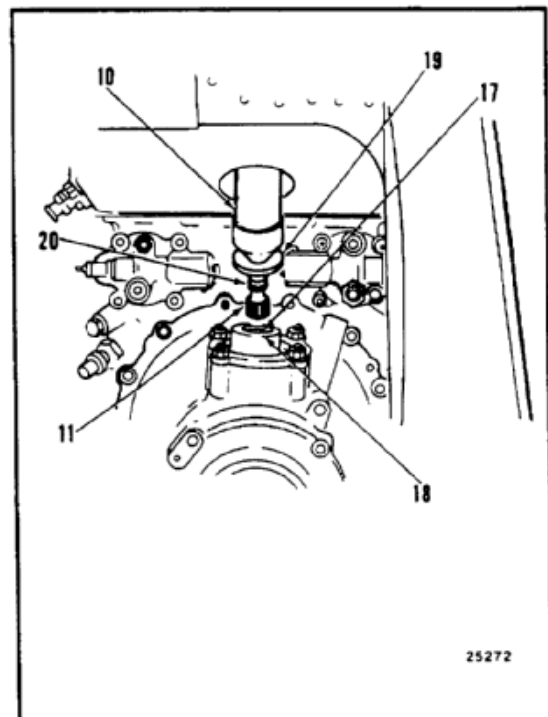


- g. Half-fill splined cavity (17) in the fan drive gear with grease (E190.1). Insert the clean end of shaft (10) into the cavity. Gradually apply enough steady downward pressure to fully seat the shaft against snubber (18). Wipe off excess grease from around shaft and snubber (18). Check that balance flange (19) seats against the snubber.

**NOTE**

Before removing shaft, note for future reference which end mates with the transmission and which end mates with the fan.

- h. Slowly remove shaft (10) from the drive gear. Do not disturb the grease on the shaft. Remove grease from around outside of drive gear and from between packing groove (20) and balance flange (19) of the shaft. Do not disturb the grease in splined cavity (17) of the gear or between the packing groove and splines (11) of the shaft.

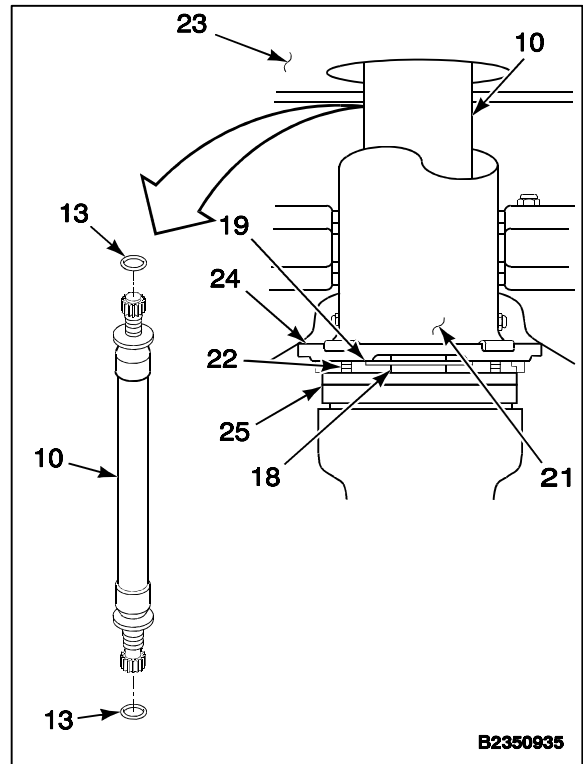


9. Install retaining shield (21) and shaft (10) as follows:
- Coat shield mounting studs (22) with oil (E253, E254, or E254.1). Insert shield (21) into the cavity in sump (23) and lower it onto studs. Keep beveled end of shield flange (24) forward.
  - Insert small blocks of wood, or equivalent, between seal retainer (25) and shield (21) high enough to raise the shield so that the top of snubber (18) can be seen.
  - Check that snubber (18) is firmly seated.
  - Install packing (13) at each end of shaft (10). Take note of the spotfaces on shaft (10). Do not disturb grease on shaft.

**NOTE**

Rocking the shaft, in the direction of the spotfaces, while applying downward hand pressure will help to seat it against the snubber.

- Install shaft (10) through sump (23) into the transmission. Alternately apply and relax hand pressure on the shaft until balance flange (19) contacts snubber (18). Check under shield (21) to ensure contact.

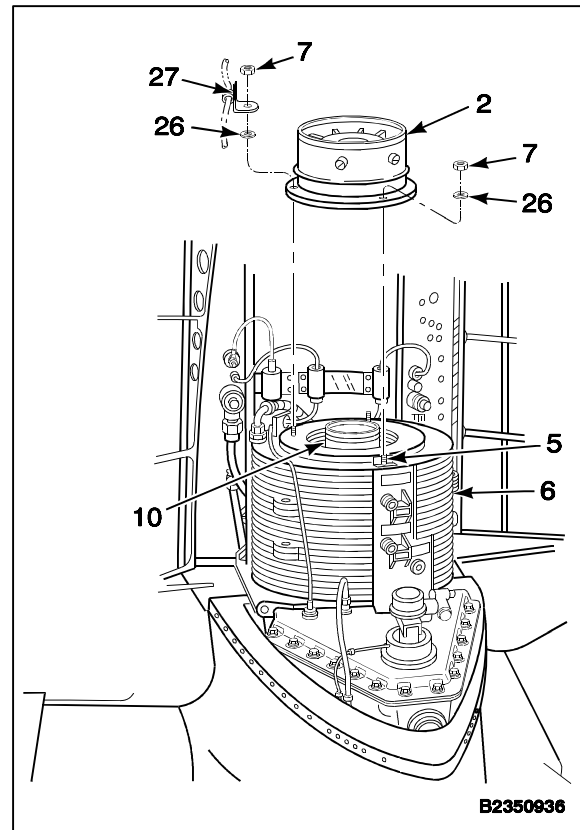


10. Install fan (2) as follows:
  - a. Coat four studs (5) with oil (E253, E254, or E254.1).
  - b. Lower the fan onto the studs. Lightly tap the fan to seat it on oil cooler (6). Use a rawhide mallet.

**WARNING**

Do not use mounting nuts to jack the fan down against the oil cooler. This pressure will load the bearing if there is too much grease.

- c. If the fan cannot be seated by tapping, remove it, being careful to hold shaft (10) in place at the transmission end to prevent the shaft from being removed with the fan. Wipe the grease from the first **0.5 inch** of the cavity in the splined shaft of the fan. Repeat steps a thru c to reinstall the fan.
- d. Check for gaps under flange of the fan as in step 6. Compare with gaps noted in step 6. If any gap has increased, remove the fan. Reinstall the fan (steps a thru c).
- e. Again, check and compare gaps as in step d. If any gap is still greater than measured in step 6, remove the fan and shaft (10). Repeat installation from step 3.
- f. When the fan is seated, install washers (26), bracket (27) (at one stud only), and nuts (7) on studs (5). Torque the nuts (7) to **100-140 inch-pounds**.



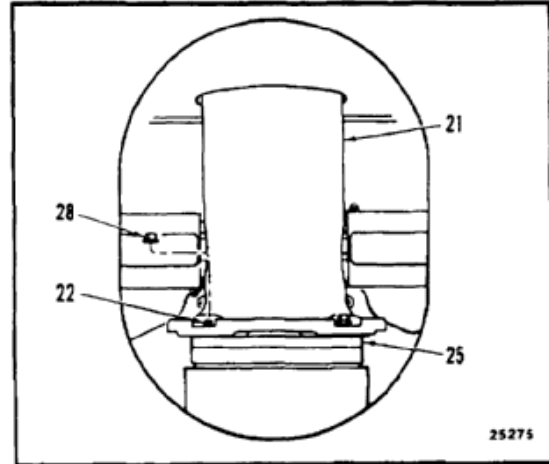
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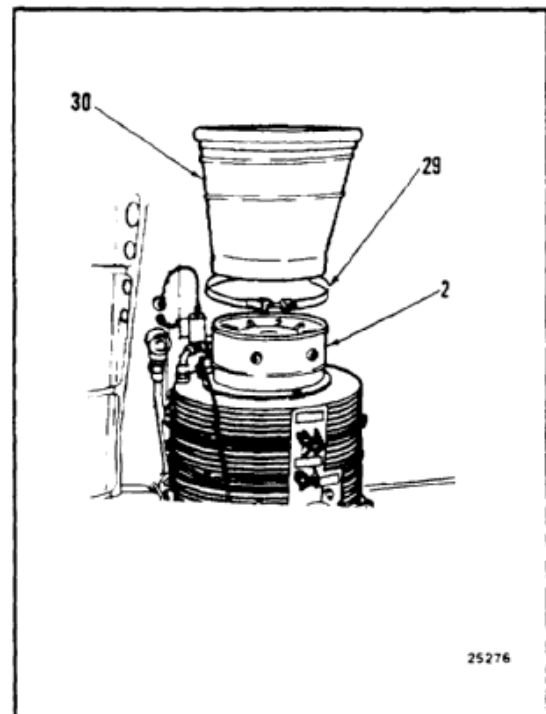
**6-186 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT 145D5319-3 OR  
-5 (Continued)**

6-186

11. Remove the blocks from under retaining shield (21). Coat studs (22) with oil (E253, E254, or E254.1). Install the shield on studs (22) against seal retainer (25).
12. Install nuts (28) on studs (22). Check for run-on torque of **10 to 15 inch-pounds** on previously used nuts. Torque nuts to **70 to 85 inch-pounds**. Check for a stud protrusion of at least two threads after nuts are torqued.



13. Coat thread of clamp (29) with oil (E253, E254, or E254.1). Install clamp and duct (30) on fan (2). Torque clamp to **30 to 35 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close pylon hinged fairing (Task 2-2).  
Perform ground run (TM 55-1520-240-10).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

Helicopters With **66**

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 0 to 150 Inch-Pounds  
 Rawhide Mallet

**Materials:**

Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Gloves (E186)  
 Oil (E253, E254, or E254.1)

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

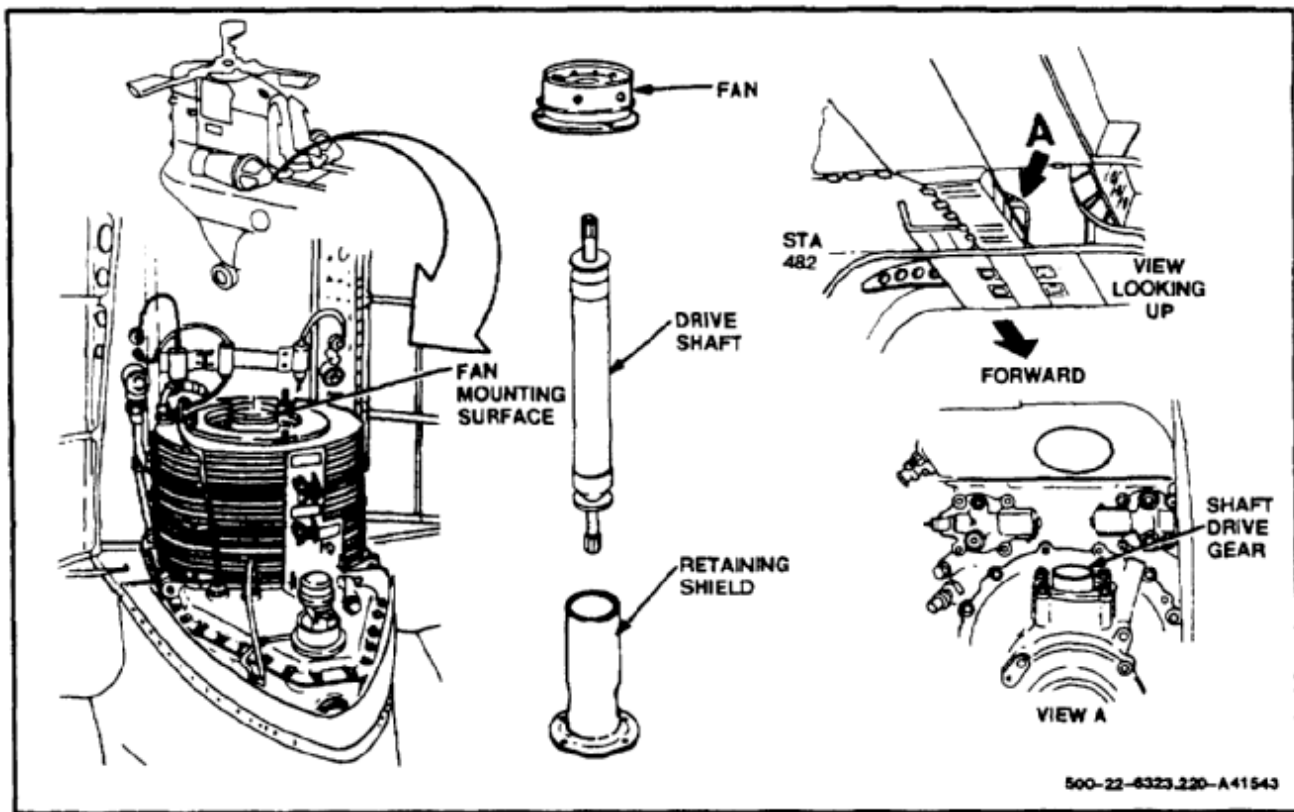
**Equipment Condition:**

Inspect Combining Transmission Oil Cooler Fan Assembly and Fan Drive Shaft (Task 6-182.1)

**General Safety Instructions:**

**WARNING**

Oil (E253, E254, and E254.1) is toxic. It can irritate skin and cause burns. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.



**6-186.1 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT  
145D5319-7 (Continued)**

6-186.1

1. With retaining nut (1) of fan (2) facing up, set the fan on a firm surface.



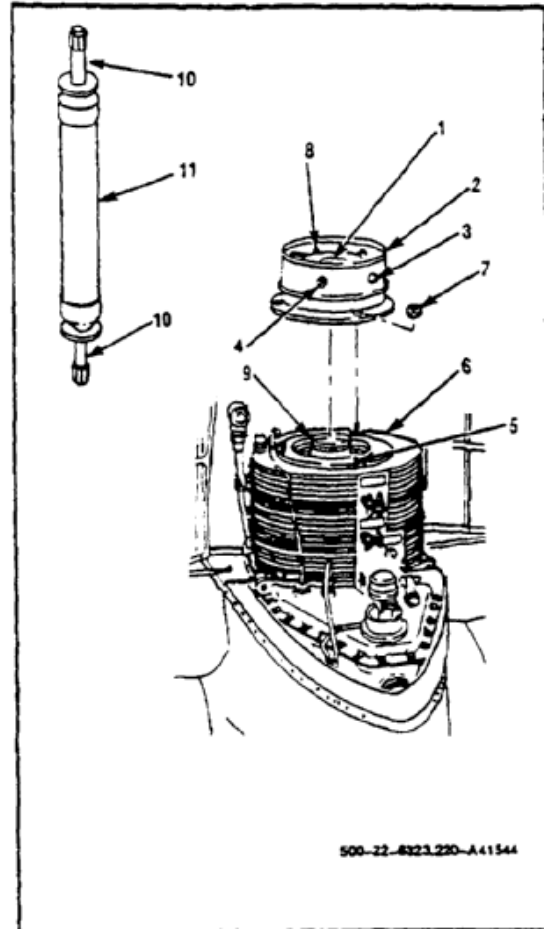
Overgreasing can damage fan.

2. Pump grease (E190) into grease fitting (3) of fan (2) until grease comes out of vent fitting (4). Do not overgrease the fan.
3. Coat four studs (5) on oil cooler (6) with oil (E253, E254, or E254.1). Install fan (2) on the studs.
4. Install nuts (7) on studs (5). Torque nuts to **5 to 15 inch-pounds** above run-on torque.
5. Slowly rotate fan impeller assembly (8). Check that the lower impeller does not rub against baffle (9).
6. Remove nuts (7) from studs (5). Remove fan (2) from cooler (6).



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

7. Clean splines (10) at each end of shaft (11). Use dry cleaning solvent (E162) and clean cloths (E120). Wear gloves (E186) and goggles.



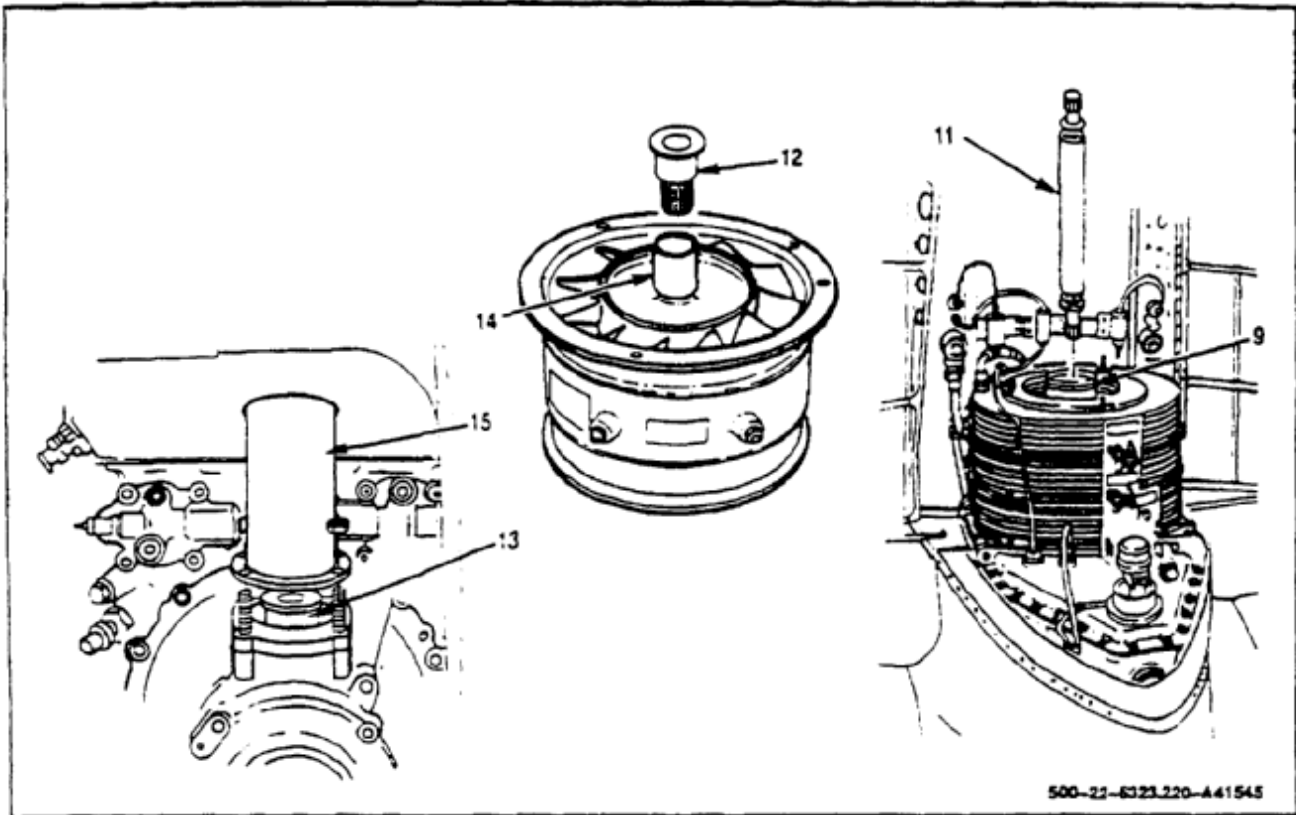
**NOTE**

Grease or other lubricant shall not be used on the splines of the drive shaft or adapters.

**NOTE**

Tap lightly using a 2x4 and hammer to fully seat adapters.

8. If removed, install adapters (12) into the splines of drive gear (13) and fan shaft (14).
9. Install retaining shield (15) (Task 6-184).
10. Install shaft (11) through baffle (9) into adapter (12) in gear (13).

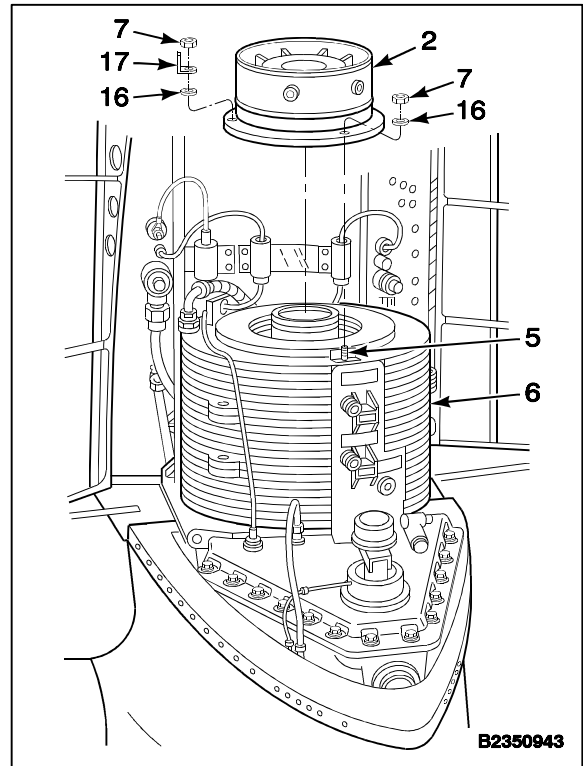


**6-186.1 INSTALL COMBINING TRANSMISSION OIL COOLER FAN AND SHAFT  
145D5319-7 (Continued)**

6-186.1

11. Install fan (2) as follows:

- a. Coat four studs (5) with oil (E253, E254, or E254.1).
- b. Lower the fan onto studs (5). Lightly tap the fan to seat it on oil cooler (6). Use a rawhide mallet.
- c. When the fan is seated, install washers (16), bracket (17) (at right stud only), and nuts (7) on studs (5). Torque the nuts to **100-140 inch-pounds**.

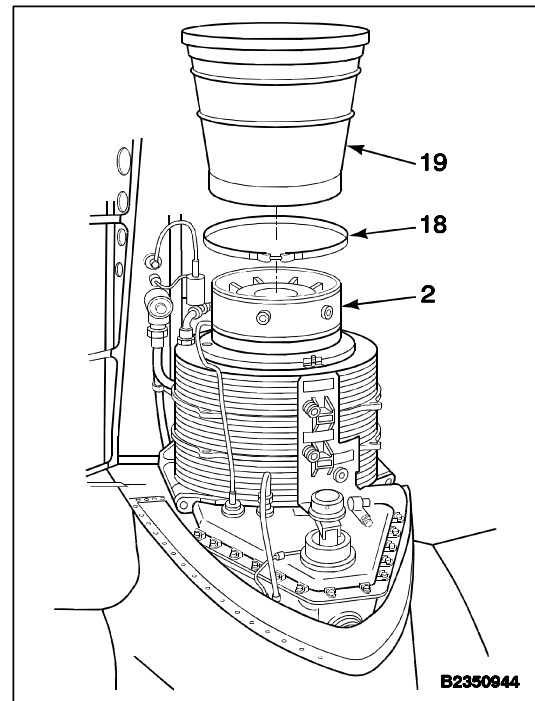


- 12. Coat thread of clamp (18) with oil (E253, E254, or E254.1). Install clamp and duct (19) on fan (2). Torque the clamp (18) to **30-35 inch-pounds**.

**INSPECT**

**FOLLOW-ON MAINTENANCE:**

- Close pylon hinged fairing (Task 2-2).
- Perform a ground run (TM 1-1520-240-10).



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Wrench, 1 Inch
- Open-End Wrench, 1-1/2 Inch
- Container, 2 Quart
- Hose, 1 Inch ID, 36 Inches Long
- Funnel

**Materials:**

- Cloth, Cleaning (E120)
- Paper Tags (E264)

**Personnel Required:**

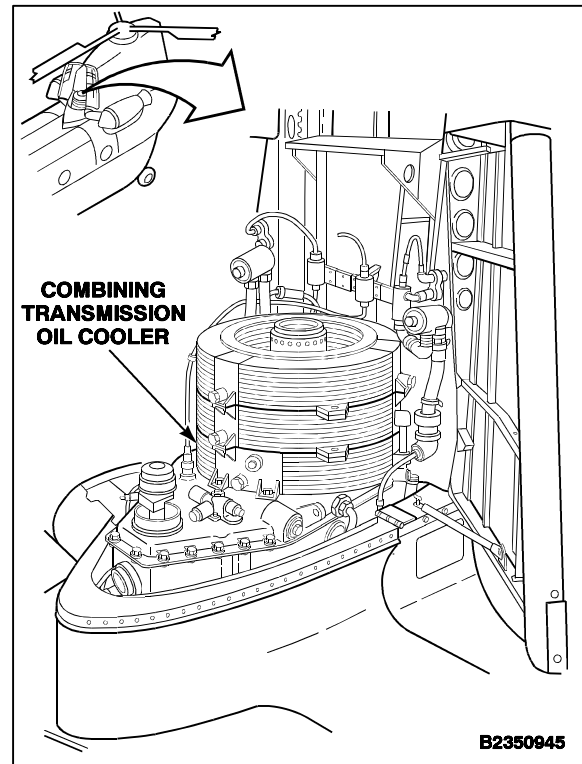
- CH-47 Helicopter Repairer

**Parts:**

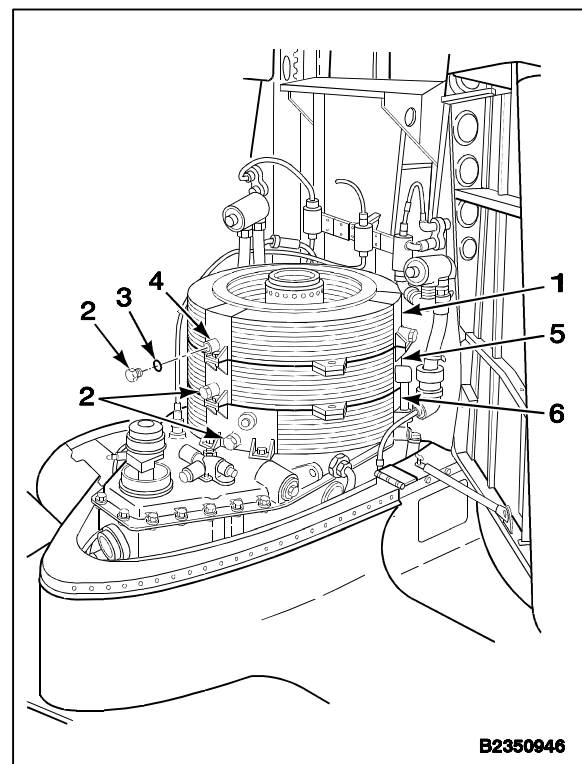
- Packings (3)

**Equipment Condition:**

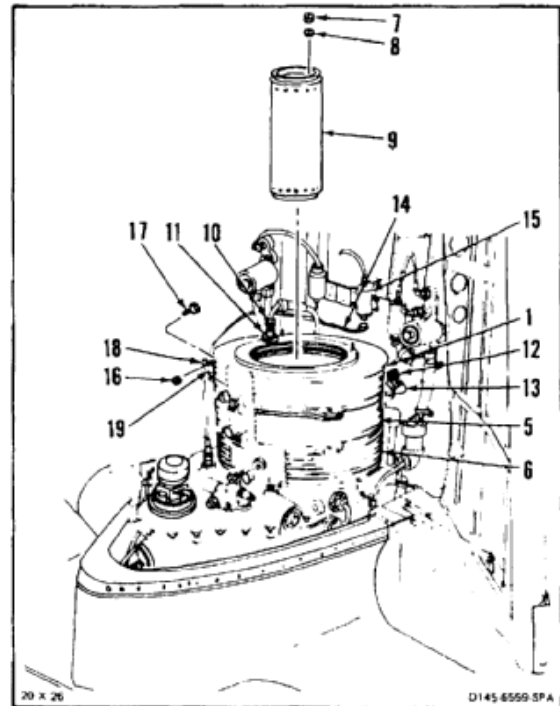
- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Pylon Hinged Fairing Open (Task 2-2)
- Oil Cooler Fan and Shaft Removed (Task 6-182)



1. Drain oil cooler (1) as follows:
  - a. Remove lockwire from drain plug (2).
  - b. Remove drain plug (2) and packing (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
  - c. Install drain plug (2) and packing (3).
2. Repeat steps 1a thru 1c for oil coolers (5 and 6).



3. Remove four nuts (7) and washers (8) from baffle (9). Remove baffle.
4. Tag and disconnect oil hose (10) from reducer (11) on top cooler (1).
5. Tag and disconnect oil hose (12) from elbow (13) on middle cooler (5).
6. Disconnect oil hose (14) from oil pressure transmitter (15).
7. Remove nut (16) and bolt (17) securing clamp (18) to bracket (19).



8. Remove nuts (20), washers (21), and bolts (22) from three places around inside of middle cooler (5).
9. Remove nuts (23), washers (24), and bolts (25) from six places around outside of middle cooler (5).

**NOTE**

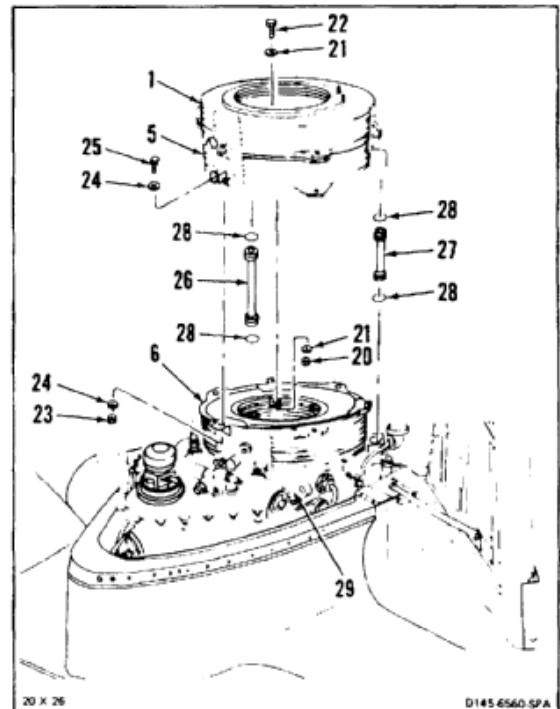
Do not tilt coolers. Oil can spill.

10. Lift coolers (1 and 5) straight up and away from cooler (6) and two oil transfer tubes (26 and 27).

**NOTE**

Transfer tubes may stay in coolers.

11. Remove two oil transfer tubes (26 and 27) and four packings (28) from sump cover (29).



12. Remove six nuts (30) and washers (31) from around inside of cooler (6).
13. Remove nuts (32), washers (33), and bolts (34) at four places around aft part of cooler (6). Remove three nuts (35) and washers (36) from forward edge of cooler.

**NOTE**

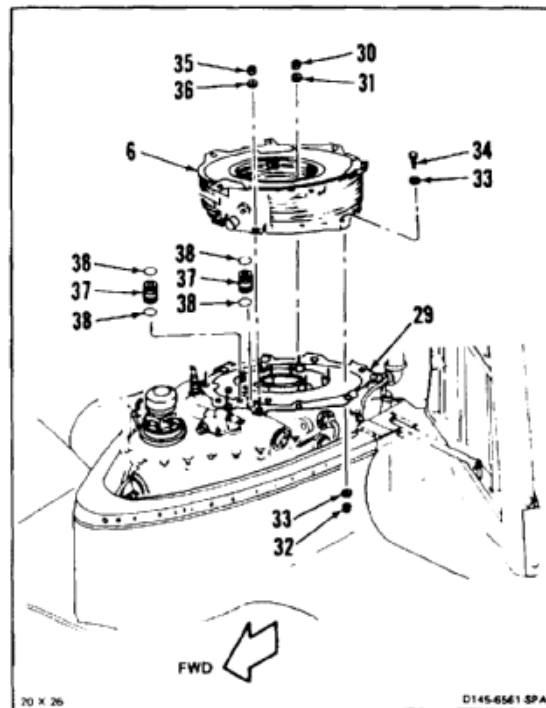
Do not tilt cooler. Oil can spill.

14. Lift cooler (6) straight up and away from sump cover (29) and two oil transfer tubes (37).

**NOTE**

Transfer tubes may stay in cooler.

15. Remove two transfer tubes (7) and four packings (38).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-618



## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Dial indicating Depth Gage 643J  
Goggles  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Brush (E86)  
Gloves (E184.1)  
Acetic Acid (E21)  
Alodine Powder (E65)  
Epoxy Primer (E292 or E293)  
Methyl-Ethyl-Ketone (E244)  
Black Lacquer Topcoat (E462)  
Polyurethane Topcoat (E285.1)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

MIL-C-53072  
TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

**General Safety Instructions:****WARNING**

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

**WARNING**

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

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

**WARNING**

Epoxy primer (E292 or E293), methyl-ethyl-ketone (E244), and polyurethane topcoat (E285.1) are flammable and toxic. They can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

Black lacquer topcoat (E462) is extremely flammable. It can be toxic. Keep away from heat, sparks, or open flames. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.

**NOTE**

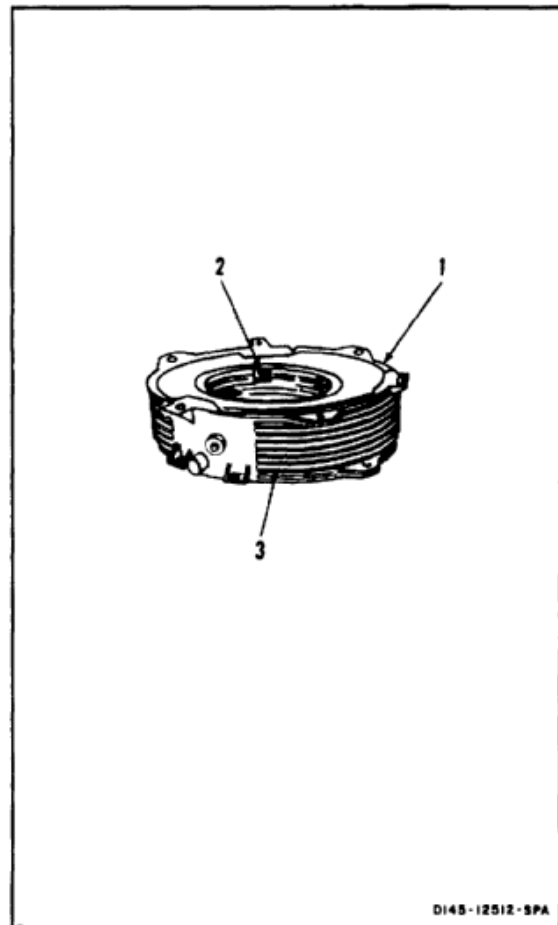
Reparable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. Clean oil and grease from the damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E184.1).
2. Check the extent and location of damage on cooler (1).

**NOTE**

Dimensions in this step refer to the extent of damage after rework.

- a. Depth of damage shall not be more than **0.025 inch**.
  - b. Damage shall not extend over more than one surface or enter any radius.
  - c. Damage shall not be closer than **1.00 inch** to any mounting hole (2).
  - d. More than **3 inches** of fins (3) shall not be crushed beyond straightening.
  - e. If any fin is bent more than **30°**, straighten it.
3. Fluorescent inspect the damaged area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If a crack is suspected in the combining transmission oil cooler outside, refer to TM 1-1520-253-23.
  4. Blend out damage with emery cloth (E123) or abrasive paper (E13). Observe the limits of step 2.
  5. Smooth the blended area with crocus cloth (E122). Do not leave any sharp edges.



D145-12512-SPA

**WARNING**

Wear gloves (E184.1) during the remainder of this task; otherwise, personal injury could result.

6. Acid etch the reworked area as follows:
  - a. Prepare a solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E184.1) and goggles.
  - b. Swab the area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse the area with cold water.
7. Fluorescent inspect the reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If crack is suspected in aft transmission oil cooler outside, refer to TM 1-1520-253-23.
8. Clean the reworked area with naphtha (E245) and clean cloths (E120). Let the area air dry.
9. Swab on solution of alodine powder (E65) and water. Use gauze sponges (E184). Swab for **2 to 5 minutes**. Rinse the area with cold water and let air dry.

**NOTE**

Priming and painting shall be done per MIL-C-53072.

10. Apply one coat of epoxy primer (E292 or E293) to the reworked area. Let air dry for **2 hours**.
11. Finish the reworked area with two coats of black lacquer (E462) or polyurethane (E285.1) as determined by the following:
  - a. Apply methyl-ethyl-ketone (MEK) (E244) to a small area of the existing topcoat near the area to be refinished. Use brush (E86).
  - b. Wipe the area. If the topcoat wipes away, use lacquer (E462). If the topcoat is unaffected, use polyurethane (E285.1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Open End Wrench, 1-1/2 Inch

**Materials:**

Oil (E254)  
 Lockwire (E231)

**Parts:**

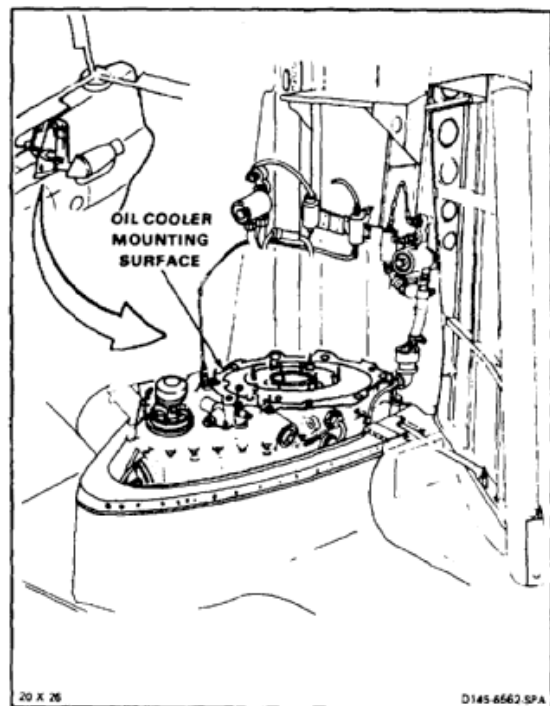
Packings

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

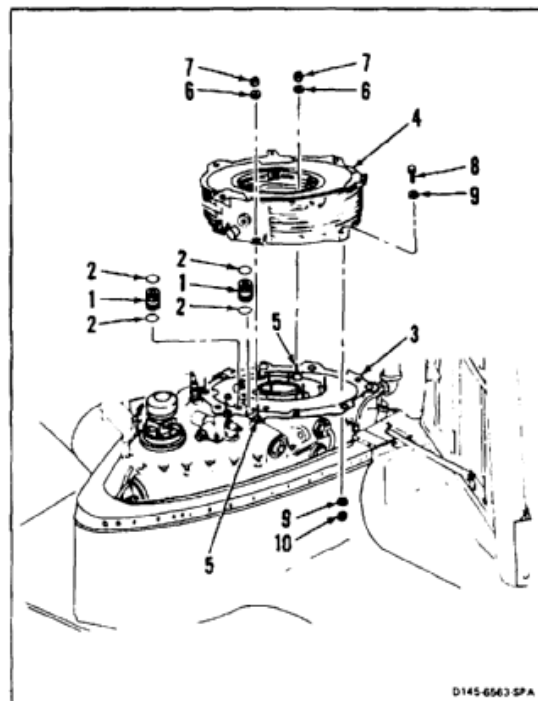


1. Install two oil transfer tubes (1), with four packings (2), in sump cover (3).

**NOTE**

Do not tilt cooler. Oil can spill.

2. Install cooler (4) on two transfer tubes (1) and nine studs (5). Press down firmly to seat cooler on tubes.
3. Install washers (6) and nuts (7) at six places around inside of cooler (4). Install washers and nuts at three places around outside of cooler. Torque nuts to **70 inch-pounds**.
4. Install bolts (8), washers (9), and nuts (10) at four places around outside of cooler (4). Torque nuts to **70 inch-pounds**.

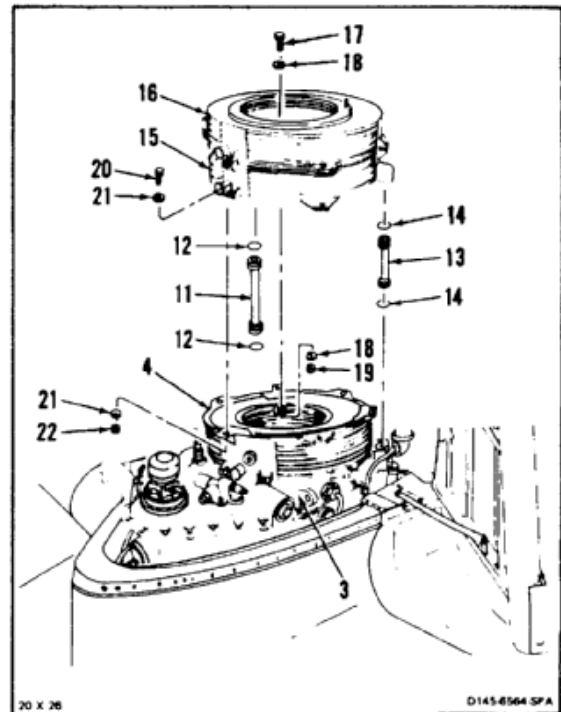


5. Install oil transfer tube (11) and two packings (12) in aft left corner of sump cover (3). Install oil transfer tube (13) and two packings (14) in aft right corner of sump cover.

**NOTE**

Do not tilt coolers. Oil can spill.

6. Install coolers (15 and 16) over cooler (4) and on two transfer tubes (11 and 13). Press down firmly to seat coolers on tubes.
7. Install bolts (17), washers (18) and nuts (19) at three places around inside of cooler (15). Torque nuts to **70 inch-pounds**.
8. Install bolts (20), washers (21) and nuts (22) at six places around outside of cooler (15). Torque nuts to **70 inch-pounds**.

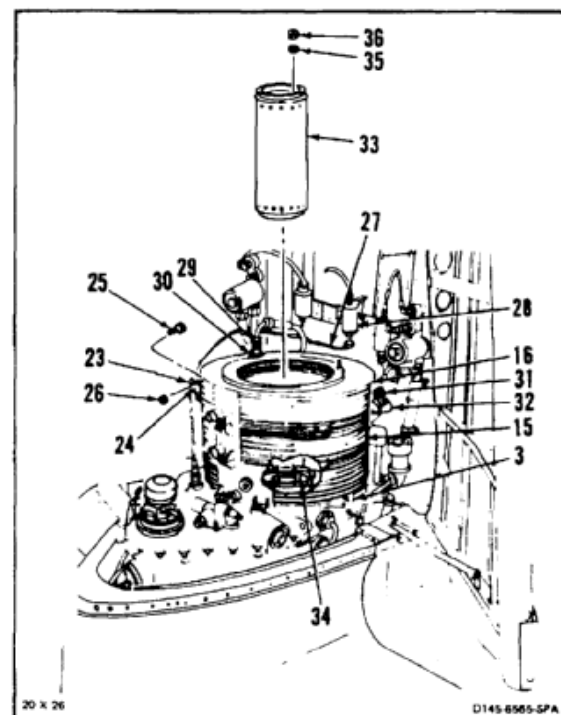


9. Position clamp (23) against bracket (24). Install bolt (25) and nut (26).
10. Connect oil hose (27) to oil pressure transmitter (28).

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

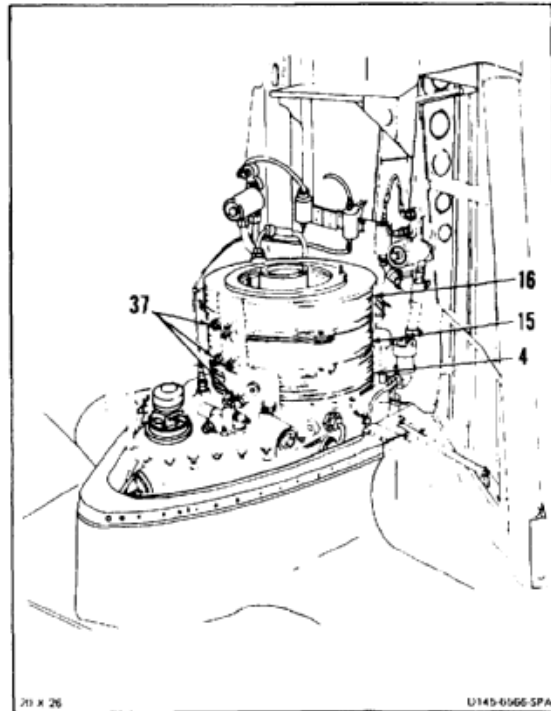
11. Coat thread of hose (29) with oil (E254). Connect hose to reducer (30) on cooler (16).
12. Coat thread of hose (31) with oil (E254). Connect hose to elbow (32) on cooler (15).
13. Install baffle (33) on four studs (34) on sump cover (3). Install washers (35) and nuts (36). Torque nuts to **70 inch-pounds**.



14. Lockwire three drain plugs (37) to oil cooler (4, 15, and 16). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install oil cooler fan and shaft (Task 6-186).  
Service combining transmission (Task 1-54).  
Close aft pylon doors (Task 2-2).  
Perform ground run (TM 55-1520-240-10).



END OF TASK

6-624

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

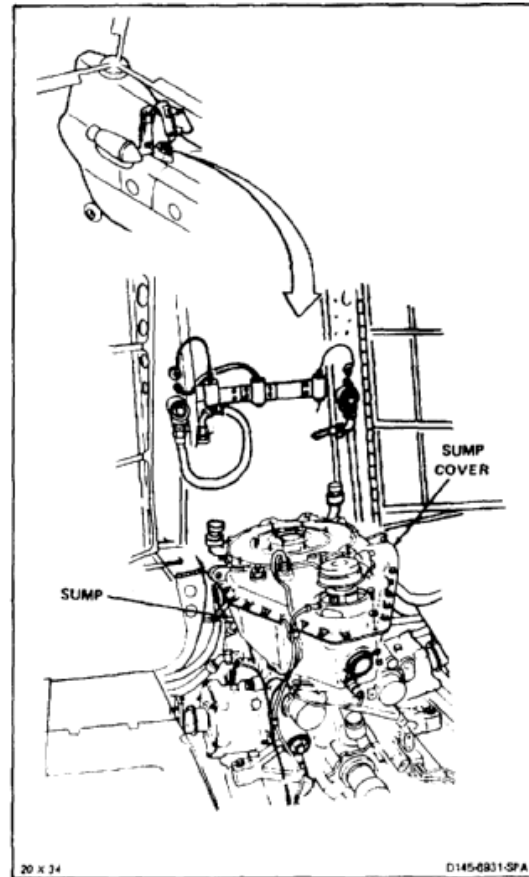
Paper Tags (E264)  
 Barrier Material (E80)  
 Tape (E388)

**Personnel Required:**

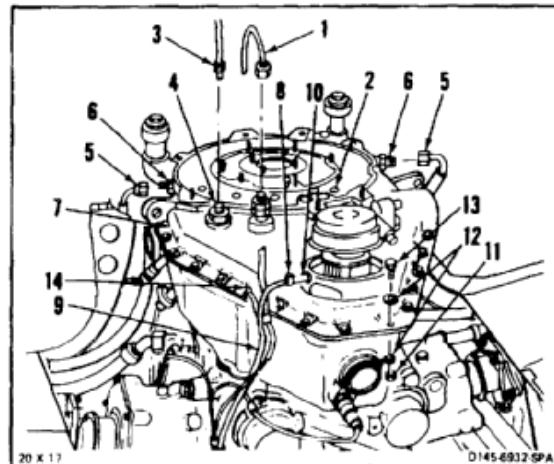
Medium Helicopter Repairer

**Equipment Condition:**

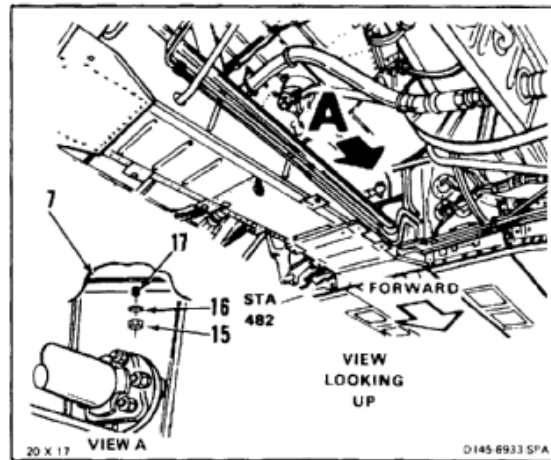
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Aft Pylon Doors Open (Task 2-2)  
 Oil Cooler Fan and Shaft Removed (Task 6-182)  
 Combining Transmission Oil Cooler Removed (Task 6-187)  
 Aft Pylon Lower Fairing Removed (Task 2-2)  
 Sump Drained (Task 6-168)

**REMOVE SUMP COVER**

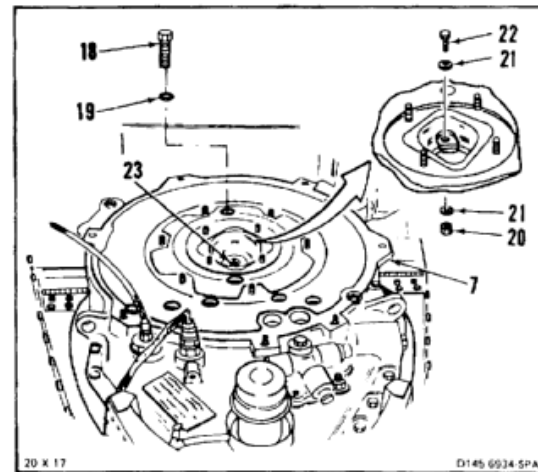
1. Tag and disconnect electrical connector (1) from oil pressure switch (2).
2. Disconnect oil hose (3) from union (4).
3. Disconnect breather hose (5) from reducer (6) on each side of sump cover (7).
4. Loosen drainline clamp (8). Disconnect drainline (9) from nipple (10).
5. Remove nuts (11) washers (12), and bolts (13) from 23 places around sump cover (7). Keep clip (14) with drainline (9).



6. From inside helicopter, remove nuts (15) and washers (16) from eight studs (17) at aft edge of cover (7).



7. Remove eight bolts (18) and washers (19) from top of sump cover (7). Remove two nuts (20), washers (21) and bolts (22) inside fan shaft hole (23).



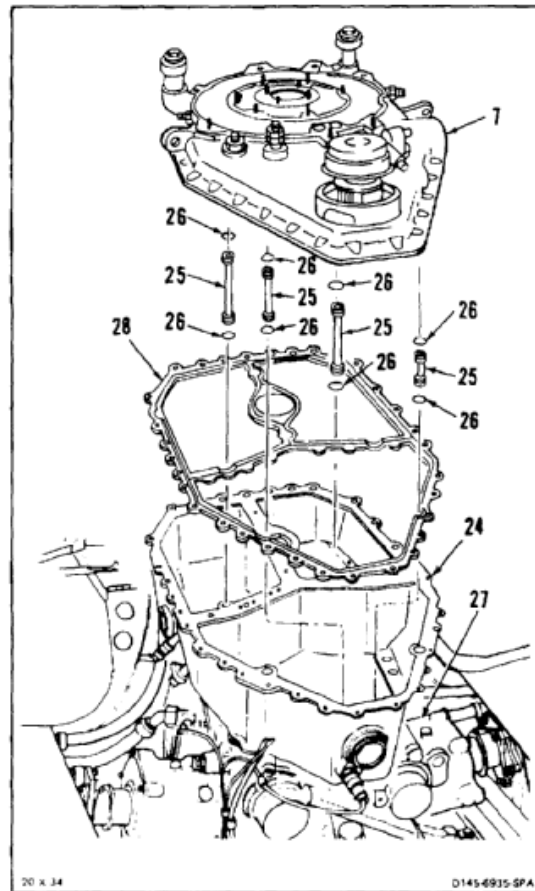


8. Lift cover (7) straight up from sump (24). Remove cover.

**NOTE**

Tubes may come off with cover or stay in transmission.

9. Remove four oil transfer tubes (25) and eight packings (26) from cover (7) or transmission (27). Remove packings (26) from tubes.
10. Remove gasket seal (28).



**REMOVE SUMP**

11. Tag and disconnect electrical connectors (29) from three temperature bulbs (30).
12. Remove 19 nuts (31) and washers (32).
13. Lift sump (24) straight up from transmission (27). Remove sump.

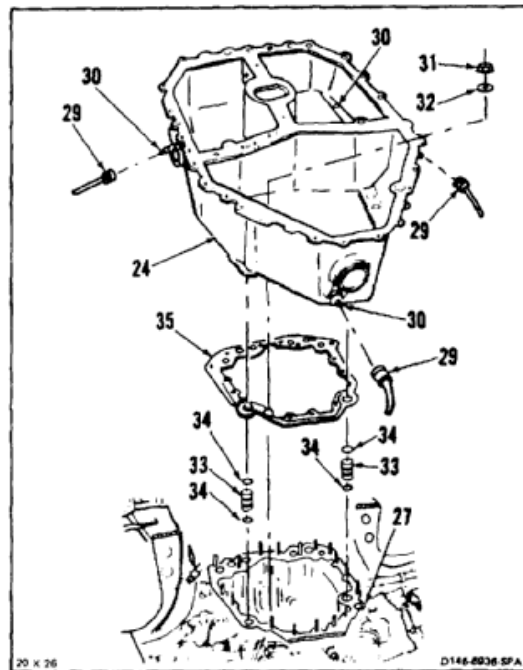
**NOTE**

Tubes may come off with sump or stay in transmission.

14. Remove two oil transfer tubes (33) and four packings (34) from sump (24) or transmission (27).
15. Remove gasket seal (35).
16. Cover opening in transmission (27) with barrier material (E80) and tape (E388).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Spanner Wrench  
 Open End Wrench, 1-3/8 Inch

**Materials:**

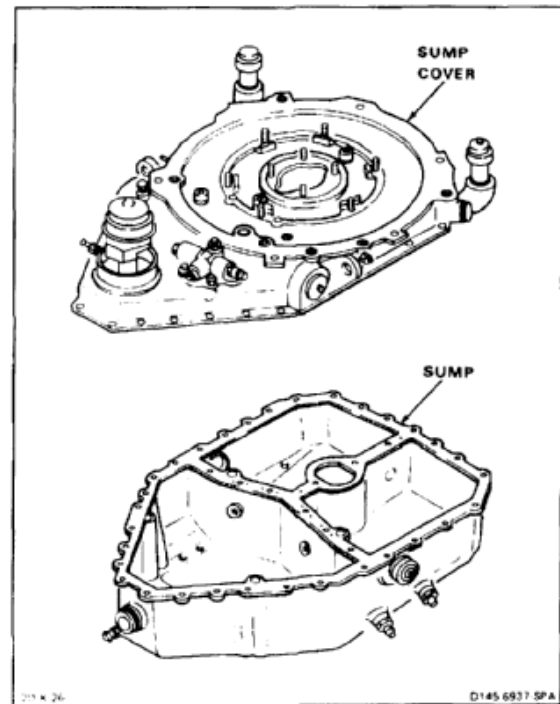
None

**Personnel Required:**

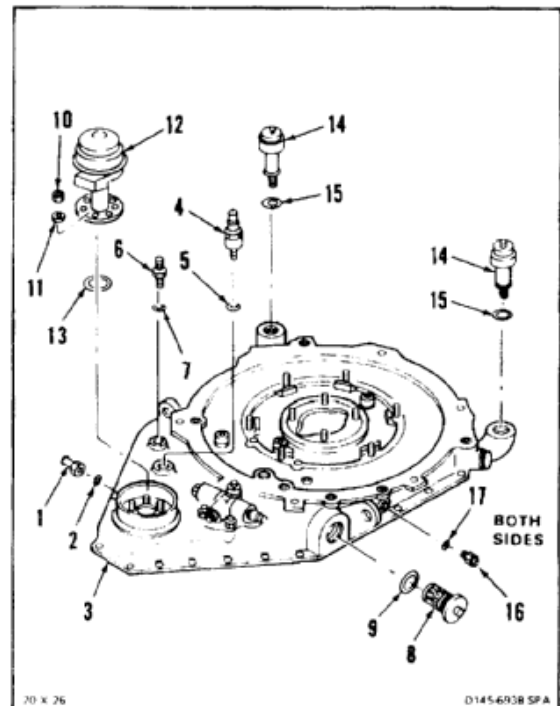
Medium Helicopter Repairer

**Equipment Condition:**

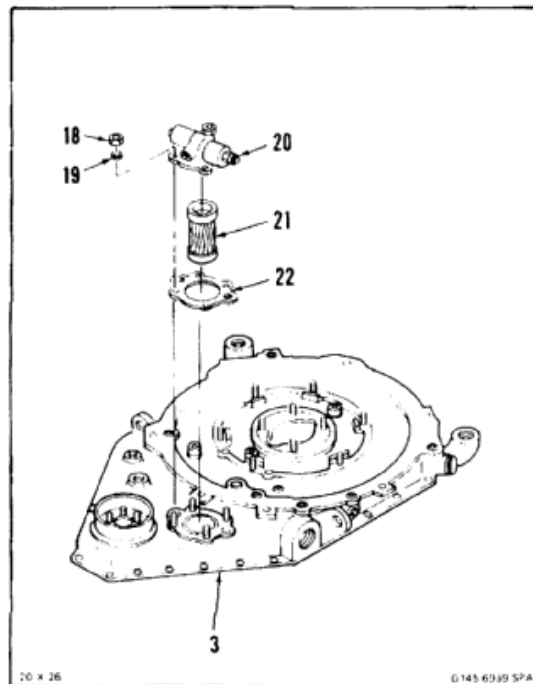
Off Helicopter Task

**DISASSEMBLE SUMP COVER**

1. Remove hose nipple (1) and packing (2) from sump cover (3).
2. Remove lockwire from oil pressure switch (4). Remove switch and packing (5).
3. Remove union (6) and packing (7).
4. Remove lockwire from inlet screen (8). Remove inlet screen and packing (9).
5. Remove five nuts (10) and washers (11) from oil filler (12). Remove oil filler and packing (13).
6. Remove lockwire from two vents (14). Remove vents and packings (15).
7. Remove reducer (16) and packing (17) from each side of sump cover (3).



8. Remove four nuts (18) and washers (19) from filter housing (20). Remove filter housing, element (21), and gasket seal (22) from sump cover (3).

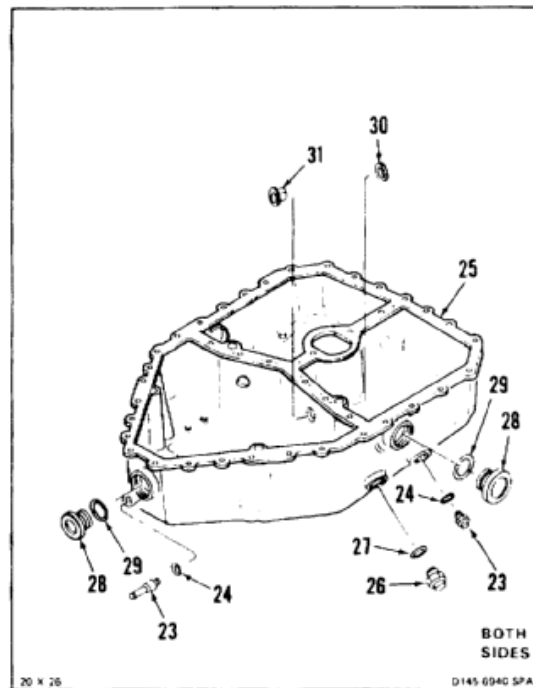


**DISASSEMBLE SUMP**

9. Remove lockwire from three temperature probes (23). Remove temperature probes and packings (24) from sump (25).
10. Remove lockwire from two drain valves (26). Remove drain valves and packings (27).
11. Remove lockwire from three sight gages (28). Remove sight gages and packings (29). Use spanner wrench.
12. Remove three retaining rings (30) and screens (31).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Spanner Wrench  
 Deep Socket, 1-3/8 Inch

**Materials:**

Oil (E254)  
 Lockwire (E231)  
 Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Gloves (E186)

**Parts:**

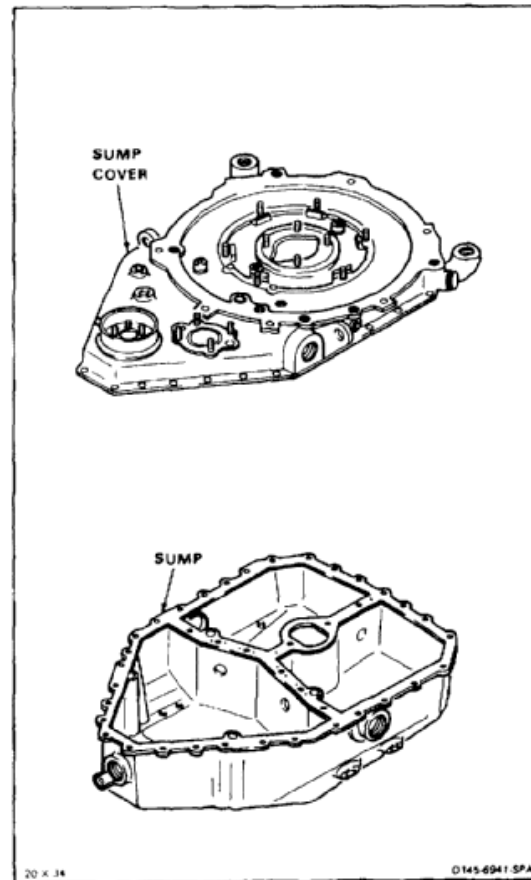
Packings

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

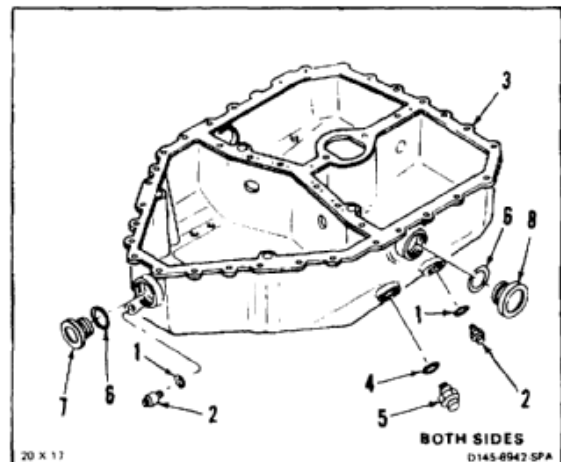
**References:**

TM 55-1520-240-23P

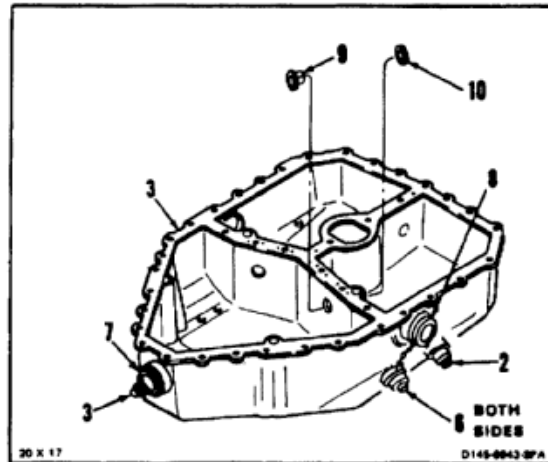
**ASSEMBLE SUMP****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

1. Coat packing (1) and thread of three temperature probes (2) with oil (E254). Install packings on probes. Install probes in sump (3). Torque probes to **60 inch-pounds**.
2. Coat packing (4) and thread of two drain valves (5) with oil (E254). Install packings on drain valves. Install drain valves in sump (3). Torque valves to **80 inch-pounds**.
3. Coat packings (6) and thread of sight gage (7) and two sight gages (8) with oil (E254). Install packings on sight gages. Install sight gages in sump. Torque gages to **80 inch-pounds**. Use spanner wrench.

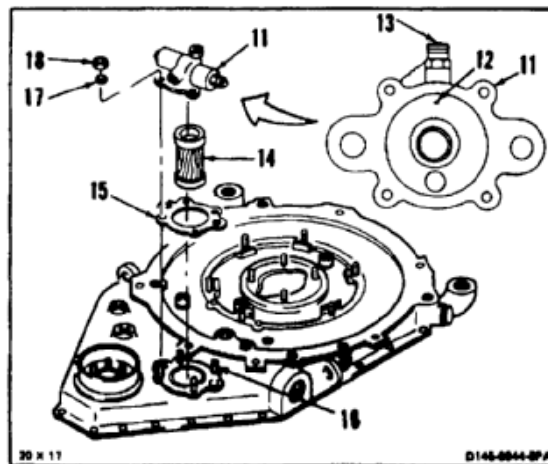


4. Lockwire sight gage (7) at front of sump (3) to temperature probe (3). Lockwire two sight gages (8) at sides of sump to drain valves (6). Use lockwire (E231).
5. Lockwire two temperature probes (2) at sides of sump (3) to sump. Use lockwire (E231).
6. Install three screens (9) and retaining rings (10).

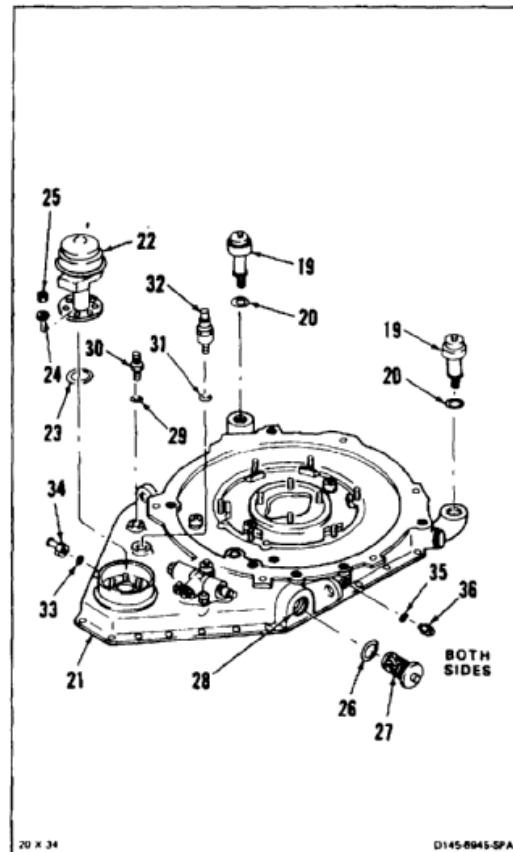
**INSPECT****ASSEMBLE SUMP COVER****WARNING**

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

7. Clean inside of filter housing (11) with dry cleaning solvent (E162) and clean cloths (E120). Check that hole (12) is free of debris. Wear gloves (E186).
8. Hold housing (11) so that indicating button (13) points straight up. Push in button to lock it down.
9. Install element (14) in housing (11).
10. Install gasket seal (15), and housing (11) on four studs (16). Install four washers (17) and nuts (18). Torque nuts to **60 inch-pounds**.



11. Install two vents (19) and packings (20). Torque vents to **80 inch-pounds**. Lockwire vents to sump cover (21). Use lockwire (E231).
12. Install oil filler (22) and packing (23) on sump cover (21). Install five washers (24) and nuts (25). Torque nuts to **60 inch-pounds**.
13. Coat packing (26) and thread of inlet screen (27) with oil (E254). Install inlet screen and packing in sump cover cavity (28). Torque screen to **80 inch-pounds**. Lockwire screen to sump cover (21) with lockwire (E231).
14. Coat packing (29) and thread of union (30) with oil (E254). Install union and packing in cover (21). Torque union to **80 inch-pounds**.
15. Coat packing (31) and thread of oil pressure switch (32) with oil (E254). Install switch and packing in cover (21). Torque switch to **80 inch-pounds**. Lockwire switch to cover with lockwire (E231).
16. Install packing (33) and hose nipple (34).
17. Coat two packings (35) and thread of two reducers (36) with oil (E254). Install reducers and packings on each side of sump cover (21). Torque reducers to **80 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

None

**Parts:**

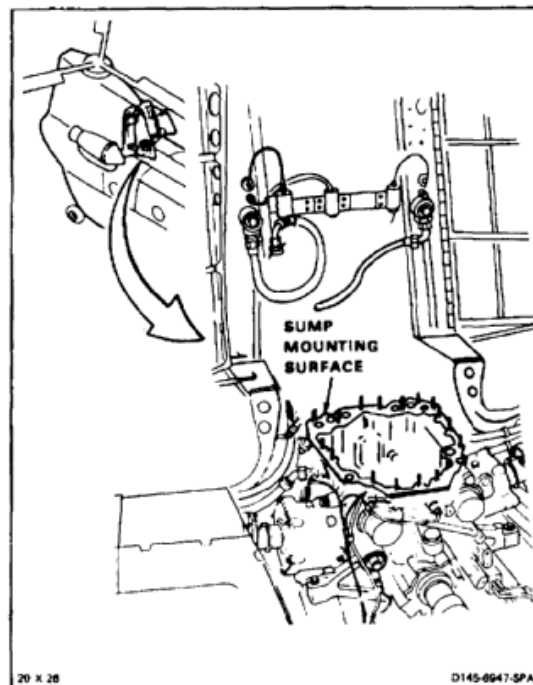
Packings

**Personnel Required:**

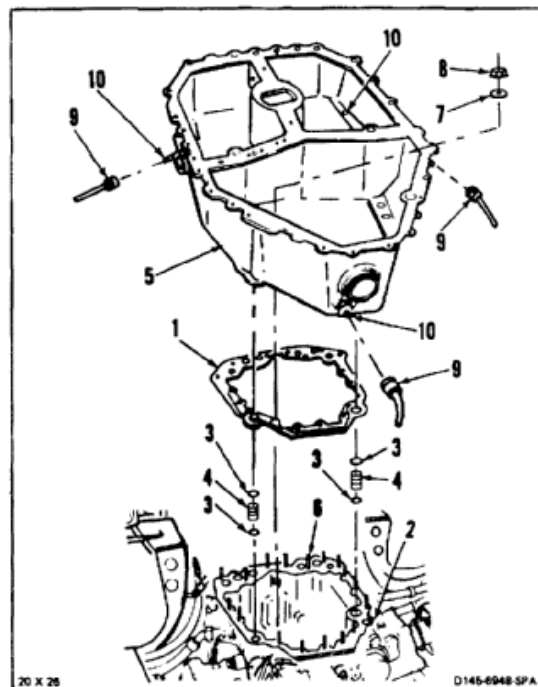
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**INSTALL SUMP**

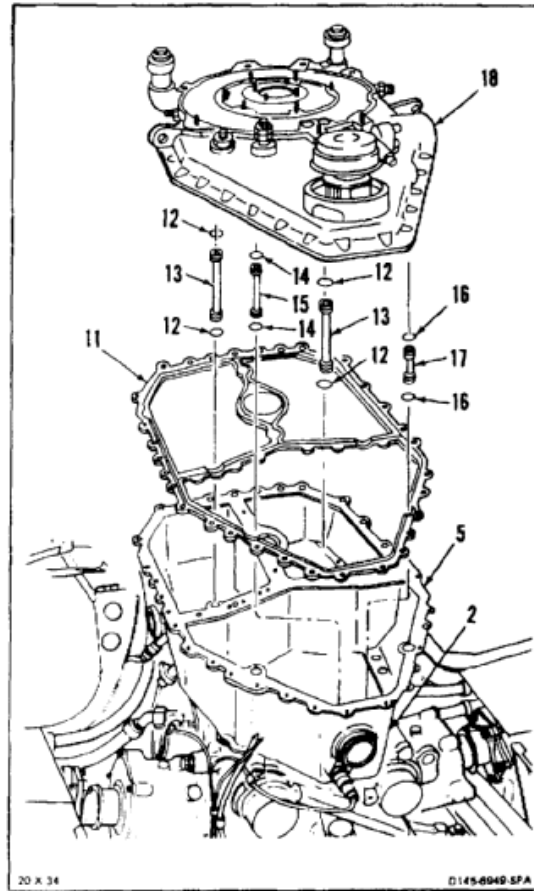
1. Position gasket seal (1) on transmission (2).
2. Install four packings (3) on two oil transfer tubes (4). Install tubes in transmission (2).
3. Install sump (5) on seal (1) and 19 studs (6).
4. Install 19 washers (7) and nuts (8) on studs (6). Torque nuts to **60 inch-pounds**.
5. Connect three electrical connectors (9) to temperature bulbs (10). Remove tags.



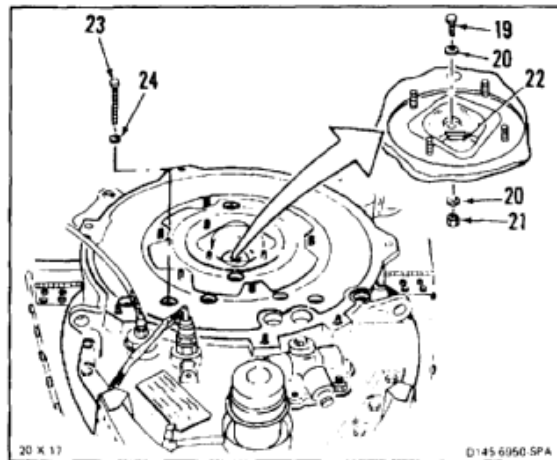


**INSPECT****INSTALL SUMP COVER**

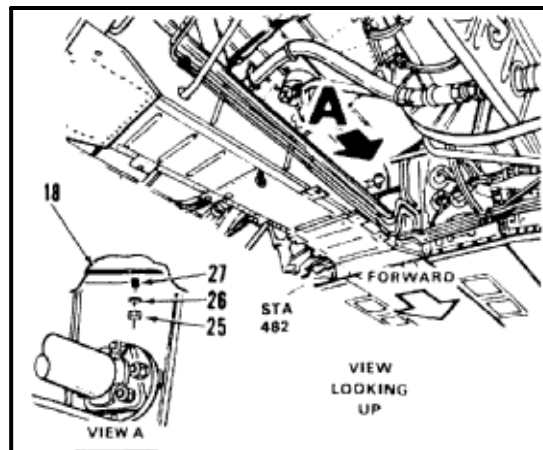
6. Position gasket seal (11) on sump (5).
7. Install four packings (12) on two oil transfer tubes (13). Install tubes in transmission (2).
8. Install two packings (14) on oil transfer tube (15). Install tube in transmission (2).
9. Install two packings (16) on oil transfer tube (17). Install tube in transmission (2).
10. Align sump cover (18) with four transfer tubes (13, 15, and 17). Install cover on sump (5). Make sure all tubes are firmly seated.



11. Install bolts (19), washers (20) and nuts (21) at two places inside fan shaft hole (22). Torque nuts to **60 inch-pounds**.
12. Install eight bolts (23) and seal washers (24). Torque bolts to **50 inch-pounds**.



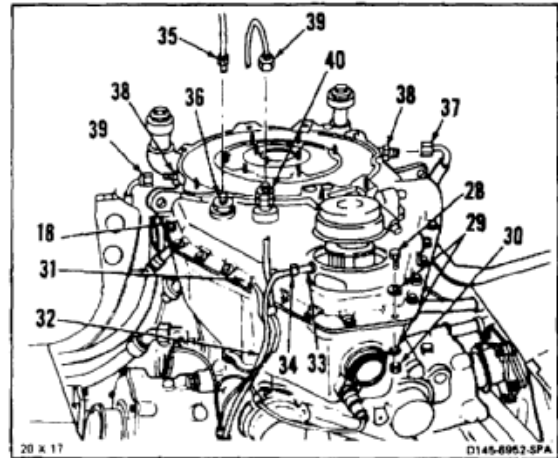
13. From inside helicopter, install eight washers (25) and nuts (26) on studs (27) at aft edge of sump cover (18). Torque nuts to **60 inch-pounds**.



**6-192 INSTALL COMBINING TRANSMISSION SUMP (Continued)**

6-192

14. Install 23 bolts (28), washers (29), and nuts (30) around sump cover (18). Install clip (31) under head of bolt where shown. Torque nuts to **60 inch-pounds**.
15. Connect drainline (32) to hose nipple (33). Tighten clamp (34).
16. Connect straight end of oil hose (35) to union (36).
17. Connect breather hose (37) to reducer (38) on each side of sump cover (18).
18. Connect electrical connector (39) to oil pressure switch (40).

**INSPECT****FOLLOW-ON MAINTENANCE:**

- Install combining transmission oil cooler (Task 6-188).
- Install oil cooler fan and shaft (Task 6-186).
- Service combining transmission sump (Task 1-54).
- Close aft pylon doors (Task 2-2).
- Perform ground run (TM 55-1520-240-10).

END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Container, 2 Quart
- Hose, 1 Inch ID, 36 Inches Long
- Spanner Wrench
- Torque Wrench, 30 to 150 Inch-Pounds
- Workstand

**Materials:**

- Oil (E254)
- Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

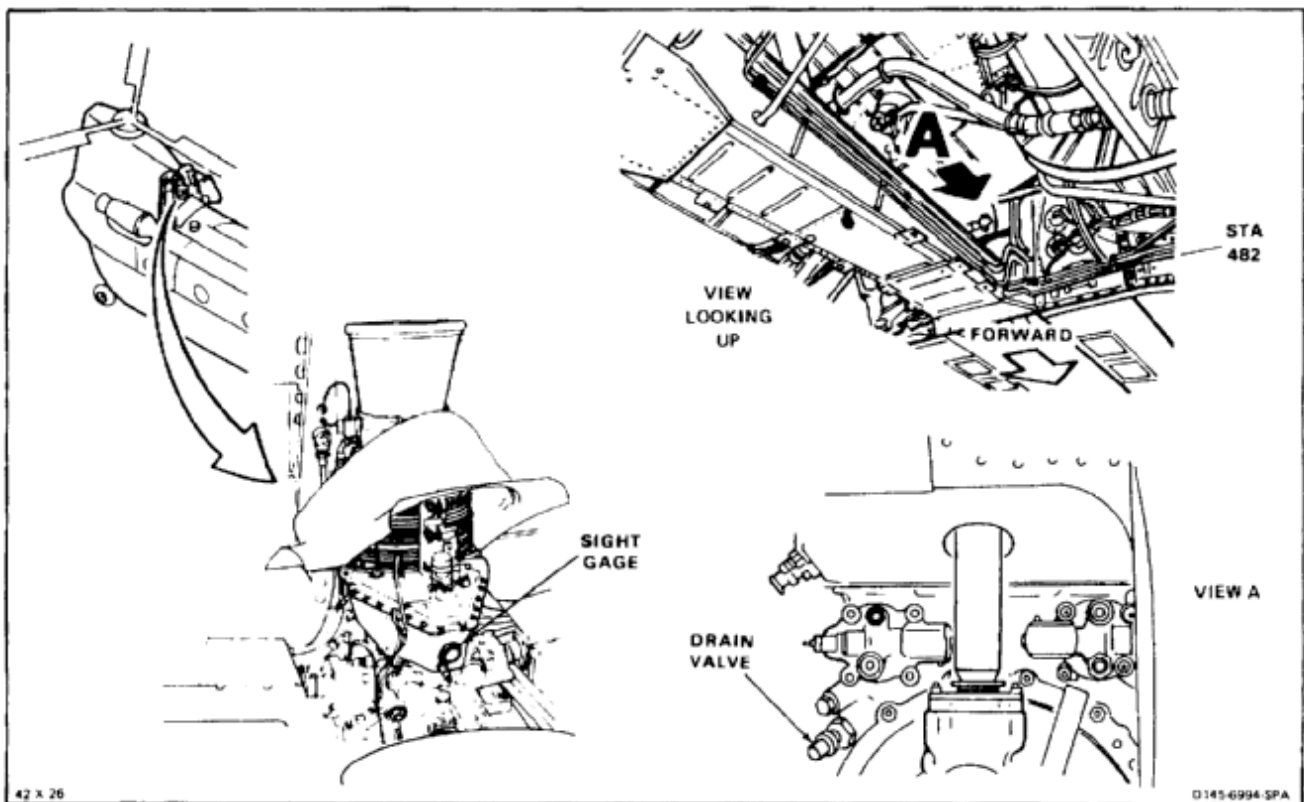
- Medium Helicopter Repairer (2)
- Inspector

**References:**

TM 55-1520-240-23P

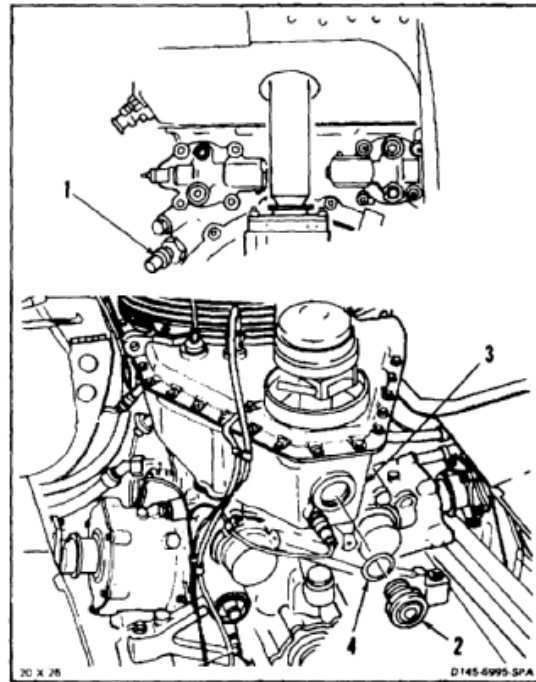
**Equipment Condition:**

- Battery Disconnected (Task 1-39)
- Electrical Power Off
- Aft Pylon Access Doors Open (Task 2-2)
- Aft Pylon Lower Fairing Open (Task 2-2)
- Cargo Ramp Open and Level (Task 2-2)



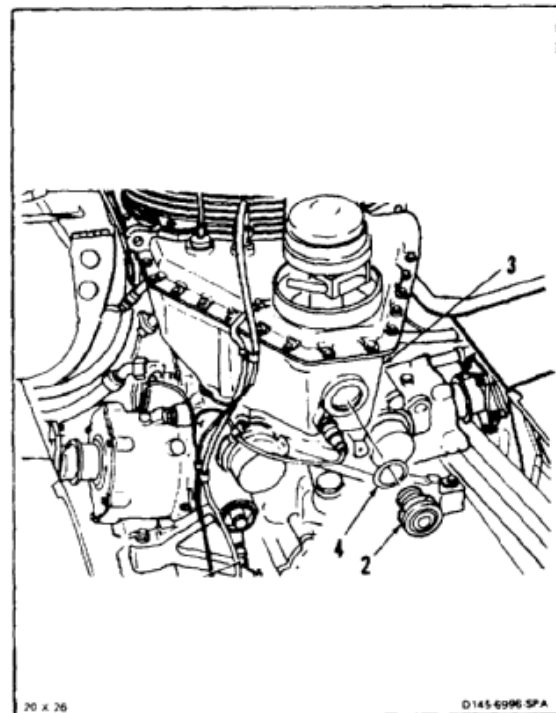
**REMOVE SIGHT GAGE**

1. From inside cabin, connect hose to drain valve (1). Direct end of hose into container.
2. Have helper view sight gage (2) on sump (3). Push in drain valve (1), twist and pull. Drain oil until level is below gage.
3. Close drain valve (1) by pushing it in and twisting it. Disconnect hose from valve.
4. Remove lockwire from sight gage (2). Remove gage from sump (3). Use spanner wrench.
5. Remove packing (4) from sight gage (2).

**INSTALL SIGHT GAGE****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

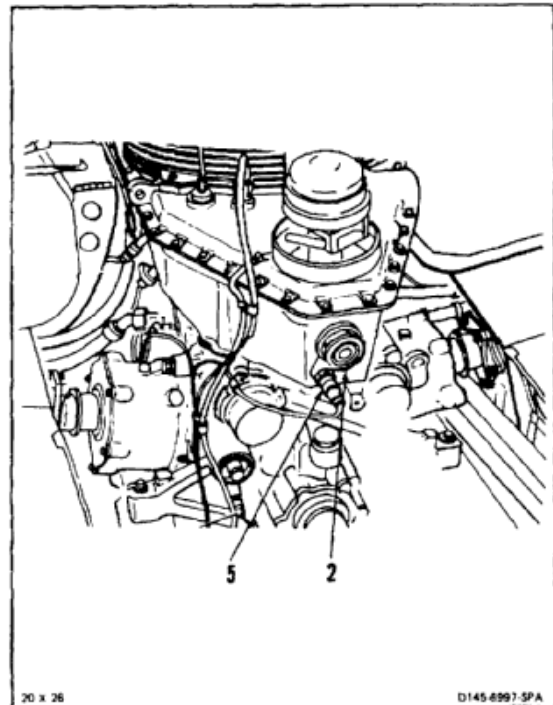
6. Coat packing (4) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. Install sight gage (2) in sump (3). Use spanner wrench. Torque gage to **80 inch-pounds**.



8. Lockwire sight gage (2) to temperature probe (5). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service combining transmission (Task 1-54).  
Close aft pylon lower fairing (Task 2-2).  
Close aft pylon access doors (Task 2-2).  
Close cargo ramp (Task 2-2).



END OF TASK

6-640

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Magnet  
Magnifying Glass, 12 Power

**Materials:**

None

**Personnel Required:**

Inspector

**Equipment Condition:**

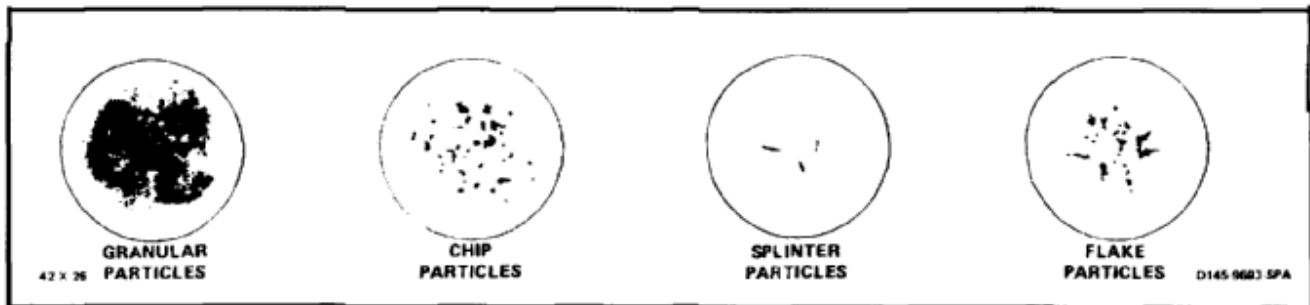
Off Helicopter Task

1. Solid particles found in the transmission oil system may be steel, magnesium, aluminum, silver, copper, bronze, or fiberglass. Examine particles as follows:
  - a. Separate steel particles. Use a magnet.
  - b. Identify and separate remaining particles by visual inspection.
  - c. Examine particles with a magnifying glass to determine shape and condition. Look for marks or discoloration that may indicate shearing, burning, or fatigue.

**FOLLOW-ON MAINTENANCE:**

None

MATERIAL	DESCRIPTION	ACTION REQUIRED
Steel	Fine, hair-like fuzz particles	Normal wear. No action required
	Limited amount of splinters, flakes, or granular particles	Possible failure. Perform serviceability check (Task 6-198)
	Thin flakes up to <b>1/16 inch</b> in diameter and <b>1/4 inch</b> long, maximum of 10 flakes	Perform serviceability check (Task 6-198)
Aluminum or magnesium	Massive amount of splinters, flakes, or granular particles	Failure. Replace transmission (Tasks 6-100 and 6-107)
	Granular particles	Perform serviceability check (Task 6-198)
Copper, bronze, or silver	Limited amount of granular particles	Possible indication of bearing cage wear. Perform serviceability check (Task 6-198)
	Massive amount of granular particles or chip particles	Failure. Replace transmission (Tasks 6-100 and 6-107)
Fiberglass	Granular or fibrous particles	Perform serviceability check (Task 6-198)



END OF TASK

INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

None

**Materials:**

None

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Helicopter on Level Surface

Engine transmission oil is supplied by the combining transmission oil system. Refer to Task 6-167.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-642



**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
 Container, 2 Quart  
 Socket, 1-3/8 Inch  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

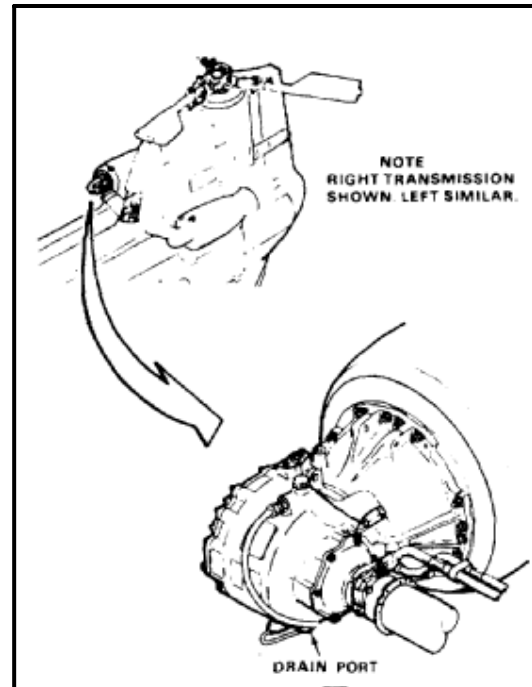
Medium Helicopter Repairer

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Engine Transmission Compartment of Combining  
 Transmission Sump Drained (Task 6-168)  
 Engine Air Inlet Screen Removed (Task 4-65)  
 Engine Transmission Fairing Removed (Task 4-70)



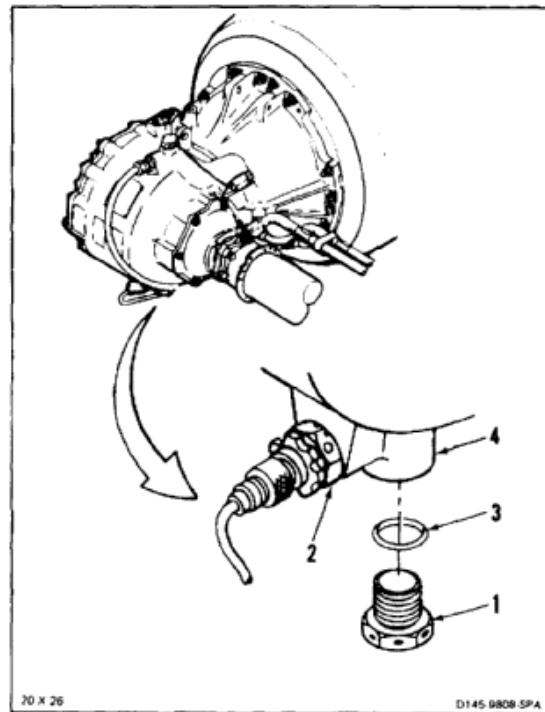
**NOTE**

Drain either engine transmission in same way. Right transmission shown.

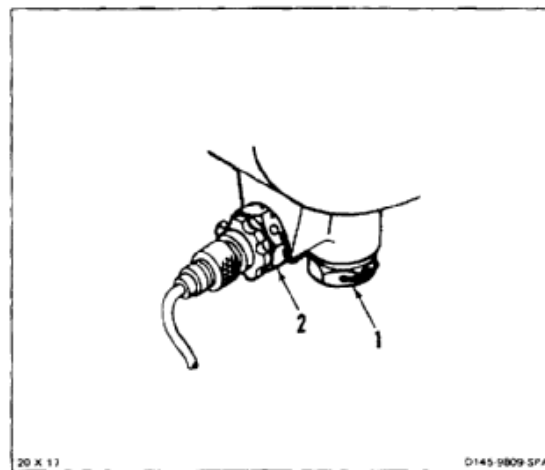
For helicopters with **37**, go to step 7.

**WITHOUT 37**

1. Remove lockwire from drain plug (1) and chip detector.
2. Remove drain plug (1). Let oil drain into container.
3. Remove packing (3) from drain plug (1).
4. Install packing (3) on drain plug (1). Install plug in transmission port (4). Torque plug to **90 inch-pounds**.

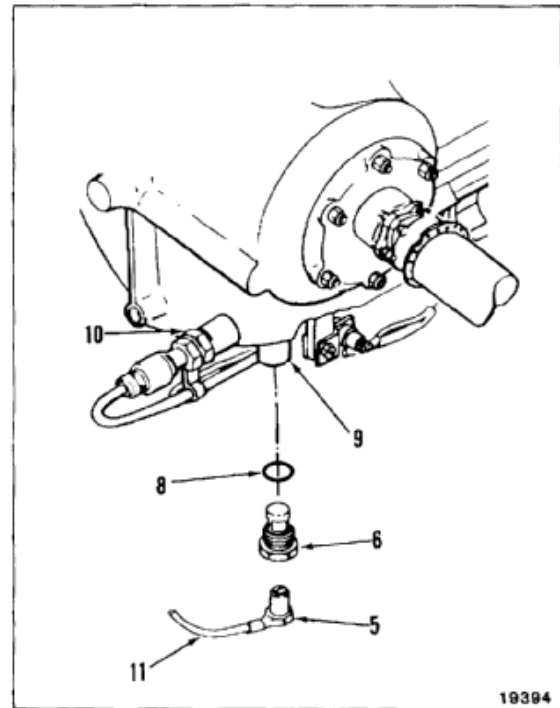


5. Lockwire drain plug (1) to chip detector (2). Use lockwire (E231).
6. Go to Follow-On Maintenance.



**WITH 37**

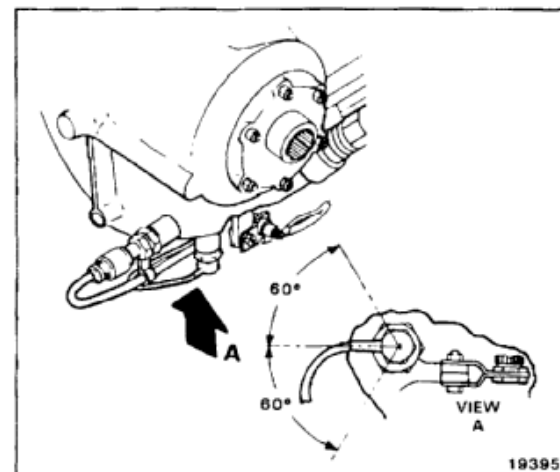
7. Remove plug (5) by turning it counterclockwise and pulling it from valve (6).
8. Remove lockwire from valve (6). Remove valve, with packing (8) from transmission port (9). Let oil drain into container.
9. Install valve (6), with new packing (8) in port (9). Torque to **77 inch-pounds**.
10. Lockwire valve (6) to temperature switch adapter (10). Use lockwire (E231).
11. Install plug (5) in valve (6) by inserting it and twisting it clockwise until it locks in place.



12. Check that cable (11) points forward within **60°** as shown.

**FOLLOW-ON MAINTENANCE:**

Install engine transmission fairing (Task 4-73).  
Install engine air inlet screen (Task 4-76).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

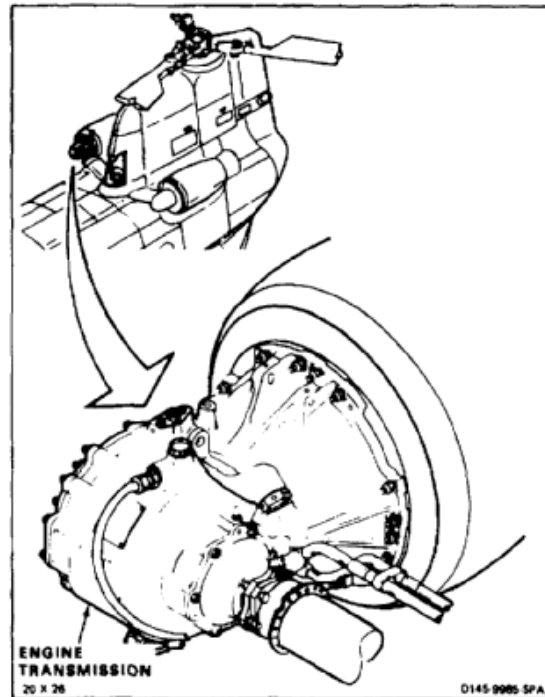
All

**Tools:**

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

**Materials:**

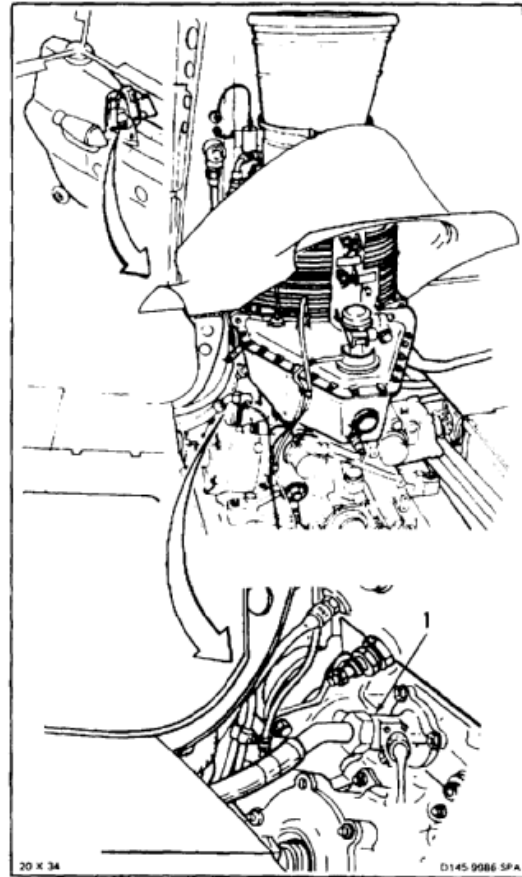
None

**Personnel Required:**Medium Helicopter Repairer  
Rotary-Wing Aviator (2)**References:**Task 1-54  
Task 6-196  
Task 6-199  
Task 6-201  
Task 6-202  
Task 6-203  
Task 6-205  
Task 6-206  
Task 6-207  
Task 6-208  
Task 6-209  
Task 6-210**Equipment Condition:**Battery Disconnected (Task 1-39)  
Electrical Power Off  
Pylon Access Doors Open (Task 2-2)  
Pylon Lower Fairing Open (Task 2-2)  
Engine Air Inlet Screen Removed (Task 4-65)  
Engine Transmission Fairing Removed (Task 4-70)

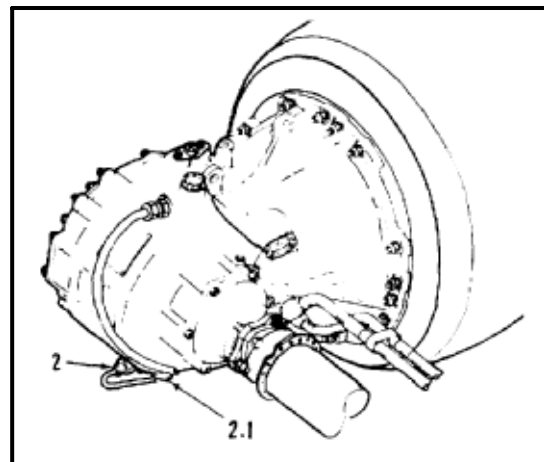
**NOTE**

Flush either engine transmission oil system in same way. Right transmission shown.

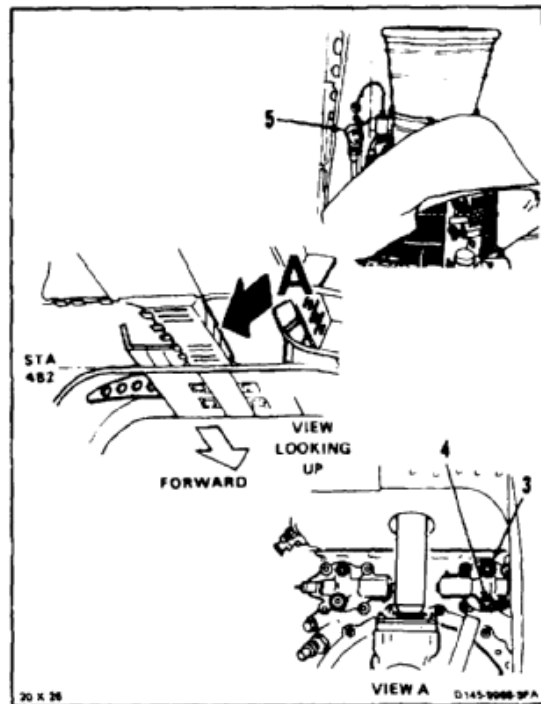
1. Drain oil from engine transmission (Task 6-196).
2. Remove, inspect, and clean debris detection screen (1) (Tasks 6-201 and 6-202). Install screen (Task 6-203).



3. Without **37**: Remove and inspect chip detector plug (2) (Task 6-205). Install plug (Task 6-206).
- 3.1. With **37**: Inspect chip detector plug (2.1) (Task 6-208.1).



4. Replace main oil filter element (3) (Task 6-199). Note position of indicator button (4).
5. If indicator button (4) was extended, remove and inspect inlet screen (5) (Tasks 6-209 and 6-210). Install screen (Task 6-211).
6. Service engine transmission with oil (Task 1-54).
7. Have pilot perform ground run (TM 55-1520-240-10). When engine transmission oil temperature stabilizes at normal, have pilot shut down helicopter.
8. Repeat steps 1 thru 6.



#### ***FOLLOW-ON MAINTENANCE:***

- Install engine transmission fairing (Task 4-73).
- Install engine air inlet screen (Task 4-76).
- Close pylon lower fairing (Task 2-2).
- Close pylon access doors (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692

**Materials:**

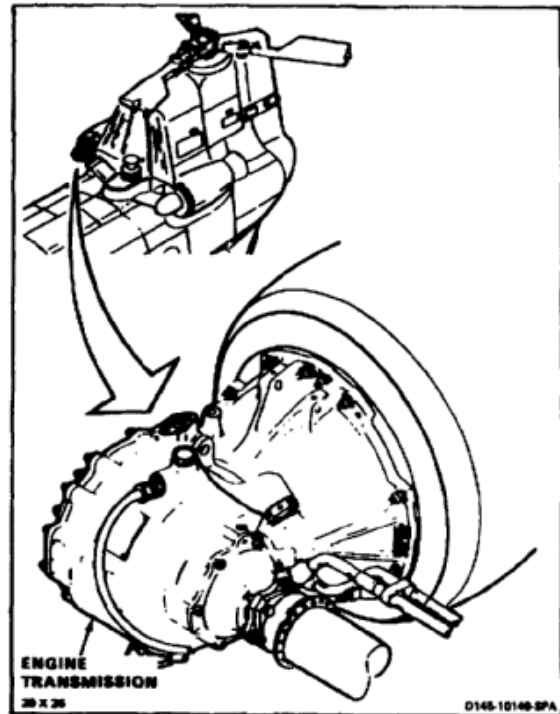
Cheesecloth (E112)

**Personnel Required:**Medium Helicopter Repairer  
Rotary-Wing Aviator (2)**References:**

Task 1-54  
 Task 6-100  
 Task 6-107  
 Task 6-196  
 Task 6-197  
 Task 6-199  
 Task 6-201  
 Task 6-202  
 Task 6-203  
 Task 6-205  
 Task 6-206  
 Task 6-207  
 Task 6-209  
 Task 6-210  
 Task 6-211  
 TM 55-1520-240-10

**Equipment Condition:**

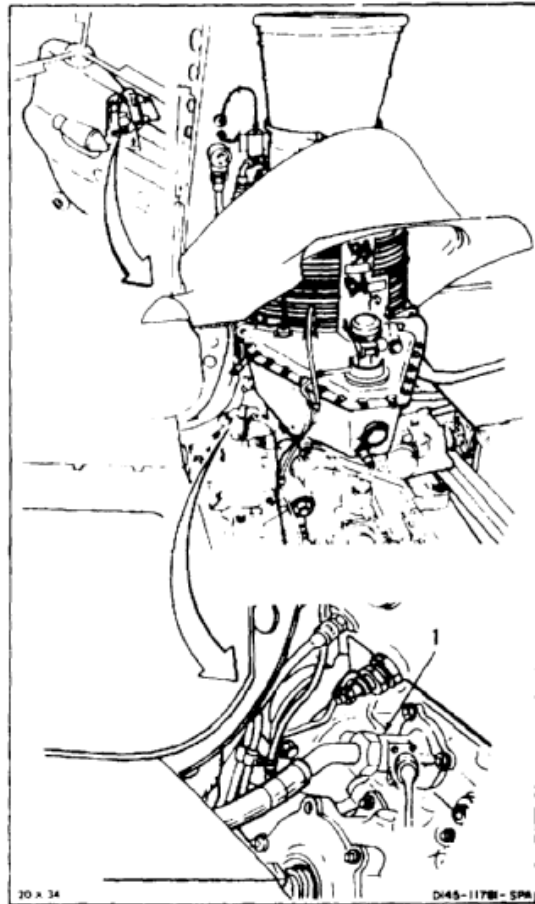
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Access Doors Open (Task 2-2)  
 Pylon Lower Fairing Open (Task 2-2)  
 Engine Air Inlet Screen Removed (Task 4-65)  
 Engine Transmission Fairing Removed (Task 4-70)



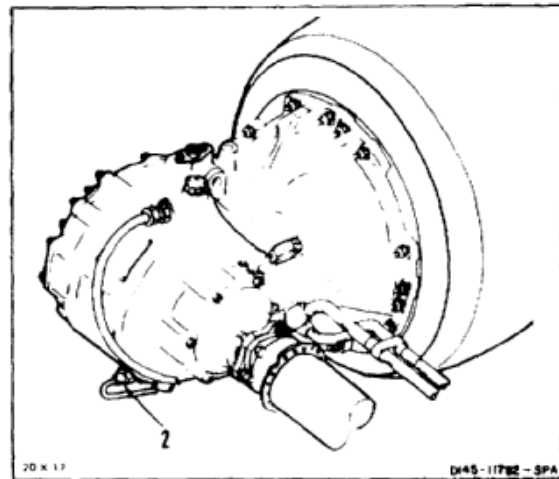
**NOTE**

Perform a serviceability check of either engine transmission in same way. Right transmission shown.

1. Drain oil from engine transmission (Task 6-196).
2. Remove, inspect, and clean debris detection screen (1) (Tasks 6-201 and 6-202). Install screen (Task 6-203).

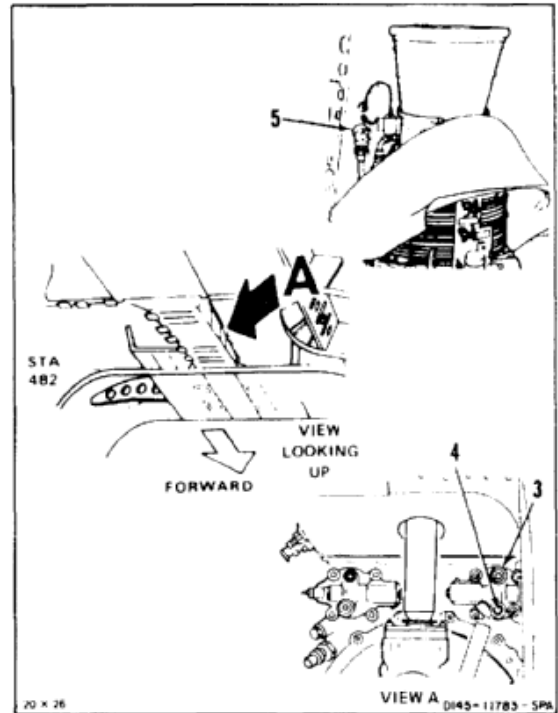


3. Remove and inspect chip detector plug (2) (Task 6-205). Install plug (Task 6-206).

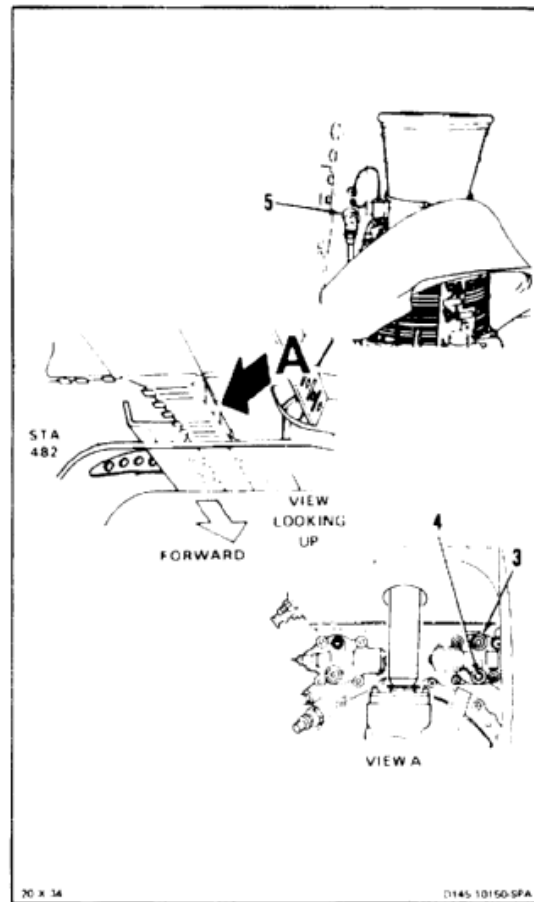




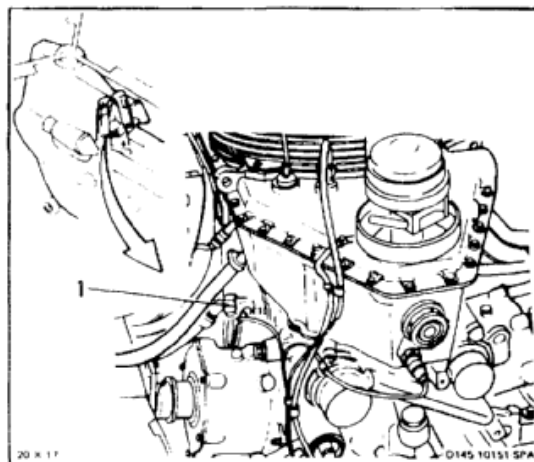
4. Replace main oil filter element (3) (Task 6-199). Note position of indicator button (4).
5. If indicator button (4) was extended, remove and inspect inlet screen (5) (Tasks 6-209 and 6-210). Install screen (Task 6-211).
6. Service transmission (Task 1-54).



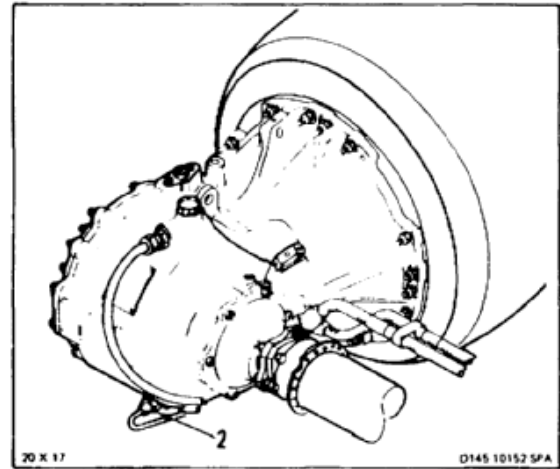
7. Have pilot perform ground run for **1 hour** at normal rotor rpm (TM 55-1520-240-10). If engine transmission oil temperature or pressure changes abnormally, or if debris screen or chip detector light comes on during operation, have pilot shut down helicopter. Check for cause.
8. Drain oil through cheesecloth (E112) or similar filter material (Task 6-196), Check for contamination.
9. Remove element in oil filter (3). If element contains debris or indicator button (4) was extended, replace with new element (Task 6-148).
10. If element in filter (3) contains debris and indicator button (4) was also extended, remove, inspect, and install inlet screen (5) (Tasks 6-209, 6-210, and 6-211).



11. Remove, inspect, and clean debris detection screen (1) (Tasks 6-201 and 6-202). Install screen (Task 6-203).



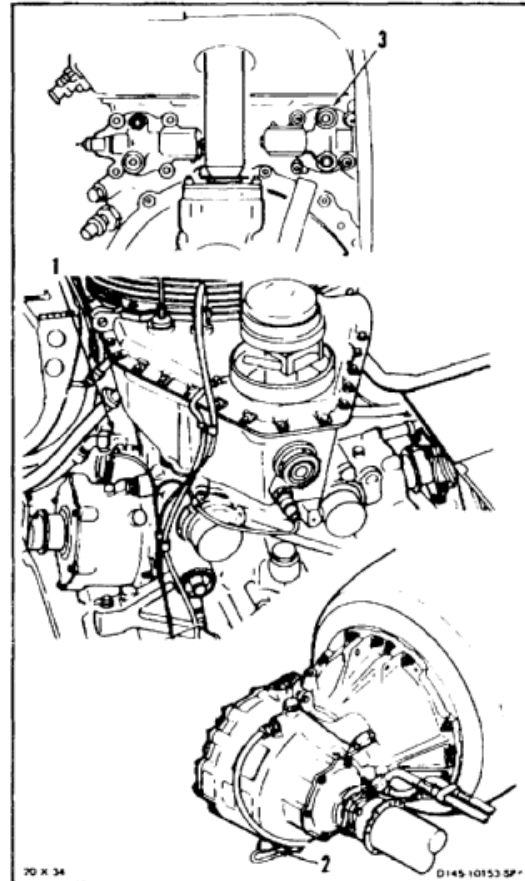
12. Remove and inspect chip detector plug (2) (Task 6-205). Install plug (Task 6-206).



13. If quantity and size of particles obtained from filter (3), screen (1), and chip detector (2) have not decreased by at least **30 percent** from original amount, replace engine transmission (Tasks 6-100 and 6-107).
14. If quantity and size of particles obtained from filter (3), screen (1) and chip detector (2) have decreased by **30 percent** or more, repeat steps 1 thru 12. If any more debris is obtained, replace engine transmission (Tasks 6-100 and 6-107).

**FOLLOW-ON MAINTENANCE:**

Install engine transmission fairing (Task 4-73).  
 Install engine air inlet screen (Task 4-76).  
 Close pylon lower fairing (Task 2-2).  
 Close pylon access doors (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 2 Quart  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Workstand

**Materials:**

Dry Cleaning Solvent (E162)  
 Cloths (E120)  
 Oil (E254)  
 Gloves (E186)  
 Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

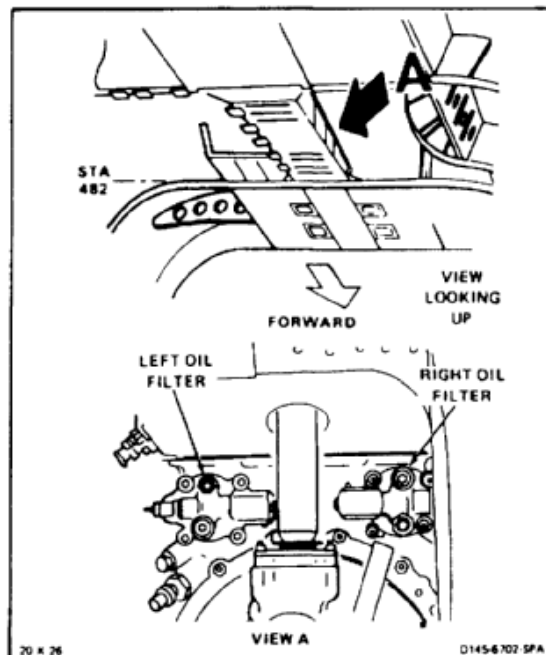
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Cargo Ramp Open and Level (Task 2-2)



**NOTE**

Procedure is same to remove left or right engine transmission main oil filter. Removal of left filter is shown here.

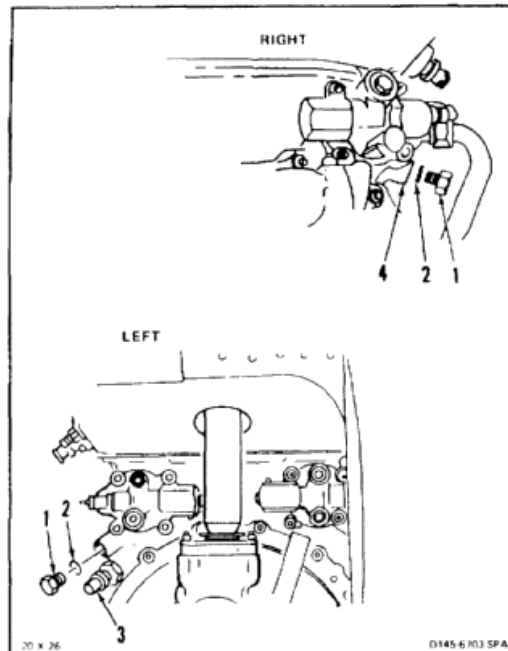
**DRAIN OIL**

1. Remove lockwire from drain plug (1). Remove plug and packing (2). Drain oil into container.

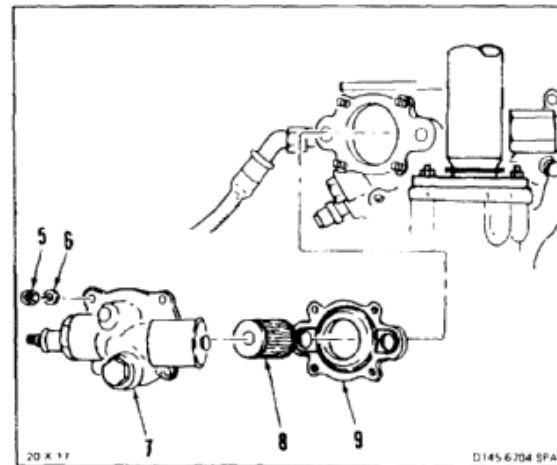
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

2. Coat plug (1) and packing (2) with oil (E254). Install plug and packing. Torque plug to **45 inch-pounds**. Lockwire plug to sump drain (3) (left filter) or transmission (4) (right filter). Use lockwire (E231).

**REMOVE FILTER ELEMENT**

3. Remove four nuts (5) and washers (6) from filter housing (7). Remove housing element (8), and gasket seal (9) from transmission (4).
4. Remove element (8) from housing (7). Inspect element for debris. If debris is found, perform a contamination analysis (Task 6-108).



**INSTALL FILTER ELEMENT****WARNING**

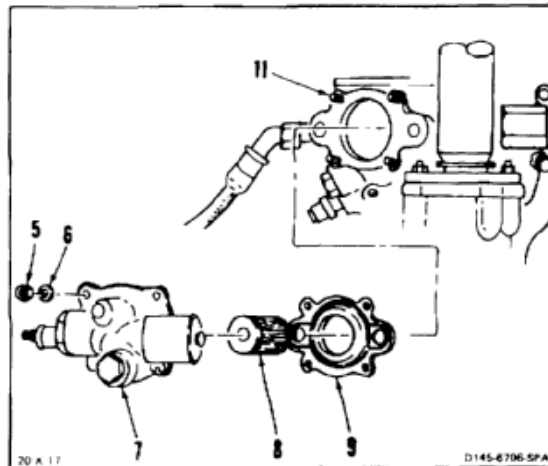
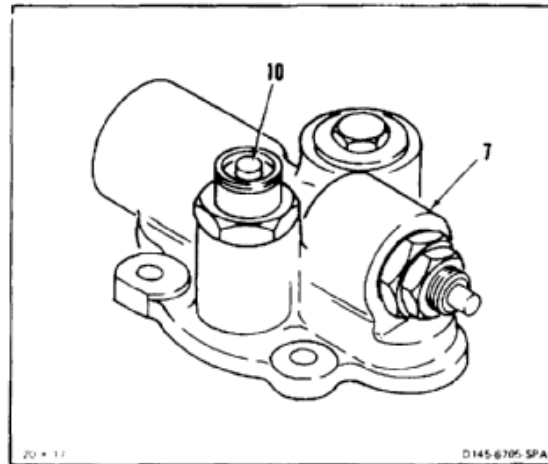
Dry cleaning solvent (E162) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention.

5. Clean inside of housing (7) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186).
6. Hold housing (7) with indicating button (10) up. Push in button to lock it down.

**NOTE**

Do not install a used filter.

7. Install new element (8) in housing (7). Install gasket seal (9) and housing on four studs (11).
8. Install four washers (6) and nuts (5). Torque nuts to **60 inch-pounds**.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service engine transmission (Task 1-54).  
Close cargo ramp (Task 2-2).

END OF TASK

6-656

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**6-199.1 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR**


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6-199.1

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
 Container, 2 Quart  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Workstand

**Materials:**

Oil (E254)  
 Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

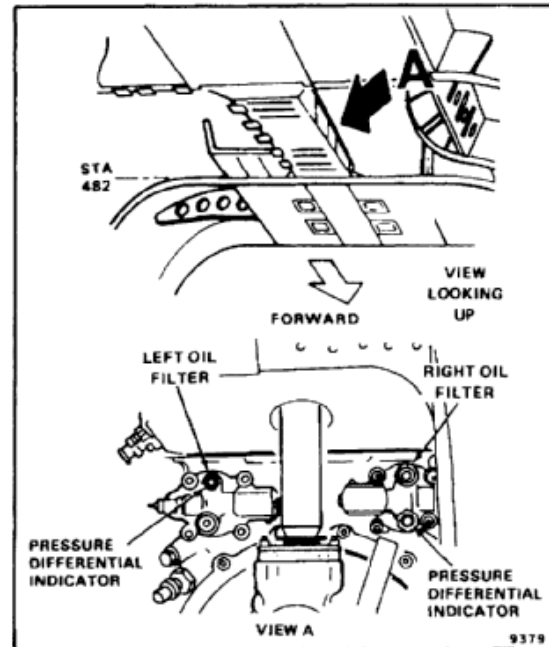
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Cargo Ramp Open and Level (Task 2-2)



**NOTE**

Procedure is same to remove indicator from left or right engine transmission main oil filter. Removal of indicator from left filter is shown here.

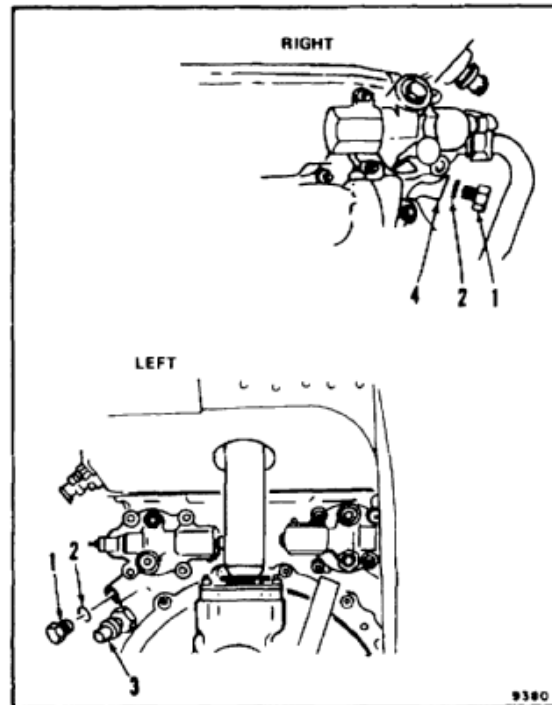
**DRAIN OIL**

1. Remove lockwire from drain plug (1). Remove plug and packing (2). Drain oil into container.

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

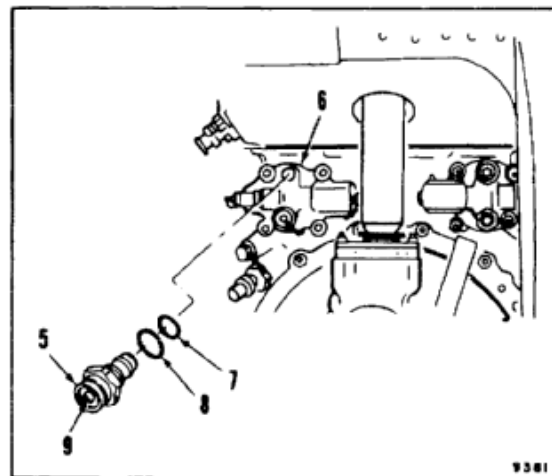
2. Coat plug (1) and packing (2) with oil (E254). Install plug and packing. Torque plug to **45 inch-pounds**. Lockwire plug to sump drain (3) (left filter) or transmission (4) (right filter). Use lockwire (E231).

**REMOVE INDICATOR**

3. Remove lockwire from pressure differential indicator (5). Remove indicator from housing (6).
4. Remove two packings (7 and 8) from indicator (5).

**INSTALL INDICATOR**

5. Install two packings (7 and 8) on indicator (5).
6. Hold indicator (5) so that button (9) points up. Check that button is pushed in and locked.
7. Install indicator (5) in housing (6).





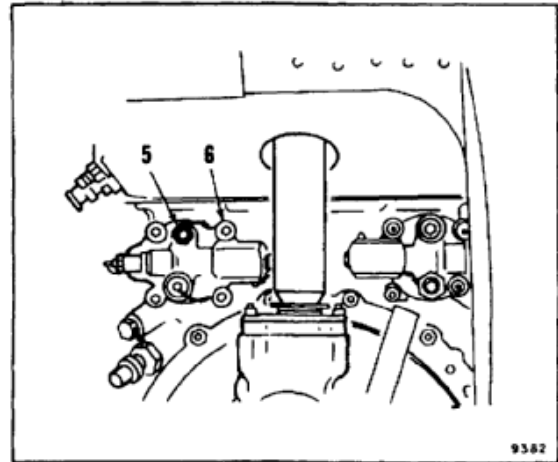
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**6-199.1 REPLACE ENGINE TRANSMISSION MAIN OIL FILTER PRESSURE DIFFERENTIAL INDICATOR (Continued)**

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6-199.1

8. Lockwire indicator (5) to housing (6). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close cargo ramp (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Torque Wrench, 0 to 150 Inch-Pounds  
Workstand

**Materials:**

Lockwire (E230)

**Personnel Required:**

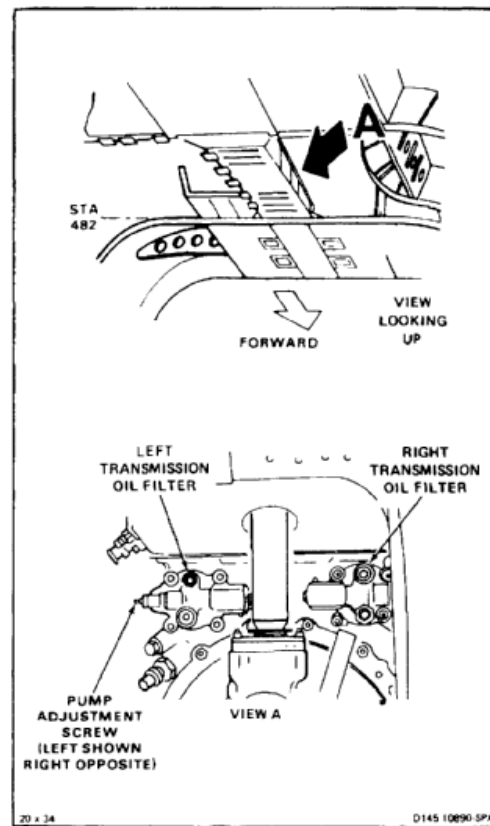
Medium Helicopter Repairer  
Inspector  
Army Rotary-Wing Aviator (2)

**References:**

TM 55-1520-240-10

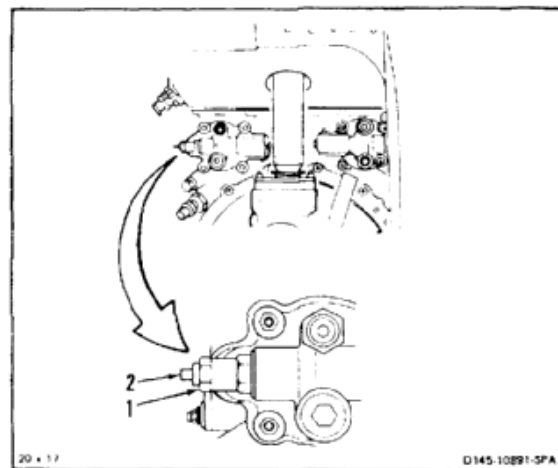
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Cargo Ramp Open and Level (Task 2-2)

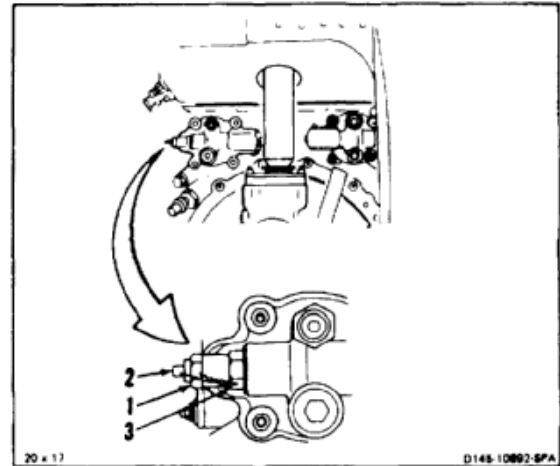
**NOTE**

Procedure is same to adjust left or right engine transmission pump. Adjustment of left pump shown here.

1. Remove lockwire from locknut (1) and setscrew (2). Hold setscrew and loosen locknut.
2. Turn setscrew no more than **1/4 turn** to adjust transmission oil pressure. Turn setscrew clockwise to increase pressure. Turn setscrew counterclockwise to decrease pressure. Required gage pressure is **40 to 70 psi**.
3. Hold setscrew (2). Torque locknut (1) to **60 inch-pounds**.



4. Have pilot perform ground run at **100 percent** rotor rpm until engine transmission oil temperature and pressure stabilize. Record oil pressure.
5. If oil pressure is **40 to 70 psi**, go to step 6. If pressure is not **40 to 70 psi**, repeat task.
6. Lockwire locknut (1) and setscrew (2) to retaining nut (3). Use lockwire (E230).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close cargo ramp (Task 2-2).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Open End Wrench, 1-1/2 Inch  
Container, 2 Quart

**Materials:**

None

**Personnel Required:**

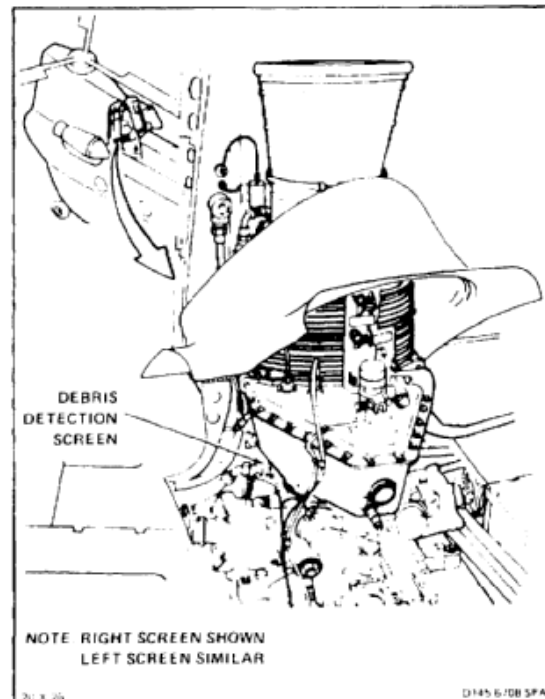
Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Aft Pylon Access Doors Open (Task 2-2)  
Aft Pylon Lower Fairing Open (Task 2-2)

**NOTE**

Procedure is same to remove left or right transmission debris detection screen. Removal of right screen is shown here.



**6-201 REMOVE ENGINE TRANSMISSION DEBRIS DETECTION SCREEN (Continued)**

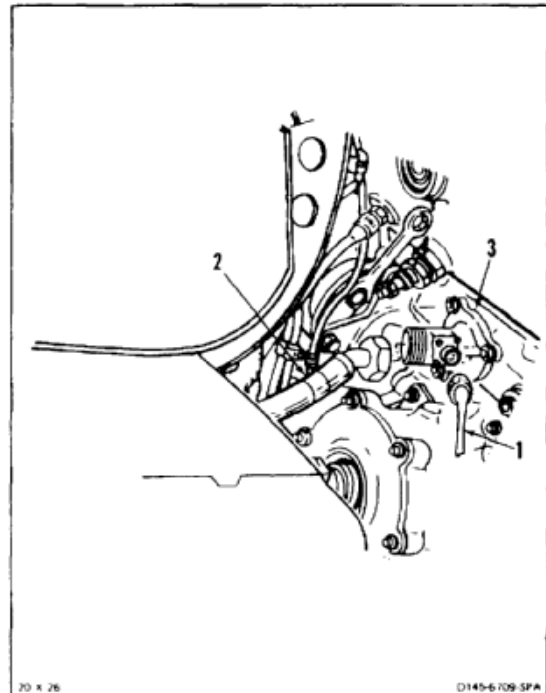
6-201

1. Disconnect electrical connector (1).



If hose is not removed from screen, debris may fall into hose when screen is removed from transmission. Continued contamination may result.

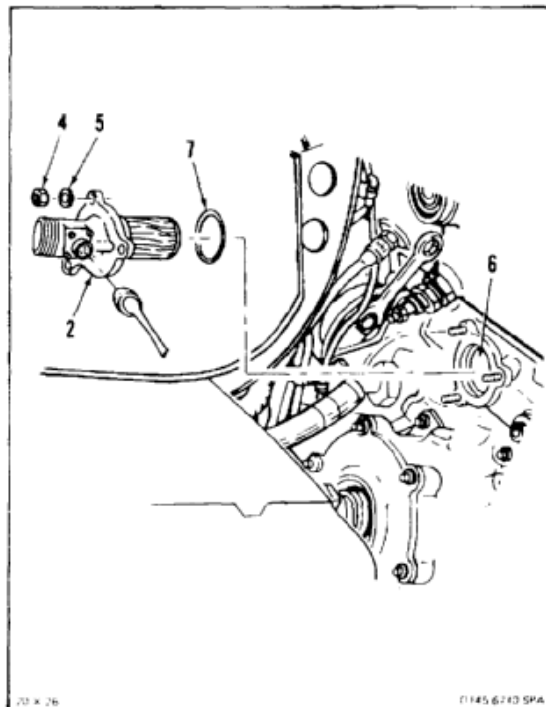
2. Disconnect hose (2) from screen (3). Cap hose quickly to prevent oil loss. Catch spilled oil in container. Retain spilled oil for contamination analysis (Task 6-108).



3. Remove three washers (4) and nuts (5). Remove screen (2) from transmission cavity (6). Catch spilled oil in container.
4. Remove packing (7) from screen (2).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Goggles

**Materials:**

Dry Cleaning Solvent (E162)

Cloth (E120)

Brush (E86)

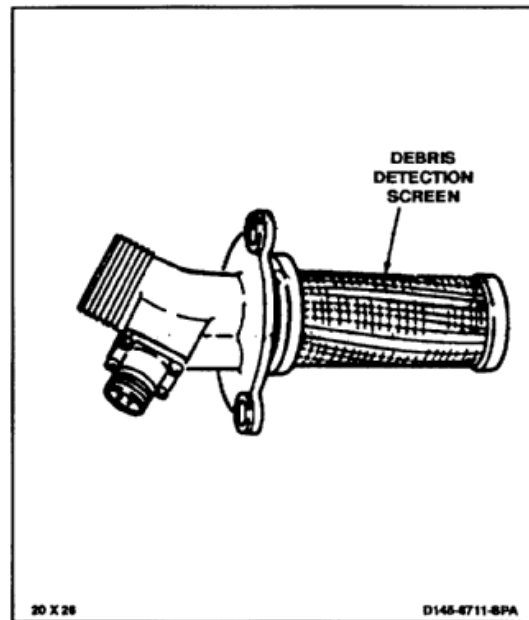
Gloves (E186)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Off Helicopter Task



1. Check screen (1) for bits of metal and other debris. Retain all debris for contamination analysis (Task 6-194).

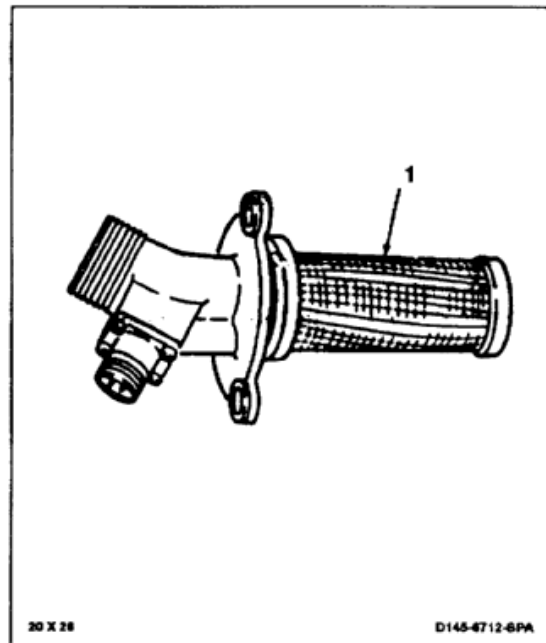
**WARNING**

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

2. Clean screen (1) with dry cleaning solvent (E162) and brush (E86). Wear gloves (E186) and goggles.
3. Inspect screen (1) for tears. There shall be no tears.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-664

**6-203 INSTALL ENGINE TRANSMISSION DEBRIS DETECTION SCREEN**

6-203

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
 Container, 2 Quart  
 Open End Wrench, 1-1/2 Inch  
 Crows Foot, 1-1/2 Inch  
 Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

None

**Parts:**

Packing

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

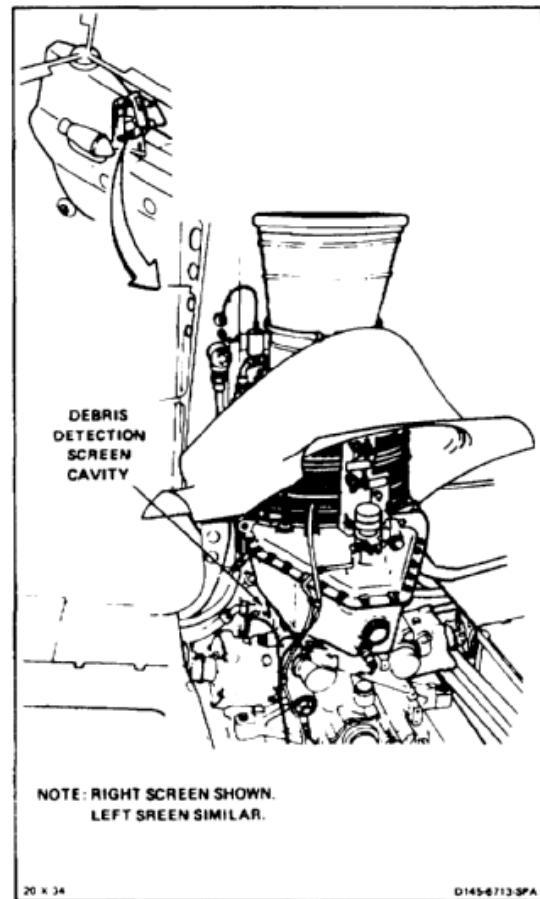
TM 55-1520-240-23P  
 TM 55-1520-240-T

**Equipment Condition:**

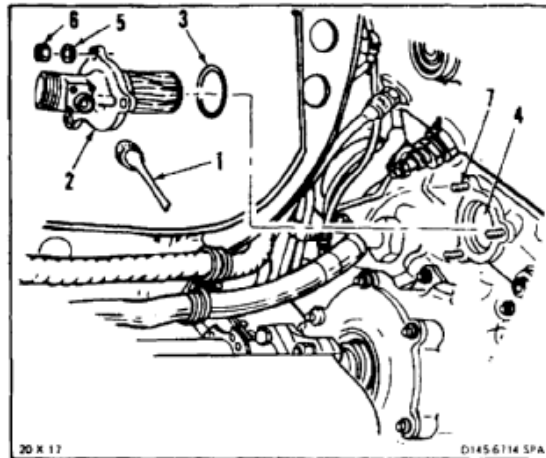
Engine Transmission Debris Detection Screen  
 Inspected (Task 6-201)

**NOTE**

Procedure is same to install left or right transmission debris detector screen. Installation of right screen is shown here.

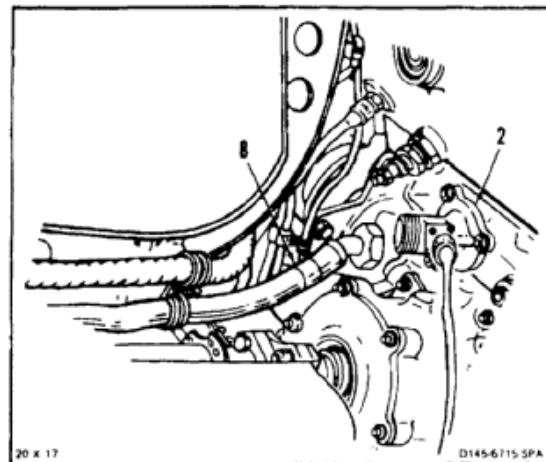


1. Connect electrical connector (1) to screen (2).
2. Perform operational check of engine transmission debris detection system (TM 55-1520-240-T).
3. Install packing (3) on screen (2). Install screen in transmission cavity (4).
4. Install washers (5) and nuts (6) on three studs (7). Torque nuts to **80 inch-pounds**.

**NOTE**

Connect hose quickly to prevent oil loss.

5. Remove cap and connect oil hose (8) to screen (2). Use container to catch spilled oil.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service engine transmission (Task 1-54).  
 Close aft pylon lower fairing (Task 2-2).  
 Close aft pylon access doors (Task 2-2).

**Task 6-204 deleted.**

END OF TASK

**6-666**



## INITIAL SETUP

**Applicable Configurations:**Without **37****Tools:**

None

**Materials:**

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

**Parts:**

Steel Nut, 1/4-28

**Personnel Required:**

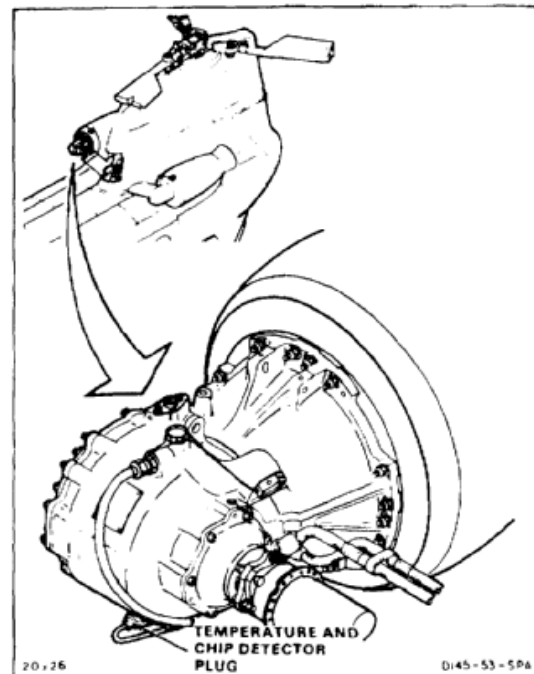
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P  
 TM 55-1520-240-T

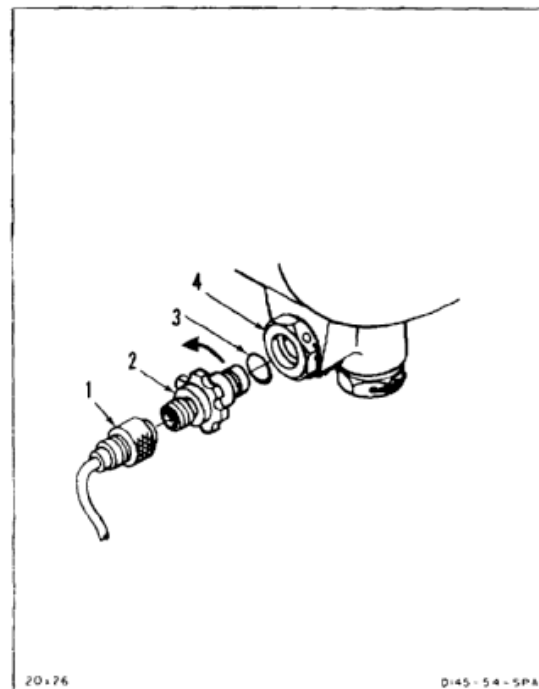
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Engine Air Inlet Screen Removed (Task 4-65)  
 Engine Transmission Fairing Removed (Task 4-70)

**NOTE**

Procedure is same to inspect plug on left or right engine transmission. Right transmission is shown here.

1. Disconnect cable plug (1).
2. Push in chip detector plug (2) and turn counterclockwise until it unlocks. Remove chip detector plug and packing (3) from body (4).



**NOTE**

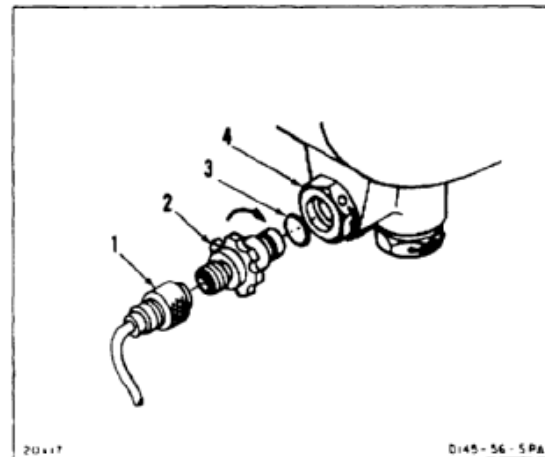
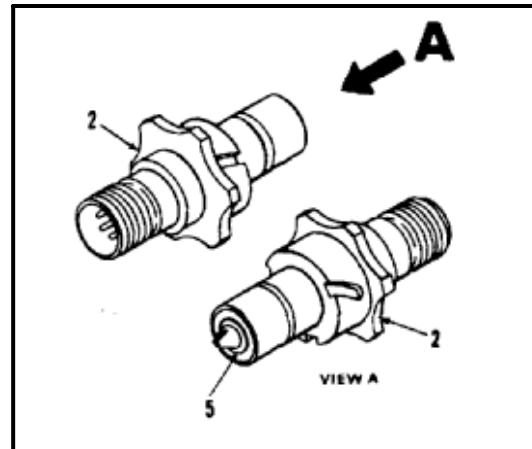
Some fuzz on tip of plug is normal.

3. Check tip (5) of plug (2) for chips. Remove any chips and save them for contamination analysis (Task 6-194).

**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

4. Clean tip (5) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry tip.
5. Check magnetism of tip (5). Tip shall lift a 1/4-28 steel nut.
6. Perform operational check of chip detector plug (2) (TM 55-1520-240-T).
7. Install chip detector plug (2) and packing (3) in body (4). Push in and turn chip detector plug clockwise to lock in place.
8. Connect cable plug (1).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install engine transmission fairing (Task 4-73).  
Install engine air inlet fairing (Task 4-75).

END OF TASK

6-668

## INITIAL SETUP

**Applicable Configurations:**Without **37****Tools:**

None

**Materials:**

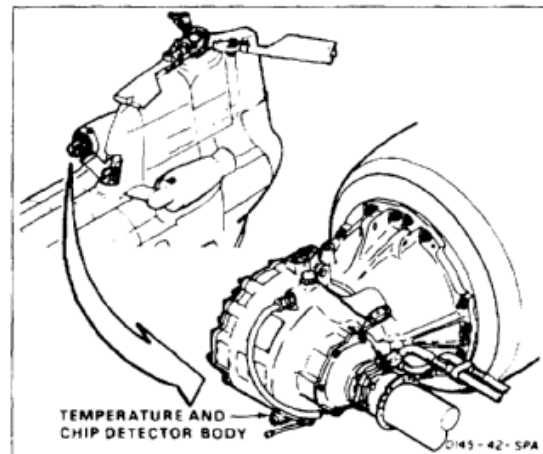
None

**Parts:**

Preformed Packing

**Personnel Required:**Medium Helicopter Repairer  
Inspector**References:**

TM 55-1520-240-23P

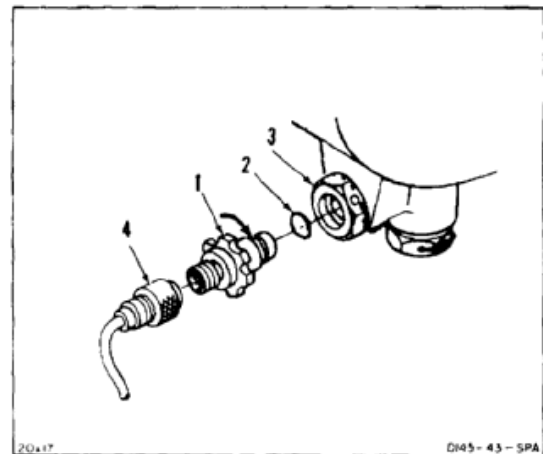
**Equipment Condition:**Operational Check of Temperature and Chip Detector  
Plug Performed (TM 55-1520-240-T)**NOTE**

Procedure is same to install plug on left or right engine transmission. Right transmission is shown here.

1. Install chip detector plug (1) and packing (2) in body (3). Push in and turn chip detector plug clockwise to lock in place.
2. Connect cable plug (4).

**FOLLOW-ON MAINTENANCE:**

Install engine transmission fairing (Task 4-73).  
Install engine air inlet fairing (Task 4-75).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**Without **37****Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 0 to 150 Inch-Pounds  
 Container, 1 Gallon  
 Modified Socket (APP E)

**Materials:**

Cloths (E120)

**Parts:**

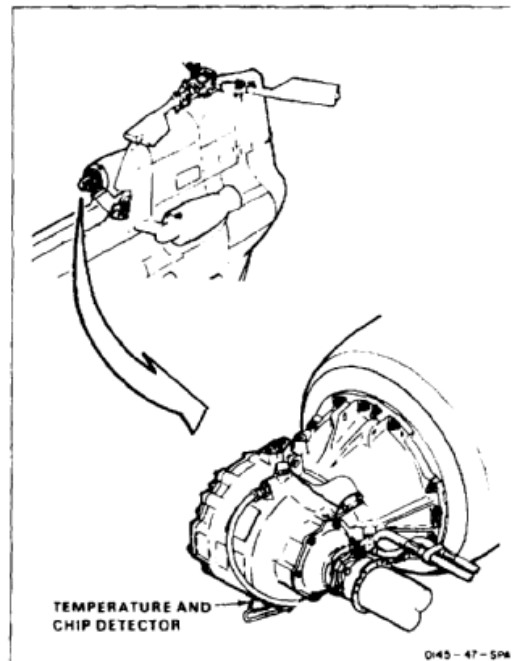
Preformed Packing

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Engine Air Inlet Screen Removed (Task 4-65)  
 Engine Transmission Fairing Removed (Task 4-70)

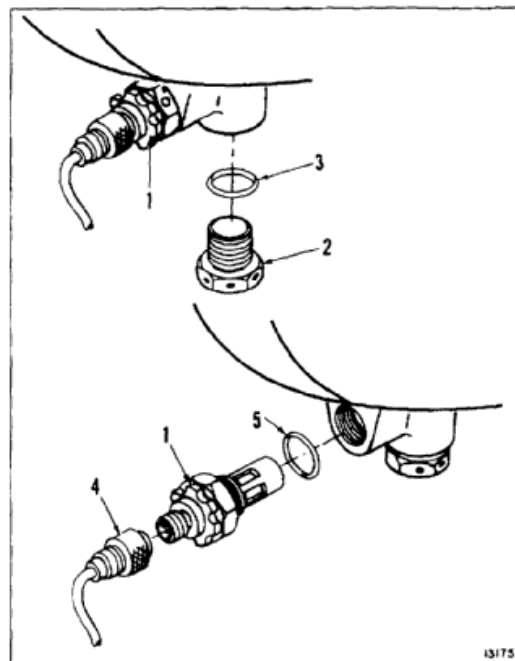
**NOTE**

Procedure is same to remove temperature and chip detector from left or right engine transmission. Right transmission is shown here.

1. Remove lockwire from detector (1) and drain plug (2).
2. Remove plug (2) and packing (3). Drain oil. Use container for oil.
3. Install plug (2) and packing (3). Torque plug to **90 inch-pounds**.
4. Wipe up any spilled oil with cloths (E120).
5. Disconnect cable plug (4).
6. Remove detector (1) and packing (5). Use modified socket (APP E).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-670

**6-207.1 FUNCTIONAL TEST OF ENGINE TRANSMISSION CHIP DETECTOR AND TEMPERATURE TRANSMITTER 6-207.1 TRANSMITTER**

**INITIAL SETUP**

**Applicable Configurations:**

All

**Tools:**

- Electrical Repairer's Tool Kit, NSN 5180-00-323-4915
- Torque Wrench, 30 to 150 Inch-Pounds
- Multimeter

**Materials:**

- Steel Hex Nut, 1/4-20 or 28
- Oil (E253 or E254)

**Personnel Required:**

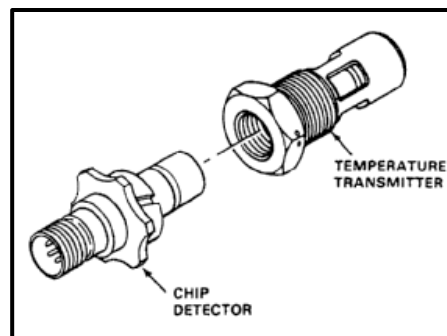
- Electrical Repairer
- Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Off Helicopter Task



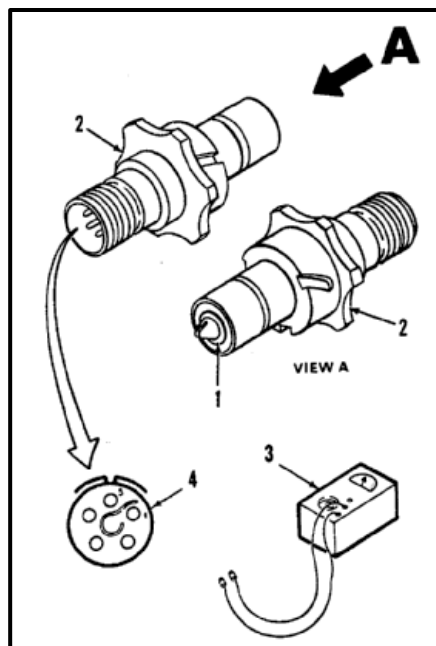
**TEST CHIP DETECTOR**

1. Test magnetism of tip (1) of chip detector plug (2). Tip shall lift a 1/4-20 or 28 steel hex nut.
2. Set range of multimeter (3) to measure resistance.
3. Bridge the gap between chip detector ring (4) and body of plug (2). Use a screwdriver or similar tool.
4. Connect the two test leads of multimeter (3) to pins of connector (4) in the order shown below. Check that multimeter indicates open (**500,000 ohms** or more) or closed (not more than **2 ohms**).

<i>Pin and Pin</i>			<i>Pin and Pin</i>		
1	2	Closed	2	3	Closed
1	3	Closed	2	4	Open
1	4	Open	3	4	Open

5. Remove tool from gap. Touch one test lead of multimeter (3) to body (2). Connect the other lead to connector pins 1 through 4 in the order shown below:

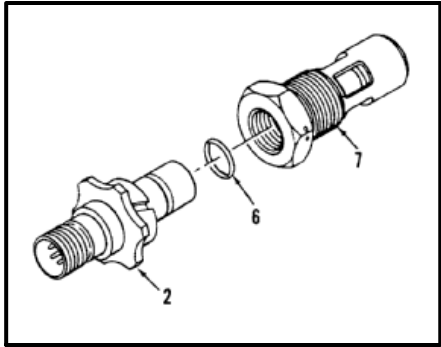
<i>Pin</i>		<i>Pin</i>	
1	Open	3	Closed
2	Closed	4	Open



**TEST TEMPERATURE TRANSMITTER**

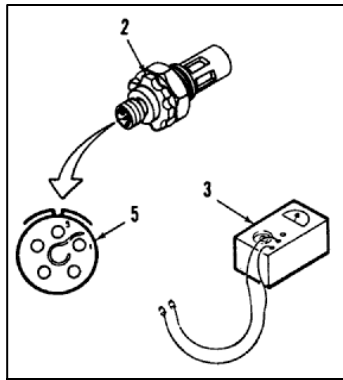
**WARNING**

Oil (E253/E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.



6. Coat packing (6) and thread of plug (2) with oil (E253 or E254). Install packing on plug.
7. Screw plug (2) into temperature transmitter (7). Torque to **43 inch-pounds**.
8. Connect the two test leads of multimeter (3) to pins of connector (4) in the order shown below. Check that multimeter indicates open (**500,000 ohms** or more) or closed (no more than **2 ohms**) as follows:

<i>Pin and Pin</i>			<i>Pin and Pin</i>		
1	2	Open	2	3	Closed
1	3	Open	2	4	Open
1	4	Open	3	4	Open



**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

**6-207.2 HIGH TEMPERATURE TEST OF ENGINE TRANSMISSION TEMPERATURE TRANSMITTER 6-207.2**

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Electrical Repairer's Tool Kit, NSN 5180-00-323-4915  
 Exhaust Gas Temperature Tester, BH112JB-53  
 Heater Probe, BH22223  
 Multimeter

**Materials:**

None

**Personnel Required:**

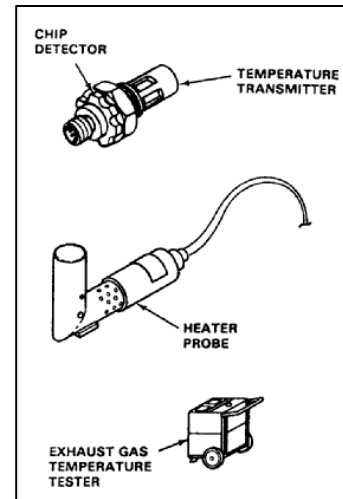
Electrical Repairer

**References:**

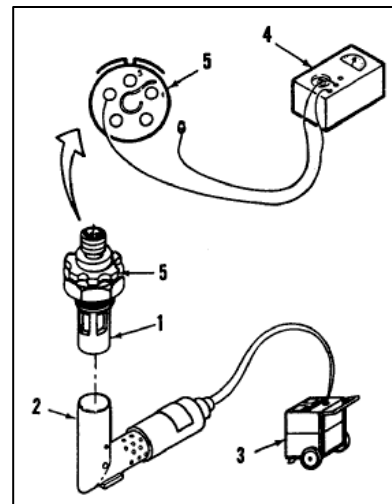
TM 55-4920-401-13&P  
 TM 55-1520-240-20P

**Equipment Condition:**

Off Helicopter Task  
 Chip Detector Installed in Temperature Transmitter  
 (Task 6-207.1)



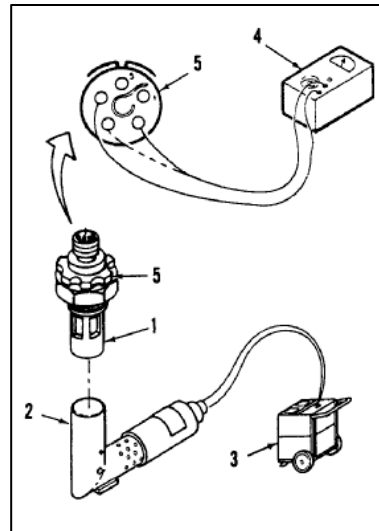
1. Connect temperature transmitter (1) to heater probe (2). Connect probe to exhaust gas temperature tester (3). (Refer to TM 55-4920-401-13&P.)
2. Set multimeter (4) to measure resistance. Connect one test lead of multimeter to pin 4 of chip detector (5). Connect the other lead to pin 3.
3. Set controls of tester (3) for **374°F**. Set MASTER POWER switch to ON and TEMPERATURE switch to OPERATE. Check that multimeter indicates open (**500,000 ohms** or more) at all temperatures up to **374°F**.



**CAUTION**

Temperature over **430°F (221°C)** can damage temperature transmitter or heater probe.

4. Using PROBE CONTROL on tester (3), increase temperature from **374°F to 405°F**. Multimeter shall indicate a closed circuit (**2 ohms** or less) by the time the unit reaches **405°F**.
5. Lower temperature to **374°F**. Multimeter shall indicate open circuit (**500,000 ohms** or more) when unit cools to **374°F** or lower.
6. Turn PROBE CONTROL on tester (3) fully counterclockwise. Turn FUNCTION SELECT and MASTER POWER switches OFF.



7. Remove test leads of multimeter (4) from chip detector (5).

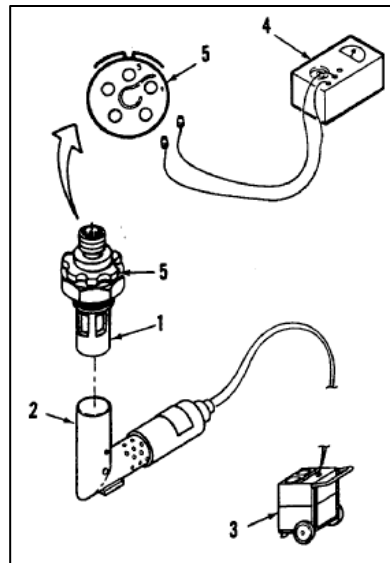
**WARNING**

Allow heater probe to cool before removing temperature transmitter. Hot probe can burn hands and fingers. If personnel are burned while handling hot probe, seek medical attention immediately.

8. Remove temperature transmitter (1) and chip detector (5) from heater probe (2).
9. Disconnect heater probe (2) from tester (3).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK



## INITIAL SETUP

**Applicable Configurations:**Without **37****Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 0 to 150 Inch-Pounds  
 Modified Socket (APP E)

**Materials:**

Lockwire (E231)

**Parts:**

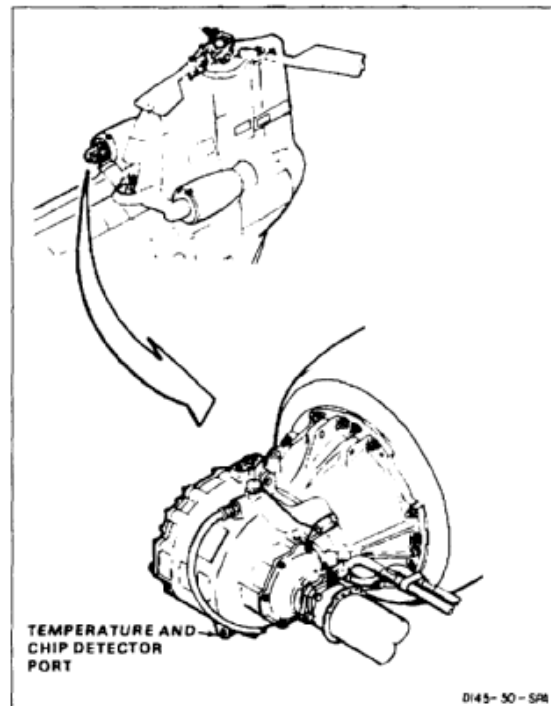
Preformed Packing

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

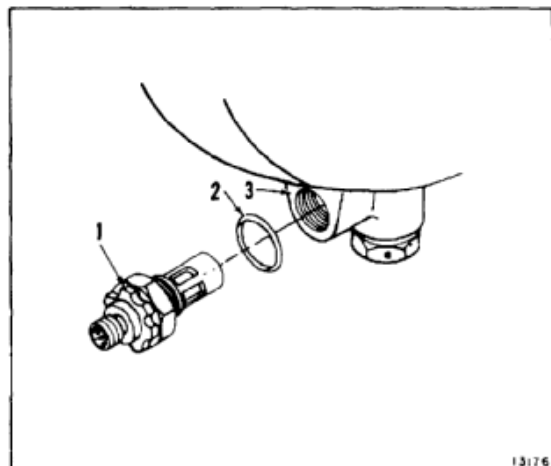
**References:**

TM 55-1520-240-23P

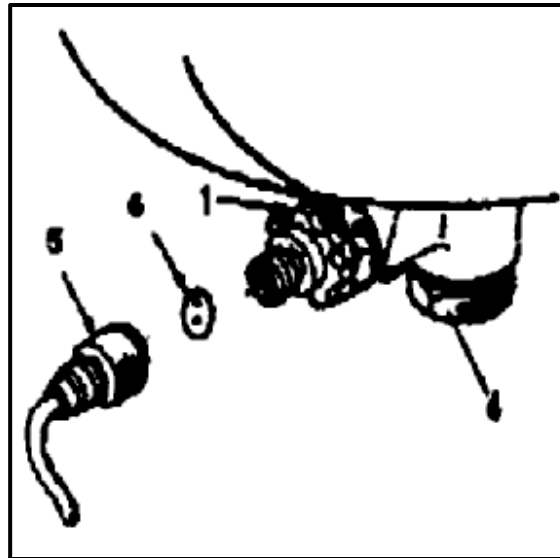
**NOTE**

Procedure is same to install temperature and chip detector on left or right engine transmission. Right transmission is shown here.

1. Install detector (1) and packing (2) in port (3). Torque detector to **90 inch-pounds**. Use modified socket (APP E).



2. Lockwire detector (1) to drain plug (4). Use lockwire (E231).
3. Interfacial seal (6) must be in place. If seal (6) is broken or missing, replace.
4. Connect cable plug (5).

***INSPECT******FOLLOW-ON MAINTENANCE:***

Perform operational check of chip detector (TM 55-1520-240-T).

Service engine transmission (Task 1-54).

Install engine transmission fairing (Task 4-73).

Install engine air inlet fairing (Task 4-75).

END OF TASK

**6-676**

## INITIAL SETUP

**Applicable Configurations:**With **37****Tools:**

None

**Materials:**

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

**Parts:**

Steel Nut, 1/4-28

**Personnel Required:**

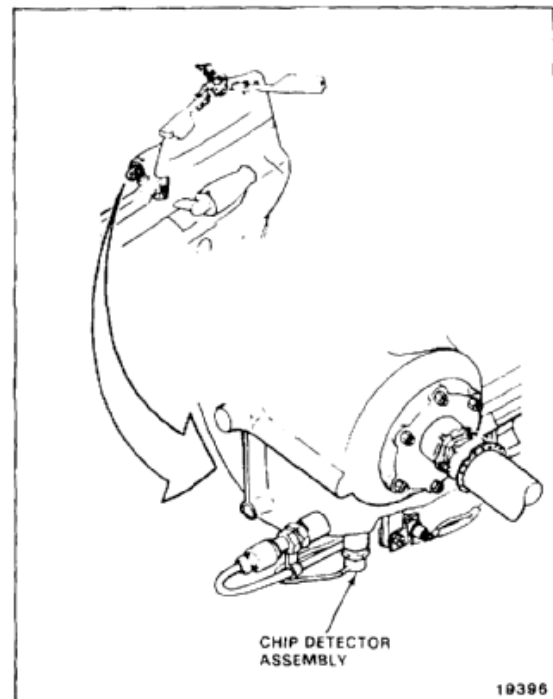
Medium Helicopter Repairer  
 Inspector

**References:**

TM 55-1520-240-23P  
 TM 55-1520-240-T

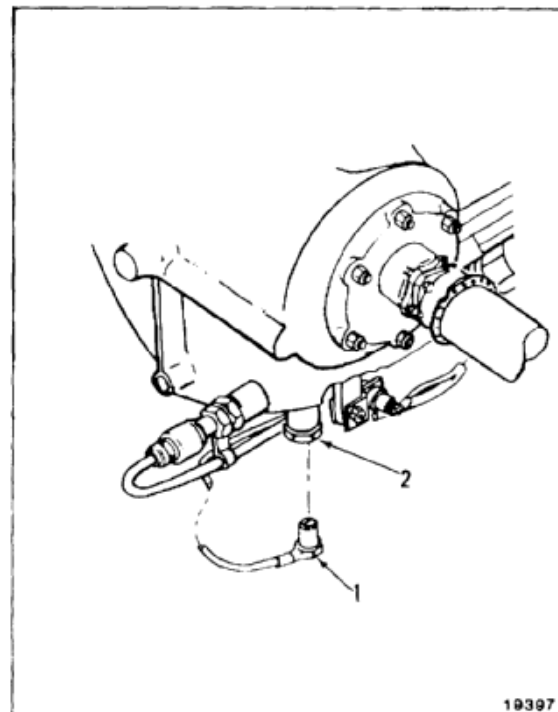
**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Engine Air Inlet Screen Removed (Task 4-65)  
 Engine Transmission Fairing Removed (Task 4-70)

**NOTE**

Procedure is same to inspect plug on left or right engine transmission. Right transmission is shown here.

1. Push in chip detector plug (1) and turn counterclockwise. Remove chip detector plug from valve (2).



**NOTE**

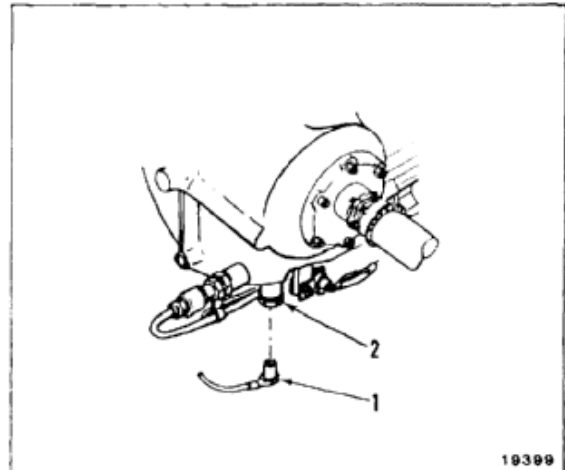
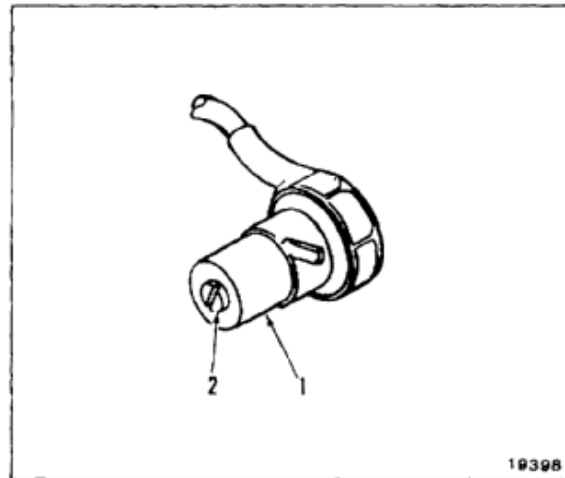
Some fuzz on tip of plug is normal.

2. Check tip (3) of plug (1) for chips. Remove any chips and save them for contamination analysis (Task 6-194).

**WARNING**

Dry cleaning solvent (E162) is flammable and toxic. It may irritate skin and cause burns. Use only in well-ventilated area away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

3. Clean tip (3) with dry cleaning solvent (E162) and cloths (E120). Wear gloves (E186). Dry tip.
4. Check magnetism of tip (3). Tip shall lift a 1/4-28 steel nut.
5. Perform operational check of chip detector plug (1) (TM 55-1520-240-T).
6. Install chip detector plug (1) in valve (2). Push in and turn chip detector plug clockwise to lock in place.

**INSPECT****FOLLOW-ON MAINTENANCE:**

Install engine transmission fairing (Task 4-73).  
Install engine air inlet fairing (Task 4-75).

END OF TASK

6-678

**6-208.2 REMOVE ENGINE TRANSMISSION CHIP DETECTOR ASSEMBLY**

6-208.2

**INITIAL SETUP****Applicable Configurations:**With **37****Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Container, 1 Gallon

**Materials:**

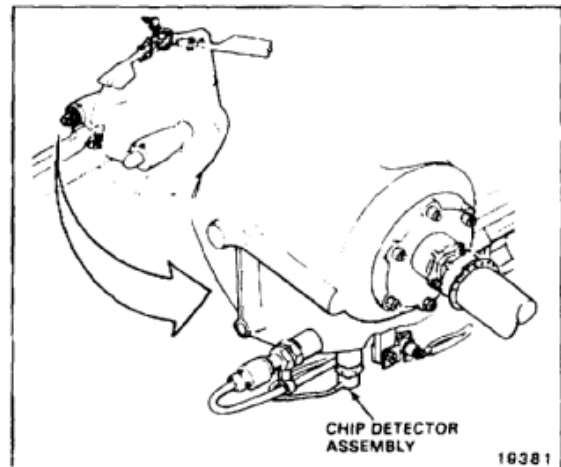
Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Engine Air Inlet Screen Removed (Task 4-65)  
 Engine Transmission Fairing Removed (Task 4-70)

**NOTE**

Procedure is same to remove chip detector assembly from left or right transmission. Right transmission shown.

**REMOVE PLUG**

1. Remove chip detector plug (1) by turning it counterclockwise and pulling it from valve (2).

**REMOVE CABLE ASSEMBLY**

2. Disconnect electrical connector (3) from assembly connector (4) at bracket (5).
3. Remove nut (6), washer (7), and clamp (8) from stud on oil jet (9). Remove clamp from cable. Loosely install clamp, nut, and washer on stud.
4. Remove lockwire from assembly connector nut (10). Remove nut. Remove connector (4) from bracket (5). Loosely install nut on connector.

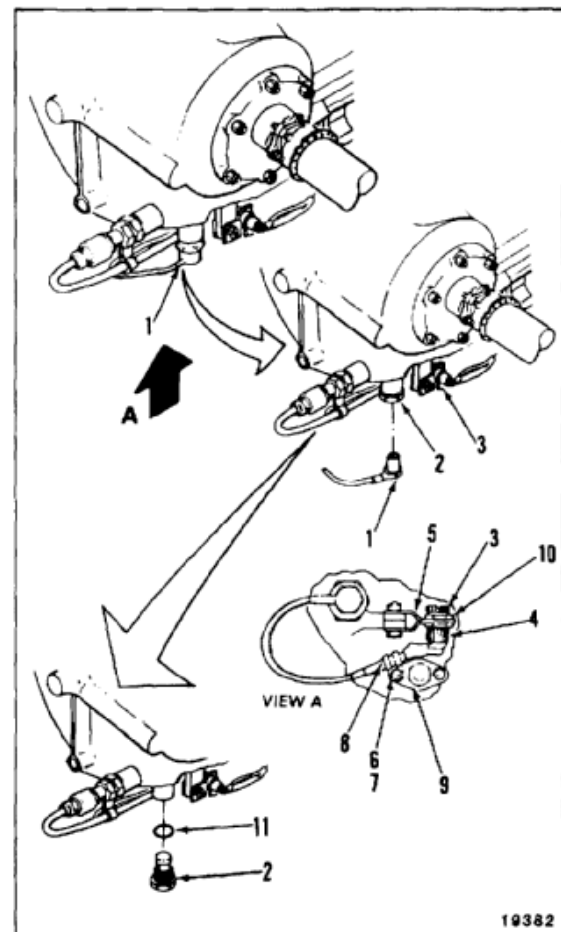
**REMOVE VALVE**

5. Remove lockwire from valve (2).
6. Place container under transmission to collect drain oil.
7. Screw valve (2) out of transmission. Let oil drain. Discard packing (11).

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK



INITIAL SETUP

**Applicable Configurations:**

With **37**

**Tools:**

- Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692
- Torque Wrench, 0 to 30 Inch-Pounds
- Torque Wrench, 0 to 150 Inch-Pounds

**Materials:**

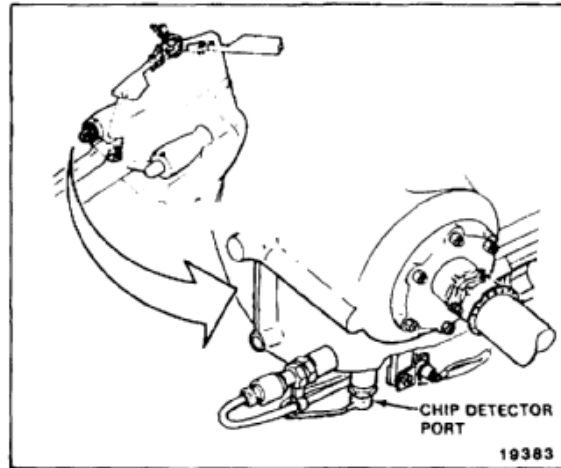
Lockwire (E231)

**Personnel Required:**

- Medium Helicopter Repairer
- Inspector

**References:**

TM 55-1520-240-23P

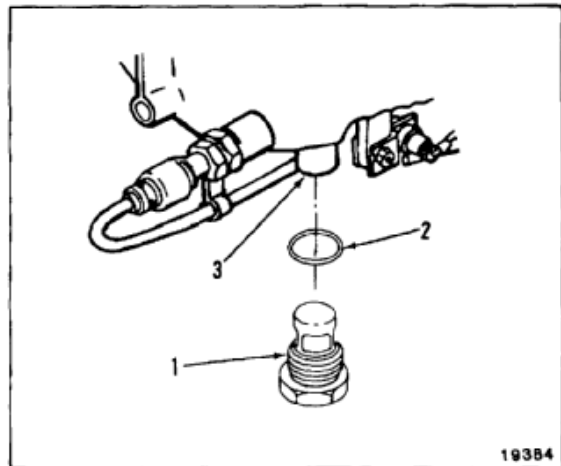


**NOTE**

Procedure is same to install chip detector assembly in right or left transmission. Right transmission shown.

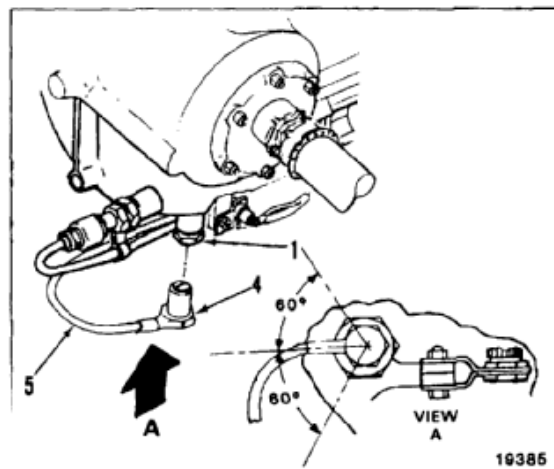
**INSTALL VALVE**

1. Install valve (1) with new packing (2) in port (3). Torque valve to **77 inch-pounds**.



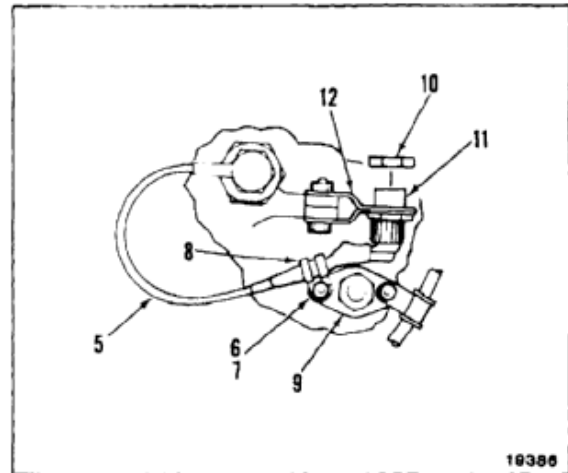
**INSTALL PLUG**

2. Install chip detector plug (4) in valve (1) by inserting and twisting it clockwise until it locks in place. Make sure cable (5) points forward within **60°** as shown.

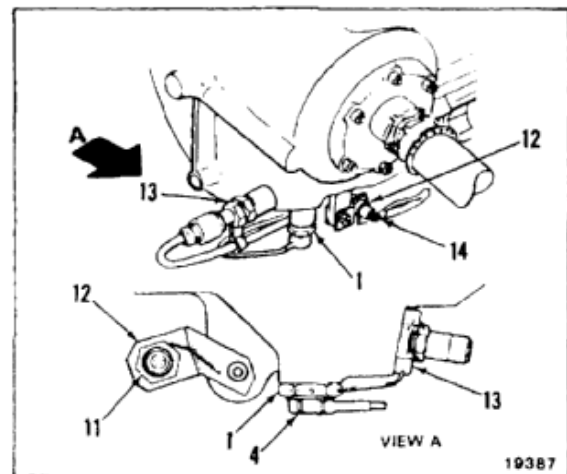


**INSTALL CABLE ASSEMBLY**

3. Remove loosely-installed nut (6), washer (7), and clamp (8) from stud on oil jet (9). Install clamp on cable (5).
4. Remove nut (10) from assembly connector (11). Install connector through bracket (12). Install nut on connector.
5. Check that cable (6) is in a smooth curve, with no kinks or sharp bends. Torque nut (11) to **45 inch-pounds**.
6. Install clamp (8), washer (7), and nut (6) on stud of oil jet (9). Torque nut to **16 inch-pounds**.



7. Lockwire chip detector valve (1) to temperature switch adapter (13). Use lockwire (E231).
8. Connect electrical connector (14) to assembly connector (11) at bracket (12).

**FOLLOW-ON MAINTENANCE:**

- Perform operational check of chip detector (TM 55-1520-240-T).
- Service engine transmission (Task 1-54).
- Install engine transmission fairing (Task 4-73).
- Install engine air inlet fairing (Task 4-75).

END OF TASK

## INITIAL SETUP

**Applicable Configurations:**With **37****Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Container, 1 Gallon

**Materials:**

Cloths (E120)

**Personnel Required:**

Medium Helicopter Repairer

**References:**

Task 6-208.2  
Task 6-208.3

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Engine Air Inlet Screen Removed (Task 4-65)  
Engine Transmission Fairing Removed (Task 4-70)

**NOTE**

Procedure is same to remove temperature switch from left or right transmission. Right transmission shown.

1. Drain transmission oil by removing chip detector plug (1) and valve (2) (Task 6-208.2). Install adapter and plug (Task 6-208.3). Do not lockwire adapter at this time.

**REMOVE SWITCH**

2. Disconnect electrical connector (3) from temperature switch (4).
3. Loosen screw (5) at clamps (6) and (7). Slide clamp assembly forward off switch (4).
4. Remove lockwire securing switch (4) to adapter (8).
5. Remove switch (4) and packing (9) from adapter (8). Discard packing.

**REMOVE ADAPTER**

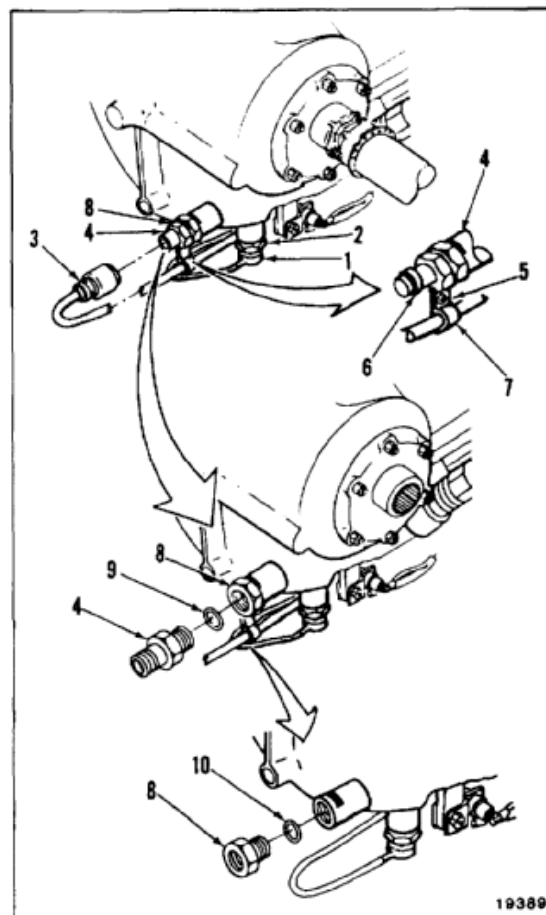
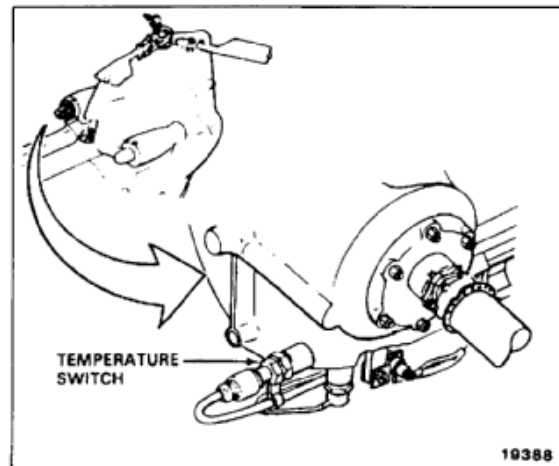
6. Remove adapter (8) and packing (10) from transmission. Discard packing.

**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

6-682





**6-208.5 INSTALL ENGINE TRANSMISSION TEMPERATURE SWITCH ASSEMBLY****6-208.5****INITIAL SETUP****Applicable Configurations:**With **37****Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
Torque Wrench, 0 to 150 Inch-Pounds

**Materials:**

Lockwire (E231)

**Parts:**

Preformed Packings

**Personnel Required:**

Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**NOTE**

Procedure is same to install temperature switch in left or right transmission. Right transmission shown.

1. Install adapter (1) with new packing (2) in the transmission port. Torque to **77 inch-pounds**.
2. Install temperature switch (3) with new packing (4) in adapter (1) Torque to **77 inch-pounds**.
3. Lockwire adapter (1) to chip detector valve (5). Lockwire switch (3) to adapter (1). Use lockwire (E231).
4. Slide clamp (5) onto switch (3). Tighten screw (6).
5. Connect electrical connector (7) to switch (3).

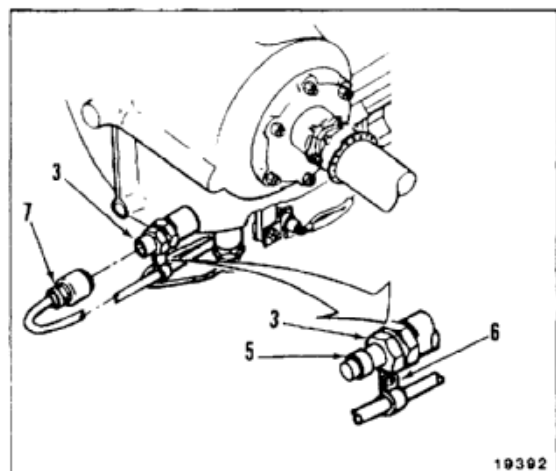
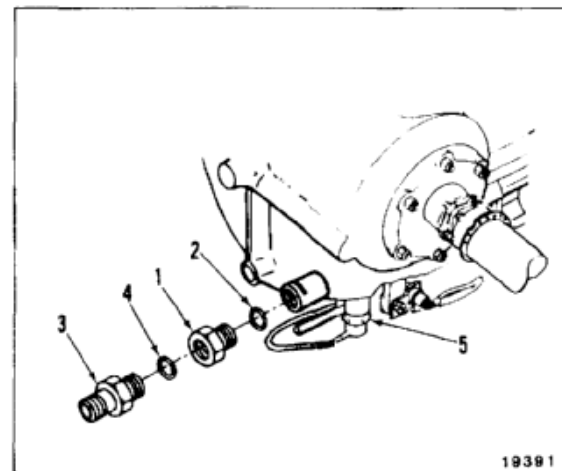
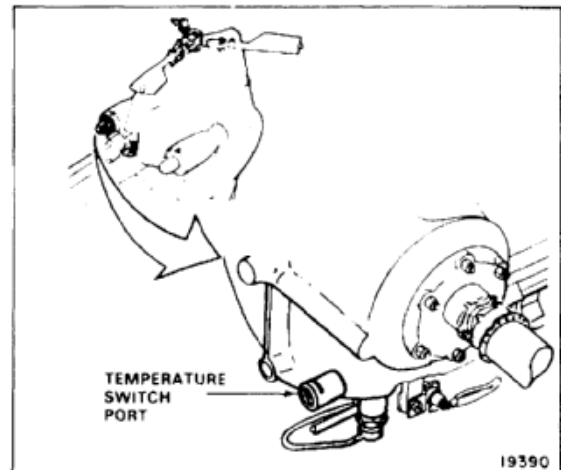
**FOLLOW-ON MAINTENANCE:**

Perform operational check of temperature switch (TM 55-1520-240-T).

Service engine transmission (Task 1-54).

Install engine transmission fairing (Task 4-73).

Install engine air inlet fairing (Task 4-75).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Barrier Material (E80)

Masking Tape (E388)

**Personnel Required:**

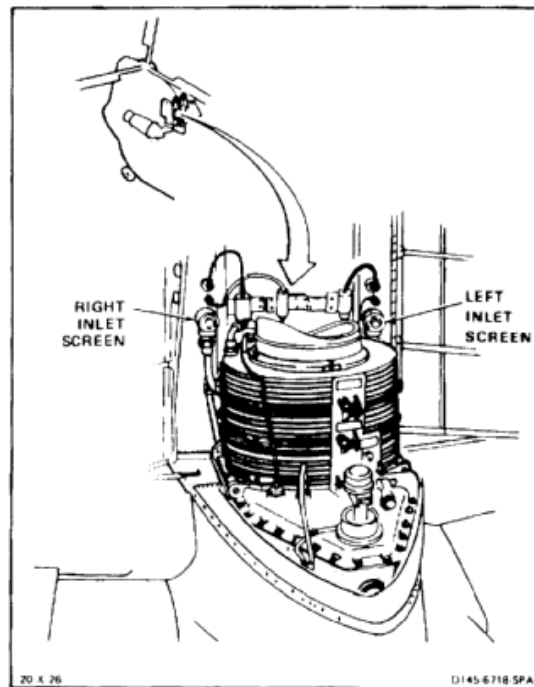
Medium Helicopter Repairer

**Equipment Condition:**

Battery Disconnected (Task 1-39)

Electrical Power Off

Aft Pylon Access Doors Open (Task 2-2)

**NOTE**

Procedure is same to remove left or right engine transmission inlet screen. Removal of right screen is shown here.

1. Remove lockwire from screen (1).

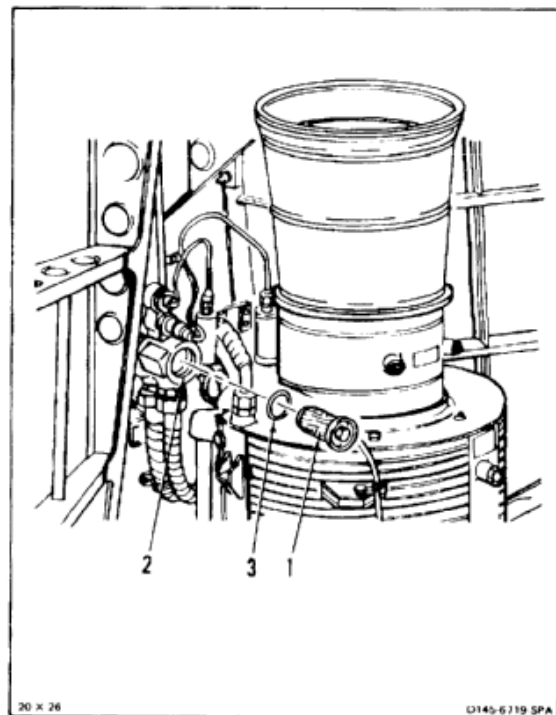


If debris enters screen housing, transmission can be damaged.

2. Remove screen (1) from housing (2). Cover opening in housing with barrier material (E80) and masking tape (E388).
3. Remove packing (3) from screen (1).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

6-684

**6-210 INSPECT ENGINE TRANSMISSION INLET SCREEN**

6-210

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

None

**Materials:**

Brush (E86)

**Personnel Required:**

Medium Helicopter Repairer

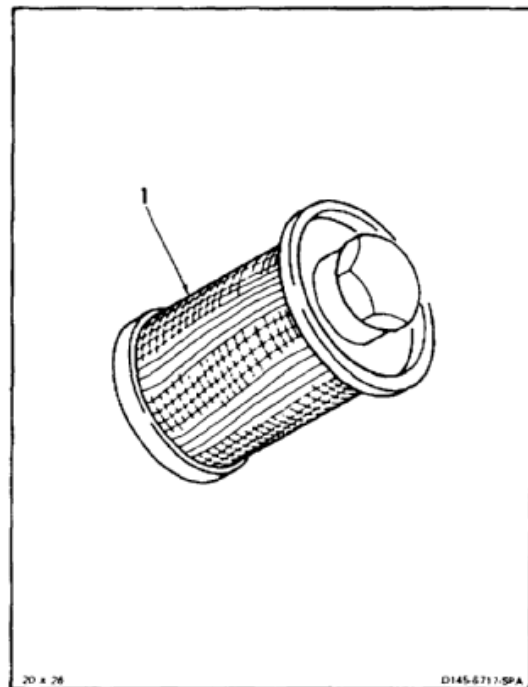
**Equipment Condition:**

Off Helicopter Task

1. Check screen (1) for bits of metal and other debris. Retain debris for contamination analysis (Task 6-108). If debris is found, reject screen.
2. Inspect screen (1) for tears. There shall be no tears.

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

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

**Materials:**

Oil (E254)  
Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

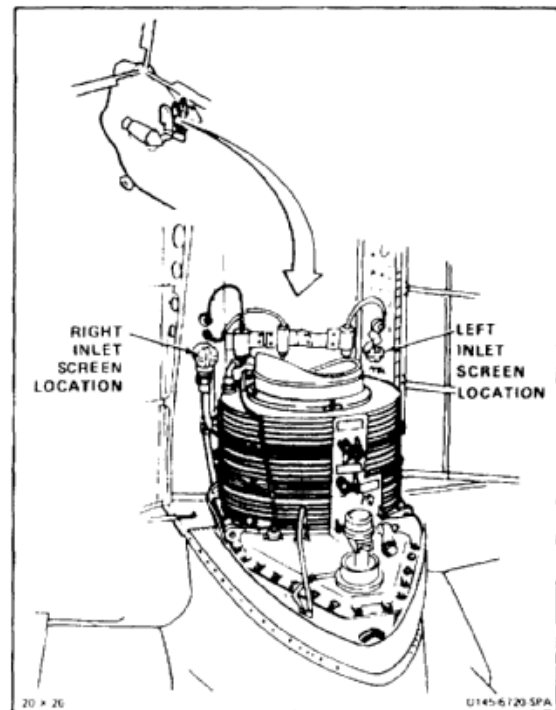
Medium Helicopter Repairer  
Inspector

**Equipment Condition:**

Engine Transmission Inlet Screen Inspected (Task  
6-210)

**References:**

TM 55-1520-240-23P



**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

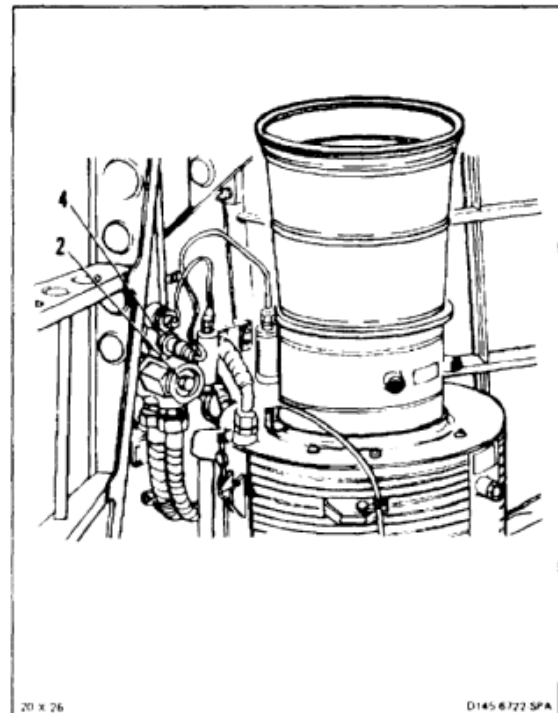
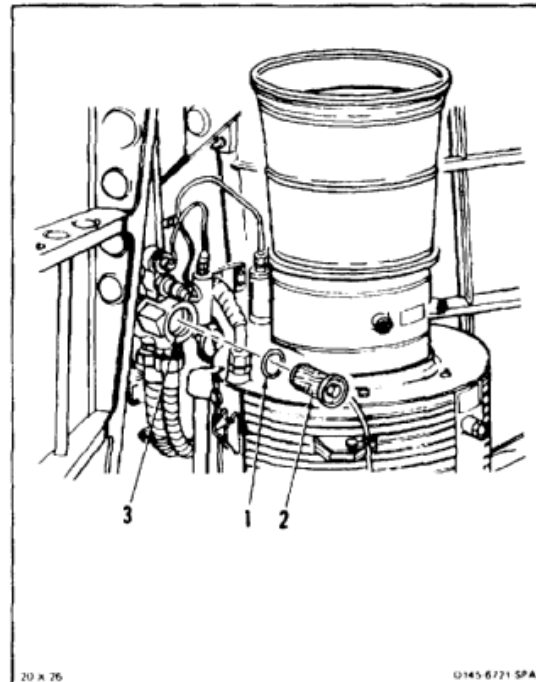
**NOTE**

Procedure is same to install left or right engine transmission screen. Installation of right screen is shown here.

1. Coat packing (1) and thread of screen (2) With oil (E254). Install packing on screen.
2. Remove tape and barrier material from cavity (3).
3. Install screen (2) in cavity (3). Torque screen to **80 inch-pounds**.
4. Lockwire screen (2) to oil pressure switch (4). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Close aft pylon access doors (Task 2-21).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
Container, 2 Quart (2)  
Hose, 1 Inch ID, 24 Inches Long  
Spanner Wrench  
Torque Wrench, 30 to 150 Inch-Pounds

**Materials:**

Oil (E254)  
Lockwire (E231)

**Parts:**

Packing

**Personnel Required:**

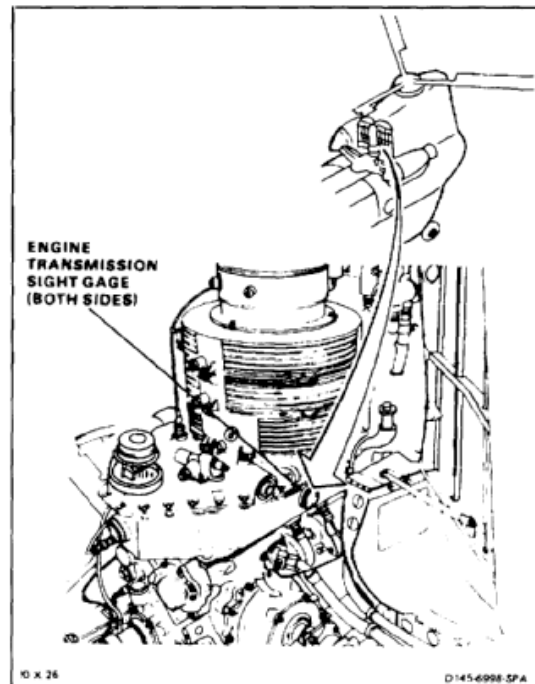
Medium Helicopter Repairer  
Inspector

**References:**

TM 55-1520-240-23P

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
Electrical Power Off  
Aft Pylon Access Doors Open (Task 2-2)  
Aft Pylon Lower Fairing Removed (Task 2-2)

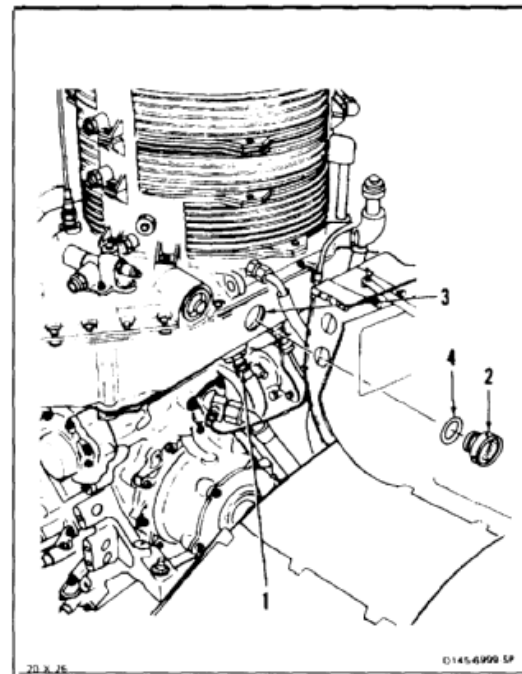


**NOTE**

Procedure is same to remove left or right engine transmission sight gage. Left gage is shown here.

**REMOVE GAGE**

1. Connect hose to drain valve (1). Direct end of hose into container.
2. Push in drain valve (1), twist, and pull. Drain oil until oil level is below sight gage (2).
3. Close drain valve (1) by pushing it in and twisting it. Disconnect hose from valve.
4. Remove lockwire from sight gage (2). Remove gage from sump (3). Use spanner wrench.

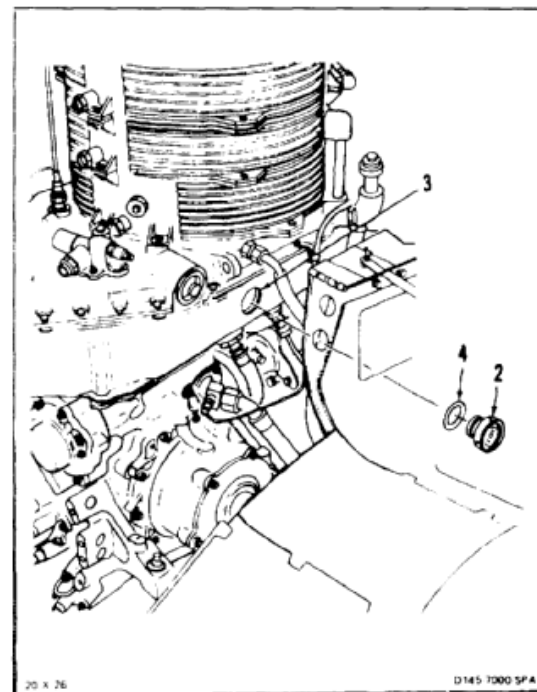


5. Remove packing (4) from sight gage (2).

**INSTALL GAGE****WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

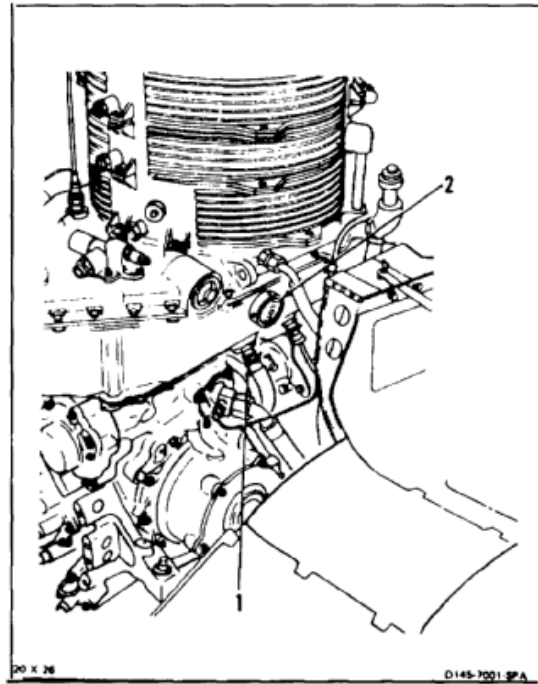
6. Coat packing (4) and thread of sight gage (2) with oil (E254). Install packing on gage.
7. Install sight gage (2) in sump (3). Use spanner wrench. Torque gage to **80 inch-pounds**.



8. Lockwire sight gage (2) to drain valve (1). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service engine transmission (Task 1-54).  
Install aft pylon lower fairing (Task 2-2).  
Close aft pylon access doors (Task 2-2).



END OF TASK

6-690



**6-212.1 REPLACE RIGHT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE****6-212.1****INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Open End Wrench, 1 Inch  
 Open End Wrench, 1-1/2 Inch  
 Funnel  
 Container, 2 Quart  
 Hose, 1 Inch ID X 36 Inches Long

**Materials:**

Cloths (E120)  
 Oil (E254)  
 Lockwire (E231)

**Parts:**

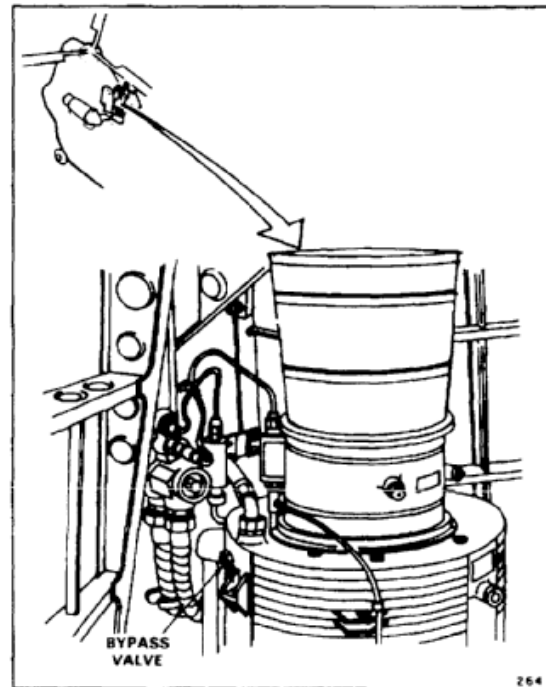
Packing

**Personnel Required:**

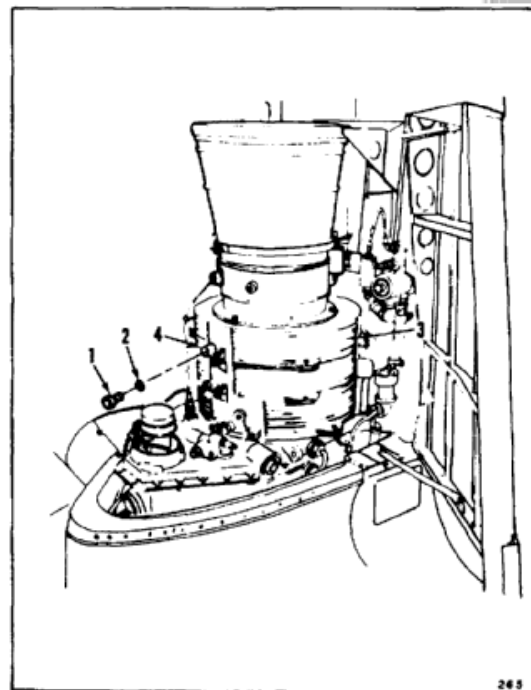
Medium Helicopter Repairer  
 Inspector

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Hinged Fairing Open (Task 2-2)

**DRAIN OIL COOLER**

1. Remove lockwire from drain plug (1).
2. Remove drain plug (1) and packing (2) from oil cooler (3). Place funnel under port (4). Drain oil through funnel into container.
3. Install plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).



**REMOVE VALVE****NOTE**

Do not let oil spill on fins of oil cooler. Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (5). Remove valve from oil cooler (3). Use cloths (E120) to absorb oil spillage.
5. Remove packing (6) from valve (5).

**INSTALL VALVE****WARNING**

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

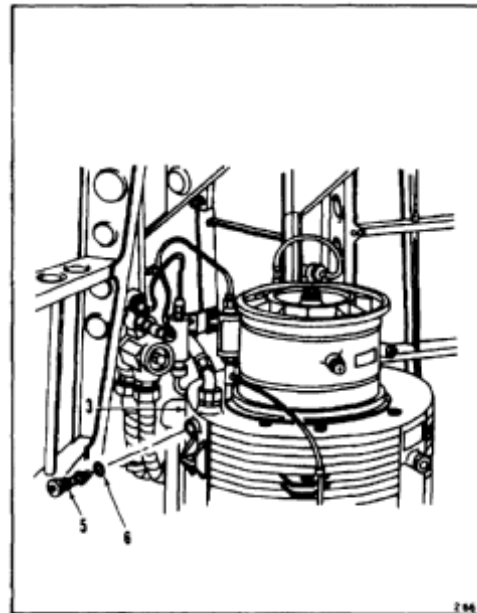
**WARNING**

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

6. Coat packing (6) and thread of bypass valve (5) with oil (E254). Install packing on valve.
7. Install valve (5) in oil cooler (3).
8. Lockwire valve (5) to oil cooler (3). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service combining transmission (Task 1-54).  
Close aft pylon doors (Task 2-2).



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
 Open End Wrench, 1 Inch  
 Open End Wrench, 1-1/24 Inch  
 Open End Wrench, 1-5/8 Inch  
 Funnel  
 Container, 2 Quart

**Materials:**

Cloths (E120)

**Parts:**

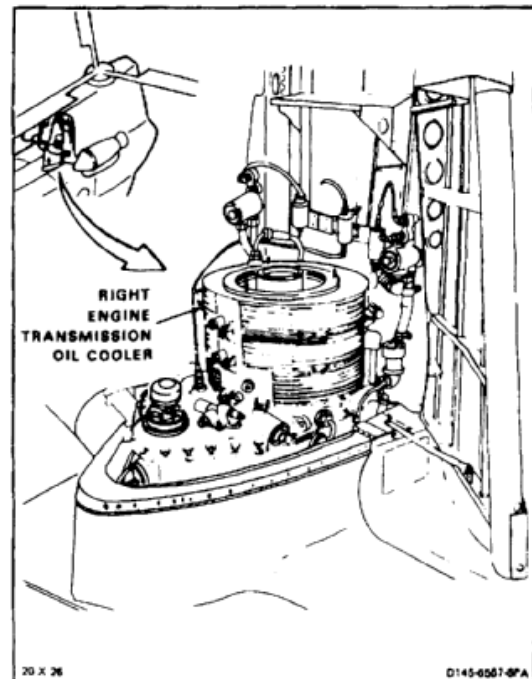
Packing

**Personnel Required:**

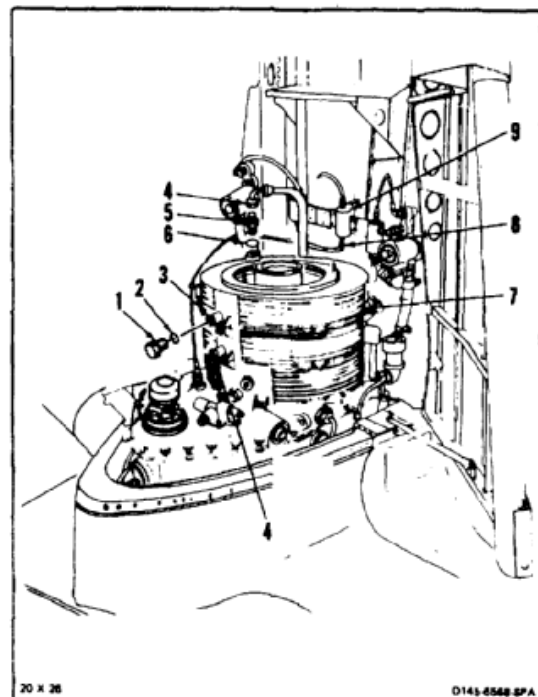
Medium Helicopter Repairer

**Equipment Condition:**

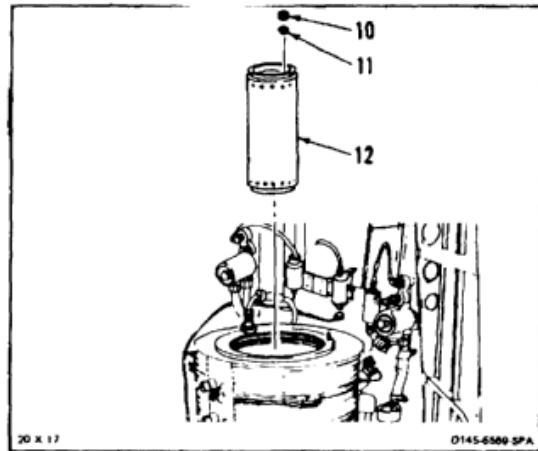
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Hinged Fairing Open (Task 2-2)  
 Oil Cooler Fan and Shaft Removed (Task 6-182)



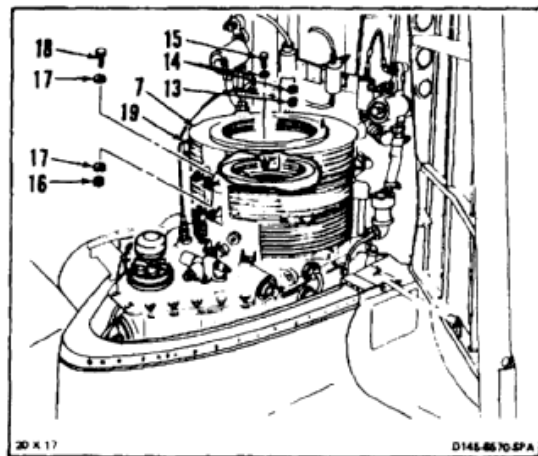
1. Remove lockwire from drain plug (1).
2. Remove drain plug (1) and packing (2). Place funnel under port (3). Drain oil through funnel into container.
3. Install drain plug (1) and packing (2).
4. Disconnect oil hose (4) from reducer (5). Remove reducer and packing (6) from cooler (7).
5. Disconnect oil hole (8) from pressure transmitter (9).



6. Remove four nuts (10) and washers (11) from baffle (12). Remove baffle.



7. Remove nuts (13), washers (14), and bolts (15) from three places around inside of cooler (7).
8. Remove nuts (16), washers (17), and bolts (18) from six places around outside of cooler (7). Remove bracket (19).



**NOTE**

Do not tilt cooler when lifting it. Oil can spill.

9. Lift cooler (7) straight up and away from cooler (20) and oil transfer tube (21).

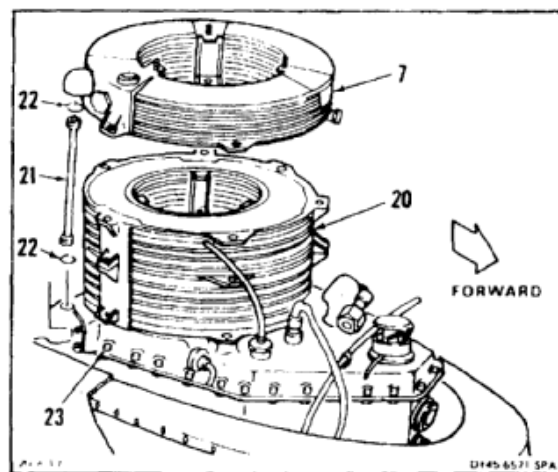
**NOTE**

Transfer tube may stay in cooler.

10. Remove transfer tube (21) and two packings (22) from sump cover (23).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

**6-213.1 REPLACE LEFT ENGINE TRANSMISSION OIL COOLER BYPASS VALVE**

6-213.1

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Wrench, 1 Inch  
 Open End Wrench, 1-1/2 Inch  
 Container, 2 Quart  
 Hose, 1 Inch ID, 36 Inches Long  
 Funnel

**Materials:**

Cloths (E120)  
 Lockwire (E231)  
 Oil (E254)

**Parts:**

Packings (2)

**Personnel Required:**

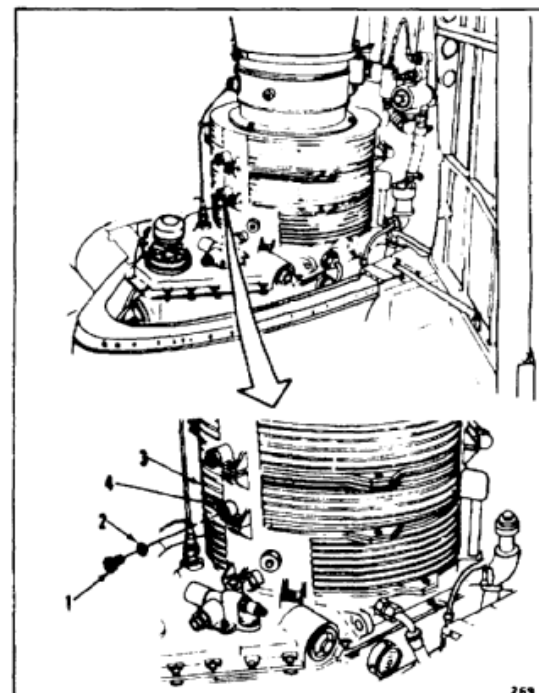
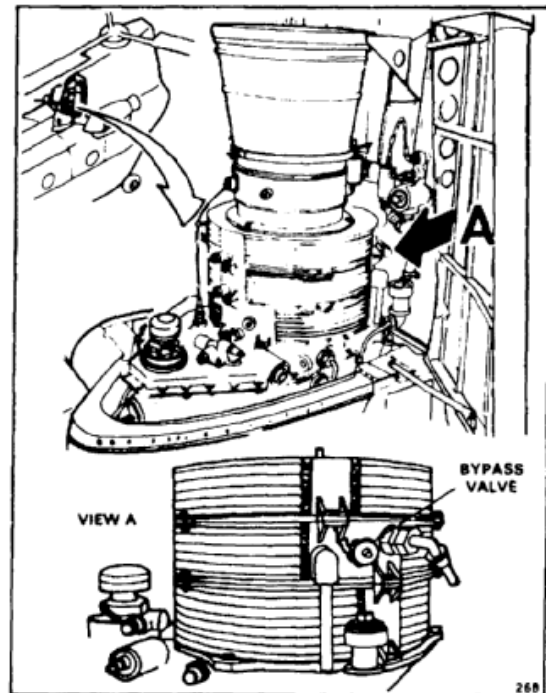
Medium Helicopter Repairer  
 Inspector

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Hinged Fairing Open (Task 2-2)

**DRAIN OIL COOLERS**

1. Remove lockwire from drain plug (1).
2. Remove drain plug (1) and packing (2) from oil cooler (3). Hold funnel under port (4). Drain oil through hose into container. Remove hose and funnel.
3. Install drain plug (1) and packing (2). Lockwire plug to oil cooler (3). Use lockwire (E231).



**REMOVE VALVE****NOTE**

Do not let oil spill on fins of oil cooler.  
Spilled oil will spray from cooler during transmission operation.

4. Remove lockwire from bypass valve (6). Remove valve from oil cooler (5). Use cloths (E120) to absorb spillage.
5. Remove packing (7) from valve (6).

**INSTALL VALVE****WARNING**

Oil (E254) is a skin irritant. If oil gets on skin, wash thoroughly. If oil soaks into clothes, change clothes immediately.

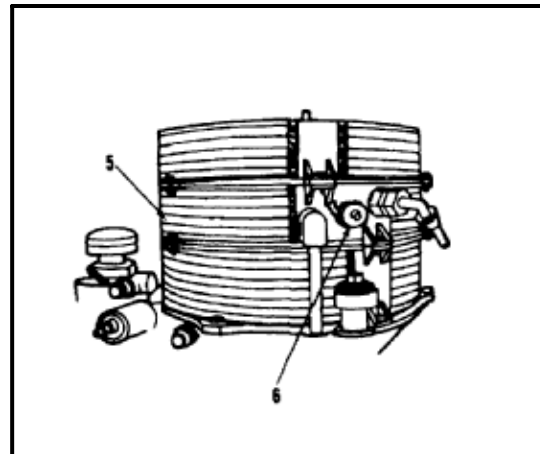
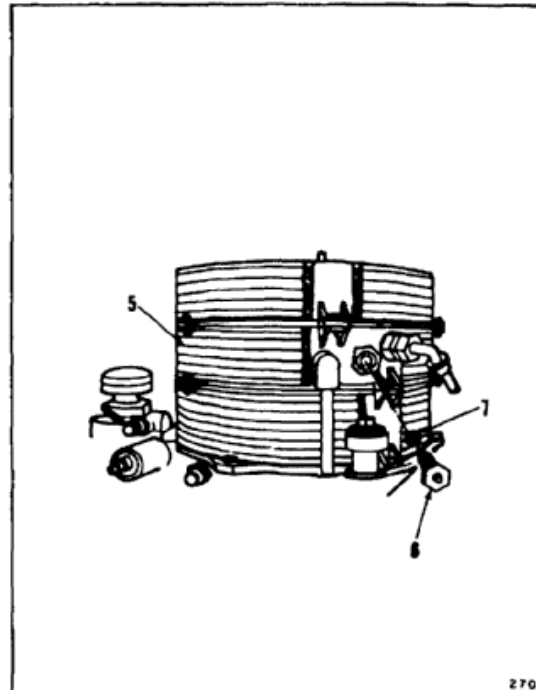
**WARNING**

Oil (E254) gives off fumes that can cause injury to personnel. Use oil in a well-ventilated area.

6. Coat packing (7) and thread of bypass valve (6) with oil (E254). Install packing on valve.
7. Install valve (6) in oil cooler (5). Torque valve to **80 inch-pounds**.
8. Lockwire valve (6) to oil cooler (5). Use lockwire (E231).

**INSPECT****FOLLOW-ON MAINTENANCE:**

Service combining transmission (Task 1-54).  
Close aft pylon doors (Task 2-2).



END OF TASK

6-696

**6-214 REMOVE LEFT ENGINE TRANSMISSION OIL COOLER**

6-214

**INITIAL SETUP****Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 51 80-00-323-4692  
 Wrench, 1 Inch  
 Open End Wrench, 1-1/2 Inch  
 Open End Wrench, 1-5/8 Inch  
 Funnel  
 Container, 2 Quart

**Materials:**

None

**Personnel Required:**

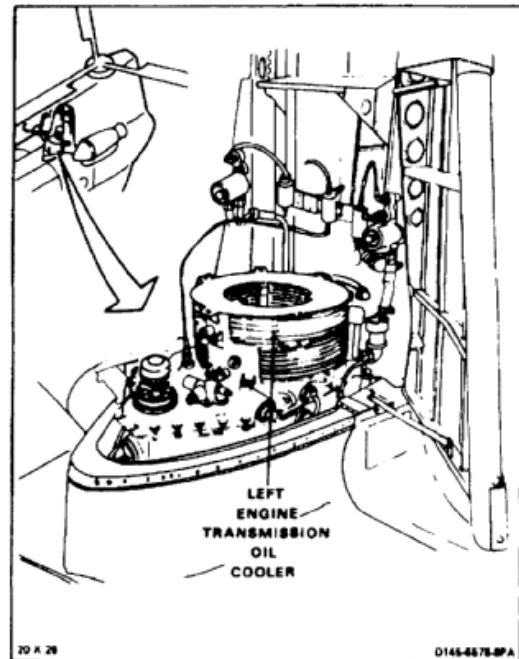
Medium Helicopter Repairer

**Parts:**

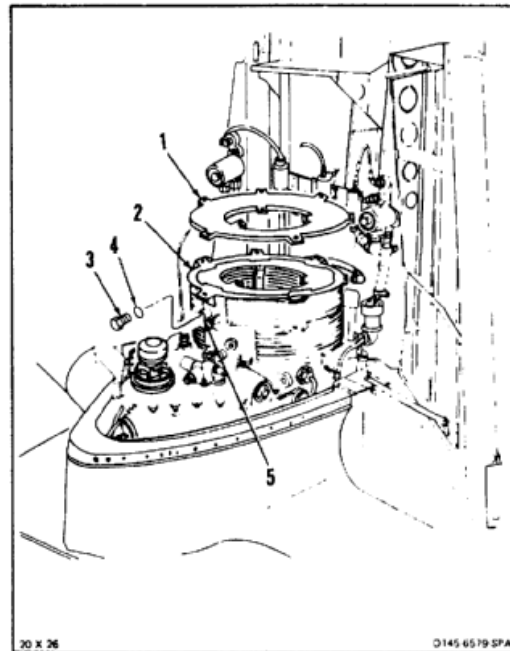
Packing

**Equipment Condition:**

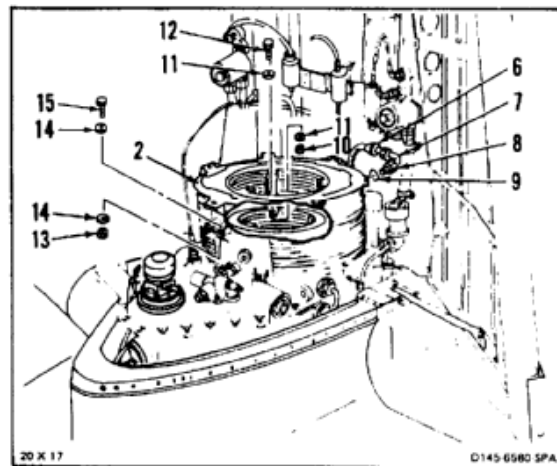
Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Pylon Hinged Fairing Open (Task 2-2)  
 Oil Cooler Fan and Shaft Removed (Task 6-182)  
 Right Engine Transmission Oil Cooler Removed (Task 6-213)



1. Remove armor plate (1) from cooler (2).
2. Remove lockwire from drain plug (3).
3. Remove drain plug (3) and packing (4). Place funnel under port (5). Drain oil through funnel into container.
4. Install drain plug (3) and packing (4).



5. Disconnect hose (6) from elbow (7). Remove elbow (7), nut (8), and packing (9) and cooler (2).
6. Remove nuts (10), washers (11), and bolts (12) from three places around inside of cooler (2).
7. Remove nuts (13), washers (14), and bolts (15) from six places around outside of cooler (2).





**NOTE**

Do not tilt cooler. Oil can spill.

8. Lift cooler (2) straight up and away from cooler (16) and oil transfer tube (17).

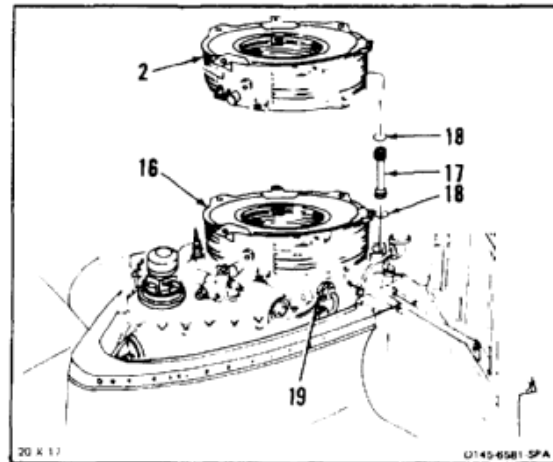
**NOTE**

Transfer tube may stay in cooler.

9. Remove transfer tube (17) and two packings (18) from sump cover (19).

**FOLLOW-ON MAINTENANCE:**

None



END OF TASK

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Dial Indicating Depth Gage 643J  
Goggles  
Fluorescent Penetrant Method

**Materials:**

Naphtha (E245)  
Emery Cloth (E123) or  
Abrasive Paper (E13)  
Crocus Cloth (E122)  
Cloths (E120)  
Gauze Sponges (E184)  
Gloves (E186)  
Acetic Acid (E21)  
Alodine Powder (E65)  
Epoxy Primer (E293)  
Black Lacquer Topcoat (E215)

**Personnel Required:**

Aircraft Powertrain Repairer  
Inspector

**References:**

TM 1-1500-335-23  
TM 1-1520-253-23

**Equipment Condition:**

Off Helicopter Task

**General Safety Instructions:****WARNING**

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

**WARNING**

Acetic acid (E21) is combustible and toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation, away from open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**WARNING**

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

**WARNING**

Epoxy primer (E293) is flammable and toxic. It can irritate skin and cause burns. Use only with adequate ventilation, away from heat or open flame. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

**CAUTION**

Do not wear photogrey glasses when fluorescent inspecting. They reduce ability to see cracks.

**NOTE**

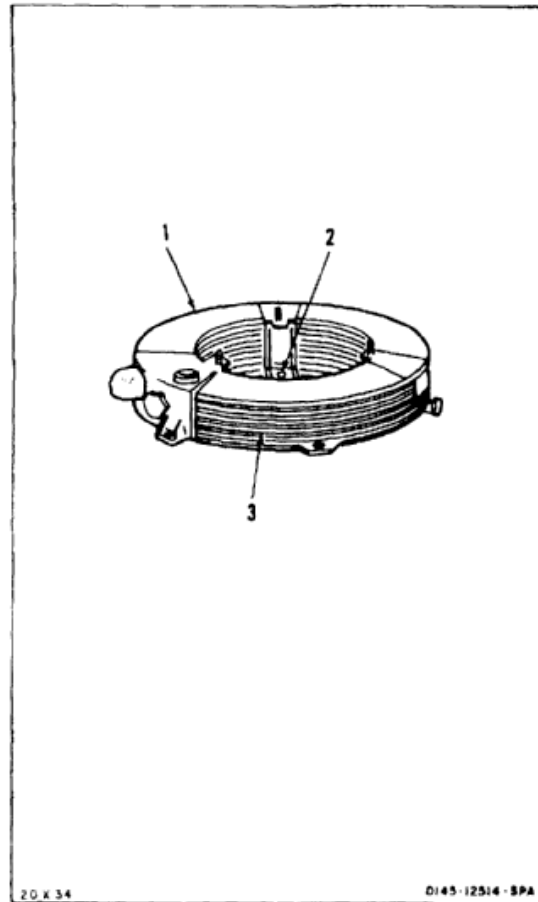
Repairable damage is limited to scratches, nicks, gouges, minor corrosion, and bent fins.

1. Clean oil and grease from damaged area. Use naphtha (E245) and clean cloths (E120). Wear gloves (E186).
2. Check extent and location of damage on cooler (1):

**NOTE**

Dimensions in this step refer to extent of damage after rework.

- a. Depth of damage shall not be more than **0.025 inch**.
  - b. Damage shall not extend over more than one surface or enter any radius.
  - c. Damage shall not be closer than **1.00 inch** to any mounting hole (2).
  - d. More than **3 inches** of fins (2) shall not be crushed beyond straightening.
3. Fluorescent inspect damaged area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If crack is suspected in the engine transmission oil cooler outside, refer to TM 1-1520-253-23.
  4. Blend out damage with emery cloth (E123) or abrasive paper (13). Observe limits of step 2.
  5. Smooth blended area with crocus cloth (E122). Do not leave any sharp edges.



6. Acid etch reworked area as follows:
  - a. Prepare solution of **3 parts** acetic acid (E21) in **7 parts** water. Wear gloves (E186) and goggles.
  - b. Swab area with solution for **2 minutes**. Use gauze sponges (E184).
  - c. Rinse area with cold water.
7. Fluorescent inspect reworked area to check for cracks (TM 1-1500-335-23). There shall be no cracks. If crack is suspected in the engine transmission oil cooler outside, refer to TM 1-1520-253-23.
8. Clean reworked area with naphtha (E245) and clean cloths (E120). Wear gloves (E186). Let area air dry.
9. Swab on solution of alodine powder (E65) and water. Use gauze sponges (E184). Swab for **2 to 5 minutes**. Rinse area with cold water and let air dry.
10. Apply epoxy primer (E293) to reworked area. Let air dry for **2 hours**.
11. Apply black lacquer topcoat (E215).

**INSPECT****FOLLOW-ON MAINTENANCE:**

None

END OF TASK

**6-702**

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Open End Wrench, 1-1/2 Inch  
 Open End Wrench, 1-5/8 Inch  
 Crow's Foot, 1-5/8 Inch

**Materials:**

Oil (E254)  
 Lockwire (E231)

**Parts:**

Packings

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

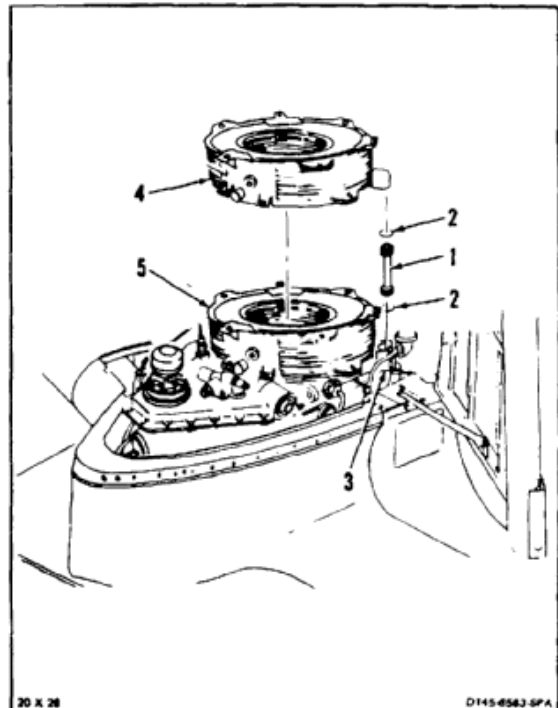
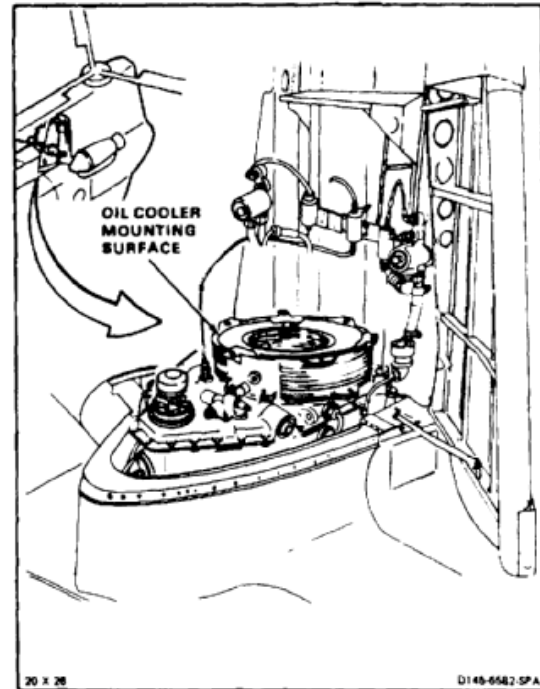
TM 55-1520-240-23P

1. Install oil transfer tube (1) and two packings (2) in sump cover (3).

**NOTE**

Do not tilt cooler. Oil can spill.

2. Install cooler (4) on cooler (5) and transfer tube (1). Press down firmly to seat cooler on tube.

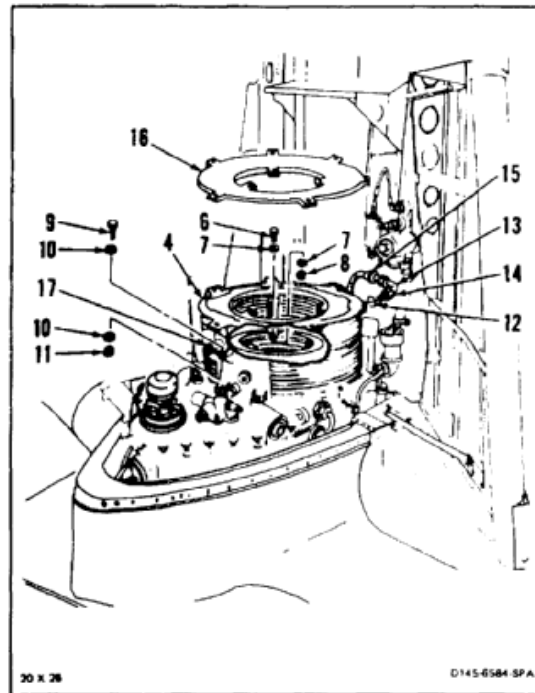


3. Install bolts (6), washers (7), and nuts (8) at three places around inside of cooler (4). Torque nuts to **70 inch-pounds**.
4. Install bolts (9), washers (10), and nuts (11) at six places around outside of cooler (4). Torque nuts to **70 inch-pounds**.

**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

5. Coat packing (12) and thread of elbow (13) with oil (E254). Install elbow and packing in cooler (4). Torque nut (14) to **80 inch-pounds**.
6. Coat thread of hose (15) with oil (E254). Connect hose to elbow (13).
7. Install armor plate (16) on cooler (4).
8. If drain plug (17) is not lockwired, lockwire plug to cooler (4). Use lockwire (E231).



**INSPECT**

**FOLLOW-ON MAINTENANCE:**

Install right engine transmission oil cooler (Task 6-216).  
 Install oil cooler fan and shaft (Task 6-186).  
 Service combining transmission (Task 1-54).  
 Close pylon hinged fairing (Task 2-2).  
 Perform ground run (TM 55-1520-240-10).

END OF TASK

6-704

## INITIAL SETUP

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanic's Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30 to 150 Inch-Pounds  
 Open End Wrench, 1-1/2 Inch  
 Open End Wrench, 1-5/8 Inch  
 Crow's Foot, 1-5/8 Inch

**Materials:**

Oil (E254)  
 Lockwire (E231)

**Parts:**

Packings

**Personnel Required:**

Medium Helicopter Repairer  
 Inspector

**References:**

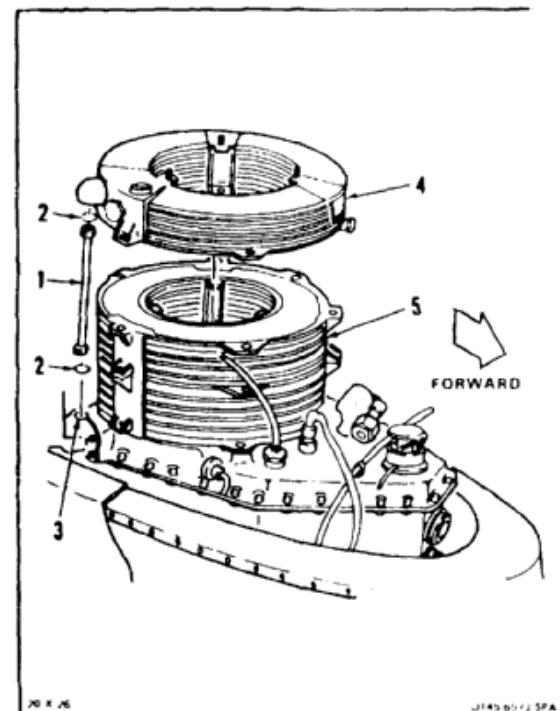
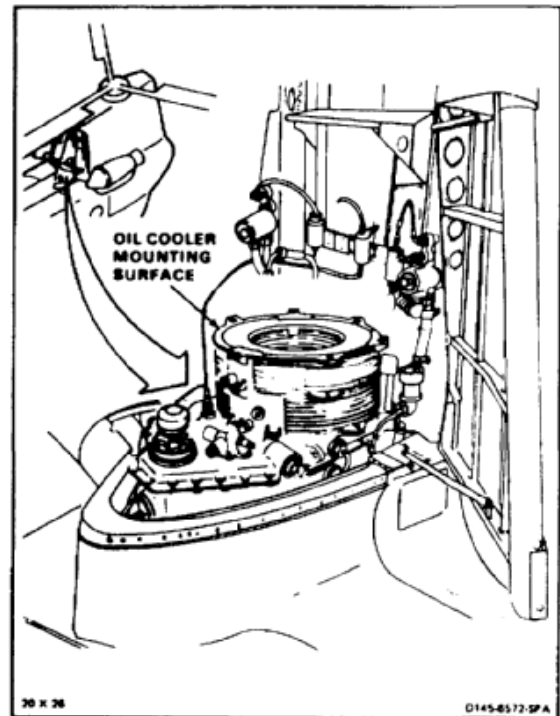
TM 55-1520-240-23P

1. Install oil transfer tube (1) and two packings (2) in sump cover (3).

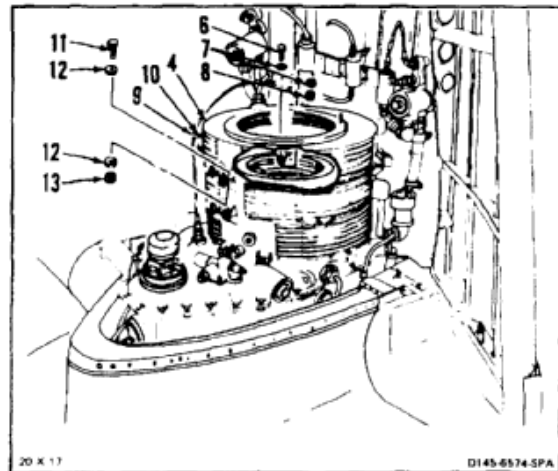
**NOTE**

Do not tilt cooler. Oil can spill.

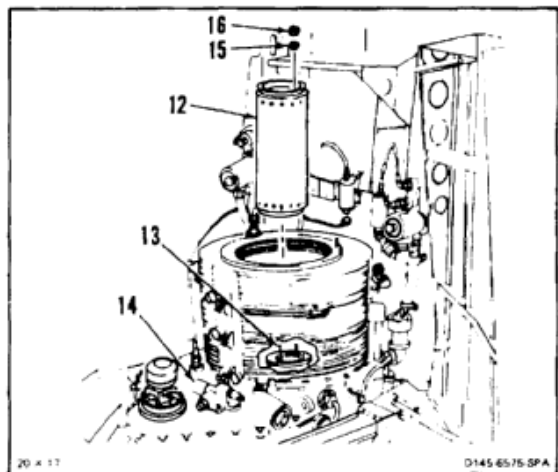
2. Install cooler (4) on cooler (5) and transfer tube (1). Press down firmly to seat cooler on tube.



3. Install bolts (6), washers (7) and nuts (8) at three places around inside of cooler (4). Torque nuts to **70 inch-pounds**.
4. Position bracket (9) on mounting lug (10). Install bolts (11), washers (12) and nuts (13) at six places around outside of cooler (4). Torque nuts to **70 inch-pounds**.



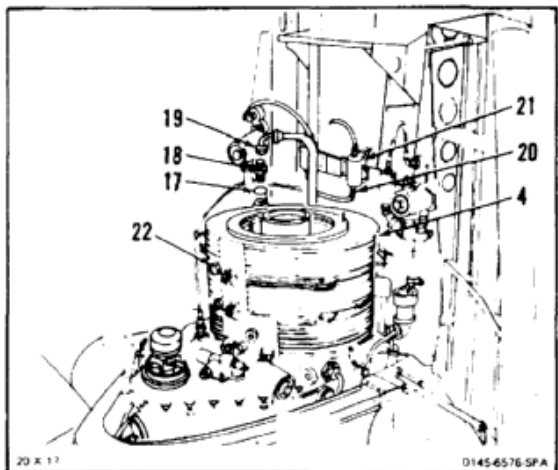
5. Install baffle (12) on four studs (13) on sump cover (14). Install washers (15) and nuts (16). Torque nuts to **70 inch-pounds**.



**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes for at least **15 minutes**. Get medical attention for eyes.

6. Coat packing (17) and thread of reducer (18) with oil (E254). Install reducer, with packing, in cooler (4). Torque reducer to **80 inch-pounds**.
7. Coat thread of hose (19) with oil (E231). Connect hose to reducer (18).
8. Connect hose (20) to pressure transmitter (21).
9. If drain plug (22) is not lockwired, lockwire plug to cooler (4). Use lockwire (E231).





***INSPECT******FOLLOW-ON MAINTENANCE:***

- Install oil cooler fan and shaft (Task 6-186).
- Service combining transmission (Task 1-54).
- Close pylon hinged fairing (Task 2-2).
- Perform ground run (TM 1-1520-240-10).

END OF TASK

**INITIAL SETUP**

**Applicable Configurations:**

All

**Tools:**

Aircraft Mechanics Tool Kit, NSN 5180-00-323-4692  
 Torque Wrench, 30-150 Inch-Pounds  
 Torque Wrench, 150-750 Inch-Pounds

**Materials:**

Marking Pencil (E270.1)  
 Oil (E254)  
 Grease (E190)  
 Dry Cleaning Solvent (E162)  
 Cloth, Cleaning (E120)  
 Gloves (E184.1)  
 Goggles (E473)

**Personnel Required:**

CH-47 Helicopter Repairer  
 Inspector  
 Rotary Wing Aviators (2)

**References:**

Task 1-89

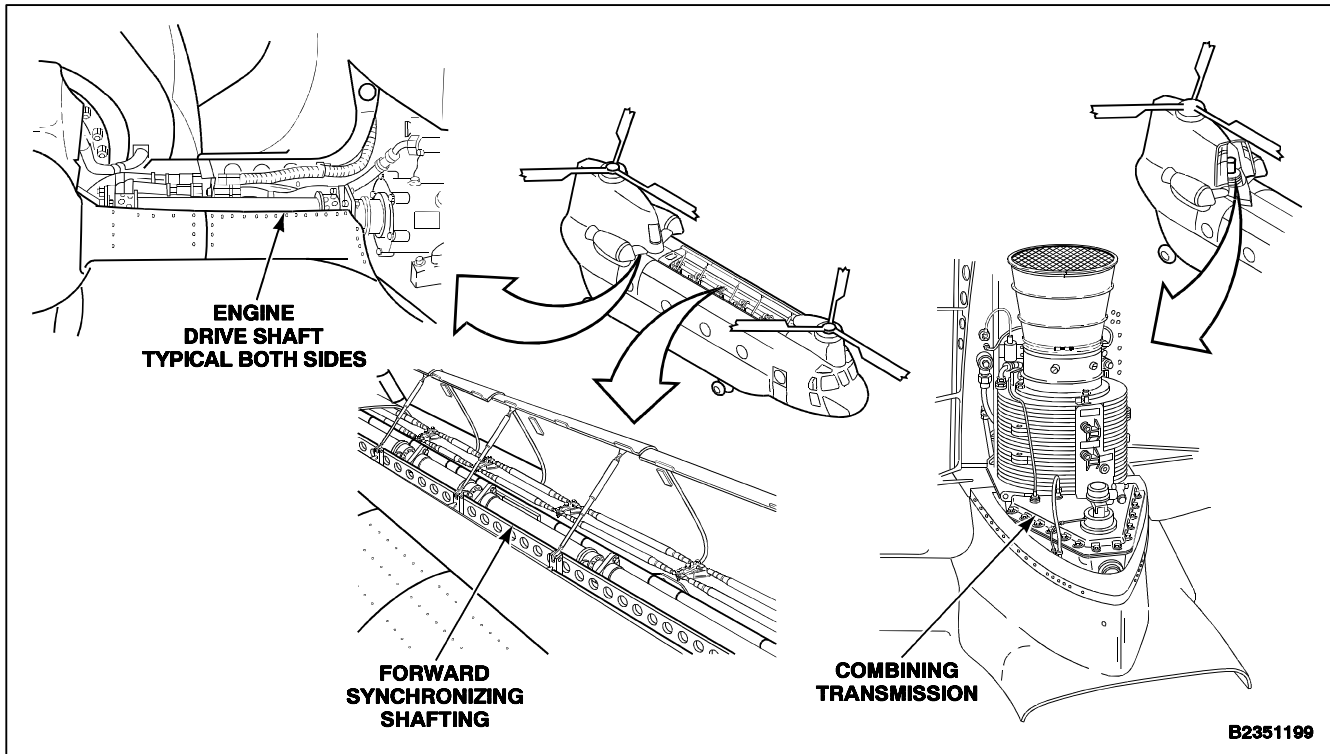
Tasks 6-2 thru 6-6  
 Tasks 6-8 thru 6-10  
 Tasks 6-12 thru 6-19  
 Task 6-30  
 Task 6-30.2  
 Task 6-30.3  
 Task 6-32  
 Task 6-182  
 Task 6-186  
 TM 1-6625-724-13&P  
 TM 1-1520-240-10

**Equipment Condition:**

Battery Disconnected (Task 1-39)  
 Electrical Power Off  
 Hydraulic Power Off  
 Pylon Hinged Fairing Open (Task 2-2)  
 Pylon Lower Fairing Open (Task 2-2)  
 Engine Drive Shaft Access Covers Removed (Task 2-2)  
 Engine Air Inlet Screens Removed (Task 4-65)  
 Engine Transmission Fairing Access Covers Open (Task 2-2)

**NOTE**

For vibration analysis setup procedures with the AVA go to TM 1-6625-724-13&P.



B2351199

**ENGINE DRIVE SHAFTS**

**NOTE**

Adjust No. 1 and No. 2 engine drive shaft in the same way. No. 2 engine drive shaft shown.

1. Inspect adapter assemblies (1 and 2) at each end of shaft (3) (Task 6-30.1).
2. Loosen nuts (4) at adapter assemblies (1 and 2) of shaft (3). Hold bolt heads to keep bolts from turning.



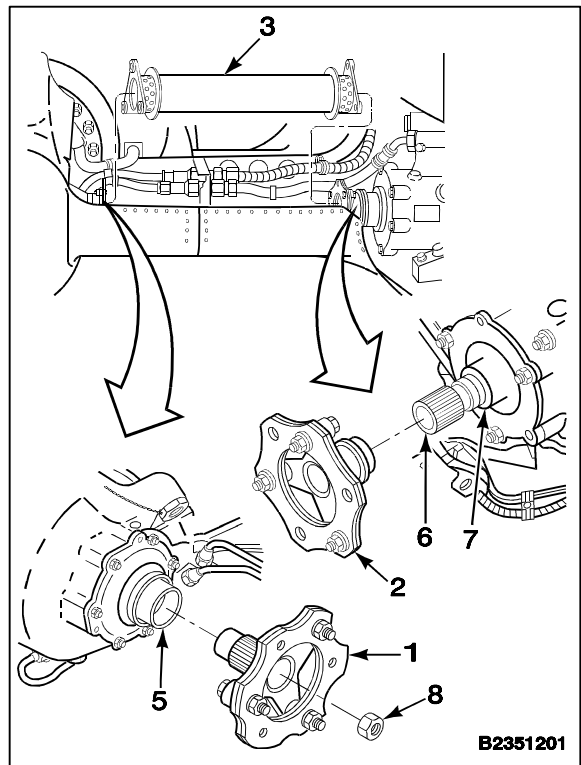
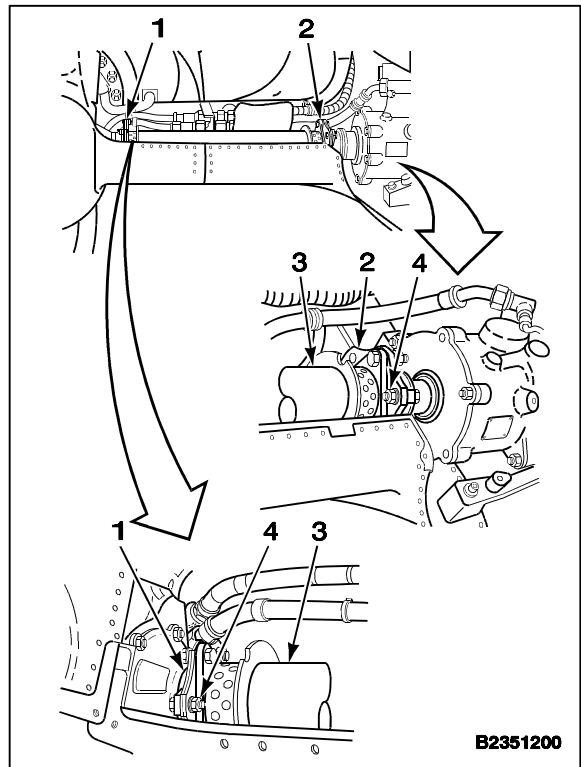
If bolts are allowed to turn, bolts, plates and shaft adapter assembly can be damaged.

3. Torque nuts (4) to **440 inch-pounds**.
4. Perform a vibration check for engine drive shafts. If vibration is not greater than **1.0 ips**, go to Follow-On Maintenance. If check is unsatisfactory (vibration greater than **1.0 ips**), continue with step 5.
5. Match-mark each drive shaft (3) to adapters (1 and 2). Match-mark adapter (1) to engine transmission (5) and adapter (2) to combining transmission (6). Use a marking pencil (E270.1).
6. Remove drive shaft (3) and adapters (1 and 2) (Task 6-30). Inspect shaft and adapters (Task 6-30.2). Check interior of shaft for water and foreign objects.



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

7. Clean splines on adapters (1 and 2), splines (7) on combining transmission (6), thread of nut (8), and mating stud within engine transmission (5). Use solvent (E162) and cloths (E120). Wear gloves (E184.1).
8. Inspect all splines for wear or damage.
9. Install adapters (1 and 2) and drive shaft (3) (Task 6-32). Make sure all match-marks line up.



10. Repeat step 4. If check is still unsatisfactory, continue with step 11.
11. Perform engine drive shaft vibration check with No. 1 engine at minimum beep and rpm re-established at **100 percent** with No. 2 engine only.
12. Repeat the check of step 11 with No. 2 engine at minimum beep and rpm re-established at **100 percent** with No. 1 engine only.
13. Shut down engines (TM 1-1520-240-10).

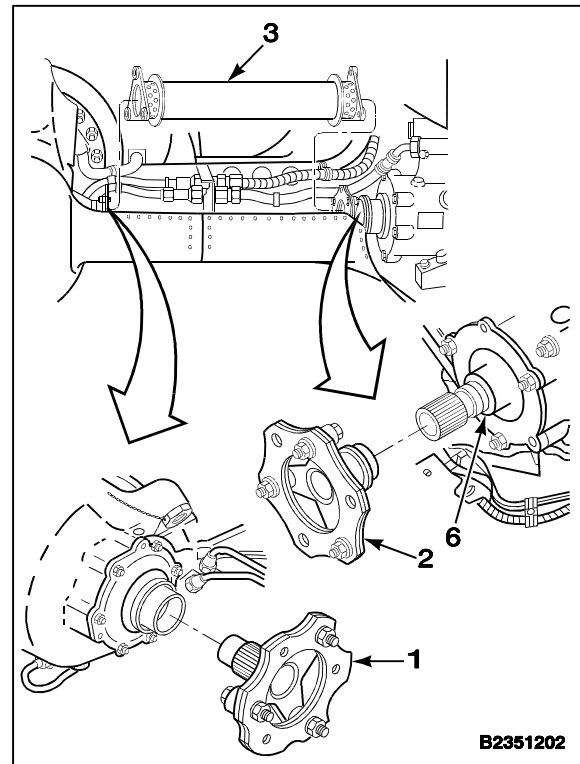
**NOTE**

No. 2 engine drive shaft is shown.  
No. 1 shaft is similar.

14. Compare vibration readings of steps 11 and 12. If readings of step 12 are higher, perform steps a thru d on No. 2 engine drive shaft (3). If readings of step 11 are higher, perform steps a thru d on No. 1 shaft.
  - a. Match-mark adapters (1 and 2) to shaft (3). Use a marking pencil (E270.1).
  - b. Remove shaft (3) (Task 6-30).
  - c. Remove adapter (2) from combining transmission (6) (Task 6-30). Rotate it **90°** clockwise facing combining transmission input pinion and reinstall it (Task 6-32).
  - d. Align match-marks on adapters (1 and 2) and shaft (3). Reinstall the shaft (Task 6-32).
15. Repeat step 6. If check is still unsatisfactory, repeat steps 11 thru 14 a maximum of **two times**. If vibration still exceeds **1.0 ips**, replace the fan (Tasks 6-182 and 6-186).

**NOTE**

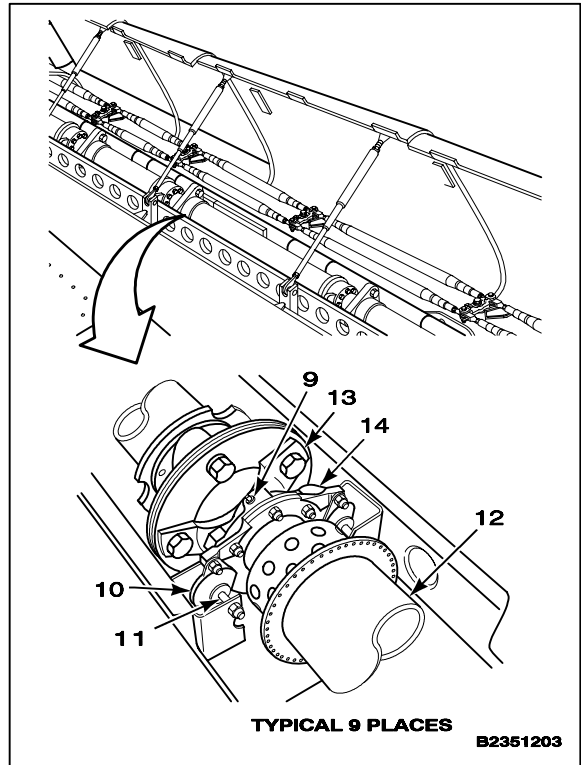
If fan has been replaced, repeat entire vibration analysis.



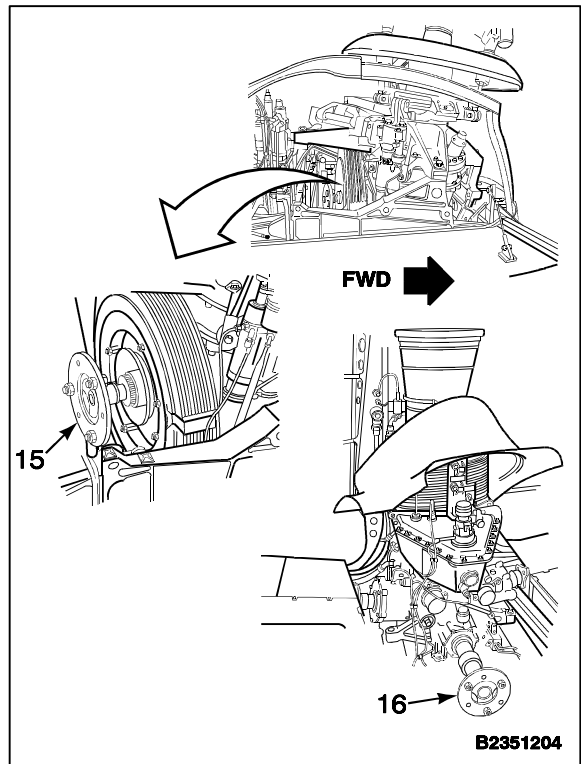
B2351202

**SYNCHRONIZING SHAFTING**

- 16. Lubricate shafting bearings at fitting (9) (Task 1-89).
- 17. Inspect shafting mounts (10) at six places (Task 6-10). Replace bushings (11) if binding or excessive play is noted (Tasks 6-13 thru 6-15).
- 18. Check each of seven shafts (12) and six adapter assemblies (13) for damage (Task 6-10). Replace any damaged shaft (Tasks 6-2 thru 6-4 and 6-17 thru 6-19).
- 19. Inspect each drive shaft support (14) for signs of overheating. If overheating is indicated, replace the support bearing (Tasks 6-12 and 6-16).



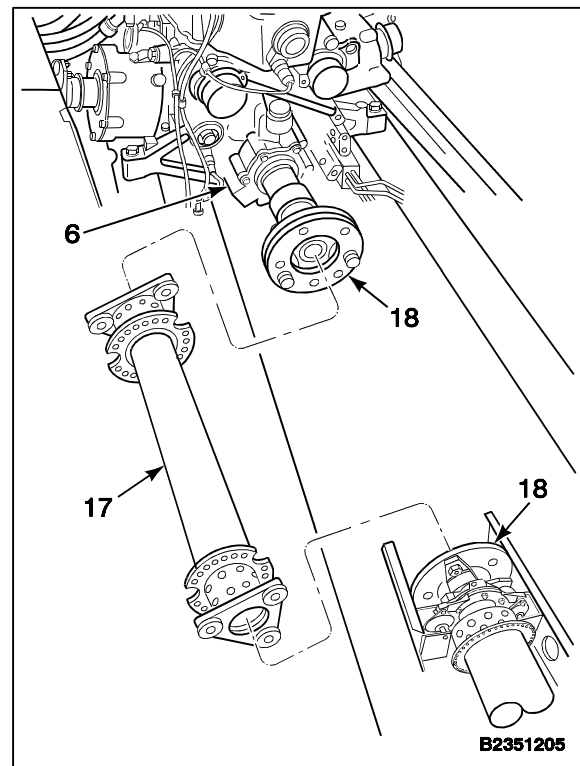
- 20. Remove, lubricate, and reinstall forward transmission adapter assembly (15) (Tasks 6-5 and 6-8).
- 21. Remove, lubricate, and reinstall combining transmission forward output shaft adapter (16) (Tasks 6-6 and 6-9).
- 22. Perform a ground run vibration check for synchronizing shaft vibration. If check is unsatisfactory, (vibration greater than **0.7 ips**), continue with step 23.



23. Reposition combining transmission forward output shaft pinion adapter (16) as follows:
- Match-mark combining transmission forward output shaft pinion adapter (16) to combining transmission (6). Match-mark No. 7 shaft (17) to No. 6 shaft (18). Use a marking pencil (E270.1).
  - Remove No. 7 shaft (Task 6-4).
  - Remove adapter (16) from transmission (6) (Task 6-6). Rotate it  $120^{\circ}$  clockwise and reinstall it (Task 6-9).
  - Reinstall No. 7 shaft (17) (Task 6-19) according to No. 6 shaft (18) match-mark. Before repeating ground run, check that rotor blades are properly phased (Task 6-27.1).
24. Repeat step 22. If check is still unsatisfactory, repeat step 23. If vibration still exceeds **0.7 ips** replace the fan (Tasks 6-182 and 6-186).

**NOTE**

If fan has been replaced, repeat entire vibration analysis.



**FAN DRIVE SHAFT**

25. Loosen clamp (19) and remove duct (20) from fan (21).
26. Inspect fan (21) for signs of contact between the vanes of impeller (22) and housing (23). If there is no evidence of contact, continue with step 28. If there is evidence of contact, replace the fan (Tasks 6-182 and 6-186).
27. Perform a ground run vibration check for the combining transmission fan. If the check is unsatisfactory (vibration greater than **0.3 ips**), continue with step 28.
28. Match-mark a vane on impeller (22) to housing (23). Use a marking pencil (E270.1).
29. Raise fan assembly (21) from fan shaft (24) and rotate slightly to rest on studs (Task 6-182). Make sure the fan shaft remains engaged in the transmission and does not rotate.
30. Rotate fan impeller (22) **90°** clockwise with respect to fan drive shaft (24). Refer to match-marks. Install fan assembly (21) (Task 6-186).

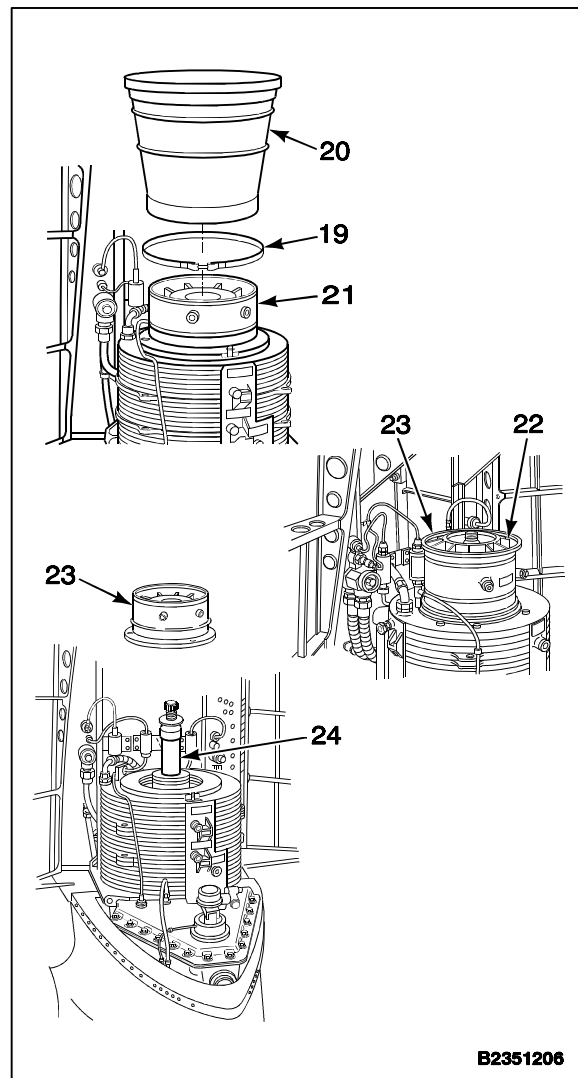
**WARNING**

Oil (E254) is toxic. It can irritate skin and cause burns. Avoid inhaling. Use only with adequate ventilation. Avoid contact with skin, eyes, or clothing. In case of contact, immediately flush skin or eyes with water for at least **15 minutes**. Get medical attention for eyes.

31. Install duct (20) and clamp (19). Coat thread of clamp with oil (E254). Wear gloves (E184.2). Torque clamp to **35 inch-pounds**.
32. Repeat step 27. If check is still unsatisfactory, repeat steps 29 thru 31 **two times**. If vibration still exceeds **0.3 ips**, replace the fan (Tasks 6-182 and 6-186).

**NOTE**

If fan has been replaced, repeat entire vibration analysis.



B2351206

***FOLLOW-ON MAINTENANCE:***

Remove vibration analysis equipment for (AVA)  
TM 1-6625-724-13&P.  
Close engine transmission fairing access cover  
(Task 2-2).  
Close pylon lower fairing (Task 2-2).  
Close pylon hinged fairing (Task 2-2).  
Install engine air inlet screen (Task 4-76).  
Perform ground run (TM 1-1520-240-10).

**Tasks 6-218 through 6-227 have been deleted.**

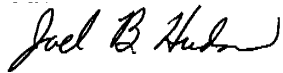
END OF TASK

**6-714 Change 1**



By Order of the Secretary of the Army:

Official:



**JOEL B. HUDSON**  
Administrative Assistant to the  
Secretary of the Army  
0220709

**ERIC K. SHINSEKI**  
General, United States Army  
Chief of Staff

DISTRIBUTION:

To be distributed in accordance with Initial Distribution Number (IDN) 311199, requirements for TM 55-1520-240-23-5.

## ***These are the instructions for sending an electronic 2028***

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@wherever.army.mil>

To: 2028@redstone.army.mil

Subject: DA Form 2028

1. **From:** Joe Smith
2. **Unit:** home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** MO
6. **Zip:** 77777
7. **Date Sent:** 19-OCT-93
8. **Pub no:** 55-2840-229-23
9. **Pub Title:** TM
10. **Publication Date:** 04-JUL-85
11. **Change Number:** 7
12. **Submitter Rank:** MSG
13. **Submitter FName:** Joe
14. **Submitter MName:** T
15. **Submitter LName:** Smith
16. **Submitter Phone:** 123-123-1234
17. **Problem:** 1
18. **Page:** 2
19. **Paragraph:** 3
20. **Line:** 4
21. **NSN:** 5
22. **Reference:** 6
23. **Figure:** 7
24. **Table:** 8
25. **Item:** 9
26. **Total:** 123
27. **Text:**

This is the text for the problem below line 27.

<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b>  <small>For use of this form, see AR 25-30; the proponent agency is ODISC4.</small>	Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM)	DATE  <h2 style="text-align: center;">8/30/02</h2>
--	--	--

TO: (Forward to proponent of publication or form)(Include ZIP Code) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, 35898	FROM: (Activity and location)(Include ZIP Code) MSG, Jane Q. Doe 1234 Any Street Nowhere Town, AL 34565
--	--

**PART 1 - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS**

PUBLICATION/FORM NUMBER <h3 style="text-align: center;">TM 9-1005-433-24</h3>	DATE <h3 style="text-align: center;">16 Sep 2002</h3>	TITLE Organizational, Direct Support, And General Support Maintenance Manual for Machine Gun, .50 Caliber M3P and M3P Machine Gun Electrical Test Set Used On Avenger Air Defense Weapon System
--	--	---

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON
1	WP0005 PG 3		2			Test or Corrective Action column should identify a different WP number.
<div style="border: 2px solid black; padding: 20px; font-size: 48px; font-weight: bold; letter-spacing: 0.5em;">           SAMPLE         </div>						

\* Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE  <h3 style="text-align: center;">MSG, Jane Q. Doe, SFC</h3>	TELEPHONE EXCHANGE/ AUTOVON, PLUS EXTENSION  <h3 style="text-align: center;">788-1234</h3>	SIGNATURE
--	---	-----------

<b>TO:</b> (Forward direct to addressee listed in publication) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, 35898	<b>FROM:</b> (Activity and location) (Include ZIP Code) MSG, Jane Q. Doe 1234 Any Street Nowhere Town, AL 34565	<b>DATE</b> 8/30/02
---	--	------------------------

**PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS**

PUBLICATION NUMBER			DATE	TITLE				
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION
<b>SAMPLE</b>								

**PART III - REMARKS** (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

TYPED NAME, GRADE OR TITLE <b>MSG, Jane Q. Doe, SFC</b>	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION <b>788-1234</b>	SIGNATURE
--	---	-----------

<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b>  For use of this form, see AR 25-30; the proponent agency is ODISC4.	Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM)	DATE
---	--	------

TO: (Forward to proponent of publication or form)(Include ZIP Code)	FROM: (Activity and location)(Include ZIP Code)
---	---

**PART 1 - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS**

PUBLICATION/FORM NUMBER <b>TM 9-1005-433-24</b>	DATE <b>16 Sep 2002</b>	TITLE Organizational, Direct Support, And General Support Maintenance Manual for Machine Gun, .50 Caliber M3P and M3P Machine Gun Electrical Test Set Used On Avenger Air Defense Weapon System
--	----------------------------	---

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON

\* Reference to line numbers within the paragraph or subparagraph.

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/ AUTOVON, PLUS EXTENSION	SIGNATURE
----------------------------	--	-----------

<b>TO:</b> (Forward direct to addressee listed in publication)	<b>FROM:</b> (Activity and location) (Include ZIP Code)	<b>DATE</b>
--	---	-------------

**PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS**

<b>PUBLICATION NUMBER</b>	<b>DATE</b>	<b>TITLE</b>
---------------------------	-------------	--------------

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

**PART III - REMARKS** (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
----------------------------	--	-----------

## The Metric System and Equivalents

### Linear Measure

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

### Weights

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 decagram = 10 grams = .35 ounce  
 1 hectogram = 10 decagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

### Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

## Temperature (Exact)

F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	C
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