TECHNICAL MANUAL

AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE MANUAL

ENGINE, GAS TURBINE MODEL T55-L-714 NSN 2840-01-353-7635

DISTRIBUTION STATEMENT A: Approved for public release, distribution is unlimited

HEADQUARTERS, DEPARTMENT OF THE ARMY
1 DECEMBER 1994

CHANGE

NO. 1

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 30 November 2002

Aviation Unit and Aviation Intermediate
Maintenance Manual

ENGINE, GAS TURBINE, MODEL T55–L–714

NSN 2840–01–353–7635

OZONE DEPLETING CHEMICAL INFORMATION

This document has been reviewed for the presence of class I ozone depleting chemicals. As of the basic, dated 1 December 1994, all references to Class I ozone depleting chemicals have been removed from this document by substitution with chemicals by the Engineering, Environment, and Logistics Oversight Office that do not cause atmospheric ozone depletion.

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3–175 and 3–176	3–175 and 3–176
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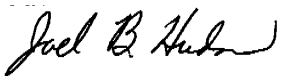

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Technical Manual

NO. 1–2840–252–23

HEADQUARTERS
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WASHINGTON D.C., 1 December 1994

TECHNICAL MANUAL

Aviation Unit and Aviation Intermediate Maintenance Manual

ENGINE, GAS TURBINE, MODEL T55–L–714
NSN 2840–01–353–7635

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US 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 rpovide 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.

OZONE DEPLETING CHEMICAL INFORMATION

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NOTE

This manual is printed in three volumes as follows:
TM 1–2840–252–23–1, consisting of Table of Contents, Chapter 1, Chapter 2, pages 2–1 through 2–322
TM 1–2840–252–23–2, consisting of Table of Contents, Chapter 2, pages 2–323 through 2–425/(2–426 blank), Chapter 3, Chapter 4, Chapter 5, Chapter 6, pages 6–1 through 6–182.
TM 1–2840–252–23–3, consisting of Table of Contents, Chapter 6, pages 6–183 through 6–265/(6–266 blank), Chapter 7, chapter 8, and Chapter 9, Appendix A through Appendix G, and an Alphabetical Index.
The Appendices and Index are applicable to Volumes 1 through 3.

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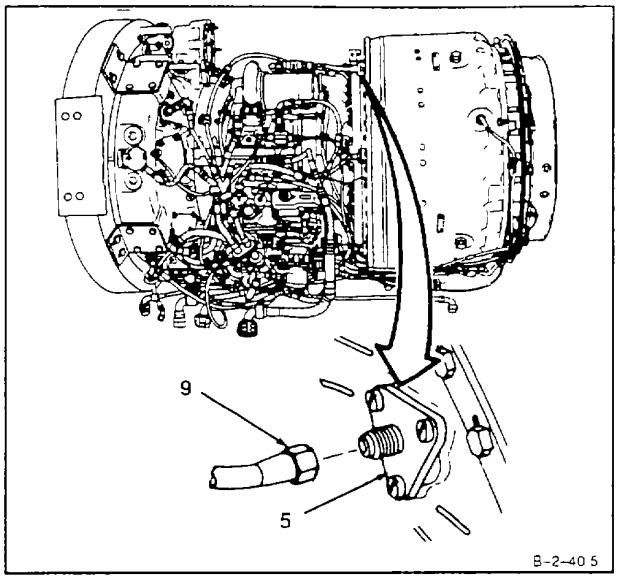
3. **Repair leaking or cracked connector (5)** as follows

   a. Disconnect hose assembly (9) from connector (5)

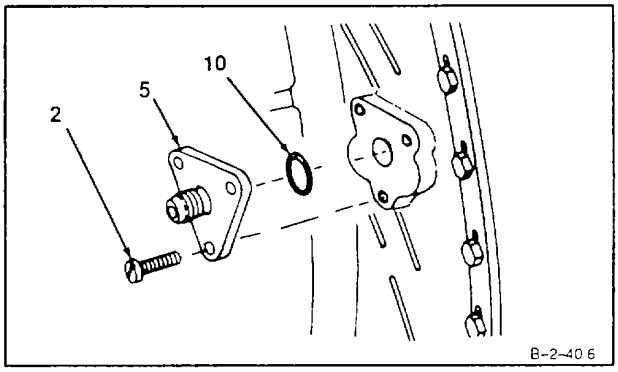


   b. Remove lockwire and three screws (2)

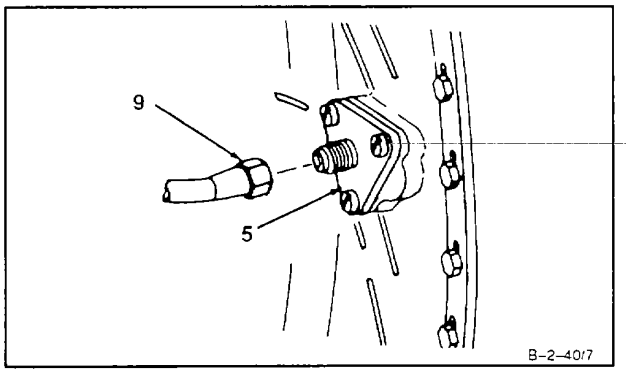
   c. Remove connector (5) and gasket (10)

   d. Install gasket (10), serviceable connector (5), and three screws (2)

   e. Lockwire three screws (2) Use lockwire (E33)



   f. Connect hose assembly (9) to connector (5)



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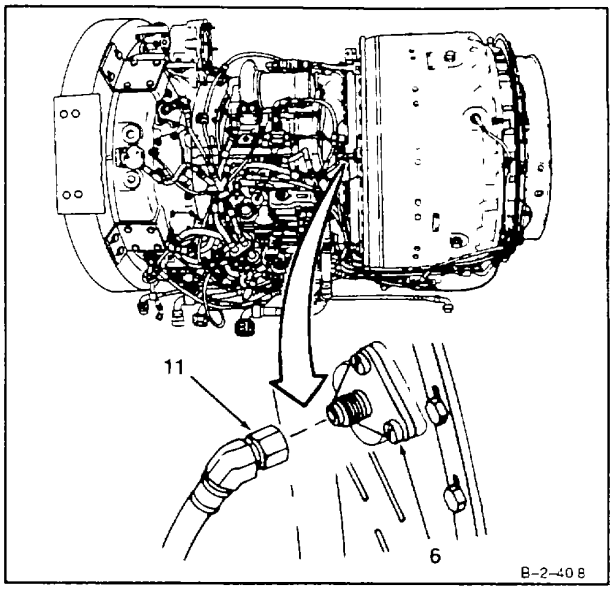
4. **Repair leaking or cracked flange (6)** as follows

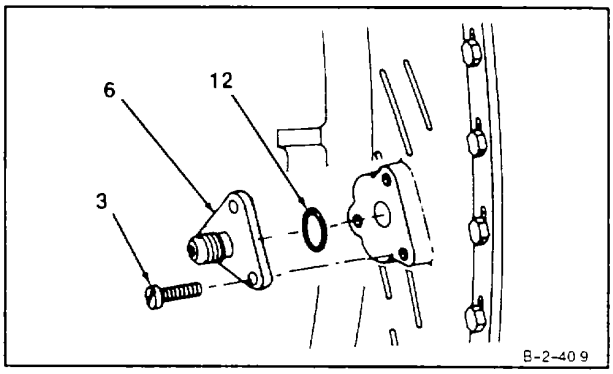
   a. Remove lockwire and disconnect hose assembly (11) from flange (6)



   b. Remove three screws (3)

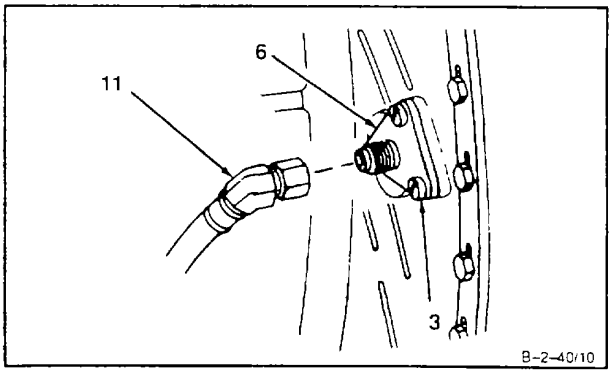
   c. Remove flange (6) and gasket (12)

   d. Install gasket (12), serviceable flange (6), and three screws (3)



   e. Connect hose assembly (11 to flange (6)

   f. Lockwire three screws (3) Use lockwire (E33)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION VIII

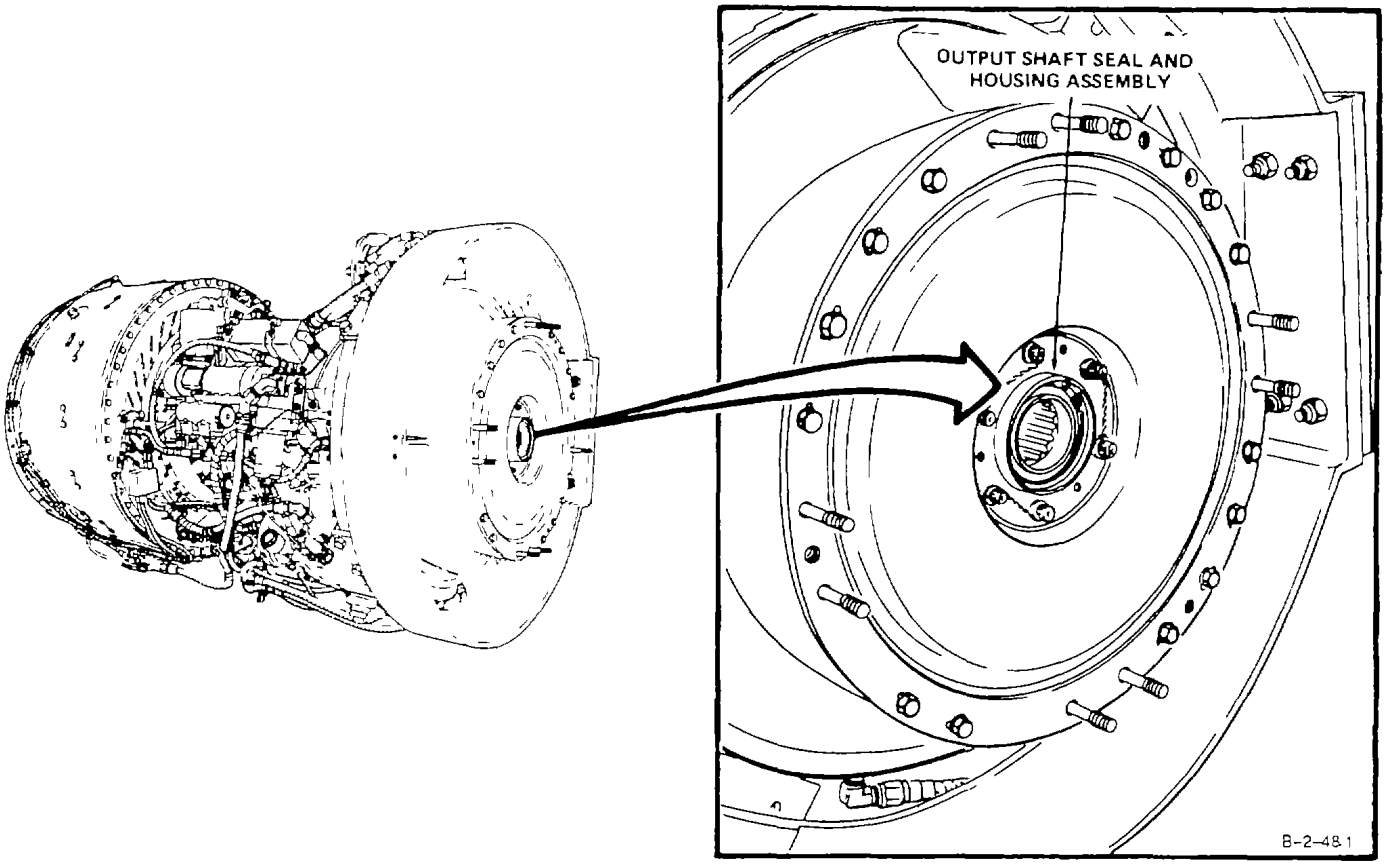
OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY

2-39 REMOVE OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY 2-39

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Handling Tool (T26) (3)

Materials
Wiping Rag (E64)
Personnel Required:
Aircraft Powerplant Repairer
References:
Task 2-41



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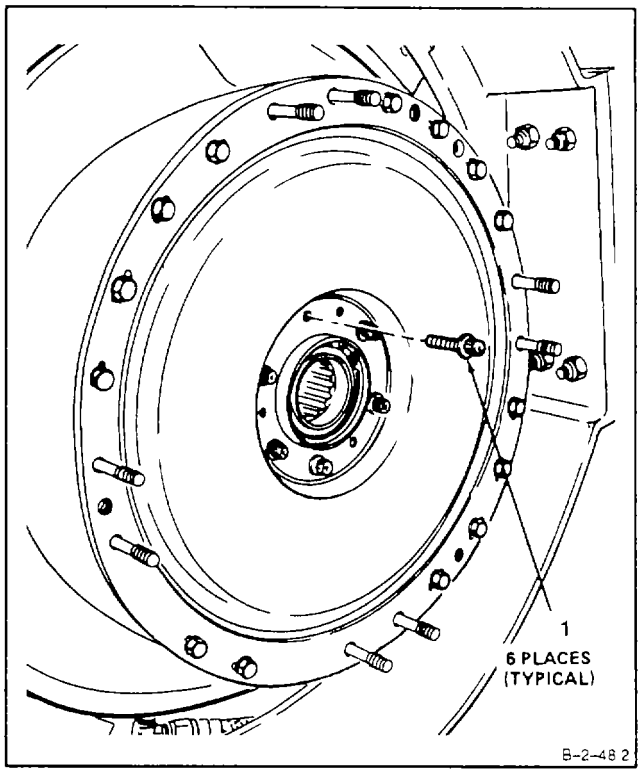
2-39 REMOVE OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY 2-39

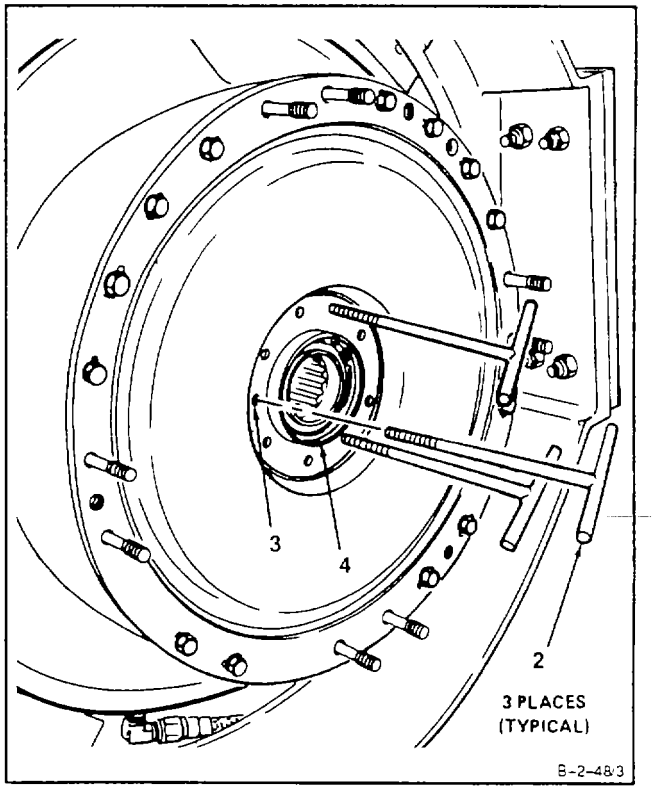
NOTE

Before removing output shaft seal and housing assembly, check for evidence of oil leakage from seal If evidence of leakage is found, have aircraft powerplant inspector examine seal housing assembly in accordance with Task 2-41

1. Remove lockwire and six bolts (1)



2. **Install three handling tools (T26) (2)** in three threaded holes (3) in output shaft seal and housing assembly (4).



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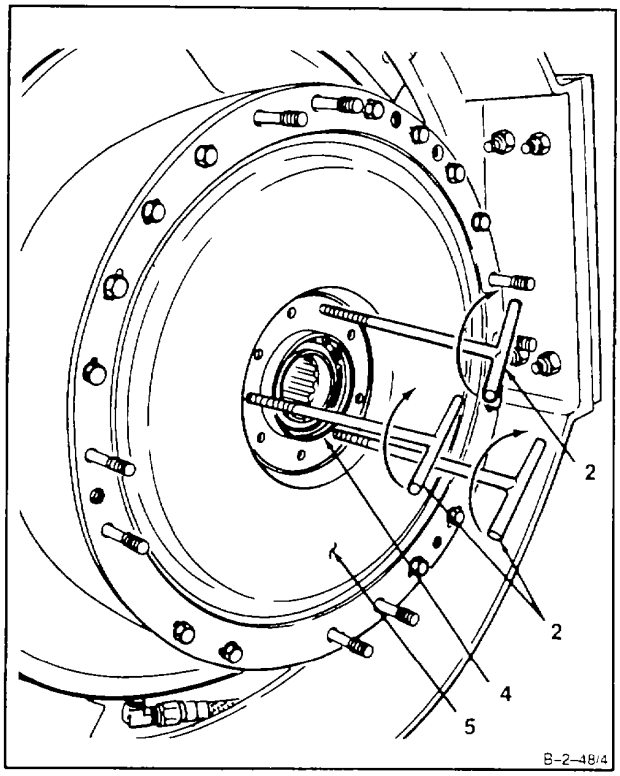
2-39 REMOVE OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY 2-39

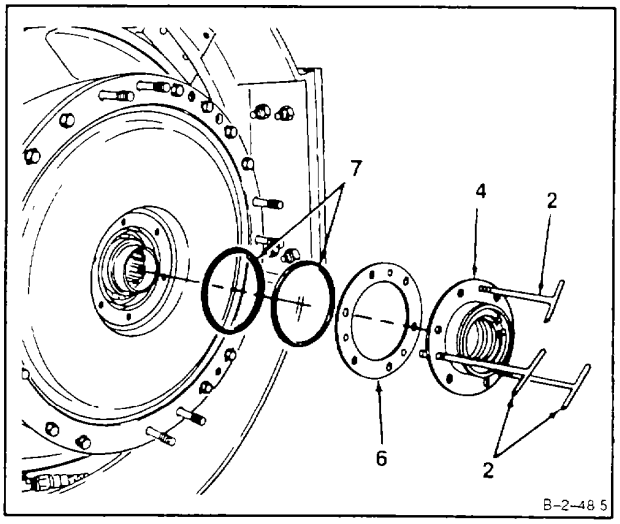
CAUTION

In following step 3, be sure to remove output shaft seal and housing assembly carefully and evenly. Carbon elements inside seals could easily break. This would result in oil leakage and damage to engine.

3. Tighten three handling tools (T26) (2) evenly. **Separate output shaft seal and housing assembly (4)** from Inlet housing cover assembly (5).



4. **Remove output shaft seal and housing assembly (4),** shim (6), and two packings (7) Remove three handling tools (T26) (2)



FOLLOW-ON MAINTENANCE

None

END OF TASK

2-40 CLEAN OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY 2-40

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Goggles
Dry, Compressed Air Source
Material:
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (30)
Personnel Required:
Aircraft Powerplant Repairer
Equipment Condition:
Off Engine Task
Output Shaft Seal and Housing Assembly Removed (Task 2-39)
General Safety Instructions

WARNING

Dry cleaning solvent (E19) 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

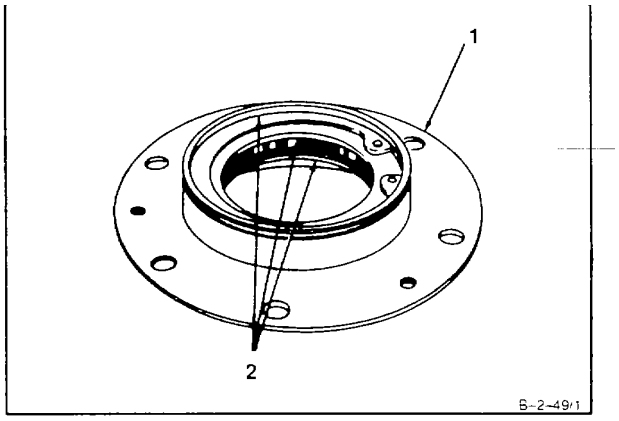
1. Wear gloves (E24) **Immerse output shaft seal housing assembly (1) in dry cleaning solvent (E19) and agitate.** Use brush on inside surfaces (2)

2. **Wipe dry.** Use clean, dry, lint-free cloth (E30)

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

3. Wear goggles **Blow dry inside surfaces (2)** using clean, dry, compressed air



FOLLOW-ON MAINTENANCE

Inspect Output Shaft Seal and Housing Assembly (Task 2-41)

END OF TASK

2-41 INSPECT OUPUT SHAFT SEAL AND HOUSING ASSEMBLY 2-41

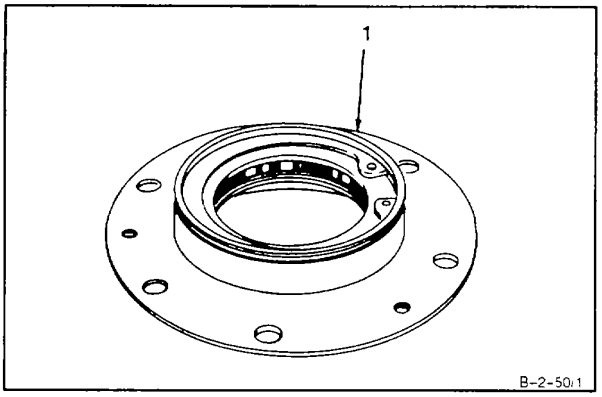
INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition
Off Engine Task

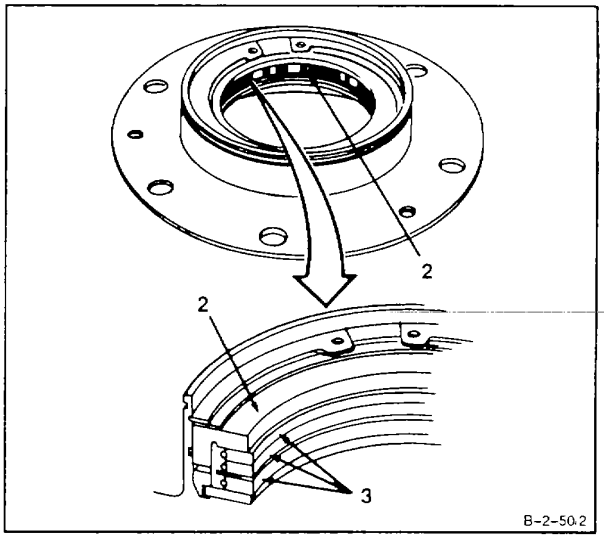
1. **Inspect output shaft seal and housing assembly (1)** as follows:

   a. There shall be no evidence of oil leakage.

   b. There shall be no cracks.



2. **Inspect oil seal (2)** There shall be no cracks or chips in three carbon elements (3)



FOLLOW-ON MAINTENANCE

None

END OF TASK

2-42 REPAIR OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY 2-42

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Installation Tool (T5)
Sleeve, 2-1/2 Inch Diameter (Appendix E)
Arbor Press
Goggles
Dry, Compressed Air Source
Outside Micrometer Caliper Set
Retaining Ring Pliers

Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

Parts:
Packings
Seal

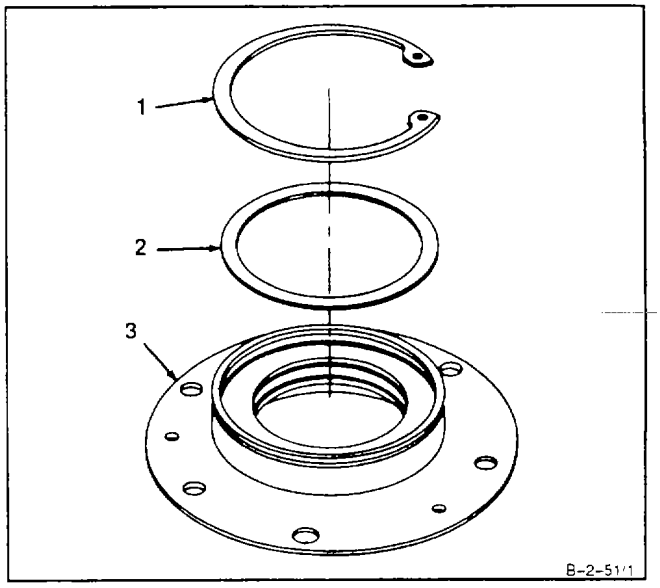
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P

Equipment Condition:
Off Engine Task

1. Repair output shaft seal and housing assembly it oil leakage or cracks are evident as follows

   a. **Remove retaining ring (1)** and shim (2) from housing (3)



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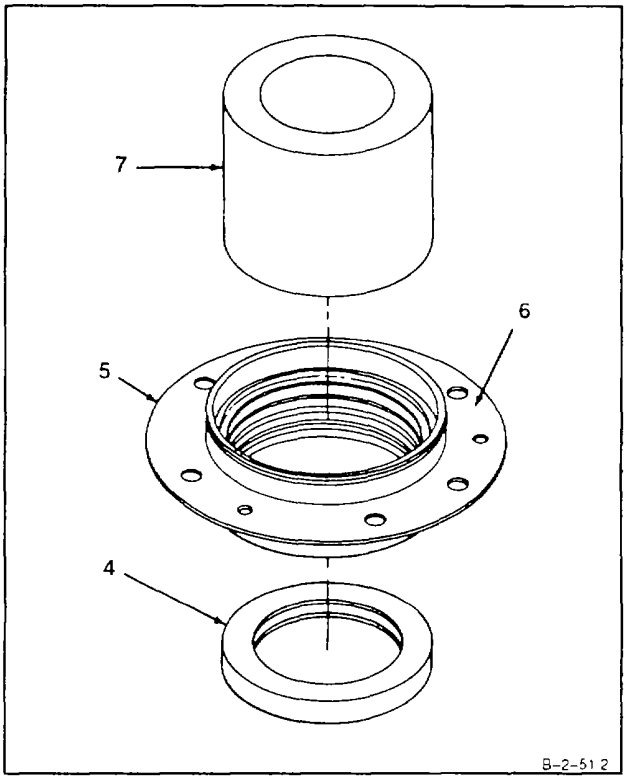
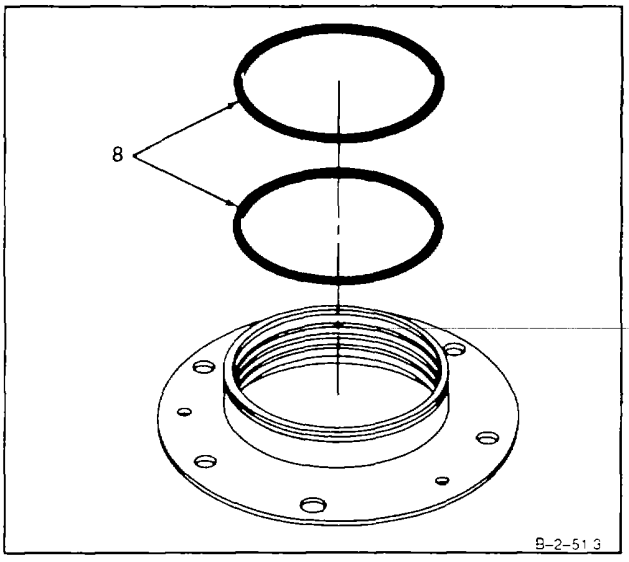
2-42 REPAIR OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY (Continued) 2-42

b. **Press oil seal (4) out of housing (5)** from aft side (6) Use 2-1/2 inch diameter sleeve (7)



c. Remove two packings (8)



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d. **Clean housing (5)** as follows

WARNING

Dry cleaning solvent (E19) 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.

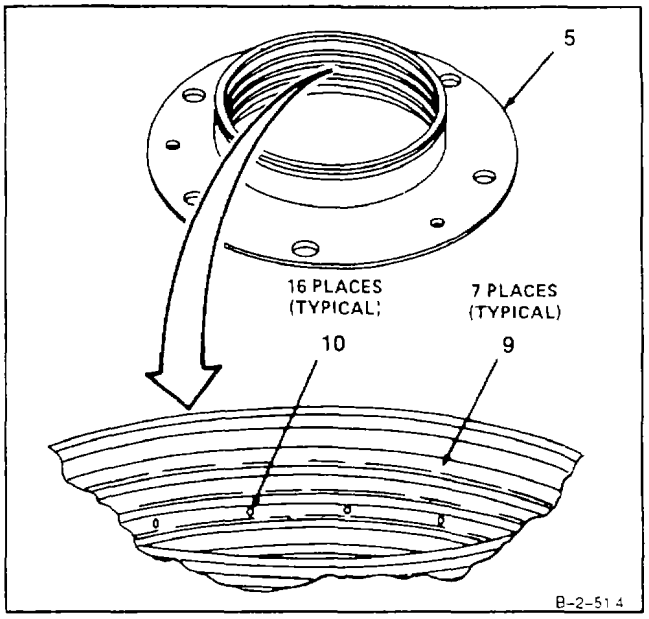
(1) Wear gloves (E24) Immerse and agitate in dry cleaning solvent (E19) Use brush in seven grooves (9)

(2) Wipe dry using clean, dry, lint-free cloth (E30)

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin In case of injury, get medical attention.

(3) Wear goggles. **Blow dry seven grooves (9) and 16 air-bleed holes (10).**



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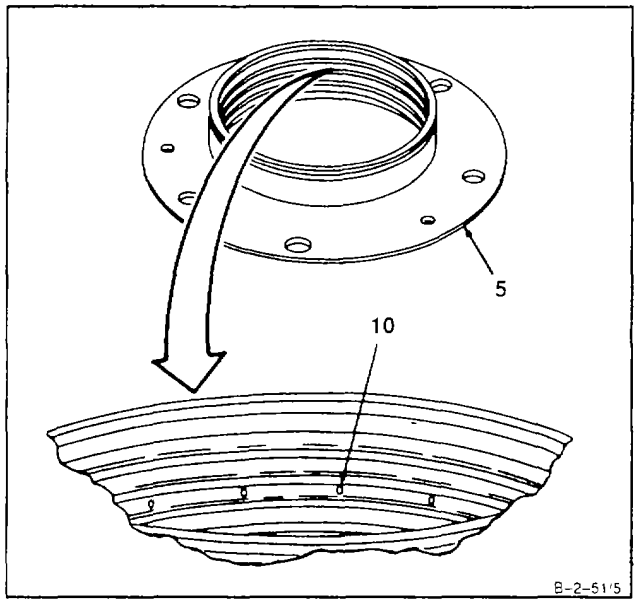
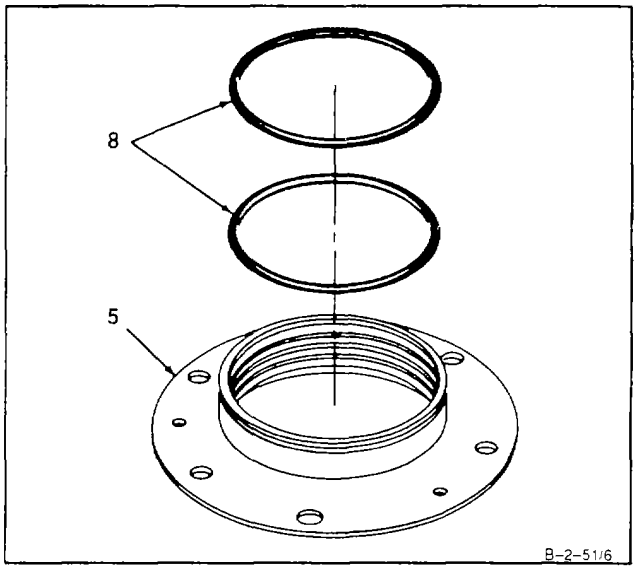
e. **Inspect housing (5).** There shall be no cracks The 16 air-bleed holes (10) shall not be clogged.



f. Install two packings (8) in housing (5).



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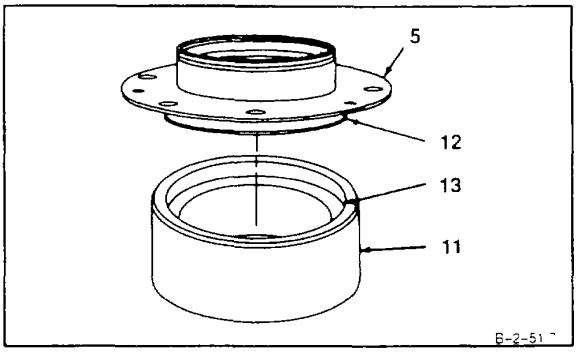
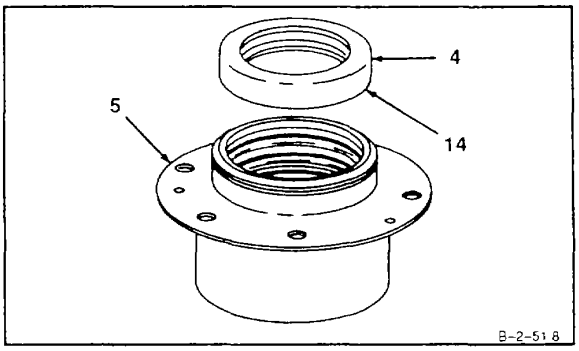
g. **Install oil seal** as follows

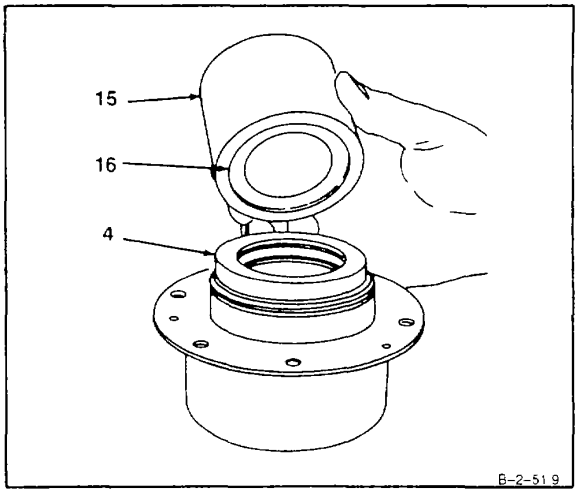
(1) Position housing (5) on ring (11) of installation tool (T5) with aft side (12) seated into recessed I.D. (13).



(2) Position oil seal (4) on housing (5) with face marked OIL SIDE (14) facing down.



(3) Position sleeve (15) of installation tool (T5) on oil seal (4) with recessed I.D. (16) facing down.



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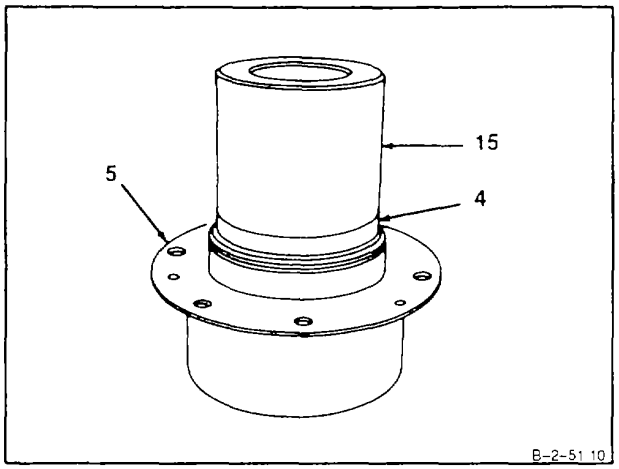
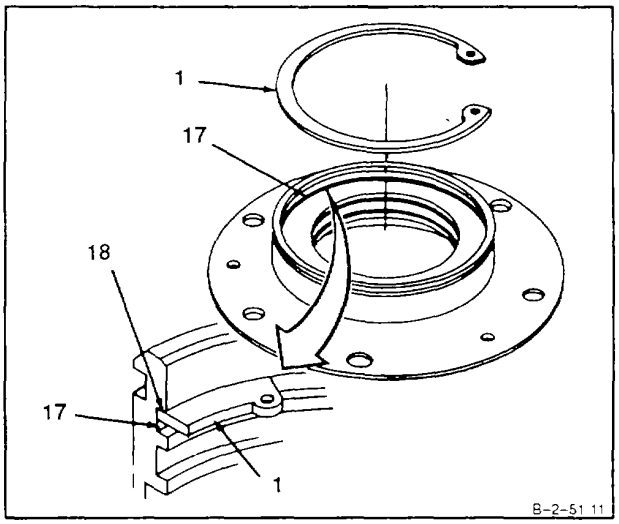
(4) Press oil seal (4) into housing (5)

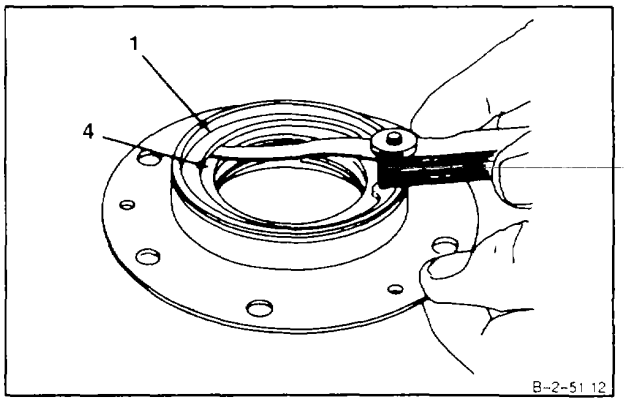
(5) Remove sleeve (15) of installation tool (T5)



h. **Temporarily install retaining ring (1)** in groove (17) Seat retaining ring (1) against groove upper lip (18).



i. **Measure gap between oil seal (4) and retaining ring (1)**



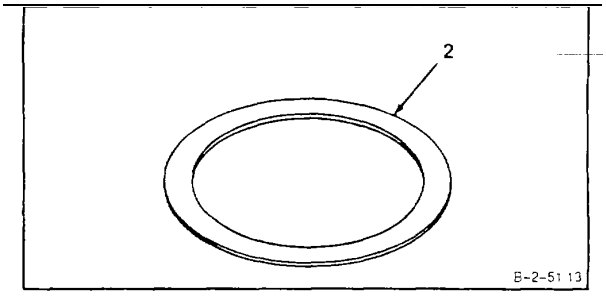
INSPECT

GO TO NEXT PAGE

j. Find gap measurement in shim selection table. Read across to find shim thickness.

SHIM THICKNESS	
If Gap Measures	Shim Thickness Required
Inch	Inch
0.005	0.004
0.006	0.004
0.007	0.006
0.008	0.006
0.009	0.008
0.010	0.008
0.011	0.010
0.012	0.010
0.013	0.012
0.014	0.012
0.015	0.014
0.016	0.014
0.017	0.016
0.018	0.016
0.019	0.018
0.020	0.018
0.021	0.020
0.022	0.020
0.023	0.022
0.024	0.022
0.025	0.024
0.026	0.024

k. Measure thickness of shim (2) and check against shim selection table.



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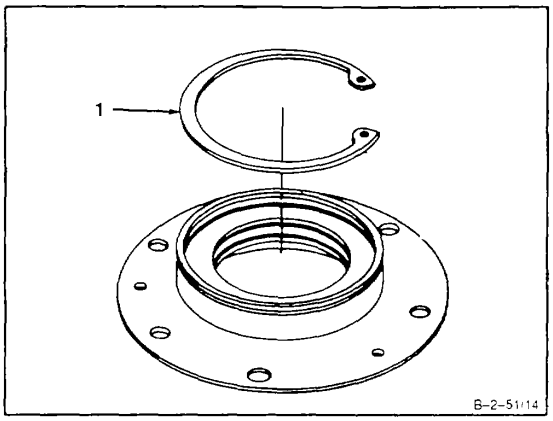
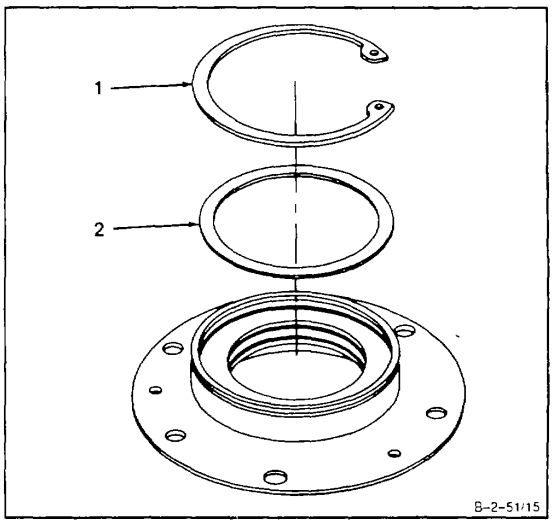
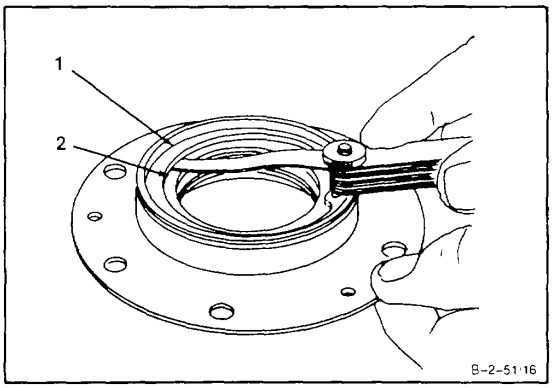
l. **Remove retaining ring (1).**



m. **Install shim (2) and retaining ring (1)**



n. **Check gap between shim (2) and retaining ring (1)** Gap shall not be more than 0.003 inch



INSPECT

FOLLOW-ON MAINTENANCE
None

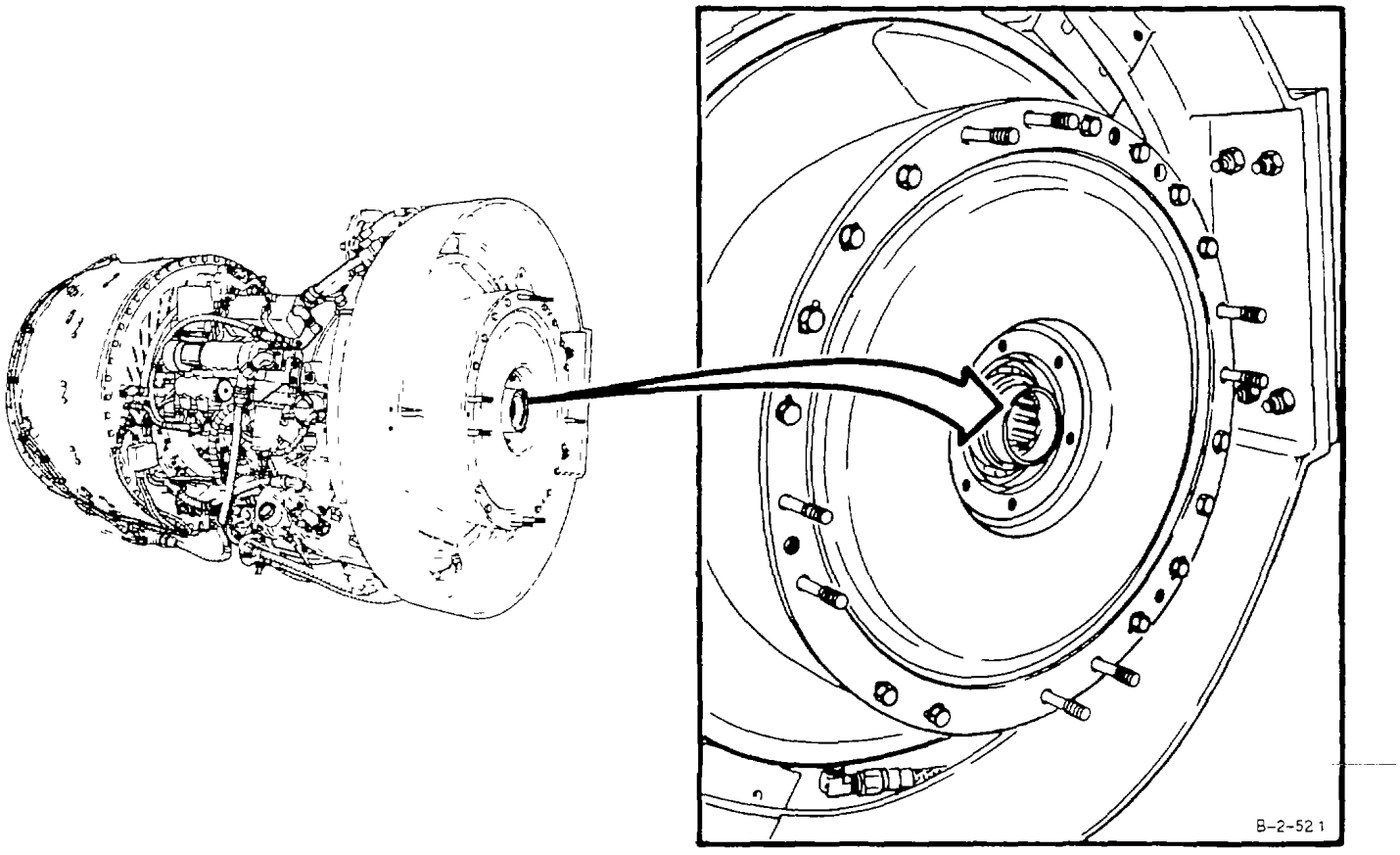
END OF TASK

2-43 INSTALL OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY 2-43

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Alignment Pin (T38) (2)
Installation Tool (T7)
Micrometer Depth Gage
Outside Micrometer Caliper Set

Materials:
Lockwire (E33)
Parts:
Packings
Shim
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
References:
TM 1-2840-252-23P



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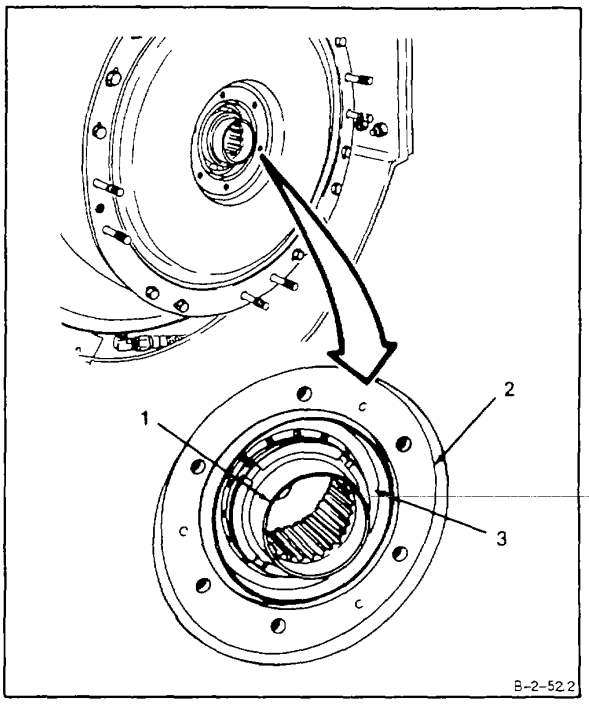
2-43 INSTALL OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY (Continued) 2-43

1. Determine shim needed as follows

   a. Push output shaft (1) rearward and **measure depth from flange (2) to edge of bearing (3)** Use micrometer depth gage.



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b. **Find depth measured in shim selection table** Read across to find shim thickness required.

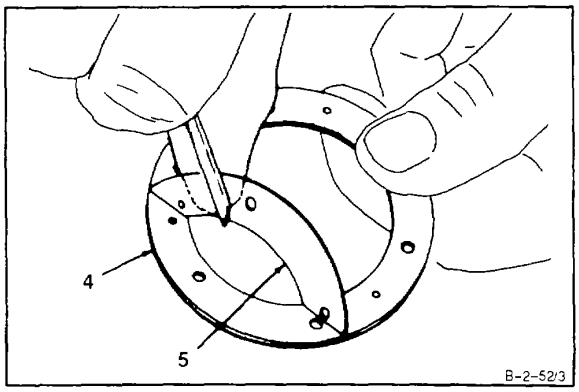
SHIM SELECTION TABLE

Depth Measured	Shim Thickness Required
Inch	Inch
0.510	0.038
0.511	0.036
0.512	0.036
0.513	0.034
0.514	0.034
0.515	0.032
0.516	0.032
0.517	0.030
0.518	0.030
0.519	0.028
0.520	0.028
0.521	0.026
0.522	0.026
0.523	0.024
0.524	0.024
0.525	0.022
0.526	0.022
0.527	0.020
0.528	0.020
0.529	0.018
0.530	0.018
0.531	0.016
0.532	0.016
0.533	0.014
0.534	0.014
0.535	0.012
0.536	0.012
0.537	0.010
0.538	0.010
0.539	0.008
0.540	0.008

2. **Prepare shim (4)**as follows

a. Peel off layers (5) as required to obtain shim thickness required.

b. **Measure thickness of shim (4)** and check against shim selection table Use outside micrometer caliper.



INSPECT

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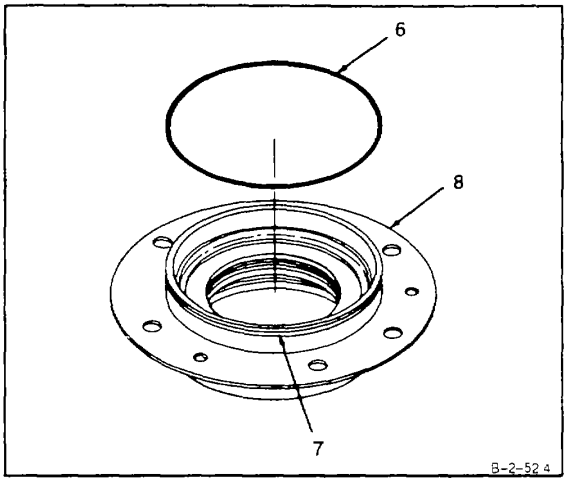
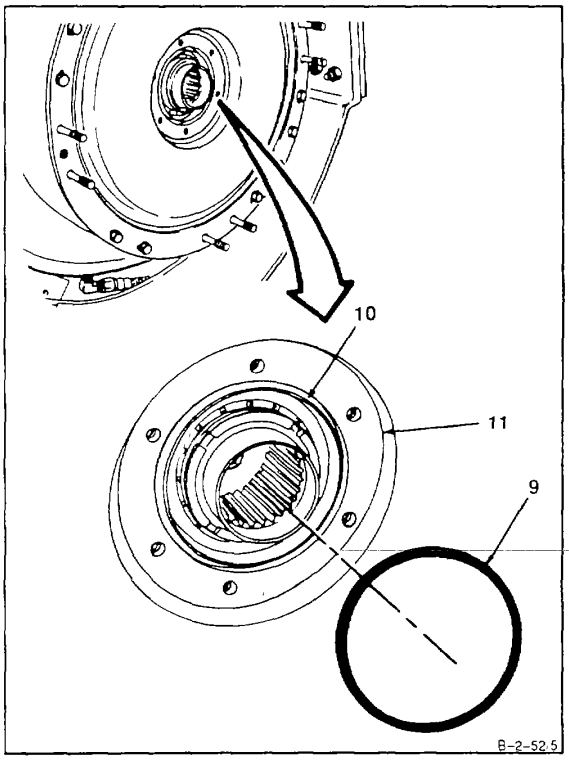
2-43 INSTALL OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY (Continued) 2-43

3. Install packing (6) in groove (7) on output shaft seal housing assembly (8)



4. Install packing (9) in groove (10) on inlet housing cover assembly (11)



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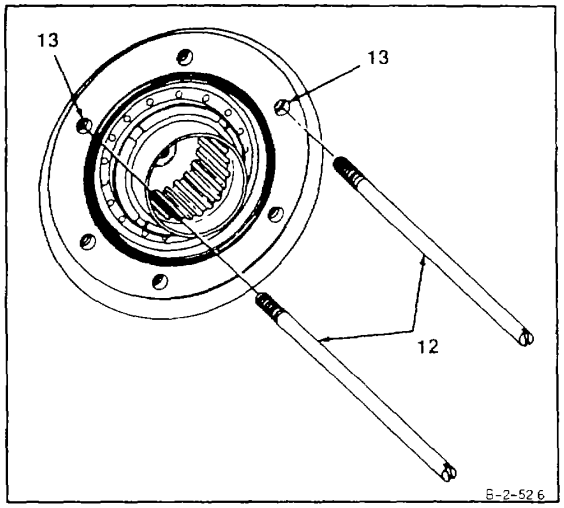
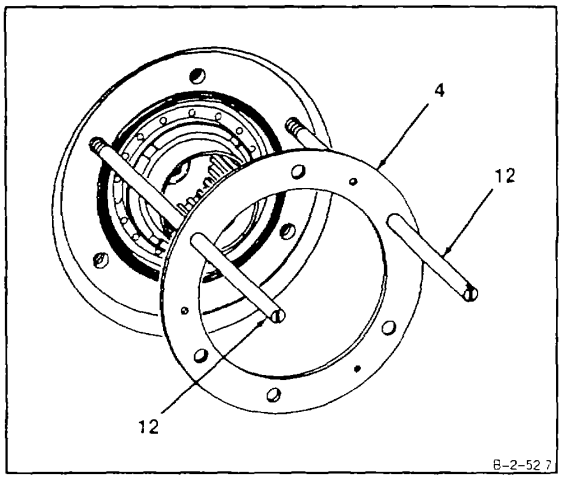
2-43 INSTALL OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY (Continued) 2-43

5. Install two alignment pins (T38) (12) in holes (13)



6. Using two alignment pins (T38) (12). **Install shim (4).**



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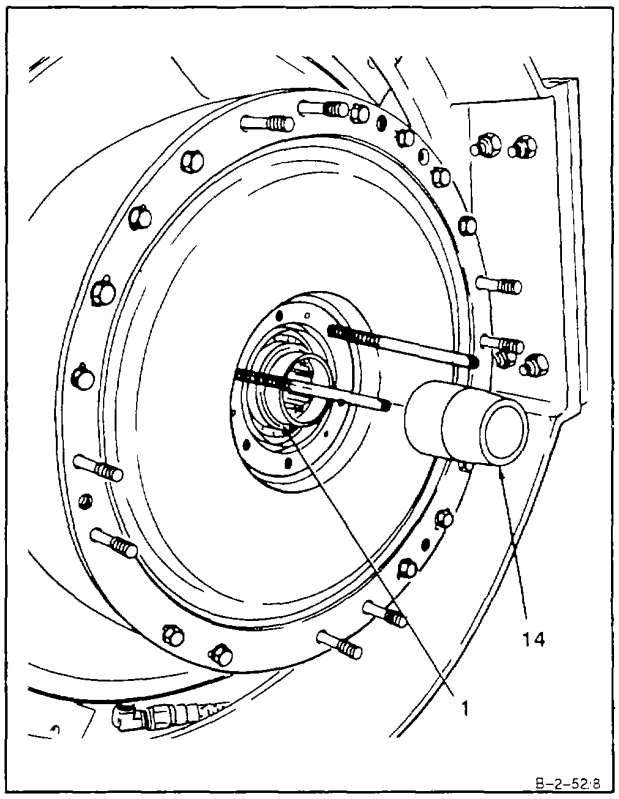
2-43 INSTALL OUTPUT SHAFT SEAL AND HOUSING ASSEMBLY (Continued) 2-43

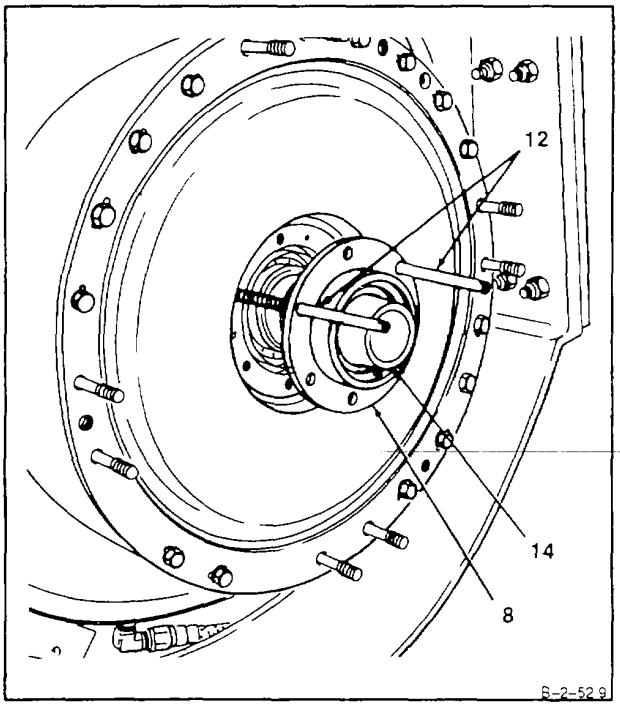
7 Install installation tool (T7) (14) on output shaft (1)



CAUTION

When installing seal and housing assembly, be careful not to damage seals Failure to comply will cause oil leakage.

8 Using two alignment pins (T38) (12) and installation tool (T7) (14), **install output shaft seal and housing assembly (8).** Remove installation tool and alignment pins



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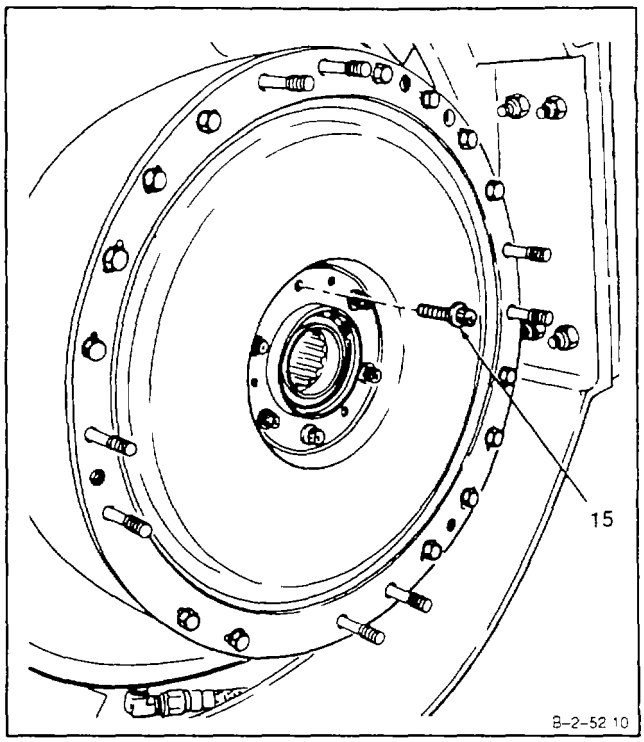
9. Install six bolts (15). Do not lockwire bolts at this time.



INSPECT

10 Check and set output shaft end play as follows

a Push output shaft (1) rearward, and measure depth from shaft end (16) to seal housing edge (17) using micrometer depth gage

b Pull output shaft (1) forward and repeat measurement in step a

c Subtract dimension in step b from dimension in step a Depth of end play shall be between 0.060-0.070 inch.

d If end play is not within limits, proceed as follows

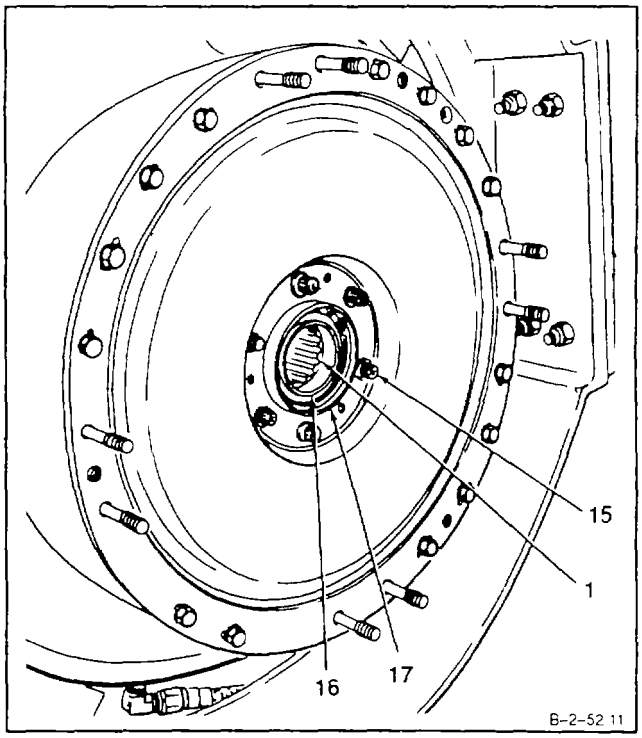
(1) Remove output shaft seal and housing assembly (Ref Task 2-39)

(2) Repeat steps 2 through 10

e **If output shaft end play is still not within limits, proceed as follows-**

(1) Remove output shaft (Ref Contractor Logistic Support)

(2) Install output shaft (Ref Contractor Logistic Support)



11. Lockwire six bolts (15) Use lockwire (E33)

INSPECT

FOLLOW-ON MAINTENANCE

Service Engine Oil System (Task 1-68)

END OF TASK

SECTION IX

INLET HOUSING COVER ASSEMBLY

2-44 REMOVE INLET HOUSING COVER ASSEMBLY (AVIM) 2-44

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944

Handling Tool (T26) (3)

Materials

Wiping Rag (E64)

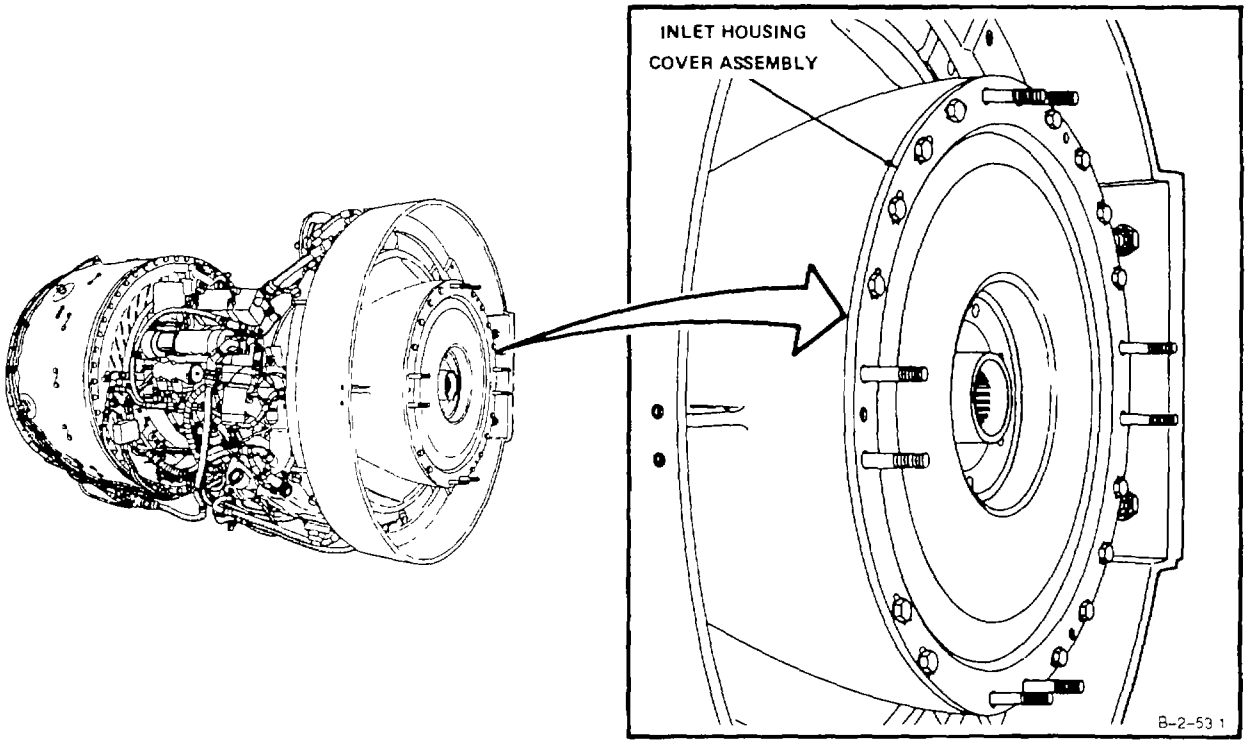
Personnel Required

Aircraft Powerplant Repairer

Equipment Condition

Engine Oil System Drained (Task 1-69)

Output Shaft Seal and Housing Assembly Removed (Task 2-39)



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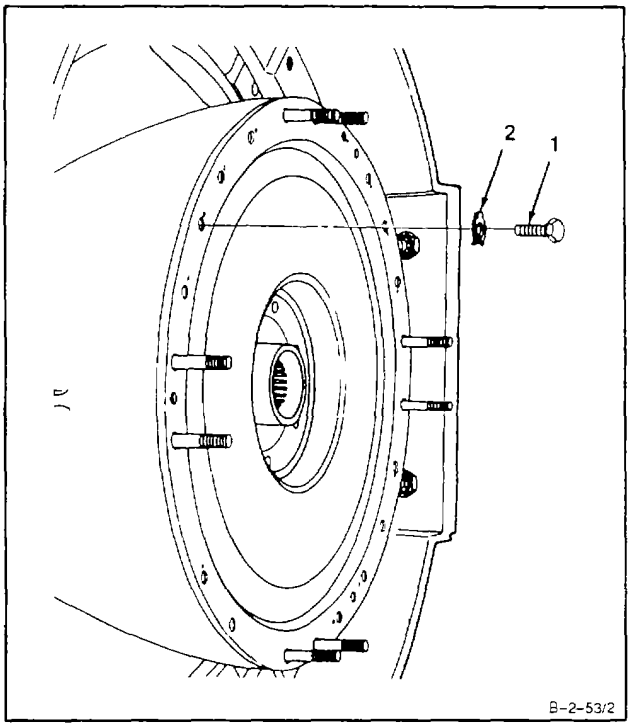
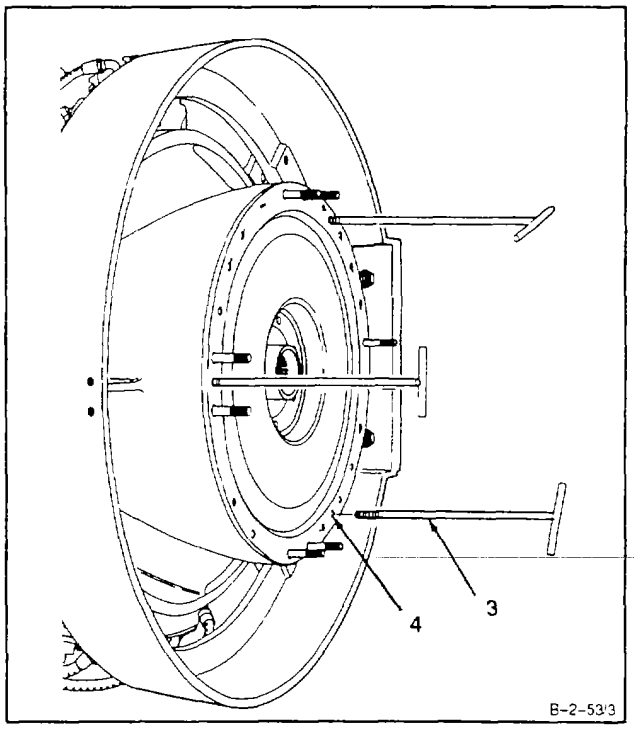
1. **Remove 14 bolts(1)** and washers (2)



2. **Install three handling tools (T26) (3)** in three threaded holes (4)



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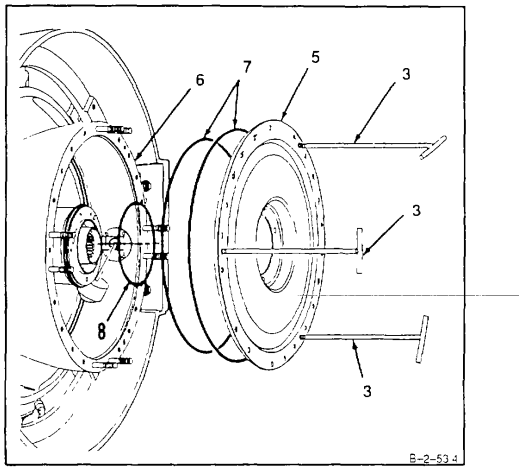
3. Tighten three handling tools (T26) (3) evenly until inlet housing cover assembly (5) separates from inlet housing (6) **Remove cover assembly (5)**

4. Remove two packings (7), and packing (8)



FOLLOW-ON MAINTENANCE:
None

END OF TASK

2-45 CLEAN INLET HOUSING COVER ASSEMBLY (AVIM) 2-45

INITIAL SETUP

Applicable Configurations

All

Tools

None

Materials

Dry Cleaning Solvent (El 7)
Gloves (E24)
Dry, Lint-Free Cloth (E30)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

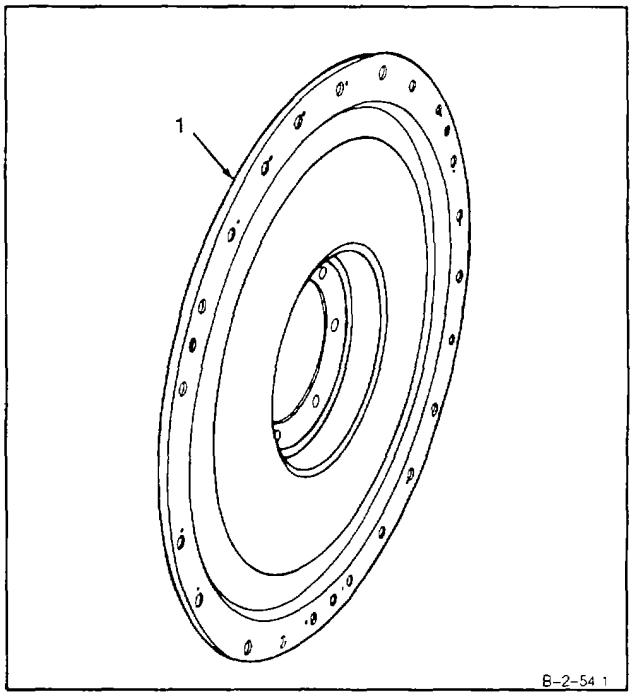
Off Engine Task
Engine Oil System Drained (Task 1-69)
Output Shaft Seal and Housing Assembly Removed (Task 2-39)
Inlet Housing Cover Assembly Removed (Task 2-44)

General Safety Instructions:

WARNING

Dry cleaning solvent (E19) 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. Wear gloves (E24) **Clean inlet housing cover assembly** (1). Use lint-free cloth (E30) dampened in dry cleaning solvent (El 7)
2. Wipe dry using clean, dry, lint-free cloth (E30)



FOLLOW-ON MAINTENANCE

Inspect Inlet Housing Cover Assembly (Task 2-46)

END OF TASK

2–46 INSPECT INLET HOUSING COVER ASSEMBLY (AVIM) 2–46

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit.
NSN 5180–00–323–5114

Materials/Parts:

Fluorescent–Penetrant Materials (E73), Appendix C

Personnel Required:

Aircraft Powerplant Inspector

References:

TM 1–1500–335–23

Equipment Condition:

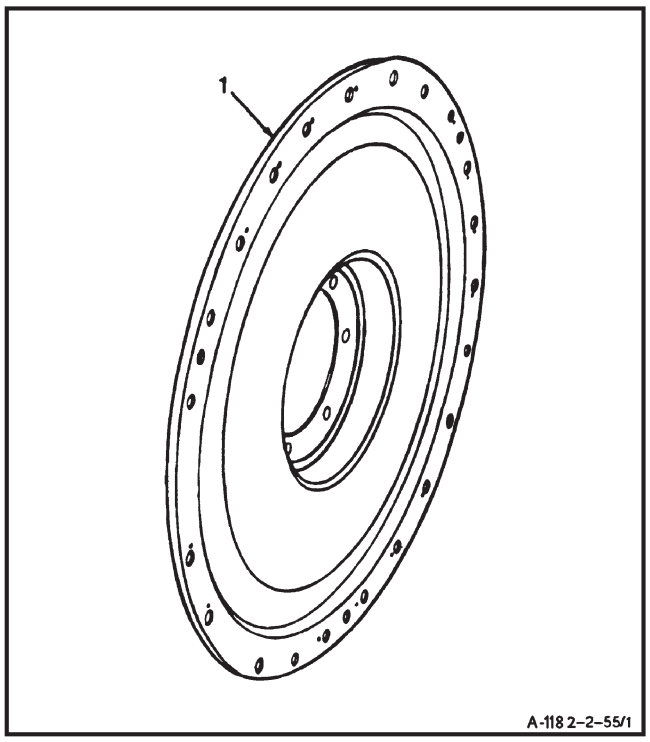
Off Engine Task

1. **Inspect inlet housing cover assembly (1).**

   a. **Perform Fluorescent–penetrant Inspection of cover Per paragraph 2–12.1.e,** (Ref. TM 1–1500–335–23). There shall be no cracks.

   b. There shall be no nicks or scratches deeper than 0.030 inches.

   c. There shall be no corrosion or paint damage.



FOLLOW–ON MAINTENANCE

None

END OF TASK

2-47 REPAIR INLET HOUSING COVER ASSEMBLY (AVIM) 2-47

INITIAL SETUP

Applicable Configurations:

All

Tools.

Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials-

Carborundum Stone (E10)
Crocus Cloth (E15)
Gray Enamel (E26)

Personnel Required

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:

Task 1-110

Equipment Condition:

Off Engine Task

General Safety Instructions-

WARNING

The inlet housing cover is made from a magnesium/nickel alloy containing radioactive thorium; particles of this material, resulting from blending or polishing are hazardous to your health if ingested or otherwise introduced into your body. Do not eat, drink, or smoke In any area where these particles might be present. Wash your hands thoroughly after working with this material If exposure or injury occurs, no matter how slight, get medical attention.

WARNING

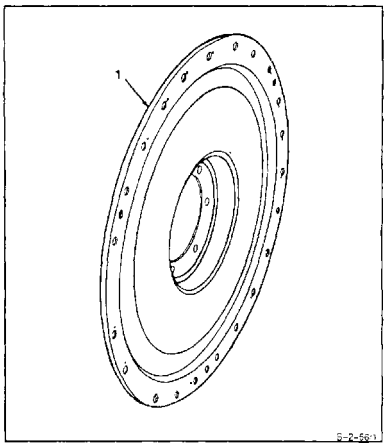
The Inlet housing cover Is made from a magnesium/nickel alloy containing radioactive thorium; particles of this material, resulting from blending or polishIng are hazardous to your health if Ingested or otherwise introduced Into your body. Do not eat, drink, or smoke in any area where these particles might be present. Wash your hands thoroughly after working with this material If exposure or injury occurs, no matter how slight, get medical attention.

1. **Repair nicks and scratches less than 0.030 inch deep** on inlet housing cover assembly (1) as follows

   a. **Blend all sharp edges** next to nicks and scratches Use carborundum stone (El0)

   b. **Polish to smooth finish** Use crocus cloth (E15)

2. **Repair damaged paint or corrosion** on inlet housing cover assembly (1) Use gray enamel (E26) (Ref Task 1-110)



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

2-48 INSTALL INLET HOUSING COVER ASSEMBLY (AVIM) 2-48

INITIAL SETUP

Applicable Configurations
All

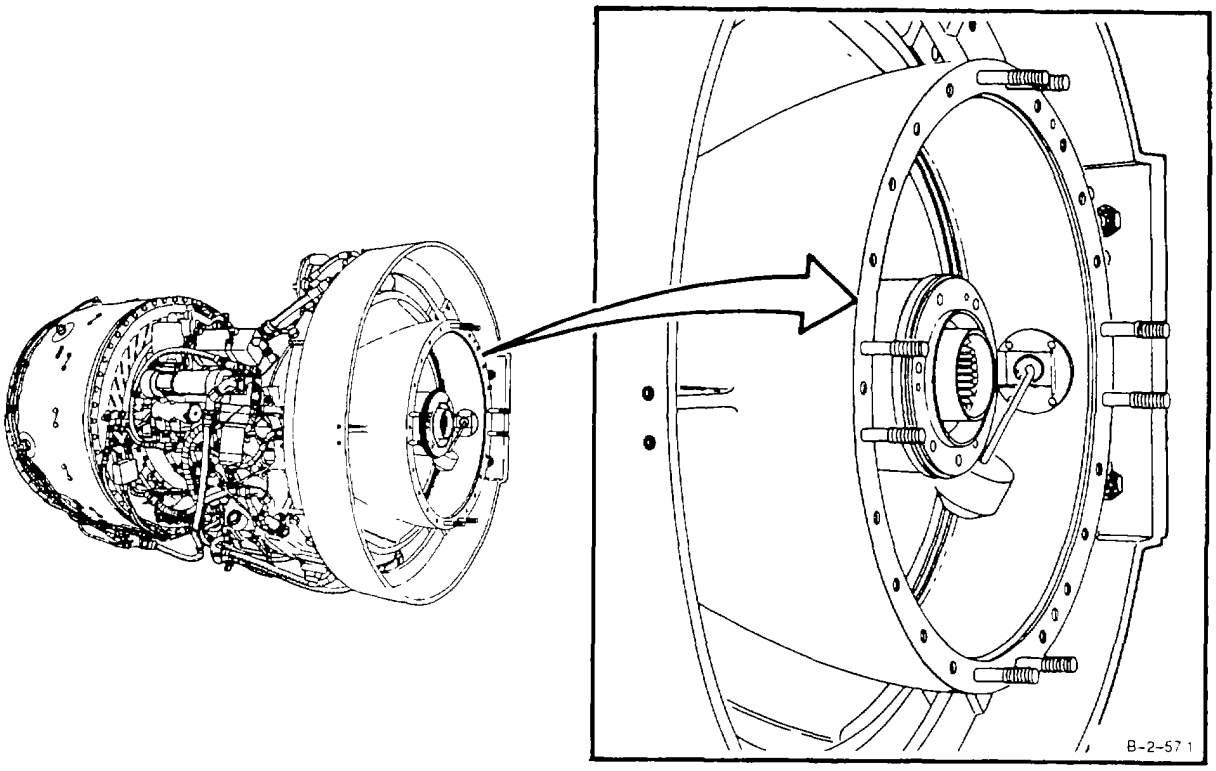
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials.
None

Parts:
Packings
Washers

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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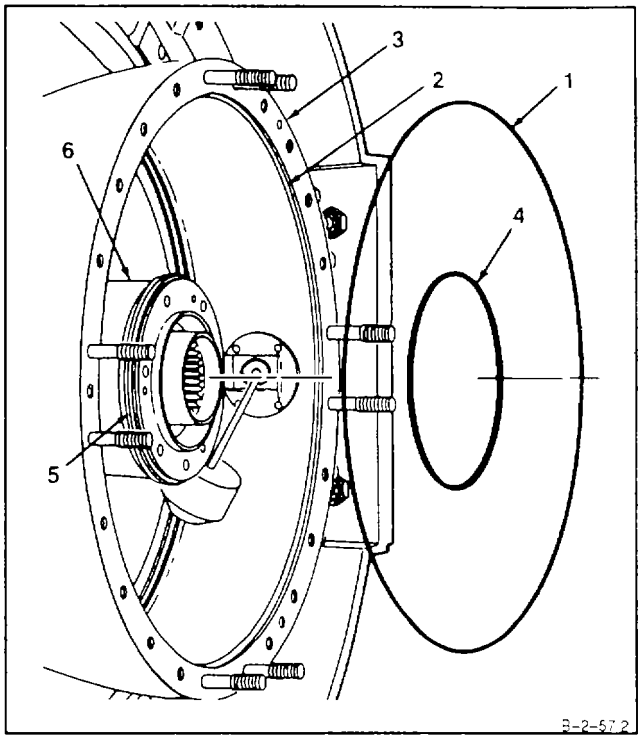
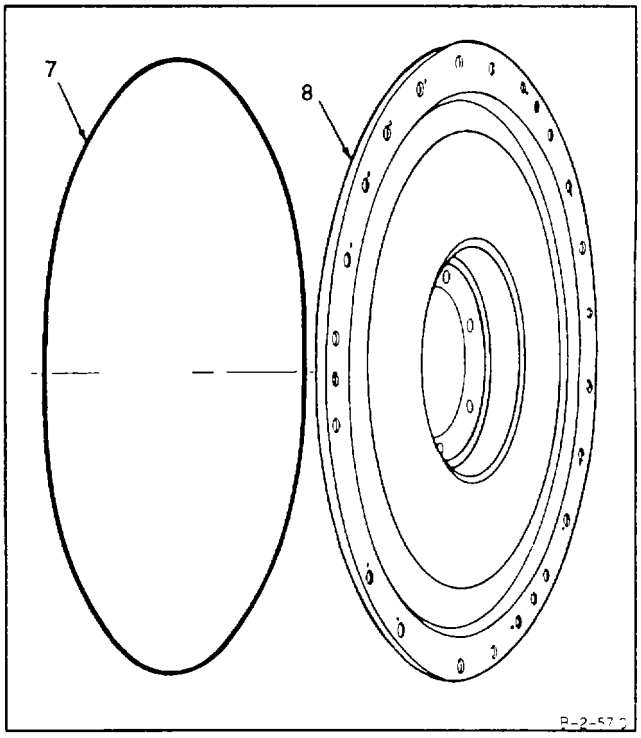
1. **Install packing (1)** in groove (2) of inlet housing (3)
2. **Install packing (4)** in groove (5) of support housing (6)



3. **Install packing (7)** on inlet housing cover assembly (8)



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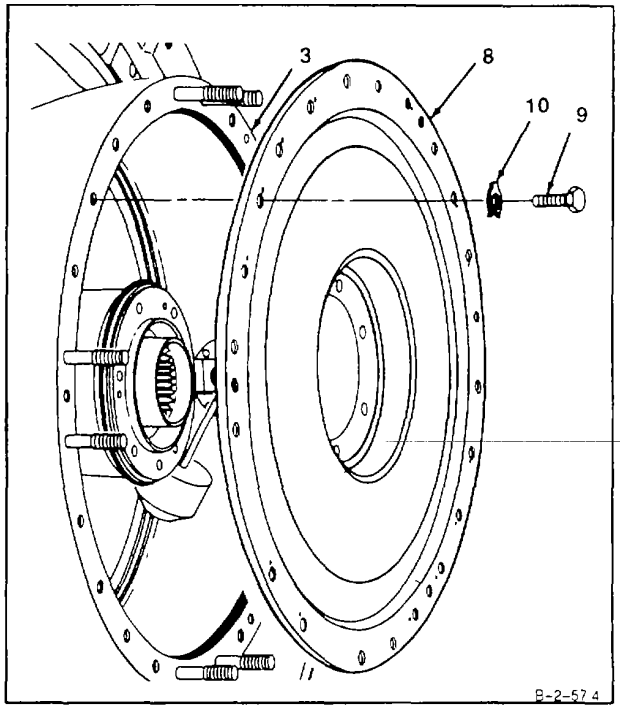
4. **Install inlet housing cover assembly (8)** on inlet housing (3) Install 14 bolts (9) and washers (10) Bend tabs on washers (10)



INSPECT

FOLLOW-ON MAINTENANCE

Install Output Shaft Seal and Housing Assembly (Task 2-43)
Service Engine Oil System (Task 1-68)

END OF TASK

SECTION X

AIR INLET HOUSING ASSEMBLY

2-49 CLEAN AIR INLET HOUSING ASSEMBLY 2-49

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Wiping Rag (E64)

Personnel Required:
Aircraft Powerplant Repairer

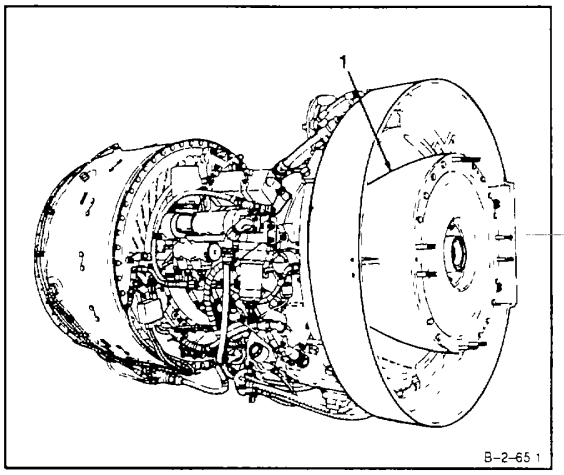
General Safety Instructions

WARNING

Dry cleaning solvent (E19) 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
Look for accumulations of dirt conforming to contour of air inlet Buildup of foreign matter may be difficult to detect because of the windswept contour it assumes

1. Wear gloves (E24) **Clean** visible portion of **air inlet housing assembly (1)** with wiping rag (E64) dampened in dry cleaning solvent (E19)



FOLLOW-ON MAINTENANCE
Inspect Air Inlet Housing Assembly (Task 2-50)

END OF TASK

2-50 INSPECT AIR INLET HOUSING ASSEMBLY 2-50

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials-
None

Personnel Required
Aircraft Powerplant Inspector

References:
Task 1-86

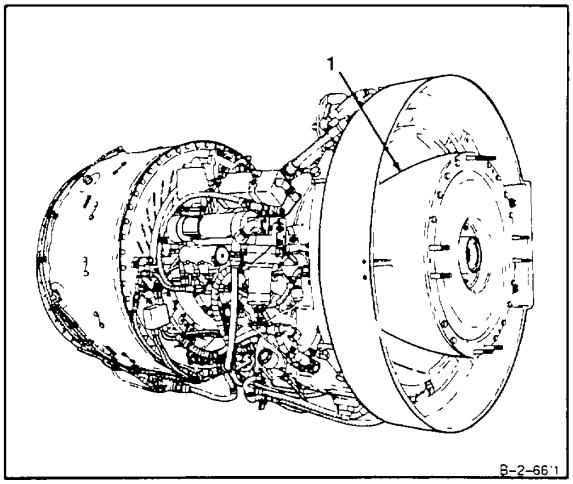
NOTE
If there is foreign object damage (FOD), look for more FOD throughout engine Perform a FOD inspection (Ref Task 1-86)

1. **Inspect air inlet housing assembly (1),** using strong light beam

   a. There shall be no cracks or FOD

   b. There shall be no paint damage

   c. There shall be no corrosion



FOLLOW-ON MAINTENANCE
None

END OF TASK

2-51 REPAIR AIR INLET HOUSING ASSEMBLY 2-51

INITIAL SETUP

Applicable Configurations.
All

Tools.
Technical Inspections Tool Kit,
NSN 5180-00-323-5114
Stainless Steel Wire Brush

Materials:
Clear Synthetic Sealant (El 3)
Gray Enamel (E26)

Personnel Required.
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References,
Task 1-110

General Safety Instructions

WARNING

The air inlet housing is made from a magnesium/nickel alloy containing ra dioactive thorium; particles of this ma terial, resulting from blending or polish mg are hazardous to your health If in gested or otherwise Introduced Into your body. Do not eat, drink, or smoke in any area where these particles might be present Wash your hands thoroughly after working with this material If expo sure or injury occurs, no matter how slight, get medical attention

WARNING

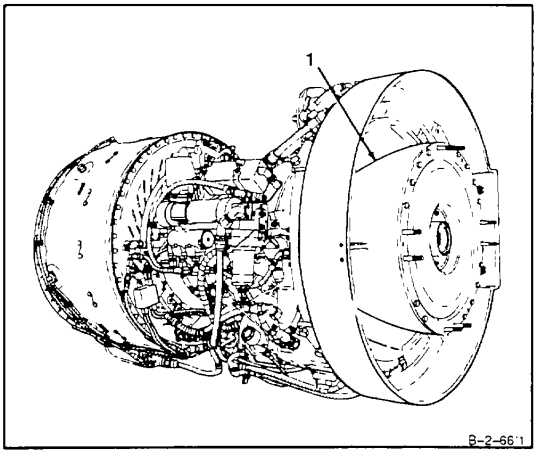
The air Inlet housing is made from a magnesium/nickel alloy containing radioactive thorium; particles of this material, resulting from blending or polishing are hazardous to your health if ingested or otherwise introduced into your body. Do not eat, drink, or smoke in any area where these particles might be present. Wash your hands thoroughly after working with this material. If exposure or Injury occurs, no matter how slight, get medical attention.

1. **Remove corrosion** using stainless steel wire brush

2. **Repair damaged paint** on air inlet housing assembly (1) as follows

   a. Touch up spray painted surfaces, using gray enamel (E26) (Ref Task 1-110)

   b. Touch up clear synthetesine painted surfaces, using clear synthetic sealant (El 3) (Ref Task 1-110)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION XI

T1 TEMPERATURE SENSOR

2-52 REMOVE T1 TEMPERATURE SENSOR 2-52

INITIAL SETUP

Applicable Configurations:

All

Tools:

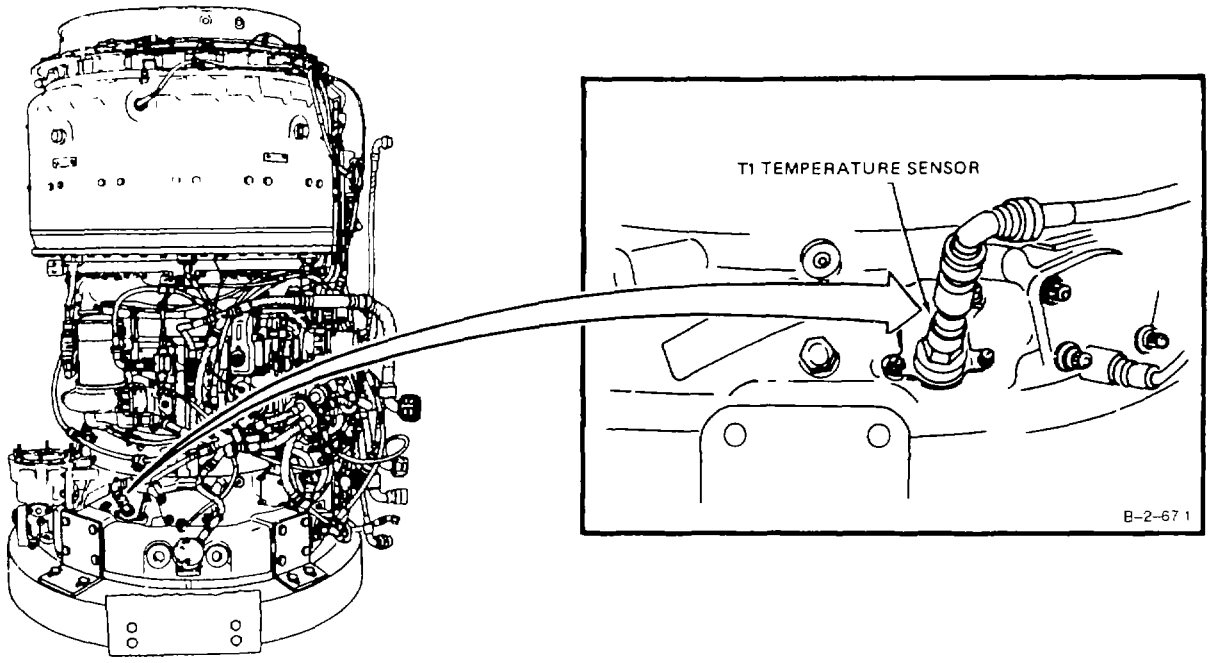
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944

Materials:

None

Personnel Required:

Aircraft Powerplant Repairer



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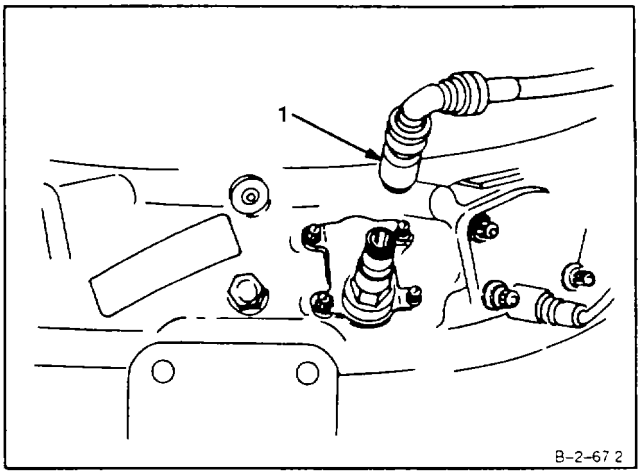
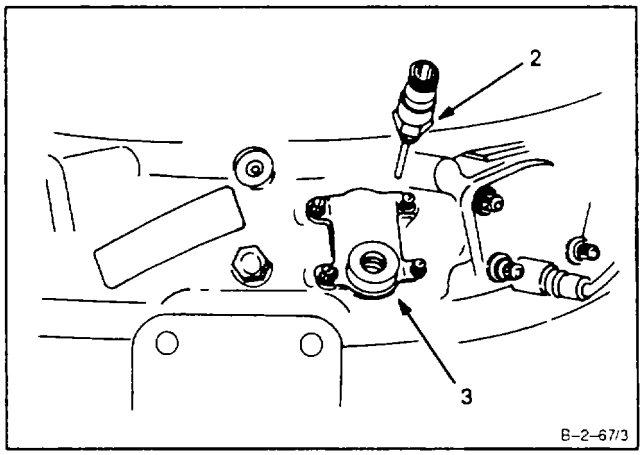
1. Disconnect electrical connector (1)



2. **Remove** lockwire and T1 **temperature sensor (2)** from inlet housing (3)



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

Dry Cleaning Solvent (E 19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required

Aircraft Powerplant Repairer
Get medical attention for eyes.

Equipment Condition.

Off Engine Task
T1 Temperature Sensor Removed (Task 2-52)

General Safety Instructions

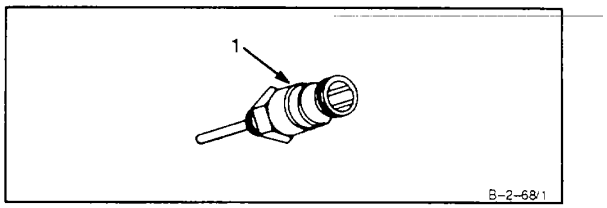
WARNING

Dry cleaning solvent (E19) 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.

1. Clean T1 temperature sensor as follows

   a. Wear gloves (E24) **Clean T1 temperature sensor (1),** using dry cleaning solvent (El 9) and brush

   b. **Remove any remaining solvent** using clean, dry, lint-free cloth (E30)



FOLLOW-ON MAINTENANCE

Inspect T1 Temperature Sensor (Task 2-54),

END OF TASK

2-54 INSPECT T1 TEMPERATURE SENSOR 2-54

INITIAL SETUP

Applicable Configurations:

All

Tools.

Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:

None

Personnel Required

Aircraft Powerplant Inspector

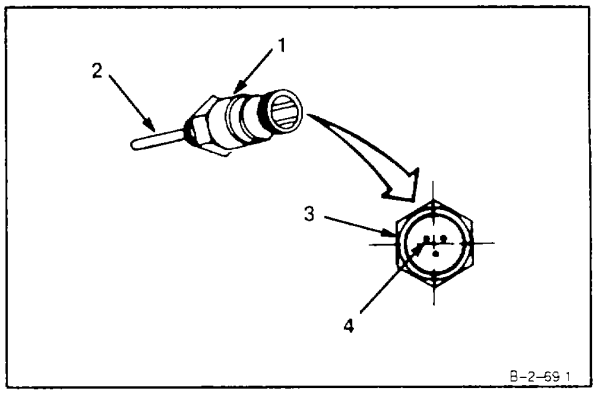
Equipment Condition:

Off Engine Task

1. Inspect T1 temperature sensor (1) as folows

   a. Inspect probe (2). There shall be no nicks or cracks

   b. Inspect connector (3) There shall be no corrosion, broken or bent pins (4)



FOLLOW-ON MAINTENANCE

None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Dry, Compressed Air
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

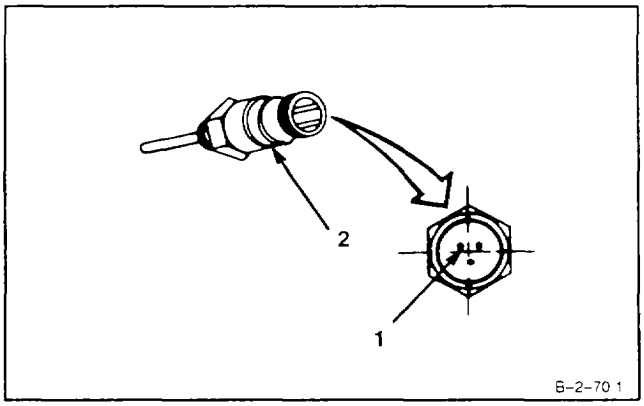
Materials
Crocus Cloth (E16)
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
Equipment Condition
Off Engine Task

NOTE

This repair is allowed, provided it does not cause pins to break or crack.

1. **Straighten bent pins (1)** of T1 temperature sensor (2) Use long-nose pliers to gently move pins (1) until they are straight.

2. **Remove corrosion from pins (1)** of T1 temperature sensor (2) Polish pin, using in and out motion over entire length of pin until corrosion is removed Use crocus cloth (E16).



WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face Do not use more than 30 psig air pressure Do not direct air toward yourself or another person Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

3 Wear goggles Remove loosened particles, using clean, dry, compressed air

INSPECT

FOLLOW-ON MAINTENANCE

None

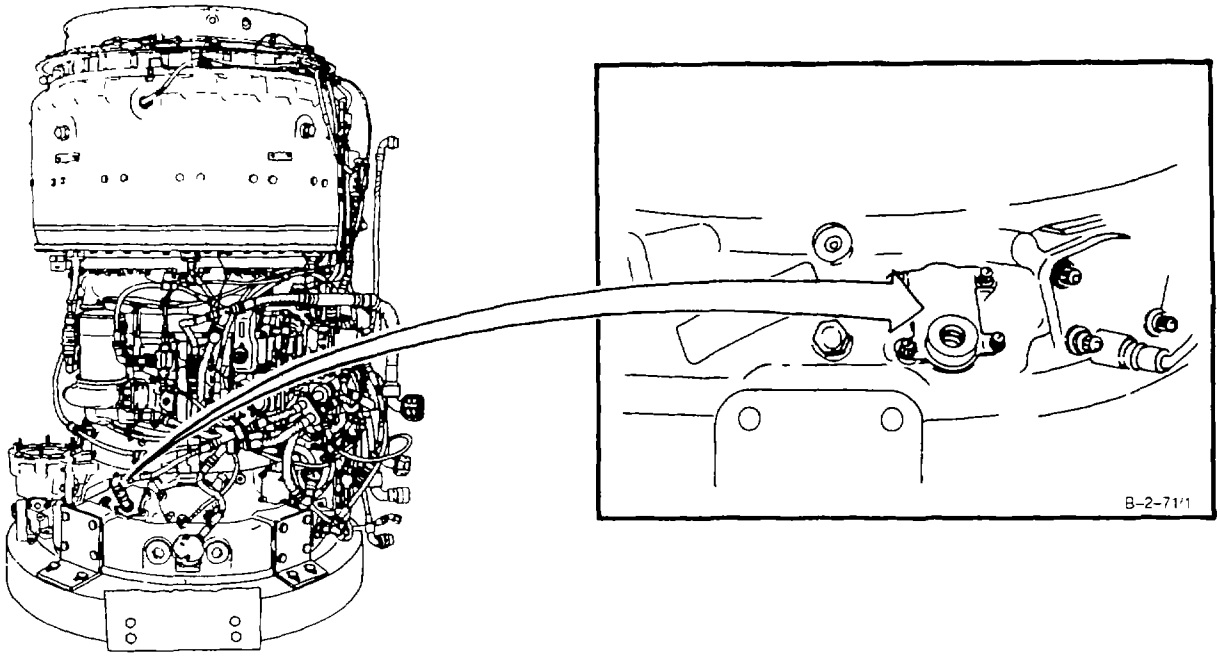
END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Crowfoot Attachment, 11/16 Inch
Torque Wrench, 30-150 Inch-Pounds

Materials
Lockwire (E33)
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
Equipment Condition
TM 1-2840-252-23P



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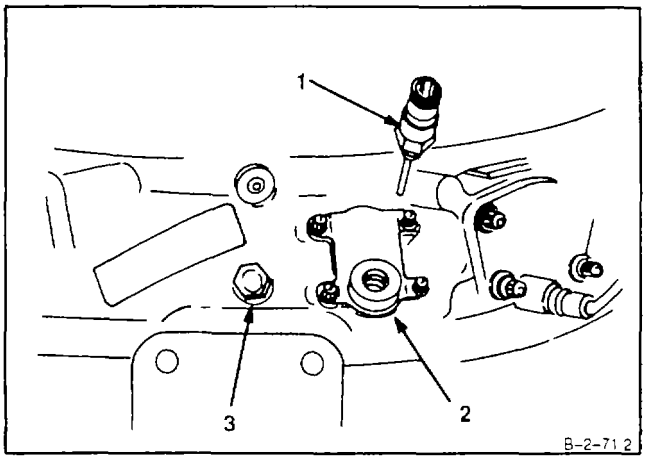
1. **Install T1 temperature sensor (1)** into inlet housing (2) and torque to 90 inch-pounds.

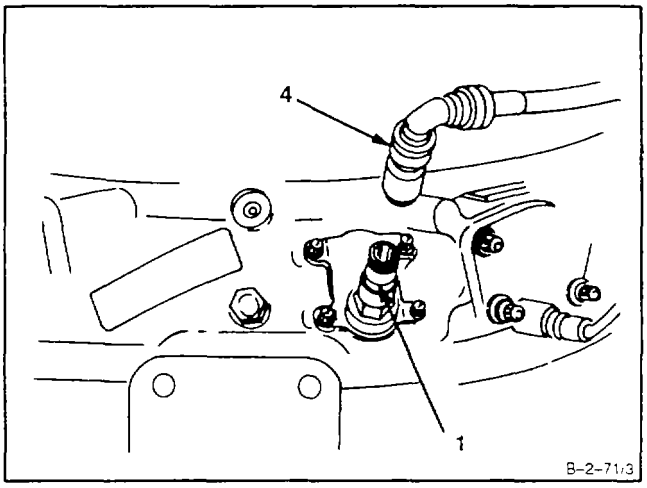
2. **Lockwire T1 temperature sensor (1)** to nut (3) Use lockwire (E33).



NOTE

In following step, it may be necessary to remove lockwire from electrical connector and reorient connector for proper installation Be sure to lockwire electrical connector if lockwire was removed.

3. **Connect electrical connector (4)** to T1 temperature sensor (1).



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION XII

AIR LINES

2-57 REMOVE HOSE ASSEMBLY (INTERSTAGE AIR-BLEED ACTUATOR TO HMA) 2-57

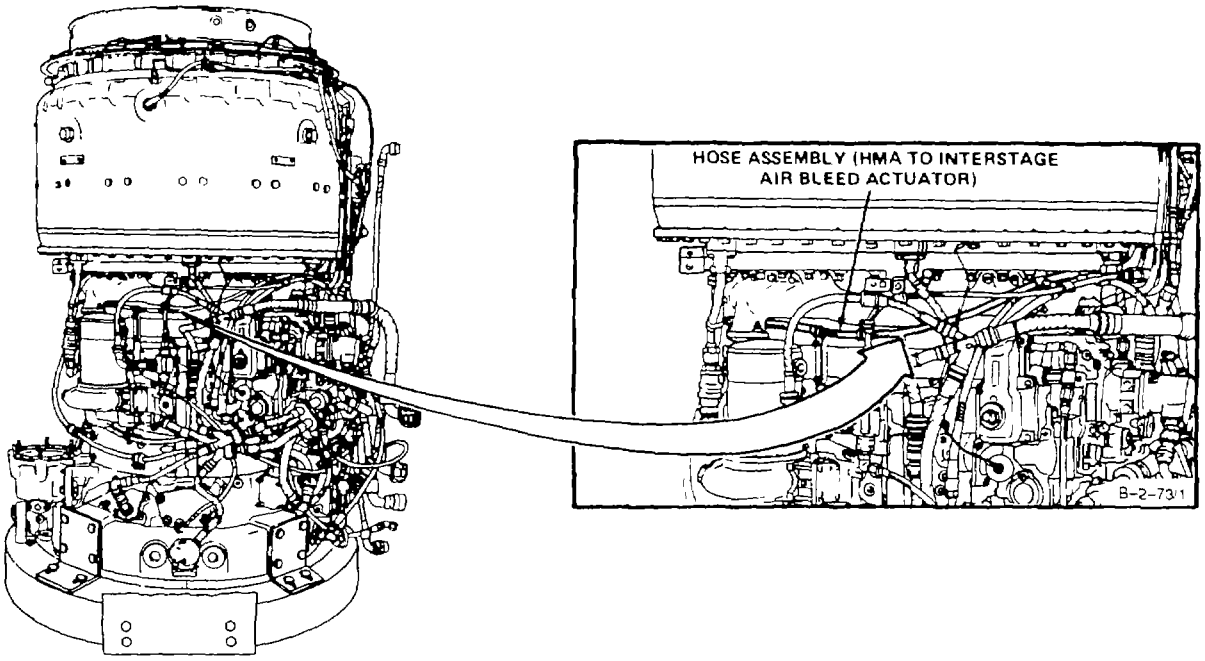
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials
None

Personnel Required:
Aircraft Powerplant Repairer



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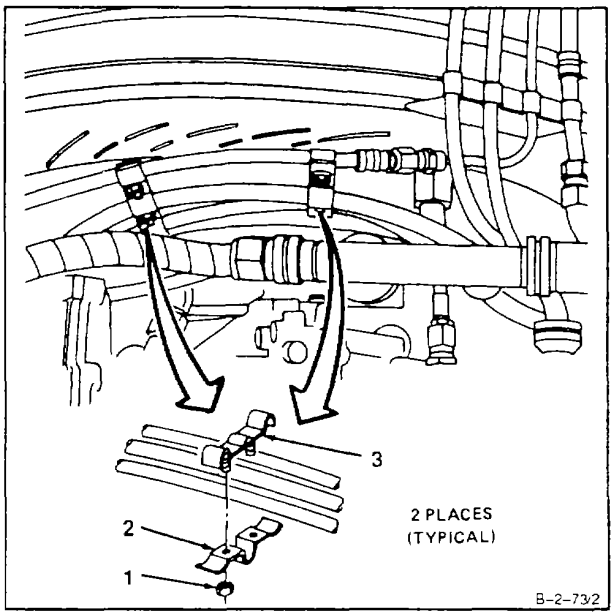
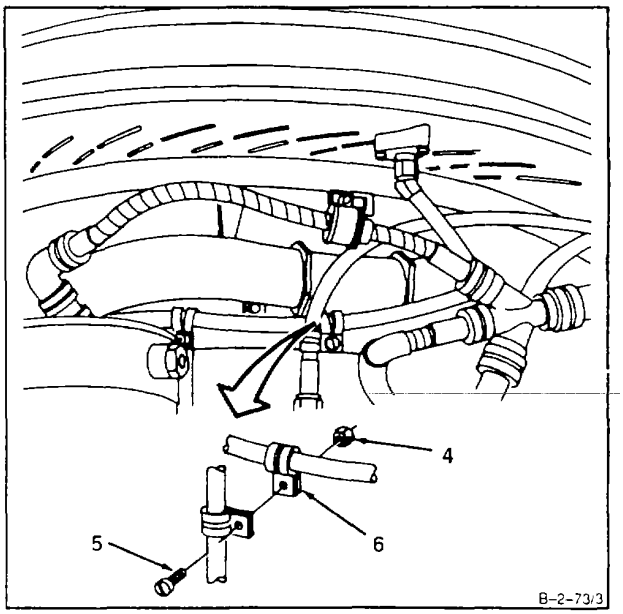
1. **Remove** four nuts (1) and clamps (2 and 3).



2. **Remove** nut (4) bolt (5), and clamp (6).



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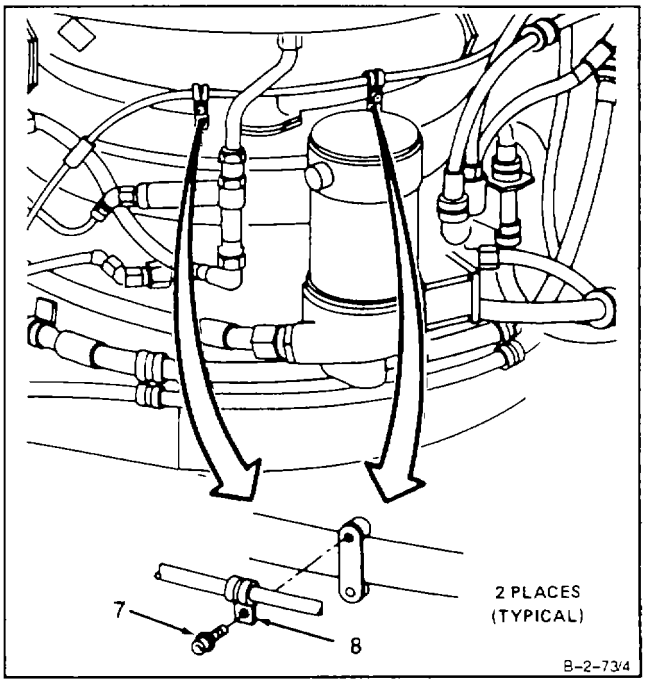
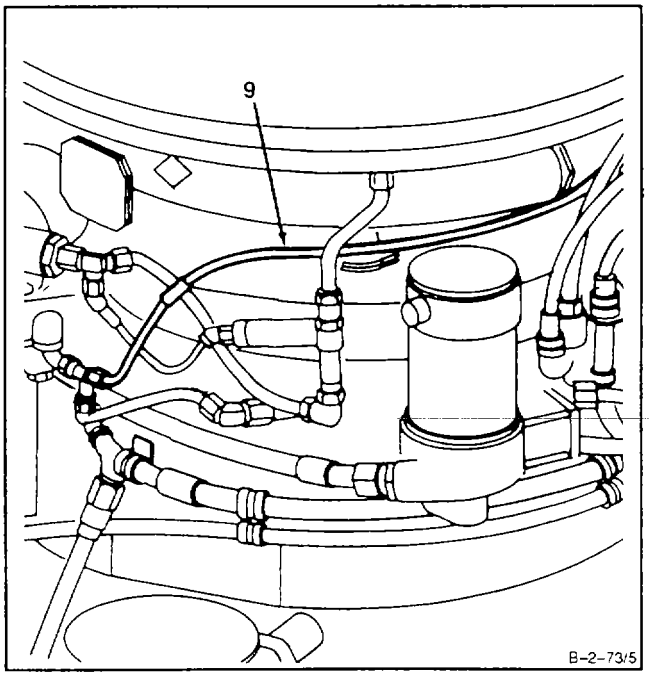
3. **Remove** lockwire, two bolts (7) and clamps (8).



4. **Disconnect and remove hose assembly (9).**



FOLLOW-ON MAINTENANCE
None

END OF TASK

2-58 INSTALL HOSE ASSEMBLY (INTERSTAGE AIR-BLEED ACTUATOR TO HMA) 2-58

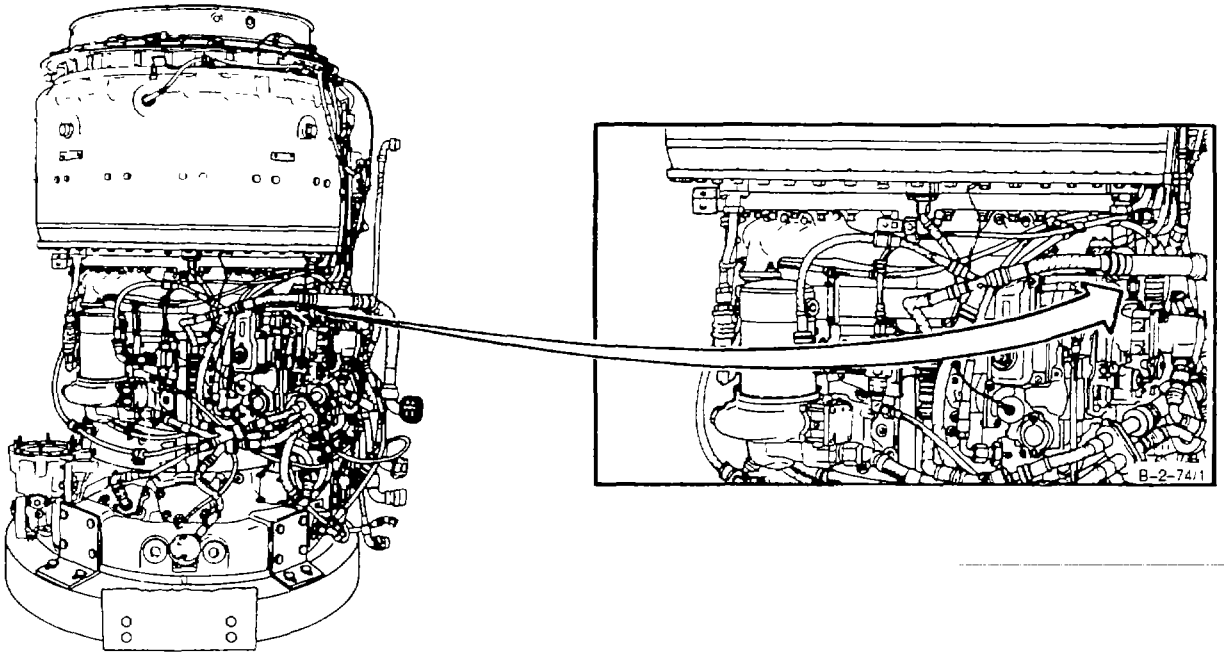
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Personnel Required:
Lockwire (E33)

Equipment Condition
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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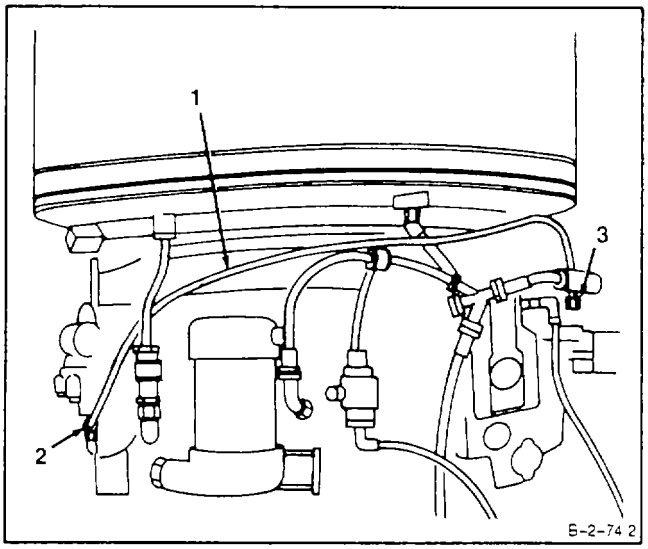
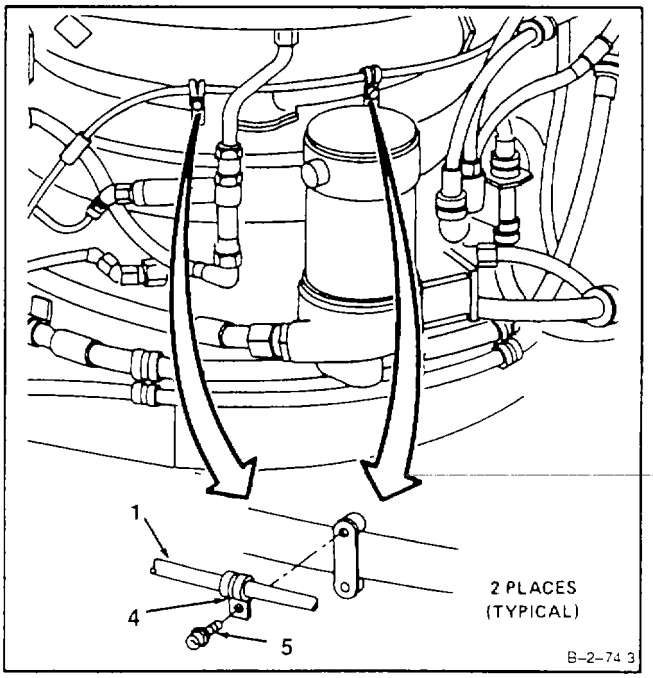
1. **Install hose assembly (1)** on tee (2) and nipple (3).



2. **Install two clamps (4)** on hose assembly (1), and install two bolts (5) Lockwire screws (5) Use lockwire (E33).



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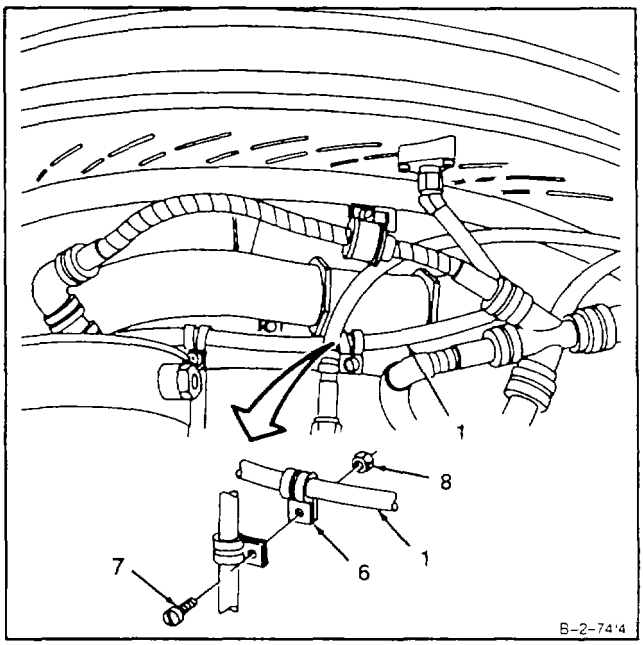
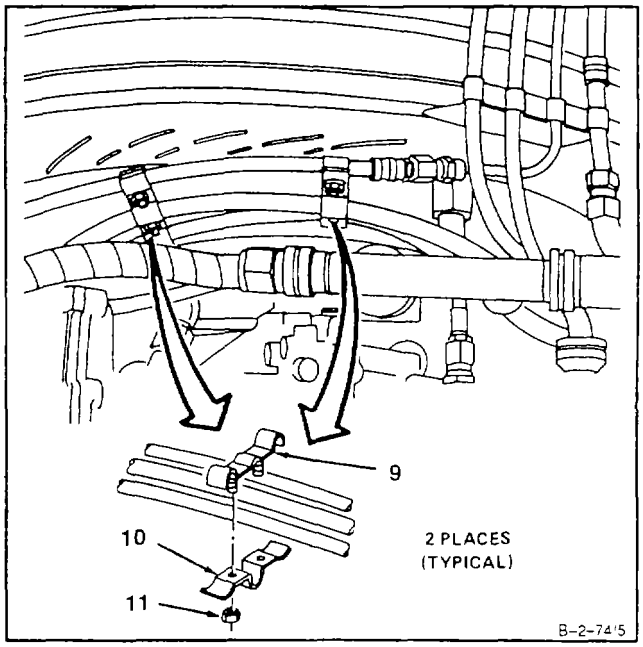
3. **Install clamp (6)** on hose assembly (1), and install bolt (7) and nut (8).



4. **Install clamps (9 and 10)** and four nuts (11).



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

2-59 REMOVE TUBE ASSEMBLY (AIR DIFFUSER ASSEMBLY TO CHECK VALVE) 2-59

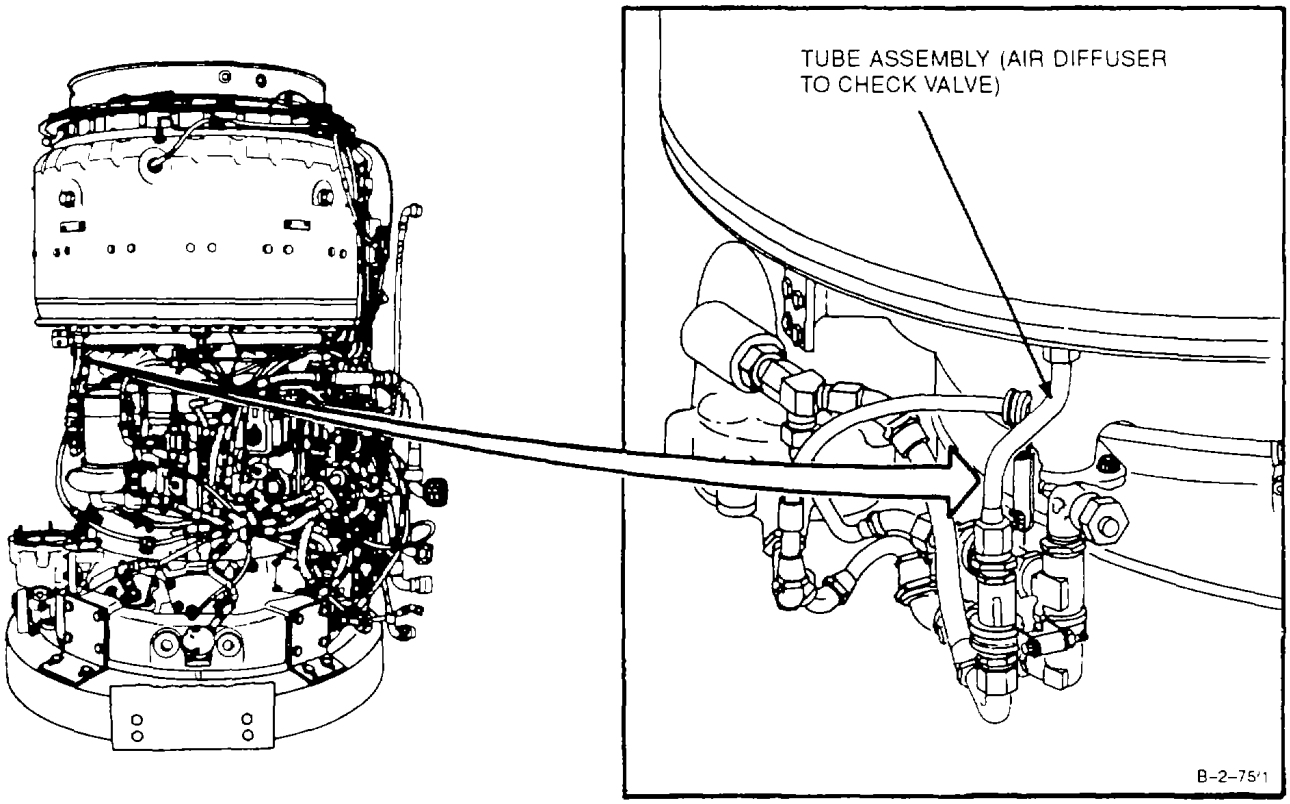
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials
None

Personnel Required:
Aircraft Powerplant Repairer



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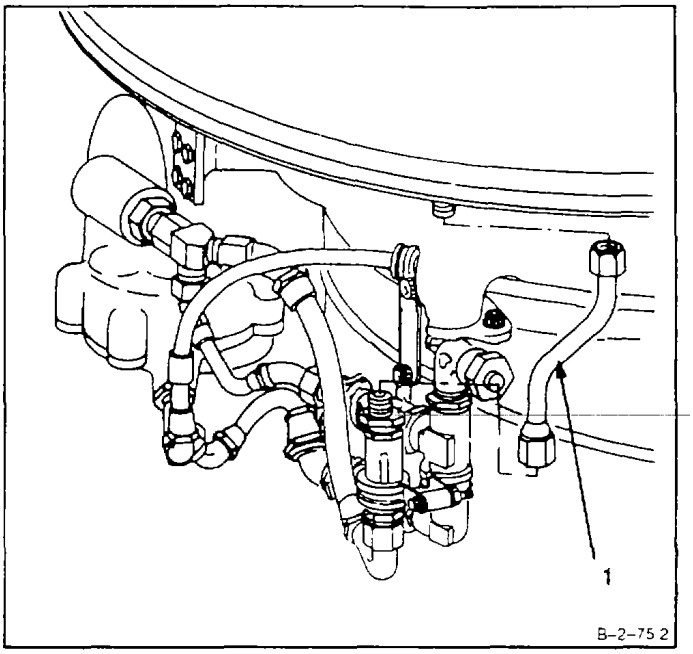
1. **Disconnect and remove tube assembly (1).**



FOLLOW-ON MAINTENANCE:
None

END OF TASK

2-60 INSTALL TUBE ASSEMBLY (AIR DIFFUSER ASSEMBLY TO CHECK VALVE) 2-60

INITIAL SETUP

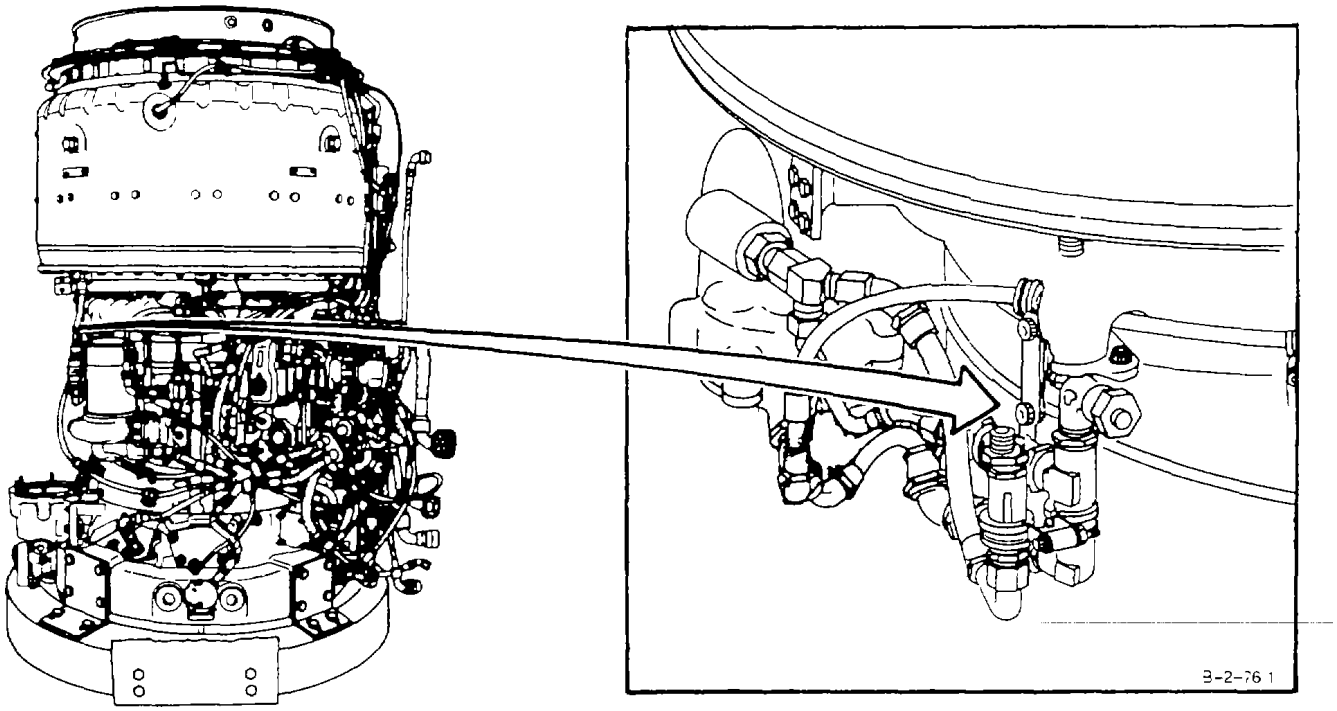
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials
None

Personnel Required:
Cable Tie

Equipment Condition
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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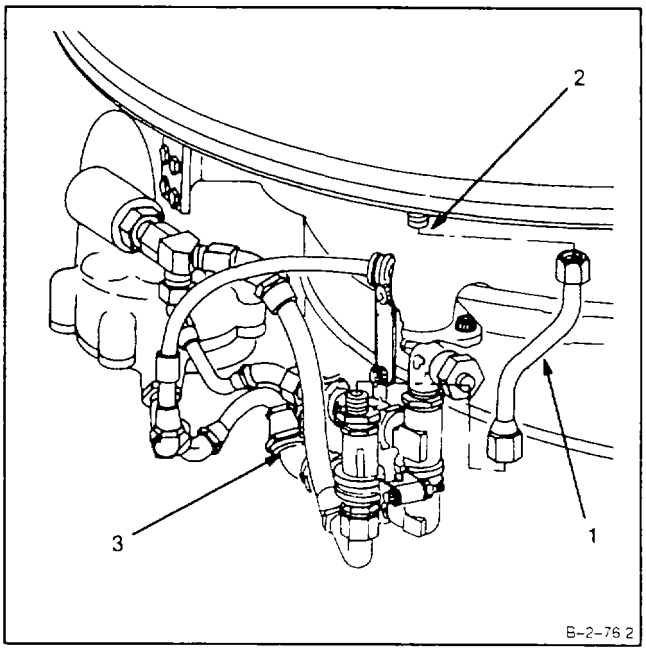
1. **Install tube assembly (1)** on nipples (2 and 3).



INSPECT.

FOLLOW-ON MAINTENANCE:
None

END OF TASK

2-61 REMOVE HOSE ASSEMBLY (COMPRESSOR HOUSING TO INLET HOUSING) 2-61

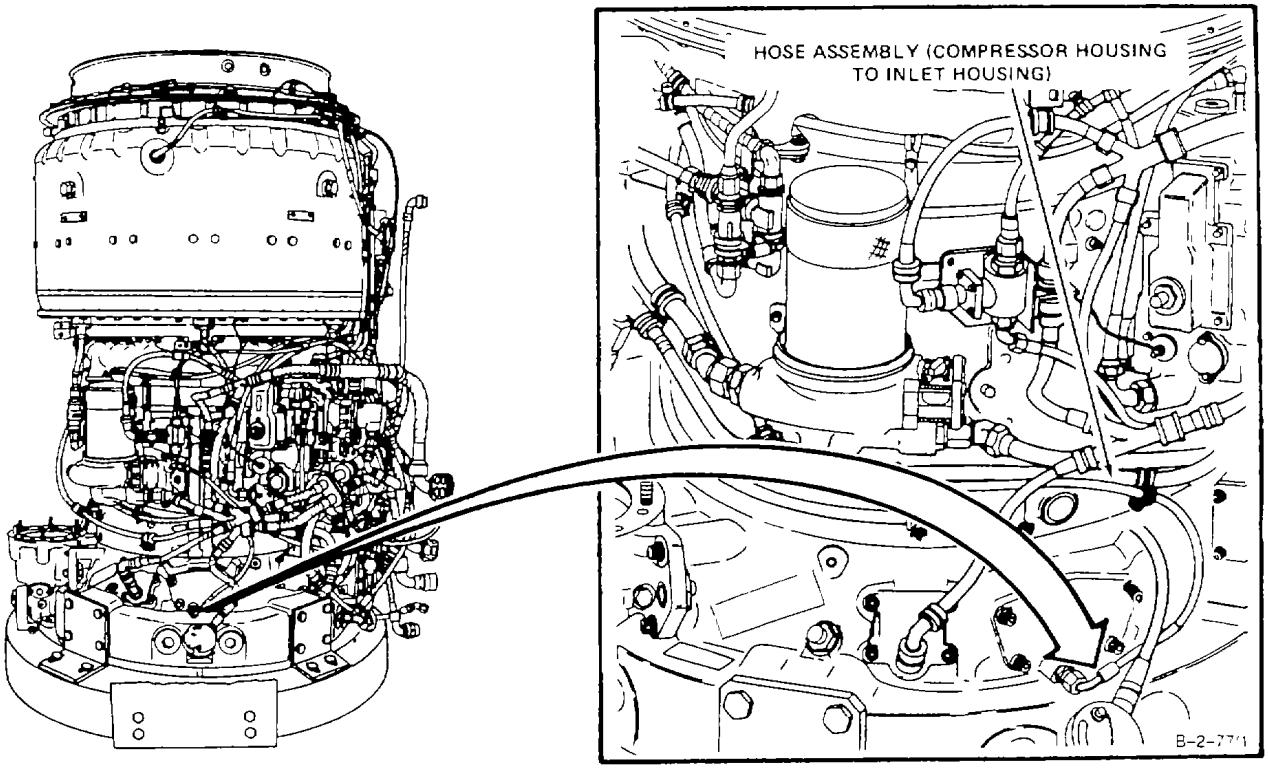
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials
None

Personnel Required:
Aircraft Powerplant Repairer



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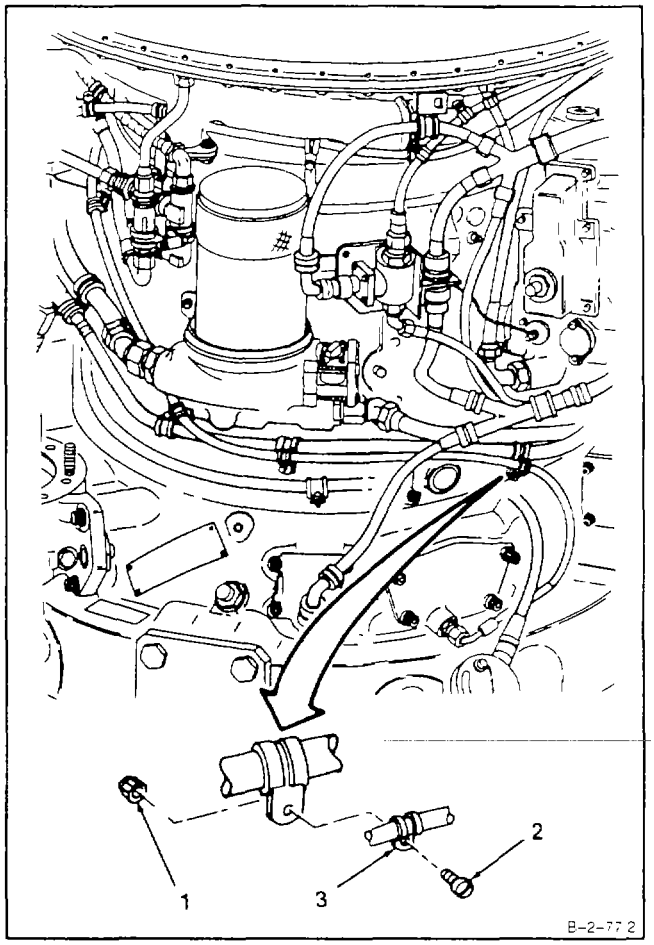
1. **Remove** nut (1), screw (2), and **clamp (3).**



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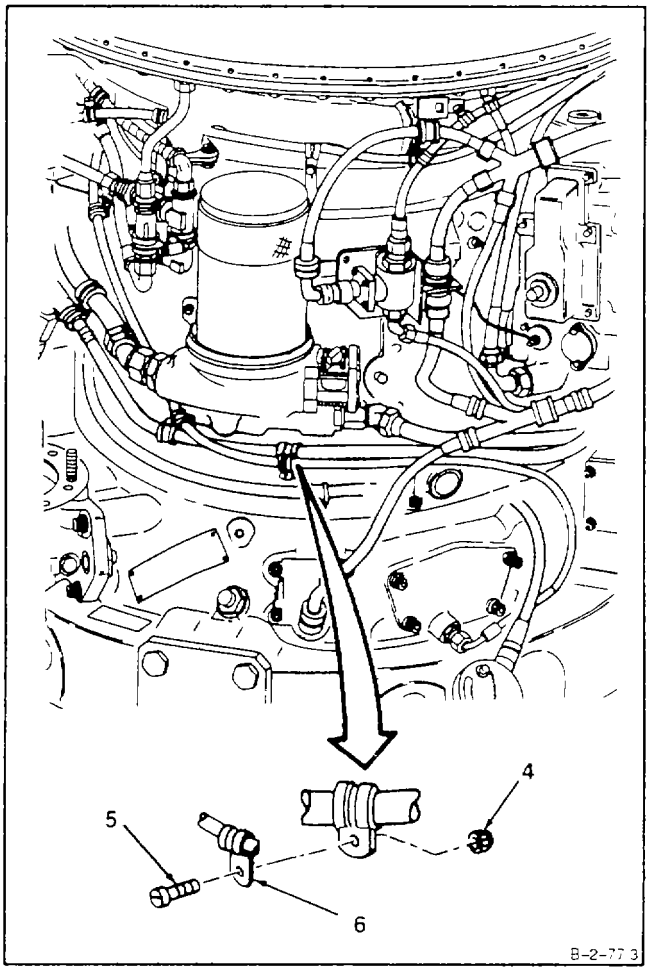
2. **Remove** nut (4), screw (5), and **clamp (6).**



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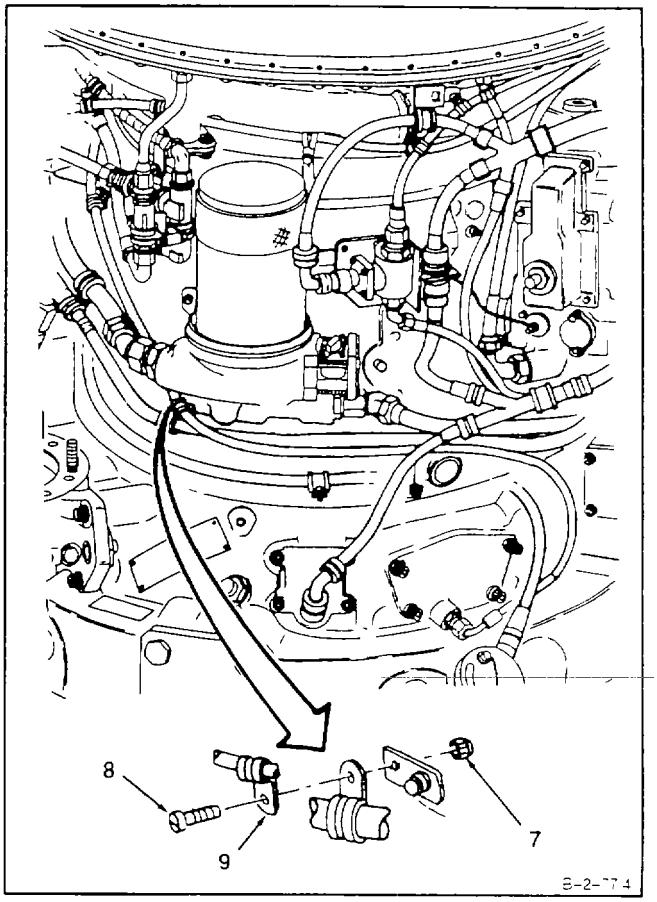
3. **Remove** nut (7), screw (8), and **clamp (9).**



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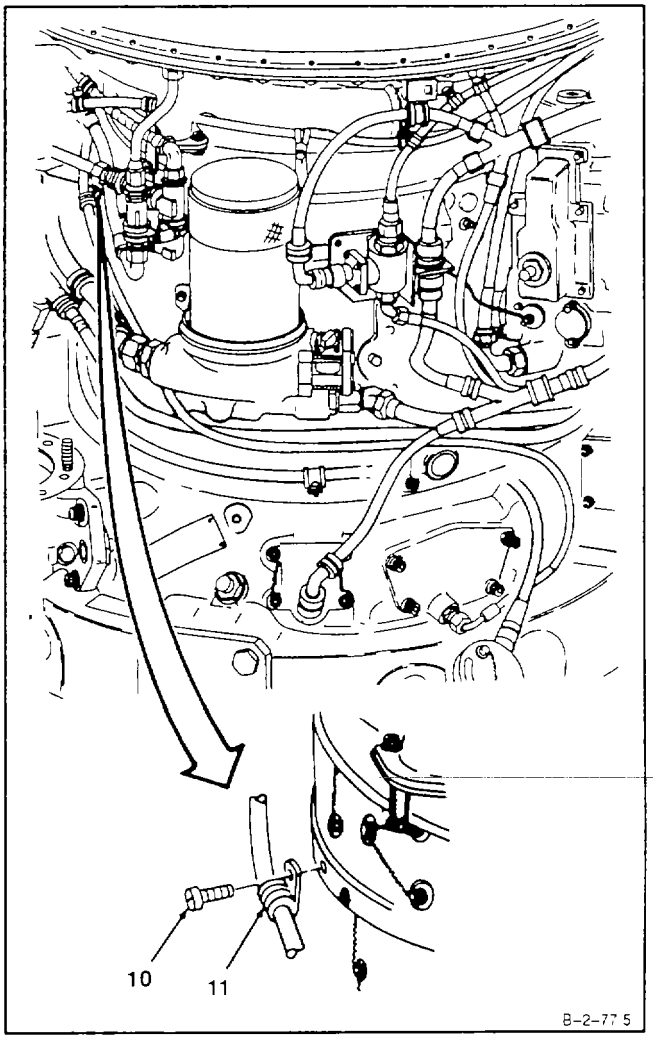
4. **Remove** lockwire, screw (10), and **clamp (11).**



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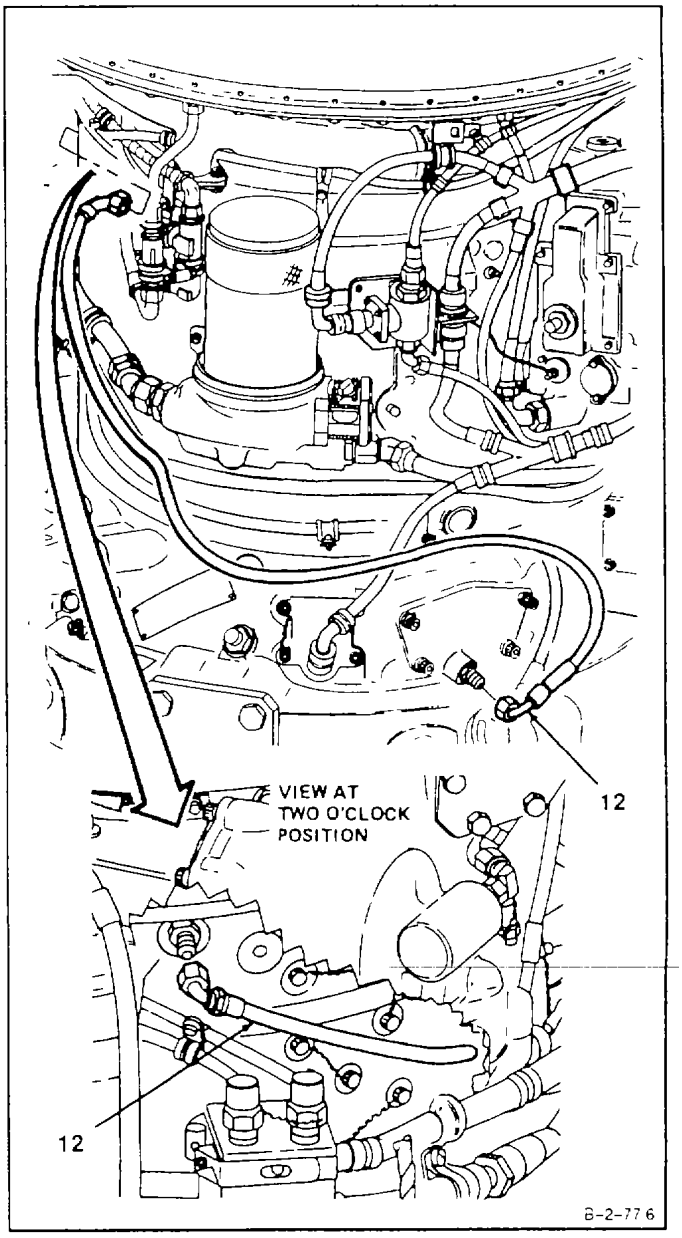
5. **Disconnect and remove hose assembly (12).**



FOLLOW-ON MAINTENANCE:
None

END OF TASK

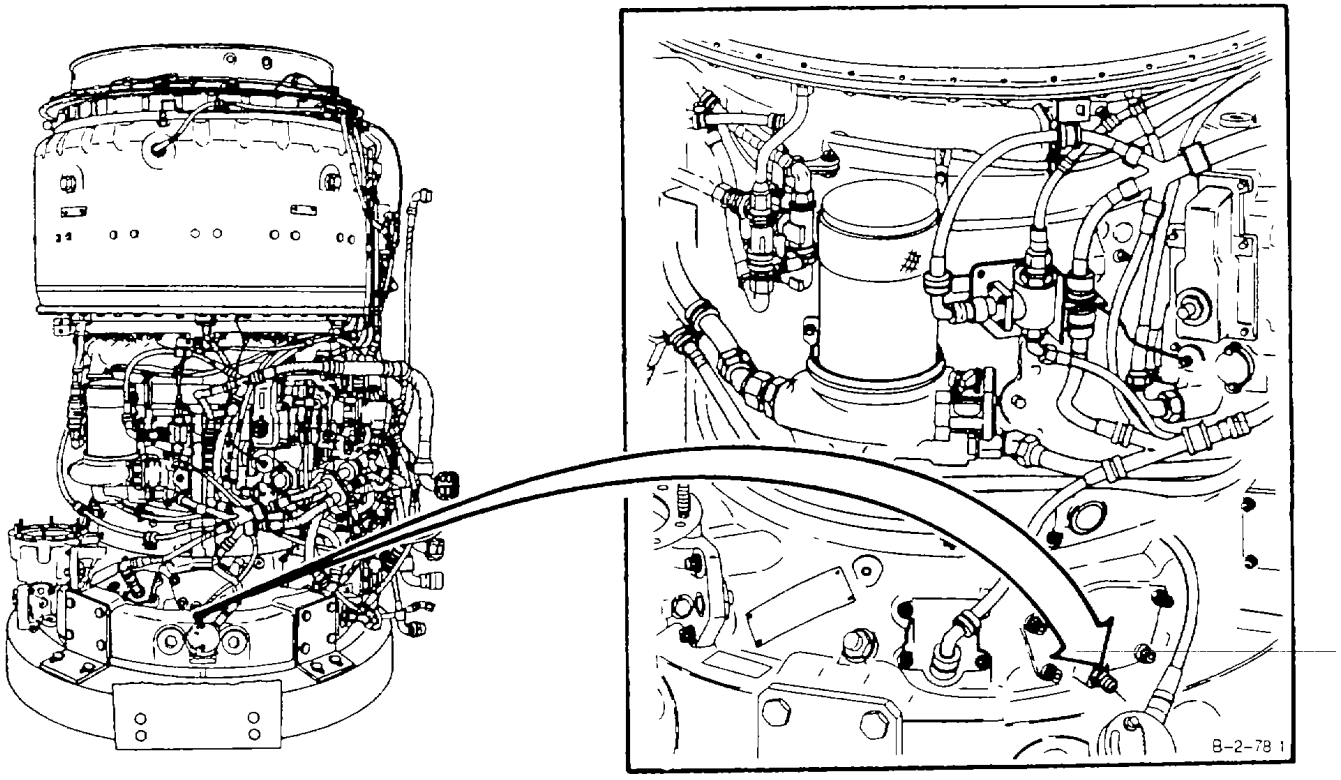
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials
Lockwire (E33)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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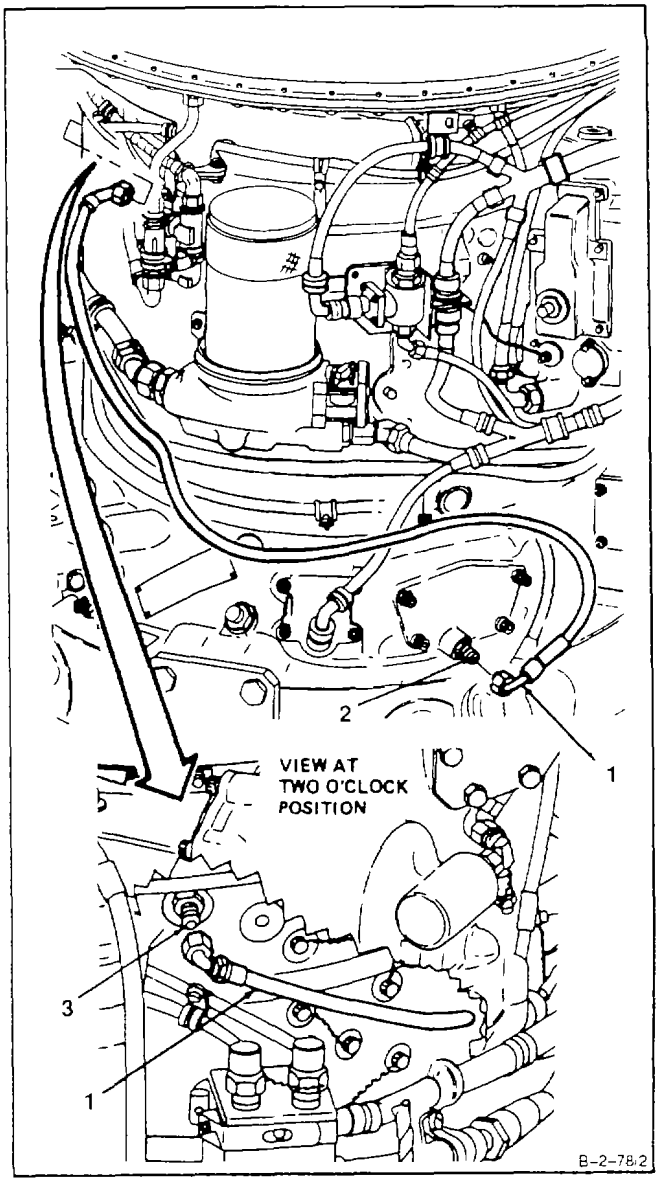
2-62 INSTALL HOSE ASSEMBLY (COMPRESSOR HOUSING TO INLET HOUSING) (Continued) 2-62

1. **Install hose assembly (1)** on nipples (2 and 3).



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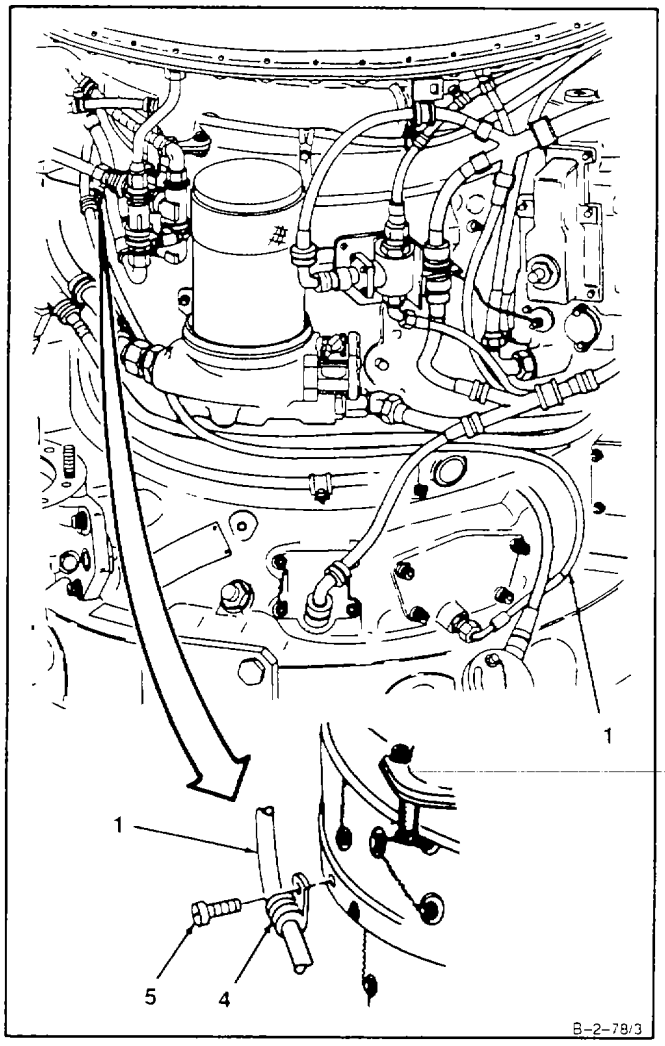
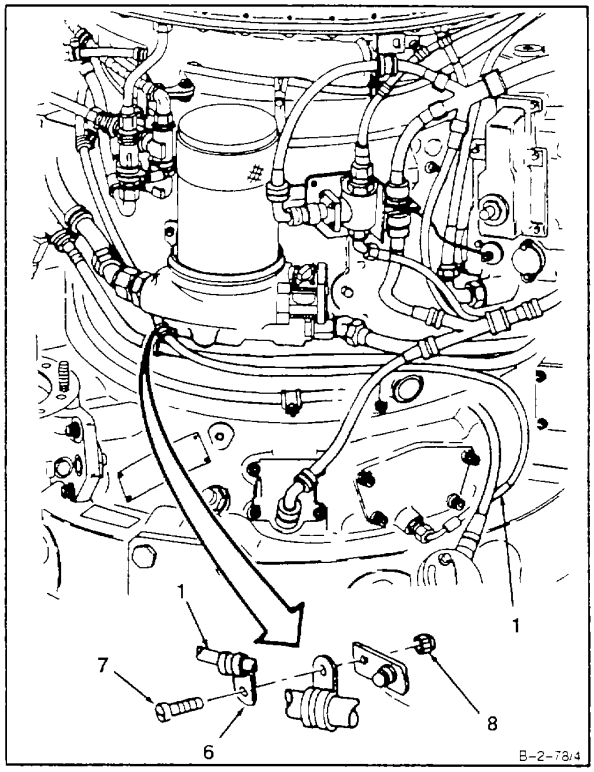
2. **Install clamp (4)** on hose assembly (1), and install screw (5) Lockwire screw (5) Use lockwire (E33)



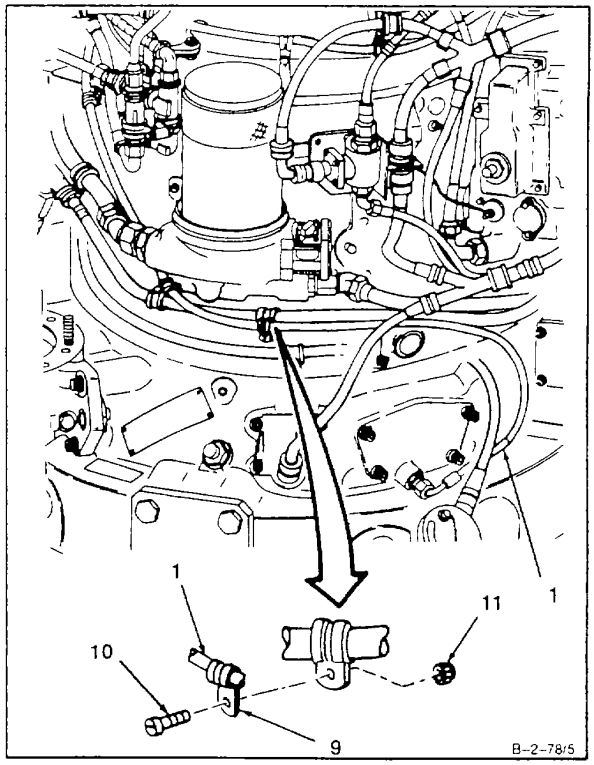
GO TO NEXT PAGE

2-62 INSTALL HOSE ASSEMBLY (COMPRESSOR HOUSING TO INLET HOUSING) (Continued) 2-62

3. **Install clamp (6)** on hose assembly (1), and install screw (7) and nut (8).



4. **Install clamp (9)** on hose assembly (1). And install screw (10) and nut (11)



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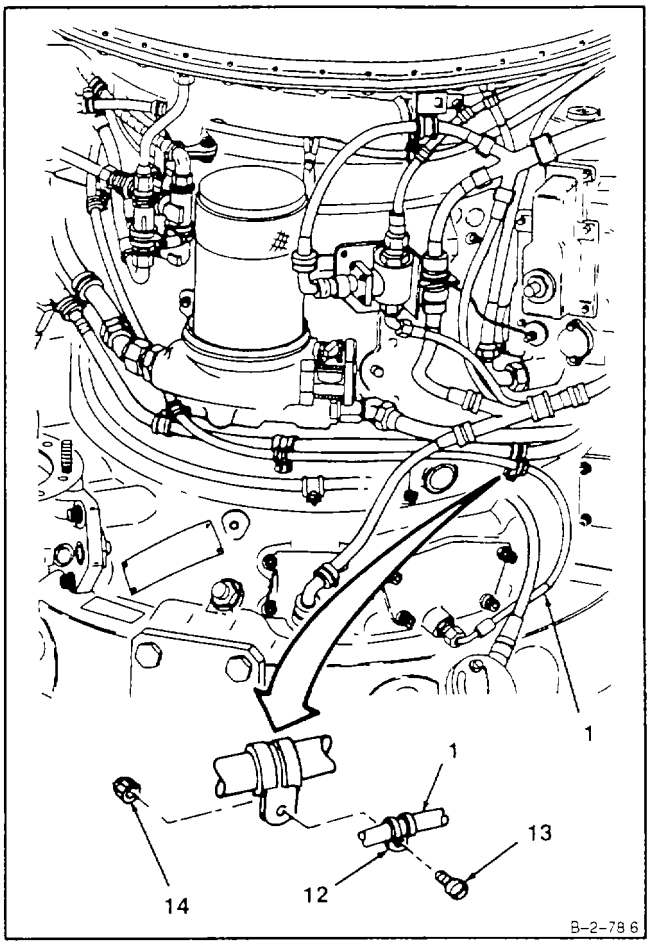
5. **Install clamp (12)** on hose assembly (1), and install screw (13) and nut(14).



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

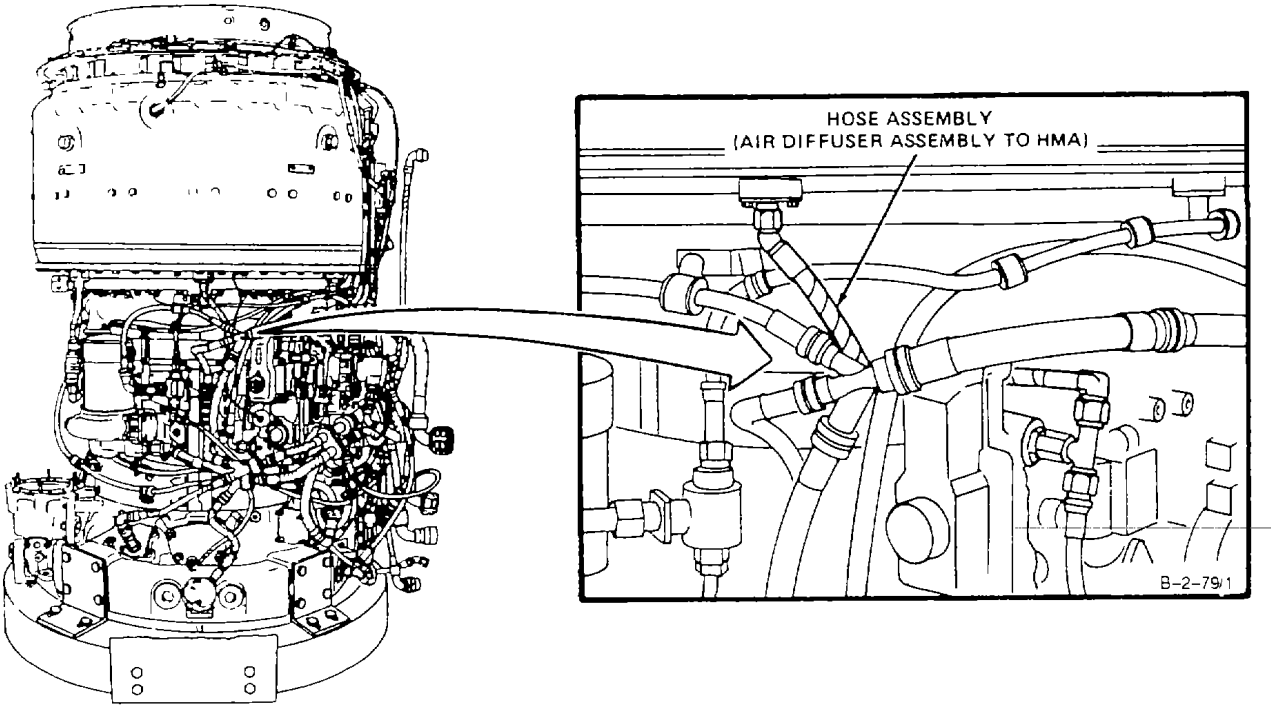
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials
None

Personnel Required:
Aircraft Powerplant Repairer



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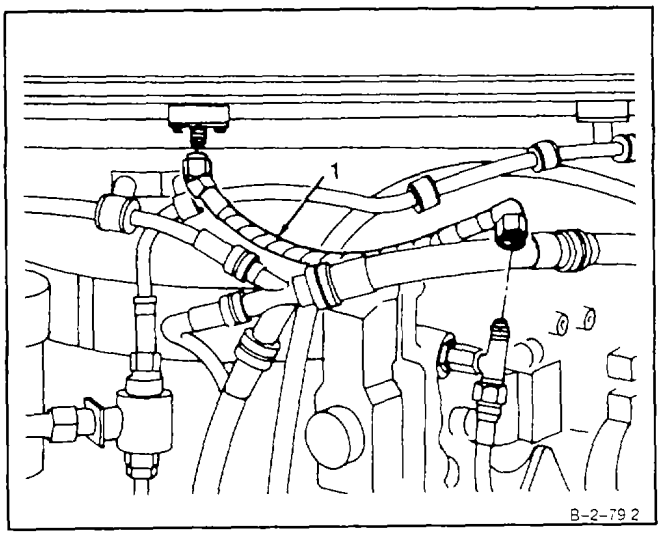
1. Disconnect and **remove hose assembly (1)**



FOLLOW-ON MAINTENANCE:
None

END OF TASK

2-64 INSTALL HOSE ASSEMBLY (AIR DIFFUSER ASSEMBLY TO HMA) 2-64

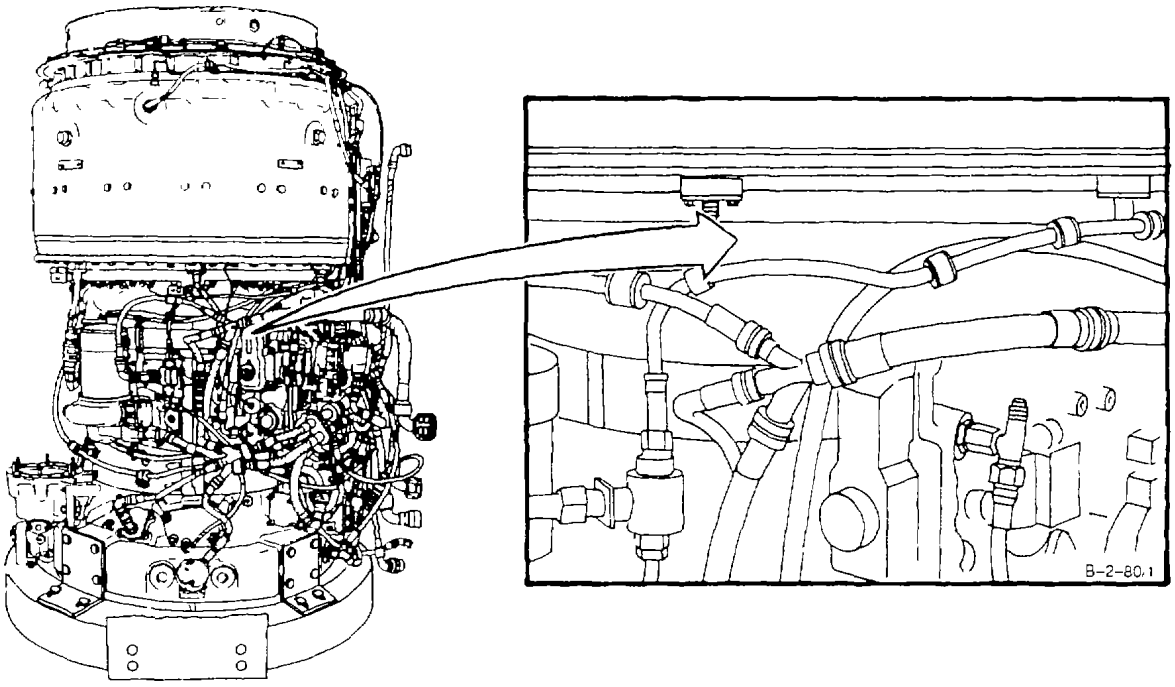
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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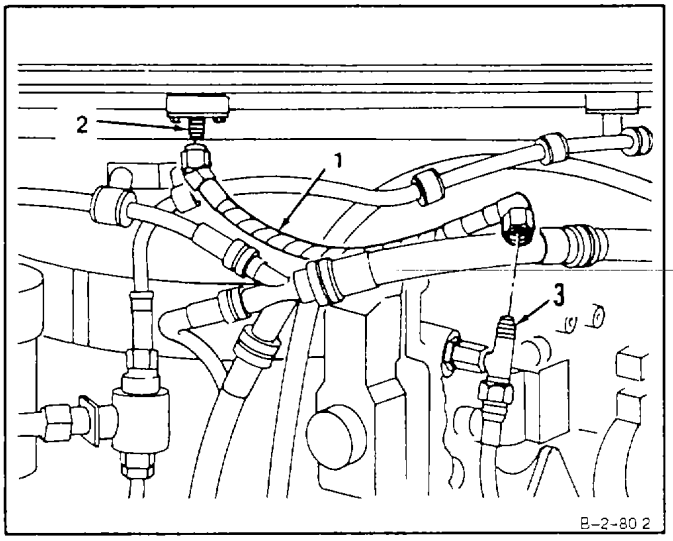
1 **Install hose assembly (1)** on union (2) and tee (3)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

2-65 REMOVE HOSE ASSEMBLY (CHECK VALVE TO INTERSTAGE AIRBLEED ACTUATOR P3 INLET) 2-65

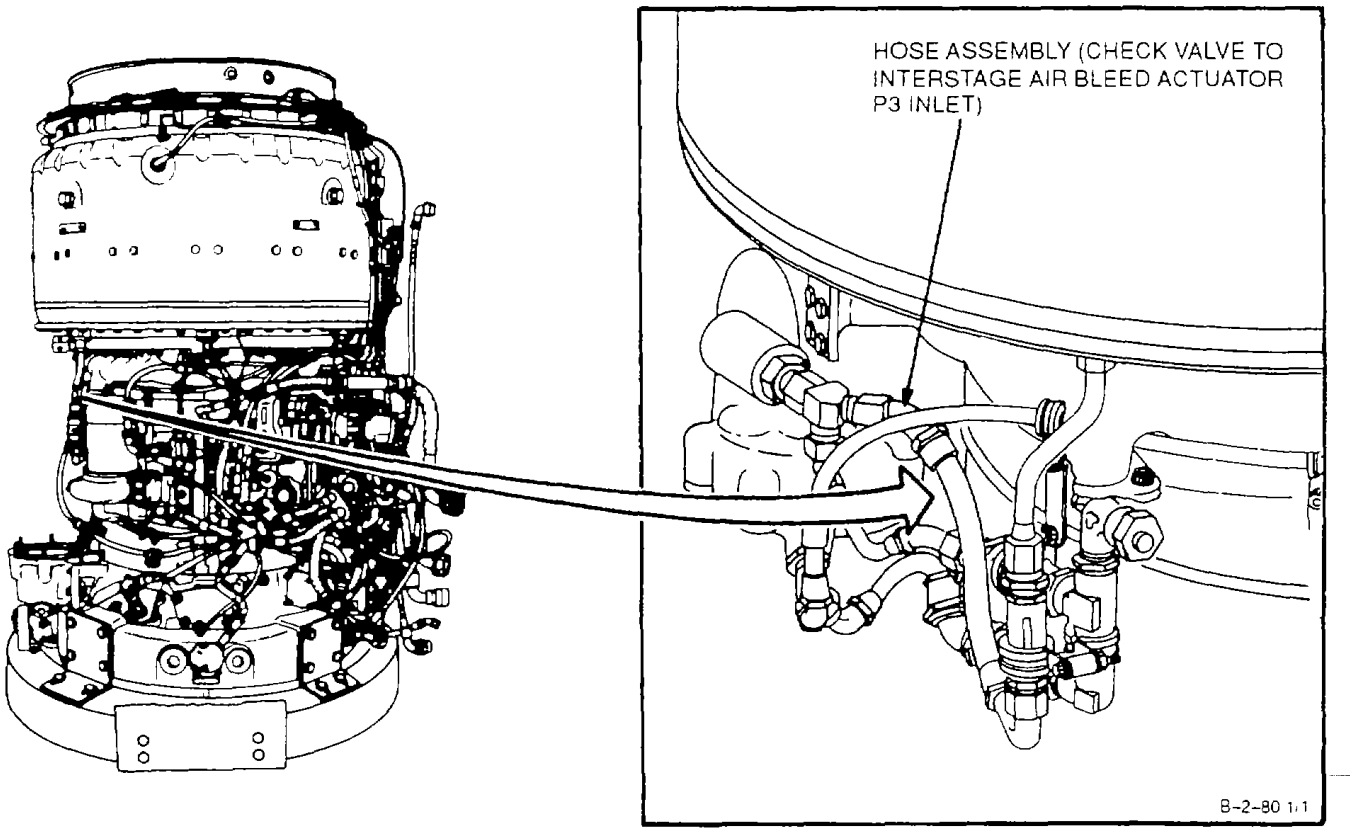
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

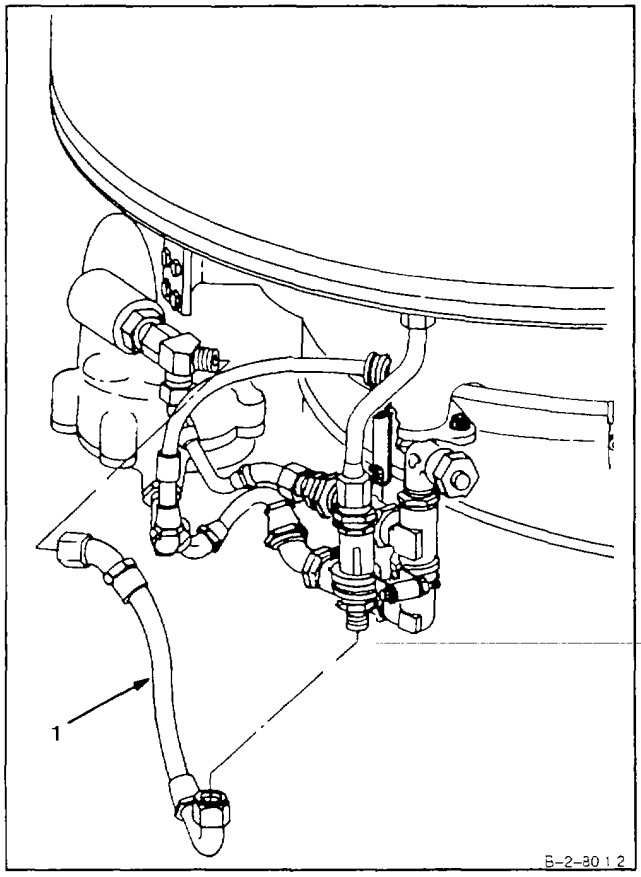
Materials
None

Personnel Required:
Aircraft Powerplant Repairer



GO TO NEXT PAGE

1 **Disconnect and remove hose assembly (1)**



FOLLOW-ON MAINTENANCE
None

END OF TASK

2-66 INSTALL HOSE ASSEMBLY (CHECK VALVE TO INTERSTAGE AIR BLEED ACTUATOR P3 INLET) 2-66

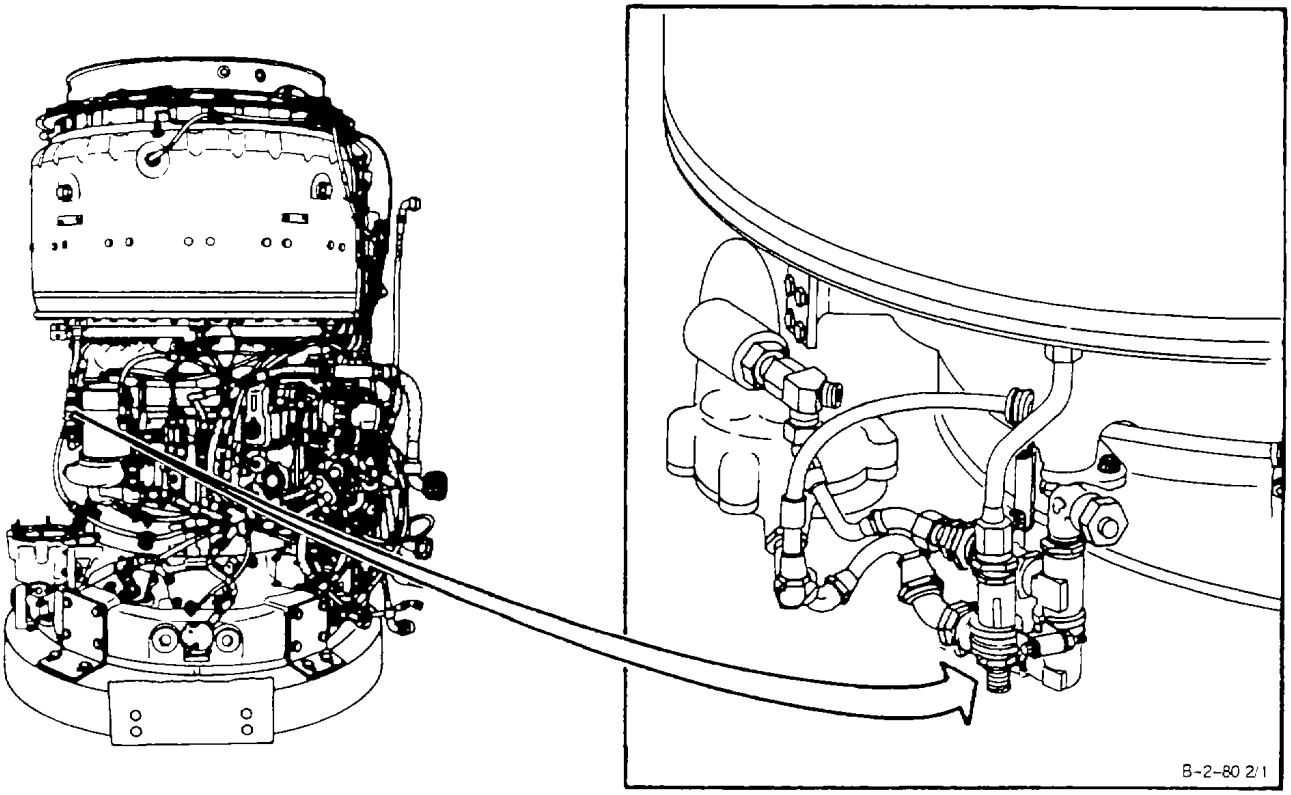
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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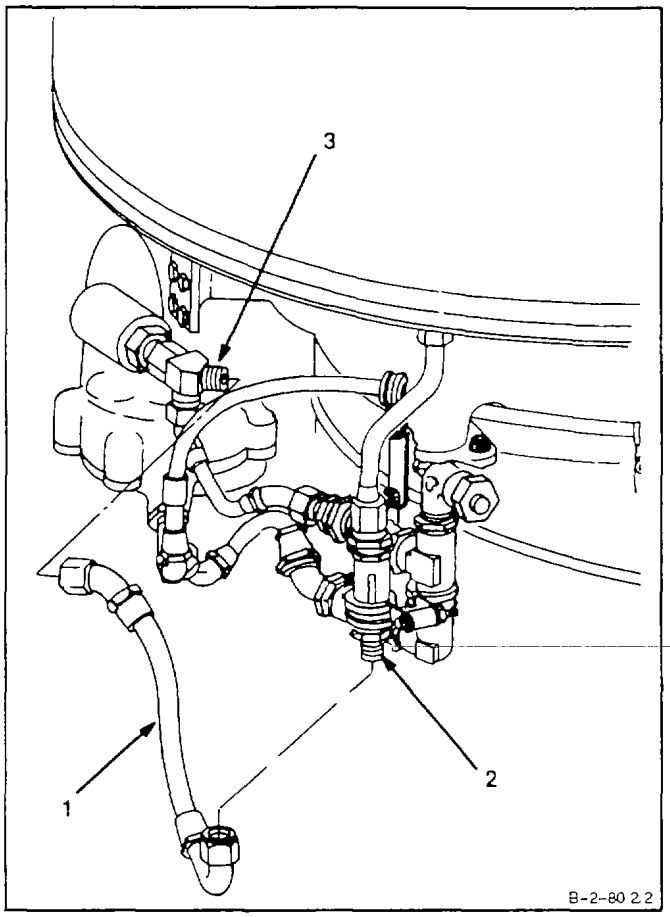
1. **Install hose assembly (1)** on nipple (2) and P3 tee (3).



INSPECT

FOLLOW-ON MAINTENANCE:
None

GO TO NEXT PAGE

2-67 REMOVE HOSE ASSEMBLY (WATER WASH TEE CHECK VALVE TO) INTERSTAGE AIR BLEED ACTUATOR P3 INLET) 2-67

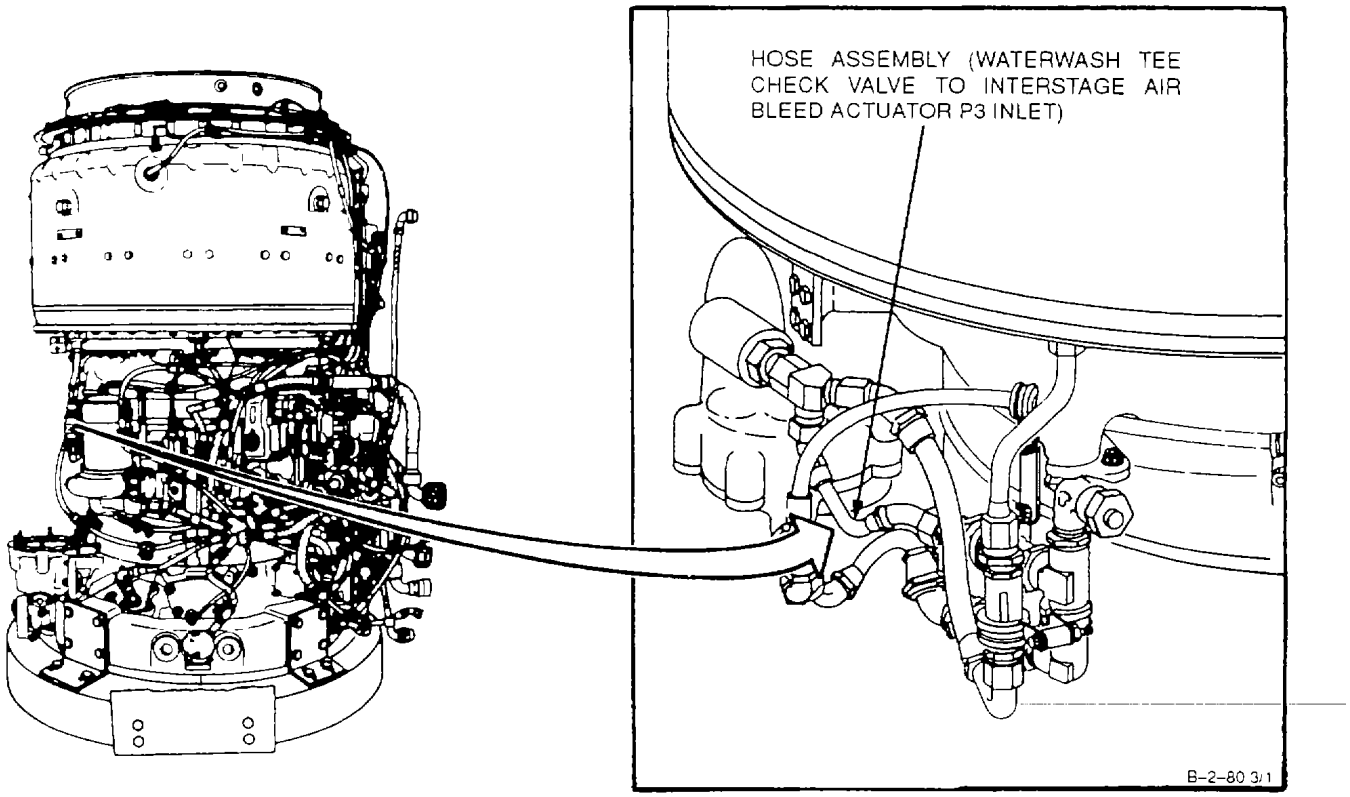
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials
None

Personnel Required:
Aircraft Powerplant Repairer



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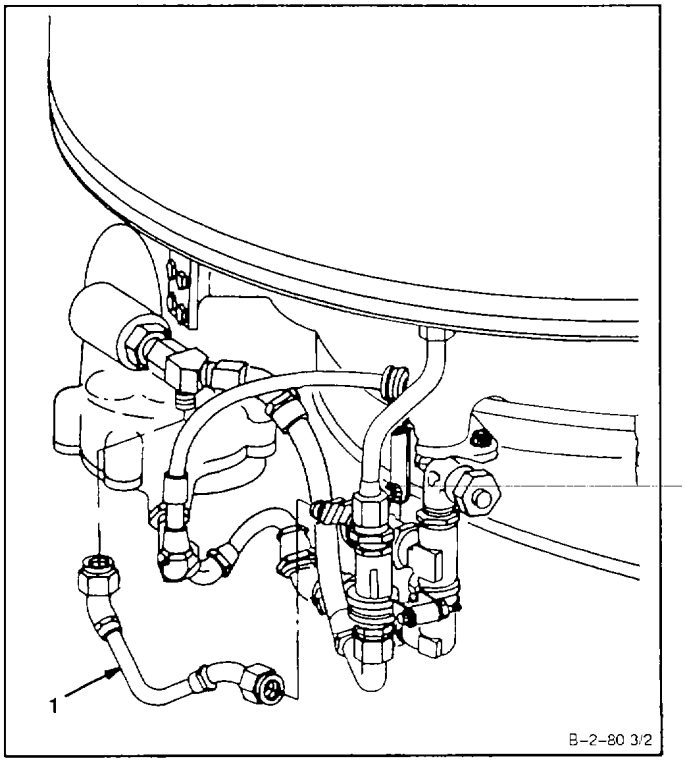
2-67 REMOVE HOSE ASSEMBLY (WATER WASH TEE CHECH VALVE TO) INTERSTAGE AIR BLEED ACTUATOR P3 INLET) (Continued) 2-67

1. **Disconnect and remove hose assembly(1).**



FOLLOW-ON MAINTENANCE:
None

END OF TASK

2-68 INSTALL HOSE ASSEMBLY (WATER WASH TEE CHECK VALVE TO) INTERSTAGE AR BLEED ACTUATOR P3 INLET) 2-68

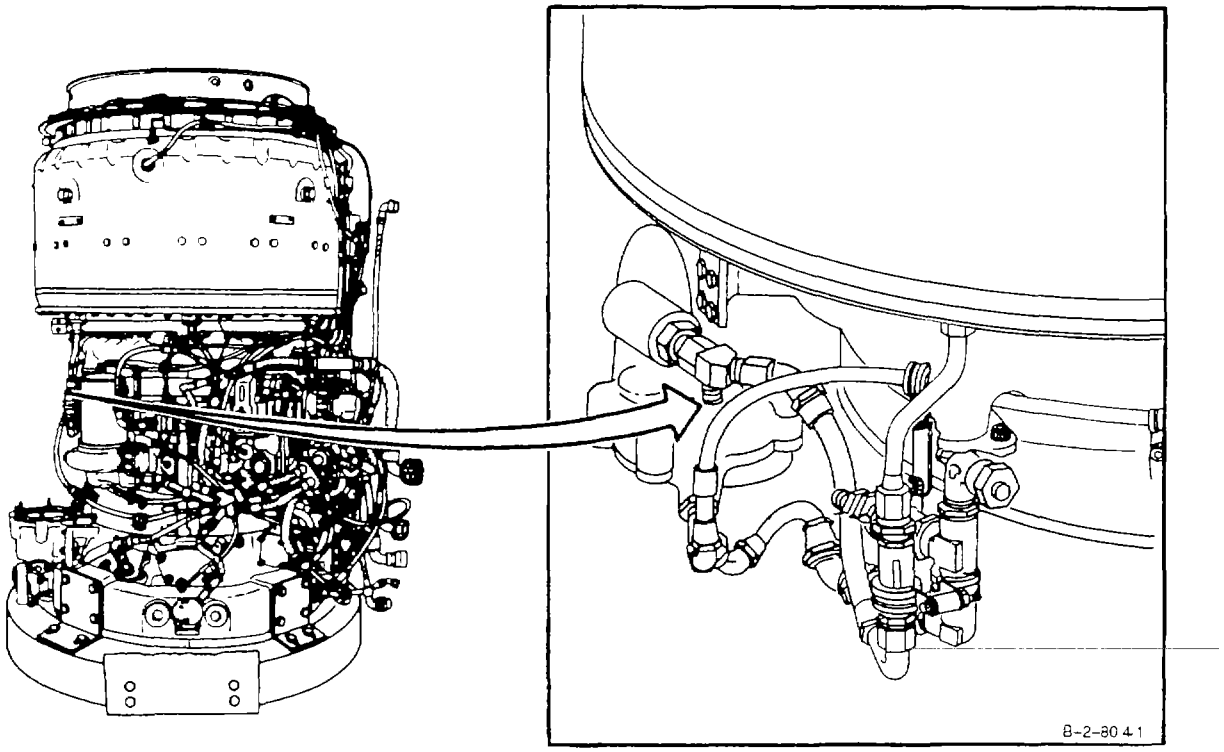
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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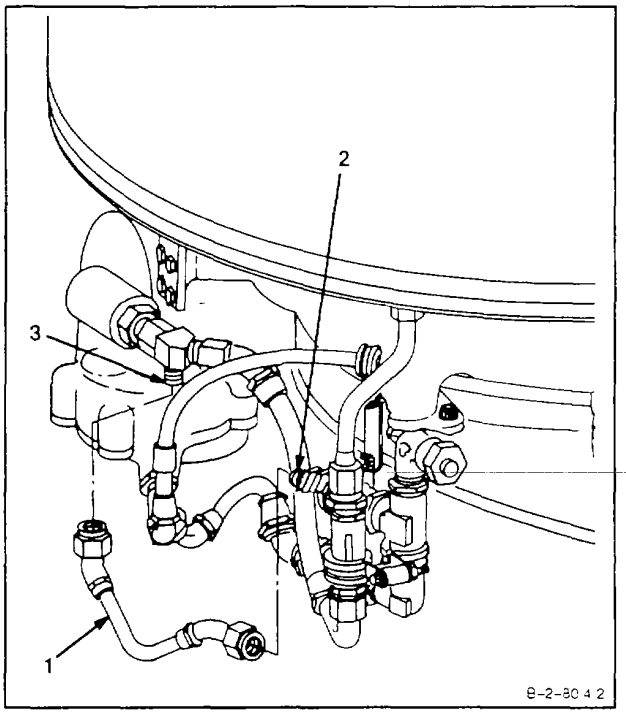
1. **Install hose assembly (1)** on nipple (2) and interstage air bleed actuator P3 tee (3)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

2-69 REMOVE HOSE ASSEMBLY (WATER WASH TEE CHECK VALVE TO) INTERSTAGE AIR BLEED ACTUATOR PM INLET) 2-69

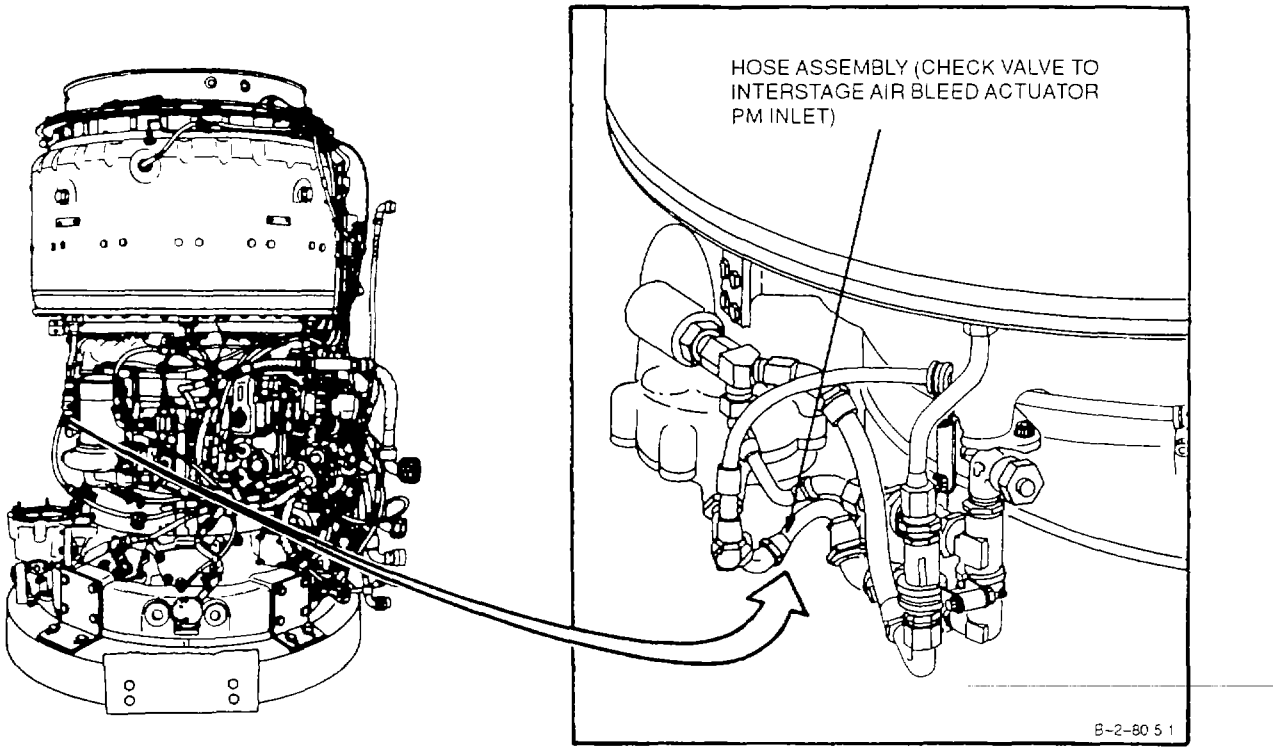
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

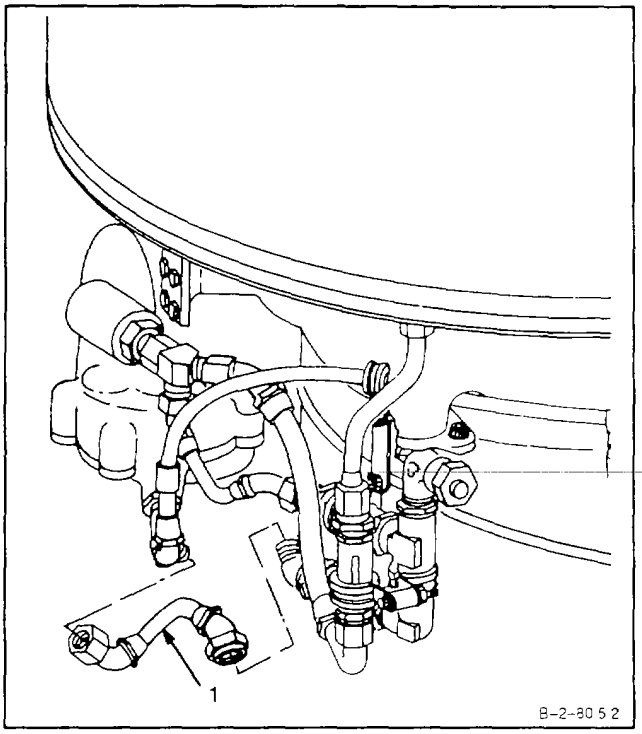
Materials
None

Personnel Required:
Aircraft Powerplant Repairer



GO TO NEXT PAGE

1. **Disconnect and remove hose assembly (1).**



FOLLOW-ON MAINTENANCE:
None

END OF TASK

2-70 INSTALL HOSE ASSEMBLY (WATER WASH TEE CHECK VALVE TO) INTERSTAGE AIR BLEED ACTUATOR PM INLET) 2-70

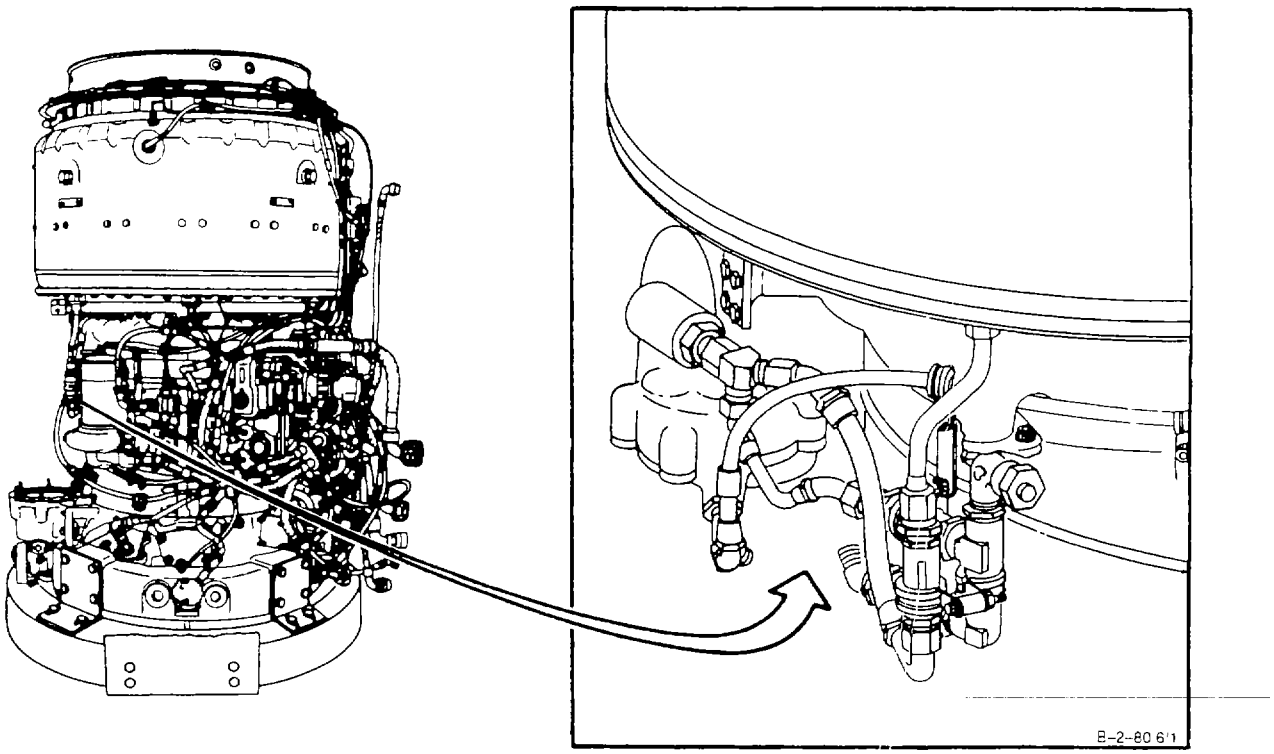
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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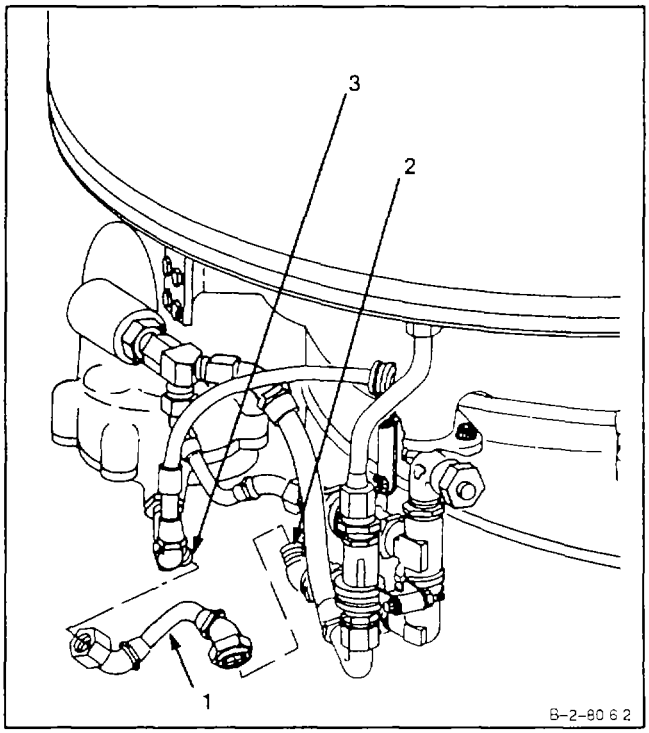
2-70 INSTALL HOSE ASSEMBLY (WATER WASH TEE CHECK VALVE TO INTERSTAGE AIR BLEED ACTUATOR PM INLET) (Continued) **2-70**

1. **Install hose assembly (1)** on elbow (2) and interstage air bleed actuator PM tee (3)



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

2-71 REMOVE HOSE ASSEMBLY (HMA TO AIRCRAFT BULKHEAD) 2-71

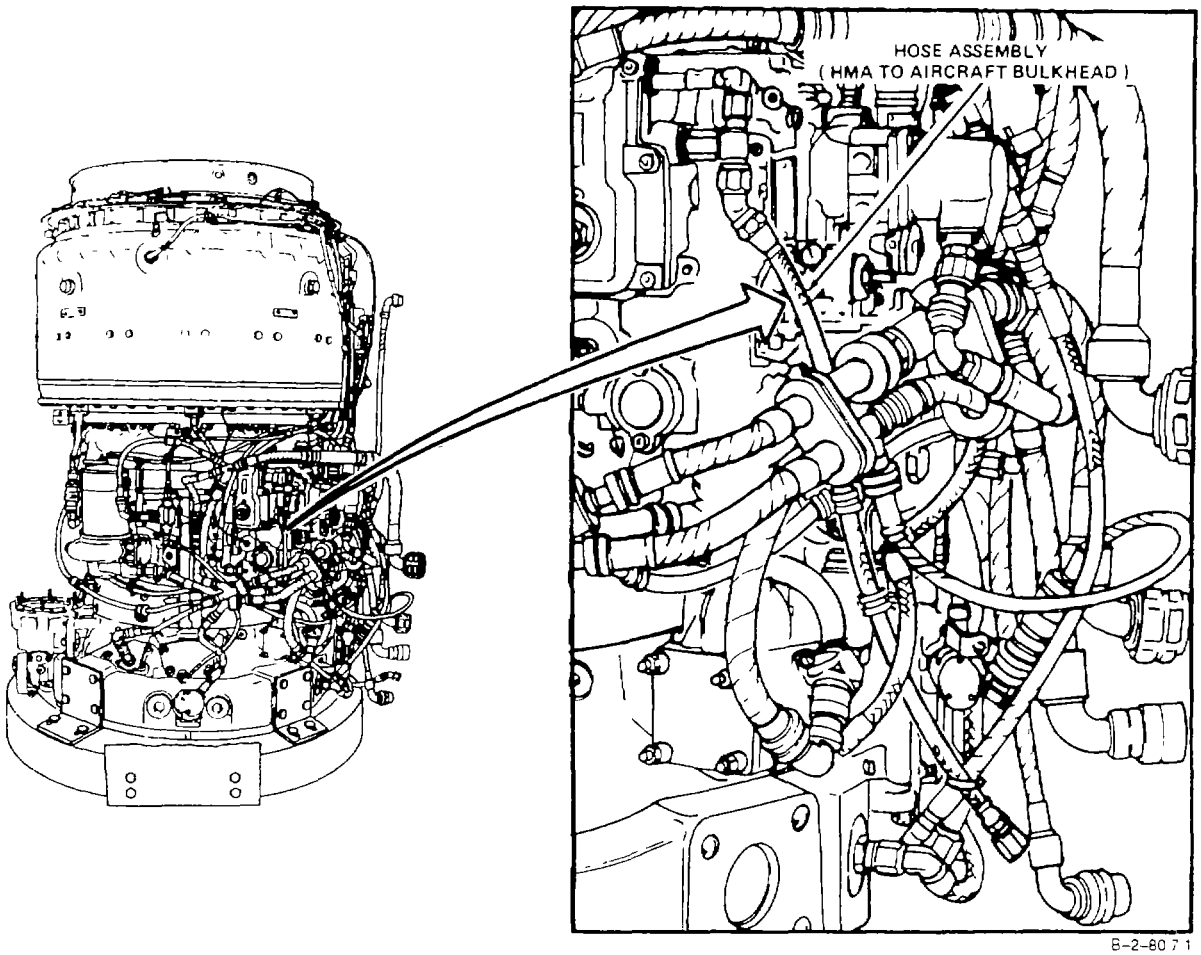
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN5180-00-323-4944

Materials
None

Personnel Required:
Aircraft Powerplant Repairer



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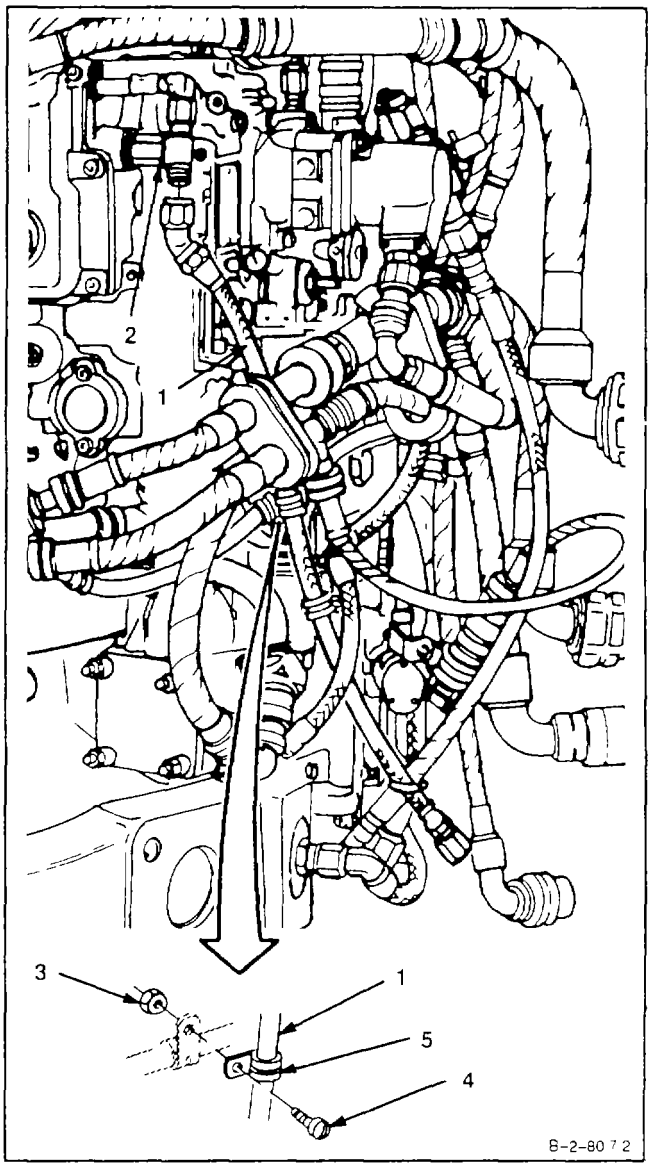
1. **Disconnect hose assembly (1) from tee (2)**

2. **Remove nut**(3), screw (4), and **clamp (5).**



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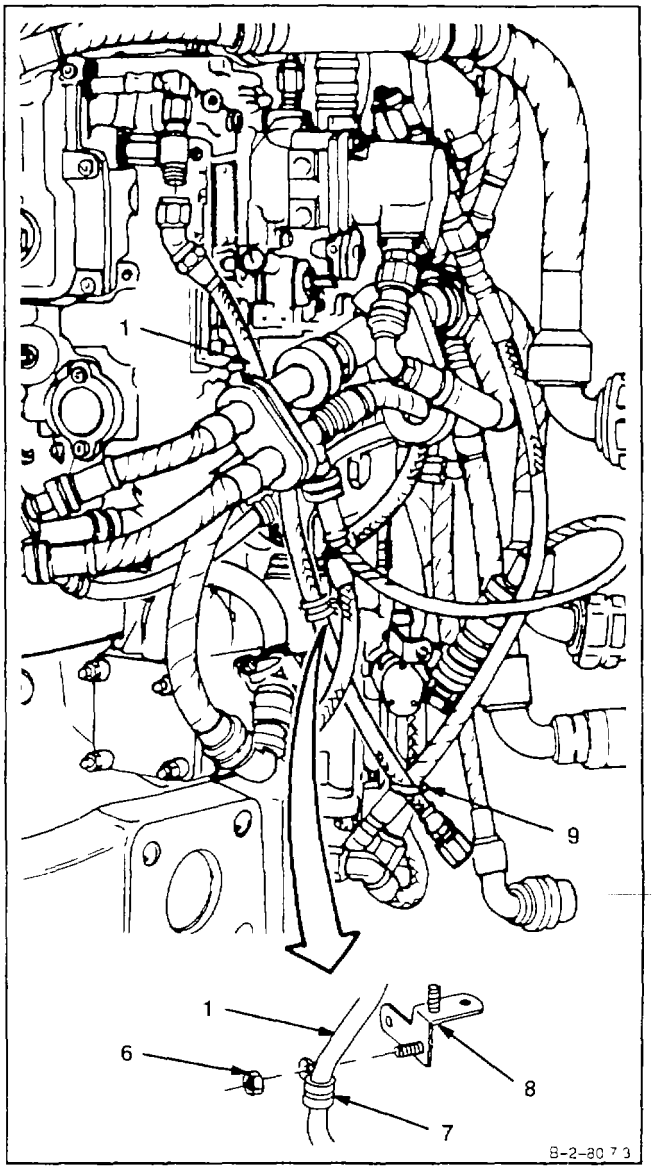
3. **Remove** nut (6) and **clamp (7)** from bracket (8)

4. **Remove** cable tie (9) and **hose assembly(1)**



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

2-72 INSTALL HOSE ASSEMBLY (HMA TO AIRCRAFT BULKHEAD) 2-72

INITIAL SETUP

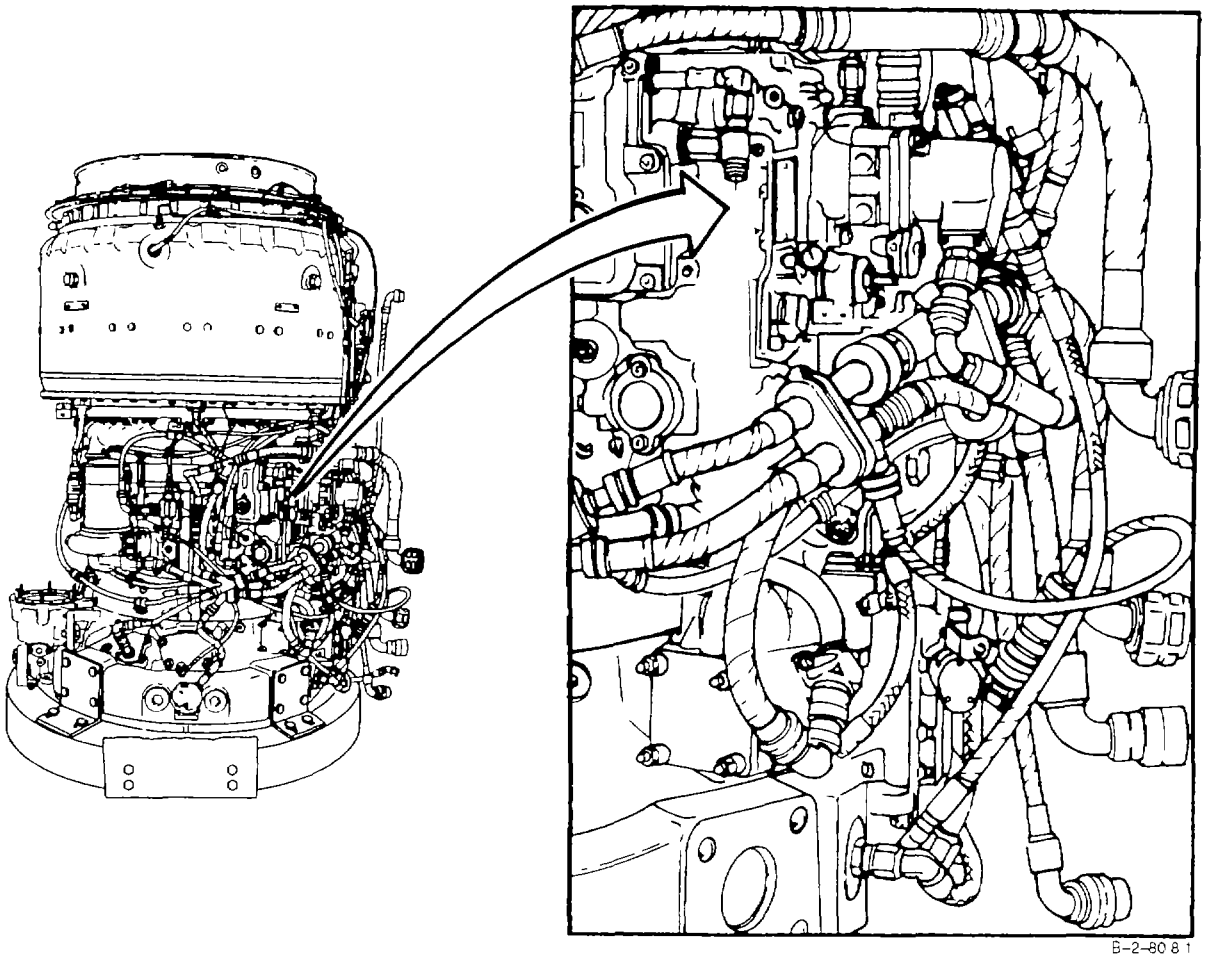
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-4944
NSN5180-00-323-5114

Materials
None

Parts:
Cable Tie

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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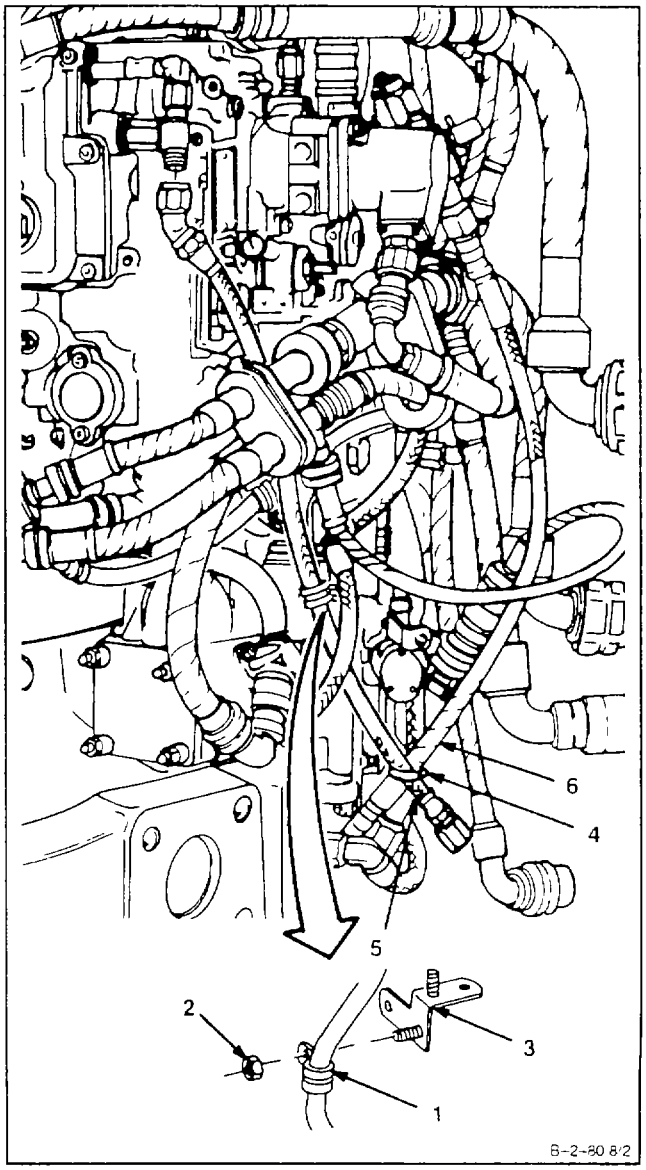
1. **Install clamp** (1) and nut (2) on bracket (3)
2. **Install cable tie (4)** on hose assemblies (5 and 6)



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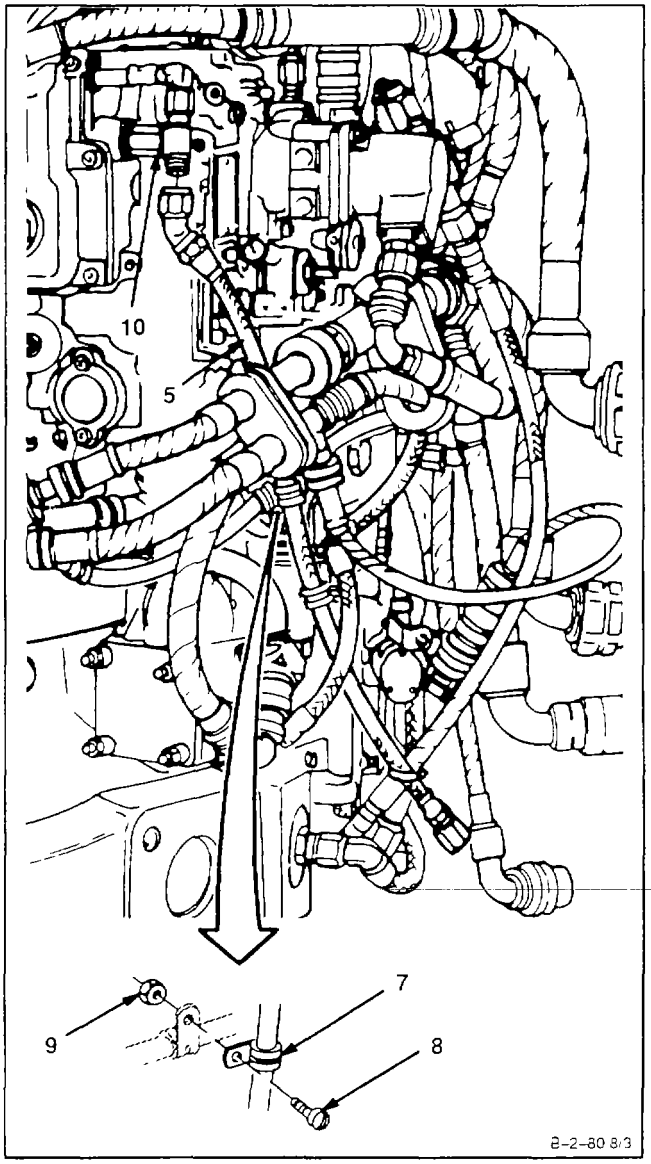
3. **Install clamp (7),** screw (8), and nut (9)

4. **Install hose assembly (5)** on tee (10)



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

2-73 REMOVE CHECK VALVE (AIR DIFFUSER TO INTERSTAGE AIR BLEED ACTUATOR) 2-73

INITIAL SETUP

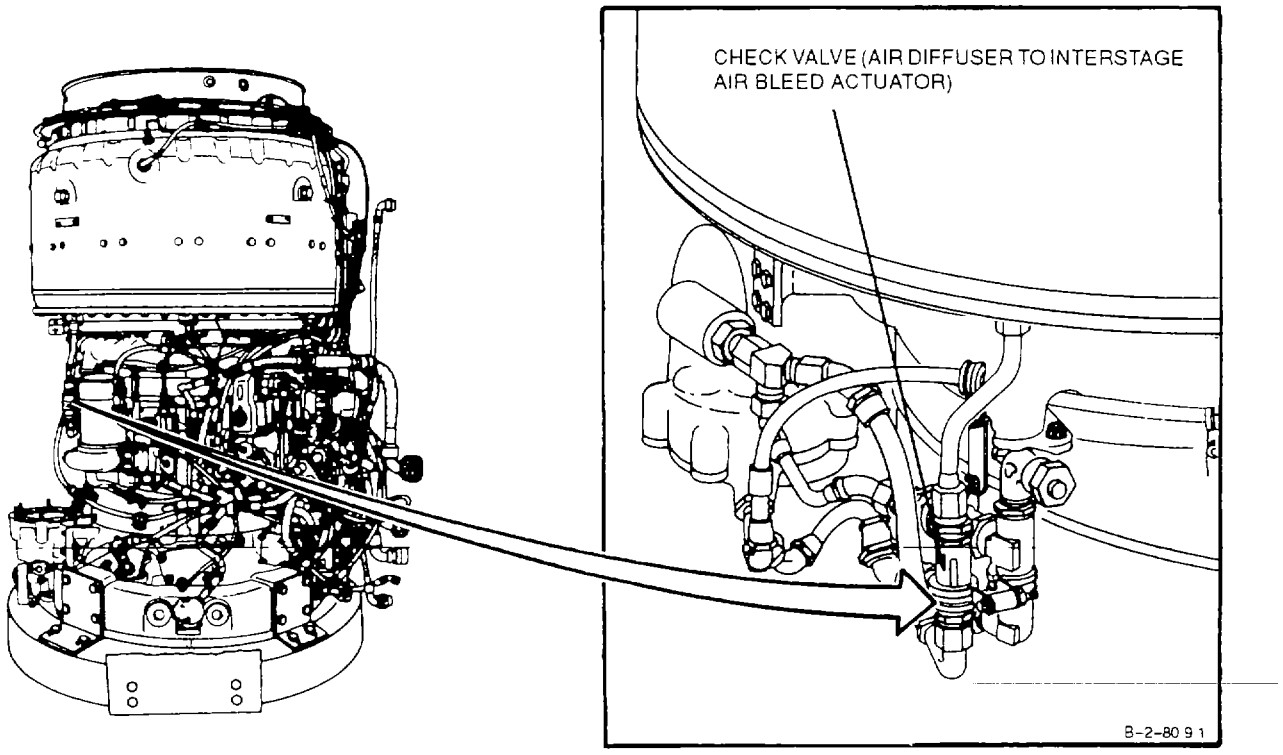
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials
None

Parts:
Cable Tie

Personnel Required:
Aircraft Powerplant Repairer



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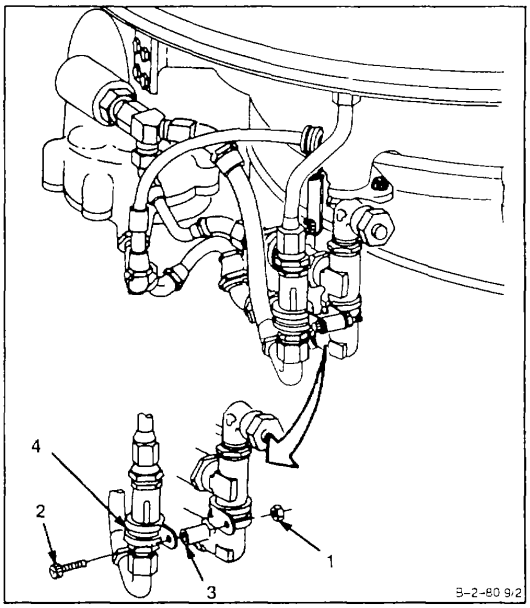
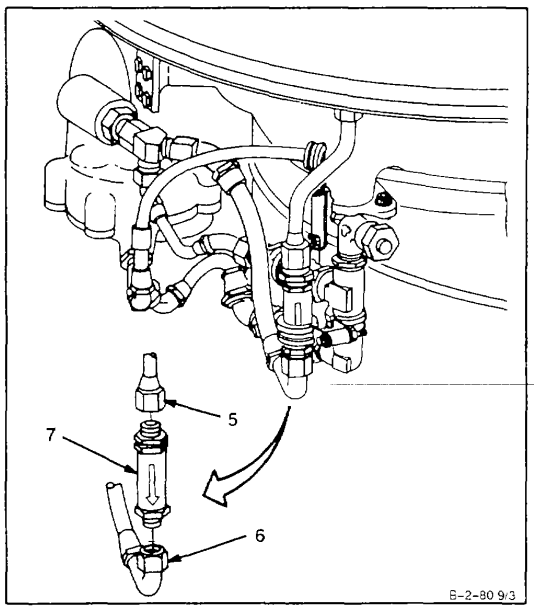
1. **Remove** nut (1), screw (2), spacer (3), and **clamp (4)**

2. Disconnect hose assemblies (5 and 6) and **remove check valve** (7)





INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

2-74 CLEAN CHECK VALVE (AIR DIFFUSER TO INTERSTAGE AIR-BLEED ACTUATOR) (Continued) 2-74

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tools Kit
NSN 5180-00-323-4944
Goggles

Materials:
Dry Cleaning Solvent (El9)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition.
Off Engine Task
Check Valve (Air Diffuser to Interstage Air Bleed Actuator) Removed (Task 2-73)

General Safety Instructions

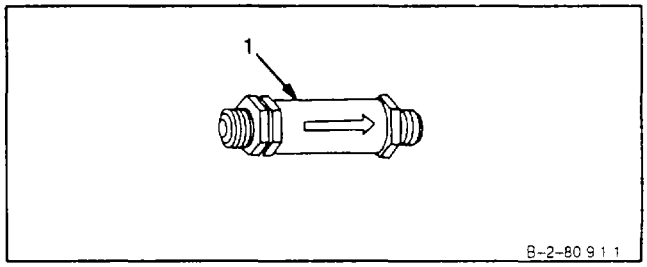
WARNING

Dry cleaning solvent (E19) 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 check valve (1)** as follows

   a. Wear gloves (E24) Immerse valve in dry cleaning solvent (El 9) and agitate Use brush on external surfaces

   b. Use lint-free cloth (E30) to remove solvent



FOLLOW-ON MAINTENANCE

None

END OF TASK

2-75 INSTALL CHECK VALVE (AIR DIFFUSER TO INTERSTAGE AIR BLEED ACTUATOR 2-75

INITIAL SETUP

Applicable Configurations:
All

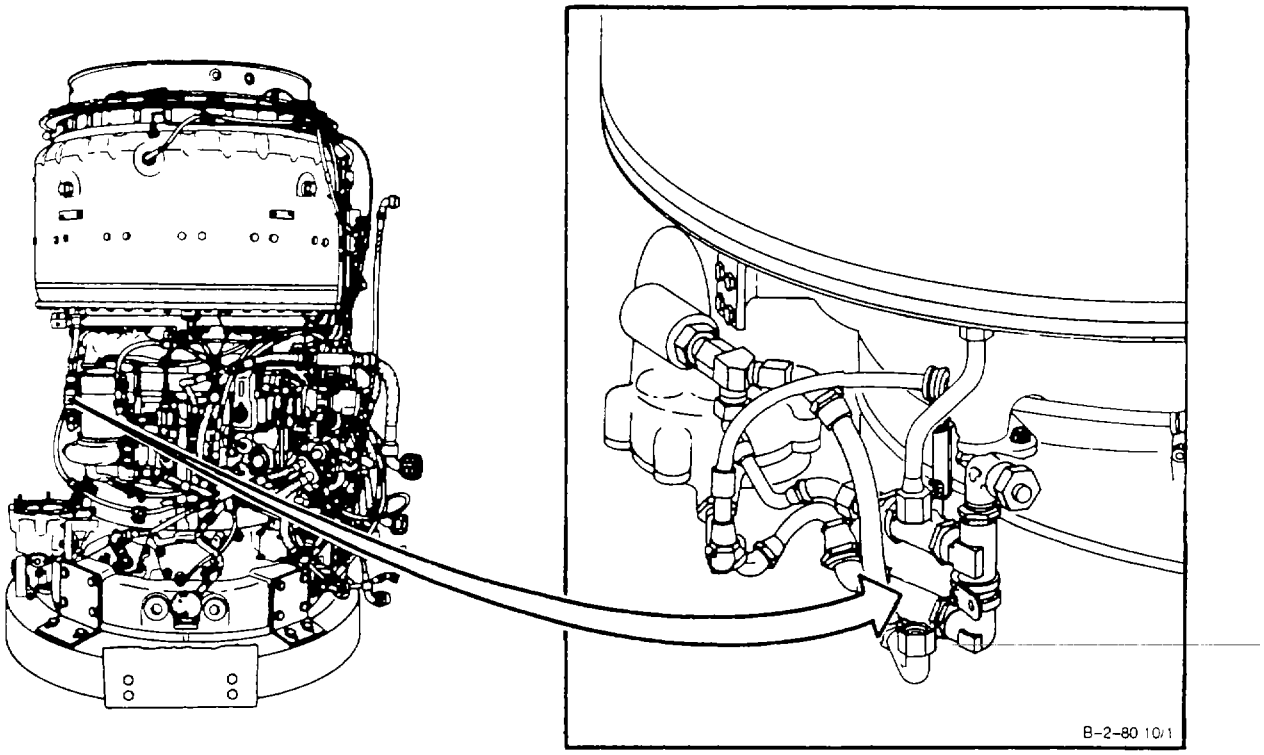
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials:
None

Parts:
Packing

Personnel Required-
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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NOTE

If check valve is a replacement, do steps 1 and 2 If same check valve that was removed is to be installed skip steps 1 and 2

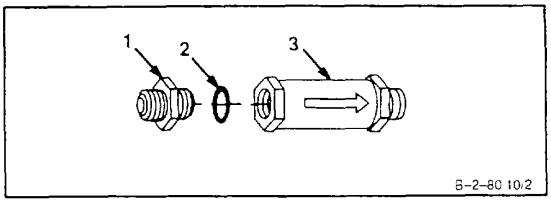
1. **Remove nipple (1)** and packing (2) **from removed check valve** (3).

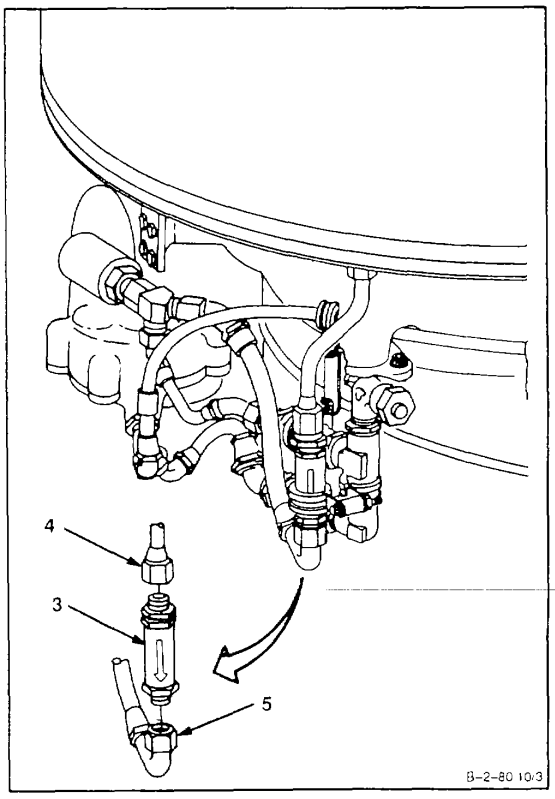
2. **Install** packing (2) and **nipple (1)** In **serviceable check valve** (3).

NOTE

Make sure arrow on check valve points forward

3. **Install check valve** (3) on hose assemblies (4 and 5)





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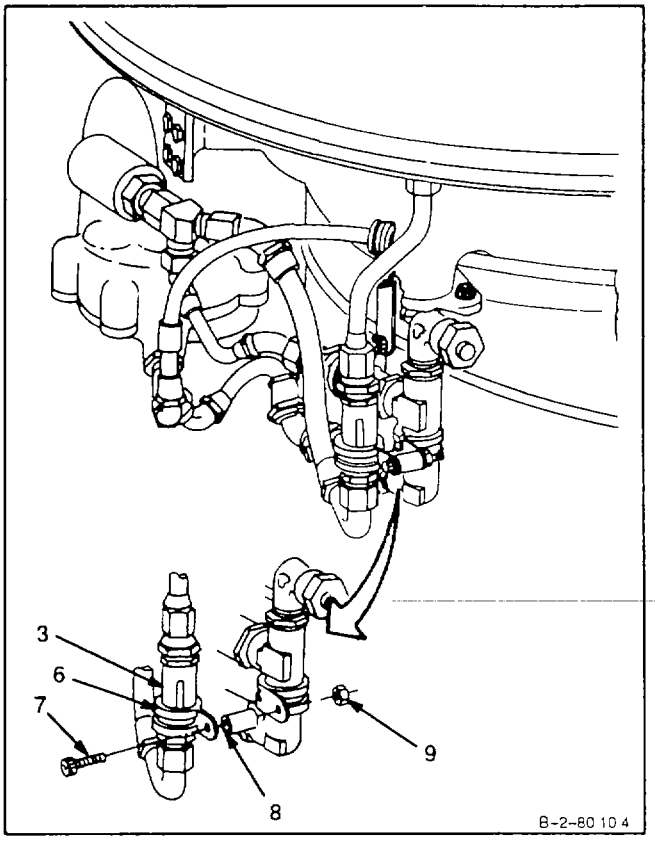
4. **Install clamp (6)** on check valve (3), and install screw (7), spacer (8), and nut (9)



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

2-76 REMOVE CHECK VALVE (WATER WASH TEE TO INTERSTAGE AIR BLEED ACTUATOR P3 INLET) 2-76

INITIAL SETUP

Applicable Configurations

All

Tools:

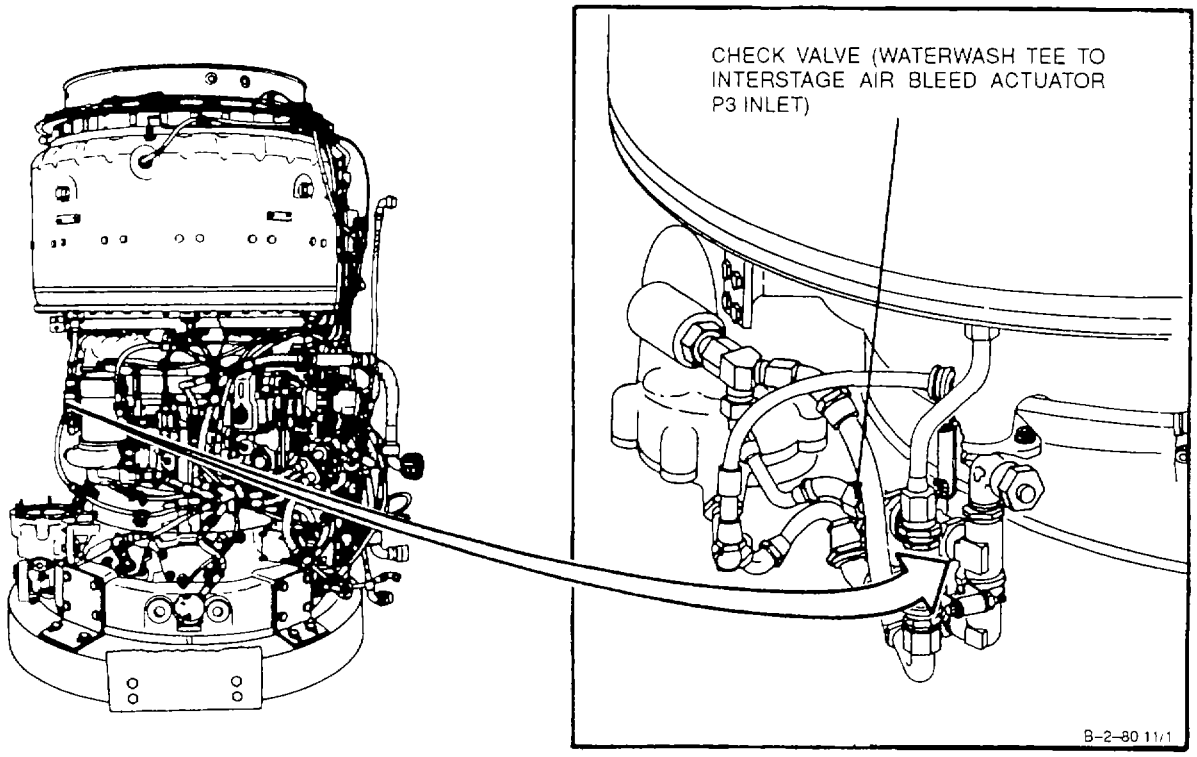
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

None

Personnel Required:

Aircraft Powerplant Repairer



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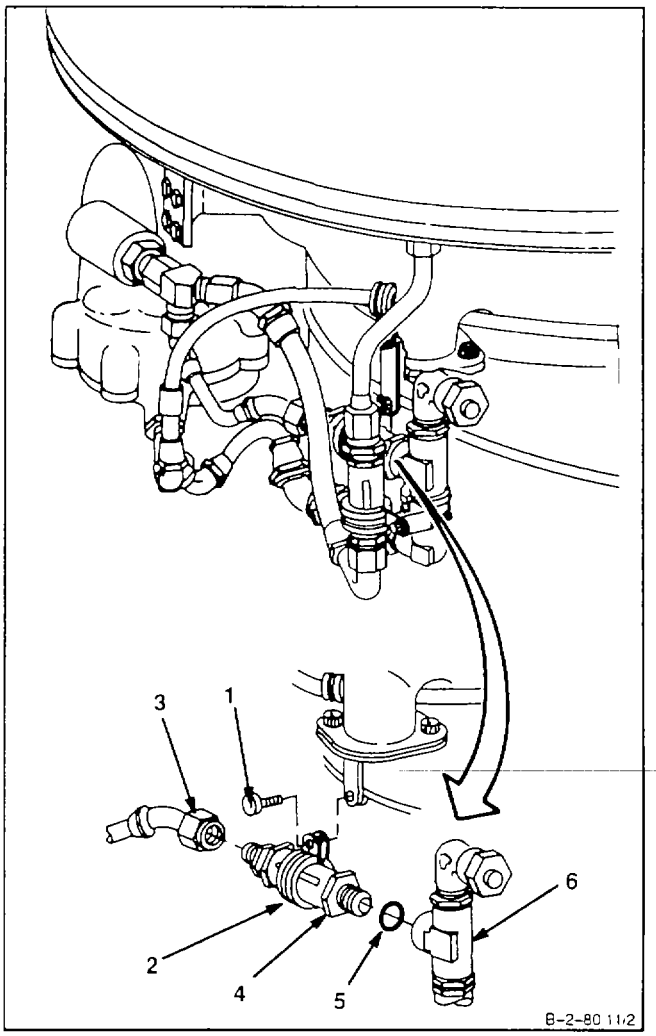
2-76 REMOVE CHECK VALVE (WATER WASH TEE TO INTERSTAGE AIR BLEED ACTUATOR P3 INLET) 2-76

1. **Remove** lockwire, bolt (1), and **clamp (2).**

2. Disconnect hose assembly (3) and **remove check valve (4) and packing (5)** from tee (6)



FOLLOW-ON MAINTENANCE

None

END OF TASK

2-77 CLEAN CHECK VALVE (WATERWASH TEE TO INTERSTAGE AIR BLEED ACTUATOR P3 INLET) 2-77

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944Goggles

Materials:

Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task
Check Valve (Water Wash Tee to Interstage Air Bleed Actuator P3 Inlet) Removed (Task 2-76)

General Safety Instructions:

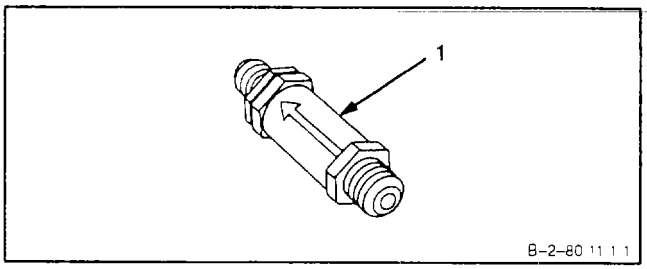
WARNING

Dry cleaning solvent (E19) 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 check valve (1)** as follows

   a. Wear gloves (E24) Immerse in dry cleaning solvent (E19) and agitate Use brush on external surfaces

   b. Use lint-free cloth (E30) to remove solvent



FOLLOW-ON MAINTENANCE

None

END OF TASK

2-78 INSTALL CHECK VALVE (WATER WASH TEE TO INTERSTAGE AIR BLEED ACTUATOR P3 INLET) 2-78

INITIAL SETUP

Applicable Configurations:
All

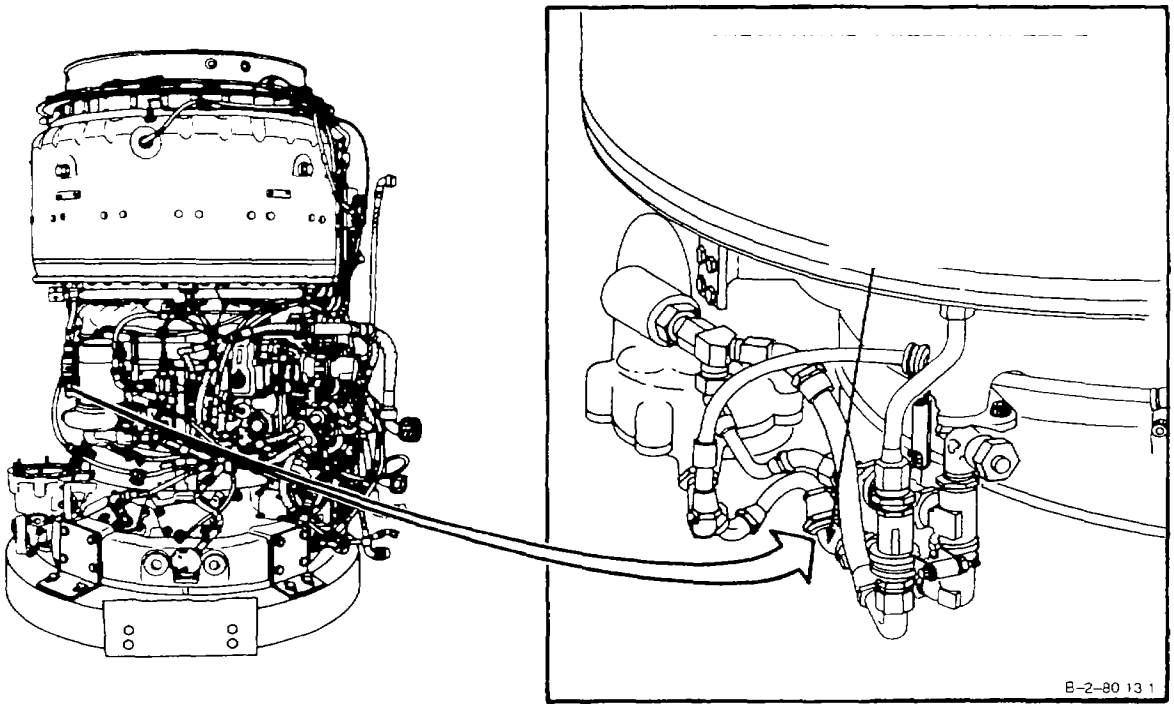
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials:
Lockwire (E33)

Parts:
Packings

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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2-78 INSTALL CHECK VALVE (WATER WASH TEE TO INTERSTAGE AIR BLEED ACTUATOR P3 INLET) (Continued) **2-78**

NOTE

If check valve is a replacement do steps 1 and 2 If same check valve that was removed is to be installed, skips steps 1 and 2

1. **Remove nipple (1)** and packing (2) **from removed check valve (3).**

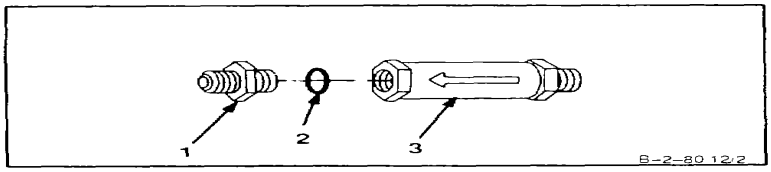
2. **Install** packing (2) and **nipple (1) in serviceable check valve (3).**

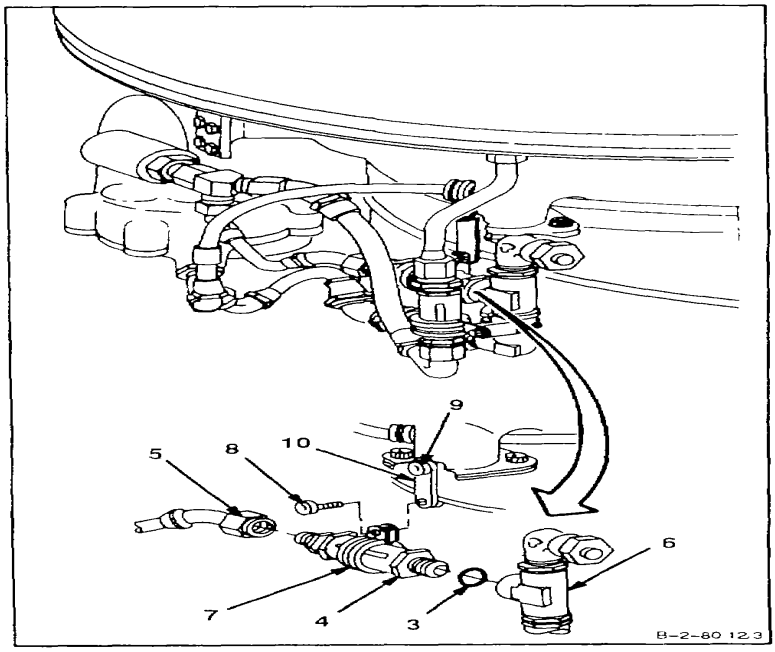
NOTE

Make sure arrow on check valve points toward air bleed actuator

3. **Install packing (3)** on check valve (4) **Install check valve (4)** on hose assembly (5) and tee (6)

4. **Install clamp** (7) on check valve (4), and install bolt (8) Lockwire bolts (8 and 9) securing bleed band retainer (10) Use lockwire (E33)





INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

2-79 REMOVE CHECK VALVE (WATER WASH TEE TO INTERSTAGE AIR BLEED ACTUATOR PM INLET) 2-79

INITIAL SETUP

Applicable Configurations

All

Tools

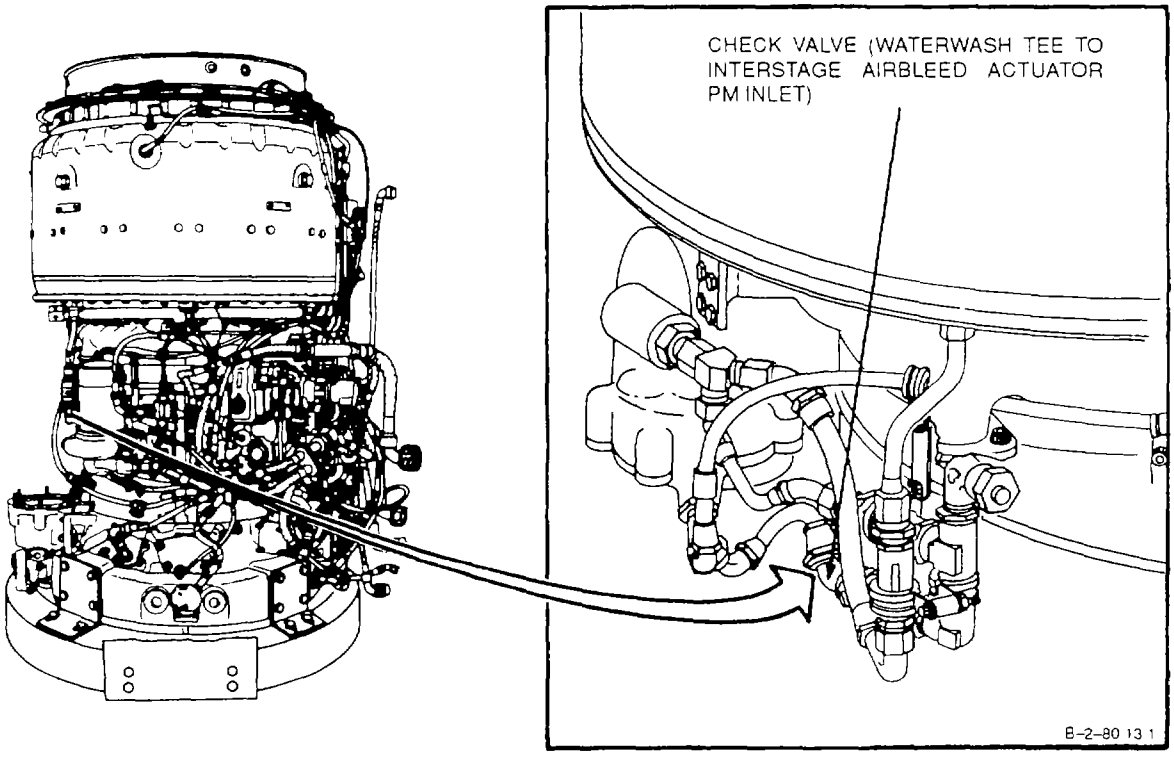
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

None

Personnel Required:

Aircraft Powerplant Repairer



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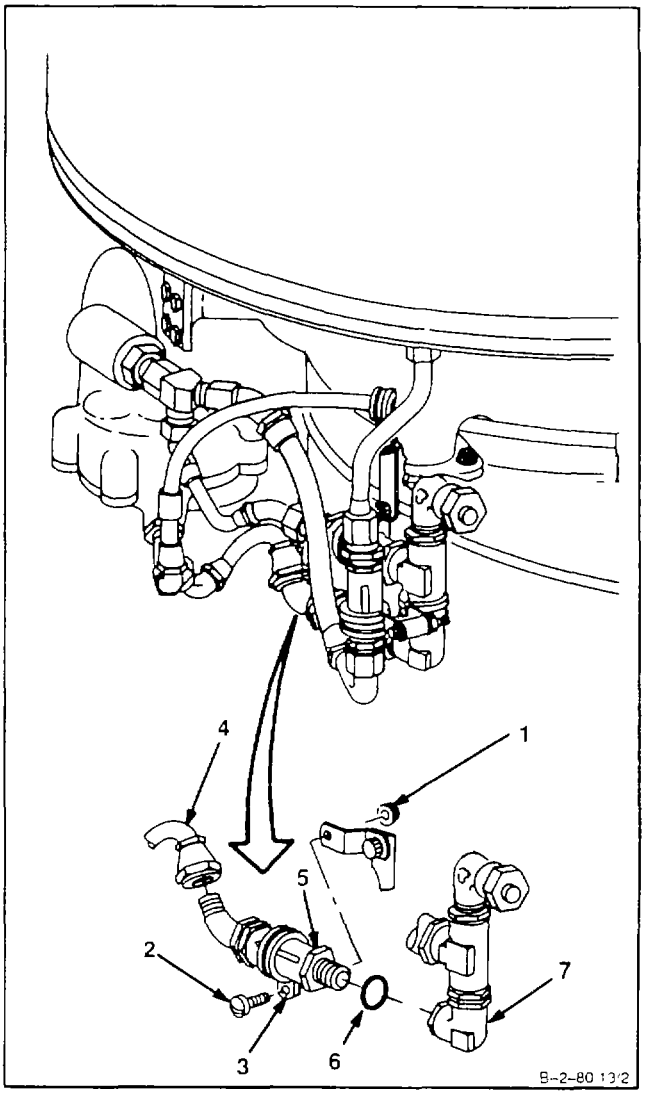
2-79 REMOVE CHECK VALVE (WATER WASH TEE TO INTERSTAGE AIR BLEED ACTUATOR PM INLET) 2-79

1. **Remove** nut (1), screw (2), and **clamp (3).**

2. Disconnect hose assembly (4) and **remove check valve** (5) and packing (6) from elbow (7)



FOLLOW-ON MAINTENANCE

None

END OF TASK

2-80 CLEAN CHECK VALVE (WATER WASH TEE TO INTERSTAGE AIR BLEED ACTUATOR PM INLET) 2-80

INITIAL SETUP

Applicable Configurations-
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Goggles

Materials:
Dry Cleaning Solvent (El19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Check Valve (Water Wash Tee to Interstage Air Bleed Actuator PM Inlet) Removed (Task 2-79)

General Safety Instructions:

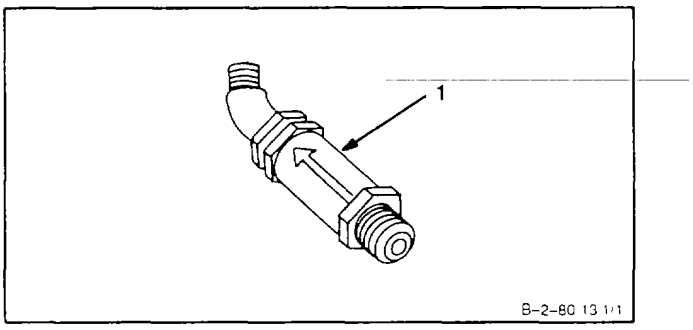
WARNING

Dry cleaning solvent (E19) **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 check valve (1) as follows

a. Wear gloves (E24) Immerse valve in dry cleaning solvent (El9) and agitate. Use brush on external surfaces.

b. Use lint-free cloth (E30) to remove solvent



FOLLOW-ON MAINTENANCE

None

END OF TASK

2-81 CLEAN CHECK VALVE (WATER WASH TEE TO INTERSTAGE AIR BLEED ACTUATOR PM INLET) 2-81

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials:

None

Parts:

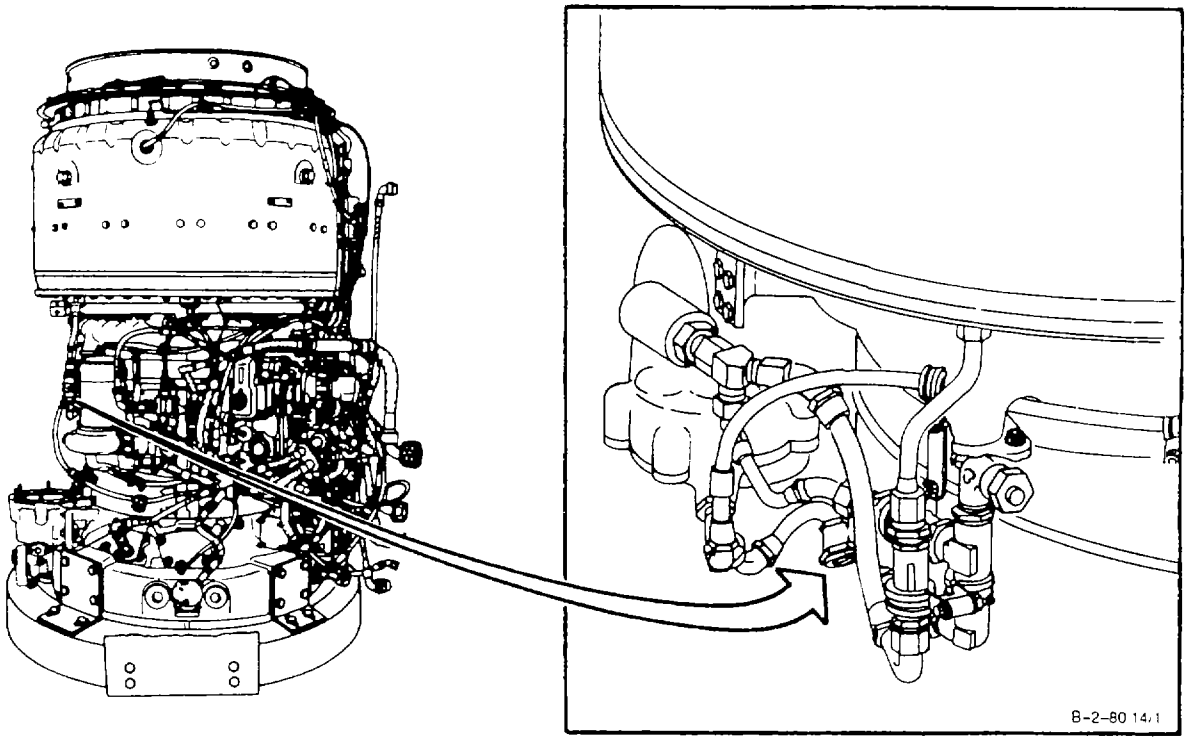
Packings

Personnel Required:

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:

TM 1-2840-252-23P



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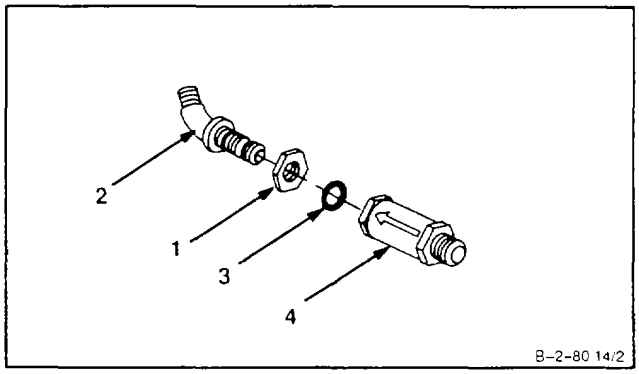
NOTE

If check valve is a replacement, do step 1 and 2 If same check valve that was removed is to be installed, skip step 1 and 2

1. Loosen nut (1) and **remove elbow (2),** nut (1), and packing (3) from removed check valve (4).

2. Install nut (1) onto elbow (2) and install packing (3) into groove between threads on elbow (2). **Install elbow (2) on serviceable check valve (4).**

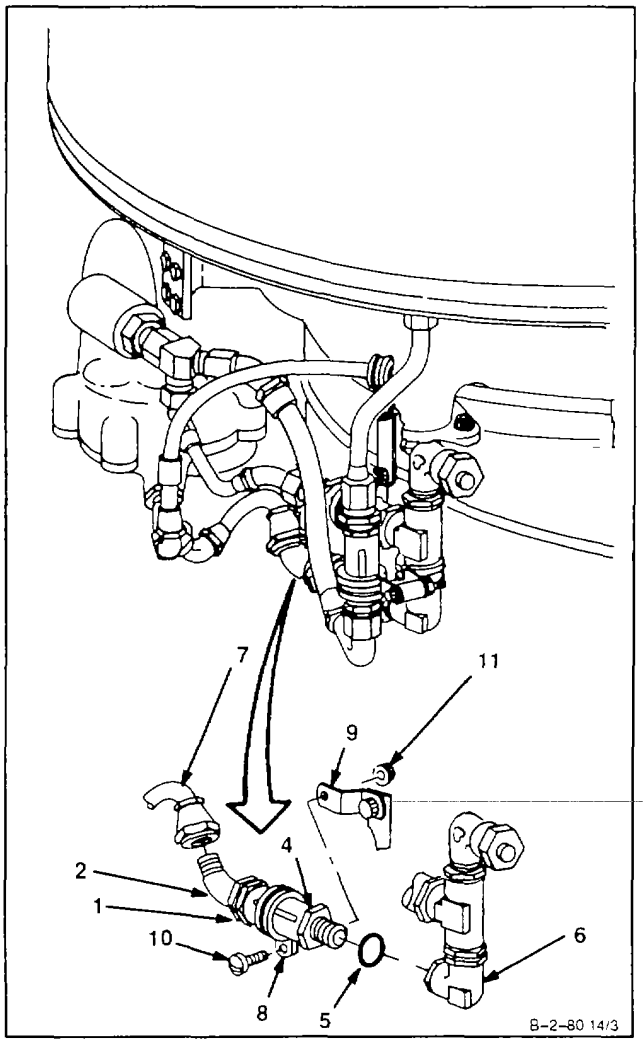


NOTE

Make sure arrow on check valve points toward air bleed actuator.

3. **Install check valve (4)** and packing (5) on elbow (6) Align elbow (2) with hose assembly (7) and tighten nut (1) to secure elbow (2) Install hose assembly (7) onto check valve (4)

4. **Install clamp (8)** on check valve (4) and bracket (9), and install screw (10) and nut (11)



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

CHAPTER 3

COMBUSTION SECTION - MAINTENANCE INSTRUCTIONS

CHAPTER OVERVIEW

This chapter contains maintenance procedures for the combustion section It is divided into the following sections and tasks:

SECTION	TASK NO	TITLE	PAGE
I		FUEL DRAIN VALVE	
	3-1	Remove Fuel Drain Valve	3-3
	3-2	Clean Fuel Drain Valve	3-5
	3-3	Inspect Fuel Drain Valve	3-6
	3-4	Install Fuel Drain Valve	3-7
II		COMBUSTION SECTION AND POWER TURBINE	
	3-5	Remove Combustion Section and Power Turbine (AVIM)	3-9
	3-6	Disassemble Combustion Section and Power Turbine (AVIM)	3-29
	3-7	Assemble Combustion Section and Power Turbine (AVIM)	3-61
	3-8	Install Combustion Section and Power Turbine (AVIM)	3-95
III		COMBUSTION SECTION	
	3-9	Disassemble Combustion Section (AVIM)	3-117
	3-10	Assemble Combustion Section (AVIM)	3-123
	3-11	Disassemble Combustion Section	3-133
	3-12	Assemble Combustion Section	3-134
IV		COMBUSTION CHAMBER VANE ASSEMBLY	
	3-13	Clean Combustion Chamber Vane Assembly (AVIM)	3-135
	3-14	Inspect Combustion Chamber Vane Assembly (AVIM)	3-136
	3-15	Repair Combustion Chamber Vane Assembly (AVIM)	3-143
V		COMBUSTION CHAMBER LINER	
	3-16	Clean Combustion Chamber Liner (AVIM)	3-145
	3-17	Inspect Combustion Chamber Liner (AVIM)	3-146
	3-18	Repair Combustion Chamber Liner (AVIM)	3-158
VI		COMBUSTION CHAMBER HOUSING	
	3-19	Clean Combustion Chamber Housing (AVIM)	3-171
	3-20	Inspect Combustion Chamber Housing (AVIM)	3-173
	3-21	Repair Combustion Chamber Housing (AVIM)	3-175

SECTION I

FUEL DRAIN VALVE

3-1 REMOVE FUEL DRAIN VALVE 3-1

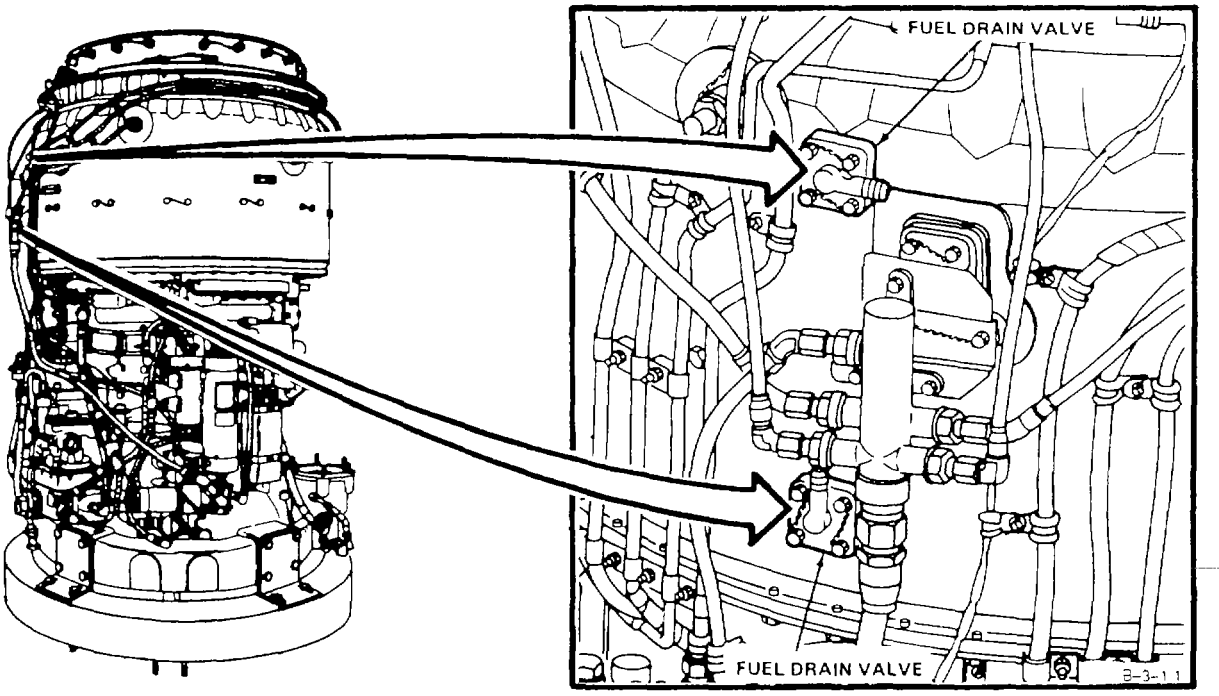
INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Container, 1 Quart
Materials:
Wiping Rag (E64)
Personnel Required:
Aircraft Powerplant Repairer

General Safety Instructions.

WARNING

Turbine fuels are very flammable They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame Drain and store in approved metal safety containers Avoid prolonged or repeated contact with skin and do not take internally Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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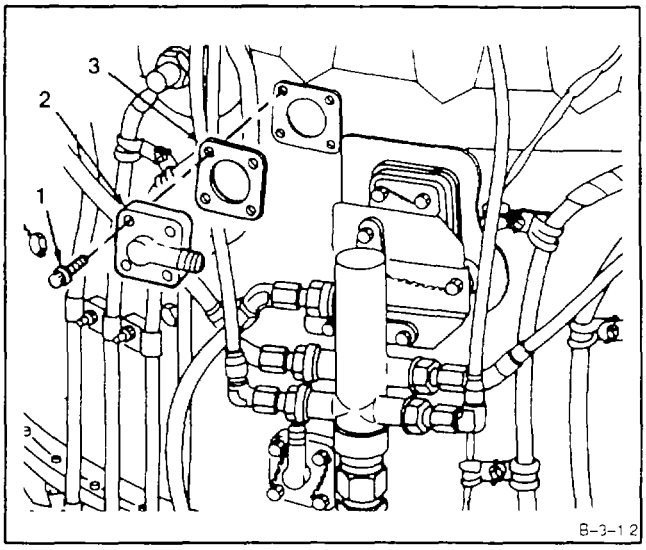
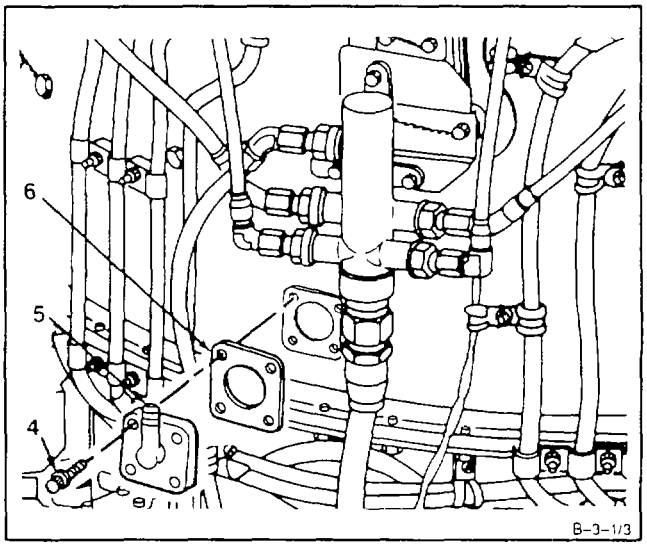
1. **Remove** lockwire, four bolts (1), **fuel drain valve** (2), and gasket (3)



2. **Remove** lockwire, four bolts (4), **fuel drain valve(5),** and gasket (6)



FOLLOW-ON MAINTENANCE

None

END OF TASK

3-2 CLEAN FUEL DRAIN VALVE 3-2

INITIAL SETUP

Applicable Configurations.
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944

Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)

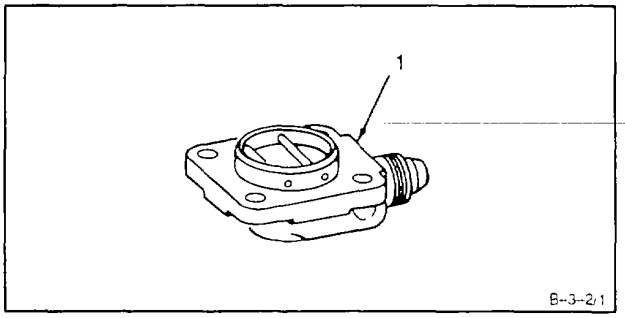
Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Fuel Drain Valve Removed (Task 3-1)

WARNING

Dry cleaning solvent (E19) 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. Wear gloves (E24) and **clean fuel drain valve (1).** Use dry cleaning solvent (E19) and brush.



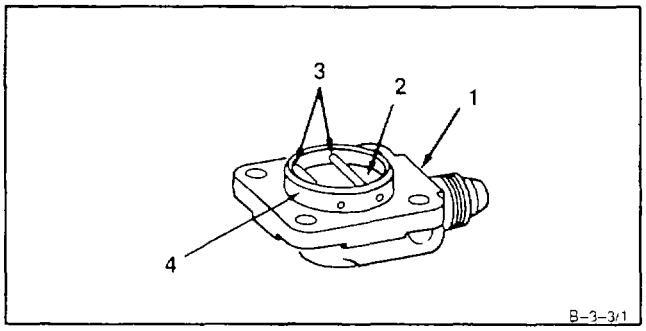
FOLLOW-ON MAINTENANCE

Inspect Fuel Drain Valve (Task 3-3)

END OF TASK

3-3 INSPECT FUEL DRAIN VALVE 3-3

INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials.
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task



1. **Inspect fuel drain valve (1).** There shall be no cracks

2. **Inspect plate (2).**

   a. Depress plate (2) and release.

   b. Plate (2) shall not stick or bind.

   c. Plate (2) shall reseat against pins (3).

3. Inspect pins (3).

   a. Pins (3) shall not be loose.

   b. Pins (3) shall not extend past valve body outside diameter (4)

FOLLOW-ON MAINTENANCE
None

END OF TASK

3-4 INSTALL FUEL DRAIN VALVE 3-4

INITIAL SETUP

Applicable Configurations:
All

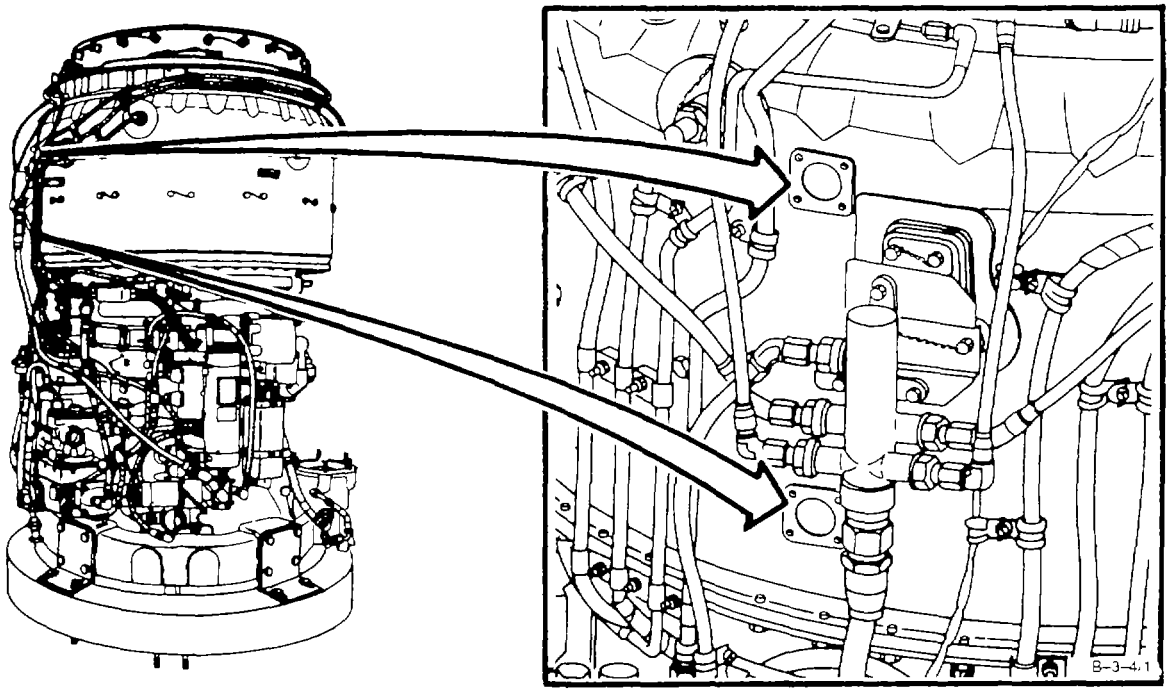
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
Anti-Seize Compound (E6)
Lockwire (E32)

Parts:
Gaskets

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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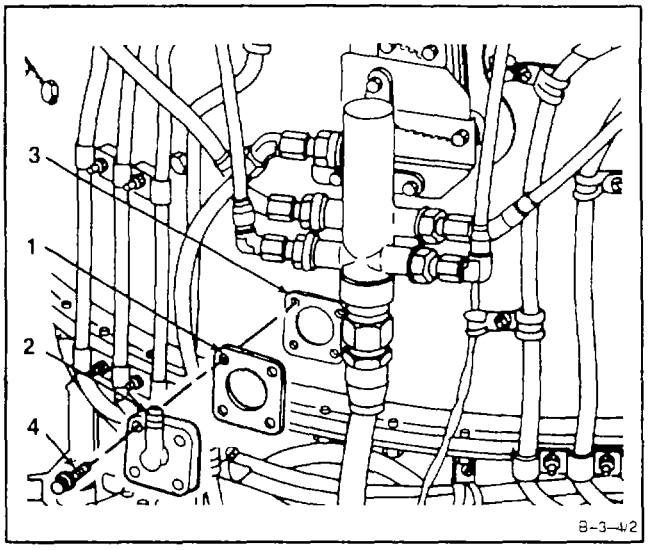
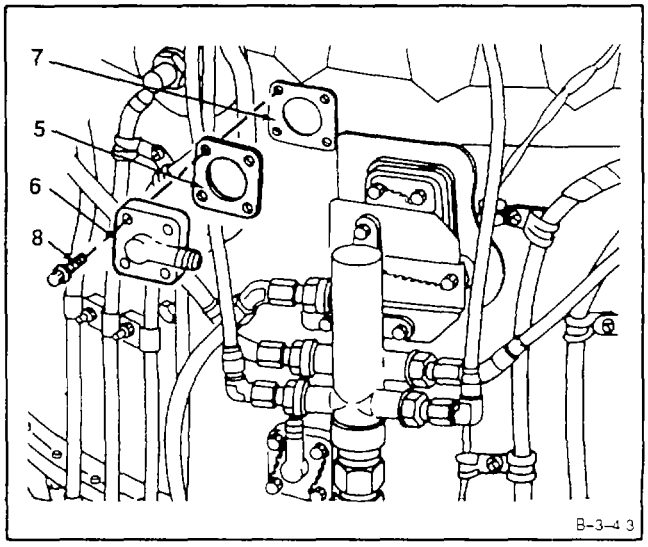
1. **Install** gasket (1) and **fuel drain valve** (2) on boss (3) Apply anti-seize compound (E6) to four bolts (4). Install four bolts (4) Lockwire bolts (4). Use lockwire (E32).



2. **Install** gasket (5) and **fuel drain valve (6)** on boss (7) Apply anti-seize compound (E6) to four bolts (8). Install four bolts (8) Lockwire bolts (8). Use lockwire (E32)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION II

COMBUSTION SECTION AND POWER TURBINE

3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) 3-5

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Group Aircraft Cover (T39)
Clamp Coupling Half (T49)
Power Turbine Fixture (T28)
Hoist

Materials:
Marking Pencil (E38)
Vexar Nylon Webbing (E62)

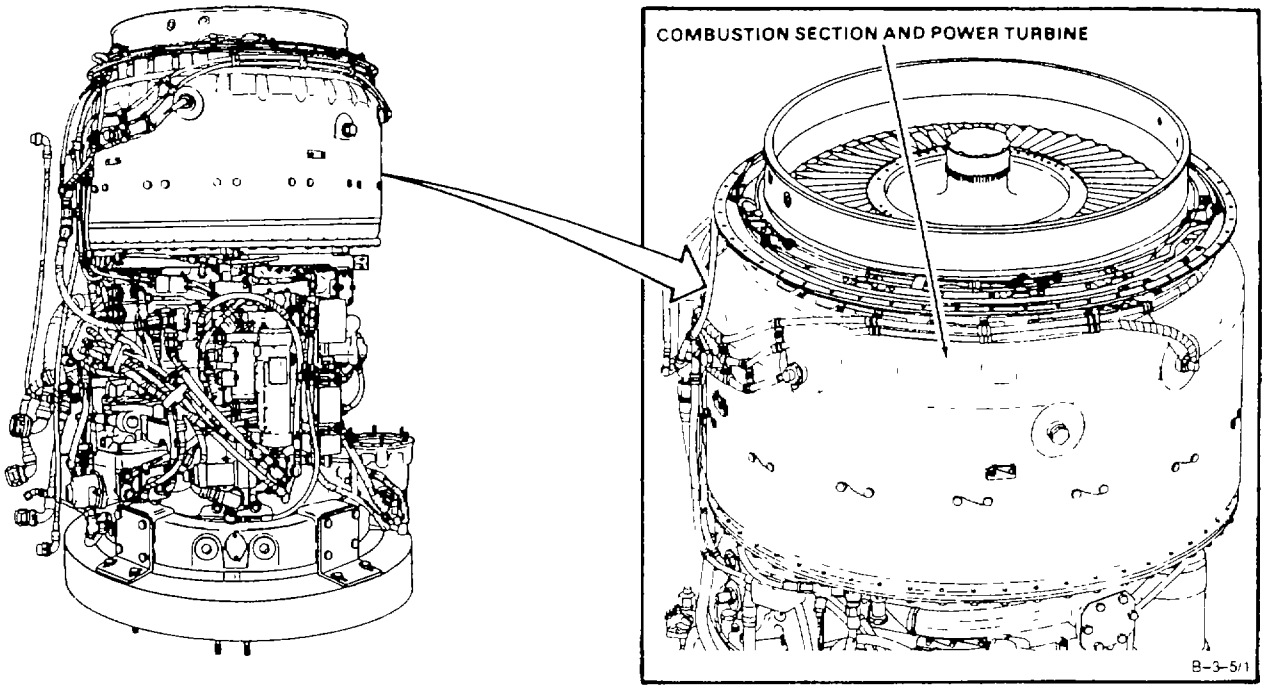
References:
Task 3-8

Personnel Required:'
Aircraft Powerplant Repairer (2)

General Safety Instructions:

WARNING

The ignition exciter stores very high and possibly fatal voltage. Use extreme care when working around ignition exciter. Serious injury could result if exciter is accidentally grounded. Do not probe inside of output receptacles with fingers or metal object. Discharge exciter only with insulated screwdriver. In case of shock or injury, get medical attention.



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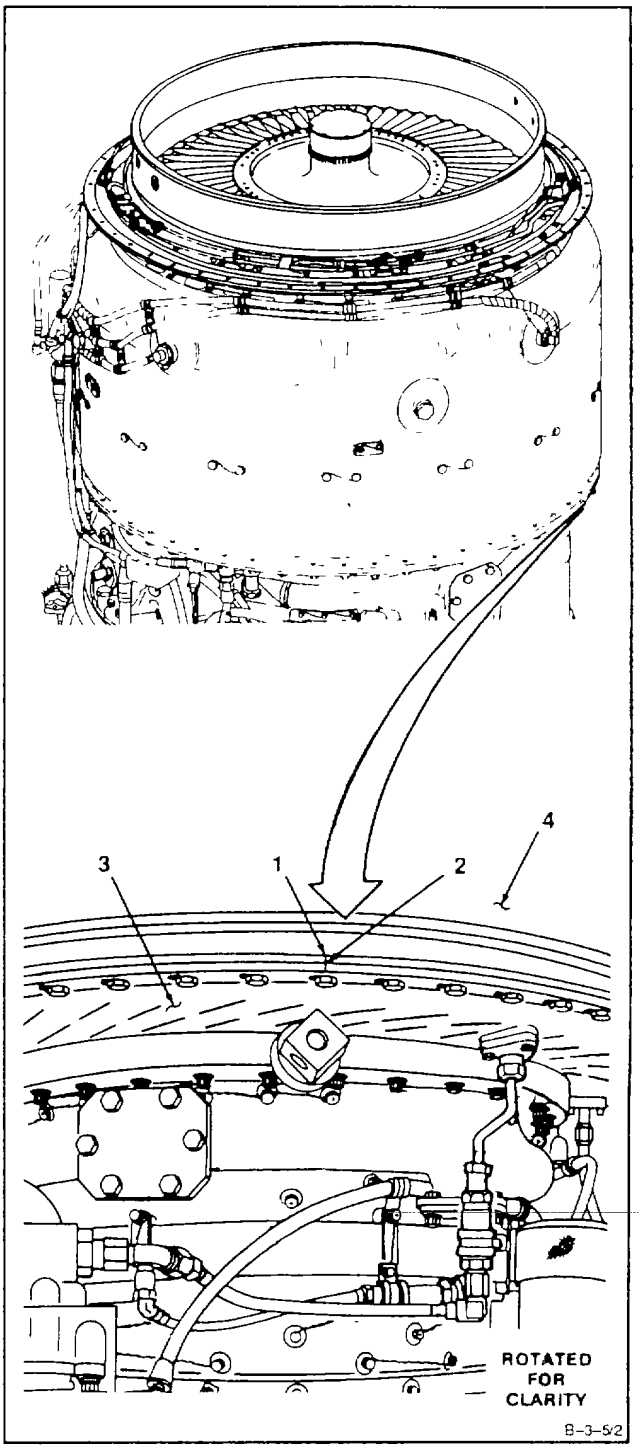
3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-5

1. **Make matchmark (1) across mating edge (2) of air diffuser assembly (3) and combustion section and power turbine (4)**. Use marking pencil (E38). Matchmark (1) will be at top dead center hole



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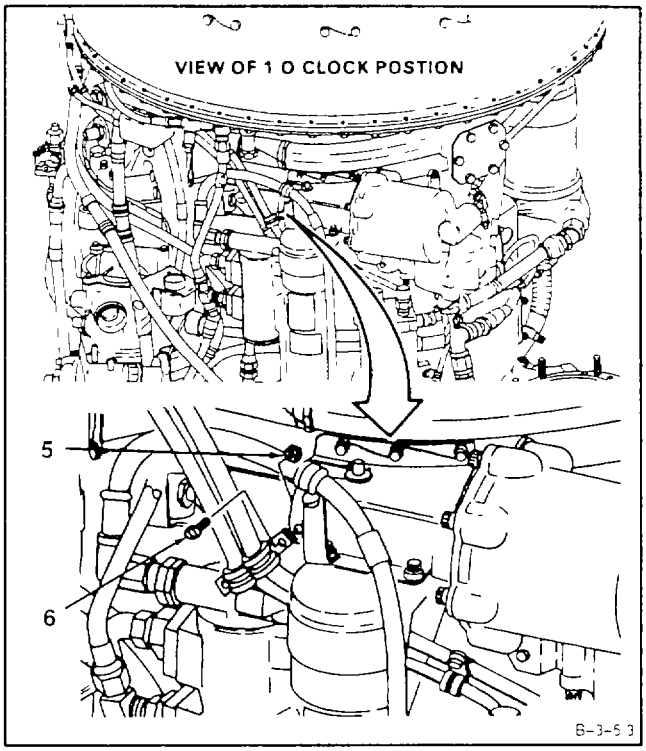
2. Remove nut (5) and screw (6)



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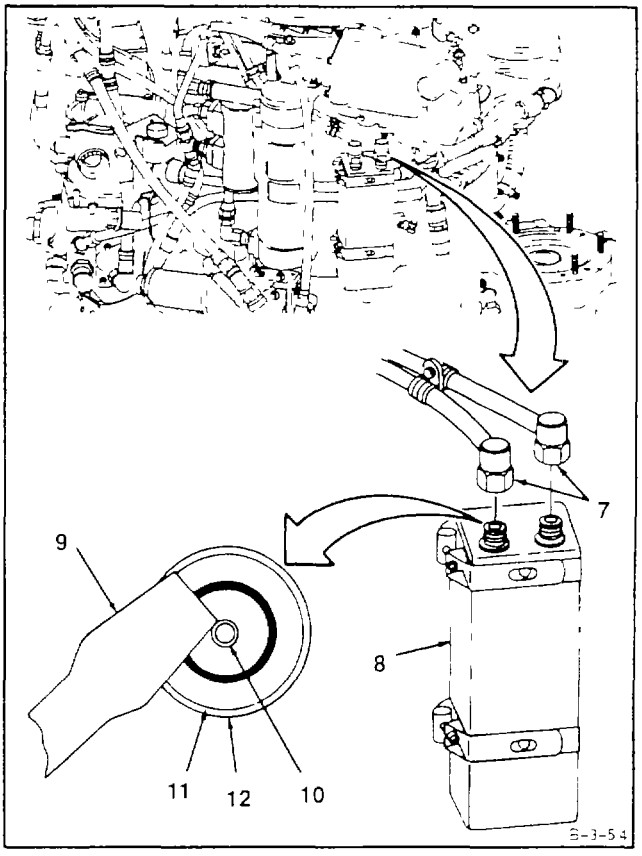
WARNING

When discharging ignition exciter, remove one lead at a time and discharge receptacle that lead was removed from. Failure to do so may result in serious shock when you are removing second lead In case of serious shock, get medical attention.

NOTE

Steps 3 and 4 apply to both output receptacles.

3. Remove lockwire and **disconnect ignition coil and cable assembly leads (7)**
4. **Discharge ignition exciter (8)** by placing tip of Insulated screwdriver (9) against pin (10) and edge (11) of receptacle (12)
5. Place ignition coil and cable assembly leads (7) to one side



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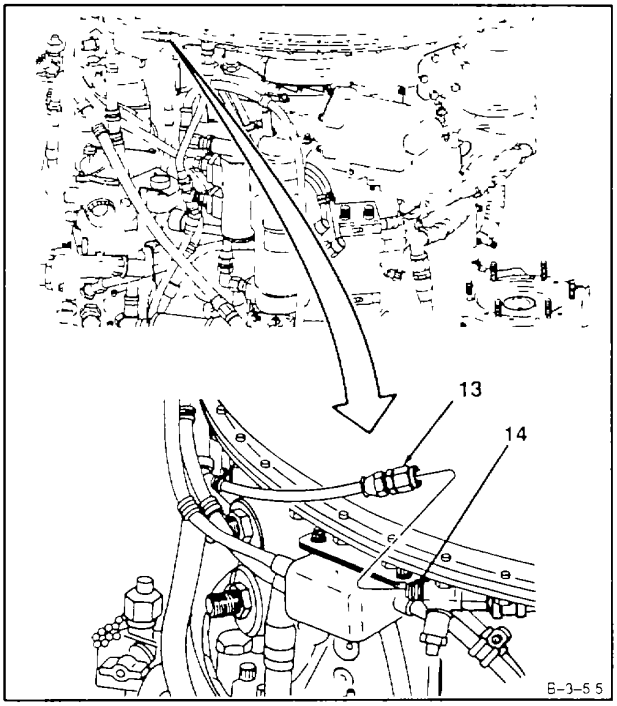
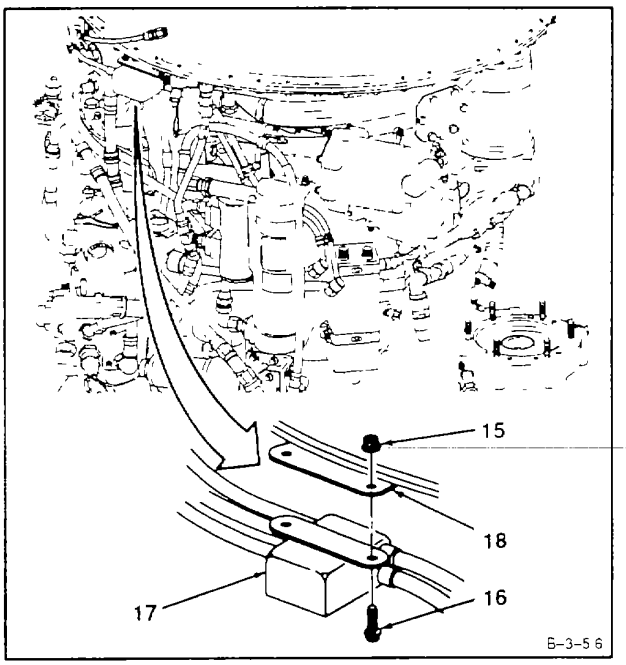
6. **Disconnect hose assembly (13**) from tee and snubber (14)



7. **Remove** two nuts (15), two bolts (16), and **ignition coil (17)** from bracket (18)



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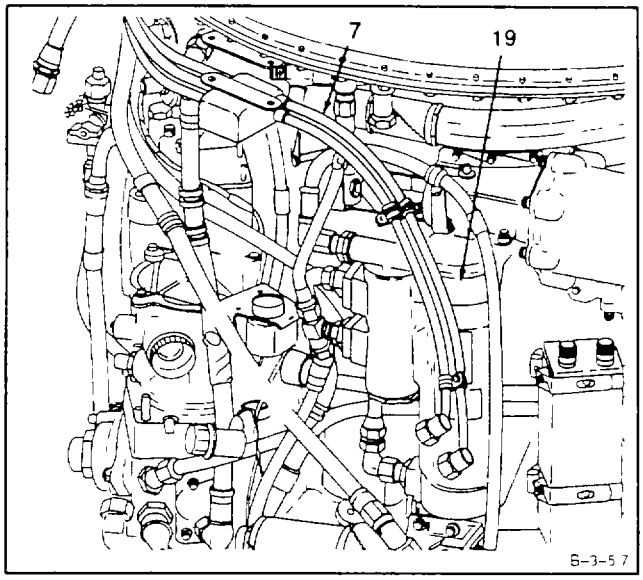
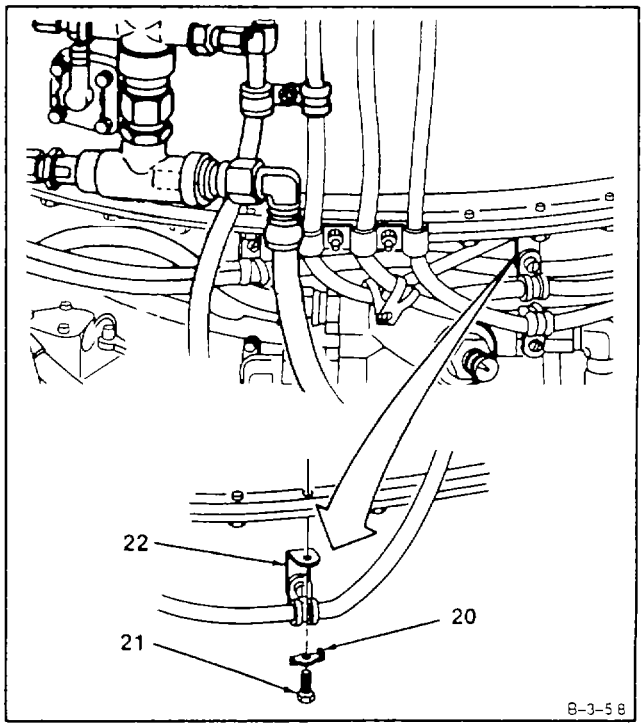
8. Pull ignition coil and cable assembly leads (7) from behind oil cooler assembly (19) and let them hang free.



9. Straighten tabs of key washer (20) and remove bolt (21), key washer (20), and bracket (22).



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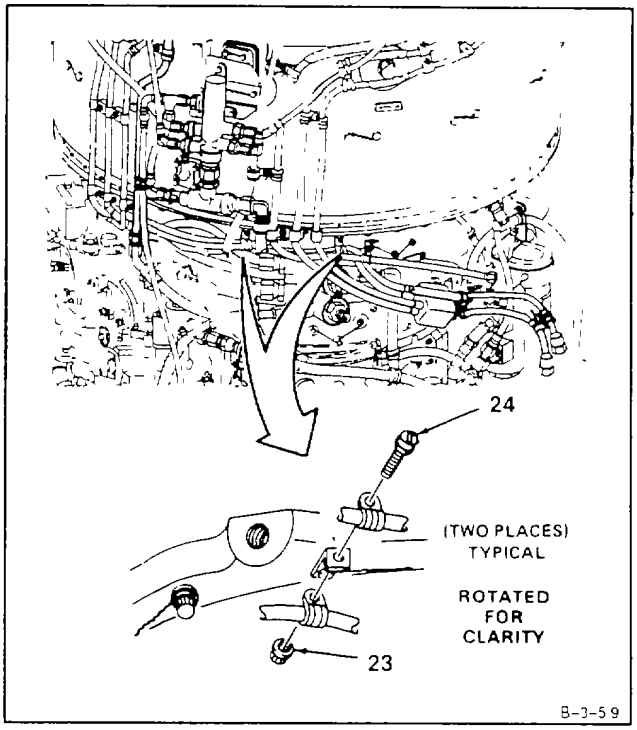
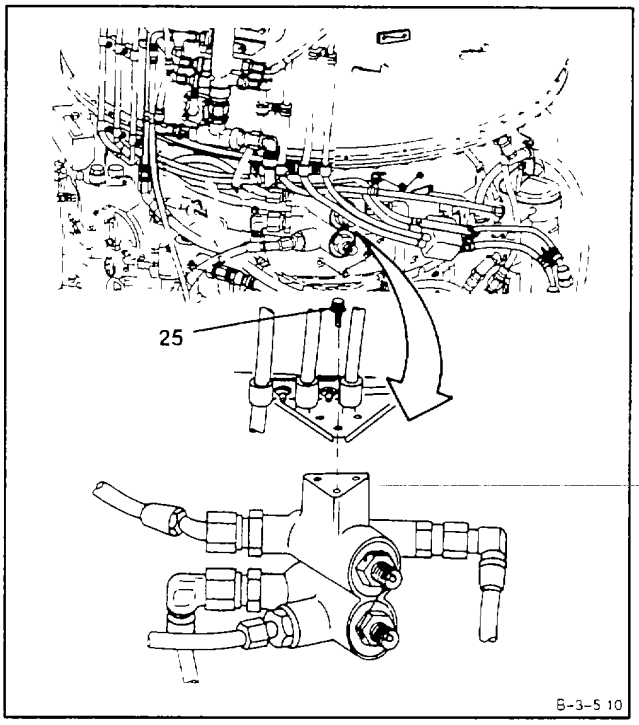
3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-5

10. Remove two nuts (23) and two screws (24)



11. **Remove** lockwire and **three bolts (25).**



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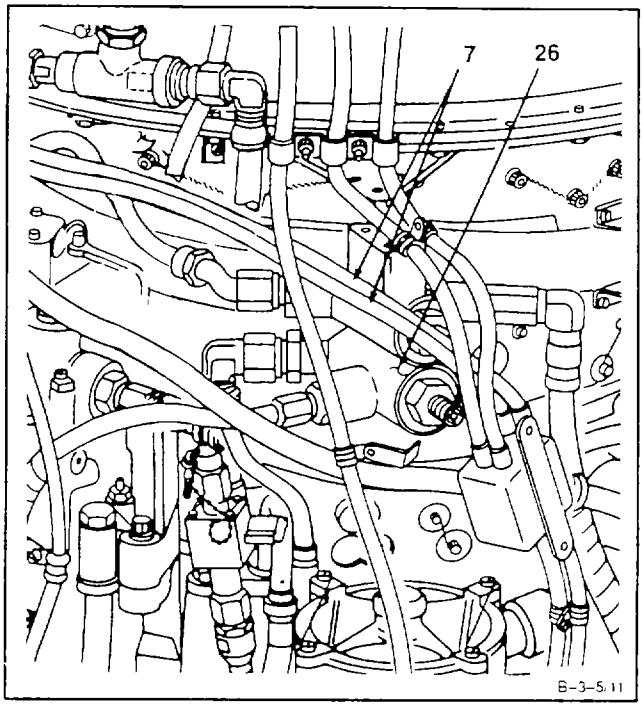
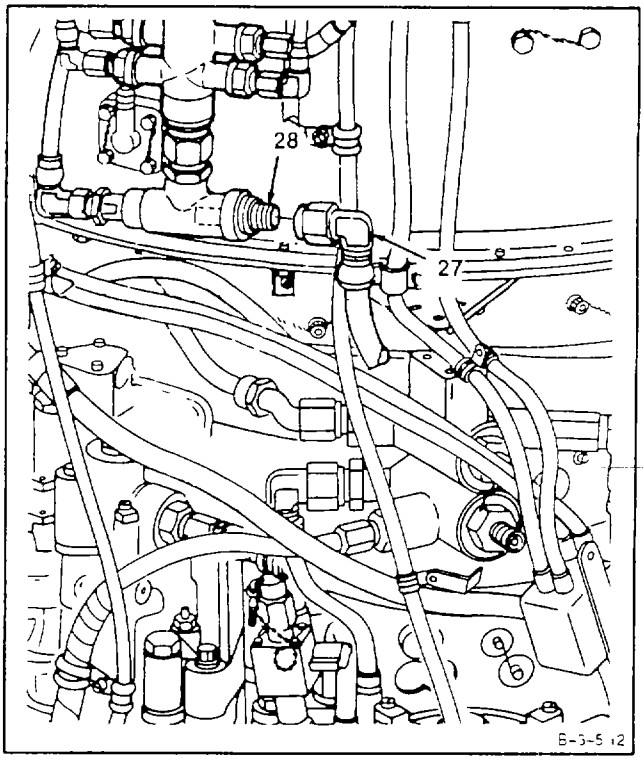
3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-5

12. Pull ignition coil and cable assembly leads (7) from behind dual chip detector (26) and let them hang free.



13. **Disconnect hose assembly (27) from pressurizing valve (28).**



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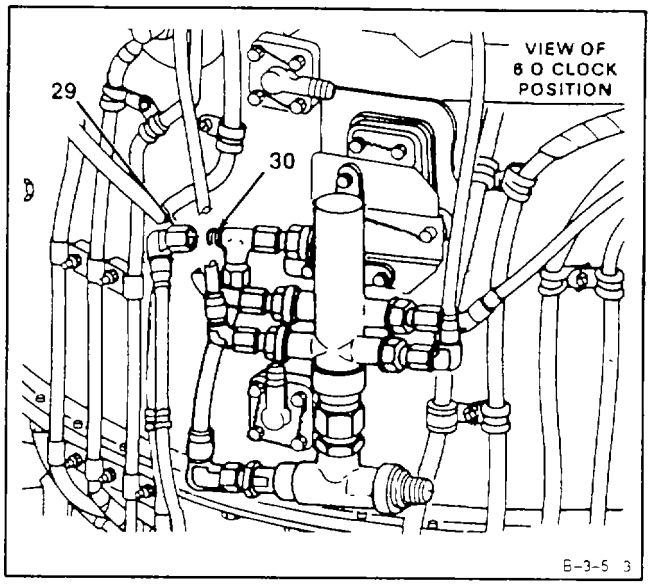
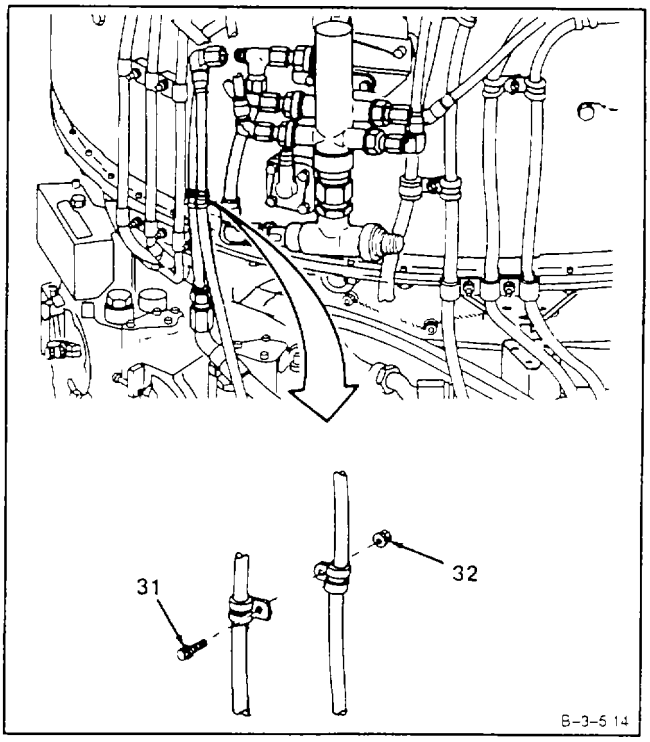
3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-5

14. **Disconnect hose assembly (29)** from tee (30)



15. Remove nut (32) and screw (31)



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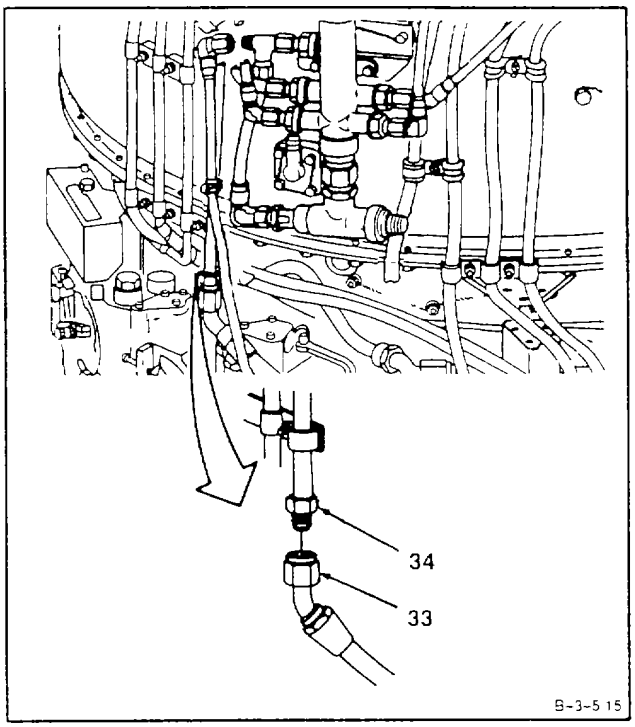
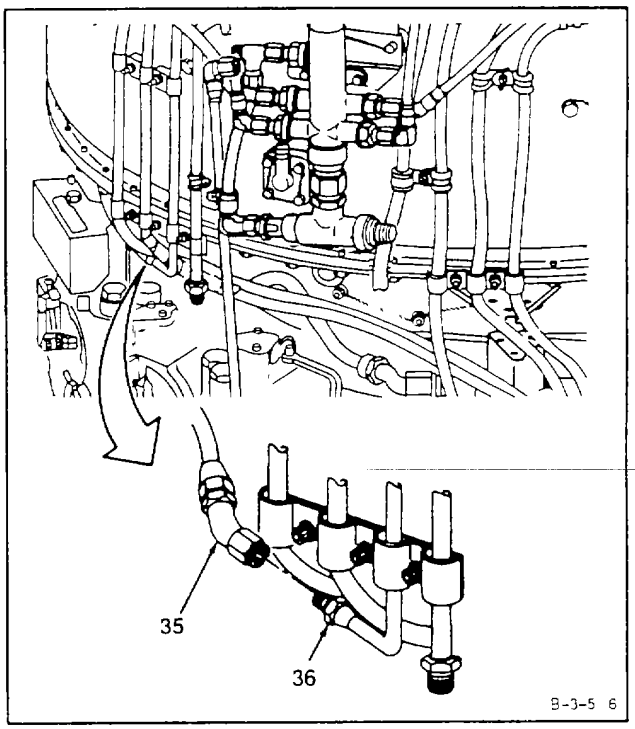
3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-5

16. Disconnect hose assembly (33) from tube assembly (34)



17. **Disconnect hose assembly (35)** from tube assembly (36)



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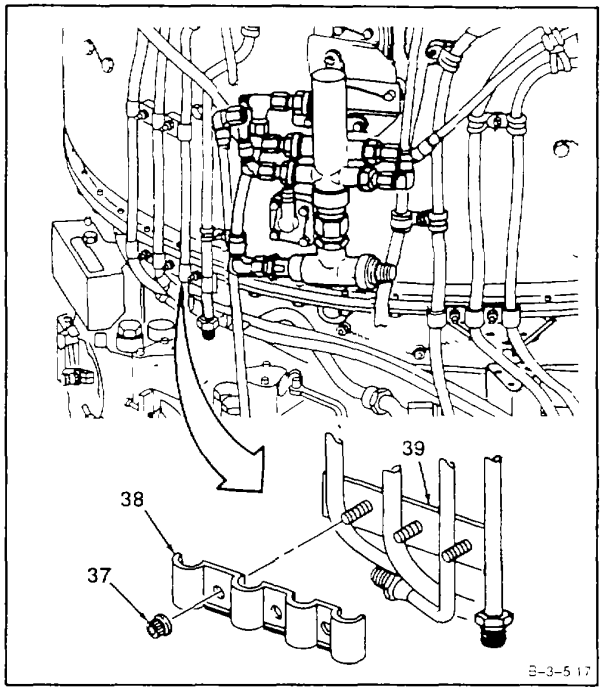
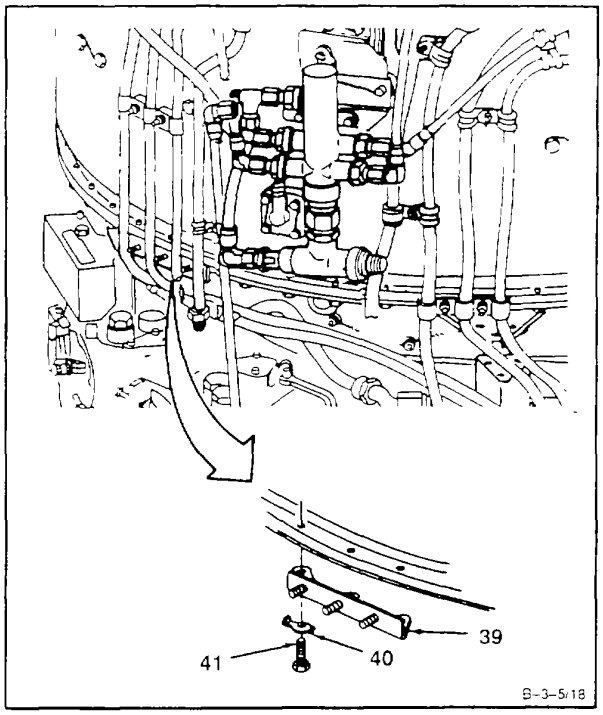
3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-5

18. Remove three nuts (37) and clamp (38) from bracket (39).

19. Straighten tabs of key washers (40) and remove three bolts (41), three key washers (40), and bracket (39).





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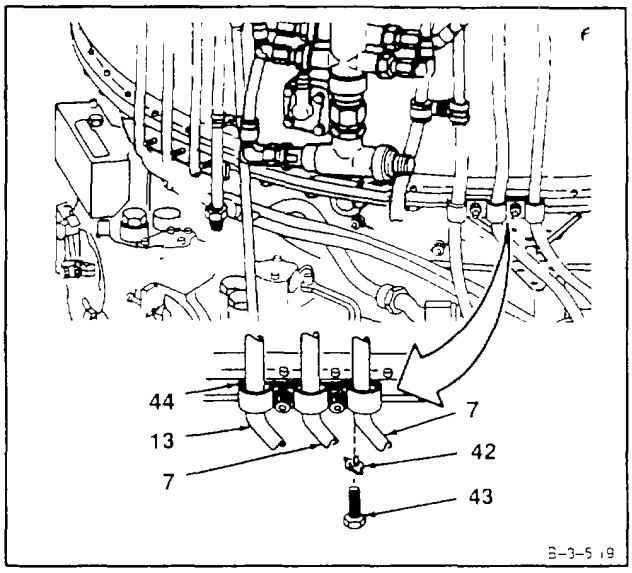
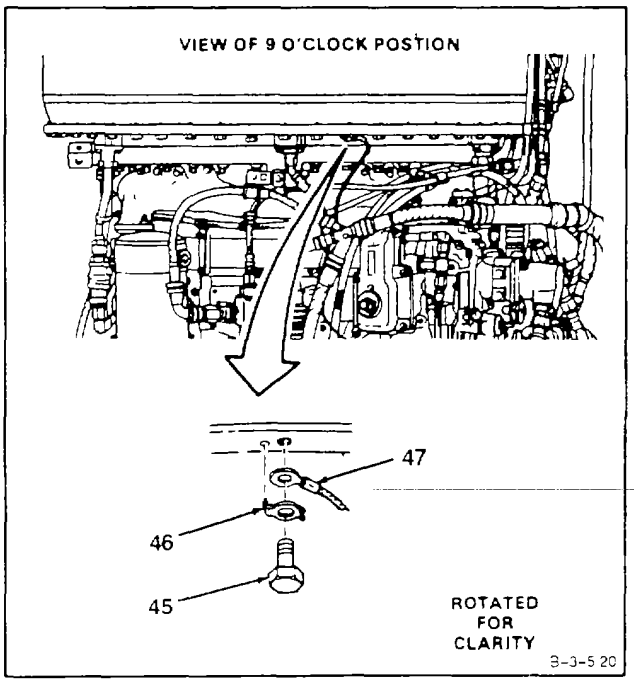
20. Straighten tabs of key washers (42) and **remove two bolts (43)** and two key washers (42). Let strap and bracket (44) remain attached to ignition coil and cable assembly leads (7) and hose assembly (13)



21. **Remove** bolt (45) key washer (46), and **jumper cable assembly (47).**



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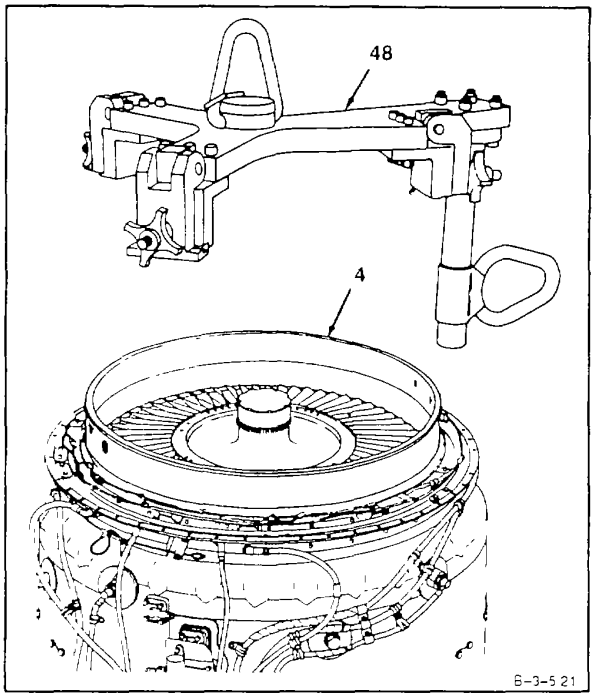
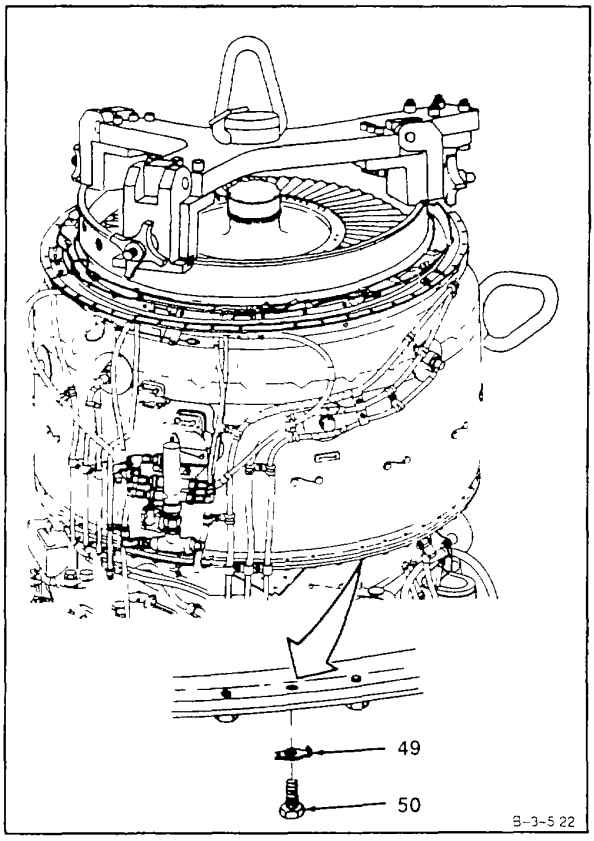
CAUTION

In following step, make certain that three clamping devices are securely attached to combustion section and power turbine Failure to comply may result in damage to engine.

22. **Install power turbine fixture (T28) (48)** on combustion section and power turbine (4).



23. Straighten tabs of key washers (49), and **remove 45 bolts** (50) and 45 key washers (49).



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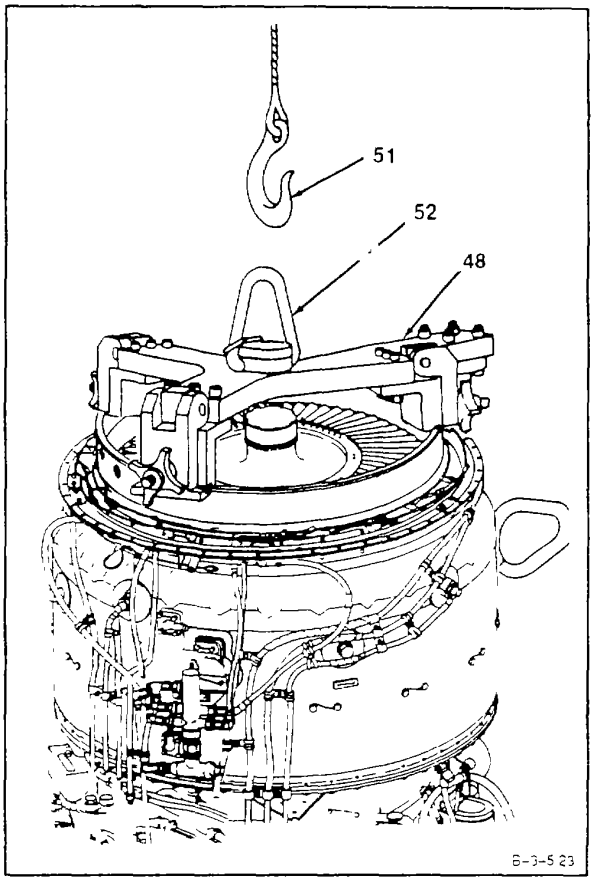
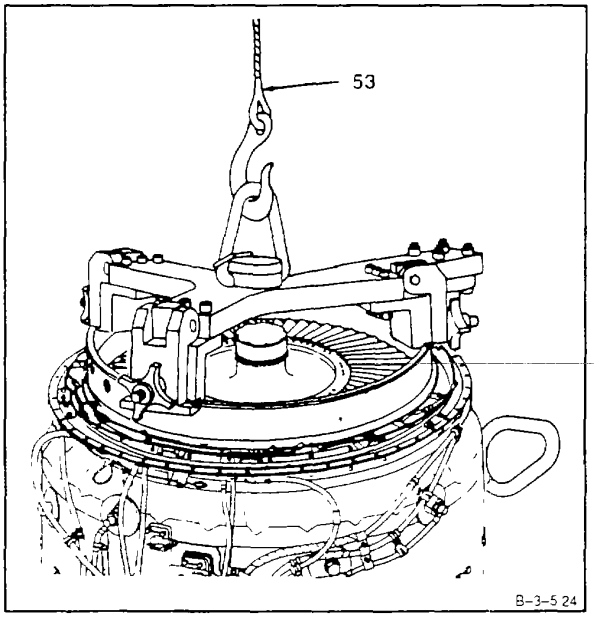
3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-5

24. **Attach hoist hook (51)** to lifting eye (52) of power turbine fixture (T28) (48)



25. Take up slack on hoist cable (53).



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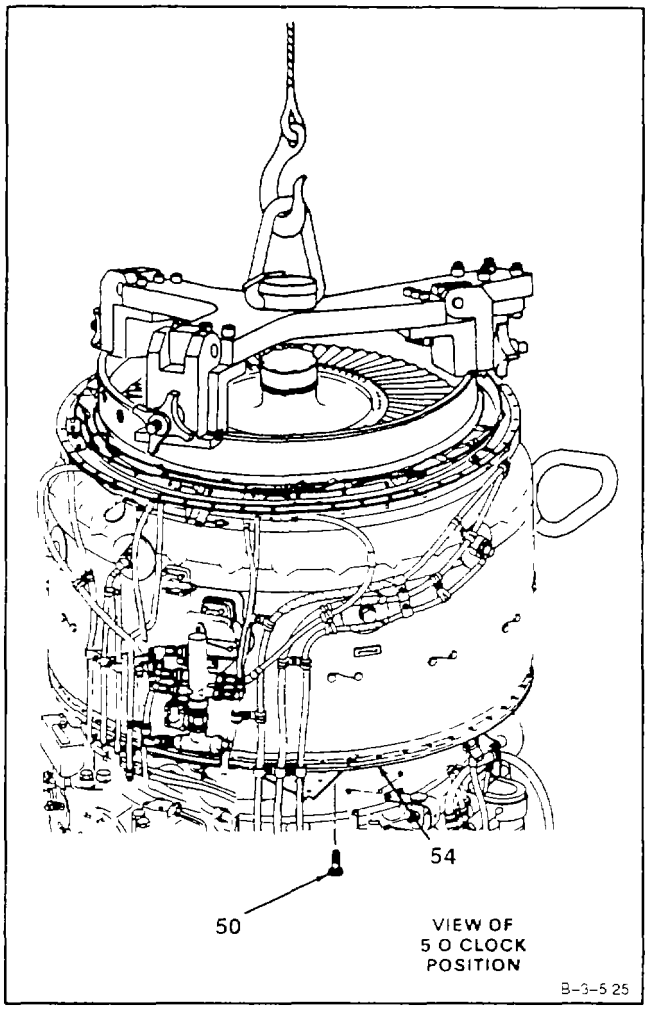
26. Install three bolts (50) in three jacking holes at approximately 1-, 5-, and 9-o'clock positions in air diffuser flange (54).



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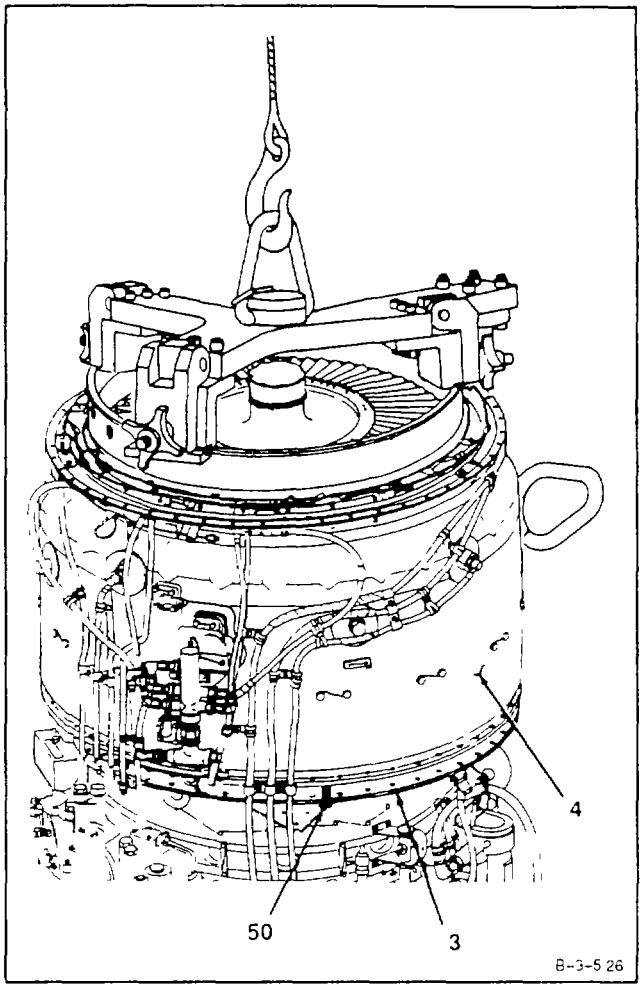
CAUTION

In following step, bolts shall be turned evenly and power turbine rotor shall be turned to detect tilting of power turbine shaft. Failure to comply will cause damage to No. 3 bearing.

27. Turn three bolts (50) evenly to separate combustion section and power turbine (4) from air diffuser assembly (3) Remove three bolts (50).



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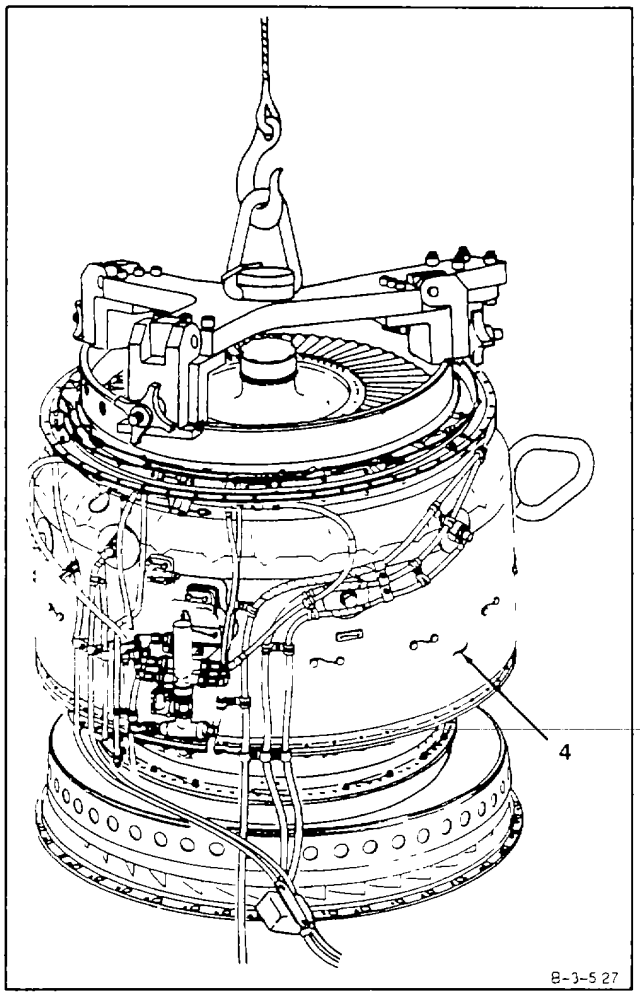
28. Remove combustion section and power turbine (4). Have helper guide combustion section and power turbine (4)



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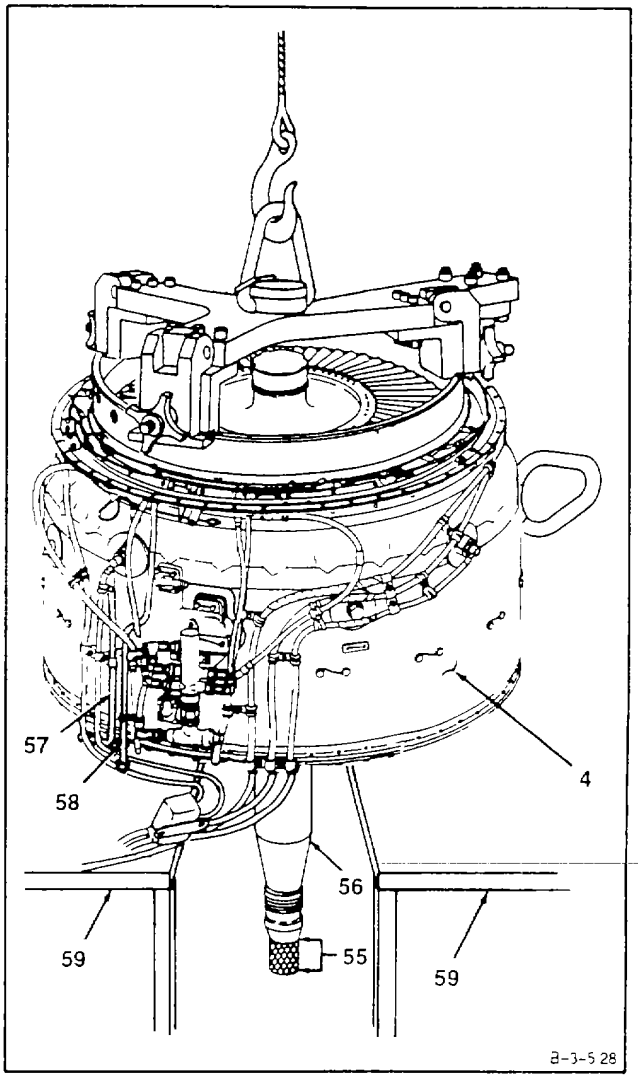
CAUTION

A protective cover must be installed over No. 3 bearing inner race location on power turbine shaft. If this is not done, damage to power turbine shaft surfaces may result.

29. Install vexar nylon webbing (E62) over No. 3 bearing inner race location (55) on shaft (56)

30. Orient combustion section and power turbine (4) so that tube assemblies (57 and 58) pass between two tables (59).

31. **Lower combustion section and power turbine (4) onto two tables (59)** placed nearly together. Shaft (56) will pass between two tables (59).



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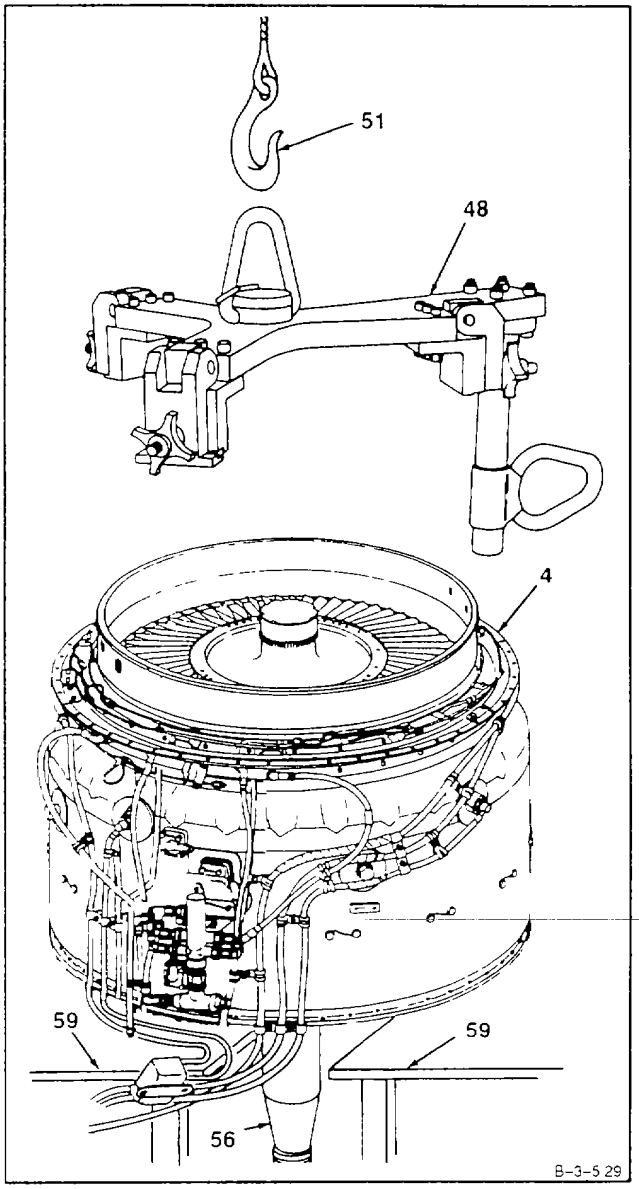
3-5 REMOVE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-5

32. Remove hoist hook (51) and power turbine fixture (T28) (48)

33. Turn combustion turbine and power turbine section (4) over on table. Measure axial clearance between second turbine disc assembly and third turbine nozzle (Ref Task 3-8, step 3). Record measurement on DA Form 2404 for future reference

34. Turn combustion turbine and power turbine section (4) over on two tables (59) Shaft (56) will pass between two tables (59).



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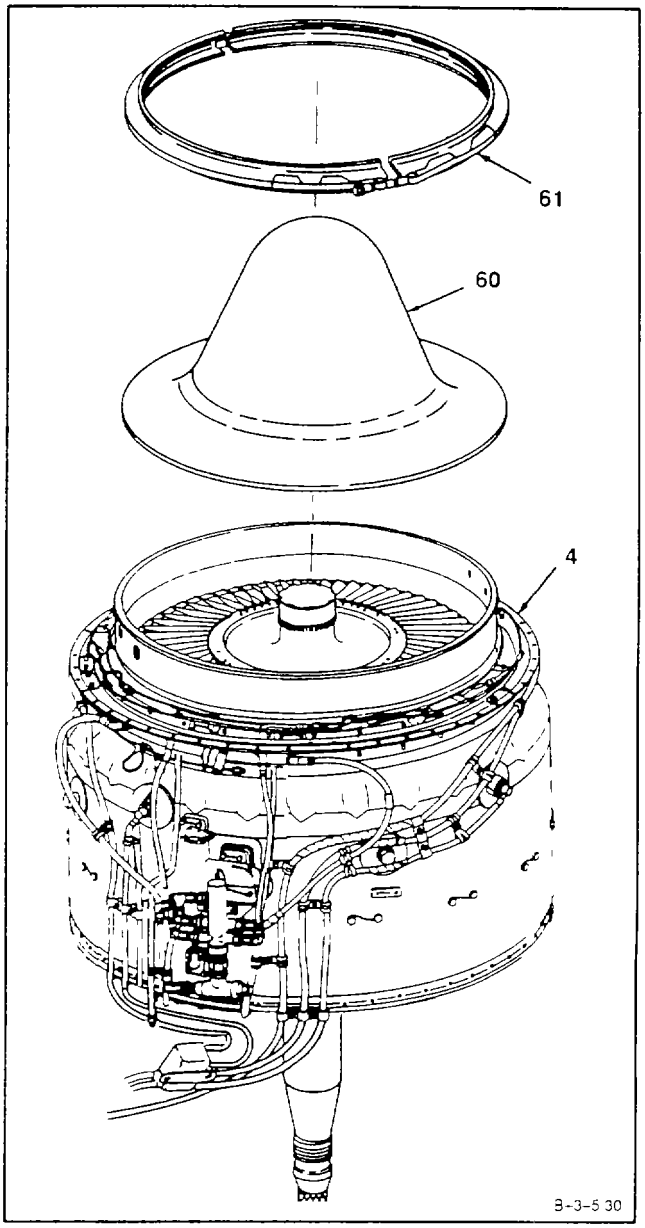
35. Install group aircraft cover (T39) (60) and secure to combustion section and power turbine (4) with clamp coupling half (T49) (61)



FOLLOW-ON MAINTENANCE
None

END OF TASK

3-6 DISASSEMBLY COMBUSTION SECTION AND POWER TURBINE (AVIM) 3-6

INITIAL SETUP

Applicable Configurations
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Coupling Half, Clamp (T49)
Cover, Aircraft, Group (T39)
Open-End Wrench (T24)
Power Turbine Fixture (T28)
Hoist
Outside Micrometer Caliper Set

Materials:
None

Personnel Required,
Aircraft Powerplant Repairer (2)

References:
Task 4-7
Task 4-12
Task 4-16
Task 6-15

Equipment Condition:
Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Thermocouple Jumper Lead Removed (Task 4-1)

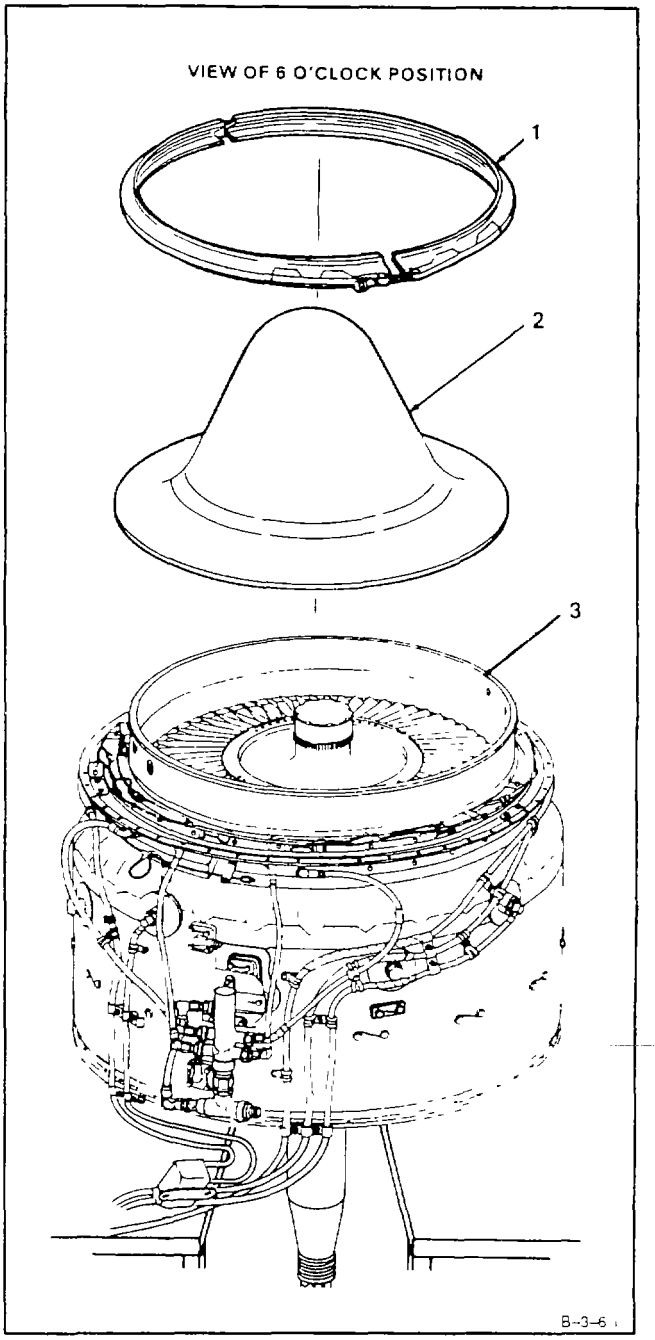
GO TO NEXT PAGE

3-6 DISASSEMBLY COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-6

NOTE

During the following steps, it may be necessary to rotate combustion section and power turbine. This may require a helper.

1. Remove clamp coupling half (T49) (1) and group aircraft cover (T39) (2) from combustion section and power turbine (3).



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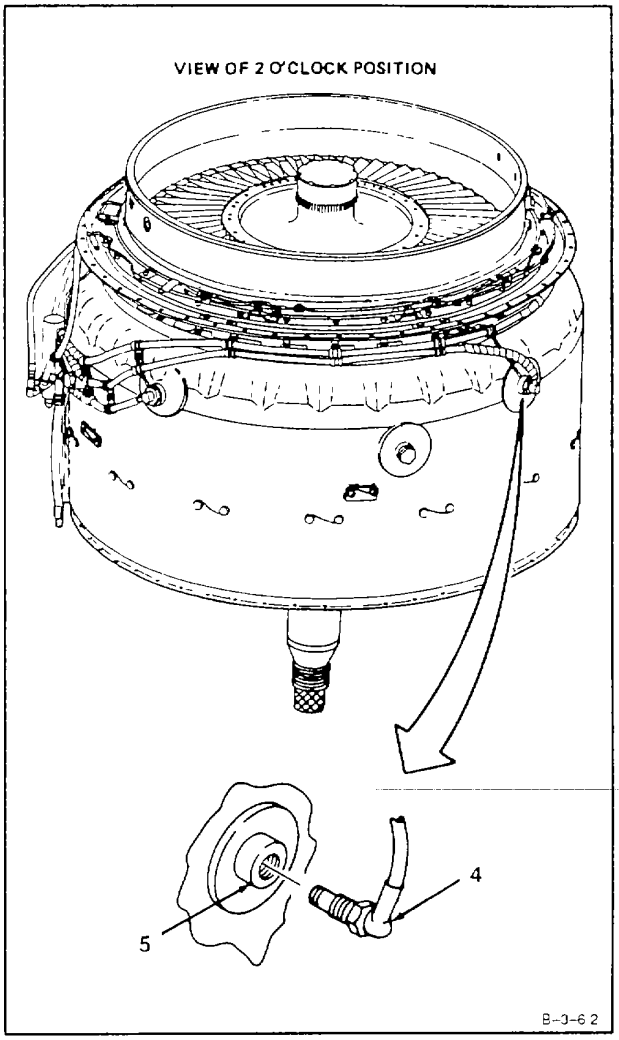
3-6 DISASSEMBLY COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-6

2. Remove lockwire and **disconnect ignition coil and cable assembly lead (4)** from receptacle (5).



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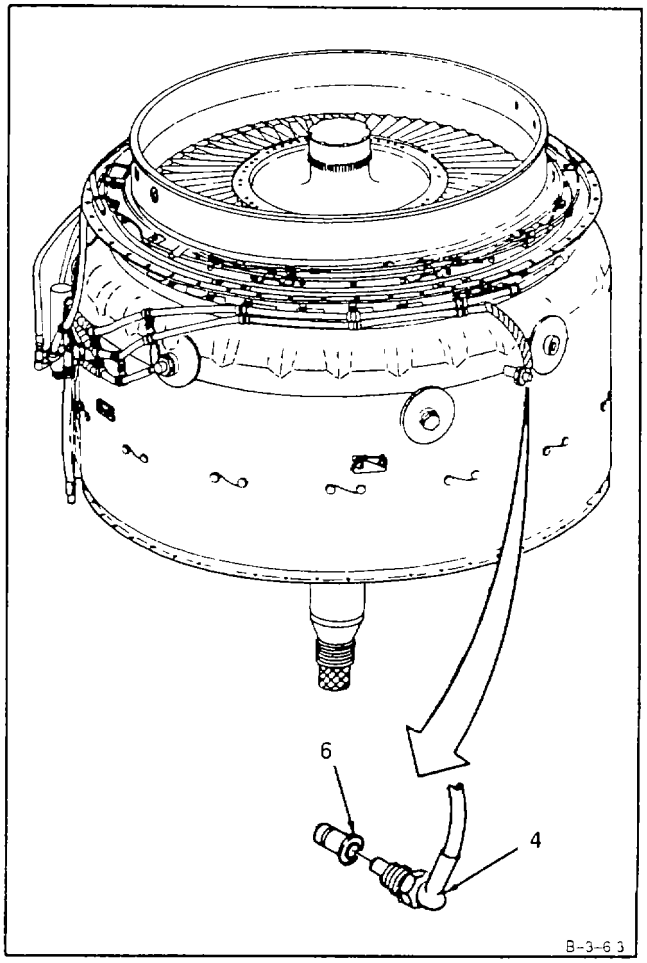
NOTE

In the following step the spark igniter may have remained in combustor housing and will have to be removed.

3. **Remove spark igniter** (6) from ignition coil and cable assembly lead (4)



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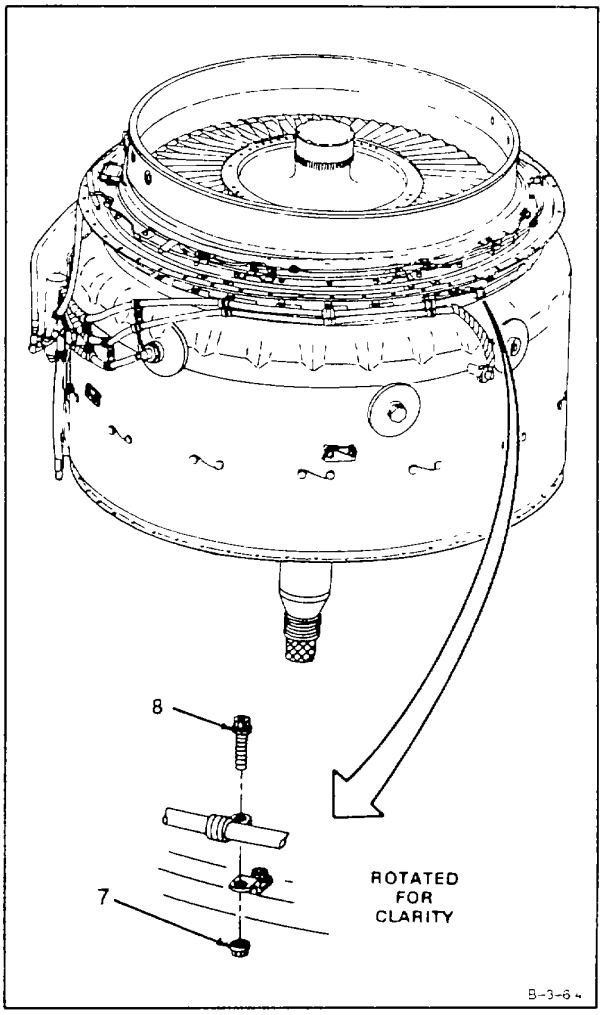
3-6 DISASSEMBLY COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-6

4. Remove nut (7) and bolt (8).



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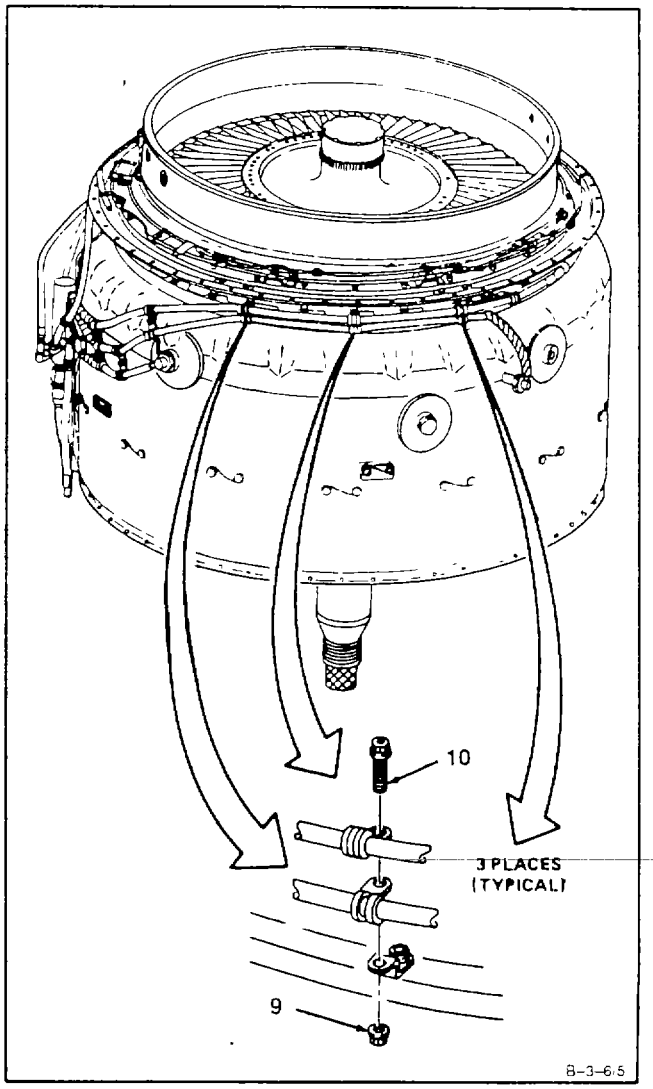
3-6 DISASSEMBLY COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-6

5. Remove three nuts (9) and three bolts (10)



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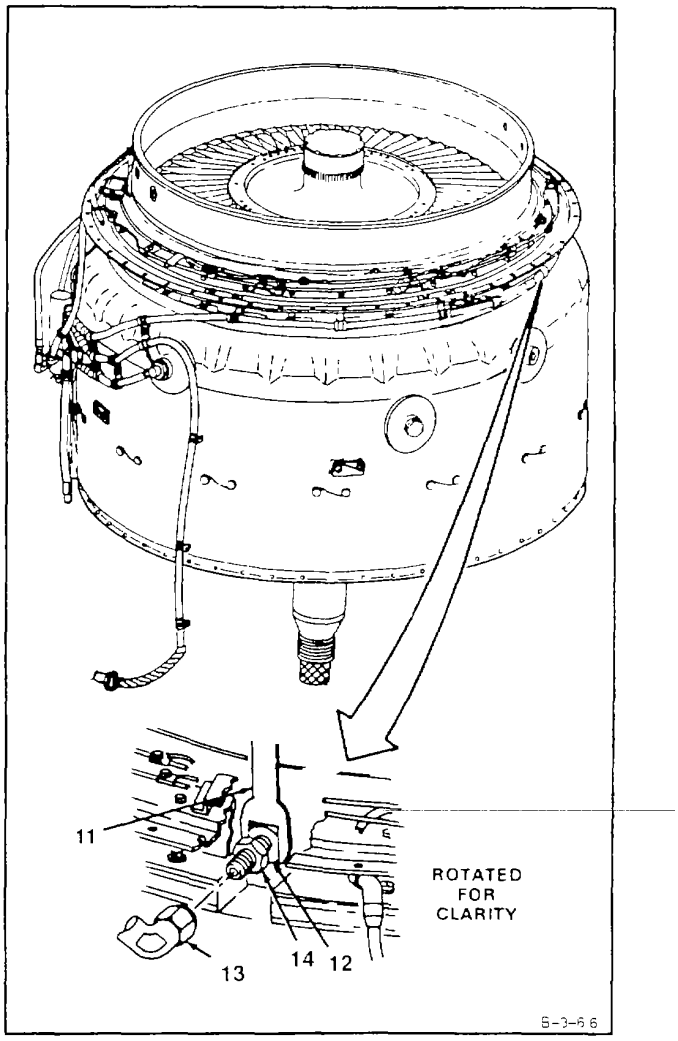
CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T24). Failure to use wrench may result in damage and mislocation of oil transfer tube resulting in oil leaks

6. Place open-end wrench (T24) (11) on No. 4 and 5 bearing lube adapter (12).

7. Disconnect and remove hose assembly (13) from reducer (14).



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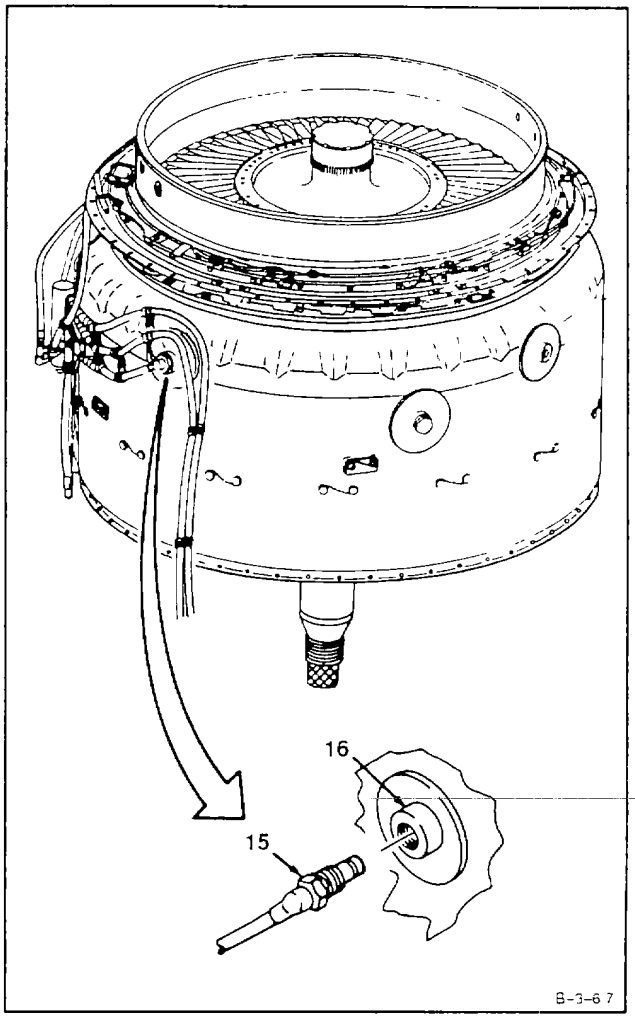
8. Remove lockwire and **disconnect ignition coil and cable assembly lead (15)** from receptacle (16).



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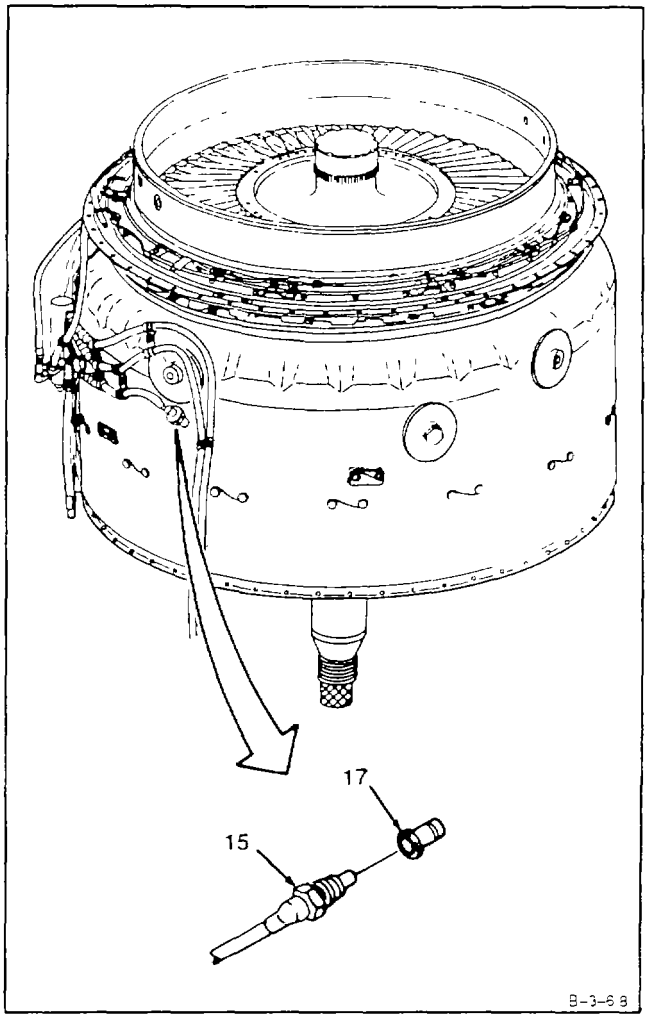
NOTE

In the following step, the spark igniter may have remained in combustor housing and will have to be removed.

9. **Remove spark igniter (17)** from ignition coil and cable assembly lead (15).



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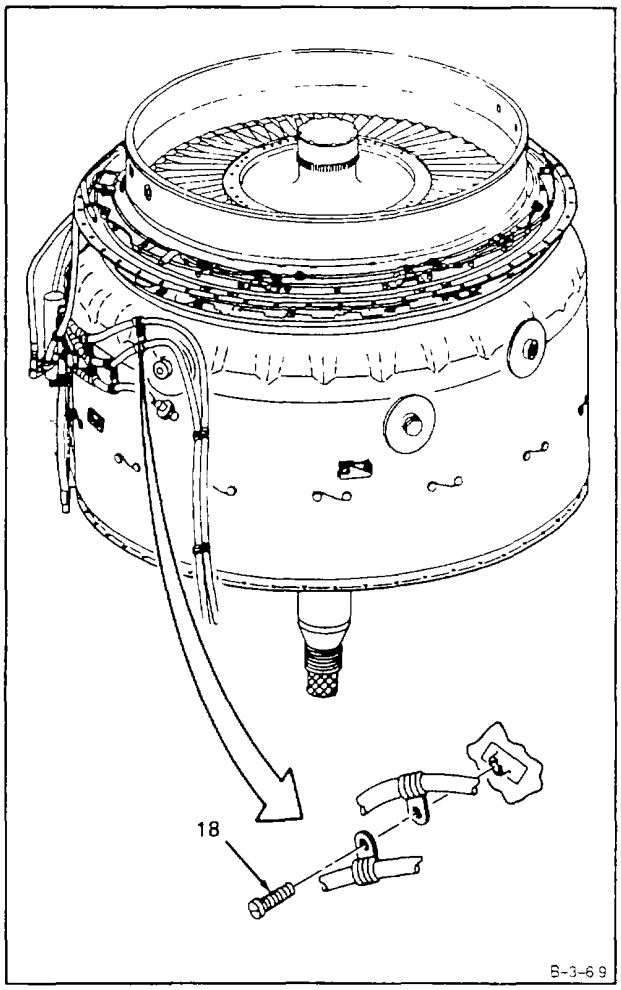
10. Remove lockwire and screw (18).



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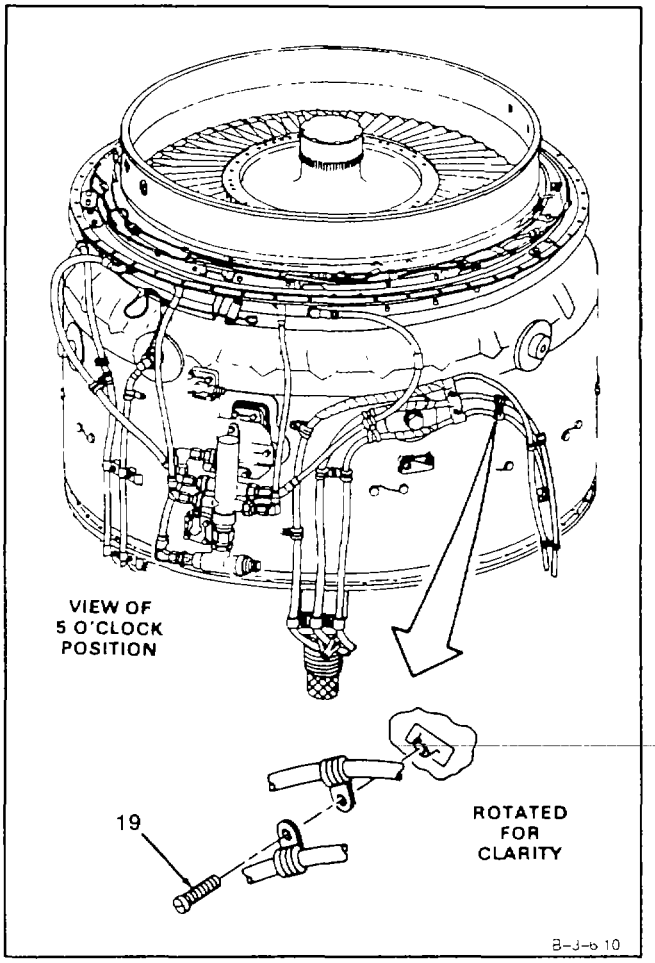
11. Remove lockwire and screw (19).



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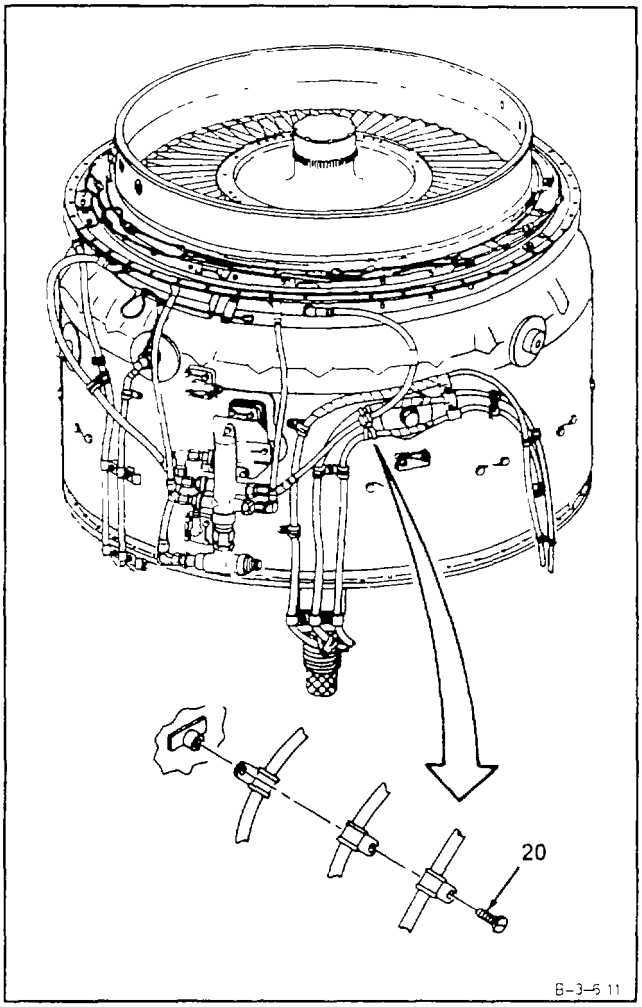
12. Remove lockwire and screw (20).



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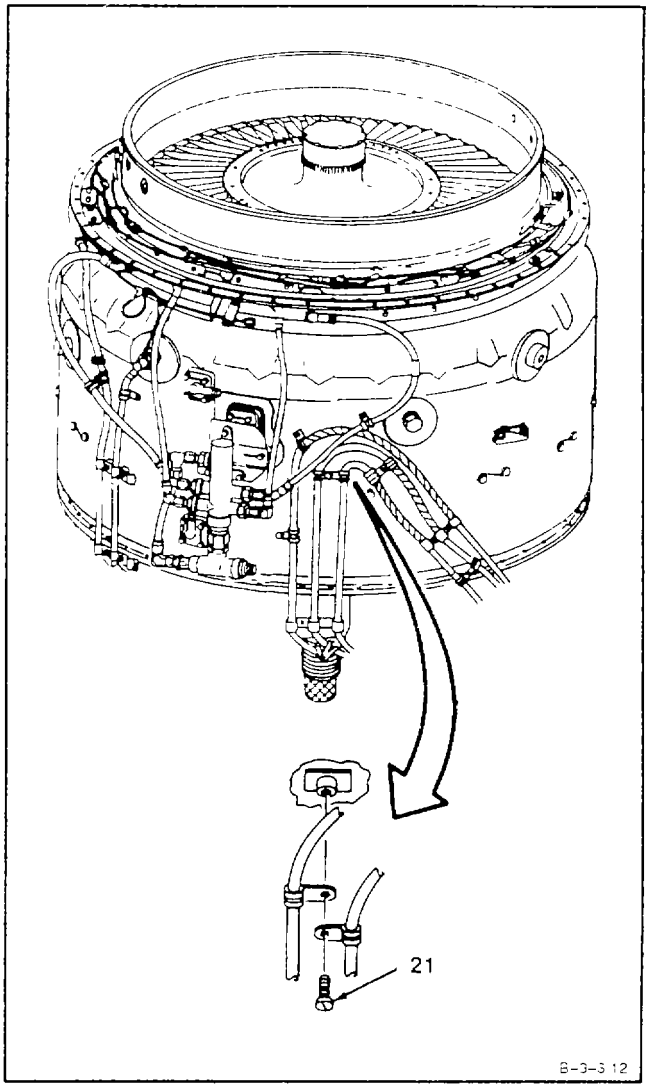
13. Remove lockwire and screw (21).



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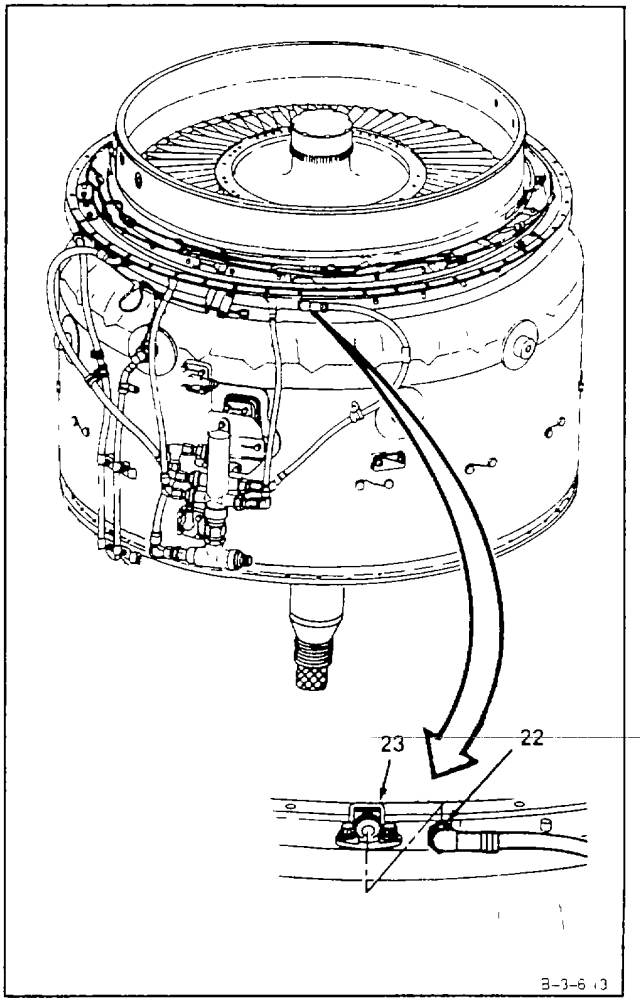
14. **Disconnect hose assembly (22)** from elbow (23).



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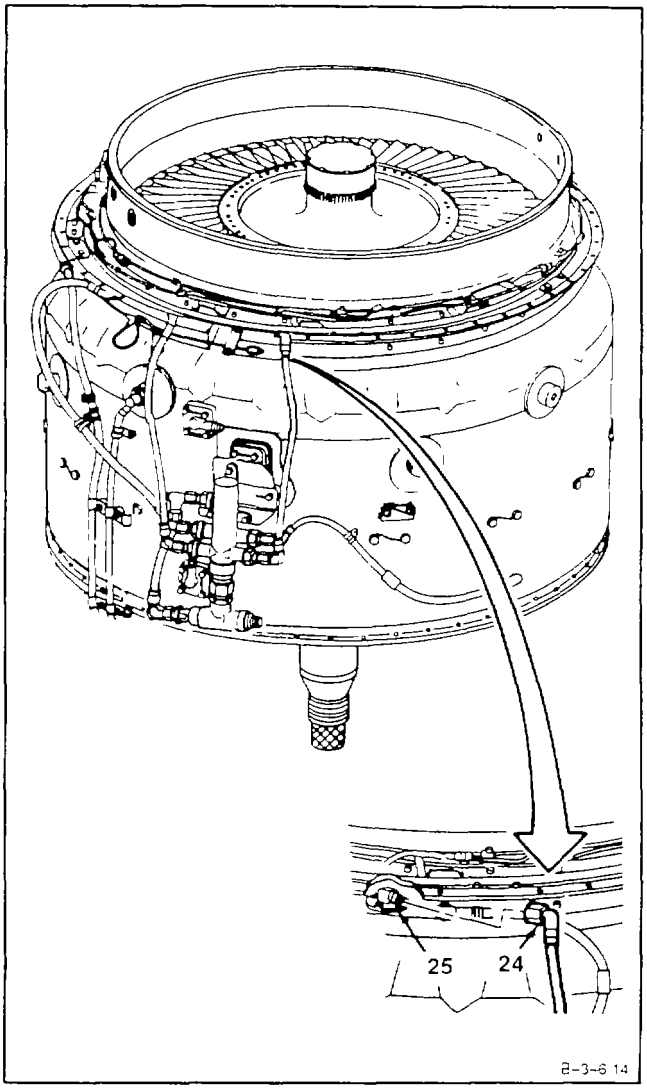
15. **Disconnect hose assembly (24)** from elbow (25).



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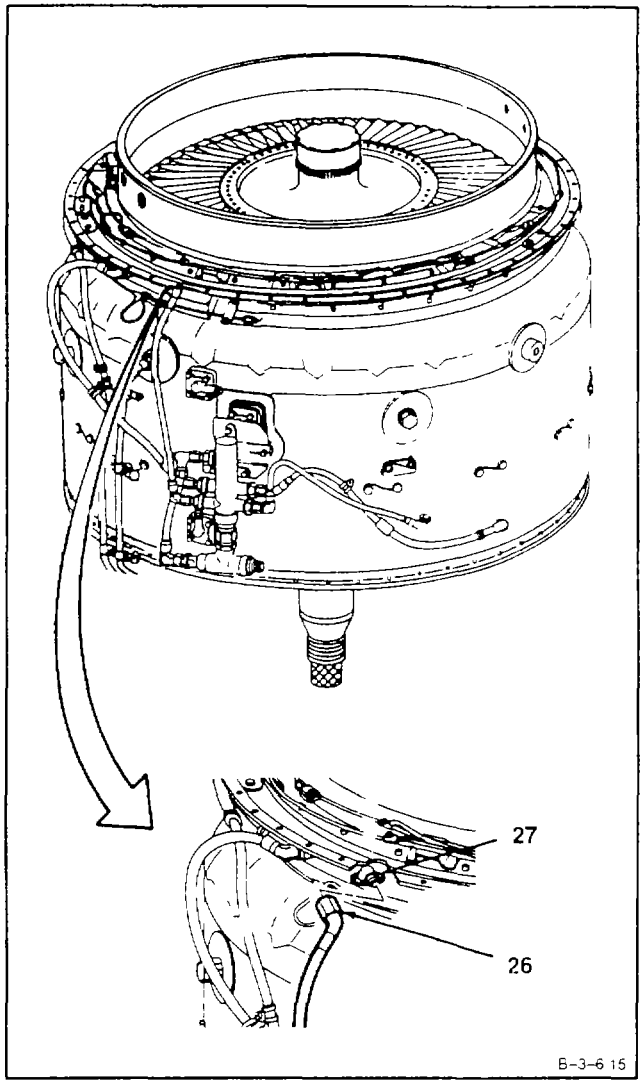
16. **Disconnect hose assembly (26)** from elbow (27).



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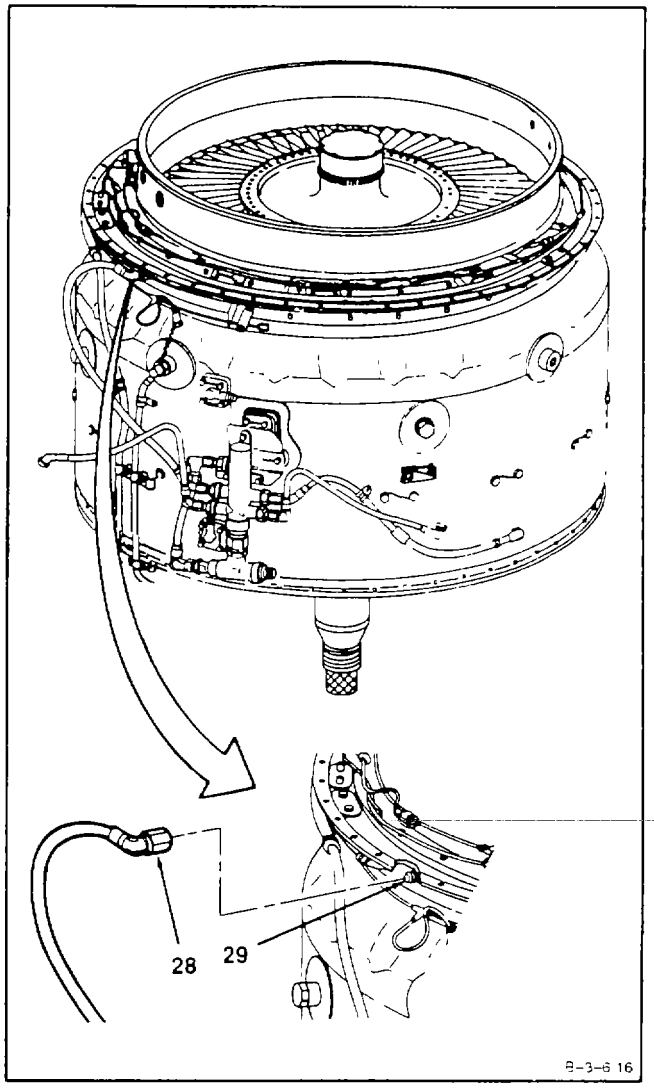
17. **Disconnect hose assembly (28)** from elbow (29).



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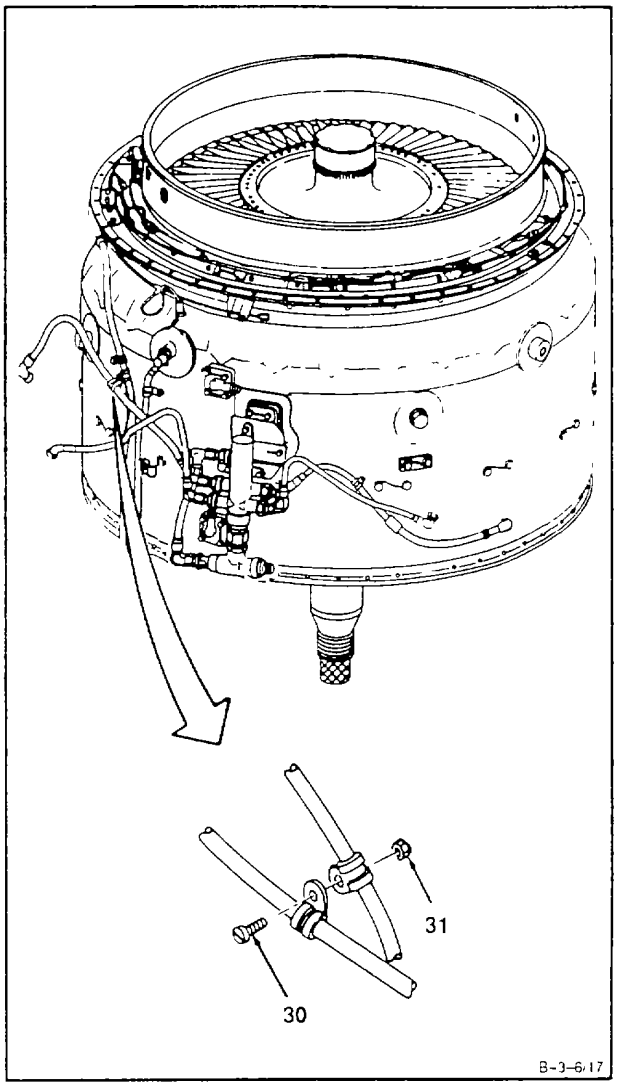
18. Remove screw (30) and nut (31).



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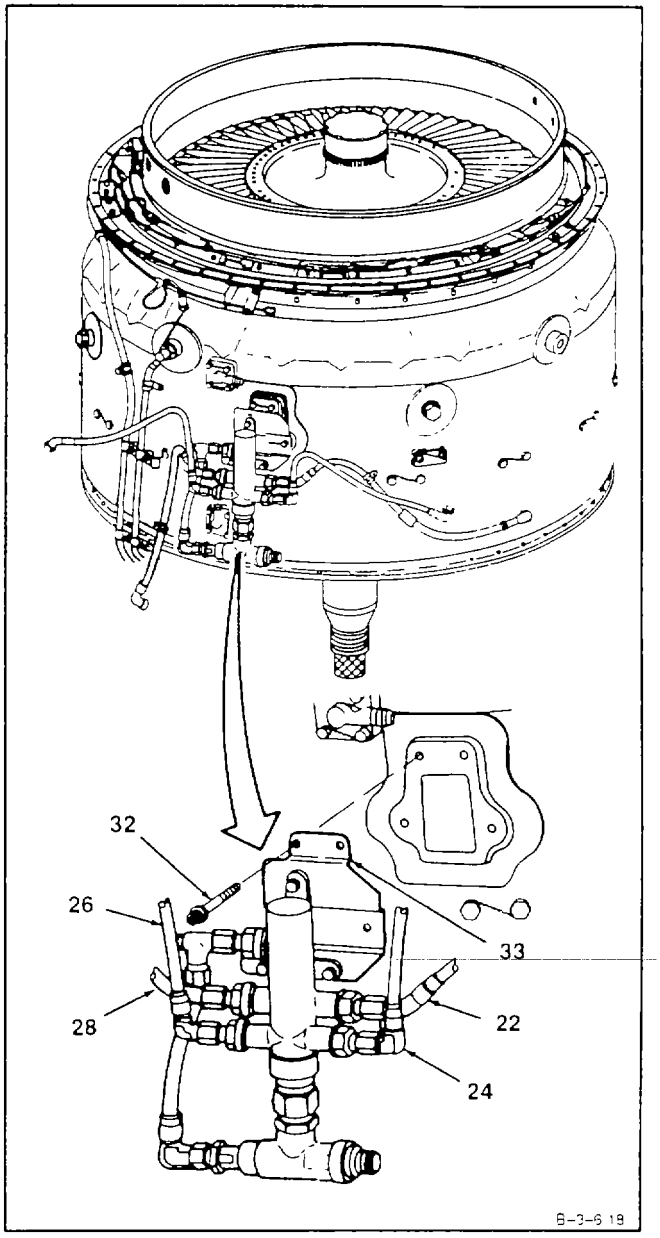
19. **Remove** lockwire, four bolts (32), and **flow divider and bracket (33),** with hose assemblies (22, 24, 26, and 28) attached.



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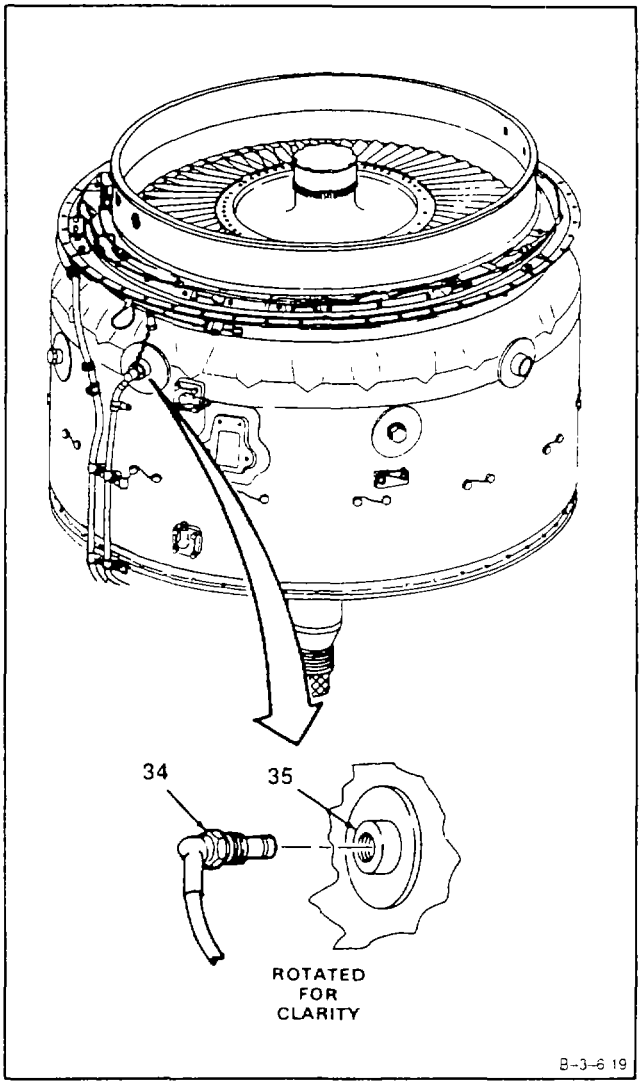
20. Remove lockwire and **disconnect ignition coil and cable assembly lead (34)** from receptacle (35).



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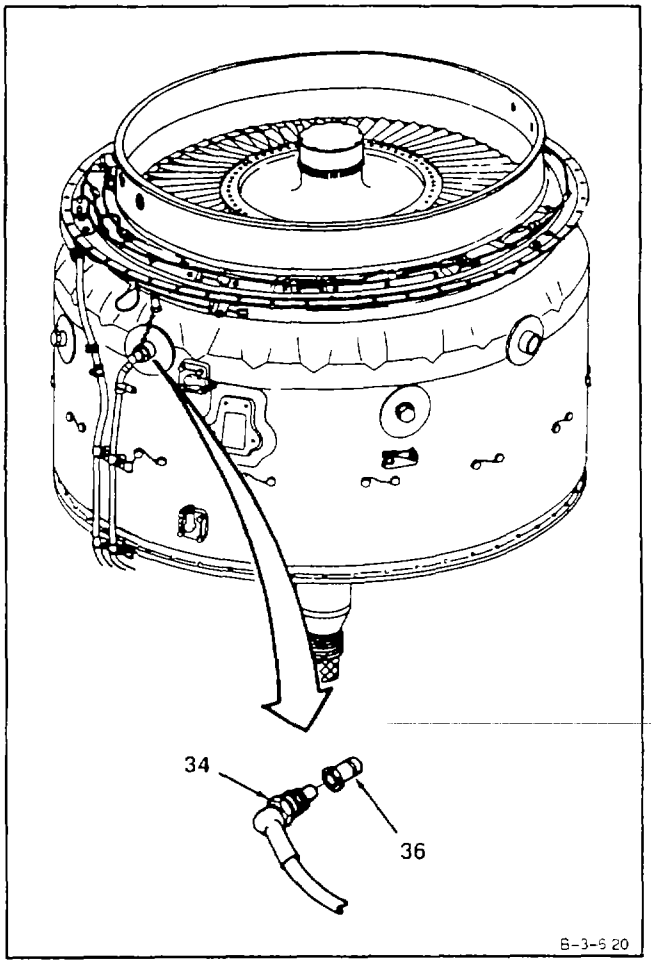
NOTE

In the following step, the spark igniter may have remained in combustor housing and will have to be removed.

21. **Remove spark igniter (36)** from ignition coil and cable assembly lead (34).



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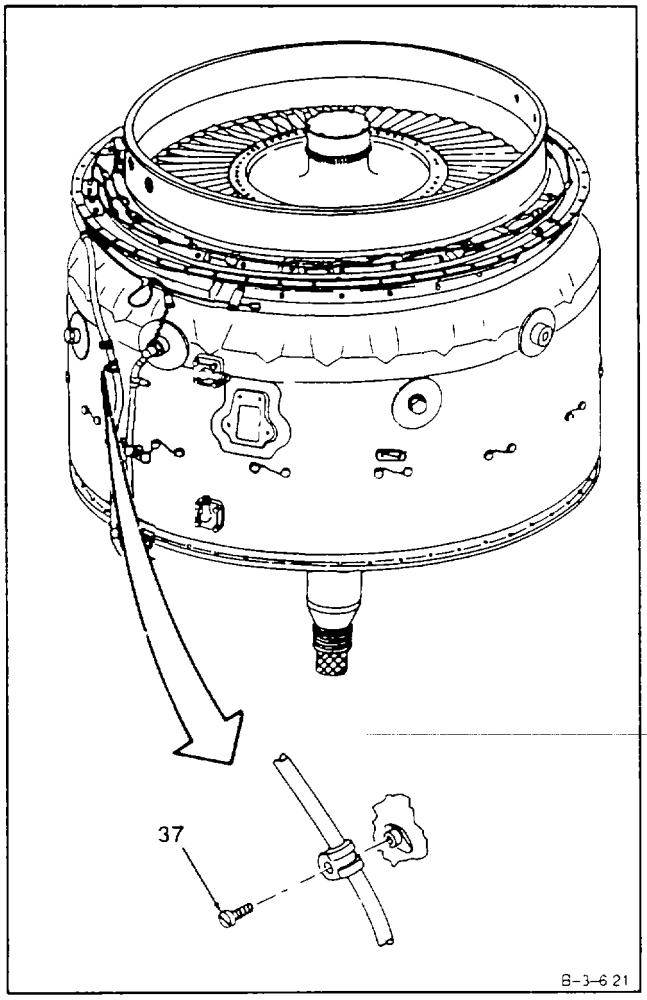
22. Remove lockwire and screw (37).



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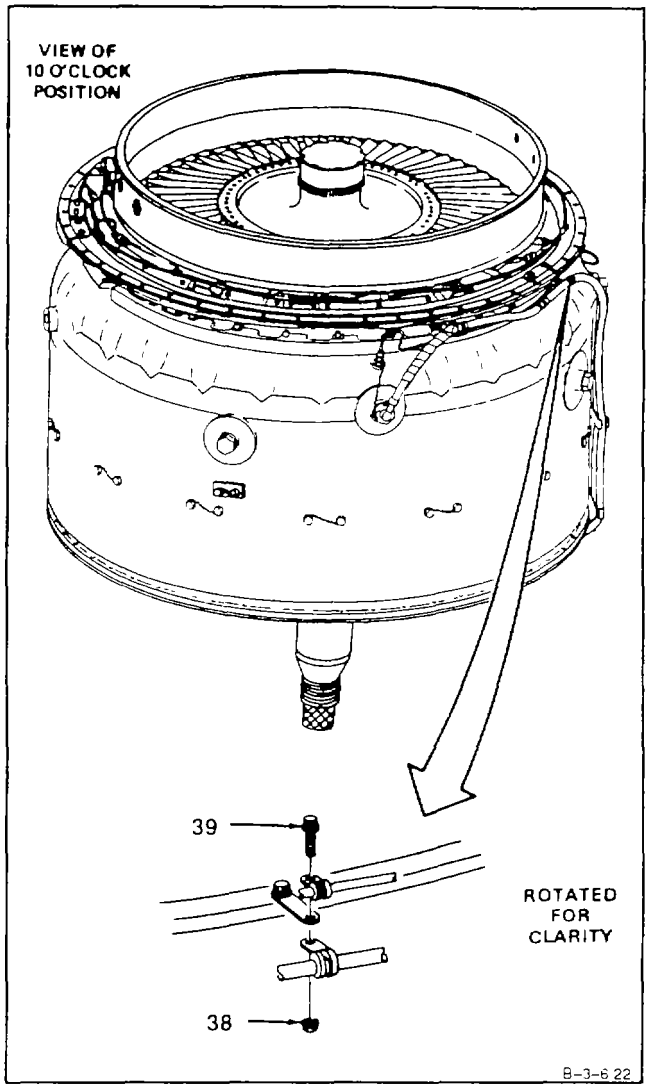
23. Remove nut (38) and bolt (39).



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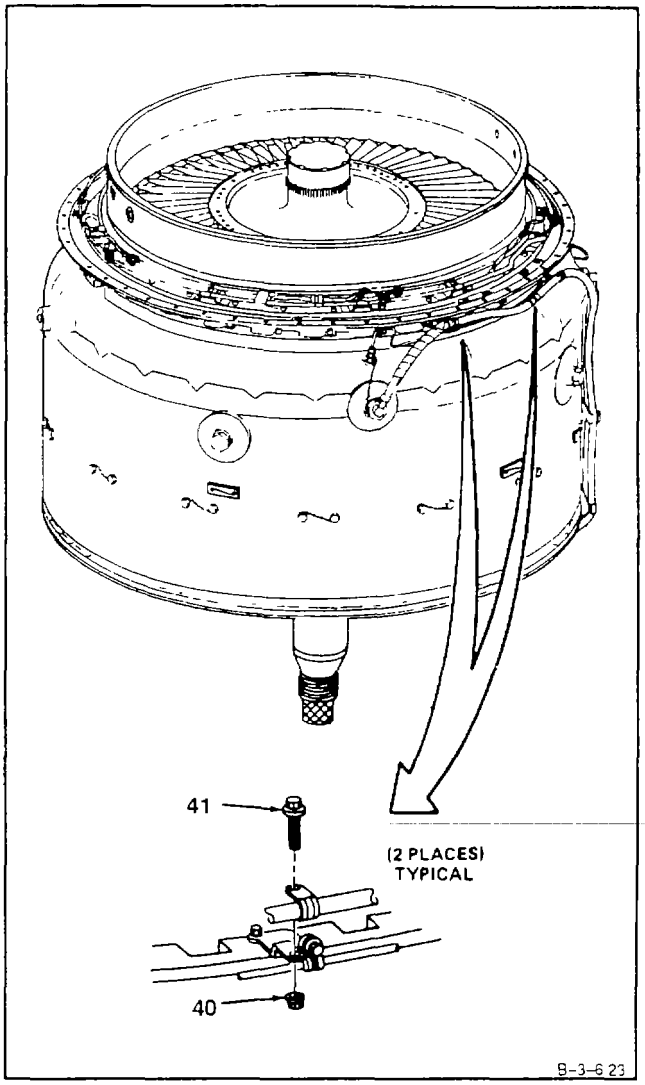
24. Remove two nuts (40) and two bolts (41).



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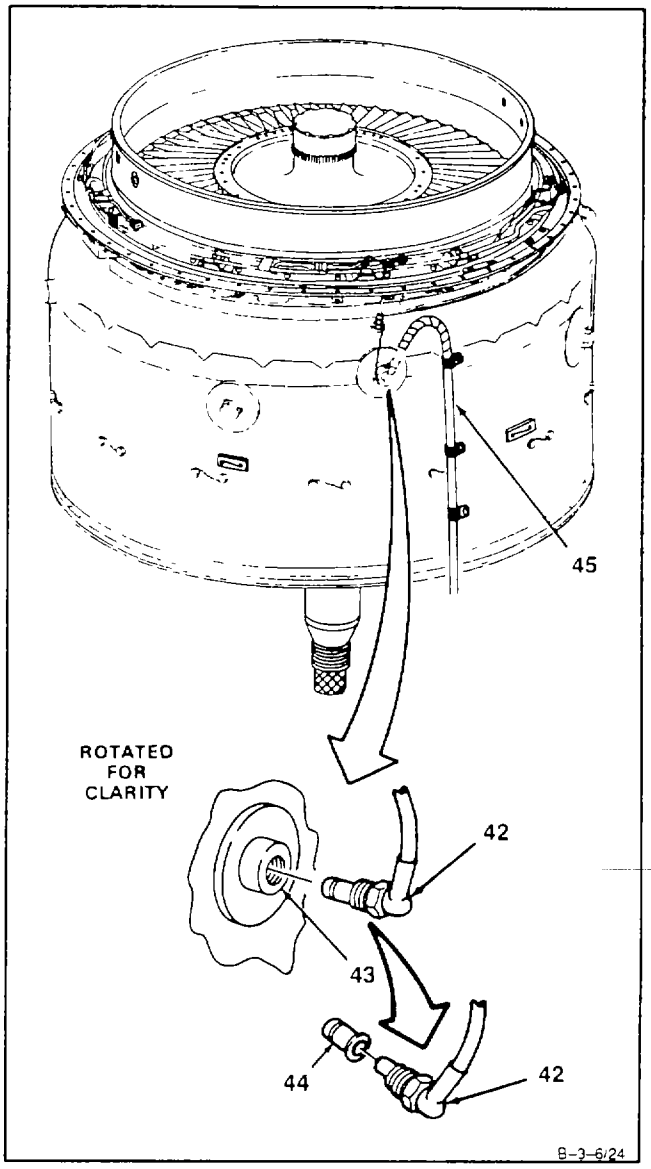
25. Remove lockwire and **disconnect ignition coil and cable assembly lead (42)** from receptacle (43).

NOTE

In the following step, the spark igniter may have remained in combustor housing and will have to be removed.

26. **Remove spark igniter (44)** from ignition coil and cable assembly lead (42), and **remove ignition coil and cable assembly (45).**



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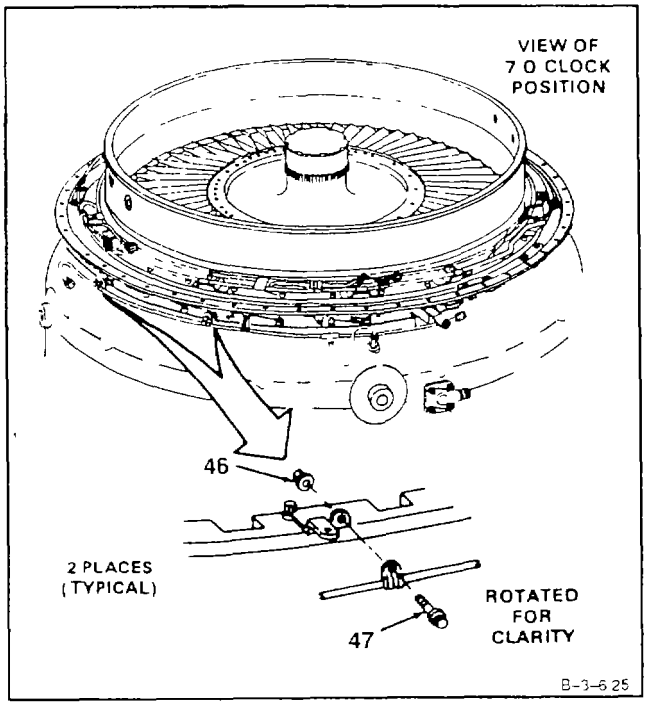
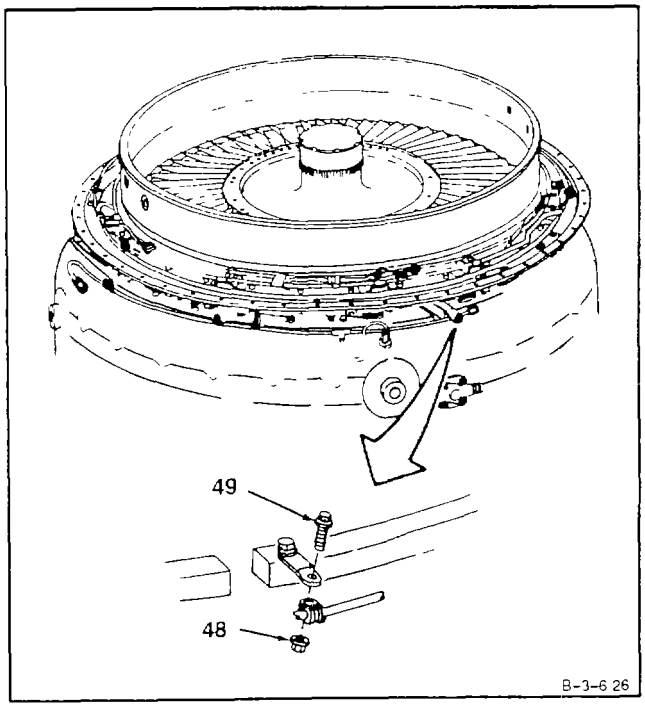
27. Remove two nuts (46) and two bolts (47).



28. Remove nut (48) and bolt (49).



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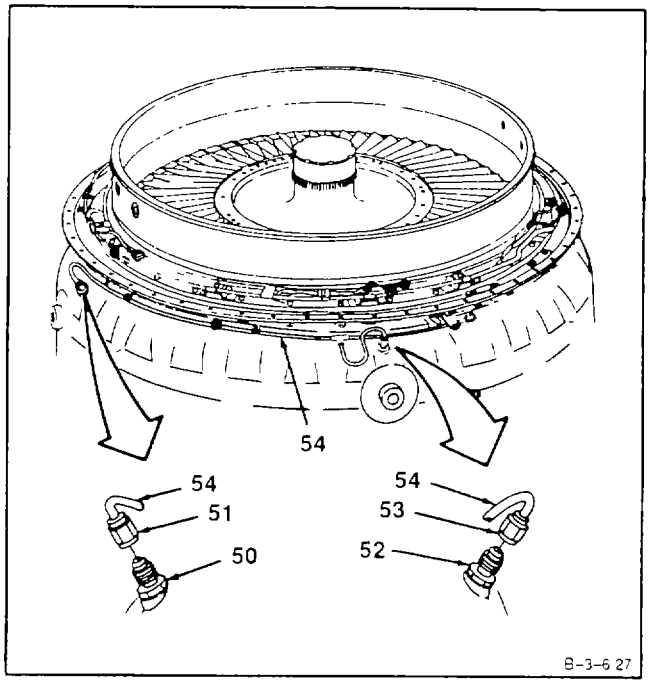
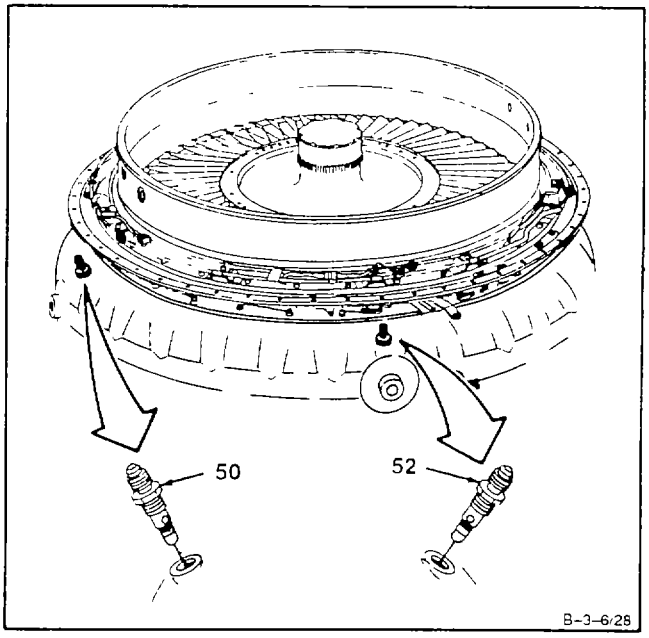
29. Using two wrenches hold start fuel nozzle (50) and loosen swivel nut (51).

30. Using two wrenches, hold start fuel nozzle (52) and loosen swivel nut (53).

31. **Disconnect and remove primer tube assembly (54)** from start fuel nozzles (50 and 52).



32. **Remove start fuel nozzles (50 and 52).**



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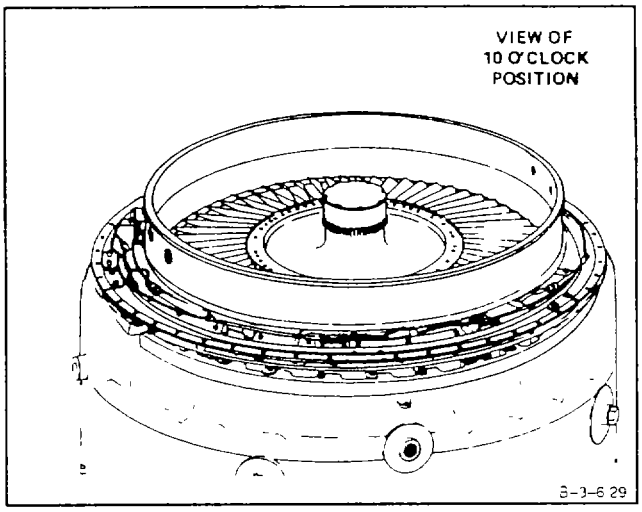
33. **Remove left- and right-hand bus bar assemblies** (Ref Task 4-7).

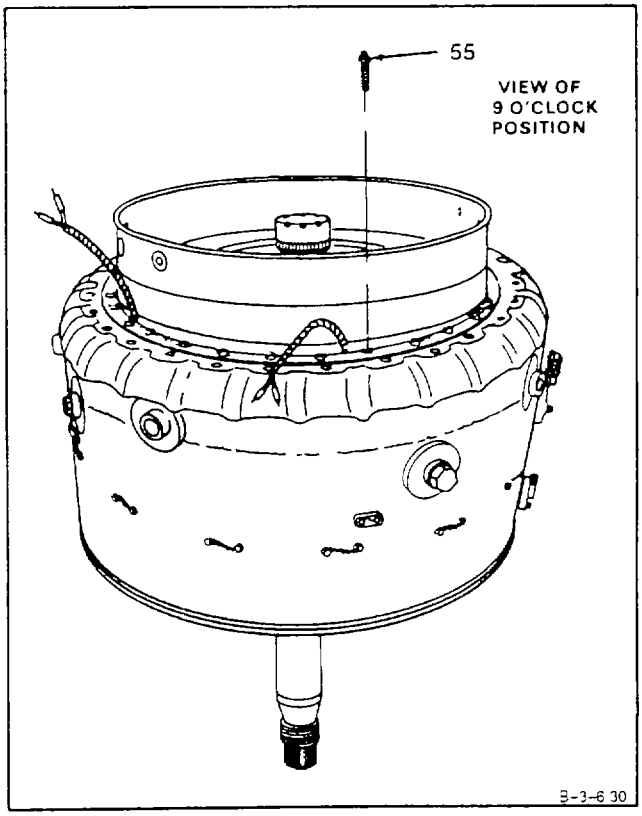


34. **Remove fireshield assembly** (Ref Task 4-12).

35. **Remove left- and right-hand fuel manifold assemblies** (Ref Task 6-15).

36. **Remove fireshield section** (Ref Task 4-16).

37. Remove lockwire and 42 bolts (55).



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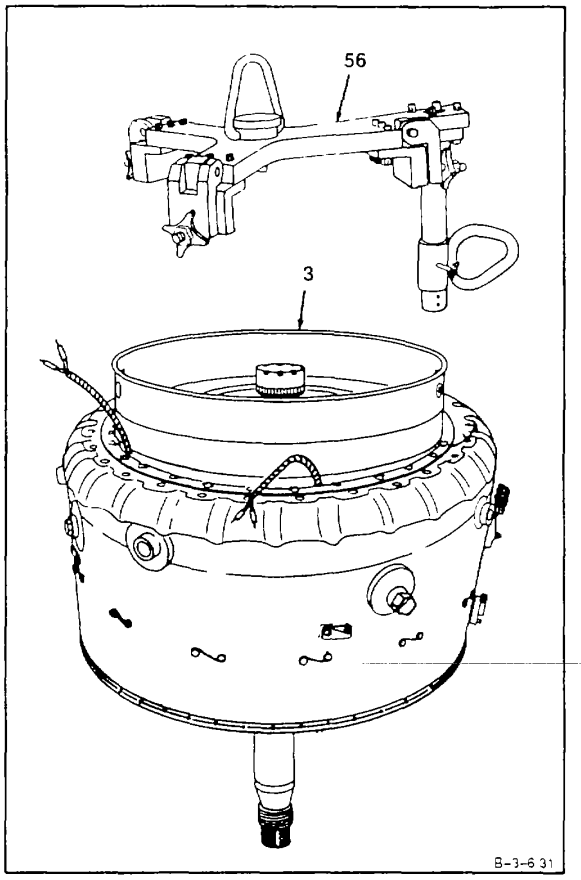
3-6 DISASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-6

38. **Install power turbine fixture (T28) (56)** on combustion section and power turbine (3).



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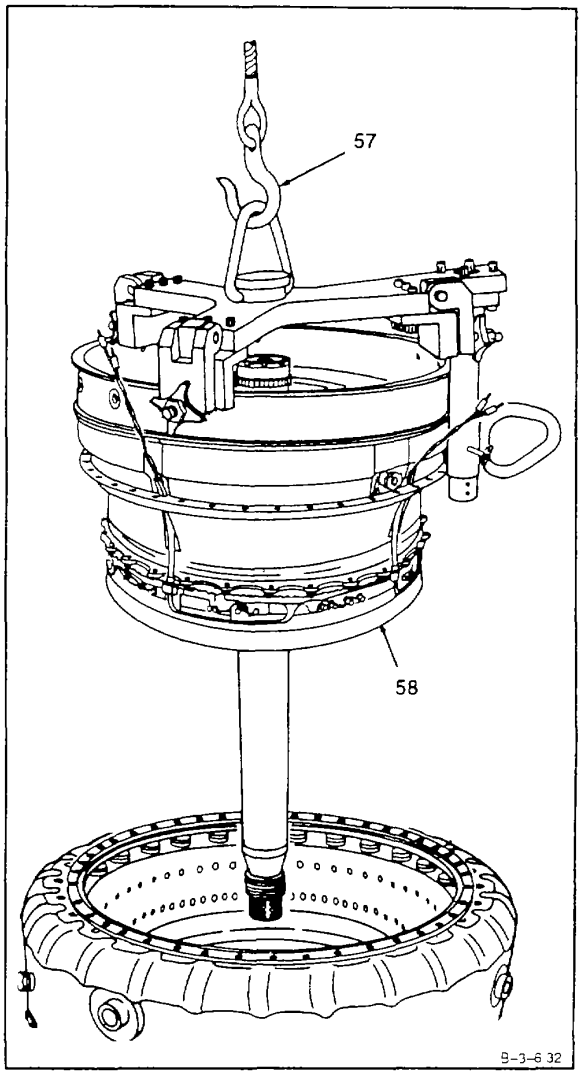
3-6 DISASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-6

39. Using hoist (57), lift power turbine assembly (58) and position between two tables.



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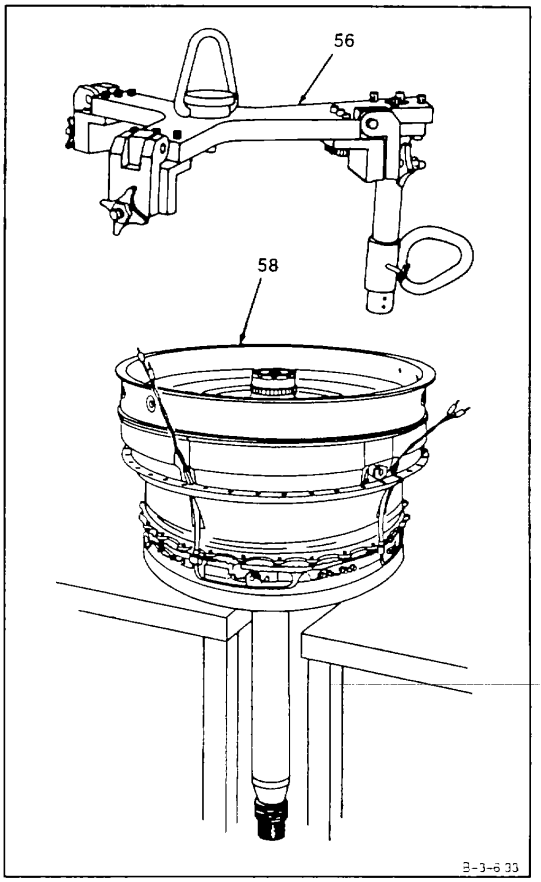
3-6 DISASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-6

40. Remove power turbine fixture (T28) (56) from power turbine assembly (58)



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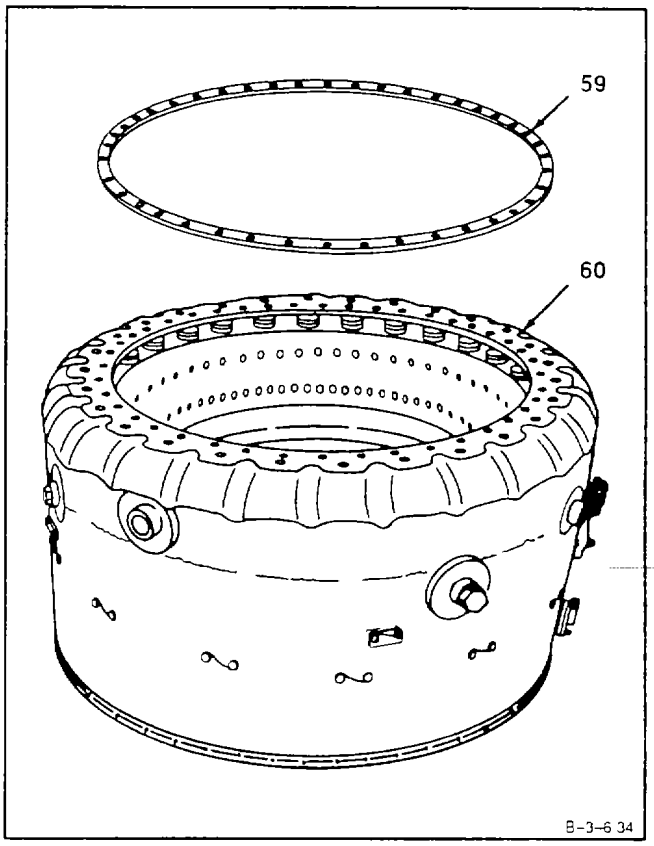
3-6 DISASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-6

41. **Remove shim (59)** from combustor assembly (60)
42. Using outside micrometer, measure thickness of shim (59) Record dimension If clearance between second turbine disc assembly and third turbine nozzle (Ref Task 3-5, step 33) was not within limits, adjust thickness of shim (59)

NOTE

Maximum total shim thickness is 0.045 inch.



FOLLOW-ON MAINTENANCE
None

END OF TASK

3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) 3-7

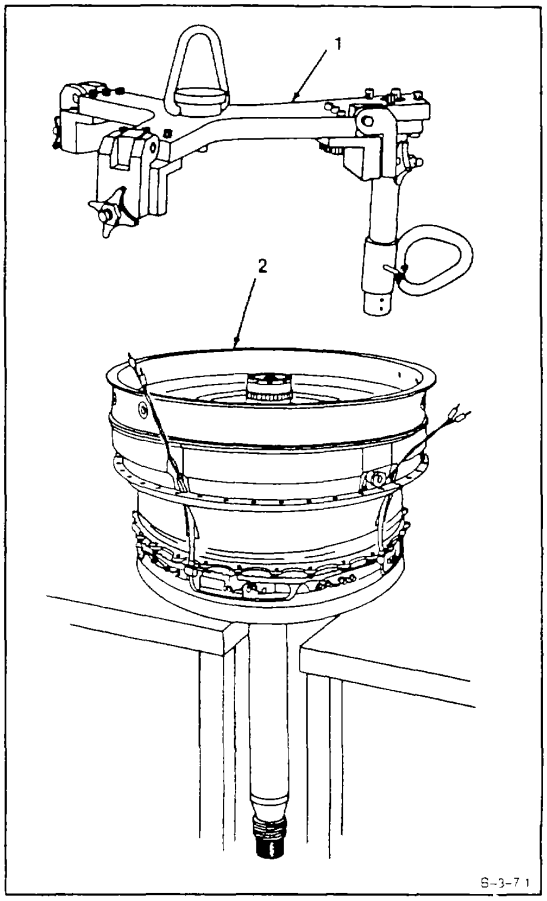
INITIAL SETUP

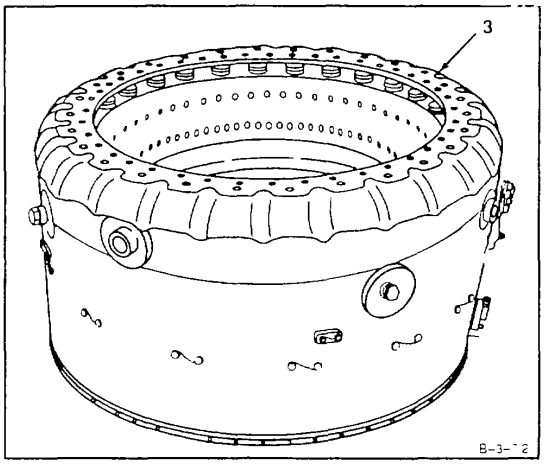
Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tools
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Group Aircraft Cover (T39)
Clamp Coupling Half (T49)
Open-End Wrench (T24)
Power Turbine Fixture (T28)
Torque Wrench, 30-150 Inch-Pounds
Crowfoot Attachment, 7/8-Inch
Hoist
Materials
Anti-Seize Compound (E6)
Kit, Lockwire (E32)
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
References:
Task 4-11
Task 4-15
Task 4-19
Task 6-19

GO TO NEXT PAGE

3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

1. **Install power turbine fixture** (T28) (1) on power turbine assembly (2)
2. Place combustor assembly (3) on two tables placed approximately 6 inches apart.





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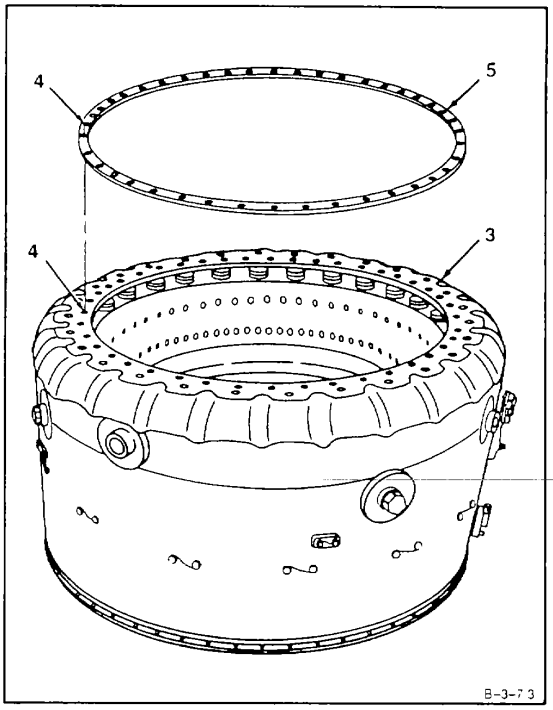
CAUTION

Maximum total thickness of shims in following step shall be 0.045 inch. Failure to comply will not allow proper engagement of mounting bolts. Damage to engine will result

3. Align bolt holes (4) and **install shim (5)** on combustor assembly (3).



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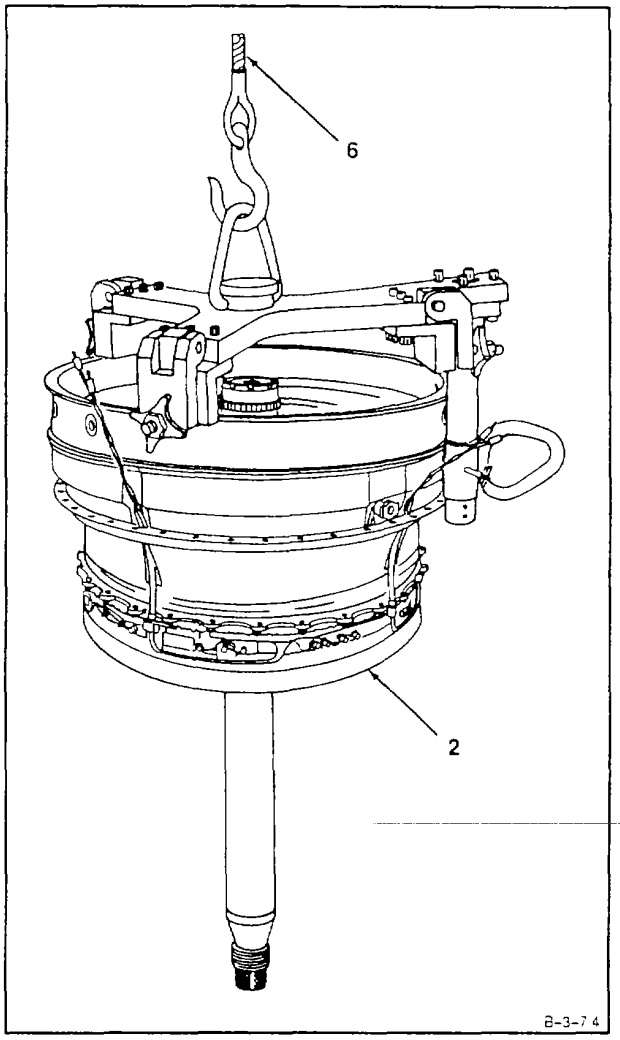
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

4. Using hoist (6) lift power turbine assembly (2).



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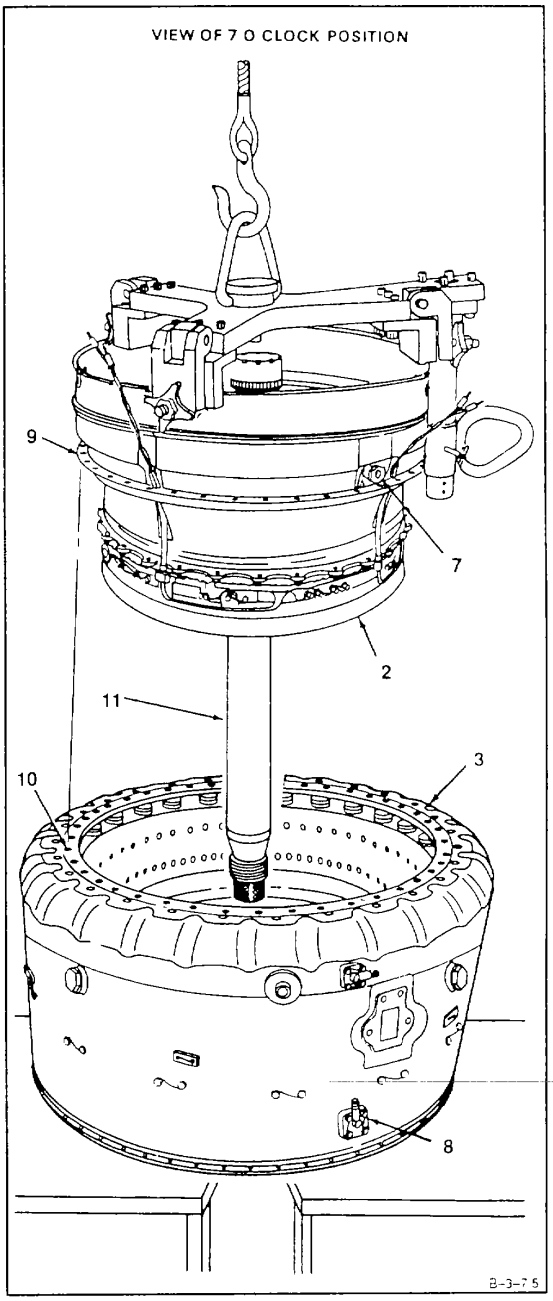
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

5. Position power turbine assembly (2) over combustor assembly (3)

6. Align lube scavenge adapter (7) with fuel drain valve (8) and bolt holes (9) with bolt holes (10)

7. Using helper, **install power turbine assembly (2) onto combustor assembly (3)** with shaft (11) going between two tables.



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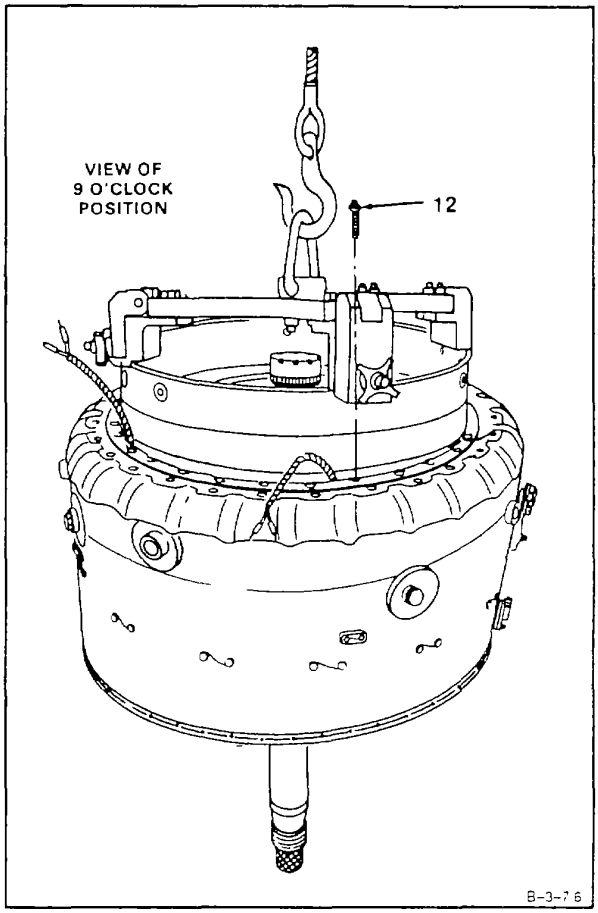
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

8. Apply anti-seize compound (E6) to 42 bolts (12). Install 42 bolts (12) **Torque 42 bolts (12) to <u>80 inch-pounds.</u>** Lockwire bolts (12) Use lockwire (E29).



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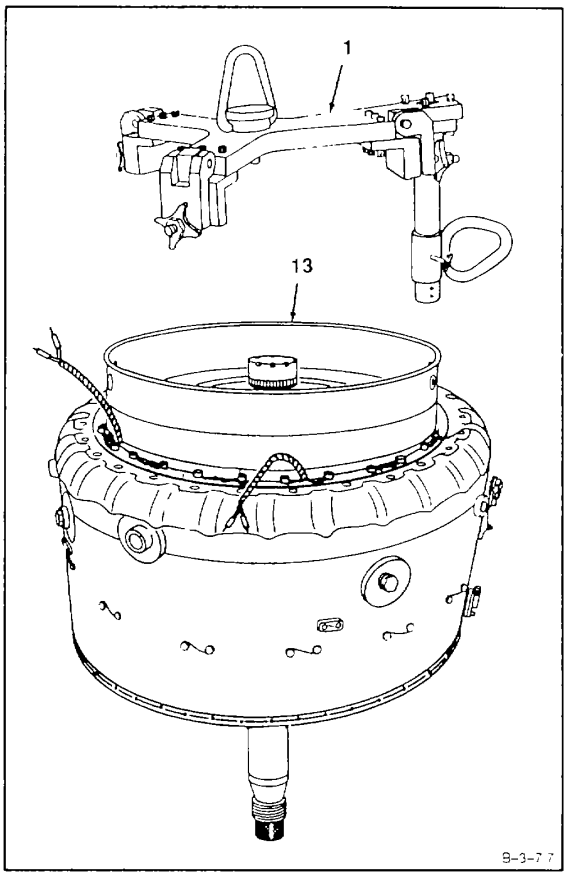
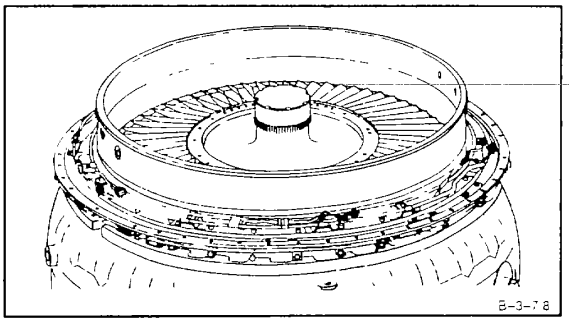
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

9. Remove power turbine fixture (T28) (1) from combustion section and power turbine (13)



10. **Install fireshield section** (Ref Task 4-19)

11. **Install left- and right-hand fuel manifold assemblies** (Ref Task 6-19)
12. **Install fireshield assembly** (Ref Task 4-15)
13. **Install left- and right-hand bus bar assemblies** (Ref Task 4-11)



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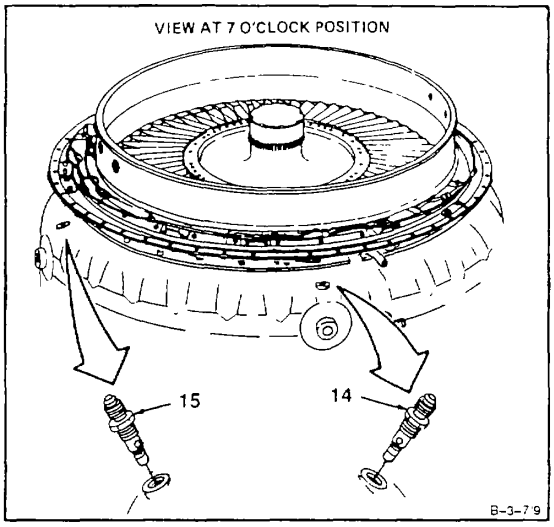
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

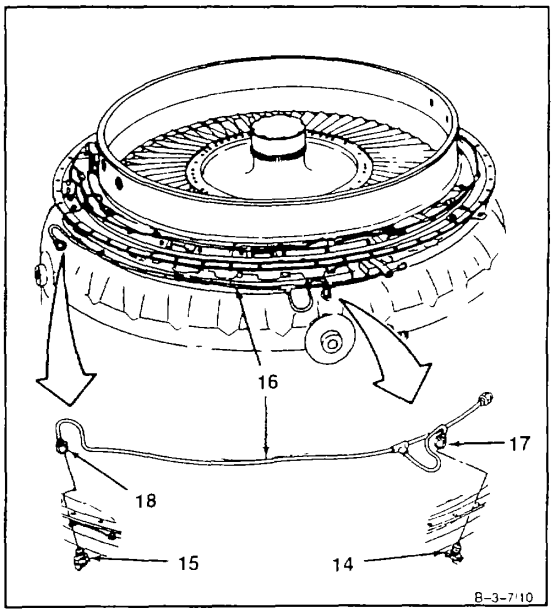
CAUTION

Hand-tighten start fuel nozzles before torquing. Failure to comply may cause damage to fuel nozzles or combustor chamber liner.

14. Apply anti-seize compound (E6) to threads of start fuel nozzles (14 and 15) Install start fuel nozzles (14 and 15).



15. **Connect primer tube assembly (16)** to start fuel nozzles (14 and 15)
16. Using two wrenches, hold start fuel nozzle (14) and tighten swivel nut (17)
17. Using two wrenches, hold start fuel nozzle (15) and tighten swivel nut (18).



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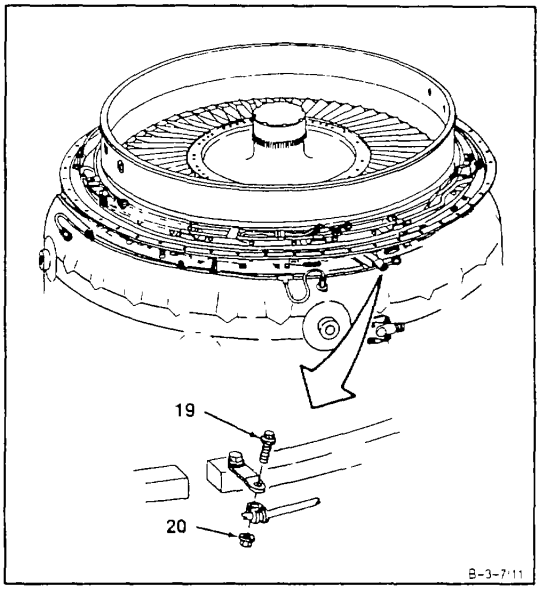
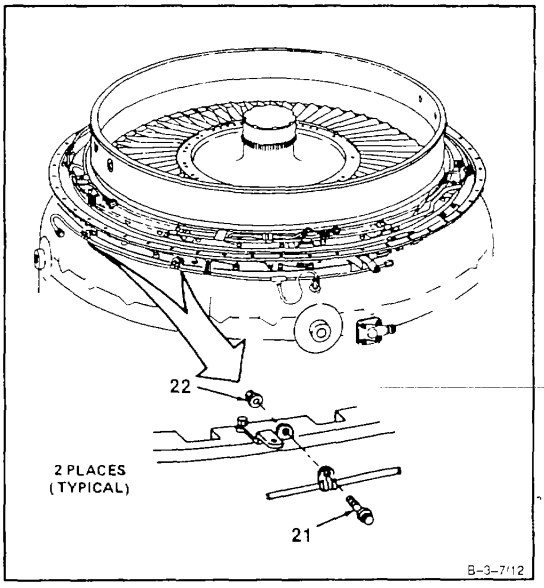
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

18. Install bolt (19) and nut (20).



19. Install two bolts (21) and two nuts (22).



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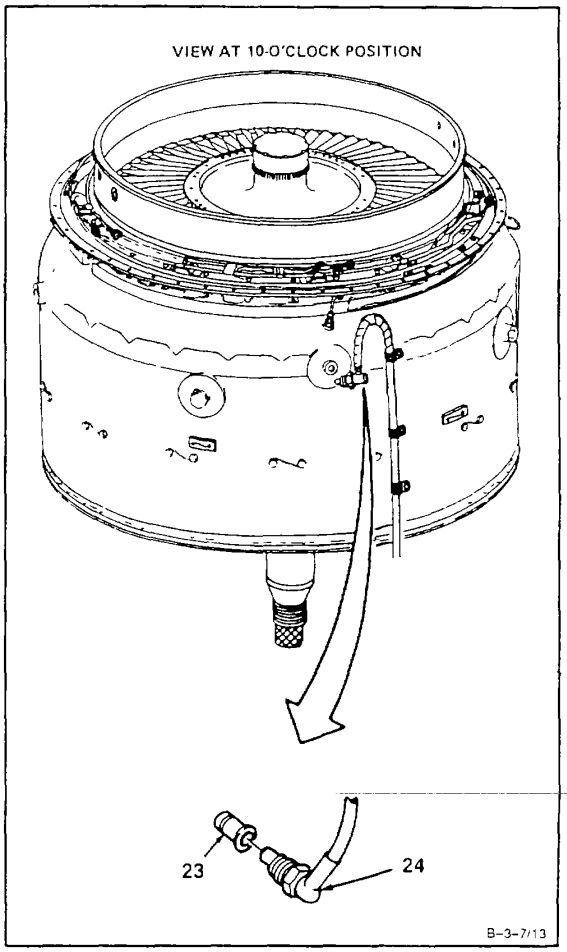
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

20. **Install spark igniter (23)** on ignition coil and cable assembly lead (24).



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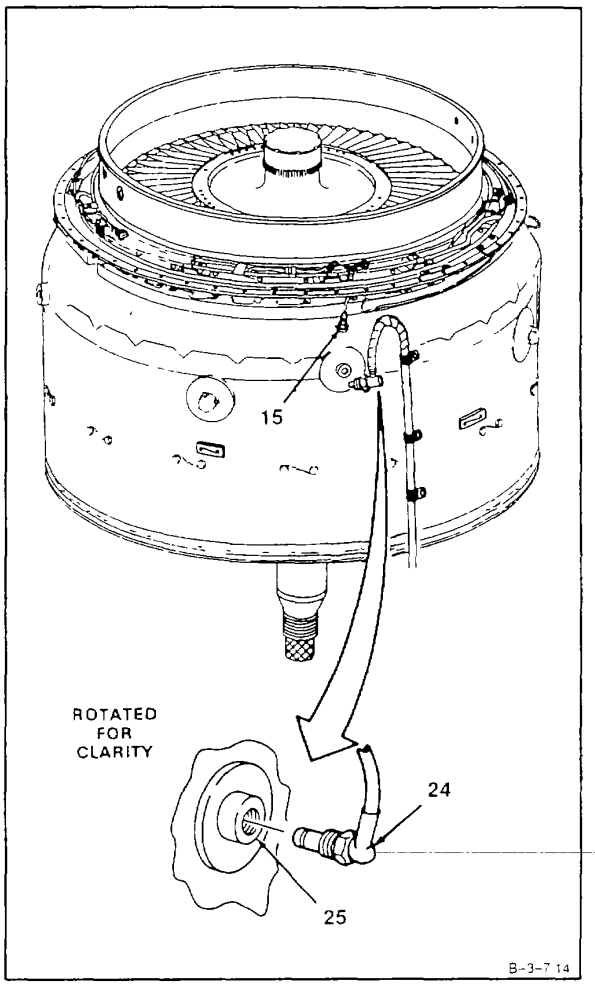
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

21. Apply anti-seize compound (E6) to threads of ignition coil and cable assembly lead (24). **Connect ignition coil and cable assembly lead (24)** to receptacle (25). **Torque ignition coil and cable assembly lead (24) to 135 inch-pounds** Use crowfoot attachment

22. Lockwire ignition coil and cable assembly lead (24) to start fuel nozzle (15) Use lockwire (E32)



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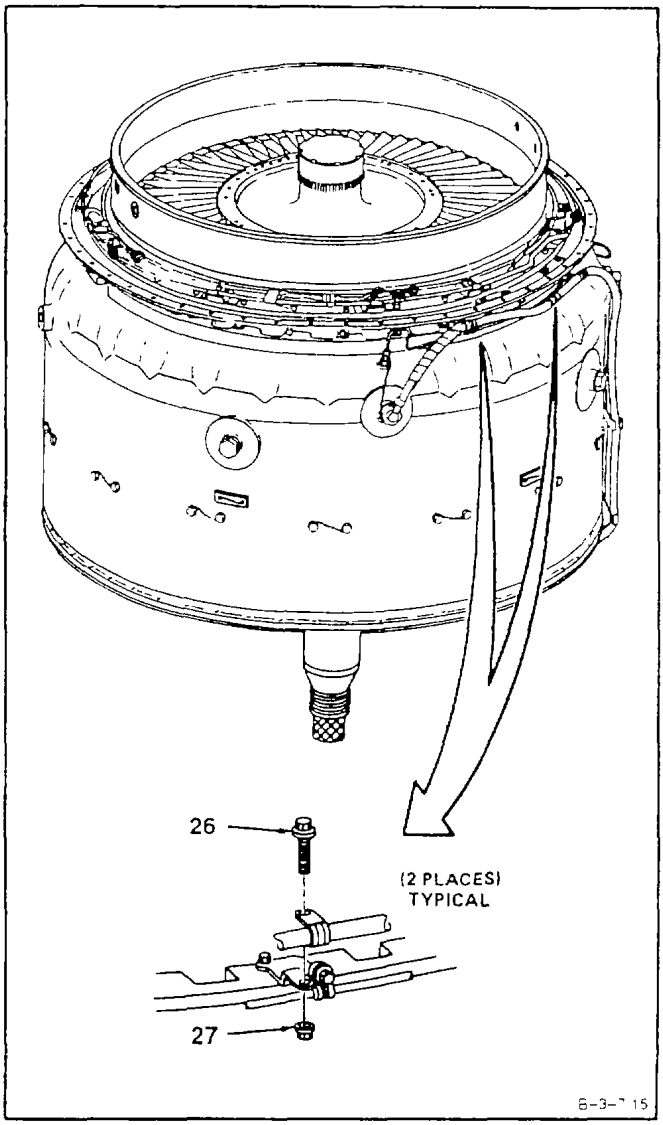
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

23. Install two bolts (26) and two nuts (27).



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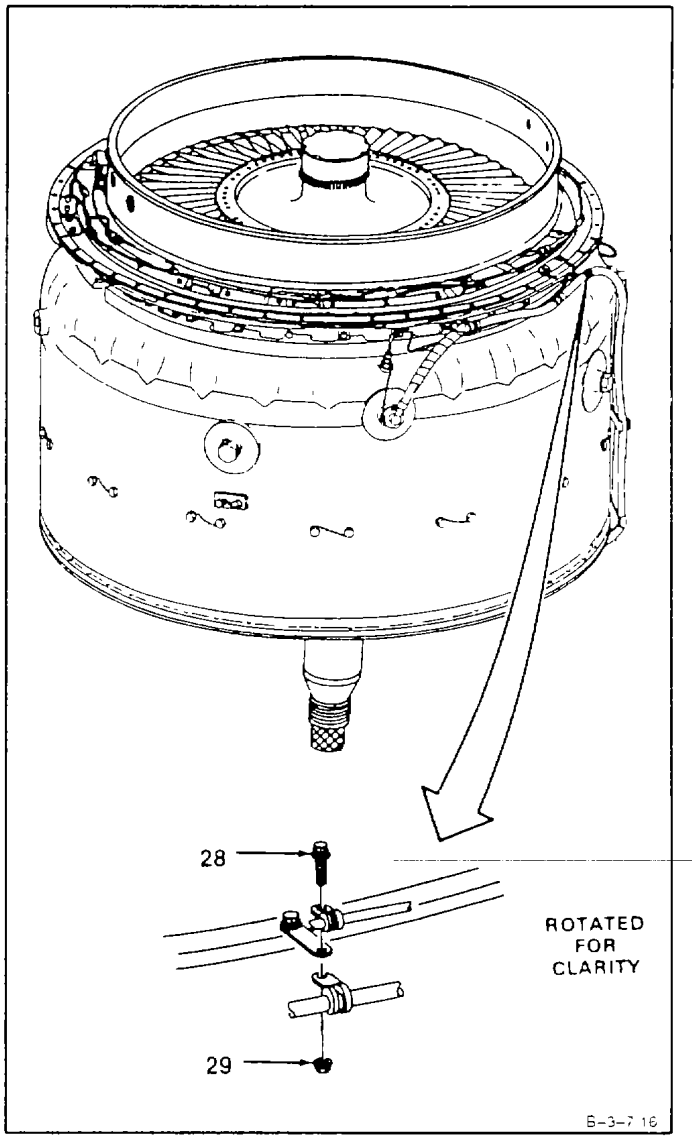
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

24. Install bolt (28) and nut (29).



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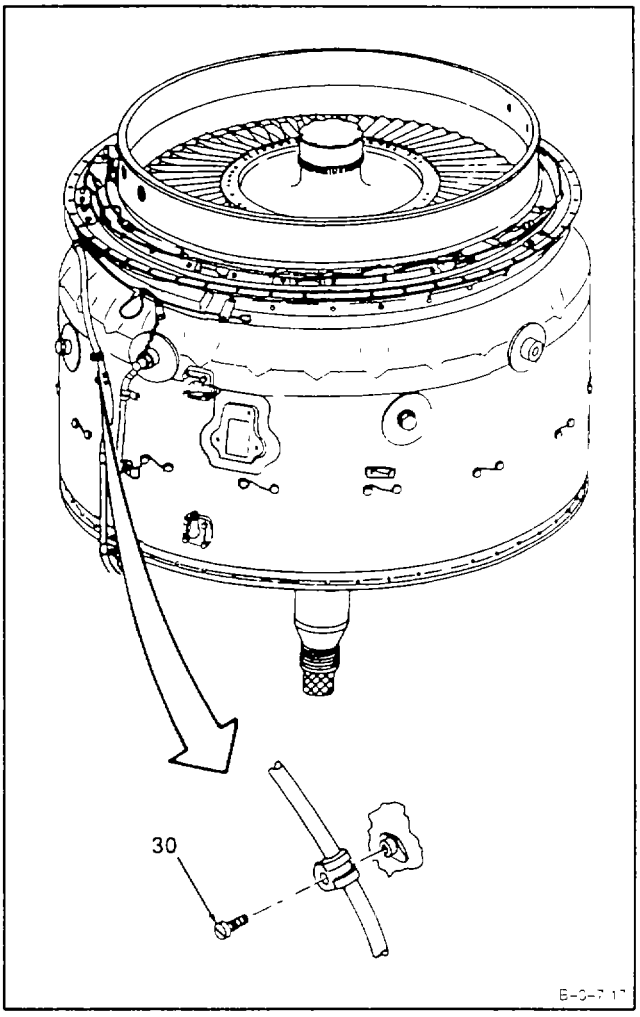
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

25. Install screw (30) Lockwire screw (30) Use lockwire (E32).



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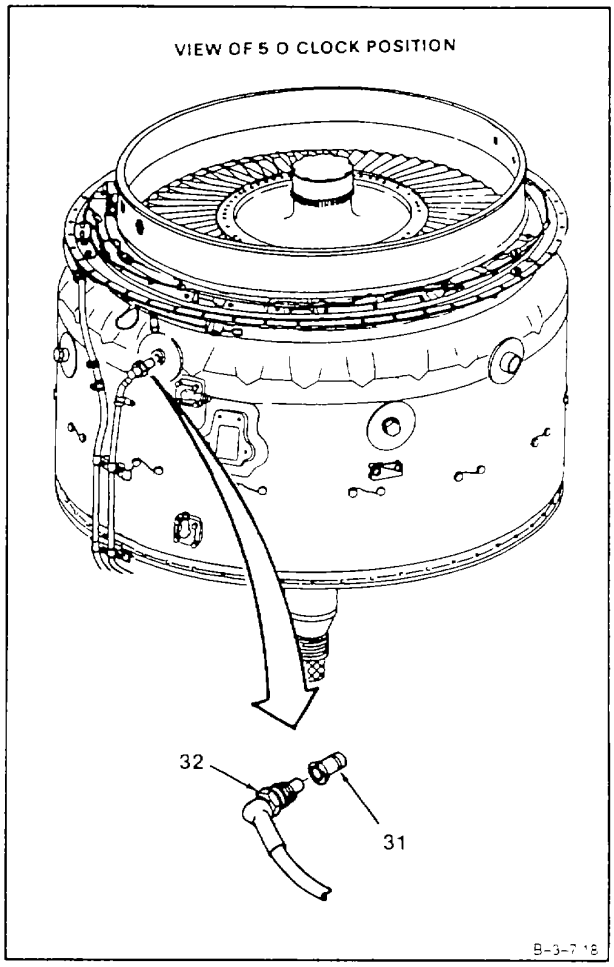
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

26. **Install spark igniter (31)** on ignition coil and cable assembly lead (32).



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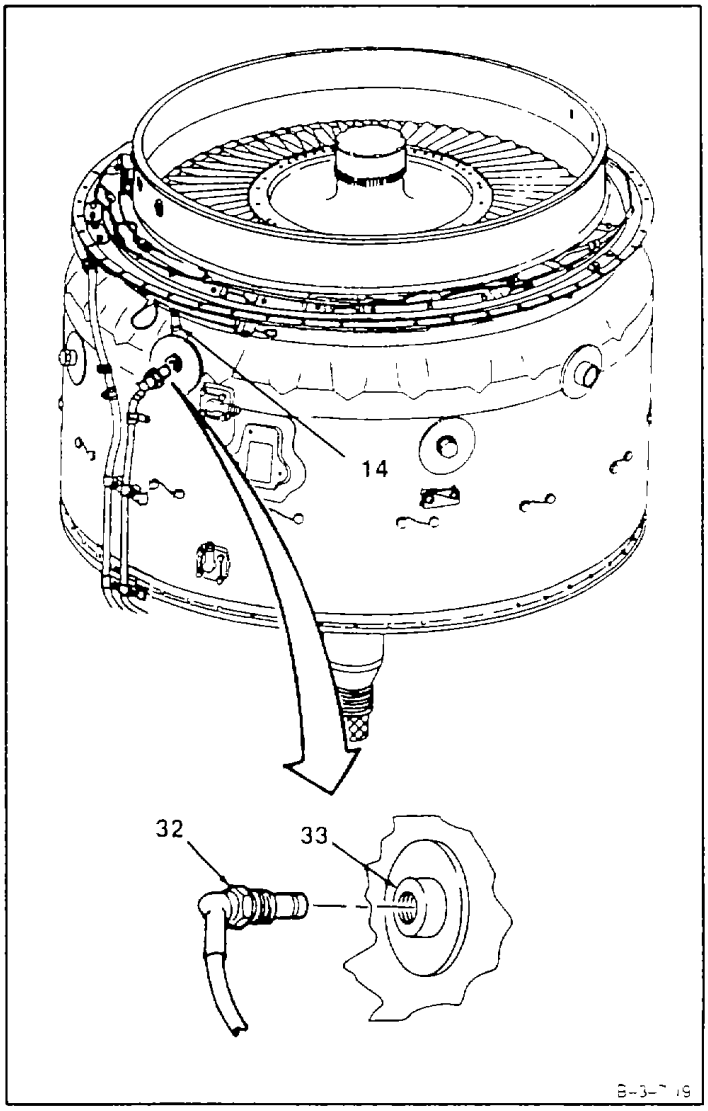
3-7 ASSEMBLE COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-7

27. Apply anti-seize compound (E6) to threads of ignition coil and cable assembly lead (32). **Connect ignition coil and cable assembly lead (32)** to receptacle (33). **Torque ignition coil and cable assembly lead (32) to 135 inch-pounds.** Use crowfoot attachment.

28. Lockwire ignition coil and cable assembly lead (32) to start fuel nozzle (14) Use lockwire (E32).



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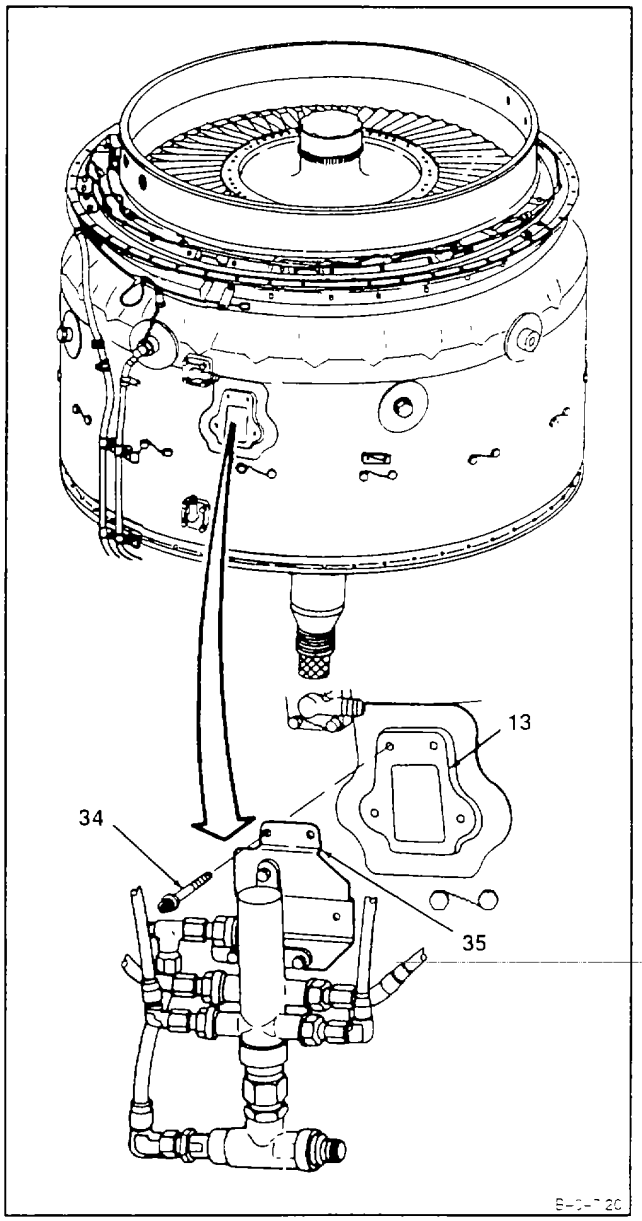
29. Apply anti-seize compound (E5) to threads of four bolts (34). **Install flow divider and bracket (35)** and four bolts (34) on combustion section and power turbine (13). Lockwire bolts (34) Use lockwire (E29).



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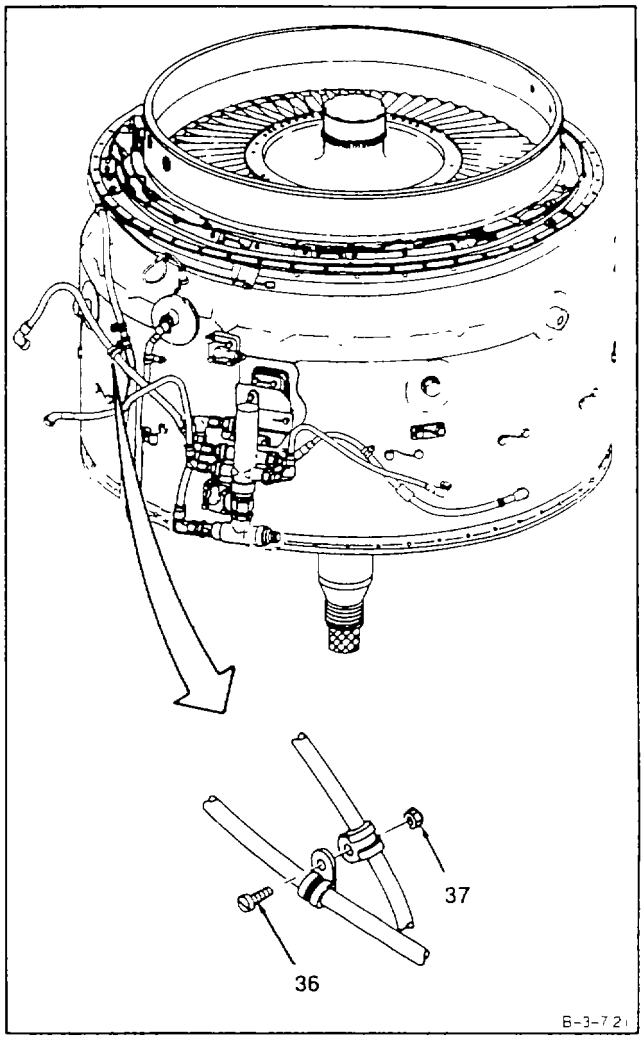
30. Install screw (36) and nut (37).



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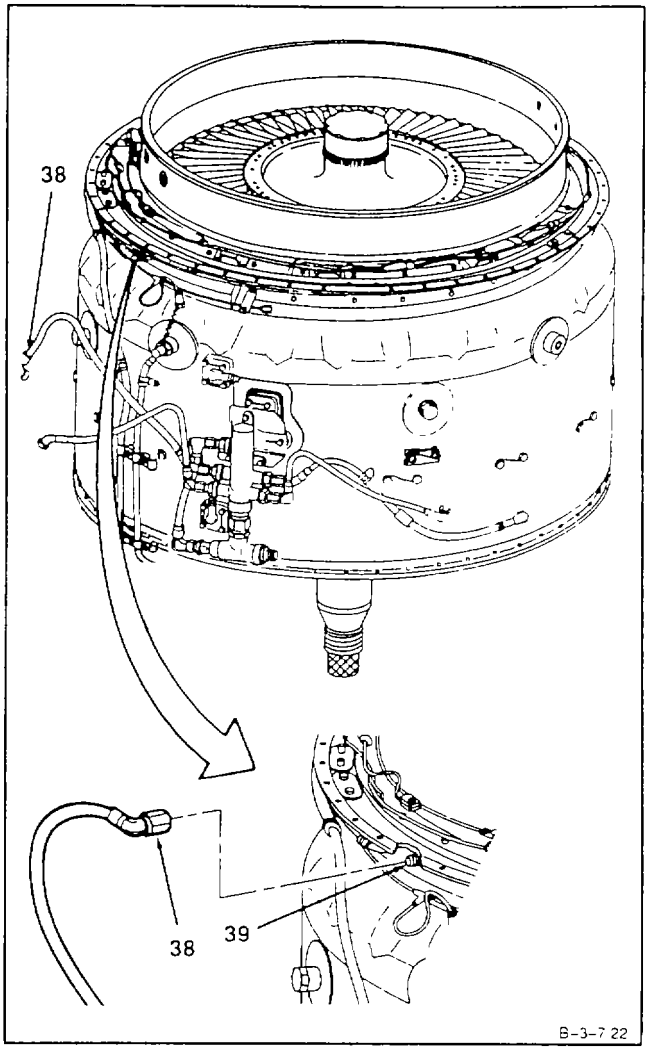
31. **Connect hose assembly (38)** to elbow (39).



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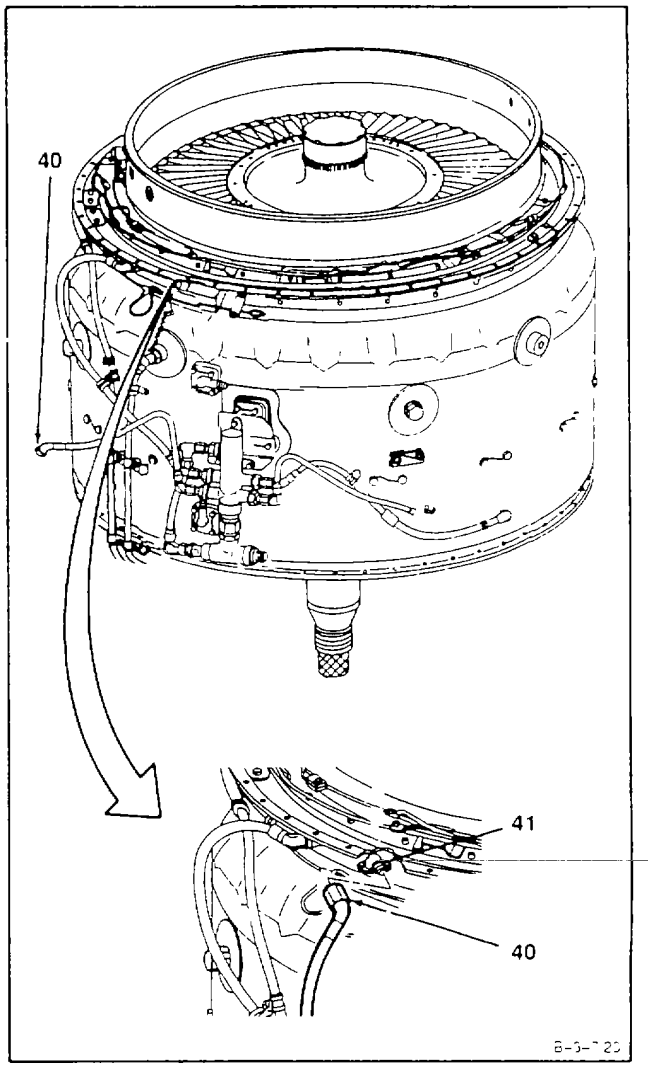
32. **Connect hose assembly (40)** to elbow (41).



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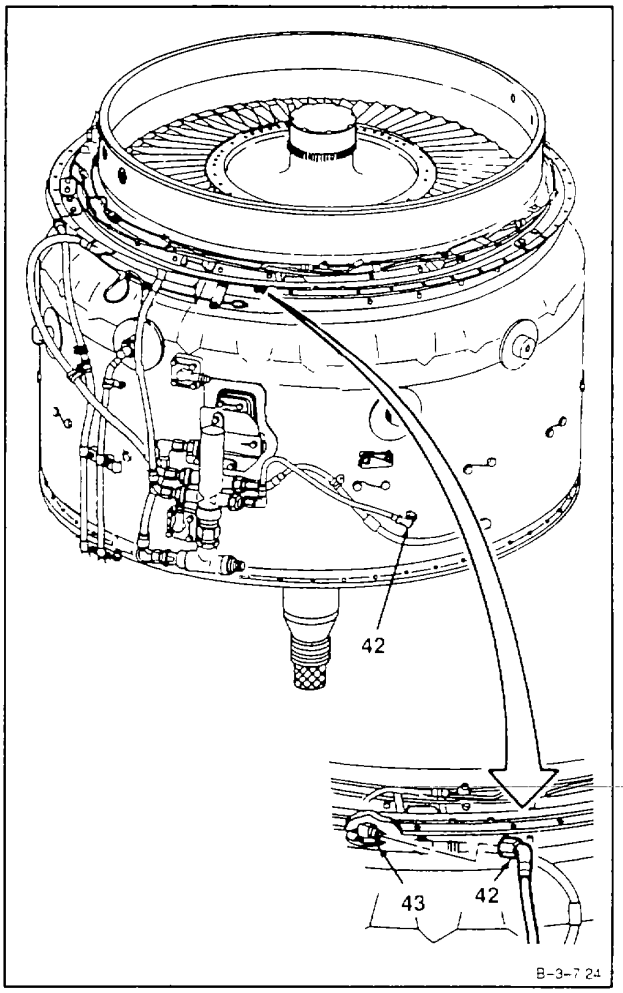
33. **Connect hose assembly (42)** to elbow (43).



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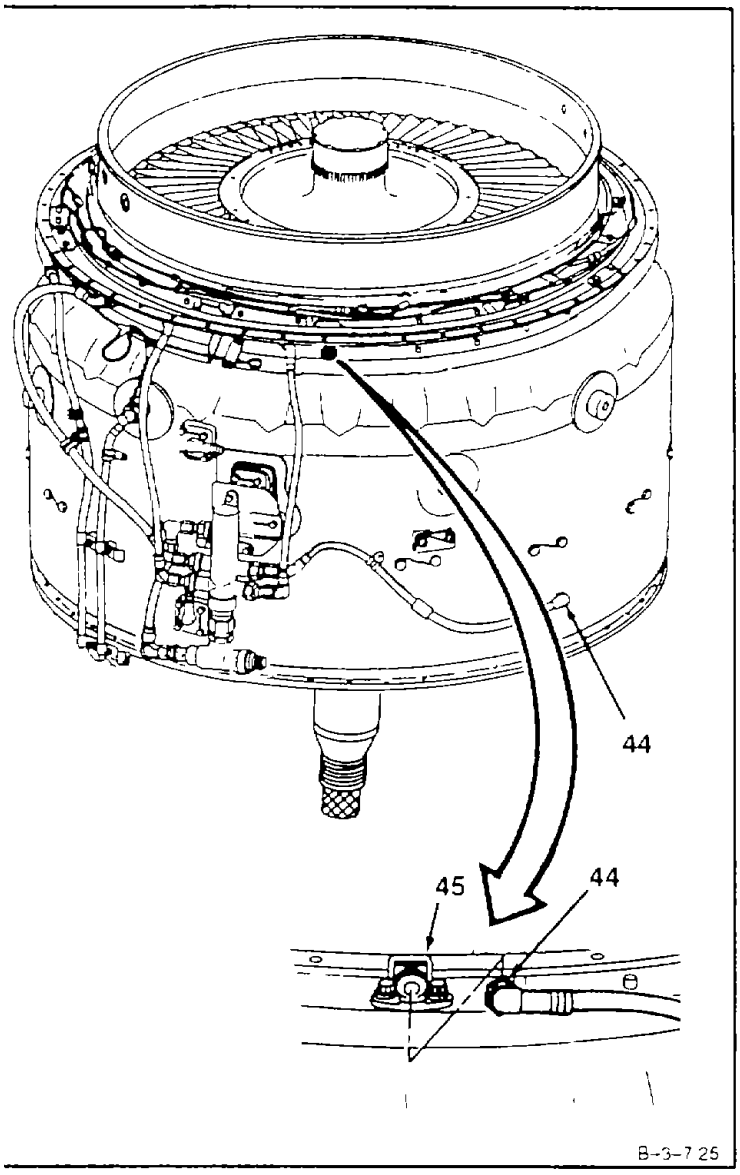
34. **Connect hose assembly (44)** to elbow (45).



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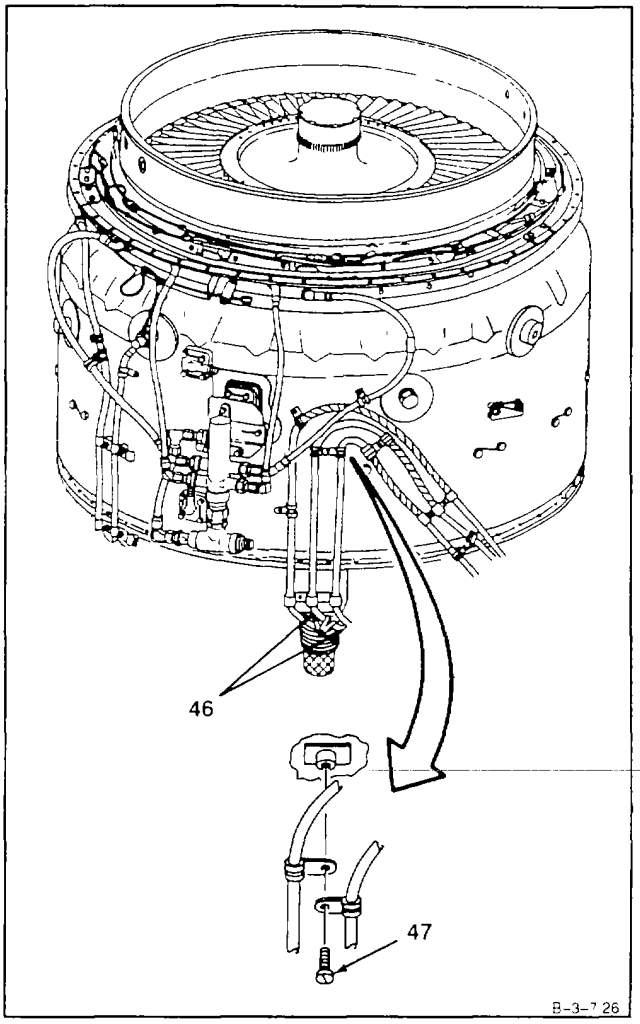
35. Route ignition coil and cable assembly (46) as shown, and install screw (47). Lockwire screw (47) Use lockwire (E32).



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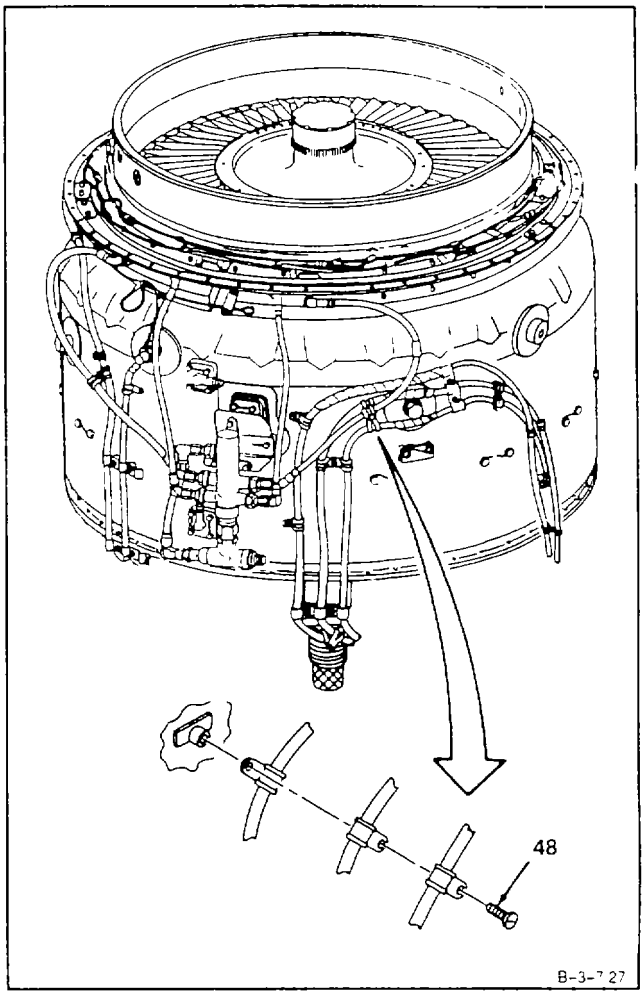
36. Install screw (48) Lockwire screw (48). Use lockwire (E32).



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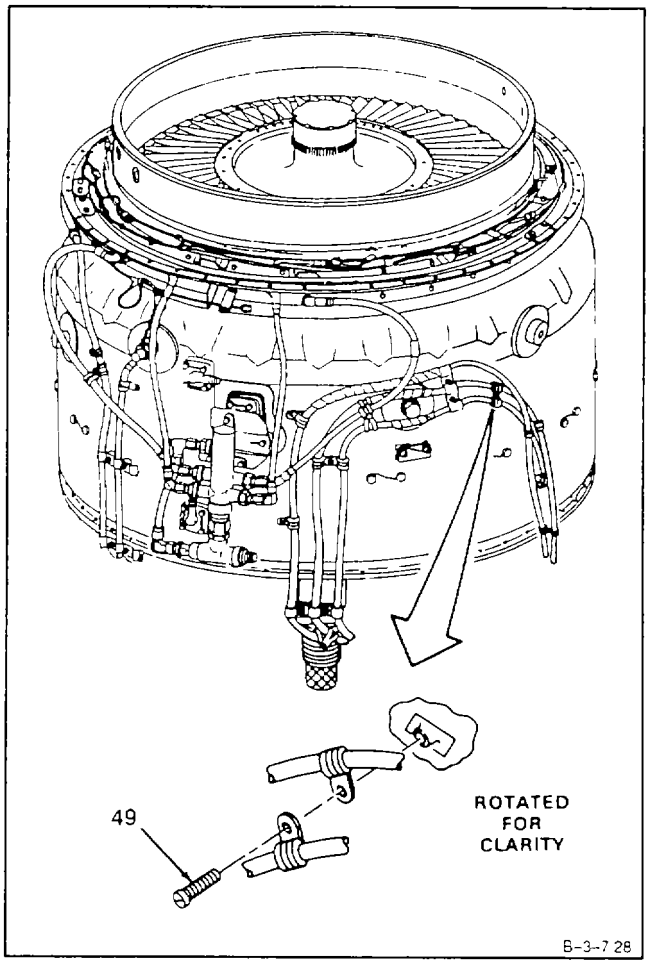
37. Install screw (49) Lockwire screw (49). Use lockwire (E32).



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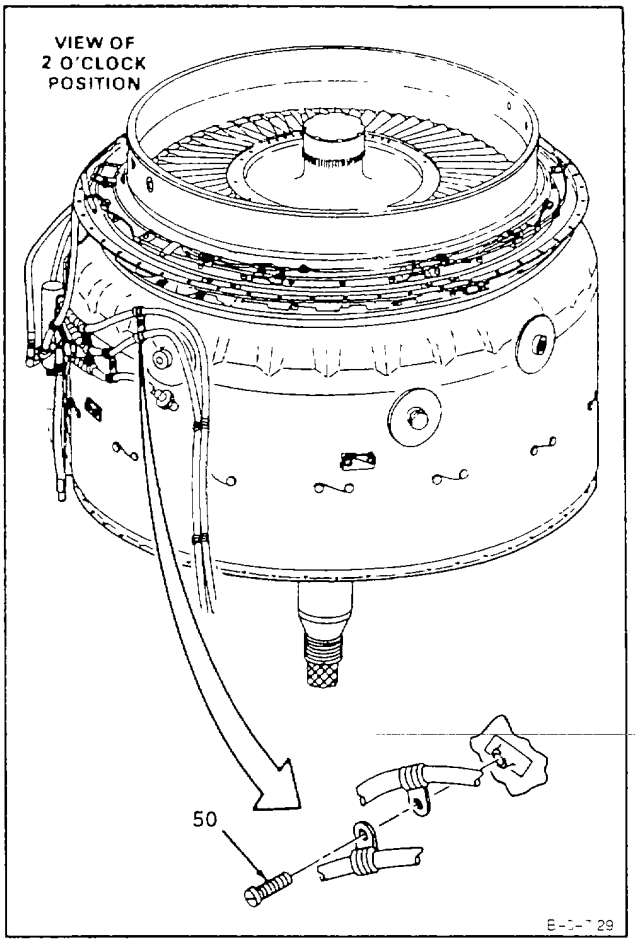
38. Install screw (50) Lockwire screw (50). Use lockwire (E32).



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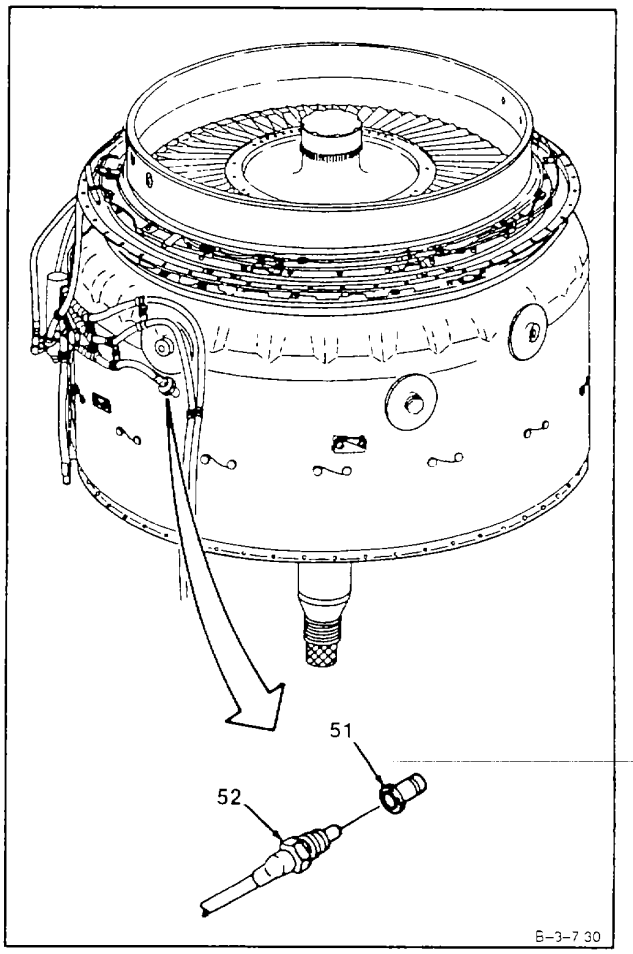
39. Install spark igniter (51) on ignition coil and cable assembly lead (52).



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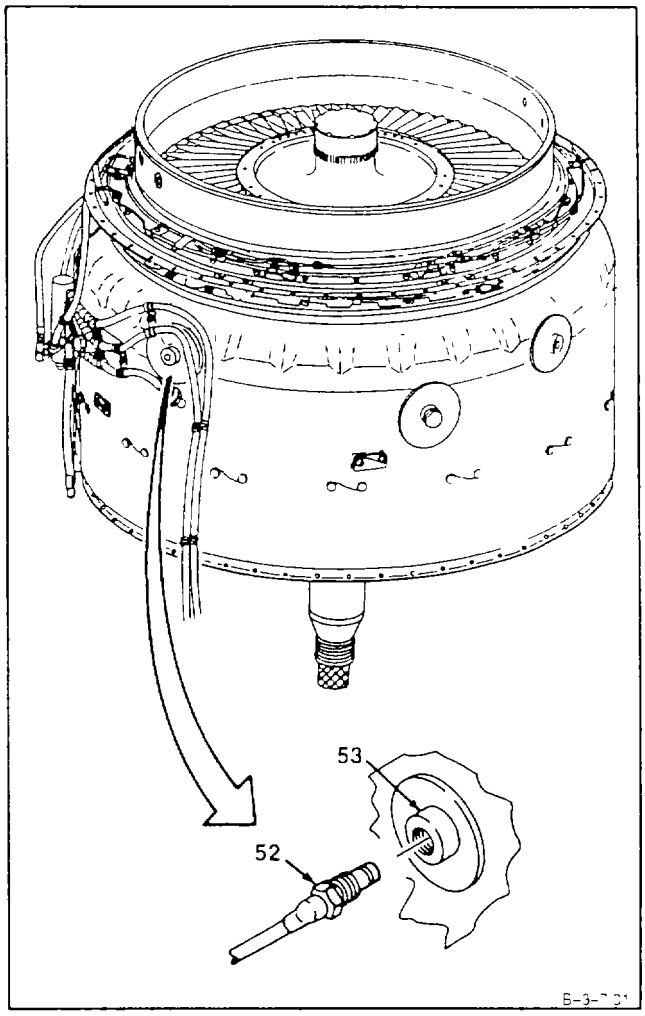
40. Apply anti-seize compound (E6) to threads of ignition coil and cable assembly lead (52) **Connect ignition coil and cable assembly lead (52)** to receptacle (53) **Torque ignition coil and cable assembly lead (60) to 135 inch-pounds** Use crowfoot attachment.

41. Lockwire ignition coil and cable assembly lead (52) Use lockwire (E32).



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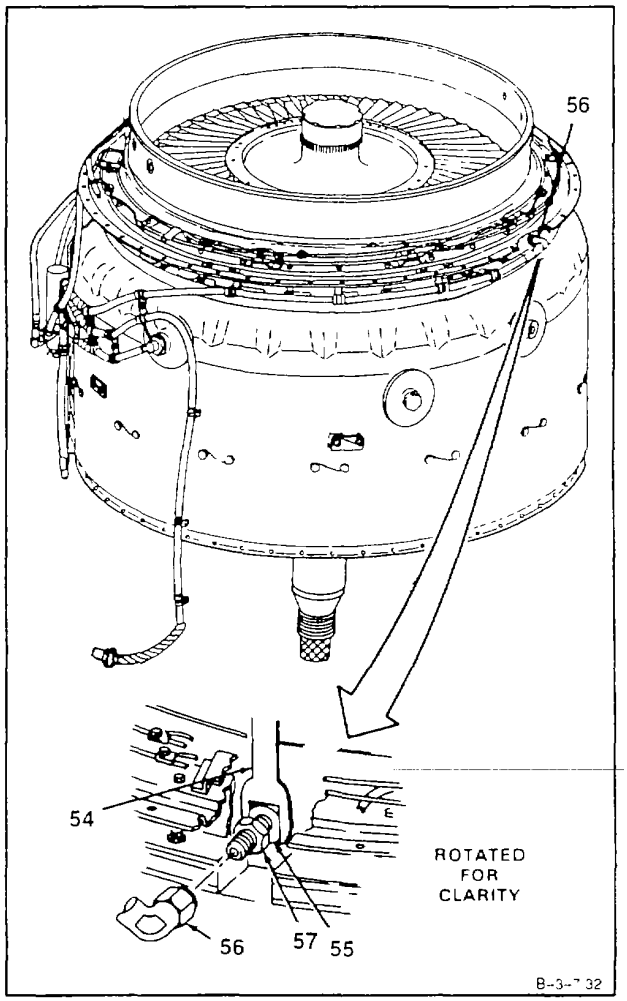
CAUTION

In following step, hold No 4 and 5 bearing lube adapter using open-end wrench (T24) Failure to use wrench may result in damage and mislocation of oil transfer tube resulting in oil leaks.

42. Place open-end wrench (T24) (54) on No 4 and 5 bearing lube adapter (55).

43. **Connect hose assembly (56)** to reducer (57).



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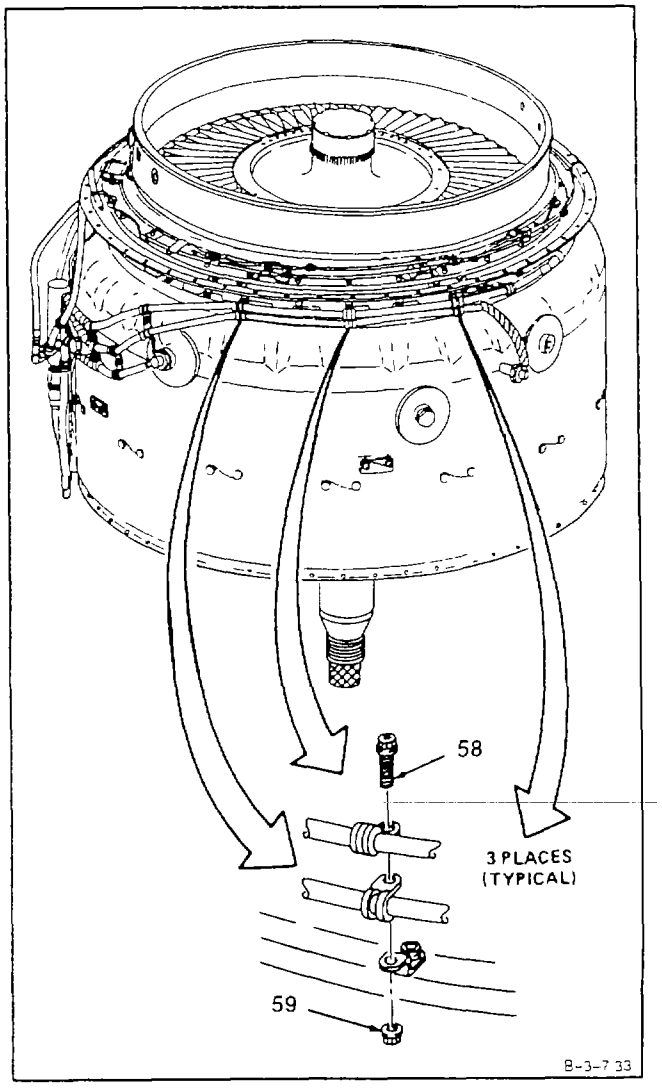
44. Install three bolts (58) and three nuts (59).



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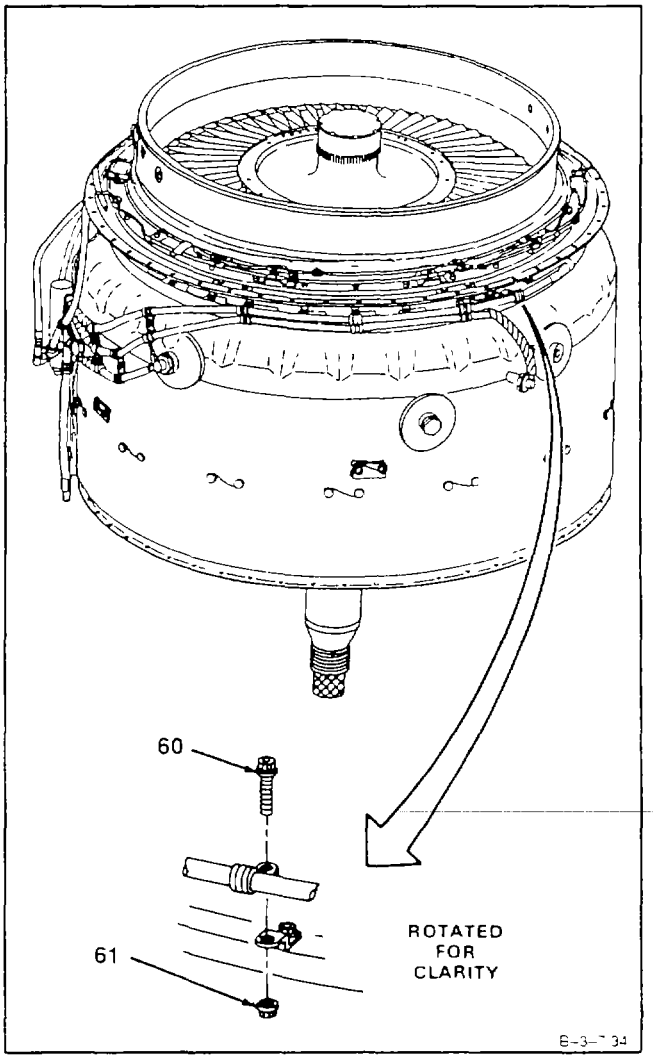
45. Install bolt (60) and nut (61).



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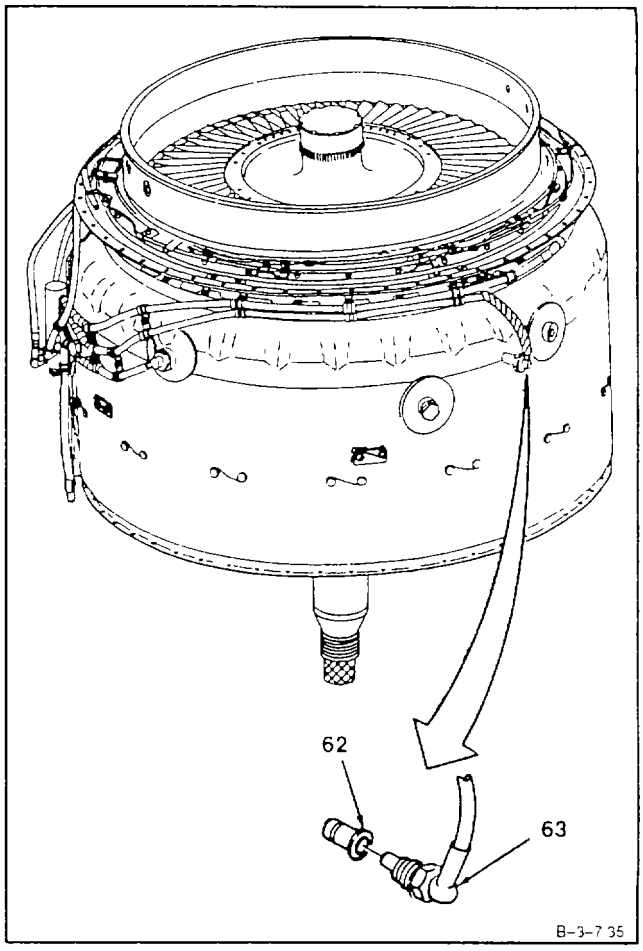
46. **Install spark igniter (62)** on ignition coil and cable assembly lead (63).



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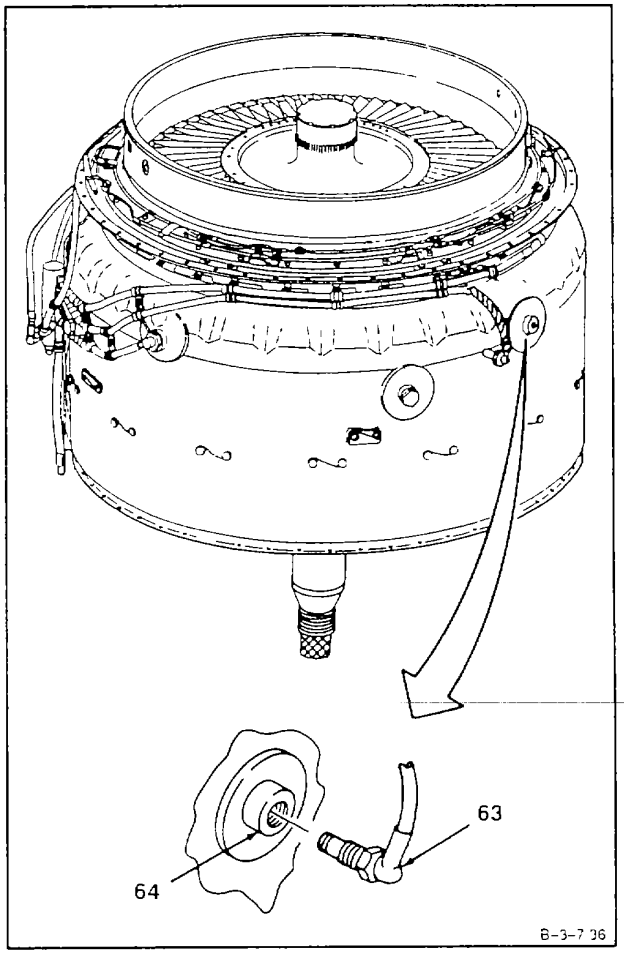
47. Apply anti-seize compound (E6) to threads of ignition coil and cable assembly lead (63**) Connect ignition coil and cable assembly lead (63)** to receptacle (64). **Torque ignition coil and cable assembly lead (63) to 135 inch-pounds**

48. Lockwire ignition coil and cable assembly (63) Use lockwire (E32).



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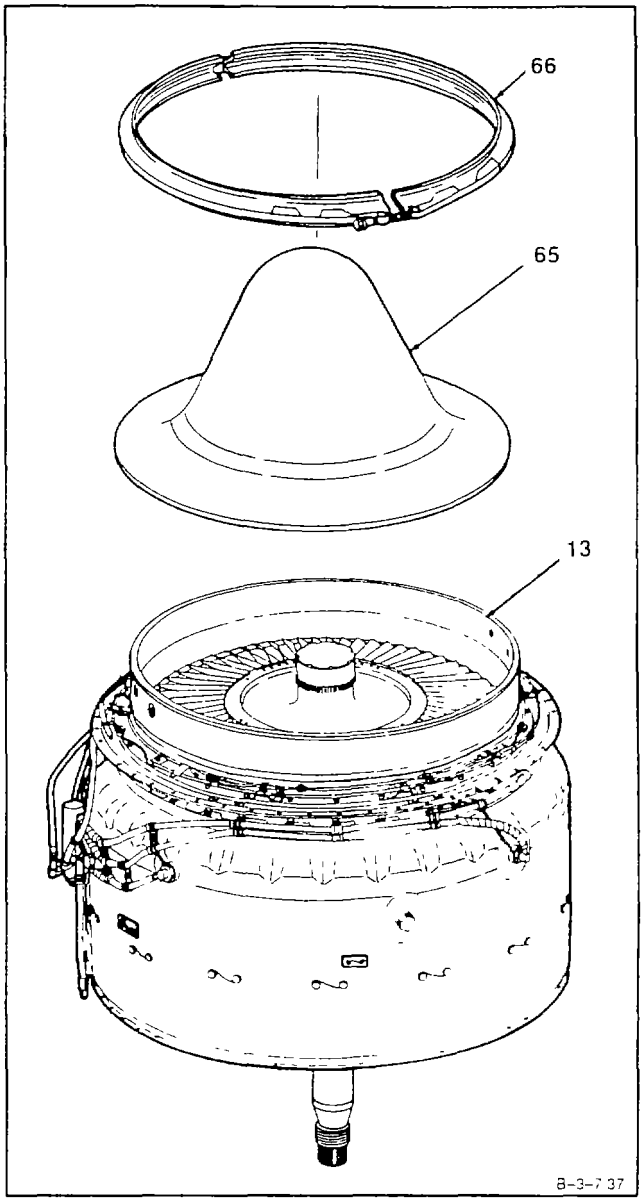
49. Install group aircraft cover (T39) (65) and secure to combustion section and power turbine (13) with clamp coupling half (T49) (66).



INSPECT

FOLLOW-ON MAINTENANCE
Install Thermocouple Jumper Lead (Task 4-6)

END OF TASK

3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) 3-8

INITIAL SETUP

Applicable Configurations:
All

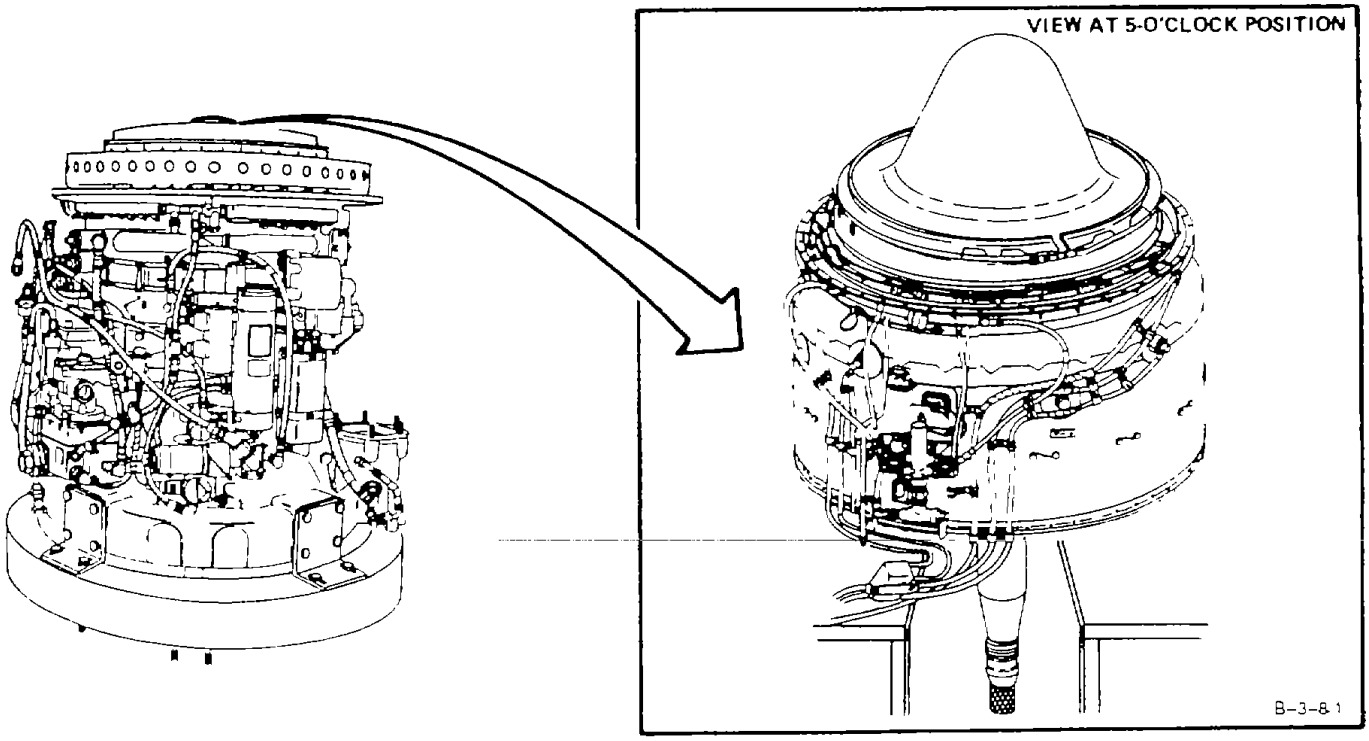
Tools:
Powerplant Mechanic s Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit
NSN 5180-00-323-5114
Locating Bar (T33)
Group Aircraft Cover (T39)
Clamp Coupling Half (T49)
Open-End Wrench (T24)
Power Turbine Fixture (T28)
Torque Wrench 30-150 Inch-Pounds
Hoist

Materials
Lockwire (E32)

Parts
Key Washers

Personnel Required:
Aircraft Powerplant Repairer (2)
Aircraft Powerplant Inspector

References
TM 1-2840-252-23
Task 2-39
Task 2-43
Task 3-6
Task 3-7
Task 4-54
Task 4-57



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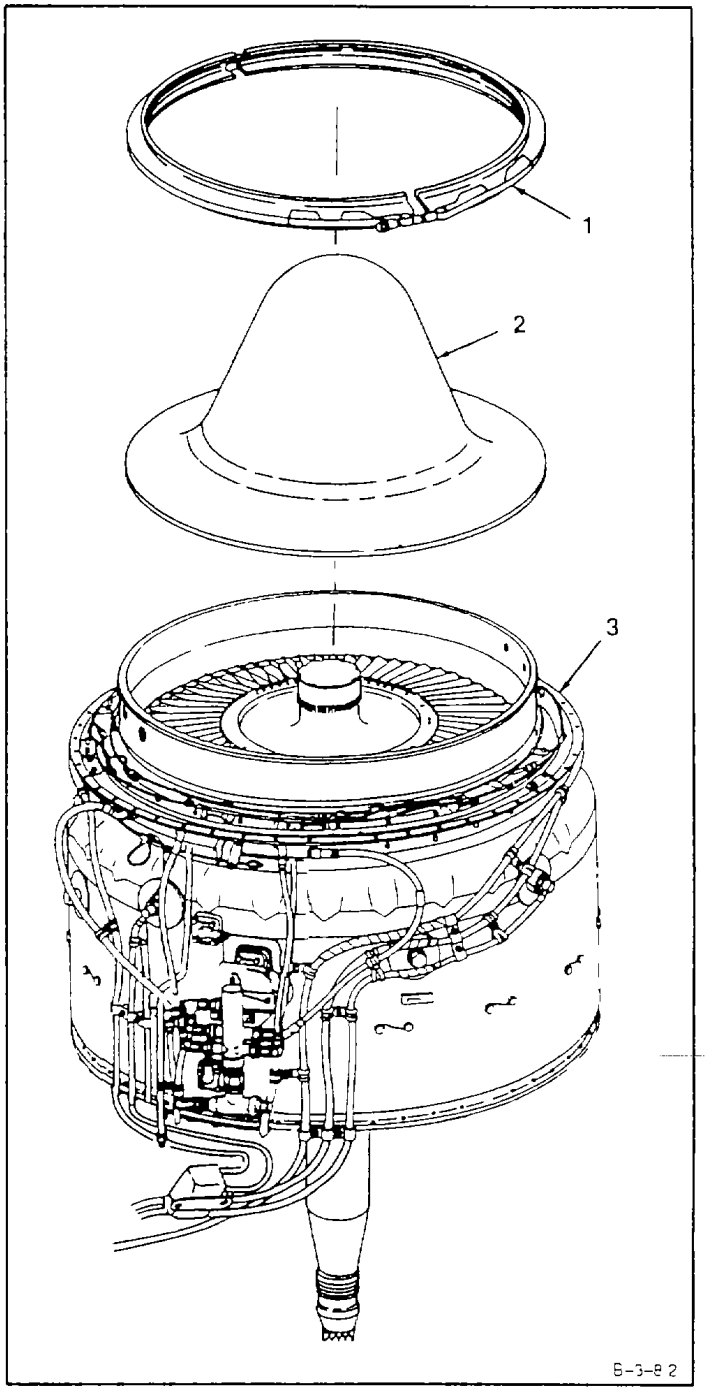
1. Remove clamp coupling half (T49) (1) and group aircraft cover (T39) (2) from combustion section and power turbine (3). Turn combustion section and power turbine over on table.



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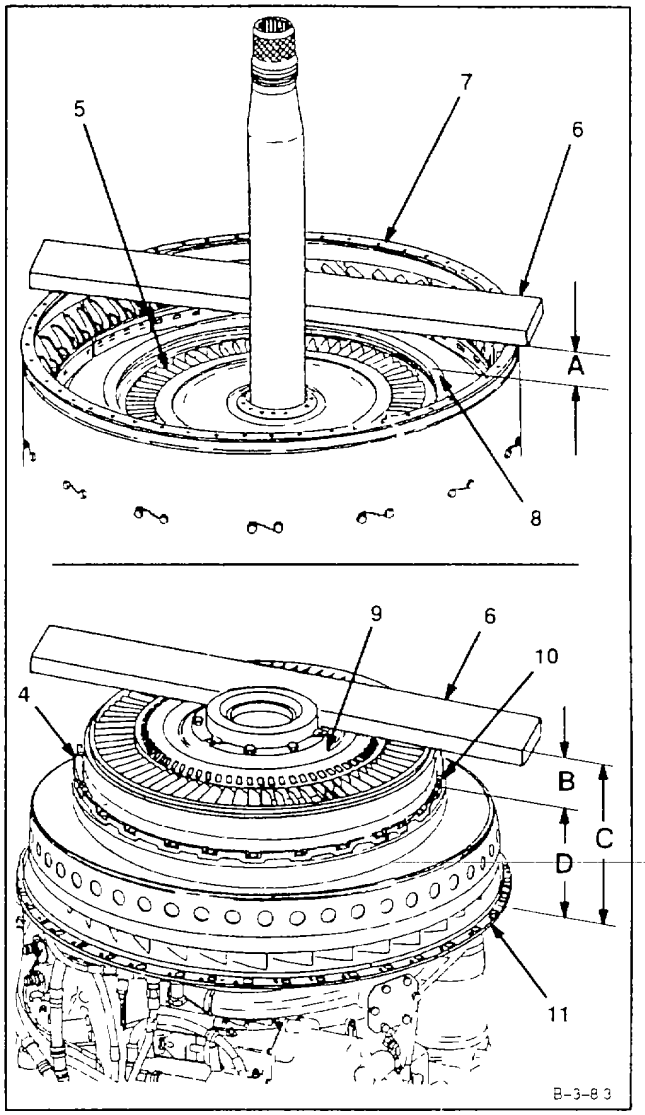
2. Calculate bumper fit between second turbine nozzle bumper (4) and third turbine nozzle (5) as follows:

a. Place locating bar (T33) (6) on combustion chamber mounting flange (7). Measure from top of locating bar (T33) (6) to third turbine nozzle outer support (8) Subtract thickness of locating bar (T33) (6). Record as dimension A.

b. Place locating bar (T33) (6) on second turbine disc assembly aft face (9). Measure from top of locating bar (T33) (6) to top of bumper (10). Record as dimension B. Measure from top of locating bar (T33) (6) to air diffuser outerflange (11) Record as dimension C. Subtract dimension B from dimension C. Record result as dimension D.

c. Subtract dimension D from dimension A Result is bumper fit. **Bumper fit shall be 0.040 inch loose to 0.040 inch tight.**

d. **If bumper fit cannot be met, replace power turbine combustor chamber shim** (Ref. Tasks 3-6 and 3-7).



INSPECT

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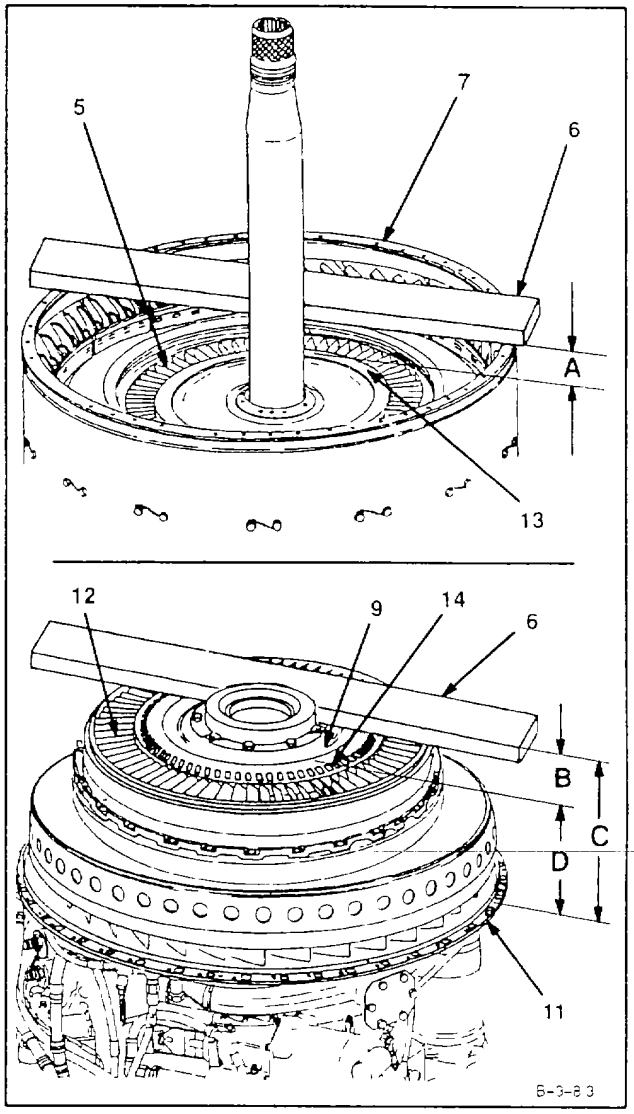
3. Calculate axial clearance between second turbine disc assembly (12) and third turbine nozzle (5) as follows

a. Place locating bar (T33) (6) on combustion chamber mounting flange (7). Measure from top of locating bar (T33) (6) to third turbine nozzle inner shroud (13). Subtract thickness of locating bar (T33) (6). Record as dimension A.

b. Place locating bar (T33) (6) on second turbine disc assembly aft face (9). Measure from top of locating bar (T33) (6) to outer aft face of disc next to blade platform (14). Record as dimension B Measure from top of locating bar (T33) (6) to air diffuser outer flange (11). Record as dimension C Subtract dimension B from dimension C. Record result as dimension D.

c. Subtract dimension D from dimension A Result is axial clearance. **Axial clearance shall be <u>0.066 inch</u> minimum.**

d. **If axial clearance cannot be met, replace power turbine combustor chamber shim** (Ref. Tasks 3-6 and 3-7).



INSPECT

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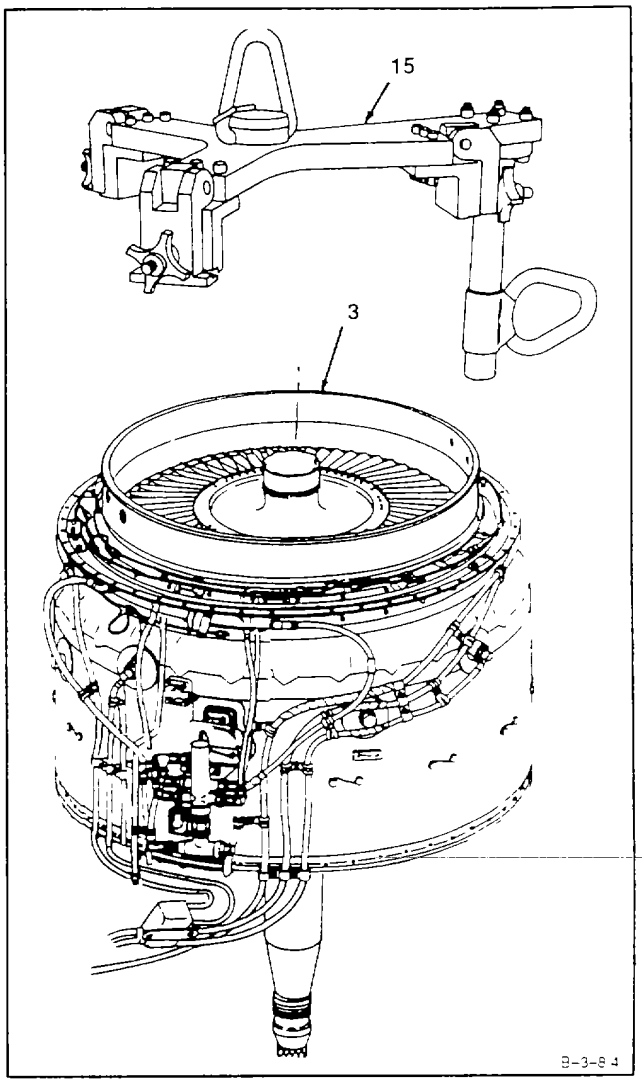
CAUTION

In following step, make certain that three clamping devices are securely attached to combustion section and power turbine. Failure to comply may result in damage to engine.

4. **Install power turbine fixture (T28) (15**) on combustion section and power turbine (3).



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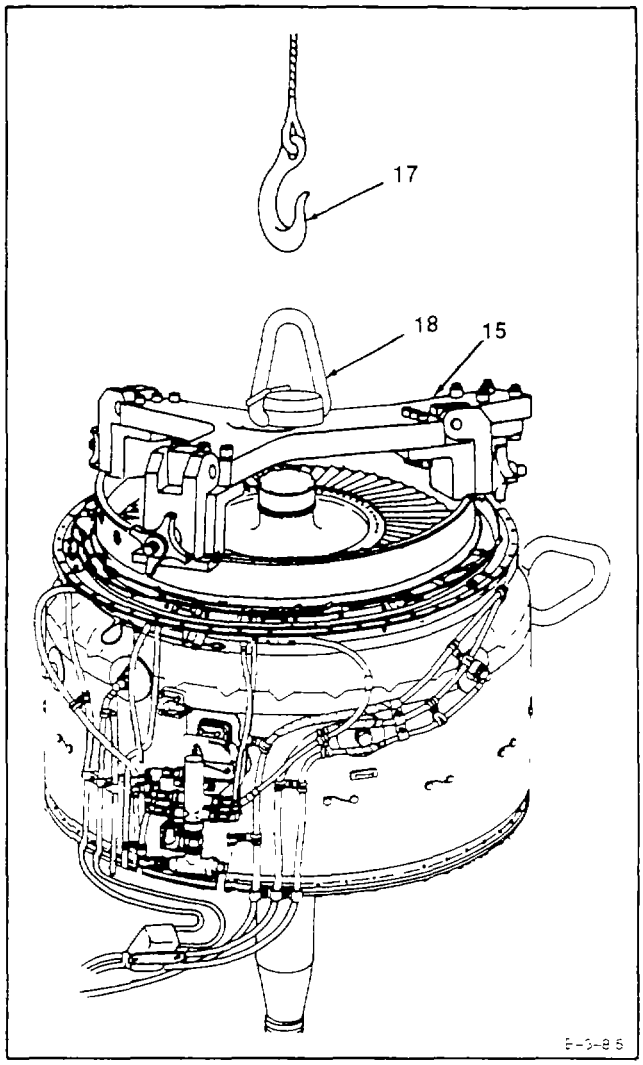
5. **Attach hoist hook (16)** to lifting eye (17) of power turbine fixture (T28) (15).



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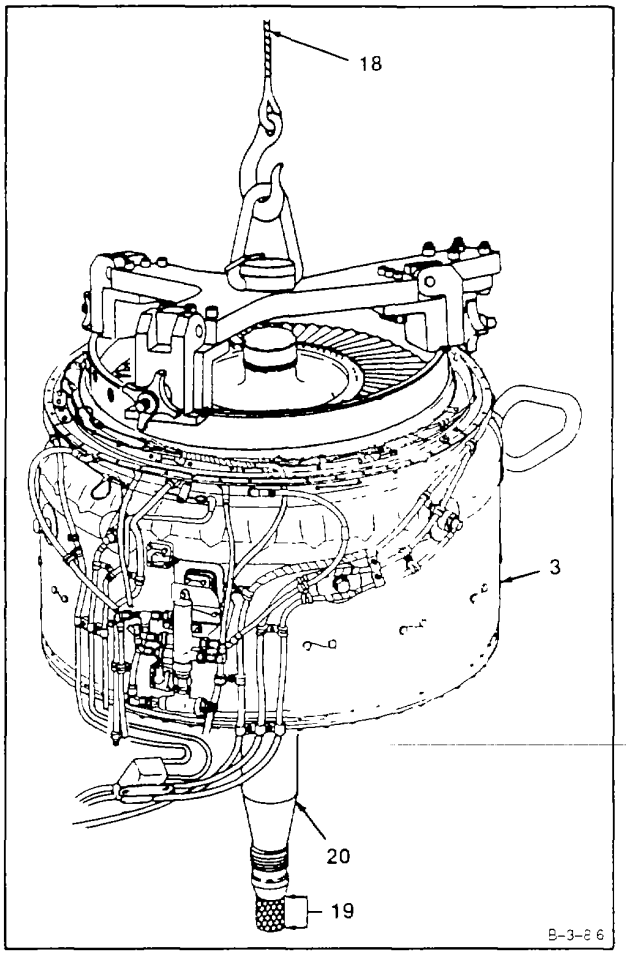
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

6. Using hoist (18) **lift combustion** section and **power turbine (3).**

7. **Remove vexar nylon webbing** from No 3 bearing inner race location (19) on shaft (20).



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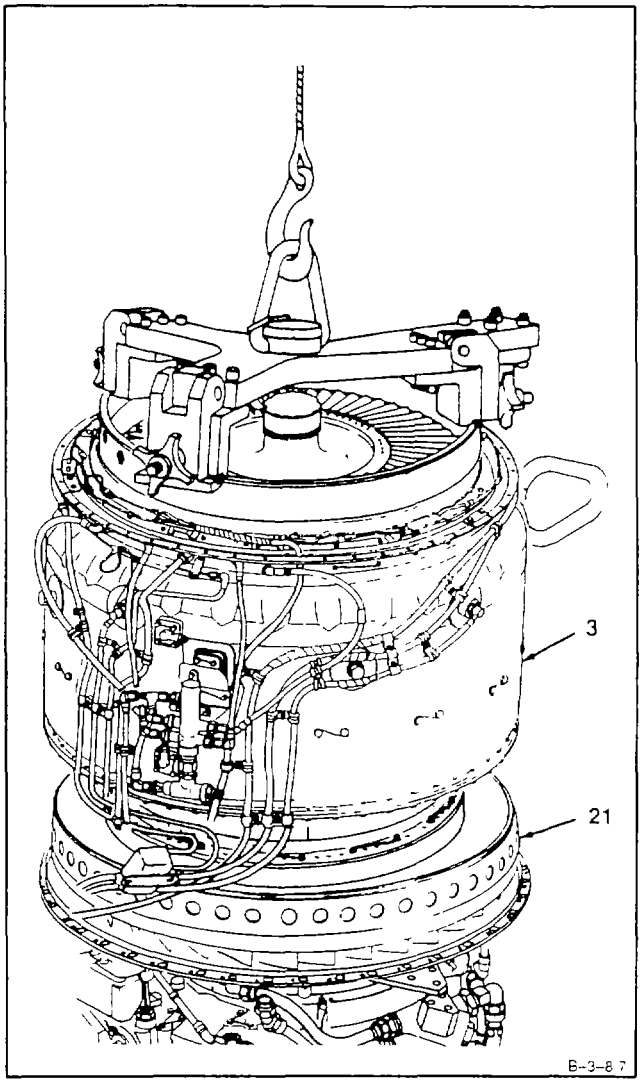
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

CAUTION

Use extreme care to guide power turbine shaft through No. 3 bearing seal and No. 3 bearing. During installation, rotate power turbine rotor to ensure freedom of rotation and engagement of output shaft

8. Using helper, **lower combustion section and power turbine (3)**onto air diffuser assembly (21)



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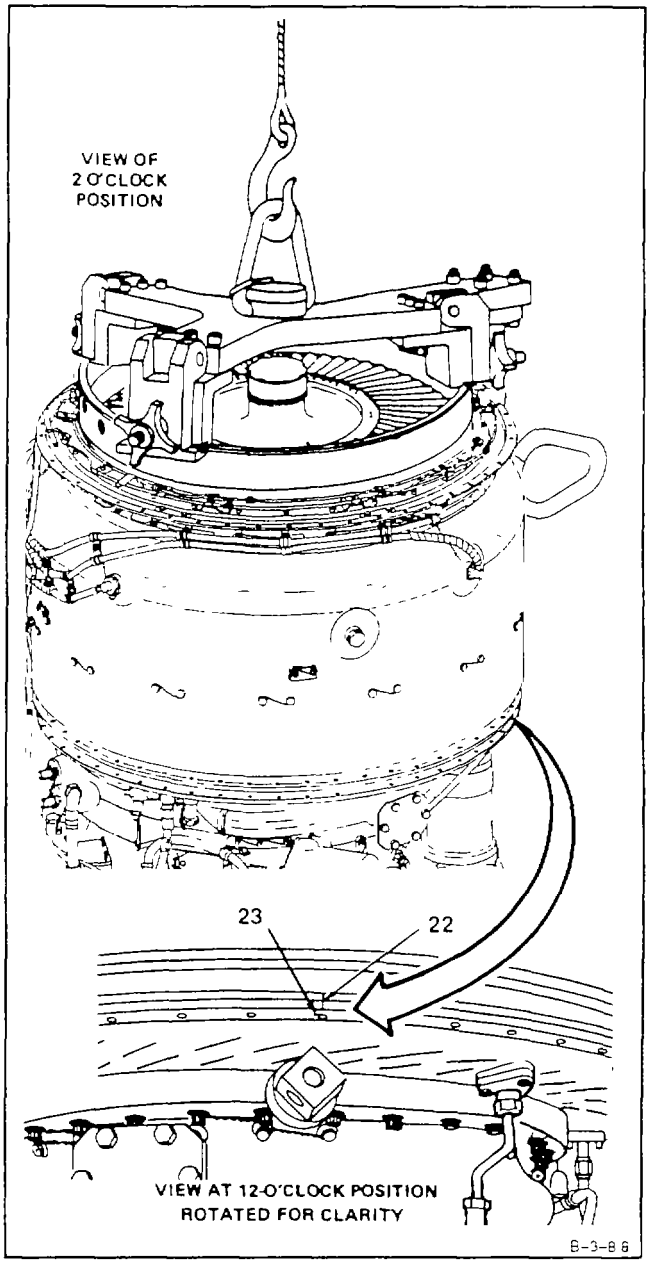
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

9. Align matchmark (22) at top center hole (23).



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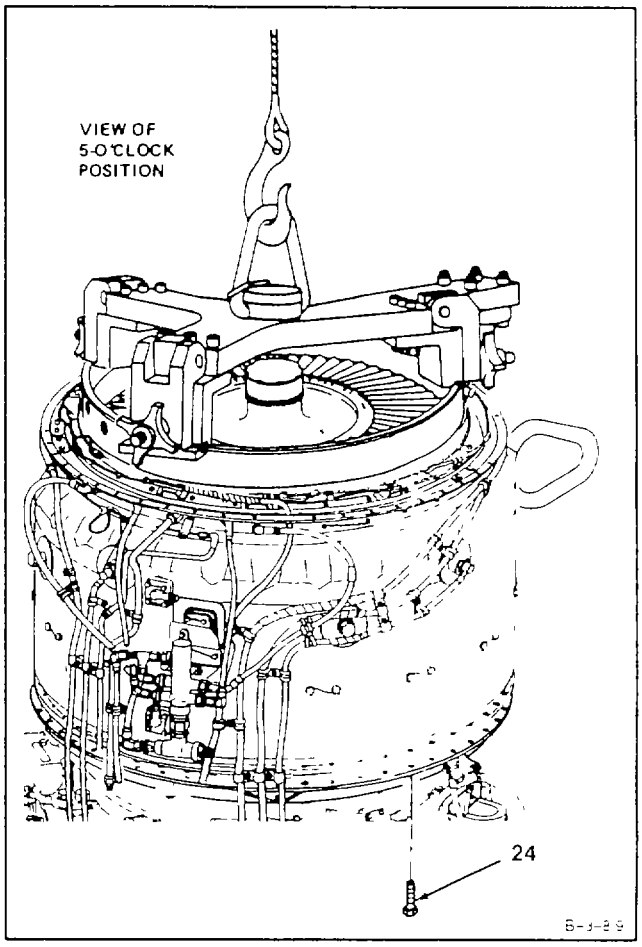
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

NOTE

Bolts are inserted through air diffuser assembly holes into threaded holes of combustor flange

10. **Install three bolts (24)** in three holes at approximately the 4- 8- and 12-o'clock positions



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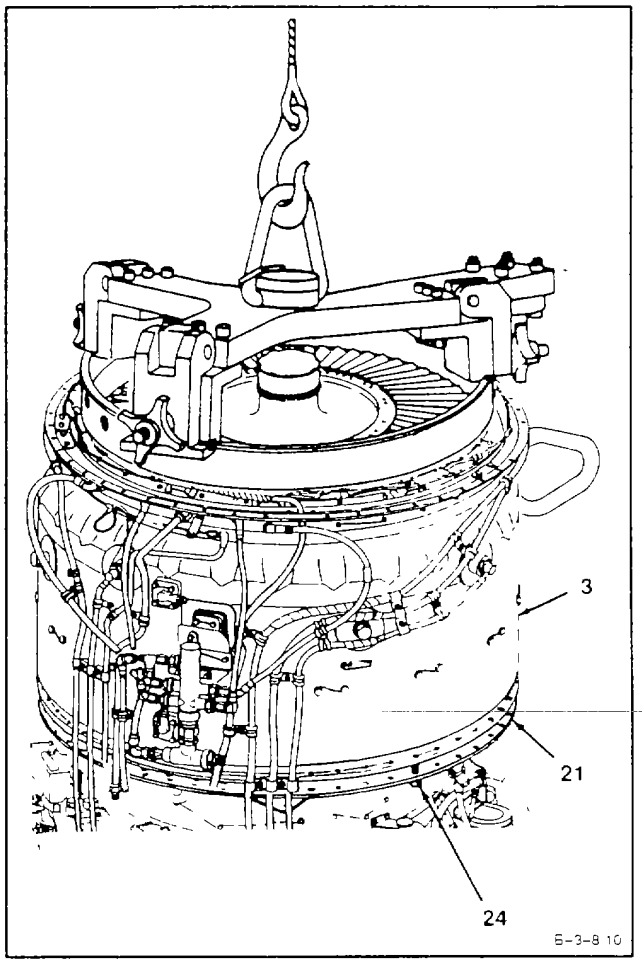
CAUTION

Do not force combustion section and power turbine onto air diffuser assembly. Damage to No. 3 bearing or other components may result.

11. Turn three bolts (24) evenly to **draw combustion section and power turbine (3) and air diffuser assembly (21)**together. Remove three bolts (24)



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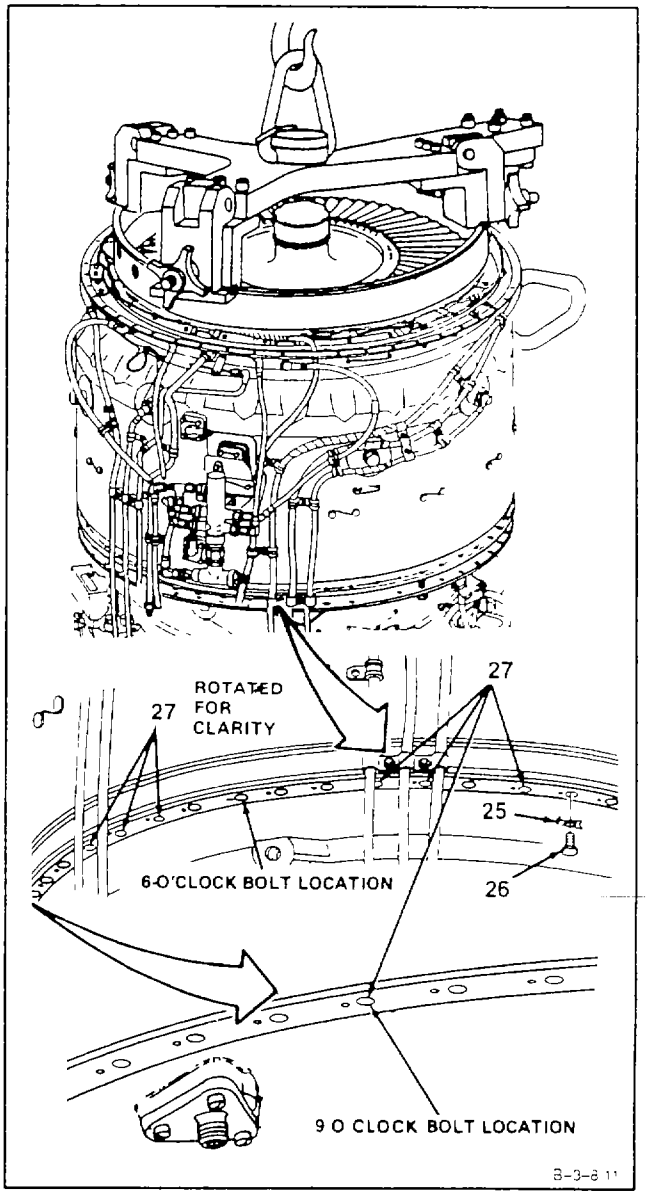
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

12. **Install** 45 key washers (25) and 45 bolts (26) in all bolt holes except seven bolt holes (27)

13. **Lock bolts (26)**by bending tabs of key washers (25)



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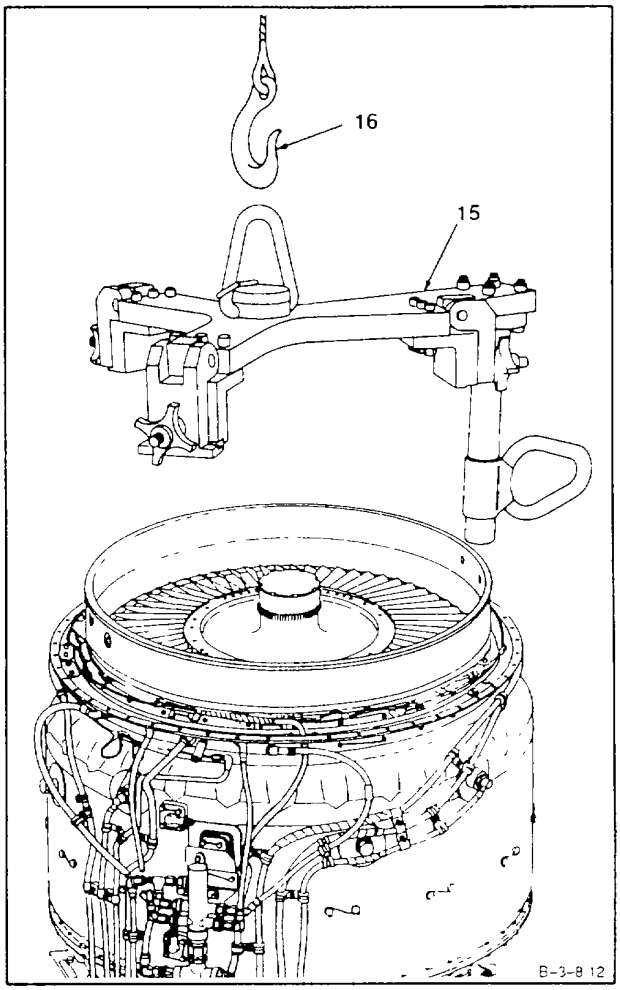
14. Remove hoist hook (16) and power turbine fixture (T54) (15).



NOTE

If replacement combustion section and power turbine is being installed do all steps.

If same combustion section and power turbine that was removed is being installed, omit step 15.

15. **Inspect output shaft end play** as follows.

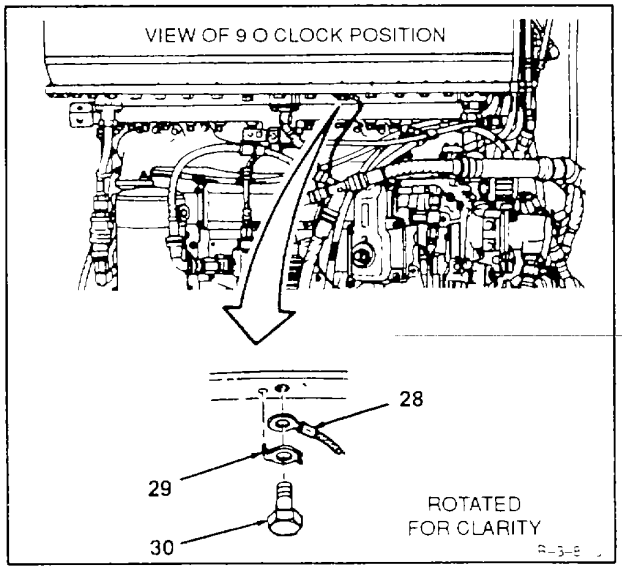
NOTE

Due to possible carbon ridge buildup on output shaft from output shaft seal, movement will be difficult For this reason, compete removal of output shaft seal and housing assembly will be required to obtain proper output shaft end play.

a. **Remove output shaft seal and housing assembly** (Ref. Task 2-39).

b. **Install output shaft seal and housing assembly** (Ref. Task 2-43).

16. **Install jumper cable assembly** (28), key washer (29), and bolt (30).



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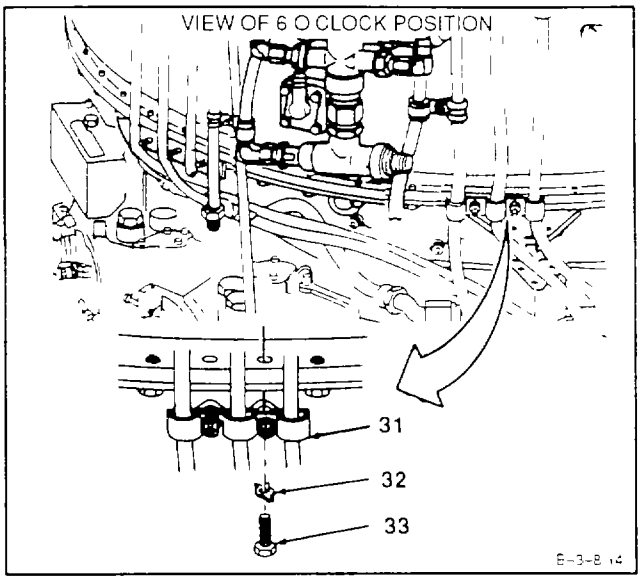
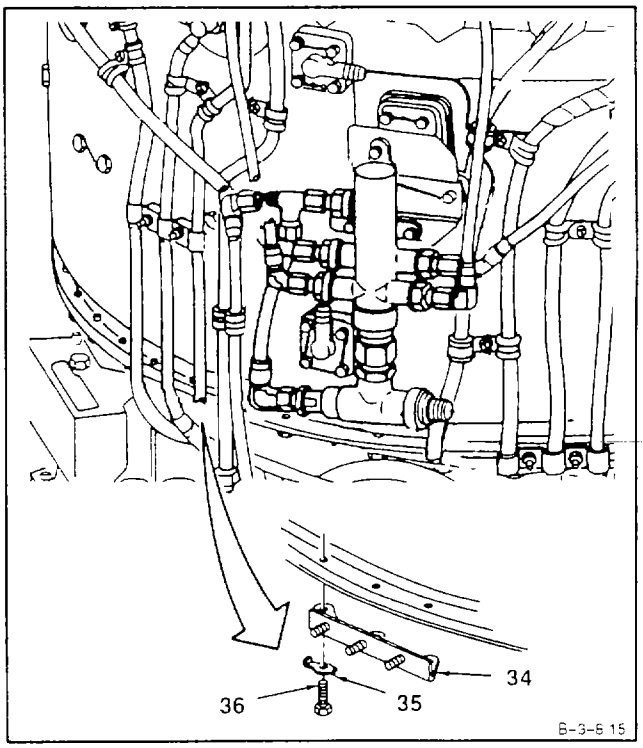
17. **Install strap and bracket (31),** two key washers (32) and two bolts (33) **Lock bolts (33)** by bending tabs of key washers (32).



18. **Install bracket (34),** three key washers (35), and three bolts (36) **Lock bolts (36)** by bending tabs of key washers (35).



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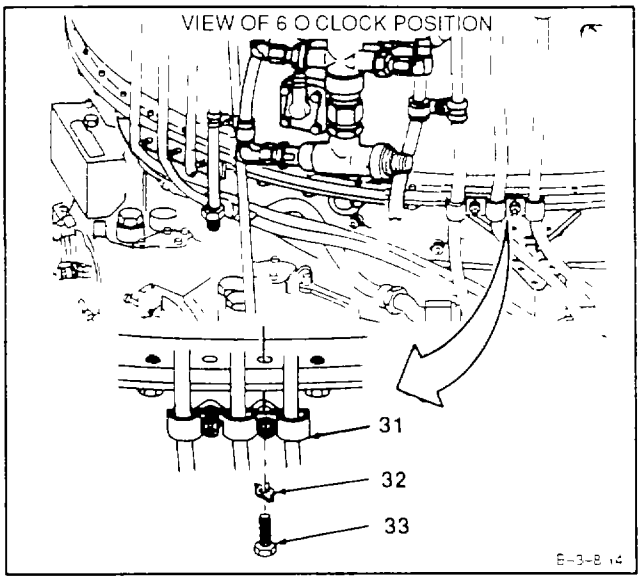
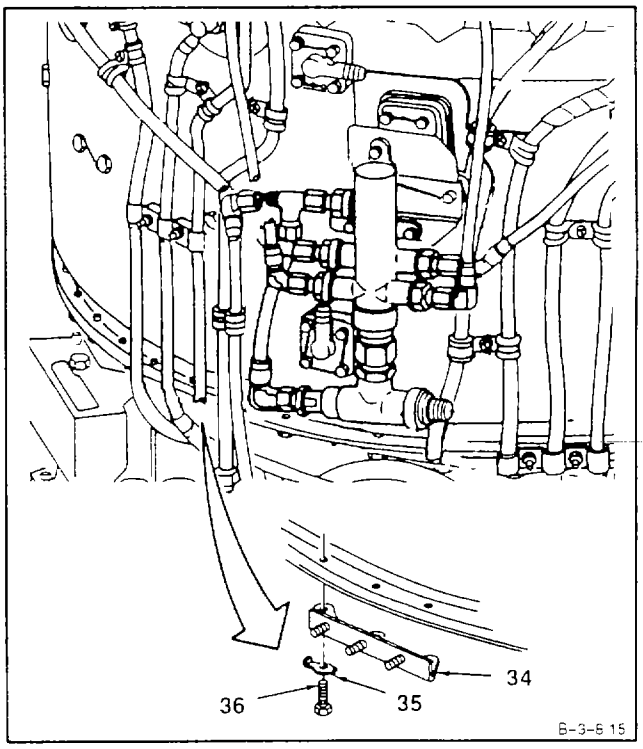
19. **Install clamp (37)** and three nuts (38) on bracket (34).



20. **Connect hose assembly (39)** to tube assembly (40).



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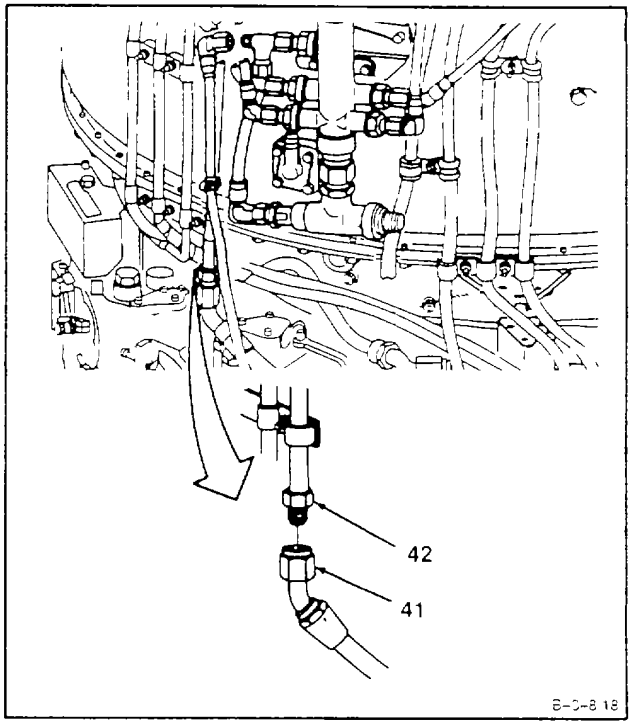
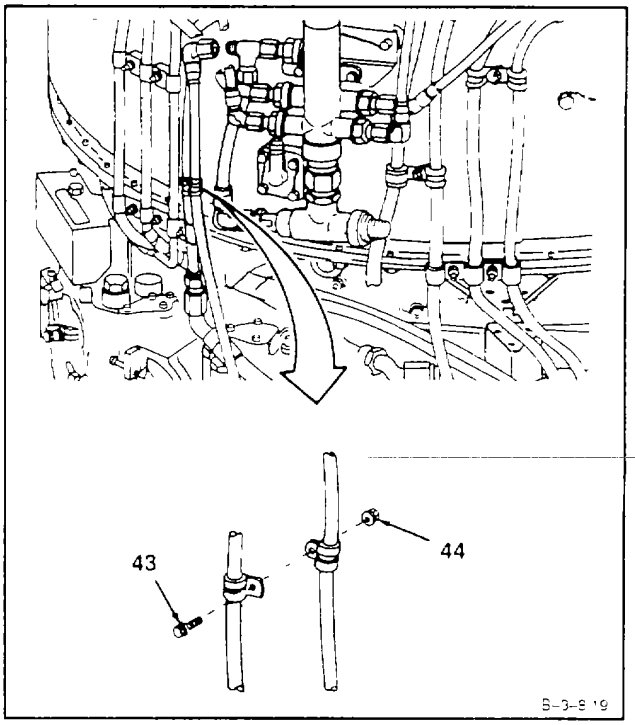
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

21. **Connect hose assembly (41)** to tube assembly (42).



22. Install screw (43) and nut (44)



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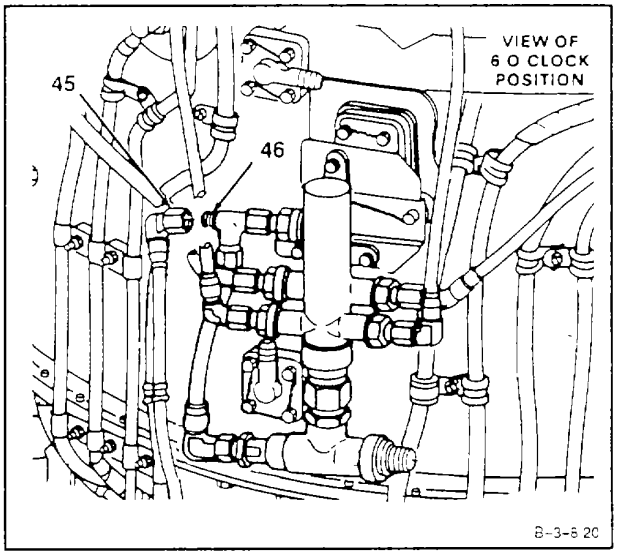
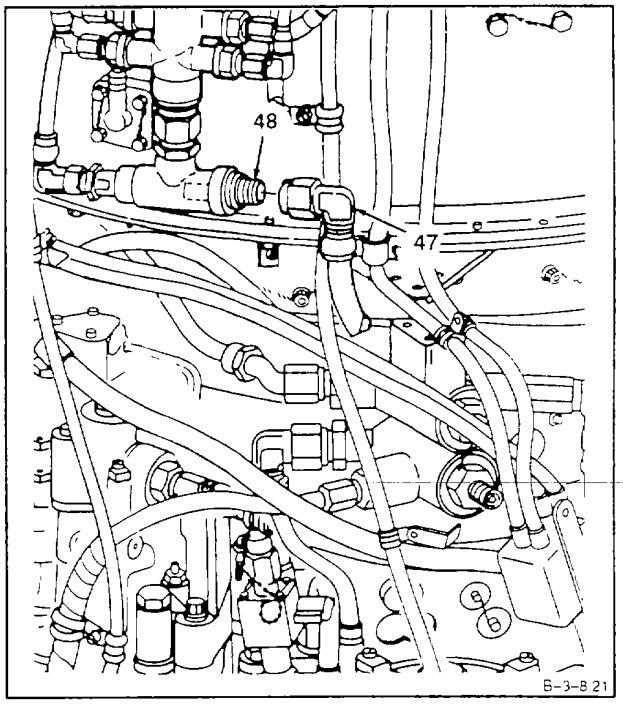
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

23. **Connect hose assembly (45)** to tee (46).



24. **Connect hose assembly (47)** to pressurizing valve (48)



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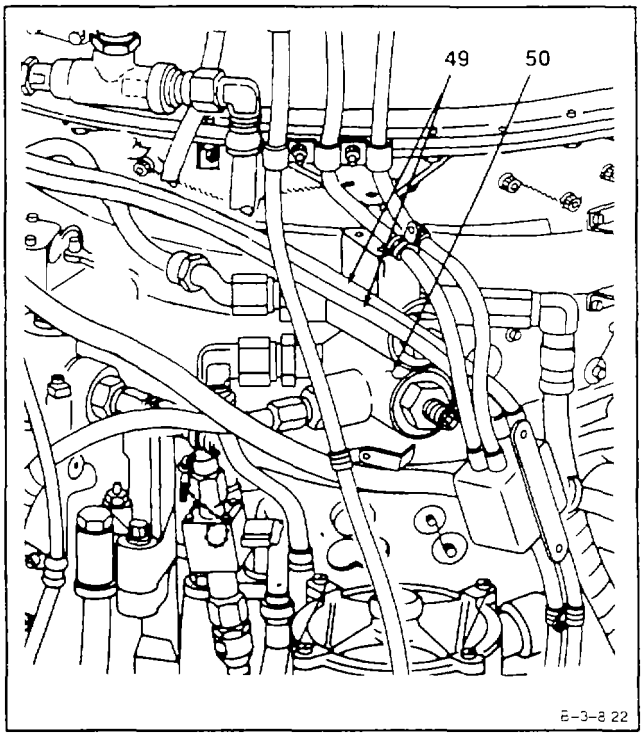
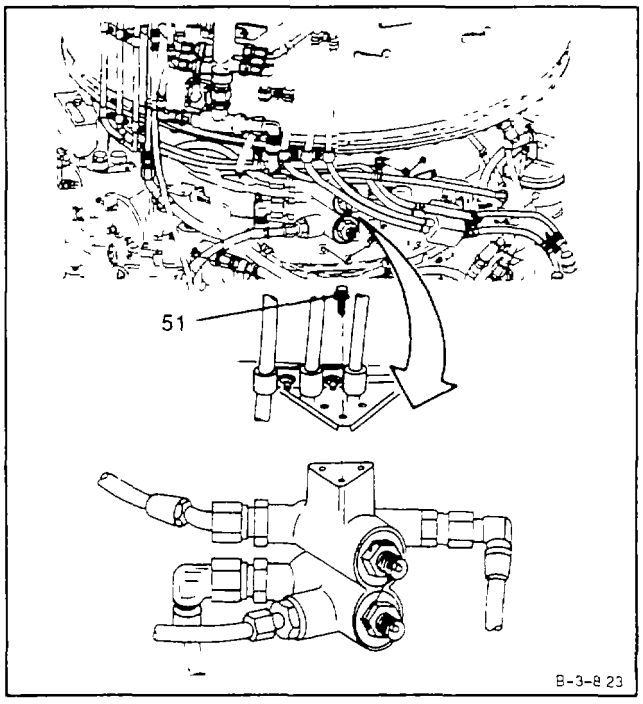
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

25. Put ignition coil and cable assembly leads (49) behind dual chip detector (50).



26. Install three bolts (51). Lockwire bolts (51). Use lockwire (E32)



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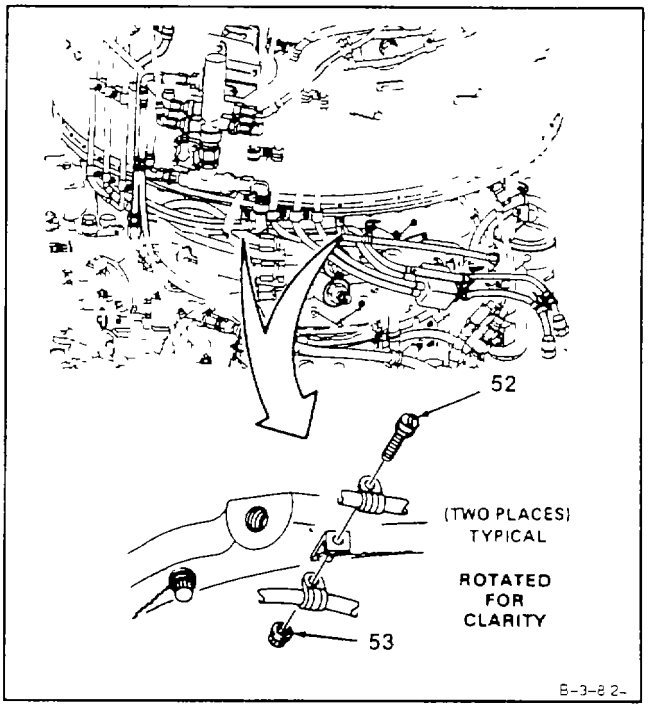
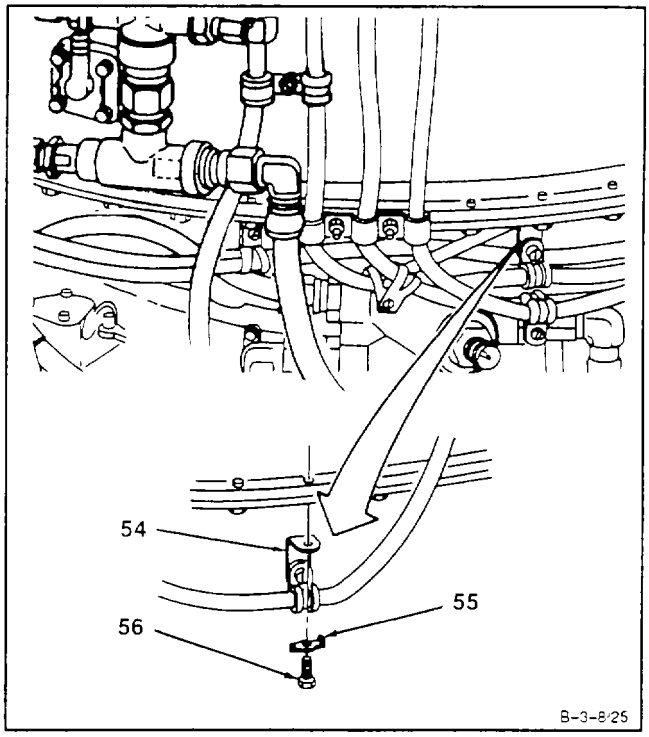
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

27. Install two screws (52) and two nuts (53).



28. Install bracket (54), key washer (55), and bolt (56) Lock bolt (56) by bending tab of key washer (55).



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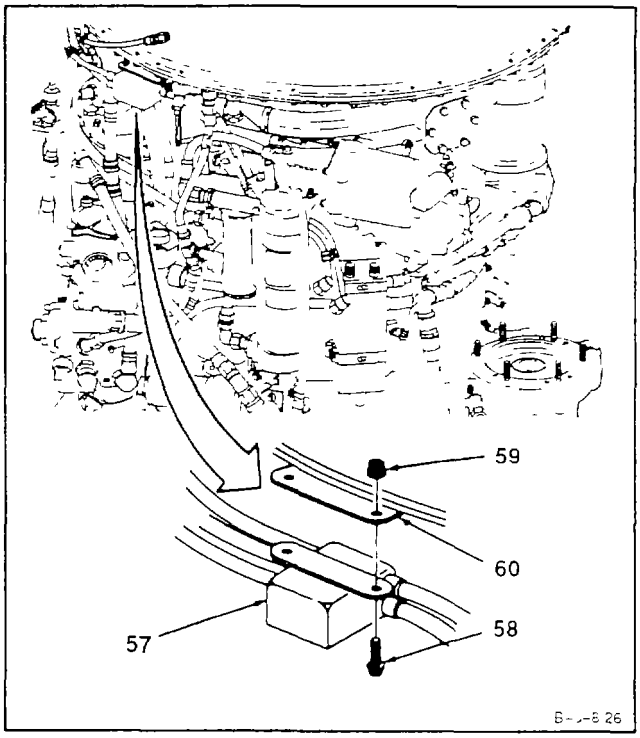
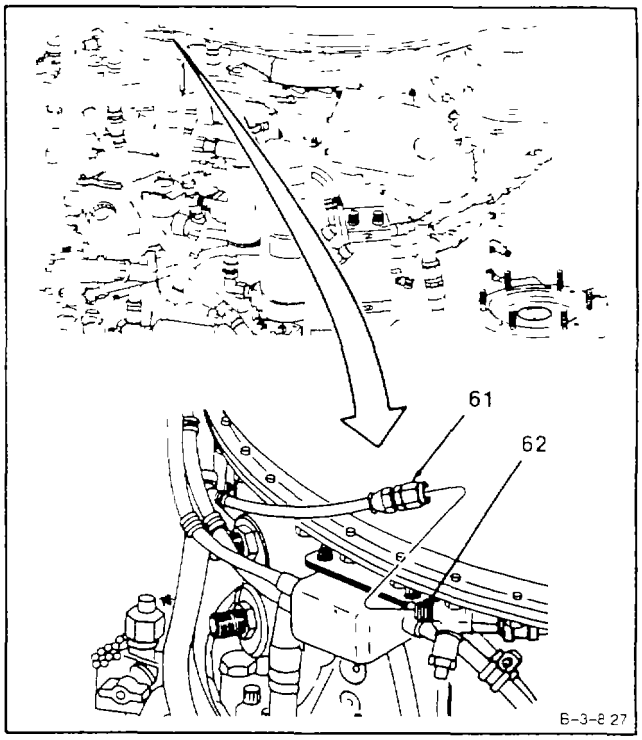
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

29. **Install ignition coil (57),** two bolts (58) and two nuts (59) on bracket (60).



30. **Connect hose assembly (61**) to tee and snubber (62).



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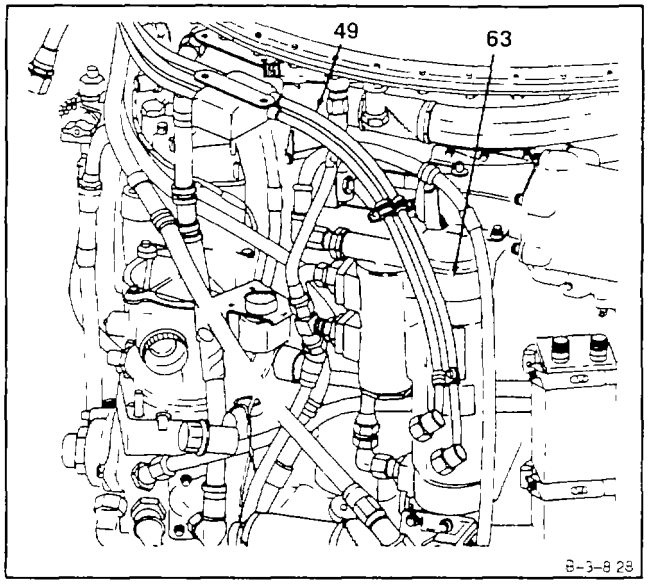
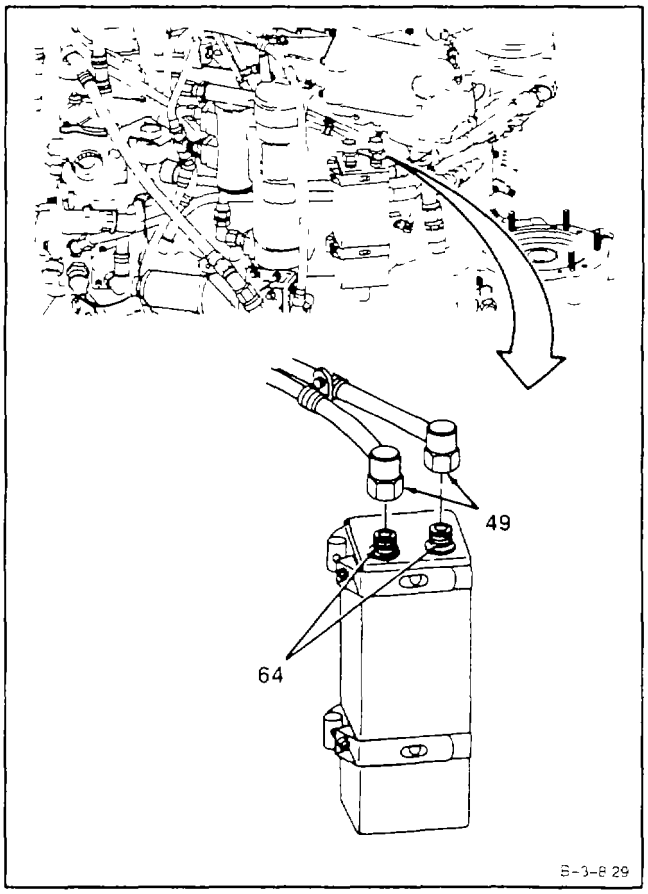
3-8 INSTALL COMBUSTION SECTION AND POWER TURBINE (AVIM) (Continued) 3-8

31. Put ignition coil and cable assembly leads (49) behind oil cooler assembly (63).



32. **Connect two ignition coil and cable assembly leads (49)** to receptacles (64). Lockwire ignition coil and cable assembly leads (49). Use lockwire (E32).



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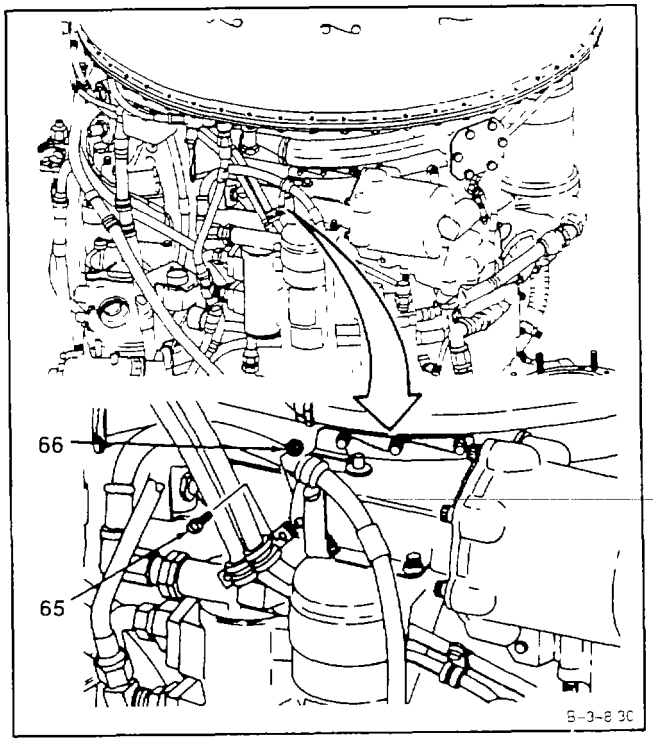
33. Install screw (65) and nut (66)



INSPECT

FOLLOW-ON MAINTENANCE
Service Engine Oil System (Task 1-68)

END OF TASK

SECTION III

COMBUSTION SECTION

3-9 DISASSEMBLE COMBUSTION SECTION (AVIM) 3-9

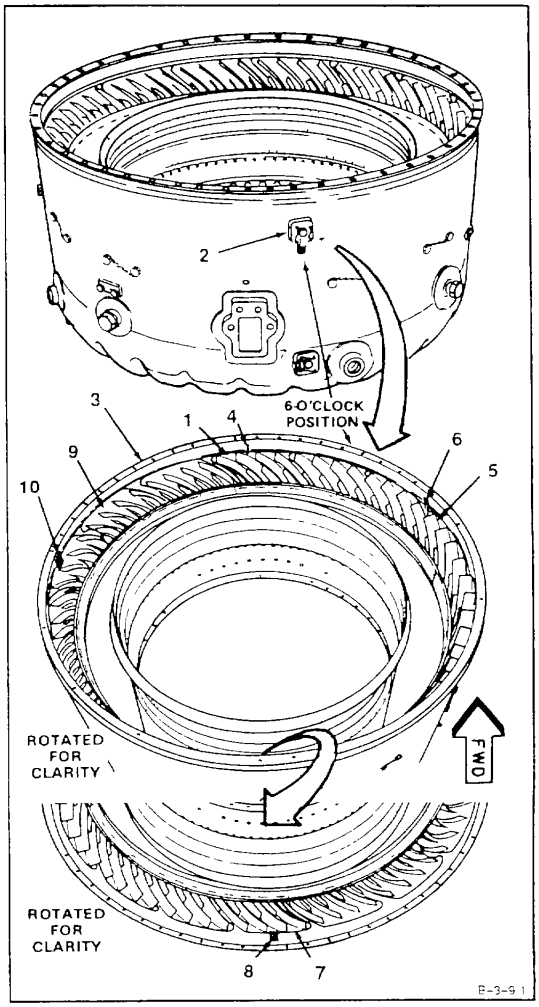
INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Phenolic Drift (Appendix E)
Materials:
Marking Pencil (E38)
Personnel Required:
Aircraft Powerplant Repairer
References:
Task 3-1
Equipment Condition
Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)

GO TO NEXT PAGE

3-9 DISASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-9

1. Locate smallest vane segment (1) at 8-o'clock position Use fuel drain valve (2), located at 6-o'clock position, for reference.
2. **Matchmark vane segment (1)** to combustion chamber housing (3) with one mark (4) Use marking pencil (E38).
3. **Matchmark vane segment (5),** located at 5-o'clock position to combustion chamber housing (3) with two marks (6) Use marking pencil (E38).
4. **Matchmark** vane **segment** (7), located at 2-o'clock position, to combustion chamber housing (3) with three marks (8) Use marking pencil (E38).
5. **Matchmark vane segment** (9), located at 1 o'clock position, to combustion chamber housing (3) with four marks (10) Use marking pencil (E38)



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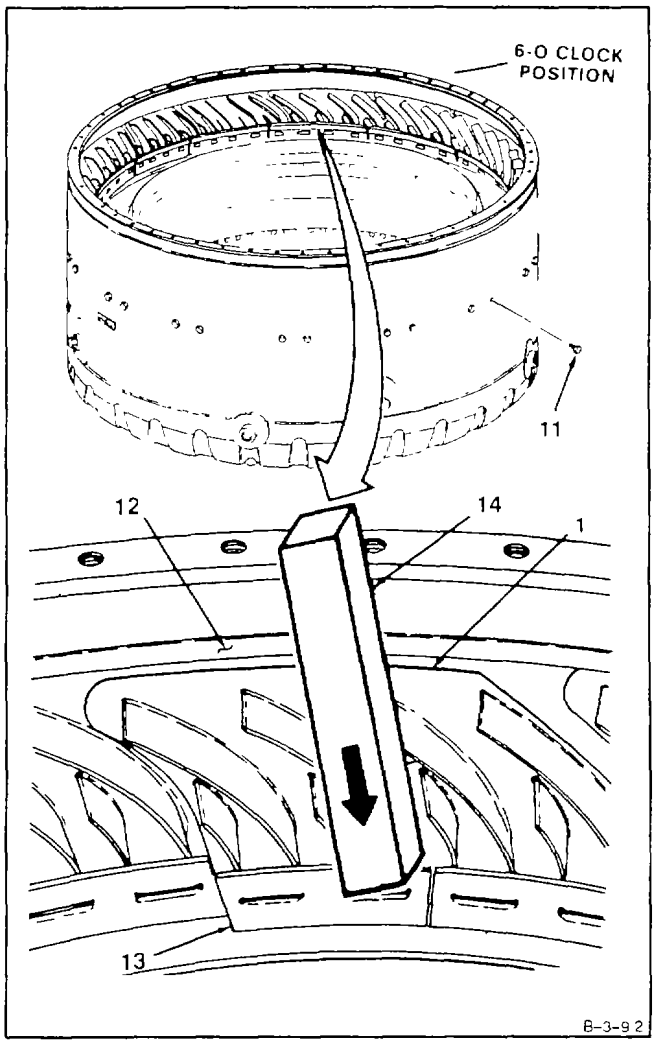
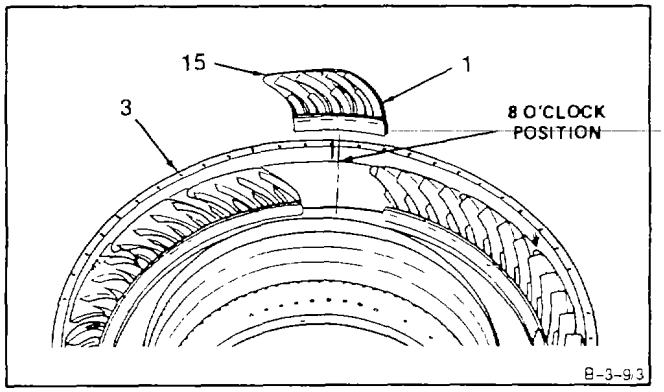
6. Remove lockwire and 28 bolts (11)

7. Loosen vane segment (1) from lip (12) Hammer lightly in aft direction on inner shroud (13) Use soft-faced hammer and phenolic drift (Appendix E) (14).



8. **Remove vane segment (1)** Tip leading edge (15) inward and pull from combustion chamber housing (3).



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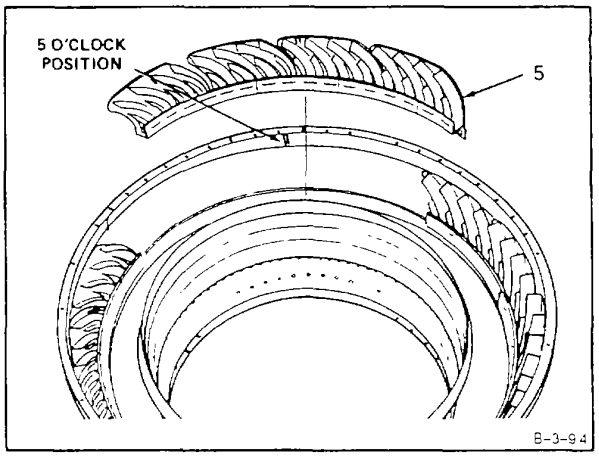
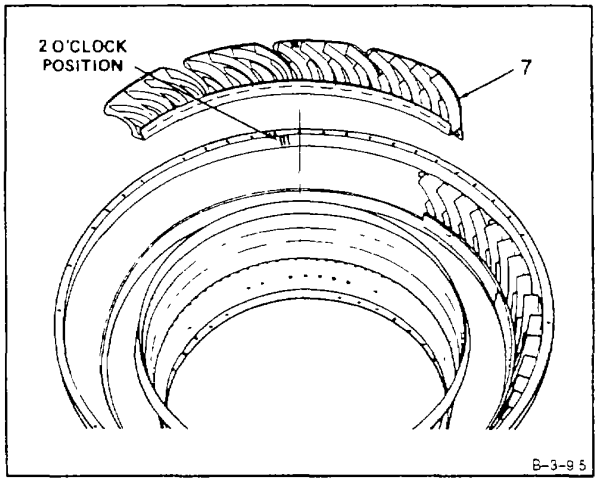
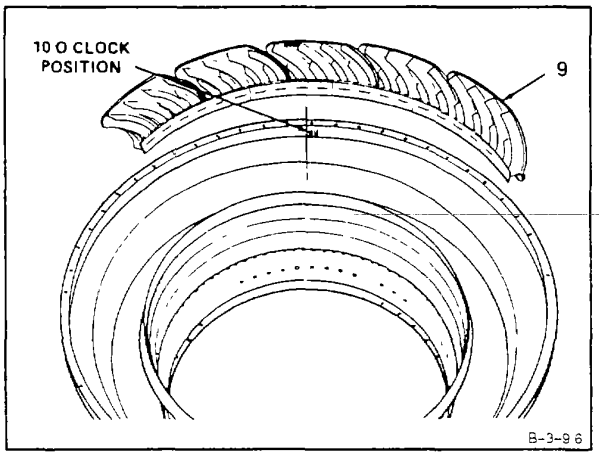
9. **Remove vane segment** (5) Use procedure in previous steps 7 and 8.



10. **Remove vane segment (7)** Use procedure in previous steps 7 and 8.



11. **Remove vane segment** (9) Use procedure in previous steps 7 and 8.



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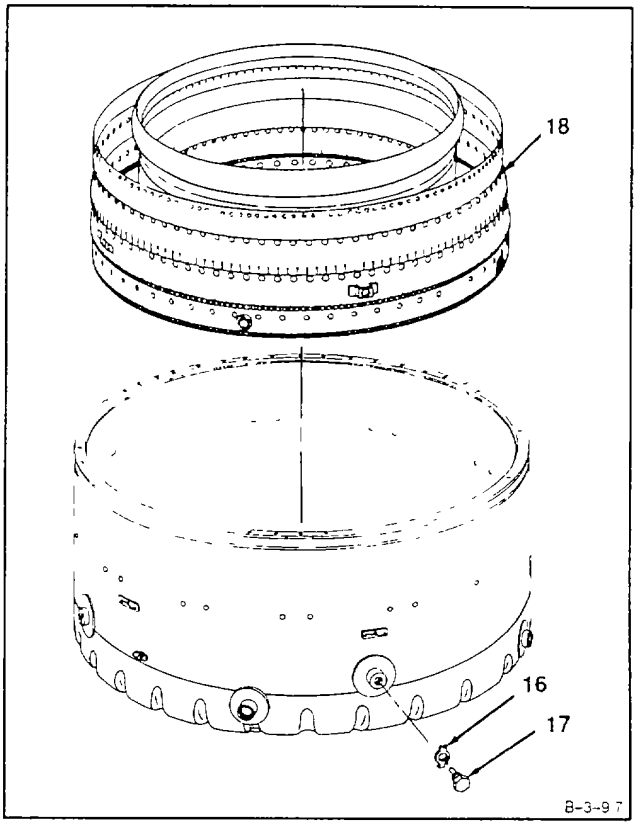
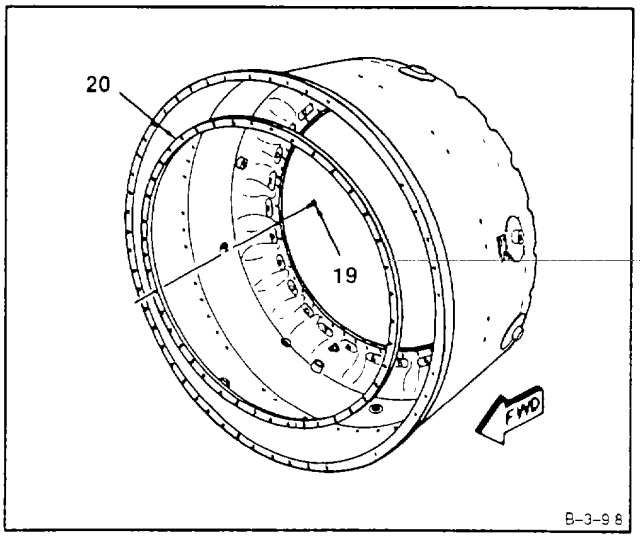
3-9 DISASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-9

12. Straighten tabs of key washers (16) and **remove** four bolts (17), four key washers (16) and **combustion chamber liner (18).**



13. **Remove** six screws (19) and **ring (20).**



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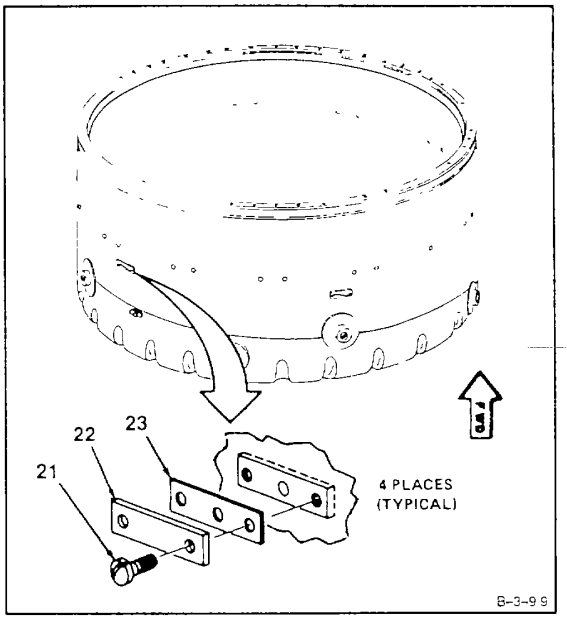
14. **Remove fuel drain valves (Ref. Task 3-1).**
15. **Remove** lockwire, eight screws (21), **four plates (22),** and four gaskets (23)



FOLLOW-ON MAINTENANCE

None

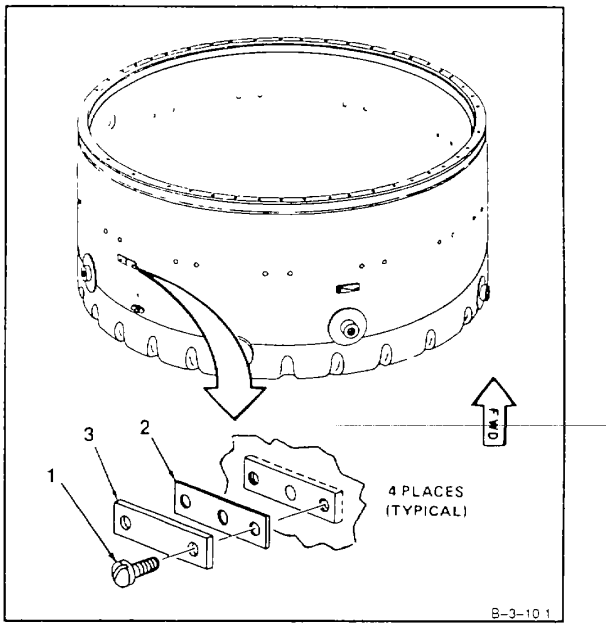
END OF TASK

3-10 ASSEMBLE COMBUSTION SECTION (AVIM) 3-10

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Wrench, 30-150 Inch-Pounds
Torque Wrench, 100-750 Inch-Pounds
Materials:
Anti-Seize Compound (E6)
Lockwire (E32)
Marking Pencil (E38)
Parts:
Gaskets
Key Washers
Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
References:
TM 1-2840-252-23P
Task 3-4

1. Apply anti-seize compound (E5) to threads of eight screws (1) **Install** four gaskets (2), **four plates (3),** and eight screws (1) Lockwire two screws to each other (1) Use lockwire (E32).
2. **Install fuel drain valves** (Ref Task 3-4).



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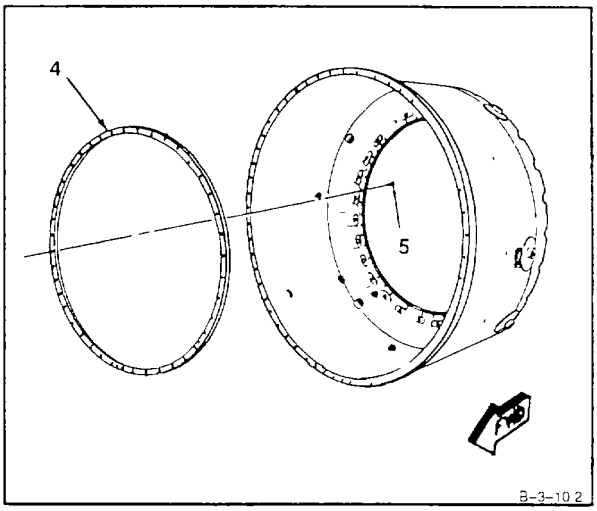
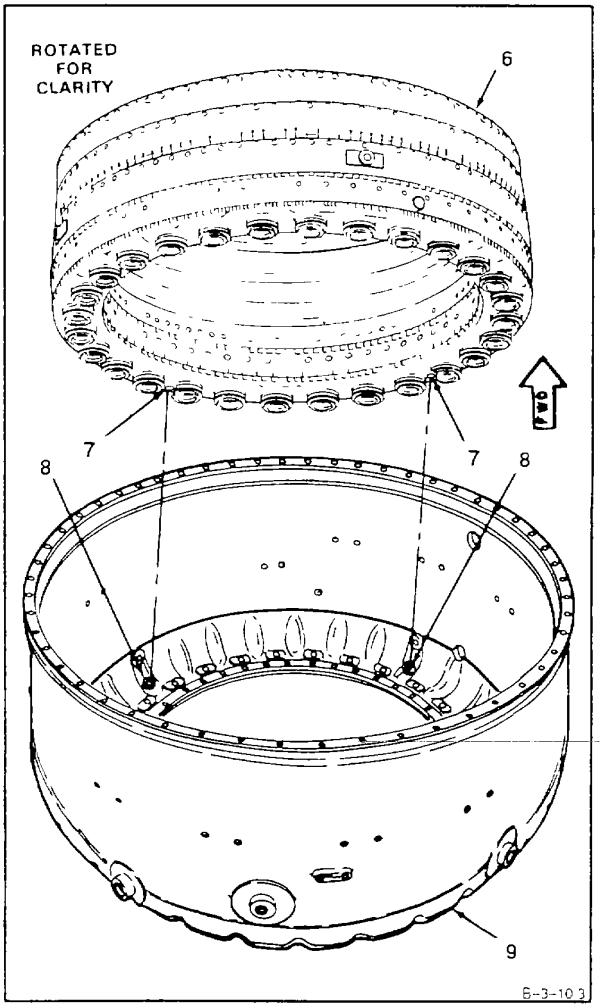
3-10 ASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-10

3. **Install ring (4)** and six screws (5).



4. Position combustion chamber liner (6) with start fuel nozzle holes (7) aligned with holes (8) in combustion chamber housing (9).



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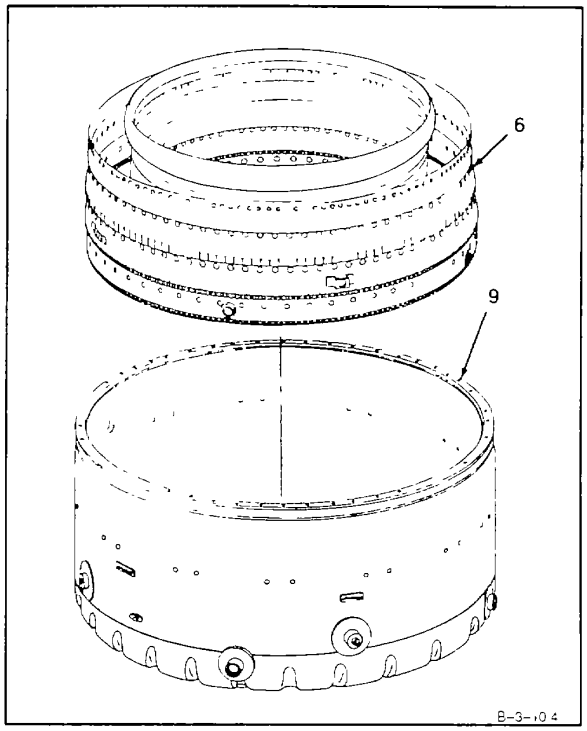
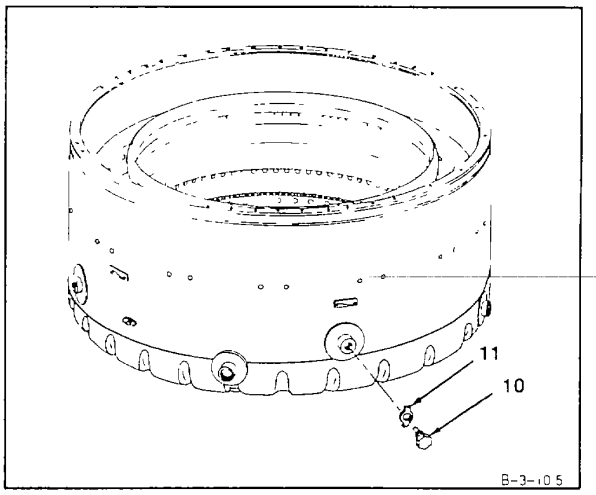
3-10 ASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-10

5. **Install combustion chamber liner (6)** in combustion chamber housing (9).



6. Coat four bolts (10) with anti-seize compound (E6)

7. Install four key washers (11) and four bolts (10). **Torque to <u>150 inch-pounds</u>** Bend tabs up on key washers (11)



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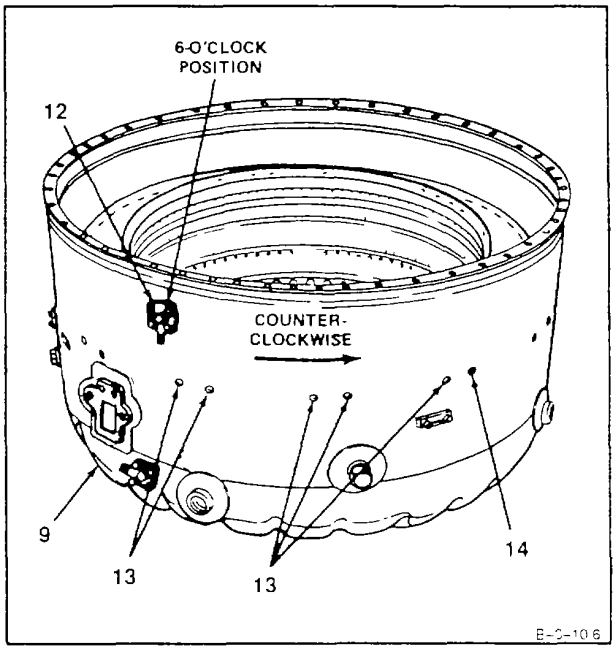
3-10 ASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-10

8. Locate forward drain valve (12) at 6-o'clock position on combustion chamber housing (9) Count five bolt holes (13) counterclockwise and mark next hole (14) Use marking pencil (E38).



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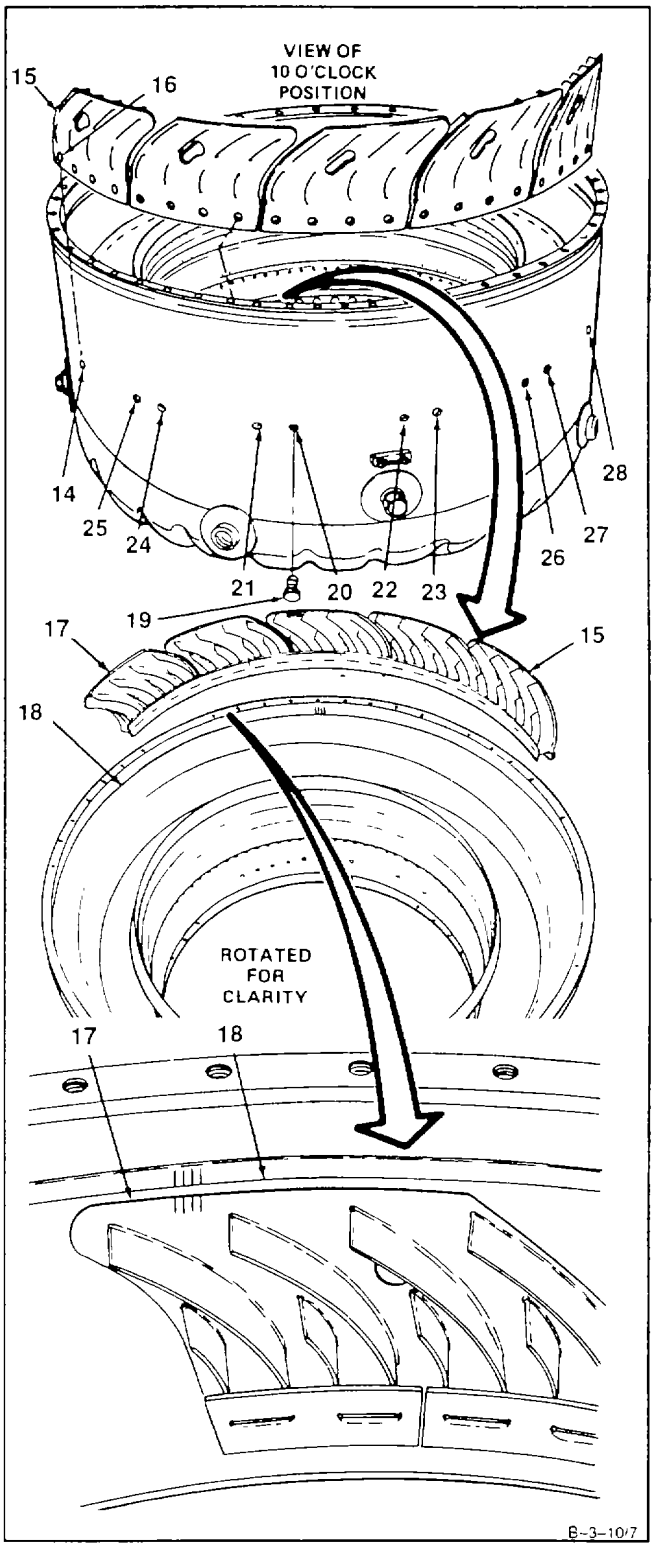
3-10 ASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-10

9. Position longest vane segment (15) with hole (16) aligned with marked hole (14).

10. **Install vane segment (15)** with forward edge (17) under lip (18).

11. Coat 28 bolts (19) with anti-seize compound (E6).

12. Install 10 bolts (19) in following sequence in holes (20, 21, 22 23, 24, 25, 26, 27, 14, and 28). **Do not tighten.**



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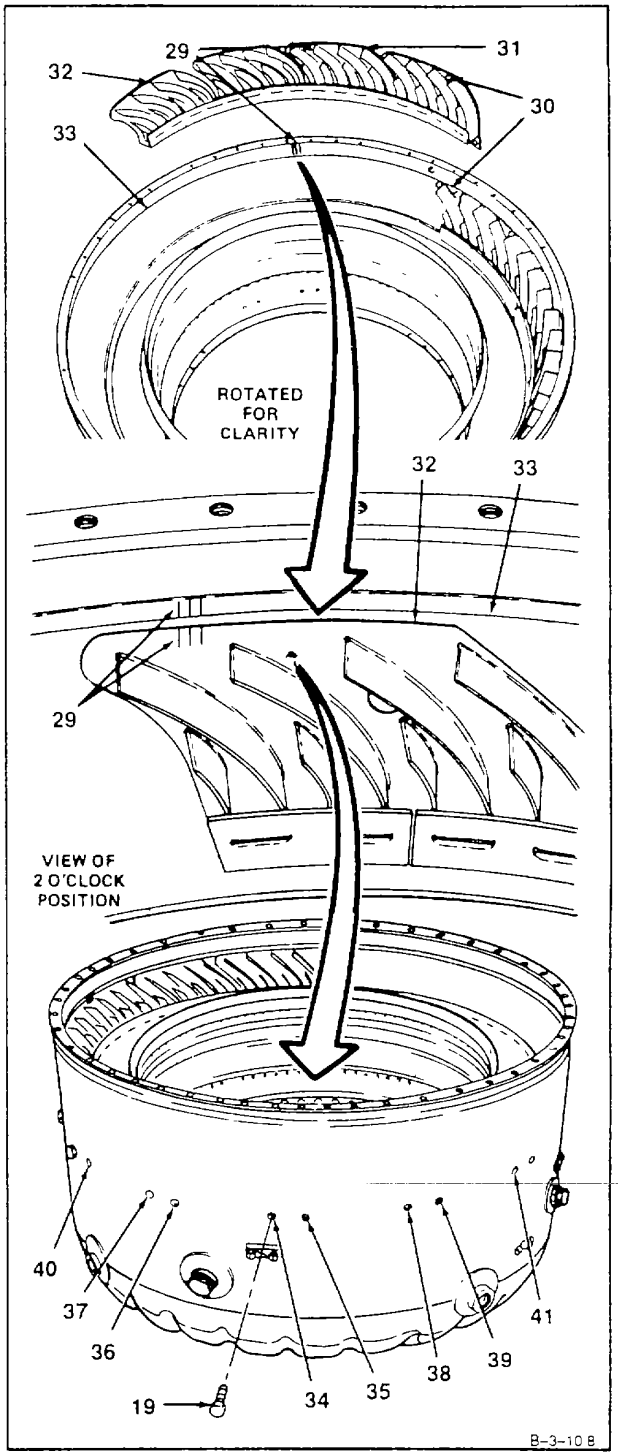
3-10 ASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-10

13. Align matchmarks (29) or matching letters C-C (30) and **install vane segment (31)** with forward edge (32) under lip (33).

14. Install eight bolts (19) in sequence in holes (34 thru 41) **Do not tighten.**



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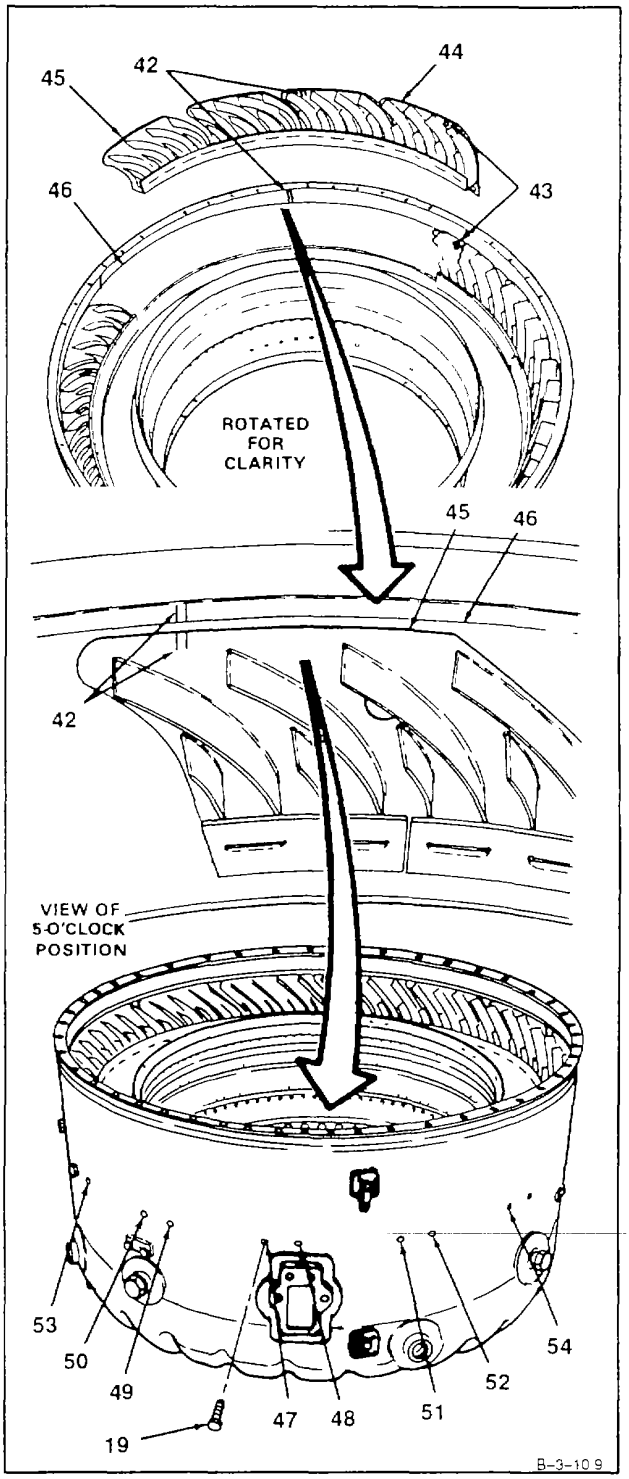
3-10 ASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-10

15. Align matchmarks (42) or matching letters D-D (43) and **install vane segment (44)** with forward edge (45) under lip (46).

16. Install eight bolts (19) in sequence in holes (47 thru 54) **Do not tighten.**



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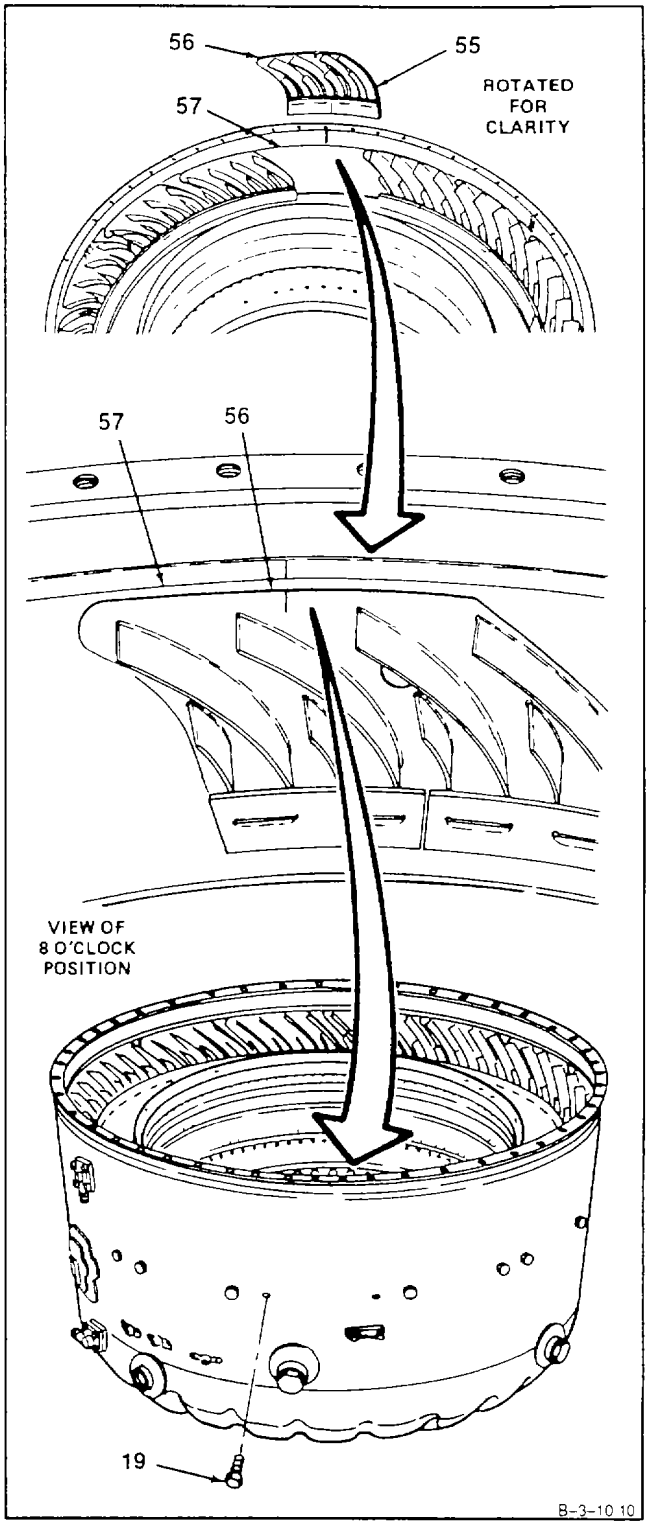
3-10 ASSEMBLE COMBUSTION SECTION (AVIM) (Continued) 3-10

17. **Install shortest vane segment (55)** with forward edge (56) under lip (57) Install two bolts (19). **Do not tighten.**



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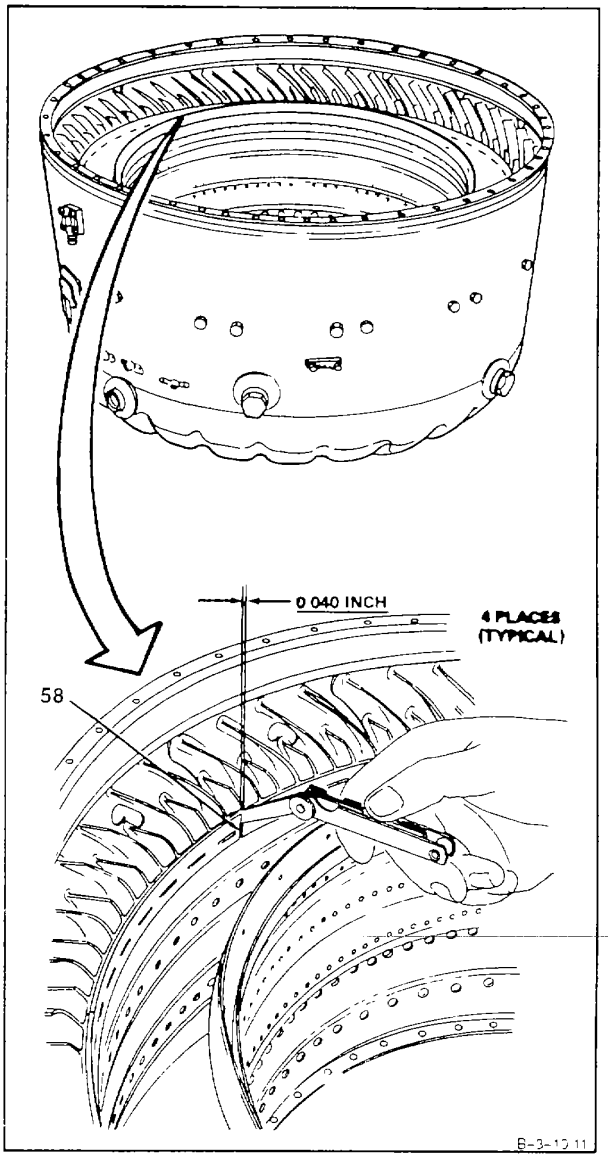
18. **Measure gaps (58) between four vane segments Gap shall be 0.040 inch.** If gap is not 0.040 inch move vane segments sideways and repeat measurement.



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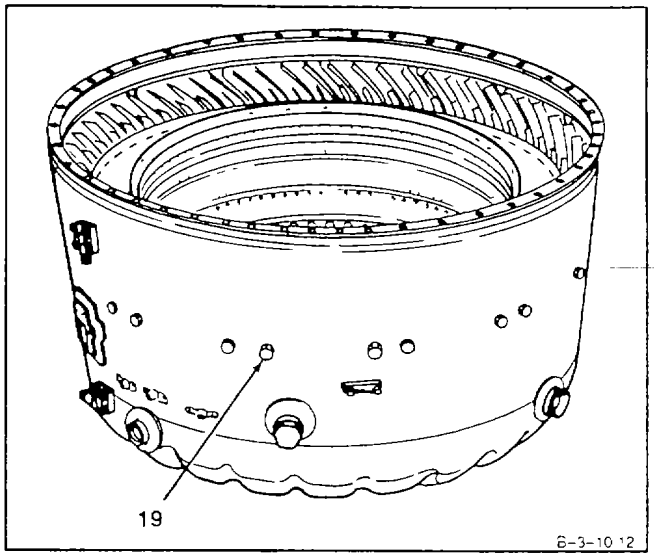
19. **Tighten 28 bolts (19). Torque to 40 inch-pounds.** Lockwire two bolts to each other (19). Use lockwire (E32).



INSPECT

FOLLOW-ON MAINTENANCE

Assemble Combustion Section and Power Turbine (Task 3-7)
Install Combustion Section and Power Turbine (Task 3-8)
Service Engine Oil System (Task 1-68)

END OF TASK

3-11 DISASSEMBLE COMBUSTION SECTION 3-11

INITIAL SETUP

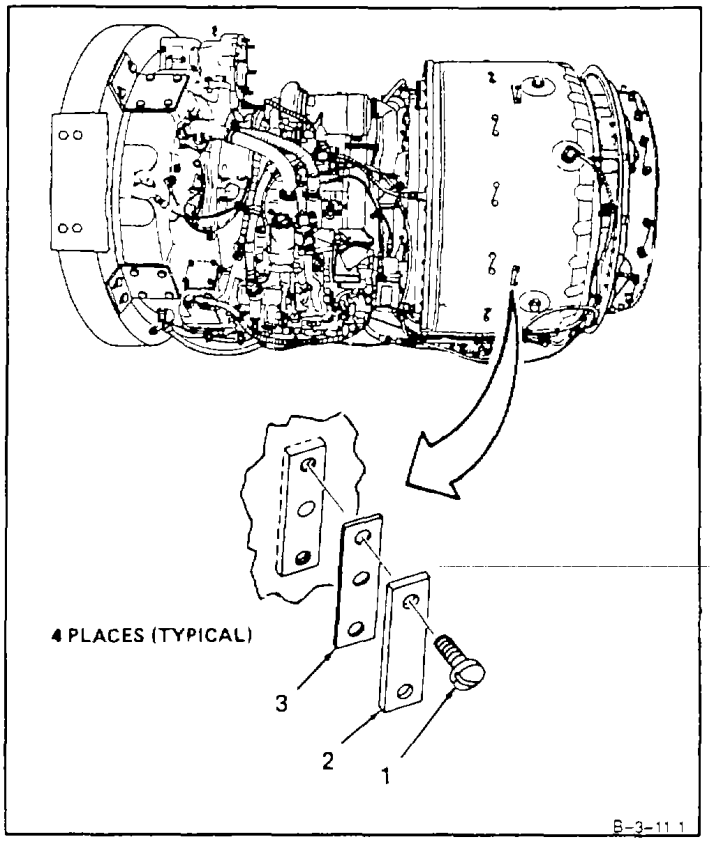
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer

1. **Remove** lockwire, eight screws (1), **four plates (2),** and four gaskets (3).



FOLLOW-ON MAINTENANCE

None

END OF TASK

3-12 ASSEMBLE COMBUSTION SECTION 3-12

INITIAL SETUP

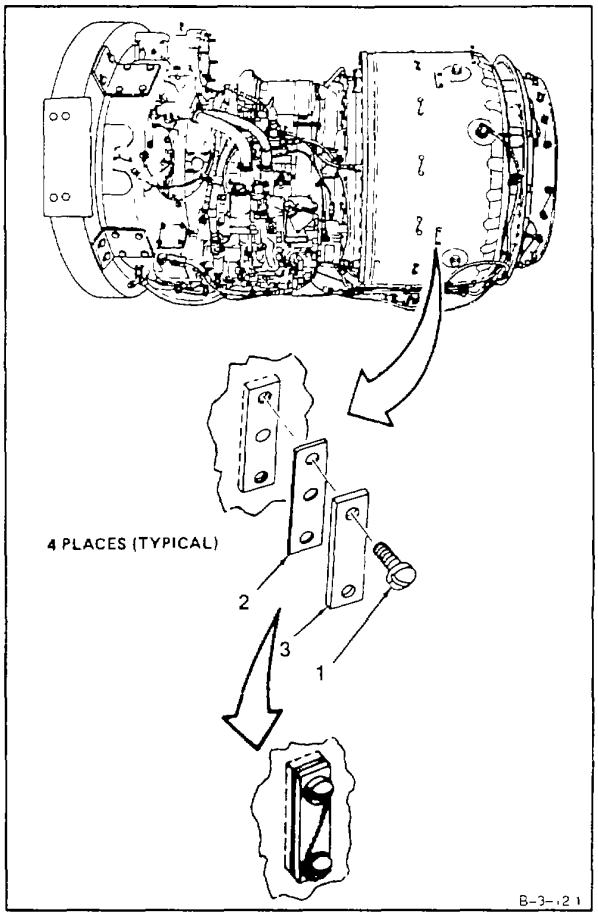
Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
Anti-Seize Compound (E6)
Lockwire (E32)
Parts:
Gaskets
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

1. Apply anti-seize compound (E6) to threads of eight screws (1) **Install** four gaskets (2), **plates (3),** and eight screws (1) Lockwire screws (1). Use lockwire (E32).

INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK



SECTION IV

COMBUSTION CHAMBER VANE ASSEMBLY

3-13 CLEAN COMBUSTION CHAMBER VANE ASSEMBLY (AVIM) 3-13

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Goggles
Dry, Compressed Air Source
Materials:
Gloves (E24)
Denatured Alcohol (E17)
Personnel Required:
Aircraft Powerplant Repairer
Equipment Condition:
Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Combustion Section Disassembled (Task 3-9)
General Safety Instructions:

WARNING

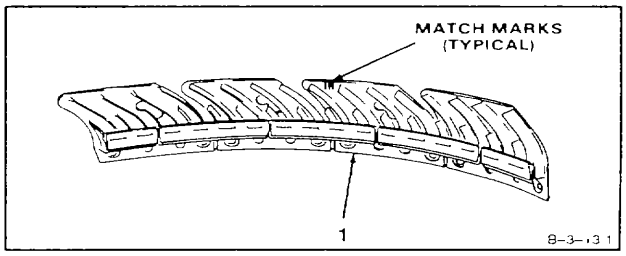
Denatured alcohol (El7) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

NOTE

Procedure to clean four combustion chamber vane assembly segments is the same. Only one is shown

NOTE

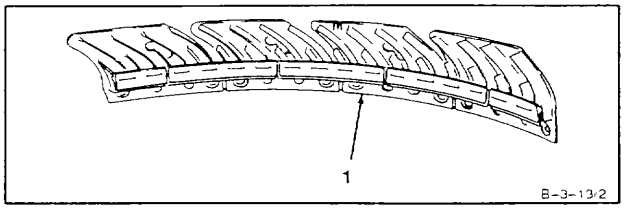
When cleaning combustion chamber vane assembly, do not remove matchmarks



1. Clean **combustion chamber vane assembly (1)** as follows
   a. Wear gloves (E24) and goggles Use denatured alcohol (El 7) and brush

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention



   b. Blow dry vane assembly (1). Use clean, dry, compressed air

FOLLOW-ON MAINTENANCE
Inspect Combustion Chamber Vane Assembly (Task 3-14)

END OF TASK

3-14 INSPECT COMBUSTION CHAMBER VANE ASSEMBLY (AVIM) 3-14

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

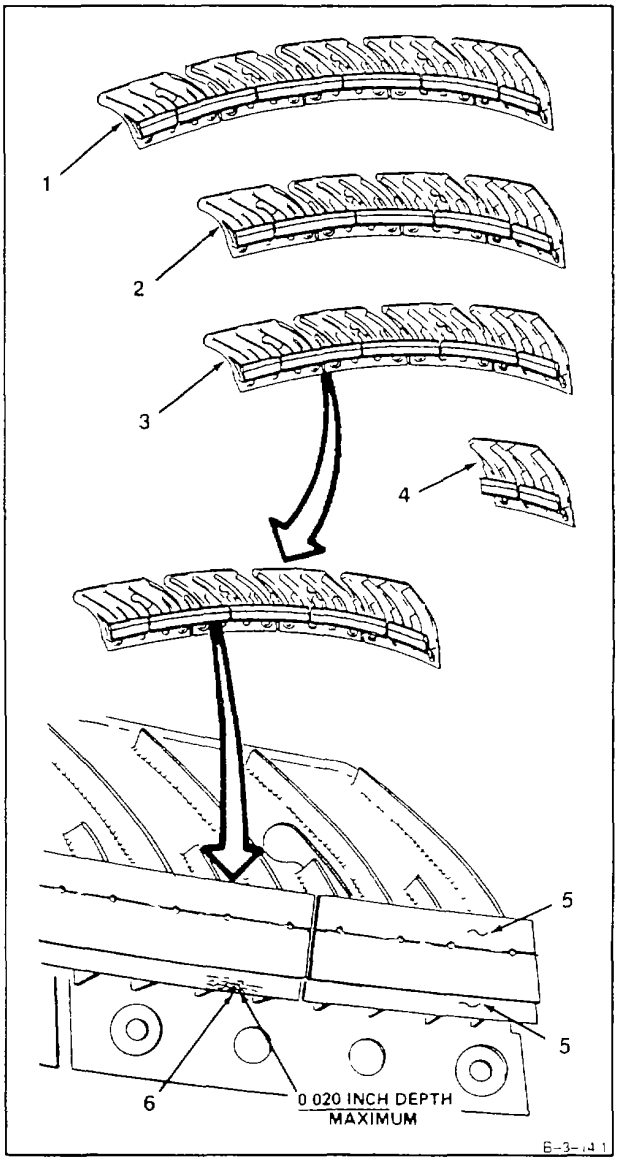
1. **Inspect four vane segments (1, 2, 3, and 4)** as follows

NOTE

The following inspection applies to four vane segments Only one vane segment is shown

a. **Inspect inner shroud (5)** as follows

(1) There shall be no chafing wear(6) deeper than 0.020 inch There shall be no cracks in chafed area.



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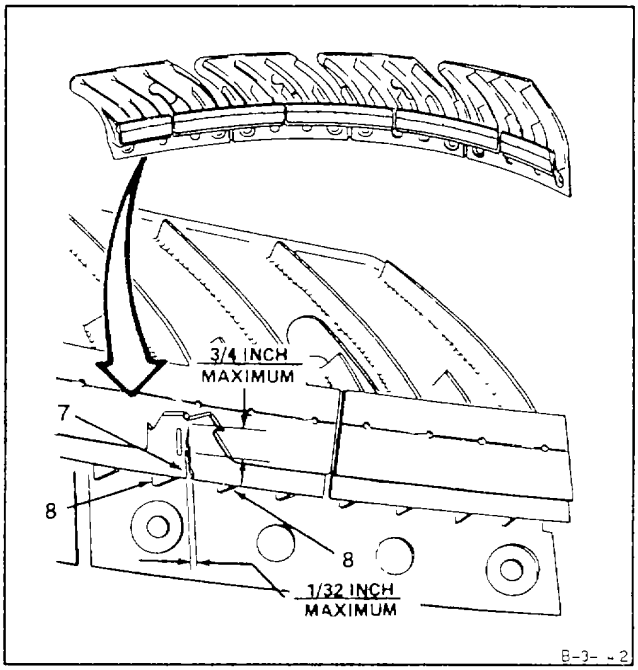
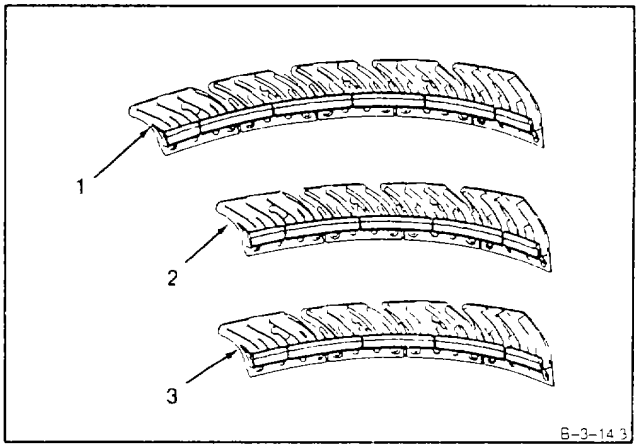
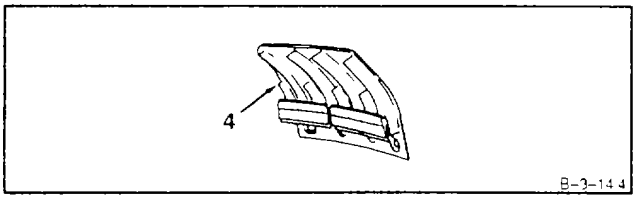
(2) There shall be no more than one crack (7) between vanes (8). There shall be no cracks (7) longer than 3/4 inch or wider than 1/32 inch.



(a) The total length of all cracks in the three longer vane assemblies (1, 2, and 3) shall not be greater than 6 inches.



(b) The total length of all cracks in the shorter vane assembly (4) shall not be greater than 2 inches.



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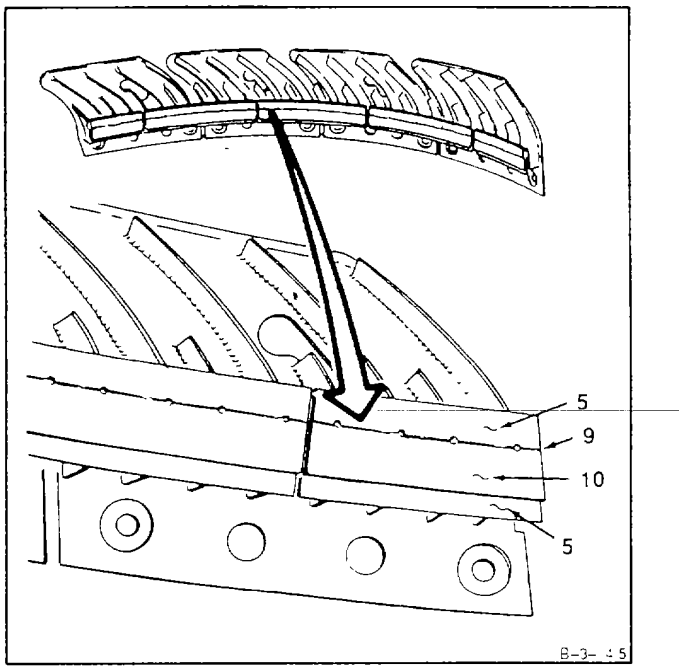
(3) Inspect weld joint (9) between inner shroud (5) and ring (10). There shall be no cracks.



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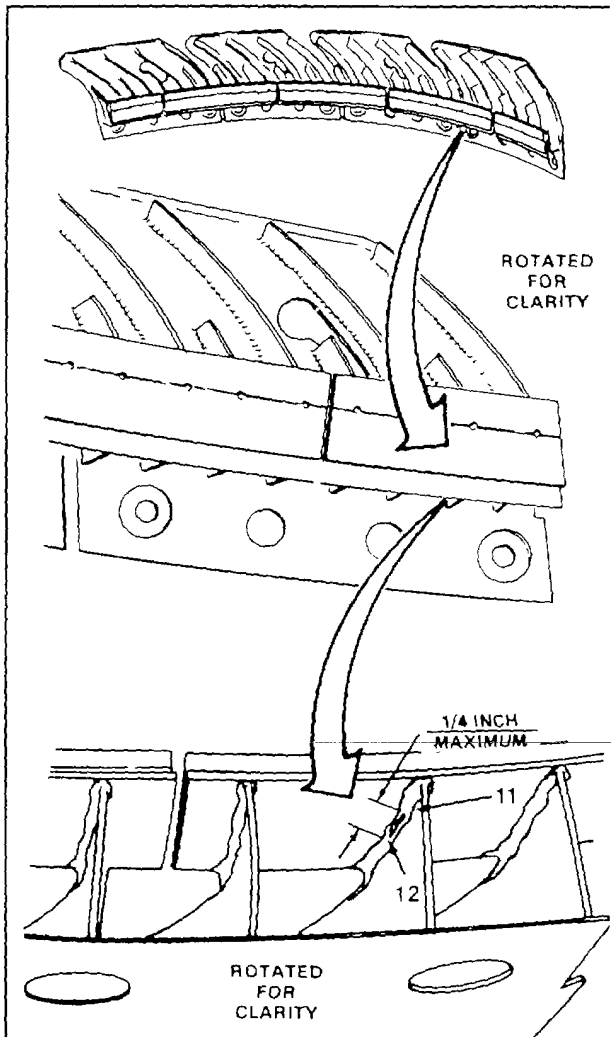
(4) Inspect vane brazement (11). There shall be no cracks (12) longer than 1/4 inch.



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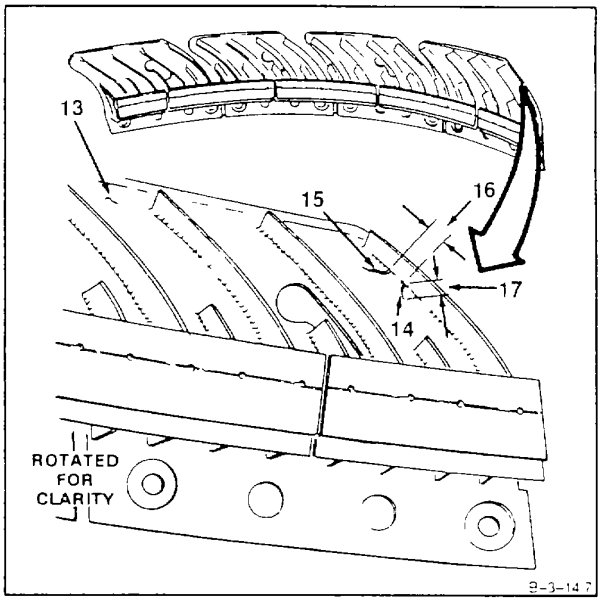
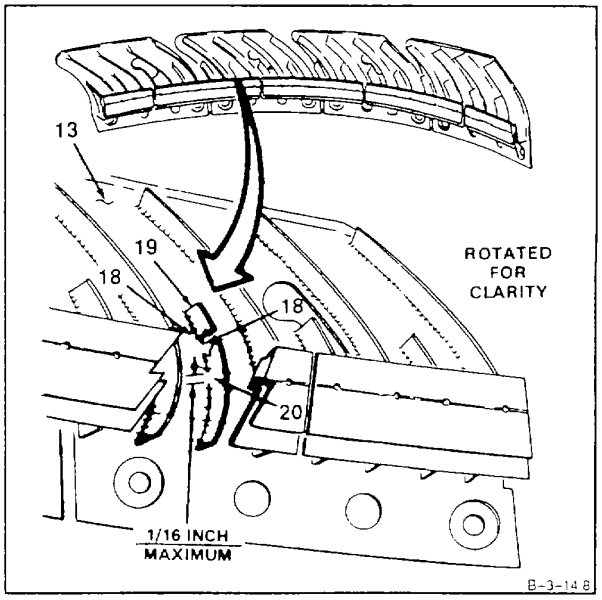
b. Inspect outer shroud (13) as follows:

(i) There shall be no cracks (14 and 15) which do not have minimum separation (16).

(a) Minimum separation (16) shall be equal to the length (17) of shorter crack (14).



(2) Inspect brazement (18) between short vane (19) and outer shroud (13). There shall be no cracks or lack of braze (20) longer than 1/16 inch.



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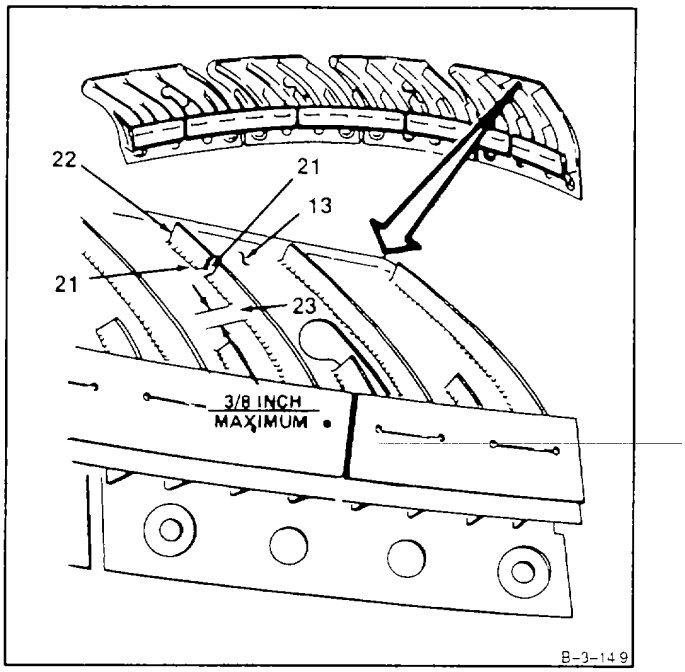
(3) Inspect brazement (21) between long vane (22) and outer shroud (13). There shall be no cracks or lack of braze (23) longer than 3/8 inch.



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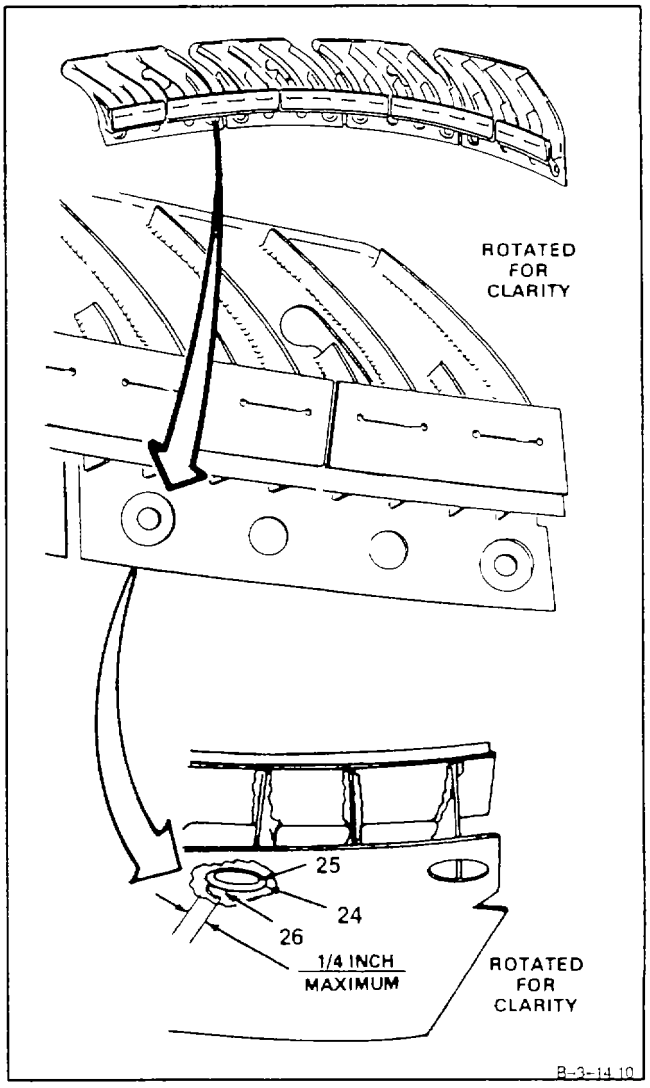
(4) Inspect braze joint (24) around boss (25). There shall be no circular cracks (26) longer than 1/4 inch.



FOLLOW-ON MAINTENANCE
None

END OF TASK

3-15 REPAIR COMBUSTION CHAMBER VANE ASSEMBLY (AVIM) 3-15

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Soft Face Mallet
Wooden Block (Appendix E)

Materials
None

Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. Repair distortion in four vane segments (1, 2, 3, and 4) as follows

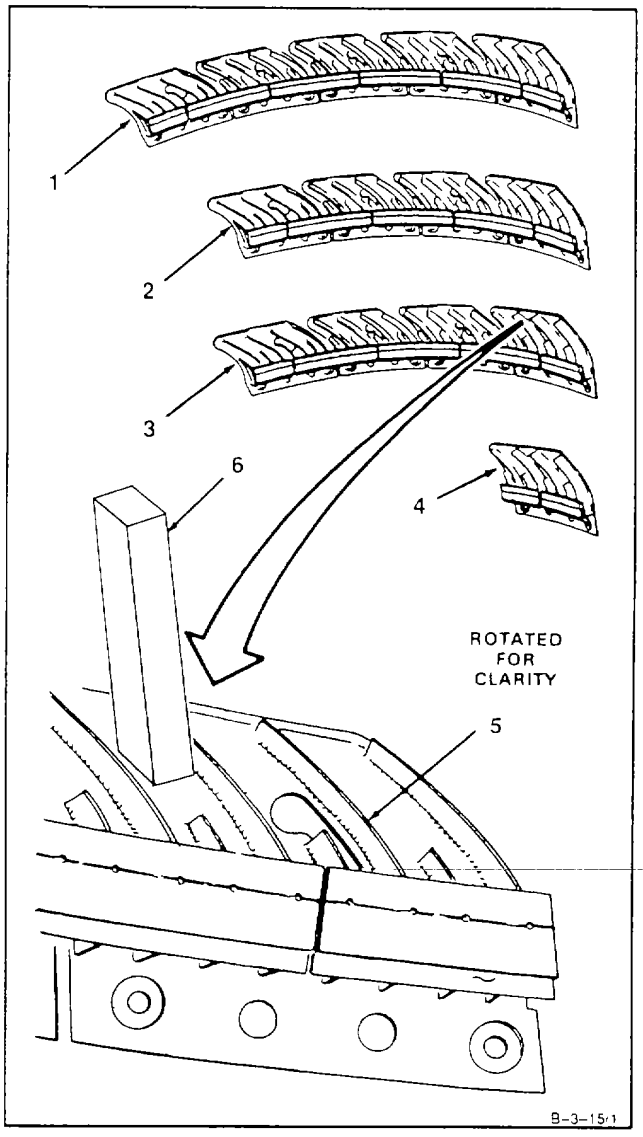
NOTE

The following steps apply to four vane segments Only one vane segment is shown.

a. Position vane segment concave side (5) up on workbench.

b. Place wooden block (Appendix E) (6) in vane segment.

c. Using soft face mallet, rework distorted vane segment to original shape.



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION V
COMBUSTION CHAMBER LINER

3-16 CLEAN COMBUSTION CHAMBER VANE LINER (AVIM) 3-16

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Goggles
Dry Compressed Air Source

Materials:
Gloves (E24)
Denatured Alcohol (E17)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Combustion Section Disassembled (Task 3-9)

General Safety Instructions:

WARNING

Denatured alcohol (E17) 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.

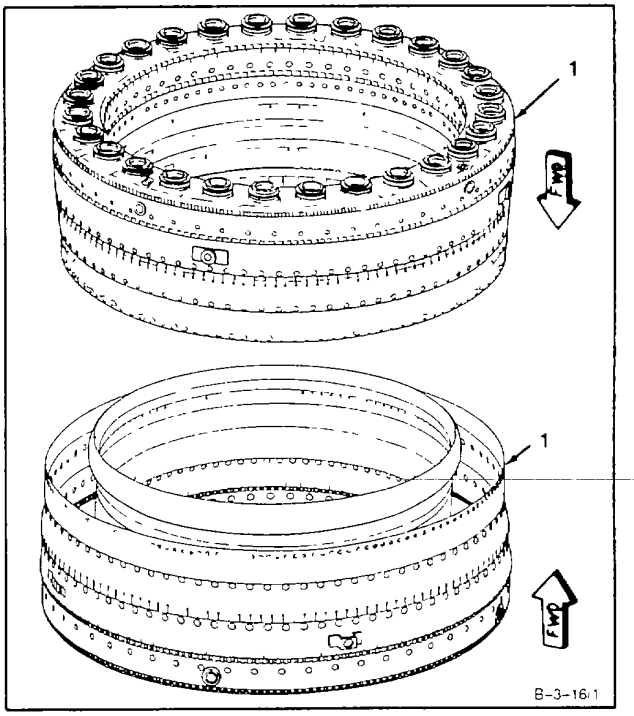
1. **Clean combustion chamber liner (1)** as follows:

   a. Wear gloves (E24) and goggles Use denatured alcohol (El7) and brush.

   WARNING

   When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

   b. **Blow dry combustion chamber liner (1)** Use clean, dry, compressed air.



FOLLOW-ON MAINTENANCE
Inspect Combustion Chamber Liner (Task 3-17)

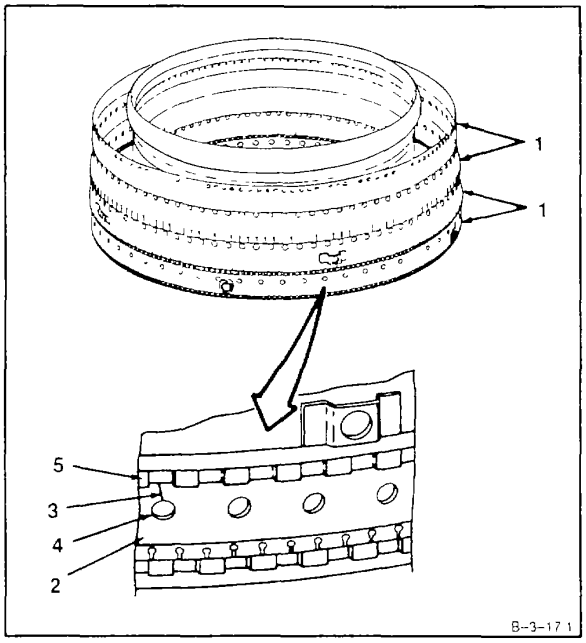
END OF TASK

3-17 INSPECT COMBUSTION CHAMBER LINER (AVIM) 3-17

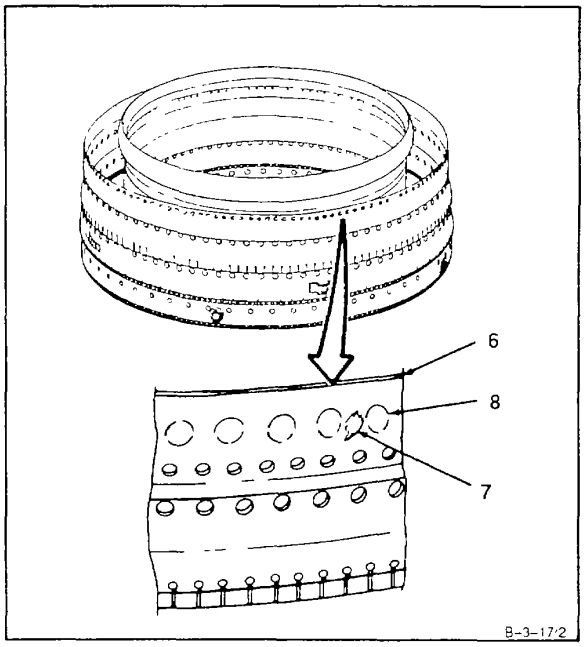
INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1. **Inspect four outer liners (1)** as follows

   a. **Inspect aft outer liner (2).** There shall be no more than one crack (3) per hole (4) reaching to forward edge (5).



   b. **Inspect forward outer liner (6).** There shall be no holes (7) worn through in dimpled area (8).



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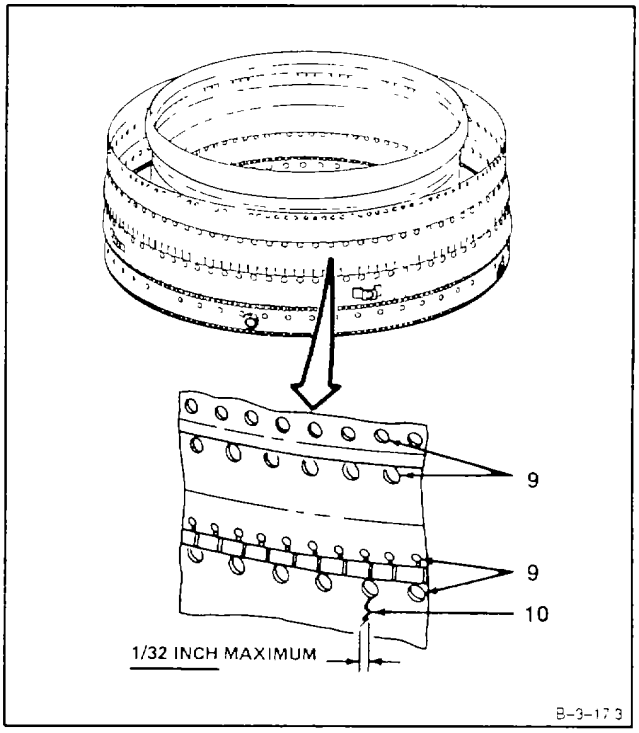
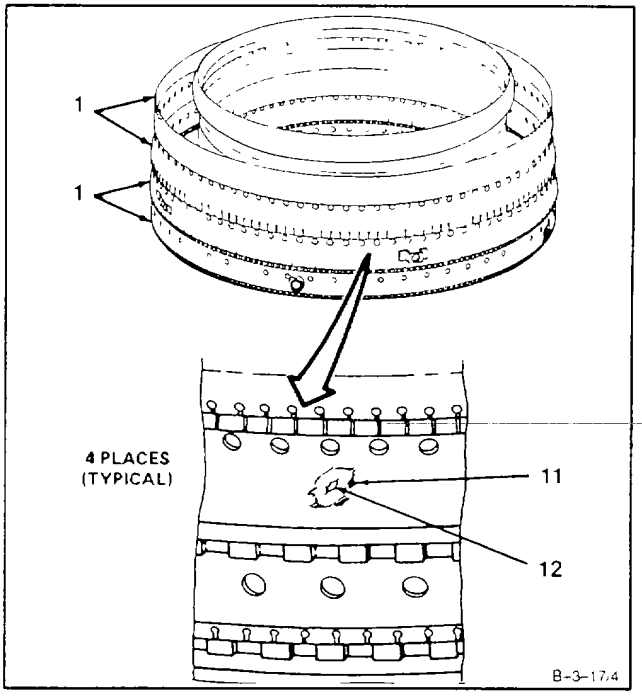
c. **Inspect air holes (9).** There shall be no more than one crack (10) per hole. These cracks shall not be more than 1/32 inch wide. There is no limit on length of these cracks.



d. **Inspect for burned areas (11)** on four outer liners (1). There shall be no holes (12).



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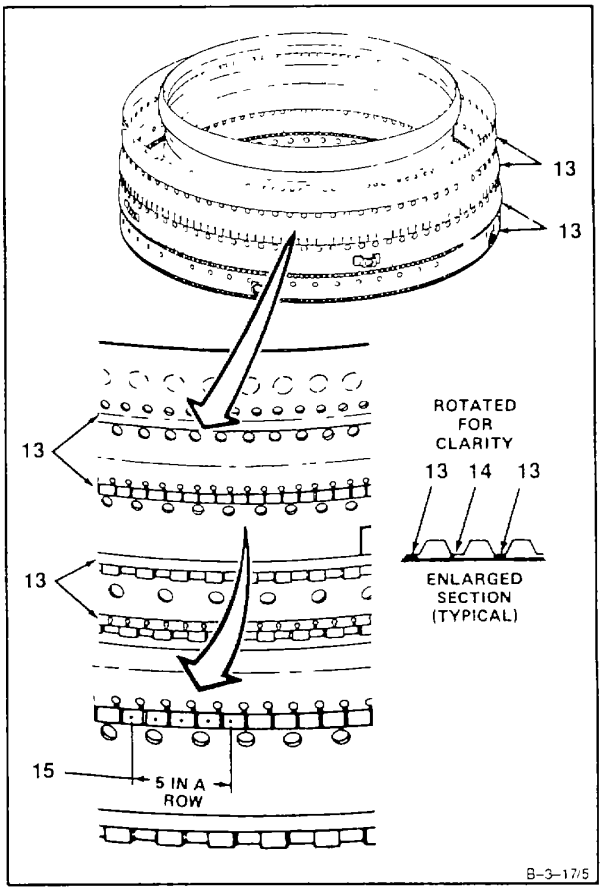
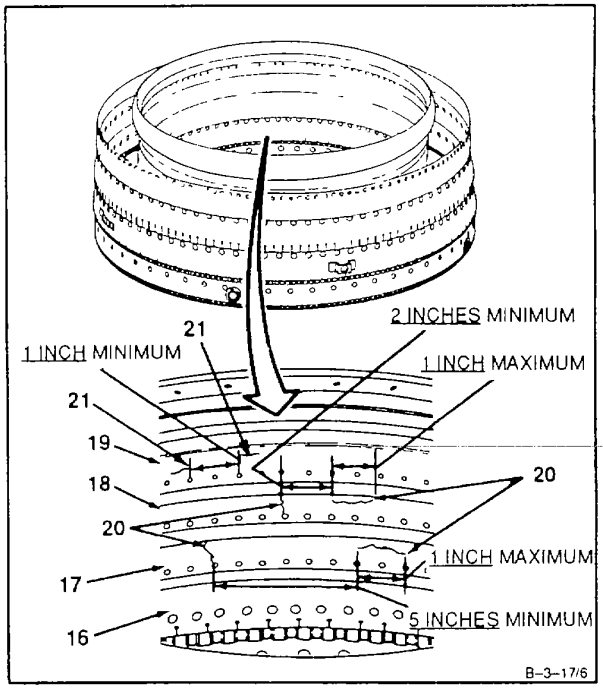
e. **Inspect joints (13).** There shall be no more than five broken or cracked spotwelds (14) in a row (15).



2. **Inspect four inner liners (16, 17, 18, and 19)** as follows

a. There shall be no cracks (20) longer than 1 inch. There shall be no cracks less than 5 Inches apart on liners (16 and 17) or less than 2 inches apart on liner (18) In addition, there shall be one portion with no more than two adjacent cracks (21) on inner liners (16, 17, 18, and 19). These cracks shall be no less than 1 inch apart.



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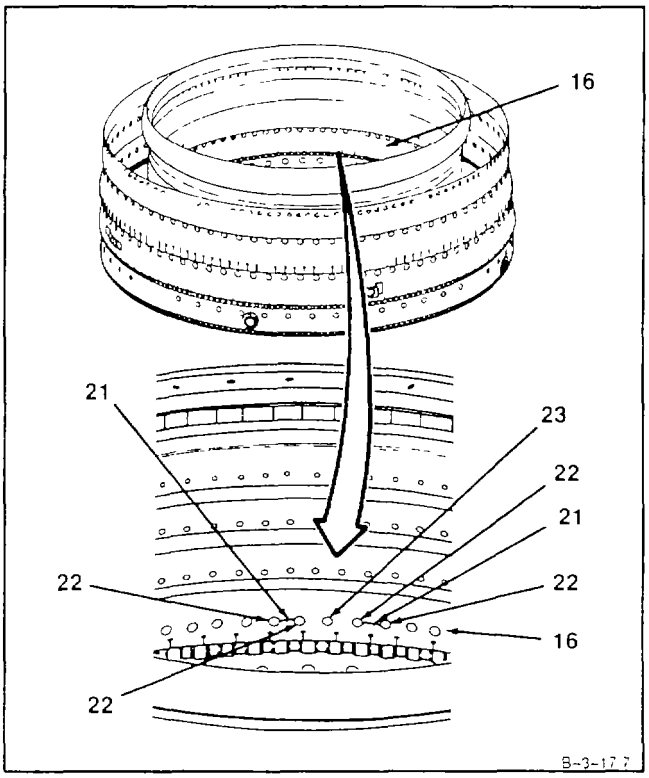
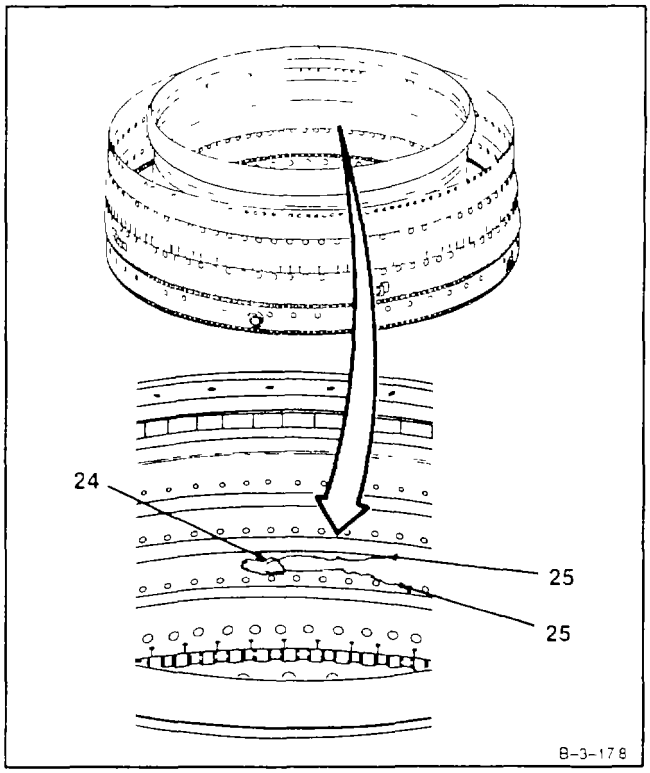
b. **Inspect aft inner liner (16).** There shall be no more than five hole to hole cracks (21) between holes (22). There cracks must be separated by at least one hole without cracks (23).



c. **Inspect for burned areas (24).** There shall be no converging cracks (25) in burned areas which could result in loss of material.



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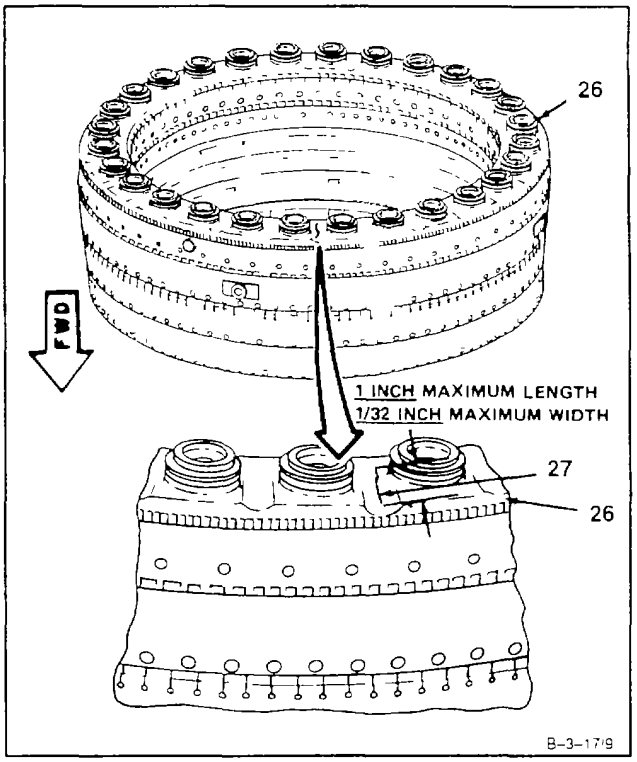
3-17 INSPECT COMBUSTION CHAMBER LINER (AVIM) (Continued) 3-17

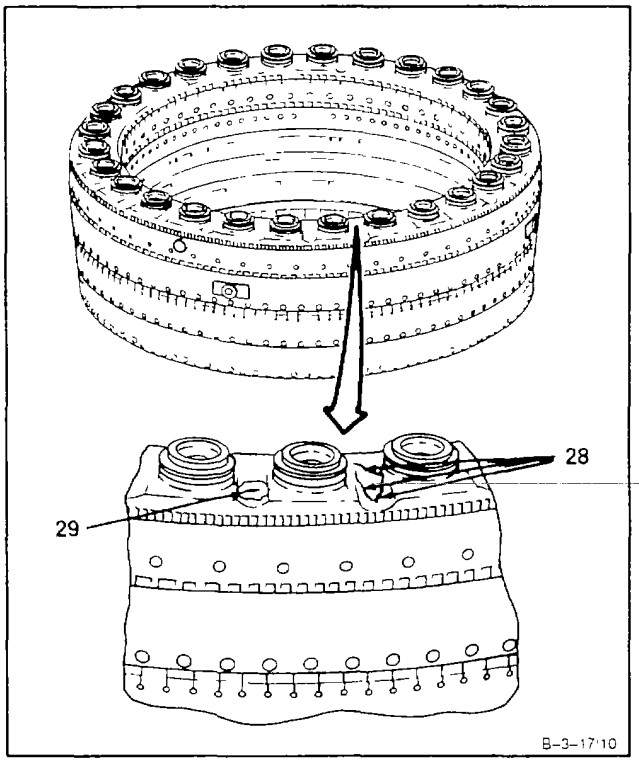
3. **Inspect liner end (26)** as follows:

   a. There shall be no cracks (27) longer than 1 inch or wider than 1/32 inch. The total length of all cracks shall not exceed 10 inches.



   b. There shall be no converging cracks (28) which could result in loss of material.

   c. There shall be no holes (29) burned through.



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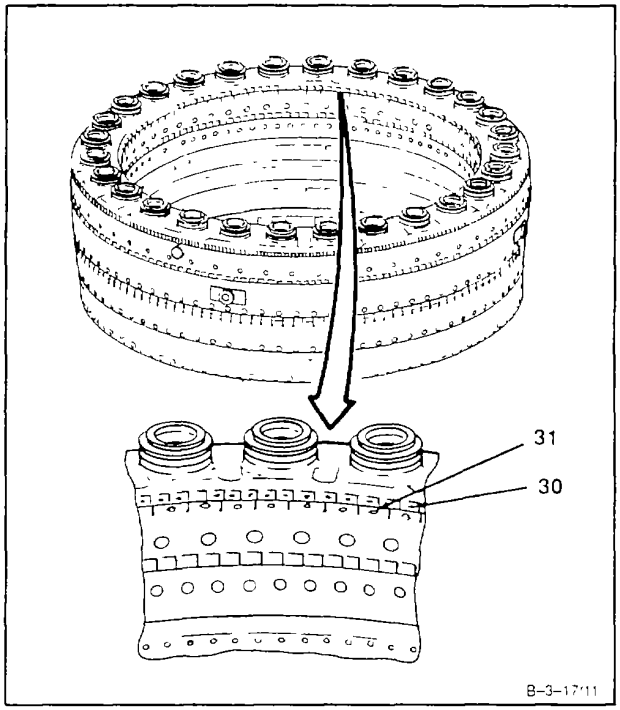
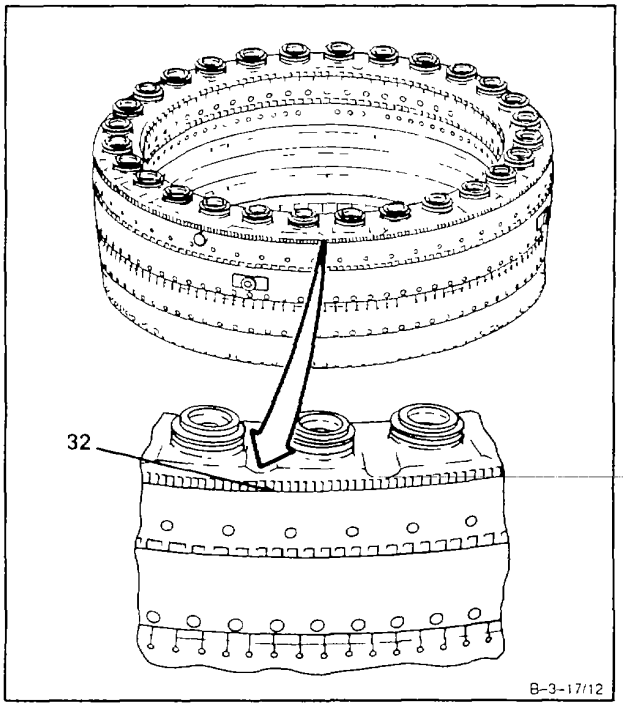
d. **Inspect joint (30).** There shall be no separation in area of spot welds (31).



e. **Inspect joint(32).** There shall be no separation.



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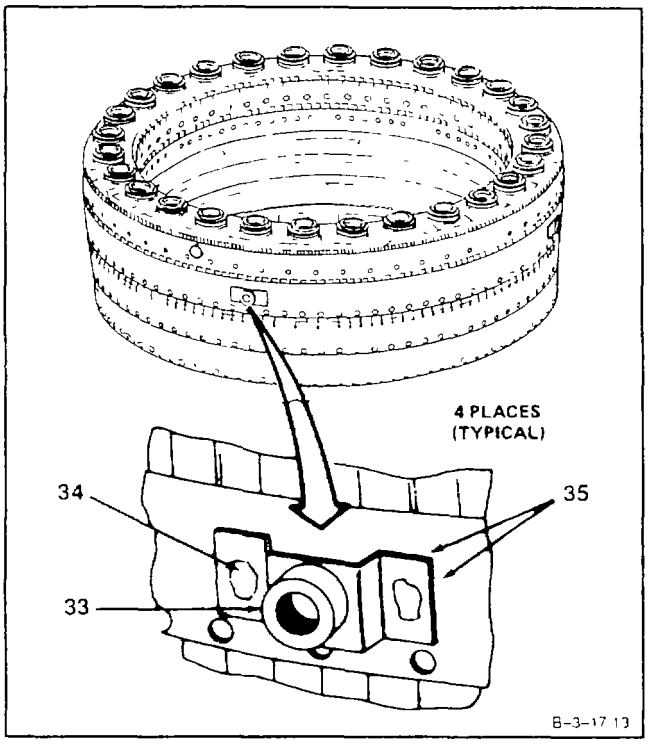
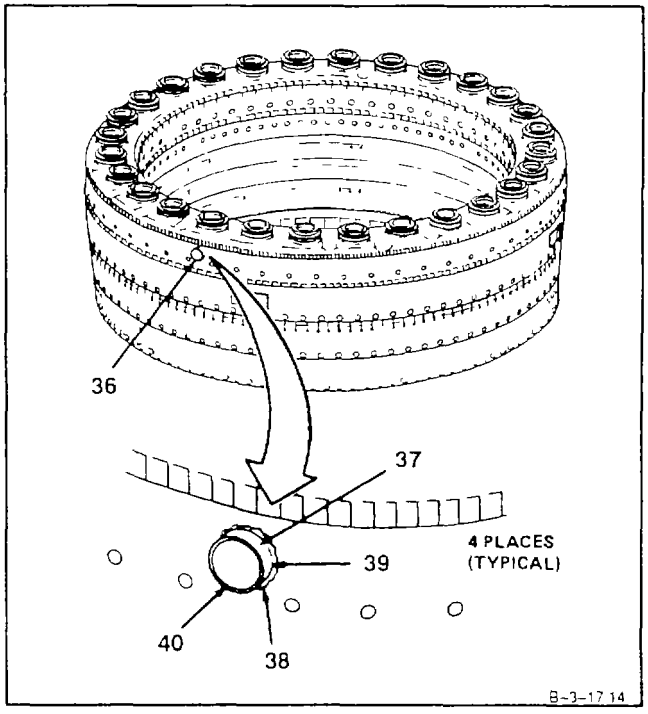
4. **Inspect four locating bushings (33).** There shall be no cracks in bushing (33), welded area (34), or mounting area (35).



5. **Inspect four seal assemblies (36)** as follows.

   a. There shall be no cracks in cup (37), welded area (38), mounting area (39), or igniter plug seal (40).



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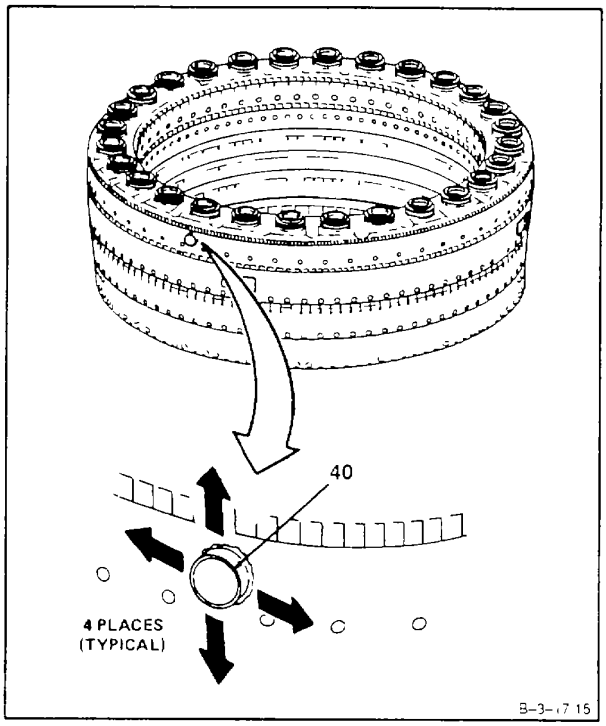
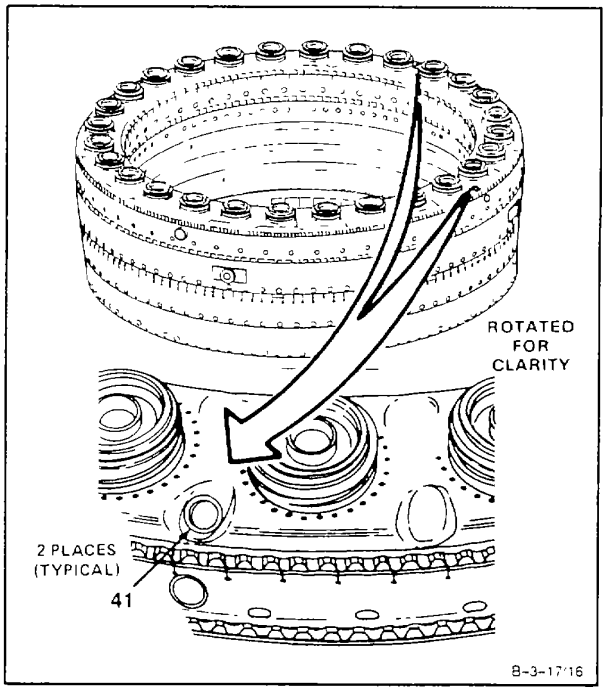
b. Push igniter plug seal (40) sideways in all directions Seal shall move freely in any direction. Use light finger force effort.



6. **Inspect two guides**(41) as follows:

a. There shall be no cracks



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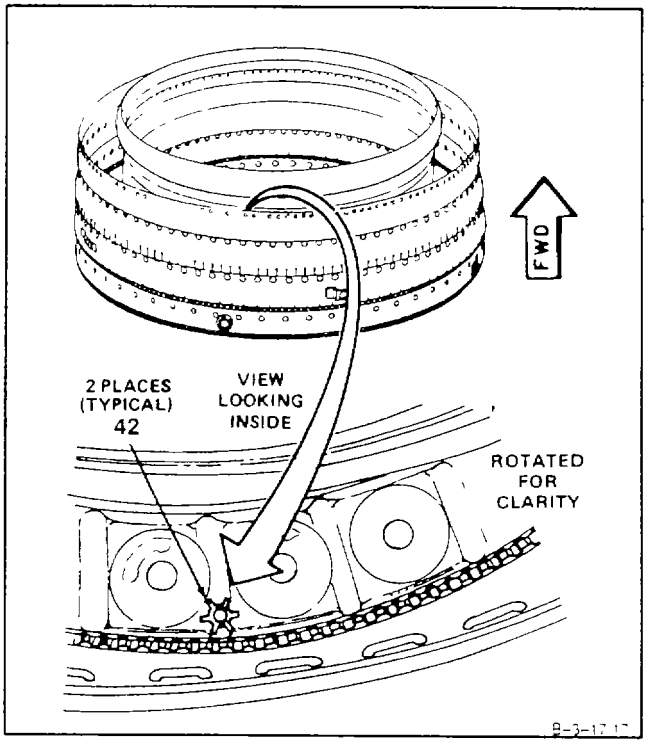
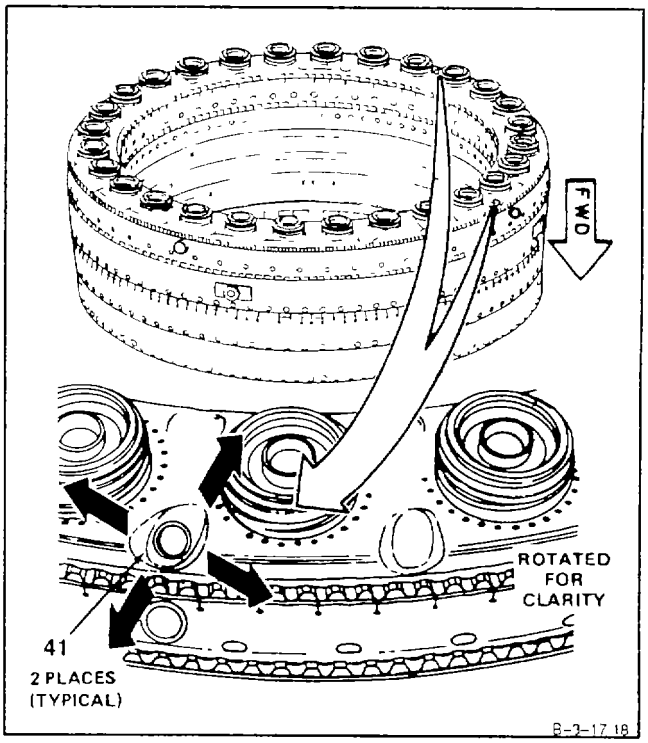
b. There shall be no broken, cracked or missing tabs (42).



c. Push guide (41) sideways in all directions. Guide shall move freely in any direction. Use light finger force effort.



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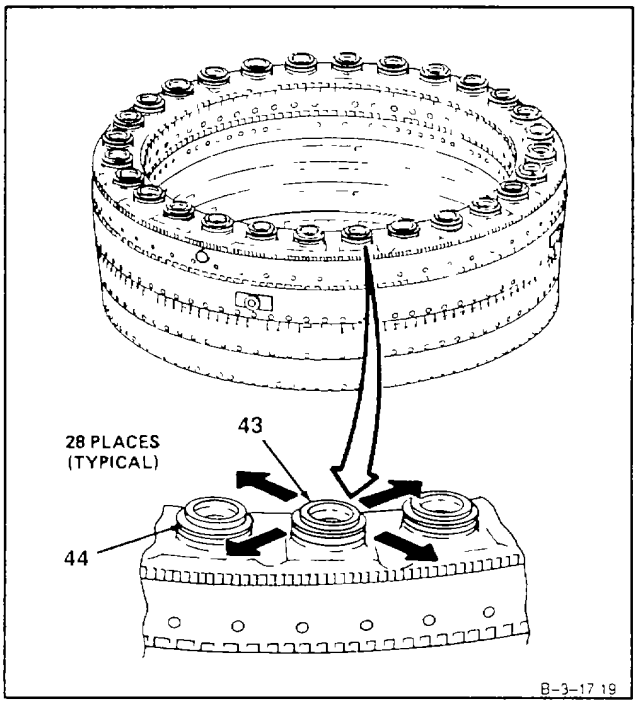
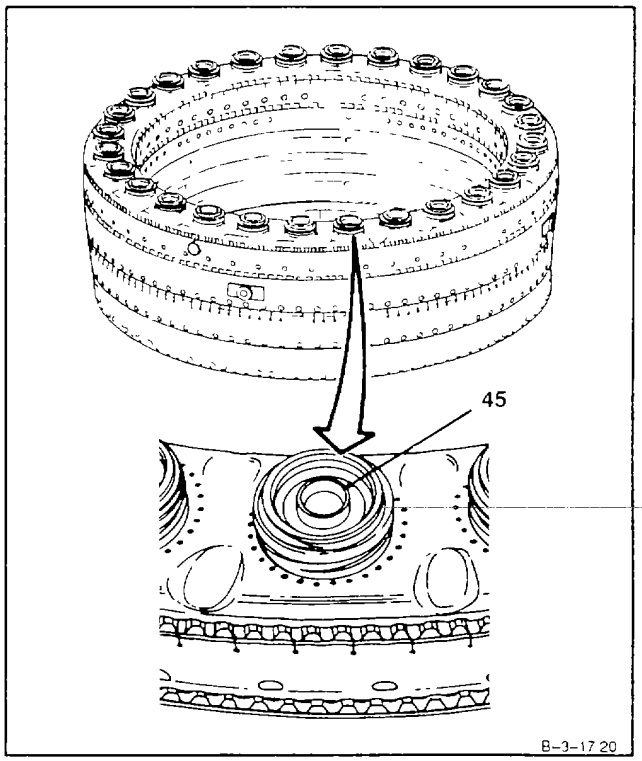
7. Inspect 28 swirlers (43) as follows:

a. Push swirler (43) sideways in all directions with hand. Firm hand pressure shall move swirler slightly. Swirlers shall be considered excessively loose if they can be moved radially with a light finger force effort.

b. Inspect spring (44). There shall be no broken coils.



c. **Inspect fuel nozzle contact area (45)** there shall be no wear that breaks through nozzle contact area (45).



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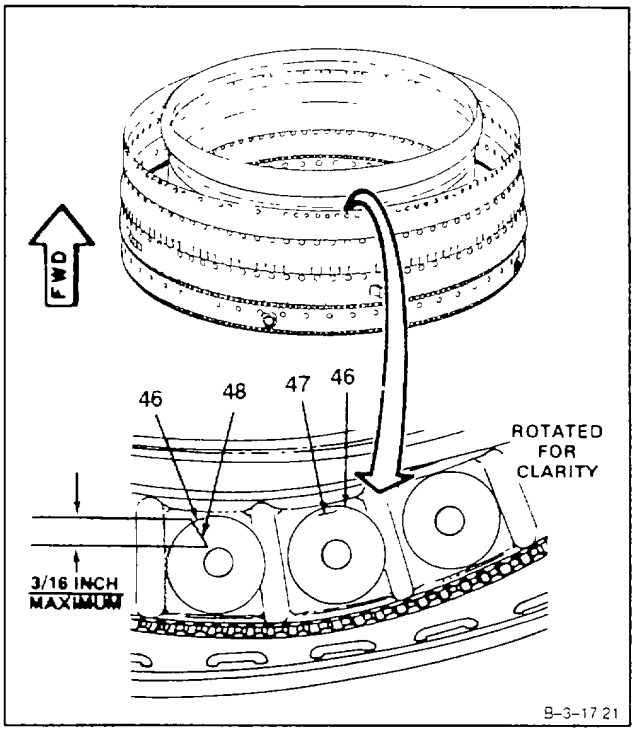
d. **Inspect swirler cup outer edges (46)** as follows:

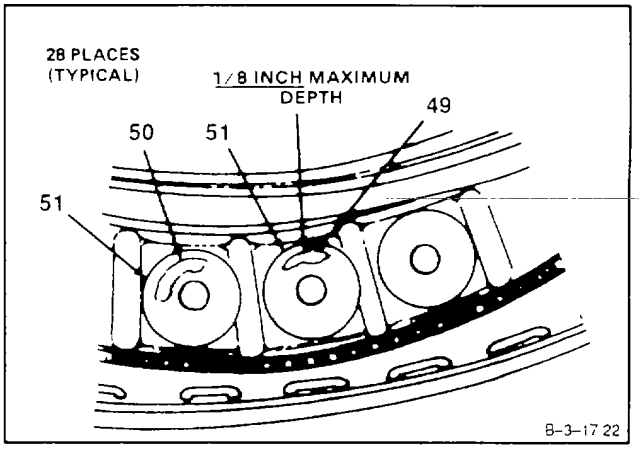
(1) There shall be no circular cracks (47).

(2) there shall be no radial cracks (48) longer than 3/16 inch.



(3) There shall be no burns (49) deeper than 1/8 inch.

(4) Burned area (50) shall not extend more than one-quarter of the way around swirler cup (51).



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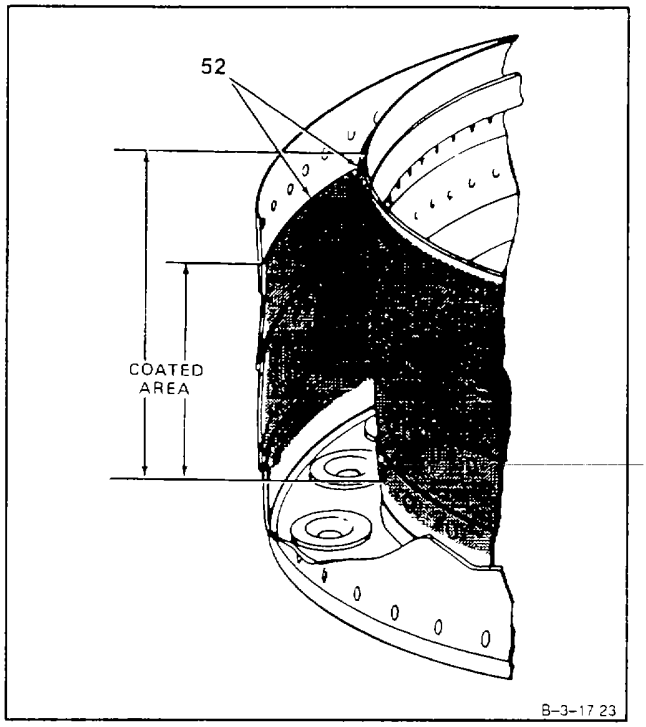
8. Inspect for loss of thermal barrier top and base coats (52) Loss of thermal barrier top and base coats is acceptable provided all other inspection criteria are met.



FOLLOW-ON MAINTENANCE

None

END OF TASK

3-18 REPAIR COMBUSTION CHAMBER LINER (AVIM) 3-18

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Clinching Tool (T14)
Swirler Installation Tool (Appendix E)
Torque Wrench, 30-150 Inch-Pounds
Goggles (2)

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

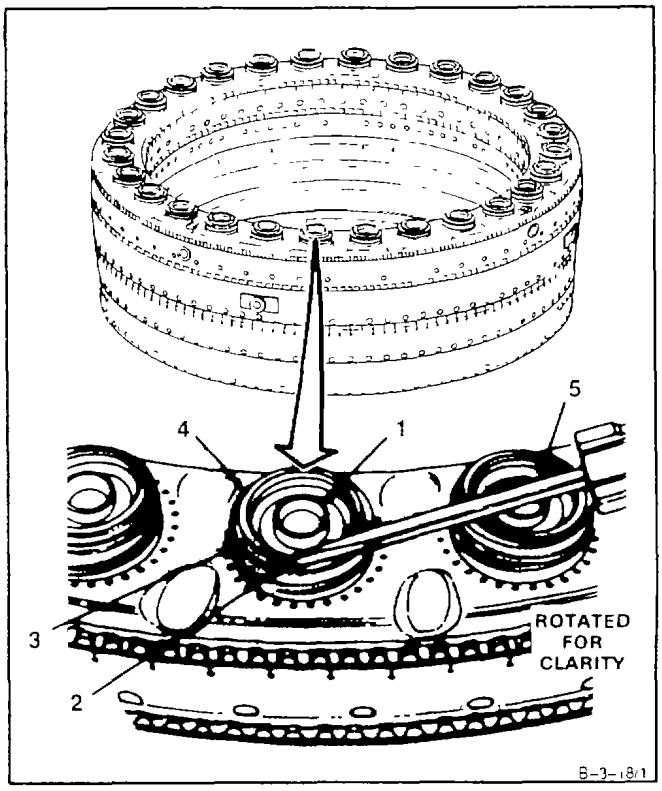
References:
TM 1-2840-252-23P

1. **Remove swirler (1)** as follows

WARNING

Be careful when removing retaining ring. Spring tension could cause parts to spring up and cause injury. If injury occurs, get medical attention

a. Wear goggles Pry tab (2) of ring (3) out from under lip (4) of swirler (1) Use screwdriver (5).



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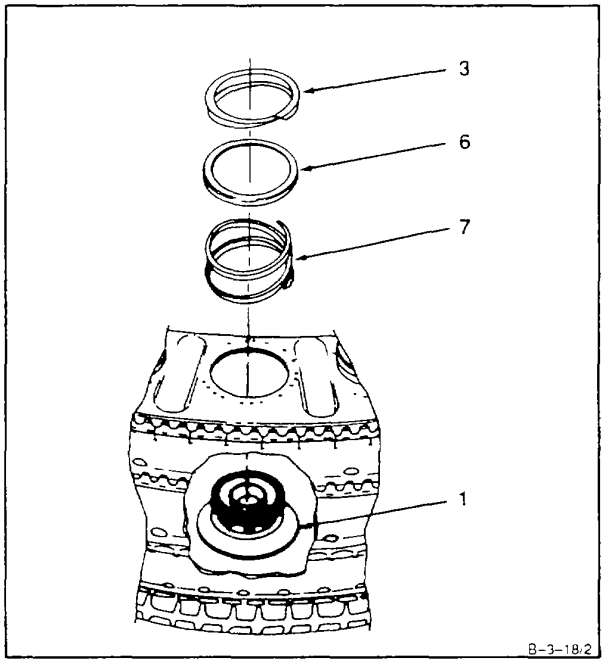
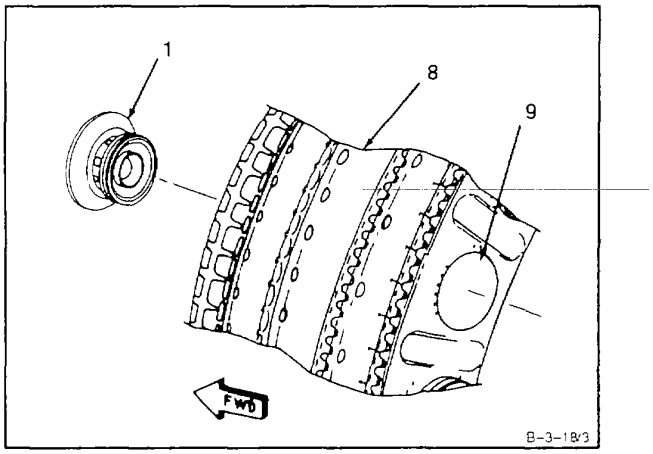
b. Remove ring (3), seat (6). and spring (7) Swirler (1) will drop to bench.



2. **Install swirler (1)**as follows

a. Install serviceable swirler (1) through forward end of liner (8) and into hole (9).



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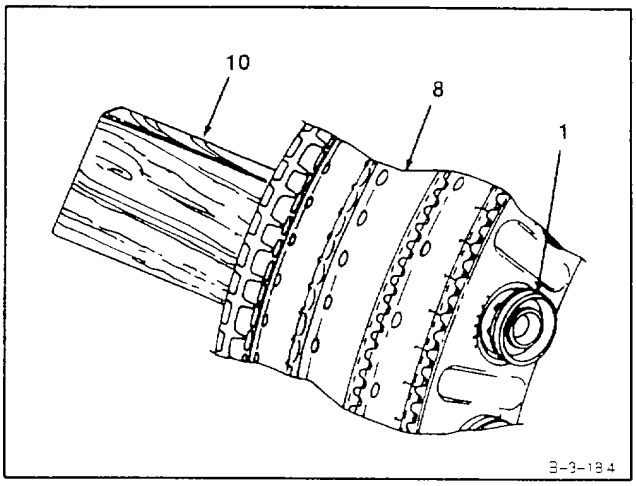
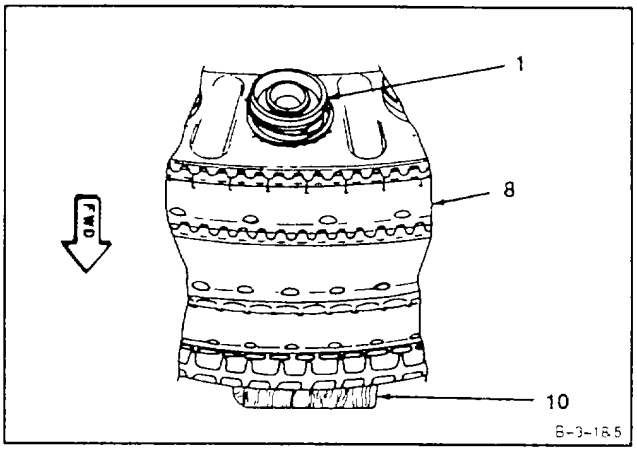
3-18 REPAIR COMBUSTION CHAMBER LINER (AVIM) (Continued) 3-18

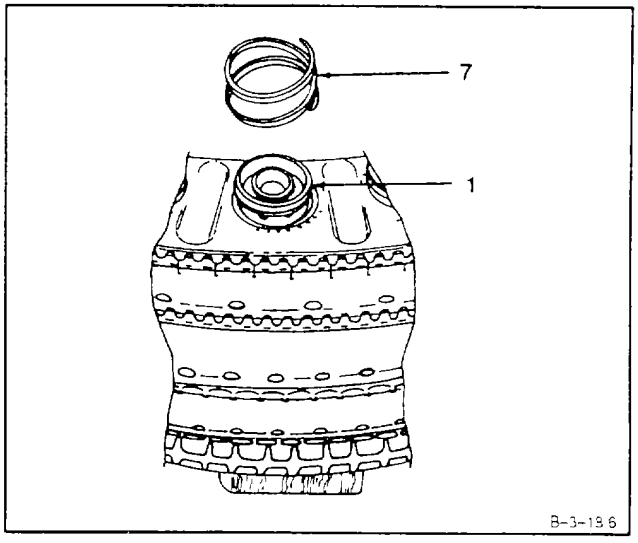
b. Using swirler installation tool (Appendix E) (10), hold swirler (1) in place in liner (8).



c. Set swirler (1), liner (8), forward end down, and swirler installation tool (10) on bench so swirler (1) is held in place by swirler installation tool (Appendix E) (10).



d. Install spring (7) over swirler (1).



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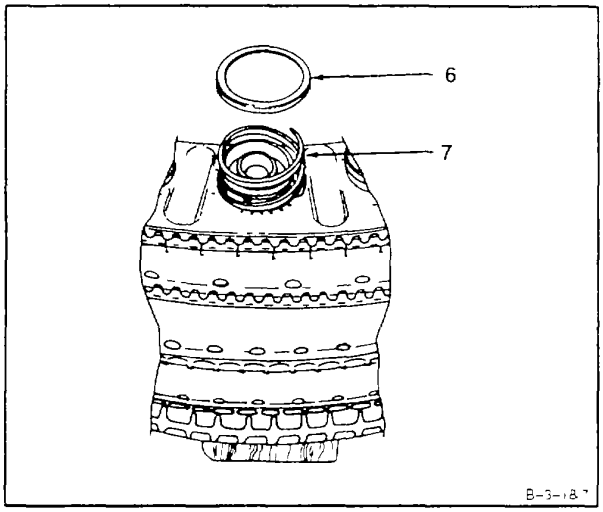
3-18 REPAIR COMBUSTION CHAMBER LINER (AVIM) (Continued) 3-18

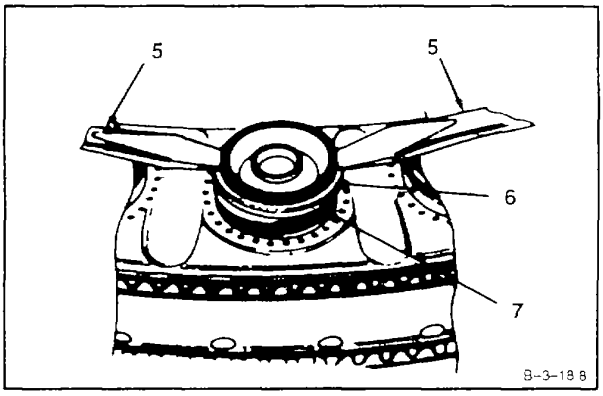
e. Install seat (6) on spring (7).



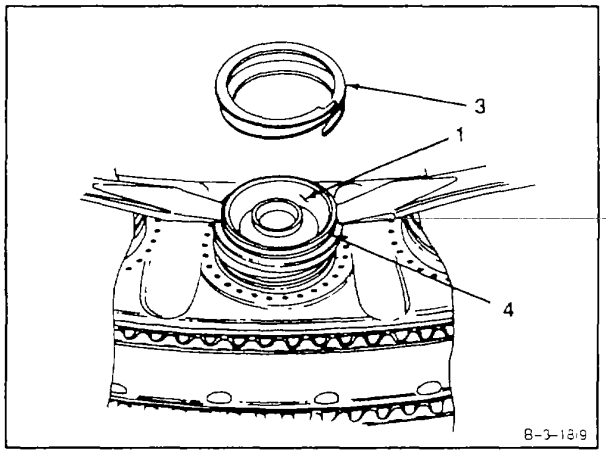
WARNING

Be careful when installing retaining ring. Spring tension could cause parts to spring up and cause Injury. If injury occurs, get medical attention.

f. Wear goggles Using two screw drivers (5), press down seat (6) to compress spring (7).



g. Have helper wear goggles and install ring (3) under lip (4) of swirler (1)



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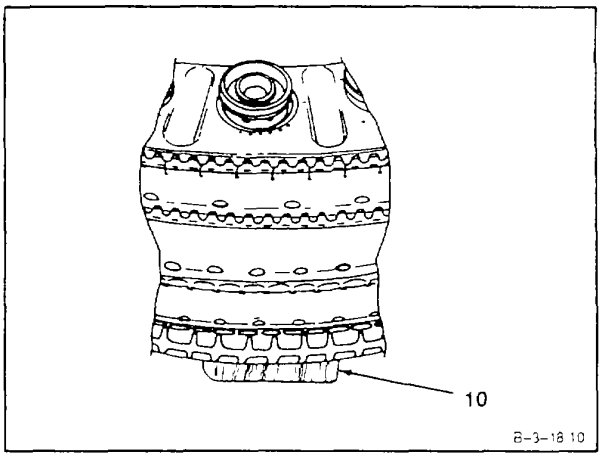
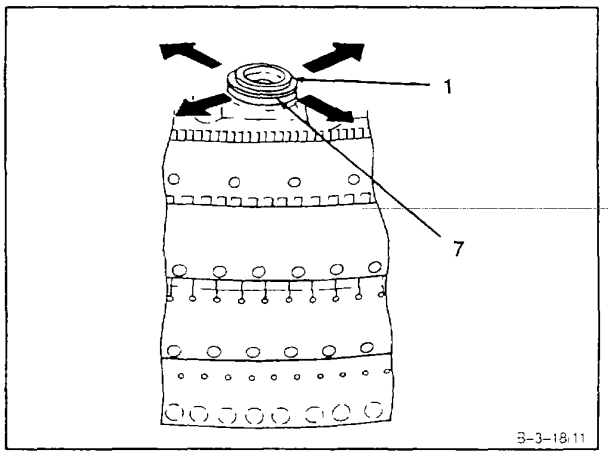
h. Remove swirler installation tool (10).



i. **Check swirler for proper fit and spring tension** as follows

(1) Push swirler (1) sideways in all directions with hand Firm hand pressure shall move swirler slightly Swirlers shall be considered excessively loose if they can be moved radially with a light finger force effort

(2) If swirler is excessively loose, replace spring (7)



INSPECT

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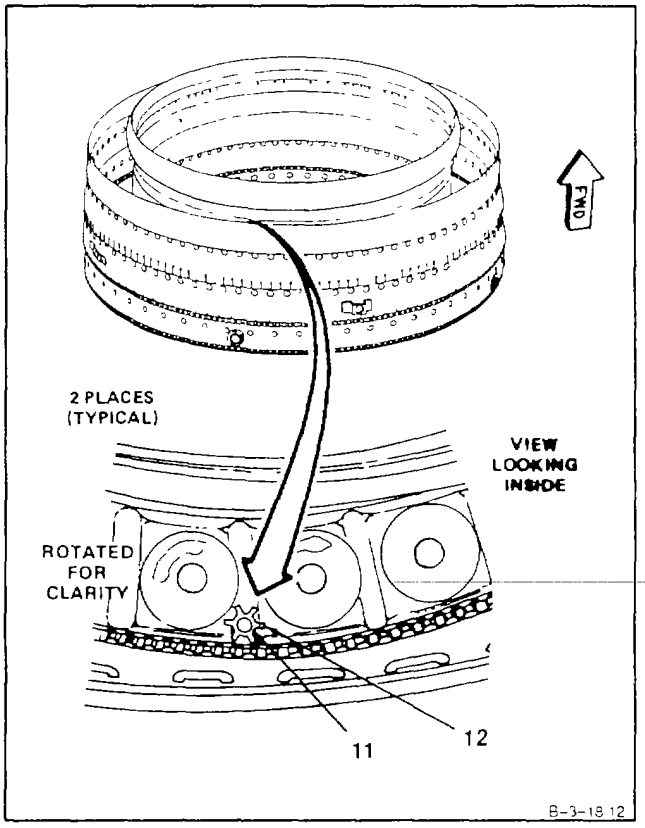
3-18 REPAIR COMBUSTION CHAMBER LINER (AVIM) (Continued) 3-18

3. **Remove nozzle guide (11)** as follows.

   a. Straighten six bent tabs (12) Use 6 inch long, round nose pliers.



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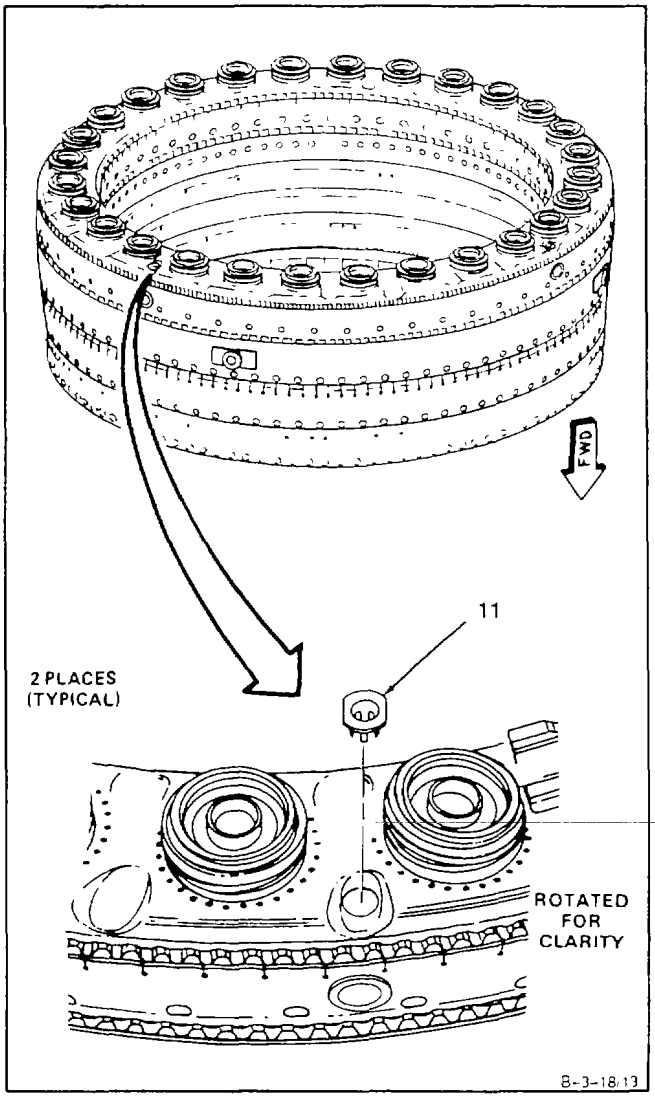
3-18 REPAIR COMBUSTION CHAMBER LINER (AVIM) (Continued) 3-18

b. Remove nozzle guide (11).



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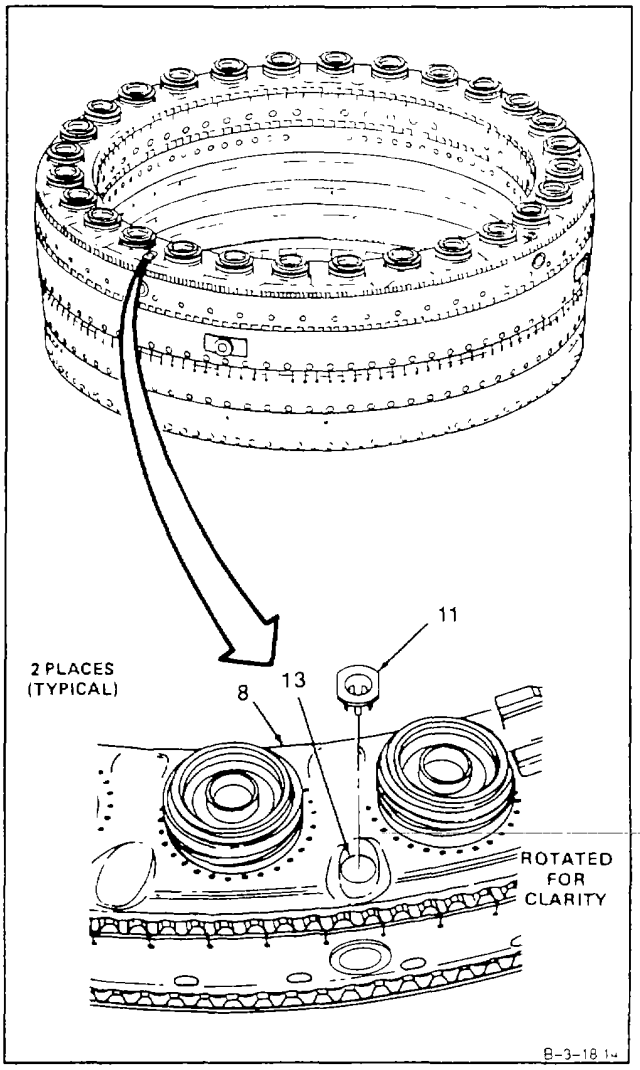
4. **Install nozzle guide (11)** as follows.

   a. Install nozzle guide (11) in hole (13) in combustion chamber liner (8).



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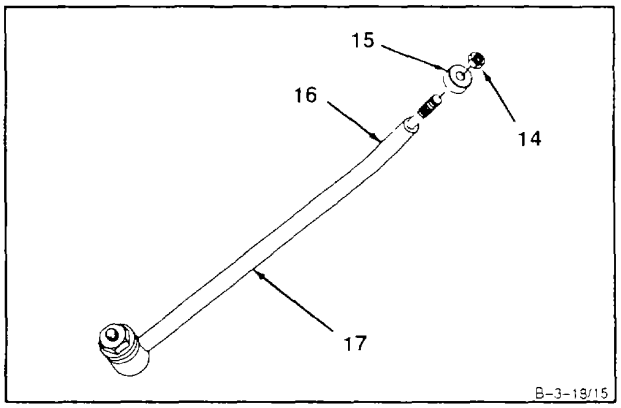
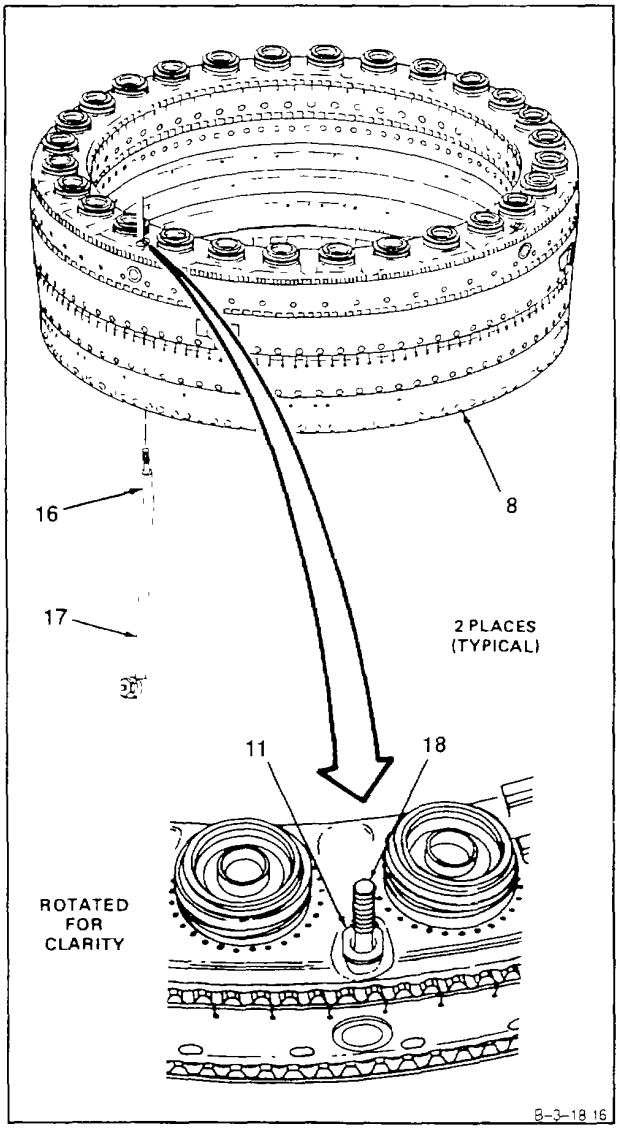
3-18 REPAIR COMBUSTION CHAMBER LINER (AVIM) (Continued) 3-18

b. Remove nut (14) and ring (15) from bent end (16) of clinching tool (T14) handle (17).



c. Insert bent end (16) of clinching tool (T14) handle (17) into combustion chamber liner (8) until threaded end (18) projects through nozzle guide (11).



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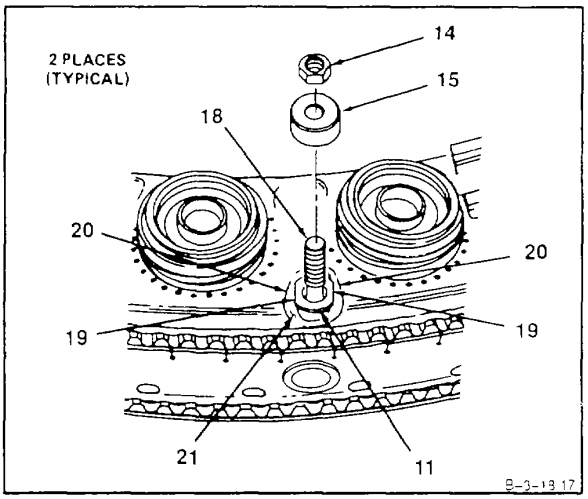
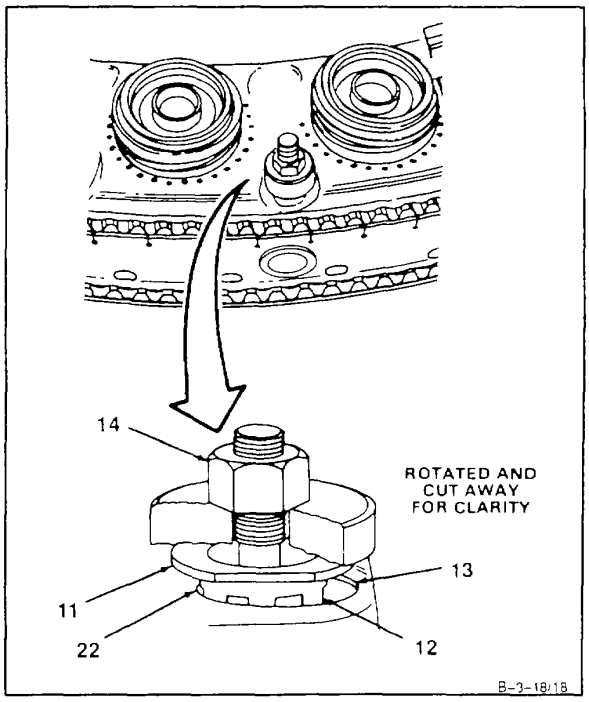
3-18 REPAIR COMBUSTION CHAMBER LINER (AVIM) (Continued) 3-18

d. Align flats (19) on nozzle guide (11) with edges (20) of indentation (21) Install ring (15) and nut (14) on threaded end (18).



e. Hold nozzle guide (11) against inner edge (22) of hole (13) and tighten nut (14) to bend six tabs (12) **Torque nut to 45 inch-pounds.**



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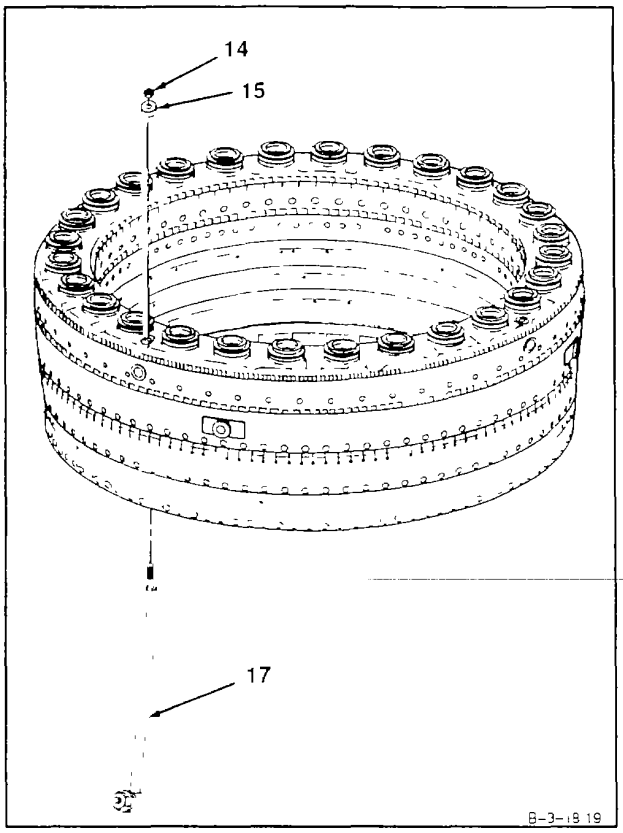
3-18 REPAIR COMBUSTION CHAMBER LINER (AVIM) (Continued) 3-18

f. Remove nut (14), ring (15) and clinching tool (T14) handle (17).



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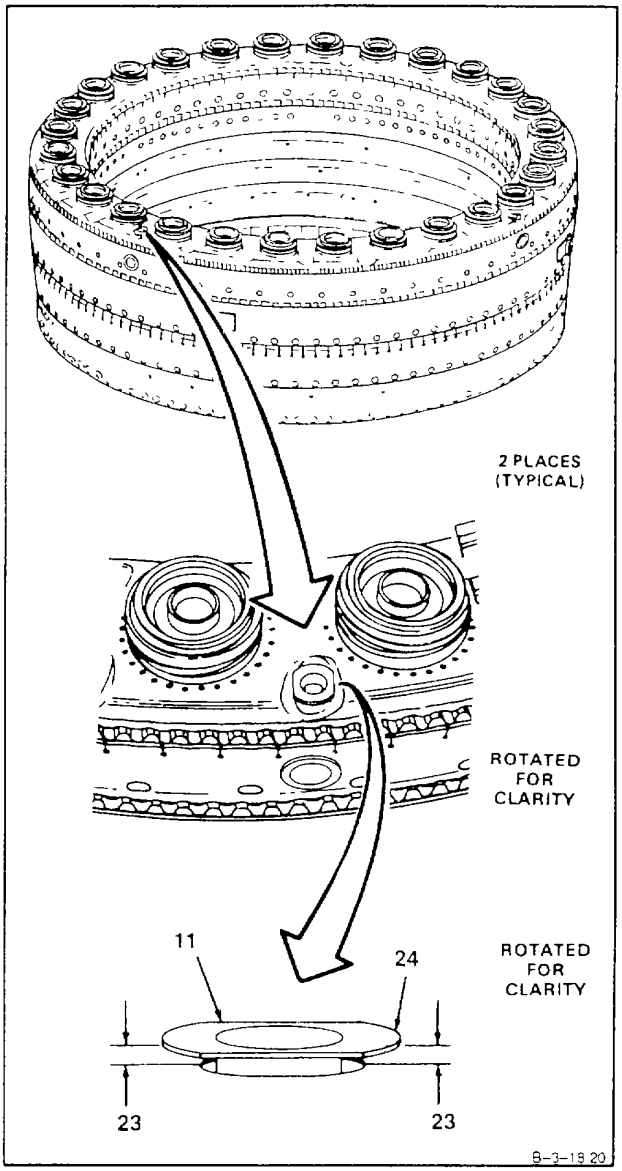
g. **Check nozzle guide (11) for proper clearance and freedom of movement** as follows:

(1) Push nozzle guide (11) in aft direction and measure clearance (23) under lip (24) at two places Clearance (23) shall not be less than 0.015 inch or more than 0.025 inch.



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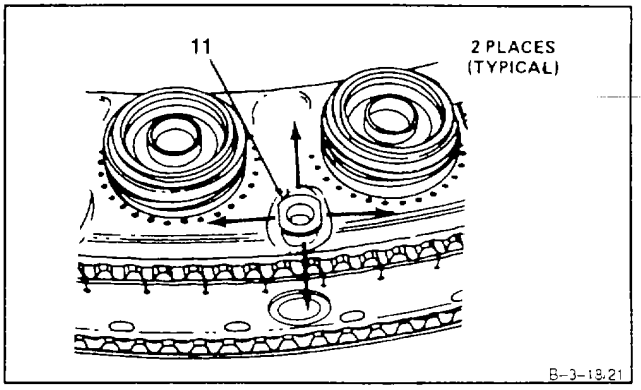
(2) Push nozzle guide (11) sideways in all directions Use light finger force effort Nozzle guide (11) shall move freely in any direction

(3) If proper clearance or freedom of movement cannot be obtained, replace nozzle guide (11)



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION VI

COMBUSTION CHAMBER HOUSING

3-19 CLEAN COMBUSTION CHAMBER HOUSING (AVIM) 3-19

INITIAL SETUP

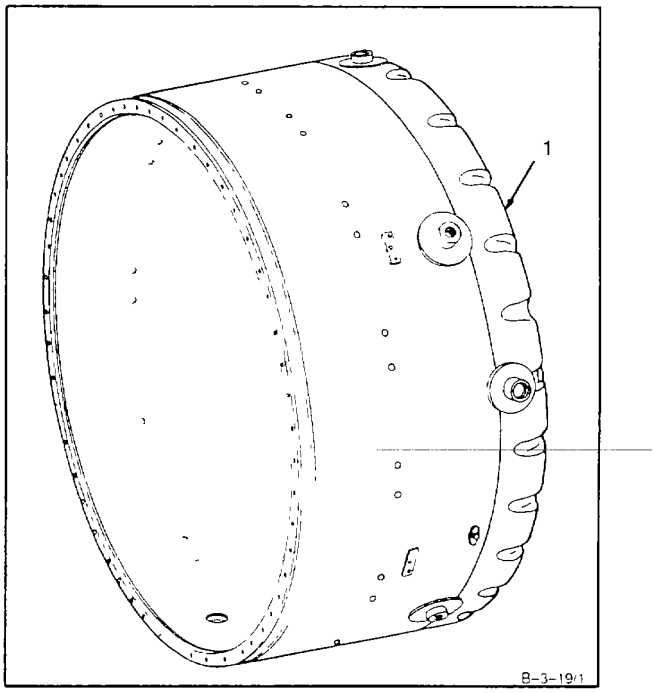
Applicable Configurations:
All
Tools:
Dry Compressed Air Source
Fiber Brush
Goggles
Materials:
Gloves (E24)
Denatured Alcohol (E17)
Personnel Required:
Aircraft Powerplant Repairer
Equipment Condition:
Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Combustion Section Disassembled (Task 3-9)

WARNING

Denatured alcohol (E17) 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 water for at least 15 minutes, Get medical attention for eyes.

1. **Clean combustion chamber housing (1)** as follows:

   a Wear gloves (E24) and goggles Use denatured alcohol (E17) and fiber brush.



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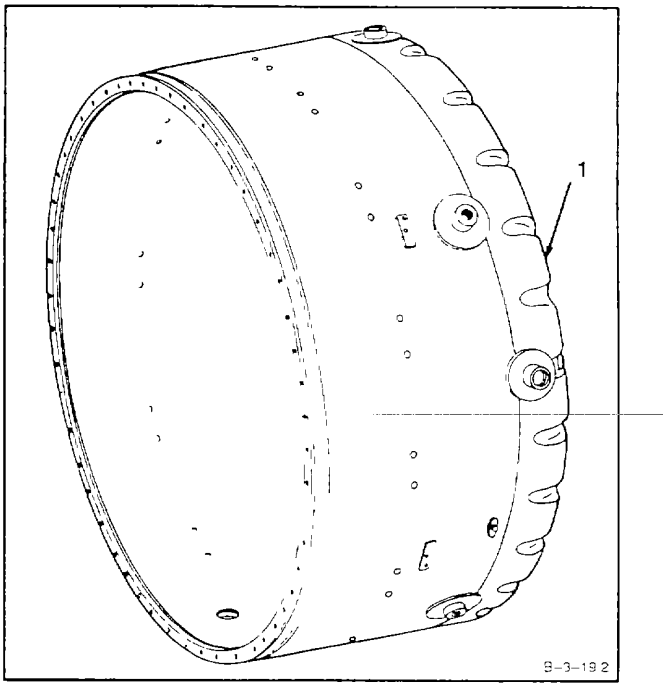
WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person Failure to comply could result in injury to eyes or skin. In case of Injury, get medical attention.

b. **Blow dry combustion chamber housing (1).** Use clean, dry, compressed air.



FOLLOW-ON MAINTENANCE

Inspect Combustion Chamber Housing (Task 3-20)

END OF TASK

3-20 INSPECT COMBUSTION CHAMBER HOUSING (AVIM) 3-20

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

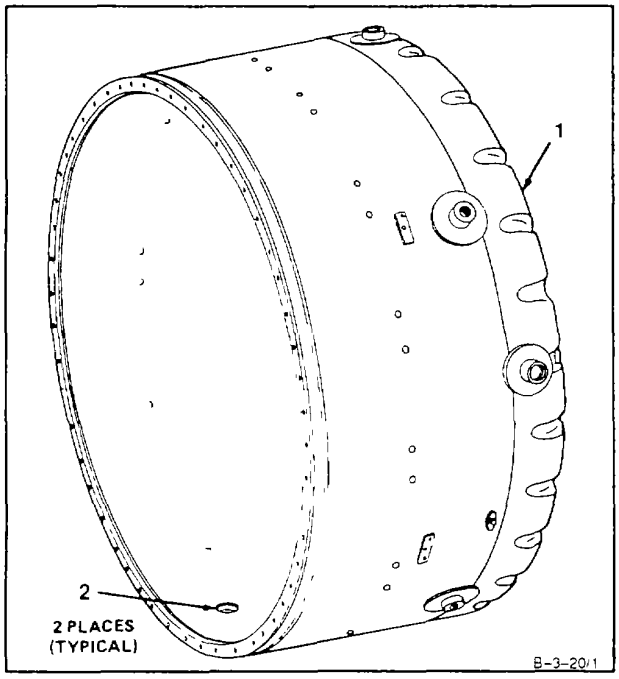
Materials:
None

Personnel Required:
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. **Inspect combustion chamber housing (1).** There shall be no cracks.

   a Inspect two fuel drain valve mounting boss weldments (2) There shall be no cracks.



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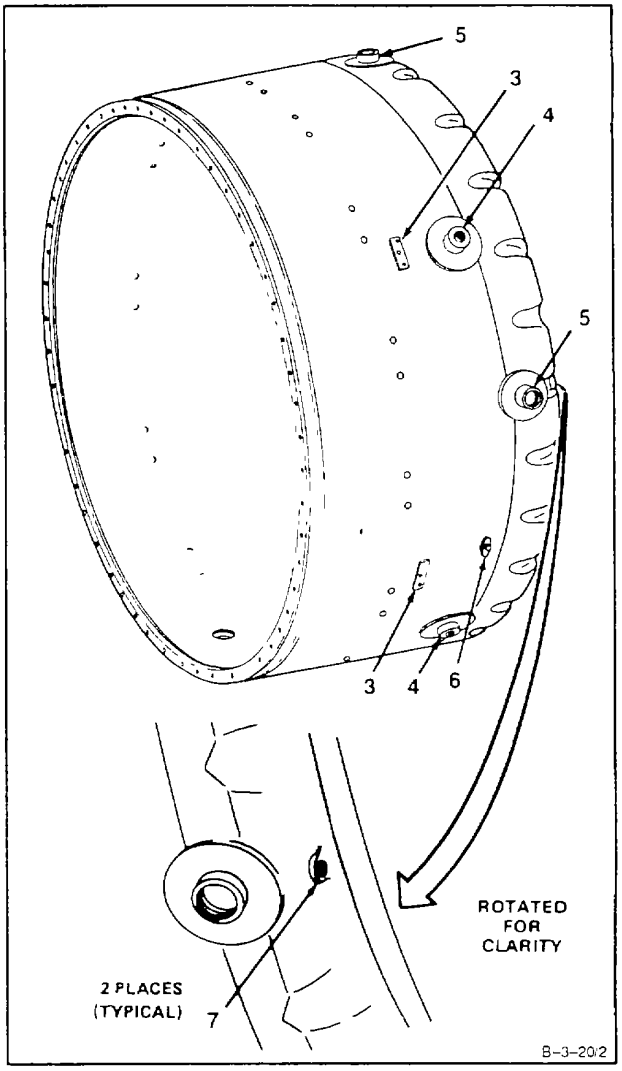
2. **Inspect four plate bosses (3), four mounting bosses (4), four igniter bosses (5) and eight nut plates (6)** There shall be none missing or broken They shall be securely mounted.

3. **Inspect two start fuel nozzle bosses (7)** They shall not be missing or broken They shall be securely mounted.



FOLLOW-ON MAINTENANCE

None

END OF TASK

3–21 REPAIR COMBUSTION CHAMBER HOUSING (AVIM) 3–21

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit.
NSN 5180–00–323–5114
General Support Welding Aircraft Maintenance Shop Set,
NSN 5130–00–621–2043
Portable Electric Grinder
NSN 5130–00–857–8526
Goggles

Materials/Parts:

Fluorescent–Penetrant Materials (E73), Appendix C

Materials/Parts:

Welding Wire (E66)
Nut Plates

Personnel Required:

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:

TM 1–1500–204–23–8
TM 1–2840–252–23P
TM 1–1500–335–23
Task 3–19

Equipment Condition:

Off Engine Task

WARNING

Welding operations are hazardous. Harmful light rays may injure eyes and burn skin. Poisonous fumes may cause illness. Burns and fires may result from hot sparks. Wear approved protective clothing and equipment. Perform welding operations in well–ventilated areas away from flammable liquids and gases. If fire occurs, call for assistance and use proper extinguishing procedures. If injury or illness occurs, get medical attention.

1. **Repair combustion chamber housing** nut plates (1) if damaged or missing as follows:

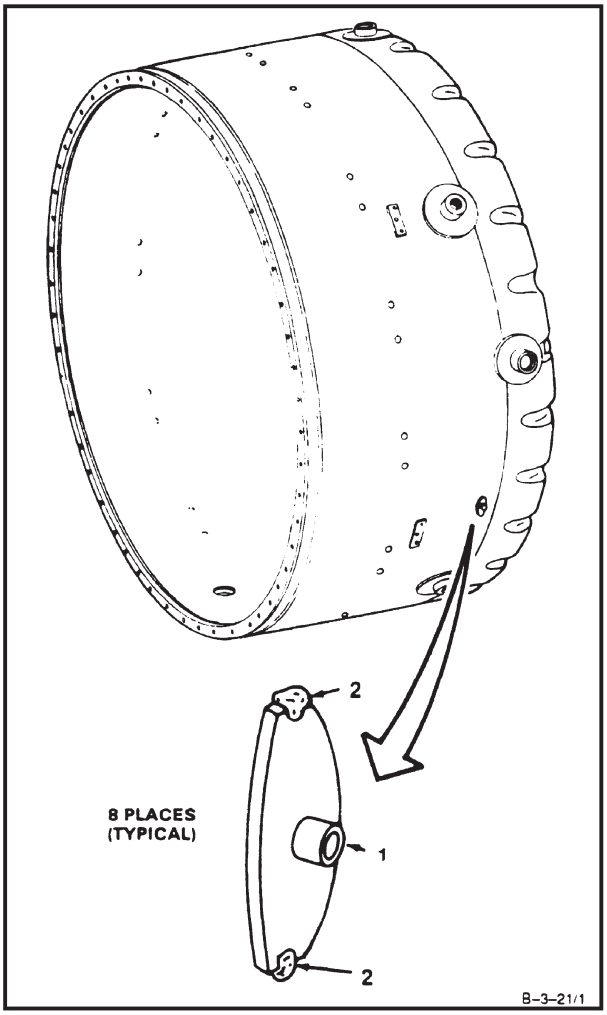
WARNING

Power grinding is hazardous to personnel. Sparks and metal chips may injure eyes. If injury occurs, get medical attention.

CAUTION

Be careful not to grind into parent metal. Damage will result to the combustion chamber housing.

a. Wear goggles. Remove damaged nut plate (1) by grinding tack welds (2). Use a portable electric grinder.



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b. Clean chips, dirt, and oil from area to be repaired (Ref. Task 3–19).

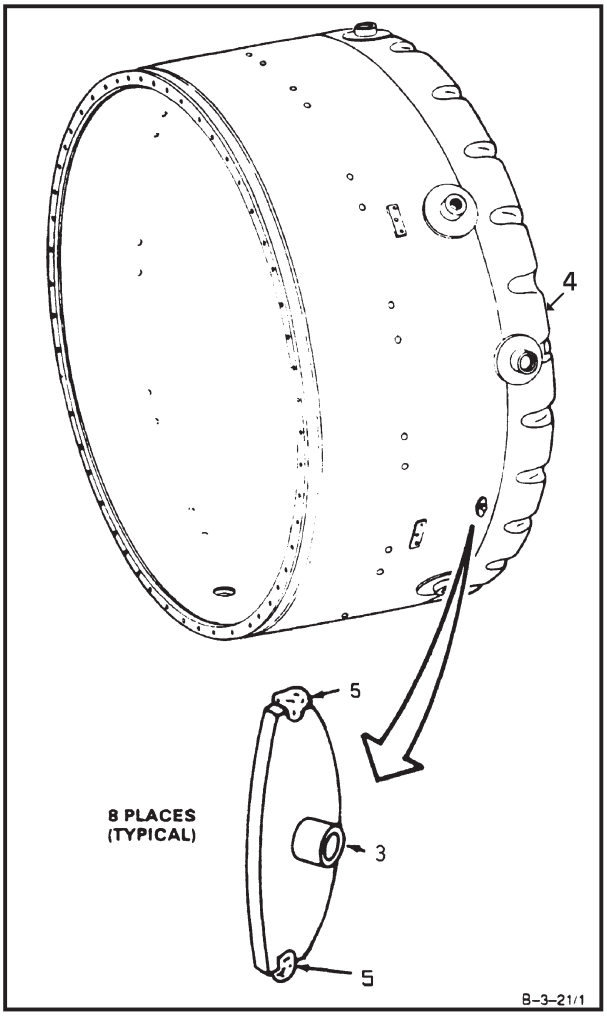
c. Position replacement nut plate (3) on combustion chamber housing (4).

NOTE

In following step d., use proper welding procedure at all times. (Ref. TM 1–1500–204–23–8).

d. Tack–weld both ends (5) of nut plate (3) using tungsten inert gas method. Use welding wire (E66).

e. Fluorescent–penetrant inspect tack welds for cracks. (Ref. TM 1–1500–335–23). There shall be no cracks. if cracks are found, repeat steps a through d.



INSPECT

FOLLOW–ON MAINTENANCE

None

END OF TASK

CHAPTER 4

TURBINE SECTION - MAINTENANCE INSTRUCTIONS

CHAPTER OVERVIEW

This chapter contains maintenance procedures for the turbine section It is divided into the following sections and tasks:

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	4-2	Clean Thermocouple Jumper Lead	4-8
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SECTION	TASK NO.	TITLE	PAGE
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	4-75	Assemble Tailpipe Assembly	4-426
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SECTION I

THERMOCOUPLE JUMPER LEAD

4-1 REMOVE THERMOCOUPLE JUMPER LEAD 4-1

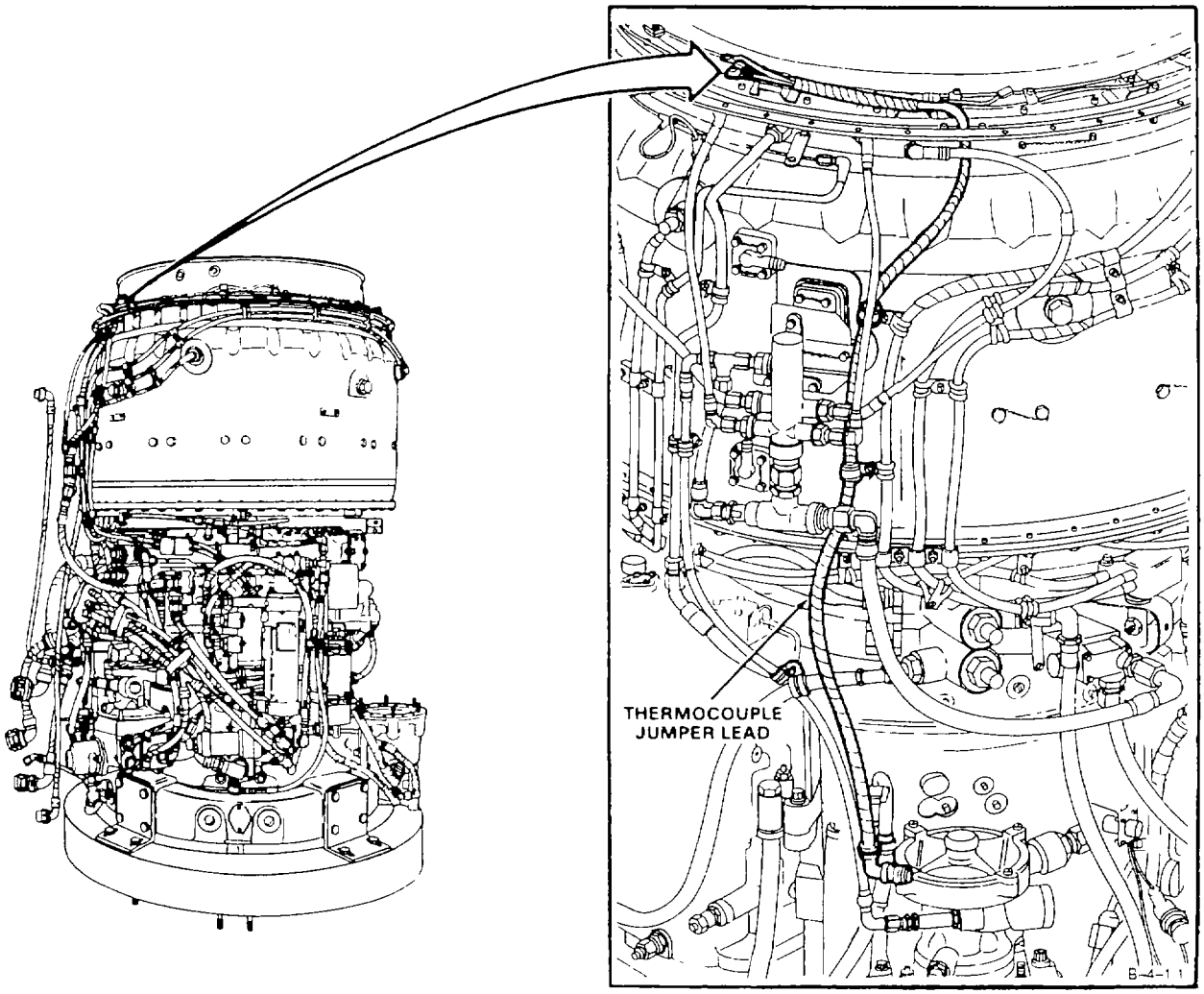
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer



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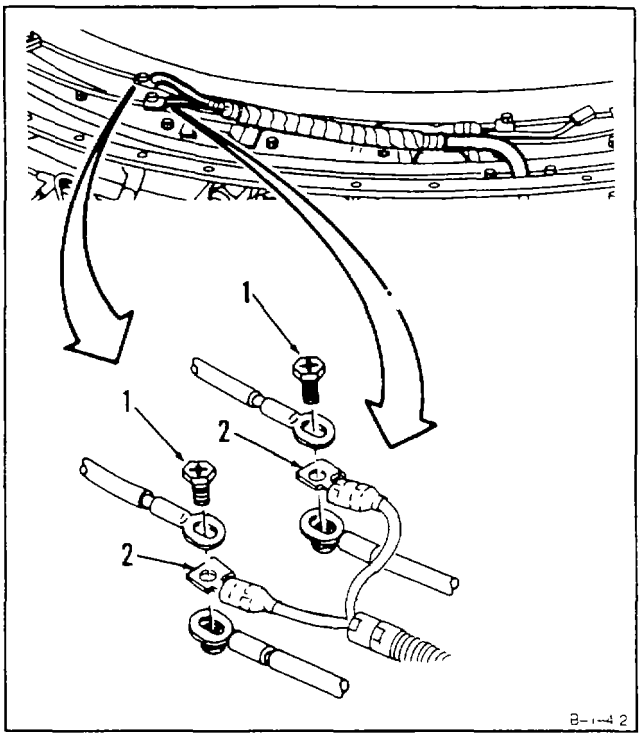
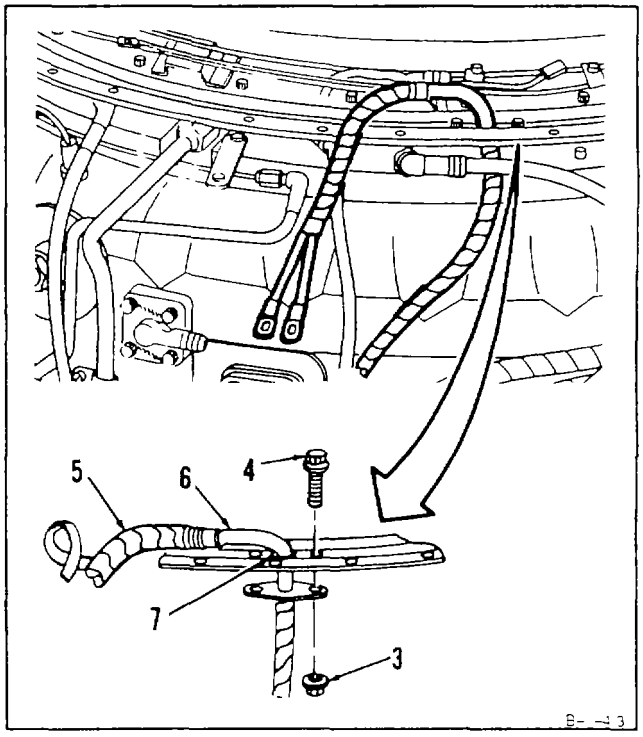
4-1 REMOVE THERMOCOUPLE JUMPER LEAD (Continued) 4-1

1. **Remove** two screws (1) and two **thermocouple jumper lead ends (2).**



2 Remove two nuts (3), two bolts (4), and spiral chafing sleeve (5). **Withdraw thermocouple jumper lead (6) through hole (7)** in fireshield assembly.



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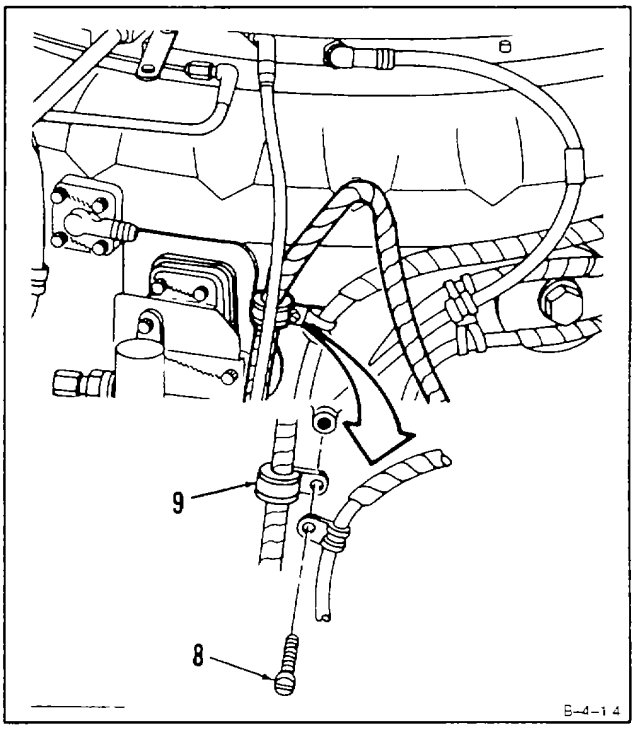
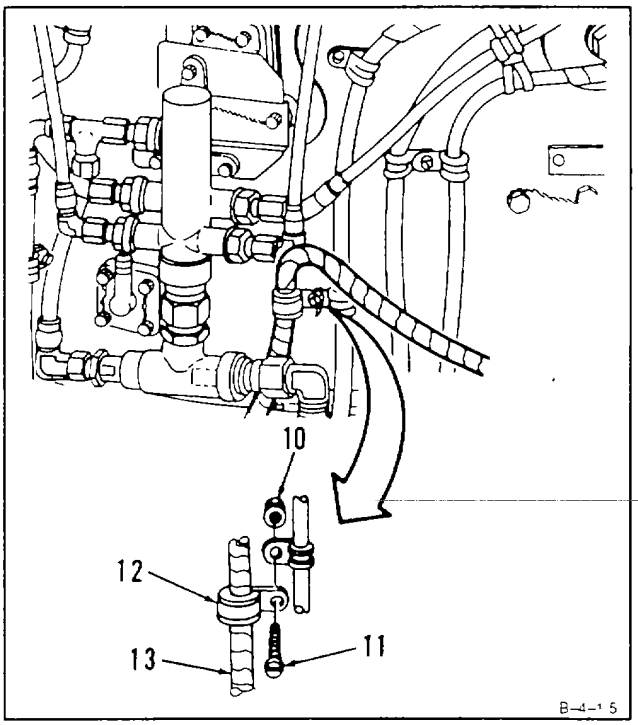
3. **Remove** lockwire, screw (8) and **clamp (9).**



4. **Remove** nut (10) screw (11), **clamp(12)**, and thermocouple jumper lead (13).



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-2 CLEAN THERMOCOUPLE JUMPER LEAD 4-2

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

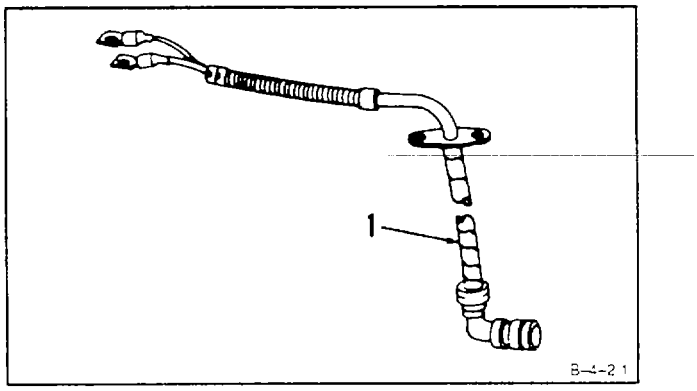
Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Thermocouple Jumper Lead Removed (Task 4-1)

WARNING

Dry cleaning solvent (E19) 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. Wear gloves (E24) and **clean thermocouple jumper lead (1).** Use lint-free cloth (E30) dampened in dry cleaning solvent (E19)



FOLLOW-ON MAINTENANCE

Inspect Thermocouple Jumper Lead (Task 4-3).

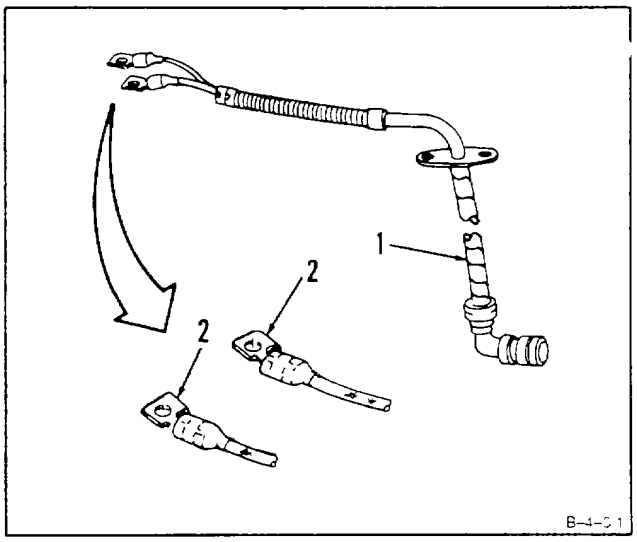
END OF TASK

4-3 INSPECT THERMOCOUPLE JUMPER LEAD 4-3

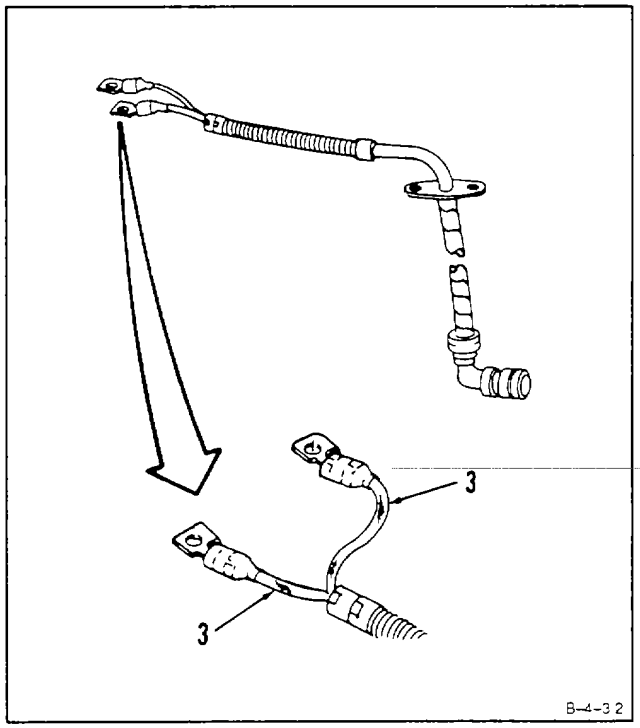
INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1. Inspect thermocouple jumper lead (1) as follows.

   a. **Inspect terminal lugs (2).** There shall be no loose or cracked terminal lugs.



   b. **Inspect lead ends (3).** There shall be no broken wires or fraying.



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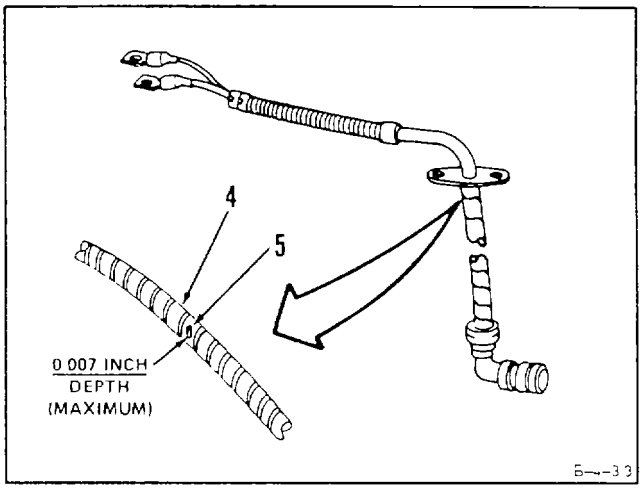
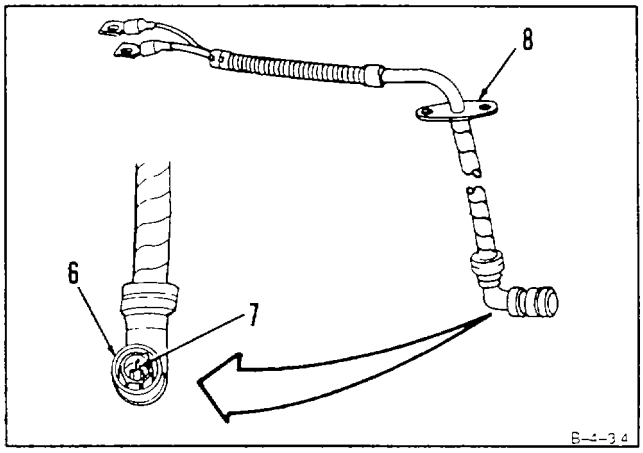
c. **Inspect outer shield (4).** There shall be no cracks or gouges. There shall be no chafes (5) deeper than 0.007 inch.



d. **Inspect electrical connector (6).** There shall be no corrosion, cracks, bent or broken pins (7). The electrical connector (6) shall not be loose.

e. **Inspect elbow mounting bracket (8).** The elbow mounting bracket (8) shall not be loose.



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-4 REPAIR THERMOCOUPLE JUMPER LEAD 4-4

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Goggles
Compressed Air Source

Materials:
Crocus Cloth (El 6)

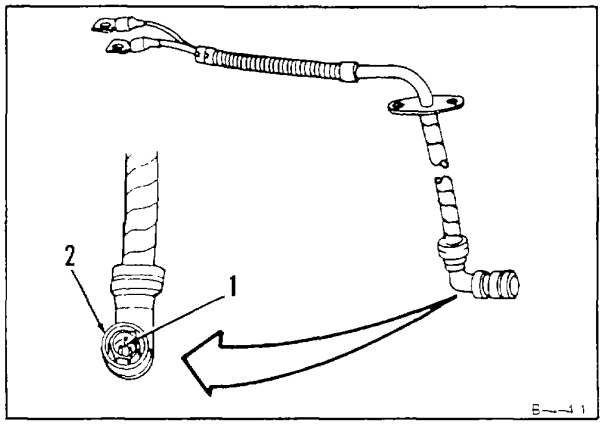
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

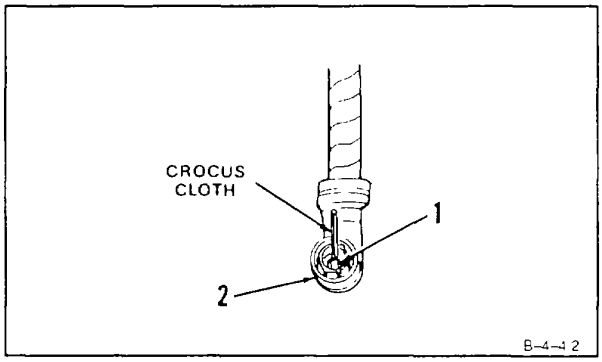
NOTE

This repair is allowed provided it does not cause pins to break or crack.

1. **Straighten bent pins (1)** of electrical connector (2). Using long-nose pliers gently move pins (1) until they are straight



2. **Remove corrosion from pins (1)** of electrical connector (2). Polish pins, using in and out motion over entire length of pin until corrosion is removed. Use crocus cloth (E16).



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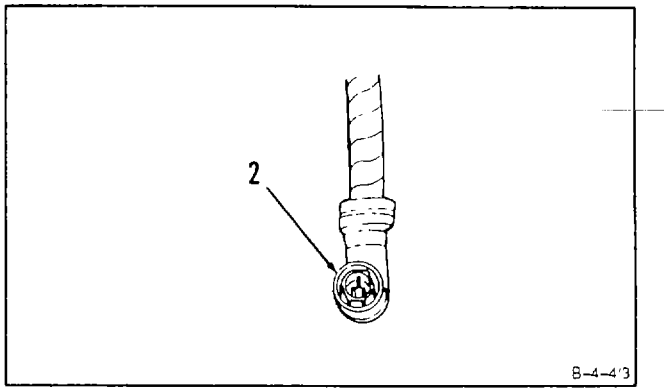
WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

3. Wear goggles. **Remove loosened particles** from connector (2) using clean, dry, compressed air.



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

4-5 TEST THERMOCOUPLE JUMPER LEAD 4-5

INITIAL SETUP

Applicable Configurations:
All

Tools:
Multimeter

Materials:
Tag (E58)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task

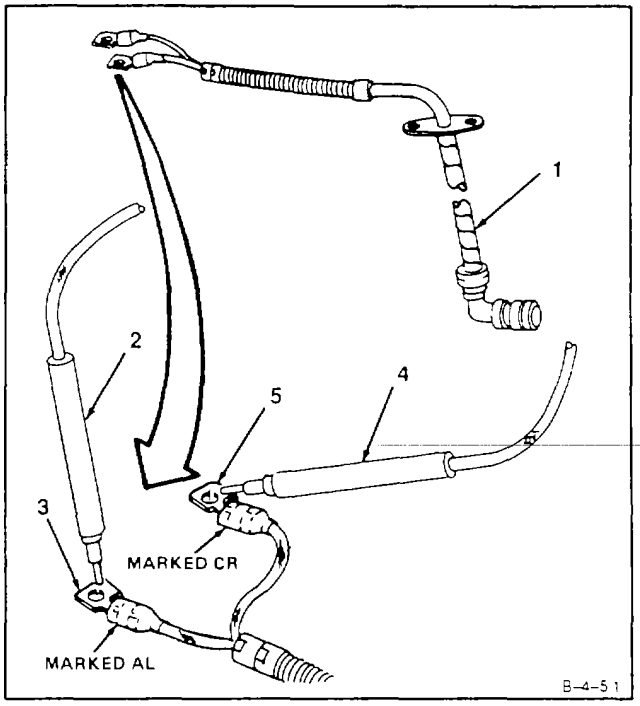
1. Using multimeter, **measure insulation resistance of thermocouple jumper lead (1)** as follows:

   a. Set multimeter range switch to RX 1000

   b. Touch red probe (2) to terminal lug (3)

   c. Touch black probe (4) to terminal lug (5)

   d. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms, tag thermocouple jumper lead as defective. Use tag (E58)



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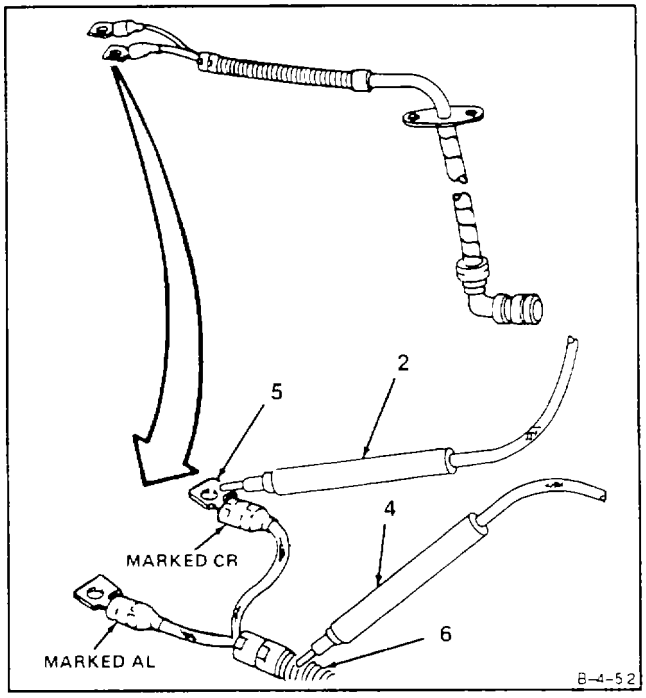
4-5 TEST THERMOCOUPLE JUMPER LEAD (Continued) 4-5

e. Touch red probe (2) to terminal lug (5).

f. Touch black probe (4) to thermocouple jumper lead shield (6).

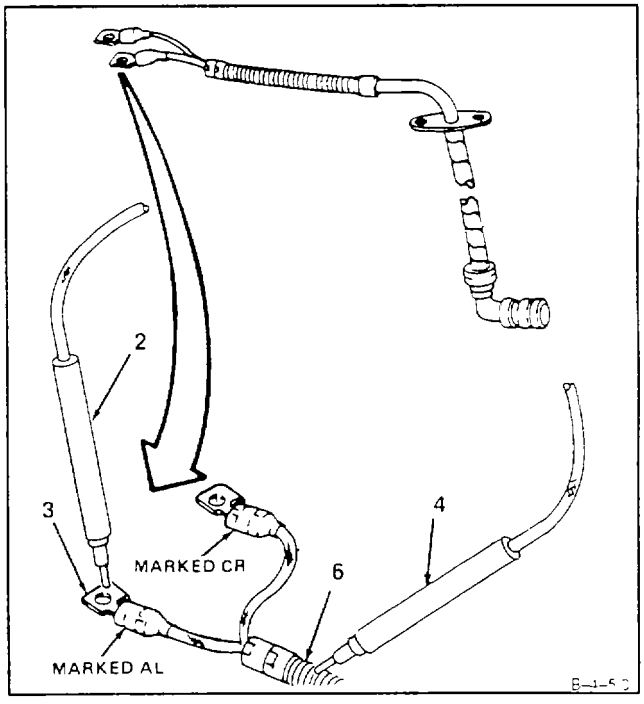
g. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms, tag thermocouple jumper lead as defective. Use tag (E58).



h. Touch red probe (2) to terminal lug (3).

i. Touch black probe (4) to thermocouple jumper lead shield (6).

j. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms tag thermocouple jumper lead as defective. Use tag (E58).



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4-5 TEST THERMOCOUPLE JUMPER LEAD 4-5

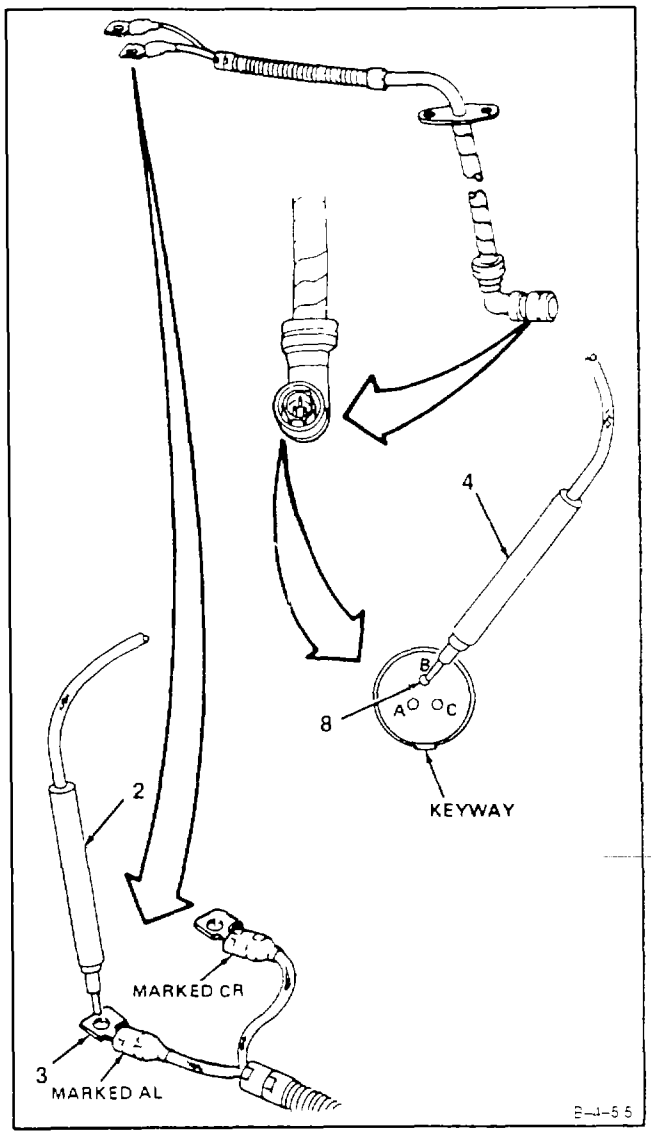
2. Using multimeter, **measure continuity of thermocouple jumper lead (1)** as follows:

   a. Set multimeter range switch to RX 1.

   b. Touch red probe (2) to terminal lug (5).

   c. Touch black probe (4) to electrical connector pin A (7).

   d. Meter shall indicate **zero ohms** maximum. If meter indicates more than zero ohms, tag thermocouple jumper lead as defective. Use tag (E58).



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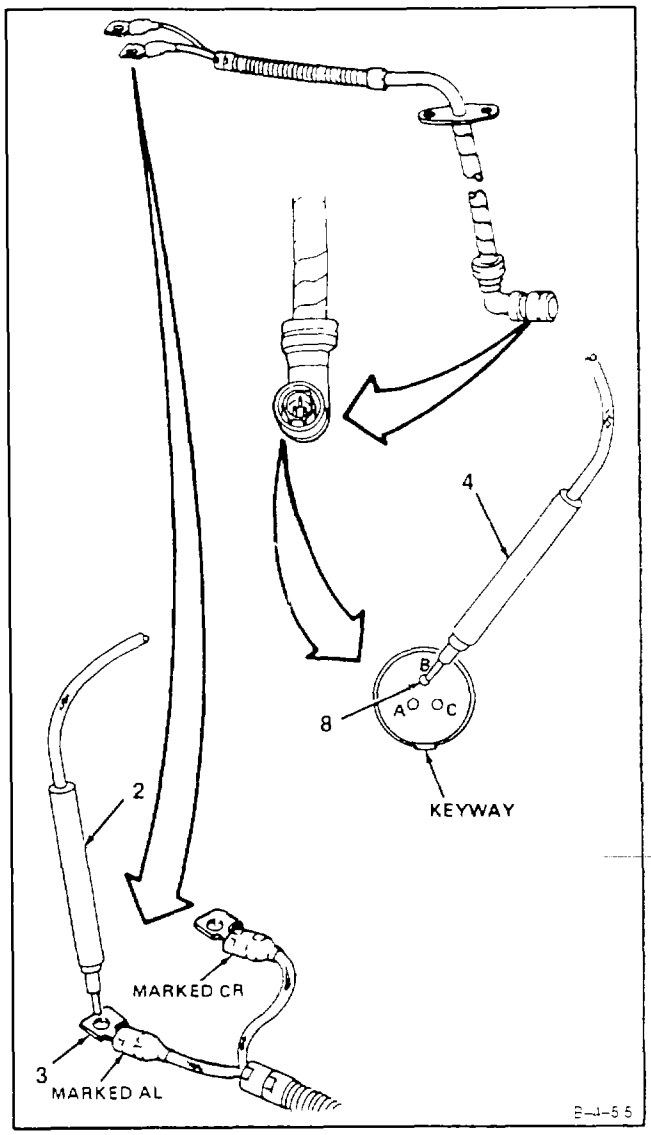
e. Touch red probe (2) to terminal lug (3).

f. Touch black probe (4) to electrical connector pin B (8).

g. Meter shall indicate **zero ohms** maximum. If meter indicates more than zero ohms tag thermocouple jumper lead as defective. Use tag (E58).



FOLLOW-ON MAINTENANCE

None

END OF TASK

4-6 INSTALL THERMOCOUPLE JUMPER LEAD 4-6

INITIAL SETUP

Applicable Configurations:

All

Tools:

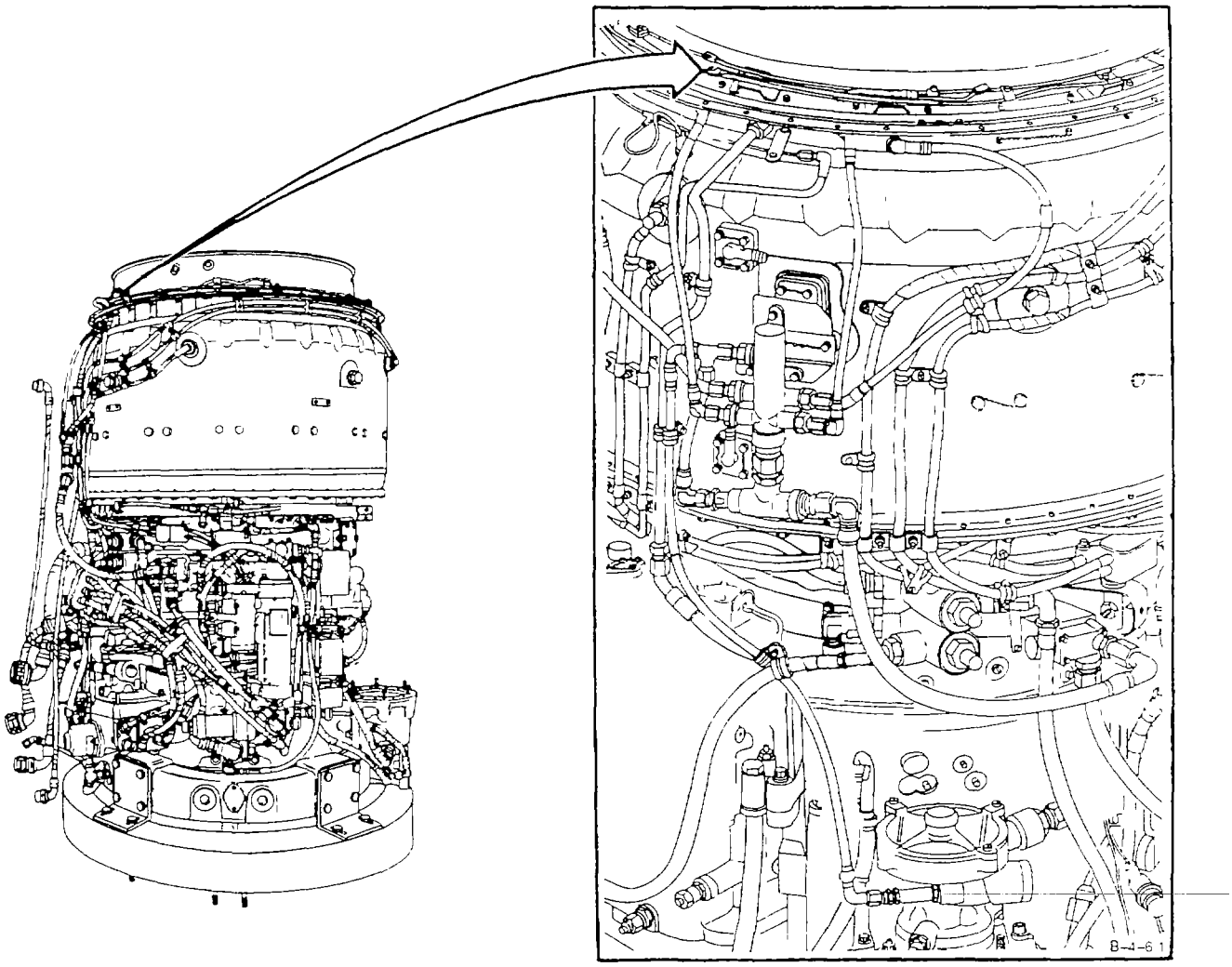
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit
NSN 5180-00-323-5114
Multimeter

Materials:

Lockwire (E32)

Personnel Required:

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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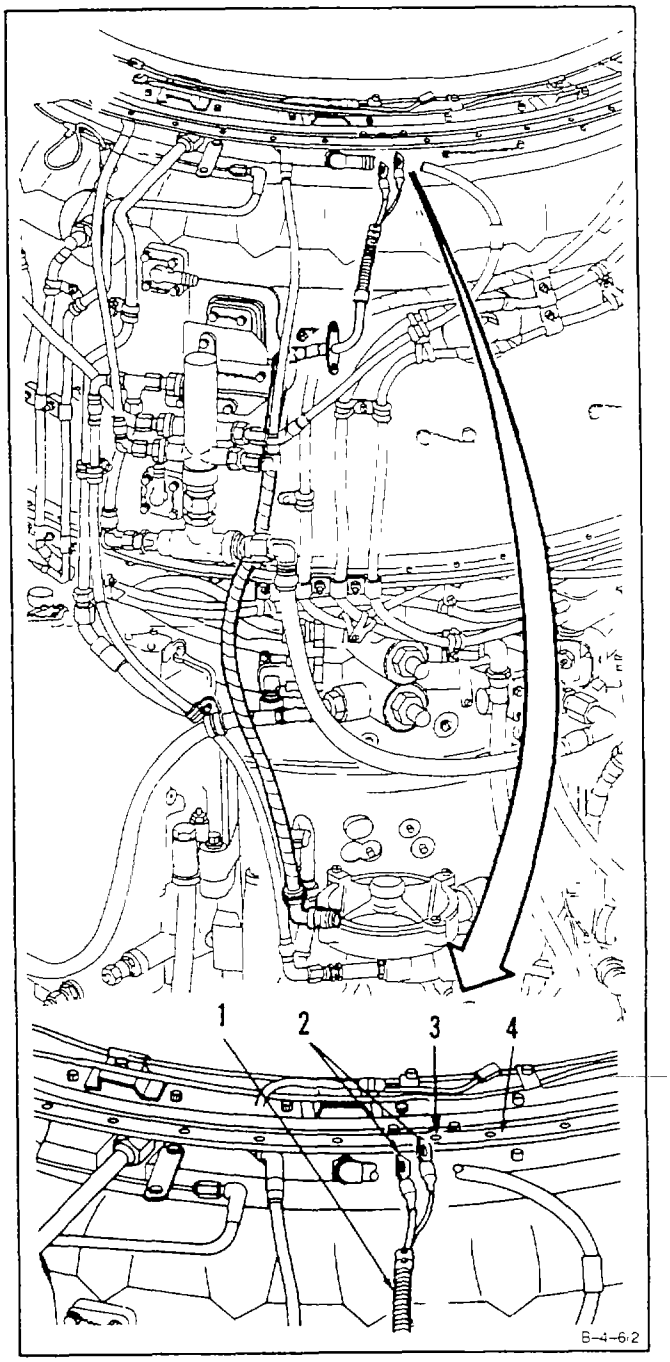
4-6 INSTALL THERMOCOUPLE JUMPER LEAD 4-6

1. **Route thermocouple jumper lead (1)** as shown. Insert lead ends (2) through hole (3) in fireshield assembly (4).



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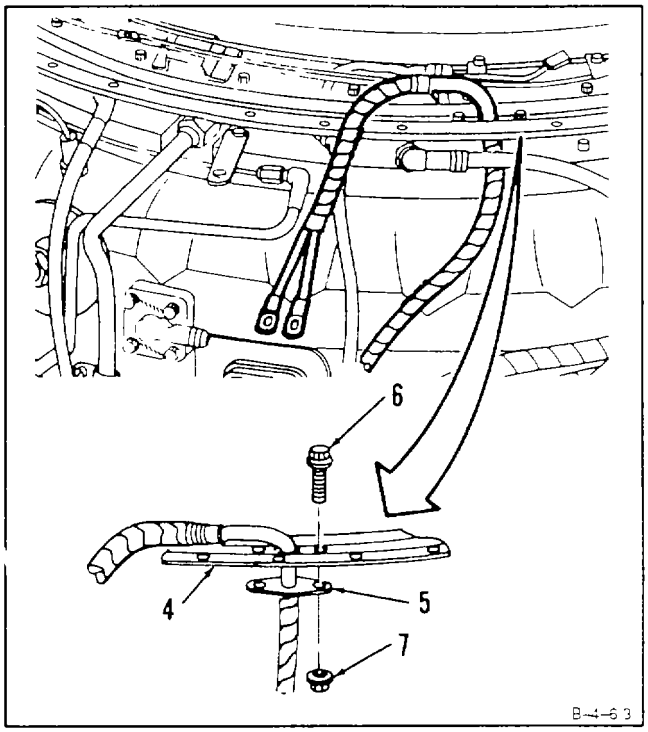
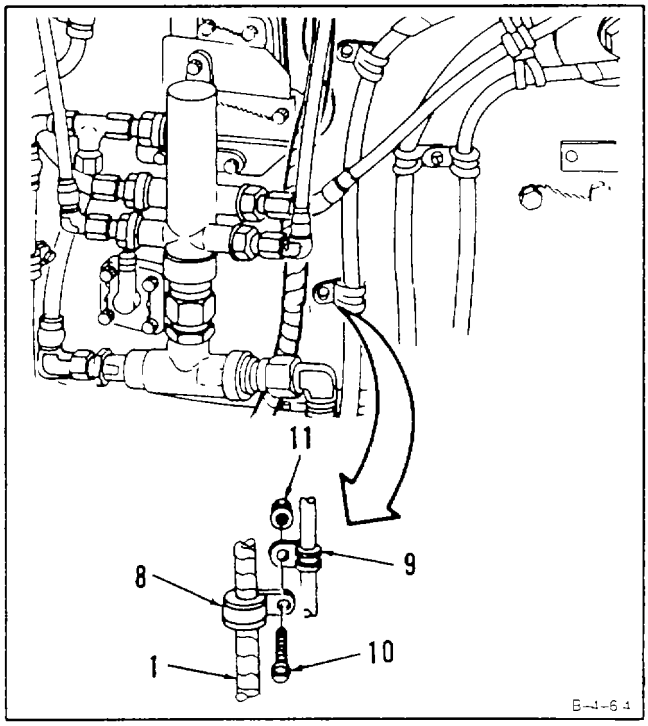
4-6 INSTALL THERMOCOUPLE JUMPER LEAD (Continued) 4-6

2. **Install plate (5)** against fireshield assembly (4). Install two bolts (6) and two nuts (7).



3. **Install clamp (8)** on thermocouple jumper lead (1) Align clamp (8) with clamp (9) and install screw (10) and nut (11).



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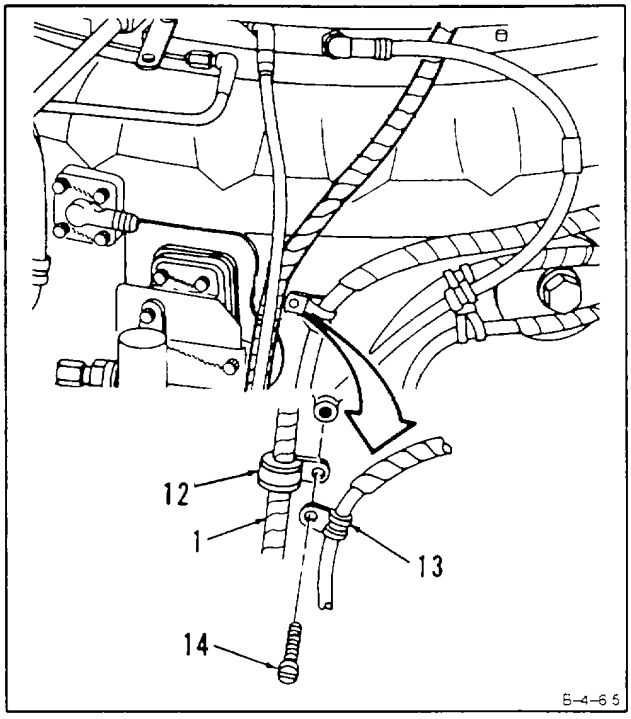
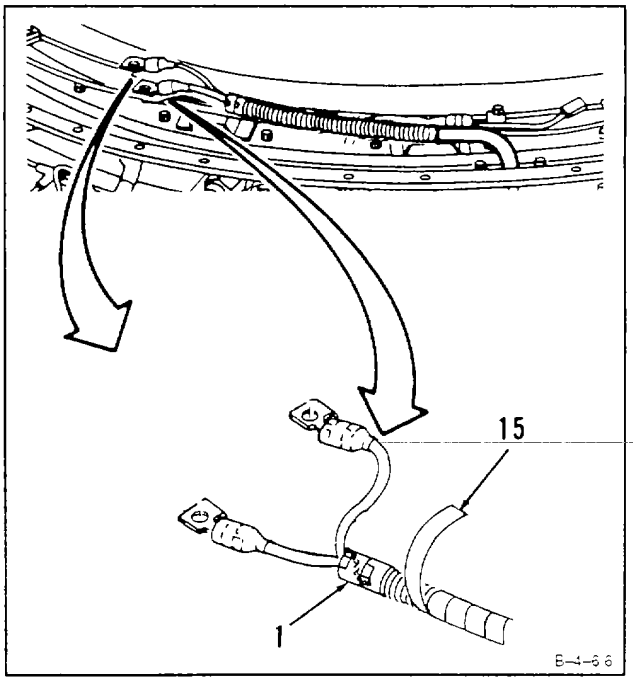
4-6 INSTALL THERMOCOUPLE JUMPER LEAD (Continued) 4-6

4. **Install clamp (12)** on thermocouple jumper lead (1). Align clamp (12) with clamp (13), and install screw (14). Lockwire screw (14). Use lockwire (E32)



5. Lockwire lead (1) and **install spiral chafing sleeve (15).**



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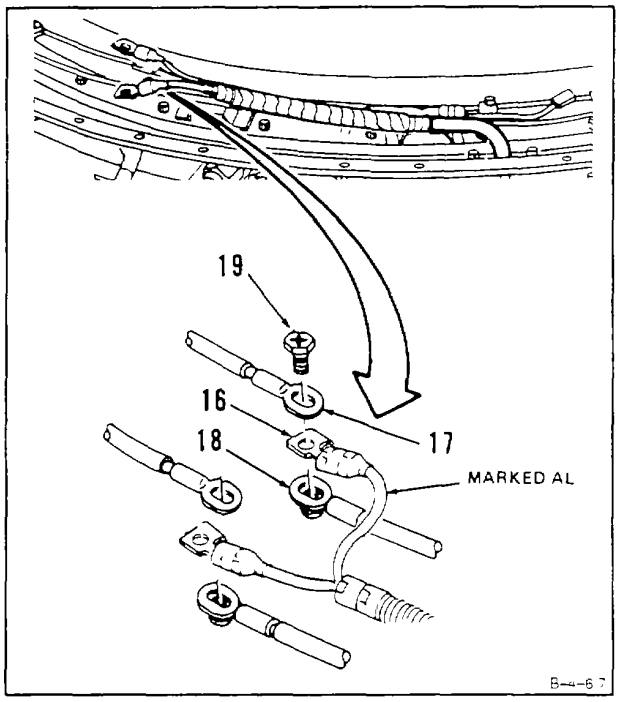
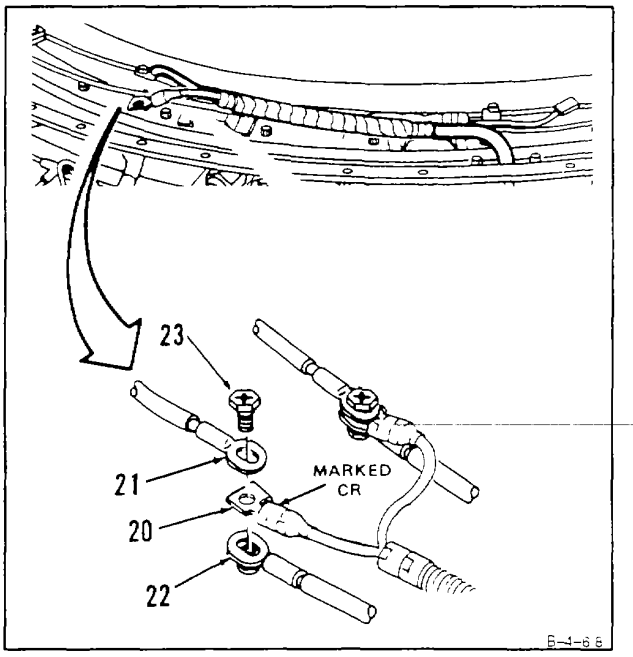
4-6 INSTALL THERMOCOUPLE JUMPER LEAD (Continued) 4-6

6 **Install terminal lug (16)** between alumel terminal lugs (17) and (18), and install screw (19).



7. **Install terminal lug (20)** between chromel terminal lugs (21) and (22), and install screw (23).



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4-6 INSTALL THERMOCOUPLE JUMPER LEAD (Continued) 4-6

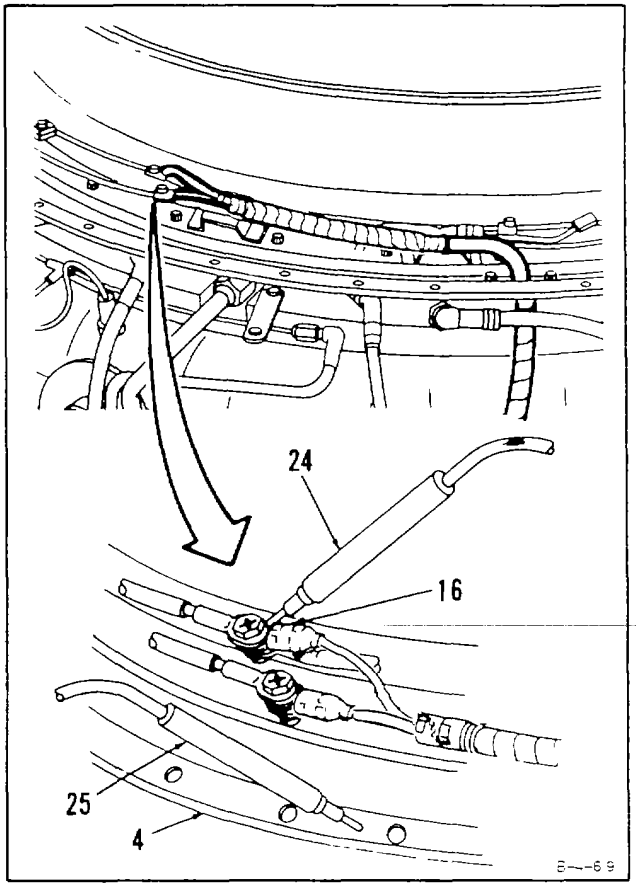
8. Using multimeter, **measure insulation resistance** as follows:

   a. Set multimeter range to R X 1000

   b. Touch red probe (24) to terminal lug (16)

   c. Touch black probe (25) to fireshield assembly (4)

   d. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms replace thermocouple jumper lead (Ref. Task 4-1 and 4-6).



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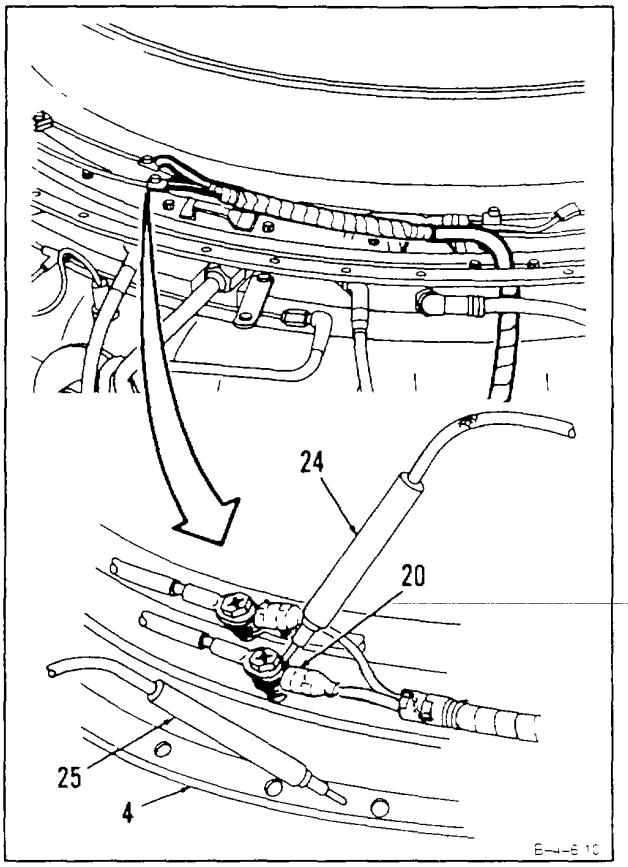
e. Touch red probe (24) to terminal lug (20).

f. Touch black probe (25) to fireshield assembly (4).

g. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms, replace thermocouple jumper lead (Ref. Task 4-1 and 4-6).



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION II

LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES

4-7 REMOVE LEFT - AND RIGHT - HAND BAR ASSEMBLIES 4-7

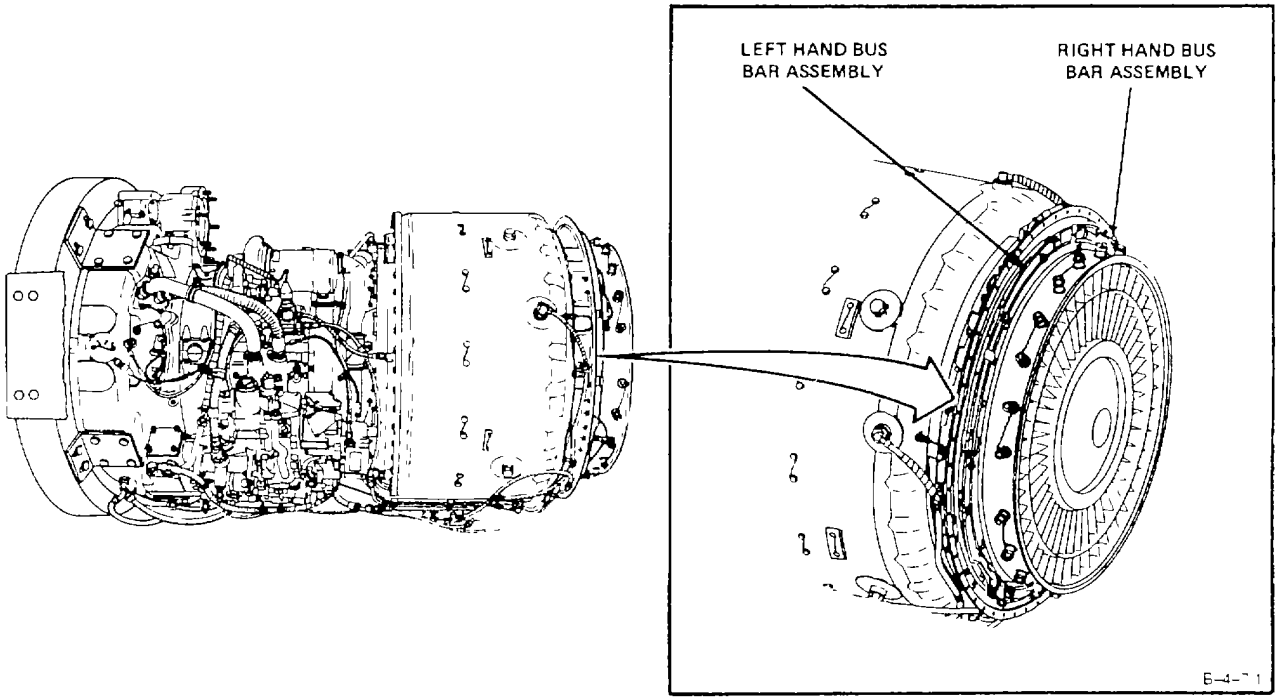
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials.
None

Personnel Required:
Aircraft Powerplant Repairer



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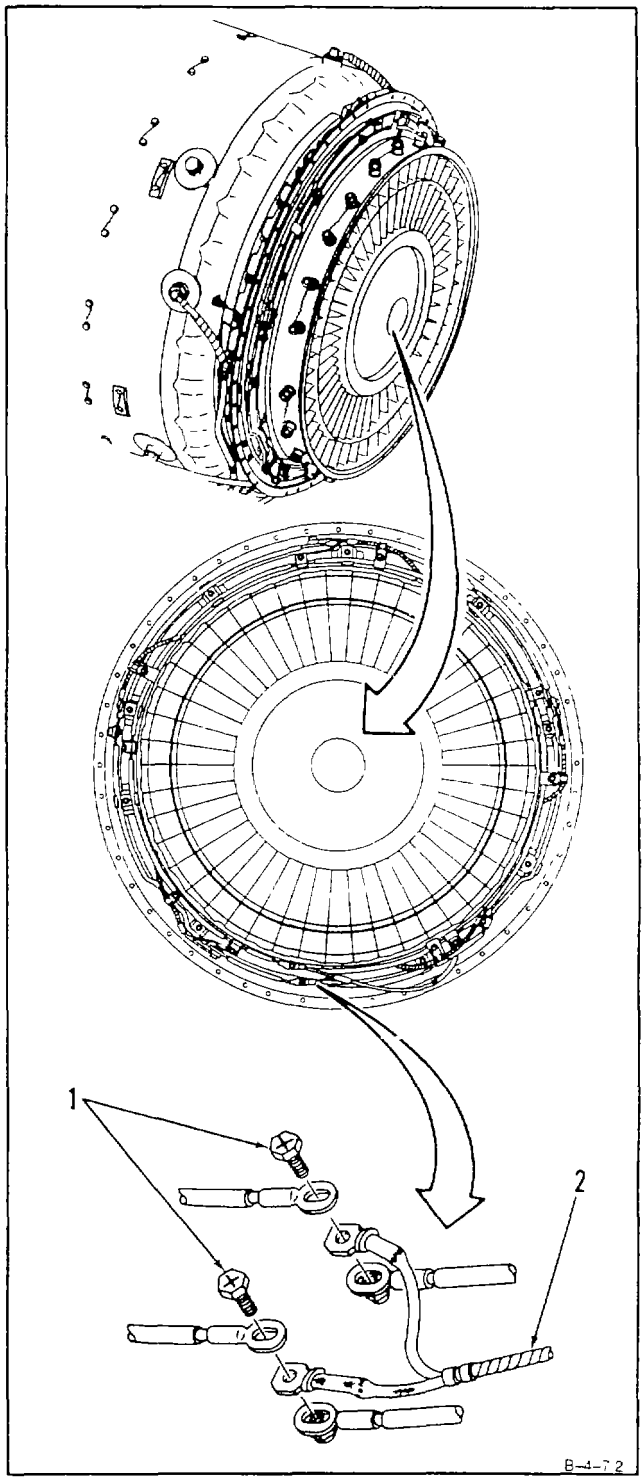
4-7 REMOVE LEFT - AND RIGHT - HAND BAR ASSEMBLIES (Continued) 4-7

1. **Remove** two screws (1) and **thermocouple jumper lead (2).**



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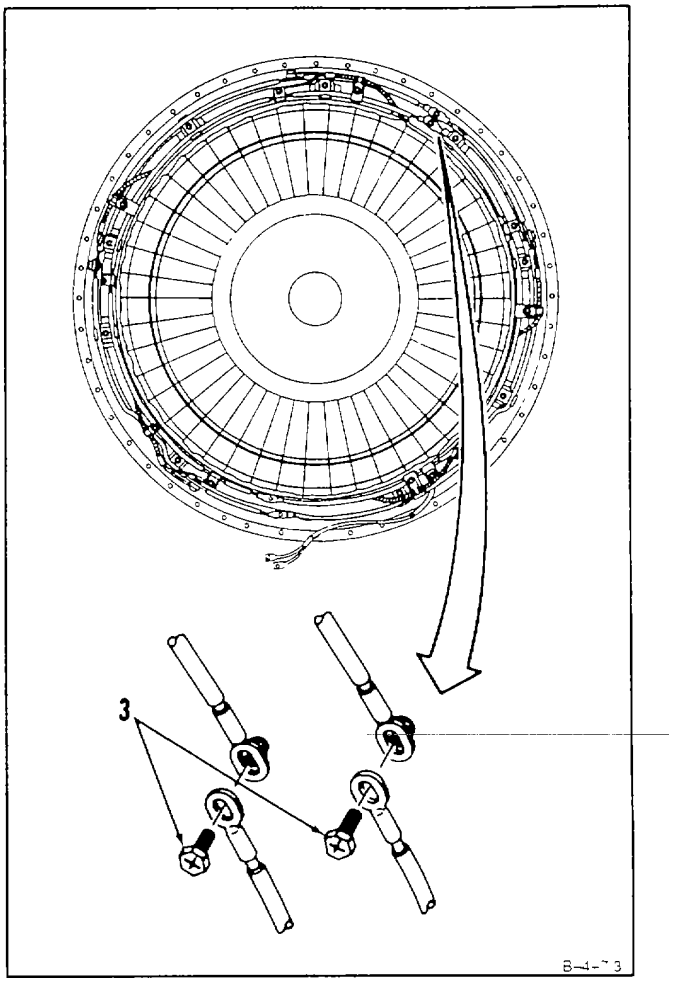
2. **Remove two screws (3).**



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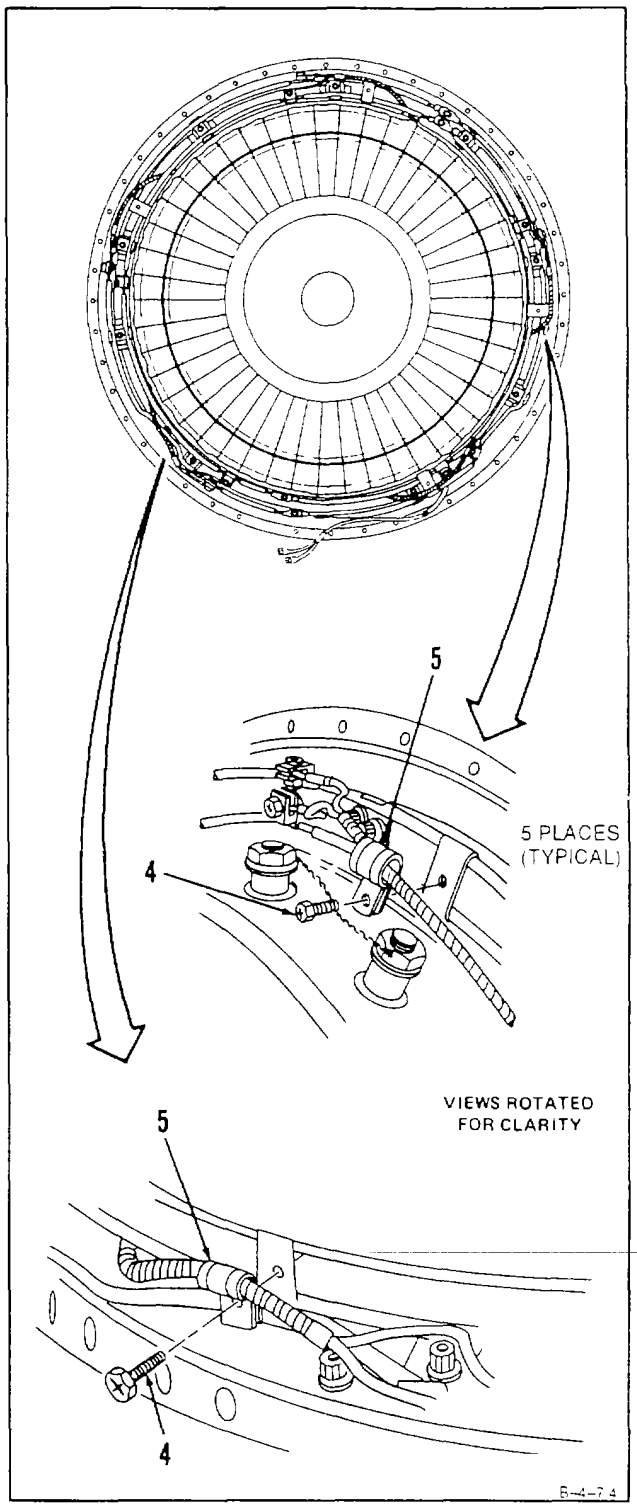
3. **Remove** five screws (4) and **five clamps (5).**



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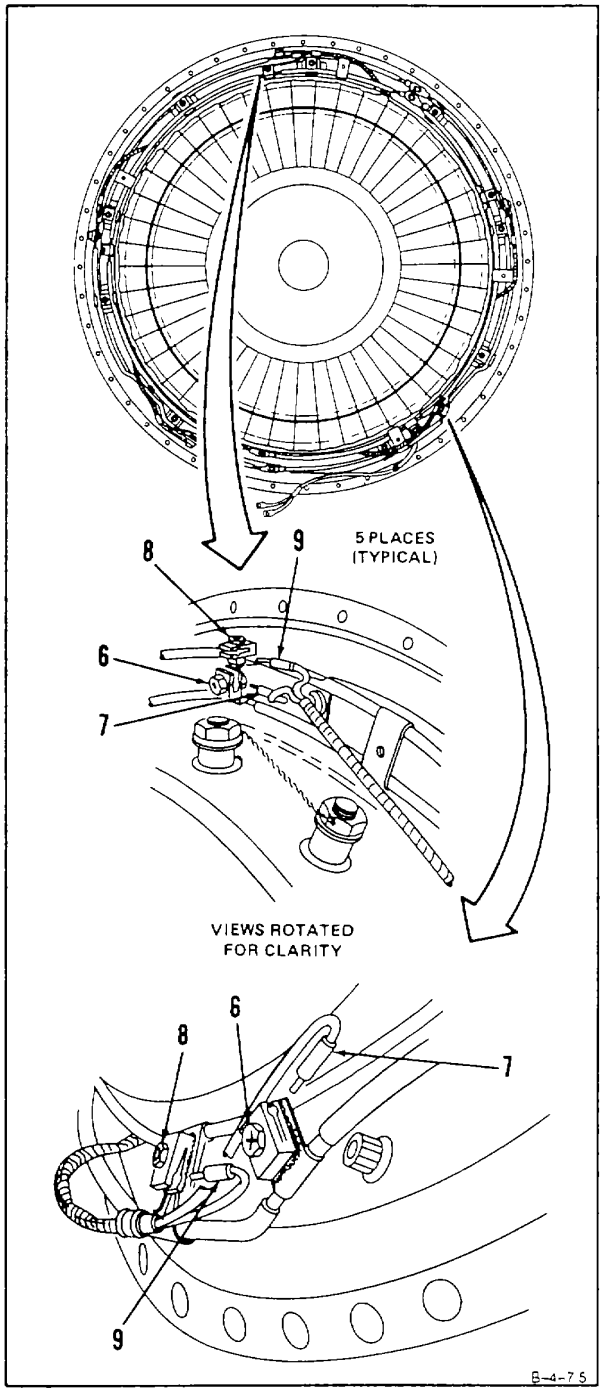
4-7 REMOVE LEFT - AND RIGHT - HAND BAR ASSEMBLIES (Continued) 4-7

4. Loosen five screws (6) and **remove five thermocouple harness pins (7).**

5. Loosen five screws (8) and **remove five thermocouple harness pins (9).**



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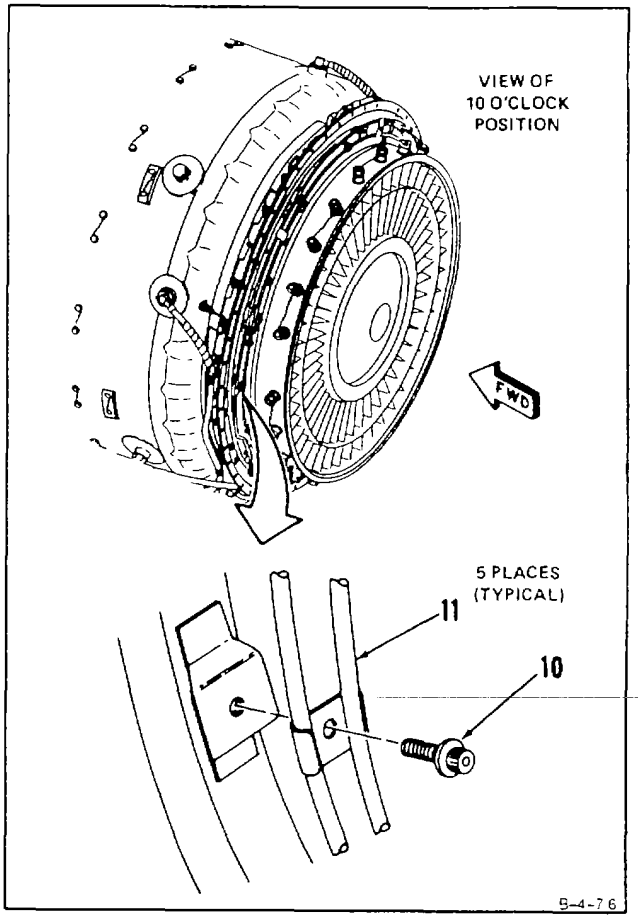
4-7 REMOVE LEFT - AND RIGHT - HAND BAR ASSEMBLIES (Continued) 4-7

6. **Remove** five bolts (10) and **left-hand bus assembly (11).**



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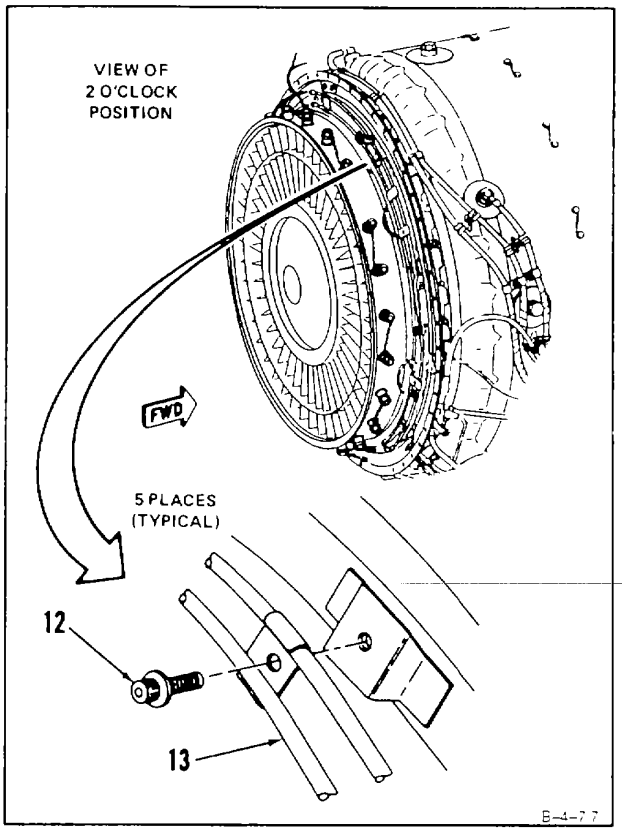
4-7 REMOVE LEFT - AND RIGHT - HAND BAR ASSEMBLIES (Continued) 4-7

7. **Remove** five bolts (12) and **right-hand bus bar assembly (13).**



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-8 CLEAN LEFT - AND RIGHT - HAND BAR ASSEMBLIES 4-8

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

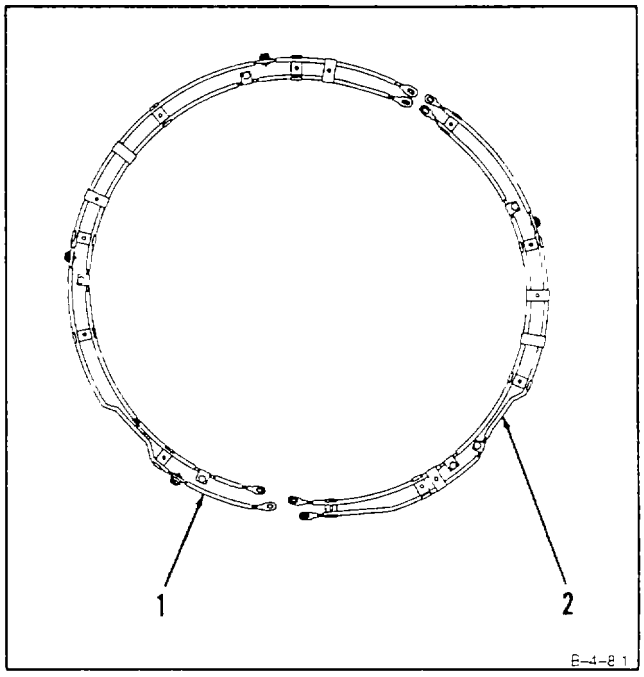
Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Left- and Right-Hand Bus Bar Assemblies Removed (Task 4-7)

WARNING

Dry cleaning solvent (E19) 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. Wear gloves (E24). **Clean left- and right-hand bus bar assemblies (1 and 2)**. Use lint-free cloth (E30) dampened in dry cleaning solvent (E19).



FOLLOW-ON MAINTENANCE

Inspect Left- and Right-Hand Bus Bar Assemblies (Task 4-9)

END OF TASK

4-9 INSPECT LEFT - AND RIGHT - HAND BAR ASSEMBLIES 4-9

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

Personnel Required:
Aircraft Powerplant Inspector

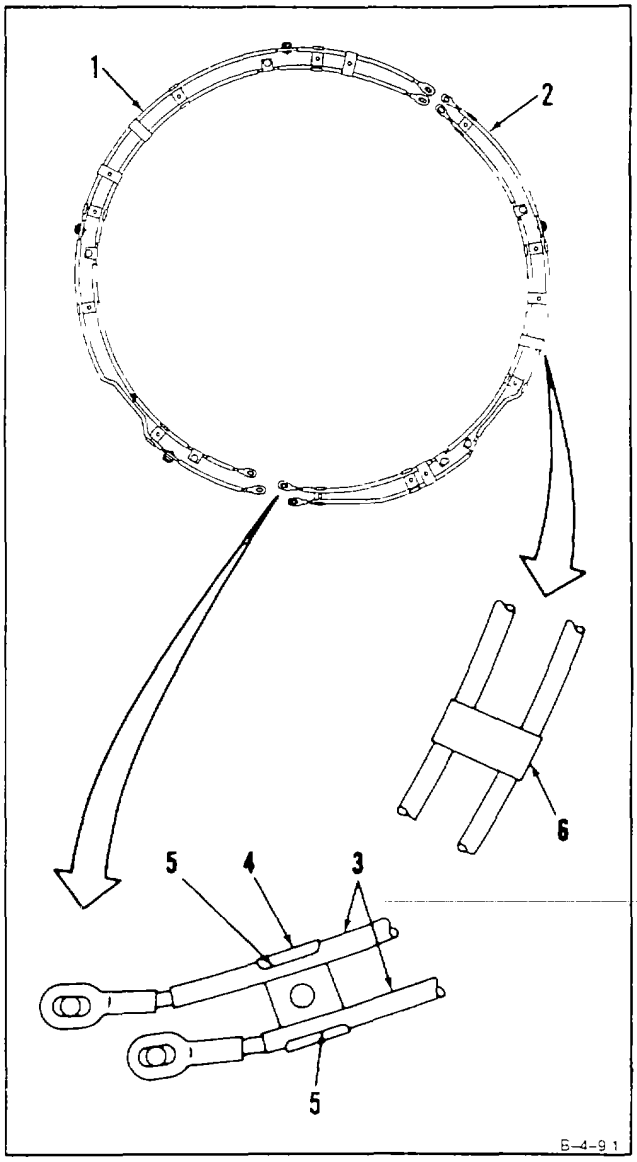
Equipment Condition:
Off Engine Task

1. **Inspect left- and right-hand bus bar assemblies (1 and 2)** as follows

   a. Inspect conductors (3). There shall be no cracks.

   b. Inspect mounting brackets (4). There shall be no cracks Any size void in brazement (5) is acceptable.

   c. Inspect spacers (6). There shall be no cracks.



FOLLOW-ON MAINTENANCE

None

END OF TASK

4-10 TEST LEFT - AND RIGHT - HAND BAR ASSEMBLIES 4-10

INITIAL SETUP

Applicable Configurations:
All

Tools:
Multimeter

Materials:
Tag (E58)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task

1. Using multimeter, **measure continuity of left- and right-hand bus bar assemblies (1 and 2)** as follows:

NOTE

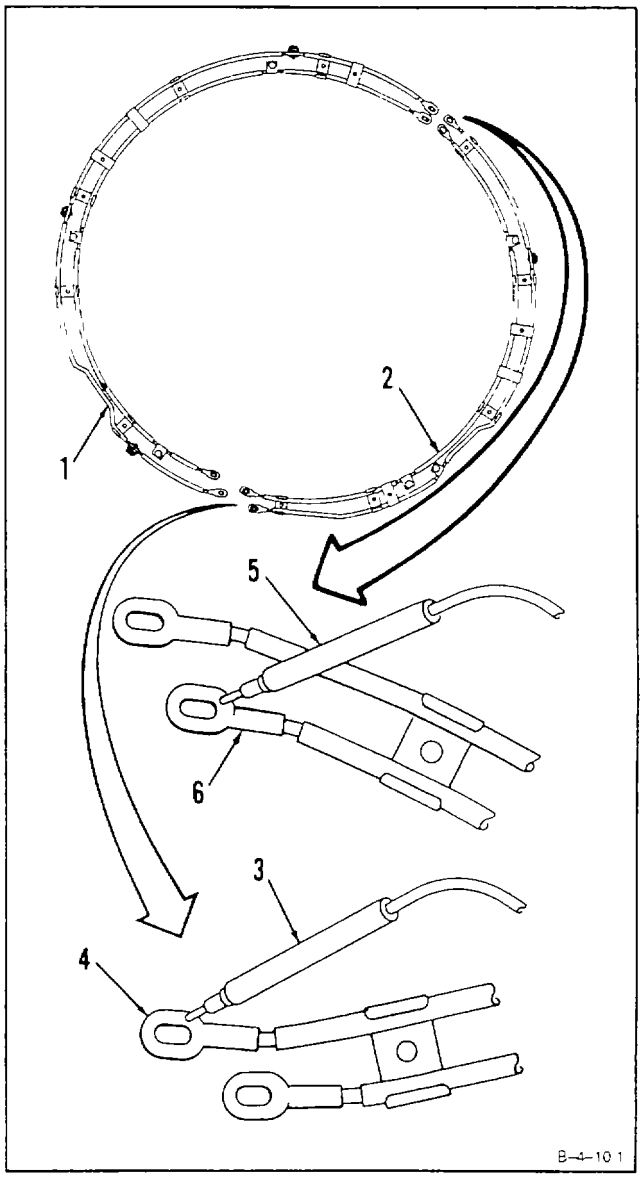
Following steps a. thru g. apply to both left- and right-hand bus bar assemblies right-hand bus bar assembly is shown.

a. Set multimeter range switch to R X 1.

b. Touch red probe (3) to terminal lug (4).

c. Touch black probe (5) to terminal lug (6).

d. Meter shall indicate **0.5 ohms** maximum. If meter indicates more than 0.5 ohms, tag bus bar assembly as defective Use tag (E58).



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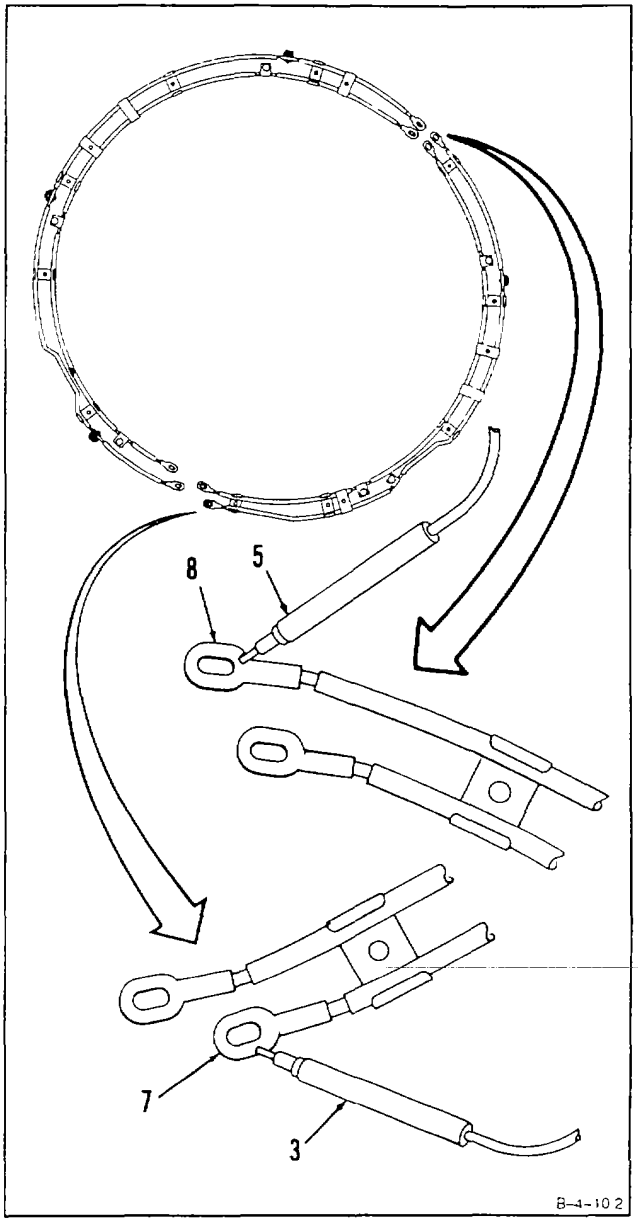
e. Touch red probe (3) to terminal lug (7)

f. Touch black probe (5) to terminal lug (8)

g. Meter shall indicate **0.5 ohms** maximum. If meter indicates more than 0.5 ohms tag bus bar assembly as defective. Use tag (E58).



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2. Using multimeter, **measure insulation resistance of left- and right-hand bus bar assemblies (1 and 2)** as follows:

NOTE

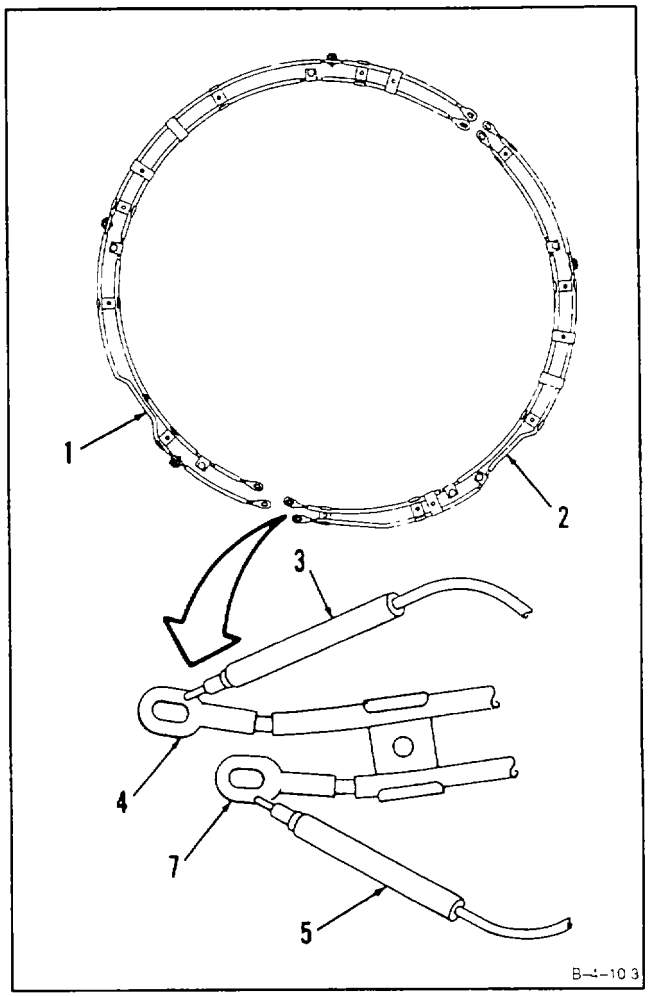
Following steps a thru m apply to both left- and right-hand bus bar assemblies. Right-hand bus bar assembly is shown

a. Set multimeter range switch to R X 1000.

b. Touch red probe (3) to terminal lug (4).

c. Touch black probe (5) to terminal lug (7).

d. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms, tag bus bar assembly as defective. Use tag (E58).



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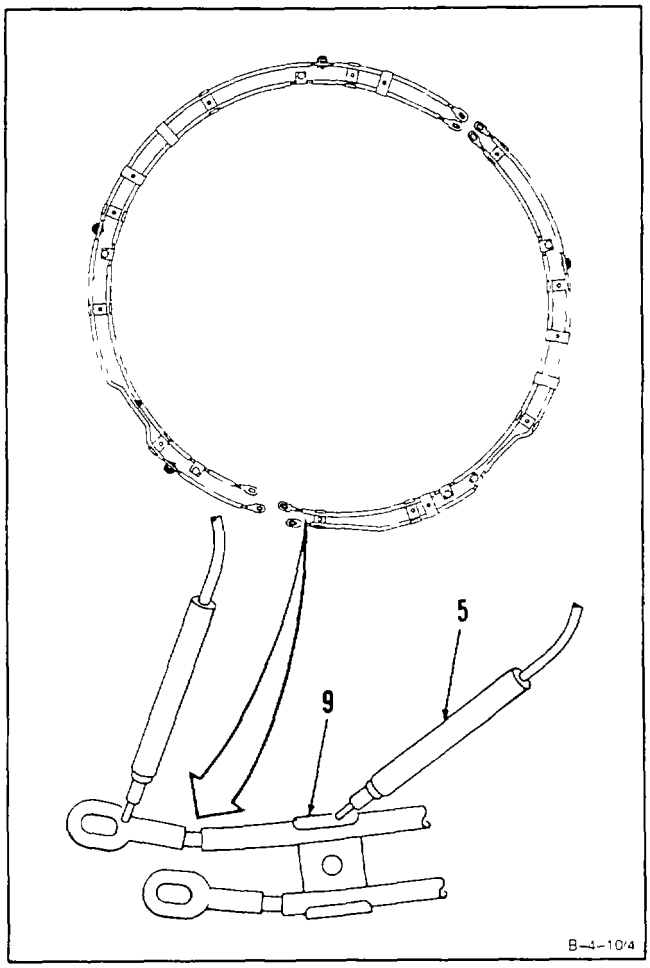
4-10 TEST LEFT - AND RIGHT - HAND BAR ASSEMBLIES (Continued) 4-10

e. Touch black probe (5) to mounting bracket (9).

f. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms, tag bus bar assembly as defective. Use tag (E58).



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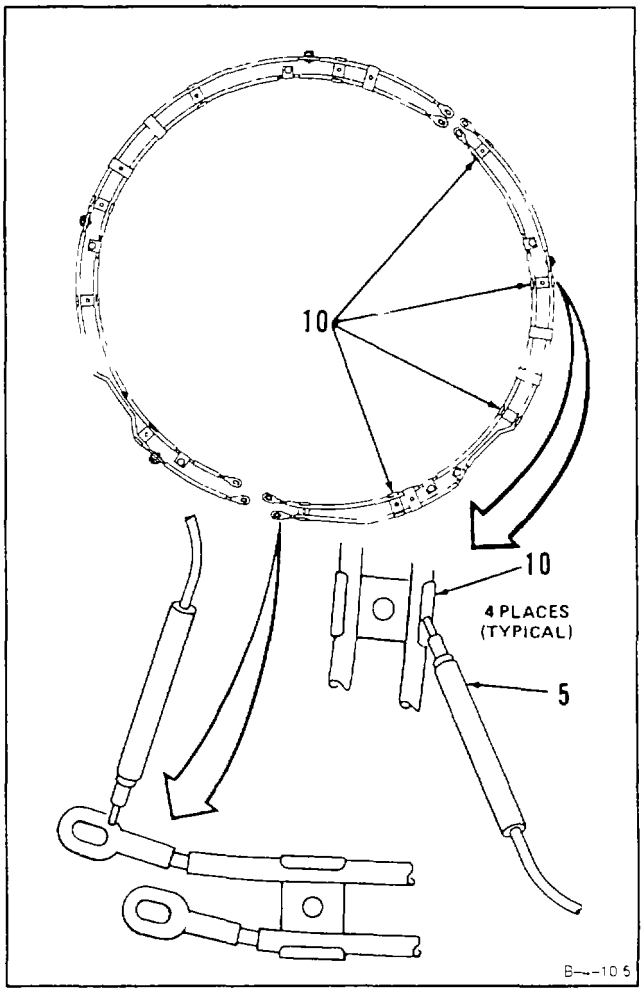
4-10 TEST LEFT - AND RIGHT - HAND BAR ASSEMBLIES (Continued) 4-10

g. Touch black probe (5) to all other mounting brackets (10).

h. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms, tag bus bar assembly as defective. Use tag (E58).



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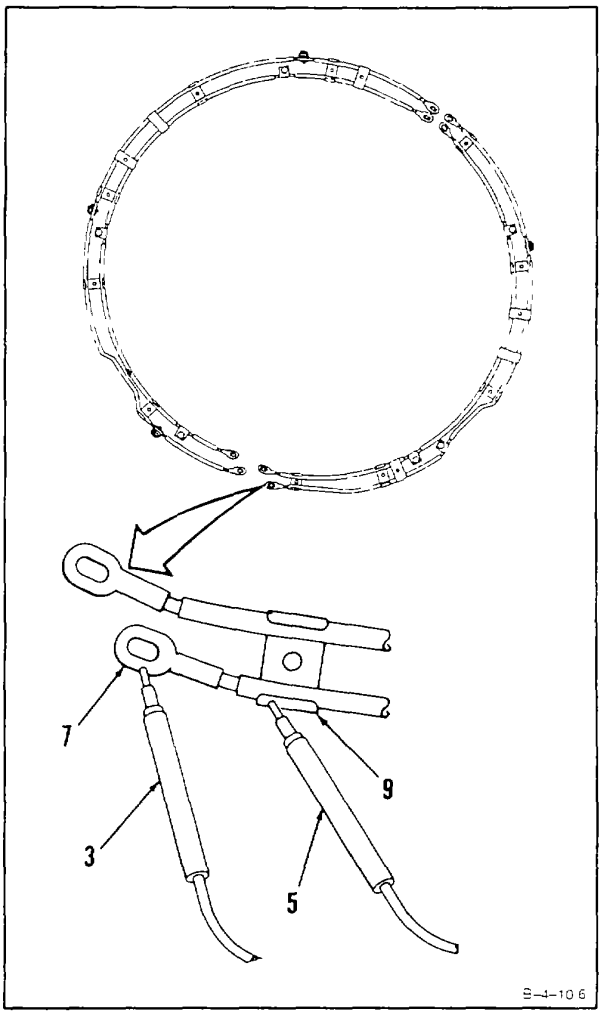
i. Touch red probe (3) to terminal lug (7).

j. Touch black probe (5) to mounting bracket (9)

k. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms, tag bus bar assembly as defective. Use tag (E58).



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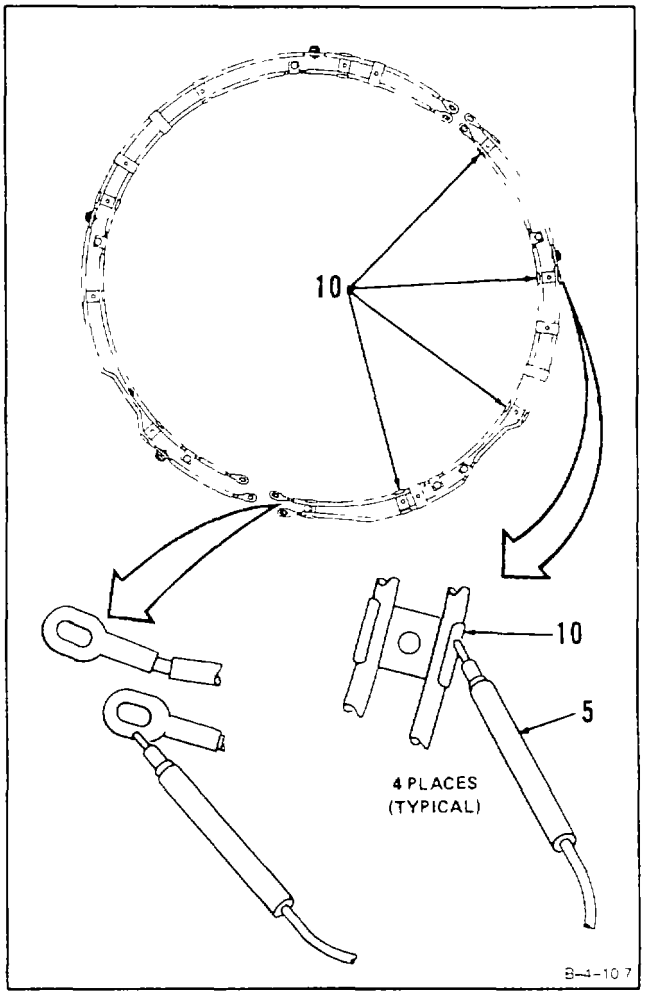
4-10 TEST LEFT - AND RIGHT - HAND BAR ASSEMBLIES (Continued) 4-10

l. Touch black probe (5) to all other mounting brackets (10).

m. Meter shall indicate **1000 ohms** minimum. If meter indicates less than 1000 ohms, tag bus bar assembly as defective Use tag (E58).



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES 4-11

INITIAL SETUP

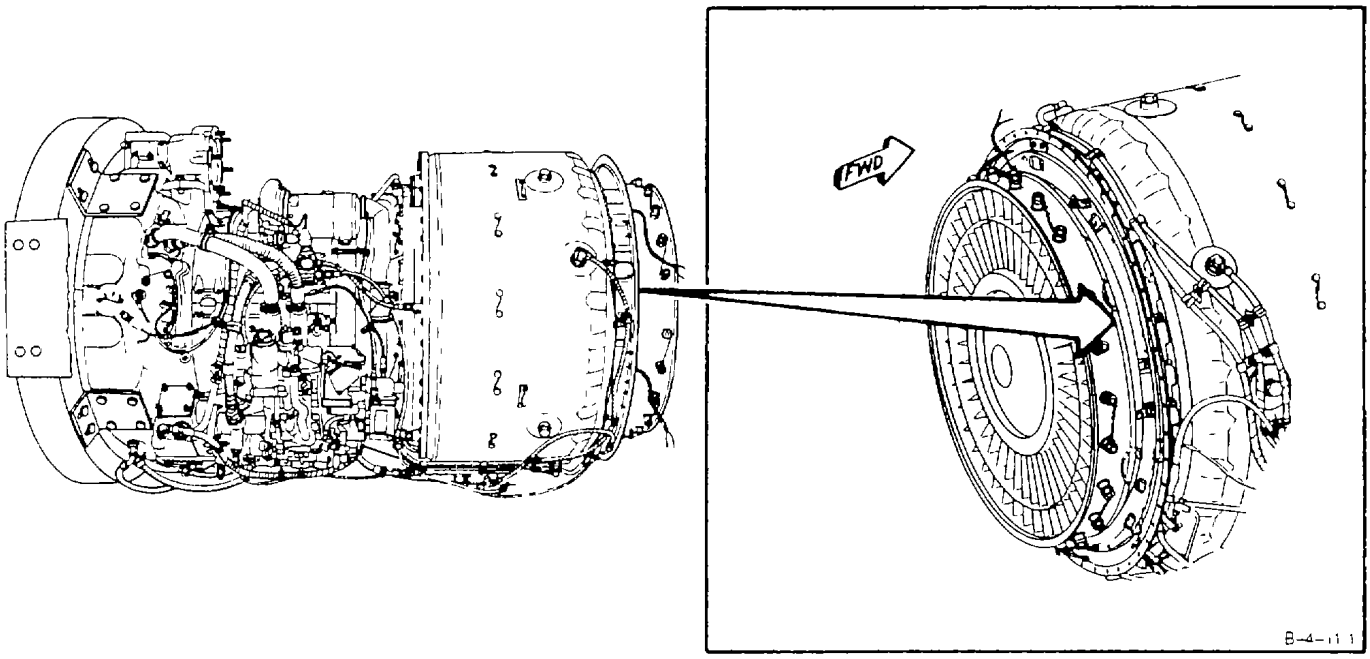
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 51 80-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
Task 4-24



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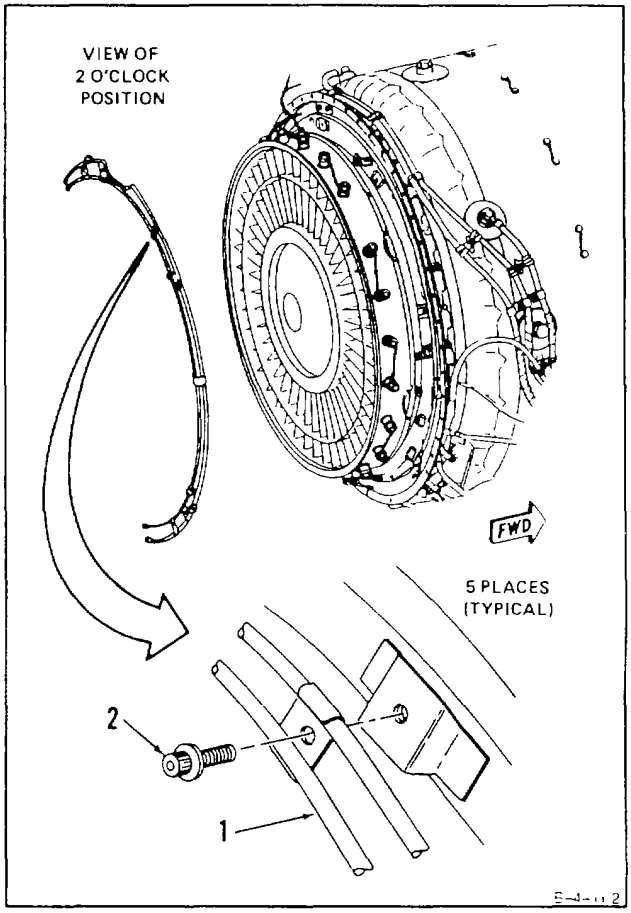
4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

NOTE

In following step, bolt at 5-o'clock position is longer

1. **Install right-hand bus bar assembly (1)** and five bolts (2).



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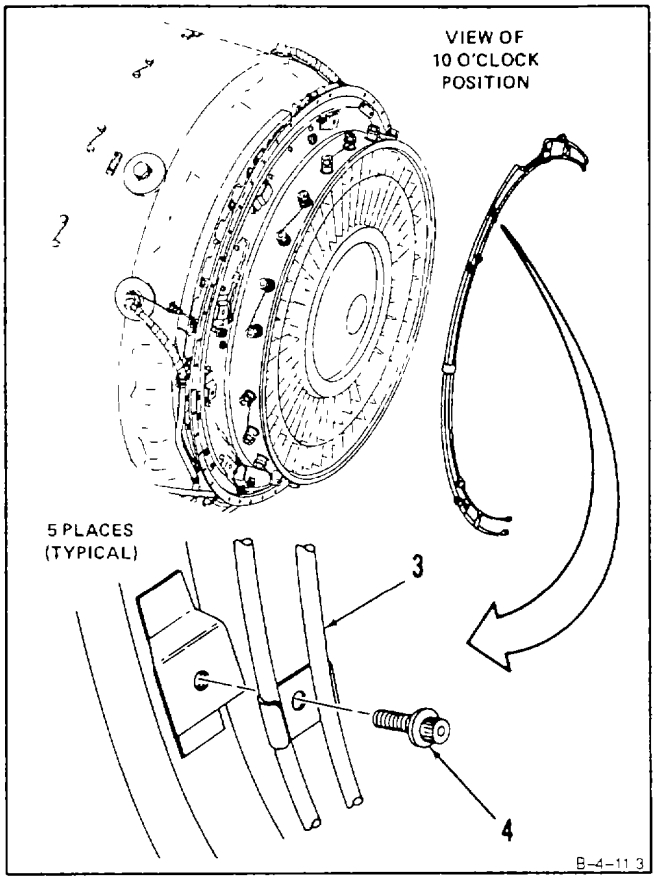
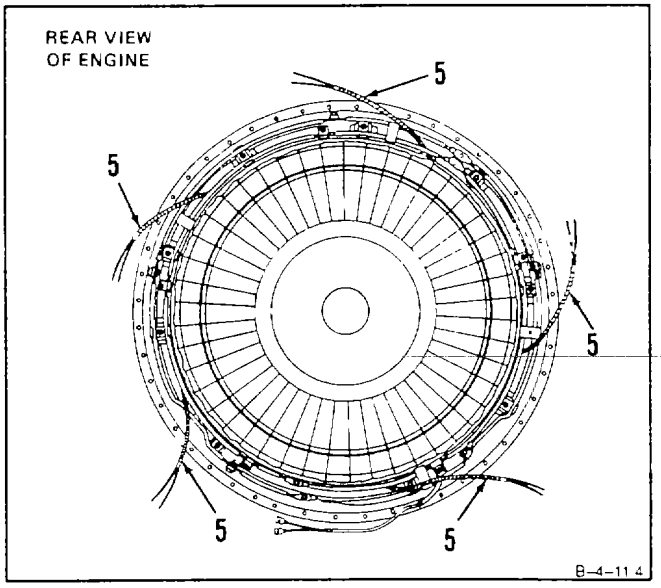
2. **Install left-hand bus bar assembly (3)** and five bolts (4).



3. **Test five thermocouple harness assemblies (5)** (Ref Task 4-24).



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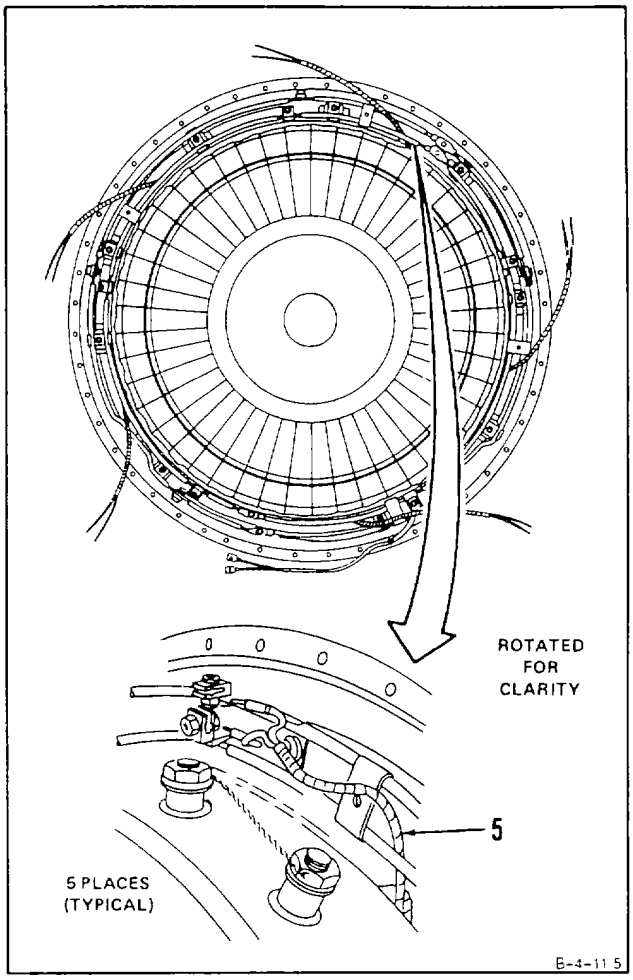
4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

4. Route five thermocouple harness assemblies (5) counterclockwise



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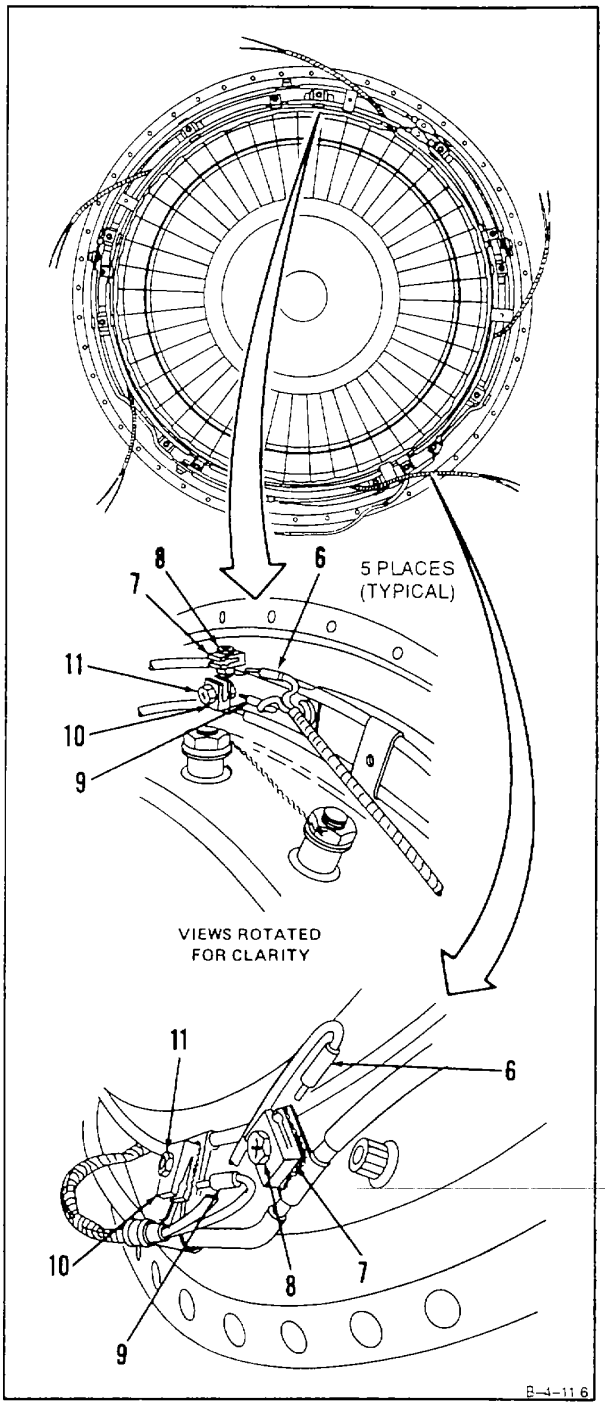
4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

5. **Install five large pins (6)** in pin clamps (7). Tighten five screws (8).

6. **Install five small pins (9)** in five pin clamps (10). Tighten five screws (11).



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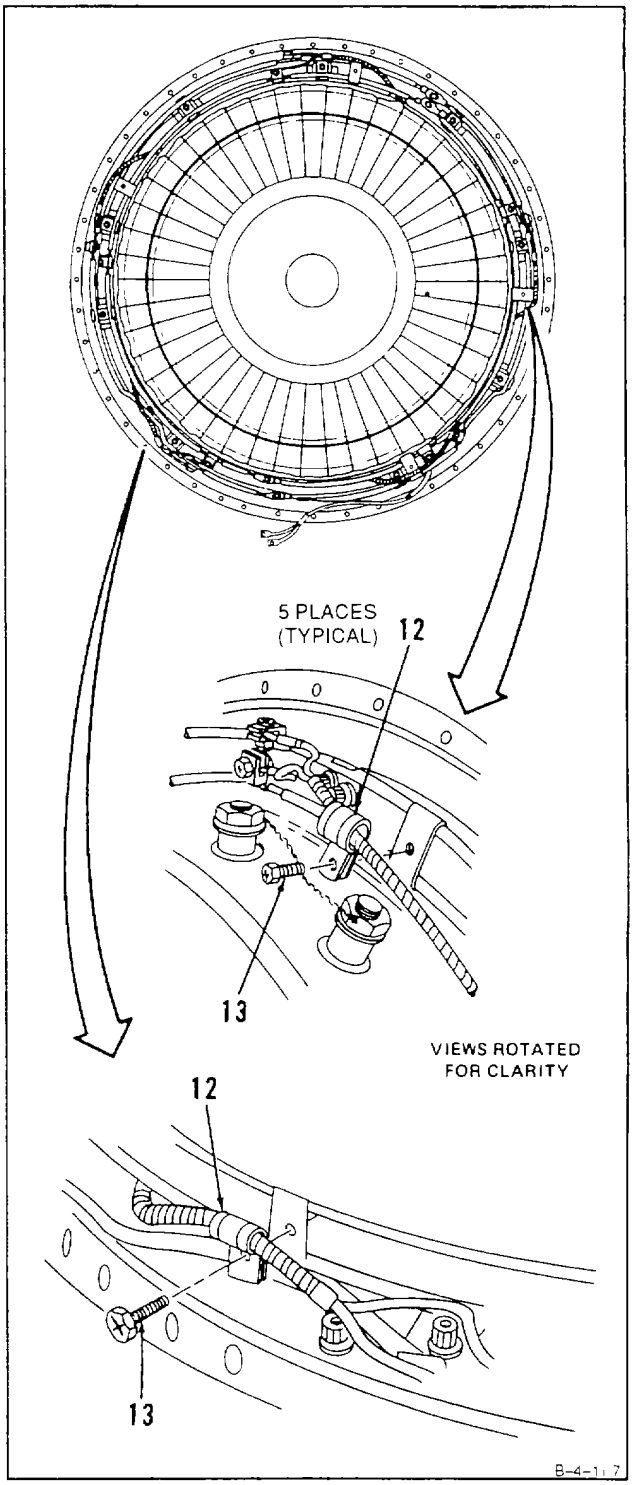
4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

7. **Install five clamps (12)** and screws (13) Tighten five screws (13).



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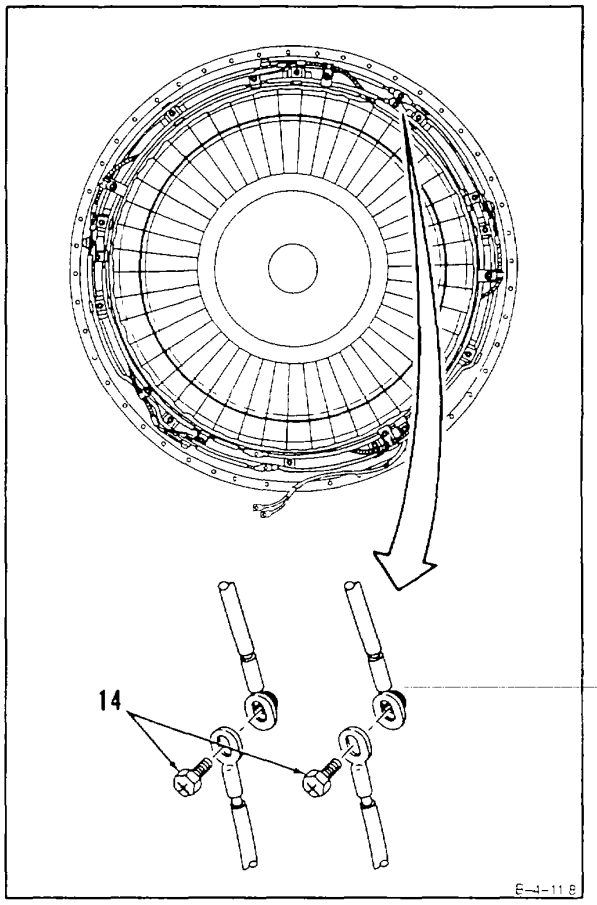
8. **Install two screws (14).**



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4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

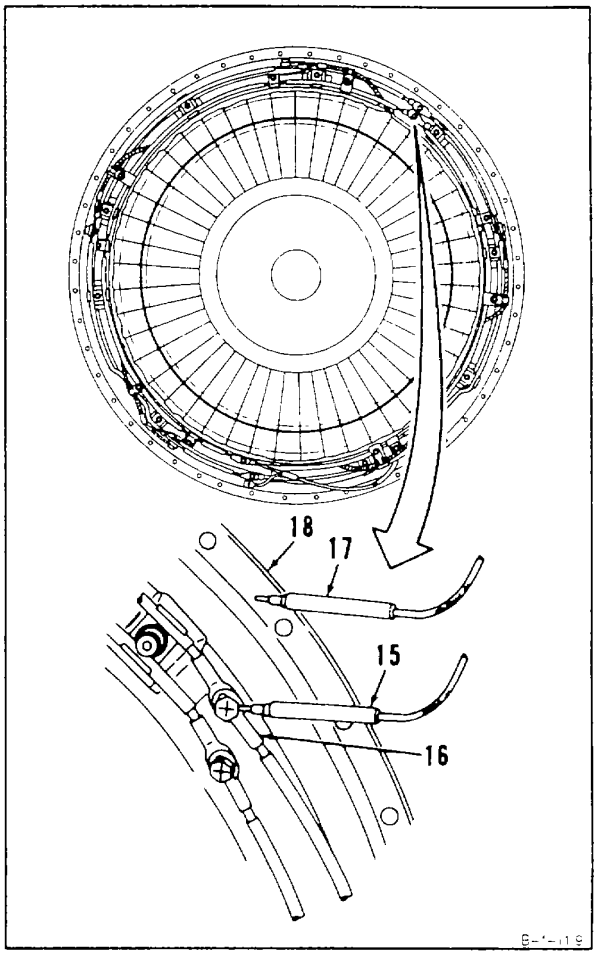
9. Using multimeter, **measure insulation resistance** as follows:

   a Set multimeter range switch to RX 1000.

   b Touch red probe (15) to terminal lug (16).

   c Touch black probe (17) to fireshield (18).

   d Meter shall indicate **1000 ohms** minimum If meter indicates less than 1000 ohms replace bus bar assembly (Ref Task 4-7 and 4-1 1).



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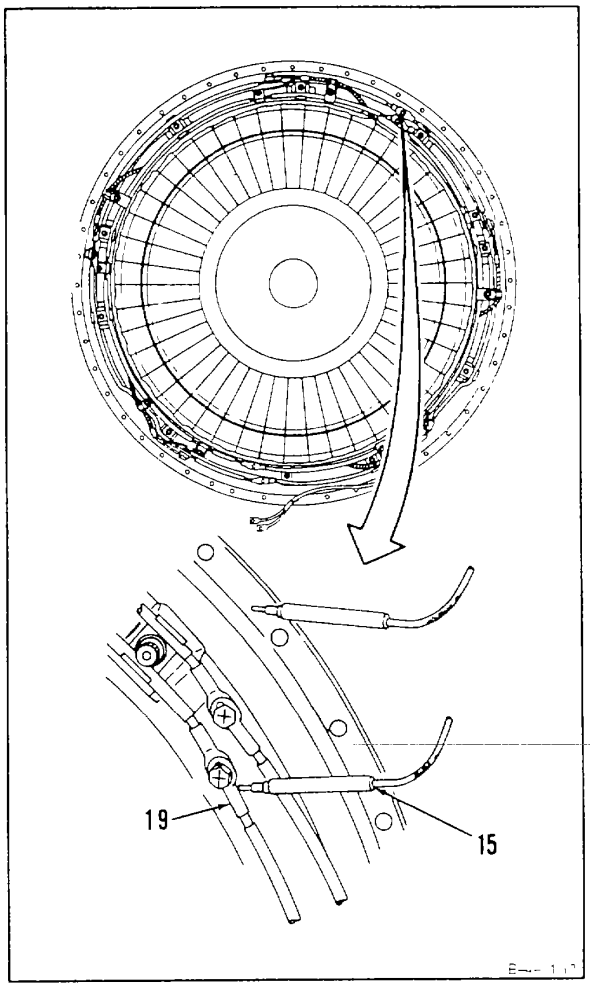
4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

e. Touch red probe (15) to terminal lug (19).

f. Multimeter shall indicate **1000 ohms** minimum If meter indicates less than 1000 ohms, replace bus bar assembly (Ref Task 4-7 and 4-11).



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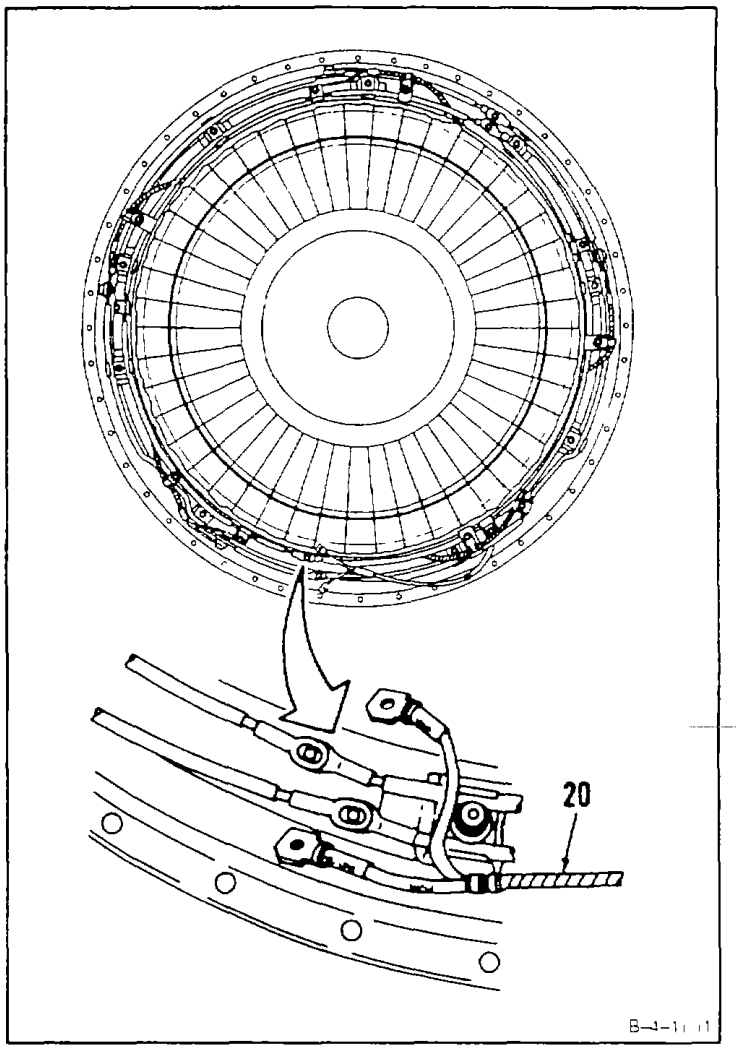
4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

10. Route thermocouple jumper lead (20) clockwise.



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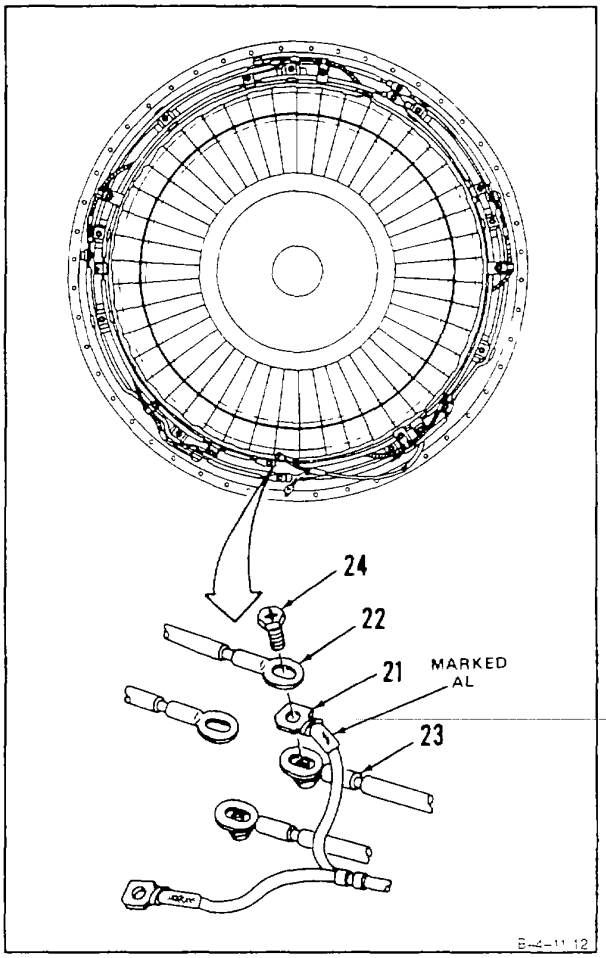
4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

11. **Install terminal lug (21),** marked AL, between terminal lugs (22 and 23) and install screw (24).



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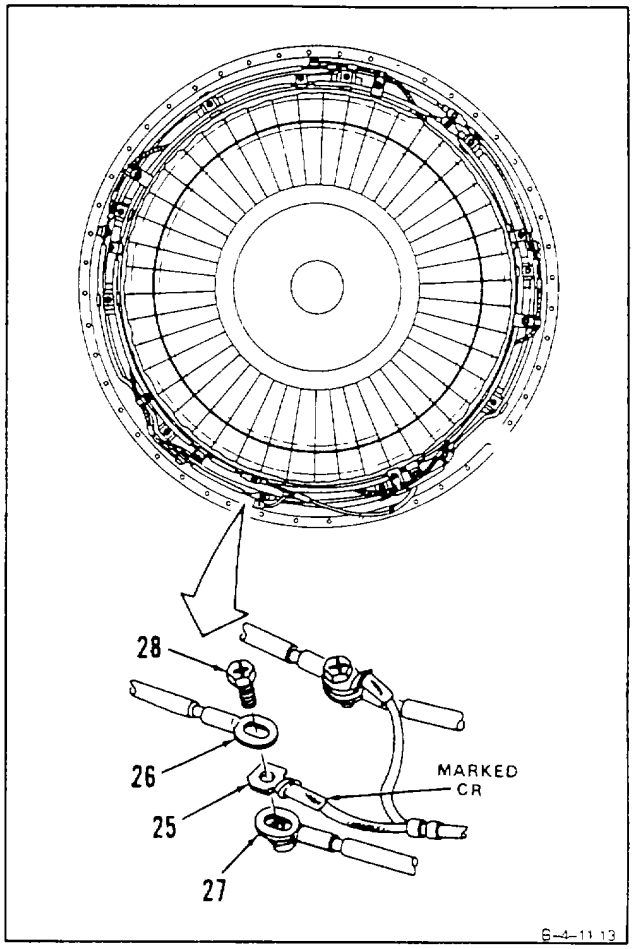
12. **Install terminal lug (25),** marked CR, between terminal lugs (26 and 27) and install screw (28).



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4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

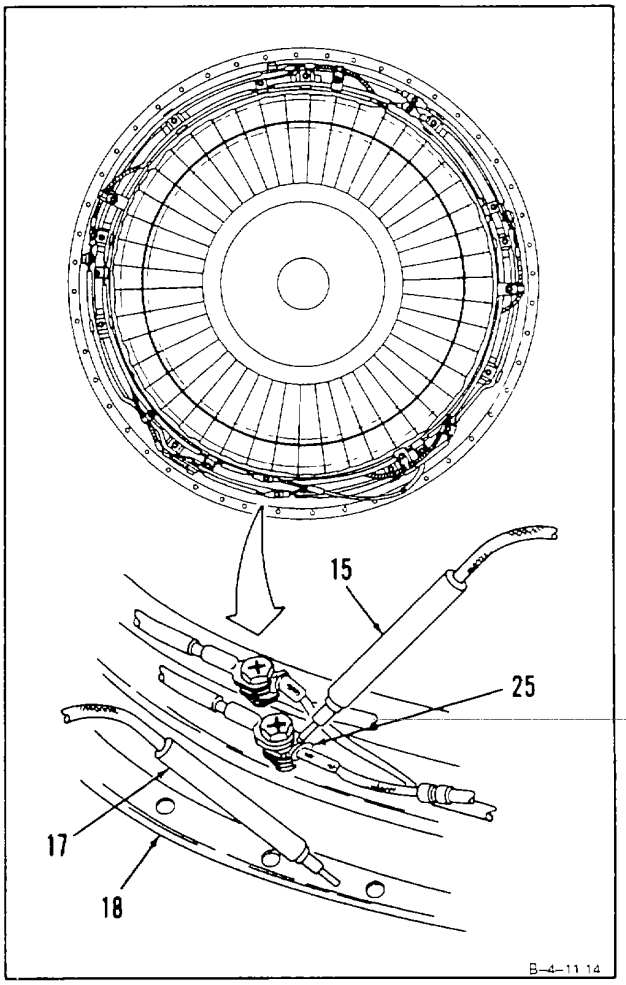
13. Using multimeter, **measure insulation resistance** as follows:

    a Set multimeter range switch to RX 1000.

    b Touch red probe (15) to terminal lug (25).

    c Touch black probe (17) to fireshield (18).

    d Multimeter shall indicate **1000 ohms** minimum If meter indicates less than 1000 ohms, replace bus bar assembly (Ref Task 4-7 and 4-11).



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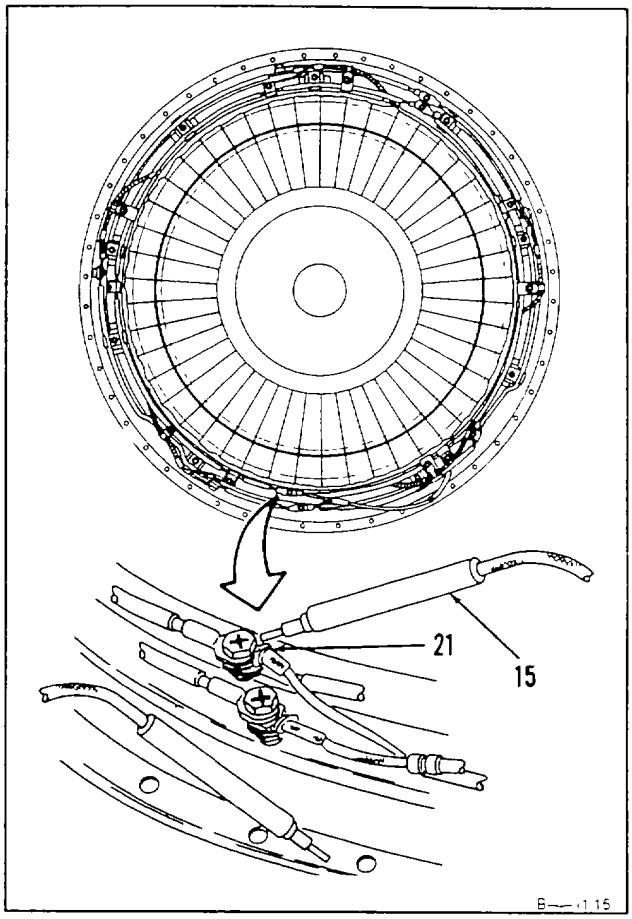
4-11 INSTALL LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES (Continued) 4-11

e. Touch red probe (15) to terminal lug (21).

f. Multimeter shall indicate **1000 ohms** minimum If meter indicates less than 1000 ohms, replace bus bar assembly (Ref Task 4-7 and 4-11).



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION III

FIRESHIELD ASSEMBLY

4-12 REMOVE FIRESHIELD ASSEMBLY 4-12

INITIAL SETUP

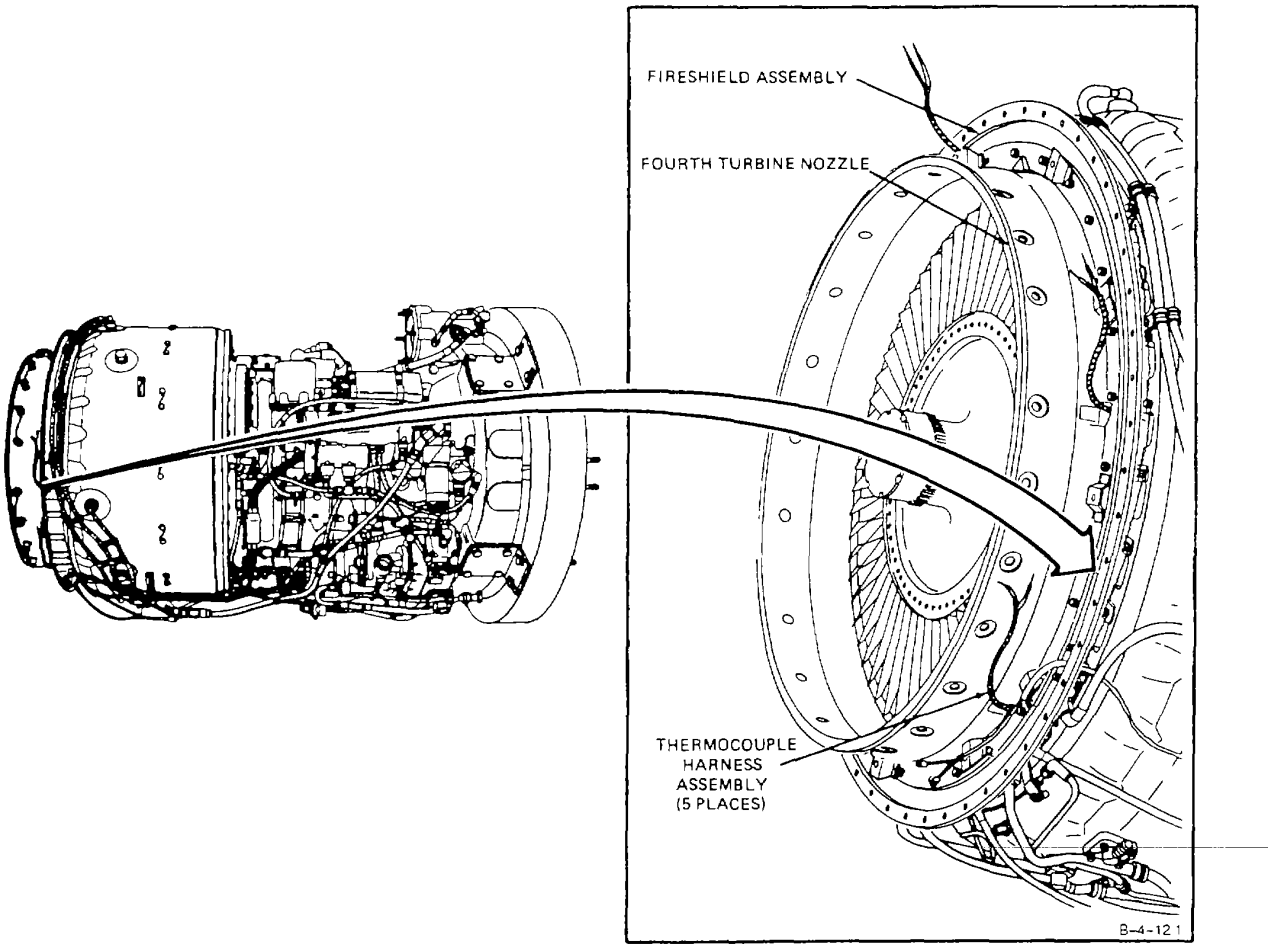
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 51 80-00-323-4944

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer

References:
Left- and Right-Hand Bus Bar Assemblies Removed (Task 4-7)



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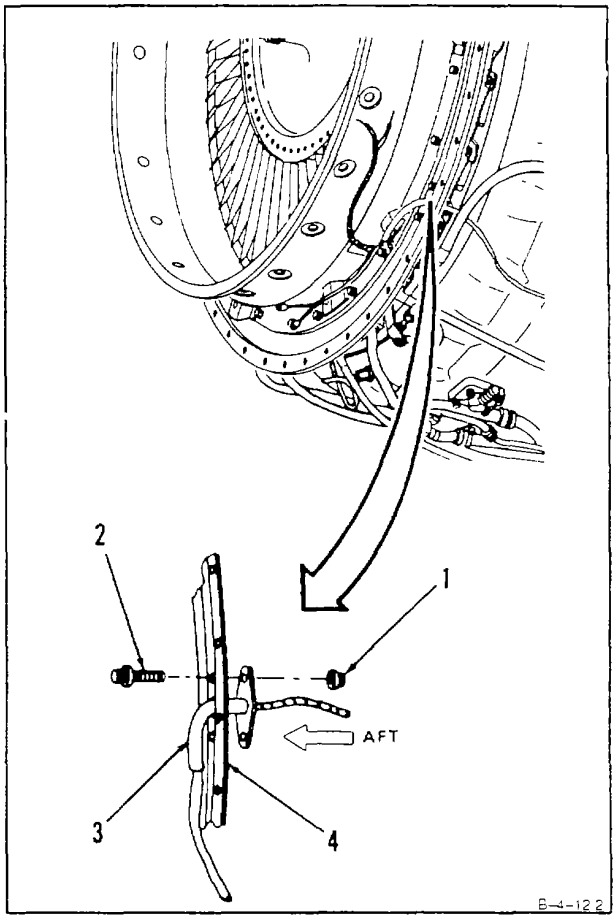
4-12 REMOVE FIRESHIELD ASSEMBLY (Continued) 4-12

1. Remove two nuts (1) and bolts (2) **Withdraw thermocouple jumper lead** (3) from fireshield assembly (4).



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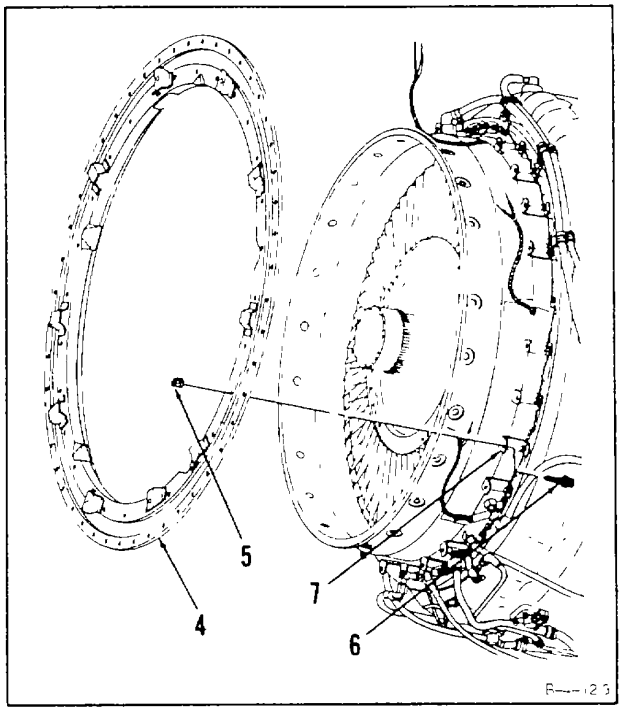
CAUTION

When removing fireshield assembly, be careful not to get five thermocouple harness assembly leads caught between fireshield and fourth turbine nozzle Failure to comply may cause damage to harness assembly leads.

2. Remove 28 nuts (5) and bolts (6) from 23 supports (7). **Remove fireshield assembly (4).**



FOLLOW-ON MAINTENANCE

None

END OF TASK

4-13 CLEAN FIRESHIELD ASSEMBLY 4-13

INITIAL SETUP

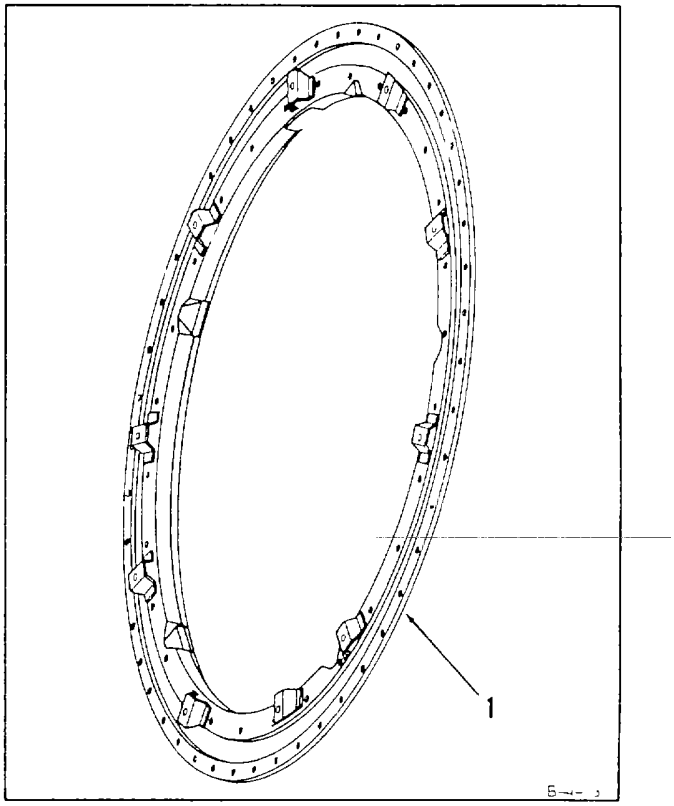
Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 51 80-00-323-4944
Goggles
Dry, Compressed Air Source
Materials:
Gloves (E24)
Denatured Alcohol (E17)
Personnel Required:
Aircraft Powerplant Repairer
Equipment Condition:
Off Engine Task
Left- and Right-Hand Bus Bar Assemblies Removed (Task 4-7)
Fireshield Assembly Removed (Task 4-12)

1. Wear gloves (E24). **Clean fireshield assembly (1)** using denatured alcohol (E17) and brush.

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

2. Wear goggles Blow dry fireshield assembly (1) using clean, dry, compressed air.



FOLLOW-ON MAINTENANCE

Inspect Fireshield Assembly (Task 4-14)

END OF TASK

4-14 INSPECT FIRESHIELD ASSEMBLY 4-14

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1. **Inspect fireshield assembly (1)** as follows:

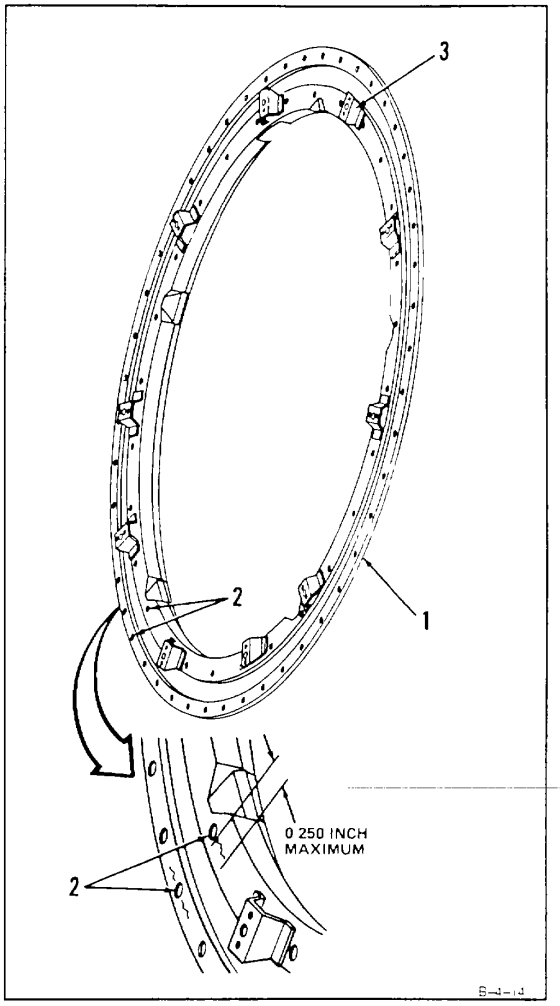
   a. Inspect for cracks.

      (1) There shall be no converging cracks.

      (2) There shall bo no cracks longer than ¼ inch in bolt hole areas (2).

   b. There shall be no loose mounting brackets (3).

   c. There shall be no bends or warpage which cause deformation after installation.



FOLLOW-ON MAINTENANCE

None
END OF TASK

4-15 INSTALL FIRESHIELD ASSEMBLY 4-15

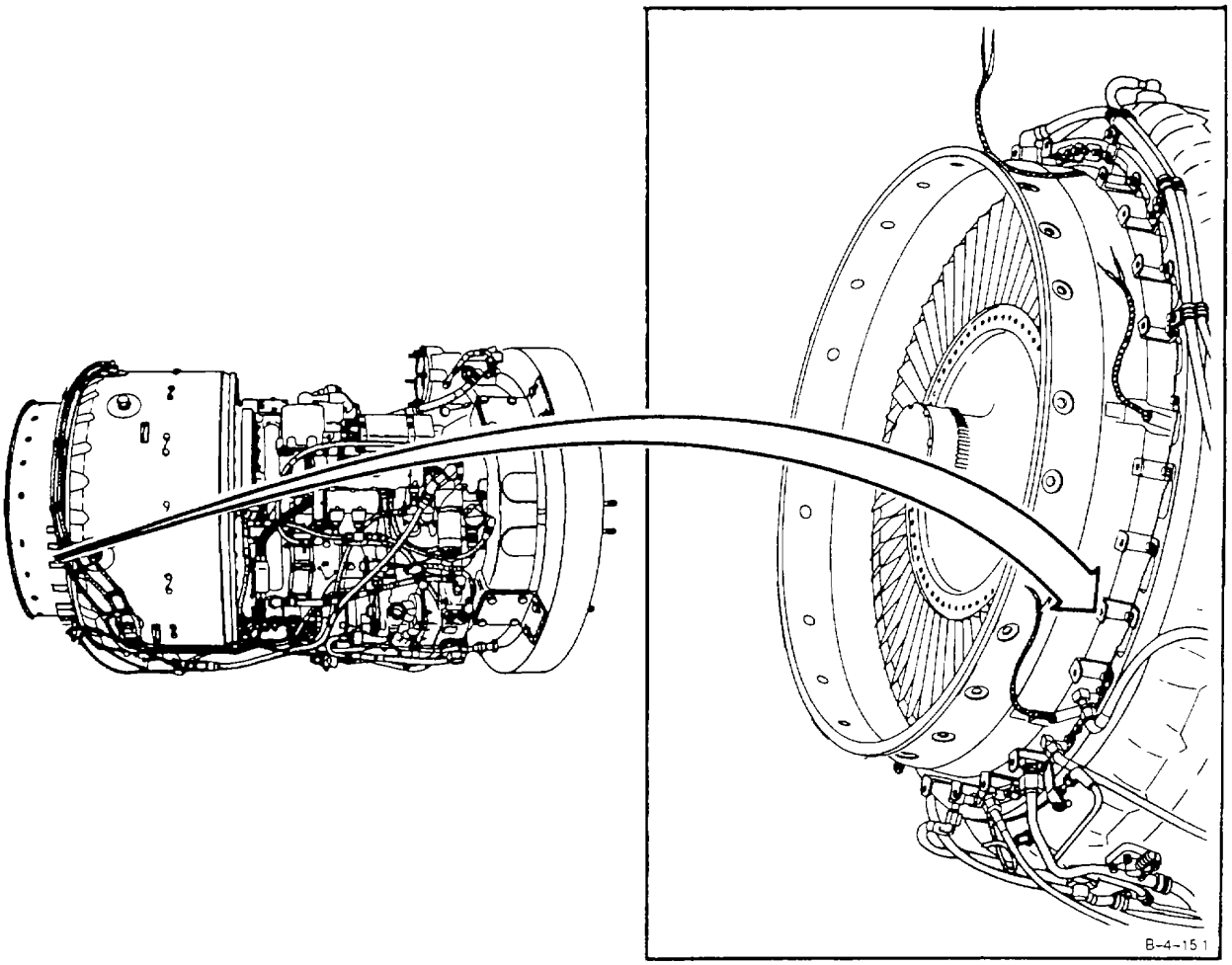
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Wrench, 30-150 Inch-Pounds

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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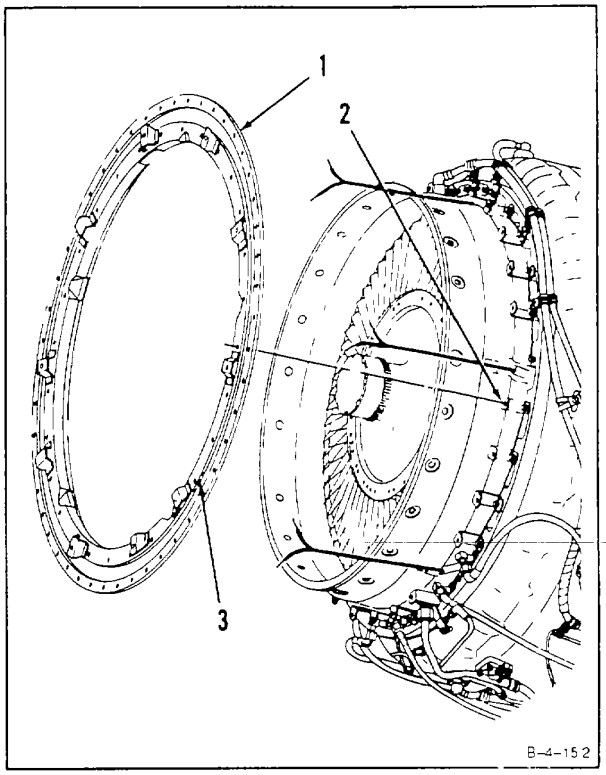
4-15 INSTALL FIRESHIELD ASSEMBLY (Continued) 4-15

CAUTION

When installing fireshield assembly, be careful not to get five thermocouple harness assembly leads caught between fireshield and fourth turbine nozzle. Failure to comply may cause damage to harness assembly leads.

1. **Align fireshield assembly (1) near 23 supports (2)** with thermocouple jumper lead mounting hole (3) at 5-o'clock position.



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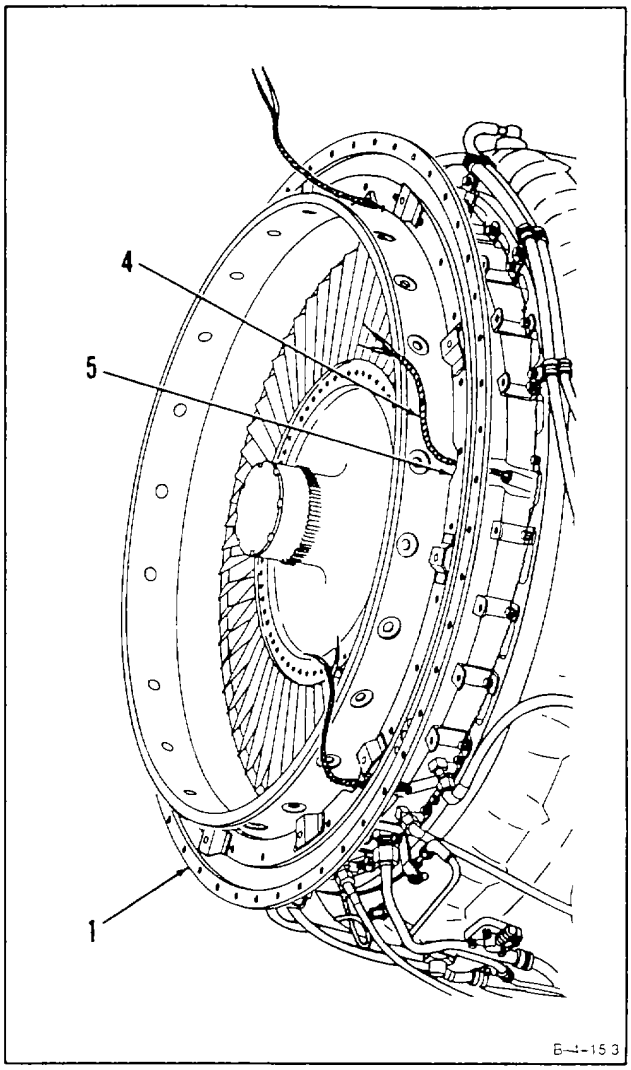
4-15 INSTALL FIRESHIELD ASSEMBLY (Continued) 4-15

2. Route five thermocouple harness assembly leads (4) through five cutouts (5) in fireshield assembly (1).



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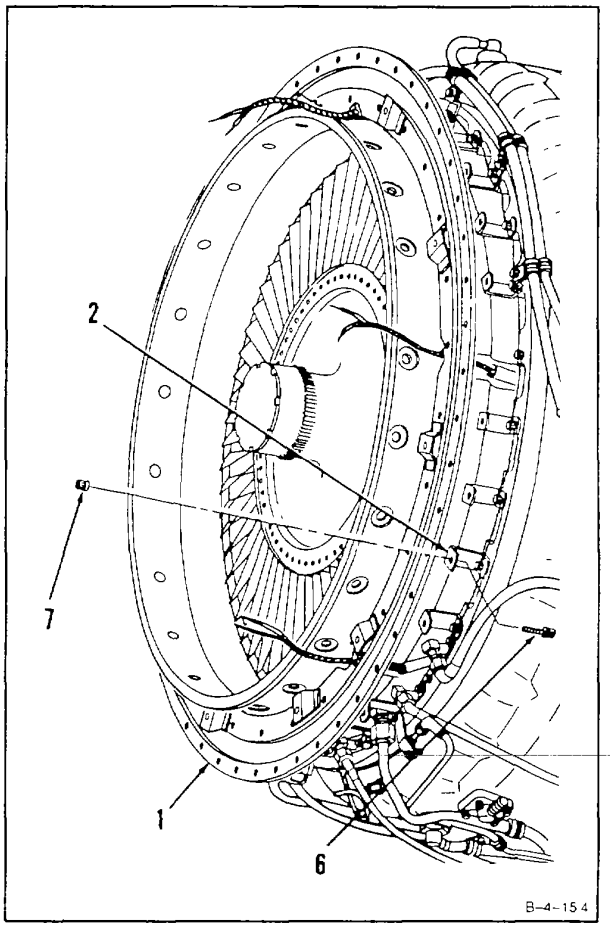
4-15 INSTALL FIRESHIELD ASSEMBLY (Continued) 4-15

3. **Install fireshield assembly (1),** 28 bolts (6) and nuts (7) on supports (2). **Torque nuts (7) to 30 inch-pounds.**



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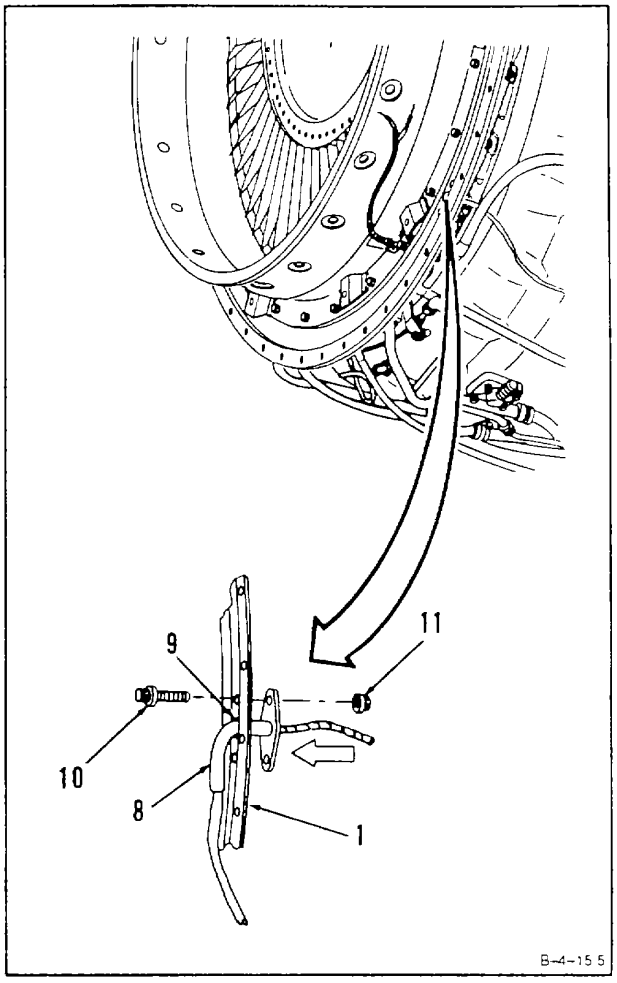
4. **Insert thermocouple jumper lead (8)** through hole (9) in fireshield assembly (1), and install two bolts (10) and nuts (11).



INSPECT

FOLLOW-ON MAINTENANCE

Install Left- and Right-Hand Bus Bar Assemblies (Task 4-11)

END OF TASK

SECTION IV

FIRESHIELD SECTION

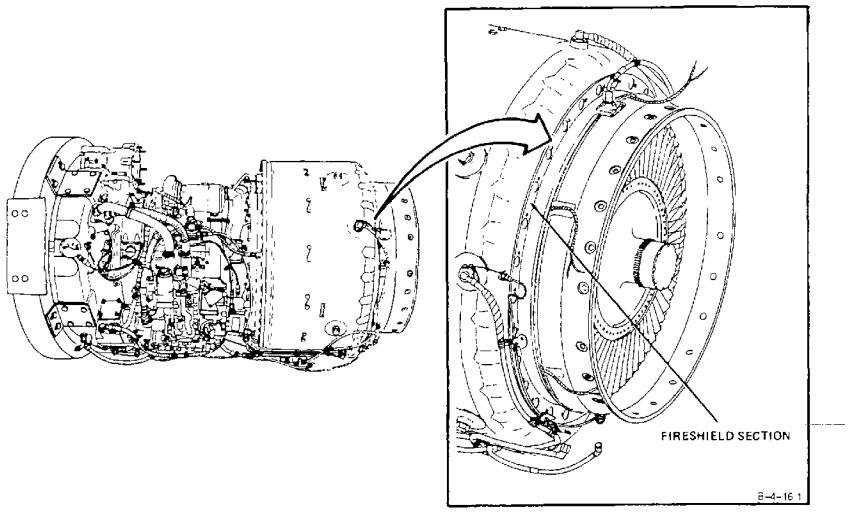
4-16 REMOVE FIRESHIELD SECTION 4-16

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Open-End Wrench (T24)
Materials:
Wiping Rag (E64)
Personnel Required:
Aircraft Powerplant Repairer
Equipment Condition:
Tube Assembly (No 4 and 5 Bearing Scavenge Connector to Tube Assembly) Removed (Task 8-71)
Left- and Right-Hand Bus Bar Assemblies Removed (Task 4-7)
Fireshield Assembly Removed (Task 4-12)
Left- and Right-Hand Fuel Manifold Assemblies Removed (Task 6-15)
General Safety Instructions:

WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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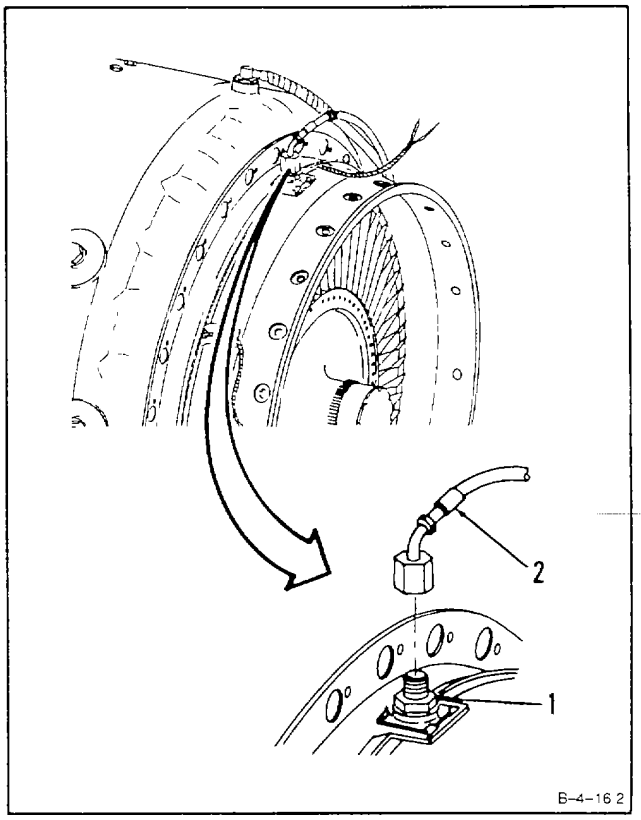
4-16 REMOVE FIRESHIELD SECTION (Continued) 4-16

CAUTION

Reducer must be held with wrench when disconnecting hose assembly. Failure to comply will cause damage to internal tube assembly

1. **Hold reducer (1)** with wrench and **disconnect hose assembly (2).**



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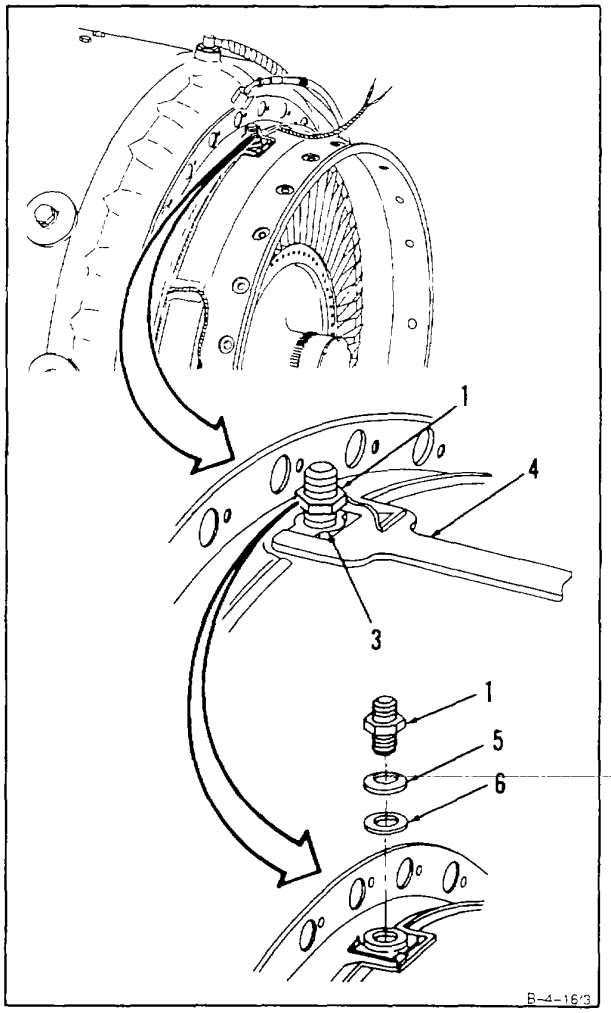
4-16 REMOVE FIRESHIELD SECTION (Continued) 4-16

CAUTION

Adapter must be held firmly when loosening reducer Failure to comply will cause damage to internal tube assembly

2. **Hold adapter (3)** with open-end wrench (T24) (4) and **loosen reducer (1).**

3. **Remove reducer (1),** spring washer (5) and, if installed, shim (6).



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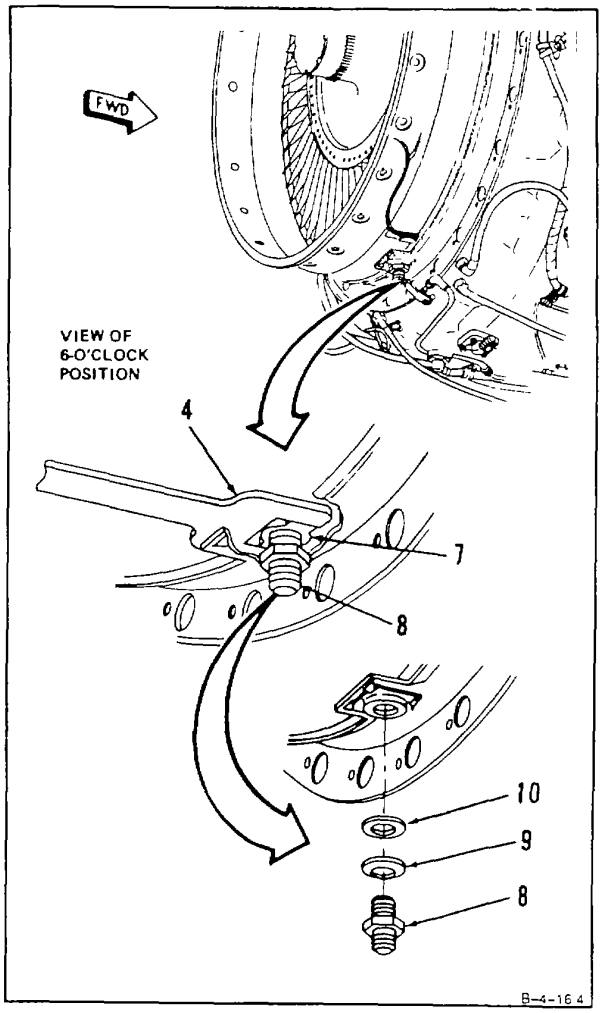
4-16 REMOVE FIRESHIELD SECTION (Continued) 4-16

CAUTION

Adapter must be held firmly when loosening reducer. Failure to comply will cause damage to internal tube assembly.

4. **Hold adapter (7)** with open-end wrench (T24) (4) and **loosen reducer (8).**

5. **Remove reducer (8),** spring washer (9), and, if installed shim (10).



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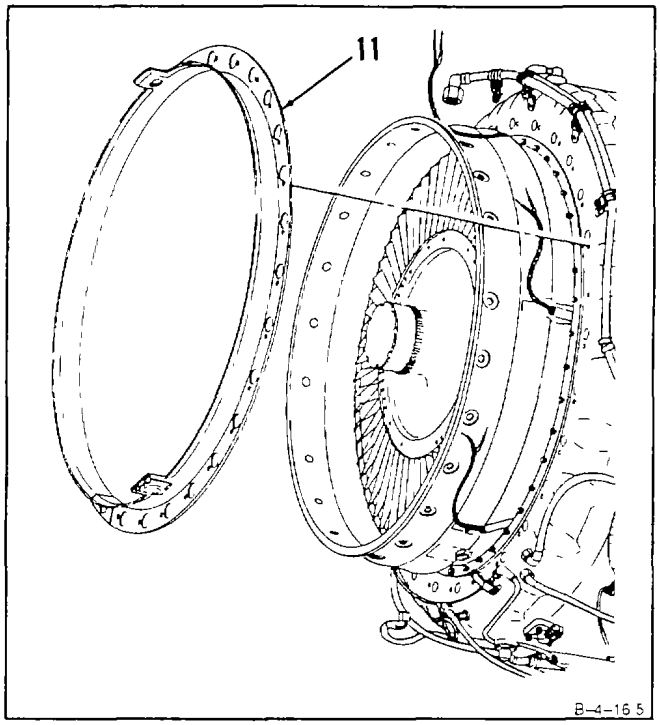
4-16 REMOVE FIRESHIELD SECTION (Continued) 4-16

6. Remove fireshield section (11).



FOLLOW-ON MAINTENANCE

None

END OF TASK

4-17 CLEAN FIRESHIELD SECTION 4-17

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Goggles
Compressed Air Source
Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Personnel Required:
Aircraft Powerplant Repairer
Equipment Condition:
Off Engine Task
Tube Assembly (No 4 and 5 Bearing Scavenge Connector to Tube Assembly) Removed (Task 8-71)
Left- and Right-Hand Bus Bar Assemblies Removed (Task 4-7)
Fireshield Assembly Removed (Task 4-12)
Left- and Right-Hand Fuel Manifold Assemblies Removed (Task 6-15)
Fireshield Section Removed (Task 4-16)
General Safety Instructions:

WARNING

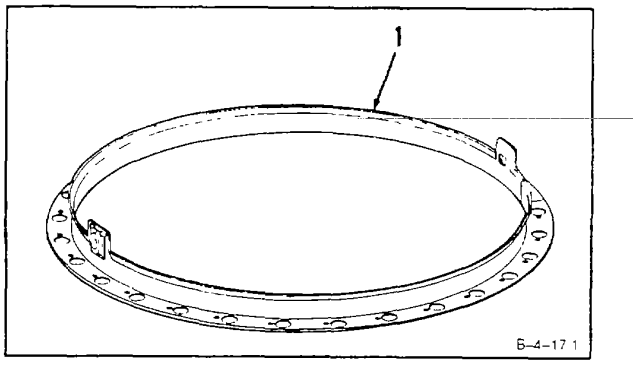
Dry cleaning solvent (E19) is flammable and toxic. It can irritate skin and cause burns Use only in well-ventilated area, away from heat and open flame In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Wear gloves (E24) Clean fireshield section (1), using dry cleaning solvent (E19) and brush.

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

2. Wear goggles Blow dry fireshield section (1), using clean, dry, compressed air.



FOLLOW-ON MAINTENANCE
Inspect Fireshield Section (Task 4-18)
END OF TASK

4-18 INSPECT FIRESHIELD SECTION 4-18

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1. **Inspect fireshield section (1).**

   a. There shall be no nicks or pits that result in holes.

   b. There shall be no dents.

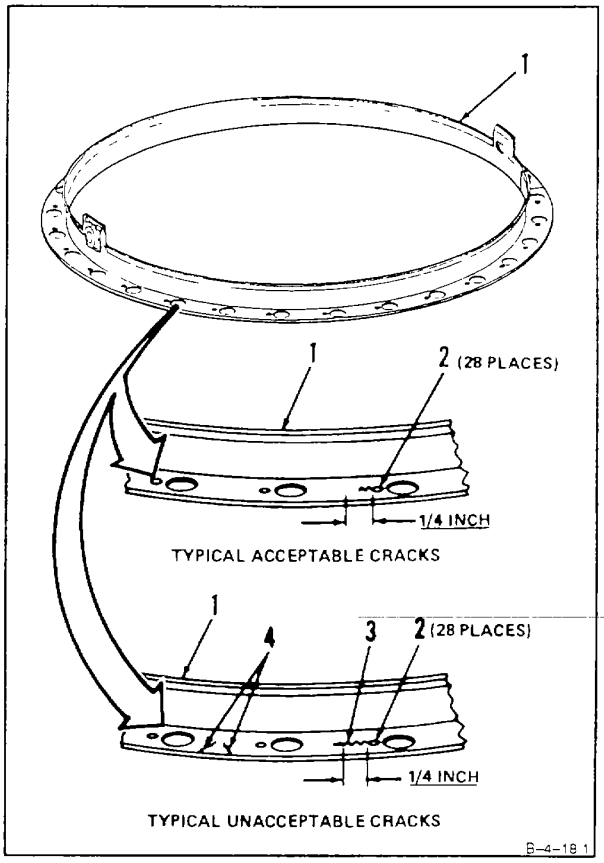
   c. There shall be no bends or warpage which cause deformation after installation.

   d. **Inspect bolt hole areas (2).**

      (1) There shall be no cracks (3) longer than 1/4 inch.

      (2) There shall be no cracks wider than 1/32 inch.

      (3) There shall be no converging cracks (4).



FOLLOW-ON MAINTENANCE

None
END OF TASK

4-19 INSTALL FIRESHIELD SECTION 4-19

INITIAL SETUP

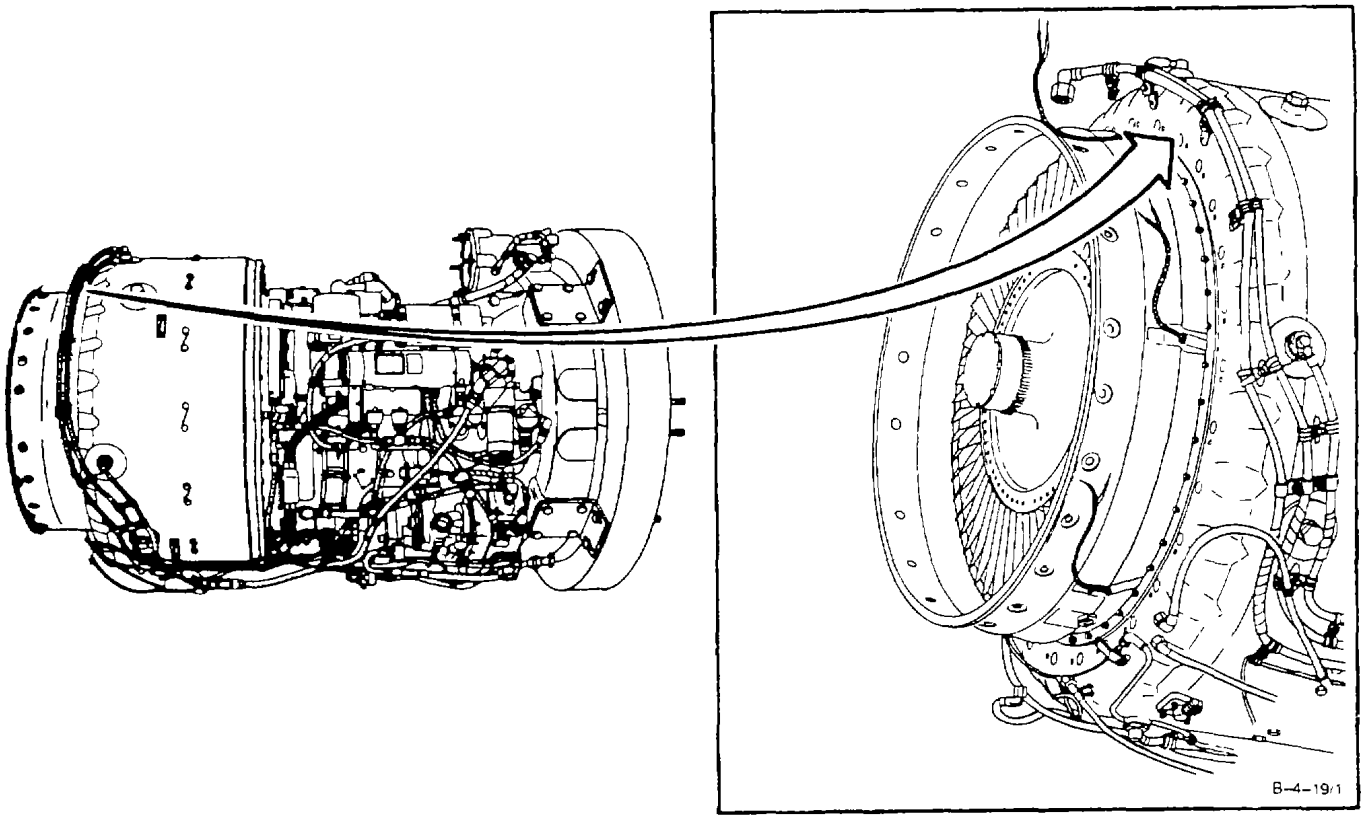
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Open-End Wrench (T24)
Torque Wrench 30-150 Inch-Pounds
Outside Micrometer Caliper Set

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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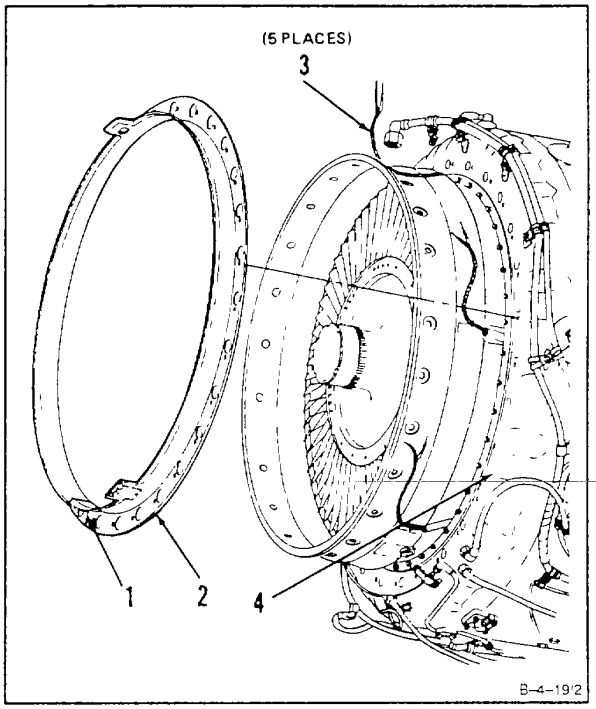
4-19 INSTALL FIRESHIELD SECTION (Continued) 4-19

CAUTION

Be careful not to snag five thermocouple harness leads under fireshield section during installation Failure to comply may cause damage to harness assemblies and wrong temperature readings

1. Position slot (1) at 7-o'clock position. **Install fireshield section (2)** over five thermocouple harness leads (3) and on combustion chamber housing (4).



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4-19 INSTALL FIRESHIELD SECTION (Continued) 4-19

2. **Determine shims needed under reducer (5)** as follows:

CAUTION

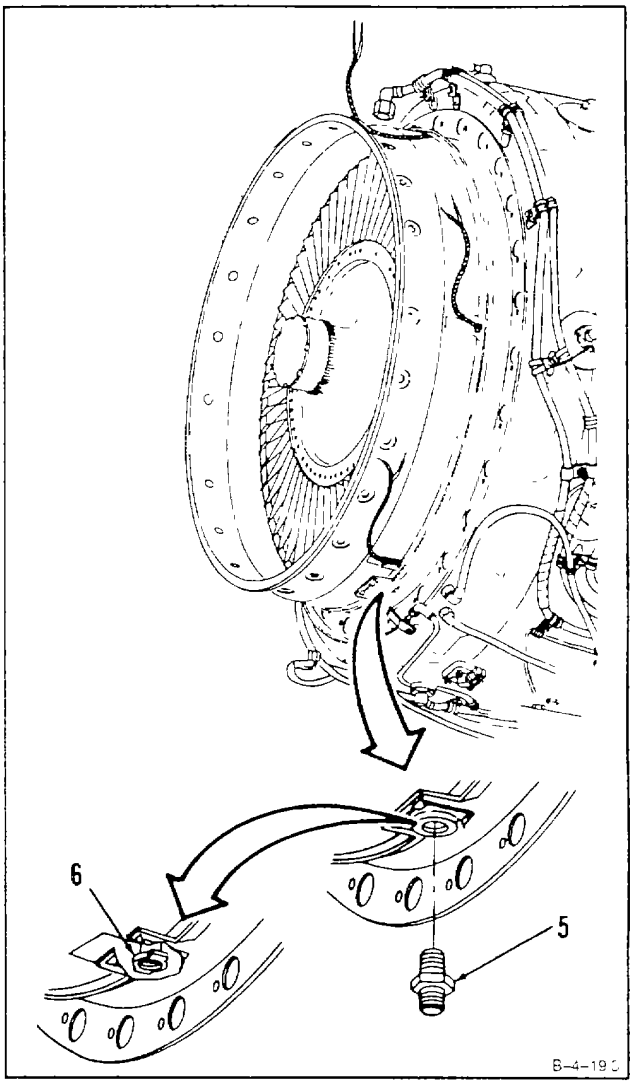
Do not tighten reducer in following step. Tightening of reducer may damage internal oil tube

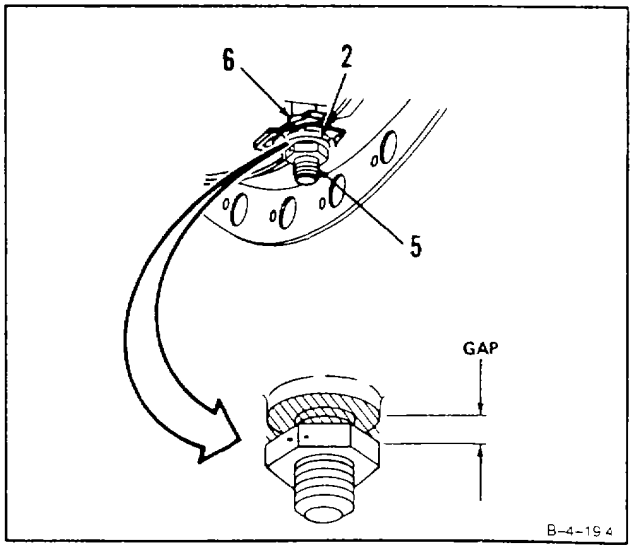
a. Thread reducer (5) in adapter (6) until it is seated.

CAUTION

In following step b, fireshield must be seated against adapter to obtain correct measurement. Failure to do so will result in incorrect gap

b. Seat fireshield section (2) against adapter (6) and measure gap between fireshield section and reducer (5).





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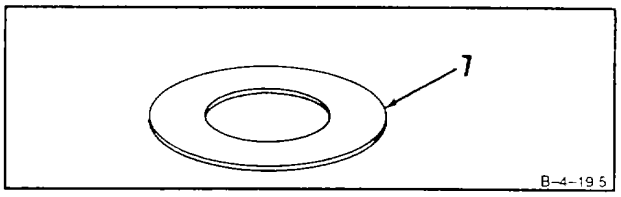
4-19 INSTALL FIRESHIELD SECTION (Continued) 4-19

c. Find gap measured in shim selection table Read across table to find shim thickness needed.

SHIM SELECTION TABLE	
IF GAP MEASURES	SHIM THICHNESS REQUIRED
INCH	INCH
0.060	NONE
0.061	NONE
0.062	0.003 to 0.005
0.063	0.003 to 0.005
0.064	0.003 to 0.005
0.065	0.006 to 0.010
0.066	0.006 to 0.010
0.067	0.006 to 0.010
0.068	0.008 to 0.012
0.069	0.008 to 0.012
0.070	0.008 to 0.012
0.071	0.009 to 0.015
0.072	0.011 to 0.017
0.073	0.011 to 0.017
0.074	0.011 to 0.017
0.075	0.012 to 0.020
0.076	0.014 to 0.022
0.077	0.014 to 0.022
0.078	0.016 to 0.024
0.079	0.016 to 0.024
0.080	0.016 to 0.024
0.081	0.016 to 0.024
0.082	0.019 to 0.029
0.083	0.019 to 0.029
0.084	0.019 to 0.029
0.085	0.022 to 0.034
0.086	0.022 to 0.034
0.087	0.022 to 0.034
0.088	0.022 to 0.034
0.089	0.024 to 0.036
0.090	0.024 to 0.036

d. Measure thickness of shims (7) and check against shim selection table Use outside micrometer caliper.



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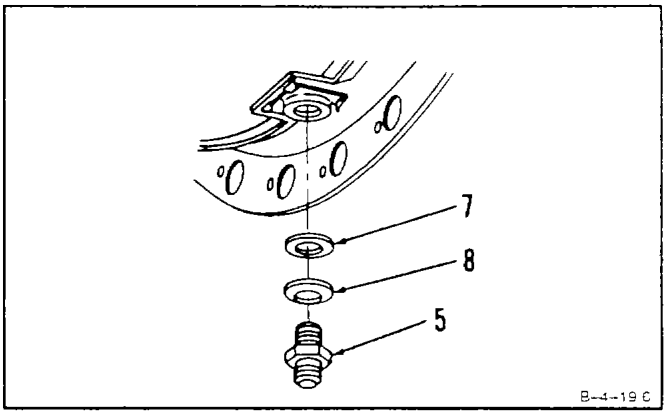
CAUTION

Concave side of washer must face fireshield section Failure to comply will place wrong tension on internal oil tube This may cause damage to oil tube.

CAUTION

Do not tighten reducer in following step 3. Tightening of reducer may damage internal oil tube.

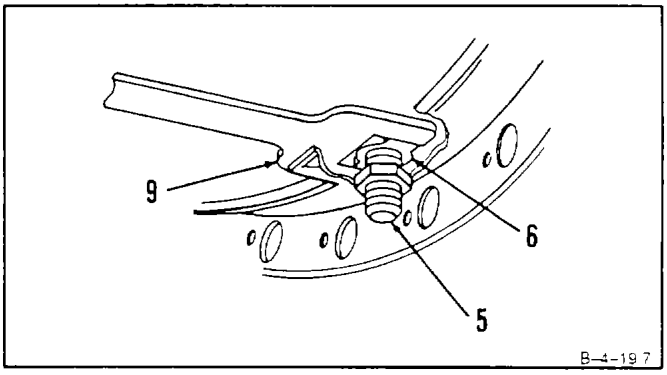
3. Remove reducer (5). **Loosely install shim (7), washer (8),** concave side up **and reducer (5).**



CAUTION

Adapter must be held firmly when tightening reducer. Failure to comply will cause damage to internal tube assembly.

4. Hold adapter (6) with open-end wrench (T24) (9). **Torque reducer (5) to<u>115 inch-pounds</u>.**



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4-19 INSTALL FIRESHIELD SECTION (Continued) 4-19

5. Determine shims needed under reducer (10) as follows

CAUTION

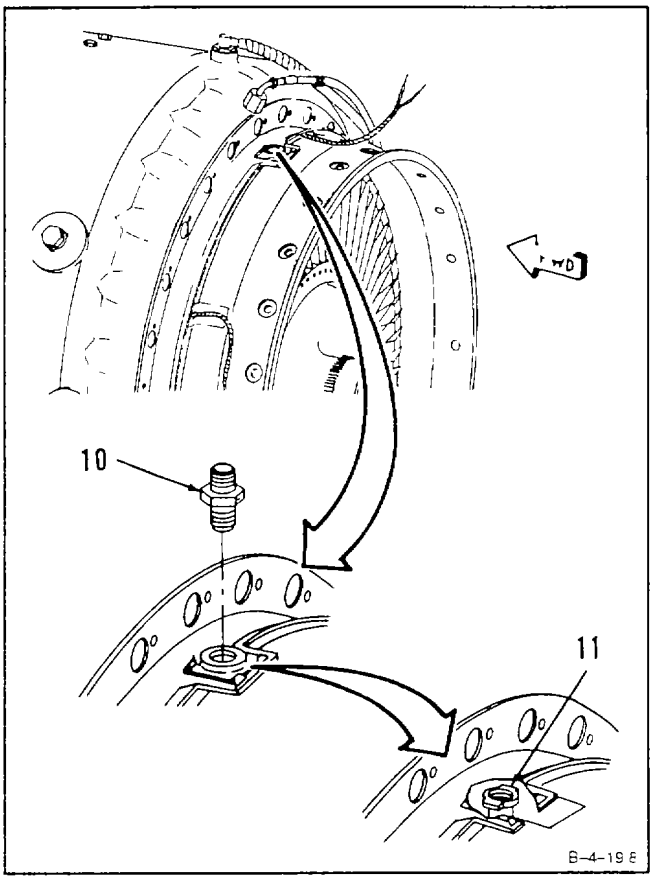
Do not tighten reducer in following step a Tightening of reducer may damage internal oil tube

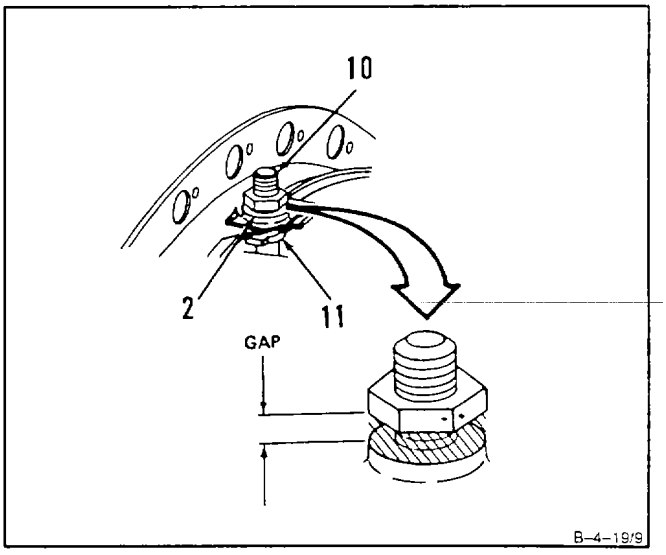
a. Thread reducer (10) in adapter (11) until it is seated

CAUTION

In following step b, fireshield must be seated against adapter to obtain correct measurement Failure to do so will result in incorrect gap

b. Seat fireshield section (2) against adapter (11) and measure gap between fireshield section and reducer (10).





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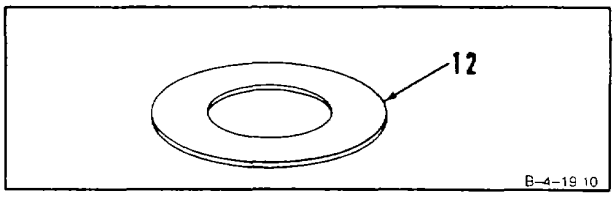
4-19 INSTALL FIRESHIELD SECTION (Continued) 4-19

c. Find gap measured in shim selection table. Read across table to find shim thickness needed.

SHIM SELECTION TABLE

IF GAP MEASURES	SHIM THICHNESS REQUIRED
INCH	INCH
0.060	NONE
0.061	NONE
0.062	0.003 to 0.005
0.063	0.003 to 0.005
0.064	0.003 to 0.005
0.065	0.006 to 0.010
0.066	0.006 to 0.010
0.067	0.006 to 0.010
0.068	0.008 to 0.012
0.069	0.008 to 0.012
0.070	0.008 to 0.012
0.071	0.009 to 0.015
0.072	0.011 to 0.017
0.073	0.011 to 0.017
0.074	0.011 to 0.017
0.075	0.012 to 0.020
0.076	0.014 to 0.022
0.077	0.014 to 0.022
0.078	0.016 to 0.024
0.079	0.016 to 0.024
0.080	0.016 to 0.024
0.081	0.016 to 0.024
0.082	0.019 to 0.029
0.083	0.019 to 0.029
0.084	0.019 to 0.029
0.085	0.022 to 0.034
0.086	0.022 to 0.034
0.087	0.022 to 0.034
0.088	0.022 to 0.034
0.089	0.024 to 0.036
0.090	0.024 to 0.036

d. Measure thickness of shims (12) and check against shim selection table Use outside micrometer caliper.



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4-19 INSTALL FIRESHIELD SECTION (Continued) 4-19

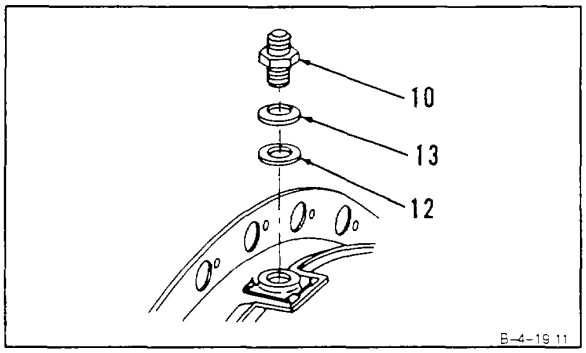
CAUTION

Concave side of washer must face fireshield section Failure to comply will place wrong tension on internal oil tube This may cause damage to oil tube.

CAUTION

Do not tighten reducer in following step 6. Tightening of reducer may damage internal oil tube.

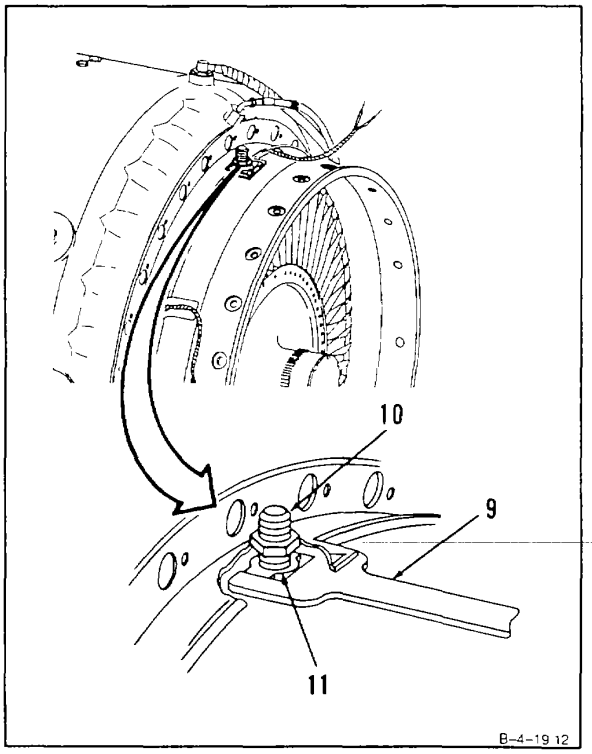
6. Remove reducer (10). **Loosely install shim (12), washer (13)** concave side down, **and reducer (10).**



CAUTION

Adapter must be held firmly when tightening reducer Failure to comply will cause damage to internal tube assembly.

7. Hold adapter (11) with open-end wrench (T24) (9). **Torque reducer (10) to 115 inch-pounds.**



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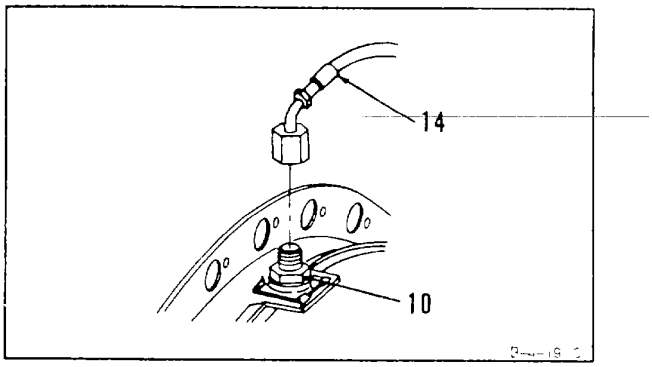
CAUTION

Reducer must be held with wrench when connecting hose assembly Failure to comply will cause damage to internal tube assembly.

8. Hold reducer (10) with wrench **Connect hose assembly (14) to reducer (10).**



INSPECT

FOLLOW-ON MAINTENANCE

Install Left- and Right-Hand Fuel Manifold Assemblies (Task 6-19)
Install Fireshield Assembly (Task 4-15)
Install Left- and Right-Hand Bus Bar Assemblies (Task 4-11)
Install Tube Assembly (No 4 and 5 Bearing Scavenge Connector to Tube Assembly) (Task 8-72)

END OF TASK

SECTION V

THERMOCOUPLE HARNESS ASSEMBLIES

4-20 REMOVE THERMOCOUPLE HARNESS ASSEMBLIES (AVIM) 4-20

INITIAL SETUP

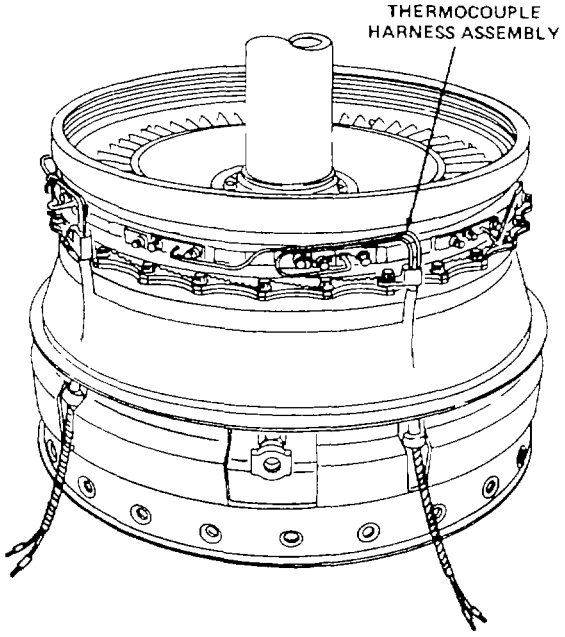
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)



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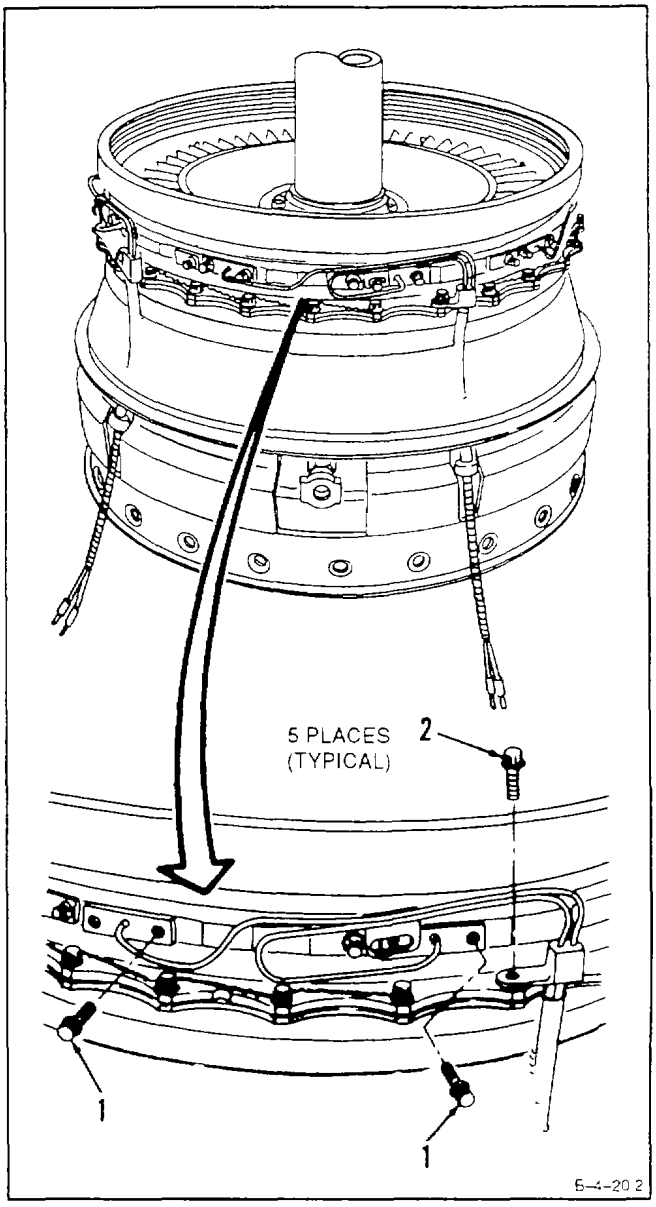
1. Remove lockwire, 20 bolts (1) and five bolts (2).



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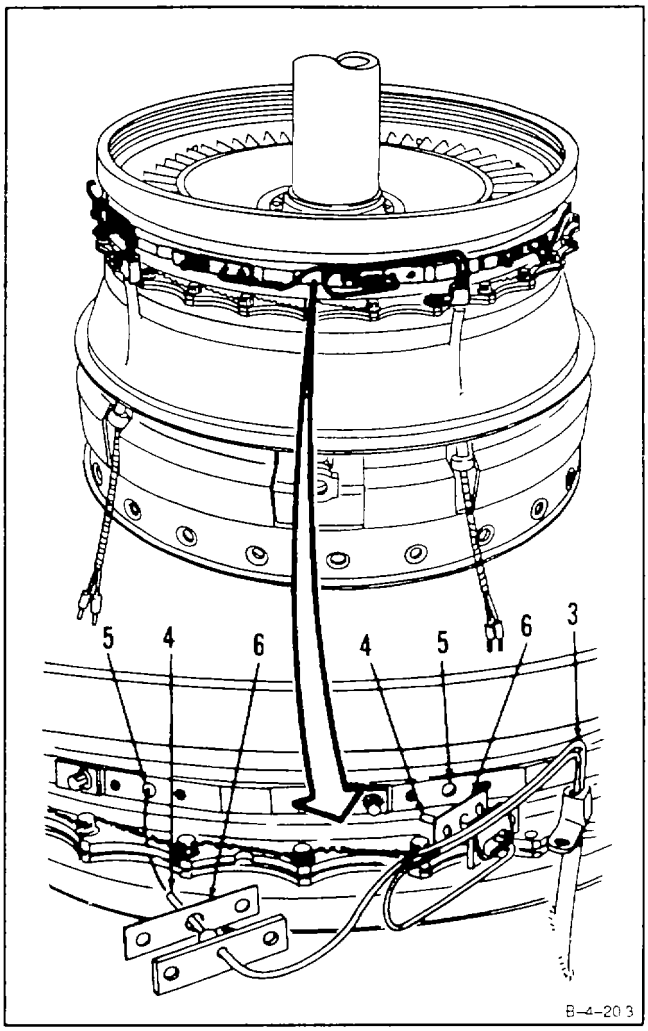
CAUTION

Be careful not to bend and damage probes Damaged probes may cause incorrect temperature indications and damage to engine.

2. Rotate five thermocouple harness assemblies (3) until probes (4) are removed from holes (5) Remove 10 gaskets (6).



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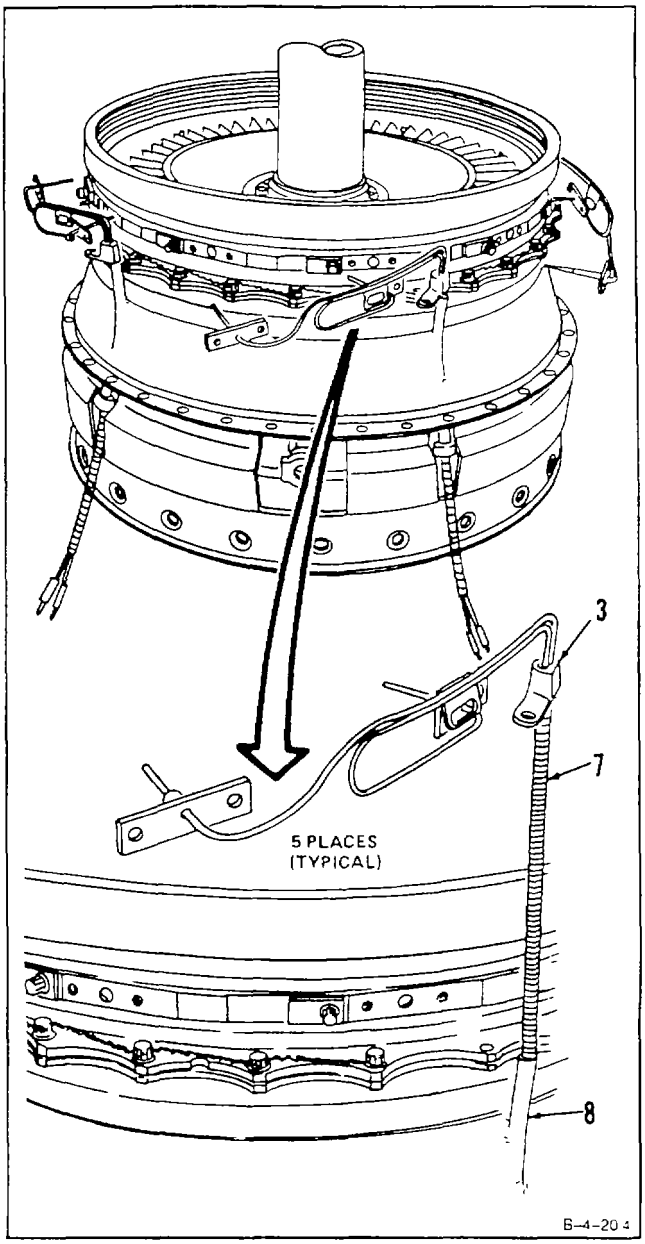
CAUTION

In following step 3., be careful in pulling cables through guide tubes. Pins or insulation could be easily damaged. This would cause incorrect temperature Indication and damage to engine.

3. Carefully pull five cables (7) through guide tubes (8), and remove five thermocouple harness assemblies (3).



FOLLOW-ON MAINTENANCE:
None

END OF TASK

4-21 CLEAN THERMOCOUPLE HARNESS ASSEMBLIES (AVIM) 4-21

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944

Materials:

Dry Cleaning Solvent (E19)

Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Thermocouple Harness Assemblies Removed (Task 4-20)

General Safety Instructions:

WARNING

Dry cleaning solvent (E19) 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

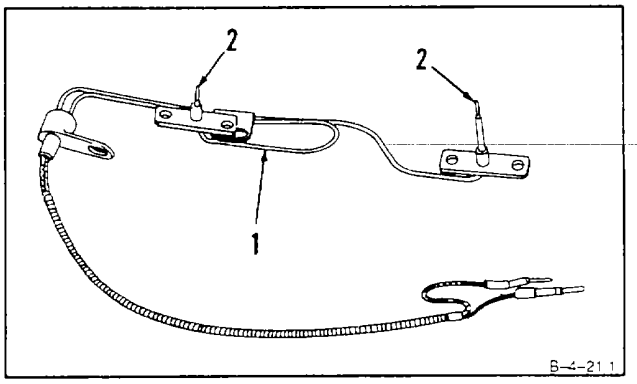
1. Clean thermocouple harness assembly (1) as follows

CAUTION

Do not immerse In dry cleaning solvent. It may cause malfunction of probes or breakdown of Internal wiring insulation.

a. Wear gloves (E24). Wipe clean with lint-free cloth (E30) dampened in dry cleaning solvent (E19) Use brush to loosen carbon on probes (2).

b. Wipe dry. Use clean, dry lint-free cloth (E30).



FOLLOW--ON MAINTENANCE

Inspect Thermocouple Harness Assemblies (Task 4-22).

END OF TASK

4-22 INSPECT THERMOCOUPLE HARNESS ASSEMBLIES (AVIM) 4-22

INITIAL SETUP

Applicable Configurations:
All

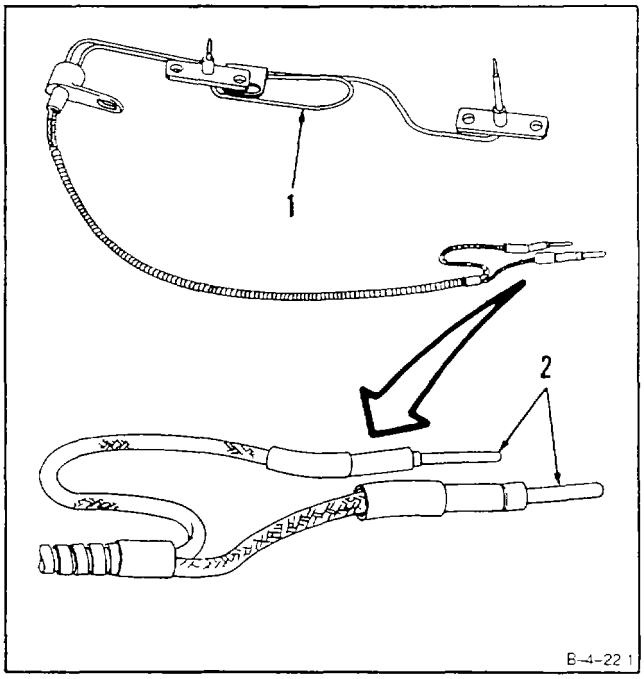
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials
None

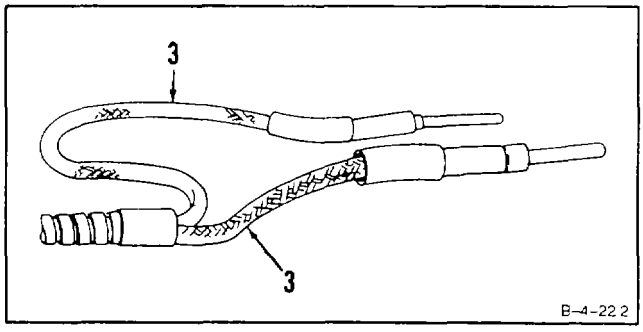
Personnel Required:
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. **Inspect thermocouple harness assemblies** (1) as follows



a. **Inspect pins (2).** There shall be no cracks, corrosion, broken or missing pins.



b. **Inspect pin leads** (3). There shall be no frayed or broken wires.

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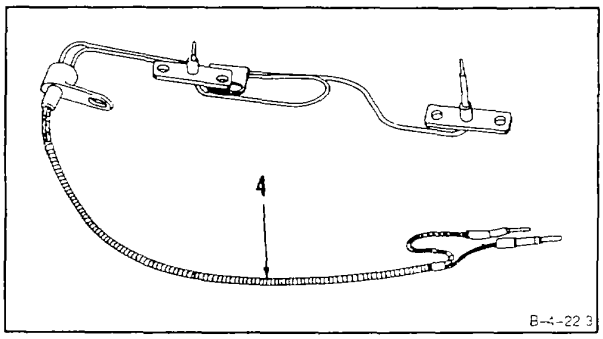
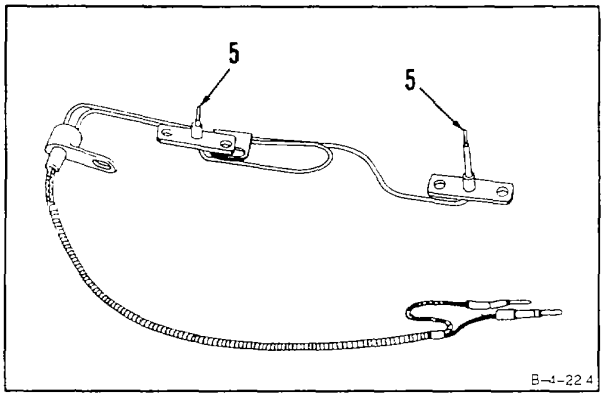
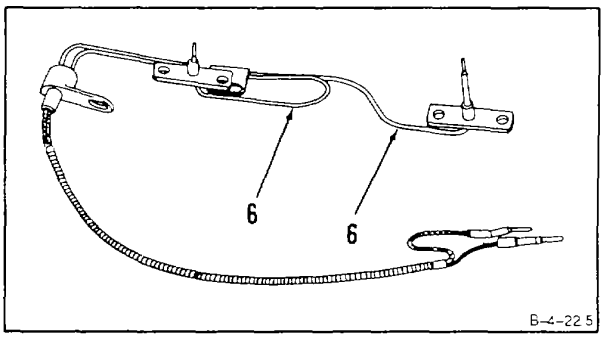
c. Inspect outer shield (4). There shall be no cracks or gouges.



d. Inspect probes (5). There shall be no cracks.



e. Inspect tubes (6). There shall be no cracks or kinks.



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

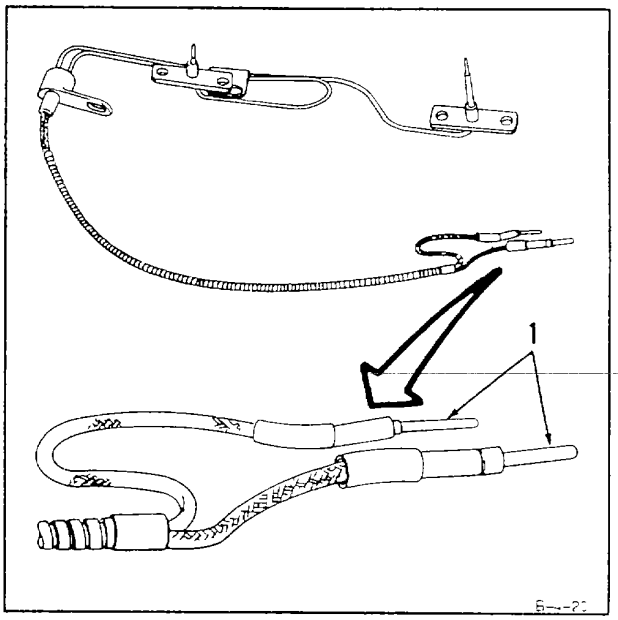
Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit
NSN 5180-00-323-5114
Wire Brush

Materials:
Lockwire (E32)
Spiral Chafing Sleeve (E55)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. **Remove corrosion from pins (1).** Use wire brush.



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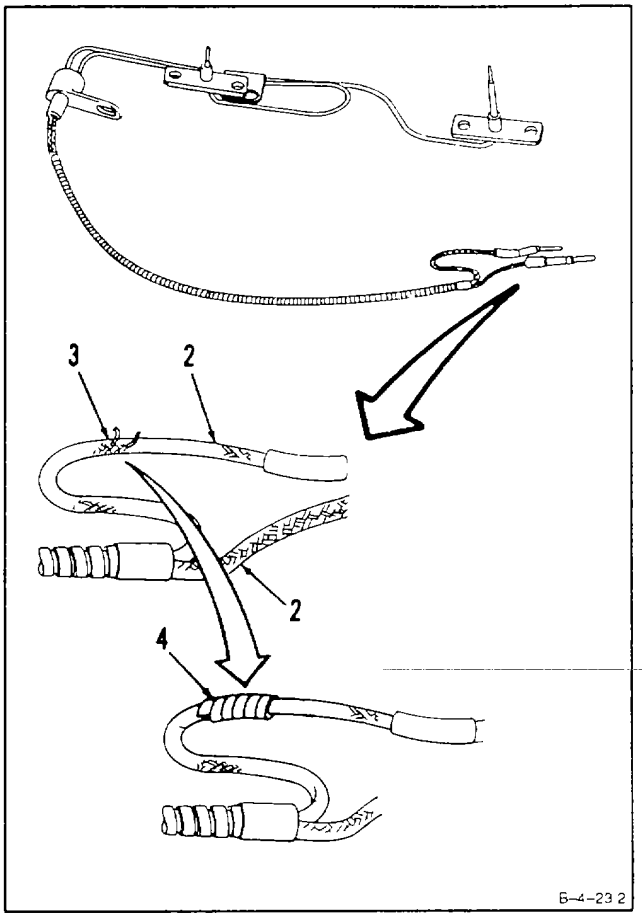
2. **Repair fraying(broken)leads (2)** as follows

a. If one or two wires (3) are broken, wrap individual lead (2) with spiral chafing sleeve (E55) (4). Be sure that spiral chafing sleeve (E55) (4) extends beyond damaged area.



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NOTE

Only one repair allowed on each lead with more than two broken wires.

NOTE

If both leads require repair the second lead will have to be repaired after insertion through thermocouple tube.

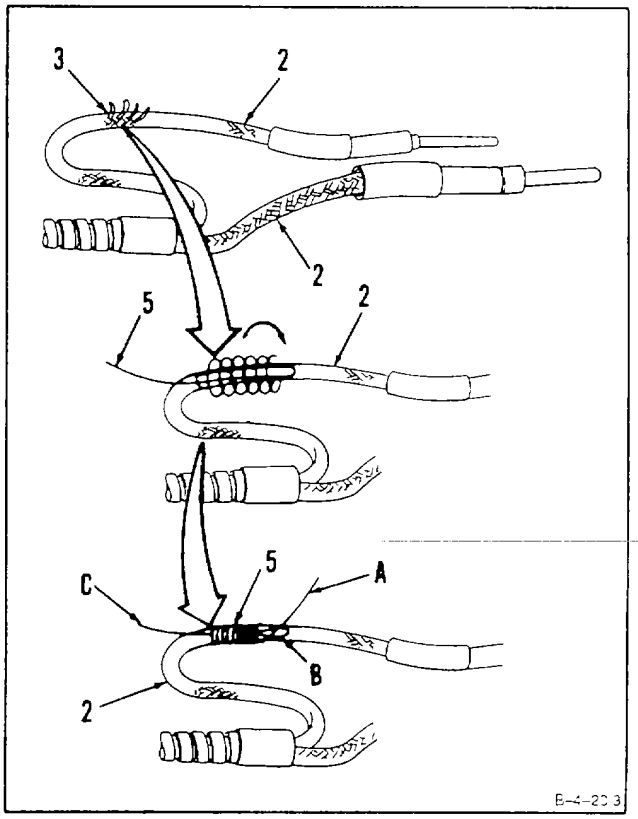
b. If three or four wires (3) on leads (2) are broken, flatten broken wires (3) of leads (2) at damaged area.

c. Use lockwire (E32) (5), wind around damaged leads (2) clockwise. Lockwire (5) should cover damaged area by 3/8-inch. Do not pass wrapping limits of 1-1/4 inch length.

NOTE

In following step d, use care when pulling end C. Pull only far enough to firmly anchor end A beneath several wraps of lockwire.

d. Finish wrap by inserting lockwire (5) end A through loop B. Hold A tight while pulling C to close loop. Release A and carefully pull C until end A is anchored beneath wrapping. Cut excess wire ends.



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

4-24 TEST THERMOCOUPLE HARNESS ASSEMBLIES (AVIM) 4-24

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Multimeter

Materials:
Acetate Fiber Tape (E60)
Tag (E58)

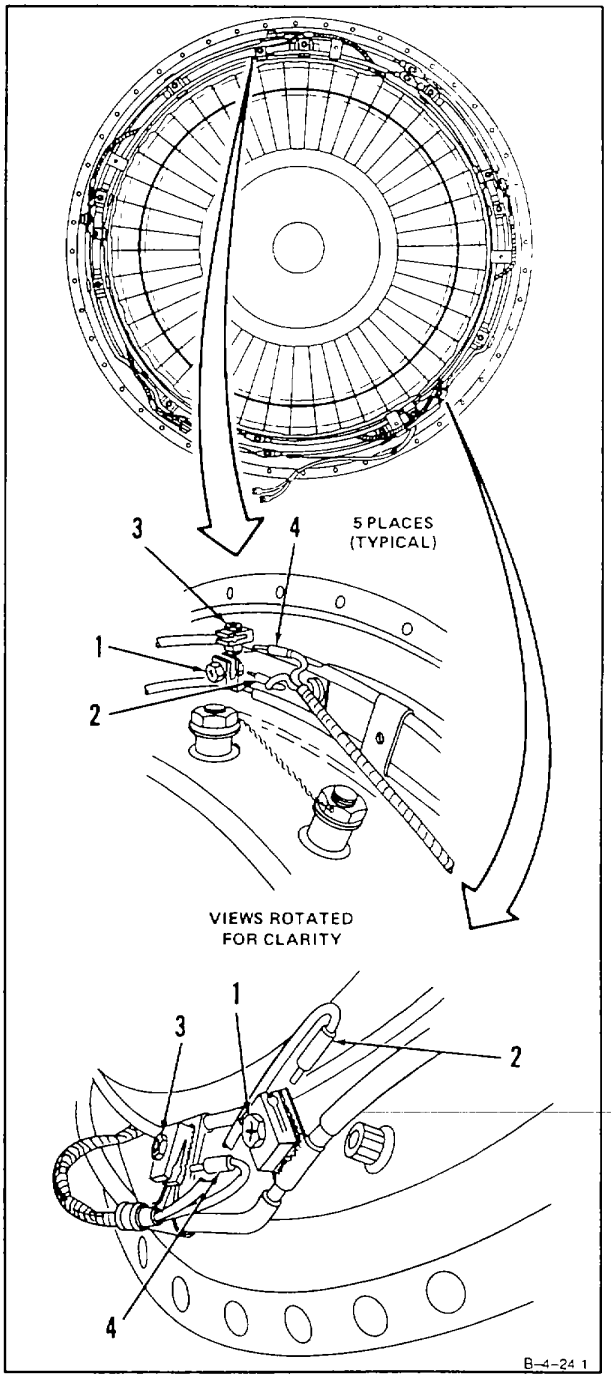
Personnel Required:
Aircraft Powerplant Repairer

NOTE

This task may be done with the five thermocouple harness assemblies on or off the engine If testing is being done with assemblies on engine, do all steps. If testing is being done with assemblies off engine, do steps 3 and 4 only.

1. Loosen five screws (1) and remove five thermocouple harness pins (2).

2. Loosen five screws (3) and remove five thermocouple harness pins (4).



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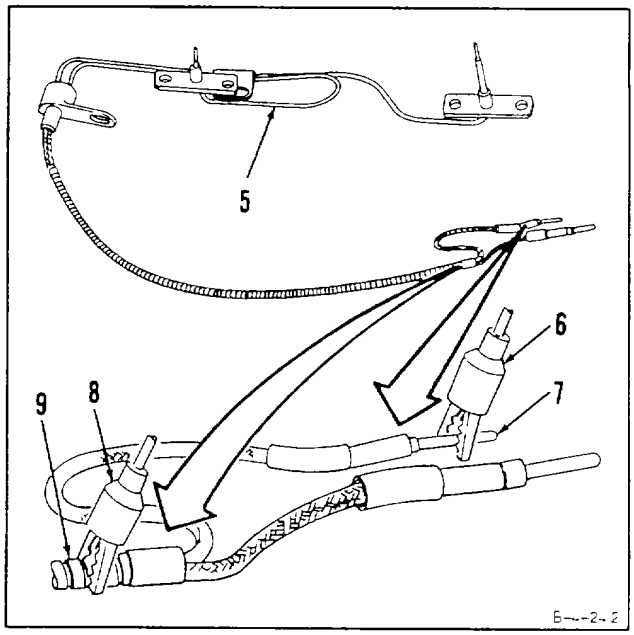
3 Measure insulation resistance of five thermocouple harness assemblies (5) as follows:

a. Set multimeter range switch to R X 1000.

b. Clip red lead (6) to pin (7).

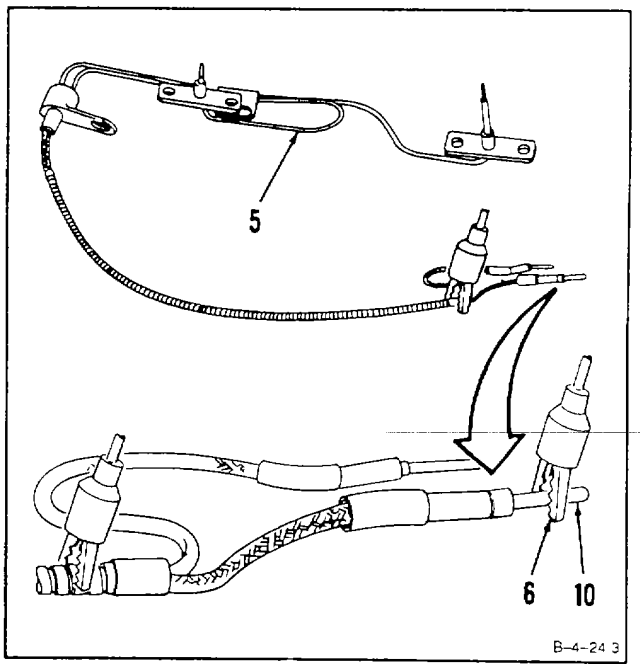
c. Clip black lead (8) to outer shield (9).

d Meter shall indicate **10,000 ohms** minimum If meter indicates less than 10,000 ohms, tag thermocouple harness assembly as defective. Use tag (E58).



e Clip red lead (6) to pin (10).

f. Meter shall indicate **10,000 ohms** minimum. If meter indicates less than 10,000 ohms, tag thermocouple harness assembly as defective. Use tag (E58).



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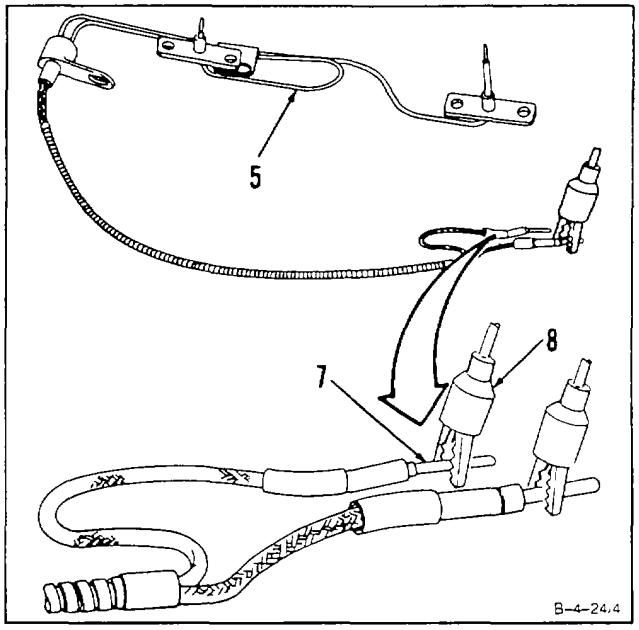
4. **Measure continuity of live thermocouple harness assemblies (5)**as follows

   a. Set multimeter range switch to R X 1.

   b. Clip black lead (8) to pin (7).

   c. Meter shall indicate **three ohms** maximum. If meter indicates more than three ohms, tag thermocouple harness assembly as defective. Use tag (E58).



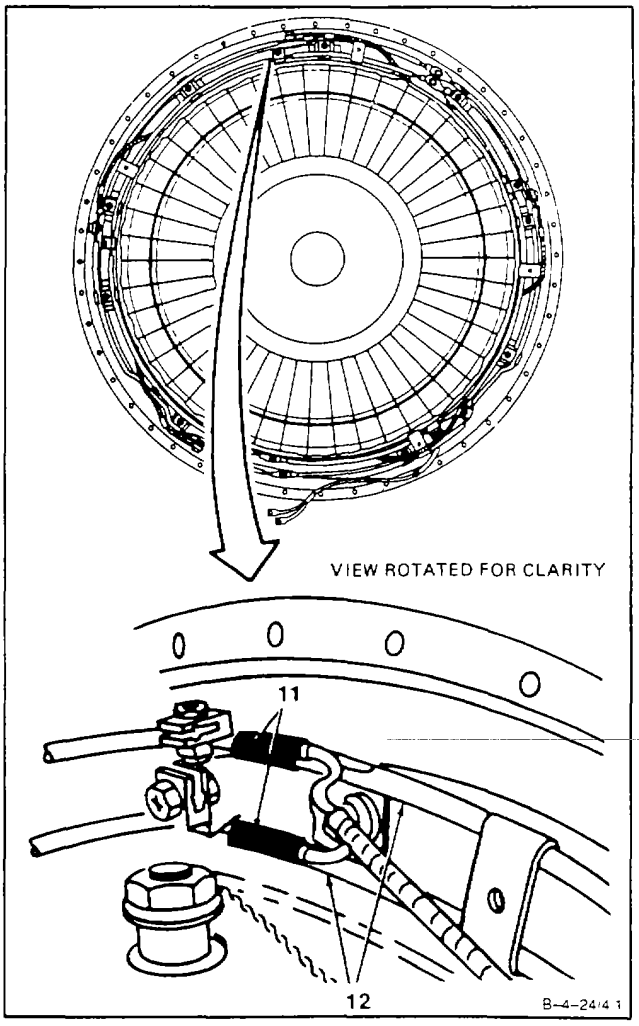
NOTE

A thermocouple harness assembly that has been found defective during on engine testing shall have its leads taped separately and then individually to the bus bar in order to remove its signal input and to prevent damage to the harness during engine operation. **An engine may remain in service with no more than one defective harness provided that It Is replaced within the next 100 hours of engine operation.**

NOTE

Any harness found defective during special inspections (hot end inspection), or during scheduled maintenance shall be replaced (Ref Task 4-20 and 4-25).

5. Tape leads (11) of defective thermocouple harness assembly separately and then **individually** to bus bar assembly (12) using acetate fiber tape (E60).



INSPECT

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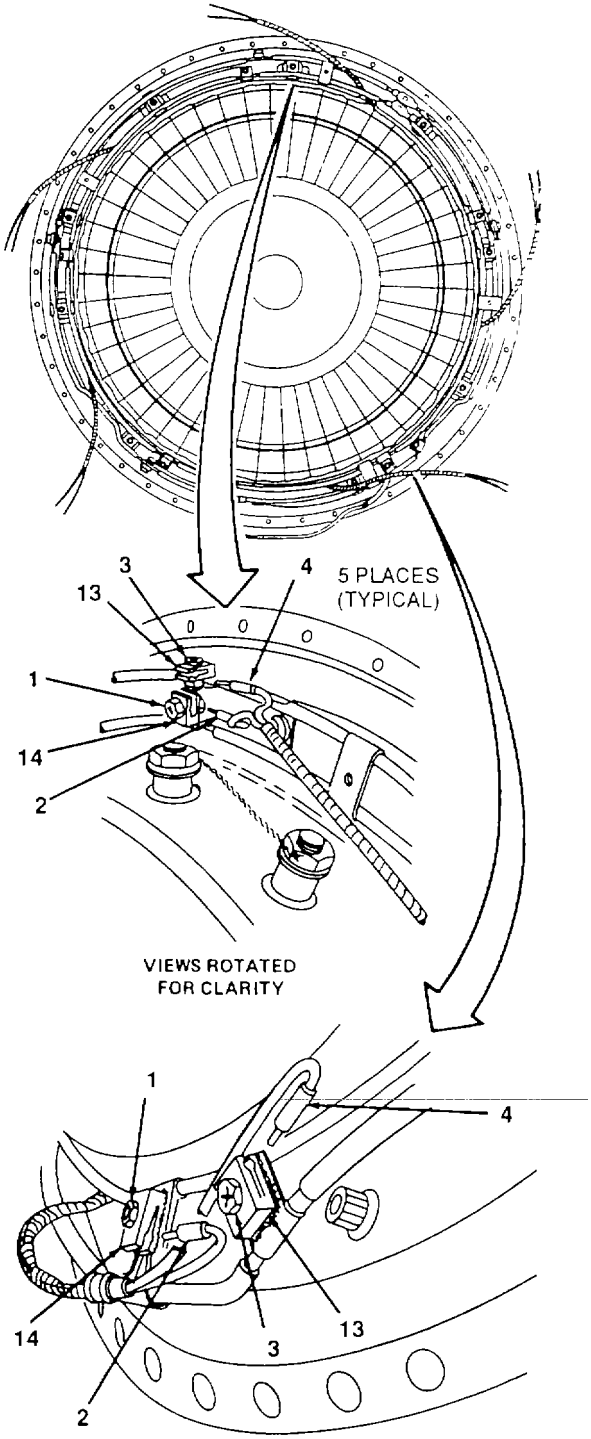
4-24 TEST THERMOCOUPLE HARNESS ASSEMBLIES (AVIM) (Continued) 4-24

6. Install five large pins (4) in pin clamps (13). Tighten five screws (3).

7. Install five small pins (2) in five pin clamps (14). Tighten five screws (1).

FOLLOW-ON MAINTENANCE:
None



END OF TASK

4-25 INSTALL THERMOCOUPLE HARNESS ASSEMBLIES (AVIM) 4-25

INITIAL SETUP

Applicable Configurations:
All

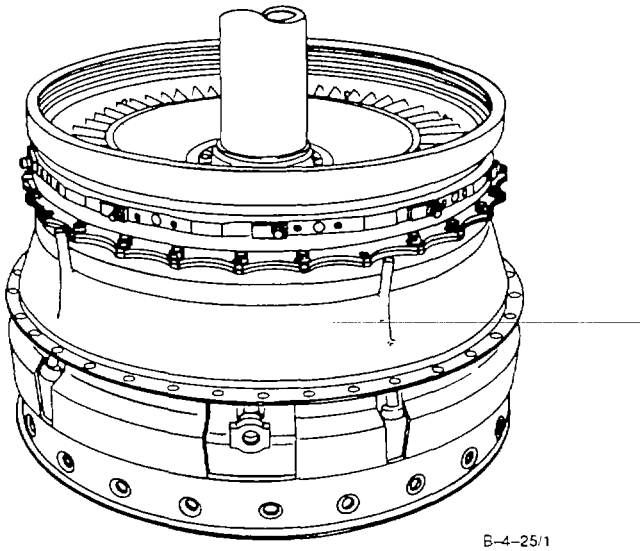
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Multimeter

Materials
Anti-Seize Compound (E6)
Lockwire (E32)

Parts
Gaskets

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P


B-4-25/1

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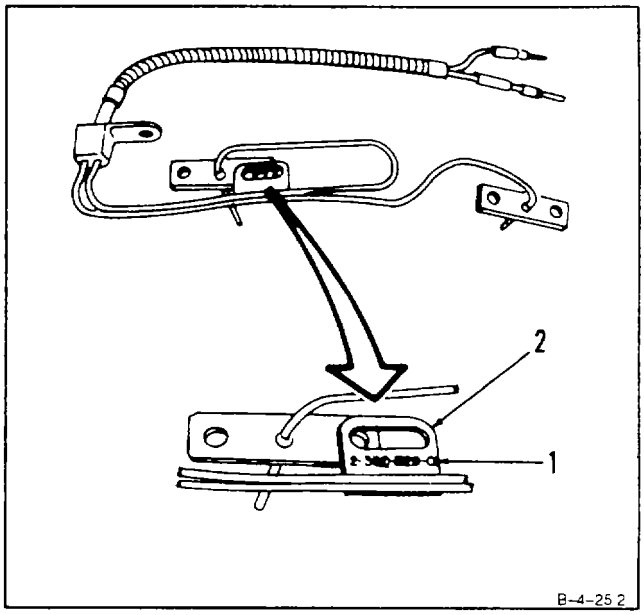
NOTE

Following step applies to five thermocouple harness assemblies. Only one is shown:

1. Locate part number (1) stamped on thermocouple harness assembly mounting tab (2).



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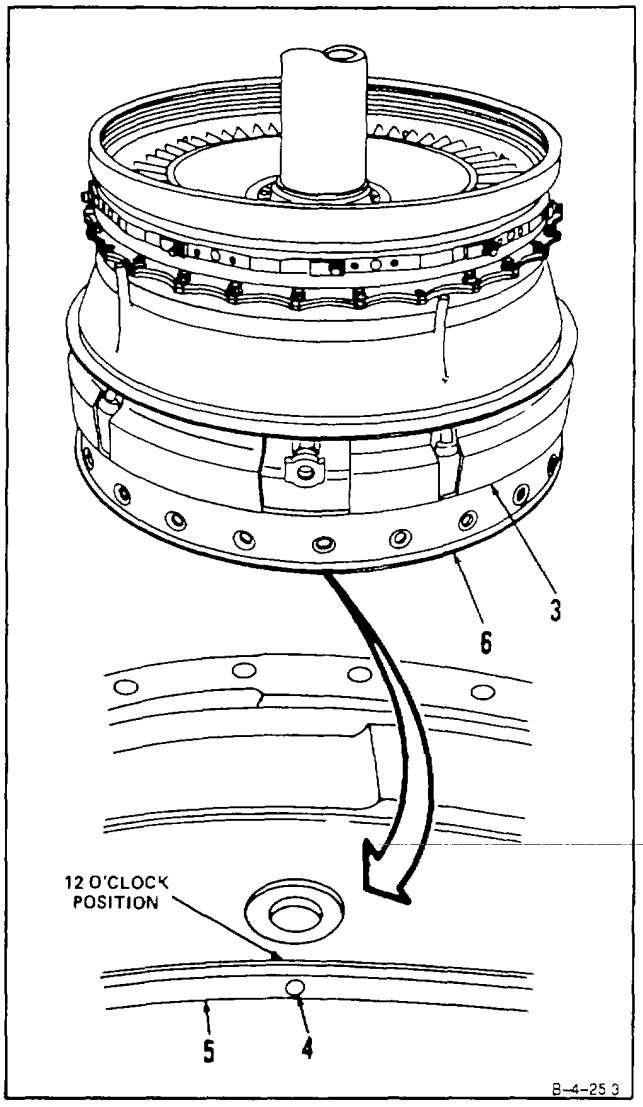
2. Locate 12 o'clock position on power turbine assembly (3) Use indentation (4) in aft face (5), aft flange (6) for reference.



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3. Position five thermocouple harness assemblies (7, 8, 9, 10, and 11) as follows:

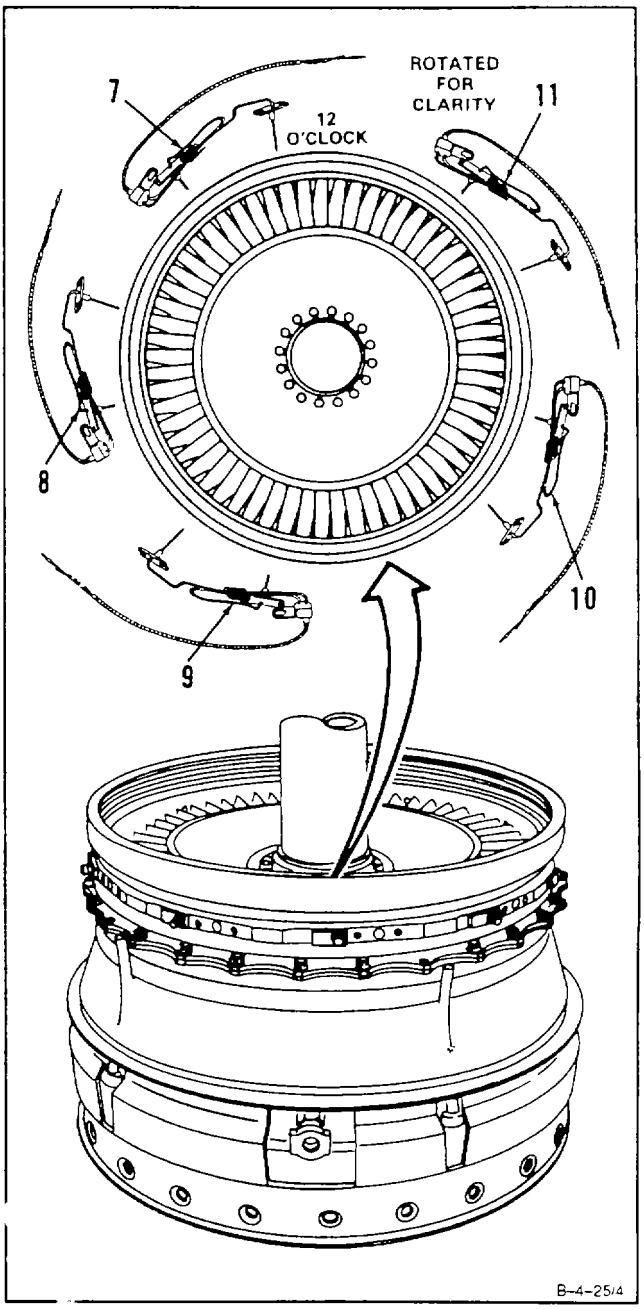
a. Position thermocouple harness assembly (7), Part No. 2-310-087-01 or Part No. 2-310-053-02, at 11 o'clock position.

b. Position thermocouple harness assembly (8), Part No. 2-310-088-01 or Part No. 2-31 0-054-02, at 9 o'clock position.

c. Position thermocouple harness assembly (9), Part No. 2-310-08601 or Part No. 2-310-052-02, at 7 o'clock position.

d. Position thermocouple harness assembly (10), Part No. 2-310-087-01 or Part No. 2-310-053-02, at 4 o'clock position.

e Position thermocouple harness assembly (11), Part No. 2-310-08601 or Part No. 2-310-052-02, at 2 o'clock position.



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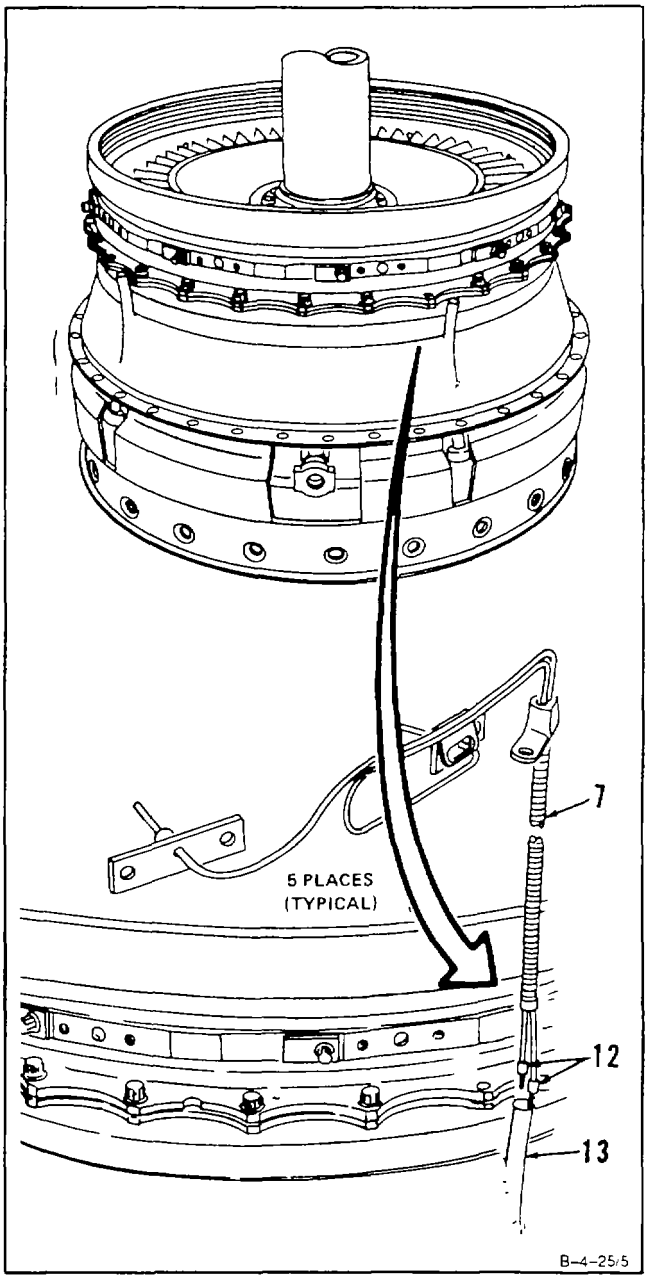
CAUTION

In following steps 4 thru 6 , do not force pin leads through guide tubes. Damage to insulation or pins could result. This will cause erroneous temperature indication.

4. Carefully insert pins (12) of thermocouple harness assembly (7) into guide tube (13).



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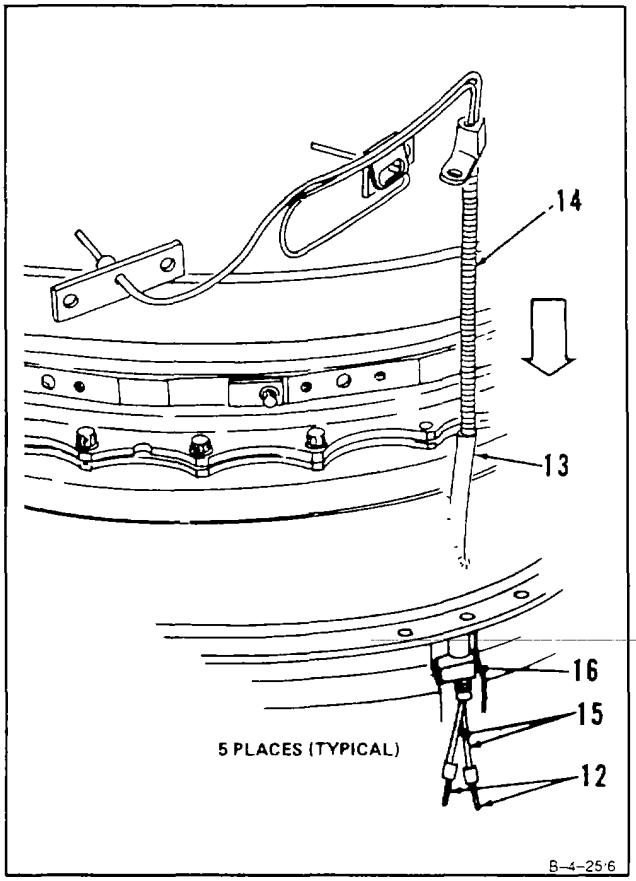
5. Carefully feed cable (14) through guide tube (13) until pins (12) and pin leads (15) extend from aft end (16).

6. Repeat steps 4 and 5 for four remaining thermocouple harness assemblies.



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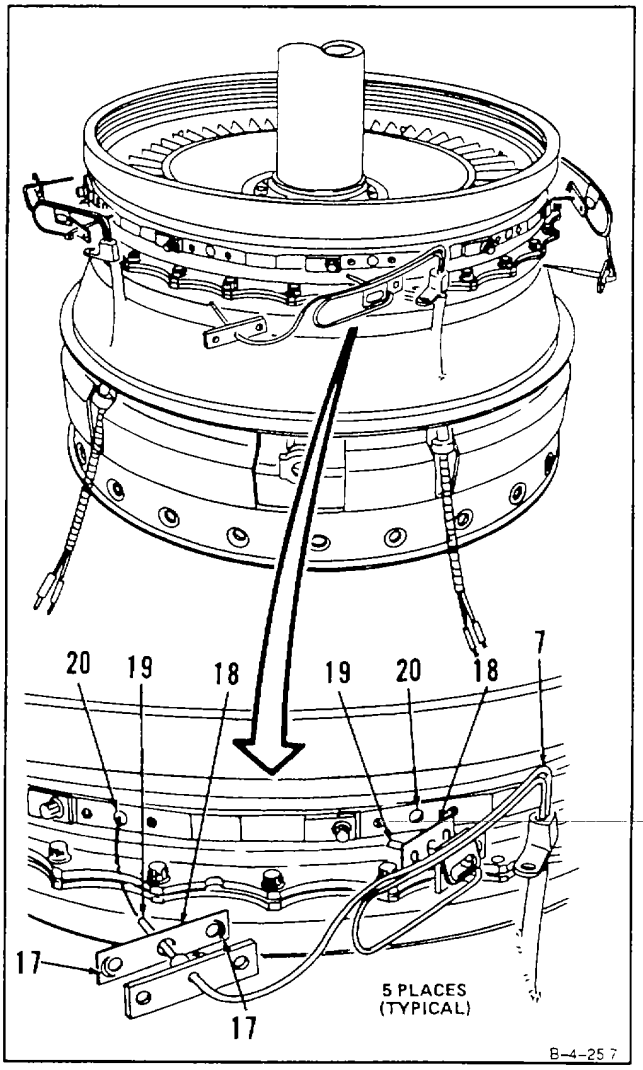
NOTE

Raised sides of gasket indentations go toward thermocouple probe Gasket may have to be turned to align bolt holes properly as holes are slightly off center.

7 Position raised indentations (17) toward thermocouple probe. **Install two gaskets (18)** and rotate thermocouple harness assembly (7) to align probes (19) with holes (20).



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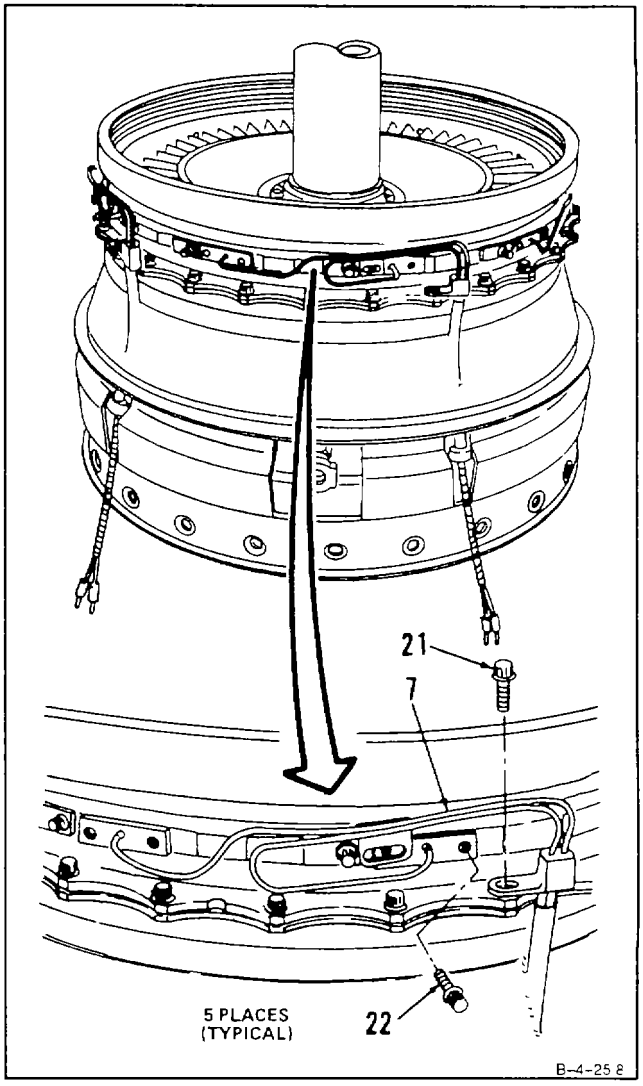
8. Apply anti-seize compound (E6) to bolt (21) and tour bolts (22). Install thermocouple harness assembly (7), bolt (21), and four bolts (22).

9. Repeat steps 7 and 8 for four remaining thermocouple harness assemblies.



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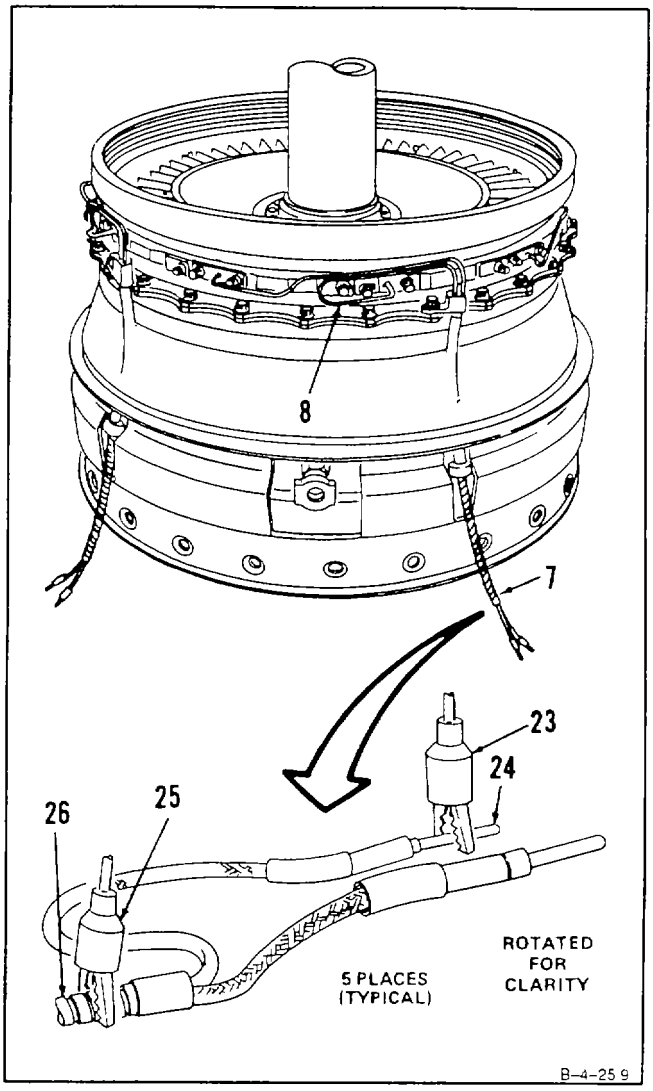
10. **Measure insulation resistance of thermocouple harness assembly (7)** as follows

a Set multimeter range switch to R X 1000.

b Clip red lead (23) to pin (24).

c Clip black lead (25) to outer shield (26).

d Meter shall indicate **10,000 ohms** minimum If meter indicates less than 10.000 ohms, replace defective thermocouple harness assembly (Ref Task 4-20 and 4-25).



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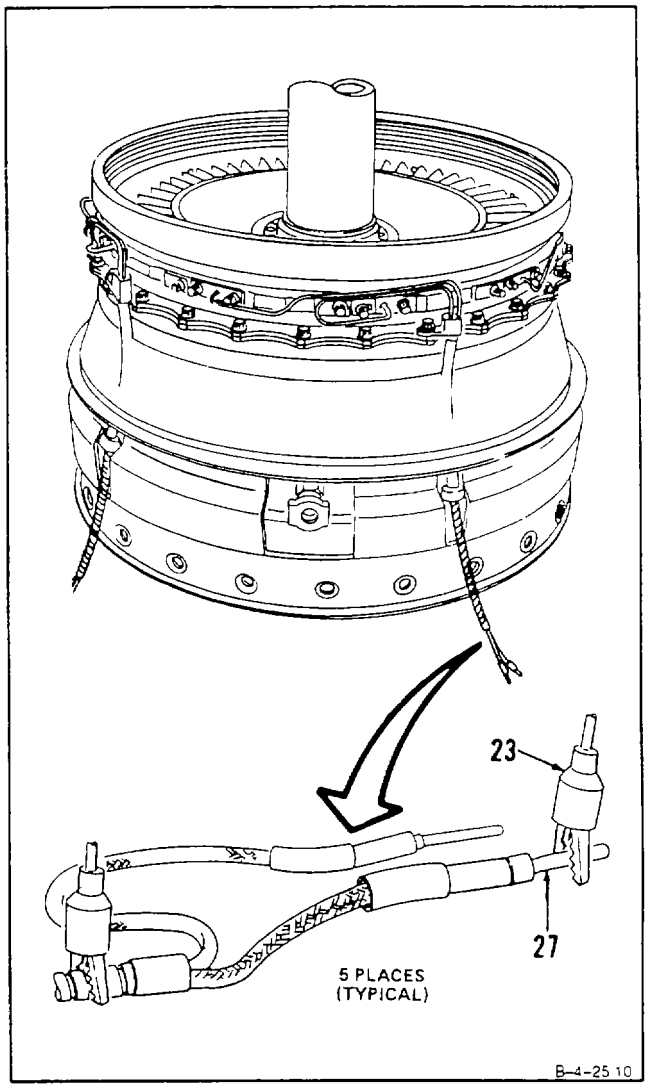
e Clip red lead (23) to pin (27).

f Meter shall indicate **10,000 ohms** minimum If meter indicates less than 10,000 ohms replace defective thermocouple harness assembly (Ref Task 4-20 and 4-25).



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11. **Measure continuity of thermocouple harness assembly** (7) as follows:

    a Set multimeter range switch to R X 1.

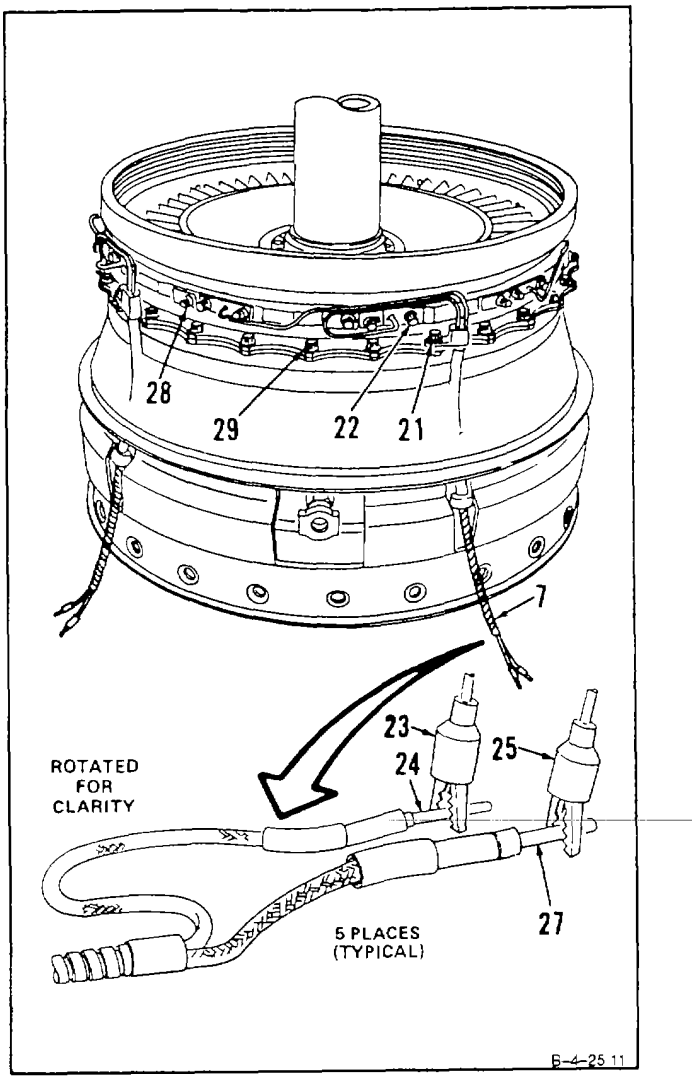
    b Clip red lead (23) to pin (24).

    c Clip black lead (25) to pin (27).

    d Meter shall indicate **three ohms** maximum If meter indicates more than three ohms replace defective thermocouple harness assembly (Ref. Task 4-20 and 4-25).

12. Repeat steps 10 and 11 for four remaining thermocouple harness assemblies.

13. Lockwire five bolts (21) and 20 bolts (22), 10 bolts (28) and 23 bolts (29). Use lockwire (E32).



INSPECT

FOLLOW-ON MAINTENANCE
Assemble Combustion Section and Power Turbine (Task 3-7).
Install Combustion Section and Power Turbine (Task 3-8).
Service Engine Oil System (Task 1-68).

END OF TASK

SECTION VI

THIRD TURBINE NOZZLE AND SUPPORT

4-26 REMOVE THIRD TURBINE NOZZLE AND SUPPORT (AVIM) 4-26

INITIAL SETUP

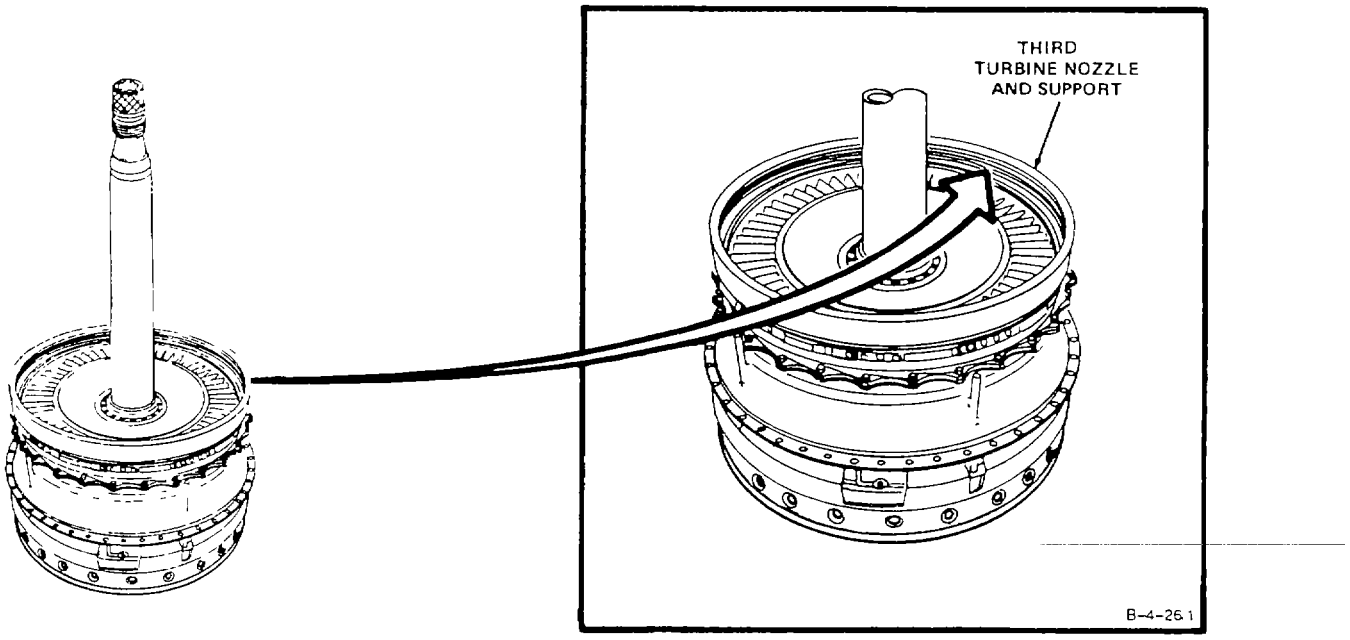
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:
Lockwire (E33)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Thermocouple Harness Assemblies Removed (Task 4-20)



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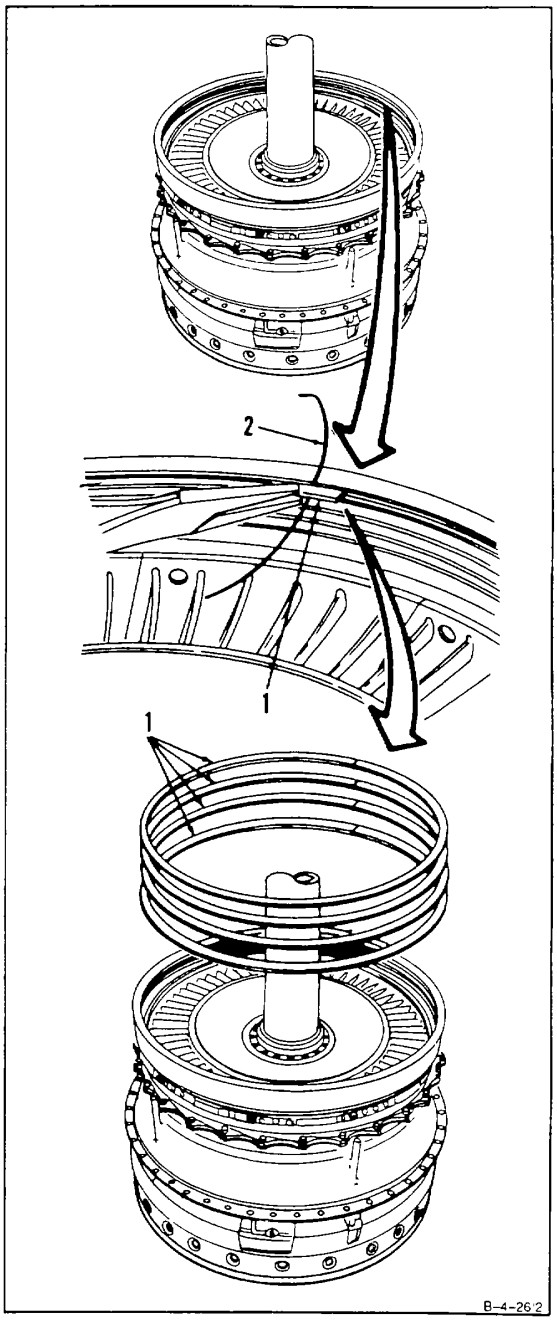
NOTE

Steps 1 and 2 apply to removal of four seal rings. Instructions for removing one are given.

1. Pull out end of seal ring (1) with pliers. Slide a piece of lockwire (E33) (2) under end of seal ring (1).

2. Slide lockwire (2) all around seal ring (1). **Remove seal ring (1).**



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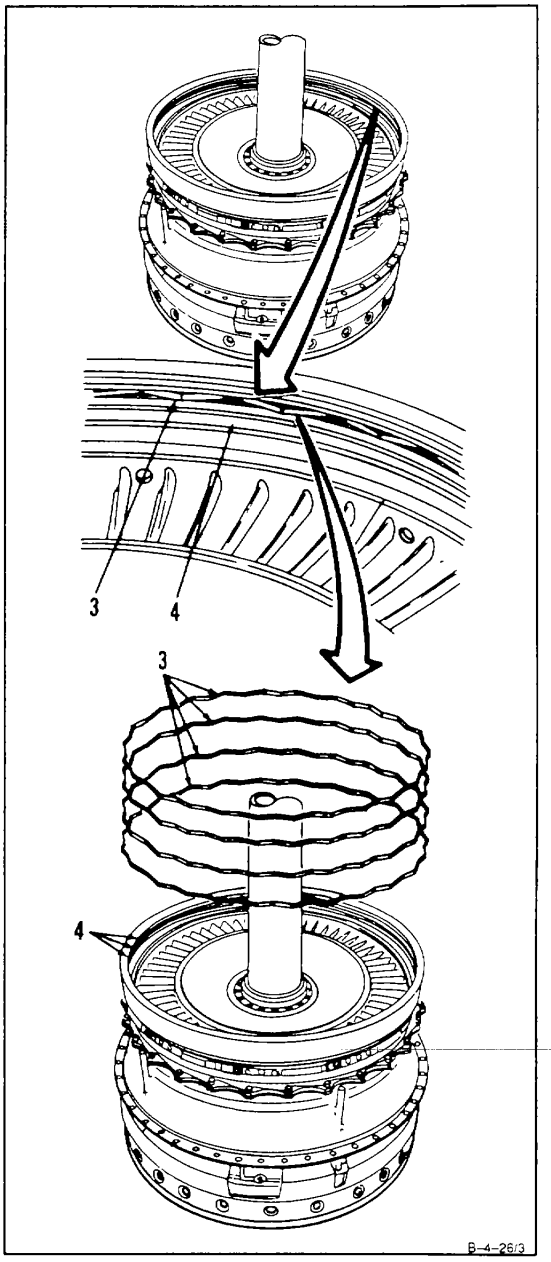
3. **Remove four springs (3)** from four seal ring grooves (4).



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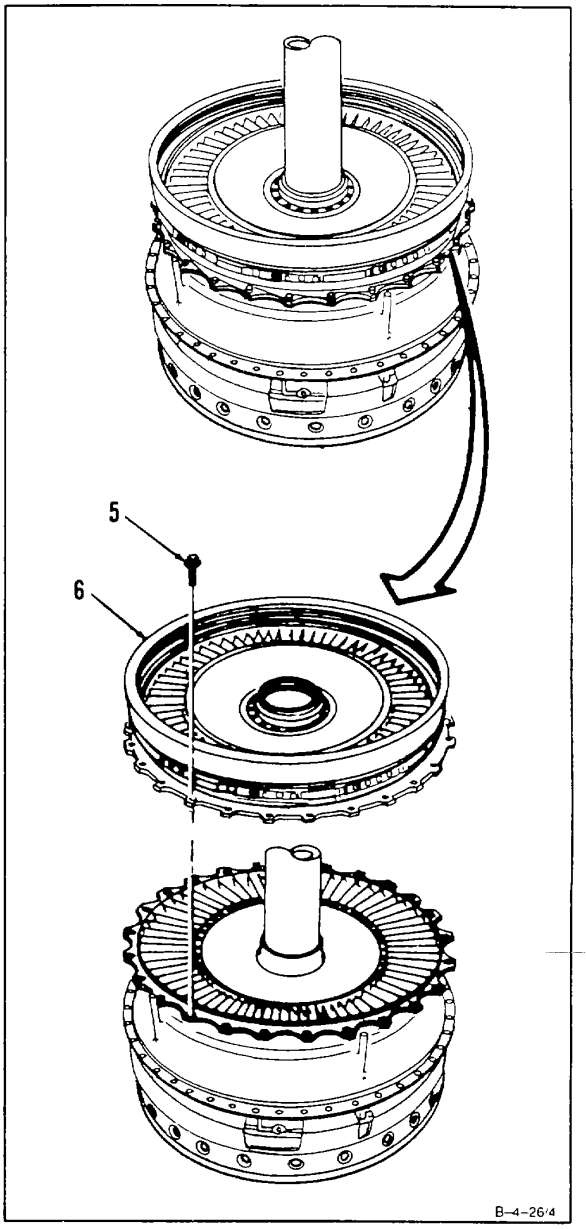
4. **Remove** lockwire 23 bolts (5), and **third turbine nozzle and support (6).**



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-27 DISASSEMBLE THIRD TURBINE NOZZLE AND SUPPORT (AVIM) 4-27

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944

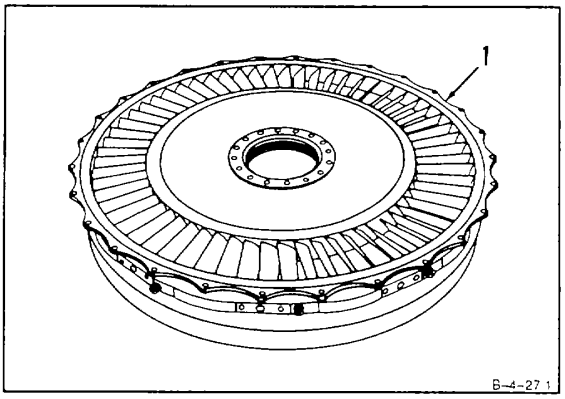
Materials:
None

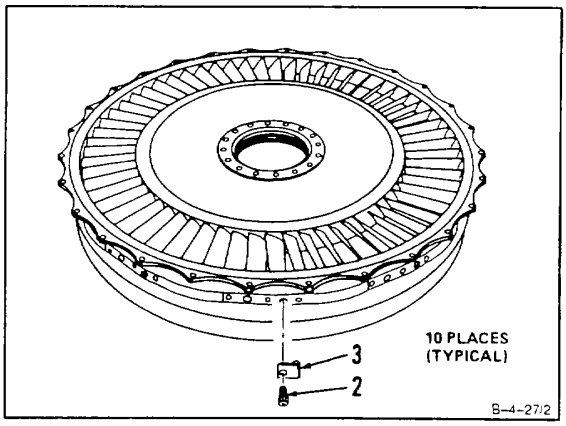
Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Thermocouple Harness Assemblies Removed (Task 4-20)
Third Turbine Nozzle and Support Removed (Task: 4-26)

1. Place third turbine nozzle and support (1) forward end down, on bench.

2. **Remove** ten bolts (2) and **pins (3).**





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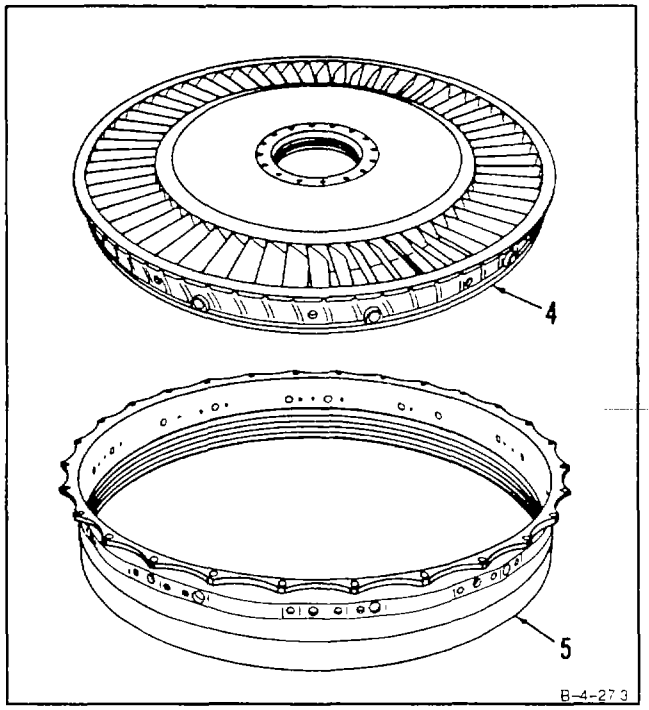
3. **Remove third turbine nozzle (4)** from support(5).



FOLLOW-ON MAINTENANCE:
None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Goggles
Compressed Air Source

Materials:
Gloves (E24)
Denatured Alcohol (E17)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Thermocouple Harness Assemblies Removed (Task 4-20)
Third Turbine Nozzle and Support Removed (Task 4-26)
Third Turbine Nozzle and Support Disassembled (Task 4-27)

---

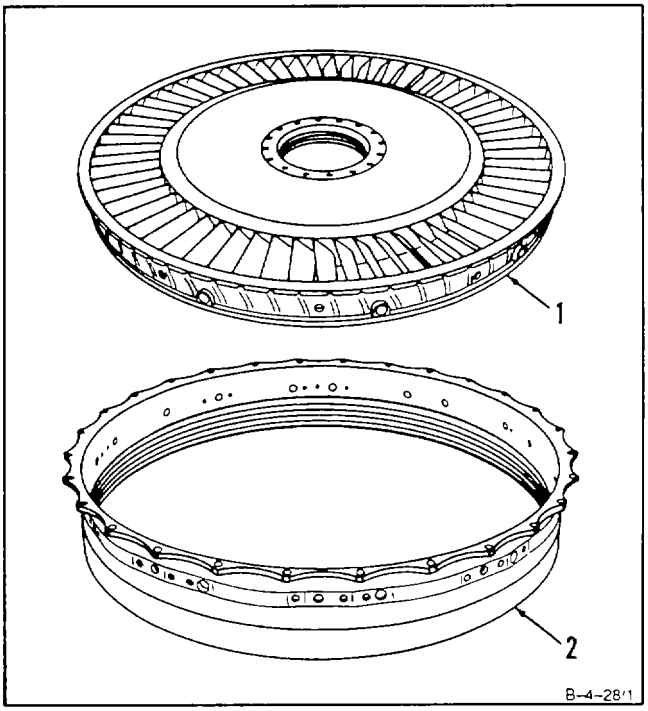
1. Clean third turbine nozzle (1) and support (2) as **follows:**

a. Wear gloves (E24) and goggles. Use brush dampened in denatured alcohol (E17).

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

b. Wear goggles **Blow dry third turbine nozzle (1) and support (2).**Use clean, dry, compressed air.



FOLLOW-ON MAINTENANCE
Inspect Third Turbine Nozzle and Support (Task 4-29).

END OF TASK

4-29 INSPECT THIRD TURBINE NOZZLE AND SUPPORT (AVIM) 4-29

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

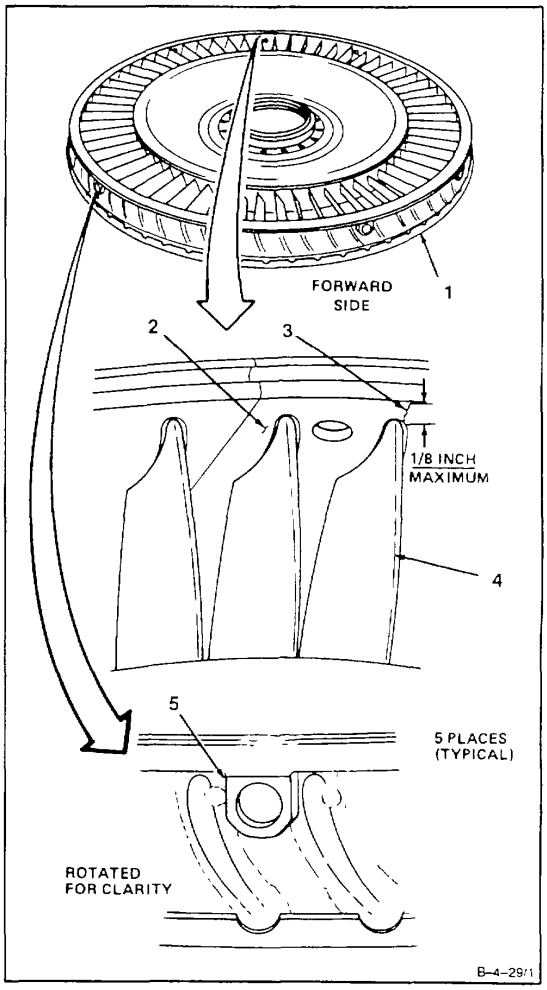
Personnel Required:
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. **Inspect forward side of third turbine nozzle (1)** as follows:

   a **Inspect outer shroud** (2). There shall be no cracks (3) from vane leading edge (4) longer than 1/8 inch.

   b There shall be no cracks longer than 1/4 inch in boss brazed joint (5). There shall be no more than five bosses with cracks less than 1/4 inch long in brazed joint (5).



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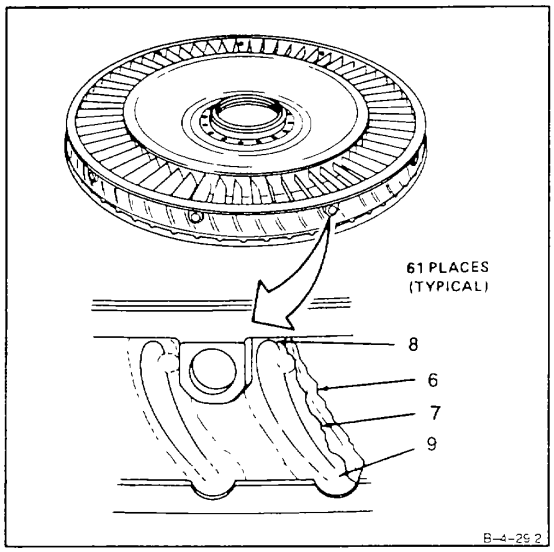
c **Inspect 61 vane brazements** (6). There shall be no more than five vane brazements with cracks (7) from leading edge (8) to trailing edge (9).



d **Inspect 61 vanes (10)** as follows:

(1) There shall be no nicks (11) in leading edge (12) deeper than 1/16 inch.

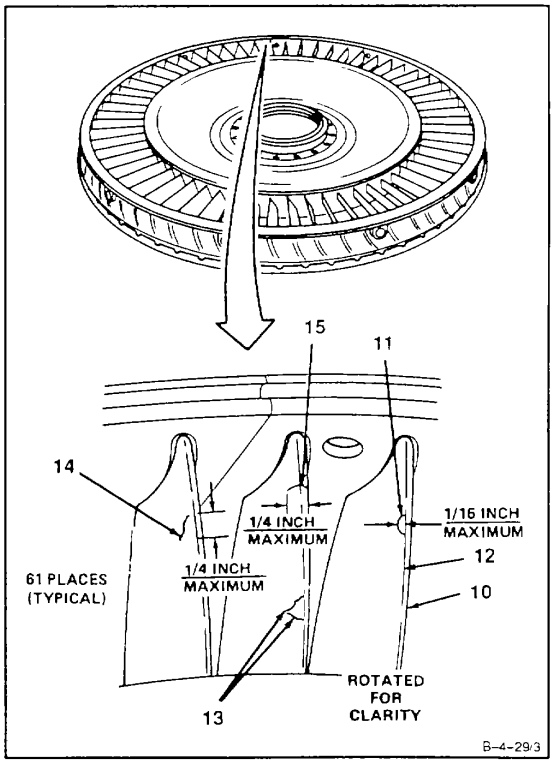
(2) There shall be no material burned off.

(3) There shall be no converging cracks (13).

(4) There shall be no radial cracks (14) longer than 1/4 inch.

(5) There shall be no cracks in any area where vane has been bent.

(6) There shall be no chordal cracks (15) longer than 1/4 inch



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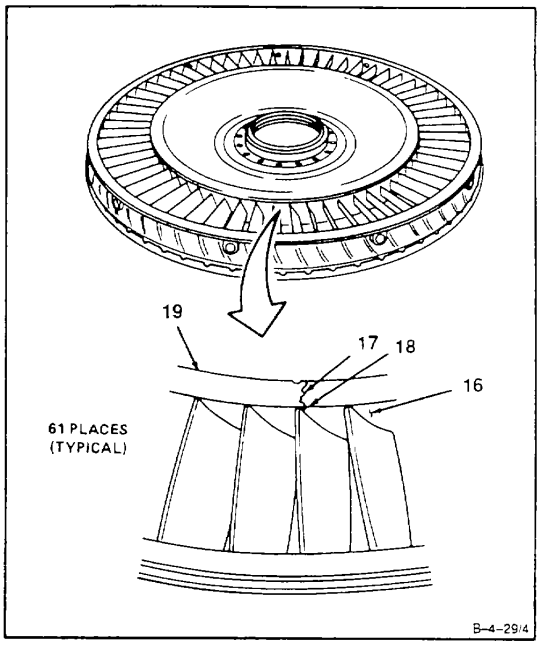
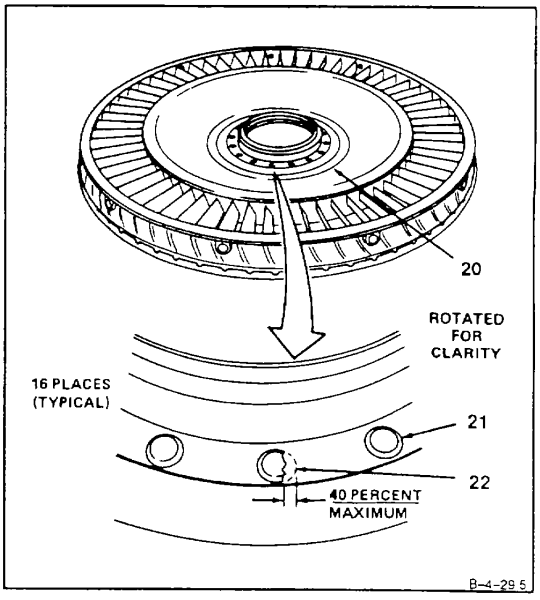
e **Inspect inner shroud (16).** There shall be no more than one crack (17) from each vane leading edge slot (18) to braze line (19).



f **Inspect forward support (20).** There shall be no cracks.

g **Inspect 16 rivets (21).** There shall not be more than 40 percent missing material (22).



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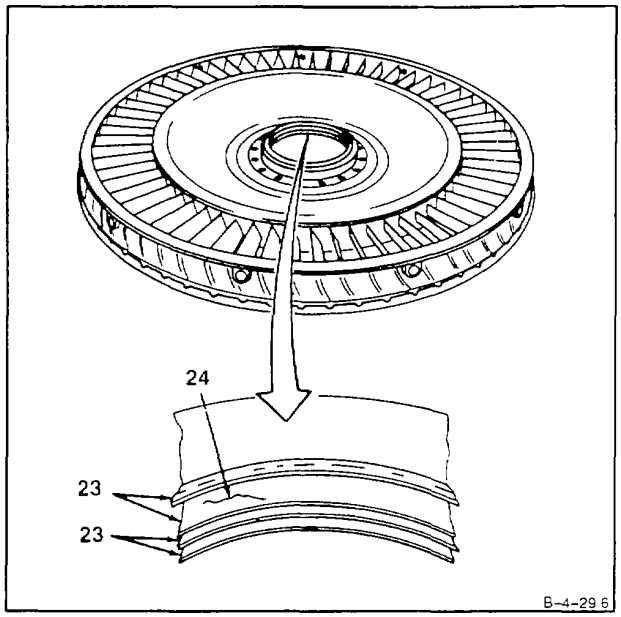
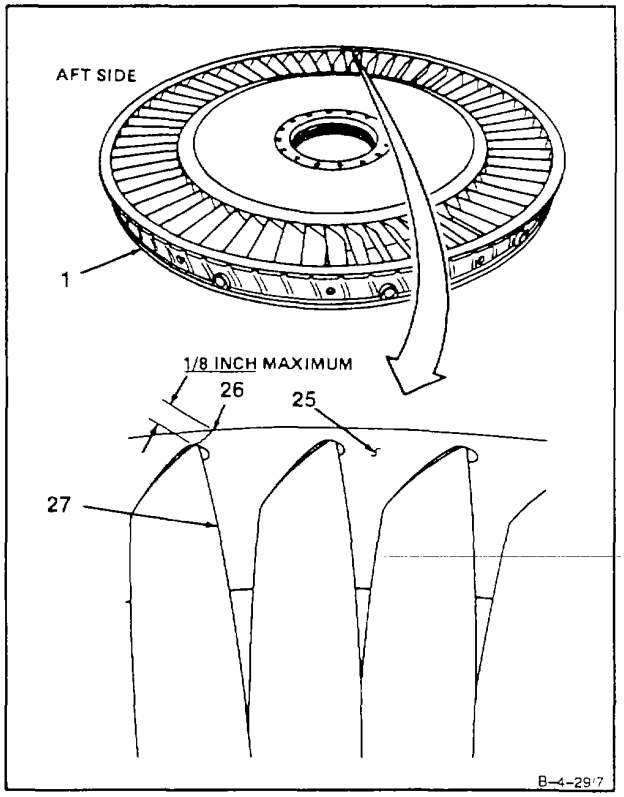
h **Inspect four seals (23)** as follows: There shall be no circumferential cracks (24).



2 **Inspect aft side of third turbine nozzle (1)** as follows:

a **Inspect outer shroud** (25). There shall be no more than 10 cracks (26) from vane trailing edges (27) These cracks (26) must not be longer than 1/8 inch.



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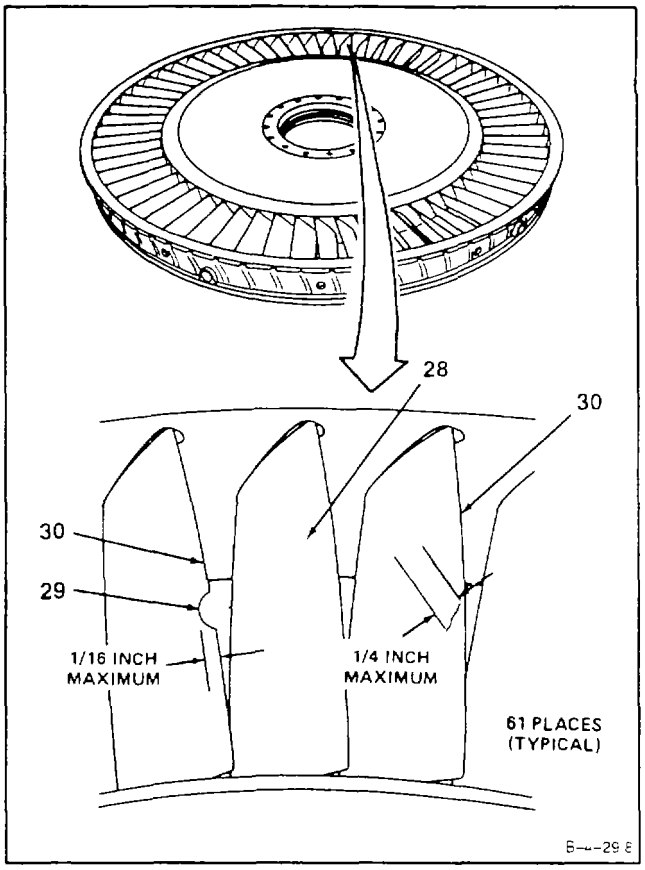
b **Inspect 61 vanes (28)** as follows:

(1) There shall be no nicks (29) in trailing edge (30) deeper than 1/16 inch.

(2) There shall be no cracks in trailing edge parent metal (30) longer than 1/4 inch.

(3) There shall be no cracks in any area where vane has been bent.



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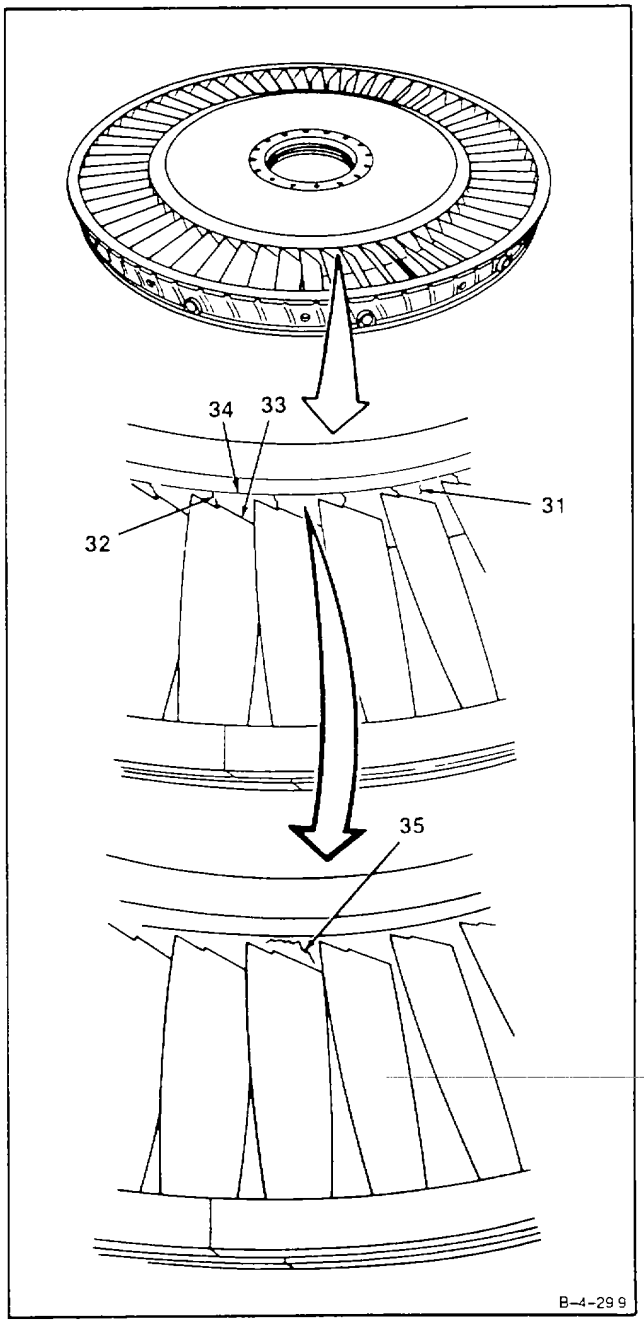
c Inspect inner shroud (31) as follows:

(1) There shall be no more than one crack (32) per vane extending from vane slot (33) to at edge (34).

(2) There shall be no circumferential cracks (35).



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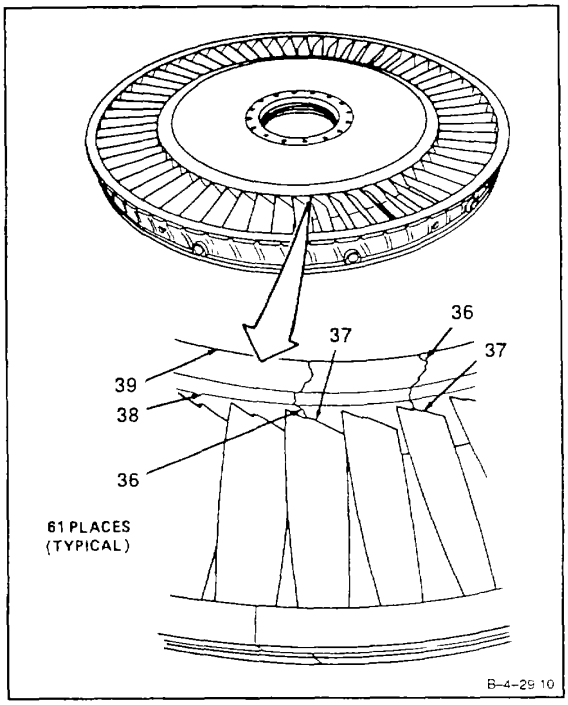
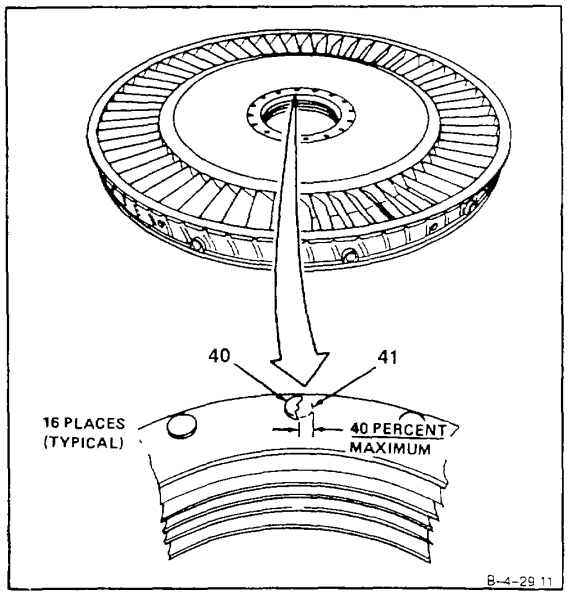
(3) There shall be no more than 20 cracks (36) extending from vane slot (37) past aft edge (38) to braze line (39).



d. **Inspect 16 rivets (40).** There shall be no more than 40 percent of rivet material missing (41).



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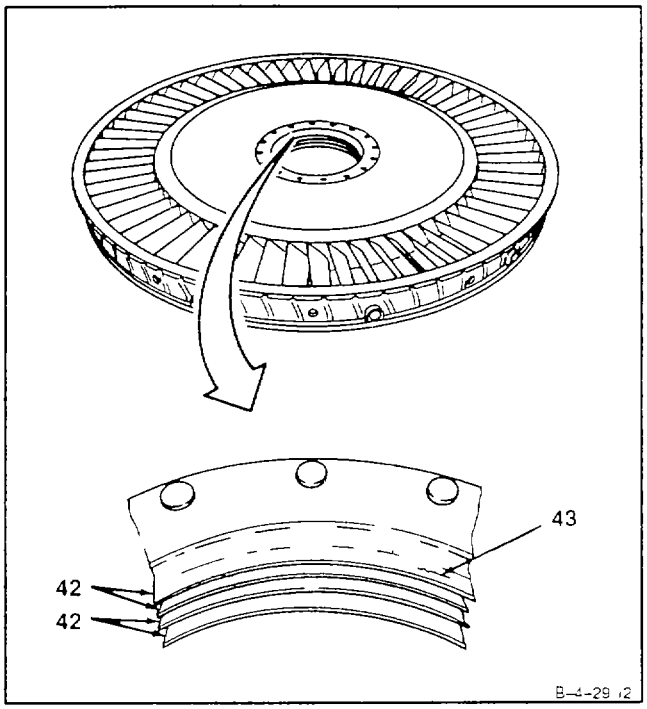
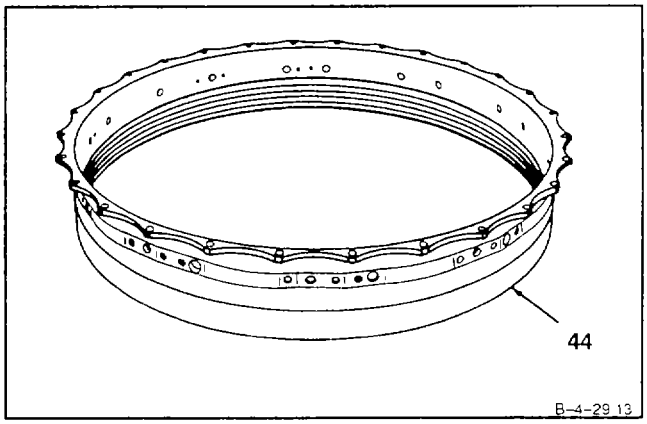
e. **Inspect four seals (42)** as follows: There shall be no circumferential cracks (43).



3. **Inspect support (44).** There shall be no cracks.



FOLLOW-ON MAINTENANCE:
None

END OF TASK

4-30 REPAIR THIRD TURBINE NOZZLE AND SUPPORT (AVIM) 4-30

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
Carborundum Stone (Ell)
Crocus Cloth (El 6)

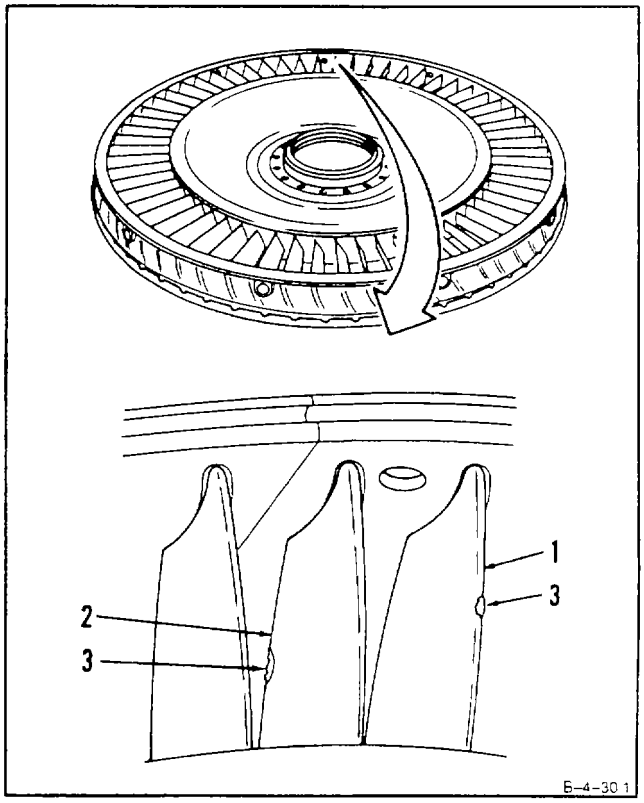
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

---

1. Repair nicks up to 1/16 inch on vane leading edge (1) and trailing edge (2) as follows:

a. Blend all raised edges (3) Use carborundum stone (Ell).

b. Polish to smooth finish Use crocus cloth (E16).



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

4-31 ASSEMBLE THIRD TURBINE NOZZLE AND SUPPORT (AVIM) 4-31

INITIAL SETUP

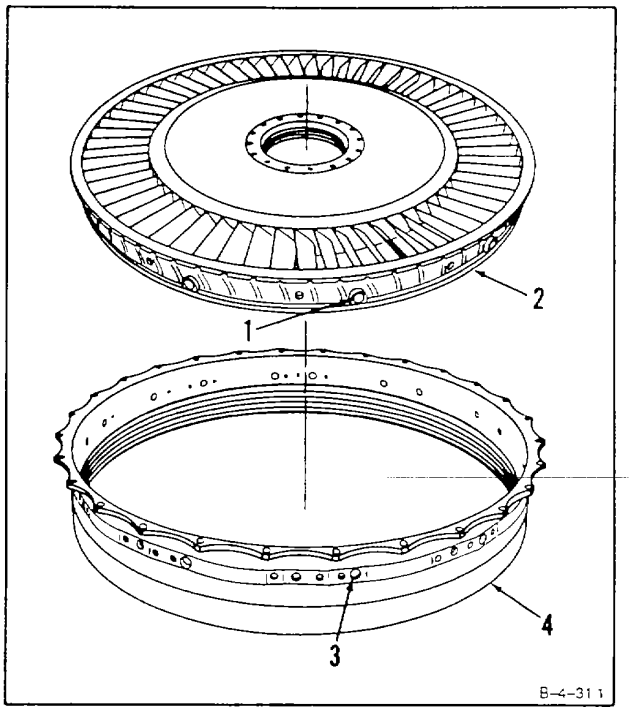
Applicable Configurations:
ALL

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials
None

Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

1. Align 10 pin holes (1) in third turbine nozzle (2) with pin holes (3) in support (4) **Install third turbine nozzle (2)** in support (4).



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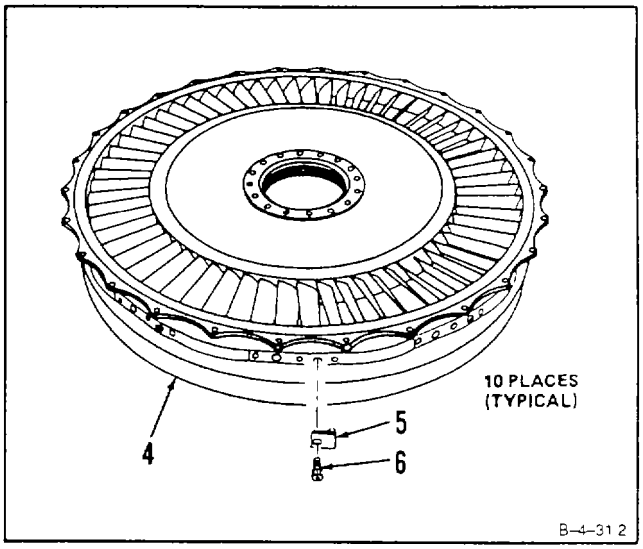
2. **Install 10 pins (5)** and bolts (6) in support (4).



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

4-32 INSTALL THIRD TURBINE NOZZLE AND SUPPORT (AVIM) 4-32

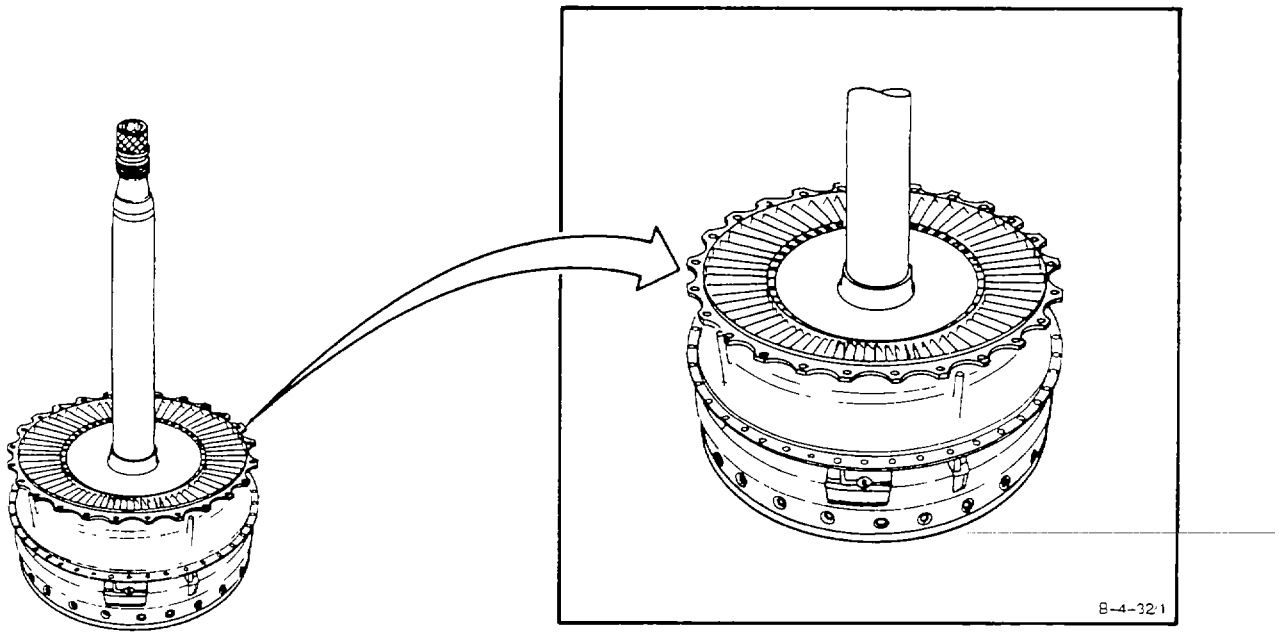
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
Anti-Seize Compound (E6)
Marking Pencil (E38)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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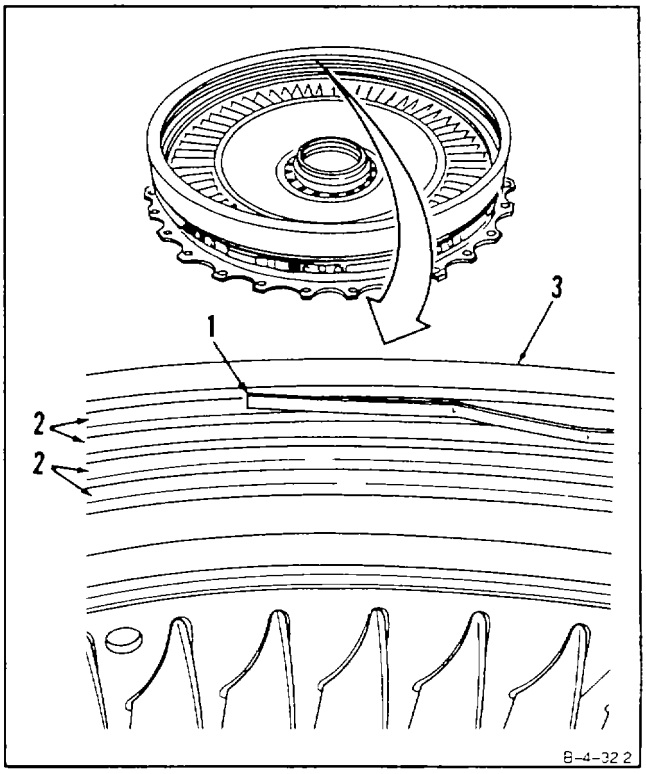
NOTE

Steps 1 and 2 apply to four sets of seal rings and expander springs One set is shown Seal rings shall be installed so that slits are staggered.

1. **Install** end of **expander spring (1)** in groove (2) of third turbine support (3) Keep feeding expander spring (1) into groove (2) until entire spring is seated.



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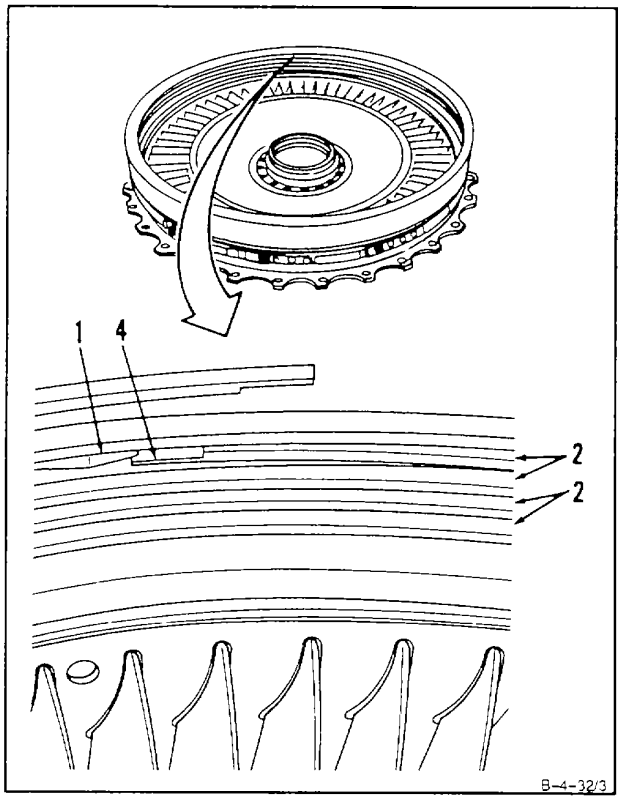
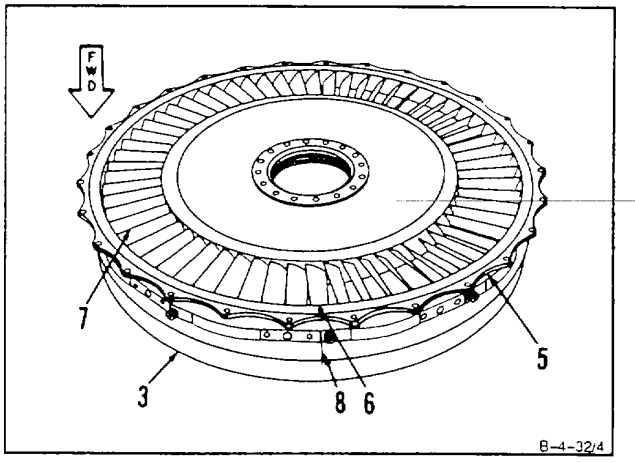
NOTE

Seal rings shall be installed with chamfered edge up.

2. **Install** end of **seal ring (4)** in groove (2) over expander spring (1) Keep feeding seal ring (4) into groove (2) until entire seal ring is seated.



3. **Locate 12-o'clock position on third turbine nozzle and support** (5). Small indentation (6) on aft flange of nozzle (7) is at 1 2-o'clock position Mark line (8) on outside of support (3) Use marking pencil (E38).



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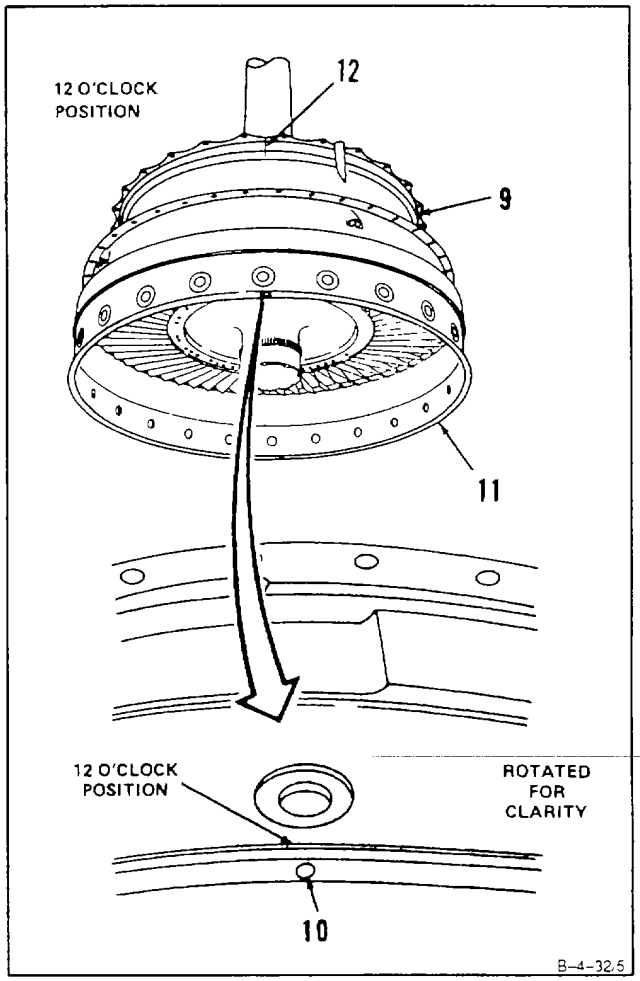
4. **Locate 1 2-o'clock position on power turbine assembly (9)**Indentation (10) in aft flange (11) is power turbine (9) at 1 2-o'clock position Use marking pencil (E38).



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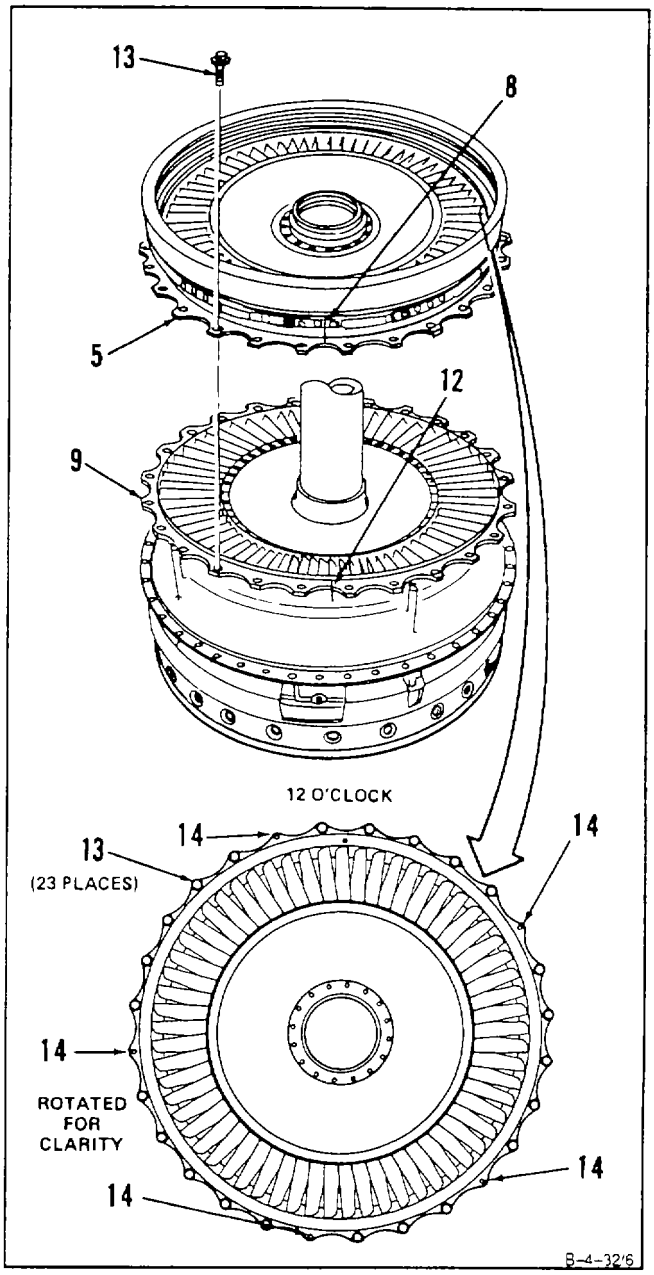
5. Apply anti-seize compound (E6) to 23 bolts (13) Align matchmarks (8 and 12) and bolt holes **Install third turbine nozzle and support (5)** and 23 bolts (13) on power turbine assembly (9) Do not install bolts (13) into five bolt holes (14) on left sides of thermocouple tubes.



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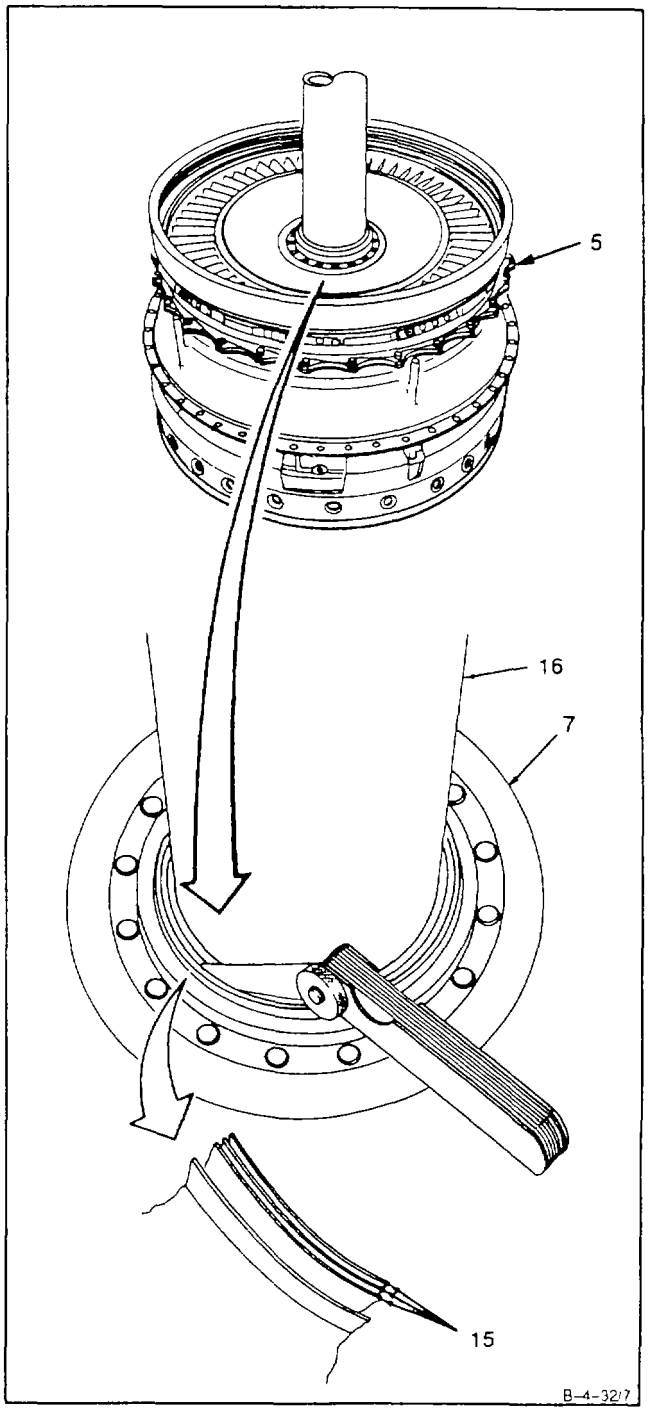
6. Check radial clearance between aft three seals (15) of third turbine nozzle (7) and shaft (16).
Use thickness gage Clearance shall not be less than 0.005 inch or more than 0.027 inch If necessary, remove third turbine nozzle and support (5), and file seals (15) with half-round tile to obtain clearance Repeat steps 5 and 6.



INSPECT

FOLLOW-ON MAINTENANCE:

Install Thermocouple Harness Assemblies (Task 4-25).
Assemble Combustion Section and Power Turbine (Task 3-7).
Install Combustion Section and Power Turbine (Task 3-8).
Service Engine Oil System (Task 1-68).

END OF TASK

SECTION VII

FOURTH STAGE POWER TURBINE ROTOR

4-33 REMOVE FOURTH STAGE POWER TURBINE ROTOR (AVIM) 4-33

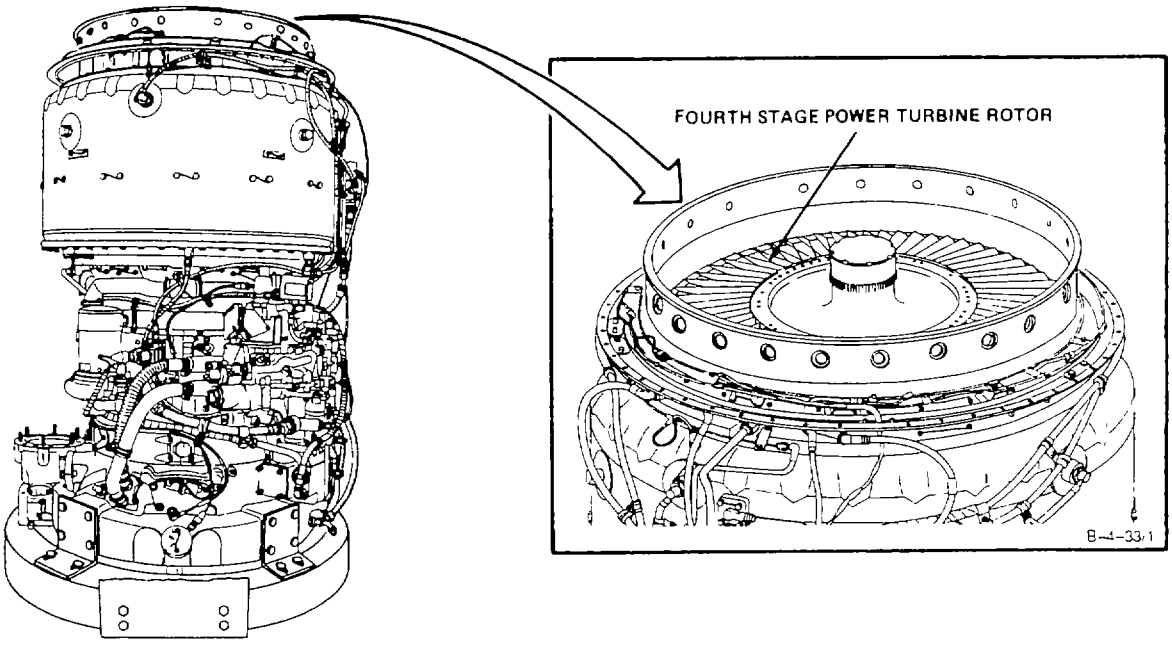
INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Torque Fixture (Tl9)
Hydraulic Wheel Puller (T31)
Torque Multiplier (T50)

Materials:
Marking Pencil (E38)
Penetrating Oil (E43)
Wiping Rag (E64)

Personnel Required:
Aircraft Powerplant Repairer (2)



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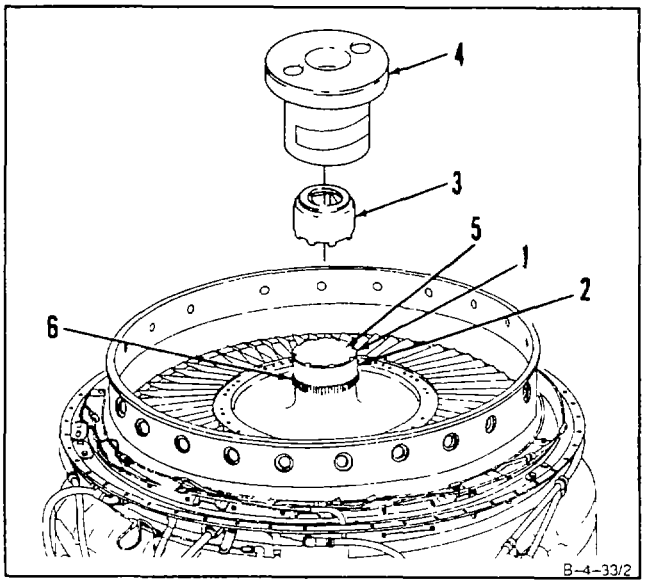
1. Straighten indents (1) of locking cup (2) and **install torque fixture (T19),** consisting of wrench (3) and holding fixture (4) as follows:

   a. Position wrench (3) on nut (5).

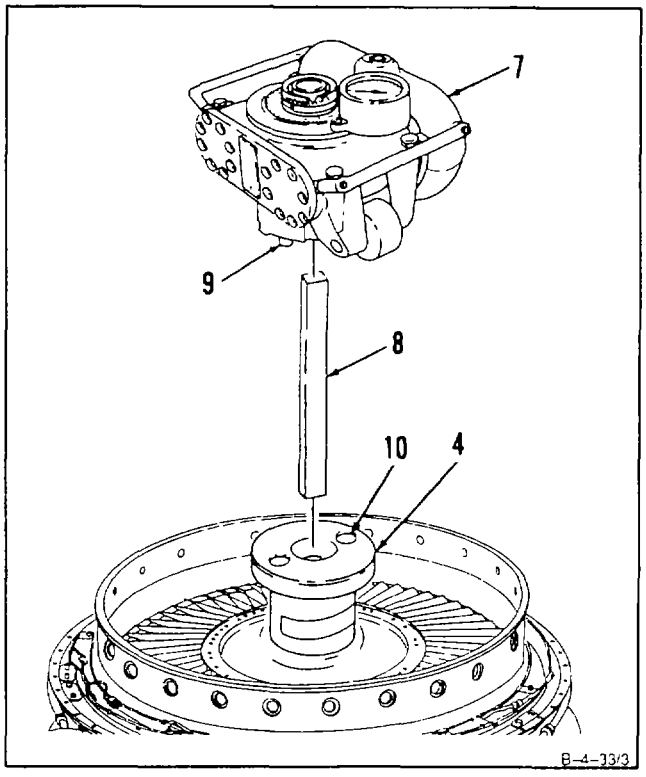
   b. Position holding fixture (4) on spline (6).



2. Using helper, **install torque multiplier (T50) (7)** as follows:

   a. Install drive bar (8) and position torque multiplier (T50) (7) over drive bar (8).

   b. Align two pins (9) with holes (10) in holding fixture (4) Place torque multiplier (T50) (7) on holding fixture (4).



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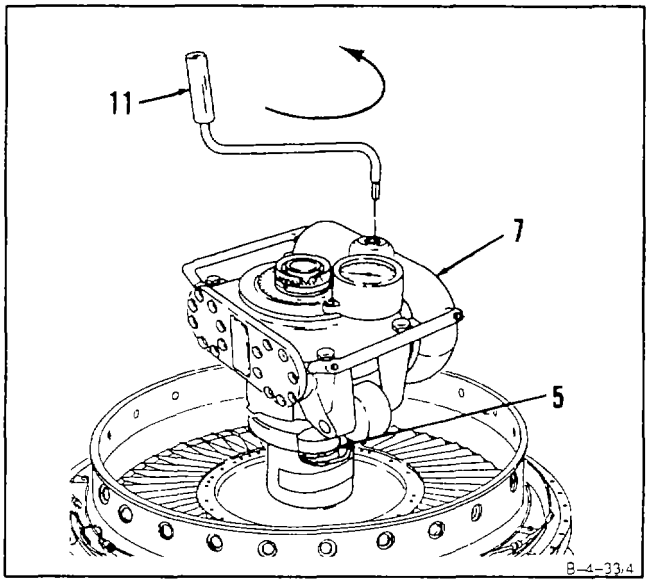
3. **Remove nut (5)**as follows:

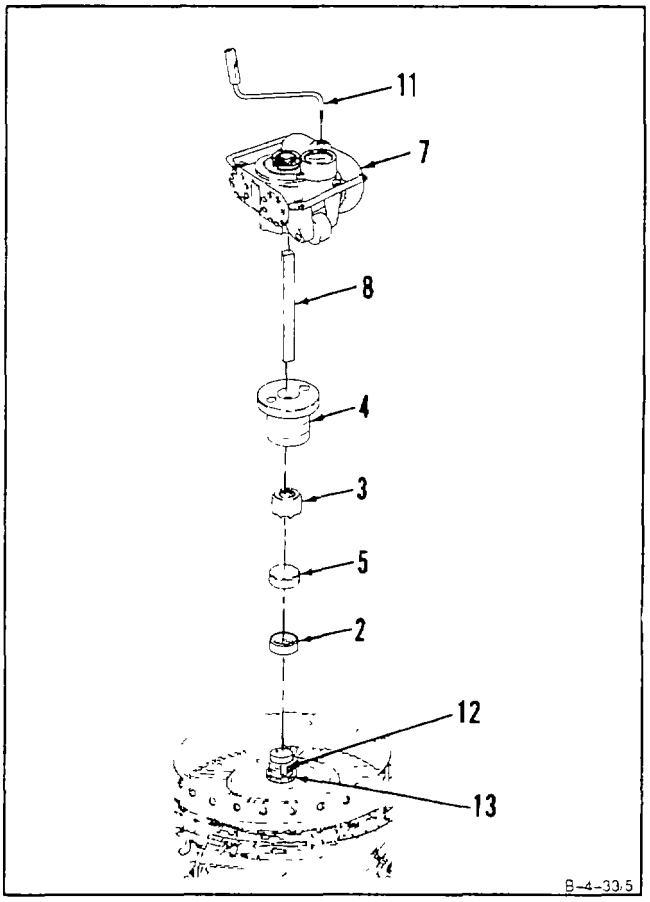
   a. Insert handle (11) in torque multiplier (T50) (7) Turn handle (11) counterclockwise until nut (5) is loose.



   b. Remove handle (11), torque multiplier (T50) (7), drive bar (8), and torque fixture (Tl9) consisting of wrench (3) and holding fixture (4).

   c. Remove nut (5) and locking cup (2).

   d. Matchmark shaft groove (12) and fourth stage turbine rotor (13) Using marking pencil (E38).



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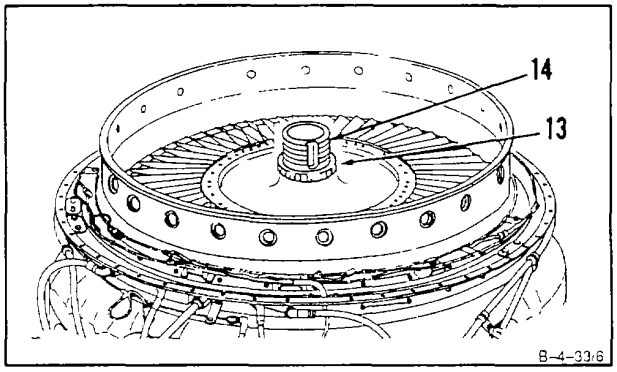
WARNING

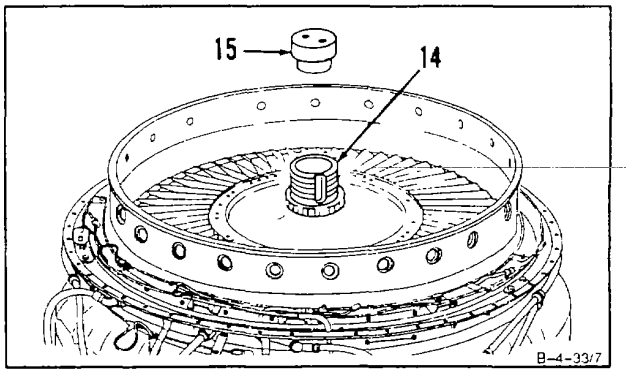
Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

4. **Soak shaft (14)** around rotor (13) with penetrating oil (E43).



5. **Install hydraulic wheel puller (T31)** as follows:

   a. Position pilot (15) on shaft (14).



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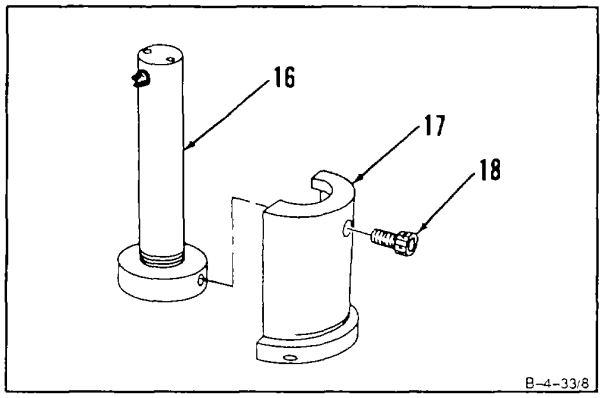
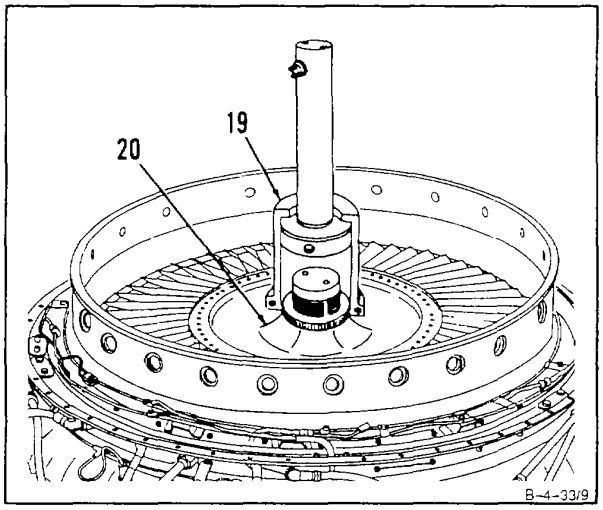
b. Position hydraulic ram (16) in one half of body (17) Install screw (18).

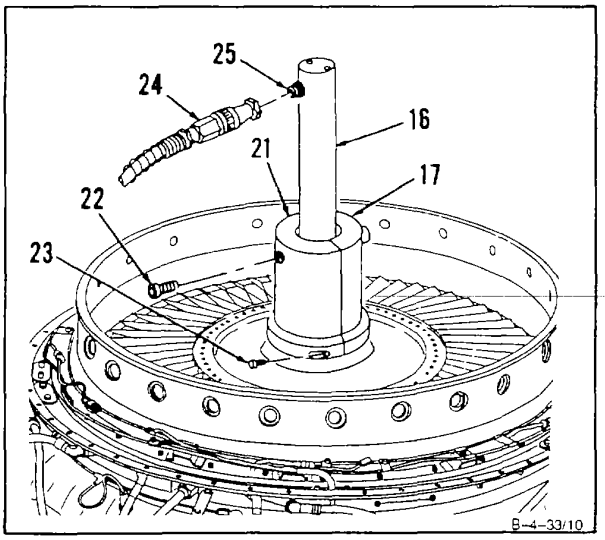


c. Position partially assembled puller (19) on fourth stage power turbine rotor hub (20).



d. Place other half of body (21) on body half (17) Install screw (22) and two screws (23).

e. Connect hydraulic pump hose (24) to fitting (25) on hydraulic ram (16).



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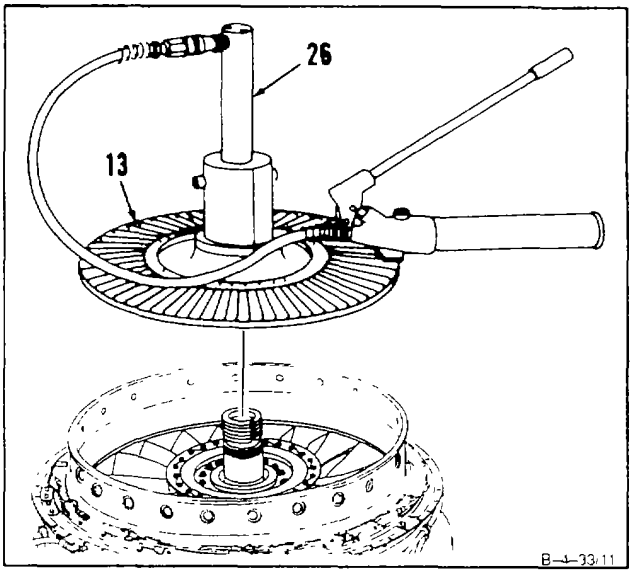
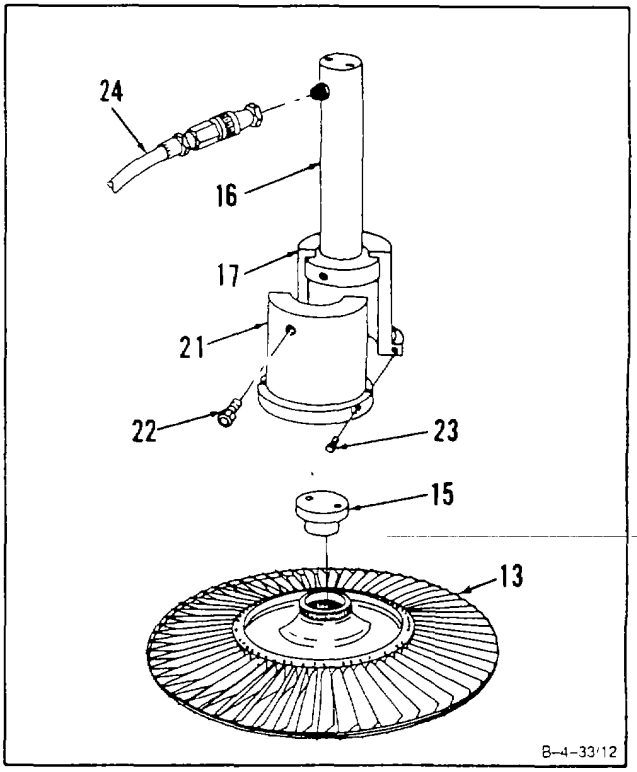
6. Using helper, **remove fourth stage power turbine rotor (13).** Use hydraulic wheel puller (T31) (26).



7. **Remove hydraulic wheel puller (T31)** consisting of hose (24), hydraulic ram (16), two body halves (1 7) and (21), screw (22), and two screws (23) and pilot (15) from fourth stage power turbine rotor (13).



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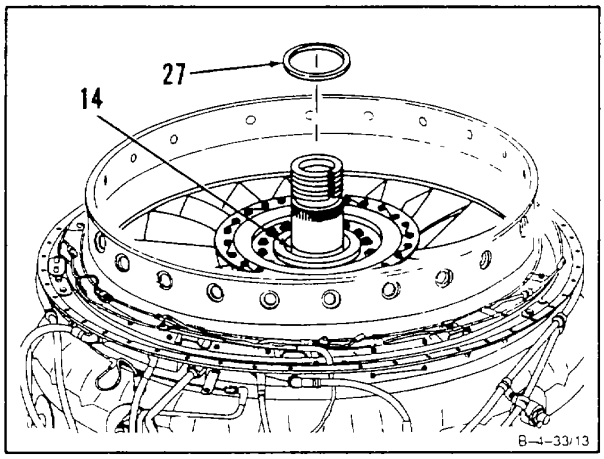
8. **Remove spacer (27)** from shaft (14).



FOLLOW-ON MAINTENANCE:
None

END OF TASK

4-34 CLEAN FOURTH STAGE POWER TURBINE ROTOR (AVIM) 4-34

INITIAL SETUP
Off Engine Task
Applicable Configurations:
ALL

Tools:
Powerplant Mechanic's Tool Kit,

NSN 5180-00-323-4944

Goggles
Compressed Air Source
Materials:
Dry cleaning solvent (El9)
Gloves (E24)
Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:

Fourth Stage Power Turbine Rotor Removed (Task 4-33)

General Safety Instructions

WARNING

Dry Cleaning Solvent (El9) 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.

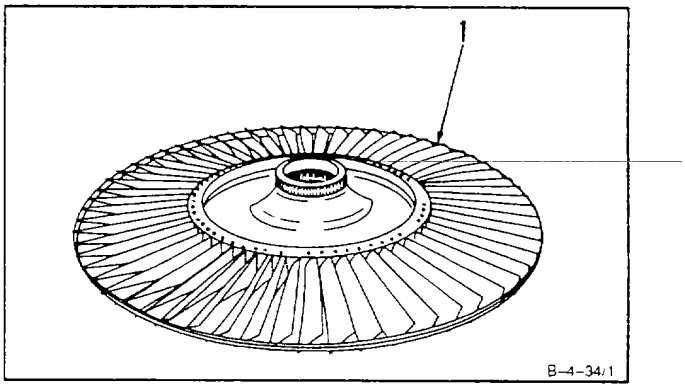
NOTE
Do not remove matchmark during cleaning

1. Wear gloves (E24) Clean fourth stage turbine rotor (1) with dry cleaning solvent (El 9) and brush.

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

2. Wear goggles Blow dry fourth stage turbine rotor (1) using clean, dry, compressed air.



FOLLOW-ON MAINTENANCE:
Inspect Fourth Stage Power Turbine Rotor (Task 4-35)

END OF TASK

4-35 INSPECT FOURTH STAGE POWER TURBINE ROTOR (AVIM) 4-35

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1 Inspect fourth stage power turbine rotor (1) as follows:

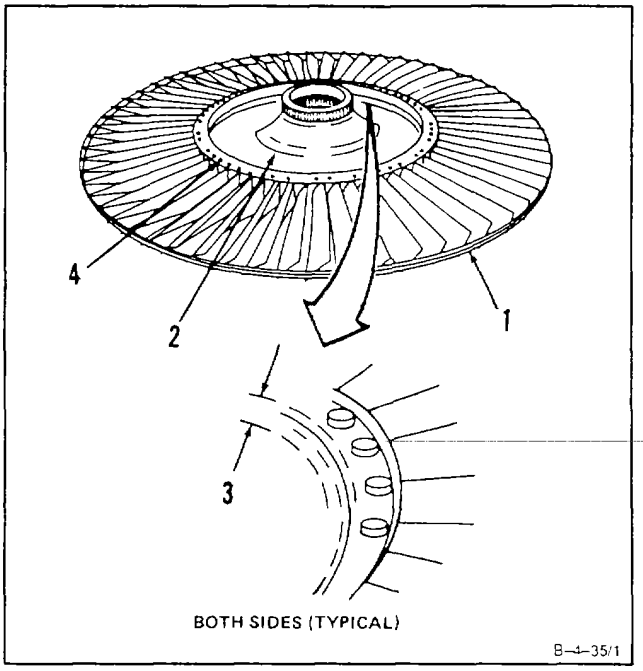
a. **Inspect disc (2).**

(1) There shall be no cracks.

(2) There shall be no burns.

(3) There shall be no nicks or rubs deeper than 0.010 inch This limit does not apply to area (3) where material has been removed for balancing.

(4) There shall be no loose or cracked pins (4).



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b **Inspect 60 blades (5).** There shall be no more than 12 damaged blades.

(1) There shall be no cracks.

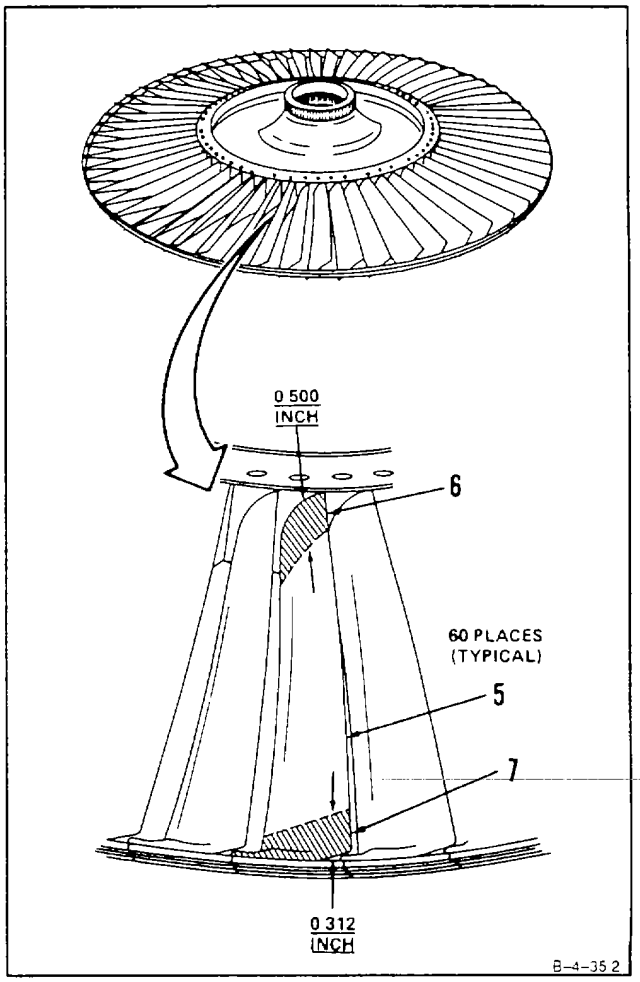
(2) There shall be no burns.

(3) There shall be no bending or distortion.

(4) There shall be no loss of material.

(5) There shall be no pitting deeper than 0.005 inch.

(6) There shall be no pitting, nicks or dents in inner critical area (6) or outer critical area (7).



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(7) Inspect inner half non-critical area (8) as follows

(a) There shall be no more than four nicks (9) or dents (10) in surface (11) longer than 0.094 inch or deeper than 0.015 inch.

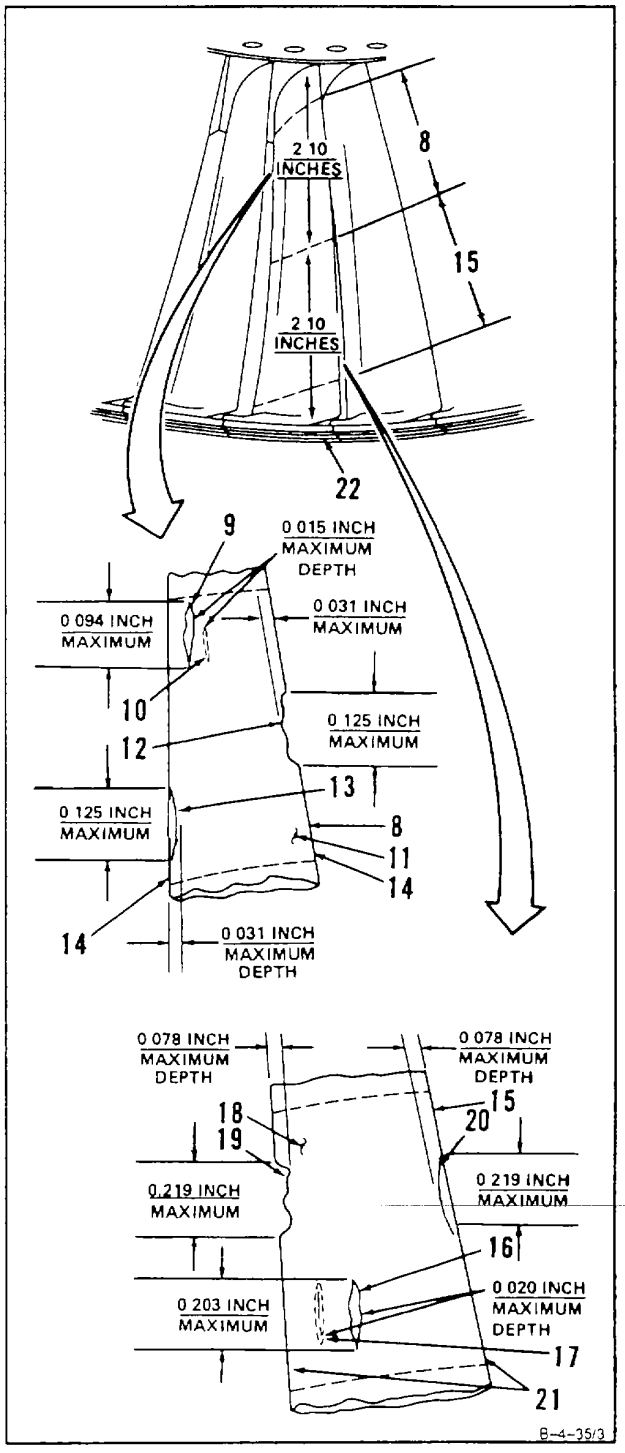
(b) There shall be no more than two nicks (12) or dents (13) on edges (14) longer than 0.125 inch or deeper than 0.031 inch.

(8) Inspect outer half noncritical area (15) as follows

(a) There shall be no more than four nicks (16) or dents (17) in surface (18) longer than 0.203 inch or deeper than 0.020 inch.

(b) There shall be no more than two nicks (19) or dents (20) on edges (2 1) longer than 0.219 inch or deeper than 0.078 inch.

(9) There shall be no nicks deeper than 0.015 inch at tip labyrinth (22).



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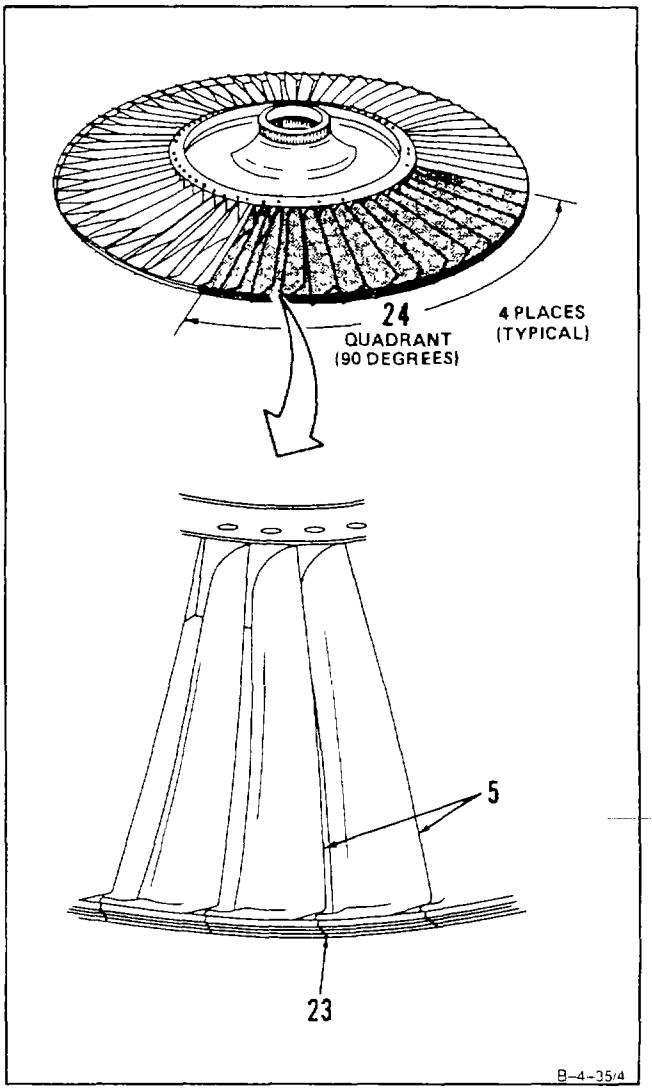
c **Measure gap (23)** between blades (5) Use thickness gage

(1) Total gap between all blades shall be no greater than 0.120 inch.

(2) Total gap between all blades in any 90 degree quadrant (24) shall be no greater than 0.030 inch.

(3) There shall be no gap greater than 0.012 inch There shall be no more than one 0.012 inch gap in any quadrant.



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-36 INSTALL FOURTH STAGE POWER TURBINE ROTOR (AVIM) 4-36

INITIAL SETUP

Applicable Configurations:

Tools:

Materials

Personnel Required:

Equipment Condition

INITIAL SETUP

Applicable Configurations.
All

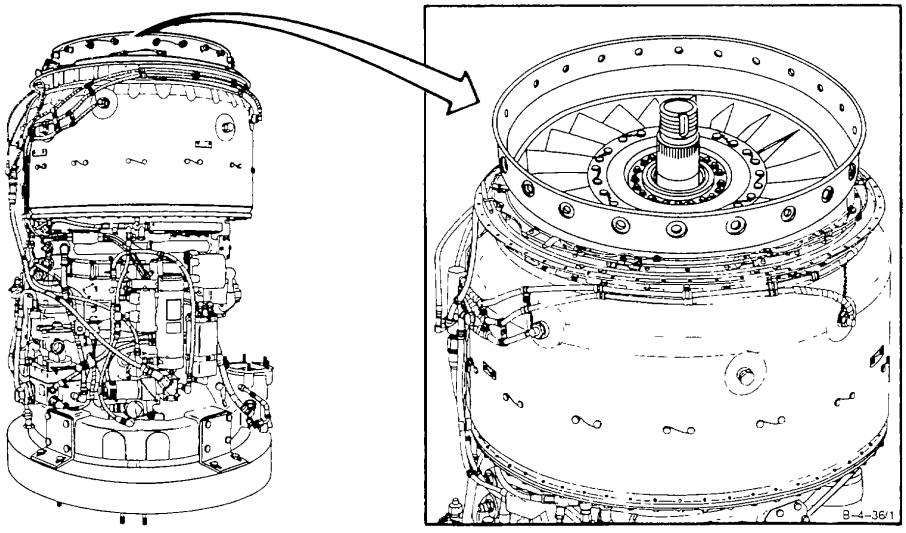
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Locating Bar (T33)
Torque Fixture (T19)
Induction Heater (T21)
Bearing Installing Tool (T22)
Control Unit (T29)
Engine History Recording Terminal (EHRT) (T37)
Holding Fixture (T30)
Torque Multiplier (T50)
Bent Wire Gage, 0.104 Inch (Appendix E)
Bent Wire Gage, 0.115 Inch (Appendix E)
Bent Wire Gage, 0.228 Inch (Appendix E)
Bent Wire Gage, 0 290 Inch (Appendix E)
Dial Indicator and Base
Heavy Duty Welders Gloves
Outside Micrometer Caliper Set
Micrometer Depth Gage

Materials:
Anti-Seize Compound (E6)

Parts:
Locking Cup

Personnel Required.
Aircraft Powerplant Repairer (2)
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P
Task 3-6
Task 3-7
Task 4-33



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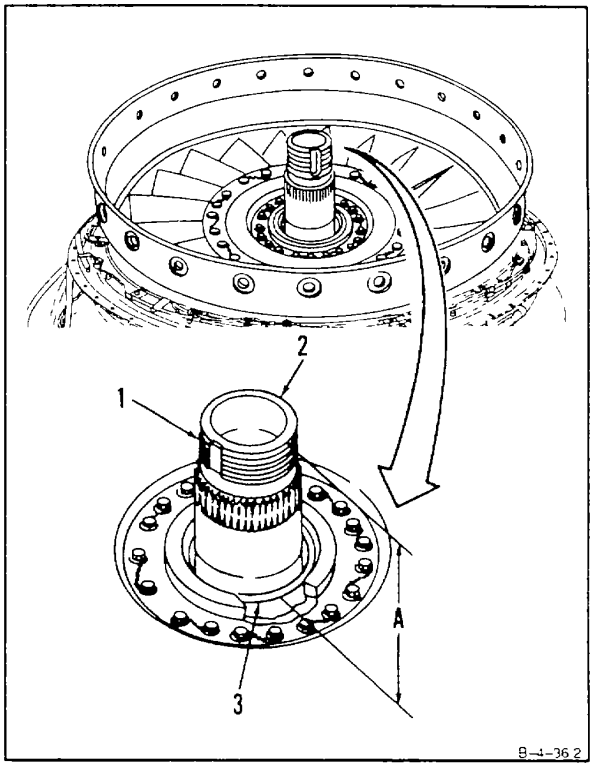
NOTE

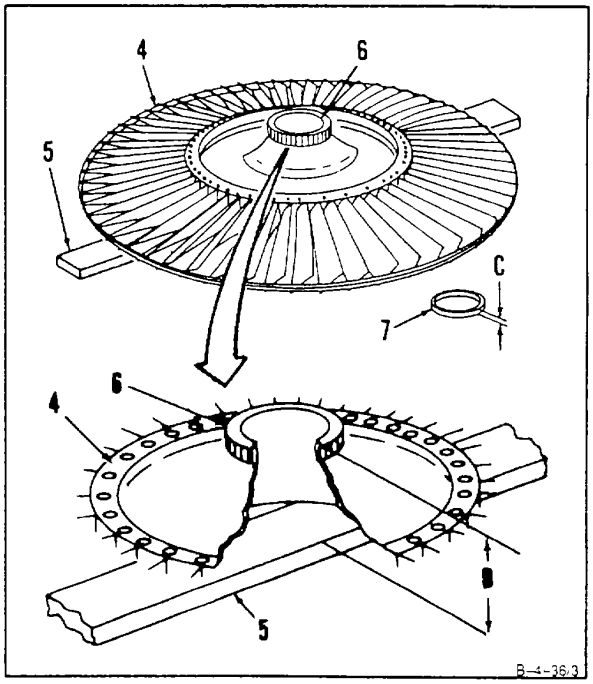
The fourth stage power turbine rotor is a critical component for which life cycle data will be recorded and stored in the DECU on the aircraft If fourth stage power turbine rotor is a replacement, it is essential to up-date life cycle count in engine history data stored in the DECU via the engine history recording terminal (EHRT) (T37) (Ref TM 1-1520-252-23).

1. **Determine how much of shaft (1) should protrude from fourth stage power turbine rotor** after fourth turbine rotor is installed.



   a. **Measure from end (2) of shaft (1) to aft face of faceplate (3)** Record as Dimension A.

   b. Place fourth stage power turbine rotor (4) wit hub on locating bar (T33) (5) **Measure from aft face of hub (6) to locating bar (T1) (5)** Record as Dimension B.



   c. If ring spacer (7) was not removed, subtract Dimension B from Dimension A The answer is how much of shaft should protrude from fourth stage power turbine rotor Record for later use

NOTE

If ring spacer was not removed, go to step 4.

   d. **If ring spacer (7) was removed (Ref Task 4-33), measure thickness of it.** Record as Dimension C.

GO TO NEXT PAGE

e. **Add Dimension C to Dimension B.** Record answer as Dimension D

f. **Subtract Dimension D from Dimension A.** The answer is how much of shaft should protrude from fourth stage power turbine rotor. Record answer for later use

2. **Determine axial clearance between fourth stage power turbine rotor blade rivet heads and heat shield outer circle screw heads.**

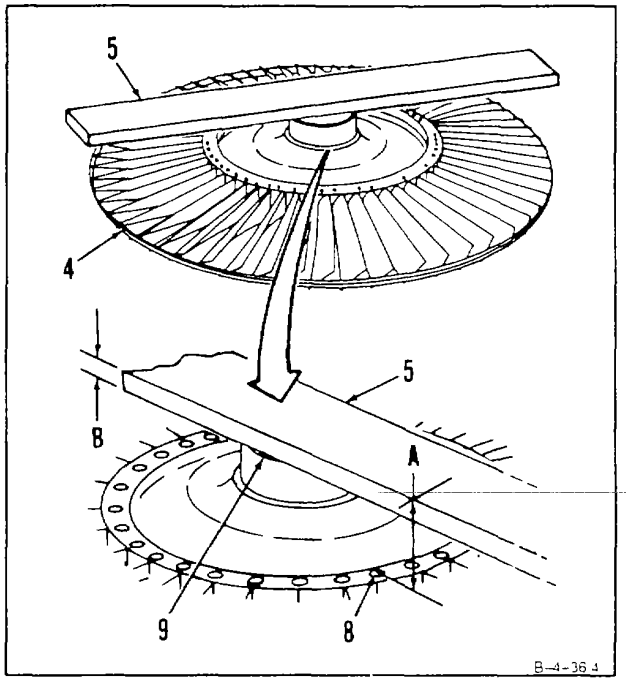
a. Place locating bar (T33) (5) on forward face of hub of fourth stage power turbine rotor (4) Measure from highest rivet head (8) to top of locating bar (T33) (5) Use micrometer depth gage Record as dimension A

NOTE

In following step, dimension B is the thickness of locating bar (T33) (5)

b. Measure from top of locating bar (T33) (5) to forward face of hub (9) Use micrometer depth gage Record as dimension B

c. Subtract dimension B from dimension A Record as dimension C



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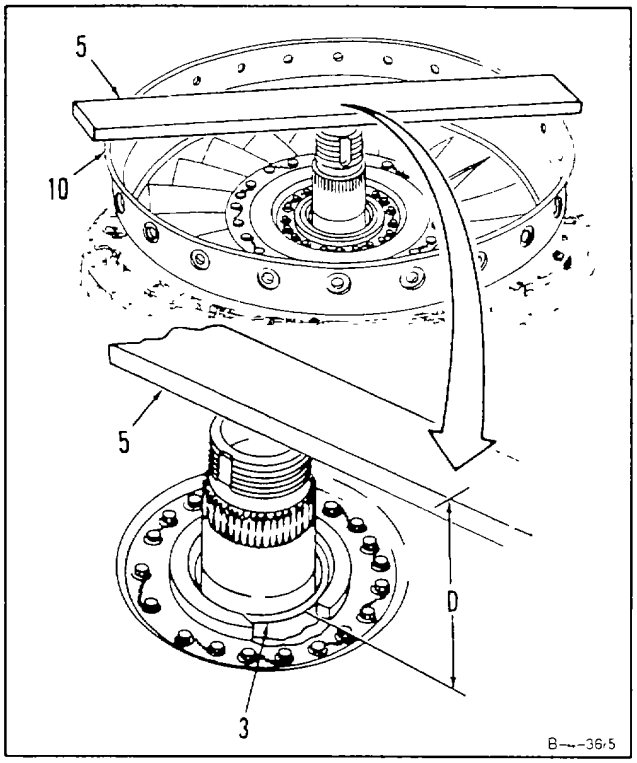
d. Place locating bar (T33)(5) on outer edge of fourth stage power turbine assembly (10).

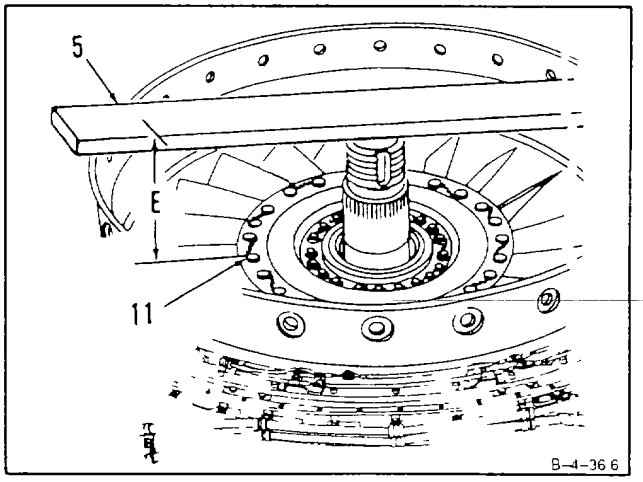
e. Measure top of locating bar (T33) (5) to top of aft face of faceplate (3). Use micrometer depth gage. Record as dimension D.



f. Measure top of locating bar (T33) (5) to top of heatshield outer circle highest screw head (11). Use micrometer depth gage. Record as dimension E.

g. Subtract dimension E from dimension D Record as dimension F.

h. Subtract dimension F from dimension C Resulting dimension is axial clearance. Clearance must be 0.139 inch minimum.



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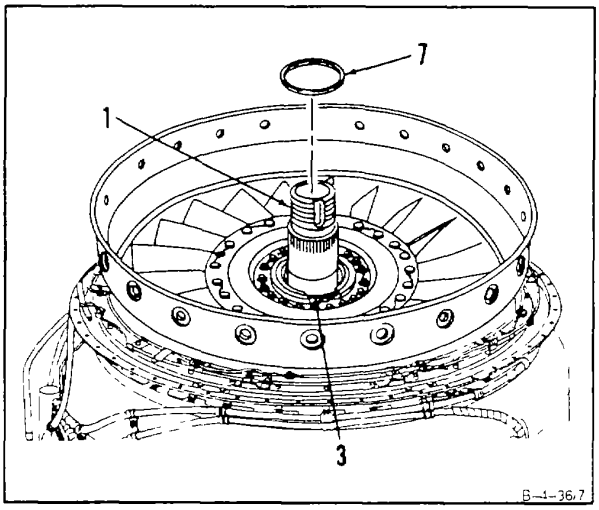
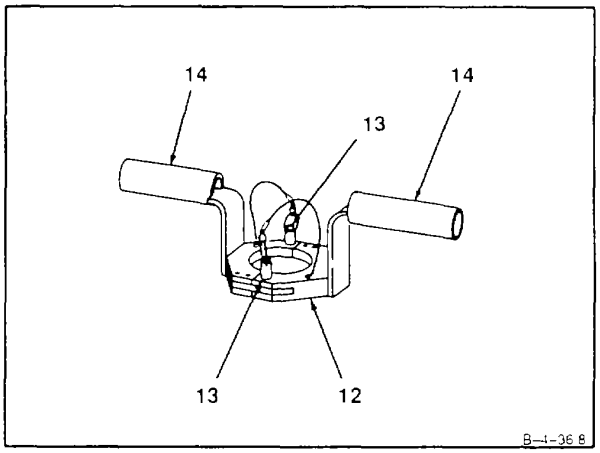
3. If removed, install ring spacer (7) on shaft (1) and against faceplate (3).



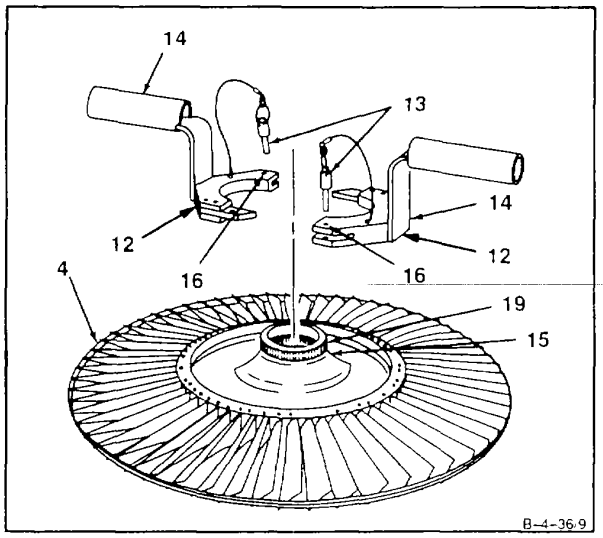
4. **Install holding fixture (T30) (12)** on fourth stage power turbine rotor as follows.

   a. Remove two pins (13) and **separate halves (14) of holding fixture (T30) (12).**



   b. **Install** halves (14) of **holding fixture (T30) (12) on** hub (15) of **fourth stage power turbine rotor (4)** just under splines (19).

   c. Install two pins (13) in holes (16).



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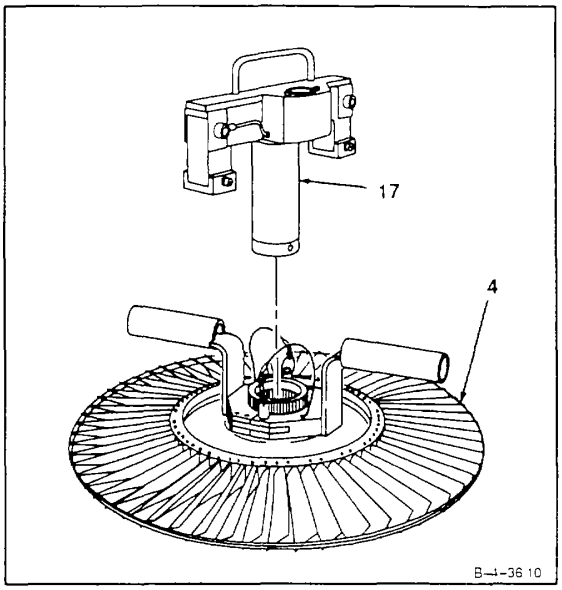
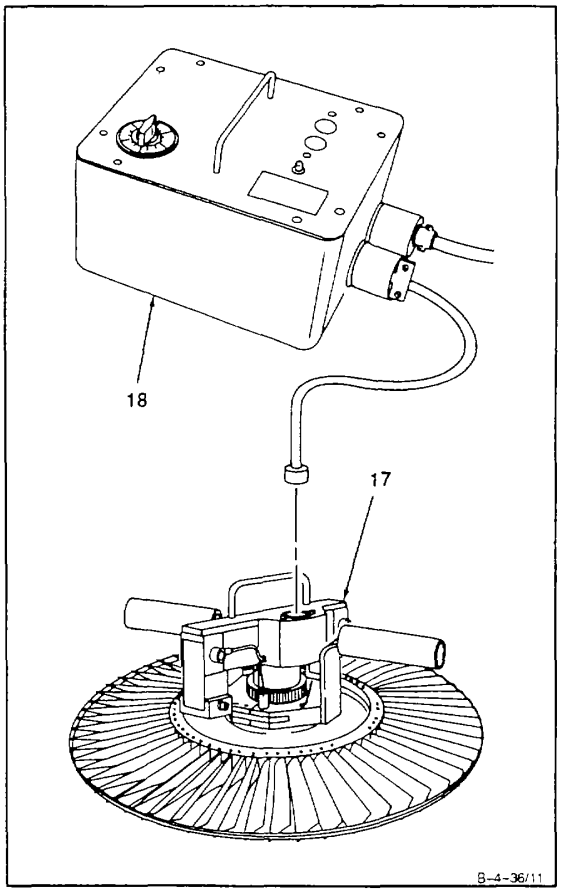
5. **Install induction heater (T21) (17)** on fourth stage power turbine rotor (4).



6. **Connect control unit (T29) (18)** to induction heater (T21) (17).



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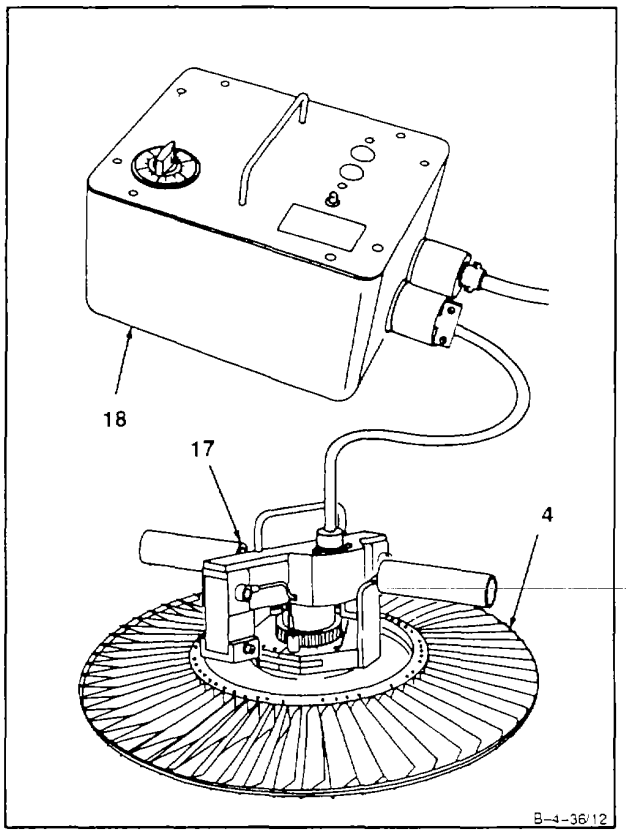
7. Using induction heater (T21) (17) and control unit (T29) (18), **heat fourth stage power turbine rotor (4) for nine minutes.**



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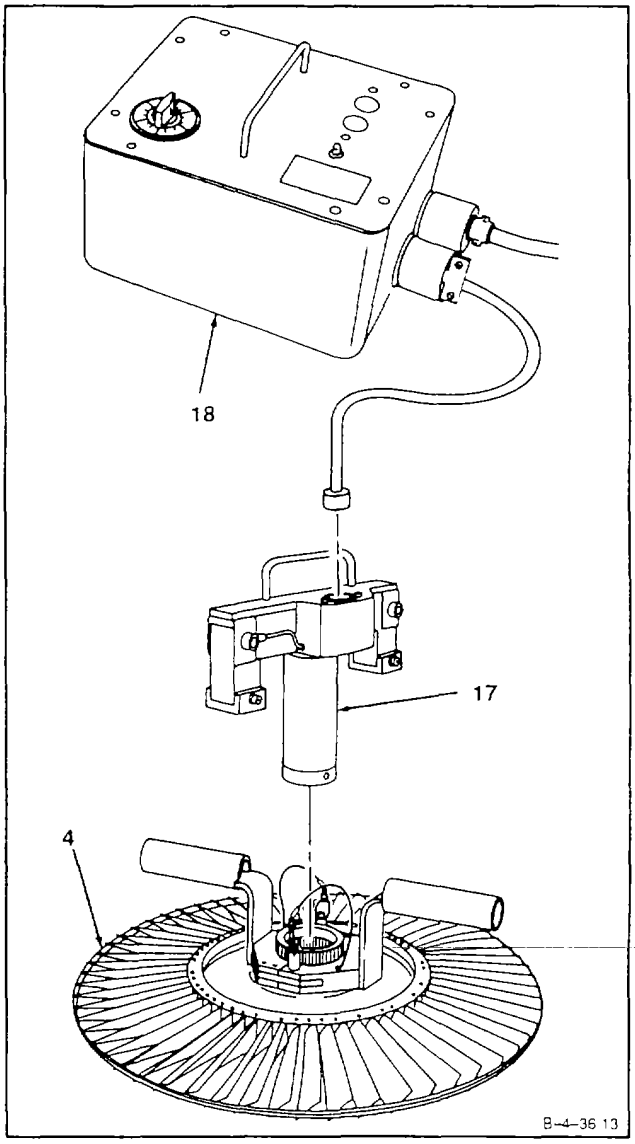
WARNING

Wear heavy duty welder's gloves when handling heated fourth stage turbine rotor. Failure to comply may cause burns Get medical attention for burns.

8. Disconnect control unit (T29) (18), and **remove induction heater (T21) (17)** from fourth stage power turbine rotor (4).



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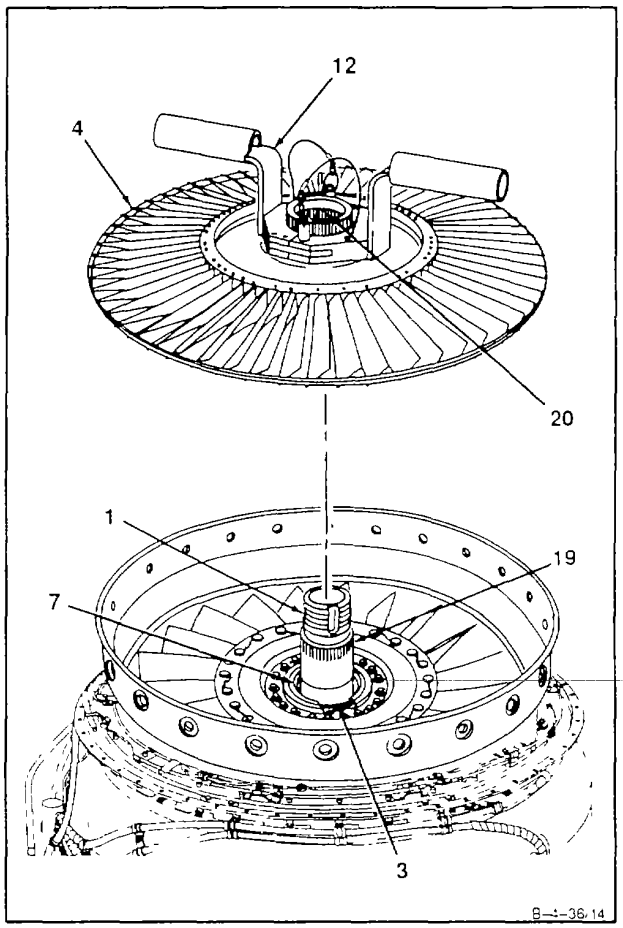
9. **Align matchmarks on fourth stage power turbine** rotor (4) with matchmarks on shaft (1).

10. Use holding fixture (T30) (12) Align spines (19 and 20) **Install fourth stage power turbine rotor** (4) on shaft (1) until bottomed out against faceplate (3) or, if installed, ring spacer (7).



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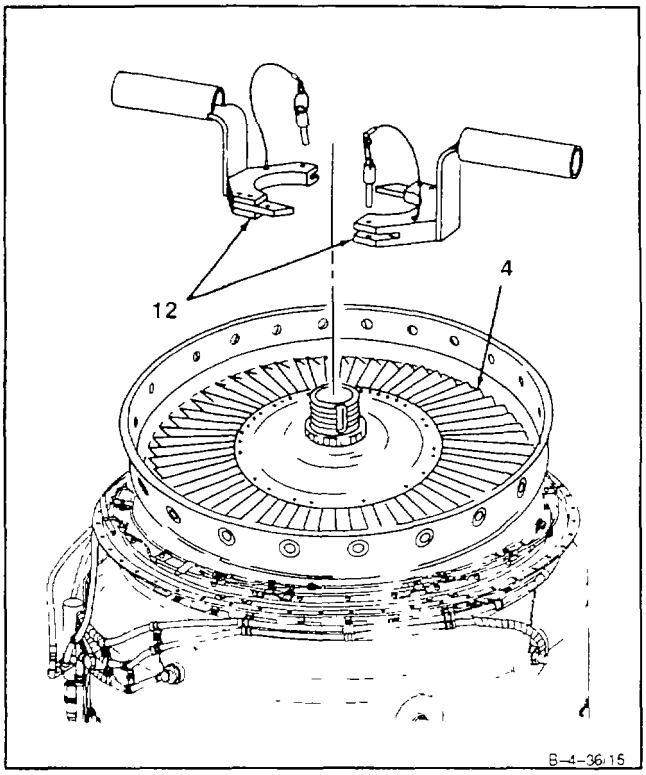
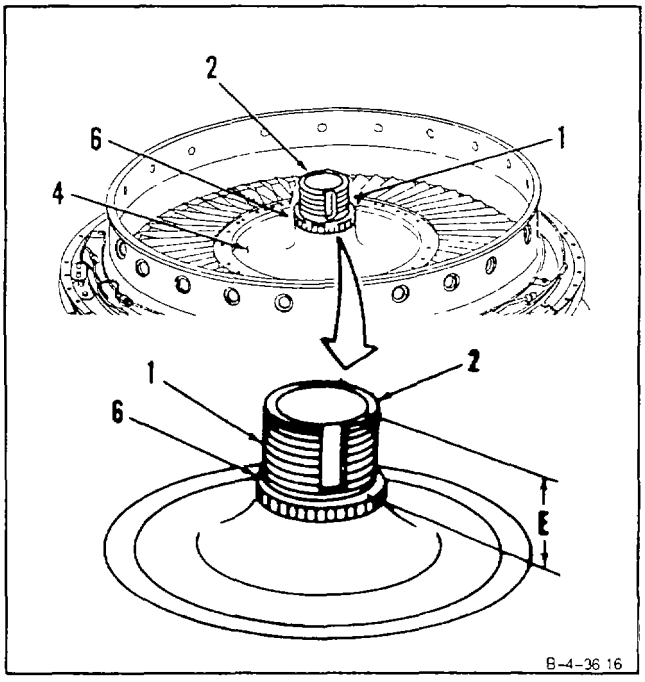
11. Remove holding fixture (T30) (12), and **allow fourth stage power turbine rotor (4) to cool** to room temperature



12. **Measure length of shaft (1) protruding out through fourth stage power turbine rotor (4).** Measure from end (2) of shaft (1) to aft face hub (6) of fourth stage power turbine rotor (4) Record as Dimension E

13. **Compare Dimension E with dimension recorded in step 1 c. or 1 f.** Dimensions shall be no more than 0.005 inch apart



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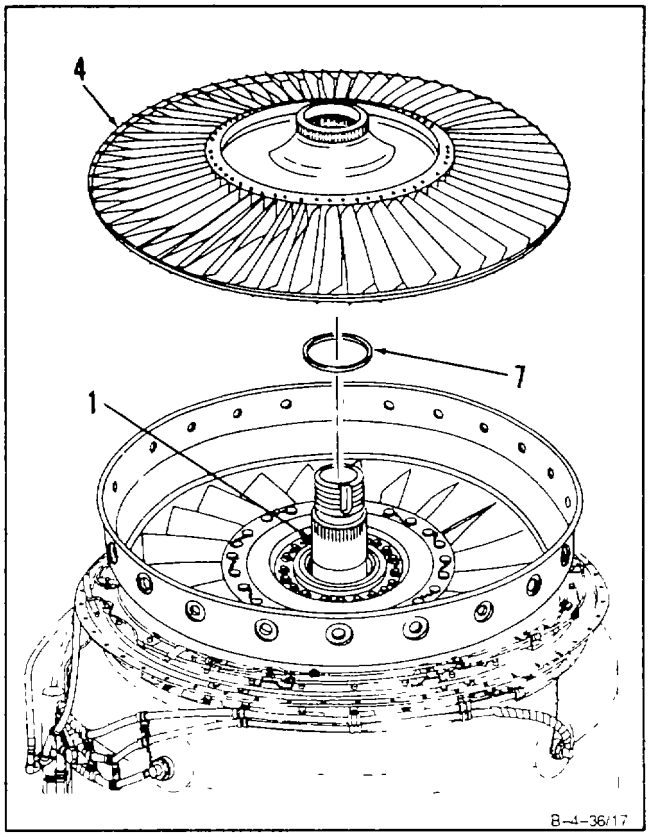
NOTE

If calculated length and measured length are not within limits, do steps 14 thru 17. If calculated length and measured length are within limits, omit steps 14 thru 17.

14. **Remove fourth stage power turbine rotor (4).**(Ref Task 4-33, steps 4 thru 8)

15. **Inspect shaft (1), fourth stage power turbine rotor (4) and, if Installed, ring spacer (7).**Check for contaminants or damage that caused rotor (4) to hang up If hang up exists, remove contaminants or replace power turbine assembly (Ref Task 3-6 and 3-7)



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16. Using bearing installing tool (T22) (21) re-seat shaft (1) and No 4 and 5 bearing package (22)

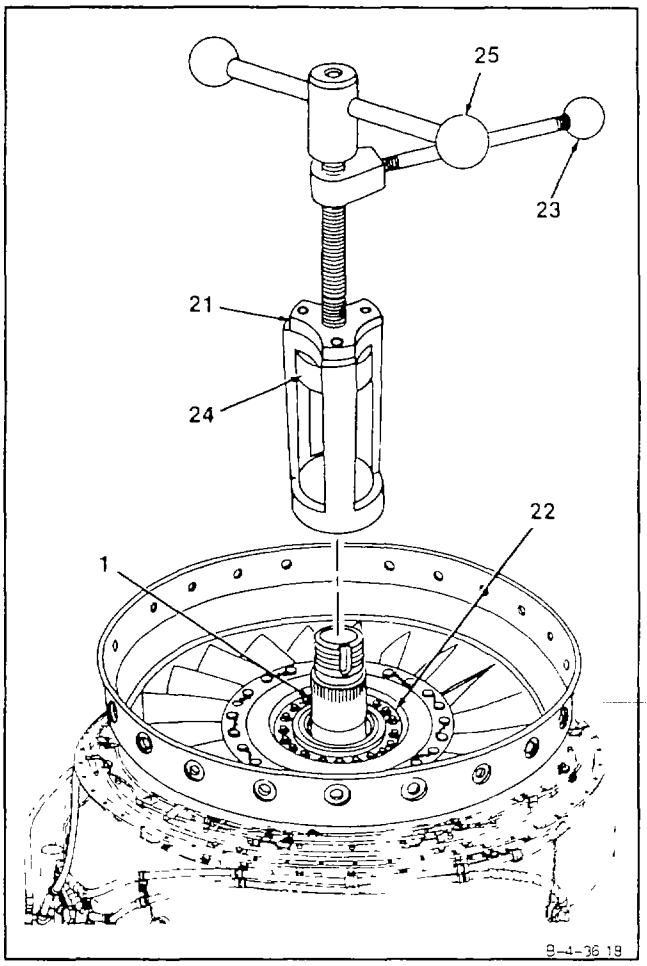
    a. Turn handle (23) counterclockwise all the way Install nut (24) on shaft (1) Tighten nut (24) on shaft (1) turning T-handle (25) clock-wise

    b. Turn handle (23) clockwise to seat No 4 and 5 bearing package (22) fully into position on third turbine rotor shoulder Remove bearing installing tool (T22) (21).

NOTE

Be sure ring spacer does not stick to installing tool.

17. **Install fourth stage power turbine rotor (40)** (Ref steps 1 through 13).



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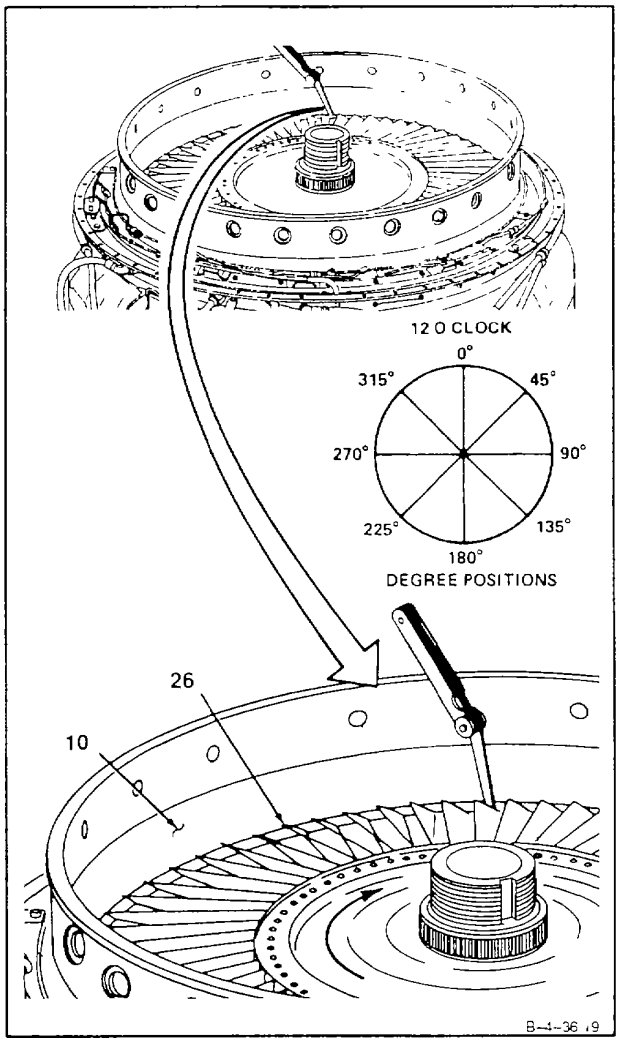
18. **Measure** clearance between blade tips (26) and fourth stage power turbine nozzle (10) **(tip clearance)** at 0, 45, 90,135, 180, 225, 270, and 315 degree positions as follows.

    a. Insert thickness gage between fourth stage power turbine nozzle (10) and blade (26) tip Rotate fourth stage turbine rotor (4) clockwise one revolution for each check

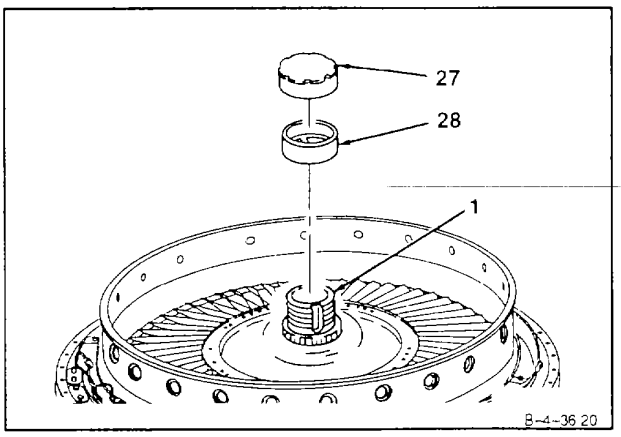
    b. Tip clearance shall be 0 020 inch minimum.

NOTE

If tip clearance is not within limits, replace power turbine assembly (Ref Tasks 3-6 and 3-7)



19. Coat threads of nut (27) with anti-seize compound (E6) **Install** serviceable locking cup (28) and **nut (27)** on shaft (1).



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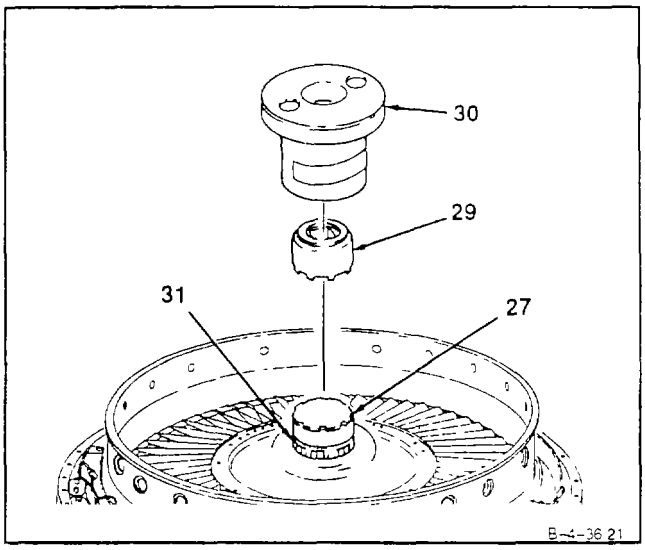
20. **Install torque fixture (T19),** consisting of wrench (29) and holding fixture (30) as follows.

    a. Position wrench (29) on nut (27).

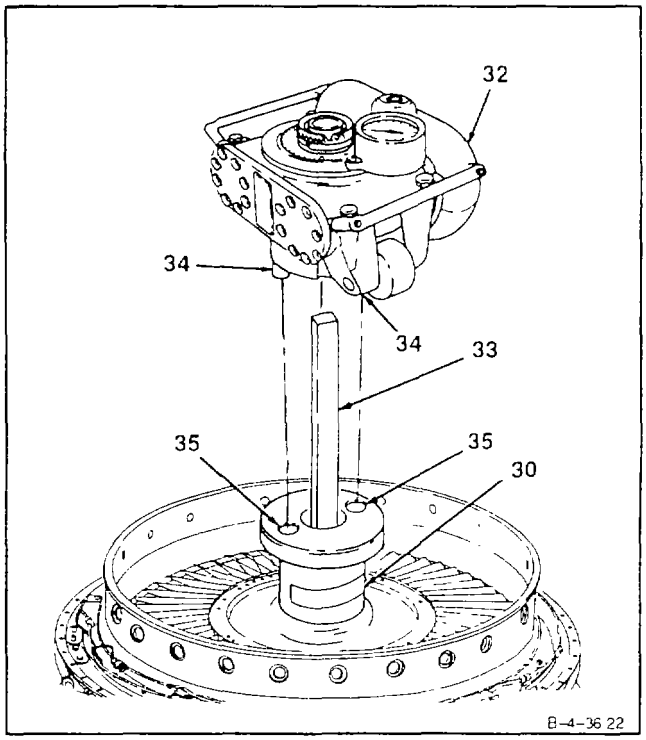
    b. Position holding fixture (30) on spline (31).



21. Using helper, **install torque multiplier** (T50) (32) as follows:

    a. Install drive bar (33) and position torque multiplier (T50) (32) over drive bar (33)

    b. Align two pins (34) with holes (35) in holding fixture (30) Place torque multiplier (T50) (32) on holding fixture (30).



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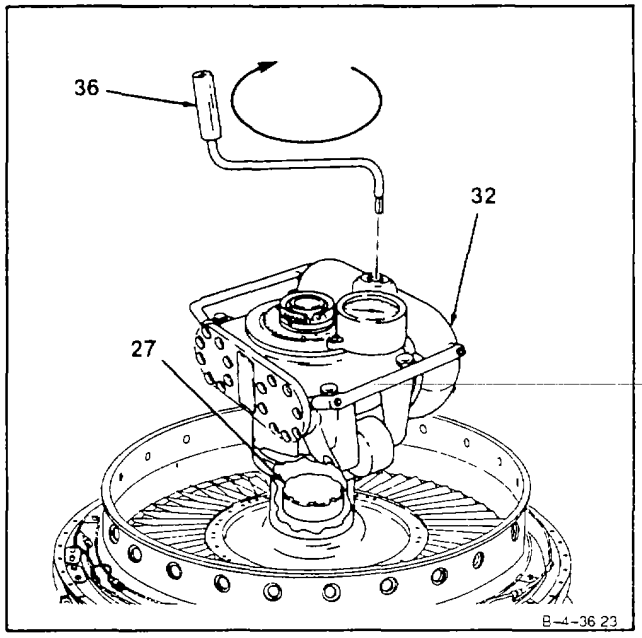
WARNING

Make sure handle is fully seated and ratchet selector on torquepack is properly set before applying torque. Rotating ratchet selector with load on torque pack can damage unit and injure personnel. If injury occurs, get medical attention.

WARNING

Do not change ratchet selector when torque load Is on torque pack. Damage to equipment or Injury to personnel can result. If Injury occurs, get medical attention.

22. Install handle (36) in torque multiplier (T50) (32) Turn handle clockwise to torque nut (27) **Torque nut (27) to <u>475 foot-pounds</u>.**



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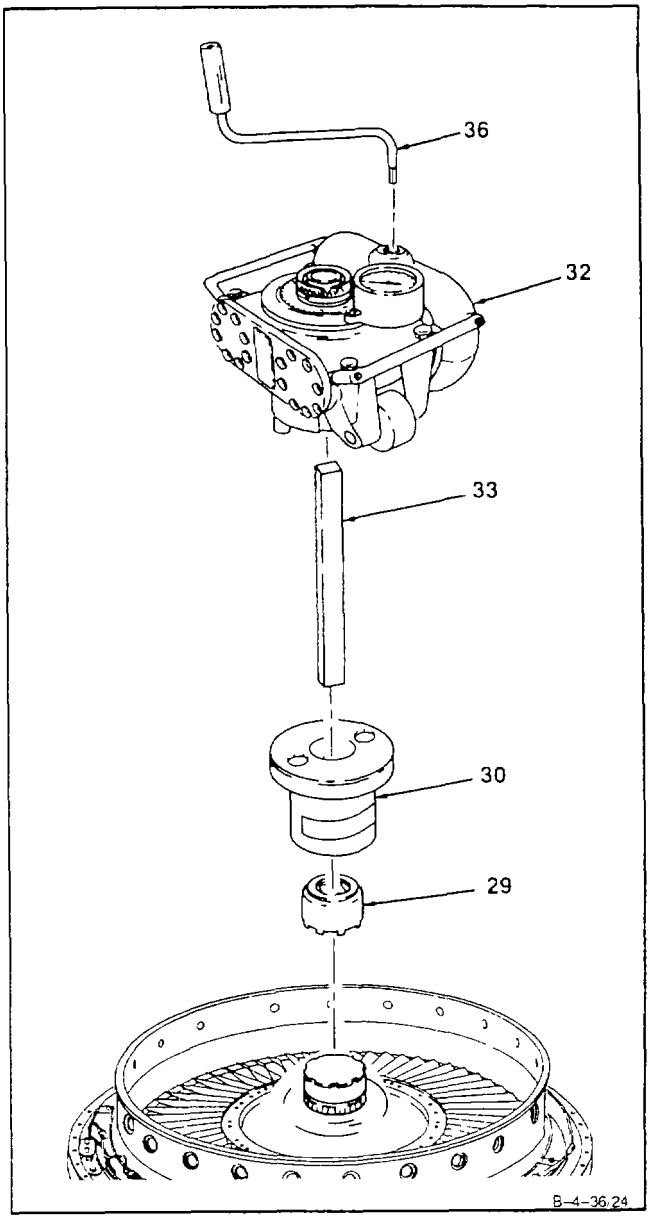
23. Remove handle (36), torque multiplier (T50) (32), drive bar (33), and torque fixture (T19), consisting of wrench (29) and holding fixture (30)



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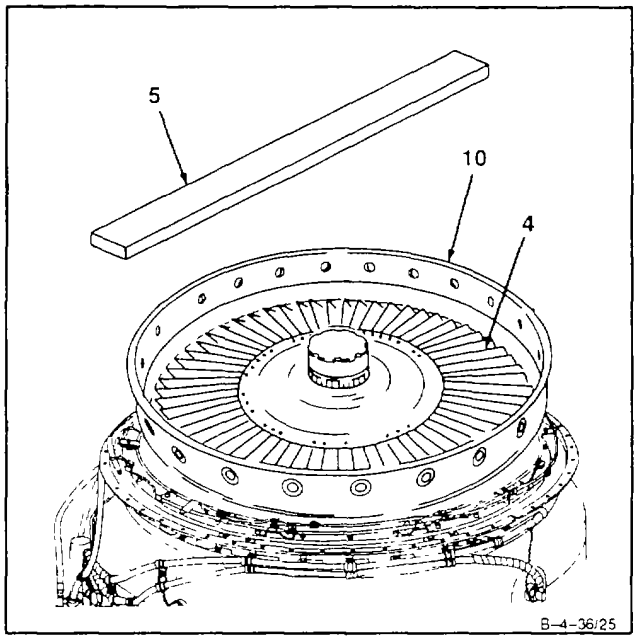
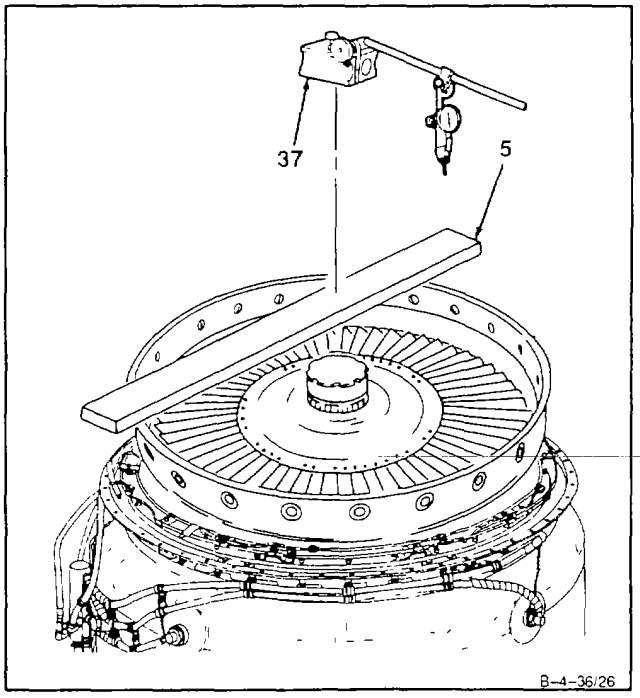
24. **Check runout of fourth stage power turbine rotor** (4).

    a. Place locating bar (T33) (5) on aft surface of fourth stage power turbine nozzle (10)



    b. Place dial indicator magnetic base (37) on locating bar (T33) (5).



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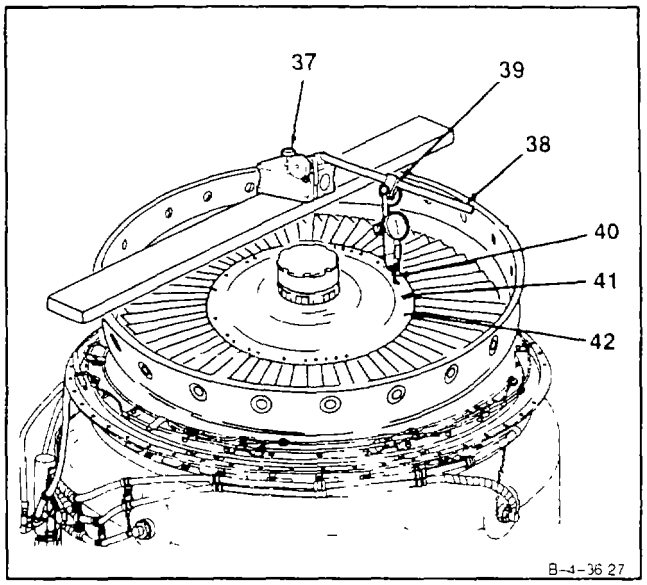
c. Adjust arm (38) on base (37) and clamp (39) Position pointer (40) on surface (41) just inside of blade retaining pins (42)



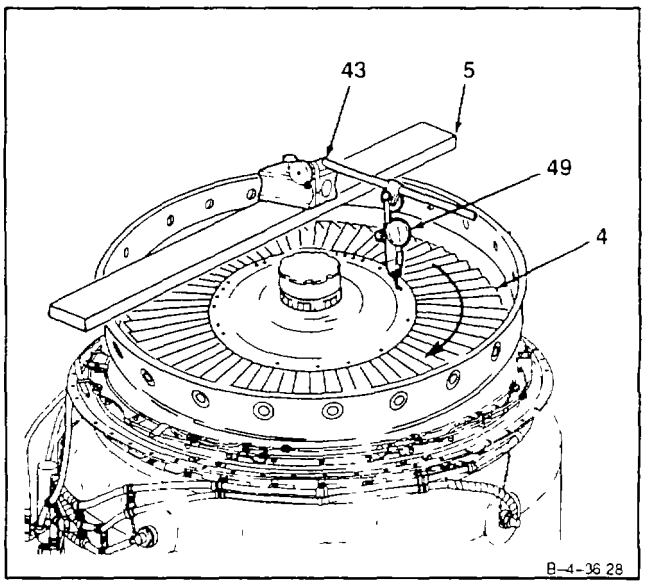
d. Zero indicator (49) Rotate fourth stage power turbine rotor (4) clockwise while noting indicator reading

e. Total indication of runout shall be no more than 0 003 inch

NOTE

If runout is not within limits, do steps 14 thru 24 If runout is still not within limits, replace power turbine assembly (Ref Tasks 3-6 and 3-7).

f. Remove dial indicator assembly (43) and locating bar (5)



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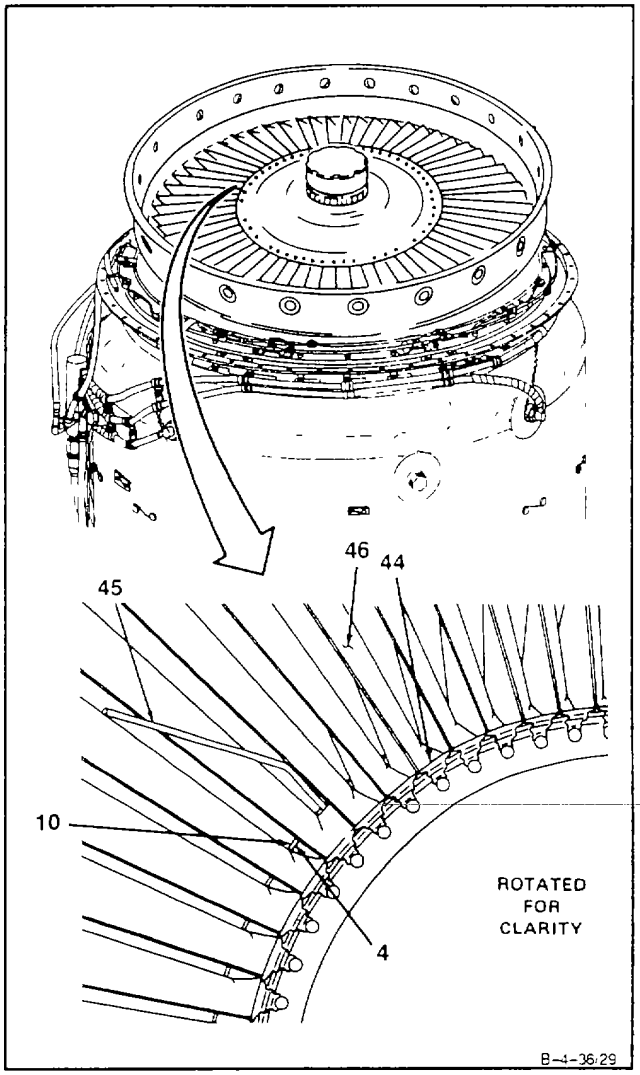
25. Check axial clearance between fourth stage power turbine rotor (4) and fourth stage power turbine nozzle (10) at blade roots (44). Use 0.104 inch and 0.228 inch bent wire gage (Appendix E) (44) inserted between fourth stage power turbine rotor blades (46). Axial clearance shall not be less than 0.104 inch or more than 0.228 inch.

NOTE

If axial clearance is not within limits, do steps 14 thru 25. Ring spacer may be installed or removed as necessary. Recheck clearance. If clearance still is not within limits, replace power turbine assembly (Ref Tasks 3-6 and 3-7).



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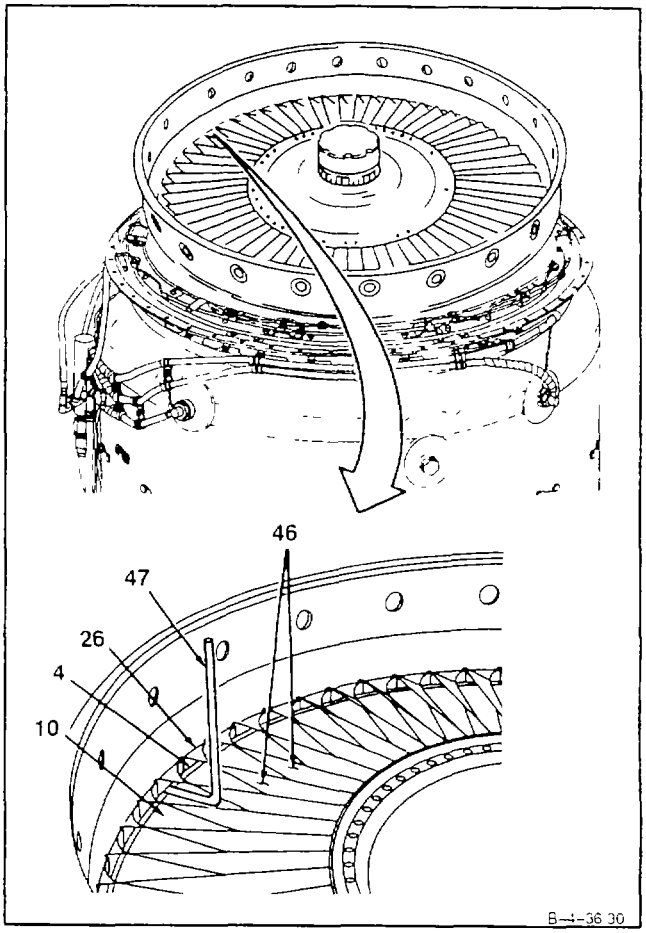
26. **Check axial clearance between fourth stage power turbine rotor (4) and fourth stage power turbine nozzle (10 at blade tips (26).** Use 0.115 inch and 0.290 inch bent wire gage (Appendix E) (47) inserted between fourth stage power turbine rotor blades (46). Axial clearance shall not be less than 0.115 inch or more than 0.290 inch.

NOTE

If axial clearance is not within limits, do steps 14 thru 26. Ring spacer may be installed or removed as necessary. Recheck clearance If clearance still is not within limits, replace power turbine assembly (Ref Tasks 3-6 and 3-7).



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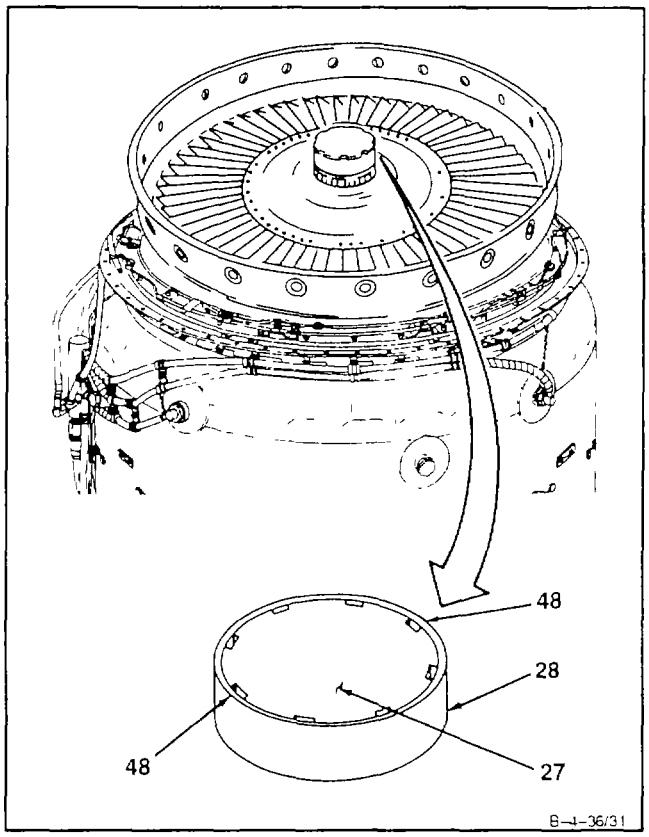
27. **Bend locking cup (28)** into nut (27) in two places (48), 180 degrees apart.



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

SECTION VIII

NO. 4 AND 5 BEARING PACKAGE

4-37 REMOVE NO. 4 AND 5 BERING PACKAGE SEALS (AVIM) (Continued) 4-37

INITIAL SETUP

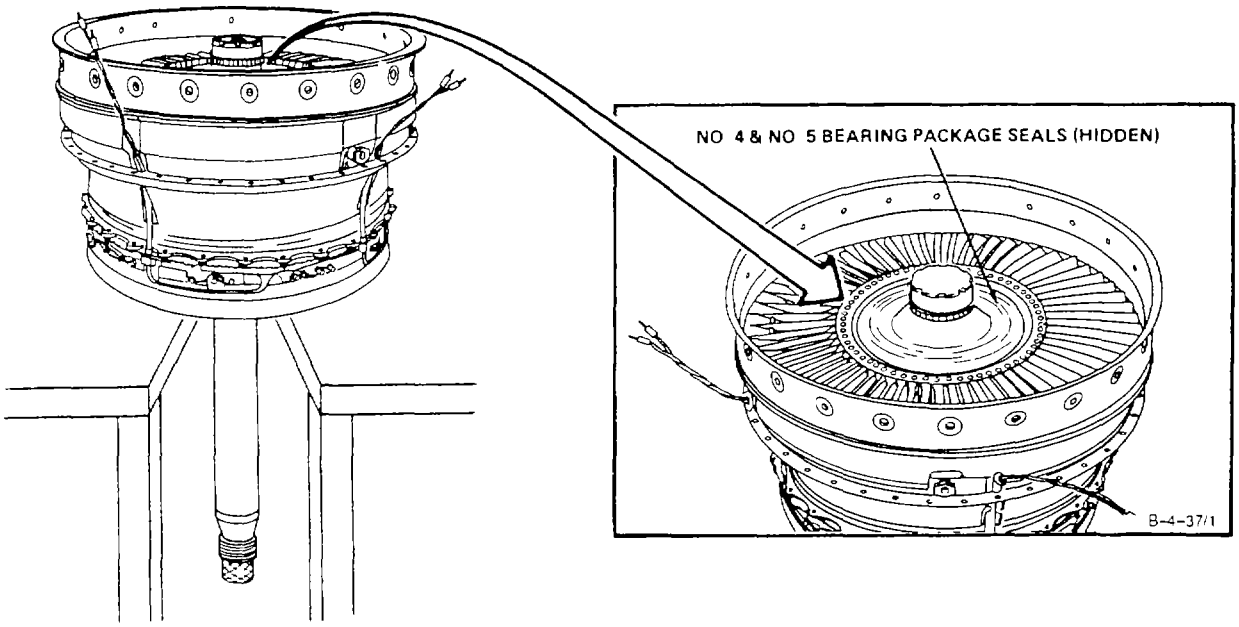
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Torque Fixture (T19)
Seal Removal Tool Set (T20)
Mechanical Puller (T23)
Hydraulic Wheel Puller (T31)
Torque Multiplier (T50)
Third Turbine Rotor Support Block (Appendix E)

Materials:
Penetrating Oil (E43)
Marking Pencil (E38)
Wiping Rag

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)



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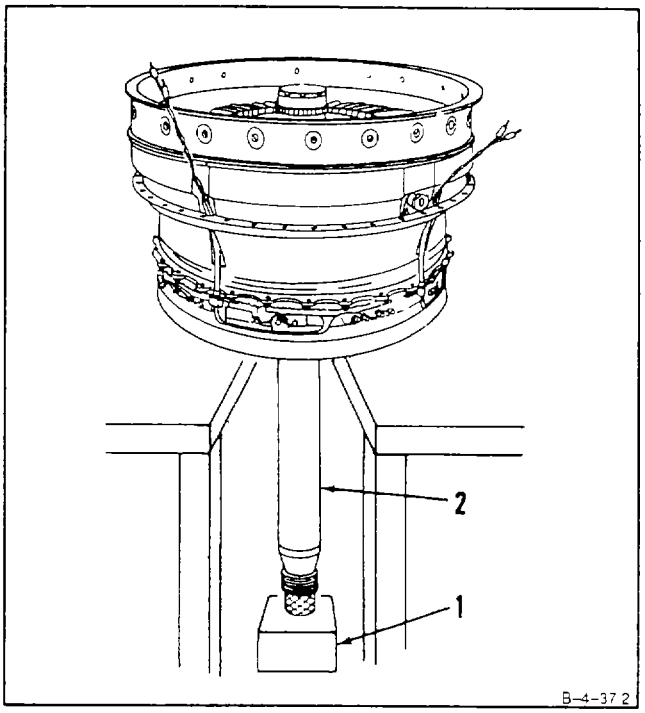
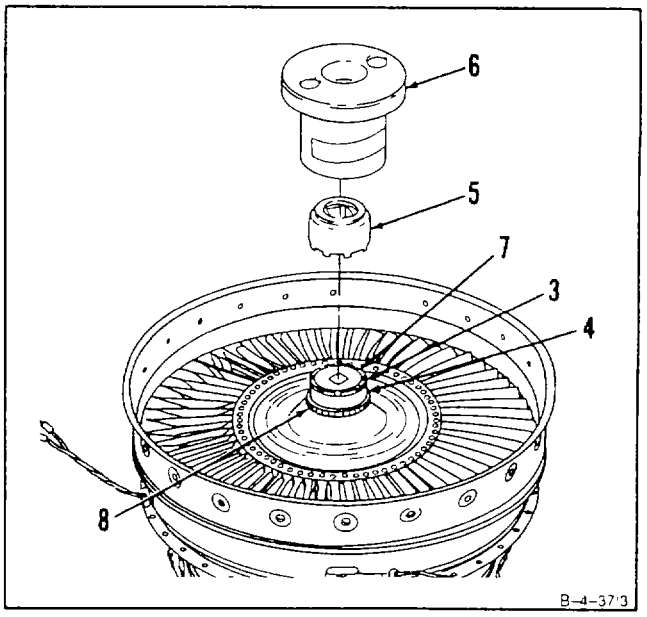
1 Place third turbine rotor support block (Appendix E) (1) under shaft (2).



2 Straighten indents (3) of locking cup (4) and **install torque fixture (T19)** consisting of wrench (5) and holding fixture (6), as follows:

a Position wrench (5) on nut (7).

b Position holding fixture (6) on spline (8).



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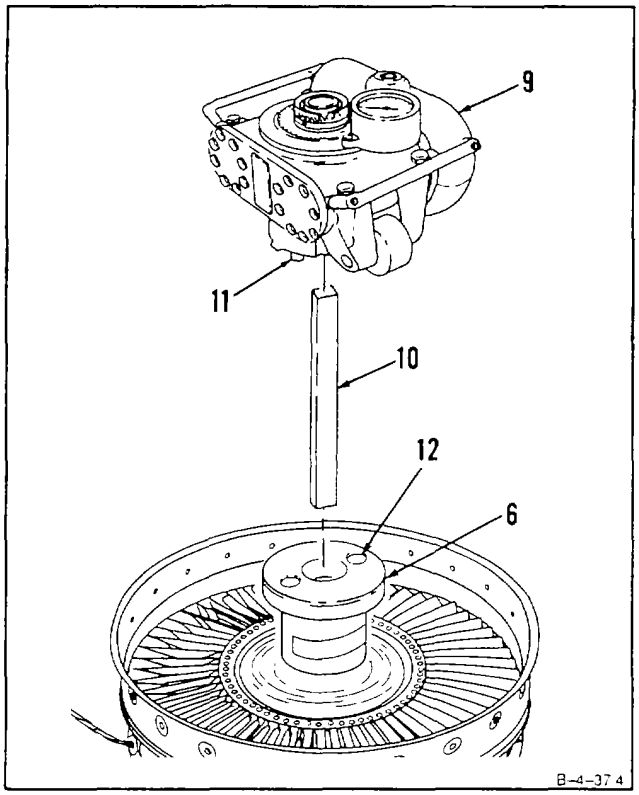
3 Using helper, **install torque multiplier (T50) (9)** as follows:

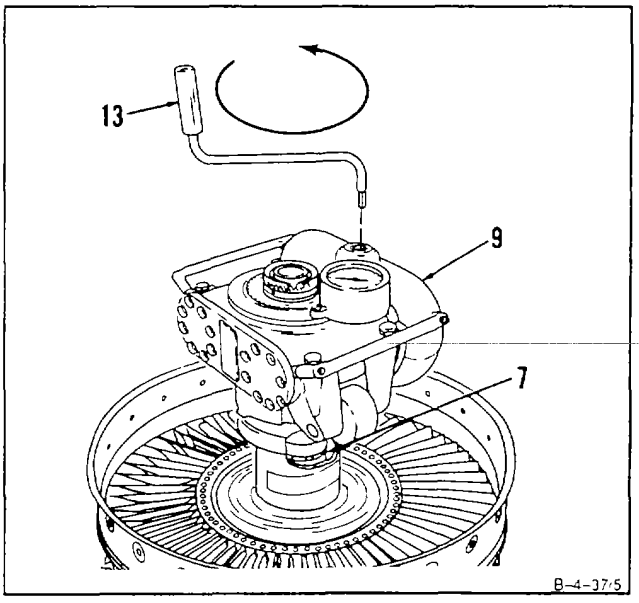
a Install drive bar (10) and position torque multiplier (T50) (9) overdrive bar (10).

b Align two pins (11) with holes (12) in holding fixture (6) Place torque multiplier (T50) (9) on holding fixture (6).



4 Remove nut (7)as follows:

a Insert handle (13) in torque multiplier (T50) (9) Turn handle (13) counterclockwise until nut (7) is loose.



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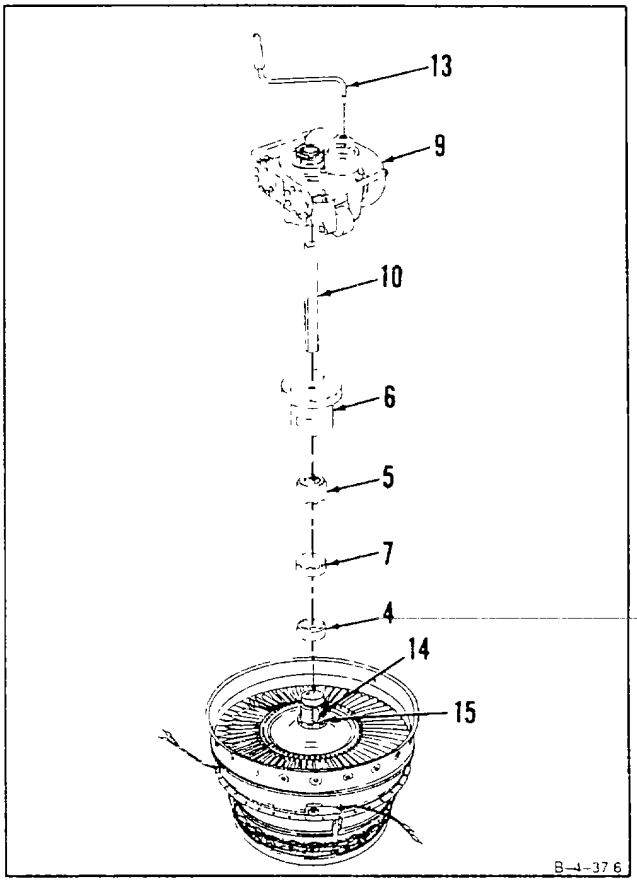
b Remove handle (13), torque multiplier (T50) (9), drive bar (10), and torque fixture (T19), consisting of wrench (5), and holding fixture (6).

c Remove nut (7) and locking cup (4).

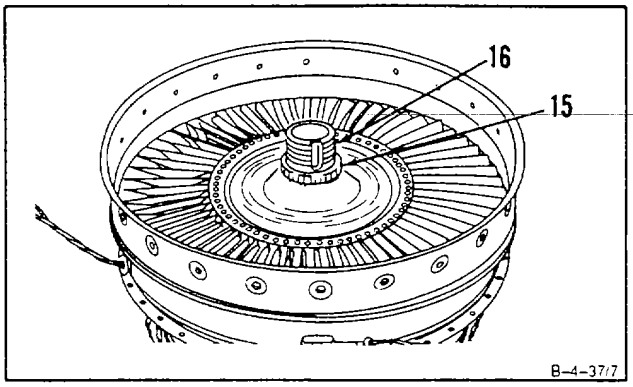
d Matchmark shaft groove (14) and fourth stage turbine rotor (15) Use marking pencil (E38).



WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin Handle only in well-ventilated areas away from heat and flame Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take Internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention Get medical attention for eyes.

5 **Soak shaft (16)** around rotor (15) with penetrating oil (E43).



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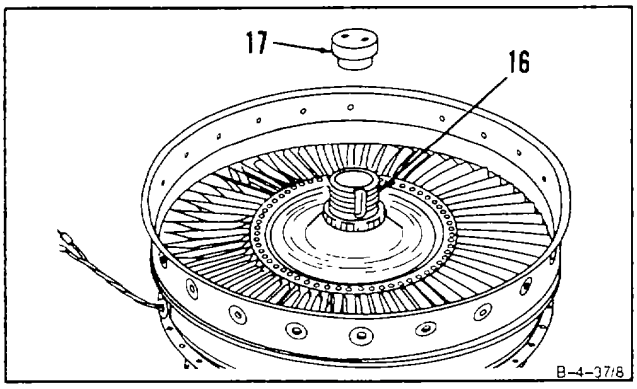
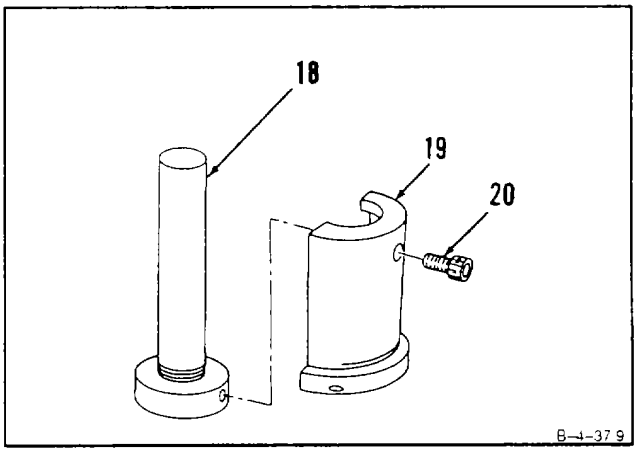
6 **Install hydraulic wheel puller (T31)** as follows:

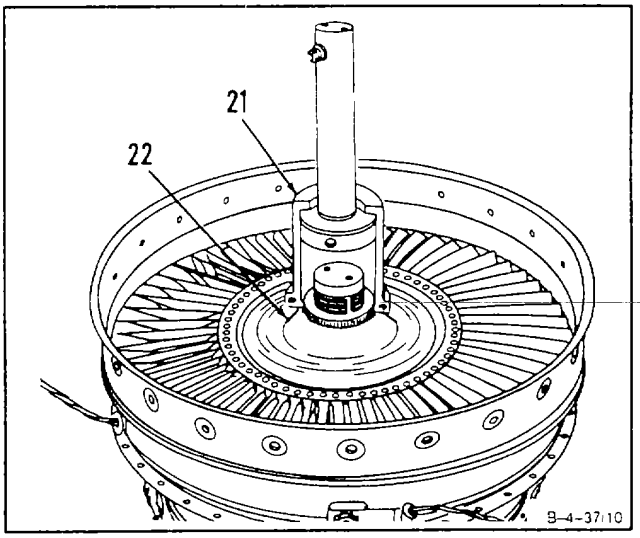
a Position pilot (17) on shaft (16).



b Position hydraulic ram (18) in one half of body (19) Install screw (20).



c Position partially assembled puller (21) on fourth stage turbine rotor hub (22).



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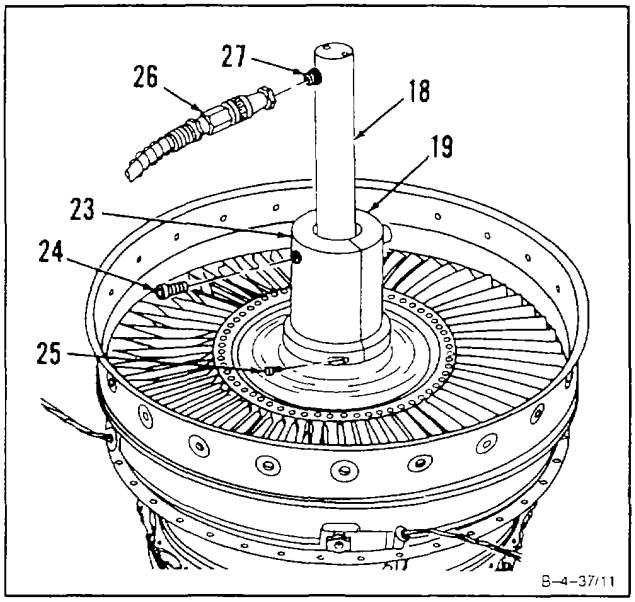
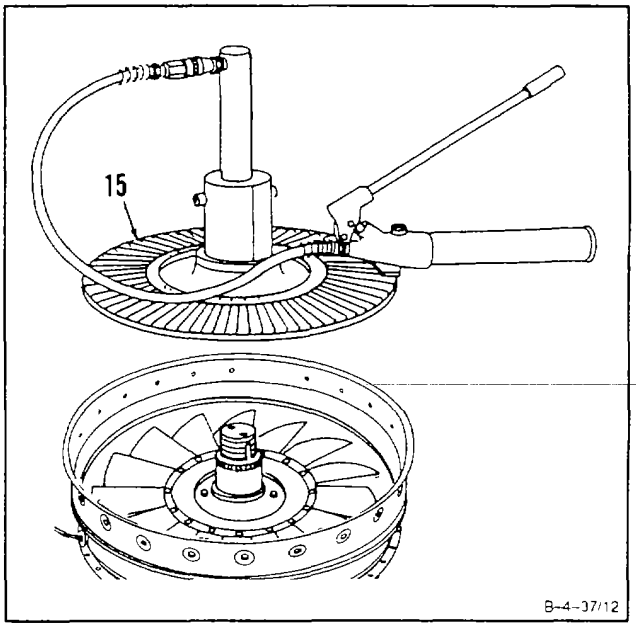
d Place other half of body (23) on body half 19) Install screw (24) and two screws (25).

e Connect hydraulic pump hose (26) to fitting 27) on hydraulic ram (18).

7 Using helper, **remove fourth stage turbine rotor (15).** Use hydraulic wheel puller (T31).





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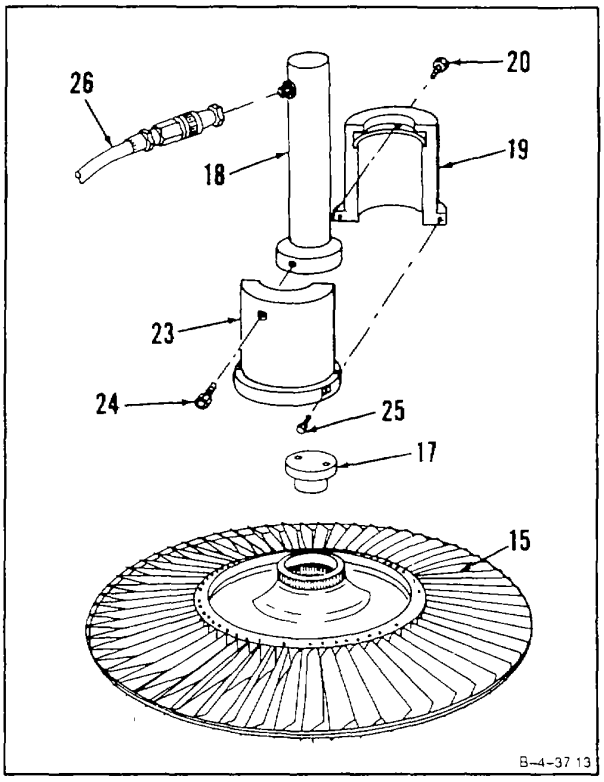
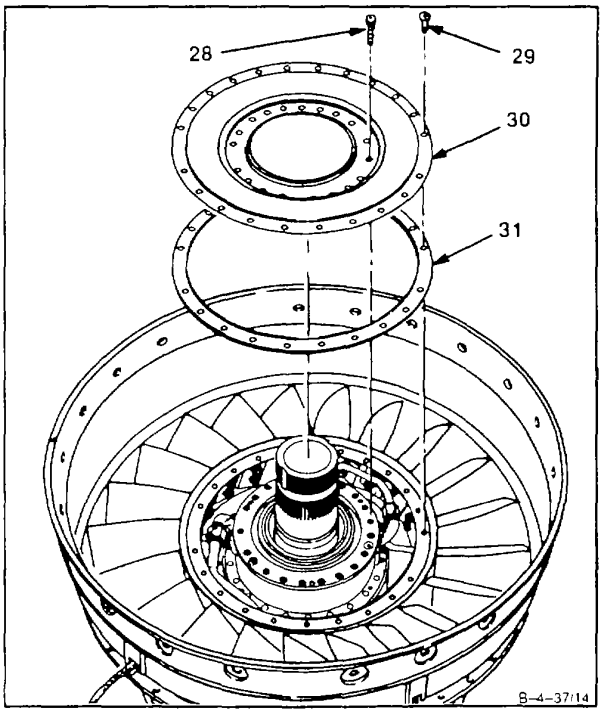
8 **Remove hydraulic wheel puller (T31)**, consisting of hose (26), hydraulic ram (18), two body halves (19 and 23), two screws (20 and 24), two screws (25), and pilot (17) from fourth stage turbine rotor (15).

9 **Remove** lockwire, 19 bolts (28), 22 screws (29), **heat shield (30),** and shim (31), if installed.





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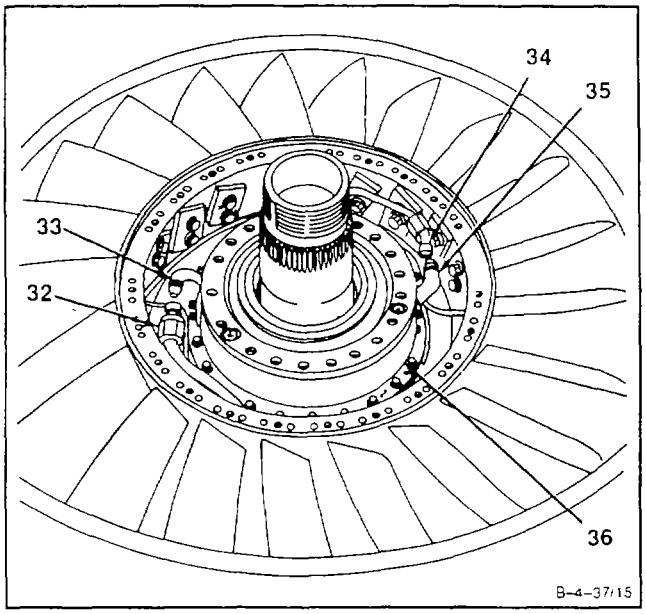
4-37 REMOVE NO. 4 AND 5 BEARING PACKAGE SEALS (AVIM) (Continued) 4-37

10. Remove lockwire and disconnect tube (32) from adapter (33).

11. Remove lockwire and disconnect tube (34) from adapter (35).

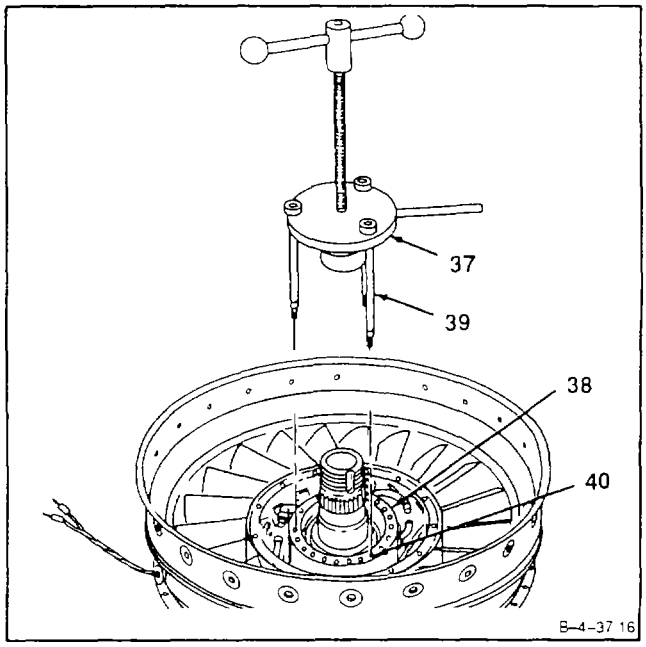
12. Remove lockwire and 19 bolts (36).



13. **Install mechanical puller (T23) (37)** as follows:

    a. Position puller (T23) (37) on No 4 and 5 bearing package (38).

    b. Align three bolts (39) with three holes (40) and install bolts (39).



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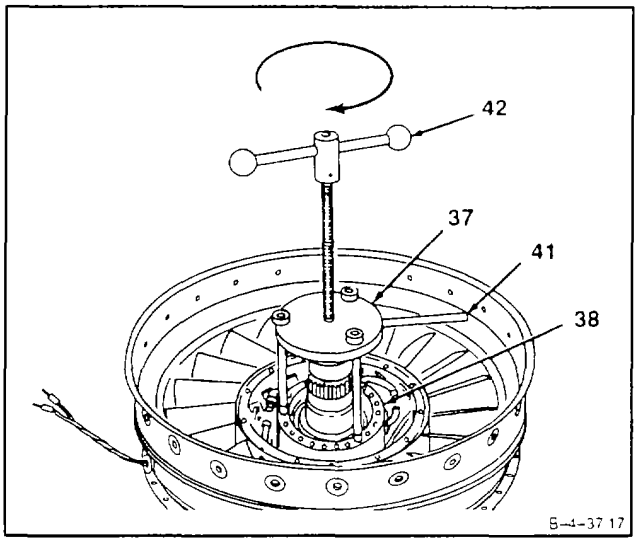
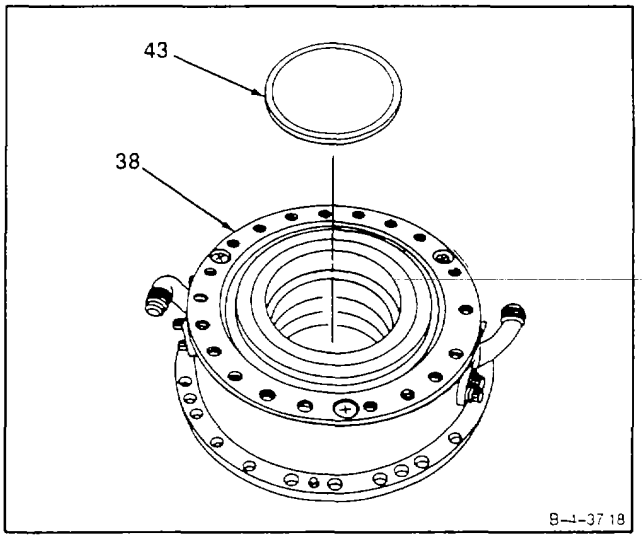
14 Hold handle (41) steady and turn handle (42) clockwise **Remove No 4 and 5 bearing package (38).**

15 **Remove mechanical puller (T23) (37).**

16 If installed, remove spacer (43) from aft end of No 4 and 5 bearing package (38).





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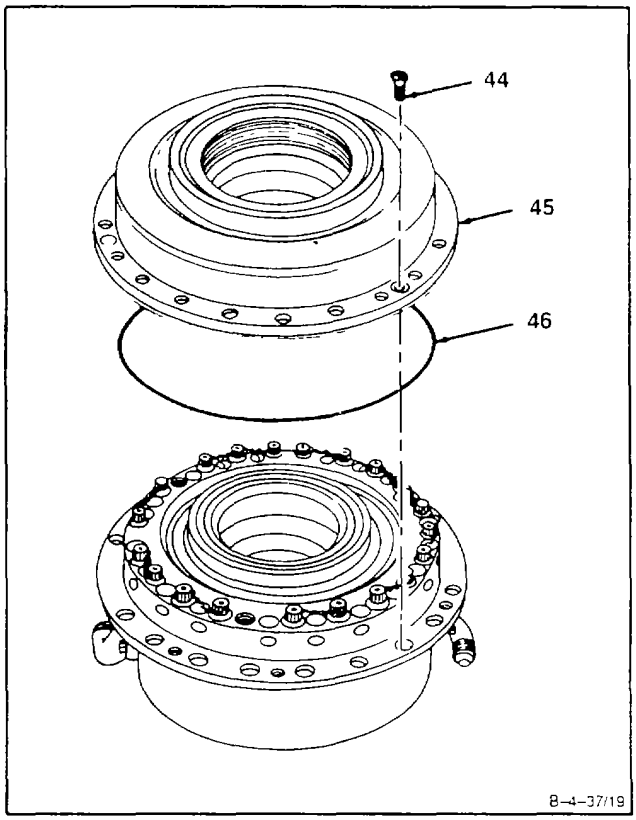
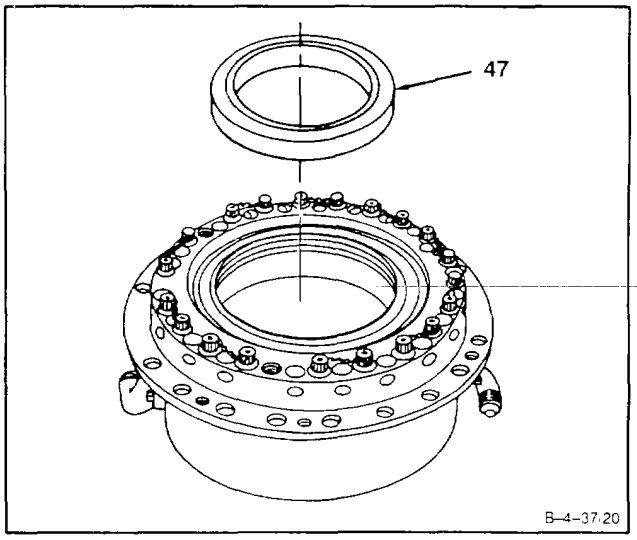
17. **Remove** three screws (44), **forward seal and retainer (45),** and gasket (46).



18. **Remove faceplate (47).**



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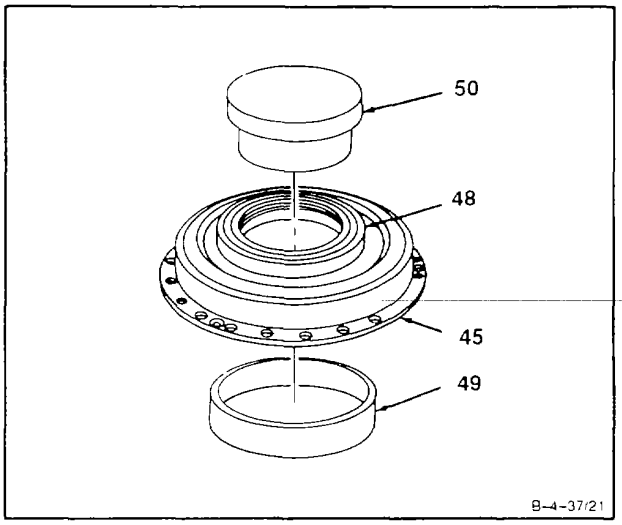
NOTE

In following step 19, tube (49) and pilot (50) are part of seal removal tool set (T20).

19. **Remove No. 4 and 5 bearing package forward seal (48)** as follows:

    a. Position tube (49) on arbor press and place seal and retainer (45) on tube (49).

    b. Install pilot (50) on seal (48) Remove seal (48) using arbor press.



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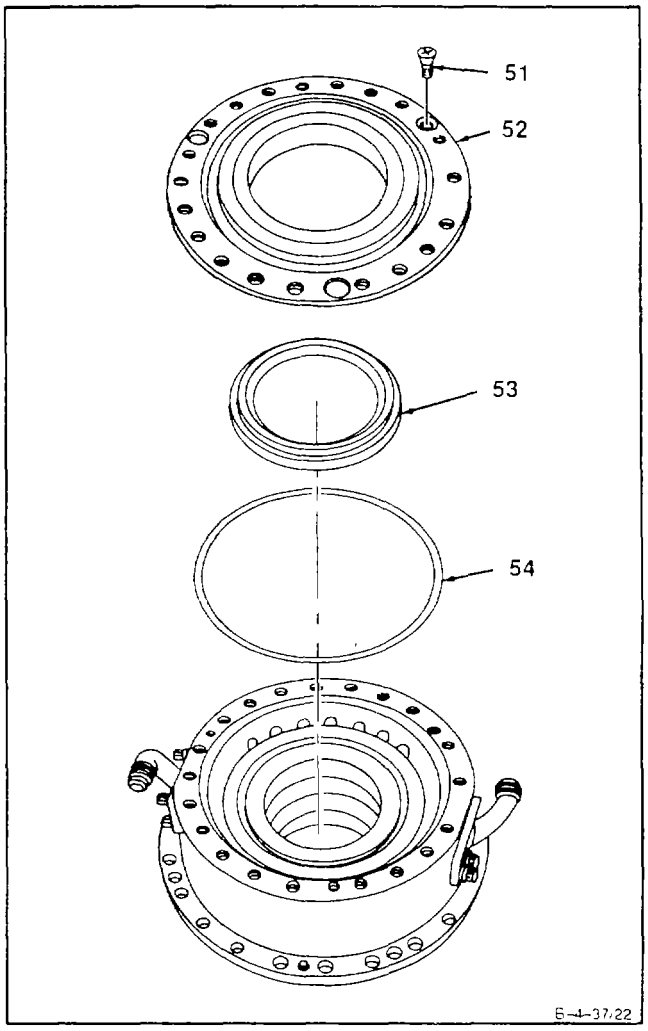
20. Remove three screws (51), and **remove aft seal and retainer (52).**

21. Remove faceplate (53) and seal (54).



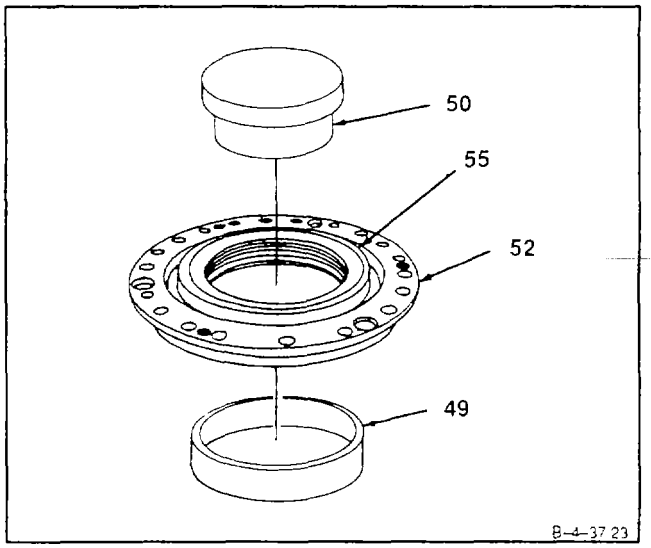
NOTE

In following step 22, tube (49) and pilot (50) are part of seal removal tool set (T20).

22. **Remove No. 4 and 5 bearing package aft seal (55)** as follows:

    a Position tube (49) on arbor press and place aft seal and retainer (52) on tube (49).

    b Install pilot (50) on seal (55) Remove seal (55). using arbor press.



FOLLOW-ON MAINTENANCE

None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Goggles
Compressed Air Source
Materials
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)
Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition
Off Engine Task
General Safety Instructions

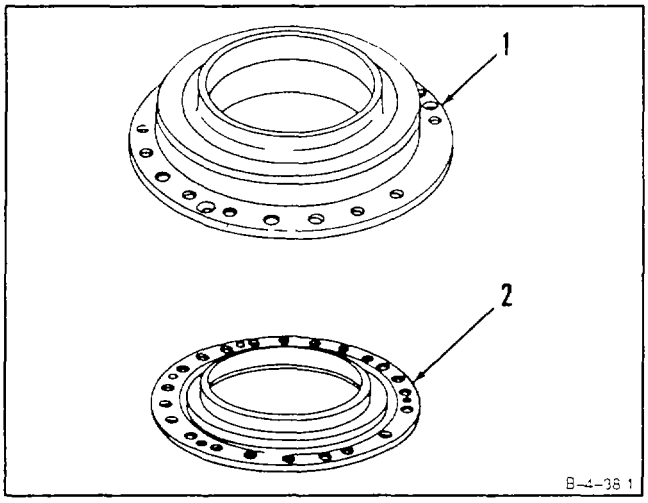
WARNING

Dry cleaning solvent (E19) 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 Wear gloves (E24) **Clean forward seal retainer (1) and aft seal retainer (2)** with dry cleaning solvent (El 9) and with brush.

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

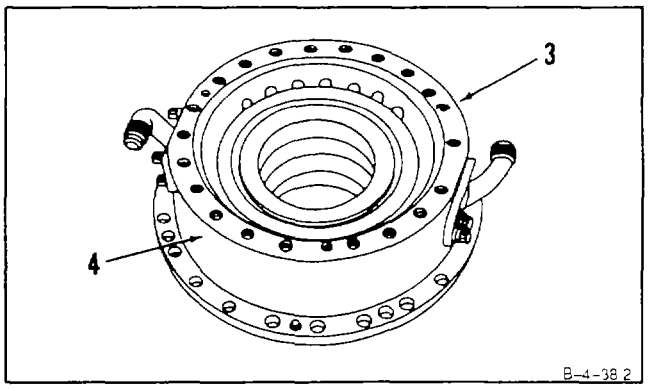


2 Wear goggles Blow dry forward seal retainer (1) and aft seal retainer (2), using clean, dry, compressed air.

3 Clean No. 4 and 5 bearing housing (3) as follows:

CAUTION

Do not allow solvent to get down into bearings. Damage to bearings may result.



a. Using a lint-free cloth (E30) dampened with dry cleaning solvent (El 9), wipe bearing housing external surface (4).

b Wipe dry Use clean, dry, lint-tree cloth (E30).

FOLLOW-ON MAINTENANCE
Inspect No 4 and 5 Bearing Package Seals (Task 4-39)

END OF TASK

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition

Off Engine Task

1. **Inspect No.4 and 5 bearings (1)** as follows:

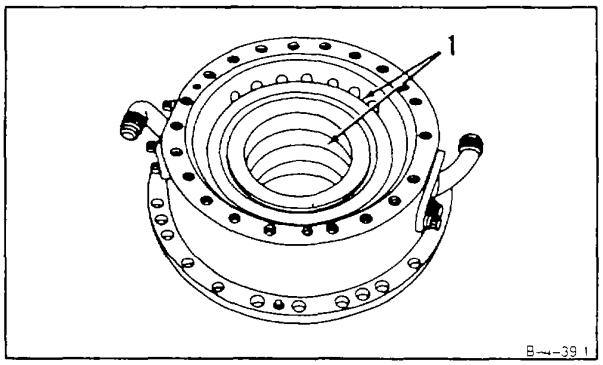
NOTE

Bearings shall remain in bearing housing during inspection.

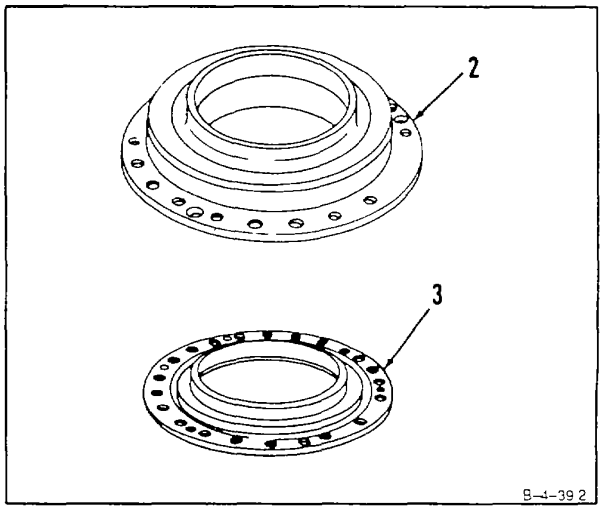
a. There shall be no rust or broken parts.

b. There shall be no foreign matter clogging the bearings which would prevent free rotation.

c. There shall be no purple, red purple, or blue discoloration.



2. **Inspect forward seal retainer (2) and aft seal retainer (3).** There shall be no cracks.



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Locating Bar (T33)
Oil Tube Fixture (T45)
Torque Fixture (Tl9)
Seal Removal Tool Set (T20)
Induction Heater (T21)
Bearing Installing Tool (T22)
Control Unit (T29)
Holding Fixture (T30)
Torque Multiplier (T50)
Bent Wire Gage, 0.104 Inch (Appendix E)
Bent Wire Gage, 0.115 Inch (Appendix E)
Bent Wire Gage, 0.228 Inch (Appendix E)
Bent Wire Gage, 0.290 Inch (Appendix E)
Arbor Press
Heavy Duty Welder's Gloves
Bolt, 1/4 x 28 x 1 Inch (2)
Dial Indicator and Base
Nut, 1/4 x 28 (2)
Reducer, P/N 2-141-121-04
Torque Wrench, 0 to 30 Inch-Pounds
Torque Wrench, 150 to 750 Inch-Pounds
Outside Micrometer Caliper Set
Micrometer Depth Gage

Materials
Anti-Seize Compound (E6)
Gloves (E23)
Lockwire (E32)
Lubricating Oil (E35 or E36)

Parts

Personnel Required:

Equipment Condition
Gasket
Locking Cup
Screws
Seals

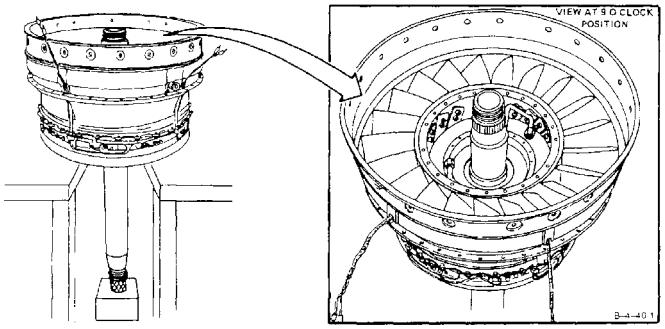
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References
TM 1-2840-252-23P
Task 3-6 Task 3-7 Task 4-33

General Safety Instructions

WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may Irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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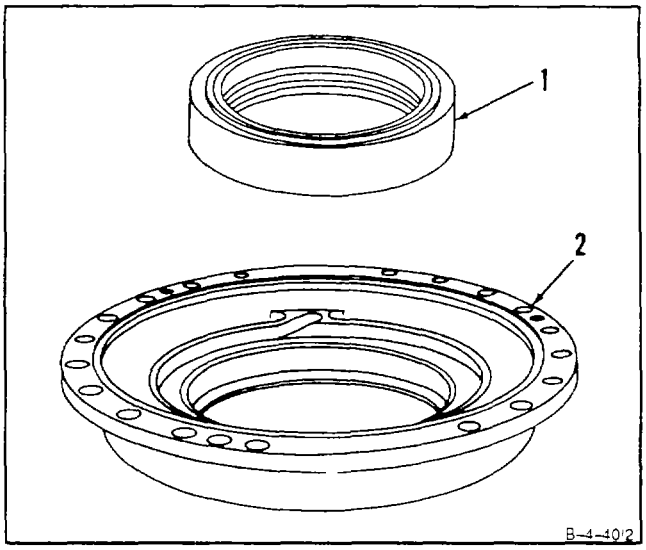
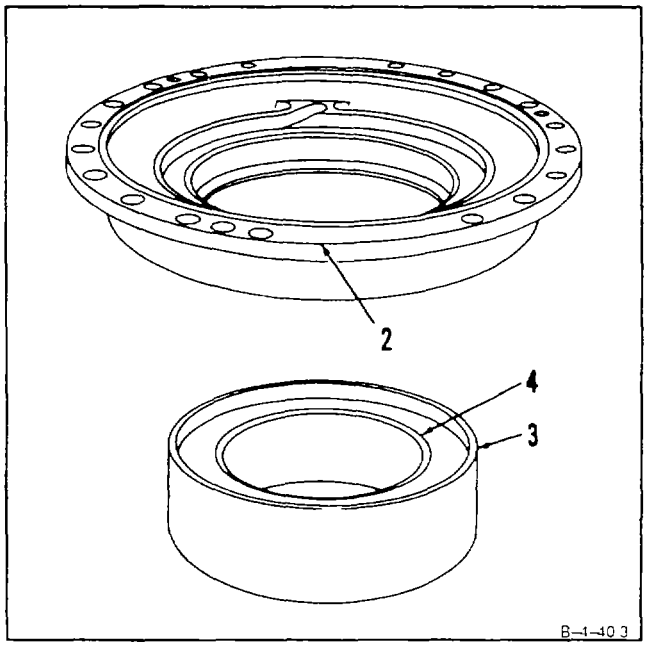
1 **Install forward seal (1) into forward seal retainer** (2) as follows:



a. Position base (3) of seal removal tool (T20) on arbor press with recess (4) facing up.

b. Position forward seal retainer (2) on base (3).



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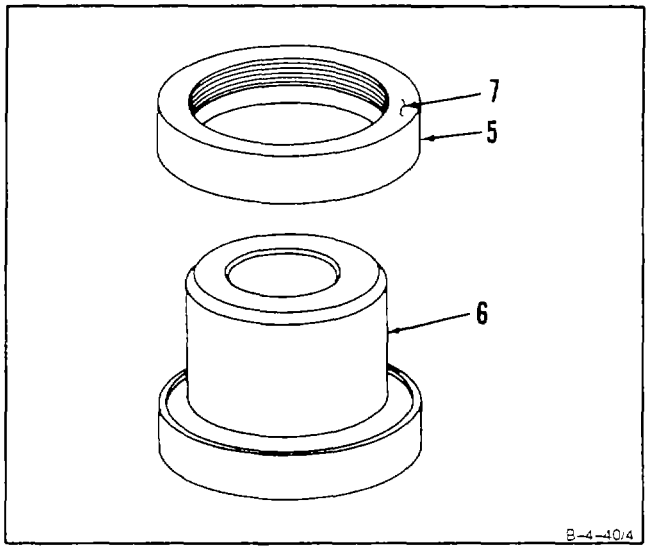
CAUTION

Care shall be taken when handling and installing seal. Carbon elements in seal could easily break. This will cause oil leakage and damage to engine.

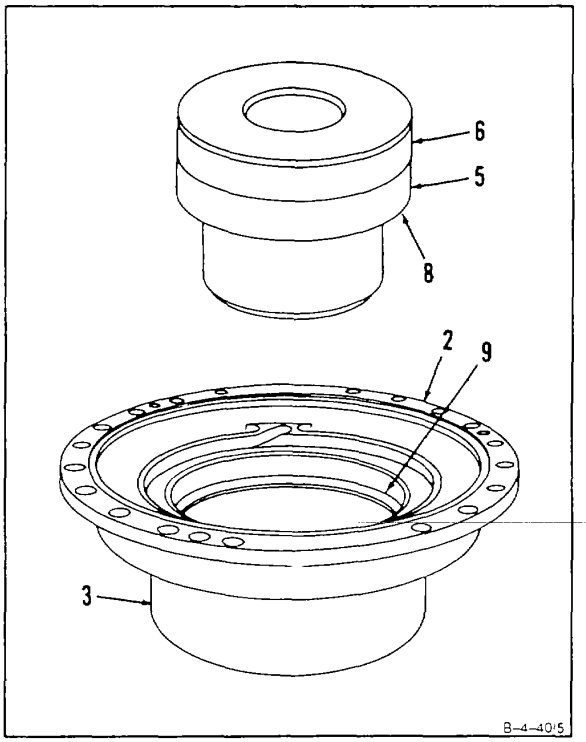
c. **Install seal (5)** carefully on adapter (6) of seal removal tool (T20) with flat side (7) facing up



d. Install adapter (6) and seal (5) through forward seal retainer (2) and into base (3)

e. Press seal (5) into forward seal retainer (2) until seal face (8) touches shoulder (9) Use arbor press

t. Remove adapter (6) and base (3)



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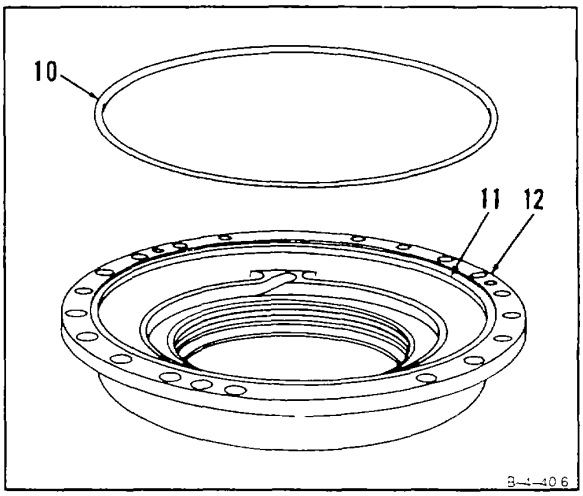
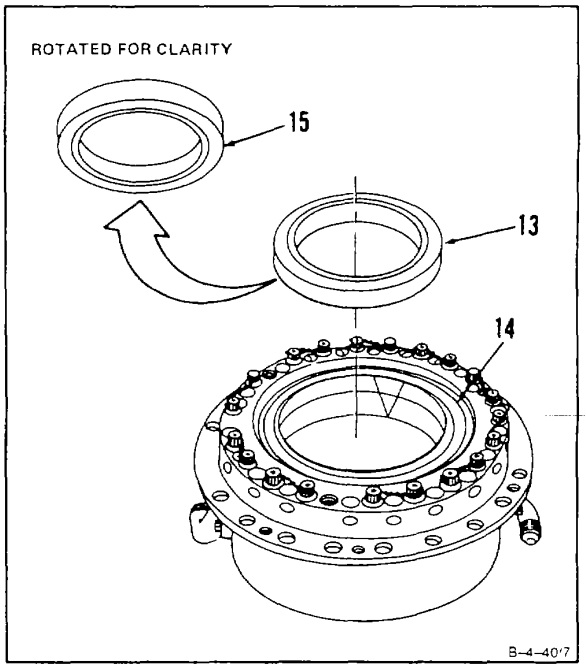
2. **Install gasket (10)** in groove(11) on forward seal and retainer (12)

CAUTION

Be sure to align apex marks on bearing inner races. If apex marks are not aligned, bearing will bind This would cause engine damage.

3. **Install faceplate (13)** on bearing (14) with beveled side (15) facing down





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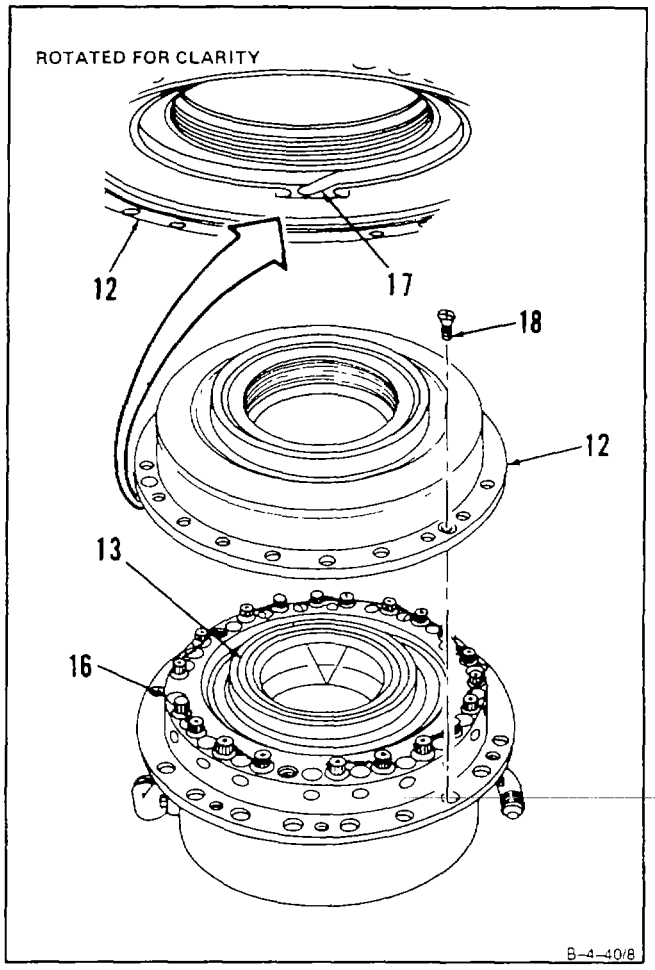
4. Align oil drain hole (16) with oil drain slot (17) on forward seal and retainer (12)

CAUTION

Be sure to apply a light coat of lubricating oil on faceplate before installation Failure to comply will cause damage to forward seal and retainer during dry running period of initial engine starts.

5. Wear gloves (E24) Apply a light coat of lubricating oil (E35 or E36) on faceplate (13) **Install forward seal and retainer (12)**and three screws (18)



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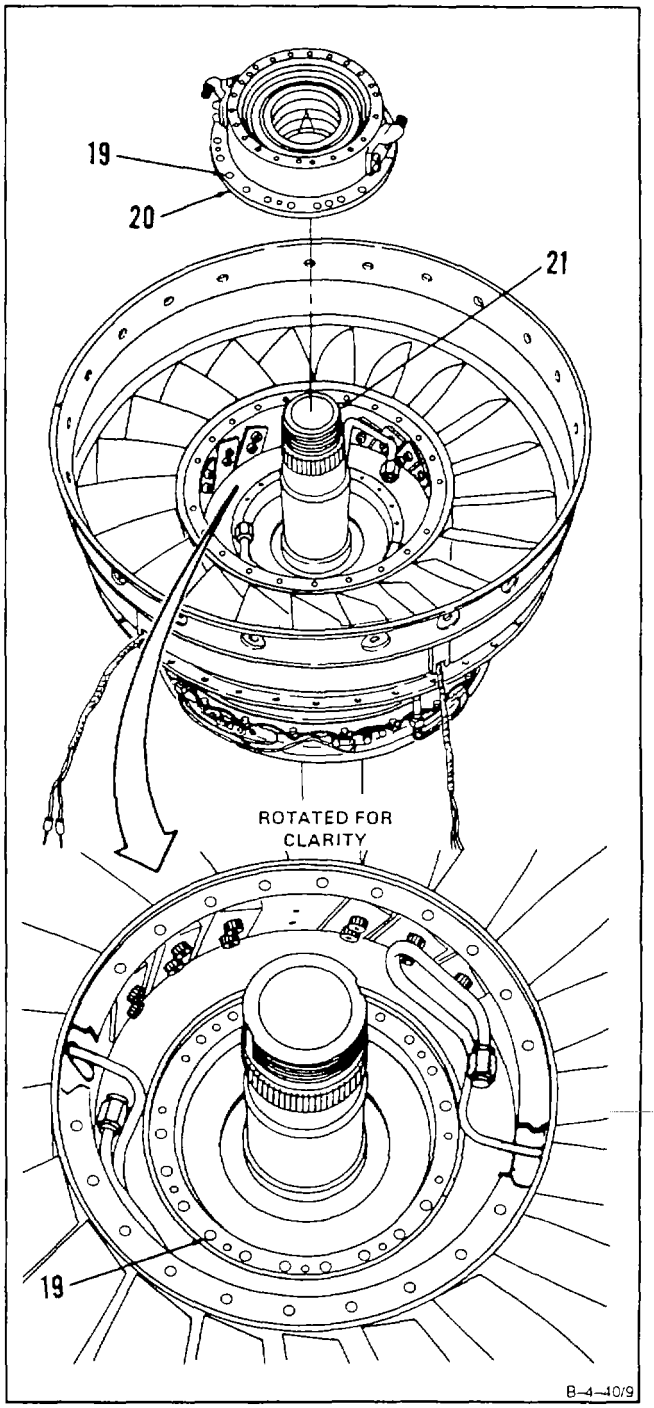
CAUTION

In following step 6, be sure to install bearing package carefully and straight on shaft Failure to comply could cause breakage of carbon elements This would cause oil leakage and engine damage.

6. Align bolt holes (19) and position **No 4 and 5 bearing package (20) on shaft (21).**



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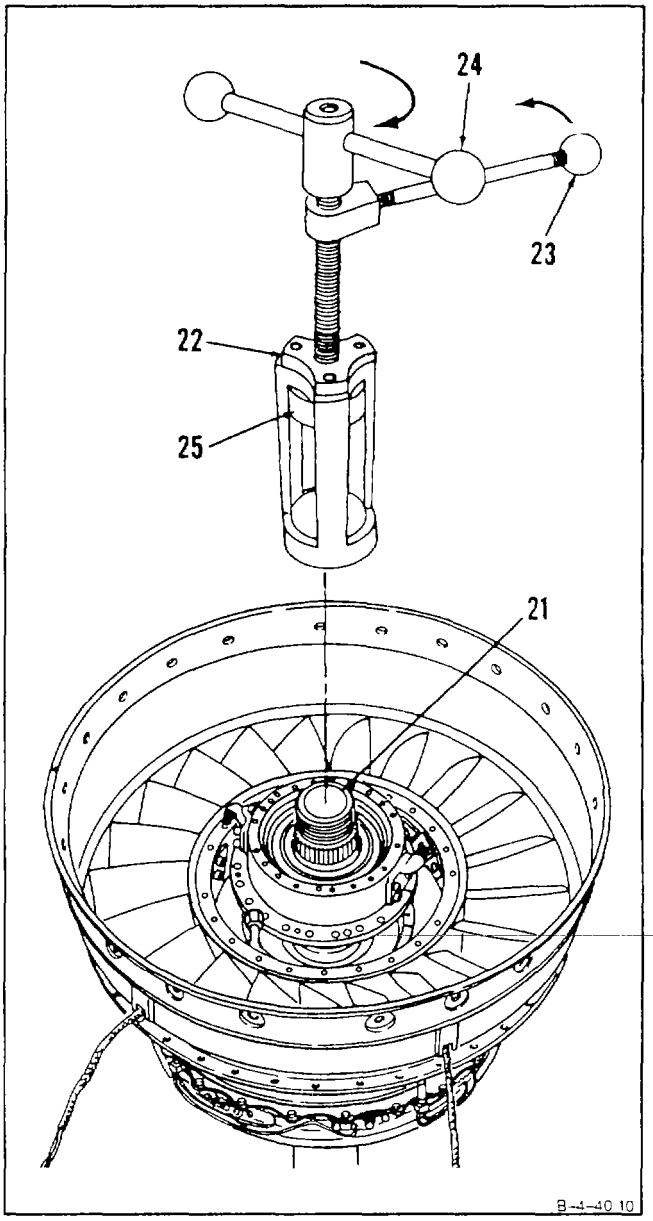
7. Install bearing installing tool (T22) (22) as follows

a. Turn handle (23) counterclockwise until it is backed out all the way

b. Install nut (25) on shaft (21) Turn T-handle (24) clockwise until nut (25) istight



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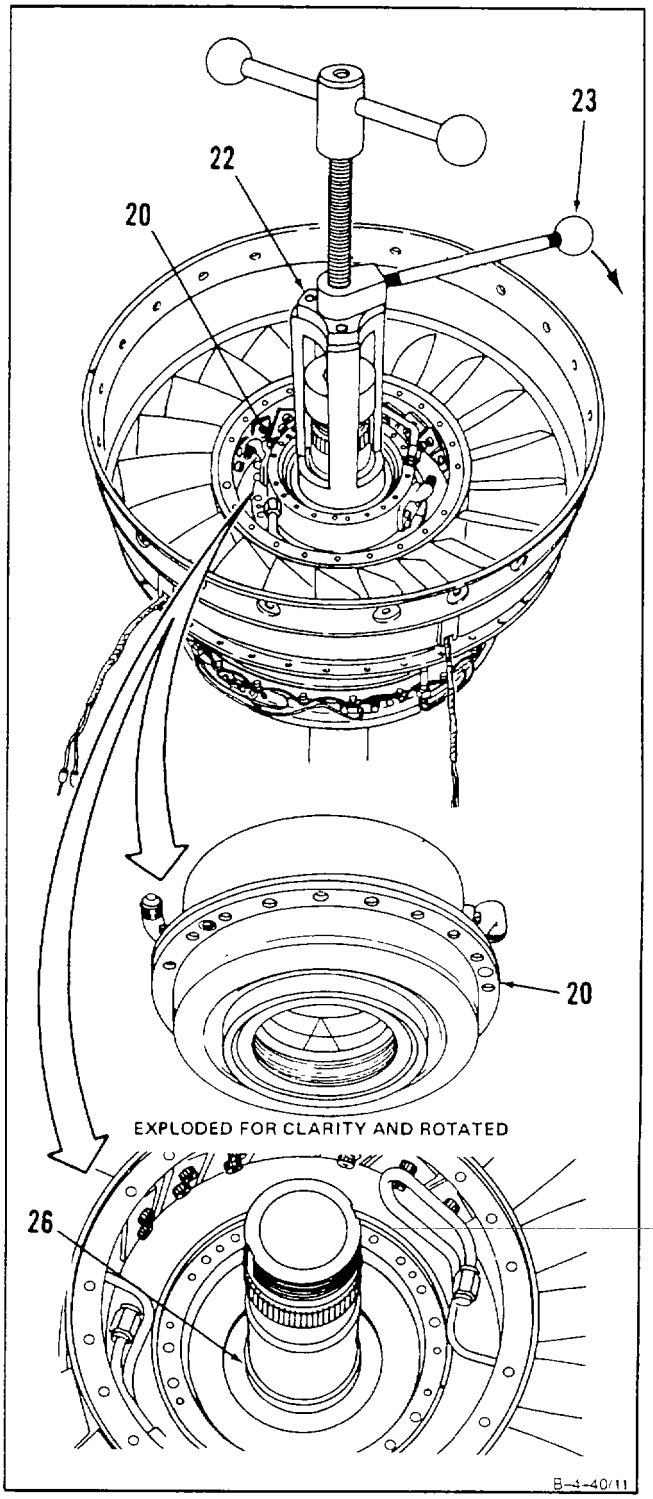
8. Seat No 4 and 5 bearing package (20) onto third turbine rotor shoulder (26) by turning handle (23) clockwise Remove bearing package installing tool (T22) (22).



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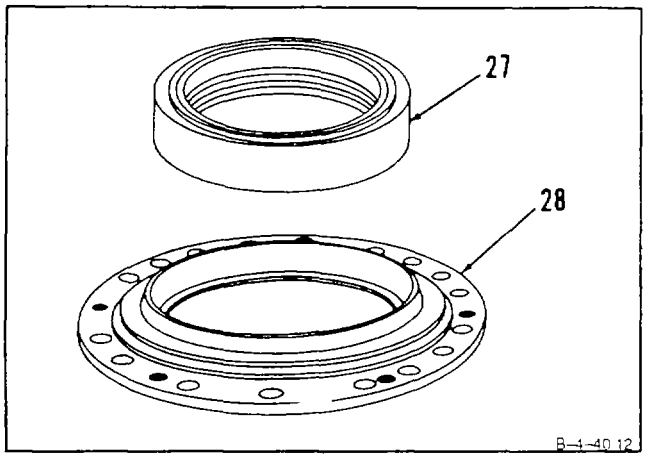
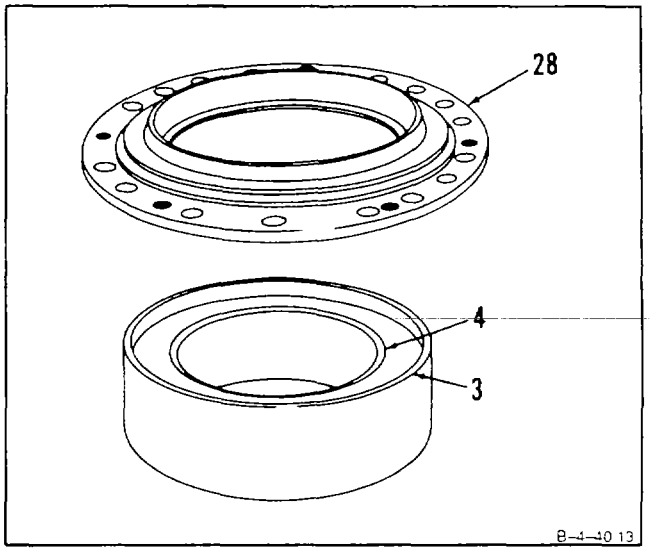
9. **Install aft seal (27) into aft seal retainer (28)** as follows

   a. Position base (3) of seal removal tool (T20) on arbor press with recess (4) facing up

   b. Position aft seal retainer (28) on base (3)





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CAUTION

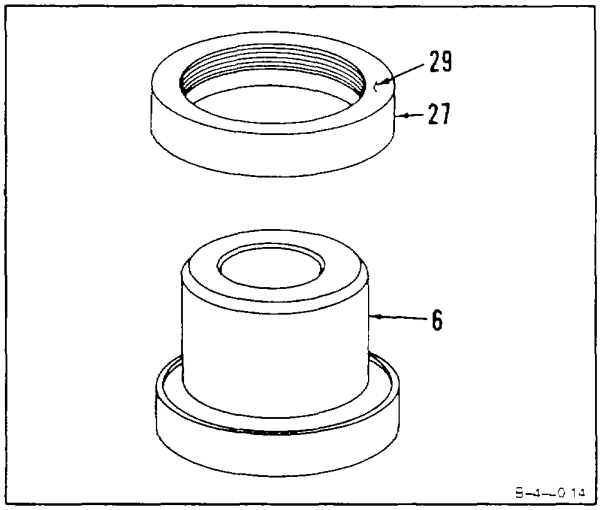
Be careful when handling and installing seal Carbon elements in seal could easily break This will cause oil leakage and damage to engine.

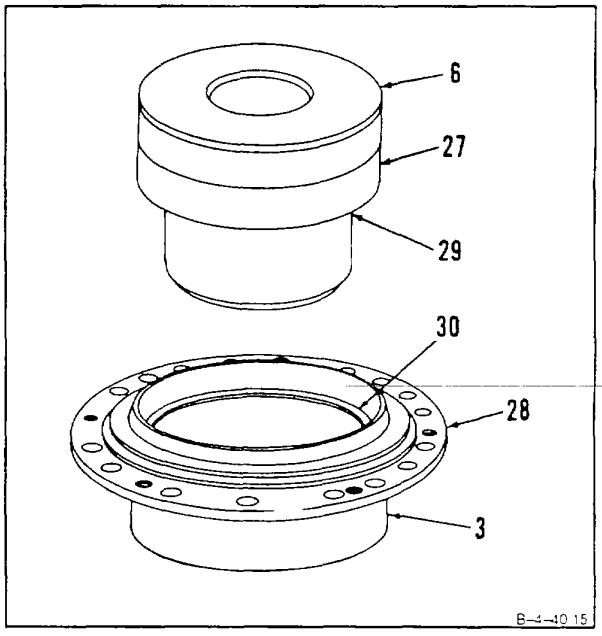
c. **Install seal (27)**carefully on adapter (6) of seal removal tool (T20) with seal face (flat side) (29) facing up

d. Install adapter (6) and seal (27) through aft seal retainer (28) and into base (3)

e. Press seal (27) into aft seal retainer (28) until seal face (29) touches shoulder (30) Use arbor press

f. Remove adapter (6) and base (3)





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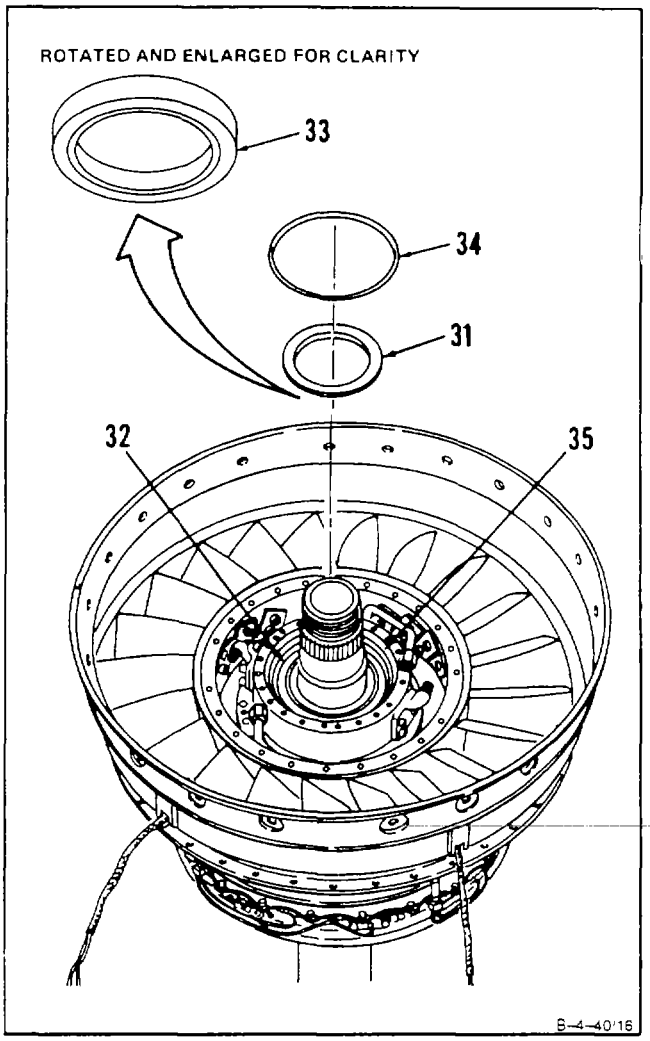
10. **Install faceplate**(31) on bearing (32) with beveled side (33) facing down

CAUTION

Seal must be dipped in lubricating oil before installation. Failure to comply will cause damage to seal during dry running period of Initial engine starts.

11. Wear gloves (E23) Dip serviceable seal (34) in lubricating oil (E35 or E36) **Install seal** (34) **in** groove (35)



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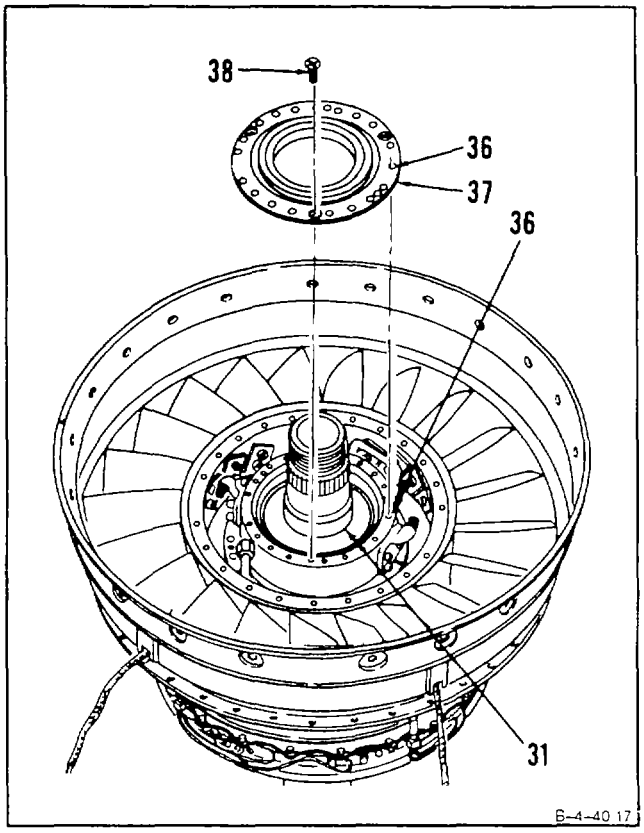
CAUTION

Be sure to apply a light coat of lubricating oil on faceplate before installation. Failure to comply will cause damage to aft seal and retainer during dry running period of initial engine starts.

12. Wear gloves (E24) Apply a light coat of lubricating oil (E35 or E36) on faceplate (31) Align bolt hole (36) and **install aft seal and retainer (37)** and three screws (38)



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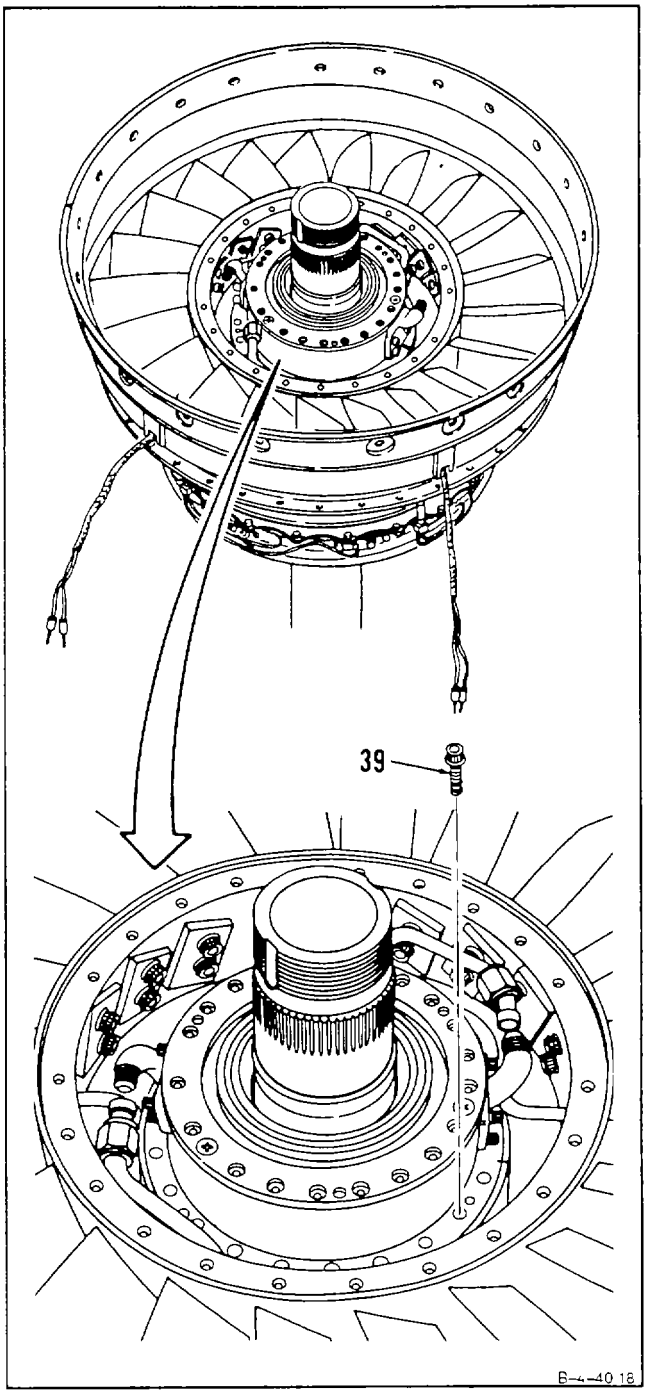
13. Apply anti-seize compound (E6) to 19 bolts (39) **Install 19 bolts (39).**

14. **Lockwire bolts (39).** Use lockwire (E32)



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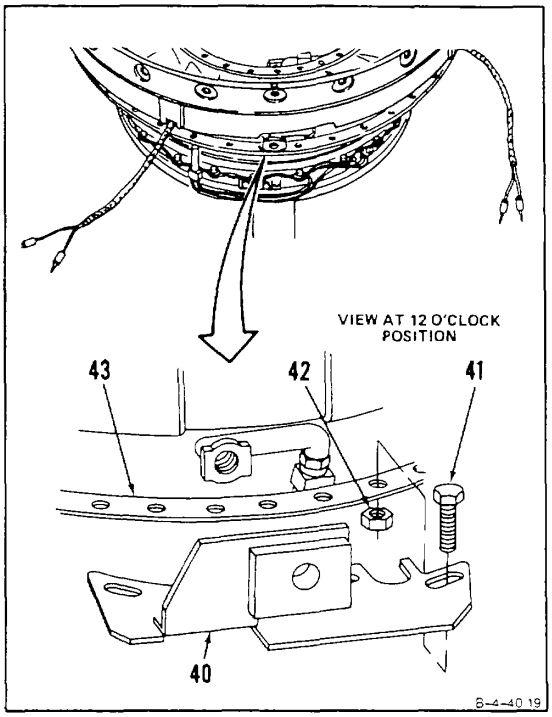
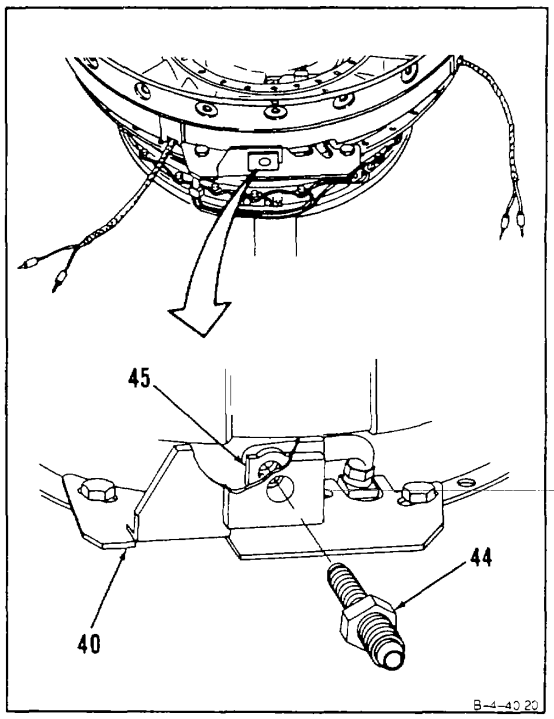
15. **Install oil tube fixture (T45) (40),** two 1/4 x 28 bolts (41), and 1/4 x 28 nuts (42) on nozzle flange (43) at the 12-o'clock position

16. **Thread reducer (44) Into oil pressure tube adapter (45)** until adapter (45) is firmly seated in oil tube fixture (T45) (40)





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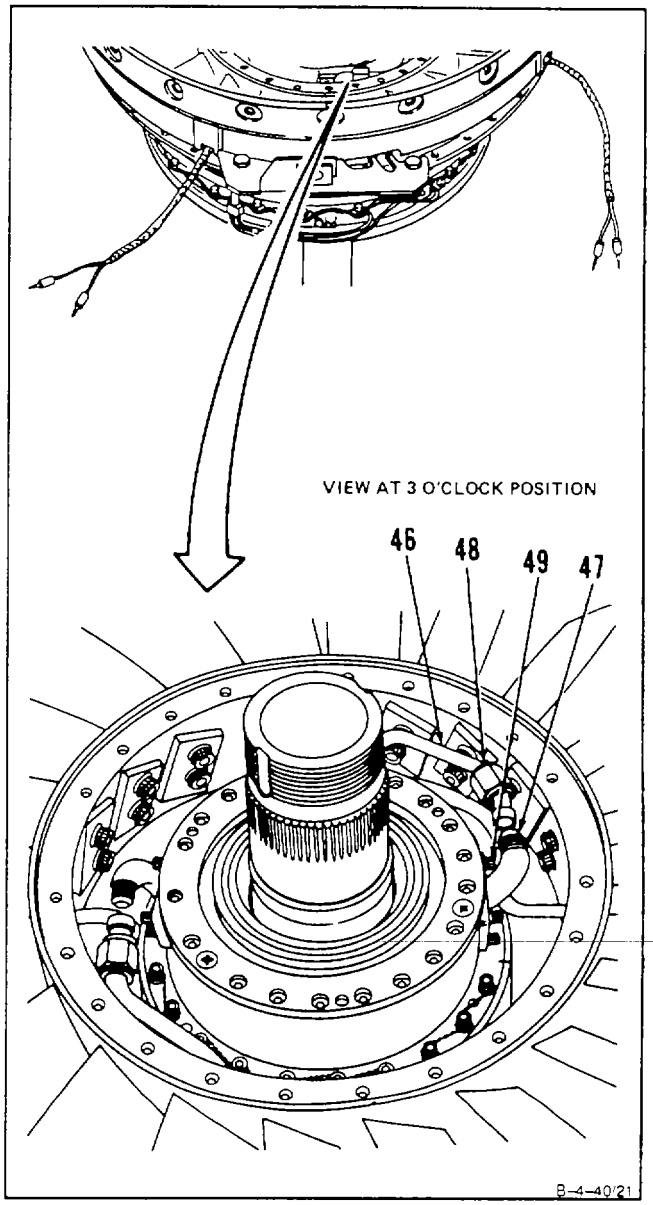
17. **Connect tube (46)** to adapter (47) **Torque nut (48) to 190 inch-pounds** Lockwire nut (48) to bolt (49) Use lockwire (E32)



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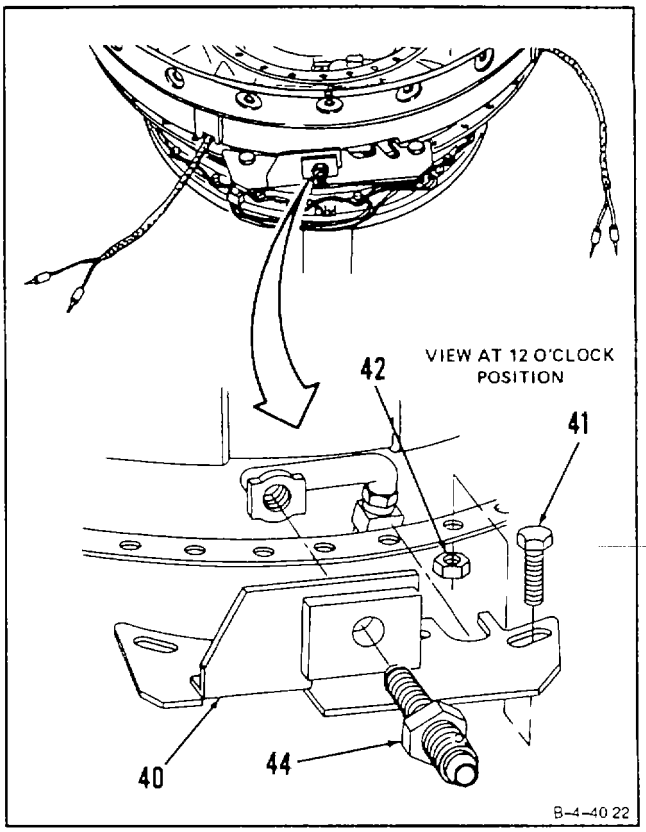
18. Remove reducer (44), two nuts (42), bolts (41), and oiltube fixture (T45) (40)



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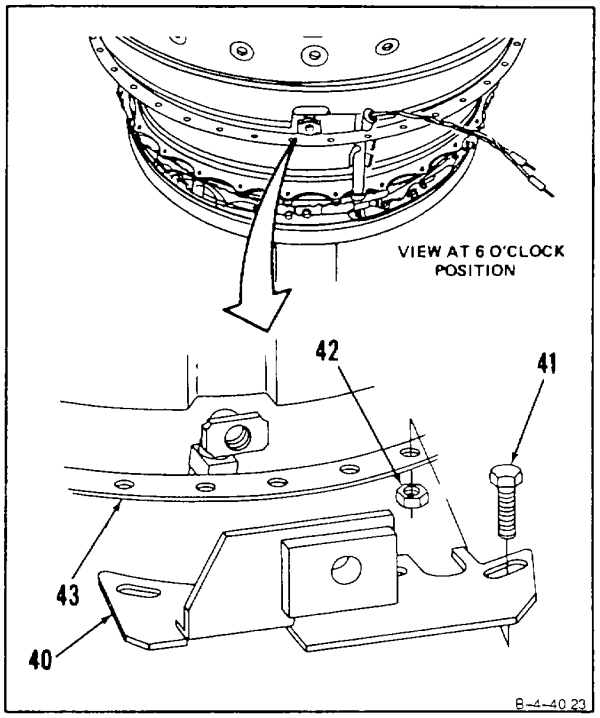
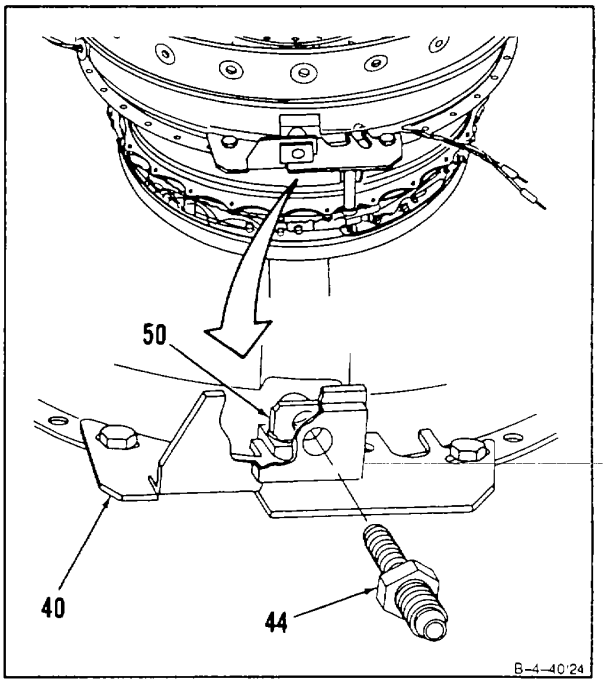
19. **Install oil tube fixture (T45) (40),** two 1/4 x 28 bolts (41), and 1/4 x 28 nuts (42) on nozzle flange (43) at the 6-o'clock position.

20. **Thread reducer (44) into oil scavenge tube adapter (50)** until adapter (50) **is** firmly seated in oil tube fixture (T45) (40).





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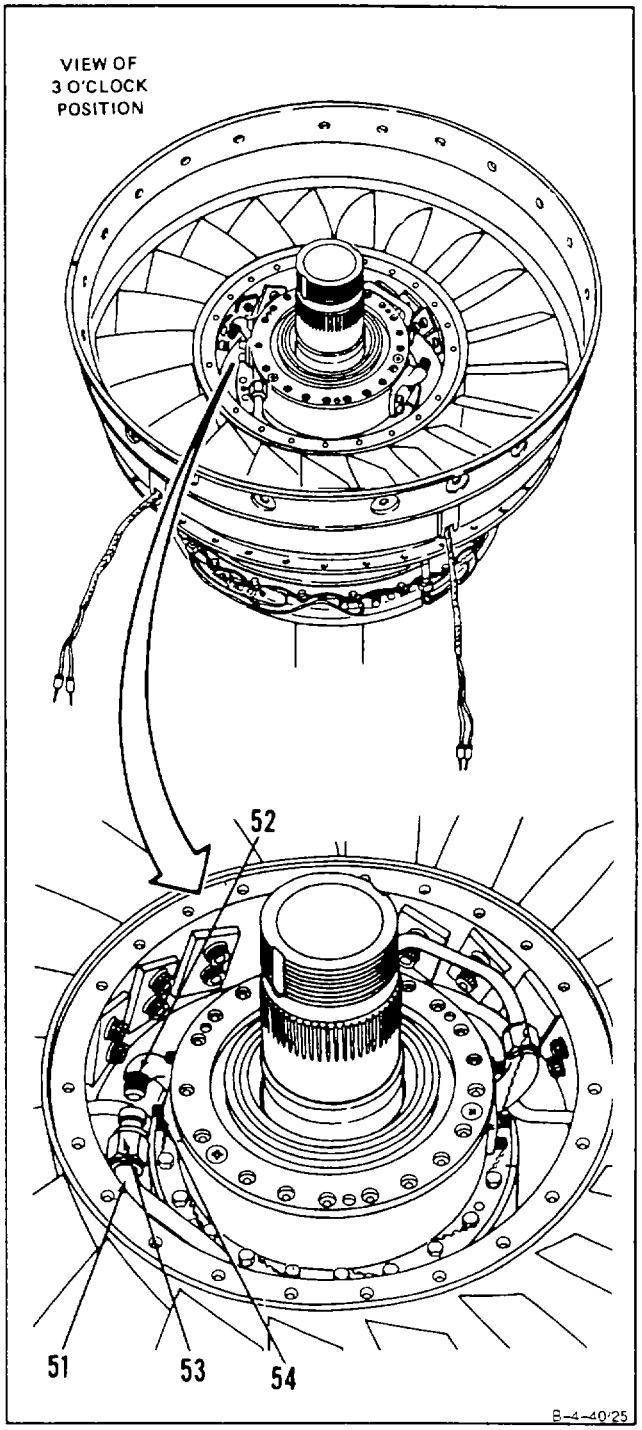
21. **Connect tube assembly (51)** to adapter (52) **Torque nut (53) to 190 Inch-pounds** Lockwire nut (53) to bolt (54) Use lockwire (E32)



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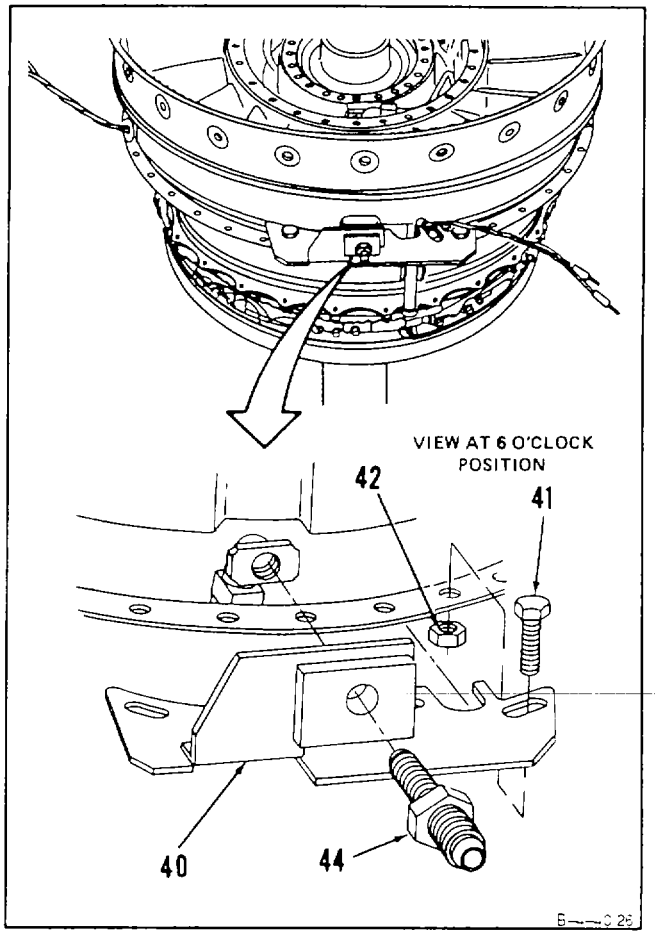
22. Remove reducer (44) two nuts (42), bolts (41) and oil tube fixture (T45) (40)



INSPECT

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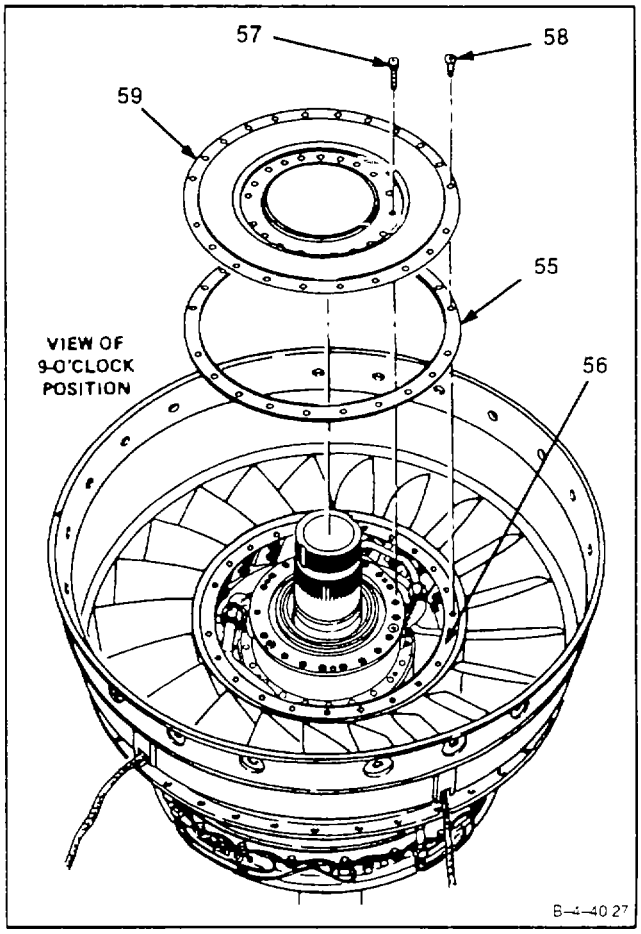
23. If removed, install shim (55) on inner bolt circle on aft face of fourth turbine nozzle assembly (56)

CAUTION

In following step, be sure to use 22 new screws. Used screws could break and cause damage to engine

24. Coat 20 bolts (57) and 22 screws (58) with antiseize compound (E6)

25. **Install heat shield (59),** 22 screws (58) and 20 bolts (57) Torque screws (58) to 23 inch-pounds, then torque bolts (57) to 83 inch-pounds Lockwire screws (58) and bolts (57) Use lockwire (E32)



INSPECT

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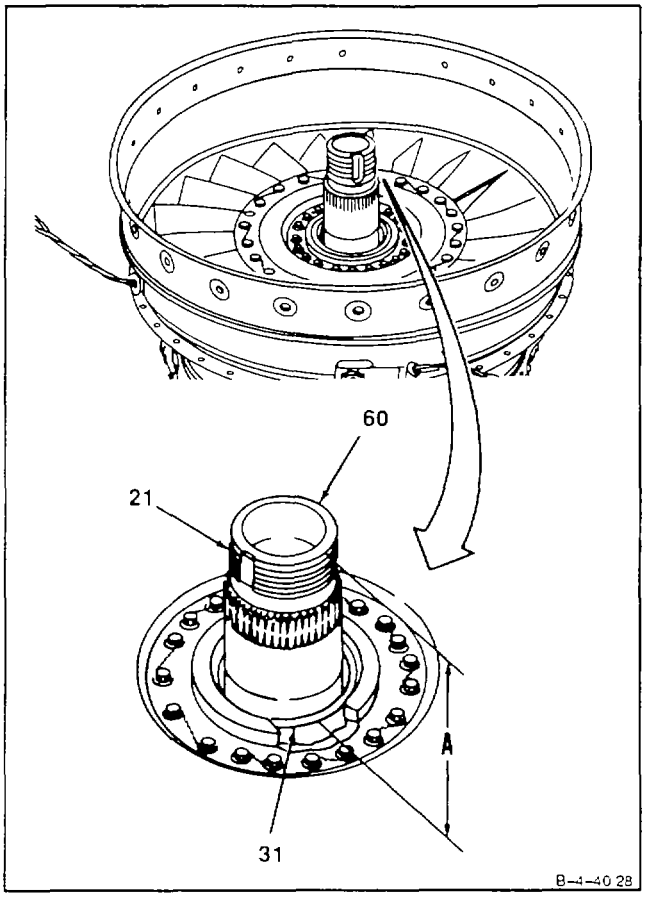
26. **Determine how much of shaft (21) should protrude from fourth stage power turbine rotor** after fourth turbine rotor is installed

    a. **Measure from end (60) of shaft (21) to aft face of faceplate (31).** Record as Dimension A.



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b. Place fourth stage power turbine rotor (61) with hub on locating bar (T33) (62) **Measure from aft face of hub (63) to locating bar (T33) (62).** Record as Dimension B

c. If ring spacer (64) was not removed, subtract Dimension B from Dimension A The answer is how much of shaft should protrude from fourth stage power turbine rotor Record for later use

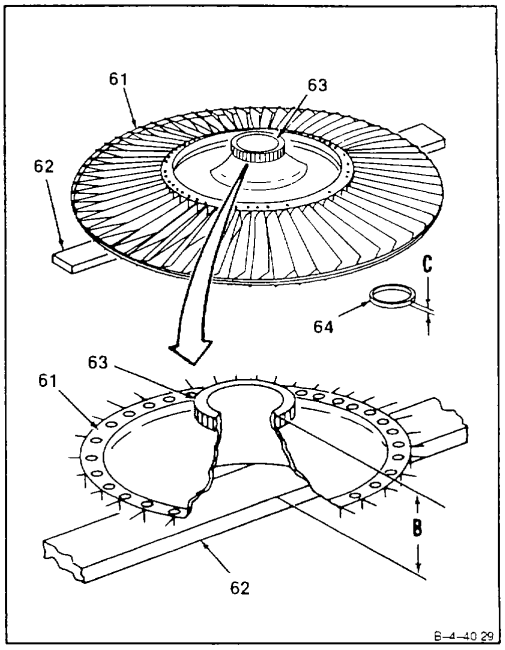
NOTE
If ring spacer was not removed, go to step 28

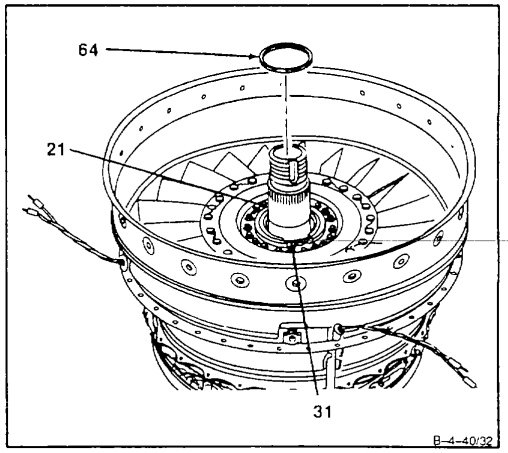
d. **If ring spacer (64) was removed** (Ref Task 4-33), **measure thickness of it** Record as Dimension C

e. **Add Dimension C to Dimension B.** Record answer as Dimension D

f. **Subtract Dimension D from Dimension A.** The answer is how much of shaft should protrude from fourth stage power turbine rotor Record answer for later use

27. If removed, install ring spacer (64) on shaft (21) and against faceplate (31)





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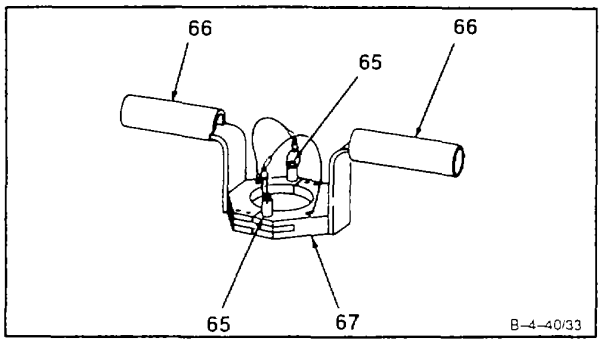
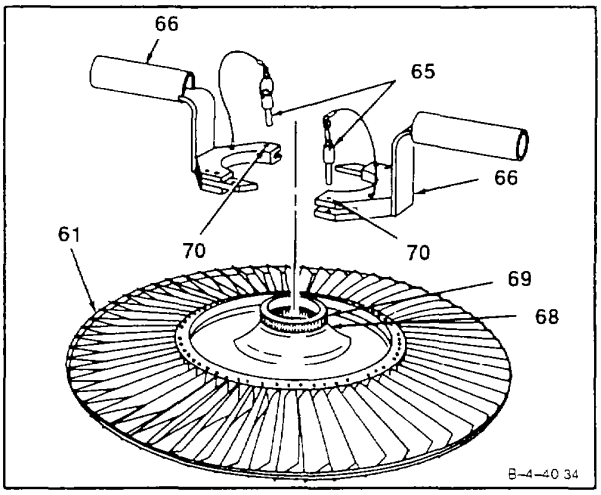
28. **Install holding fixture** (T30) on fourth stage power turbine rotor as follows

    a. Remove two pins (65) and **separate halves (66) of holding fixture (T30) (67)**

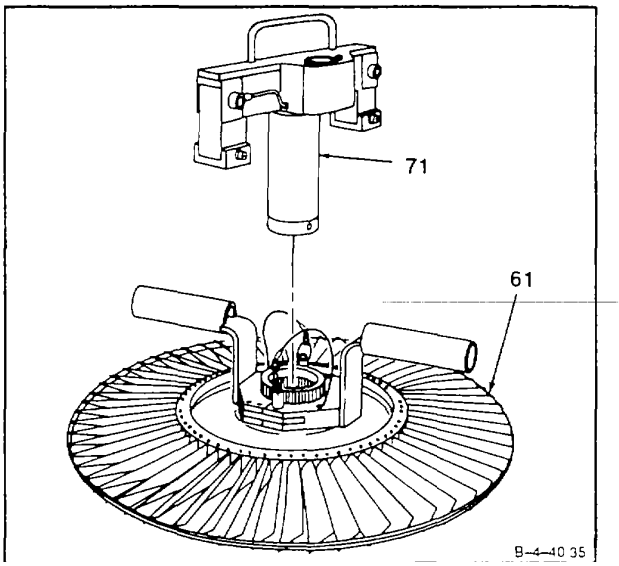


    b. Install halves (66) of holding fixture (T30) on hub (68) of **fourth stage power turbine rotor (61)** just under splines (69)

    c. Install two pins (65) in holes (70)



29. **Install Induction heater (T21) (71)** on fourth stage power turbine rotor (61)



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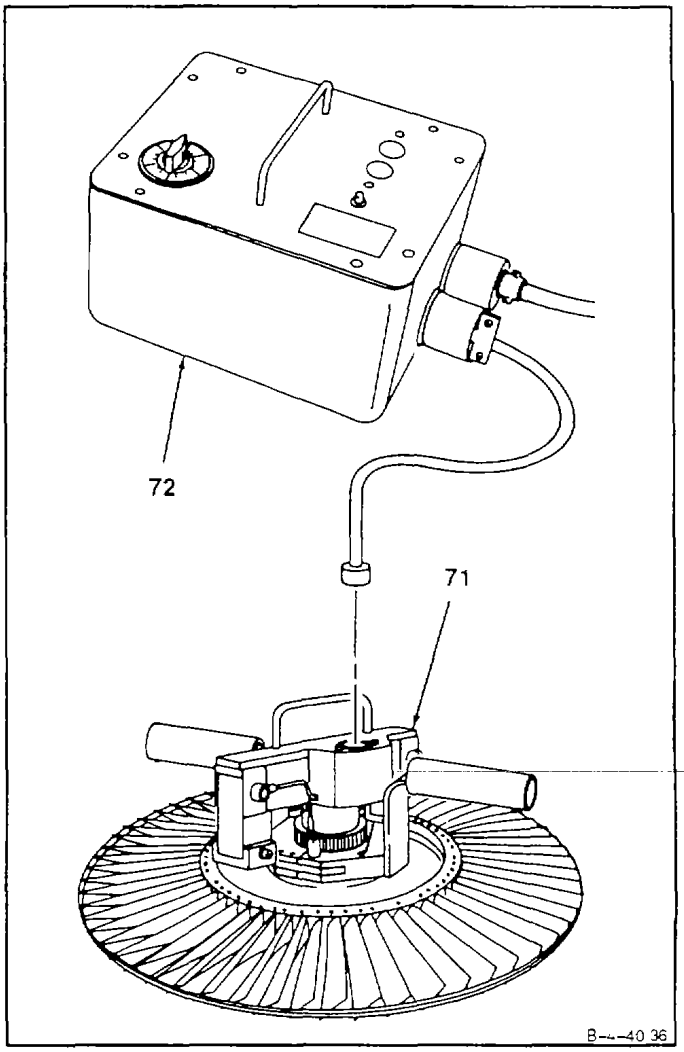
30. **Connect control unit (T29) (72)** to induction heater (T50) (71)



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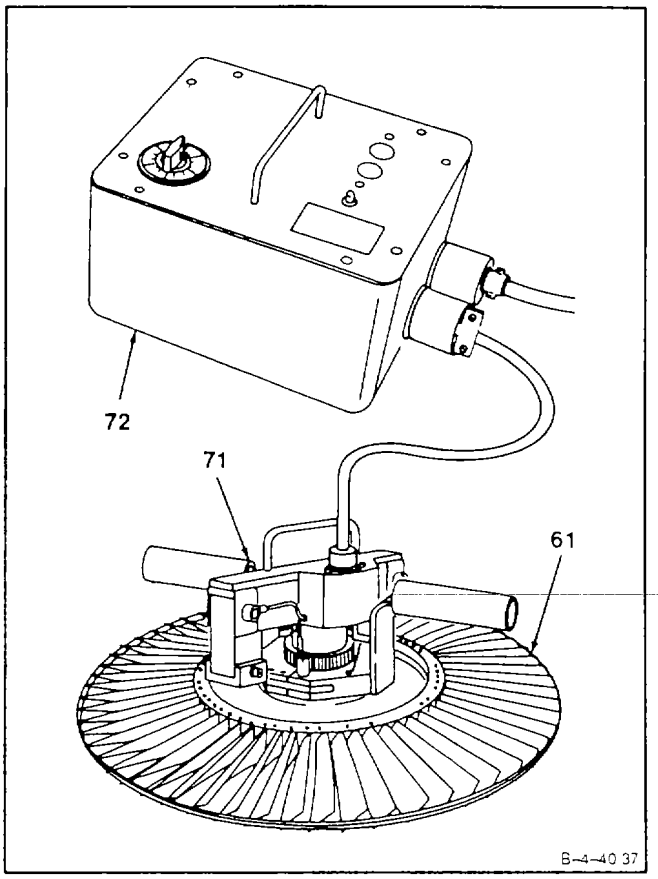
31. Using induction heater (71) and control unit (72), **heat fourth stage power turbine rotor (61) for nine minutes.**



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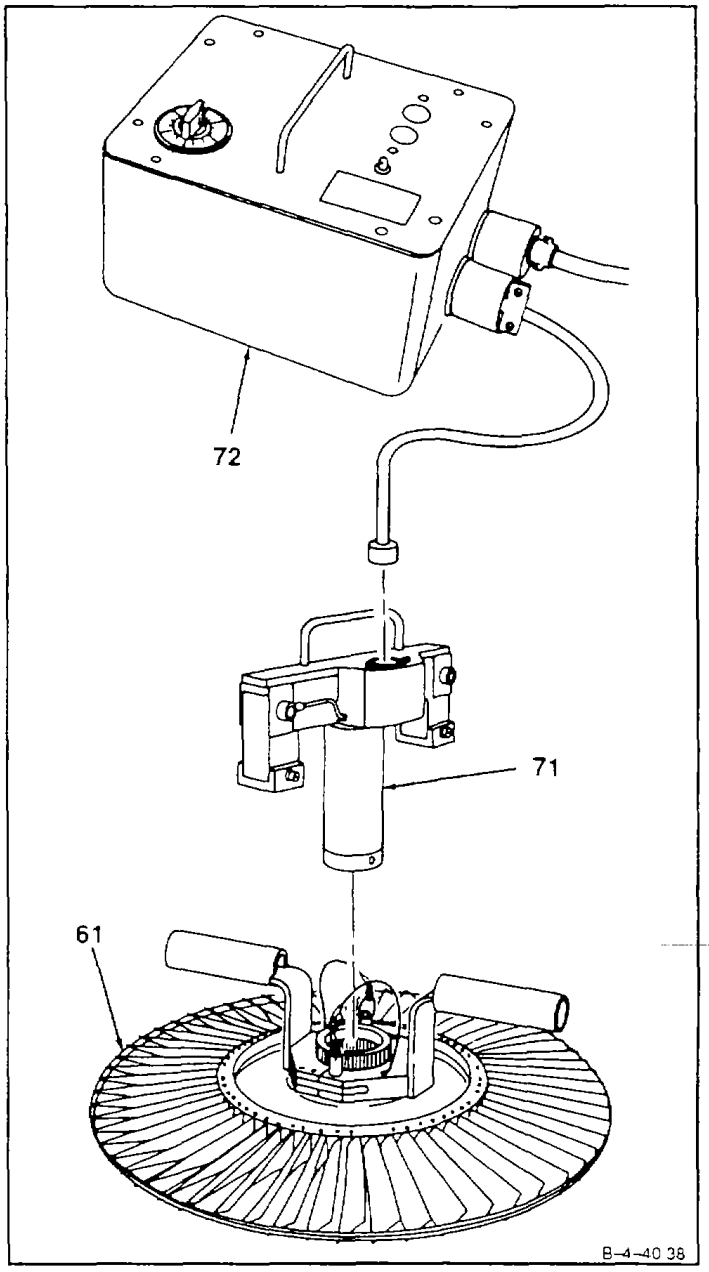
WARNING

Wear heavy duty welders gloves when handling heated fourth stage turbine rotor Failure to comply may cause burns. Get medical attention for burns

32. Disconnect control unit (72), and **remove induction heater (71)**from fourth stage power turbine rotor (61)



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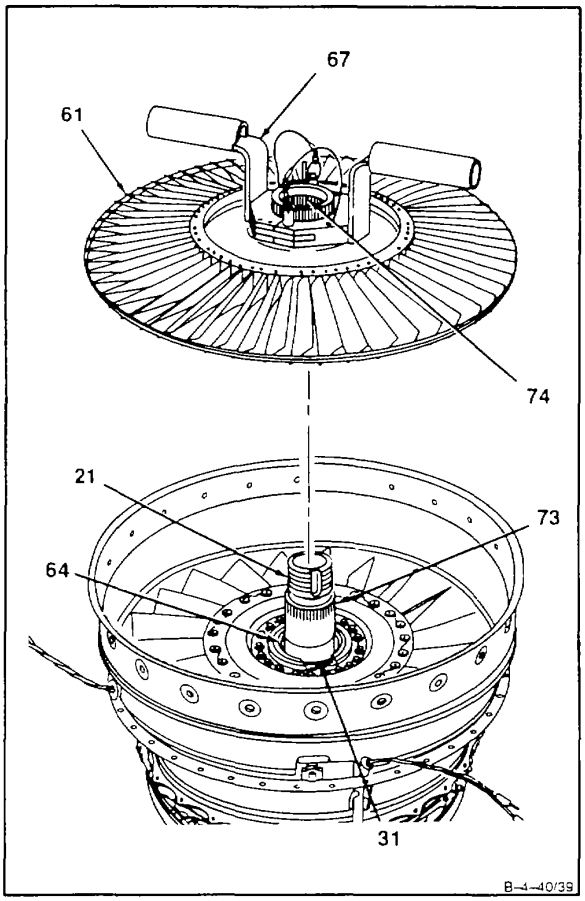
3**3. Align matchmarks on fourth stage power turbine** rotor (61) with matchmarks on shaft (21)

34. Use holding fixture (T30) (67) Align splines (73 and 74) **Install fourth stage power turbine rotor (61)** on shaft (21) until bottomed out against faceplate (31) or, **it** installed, ring spacer (64)



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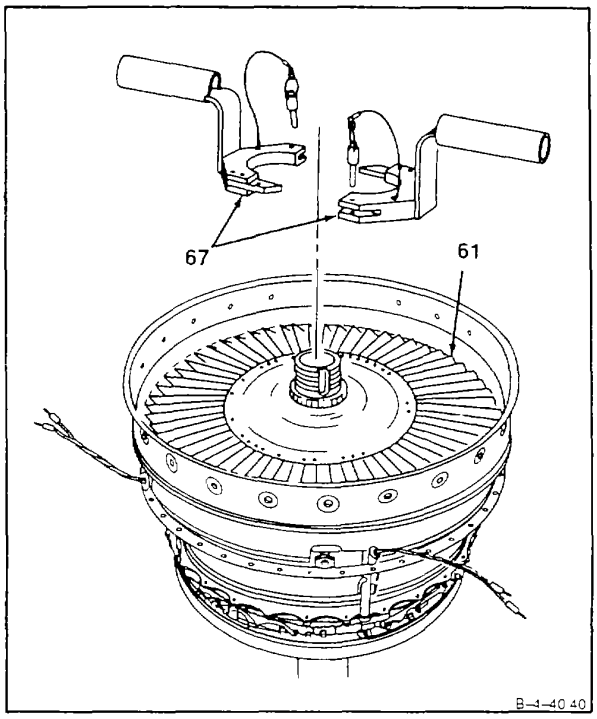
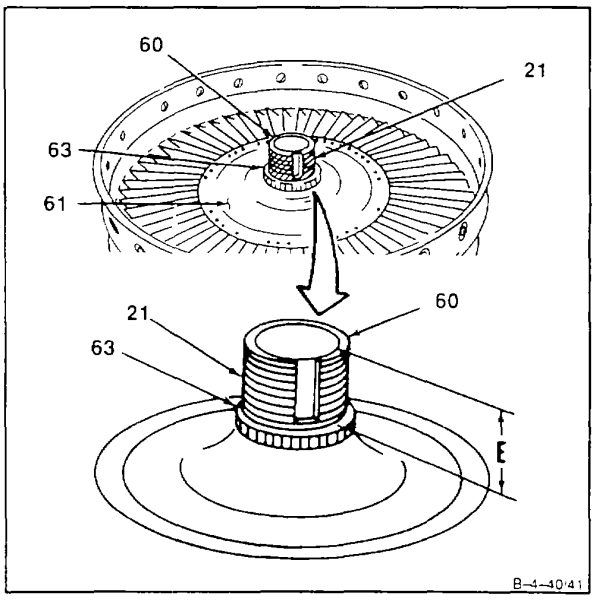
35. Remove holding fixture (67), and **allow fourth stage power turbine rotor (61) to cool** to room temperature



36. **Measure length of shaft (21) protruding out through fourth stage power turbine rotor (61).** Measure from end (60) of shaft (21) to aft face of hub (63) on fourth stage power turbine rotor (61) Record as Dimension E

37. **Compare Dimension E with dimension recorded in step 25 c or f.** Dimensions shall be no more than 0.005 inch apart



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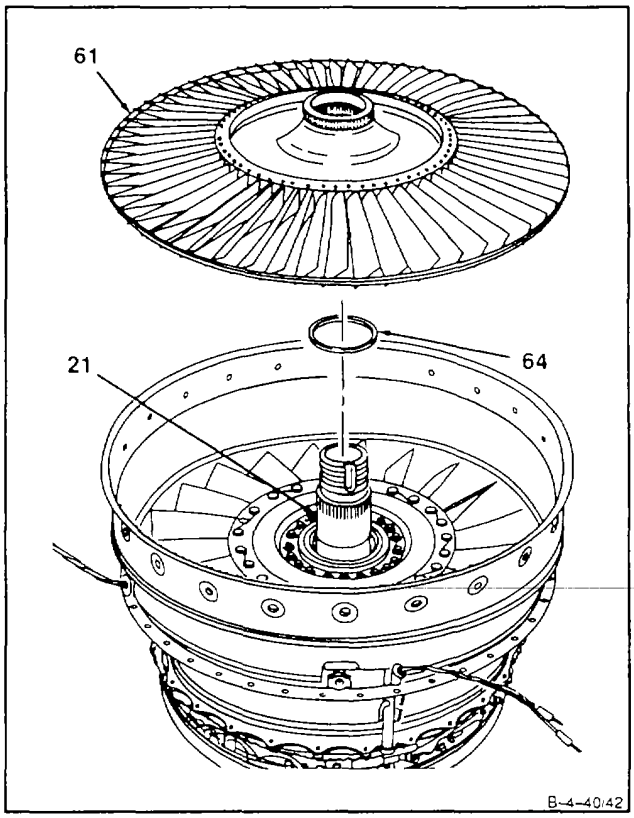
NOTE

If calculated length and measured length are not within limits, do steps 38 thru 41 If calculated length and measured length are within limits, omit steps 38 through 41

38. **Remove fourth stage power turbine rotor (61)** (Ref Task 4-33, steps 4 thru 8)

39. **Inspect shaft**(21), **fourth stage power turbine rotor (61) and, if installed, spacer (64)** Check for contaminants or damage that caused rotor (61) to hang up If hang up exists, remove contaminants or replace power turbine assembly



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40. Using bearing package installing tool (T22) (22), re-seat third power turbine shaft (75) and No 4 and 5 bearing package (20)

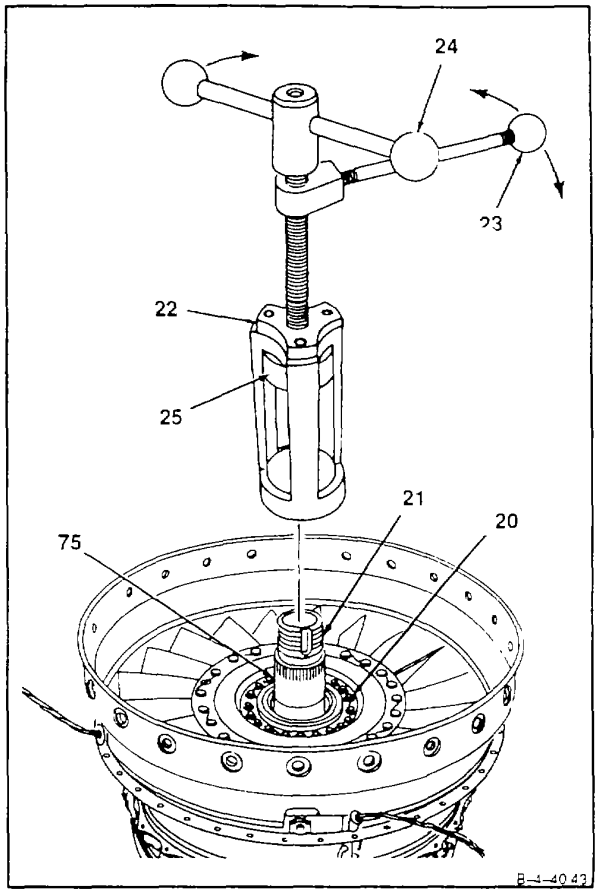
    a. Turn handle (23) counterclockwise all the way Install nut (25) on shaft (21) Tighten nut (25) on shaft (21), turning T-handle (24) clockwise

    b. Turn handle (23) clockwise to seat bearing package (20) fully into position on third turbine rotor shoulder Remove bearing package installing tool (T22) (22)

NOTE

Be sure ring spacer does not stick to removal tool

41. **Install fourth stage power turbine rotor (61)** (Ref steps 26 thru 37)



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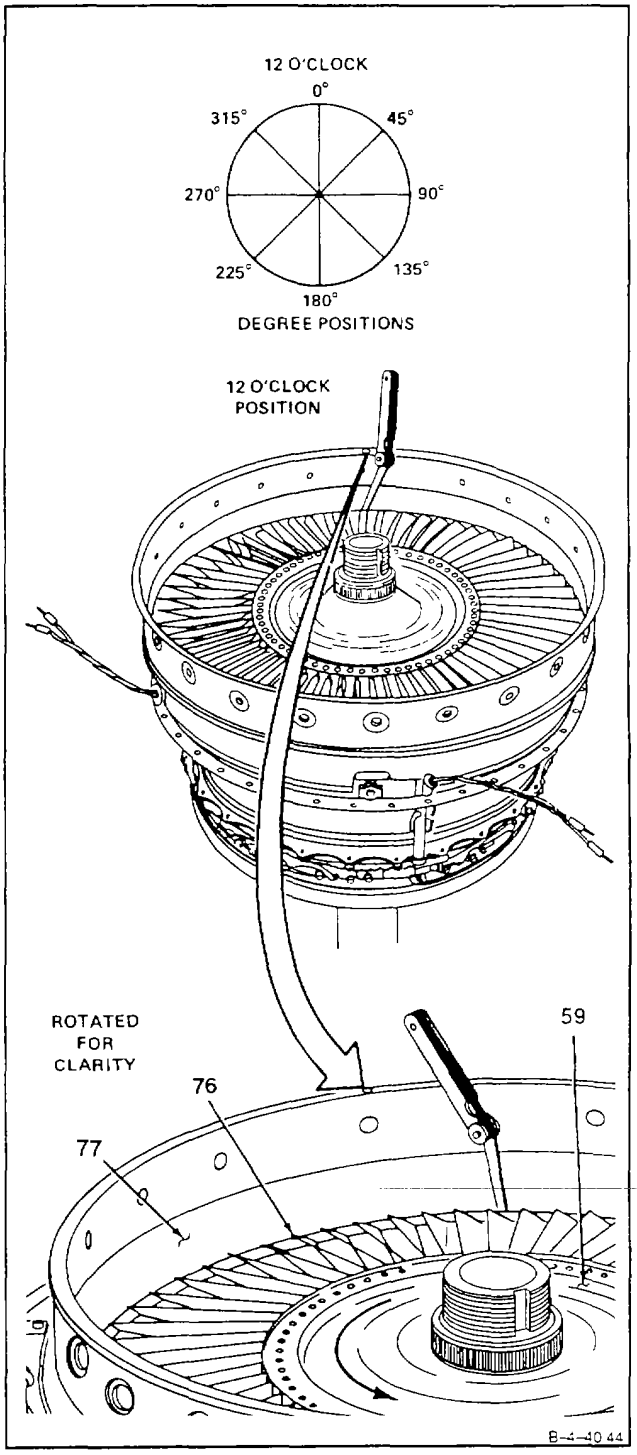
42. **Measure** clearance between tips of blades (76) and fourth stage power turbine nozzle (77) **(tip clearance)** at 0, 45, 90, 135, 180, 225, 270, and 315-degree positions as follows

    a. Insert thickness gage between fourth stage power turbine nozzle (77) and blade (76) tip Rotate fourth stage turbine rotor (61) counter-clockwise one revolution for each check

    b. Tip clearance shall be 0.020 inch minimum



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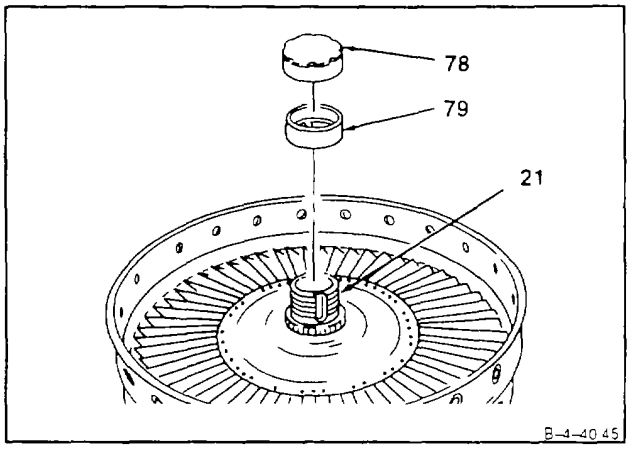
NOTE

If tip clearance is not within limits, replace power turbine assembly.

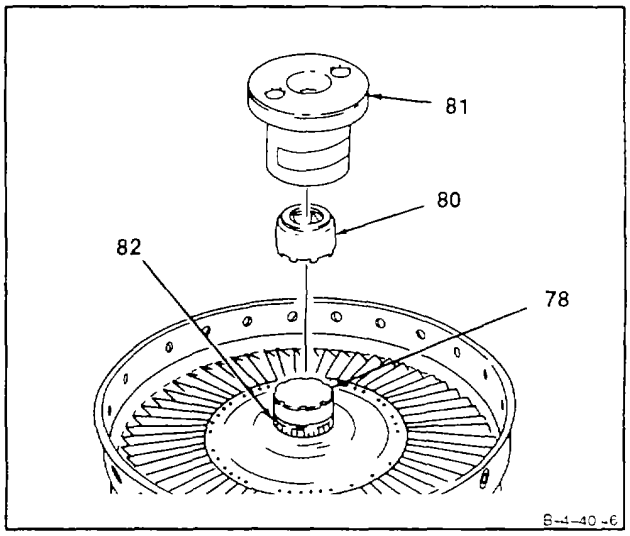
43. Coat threads of nut (78) with anti-seize compound (E6) **Install locking cup (79) and nut (78)** on shaft (21)



44. **Install torque fixture (T19)** consisting of wrench (80) and holding fixture (81) as follows

    a. Position wrench (80) on nut (78)

    b. Position holding fixture (81) on spine (82)



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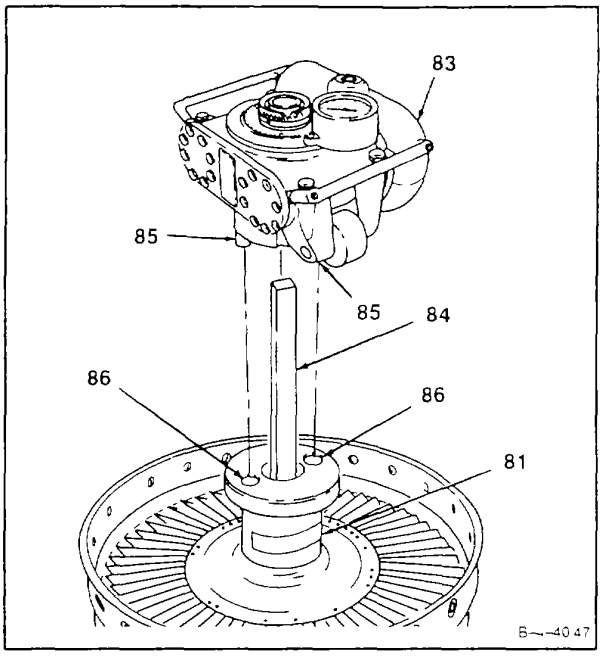
5. Using helper, **Install torque multiplier (T50) (83)** as follows

   a. Install drive bar (84) and position torque multiplier (T63) (83) over drive bar (84)

   b. Align two pins (85) with holes (86) in holding fixture (81) Place torque multiplier (T50) (83) on holding fixture (81)



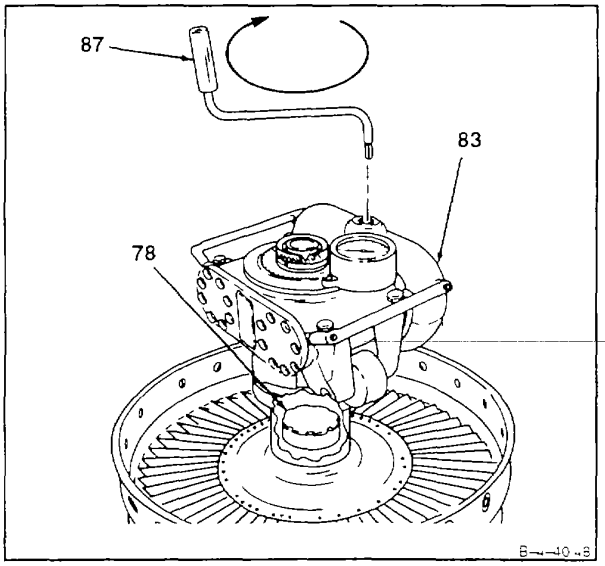
WARNING

Make sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque Rotating ratchet selector with load on torque pack can damage unit and injury personnel If injury occurs, get medical attention.

WARNING

Do not change ratchet selector when torque load is on torque pack Damage to equipment or injury to personnel can result. If injury occurs, get medical attention.

46. **Install handle (87)** in torque multiplier (T50) (83) Turn handle clockwise to torque nut (78) **Torque nut (78) to 475 foot-pounds.**



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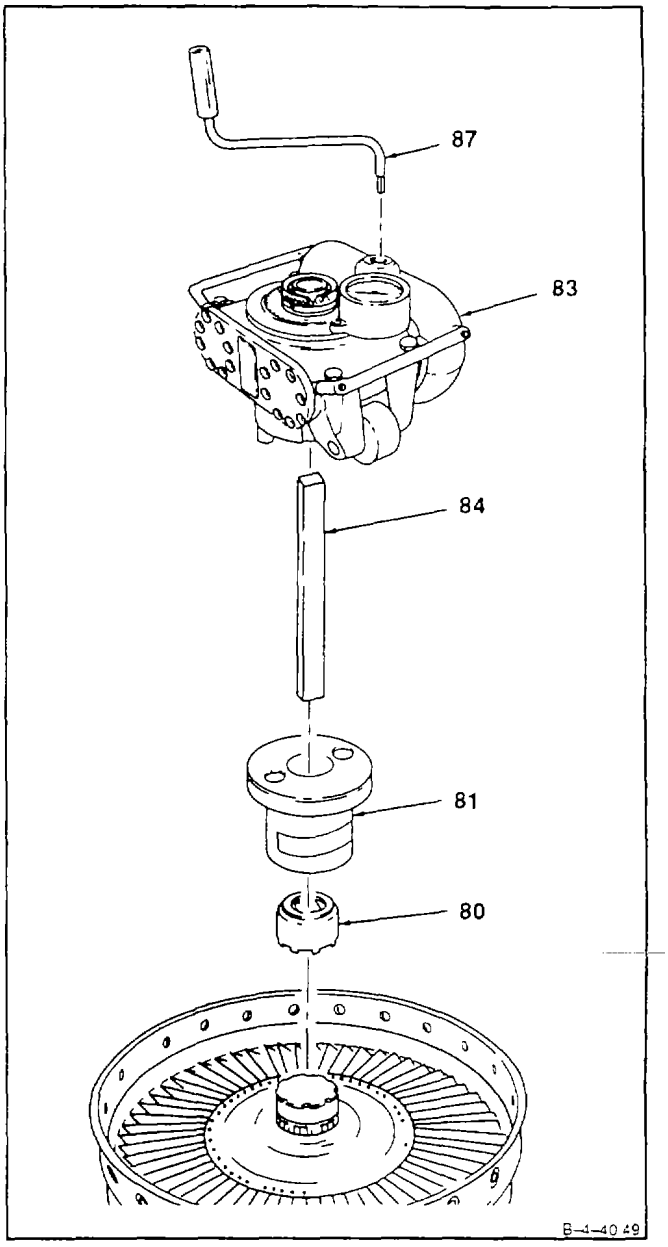
47. Remove handle (87), torque multiplier (T50) (83), drive bar (84), and torque fixture (T19), consisting of wrench (80) and holding fixture (81)



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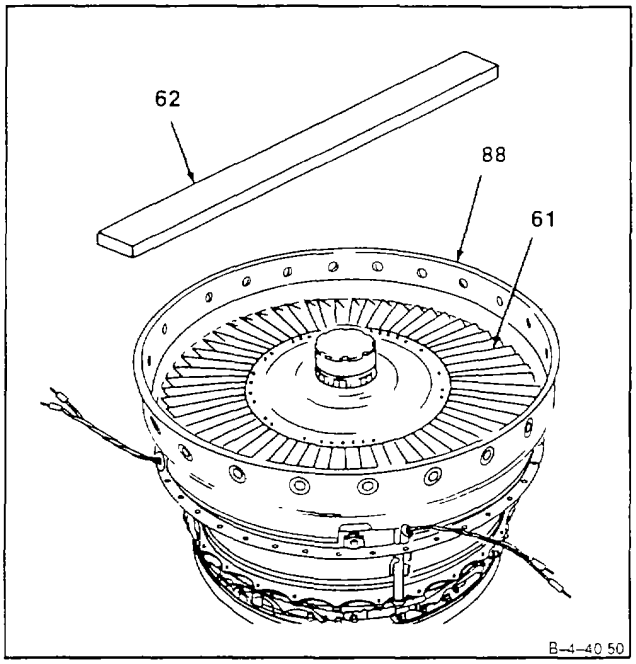
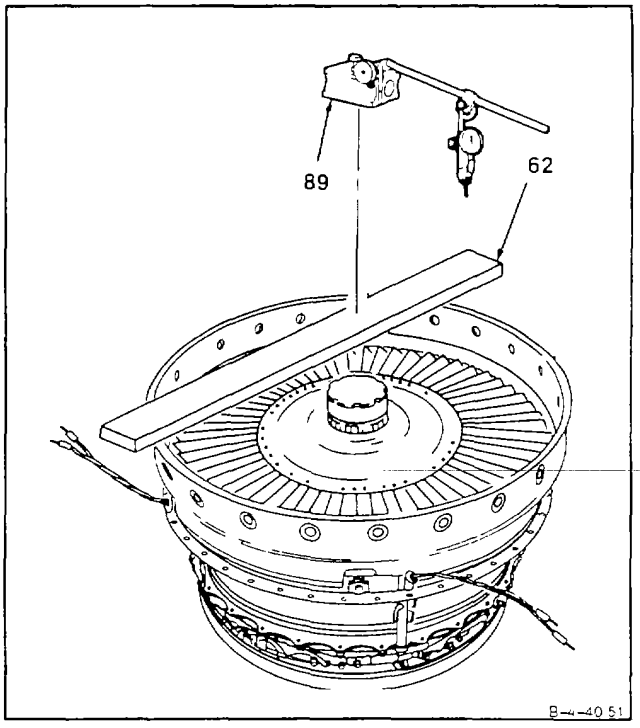
48. **Check runout of fourth stage power turbine rotor (61)**

a. Place locating bar (T33) (62) on aft surface of fourth stage power turbine nozzle (88)



b. Place dial indicator magnetic base (89) on locating bar (T33) (62)



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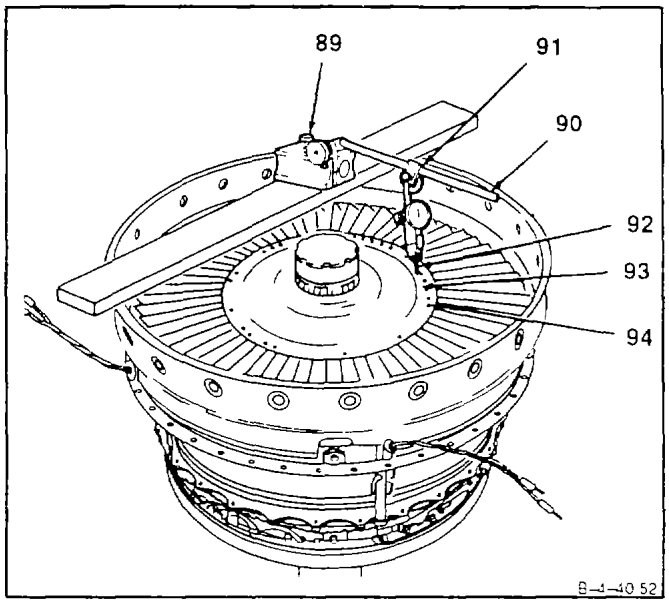
c. Adjust arm (90) at base (89) and clamp (91) Position pointer (92) on surface (93), lust inside of blade retaining pins (94)



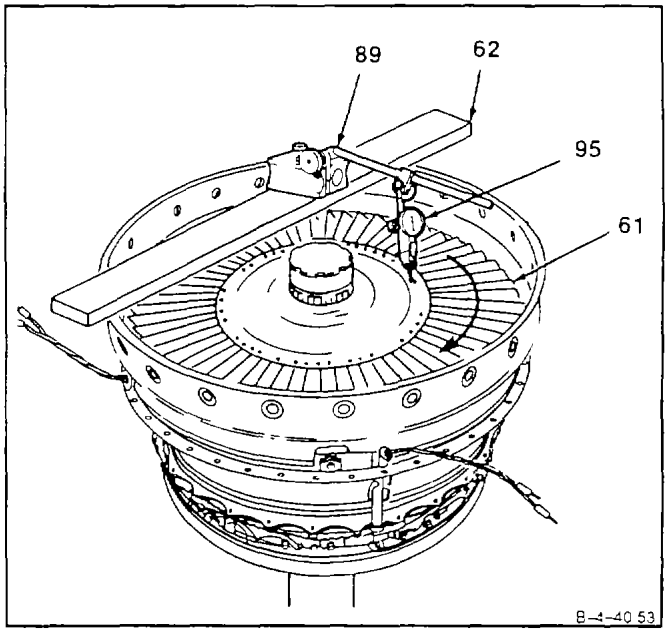
d. Zero indicator (95) Rotate fourth stage power turbine rotor (61) clockwise while noting indicator reading

e. Runout shall be no more than 0.003 inch

NOTE

If runout is not within limits, do steps 38 thru 48. If runout is still not within limits, replace power turbine assembly.

f. Remove dial indicator (89) and locating bar (T33) (62)



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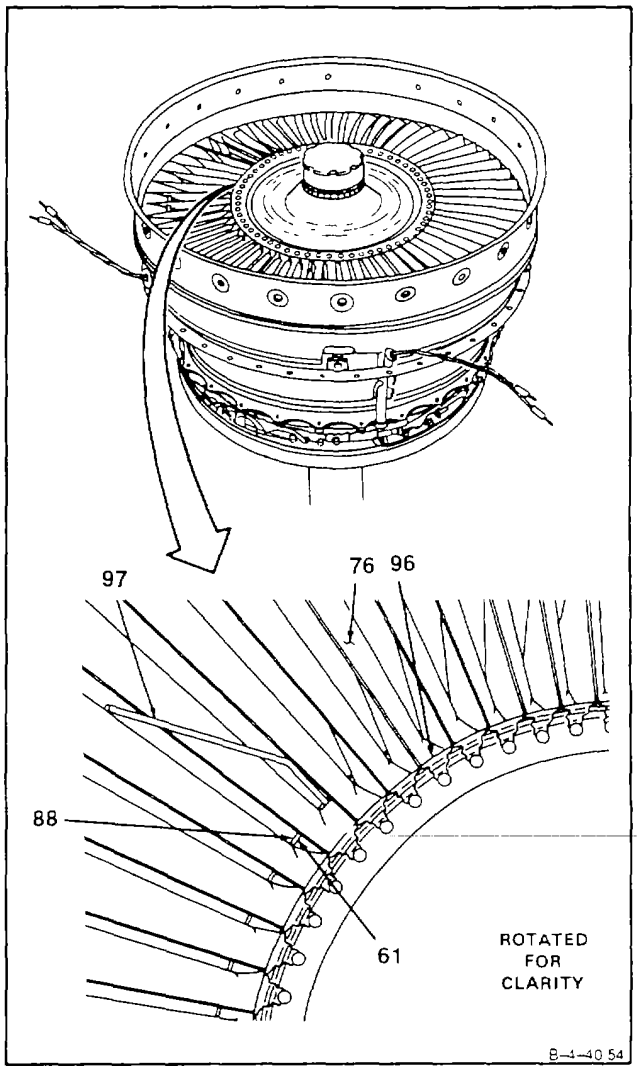
49. **Check axial clearance between fourth stage power turbine rotor (61) and fourth stage power turbine nozzle (88) at blade roots (96).** Use 0.104 inch and 0.228 inch bent wire gages (Appendix E) (97) inserted between fourth stage power turbine rotor blades (76) Axial clearance shall not be less than 0.104 inch or more than 0.228 inch.

NOTE

If axial clearance is not within limits, do steps 38 through 49 Ring spacer may be installed or removed as necessary Recheck clearance If clearance still is not within limits, replace power turbine assembly



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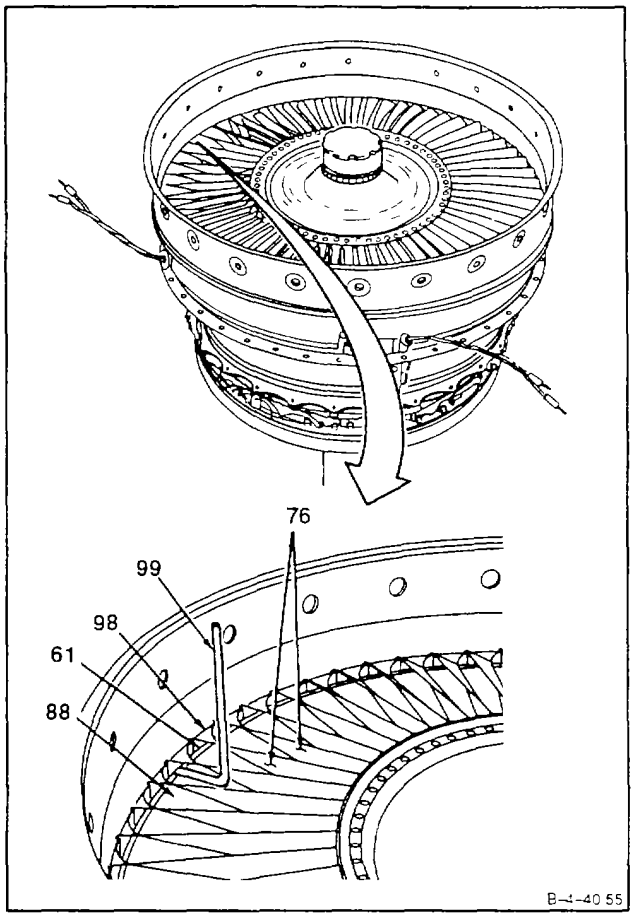
50. **Check axial clearance between fourth stage power turbine rotor (61) and fourth stage power turbine nozzle (88) at blade tips (98).** Use 0.115 inch and 0.290 inch bent wire gage (Appendix E) (99) inserted between fourth stage power turbine rotor blades (76) Axial clearance shall not be less than 0.115 inch or more than 0.290 inch.

NOTE

If axial clearance is not within limits, do steps 38 through 50 Ring spacer may be installed or removed as necessary Recheck clearance If clearance still is not within limits, replace power turbine assembly



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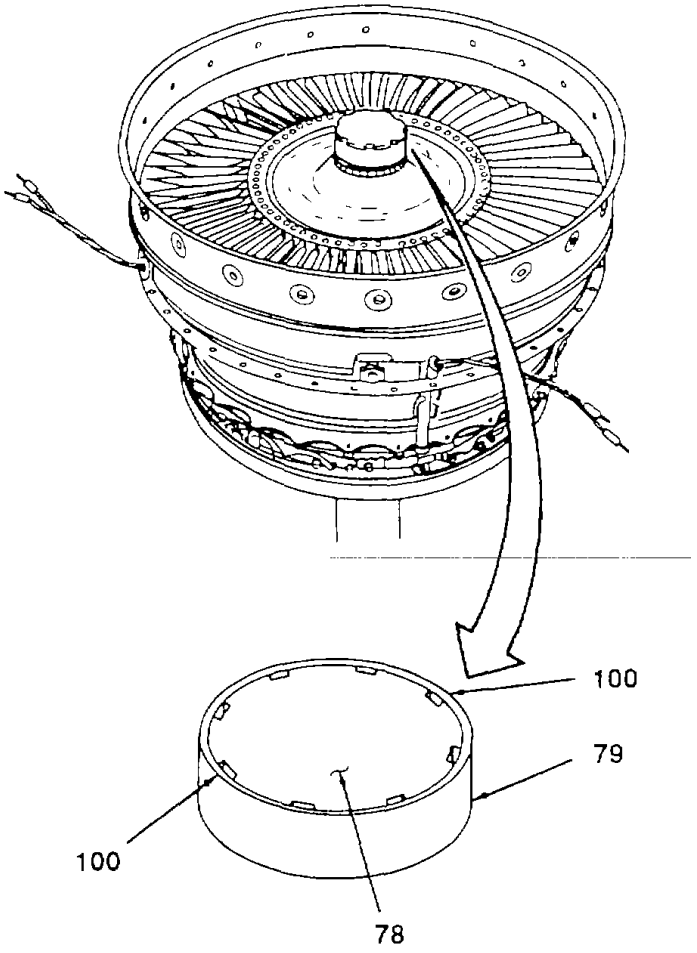
51. Bend locking cup (79) into nut (78) in two places (100) 180 degrees apart



INSPECT

FOLLOW-ON MAINTENANCE
Assemble Combustion Section and Power Turbine (Task 3-7)
Install Combustion Section and Power Turbine (Task 3-8)
Service Engine Oil System (Task 1-68)

END OF TASK

4-41 PRESSURE TEST NO. 4 AND 5 BEARING OIL TUBES AND BEARING PACKAGE (AVIM) 4-41

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Pressure Check Fixture (Ti5)
Open-End Wrench (T24)
Compressed Air Source
Regulator
Pressure Gage, 0-100 psi
Shut-off Valve

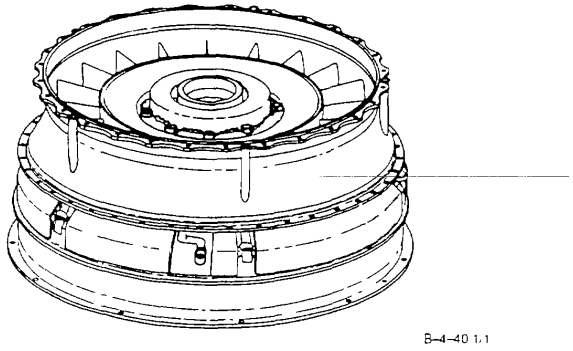
Materials:
None

Materials:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task

References:
Task 3-6
Task 3-7
Task 4-37
Task 4-40
Task 4-42
Task 4-45
Task 4-50

Parts:
Packing (2)



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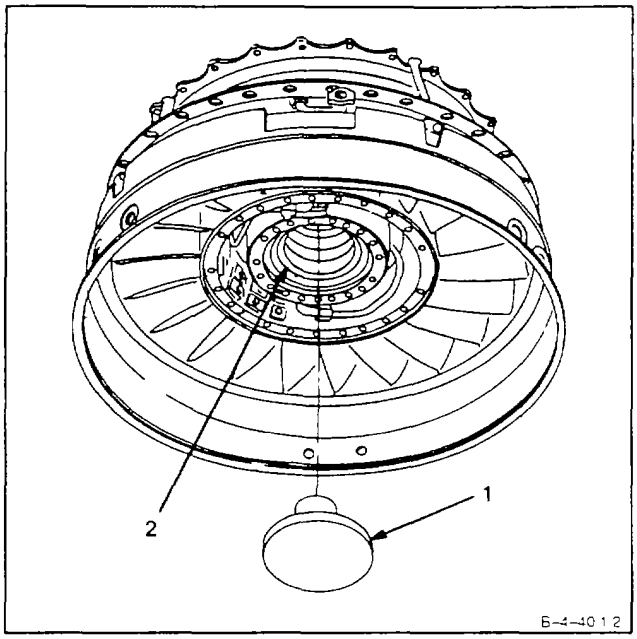
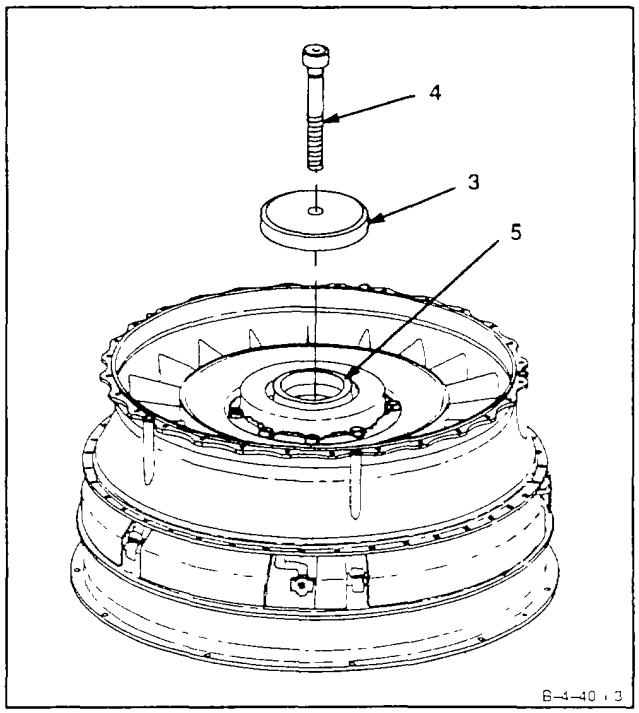
1. Install fourth stage power turbine nozzle (AVIM) (Task 4-50, steps 1 thru 13)

2. **Install pressure check fixture (T15)** as follows

   a. Install bottom plate (1) on No 4 and 5 bearing package aft face (2)



   b. Install top plate (3) and screw (4) on No 4 and 5 bearing package forward face (5)



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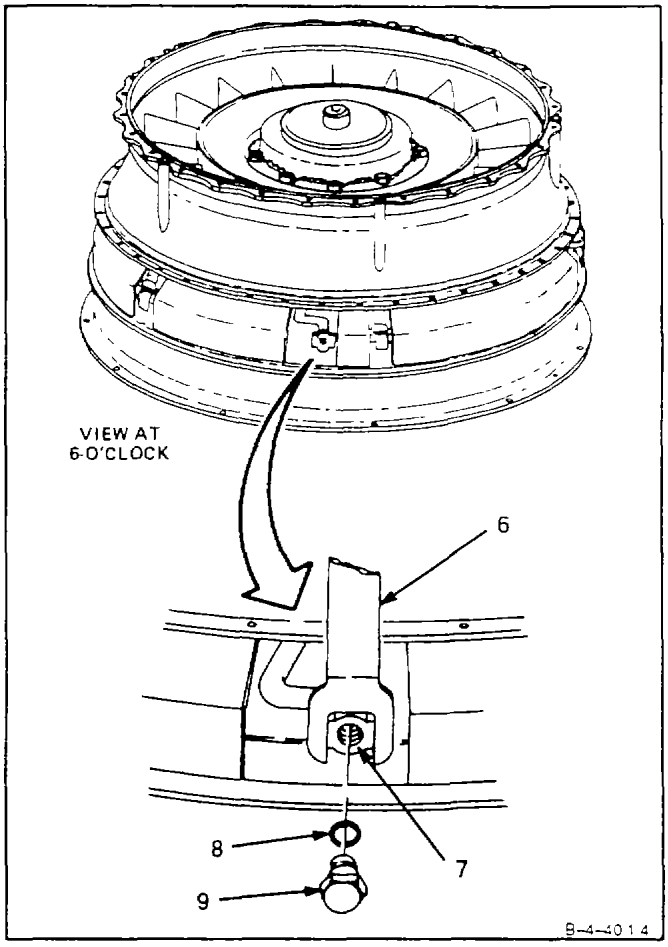
4-41 PRESSURE TEST NO. 4 AND 5 BEARING OIL TUBES AND BEARING PACKAGE (AVIM) 4-41

CAUTION

In following step, hold No. 4 and 5 bearing scavenge adapter using open-end wrench (T24). Failure to use wrench may result in damage and mislocation of oil transfer tube resulting in oil leaks.

c. Place open-end wrench (T24) (6) on No 4 and 5 bearing scavenge adapter (7) and install packing (8) and plug (9)



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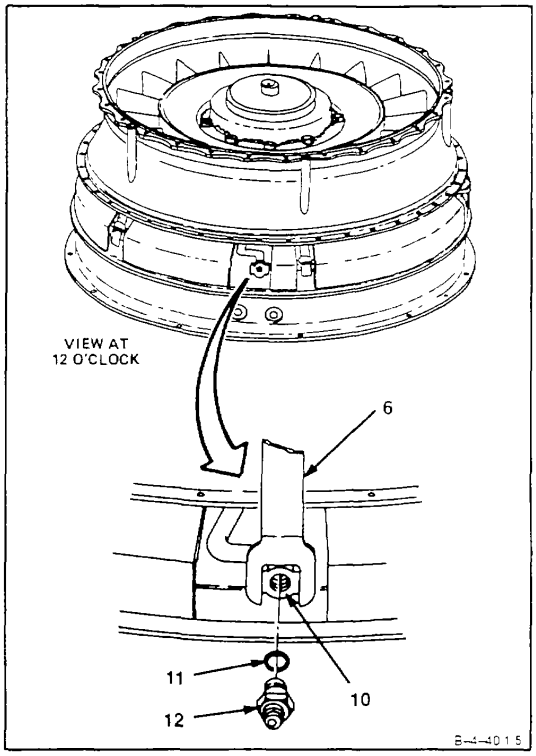
CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T24). Failure to use wrench may result In damage and mislocation of oil transfer tube resulting in oil leaks.

d. Place open-end wrench (T24) (6) on No 4 and 5 bearing lube adapter (10) and install packing (11) and nipple (12) Connect compressed air source to nipple (12)



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e. Adjust regulator (13) and apply 60 psi compressed air to pressurize No 4 and 5 bearing oil tubes and bearing package

3. Shut off compressed air source supply valve (14) and observe pressure gage (15) for 5 minutes Pressure should not drop more than 1 psi

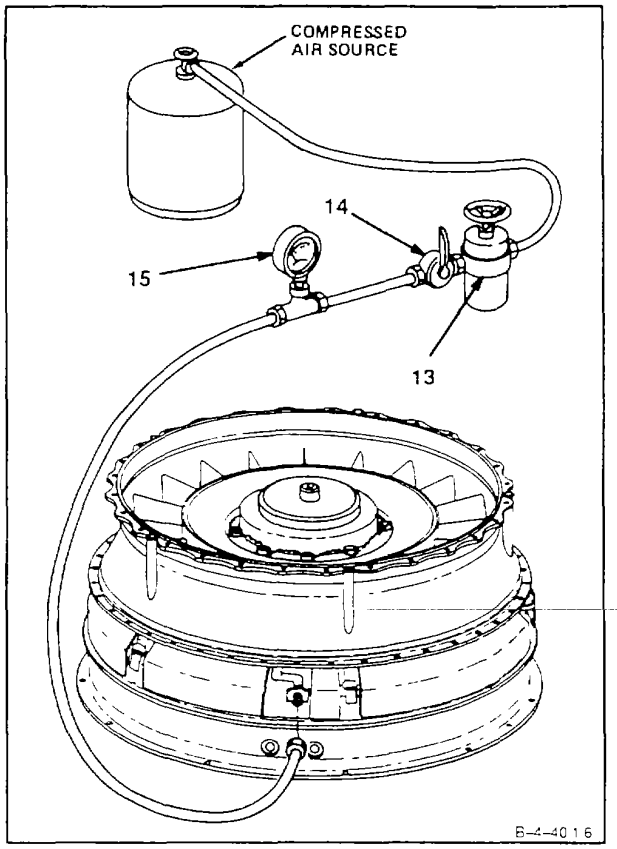
   a. If pressure does not drop more than 1 psi in 5 minutes, No 4 and 5 bearing package and bearing oil tubes are acceptable Omit following step (b) and proceed to step 4

   b. If pressure drops more than 1 psi in 5 minutes, No 4 and 5 bearing package and bearing oil tubes are not acceptable Proceed as follows

      (1) Replace No 4 and 5 bearing oil tubes (Ref Tasks 4-42 and 4-45) and repeat steps 2 thru 4

      (2) If leakage still exists, replace No 4 and 5 bearing package seals (Ref Tasks 4-37 and 4-40) and repeat steps 2 thru 4

      (3) If leakage still exists, replace power turbine (Ret Task 3-6, steps 42 thru 45 and Task 3-7, steps 1 thru 9)



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WARNING

In following step 4, gradually loosen nut on compressed airline and relieve air pressure before removing. Failure to comply may result in personal injury.

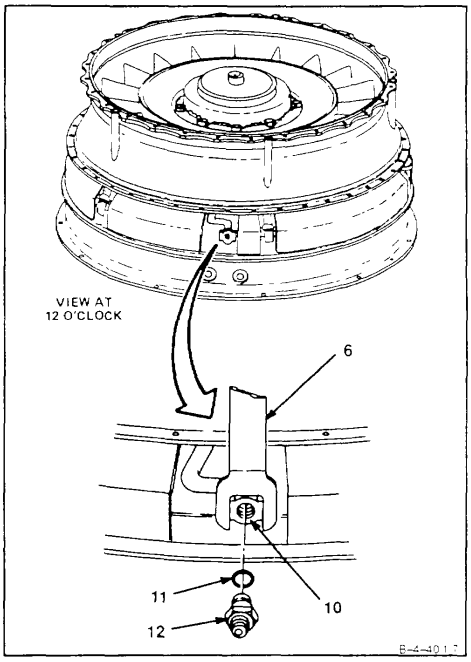
4. **Remove pressure check fixture (T15)** as follows

   a. Disconnect compressed air source

CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T24). Failure to use wrench may result in damage and mislocation of oil transfer tube resulting in oil leaks

   b. Place open-end wrench (T24) (6) on No 4 and 5 bearing lube adapter (10) and remove nipple (12) and packing (11)



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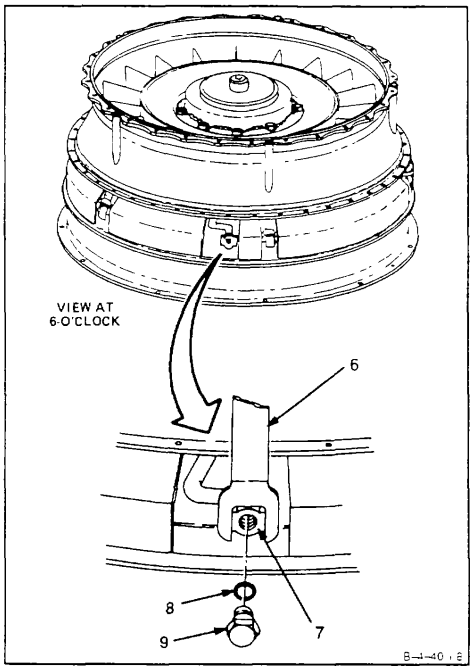
4-41 PRESSURE TEST NO. 4 AND 5 BEARING OIL TUBES AND BEARING PACKAGE (AVIM) (Continued) 4-41

CAUTION

In following step, hold No 4 and 5 bearing scavenge adapter using open-end wrench (T24). Failure to use wrench may result in damage and mislocation of oil transfer tube resulting in oil leaks.

c. Place open-end wrench (T24) (6) on No 4 and 5 bearing scavenge adapter (7) and remove plug (9) and packing (8)



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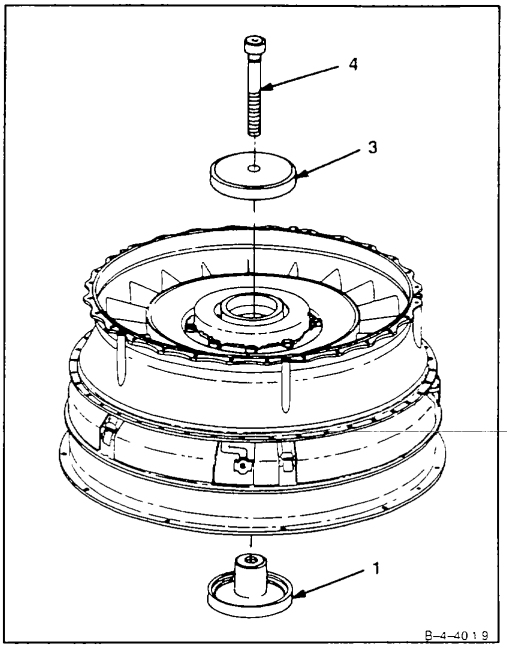
d. Remove screw (4) and plates (3 and 1)



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-42 REMOVE NO. 4 AND 5 BEARING OIL TUBES (AVIM) 4-42

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-49-4 4

Materials:

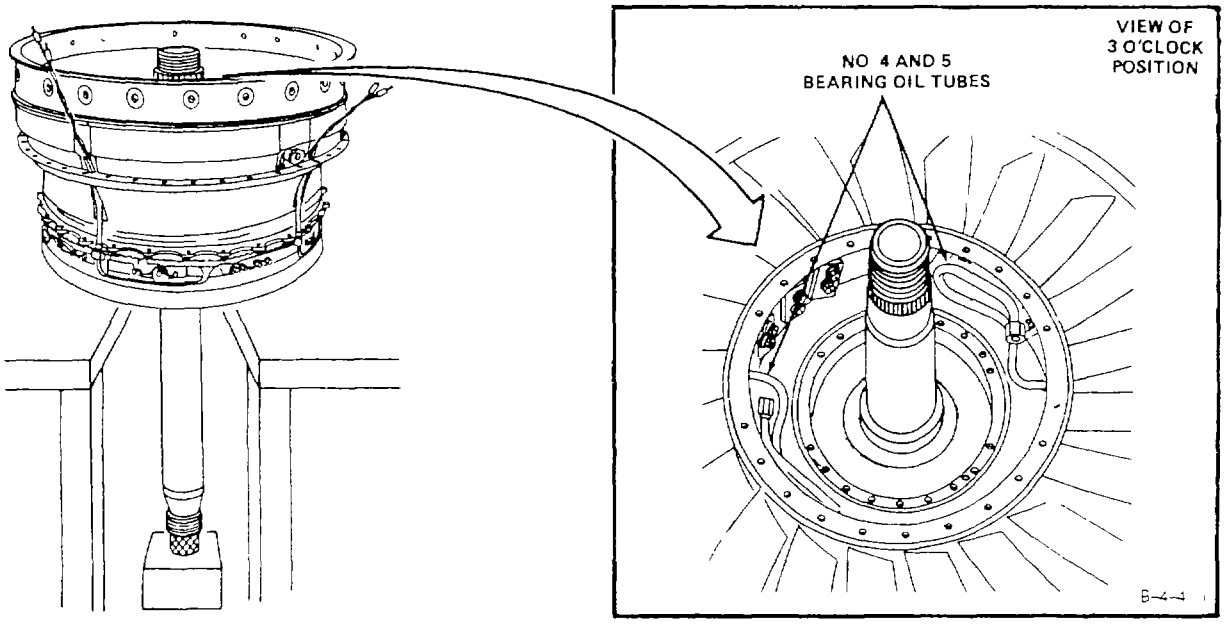
None

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition

Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
No 4 and 5 Bearing Package (AVIM) Removed (Task 4-37, Steps 1 thru 15)



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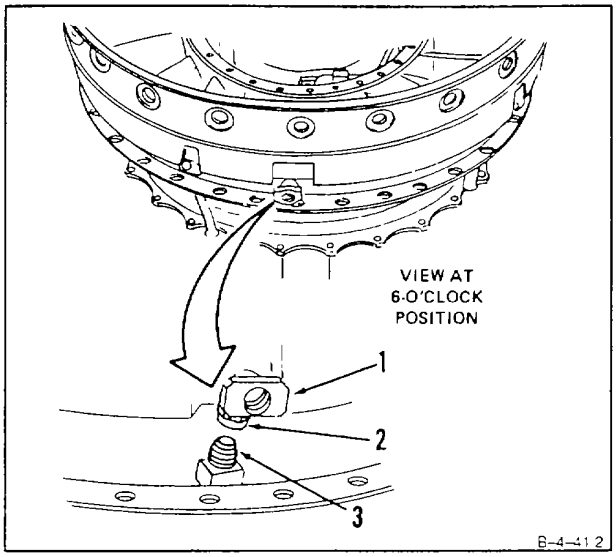
1. **Remove No 4 and 5 Bearing oil scavenge tube adapter (1)**as follows

   a. Remove lockwire from adapter nut (2)

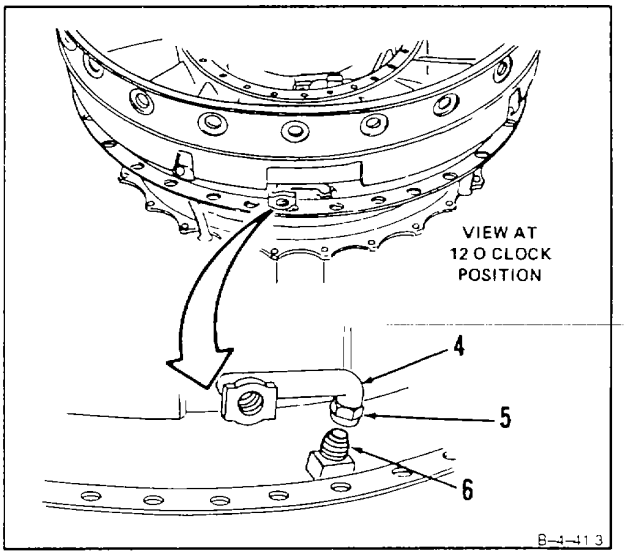
   b. Remove adapter (1) from tube assembly (3)



2. **Remove No. 4 and 5 bearing oil pressure tube adapter (4)**as follows

   a. Remove lockwire from adapter nut (5)

   b. Remove adapter (4) from tube assembly (6)



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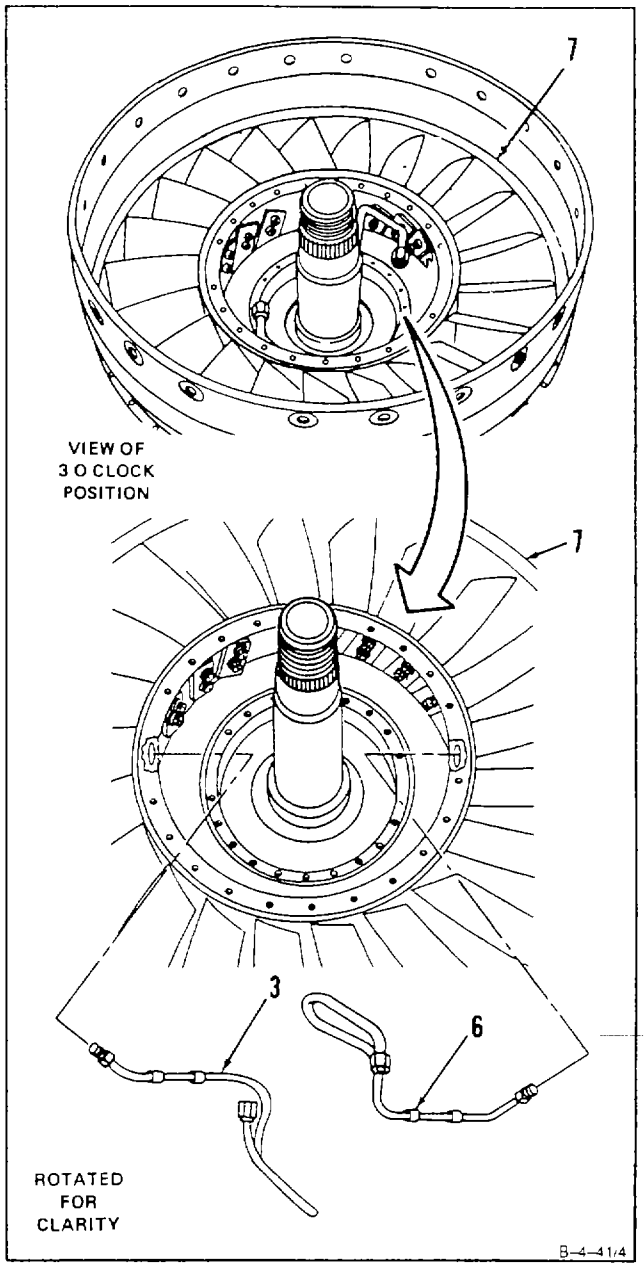
3. **Remove tube assemblies (3) and (6)** from fourth stage power turbine nozzle (7)



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-43 CLEAN NO. 4 AND 5 BEARING OIL TUBES (AVIM) 4-43

INITIAL SETUP

Applicable Configurations:

All

Tools:

Dry, Compressed Air Source
Fiber Brush
Goggles

Materials:

Gloves (E24)
Denatured Alcohrni (E17)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
No 4 and 5 Bearing Oil Tubes Removed (Task 4-42)

General Safety Instructions:

WARNING

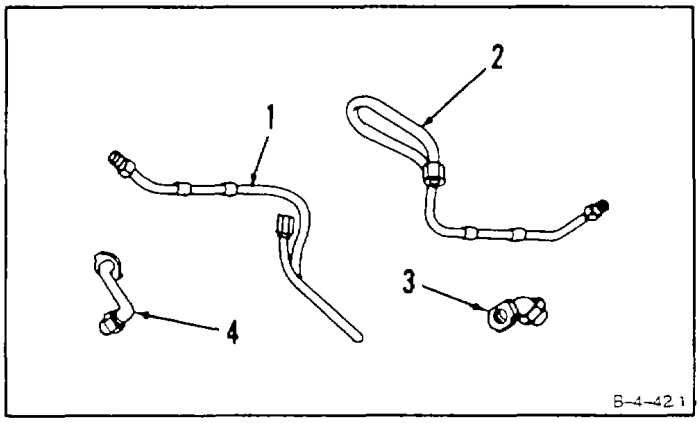
Denatured alcohol (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Wear gloves (E24) and goggles **Clean oil tube assemblies (1 and 2) and adapters (3 and 4)** Use denatured alcohol and fiber brush

   WARNING

   When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than <u>30 psig</u> air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin In case of injury, get medical attention.

2. Wear goggles **Blow dry internal and external surfaces** of oil tube assemblies (1 and 2) and adapters (3 and 4) Use clean, dry compressed air



FOLLOW-ON MAINTENANCE

Inspect No 4 and 5 Bearing Oil Tubes (Task 4-44)

END OF TASK

4-44 INSPECT NO. 4 AND 5 BEARING OIL TUBES (AVIM) 4-44

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

Personnel Required:
Aircraft Powerplant Inspector

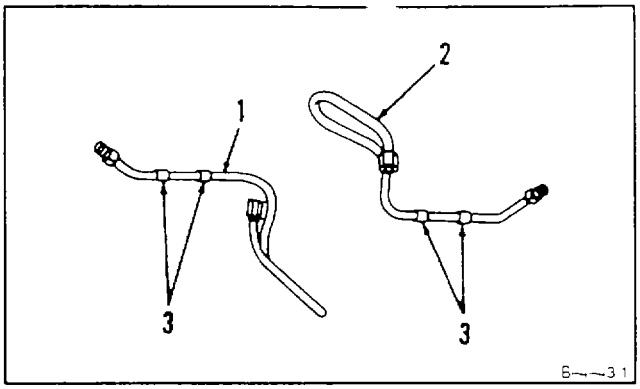
Equipment Condition:
Off Engine Task

1. **Inspect No. 4 and 5 bearing oil tubes (1 and 2)** as follows

   a. There shall be no cracks

   b. There shall be no nicks dents or rub wear greater than 0.040 inch depth on oil tube sleeves (3)

   c. There shall be no nicks, dents or rub wear greater than 0.030 inch depth on oil tubes (1 and 2)

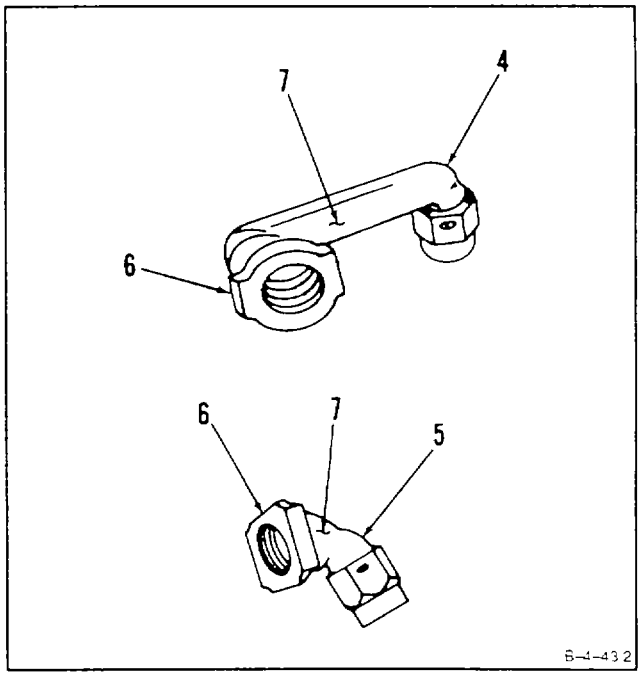


2. **Inspect adapters (4 and 5)** as follows

   a. There shall be no cracks

   b. There shall be no nicks, dents or rub wear greater than 0.050 inch depth on adapter squared ends (6)

   c. There shall be no nicks, dents or rub wear greater than 0.020 inch depth on adapter tube areas (7)



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-45 INSTALL NO. 4 AND 5 BEARING OIL TUBES (AVIM) 4-45

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Oil Tube Fixture (T45)
Bearing Installing Tool (T22)
Reducer, P/N 2-141-121-04
Bolt, 1/4 x 28 x 1-Inch (2)
Nut, 1/4 x 28 (2)
Torque Wrench, 0-30 Inch-Pounds
Torque Wrench, 30-150 Inch-Pounds
Torque Wrench, 100-750 Inch-Pounds

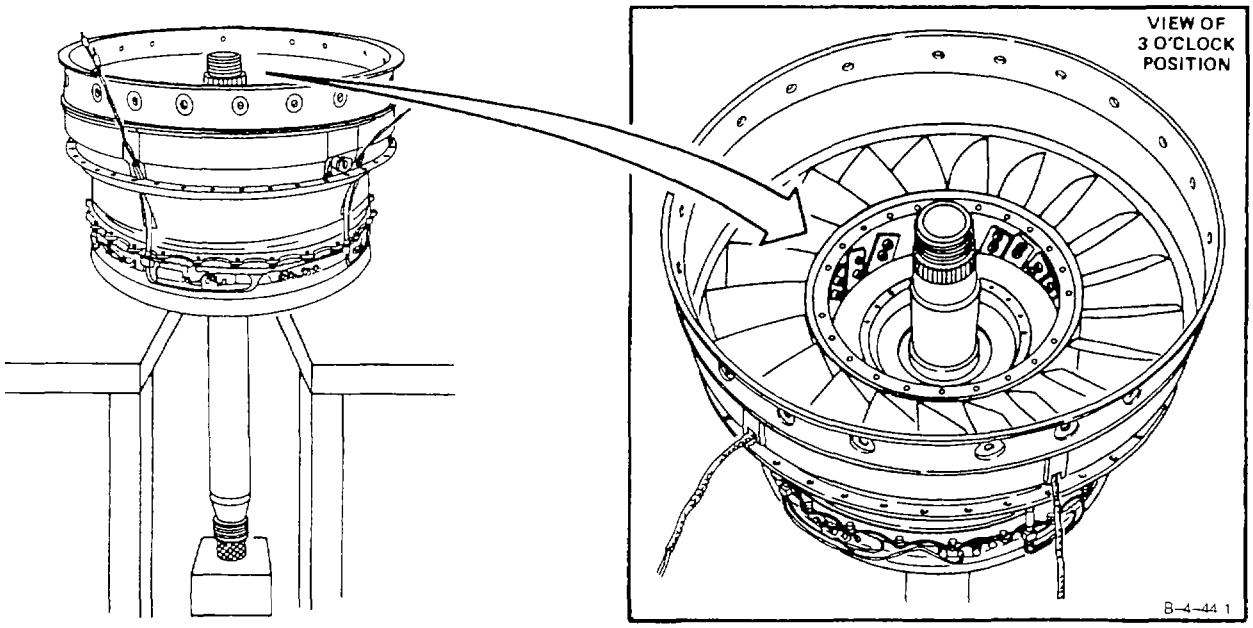
Parts:
Seal
Screws

Materials:
Anti-Seize Compound (E6)
Gloves (E24)
Lockwire (E32)
Lockwire (E33)
Lubricating Oil (E35 or E36)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:

TM 1-2840-252-23P
Task 4-36



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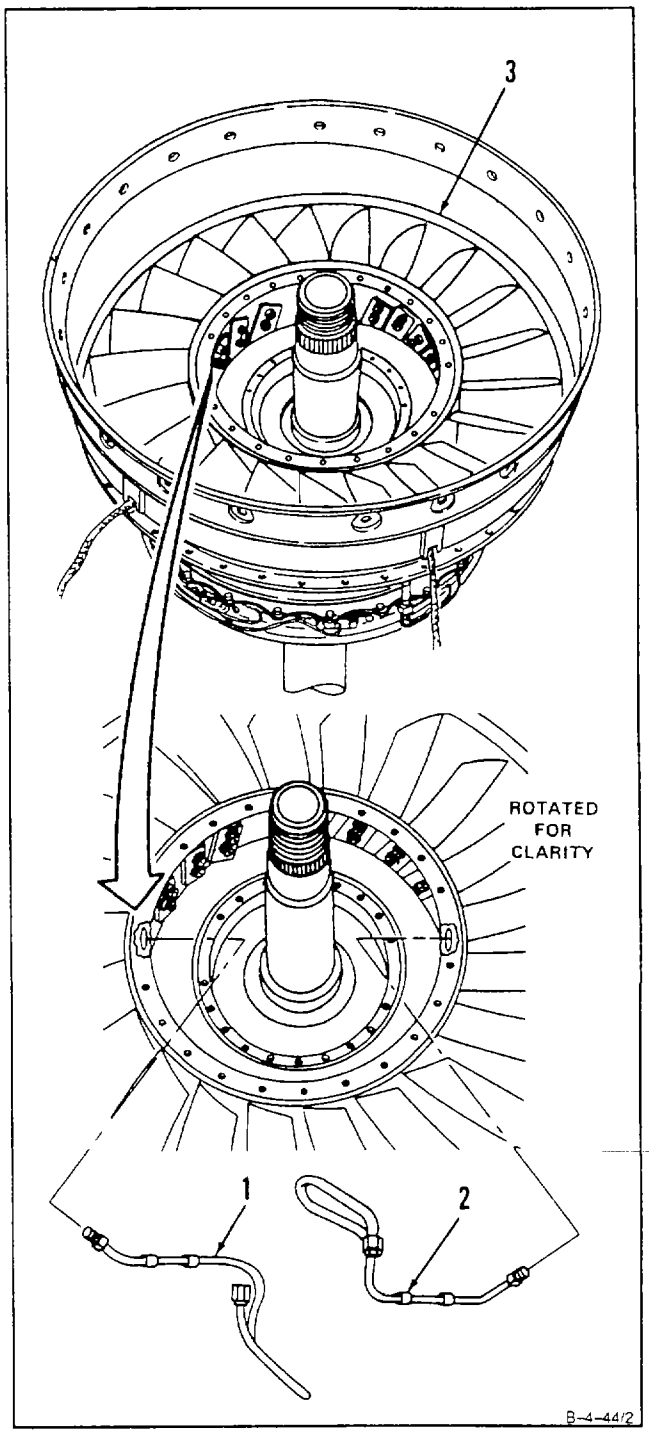
1. **Install tube assemblies (1 and 2)** into fourth stage power turbine nozzle (3) at 6- and 12-o'clock positions as follows



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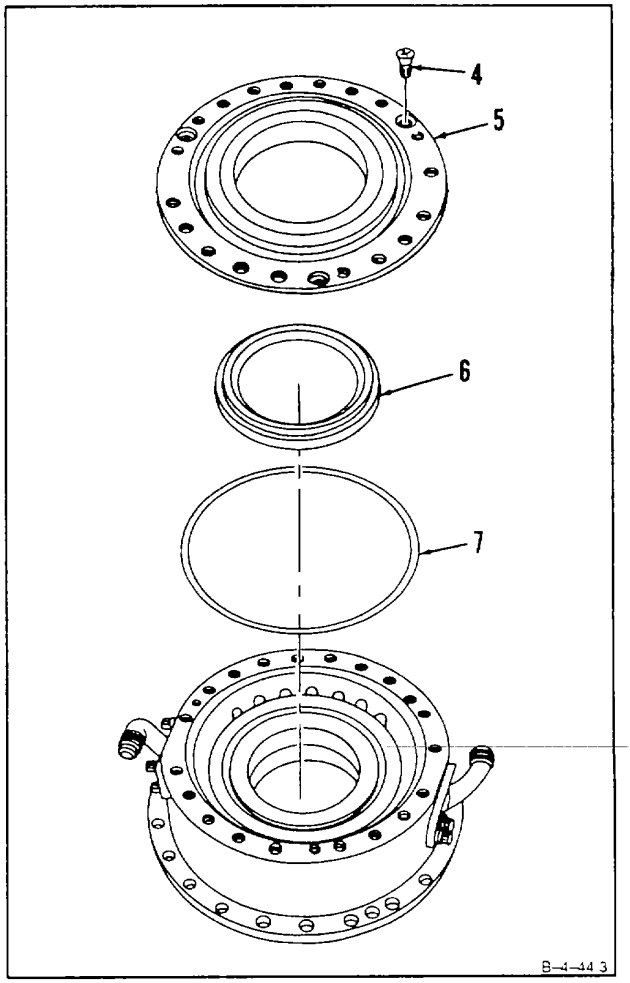
a. Remove three screws (4) and remove aft seal and retainer (5)

b. Remove faceplate (6) and seal (7)



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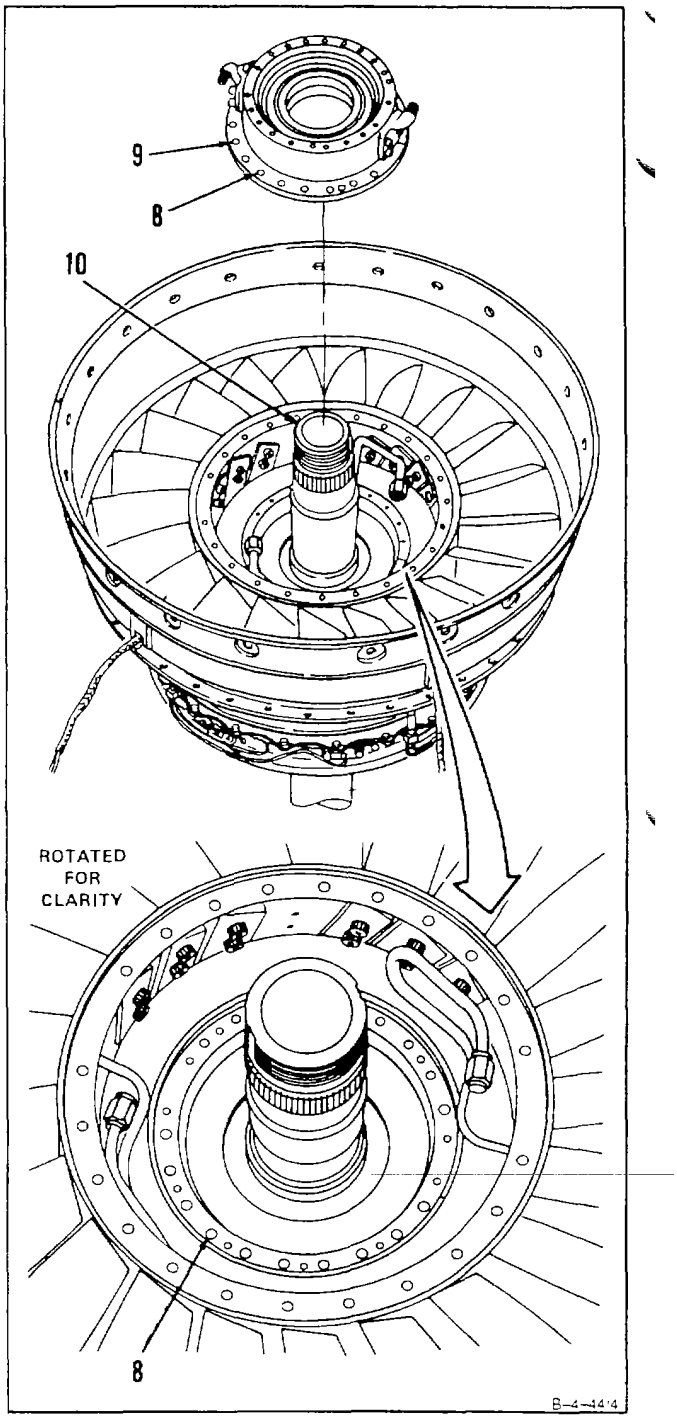
CAUTION

Be sure to install bearing package carefully and straight Carbon seal elements could easily break. This would cause oil leakage and engine damage

c. Align bolt holes (8) and position No 4 and 5 bearing package (9) on integral shaft assembly (10)



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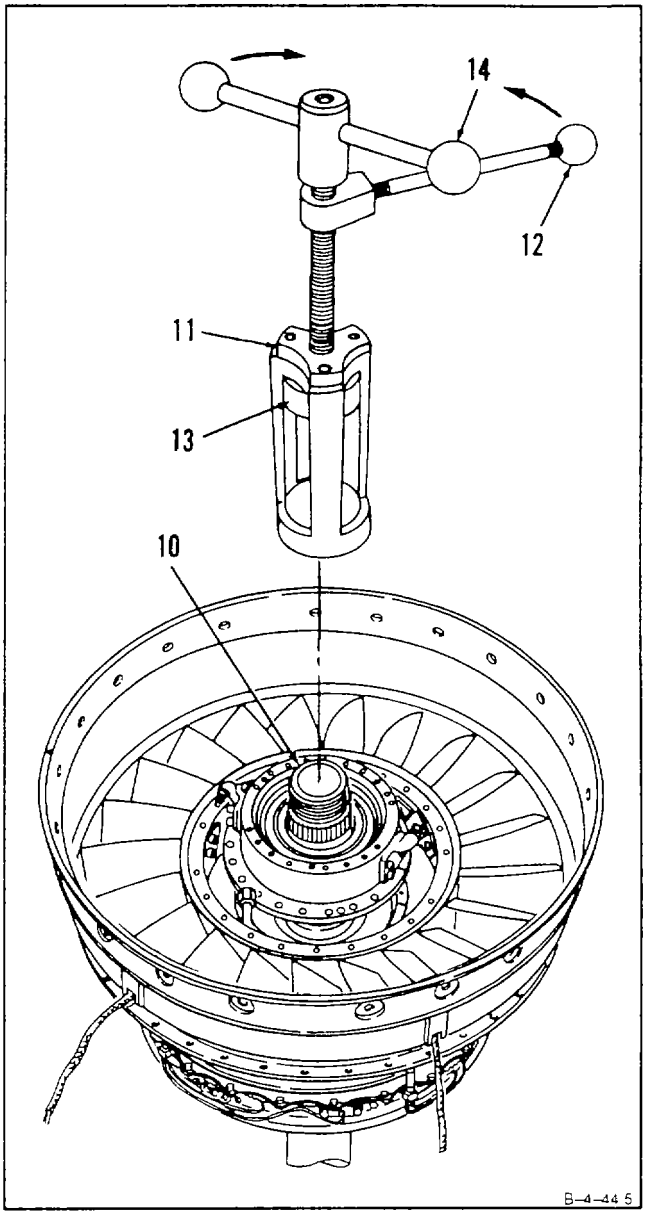
d. **Install bearing installing tool (T22) (11)** as follows

(1) Turn handle (12) counterclockwise until it is backed out all the way

(2) Install nut (13) on shaft (10) Turn T-handle (14) clockwise until nut (13) is tight



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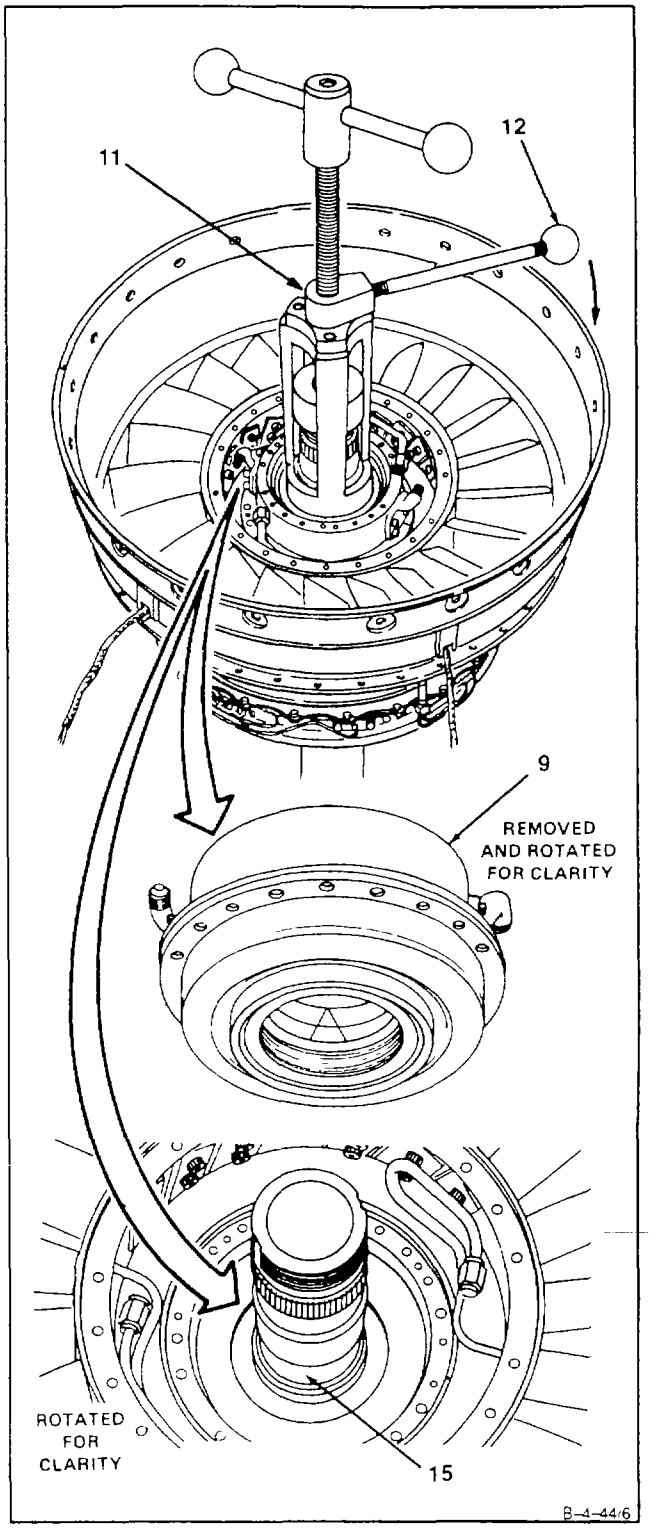
e. **Seat No. 4 and 5 bearing package (9)** onto third turbine rotor shaft shoulder (15) by turning handle (12) clockwise Remove bearing installing tool (T22) (11)



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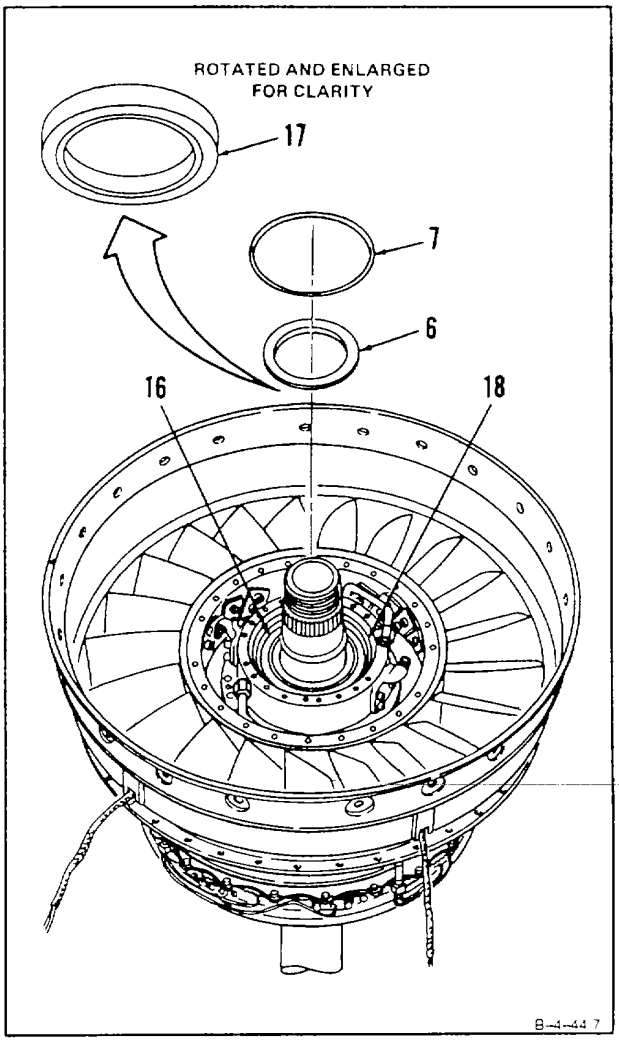
t. **Install faceplate (6)** on bearing (16) with beveled side (17) facing down

g. **Install seal (7)** in groove (18)



INSPECT

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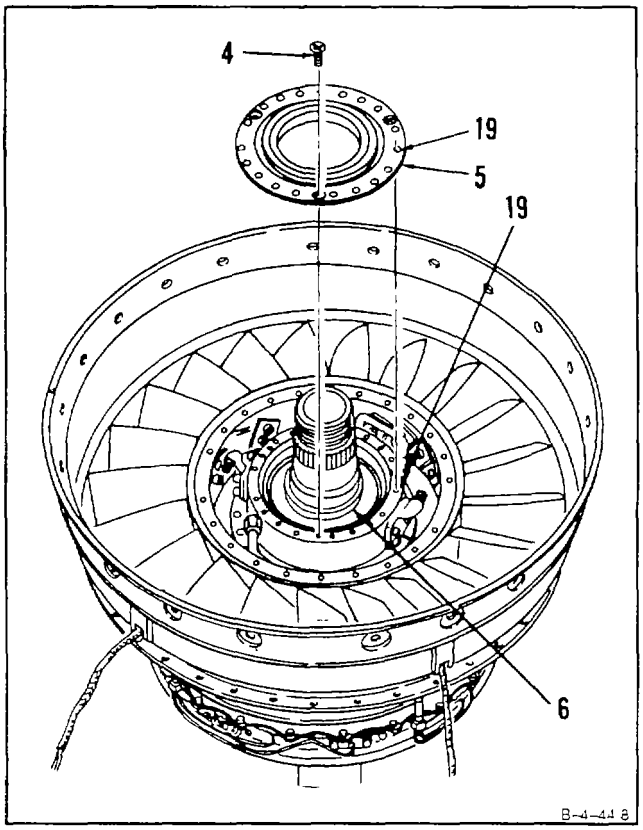
WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention Get medical attention for eyes.

CAUTION

Be sure to apply a light coat of lubricating oil on faceplate before installation. Failure to comply will cause damage to aft seal during dry running of initial engine starts.

h. Wear gloves (E24) Apply light coat of lubricating oil (E35 or E36) on faceplate (6) Align bolt holes (19) and **install aft seal and retainer (5)** and three screws (4)



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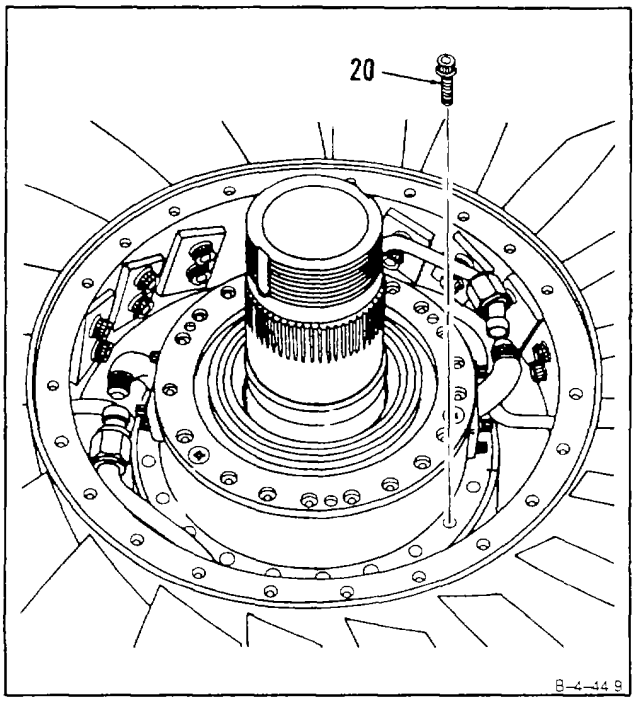
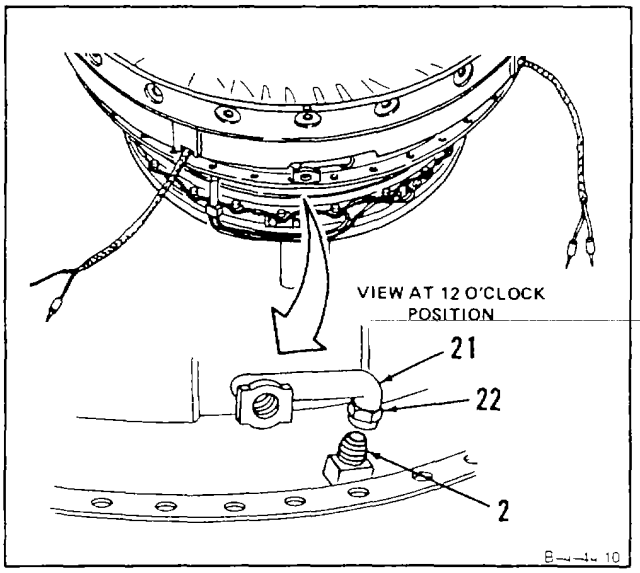
i. Apply anti-seize compound (E6) to 19 bolts (20) Install 19 bolts (20)

j. Lockwire bolts (20) Use lockwire (E33)



k. **Install No 4 and 5 bearing oil pressure tube adapter (21)**at 12-o'clock position as follows

(1) Install adapter (21) on tube assembly (2) Tighten nut (22) finger tight



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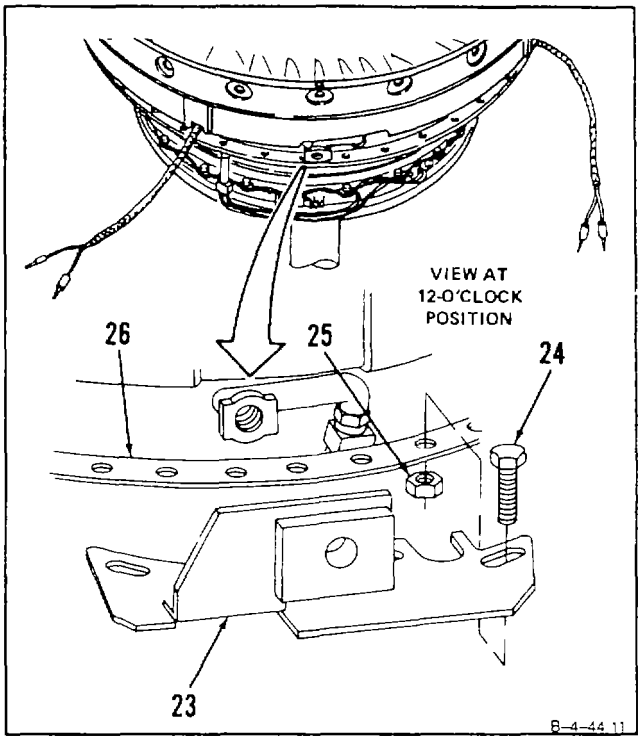
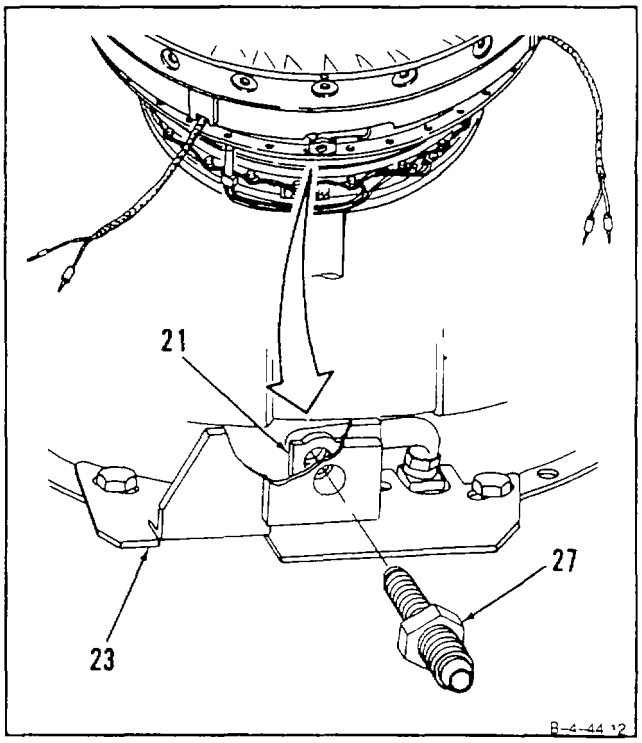
(2) **Install oil tube fixture (T45) (23)** two 1/4 x 28 bolts (24) and 1/4 x 28 nuts (25) on nozzle flange (26) at the 1 2-o'clock position

(3) **Thread reducer (27) into oil pressure tube adapter (21)** until adapter (21) is firmly seated in oil tube fixture (T45) (23)





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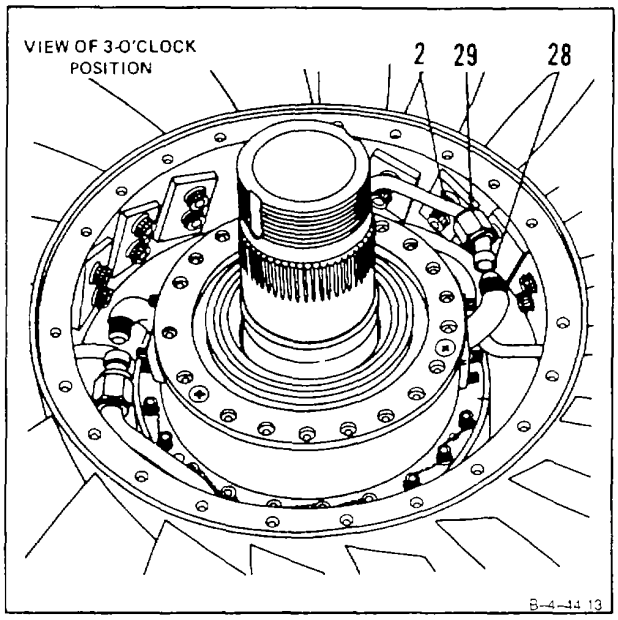
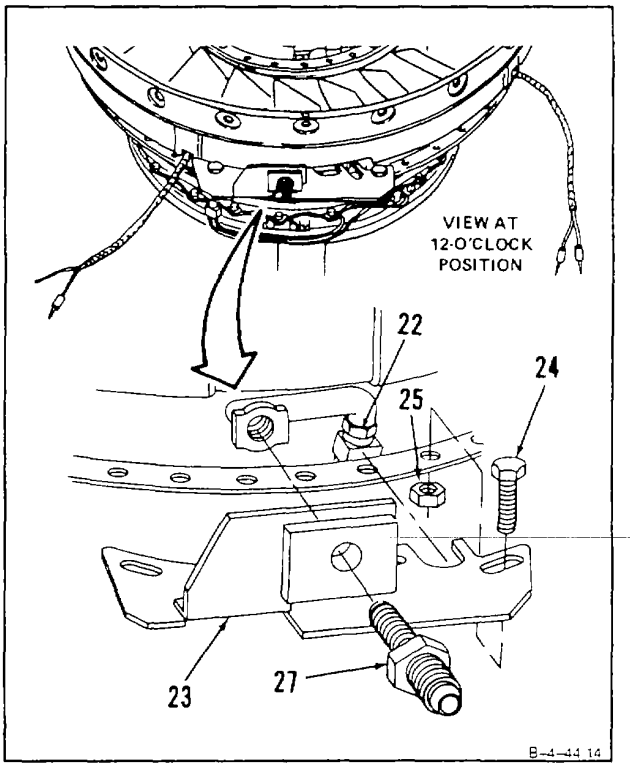
(4) **Connect tube (2)** to adapter (28) **Torque nut (29) to 190 inch-pounds**. Lockwire nut (29) Use lockwire (E32)



(5) Remove reducer (27) two nuts (25), bolts (24) and oil tube fixture (T45) (23)

(6) **Tighten adapter nut (22) Torque to 140 inch-pounds** Lockwire adapter nut (22) Use lockwire (E32)



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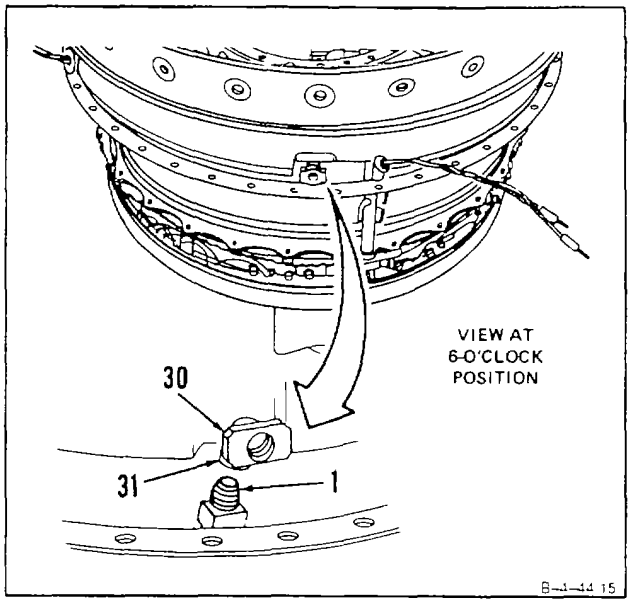
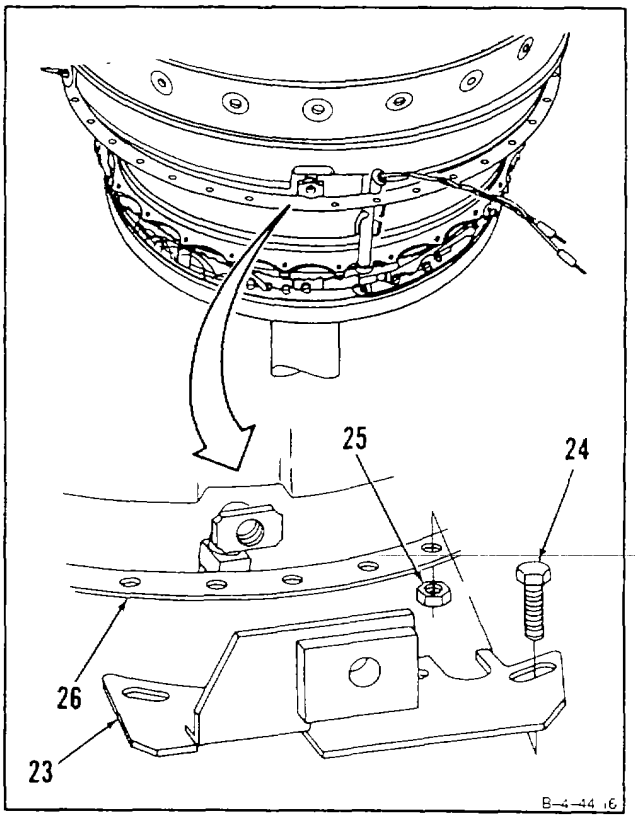
I. **Install No 4 and 5 bearing oil scavenge tube adapter (30)** at 6-o'clock position as follows:

(1) Install adapter (30) on tube assembly (1) Tighten nut (31) finger-tight



(2) **Install oil tube fixture (T45) (23)**, two 1/4 x 28 bolts (24) and 1/4 x 28 nuts (25) on nozzle flange (26) at the 6o'clock position



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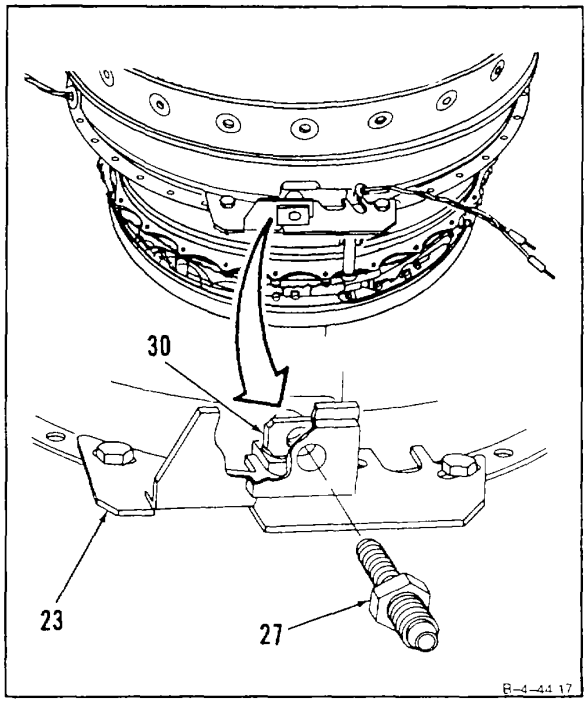
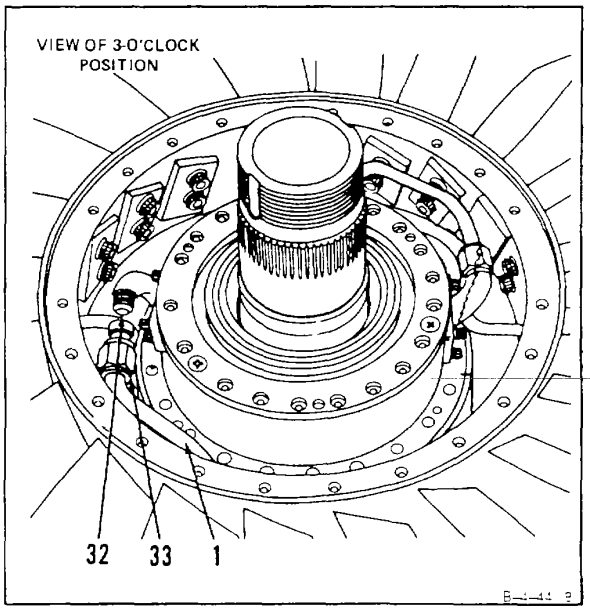
(3) **Thread reducer (27) into oil scavenge tube adapter (30)** until adapter (30) is firmly seated in oil tube fixture (T45) (23)



(4) **Connect tube assembly (1)** to adapter (32) **Torque nut (33) to 190 inch-pounds** Lockwire nut (33) Use lockwire (E32)



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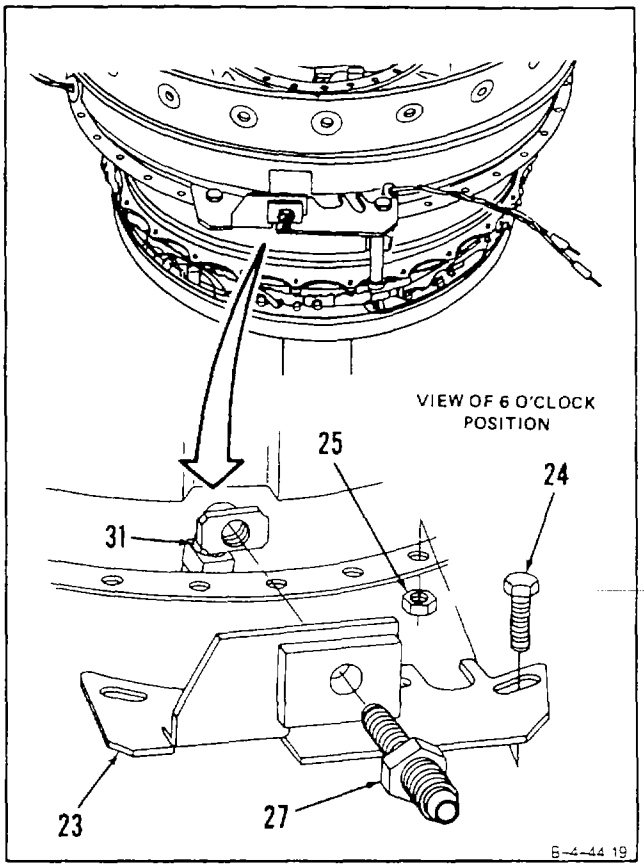
(5) Remove reducer (27), two nuts (25), bolts (24) and **oil tube fixture (T45) (23).**

(6) **Tighten adapter nut (31). Torque to 140 inch-pounds.** Lockwire adapter nut (31) Use lockwire (E32).



INSPECT

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m. If removed, install shim (34) on inner bolt circle on aft face of fourth turbine nozzle assembly (35).

CAUTION

In following step, be sure to use 22 new screws. Used screws could break and cause damage to engine.

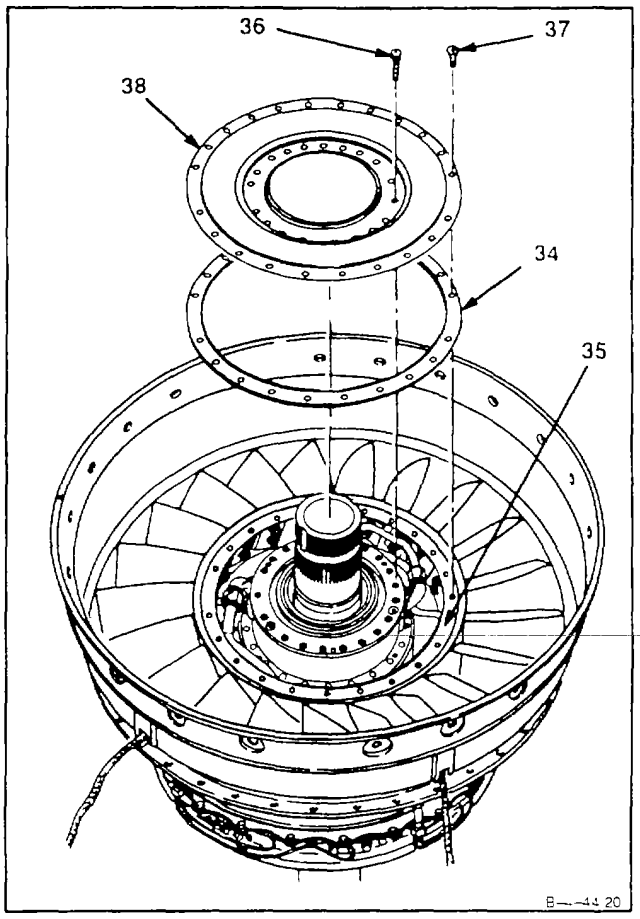
n. Coat 20 bolts (36) and 22 screws (37) with anti-seize compound (E6).

CAUTION

In following step, outer bolts are to be torqued first to reduce breakage of screws that can cause damage to plate.

o. **Install heat shield (38),** 22 screws (37) and 20 bolts (36) **Torque screws (37) to 23 inch-pounds, then torque bolts (36) to 83 inch-pounds.** Lockwire screws (37) and bolts (36) Use lockwire (E33).

p. **Install fourth stage power turbine rotor** (Ref Task 4-36, steps 25 thru 50).



INSPECT

FOLLOW-ON MAINTENANCE:
Assemble Combustion Section and Power Turbine (Task 3-7).
Install Combustion Section and Power Turbine (Task 3-8).
Service Engine Oil System (Task 1-68).

END OF TASK

SECTION IX

FOURTH STAGE POWER TURBINE NOZZLE

4-46 REMOVE FOURTH STAGE POWER TURBINE NOZZLE (AVIM) 4-46

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

Materials:
None

Personnel Required:

Aircraft Powerplant Repairer

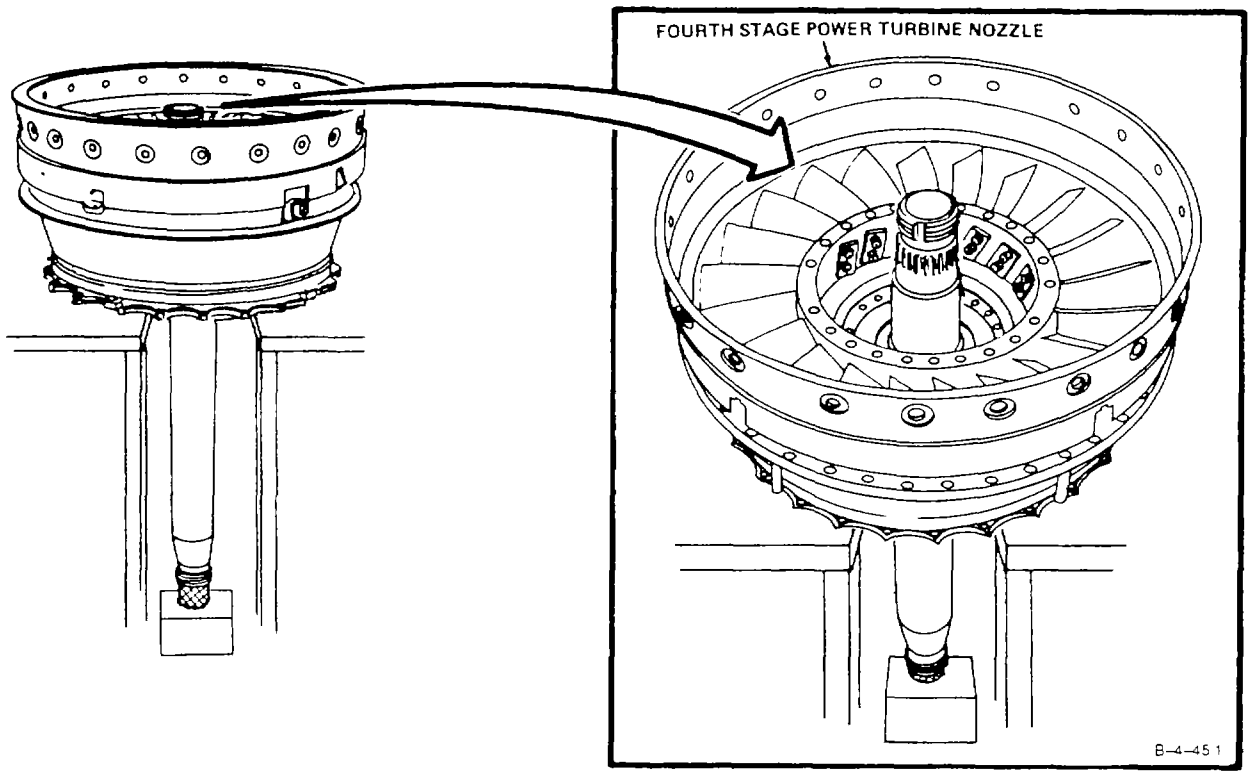
Equipment Condition:
Engine Oil System Drained (Task 1-69)

Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)

Thermocouple Harness Assemblies Removed (Task 4-20)

Third Turbine Nozzle and Support Removed (Task 4-26)

No 4 and 5 Bearing Package Removed (Task 4-37, Steps 1 thru 15)
No 4 and 5 Bearing **Oil** Tubes Removed (Task 4-42)



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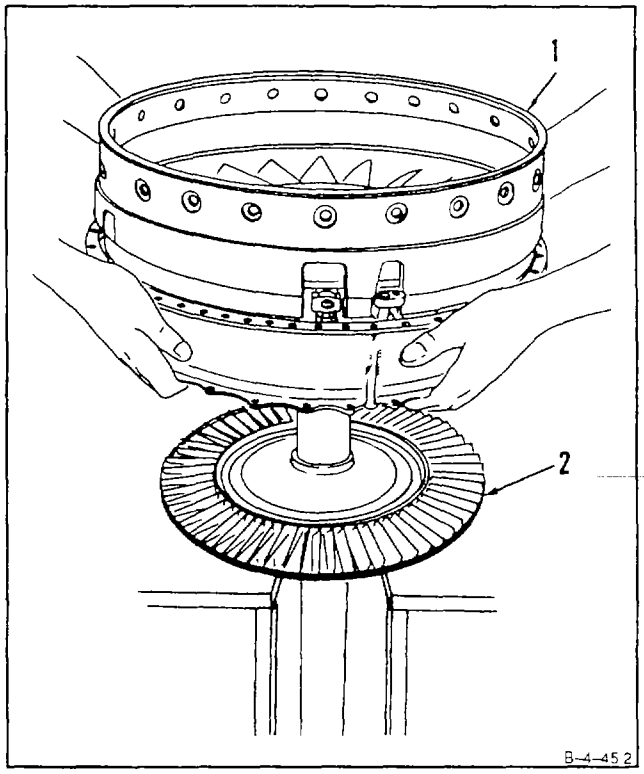
1. Using helper, **remove fourth stage power turbine nozzle (1)** from third stage power turbine rotor (2)



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-47 CLEAN FOURTH STAGE POWER TURBINE NOZZLE (AVIM) 4-47

INITIAL SETUP

Applicable Configurations:

All

Tools:

Dry, Compressed Air Source
Fiber Brush
Goggles

Materials:

Dry Cleaning Solvent (El 9)
Gloves (E24)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task
Engine System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Thermocouple Harness Assemblies Removed (Task 4-20)
Third Turbine Nozzle and Support Removed (Task 4-26)
No 4 and 5 Bearing Package Removed (Task 4-37, Steps 1 thru 15)
No 4 and 5 Bearing **Oil** Tubes Removed (Task 4-42)
Fourth Stage Power Turbine Nozzle Removed (Task 4-46)

General Safety Instructions:

WARNING

Dry cleaning solvent (E19) 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.

1. **Clean fourth stage power turbine nozzle (1)**

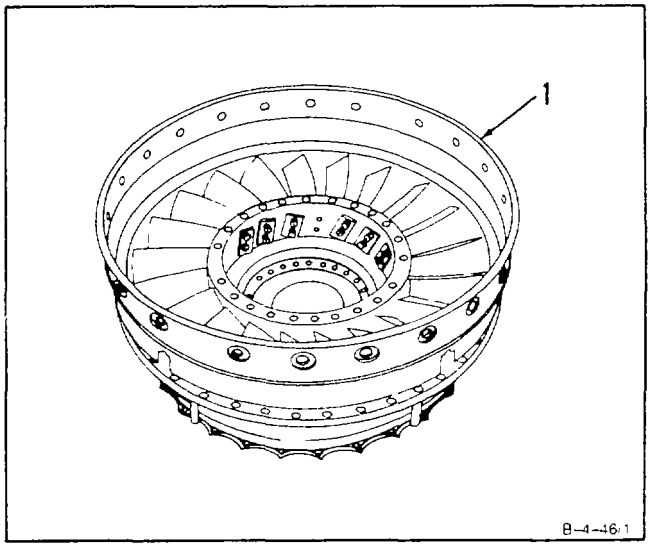
   a. Wear gloves (E24) **Clean nozzle with dry cleaning solvent (E19)**

   b. Remove contaminants by scrubbing with a fiber brush

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

   c. Wear goggles **Blow dry nozzle (1),** using clean, dry, compressed air.



FOLLOW-ON MAINTENANCE

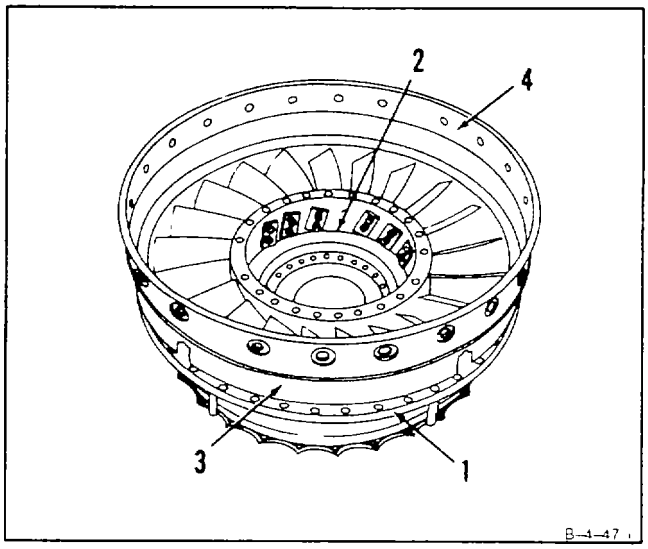
Inspect Fourth Stage Power Turbine Nozzle (Task 4-48).

END OF TASK

INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1. **Inspect fourth stage power turbine nozzle (1)** as follows

   a. **Inspect inner support area (2), outer support area (3), and rear flange area (4).** There shall be no cracks or indications of burning



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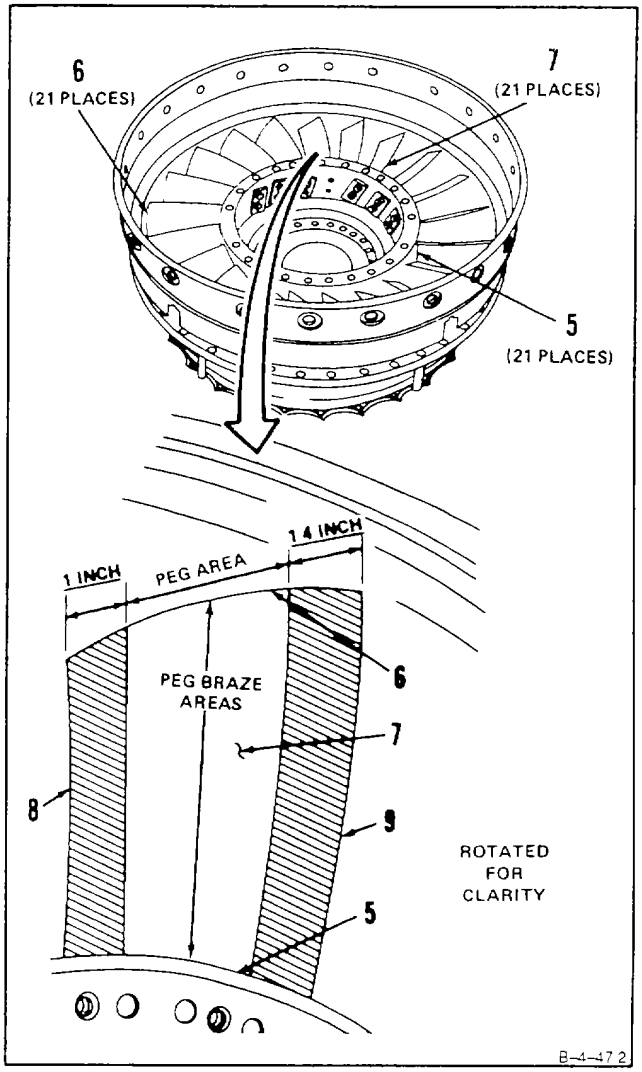
b. **Inspect inner shroud to vane brazements (5) and outer shroud to vane brazements (6)** as follows

(1) **Determine peg area of vanes (7).** Measure 1 inch in from leading edge (8) and 1.4 inches in from trailing edge (9) at brazements (5 and 6) Vane peg area is between measurements.

(2) **Inspect brazements (5) in peg area.** Total length of all cracks in all brazements (5) in peg area shall not be more than 1.25 inches.

(3) **Inspect brazements (6) in peg area.** Total length of all cracks in all brazements (6) in peg area shall not be more than 1.50 inches.

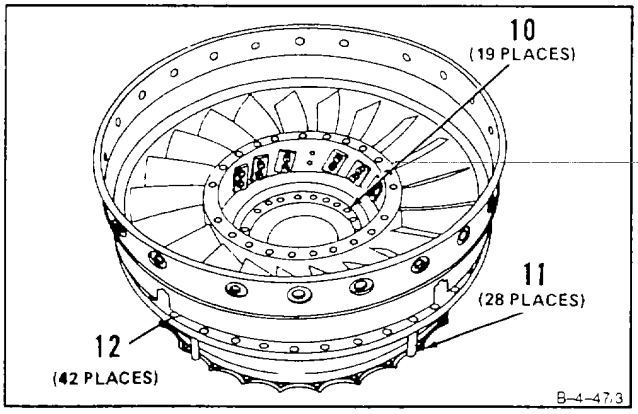


c. **Inspect areas around bolt holes (10,11, and 12)**

(1) There shall be no more than one crack starting from any one hole

(2) There shall be no cracks which could result in material fallout

(3) There shall be at least one hole without cracks separating holes with cracks



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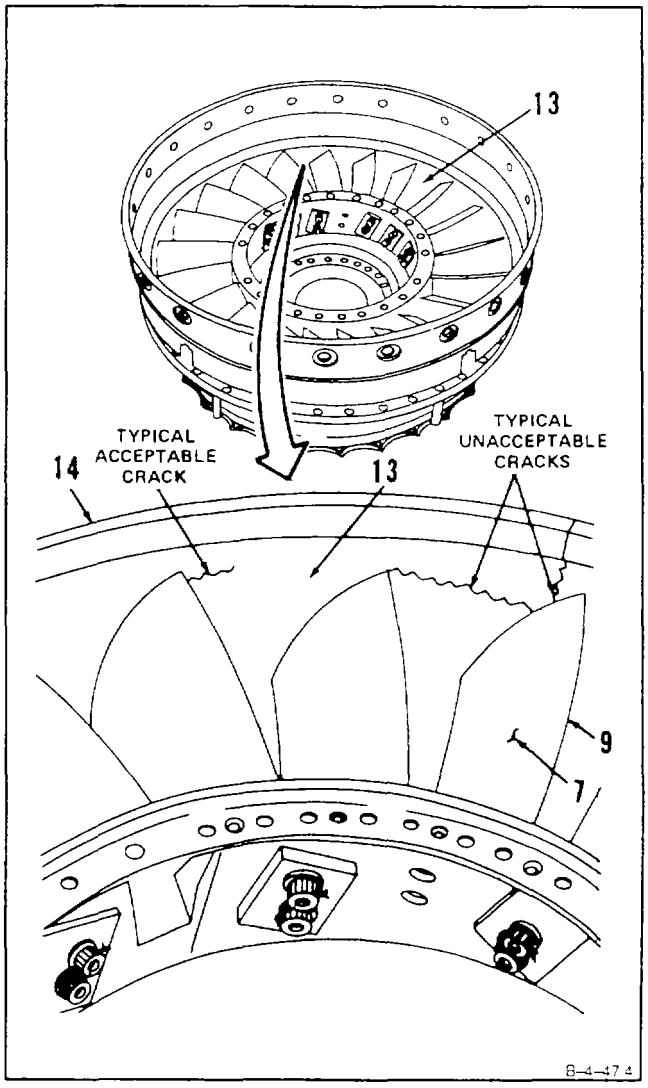
d. **Inspect outer shroud(13).**

(1) There shall be no cracks extending from trailing edge (9) of vane (7) into weldment (14)

(2) There shall be no vane-to-vane cracks



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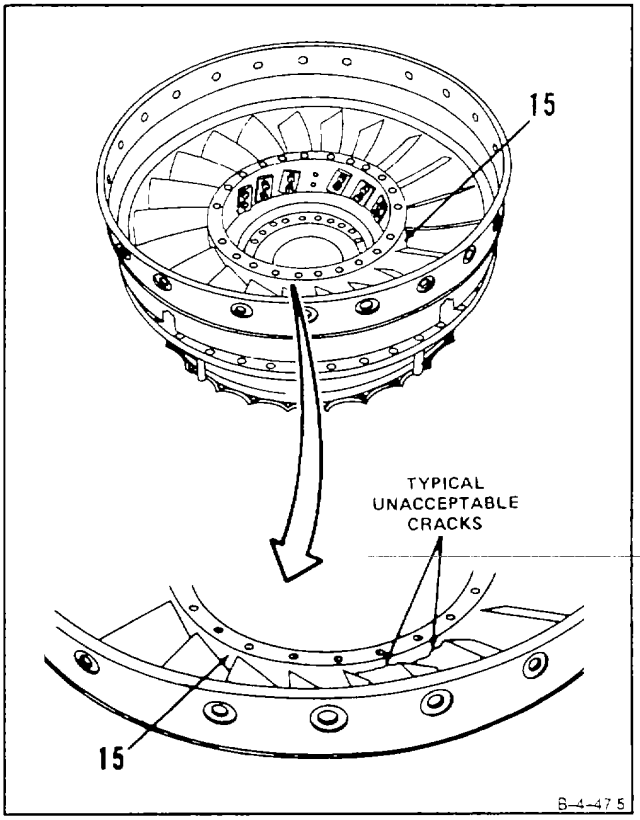
e. **Inspect inner shroud (15).** There shall be no vane-to-vane cracks



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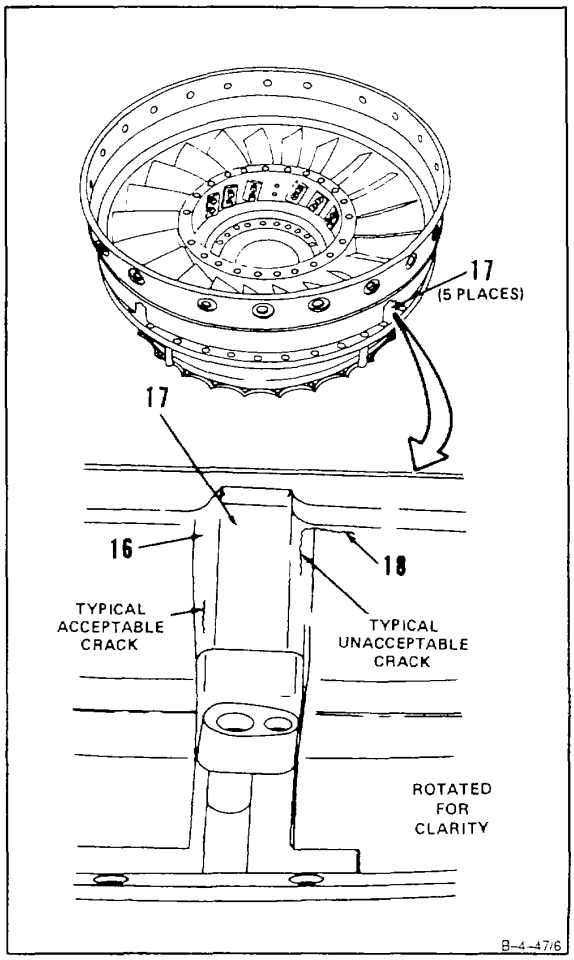
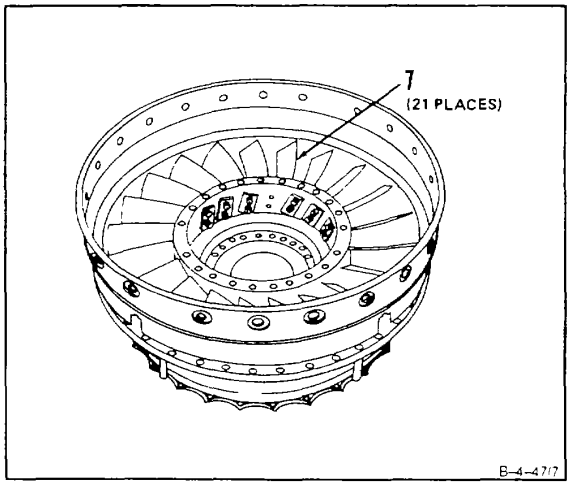
f. **Inspect stiffener ring weldments (16) at five cutout areas (17).** There shall be no circumferential cracks (18)



g. **Inspect 21 vanes (7)**

(1) There shall be no nicks, dents, or scratches, anywhere on vane, deeper than 0.030 inch

(2) There shall be no punctures in the vanes



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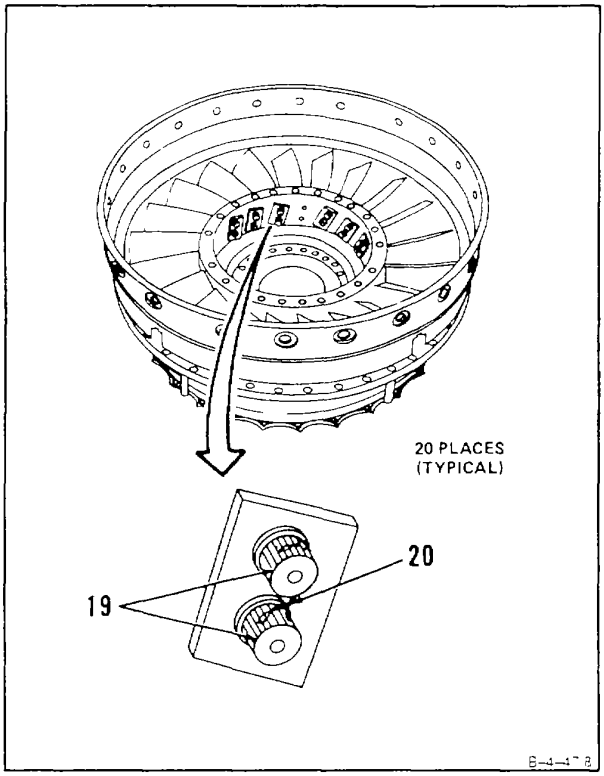
h. **Inspect retention bolts (19).** There shall be no broken lockwire (20)



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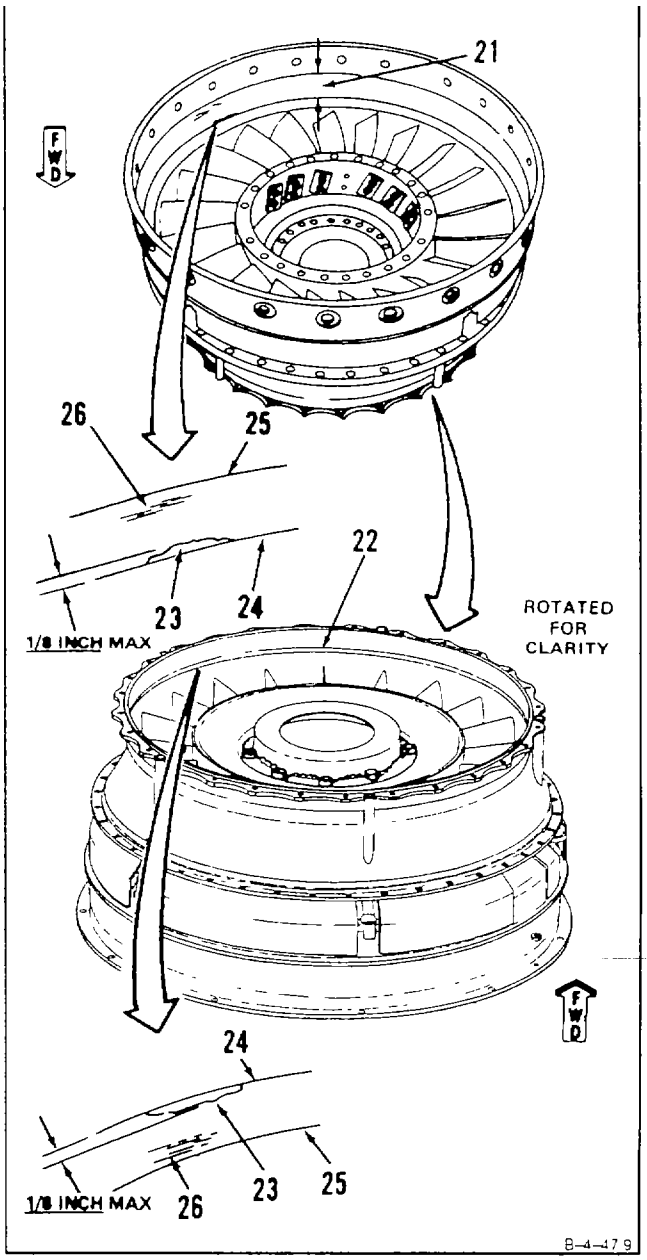
i. **Inspect plasma sprayed area of cylinder (21) and third turbine nozzle contact area (22)** as follows:

(1) There shall be no chips (23) in coating on forward edge (24) greater than 1/8 inch long axially.

(2) There shall be no chips in coating on aft edge (25).

(3) There shall be no rubs (26) in blade track area that breaks through coating to base metal.



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Hand File Set
Torque Wrench, 0-30 Inch-Pounds

Materials:
Crocus Cloth (E16)
Lockwire (E33)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

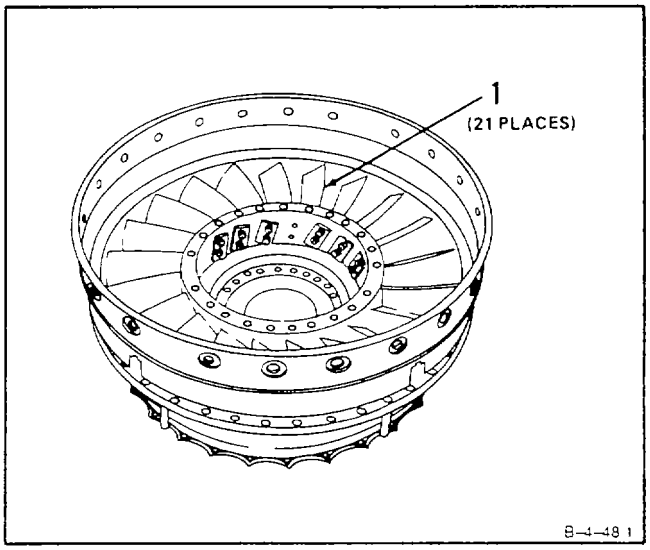
1. **Repair nicks, dents, and scratches 0.030 inch deep or less, in vanes (1)**

NOTE

Repair depth shall not exceed 0.030 inch.

a. Blend repair defect Use file

(1) Polish blended area with crocus cloth (E16)



INSPECT

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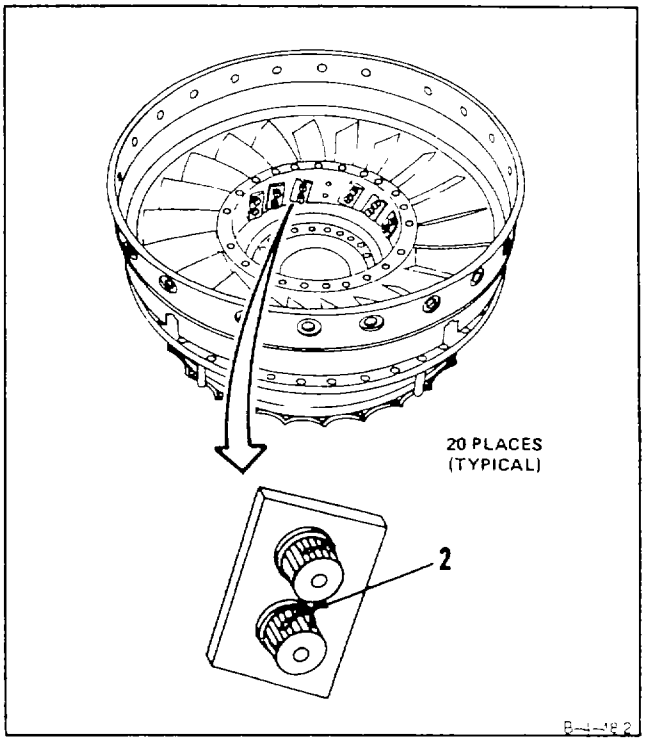
2. **Replace broken lockwire (2).**

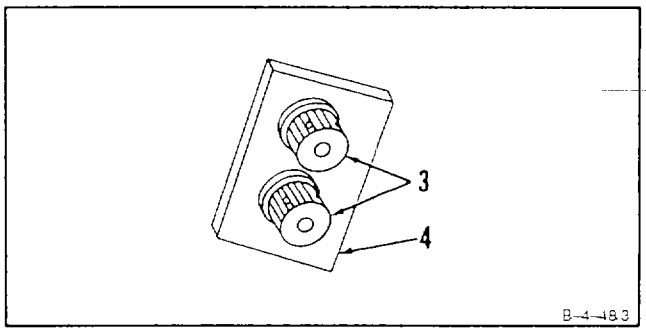


NOTE

In following step a, thread drag may cause indication of contact Apply up to 120 inch-pounds of torque to overcome thread drag

a. Remove lockwire (2) and loosen bolts (3) approximately one full turn, then tighten bolts (3) until bolt heads contact plate (4)

b. Back-off bolts (3) one-half to three-quarter turn and lockwire Use lockwire (E33)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

4-50 INSTALL FOURTH STAGE POWER TURBINE NOZZLE (AVIM) 4-50

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Locating Bar (T33)
Oil Tube Fixture (T45)
Bearing Installing Tool (T22)
Torque Wrench, 0-30 Inch-Pounds
Torque Wrench, 30-150 Inch-Pounds
Torque Wrench, 100-750 Inch-Pounds
Reducer, P/N 2-141-121-04
Bolt, 1/4 x 28 x 1 Inch (2)
Nut, 1/4 x 28 (2)

Materials:

Anti-Seize Compound (E6)
Gloves (E23)
Lockwire (E33)
Lubricating Oil (E35 or E36)

Parts:

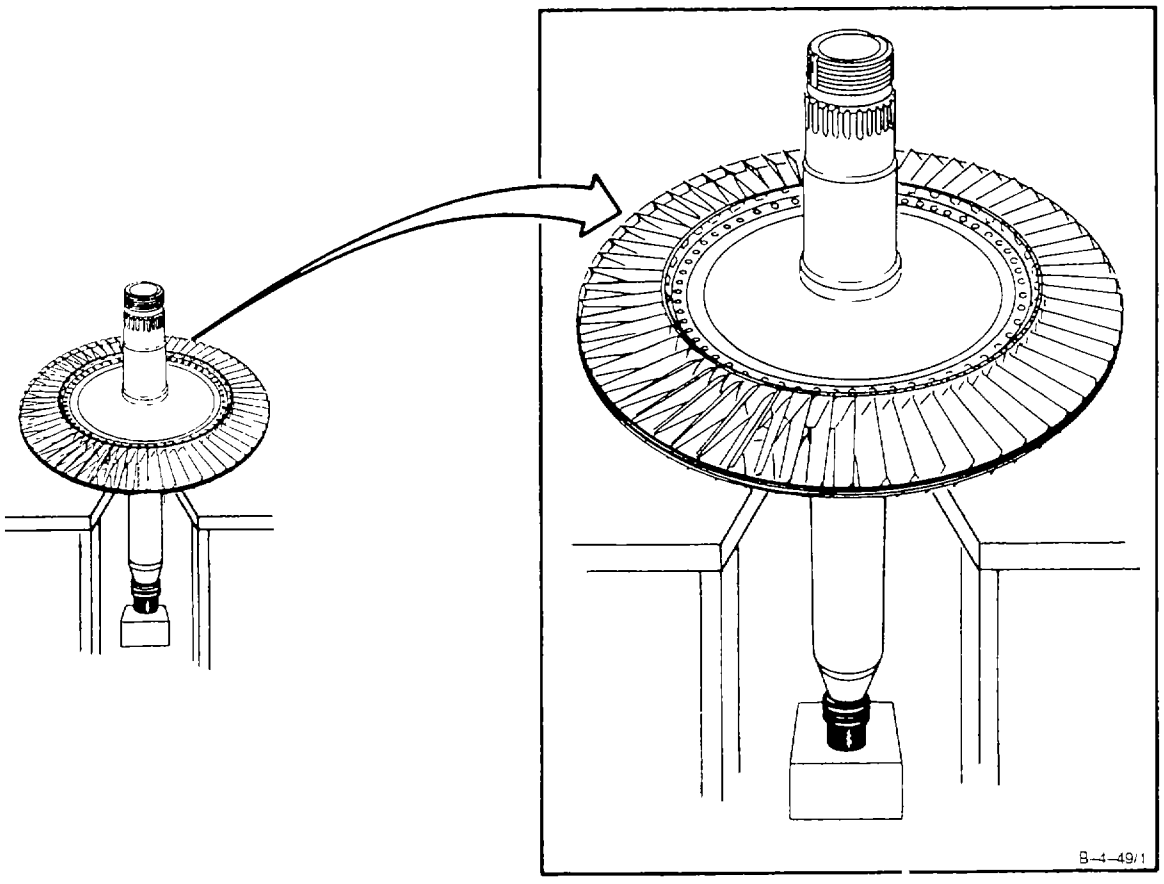
Seals
Screws

Personnel Required:

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:

TM 1-2840-252-23P
Task 4-45
Task 4-41



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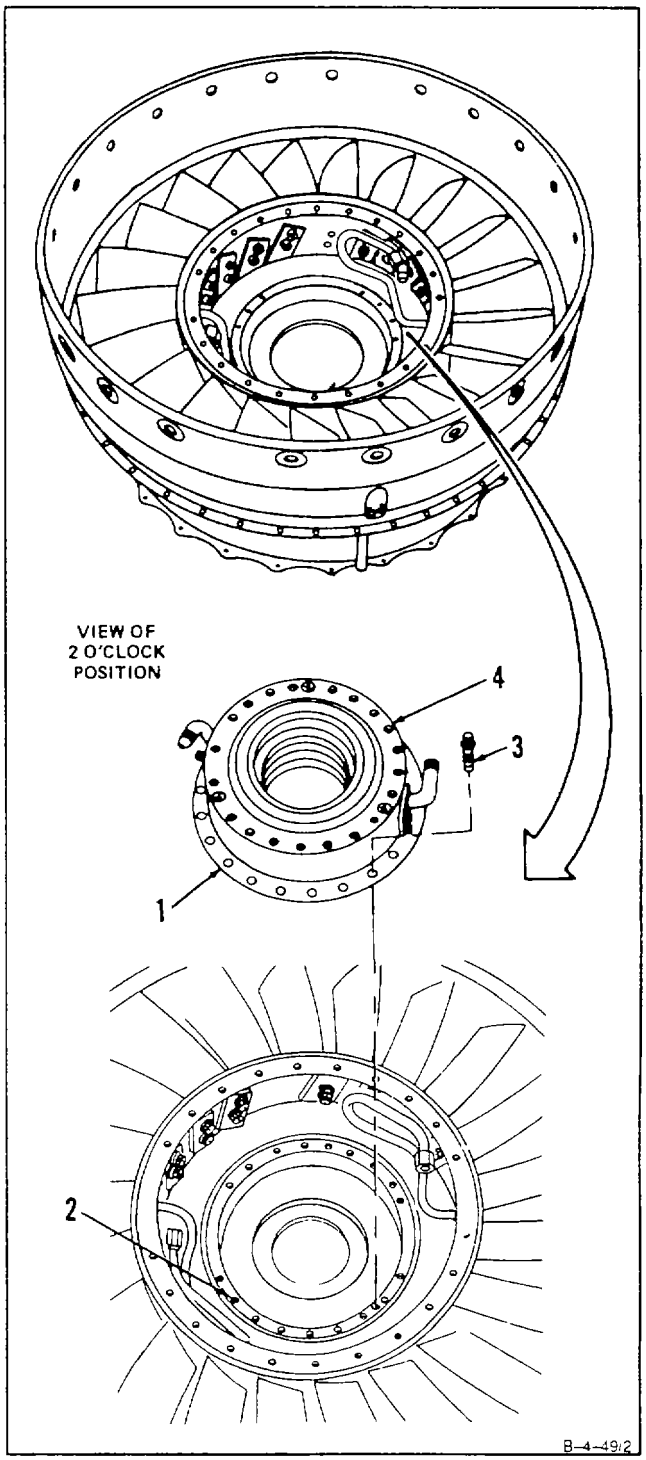
1. **Install No. 4 and 5 bearing oil tubes** (Ref Task 4-45)
2. Align bolt hole (1) with bolt hole (2)
3. Apply anti-seize compound (E6) to 19 bolts (3)
4. **Install No. 4 and 5 bearing package (4)** and 19 bolts (3)
5. **Lockwire bolts (3).** Use lockwire (E33)



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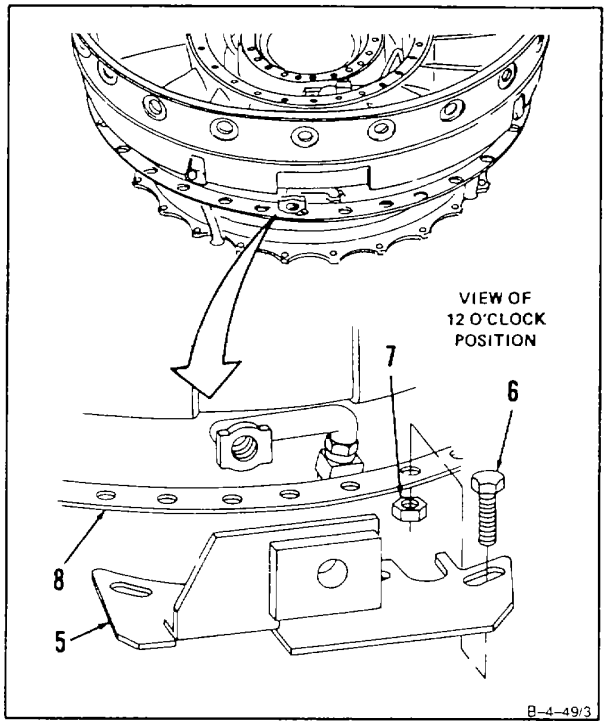
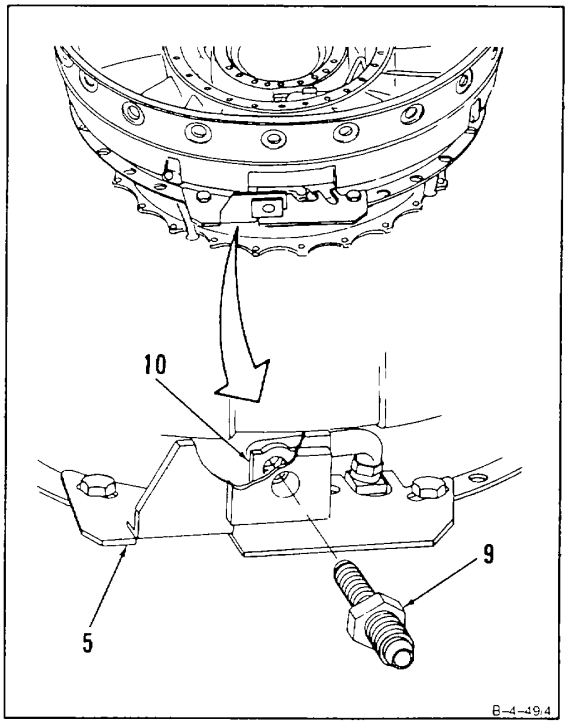
4-50 INSTALL FOURTH STAGE POWER TURBINE NOZZLE (AVIM) (Continued) 4-50

6. Install **oil tube fixture (T45)** (5), two 1/4 x 28 bolts (6), and 1/4 x 28 nuts (7) on nozzle flange (8) at the 12-o'clock position



7. **Thread reducer (9) into lube-in adapter (10)** until adapter (10) is firmly seated in oil tube fixture (T45) (5)



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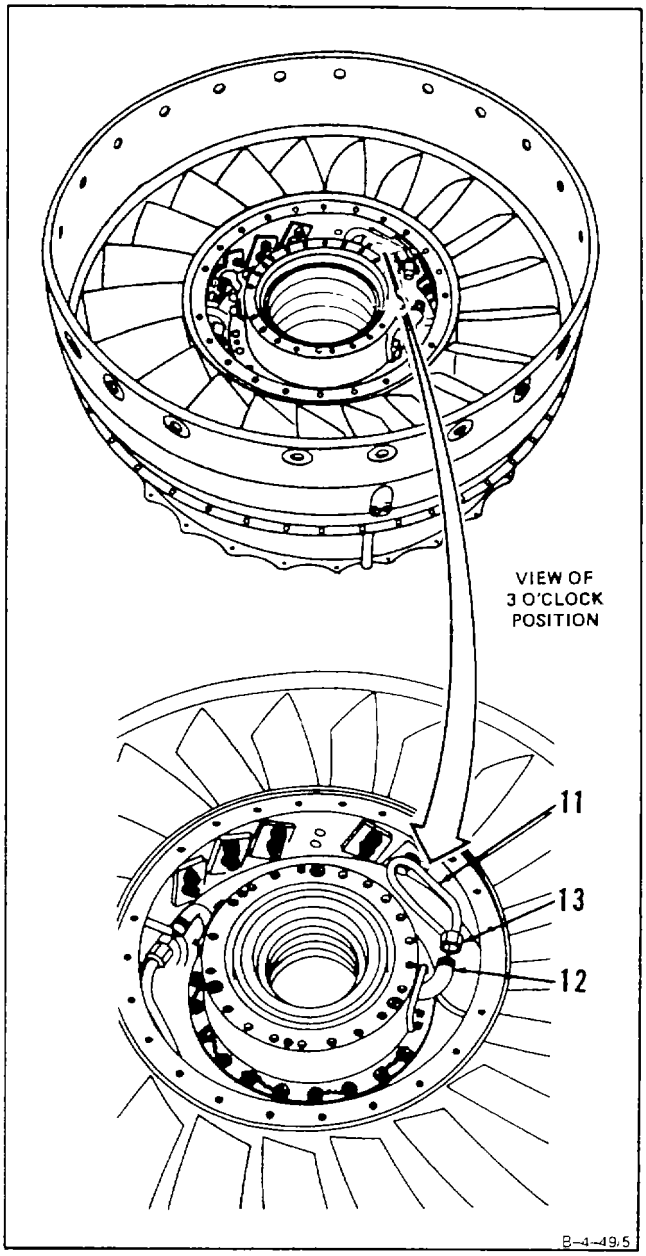
8 **Connect tube assembly (11) to adapter (12)** at 12-o'clock position. Torque nut (13) to 190 inch-pounds. Lockwire nut (13). Use lockwire (E33)



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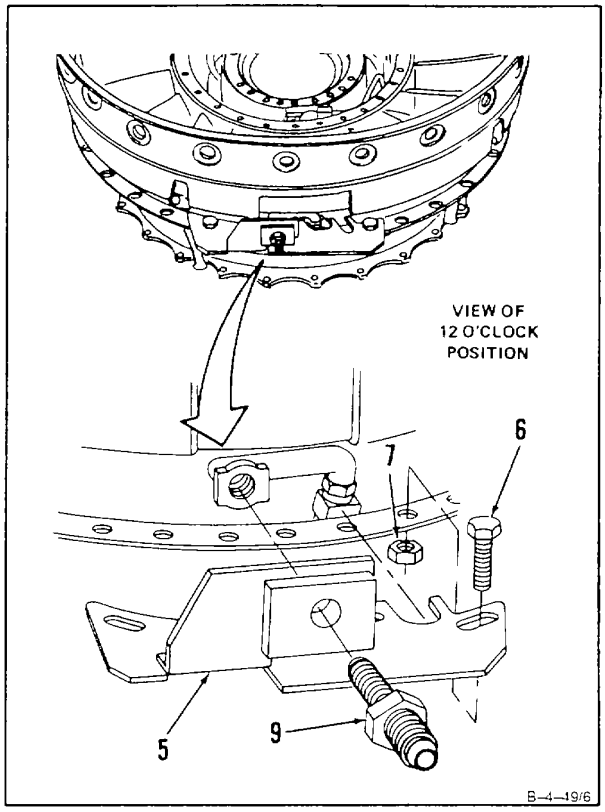
4-50 INSTALL FOURTH STAGE POWER TURBINE NOZZLE (AVIM) (Continued) 4-50

9. Remove reducer (9), bolts (6), nuts (7), and oil tube fixture (T45) (5).



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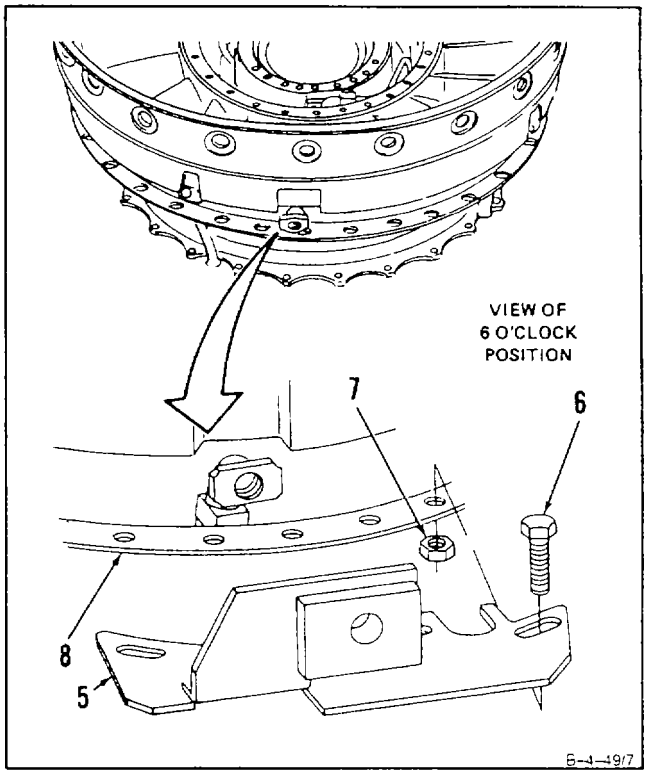
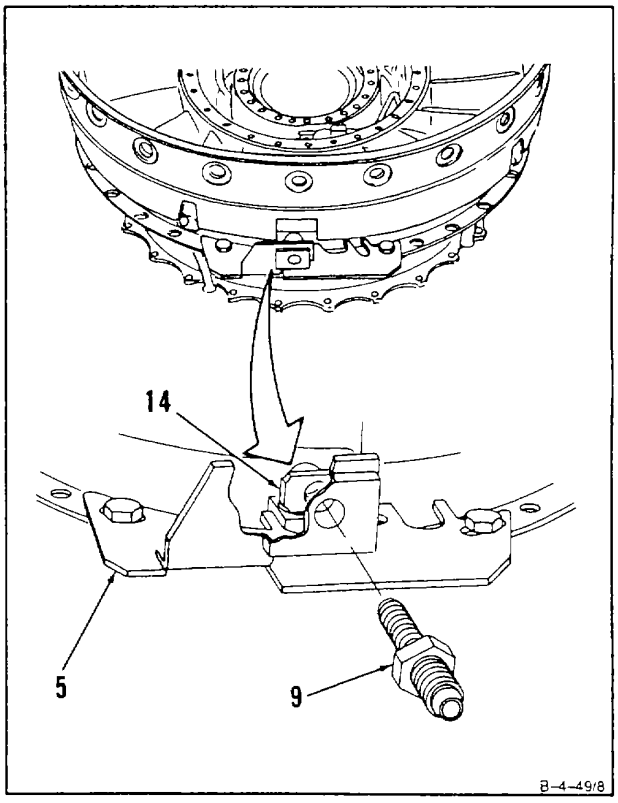
4-50 INSTALL FOURTH STAGE POWER TURBINE NOZZLE (AVIM) (Continued) 4-50

10. **Install oil tube fixture (T45) (5),** two 1/4 x 28 bolts (6), and 1/4 x 28 nuts (7) on nozzle flange(8) at the 6-o'clock position.



11. **Thread reducer (9) into lube scavenge adapter (14)** until adapter (14) is firmly seated in oil tube fixture (T45) (5).



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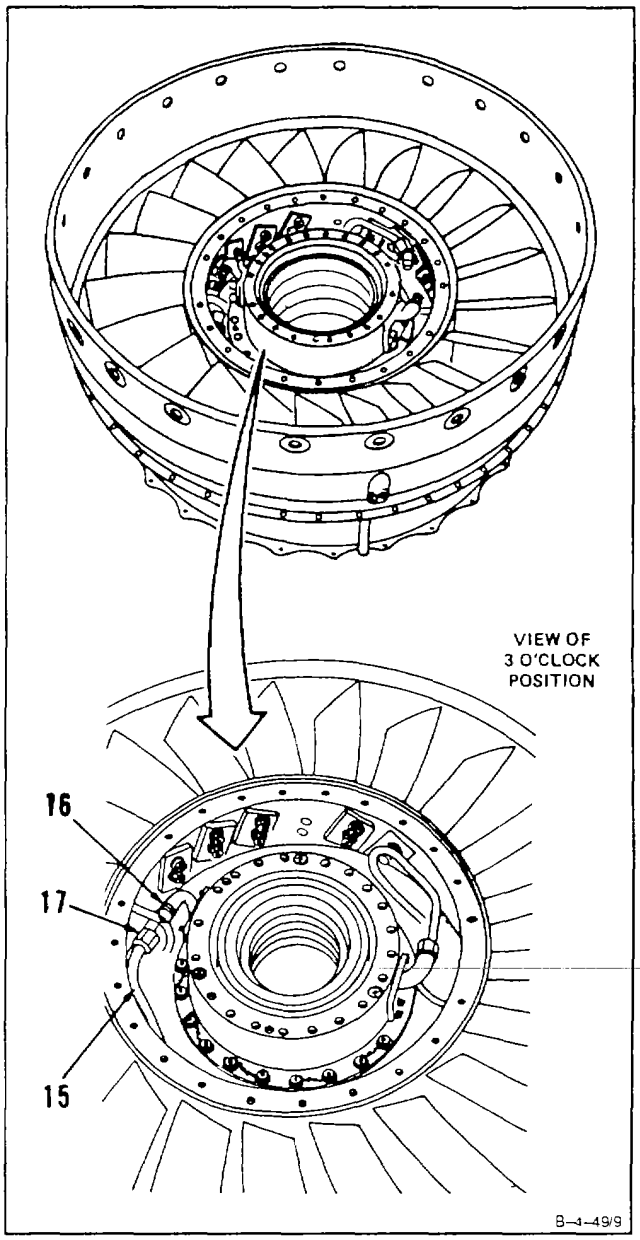
12. **Connect tube assembly (15)** to adapter (16) at 6-o'clock position. **Torque nut (17) to 190 inch-pounds.** Lockwire nut (17). Use lockwire (E33).



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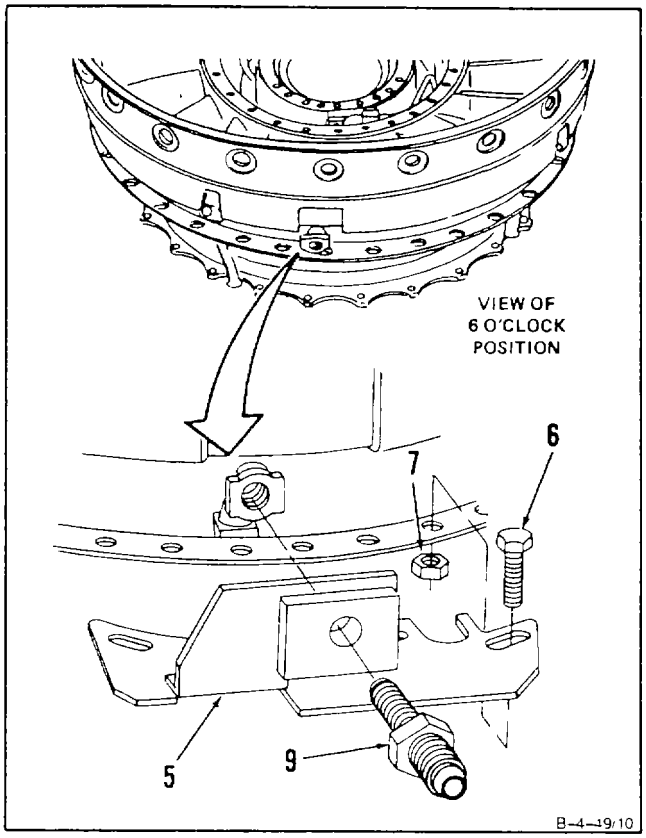
13. Remove reducer (9), two bolts (6), nuts (7) and oil tube fixture (T45) (5).

14. Pressure test No 4 and 5 bearing oil tubes and bearing package (Ref Task 4-41).



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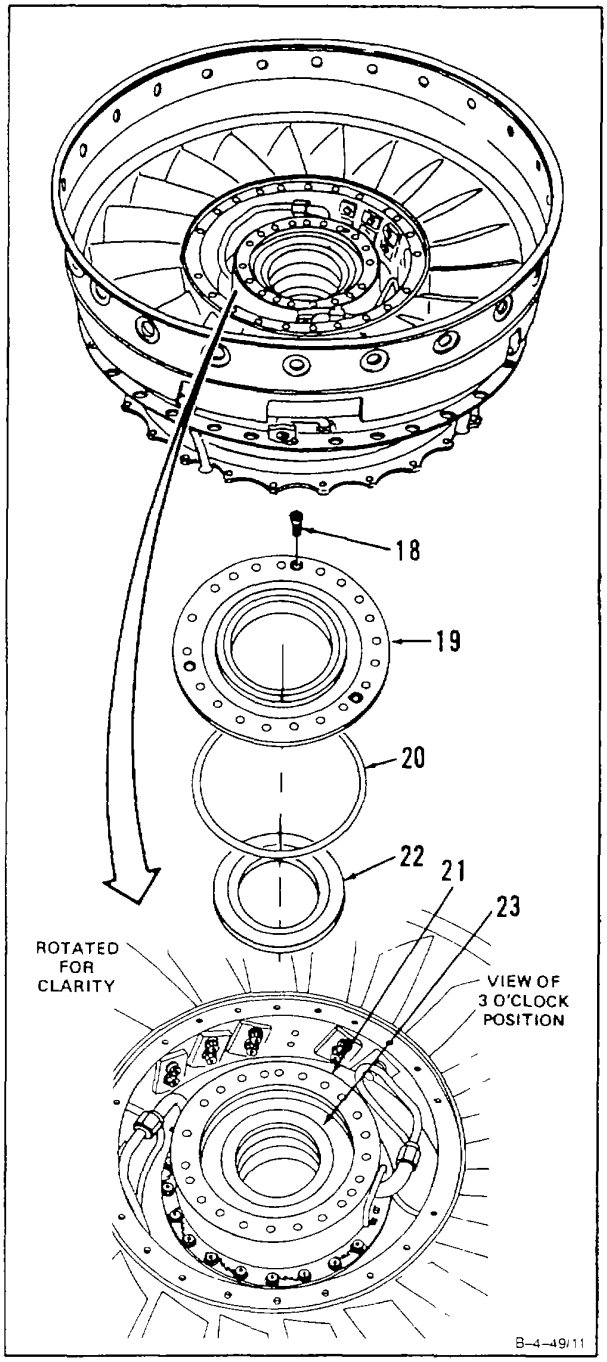
15. **Remove** three screws (18), **aft seal retainer** (19), and seal (20) from bearing housing (21).

16. **Remove faceplate (22)** from bearing (23).



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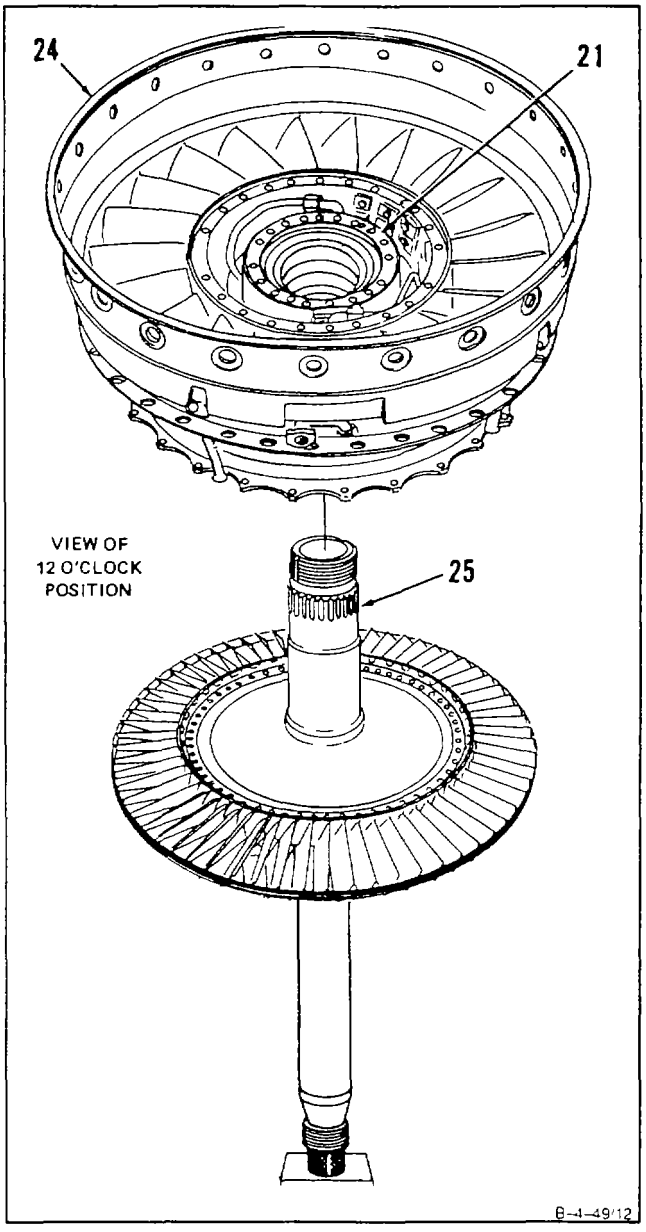
NOTE

The third stage power turbine rotor is a critical component for which life cycle data will be recorded and stored in the DECU on the aircraft.

If third stage power turbine rotor is a replacement, it is essential to update life cycle count in engine history data stored in the DECU via the engine history recording terminal (EHRT) (T37) (Ref TM 1-1520-252-23).

17. **Install fourth stage power turbine nozzle (24) with bearing housing (21) installed** on rear shaft of integral shaft assembly (25).



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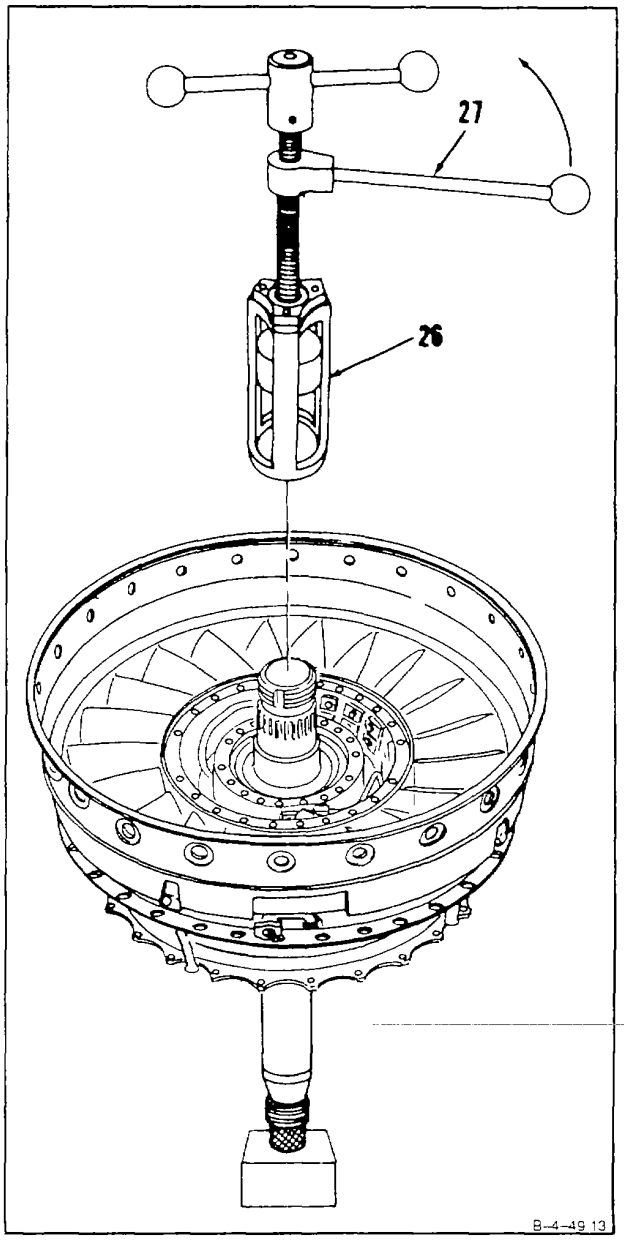
18. **Install bearing installing tool (T22) (26)** as follows:

    a. Turn handle (27) counterclockwise until it is backed out all the way.



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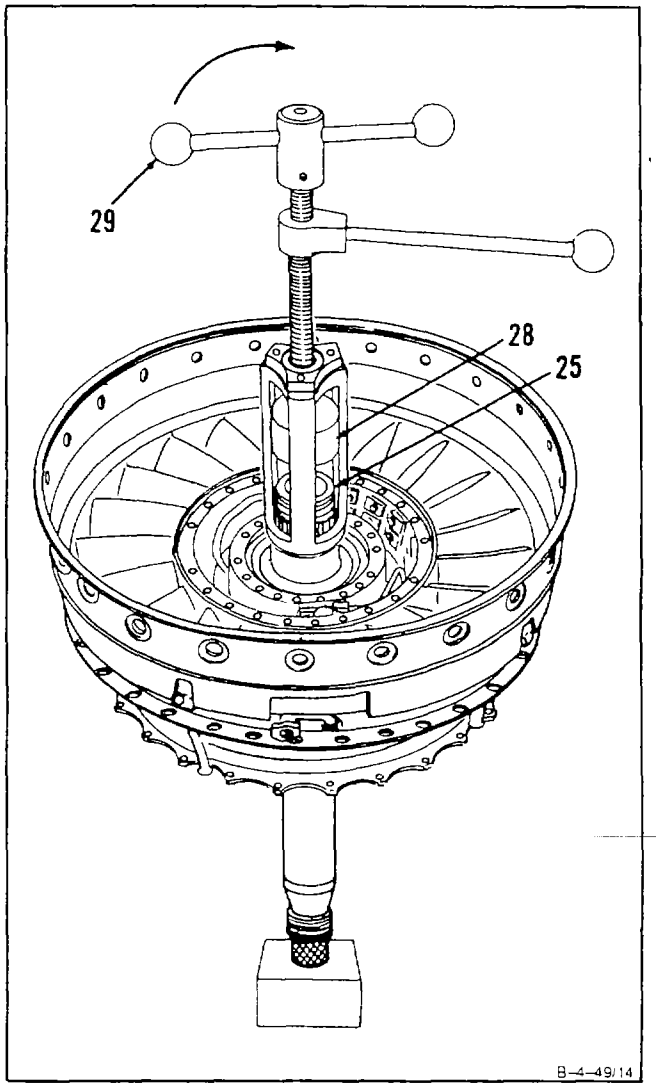
4-50 INSTALL FOURTH STAGE POWER TURBINE NOZZLE (AVIM) (Continued) 4-50

b. Install nut (28) on integral shaft assembly (25). Turn T-handle (29) clockwise until nut (28) is tight.



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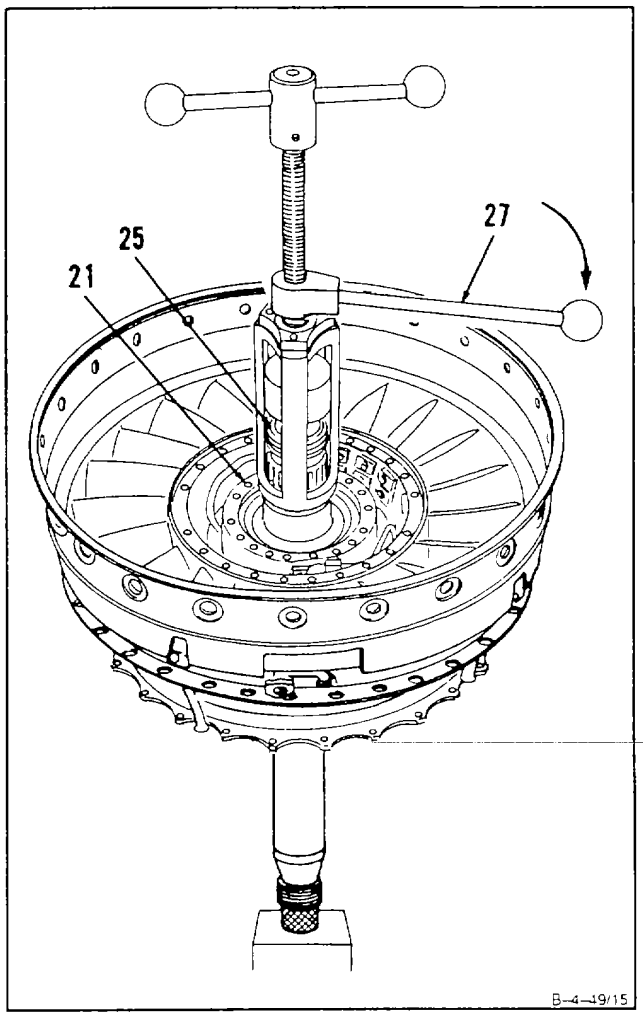
19. **Seat No. 4 and 5 bearing package (21)** against integral shaft assembly (25) by turning handle (27) clockwise.



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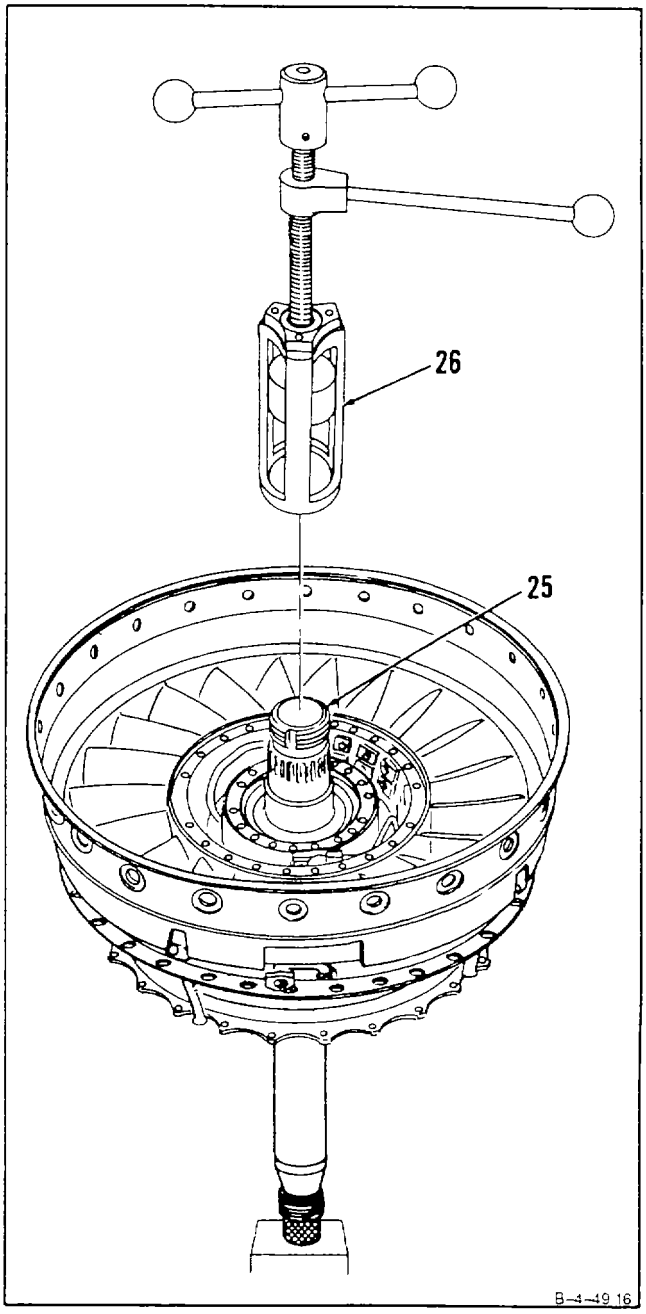
20. **Remove bearing installing tool (T22) (26)** from integral shaft assembly (25).



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21. **Install faceplate (22),** beveled side down, on No 5 bearing (23).

22. **Install seal (20).**

INSPECT

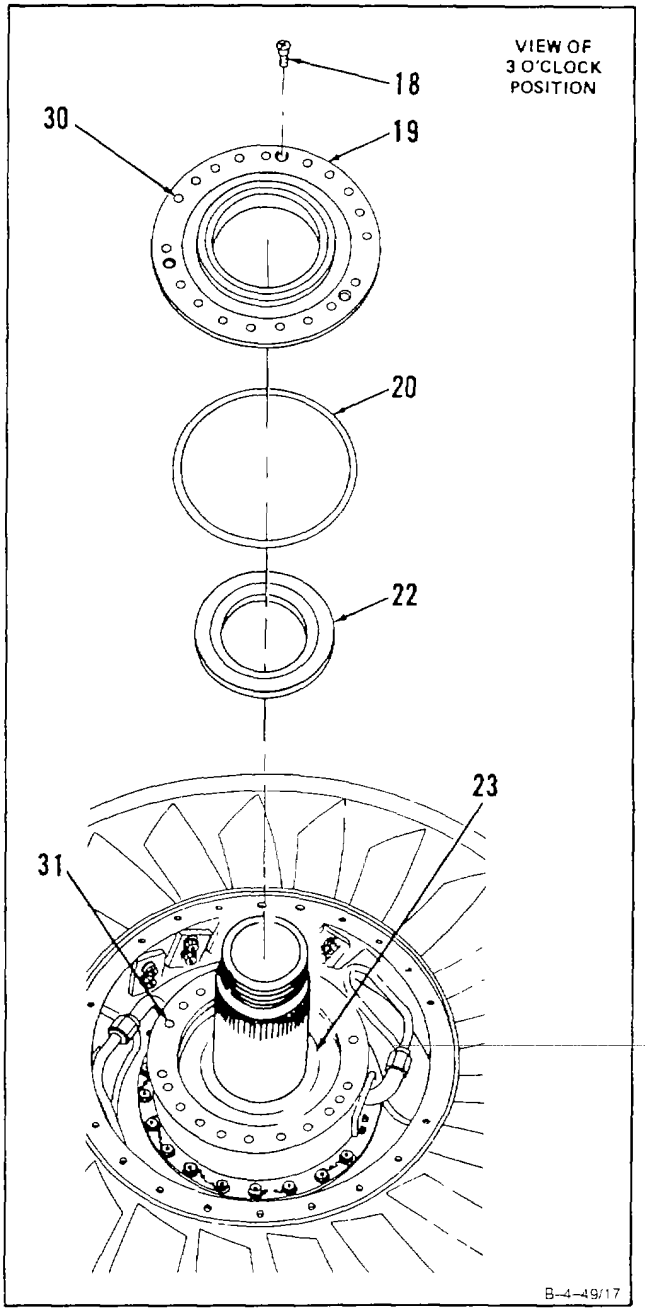
WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

CAUTION

Be sure to apply a light coat of lubricating oil on faceplate before installation. Failure to comply will cause damage to aft seal during dry running of initial engine starts.

23. Wear gloves (E23). Apply light coat of lubricating oil (E35 or E36) on faceplate (22). Align bolt holes (30) with bolt holes (31) and **install aft seal and retainer (19)** and three screws (18).



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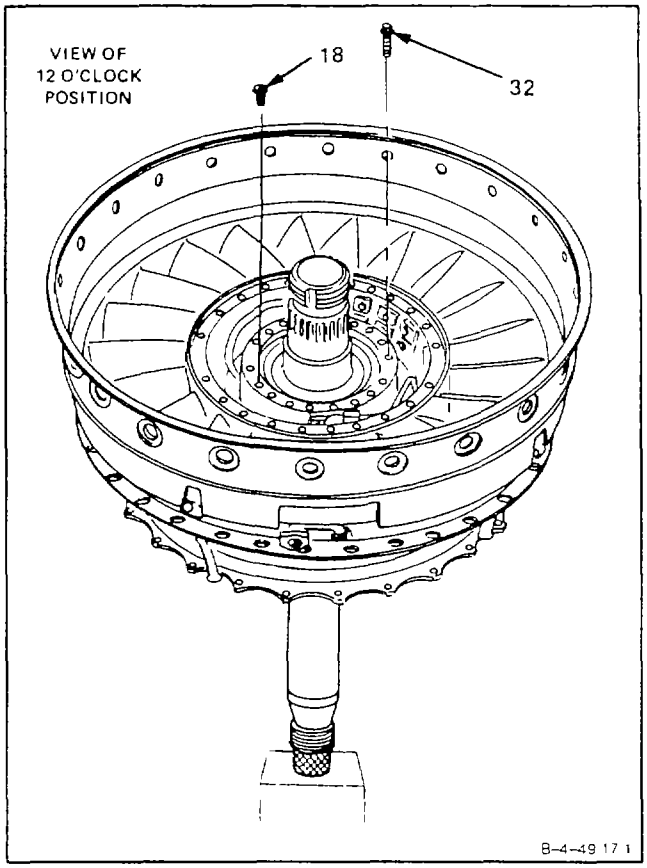
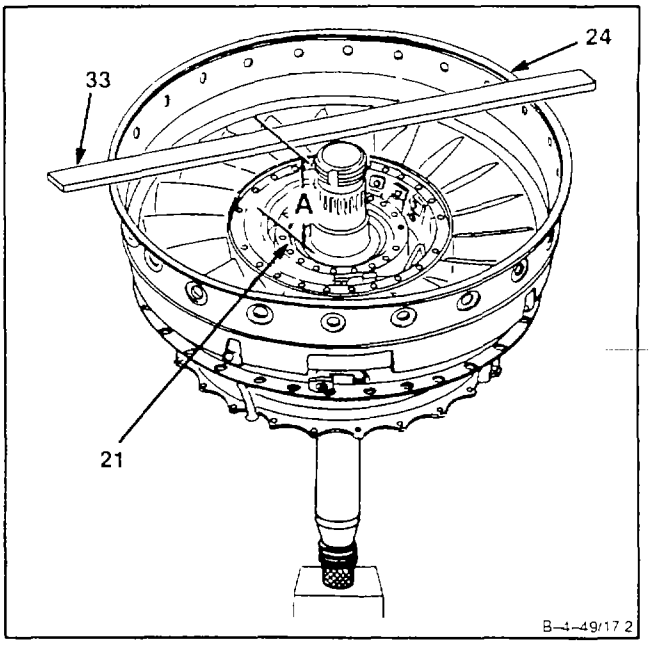
24. Install 20 bolts (32). **Torque bolts (32) to 85 inch-pounds.** Retighten three screws (18) as required. Remove 20 bolts (32).



25. **Measure clearance between forward face of inner bolt circle area of heat shield and aft face of No. 4 and 5 bearing seal housing as follows:**

    a. Place locating bar (T33) (33) on outer edge of fourth turbine nozzle assembly (24).

    b. Measure from top of locating bar (T33) (33) to aft face of bearing seal housing (21) in three locations. Use micrometer depth gage. Record average as dimension A.



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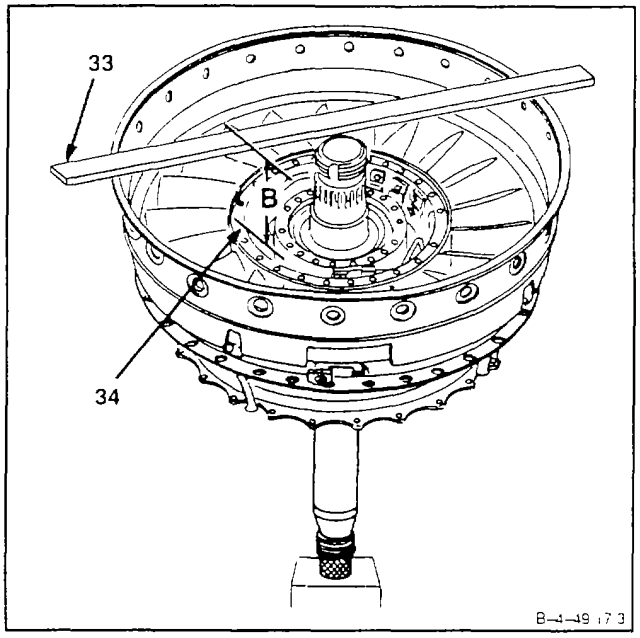
c. Measure from top of locating bar (T33) (33) to inner aft face of fourth turbine nozzle assembly (34), in three locations. Use micrometer depth gage Record average as dimension B.

d. Subtract dimension A from dimension B. Record as dimension C.

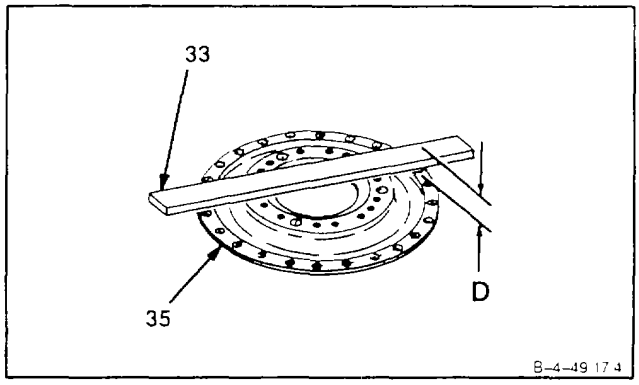


e. Place locating bar (T33) (33) on forward face of inner bolt circle on heat shield (35).

f. Measure from top of locating bar (T33) (33) to forward face of outer flange on heat shield (35) in three locations. Use micrometer depth gage Record average as dimension D.

NOTE

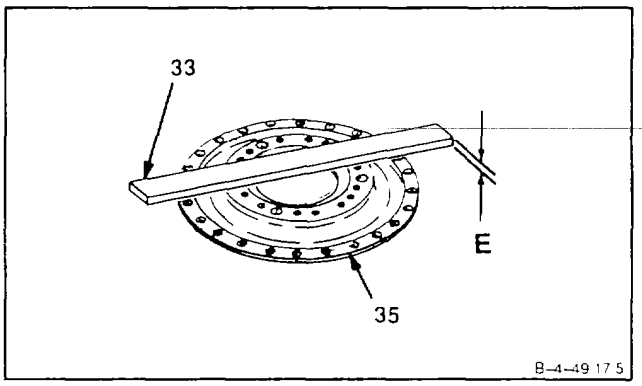
In following step g, dimension E is the thickness of locating bar (T33) (33).



g. Measure from top of locating bar (T33) (33) to forward face of inner bolt circle on heat shield (35). Use micrometer depth gage. Record as dimension E.

h. Subtract dimension E from dimension D. Record as dimension F.

i. Subtract dimension F recorded in step h from dimension C recorded in step d to obtain clearance at inner bolt circle. Record as dimension G.



NOTE

Clearance required is 0.001 inch minimum.

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NOTE

If Dimension G is 0.001 inch or greater, proceed to step 27.

NOTE

To maintain axial clearance between screw heads (outer circle) and fourth turbine rotor blade rivet heads, clearance should be held as close to minimum as possible.

SHIM SELECTION TABLE	
PART NUMBER	**SHIM THICKNESS**
2-141-422-01	0.010 inch
2-141-422-02	0.020 inch
2-141-422-03	0.040 inch

j. If required, select shim from shim selection table to a maximum of 0.080 inch. Add shim at outer flange to achieve clearance of 0.001 to 0.050 inch at inner bolt circle mounting surface.

Example If dimension G is -0.039 inch, select shim Part No 2-141-422-03. Clearance will be 0. 001 inch. If dimension G is -0.019 inch, select shim Part No 2-141-422-02. Clearance will be 0.001 inch.

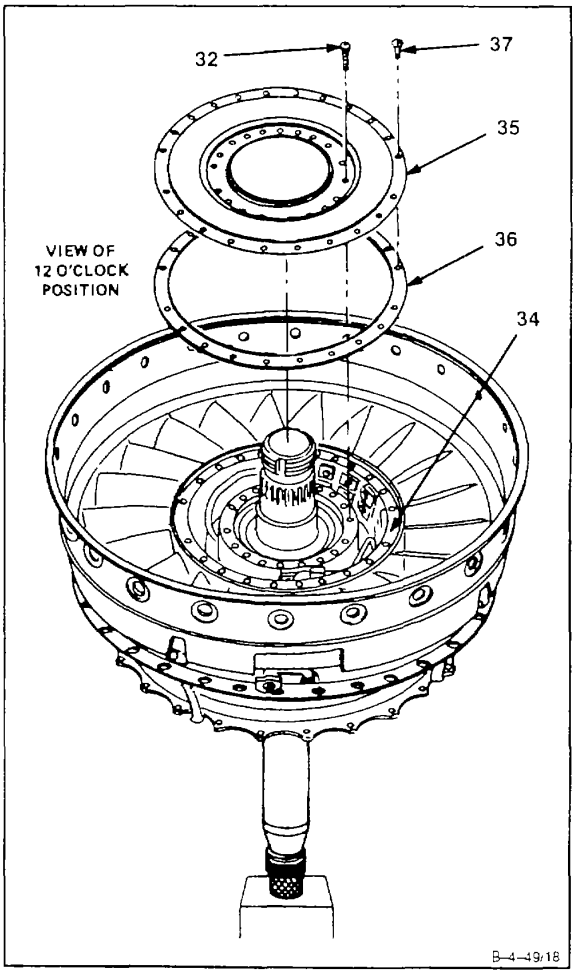
26. Install shim (36), selected in previous step j on inner bolt circle on aft face of fourth turbine nozzle assembly (34).

27. Coat 20 bolts (32) and 22 new screws (37) with anti-seize compound (E6).

CAUTION

In following step 28, be sure to use 22 new screws. Used screws could break and cause damage to engine. Outer screws are to be torqued first to reduce breakage.

28 **Install heat shield (35),** 22 screws (37) and 20 bolts (32). **Torque screws (37) to 20 to 25 inch-pounds, then torque bolts (32) to 70 to 95 inch-pounds.** Lockwire screws (37) and bolts (32). Use lockwire (E33).



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29. **Turn fourth stage power turbine nozzle (24) over on table.**

30. **Measure third stage power turbine rotor (38) tip clearance** at 0.45,.90,.135,.180, 225,.270, and 315 degree positions as follows:

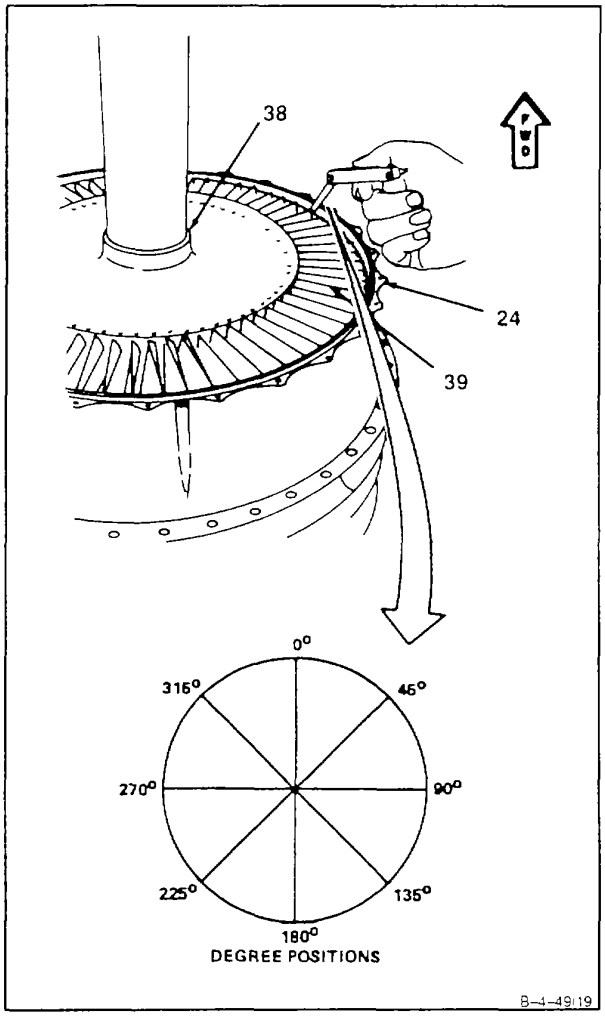
    a. Insert thickness gage between third stage power turbine rotor blades (39) and fourth stage power turbine nozzle (24).

    b. Rotate third stage power turbine rotor (38) counterclockwise one revolution for each check.

    c. Tip clearance shall be 0.020 inch minimum.

    d. If tip clearance is below 0.020 inch, replace power turbine assembly.

31. **Turn fourth stage power turbine nozzle (24) over on two tables.**



INSPECT

FOLLOW-ON MAINTENANCE
Install Fourth Stage Power Turbine Rotor (Task 4-36).
Install Third Turbine Nozzle and Support (Task 4-32).
Install Thermocouple Harness Assemblies (Task 4-25).
Assemble Combustion Section and Power Turbine (Task 3-7).
Install Combustion Section and Power Turbine (Task 3-8).
Service Engine Oil System (Task 1-68).

END OF TASK

SECTION X

THIRD STAGE POWER TURBINE ROTOR

4-51 CLEAN THIRD STAGE POWER TURBINE ROTOR (AVIM) 4-51

INITIAL SETUP

Applicable Configurations:
All
Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Goggles
Dry, Compressed Air Source
Materials:
Gloves (E24)
Denatured Alcohol (E17)
Personnel Required
Aircraft Powerplant Repairer:

Equipment Condition:

Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Combustion Section and Power Turbine Disassembled (Task 3-6)
Thermocouple Harness Assemblies Removed (Task 4-20)
Third Turbine Nozzle and Support Removed (Task 4-26)
No 4 and 5 Bearing Package Seals Removed (Task 4-37, Steps 1 thru 15)
Fourth Stage Power Turbine Nozzle Removed (Task 4-46)

1 Remove vexar nylon webbing from shaft journal area (1).

NOTE

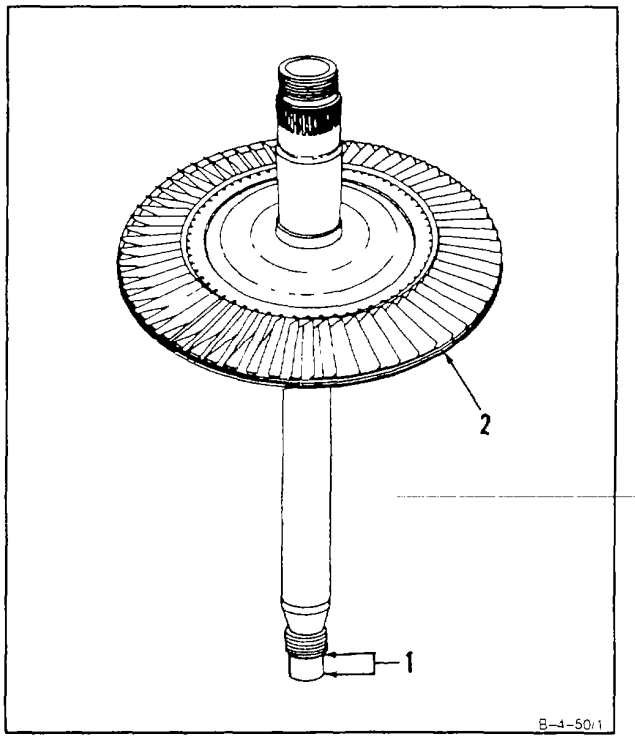
Do not remove matchmarks

2 Wear gloves (E24) and goggles. **Clean third stage power turbine rotor (2)** using denatured alcohol (E17) and brush.

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

3 Wear goggles. **Blow dry third stage power turbine rotor (2)** using clean, dry, compressed air.



FOLLOW-ON MAINTENANCE

Inspect Third Stage Power Turbine Rotor (Task 4-52).

END OF TASK

4-52 INSPECT THIRD STAGE POWER TURBINE ROTOR (AVIM) 4-52

INITIAL SETUP

Applicable Configurations

All

Tools:

Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Outside Micrometer Caliper Set

Materials:

Vexar Nylon Webbing (E62F

Personnel Required:

Aircraft Powerplant Inspector

References:

Task 1-109

Equipment Condition:

Off Engine Task

1. **Inspect third stage power turbine rotor (1)** as follows:

   a **Inspect disc (2).**

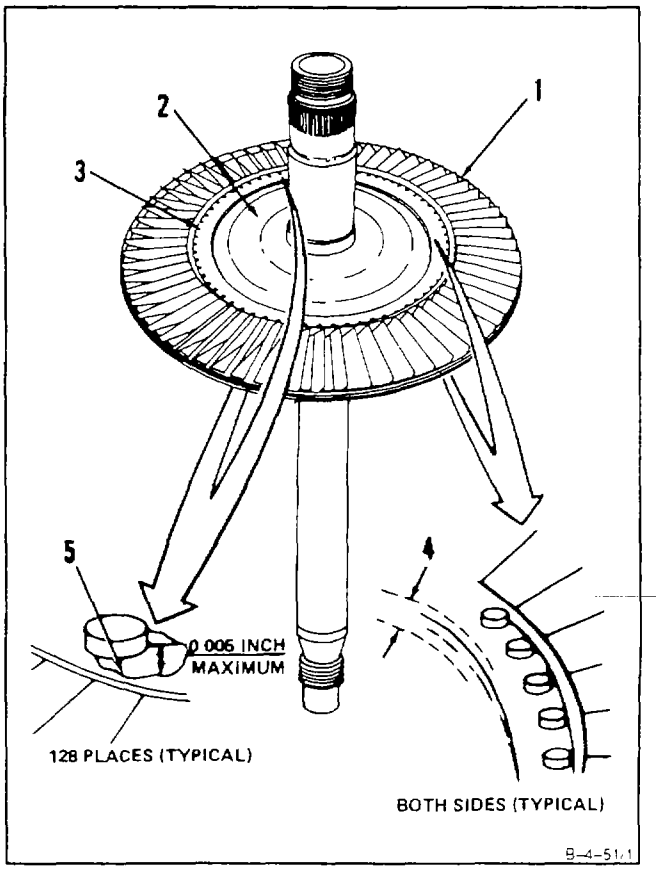
      (1) There shall be no cracks

      (2) There shall be no burns

      (3) There shall be no loose or cracked pins (3)

      (4) There shall be no pitting, nicks or rubs deeper than 0.010 inch. This limit does not apply to area (4) where material has been removed for balancing.

      (5) Inspect pin head area (5). There shall be no indents deeper than 0.005 inch. There shall be no indents which do not have a smooth contour. There shall be no cracks.



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4-52 INSPECT THIRD STAGE POWER TURBINE ROTOR (AVIM) (Continued) 4-52

NOTE

The following inspection applies to both sides of blades Only one side is shown.

b. **Inspect 64 blades (6).** There shall be no more than 12 damaged blades.

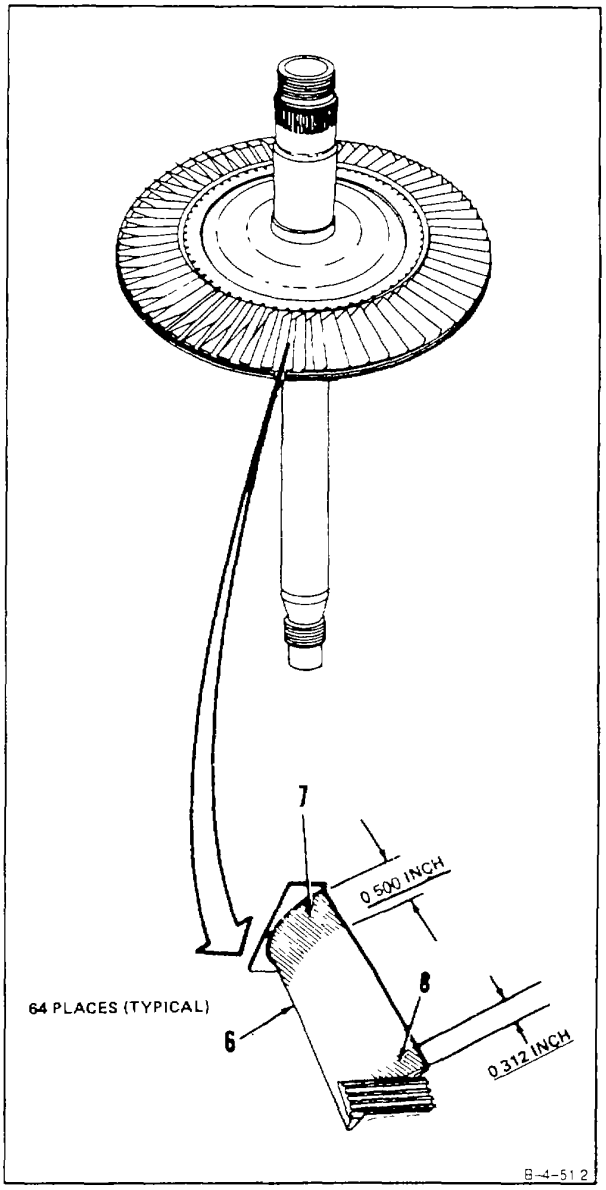
(1) There shall be no cracks.

(2) There shall be no burns.

(3) There shall be no bending or distortion.

(4) There shall be no loss of material.

(5) There shall be no nicks, dents or pitting in inner critical area (7) or outer critical area (8).



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4-52 INSPECT THIRD STAGE POWER TURBINE ROTOR (AVIM) (Continued) 4-52

(6) Inspect inner half non-critical area (9) as follows:

(a) There shall be no nicks or dents (10) in airfoil surface (11) longer than 0.078 inch or deeper than 0.010 inch.

(b) There shall be no nicks or dents (12) in edges (13) longer than 0.125 inch or deeper than 0.031 inch.

(c) There shall be no pitting deeper than 0.010 inch.

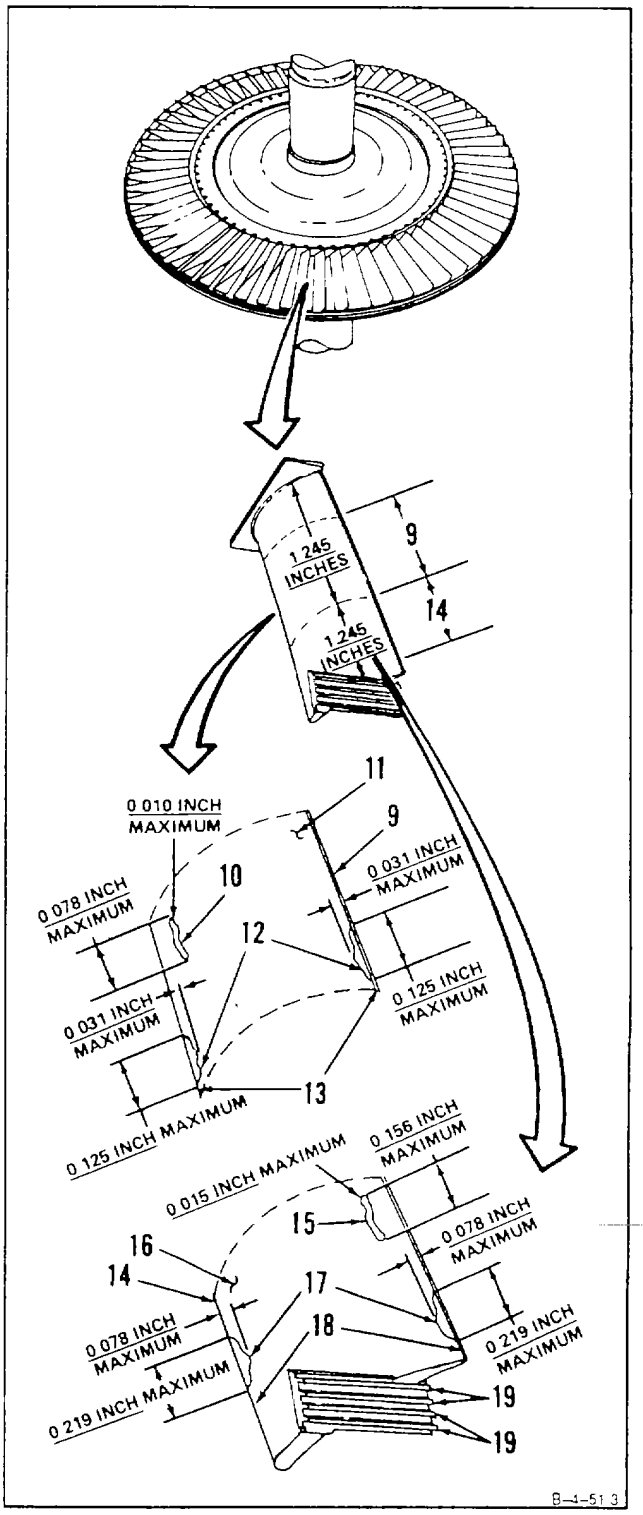
(7) Inspect outer half non-critical area (14) as follows:

(a) There shall be no nicks or dents (15) in airfoil surface (16) longer than 0.156 inch or deeper than 0.015 inch.

(b) There shall be no nicks or dents (17) in edges (18) longer than 0.219 inch or deeper than 0.078 inch.

(c) There shall be no pitting deeper than 0.010 inch.

(8) There shall be no nicks deeper than 0.015 inch at tip labyrinth (19).



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4-52 INSPECT THIRD STAGE POWER TURBINE ROTOR (AVIM) (Continued) 4-52

c. Inspect shaft (20).

(1) There shall be no cracks.

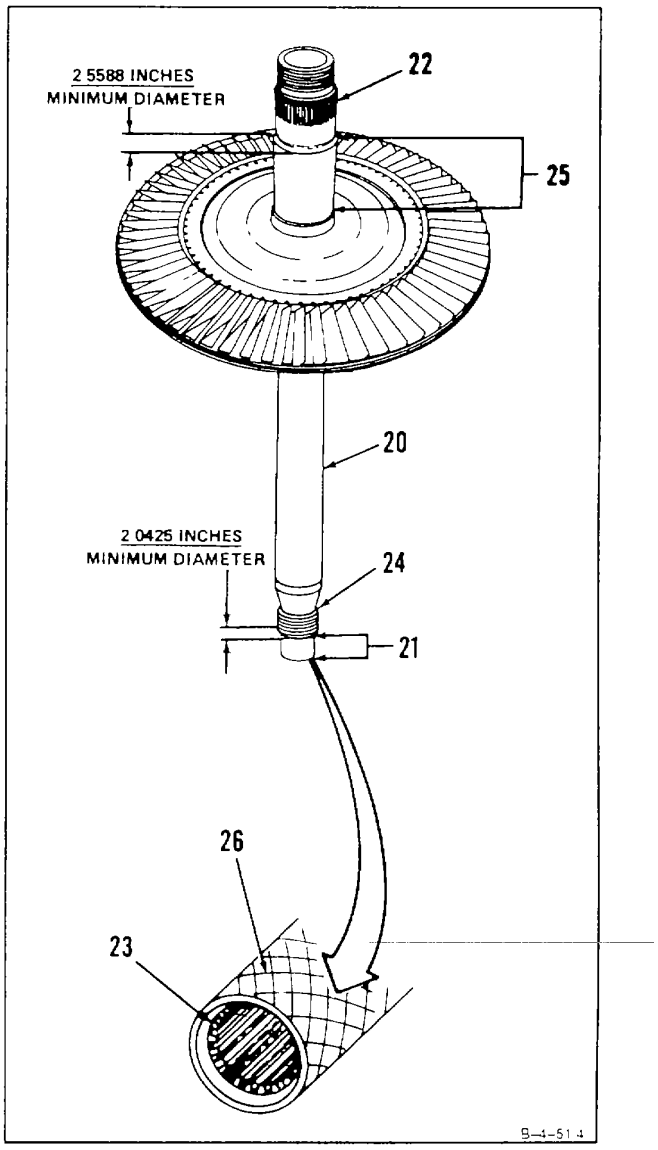
(2) Inspect shaft journal area (21) There shall be no pitting or nicking The outside diameter shall not be worn to less than 2.0425 inches.

(3) Inspect splines (22 and 23) (Ref Task 1-109). There shall be no wear deeper than 0.007 inch on spline (22) and 0.005 inch on spline (23).

(4) Inspect labyrinth seal (24) for cracks.

(5) Inspect shaft journal area (25) The outside diameter shall not be worn to less than 2.5588 inches.

2. Install vexar nylon webbing (E62) (26) over shaft journal area (21).



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-53 REPAIR THIRD STAGE POWER TURBINE ROTOR (AVIM) 4-53

INITIAL SETUP

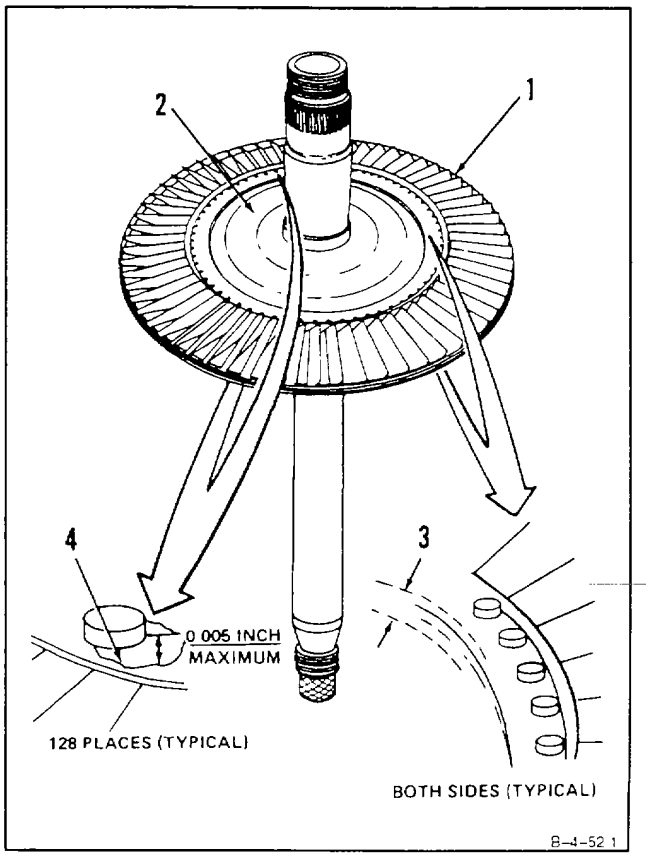
Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials
Carborundum Stone (E11)
Crocus Cloth (E16)
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1. **Repair third stage power turbine rotor (1)** as follows:

   a. **Repair disc (2).**

      (1) Blend repair pits, nicks and rubs up to 0.010 inch deep except in area (3) where material has been removed for balancing. Use carborundum stone (E11) Polish to smooth finish Use crocus cloth (E16).

      (2) Polish indents in pin head area (4) up to 0.005 inch deep Use crocus cloth (E16) to polish to smooth contour.



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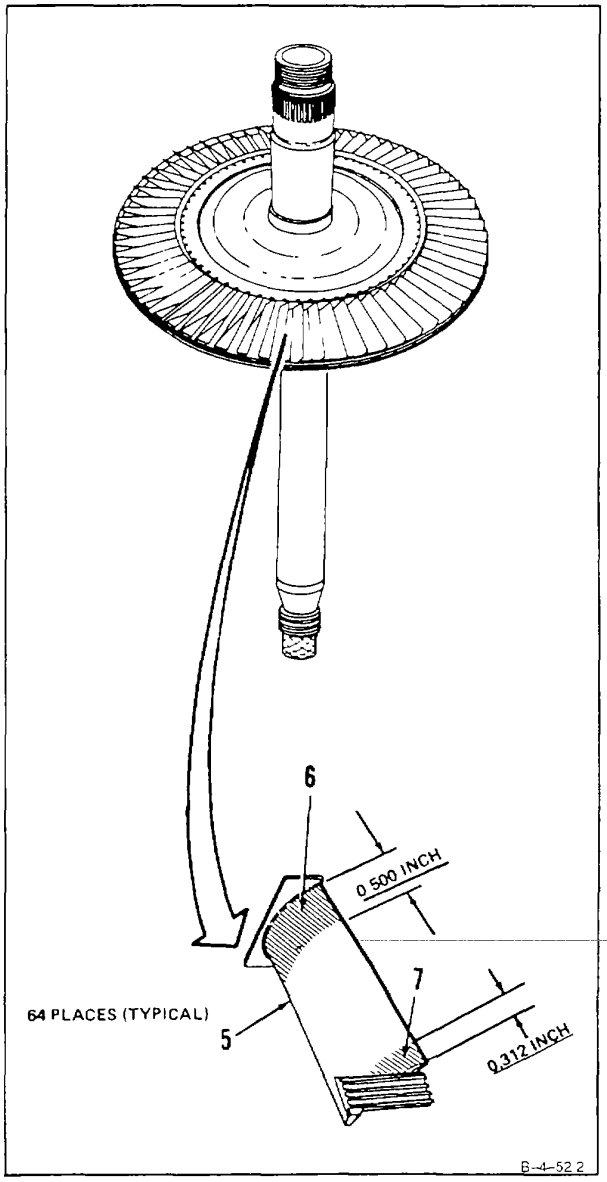
b. **Repair 64 blades** (5) There shall be no more than 12 damaged blades.

NOTE

The following repair applies to both sides of blades Only one side is shown.

(1) There shall be no repair in inner (6) or outer (7) critical area.

(2) Blend repair pits up to 0.010 inch deep. Use carborundum stone (E11) and crocus cloth (E16).



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4-53 REPAIR THIRD STAGE POWER TURBINE ROTOR (AVIM) (Continued) 4-53

(3) Blend repair inner non-critical area (8) up to the following limits.

(a) Nicks and dents (9) in airfoil surface (10) up to 0.010 inch deep and up to 0.078 inch long.

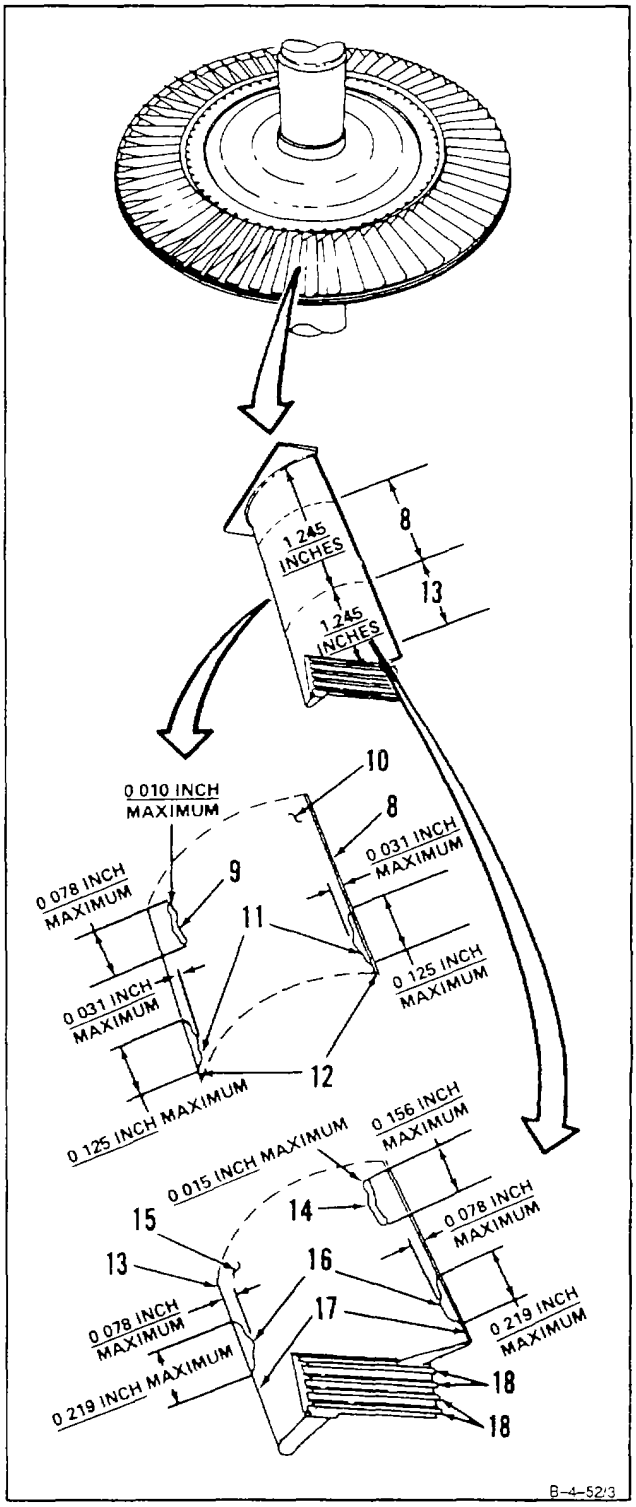
(b) Nicks and dents (11) in edges (12) up to 0.031 inch deep and up to 0.25 inch long.

(4) Blend repair outer non-critical area (13) up to the following limits.

(a) Nicks and dents (14) in airfoil surface (15) up to 0.015 inch deep and up to 0.156 inch long.

(b) Nicks and dents (16) in edges (17) up to 0.078 inch deep and up to 0.219 inch long.

(5) Blend repair nicks up to 0.015 inch deep at tip labyrinth (18).



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NOTE

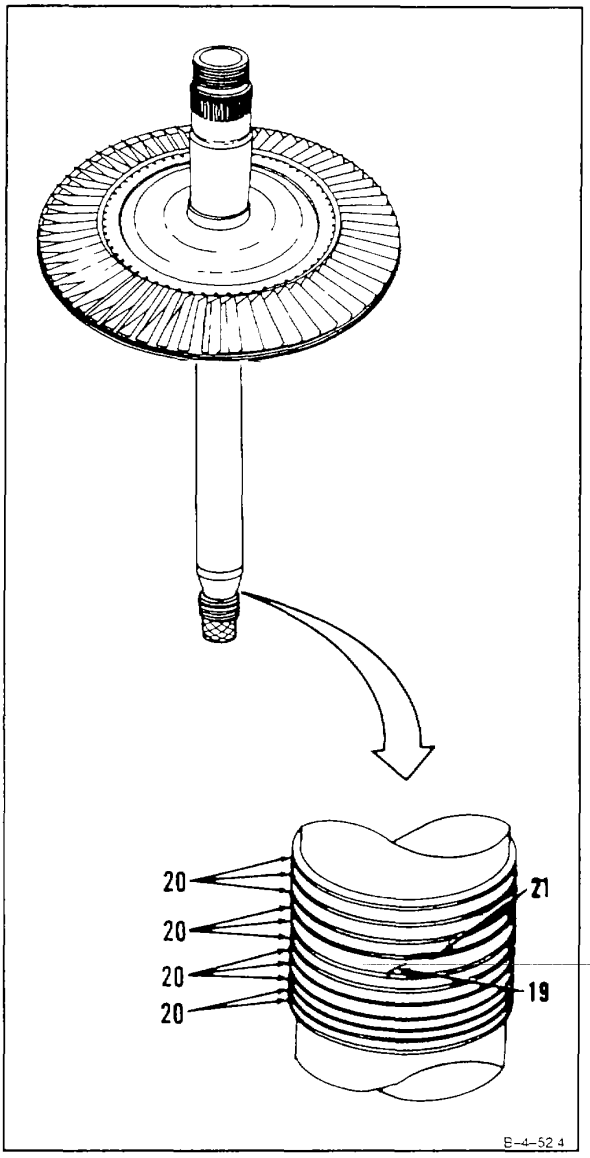
Repair is allowed to any depth provided no cracks are visible.

c. **Repair labyrinth seals (20).** Repair cracks (19) in labyrinth seals (20) as follows.

(1) Blend all sharp edges (21) Use carborundum stone (E11).

(2) Polish to smooth finish Use crocus cloth (E16).

(3) All seals can be blend repaired One seal (20) must have at least 0.010 inch material remaining after repair.



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION XI

SECOND TURBINE DISC ASSEMBLY

4-54 REMOVE SECOND TURBINE DISC ASSEMBLY (AVIM) 4-54

INITIAL SETUP

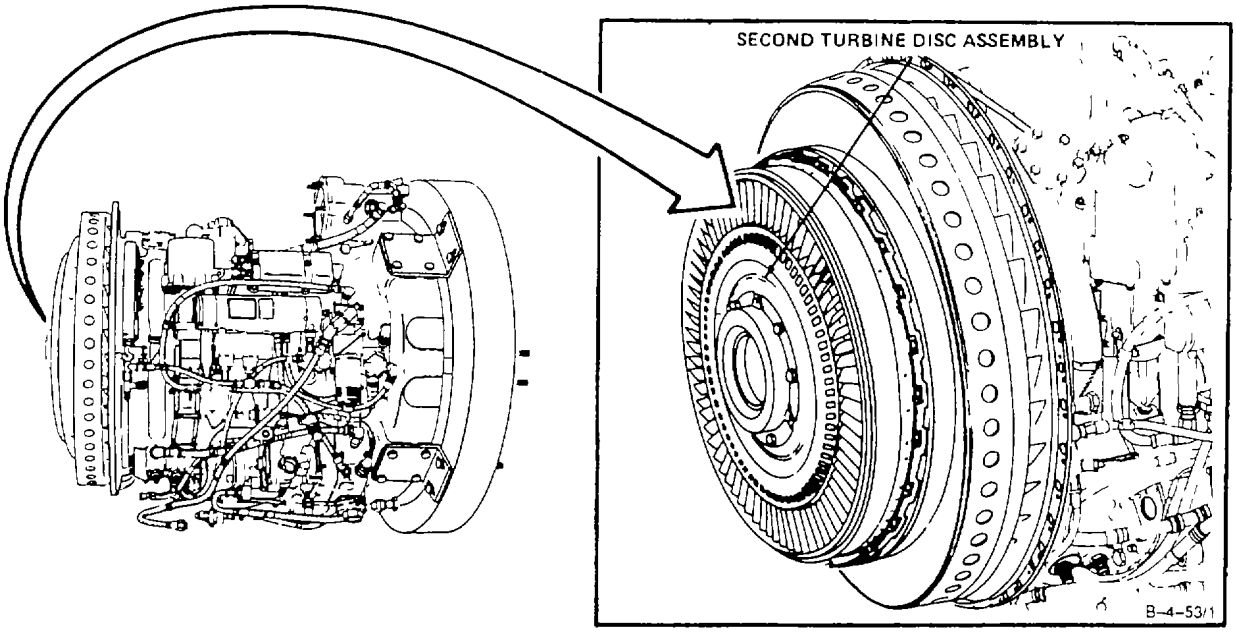
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
GP Spacer Puller (T48)

Materials:
Carborundum Stone (E11)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)



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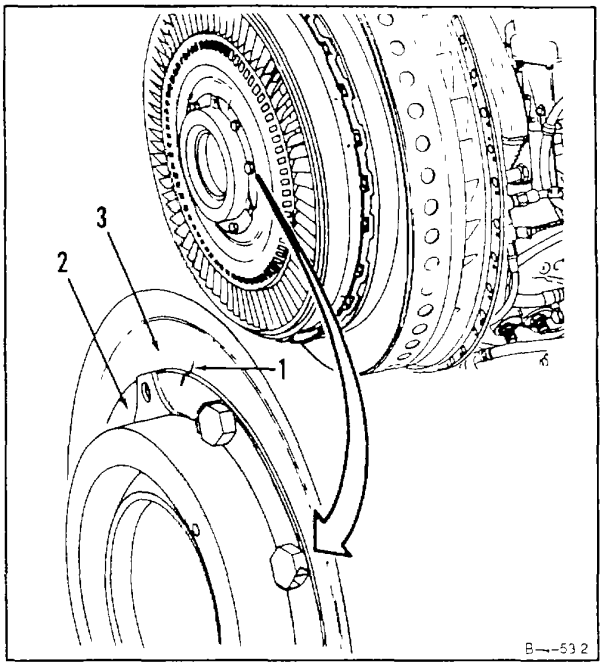
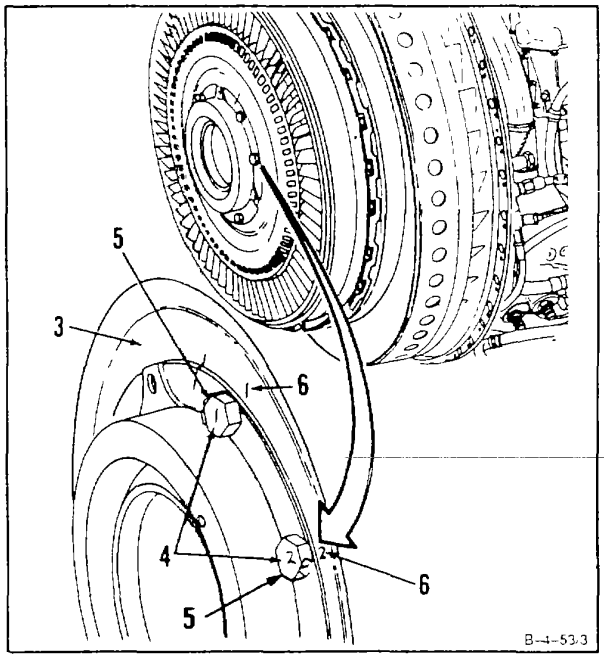
4-54 REMOVE SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-54

1. Draw matchmark (1) from seal (2) to second turbine disc (3) using marking pencil (E38).



2. Mark index numbers (4) on each of six bolts (5) and mark six matching numbers (6) on second turbine disc (3) using marking pencil (E38).



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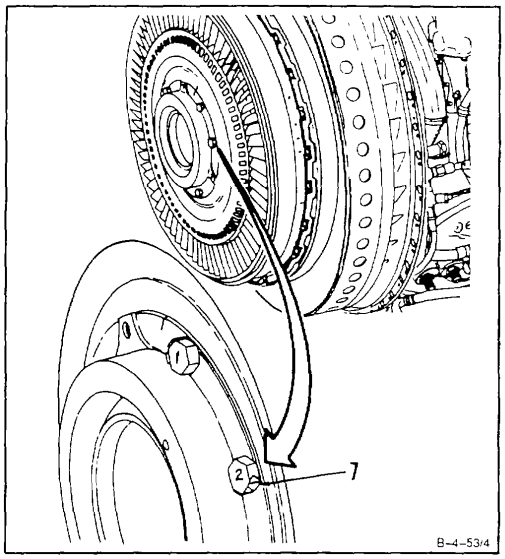
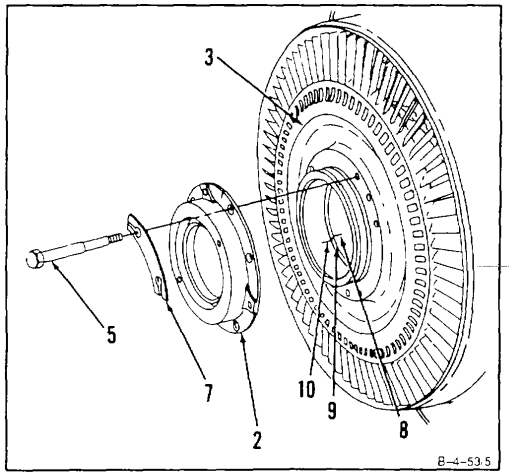
4-54 REMOVE SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-54

3. **Straighten tabs of three locking plates (7).**



4. **Remove** six bolts (5), three locking plates (7), and **seal (2).**

5. Draw matchmark (8) on inside surface of shaft (9) in line with matchmark (10) on second turbine disc (3) Use marking pencil (E38).



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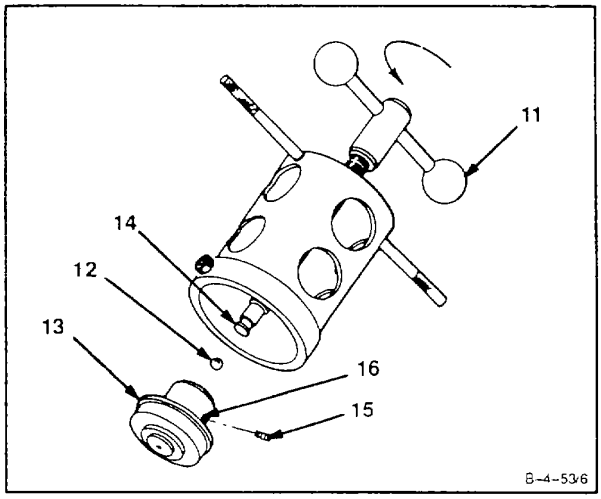
6. Assemble details of GP spacer puller (T48) as follows



a. Turn T-handle (11) clockwise all the way

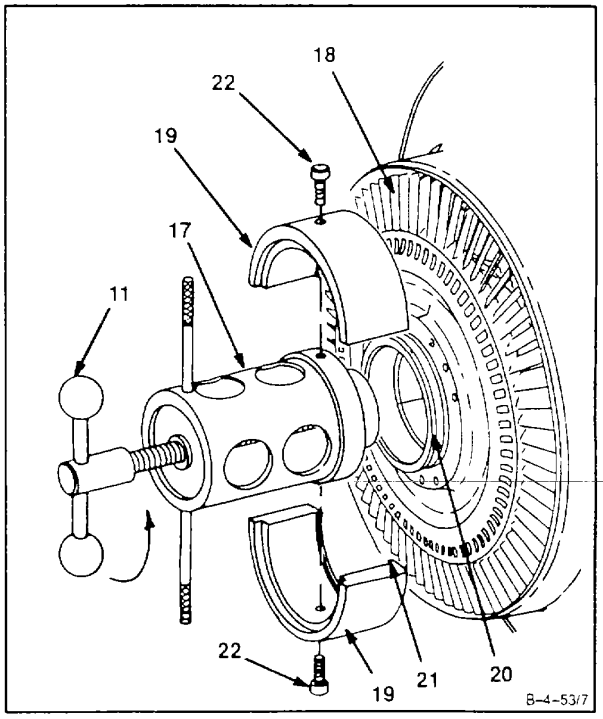
CAUTION

Be sure ball is in base of adapter before installing onto shaft Ball could easily fall out. This would cause damage to puller.

b. Install ball (12), detail of GP spacer puller (T48) in base of adapter LTCT7923-04 (13), detail of GP spacer puller (T48).

c Install adapter (13) on shaft (14) Install spring pin (15) into hole (16).

7. **Install GP spacer puller (17)** onto second turbine disc assembly (18) as follows.



a. Turn T-handle (11) counterclockwise all the way.

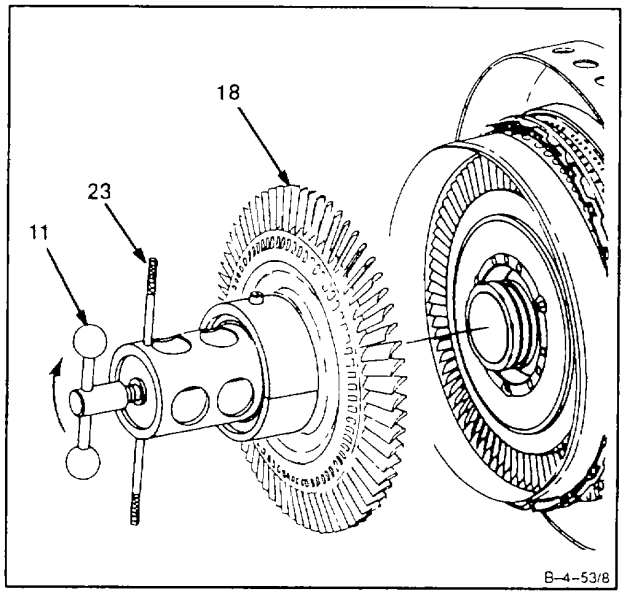
b. Install GP spacer puller (17) on second turbine disc assembly (18).

c. Position two puller halves (19), detail of GP spacer puller (T48) around flange (20) of second turbine disc assembly (18) Make sure lip (21) of puller halves (19) engages flange (20) of second turbine disc assembly (18) Secure with two 1.00 inch long rocket head cap screws (22).

GO TO NEXT PAGE

4-54 REMOVE SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-54

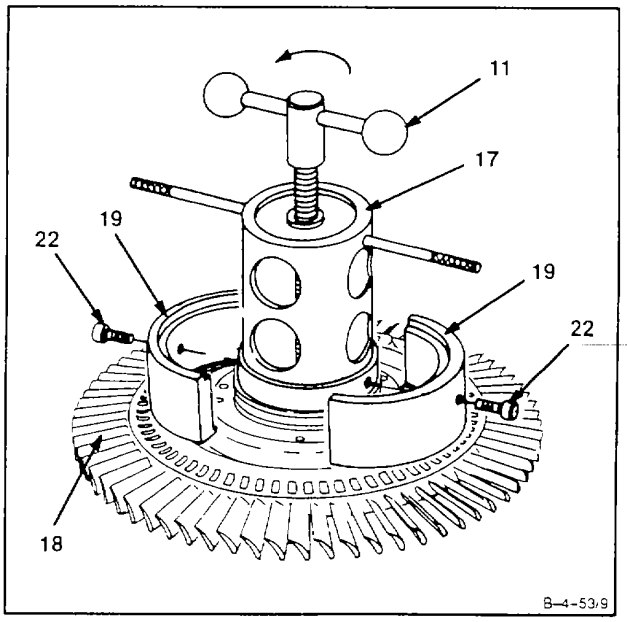
8. Hold puller handle (23) and turn T-handle (11) clockwise to **remove second turbine disc assembly (18)** Have helper support assembly during removal.



9. **Remove GP spacer puller (17)** from second turbine disc assembly (18) as follows.

   a. Turn T-handle (11) counterclockwise until loose.

   b Remove two 1.00 inch long socket head cap screws (22), two puller halves (19), and GP spacer puller (17) from second turbine disc assembly (18).



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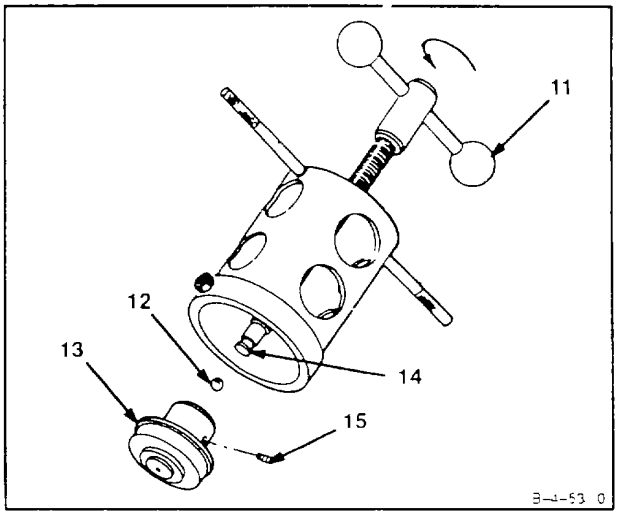
4-54 REMOVE SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-54

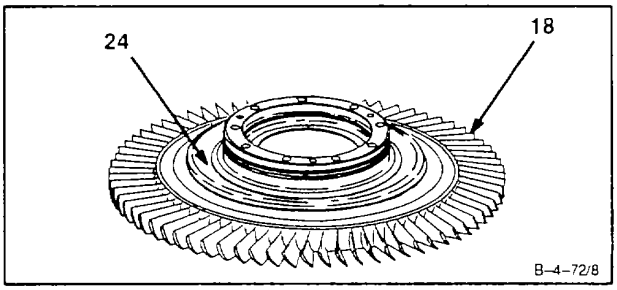
c. Turn T-handle (11) clockwise all the way.
d. Remove spring pin (15) from adapter (13).
e. Remove adapter (13) from shaft (14), and ball (12) from base of adapter (13).



NOTE

If second turbine spacer came off with second turbine disc assembly, proceed as follows.

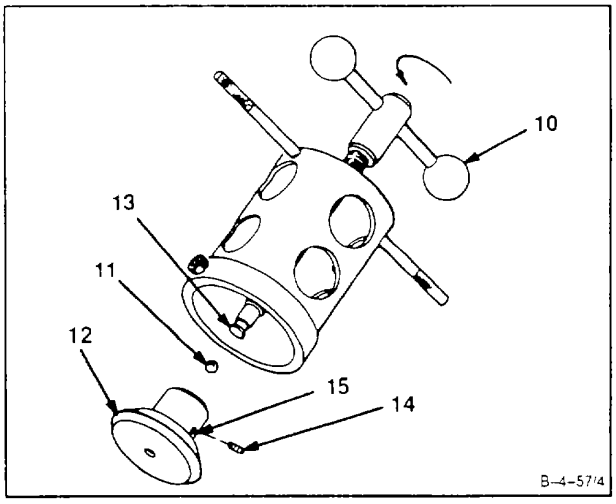
10. **Matchmark second turbine spacer (24)** to second turbine disc assembly(18) using marking pencil (E38).
11. **Assemble details of GP spacer puller (T48)** as follows.
    a. Turn T-handle (11) clockwise all the way.



CAUTION

Be sure ball is in base of adapter before installing onto shaft Ball could easily fall out This would cause damage to puller.

    b. Install ball (12), detail of GP spacer puller assembly kit (T48) in base of adapter LTCT7923-05 (25), detail of GP spacer puller assembly kit (T48).
    c. Install adapter (25) on shaft (14) Install spring pin (15) into hole (26).



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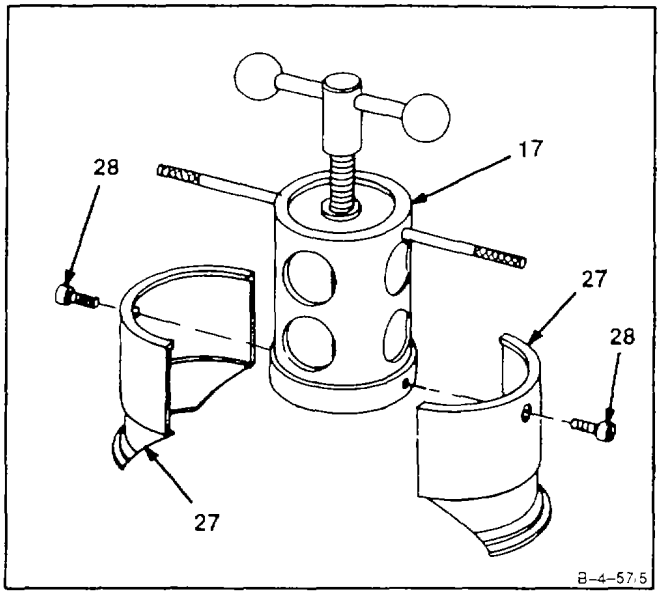
4-54 REMOVE SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-54

d. Install two puller shells (27) detail of GP spacer puller assembly kit (T48) on GP spacer puller (17). Install two 0.625 inch long socket head cap screws (28) one turn only.



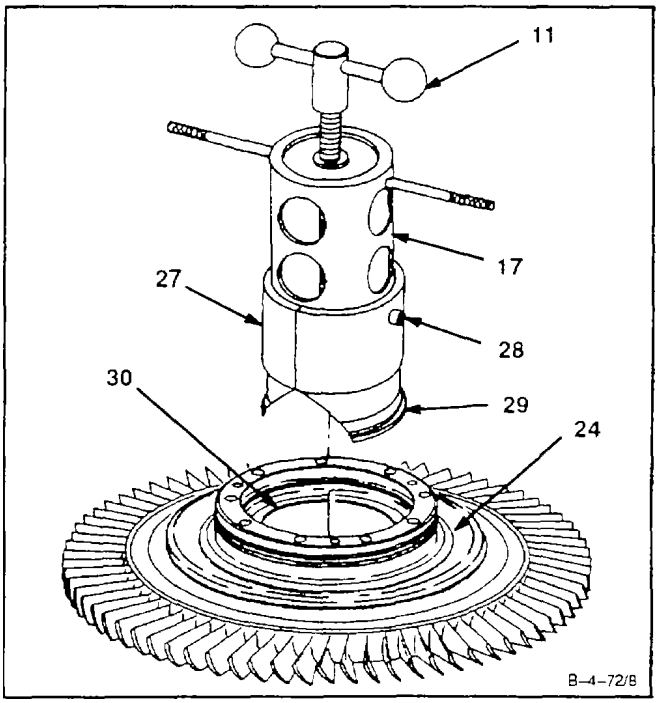
12. **Install GP spacer puller (17) on second turbine spacer** as follows.

a. Turn T-handle (11) counterclockwise all the way.

b Install GP spacer puller (17) on second turbine spacer (24).

c. Make sure lip (29) of puller shells (27) engages flange (30) of second turbine spacer (24).

d. Tighten two 0.625 inch long socket head cap screws (28).



CAUTION

Make sure adapter is centered on second turbine disc Pull second turbine spacer slowly and evenly. If spacer is not pulled off evenly, damage to spacer could occur.

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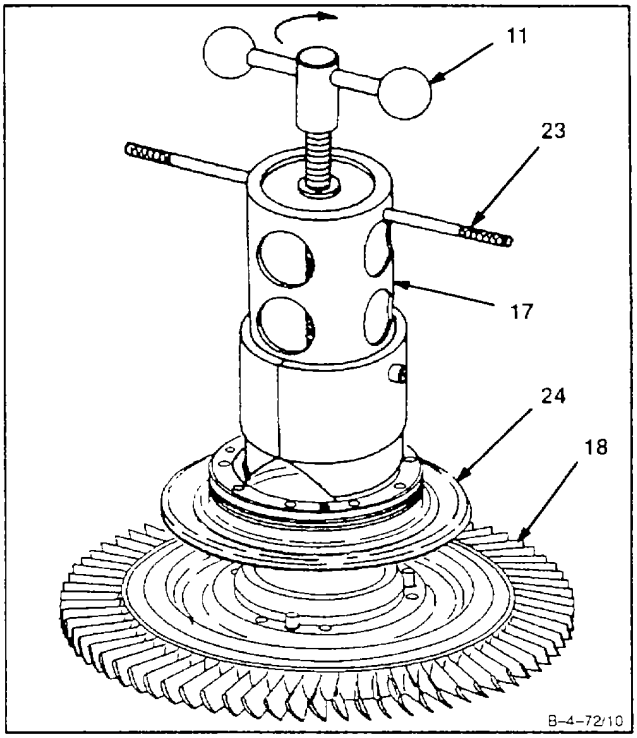
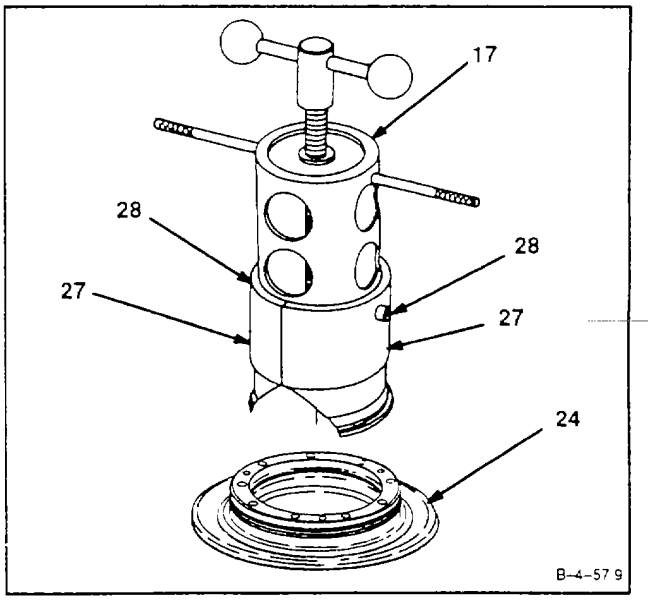
e. Hold puller handle (23) Turn T-handle (11) clockwise until GP spacer puller (17) is locked in position.

f. Have helper hold puller handle (23) Turn T-handle (11) clockwise and **remove second turbine spacer (24)** from second turbine disc assembly (18).



13. **Remove GP spacer puller (17)** from second turbine spacer (24) as follows.
    a. Loosen two 0.625 inch long socket head cap screws (28) and remove GP spacer puller) (17) from second turbine spacer (24).
    b. Remove two 0.625 inch long socket head cap screws (28) and two puller shells (27) from GP spacer puller (17).

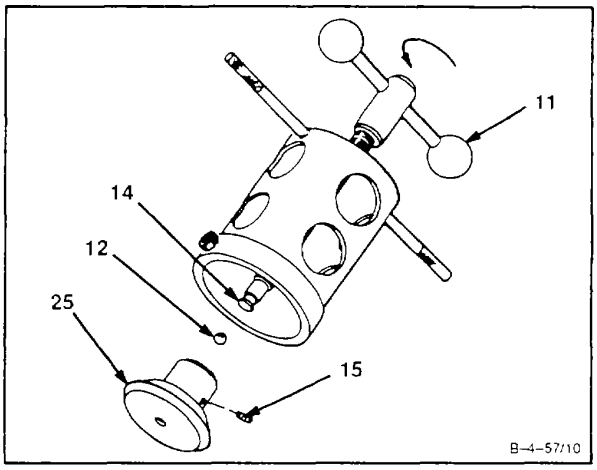


4-54 REMOVE SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-54

c. Turn T-handle (11) clockwise all the way.

d. Remove spring pin (15) from adapter (25).

e. Remove adapter (25) from shaft (14) and ball (12) from base of adapter (25).



FOLLOW-ON MAINTENANCE

None

END OF TASK

4-55 CLEAN SECOND TURBINE DISC ASSEMBLY (AVIM) 4-55

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Goggles
Dry, Compressed Air Source

Materials:
Gloves (E24)
Denatured Alcohol (E17)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Second Turbine Disc Assembly Removed (Task 4-54)

General Safety Instructions:

WARNING

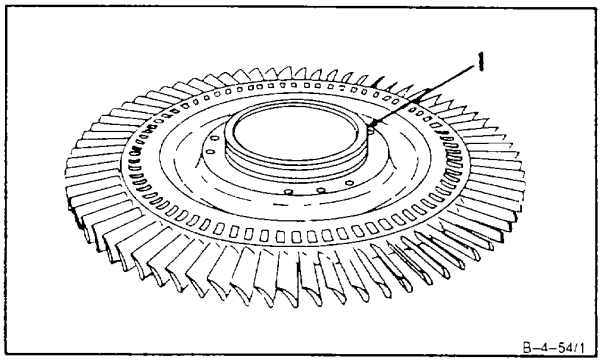
When using compressed air for cleaning, use approved protective equipment for eyes and face Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

1. **Clean second turbine disc assembly (1)** as follows:
   a. Wear gloves (E24) and goggles. **Clean second turbine disc (1)** using denatured alcohol (E17) and brush.

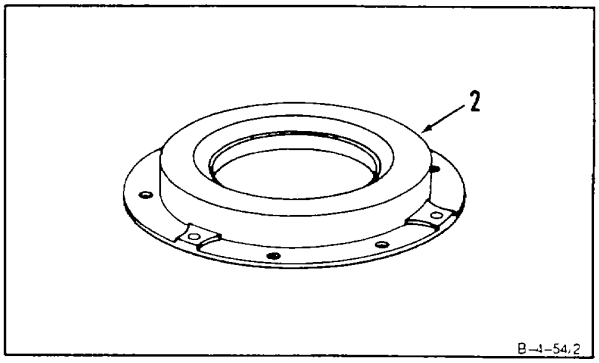
   CAUTION

   In following step, avoid directing air at blade air cooling passages. Failure to comply may cause blockage of blade air cooling passages.

   b **Blow dry second turbine disc assembly (1),** using clean, dry, compressed air.



2. **Clean seal (2)** as follows.
   a. Wear gloves (E24) and goggles **Clean seal (2),** using denatured alcohol (E17) and brush.
   b. **Blow dry seal (2)** using clean, dry, compressed air.



FOLLOW-ON MAINTENANCE
Inspect Second Turbine Disc Assembly (Task 4-56)

END OF TASK

4-56 INSPECT SECOND TURBINE DISC ASSEMBLY (AVIM) 4-56

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:

Personnel Required:
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. **Inspect rotor blades (1) and second turbine disc assembly (2).** There shall be no cracks.

   a. **Inspect blades (1).**

      (1) There shall be no nicks deeper than 0.015 inch.

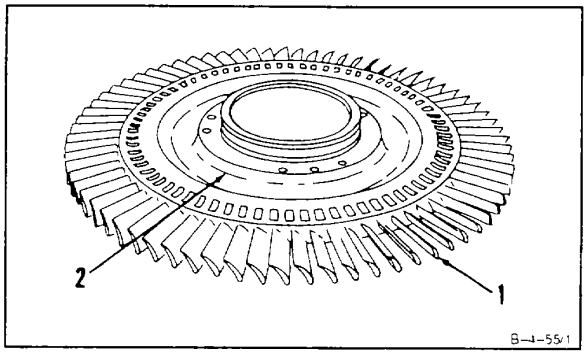
      (2) There shall be no bent or distorted blades.

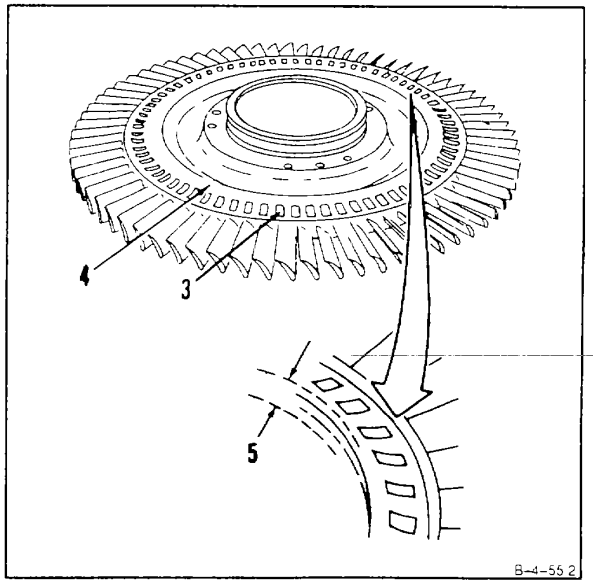
      (3) Tip rubs shall not be deeper than 0.010 inch.

      (4) Surface oxidation is acceptable provided there is no burning or loss of material.

   b. **Inspect sealing plates (3).** There shall be no loose or missing sealing plates.

   c. **Inspect disc face (4).** Scoring shall not be deeper than 0.010 inch. This limit does not apply to area (5) where material has been removed for balancing.





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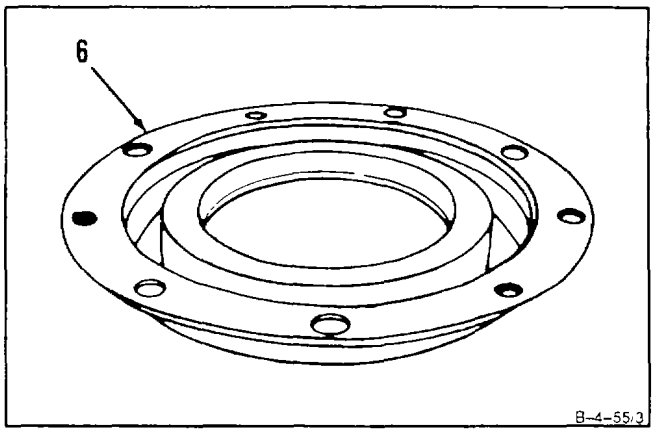
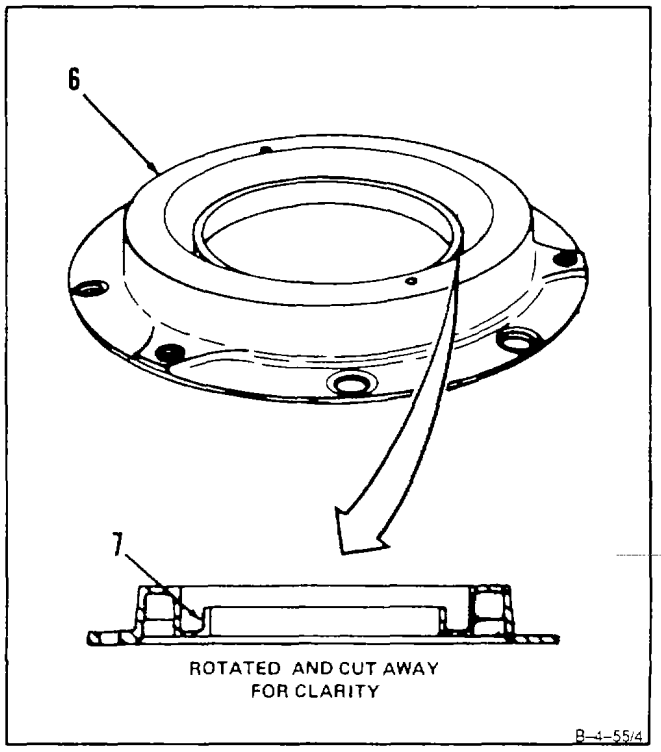
2. **Inspect seal (6)**There shall be no cracks.



3. **Inspect seal (6)** inside diameter (7) Rubs shall not be deeper than 0.010 inch.



FOLLOW-ON MAINTENANCE

None

END OF TASK

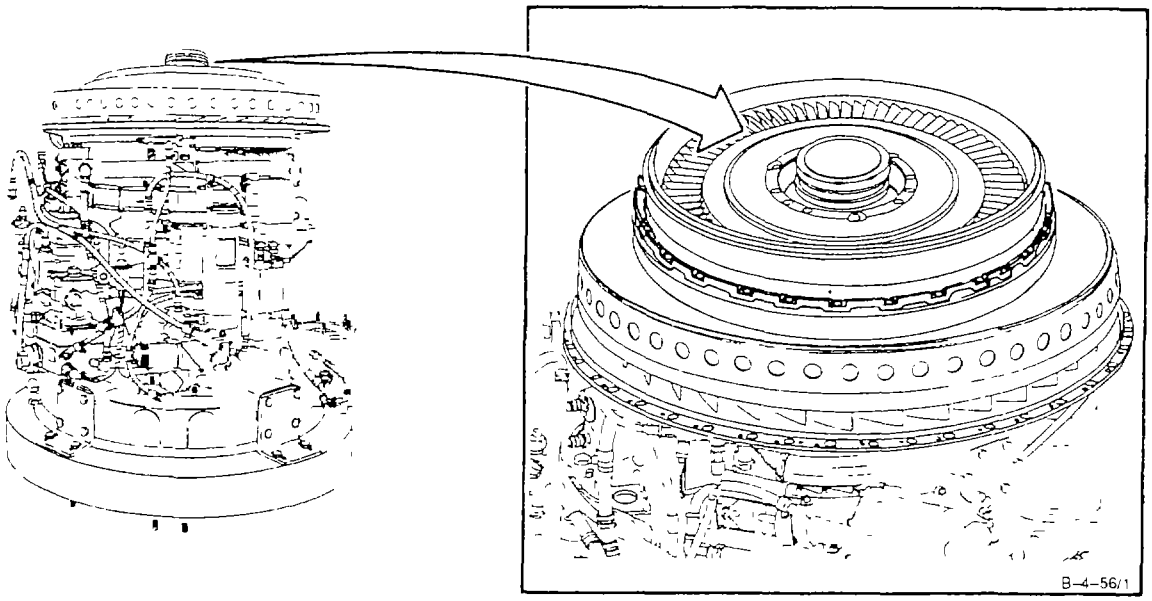
4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) 4-57

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Bent Wire Gage, 0 225 inch (Appendix E)
Dial Indicator Support (T40)
Dial Indicator and Base
Torque Wrench, 150-750 inch-Pounds
Slave Bolt, P/N STD3053-31 (3)
Materials:
Anti-Seize Compound (E6)

Parts

Lockplates
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
References:
TM 1-1520-252-23
TM 1-2840-252-23P
Task 4-54
Task 4-57
Task 4-58
Task 4-61
Task 4-62
Task 4-63
Task 4-67
Task 4-69



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4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

NOTE

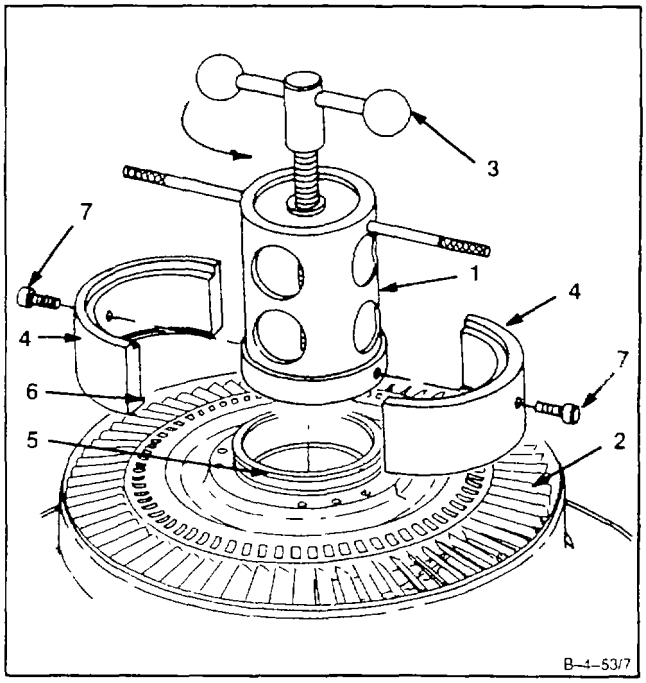
The first turbine disc assembly, turbine spacer, second turbine disc assembly, seal, three locking plates, and six bolts are supplied as a balanced matched set. If the second turbine disc assembly is replaced, all other parts in the balanced, matched set shall be replaced. Use field replacement first and second turbine disc assembly, part number 2-121-480-19.

NOTE

If second turbine disc assembly is being replaced, do all steps.

If same second turbine disc assembly that was removed is being installed, omit steps 1 through 5.

1. **Remove second turbine nozzle, spacer, case, and bumper** (Ref Task 4-58).
2. **Remove first turbine disc assembly** (Ref Task 4-63).
3. **Place in service field replacement first and second turbine disc assembly** (Ref Task 4-69).
4. **Install first turbine disc assembly** (Ref Task 4-67).
5. **Install second turbine nozzle, spacer, case, and bumper** (Ref Task 4-62).
6. **Install GP spacer puller (1)** onto second turbine disc assembly (2) as follows:
   a. Turn T-handle (3) counterclockwise all the way.
   b. Install GP spacer puller (1) on second turbine disc assembly (2).
   c. Position two puller halves (4), detail of GP spacer puller (T48) around flange (5) of second turbine disc assembly (2). Make sure lip (6) of puller halves (4) engages flange (5) of second turbine disc assembly (2). Secure with two 1.00 inch long socket head cap screws (7).



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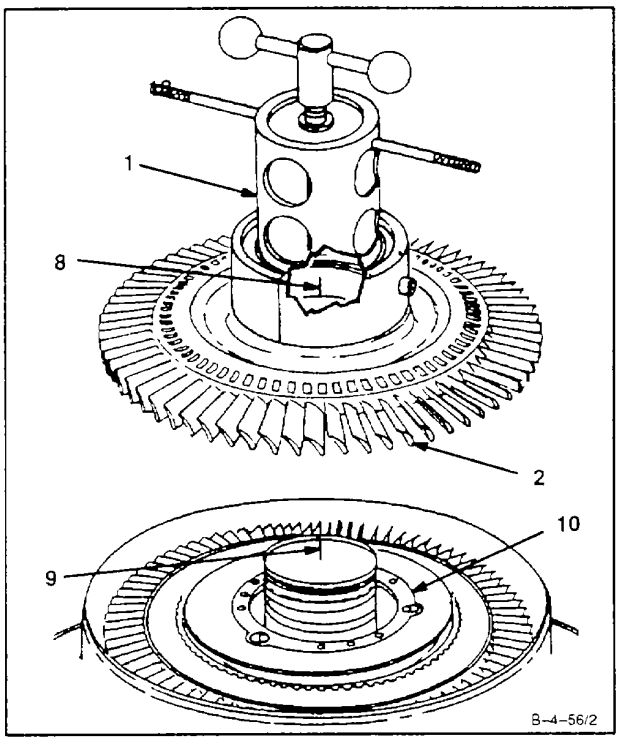
4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

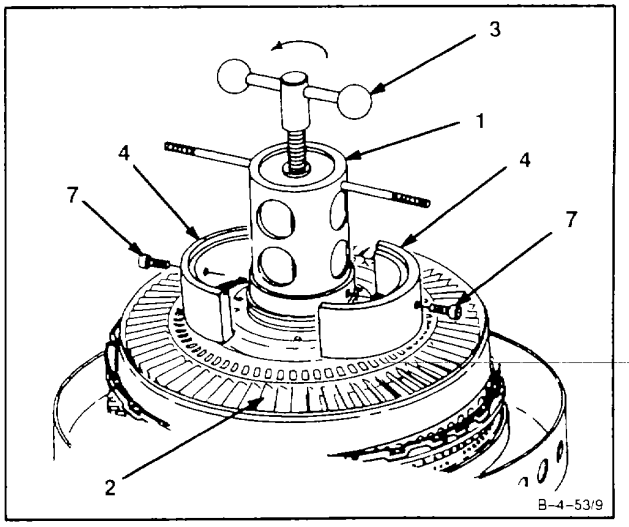
7. Using GP spacer puller (1) as a handling tool, align matchmarks (8 and 9) **and seat second turbine disc assembly (2) on turbine spacer (10).**



8. **Remove GP spacer puller (1)** from second turbine disc assembly (2) as follows:

   a. Turn T-handle (3) counterclockwise until loose.

   b. Remove two 1.00 inch long socket head cap screws (7), two puller halves (4), and GP spacer puller (1) from second turbine disc assembly (2).



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4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

9. Coat threads of six bolts (11) with anti-seize compound (E6)

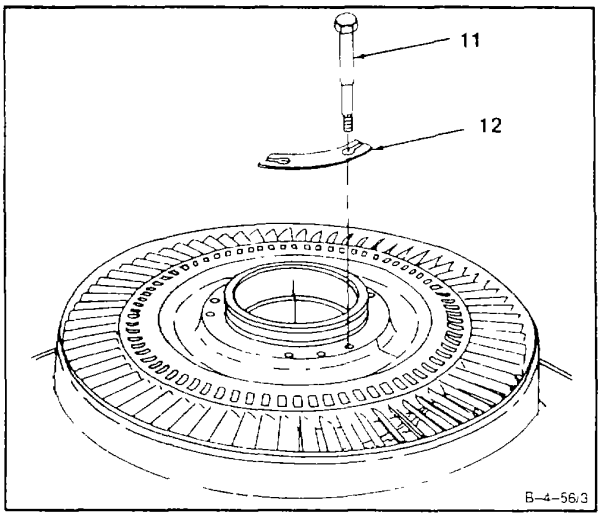
NOTE

Do not bend up tabs of locking plates.

NOTE

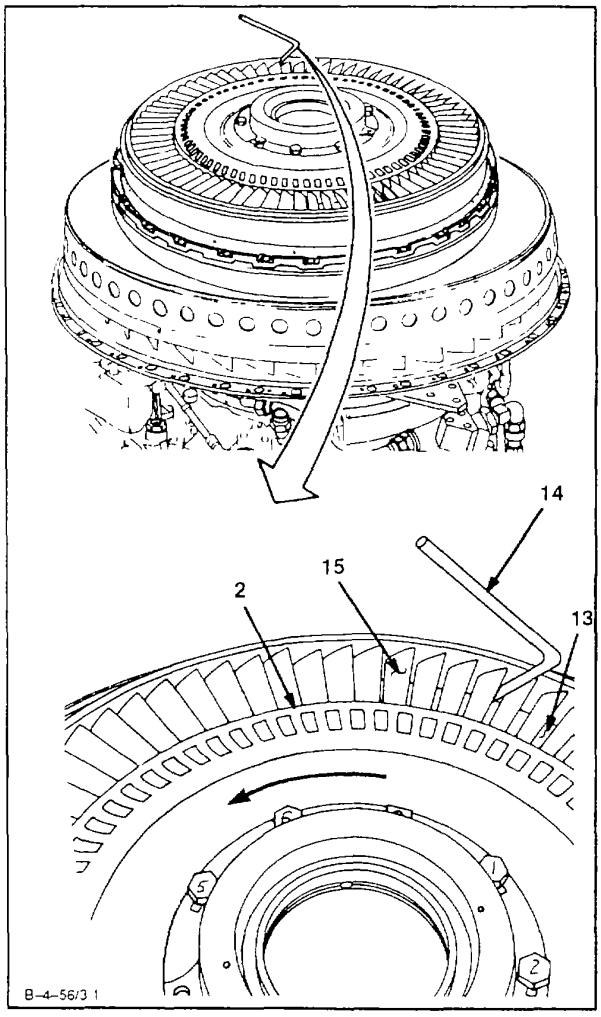
Bolts must be installed in accordance with index numbers marked on bolt heads and second turbine disc assembly. If any of the six bolts are lost, all six bolts must be replaced and a vibration test performed (Ref. TM 1-1520-252-23).

10. **Install new locking plates (12) and bolts (11**) on second turbine disc assembly.



11. **Stagger tighten bolts (11). Torque to 155 inch-pounds.**

12. Check axial clearance between second turbine disc assembly (2) and second turbine nozzle (13). Use 0.225 inch bent wire gage (Appendix E) (14) inserted between blades (15) of second turbine disc assembly (2). **Axial clearance shall be 0.225 inch minimum.**



INSPECT

NOTE

If axial clearance is not within limits, do all steps.
If axial clearance is acceptable, omit steps a. thru c..

a. Recheck first turbine disc assembly installation procedure as follows:

(1) Remove second turbine disc assembly (Ref Task 4-54).

(2) Remove second turbine nozzle (Ref Task 4-58).

(3) Remove first turbine disc assembly (Ref Task 4-63).

GO TO NEXT PAGE

(4) Install first turbine disc assembly (Ref Task 4-67). Maintain as close to minimum clearance of 0.150 inch as possible between first turbine disc assembly and first turbine nozzle

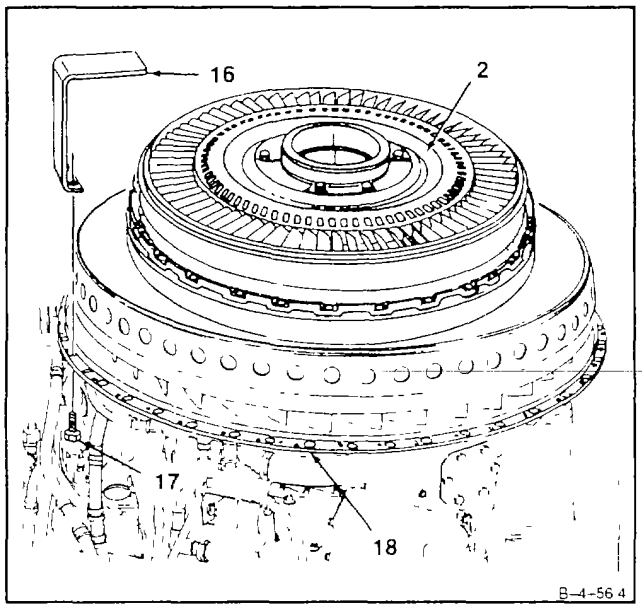
b. Repeat steps 6 thru 12

c. If axial clearance still cannot be met, replace parts as necessary

INSPECT

13. **Check runout of second turbine disc assembly (2)** as follows:

a. Install dial indicator support (T40) (16) and three slave bolts (17) on air diffuser (18)



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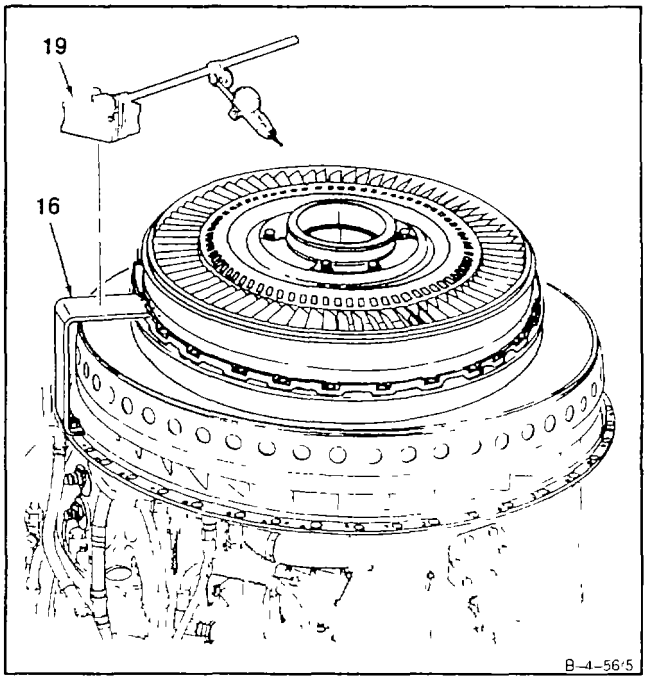
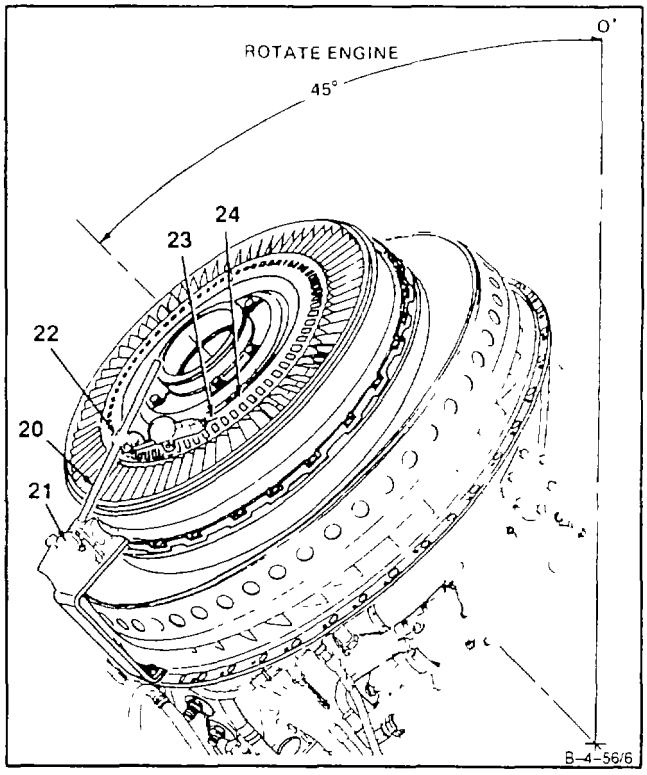
4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

b. Place magnetic base of dial indicator (19) on dial indicator support (T40) (16)



c. Rotate engine to approximately 45 degrees

d. Adjust arm (20) at base (21) and indicator clamp (22) to position pointer (23) on outer surface (24) next to blade roots.



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4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

NOTE

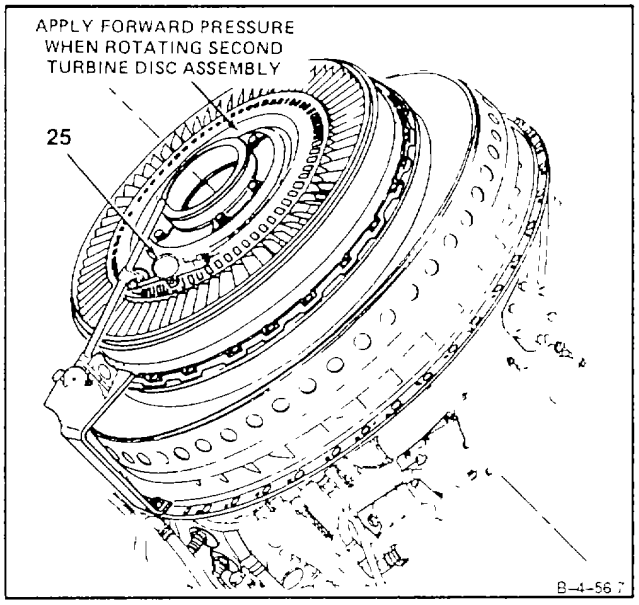
When checking runout, apply forward pressure to compensate for bearing internal clearance

NOTE

While rotating second turbine disc assembly, a slight rubbing sound may be heard. This is normal due to wearing in of second turbine nozzle labryinth seal

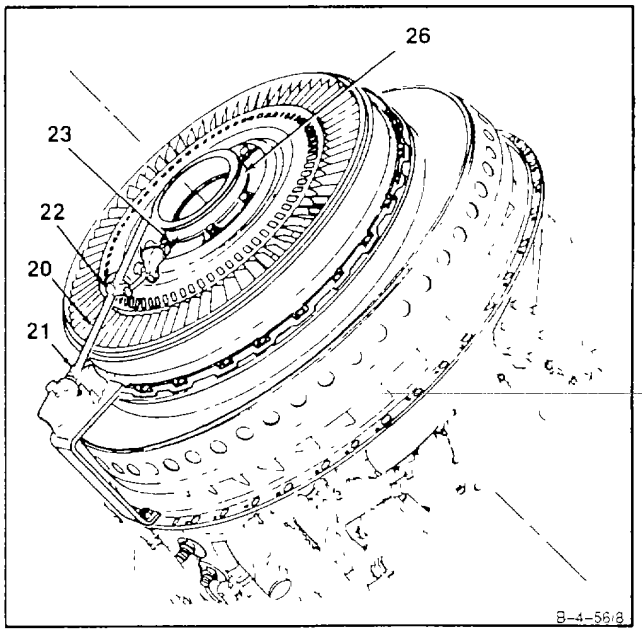
e. Zero indicator (25) and rotate second turbine disc assembly counterclockwise while recording dimension.

f. Maximum allowable runout shall be 0.004 inch. Record runout.



INSPECT

g. Adjust arm (20) at base (21) and indicator clamp (22) to position pointer (23) on hub (26).



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4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

NOTE

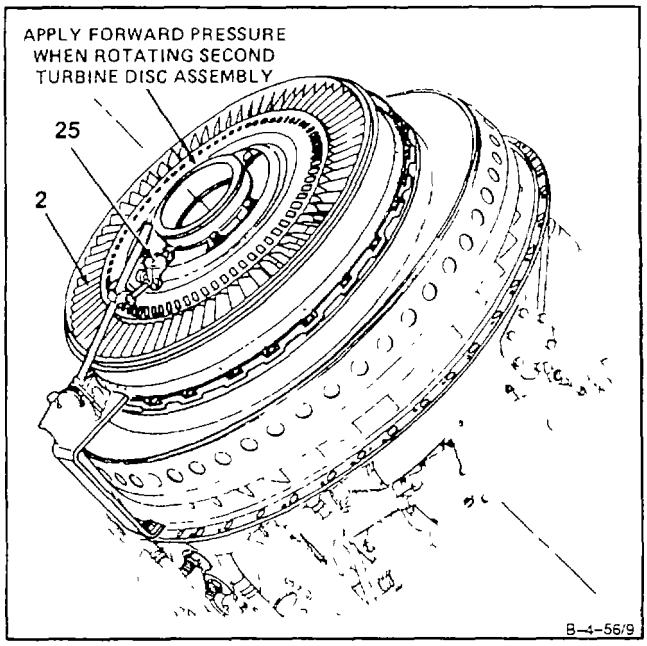
When checking runout, apply forward pressure to compensate for bearing internal clearance

NOTE

While rotating second turbine disc assembly, a slight rubbing sound may be heard. This is normal due to wearing in of second turbine nozzle labyrinth seal

h. Zero indicator (25) and rotate second turbine disc assembly (2) counterclockwise while recording dimension.

i. Maximum allowable runout shall be 0.003 inch Record runout.



INSPECT

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4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

NOTE

If either runout measured in steps f. and i is not within acceptable limits, do all steps. If both runouts measured in steps f and are within acceptable limits, omit steps j thru m

j. Loosen arm (20) at base (21) and move arm (20) away from second turbine disc assembly (2).

k. Loosen and **retorque (high side of runout first) six bolts (11) to155 inch-pounds**

I. Repeat steps d through i.

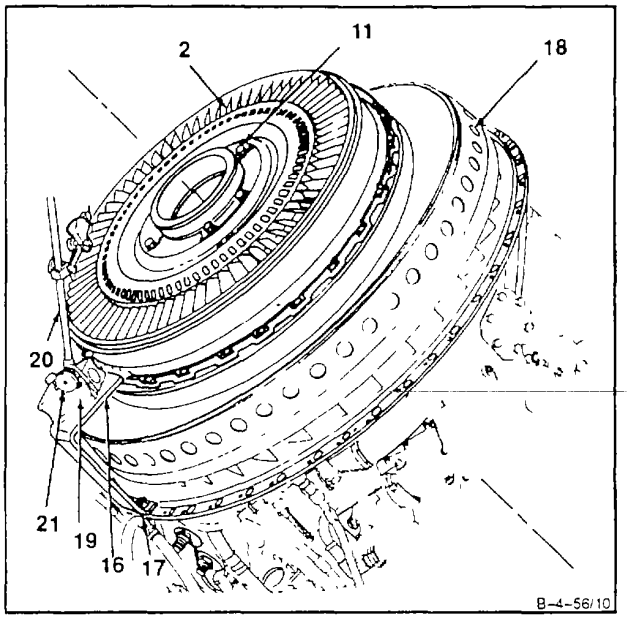
NOTE

The first turbine disc assembly, turbine spacer, second turbine disc assembly, seal, three locking plates and six bolts are supplied as a balanced matched set. If the second turbine disc assembly is replaced, all other parts in the balanced, matched set shall be replaced Use field replacement first and second turbine disc assembly, part number 2-121-480-19

m. If runouts still are not met, **replace second turbine disc assembly**(Ref Task 4-54 and 4-57).

n. Remove dial indicator (19), three slave bolts (17), and support (16) from air diffuser (18).

o. Rotate engine to vertical position.



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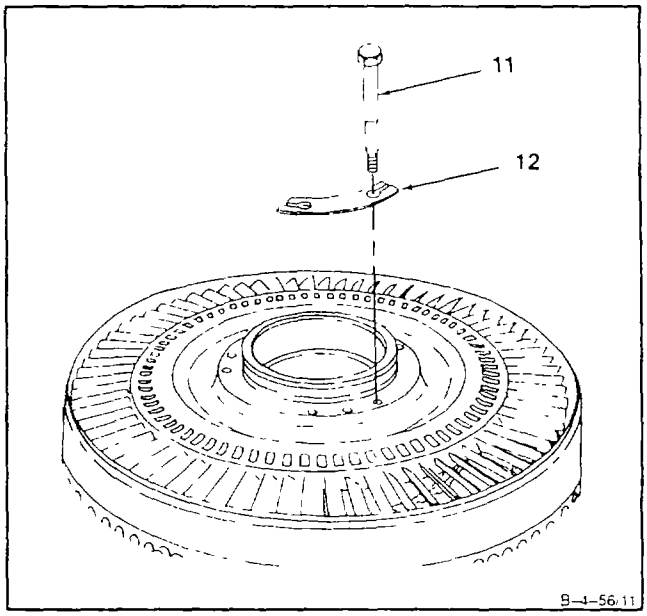
4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

14. **Remove** six bolts (11) and three **locking plates (12).**



NOTE

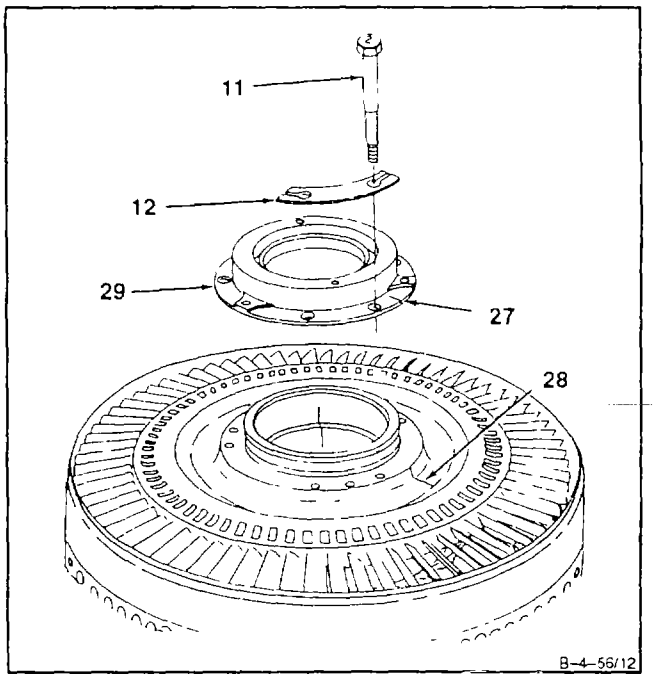
Bolts must be installed in accordance with index numbers marked on bolt heads and second turbine disc assembly.

NOTE

In following step 15., do not bend up tabs of locking plates.

15. Align matchmarks (27 and 28) and **install seal (29), three locking plates (12) and six bolts (11).**

16. **Stagger tighten bolts (11) Torque to <u>155 inch-pounds</u>.**



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4-57 INSTALL SECOND TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-57

17. **Measure second turbine disc assembly (2) tip clearance** at 0, 45, 90, 124,180, 225, 270 and 315 degree positions as follows:

    a. Insert thickness gage (30) between blade tip (31) and second turbine nozzle inside diameter (32).

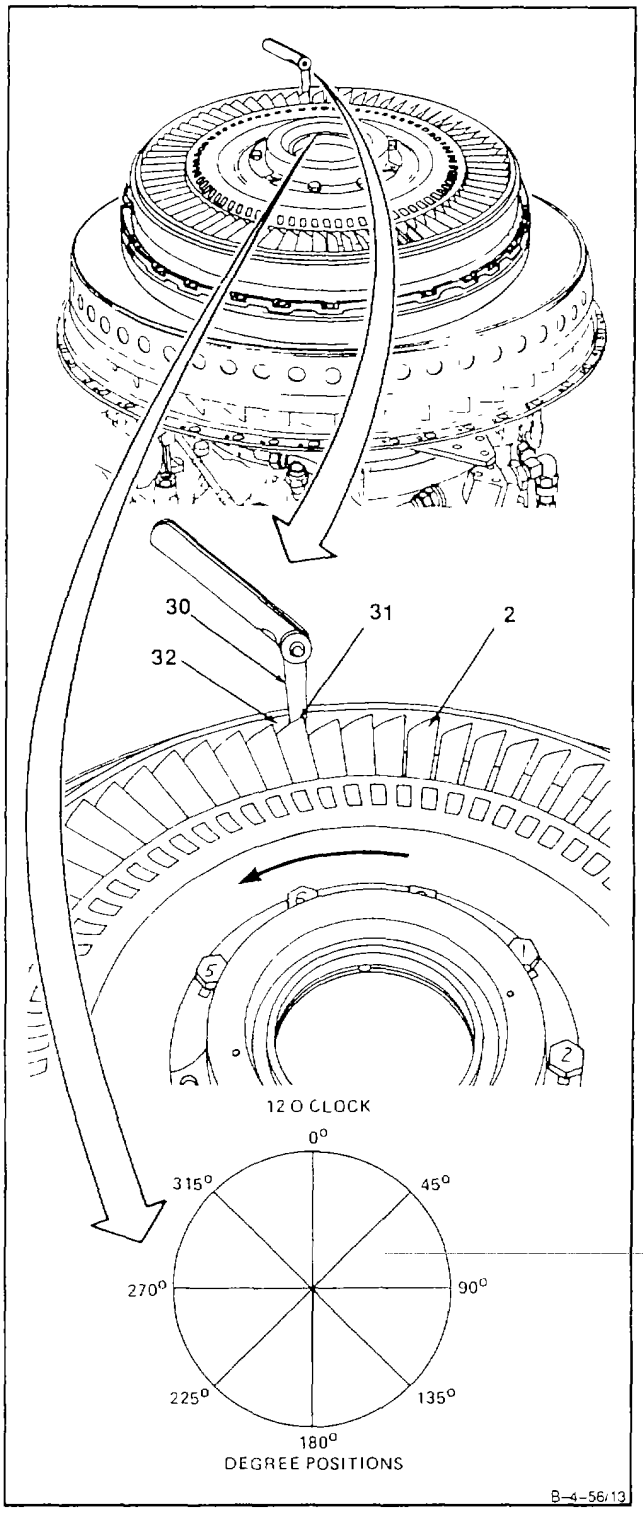
    NOTE

    While rotating second turbine disc assembly, a slight rubbing sound may be heard. This is normal due to wearing in of second turbine nozzle labryinth seal.

    b. **Measure and record minimum tip clearance** while rotating second turbine disc assembly (2) counterclockwise one revolution.

    c . Tip clearance shall be 0.019 inch minimum.

    d. **If tip clearance is less than 0.019 inch, repair second turbine nozzle**(Ref Task 4-61).



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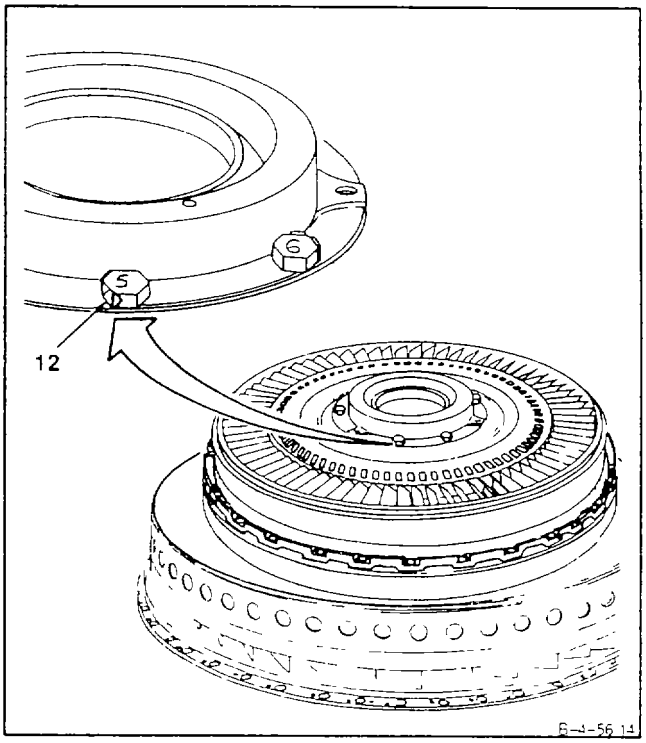
18. Bend up tabs of three locking plates (12)



INSPECT

FOLLOW-ON MAINTENANCE:

Install Combustion Section and Power Turbine (Task 3-8).
Service Engine Oil System (Task 1 68).

END OF TASK

SECTION XII

SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER

4-58 REMOVE SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM) 4-58

INITIAL SETUP

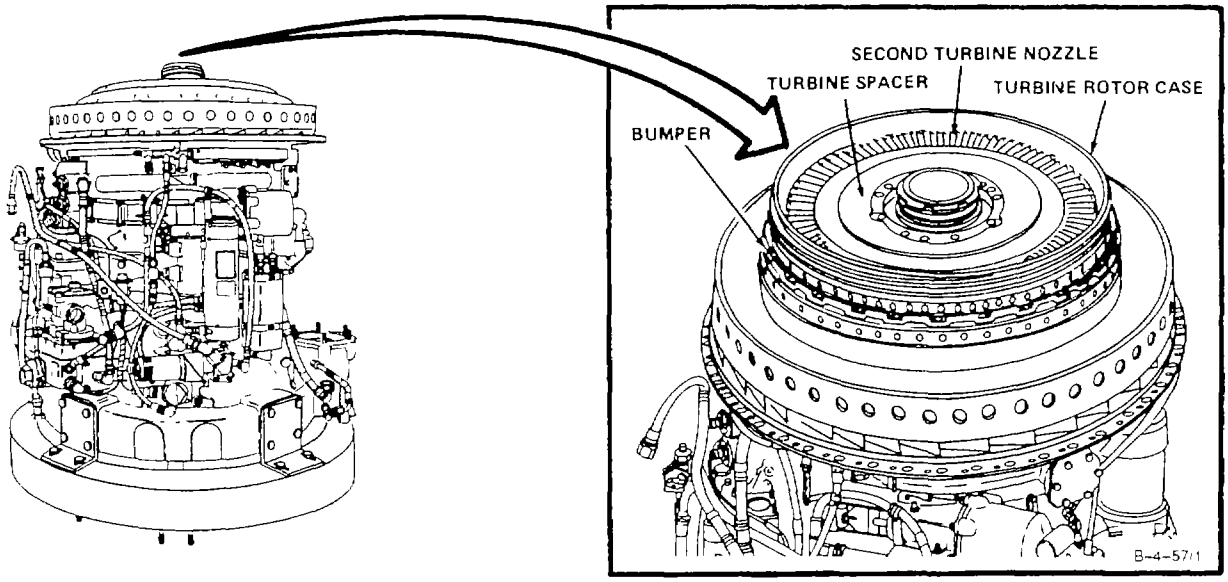
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
GP Spacer Puller Assembly Kit (T48)
Thickness Gage (Appendix E)

Materials:
Marking Pencil (E38)

Personnel Required:
Aircraft Powerplant Repairer (2)
Aircraft Powerplant Inspector

Equipment Condition:
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Second Turbine Disc Assembly Removed (Task 4-54)



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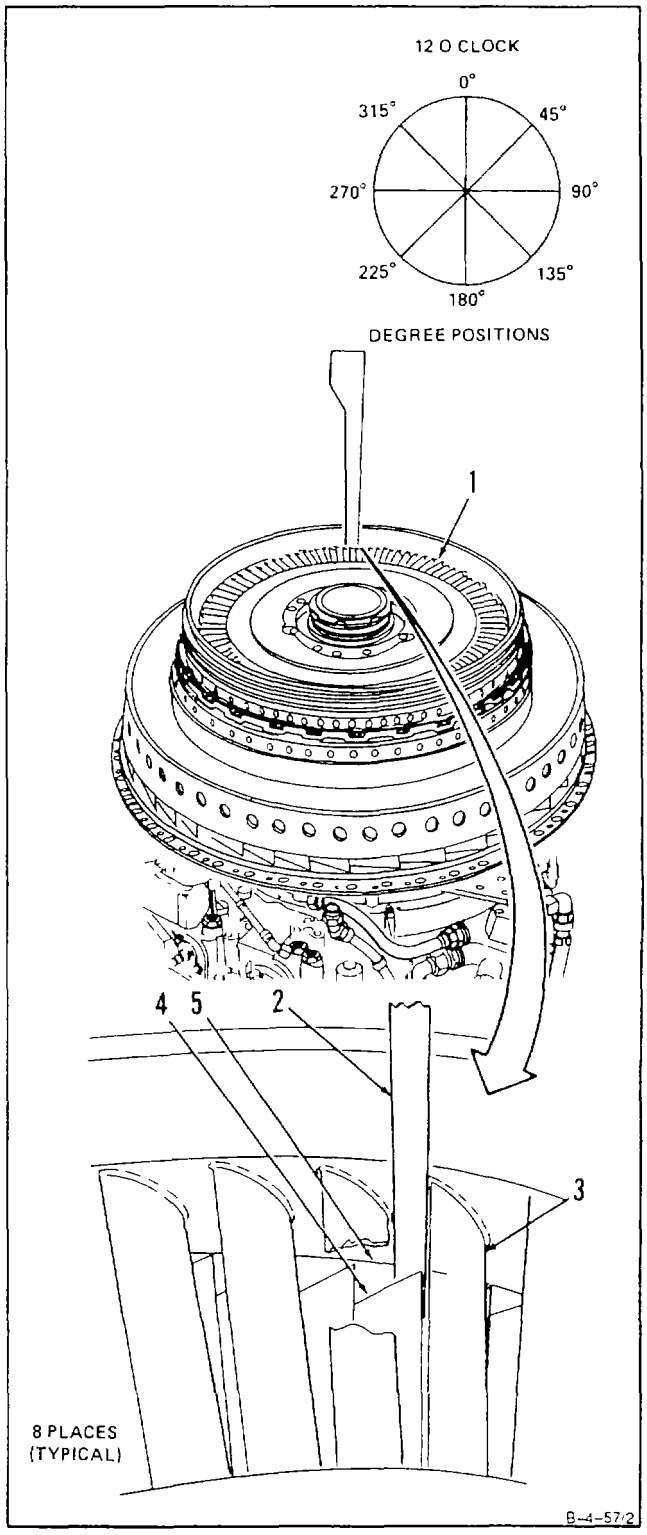
4-58 REMOVE SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM)(Continued) 4-58

1. **Measure first turbine disc assembly (1) tip clearance** at 0, 45, 90, 135, 180, 225, 270, and 315 degree positions as follows:

   a. Insert thickness gage (Appendix E) (2) between second turbine nozzle vanes (3) and between blade tip (4) and turbine rotor case inside diameter (5).

   b. Rotate first turbine disc assembly (1) one revolution for each measurement.

   c. Tip clearance shall be 0.019 inch minimum. Record positions below minimum.



INSPECT

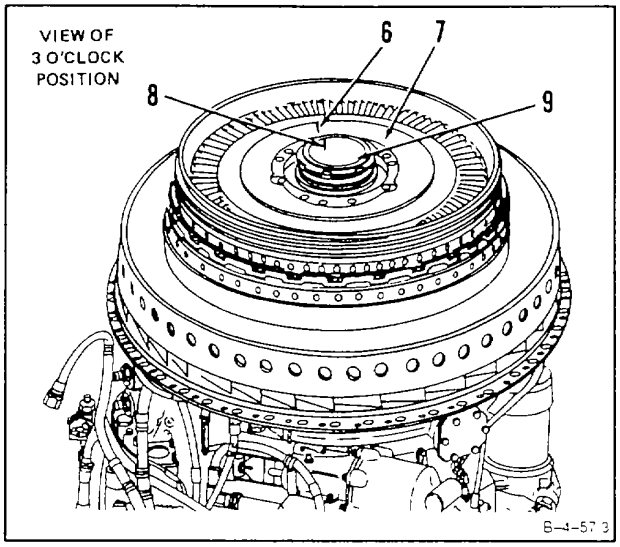
GO TO NEXT PAGE

4-58 REMOVE SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM)(Continued) 4-58

NOTE

If second turbine spacer came off with second turbine disc assembly, omit steps 2 thru 6. If second turbine spacer did not come off with second turbine disc assembly, do all steps.

2. Draw matchmark (6) on turbine spacer (7) in line with matchmark (8) on inside of shaft (9). Use marking pencil (E38).



3. **Assemble details of GP spacer puller (T48) as follows:**

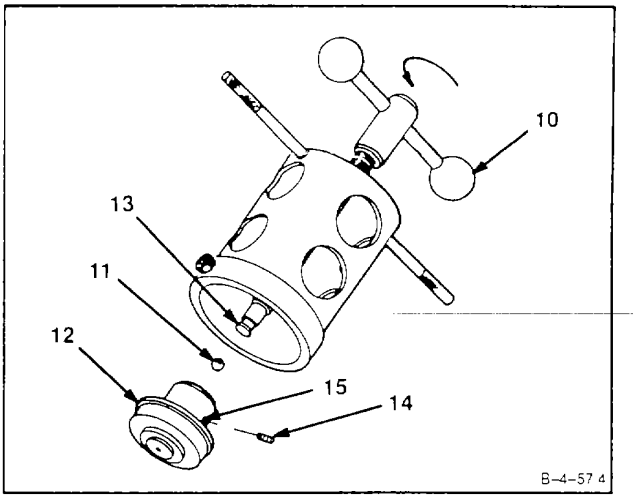
   a. Turn T-handle (10) clockwise all the way.

CAUTION

Be sure ball is in base of adapter before installing onto shaft. Ball could easily all out. This would cause damage to puller.

   b. Install ball (11), detail of GP spacer puller assembly kit (T48) in base of adapter LTCT7923-04 (12), detail of GP spacer puller assembly kit (T48).

   c. Install adapter (12) on shaft (13). Install spring pin (14) into hole (15).



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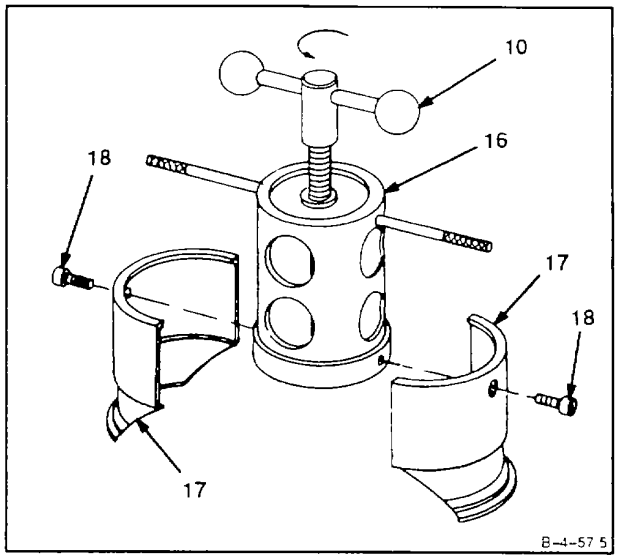
4-58 REMOVE SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM)(Continued) **4-58**

4. **Install GP spacer-puller (16) on second turbine spacer as follows**

   a. Turn T-handle (11) counterclockwise all the way.

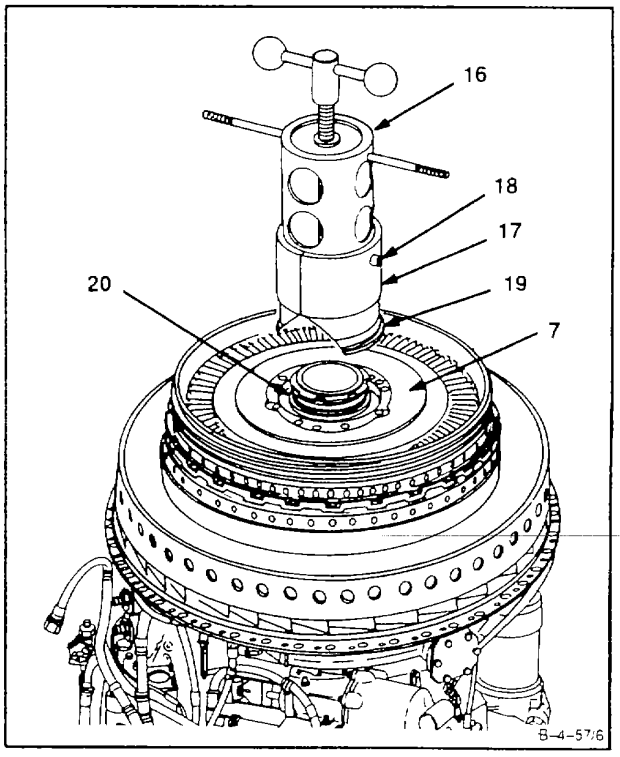
   b. Install two puller shells (17) detail of GP spacer puller assembly kit (T48) on GP spacer puller (16) Install two 0.625 inch long socket head cap screws (18) one turn only.



   c. Install GP spacer puller (16) on second turbine spacer (7).

   d. Make sure lip (19) of puller shells (17) engages flange (20) of second turbine spacer (7).

   e. Tighten two 0.625 inch long socket head cap screws (18).



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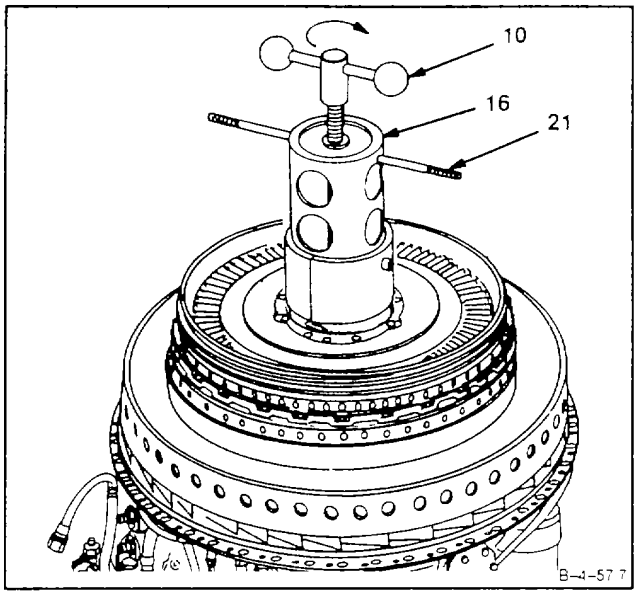
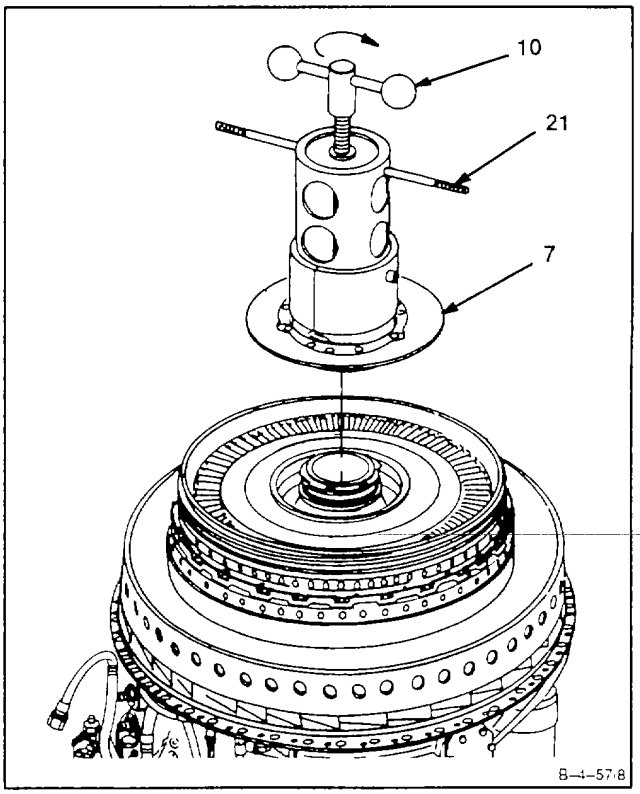
4-58 REMOVE SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM) (Continued) **4-58**

5. **Remove second turbine spacer (7)** as follows:

   a. Hold puller handle (21) Turn T-handle (10) clockwise until GP spacer puller (16) is locked in position.



   b. Have helper hold puller handle (21) Turn T-handle (10) clockwise and remove turbine spacer (7).



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4-58 REMOVE SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM)(Continued) **4-58**

6. **Remove GP spacer puller(16) from second turbine spacer as follows:**

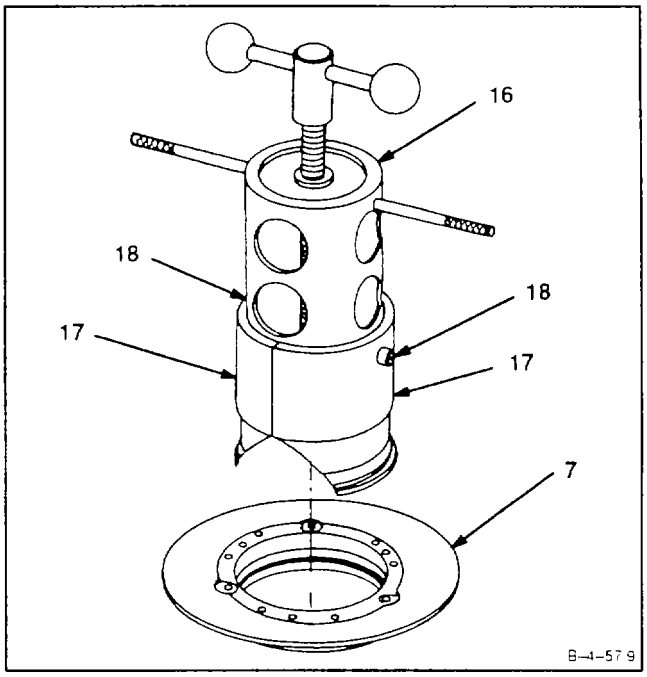
   a. Loosen two 0.625 inch long socket head cap screws (18) and remove GP spacer puller (16) from second turbine spacer (7).

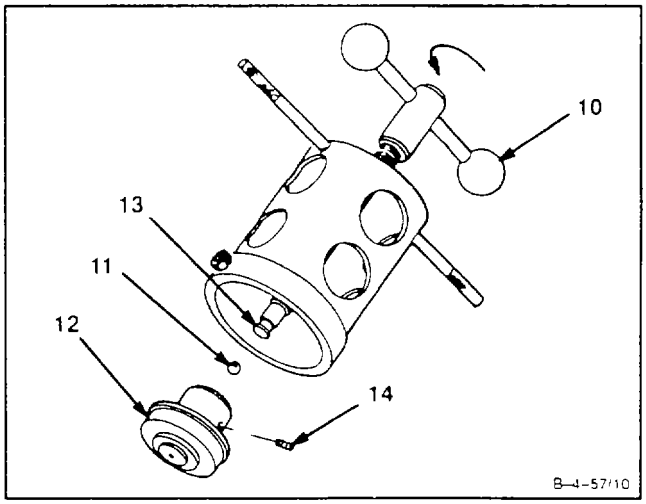
   b. Remove two 0.625 inch long socket head cap screws (18) and two puller shells (17) from GP spacer puller (16).

   c. Turn T-handle (10) clockwise all the way.

   d. Remove spring pin (14) from adapter (12).

   e. Remove adapter (12) from shaft (13), and ball (11) from base of adapter (12).





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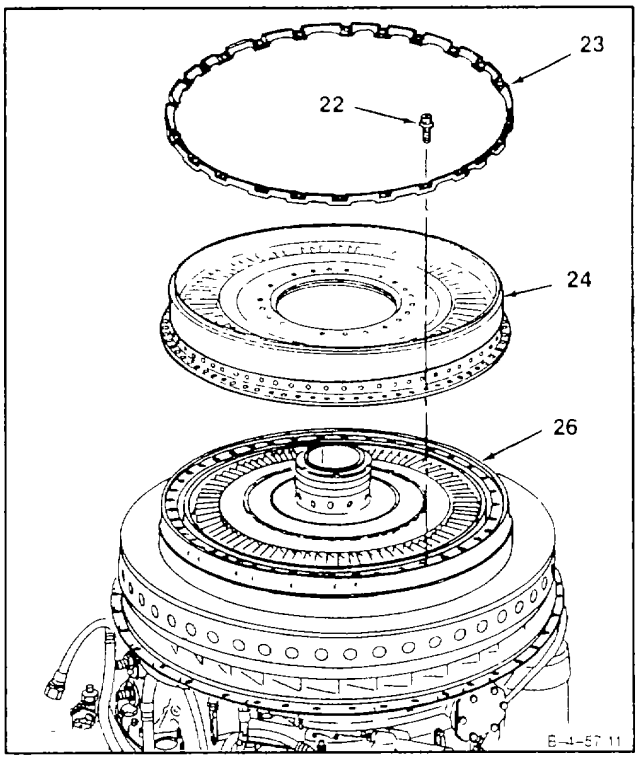
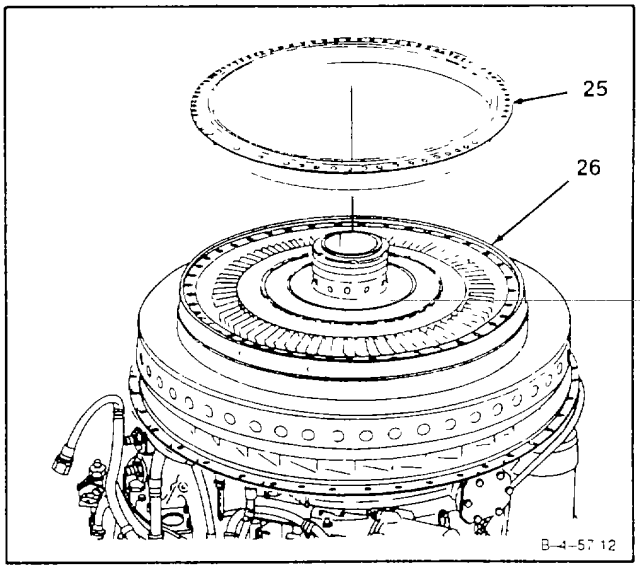
4-58 REMOVE SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM) (Continued) 4-58

7. Matchmark second turbine nozzle (24) to first turbine nozzle (26) using marking pencil (E38).

8. **Remove** lockwire, 24 bolts (22), bumper (23), and **second turbine nozzle (24).**



9. Matchmark turbine rotor case (25) to first turbine nozzle (26) using marking pencil (E38). **Remove turbine rotor case (25).**



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-59 CLEAN SECOND TURBINE NOZZLE,SPACER,CASE,AND BUMPER(AVIM) 4-59

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Goggles
Dry, Compressed Air Source

Materials:

Denatured Alcohol (E17)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Second Turbine Disc Assembly Removed (Task 4-54)
Second Turbine Nozzle Spacer Case and Bumper Removed (Task 4-58)
First Turbine Disc Assembly Removed (Task 4-63)

General Safety Instructions:

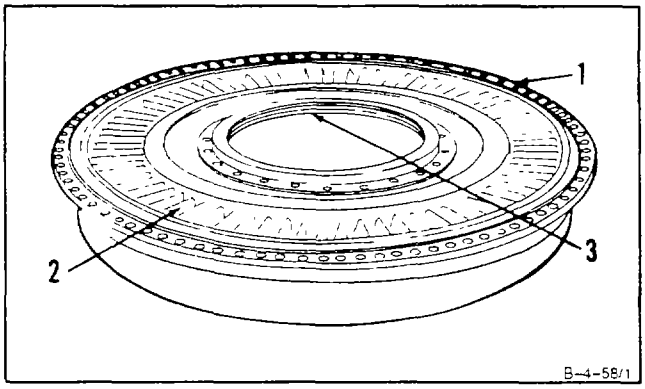
WARNING

When using compressed air for cleanmg, use approved protective equipment for eyes and face Do not use more than 30 psig air pressure Do not direct air toward yourself or another person Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention

1. **Clean second turbine nozzle (1)** as follows:

   a. Wear gloves (E24) Wipe second turbine nozzle (1) with lint-free cloth (E30) dampened in denatured alcohol (E17). Use brush on vanes (2) and seal rings (3).

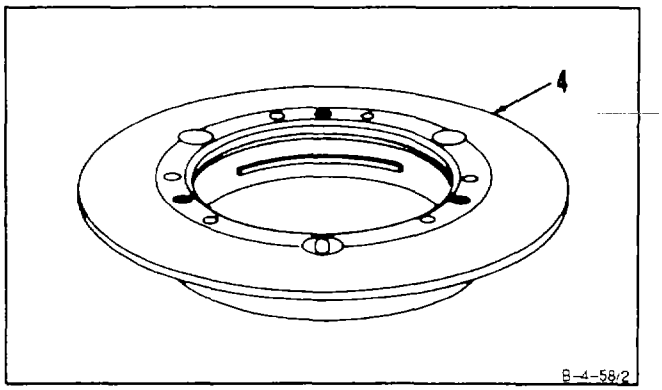
   b. Wear goggles. **Blow dry nozzle** Use clean, dry, compressed air.



2. **Clean turbine spacer (4)** as follows:

   a. Wipe turbine spacer (4) with lint-free cloth (E30) dampened in denatured alcohol (E17).

   b. **Blow dry spacer** Use clean, dry, compressed air.



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3. **Clean turbine rotor case (5)** as follows:

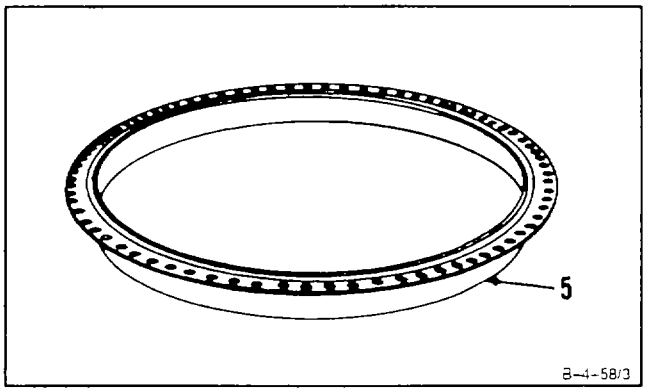
   a Wipe turbine rotor case (5) with lint-free cloth (E30) dampened in denatured alcohol (E17).

   b **Blow dry case.** Use clean, dry, compressed air.

4. **Clean bumper (6)** as follows:

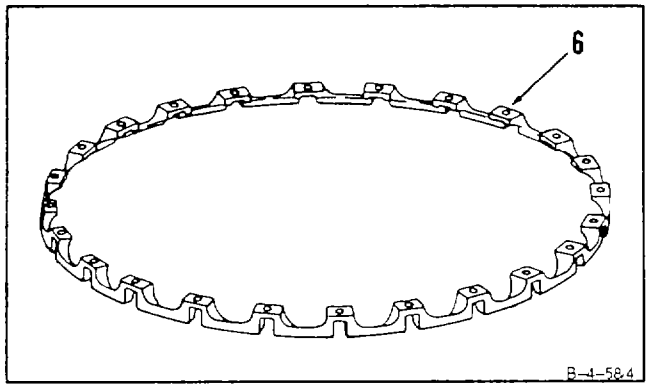
   a Wipe bumper (6) with lint-free cloth (E30) dampened in denatured alcohol (E17).

   b **Blow dry bumper.** Use clean, dry, compressed air.



FOLLOW-ON MAINTENANCE:

Inspect Second Turbine Nozzle, Spacer, Case, and Bumper (Task 4-60).



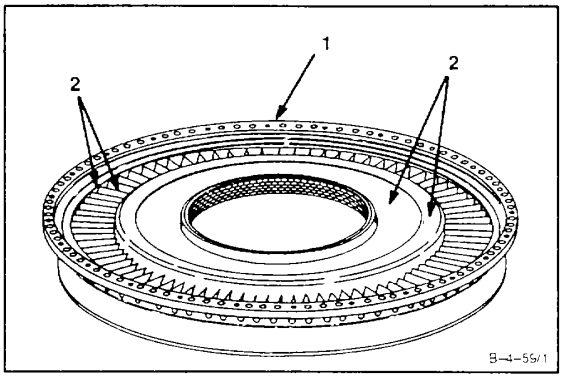
END OF TASK

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition
Off Engine Task

1. **Inspect forward side of second turbine nozzle (1)** as follows:

a. **Inspect forward surfaces (2)** for dents There shall be no dents deeper than 1/16 inch.



b. **Inspect 77 vanes (3)** as follows:

NOTE

The following inspection in steps (1) and (2) applies to all surfaces of the entire vane Only the forward view is shown.

(1) General inspection.

(a) There shall be no nicks, burrs or scratches (4) deeper than 1/32 inch.

(b) There shall be no buckling.

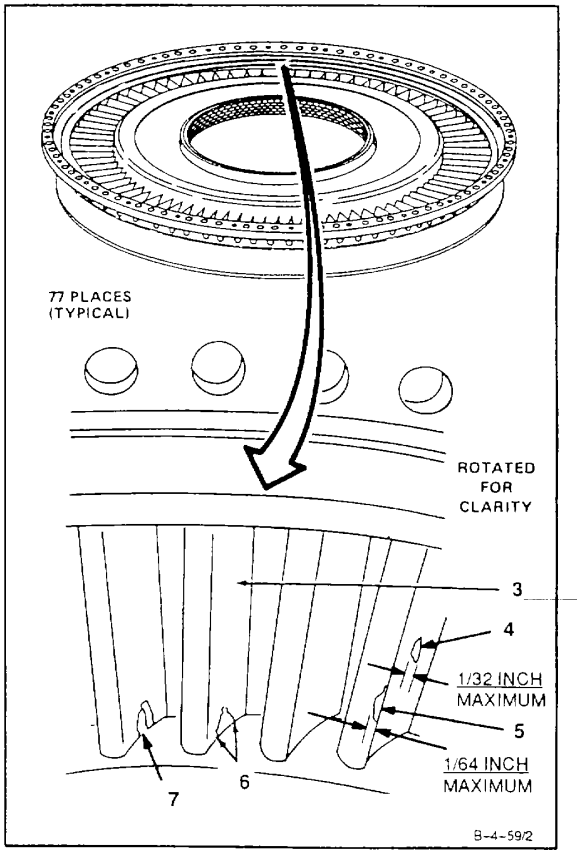
(c) There shall be no burning or metal loss (5) deeper than 1/64 inch.

(d) There shall be no severe or moderate deterioration of coating due to erosion, corrosion, FOD, or aluminum depletion.

(2) Inspect for cracks

(a) There shall be no converging cracks (6).

(b) There shall be no cracks (7) with vane core visible.



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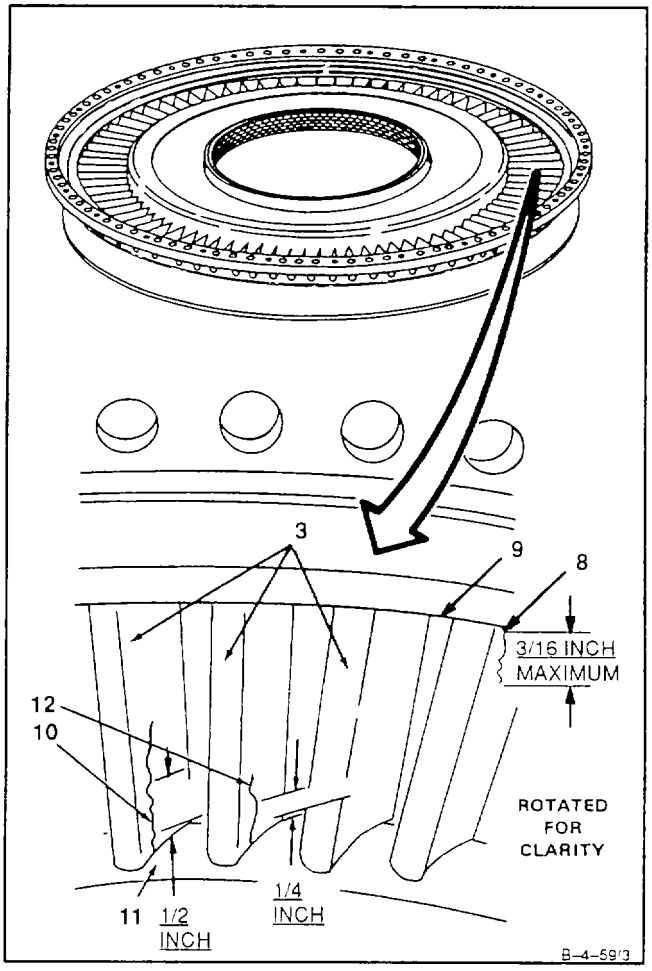
(c) There shall be no cracks (8) from outer shroud (9) longer than 3/16 inch.

(d) There shall be no cracks (10) from inner shroud (11) longer than 1/2 inch.

(e) There shall be no vane with more than one crack (12) from inner shroud (11) longer than 1/4 inch.

(f) There shall be no more than three vanes (3) with cracks (12) from inner shroud (11) longer than 1/4 inch.



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(3) Inspect for chordal cracks from leading edge.

(a) There shall be no cracks (13) in vane leading edge (14) longer than 3/8 inch.

NOTE

The following crack must not be closer than 3/32 inch radial distance to trailing edge chordal crack shown in step 2 b (1) (a).

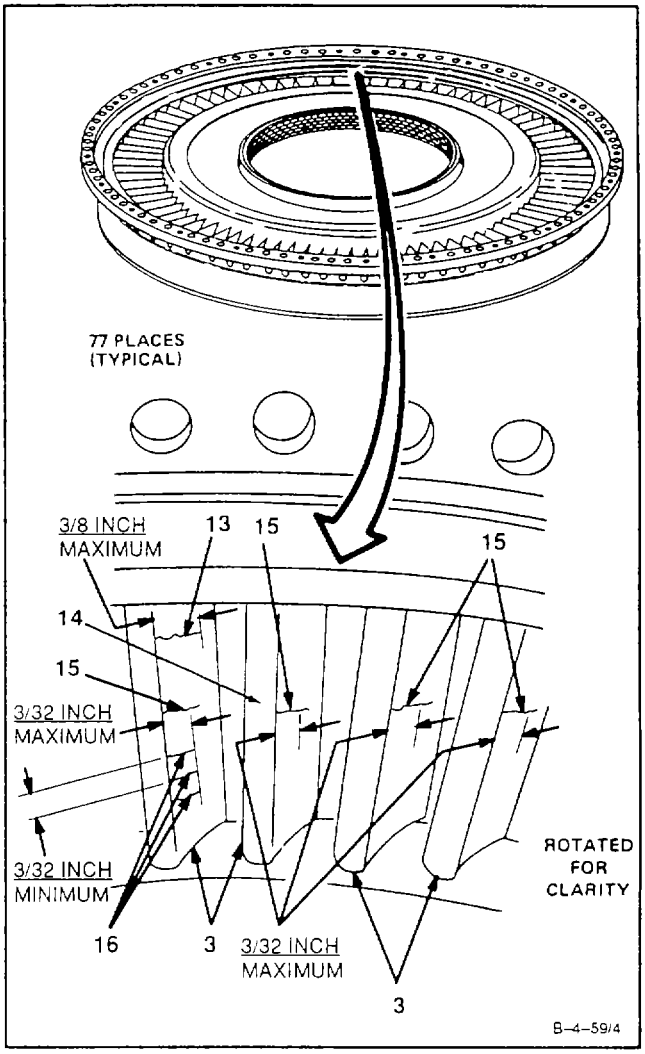
(b) There shall be no vane with more than one crack (15) longer than 3/32 inch.

(c) There shall be no vane with two cracks (16) closer than 3/32 inch.

(d) There shall be no vane with more than three cracks (16) up to 3/32 inches long.

(e) There shall be no more than two adjacent vanes (3) with cracks (15) longer than 3/32 inch.

(f) There shall be no more than four vanes (3) with cracks (15) longer than 3/32 inch.



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c. **Inspect inner seal forward support (17)** as follows:

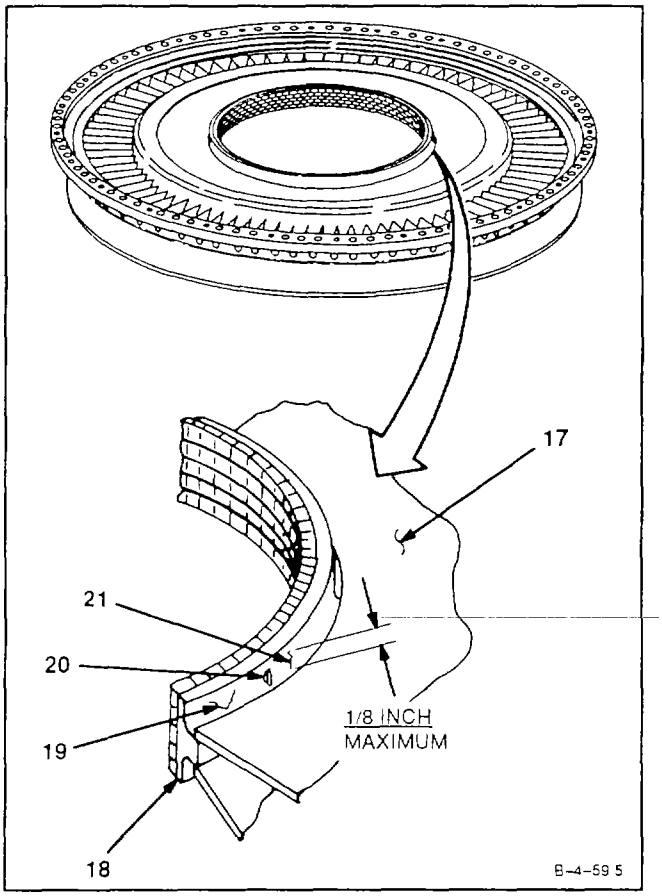
(1) There shall be no cracks or distortion.

d. **Inspect inner seal support ("T"-section) (18)** as follows:

(1) There shall be no converging axial cracks (19).

(2) There shall be no axial cracks (20) which are not tight-lipped.

(3) There shall be no axial cracks (21) longer than 1/8 inch.



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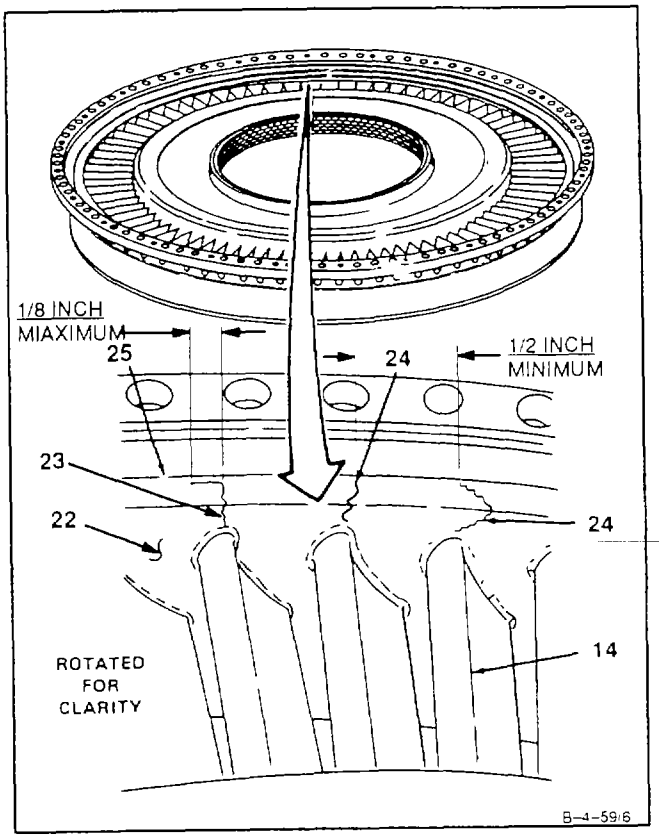
e. **Inspect outer shroud (22)** as follows:

(1) There shall be no circumferential cracks.

(2) There shall be no axial cracks (23) with a circumferential component at either end longer than 1/8 inch.

(3) There shall be no more than ten axial cracks (24) which extend from vane leading edge (14) to edge of sealing baffle (25) These cracks can be full depth and progress radially, but must be separated by at least 1/2 inch.



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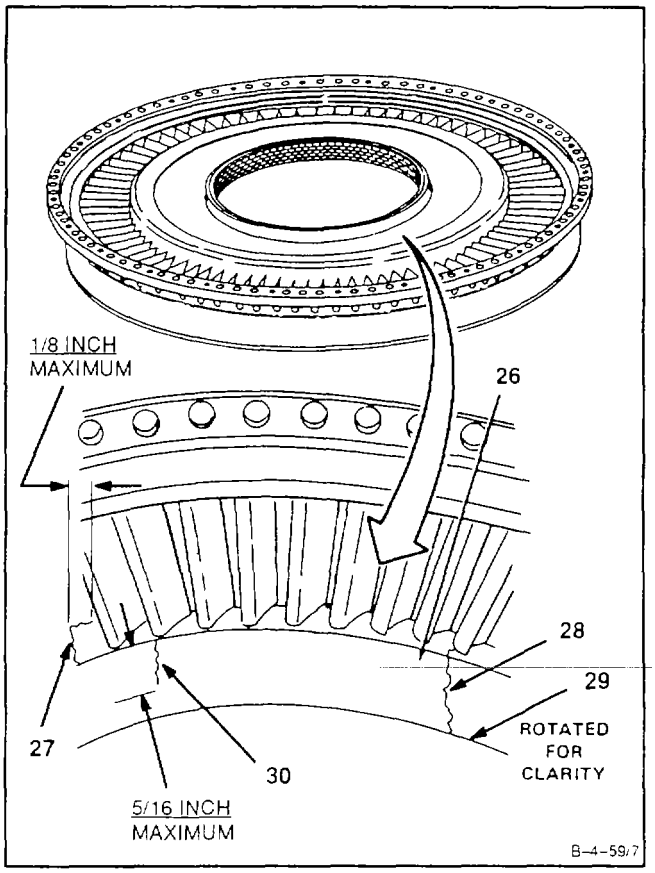
f. **Inspect inner shroud (26)** as follows:

(1) There shall be no circumferential cracks.

(2) There shall be no axial cracks (27) with a circumferential component at either end longer than 1/8 inch.

(3) There shall not be more than one axial crack (28) which extends from vane/inner shroud slot to inner shroud/support braze joint (29).

(4) There shall be no more than 15 axial cracks (30) longer than 1/8 inch, which extend from vane/inner shroud slot toward inner shroud/support braze joint (29) These cracks must not be longer than 5/1 6 inch.



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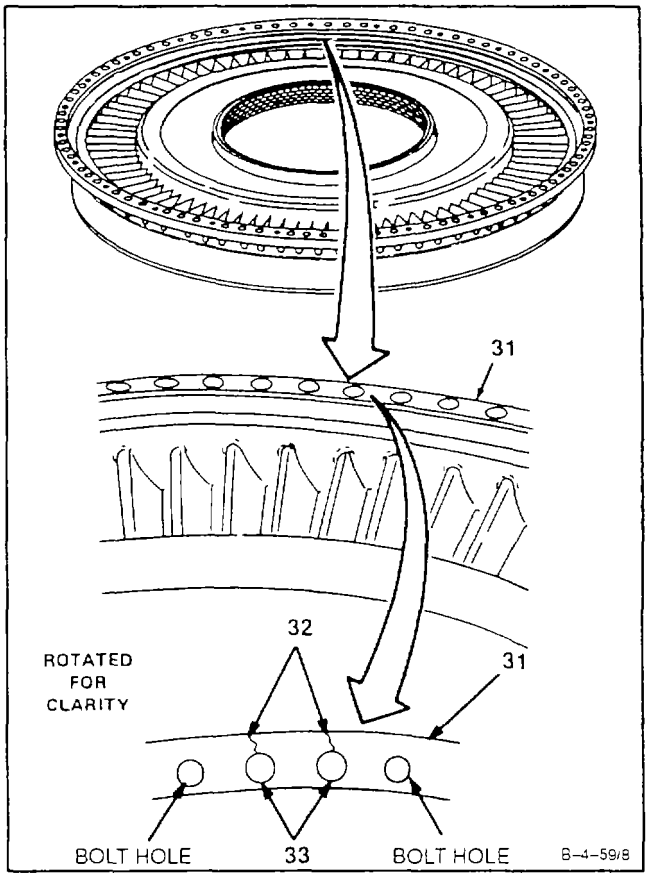
g. Inspect mounting ring (31). There shall not be more than one radial crack (32) per cooling hole (33)



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h. **Inspect honeycomb seal (34)** as follows:

(1) There shall be no circumferential cracks (35) or voids in joint (36).

NOTE

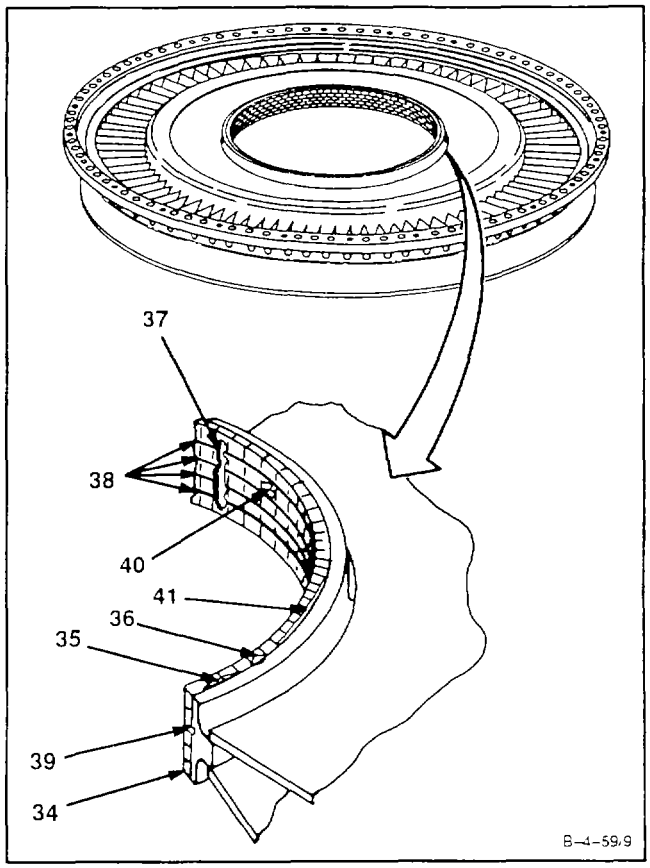
In following step, grooves referred to are circumferential cuts in honeycomb seal material made by four knife edges of the second turbine spacer as the turbine rotates.

(2) There shall be no seal material broken away so as to cause a gap (37) across all four grooves (38) and also progressing beyond first or last groove.

(3) There shall be no grooving (39) through to base parent metal.

(4) There shall be no cracks (40) which are not tight-lipped.

(5) There shall be no circumferential separation (41) between seal element and parent metal.



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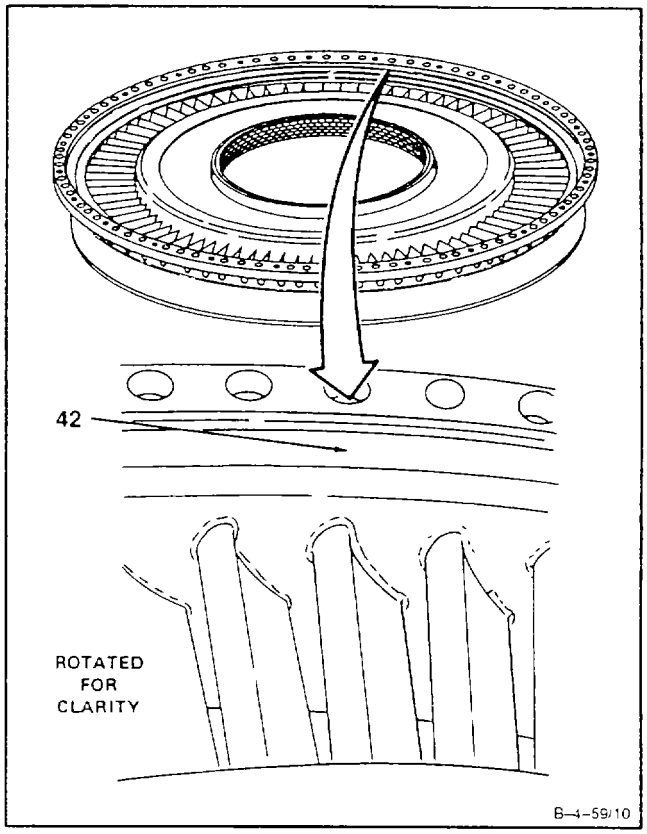
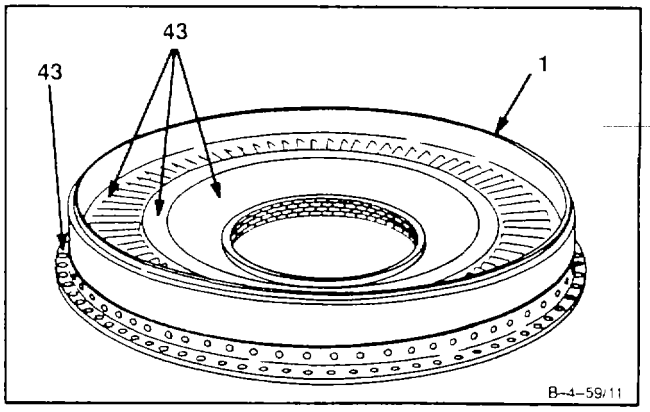
i. **Inspect sealing baffle (42).** There shall be no cracks.

2. **Inspect aft side of second turbine nozzle (1)** as follows:

a. **Inspect aft surfaces (43)** for severe damage There shall be no damage deeper than 1/16 inch.





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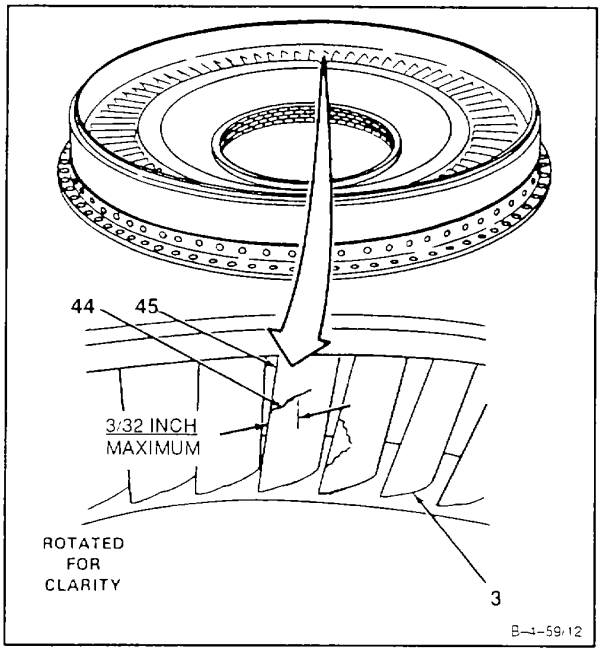
b. **Inspect 77 vanes (3)** as follows:

(1) Inspect for chordal cracks from trailing edge.

NOTE

The following crack must not be closer than 3/32 inch radial distance to leading edge chordal crack shown in step 1.b . 3) (b).

(a) There shall be no cracks (44) from trailing edge (45) longer than 3/32 inch.



c. **Inspect inner seal aft support (46)** as follows:

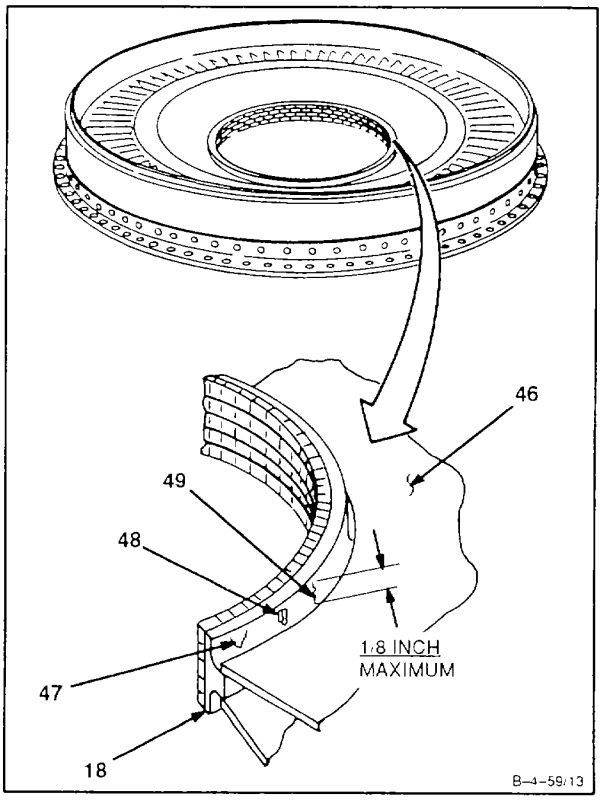
(1) There shall be no cracks or distortion.

d **Inspect inner seal support ("T"-section) (18)** as follows:

(1) There shall be no converging axial cracks (47).

(2) There shall be no axial cracks (48) which are not tight-lipped.

(3) There shall be no axial cracks (49) longer than 1/8 inch.



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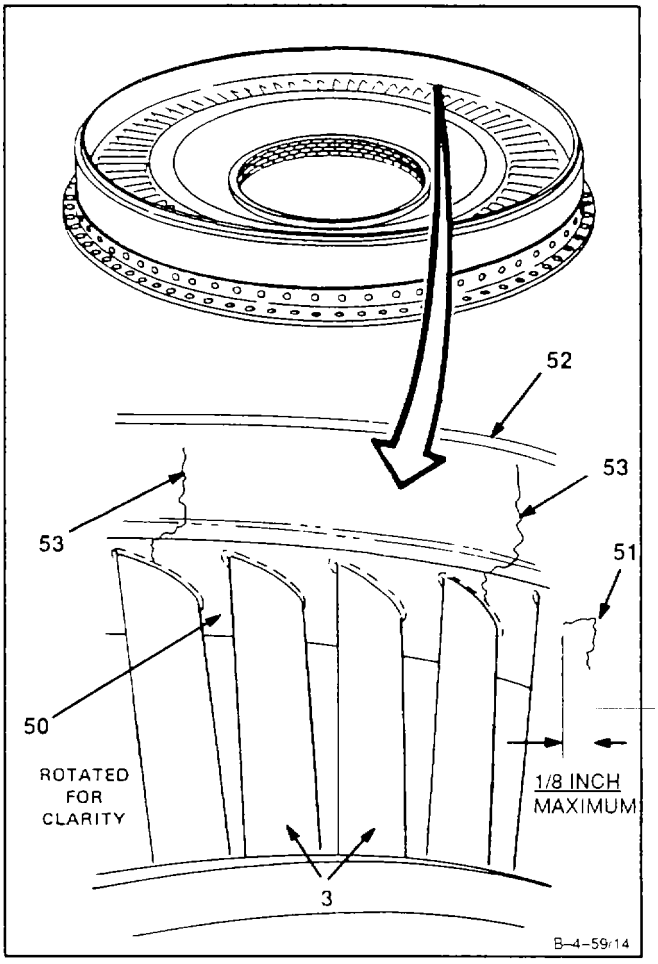
e. Inspect outer shroud (50).

(1) There shall be no circumferential cracks.

(2) There shall be no axial cracks (51) with a circumferential component at either end longer than 1/8 inch.

(3) There shall be no axial cracks which extend from vane/outer shroud braze joint to aft edge of cylinder (52).

(4) a here shall be no more than four axial cracks (53) extending aft from vane/outer shroud braze joint toward aft edge of cylinder (51) These cracks must be tight-lipped and must be separated by a minimum of two vanes (3).



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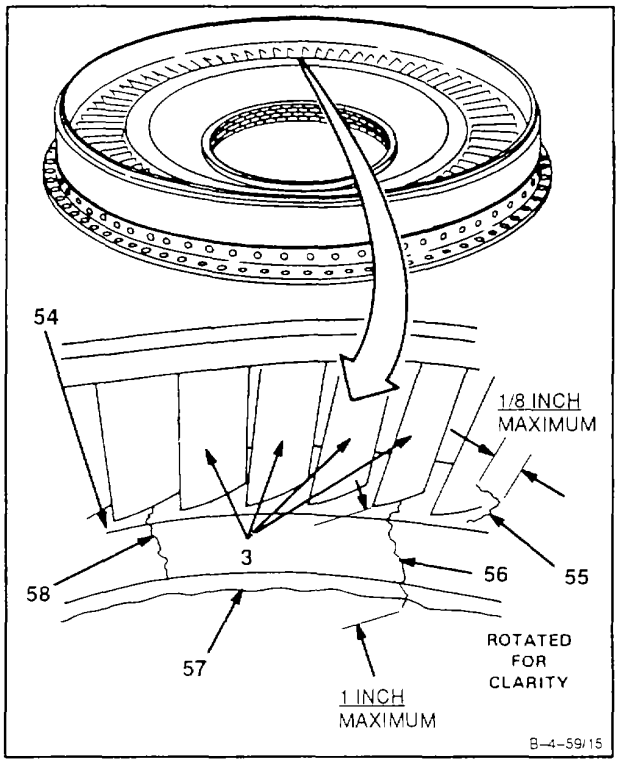
f. **Inspect inner shroud (54)** as follows:

(1) There shall be no circumferential cracks.

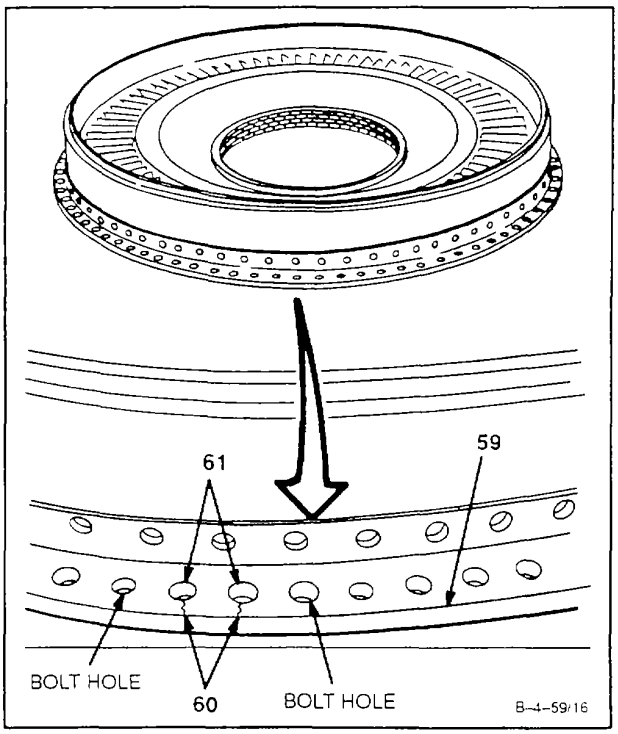
(2) There shall be no axial cracks (55) with a circumferential component at either end longer than 1/8 inch.

(3) There shall not be more than four axial cracks (56) which extend from vane/inner shroud slot to beyond inner shroud/aft support braze joint (57) These cracks, must be tight-lipped, separated by at least four vanes (3), and not longer than 1 inch.

(4) There shall not be more than eight axial cracks (58) which extend from vane/inner shroud slot to inner shroud/aft support braze joint (57).



g **Inspect mounting ring (59).** There shall not be more than one radial crack (60) per cooling hole (61).



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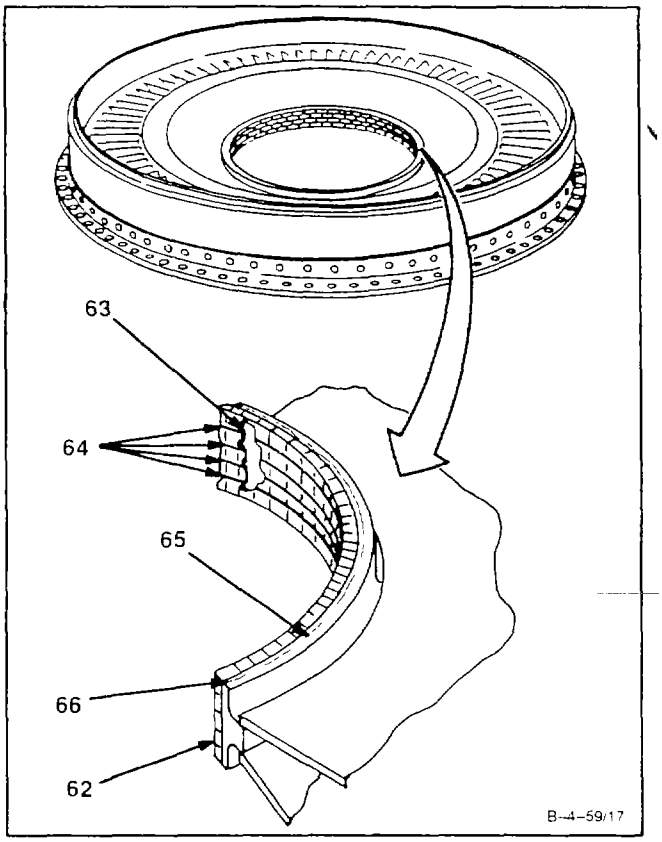
h. **Inspect honeycomb seal (62)** as follows:

NOTE

In following step grooves referred to are circumferential cuts in honeycomb seal material made by four knife edges of the second turbine spacer as the turbine rotates.

(1) There shall be no seal material broken away so as to cause a gap (63) across all four grooves (64) and also progressing beyond first or last groove.

(2) A 360° gap (65) is acceptable in joint (66).



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i. **Inspect outer shroud cylinder (67)** as follows:

(1) Inspect inside diameter (68) There shall be no grooves (69) deeper than 1/64 inch.

(2) Inspect outside diameter (70) as follows:

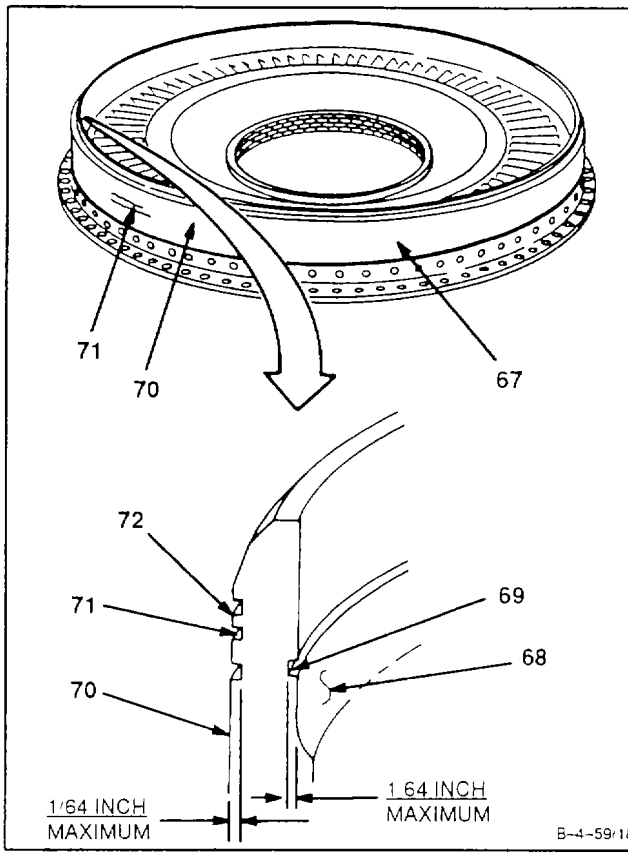
(a) There shall be no cracks.

(b) There shall be no grooves (71) caused by fretting of third turbine nozzle support seals and expander springs deeper than 1/64 inch.

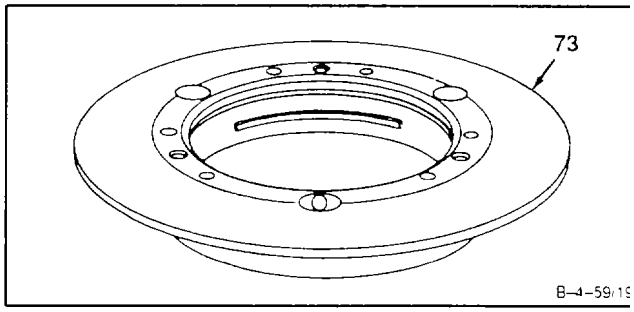
CAUTION

Grooving may result in formation of steps which could cause severe difficulty in future removal of combustion section and power turbine. This difficulty could result in damage to engine components

(c) There shall be no steps (72) caused by grooving.



3 Inspect turbine spacer (73). There shall be no cracks There shall be no dents deeper than 1/8 inch.



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4. **Inspect turbine rotor case (74)** as follows.

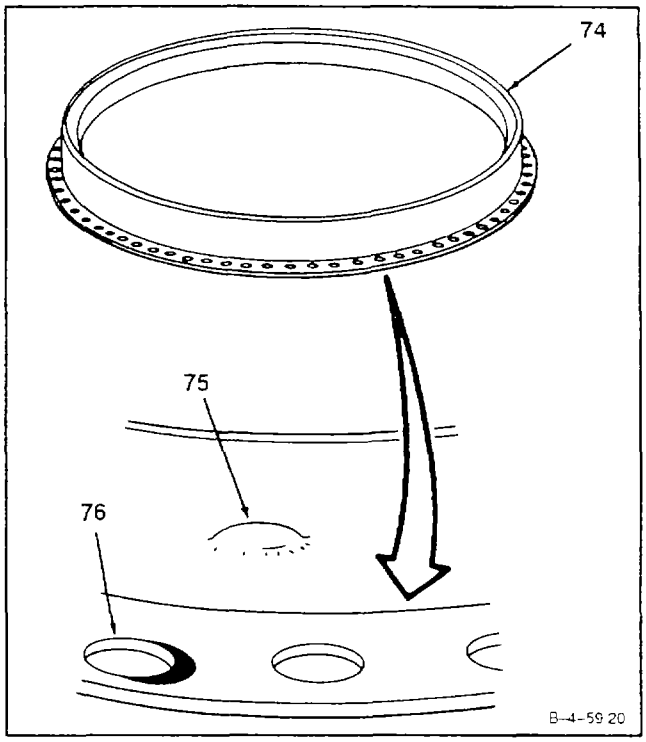
   a. There shall be no cracks.

   b. There shall be no dents (75) deeper than 1/8 inch.

NOTE

In following step c, the bolt holes are located closer to the outer edge.

   c. The bolt holes (76) shall not be elongated.



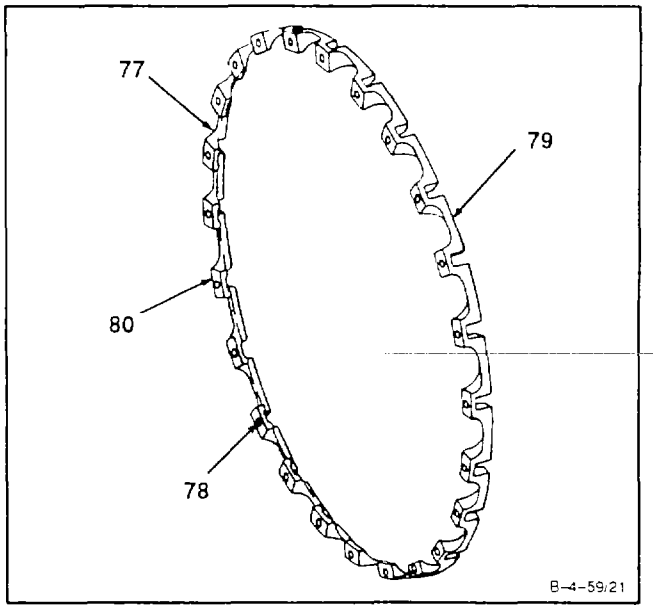
5. **Inspect second turbine nozzle bumper (77)** as follows:

   a. There shall be no deformation and/or severe damage.

   b. The bolt holes (78) shall not be elongated.

   c. There shall be no wear or fretting at third turbine nozzle support contact area (79) exceeding 0.010 inch in depth providing all build clearances can be maintained.

   d. There shall be no wear or fretting at second turbine nozzle contact area (80) exceeding 0 005 inch in depth providing all build-up clearances can be maintained.



FOLLOW-ON MAINTENANCE:
None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,

NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Skimming Maintenance Kit (T44)
Sound Protector
Goggles
Vernier Caliper, 1 -Inch
Vacuum Cleaner

Materials
Emery Cloth (E20)
Lockwire (E33)
Marking Pencil (E38)

Personnel Required:
Aircraft Powerplant Repairer (2)
Aircraft Powerplant Inspector

Equipment Condition
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Second Turbine Disc Assembly Removed (Task 4-54)
Second Turbine Nozzle Spacer, Case and Bumper Removed (Task 4-58)
First Turbine Disc Assembly Removed (Task 4-63)

References:
Task 4-57

General Safety Instructions:

WARNING

Exposure to skimming maintenance kit noise may cause ringing in ears, and temporary or permanen hearing loss. When using skimming maintenance kit, wear approved hearing protection If ringing in ears or loss of hearing persists, get medical attention.

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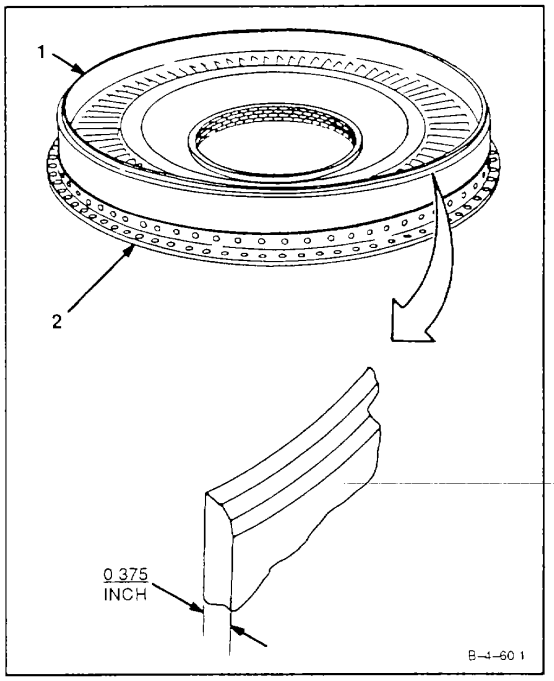
1. **Measure wall thickness of outer shroud cylinder (1)** of second turbine nozzle (2). Use vernier caliper If amount of material to be removed results in a wall thickness of less than 0 375 inch, replace nozzle assembly.



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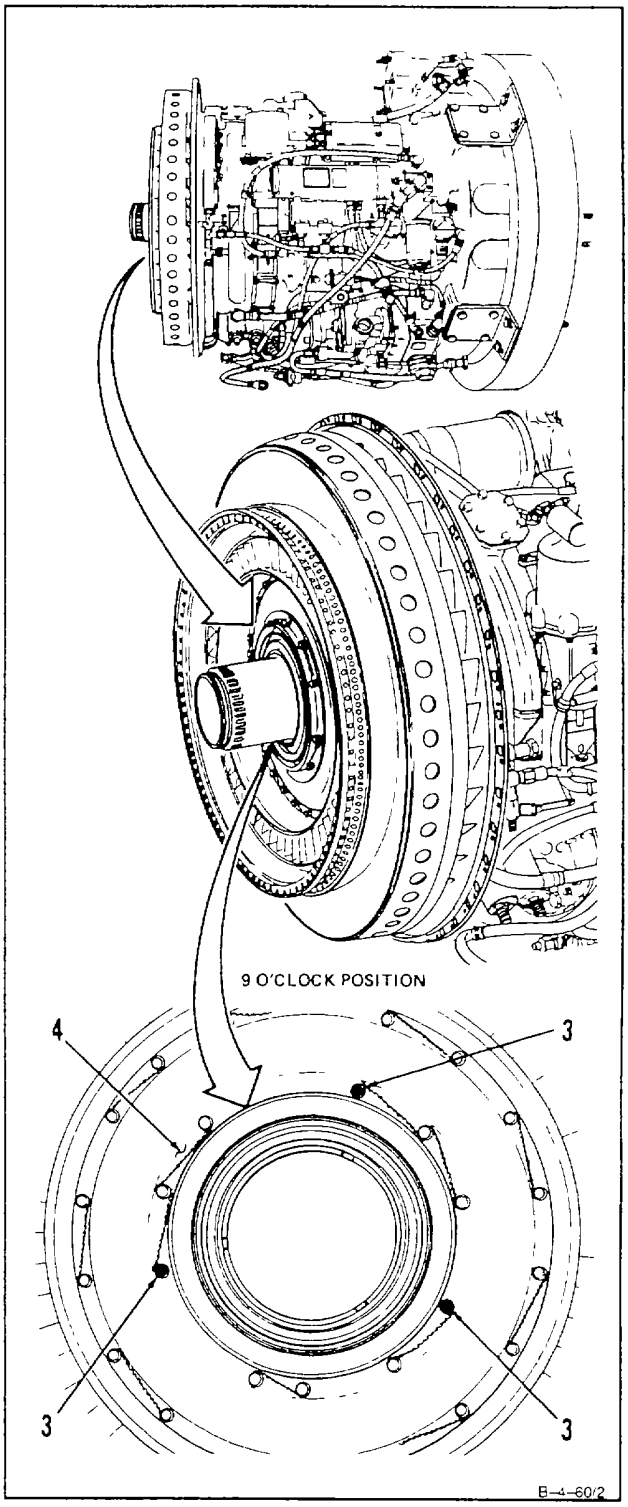
2. Remove lockwire and three bolts (3) from baffle retainer (4).



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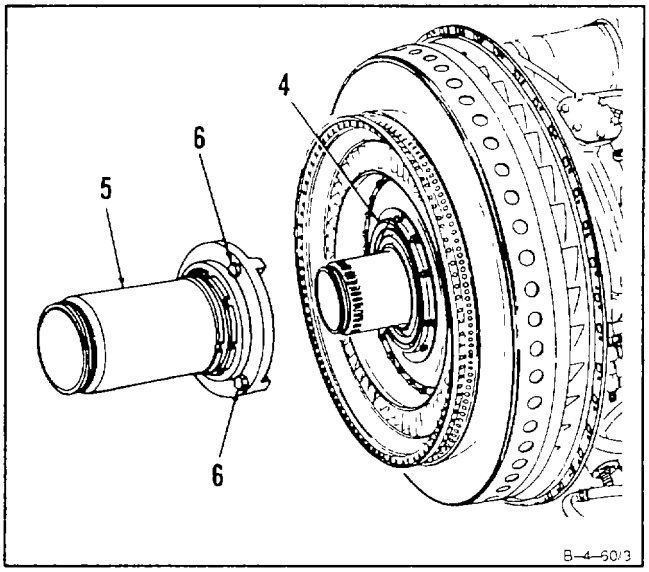
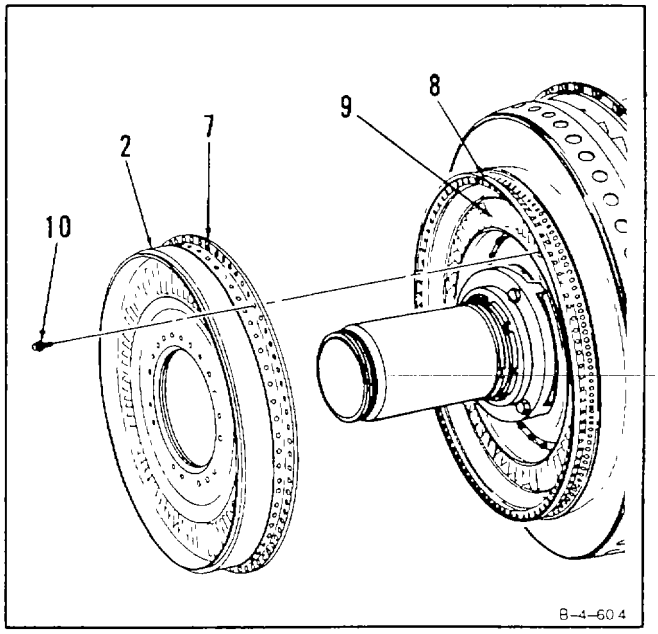
3. **Install adapter (5),** part of skimming maintenance kit (T44), on baffle retainer (4).

4. Tighten three bolts (6).



5. Align matchmark (7) on second turbine nozzle (2) and matchmark (8) on first turbine nozzle (9). **Install second turbine nozzle (2)** and 24 bolts (10).



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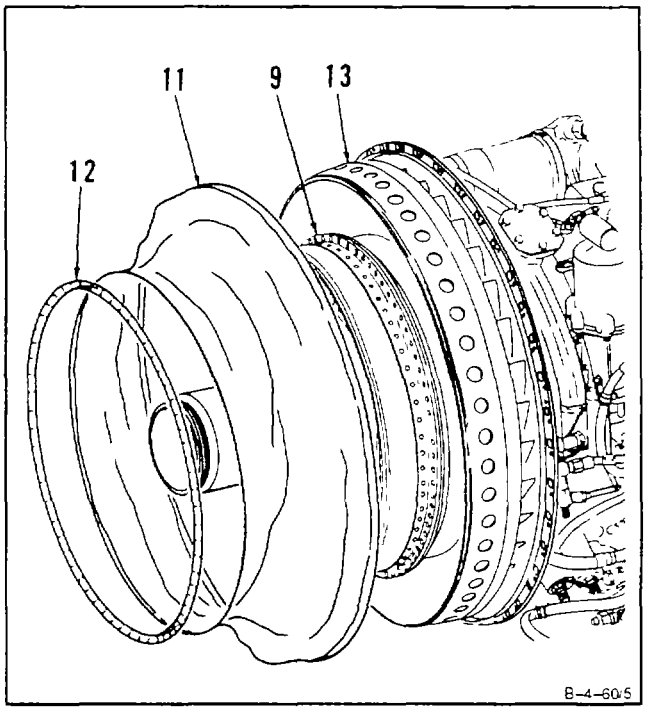
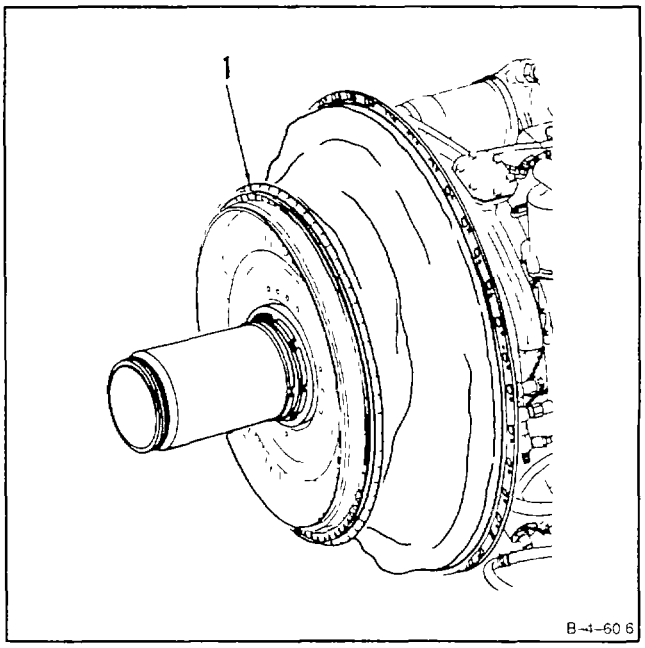
NOTE

In following step 6, difficulty may be encountered when installing cover due to tight fit of cover around air diffuser assembly. The tight fit is necessary to ensure that machining chips do not enter air diffuser assembly.

6. **Install protective cover (11) and spring (12),** part of skimming maintenance kit (T44), on first turbine nozzle (9) and air diffuser assembly (13).



7. Measure tip clearance (Ref. Task 4-57) and **mark case (1)** of second turbine nozzle at the point of lowest tip clearance. Use marking pencil (E38).



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8. Subtract lowest tip clearance from MINIMUM required tip clearance (O.025 inch). Result is the amount of material to be removed from case (1).

NOTE

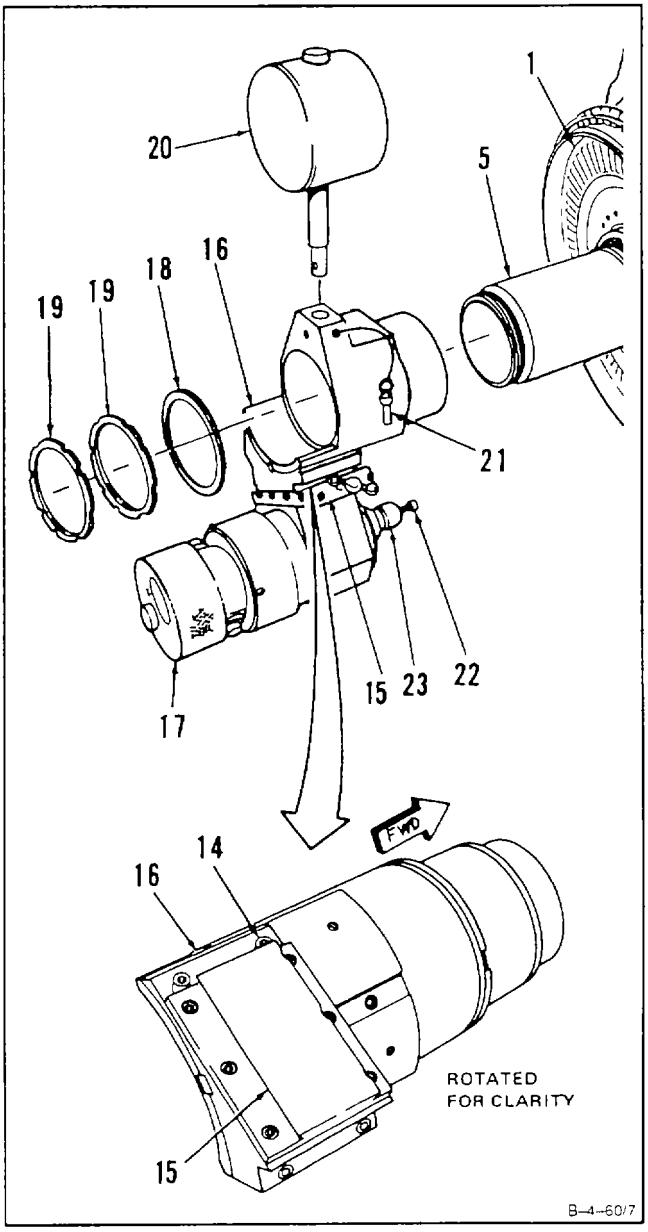
Check housing for position of support. Support must be installed at the rear position on housing. If support is not installed at the rear position on housing, perform step 9.

9. Remove four screws (14) and move support (15) to aft position on housing (16) Install four screws (14)

10. Use helper and **install milling machine (17),** part of skimming maintenance kit (T44), on adapter (5) Install washer (18) and two nuts (19), using spanner wrench, part of skimming maintenance kit (T44)

11. **Install counterweight (20) and pin (21).**

12. **Install cutter (22),** part of skimming maintenance kit (T32), **in collet (23).** Do not tighten collet (23).



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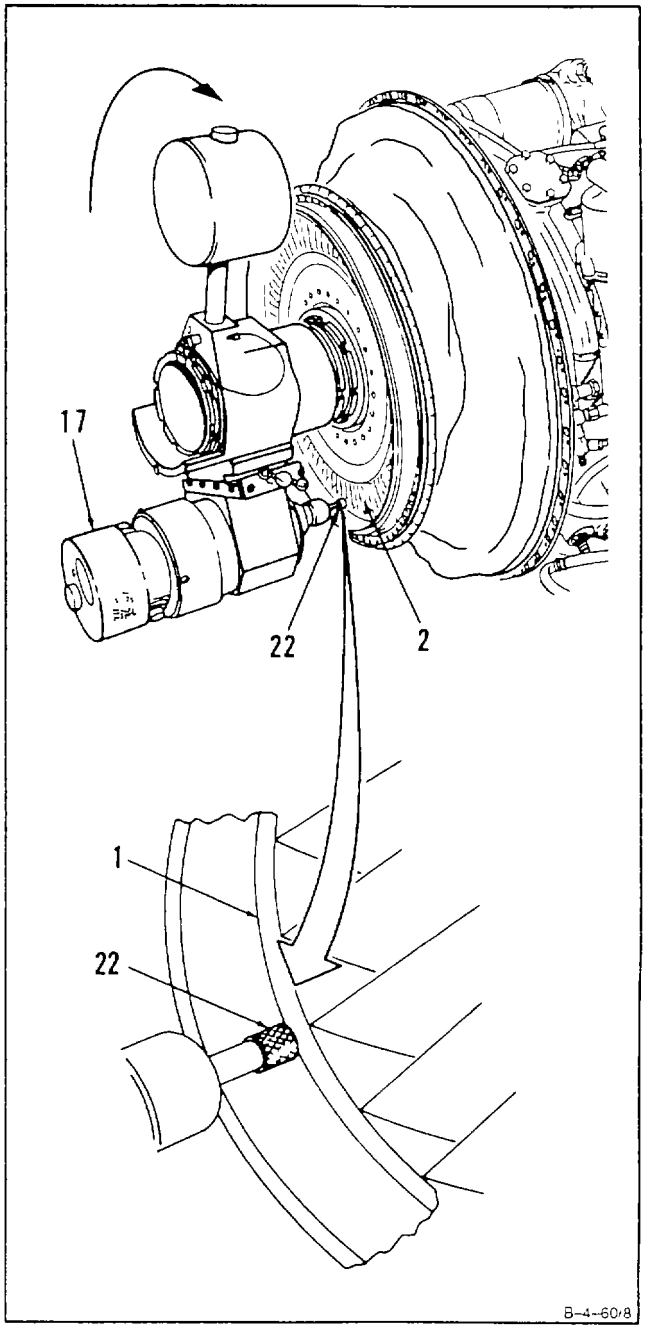
13. **Rotate milling machine (17) clockwise** until front stop is reached.

CAUTION

In following step, do not allow cutter to project beyond edge of taper in case. Failure to comply will cause damage to nozzle during milling operation.

14. **Adjust cutter (22)** until forward edge of cutter reaches edge of taper in case (1) of second turbine nozzle (2) Do not adjust cutter (22) beyond his point.



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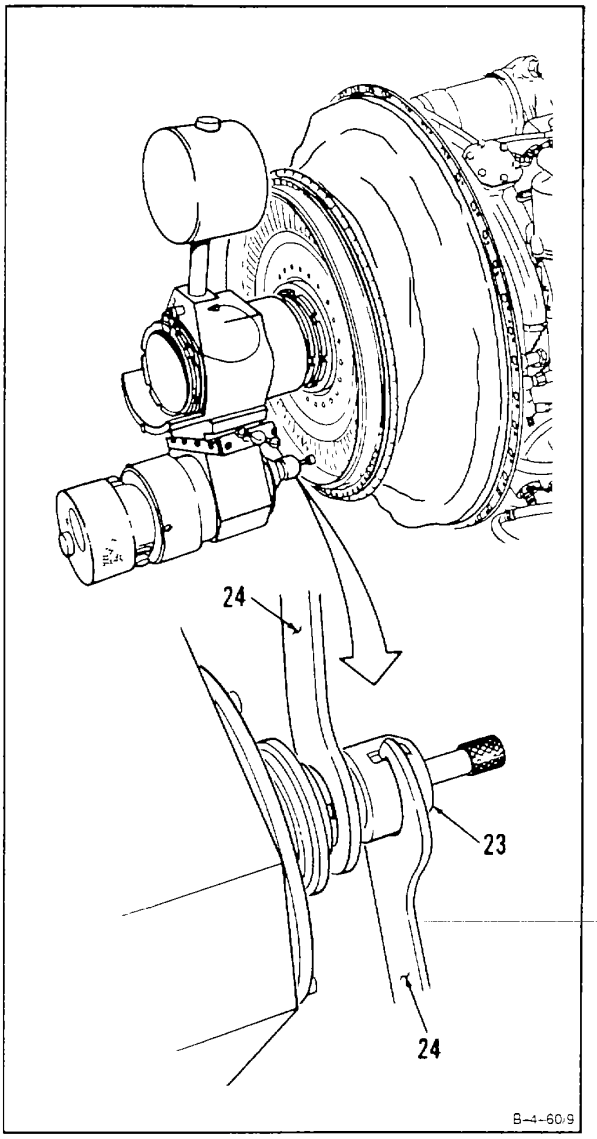
15. **Tighten collet (23)** with two spanner wrenches (24), part of skimming maintenance kit (T44).



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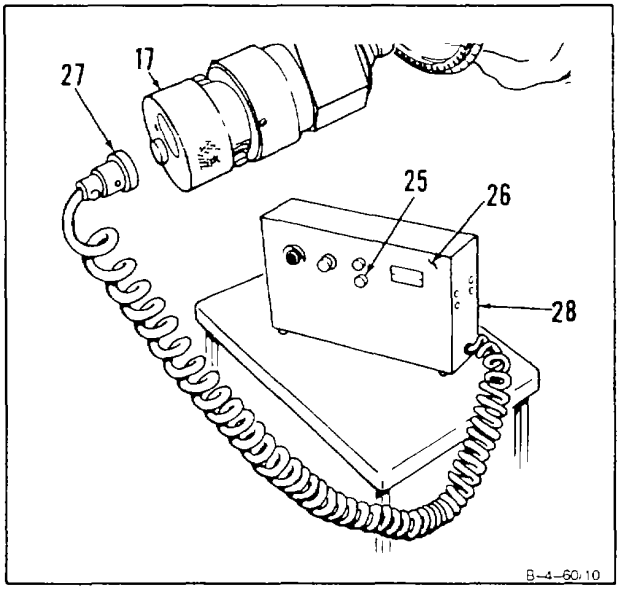
16. **Press STOP button (25)** on control panel (26).

17. **Connect control box connector (27)** to milling machine (1 7).

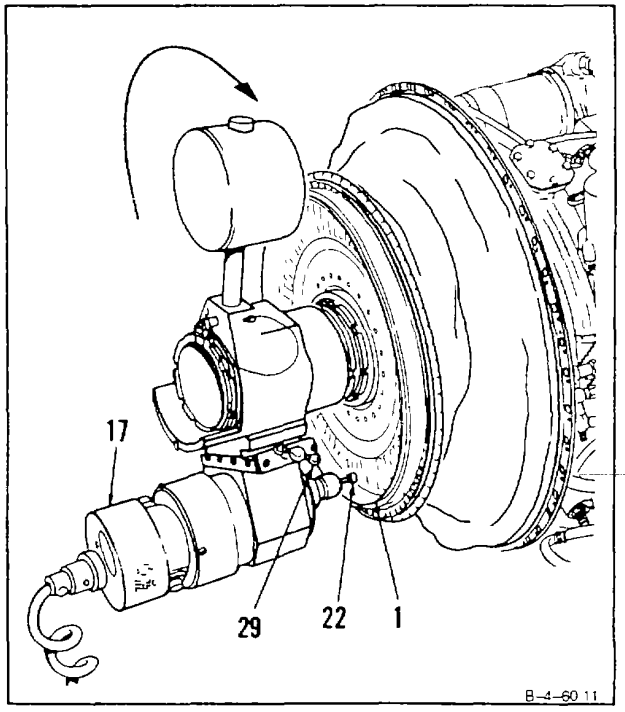
18. **Connect control box (28) to a 110 VAC power source.**



19. **Rotate milling machine (17)** counterclockwise until cutter (22) is on mark that was recorded on case (1) in step 7.

20. **Turn adjusting knob (29)** on milling machine (17) until cutter (22) lust makes contact with case (1) inner diameter.

21. **Rotate milling machine (17) clockwise** until front stop is reached.



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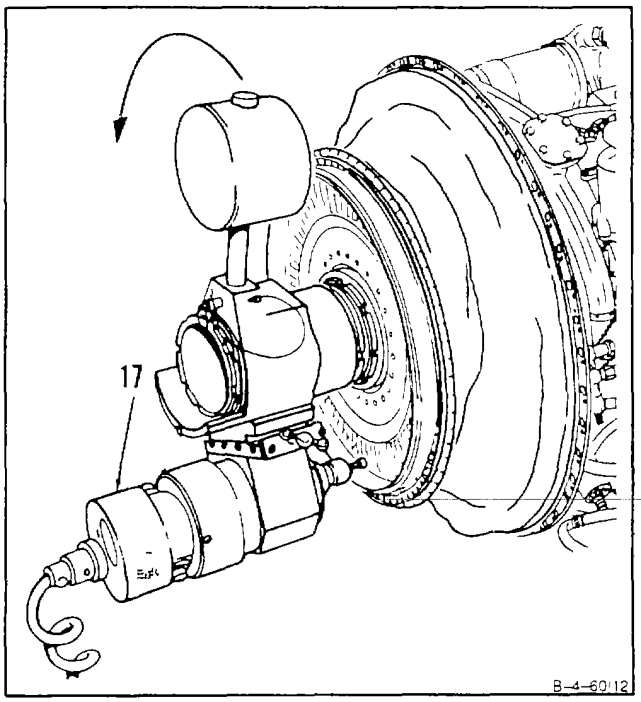
NOTE

In following step, ensure that no binding occurs when milling machine returns to rear stop.

22. **Rotate milling machine (17) counterclockwise** until rear stop is reached.

23. If binding occurs, repeat step 20 at area where binding occurred.



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WARNING

Keep hands and clothing away from rotating parts. Contact with rotating parts could cause injury. It injury occurs, get medical attention.

WARNING

Exposure to skimming maintenance kit noise may cause ringing in ears, and temporary or permanent hearing loss. When using skimming maintenance kit, wear approved hearing protection. If ringing in ears or loss of hearing persists, get medical attention.

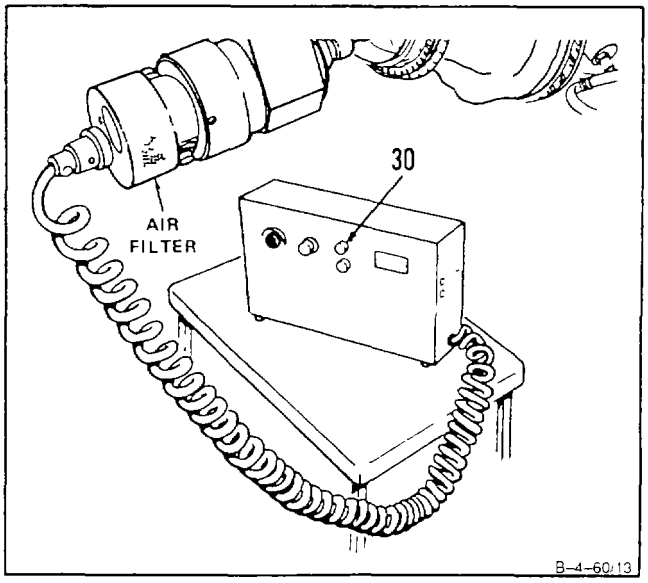
CAUTION

Make sure air filter of milling machine is unblocked at all times during operation Failure to comply will reduce flow of cooling air through the motor

NOTE

In following step 24, allow motor to run for 15 seconds to reach operating speed.

24. Wear goggles and sound protector. **Press START button (30).**



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CAUTION

In following step, do not stop rotation during the clockwise or counterclockwise movement until stops are reached. Stopping cutter before stops are reached may cause deep gouges or chatter marks in case.

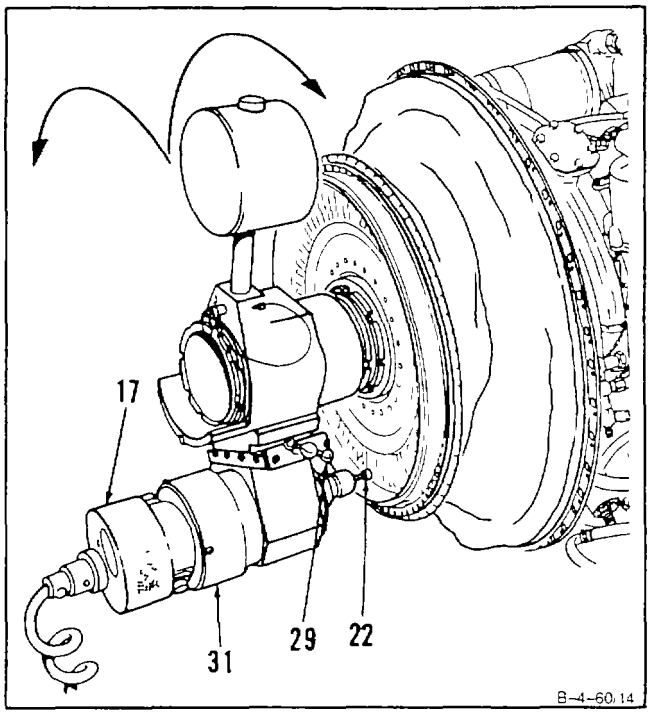
25. Place hands on collar (31) and **rotate milling machine (17) clockwise** until front stop is reached and immediately rotate milling machine (17) counterclockwise until rear stop is reached.

CAUTION

Do not advance cutter more than one increment for any cut. All clockwise and counterclockwise rotations must be made slowly and without stopping.

26. **Turn adjusting knob (29) one increment clockwise**. One increment clockwise advances cutter (22) radially 0.001 inch.

27. Continue to repeat steps 25 and 26 until amount of material to be removed, which was determined in step 8, is completed.



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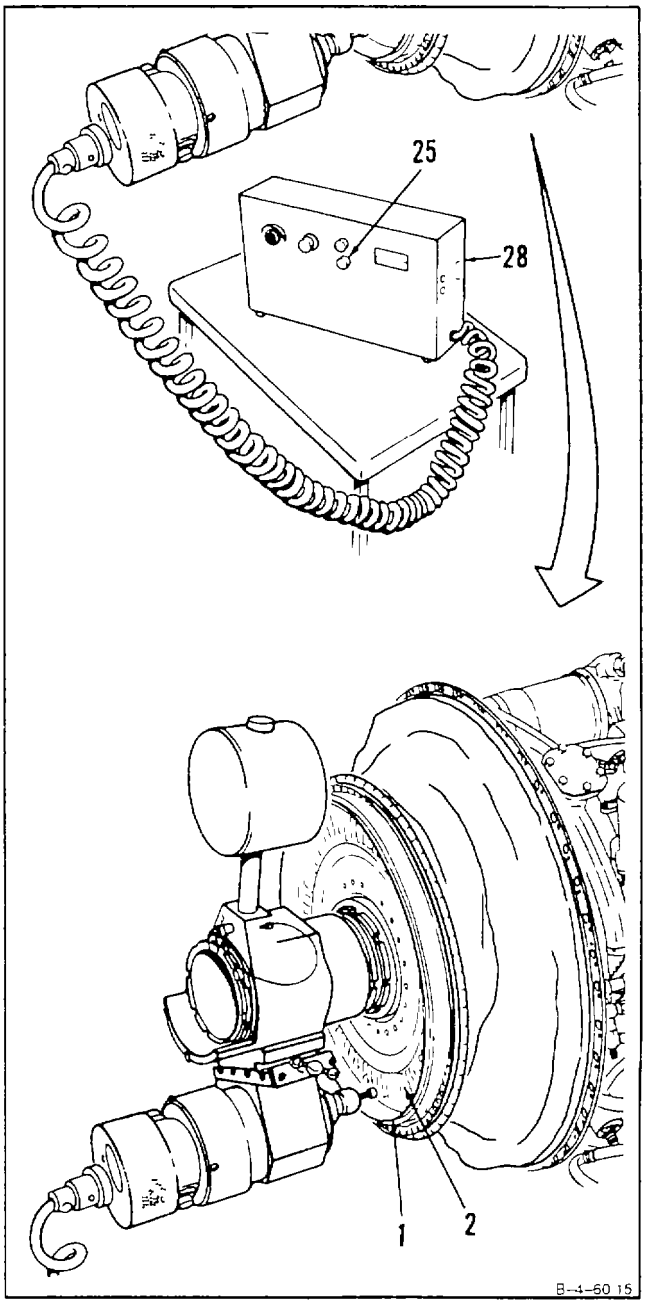
28. **Press STOP button (25).**

29. Unplug control box (28) from electrical power source.

30. Remove any chips or burrs from inside of case (1) Use fine emery cloth (E20).

31. **Measure wall thickness of case** (1) of second turbine nozzle (2) Wall thickness shall not be less than 0.150 inch.



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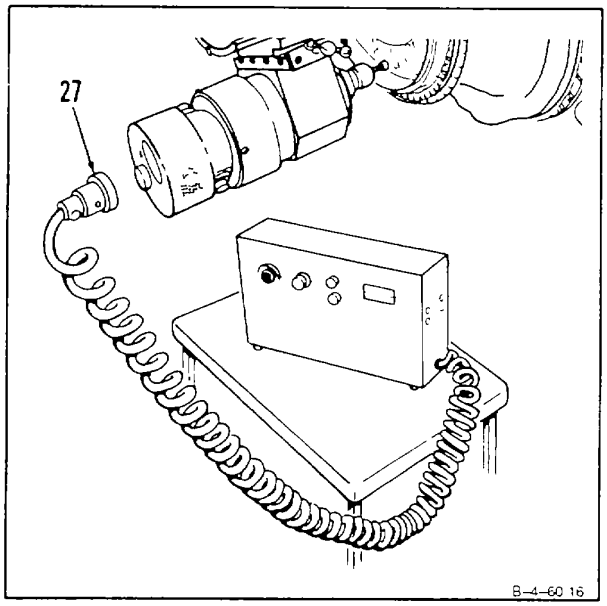
32. Disconnect connector (27).



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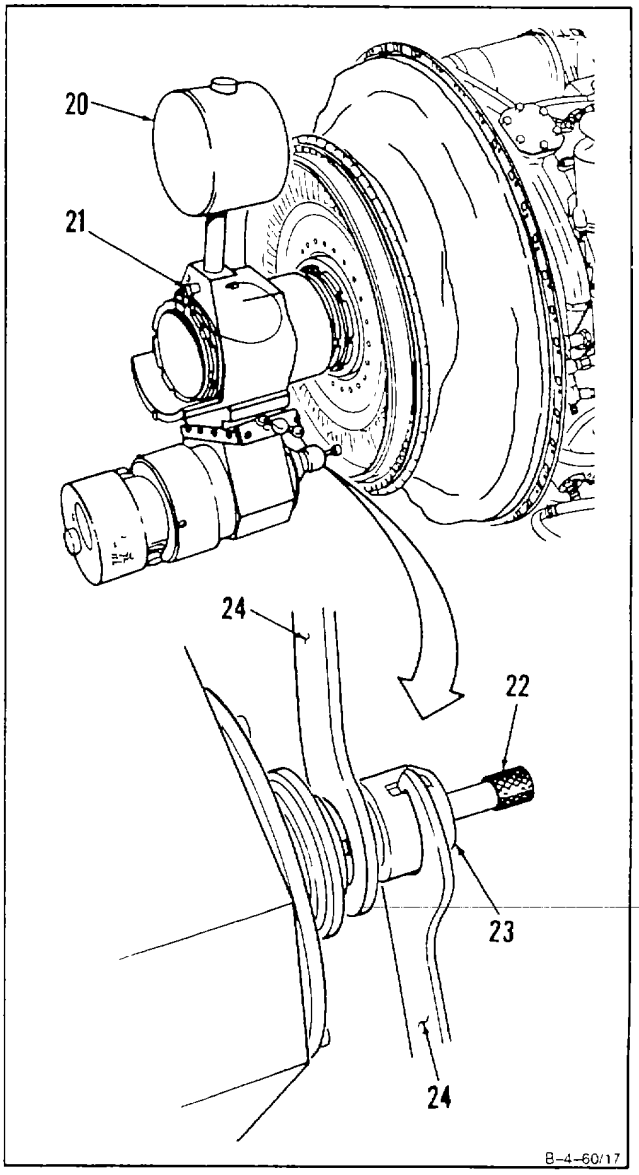
33. **Remove cutter (22)** from collet (23) using two spanner wrenches (24) part of skimming maintenance kit (T44).

34. Pull pin (21) and **remove counterweight (20).**



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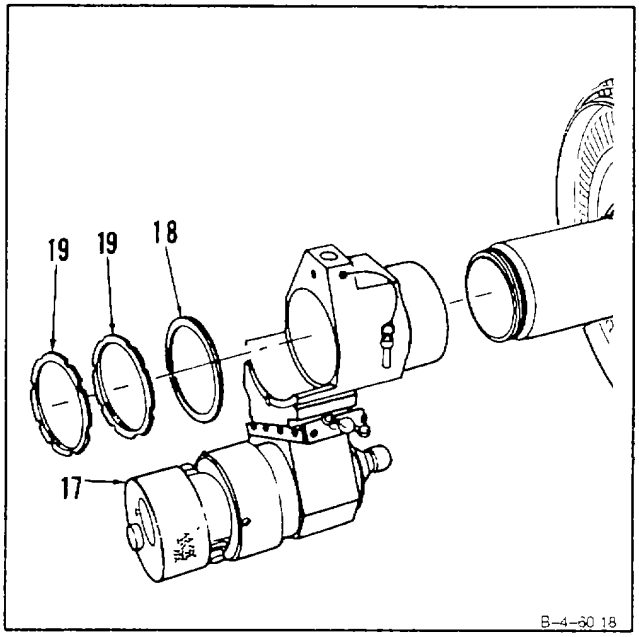
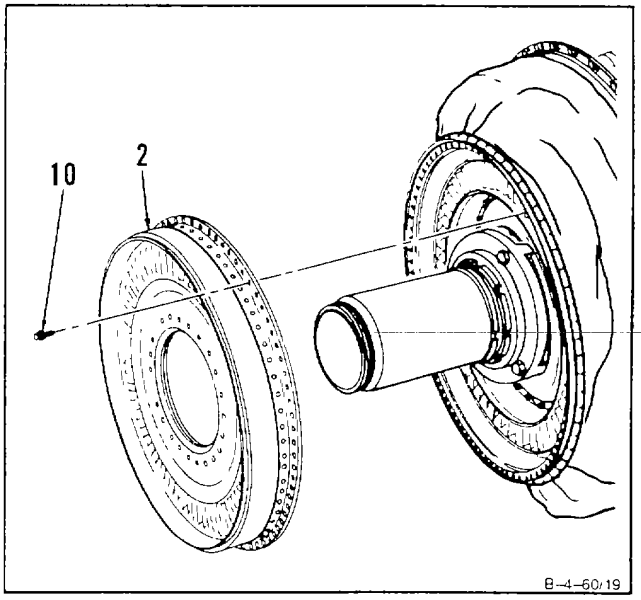
35. Using spanner wrench, part of skimming maintenance kit (T44), remove two nuts (19) and washer (18) Using helper, **remove milling machine (17).**



36. **Remove** 24 bolts (10) and **second turbine nozzle (2).**



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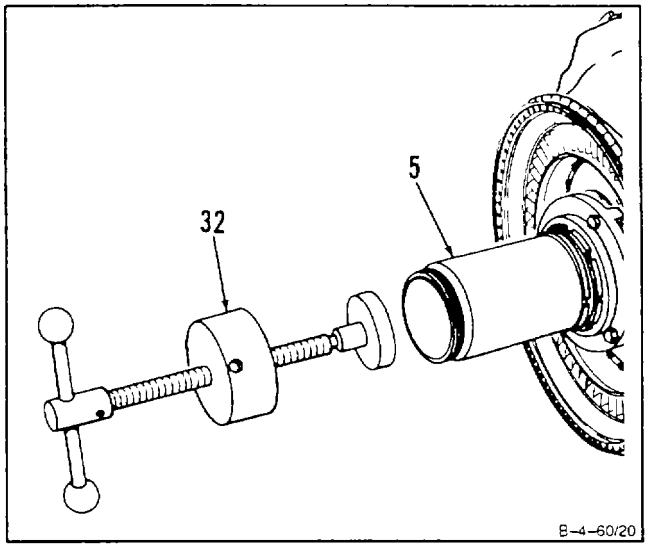
37. **Install mechanical puller (32),** part of skimming maintenance kit (T44) on adapter (5) Tighten puller (32) until it bottoms on adapter (5).

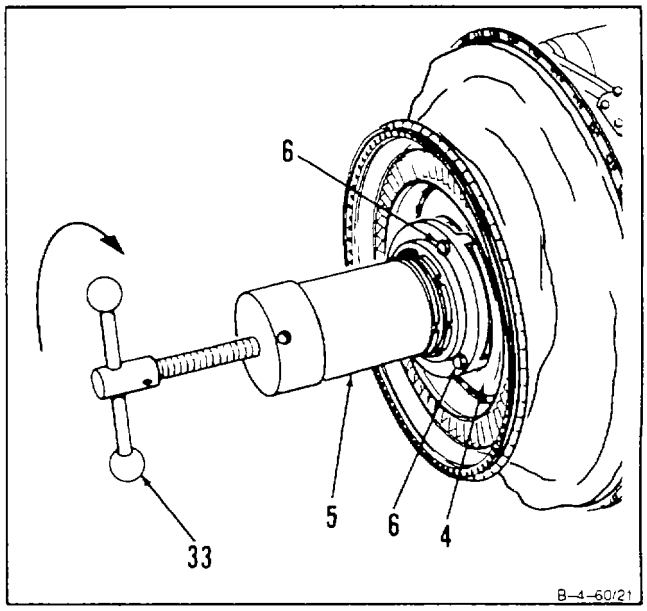


38. Loosen three bolts (6) until they are free of baffle retainer (4).

CAUTION

In following step, support adapter while it is being removed. Failure to comply will cause damage to second turbine nozzle.

39. **Turn handle (33) clockwise until adapter (5) is removed.**



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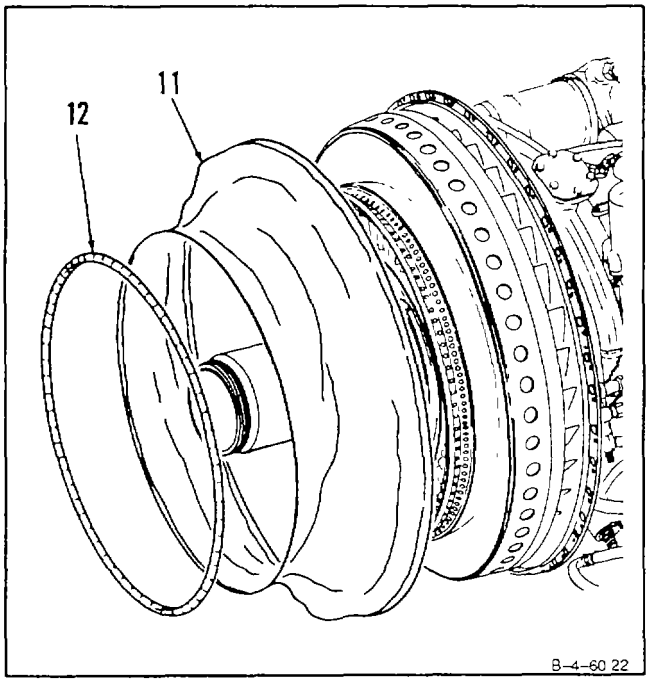
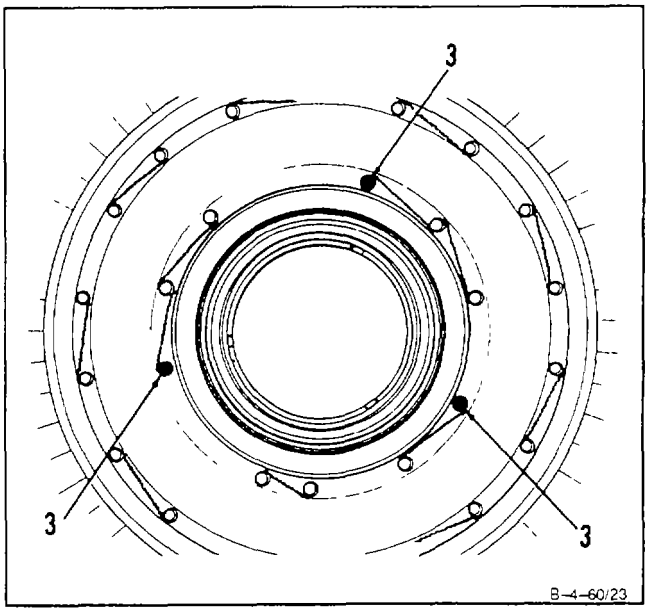
NOTE

In following step, difficulty may be encountered when removing cover due to tight fit of cover around air diffuser assembly the tight fit is necessary to ensure that machining chips do not enter air diffuser assembly.



40. **Remove spring (12) and cover (11).**

41. Use vacuum cleaner to **remove metal particles.**



42. **Install three bolts (3).** Lockwire bolts (3). Use lockwire (E33).

INSPECT

FOLLOW-ON MAINTENANCE
Install First Turbine Disc Assembly (Task 4-67).
Install Second Turbine Nozzle, Spacer, Case and Bumper (Task 4-58).
Install Second Turbine Disc Assembly (Task 4-57).
Install Combustor Section and Power Turbine (Task 3-8).
Service Engine Oil System (Task 1-68).

END OF TASK

4-62 INSTALL SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM) 4-62

INITIAL SETUP

Applicable Configurations:

Repairer
All

Personnel Required:

Aircraft Powerplant
Aircraft Powerplant Inspector

Tools:

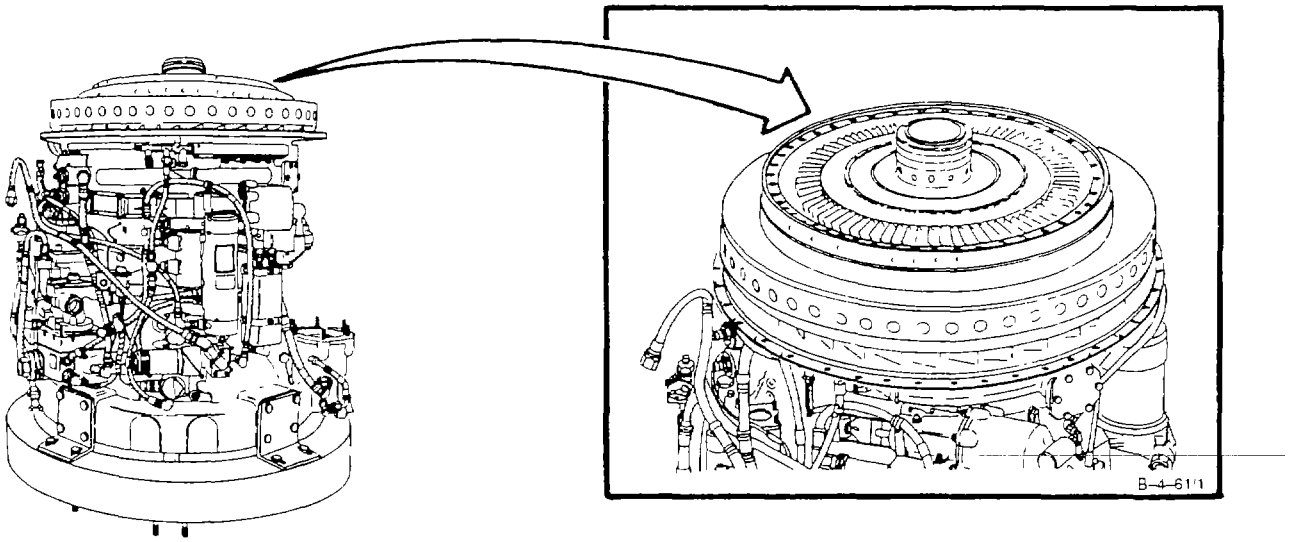
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Bent Wire Gage, 0 053 Inch (Appendix E)
Thickness Gage (Appendix E)

References:

Task 4-57
Task 4-63
Task 4-67
Task 4-68
Task 4-69

Materials:

Lockwire (E32)
Anti-Seize Compound (E6)



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NOTE

The first turbine disc assembly, turbine spacer, second turbine disc assembly, seal, three locking plates and six bolts are supplied as a balanced, matched set If the turbine spacer is replaced, all other parts in the balanced, matched set shall be replaced. Use field replacement first and second turbine disc assembly

NOTE

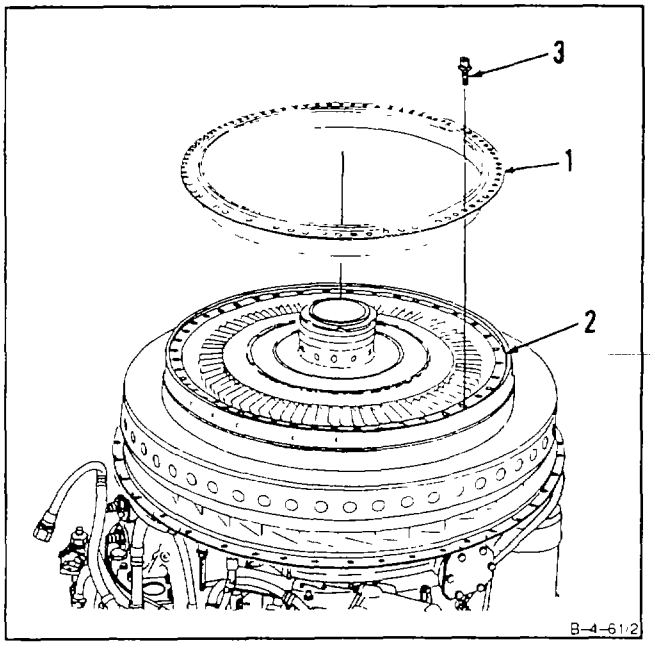
If same turbine spacer that was removed is being installed, omit steps 1 thru 3 If turbine spacer **is** being replaced, do all steps.

1. **Remove first turbine disc assembly** (Ref. Task 4-63).

2. **Place in service field replacement first and second turbine disc assembly**(Ref. Task 4-69).

3. **Install first turbine disc assembly** (Ref. Task 4-67).

4. Align matchmarks and **install turbine rotor case (1)** on first turbine nozzle (2) Temporarily install 12 bolts (3).



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4-62 INSTALL SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM) 4-62

5. **Measure first turbine disc assembly (4) tip clearance** at 0, 45, 90, 135, 180, 225, 270, and 315 degree positions as follows:

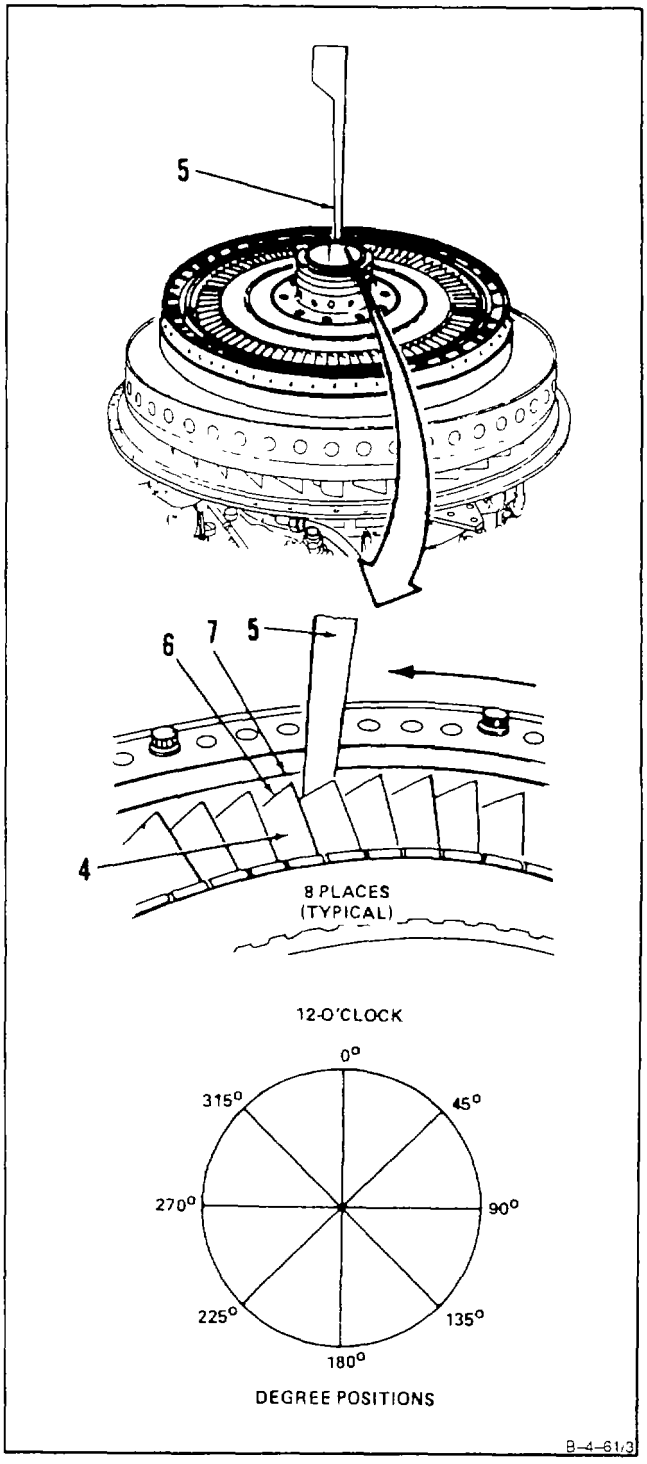
a. Insert thickness gage (Appendix E) (5) between blade tip (6) and turbine rotor case inside diameter (7).

b. Rotate first turbine disc assembly (4) counterclockwise one revolution for each check.

c. Tip clearance shall be 0.019 inch minimum.

d. **If tip clearance is less than 0.019 inch**, loosen bolts (3) and **reposition turbine rotor case (1).** Tighten bolts (3) and repeat steps a thru c.

e. **If tip clearance is still less than 0.019 inch, repair first turbine rotor case** (Ref. Task 4-68).



INSPECT

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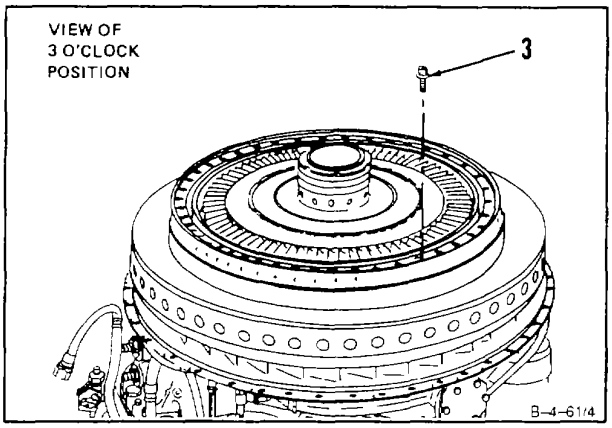
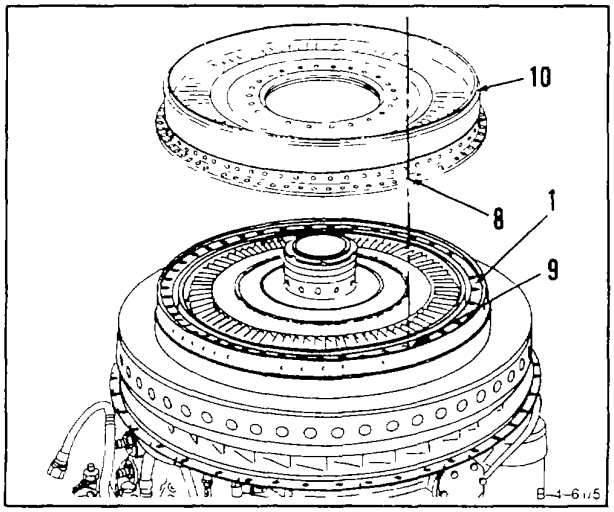
6. **Remove 12 bolts (3).**



NOTE

If installing same second turbine nozzle that was removed align matchmarks on second turbine nozzle and turbine rotor case.

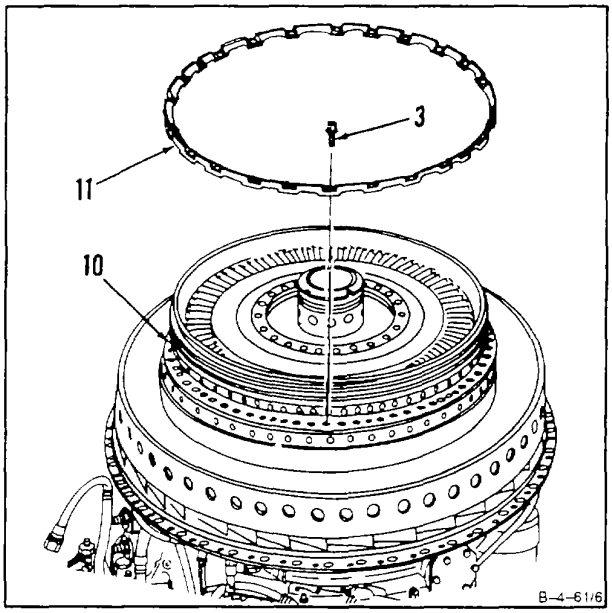
7. Align bolt holes (8 and 9) and **install second turbine nozzle (10)** on turbine rotor case (1).



8. Install bumper (11) on second turbine nozzle (10).

9. Coat 24 bolts (3) with anti-seize compound (E6).

10. Install 24 bolts (3).



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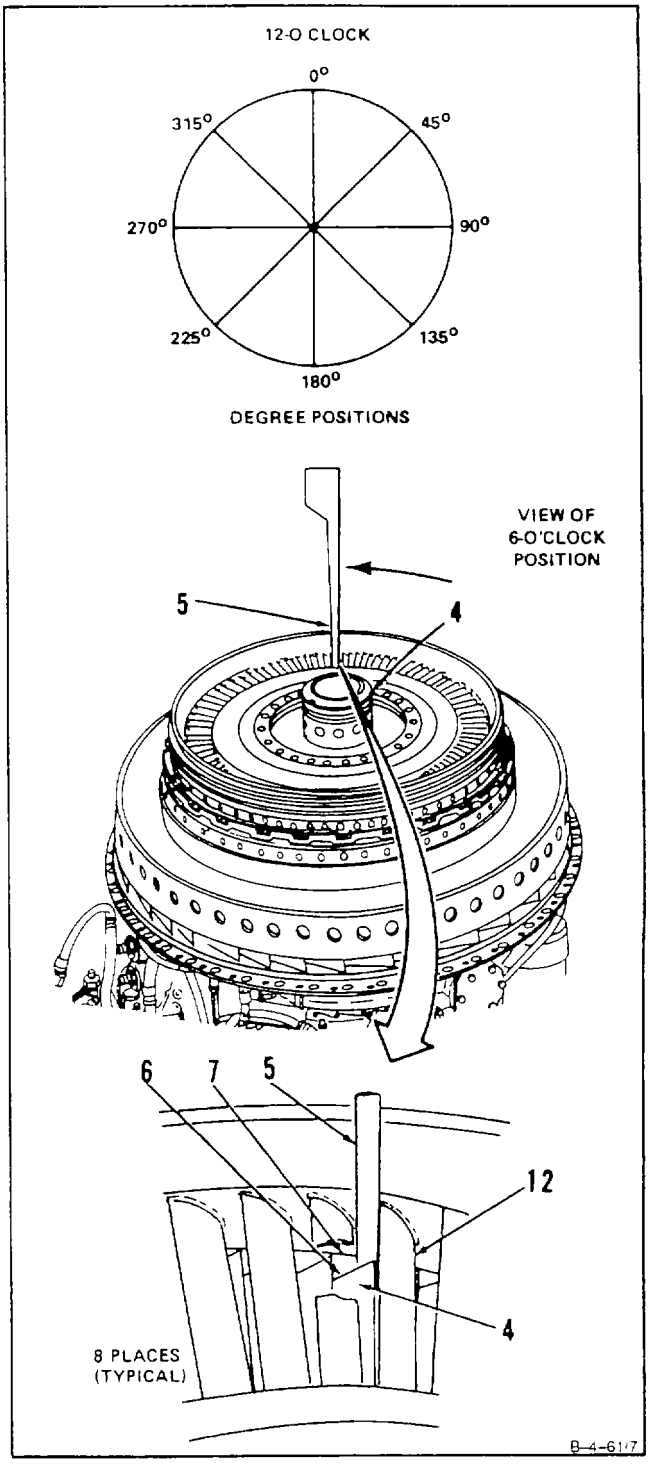
4-62 INSTALL SECOND TURBINE NOZZLE, SPACER, CASE, AND BUMPER (AVIM) 4-62

11. **Measure first turbine disc assembly (4) tip clearance** at 0, 45, 90, 135, 180, 225, 270, and 315 degree positions as follows.

a. Insert thickness gage (Appendix E) (5) between second turbine nozzle vanes (12) and between blade tip (6) and turbine rotor case inside diameter (7).

b. Rotate first turbine disc assembly (4) counterclockwise one revolution for each check. Tip clearance shall be 0.019 inch minimum.

c. **If tip clearance is less than 0.019 inch, repair first turbine rotor case**(Ref. Task 4-68).



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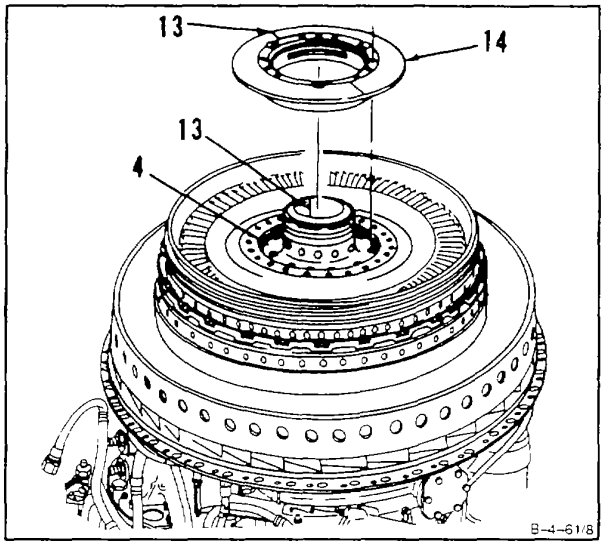
12. Align matchmarks (13) and **install turbine spacer (14)** on first turbine disc assembly (4).



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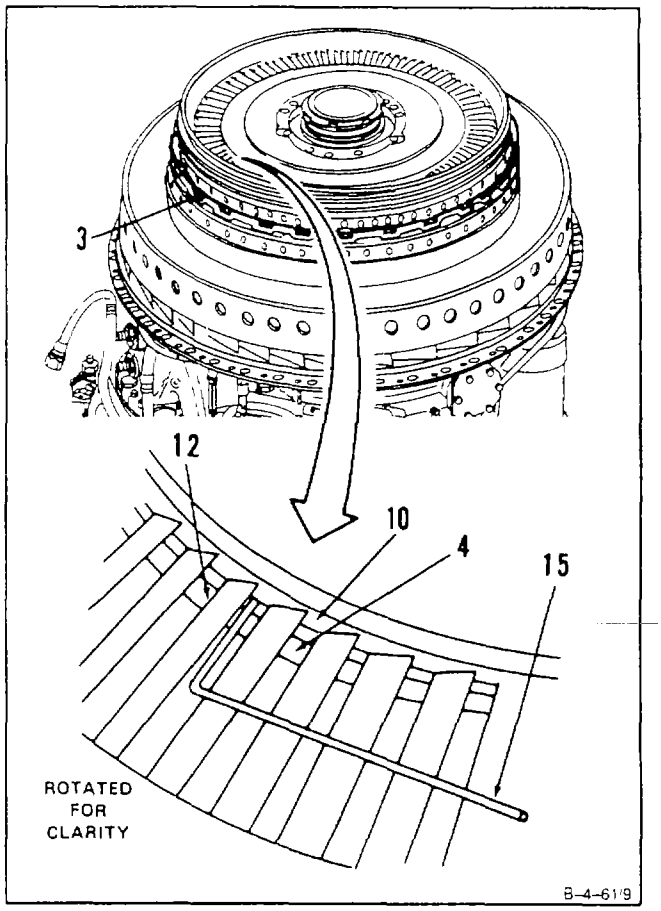
13. **Check axial clearance** between first turbine disc assembly (4) and second turbine nozzle (10). Use 0.053 inch bent wire gage (Appendix E) (15) inserted through second turbine nozzle vanes (12).



INSPECT

14. If axial clearance is acceptable, omit step 15. If axial clearance is not within limits, do all steps.

15. If axial clearance cannot be obtained, recheck first turbine disc assembly installation procedure as follows:

a. Remove second turbine nozzle (Ref. Task 4-58).

b. Remove first turbine disc assembly (Ref. Task 4-63).

c. Install first turbine disc assembly (Ref. Task 4-67). Maintain as close to minimum clearance of 0.150 inch as possible between first turbine disc assembly and first turbine nozzle.

d. Repeat steps 4 thru 13.

e. If axial clearance still cannot be met, replace parts as necessary.

16. Lockwire 24 bolts (3) Use lockwire (E32).

INSPECT

FOLLOW-ON MAINTENANCE

Install Second Turbine Disc Assembly (Task 4-57).
Install Combustion Section and Power Turbine (Task 3-8).
Service Engine Oil System (Task 1-68).

END OF TASK

SECTION XIII

FIRST TURBINE DISC ASSEMBLY

4-63 REMOVE FIRST TURBINE DISC ASSEMBLY (AVIM) 4-63

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Mechanical Puller (T18)
Torque Fixture (T13)
Torque Multiplier (T50)

Materials:

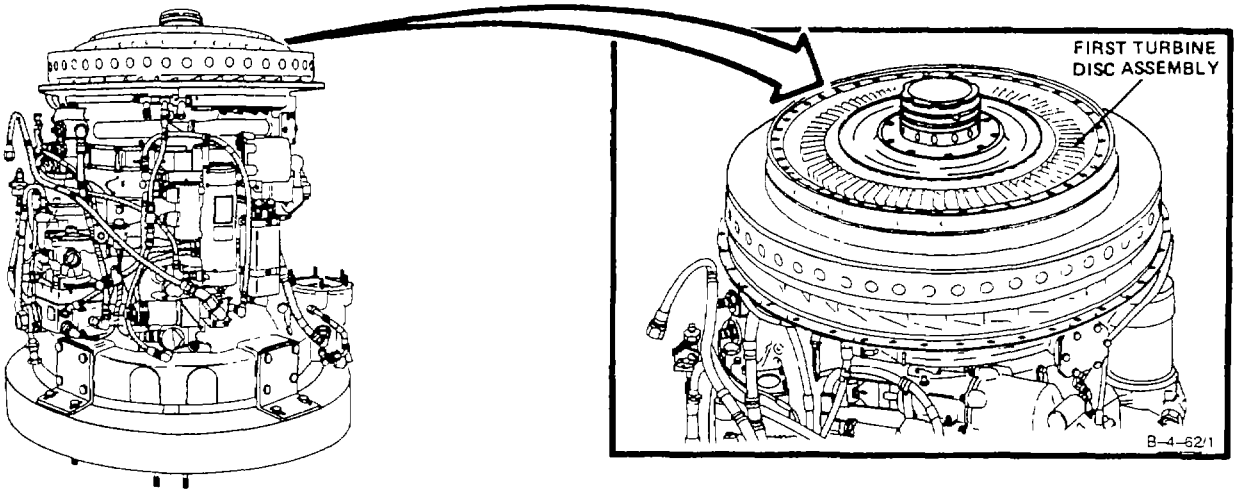
None

Personnel Required:

Aircraft Powerplant Repairer (2)

Equipment Condition:

Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Second Turbine Disc Assembly Removed (Task 4-54)
Second Turbine Nozzle, Spacer, Case, and Bumper Removed (Task 4-58)



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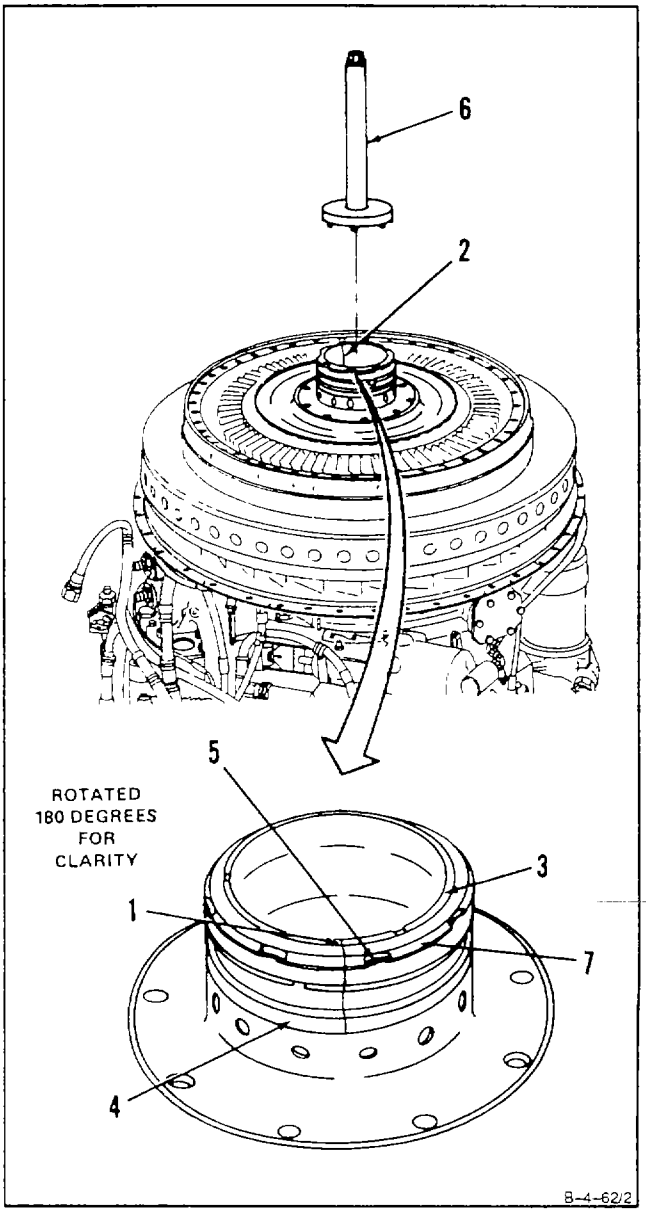
4-63 REMOVE FIRST TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-63

1. Draw matchmark (1), in line with matchmark (2) on inside of compressor shaft, from top of compressor shaft (3) to first turbine disc assembly (4).

2. **Install torque fixture (T13)** as follows:

   a. Straighten indents of retaining washer (5).

   b. Position wrench (6) on retaining nut (7).



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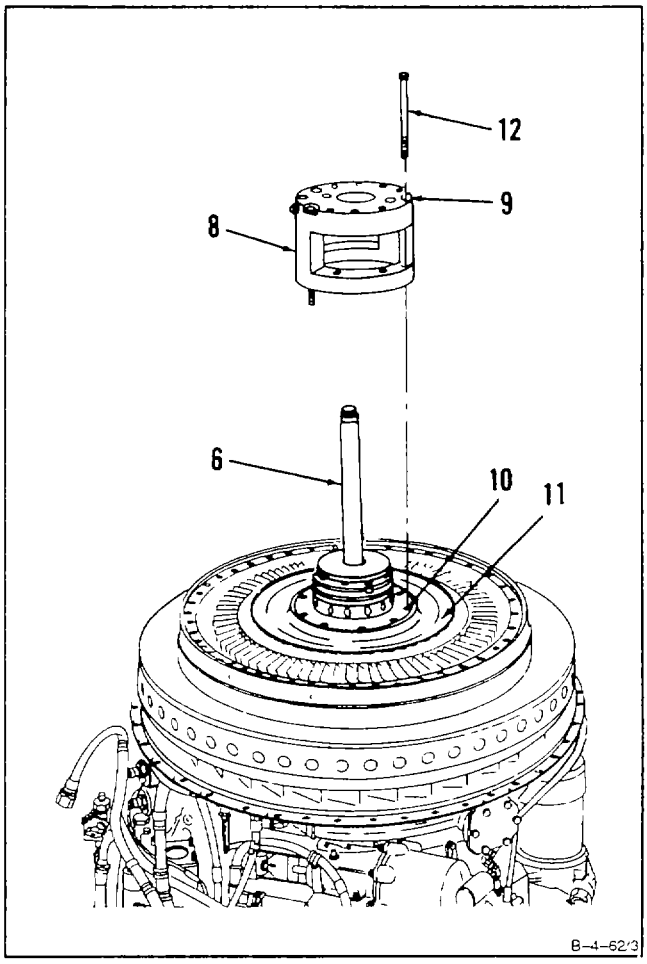
4-63 REMOVE FIRST TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-63

NOTE

In following step c, align large holes on bottom of adapter with hollow pins on disc assembly.

c. Position adapter (8) on wrench (6). Align three bolt holes (9) with holes (10) in disc assembly (11).

d. Install three bolts (12) in bolt holes (9).



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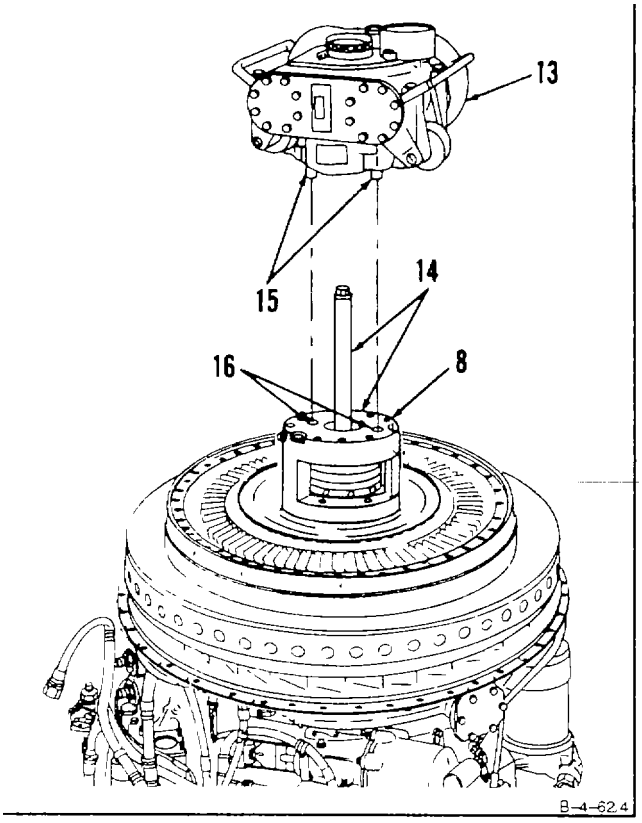
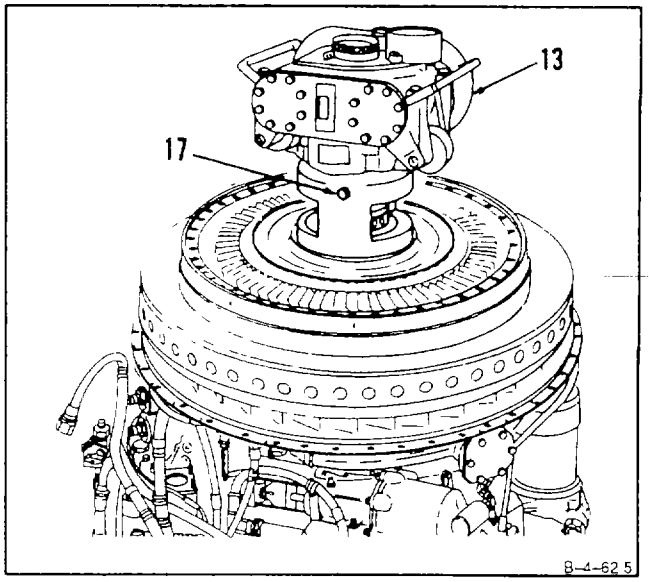
3. Install torque multiplier (T50) (13) as follows:

a. Have helper assist and position torque multiplier (T50) (13) overtorque fixture (T13) (14). Align two pins (15) with holes (16) in adapter (8). Place torque multiplier (T50) (13) on adapter (8).



b. Loosen lockpin (17) to lower torque multiplier (T50) (13).

c. Tighten lockpin (17) to lock torque multiplier (T50) (1 3) in place.



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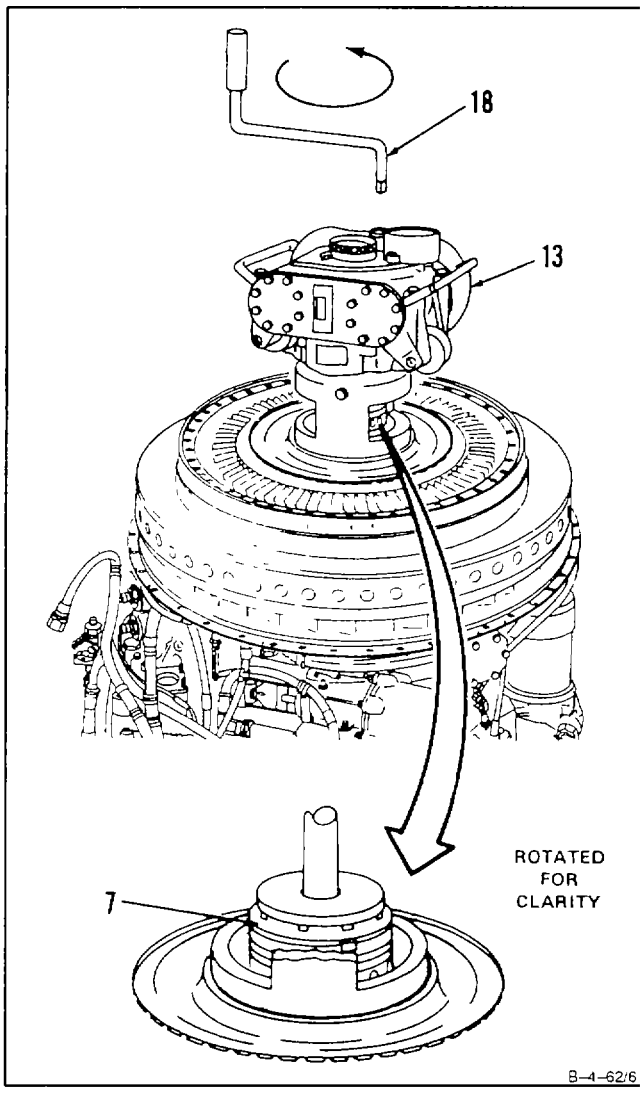
4. **Remove nut(7)** as follows:

   a. Insert handle (18) in torque multiplier (T50) (13). Turn handle (18) counterclockwise until nut (7) is loose.



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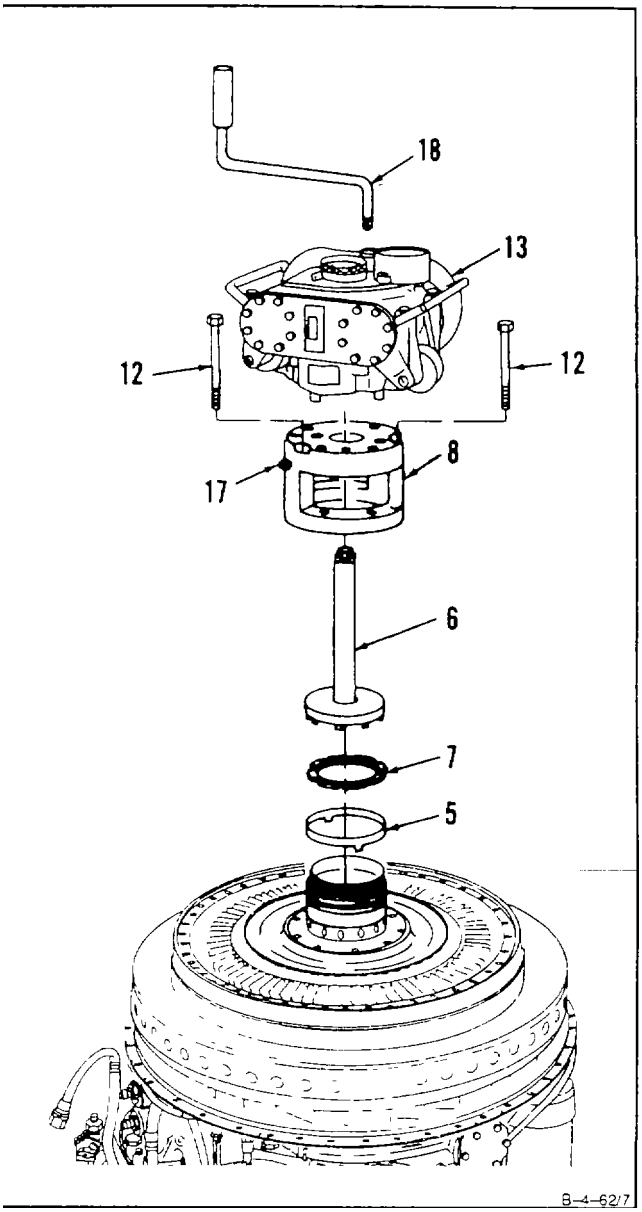
4-63 REMOVE FIRST TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-63

b. Loosen lockpin (17).

c. Remove handle (18), torque multiplier (T50) (13), torque fixture (T13), consisting of adapter (8), wrench (6), and bolts (12).

d. Remove retaining nut (7) and retaining washer (5).



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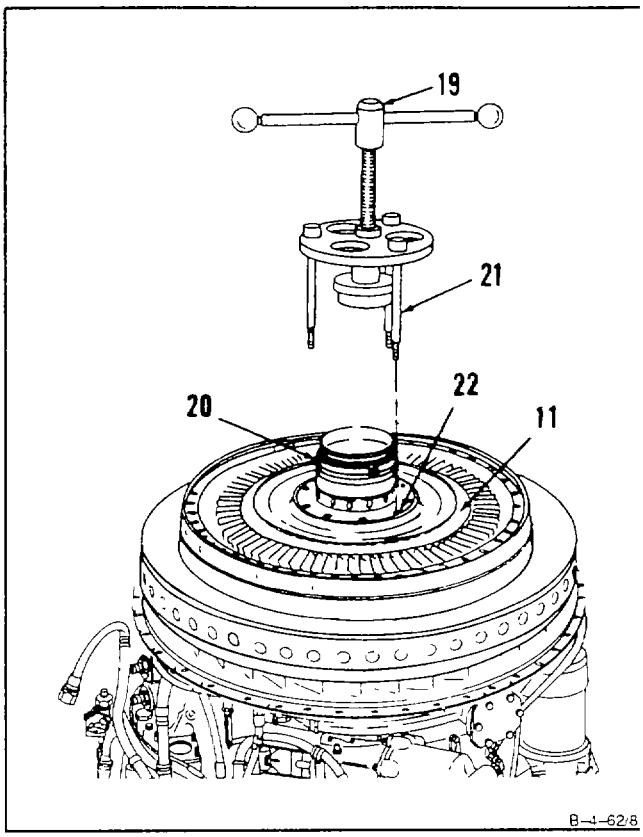
4-63 REMOVE FIRST TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-63

5. **Install puller (T14) (19)** as follows:

   a. Position puller (T18) (19) on shaft (20). Align three bolts (21) with three bolt holes (22) in disc assembly (11).

   b. Tighten three bolts (21) until bottomed on disc assembly (11).



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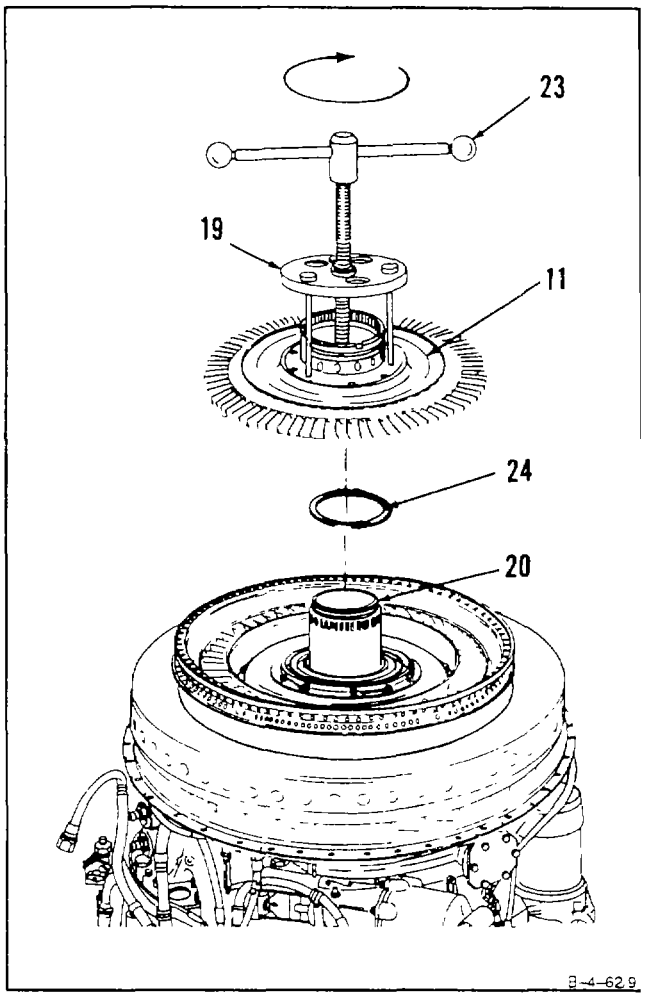
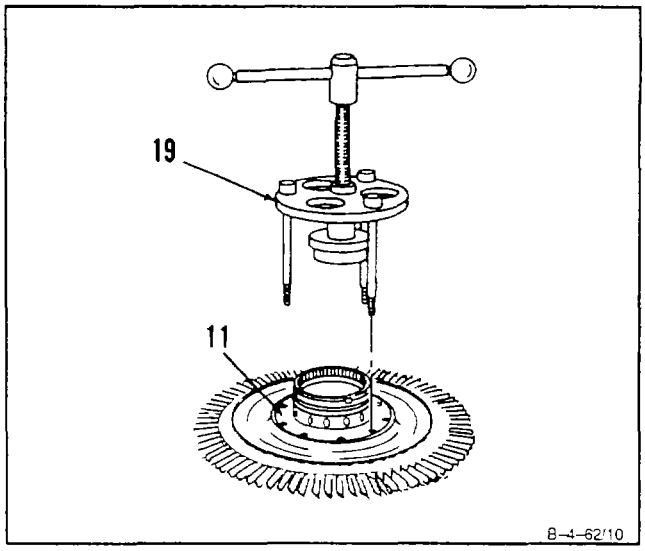
6. **Remove disc assembly (11)** as follows:

   a. Turn handle (23) clockwise until disc assembly (11) is free of shaft (20). Have helper hold mechanical puller (T18) (19).

   b. Remove disc assembly (11) and shim (24).



7. **Remove puller (T18) (19)** from disc assembly (11).



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-64 CLEAN FIRSTTURBINE DISC ASSEMBLY (AVIM) 4-64

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-3234944
Goggles
Dry, Compressed Air Source

Materials:

Dry Cleaning Solvent (E19)
Gloves (E24)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Second Turbine Disc Assembly Removed (Task 4-54)
Second Turbine Nozzle, Spacer, Case, and Bumper Removed (Task 4-58)
First Turbine Disc Assembly Removed (Task 4-63)

General Safety Instructions:

WARNING

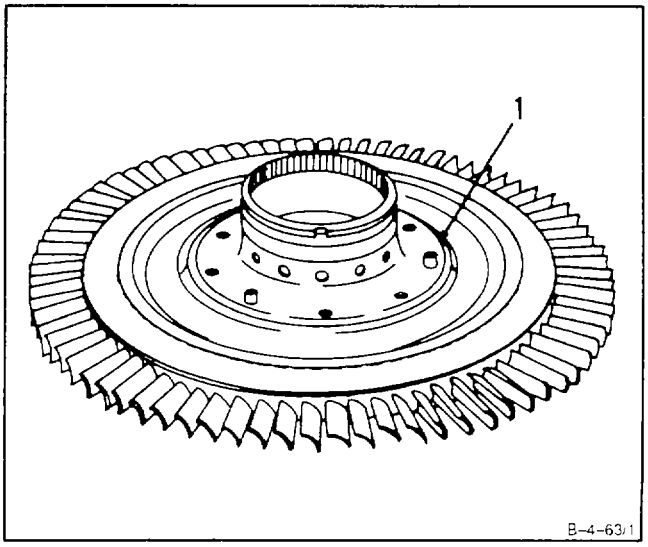
Dry cleaning solvent (E19) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Wear gloves (E24). Clean first turbine disc assembly (1) with brush dampened in dry cleaning solvent (E19).

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 pslg air pressure. Do not direct air toward yourself or another person. Failure to comply could result In injury to eyes or skin. In case of injury, get medical attention.

2. Wear goggles Blow dry disc assembly. Use clean, dry compressed air.



FOLLOW-ON MAINTENANCE

Inspect First Turbine Disc Assembly (Task 4-65)

END OF TASK

4-65 INSPECT FIRST TURBINE DISC ASSEMBLY (AVIM) 4-65

INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
References:
Task 1-109
Equipment Condition:
Off Engine Task

1. **Inspect first turbine disc assembly (1)** as follows:

   a. Inspect 80 blades (2).

   (1) There shall be no nicks, dents, or scratches deeper than 0.015 inch.

   (2) There shall be no bends or distortion.

   (3) There shall be no cracks.

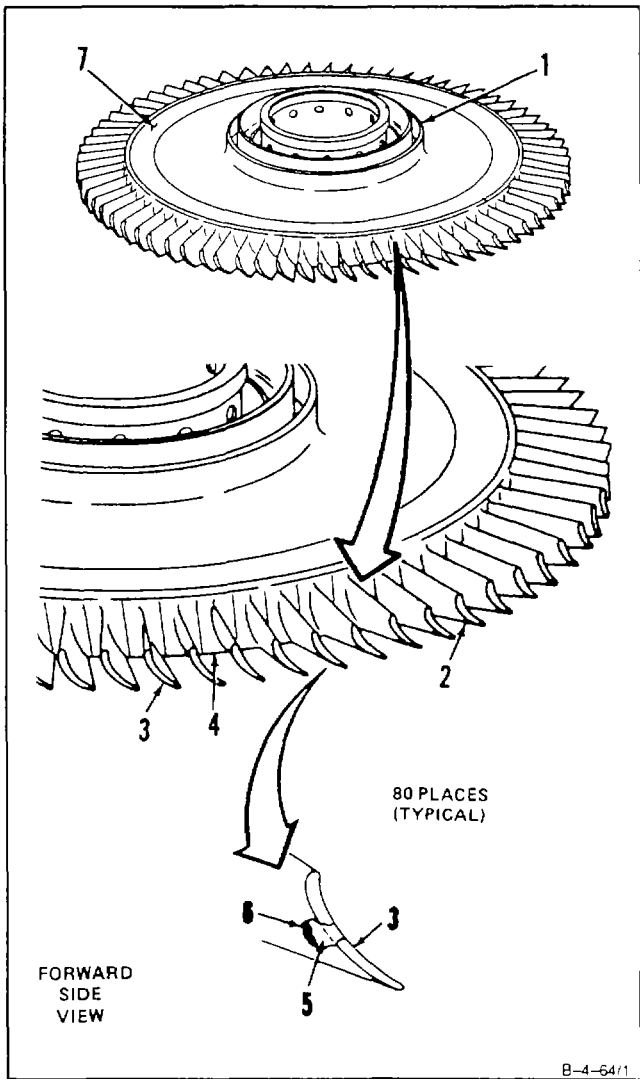
   (4) There shall be no rubs on blade tips (3) or blade platform (4) deeper than 0.015 inch.

   (5) There shall be no loss of material due to burning.

   (6) There shall be no material rollover (5) on blade tips (3).

   (7) There shall be no bluish-black discoloration in area (6) adjacent to rollover (5).

   b. **Inspect sealing plate** (7). There shall be no cracks.



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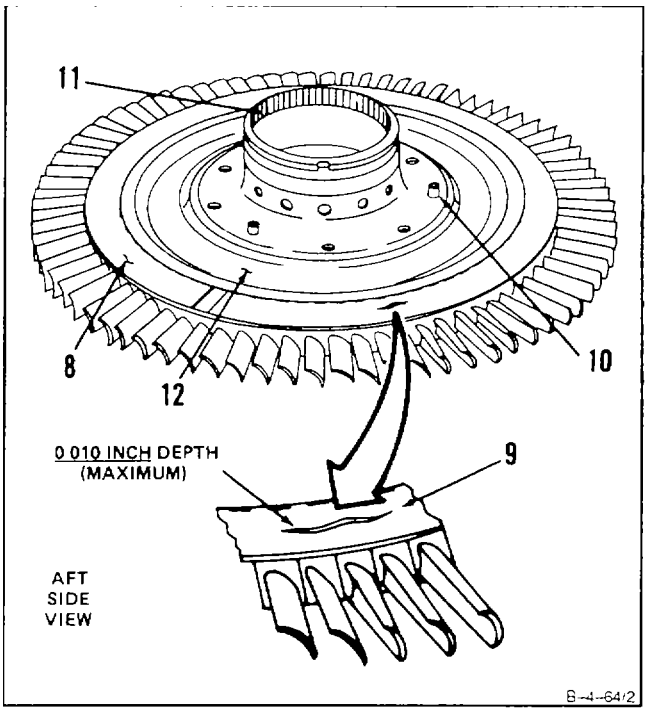
c. **Inspect retaining ring** (8). There shall be no cracks There shall be no scoring (9) deeper than 0. 010 inch.

d. **Inspect three hollow pins (10).** There shall be none missing or broken.

e. **Inspect spline** (11) (Task 1-109). There shall be no wear deeper than 0.005 inch on spline (11).

f. **Inspect disc (12).** There shall be no cracks.



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-66 REPAIR FIRST TURBINE DISC ASSEMBLY (AM) 4-66

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
Carborundum Stone (E11)
Crocus Cloth (E16)

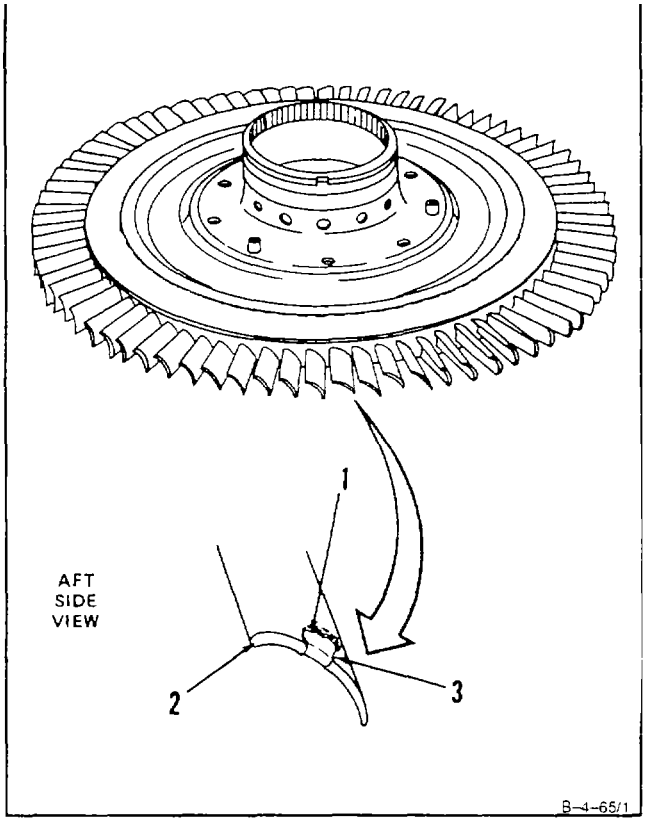
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. **Repair material rollover (1) on blade tips (2)** as follows:

   a. Blend all sharp edges (3). Use carborundum stone (E11).

   b. Polish to smooth finish Use crocus cloth (E16).



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

4-67 INSTALL FIRST TURBINE DISC ASSEMBLY (AVIM) 4-67

INITIAL SETUP

Applicable Configurations:
All

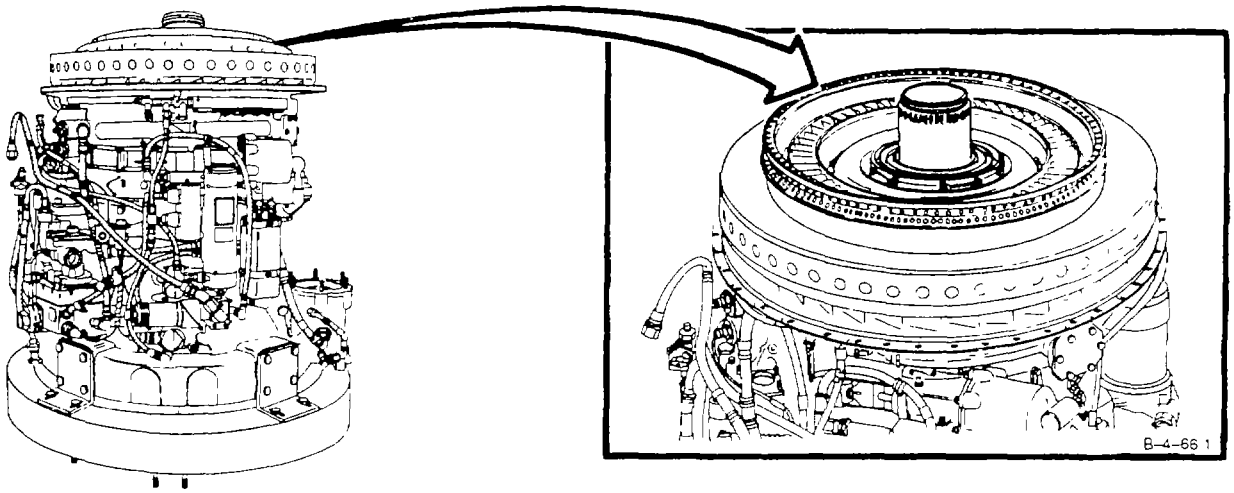
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Locating Bar (T33)
Dial Indicator Support (T40)
Assembling Fixture (Bore Heater) (T43)
Torque Fixture (T13)
Control Unit (T29)
Torque Multiplier (T50)
Bent Wire Gage, 0 100 Inch (Appendix E)
Micrometer Depth Gage
Dial Indicator and Base
Heavy Duty Welder's Gloves
Outside Micrometer Caliper Set
Slave Bolt, P/N STD3053-31 (3)

Materials:
Marking Pencil (E38)
Anti-Seize Compound (E6)

Parts:
Shims
Washer

Personnel Required:
Aircraft Powerplant Repairer (2)
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P
Task 4-63
Task 4-69



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4-67 INSTALL FIRST TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-67

NOTE

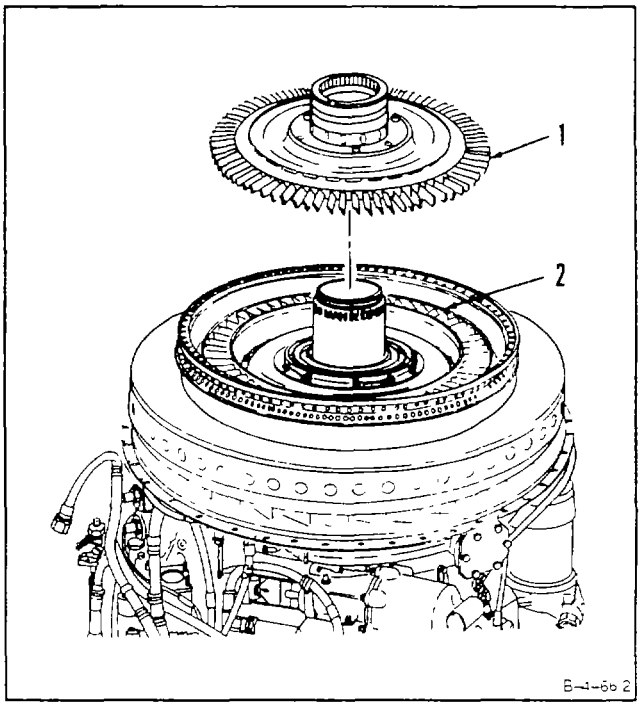
The first turbine disc assembly, spacer, second turbine disc assembly, seal, three locking plates, and six bolts are supplied as a balanced, matched set. If the first turbine disc assembly is replaced, all other parts in the balanced, matched set shall be replaced. Use field replacement first and second turbine disc assembly

NOTE

If same first turbine disc assembly that was removed is being installed, omit step 1. If first turbine disc assembly is being replaced, do all steps

1. **Place in servicefield replacement first and second turbine disc assembly** (Ref. Task 4-69)

2. **Determine thickness of rotor shim to establish clearance between first turbine disc assembly (1) and first turbine nozzle (2)** as follows:



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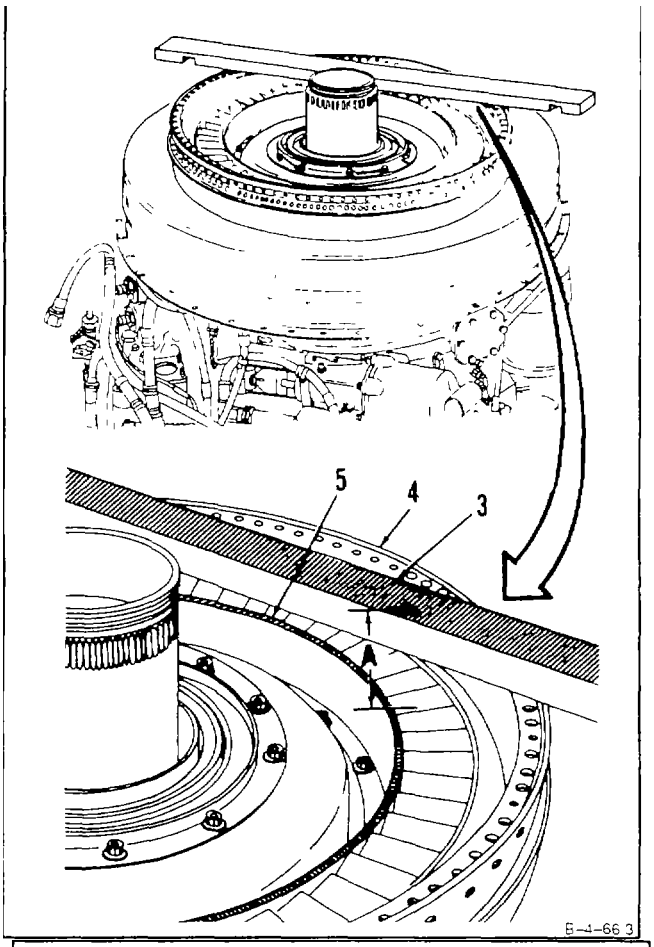
4-67 INSTALL FIRST TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-67

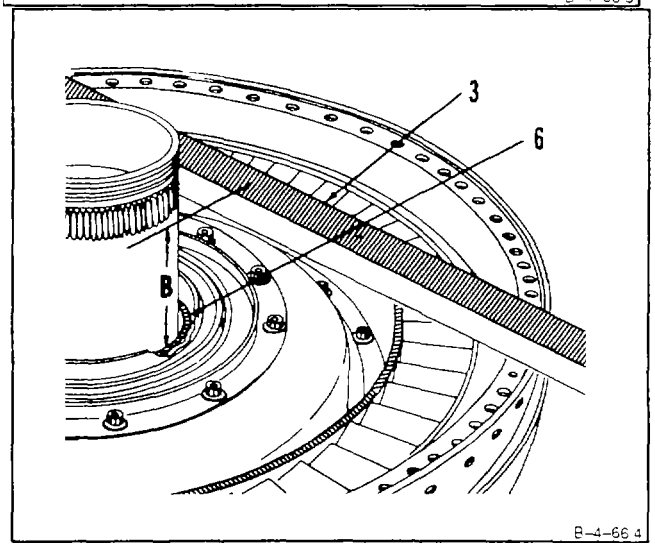
a. Place locating bar (T33) (3) on first turbine nozzle outer flange (4).

b. Measure from top of locating bar (T33) (3) to highest seal strip on edge of first turbine nozzle inner shroud (5). Use micrometer depth gage Record as dimension A.



c. Measure from top of locating bar (T33) (3) to rearface of rear seal sleeve (6). Use micrometer depth gage. Record as dimension B.

d. Subtract dimension A from dimension B Record as dimension C.



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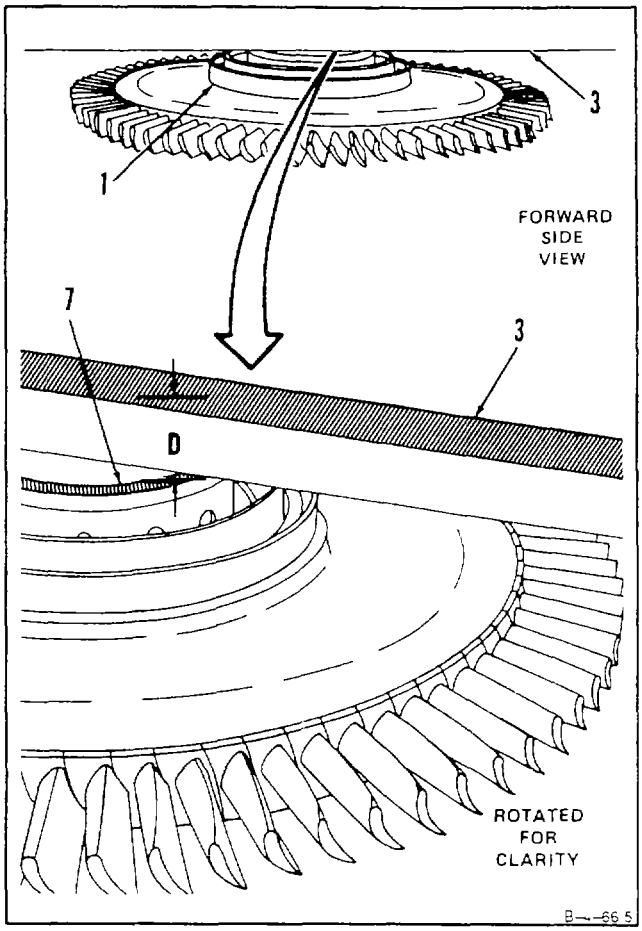
4-67 INSTALL FIRST TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-67

e. Place locating bar (T33) (3) on first turbine disc assembly (1) forward side.

NOTE

In following step f, dimension D is thickness of locating bar (T33) (3).

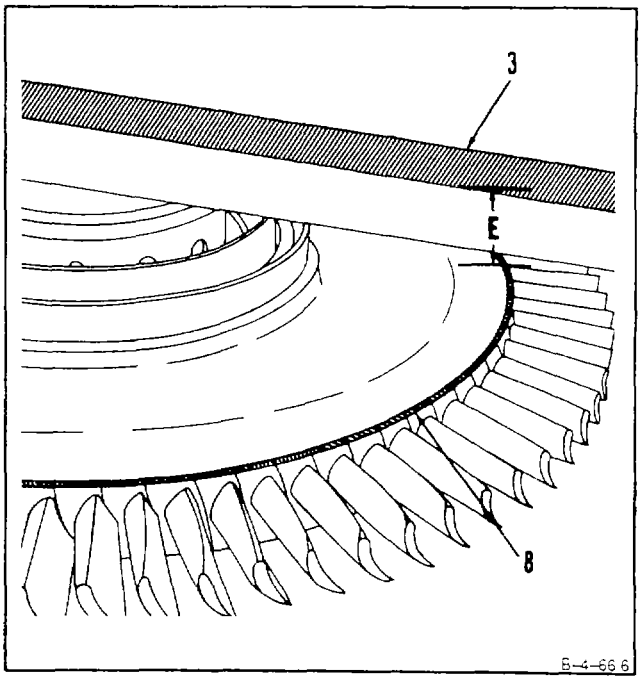
f. Measure from top of locating bar (T33) (3) to first turbine disc assembly mounting face (7). Use micrometer depth gage Record as dimension D.



g. Measure from top of locating bar (T33) (3) to highest blade root (8) at outer rim of first turbine disc assembly Use micrometer depth gage. Record as dimension E.

h. Subtract dimension D from dimension E Record as dimension F.

i. Subtract dimension C from dimension F. Record as dimension G.



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NOTE

Clearance required is 0.150 inch minimum. If dimension G equals or exceeds 0.150 inch, go to step 4.

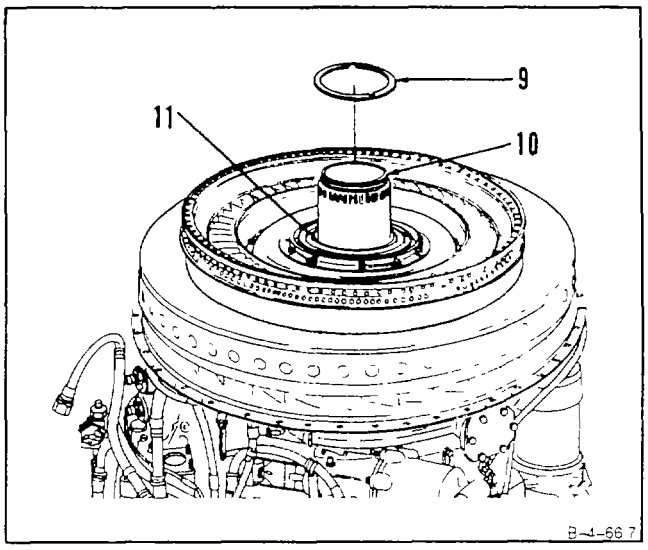
j. Subtract dimension G from 0.150 inch. **Select shim from shim selection table** to obtain 0.150 inch minimum. Check shim thickness. Use outside micrometer caliper.

Example: If dimension G is 0.135 inch select Shim Part No. 2-121-089-01. If dimension G is 0.100 inch, select Shim Part No. 2-121-089-03.

SHIM SELECTION TABLE	
PART NUMBER	SHIM THICKNESS
2-121-089-01	0.020 inch
2-121-089-02	0.040 inch
2-121-089-03	0.055 inch

INSPECT

3. **Install shim (9)**over shaft (10) Position shim (9) on compressor rotor hub (11)



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4. **Heat first turbine disc assembly hub (12)** as follows:

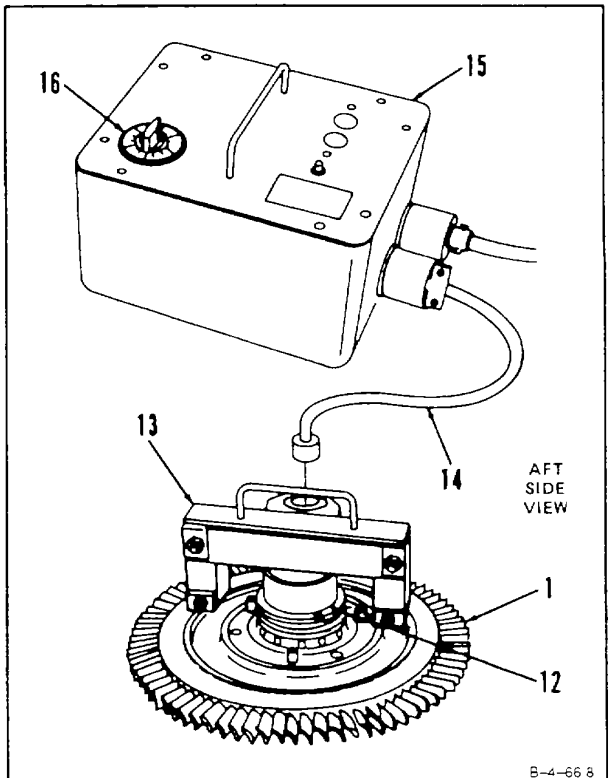
   a. Place first turbine disc assembly (1) on heat resistant work surface.

   b. Position bore heater (T43) (13) on hub (12).

   c. Connect cable (14) of control unit (T29) (15) to heater (T43) (13).

   d. Connect control unit (T29) (15) to power source.

   e. Set timer (16) for three minutes



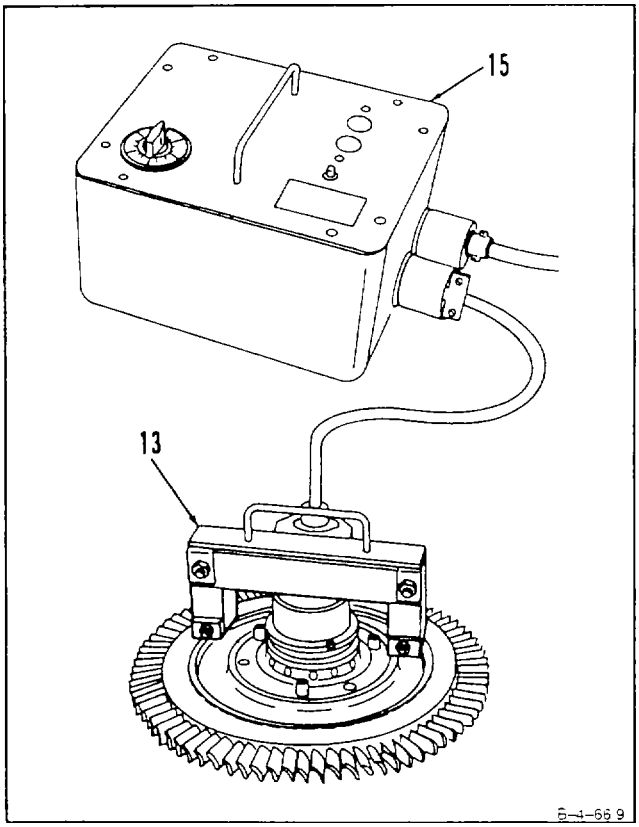
WARNING

Wear heavy duty welders gloves when handling heated parts. Heated parts can cause burns. If burns occur, get medical attention.

CAUTION

Do not allow bore heater to operate for more than 3 minutes. Bore heater heating element could be damaged.

   f. Wear heavy duty welder's gloves. After three minute heating period, disconnect control unit (T29) (15) and remove bore heater (T43) (13).



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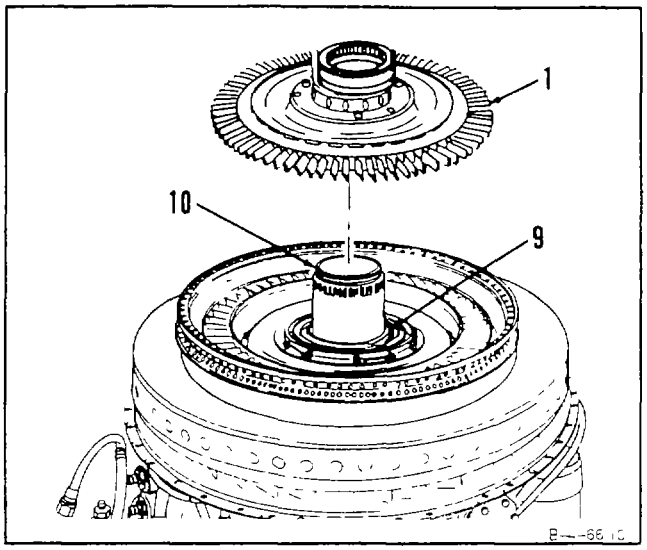
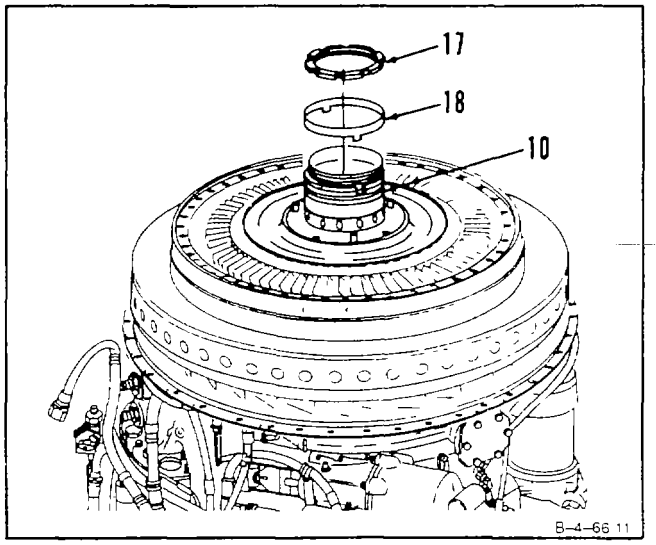
5. Wear heavy duty welders gloves. Align balance matchmarks. Install heated first turbine disc assembly (1) on compressor shaft (10) until seated on shim (9).



CAUTION

In following step 6, install nut with chamfered side facing down.

6. Coat nut (17) with anti-seize compound (E6). **Install washer (18) and nut (17) on shaft (10).**



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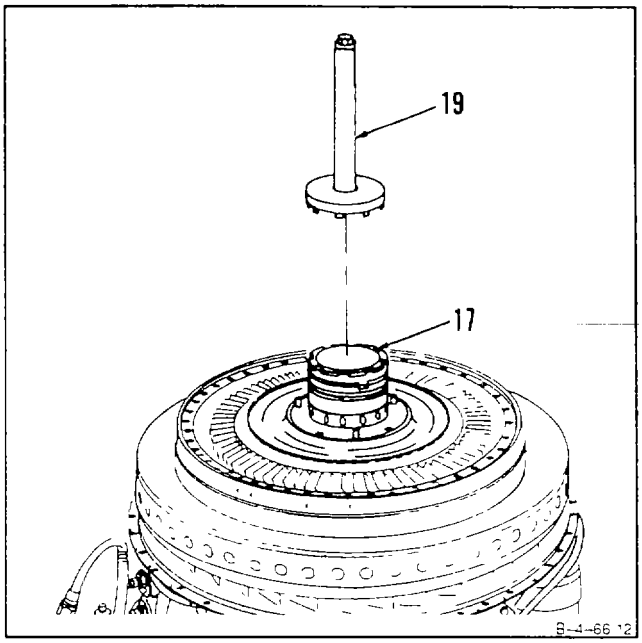
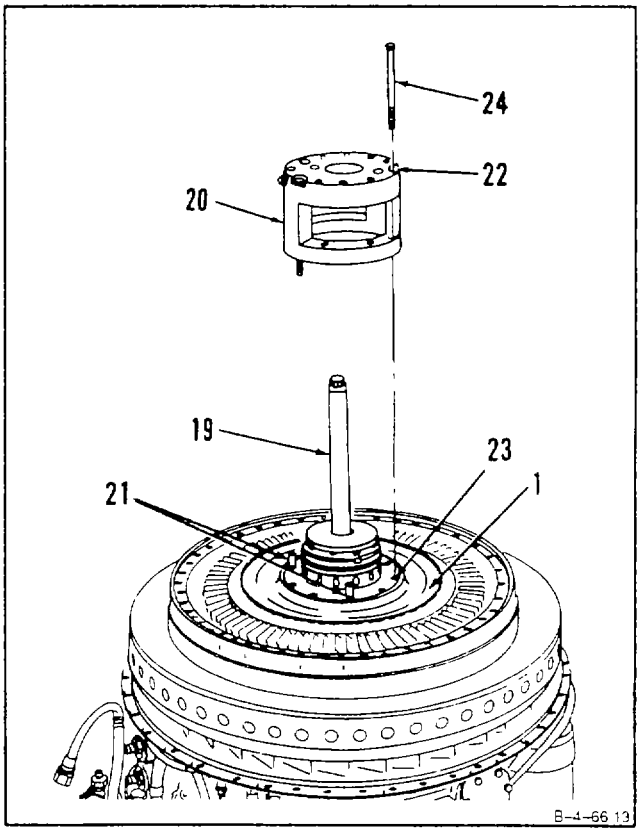
7. Install torque fixture (T13) as follows:

a. Position wrench (19) on nut (17).



b. Align large holes in bottom of adapter (20) with hollow pins (21) in disc assembly (1). Position adapter (20) on wrench (19). Align three bolt holes (22) with holes (23) in disc assembly (1).

c. Install three bolts (24) in holes (22).



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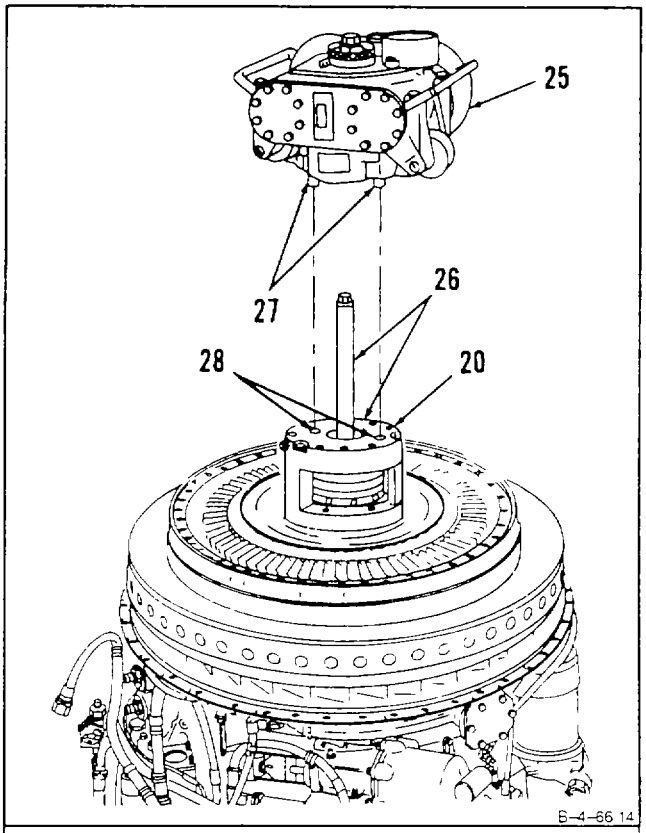
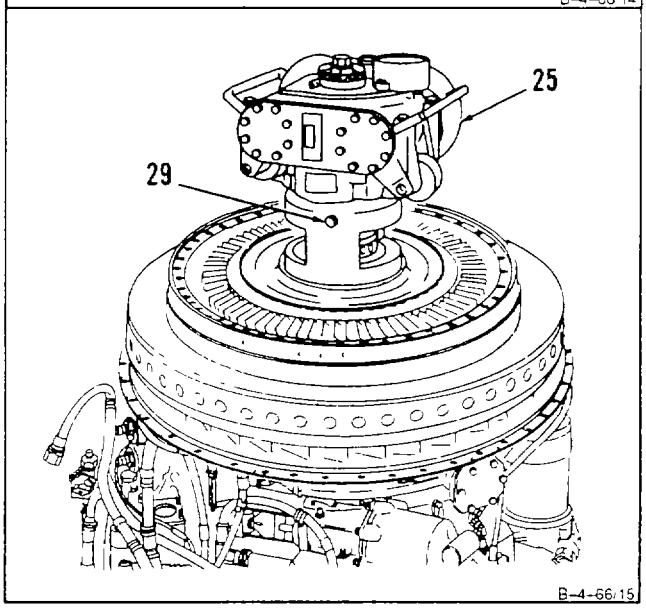
8. Have helper assist, and **install torque multiplier (T50) (25)** as follows:

   a. Position torque multiplier (T50) (25) over torque fixture (T13) (26). Align two pins (27) with holes (28) in adapter (20). Place torque multiplier (T50) (25) on adapter (20).



   b. Loosen lockpin (29) to lower torque multiplier (T50) (25).

   c. Tighten lockpin (29) to lock torque multiplier (T50) (25) in place.



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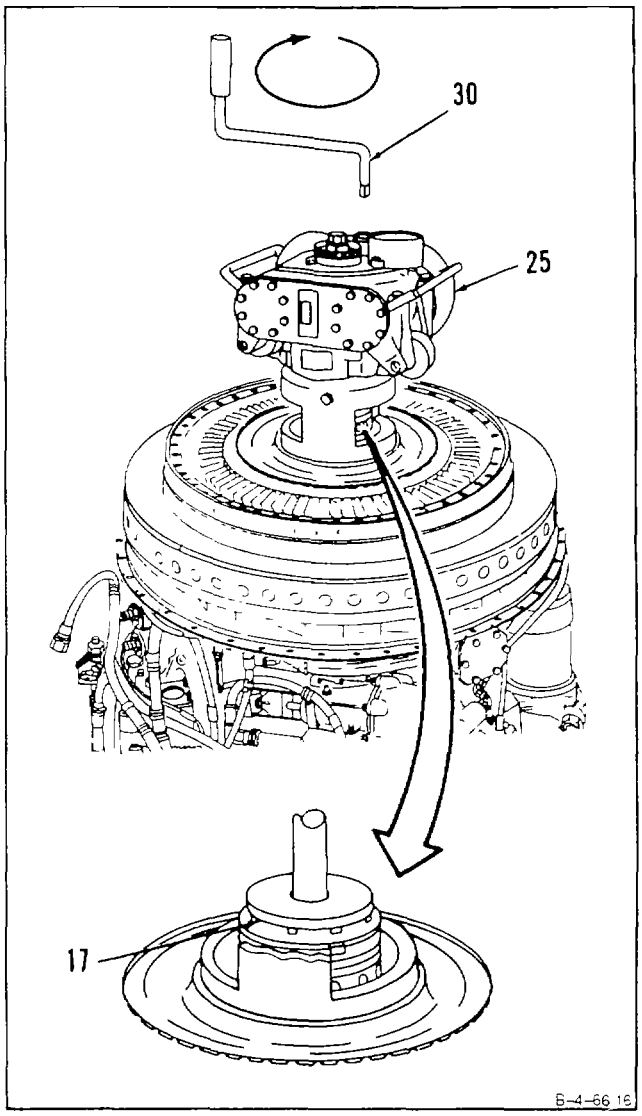
WARNING

Make sure handle is fully seated and ratchet selector on torque pack is properly set before applying torque. Rotating ratchet selector with load on torque pack can damage unit and injure personnel. It injury occurs, get medical attention.

WARNING

Do not change ratchet selector when torque load Is on torque pack. Damage to equipment or injury to personnel can result. If injury occurs, get medical attention.

9. Insert handle (30) in torque multiplier (TSO) (25). Turn handle (30) clockwise. **Torque nut (17) to 375 foot-pounds.**



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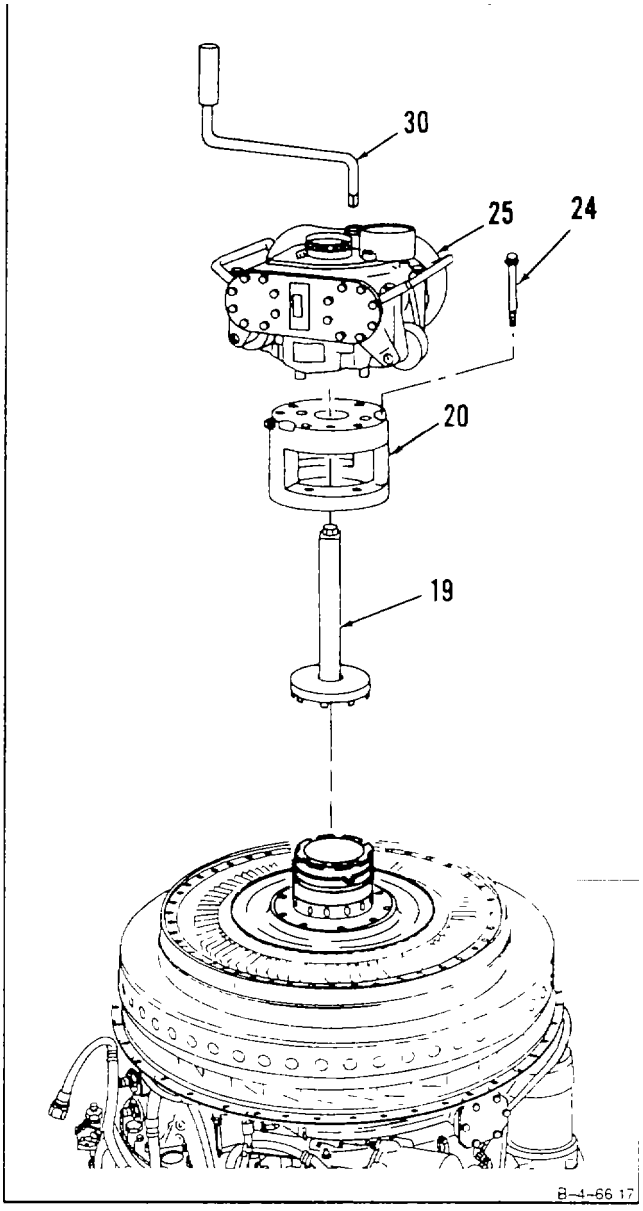
10. **Remove handle (30), torque multiplier (T50) (25), and torque fixture (T13),** consisting of adapter (20), and wrench (19) and bolts (24).



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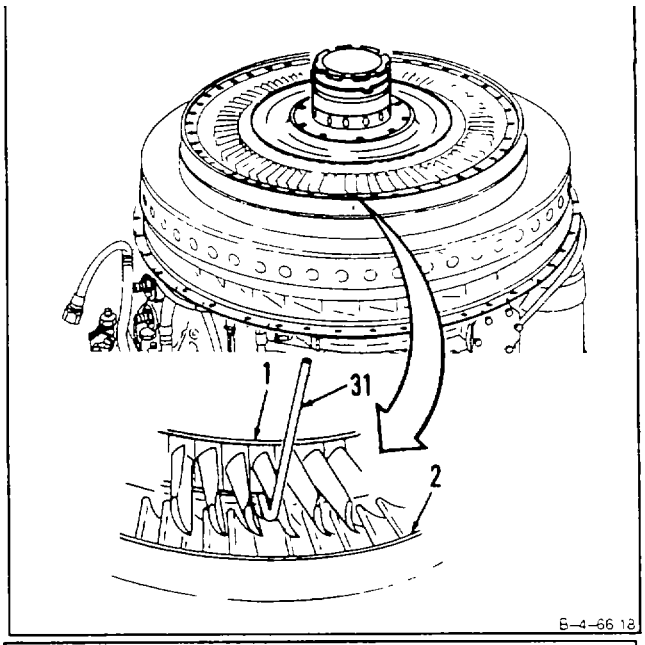
11. **Check axial clearance between first turbine nozzle (2) and first turbine disc assembly (1)**. Use bent wire gage (Appendix E) (31) inserted between first turbine nozzle (2) and first turbine disc assembly (1). **Clearance shall be 0.100 inch minimum.**

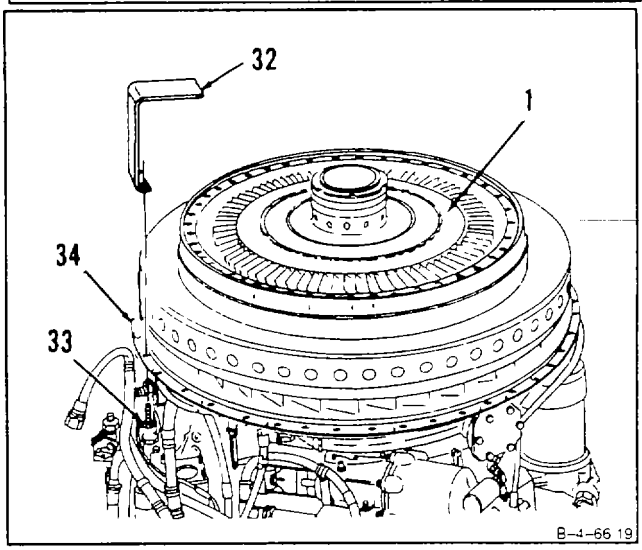
12. **If clearance Is not proper, remove parts and recheck shim thickness (step 2).**



INSPECT

13. **Check runout of first turbine disc assembly (1)** as follows:

    a. Install dial indicator support (T40) (32) and three slave bolts, P/N STD3053-31 (33) on air diffuser (34).



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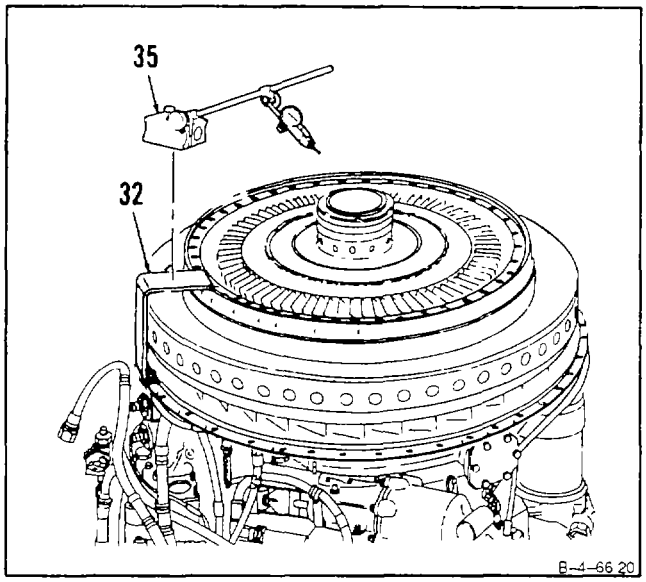
4-67 INSTALL FIRST TURBINE DISC ASSEMBLY (AVIM) (Continued) 4-67

b. Place dial indicator and base (35) on support (T40) (32).



c. Rotate engine to approximately 45 degrees.

NOTE

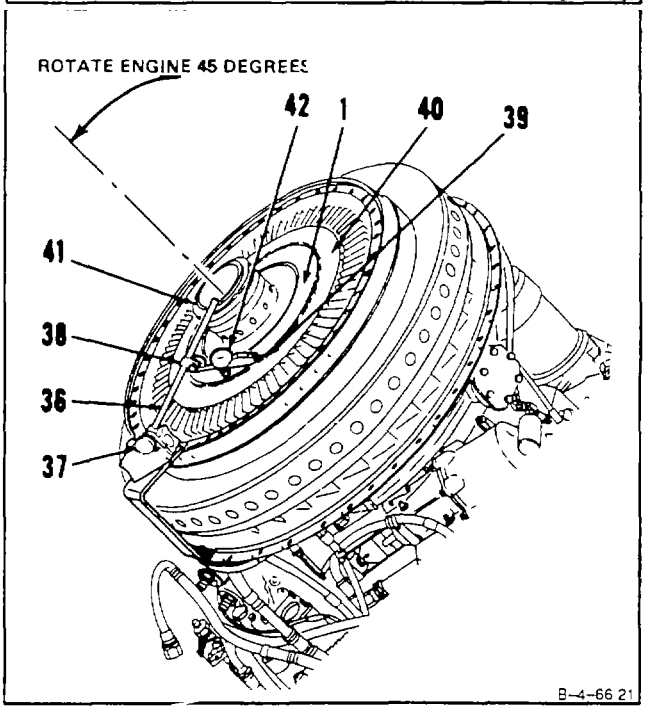
In following step d, be sure pointer is on disc rim and not on retaining plate

d. Adjust arm (36) at base (37) and clamp (38) to position pointer (39) on outer surface (40) adjacent to blade roots

NOTE

When checking runout, apply forward pressure to hub (41) to compensate for bearing internal clearance.

e. Zero indicator (42) and rotate first turbine disc assembly (1) Record dimension. Maximum allowable runout shall be 0.004 inch.



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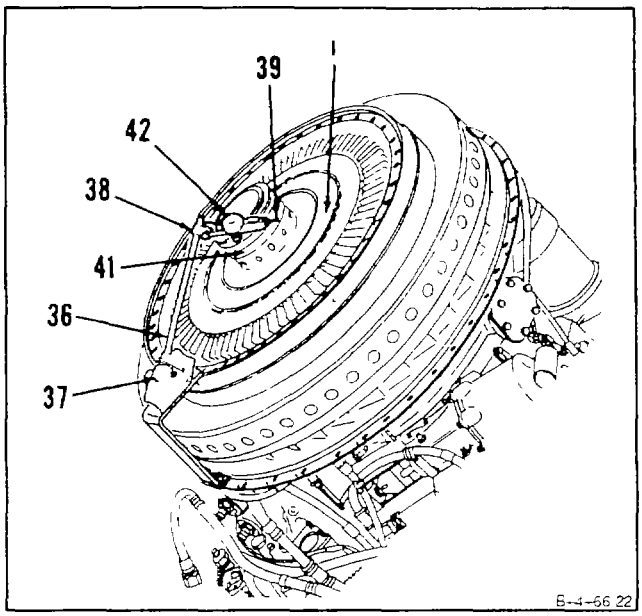
f. Adjust arm (36) at base (37) and clamp (38). Position pointer (39) on hub (41).

g. Zero indicator (42) and rotate first turbine disc assembly (1). Record dimension. Maximum allowable runout shall be 0 002 inch.

NOTE

If dimensions recorded in steps 13 e and 13 g are not within limits do following steps 14 thru 21. If dimensions recorded in steps 13 e and 13 g are within limits, omit steps 14 thru 21.

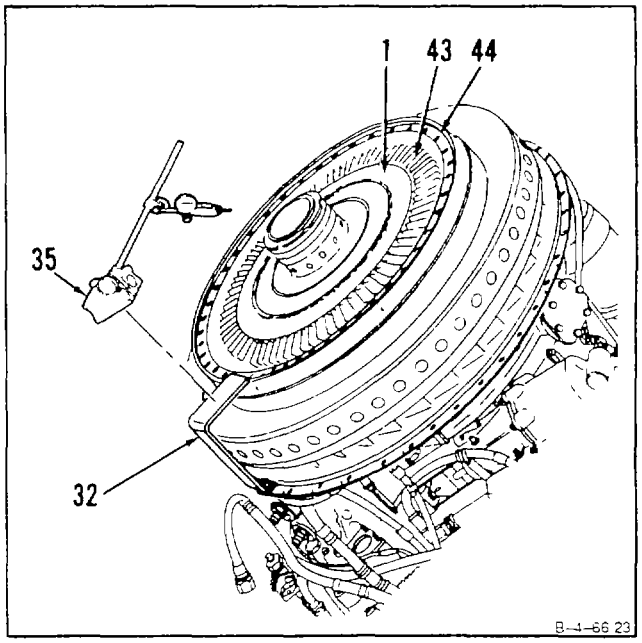


INSPECT

14. **Remove dial indicator and base (35)** and support (32).

15. Hold disc assembly (1) steady. **Draw a match- mark on a blade (43) and flange (44)** using marking pencil (E38).

16. Remove **first turbine disc assembly (1)** (Ref. Task 4-63).



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CAUTION

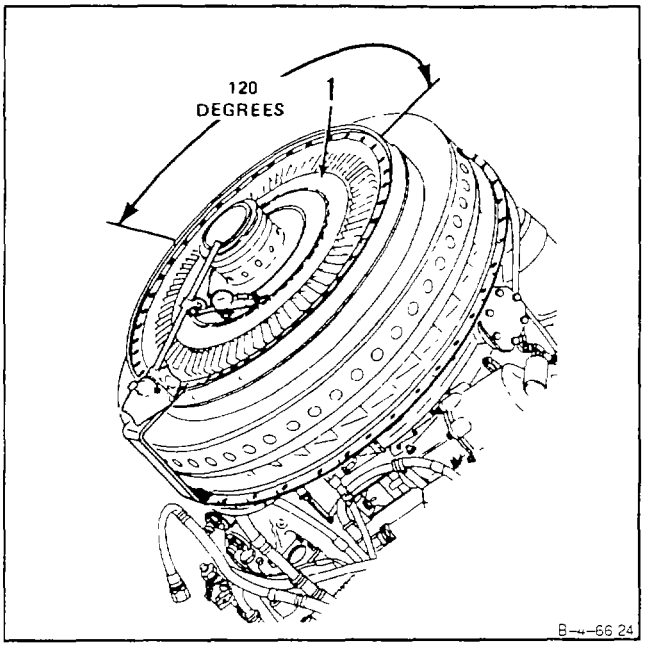
If following step brings dimensions within limits, matchmark on compressor shaft shall be relocated to align with first turbine disc. Failure to comply will result in out of balance condition of all gas producer parts.

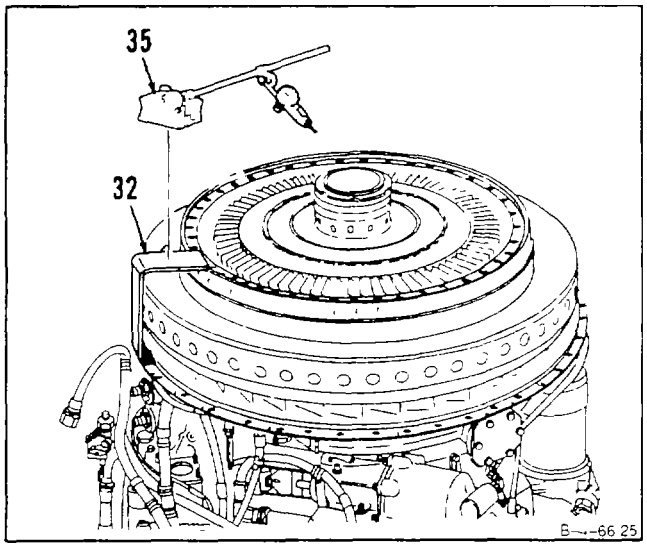
17. **Install disc assembly (1) rotated approximately 120 degrees. Repeat steps 4 thru 13.**

18. If first turbine disc (1) is rotated so matchmarks do not align, erase old matchmark on compressor shaft. Remark matchmark on compressor shaft to align with matchmark on first turbine disc (1). Use marking pencil (E38).

19. Rotate engine to vertical position.

20. Remove dial indicator and base (35) from support (32).





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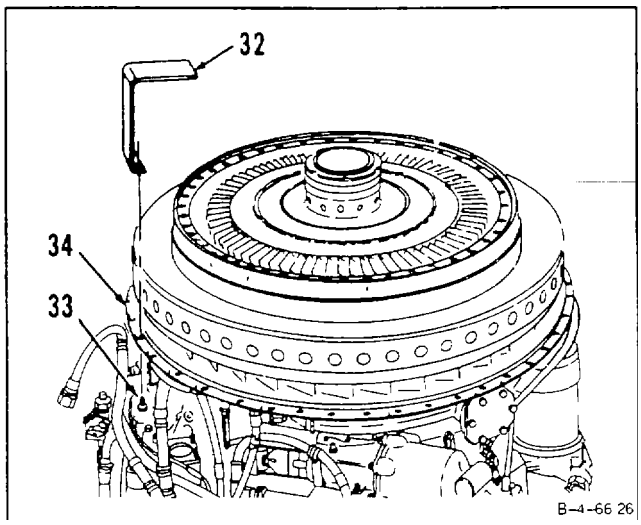
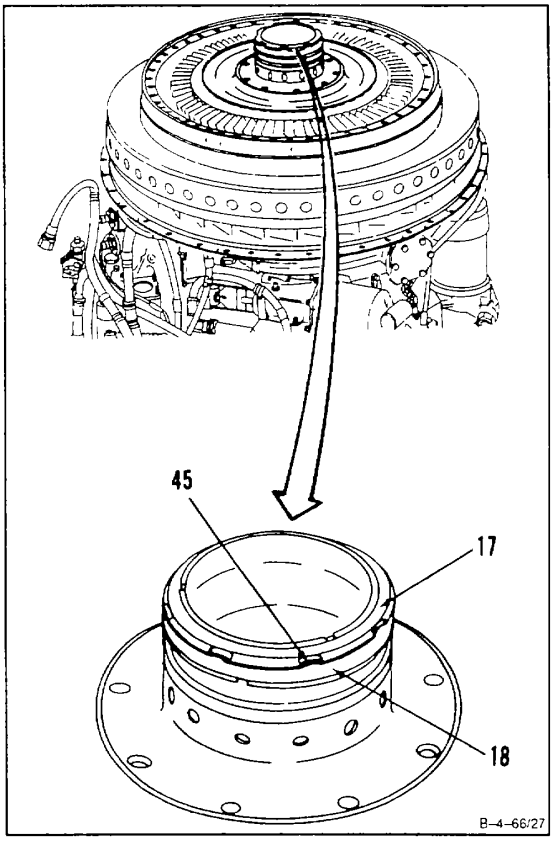
21. **Remove** three slave bolts (33) and **dial Indicator support (32)**from air diffuser (34).



22. Bend washer (18) into two nut cutouts (45), 180 degrees apart, to **lock nut (17).**



INSPECT

FOLLOW-ON MAINTENANCE
Install Second Turbine Nozzle, Spacer, Case, and Bumper (Task 4-62)
Install Second Turbine Disc Assembly (Task 4-57)
Install Combustion Section and Power Turbine (Task 3-8)
Service Engine Oil System (Task 1-68)

END OF TASK

SECTION XIV

FIRST TURBINE ROTOR CASE

4-68 REPAIR FIRST TURBINE ROTOR CASE (AVIM) 4-68

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Goggles
Skimming Maintenance Kit (T44)
Sound Protector
Vernier Caliper, 1-lnch
Vacuum Cleaner

Materials:
Emery Cloth (E20)
Lockwire (E33)
Marking Pencil (E38)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
Task 4-62

Equipment Condition:
Engine Oil System Drained (Task 1-69)
Combustion Section and Power Turbine Removed (Task 3-5)
Second Turbine Disc Assembly Removed (Task 4-54)
Second Turbine Nozzle, Spacer, Case, and Bumper Removed (Task 4-58)
First Turbine Disc Assembly Removed (Task 4-63)

General Safety Instructions:

WARNING

Exposure to skimming maintenance kit noise may cause ringing in ears, and temporary or permanent hearing loss. When using skimming maintenance kit, wear approved hearing protection. If ringing in ears or loss of hearing persists, get medical attention.

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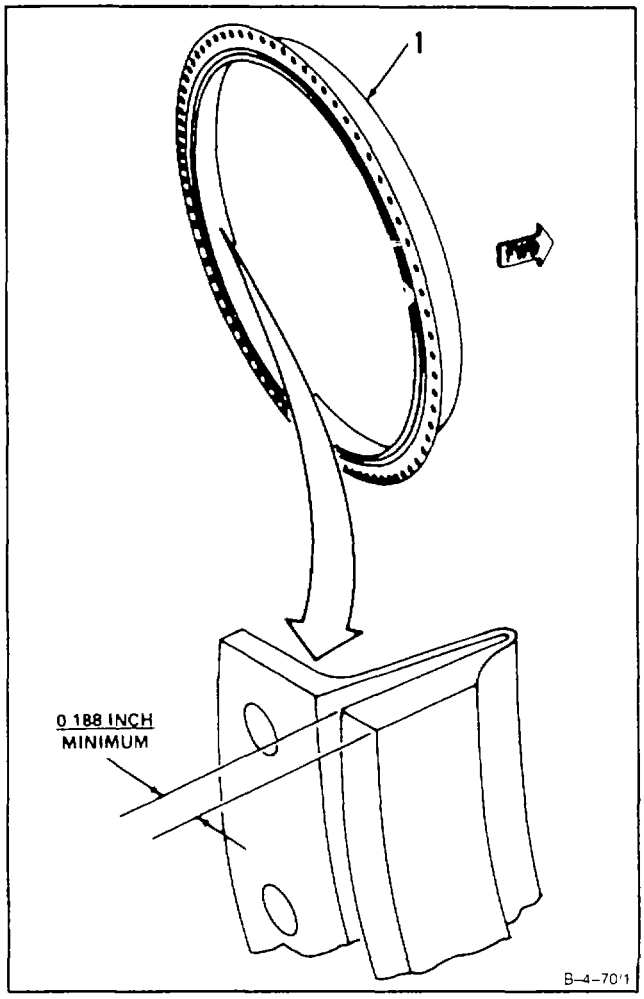
4-68 REPAIR FIRST TURBINE ROTOR CASE (AVIM) (Continued) 4-68

1. **Measure wall thickness of first turbine rotor case** (1). Use vernier caliper If amount of material to be removed results in a wall thickness of less than 0.188 inch, replace case.



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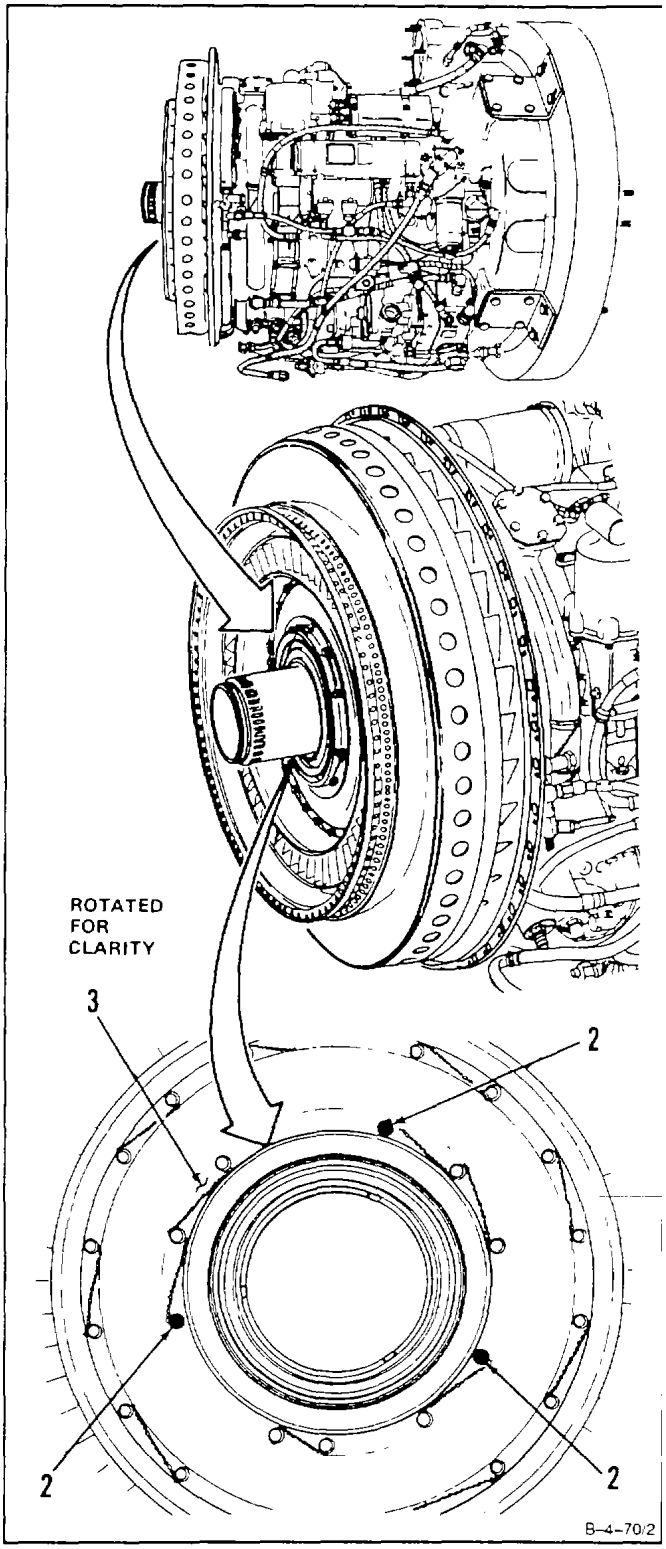
4-68 REPAIR FIRST TURBINE ROTOR CASE (AVIM) (Continued) 4-68

2. Remove lockwire and **three bolts (2)**from baffle retainer (3)



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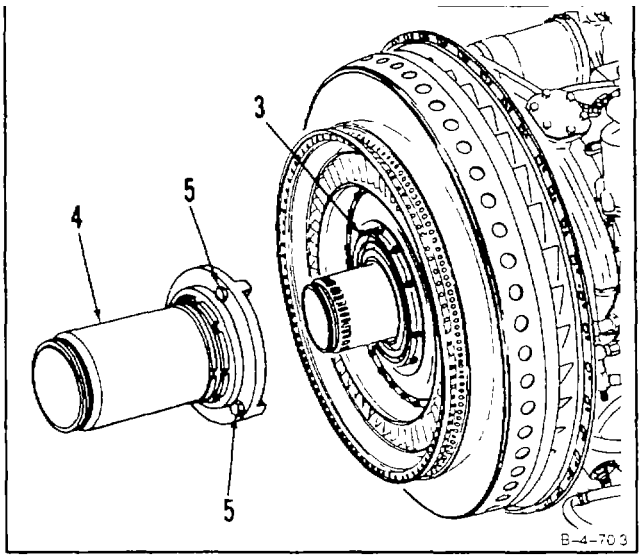
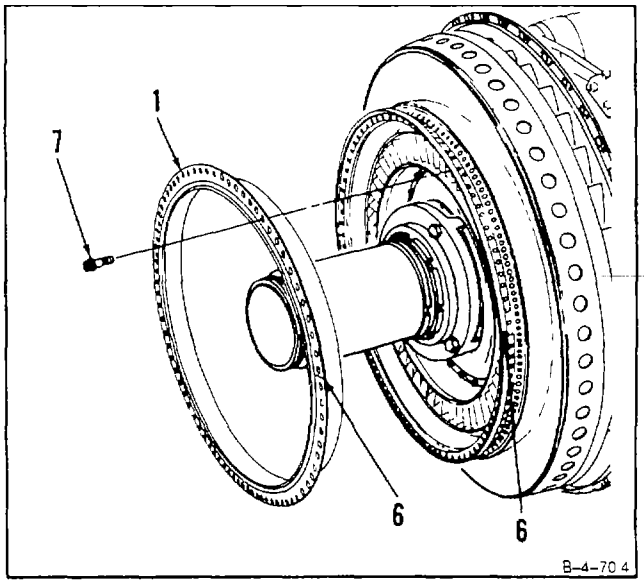
4-68 REPAIR FIRST TURBINE ROTOR CASE (AVIM) (Continued) 4-68

3. **Install adapter (4),** part of skimming maintenance kit (T44), on baffle retainer (3).

4. Tighten three bolts (5)



5. Align matchmarks (6) and **install first turbine rotor case (1)** and 24 bolts (7).



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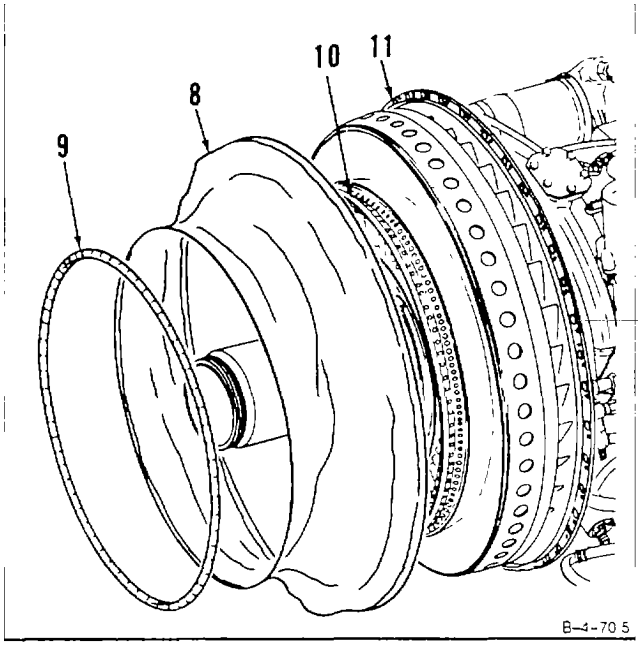
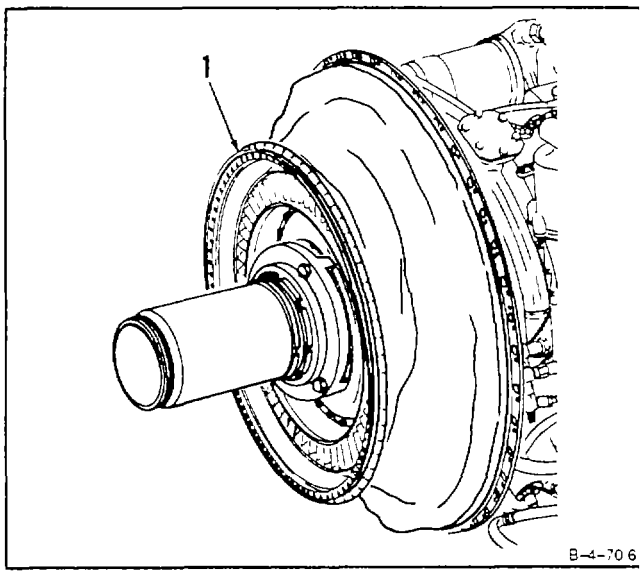
NOTE

In following step (6), difficulty may be encountered when installing cover due to tight fit of cover around air diffuser assembly. The tight fit is necessary to ensure that machining chips do not enter air diffuser assembly.

6. **Install protective cover (8) and spring** (9), part of skimming maintenance kit (T44), on first turbine nozzle (10) and air diffuser assembly (11).



7. Measure tip clearance (Ref. Task 4-62, step 5) and **mark case (1)** at the point of lowest tip clearance. Use marking pencil (E38).



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8. Subtract lowest tip clearance from MINIMUM required to clearance 0.019 inch Result is the amount of material to be removed from case (1)

Example	
Minimum Tip Clearance Required	0.019 Inch
Subtract Lowest Tip Clearance	-0.015 Inch
Amount of Material to be Removed	0.004 Inch

NOTE

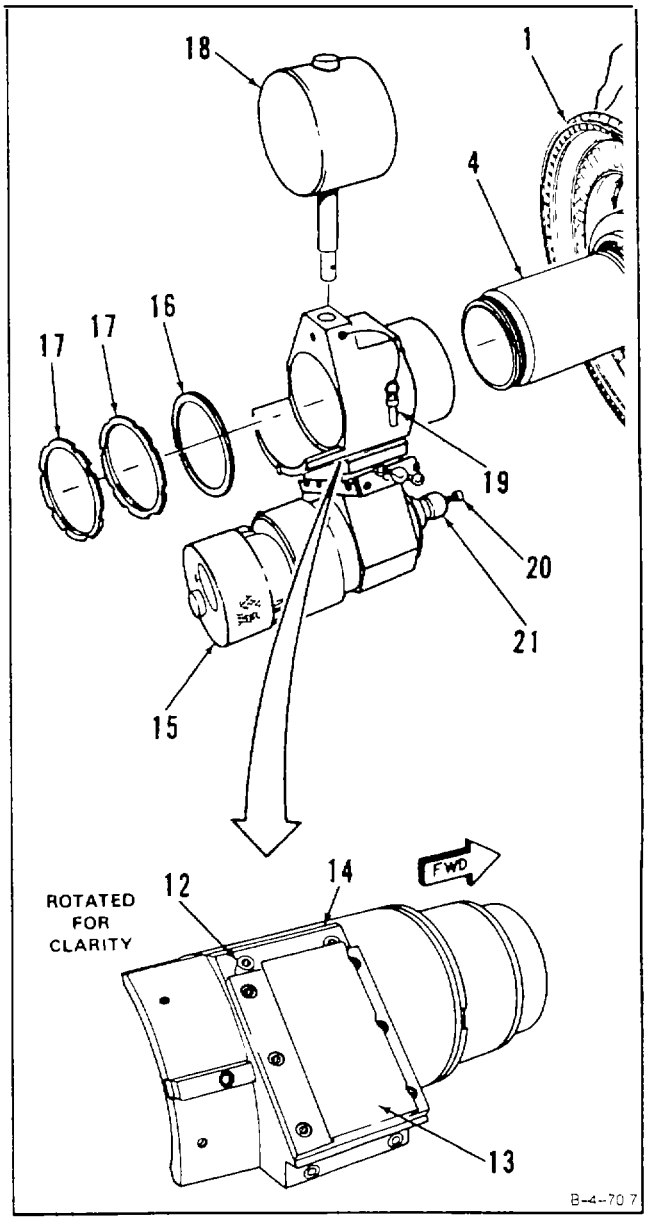
Check housing for position of support. Support must be installed at the forward position on housing. If support is not installed at the forward position on housing, perform step 9.

9. Remove four screws (12) and move support (13) to forward position on housing (14). Install four screws (12).

10. Use helper and **install milling machine** (15), part of skimming maintenance kit (T44), on adapter (4). Install washer (16) and two nuts (17) using spanner wrench, part of skimming maintenance kit (T44).

11. **Install counterweight (18)** and pin (19).

12. **Install cutter (20),** part of skimming maintenance kit (T44) **in collet (21)** Do not tighten collet (21).



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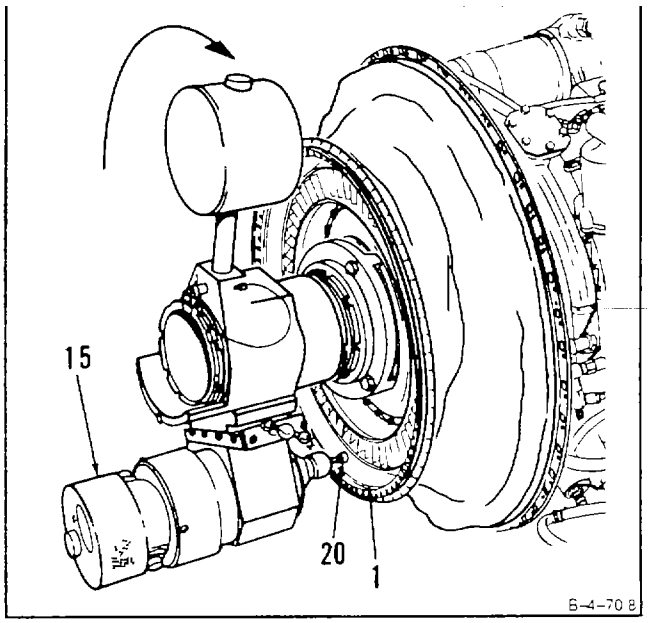
13. **Rotate milling machine (15) clockwise** until front stop is reached

CAUTION

In following step 14, do not allow cutter to project beyond forward edge of case. Failure to comply will cause damage to nozzle outer shroud during milling operation.

14. **Adjust cutter (20)** until forward edge of cutter reaches forward edge of case (1). Do not adjust cutter beyond this point



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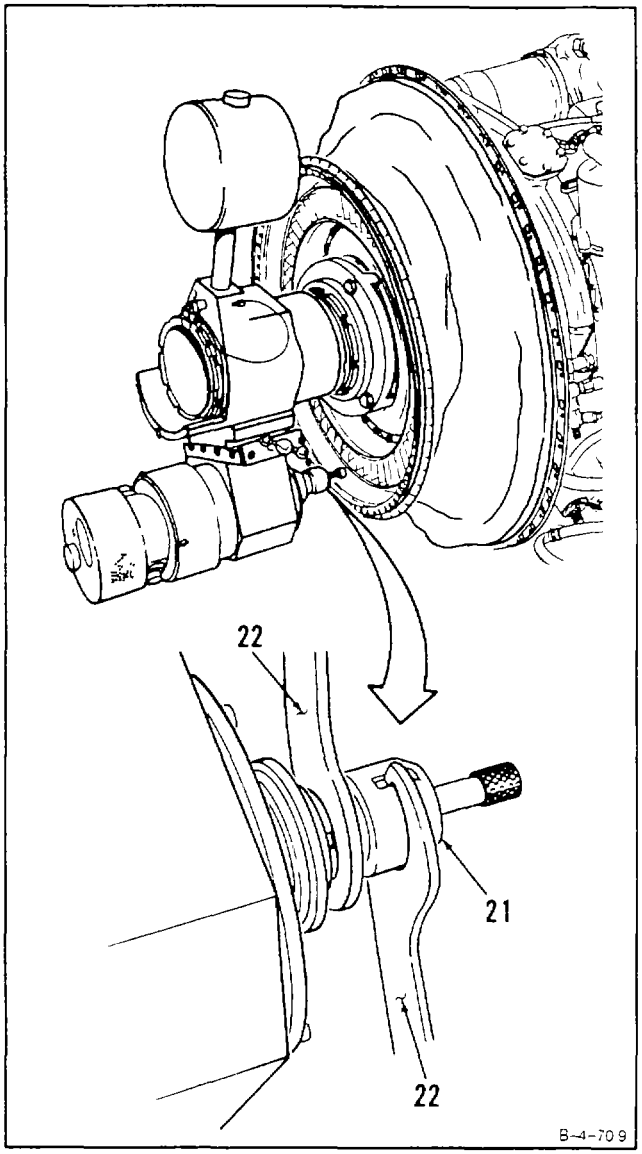
15. **Tighten collet (21)**with two spanner wrenches (22), part of skimming maintenance kit (T44)



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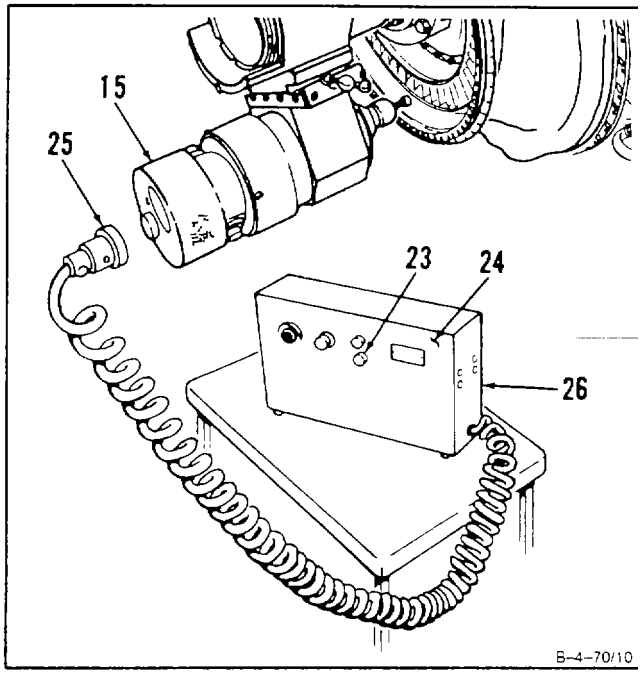
16. **Press STOP button (23)** on control panel (24).

17. **Connect control box connector (25)** to milling machine (15).

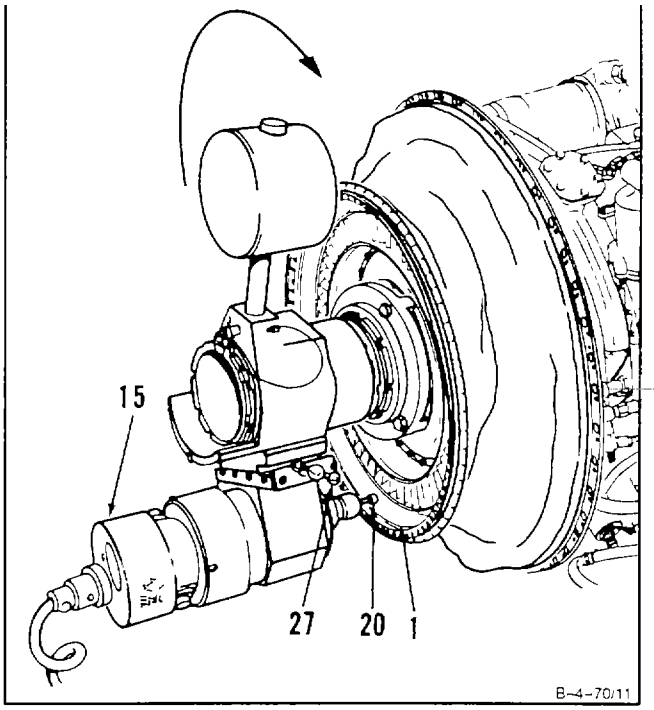
18. **Connect control box (26) to a 110 VAC power source.**



19. **Rotate milling machine (15) counterclockwise,** until cutter (20) is on mark that was recorded on case (1) in step 7.

20. **Turn adjusting knob (27)** on milling machine (15) until cutter (20) lust makes contact with case (1) inner diameter.

21. **Rotate milling machine (15) clockwise** until front stop is reached.



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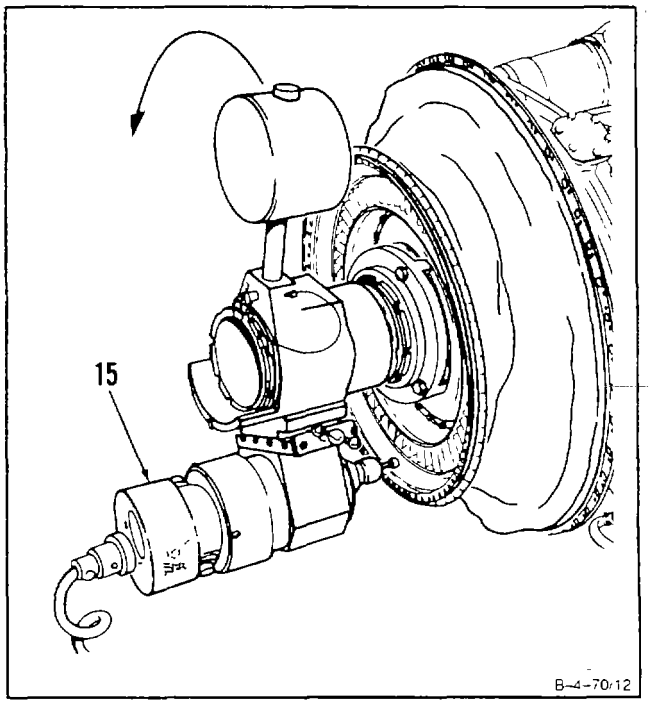
NOTE

In following step 22 ensure that no binding occurs when milling machine returns to rear stop

22. **Rotate milling machine (15) counterclockwise** until rear stop is reached.

23. If binding occurs repeat step 20, at area where binding occurred.



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WARNING

Keep hands and clothing away from rotating parts. Contact with rotating parts could cause injury. If injury occurs, get medical attention.

WARNING

Exposure to skimming maintenance kit noise may cause ringing in ears, and temporary or permanent hearing loss . When using skimming maintenance kit, wear approved hearing protection. If ringing in ears or loss of hearing persists, get medical attention.

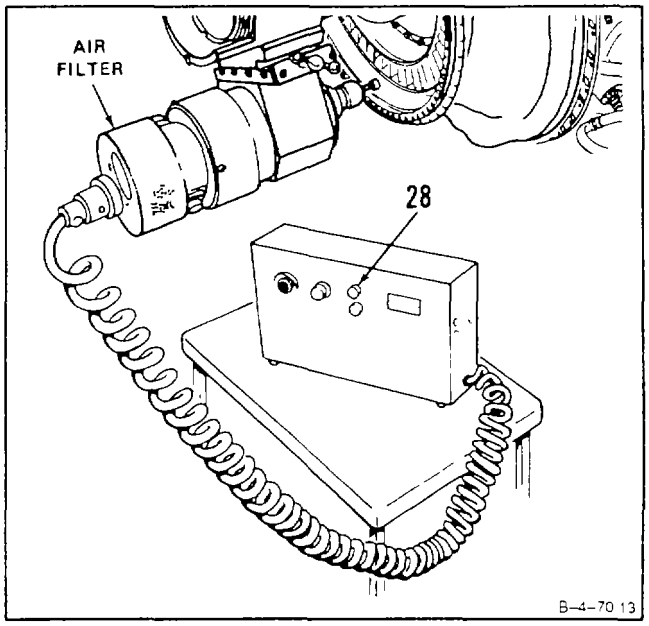
CAUTION

Make sure air filter of milling machine is unblocked at all times during operation. Failure to comply will reduce flow of cooling air through the motor.

NOTE

In following step 24, allow motor to run for 15 seconds to reach operating speed.

24. Wear goggles and sound protector. **Press START button (28).**



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CAUTION

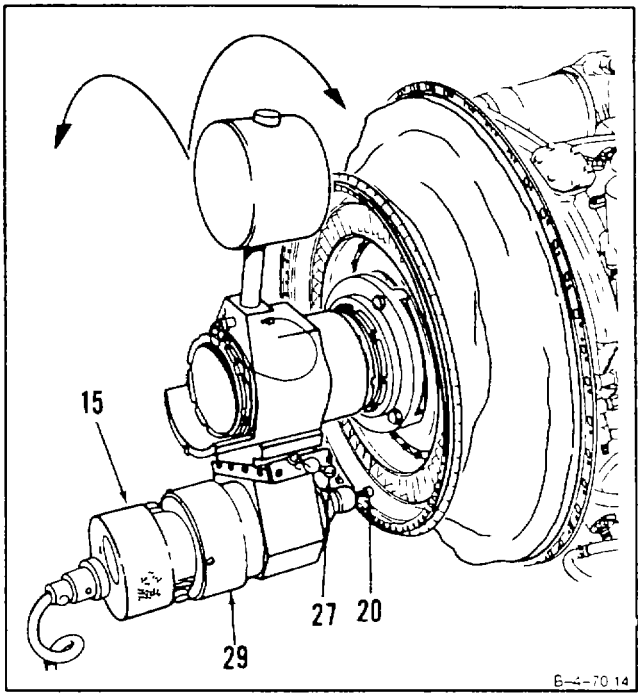
In following step 25, do not stop rotation during the clockwise or counter-clockwise movement until stops are reached. Stopping cutter before stops are reached may cause deep gouges or chatter marks in case.

25. Place hands on collar (29) and **rotate milling machine (15) clockwise** until front stop is reached and immediately rotate milling machine (15) counterclockwise until rear stop is reached.

CAUTION

Do not advance cutter more than one increment for any cut. All clockwise and counterclockwise rotations must be made slowly and without stopping.

26. **Turn adjusting knob (27) one increment clockwise.** One increment clockwise advances cutter (20) radially 0.001 inch.



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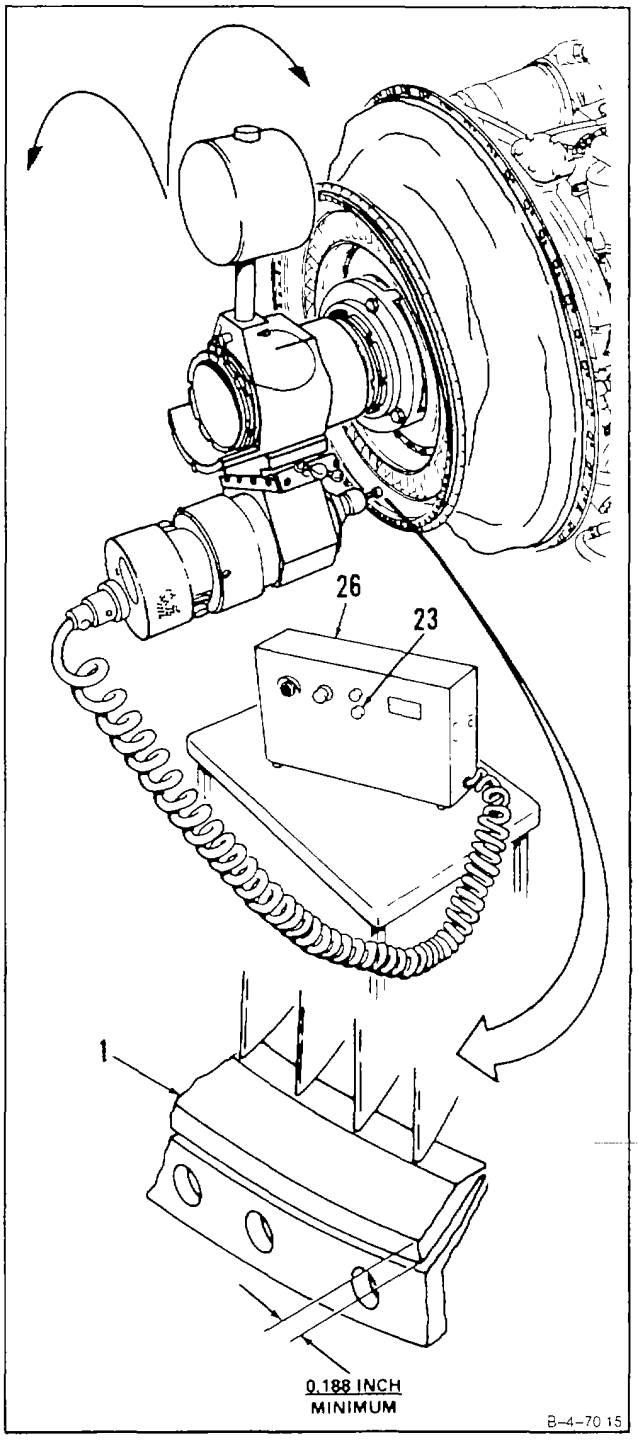
27. Continue to repeat steps 25 and 26 until amount of material which was determined in step 8 is completely removed

28. **Press STOP button (23).**

29. **Unplug control box (26)** from electrical power source

30. **Remove** any **burrs** from inside of case (1) Use fine emery cloth (E20)

31. **Measure wall thickness of case (1).** Wall thickness shall not be less than 0.188 inch.



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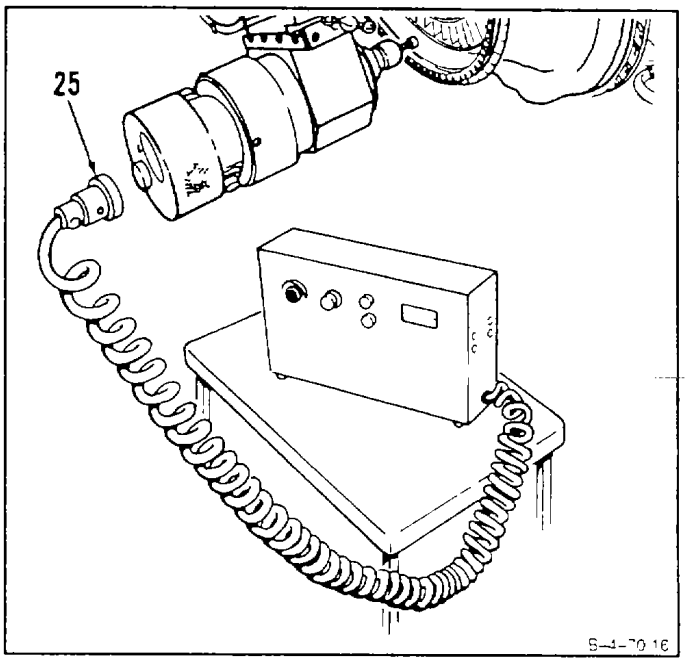
32. **Disconnect connector (25).**



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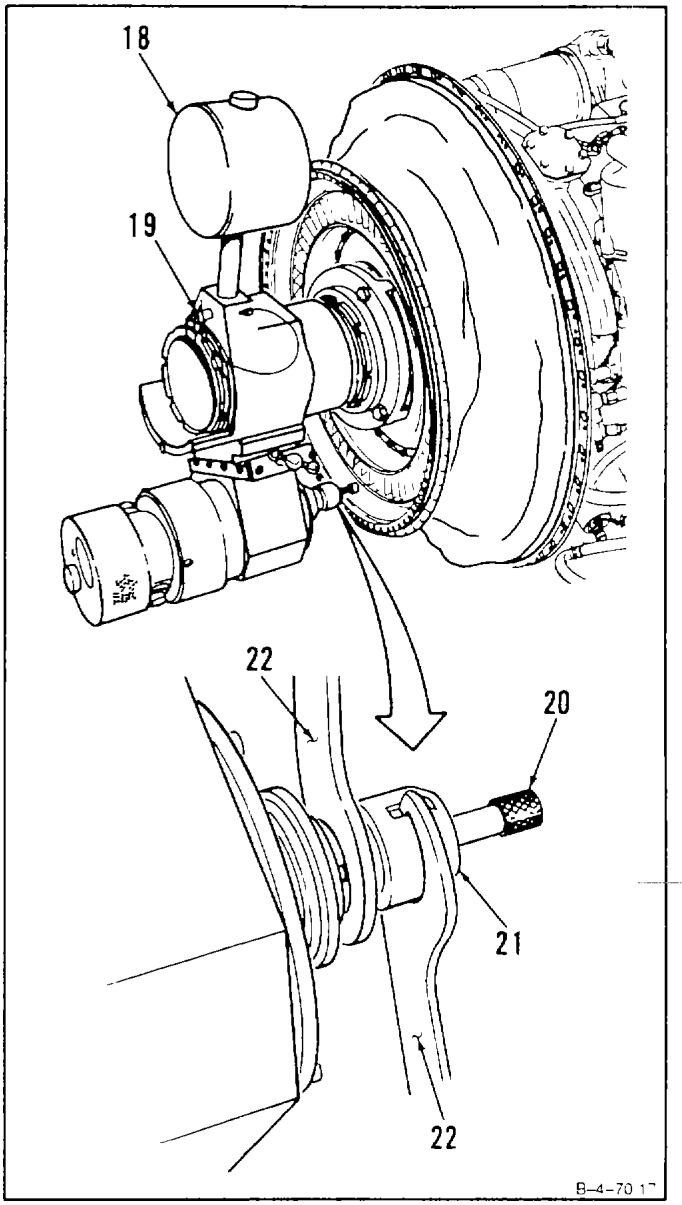
33 **Remove cutter (20)** from collet (21), using two spanner wrenches (22), part of skimming maintenance kit (T44)

34. Pull pin (19) and **remove counterweight (18)**



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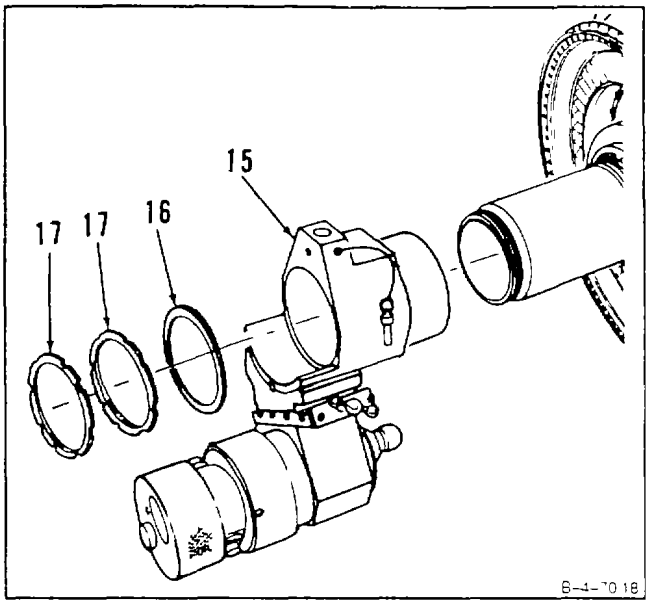
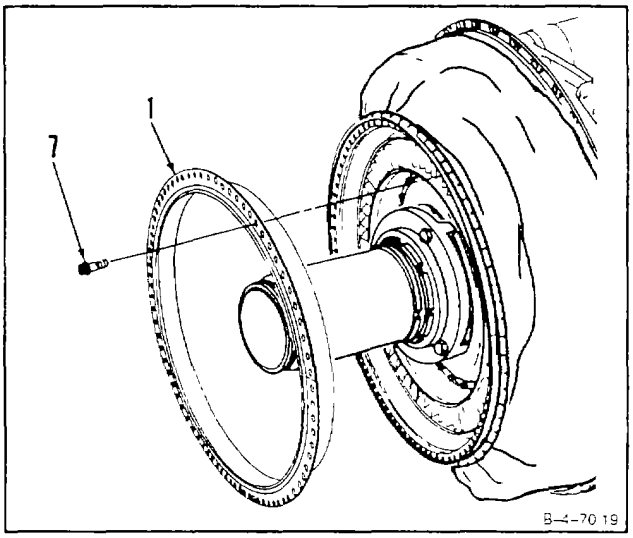
35. Using spanner wrench, part of skimming maintenance kit (T44), remove two nuts (17) and washer (16) Using helper, **remove milling machine (15).**



36. **Remove** 24 bolts (7) and **first turbine rotor case (1)**



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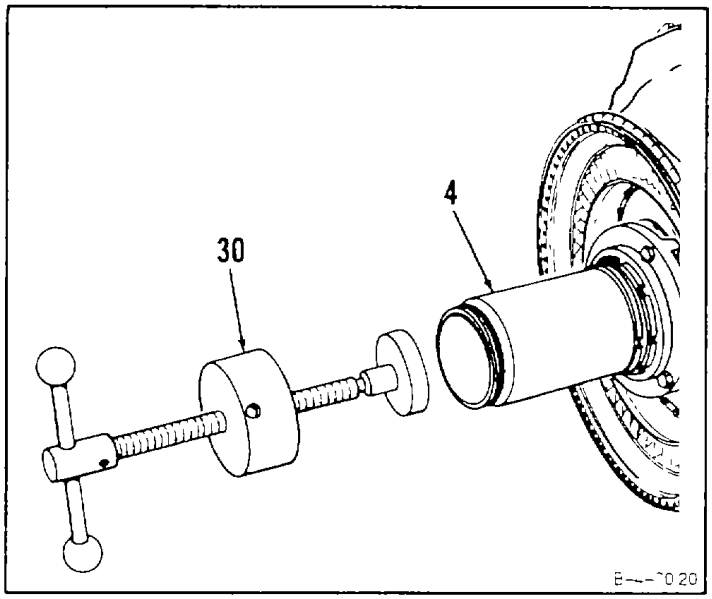
37 **Install mechanical puller (30),** part of skimming maintenance kit (T44) on adapter (4) Tighten puller until it bottoms on adapter (4)

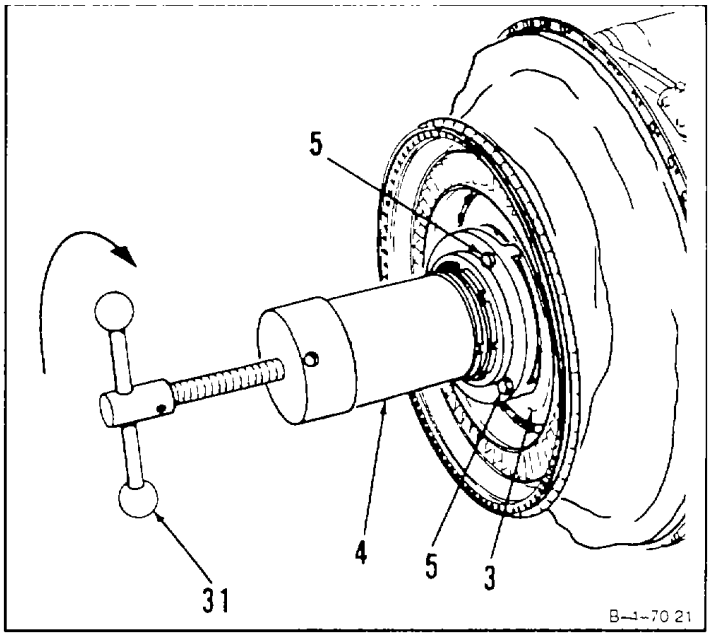


38. Loosen three bolts (5) until they are free of baffle retainer (3)

CAUTION

In following step 39, support adapter while it is being removed. Failure to comply will cause damage to first turbine nozzle

39. **Turn handle (31) clockwise until adapter (4) is removed.**



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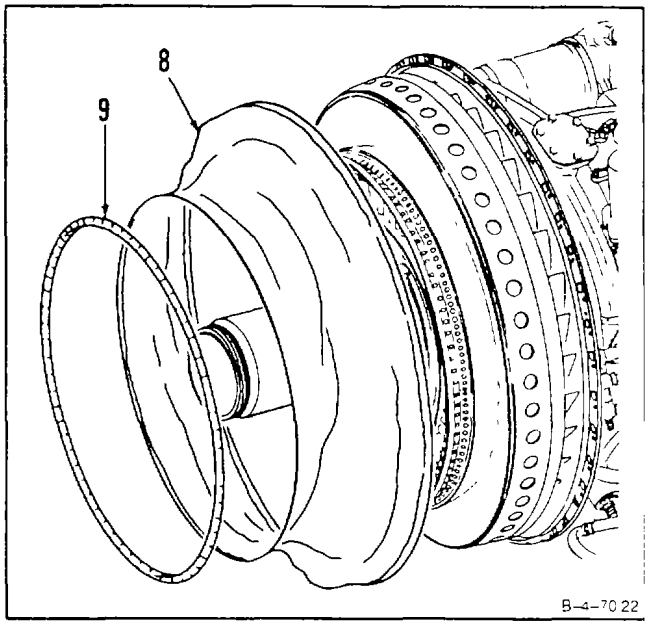
NOTE

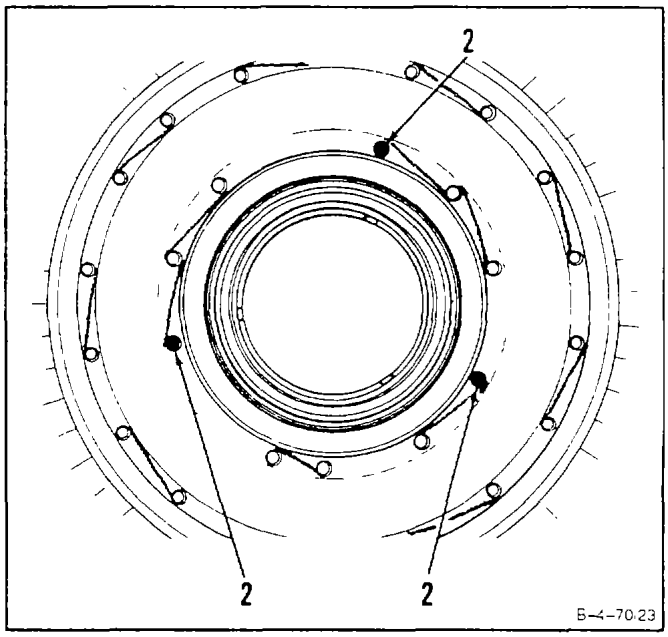
In following step 40, difficulty may be encountered when removing cover due to tight fit of cover around air diffuser assembly The tight fit is necessary to ensure that machining chips do not enter air diffuser assembly

40. **Remove spring (9) and cover (8)**



41. Use vacuum cleaner to **remove metal particles**

42. Install three bolts (2) Lockwire bolts (2) Use lockwire (E33)



INSPECT

FOLLOW-ON MAINTENANCE

Install First Turbine Disc Assembly (Task 4-67)
Install Second Turbine Nozzle, Spacer, Case, and Bumper (Task 4-62)
Install Second Turbine Disc Assembly (Task 4-57)
Install Combustion Section and Power Turbine (Task 3-8)
Service Engine Oil System (Task 1-68)

END OF TASK

SECTION XV

FIELD REPLACEMENT FIRST AND SECOND TURBINE DISC ASSEMBLY

4-69 PLACE IN SERVICE FIELD REPLACEMENT FIRST AND SECOND TURBINE DISC ASSEMBLY (AVIM) 4-69

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
GP Spacer Puller (T48)

Materials:
Marking Pencil (E38)

Personnel Required:

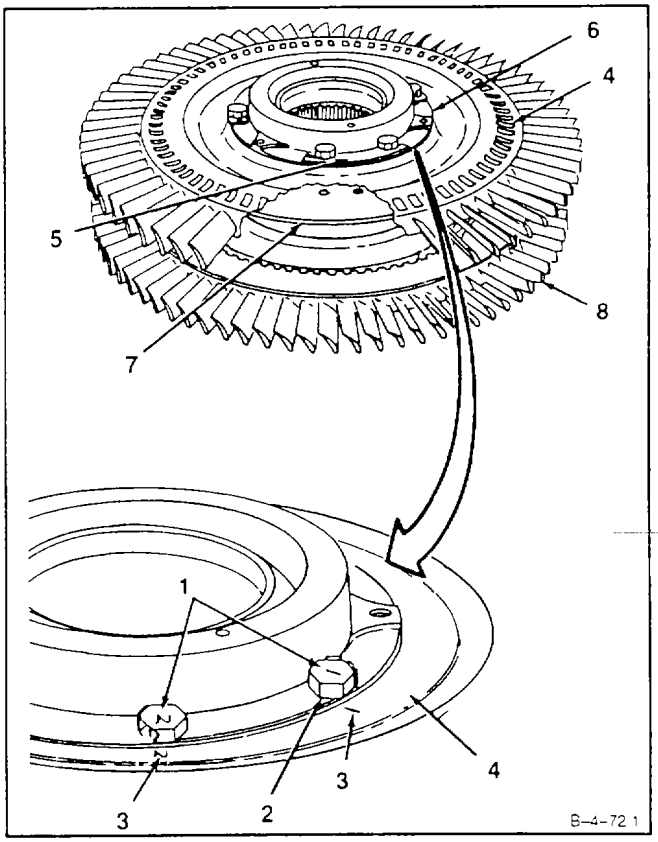
Equipment Condition:
Aircraft Powerplant Repairer (2)

NOTE

The first turbine disc assembly, spacer, second turbine disc assembly, and seal are critical components for which life cycle data will be recorded and stored in the DECU on the aircraft
If first turbine disc assembly, spacer, second turbine disc assembly, and seal are replacements, it is essential to update life cycle count in engine history data stored in the DECU via the engine history recording terminal (EHRT) (T37) (Ref. TM1-1520-252-23)

1. Mark index numbers (1) on each of six bolts (2) and mark six bolts (2) and mark six matching numbers (3) on second turbine disc assembly (4) using marking pencil (E38)

2. Matchmark three locking plates (5), seal (6), second turbine disc assembly (4), turbine spacer (7), and first turbine disc assembly (8) Use marking pencil (E38)



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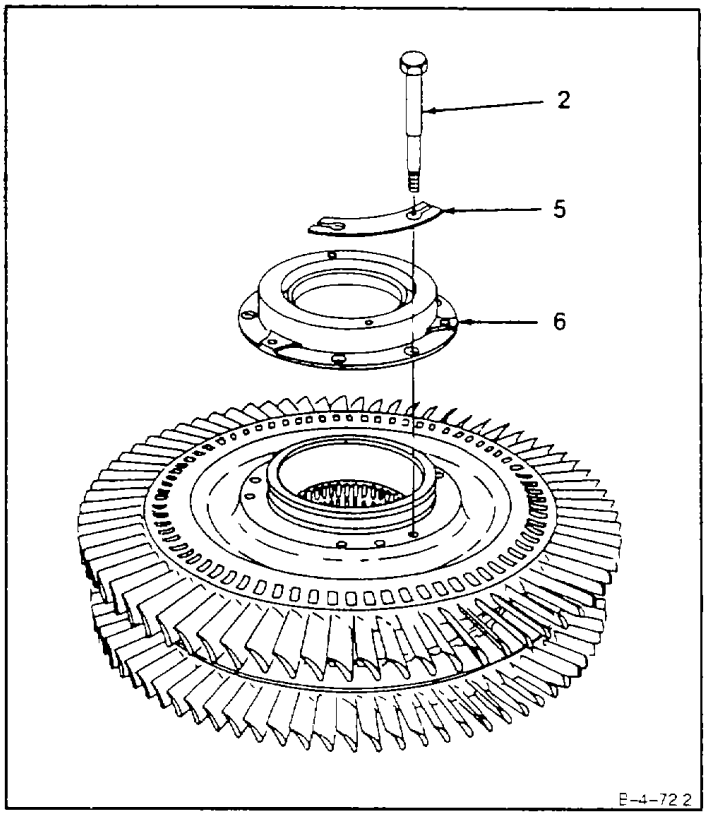
3. **Remove** six bolts (2), three locking plates (5), and **seal (6)**



CAUTION

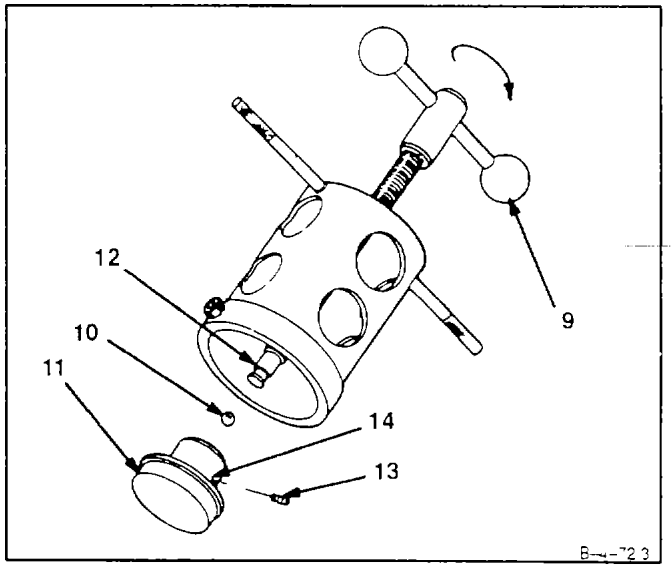
Be sure ball is in base of adapter before installing onto shaft. Ball could easily fall out. This would cause improper use of puller.

4. **Assemble details of GP spacer puller (T48)** to remove second turbine disc assembly as follows

   a. Turn T-handle (9) clockwise all the way

   b. **Install ball (10),** detail of GP spacer puller (T48) in base of adapter LTCT7923-1 2 (11), detail of GP spacer puller (T48)

   c. **Install adapter(11)** on shaft (12) Install spring pin (13) into hole (14)



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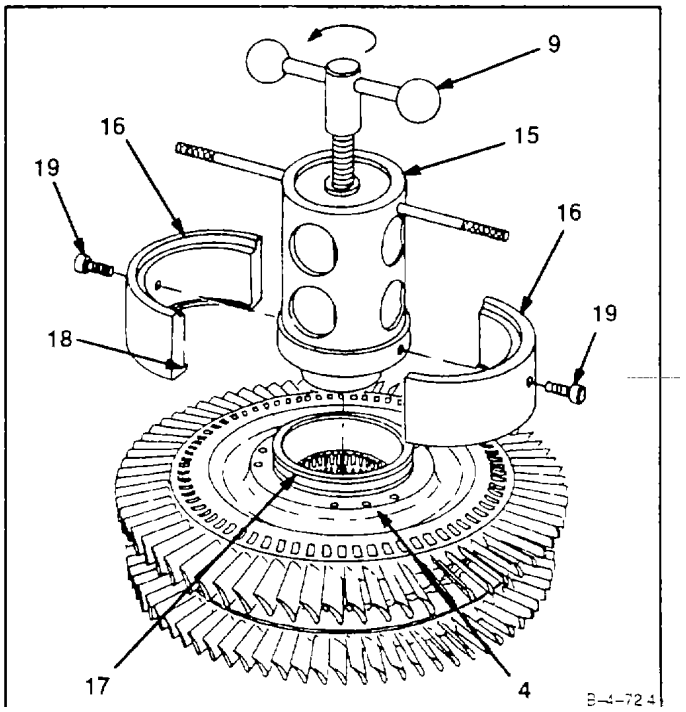
5. **Install GP spacer puller (T48) (15)** into second turbine disc assembly (4) as follows

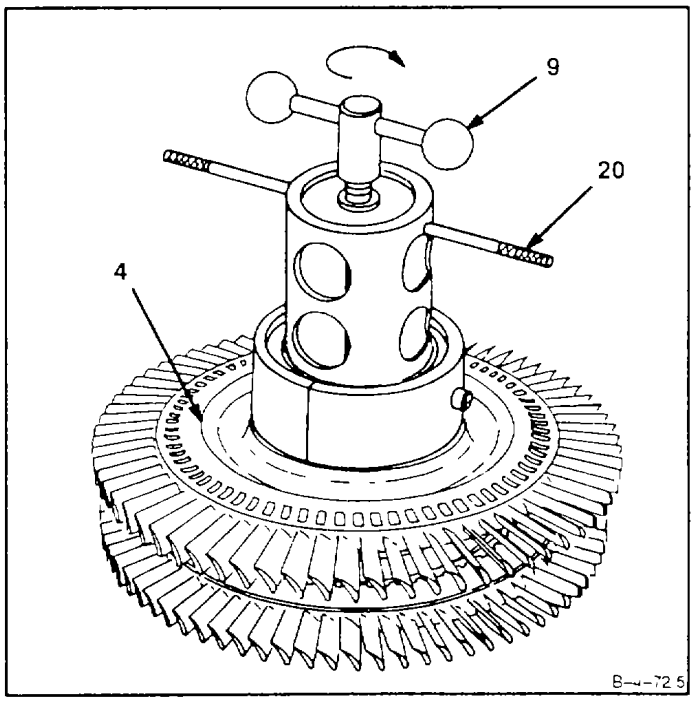
a. Turn T-handle (9) counterclockwise all the way

b. Install GP spacer puller (15) on second turbine disc assembly (4)

c. Position two puller halves (1 6), detail of GP spacer puller (T48) around flange (17) of second turbine disc assembly (4) Make sure lip (18) of puller halves (16) engages flange (17) of second turbine disc assembly (4) Secure with two 1.00 inch long socket head cap screws (19)



6. Have helper hold puller handle (20) Tighten T-handle (19) and **remove second turbine disc assembly (4).**



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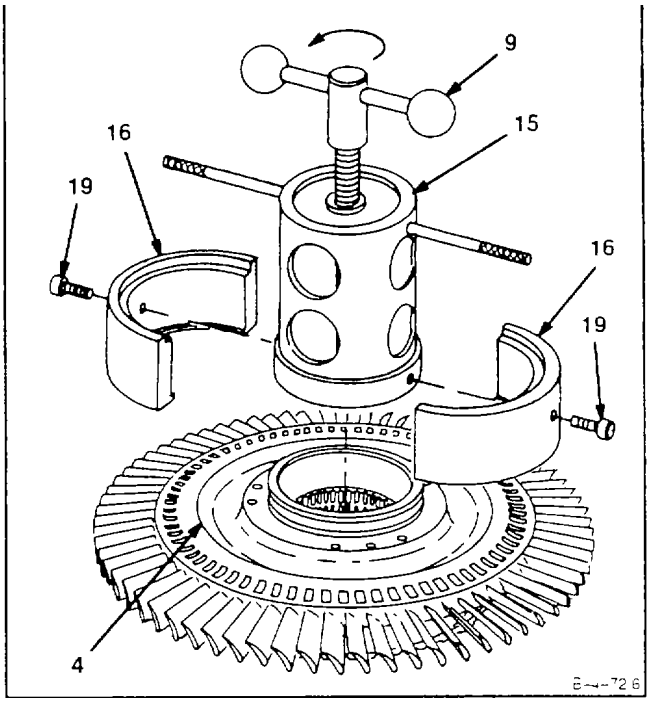
7. Remove GP spacer puller (T48) (15), from second turbine disc assembly (4) as follows

a. Turn T-handle (9) counterclockwise until loose

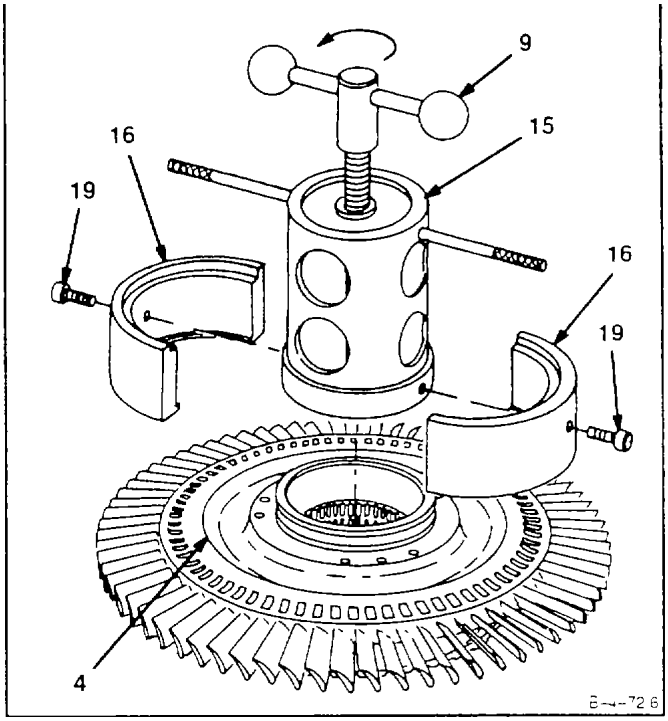
b. Remove two 1.00 inch long socket head cap screws (19), two puller halves (16), and GP spacer puller (15) from second turbine disc assembly (4)



8. Install GP spacer puller (T48) (15) on second turbine spacer as follows

a. Turn T-handle (9) counterclockwise all the way

b. **Install two puller shells (21),** detail of GP spacer puller (T48) on GP spacer puller (1 5) Install two 0.625 inch long socket head cap screws (22) one turn only



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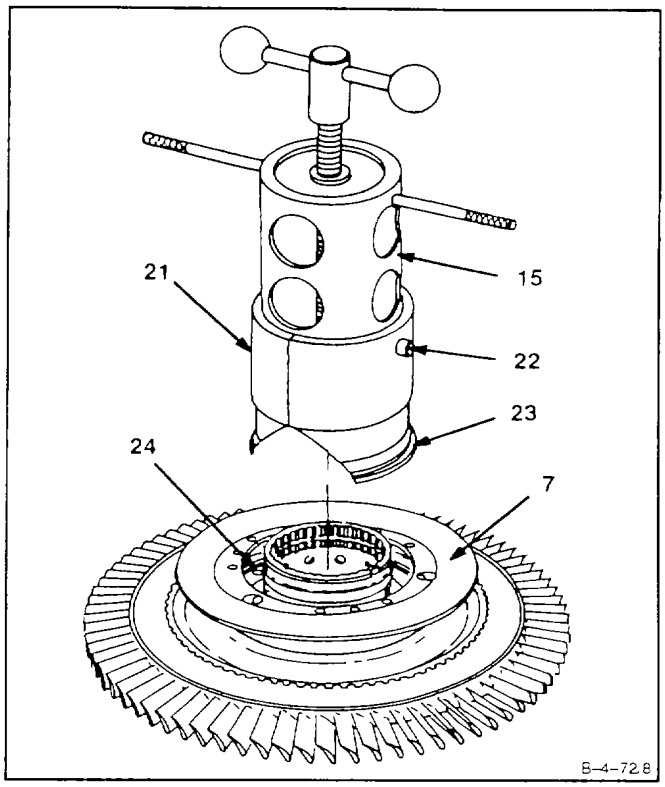
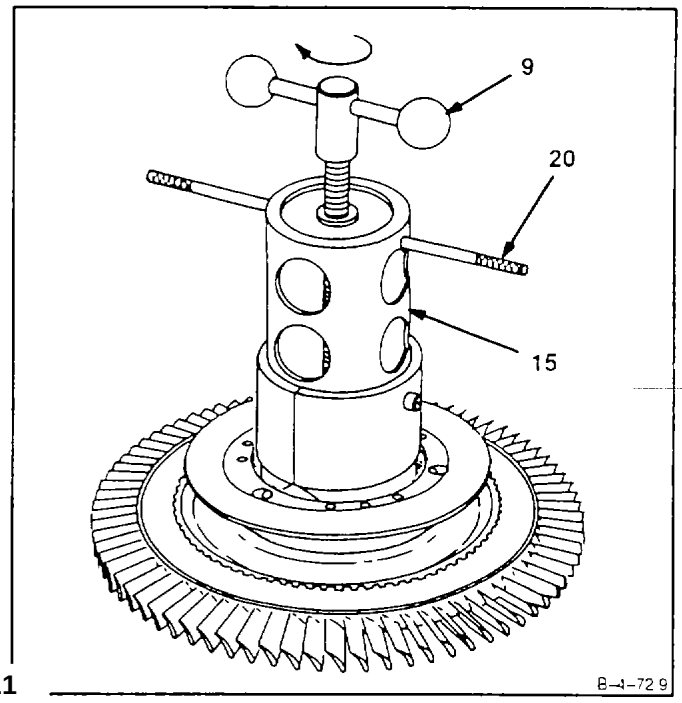
c. **Install GP spacer puller (15)** on second turbine spacer (7)

d. Make sure lip (23) of puller shells (21) engage flange (24) of second turbine spacer (7)

e. Tighten two 0.625 inch long socket head cap screws (22)



f. Hold puller handle (20) and turn T-handle (9) clockwise until GP spacer puller (15) is locked in position



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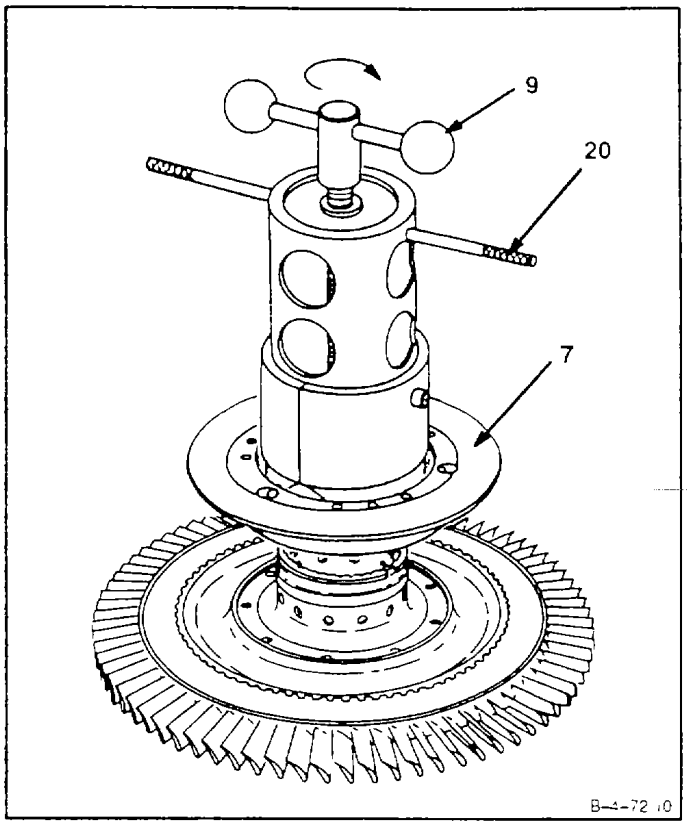
9. Hold puller handle (20) and tighten T-handle (9) and **remove second turbine spacer (7).**



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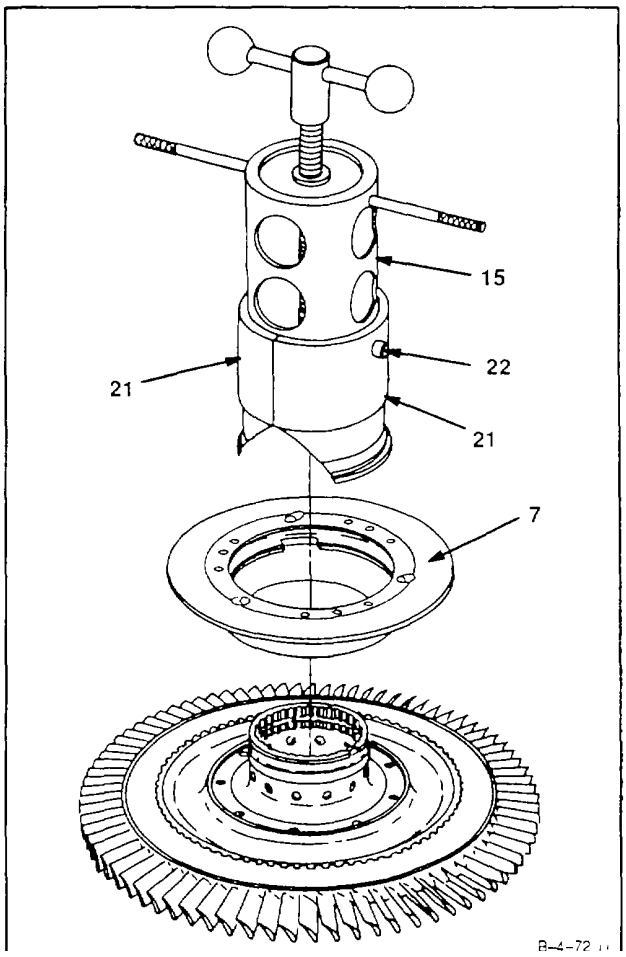
10. Loosen two socket head cap screws (19)

11. **Remove GP spacer puller (15)** from second turbine spacer (7)

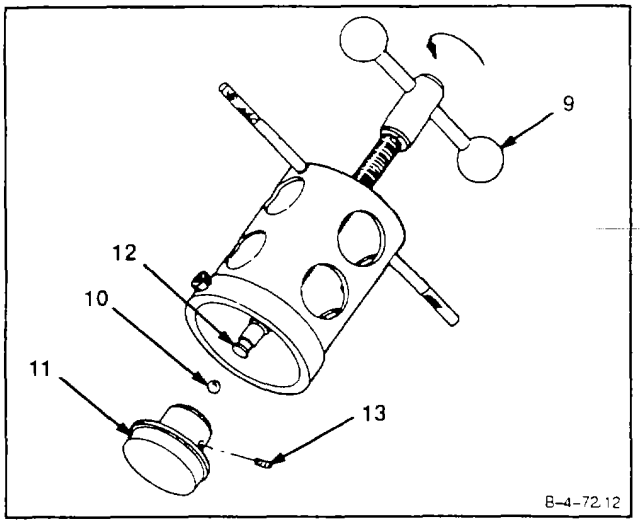
12. Remove two 0.625 inch long socket head cap screws (22) and two puller shells (21) from GP spacer puller (1 5)



13. Turn T-handle (9) clockwise all the way

14. **Remove spring pin (13)** from adapter (11)

15. **Remove adapter (11)** from shaft (12), and ball (10) from base of adapter (11)



FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION XVI

TAILPIPE ASSEMBLY

4-70 REMOVE TAILPIPE ASSEMBLY 4-70

INITIAL SETUP

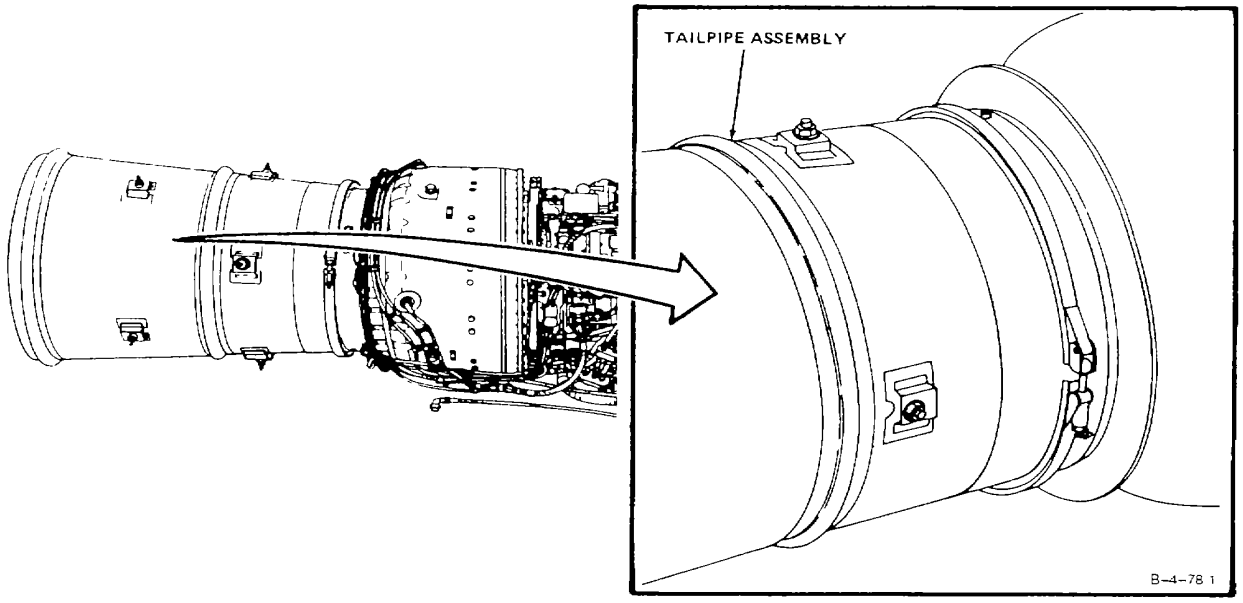
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:
Marking Pencil (E38)

Personnel Required:

Equipment Condition:
Aircraft Powerplant Repairer (2)



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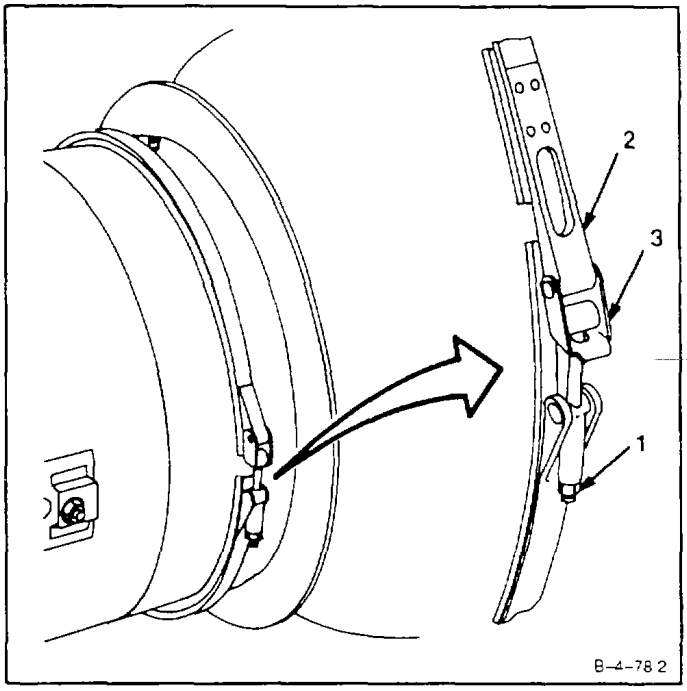
4-70 REMOVE TAILPIPE ASSEMBLY 4-70

1. Matchmark tailpipe to engine at 12 O'clock position Use marking pencil (E38)

NOTE
In following step 2, latch may be located at 3-o'clock or 9-o'clock position The 3-o'clock position is shown

2. Remove lockwire Loosen nut (1) on retainer coupling (2) Disengage latch (3)

3. **Remove retainer coupling (2)**



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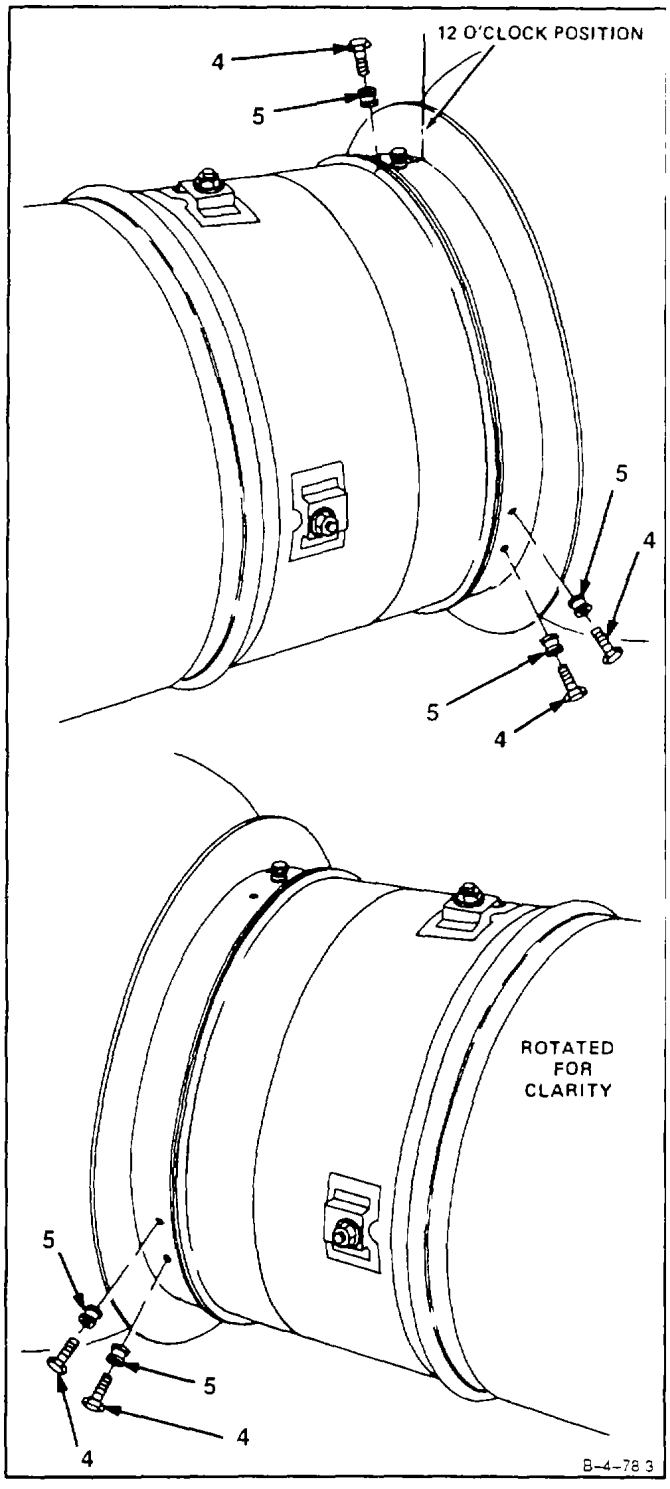
4. Remove lockwire, **five bolts (4), and spacers (5).**



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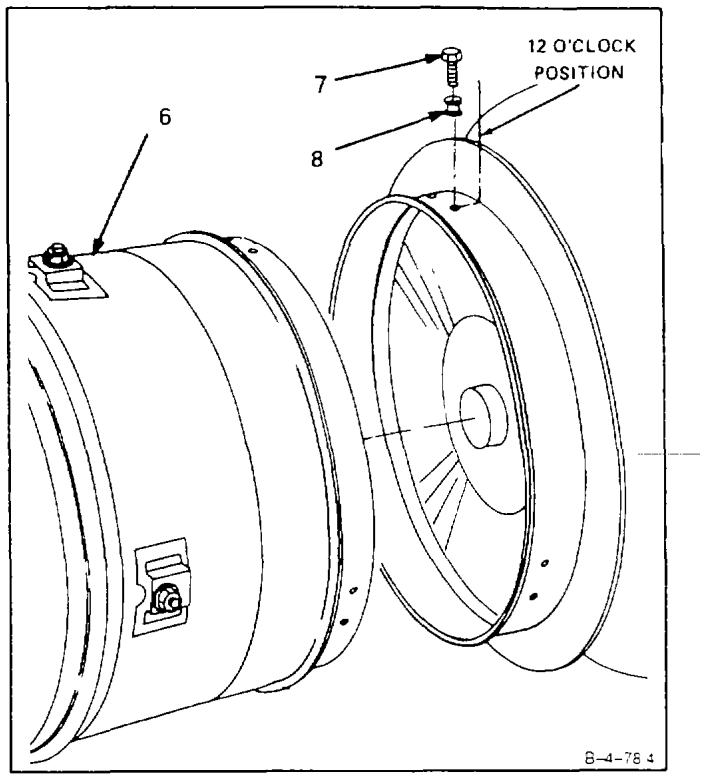
CAUTION

Do not let tailpipe assembly contact engine blades. Damage to blades can result.

5. Have another repairer support tailpipe assembly (6). **Remove bolt (7), and spacer (8).**

6. **Remove tailpipe assembly (6)**



FOLLOW-ON MAINTENANCE
None

END OF TASK

4-71 DISASSEMBLE TAILPIPE ASSEMBLY 4-71

INITIAL SETUP

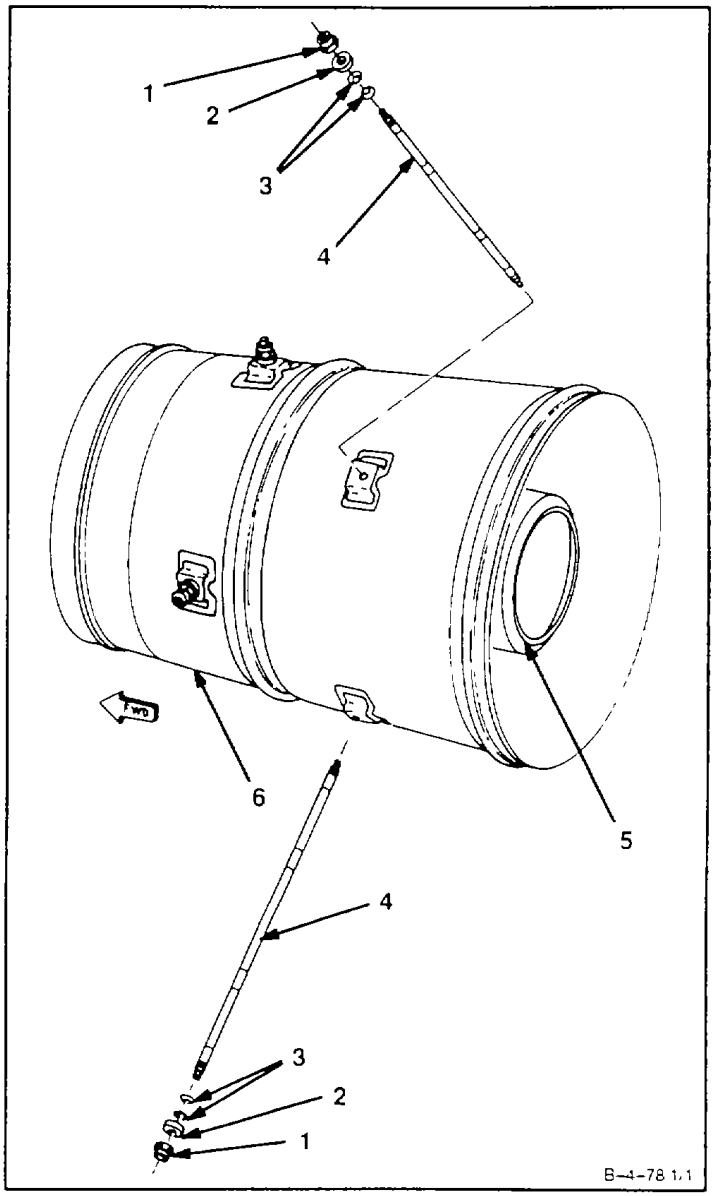
Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Materials ;
None
Personnel Required:
Aircraft Powerplant Repairer (2)
Equipment Condition:
Off Engine Task
Tailpipe Assembly Removed (Task 4-70)

1. Remove safety cable or lockwire, four nuts (1), spacers (2), and eight spring disks (3) from two aft support rods (4)

NOTE

The following steps 2 through 5 require the aid of another mechanic to support the centerbody

2. Have another mechanic support the centerbody (5). **Remove two aft support rods (4)** from tail-cone assembly (6)



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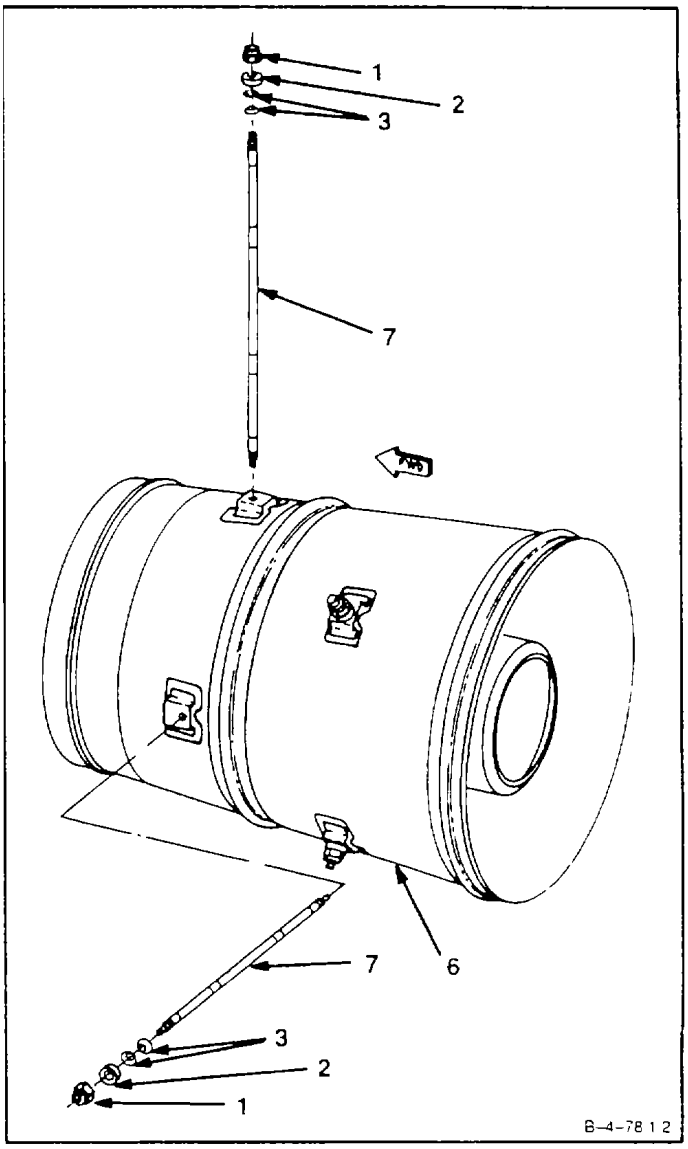
3 Remove safety cable or lockwire, four nuts (1), spacers (2), and eight spring disks (3) from two forward support rods (7)

4. **Remove two forward support rods (7)** from tail-cone assembly (6)



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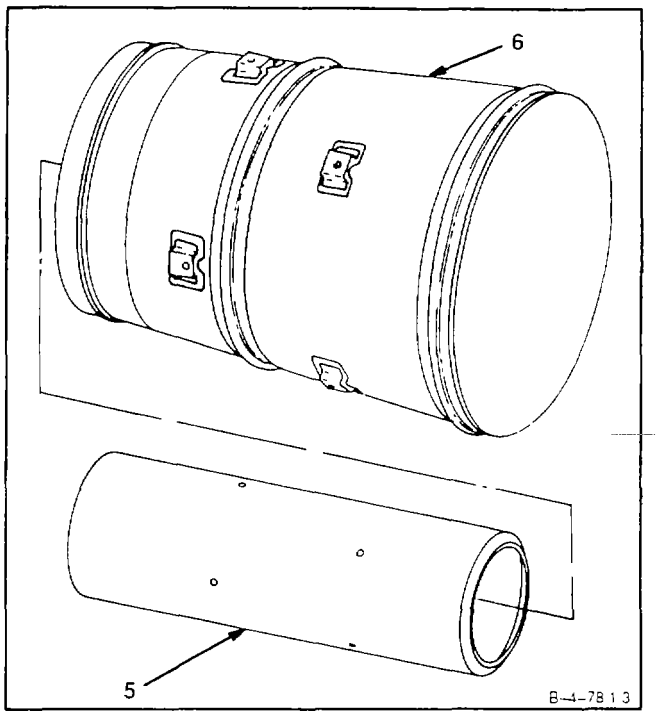
5. **Remove centerbody (5)** from tailcone assembly (6).



FOLLOW-ON MAINTENANCE

None

END OF TASK

4-72 CLEAN TAILPIPE ASSEMBLY 4-72

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Goggles
Compressed Air Source

Materials:
Dry Cleaning Solvent (El9)
Gloves (E24)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Tailpipe Assembly Removed (Task 4-70)
Tailpipe Assembly Disassembled (Task 4-71)

General Safety Instructions:

WARNING

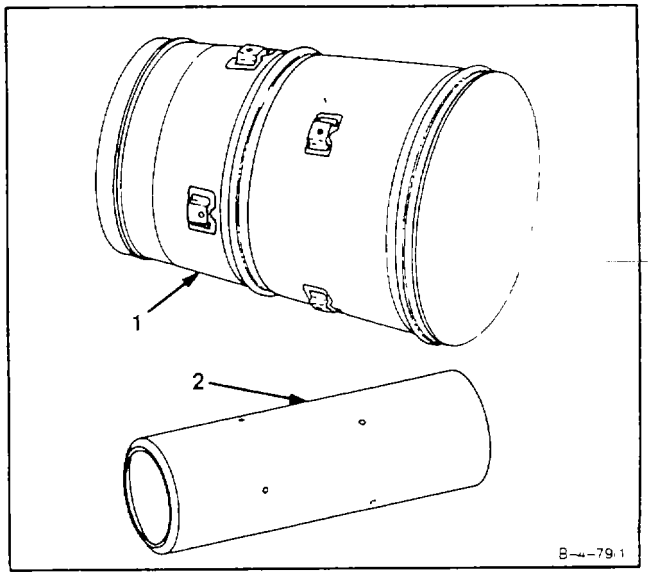
Dry cleaning solvent (E19) is flammable and toxic. It can irritate skin and cause burns. Use only in well- ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

1. Wear gloves (E24). **Clean tailcone assembly (1) and centerbody (2),** using dry cleaning solvent (E19) and brush

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

2. Wear goggles. **Blow dry tailcone assembly (1) and centerbody (2)**using clean, dry, compressed air.



FOLLOW-ON MAINTENANCE

Inspect Tailpipe Assembly (Task 4-73).

END OF TASK

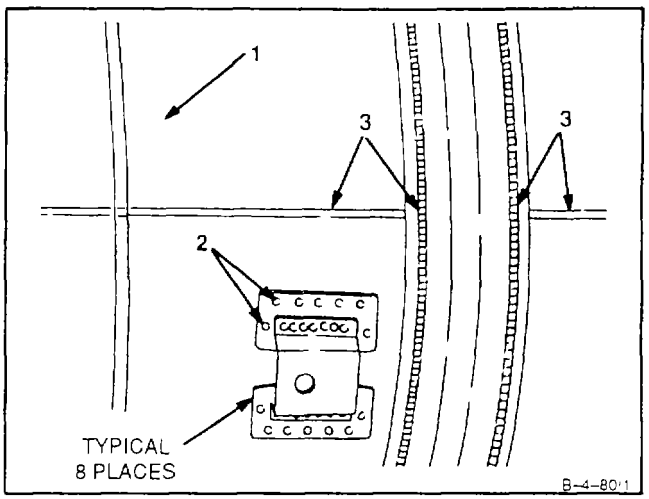
4-73 INSPECT TAILPIPE ASSEMBLY 4-73

INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

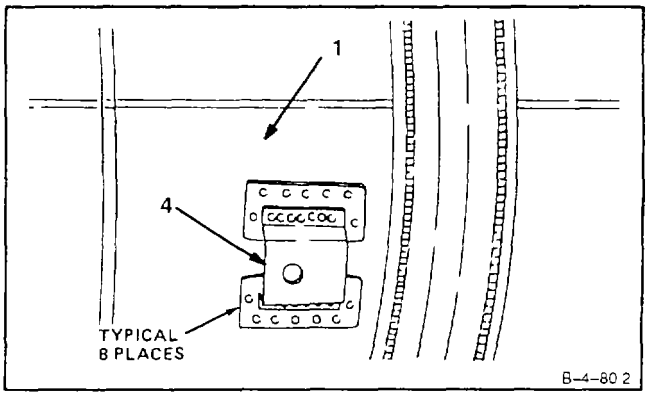
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1. **Inspect tailcone assembly (1)** as follows

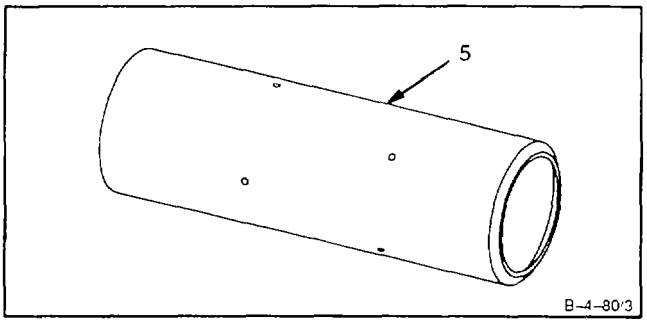
   a. Inspect for cracks in spot welds (2) and seam welds (3).



   b. **Inspect support rod brackets (4)** on tailcone assembly (1) for cracks and distortion.



   c. **Inspect centerbody (5)** for distortion and buckling.



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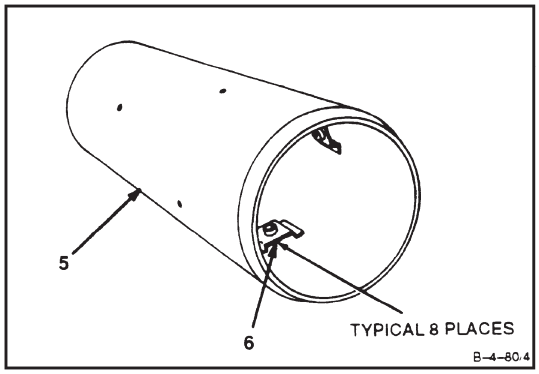
d. **Inspect support rod brackets (6)** in center body (5) for cracks and distortion.

e. Inspect support rods (7) for wear, original diameter is 0.396 +/– 0.001. Maximum allowable wear is 0.040 inch.

f. Inspect support rod brackets (6) center hole for wear, original hole diameter is 0.400 +/– 0.003 inches. maximum allowable wear is 0.040 inch.



NOTE

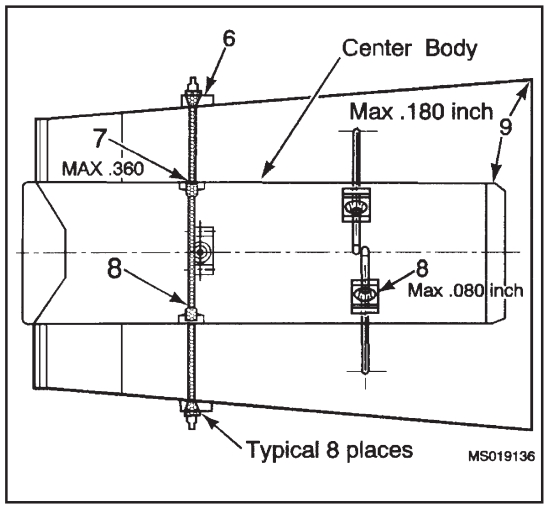
Use wire gage and measure rod and center hole wear. Maximum combined wear may not exceed 0.080 inch (8).

g. Measure wear of center body (5). The center body up and down movement must not exceed 0.180 inch. Measure the up and down movement at the aft end of center body to aft end of tailpipe a the 12:00 O'clock positioin (9).

NOTE

Worn rods or worn center bodies may be replaced seperately to maintain authorized tolerances.

h. Fore and Aft movement of center body must not exceed 0.115 inch.



FOLLOW–ON MAINTENANCE

None

END OF TASK

4-74 REPAIR TAILPIPE ASSEMBLY 4-74

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials:
Carborundum Stone (Ell)
Crocus Cloth (El6)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

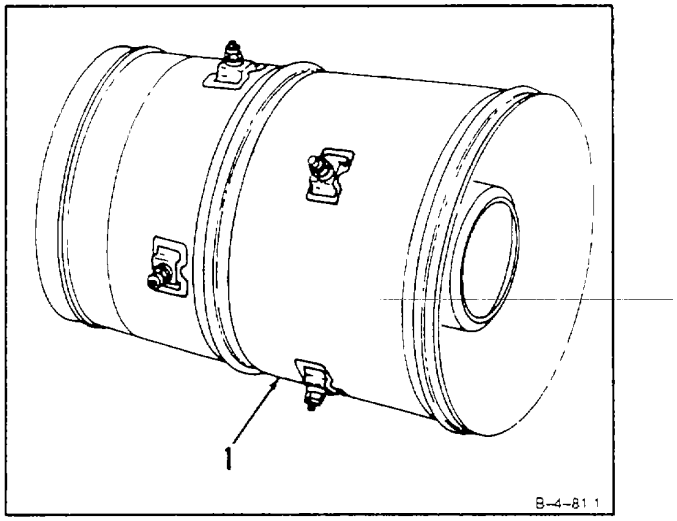
References:
TM 1-2840-252-23P

Equipment Condition:
Off Engine Task

1. **Repair nicks and scratches on tailpipe assembly (1)** as follows:

   a. **Blend all sharp edges** next to nicks and scratches. Use carborundum stone (E11).

   b. **Polish to smooth finish.** Use crocus cloth (E16)



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

4-75 ASSEMBLE TAILPIPE ASSEMBLY 4-75

INITIAL SETUP:
Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Depth, Vernier
Materials:
Anti-Seize Compound (E6)
Lockwire (E33)
Safety Cable (E49)
Personnel Required:
Aircraft Powerplant Repairer (2)
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

NOTE

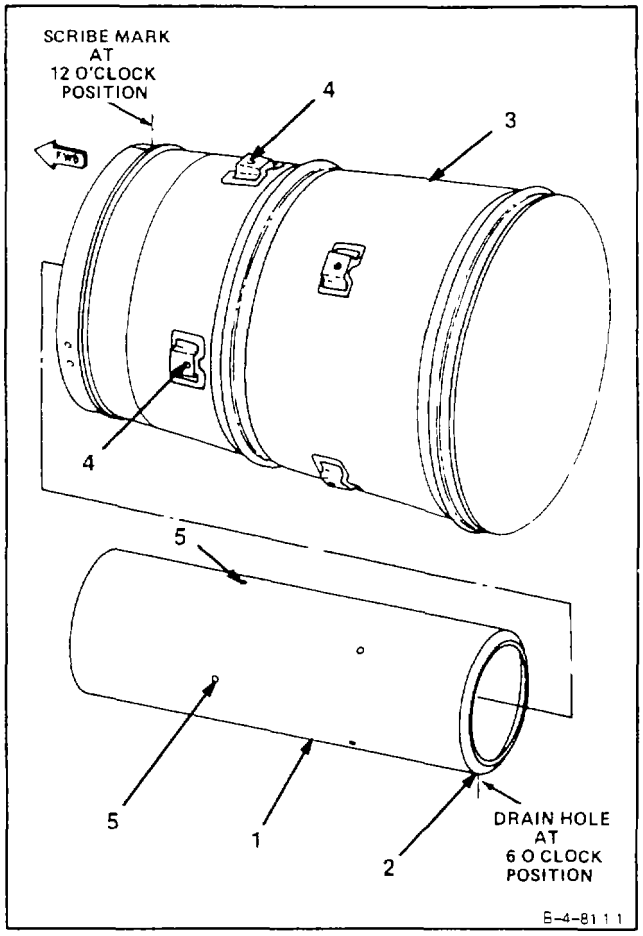
The following steps 1 through 5 require the aid of another mechanic to support the centerbody.

NOTE

In following step 1, be sure to orient centerbody drain hole with respect to scribe mark at 12-o'clock location on forward flange of tailcone assembly.

1. **Place centerbody (1)** with drain hole (2) at 6 o'clock, aft position, **inside tailcone assembly**(3).

2. Align rod holes (4 and 5).



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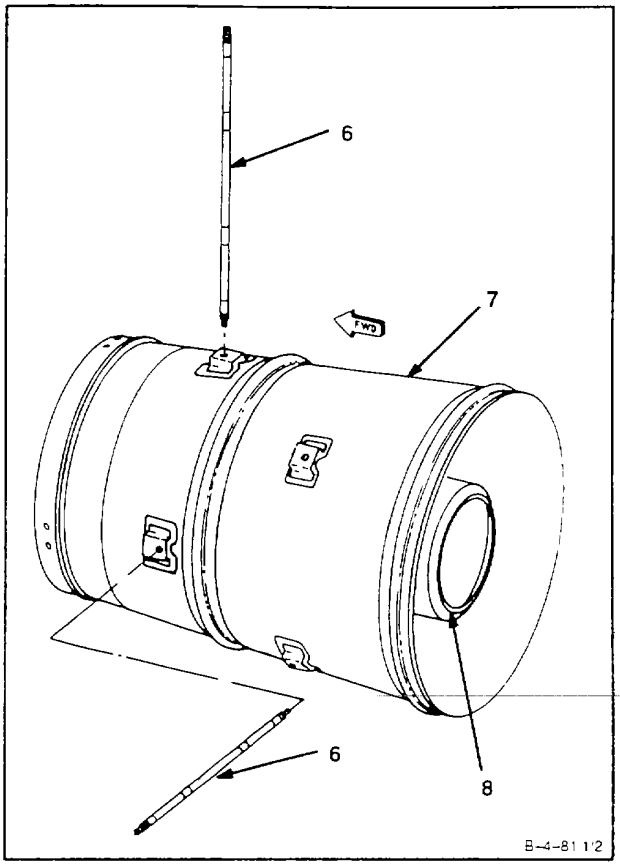
3. **Insert two short support rods (6)** through for- ward holes of tailcone assembly (7) and centerbody (8).

4. **Visually center support rods** (6).



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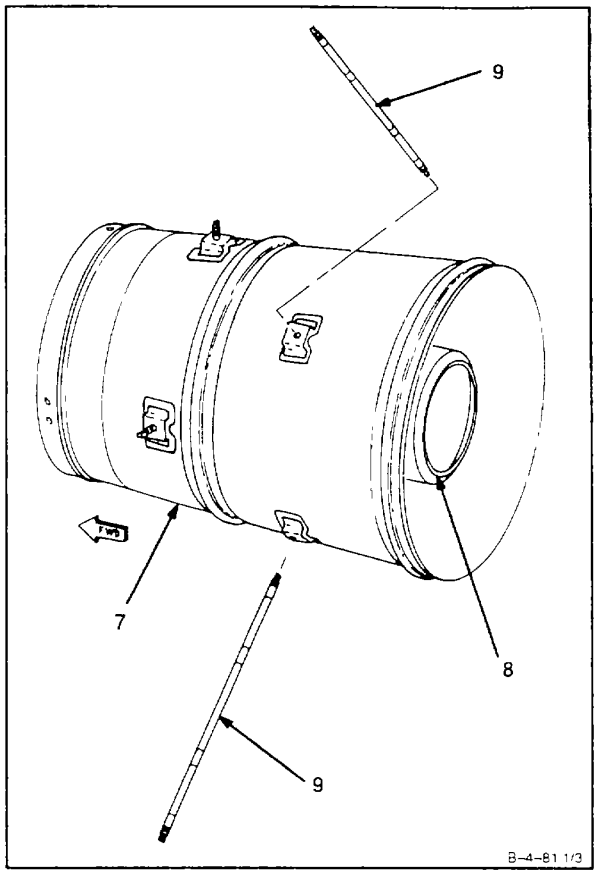
5. Insert **two long support rods (9)** through aft holes of tailcone assembly (7) and centerbody (8).

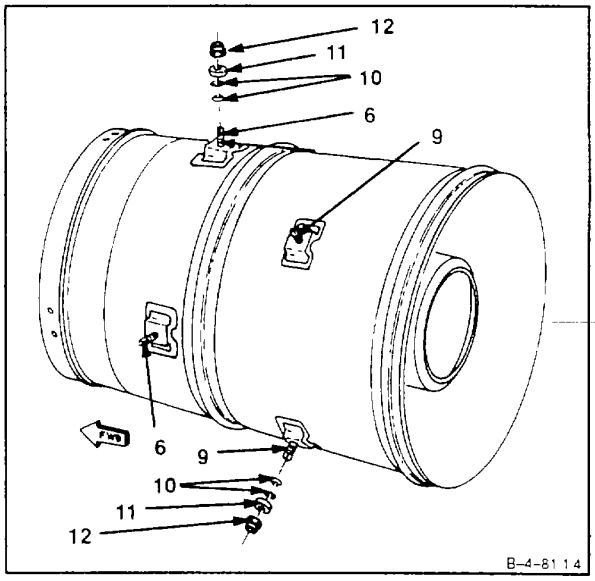
6. **Visually center support rods (9).**



7. **Install two spring discs (10), with convex faces in contact, and spacer (11)** on each end of support rods (6 and 9).

8. Coat threads of eight rod ends (6) and (9) with anti-seize compound (E6).

9. **Install one nut (12) on each end of support rods (6 and 9).** Tighten finger tight maintaining equal protrusion at both ends of support rods (6 and 9).



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10. **Tighten nut (12)** at each end of support rods (6 and 9) Dimension between spacer (11) and tailcone bracket (13) shall be 0.068 - 0.072 inch.

NOTE

In the following step 11., protrusion measurement shall be from end of support rod to top of nut.

In order to achieve the requirements of step 11, dimension 0.068 - 0.072 inch may vary beyond limits provided the sum total of gap (two places) on each individual rod is 0.122 - 0.164 inch.

11. Using a depth vernier (14) **measure protrusion of support rods (6 and 9).** Protrusion at one end shall be within 0.06 inch of protrusion measured at opposite end.

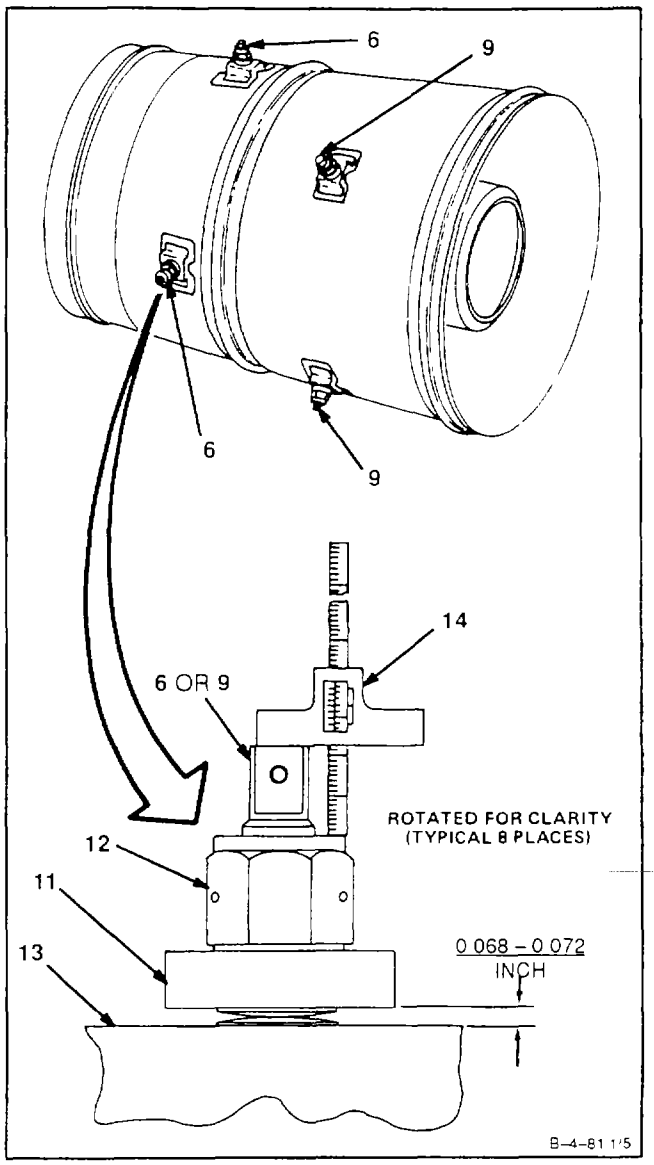
12. If protrusion measured in step 11 is not within tolerance for any support rod (6 or 9), perform the following.

    a. Loosen nut (12) at each end of support rod.

    b. Center support rod.

    c. Repeat steps 10 and 11.

13. Lockwire nut (12) to rod end. Use safety cable (E49).



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

4-76 INSTALL TAILPIPE ASSEMBLY 4-76

INITIAL SETUP

Applicable Configurations:

All

Tools:

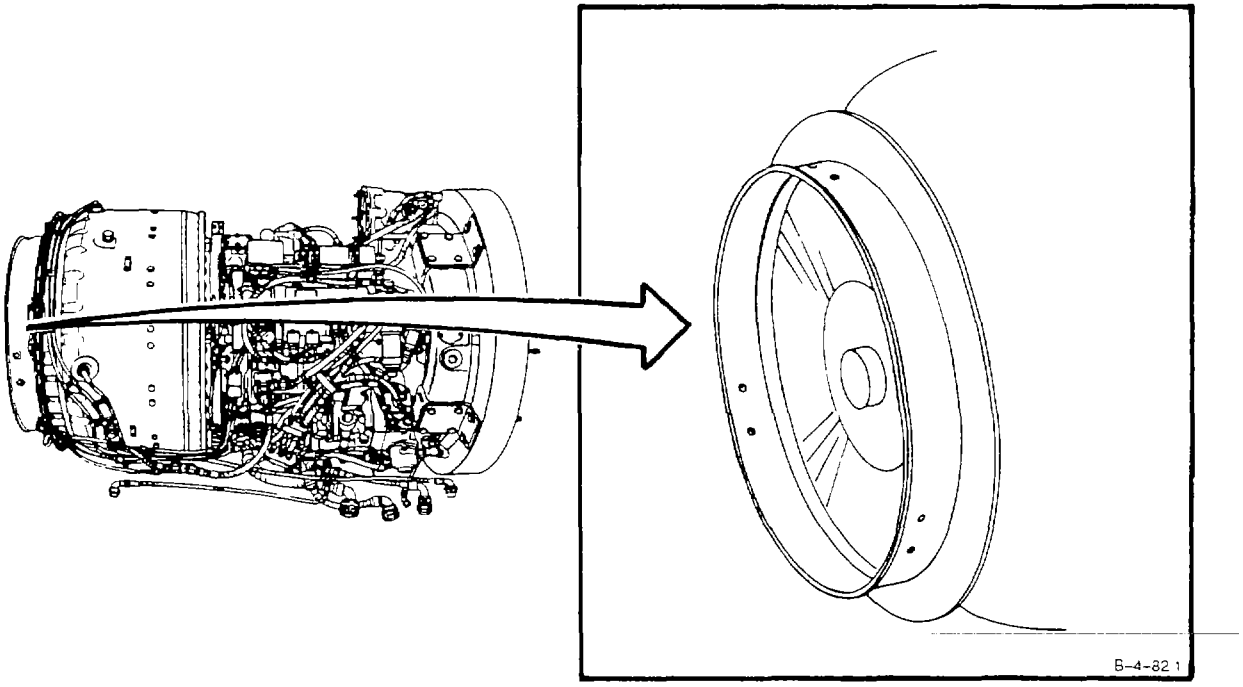
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944 P
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Wrench, 150-750 Inch-Pounds
Torque Wrench, 30-150 Inch-Pounds

Materials.

Anti-Seize Compound (E6)
Lockwire (E32)
Lockwire (E33)

Personnel Required:

Aircraft Powerplant Repairer (2)
Aircraft Powerplant Inspector



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4-76 INSTALL TAILPIPE ASSEMBLY 4-76

CAUTION

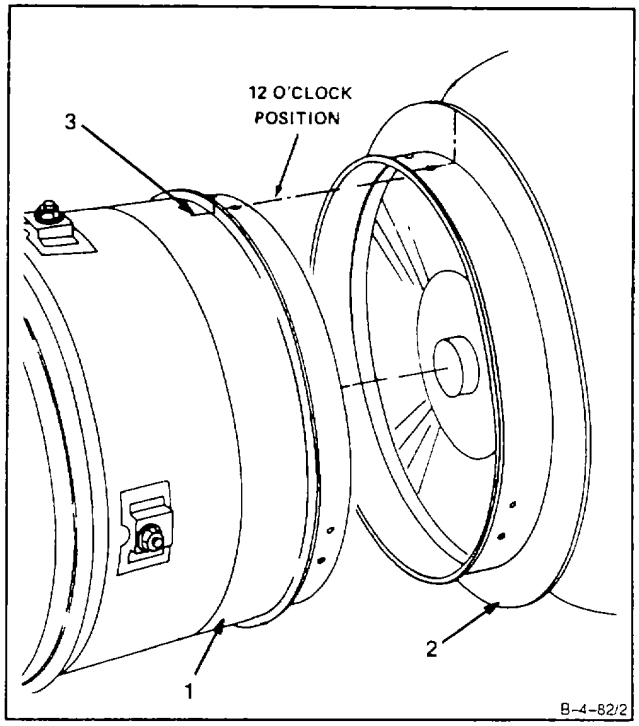
Do not let tailpipe assembly contact engine blades. Damage to blades can result.

NOTE

The following steps 1 thru 3 require the aid of another repairer to support the tailpipe assembly.

Bolt holes on tailpipe assembly must be aligned with bolt holes on engine.

1. Position tailpipe assembly (1) on engine (2) so that matchmark (3) aligns with matchmark on engine at 12-o'clock position. **Install tailpipe assembly.**



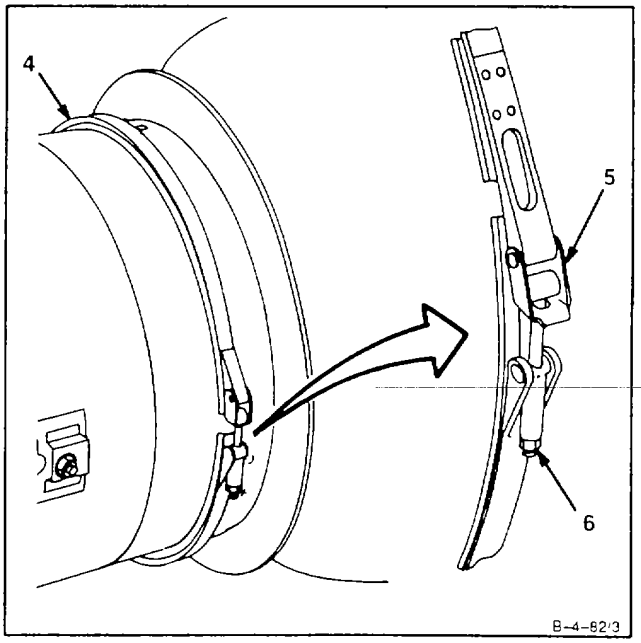
NOTE

In following step 2 position center of latch at 3-o'clock or 9 o'clock position. The 3-o'clock position is shown.

2. **Install retainer coupling (4).** Engage latch (5) and tighten nut (6) Torque to 50 inch-pounds.

3. Tap all around retainer coupling (4), using rubber mallet, to seat properly. Retorque nut (6) to 50 inch-pounds.

4. Lockwire latch (5). Use lockwire (E32).



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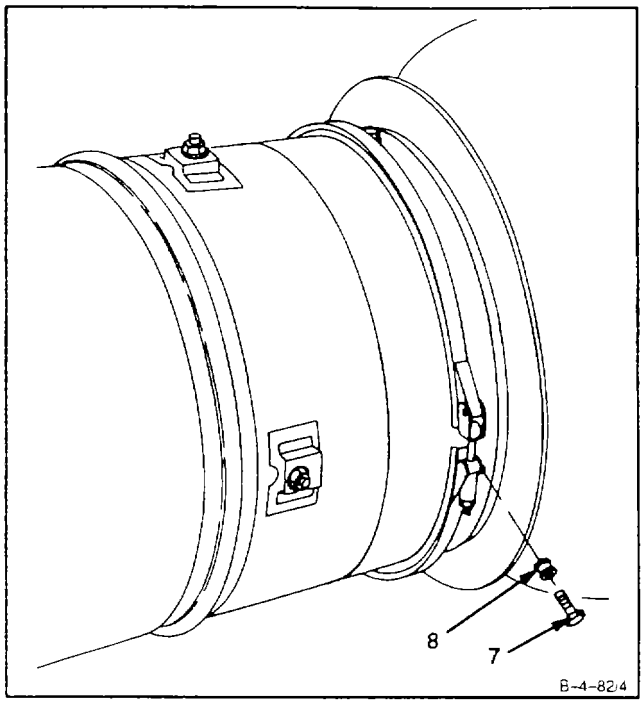
4-76 INSTALL TAILPIPE ASSEMBLY (Continued) 4-76

5. **Apply anti-seize compound (E6)** to six bolts (7) Install six bolts (7) and six spacers (8). Torque to 280 inch-pounds.

6. Lockwire bolts (7) Use lockwire (E33).



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

CHAPTER 5

ACCESSORY GEAR SECTION - MAINTENANCE INSTRUCTIONS

CHAPTER OVERVIEW

This chapter contains maintenance procedures for the accessory gear section It is divided into the following sections and tasks.

SECTION	TASK NO.	TITLE	PAGE
I		ACCESSORY GEARBOX ASSEMBLY	
	5-1	Remove Accessory Gearbox Assembly	5-3
	5-2	Disassemble Accessory Gearbox Assembly	5-12
	5-3	Clean Accessory Gearbox Assembly	5-17
	5-4	Inspect Accessory Gearbox Assembly	5-20
	5-5	Repair Accessory Gearbox Assembly	5-22
	5-6	Assemble Accessory Gearbox Assembly	5-23
	5-7	Install Accessory Gearbox Assembly	5-28
II		PT SPEED PICKUP	
	5-8	Remove PT Speed Pickup	5-41
	5-9	Clean PT Speed Pickup	5-43
	5-10	Inspect PT Speed Pickup	5-44
	5-11	Repair PT Speed Pickup	5-45
	5-12	Install PT Speed Pickup	5-46
III		PT SPEED PICKUP DRIVE ASSEMBLY	
	5-13	Remove PT Speed Pickup Drive Assembly	5-49
	5-14	Clean PT Speed Pickup Drive Assembly	5-51
	5-15	Inspect PT Speed Pickup Drive Assembly	5-52
	5-16	Repair PT Speed Pickup Drive Assembly	5-53
	5-17	Install PT Speed Pickup Drive Assembly	5-54
IV		STARTER DRIVE ASSEMBLY	
	5-18	Remove Starter Drive Assembly	5-57
	5-19	Clean Starter Drive Assembly	5-61
	5-20	Inspect Starter Drive Assembly	5-62
	5-21	Repair Starter Drive Assembly	5-63
	5-22	Install Starter Drive Assembly	5-70

SECTION	TASK NO.	TITLE	PAGE
V		OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY	
	5-23	Remove Overspeed Drive and Outlet Cover Assembly	5-75
	5-24	Disassemble Overspeed Drive and Outlet Cover Assembly	5-77
	5-25	Clean Overspeed Drive and Outlet Cover Assembly	5-80
	5-26	Inspect Overspeed Drive and Outlet Cover Assembly	5-81
	5-27	Repair Overspeed Drive and Outlet Cover Assembly	5-83
	5-28	Assemble Overspeed Drive and Outlet Cover Assembly	5-84
	5-29	Install Overspeed Drive and Outlet Cover Assembly	5-87
	5-30	Backlash Check Overspeed Drive and Outlet Cover Assembly	5-90

SECTION I

ACCESSORY GEARBOX ASSEMBLY

5-1 REMOVE ACCESSORY GEARBOX ASSEMBLY 5-1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-3234944
Gear Holding Fixture (T10)
Handling Tool (T26)
Hex Drive Socket Head Screw Key Set
Container, 1 Quart

Materials:

Wiping Rag (E64)

Personnel Required:

Aircraft Powerplant Repairer

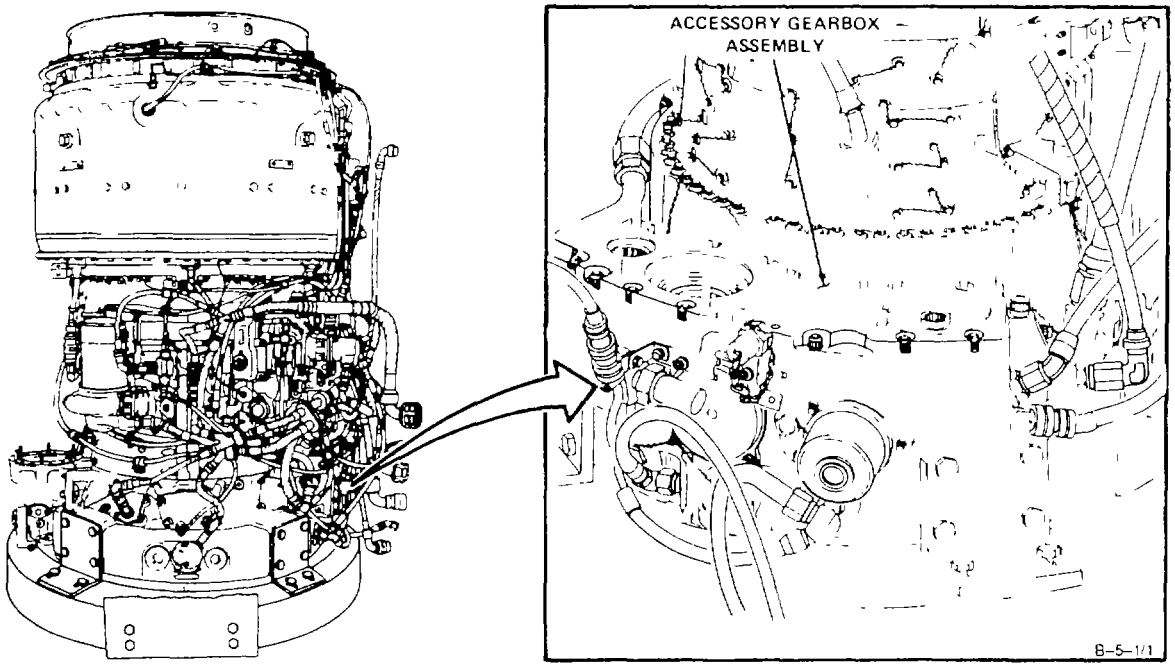
Equipment Condition:

Engine Oil System Drained (Task 1-69)
Fuel Boost Pump Assembly Removed (task 6-8)
Tube Assembly Removed (Inlet Housing to Main Oil Pump) (Task 8-65)
Hydromechanical Assembly Removed (Task 6-1)
Main Oil Pump Removed and Scavenge Oil Screen (Task 8-1)
Speed Pickup Drive Assembly Removed (Task 5-13)

General Safety Instructions:

WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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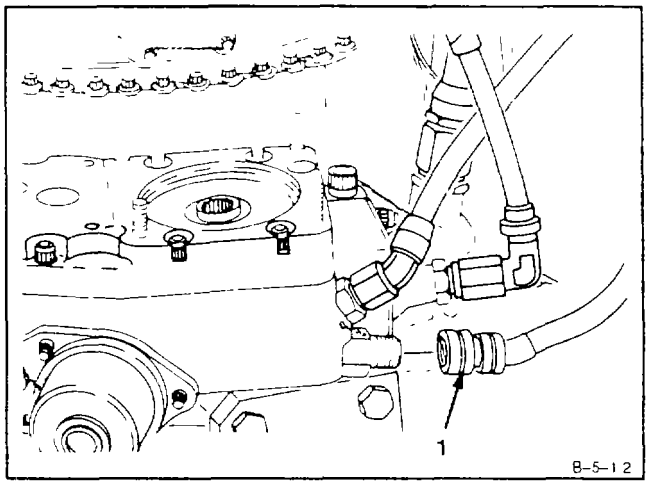
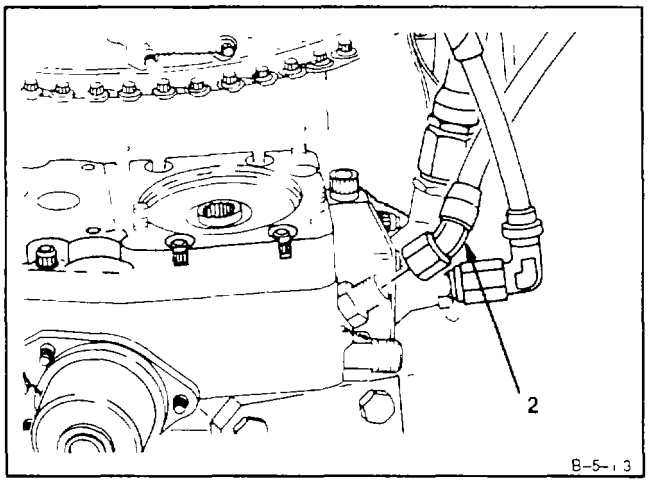
5-1 REMOVE ACCESSORY GEARBOX ASSEMBLY (Continued) 5-1

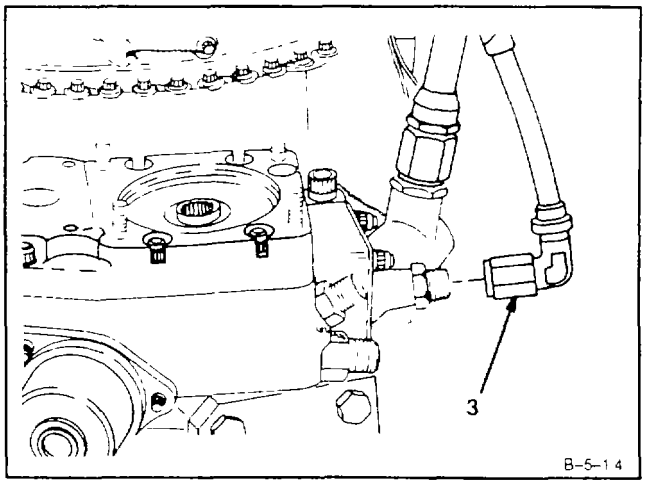
1. Remove lockwire and **disconnect electrical connector (1).**



2. **Disconnect hose assembly (2).**



3. **Disconnect hose assembly (3).**



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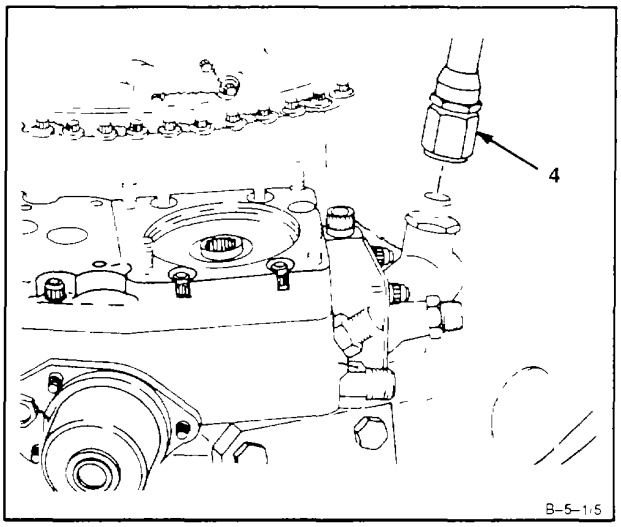
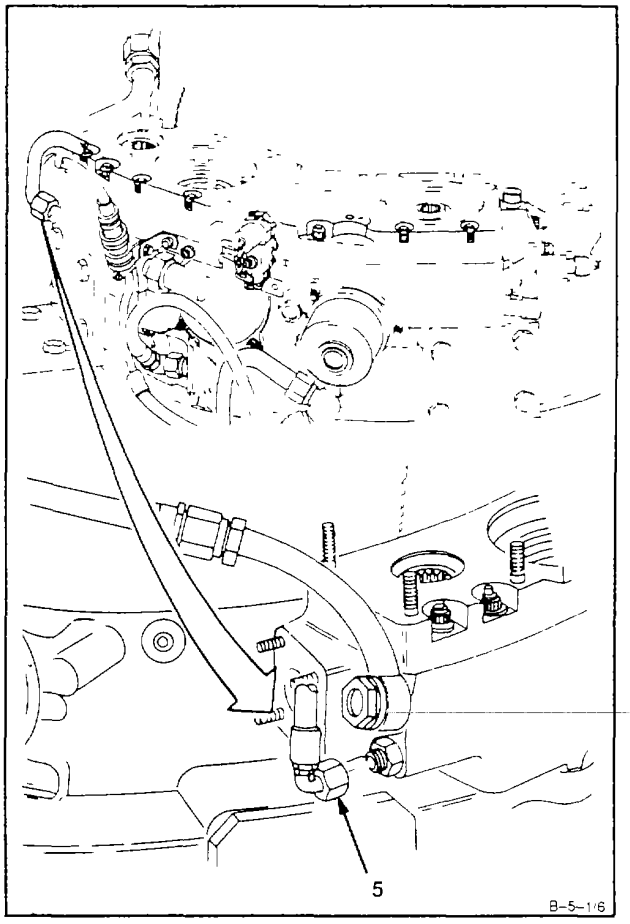
5-1 REMOVE ACCESSORY GEARBOX ASSEMBLY (Continued) 5-1

4. **Disconnect tube and hose assembly(4).**



5. **Disconnect hose assembly (5).**



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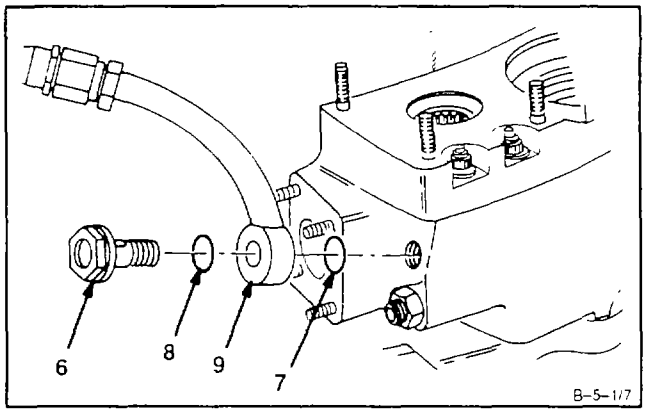
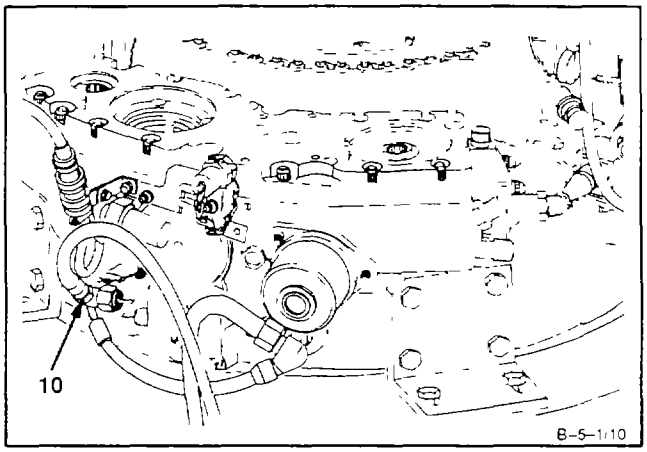
5-1 REMOVE ACCESSORY GEARBOX ASSEMBLY (Continued) 5-1

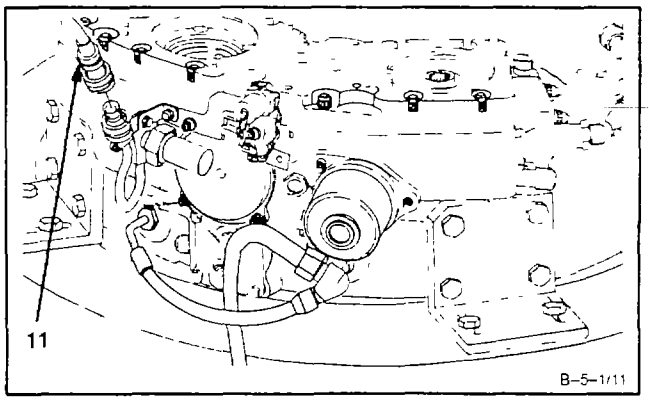
6. **Remove** lockwire, **bolt (6**), and packings (7) and (8) Set tube assembly (9) to one side.



7. **Disconnect**and remove **hose assembly (10).**



8. **Remove electrical connector (11).**



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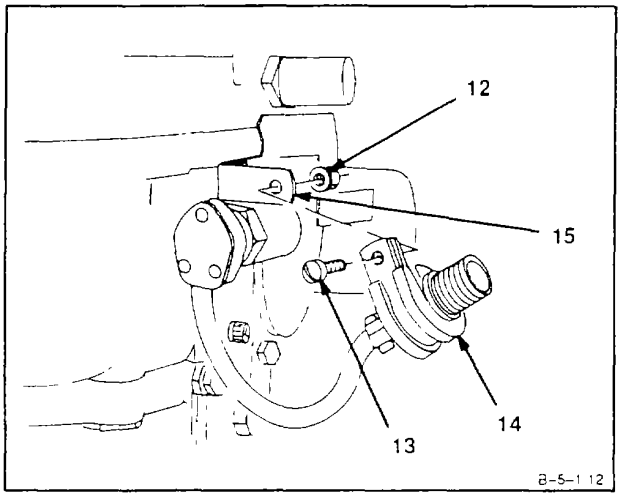
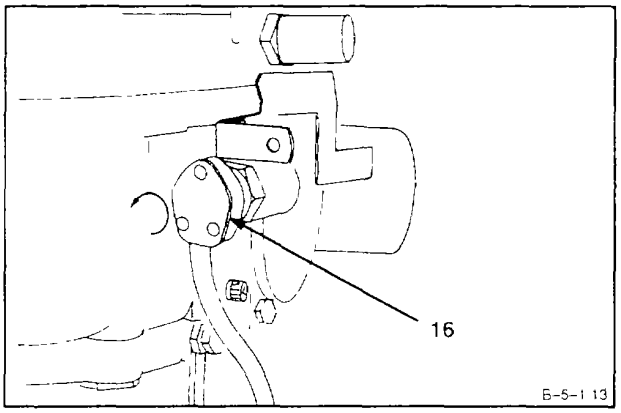
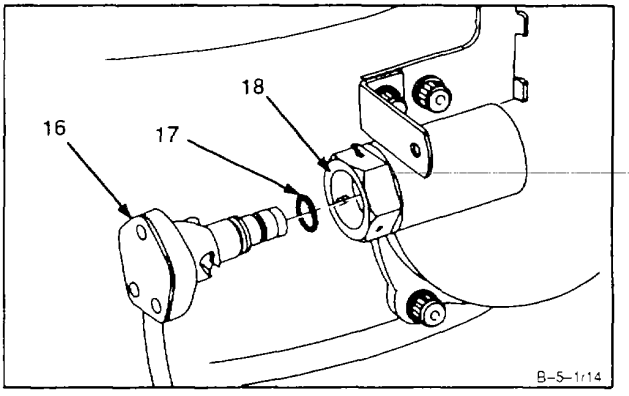
9. **Remove** nut (12), screw (13), and **clamp (14)** from bracket (15).



10. Push plug in, turn counterclockwise and **remove plug (16).**



11. **Remove plug (16)** and packing (17) from housing (18).



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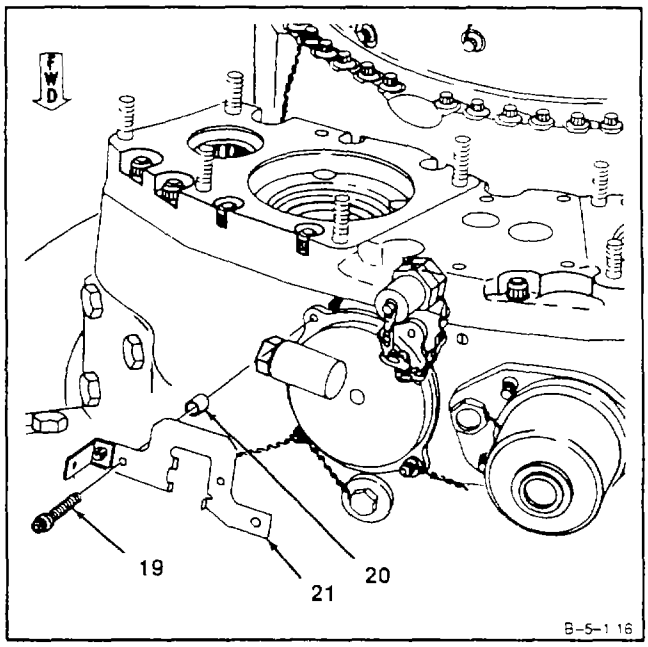
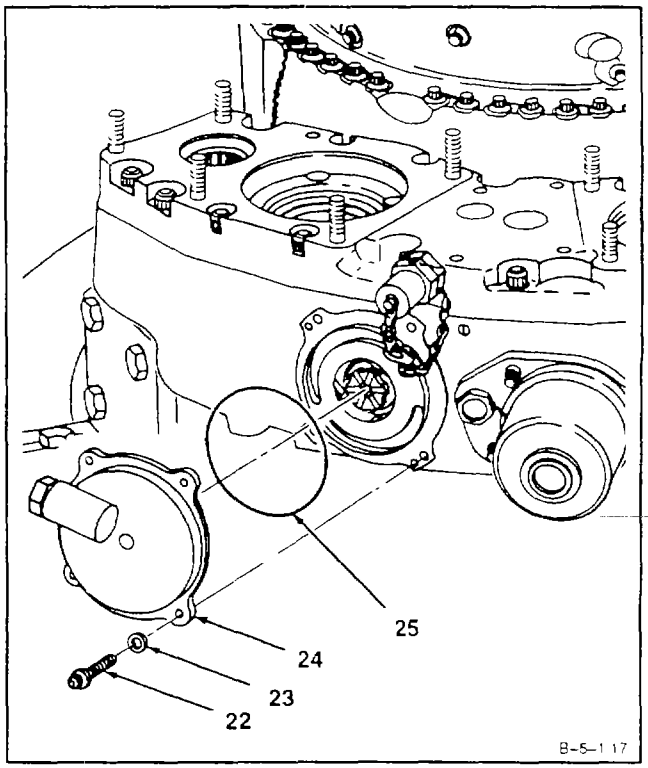
12. **Remove** lockwire, two bolts (19), spacers (20), and **bracket (21).**



13. **Remove** lockwire, two bolts (22), washers (23), **housing (24),** and packing (25).



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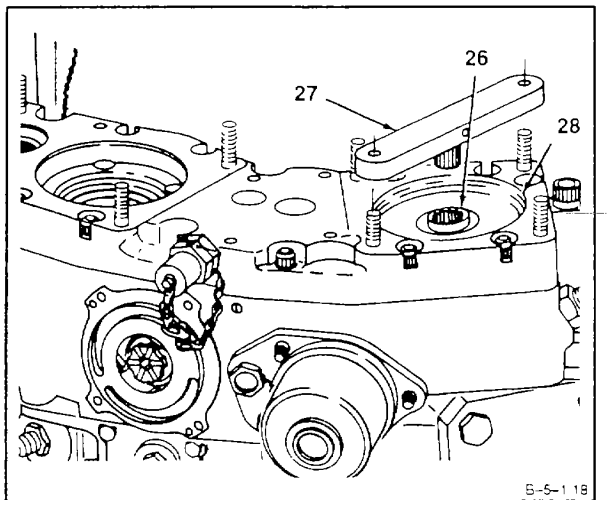
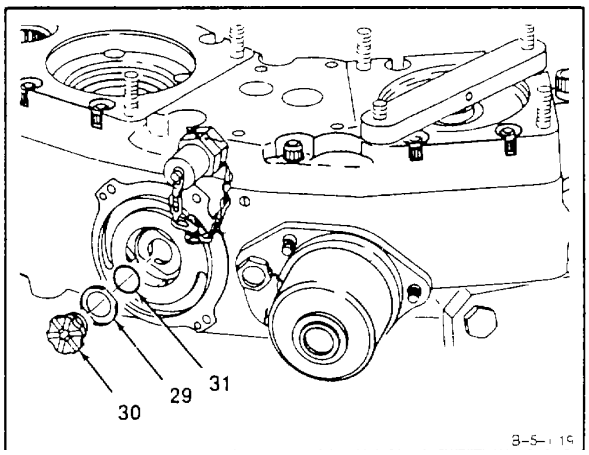
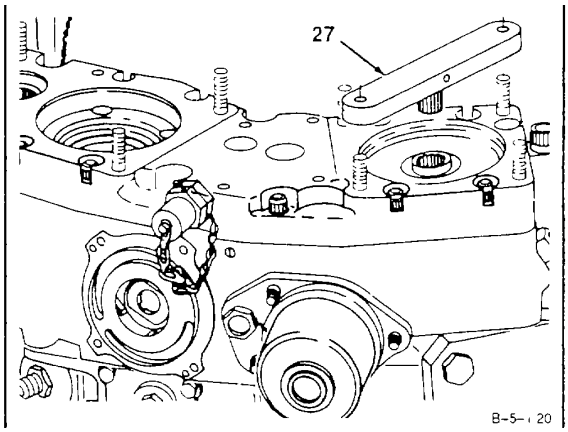
14. Turn spline (26) to align with gear holding fixture (T1O) (27) **Install gear holding fixture (T1O)** (27) on fuel pump mounting pad (28).



15. Unlock locking plate (29) **Remove plug (30),** locking plate (29), and packinq (31) Use 1/4inch hex drive socket head screw key.



16. Remove gear holding fixture (T10) (27).



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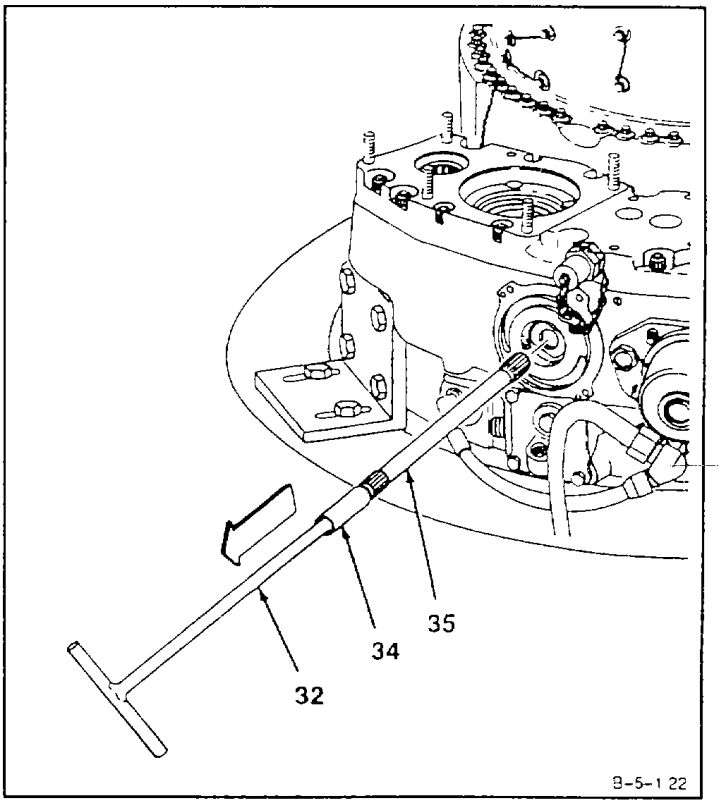
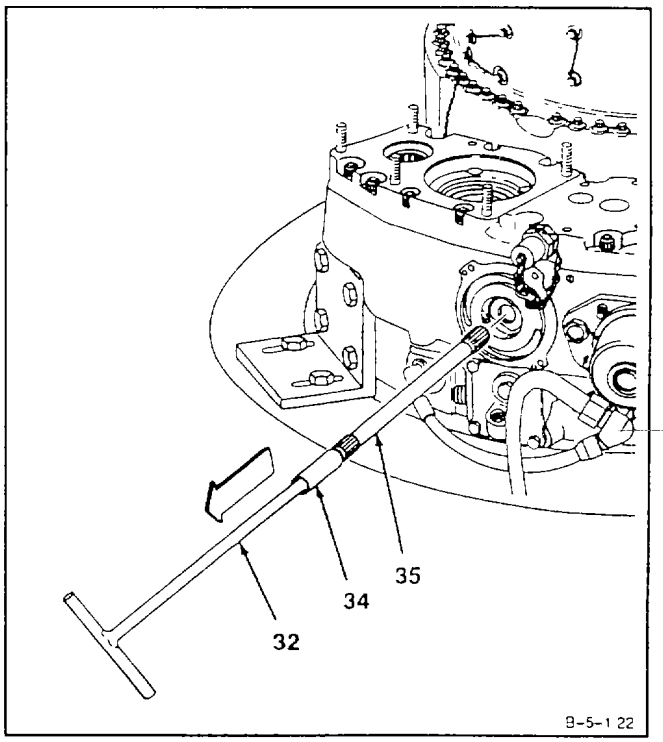
17. Insert handling tool (T26) (32) in hole (33) Screw handling tool (T26) (32) into end of gearshift (not shown)



18. Using handling tool (T26) (32), remove spacer **(34) and gearshaft (35).**

19. Remove gearshaft (35) and spacer (34) from handling tool (T26) (32).



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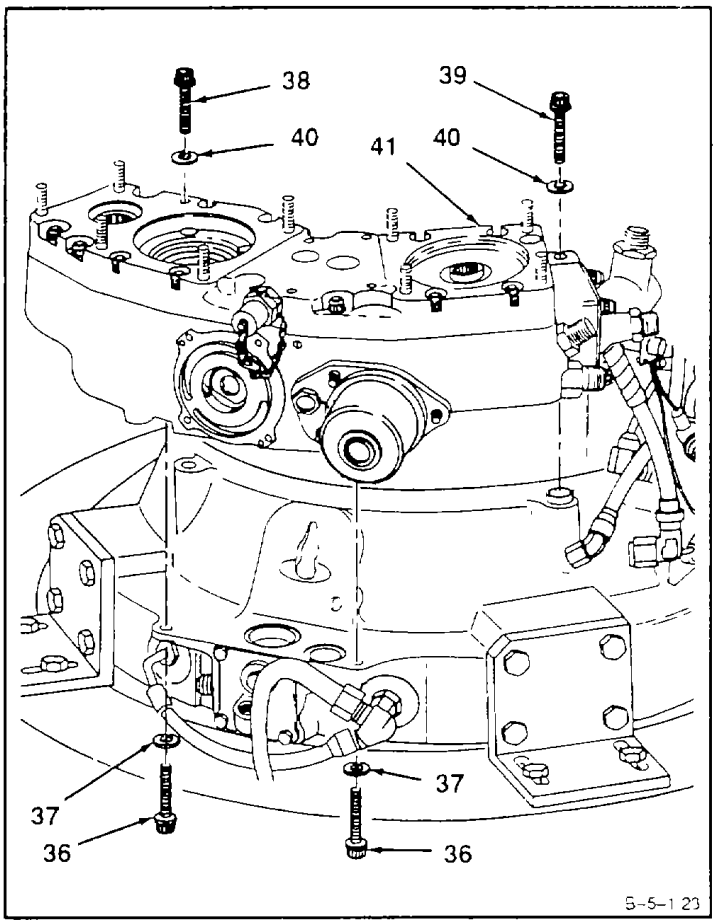
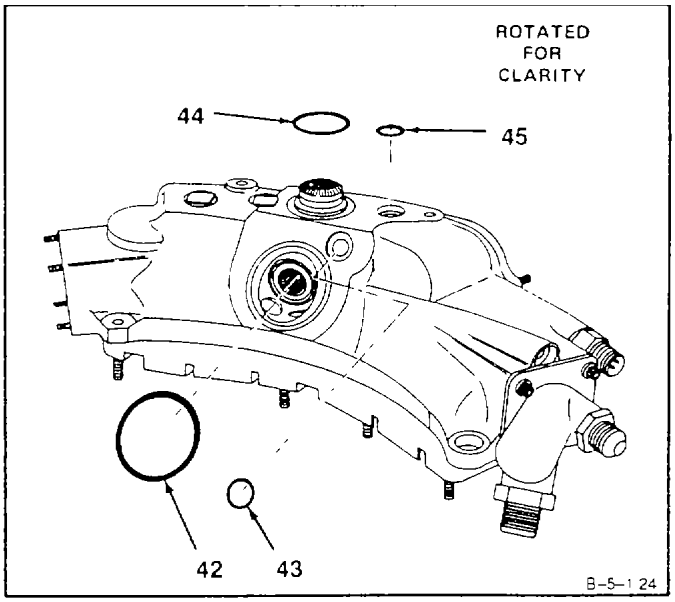
20. Remove two bolts (36) and washers (37)**Remove** lockwire, bolts (38) and (39), two washers (40), and **accessory gearbox assembly (41).**



21. Remove packings (42), (43), (44), and (45).



FOLLOW-ON MAINTENANCE
None

END OF TASK

5-2 DISASSEMBLE ACCESSORY GEARBOX ASSEMBLY 5-2

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Retaining Ring Pliers

Materials:
Wiping Rag (E64)

Personnel Required
Aircraft Powerplant

Equipment Condition:
Off Engine Task
Engine Oil Drained (Task 1-69)
Fuel Boost Pump Assembly Removed (Task 6-8)
Main Otl Pump and Scavenge Oil Screen Removed (Task 8-1)
Hydromechanical Assembly Removed (Task 6-1)
Accessory Gearbox Assembly Removed (Task 5-1)
PT Speed Pickup Drive Assembly Removed (Task 5-13)

General Safety Instructions

WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin Handle only in well-ventilated areas away from heat Repairer and flame Drain and store in approved metal safety containers Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention Get medical attention for eyes.

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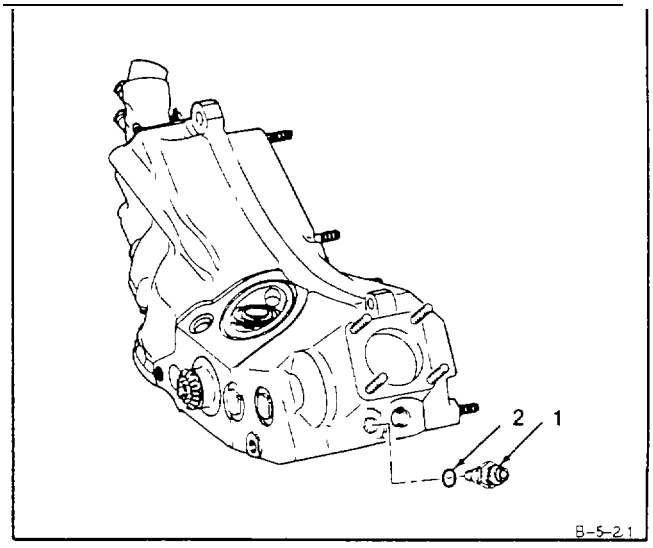
1. Remove adapter (1) and packing (2)



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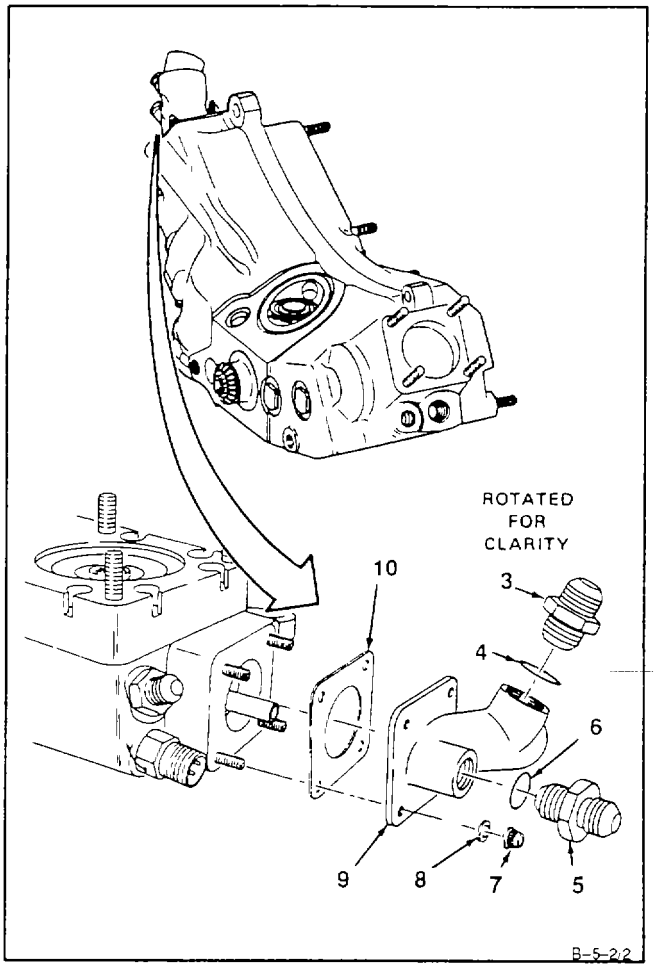
2. **Remove nipples (3 and 5)** and packings (4 and 6).

3. **Remove** four nuts (7), washers (8), **collector assembly (9),** and gasket (10).



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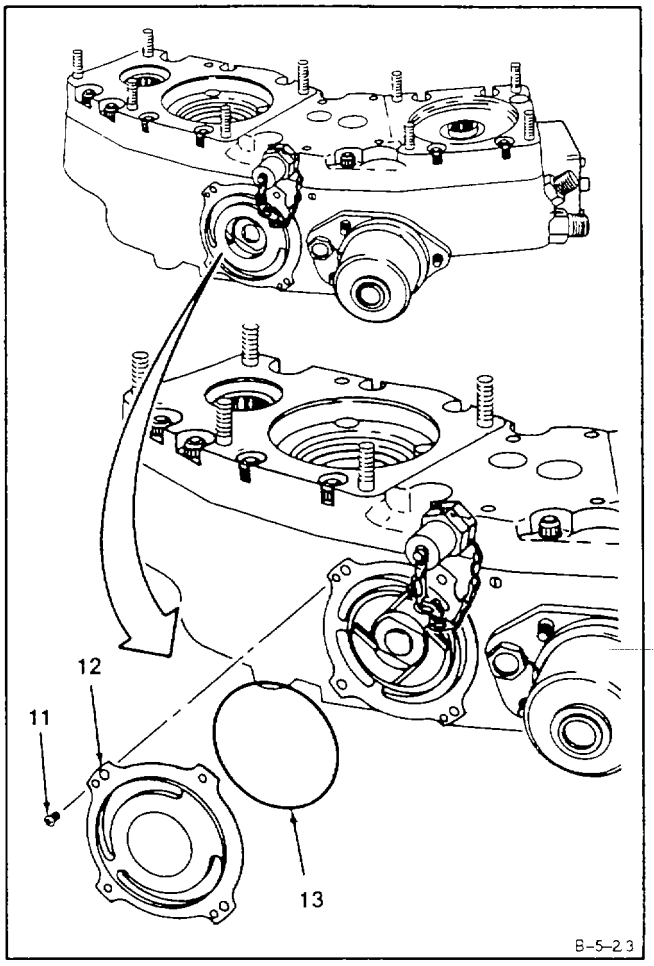
4. **Remove** two screws (11), **housing (12),** and packing (13)



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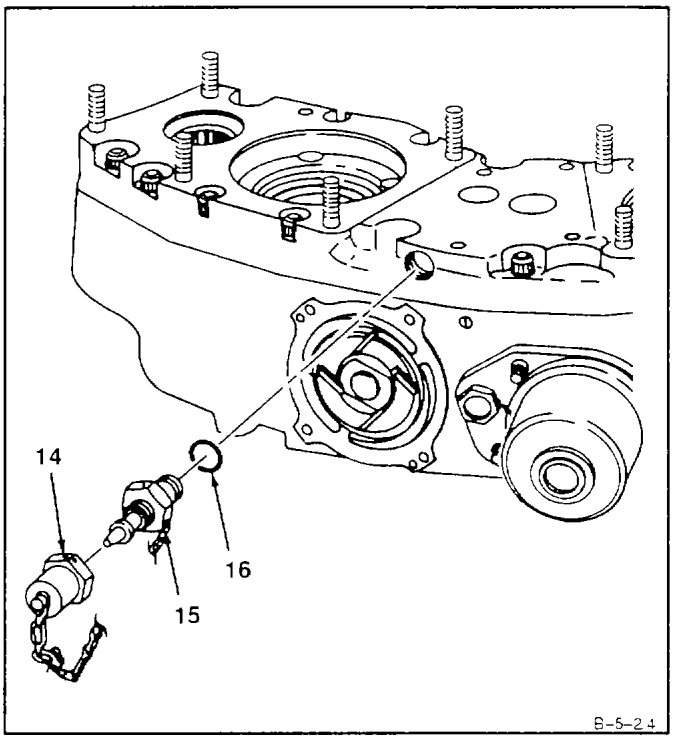
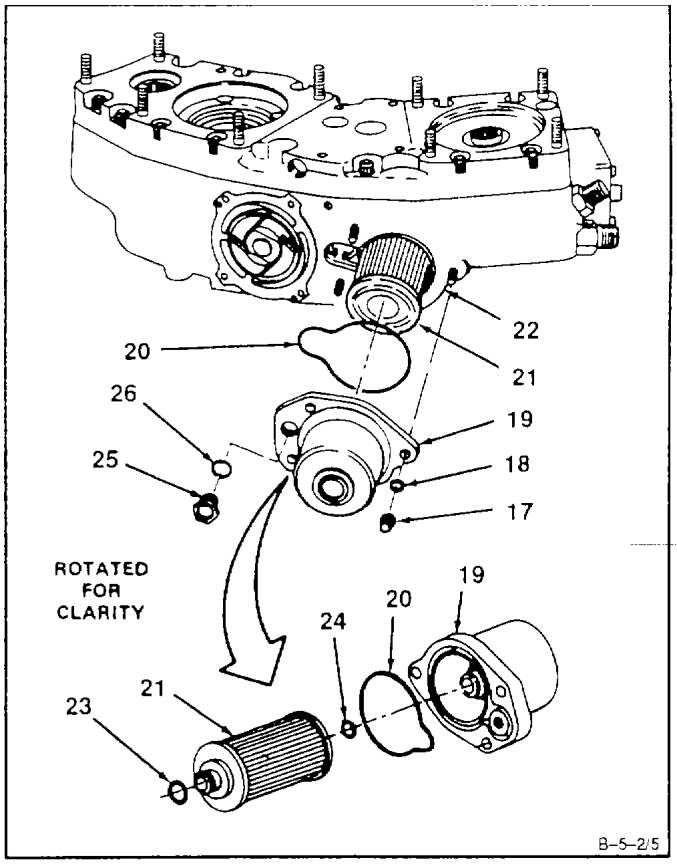
5. Remove lockwire and cap (14) from oil sampling drain cock (15) **Remove oil sampling drain cock (15)** and packing (16).



6. Remove plug lockwire, three nuts (17), three washers (18), **oil filter cover assembly (19)**, and packing (20)

7. **Remove oil filter element (21)** from accessory gearbox (22) and remove packings (23 and 24)

8. Remove plug (25) and packing (26)



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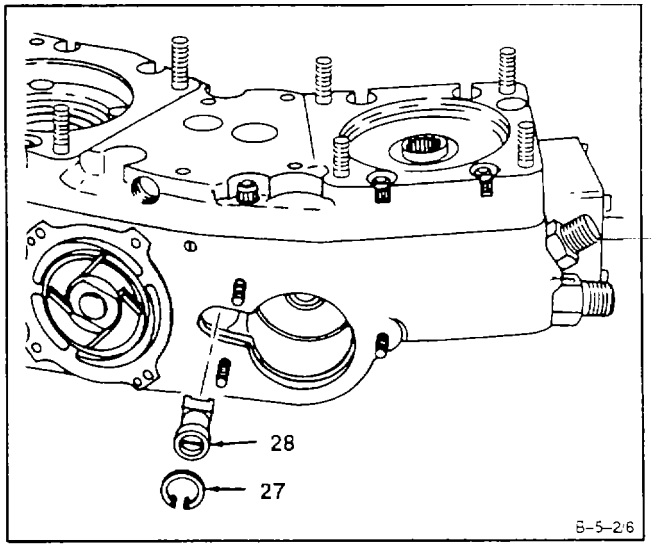
WARNING

In following step, be careful when re- moving ring Ring may spring loose and cause injury. If injury occurs, get medical attention

9. **Remove** ring (27) and **relief valve** (28). Use retaining ring pliers.



FOLLOW-ON MAINTENANCE
None

END OF TASK

5-3 CLEAN ACCESSORY GEARBOX ASSEMBLY (Continued) 5-3

INITIAL SETUP

Applicable Configurations

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-3234944
Goggles
Dry, Compressed Air Source

Materials:

Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required

Aircraft Powerplant Repairer

Equipment Condition:

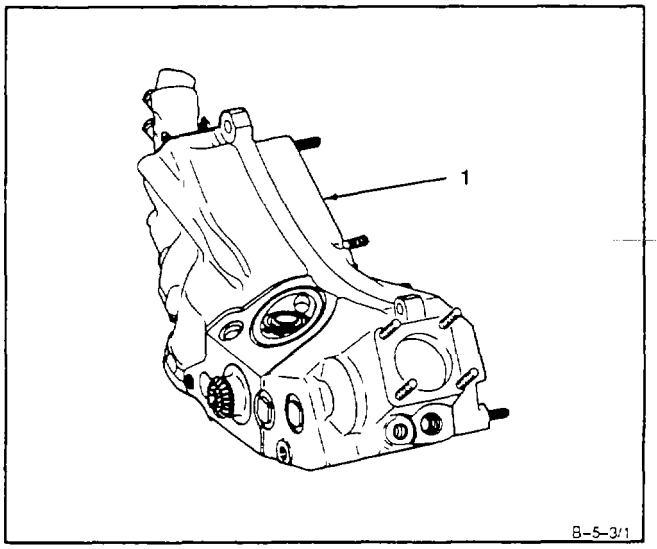
Off Engine Task
Engine Oil System Drained (Task 1-69)
Fuel Boost Pump Assembly Removed (Task 6-8)
Main Oil Pump and Scavenge Oil Screen Removed (Task 8-1)
Hydromechanical Assembly Removed (Task 6-1)
Accessory Gearbox Assembly Removed (Task 5-1)
Accessory Gearbox Assembly Disassembled (Task 5-2)
PT Speed Pickup Drive Assembly Removed (Task 5-13)

General Safety Instructions

WARNING

Dry cleaning solvent (E19) 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. Wear gloves (E24) **Clean accessory gearbox assembly (1)** with lint-free cloth (E30) dampened in dry cleaning solvent (E19)



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2. **Clean spacer(2), gearshaft (3), and housing (4)** as follows

   a. Immerse and agitate in dry cleaning solvent (E19)

   b. Wipe dry using clean, lint-free cloth (E30)

   WARNING

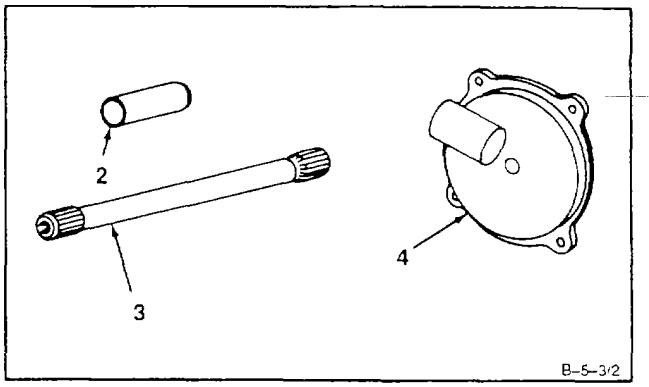
   When using compressed air for clean- ing, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

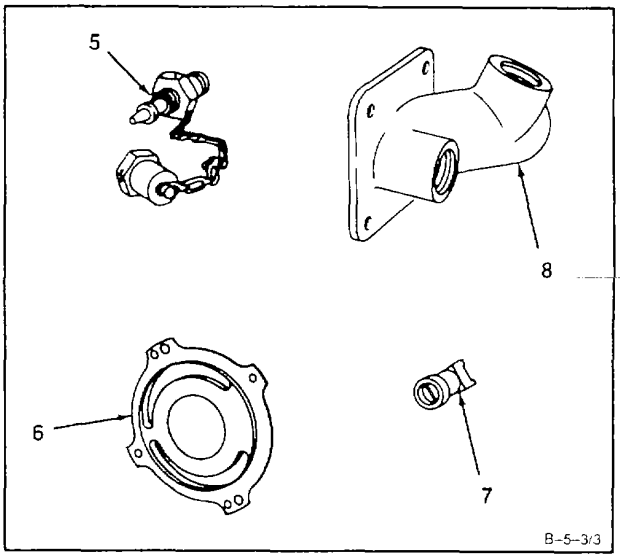
   c. Wear goggles Blow dry internal and external surfaces using clean, dry, compressed air

3. **Clean oil sampling drain cock (5), oil scav- enge housing (6), relief valve (7), and collector (8)**

   a. Immerse and agitate in dry cleaning solvent (E1 9)

   b. Wipe dry using clean, lint-free cloth (E30)





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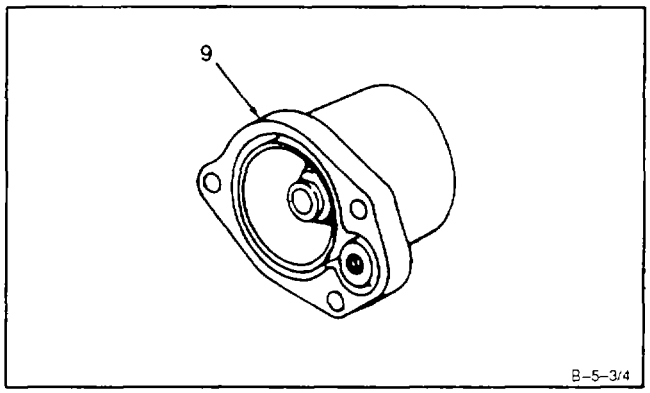
4. Clean oil filter cover assembly (9) as follows

a. Wear gloves (E24) Immerse and agitate oil filter cover (9) in dry cleaning solvent (E1 9) Use brush on outside surfaces

b. Wipe outside surfaces dry with clean lint-free cloth (E30)

c. Wear goggles Blow dry internal and external surfaces using clean, dry, compressed air

FOLLOW-ON MAINTENANCE
Inspect Accessory Gearbox Assembly (Task 5-4)



END OF TASK

5–4 INSPECT ACCESSORY GEARBOX ASSEMBLY 5–4

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit.
NSN 5180–00–323–5114

Materials/Parts:
Fluorescent–Penetrant Materials (E73), Appendix C

Personnel Required:
68B30 Aircraft Powerplant Inspector

References:
TM 1–1500–335–23
Task 1–86
Task 1–109

Equipment Condition:
Off Engine Task

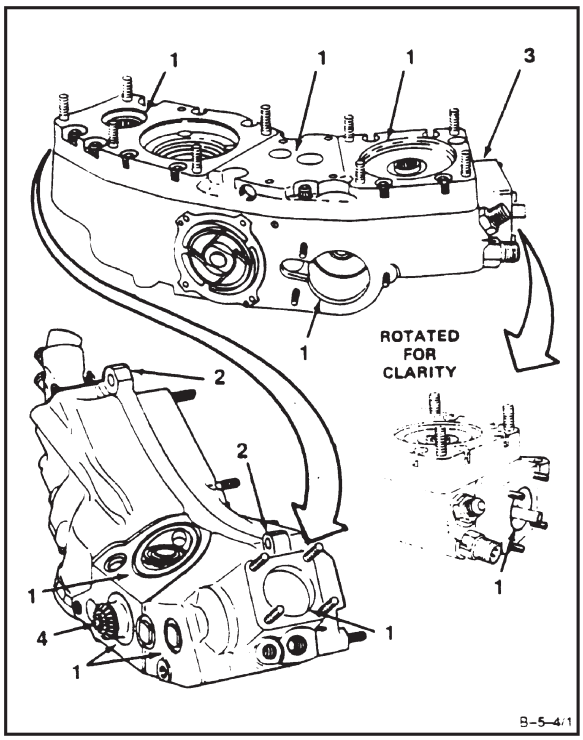
1. **Inspect** mounting surfaces (1) and flanges (2) of **accessory gearbox assembly (3).** There shall be no cracks.

2. Inspect accessory gearbox assembly (3) as follows:

   a. There shall be no cracks.

   b. There shall be no breakthrough of material caused by chafing.

3. **Inspect drive gear (4)** (Ref. Task1–109). There shall be no wear allowed.



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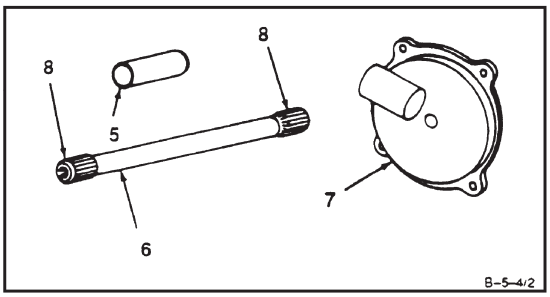
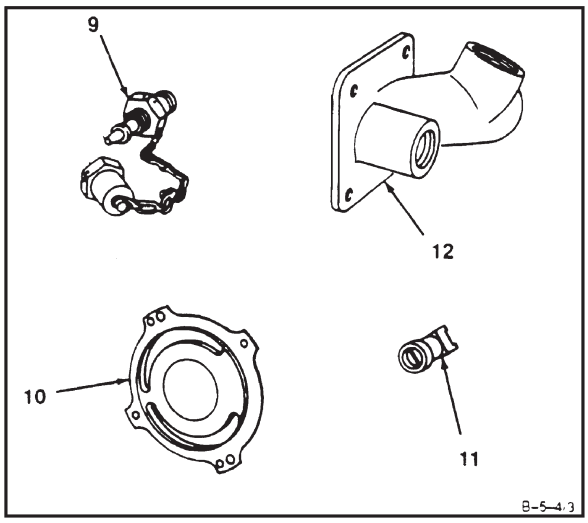
4. **Inspect spacer (5), gearshaft (6) and (7) using fluorescent–pentrant** (Ref. TM 1–1500–335–23). Parts requiring fluorescent penetrant inspection will be final cleaned, prior to inspection, with N–Propyl Bromide (Vapor degreasing only) (Item E74, Appendix C), DS–108 (Item E75, Appendix C), Electron (Item E76, Appendix C), or Positron (Item E77, Appendix C). DS–108, Electron or Positron must be followed by an acetone (Item E1, Appendix C) or Isopropyl Alcohol (Item E78, Appendix C) rinse or wipe. Parts must be dried until there is no visible solvent residue before applying penetrant. There shall be no cracks.



5. **Inspect gearshaft (6). Inspect splines (8)** (Ref. Task 1–109). There shall be no wear deeper than 0.007 inch on splines (8).

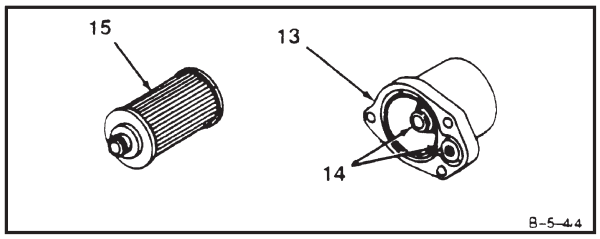
6. **Inspect oil sampling drain cock (9), oil scavenge housing (10), relief valve (11), and collector (12).** There shall be no cracks.



7. **Inspect oil filter cover assembly (13).**

   a. There shall be no cracks.

   b. There shall be no nicks, dents, or scratches deeper than 0.010 inch on packing groove (14).



8. **Inspect filter element (15).** There shall be no contamination. If contamination is found, inspect contaminated oil system (Ref. Task1–80).

FOLLOW–ON MAINTENANCE
None

END OF TASK

5-5 REPAIR ACCESSORY GEARBOX 5-5

INITIAL SETUP

Applicable Configurations:
All

Tools
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
Acid Swabbing Brush (E2)
Gray Enamel (E26)

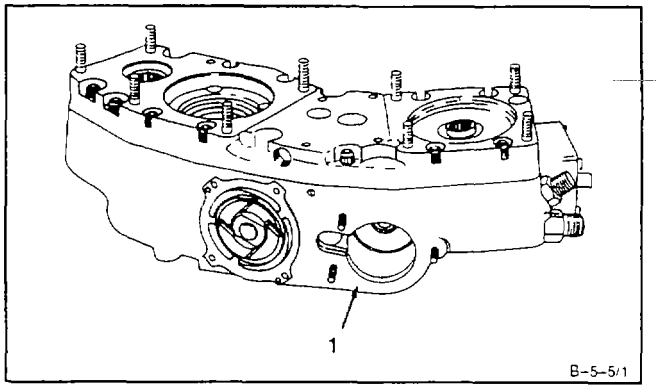
Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
Task 1-110

Equipment Condition
Off Engine Task

---

1. Repair damaged paint on accessory gearbox assembly (1). Apply a coat of gray enamel (E26) Use acid swabbing brush (E2) Use procedures for touch-up of magnesium and magnesium alloys (Ref Task 1-110)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

5-6 ASSEMBLE ACCESSORY GEARBOX ASSEMBLY 5-6

INITIAL SETUP

Applicable Configurations:
All

Tools
Powerplant Mechanic's Tool Kit, NSN 5180-00-3234944
Technical inspection Tool Kit, NSN 5180-00-323-5114
Torque Wrench, 30-150 Inch-Pounds
Retaining Ring Pliers

Materials:
Lockwire (E33)

Parts.
Packings
Gasket

Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

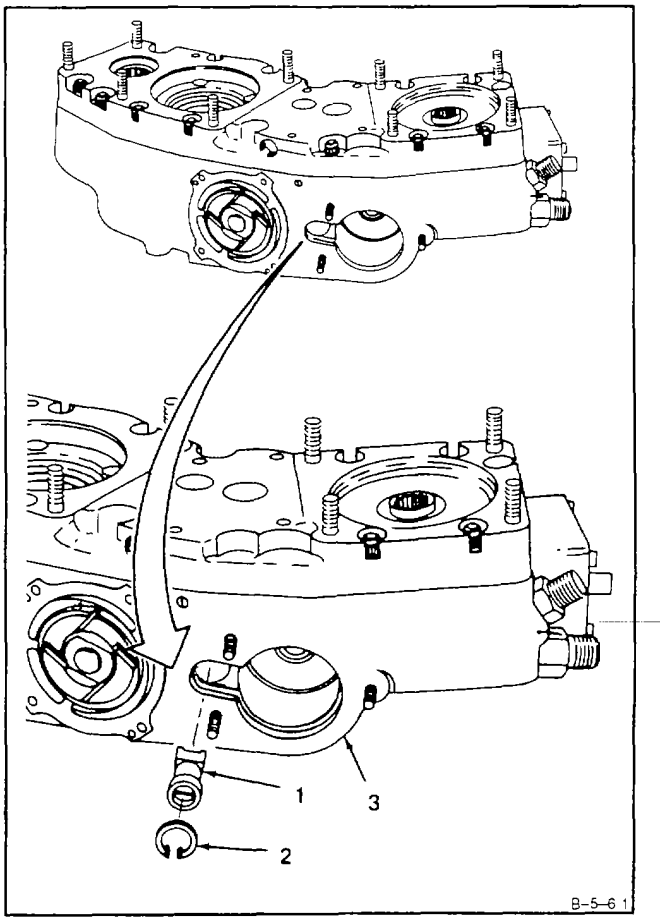
References:
TM 1-2840-252-23P
properly seated in groove

Equipment Condition'
Off Engine Task

WARNING

In following step, be careful when in- stalling ring Ring may spring loose and cause injury If injury occurs, get medical attention.

1. **Install relief valve (1)** and ring (2) in accessory gearbox assembly (3) Ensure retaining ring (2) is



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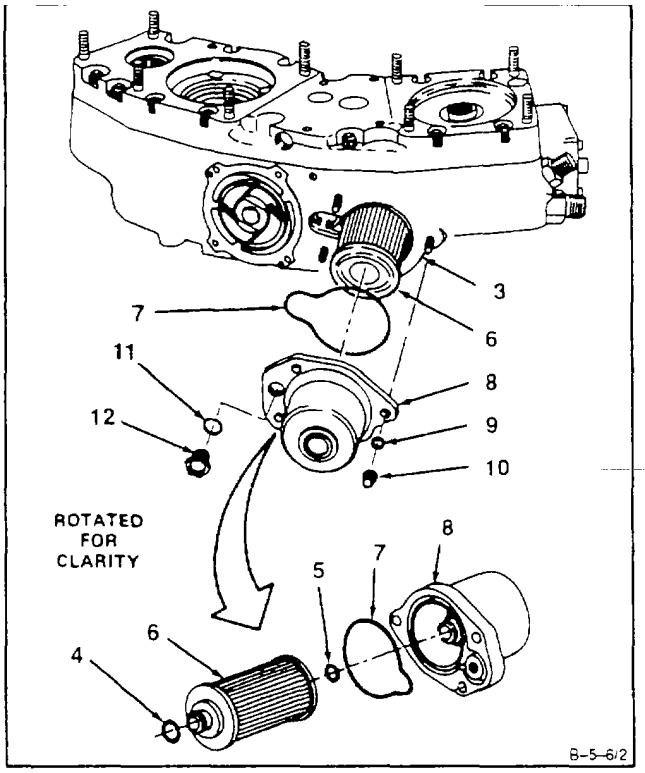
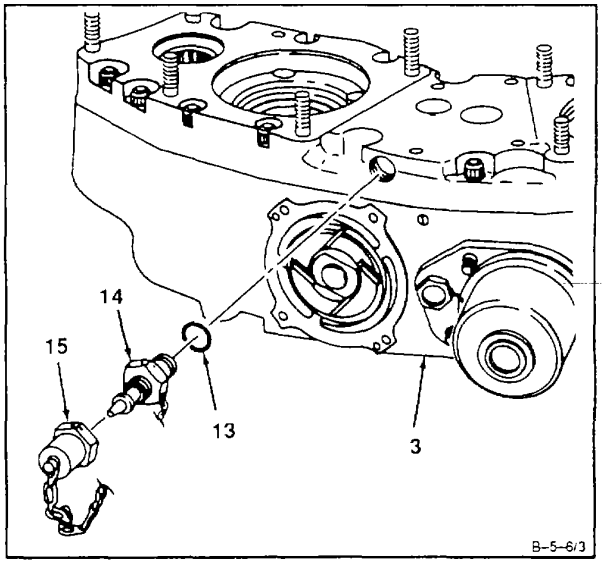
2. Install packings (4 and 5) on oil filter element (6) **Install element (6)** into accessory gearbox assembly (3)

3. Install packing (7) on oil filter cover (8) **Install oil filter cover assembly (8),** three washers (9), and nuts (10) on accessory gearbox assembly (3)

4. **Install** packing (11) and **plug (12)** in oil filter cover and lockwire Use lockwire (E33)



5. Install packing (13) and oil sampling drain cock housing (14) in accessory gearbox assembly (3) **Install oil sampling draln cock cap (15)** on housing (14) Lockwire drain cock cap (15) Use lockwire (E33)



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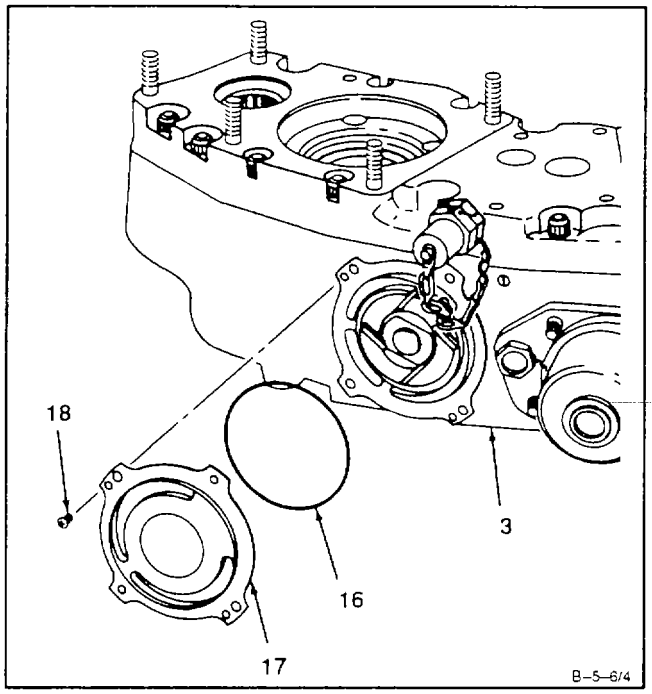
6. **Install** packing (16), **housing (17),** and two screws (18) on accessory gearbox assembly (3)



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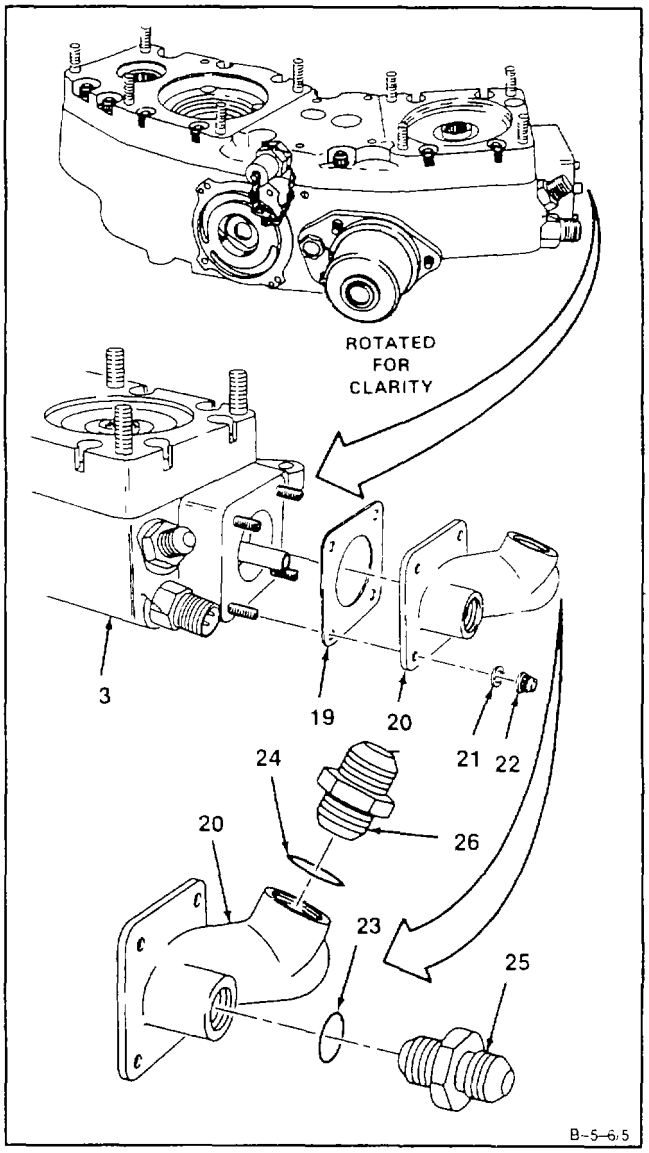
7. **Install** gasket (19), **collector (20),** four washers (21), and nuts (22) on accessory gearbox assem- bly (3)

8. Install packings (23 and 24) and **nipples (25 and 26)** in collector (20)



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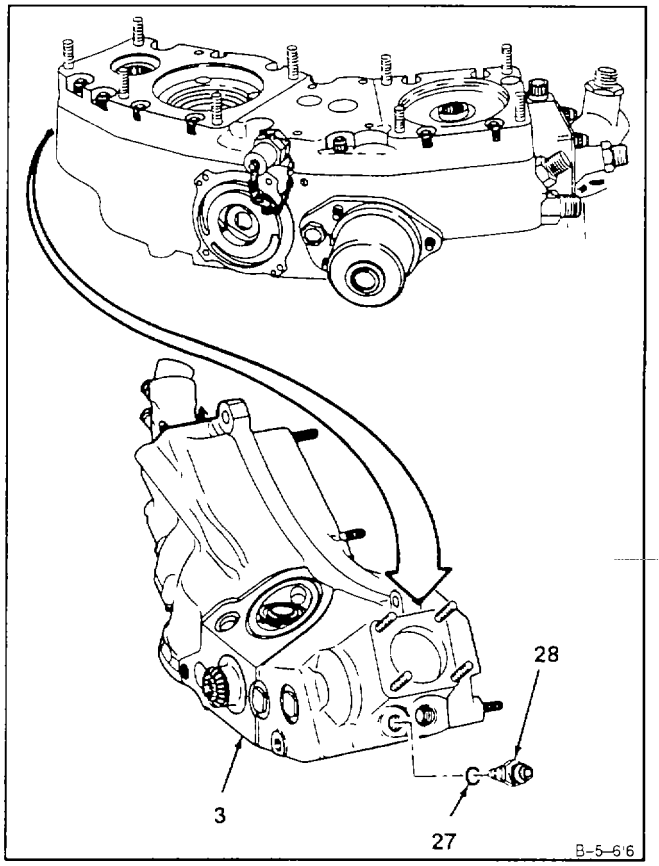
9. Install packing (27) and **adapter (28)**in accessory gearbox assembly (3)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical inspection Tool Kit,
NSN 5180-00-323-5114
Gear Holding Fixture (T1O)
Handling Tool (T26)
Hex Drive Socket Head Screw Key Set
Socket Wrench Attachment, Socket Head Screw,
1/2 inch, (Snap-on SA16A, or equivalent)
Torque Wrench, 100-750 Inch-Pounds

Materials,

Lockwire (E33)

Parts

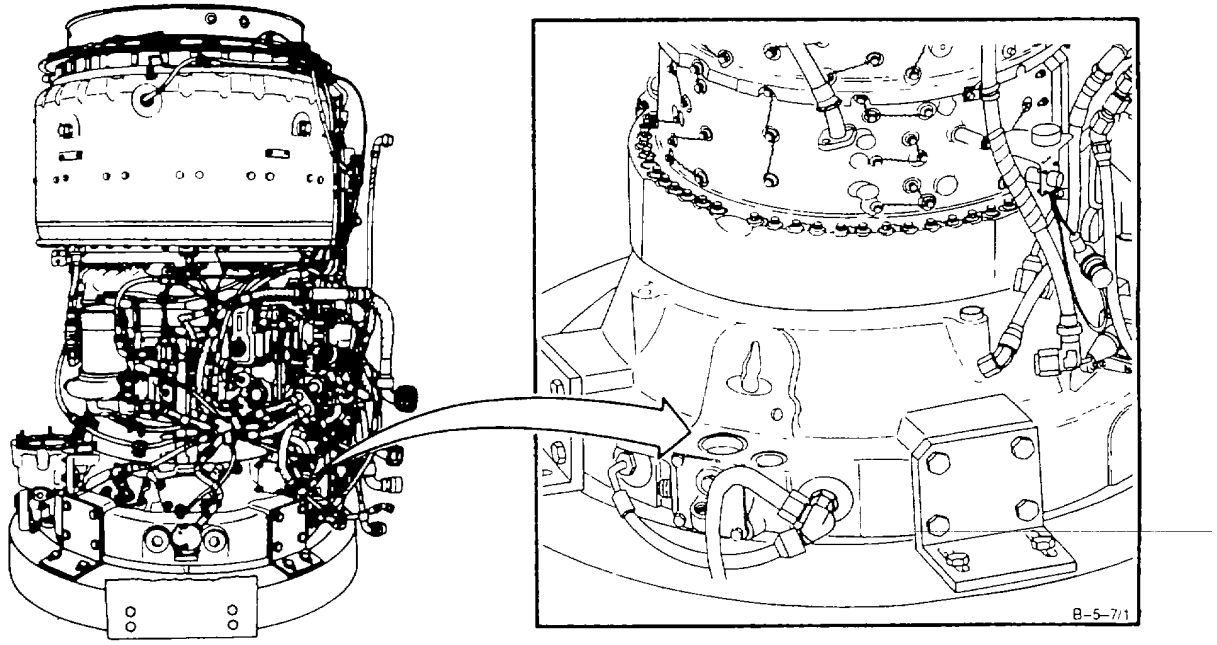
Packings
Locking Plate

Personnel Required

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References,

TM 1-2840-252-23P



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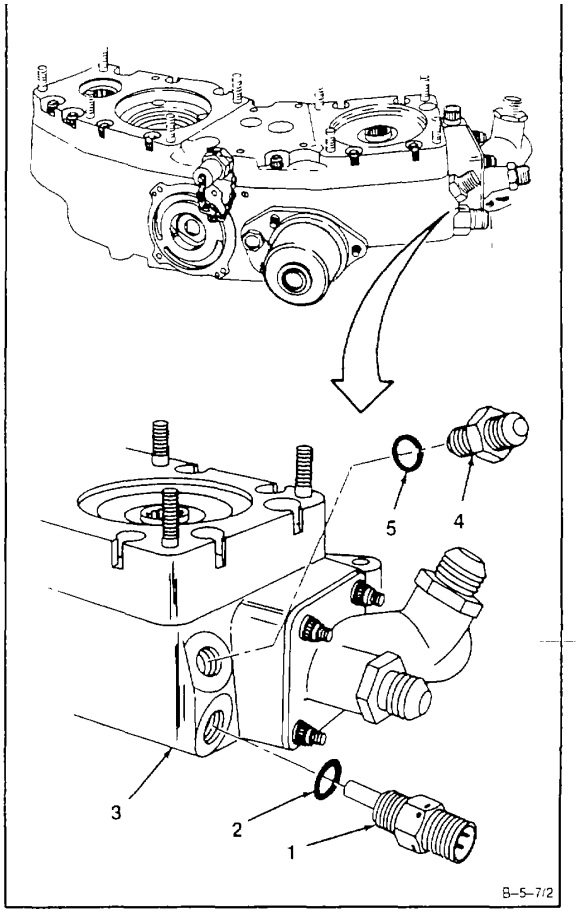
5-7 INSTALL ACCESORY GEARBOX ASSEMBLY (Continued) 5-7

NOTE

If accessory gearbox assembly is a replacement, do steps 1 thru 4 If same accessory gearbox assembly that was removed is to be installed, omit steps 1 thru 4

1 **Remove** lockwire, **oil temperature transmitter (1),** and gasket (2) from removed accessory gearbox assembly (3)

2 **Remove union (4)** and packing (5) from removed accessory gearbox assembly (3)



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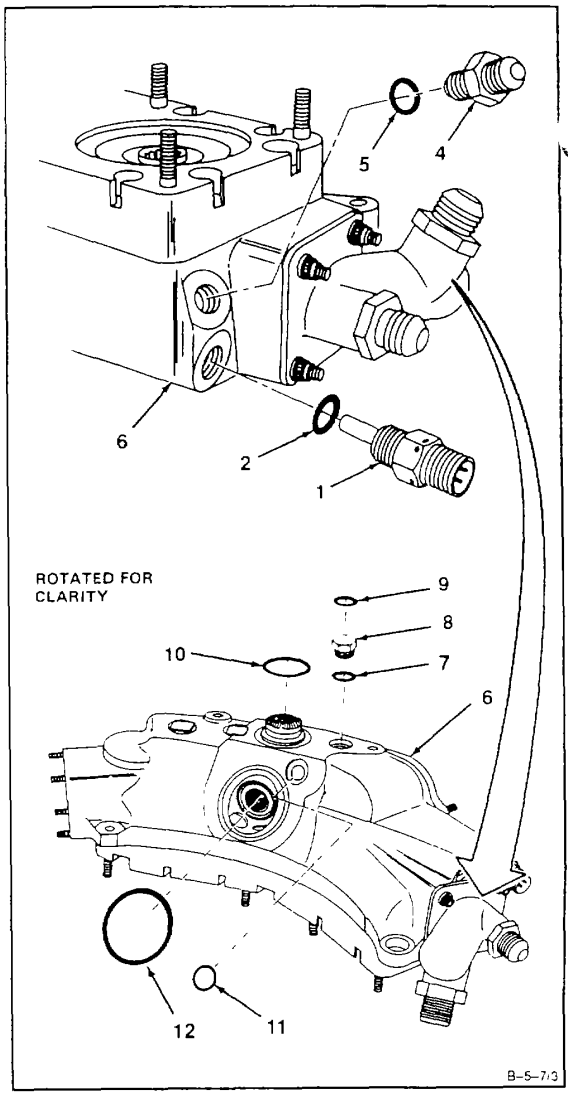
3 **Install** gasket (2) and **oil temperature transmit ter (1) in serviceable accessory gearbox as sembly** (6) Lockwire oil temperature transmitter (1) Use lockwire (E33)

4 **Install** packing (5) and **union (4) in serviceable accessory gearbox assembly (6).**

5 **Install** packing (7) and **plug (8) in serviceable accessory gearbox assembly (6).**

6 Install packings (9), (10), (11), and (12) in accessory gearbox assembly (6)



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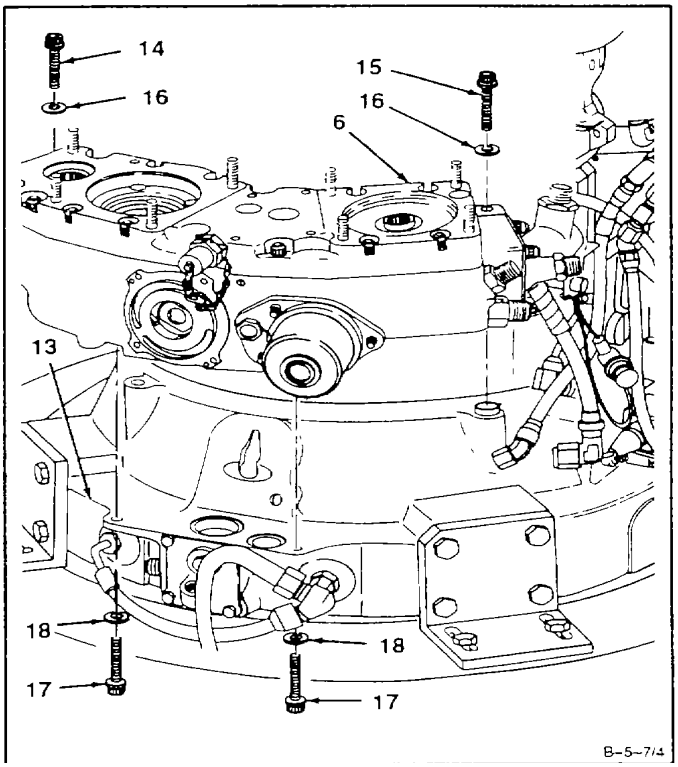
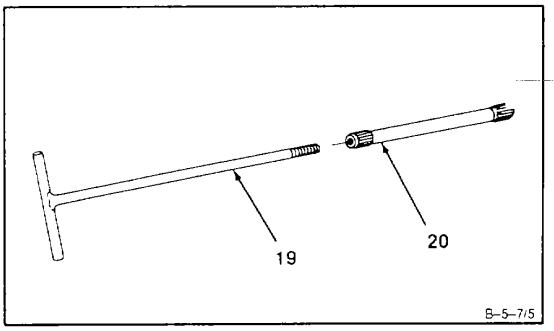
7 **Install accessory gearbox assembly (6)** on inlet housing assembly (13)

8 Install bolts (14) and (15), two washers (16), two bolts (17), and two washers (18) **Torque bolts (14)** and **(15) to 195 inch-pounds** Torque bolts **(17) to 145 inch-pounds.** Lockwire bolt (15) Use lockwire (E33)



9 Thread handling tool (T26) (19) into end of gear-shaft (20)



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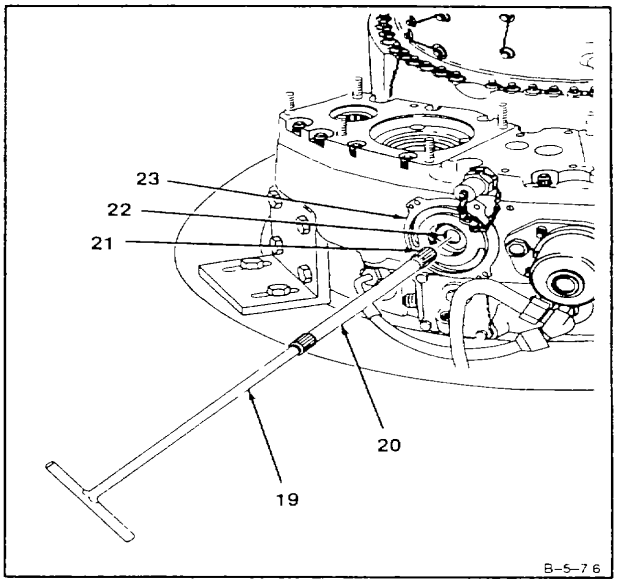
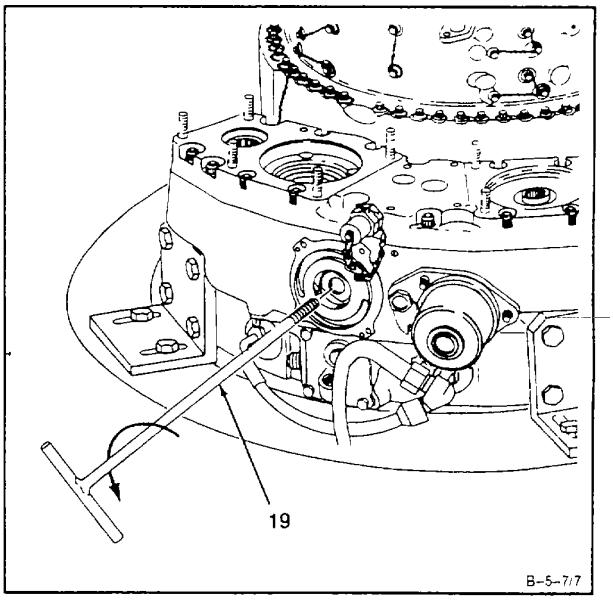
10 Align splines (21) and (22) Using handling tool (T26) (19), **install gearshaft (20)** in scavenge pump housing (23)



11 Remove handling tool (T26) (19)



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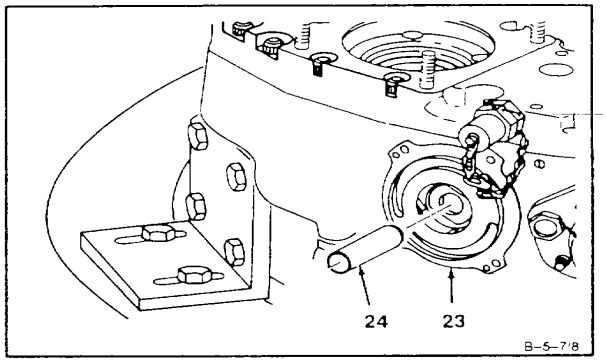
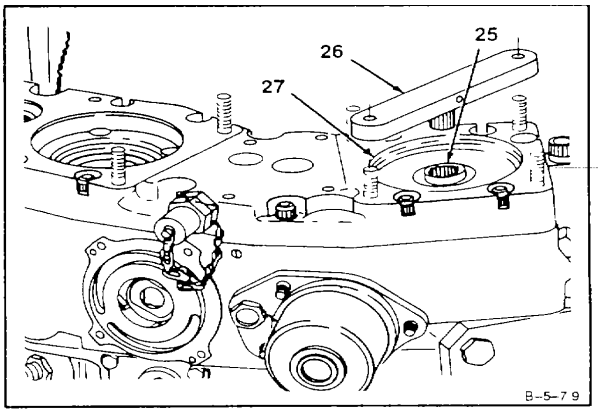
12 **Install spacer (24)** through scavenge pump housing (23)



13 Turn spline (25) to align with gear holding fixture (T10) (26) Install gear holding fixture (T10) (26) on fuel boost pump mounting pad (27)

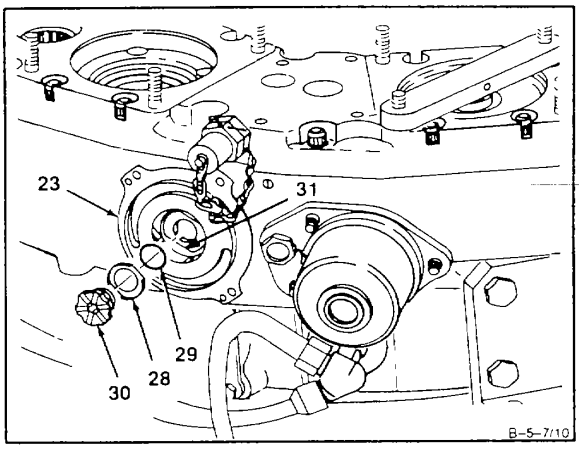


14. Install locking plate (28) and packing (29) on plug (30)

NOTE

In following step 15, align flats on locking plate (28) with recess (31) in scavenge pump impeller

15. **Install plug (30)** in scavenge pump housing (23) **Torque plug (30) to<u>140 inch-pounds</u>** Use <u>1/4inch</u> hex drive socket head screw key Bend tangs on locking plate (28)



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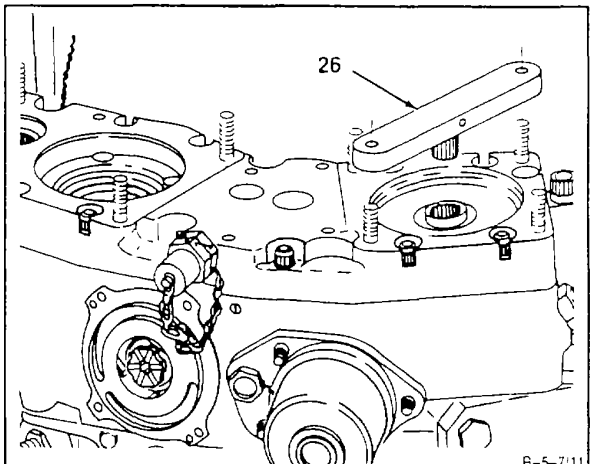
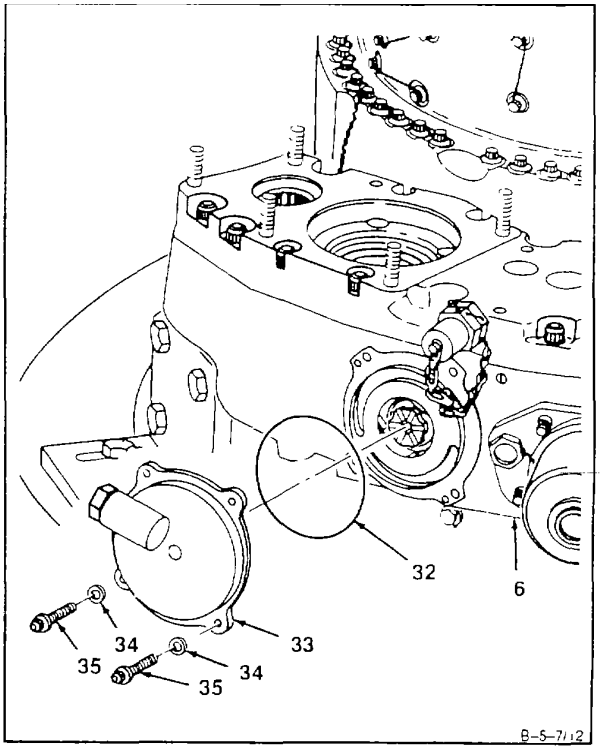
16. Remove gear holding fixture (T1O) (26)



NOTE

If either accessory gearbox assembly or overspeed drive gear assembly have been changed, N2 gear backlash shall be taken Refer to Task 5-30

17. Install packing (32) on housing (33) **Install housing (33),** two washers (34), and bolts (35) on accessory gearbox assembly (6) Lockwire bolts (35) Use lockwire (E33)



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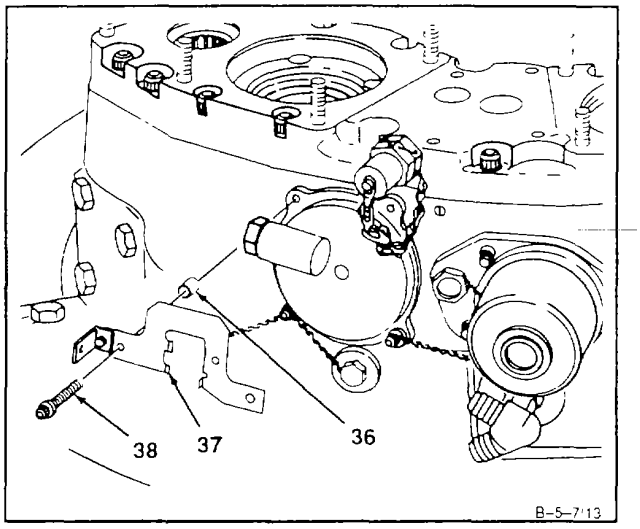
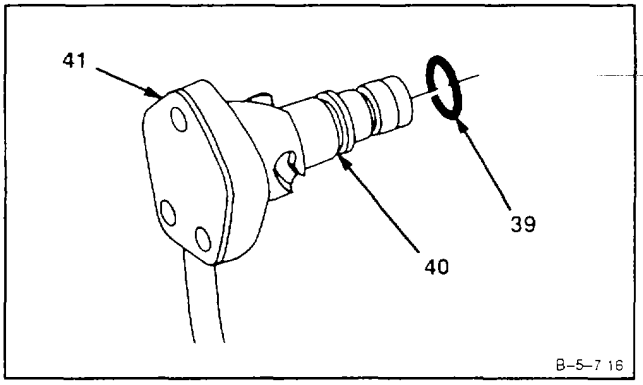
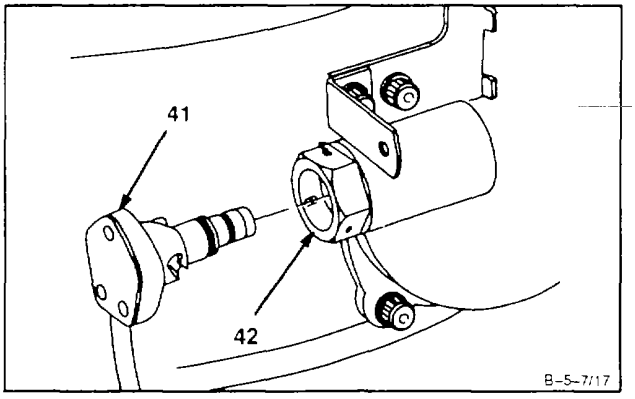
18. **Install** two spacers (36), **bracket (37),** and two bolts (38) Lockwire bolts (38) Use lockwire (E33)



19. **Install packing (39)** in groove (40) on plug (41)



20 **Install plug (41)** in housing (42)



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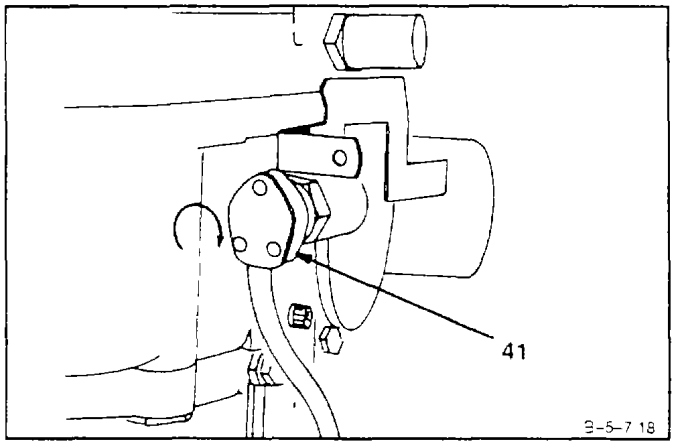
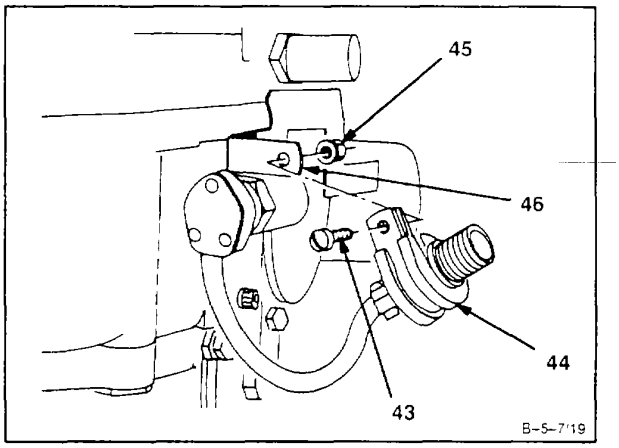
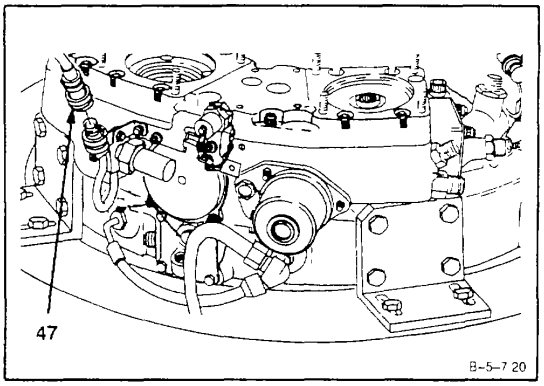
21. **Lock plug** (41) Push in on plug and turn clockwise



22. **Install** screw (43), **clamp (44),** and nut (45) on bracket (46)



23. **Install electrical connector (47).**



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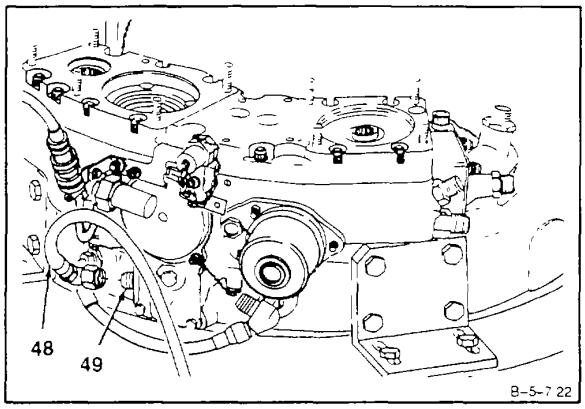
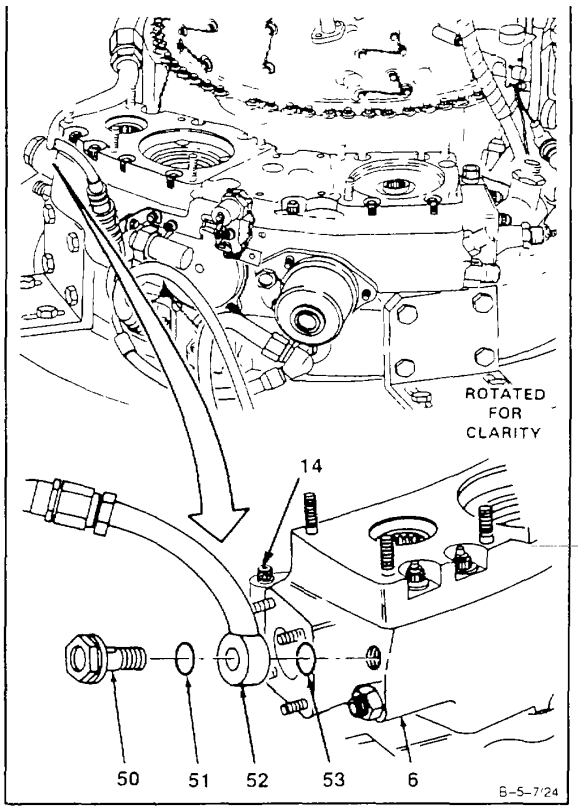
24 **Connect hose assembly (48)** to nipple (49)



25. **Install** bolt (50), packing (51), **tube assembly (52),** and packing (53) on gearbox assembly (6) Use 1/2-inch socket head screw key Lockwire bolt (50) to bolt (14), previously installed Use lockwire (E33)



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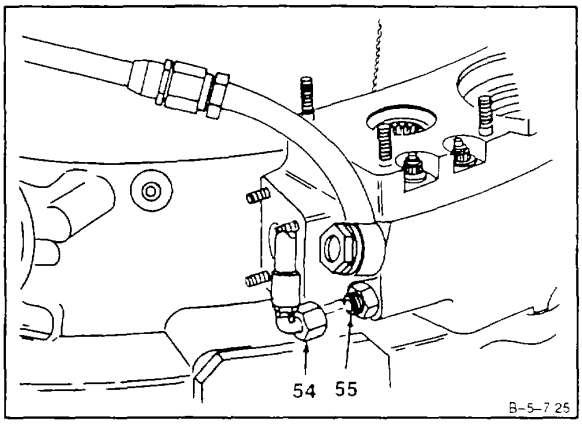
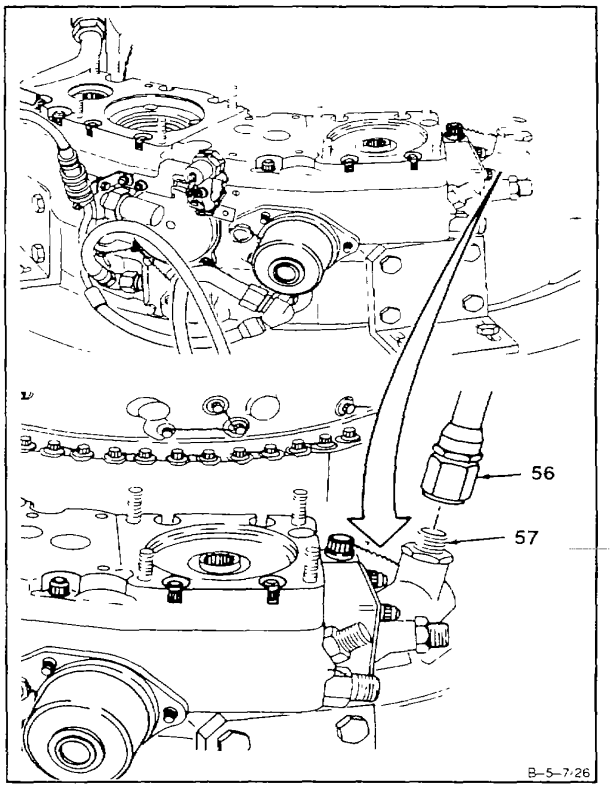
26. **Connect hose assembly (54)** to adapter (55)



27. **Connect tube and hose assembly (56)** to nipple (57)



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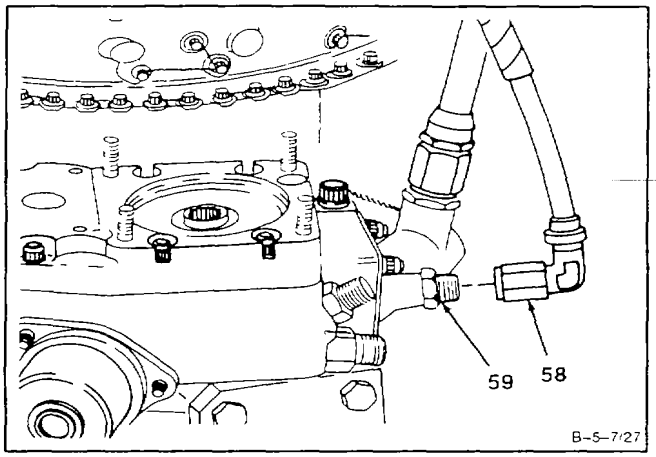
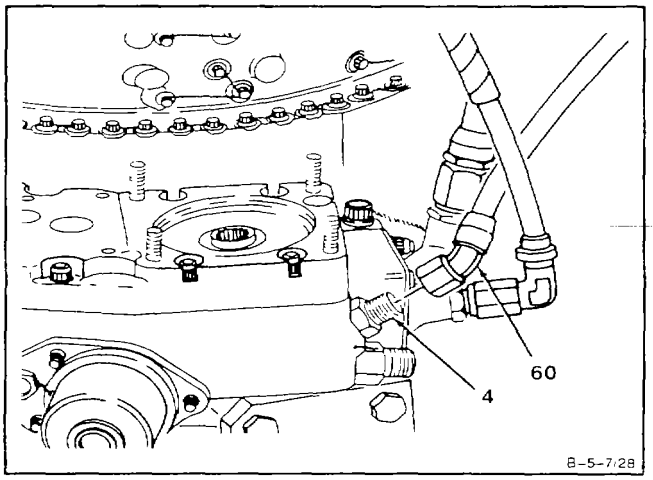
28. **Connect hose assembly (58)** to nipple (59)



29. **Connect hose assembly (60)** to union (4)



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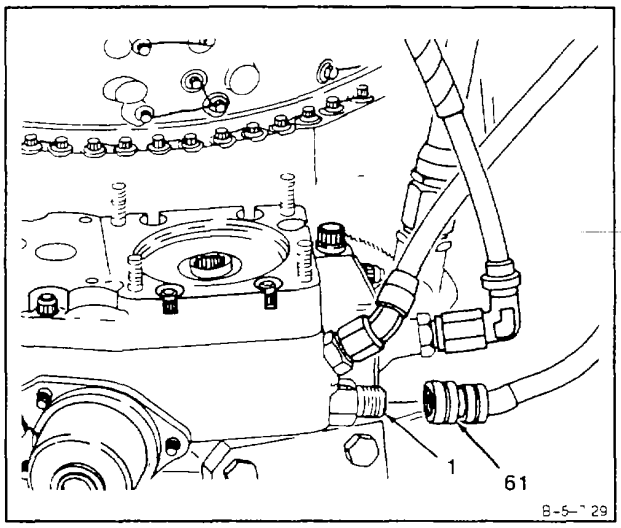
30. Connect electrical connector (61) to oil temperature transmitter (1)



INSPECT

FOLLOW-ON MAINTENANCE
Install Hydromechanical Assembly (Task 6-5)
Install Main Oil Pump and Scavenge Oil Screen (Task 8-6)
Install Tube Assembly (Inlet Housing to Main Oil Pump) (Task 8-66)
Install Fuel Boost Pump Assembly (Task 6-12)
Service Engine Oil System (Task 1-68)
Install Speed Pickup Drive Assembly (Task 5-17)

END OF TASK

SECTION II

PT SPEED PICKUP

5-8 REMOVE PT SPEED PICKUP 5-8

INITIAL SETUP

Applicable Configurations

All

Tools

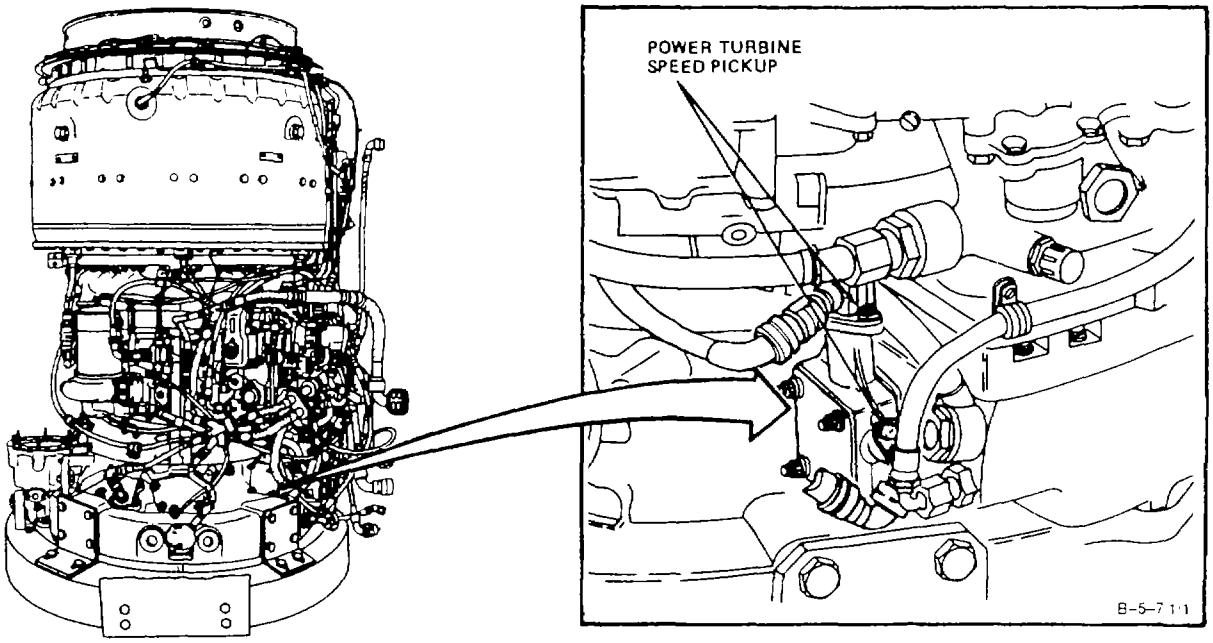
Powerplant Mechanic's Tool K**it,**
NSN 51**80-00**-3234944

Materials:

None

Personnel Required

Aircraft Powerplant Repairer



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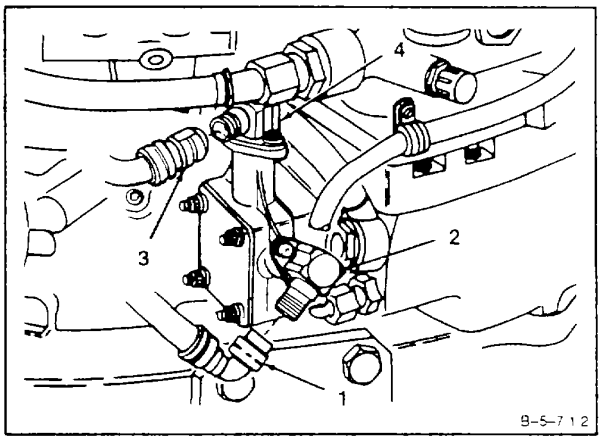
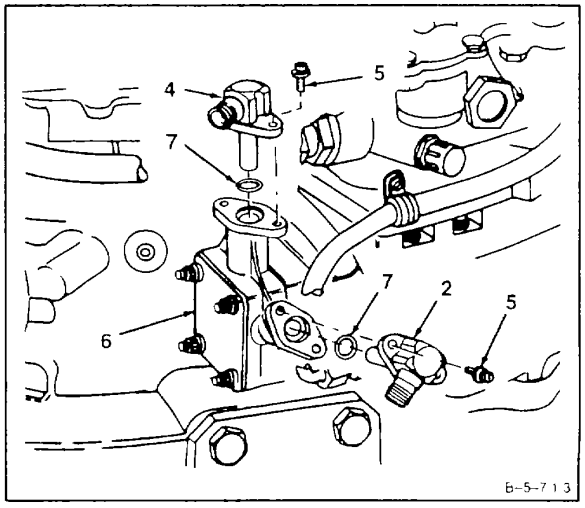
1. **Disconnect electrical connector** (1) from power turbine speed pickup (2)

2. **Disconnect electrical connector** (3) from power turbine speed pickup (4)



NOTE
The following step applies to both power turbine speed pickups

3. **Remove** lockwire, two bolts (5). and **power turbine speed pickup (2 and** 4) from speed pickup drive assembly (6) Remove packing (7)



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-3234944

Materials:

Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task
Power Turbine Speed Pickup removed (Task 5-8)

General Safety Instructions

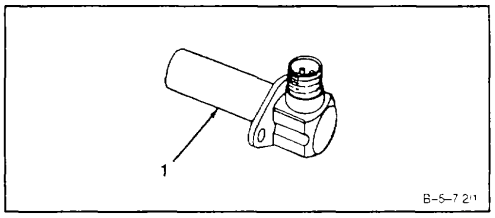
WARNING

Dry cleaning solvent (E19) 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 power turbine speed pickup as follows

a. Wear gloves (E24) Clean **power turbine speed pickup (1), using dry cleaning solvent (E19) and brush**

b. Remove any remaining solvent using clean, dry, lint-free cloth (E30)



FOLLOW-ON MAINTENANCE

Inspect Power Turbine Speed Pickup (Task 5-10)

END OF TASK

5-10 INSPECT PT SPEED PICKUP 5-10

INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Multimeter

Materials
None
Personnel Required
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

NOTE
The following step applies to both power turbine speed pickups Only one power turbine speed pickup is shown

1. Inspect powerturbine speed pickup (1) as follows

a. Inspect for rub at tip (2)

b. Inspect connector (3). There shall be no corrosion, broken or bent pins (4)

c. Inspect insulator (5) for damage

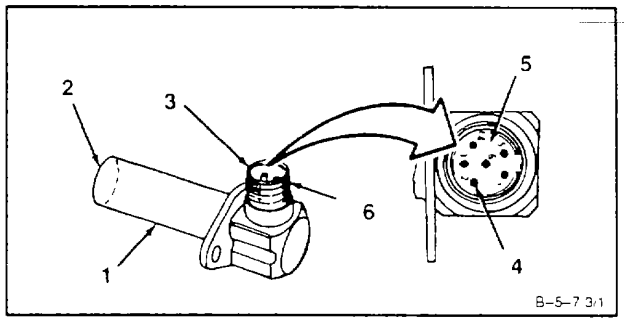
d. Inspect connector thread (6) condition

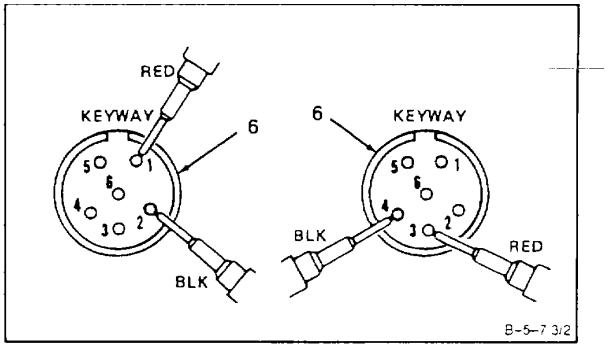
e. Inspect coll resistance of speed pickup (1) as follows

(1) Use multimeter with function switch set to ohms and range switch set to R X 10 Reject any speed pickup that does not conform to following specification

(2) Place red lead of multimeter to pin 1 and the black lead to pin 2 of connector (6) Resistance should not be less than 21.7 ohms and not more than 29.4 ohms

(3) Place red lead of multimeter to pin 3 and the black to pin 4 of connector (6) Resistance should be not less than 43.1 ohms and not more than 58.3 ohms





FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP
Applicable Configurations
All
Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Dry, Compressed Air Source

Materials'
Crocus Cloth (E16)
Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
Equipment Condition
Off Engine Task

NOTE

This repair is allowed, provided it does not cause pins to break or crack.

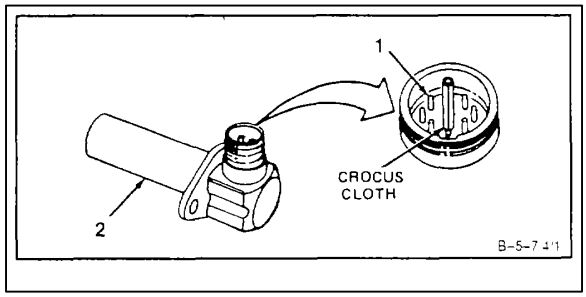
1. **Straighten bent pins (1)** of power turbine speed pickup (2) Use long-nose pliers to gently move pins (1) until they are straight

2. **Remove corrosion from pins (1)** of power turbine speed pickup (2) Polish pin, using in and out motion over entire length of pin until corrosion is removed Use crocus cloth (E1 6)

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig **air pressure. Do not direct air towara yourself or another person. Failure to comply could result in** injury to eyes or skin. In case of Injury, get medical attention.

3. Wear goggles Remove loosened particles, using clean, dry, compressed air



FOLLOW-ON MAINTENANCE
None

END OF TASK

5-12 INSTALL PT SPEED PICKUP 5-12

INITIAL SETUP

Applicable Configurations:
All

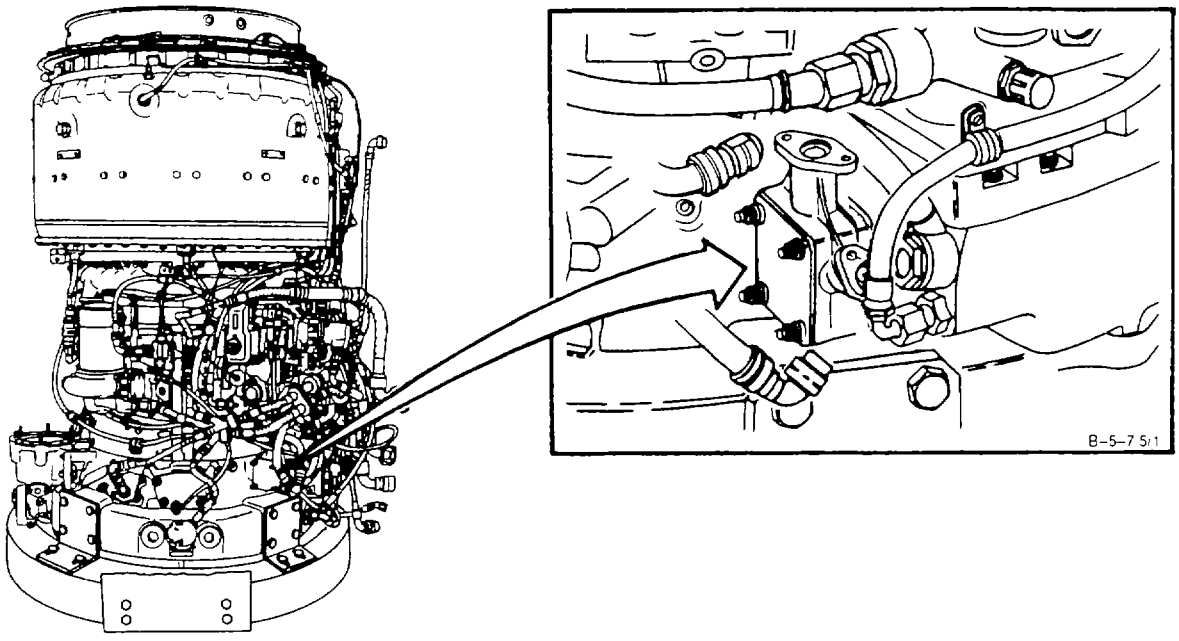
Tools
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials
Lockwire (E33)

Parts:
Packings

Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References
TM 1-2840-252-23P



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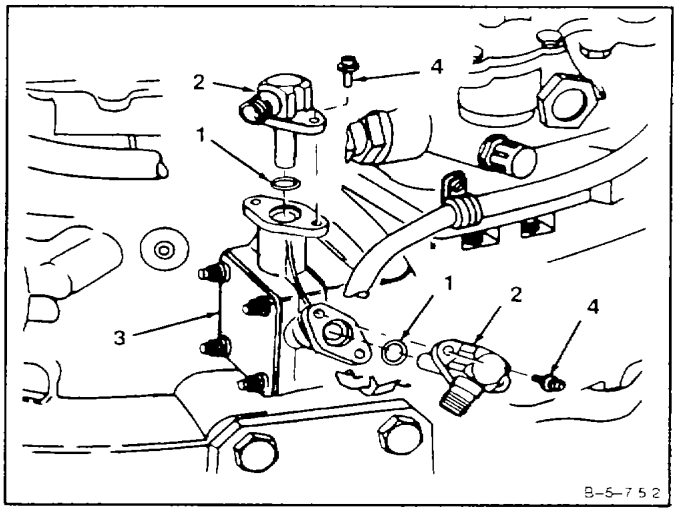
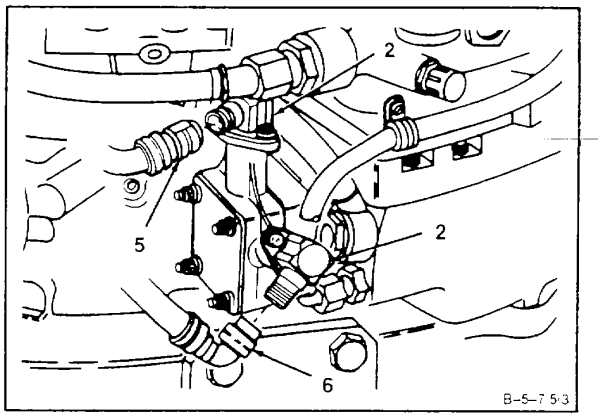
1. **Install** packing (1) on **power turbine speed pickup (2)** and insert into drive assembly (3) Install two bolts (4) and lockwire Use lockwire (E33)

NOTE
The second power turbine speed pickup is identical



2. **Connect electrical connector** (5) to power turbine speed pickup (2)

3. **Connect electrical connector** (6) to power turbine speed pickup (2)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION III

PT SPEED PICKUP DRIVE ASSEMBLY

5-13 REMOVE PT SPEED PICKUP DRIVE ASSEMBLY 5-13

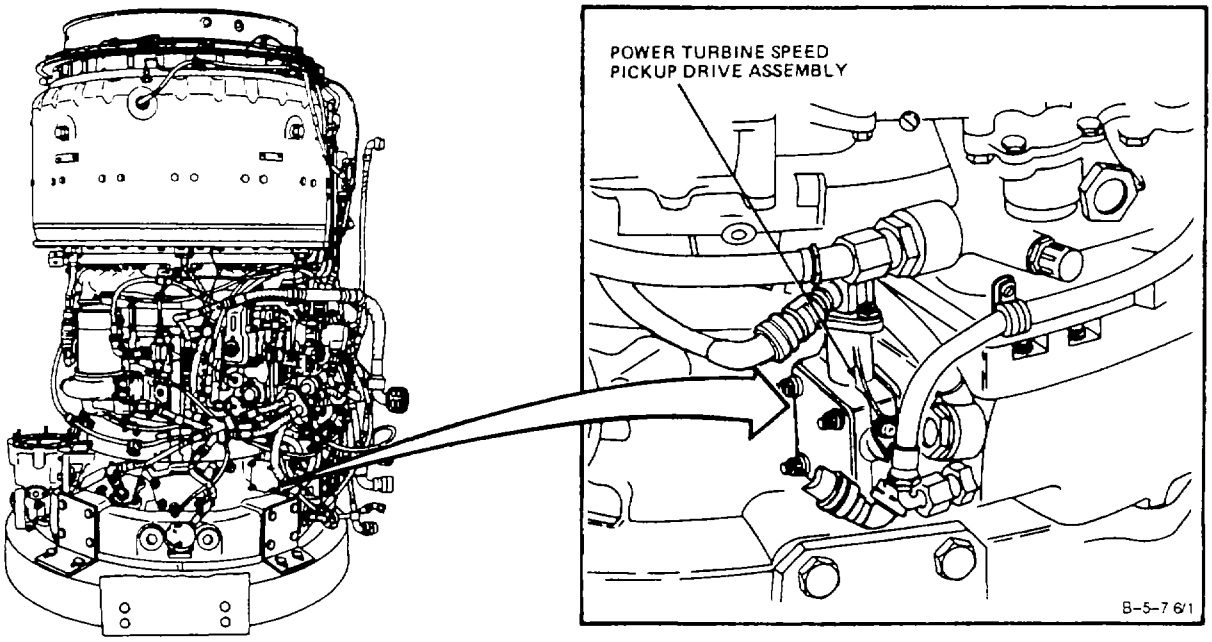
INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-3234944
Container, 1-Quart
Materials:
Wiping Rag (E64)
Personnel Required
Aircraft Powerplant Repairer
Equipment Condition:
Engine oil System Drained (Task 1-69)

General Safety Instructions:

WARNING

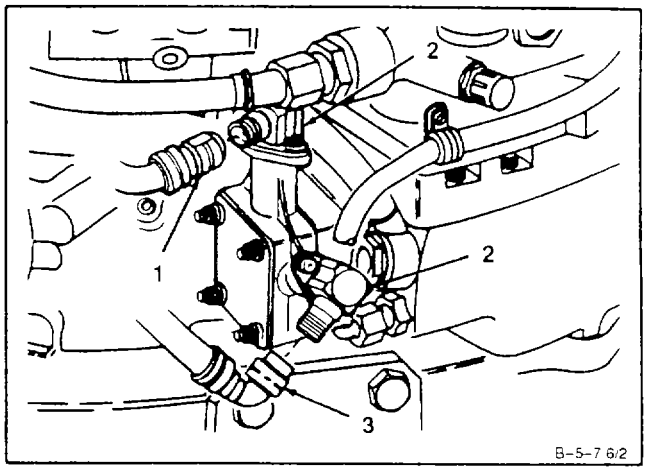
Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes



5-13 REMOVE PT SPEED PICKUP DRIVE ASSEMBLY (Continued) 5-13

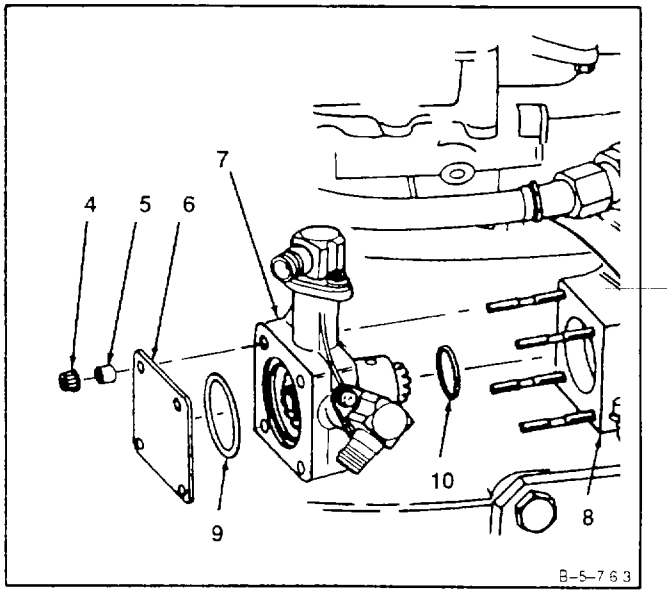
1 **Disconnect cable assembly (1)** from power turbine speed pickup (2)

2 **Disconnect cable assembly (3)** from power turbine speed pickup (2)



3 **Remove** four nuts (4), four spacers (5), cover (6) and **power turbine speed pickup drive assembly (7)** from accessory gearbox (8)

4 Remove packing (9) from cover (6) and packing (1 0) from power turbine speed pickup drive assembly (7)



FOLLOW-ON MAINTENANCE
None

END OF TASK

5-14 CLEAN PT SPEED PICKUP DRIVE ASSEMBLY 5-14

INITIAL SETUP

Applicable Configurations:
All

Tools
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Dry, Compressed Air Source
Goggles

Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition.
Off Engine Task

General Safety Instructions

WARNING

Dry cleaning solvent (E19) 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

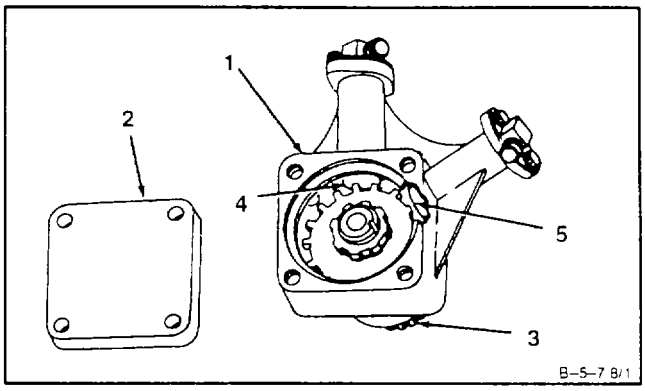
In following step, avoid cleaning bearings and all other internal parts with dry cleaning solvent and brush.

1 Wear gloves (E24) Clean exterior of power turbine speed pickup drive assembly (1) and cover (2), using dry cleaning solvent (E19) and brush

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

2 Wear goggles Blow dry housing assembly (1) and cover (2), using clean, dry, compressed air



FOLLOW-ON MAINTENANCE
Inspect Power Turbine Speed Pickup Assembly
(Task 5-15)

END OF TASK

5-15 INSPECT PT SPEED PICKUP DRIVE ASSEMBLY 5-15

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

Personnel Required:
Aircraft Powerplant Inspector

References:
Task 1-109

Equipment Condition:
Off Engine Task

1 **Inspect housing assembly (1).** There shall be no cracks

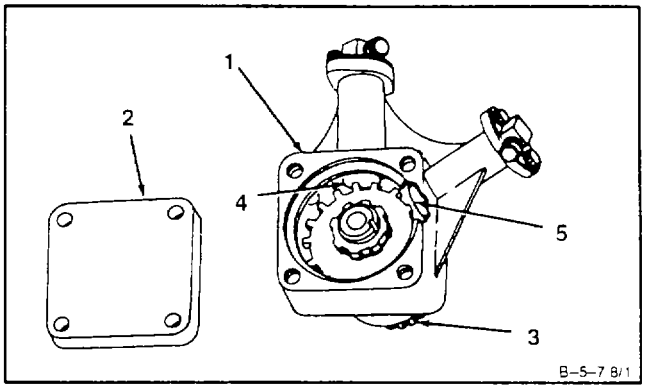
2 **Inspect cover (2).**

a There shall be no cracks or warping

3 **Inspect gear teeth (3).**

a There shall be no wear allowed (Ref Task 1 -1 09)

4 **Check for rubs** at tip of speed sensors (4 and 5)



FOLLOW-ON MAINTENANCE

None

END OF TASK

5-16 REPAIR PT SPEED PICKUP DRIVE ASSEMBLY 5-16

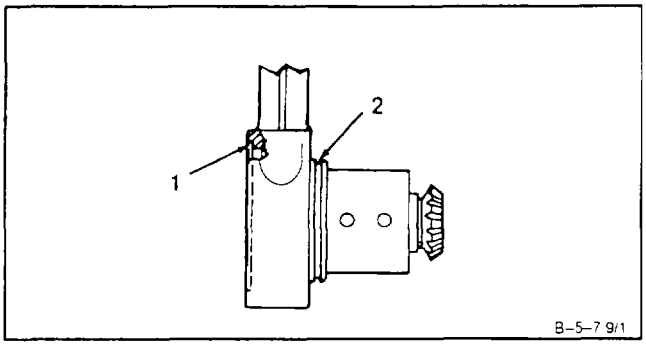
INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
Crocus Cloth (E16)
Personnel Required
Aircraft Powerplant Inspector
Equipment Condition:
Off Engine Task

1 **Repair nicks, dents, and scratches in packing sealing surface (1) or in packing groove (2) as follows:**

NOTE
Repair is allowed only if depth after repair is not more than 0.015 inch

a Blend-repair using file

b Polish repaired area Use crocus cloth (E16)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

5-17 INSTALL PT SPEED PICKUP DRIVE ASSEMBLY 5-17

INITIAL SETUP

Applicable Configurations:
All

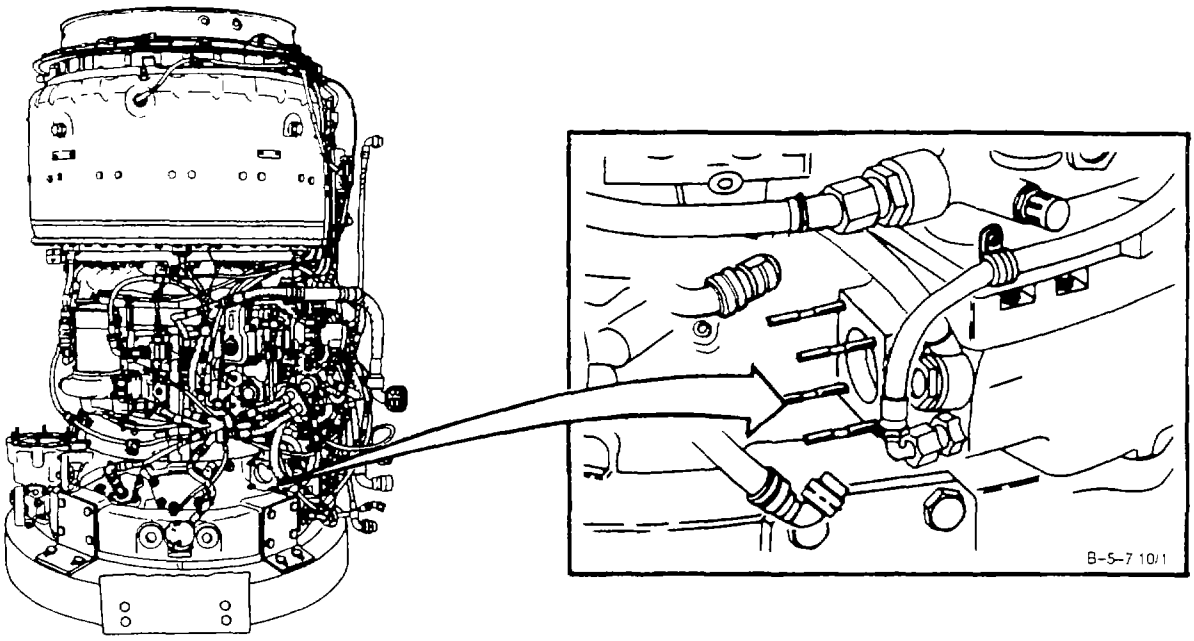
Tools.
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944
Technical inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
Lockwire (E33)

Parts
Packings
Packing

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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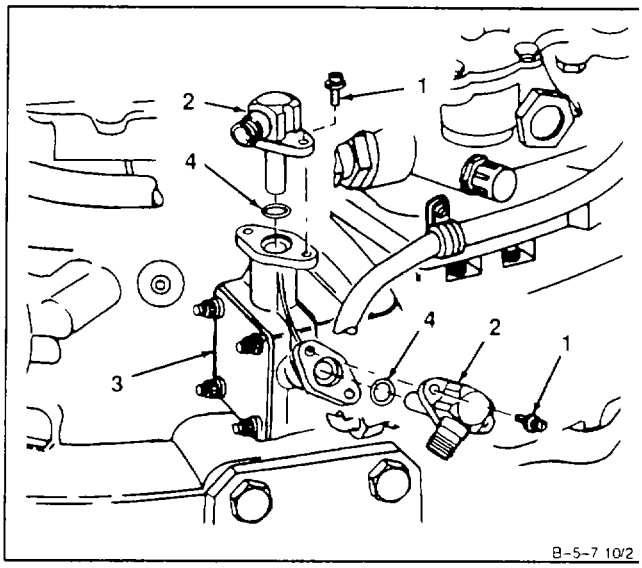
5-17 INSTALL PT SPEED PICKUP DRIVE ASSEMBLY (Continued) 5-17

NOTE

If power turbine speed pickup drive assembly is a replacement, do steps 1 through 3 If same drive assembly that was removed is to be installed, skip steps 1 thru 3

1 **Remove** lockwire, two bolts (1), and **power turbine speed pickup (2)** from drive assembly (3) and remove packing (4)



NOTE

Both speed pickups are identical Steps 1 thru 3 pertain to both speed pickups

2 **Install** packing (4) on **power turbine speed pickup** (2) and install into serviceable speed pickup drive assembly (3)

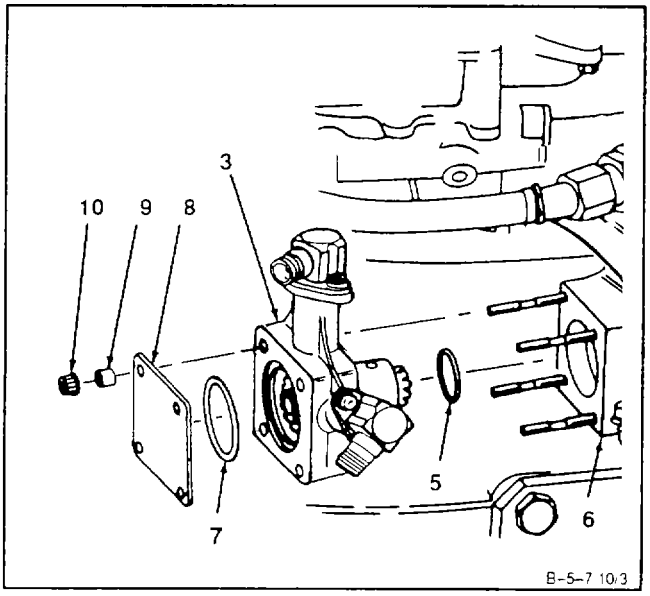
3 Install two bolts (1) and lockwire Use lockwire (E33)

4 Install packing (5) in groove of speed pickup drive assembly (3)

NOTE

If speed pickup drive assembly is being replaced, gear tooth pattern and backlash must be checked (Refer to contractor support)

5 **Install serviceable speed pickup drive assembly (3** into accessory gearbox (6)



NOTE

Use caution to ensure gear tooth engagement

6 Install packing (7) on cover (8)

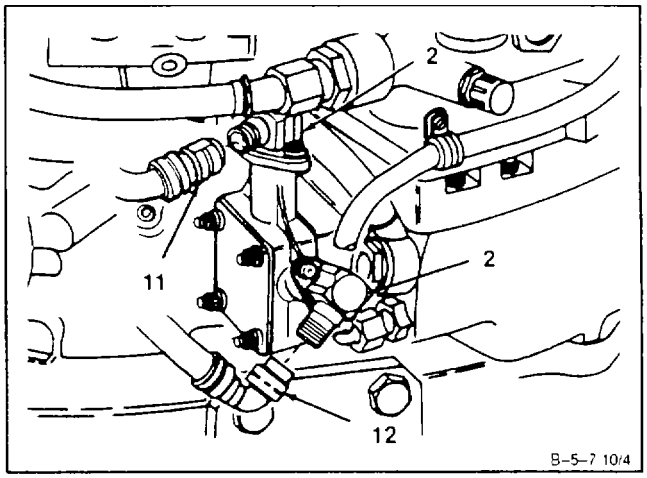
7 Install cover (8) on speed pickup drive assembly (3) with four spacers (9) and four nuts (1 0) Lockwire nuts (1 0) Use lockwire (E33)

GO TO NEXT PAGE

5-17 INSTALL PT SPEED PICKUP DRIVE ASSEMBLY (Continued) 5-17

8 **Connect cable assembly (11)** to speed pickup connector (2)

9 **Connect cable assembly (12)** to speed pickup connector (2)



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION IV

STARTER DRIVE ASSEMBLY

5-18 REMOVE STARTER DRIVE ASSEMBLY 5-18

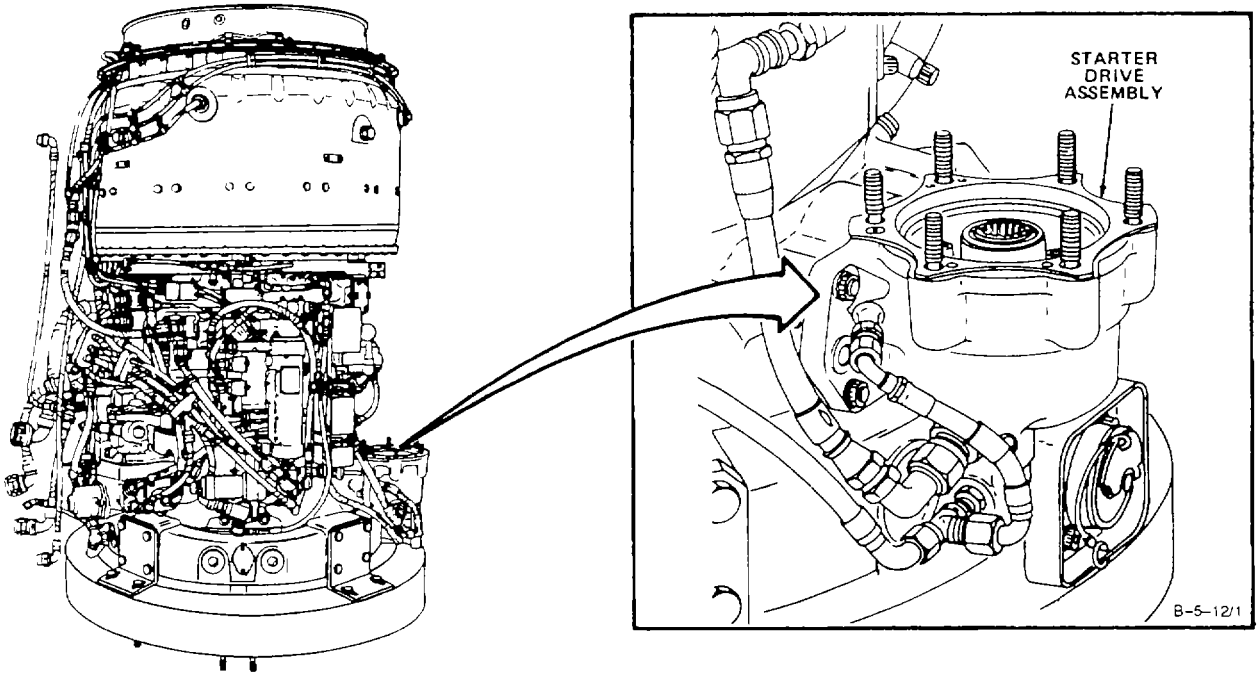
INITIAL SETUP

Applicable Configurations.
All

Tools.
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials
Wiping Rag (E64)

Personnel Required
Aircraft Powerplant Repairer



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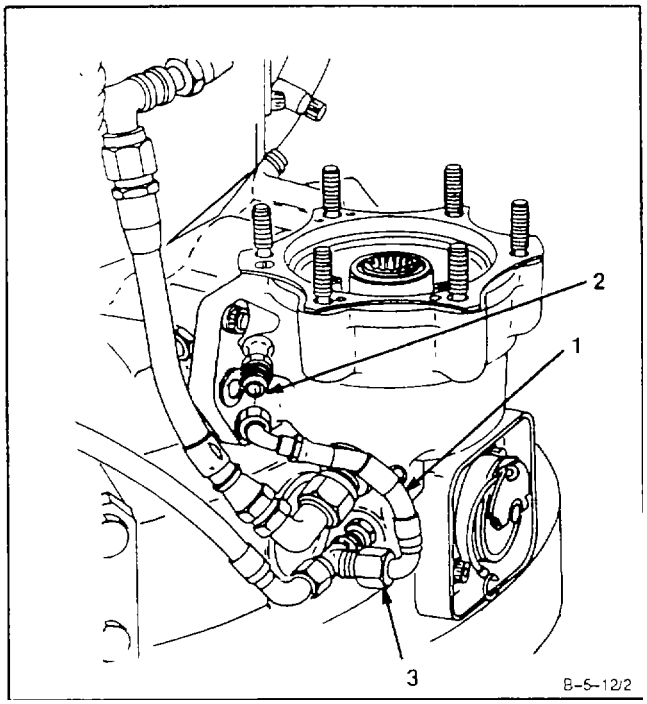
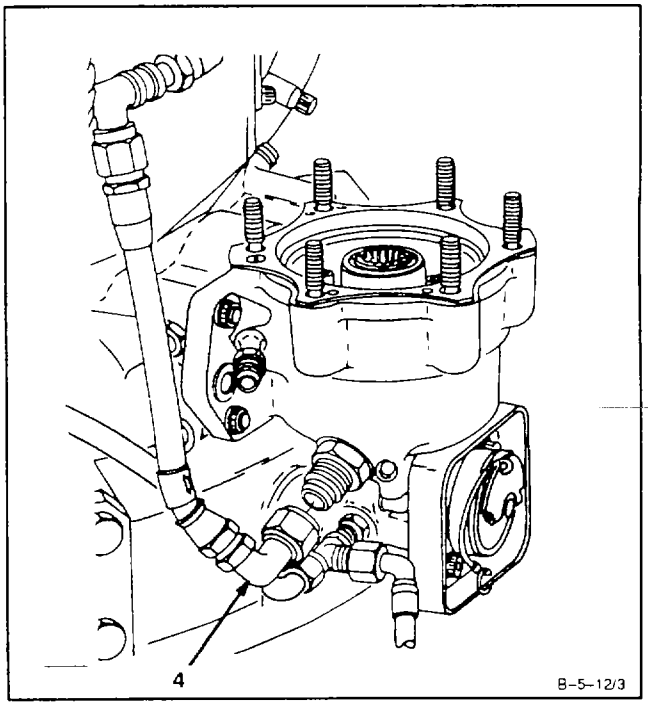
5-18 REMOVE STARTER DRIVE ASSEMBLY (Continued) 5-18

1 **Disconnect hose assembly (1)** from fitting (2) Loosen connector (3)



2 **Disconnect hose assembly (4)**



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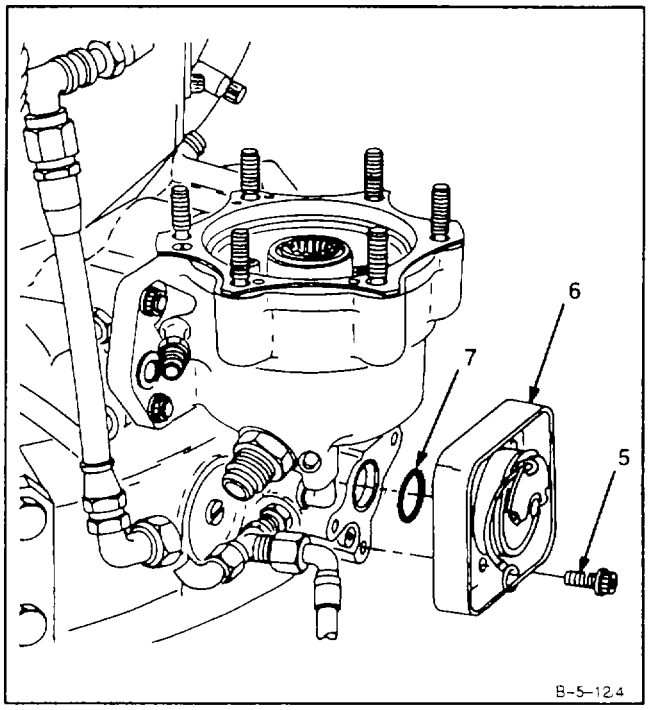
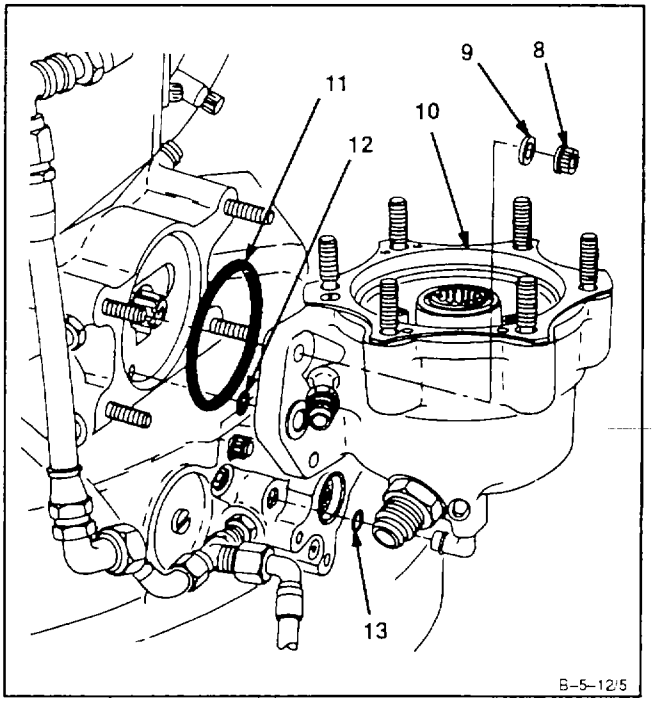
5-18 REMOVE STARTER DRIVE ASSEMBLY (Continued) 5-18

3 **Remove** lockwire, three screws (5), and **oil filler assembly (6)** Remove packing (7)



4 **Remove** four nuts (8), washers (9), and **starter drive assembly (10).** Remove packings (11 and 12)

5 Remove packing (13)



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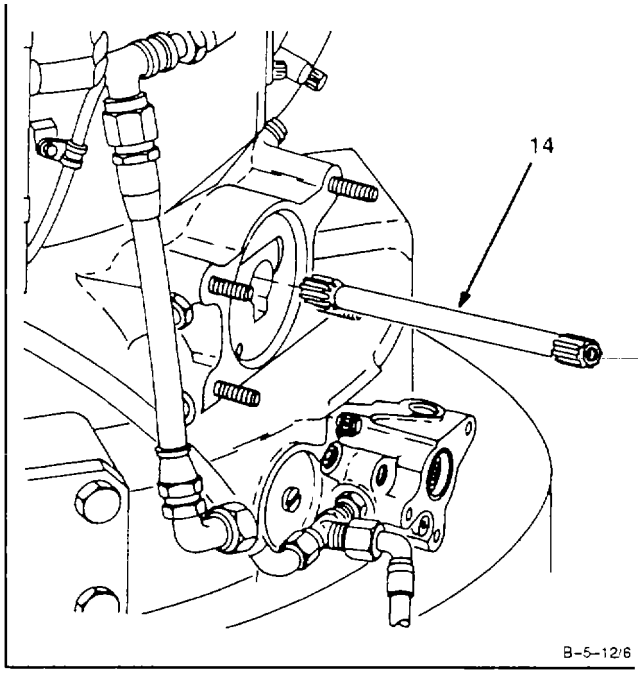
5-18 REMOVE STARTER DRIVE ASSEMBLY (Continued) 5-18

6 **Remove gearshaft (14).**



FOLLOW-ON MAINTENANCE
None

END OF TASK

5-19 CLEAN STARTER DRIVE ASSEMBLY (Continued) 5-19

INITIAL SETUP

Applicable Configurations:
All

Tools
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required
Aircraft Powerplant Repairer

References:
Task 5-20

Equipment Condition:
Off Engine Task
Starter Drive Assembly Removed (Task 5-18)

General Safety Instructions

WARNING

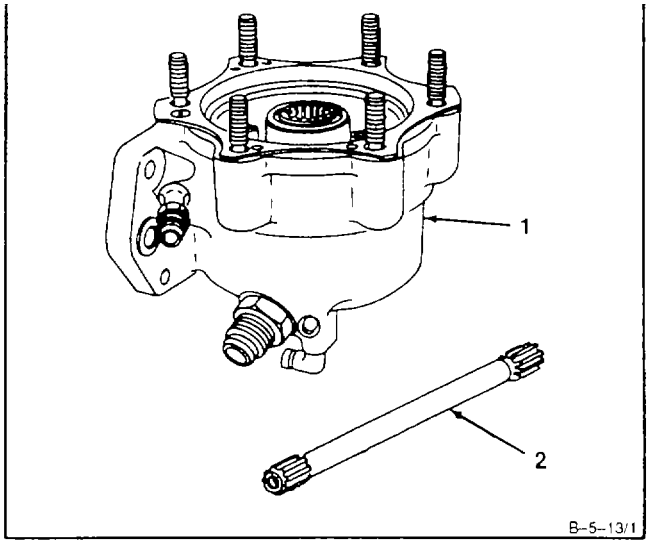
Dry cleaning solvent (E19) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

NOTE

Before cleaning starter drive assembly, check for evidence of oil leakage at seals. If evidence of leakage is found, have aircraft powerplant inspector inspect assembly (Ref Task 5-20).

1 Wear gloves (E24) and clean starter drive assembly (1) and gearshaft (2) Use dry cleaning solvent (E19) and brush

2 Remove any remaining solvent with clean, lint free cloth (E30)



FOLLOW-ON MAINTENANCE

Inspect Starter Drive Assembly (Task 5-20)

END OF TASK

5-20 INSPECT STARTER DRIVE ASSEMBLY 5-20

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

Personnel Required:
Aircraft Powerplant Inspector

References
Task 1-109

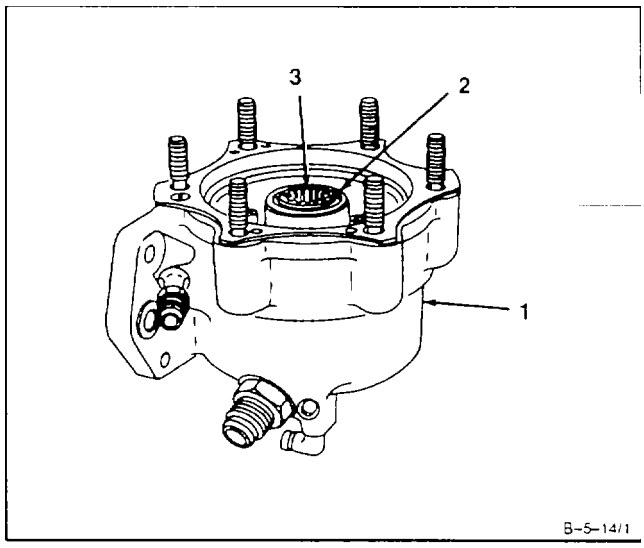
General Safety Instructions:
Off Engine Task

1 Inspect starter drive assembly (1).

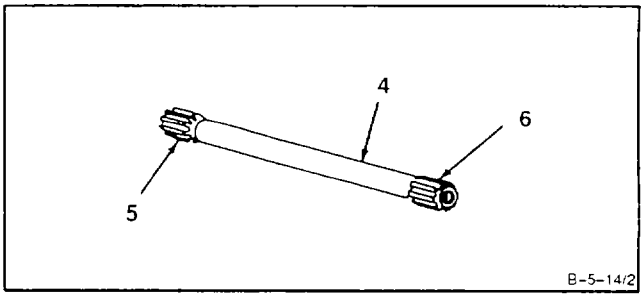
a There shall be no cracks

b There shall be no evidence of leakage in area of seal (2)

c There shall be no wear deeper than 0.012 inch on splines (3)



2 Inspect gearshaft (4) There shall be no wear deeper than 0.007 inch on splines (5 and 6) (Ref Task 1-109)



FOLLOW-ON MAINTENANCE

None

END OF TASK

5-21 REPAIR STARTER DRIVE ASSEMBLY 5-21

INITIAL SETUP

Applicable Configurations
All

Tools.
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical inspection Tool Kit,
NSN 5180-00-323-5114
Locating Bar (T33)
Handling Tool (T26) (3)
Sleeve Bushing (Appendix E)
Oil Seal Removal Tool (Appendix E)
Oil Seal Installation Tool (Appendix E)
Arbor Press
Micrometer Depth Gage
Outside Micrometer Caliper Set

Materials
Lockwire (E33)
Lubricating Oil (E35 or E36)
Wiping Rag (E64)

Parts
Seal
Packing
Shim

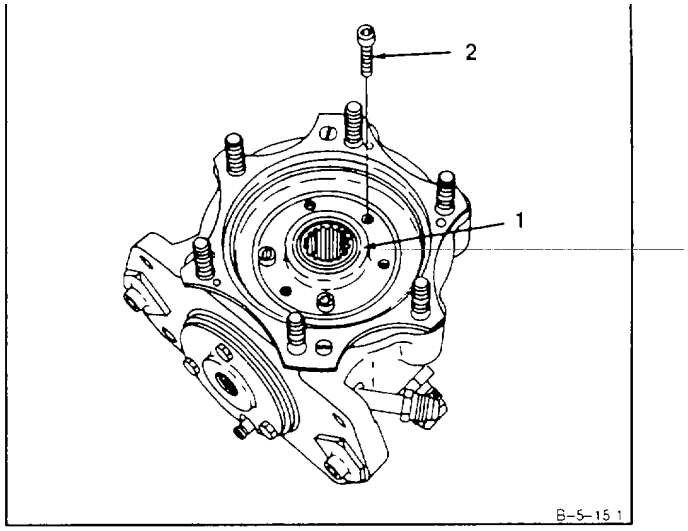
Personnel Required
Aircraft Powerplant Repaired
Aircraft Powerplant Inspector

References
TM 1-2840-252-23P

Equipment Condition:
Off Engine Task

1 Repair leaks in area of seal (1)

a **Remove** lockwire and **three bolts (2).**



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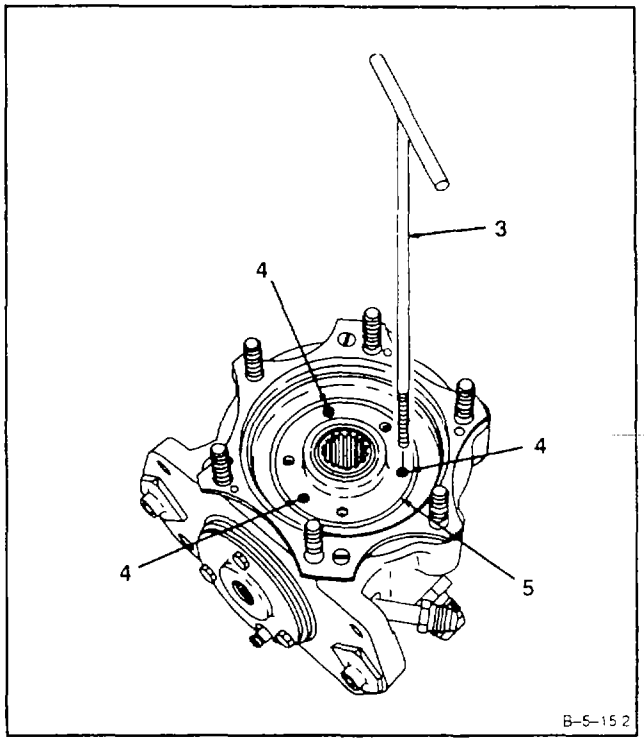
5-21 REPAIR STARTER DRIVE ASSEMBLY (Continued) 5-21

b **Install three handling tools (T26)**(3) in threaded holes (4) of seal retainer (5)



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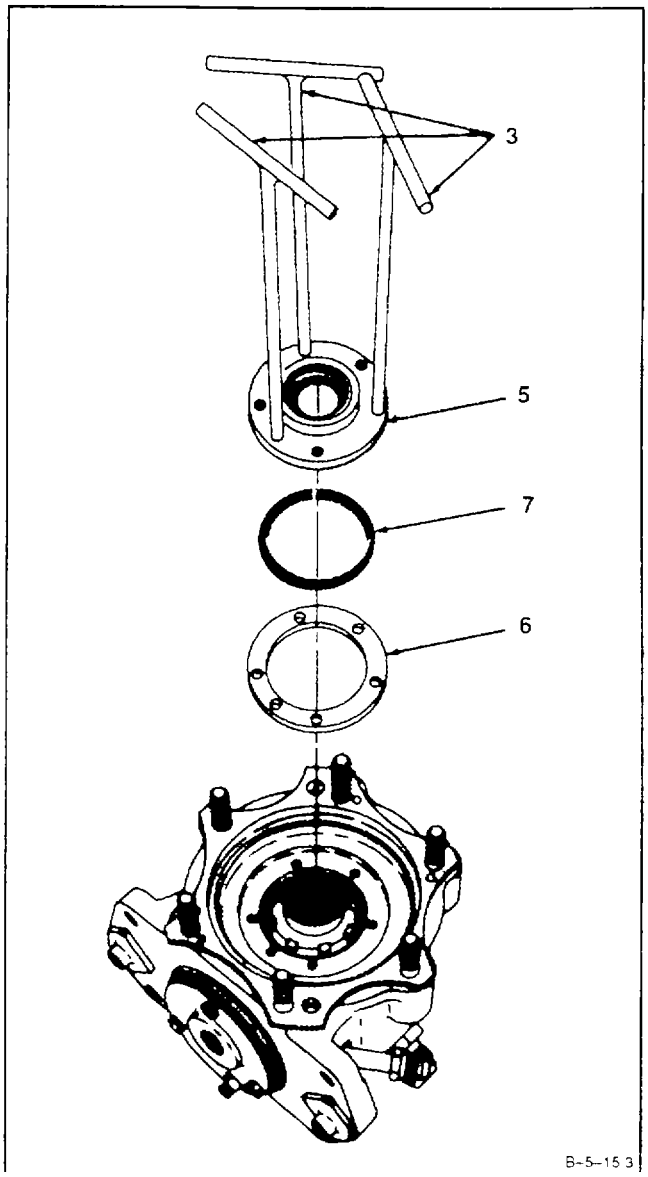
5-21 REPAIR STARTER DRIVE ASSEMBLY (Continued) 5-21

c Turn three handling tools (3) evenly clockwise and **remove seal retainer (5).** Remove shim (6) and packing (7)

d Remove handling tools (3)



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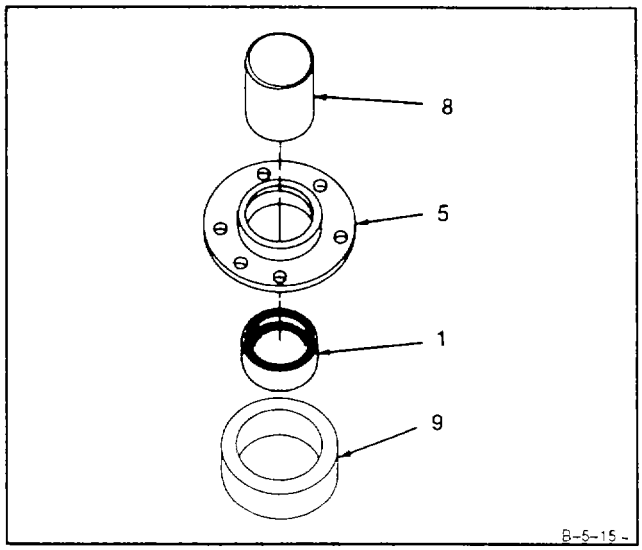
5-21 REPAIR STARTER DRIVE ASSEMBLY (Continued) 5-21

e Remove seal (1) from seal retainer (5)

(1) Place sleeve bushing (Appendix E) (9) under seal retainer (5)

(2) Use oil seal removal tool (Appendix E) (8) and arbor press

(3) Remove seal (1)



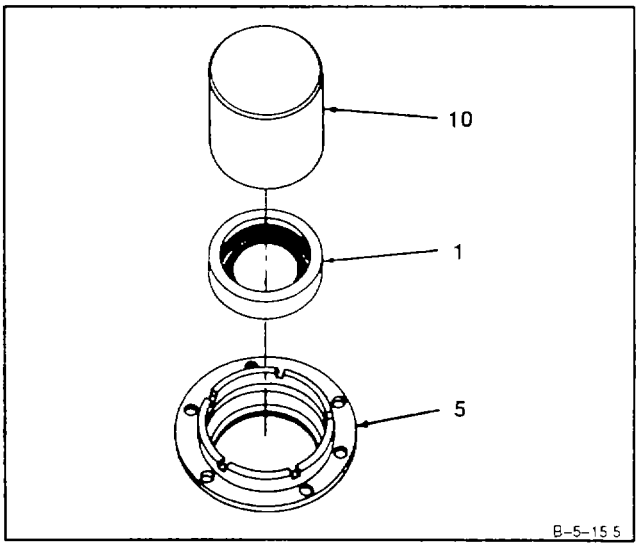
WARNING

Lubricating oils cause paralysis If swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention Get medical attention for eyes.

CAUTION

Seal must be dipped in lubricating oil (E35 or E36) before installation. Failure to comply will cause damage to seal during dry running period of initial engine starts

f Dip serviceable seal (1) in lubricating oil (E35 or E36) **Install seal (1)**in seal retainer (5) Use oil seal installation tool (Appendix E) (10) and arbor press



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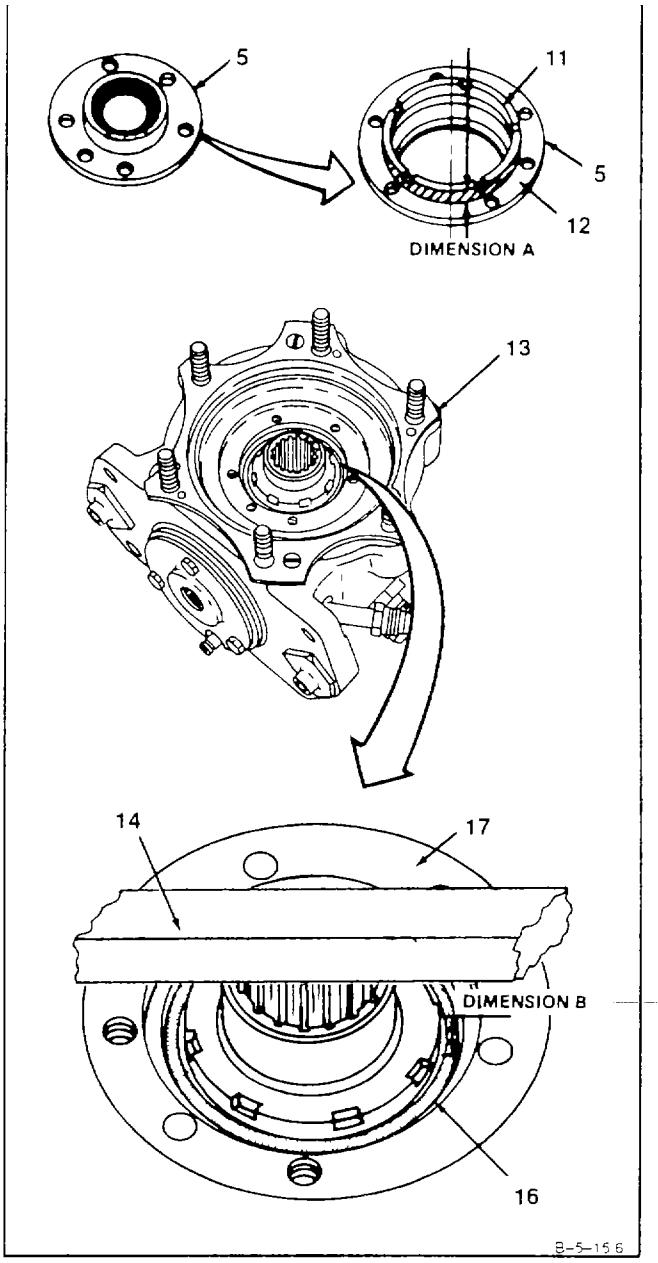
5-21 REPAIR STARTER DRIVE ASSEMBLY (Continued) 5-21

g **Determine shim thickness needed to** maintain proper bearing pinch as follows

(1) On seal retainer flange (5), measure from inner flange surface (11) to retainer flange (12) Record as Dimension A

(2) On starter drive assembly (13), place locating bar (T33) (14) on starter drive mount flange (13) Use micrometer depth gage Measure to bearing surface (16) Record as Dimension D Measure to support outer surface (17) Record as Dimension E Subtract Dimension E frown Dimension D Record result as Dimension B

(3) Subtract Dimension B from Dimension A Record as Dimension C



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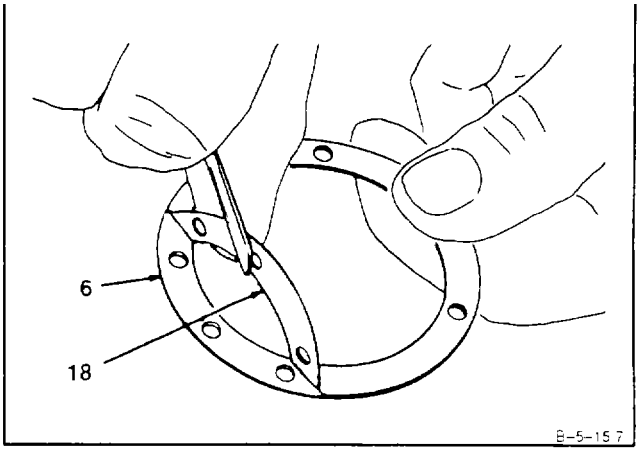
(4) Find Dimension C in shim selection table. Read across and find needed thickness.

SHIM SELECTION TABLE	
DIMENSION C (INCH)	SHIM THICKNESS (INCH)
0.003	0.000
0.004	0.000
0.005	0.000
0.006	0.000
0.007	0.002
0.008	0.004
0.009	0.004
0.010	0.006
0.011	0.006
0.012	0.008
0.013	0.008
0.014	0.010
0.015	0.010
0.016	0.012
0.017	0.012

h Prepare shim (6) as follows:

(1) Peel off layers (18) required to obtain shim thickness needed.

(2) Measure thickness of shim (6) and check against shim selection table Use outside micrometer caliper set.



INSPECT

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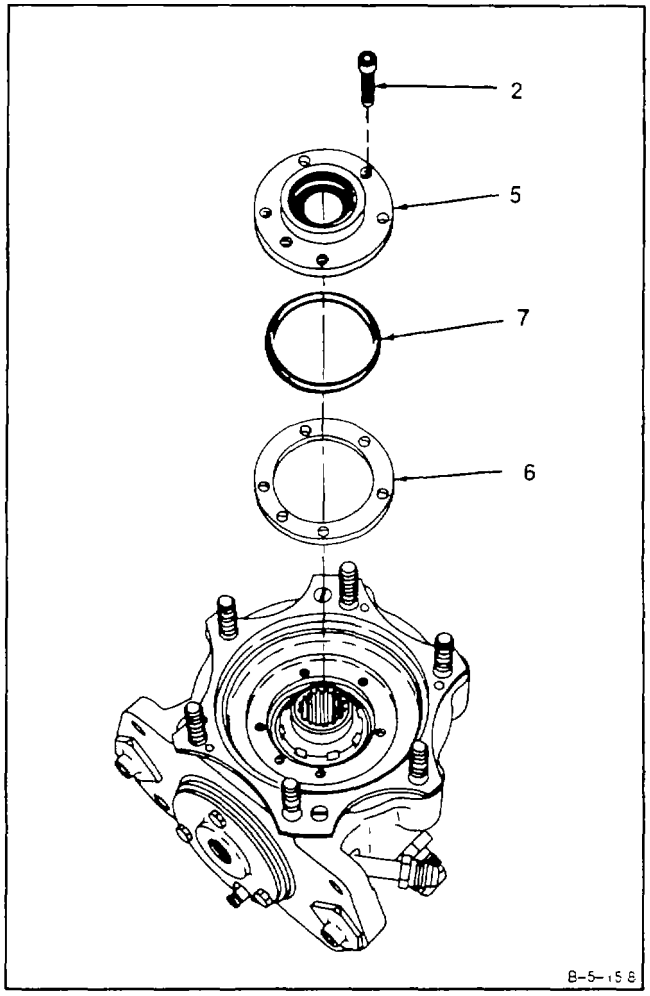
i. Install packing (7) on seal retainer (5). **Install** shim (6), **seal retainer (5),** three bolts (2) and lockwire. Use lockwire (E33).



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

5-22 INSTALL STARTER DRIVE ASSEMBLY 5-22

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit
NSN 5180-00-323-5114

Materials:

Lockwire (E33)

Personnel Required:

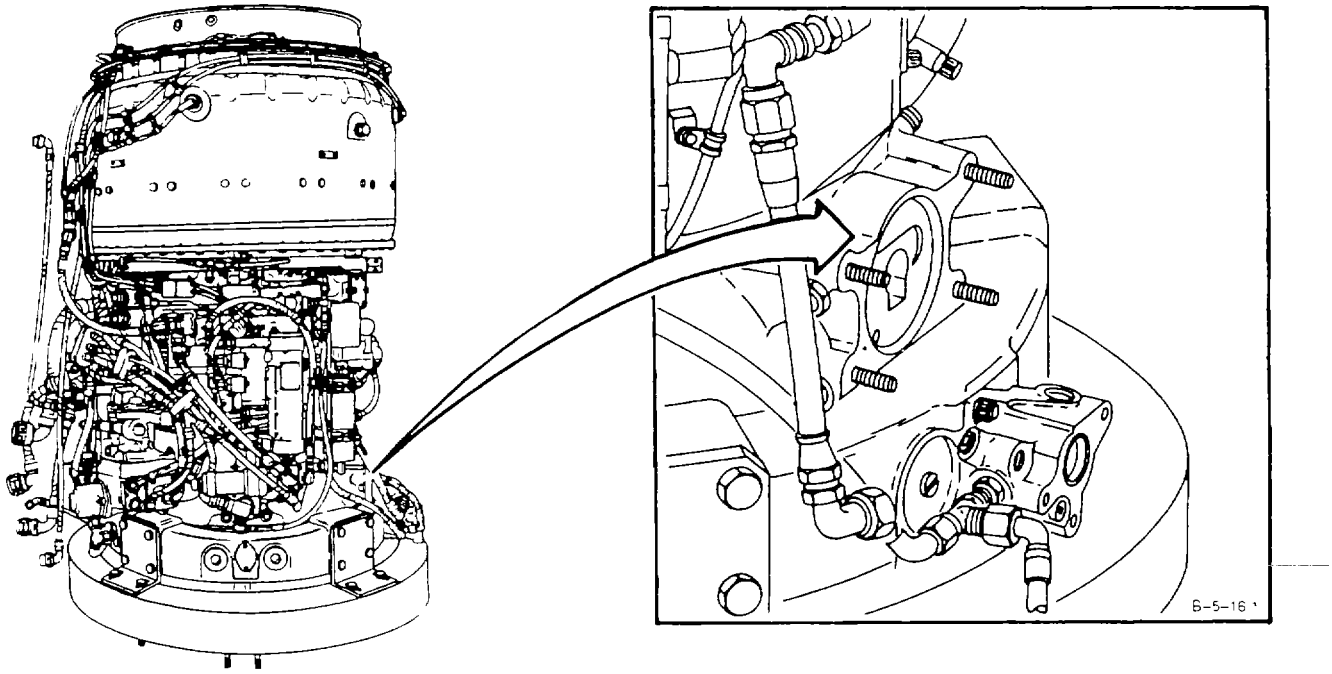
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:

TM 1-2840-252-23P

Parts:

Packings



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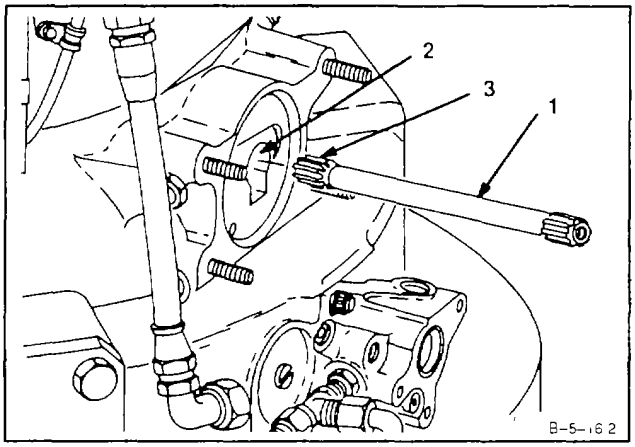
NOTE

In following step 1, gearshaft may have to be rotated slightly to engage splines

1. **Install gearshaft (1)** into widest portion of hole (2). Guide straight in until splines (3) engage with internal accessory drive gear splines



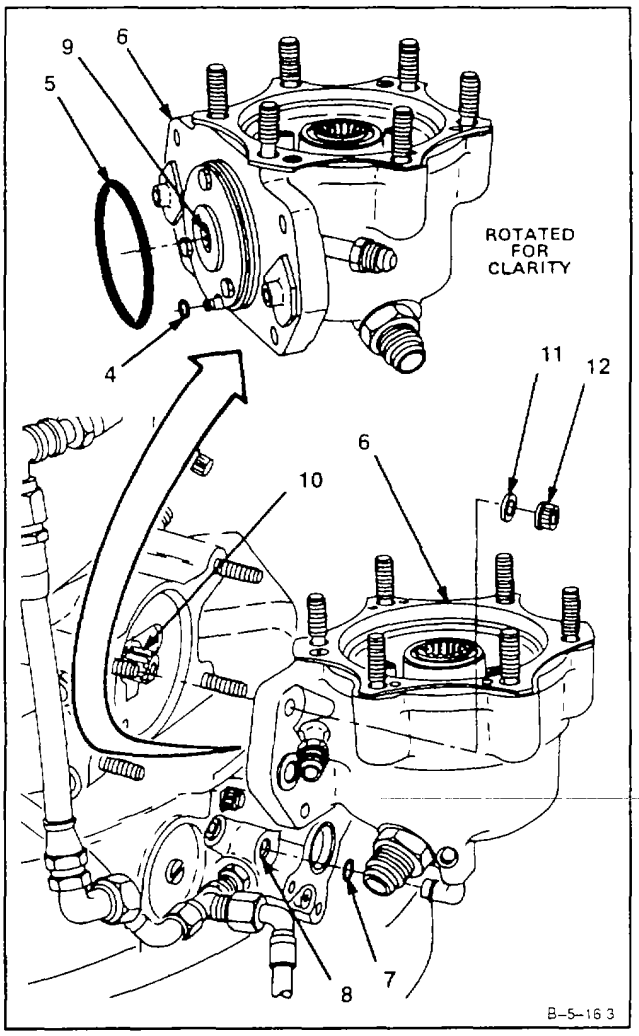
2. Install packings (4 and 5) on starter gearbox assembly (6)

3. Install packing (7) in housing assembly (8)

NOTE

In following step 4, splines may have to be rotated slightly to engage properly

4. Engage spines (9) with splines (10). **Install starter drive assembly (6),**four washers (11), and nuts (12)



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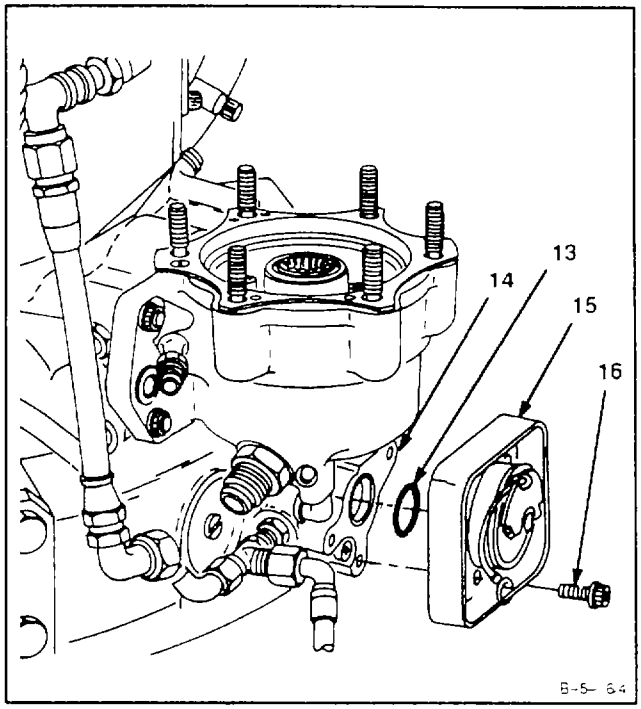
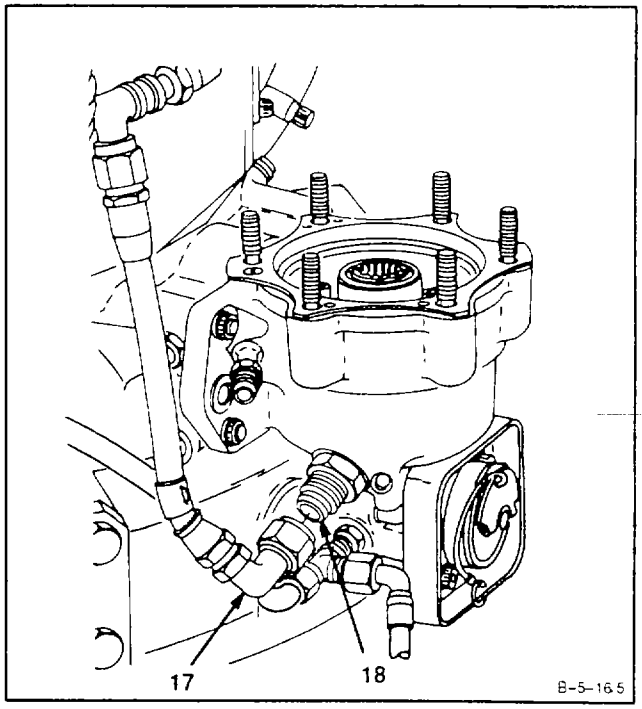
5. Install packing (13) on filler housing (14)

6. **Install oil filler assembly (15)** on oil filler housing (14) Install three bolts (16) and lockwire. Use lockwire (E33).



7. **Connect hose assembly (17)** to reducer (18).



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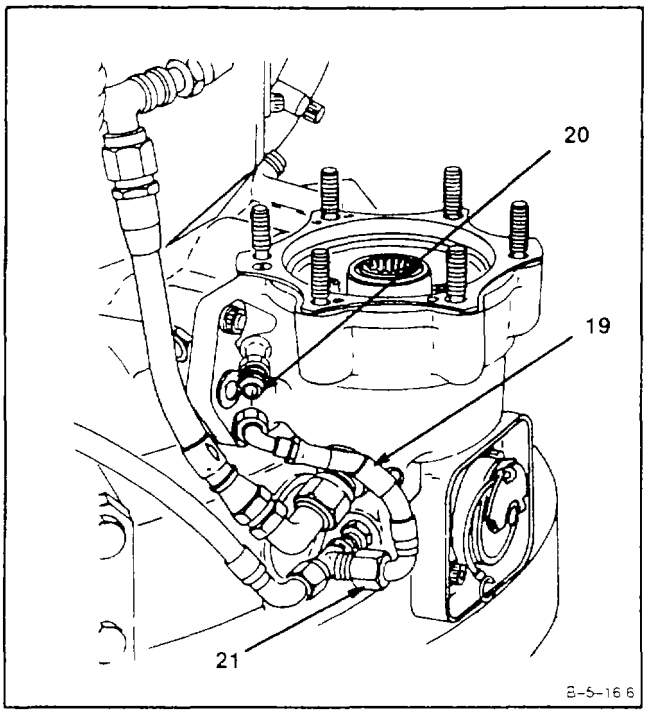
8. Connect hose assembly (19) to fitting (20) Tighten connector (21)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION V
OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY

5-23 REMOVE OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY 5-23

INITIAL SETUP

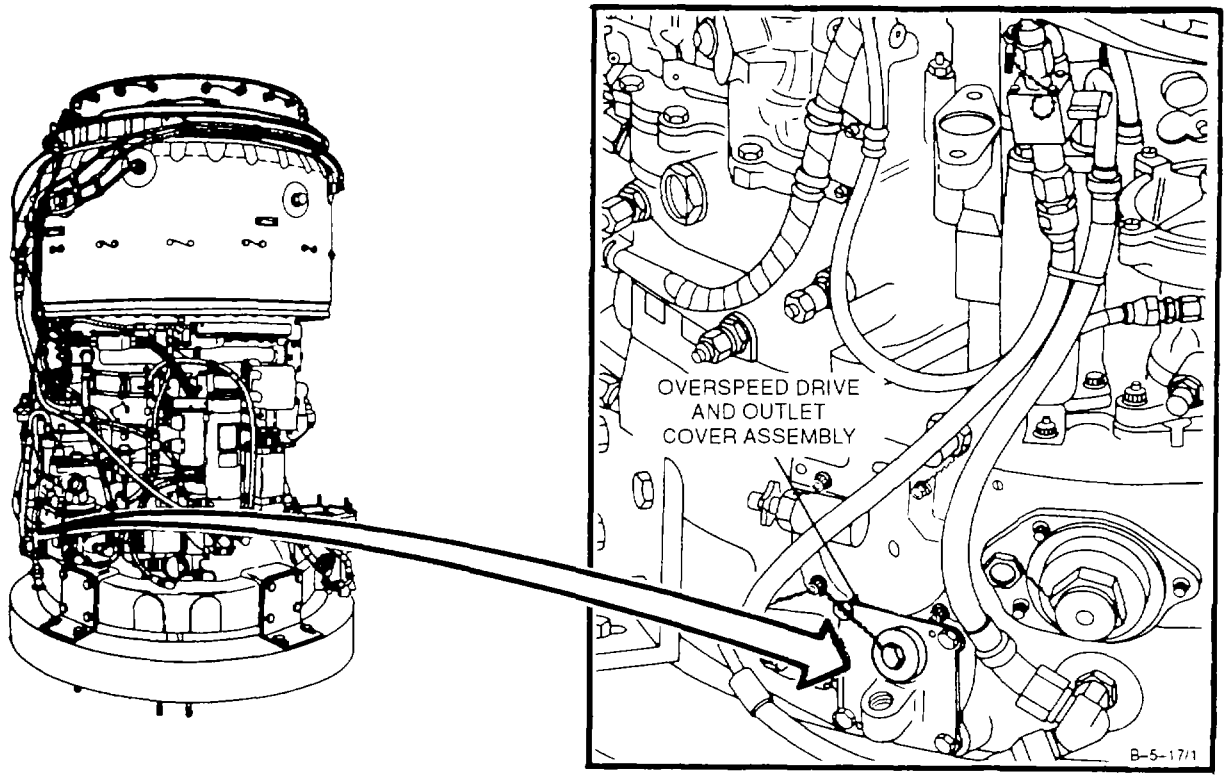
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition
Engine Oil System Drained (Task 1-69)
Tube Assembly Removed (Inlet Housing to Main Oil Pump) (Task 8-65)



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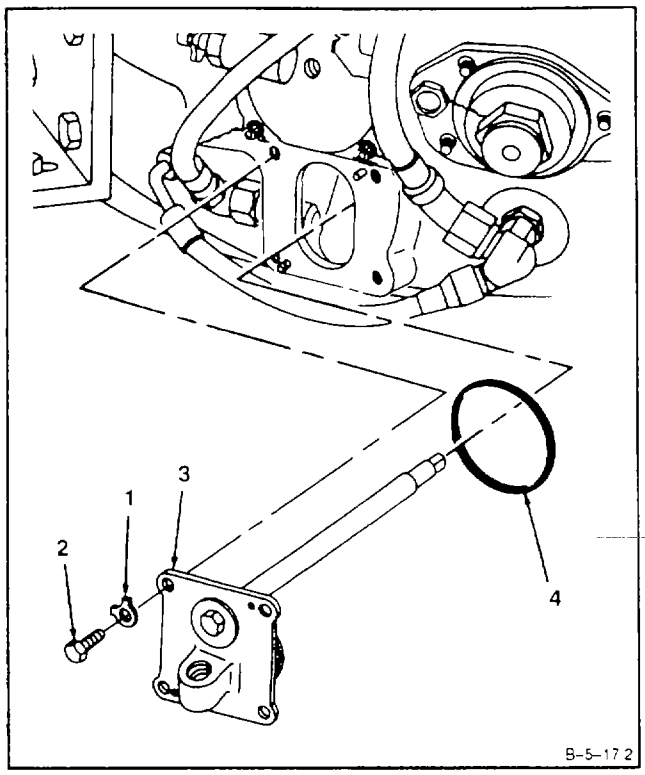
1. Remove lockwire and straighten tabs of four washers (1). Remove four bolts (2) and washers (1). **Remove overspeed drive cover (3)** and packing (4)



FOLLOW-ON MAINTENANCE:
None

END OF TASK

5-24 DISASSEMBLE OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY 5-24

INITIAL SETUP

Applicable Configurations:
All

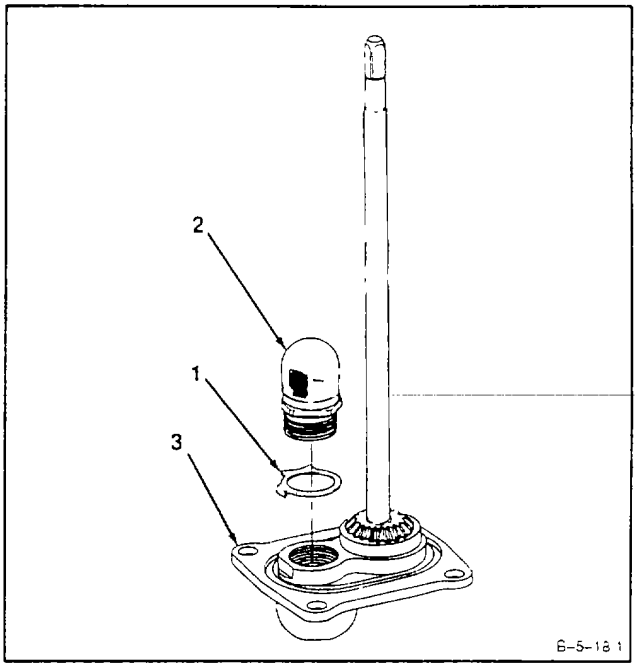
Tools:
Powerplant Mechanic's Tool Kit'
NSN 5180-00-323-4944
Mechanical Puller Attachment,
NSN 5120-00-711-6753
Wrench (Appendix E)
Vise
Jaw Caps

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition
Off Engine Task
Engine Oil Drained (Task 1-69)
Overspeed Drive and Outlet Cover Assembly Removed (Task 5-23)

1. Straighten washer (1) **Remove strainer (2)** and washer (1) from cover (3) Use wrench (Appendix E)



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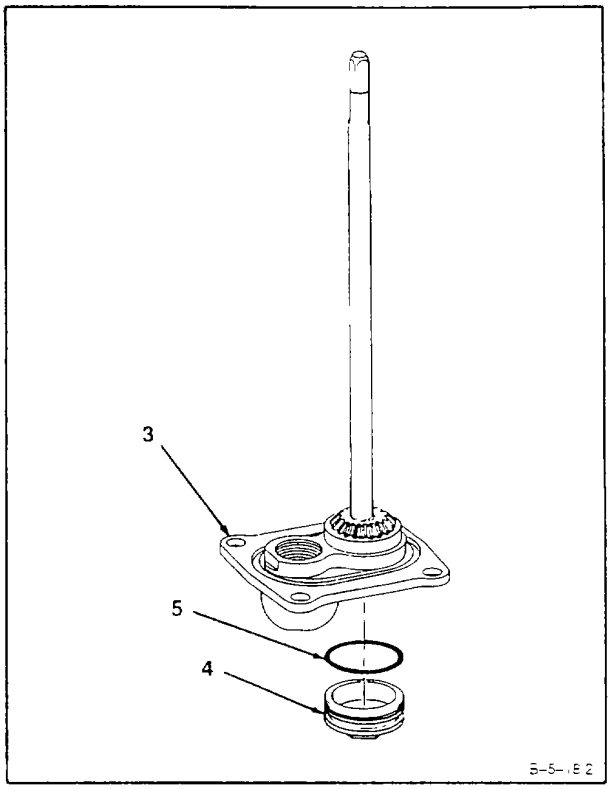
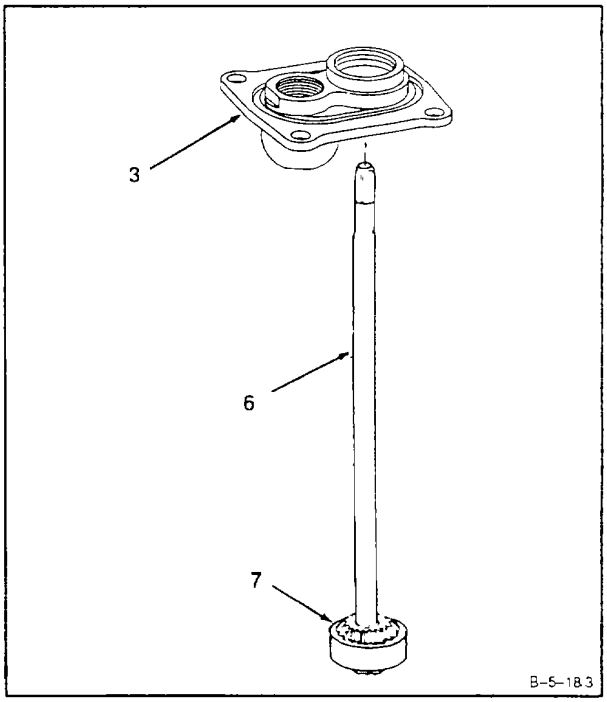
2. **Remove bearing retaining plug (4)** and packing (5) from cover (3)



3. **Tap and remove gear assembly (6) and bearing (7)** as a unit from cover (3)



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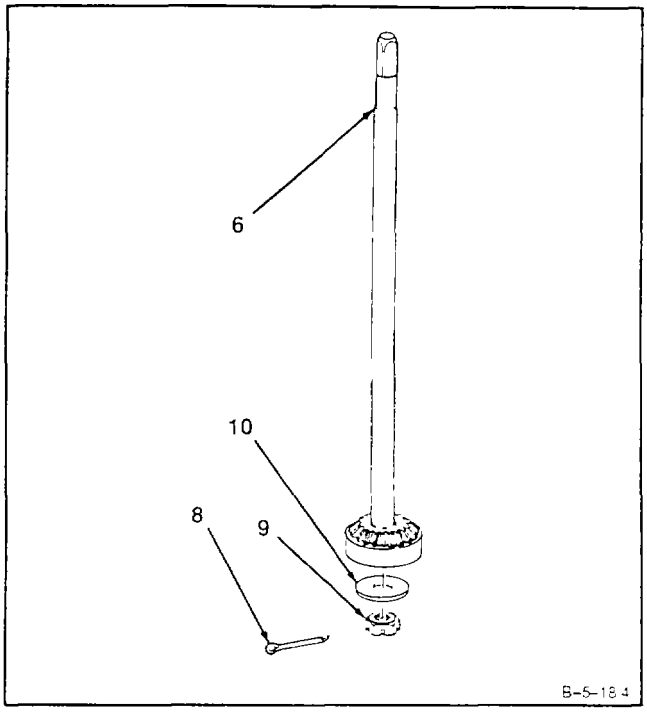
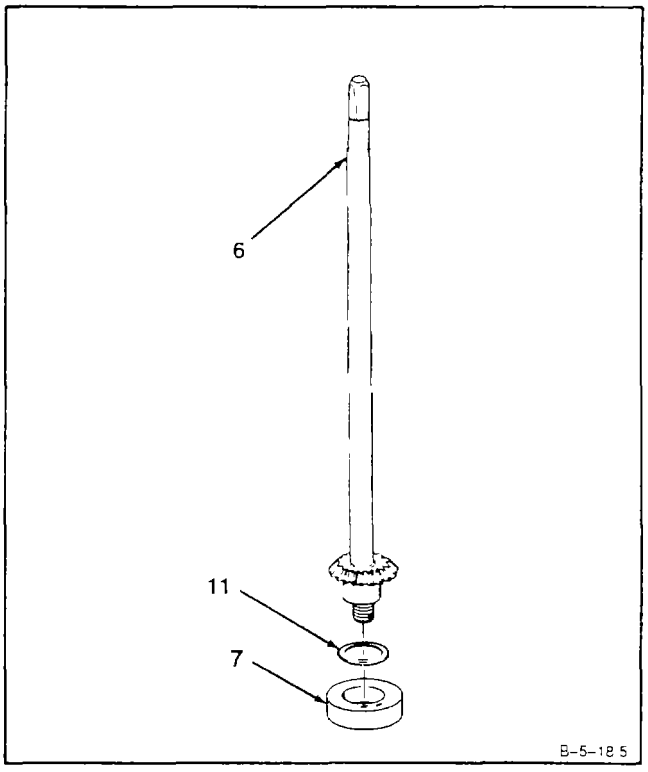
4. **Remove** cotter pin (8), **nut (9),** and washer (10) from gear assembly (6)



5. **Remove bearing (7)** from gear assembly (6) Use mechanical puller attachment

6. Remove shim (11) If shim is a laminated shim, record measurement and discard. Replace with solid shim



FOLLOW-ON MAINTENANCE
None

END OF TASK

5-25 CLEAN OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY 5-25

INITIAL SETUP

Applicable Configurations:
All
Tools:
Goggles
Compressed Air Source
Fiber Brush
Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)
Personnel Required:
Aircraft Powerplant Repairer
Equipment Condition:
Off Engine Task
Engine Oil Drained (Task 1-69)
Overspeed Drive and Outlet Cover Removed (Task 5-23)
Overspeed Drive and Outlet Cover Disassembled (Task 5-24)
General Safety Instructions:

WARNING

Dry Cleaning Solvent (E19) 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

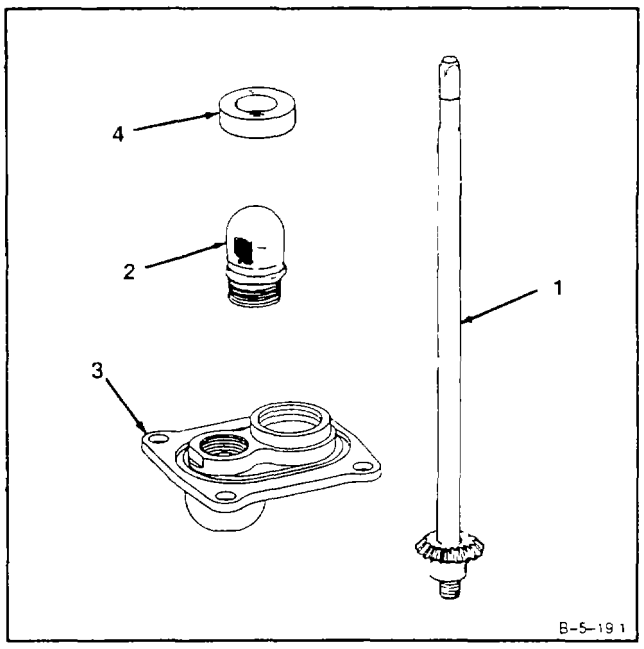
Protect bearings from damage. Handle only in clean area. Use clean, lint-free cloth (E30). Damaged bearings can cause engine failure.

1. Wear gloves (E24) **Clean gear assembly (1), strainer (2), cover (3), and bearing (4)** by immersing in dry cleaning solvent (El 9) Scrub with a fiber brush.

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin In case of injury, get medical attention.

2. Wear goggles. Blow dry. Use clean, dry, compressed air.



FOLLOW-ON MAINTENANCE
Inspect (Task 5-26).

END OF TASK

5-26 INSPECT OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY 5-26

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
Lint-Free Cloth (E30)
Lubricating Oil (E35 or E36)
Personnel Required:
Aircraft Powerplant Inspector
References:
Task 1-109
Equipment Condition:
Off Engine Task

1. **Inspect gear assembly (1)**

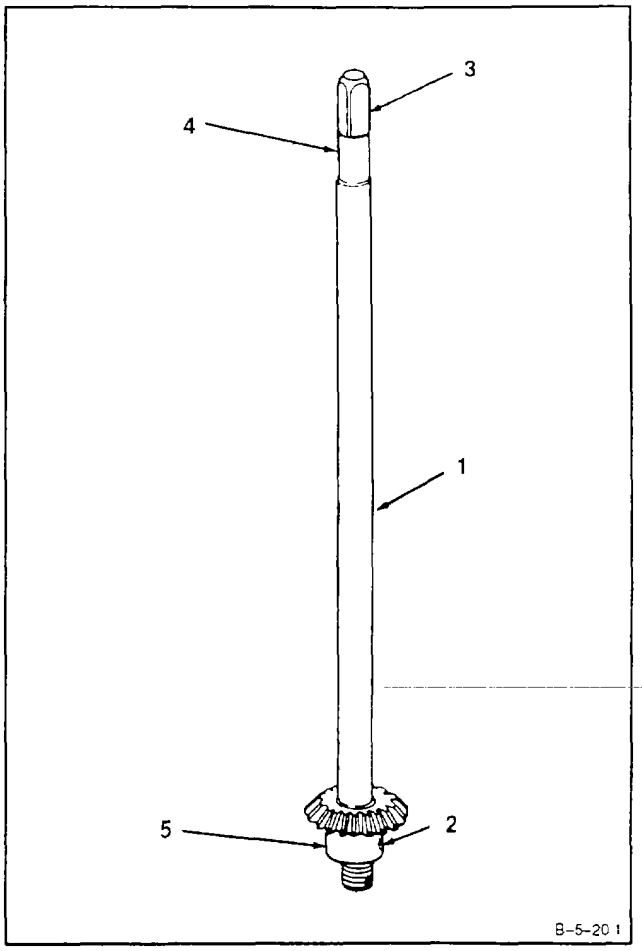
   a. There shall be no cracked or chipped teeth.

   b. There shall be no bends in shaft.

   c. Pin (2) shall not be missing, broken, or loose.

   d. Spline (3) shall not be worn deeper than 0.007 inch (Ref Task 1-109).

   e. There shall be no wear or scoring on machined area (4) and journal (5) deeper than 0.009 inch.



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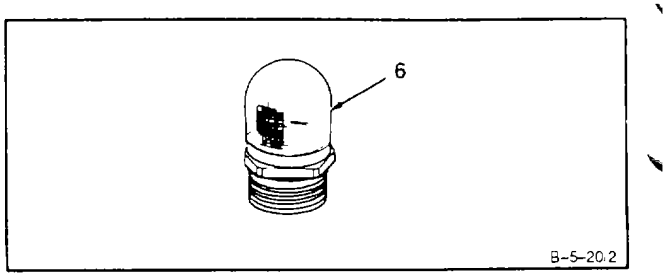
2. **Inspect strainer (6).**

   a. There shall be no contamination.

   b. There shall be no tears in wire mesh.



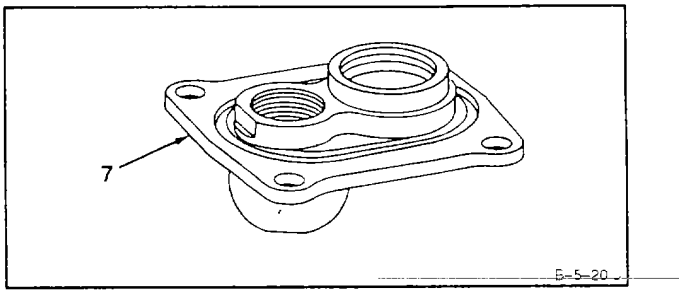
3. **Inspect cover (7)**for cracks. There shall be no cracks.

4. **Inspect bearing (8).**

   a. There shall be no rust or broken parts

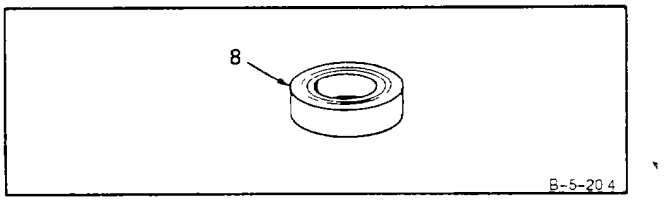
   b. There shall be no pitting

   c. There shall be no red-purple, purple or blue discoloration



WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store In approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If Irritation of skin results, get medical attention Get medical attention for eyes.



5. Immerse bearing (8) in lubricating oils (E35 or E36) and wrap in lint-free cloth (E30)

FOLLOW-ON MAINTENANCE

None

END OF TASK

5-27 REPAIR OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

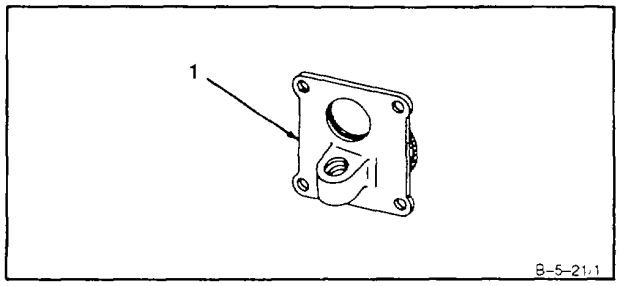
Materials
Acid Swabbing Brush (E2)
Crocus Cloth (E26)
Gray Enamel (E26)

Personnel Required:
Aircraft Powerplant Repairer

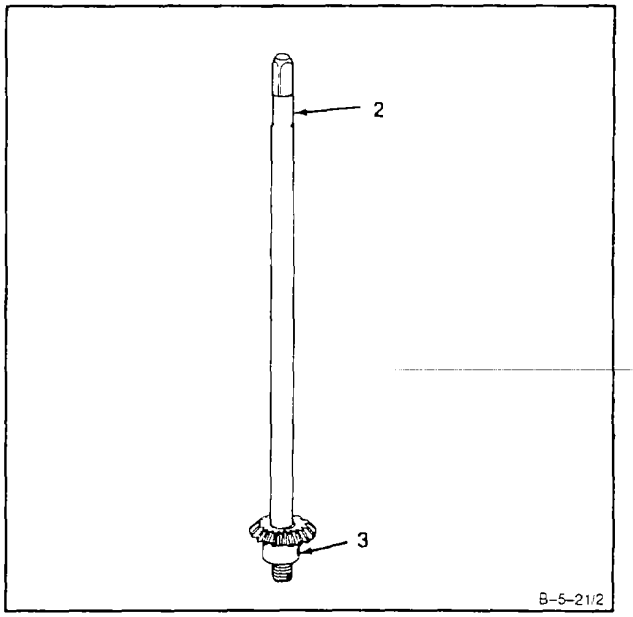
References:
Task 1-110

Equipment Condition
Off Engine Task

1. **Repair damaged paint on cover (1).** Apply a coat of gray enamel (E26) Use acid swabbing brush (E2) Use procedures for touch-up of magnesium and magnesium alloys (Ref Task 1-110)



2. Polish machined area (2) and journal (3) that have wear or scoring less than 0.009 inch. Use crocus cloth (E16)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

5-28 ASSEMBLE OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY 5-28

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Sleeve (Appendix E)
Wrench (Appendix E)
Torque Wrench, 30-150 Inch-Pounds
Machinist's Vise
Jaw Caps
Arbor Press

Parts:
Packings
Shim
Cotter Pin

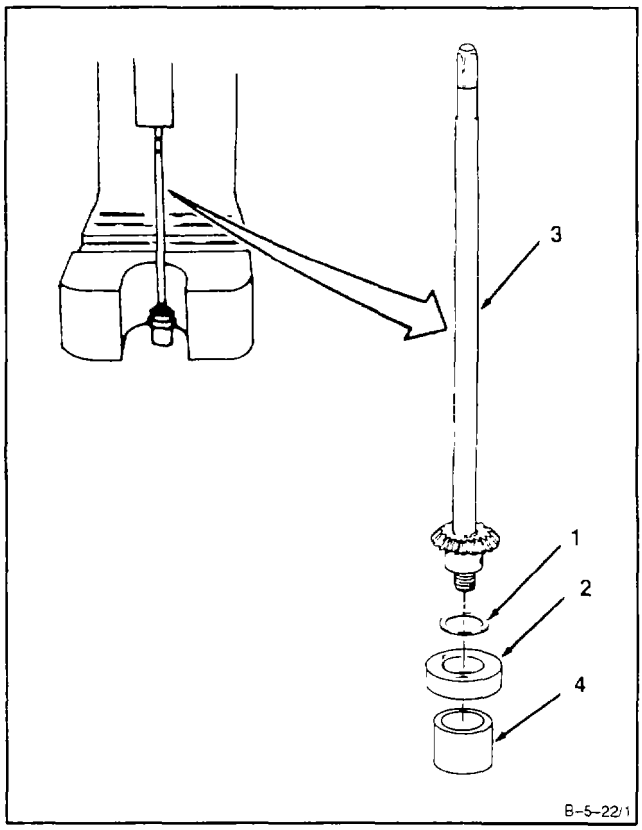
Materials:
None

Personnel Required:
Aircraft Power plant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P

Equipment Condition:
Off Engine Task

1. **Install shim (1) and bearing (2)** on gear assembly (3) Use sleeve (Appendix E) (4)



INSPECT

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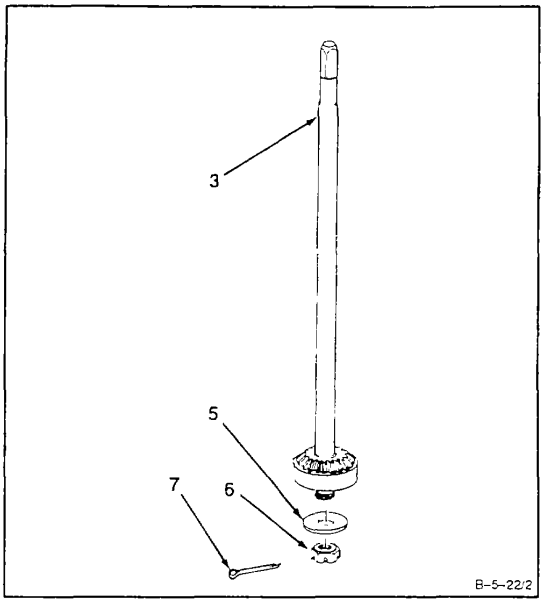
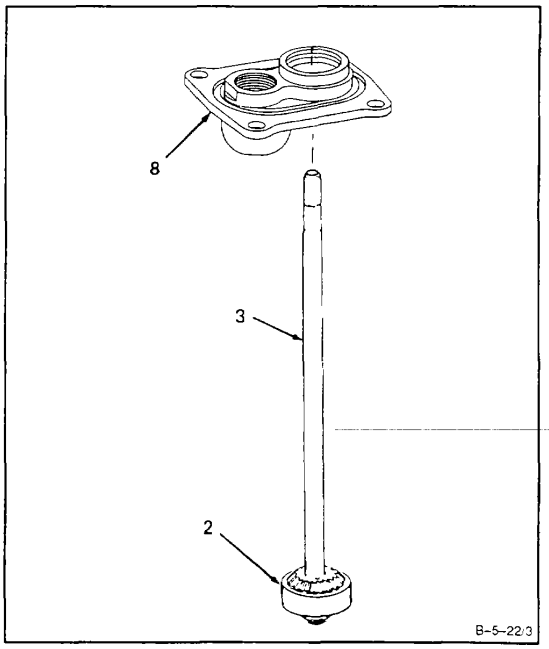
2. **Install** washer (5) and nut **(6)** on gear assembly (3). **Torque nut (6) to40 to 50 inch-pounds**

3. Install cotter pin (7).



4. **Install gear assembly (3) and bearing (2)** into cover (8).



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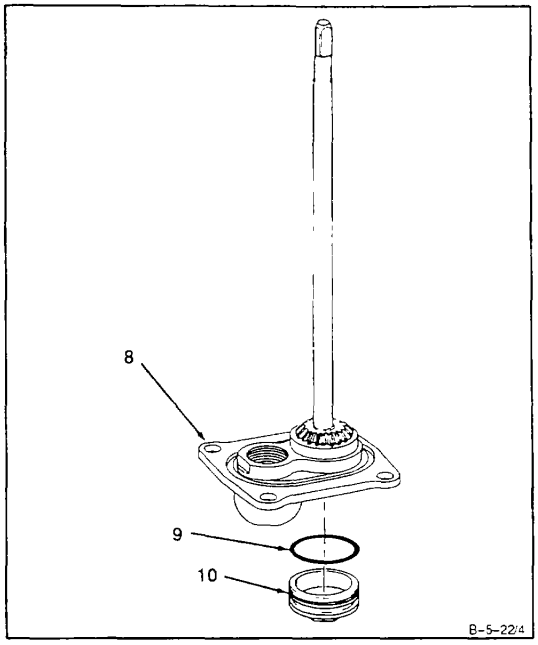
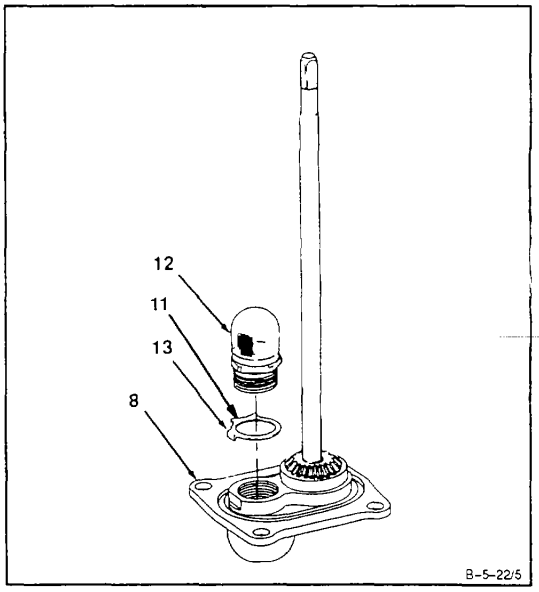
5-28 ASSEMBLE OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY (Continued) 5-28

5. **Install** packing (9) and **bearing retaining plug (10)** in cover (8). **Torque plug (10) to45 inch-pounds**



6. **Install** washer (11) and **strainer** (12) into cover (8). Torque strainer to **25 inch-pounds**. Use wrench (Appendix E).

7. **Bend tab (13) of washer (11)** up against strainer (12).



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

5-29 INSTALL OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY 5-29

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Torque Wrench, 30-150 Inch-Pounds

Materials:

Lockwire (E33)
Lubricating Oil (E36)
Lubricating Oil (E37)
Shortening Compound (E51)

Parts:

Packing

Personnel Required:

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

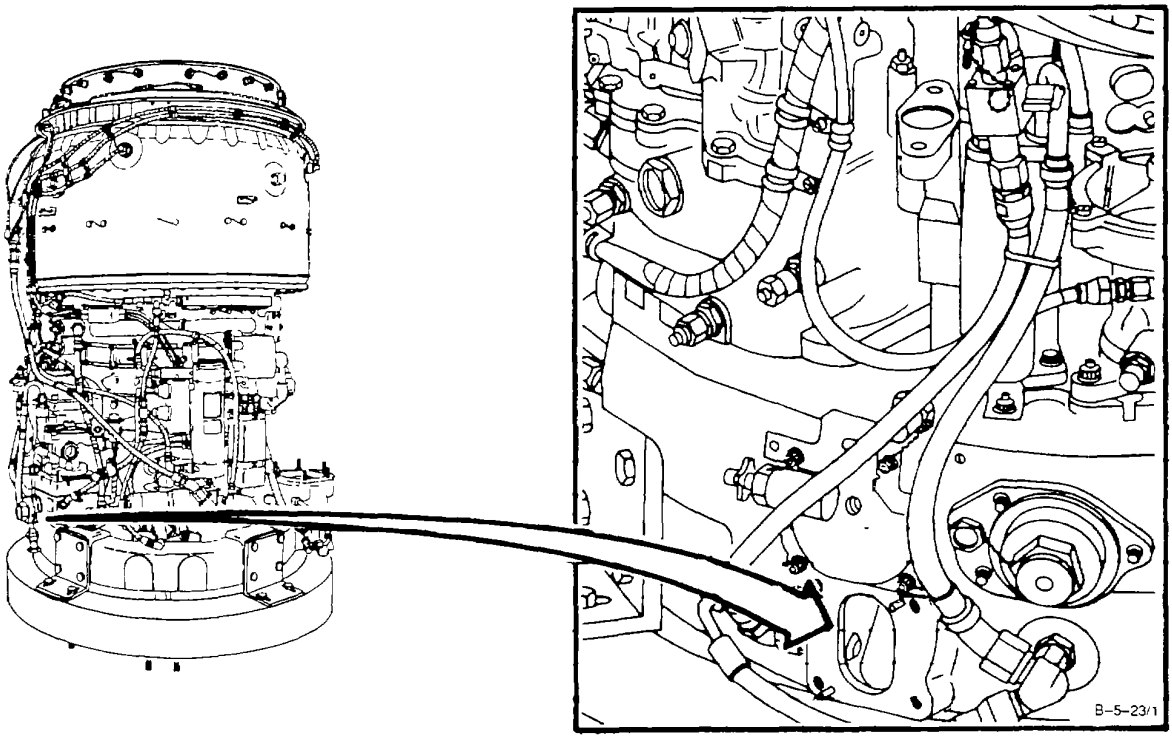
References:

TM 1-2840-252-23P

General Safety Instructions:

WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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NOTE

If either accessory gearbox assembly or overspeed drive gear assembly is a replacement, check backlash on overspeed drive gear (Ref Task 5-30).

1. Install packing (1) on overspeed drive and outlet cover assembly (2)

WARNING

Lubricating oils cause paralysis If swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

CAUTION

It may be necessary to remove inlet housing cover assembly (Ref. Task 2-44) to allow visual Inspection of garter seal while Installing overspeed drive gearshaft. Failure to properly install gearshaft could result In damage to garter seal.

NOTE

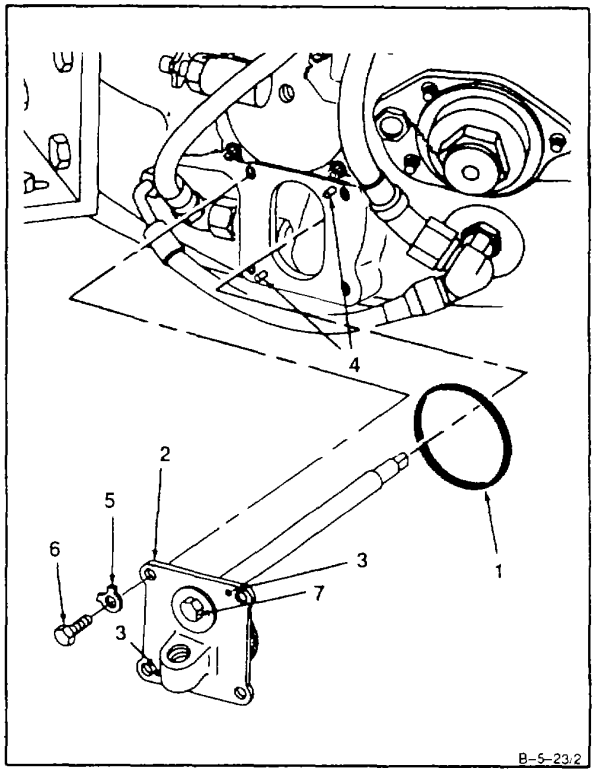
Use care in guiding gearshaft through output shaft support housing garter seal

2. Coat end of gearshaft (3) with shortening compound (E51), or lubricating oil (E36) or (E37)

3. Align holes (4) in cover (2) with pins (5) and **Install cover assembly (2)** four washers (6), and bolts (7)

4. Bend tabs of washers (6)

5. Lockwire plug (8) Use lockwire (E33)



INSPECT

FOLLOW-ON MAINTENANCE

Install Tube Assembly (Inlet housing to Main **Oil** Pump) (Task 8-66)
Service Engine Oil System (Task 1-68)

END OF TASK

5-30 BACKLASH CHECK OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY 5-30

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tools Kit,
NSN 5180-00-3234944
Technical Inspection Tool Kit
NSN 5180-00-323-5114
Sleeve (Appendix E)
Wrench (Appendix E)
Torque Wrench, 30-150 Inch-Pounds
Machinist's Vise
Jaw Caps
Arbor Press
Dial Indicator
Backlash Gage (T6)
Outside Micrometer Caliper Set
Gear Holding Fixture (T3)
Materials.
Lubricating Oil (E36)
Lubricating **Oil** (E37)
Shortening Compound (E51)
Parts
Packings
Shim
Cotter Pin

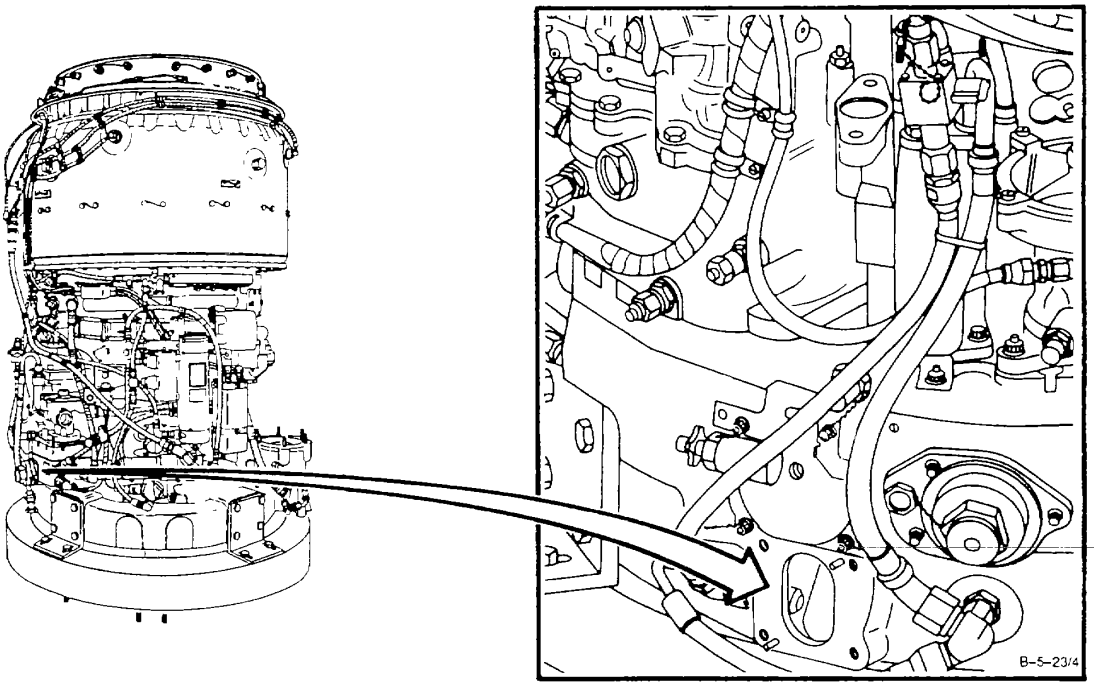
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P

General Safety Instructions.

WARNING

Lubricating oils cause paralysis it swallowed. Prolonged contact with them may irritate the skin Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally Wash contacted area of skin thoroughly after handlng. If irritation of skin results, get medical attention Get medical attention for eyes.



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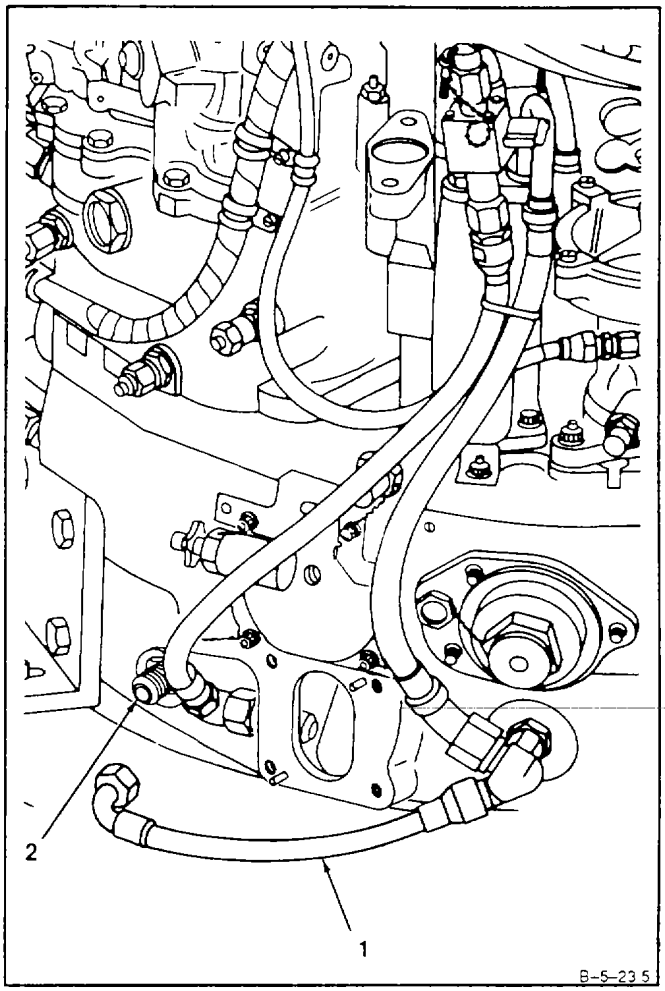
5-30 BACKLASH CHECK OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY (Continued) 5-30

1. Disconnect hose assembly (1) from fluid passage bolt (2)



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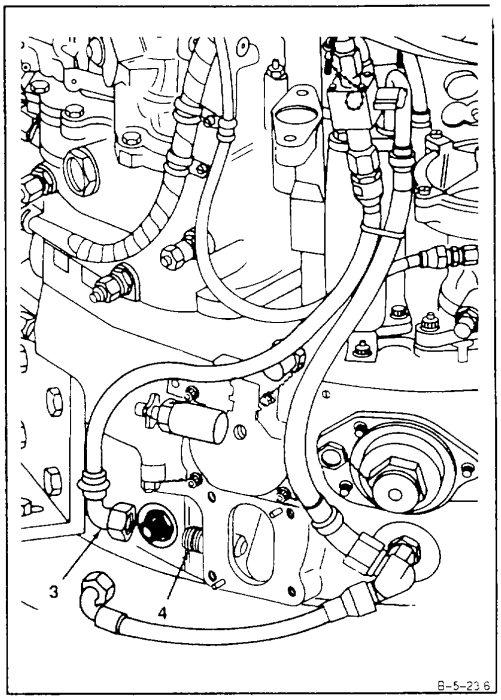
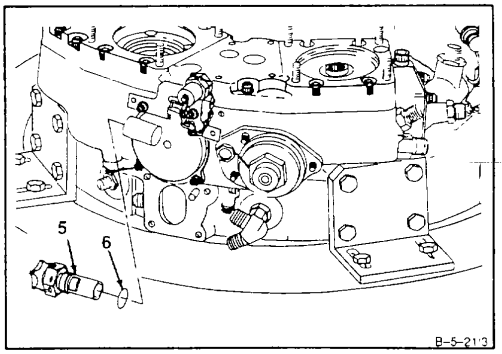
2. **Disconnect hose assembly (3)** from nipple (4)



3. **Remove** lockwire **chip detector (5),** and packing (6)



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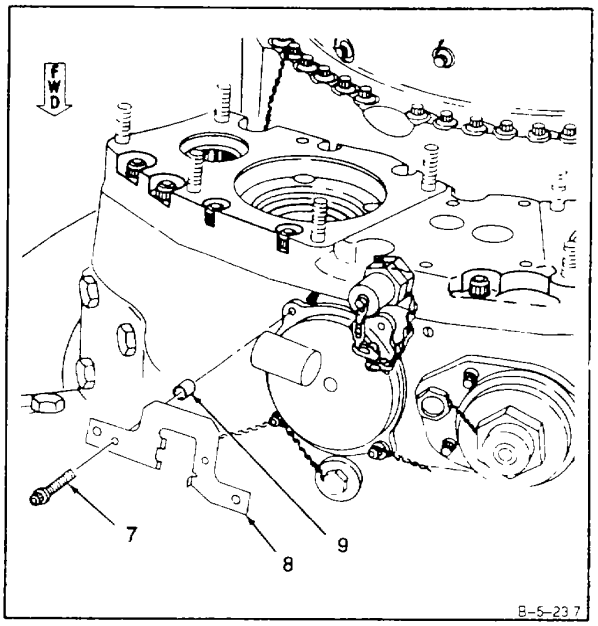
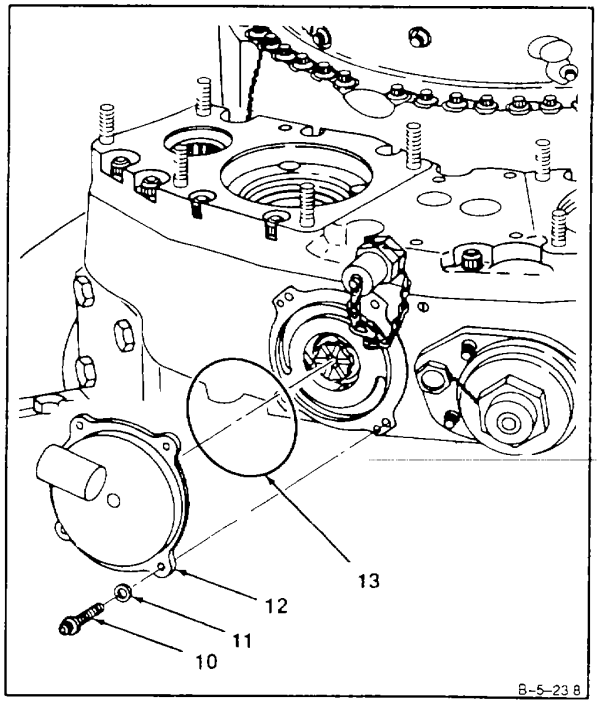
4. **Remove** lockwire, two bolts (7), spacers (9), and **bracket (8).**



5. **Remove** lockwire, two bolts (10), washers (11) **housing (12),** and packing (13)



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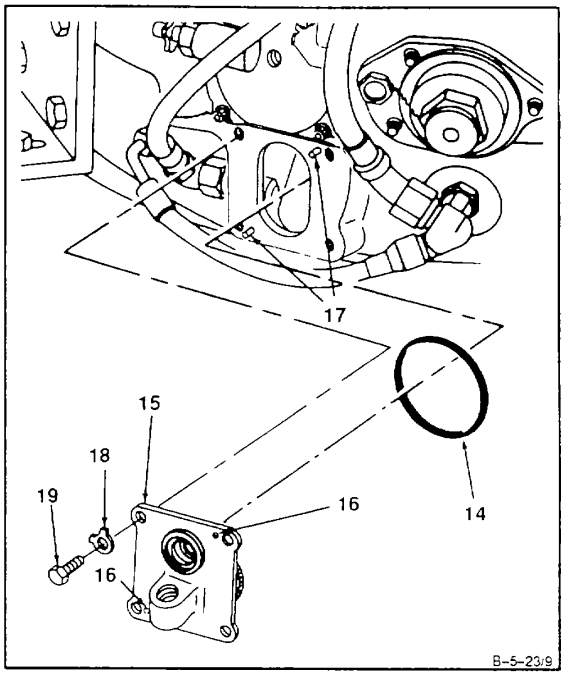
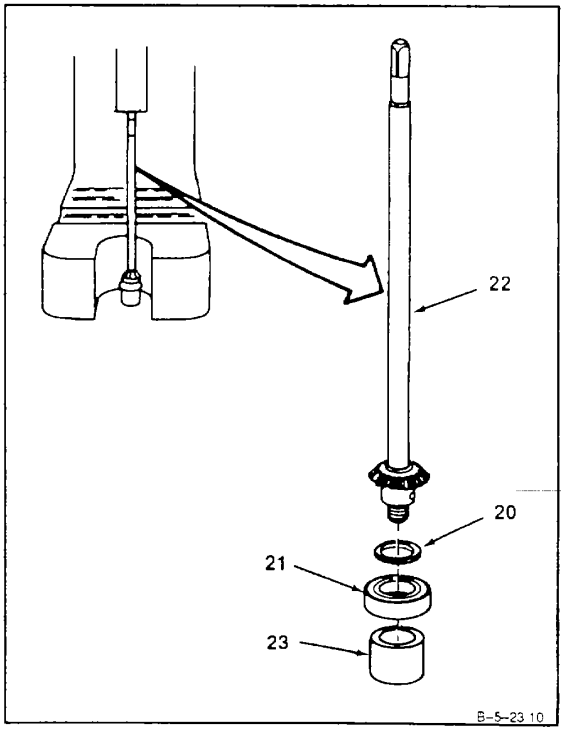
6. Install packing (14) on overspeed drive and outlet cover assembly (15)

7. Align holes (16) in cover (15) with pins (17) and **install cover assembly(15),** four washers (18), and bolts (19)



8. **Install shim (20) and bearing (21)** on gear assembly (22) Use sleeve (Appendix E) (23)



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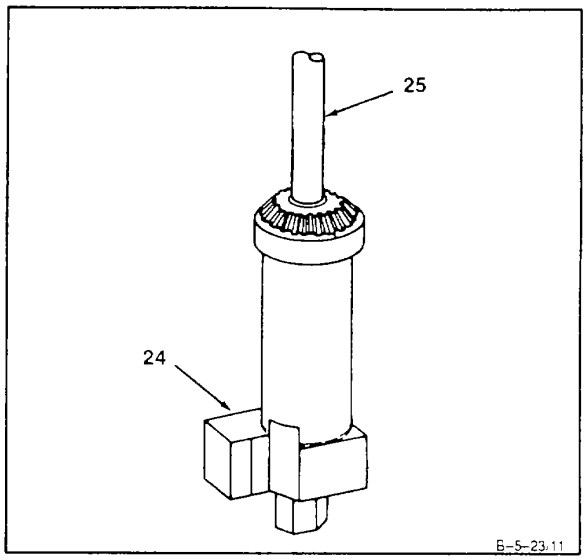
9. **Install backlash gage (T6) (24) on threaded end of gear and bearing assembly (25).**



WARNING

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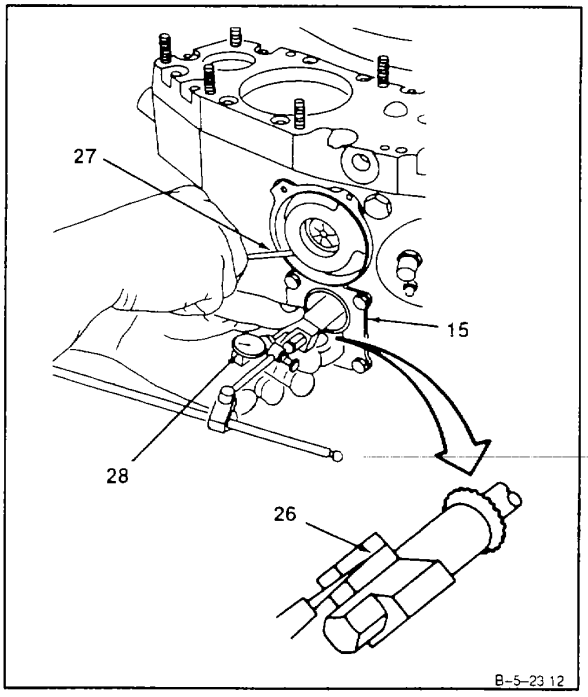
CAUTION

It may be necessary to remove inlet housing cover assembly (Ref Task 2-44) to allow visual inspection of garter seal while installing overspeed drive gearshaft. Failure to properly install gearshaft could result in damage to garter seal.

NOTE

Use care in guiding gearshaft through output shaft support housing garter seal



10. Coat end of gearshaft with shortening compound (E51) or lubricating oil (E36) or (E37)

11. Install bevel gear assembly and backlash gage (26) through overspeed drive cover assembly (15)

12. Insert gear holding fixture (T3) (27) into gearbox and lock bevel gear

13. Using backlash gage dial indicator (28) with indicator tip on scribed line on backlash gage, check backlash of bevel gear Backlash shall be 0.007 inch to 0.013 inch

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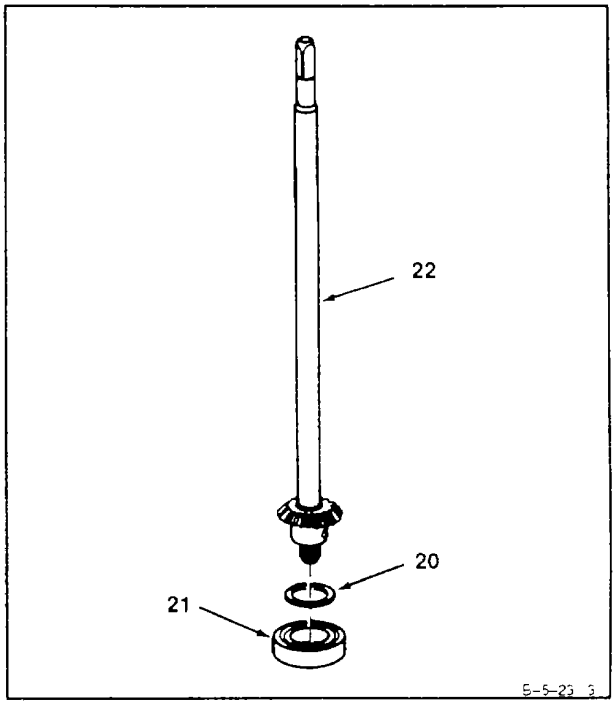
NOTE

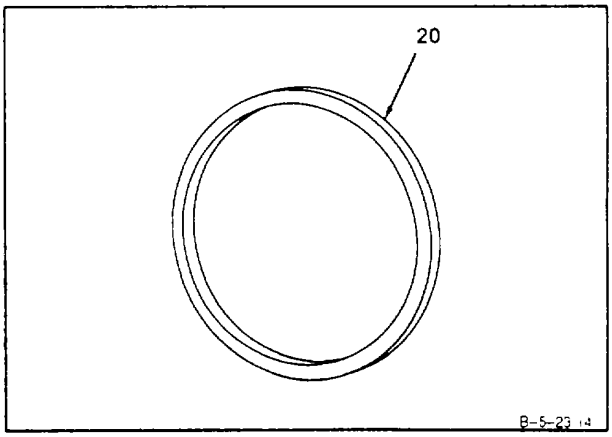
If backlash is not within limits do all steps
If backlash is within limits omit steps 14 and 15

14. If backlash is not within limits proceed as follows

    a. Remove bearing (21) and shim (20) from gear assembly (22)



    b. Measure thickness of shim (20) in three locations 120 degrees apart Use outside micrometer caliper Record average thickness of shim (20)



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NOTE

If backlash is less than 0.007 inch, a thinner shim must be installed If backlash is greater than 0.013 inch, a thicker shim must be installed Increasing or decreasing shim thickness by 0.002 inch will change backlash approximately 0.001 inch

c. Select shim from shim selection table

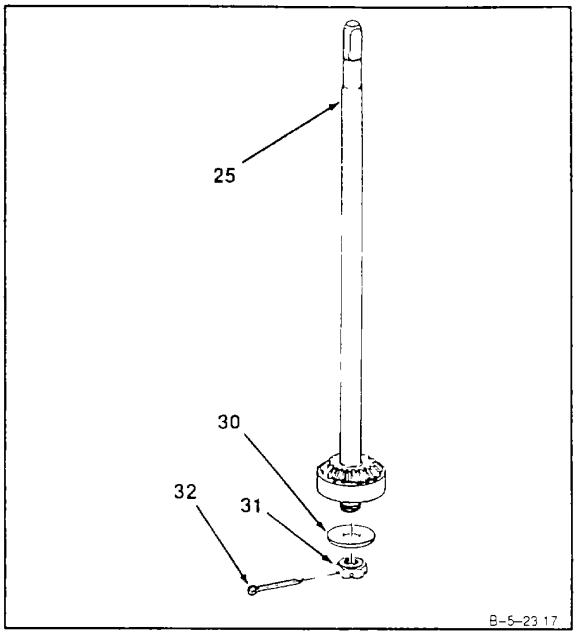
15. Repeat steps 8 thru 13

SHIM SELECTION TABLE

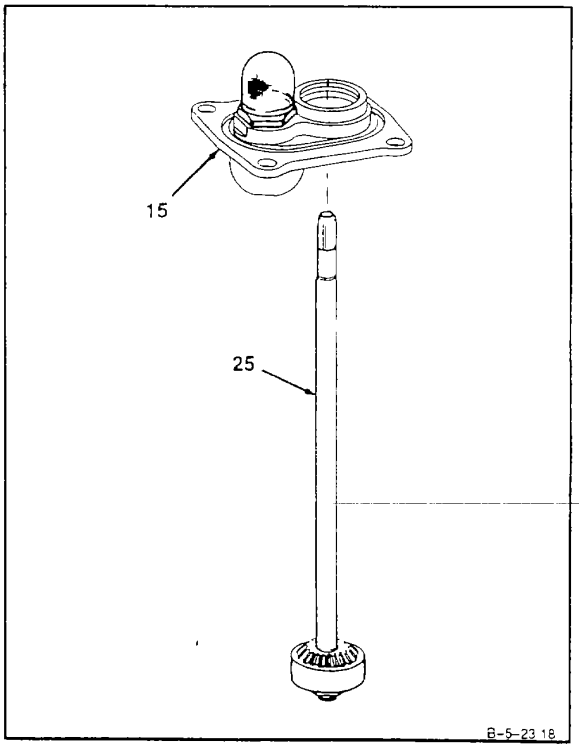
SHIM PART NUMBER	SIZE (INCH)
2-080-229-01	0.0015-0.0035
2-080-229-02	0.004-0.006
2-080-229-03	0.007-0.009
2-080-229-04	0.010-0.012
2-080-229-05	0.013-0.015
2-080-229-06	0.016-0.018
2-080-229-07	0.019-0.021
2-080-229-08	0.022-0.024
2-080-229-09	0.025-0.027
2-080-229-10	0.028-0.030
2-080-229-11	0.031-0.033
2-080-229-12	0.034-0.036
2-080-229-13	0.037-0.039
2-080-229-14	0.040-0.042
2-080-229-15	0.043-0.045
2-080-229-16	0.046-0.048

GO TO NEXT PAGE

16. **Install** washer (30) and **nut (31)** on gear and bearing assembly (25) **Torque nut (31) to 45 inch-pounds** Align cotter pin (32) **with** hole in nut (31) Install cotter pin (32) Bend cotter pin



17. **Install gear and bearing assembly (25)** into cover assembly (15)



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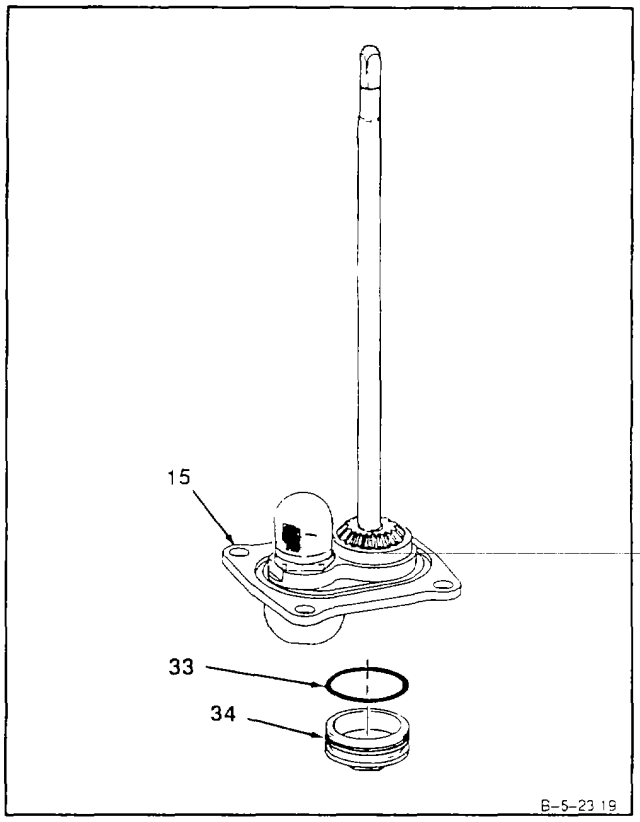
18. Install packing (33) and **bearing retaining plug (34)** in cover assembly (15) **Torque plug (34) to 45 inch-pounds.**



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19. Install packing (14) on overspeed drive and outlet cover assembly (15)

WARNING

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CAUTION

It may be necessary to remove Inlet housing cover assembly (Ref.Task 2-44) to allow visual inspection of garter seal while Installing overspeed drive gearshaft. Failure to properly Install gearshaft could result in damage to garter seal.

NOTE

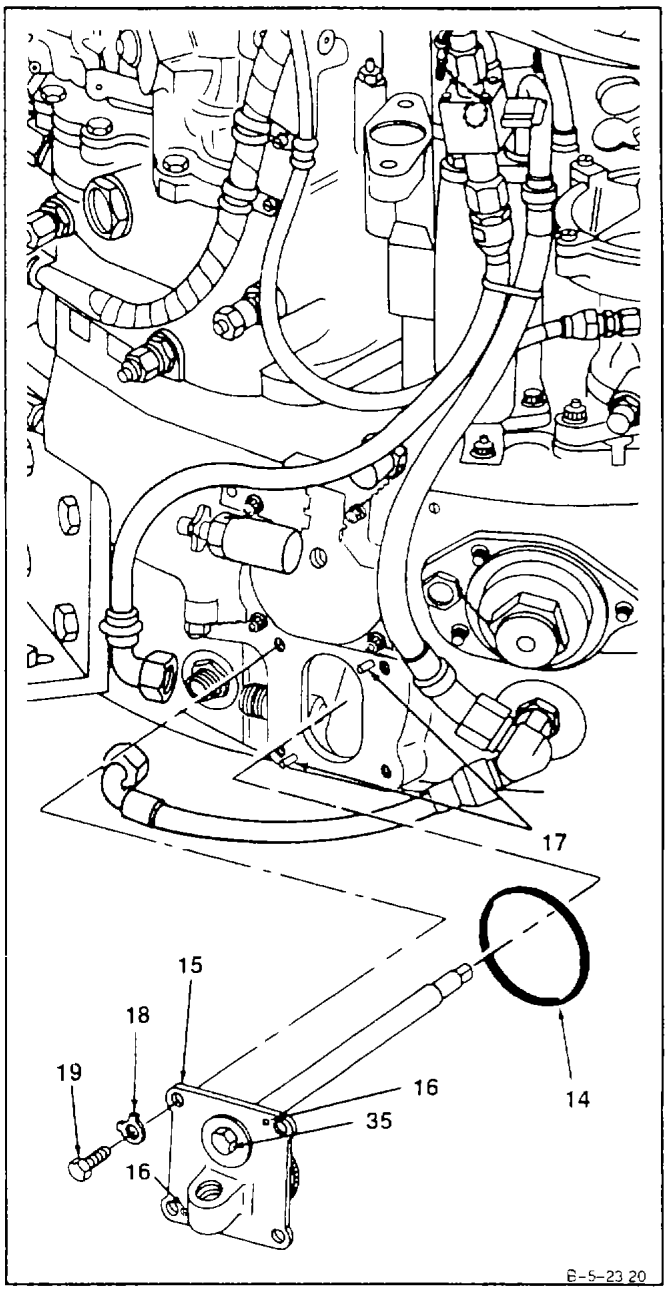
Use care in guiding gearshaft through output shaft support housing garter seal

20. Coat end of gearshaft with shortening compound (E51), or lubricating oil (E36) or (E37)

21. Align holes (16) in cover assembly (15) with pins (17) and **Install cover assembly (15),** four washers (18), and bolts (19)

22. Bend tabs of washers (18)

23. Lockwire plug (35) Use lockwire (E33)



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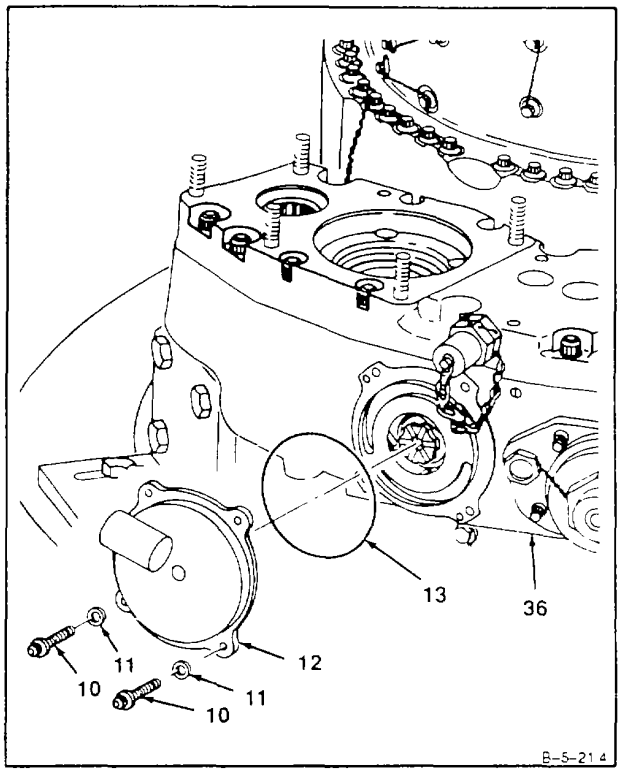
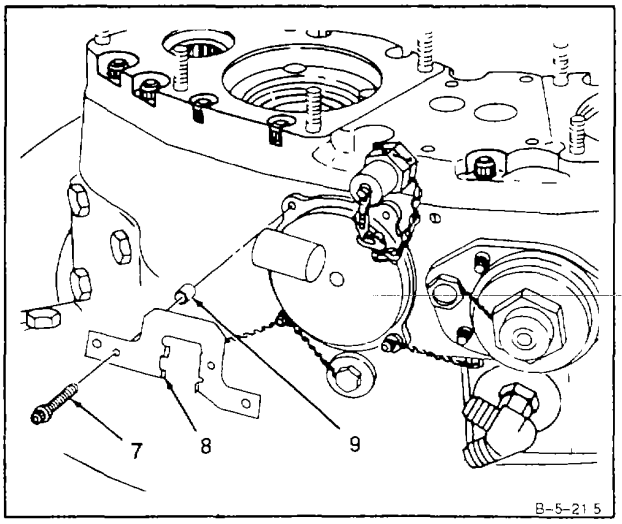
24. Install packing (13) on housing (12) **Install housing (12),** two washers (11), and bolts (10) on accessory gearbox assembly (36) Lockwire bolts (10) Use lockwire (E33)



25. **Install** two spacers (9), **bracket** (8), and two bolts (7) Lockwire bolts (7) Use lockwire (E33)



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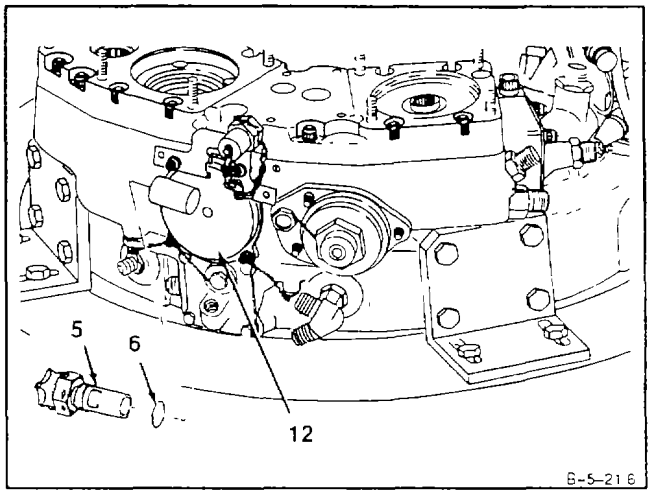
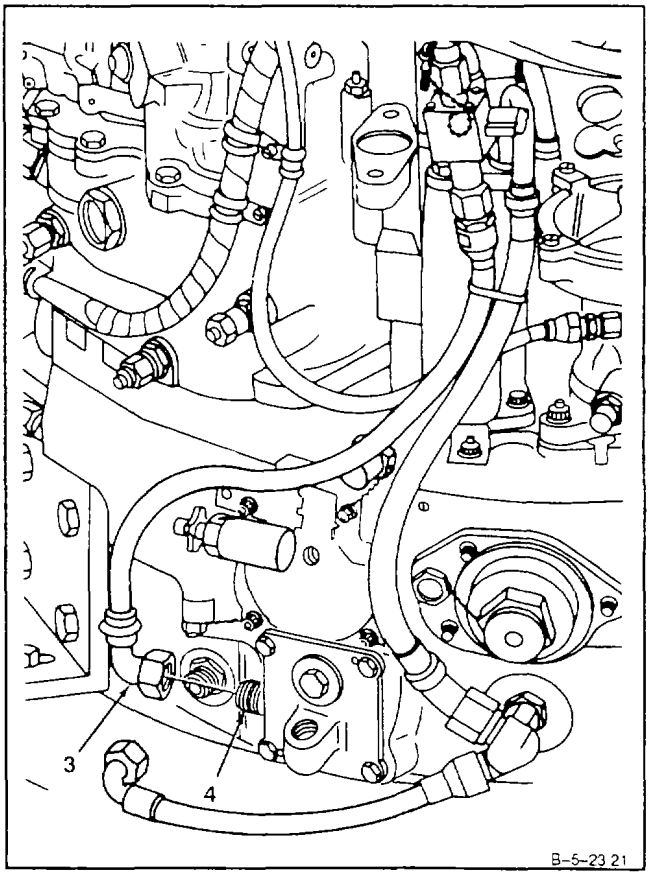
26. **Install** packing (6) and **chip detector (5)** in housing (1 2) Lockwire chip detector (5) Use lockwire (E33)



27. Install hose assembly (3) on nipple (4)



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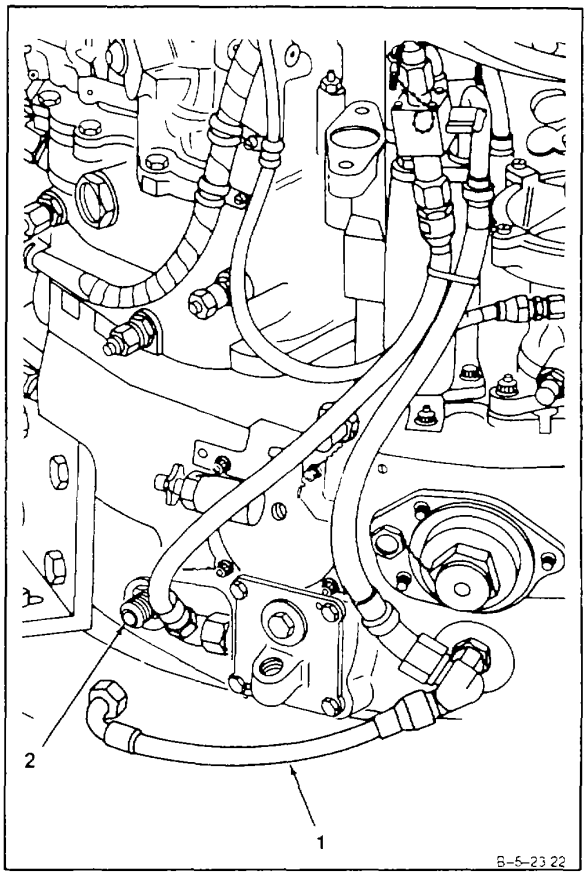
28. Install hose assembly (1) on fluid passage bolt (2)



INSPECT

FOLLOW-ON MAINTENANCE
Install Tube Assembly (Inlet Housing to Main Oil Pump (Task 8-66)
Service Engine Oil System (Task 1-68)

END OF TASK

CHAPTER 6

FUEL SYSTEM - MAINTENANCE INSTRUCTIONS

CHAPTER OVERVIEW I

This chapter contains maintenance procedures for the fuel system It is divided into the following sections and tasks:

SECTION	TASK NO.	TITLE	PAGE
I		HYDROMECHANICAL ASSEMBLY (HMA)	
	6-1	Remove Hydromechanical Assembly (HMA)	6-5
	6-2	Clean Hydromechanical Assembly (HMA)	6-12
	6-3	Inspect Hydromechanical Assembly (HMA)	6-13
	6-4	Repair Hydromechanical Assembly (HMA)	6-15
	6-5	Install Hydromechanical Assembly (HMA)	6-17
II		HYDROMECHANICAL ASSEMBLY (HMA) - PREPARATION FOR STORAGE OR SHIPMENT	
	6-6	Preserve Hydromechanical Assembly (HMA)	6-27
	6-7	Package Hydromechanical Assembly (HMA)	6-32
III		FUEL BOOST PUMP ASSEMBLY	
	6-8	Remove Fuel Boost Pump Assembly	6-35
	6-9	Clean Fuel Boost Pump Assembly	6-37
	6-10	Inspect Fuel Boost Pump Assembly	6-38
	6-11	Repair Fuel Boost Pump Assembly	6-39
	6-12	Install Fuel Boost Pump Assembly	6-42
IV		FUEL BOOST PUMP ASSEMBLY - PREPARATION FOR STORAGE OR SHIPMENT	
	6-13	Preserve Fuel Boost Pump Assembly	6-47
	6-14	Package Fuel Boost Pump Assembly	6-48
V		LEFT- AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES	
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SECTION I

HYDROMECHANICAL ASSEMBLY (HMA)

6-1 REMOVE HYDROMECHANICAL ASSEMBLY (HMA) 6-1

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Container, 1 Quart
Putty Knife

Materials:

Wiping Rag (E64)
Caps

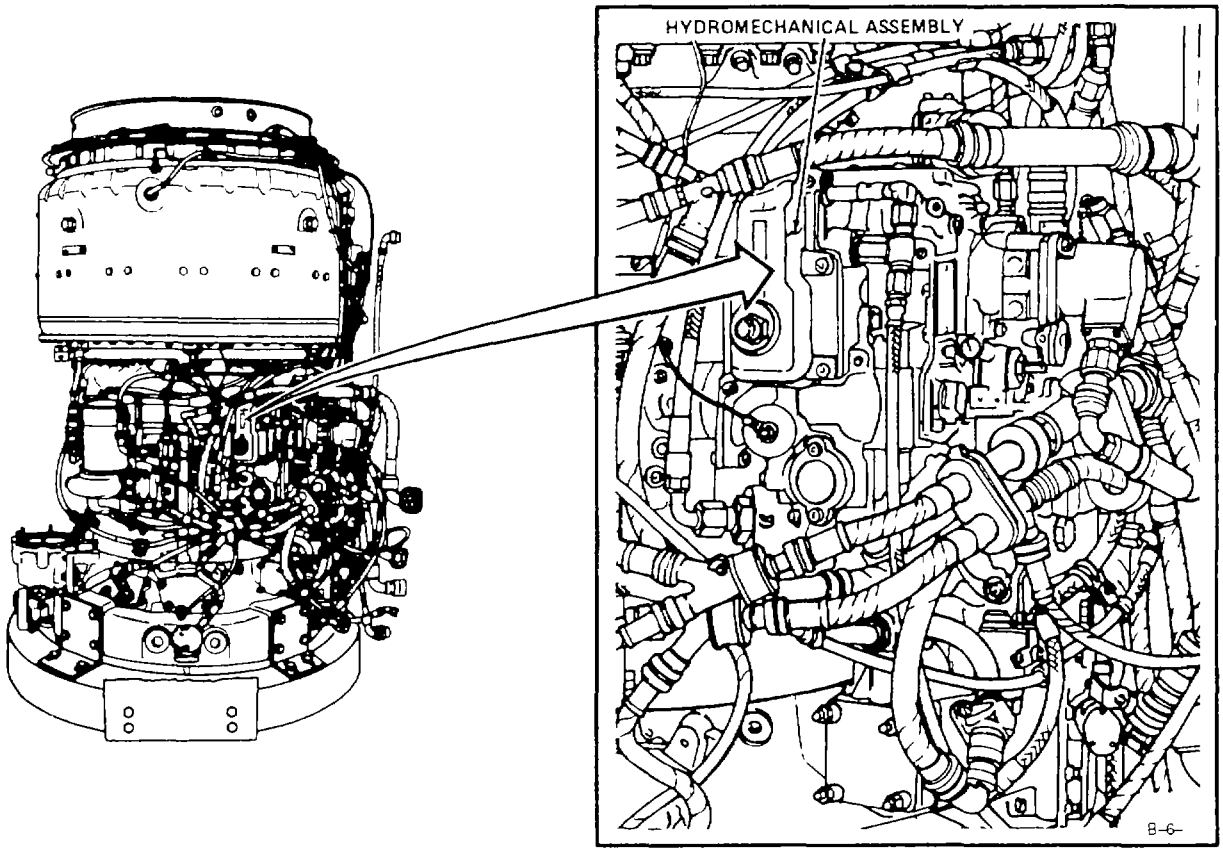
Personnel Required:

Aircraft Powerplant Repairer (2)

General Safety Instructions:

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention Get medical attention for eyes.



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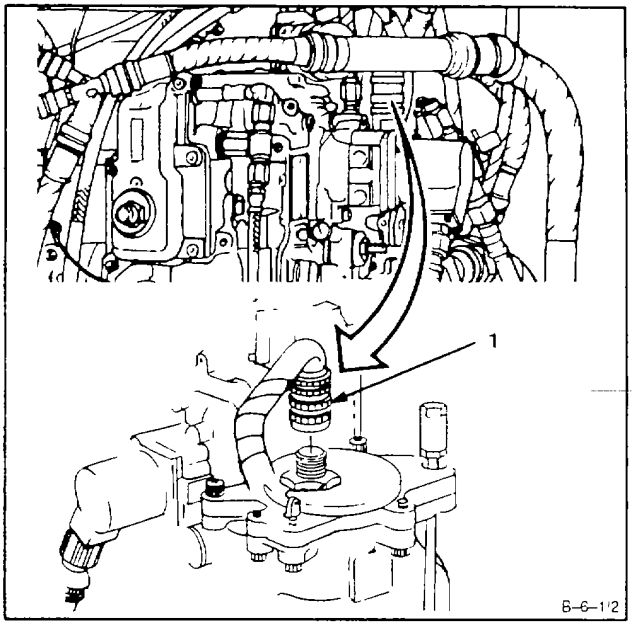
NOTE

If hydromechanical assembly is being removed from engine and will not be reinstalled for a period longer than 48 hours, it must be preserved after removal.

1 **Disconnect electrical connector (1).**



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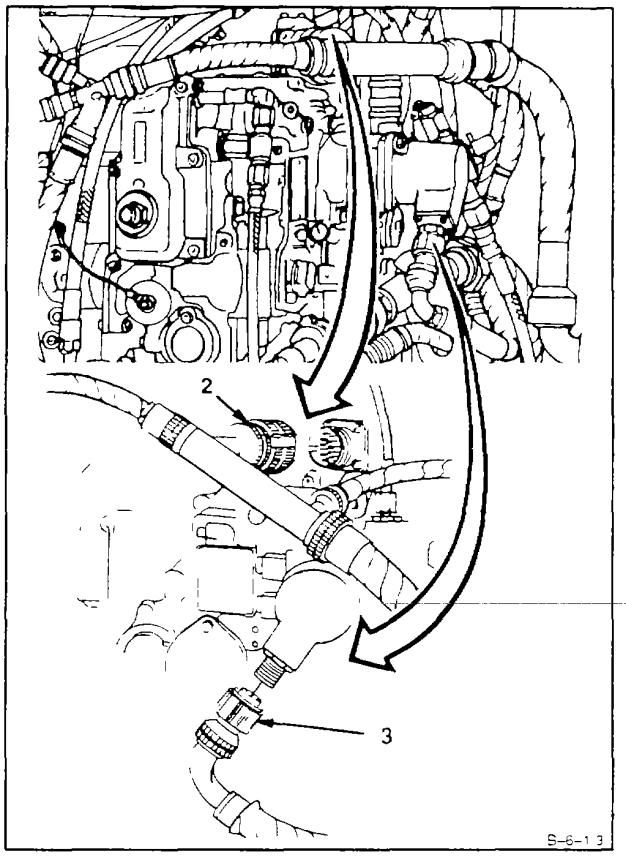
6-1 REMOVE HYDROMECHANICAL ASSEMBLY (HMA) (Continued) 6-1

2. **Disconnect electrical connector (2).**

3. Disconnect electrical connector (3).



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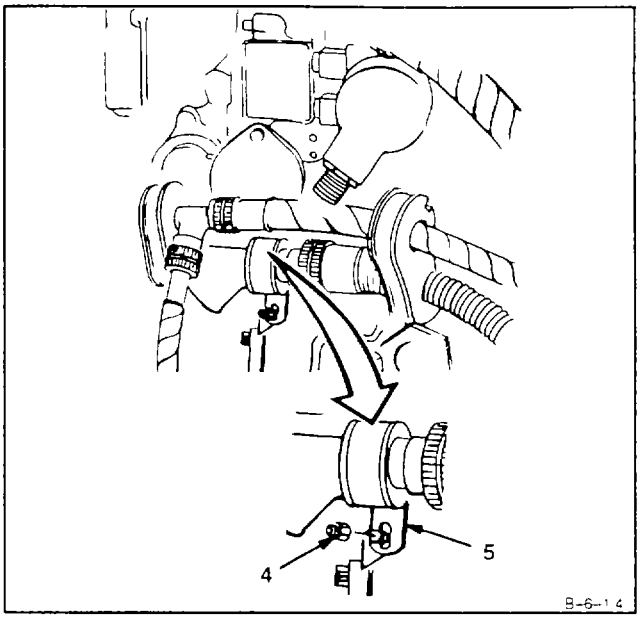
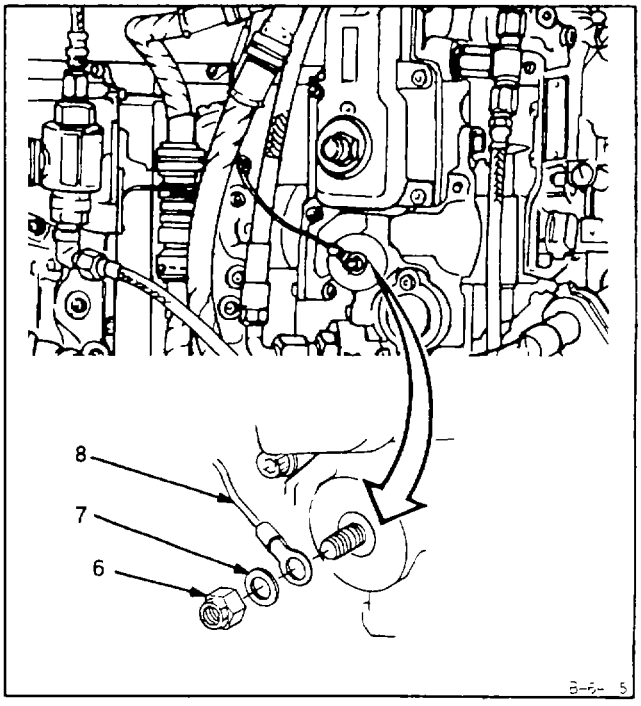
4. **Remove nut (4)**and clamp (5).



5. **Remove nut (6)** washer (7), and **jumper cable** assembly (8).



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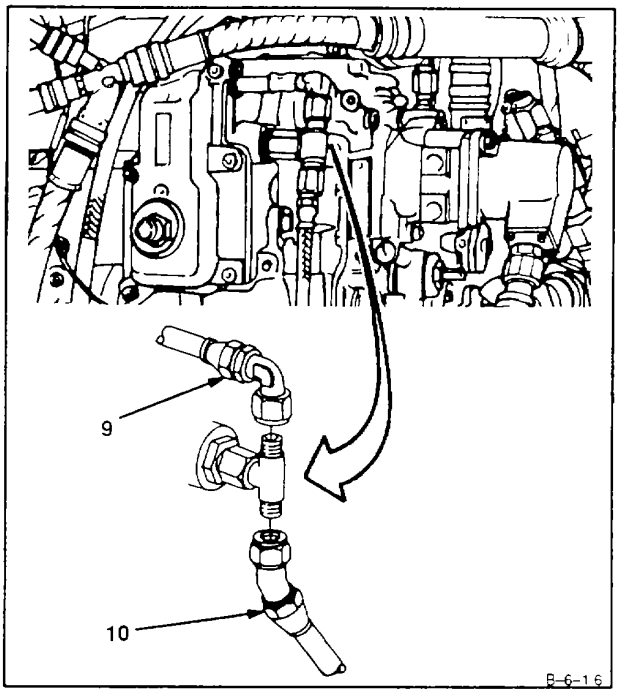
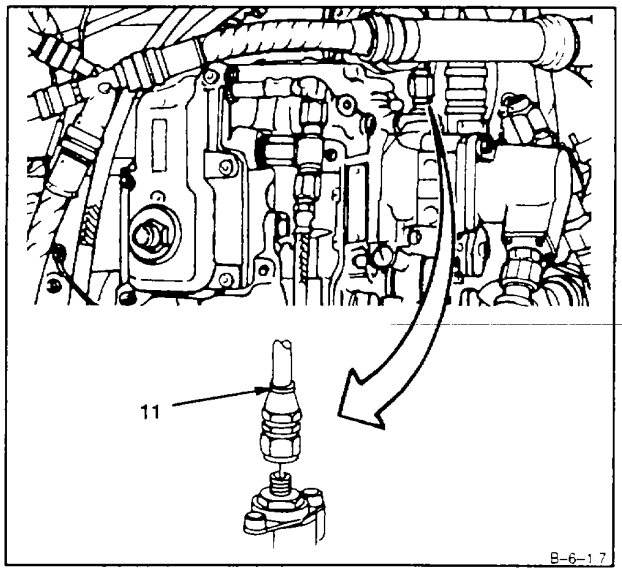
6. **Disconnect hose assembly (9)**

7. **Disconnect hose assembly (10)**



8. Disconnect hose assembly (11).



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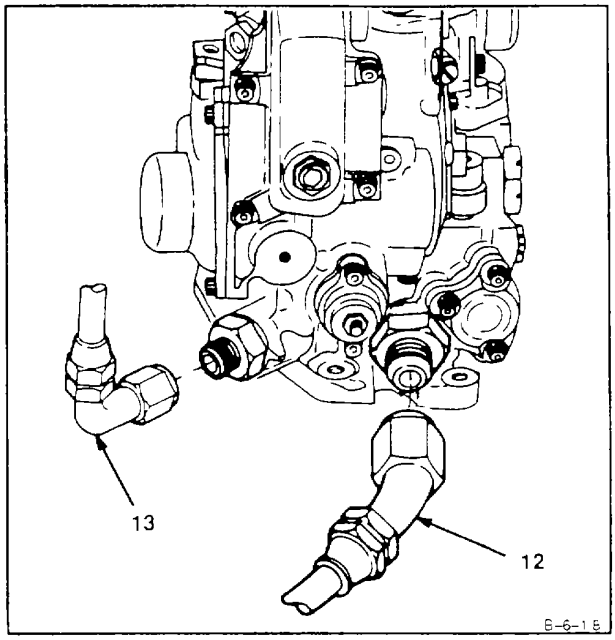
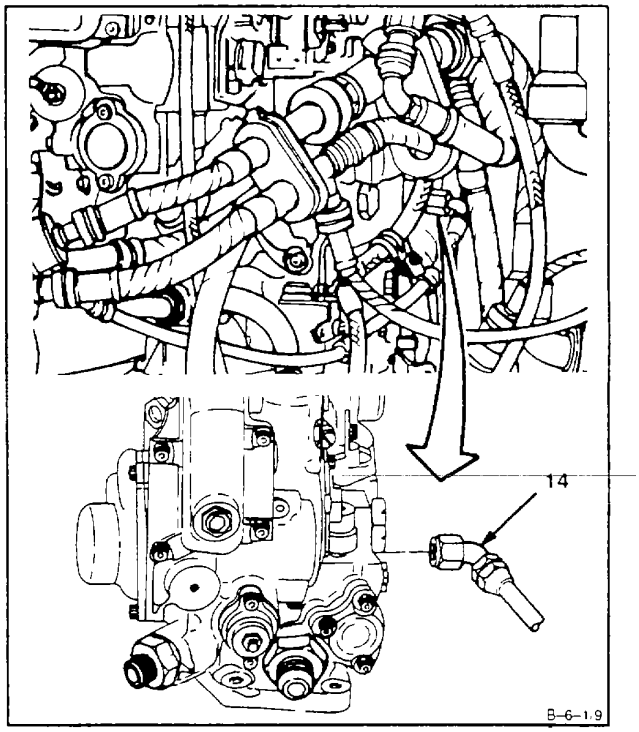
9. **Disconnect hose assembly (12).**

10. **Disconnect hose assembly (13).**



11. **Disconnect hose assembly (14).**



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6-1 REMOVE HYDROMECHANICAL ASSEMBLY (HMA) (Continued) 6-1

12. Remove lockwire and loosen bolt (15).

13. Remove three nuts (16) and three washers (17).

14. Remove one nut (18), washer (17) and bracket (19).

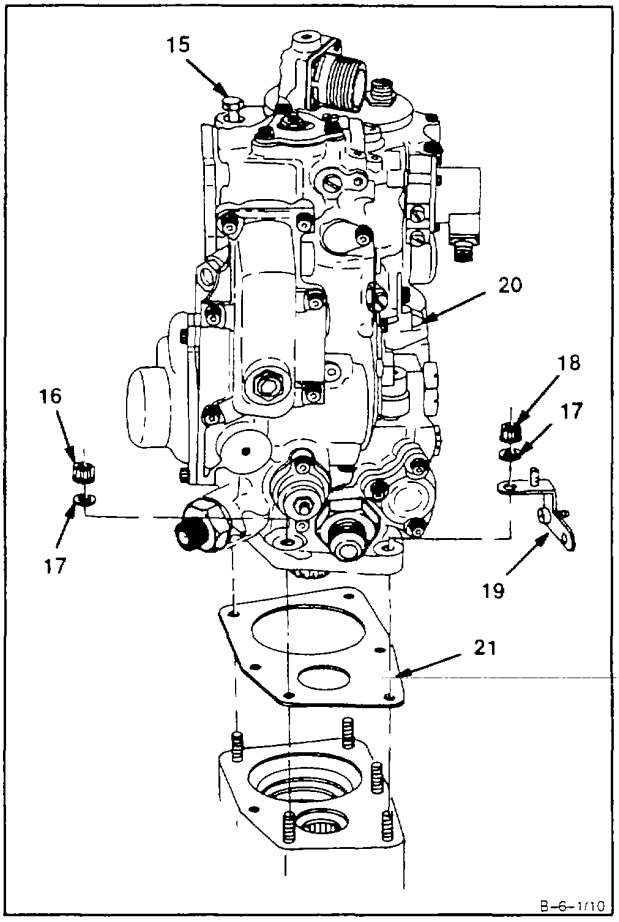
NOTE

In following step, two repairers are required to lift hydromechanical assembly clear of P4 connector harness.

15. **Remove hydromechanical assembly (20)** and gasket (21). It necessary scrape off old gasket. Use putty knife.

NOTE

If hydromechanical assembly is removed from engine and will not be reinstalled for a period longer than 48 hours, it must be preserved (Ref Task 6-6).



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-2 CLEAN HYDROMECHANICAL ASSEMBLY (HMA) 6-2

INITIAL SETUP

Applicable Configurations:
All

Tools:
None

Materials:
Dry Cleaning Solv*ents* (E19)
Gloves (E24)
Wiping Rag (E64)

Personnel Required:
Aircraft Powerplant Repairer

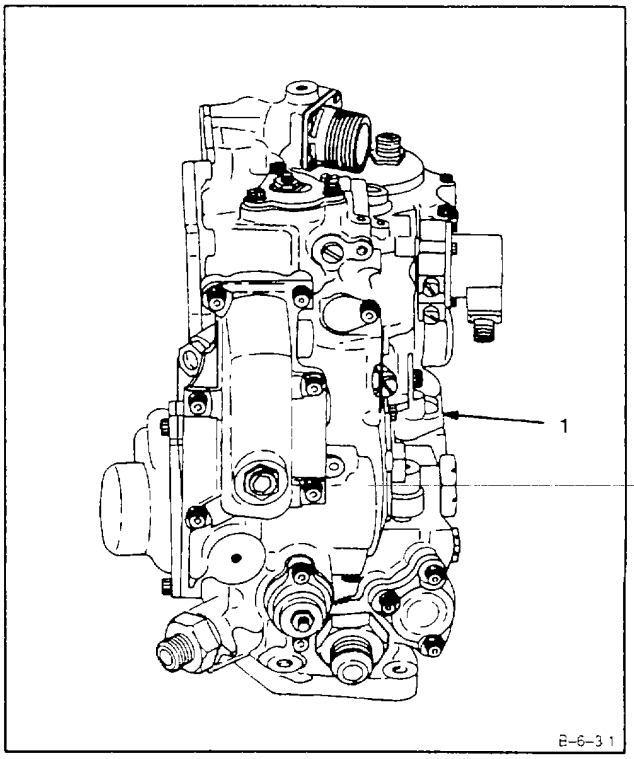
Equipment Condition
Off Engine Task
Hydromechanical Assembly Removed (Task 6-1)

General Safety Instructions:

WARNING

Dry cleaning solvent (E19) 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. Wear gloves (E24). **Clean hydromechanical assembly(1)** with wiping rag (E64) dampened in dry cleaning solvent (E19).



FOLLOW-ON MAINTENANCE
Inspect Hydromechanical Assembly (Task 6-3)

END OF TASK

6-3 INSPECT HYDROMECHANICAL ASSEMBLY (HMA) 6-3

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

Personnel Required:
Aircraft Powerplant Inspector

References:
Task 1-109

Equipment Condition:
Off Engine Task

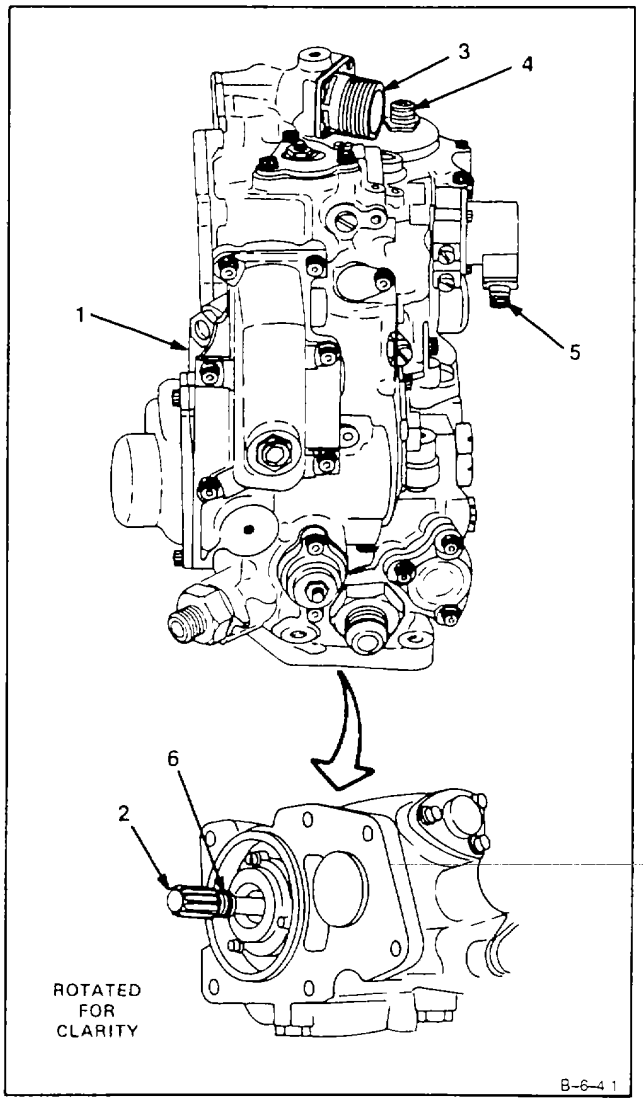
1. **Inspect hydromechanical assembly housing (1).** There shall be no cracks. There shall be no evidence of leakage.

   a. Inspect inlet and outlet openings for damaged threads.

   b. Inspect splines (2) (Ref Task 1-109). There shall be no wear deeper than 0.007 inch on splines (2).

   c. Inspect electrical connectors (3, 4, and 5) for bent pins and/or corrosion.

   d. Inspect seal (6) for damage. Seal shall not be missing, cut, or deformed.



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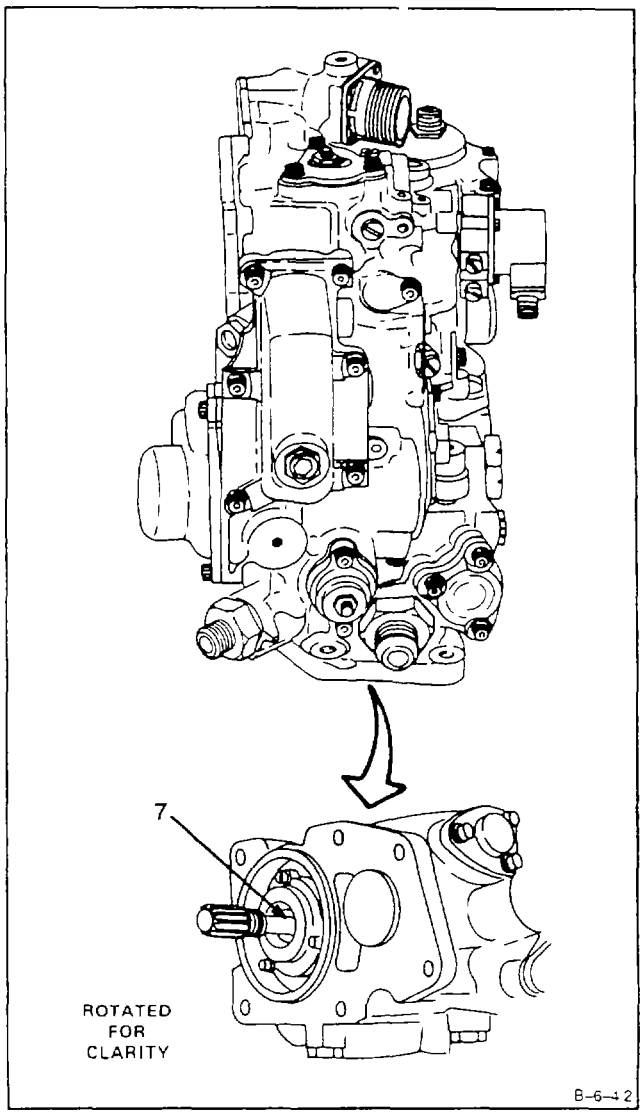
6-3 INSPECT HYDROMECHANICAL ASSEMBLY (HMA) (Continued) 6-3

2. Inspect area around shaft (7). There shall be no evidence of leakage



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools.
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials::
Crocus Cloth (E16)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

References:
TM 1-2840-252-23P

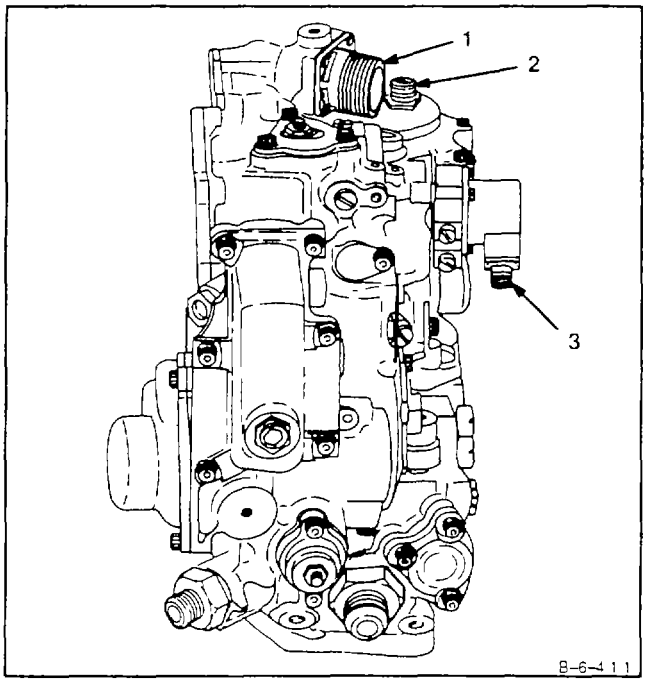
General Safety Instructions':

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

1. **Repair electrical connectors** as follows.

   a. Straighten bent pins in connectors (1) and (2) with long nose pliers until straight.
   b. Remove corrosion from connectors (1), (2),and (3) with crocus cloth (E16).



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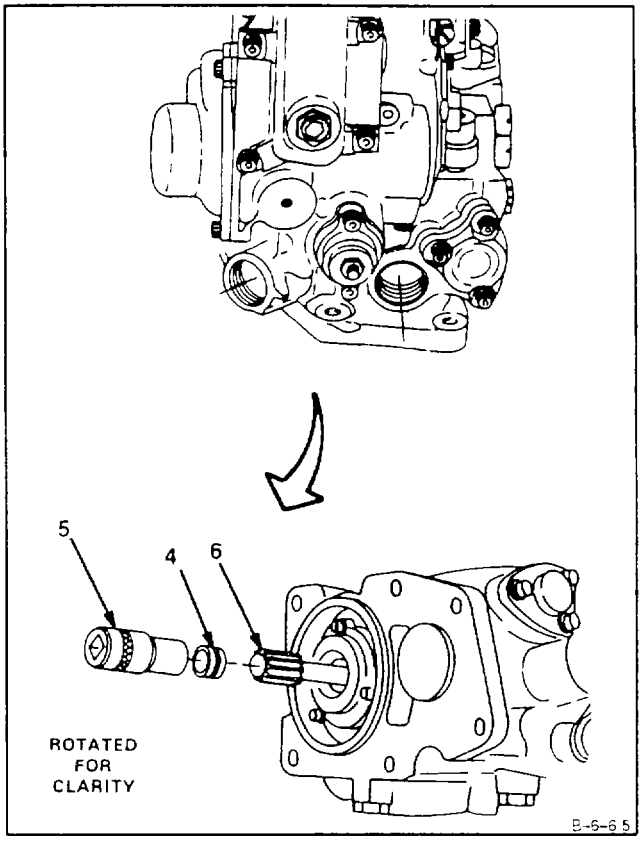
2. **Repair** hydromechanical assembly showing evidence of leakage or with missing cut or deformed seal as follows.

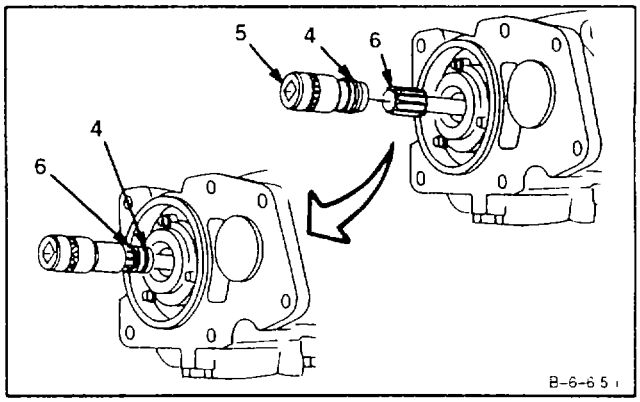
a. Remove damaged or defective seal (4).

b. Slide new seal (4) onto wrenching end of 3/8 inch deep style socket (5).



c. Position socket (5) with seal (4) installed on end of splined shaft (6).

d. **Install seal (4)** over splined shaft (6) and adjacent to male spline.



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

6-5 INSTALL HYDROMECHANICAL ASSEMBLY (HMA) 6-5

INITIAL SETUP

Applicable Configurations:
All

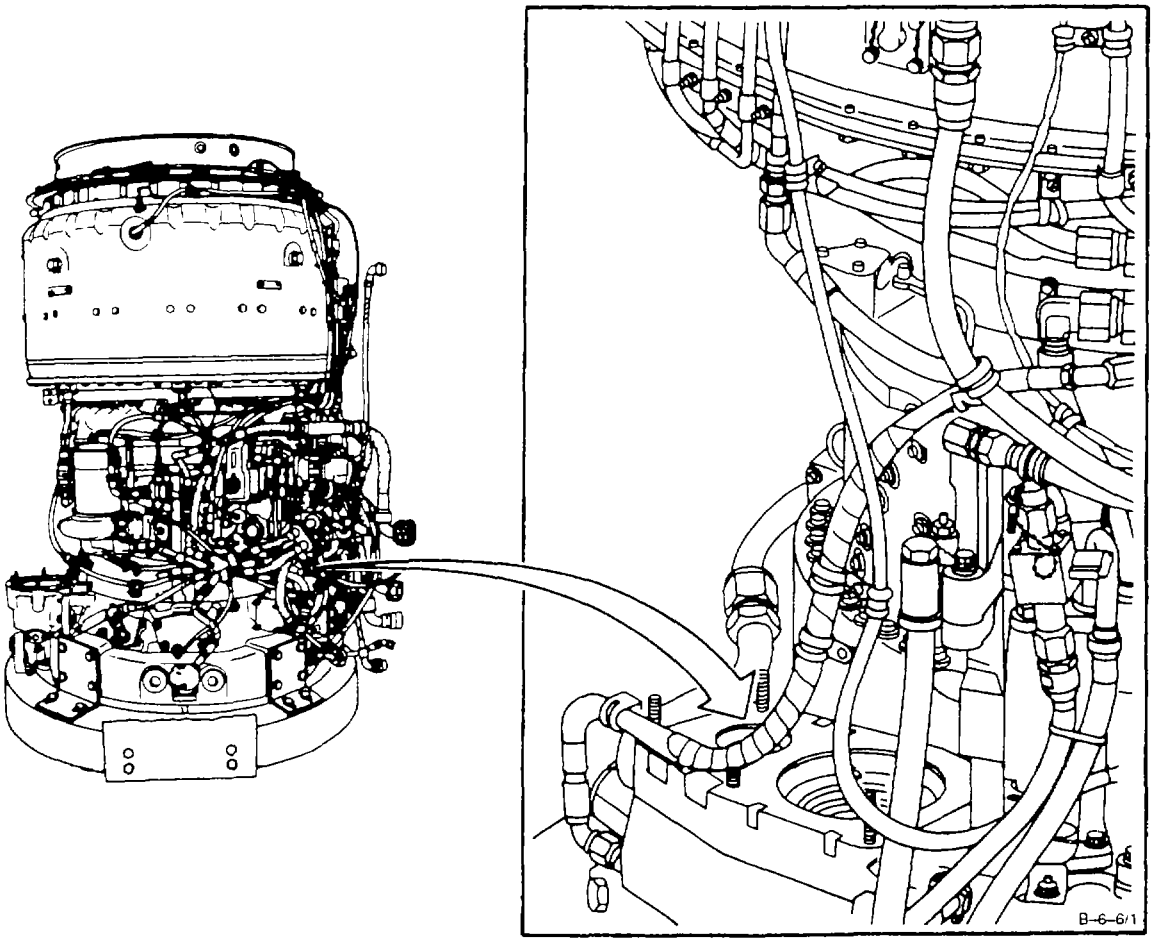
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114
Flare, Crowfoot Attachment, 1-1/8 Inch

Materials:
Gloves (E24)
Lockwire (E33)
Lubricating Oil (E36)
Lubricating Oil (E37)

Parts:
Gasket
Packings
Seal

Personnel Required:
Aircraft Powerplant Repairer (2)
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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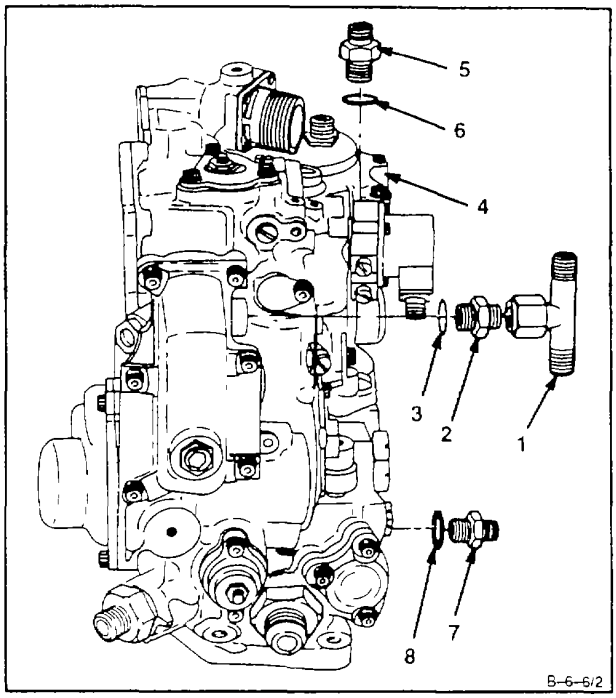
NOTE

If hydromechanical assembly is a replacement, do steps 1 thru 9. If same hydromechanical assembly that was removed is to be installed, omit steps 1 thru 9.

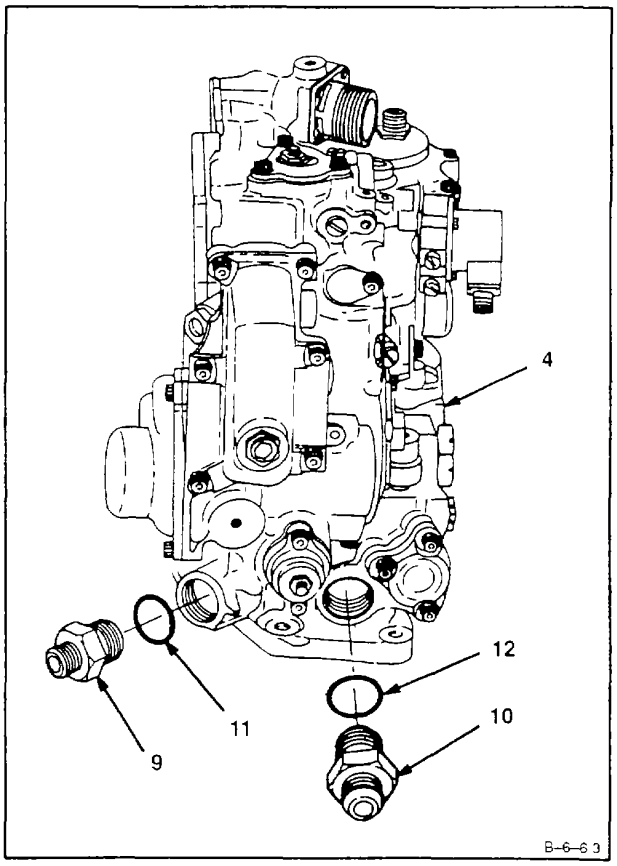
1. **Remove tee (1), nipple (2),** and packing (3) from removed hydromechanical assembly (4).

2. **Remove nipple (5)** and packing (6) from removed hydromechanical assembly (4).

3. **Remove nipple (7)** and packing (8) from removed hydromechanical assembly (4).



4. **Remove reducer (9), nipple (10),** and packings (11) and (12) from removed hydromechanical assembly (4). Use 1-1/8 inch flare, crowfoot attachment



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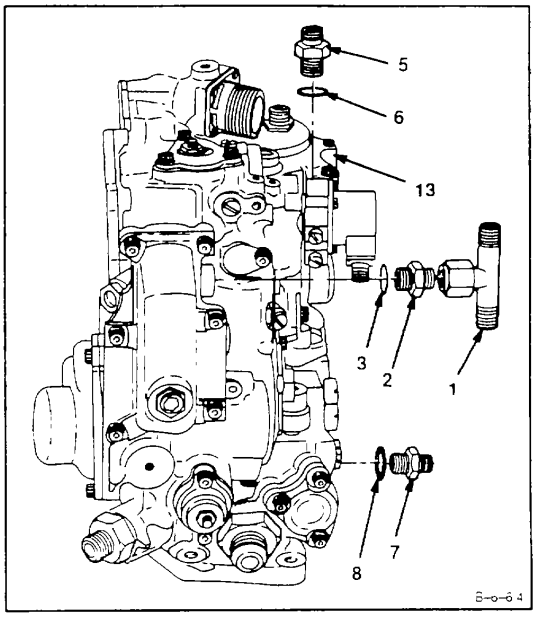
5. **Install** packing (3), **nipple (2), and tee (1) in serviceable hydromechanical assembly (13).**

6. **Install** packing (6) and **nipple (5) in serviceable hydromechanical assembly (13).**

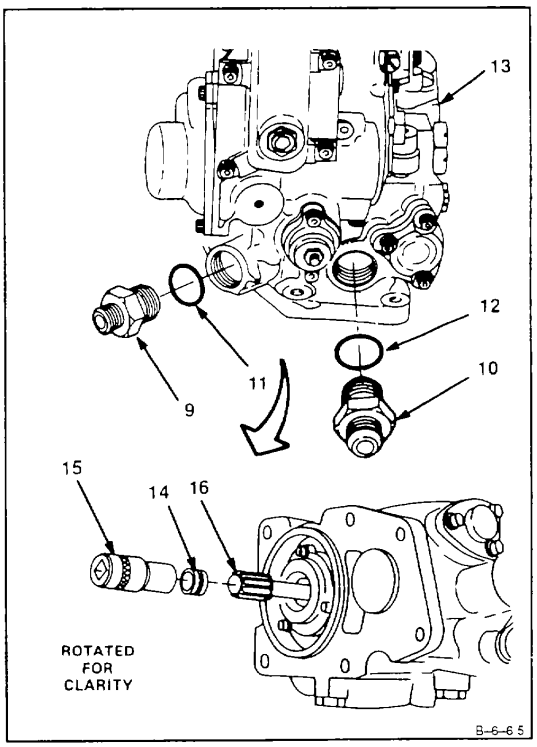
7. **Install** packing (8) and **nipple (7) in serviceable hydromechanical assembly (13).**



8. **Install** packings (11) and (12), **reducer (9), and nipple** (10). **In serviceable hydromechanical assembly (13).** Use 1-1/8 inch flare, crowfoot attachment.

9. **Install seal (14) on serviceable hydromechanical assembly (13)** as follows.

   a. Slide seal (14) onto wrenching end of 3/8 inch deep style socket (15).



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b. Position socket (15) with seal (14) installed, on end of splined shaft (16)

c. **Install seal (14)** over splined shaft (16) and adjacent to male spline

10. **Position gasket (17)** over studs (18).

WARNING

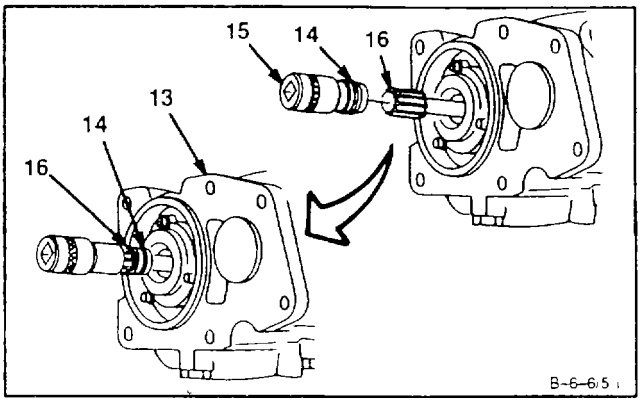
Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

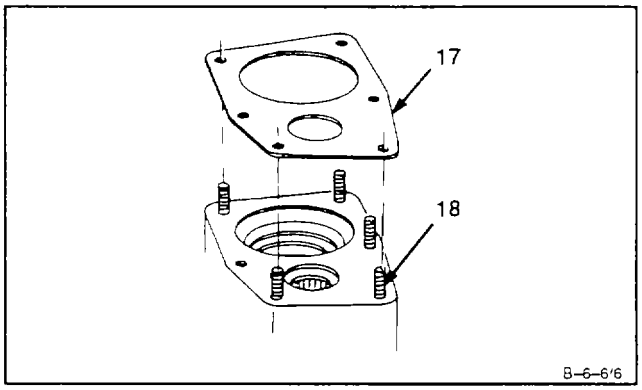
11. **Wear gloves (E24). Lubricate male spline (16) and seal (14) of hydromechanical assembly (13)** with lubricating oil (E36 or E37).

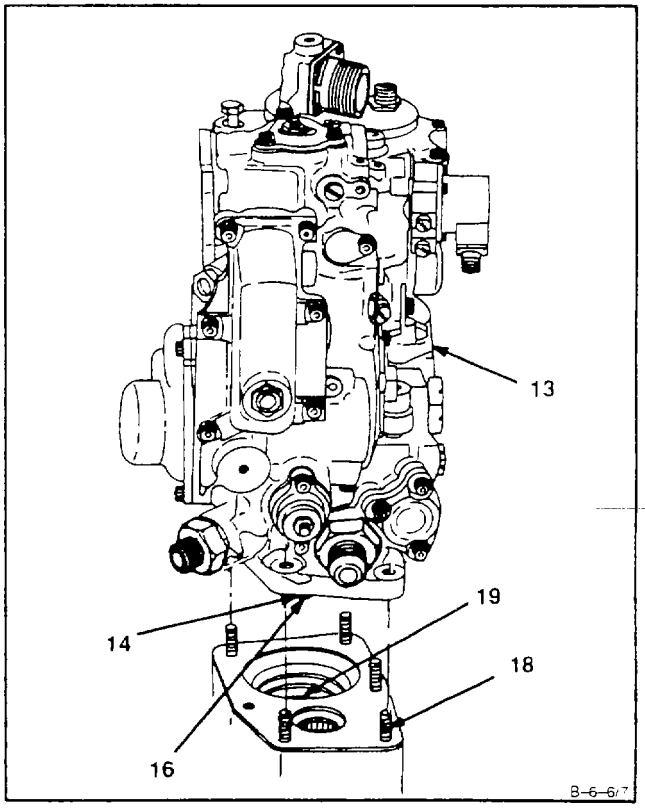
NOTE

It may be necessary to have helper rotate compressor rotor and power turbine to mesh spines.

12. **Position hydromechanical assembly (13) onto studs (18)**, carefully meshing hydromechanical assembly male spline (16) with accessory drive gearbox spline (19).







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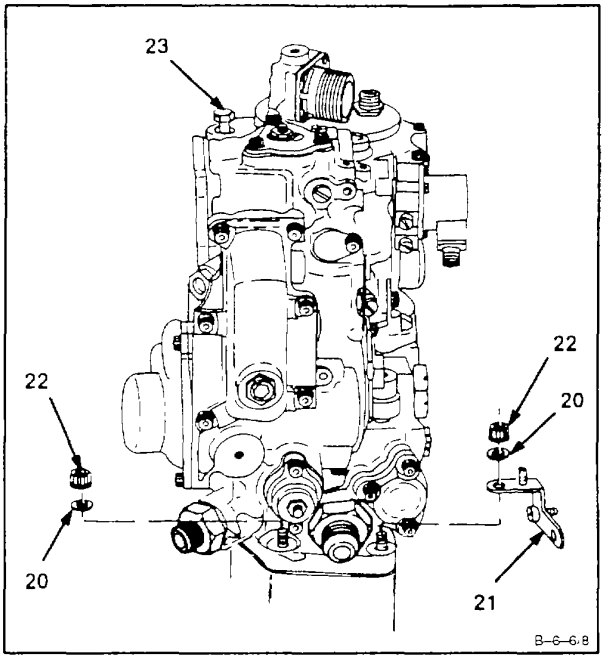
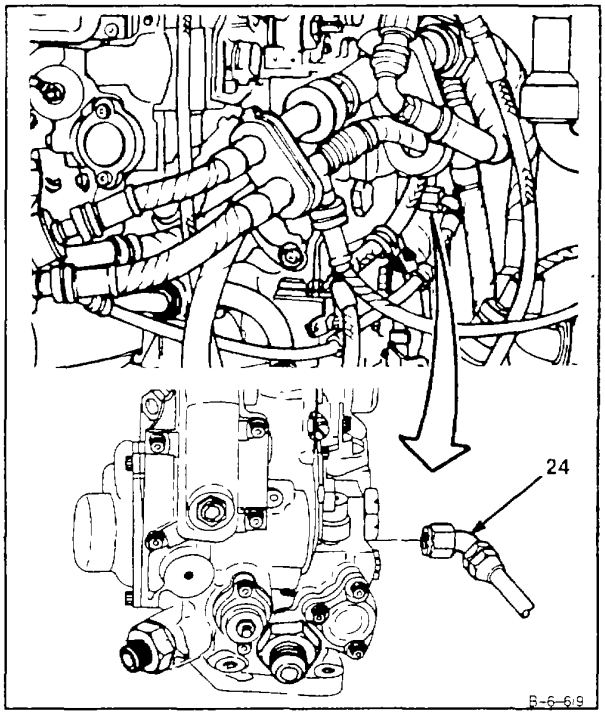
13. **Install** four washers (20), **bracket (21),** four nuts (22) and bolt (23). Lockwire bolt (23). Use lockwire (E33).



14. **Install hose assembly (24).**



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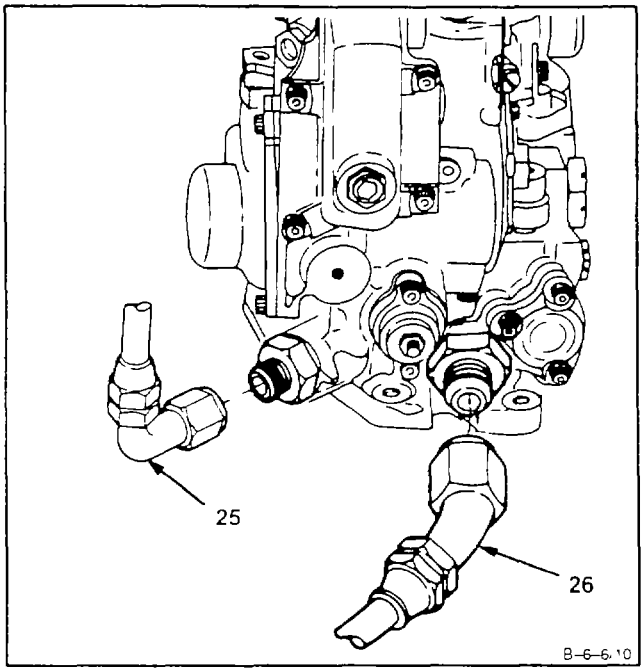
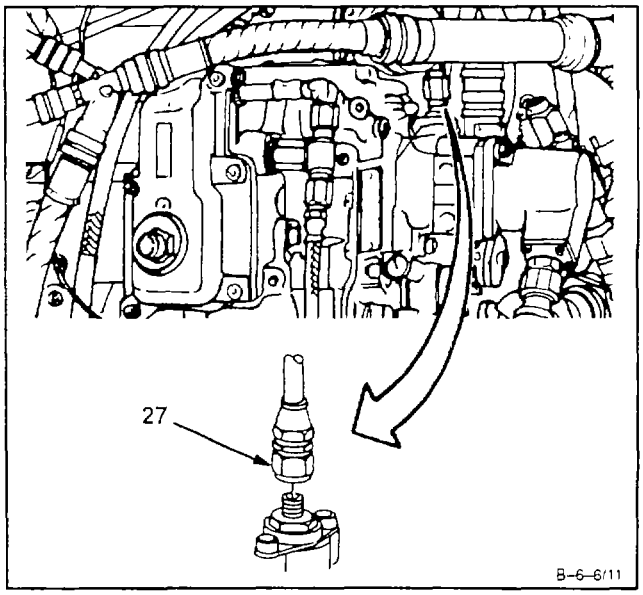
15. **Install hose assembly (25).**

16. **Install hose assembly (26).**



17. **Install hose assembly (27).**



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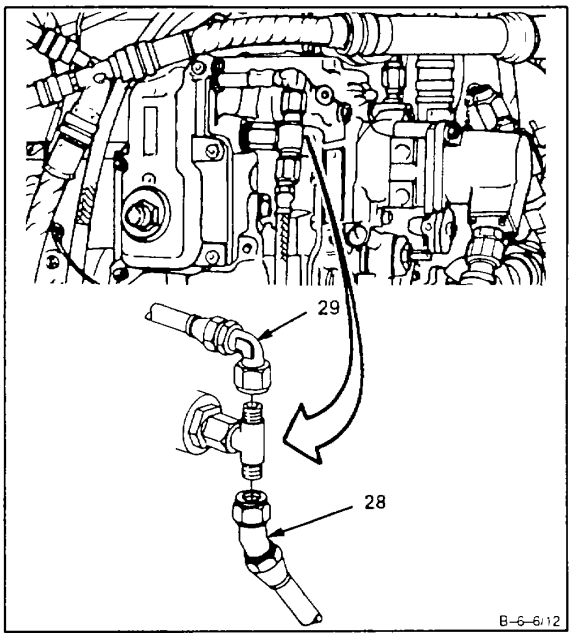
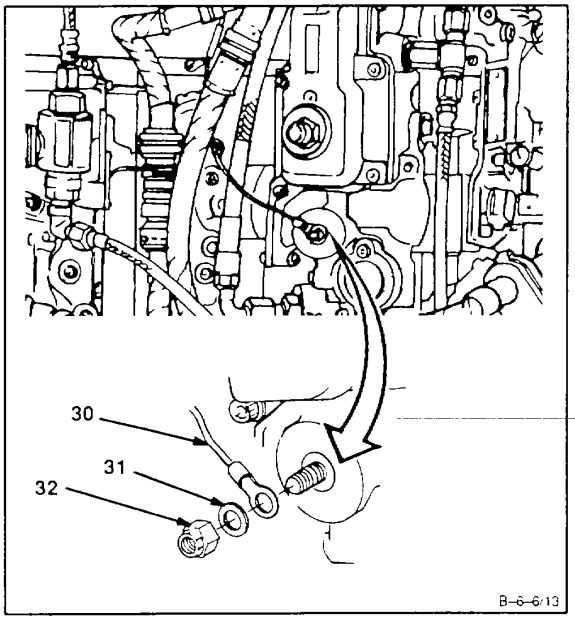
18. **Install hose assembly (28).**

19. **Install hose assembly (29).**



20. **Install jumper cable assembly (30)**, washer (31), and nut (32).



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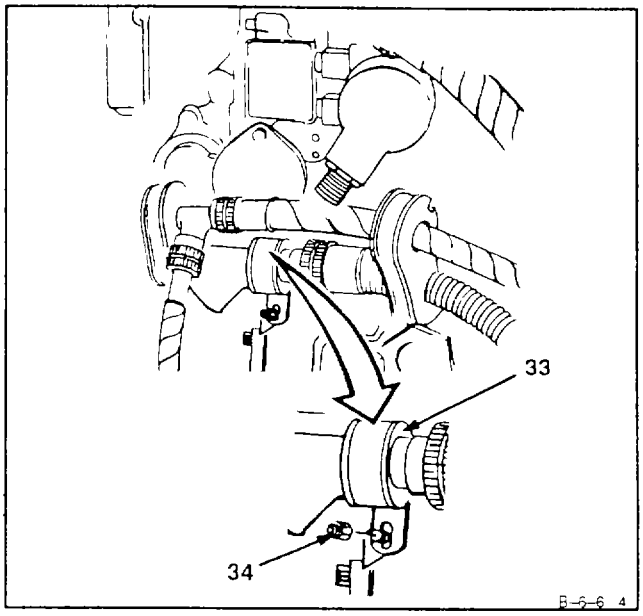
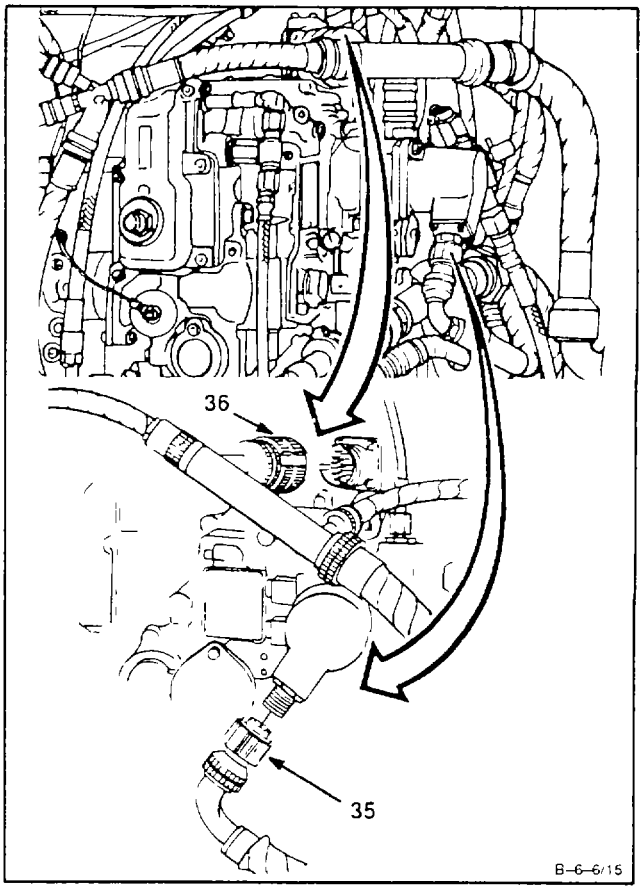
6-5 INSTALL HYDROMECHANICAL ASSEMBLY (HMA) (Continued) 6-5

21. **Install clamp (33)**and nut (34)



22. **Install electrical connector (35)**

23. **Install electrical connector (36)**



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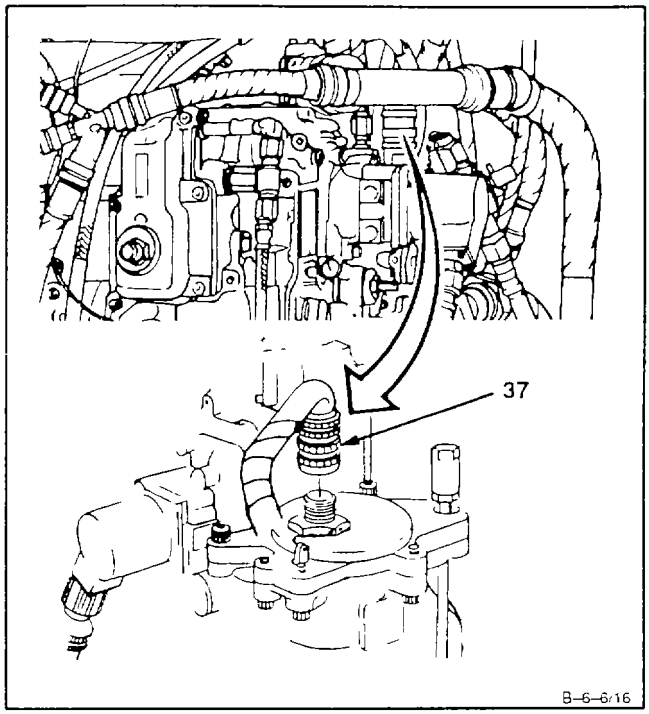
24. Install electrical connector (37).



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

SECTION II

HYDROMECHANICAL ASSEMBLY (HMA) - PREPARATION FOR STORAGE OR SHIPMENT

6-6 PRESERVE HYDROMECHANICAL ASSEMBLY (HMA) 6-6

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Hose Assembly (Appendix E) (2)
Socket Wrench Handle
Container, 2 Gallon (2)

Materials

High Pressure Caps
Gloves (E24)
Lubricating Oil (E35)

Personnel Required

Aircraft Powerplant Repairer (2)

Equipment Condition

Off Engine Task
Hydromechanical Assembly Removed (Task 6-1)

General Safety Instructions:

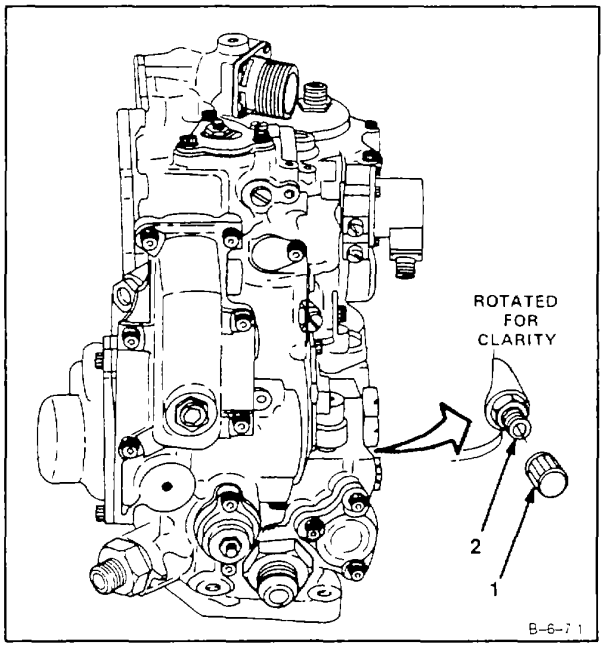
WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin Handle only in well-ventilated areas away from heat and flame Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling If irritation of skin results, get medical attention. Get medical attention for eyes.

NOTE

If hydromechanical assembly is removed from engine and is not to be reinstalled for a period longer than 48 hours, it must be preserved.

1. **Install high pressure cap (1)** on fitting (2).



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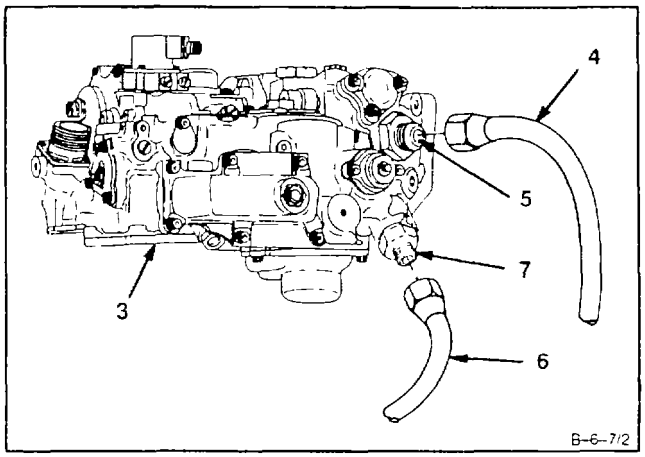
2. **Place hydromechanical assembly (3) in horizontal position.**

3. **Install hose assembly (Appendix E)** (4) to fitting (5).

4. **Install hose assembly (Appendix E)** (6) to fitting (7).



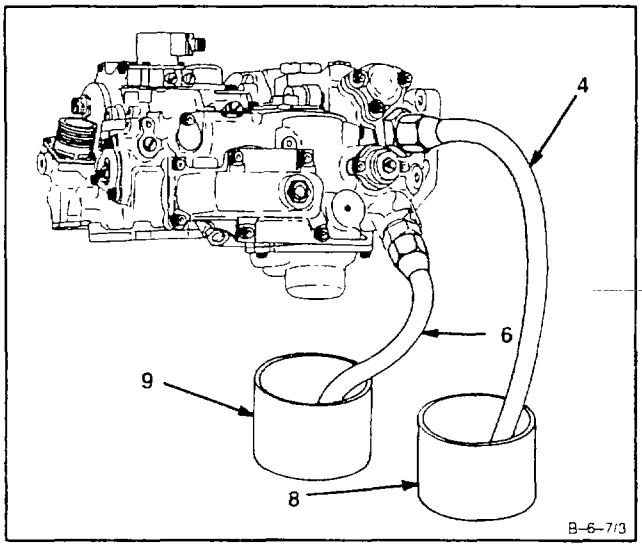
WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may Irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store In approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes

5. **Wear gloves (E24). Put** 2 quarts **lubricating oil (E35) In container (8).**

6. **Put hose assembly (4)** in container (8).

7. **Put hose assembly (6)** in container (9).



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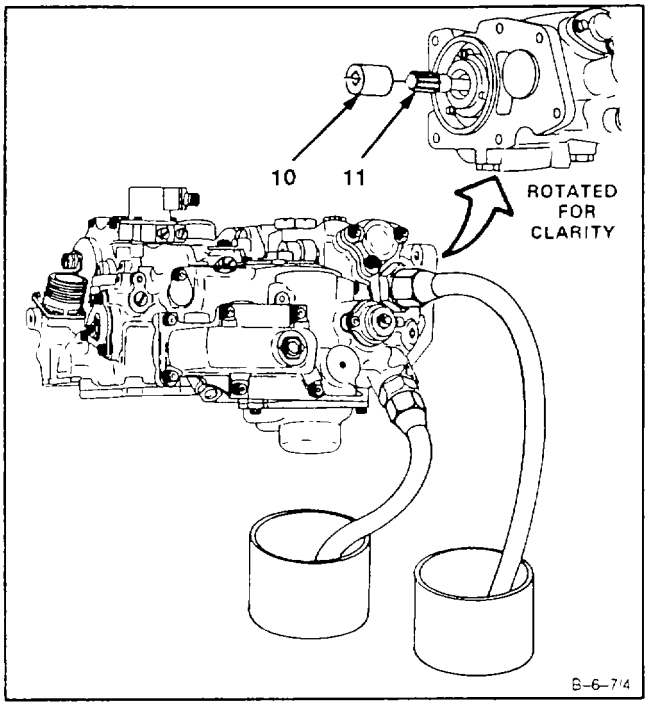
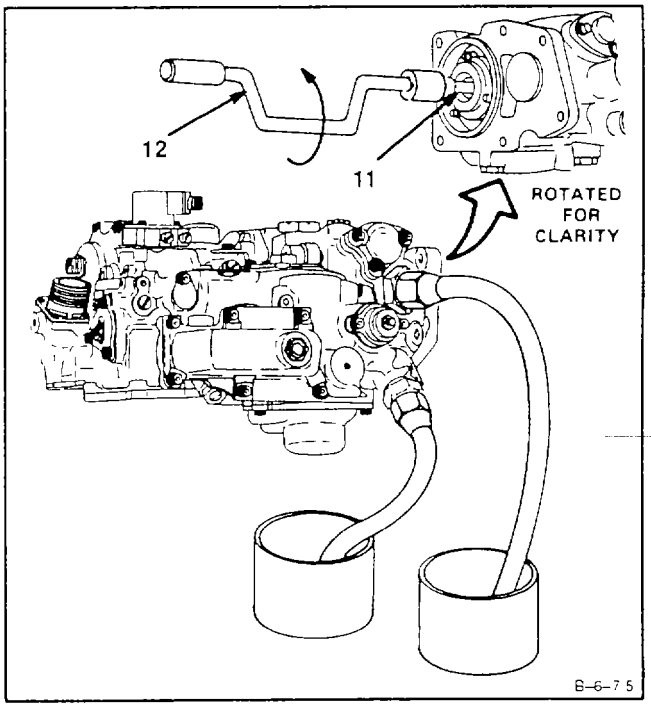
8. Install 9/16 inch. 12 point deep socket (10) on N1 drive spline (11)



9. Using helper to support hydromechanical assembly, use socket wrench handle (12) to **rotate N1 drive spline (11) counterclockwise Continue rotating Ni drive spline (11) until all fuel is flushed out** by oil.



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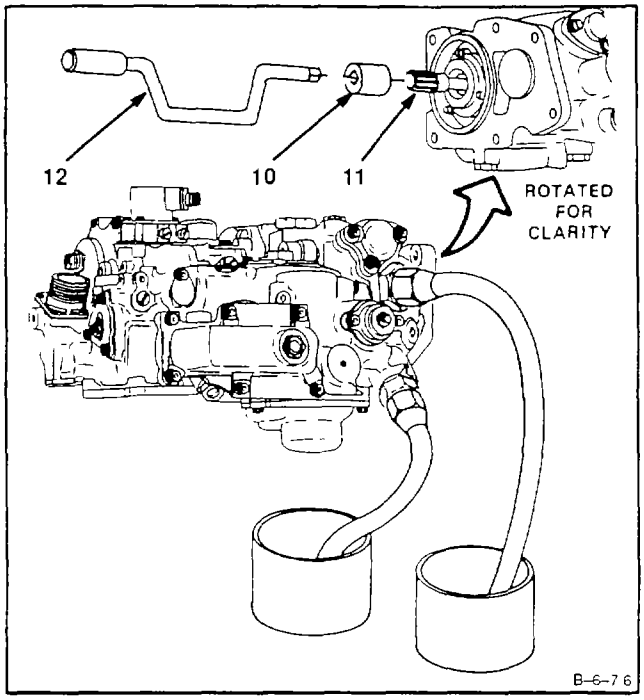
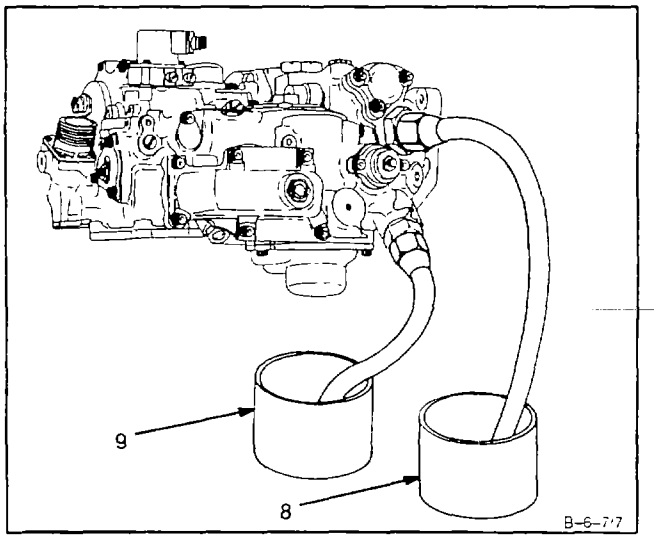
10. Remove socket wrench handle (12) and socket (10) from N1 drive spine (11).



11. Remove two containers (8 and 9) Discard lubricating oil (E35) from container (9).



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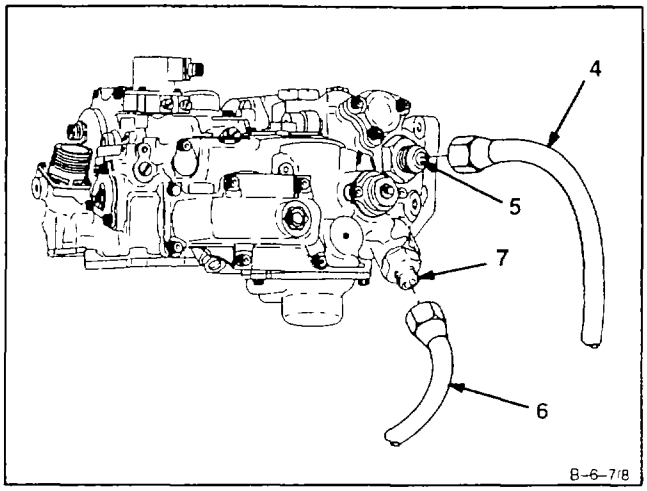
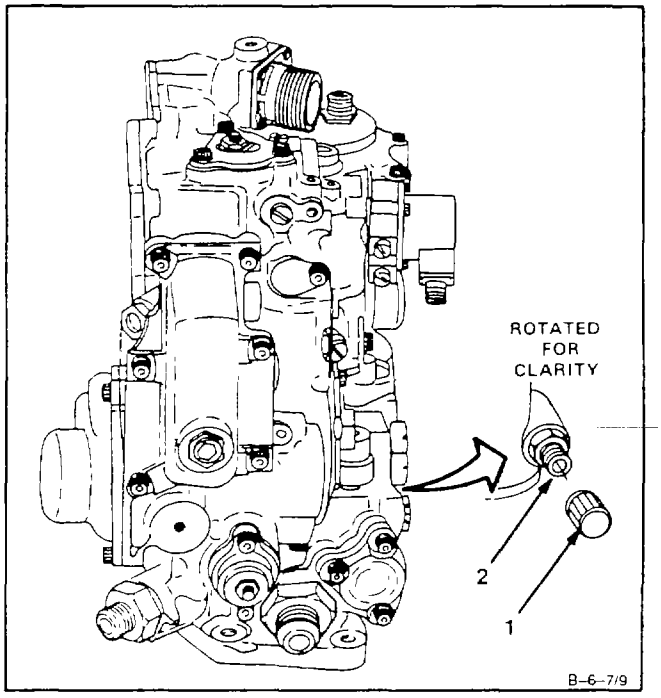
12. Remove hose assembly (Appendix E) (6) from fitting (7).

13. Remove hose assembly (Appendix E) (4) from fitting (5).



14. Remove high pressure cap (1) from fittings (2).

15. Install caps and plugs on all openings to keep contaminants out of hydromechanical assembly.



FOLLOW-ON MAINTENANCE
Package Hydromechanical Assembly (Task 6-7).

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Technical Inspection Tool Kit
NSN 5180-00-323-5114

Materials
Barrier Material (E7)
Desiccant Bag (El8) (3)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition;
Off Engine Task
Hydromechanical Assembly Preserved (Task 6-6)

References:
TB 55-8100-200-25

GO TO NEXT PAGE

1. **Install molded bottom** (1) in container (2).

2. **Wrap hydromechanical assembly (3)** securely with barrier material (E7).

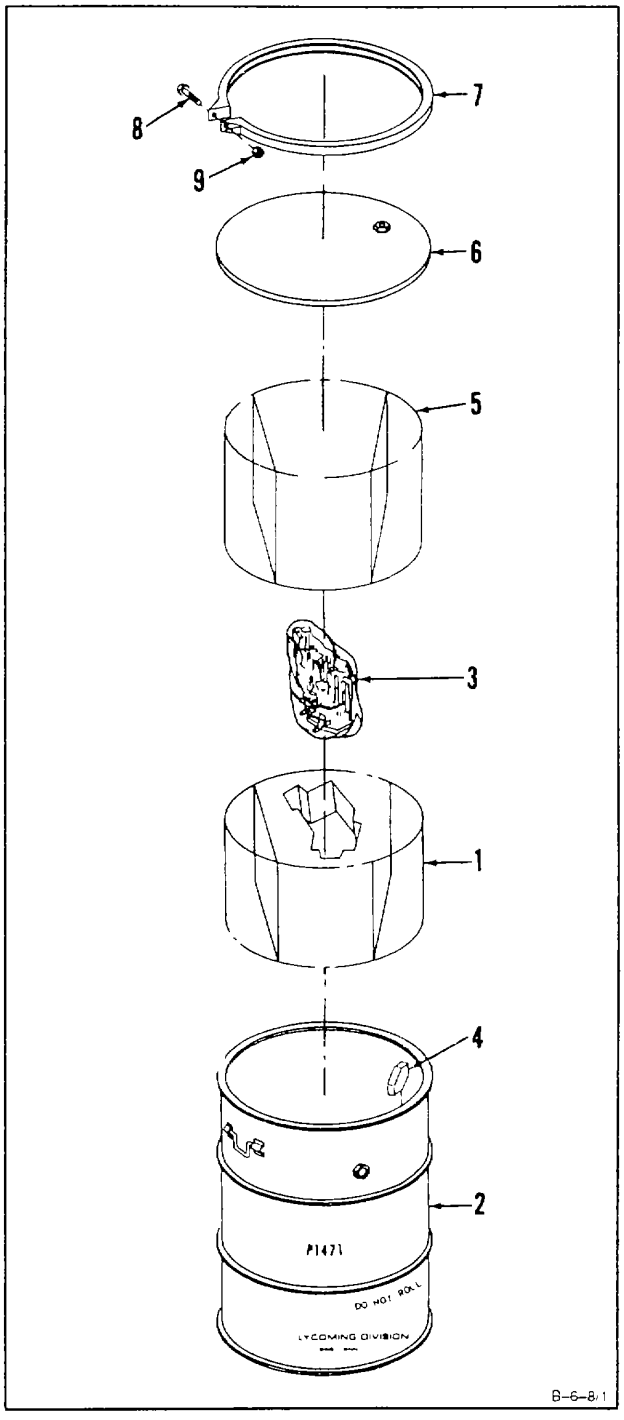
NOTE

In following step, place hydromechanical assembly historical record in a greaseproof envelope and place in container with hydromechanical assembly.

3. **Install hydromechanical assembly (3)** on molded bottom (1) Install historical record.

4. **Install three bags of desiccant (El8)** (4) in container (2).

5. **Install molded top support** (5) on hydromechanical assembly (3).



INSPECT

6. **Install lid (6)** on container (2).

7. **Install closure ring (7)** around lid (6) and metal shipping container (2).

8. Install bolt (8) and nut (9).

INSPECT

FOLLOW-ON MAINTENANCE
None
END OF TASK

SECTION III

FUEL BOOST PUMP ASSEMBLY

6-8 REMOVE FUEL BOOST PUMP ASSEMBLY (HMA) (Continued) 6-8

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944

Container, 1 Quart

Materials

Wiping Rag (E64)

Personnel Required:

Aircraft Powerplant Repairer

References:

Task 6-10

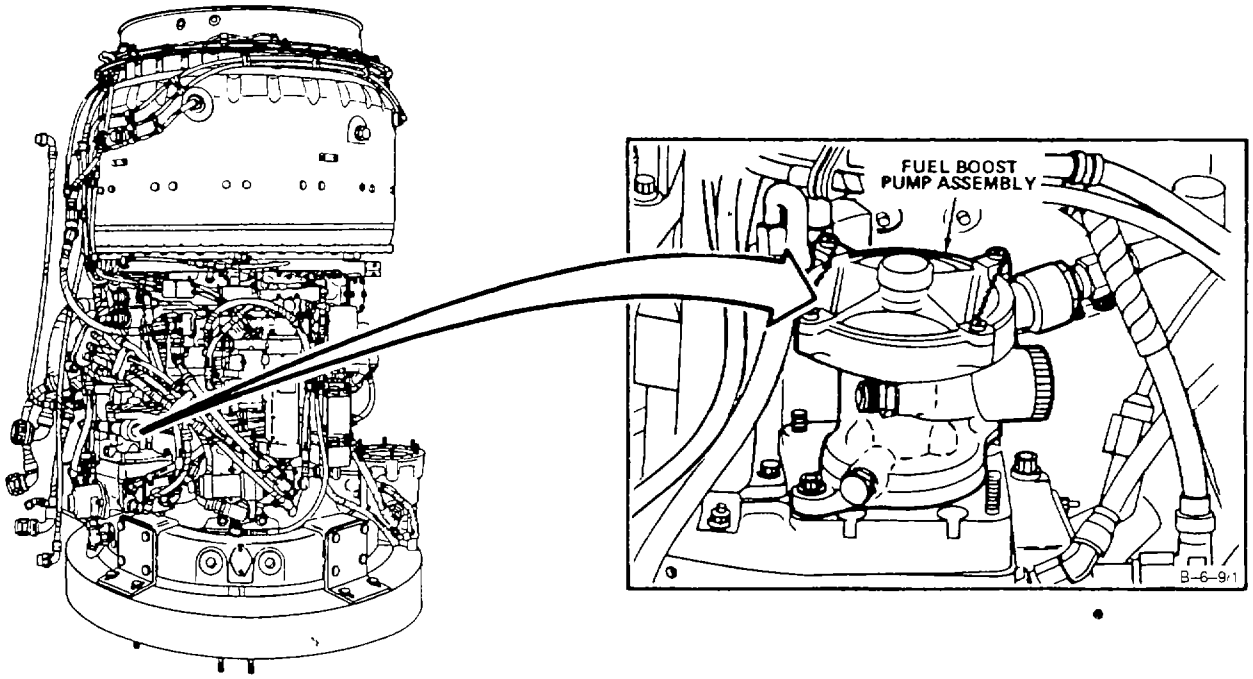
Equipment Condition:

Fuel Check Valve Removed (Task 6-49).

General Safety Instructions

WARNING

Turbine fuels are very flammable They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If Irritation of skin results, get medical attention. Get medical attention for eyes.



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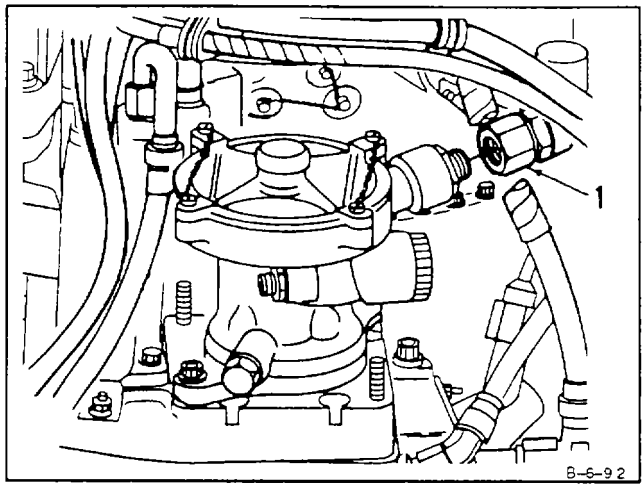
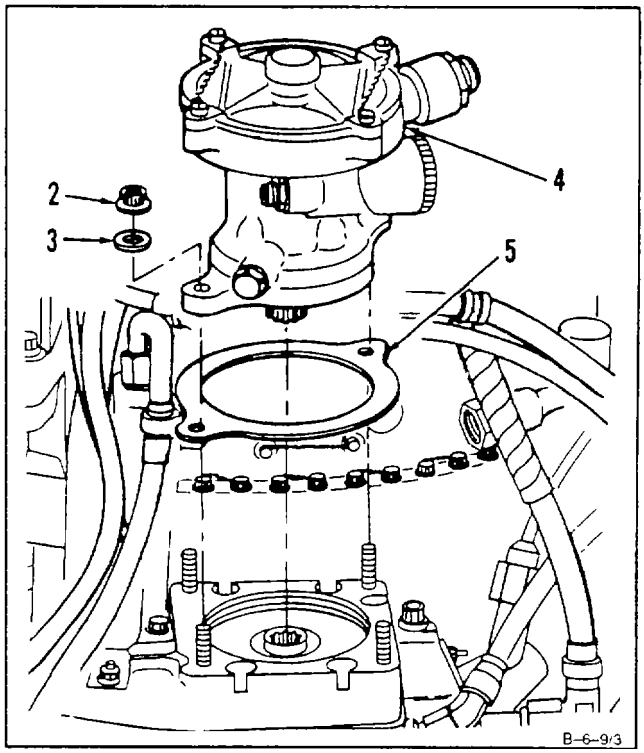
NOTE

Before removing fuel boost pump, check for evidence of fuel leakage between pump housing and cover and at seal drain If evidence of leakage is found, have an aircraft powerplant inspector examine pump in accordance with Task 6-10.

1. **Disconnect hose assembly (1).**



2. **Remove** two nuts (2), washers (3), **fuel boost pump assembly** (4), and gasket (5).



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit
NSN:5180-00-323-4944

Materials;
Dry cleaning solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)
Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition
Off Engine Task
Fuel Boost Pump Assembly Removed (Task 6-8)

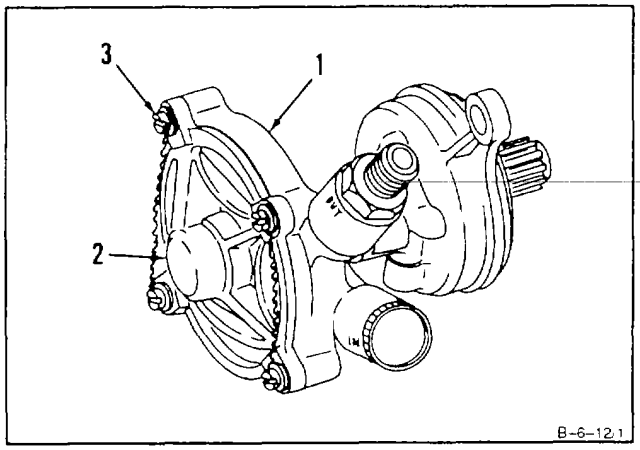
General Safety Instructions.

WARNING

Dry Cleaning Solvent(E19)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 eyeswith water for at least 15 minutes. Get medical attention for eyes.

1. Wear gloves (E24) **Clean fuel boost pump assembly (1).**Use dry cleaning solvent (El 9) and brush.

2. **Remove any remaining solvent**with clean, lint-free cloth (E30).



FOLLOW-ON MAINTENANCE:
Inspect Fuel Boost Pump Assembly (Task 6-10).

END OF TASK

6-10 INSPECT FUEL BOOST PUMP ASSEMBLY 6-10

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit
NSN 5180-00-323-5114
Materials
None

Personnel Required:
Aircraft Powerplant Inspector
References:
Task 1-109
Equipment Condition
Off Engine Task

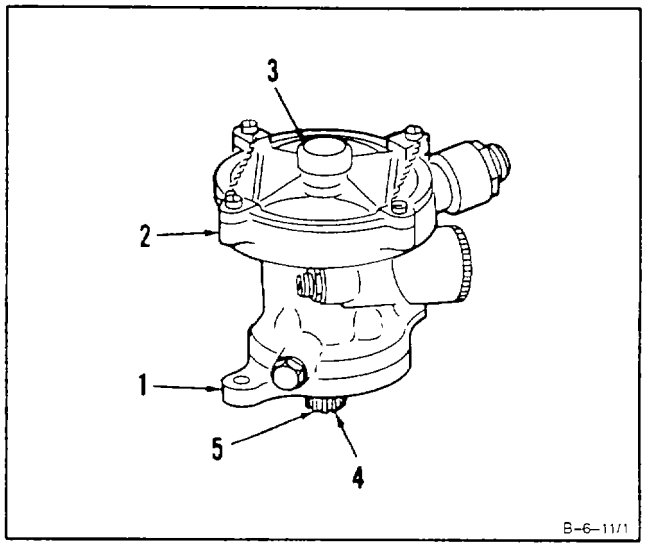
1. Inspect fuel boost pump assembly (1).

a. There shall be no cracks.

b. There shall be no evidence of leakage between housing (2) and cover (3).

c. Turn shaft (4) There shall be no binding, roughness, or evidence of leakage around shaft.

d. Inspect spline (5) (Ref Task 1-109). There shall be no wear deeper than 0 007 inch on spline (5).



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Wrench, 0-30 Inch-Pounds
Screwdnver Bit

Materials

Lockwire (E33)
Wiping Rag (E64)

Parts:

Packing

Personnel Required:

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:

TM 1-2840-252-23P

Equipment Condition

Off Engine Task

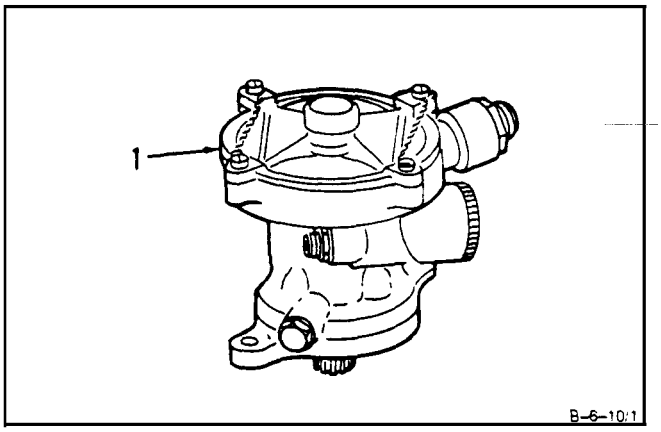
General Safety Instructions

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, Get medical attention for eyes.

1. **Repair leak between housing (1) and cover (2)** as follows:

   a. Remove lockwire and loosen **four screws (3)** two full turns each.



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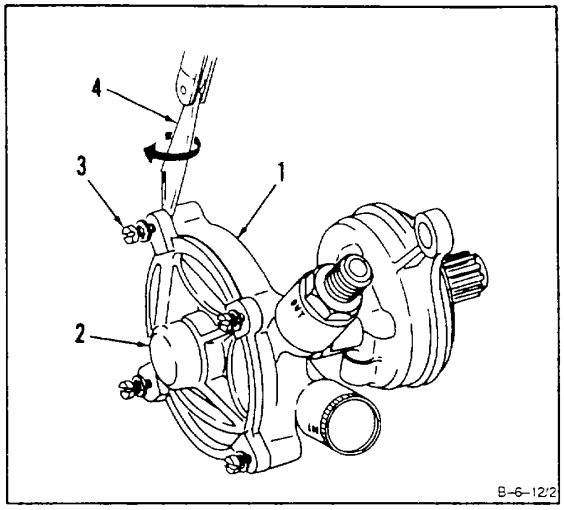
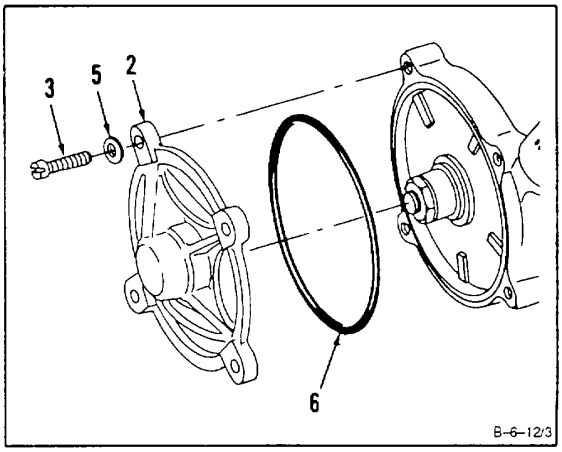
CAUTION

Do not tilt or cock cover during removal. Carbon bearing could be damaged

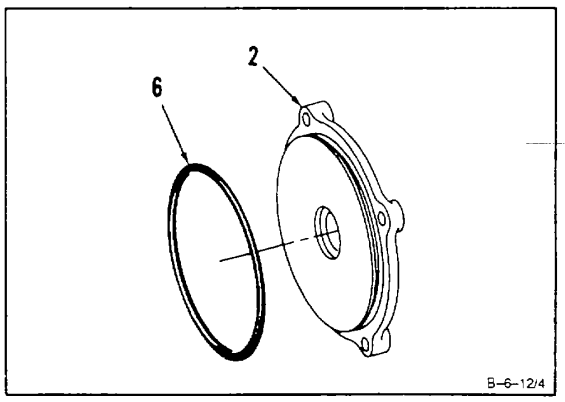
b. Carefully **separate cover (2) from housing (1),** using pocketknife (4) at each screw (3).



c. **Remove** four screws (3), washers (5), **cover (2),** and packing (6).



d. **Install new packing (6)** on cover (2).



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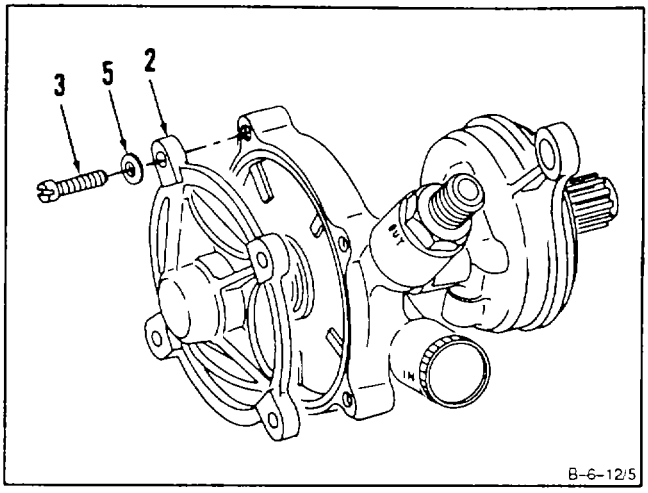
CAUTION

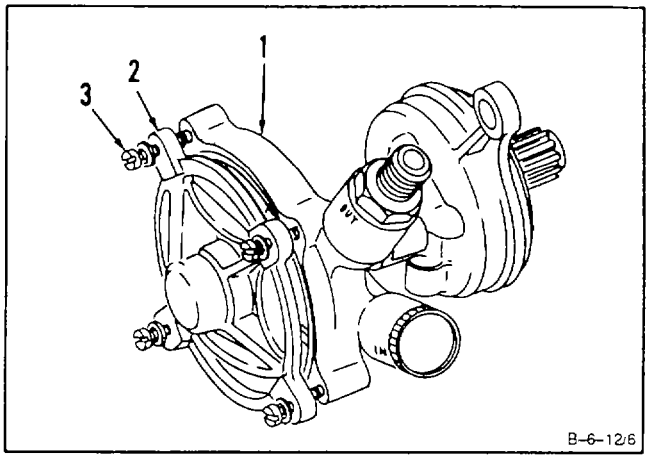
Do not tilt or cock cover during installation. Carbon bearing could be damaged

e. **Loosely install cover (2),** four washers (5), and screws (3).



f. **Turn four screws (3) evenly until cover (2) is seated** against housing (1).

g. **Torque** four screws (3) to **25 inch-pounds** and lockwire. Use lockwire (E33).



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

6-12 INSTALL FUEL BOOST PUMP ASSEMBLY 6-12

INITIAL SETUP
All

Applicable Configurations:
All

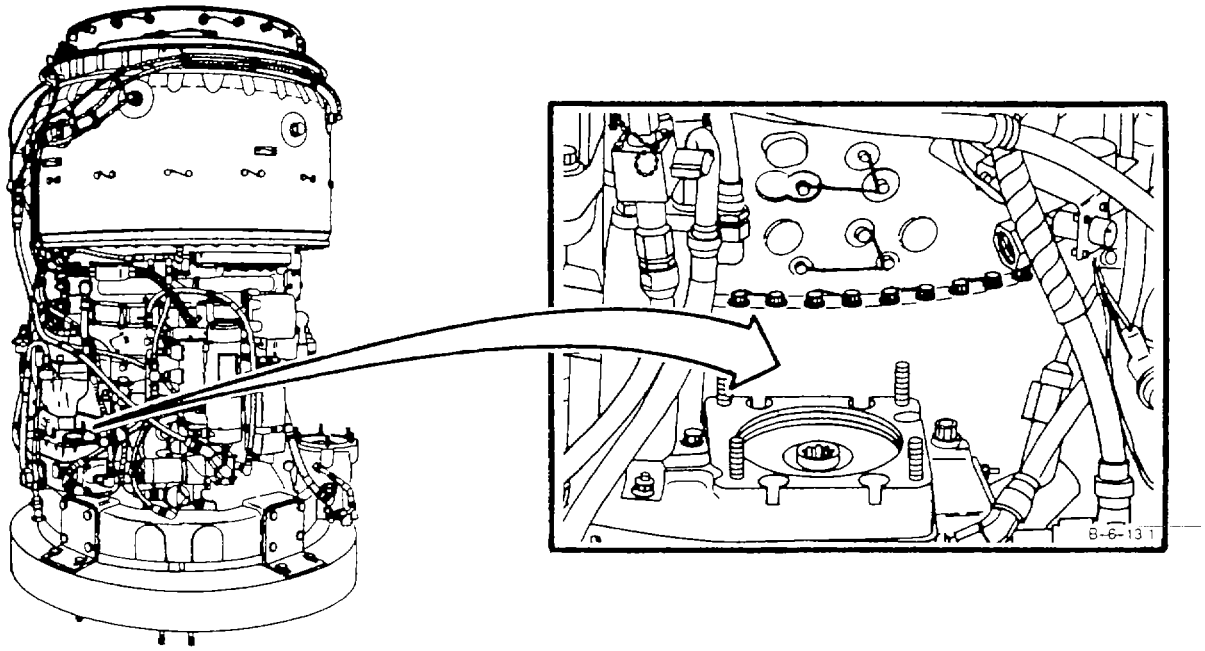
Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit
NSN 5180-00-323-5114

Materials
Lubricant (E34)

Parts:
Gasket
Packings

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1 -2840-252-23P



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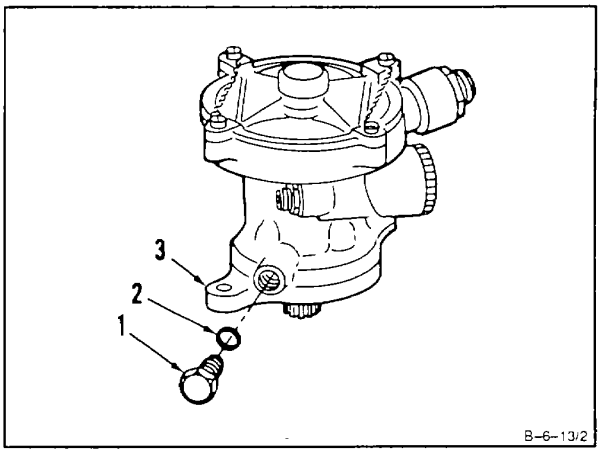
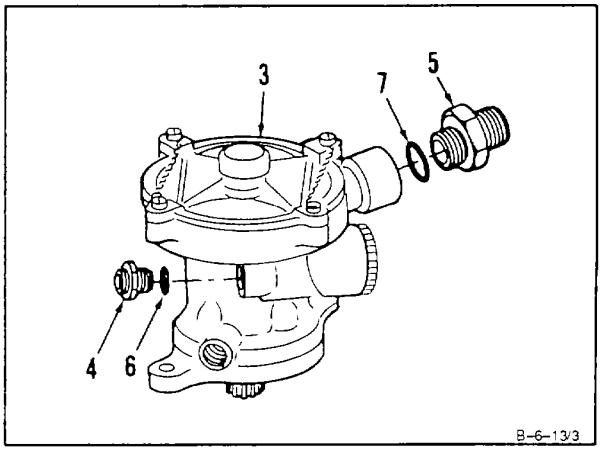
NOTE

If fuel boost pump is a replacement, do steps 1 thru 4 If same fuel boost pump that was removed is to be installed, omit steps 1 thru 4.

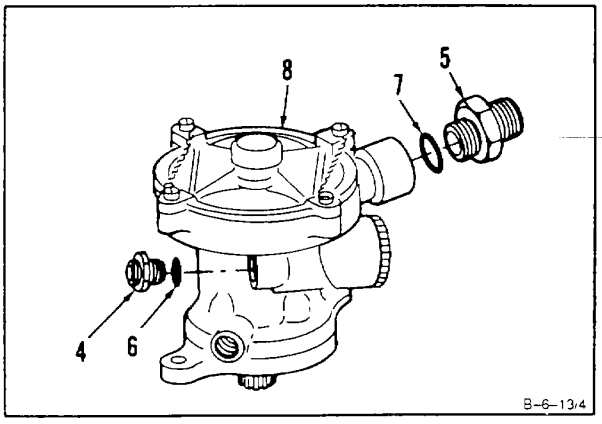
1. **Remove plug (1)** and packing (2) **from removed fuel boost pump (3).**



2. **Remove nipples (4 and 5)** and packings (6 and 7) **from removed fuel boost pump (3).**



3. **Install** packings (6 and 7) and **nipples (4 and 5)** In **serviceable fuel boost pump (8).**



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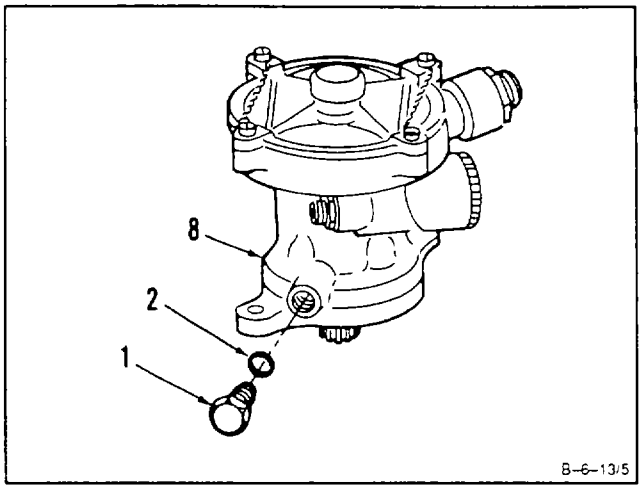
4. **Install** packing (2) and **plug (1)** In **serviceable fuel boost pump** (8).

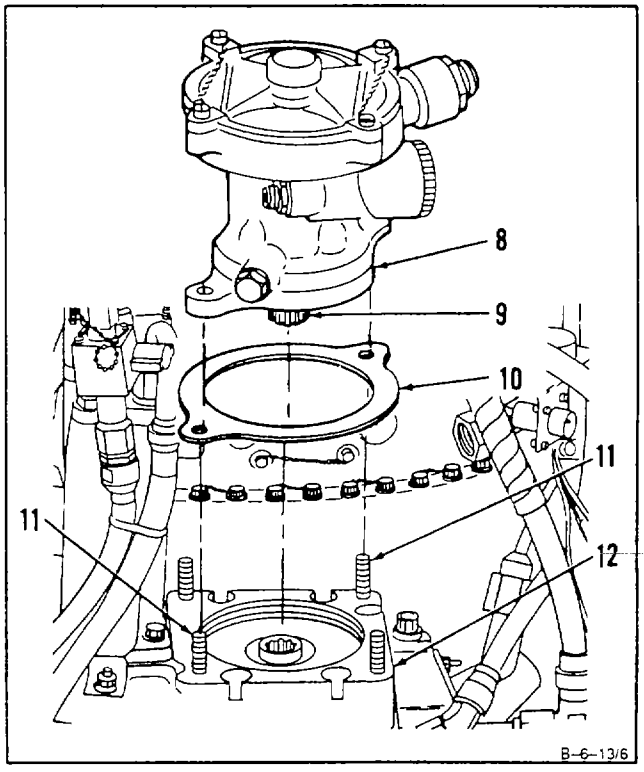


5. Apply lubricant (E34) to splines (9).

6. **Install** gasket (10) and **fuel boost pump assembly** (8) on studs (11) of accessory gearbox assembly (12)

NOTE

If splines of fuel boost pump shaft and accessory gearbox do not engage, do step 7 If splines do engage and pump assembly seats against gearbox assembly, omit step 7.



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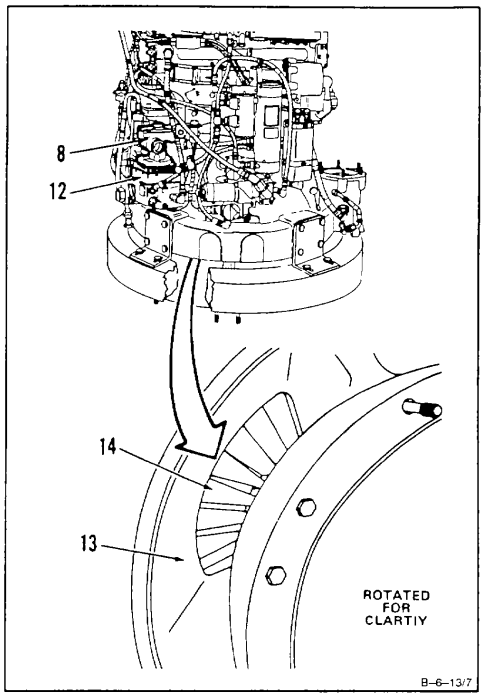
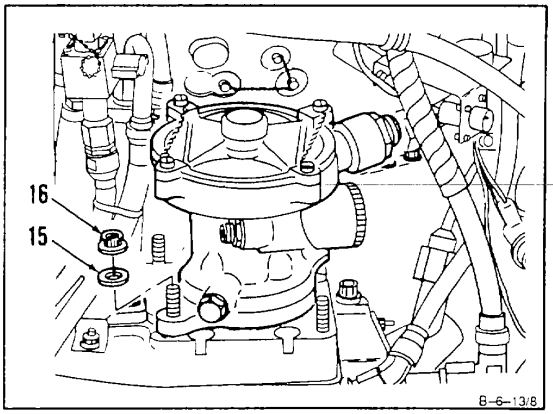
6-12 INSTALL FUEL BOOST PUMPASSEMBLY (Continued) 6-12

7. Reach into air inlet area (13) and **turn compressor rotor** (14) **until fuel boost pump assembly (8) seats** against gearbox assembly (12)



8. Install two washers (15) and nuts (16)



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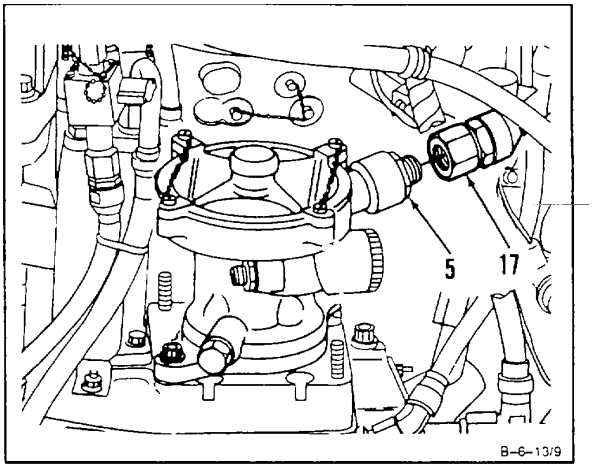
9 Connect hose assembly (17) to nipple (5)



INSPECT

FOLLOW-ON MAINTENANCE
Install Fuel Check Valve (Task 6-51)

END OF TASK

SECTION IV

FUEL BOOST PUMP ASSEMBLY-PREPERATION FOR STORAGE OR

SHIPMENT

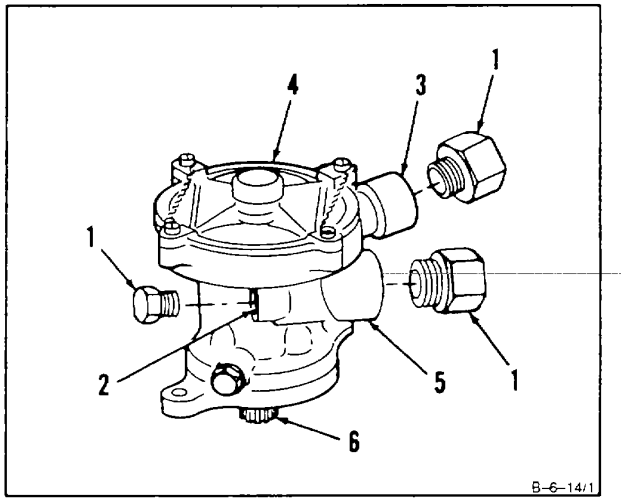
6-13 PRESERVE FUEL BOOST PUMP ASSEMBLY 6-13

INITIAL SETUP
Applicable Configurations:
All
Tools.
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Materials:
Gloves (E24)
Lubricating Oil (E35)
High Pressure Plugs
Personnel Required
Aircraft Powerplant Repairer
Equipment Condition:
Off Engine Task
Fuel Boost Pump Assembly Removed (Task 6-8)

1. Install high pressure plugs (1) in ports (2 and 3) on fuel boost pump assembly (4)

WARNING

Lubricating oils cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If Irritation of skin results, get medical attention Get medical attention for eyes.



2. Wear gloves (E24) Pour lubricating **oil** (E35) in port (5) until port (5) is **filled.**

3. Install high pressure plug (1) in port (5).

4. Rotate fuel boost pump spline (6) counterclockwise by hand at least three revolutions.

5. Remove high pressure plug (1) from port (5) and refill port (5) with lubricating **oil** (E35)

6. Install high pressure plug (1) in port (5)

FOLLOW-ON MAINTENANCE
Package Fuel Boost Pump Assembly (Task 6-14)

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools.

None

Materials:

Barrier Material (E7)
Tape (E39)

Personnel Required

Aircraft Powerplant Repairer

Equipment Condition

Fuel Boost Pump Assembly Removed (Task 6-8)
Fuel Boost Pump Assembly Preserved (Task 6-13)

---

1. **Wrap fuel boost pump** securely with barrier material (E7)

2. **Install fuel boost** pump in suitable fiberboard box

3. **Package fiberboard box** securely to allow no movement of fuel boost pump

4. **Seal box** with tape (E39)

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION V

LEFT- AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES

6-15 REMOVE LEFT- AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES 6-15

INITIAL SETUP

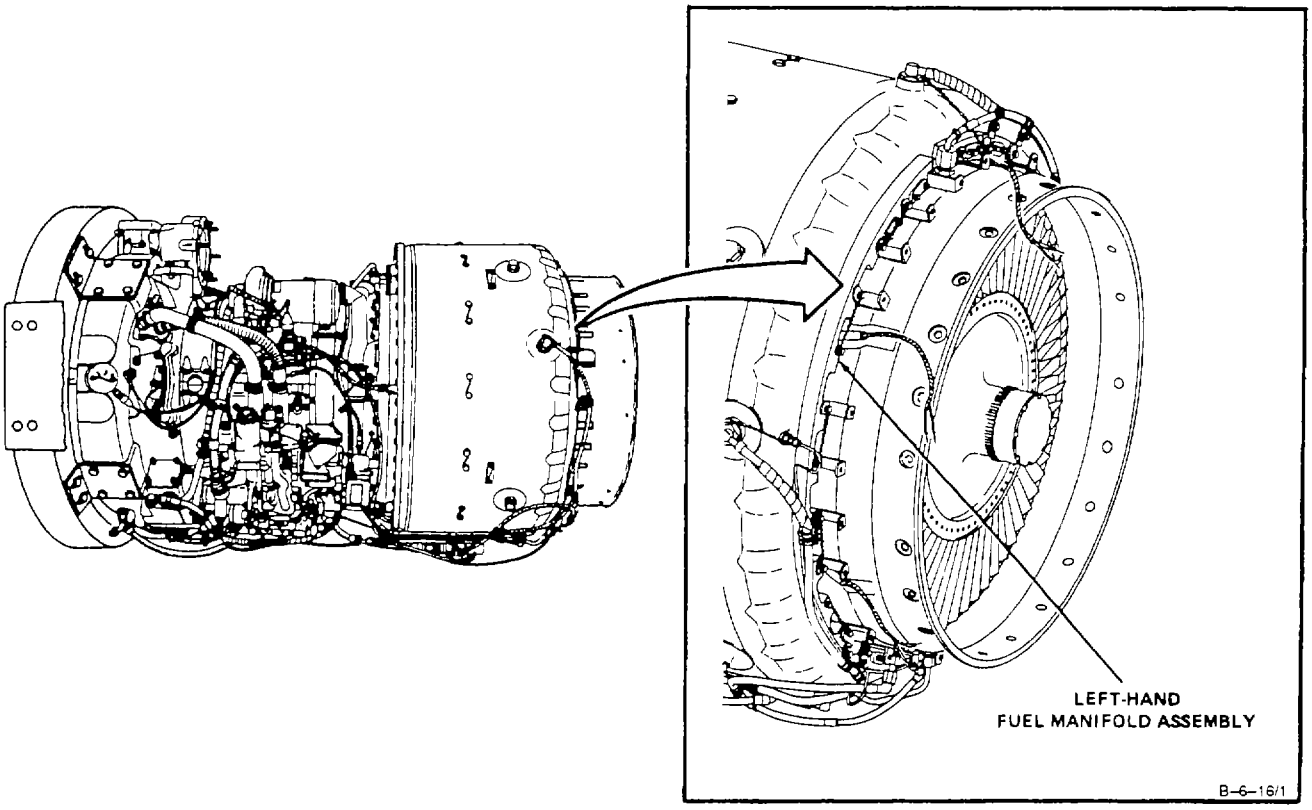
Applicable Configurations:
All

Tools
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials
None

Personnel Required
Aircraft Powerplant Repairer

Equipment Condition:
Left- and Right-Hand Bus Bar Assemblies Removed (Task 4-7)
Fireshield Assembly Removed (Task 4-12)



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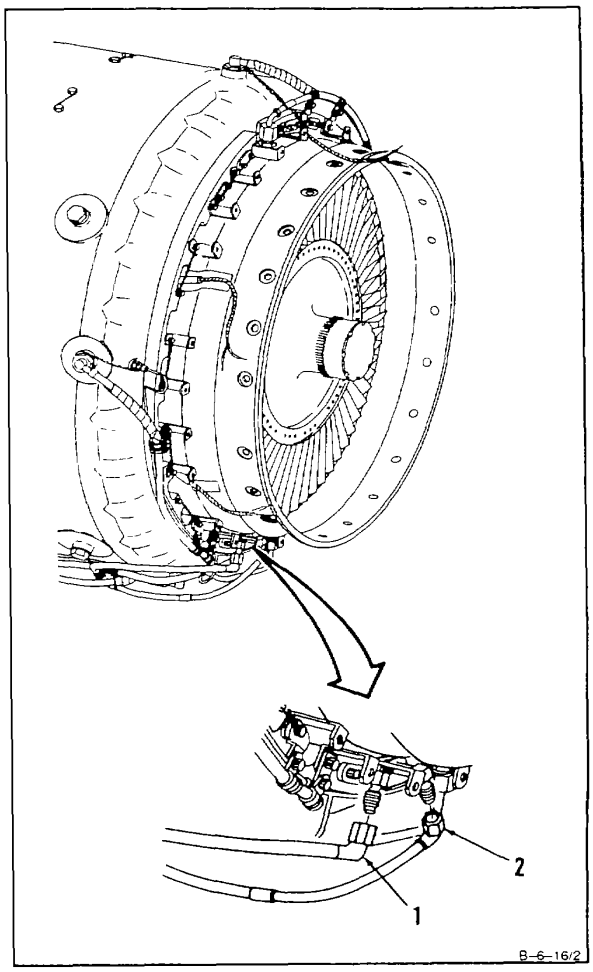
6-15 REMOVE LEFT- AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES (CONTINUED) 6-15

1. **Disconnect hose assemblies (1 and 2)**



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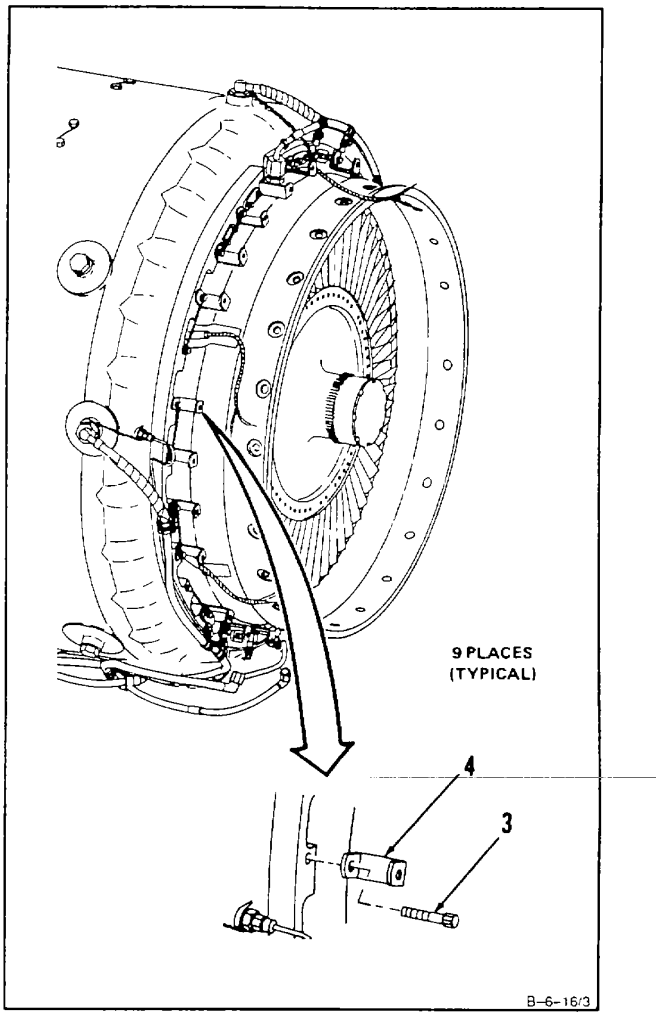
2. **Remove** lockwire, **nine bolts** (3), **and supports (4).**



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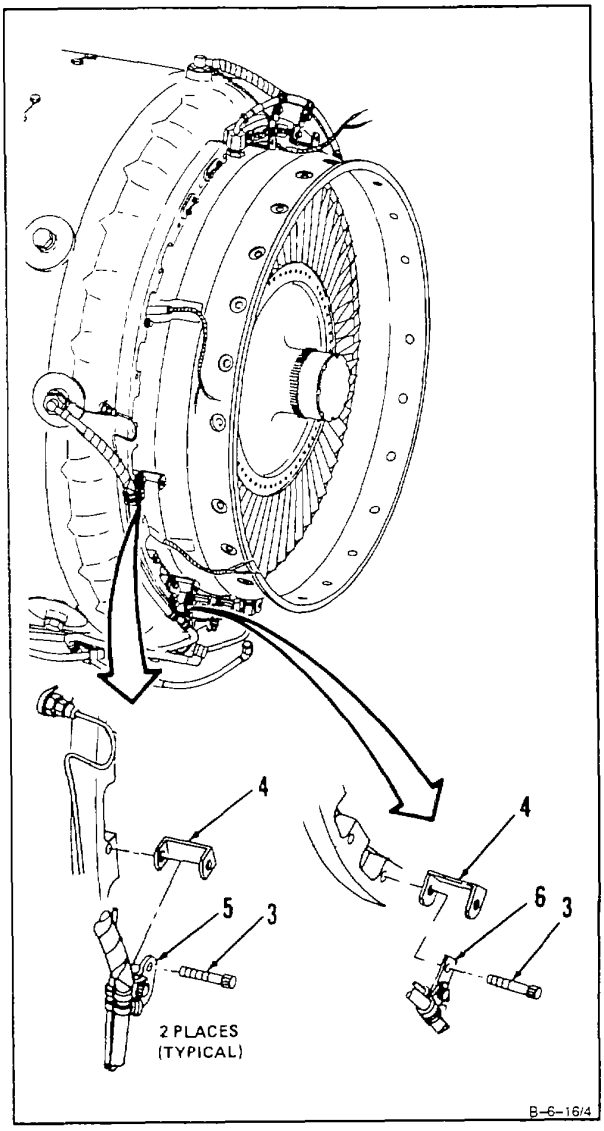
3. **Remove** lockwire, **three bolts (3), two brackets** (5), **plate (6), and three supports (4)**



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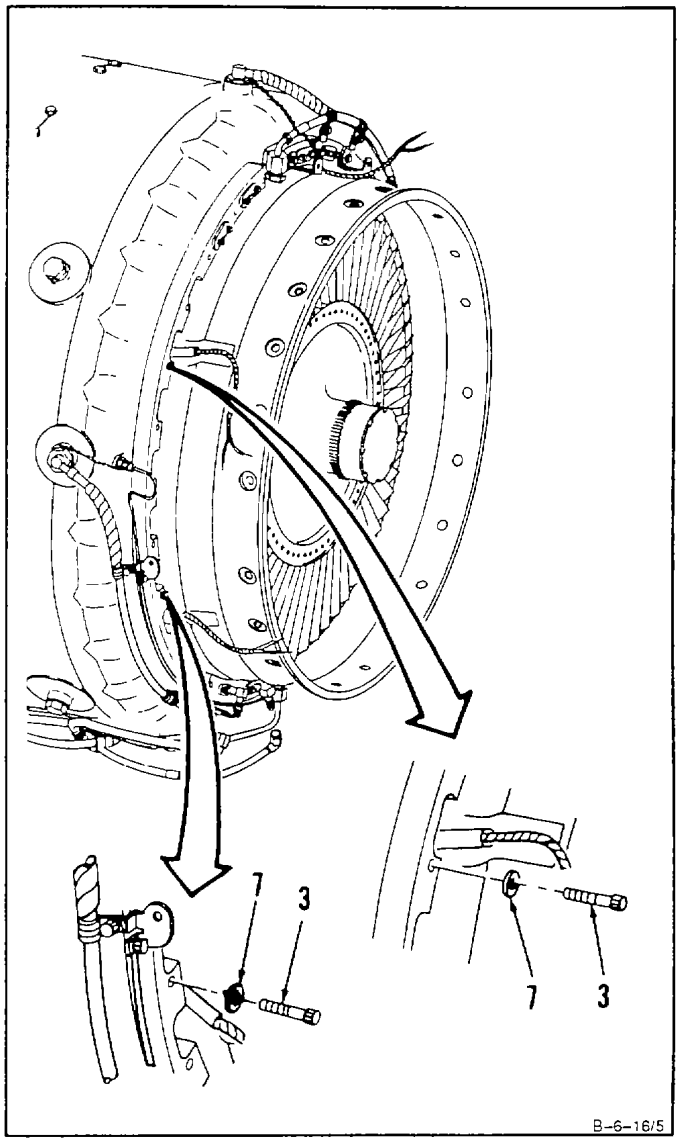
4. **Remove** lockwire, **two bolts** (3), and washers **(7)**



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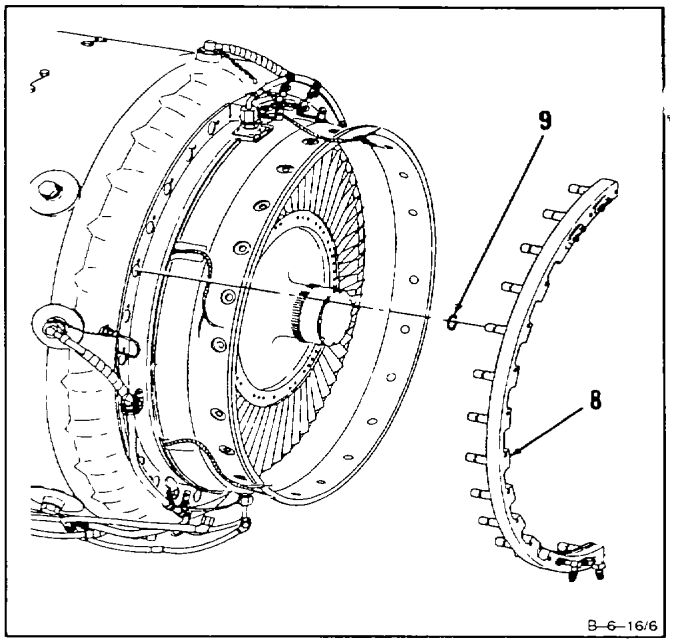
5. **Remove left-hand fuel manifold assembly (8)** and 14 seals (9)



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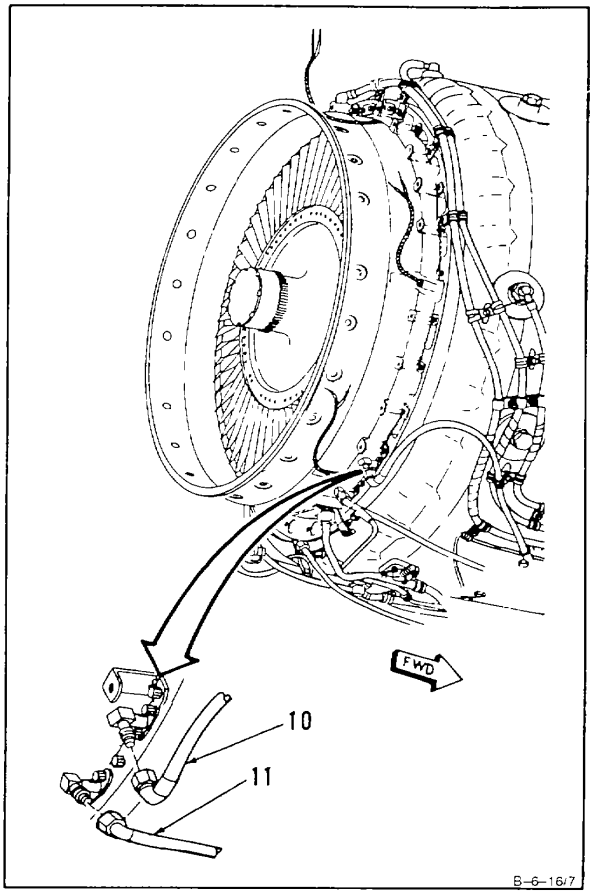
6. **Disconnect hose assemblies (10 and 11).**



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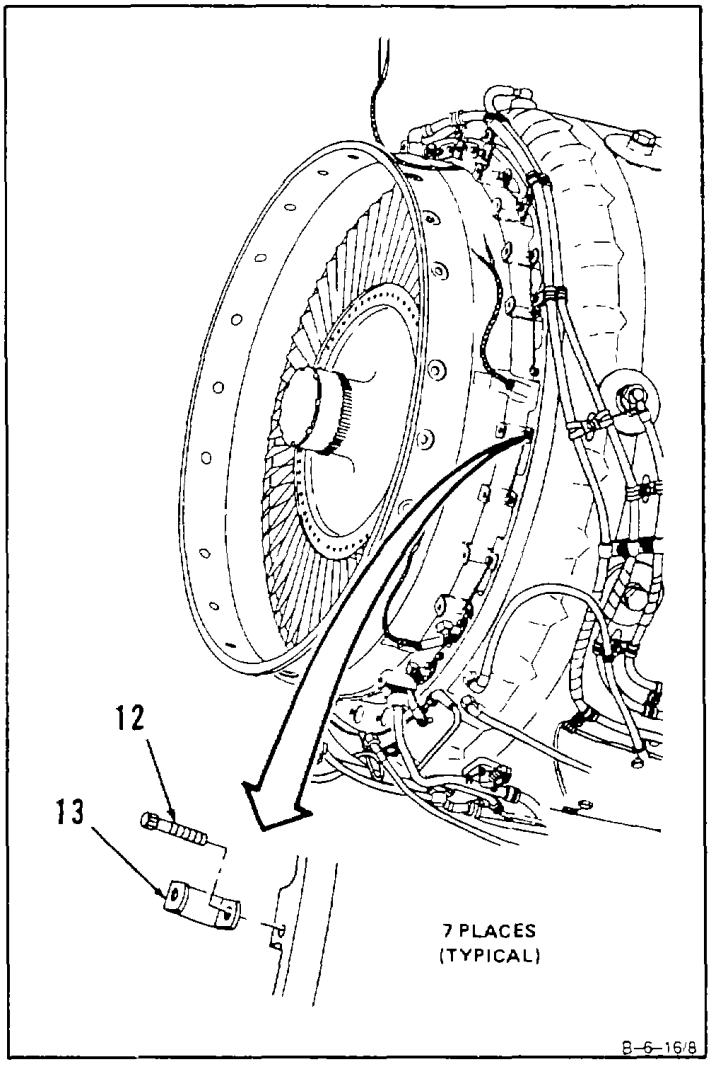
6-15 REMOVE LEFT- AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES (CONTINUED) 6-15

7. **Remove** lockwire, **seven bolts (12), and supports (13).**



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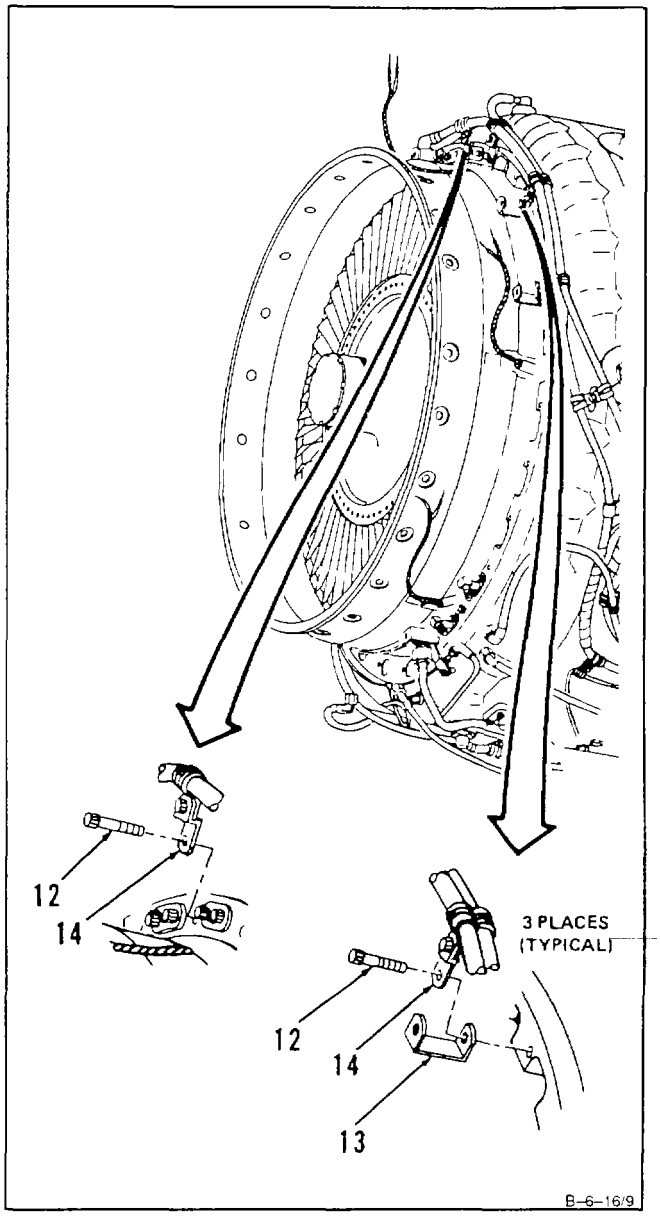
8. **Remove** lockwire, **four bolts (12), brackets (14), and three supports (13)**



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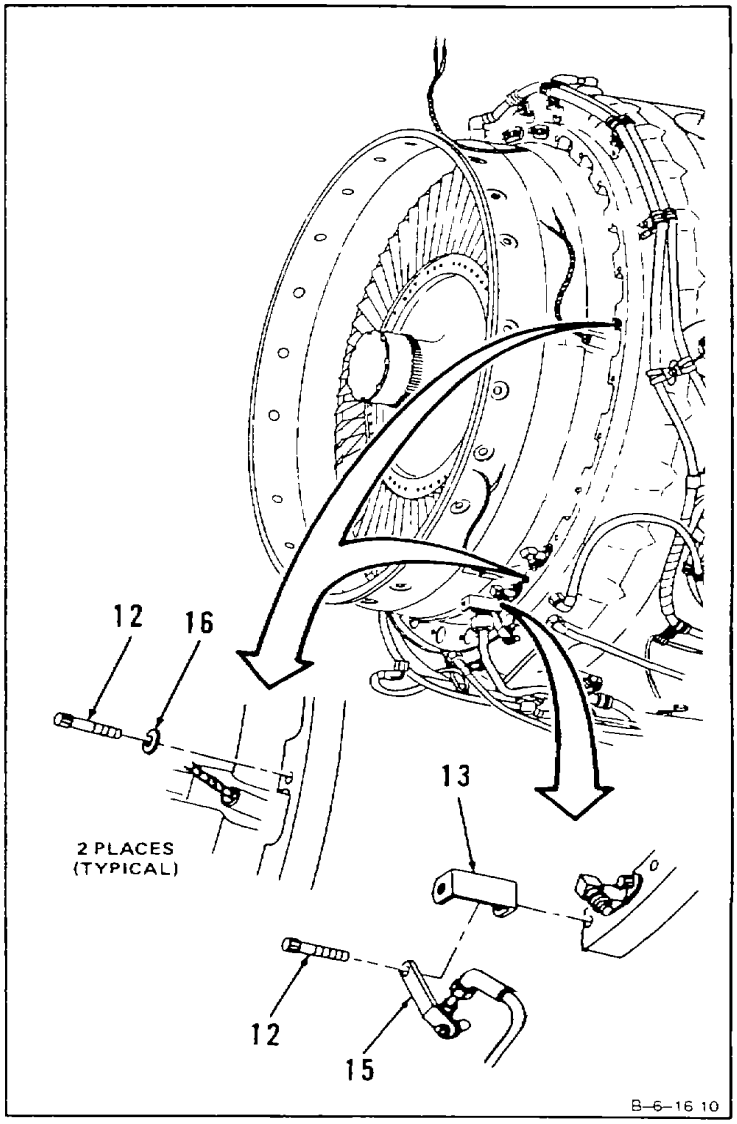
9. **Remove** lockwire, **three bolts (12), bracket (15), support (13), and two washers (16).**



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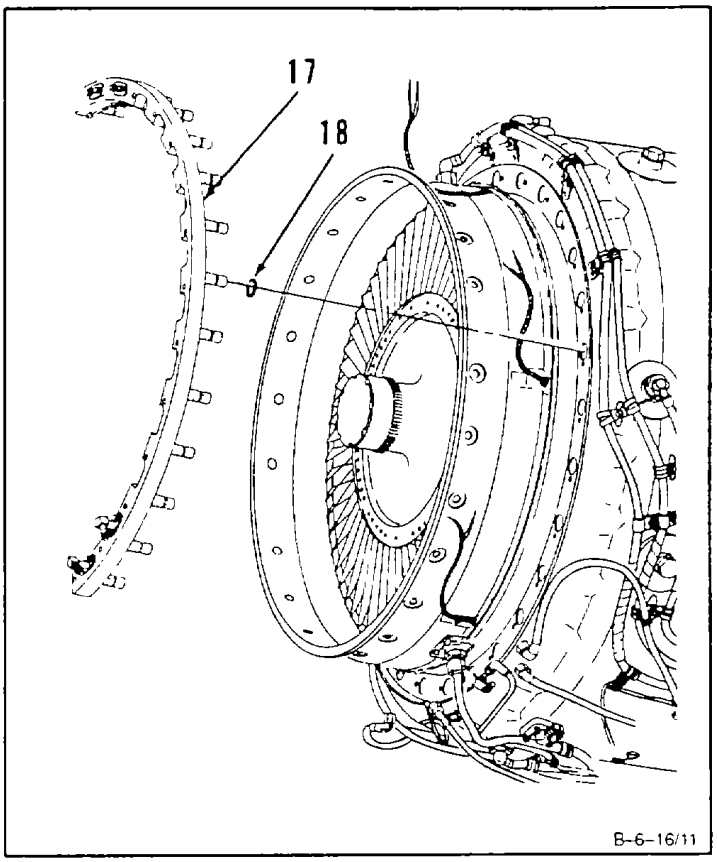
10. **Remove right-hand fuel manifold assembly (17)** and 14 seals (18)



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-16 CLEAN LEFT AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES 6-16

INITIAL SETUP

Applicable Configurations-
All

Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-3234944
Goggles
Dry, Compressed Air Source

Materials:
Gloves (E24)
Lint-Free Cloth (E30)
Denatured Alcohol (El 7)

Personnel Required-
Aircraft Powerplant Repairer

***Equipment** Condition:*
Off Engine Task
Left- and Right-Hand Bus Bar Assemblies Removed (Task 4-7)
Fireshield Assembly Removed (Task 4-12)
Left- and Right-Hand Fuel Manifold Assemblies Removed (Task 6-15)

NOTE

Before cleaning left- and right-hand fuel manifolds, check for evidence of fuel leakage between covers, elbows and manifolds

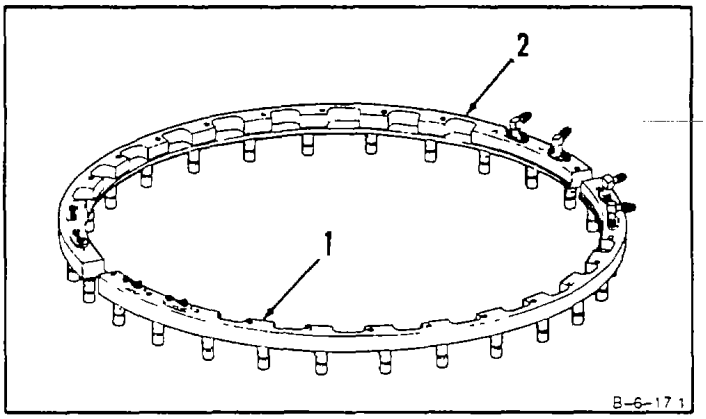
1. Wear gloves (E24) and goggles **Clean left- and right-hand fuel manifold assemblies (1 and 2).** Immerse in denatured alcohol (E17) and agitate Use brush to remove loose carbon

2. Wipe dry using clean, dry, lint-free cloth (E30)

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result In Injury to eyes or skin. In case of injury, get medical attention.

3. Wear goggles Blow dry any remaining solvent Use clean, dry, compressed air



FOLLOW-ON MAINTENANCE
Inspect Left- and Right-Hand Fuel Manifold Assemblies (Task 6-17)

END OF TASK

6-17 INSPECT LEFT AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES 6-17

INITIAL SETUP

Applicable Configurations
All

Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

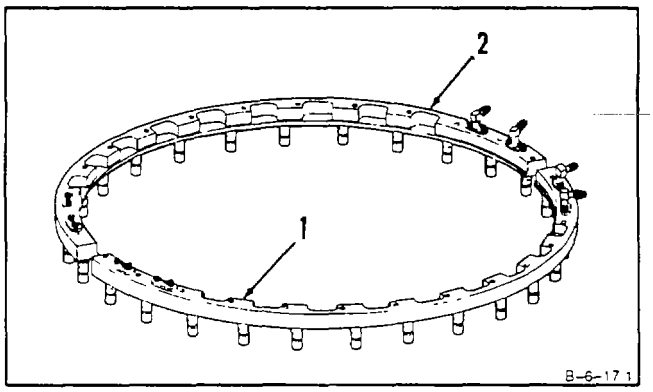
Personnel Required
Aircraft Powerplant Inspector

References,
Task 6- 16

Equipment Condition
Off Engine Task

---

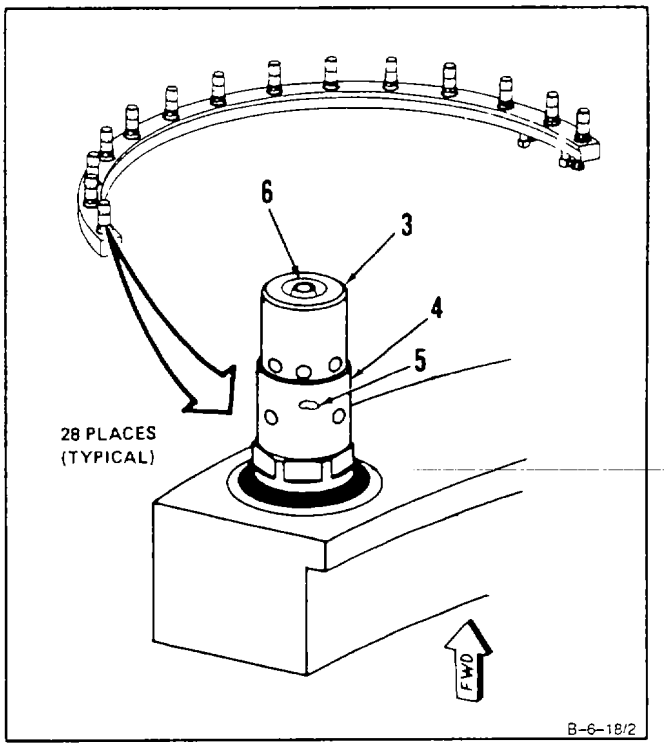
1. Inspect left- and right-hand fuel manifold assemblies (1 and 2) There shall be no cracks



2. Inspect nozzle tips(3). There shall be no cracks or loss of material

3. Inspect nozzle(4) for chafing (5) There shall be no chafing that causes material breakthrough

4 Inspect nozzle spray hole (6) for carbon deposits If carbon deposits exist, clean left- and right-hand fuel manifold assemblies (Ref Task 6-16)



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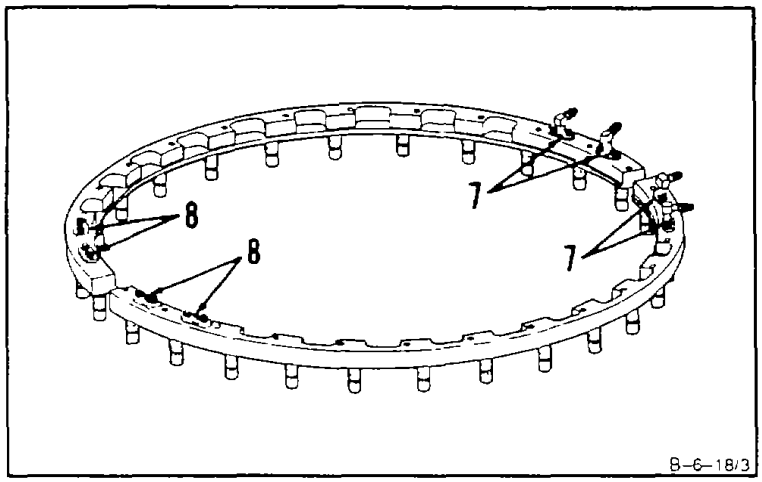
5. Inspect elbows (7) and covers (8). There shall be no signs of leakage



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-18 REPAIR LEFT AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES 6-18

INITIAL SETUP

Applicable Configurations
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Torque Adapter, 7/32-inch

Materials
Lockwire (E33)

Parts
Packings

Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P

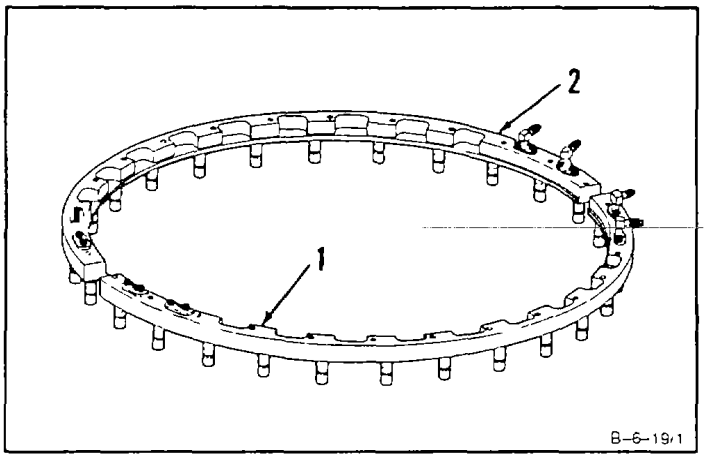
Equipment Condition
Off Engine Task

---

1. **Repair leaksIn left-hand manifold (1) and right-hand manifold(2)** as follows

NOTE

Only covers or elbows that had indications of leakage around them need be removed for replacement of packings The following steps cover replacement of all packings



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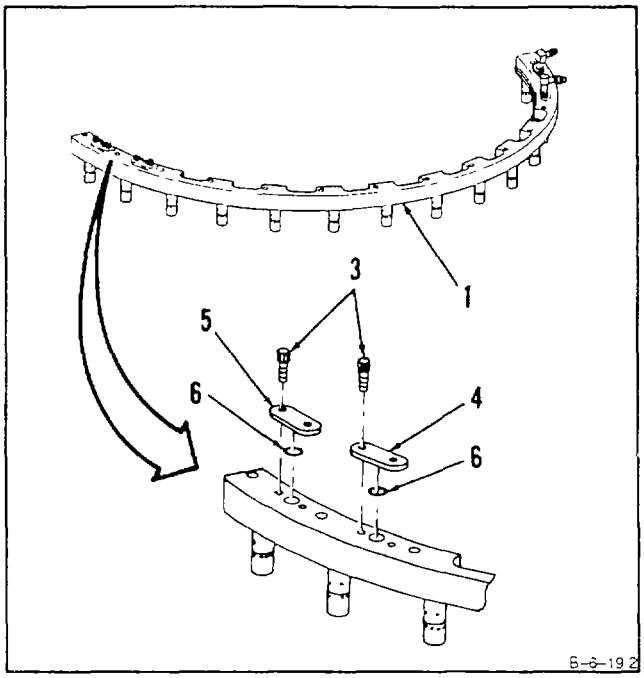
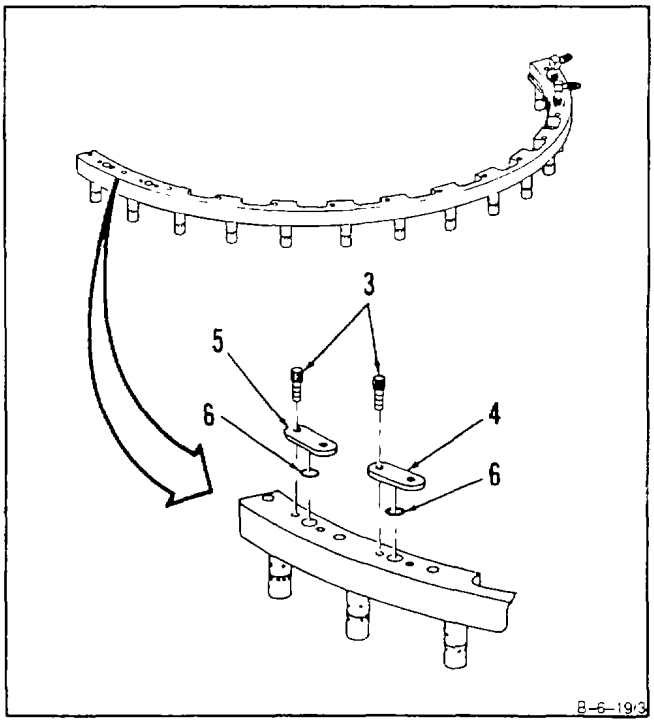
a. Repair leaks in left-hand manifold (1)

(1) **Remove** lockwire, four bolts (3) **covers (4 and 5),** and two packings (6)



(2) Install two new packings (6), **covers (4 and 5),** and four bolts (3) Lockwire bolts (3) Use lockwire (E33)



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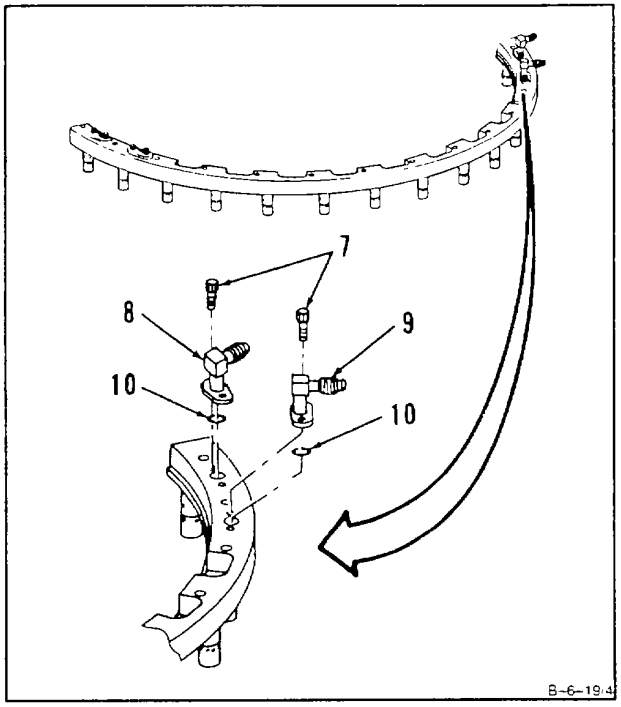
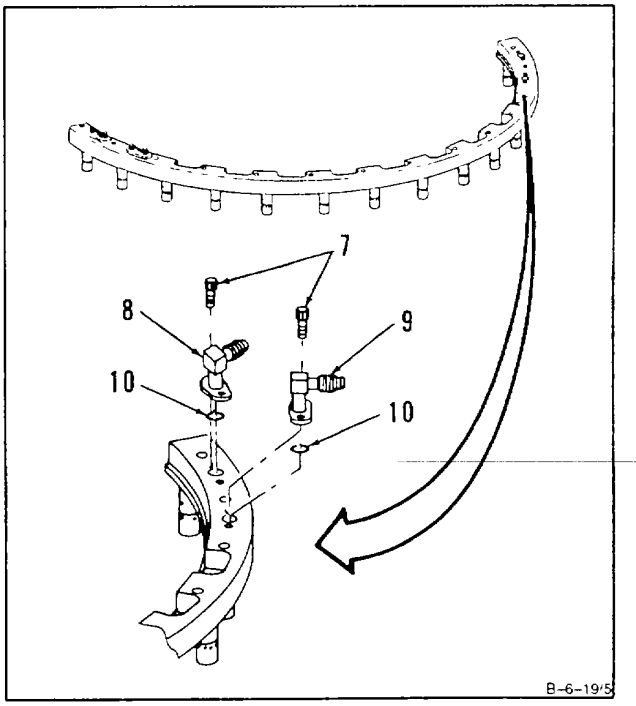
(3) **Remove** lockwire, four bolts (7), **elbows (B and 9),** and two packings (10) Use 7/32-inch torque adapter.



(4) **Install** two new packings (10), elbows **(8 and 9),** and four, bolts (7) Use 7/32-inch torque adapter.

(5) Lockwire bolts (7) Use lockwire (E33).



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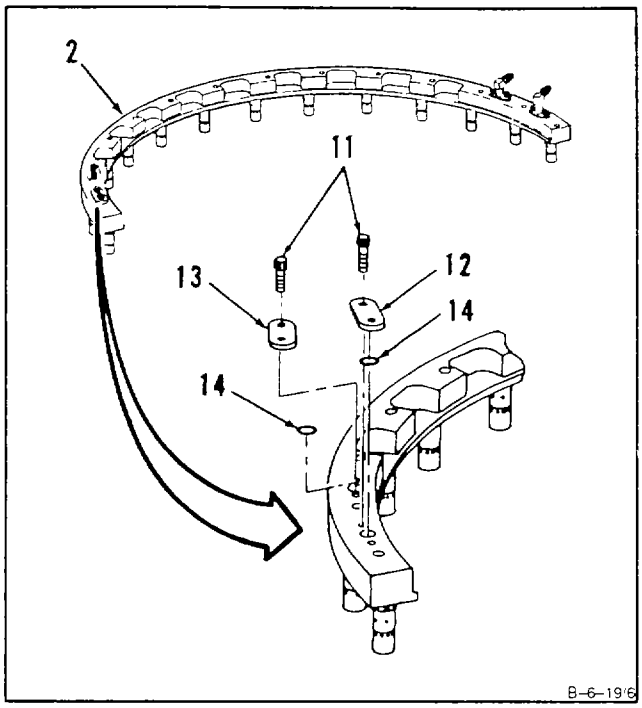
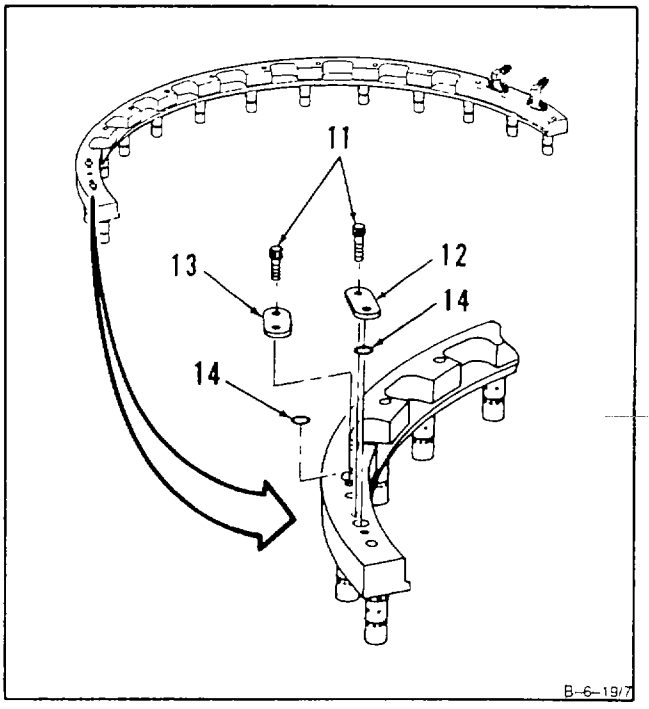
b Repair leaks in right-hand manifold (2).

(1) **Remove** lockwire, four bolts (11), **covers (12 and 13),** and two packings (14).



(2) Install two new packings (14), **covers (12 and 13),** and four bolts (11) Lockwire bolts (11) Use lockwire (E33).



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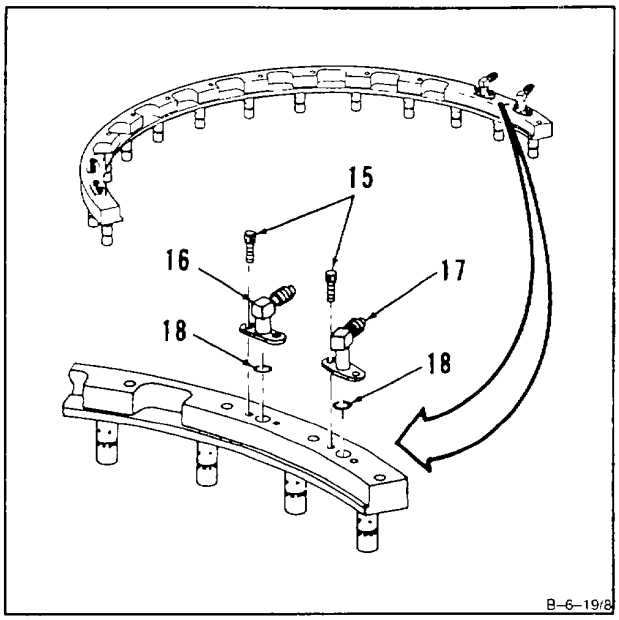
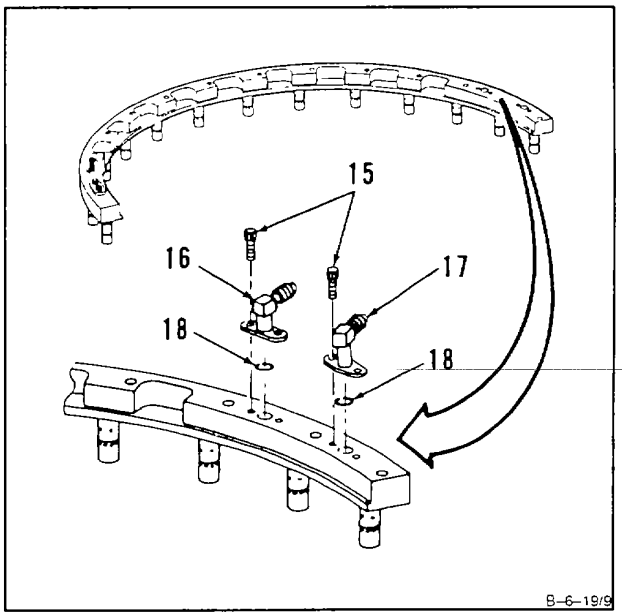
(3) Remove lockwire, four bolts (15), **elbows (16 and 17),** and two packings (18) Use 7/32-inch torque adapter.



(4) **Install** two new packings (18), **elbows** (**16 and 17),** and four bolts (15) Use 7/32-inch torque adapter.

(5) Lockwire bolts (15) Use lockwire (E33).



INSPECT

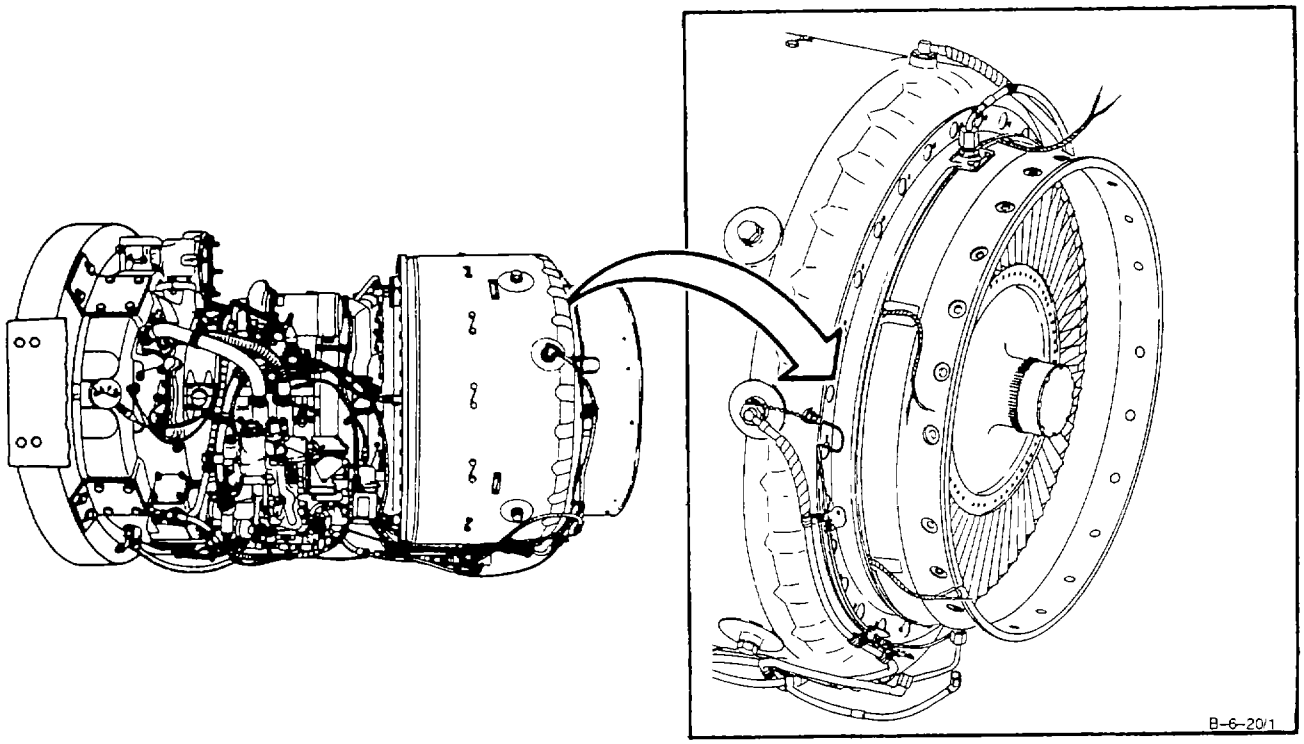
FOLLOW-ON MAINTENANCE
None

END OF TASK

6-19 INSTALL LEFT- AND RIGHT-HAND FUEL MANIFOLD ASSEMBLIES 6-19

INITIAL SETUP
Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Kit,
NSN 5180-00-323-5114
Torque Wrench, 0-30 Inch-Pounds
Torque Wrench, 30-150 Inch-Pounds
Torque Adapter Wrench (T25)

Materials-
Lockwire (E32)
Parts:
Seals
Personnel Required
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
References
TM 1-2840-252-23P



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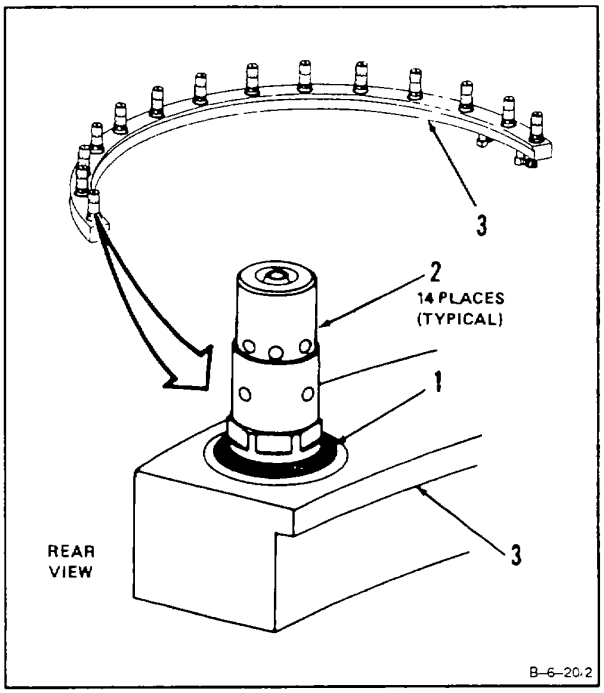
CAUTION

In following step 1, seals must be fully seated and must be squarely against nozzle flanges. Failure to comply will cause Interference with fireshield section, damage and leaks.

1. **Install 14 seals (1)** on 14 nozzles (2) on left hand fuel manifold assembly (3).



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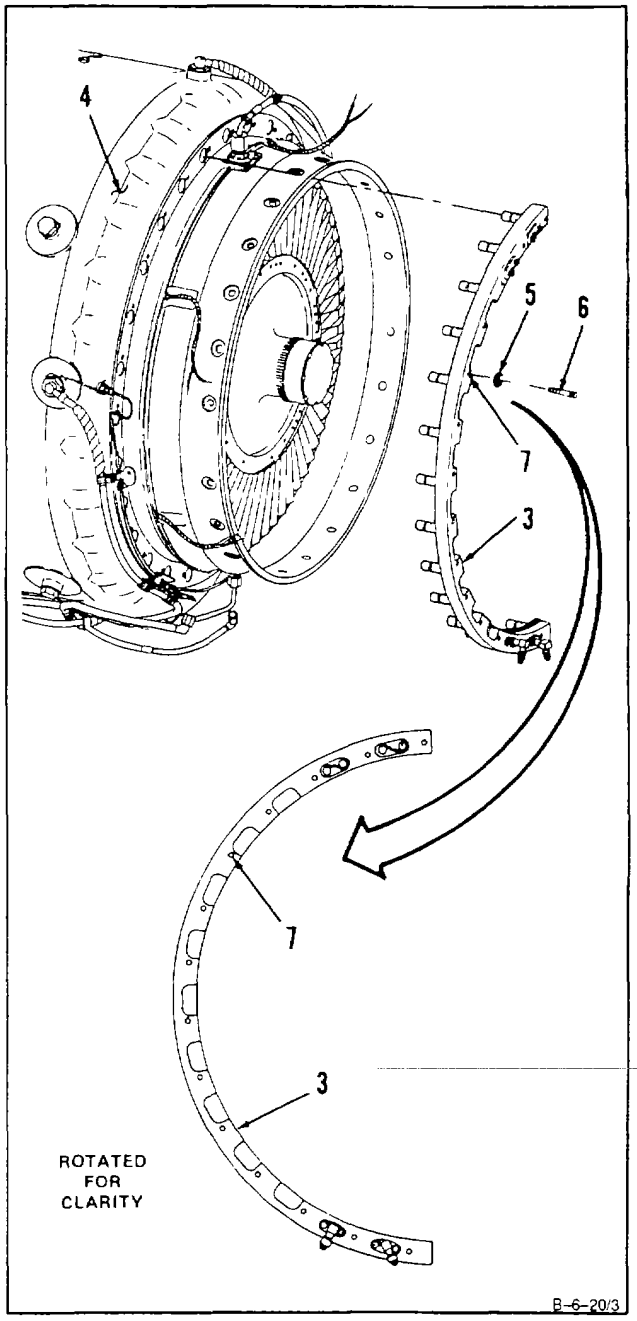
2. **Install left-hand fuel manifold assembly (3)** in housing (4).

NOTE

In following steps 3 thru 7, leave bolts loose to allow for fireshield alignment.

3. Install washer (5) and bolt (6) in hole (7).



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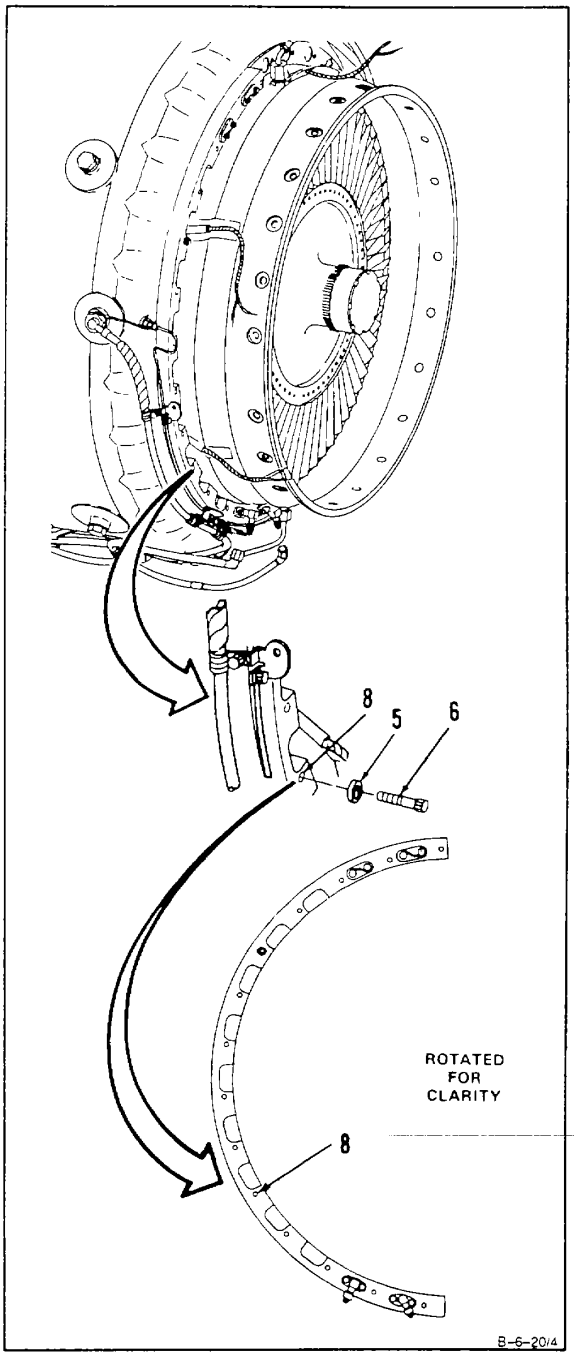
4 Install bolt (6) and washer (5) in hole (8).



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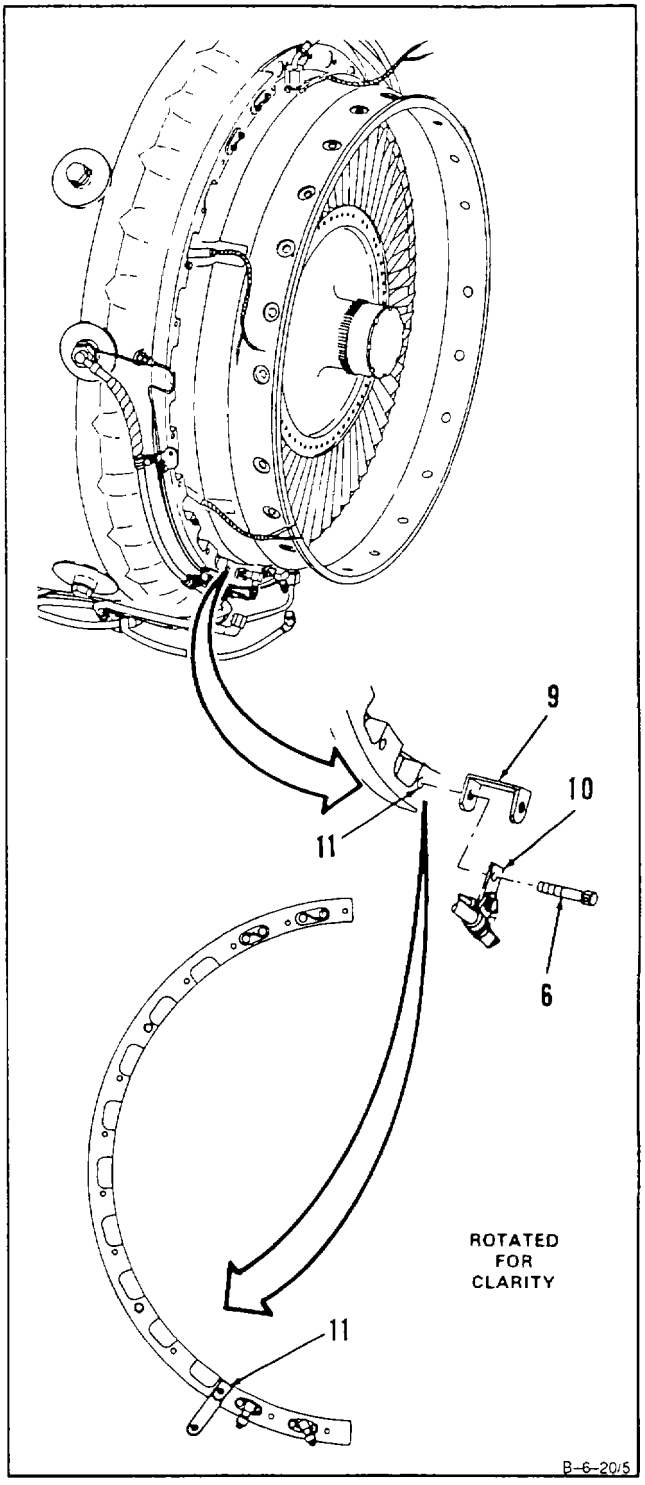
5. Install support (9), plate (10), and bolt (6) in hole (11).



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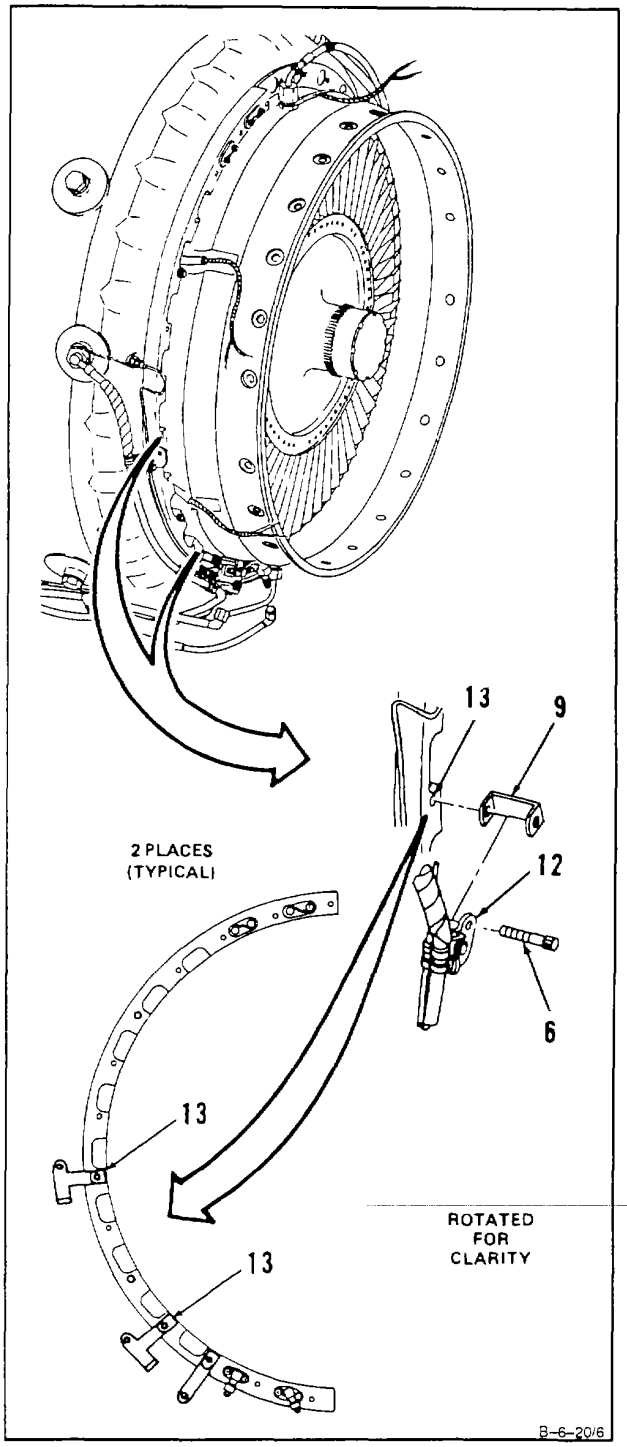
6. Install two supports (9), two brackets (12), and two bolts (6) in holes (13).



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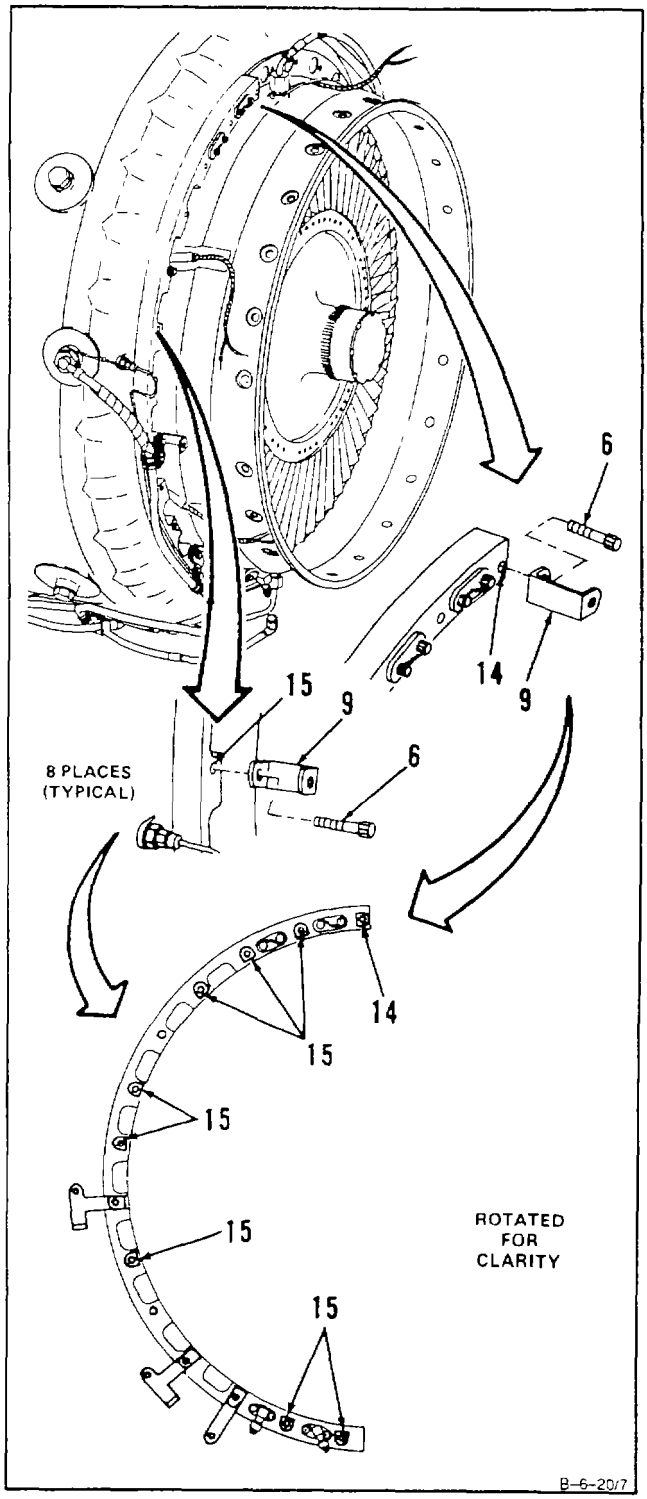
7. Install support (9) and bolt (6) in hole (14).

8. Install eight supports (9) and bolts (6) in remaining holes (15).



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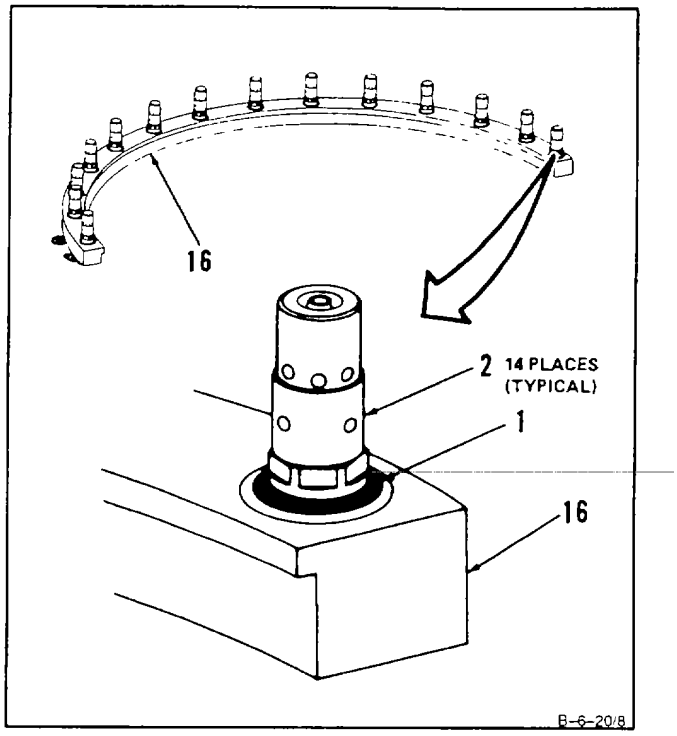
CAUTION

In following step 9, seals must be fully seated and must be squarely against nozzle flanges Failure to comply will cause Interference with fireshield section, damage and leaks.

9. **Install 14 seals (1)** on 14 nozzles (2) on righthand fuel manifold assembly (16).



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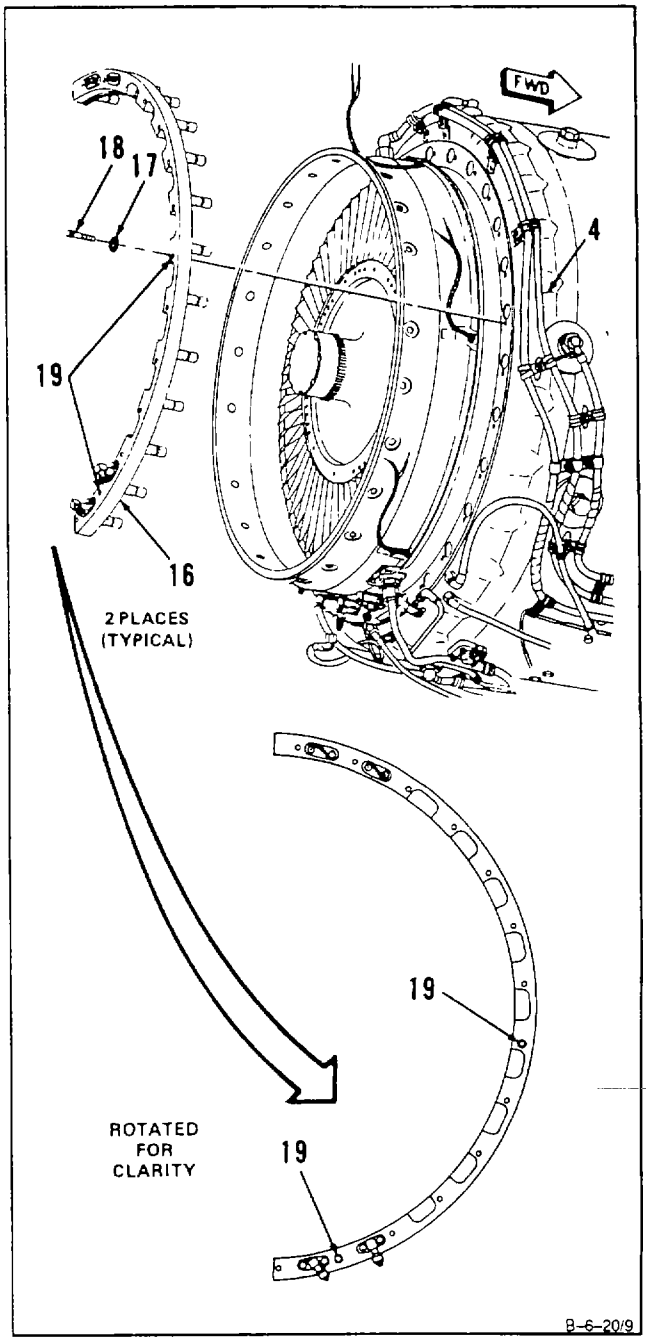
10. **Install right-hand fuel manifold assembly (16)** in housing (4).

NOTE

In following steps 11 thru 15, leave bolts loose to allow for fireshield alignment

11. Install washers (17) and bolts (18) in holes (19).



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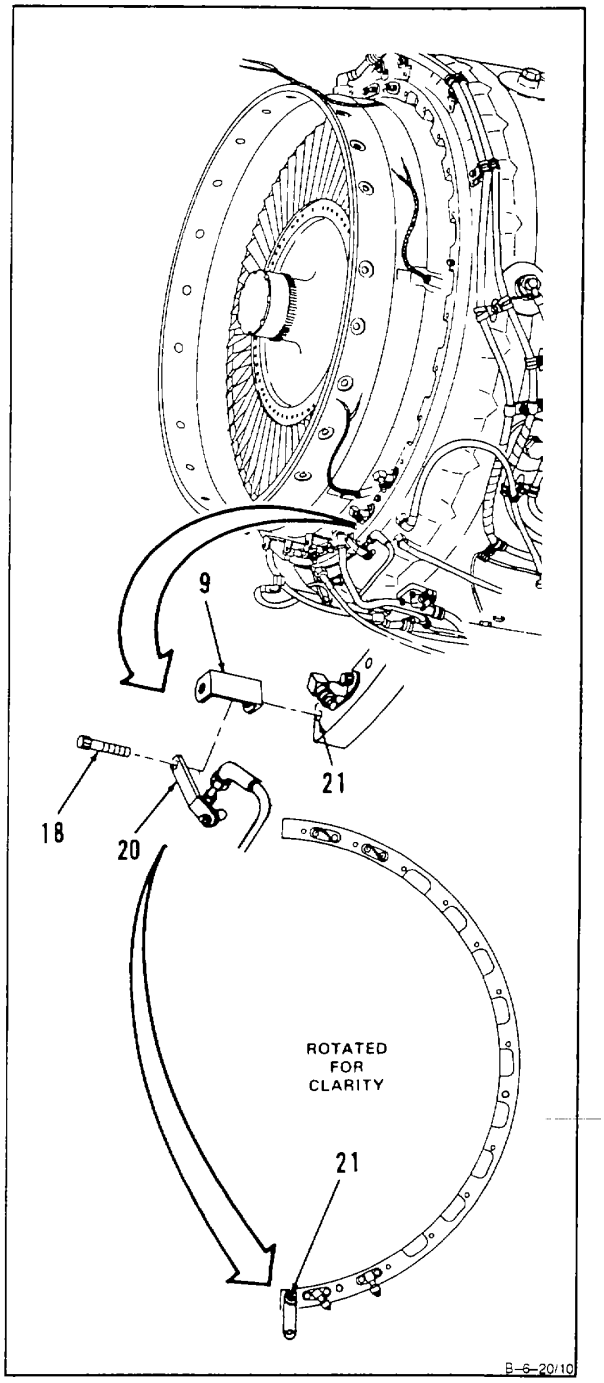
12. Install support (9), bracket (20), and bolt (18) in hole (21).



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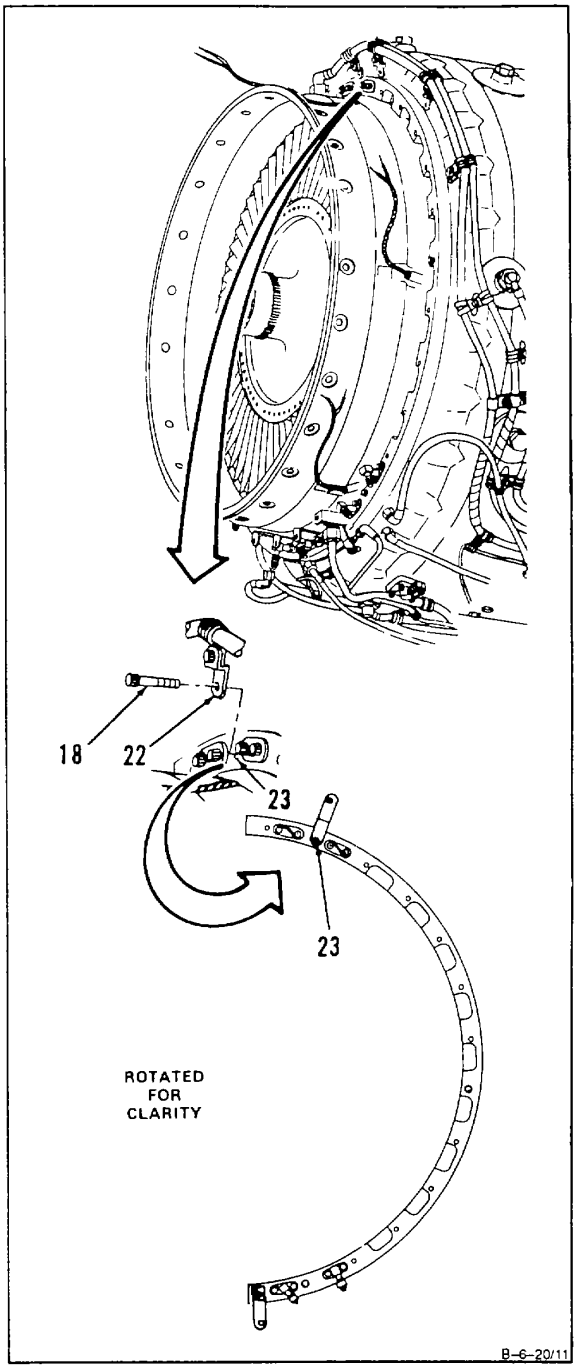
13. Install bracket (22) and bolt (18) in hole (23).



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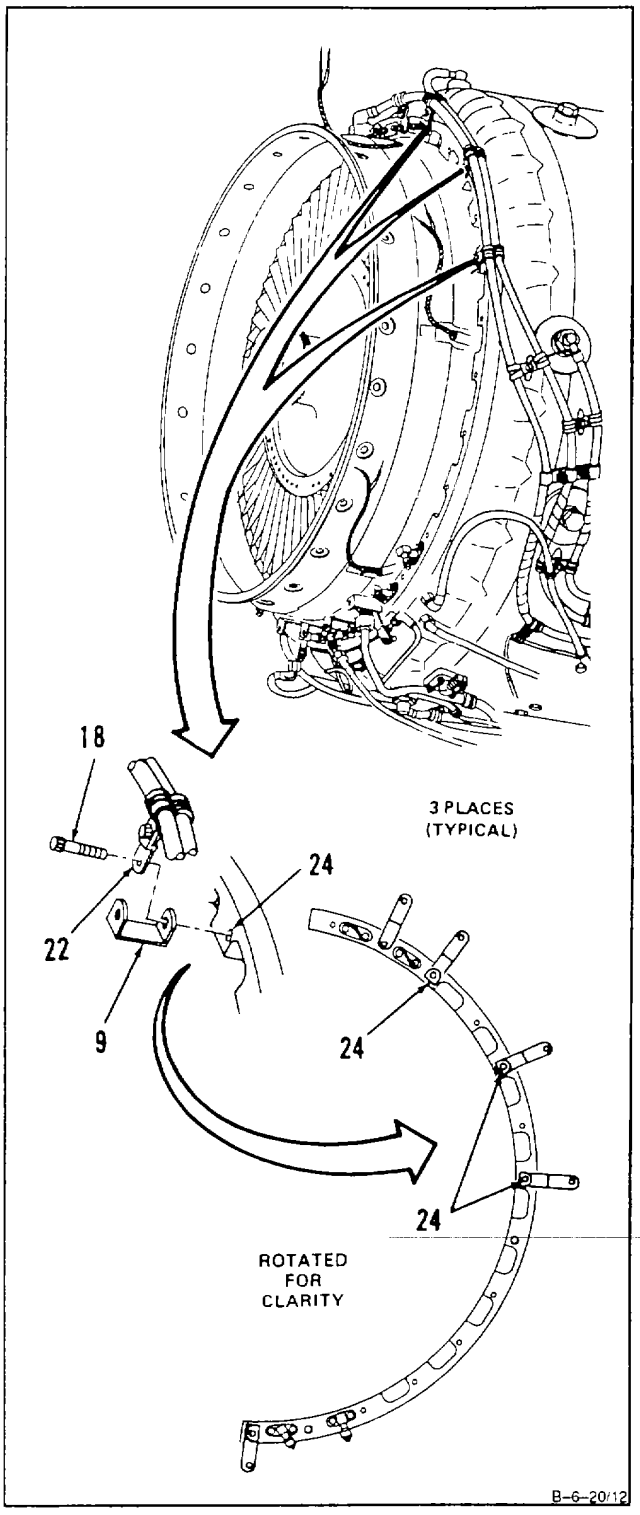
14. Install three supports (9), three brackets (22), and three bolts (18) in three holes (24).



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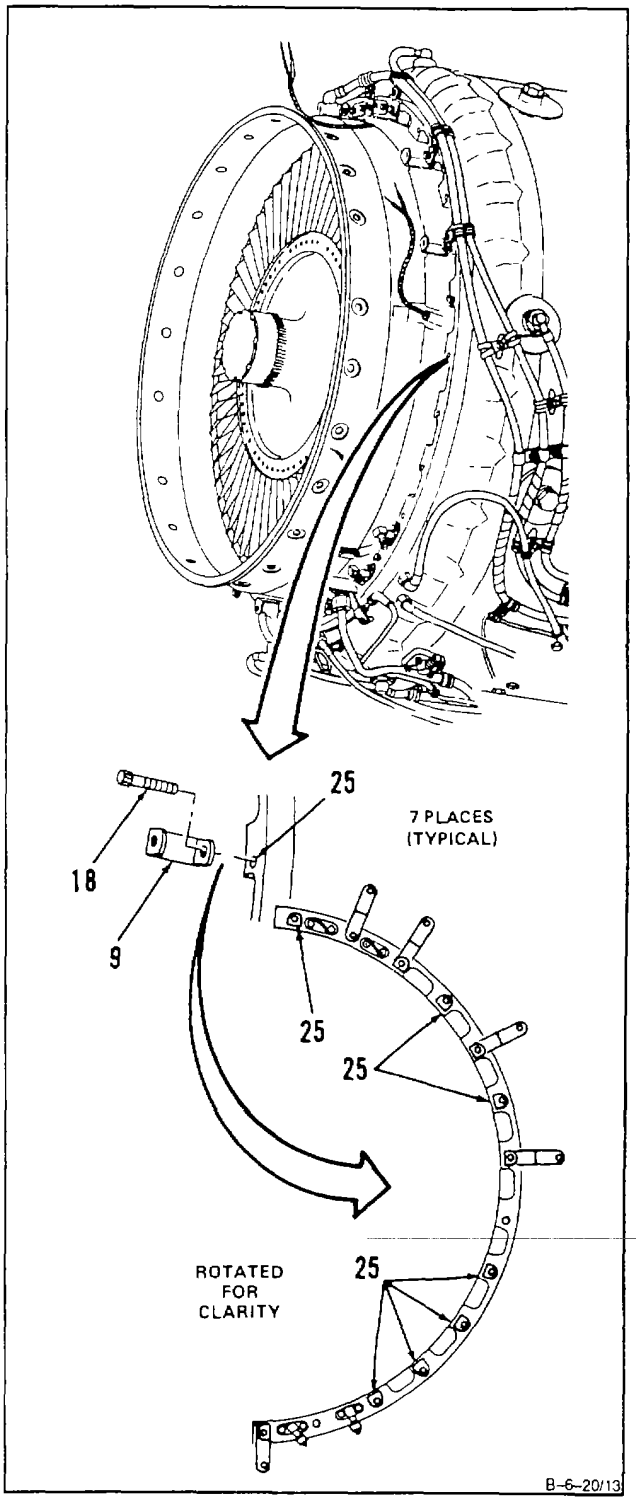
15. Install seven supports (9) and seven bolts (18) in seven remaining holes (25).



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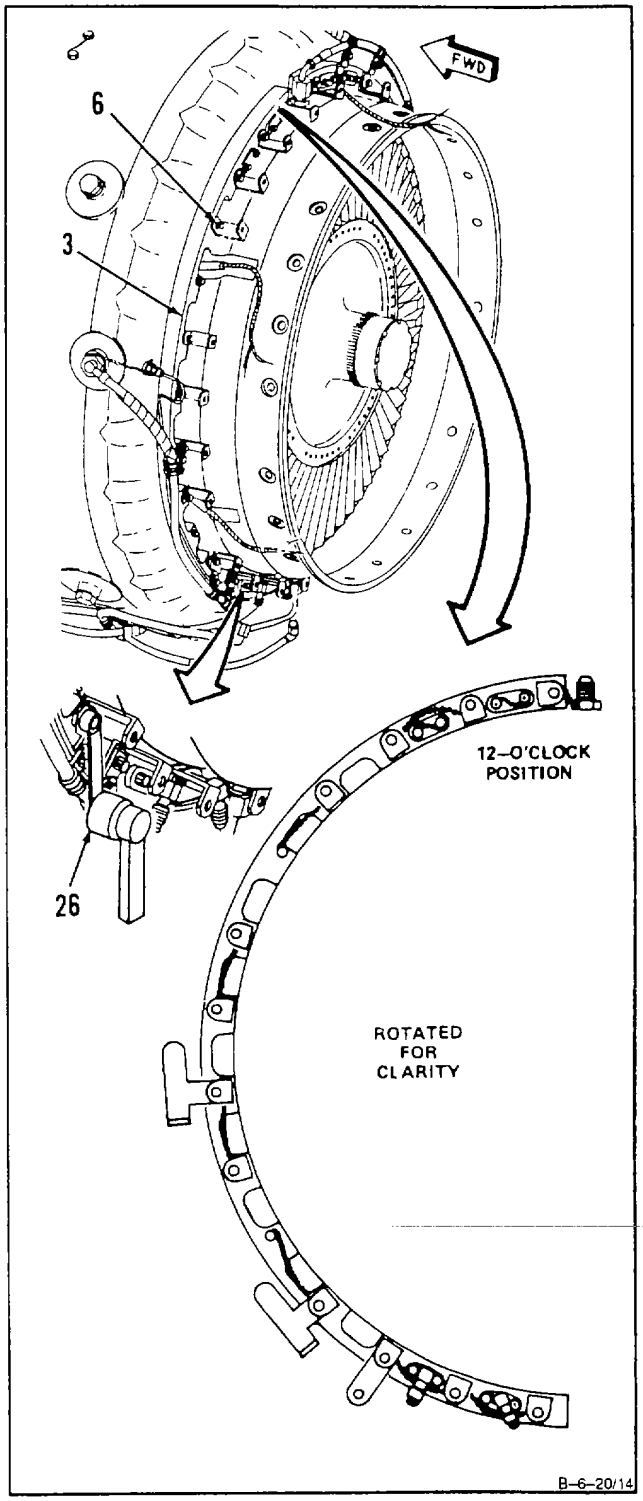
16. Using torque adapter wrench (T15) (26), **torque** a**ll bolts (6) to 40 Inch-pounds** on left-hand fuel manifold (3).

17. Lockwire 14 bolts (6) on left-hand fuel manifold (3) Use lockwire (E32).



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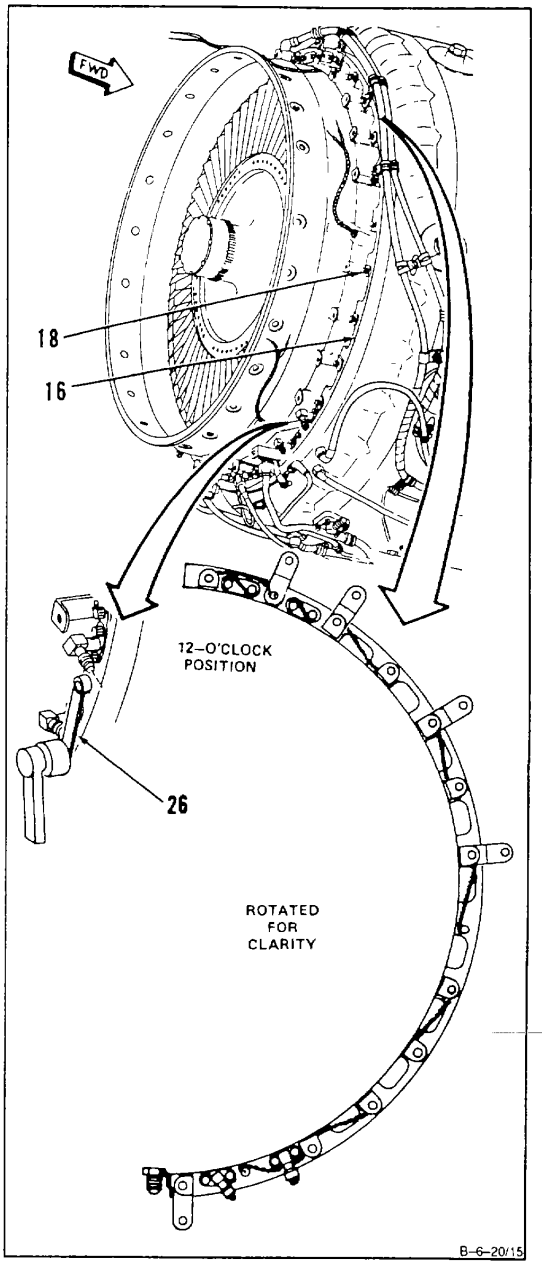
18. Using torque adapter wrench (T25) (26), **torque all bolts (18) to 40 inch-pounds** on right-hand fuel manifold (16).

19. Lockwire 14 bolts (18) on right-hand fuel manifold (16) Use lockwire (E32).



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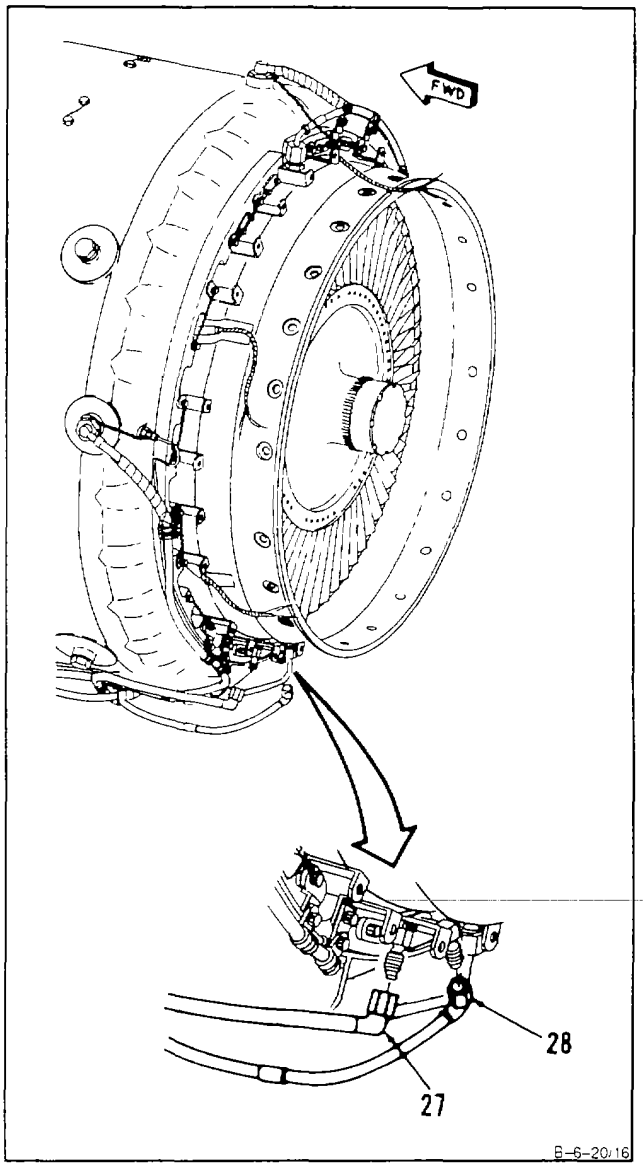
20. Connect hose assemblies (27 and 28).



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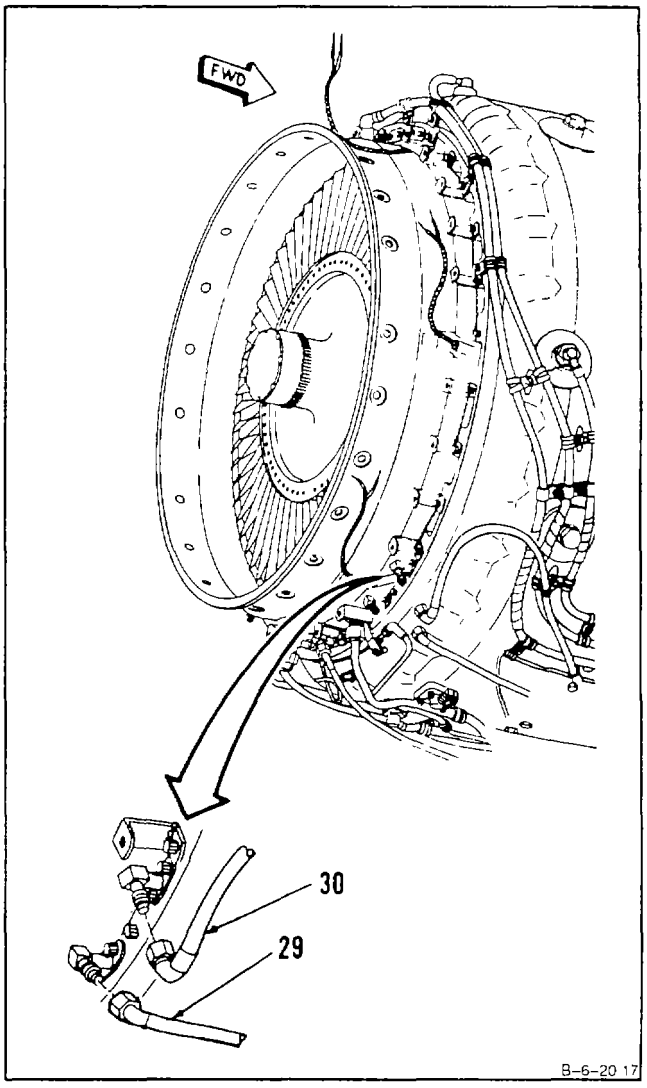
21. Connect hose assemblies (29 and 30).



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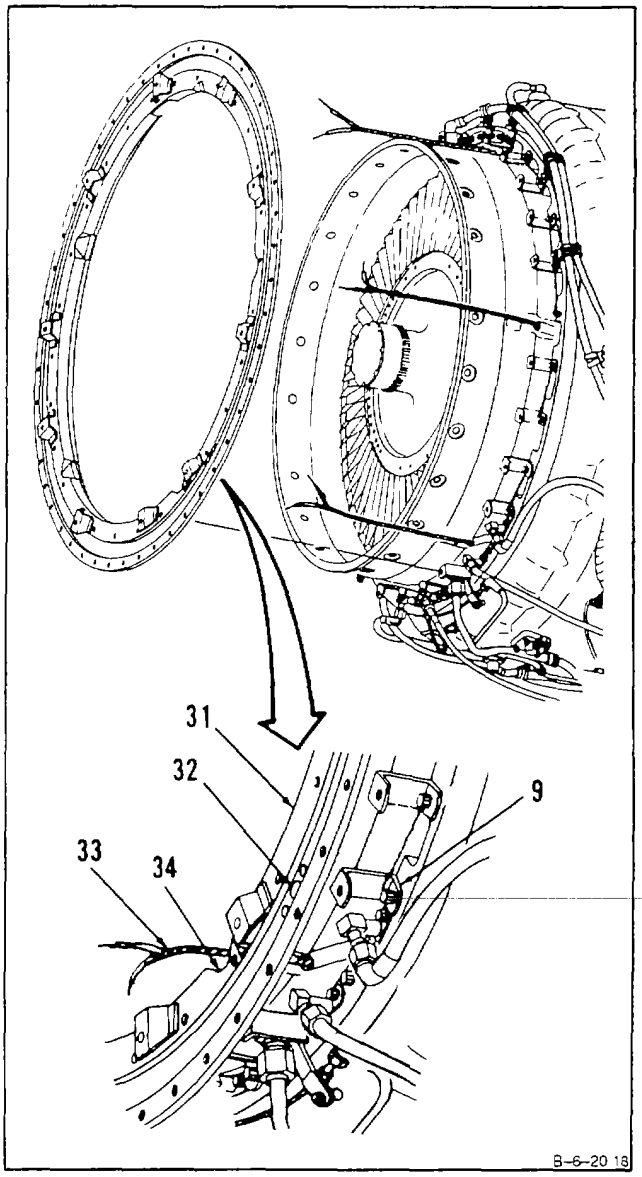
CAUTION

When installing fireshield assembly, be careful not to get five thermocouple harness assembly leads caught between fireshield and fourth turbine nozzle. Failure to comply may cause damage to harness assembly leads.

22. Align fireshield assembly (31) near 23 supports (9) with thermocouple jumper lead mounting hole (32) at 5-o'clock position.

23. Route five thermocouple harness assembly leads (33) through five cutouts (34) in fireshield assembly (31).



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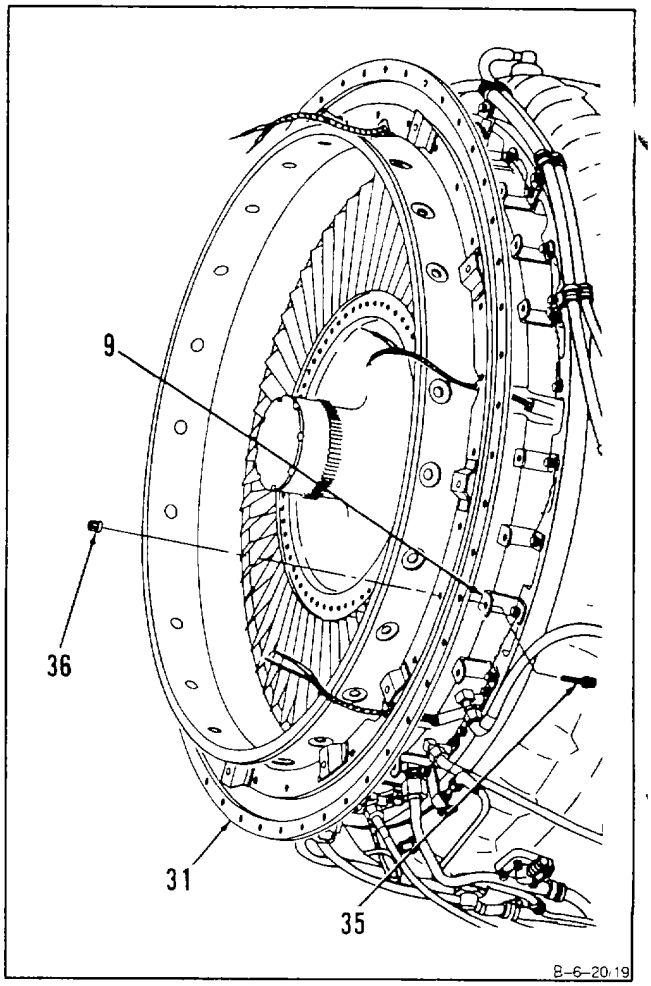
NOTE

In following step 24, do not tighten bolts until supports are aligned.

24. **Install fireshield assembly (31)** on 23 supports (9), and install 23 bolts (35) and 23 nuts (36).



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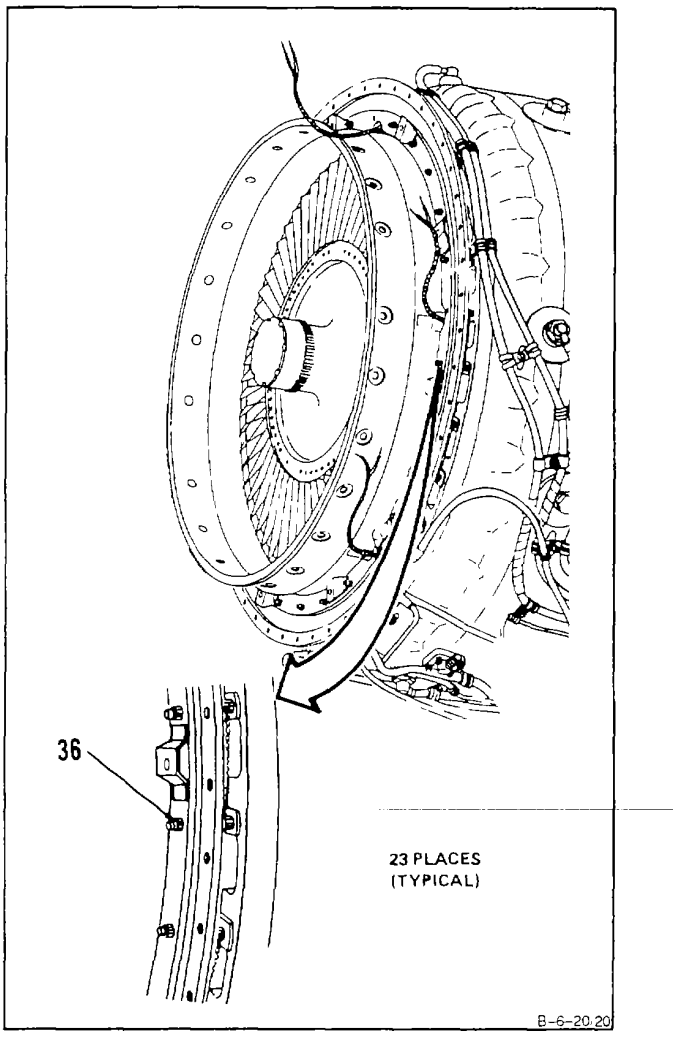
25. **Torque 23 nuts (36) to 30 inch-pounds**



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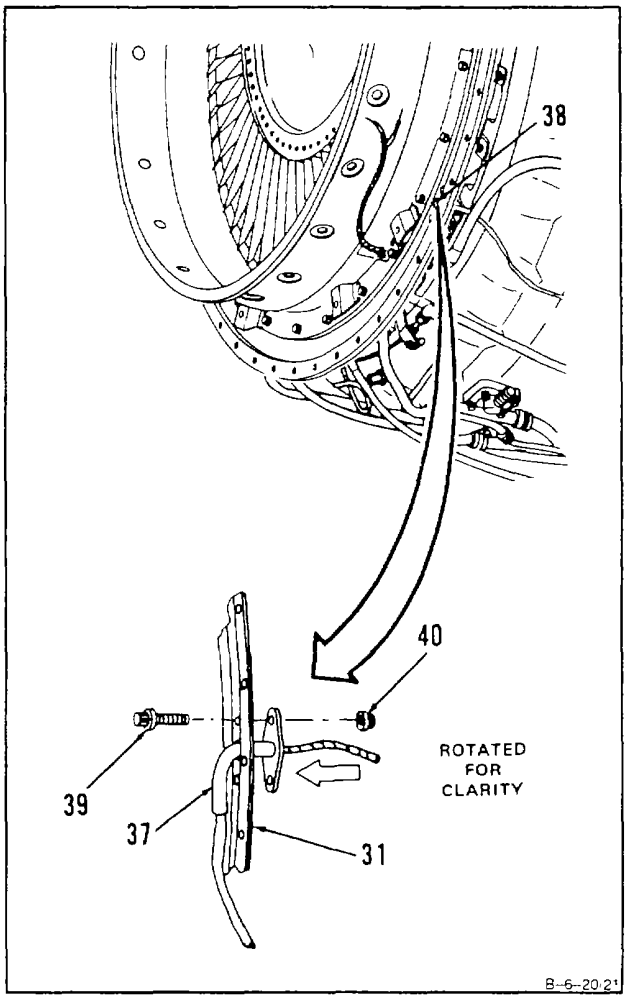
26. **Insert thermocouple jumper lead (37)** through hole (38) in fireshield assembly (31).

27. Install two bolts (39) and nuts (40).



INSPECT

FOLLOW-ON MAINTENANCE:

Install Left- and Right-Hand Bus Bar Assemblies (Task 4-11).

END OF TASK

SECTION VI

PRIMER TUBE ASSEMBLY

6-20 REMOVE PRIMER TUBE ASSEMBLY 6-20

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Container, 1 Quart

Materials:

Wiping Rag (E64)

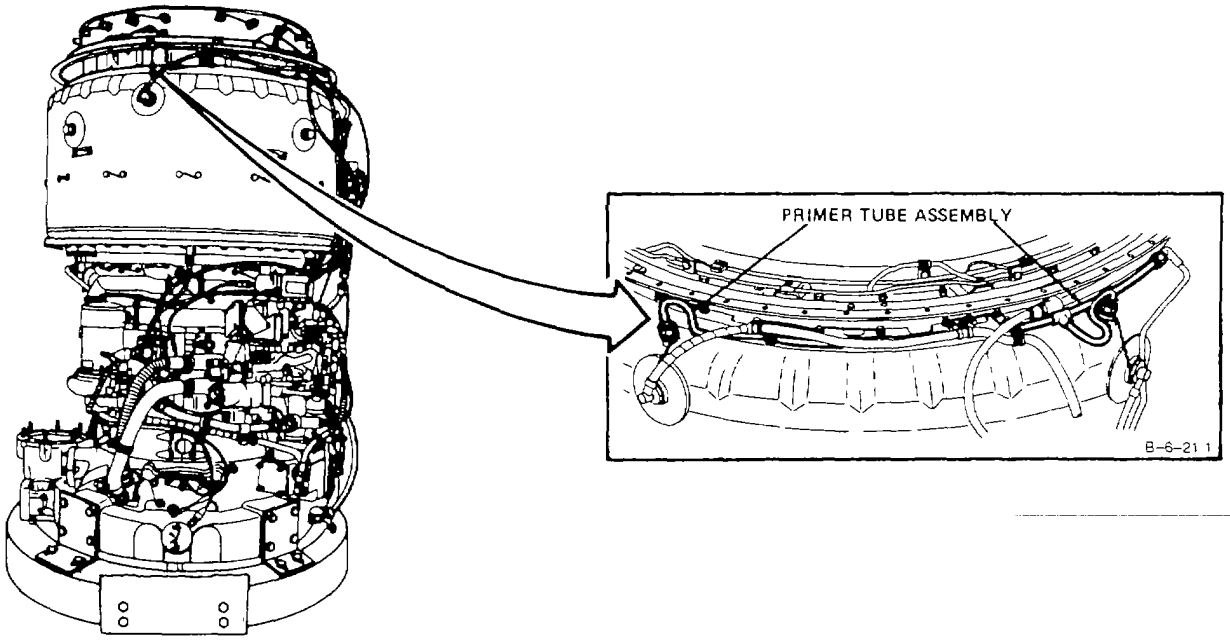
Personnel Required:

Aircraft Powerplant Repairer

General Safety Instructions

WARNING

Turbine fuels are very flammable They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes



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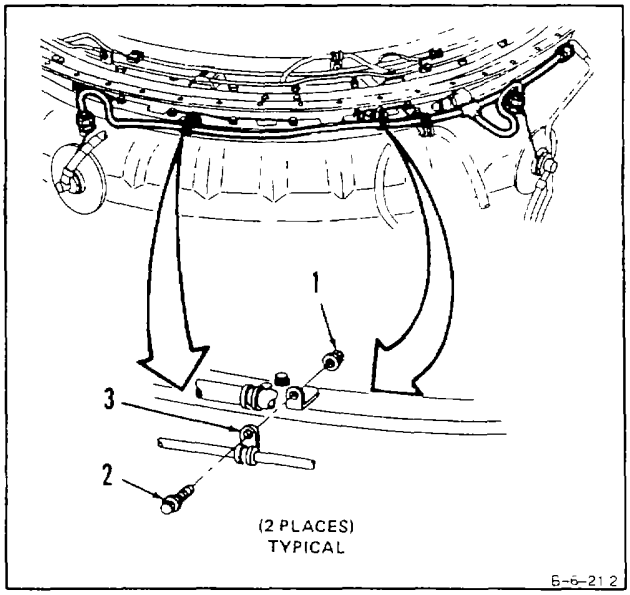
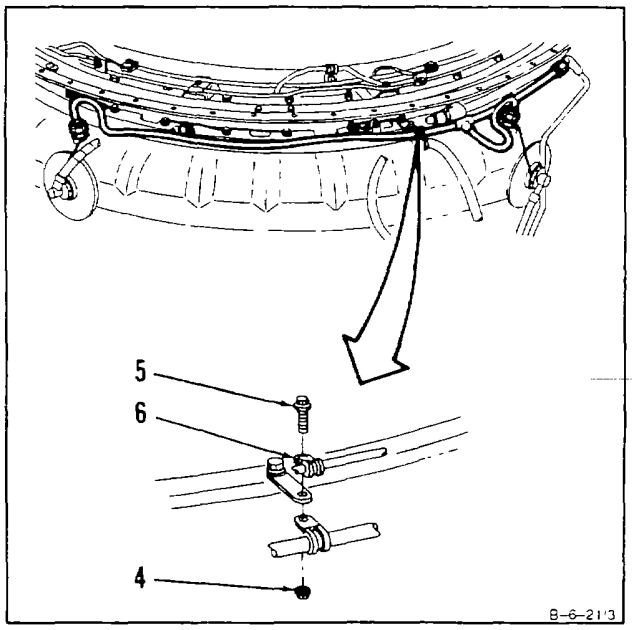
6-20 REMOVE PRIMER TUBE ASSEMBLY (Continued) 6-20

1. **Remove** two nuts (1), two bolts (2), and **two clamps (3).**



2. **Remove** nut (4), bolt (5), and **clamp (6).**



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6-20 REMOVE PRIMER TUBE ASSEMBLY (Continued) 6-20

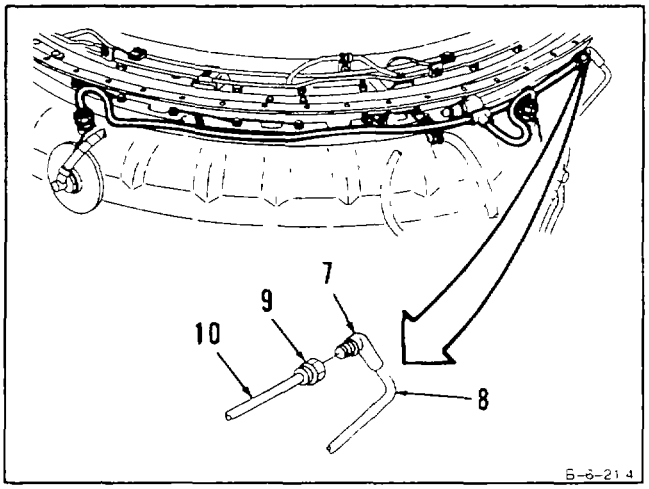
3. Using two wrenches, hold elbow (7) on tube assembly (8) and loosen swivel nut (9)

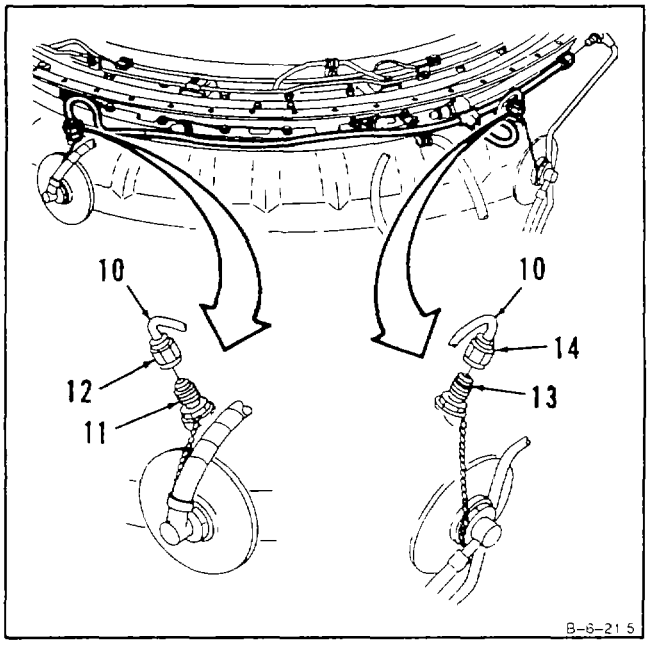
4. **Disconnect primer tube assembly (10)** from tube assembly (8)

5 Using two wrenches, hold start fuel nozzle (11) and loosen swivel nut (12)

6. Using two wrenches, hold start fuel nozzle (13) and loosen swivel nut (14)

7. **Disconnect and remove primer tube assembly (10)** from start fuel nozzles (11 and 13)





FOLLOW-ON MAINTENANCE
None

END OF TASK

6-21 CLEAN PRIMER TUBE ASSEMBLY 6-21

INITIAL SETUP

Applicable Configurations:
All

Tools:
Goggles
Compressed Air Source

Materials:
Dry Cleaning Solvent (El 9)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition.
Primer Tube Assembly Removed (Task 6-20)

General Safety Instructions:

WARNING

Dry cleaning solvent (E19) 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 primer tube assembly (1) as follows

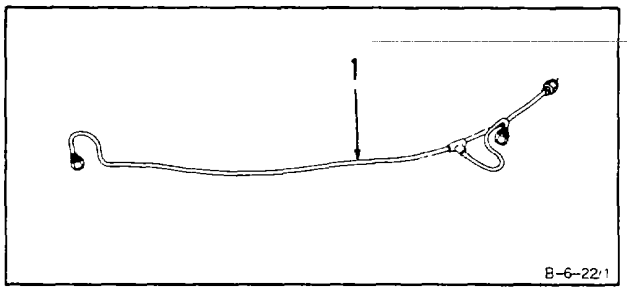
a. Wear gloves (E24) Immerse primer tube assembly (1) in dry cleaning solvent (E19) and agitate.

b. Wipe dry. Use lint-free cloth (E30).

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result In Injury to eyes or skin. In case of Injury, get medical attention.

c Wear goggles. Blow dry internal passages using clean, dry, compressed air.



FOLLOW-ON MAINTENANCE

Inspect Primer Tube Assembly (Task 6-22)

END OF TASK

6-22 INSPECT PRIMER TUBE ASSEMBLY 6-22

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:

None

Personnel Required:

Aircraft Powerplant Inspector

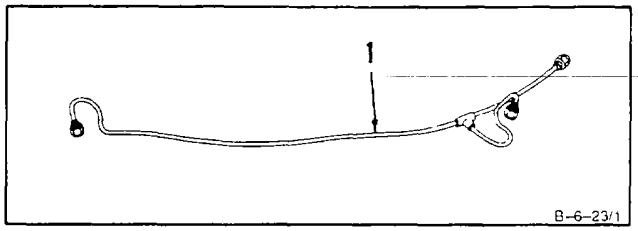
Equipment Condition:

Off Engine Task

1 Inspect primer tube assembly (1) as follows

a. There shall be no cracks

b. There shall be no chafing wear deeper than 0.002 inch.



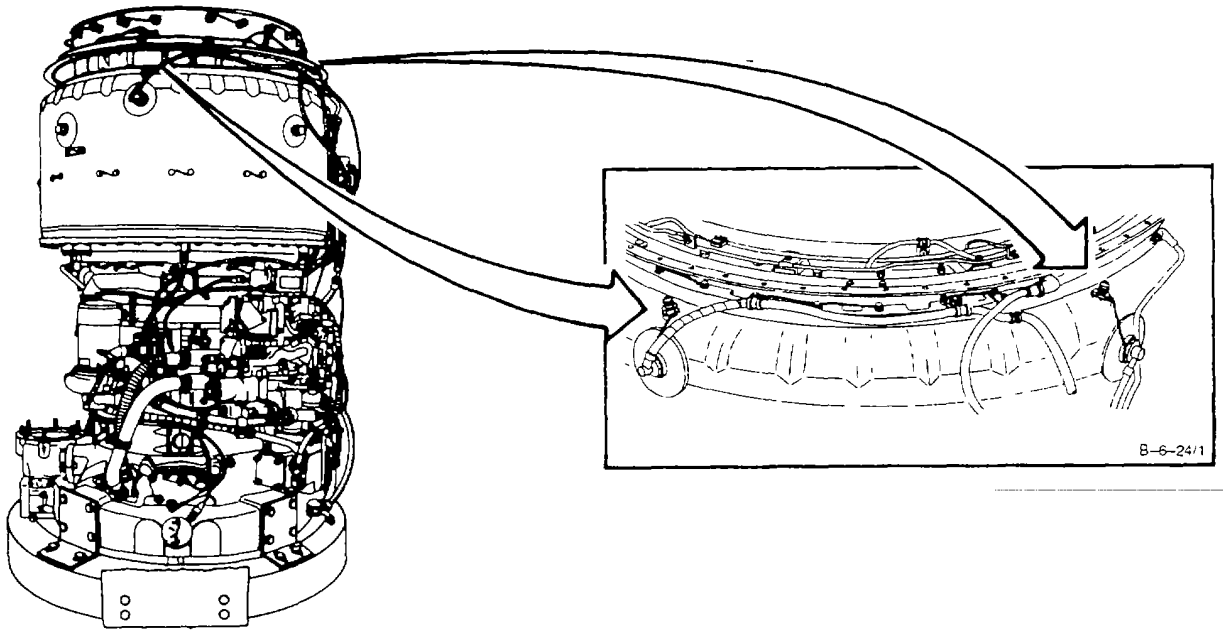
FOLLOW-ON MAINTENANCE

None

END OF TASK

6-23 INSTALL PRIMER TUBE ASSEMBLY 6-23

INITIAL SETUP
Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required-
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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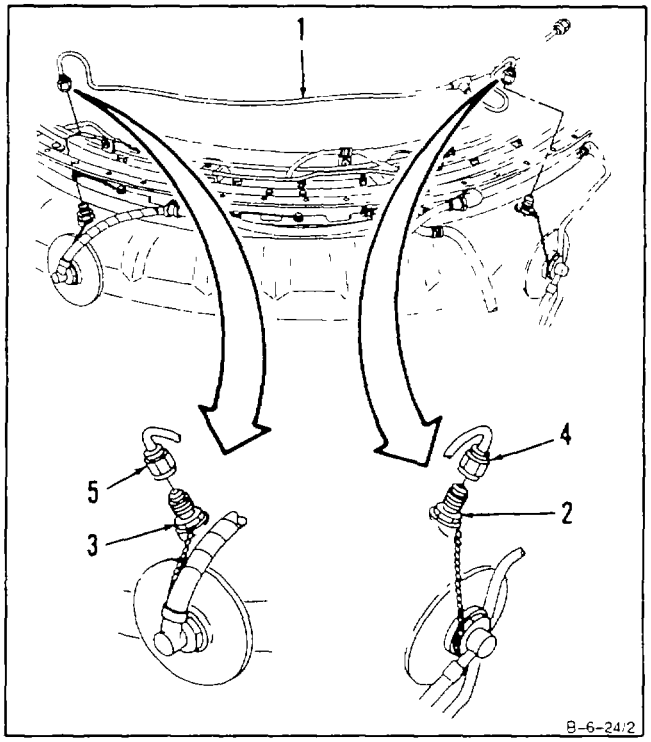
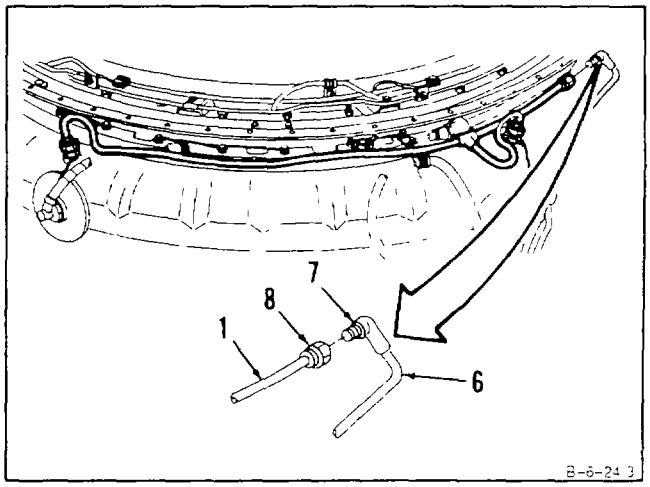
6-23 INSTALL PRIMER TUBE ASSEMBLY (Continued) 6-23

1. **Connect primer tube assembly (1)** to start fuel nozzles (2 and 3)
2. Using two wrenches, hold start fuel nozzle (2) and tighten swivel nut (4)
3. Using two wrenches, hold start fuel nozzle (3) and tighten swivel nut (5)
4. **Connect tube assembly (6)** to primer tube assembly (1)
5. Using two wrenches, hold elbow (7) on tube assembly (6) and tighten swivel nut (8)





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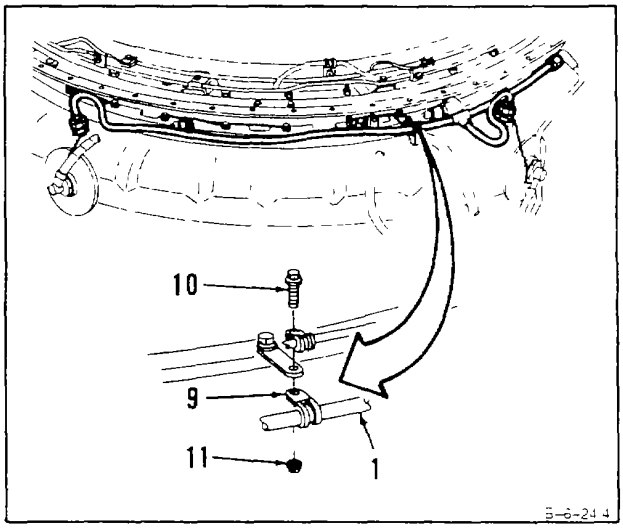
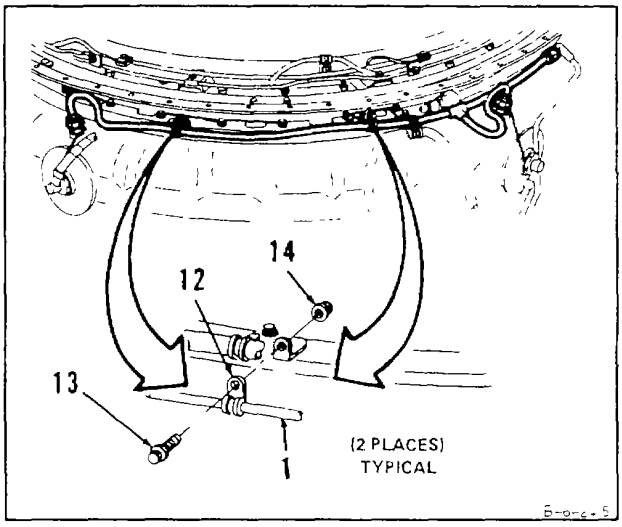
6-23 INSTALL PRIMER TUBE ASSEMBLY (Continued) 6-23

6. **Install clamp (9)** on primer tube assembly (1), and install bolt (10) and nut (11).



7. **Install two clamps (12)** on primer tube assembly (1), and install two bolts (13) and nuts (14).



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION VII

START FUEL NOZZLES

6-24 REMOVE START FUEL NOZZLES 6-24

INITIAL SETUP

Applicable Configurations:'

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-3234944

Container, 1 Quart

Materials:

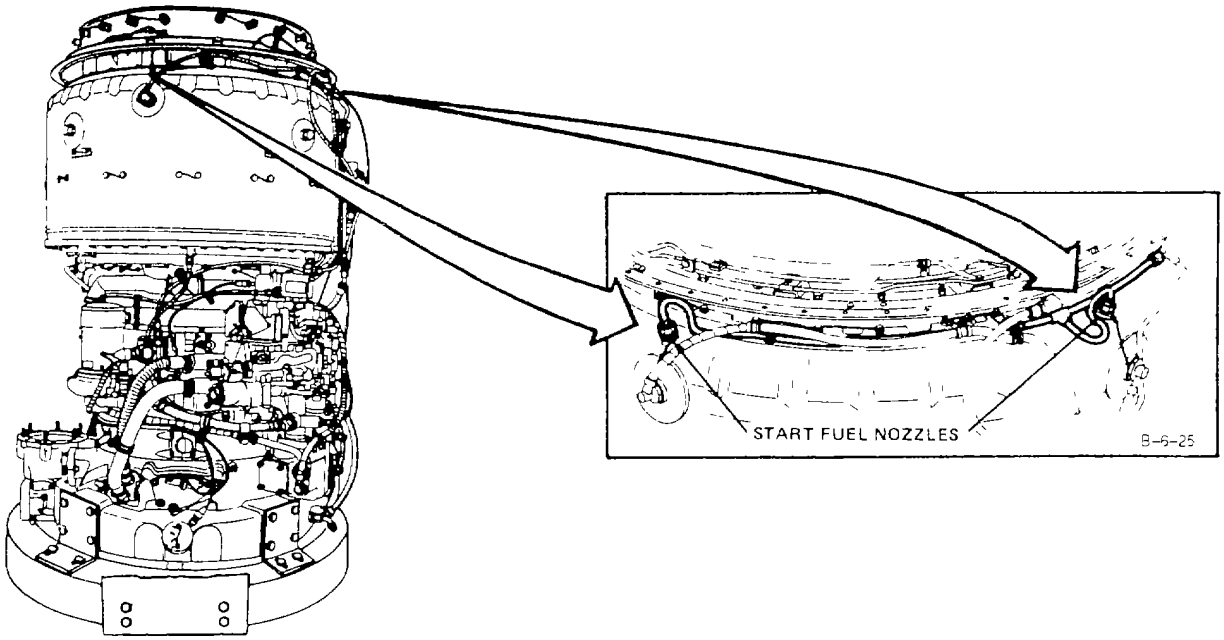
Wiping Rag (E64)

Personnel Required:

General Safety Instructions:

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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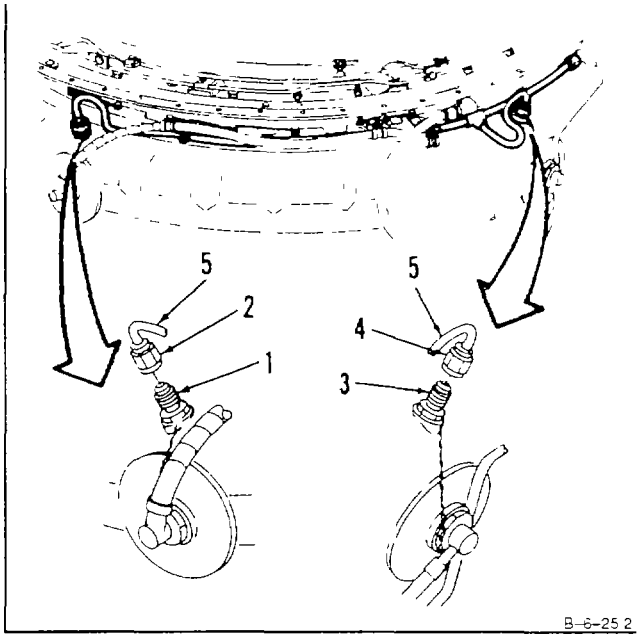
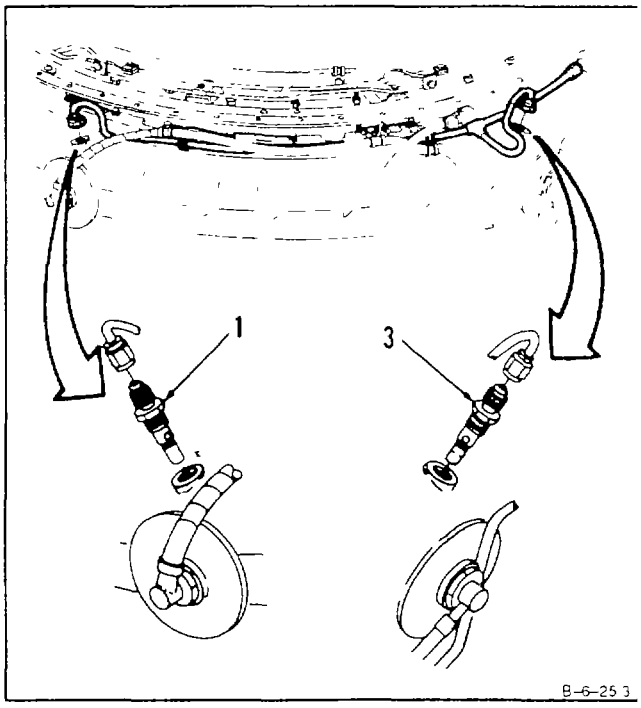
1. Using two wrenches, hold start fuel nozzle (1) and loosen swivel nut (2).
2. Using two wrenches, hold start fuel nozzle (3) and loosen swivel nut (4).
3. **Disconnect primer tube assembly** (5) from start fuel nozzles (1 and 3).



4 **Remove** lockwire and remove **two start fuel nozzles (1 and 3).**



FOLLOW-ON MAINTENANCE

None

END OF TASK

6-25 CLEAN START FUEL NOZZLES 6-25

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Goggles
Dry, Compressed Air Source

Materials:
Dry Cleaning Solvent (El9)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:
Aircraft Powerplant Repairer

Equipment Condition:
Off Engine Task
Start Fuel Nozzles Removed (Task 6-24)

General Safety Instructions:

WARNING

Dry cleaning solvent (E19) 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.

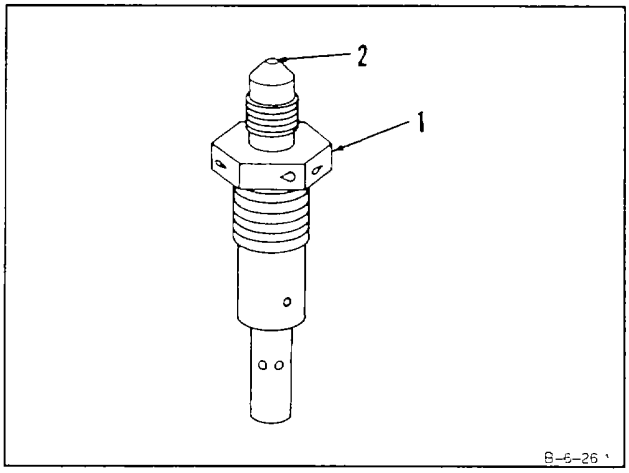
1 Wear gloves (E24). **Clean start fuel nozzles (1).** Use dry cleaning solvent (El9) and brush

2 After cleaning, **remove residue** with clean, lint free cloth (E30)

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

3 Wear goggles. **Blow out internal air passage (2).** To clean stuck ball, use clean, dry, compressed air.



FOLLOW-ON MAINTENANCE

Inspect Start Fuel Nozzles (Task 6-26)

END OF TASK

6-26 INSPECT START FUEL NOZZLES 6-26

INITIAL SETUP
Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant
Equipment Condition:
Off Engine Task

1 Inspect start fuel nozzle (1). There shall be no cracks

NOTE

Chafing on start fuel nozzle tip may indicate damage in liner boss. Damage in liner boss can result in blocked or restricted spray pattern.

2 Inspect start fuel nozzle air shroud ends (2) as follows:

a. There shall be no bent shroud ends.

b. There shall be no distorted or burned out shroud ends.

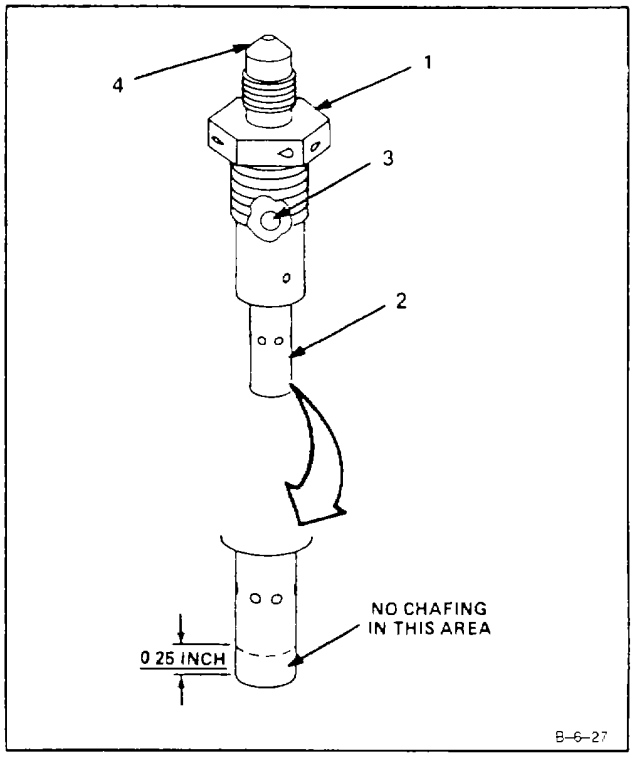
c. There shall be no chafing in area 0 25 inch from bottom of shroud ends.

3. Inspect start fuel nozzle internal ball (3) for freedom of operation.

a. Shake start fuel nozzle (1) and listen for rattle.

b. There shall be no stuck ball.

4. Inspect start fuel nozzle tip (4). There shall be no wear or distortion.



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-27 INSTALL START FUEL NOZZLES 6-27

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944

Technical Inspection Tool Kit, NSN 5180-00-323-5114

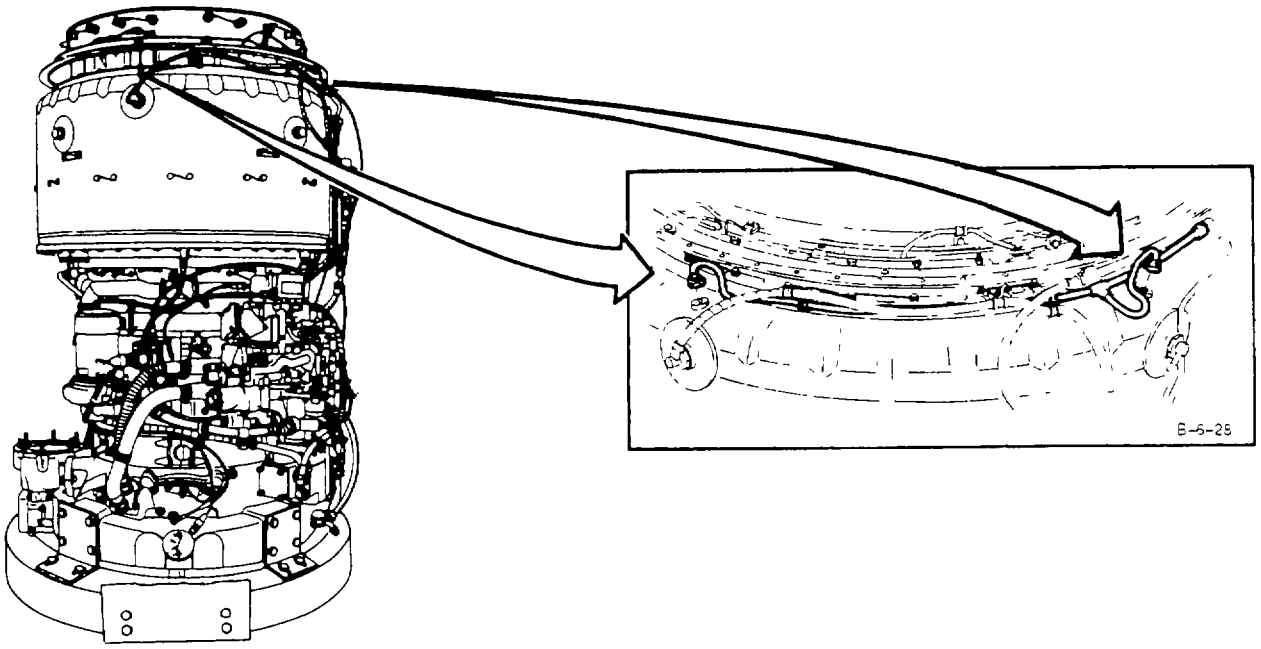
Materials:

Lockwire (E33)

Personnel Required:

Aircraft Powerplant Repairer

Aircraft Powerplant Inspector



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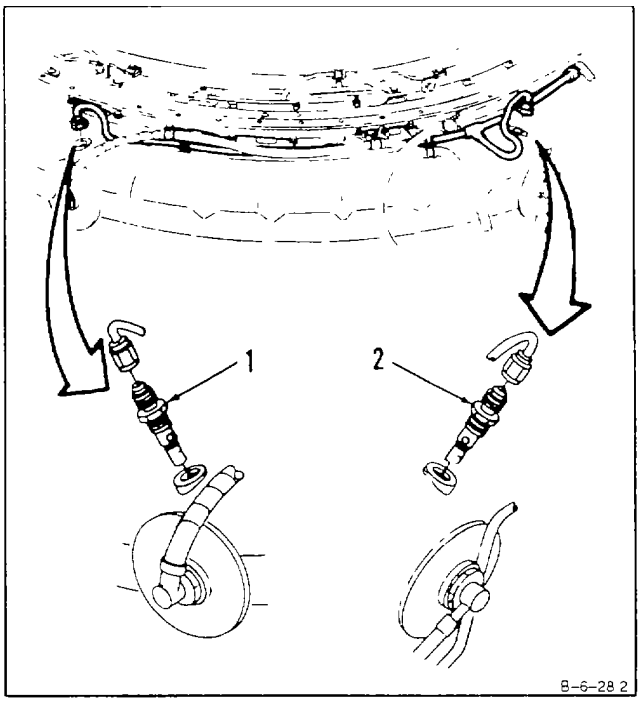
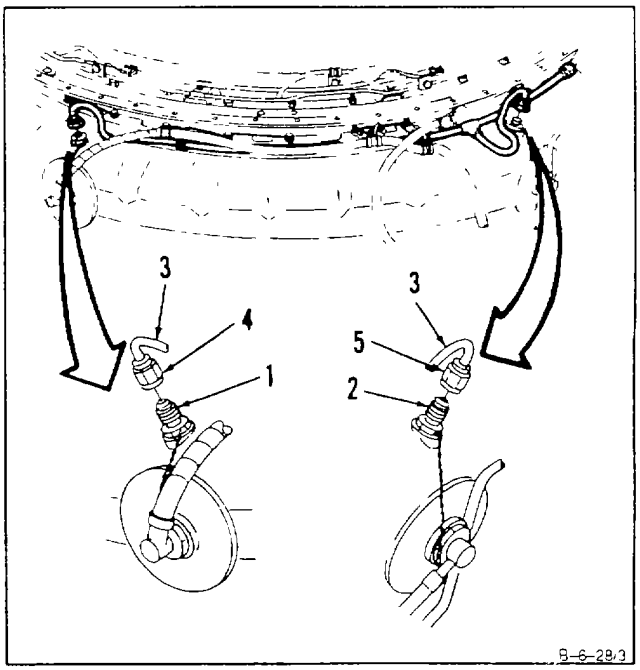
CAUTION

In following step, insert nozzles hand tight to ensure that they do not hit combustion chamber liner. Shift liner port as needed. Failure to comply may cause chafing and leakage.

1. **Install two start fuel nozzles (1 and 2)** and lock wire. Use lockwire (E33).



2. **Connect primer tube assembly (3)** to start fuel nozzles (1 and 2).
3. Using two wrenches, hold start fuel nozzle (1) and tighten swivel nut (4).
4. Using two wrenches hold start fuel nozzle (2) and tighten swivel nut (5).



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION VIII

MAIN FUEL FILTER AND BRACKET

6-28 REMOVE MAIN FUEL FILTER AND BRACKET 6-28

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Too] Kit,
NSN 5180-00-323-4944
Container, 1 Quart

Materials:

Wiping Rag (E64)

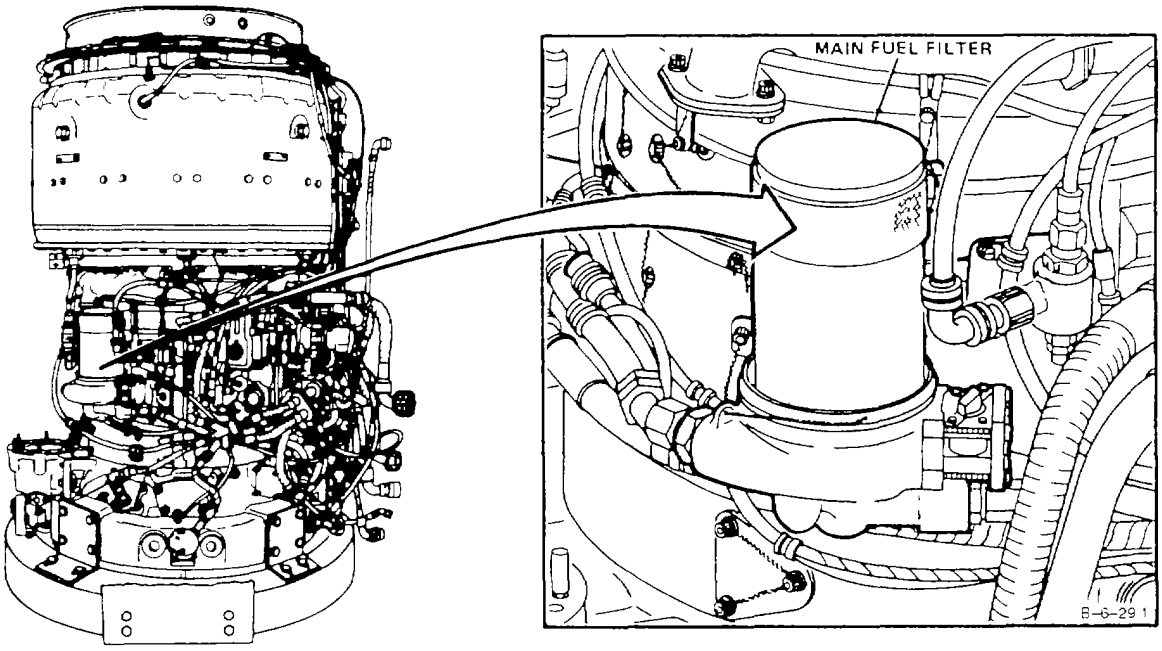
Personnel Required:

Aircraft Powerplant Repairer

General Safety Instructions:

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes



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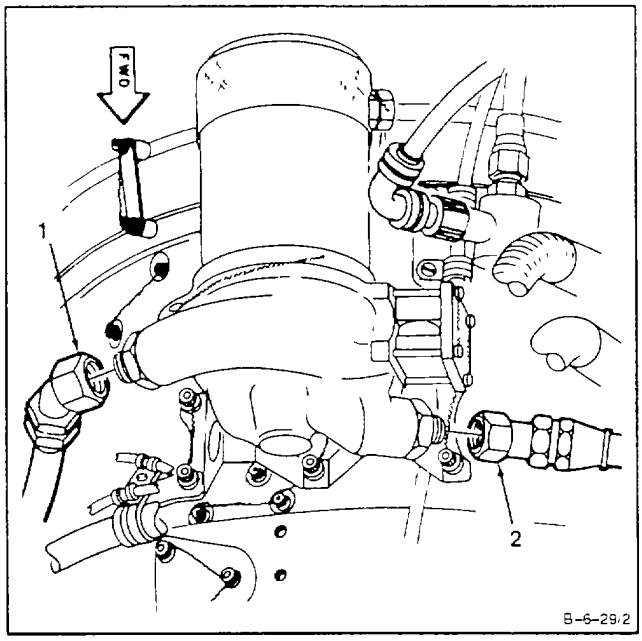
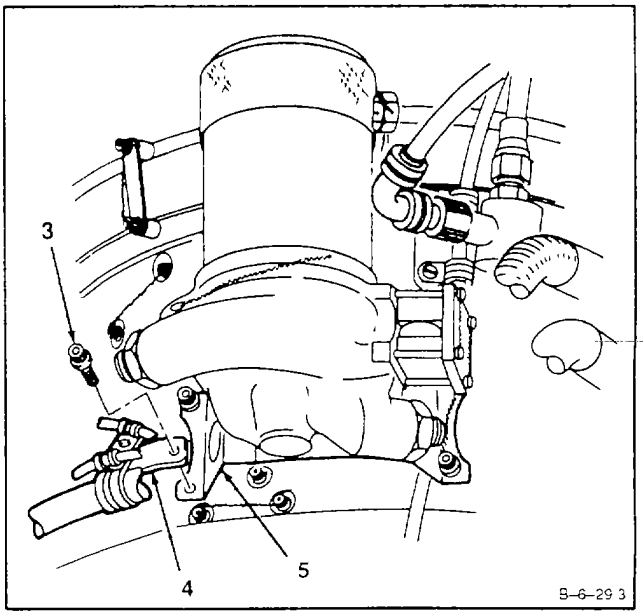
6-28 REMOVE MAIN FUEL FILTER AND BRACKET (Continued) 6-28

1. **Disconnect hose assemblies (1 and 2).**



2. Remove lockwire and two bolts (3). **Move two brackets (4) away from bracket (5).**



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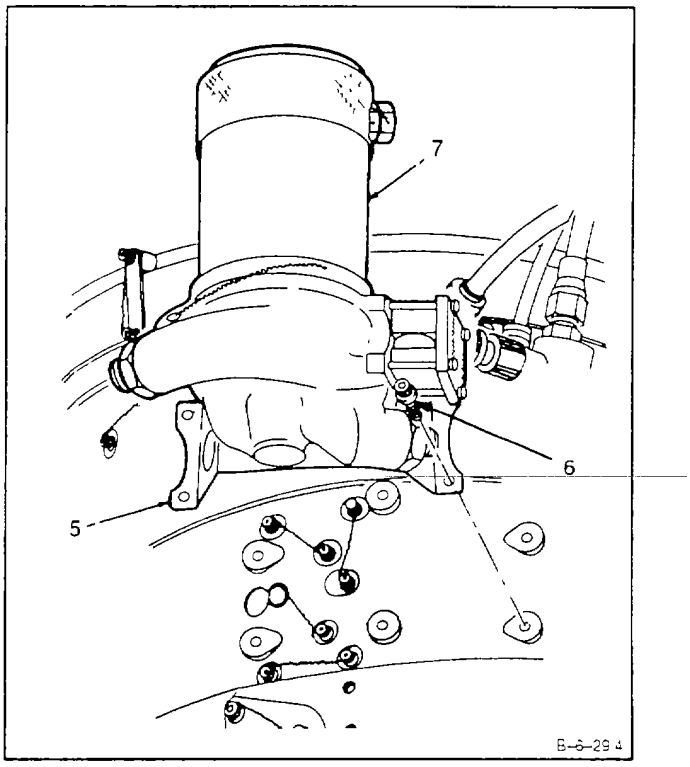
3. **Remove** lockwire remaining two bolts (6), and **main fuel filter (7),** with bracket (5) attached.



FOLLOW-ON MAINTENANCE:

None

END OF TASK

6-29 DISASSEMBLE MAIN FUEL FILTER AND BRACKET 6-29

INITIAL SETUP

Applicable Configurations:
All

Tools:'
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944
Vise
Jaw Caps
Strap Wrench

Materials:
Wiping Rag (E64)

Personnel Required:
Aircraft Powerplant Repairer

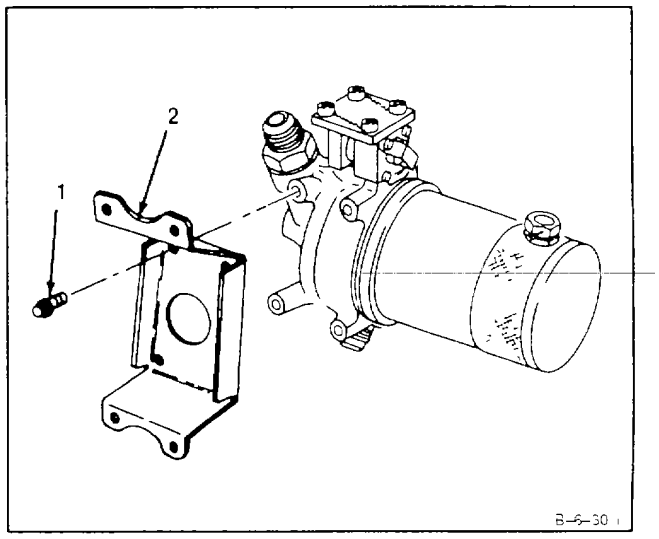
Equipment Condition:
Off Engine Task
Main Fuel Filter and Bracket Removed (Task 6-28)

General Safety Instructions:

WARNING

Turbine fuels are very flammable They may cause drying and irritation of skin or eyes Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling If irritation of skin results, get medical attention. Get medical attention for eyes.

1. Remove lockwire and four bolts (1) **Remove bracket (2).**



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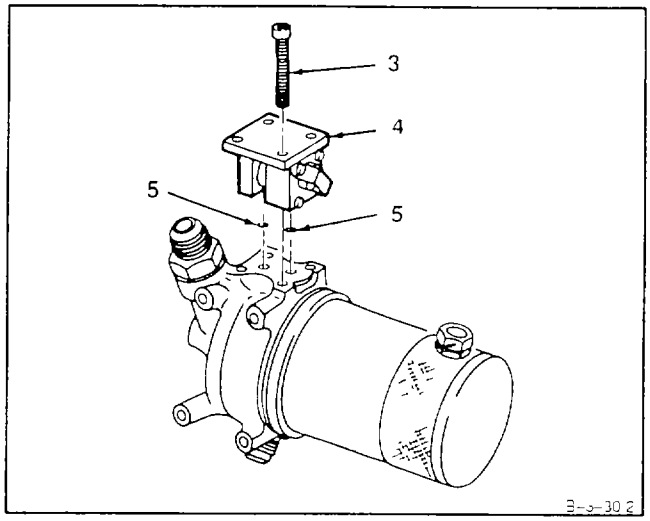
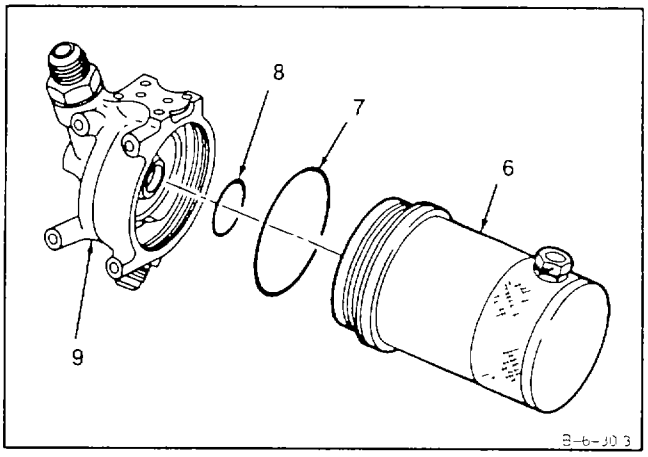
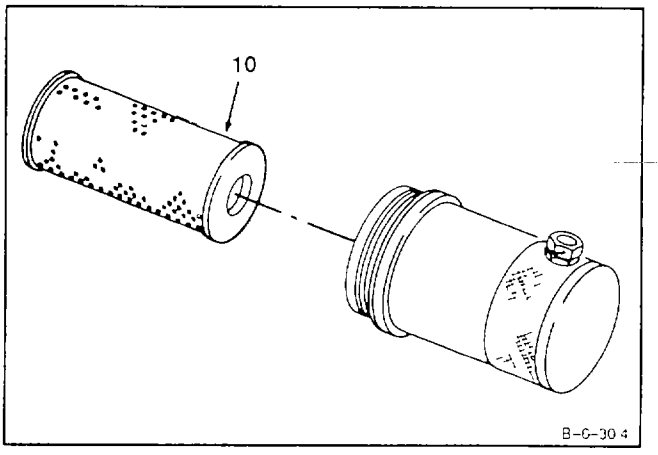
2. **Remove** lockwire, four screws (3), **pressure differential switch (4),** and two packings (5).



3. **Remove** lockwire, **filter bowl (6),** and packings (7 and 8) from filter head (9) Use vise with jaw caps and strap wrench.



4. **Remove filter element (10).**



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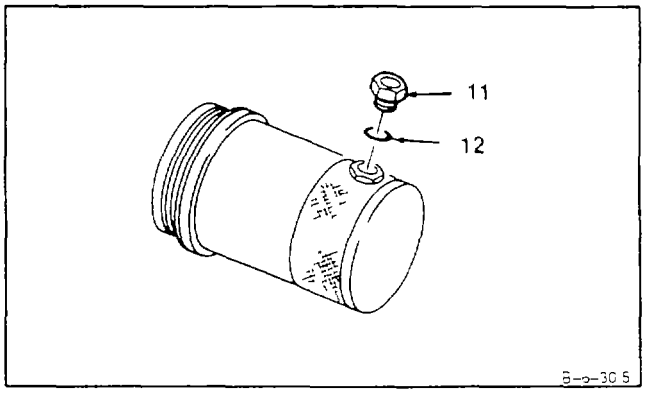
5. **Remove** lockwire **drain plug (11)**, and packing (12).



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-30 CLEAN MAIN FUEL FILTER AND BRACKET 6-30

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Goggles
Dry, Compressed Air Source

Materials:
Dry Cleaning Solvent (El 9)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:
Aircraft Powerplant Repairer

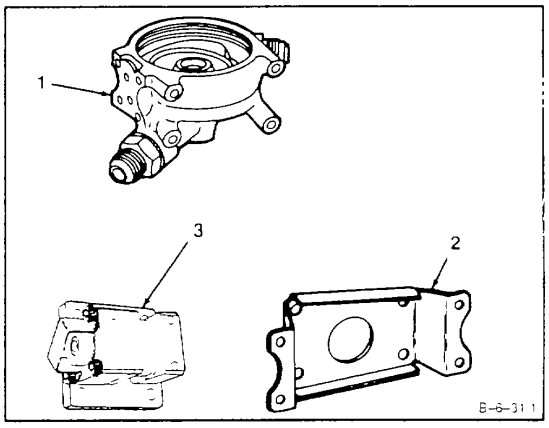
Equipment Condition:
Off Engine Task
Main Fuel Filter and Bracket Removed (Task 6-28)
Main Fuel Filter and Bracket Disassembled (Task 6-29)

General Safety Instructions:

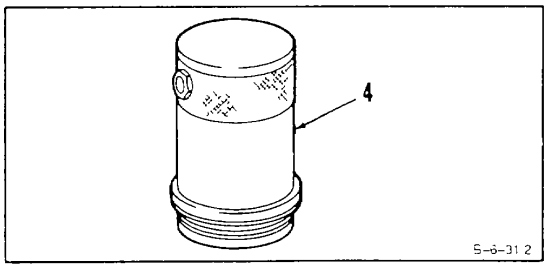
WARNING

Dry cleaning solvent (E19) 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. Wear gloves (E24) **Clean filter head (1), bracket (2), and pressure differential switch (3).** Use lint-free cloth (E30) dampened in dry cleaning solvent (El 9).



2. **Clean bowl (4).** Use dry cleaning solvent (E19) and brush



WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin In case of injury, get medical attention.

3. Wear goggles. **Blow dry bowl (4)** using clean, dry, compressed air.

FOLLOW-ON MAINTENANCE
Inspect Main Fuel Filter and Bracket (Task 6-31).

END OF TASK

6-31 INSPECT MAIN FUEL FILTER AND BRACKET 6-31

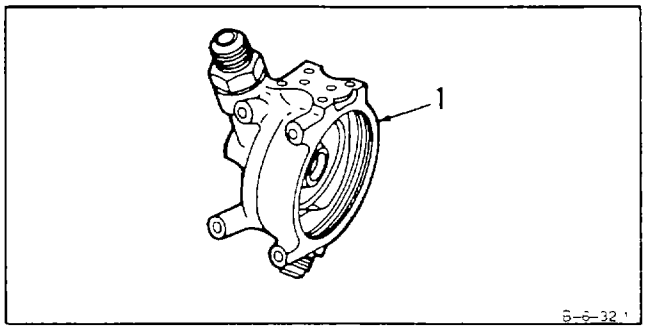
INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
Lockwire (E33)

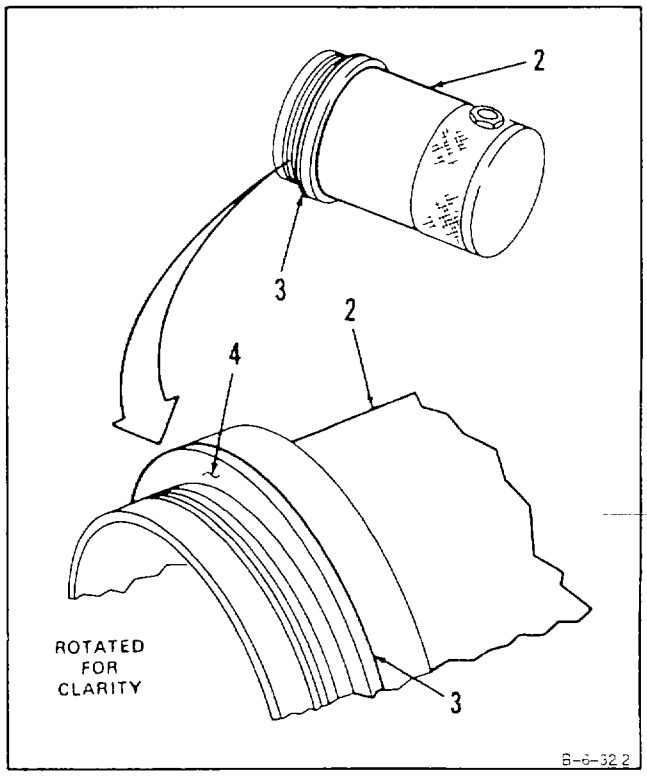
Personnel Required:
Aircraft Powerplant Inspector
References:
Task 1-79
Equipment Condition:
Off Engine Task

1. **Inspect filter head (1)**There shall be no cracks.



2. **Inspect bowl (2)**There shall be no cracks.

3. **Inspect ring spacer (3)** on bowl (2). There shall be no cuts or tears on flat surface (4) of ring spacer (3).



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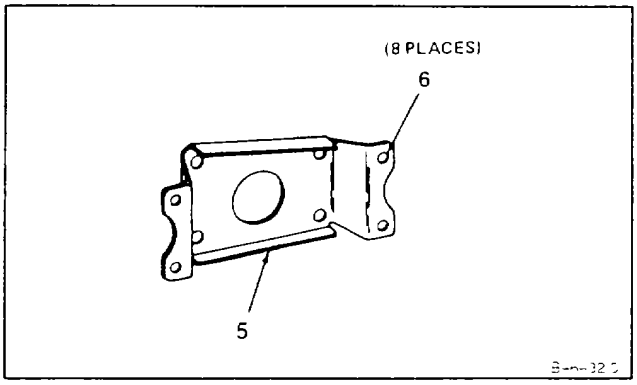
4. **Inspect bracket**(5).

   a There shall be no corrosion or pitting.

   b. There shall be no bends or distortion in area around eight bolt holes (6).

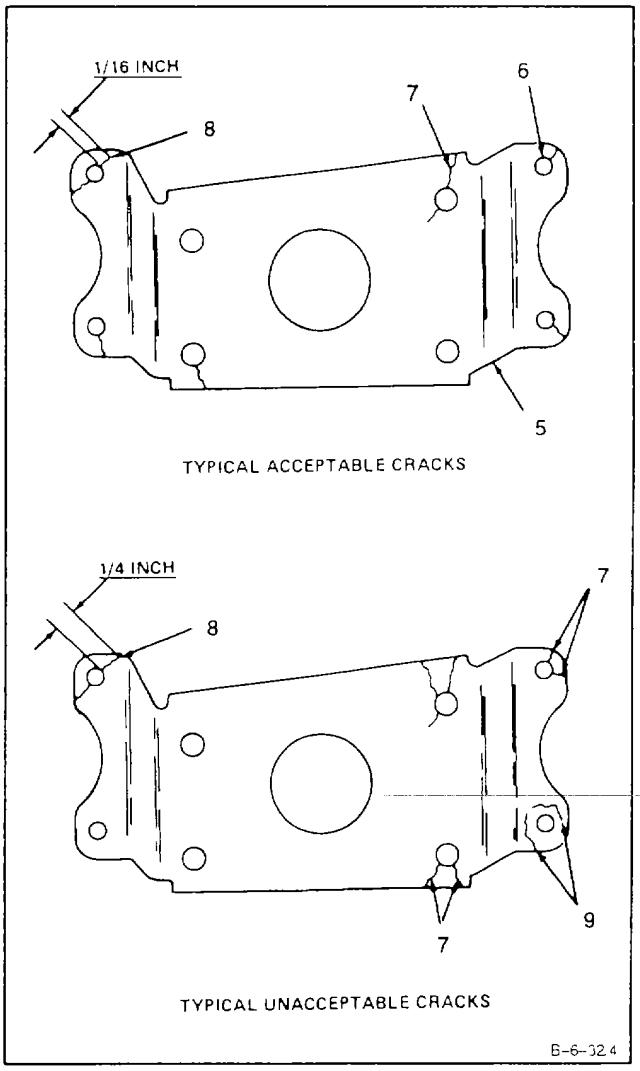


5. Inspect bracket (5) There shall be no cracks beyond the following limits:

   a. **There shall be no more than one edge-to-bolt hole crack (7)**per each bolt hole (6).

   b. At bolt holes with edge-to-bolt hole crack (7) **there shall be no more than one additional crack (8).** Crack (8) shall be no more than 1/16 inch long.

   c. **There shall be no converging cracks (9)** that might cause material to fall out.



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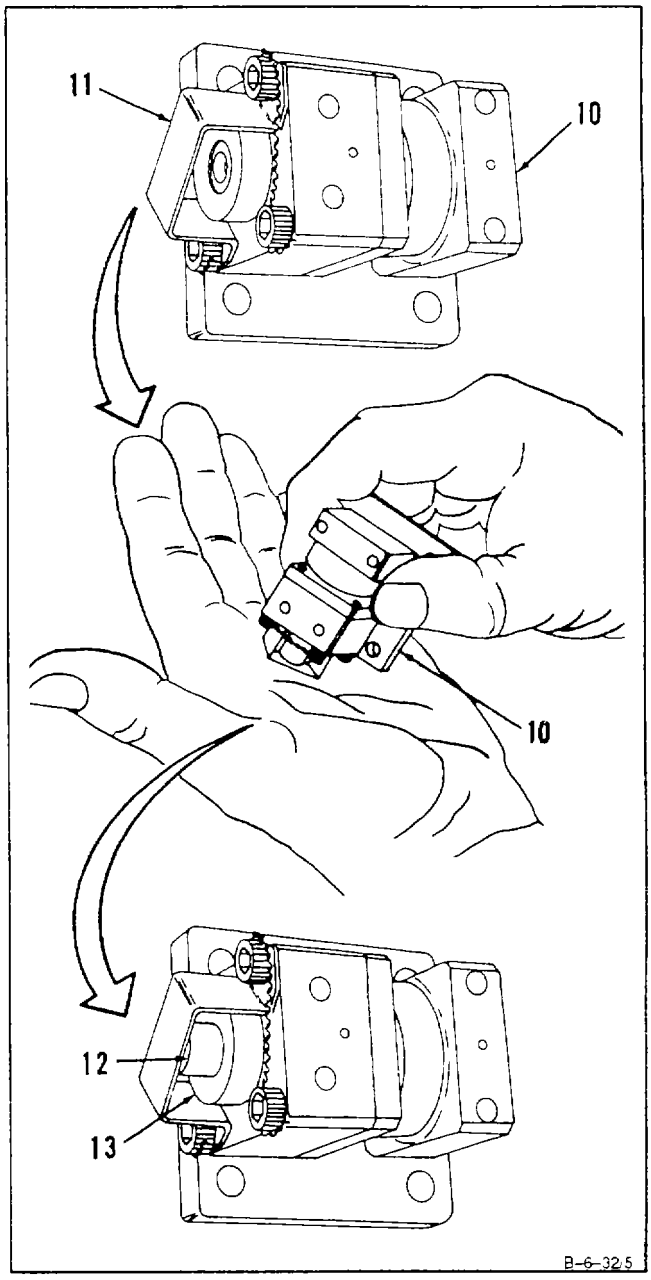
6. Inspect pressure differential switch (10) as follows.

a. Strike differential pressure switch (10), with bracket (11) down against palm of hand Poppet (12) should extend out of housing (13) and stay that way.



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b. Using machinist's steel rule (14), push poppet (12) into housing (13). Poppet (12) should snap back into housing (13) smoothly with light pressure applied.

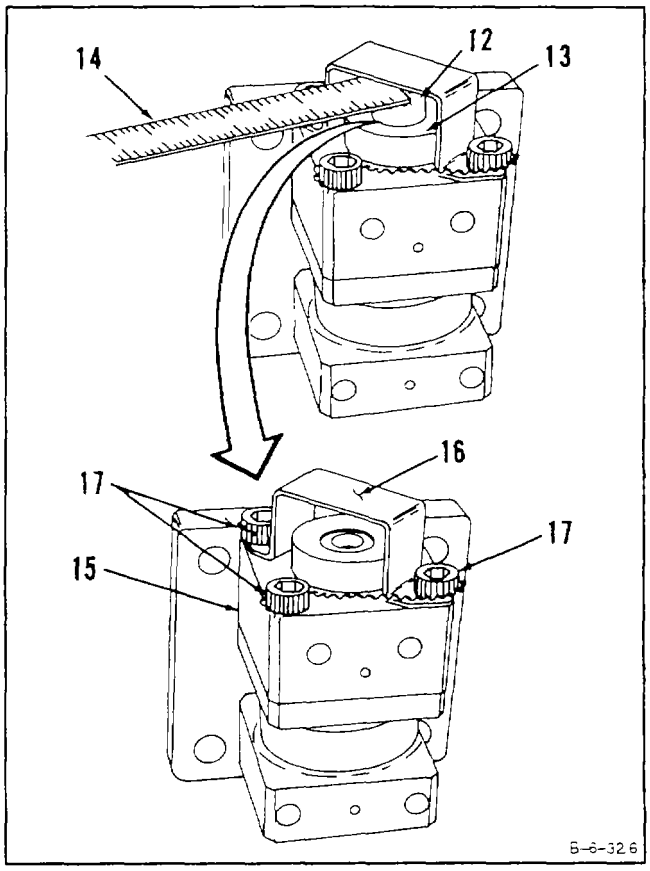
c. Inspect housing (15). There shall be no cracks.

d. Inspect bracket (16). There shall be no looseness If looseness exists, proceed as follows:

(1) Remove lockwire.

(2) Tighten bolts (17).

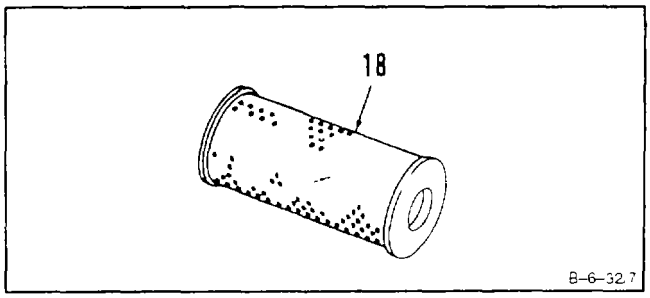
(3) Lockwire bolts (17) Use lockwire (E33).



NOTE

In following step, if contamination is found inspect contaminated fuel system (Ref Task 1-79).

7. Inspect filter element (18). There shall be no contamination If contaminated, throw away.



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-32 REPAIR MAIN FUEL FILTER AND BRACKET 6-32

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. **Straighten bends or distortion in area of bolt holes (1) in bracket (2).**

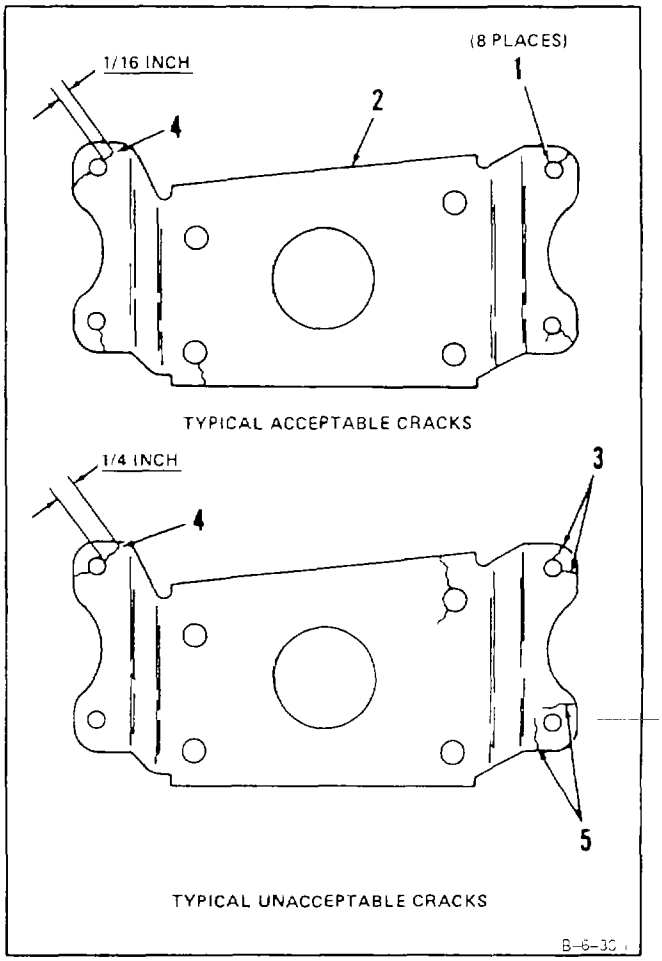
NOTE

This repair is allowed as long as it does not generate cracks beyond the following limits:

a. There shall be no more than one edge-to-bolt hole crack (3) per each bolt hole (1).

b. At bolt holes with edge-to-bolt hole crack (3), there shall be no more than one additional crack (4) Crack (4) shall be no more than 1/16 inch long.

c. There shall be no converging cracks (5) that might cause material to fall out.



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
Lockwire (E33)

Parts:
Filter Element
Packings

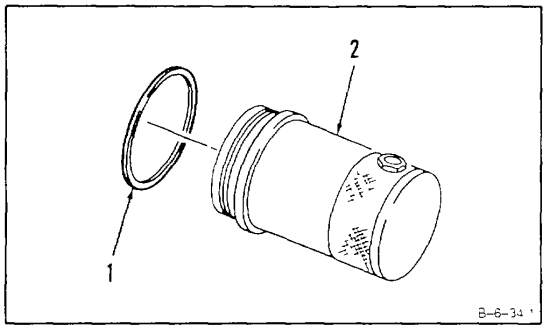
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P

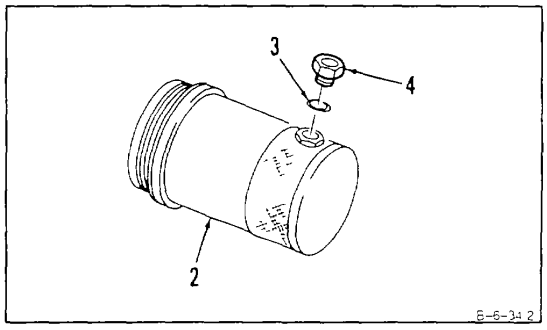
Equipment Condition:
Off Engine Task

NOTE
If bowl or ring spacer is a replacement, do step 1.

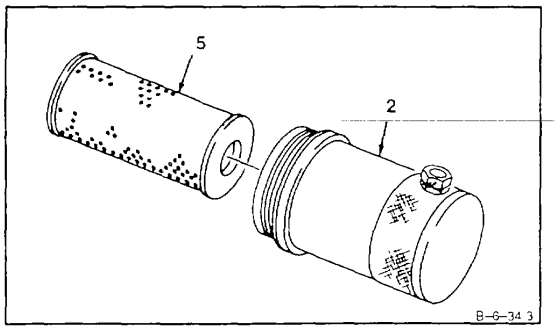
1. **Install ring spacer (1)** on bowl (2).



2. **Install** packing (3) and **drain plug (4)** in bowl (2) Lockwire drain plug (4) Use lockwire (E33).



3. **Install filter element (5)** in bowl (2).



NOTE
If main fuel filter is a replacement, do steps 4 and 5. It same fuel filter that was removed is to be installed, omit steps 4 and 5.

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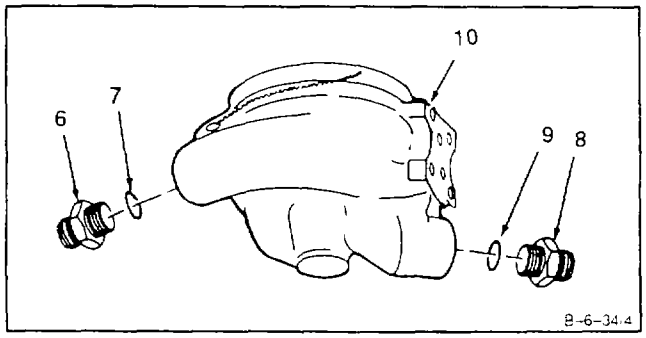
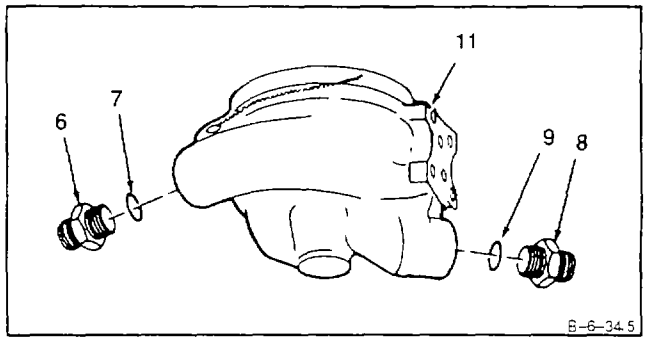
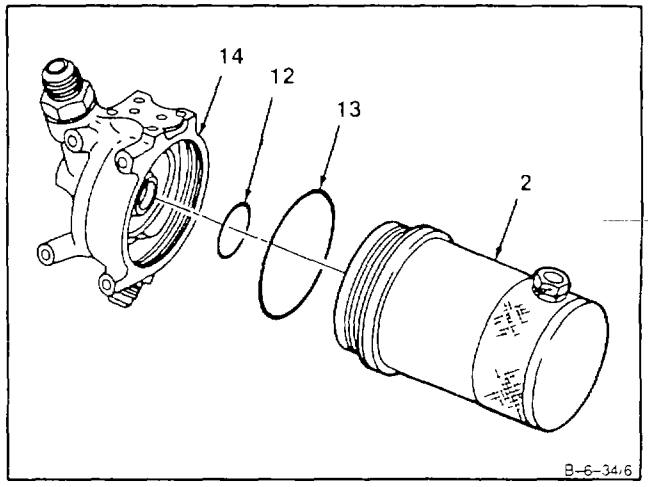
4. **Remove nipples (6 and 8)** and packings (7 and 9) **from old filter head assembly (10).**



5. **Install** packings (7 and 9) and **nipples (6 and 8) in serviceable filter head assembly (11).**



6. Install packings (12 and 13) on filter head (14). **Install bowl (2).** Hand-tighten and lockwire. Use lockwire (E33).



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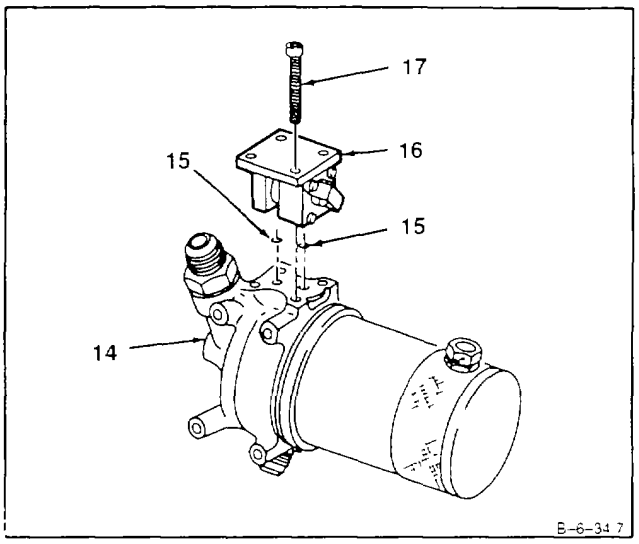
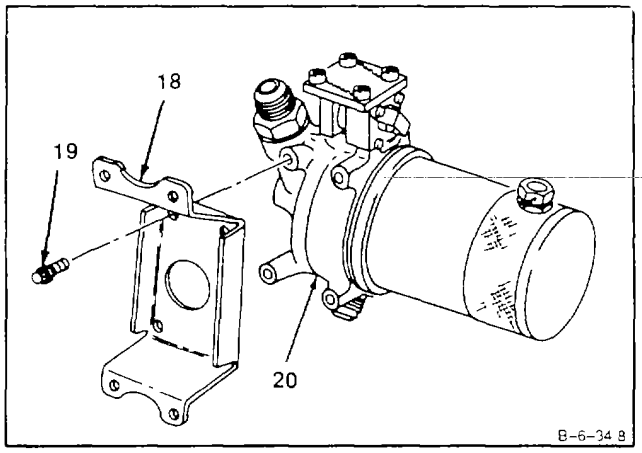
CAUTION

In following step 7, make sure indicator is positioned correctly. Failure to comply will prevent indicator from functioning.

7. **Install** two packings (15) and **differential pressure indicator (16**) on filter head (14). Install four screws (17) and Lockwire. Use lockwire (E33)



8. **Install bracket (18)** and four bolts (19) on main fuel filter (20). Lockwire bolts (19). Use lockwire (E33).



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-34 INSTALL MAIN FUEL FILTER AND BRACKET 6-34

INITIAL SETUP

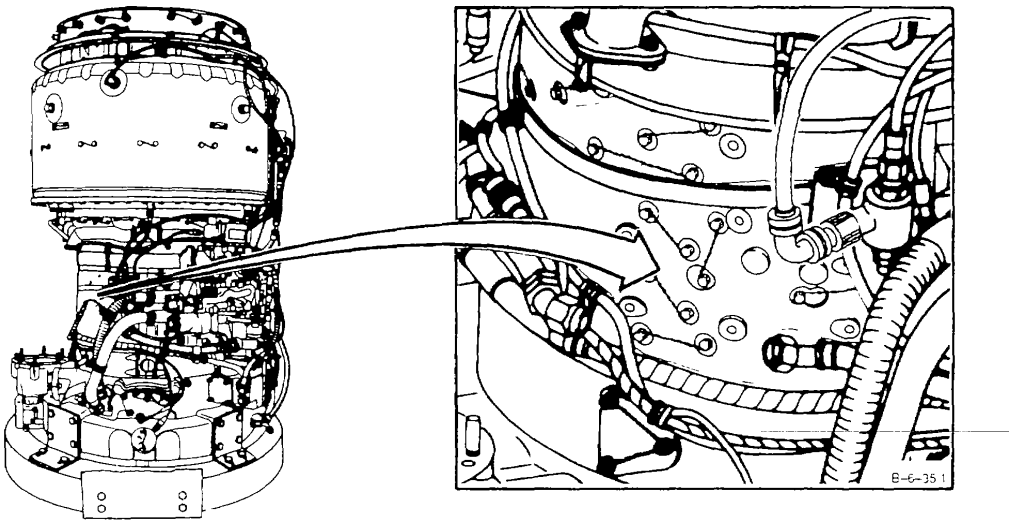
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
Lockwire (E33)

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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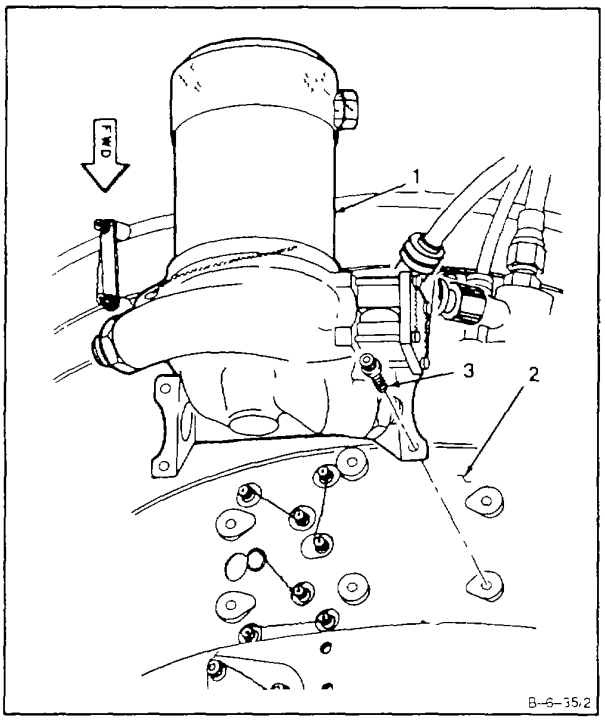
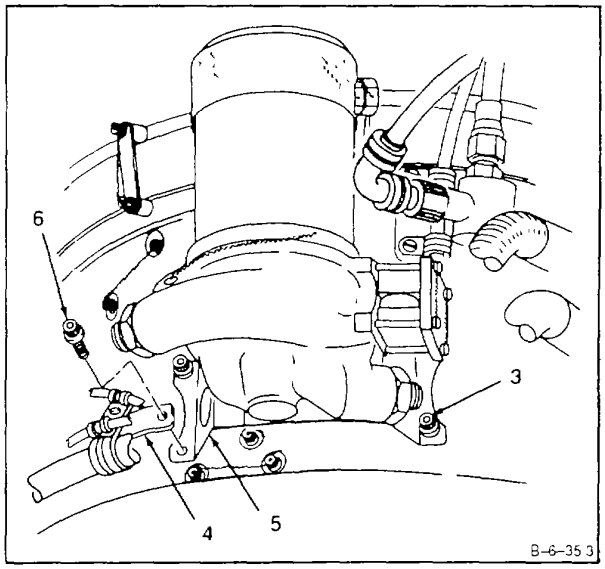
1. **Install main fuel filter and bracket** (1) on compressor housing (2) Install two bolts (3).



2. Align two brackets (4) with bracket (5) and install two bolts (6). Lockwire two bolts (3) and two bolts (6). Use lockwire (E33).



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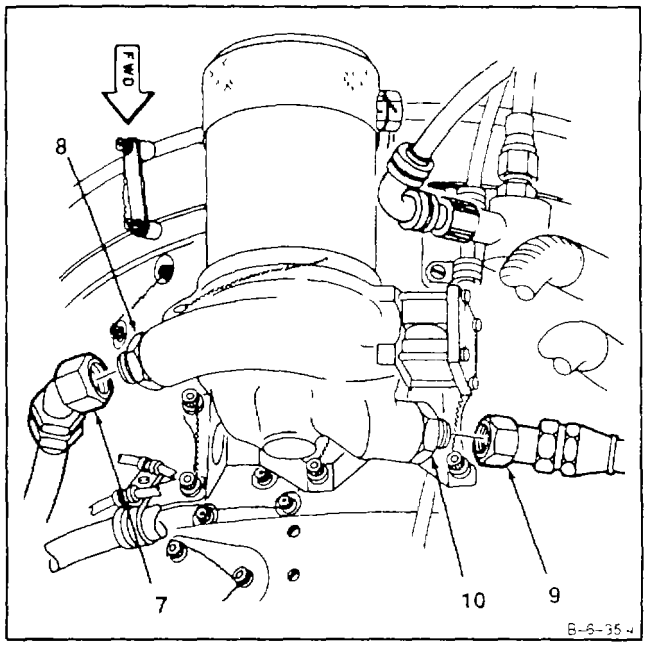
3. **Connect hose assembly (7)** to nipple (8).

4. **Connect hose assembly (9)** to nipple (10).



INSPECT

FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-35 REMOVE IN-LINE FUEL FILTER ASSEMBLY 6-35

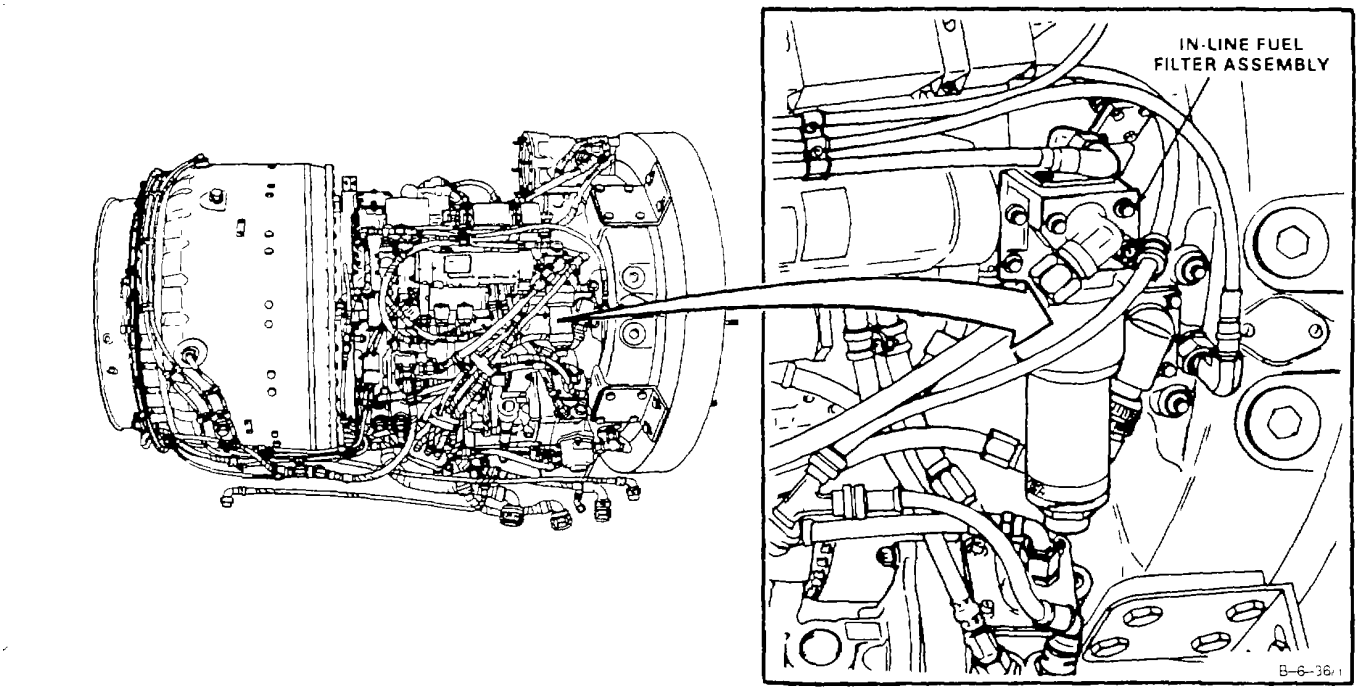
INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Container, 1 Quart
Materials:
Wiping Rag (E64)
Personnel Required:
Aircraft Powerplant Repairer

General Safety Instructions:

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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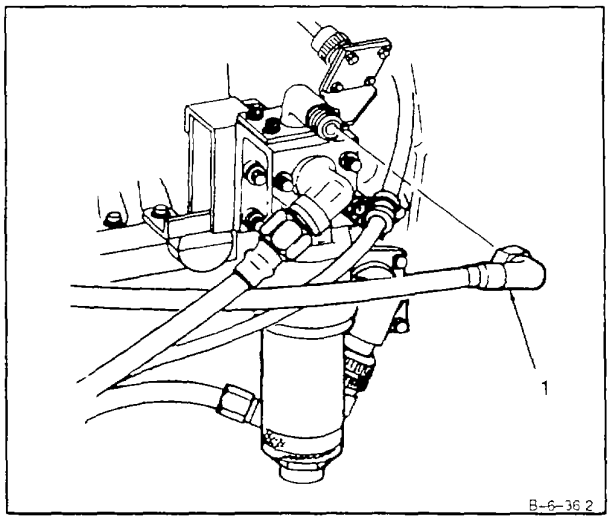
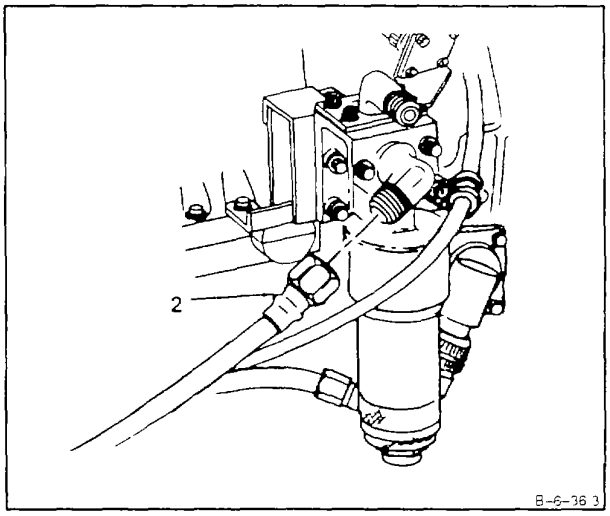
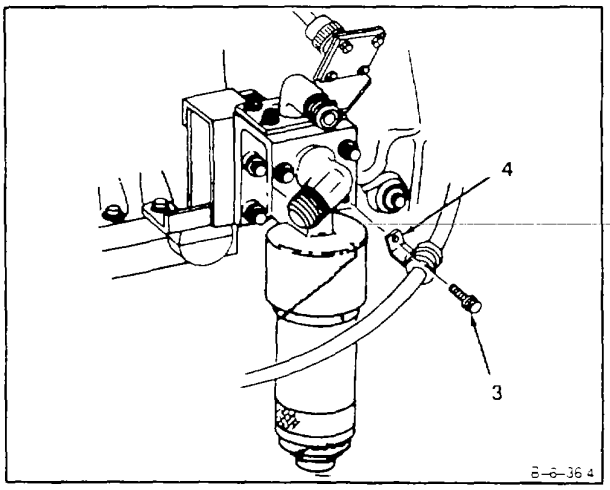
1. **Disconnect hose assembly (1).**



2. **Disconnect hose assembly (2).**



3. **Remove bolt (3)** and **standoff (4)** Loosely reinstall bolt (3).



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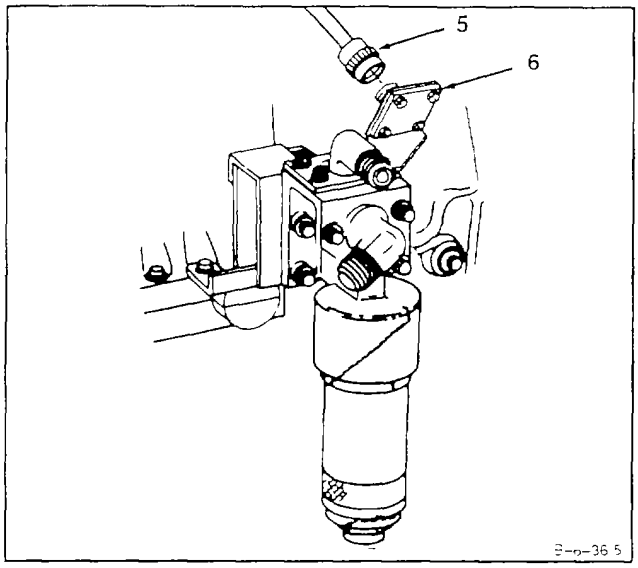
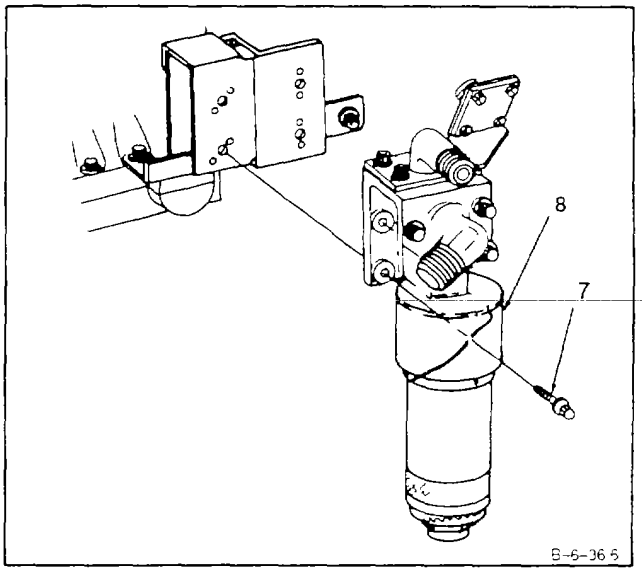
4. Disconnect electric harness connector (5) from dummy connector (6).



5. **Remove** four bolts (7), and **in-line fuel filter assembly (8)**



FOLLOW-ON MAINTENANCE:
None

END OF TASK

6-36 DISASSEMBLE IN-LINE FUEL FILTER ASSEMBLY 6-36

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Deep Style Socket, 1-Inch
Vise
Jaw Caps
Strap Wrench

Materials:
Wiping Rag (E64)

Personnel Required:
Aircraft Powerplant Repairer

References:
Task 6-38

Equipment Condition:
Off Engine Task
In-Line Fuel Filter Assembly Removed (Task 6-35)

General Safety Instructions:

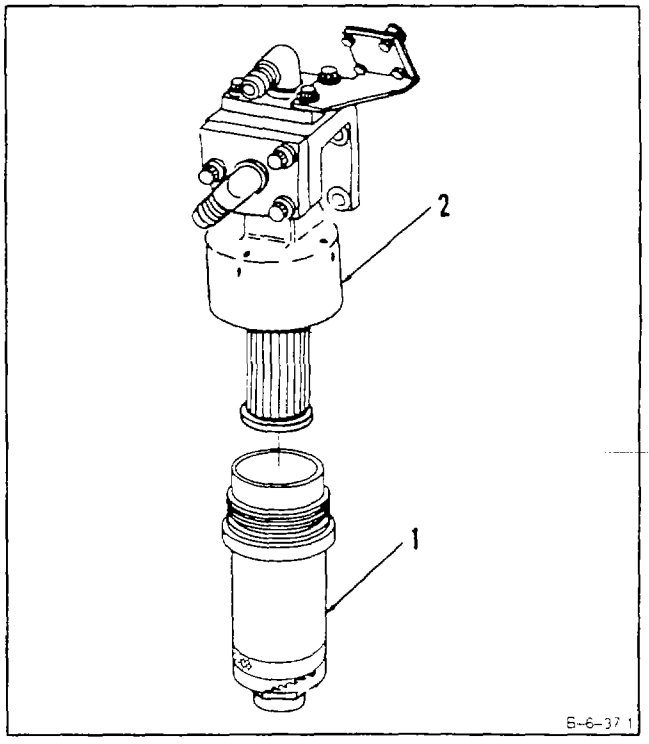
WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

NOTE

Before disassembling in-line fuel filter assembly, check for evidence of fuel leakage between filter bowl and filter head. If evidence of leakage is found, have an aircraft powerplant inspector examine filter assembly in accordance with Task 6-38.

1. Remove lockwire and **unscrew filter bowl (1)** from filter head (2) Use vise with Jaw caps and strap wrench



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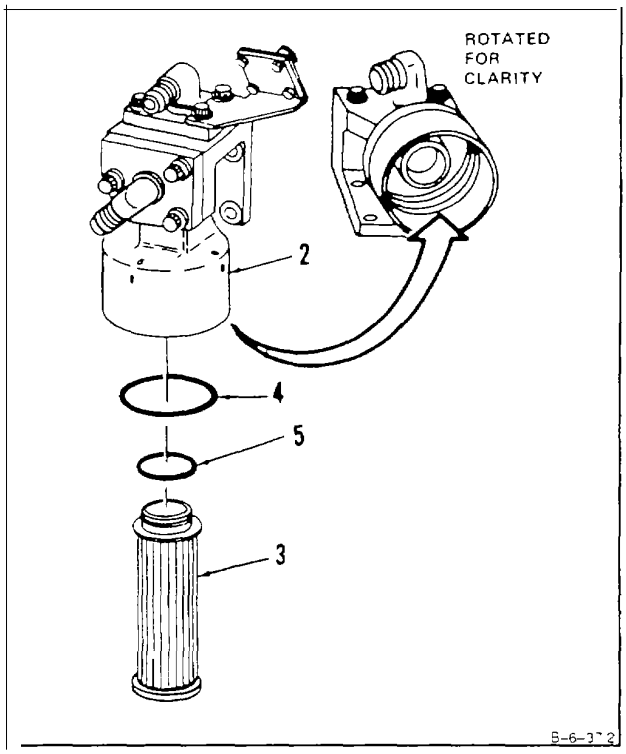
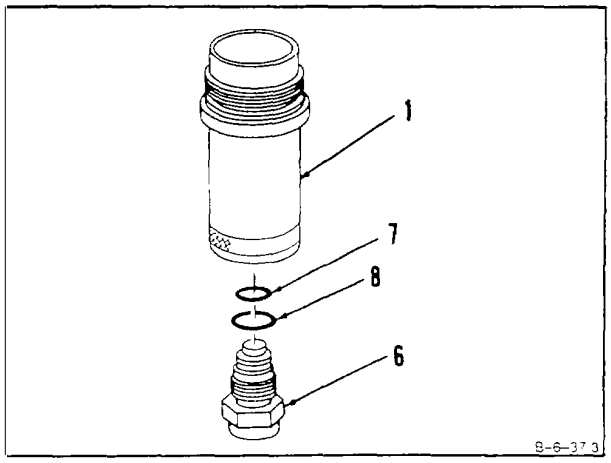
CAUTION

Do not use pliers to remove filter element Damage to filter element may occur. If damaged, replace filter element.

2. **Pull filter element (3) and packing**(4) from filter head (2) Remove packing (5) from filter element (3).



3. **Remove** lockwire Hold bowl (1) with strap wrench and **remove differential pressure indicator (6)** from bowl (1), using deep style socket Remove packings (7 and 8)



FOLLOW-ON MAINTENANCE

None

END OF TASK

6-37 CLEAN IN-LINE FUEL FILTER ASSEMBLY 6-37

INITIAL SETUP

Applicable Configurations:

All

All

Tools:

Powerplant Mechanic's Tool Kit,

NSN 5180-00-323-4944

Materials:

Dry Cleaning Solvent (El 9)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task

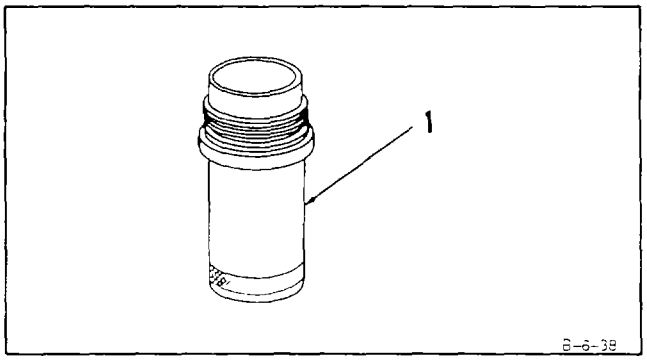
In-Line Fuel Filter Assembly Removed (Task 6-35)
In-Line Fuel Filter Assembly Disassembled (Task 6-36)

General Safety Instructions:

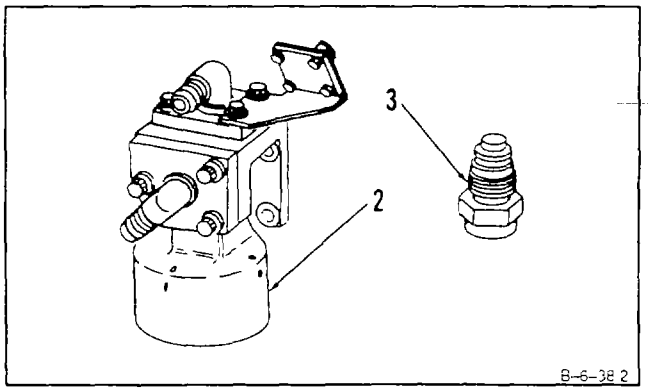
WARNING

Dry cleaning solvent (E19) 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. Wear gloves (E24) **Clean filter bowl**(1) Use dry cleaning solvent (E19) and brush.
2. After cleaning, **remove residue**with clean, lint-free cloth (E30).



3. **Clean filter head (2) and differential pressure indicator (3)**with lint-free cloth (E30) dampened in dry cleaning solvent (E19).
4. After cleaning, **remove residue**with clean, lint-free cloth (E30).



FOLLOW-ON MAINTENANCE

Inspect In-Line Fuel Filter Assembly (Task 6-38)

END OF TASK

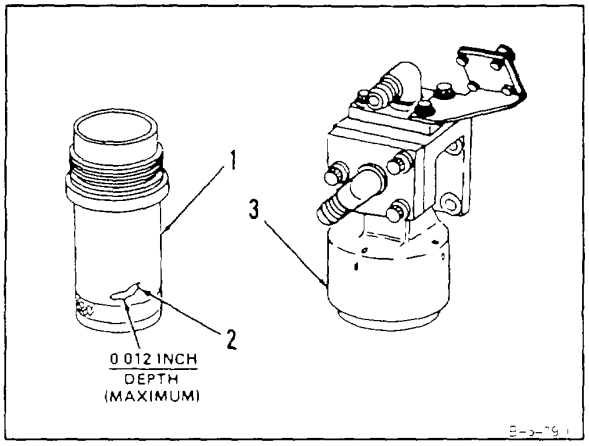
6-38 INSPECT IN-LINE FUEL FILTER ASSEMBLY 6-38

INITIAL SETUP

Applicable Configurations:
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required:
Aircraft Powerplant Inspector
References:
Task 1-79
Equipment Conditions:
Off Engine Task

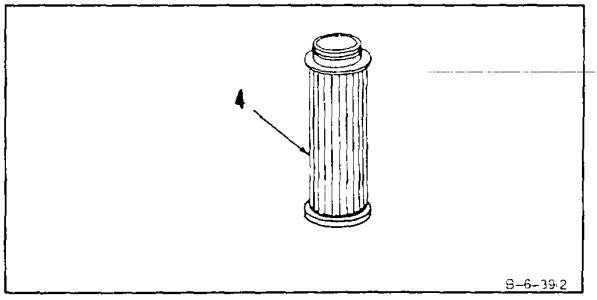
1. **Inspect filter bowl (1).** There shall be no cracks There shall be no chafing (2) deeper than 0. 012 inch

2. **Inspect filter head (3).** There shall be no cracks



NOTE
In following step. if contamination is found, inspect contaminated fuel system (Ref. Task 1-79).

3. **Inspect filter element (4).** There shall be no contamination If contaminated throw away.



FOLLOW-ON MAINTENANCE

None

END OF TASK

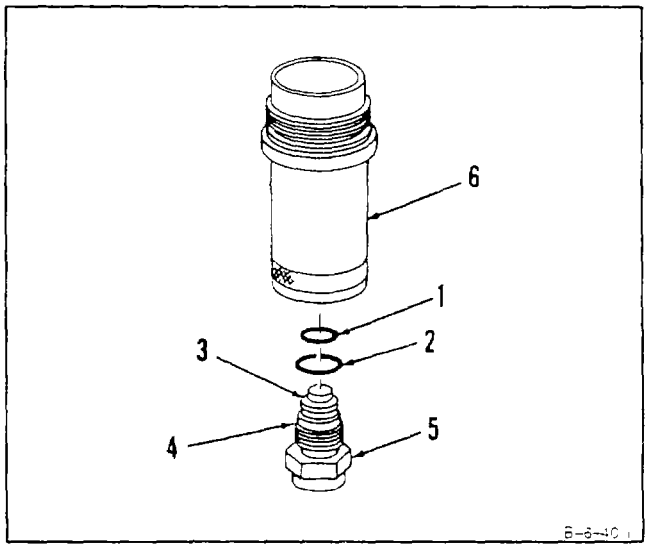
6-39 ASSEMBLE IN-LINE FUEL FILTER ASSEMBLY 6-39

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Deep Style Socket. 1-Inch
Strap Wrench
Materials:
Lockwire (E33)
Parts:
Packings
Filter Element
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
References:
TM 1-2840-252-23P
Equipment Condition:
Off Engine Task

1. Install packings (1 and 2) in grooves (3 and 4) on differential pressure indicator (5)

2. Install **differential** pressure **indicator (5)** in filter bowl (6) Bottom by hand, then turn 1/4 to 1/2 turn. Use deep style socket and hold bowl (6) with strap wrench Lockwire indicator (5) Use lockwire (E33)



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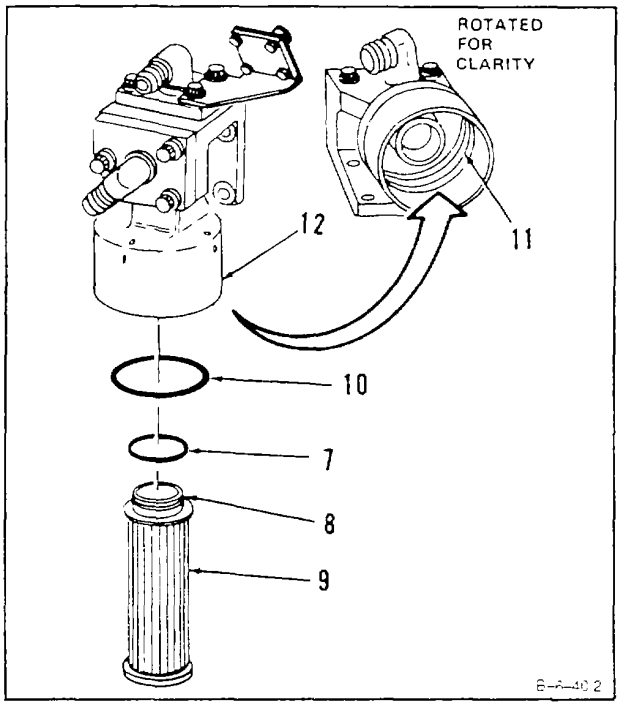
3. Install packing (7) in groove (8) of serviceable filter element (9).

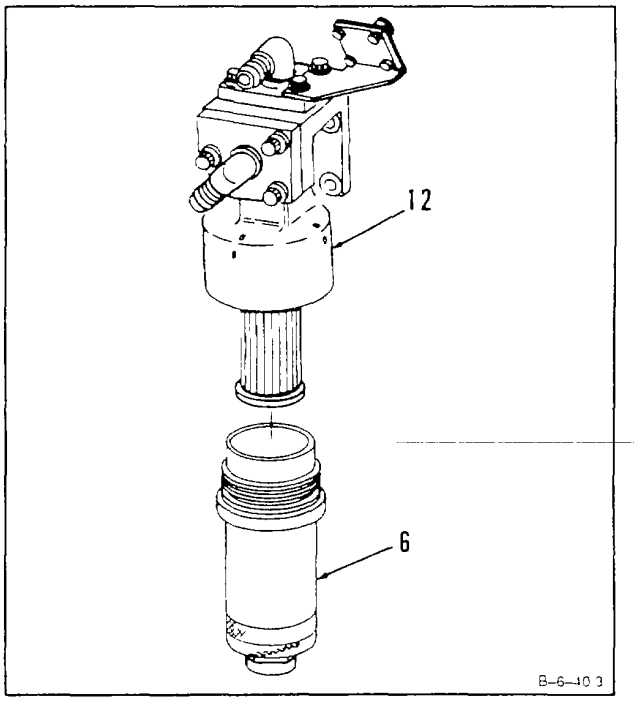
4. Install **packing (10) in groove (11) and filter** element (9) in filter head (12) Press in by hand.



CAUTION

Do not use wrench on indicator to tighten bowl or damage may occur.

5. **Install filter bowl**(6) in filter head (12) and hand-tighten Lockwire filter bowl (6) Use lockwire (E33).



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

6-40 INSTALL IN-LINE FUEL FILTER ASSEMBLY 6-40

INITIAL SETUP

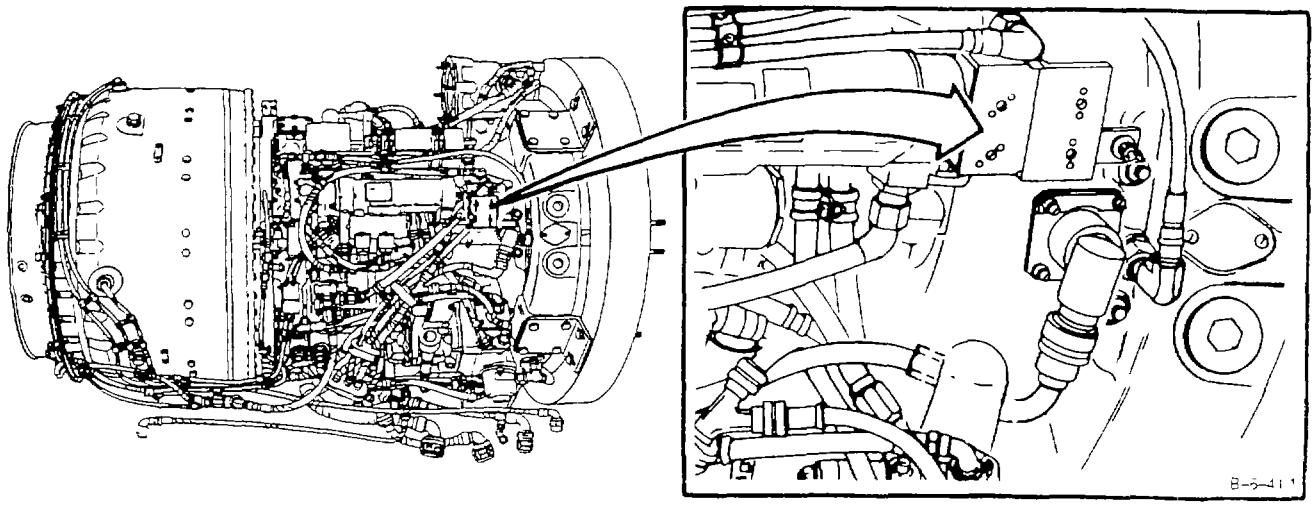
Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:
None

References:
TM 1-2840-252-23P

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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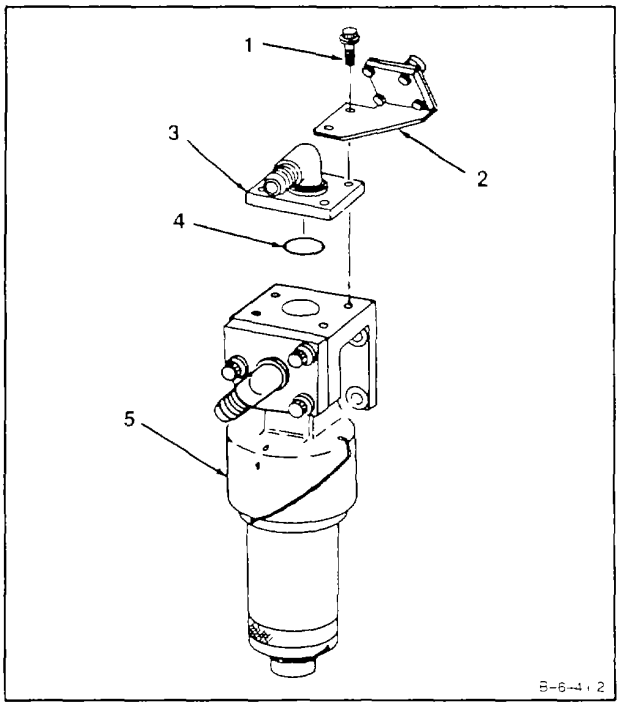
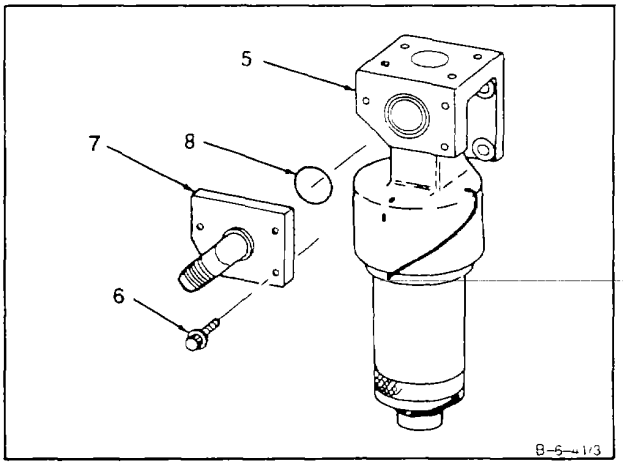
NOTE

If in-line fuel filter assembly is a replacement, do steps 1 thru 4 If same in-line fuel filter assembly that removed is to be installed, omit steps 1 thru 4.

1. **Remove** four bolts (1), **bracket (2), fitting**(3), and packing (4) **from removed in-line fuel filter assembly (5).**



2. **Remove** three bolts (6), **fitting** (7), and packing (**8) from removed in-line fuel filter assembly (5).**



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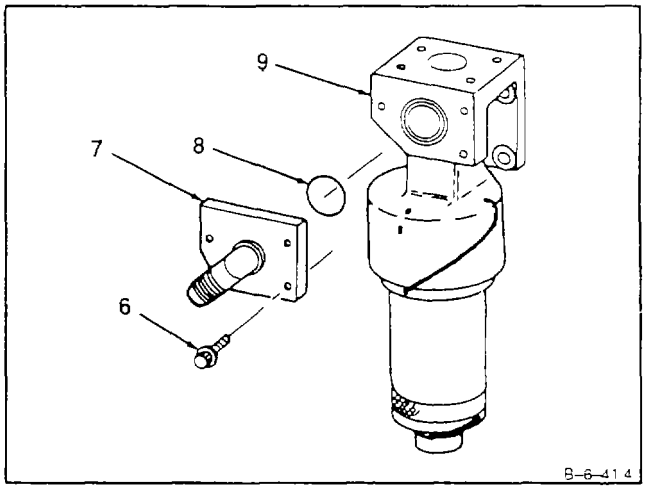
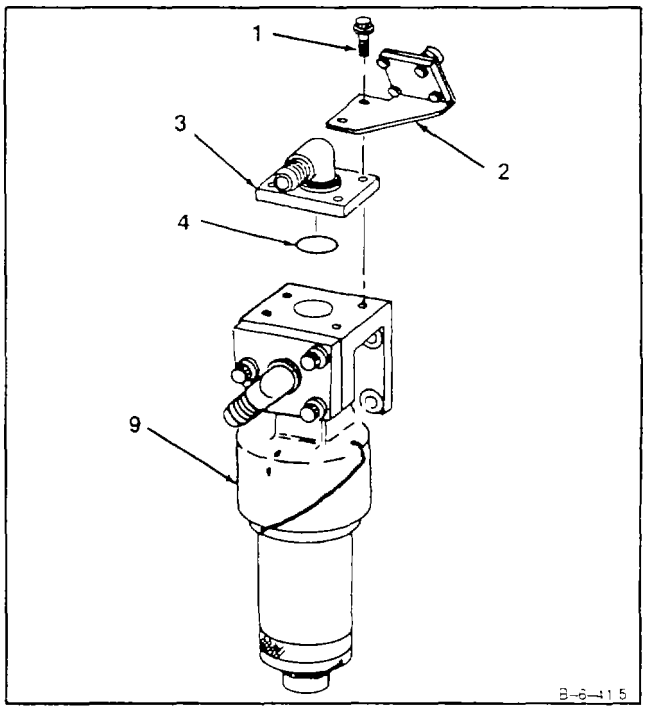
3. **Install** packing (8) and fitting (7) on serviceable in-line fuel filter assembly (9) Install three bolts (6).



4. **Install** packing (4), **fitting (3), and bracket (2) on serviceable in-line fuel filter assembly (9).** Install four bolts (1).



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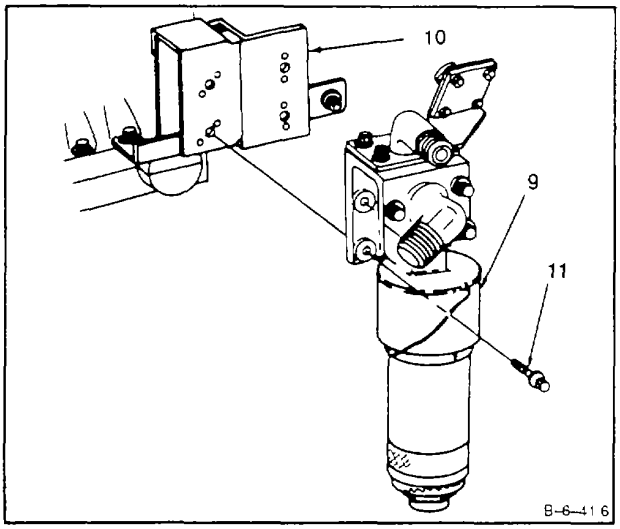
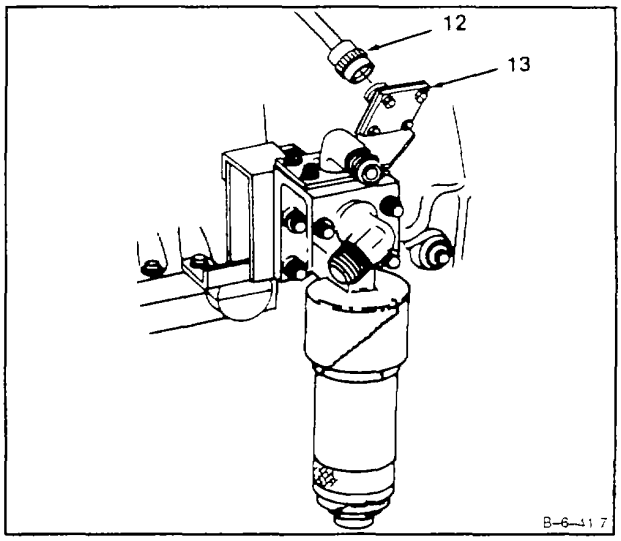
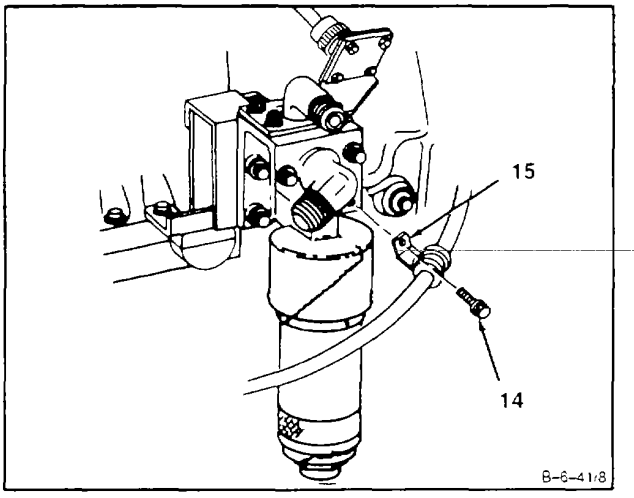
5. **Install In-line fuel filter assembly** (9), on bracket (10) Install four bolts (11).



6. Connect electrical harness connector (12) to dummy connector (13).



7. Remove loosely installed bolt (14) Install bolt (14) and standoff (15).



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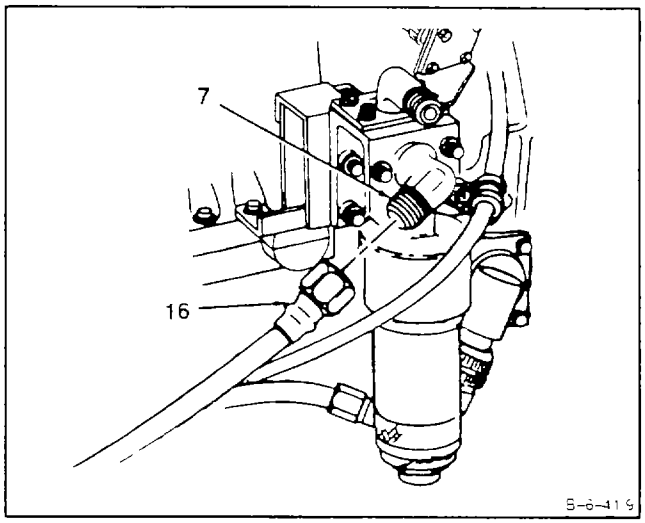
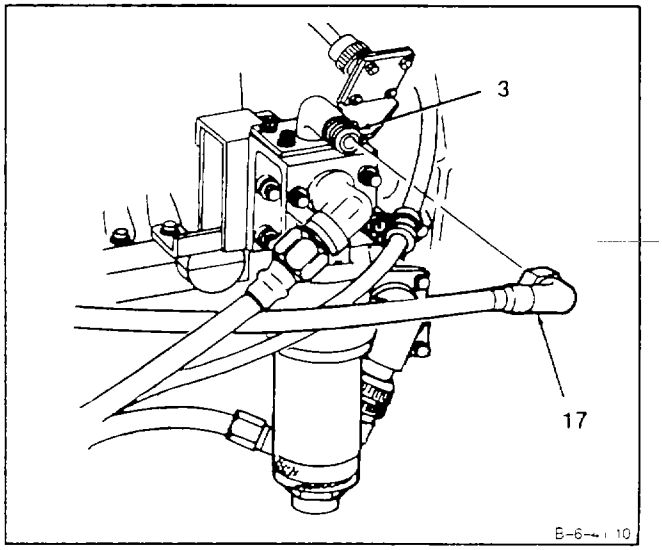
8. **Connect hose assembly (16)** to fitting (7).



9. **Connect hose assembly (17)** to fitting (3).



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION X

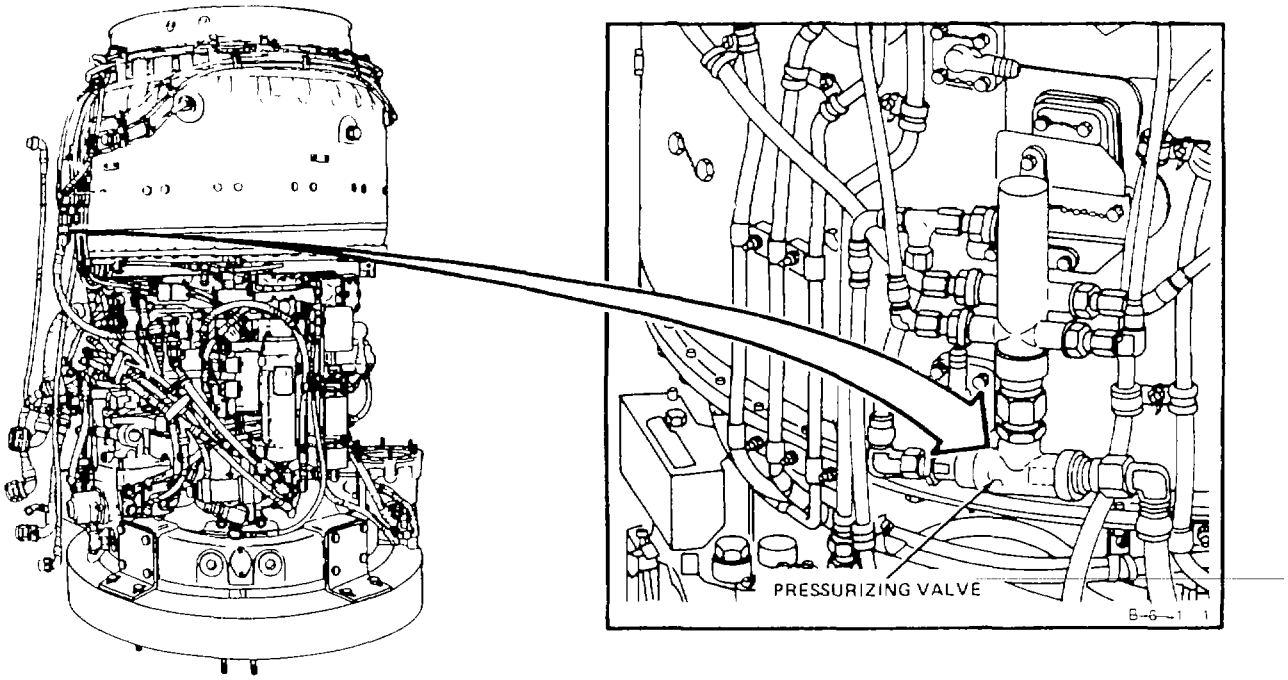
PRESSURIZING VALVE

6-41 REMOVE PRESSURIZING VALVE 6-41

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:
None
Personnel Required
Aircraft Powerplant Repairer



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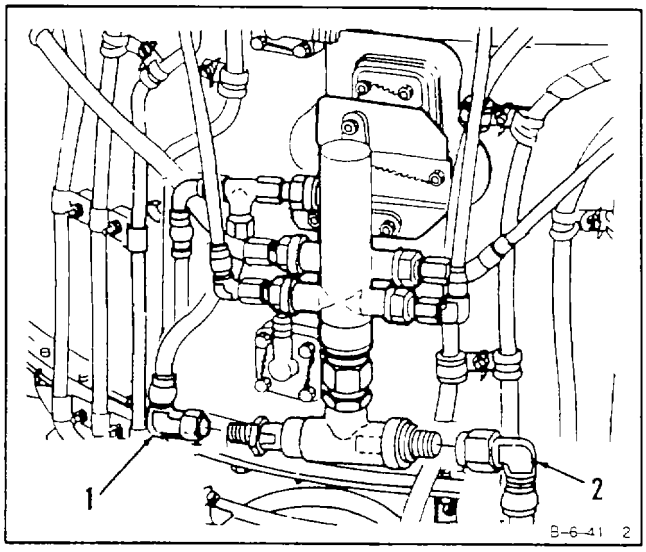
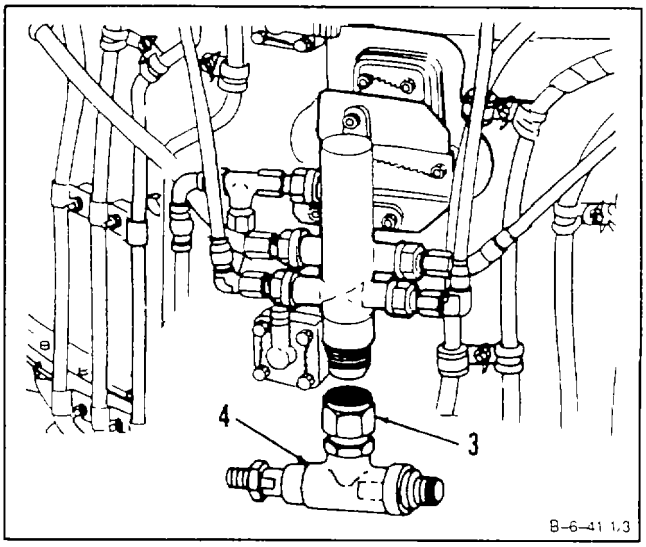
1. **Disconnect hose assemblies (1 and 2).**



2. Disconnect nut (3) and **remove pressurizing valve (4)**



FOLLOW-ON MAINTENANCE

None

END OF TASK

6-42 CLEAN PRESSURIZING VALVE 6-42

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:
Dry Cleaning Solvent (E19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:
Aircraft Powerplant, Repairer

Equipment Condition:
Off Engine Task
Pressurizing Valve Removed (Task 6-41)

General Safety Instructions:

WARNING

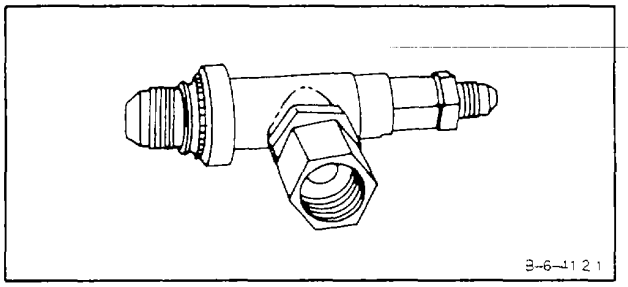
Dry cleaning solvent (E19) is flammable and toxic. It canirritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

---

1. Clean pressurizing valve as follows:

a. Wear gloves (E24) Clean pressurizing valve (1) using dry cleaning solvent (El 9) and brush.

b. Wipe dry Use lint-free cloth (E30).



FOLLOW-ON MAINTENANCE

Inspect pressurizing valve (Task 6-43).

END OF TASK

INITIAL SETUP

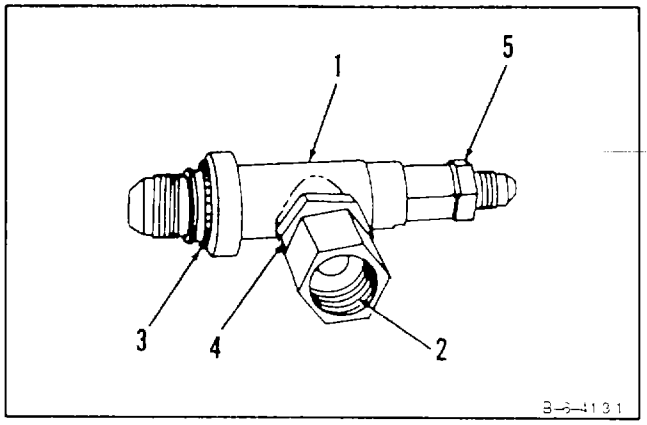
Applicable Configurations
All
Tools
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
None
Personnel Required
Aircraft Powerplant Inspector
Equipment Condition
Off Engine Task

1. Inspect pressurizing valve (1)

a. There shall be no nicks, scratches, and gouges on sealing surface

b. There shall be no damaged threads on inside of nut (2)

c. Fittings (3, 4 and 5) shall not be loose If fittings are loose tighten fittings



FOLLOW-ON MAINTENANCE

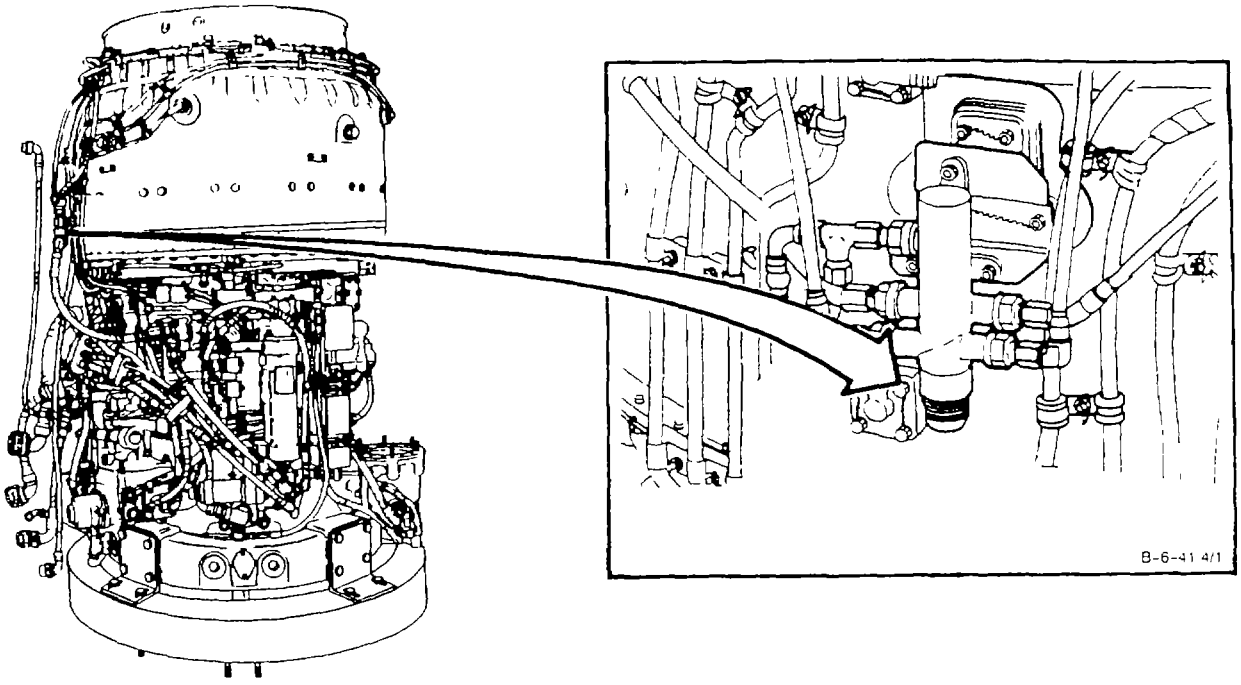
None

END OF TASK

6-44 INSTALL PRESSURIZING VALVE 6-44

INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Materials:
Packing
Personnel Required.
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector
References:
TM 1-2840-252-23P



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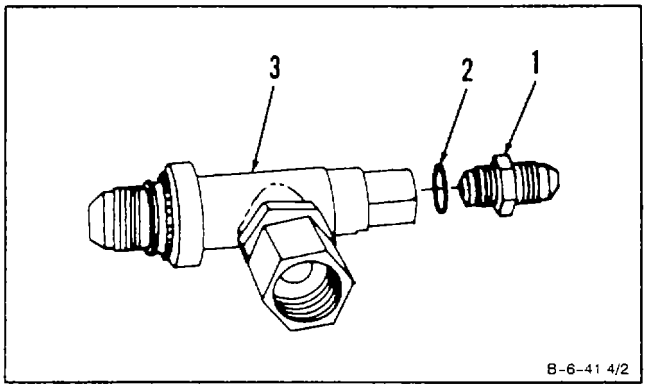
NOTE

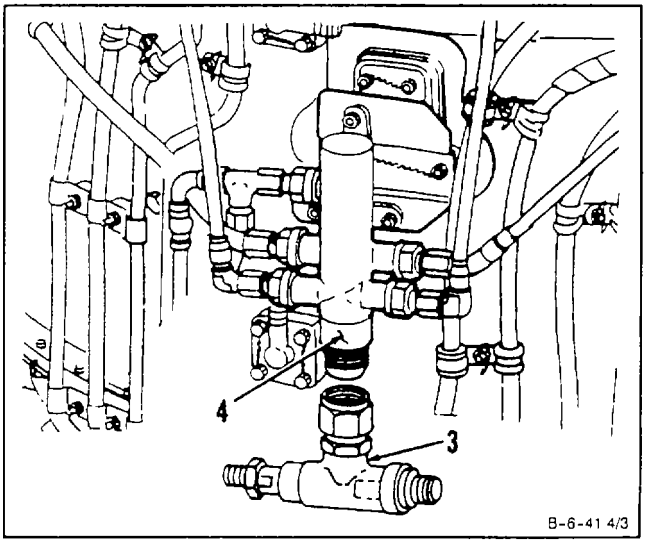
If pressurizing valve is a replacement, do steps 1 and 2. If same pressurizing valve that was removed is to be installed, omit steps 1 and 2.

1. **Remove reducer (1)** and packing (2) **from removed pressurizing valve (3).**

2. **Install reducer (1)** and packing (2) in **serviceable pressurizing valve (3).**



3. **Install pressurizing valve (3)** onto flow divider (4).



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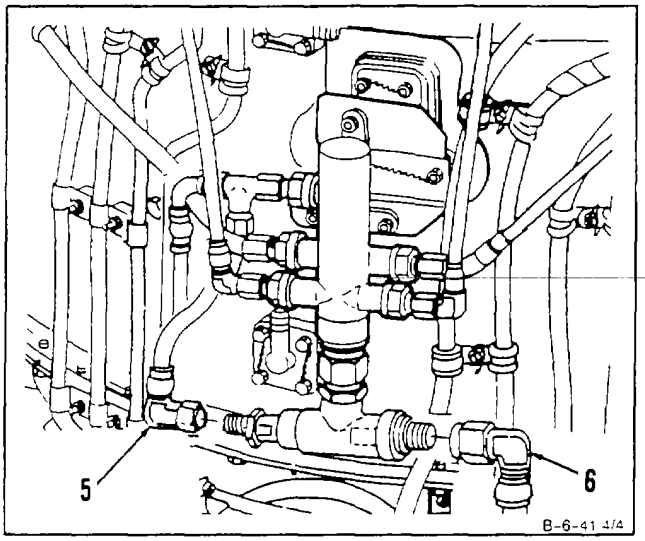
4. **Connect hose assemblies (5 and 6).**



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

SECTION XI

FLOW DIVIDER AND BRACKET

6-45 REMOVE FLOW DIVIDER AND BRACKET 6-45

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Container, 2 Quart

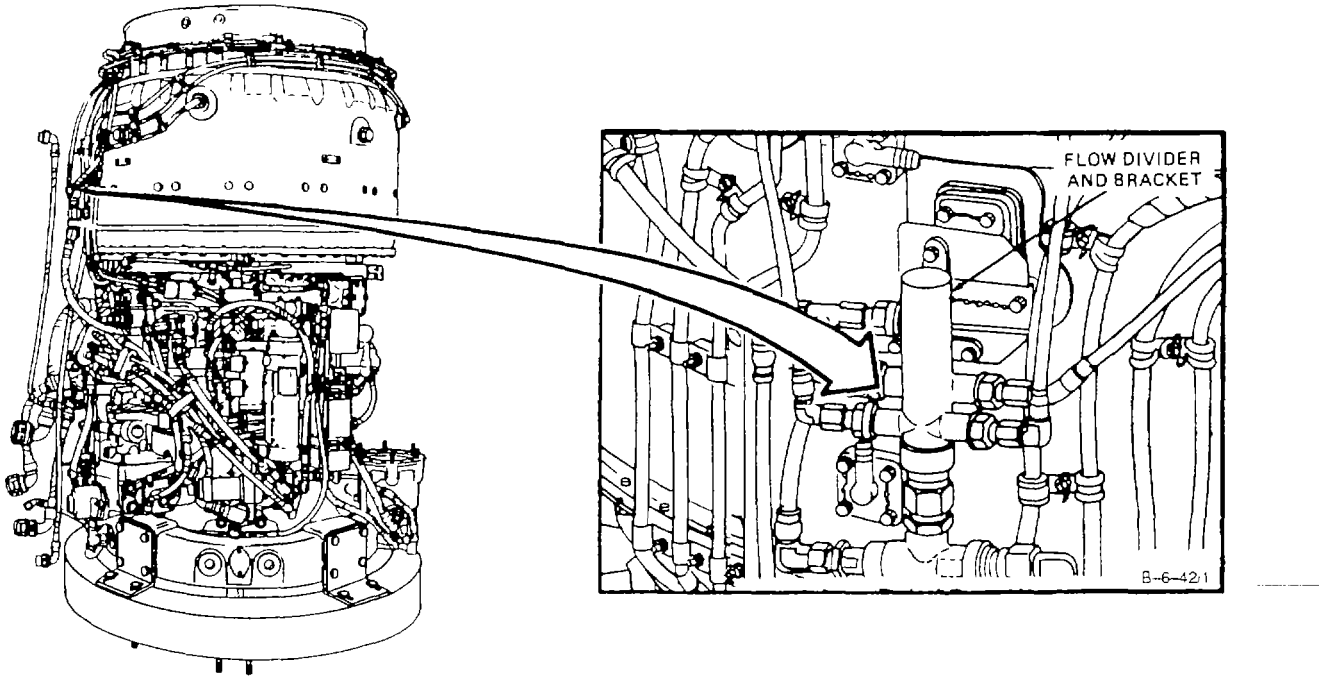
Materials:
Wiping Rag (E64)

Personnel Required
Aircraft Powerplant Repairer

General Safety Instructions

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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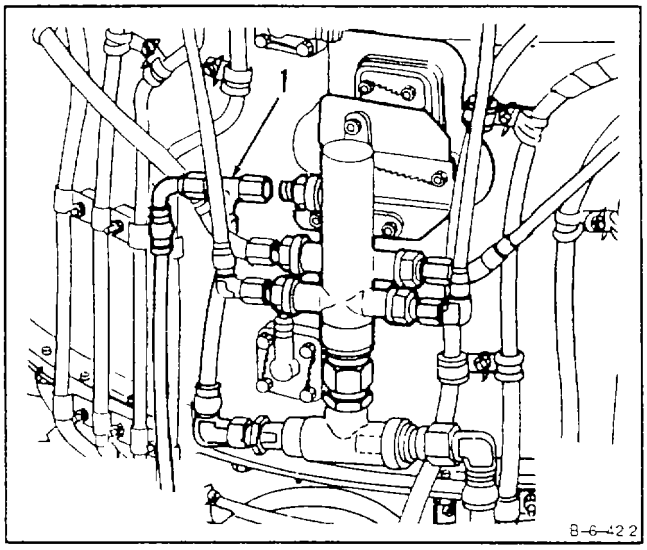
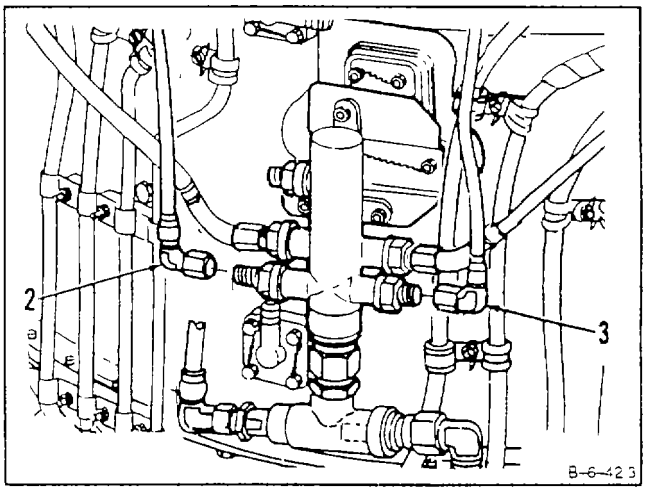
1. **Disconnect tee assembly (1).**

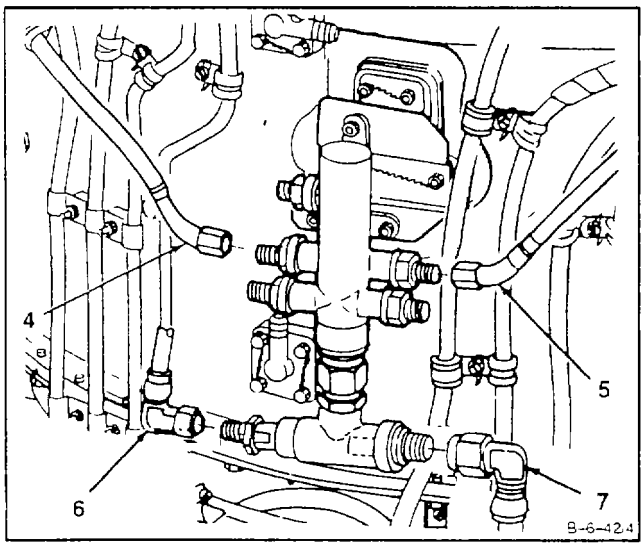


2. **Disconnect hose assemblies (2 and 3).**



3. **Disconnect hose assemblies (4 and 5).**

4. **Disconnect hose assemblies (6 and 7).**



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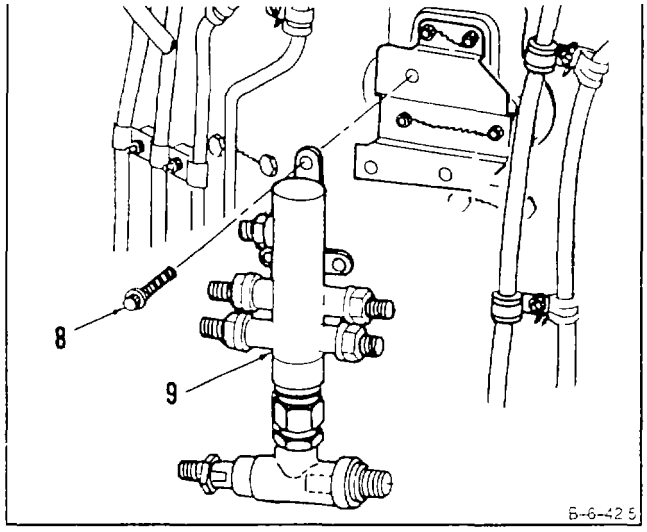
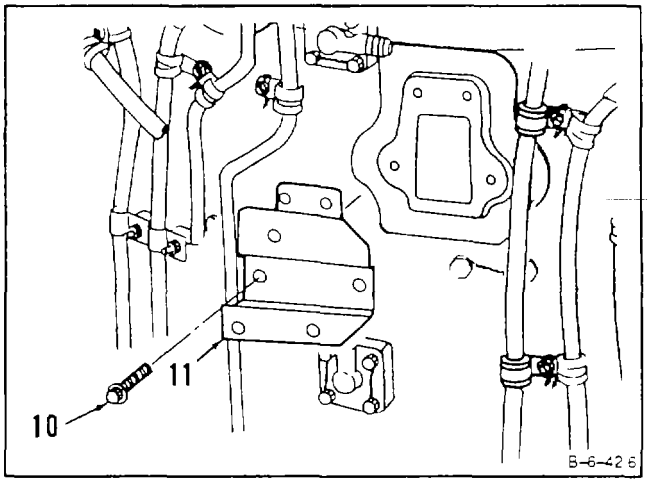
5. Remove three bolts (8) and flow divider (9).



6. Remove lockwire and four bolts (10) and bracket (11)



FOLLOW-ON MAINTENANCE
None

END OF TASK

INITIAL SETUP

Applicable Configurations

All

Tools

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials

Dry Cleaning Solvent (El9)
Gloves (E24)
Lint-F*ree Cloth (E30)*

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

Off Engine Task

Fuel Check Valve Removed (Task 6-49)
Flow Divider and Bracket Removed (Task 6-45)

General Safety Instructions,

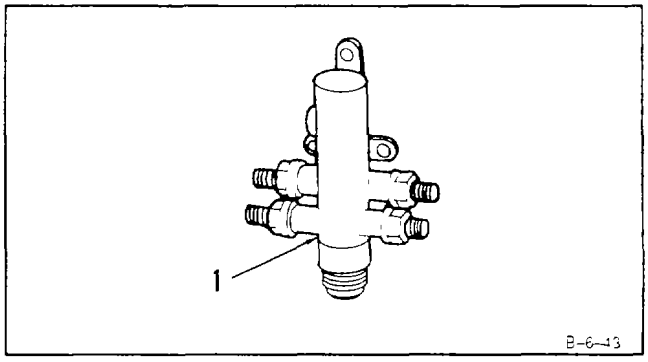
WARNING

Dry cleaning solvent (El9) 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 flow divider (1)** as follows:

   a. Wear gloves (E24) Clean flow divider using dry cleaning solvent (El 9) and brush

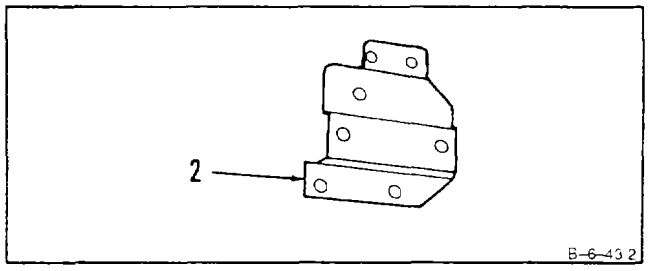
   b. Wipe dry Use lint-free cloth (E30)



2. Clean bracket (2) as follows

   a. Use lint-free cloth (E30) dampened in dry cleaning solvent (El9)

   b. Wipe dry Use lint-free cloth (E30)



FOLLOW-ON MAINTENANCE

Inspect Flow Divider and Bracket (Task 6-47)

END OF TASK

6-47 INSPECT FLOW DIVIDER AND BRACKET 6-47

INITIAL SETUP

Applicable Configurations
All
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

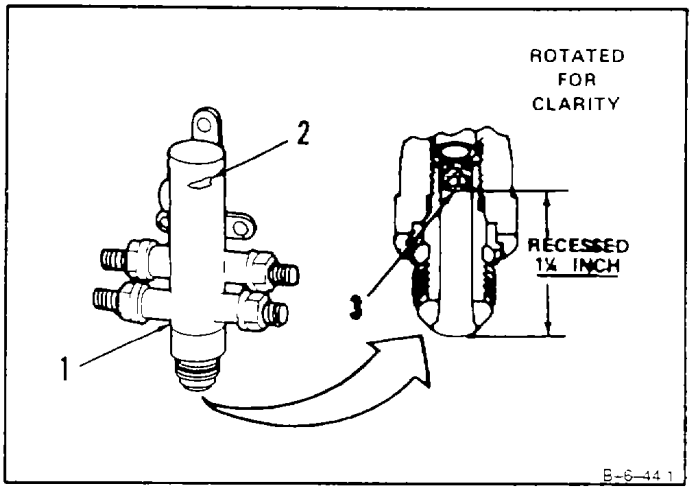
Materials-

None
Personnel Required
Aircraft Powerplant Inspector
Equipment Condition
Off Engine Task

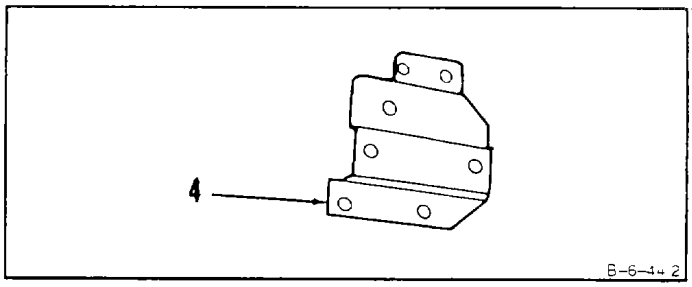
---

1. **Inspect flow divider (1).** There shall be no cracks There shall be no chafing (2) deeper than 0.031 inch.

2. **Inspect inlet screen (3).** There shall be no clogging.



3. **Inspect bracket (4).** There shall be no cracks



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-48 INSTALL FLOW DIVIDER AND BRACKET 6-48

INITIAL SETUP

Applicable Configurations:
A***ll***

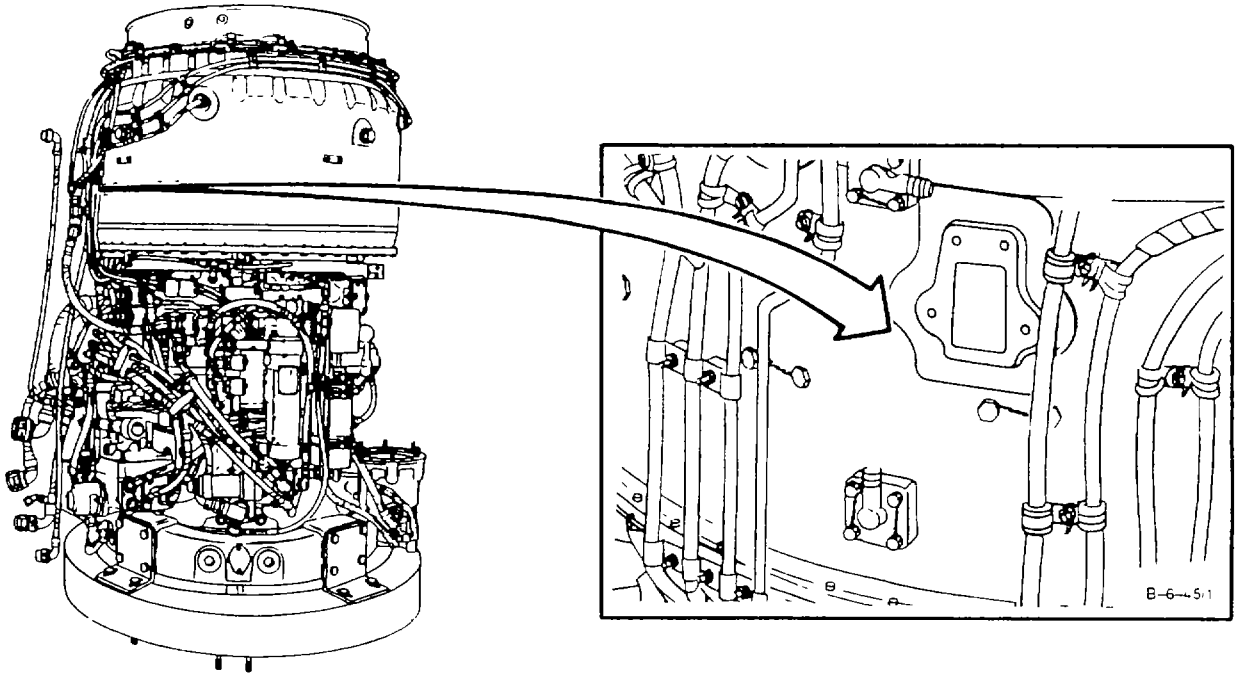
Tools*:*
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Vise
Jaw Caps

Materials:
Lockwire (E33)

Parts:
Packings

Personnel Required'
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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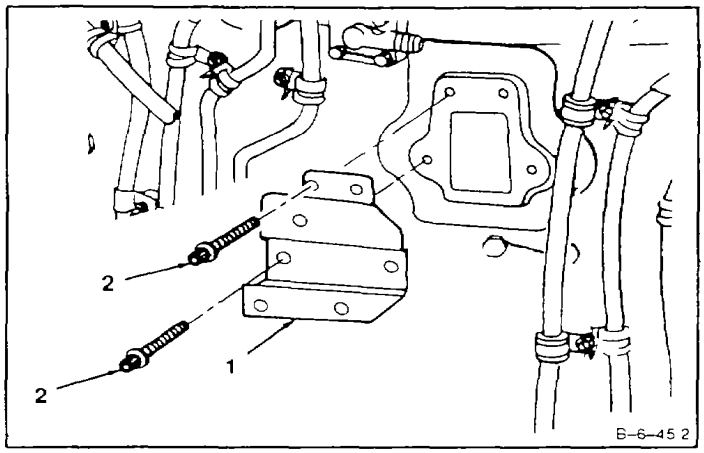
1. **Install bracket**(1) and four bolts (2) Lockwire bolts (2) Use lockwire (E33)

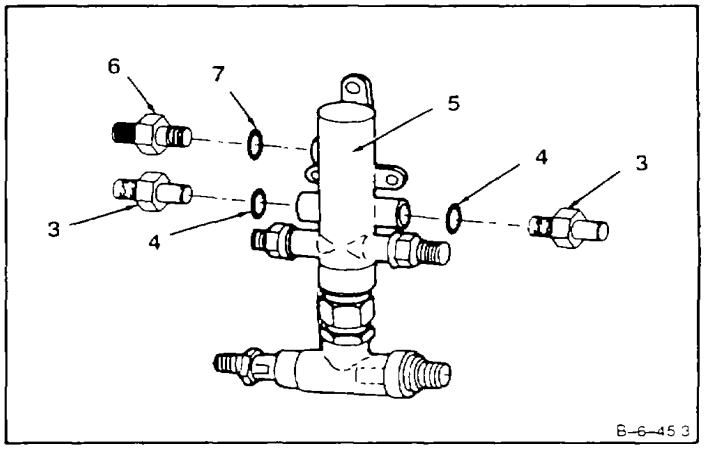


NOTE

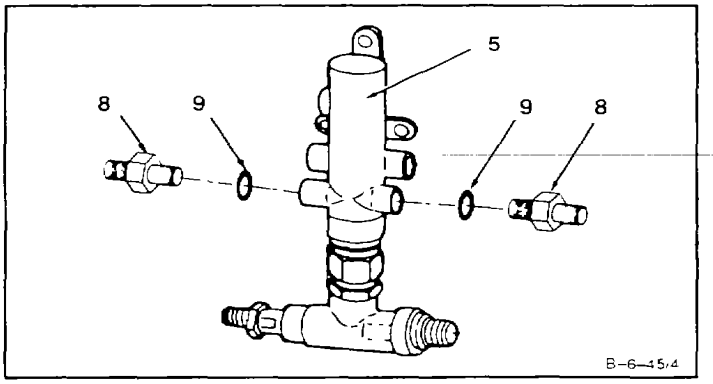
If flow divider is a replacement, do steps 2 thru 7 If same flow divider that was removed is to be installed, omit steps 2 thru 7

2. **Remove two reducers (3)** and packings (4) from **removed flow divider** (5) Use vise with jaw caps

3. Remove reducer (6) and packing (7) from removed **flow** divider (5).



4. **Remove two nipples (8)** and packings (9) **from removed flow divider (5).**



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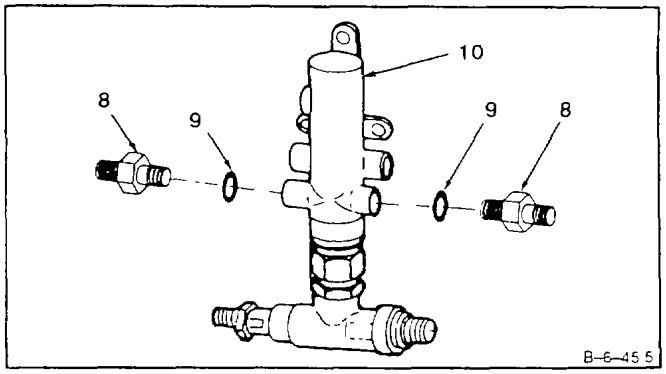
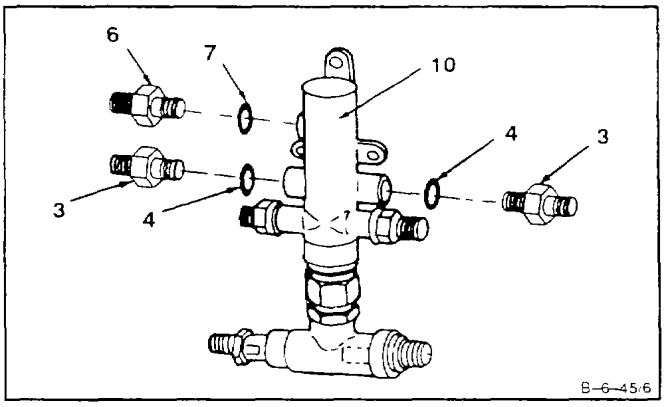
5. **Install** two packings (9) and **two nipples (8) on serviceable flow divider (10)**

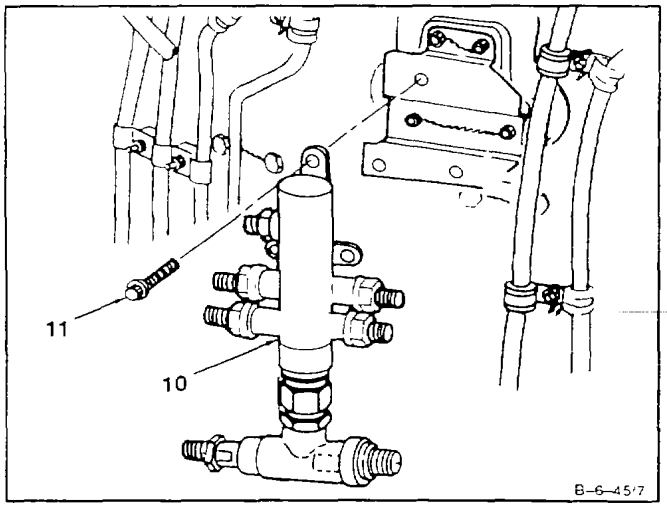


6. **Install** packing (7) and **reducer** (6) on serviceable flow divider (10)

7. **Install** two packings (4) and **two reducers** (3) on serviceable flow divider (10)



8. **Install flow divider (10)** and three bolts (11)



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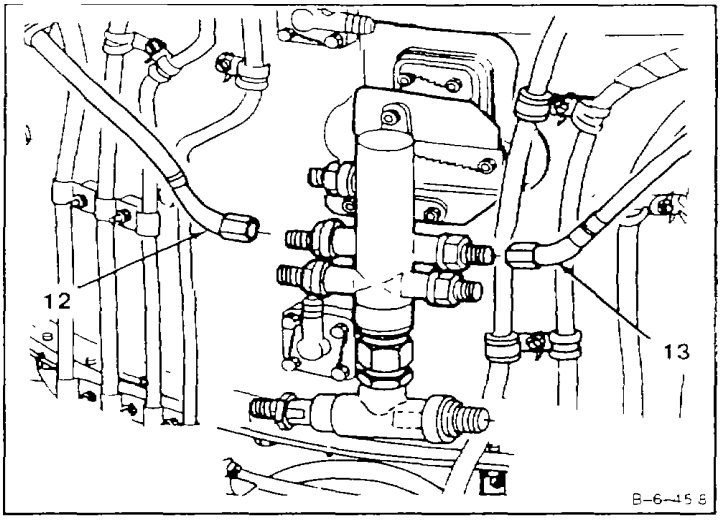
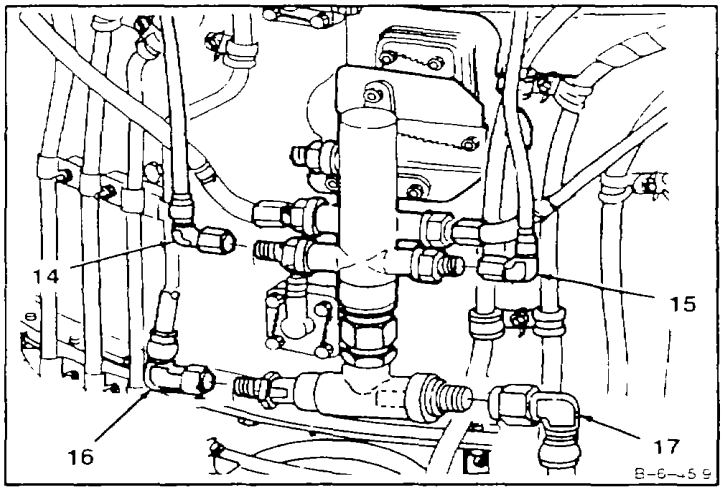
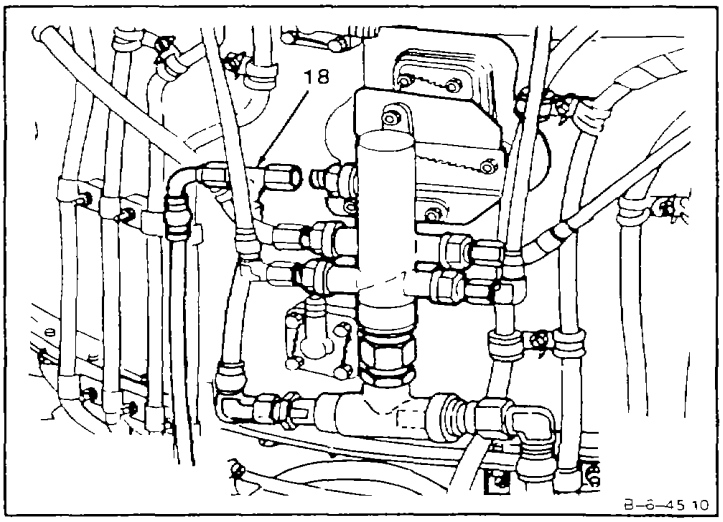
9. Connect hose assemblies (12 and 13).



10. Connect hose assemblies (14 and 15)
11. Connect hose assemblies (16 and 17)



12. Connect tee assembly (18)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION XII

FUEL CHECK VALVE

6-49 REMOVE FUEL CHECK VALVE 6-49

INITIAL SETUP

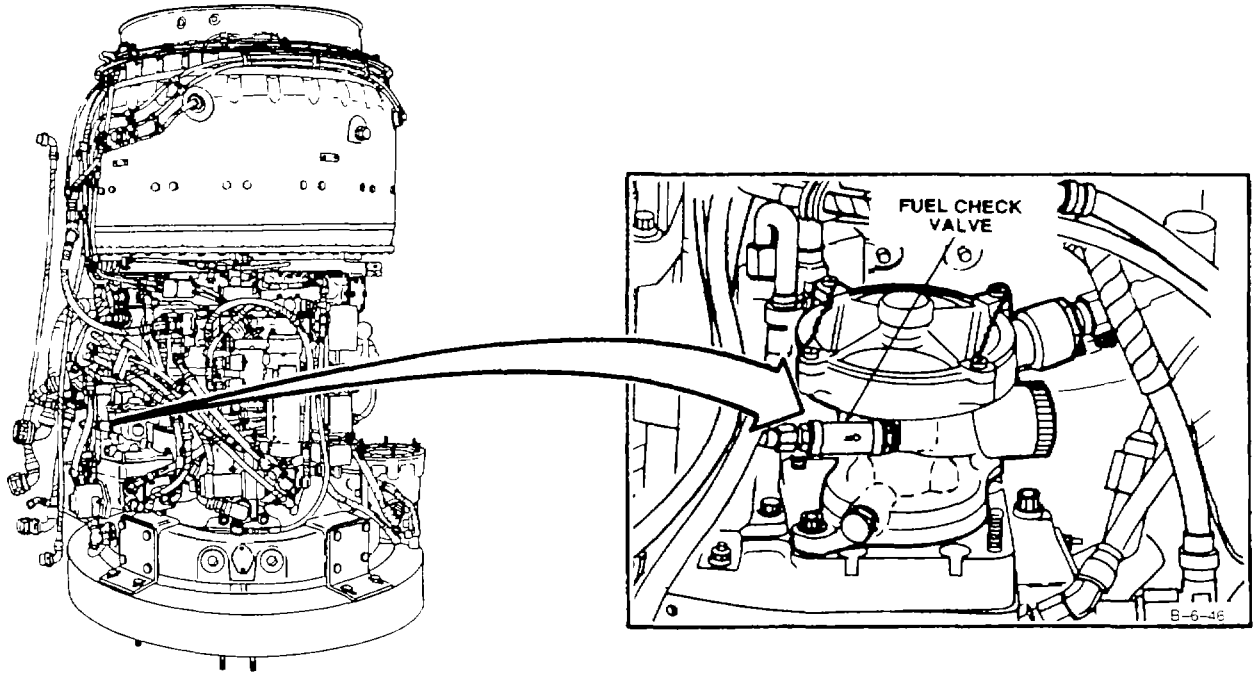
Applicable Configurations
All
Tools,
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Container, 1 Quart
Materials:
Wiping Rag (E64)
Personnel Required'
Aircraft Powerplant Repairer

References:
Task 6-8

General Safety Instructions

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention Get medical attention for eyes.



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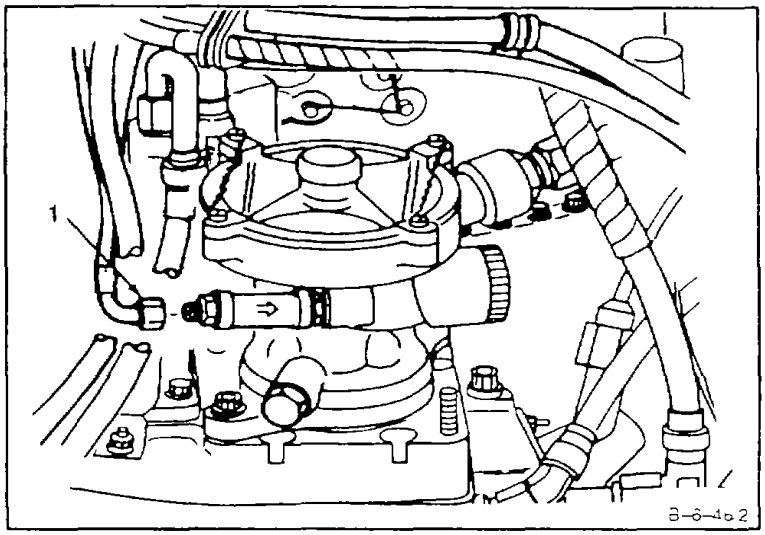
1. Disconnect hose assembly (1).

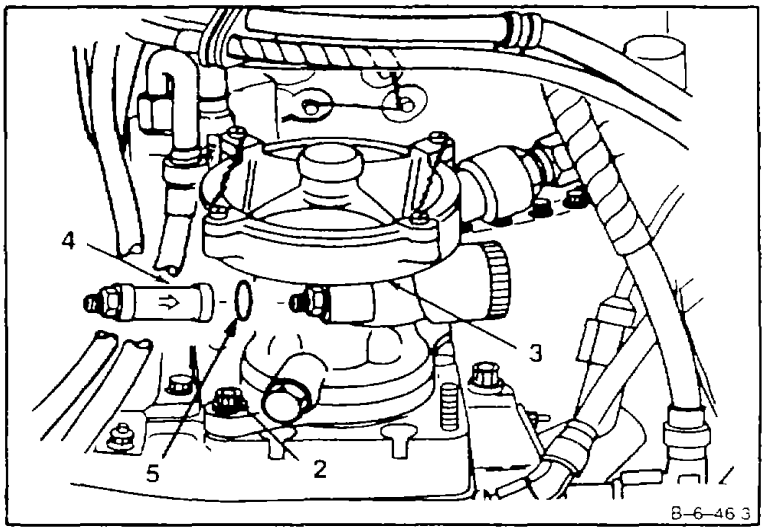
NOTE

In following step, it will be necessary to tilt fuel boost pump slightly to provide adequate clearance

2. Loosen two nuts (2) and cant fuel boost pump assembly (3) Unscrew and **remove fuel check valve (4)** and packing (5)



FOLLOW-ON MAINTENANCE
None



END OF TASK

6-50 CLEAN FUEL CHECK VALVE 6-50

INITIAL SETUP

Applicable Configurations

All

Tools

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials

Dry Cleaning Solvent (El 9)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required.

Aircraft Powerplant Repairer

Equipment Condition

Off Engine Task
Fuel Check Valve Removed (Task 6-49)
General Safety Instructions

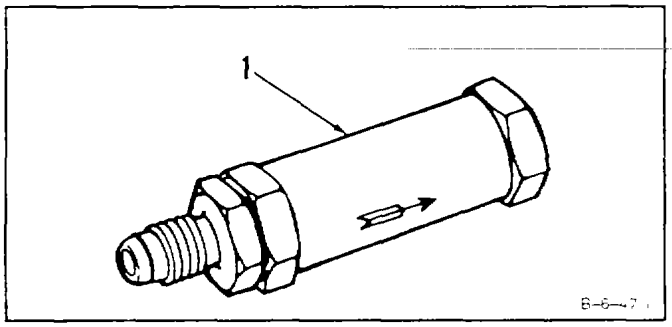
WARNING

Dry cleaning solvent (El9) 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 fuel check valve (1) as follows

a. Wear gloves (E24) Immerse valve in dry cleaning solvent (El9) and agitate Use brush on external surfaces

b. Use lint-free cloth (E30) to remove solvent



FOLLOW-ON MAINTENANCE

None

END OF TASK

6-51 INSTALL FUEL CHECK VALVE 6-51

INITIAL SETUP

Applicable Configurations:
All

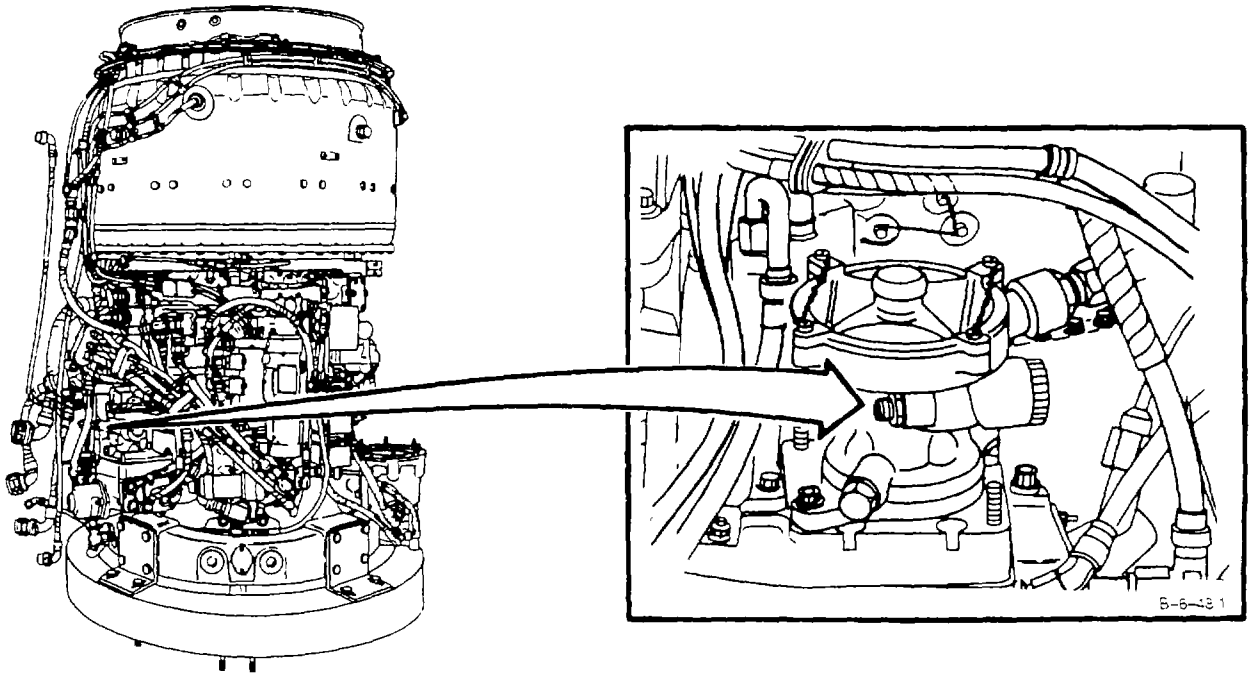
Tools:
Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
Technical Inspection Tool Kit, NSN 5180-00-323-5114

Materials:
None

Parts:
Packing

Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:
TM 1-2840-252-23P



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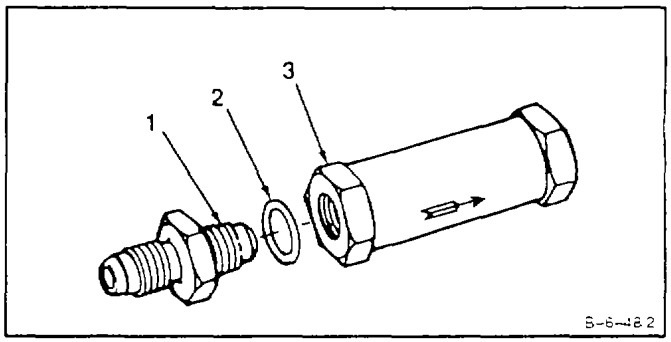
NOTE

If fuel check valve is a replacement, do steps 1 and 2 If same fuel check valve that was removed is to be installed, omit steps 1 and 2

1. **Remove nipple (1)** and packing (2) **from removed fuel check valve** (3).

2. **Install** packing (2) and **nipple (1) in serviceable fuel check valve** (3).



NOTE

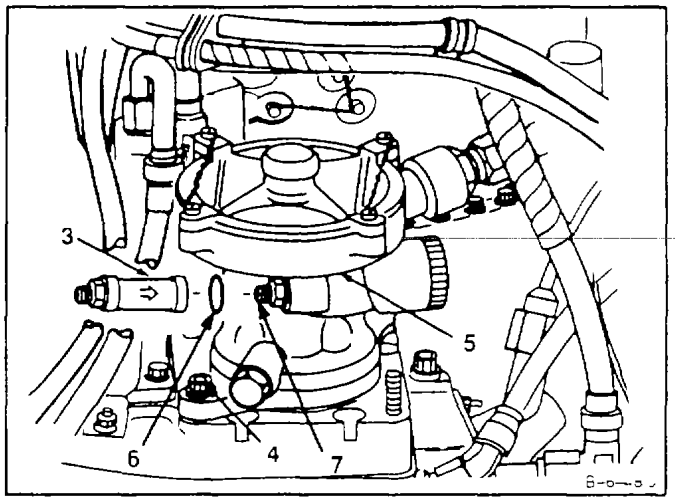
Make sure arrow on fuel check valve points toward fuel boost pump assembly

In following step, it will be necessary to tilt fuel boost pump slightly to provide adequate clearance

3. **Loosen two nuts (4) and cant fuel boost pump assembly (5).**

4. **Install fuel check valve** (3) and packing (6) onto nipple (7)

5. **Tighten two nuts (4) to secure fuel boost pump assembly (5).**



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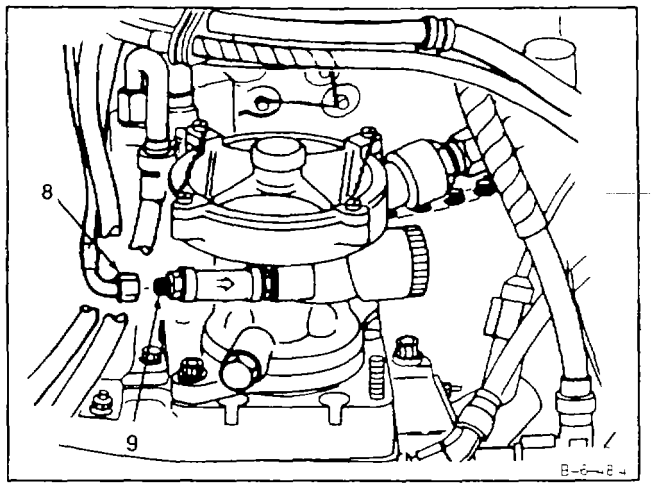
6. **Connect hose assembly (8)** to nipple (9).

INSPECT

FOLLOW-ON MAINTENANCE
None



END OF TASK

SECTION XIII

OVERSPEED SOLENOID VALVE

6-52 REMOVE OVERSPEED SOLENOID VALVE 6-52

INITIAL SETUP

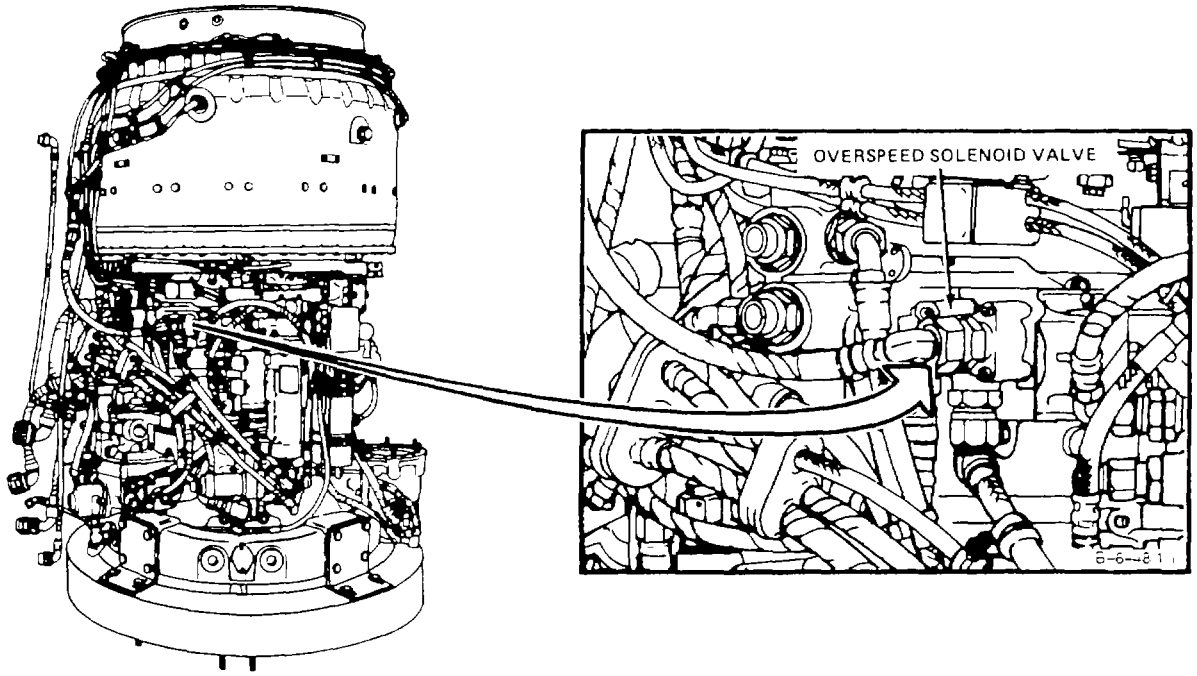
Applicable Configurations:
All

Tools
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944

Materials
None

Personnel Required
Aircraft Powerplant Repairer

References.
Task 6-54



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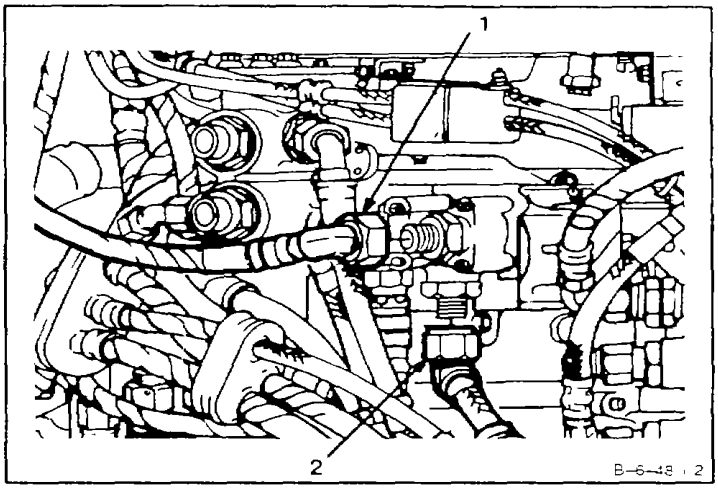
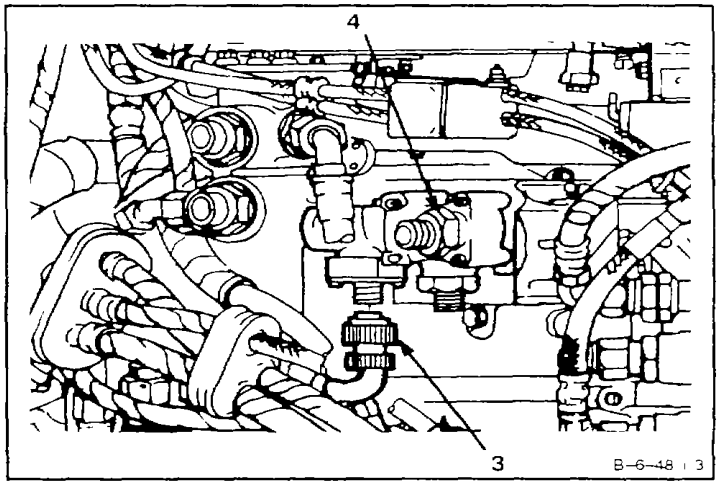
6-52 REMOVE OVERSPEED SOLENOID VALVE (Continued) 6-52

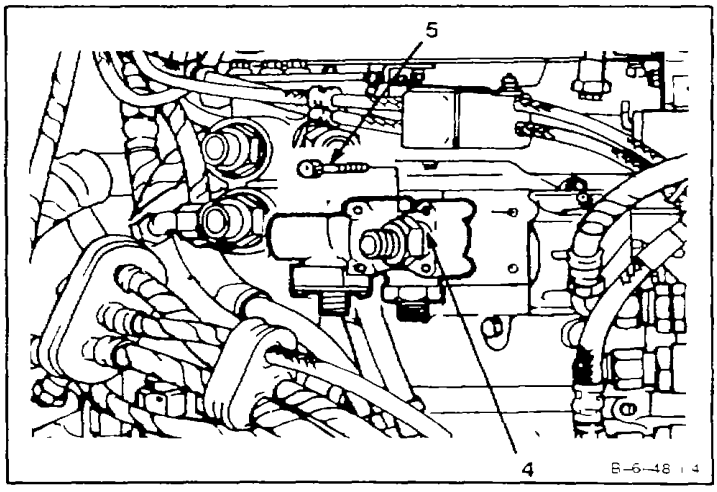
1. **Disconnect hose assemblies (1 and 2).**



2. **Disconnect electrical connector (3)** from overspeed solenoid valve (4)



3. **Remove** four bolts (5) and **overspeed solenoid valve (4).**



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-53 CLEAN ONERSPEED SOLENOID VALVE 6-53

INITIAL SETUP

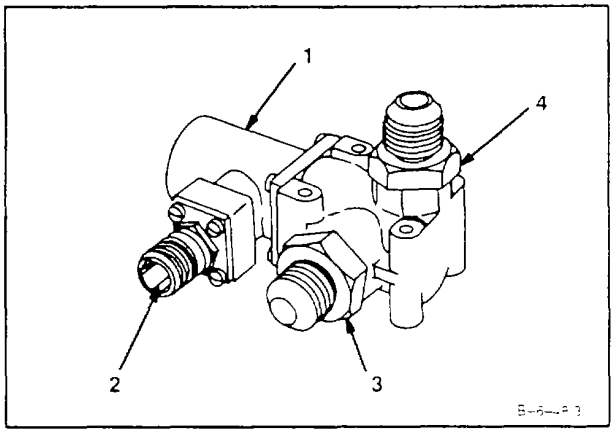
Applicable Configurations:
All
Tools:
None
Materials:
Dry Cleaning Solvent (E9)
Gloves (E24)
Lint-Free Cloth (E30)
Personnel Required:
Aircraft Powerplant Repairer
Equipment Condition:
Off Engine Task
Overspeed Solenoid Valve Removed (Task 6-52)

General Safety Instructions,

WARNING

Dry cleaning solvent (El9) 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. Wear gloves (E24) Clean overspeed solenoid valve (1) with clean, lint-free cloth dampened in dry cleaning solvent (El 9)



FOLLOW-ON MAINTENANCE
Inspect Overspeed Solenoid Valve (Task 6-54)

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:

None

Personnel Required

Aircraft Powerplant Inspector

Equipment Condition:

Off Engine Task

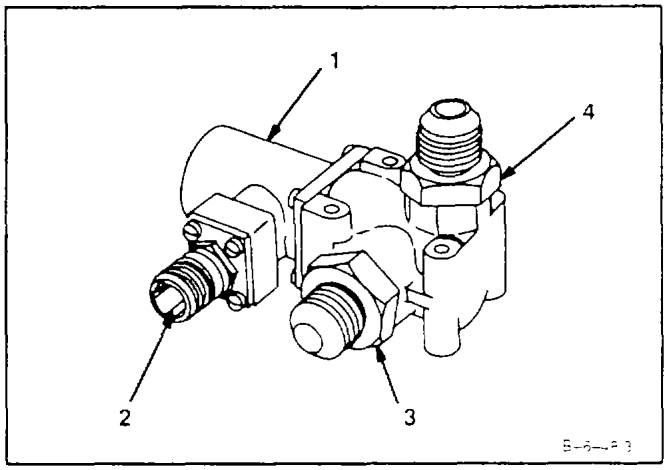
1. Inspect overspeed solenoid valve (1).

a. There shall be no cracks

b. Pins (2) shall not be broken or bent

c. There shall be no corrosion on pins (2)

d. Fittings (3 and 4) shall not be loose If fittings are loose, tighten fittings



FOLLOW-ON MAINTENANCE

None

END OF TASK

INITIAL SETUP

Applicable Configurations

All

Tools:

Dry, Compressed Air
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials.

Crocus Cloth (El 6)

Personnel Required-

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition

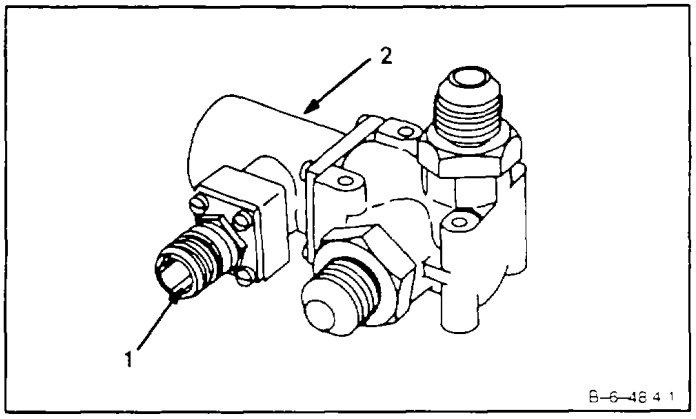
Off Engine Task

NOTE

This repair is allowed provided it does not cause pins to break or crack.

1. Straighten bent pins (1) of overspeed solenoid valve (2) Using long-nose pliers, gently move pins (1) until they are straight

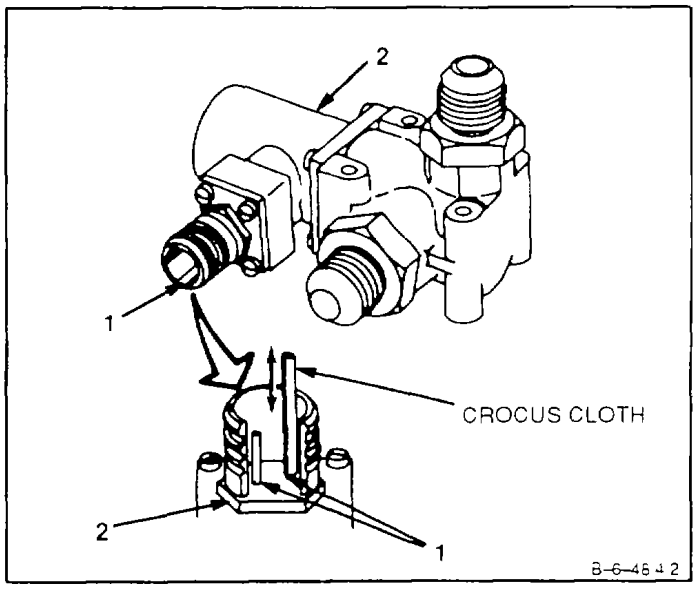
2. Remove corrosion from pins (1) of overspeed solenoid valve (2) Polish pins, using in and out motion over entire length of pin until corrosion is removed Use crocus cloth (El 6)



WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medi- cal attention.

3. Wear goggles Remove loosened panicles from pins (1), using clean, dry, compressed air



INSPECT

FOLLOW-ON MAINTENANCE

None

END OF TASK

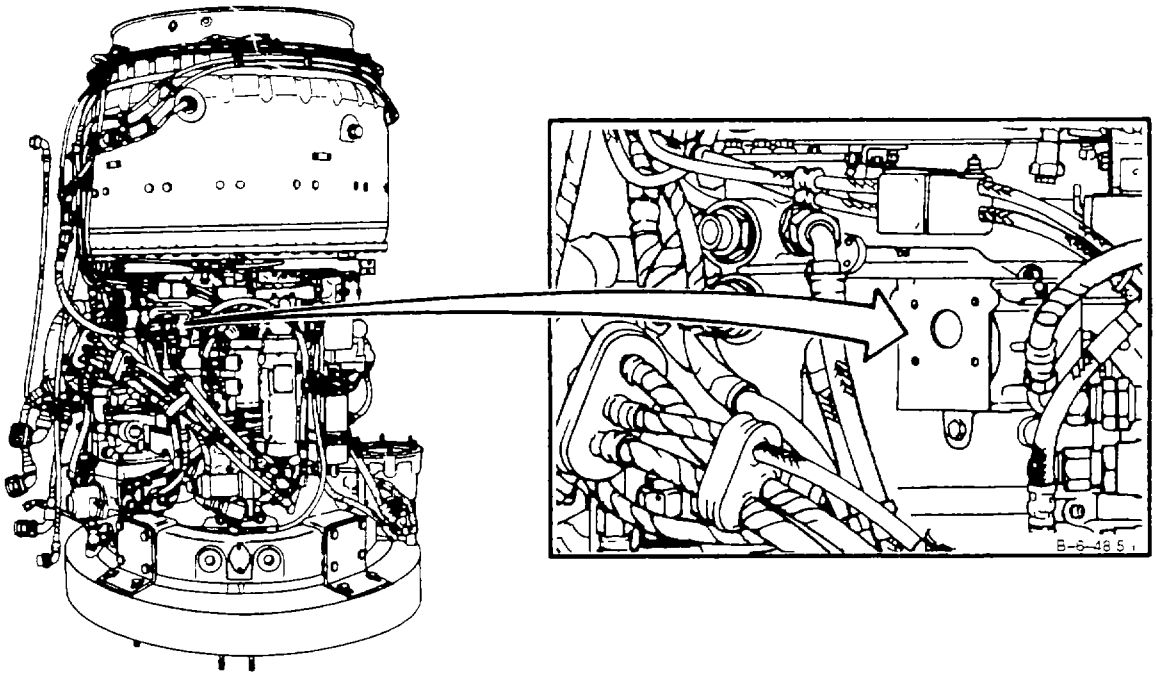
INITIAL SETUP

Applicable Configurations:
All

Tools.
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Deep Style Socket, 1-Inch

Materials:
None

Personnel Required.
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



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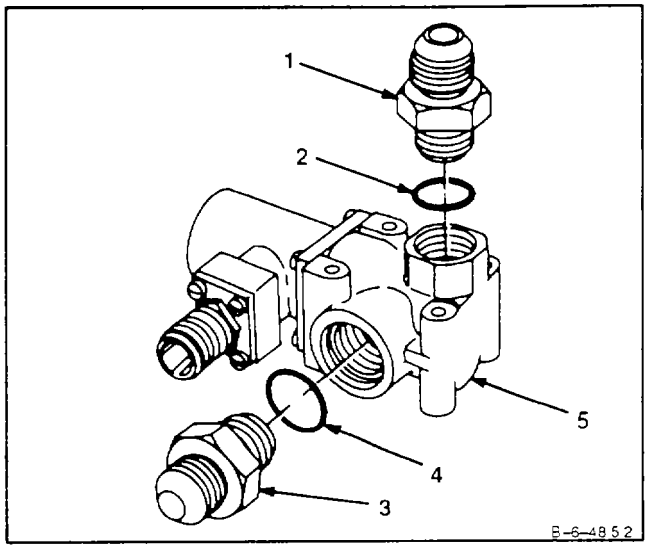
NOTE

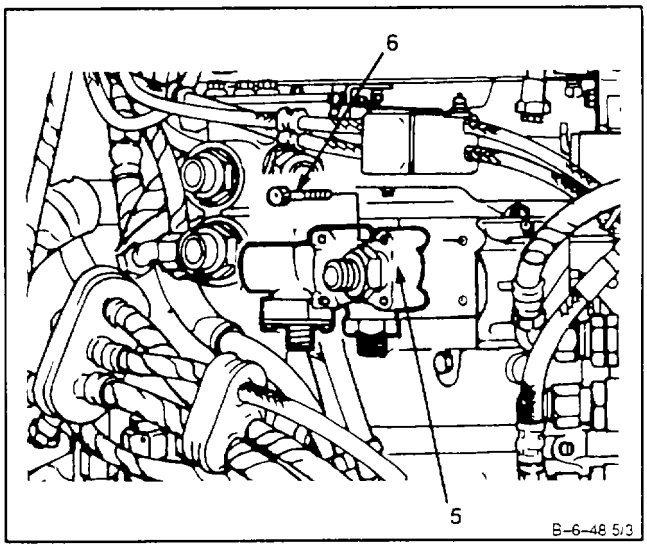
If overspeed solenoid valve is a replacement, do steps 1 and 2 If same overspeed solenoid valve that was removed is to be installed, omit steps 1 and 2

1. **Remove reducer (1),** packing (2), **reducer (3),** and packing (4) **from removed overspeed solenoid valve (5).**

2. **Install reducer (1),** packing (2), reducer (3), and packing (4) **in serviceable overspeed solenoid valve (5).**



3 **Install overspeed solenoid valve (5)** and four bolts (6)



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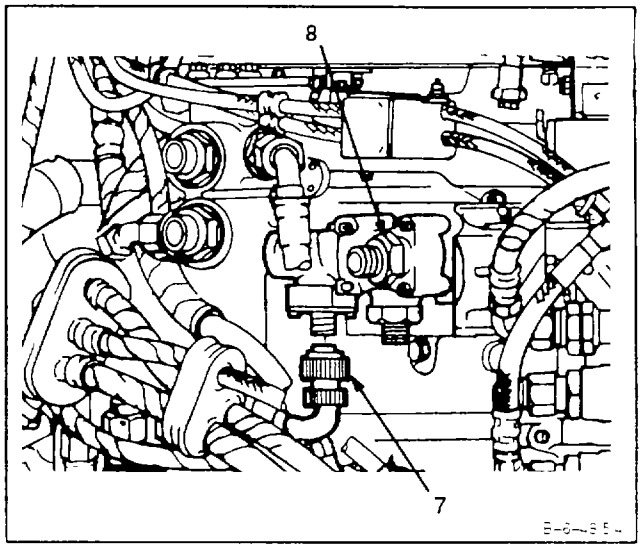
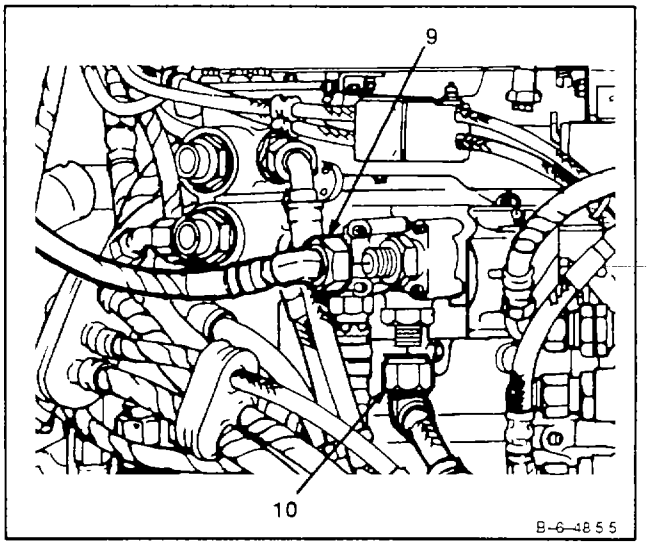
4. Connect electrical connector (7) to overspeed solenoid valve (8)



5. Connect hose assemblies (9 and 10)



FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION XIV

STARTING FUEL SOLENOID VALVE

6-57 REMOVE STARTING FUEL SOLENOID VALVE 6-57

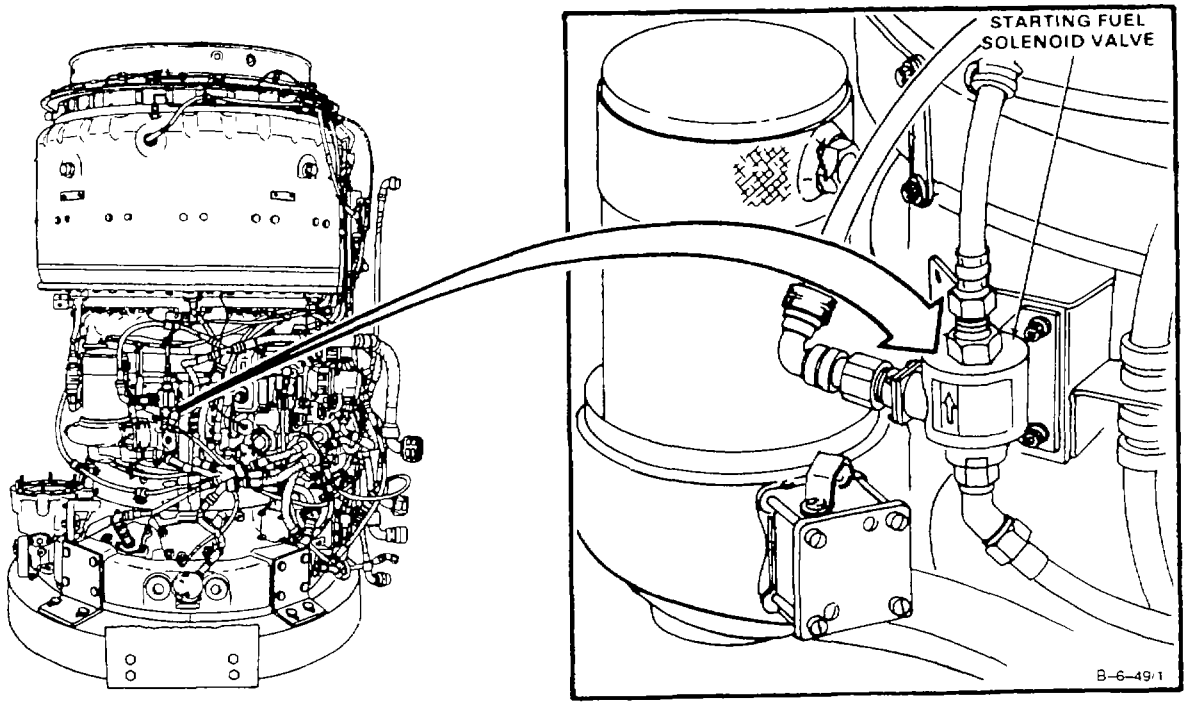
INITIAL SETUP

Applicable Configurations:
All
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Container, 1 Quart
Materials:
Wiping Rag (E64)
Personnel Required:
Aircraft Powerplant Repairer
References:
Task 6-59

General Safety Instructions

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling It irritation of skin results, get medical attention. Get medical attention for eyes.



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6-57 REMOVE STARTING FUEL SOLENOID VALVE (Continued) 6-57

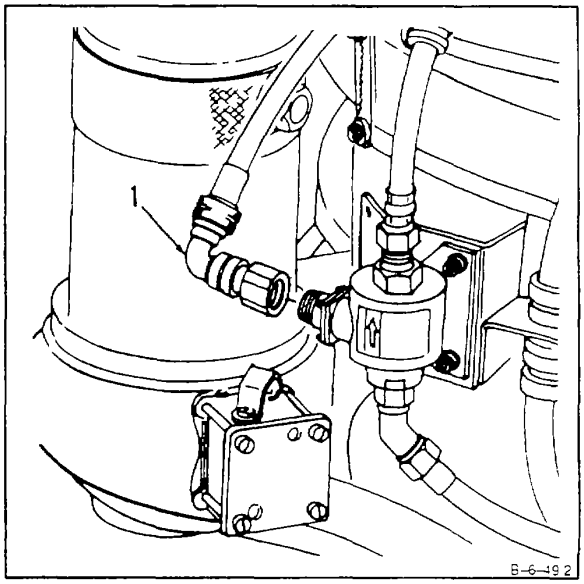
NOTE

Before removing starting fuel solenoid valve, check for evidence of fuel leakage between fittings and solenoid valve housing If evidence of leakage is found, have an aircraft powerplant inspector examine valve in accordance with Task 6-59

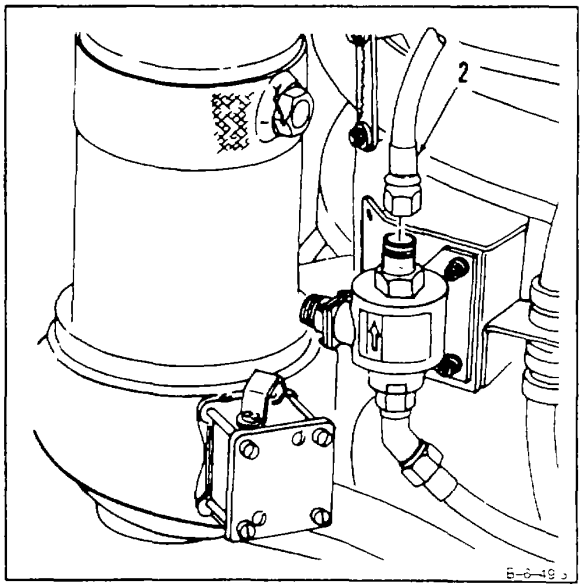
NOTE

It may be necessary to gently pry mounting bracket outward to disconnect electrical connector and remove mounting hardware.

1. **Disconnect electrical connector (1).**



2. **Disconnect hose assembly (2).**



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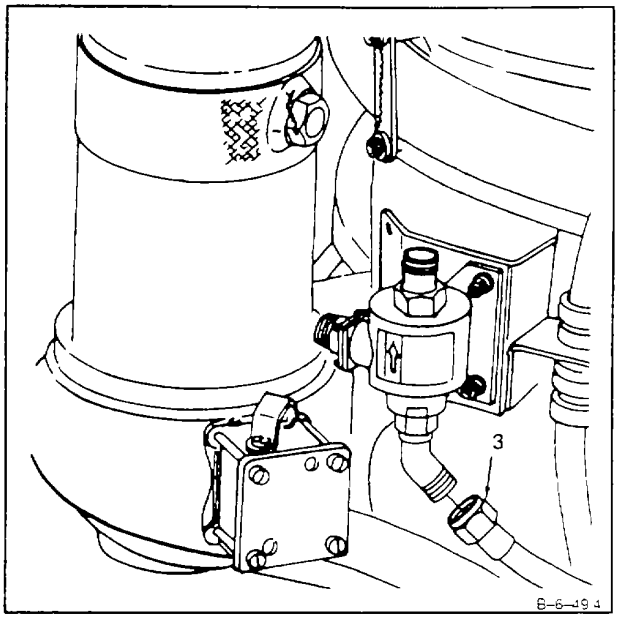
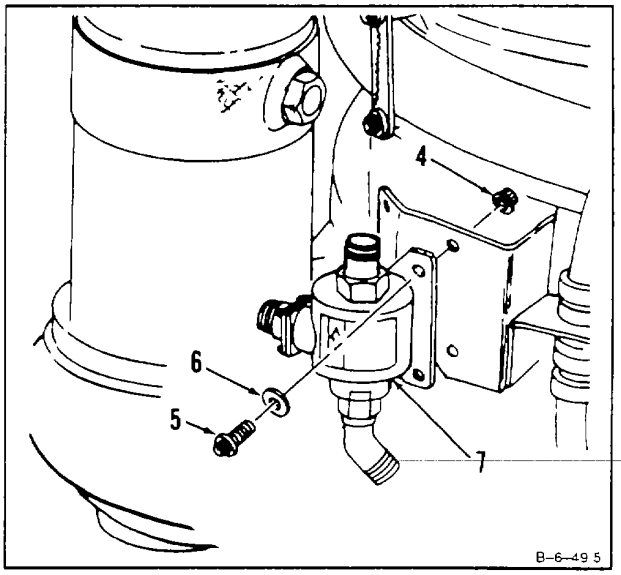
6-57 REMOVE STARTING FUEL SOLENOID VALVE (Continued) 6-57

3. **Disconnect hose assembly (3).**



4. **Remove** two nuts (4), bolts (5), washers (6), and **starting fuel solenoid valve (7)**



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-58 CLEAN STARTING FUEL SOLENOID VALVE 6-58

INITIAL SETUP

Applicable Configurations:

All

Tools:

None

Materials:

Dry Cleaning Solves (E19)
Gloves (E24)
Lint-Free Cloth (E30)

Personnel Required:

Aircraft Powerplant Repairer

Equipment Condition:

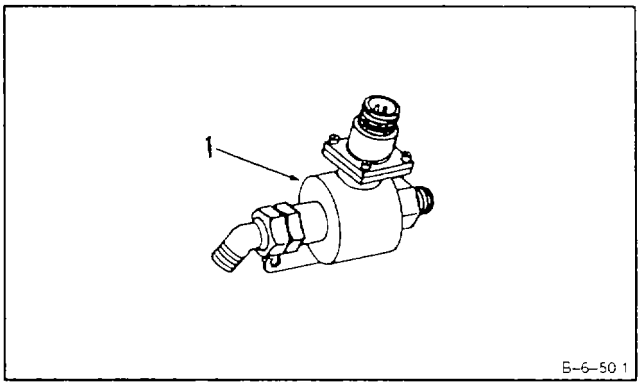
Off Engine Task
Starting Fuel Solenoid Valve Removed (Task 6-57)

General Safety Instructions:

WARNING

Dry cleaning solvent (El9) 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. Wear gloves (E24) Clean starting fuel solenoid valve (1) with clean, lint-free cloth dampened in dry cleaning solvent (E19).



FOLLOW-ON MAINTENANCE

Inspect Starting Fuel Solenoid Valve (Task 6-59)

END OF TASK

6-59 INSPECT STARTING FUEL SOLENOID VALVE 6-59

INITIAL SETUP

Applicable Configurations:
All

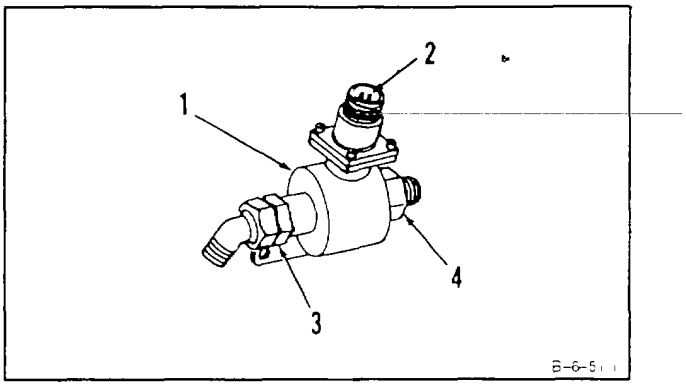
Tools:
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials.
None

Personnel Required:
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

1. Inspect starting fuel solenoid valve (1).
   a. There shall be no cracks
   b. Pins (2) shall not be broken or bent
   c. There shall be no corrosion on pins (2)
   d. Fittings (3 and 4) shall not be loose If fittings are loose, tighten fittings



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-60 REPAIR STARTING FUEL SOLENOID VALVE 6-60

INITIAL SETUP

Applicable Configurations:
All

Tools:
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Goggles
Dry, Compressed Air Source

Materials:
Crocus Cloth (E16)

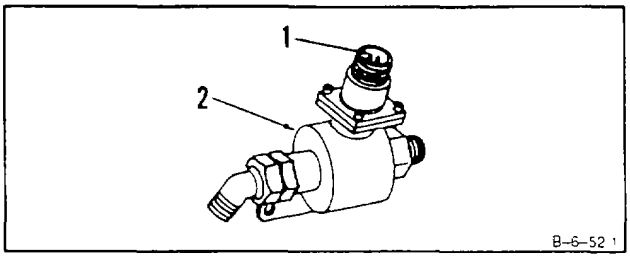
Personnel Required:
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

Equipment Condition:
Off Engine Task

NOTE

This repair is allowed provided it does not cause pins to break or crack

1. **Straighten bent pins (1)** of starting fuel solenoid valve (2) Using long-nose pliers, gently move pins (1) until they are straight

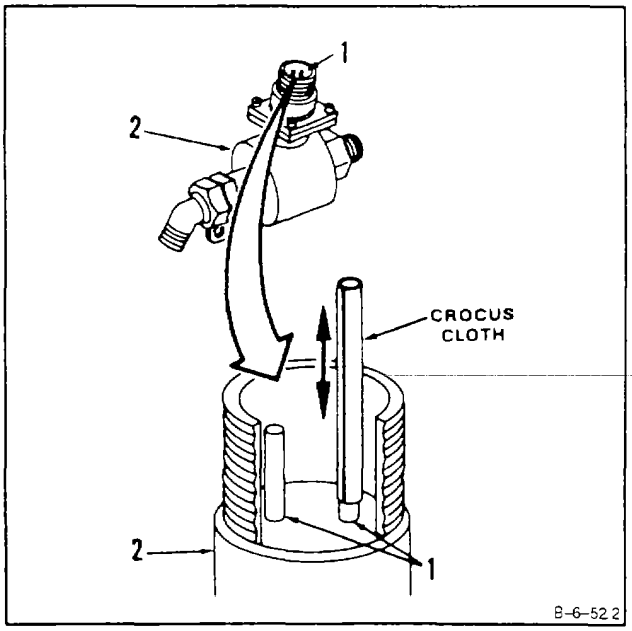


2. **Remove corrosion from pins (1)** of starting fuel solenoid valve (2) Polish pins, using in and out motion over entire length of pin until corrosion is removed Use crocus cloth (E16)

WARNING

When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin In case of injury, get medical attention.

3. Wear goggles. **Remove loosened particles** from pins (1), using clean, dry, compressed air



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

6-61 INSTALL STARTING FUEL SOLENOID VALVE 6-61

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:

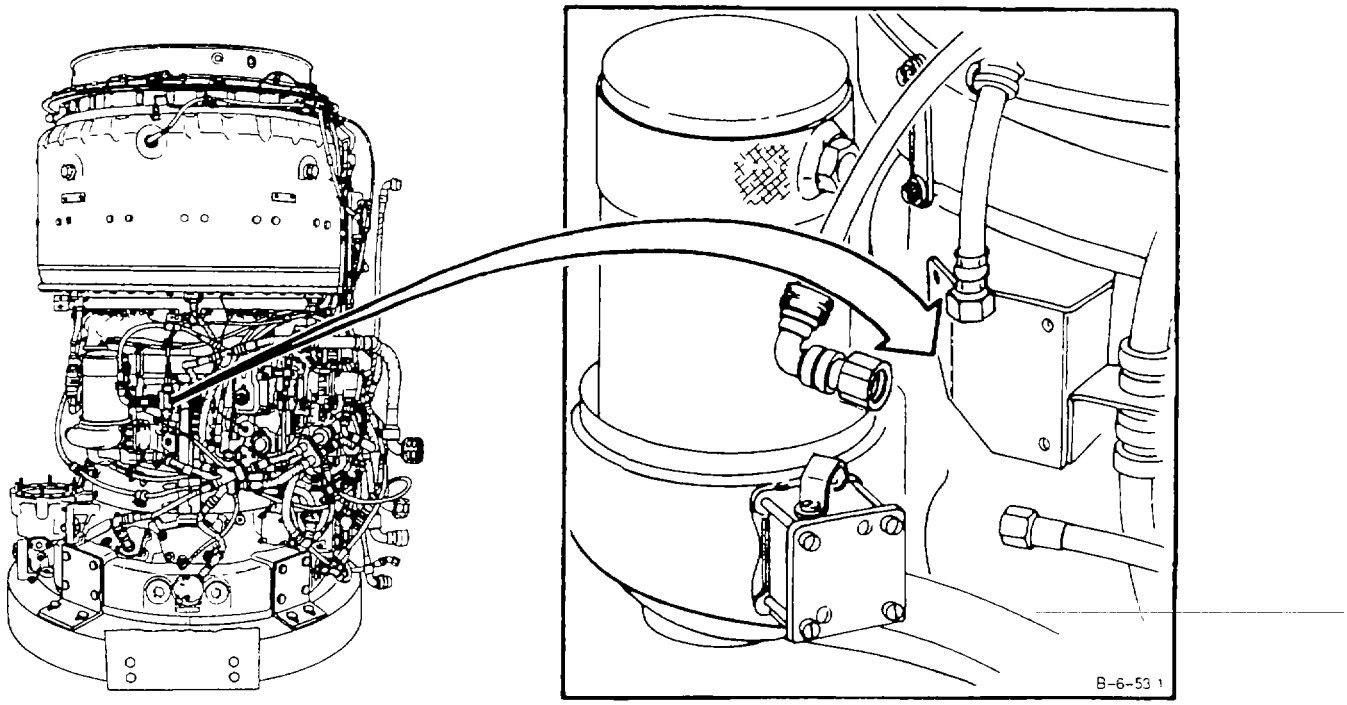
Lockwire (E33)
Packing

Personnel Required:

Aircraft Powerplant Repairer
Aircraft Powerplant Inspector

References:

TM 1-2840-252-23P



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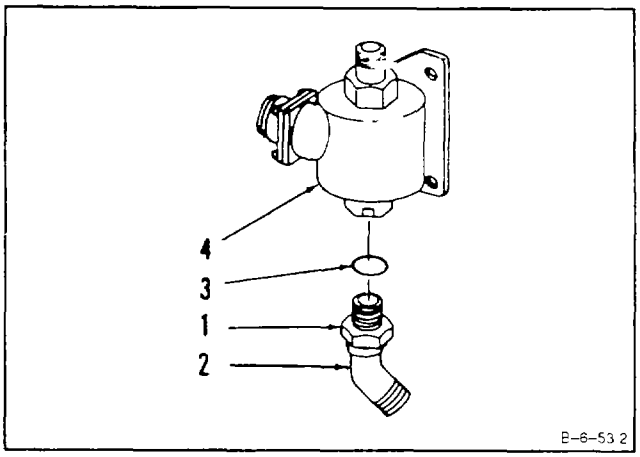
6-61 INSTALL STARTING FUEL SOLENOID VALVE (Continued) 6-61

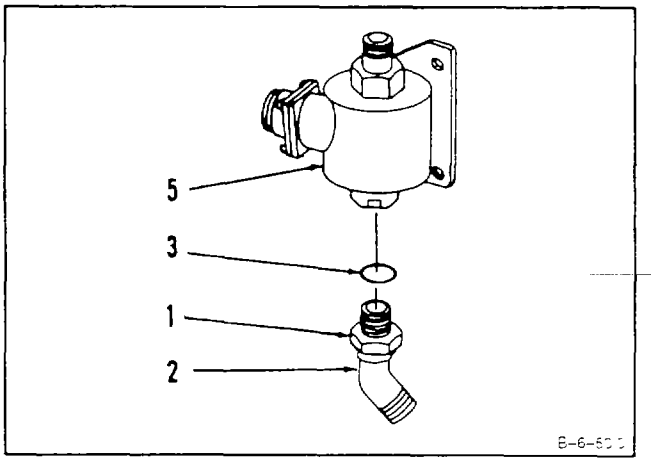
NOTE

If starting fuel solenoid valve is a replacement, do steps 1 and 2 If same starting fuel solenoid that was removed is to be installed, omit steps 1 and 2

1. Loosen nut (1), and **remove elbow (2)**and packing (3) **from removed starting fuel solenoid valve (4).**



2. **Install elbow (2)**and packing (3) **in serviceable starting fuel solenoid valve (5).**Position elbow (2) as shown and tighten nut (1)



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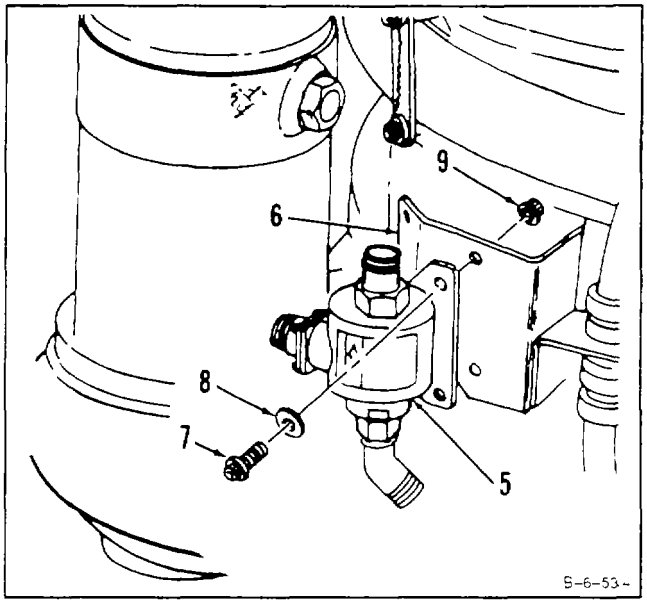
6-61 INSTALL STARTING FUEL SOLENOID VALVE (Continued) 6-61

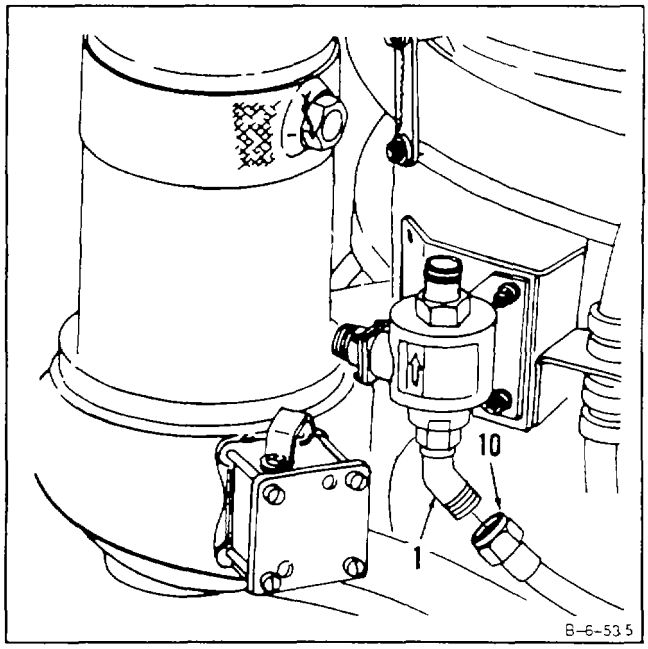
NOTE

It may be necessary to gently pry mounting bracket outward to install mounting hardware

3. **Install starting fuel solenoid valve (5) on bracket (6)** Install two bolts (7), two washers (8), and two nuts (9)



4. **Connect hose assembly (10)** to elbow (1)



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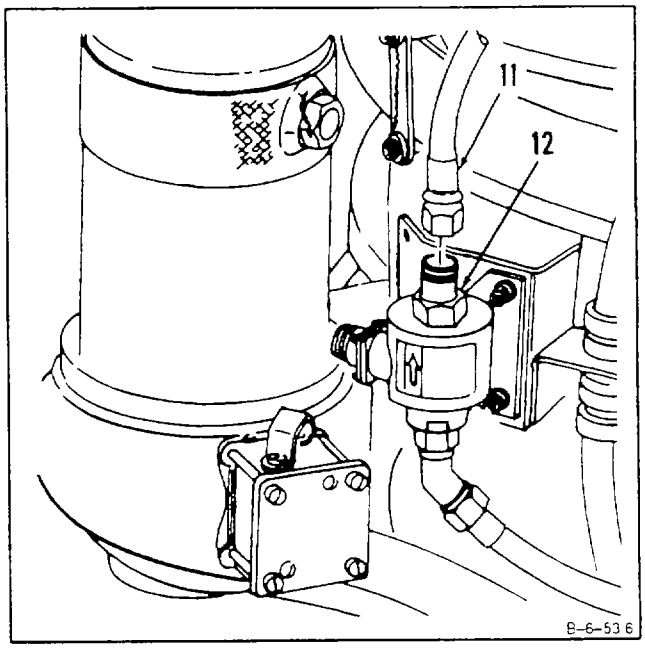
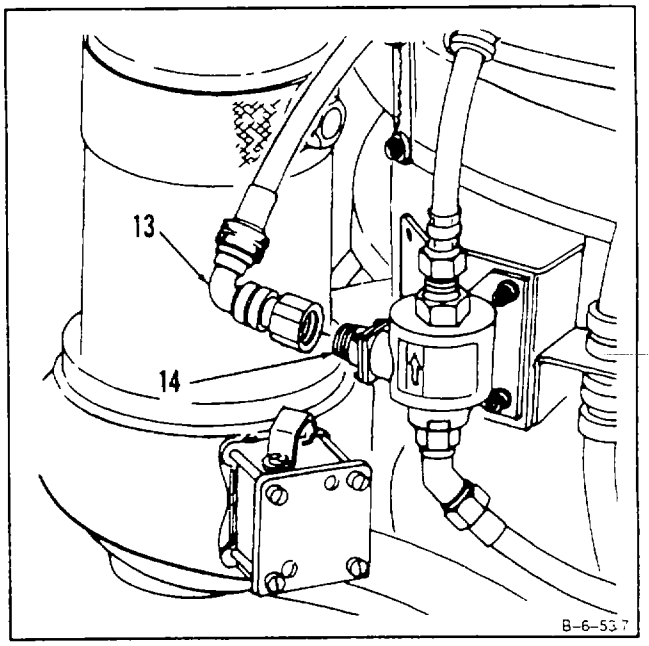
5. **Connect hose assembly (11)** to valve (12)



NOTE

It may be necessary to gently pry mounting bracket outward to install electrical connector

6. **Connect electrical connector (13)** to connector (14)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

SECTION XV

FUEL LINES

6-62 REMOVE HOSE ASSEMBLY (OIL COOLER TO IN-LINE FUEL FILTER) 6-62

INITIAL SETUP

Applicable Configurations:

All

Tools:-

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Container, 1 Quart

Materials:

Wiping Rag (E64)

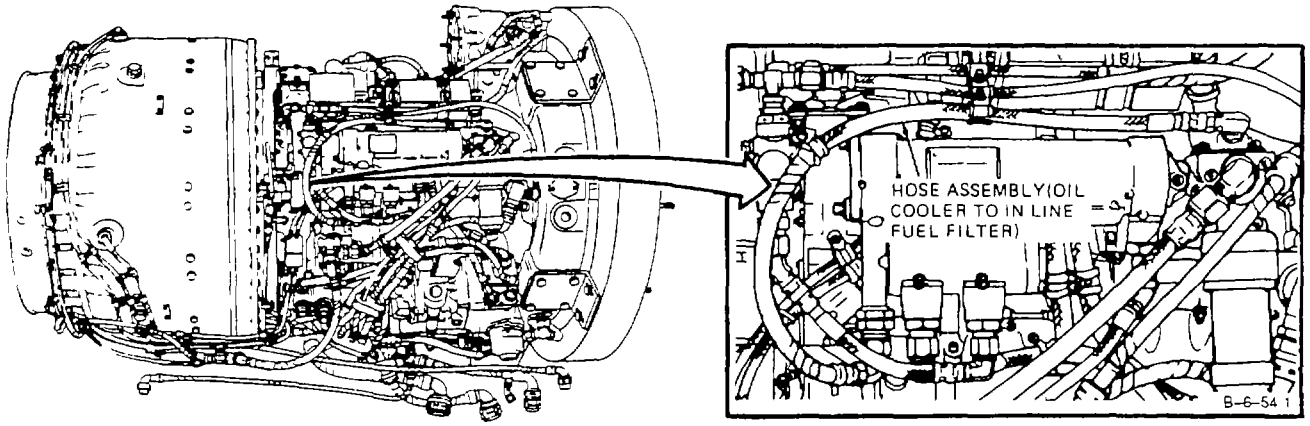
Personnel Required:

Aircraft Powerplant Repairer

General Safety Instructions:

WARNING

Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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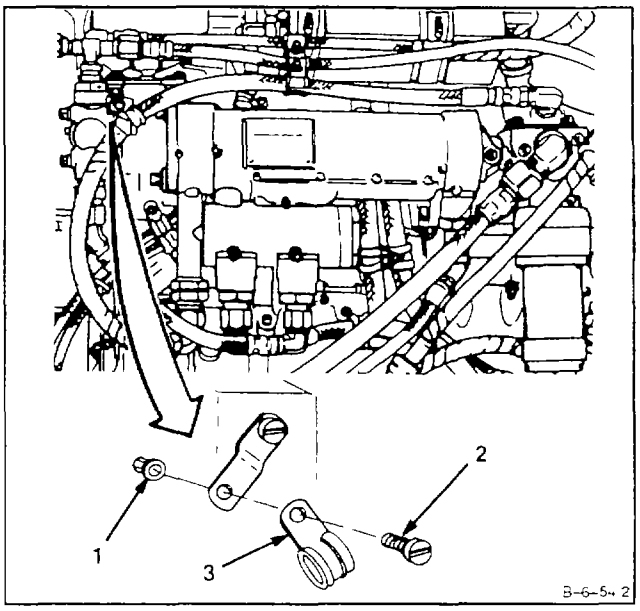
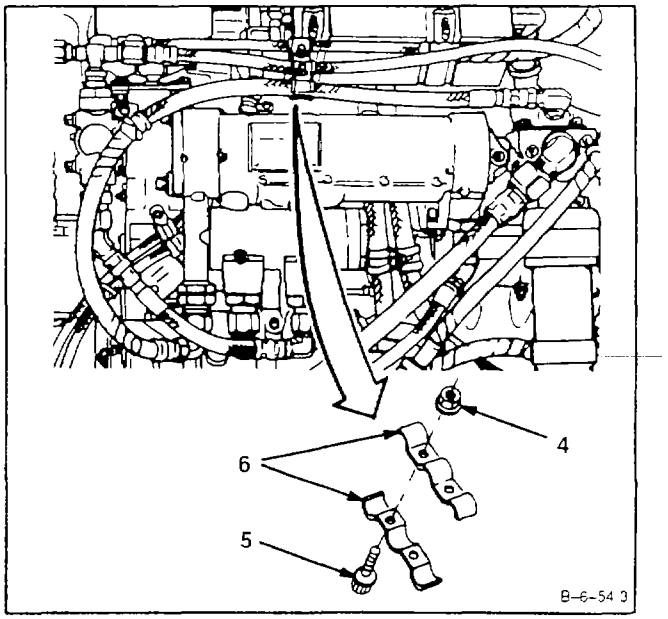
6-62 REMOVE HOSE ASSEMBLY (OIL COOLER TO IN-LINE FUEL FILTER) (Continued) 6-62

1. **Remove** nut (1), screw (2), and **clamp (3).**



2. **Remove** two nuts (4), two screws (5), and **bracket assembly (6)**



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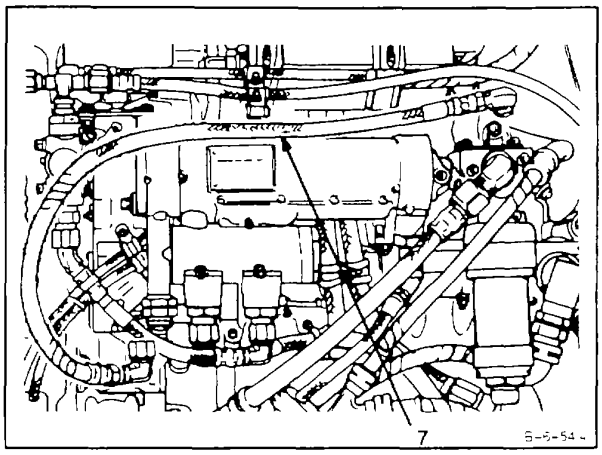
6-62 REMOVE HOSE ASSEMBLY (OIL COOLER TO IN-LINE FUEL FILTER) (Continued) 6-62

3. **Disconnect and remove hose assembly (7).**



FOLLOW-ON MAINTENANCE
None

END OF TASK

6-63 INSTALL HOSE ASSEMBLY (OIL COOLER TO IN-LINE FUEL FILTER) 6-63

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

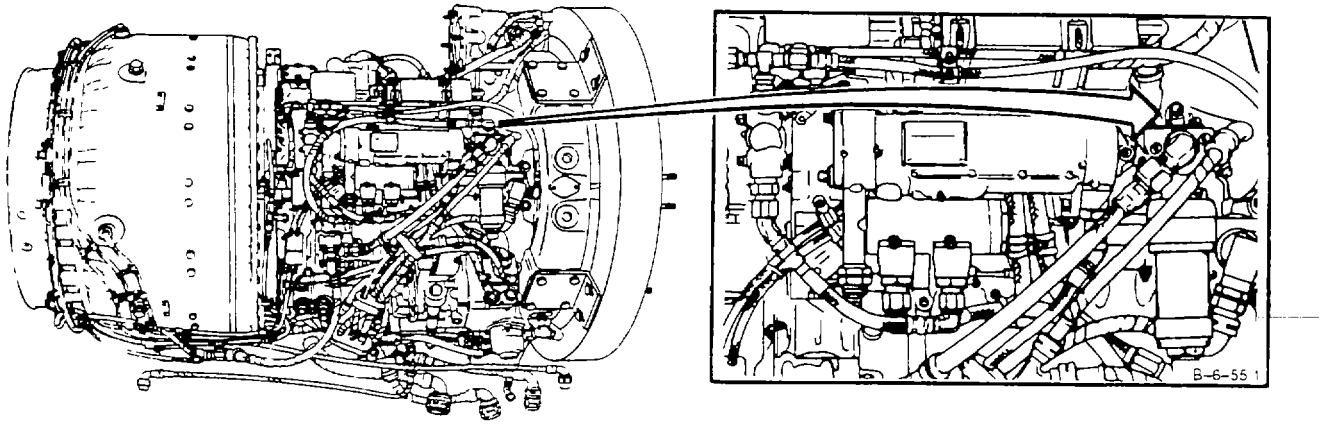
Technical Inspection Tool Kit,
NSN 5180-00-323-5114

Materials:

None

Personnel Required:

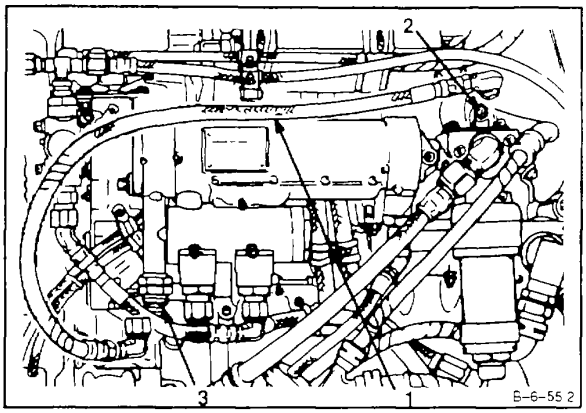
Aircraft Powerplant Repairer
Aircraft Powerplant Inspector



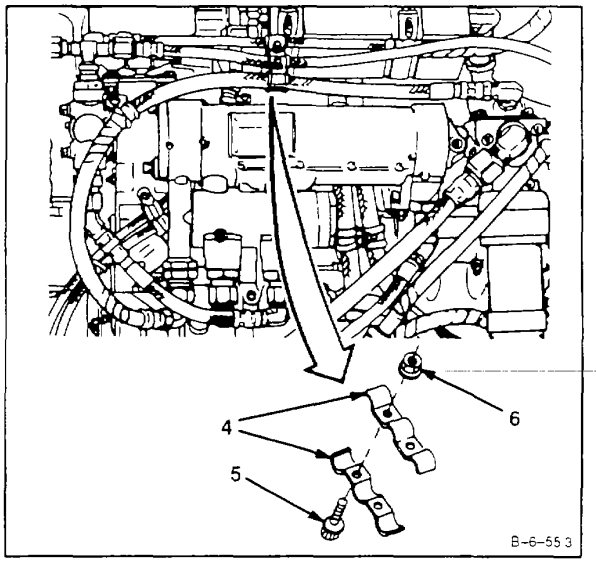
GO TO NEXT PAGE

6-63 INSTALL HOSE ASSEMBLY (OIL COOLER TO IN-LINE FUEL FILTER) (Continued) 6-63

1. **Install hose assembly (1)** on flange elbow (2) and nipple (3)



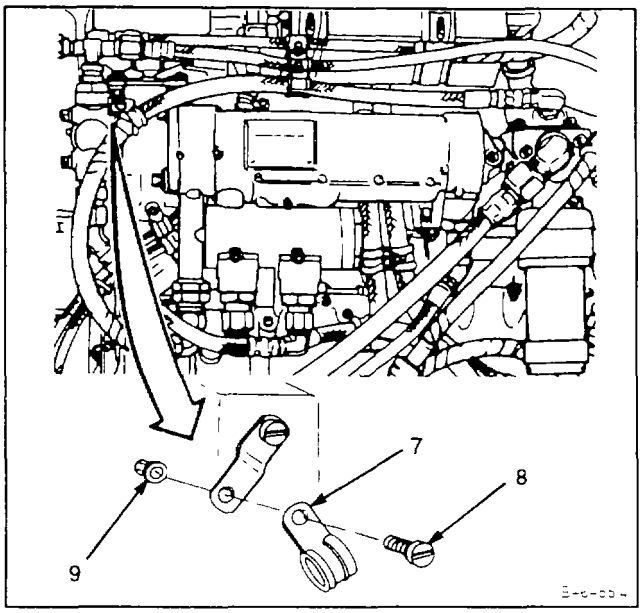
2. **Install bracket assembly (4),** two screws (5), and two nuts (6)



GO TO NEXT PAGE

6-63 INSTALL HOSE ASSEMBLY (OIL COOLER TO IN-LINE FUEL FILTER) (Continued) 6-63

3. **Install clamp (7),**screw (8), and nut (9)



INSPECT

FOLLOW-ON MAINTENANCE
None

END OF TASK

By Order of the Secretary of the Army

GORDON R SULLIVAN
General, United States Army
Chief of Staff

Official
MILTON H HAMILTON
Administrative Assistant to the
Secretary of the Army
07770

DISTRIBUTION:
To be distributed in accordance with DA Form 12-31-E, block no 3466, requirements for TM 1-2840-252-23-2.

U.S. GOVERNMENT PRINTING OFFICE: 1995-655-121/20011

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@wherever.army.mil>
To: 2028@redstone.army.mil

Subject: DA Form 2028

1. ***From:*** Joe Smith
2. *Unit:* home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19–OCT–93
8. ***Pub no:*** 55–2840–229–23
9. ***Pub Title:*** TM
10. ***Publication Date:*** 04–JUL–85
11. *Change Number:* 7
12. *Submitter Rank:* MSG
13. ***Submitter FName:*** Joe
14. *Submitter MName:* T
15. ***Submitter LName:*** Smith
16. ***Submitter Phone:*** 123–123–1234
17. ***Problem:*** **1**
18. *Page:* 2
19. *Paragraph:* 3
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS

For use of this form, see AR 25–30; the proponent agency is ODISC4.

Use Part II (*reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)

DATE: 8/30/02

TO: (*Forward to proponent of publication or form)(Include ZIP Code)*
Commander, U.S. Army Aviation and Missile Command
ATTN: AMSAM–MMC–MA–NP
Redstone Arsenal, AL 35898

FROM: (*Activity and location)(Include ZIP Code)*
MSG, Jane Q. Doe
1234 Any Street
Nowhere Town, AL 34565

PART 1 – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9–1005–433–24	16 Sep 2002	Organizational, Direct Support, And General Support Maintenance Manual for Machine Gun, .50 Caliber M3P and M3P Machine Gun Electrical Test Set Used On Avenger Air Defense Weapon System

ITEM NO.	PAGE NO.	PARA–GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON
1	WP0005 PG 3		2			Test or Corrective Action column should identify a different WP number.

EXAMPLE

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/ AUTOVON, PLUS EXTENSION	SIGNATURE
MSG, Jane Q. Doe, SFC	788–1234	

TO: (*Forward direct to addressee listed in publication*)	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**
Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM–MMC–MA–NP Redstone Arsenal, AL 35898	MSG, Jane Q. Doe 1234 Any Street Nowhere Town, AL 34565	8/30/02

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

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.*)

EXAMPLE

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
MSG, Jane Q. Doe, SFC	788–1234	

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25–30; the proponent agency is ODISC4.	Use Part II (*reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)	DATE
TO: (*Forward to proponent of publication or form)(Include ZIP Code)* Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM–MMC–MA–NP Redstone Arsenal, AL 35898	FROM: (*Activity and location)(Include ZIP Code)*	

PART 1 – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TM 1–2840–252–23–2	1 December 1994	Engine, Gas Turbine Model T55–L–714

ITEM NO.	PAGE NO.	PARA–GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON

** Reference to line numbers within the paragraph or subparagraph.*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/ AUTOVON, PLUS EXTENSION	SIGNATURE

TO: (*Forward direct to addressee listed in publication*) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM–MMC–MA–NP Redstone Arsenal, AL 35898	**FROM:** (*Activity and location) (Include ZIP Code)*	**DATE**

PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TM 1–2840–252–23–2	1 December 1994	Engine, Gas Turbine Model T55–L–714

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

USAPA V3.01

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 073437-000