

TECHNICAL MANUAL

**AVIATION UNIT AND
AVIATION INTERMEDIATE
MAINTENANCE MANUAL**

**ENGINE, GAS TURBINE
MODEL T55-L-712
NSN 2840-01-030-4890**

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26 APRIL 1983

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NO. 10

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Aviation Unit and Aviation intermediate
Maintenance Manual

**ENGINE, GAS TURBINE
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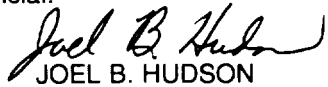
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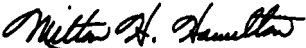
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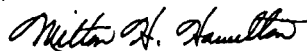
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WARNING AND FIRST AID DATA

Warnings, cautions and notes emphasize important and critical instructions. They are defined as follows:

WARNING

An operating procedure or practice which, if not correctly followed, will result in personnel injury or loss of life.

CAUTION

An operating procedure or practice which, if not strictly observed, will result in damage or destruction of equipment.

NOTE

An operating procedure or condition which it is essential to highlight.

Personnel performing instructions involving operations, procedures, materials, and practices which are included or implied in this technical manual shall observe the following instructions. Disregard of these warnings and precautionary information can cause serious injury or death. Refer to FM 21-11 for first aid data to treat injuries resulting from working on the engine.

WARNING

Fuels

- 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.

WARNING

Lubricating Oils

- 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

WARNING

Dangerous Voltages

- 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 finger or metal objects.
- Discharge exciter only with insulated screwdriver.
- In case of shock or injury, get medical attention.

Discharging Ignition Exciter

- 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.

WARNING**Compressed Air**

- 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.

WARNING**Corrosion Preventive Compounds**

- These materials are flammable and toxic.
- Use only in well-ventilated area away from heat, sparks and open flames.
- If swallowed, do not induce vomiting. Get medical attention.
- In case of contact immediately flush skin and eyes with water for 15 minutes. Get medical attention for eyes.

WARNING**Cleaning Solvents**

- These materials are flammable and toxic. They can irritate skin and cause burns.
- Use only in well-ventilated area, away from heat, sparks and open flame.
- In case of contact, immediately flush skin and eyes with water for at least 15 minutes. Get medical attention for eyes.

WARNING

Handling of Heated Parts

- Wear asbestos gloves when handling heated parts for assembly and disassembly. Failure to comply may cause severe burns.
- Get medical attention for burns.

WARNING

Handling of Parts Treated with Dry Ice

- Dry ice is very cold. It can cause severe burns.
- Wear approved protective equipment and handle only in well-ventilated areas. Get medical attention for burns.

WARNING

Handling of Spring Loaded Parts

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

WARNING

Nitric Acid

- Both nitric acid and its vapors are a personnel hazard.
- Avoid contact with skin, eyes or clothing. Avoid inhalation of vapors.
- In case of contact, immediately flush skin and eyes with water for at least 15 minutes. Get medical attention.

WARNING**Handling Engine Shipping Container**

- Be careful when working with engine shipping container. Make sure both sections of container are grounded.
- Make sure container is opened in well-ventilated area. Failure to do so could result in explosion.
- Shipping container is pressurized. Make certain that all air pressure has been released before removing valve stem or loosening nuts. If nuts are removed before pressure is released, internal pressure could blow cover off and cause serious injury.
- If injury occurs, get medical attention.

WARNING**Handling of Skimming Maintenance Kit**

- Contact with skimming maintenance kit rotating parts could cause injury. Exposure to maintenance kit noise may cause ringing in ears, and temporary or permanent hearing loss.
- Keep hands and clothing away from rotating parts and wear approved hearing protection.
- If injury occurs, or ringing in ears or loss of hearing persists, get medical attention.

WARNING**Sodium Bichromate**

- Sodium bichromate is highly toxic, do not take internally.
- Use only with adequate ventilation. Avoid prolonged or repeated contact with skin.
- Wear approved gloves and goggles, or face shield and apron, and wash hands thoroughly after handling.
- Wear respirator if sodium bichromate is in powdered form.
- In case of contact, immediately flush skin and eyes with water for at least 15 minutes. Get medical attention.

WARNING

Welding Operations

- 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.

WARNING

Use of Engine Maintenance Sling

- Inspect sling prior to use for signs of abuse or wear, Failure to comply may cause injury to personnel and/or damage to engine.
- When using sling, make sure hoist lifting capacity is 1200 pounds.
- In case of injury get medical attention.

WARNING

Power Grinding

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

WARNING**Handling Torque Multiplier**

- 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 may damage unit and injure personnel.
- Do not change ratchet selector when torque load is on torque pack.
- If injury occurs, get medical attention.

WARNING**Flight Safety Critical Aircraft Parts (FSCAP)**

The T-55 flight safety critical aircraft parts inclusion in this manual will be restricted to the flight safety critical aircraft parts section, including Table 1. Warnings will not be included throughout the manual. Flight safety critical aircraft parts require special handling during maintenance and compliance to all maintenance procedures are mandatory.

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WASHINGTON, D.C., 26 April 1983

Aviation Unit and Aviation Intermediate
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ENGINE, GAS TURBINE, MODEL T55-L-712
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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 or 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 Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. You may also submit your recommended changes by E-mail directly to <mpmt%avma28@st-louis-emh7.army.mil>. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

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HOW TO USE THIS MANUAL

OVERVIEW

This information gives a general description of the entire manual and how to use it along with the repair parts and special tools list (TM 55-2840-254-23P). If you cannot find information, you cannot do the job. Learning how to use this manual can help. Check how the manual is put together and how its system works.

1. DESCRIPTION OF MANUAL

This manual has nine chapters and six appendixes. Each chapter is divided into sections. Each section in Chapter 1 is divided into paragraphs or tasks. Each section in Chapters 2 thru 9 is divided into tasks. The tasks tell you what you need and how to do any job. The paragraphs have specific information you will need to know. The appendixes have general information you will need to know. They list references, expendable supplies and materials etc.

A. Chapters. Chapters divide the manual into usable engine maintenance groups. They align with standard groupings shown in the MAC chart. Refer to Appendix B.

B. Sections Sections divide the chapters into smaller groups. They have information about the components of parts for which the chapter is titled. They align with components shown in the MAC chart. Refer to Appendix B.

C. Paragraphs/Tasks. Paragraphs make up some of the sections in Chapter 1. They contain specific information about the engine. Tasks make up some of the sections in Chapter 1 and the sections in Chapters 2 thru 9. It is the tasks that have the information you need to do any job. The upper heading after the task number is the task name. It tells the job to be done in the task. The task heading at the top of each page specifies the task to be performed and the lowest maintenance level authorized to perform that task. Tasks to be accomplished by the Aviation Intermediate Maintenance level only will be reflected by the term (AVIM) at the end of the task heading. If the term (AVIM) is not at the end of the task heading, then either the Aviation Unit or Aviation Intermediate Maintenance (AVUM) or (AVIM) level can accomplish that task. All paragraphs and tasks are numbered. This helps you find what you need when you need it. **USE THE INDEX TO FIND THE PARAGRAPH OR TASK YOU NEED. DO NOT USE PAGE NUMBERS.** Paragraphs and tasks are numbered as follows:

(1) Two-element numbers are used as shown in the examples:

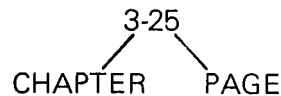


(2) The first number is the number of the chapter. The second number is the paragraph or task in that chapter. The two elements are separated by a dash.

HOW TO USE THIS MANUAL (Continued)

D. Page Numbers. Pages are numbered by order of chapters, from front to back of manual. They are used as follows:

- (1) Two-element numbers are used as shown in the example:



(2) The first number is the number of the chapter. The second number is the page in that chapter.

E. Initial Setup Tables. An initial setup table is the first part of every task in the manual. It lists information you will need to know before you can do the job. How to prepare the work area, what tools will be needed, and other critical information are listed when they apply. The following headings are used when they apply.

(1) Applicable Configuration. If the task does not apply to all engine configurations, different configurations covered by the same procedure will be brought to your attention.

(2) Tools. Tools, tool kits, or shop sets needed to do the task are listed here. If tools from your repairman's tool kit are needed, the kit is listed. Individual tools from your shop set are listed, as needed, by name, type, and size. Tools you need that are not in the kit or set, are listed by name, type, and size. Special tools and test and support equipment are listed by a T-number. Find these items in Table 1-1.

(3) Materials. This heading lists all expendable items and support materials (things you normally use up doing a job). These are things like solvent, rags, grease, safety wire, etc. They are listed by an E-number; example: Grease (E23). Find these items in Appendix C.

(4) Parts. This heading lists all mandatory replacement parts (parts you must replace if you expose or remove them during the task). These are things like gaskets, packings, cotter pins, lockwashers, etc. They are listed by RPSTL nomenclature.

(5) personnel Required. This heading lists the people needed to do the job. They are identified by their MOS. The heading identifies the MOS and the recommended skill level to accomplish the subject task. The assigned skill level should not be construed as the only skill level authorized to accomplish that task. The Maintenance Allocation Chart (MAC) (Ref. Appendix B) assigns maintenance functions to the authorized maintenance level without regard to the MOS skill level. When more than one of any MOS is needed, the number needed is shown in parentheses. The text will tell you when the additional MOS is needed.

(6) References. This heading lists related tasks and TM's you will need to do the job. The task steps tell you when these tasks and TM's are needed.

(7) Equipment Condition. This heading lists all the things to be done before you start the job. To help, the number of the task that tells you how to do them is given when applicable.

HOW TO USE THIS MANUAL (Continued)

NOTE

All tasks covered in this manual are off helicopter tasks. If a task is an off engine task, it will be brought to your attention under "Equipment Condition." Example: "Off Engine Task."

(8) **General Safety Instructions.** Safety precautions that must be observed when you are doing the job are described under this heading. Warnings also include basic first aid instructions.

F. **Locator Illustrations.** When needed (for removal, installation and other procedures) a locator illustration is included on or facing initial setup pages. They show you the area of the engine to be worked on. Parts involved in the task are called out.

G. **Illustration Arrows.** You will find five types of arrows used. They areas shown below:



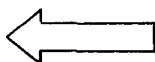
Locator arrow used to show parts that cannot be easily seen or to indicate area of engine being worked on.



Index arrow used to identify parts on artwork.



Direction arrow used to indicate position; i.e., fwd, aft.



Movement arrow used to indicate direction of movement.



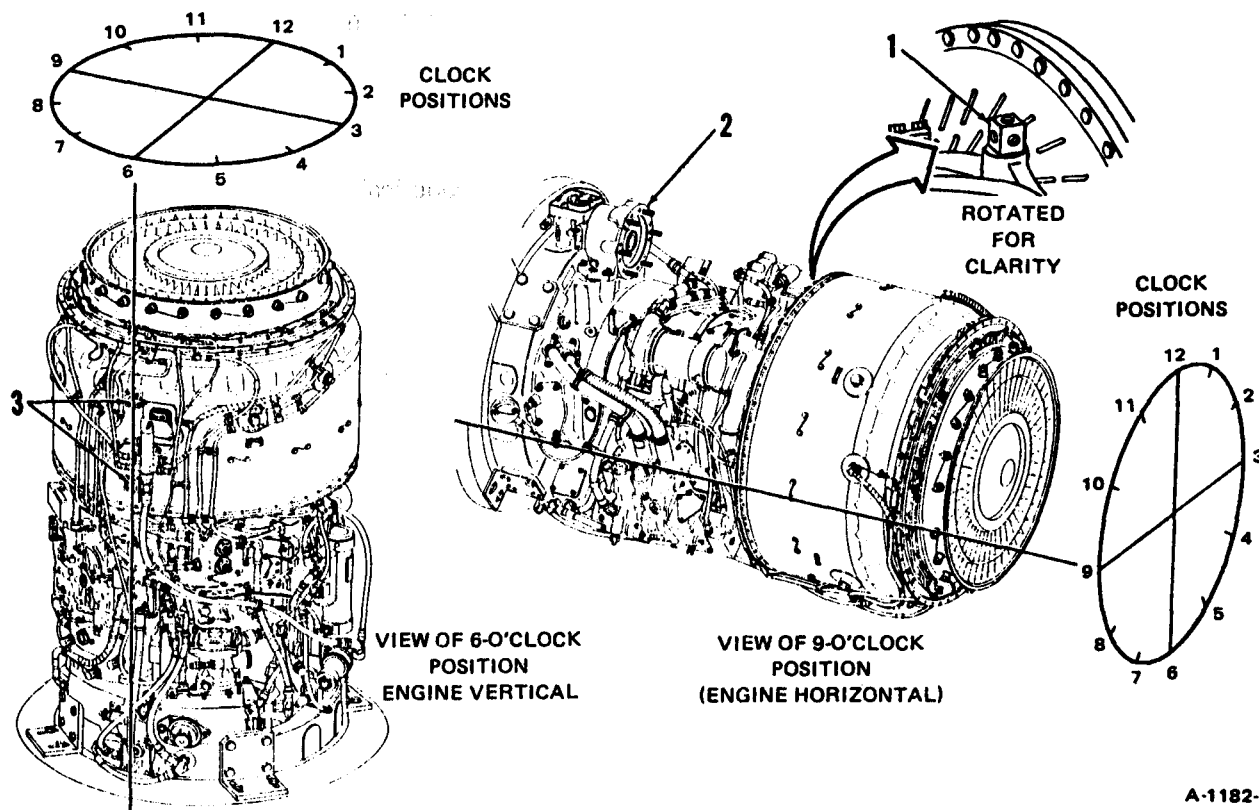
Movement arrow used to indicate direction of rotation.

H. **Procedures.** Step by step procedures tell you how to do the job. They are arranged in logical sequence to help you get the job done efficiently.

HOW TO USE THIS MANUAL (Continued)

I. Use of Clock Positions. Many procedures contain references to or views of clock positions. Comparing engine to face of clock is an easy way to locate specific engine areas. To help find clock positions on the engine, remember the following:

- (1) Clock position is always determined from rear of engine.
- (2) Once a clock position is determined from rear of engine, visualize that clock position along entire length of engine.
- (3) Hoist adapter (1) and starter drive assembly (2) are mounted at the 12-o'clock position.
- (4) Two fuel drain valves (3) are mounted at the 6-o'clock position.
- (5) Some procedures show engine mounted vertical in maintenance stand. This does not change the method for finding clock positions on the engine.



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HOW TO USE THIS MANUAL (Continued)

J. Appendix A - References. This appendix lists all referenced publications needed to perform the maintenance procedures in this manual.

K. Appendix B - Maintenance Allocation Chart (MAC). This appendix consists of four sections as follows:

Section I - Introduction. This section is a summary of what is in the MAC.

Section II. This section is the MAC. The MAC assigns maintenance functions in accordance with the Three Levels of Maintenance concept for Army Aviation. The MAC has six columns, containing the following information:

Columns 1 and 2 - Functional Groups. These columns identify maintenance significant components, assemblies, subassemblies, and modules.

Column 3 - Maintenance Function. This column lists the maintenance functions to be performed on the items listed in column 2.

Column 4 - Maintenance Categories. The maintenance categories (levels) AVUM, AVIM, and DEPOT are listed with individual columns. These columns identify the maintenance level at which each maintenance function is to be performed.

Column 5 - Tools and Equipment. This column lists the reference code identifying the tool or test equipment required, as listed in Section III.

Column 6 - Remarks. Remarks identified by an alphabetical code, where applicable, are listed in Section IV and identified in column 6.

Section III - Tool and Test Equipment Requirements. This section consists of five columns, containing the following information:

Tool or Test Equipment Reference Code. This column lists the reference code listed in Column 5 - Tools and Equipment in the MAC.

Maintenance Category. This column lists the maintenance category (level) authorized to use the tool or test equipment.

Nomenclature. This column lists the nomenclature of the tools and test equipment.

National/NATO Stock Number. This column lists the stock number applicable to each tool or test equipment.

Tool Number. The tool number is listed to aid in identifying the tool or test equipment.

Section IV - Remarks. This section has two columns, containing the following information:

Reference Code. This column contains alphabetical codes or numbers in parentheses corresponding to the codes appearing in the applicable columns in the MAC.

Remarks/Notes. This column contains the actual notes cross-referenced by the reference codes to the MAC.

HOW TO USE THIS MANUAL (Continued)

L. Appendix C - Expendable Supplies and Materials List. This appendix lists all expendable supplies and materials called out in the manual. The following columns are provided.

(1) Item Number. This is the E-number assigned to the expendable item. It is referred to in the detail procedures. Example: "Use cleaning solution (E11)."

(2) National Stock Number. This is the national stock number assigned to the item. Use it to request or requisition the item.

(3) Description. This column lists the Federal name and, if required, a description to identify the item. The last line for each item shows the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

M. Appendix D - Wiring Diagrams. This appendix contains the engine wiring diagram. Use this appendix to help you understand the description of the engine electrical system.

N. Appendix E - Illustrated List of Manufactured Items. This appendix lists and illustrates any parts or tools you may have to make to do a job.

O. Appendix F - Abbreviations. This appendix lists abbreviations you will find in the manual.

P. Glossary. Definitions of terms you find in the manual are listed hereto help you.

Q. Index. This appears at the end of the manual. It lists all subjects in the manual by alphabetical order. Items are listed as follows:

(1) Each paragraph/task number is listed with the subject it applies to:

Example:

	<u>Para./</u>	<u>Page</u>
	<u>Task</u>	
Fuel Boost Pump Assembly		
Clean . . . . .	.6-10	6-42
Inspect . . . . .	.6-11	6-43
Install . . . . .	.6-13	6-48
Package	6-15	6-56
Preserve . . . . .	.6-14	6-55
Remove . . . . .	.6-9	6-39
Repair . . . . .	.6-12	6-44

HOW TO USE THIS MANUAL (Continued)

(2) Some tasks are listed by the job to be done. The subjects or components are listed under them.

Example:

	<u>Para./ Task</u>	<u>Page</u>
Remove		
Accessory Gear Assembly (AVIM)	5-8	5-45
Accessory Gearbox Assembly	5-1	5-3
Air Diffuser Assembly (AVIM)	2-36	2-351
Anti-Icing Air Gallery Cover	2-14	2-51

Check over the index and see how it can work for you. It can make finding information easy.

R. Part Numbers. Part numbers are not listed in this manual except where absolutely needed for clarity. You can find the part number you need in the Repair Parts and Special Tools List (RPSTL) (TM 55-2840-254-23P).

2. HOW TO FIND WHAT YOU NEED

A. General Information (Troubleshooting).

(1) Look at the "INDEX." Find "Symptom Index." The "INDEX" gives the paragraph number for the symptom index. Go to the Symptom Index.

(2) Find your symptom in the "Symptom Index. " Next to the symptom is the page number of the troubleshooting procedure that will help you solve your problem. Turn to the troubleshooting procedure page.

(3) Follow the troubleshooting procedure until you find the problem. The troubleshooting procedure gives you the task number of the maintenance procedure needed to fix the engine. Turn to that task.

(4) Follow the maintenance procedure and complete all work. Check again and make sure you are right. When the job is done, recheck that the trouble has been corrected.

B. Part Numbers. To find a part number go to the RPSTL (TM 55-2840-254-23P). Find the "How To Locate Repair Parts" paragraph in the introduction. It will tell you how to find your part number.

C. Tasks. To find any task, use the "INDEX." Find the subject you want. The "INDEX" gives you the task number you want.

HOW TO USE THIS MANUAL (Continued)

3. HOW TO PREPARE FOR A TASK

Read the initial setup page carefully before starting. It tells you what you will need and what you have to know to start the job. **DO NOT START A JOB UNTIL:**

- You know what is needed
- You have the things you need
- You understand what to do

A. If a tool has a T-number in front of it, go to the Special Tools and Test and Support Equipment List in Table 1-1. Read down the far left-hand column to your T-number. This is the tool you need for your task.

B. If an expendable material has an E-number in front of it, go to the Expendable Supplies and Materials List in Appendix C. Read down the Item Number column to your E-number. This is the expendable you need for your task.

C. If parts are listed, they can be drawn from supply. Before you start the job, check and make sure you can get the needed parts. Part numbers are listed in TM 55-2840-254-23P.

D. Check for personnel required.

E. If preliminary procedures are listed under "Equipment Conditions," **BE SURE THE LISTED JOBS ARE DONE**; then do this job.

4. HOW TO DO THE JOB

Before starting, read the entire task. Familiarize yourself with the entire procedure before you begin the task. As you read, remember the following:

A. PAY ATTENTION TO WARNINGS, CAUTIONS AND NOTES.

B. Always follow standard maintenance practices (Chapter 1, Section XIII).

C. When values are underlined or followed by the word INSPECT, an inspector must OK the completed step.

D. Major steps and key words are printed in bold type for experienced repairers.

E. A GLOSSARY is provided. It lists the special words and terms used in this manual and gives their meaning. Use it. It may help you understand the instructions.

CHAPTER 1 INTRODUCTION AND ENGINE GENERAL

CHAPTER OVERVIEW

This chapter contains standard data and information about forms, records, reports, and general procedures. It also contains descriptions and other data about the engine and its major components. The chapter is divided into the following sections:

SECTION	<u>TITLE</u>	PAGE
I	General Information	1-1
II	Equipment Description and Data	1-3
III	Principles of Operation	1-13
IV	Repair Parts; Special Tools; Test, Measurement, and Diagnostic Equipment (TMDE); and Support Equipment	1-41
V	Service Upon Receipt	1-43
VI	Hoisting	1-109
VII	Troubleshooting	1-119
VIII	Servicing	1-219
IX	Preventive Maintenance Checks and Services	1-239
X	Maintenance Procedures	1-443
XI	Preparation for Storage and Shipment	1-553
XII	Standard Torque Limits	1-623
XIII	Standard Practices and Procedures	1-627

Section I. GENERAL INFORMATION

1-1 SCOPE

Type of Manual:

Aviation Unit and Aviation Intermediate Maintenance Manual

Model Numbers and Equipment Name:

T55-L-712 - Engine, Gas Turbine

Purpose of Equipment:

Powerplant for CH-47 Helicopter

1-2 MAINTENANCE FORMS, RECORDS, AND REPORTS

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

1-3 DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

NOTE

Decision to destroy an engine shall be made by appropriate authority.

Destroy engine to prevent use by enemy when evacuation to safety is not possible. Refer to TM 750-244-1-5

1-4 PREPARATION FOR STORAGE AND SHIPMENT

These requirements, including packaging and storage, are included in Section XI.

1-5 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

■ Refer to FM1-500.

1-6 OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS

The following cross reference list contains nomenclature used in the manual which deviates from official nomenclature.

NOMENCLATURE CROSS-REFERENCE LIST

<u>Common Name</u>	<u>Official Nomenclature</u>
Main Oil Pump	Rotary Pump
In-Line Fuel Filter	Pressure Fluid Filter
Differential Pressure Indicator	Deltadyne Indicator
Centrifugal Impeller	Centrifugal Compressor Rotor
Thermocouple Jumper Lead	Electrical Lead
Output Shaft	Spur Gearshaft
Start Fuel Nozzle	Fuel Injection Nozzle
Starter Gearbox Filter	Lube Oil Jet
Torquemeter Junction Box	Distribution Box
Air Diffuser Assembly	Turbine Diffuser Case
Fuel Boost Pump	Centrifugal Pump
Main Fuel Filter	Filter and Indicator
Scavenge Oil Screen	Strainer Element

1-7 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your T55-L-712 engine needs improvement, let us know. Send us an EIR. You, the user are the only one who can tell us what you do not like about your equipment. Let us know why you do not like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to:

Commander
 USAATCOM
 ATTN: AMSAT-I-MDO
 4300 Goodfellow Blvd.
 St. Louis, MO 63120

We will send you a reply.

1-7.1 FLIGHT SAFETY CRITICAL AIRCRAFT PARTS (FSCAP) PROGRAM

- A. A FSCAP is defined as a part, assembly, or installation procedure with one or more critical characteristics that if not conforming to the design data or quality requirements, could result in serious injury or death to the crew members and/or serious damage to the helicopter.
- B. A critical characteristic is any dimension, tolerance, finish, material, manufacturing, assembly, or inspection process, or other feature which, if not conforming or missing, could cause failure or malfunction of the FSCAP.
- C. Critical characteristics produced during the manufacturing process are termed manufacturing critical characteristics. Critical characteristics not introduced during manufacturing but critical in terms of assembly/installation (e.g. proper torque) are termed installation critical characteristics.
- D. The following identifies parts, assemblies, or installations under the FSCAP Program, requiring special handling during maintenance and lists all current flight safety parts. Parts may not be repairable at field level.

PART NUMBER	NOMENCLATURE
1-300-003-01	Bearing, Ball, Annular
1-300-003-03	Bearing, Ball, Annular
1-300-004-01	Bearing, Ball, Annular
1-300-004-05	Bearing, Ball, Annular
1-300-005	Bearing, Ball, Annular
2-030-007-05	Gearshaft, Spur
2-030-012-02	Gear, Bevel
2-030-014-02	Gear, Bevel
2-030-043-02	Gear, Bevel
2-030-044-02	Gear, Bevel
2-030-070-06	Gear Assembly, Overspeed
2-030-150-04	Gearshaft, Bevel

2-061-093-04	Support Brng No. 3 PT
2-061-280-06	Housing, Inlet
2-070-000-10	Gear Assembly, Accessory
2-070-005-02	Gear, Bevel
2-070-024-04	Gearshaft, Bevel
2-080-000-36	Gearbox, Accessory Drive
2-080-009-04	Spur Power Control Drive Gear
2-080-010-18	Cover and Support
2-080-013-03	Gear, Bevel
2-080-016-02	Gear, Spur
2-080-019-04	Gear, Spur
2-080-020-39	Housing, Gearbox Turbine
2-080-021-06	Gear, Spur
2-080-031-04	Gear, Bevel
2-080-032-02	Gear, Spur
2-080-036-02	Gear, Spur
2-080-043-02	Gear, Cluster
2-080-050-07	Gear, Spur
2-080-058-02	Impeller, Oil Scavenge
2-080-060-07	Gear, Assembly, Accessory
2-080-070-06	Gear, Spur
2-080-089-01	Gearshaft, Spur
2-080-100-02	Gear, Spur
2-080-110-02	Gear, Cluster
2-080-144-01	Gear, Spur
2-080-145-01	Gear, Bevel
2-080-146-01	Shaft, Drive Gear
2-080-147-01	Gear, Bevel
2-080-230-01	Gearshaft, Bevel, Spur
2-080-240-01	Gear-shaft, Bevel
2-080-370-09	Housing, Gearbox, Turbine
2-100-024-08	Blade, Compressor Rotor
2-100-024-10	Blade Set, Turbine
2-100-025-07	Blade, Compressor Rotor
2-100-025-09	Blade Set, Turbine
2-100-026-07	Blade, Turbine Engine
2-100-026-09	Blade Set, Turbine

2-100-027-07	Blade, Compressor Rotor
2-100-027-09	Blade Set, Turbine
2-100-048-16	Vane Assembly, Stator
2-100-042-03	Disk, Axial Compressor
2-100-043-01	Disk, Axial Compressor
2-100-044-01	Disk, Axial Compressor
2-100-045-01	Disk, Axial Compressor
2-100-050-16	Vane, Assembly, Stator
2-100-052-09	Spacer, Compressor Rotor
2-100-053-15	Central Compressor Inducer
2-100-054-19	Central Compressor Impeller
2-100-060-26	Vane Assembly, Stator
2-100-180-17	Rotor, Compressor,
2-100-230-12	Vane Assembly, Stator
2-101-099-01	Nut, Plain, Round
2-101-109-01	Nut, Plain, Round
2-101-210-01	Gear, Bevel
2-101-238-04	Shaft, Compressor Rotor
2-101-244-04	Blade, Compressor Rotor
2-101-244-06	Blade Set, Turbine
2-101-263-02	Disk, Axial Compressor
2-101-321-03	Blade, Compressor Rotor
2-101-321-09	Blade Set, Turbine
2-101-322-03	Blade, Compressor Rotor
2-101-322-05	Blade Set, Turbine
2-101-331-02	Disk, Axial Compressor
2-101-332-02	Disk, Gas Turbine Engine
2-101-580-04	Vane Assembly, Stator
2-101-608-21	Compressor
2-101-790-01	Vane Assembly, Stator
2-101-790-47	Vane Assembly, Stator
2-103-024-03	Spacer, Compressor Rotor
2-103-090-02	Vane Assembly, Stator
2-110-070-25	Case, Gas Turbine Engine
2-121-026-09	Bolt, Externally Relieve
2-121-026-11	Bolt, Externally Relieve
2-121-028-03	Nut, Plain, Round

2-121-051-14	Disk, Turbine
2-121-051-27	Disk, Turbine
2-121-058-18	Disk, Gas Turbine Engine
2-121-071-24	Spacer, Turbine, Gas
2-121-075-10	1st Stage Gas Pro Seal Plate
2-121-078-14	Seal, Air, Gas Turbine
2-121-090-33	Turbine Rotor, Turbine
2-121-100-60	Nozzle, Gas Producer
2-121-110-25	Disc Assy, 2nd Turb Rot Assy
2-121-140-39	Blade, Turbine Engine
2-121-140-40	Blade, Turbine Engine
2-121-140-43	Blade, Turbine Engine
2-121-140-44	Blade, Turbine Engine
2-121-142-09	Blade, Turbine Engine
2-121-142-10	Blade, Turbine Engine
2-121-180-03	Ring, Retaining
2-121-300-44	Nozzle, Turbine, Engine
2-121-310-01	Blade, Turbine Engine
2-121-310-01	Blade, Turbine Engine
2-121-310-02	Blade, Turbine Engine
2-131-162-06	Swirler, Combustor
2-140-103-02	Nut, Plain, Round
2-141-034-36	Blade, Turbine Engine
2-141-034-46	Blade, Turbine Engine
2-141-036-26	Blade, Turbine Engine
2-141-036-51	Blade, Turbine Engine
2-141-036-57	Blade, Turbine Engine
2-141-050-05	Gearshaft, Spur
2-141-057-17	Disk and Hub, Turbine
2-141-120-40	Nozzle Assembly, 3rd Stage
2-141-150-31	Nozzle Assy, 4th Stg Turbine
2-141-170-22	4th Turbine Rotor Assembly
2-141-170-24	4th Turbine Rotor Assembly
2-141-221-01	Cup, Locking, Disk Rear
2-141-222-01	Nut, Retaining, Turbine
2-141-350-05	3rd Turbine Rotor Assembly
2-141-360-04	Shaft, Turbine

2-160-350-15	Actuator Assembly, Internal
2-160-397-02	Shaft. Drive, Fuel B
2-160-398-02	Shaft, Shouldered
2-160-750-02	Cooler Assembly Oil
2-160-790-04	Pump, Centrifugal
2-160-950-29	Manifold Assembly, Fuel
2-160-950-30	Manifold Assembly, Fuel
2-160-950-37	Manifold, Fluid, Aircraft
2-160-950-38	Manifold, Fluid, Aircraft
2-161-620-24	Fuel Control, Main, Turbine
2-161-620-68	Fuel Control, Main, Turbine
2-200-070-23	Parts Kit, Torquemeter
2-300-005	Bearing, Roller, Cylinder
2-300-009	Bearing, Ball, Annular
2-300-009-02	Bearing, Ball, Annular
2-300-016-03	Bearing, Ball, Annular
2-300-017-01	Bearing, Ball, Annular
2-300-022-01	Bearing, Ball, Annular
2-300-023	Bearing, Ball, Annular
2-300-023-02	Bearing, Ball, Annular
2-300-024	Bearing, Ball, Annular
2-300-031	Bearing, Ball, Annular
2-300-034-01	Bearing, Roller, Cylinder
2-300-035-01	Bearing, Roller, Cylinder
2-300-056-02	Bearing, Roller, Cylinder
2-300-059-01	Bearing, Ball, Duplex
2-300-064-01	Bearing, Ball, Duplex
2-300-242-01	Hose Assembly, Nonme
2-300-384-01	Pump, Rotary
2-300-908-01	Flow Divider, Fuel
2-300-933-02	Bearing, Ball, Annular
2-300-934	Bearing, Ball, Annular
2-300-934-01	Bearing, Ball, Annular
2-300-935	Bearing, Ball, Annular
2-300-935-01	Bearing, Ball, Annular
2-300-941-01	Bearing, Ball, Annular
2-300-973-01	Seal, Intershaft Dble Pos

2-310-086-01	Thermocouple, Immers
2-310-087-01	Thermocouple, Immers
2-310-088-01	Thermocouple, Immers

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

Engine characteristics, capabilities, and features are as follows:

CHARACTERISTICS

- Manufacturer ALLIED SIGNAL
Phoenix, AZ
- Model T55-L-712
- Type Free power turbine, two stage
- Dimensions
Overall Length 48.53 inches
Nominal Diameter 28.72 inches
- Weight (Dry) 750 Pounds (Approximate)
- Type Fuel MIL-T-5624 (Grade JP-4,
Alternate JP-5 or JP-8)

- Type Oil MIL-L-23699 or MIL-L-7808

- Rotational Directions
 - Compressor Rotor Counterclockwise
 - First Turbine Rotor Disc Counterclockwise
 - Second Turbine Rotor Disc Counterclockwise
 - Output Shaft Clockwise
 - Power Turbine Shaft Clockwise
 - Third Turbine Rotor Disc Clockwise
 - Fourth Turbine Rotor Disc Clockwise

CAPABILITIES AND FEATURES

- Combustion Chamber External Annular

- Compressor Ratio 8 to 1

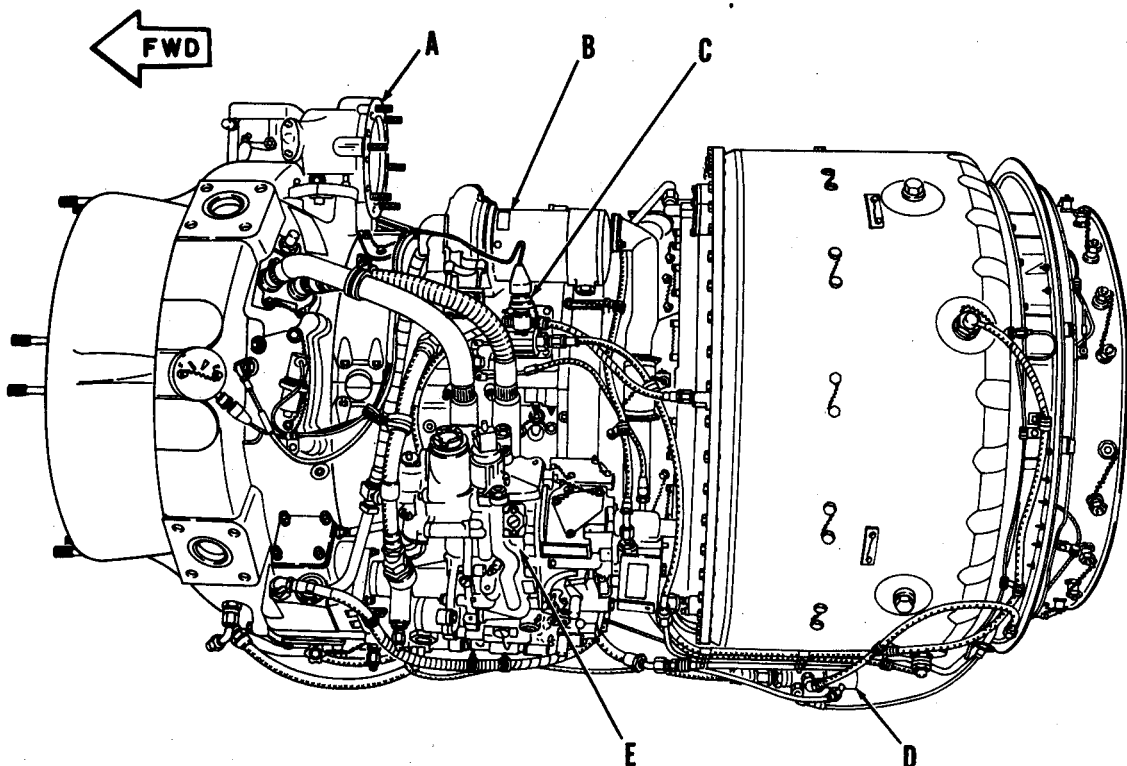
- Horsepower (Military) 3750

- Maximum Altitude 25,000 Feet

1-9 LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

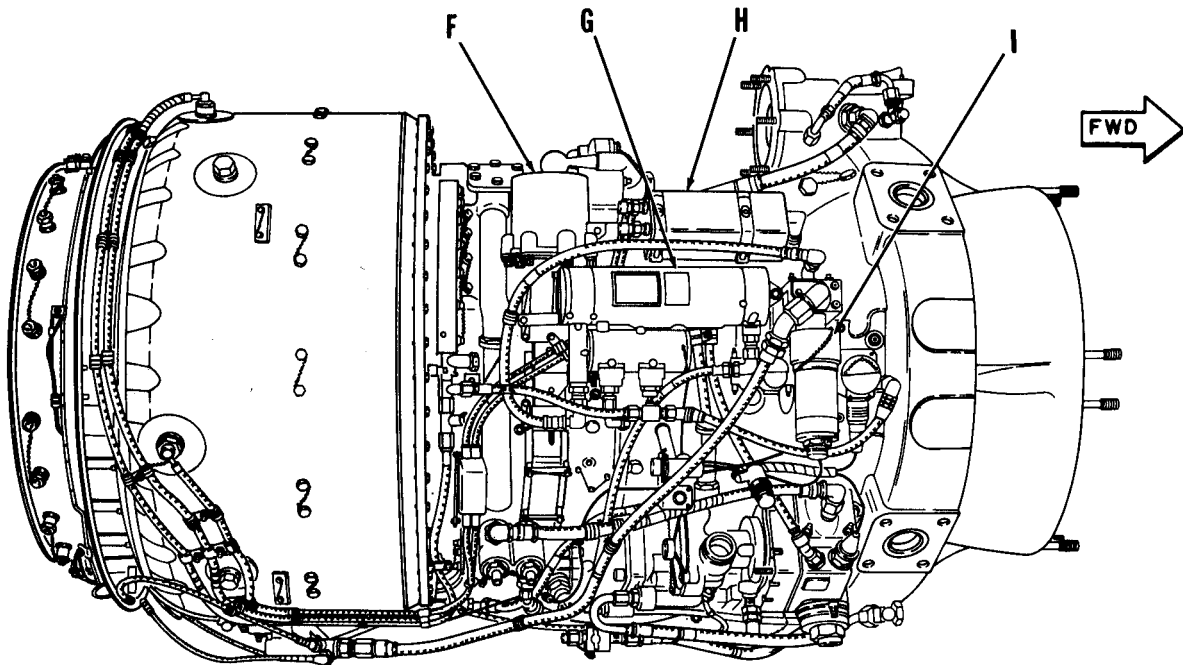
Get to know your engine. The major components are listed and keyed in the following diagrams.

- A STARTER DRIVE ASSEMBLY. Mounts at the 12-o'clock position on the inlet housing and provides the mounting pad for the starter. Internally connects to a shaft which is connected by gearing to the compressor rotor.
- B MAIN FUEL FILTER. Filters fuel prior to delivery to the engine fuel control. Provides a visual indication when it is close to bypassing its element because of clogging.
- C STARTING FUEL SOLENOID VALVE. Controls fuel flow to the starting fuel primer tube and start fuel nozzles. Activated by airframe-mounted switch.
- D FLOW DIVIDER. Mounts at the bottom of the combustion section. Divides fuel flow from in-line fuel filter into primary and secondary flows to the main fuel manifolds.
- E FUEL CONTROL. Mounts on the accessory drive gearbox. Is a hydromechanical device containing a fuel pump, gas producer and power turbine speed governors, an acceleration and deceleration control, an air-bleed signal mechanism, and a fuel shutoff valve.



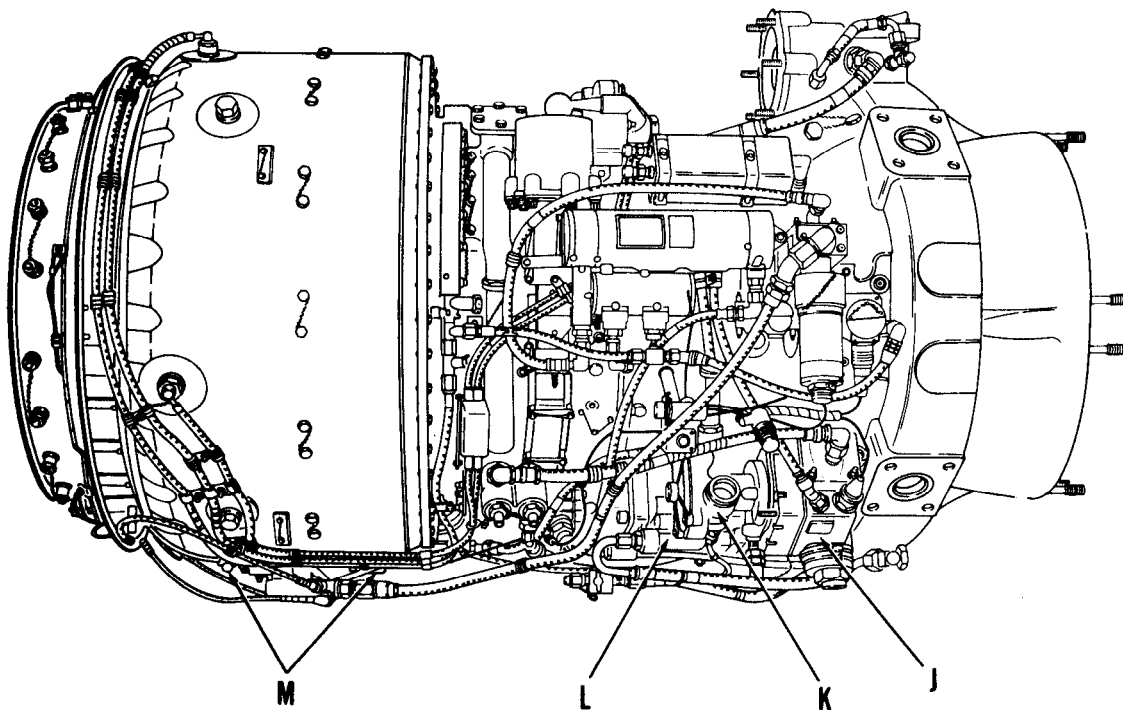
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- F INTERSTAGE AIR-BLEED ACTUATOR. Pneumatic device that mounts on the compressor housing. Connects mechanically to compressor bleed band. Opens and closes bleed band on input signal from fuel control.
- G OIL COOLER. Mounts on interstage air-bleed actuator and by bracket to compressor housing. Uses fuel flowing through passages surrounding oil paths to absorb heat from the oil. Connects in fuel system between the fuel control and the in-line fuel filter. Connects in oil system between the main oil filter and certain major bearing filters and strainers.
- H IGNITION EXCITER. Mounts on brackets secured to compressor housing. Connected electrically to spark igniters by coil and cable assembly. Contains a vibrator transformer which converts low voltage to high voltage.
- I IN-LINE FUEL FILTER. Mounts on bracket on inlet housing. Provides final fuel filtering prior to delivery to the main fuel manifolds. Contains a paper filter element. Provides a visual indication when it is close to bypassing its element because of clogging.



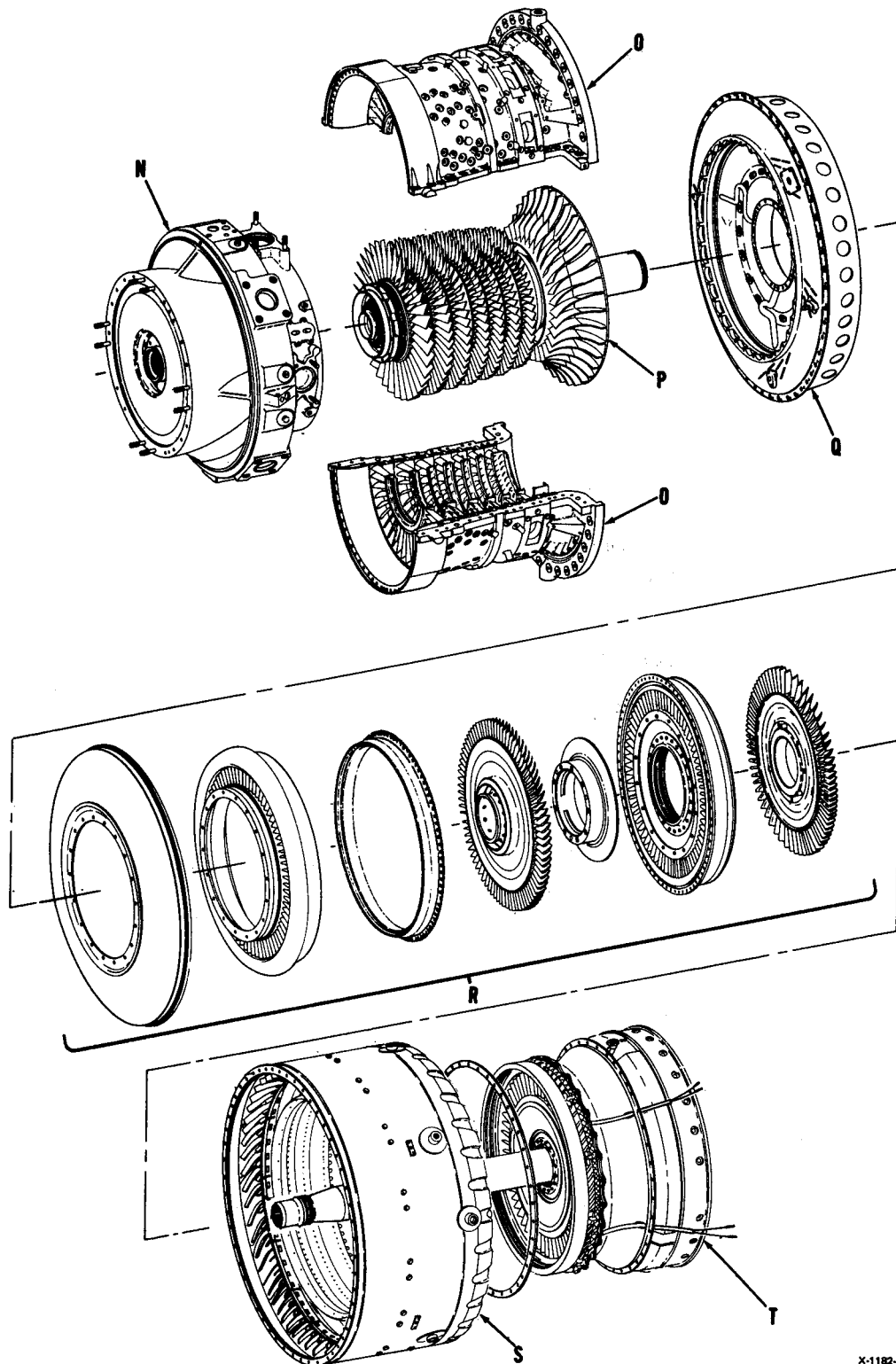
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- J ACCESSORY GEARBOX ASSEMBLY. Mounts on the inlet housing. Contains drive gears and provides mounting pads for the fuel boost pump, main oil pump, fuel control, and power turbine overspeed governor drive. Contains self-sealing chip detector allowing inspection without loss of oil. The power turbine overspeed governor drive is connected through a shaft and gearing to the power output shaft. All other drives are connected through a shaft and gearing to the compressor rotor.
- K FUEL BOOST PUMP. Mounts on the accessory gearbox assembly. Delivers fuel from the airframe fuel supply through the main fuel filter to the fuel control. Increases fuel pressure slightly ensuring a positive pressure at the fuel control inlet.
- L MAIN OIL PUMP. Mounts on the rear of the accessory gearbox assembly. Contains three elements within a common housing. One element supplies lubricating oil pressure. The second element returns main scavenge oil to the integral oil tank in the inlet housing. The third element returns No. 4 and 5 bearing scavenge oil to the oil tank. Contains an adjustable pressure relief valve to regulate oil pressure. Also contains check valve to keep oil from entering engine when it is not running.
- M DRAIN VALVE ASSEMBLIES. Located at 6-o'clock position on combustion chamber. Spring-loaded open. When engine is running, internal engine pressure keeps valve closed. When engine is stopped, internal pressure is removed and valve opens allowing unburned fuel in the combustion chamber to be drained.



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- N AIR INLET HOUSING ASSEMBLY. Located at front of engine. One-piece casting forming an inner and outer housing joined by four hollow struts. Contains engine oil supply tank. Internally provides mounting surfaces for the output shaft support housing, torquemeter head assembly, accessory drive gear assembly (with all gearing to extract power for the accessory gearbox assembly), and the No. 1 and No. 3 bearings and supports. Outer housing has four equally spaced engine mounting pads. Externally provides mounting pads for the starter drive assembly, oil filler assembly, torquemeter junction box, and oil level indicator.
- O COMPRESSOR HOUSING ASSEMBLY. Consists of two halves that fit around the compressor rotor assembly. Secures in front to inlet housing assembly, and to the air diffuser assembly in the rear. Stator vanes, secured inside the housing, fit between the compressor rotor assembly stages when housing is in place.
- P COMPRESSOR ROTOR ASSEMBLY. Supported at the inlet housing by the No. 1 main bearing and at the air diffuser assembly by the No. 2 main bearing. Consists of seven compressor stages and a centrifugal impeller tightly fitted on a common shaft.
- Q AIR DIFFUSER ASSEMBLY. Mounts on compressor housing rear flange. Supports combustor assembly and non-turning parts of turbine section and provides mounting surface for No. 2 bearing housing. Contains internal vanes to cut down on air swirl and direct compressor air to combustion section. Also contains internal oil tubes for No. 2 bearing lubrication.
- R GAS PRODUCER TURBINE SECTION. Consists of curl assembly, first turbine nozzle assembly, cylinder, first turbine disc assembly, spacer, second turbine nozzle assembly, and second turbine disc assembly. Discs and spacer are coupled together and mounted on rear of compressor rotor shaft. All other parts are supported by the air diffuser assembly.
- S COMBUSTOR ASSEMBLY. Mounts on the air diffuser assembly. Consists of a combustor housing, a vane assembly, and a liner assembly. Liner has holes arranged to control air for cooling and combustion. The housing assembly fits around the liner assembly and the power turbine assembly and provides an area for combustion and expansion.
- T POWER TURBINE ASSEMBLY. Mounts to and fits into the combustor assembly. Power shaft goes forward through the compressor rotor shaft. Supported in front by No. 3 main bearing. Supported in rear by No. 4 and 5 main bearing which are part of the power turbine assembly. Contains two disc assemblies and two nozzle assemblies. First disc assembly (third turbine disc) and power shaft are made as one piece. The second disc assembly (fourth turbine disc) mounts on the shaft so the shaft and disc assemblies rotate as a unit. Also contains thermocouple harness and probes so temperature at power turbine inlet may be monitored. Internally contains oil tubes for the No. 4 and 5 bearing lubrication.

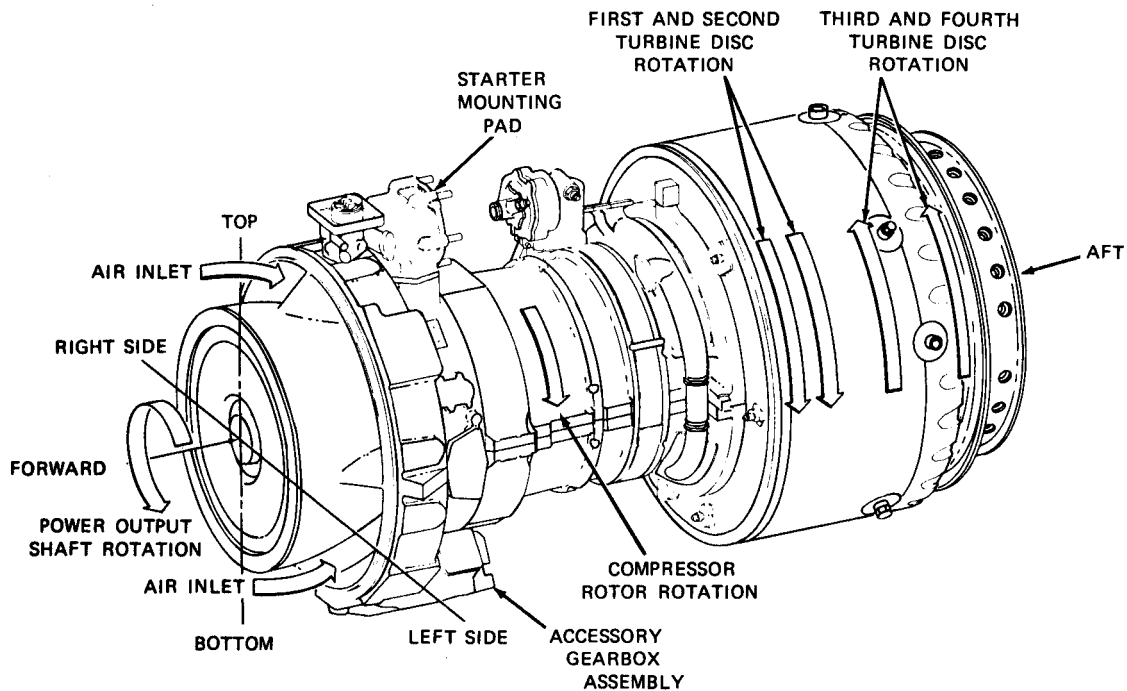


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1-10 DIRECTIONAL REFERENCES

The following directional references and terms are used in this manual.

<u>Direction</u>	<u>Description</u>
Forward	End of engine from which power is extracted.
Aft	End of engine from which exhaust gases are expelled.
Right/Left	Determined by observing engine from aft end.
Bottom	Determined by location of accessory gearbox assembly.
Top	Determined by location of starter mounting pad.
O'clock	Position expressed as viewed from aft end of engine.
Direction of Rotation	Determined as viewed from rear of engine. (Clockwise or Counterclockwise).



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1-11 EQUIPMENT DATA

This paragraph lists equipment data which may help you.

Equipment Data

- Oil System Capacity3.75 gallons
- Electrical Requirements
 - Ignition Exciter Unit 2.5 amps during starting
 - Starting Solenoid Valve 1.5 amps during starting
 - Chip Detector 0.5 amps continuous
 - Oil Temperature Transmitter 0.25 amps continuous
 - Low Oil Level Switch 0.5 amps continuous

1-12 SAFETY, CARE, AND HANDLING

CAUTION

The inlet housing, starter gearbox housing, compressor housing and anti-king gallery cover are made from magnesium containing small amounts of thorium. Adherence to the following is required.

Fire Hazard Class: Health: 0 Flammability: 1 Reactivity: 2
 The Fourth Diamond: Avoid Use of Water

WARNING

Grinding or machining magnesium thorium castings will generate dust or chips which will burn or may explode. The dust or chips are of low level radioactivity.

- A. Special precautions must be employed to protect against breathing or eating the dust or metal shavings. Excessive intake of Thorium for a long time can cause lung cancer or bone cancer. Wherever Mag/Thorium castings are machined, ground, and welded on, employees should be instructed on basic radiological health principles. Eating, drinking or smoking is prohibited where ingestion of the dust or metal is possible. Good personal hygiene such as thoroughly washing hands and face before going on break should be followed.
- B. Magnesium dust and shavings are extremely flammable. When machining, grinding or welding, Class D fire extinguishing agents should be readily available for extinguishing metal powder or dust fires. Water should never be used for extinguishing magnesium fires.
- C. The dust and machining wastes are considered low level radioactive wastes and must be disposed of according to the National Regulatory Commission (NRC) low level radioactive waste disposal regulations, so they should be collected separately.

1-12 SAFETY, CARE, AND HANDLING (Continued)

WARNING

SKIN: Radiological damage from alpha particles may occur if metal dust or particles enter the body through cuts in the skin.

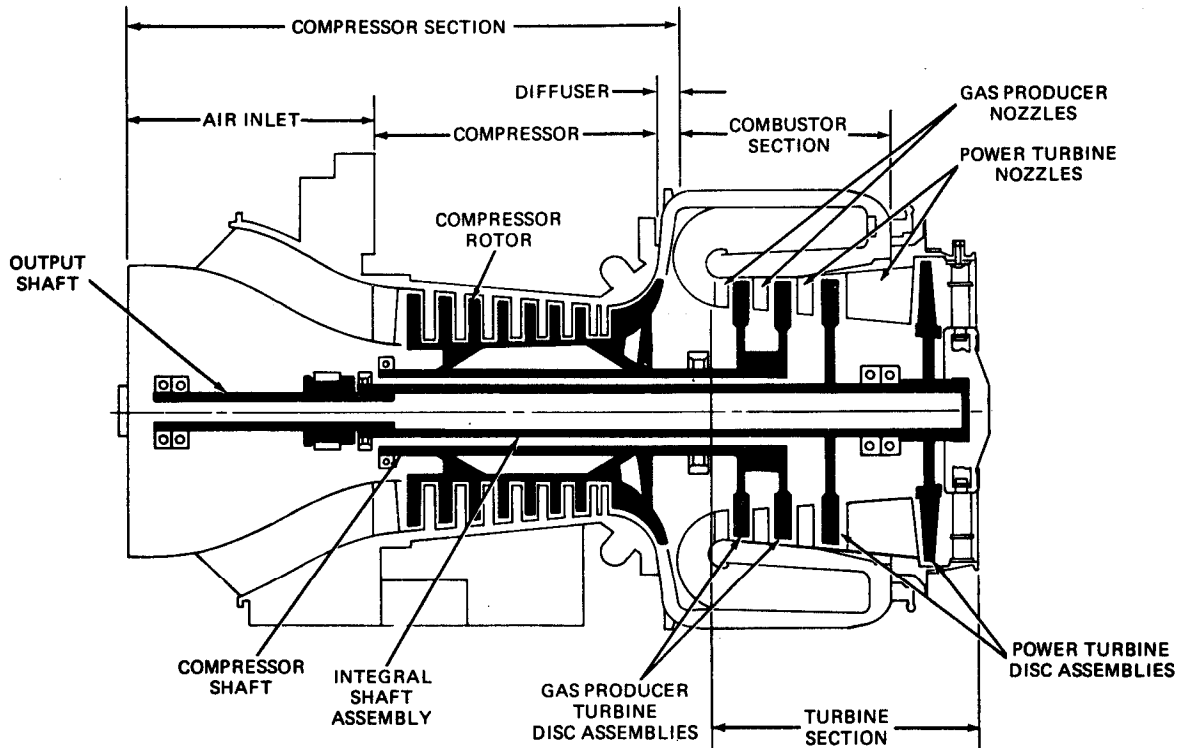
BREATHING: Possible carcinogenic effects from overexposure and breathing of dust due to Thorium radioactivity.

D. Observe all general precautions and safety regulations. Remember, engine is heavy. Do not try to lift or work underneath engine without observing all regulations, cautions, and warnings.

Section III. PRINCIPLES OF OPERATION

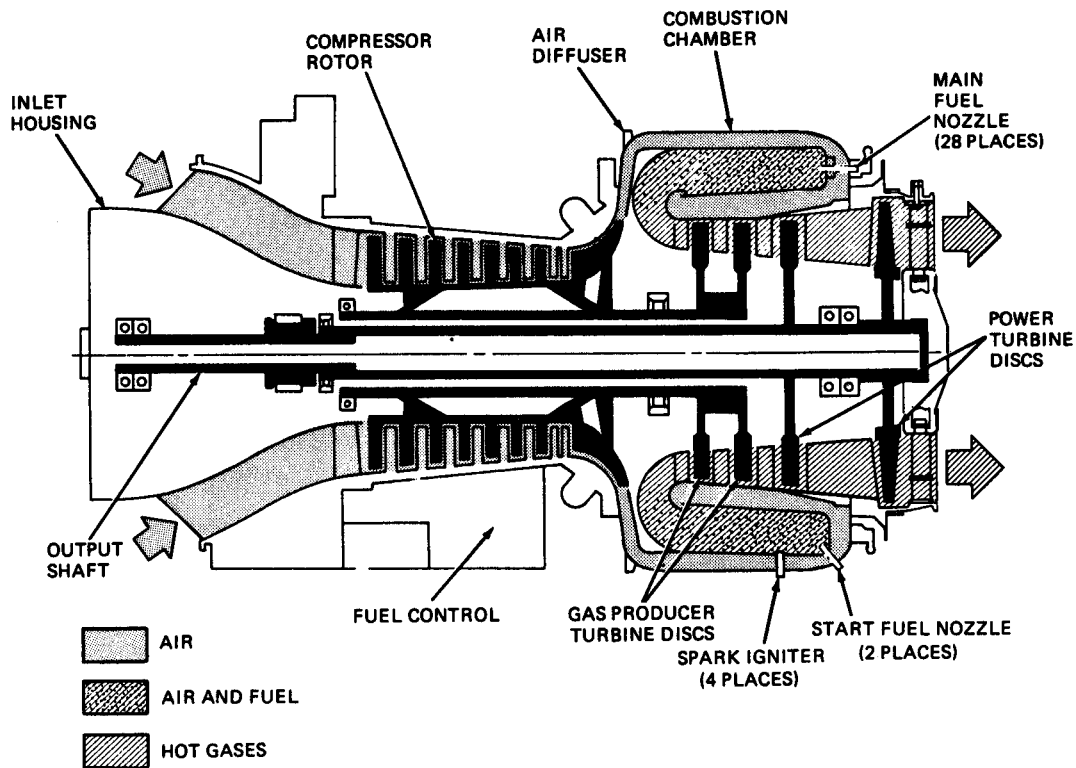
1-13 ENGINE

A. Your T55-L-712 engine is a turboshaft gas turbine engine. The three major sections are the compressor section, the combustor section, and the turbine section. These sections are designed to form a reverse annular flow path for air and hot gases. Externally they provide mounting pads for engine related accessories and components. The compressor rotor is directly connected to the gas producer turbine disc assemblies. The power turbine disc assemblies are directly connected to the integral shaft assembly. The integral shaft assembly, which runs inside of the compressor shaft, is splined to the output shaft. The output shaft is located at the forward end of the engine. Its speed is equal to power turbine speed.



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B. As the compressor rotor is turned by the starter system, air enters the inlet housing. This air is directed into the compressor rotor area and is compressed. The compressed air flows through the air diffuser and into the combustion chamber. Some of this air mixes with fuel from two starting fuel nozzles to form a combustible mixture. Four spark igniters provide spark and ignite the mixture. This creates hot expanding gases which are discharged through the turbine section. Some energy from the hot gases drives two gas producer turbine discs which drive the compressor rotor. The remaining energy drives two power turbine discs which drive the output shaft. When engine reaches certain speed, the fuel control and flow divider allow metered main fuel to flow to 28 main fuel nozzles. These nozzles allow fuel to flow into the combustion chamber where it is ignited by burning starting fuel.

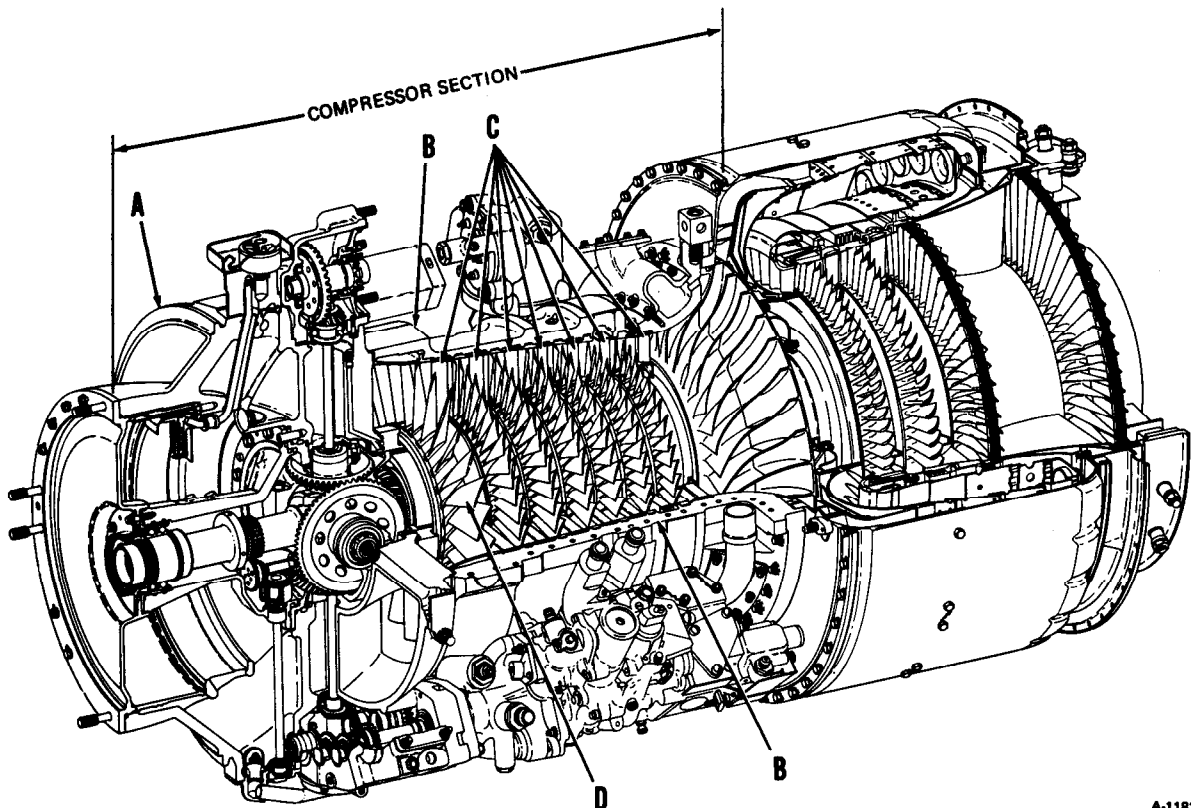


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1-14 COMPRESSOR SECTION

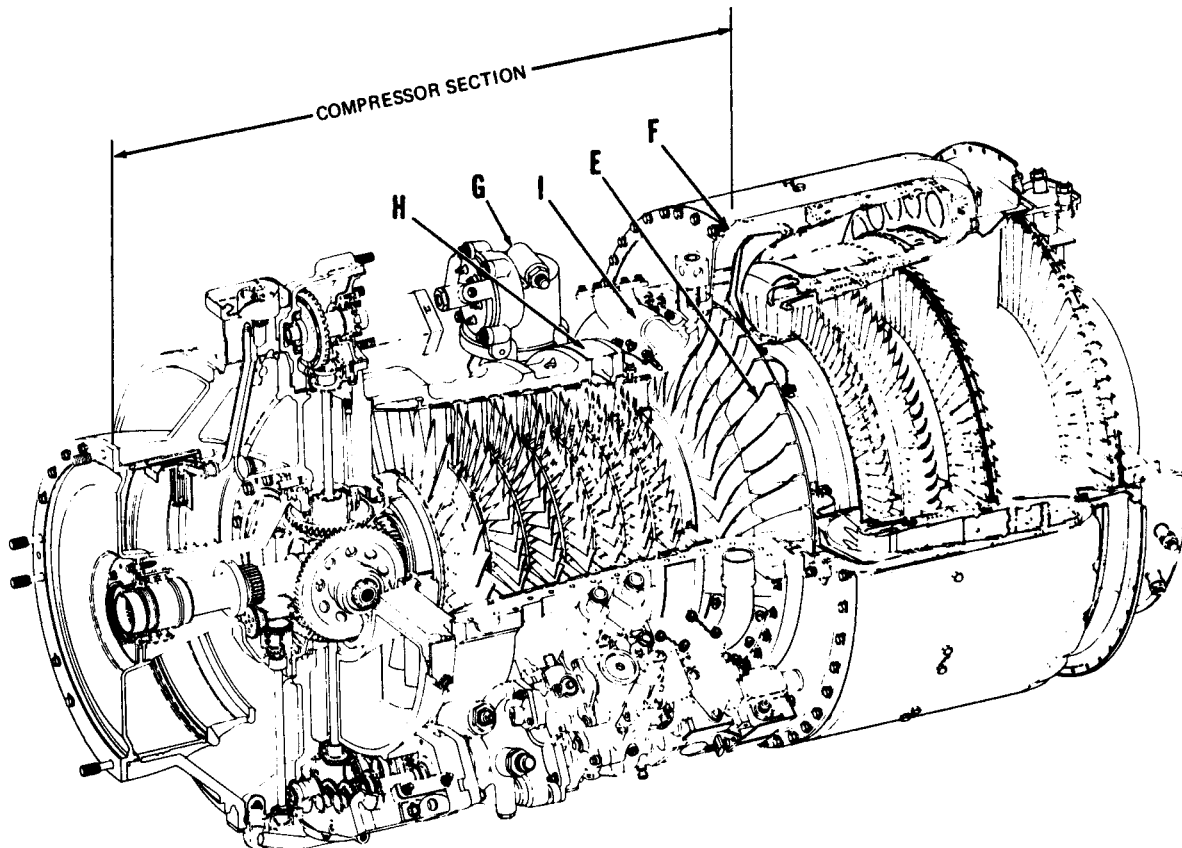
Consists of approximately the front two-thirds of engine. Major functions are to provide air inlet, air compression, and air distribution. Also provides air for internal cooling of parts and pressurization of seals. Customer bleed provisions and air-bleed provisions to prevent surge (loss of compressor air flow) are built in.

- A AIR INLET HOUSING ASSEMBLY. Provides air flow path which directs inlet air to the compressor area. Also provides supply tank for engine oil system.
- B COMPRESSOR HOUSING. Forms the outer wall of the air flow path through the compressor area. Designed to aid air compression by gradual decrease in inside diameter from front to rear. Vent holes used in conjunction with compressor bleed band allows controlling of compressor bleed air. Holes toward rear of housing allow heated air to flow into the air gallery for customer use.
- C STATOR VANES. Attached directly to the inside of the compressor housing. Designed to direct air flow so it hits compressor rotor blades at best angle for most efficient operation.
- D COMPRESSOR ROTOR BLADES. Located around each of seven compressor rotor disc assemblies. Designed to raise the pressure level of air as it passes through each stage of the compressor.



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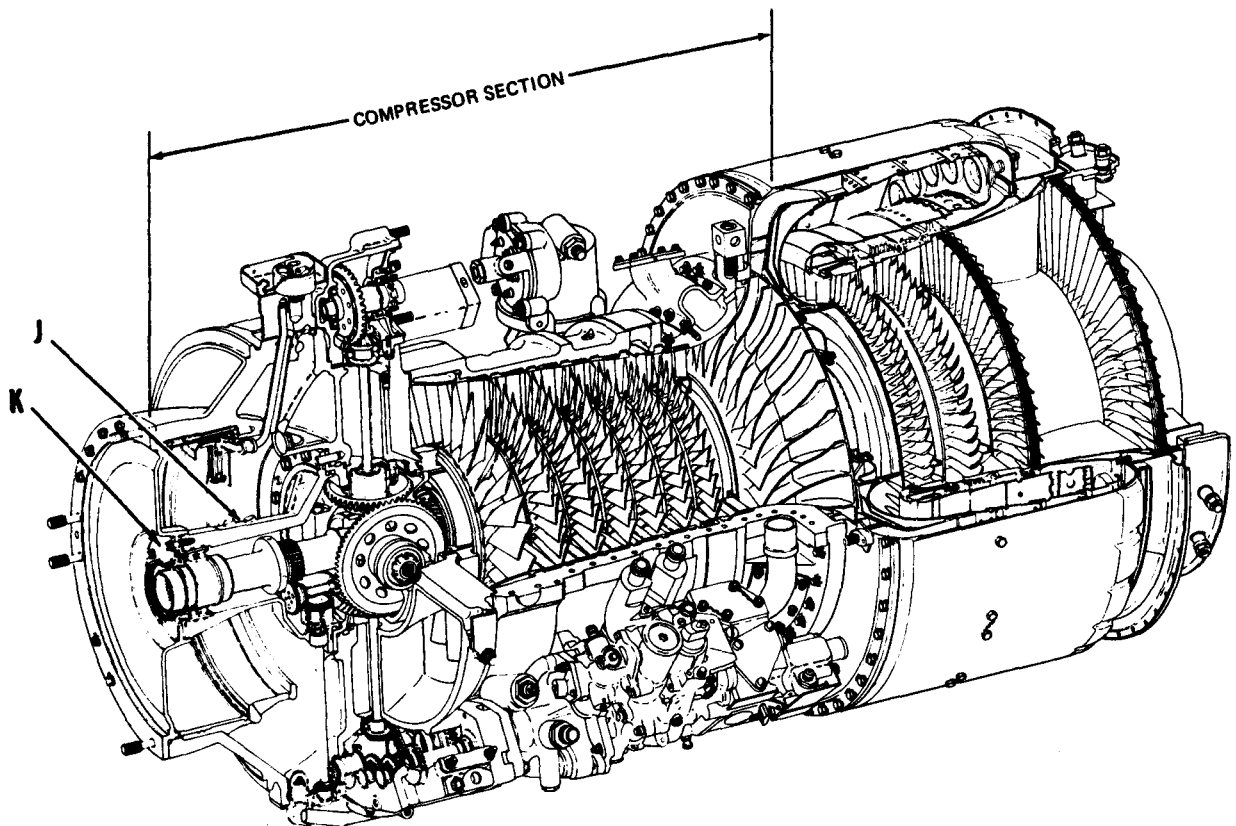
- E CENTRIFUGAL IMPELLER. Physically part of compressor rotor assembly. Designed to further compress and direct air through air diffuser assembly.
- F AIR DIFFUSER. Provides path for compressed air between centrifugal impeller and combustion chamber. Contains straightening vanes inside that remove air swirl created by the centrifugal impeller.
- G INTERSTAGE AIR-BLEED ACTUATOR. Pneumatic device that controls compressor air-bleed by tightening and loosening metal band over vent holes in compressor housing. Receives input signal from fuel control.
- H COMPRESSOR BLEED BAND. Metal band located around vent holes toward rear of compressor housing. By tightening and loosening bleed band, a regulated amount of air can be bled from compressor. This allows more rapid acceleration without surge. Control led by interstage air-bleed actuator.
- I AIR GALLERY COVER. Fits around aft end of compressor housing. Holes in compressor housing allow heated air to flow into air gallery cover. Port is provided in cover for customer use of this air.



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J OUTPUT SHAFT SUPPORT HOUSING. Supported by inlet housing. Supports No. 6 and 7 bearings at front end of engine.

K OUTPUT SHAFT SEAL HOUSING. Mounts on inlet housing cover at front of output shaft support housing. Supports output shaft seal.



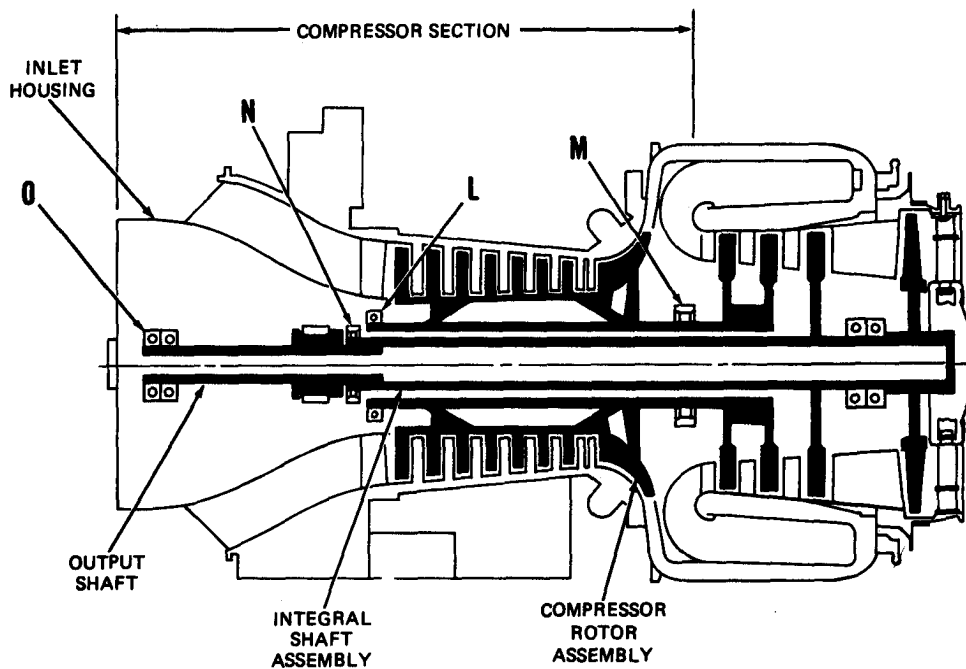
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L NO. 1 BEARING. Supported in bearing housing which is supported by inlet housing. Supports forward end of compressor rotor assembly.

M NO. 2 BEARING. Supported in bearing housing which is supported by air diffuser assembly. Supports rear end of compressor rotor assembly.

N NO. 3 BEARING. Supported by power shaft bearing support which is supported by inlet housing. Supports forward end of integral shaft assembly.

O NO. 6 AND 7 BEARINGS. Supported by output shaft support housing. Supports forward end of output shaft.

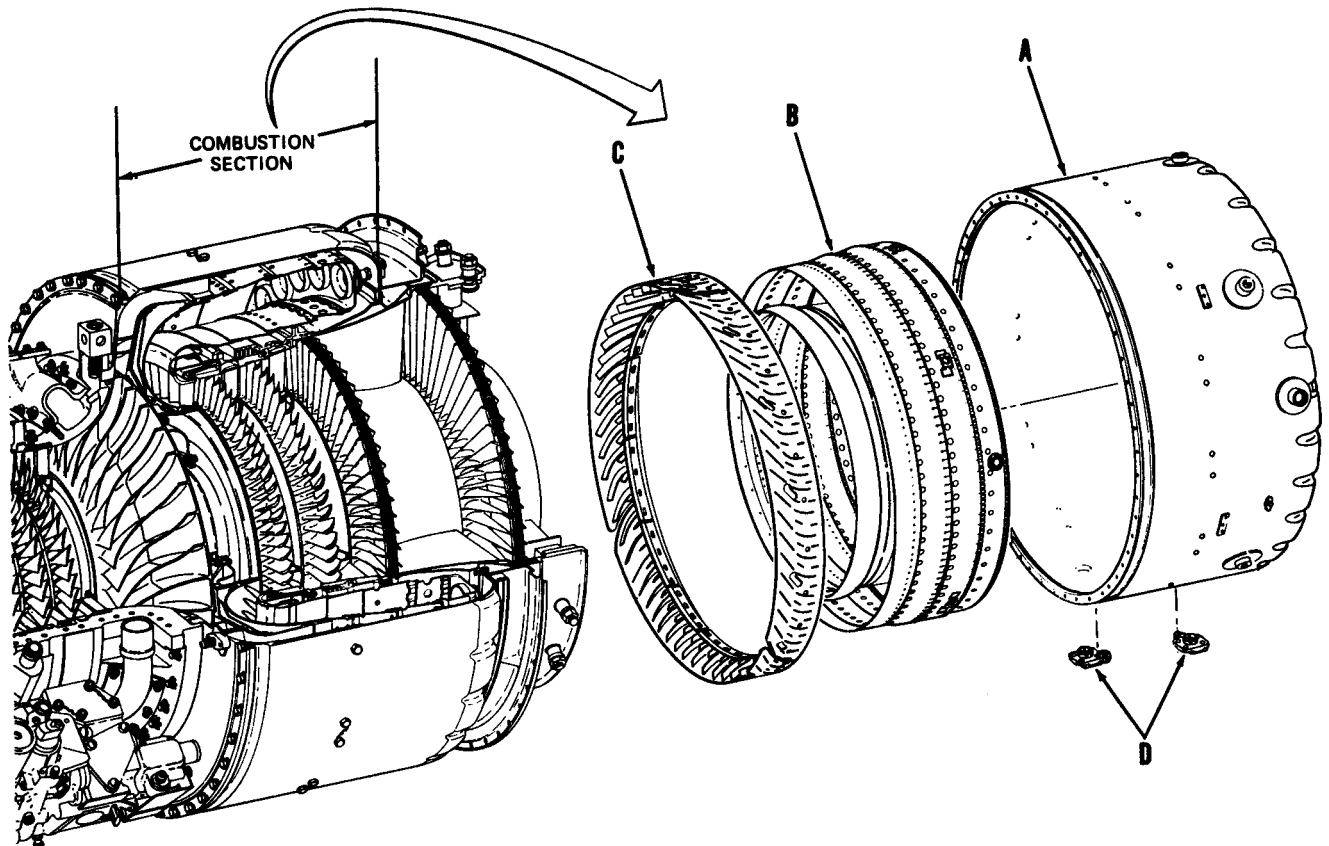


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1-15 COMBUSTION SECTION

Attaches directly to air diffuser assembly and fits around major portion of turbine section. Provides area for combustion and air expansion. Also has provisions for draining overboard unburned fuel left in combustor housing.

- A COMBUSTION CHAMBER HOUSING. Forms outer wall and is major support for combustion section and power turbine. Provides mounting surfaces for main fuel manifold, fire shield, flow divider, spark igniters, and start fuel nozzles.
- B COMBUSTION CHAMBER LINER. Mounts inside combustion chamber housing. Contains holes to let a controlled amount of air to enter the liner. Fuel is also fed into the liner where combustion takes place.
- C COMBUSTION CHAMBER VANES. Mount in combustion chamber housing. Work in conjunction with straightening vanes in air diffuser to remove air swirl and distribute air properly in combustion section.
- D DRAIN VALVE ASSEMBLY. Two, mounted at bottom of combustion chamber housing. Spring normally holds valve open. With engine running, internal engine pressure pushes valve closed. With engine stopped, valve opens and unburned fuel in combustion chamber housing drains out.

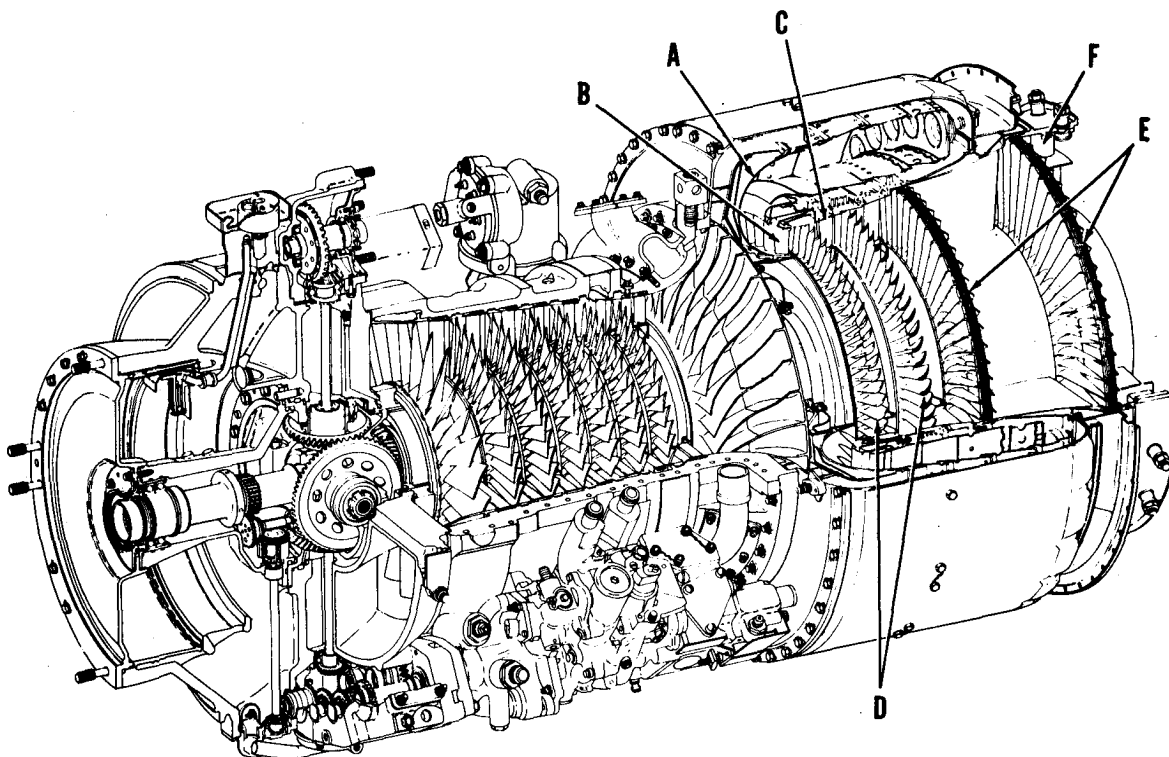


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1-16 TURBINE SECTION

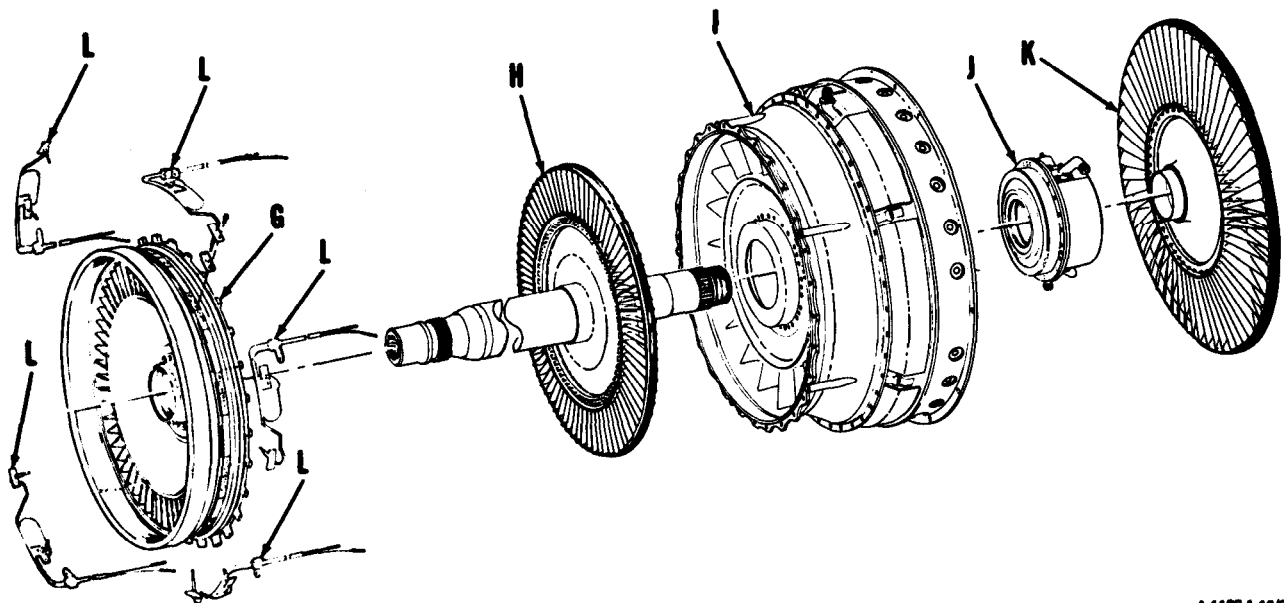
Directs and uses energy created in combustion section to keep compressor rotor turning and for output power. Includes gas producer and power turbine components. Contains provisions for measuring gas temperature at input to power turbine assembly. Also contains provisions to contain engine parts in case of internal engine failure.

- A CURL ASSEMBLY. Located directly behind air diffuser. Forms outer wall of path for hot gases leaving combustion section. Smoothly changes direction of hot gases and guides them to first gas producer nozzle.
- B FIRST GAS PRODUCER NOZZLE. Located aft of curl assembly and forward of first gas producer disc assembly. Outer portion forms inner wall of path for hot gases leaving combustion section. Nozzle vanes direct hot gases so they hit first gas producer disc blades most efficiently.
- C SECOND GAS PRODUCER NOZZLE. Located between first and second gas producer disc assemblies. Nozzle vanes direct hot gases leaving first gas producer disc assembly so they hit second gas producer disc blades most efficiently.
- D GAS PRODUCER DISC ASSEMBLIES. Coupled directly to compressor rotor assembly. As hot gases hit disc assembly blades, disc assemblies turn causing compressor rotor to turn.
- E POWER TURBINE ASSEMBLY. Contains two disc assemblies, two nozzles, No. 4 and 5 bearing package and a thermocouple system (see G through L).
- F TURBINE EXIT VANE. Mounts on rear of engine. Distributes exhaust to lower the effect of thrust. Also, helps to prevent engine parts from being thrown about should damage occur internally in power turbine assembly.



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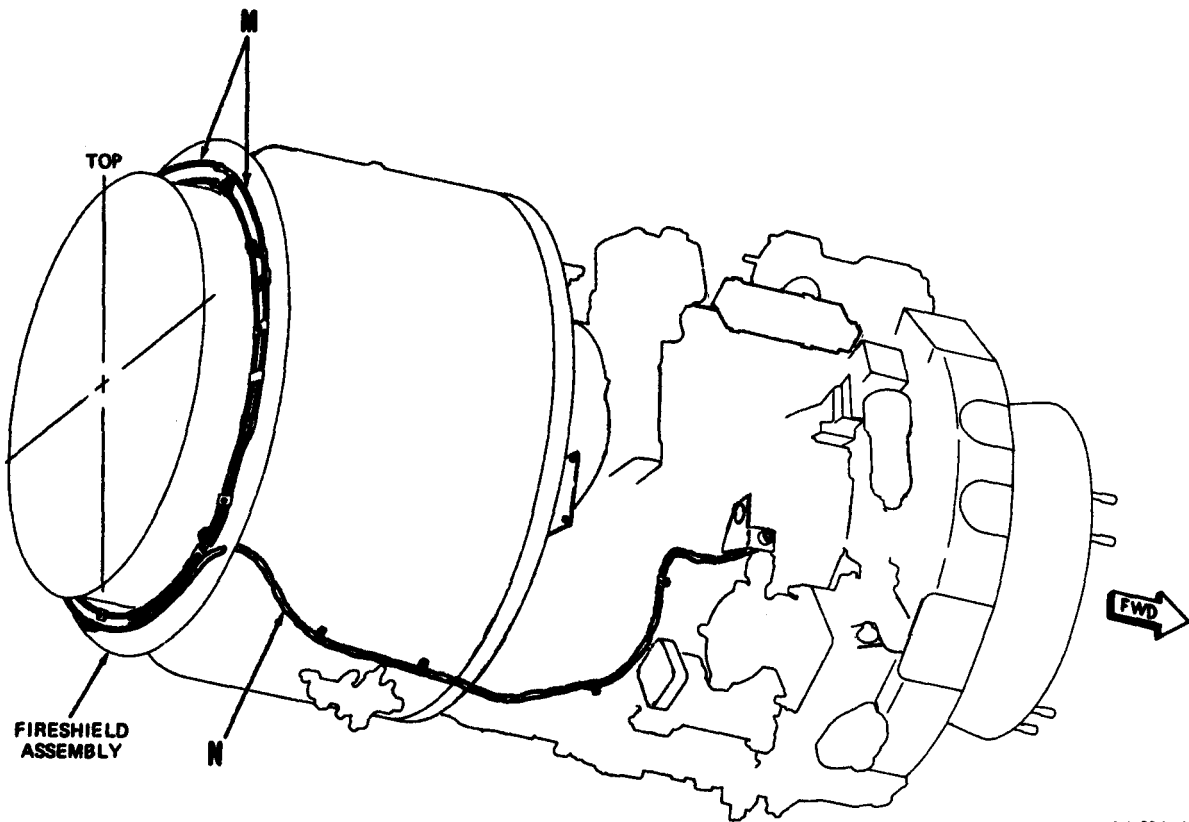
- G THIRD TURBINE NOZZLE AND SUPPORT. Located between second gas producer disc assembly and third turbine disc (part of integral shaft assembly). Provides mounting areas for five thermocouple harness assemblies. Directs hot gases so they hit third turbine blades most efficiently.
- H INTEGRAL SHAFT ASSEMBLY. Power shaft and third turbine disc (first power turbine disc) are welded to form a single unit. Splined to output shaft at front of engine. As hot gases hit blades, integral shaft assembly turns causing output shaft to turn.
- I FOURTH TURBINE NOZZLE. Main support for power turbine assembly. Provides mounting area for exit vane assembly and No. 4 and 5 bearing package. Fits within and mounts on combustion section. Nozzle vanes direct hot gases leaving integral shaft assembly so they hit fourth turbine disc blades most efficiently.
- J NO. 4 AND 5 BEARING PACKAGE. Contains twin bearings, and mounts in fourth turbine nozzle. Supports rear of integral shaft assembly between third and fourth turbine discs.
- K FOURTH TURBINE DISC ASSEMBLY (SECOND POWER TURBINE DISC). Mounts on rear end of integral shaft assembly. As hot gases leaving fourth turbine nozzle hit fourth turbine disc blades, disc assembly turns. Assists integral shaft assembly to turn output shaft.
- L THERMOCOUPLE HARNESS ASSEMBLIES. Five, with two probes each, positioned around power turbine assembly. Ten probe ends insert into and mount around third turbine nozzle and support. Leads fit through five guide tubes located around fourth turbine nozzle and secure to bus bar assembly. Probes made of material which when heated react by developing a proportional voltage. The average of these voltages is reflected by cockpit indicator calibrated to read temperature in degrees centigrade.



A-1182-1-16/2

M LEFT- AND RIGHT-HAND BUS BAR ASSEMBLIES. Mounted on aft side of fireshield assembly at rear of engine. Provides a common junction point for five thermocouple harnesses and thermocouple jumper lead.

N THERMOCOUPLE JUMPER LEAD. Connects to bus bar assembly and runs forward to main electrical bracket. Provides electrical path from bus bar assemblies to airframe wiring.



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1-17 ACCESSORY GEAR SECTION

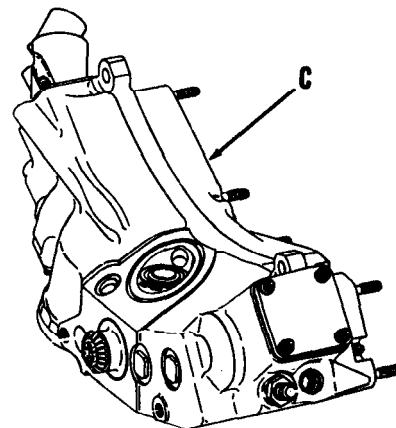
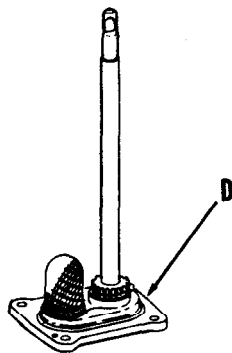
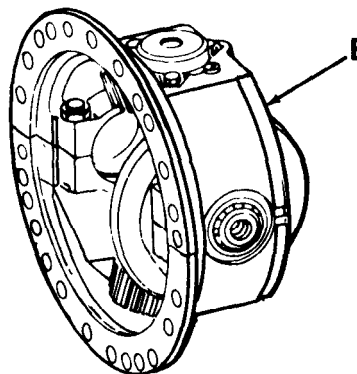
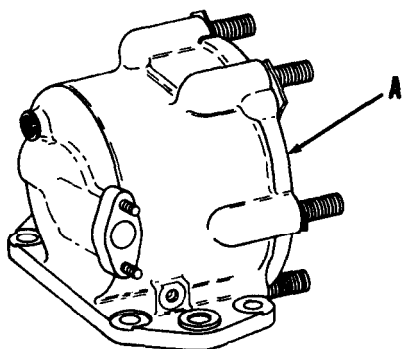
A. Provides gear train that connects starter to compressor rotor assembly and compressor rotor assembly to N1 driven accessories (accessories driven by gas producer system). Also provides gear train between output shaft and N2 driven accessories (accessories driven by power turbine system).

A STARTER DRIVE ASSEMBLY. Mounts at 12-o'clock position on inlet housing. Starter mounts on starter drive assembly.

B ACCESSORY GEAR ASSEMBLY. Mounts in inlet housing directly between the starter drive assembly and the accessory gearbox assembly.

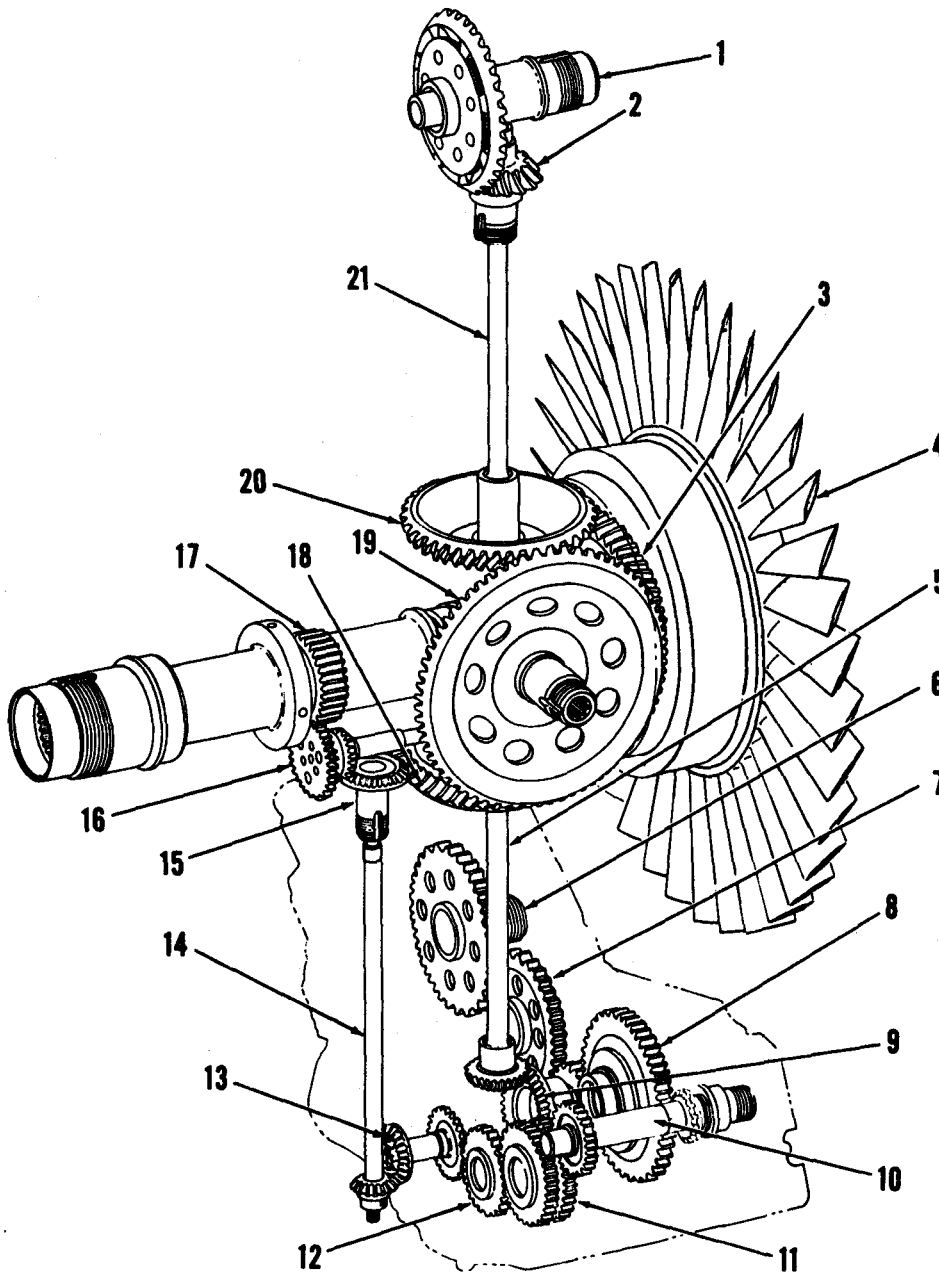
C ACCESSORY GEARBOX ASSEMBLY. Mounts at 6-o'clock position on inlet housing. Contains drive gears and provides mounting pads for fuel boost pump, main oil pump, and fuel control.

D OVERSPEED DRIVE AND OUTLET COVER ASSEMBLY. Mounts at 6-o'clock position on inlet housing forward of accessory gearbox assembly.

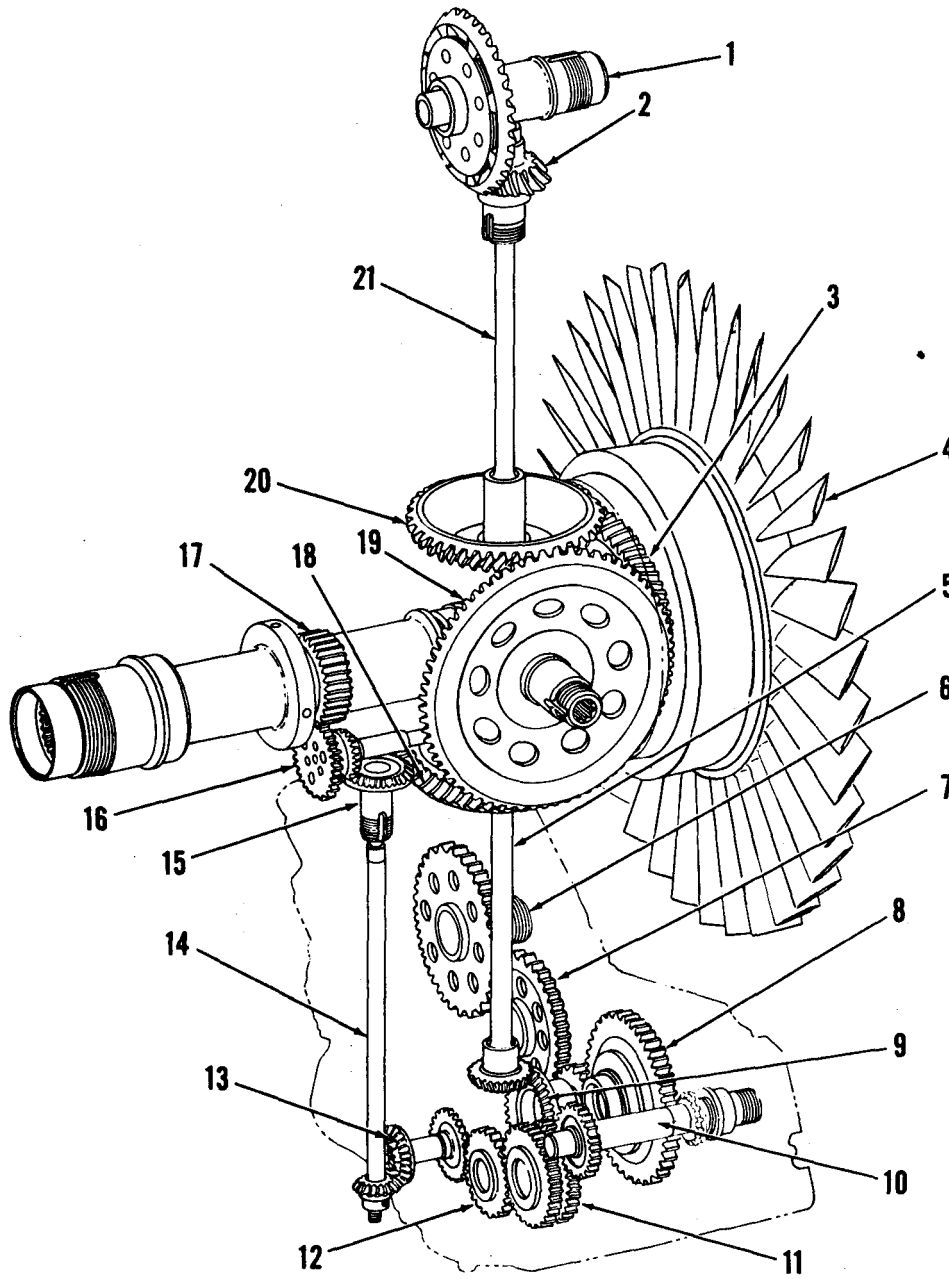


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B. Gearshaft assembly (1) and gearshaft (2) are located in the starter drive assembly. Bevel gearshafts (18 and 20) and bevel gear (19) are located in the accessory gear assembly. The fuel boost pump drive gear (6), main oil pump drive spur gear (7), fuel control drive spur gear (8), N1 driven bevel gear (9), overspeed governor control drive bevel spur gearshaft (10), spur gear cluster (11), spur gear (12), and N2 driven bevel gear (13) are located in the accessory gearbox assembly. The N2 driven bevel gearshaft (14) is part of the overspeed drive and tank outlet cover assembly. Overspeed drive bevel gear (15) and spur gear (16) are part of the output shaft support housing (not shown). The output shaft (17) is mounted and rotates through the output shaft support housing. Bevel gear (3) is part of the compressor rotor assembly (4).

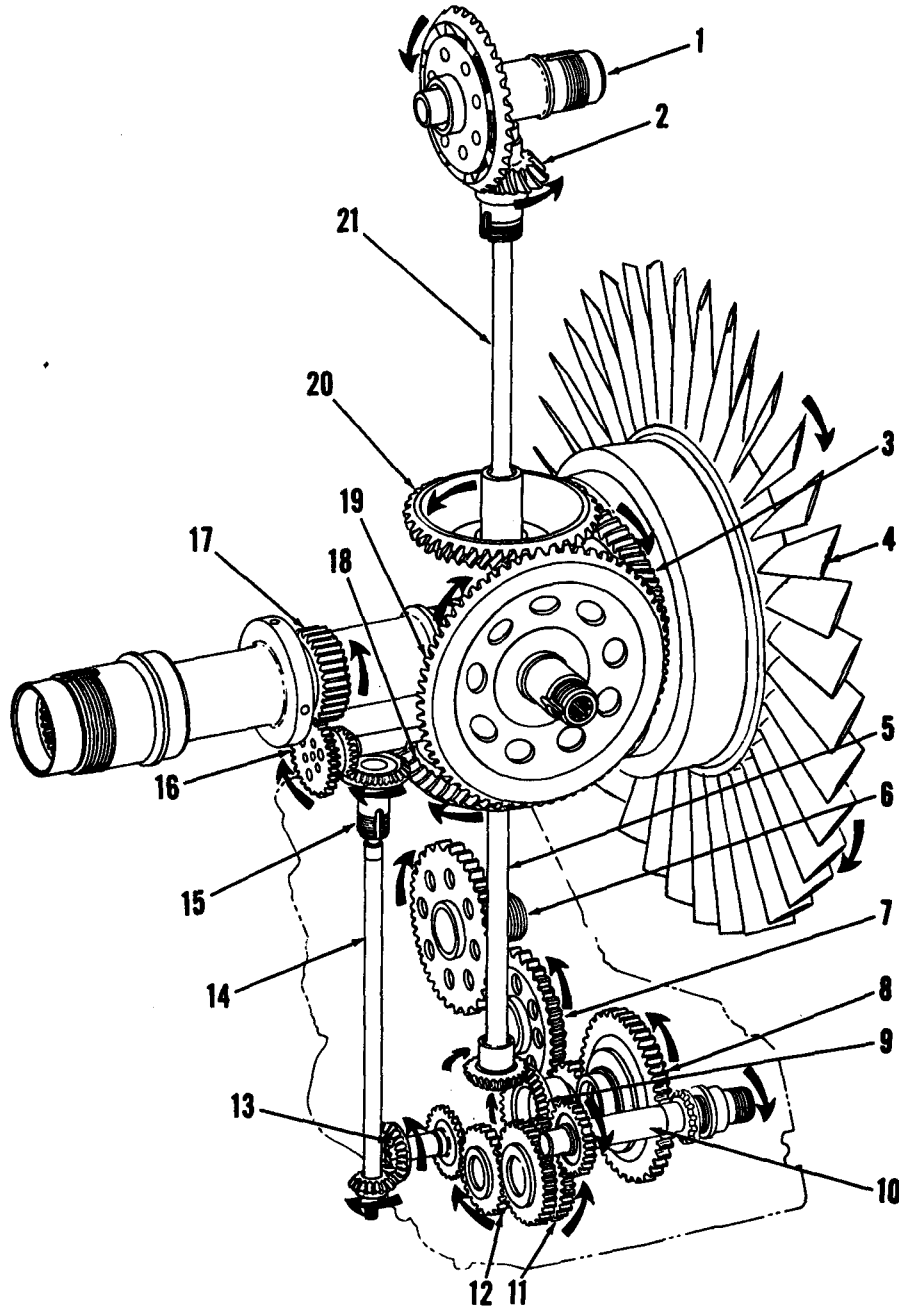


C. Gearshaft assembly (1) meshes with gearshaft (2). Gearshaft (2) connects to gearshaft (20) through spur gearshaft (21). Gearshaft (20) meshes with gear (19). Gear (19) meshes with gear (3) and gearshaft (18). Gearshaft (18) connects to gear (9) through N1 driven spur gearshaft (5). Gear (9) meshes with gears (7 and 8), and gear (7) meshes with gear (6). Splines on output shaft (17) mesh with gear (16) which meshes with gear (15). Gear (15) is connected to gear (13) through gearshaft (14). Gear (13) meshes with gear (12). Gear (12) meshes with gear cluster (11) which meshes with gearshaft (10).



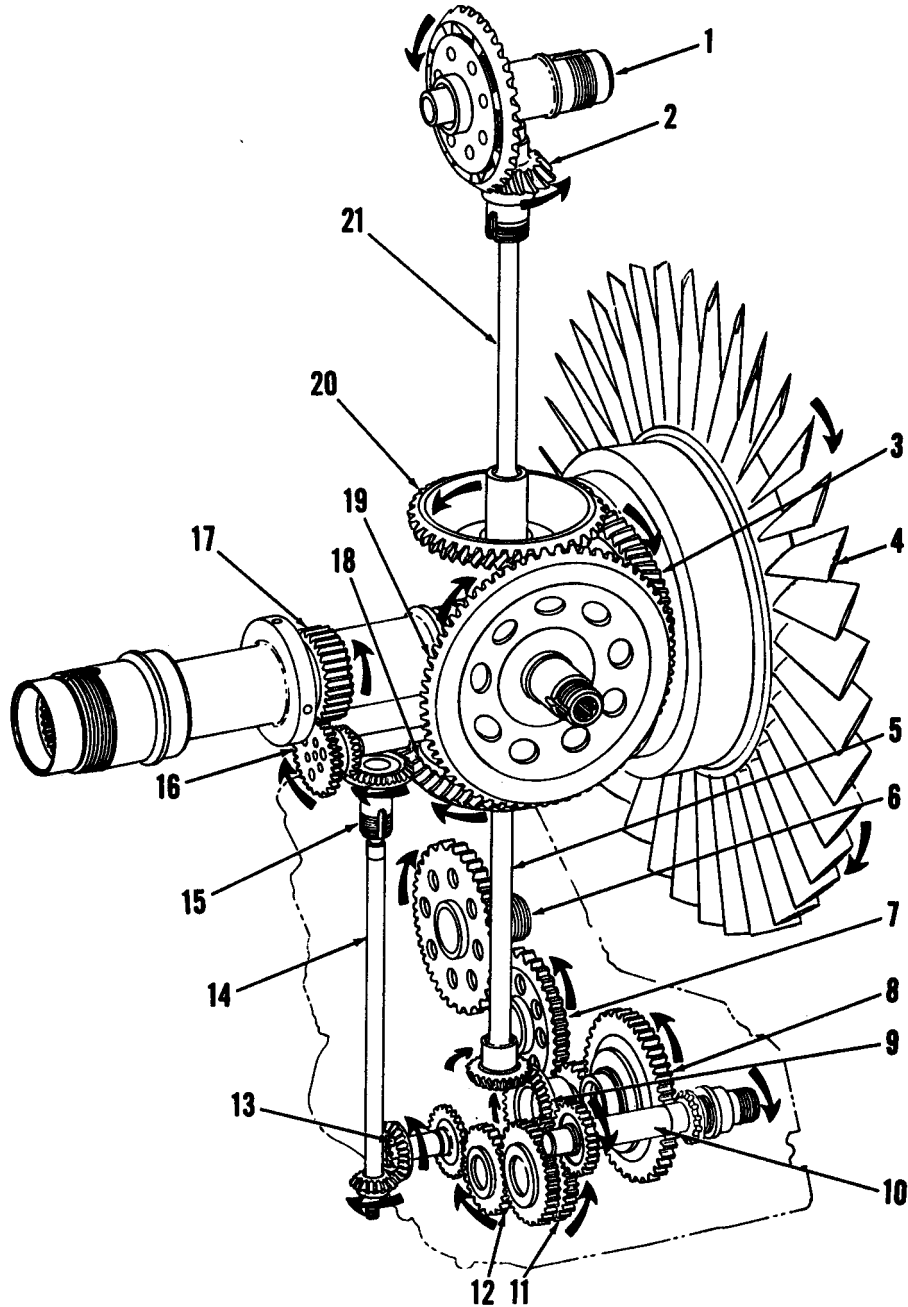
X-1182-1-17/3

D. When starter is engaged, gearshaft assembly (1) and gearshaft (2) turn causing gearshaft (20) to turn. Gearshaft (20) turns gear (19). Gear (19) turns gear (3) and gearshaft (18). Gearshaft (18) through gearshaft (5) turns gear (9). Gear (9) turns gears (7 and 8). Gear (7) turns gear (6). As output shaft (17) is turned by power turbine assembly (not shown), gears (16 and 15) turn. Gear (15) turns gearshaft (14) which turns gear (13). Gear (13) turns gear (12). Gear (12) turns gear cluster (11) which turns gearshaft (10).



X-1182-1-17/4

E. When starter is disengaged, compressor rotor assembly (4) becomes N1 driving unit. Compressor rotor assembly (4) turns and gear (3) turns gear (19). Gear (19) turns gearshafts (18 and 20). Gearshaft (18) through gearshaft (5) turns gear (9). Gear (9) turns gears (7 and 8). Gear (7) turns gear (6). The remainder of the accessory gear section continues to operate as when starter was engaged.

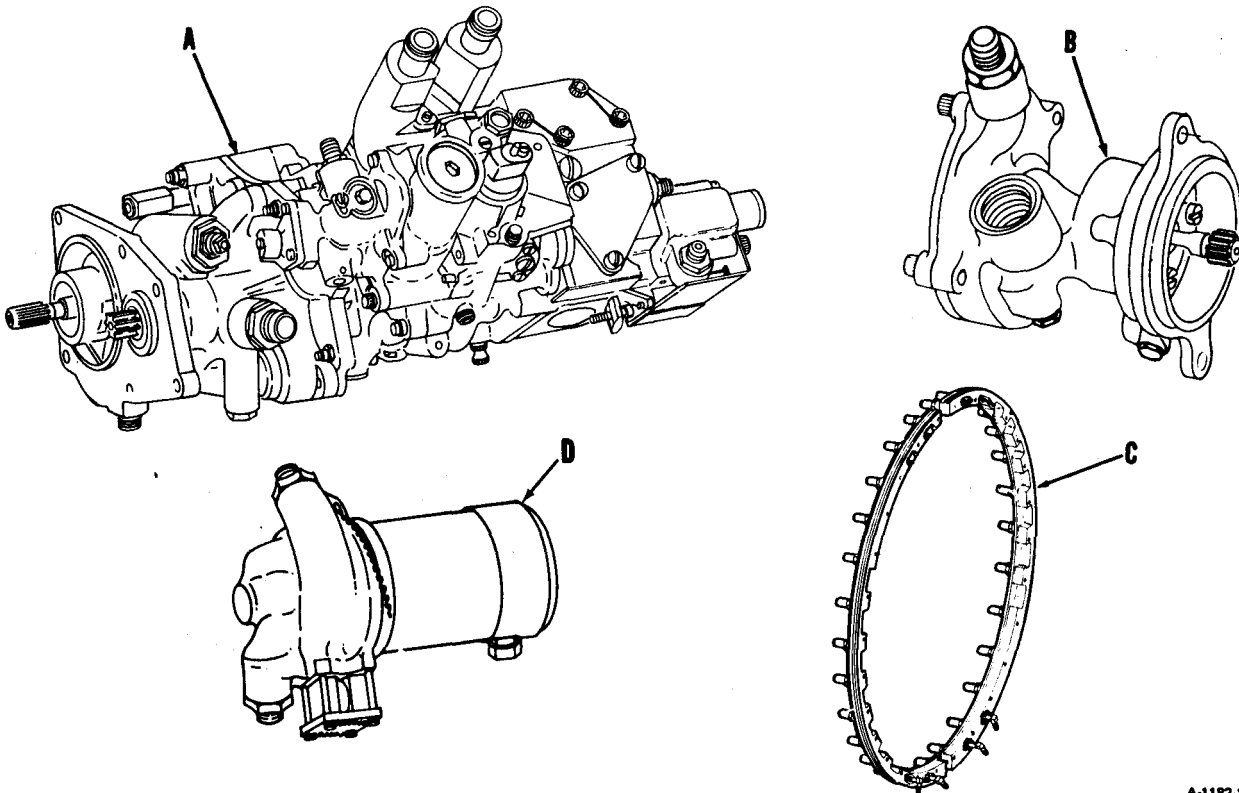


X-1182-1-17/5

1-18 FUEL SYSTEM

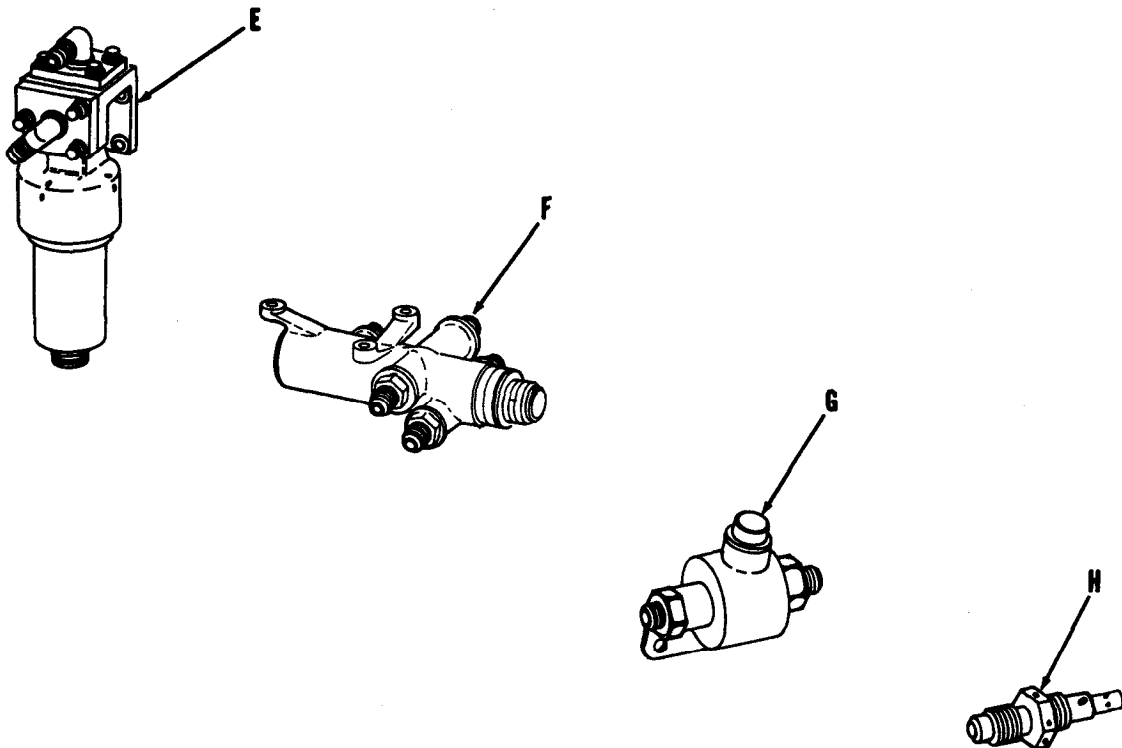
A. Controls and distributes fuel for engine operation. Components are listed and keyed in following diagrams.

- A FUEL CONTROL. Hydromechanical device containing a fuel pump, two speed governors, an acceleration and deceleration control, an air-bleed signal mechanism, and a fuel shutoff valve. Single power lever connection provided to select desired engine power from OFF to MAXIMUM power. Mounts on and is driven by accessory gearbox assembly.
- B FUEL BOOST PUMP. Contains single centrifugal impeller. Provides fuel pressure rise of 10 to 20 psi dictated by speed and flow conditions. Mounts on and is driven by accessory gearbox assembly.
- C MAIN FUEL MANIFOLD. Consists of two halves each having 14 main fuel nozzles. Mounts on rear surface of combustor section. Nozzles insert through holes in combustor section and into combustion area.
- D MAIN FUEL FILTER. Mounts on bracket on left side of compressor housing. Contains replaceable filter element. Also contains popout indicator button. Button pops out if filter element is close to being bypassed because of clogging.



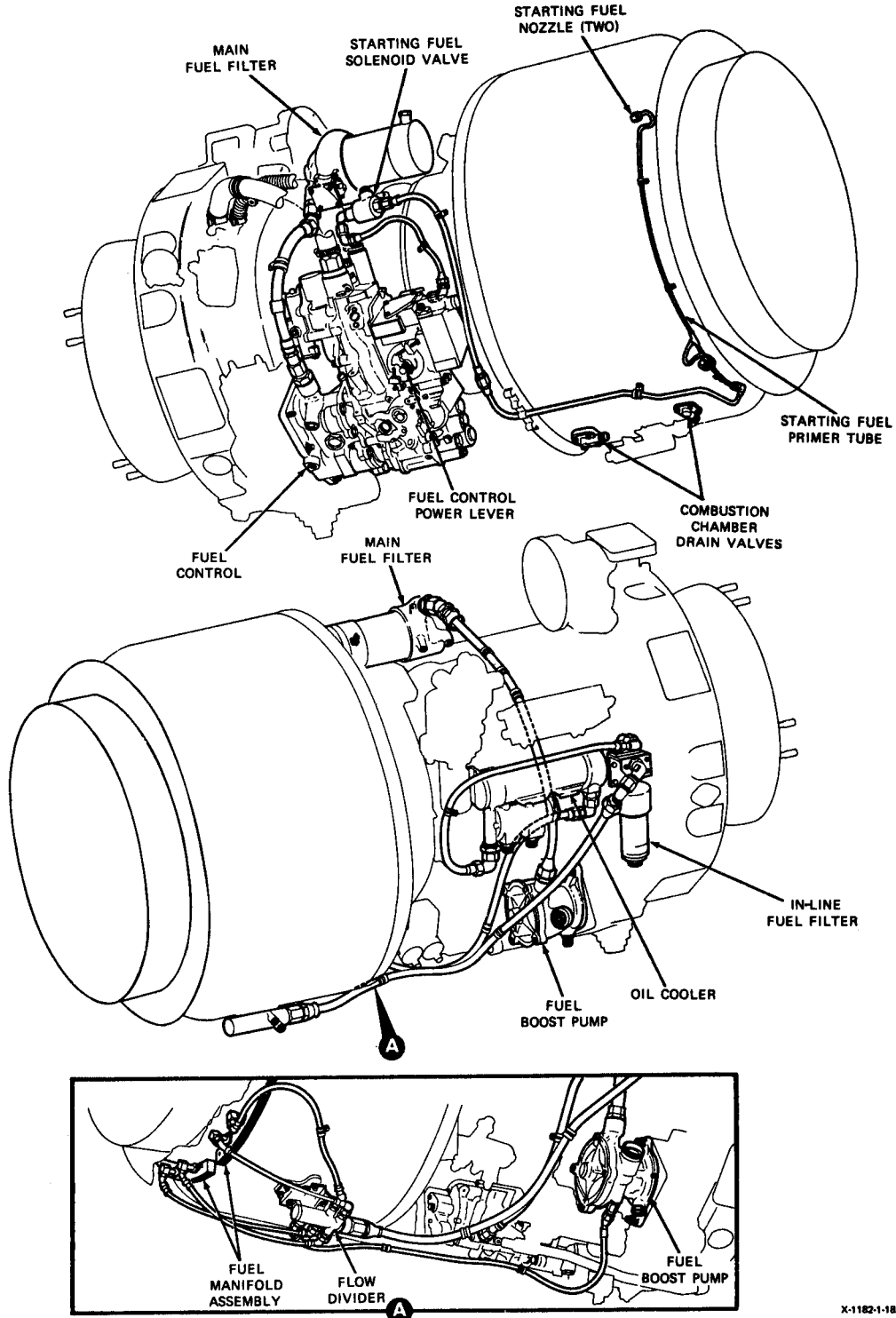
A-1182-1-18/1

- E IN-LINE FUEL FILTER. Mounts on bracket on right side of compressor housing. Contains replaceable filter element. Also contains a popout indicator button. Button will pop out if filter element is close to being bypassed because of clogging.
- F FLOW DIVIDER. Mounts at 6-o'clock position on combustor section. Contains one common input and five separate outputs. One output port contains a check valve. The other four output ports consist of two primary and two secondary ports. Designed so primary and secondary ports allow fuel to flow at different predetermined input pressures.
- G STARTING FUEL SOLENOID VALVE. Mounts on bracket on left side of compressor housing. Normally closed and will not let fuel flow through it. Designed to open on electrical signal allowing fuel to flow through it.
- H START FUEL NOZZLES. Mount at 6 - and 9-o'clock position near aft end of combustor section. Provide means of feeding starting fuel into combustion chamber where it is ignited by spark from igniter plug.



A-1182-1-18/2

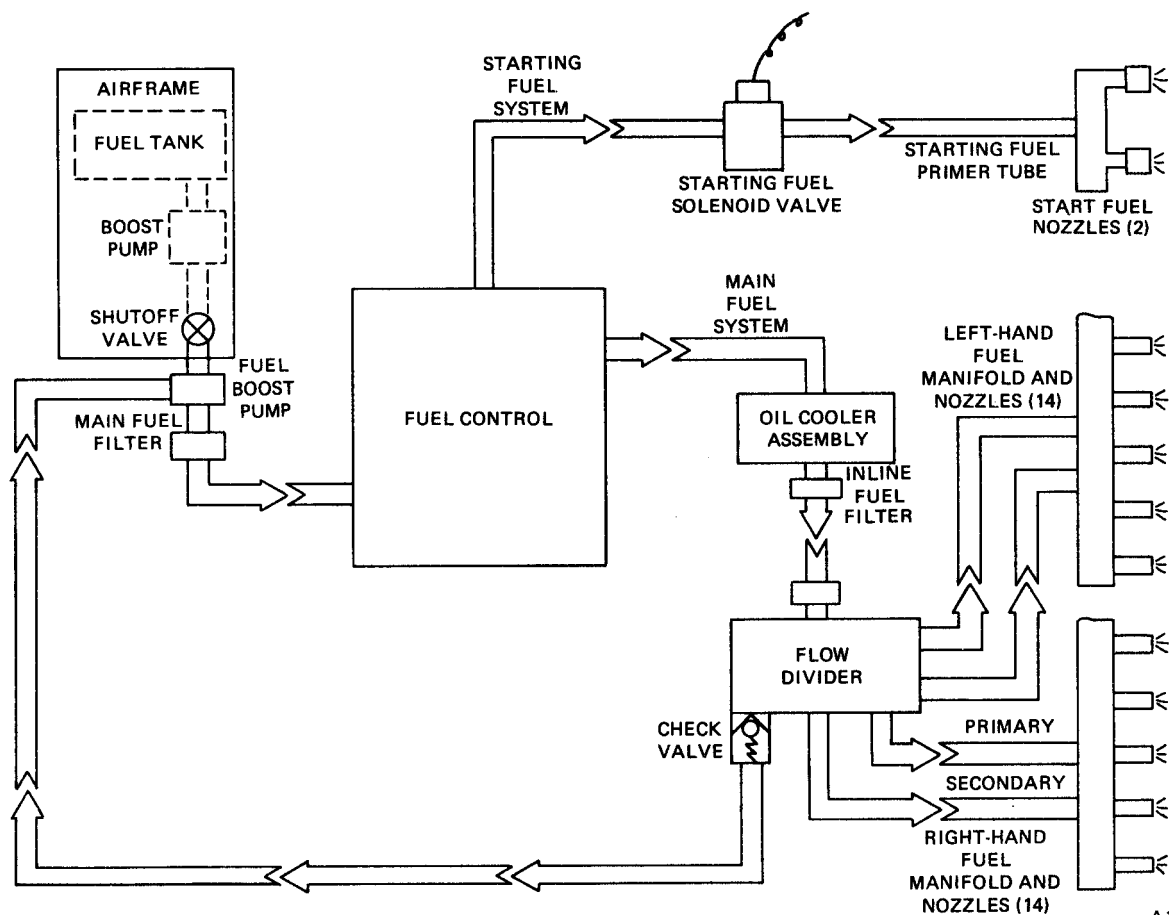
B. Fuel flow between components is provided by rigid tube assemblies or flexible lines as applicable. Designed and routed so no stress is placed on components.



X-1182-1-18/3

C. Fuel flow through engine fuel system is as follows:

- (1) Fuel from airframe fuel supply system enters engine through fuel boost pump.
- (2) Fuel flows through main fuel filter and into fuel control.
- (3) Two flow paths leave fuel control; starting fuel system and main fuel system.
- (4) Starting fuel flows to starting fuel solenoid valve. When energized (open), fuel flows to starting fuel primer tube which carries fuel to two start fuel nozzles.
- (5) Main fuel flows through the oil cooler assembly and the in-line fuel filter to the flow divider.
- (6) Flow divider splits fuel flow to provide two separate flows (primary and secondary) to each fuel manifold half. Fuel flows through manifold halves to 28 nozzles and into the combustor.
- (7) Return line from flow divider to fuel boost pump allows fuel remaining in flow divider to seep back to fuel boost pump. Check valve prevents fuel flow from boost pump to flow divider.



A-1182-1-18/4

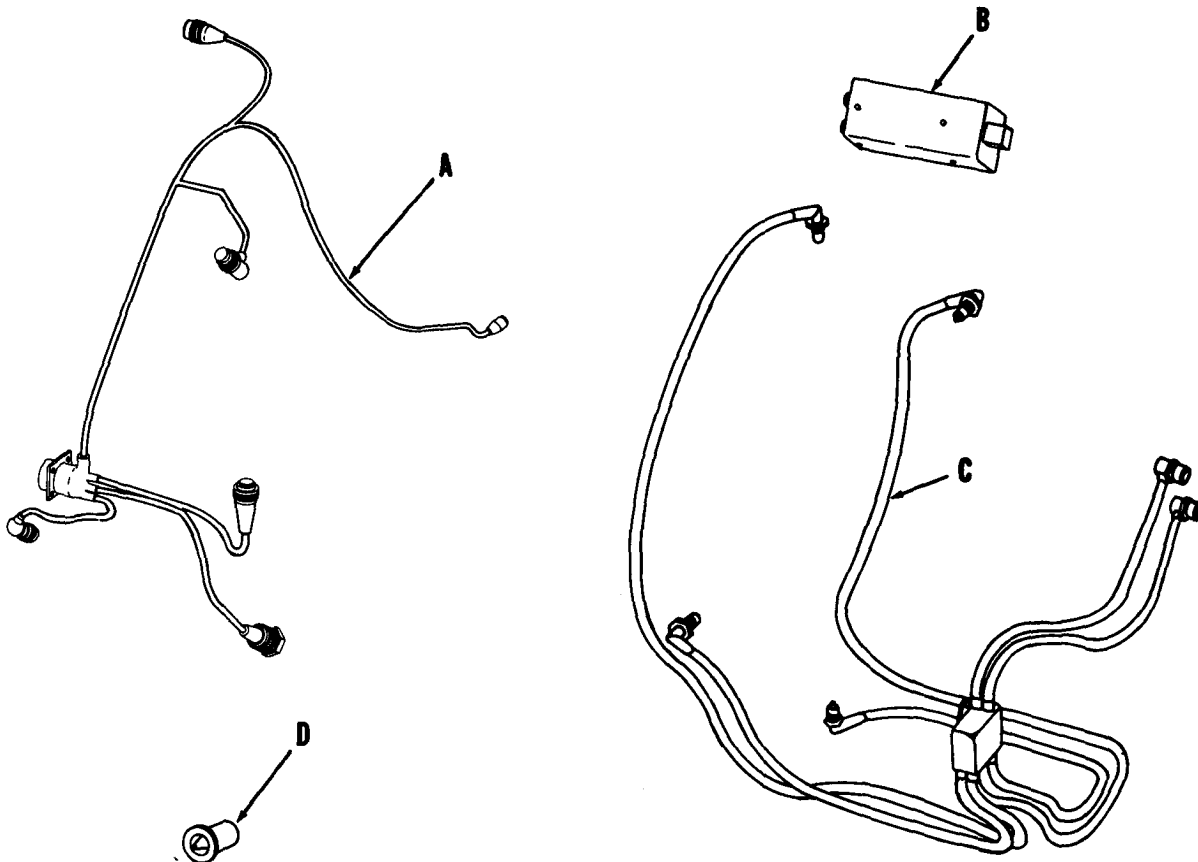
1-19 ELECTRICAL AND IGNITION SYSTEM

A. Provides circuitry for ignition, starting, and all electrical accessories. (Ref. Appendix D.) Components are listed and keyed in the following diagram.

NOTE

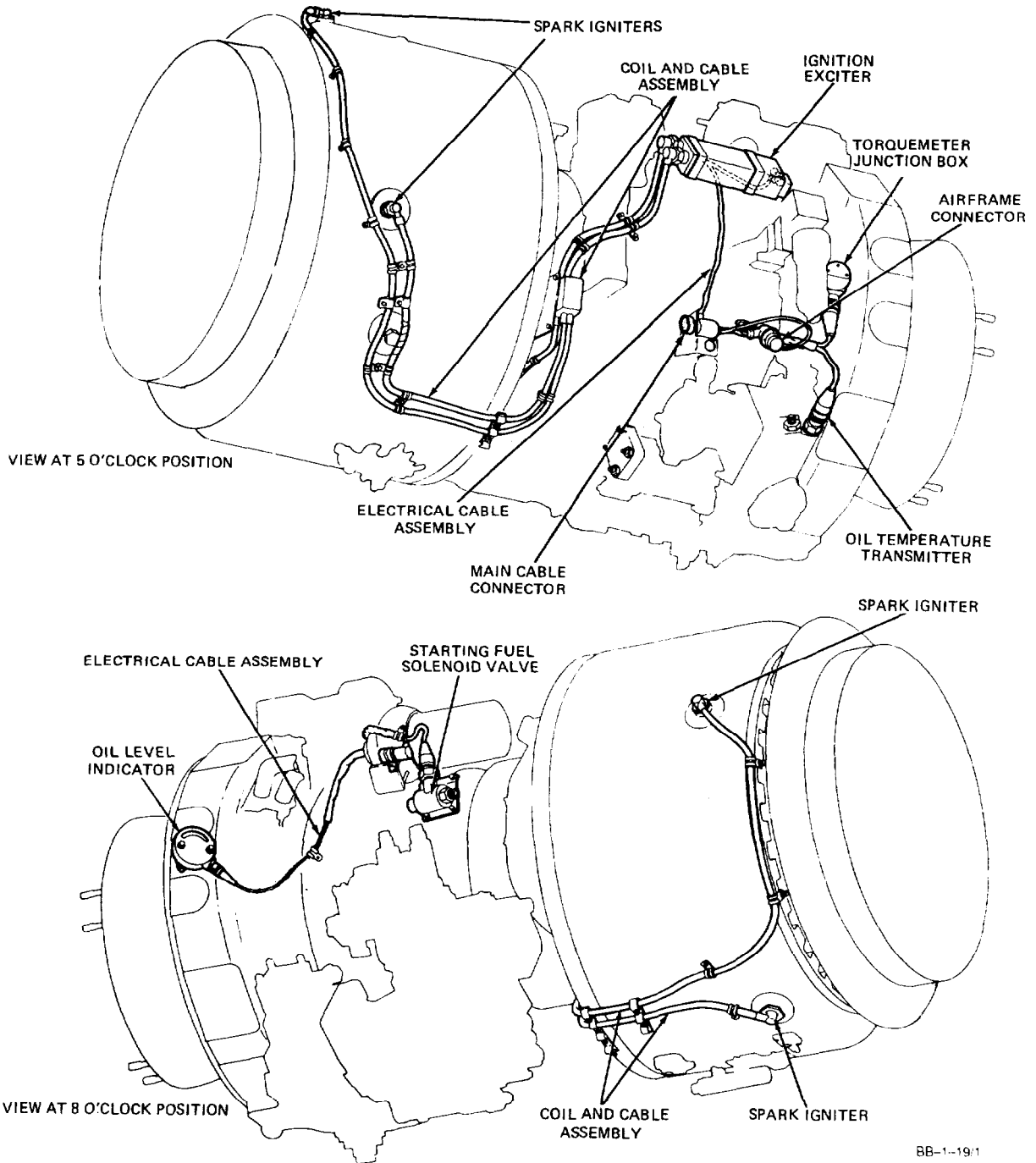
Some engine Electrical Cable Assemblies may have 9 smaller connectors. The two additional connectors are not used.

- A ELECTRICAL CABLE ASSEMBLY. Provides circuitry for electrical accessories. Consists of main connector for airframe harness hookup and 6 smaller connectors for accessories.
- B IGNITION EXCITER. Mounts on brackets on right side of compressor housing, Provides high voltage pulse required for ignition. Converts 24 volt input at 2.5 amperes current to 2500 volts.
- C COIL AND CABLE ASSEMBLY. Provides high voltage ignition wiring. Consists of shielded cabling and transformer. Splits high voltages from ignition exciter and distributes them equally to four spark igniters.
- D SPARK IGNITERS. Mount at approximately 12-, 3-, 6-, and 9-o'clock positions near aft end of combustor section. Provides spark discharge needed for ignition in combustion area.



A-1182-1-19/1

B. Coil and cable assembly connects to four spark igniters and two connectors on ignition exciter. Electrical cable assembly connects to torquemeter junction box, oil temperature transmitter, ignition exciter, oil level indicator, and starting fuel solenoid valve. Main cable assembly connector is attached to bracket on right side of engine. Cable assemblies are designed and routed to prevent stress on components and cable assemblies and to prevent chafing.



BB-1--19:1

1-20 LUBRICATION SYSTEM

A. Self-contained system provides lubrication of all engine bearings and gears. Included are provisions to allow monitoring of oil temperature, oil level, and metal contamination. Main components are listed and keyed in following diagrams.

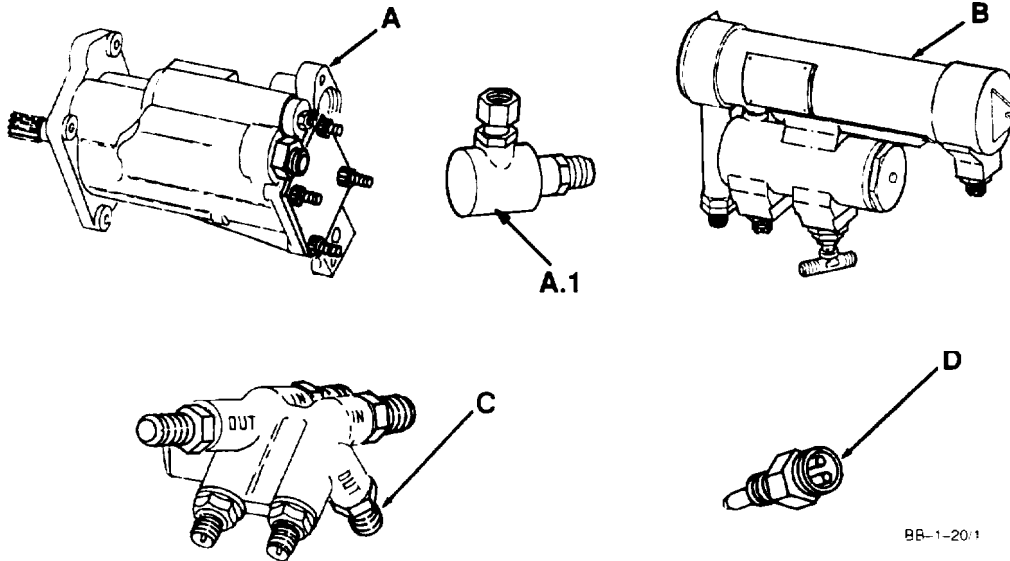
A. MAIN OIL PUMP. Contains three gear-type elements on one common splined shaft. One element supplies oil pressure. The other two return scavenge oil to the Integral oil tank. Provides 50 to 90 psig oil pressure during normal engine operating conditions. Mounts on and is driven by accessory gearbox assembly.

A. 1. CHECK VALVE. Located downstream of oil pump and main oil filter. In this location, any contamination which may be present in the oil after servicing or from oil pump wear will have to pass through the main oil filter and therefore will not be able to cause improper operation of check valve. The check valve also prevents oil from oil tank from leaking into No. 1 bearing, past No. 1 seal and overboard through the inlet housing.

B. OIL COOLER ASSEMBLY. Provides a means of lowering oil temperature. Contains many small diameter aluminum tubes (fuel flow paths) running lengthwise through one large oil flow path. As hot oil passes over low-temperature fuel tubes some heat is transferred to fuel. Results in higher fuel temperature (desired) and lower oil temperature. Mounts on interstage air-bleed actuator and bracket on right side of compressor housing.

C. OIL TEMPERATURE TRANSMITTER. Provides a means of relaying oil temperature to cockpit indicator. Converts oil temperature to electrical signal. Installs in right side of accessory gearbox.

D. DUAL CHIP DETECTOR. Provides a means to filter and detect metal contamination originating in the No. 2 or No. 4 and 5 bearing areas. Contains two separate plug assemblies each surrounded by a small mesh basket (filter). Buildup of chips between filter and plug assembly can be detected by a resistance check or by visual inspection.

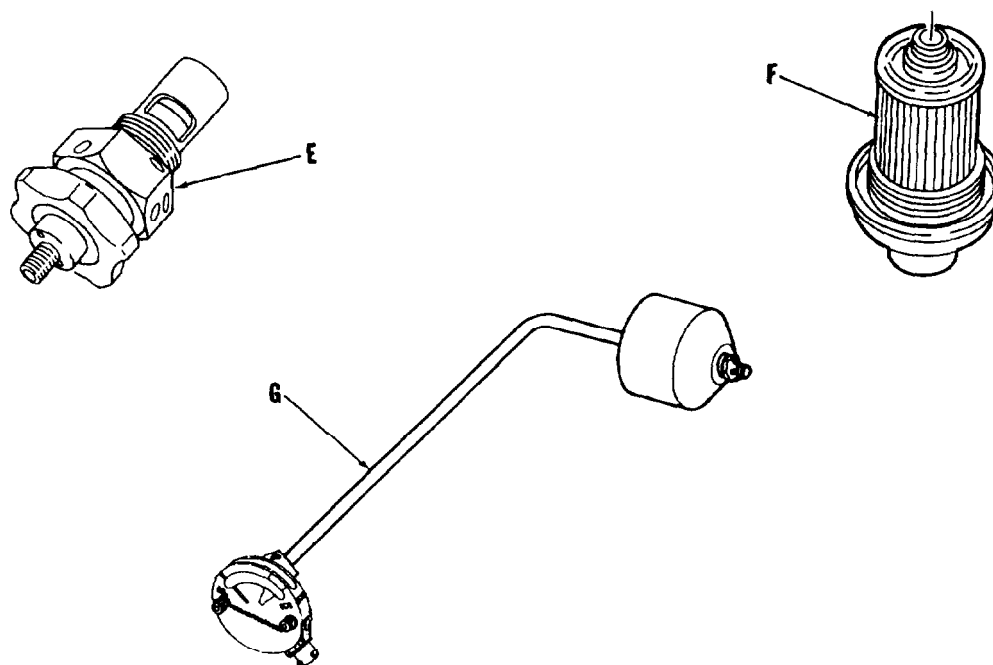


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E. GEARBOX CHIP DETECTOR. Provides a means to detect metal contamination originating in accessory gearbox assembly. Contains magnetic quick disconnect plug and self-sealing housing. Allows plug to be removed and checked for contamination without loss of engine oil. Located at bottom of accessory gearbox assembly.

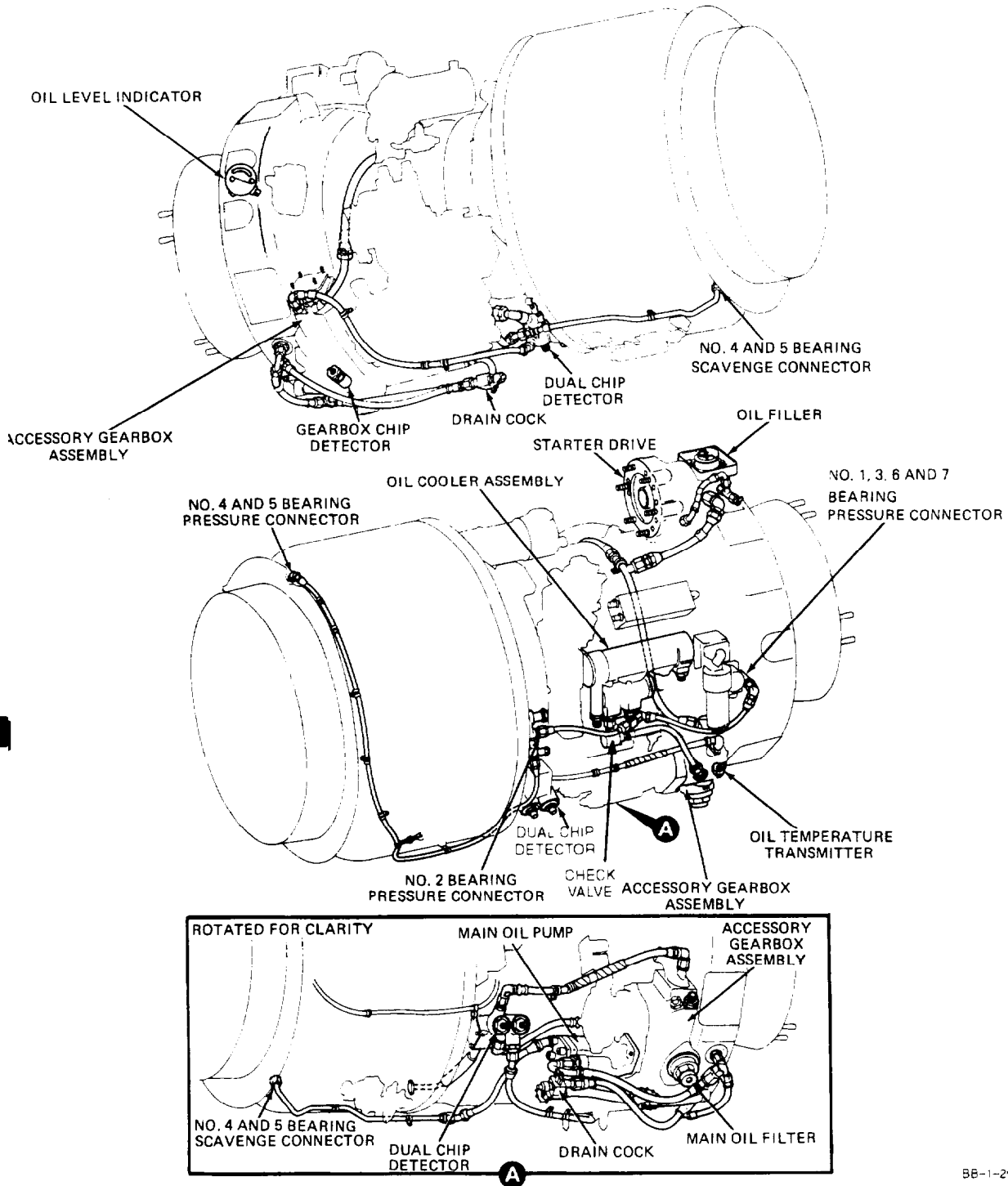
F. MAIN OIL FILTER. Consists of cover assembly and replaceable filter element. Cap and stem assembly contains popout indicator button. Button pops out if filter element is close to being bypassed because of clogging. Also contains bypass valve. Valve allows oil to bypass filter element and supply oil to engine if filter does become clogged. Located at bottom of accessory gearbox assembly.

G. OIL LEVEL INDICATING SYSTEM. Consists of float assembly connected directly to an externally mounted indicator. Indicator contains visual pointer and electrical low level switch. Switch provides ability to indicate low oil level on cockpit indicator. Float assembly located inside inlet housing assembly. Indicator mounts on left side of inlet housing at 9-o'clock position.



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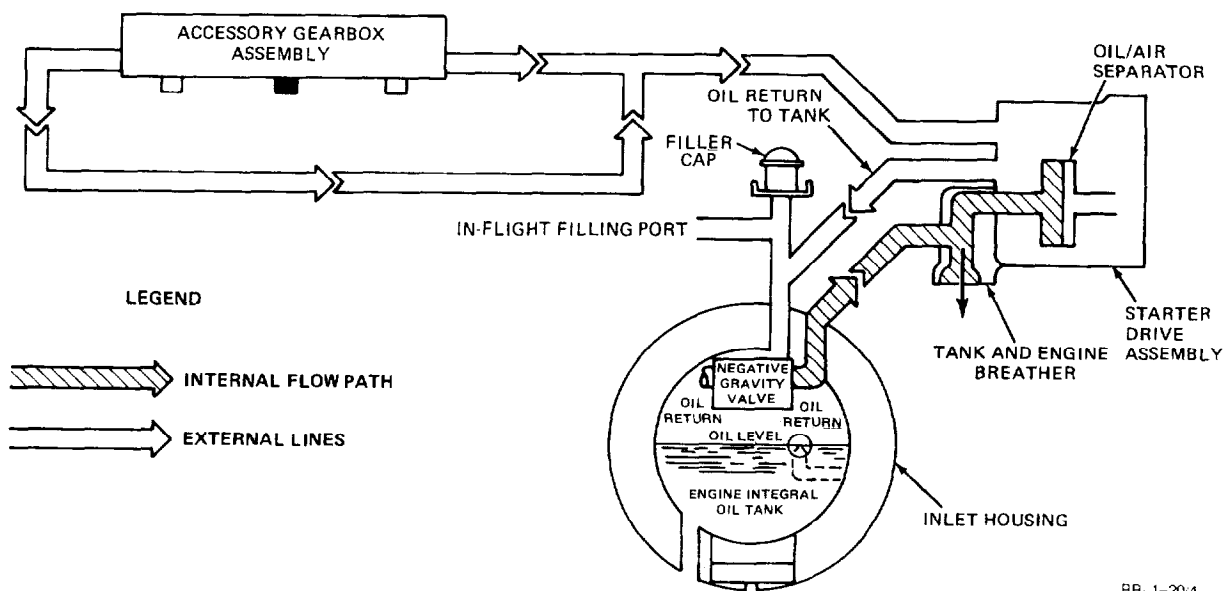
B. Oil flow between components is provided by rigid tube assemblies or flexible lines as applicable. Designed and routed so no stress is placed on components.



BB-1-20-3

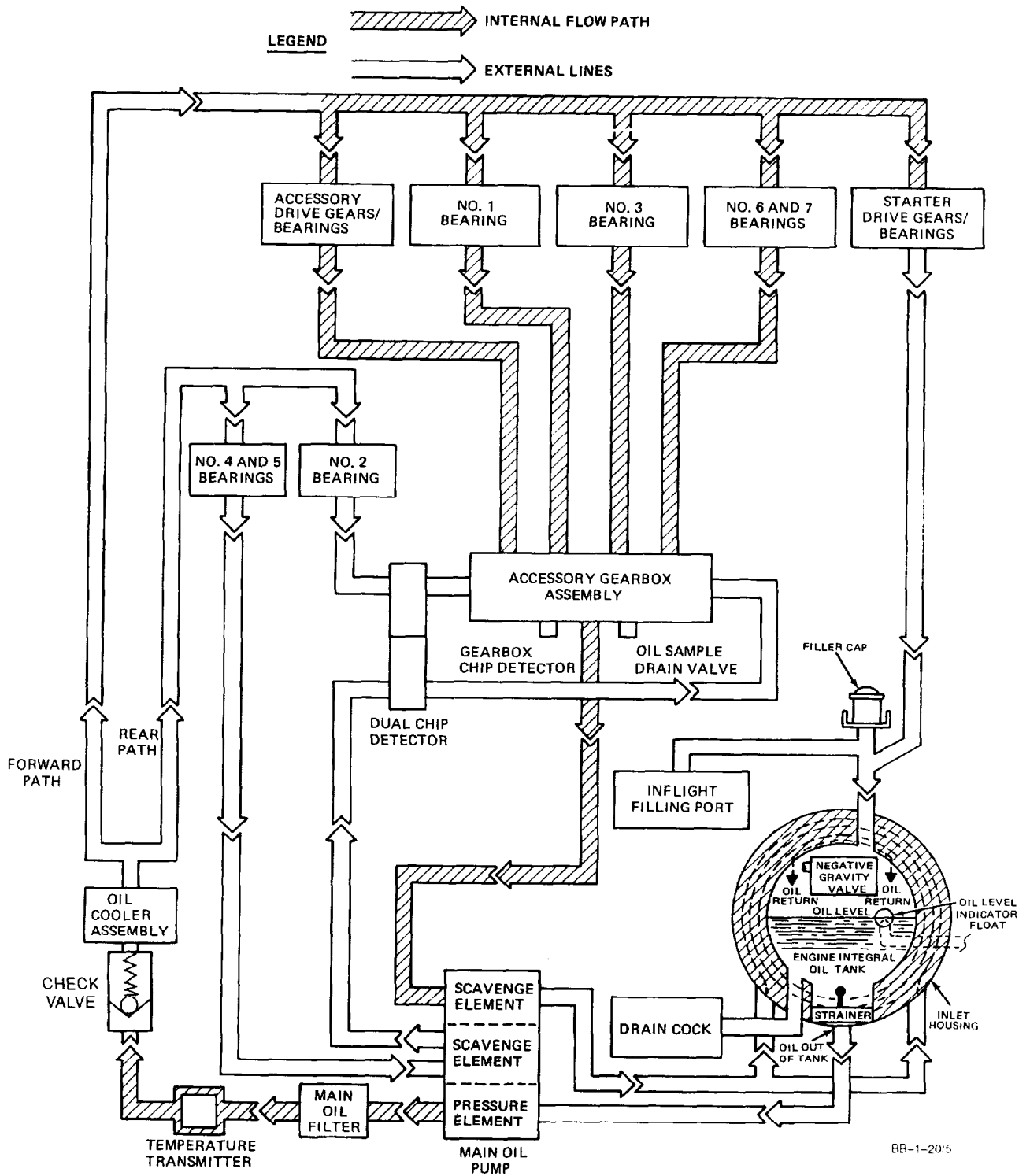
C. During engine operation some air enters the lubrication system. To get rid of this air, a venting system is included as part of the lubrication system. It removes air from accessory gearbox assembly and integral oil tank as follows:

- (1) Accessory gearbox assembly air/oil vapor flows through two external vent lines to starter drive assembly.
- (2) Integral oil tank air/oil vapor flows through negative gravity valve, at top of oil tank, and internally to starter drive assembly
- (3) Part of gearing in starter drive assembly acts as a centrifuge and separates air from oil. Oil returned to tank through normal return line. Air vented overboard through tank and engine breather. Helps to keep oil loss to a minimum.



D. Oil flow through the engine lubrication system is as follows:

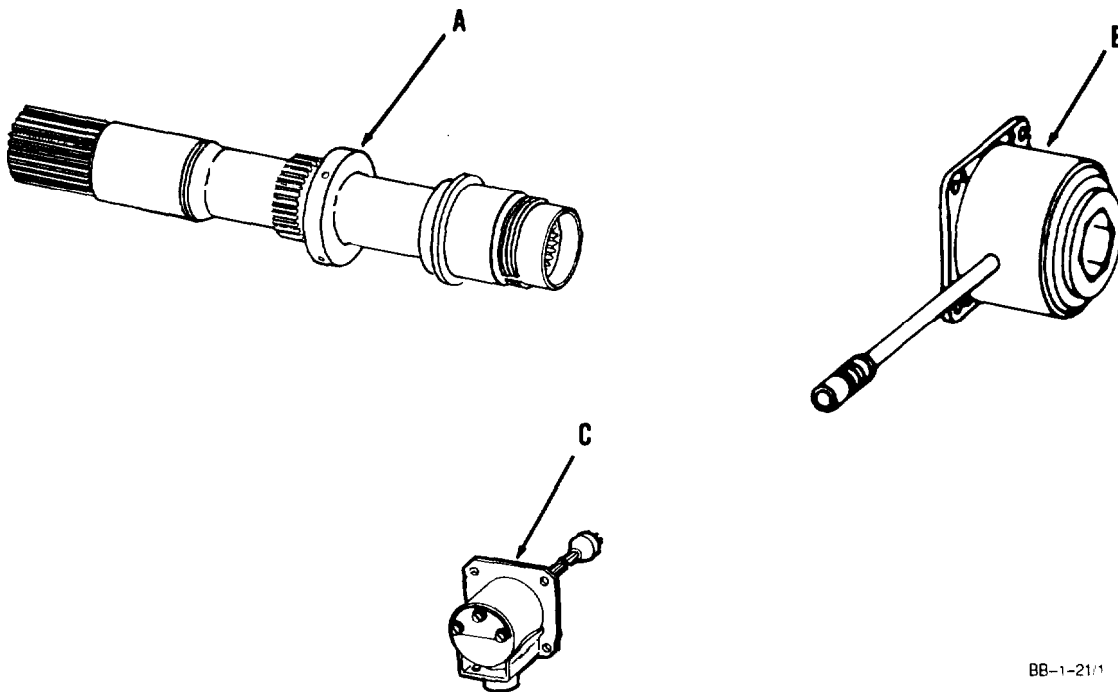
- (1) Oil leaves integral oil tank through bottom of inlet housing and flows through an external line to main oil pump.
- (2) Oil from pump pressure element flows through the main oil filter, past temperature transmitter, through the check valve and oil cooler assembly. The main oil pump, filter and cooler assembly each contain bypass valves.
- (3) Two flow paths leave oil cooler assembly. One path flows oil to rear of engine to lubricate No. 2 and No. 4 and 5 bearings. Second flow path directs oil to front of engine to lubricate accessory drive gears and bearings, starter drive gears and bearings, and No. 1, 3, 6 and 7 bearings.
- (4) Oil flows through a filter to No. 2 bearing, through dual chip detector and to accessory gearbox assembly.
- (5) Oil flows through a filter to No. 4 and 5 bearings, through scavenge element in main oil pump. through dual chip detector, and to accessory gearbox assembly.
- (6) Oil leaving accessory drive gears and bearings and the No. 1, 3, 6, and 7 bearings flows through internal paths to accessory gearbox assembly.
- (7) Oil leaves accessory gearbox assembly through a strainer and main scavenge element in main oil pump and returns to inlet housing.
- (8) Oil flow in inlet housing is through two passages that surround the integral oil tank. As passages are located in inner diameter of inlet housing next to inlet air passage, heat transfer takes place. Inlet air is heated (desired) and oil temperature lowered. Oil flow then reenters oil tank.
- (9) Oil entering starter drive gears and bearings is filtered and flows directly to integral oil tank filler tube and into tank.
- (10) Oil is removed from integral oil tank by opening drain cock



1-21 TORQUEMETER SYSTEM

Provides means to monitor engine power output. (Ref. Appendix D.) Needs electrical input signal from air-frame supplied power supply. Creates electrical signal in direct proportion to the amount of torque developed. Electrical signals averaged and directed to cockpit indicator. Engine parts are a calibrated set. One defective part means all three must be replaced. Engine parts are listed and keyed in following diagram.

- A. **OUTPUT SHAFT.** Located at front of engine within inlet housing assembly. Main torque system component; also major engine component. Splines directly to power shaft, and provides internal splines for helicopter drive shaft. Rotates within head assembly. As torque is applied to shaft, voltages are induced into head assembly coils.
- B. **HEAD ASSEMBLY.** Located within inlet housing assembly and encircles part of output shaft. Transformer containing three primary coils and six secondary coils. Electrical connector provided. Transfers induced voltages to junction box.
- C. **JUNCTION BOX.** Externally mounted at 3-o'clock position on inlet housing assembly. Connects electrically to head assembly. Converts AC voltage signals to DC signals. Provides external connector to transfer electrical signals to cockpit indicator.



BB-1-21/1

Section IV. REPAIR PARTS; SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE): AND SUPPORT EQUIPMENT

1-22 COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

1-23 SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools, TMDE, and support equipment are listed in the repair parts and special tools list (TM 55-2840-254-23P), the maintenance allocation chart (Appendix B), and Table 1-1. Tools to be fabricated are listed and shown in the illustrated list of manufactured items (Appendix E).

Table 1-1. Special Tools, TMDE, and Support Equipment

TOOL OR TEST EQUIPMENT REFERENCE T CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
T1	AVIM	Bar, Locating	5120-00-671-2129	LTCT153
T2	AVIM	Alignment Pin	5120-00-898-0697	LTCT387
T3	AVIM	Puller, Mechanical	5120-00-012-8865	LTCT1
T4	AVIM	Gage, Backlash	5220-00-015-6985	LTCT1
T5	AVIM	Fixture, Holding Gear	4920-00-012-8780	LTCT1
T5.1	AVIM	Fixture, Holding Gear	4920-00-012-9091	LTCT1
T6	AVUM	Puller, Mechanical	5120-00-509-2965	LTCT121
T7	AVUM	Installation Tool	4920-00-475-2552	LTCT1
T7.1	AVIM	Gage, Backlash	5220-00-015-6982	LTCT1
T8	AVUM	Installation Tool	4920-00-509-8087	LTCT1
T9	AVIM	Plate, Wrenching Pin	4920-00-509-8060	LTCT1
T1	AVIM	Adapter, Engine	4920-00-020-2687	LTCT1
T11	AVUM	Light, Test, Oil Level	4920-00-940-2910	LTCT1
T12	AVUM	Fixture, Gear Holding	4920-00-872-7858	LTCT1
T13	AVUM	Cover, Protective Engine	4920-00-916-2448	LTCT1
T14	AVIM	Puller, Mechanical	5120-00-110-4235	LTCT1
T15	AVIM	Torque Adapter, Wrench	5120-00-972-8191	LTCT1
T16	AVUM	Handling Tool	5120-00-959-7633	LTCT1
T17	AVUM	Handling Tool	5120-00-959-7635	LTCT1
T18	AVUM	Handling Tool	5120-00-959-7636	LTCT1
T19	AVUM	Drift Assembly	4920-00-891-4653	LTCT1
T20	AVUM	Tool Installing	4920-00-898-7925	LTCT1
T21	AVUM	Punch, Locking Cup	5120-00-951-8622	LTCT1
T22	AVIM	Socket, Wrench, Face	5120-00-918-1883	LTCT3009
T23	AVIM	Holding Tool, Shaft	5120-00-109-4669	LTCT3927
T24	AVIM	Cover, Aircraft, Group	1730-00-133-9550	LTCT3936
T25	AVIM	Puller, Mechanical	5120-00-109-4670	LTCT3961
T26	AVIM	Installing Tool	5120-00-109-4568	LTCT4968
T27	AVIM	Support, Dial Indicator	4920-00-110-9986	LTCT6098
T28	AVIM	Puller, Mechanical	5120-00-109-4674	LTCT6173
T29	AVIM	Cover, Aircraft Group	1730-00-134-0979	LTCT6271
T30	AVIM	Fixture, Assembling (Bore Heater)	4920-00-134-0162	LTCT6354

Table 1-1. Special Tools, TMDE, and Support Equipment (Continued)

TOOL OR TEST EQUIPMENT REFERENCE T CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
T31	AVUM	Tool Kit, Installation Kit, Maintenance (Skimming)	5180-00-125-4106	LTCT6623
T32	AVIM		4920-00-134-0163	LTCT6629
T33	AVIM	Screwdriver, Special Fixture, Holding Tube Adapter, Puller, Output Shaft	5120-00-125-4015	LTCT7296
T34	AVIM		4920-01-137-3557	LTCT7202
T35	AVIM		5120-01-144-5533	LTCT7285-01
T36	AVIM	Plate, Turbine Disc Separating Masking Kit, First Stage Stator, RTV	5120-01-159-7136	LTCT7309X-01
T36.1	AVUM			LTCT7612
T37	AVIM	Coupling Half, Clamp Stand, Modular Engine Test	5340-00-156-1191	LTCT9917
T38	AVIM		4920-00-167-9178	LTCT10465-02
T38.1	AVUM	Application Kit, RTV		LTCT11527-1
T39	AVIM	Alignment Pin	5120-00-178-0974	LTCT13038
T40	AVIM	Fixture, Torque	4920-00-866-0863	LTCT13344
T41	AVIM	Clinching Tool	5120-00-481-3117	LTCT13411
T42	AVIM	Fixture, Pressure	4920-00-866-0849	LTCT13442
T43	AVIM	Cable Assembly, Special	4920-00-409-8222	LTCT13476-02
T44	AVIM	Tester, Seal Leakage	4920-00-444-2362	LTCT13606
T45	AVIM	Comparator, Electron	4920-00-187-5728	LTCT13608
T46	AVIM	Fixture, Torque	4920-00-834-2178	LTCT13771
T47	AVUM	Puller, Mechanical	5120-00-784-1276	LTCT13839
T48	AVIM	Fixture, Torque	4920-00-372-4596	LTCT13857-01
T49	AVIM	Tool Set, Seal Removal	4920-00-866-0858	LTCT13868
T50	AVIM	Heater, Induction	4920-00-372-4595	LTCT13873
T51	AVIM	Installing Tool, Bearing	5120-00-370-3939	LTCT13874
T52	AVIM	Puller, Mechanical	5120-00-370-3934	LTCT13877-01
T53	AVUM	Wrench, Open-End	5120-00-834-2141	LTCT13911
T54	AVIM	Fixture, Power Turbine	4920-00-834-2182	LTCT14360
T56	AVIM	Fixture, Holding	4920-01-115-6995	LTCT14616
T57	AVIM	Puller, Mechanical	5120-01-137-3852	LTCT14666-02
T58	AVIM	Puller Wheel, Hydraulic	5130-01-115-6996	LTCT14672
T59	AVIM	Tool, Bearing Removal	5120-01-137-3558	LTCT14686
T60	AVUM	Sling, Aircraft Maintenance	1730-01-007-6990	LTCT14700
T61	AVIM	Puller, Mechanical	5120-01-111-4312	LTCT14722-01
T62	AVIM	Puller, Turbine Disc	5120-01-111-4311	LTCT14723-01
T63	AVIM	Multiplier, Torque	5120-00-482-2543	PD2501
T64	AVUM	Vibration Monitoring Kit	4920-00-879-0331	171170-0104
T65	AVUM	Adapter, Torque	5120-00-252-0262	FRES7
T66	AVUM	Crowfoot, Open End	5120-00-184-8414	
T67	AVIM	Trim Tool, Cold Weather	5310-01-172-8172	LTCT5985-01

1-24 REPAIR PARTS

Repair parts are listed and illustrated in the Repair Parts and Special Tools List (RPSTL) (TM 55-2840-254-23P) covering Aviation Unit and Aviation Intermediate Maintenance for this Equipment.

Section V. SERVICE UPON RECEIPT

This section contains general procedures for proper handling of engine upon receipt at any facility. It has instructions for checking pressurized shipping containers immediately upon receipt and every 90 days (or more frequently). It also has instructions for removing engine from shipping container, making engine ready for use after storage, and installing and removing engine on maintenance stand. It is divided into the following tasks:

LIST OF TASKS

NUMBER	TASK	PAGE
1-25	Inspect Pressurized Shipping and Storage Container	1-45
1-26	Remove Engine From Shipping and Storage Container	1-63
1-27	Activate Engine After Storage	1-88
1-28	Install Engine On Maintenance Stand	1-99
1-29	Remove Engine From Maintenance Stand	1-105

1-25 INSPECT PRESSURIZED SHIPPING AND STORAGE CONTAINER

1-25

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
Compressed Air Source
Pressure Gage, 0-30 PSI
Half Round File
Wire Brush

Materials:

Bonding Seal (E9)
Desiccant Bags (E16)
Glycerol (E21)
Lint-Free Cloth (E26)
Liquid Soap (E27)

Parts:

Humidity Indicator Card
Gasket
Valve Stem
Packings
Valve

Personnel Required:

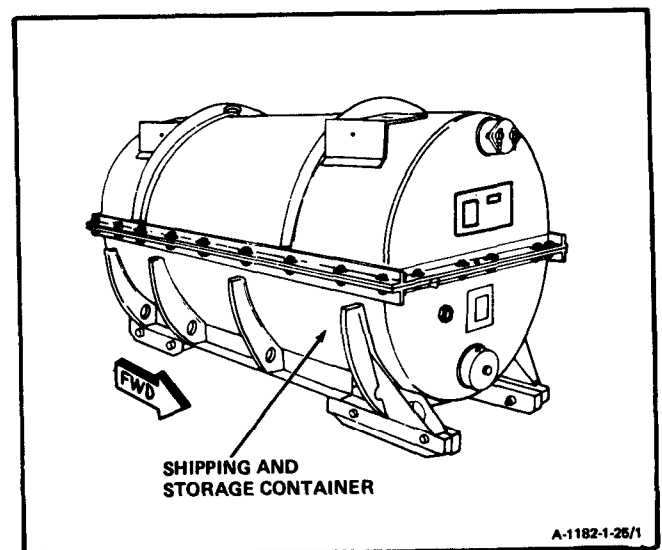
68B10 Aircraft Powerplant Repairer
68630 Aircraft Powerplant Inspector

References:

TB 55-8100-200-25
TM38-750
Task 1-26
Task 1-111
Task 1-112
Task 1-113

General Safety Instructions:**WARNING**

Before starting this procedure, make sure both sections of container are grounded. Make sure container is opened in well-ventilated area. Failure to do so could result in explosion.

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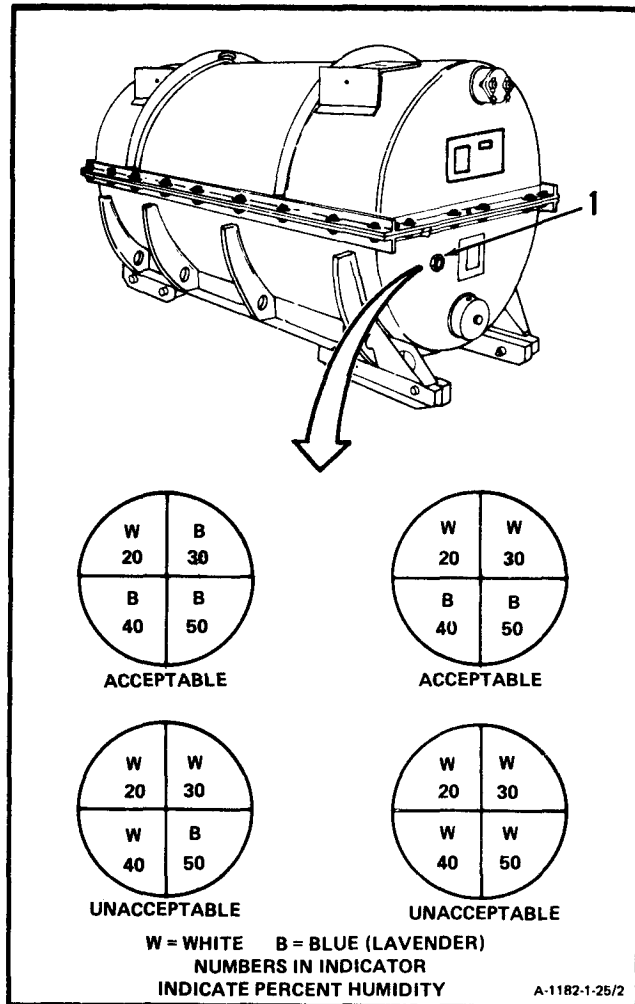
NOTE

This procedure shall be performed immediately upon receipt of engine and at least every 90 days thereafter.

- 1. Check colors of humidity indicator (1).** Indicator (1) should show acceptable color condition, The 40 and 50 percent segments shall be blue.

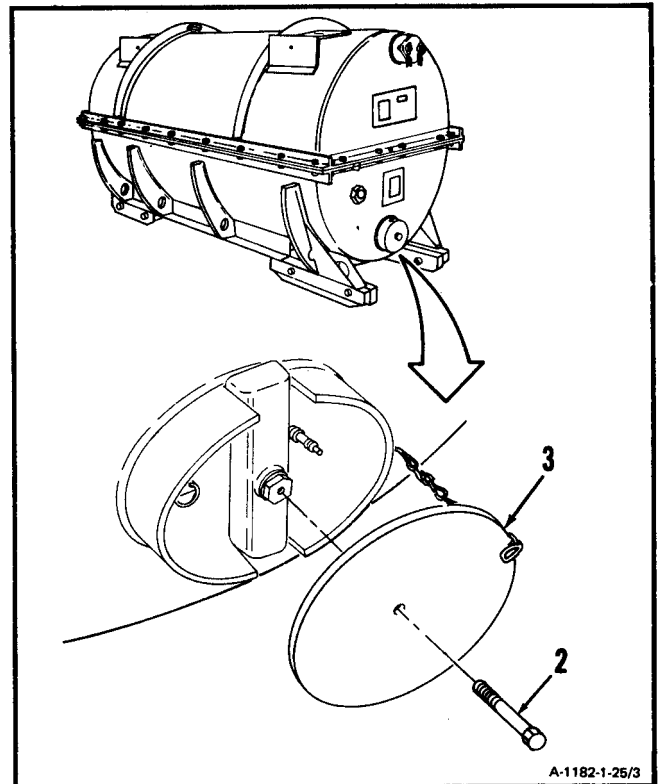
NOTE

If humidity indicator shows unacceptable color condition, omit steps 2. thru 34.
If color condition is acceptable, do steps 2. thru 34.

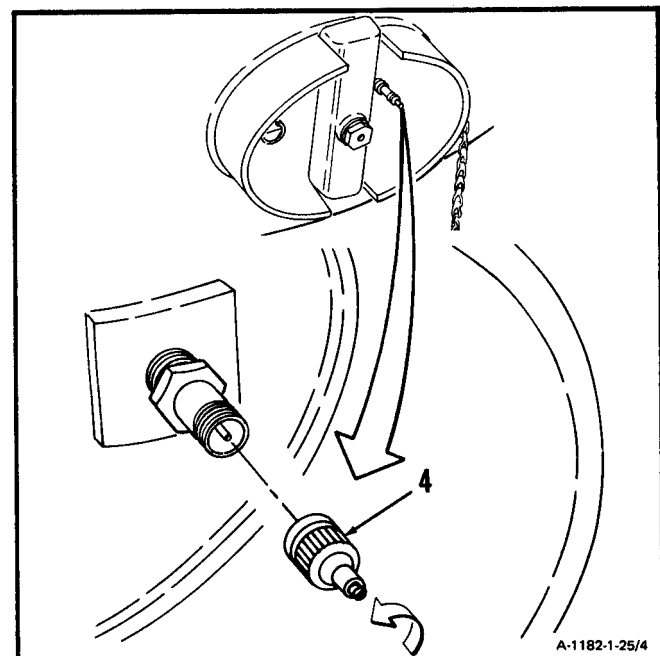


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2. Remove bolt (2) and cover (3).

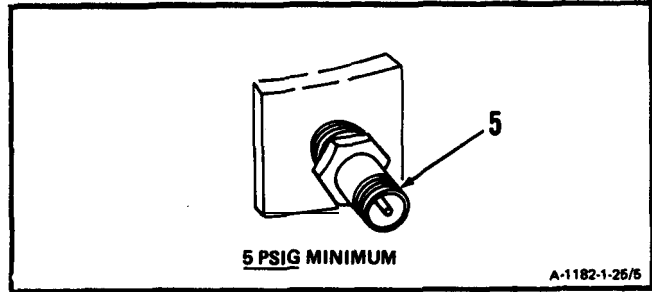


3. Remove valve cap (4).



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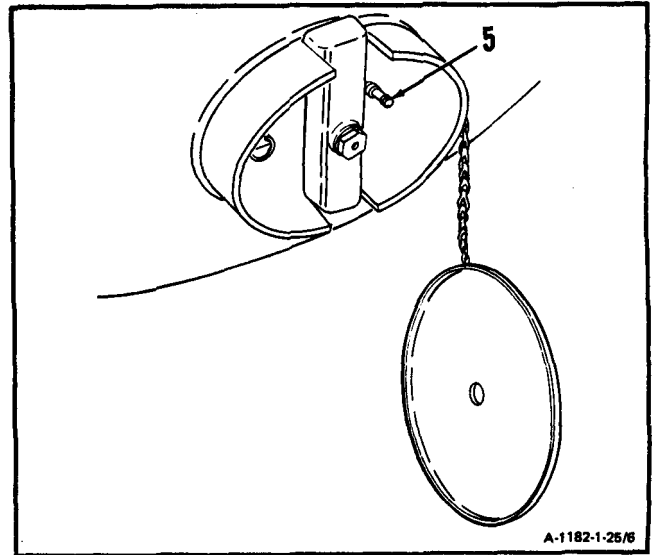
4. Check air pressure with pressure gage at valve (5). Pressure shall not be less than 5 psig.



5. If air pressure is between 1 and 5 psig, proceed as follows:

- a. Apply 5 psig air pressure to valve (5). Use clean dry compressed air.
- b. Do steps 7, 8, 9, 10, 11, 12, 13 and 14.

6. If air pressure is below 1 psig, go to step 35.

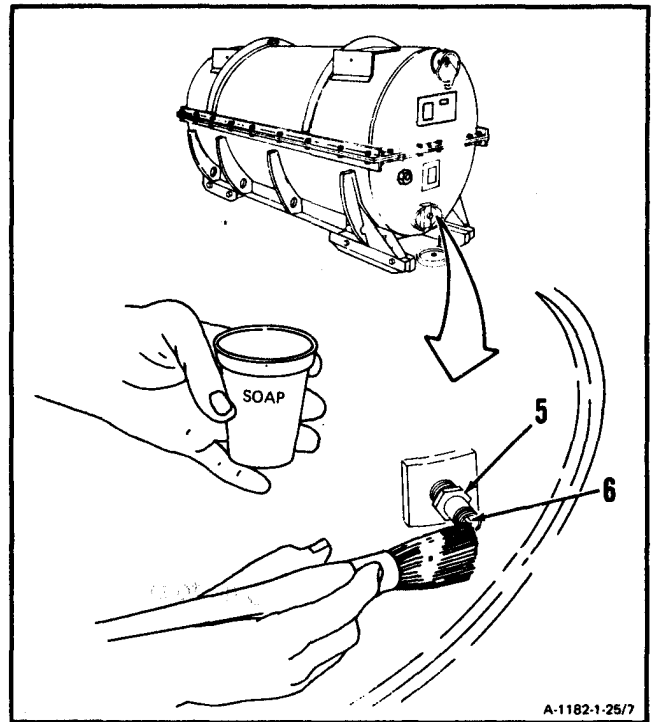


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NOTE

In following step, presence of air bubbles indicates a leak.

7. **Inspect for leaks** by applying liquid soap (E27) to valve (5) and valve stem (6).

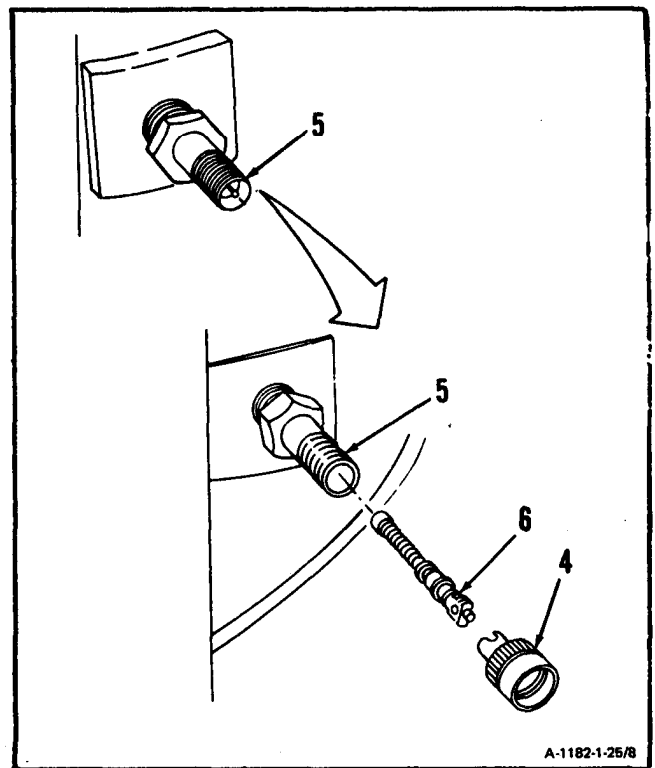


8. If leak exists at valve stem (6), replace valve stem (6) as follows:

WARNING

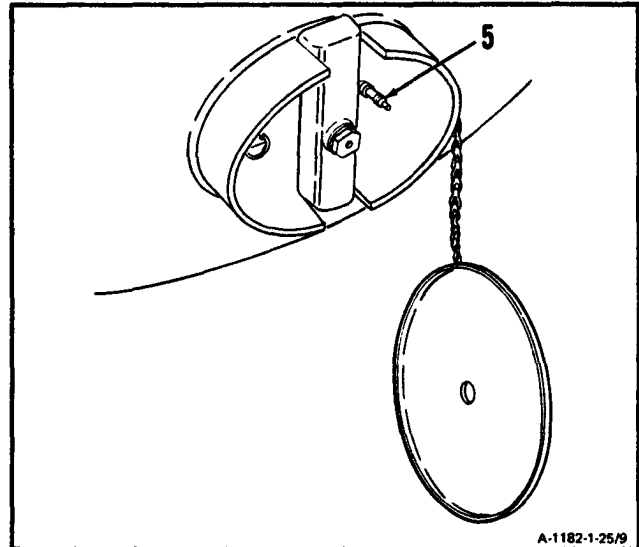
Shipping container is pressurized. Use care during removal of valve stem. Injury to personnel can result. If injury occurs, get medical attention.

- a. Remove valve stem (6) from valve (5). Use slotted end of valve cap (4).
 - b. Install serviceable valve stem (6) in valve (5). Use slotted end of valve cap (4).
9. If leaks exist at valve (5), replace valve (5) as follows:
 - a. Remove valve (5).
 - b. Install serviceable valve (5).

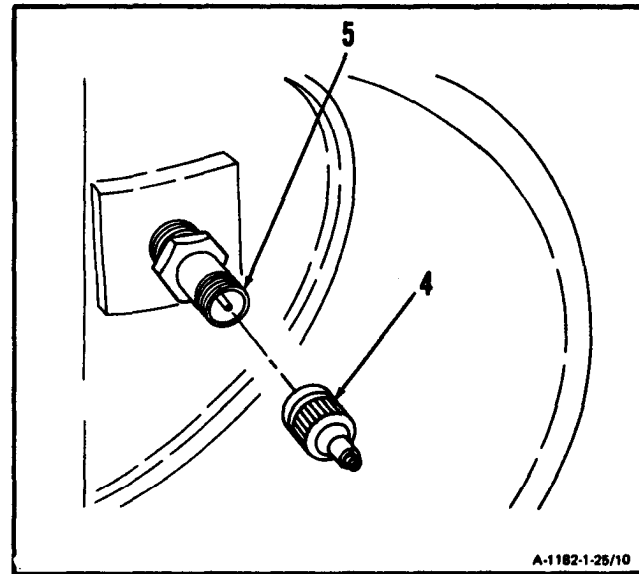


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10. Apply 5 psig air pressure to valve (5). Use clean, dry compressed air.
11. Recheck valve and valve stem for leaks (Ref. steps 7, 8, and 9).



12. Install valve cap (4) on valve (5).



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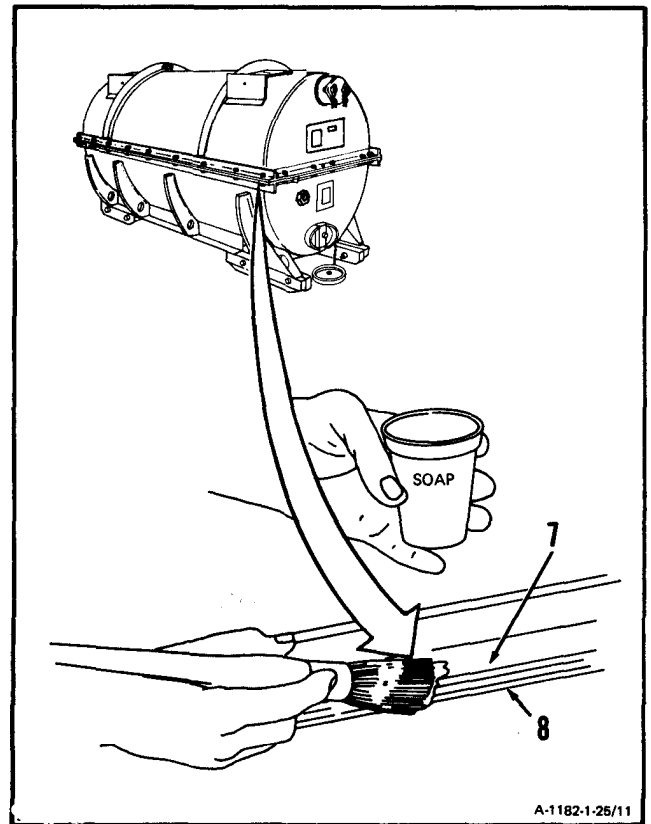
1-25 INSPECT PRESSURIZED SHIPPING AND STORAGE CONTAINER (Continued)

1-25

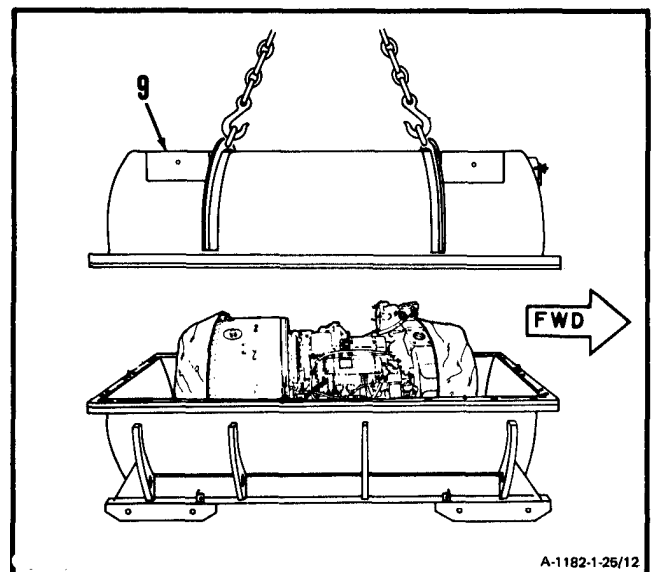
NOTE

In following step, presence of air bubbles indicates a leak.

13. **Check for leaks** by applying liquid soap (E27) to shipping container mating flanges (7 and 8).
14. **If no leaks exist at flanges (7 and 8), omit steps 15. thru 35.** If leaks exist at flanges (7 and 8), do steps 5. thru 35.

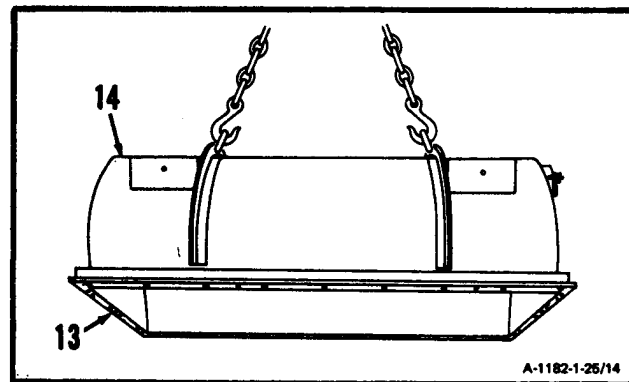
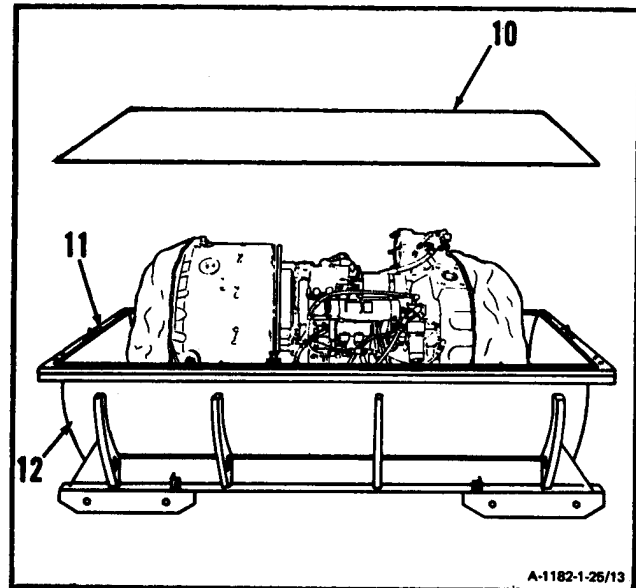


15. **Remove shipping and storage container cover assembly (9).** (Ref. Task 1-26, steps 7. thru 11.).



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16. Remove sealing gasket (10).
17. **Inspect sealing gasket (10).** There shall be no material missing, breakage or foreign material stuck to gasket.
18. **Inspect flange surface (11) for rust or foreign material. If rust or foreign material is found clean flange surface (11) as follows:**
 - a. Clean flange surface (11) on all four sides of base assembly (12). Use wire brush.
 - b. If rough projections exist, smooth projections out. Use half round file.
19. **Clean flange surface (13) on all four sides of cover assembly (14).** Use wire brush. If rough projections exist, smooth projections out using half round file.

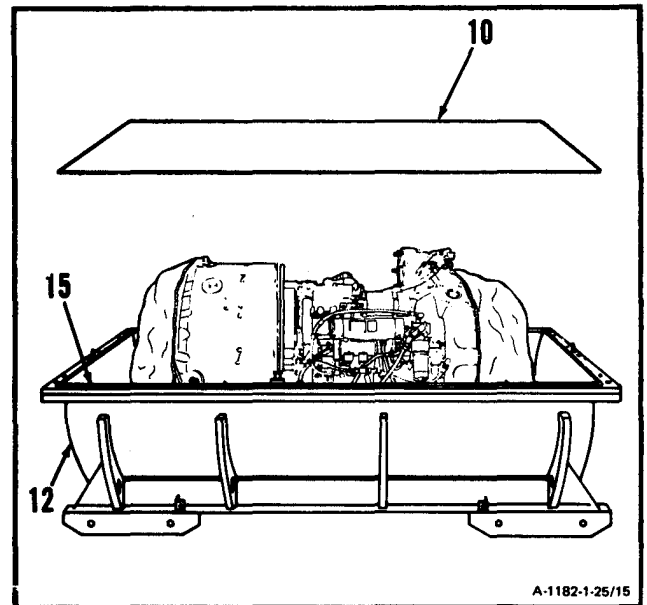


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1-25 INSPECT PRESSURIZED SHIPPING AND STORAGE CONTAINER (Continued)

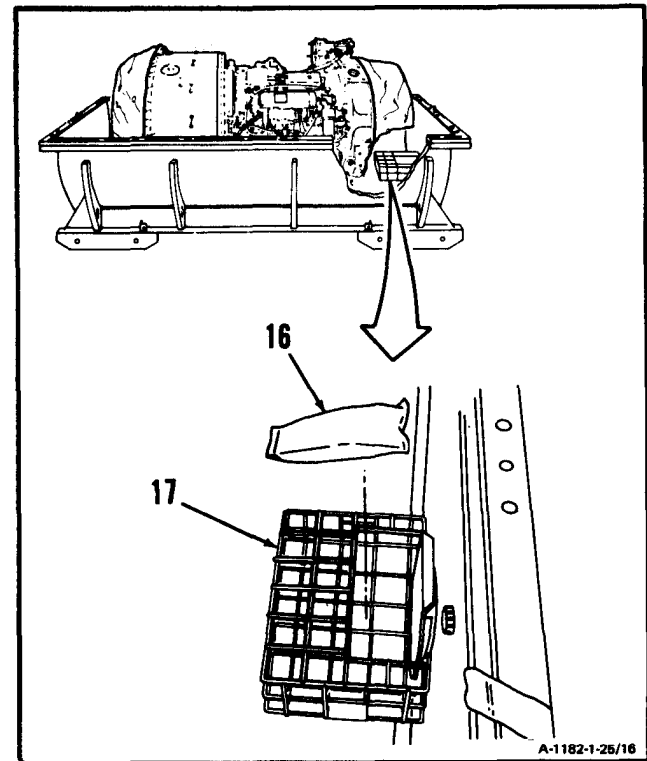
1-25

20. Wipe sealing gasket (10) clean using lint-free cloth (E26).
21. Apply light coat of glycerol (E21) on sealing gasket (10). **Install sealing gasket (10)** in groove (15) of base assembly (12).

**NOTE**

Step 22. shall be performed immediately before cover assembly is lowered onto base assembly.

22. **Install five bags of desiccant (16)** (E 16) in desiccant basket (17).

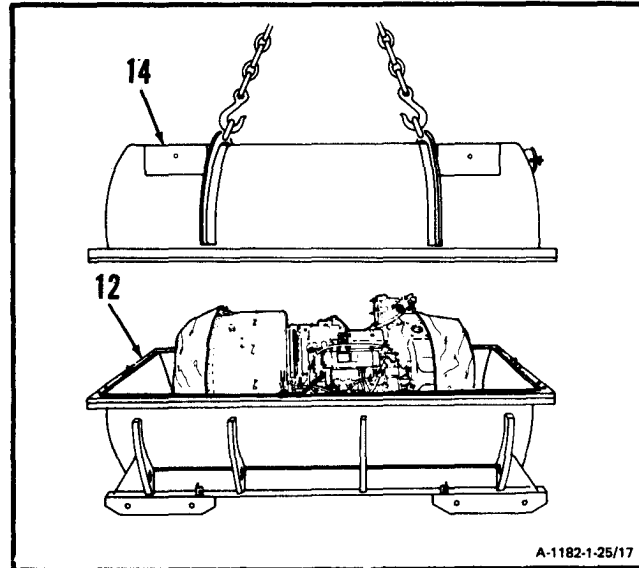


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1-25 INSPECT PRESSURIZED SHIPPING AND STORAGE CONTAINER (Continued)

1-25

23. **Install cover assembly (14)** on base assembly (12) (Ref. Task 1-26, steps 33 through 50).



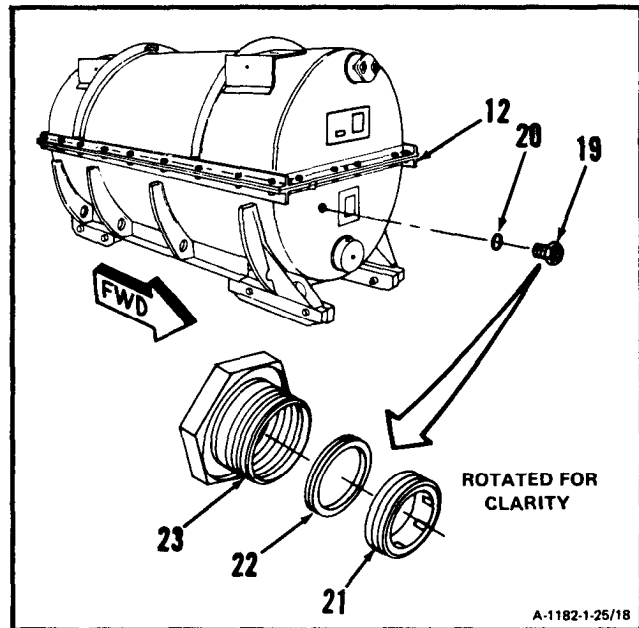
A-1182-1-25/17

24. Remove humidity indicator (19) and packing (20).

25. Remove bushing (21) and humidity indicator card (22).

26. **Install new humidity indicator card (22)** and bushing (21) in housing (23).

27. Install packing (20) and humidity indicator (19) in base assembly (12).



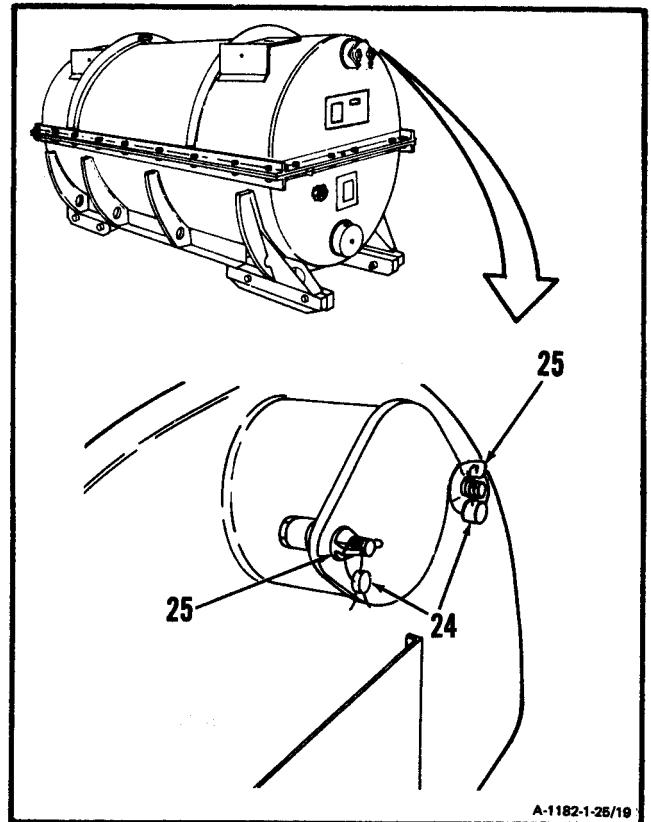
A-1182-1-25/18

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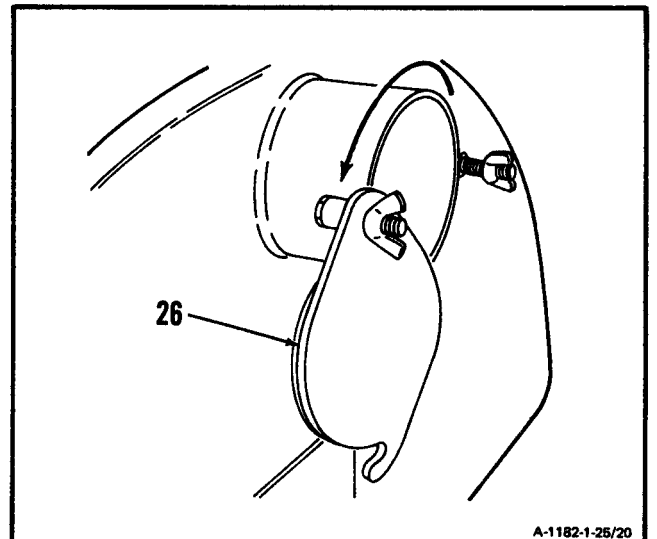
1-25 INSPECT PRESSURIZED SHIPPING AND STORAGE CONTAINER (Continued)

1-25

28. Remove two bonding seals (24), and loosen wing nuts (25).

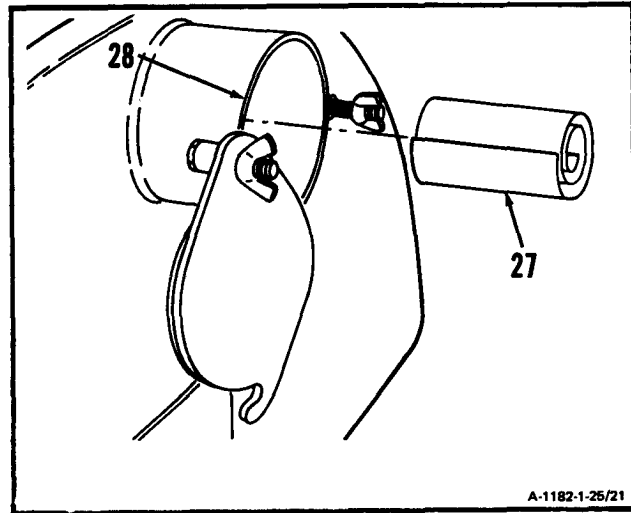


29. Open cover assembly (26).

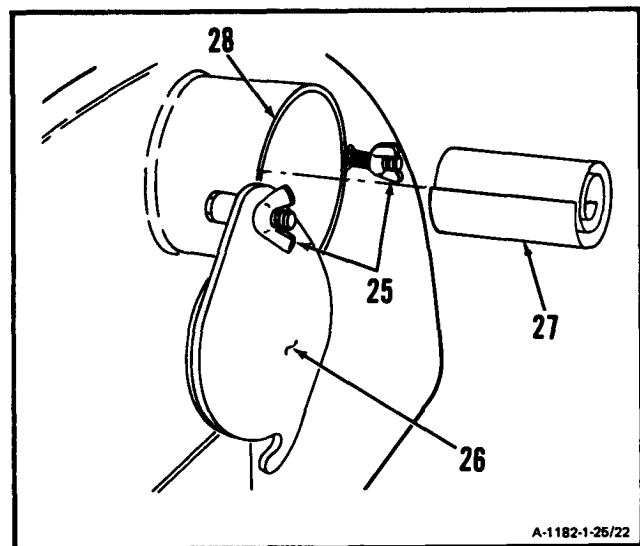


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30. Remove historical records (27) from record receptacle (28). Record date of repressurization and name of activity on historical record (27) (Ref. TM 38-750).



31. Install complete historical records (27) in record receptacle (28). Close cover (26) and tighten two wing nuts (25).

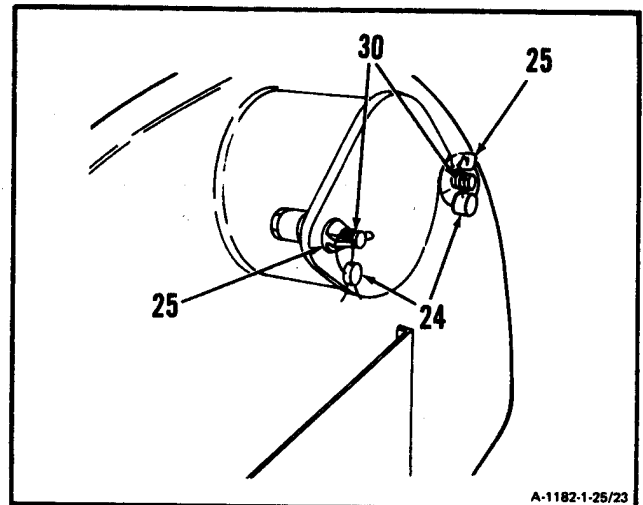


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1-25 INSPECT PRESSURIZED SHIPPING AND STORAGE CONTAINER (Continued)

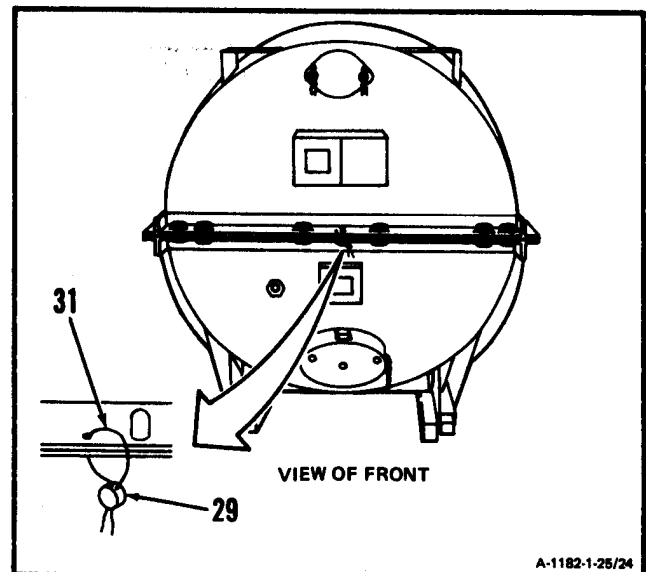
1-25

32. Install two bonding seals (E9) (24) through wing nuts (25) and bolts (30).



A-1182-1-25/23

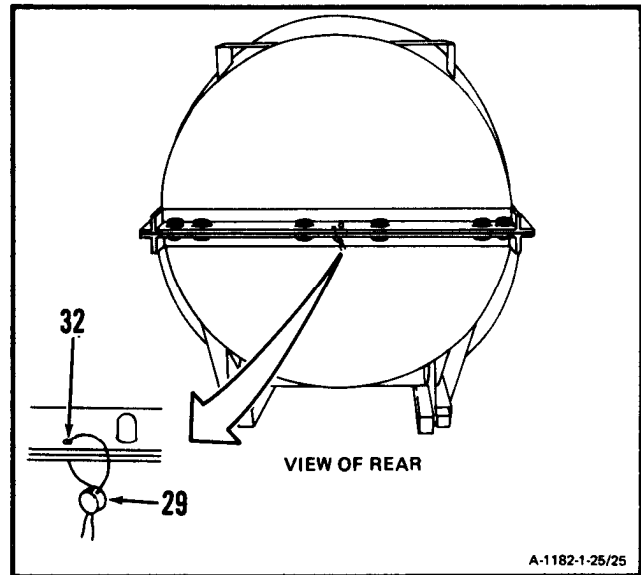
33. Install bonding seal (E9) (29) through hole (31) on forward end of shipping container.



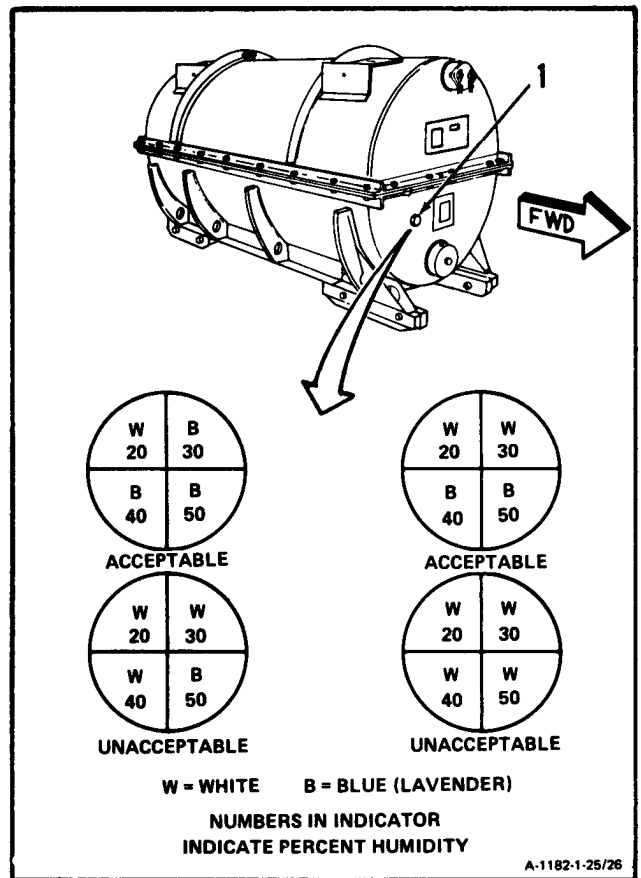
A-1182-1-25/24

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34. Install bonding seal (E9) (29) through hole (32) on aft end of shipping container.



35. Check humidity indicator (1). If 40 and 50 percent segments are not blue proceed as follows:

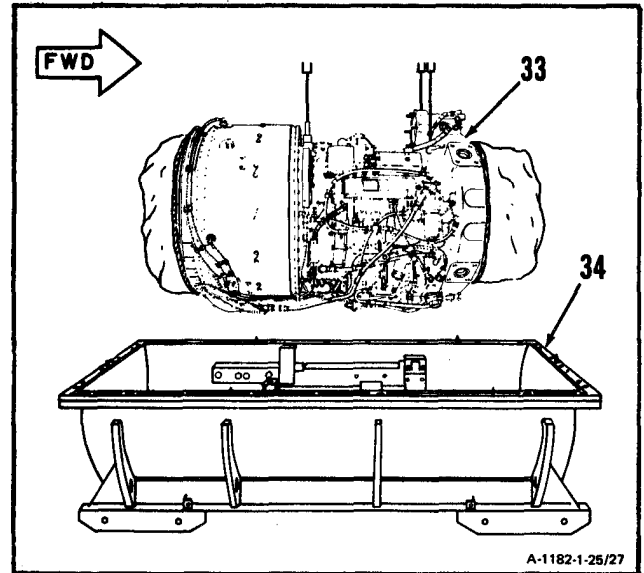


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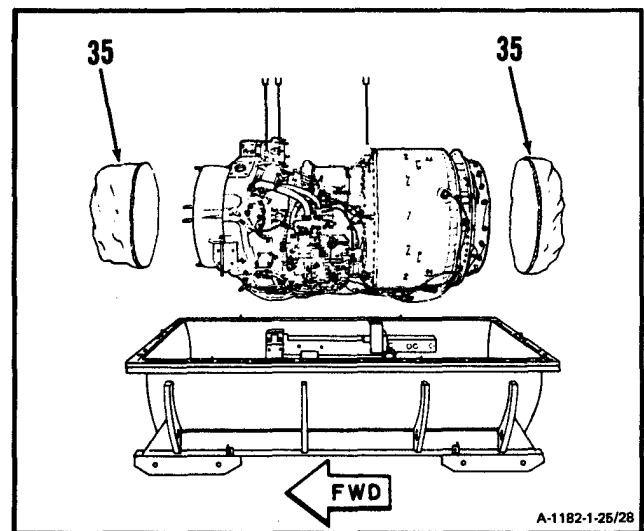
1-25 INSPECT PRESSURIZED SHIPPING AND STORAGE CONTAINER (Continued)

1-25

- a. Remove engine (33) from shipping container (34) (Ref. Task 1-26, steps 4 thru 31)

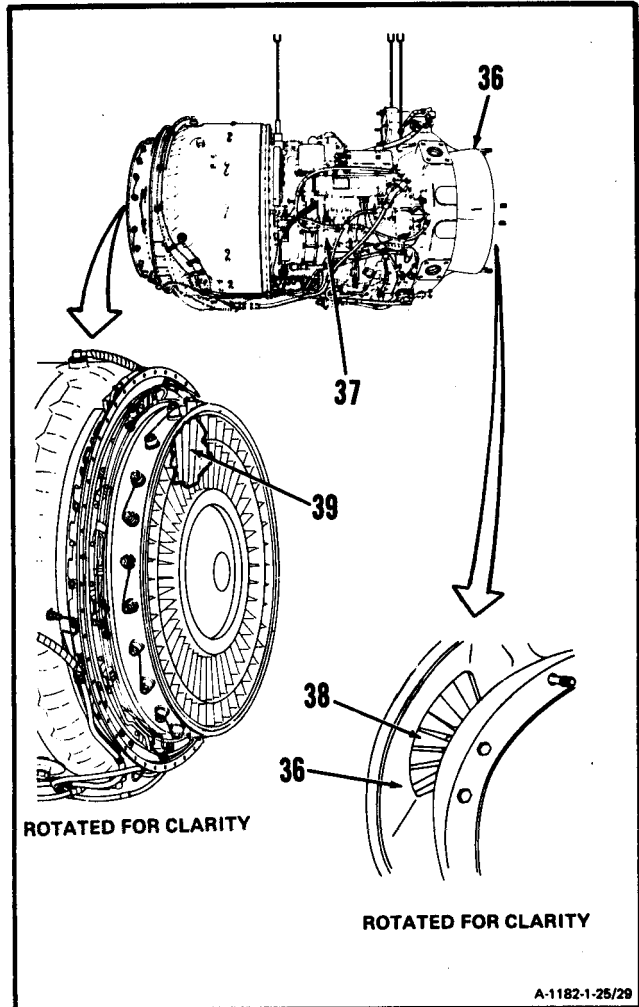


- b. Remove two plastic covers (35).

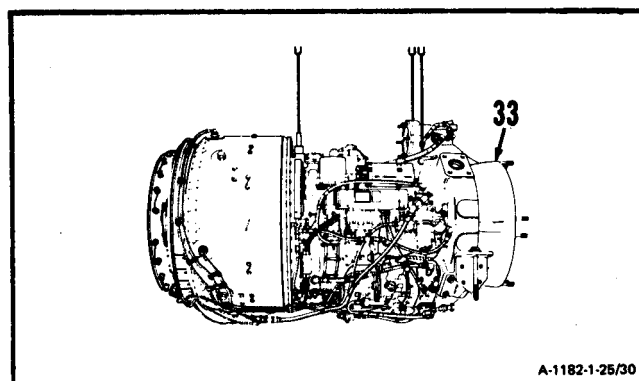


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c. Inspect inlet (36), compressor housing (37), visible compressor rotor blades (38), and fourth turbine rotor blades (39). There shall be no corrosion. If corrosion exists, repair or replace any item that your maintenance level allows. Otherwise replace engine.

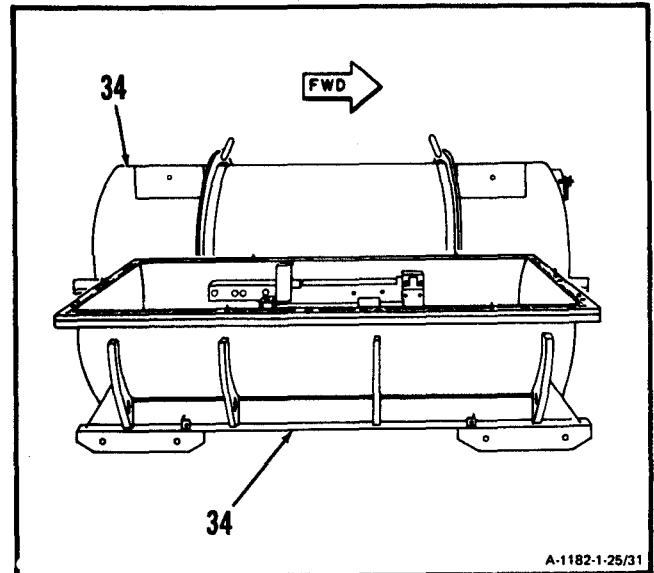


d. Preserve and prepare engine (33) for shipment or storage (Ref. Task 1-111).

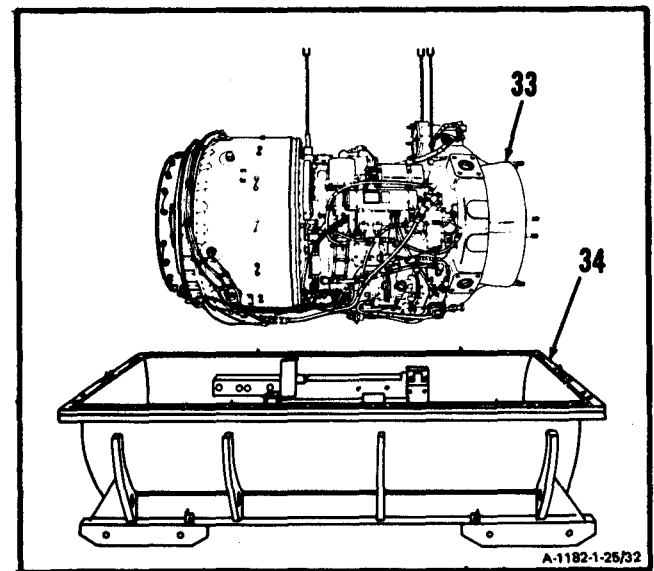


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e. Prepare and inspect shipping and storage container (34) (Ref. Task 1-112).



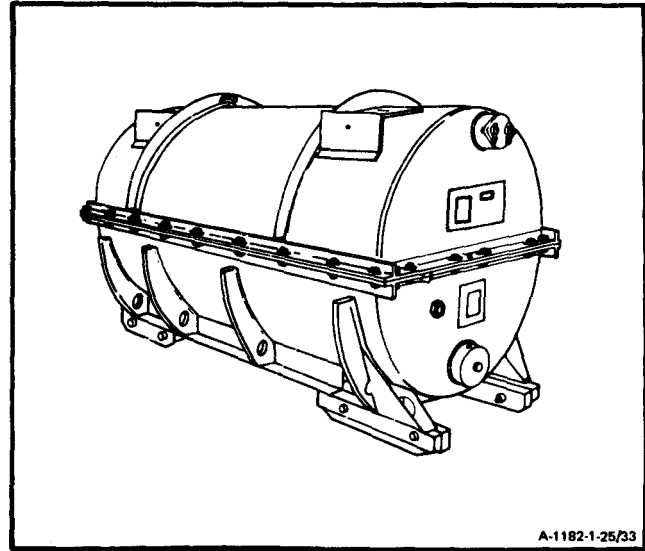
f. Install engine (33) into shipping and storage container (34) (Ref. Task 1-113).



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FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER

1-26

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
Chain with Hooks (Appendix E)
Torque Wrench, 100-750 Inch-Pounds
Compressed Air Source
Vacuum Cleaner
Pressure Gage, 0-30 PSI
Wire Brush
Half Round File
Hoist

Materials:

Desiccant Bag (E 16)
Glycerol (E21)
Lint-Free Cloth (E26)
Liquid Soap (E27)
Tar (E55)
Wiping Rag (E58)

Personnel Required:

68B10 Aircraft Powerplant Repairer (2)
68630 Aircraft Powerplant Inspector

References:

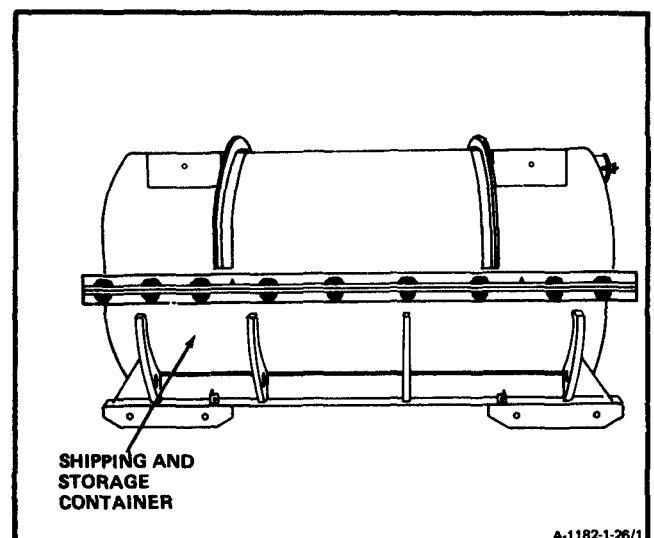
TM 55-1520-240-23
TM 55-4920-328-13
Task 1-25
Task 1-28
Task 1-30
Task 1-83

General Safety Instructions:**WARNING**

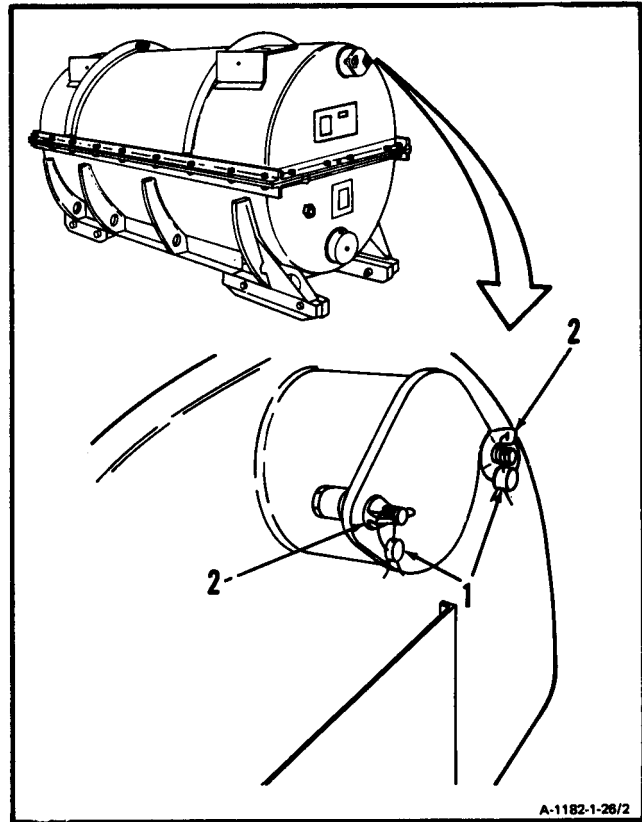
Before starting this procedure, make sure both sections of container are grounded. Make sure container is opened in well-ventilated area. Failure to do so could result in explosion.

WARNING

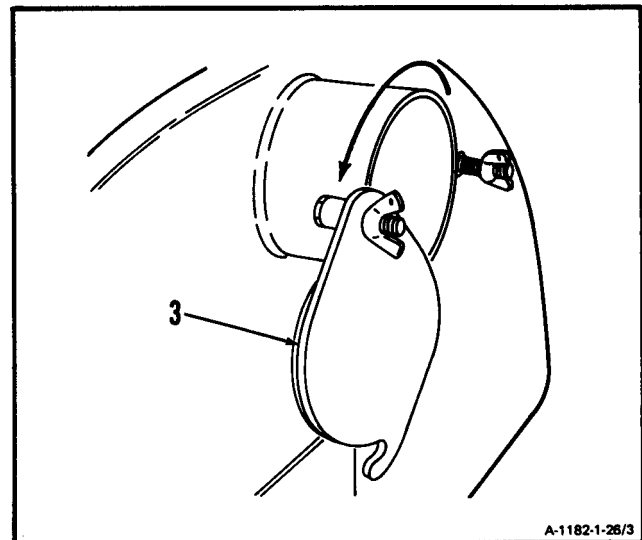
Shipping container is pressurized. Use care during removal of valve stem. Injury to personnel can result. If injury occurs, get medical attention.

**GO TO NEXT PAGE**

1. Remove two bonding seals (1), and loosen wing nuts (2).

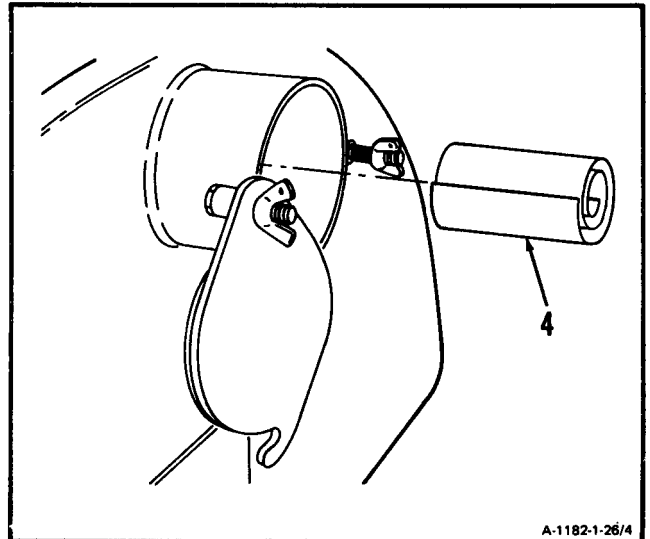


2. Rotate cover assembly (3).

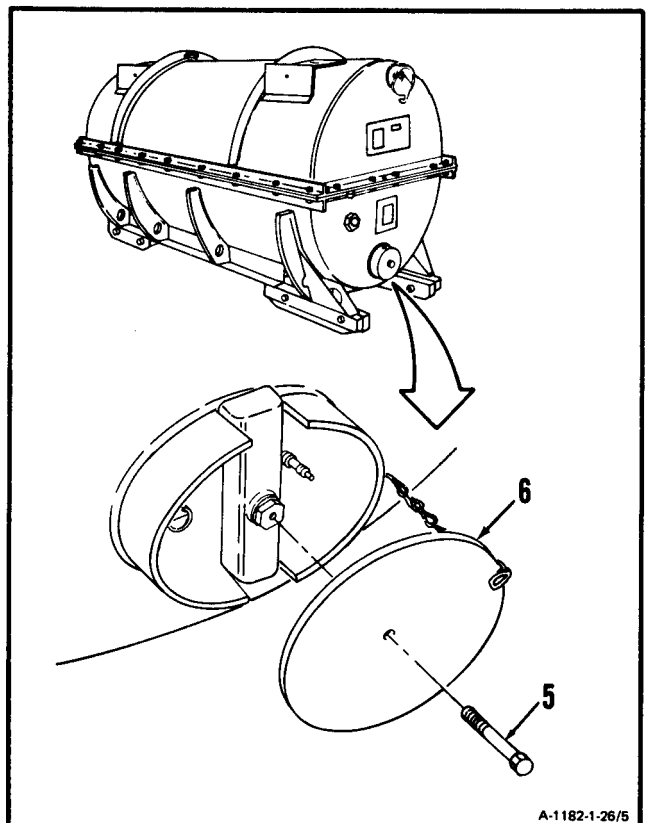


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3. Remove historical records (4).

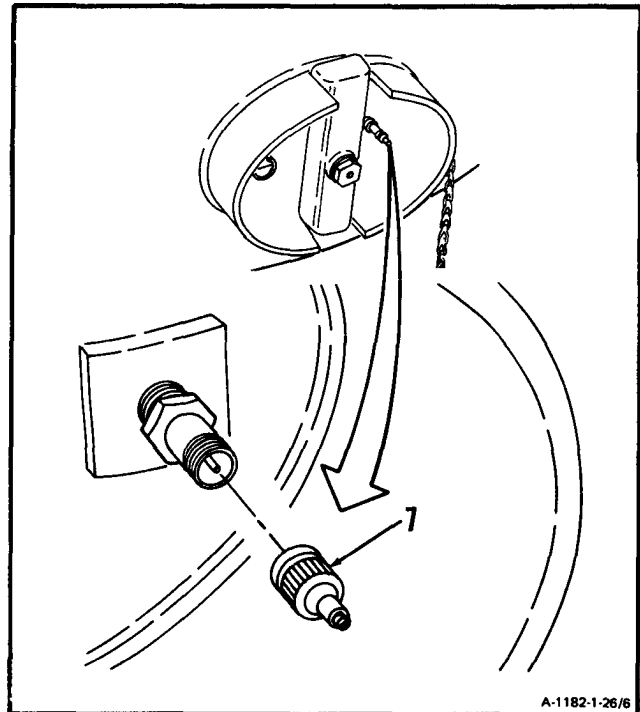


4. Remove bolt (5) and cover (6).



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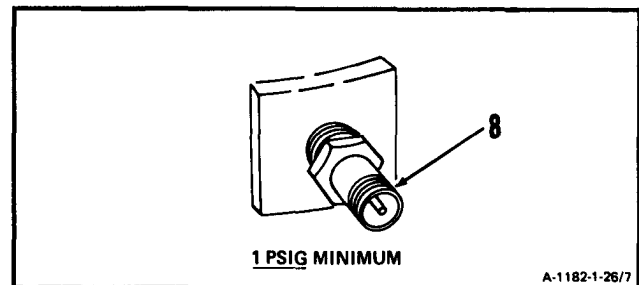
5. Remove valve cap (7).



NOTE

In following step 6. if air pressure is less than 1 psig, container and engine should be inspected (Ref. Task 1-25).

6. **Check air pressure** with pressure gage at valve (8). pressure shall not be less than 1 psig.

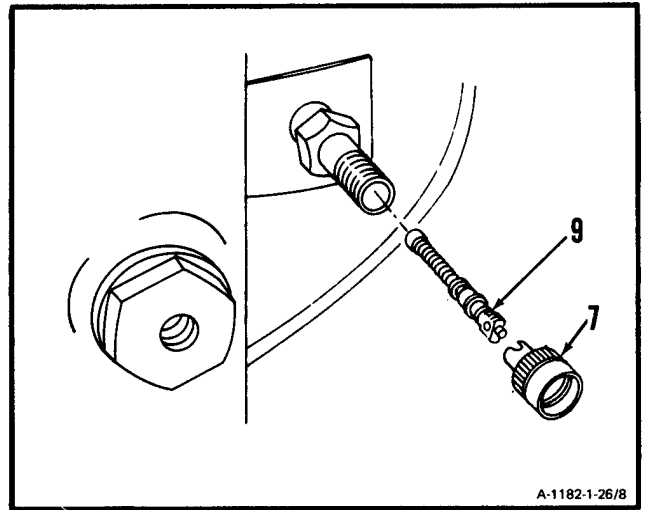


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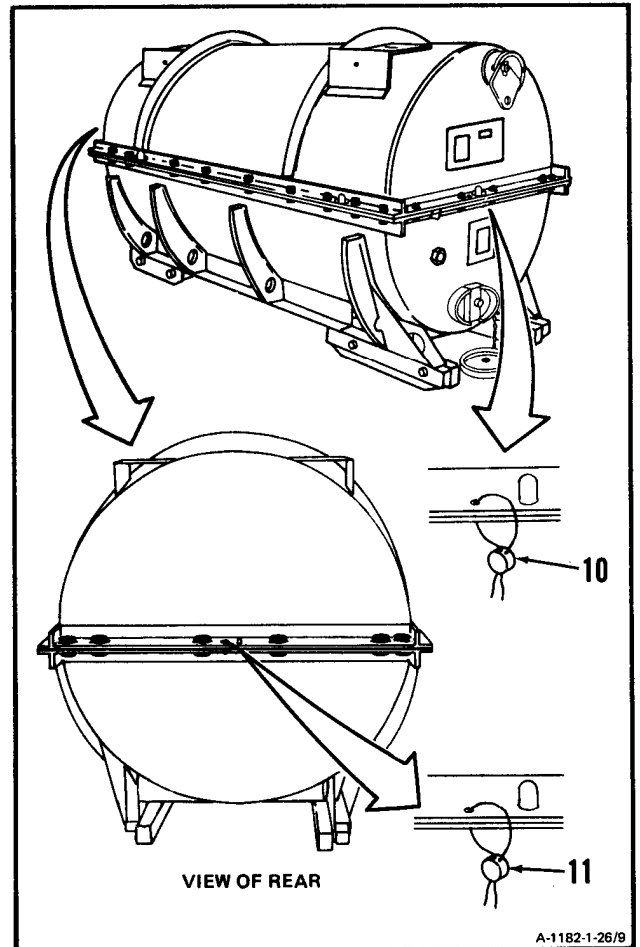
WARNING

Shipping container is pressurized. Use care during removal of valve stem. Injury to personnel can result. If injury occurs, get medical attention.

7. Remove valve stem (9). Use slotted end of valve cap (7).



8. Remove bonding seals (10 and 11).

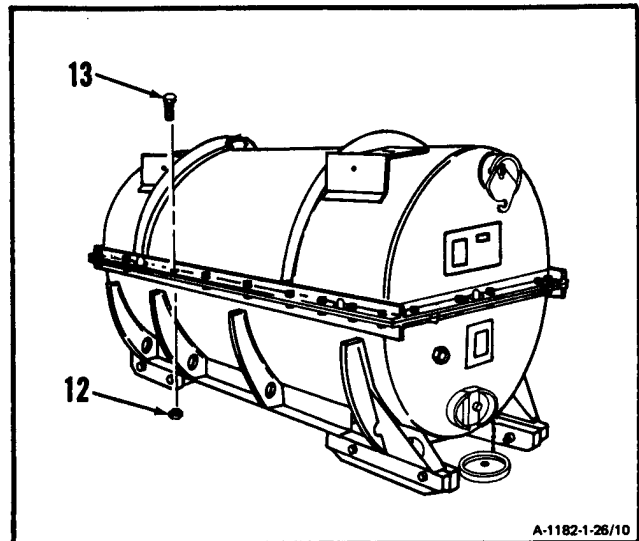


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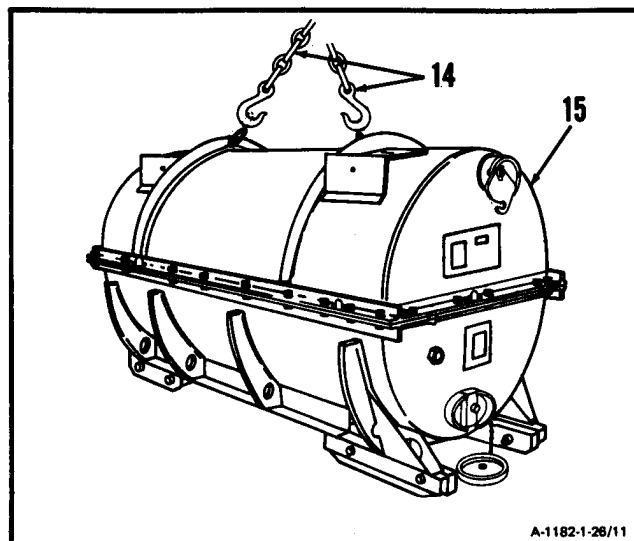
WARNING

Make certain that all air pressure has been released before loosening nuts. If nuts are removed before pressure is released, internal pressure could blow cover off and cause serious injury. If injury occurs, get medical attention.

9. Remove 30 nuts (12) and bolts (13).



10. Install hoist and chain with hooks (Appendix E) (14) to cover assembly (15).

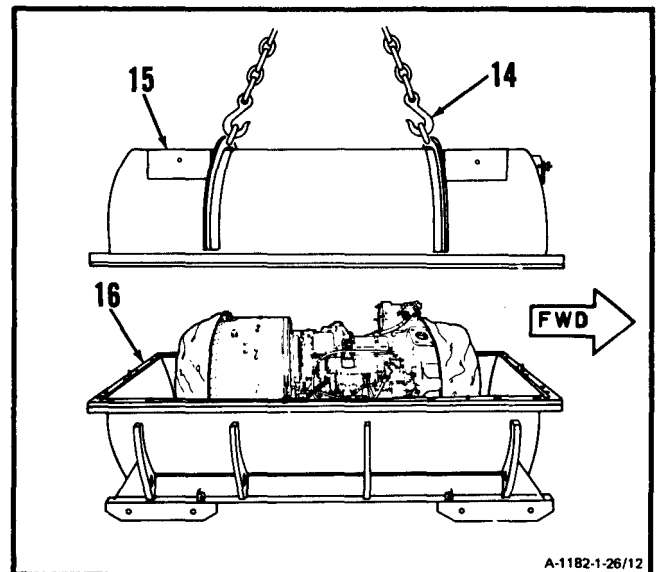


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1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

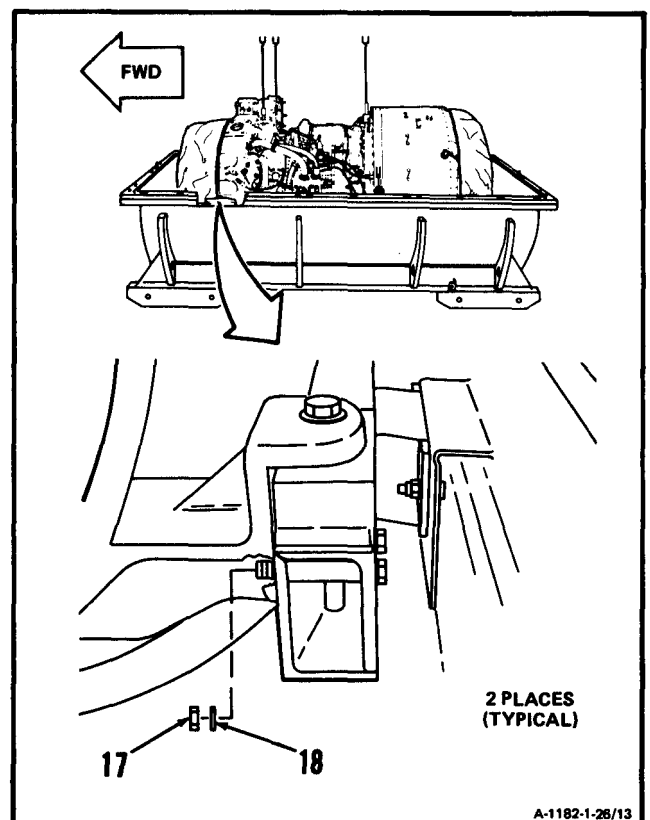
1-26

11. Using helper, **remove cover assembly (15)** from base assembly (16). Use hoist and chain with hooks (Appendix E) (14).
12. Set cover assembly (15) down and remove chain with hooks (Appendix E) (14).
13. **Install engine maintenance sling** (Ref. Task 1-30).

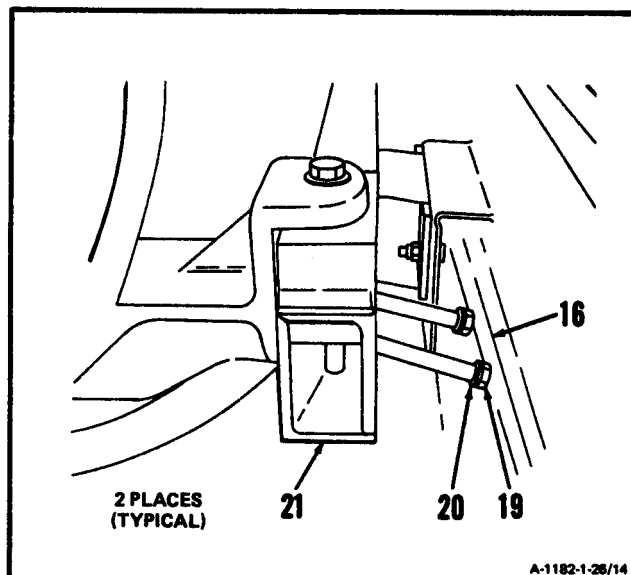
**NOTE**

Procedures for removing bolts that secure left- and right-hand mounting brackets to shipping container are the same. Procedures for removing left-hand mounting bracket bolts are given.

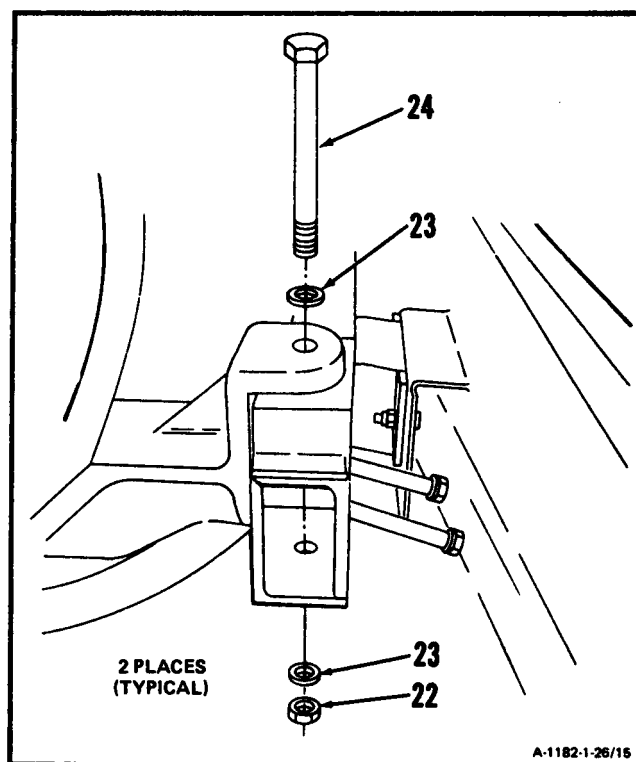
14. Remove two nuts (17) and washers (18).

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15. Pull two bolts (19) with washers (20) from frame (21) until bolt (19) heads rest on inside of base assembly (16).



16. Remove nut (22), two washers (23), and bolt (24).



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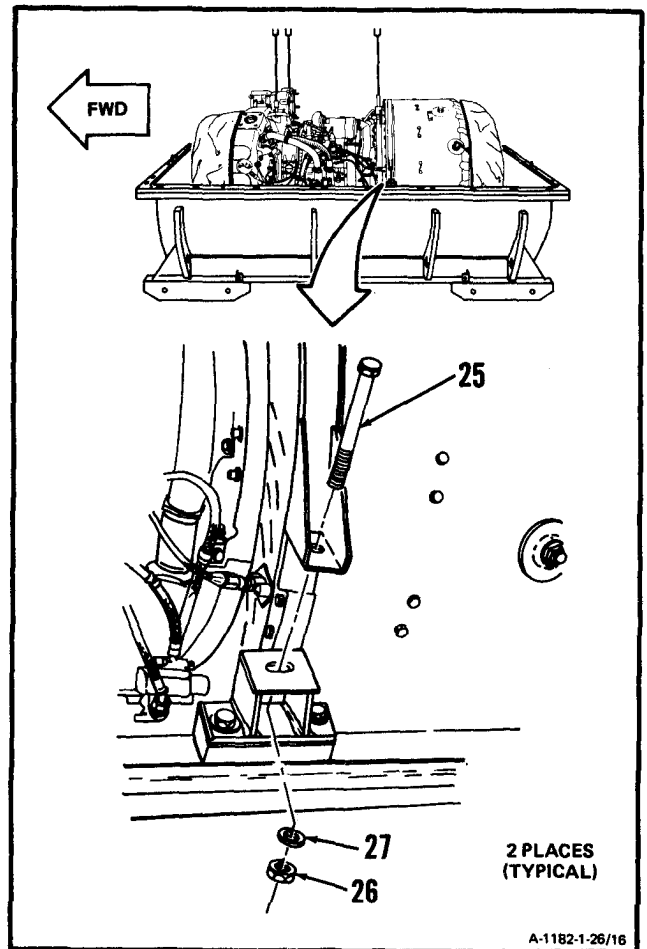
1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

1-26

NOTE

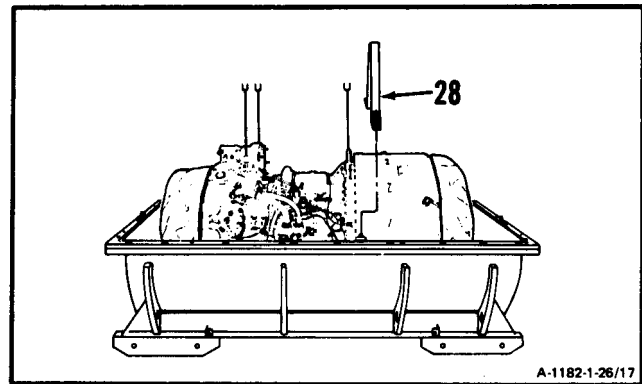
Procedures for removing left- and right-hand bolts that secure clamp to shipping container are the same. Procedure for removing left-hand bolt is given.

17. Remove bolt (25), nut (26), and washer (27).



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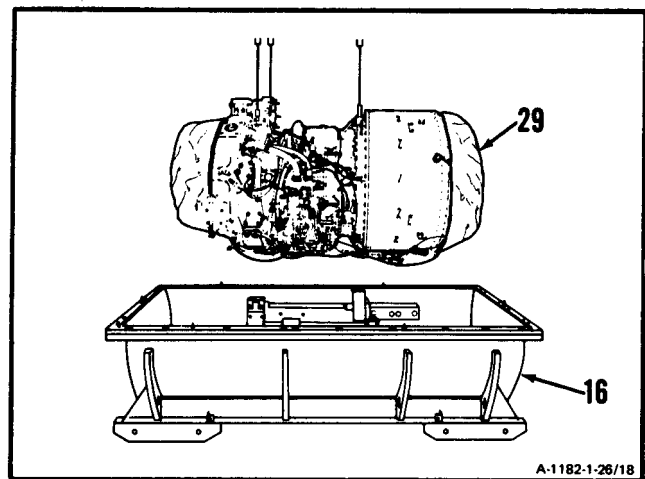
18. Remove clamp (28),



CAUTION

If engine is dropped during handling, inspect engine (Ref. Task 1-83).

19. Using helper, lift engine (29) away from base assembly (16).



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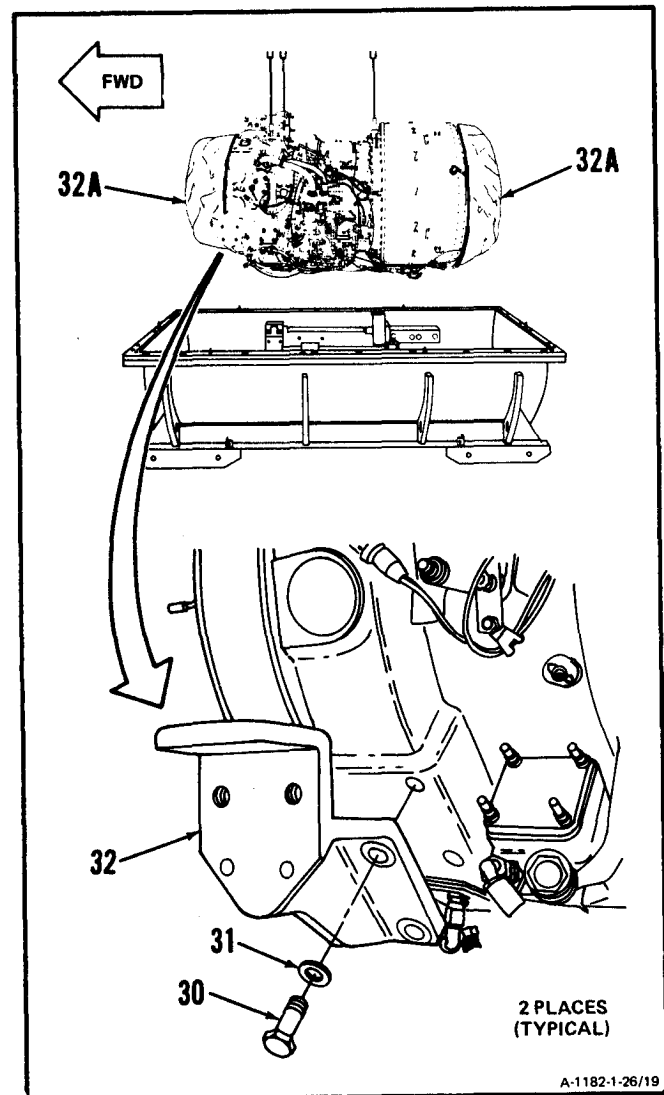
1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

1-26

NOTE

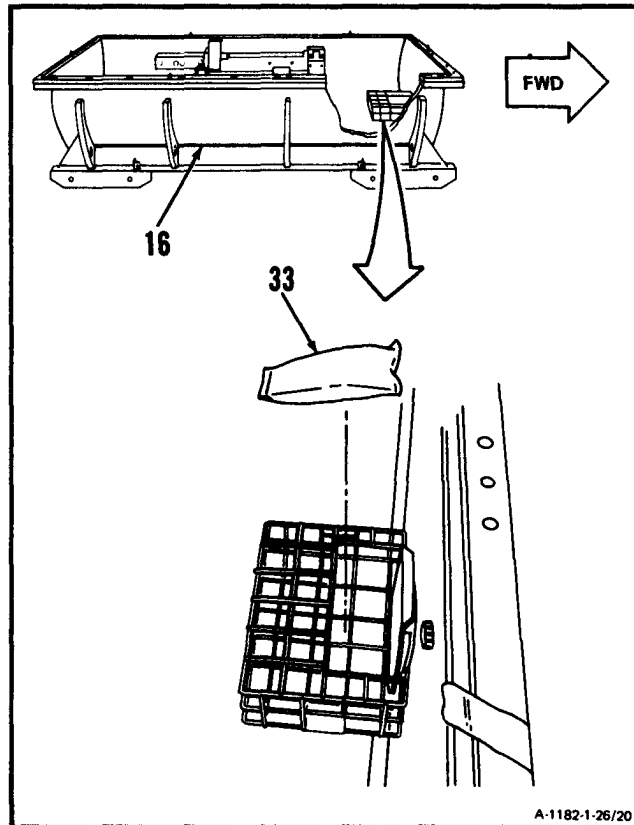
Procedures for removing left- and right-hand shipping container bracket from engine are the same. Procedure for removing left-hand shipping container bracket is given.

20. Remove four bolts (30), washers (31), and bracket (32).
21. Remove two plastic covers (32A). **Install engine in aircraft, modular engine test stand (T38) or engine "L" stand** Ref. TM 55-1520-240-23, TM 55-4920-328-13 or Task 1-28).

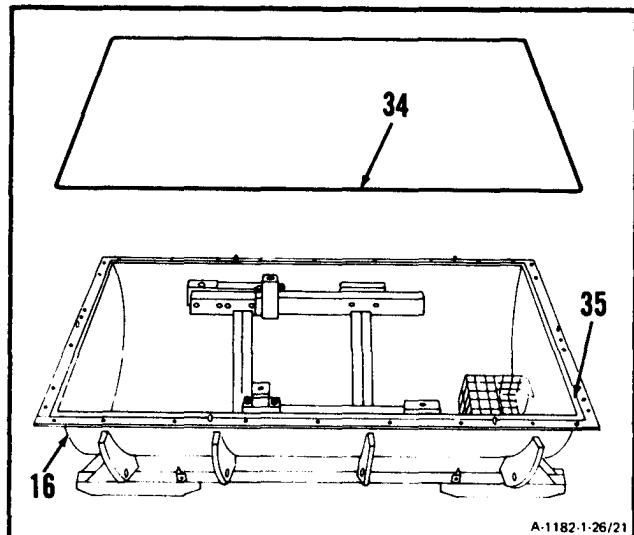


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- 22. Remove five desiccant bags (E16) (33).
- 23. Remove dirt and other debris from inside of base assembly (16). Use vacuum cleaner.
- 24. Place brackets, clamp, bolts, washers and nuts, removed in previous-steps 14, 15, 16, 17, 18, and 20 in bottom of shipping container.



- 25. Remove sealing gasket (34).
- 26. Inspect sealing gasket (34). There shall be no material missing, breakage or foreign material stuck to gasket.
- 27. Inspect gasket mating surface for rust or foreign material. If rust or foreign material is found clean flange surface (35) as follows:
 - a. Clean surface (35) on all four sides of base assembly (16). Use wire brush.
 - b. If rough projections exist, smooth projections out. Use half round file.

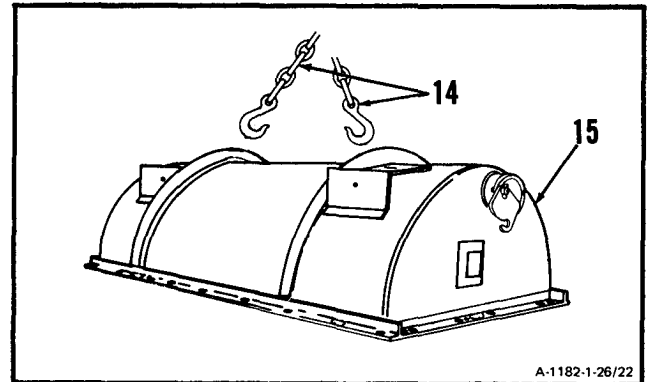


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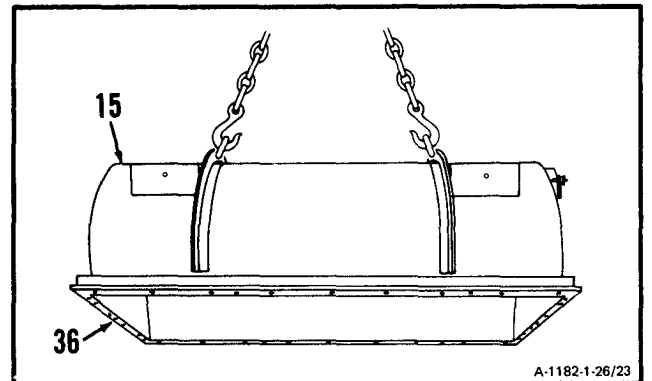
1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

1-26

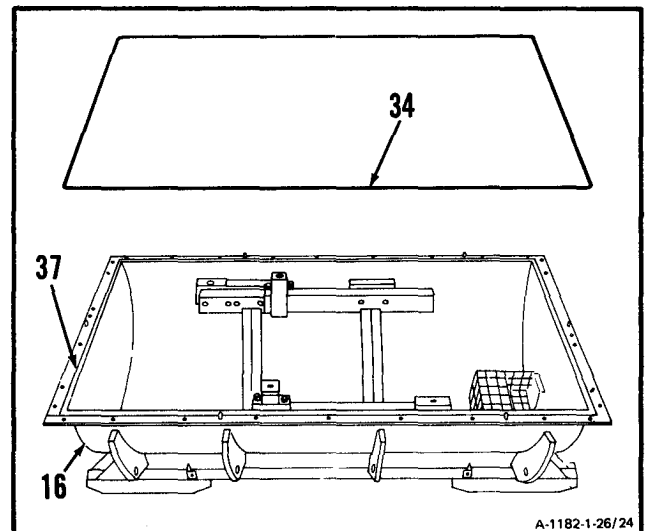
28. Install hoist and chain with hooks (Appendix E) (14) to cover assembly (15). Raise cover assembly (15).



29. **Clean flange surface (36)** on all four sides of cover assembly (15). Use wire brush. If rough projections exist, smooth projections out using half round file.



30. Wipe sealing gasket (34) clean using lint-free cloth (E26).
31. Apply light coat of glycerol (E21) on sealing gasket (34). **Install sealing gasket (34)** in groove (37) of base assembly (16).



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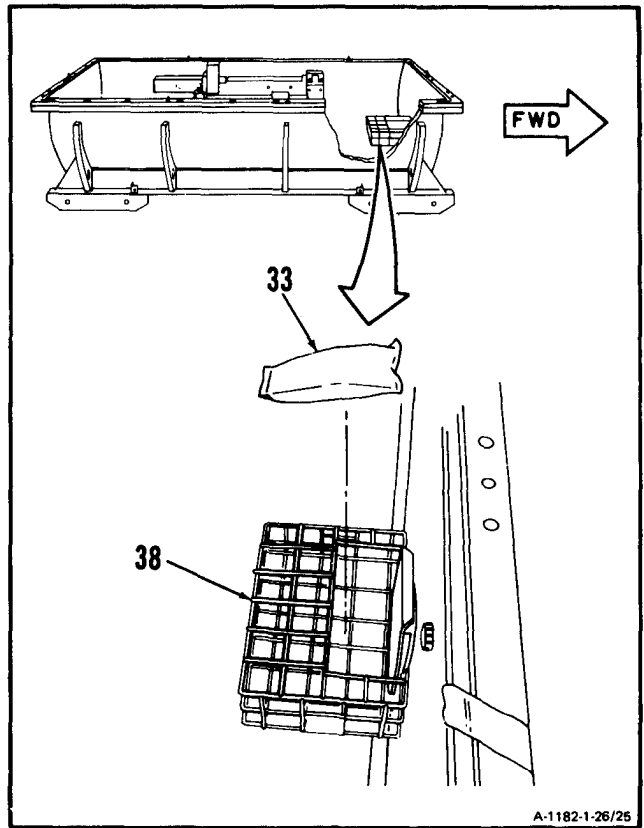
1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

1-26

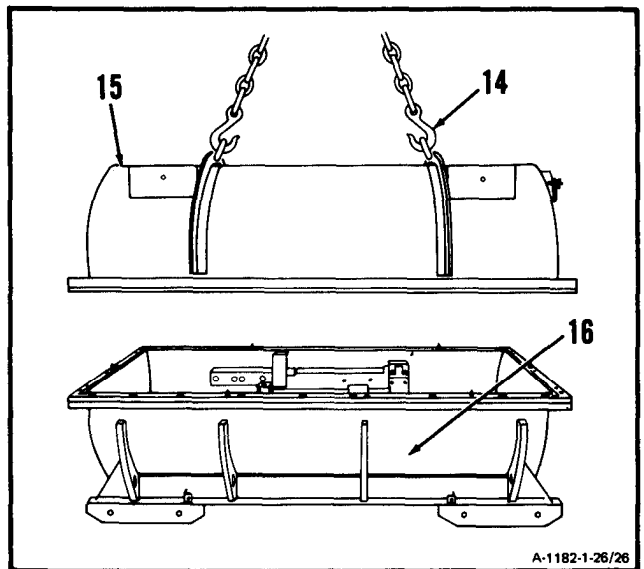
NOTE

Step 32. shall be performed before cover assembly is lowered onto base assembly.

- 32. Install five bags of desiccant (E16) (33) in desiccant basket (38).

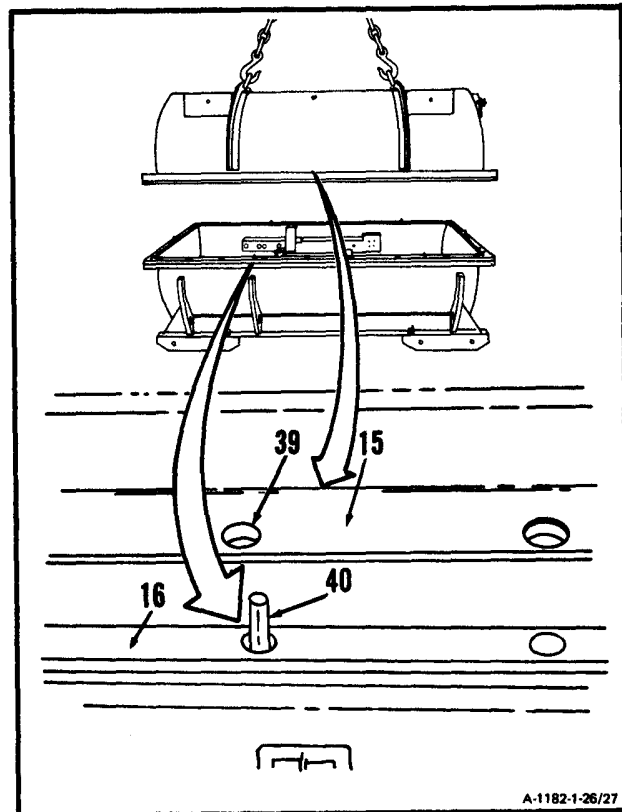


- 33. Using helper, position cover assembly (15) over base assembly (16). Use hoist and chain with hooks (Appendix E) (14).

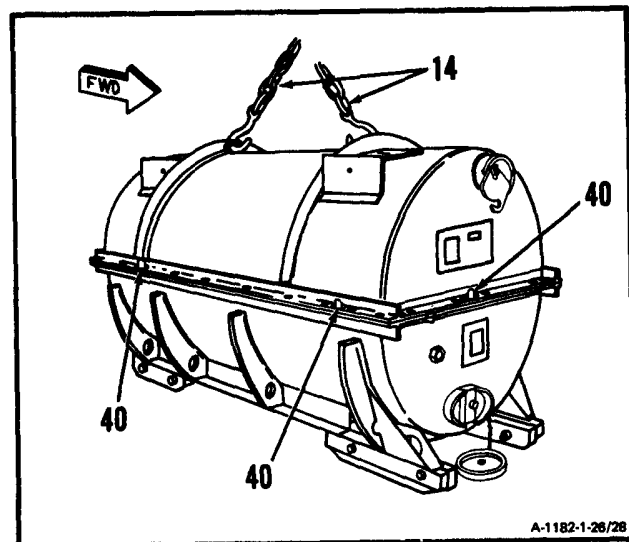


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34. Have helper align six holes (39) in cover with six locating pins (40) on base. Lower and **install cover assembly (15)** on base assembly (16).



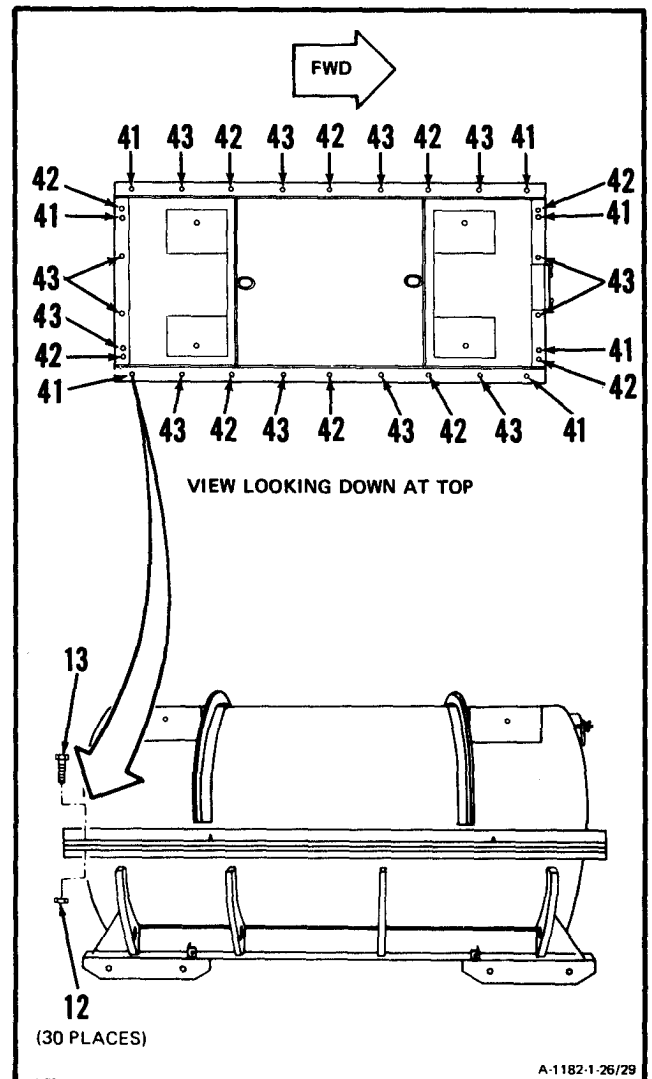
35. **Check alignment of six locating pins (40).** Release tension in chain with hooks (Appendix E) (14). Remove chain with hooks.



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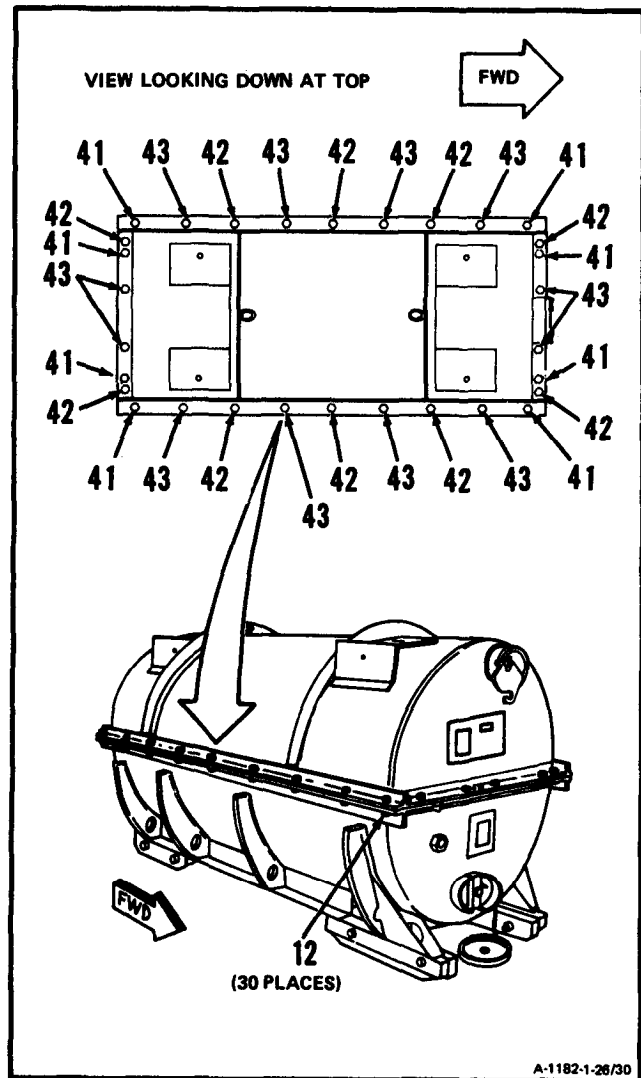
1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

36. Install 30 bolts (13) and nuts (12) in holes (41, 42, and 43). Finger-tighten nuts.



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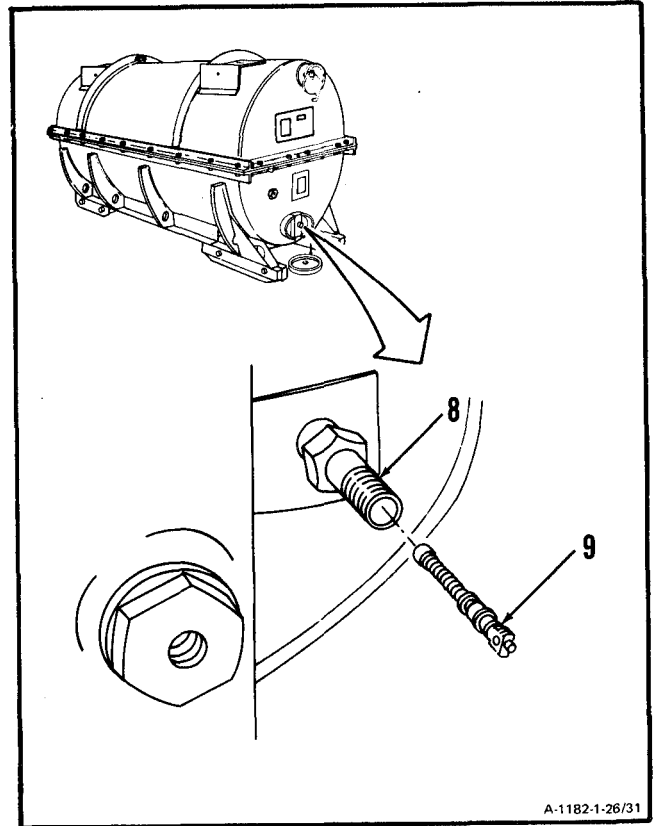
37. Torque 30 nuts (12) at bolt holes (41, 42, and 43), in that order, to 525 inch-pounds.



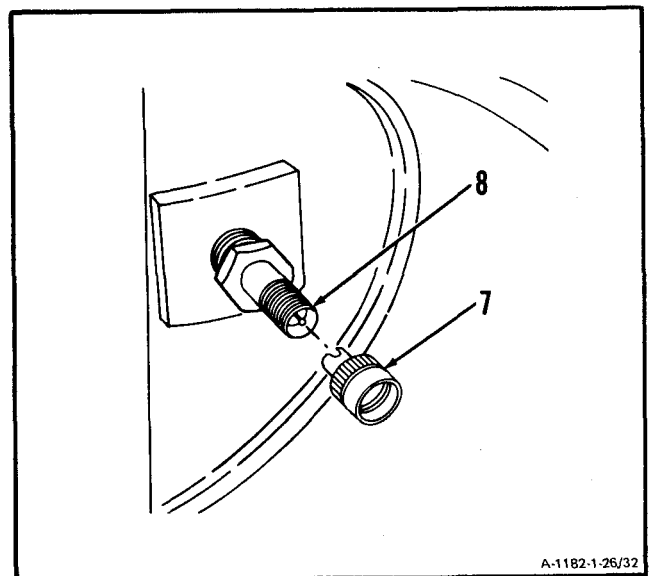
A-1182-1-26/30

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38. Install valve stem (9) in valve (8).

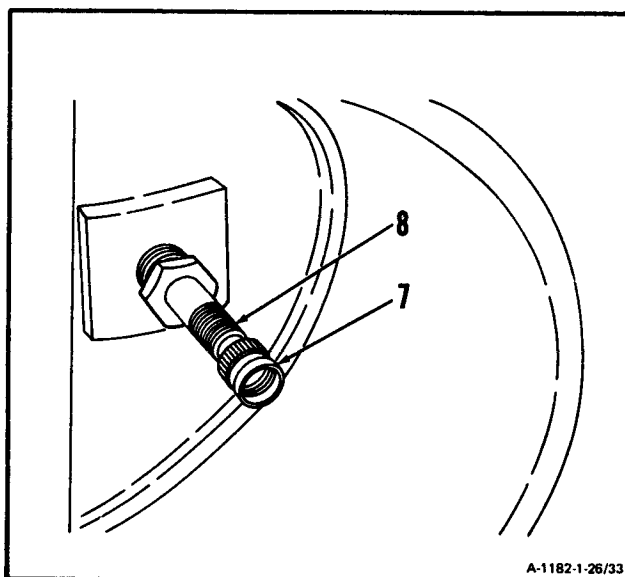


39. Install slotted end of valve cap (7) in valve (8).

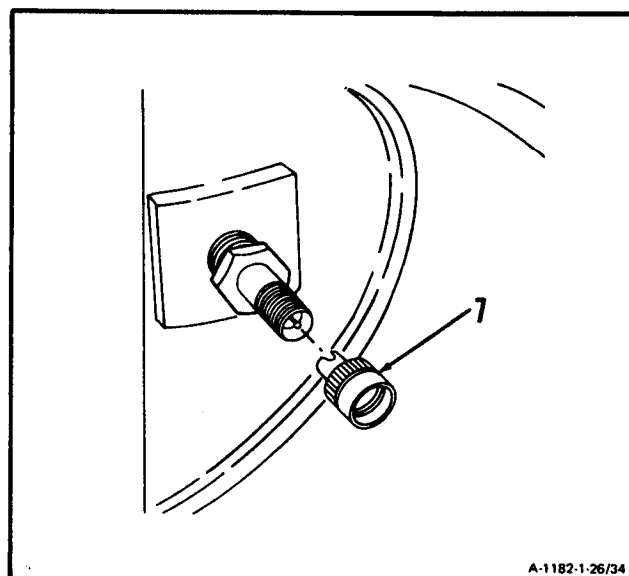


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40. Engage valve stem located inside valve (8) with valve cap (7). Turn valve cap (7) until valve stem is tight.



41. Remove valve cap (7).

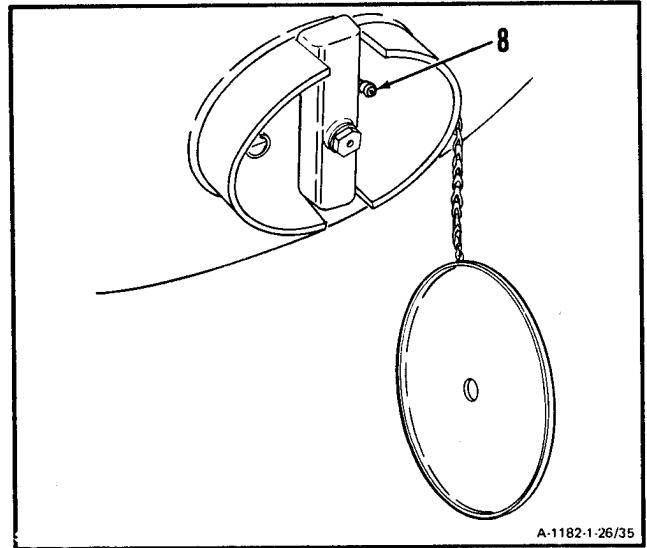


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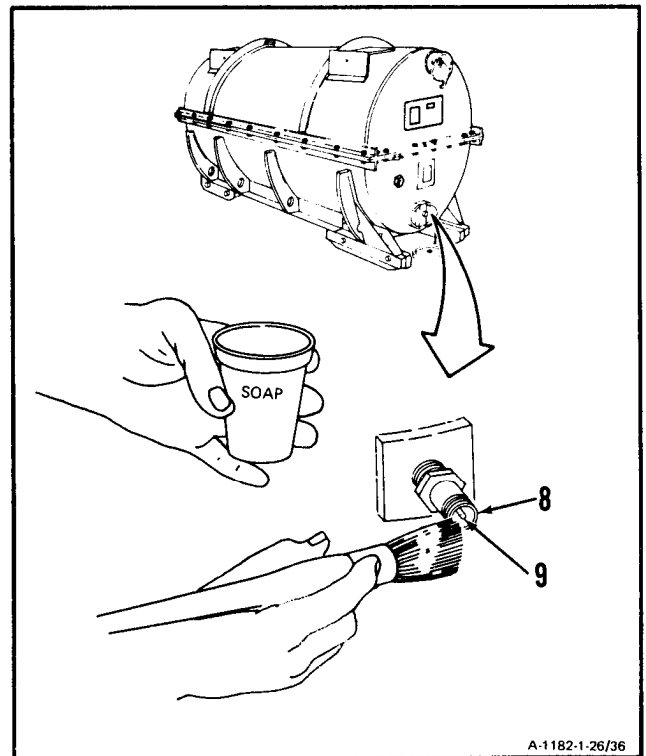
1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

1-26

42. Apply **5 psig** air pressure to valve (8). Use clean, dry compressed air.



43. **Inspect for leaks** by applying liquid soap (E27) to valve (8) and valve stem (9).



GO TO NEXT PAGE

44. If leak exists at valve stem (9), replace valve stem (9) as follows:

WARNING

Use care during removal of valve stem. Injury to personnel can result. If injury occurs, get medical attention.

- a. Remove valve stem (9) from valve (8). Use slotted end of valve cap (7).
- b. Install serviceable valve stem (9) in valve (8). Use slotted end of valve cap (7).

45. If leaks exist at valve (8) tighten valve (8). If valve still leaks, replace valve (8) as follows:

WARNING

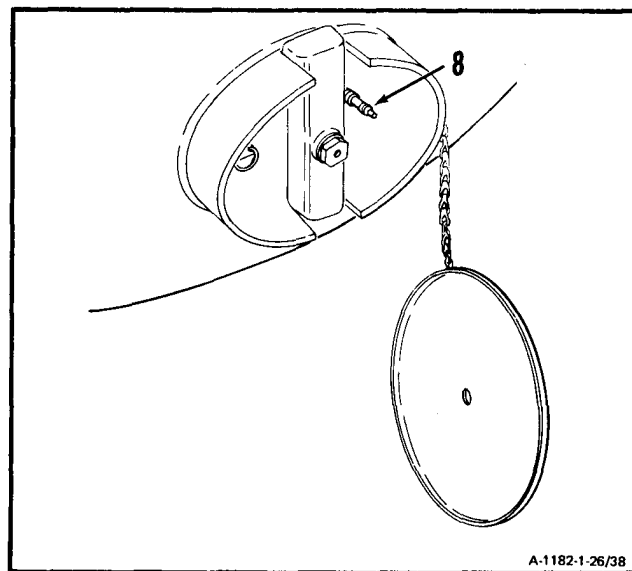
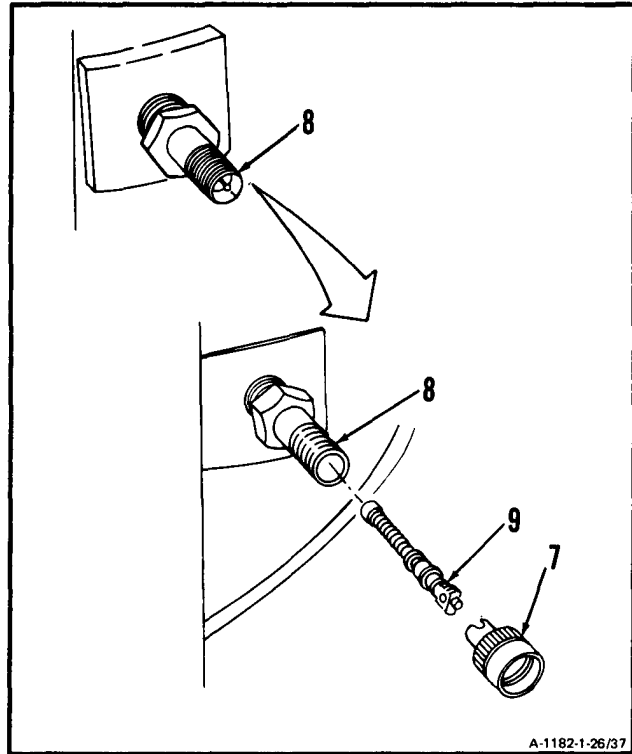
Use care during removal of valve. Injury to personnel can result. If injury occurs, get medical attention.

- a. Remove valve (8).
- b. Install serviceable valve (8).

NOTE

Following step only applies if valve stem or valve were replaced. If valve or valve stem were not replaced, omit step 46.

46. Apply **5 psig** air pressure to valve (8). Use clean, dry compressed air.

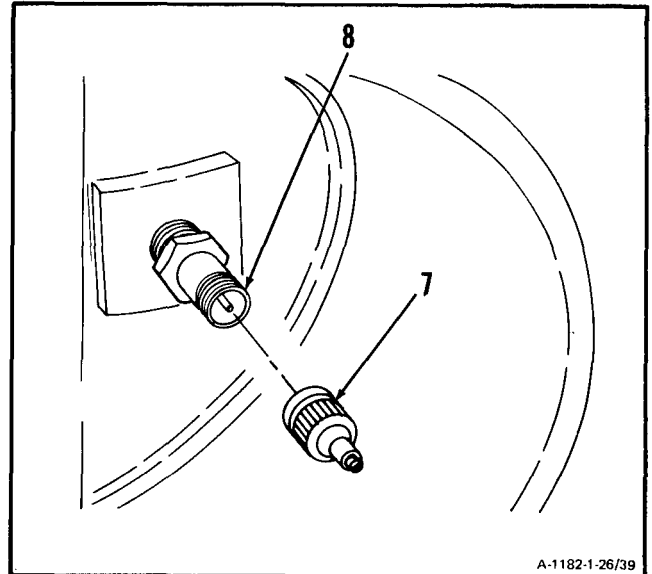


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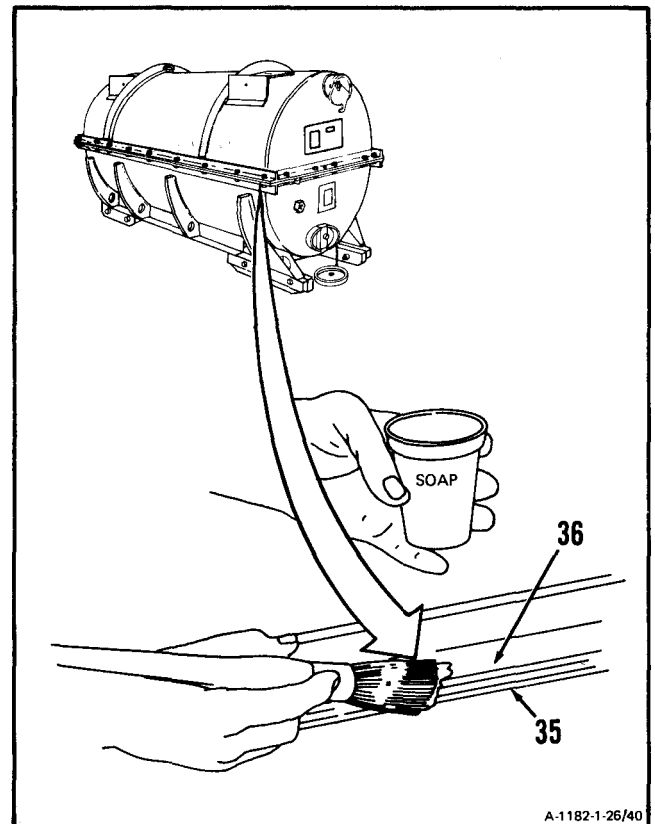
1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

1-26

47. Install valve cap (7) on valve (8).



48. **Check for leaks** by applying liquid soap (E27) to shipping container mating flanges (35 and 36). There shall be no leaks. **If leak exists, inspect pressurized shipping and storage container** (Ref. Task 1-25).

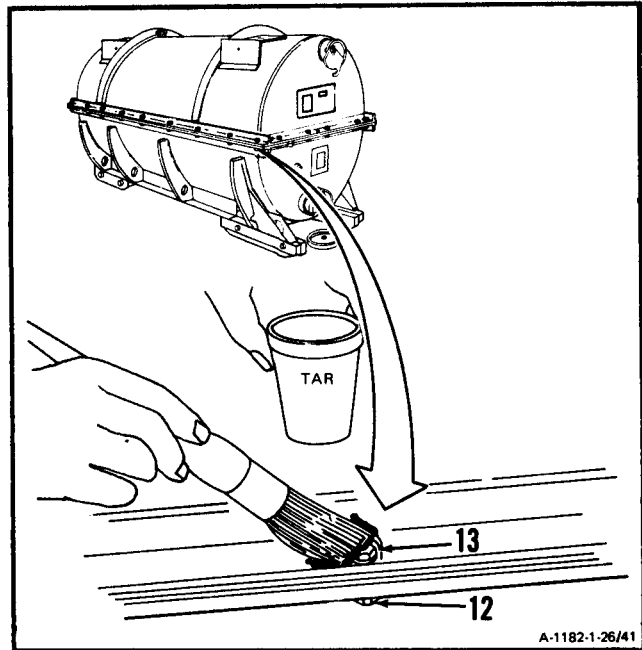


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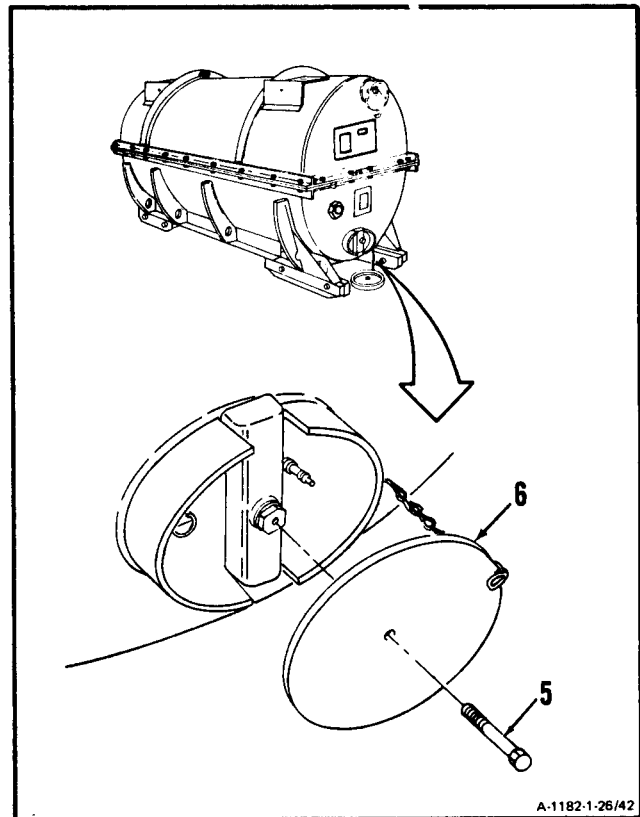
NOTE

In following step 49., tar is applied to prevent corrosion.

49. Apply tar (E55) to 30 bolts (13) and nuts (12).



50. Install cover (6) and bolt (5).

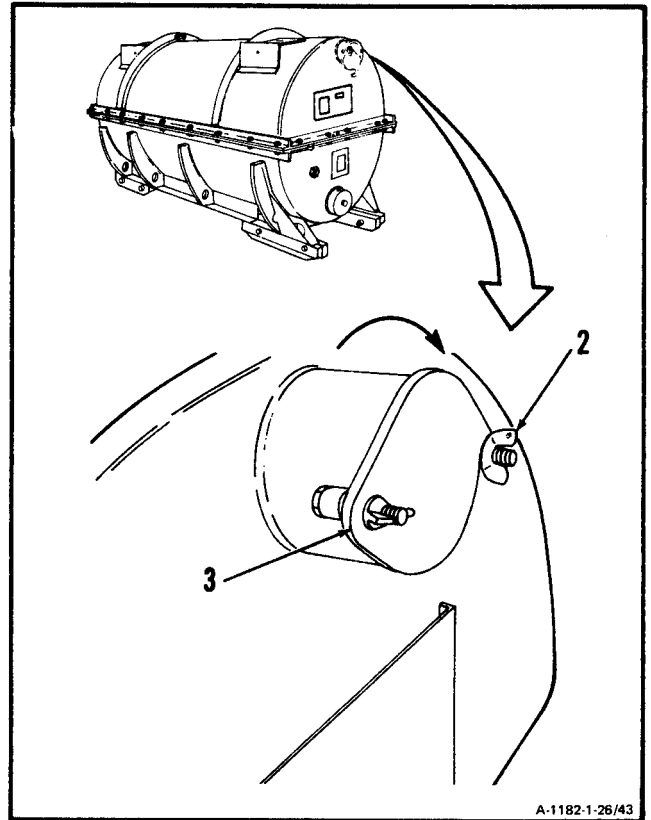


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1-26 REMOVE ENGINE FROM SHIPPING AND STORAGE CONTAINER (Continued)

1-26

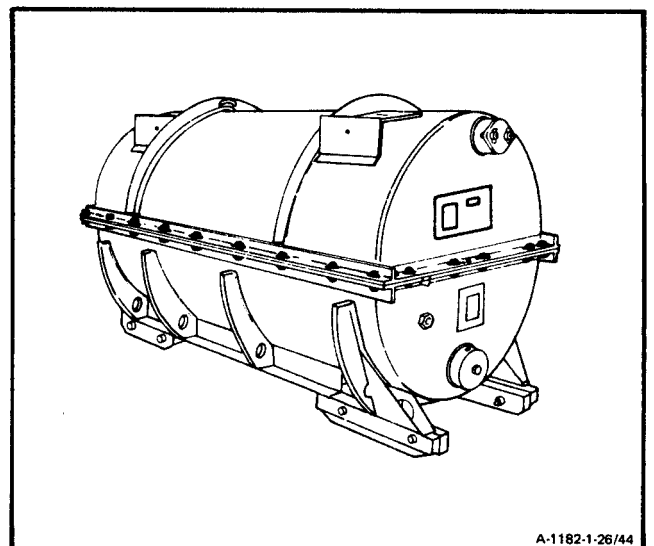
- 51. Close cover (3) and tighten two wing nuts (2).
- 52. Mark top of container "EMPTY." Use 6-inch letters.



INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-27 ACTIVATE ENGINE AFTER STORAGE

1-27

INITIAL SETUP

Task 8-35

Task 8-88

Task 8-89

Task 8-90

Task 8-93

Task 8-94

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,

NSN 5180-00-323-4944

Technical Inspection Tool Kit,

nSN 5180-00-323-5114

Drain Hose, (Appendix E)

Container, 2 Quart

Container, 2 Gallon

Multi meter

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.

WARNING

Lubricating oils (E32 and E33) cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in wall-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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

Materials:

Dry Cleaning Solvent (E17)

Gloves (E20)

Lubricating Oil (E32)

Lubricating Oil (E33)

Personnel Required:

68B10 Aircraft Powerplant Repairer

68B30 Aircraft Powerplant Inspector

68B30 Aircraft Powerplant Supervisor

References:

TM 55-4920-328-13

TM 55-1520-240-23

TM 55-1520-240-10

TM 55-1520-240-MTF

Task 1-26

Task 1-74

Task 1-75

Task 1-86

Task 1-99

Task 1-107

Task 7-6

Task 7-10

Task 8-28

Task 8-29

Task 8-30

Task 8-33

GO TO NEXT PAGE

1-27 ACTIVATE ENGINE AFTER STORAGE (Continued)

1-27

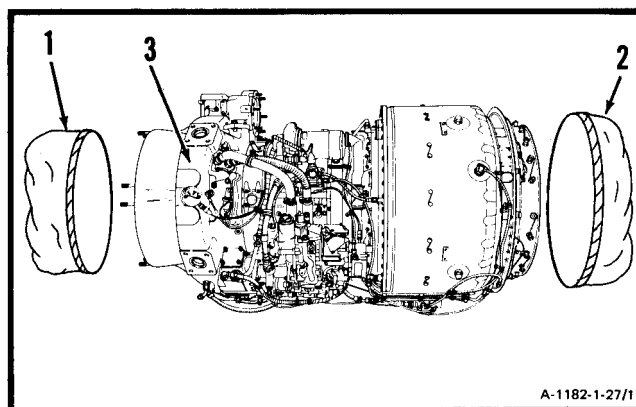
NOTE

A new, overhauled, or long-term storage engine is preserved and stored in a shipping and storage container.

NOTE

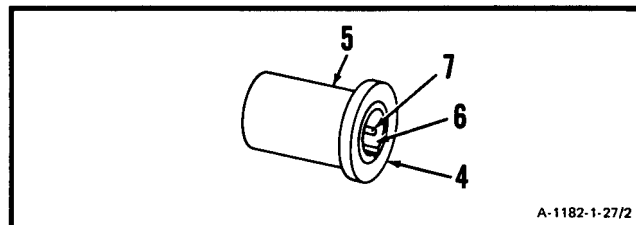
For fuel control priming, go to step 22.

1. **Remove engine from Shipping and storage container** (Ref. Task 1-26).
2. Remove inlet cover (1) and exhaust cover (2) from engine (3).
3. **Install engine on test stand** (Ref. TM 55-4920-328-13) **or airframe** (Ref. TM 55-1520-240-23).
4. **Remove spark igniters** (Ref. Task 7-6).

**WARNING**

Dry cleaning solvent (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.

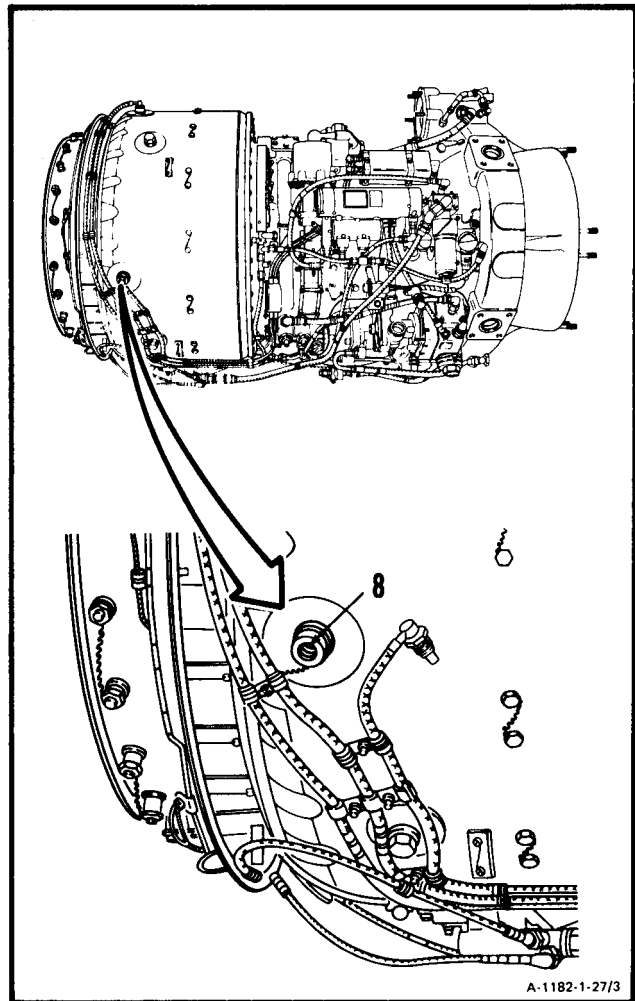
5. Wear gloves (E20). **Clean spark igniters (4)** using dry cleaning solvent (E17) and brush.
6. **Inspect spark igniters (4).**
 - a. There shall be no cracks or gouges in shank (5).
 - b. There shall be no chips or cracks in ceramic surface (6).
 - c. Pin (7) shall not be bent or broken.



GO TO NEXT PAGE

7. Check exposed openings (8) for foreign material,

8. Install spark igniters (Ref. Task 7-10).



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1-27 ACTIVATE ENGINE AFTER STORAGE (Continued)

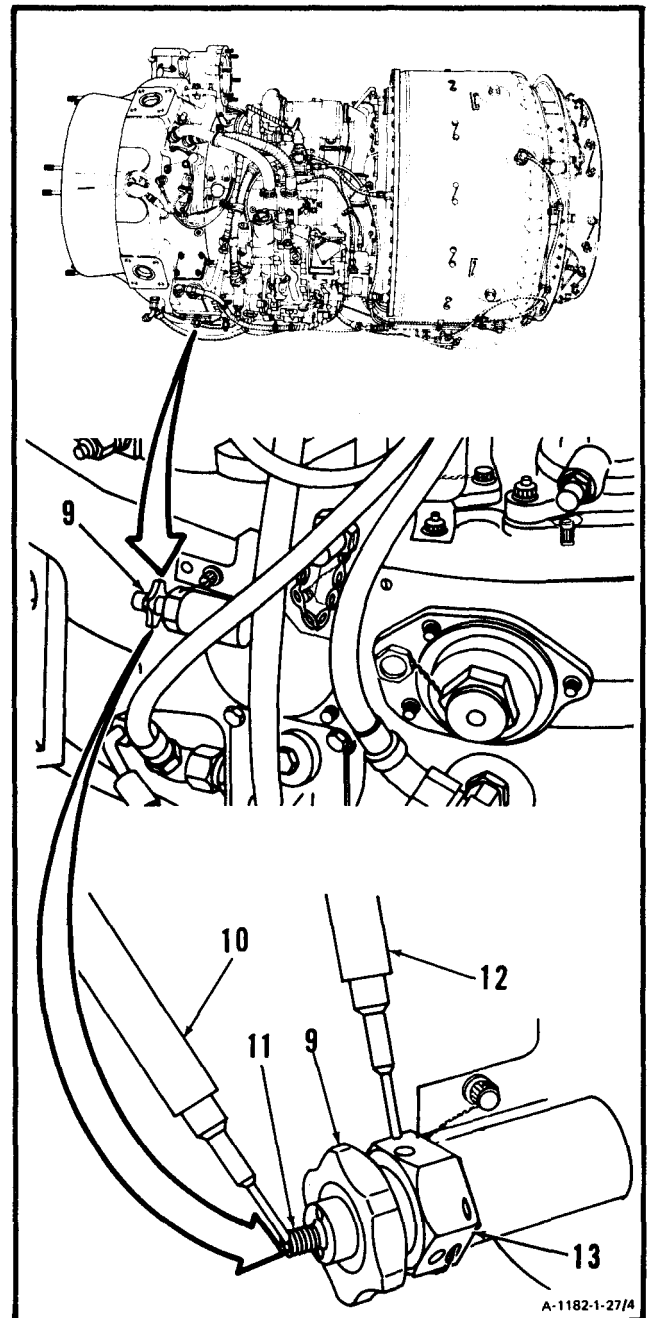
1-27

9. Using multimeter, **check for continuity at gear-box chip detector (9)**.
- Set multimeter to Rx 1000 scale.
 - Touch red probe (10) to stud (11).
 - Touch black probe (12) to chip detector housing (13).
 - Meter shall indicate more than 10,000 ohms minimum.

NOTE

Continuity exists if meter indicates less than 10,000 ohms.

- In preceding step 9. if continuity exists, **remove chip detector** (Ref. Task 8-88).
- Disassemble chip detector** (Ref. Task 8-89).
- Clean chip detector** (Ref. Task 8-90).
- Assemble chip detector** (Ref. Task 8-93).
- Install chip detector** (Ref. Task 8-94).



GO TO NEXT PAGE

1-27 ACTIVATE ENGINE AFTER STORAGE (Continued)

1-27

15. Using multimeter, **check for continuity at dual chip detector (14).**

NOTE

The following steps apply to both magnetic chip detectors.

- a. Touch red probe (15) to pin (16).
- b. Touch black probe (17) to threads (18).
- c. Meter shall indicate more than 10,000 ohms minimum.

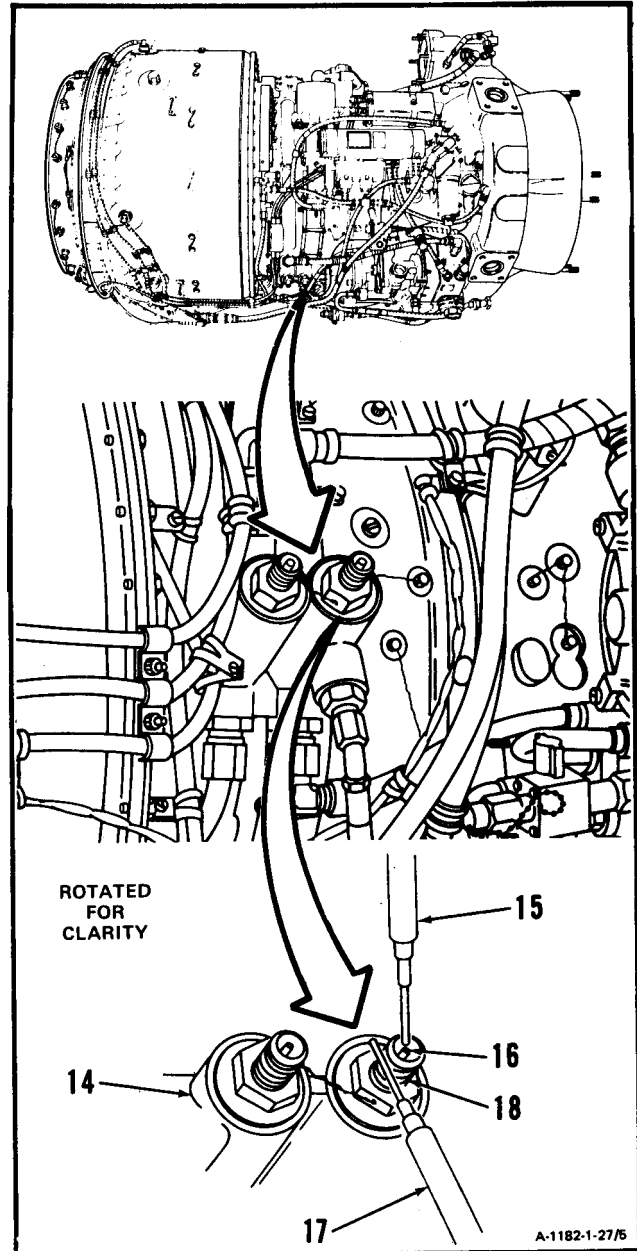
NOTE

Continuity exists if meter indicates less than 10,000 ohms.

16. In preceding step 15, if continuity exists, **remove dual chip detector** (Ref. Task 8-28).
17. **Disassemble dual chip detector** (Ref. Task 8-29).
18. **Clean dual chip detector** (Ref. Task 8-30).
19. **Assemble dual chip detector** (Ref. Task 8-33).
20. **Install dual chip detector** (Ref. Task 8-35).
21. **Service engine oil system** (Ref. Task 1-74) with lubricating oil (E32 or E33).

NOTE

The following steps, 22. thru 30., prime the fuel control.

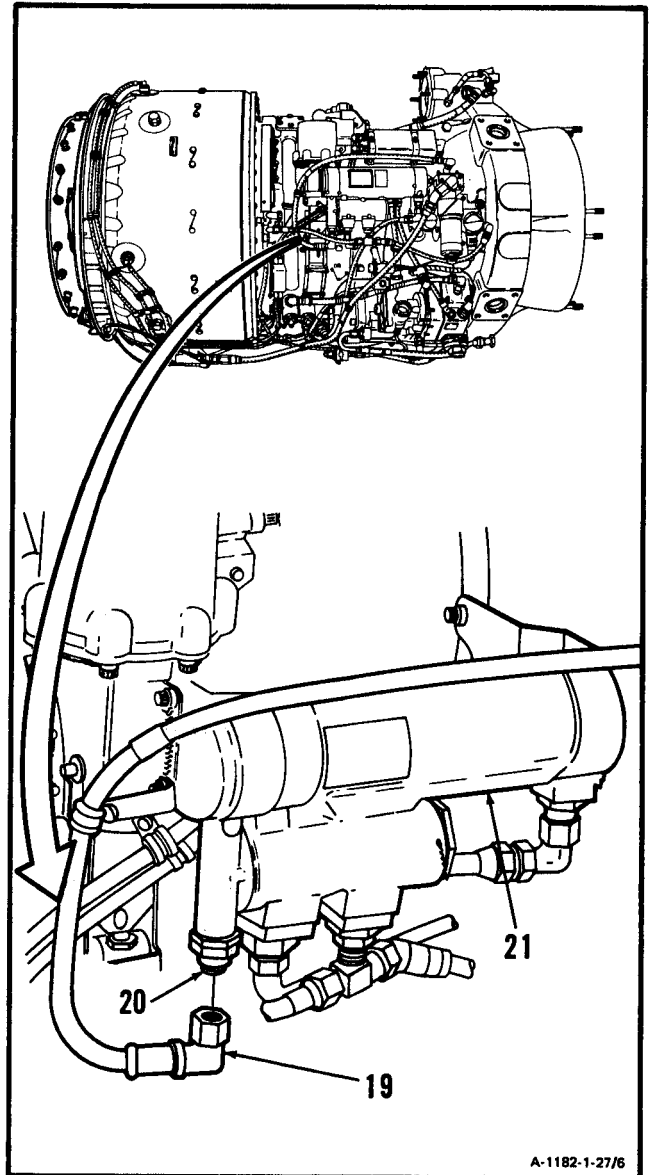


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1-27 ACTIVATE ENGINE AFTER STORAGE (Continued)

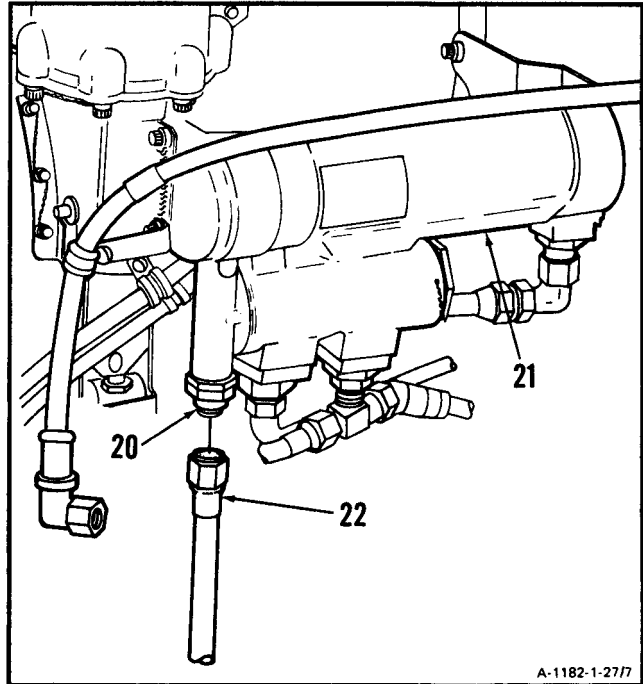
1-27

22. Disconnect tube assembly (19) from tube assembly (20) of oil cooler assembly (21).



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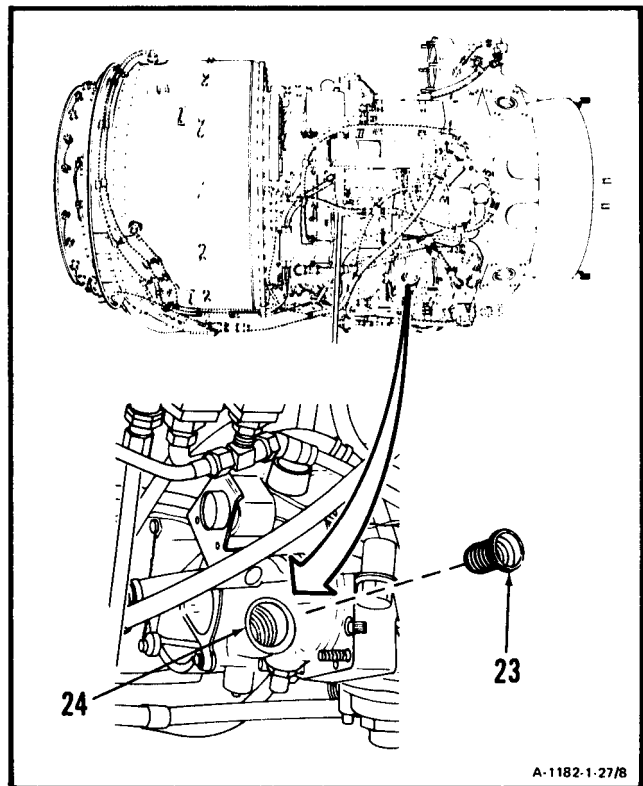
23. Connect drain hose (Appendix E) (22) to tube assembly (20) of oil cooler assembly (21).
24. Insert drain hose (Appendix E) (22) into suitable approved metal container two gallon.



NOTE

If engine is installed in test stand, do steps 25 thru 27. If engine is installed in airframe, omit steps 25 thru 27.

25. Remove cap (23) from fuel boost pump assembly (24).

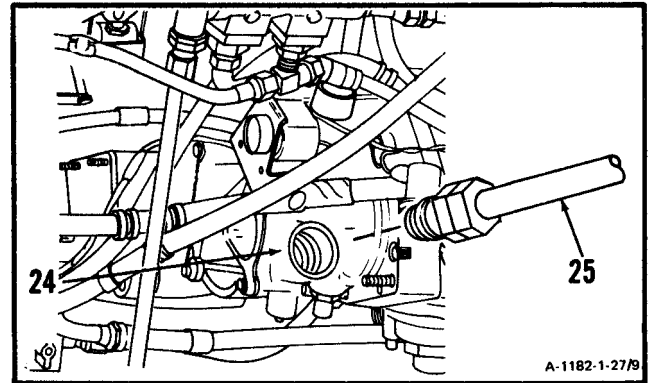


GO TO NEXT PAGE

1-27 ACTIVATE ENGINE AFTER STORAGE (Continued)

1-27

26. **Connect hose (25)** from test stand (Ref. TM 55-4920-328-13) to fuel boost pump assembly (24).
27. Disconnect 28V dc to ignition unit. **Operate boost pump to prime fuel system and motor engine to maximum cranking speed (Ref. Task 1-107). Actuate starting fuel solenoid. Move power lever (N1) from ground idle position to maximum position until solid stream of fuel (without air bubbles) is seen.** At least one gallon must flow into container. After fuel system is primed, reconnect 28V dc to ignition unit.

**NOTE**

The engine lubrication system is fully primed when the oil pressure gage shows a steady positive indication.

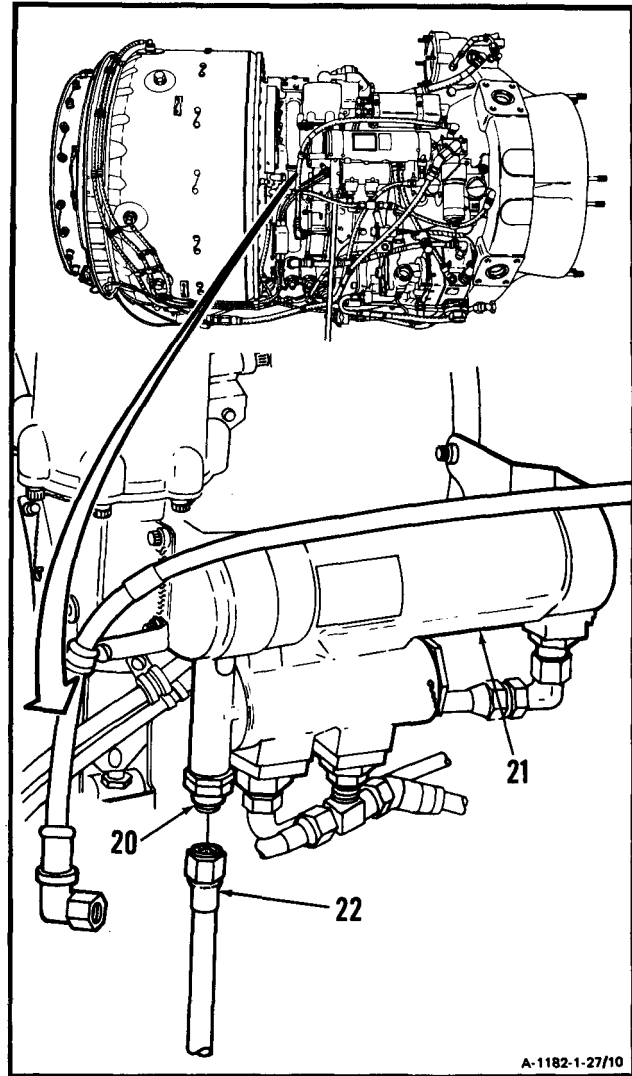
NOTE

If engine is installed in airframe, do step 28. If engine is installed in test stand, omit step 28.

28. **Motor engine to maximum cranking speed (Ref. TM 55-1520-240-10). Actuate starting fuel solenoid. Move power lever (N1) from ground idle position to maximum position until solid stream of fuel (without air bubbles) is seen.** At least one gallon must flow into container.

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29. Disconnect and remove drain hose (Appendix E) (22) from tube assembly (20) of oil cooler assembly (21).



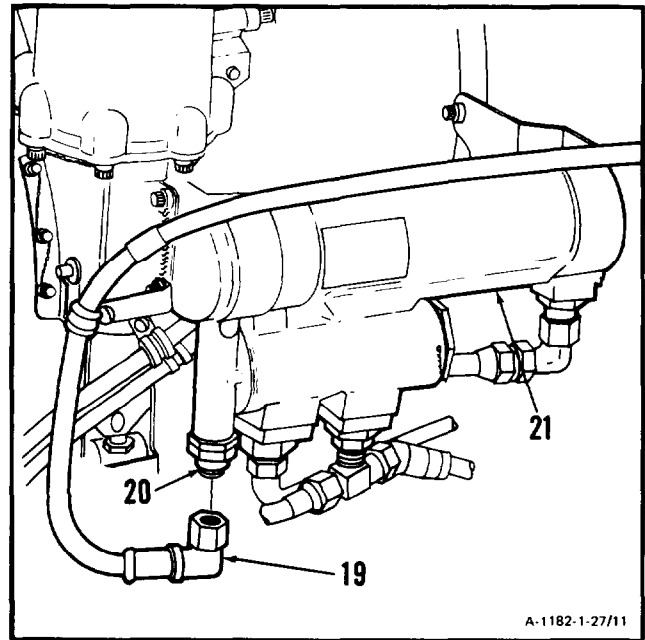
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30. **Connect fuel hose assembly (19) to tube assembly (20) of oil cooler assembly (21).**
31. **Visually inspect engine for leakage on initial run.**
32. **Start and run engine for five minutes at approximately 75 percent N1 speed** (Ref. Task 1-107, or TM 55-1520-240-10, or initial run-up TM 55-1520-240-23).
33. **Shut down engine** (Ref. Task 1-107 or TM 55-1520-240-10).
34. **Visually inspect main oil filter by pass indicators.** If indicator button is extended, inspect main oil cap and stem assembly and oil filter element for contamination (Ref. Task 1-99).

NOTE

If bypass indicator button on main oil filter is not extended, omit steps 35 and 36.

35. If bypass indicator button has extended and contamination is present, proceed as follows:
 - a. **Drain Engine Oil System** (Ref. Task 1-75).
 - b. **Service Engine Oil System** (Ref. Task 1-74.)
 - c. **Repeat steps 31. thru 33.**
36. **If bypass indicator button has extended again, perform contaminated oil system inspection** (Ref. Task 1-86).
37. **Service Engine Oil System** (Ref. Task 1-74).

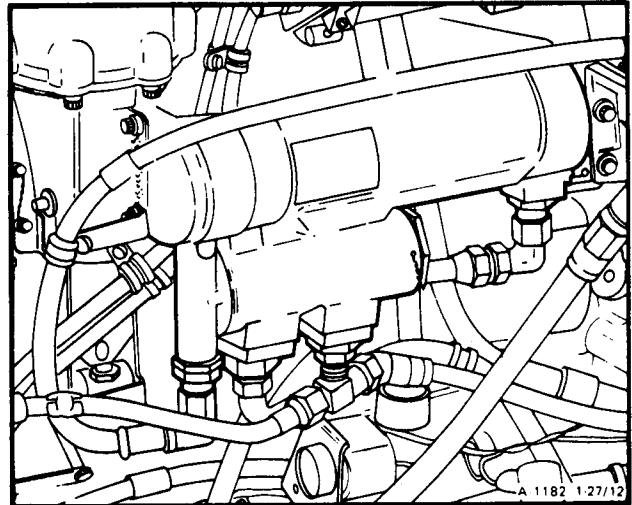


A-1182-1-27/11

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FOLLOW-ON MAINTENANCE:

Perform Flight Test (Ref. TM 55-1520-240-MTF).



END OF TASK

1-28 INSTALL ENGINE ON MAINTENANCE STAND

1-28

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
Engine Protective Cover (T13)
Engine "L" Stand

Materials:

None

Personnel Required:

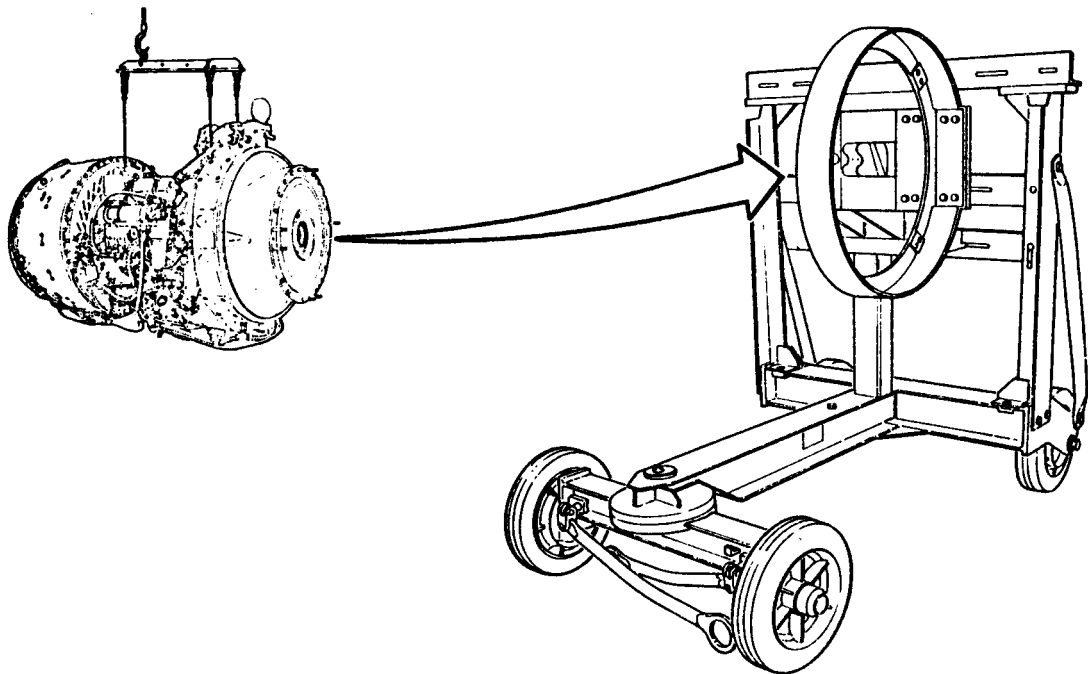
68B10 Aircraft Powerplant Repairer
68630 Aircraft Powerplant Inspector

References:

Task 1-31

Equipment Condition:

Engine Maintenance Sling Installed
(Task 1-30)



A-1182-1-28/1

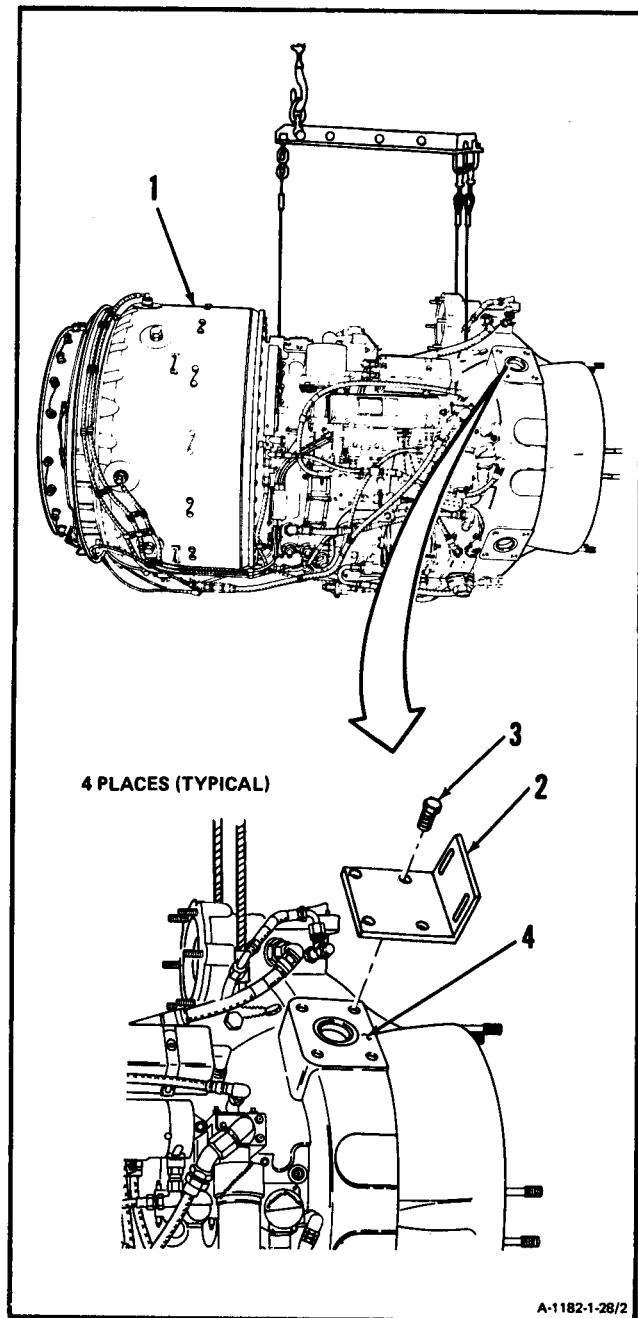
GO TO NEXT PAGE

1. Lift engine (1) to comfortable working position.

NOTE

Step 2. applies to four brackets to be installed at the 1-, 4-, 7-, and 10-o'clock positions. Instructions for bracket at 1 o'clock position are given.

2. Install bracket (2) and four bolts (3) on inlet housing (4).

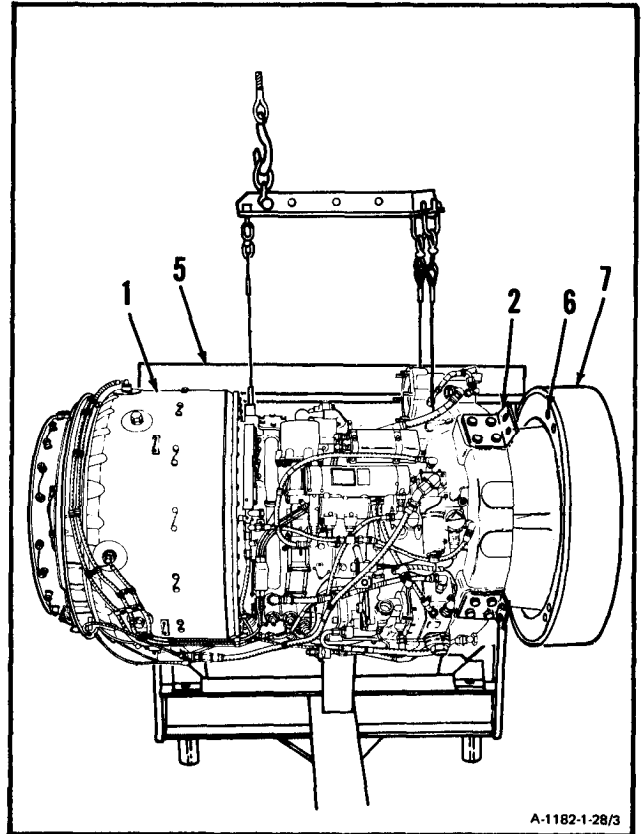


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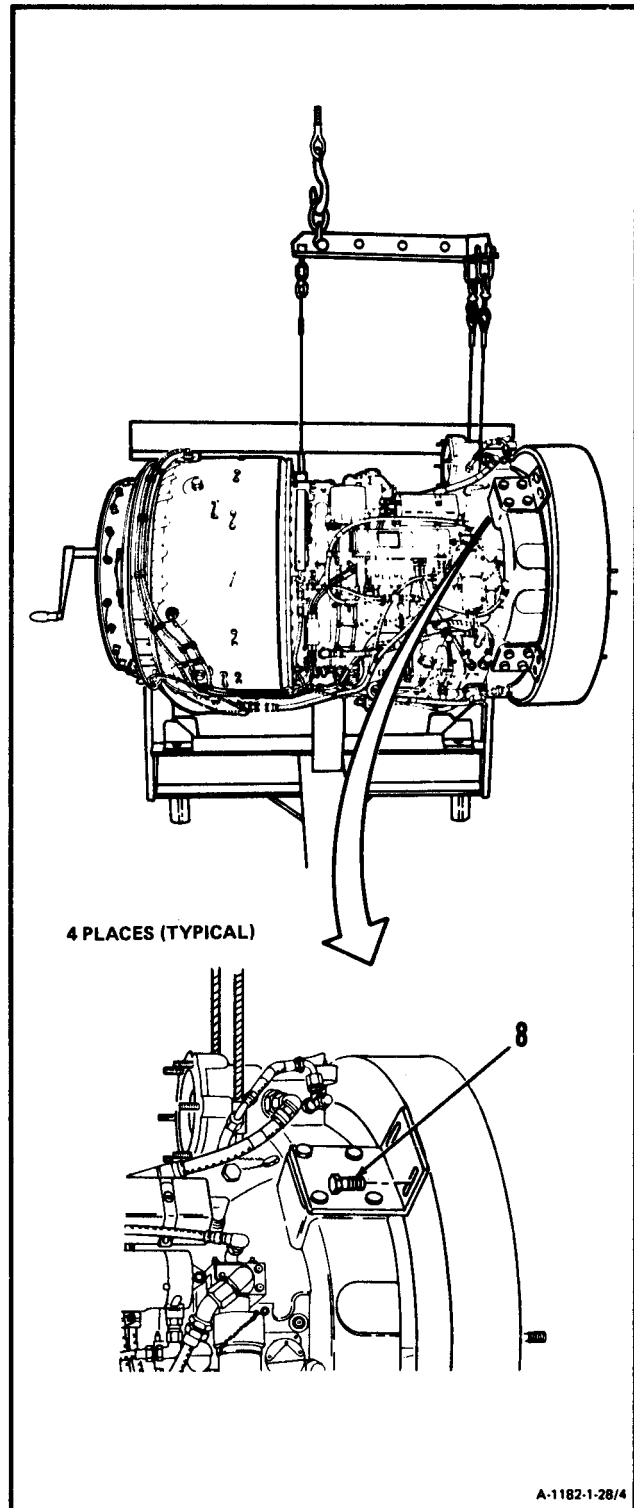
1-28 INSTALL ENGINE ON MAINTENANCE STAND (Continued)

1-28

3. Position engine "L" stand (5) in a clear working area.
4. **Guide engine (1)** into engine "L" stand (5).
Align brackets (2) with bolt holes (6) in base adapter (7).

**GO TO NEXT PAGE**

5. Install eight bolts (8).

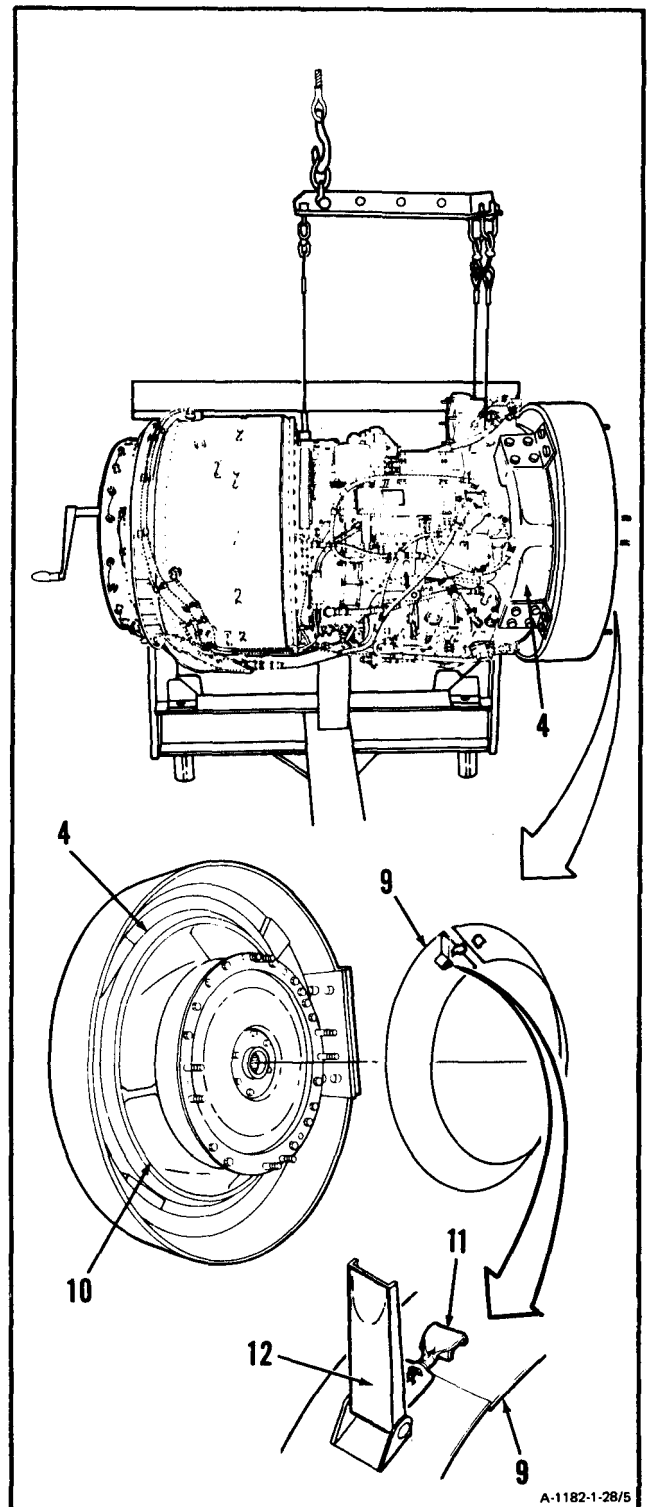


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1-28 INSTALL ENGINE ON MAINTENANCE STAND (Continued)

1-28

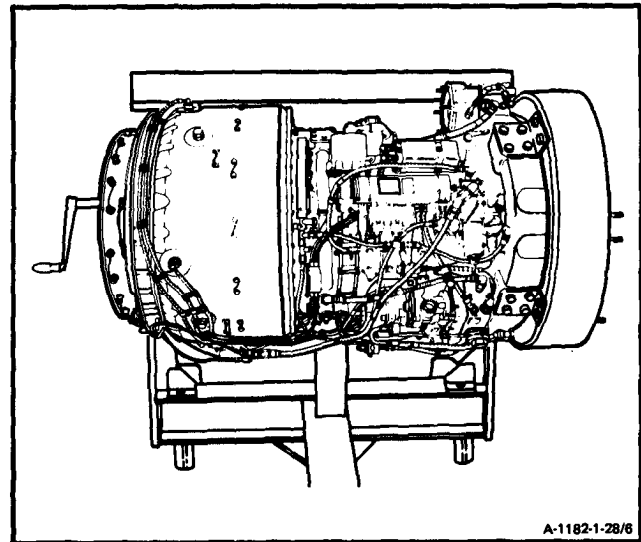
6. **Install engine protective cover (T13) (9)** on inlet housing (4) as follows:
- Place engine protective cover (T13) (9) on inlet housing (4) covering intake ports (10).
 - Adjust clip (11) by turning counterclockwise or clockwise as required. Secure clip (11) and latch (12).

**INSPECT****GO TO NEXT PAGE**

A-1182-1-28/5

FOLLOW-ON MAINTENANCE:

Remove Engine Maintenance Sling
(Task 1-31).



END OF TASK

1-29 REMOVE ENGINE FROM MAINTENANCE STAND

1-29

INITIAL SETUP**Applicable Configurations:**

All

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

None

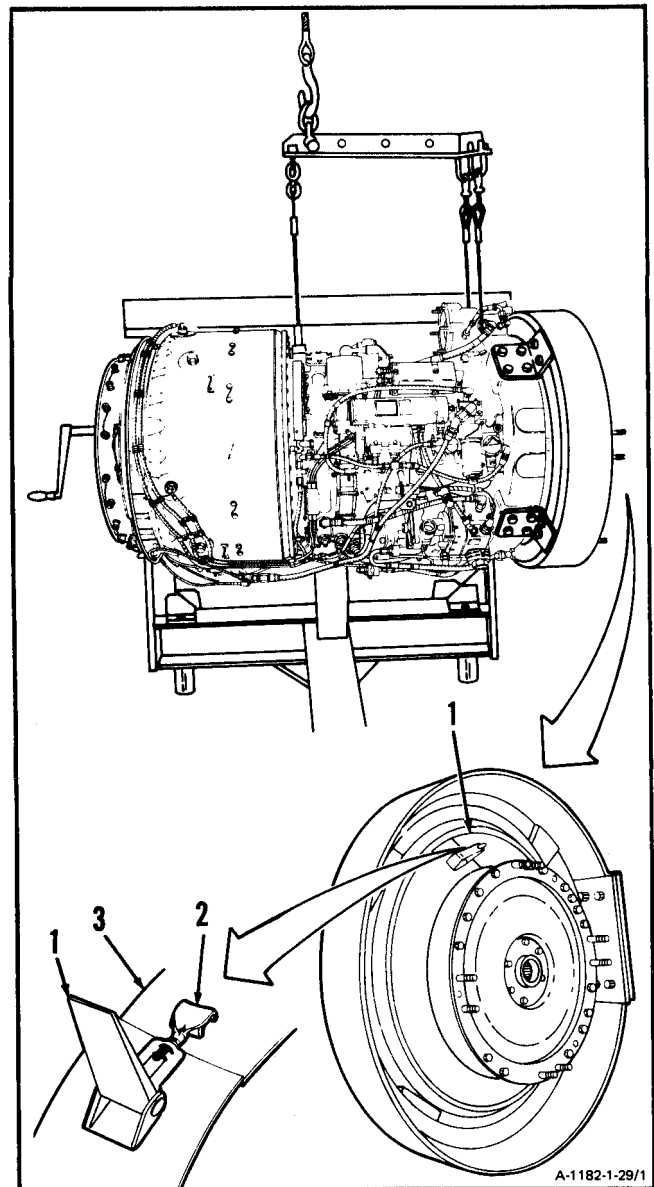
Personnel Required:

68B10 Aircraft Powerplant Repairer

Equipment Condition:

Engine Maintenance Sling Installed (Task 1-30)

1. Lift latch (1) in upward position, releasing clip (2), and **remove engine protective cover (T13) (3).**



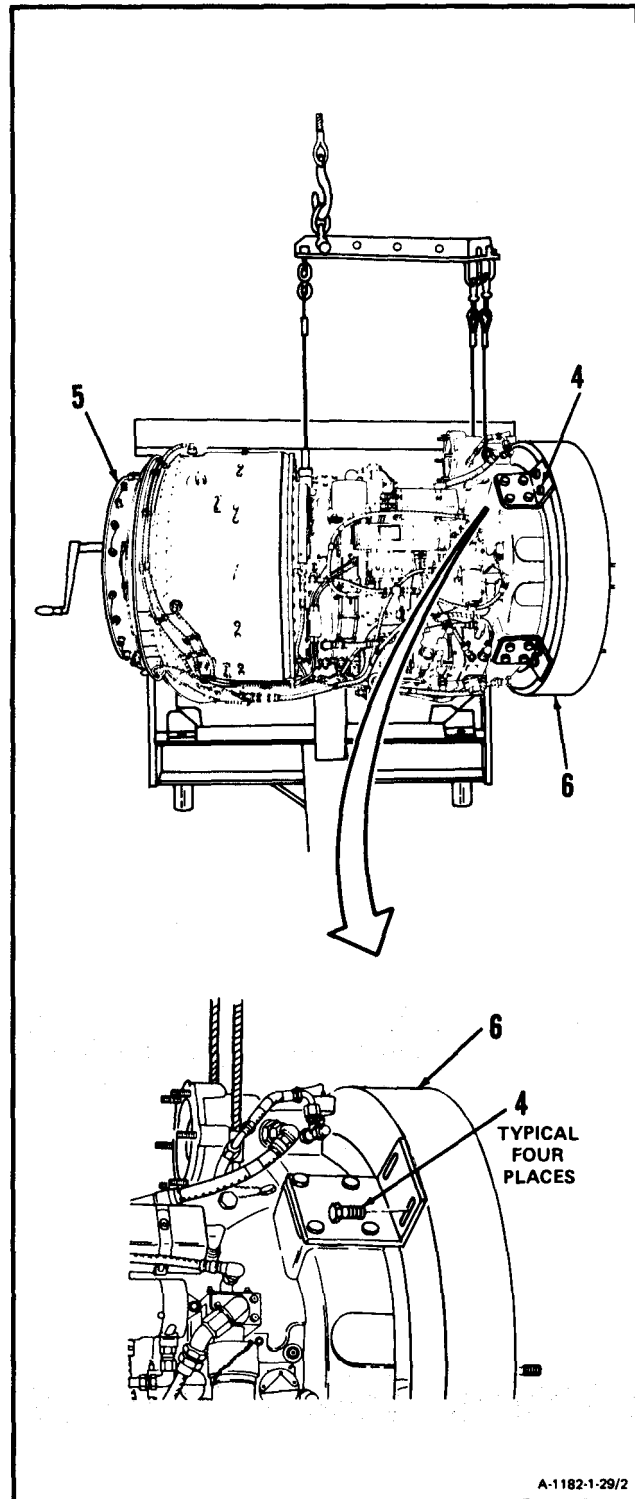
A-1182-1-29/1

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CAUTION

Ensure engine maintenance sling cables are straight and vertical to prevent swinging. Possible engine damage could occur.

2. Remove eight bolts (4). This will release engine (5) from base adapter (6).



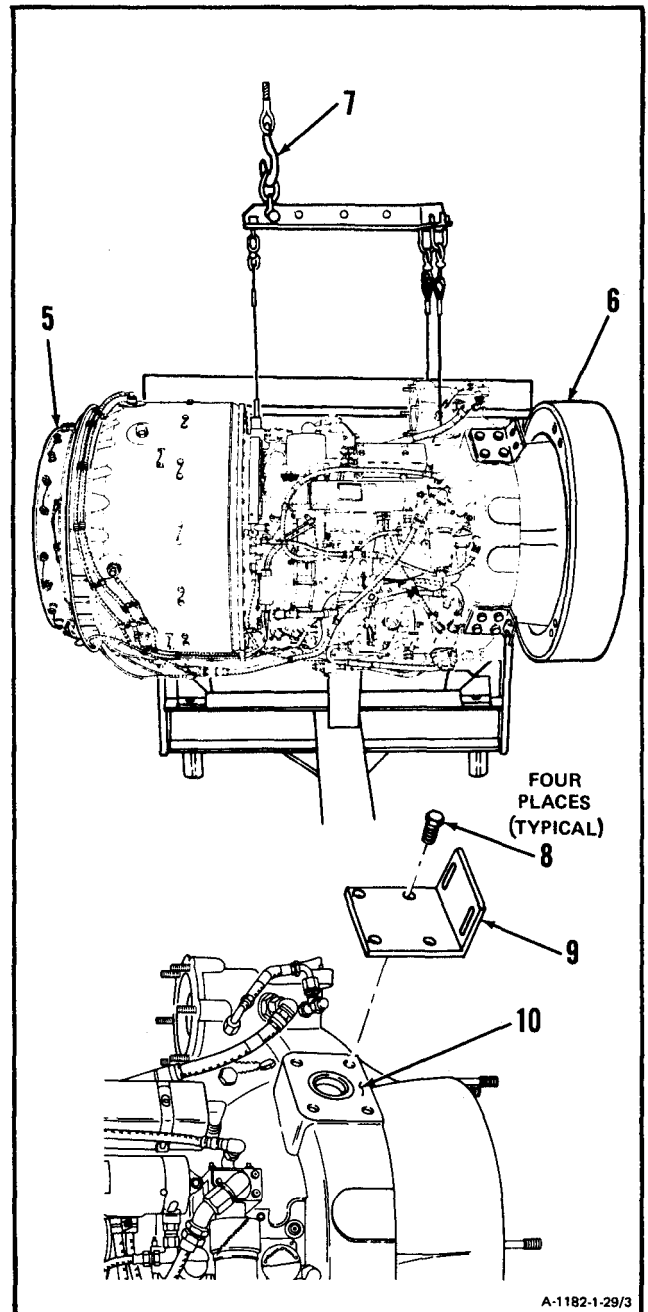
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1-29 REMOVE ENGINE FROM MAINTENANCE STAND (Continued)

1-29

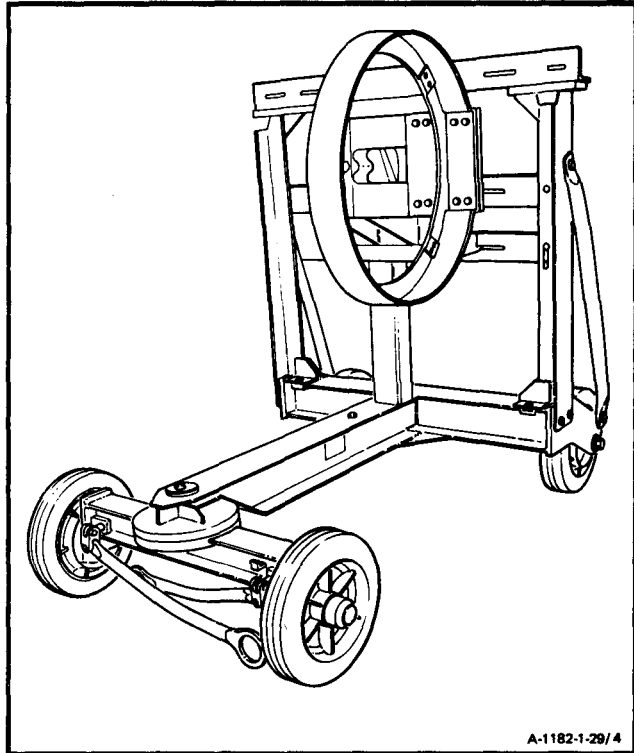
3. Move hoist (7) and engine (5) away from base adapter (6).
4. Remove sixteen bolts (8) and four brackets (9) from inlet housing (10).



GO TO NEXT PAGE

FOLLOW-ON MAINTENANCE:

None



END OF TASK

Section VI. HOISTING

This section contains general procedures needed when engine has to be lifted. It has instructions for installing and removing engine maintenance sling. It is divided into the following tasks:

LIST OF TASKS

NUMBER	TASK	PAGE
1-30	Install Engine Maintenance Sling	1-111
1-31	Remove Engine Maintenance Sling	1-116

1-30 INSTALL ENGINE MAINTENANCE SLING

1-30

INITIAL SETUP

Personnel Required:

68B10 Aircraft Powerplant Repairer

Applicable Configurations:

All

General Safety Instructions:

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Aircraft Maintenance Sling (T60)
Hoist

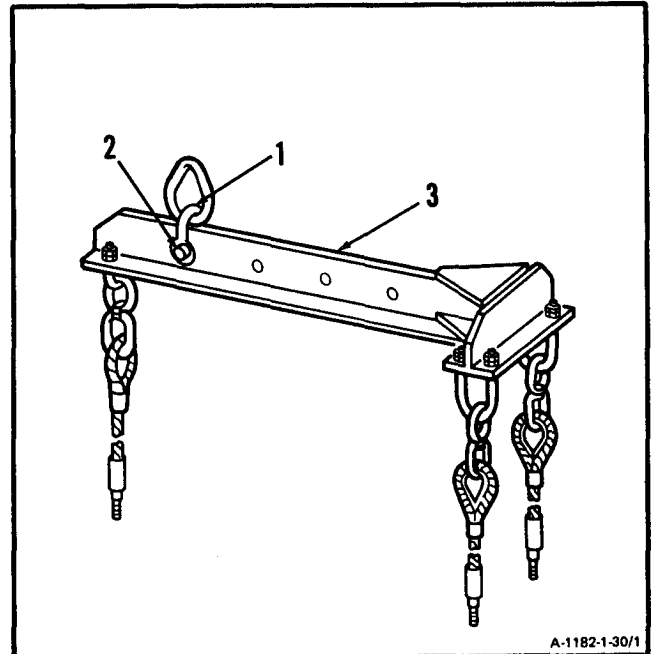


Inspect sling prior to use for signs of abuse or wear. Failure to comply may cause injury to personnel and/or damage to engine. In case of injury get medical attention.

Materials:

None

1. Ensure lifting link (1) is installed in last hole (2) of sling (T60) (3).

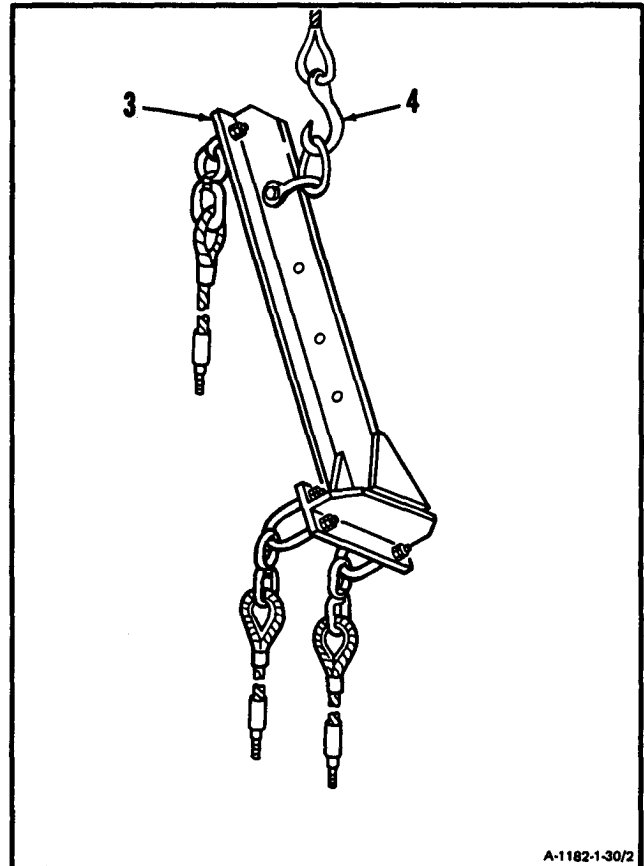


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WARNING

Ensure that hoist lifting capacity is 1200 pounds.

2. Attach sling (T60) (3) to a hoist (4) with a lifting capacity of 1200 pounds and position above engine.

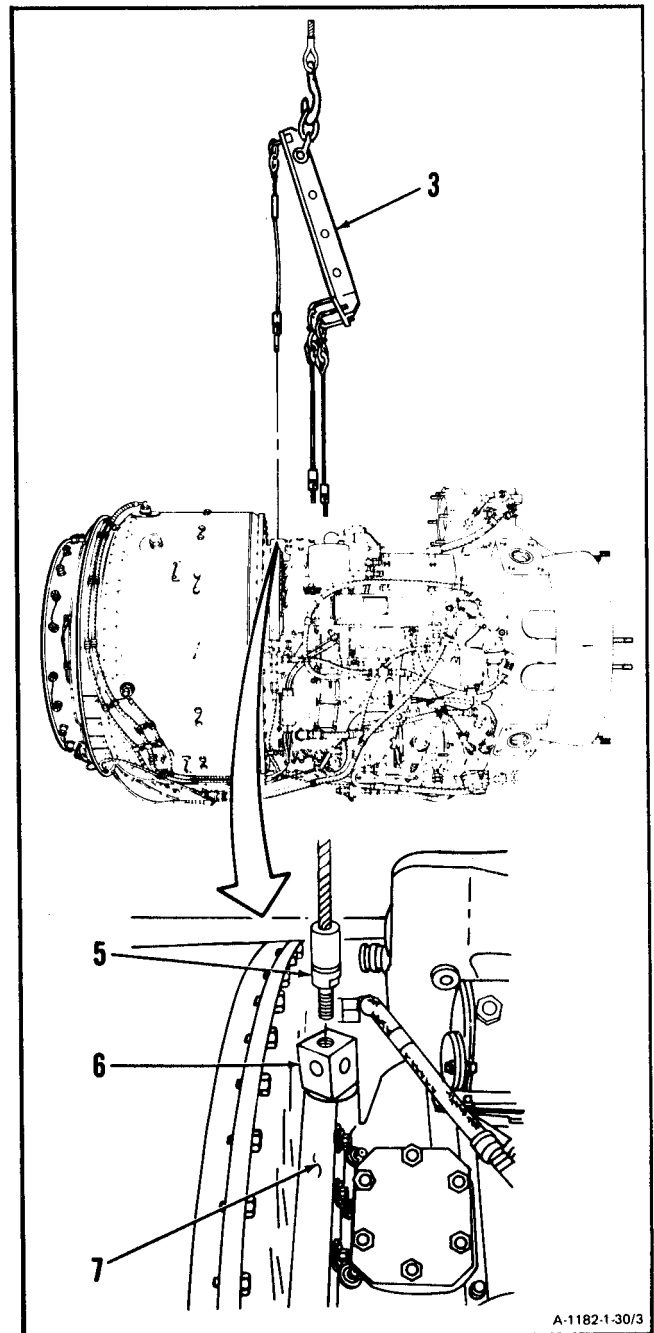


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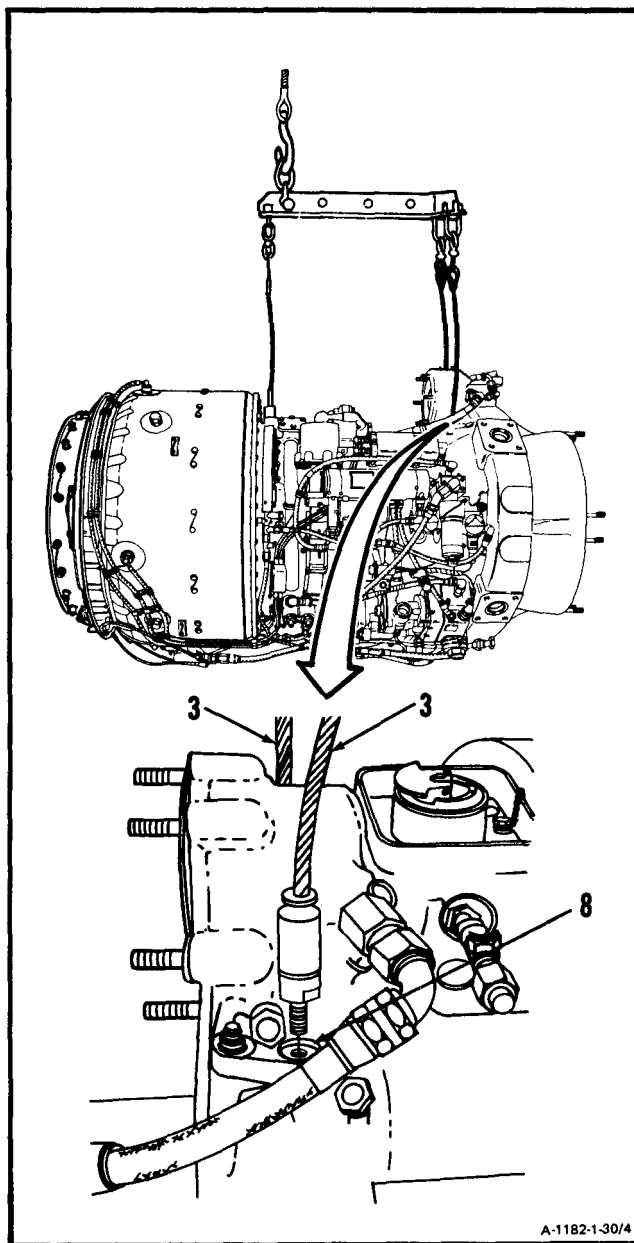
1-30 INSTALL ENGINE MAINTENANCE SLING (Continued)

1-30

- Secure rear leg (5) of sling (T60) (3) to hoist adapter (6) mounted on compressor housing (7).

**GO TO NEXT PAGE**

4. Secure sling (T60) (3) to left and right side of starter drive housing mounting flange (8).

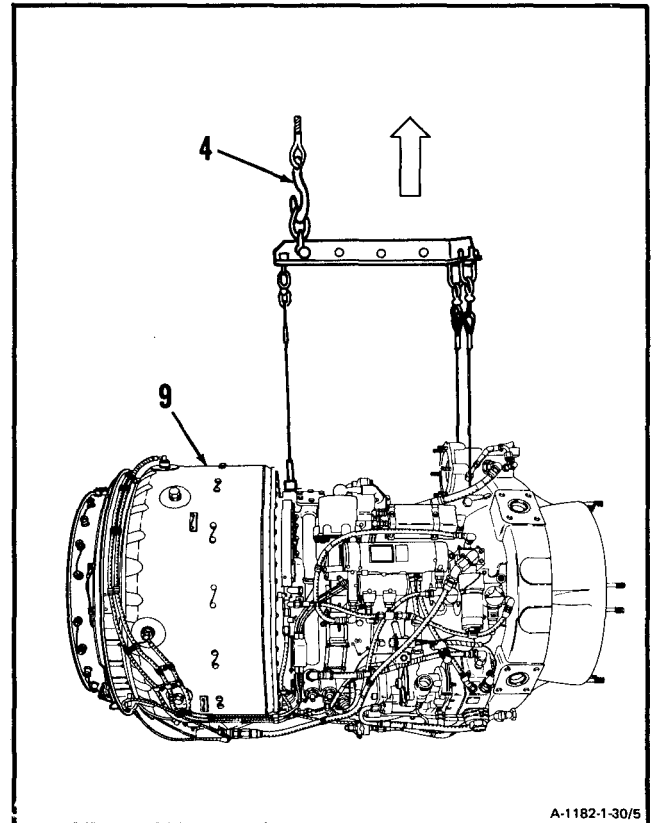


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1-30 INSTALL ENGINE MAINTENANCE SLING (Continued)

1-30

5. Adjust hoist (4) to lift engine (9).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-31 REMOVE ENGINE MAINTENANCE SLING

1-31

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

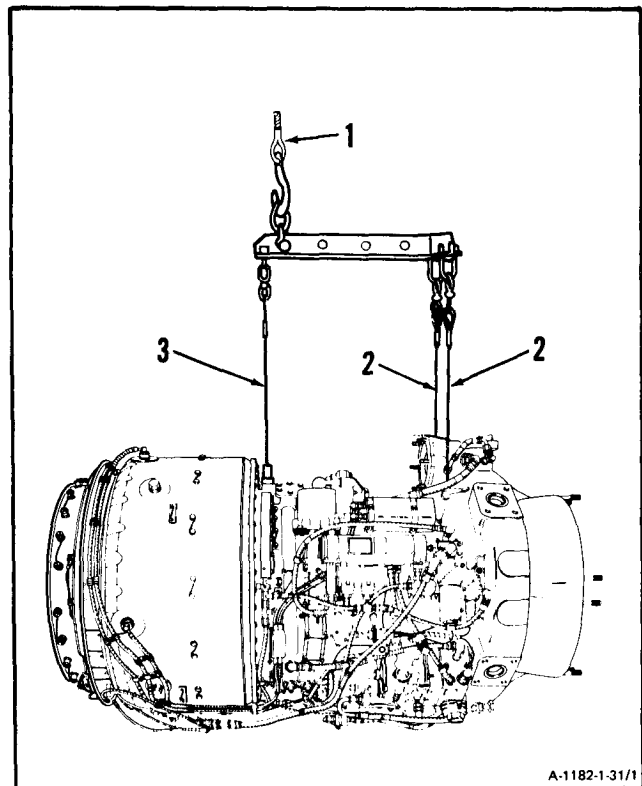
Materials:

None

Personnel Required:

68B10 Aircraft Powerplant Repairer

1. Lower hoist (1) to allow slack in sling cables (2 and 3).



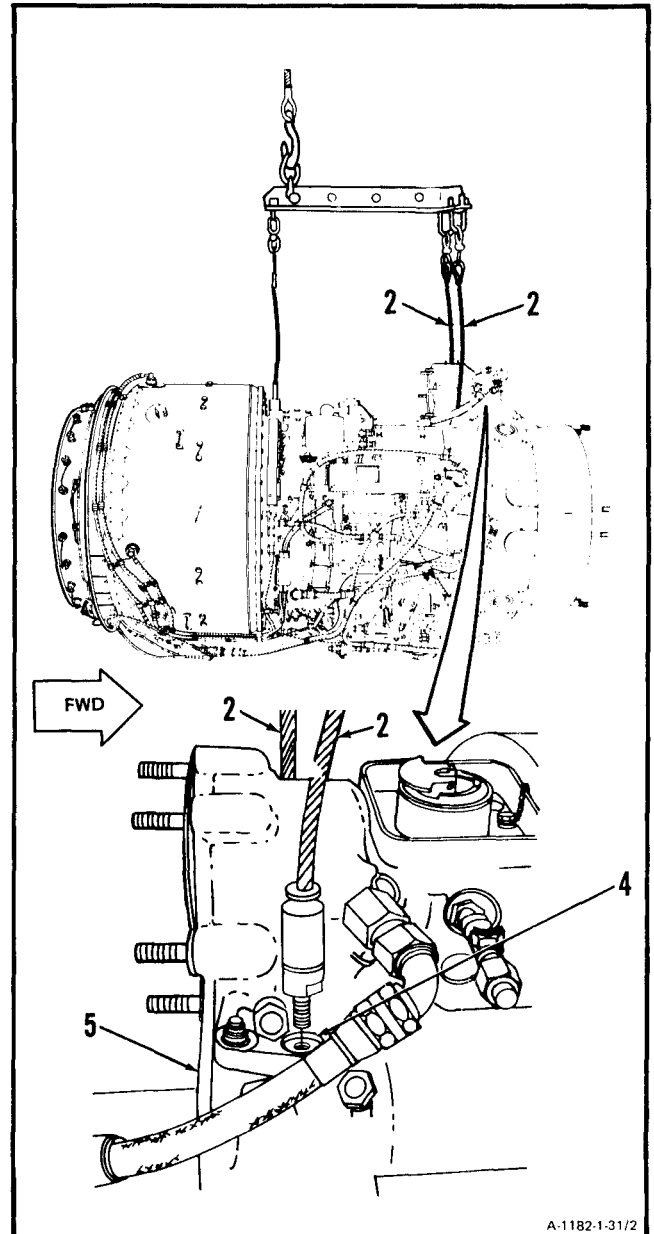
A-1182-1-31/1

GO TO NEXT PAGE

1-31 REMOVE ENGINE MAINTENANCE SLING (Continued)

1-31

2. Remove cables (2) from starter housing holes (4) on left and right side of engine (5).

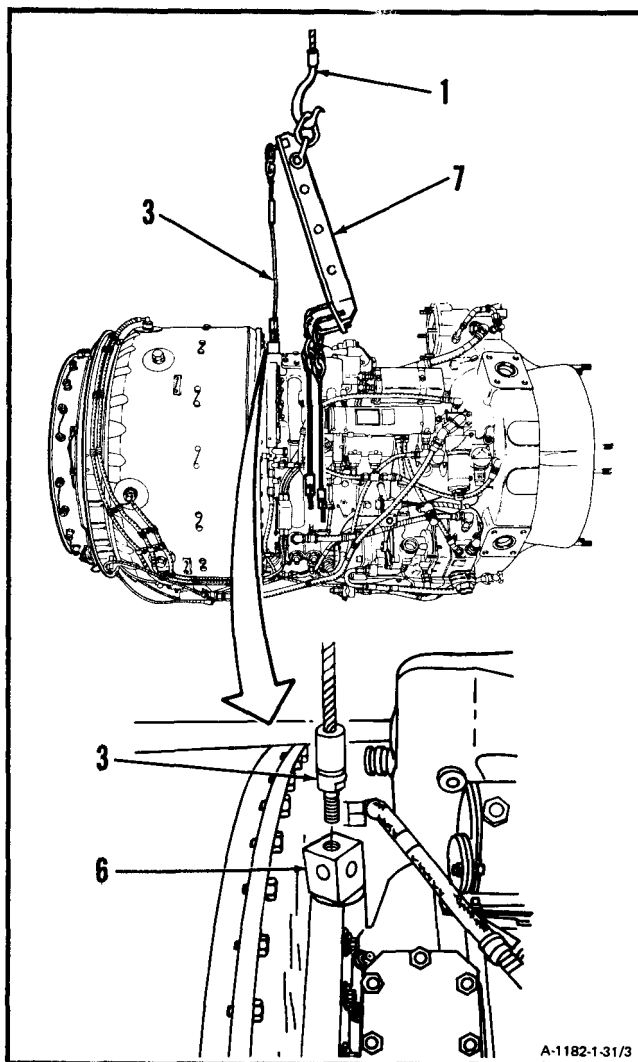


GO TO NEXT PAGE

1-31 REMOVE ENGINE MAINTENANCE SLING (Continued)

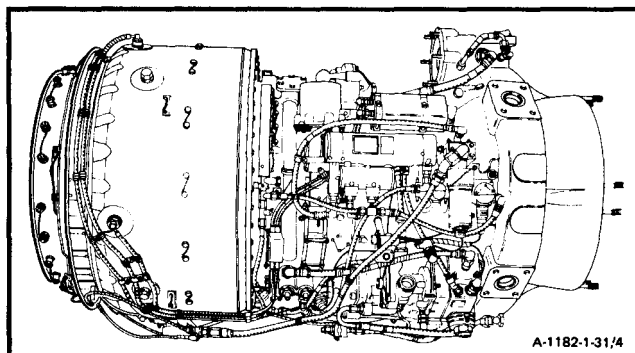
1-31

3. Remove cable (3) from hoist adapter (6).
4. Remove engine maintenance sling (7) (T60) from hoist (1).



FOLLOW-ON MAINTENANCE:

None



END OF TASK

Section VII. TROUBLESHOOTING

1-32 SYMPTOM INDEX

The following is a list of symptoms that may arise in the T55-L-712 gas turbine engine. Task and page numbers where corrective procedures can be found are included.

SYMPTOM	TASK	PAGE
Starter Does Not Turn Engine or Cranking Speed is Slow	1-34	1-124
Engine Does Not Start - No Snapping Sound is Heard When Starting System is Activated	1-35	1-128
No Combustion During Start – Ignition System Normal - Visual Check	1-36	1-130
No Combustion During Start - Ignition System Normal	1-37	1-132
Torching Starts - Visual Check	1-38	1-137
Torching Starts	1-39	1-138
With Power Lever (N1) in Ground Idle Position, Engine Does Not Reach Ground Idle Speed - Visual Check	1-40	1-142
With Power Lever (N1) in Ground Idle Position, Engine Does Not Reach Ground Idle Speed	1-41	1-144
Ground Idle Speed is Incorrect - Visual Check	1-42	1-147
Ground Idle Speed is Incorrect	1-43	1-148
Torque Low at Maximum Power Lever (N1) Setting - Visual Check	1-44	1-151
Torque Low at Maximum Power Lever (N1) Setting	1-45	1-152
Torque High at Maximum Power Lever (N1) Setting	1-46	1-156
Compressor Surges or Bleed Band Popping on Acceleration	1-47	1-158
Compressor Bleed Band Remains Open	1-48	1-160
N1 Transient Overshoots - N2 Speed Cannot Be Reached - Visual Check	1-49	1-162
N1 Transient Overshoots - N2 Speed Cannot Be Reached	1-50	1-163
N2 Overshoots or Undershoots	1-51	1-165

1-32 SYMPTOM INDEX (Continued)

1-32

SYMPTOM	TASK	PAGE
Erratic or Oscillating N1 Speed While Engine is Topped Out (Governing on N1)	1-52	1-166
Erratic or Oscillating N2, PTIT, Torque or N1 While Governing on N2	1-53	1-170
Flameout - Visual Check	1-54	1-174
Flameout	1-55	1-176
Oil Pressure Indicating Low or High - Visual Check	1-56	1-180
Oil Pressure Indicating Low or High	1-57	1-182
Oil pressure Fluctuation (Total Needle Oscillation of More Than <u>10 PSI</u>) - Visual Check	1-58	1-185
Oil Pressure Fluctuation (Total Needle Oscillation of More Than <u>10 PSI</u>)	1-59	1-186
High Oil Temperature Indication - Visual Check	1-60	1-189
High Oil Temperature Indication	1-61	1-190
Static Oil Leakage at Combustion Chamber Drain Valve or Bleed Band Caused By Internal Oil Seepage - Visual Check	1-62	1-192
Static Oil Leakage at Combustion Chamber Drain Valve or Bleed Band Caused By Internal Oil Seepage	1-63	1-193
Excessive Chips Found on Oil Filter Element and/or Chip Detectors	1-64	1-195
High or Erratic PTIT During Steady-State Operation	1-65	1-196
High PTIT During Starts- Visual Check	1-66	1-199
High PTIT During Starts	1-67	1-200
High PTIT During Accelerations - Visual Check	1-68	1-205
High PTIT During Accelerations	1-69	1-206
High Oil Consumption (More Than <u>2-Quarts</u> Per Hour)	1-70	1-210
N1 Overspeed	1-71	1-212
N2 Overspeed	1-72	1-214
Abnormal Engine Coastdown Noise or Time (Less Than <u>25 Seconds</u>)	1-73	1-216
Engine Fails to Accelerate During Start With High PTIT	1-73.1	1-218

1-33 TROUBLESHOOTING PROCEDURES

Engine trouble can be either obvious or hidden. If hidden troubles are not detected, serious and considerable damage may occur to the engine. Therefore, it is essential to have a thorough knowledge of the correct power turbine inlet temperature, fuel flow, lubrication oil pressure, and other important details of normal engine operation.

It is essential to have information of previous trouble and work performed on the engine. Check each possible source of trouble until the trouble has been isolated by a process of elimination. Systematic checking is essential for thorough troubleshooting. It saves time and promotes accuracy. If the symptom also contains a visual check, always perform the visual check first. In all troubleshooting tasks, if fault cannot be corrected by the end of the task the engine is to be replaced.

Tasks 1-34 thru 1-73 contain troubleshooting procedures to be used for isolating and correcting engine problems. The symptom is the task title and appears at the top of the task. A logic tree flow chart is used in conjunction with locator illustrations to assist troubleshooting. To use the flow chart, start at the first left-hand box. Follow all instructions, answer all questions and proceed through chart as indicated. Use locator illustrations as needed and proceed through chart until symptom has been corrected.

LIST OF TASKS

NUMBER	TITLE
1-34	Starter Drive Does Not Turn Engine or Engine Cranking Speed is Too Slow
1-35	Engine Does Not Start - No Snapping Sound is Heard When Starting System is Activated
1-36	No Combustion During Start - Ignition System Normal - Visual Check
1-37	No Combustion During Start - Ignition System Normal
1-38	Torching Starts - Visual Check
1-39	Torching Starts
1-40	With Power Lever (N1) in Ground Idle Position, Engine Does Not Reach Ground Idle Speed - Visual Check
1-41	With Power Lever (N1) in Ground Idle Position, Engine Does Not Reach Ground Idle Speed
1-42	Ground Idle Speed is Incorrect - Visual Check

1-33 TROUBLESHOOTING PROCEDURES (Continued)

1-33

LIST OF TASKS (Continued)

NUMBER	TITLE
1-43	Ground Idle Speed is Incorrect
1-44	Torque Low at Maximum Power Lever (N1) Setting - Visual Check
1-45	Torque Low at Maximum Power Lever (N1) Setting
1-46	Torque High at Maximum Power Lever (N1) Setting
1-47	Compressor Surges or Bleed Band Popping on Acceleration
1-48	Compressor Bleed Band Remains Open
1-49	N1 Transient Overshoots - N2 Speed Cannot Be Reached - Visual Check
1-50	N1 Transient Overshoots - N2 Speed Cannot Be Reached
1-51	N2 Overshoots or Undershoots
1-52	Erratic or Oscillating N1 Speed While Engine is Topped Out (Governing on N1)
1-53	Erratic or Oscillating N2, PTIT, Torque or N1 While Governing on N2
1-54	Flameout - Visual Check
1-55	Flameout
1-56	Oil Pressure Indicating Low or High - Visual Check
1-57	Oil Pressure Indicating Low or High
1-58	Oil Pressure Fluctuation (Total Needle Oscillation of More Than <u>10 PSI</u>) - Visual Check
1-59	Oil Pressure Fluctuation (Total Needle Oscillation of More Than <u>10 PSI</u>)
1-60	High Oil Temperature Indication - Visual Check
1-61	High Oil Temperature Indication
1-62	Static Oil Leakage at Combustion Chamber Drain Valve or Bleed Band Caused By Internal Oil Seepage - Visual Check

1-33 TROUBLESHOOTING PROCEDURES (Continued)

1-33

LIST OF TASKS (Continued)

NUMBER	TITLE
1-63	Static Oil Leakage at Combustion Chamber Drain Valve or Bleed Band Caused By Internal Oil Seepage
1-64	Excessive Chips Found on Oil Filter Element and/or Chip Detectors
1-65	High or Erratic PTIT During Steady State Operation
1-66	High PTIT During Starts – Visual Check
1-67	High PTIT During Starts
1-68	High PTIT During Accelerations – Visual Check
1-69	High PTIT During Accelerations
1-70	High Oil Consumption (More Than <u>2-Quarts</u> Per Hour)
1-71	N 1 Overspeed
1-72	N2 Overspeed
1-73	Abnormal Engine Coastdown Noise or Time (Less Than <u>25 Seconds</u>)
1-73.1	Engine Fails to Accelerate During Start with High PTIT

INITIAL SETUP

Materials:

None

Applicable Configurations:

All

Personnel Required:

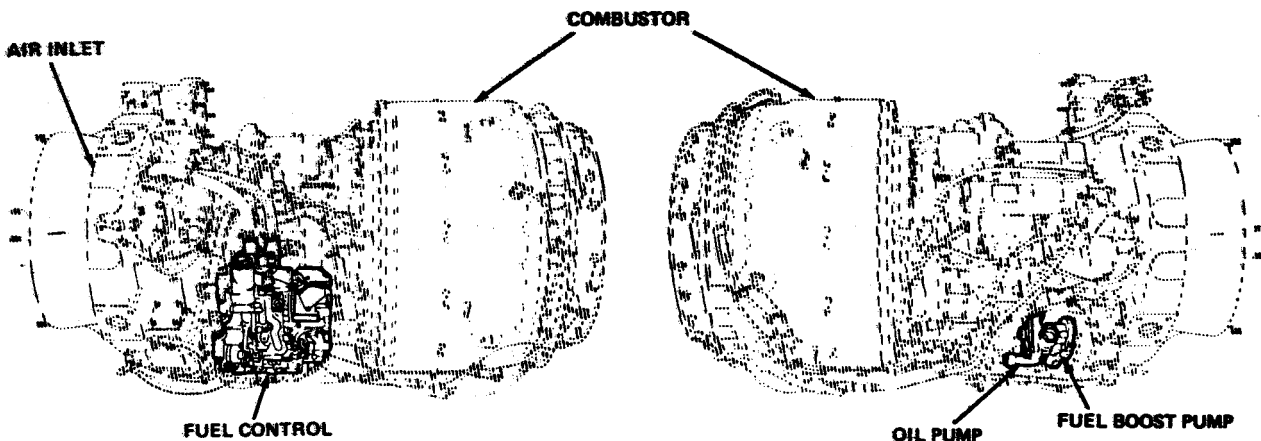
68B20 Aircraft Powerplant Repairer

Tools:

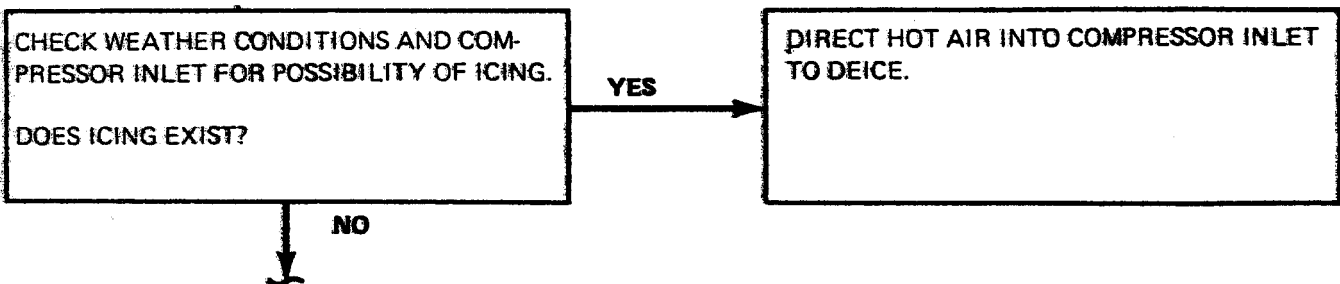
Powerplant Mechanic's Tool Kit,
NSN 5180-00-3234944
Portable Duct Type Heater,
NSN 4520-00-915-7789

References:

TM 55-1520-240-T
TM 55-4920-328-13
Task 1-92 Task 6-1
Task 1-93 Task 6-6
Task 2-19 Task 6-9
Task 2-22 Task 6-13
Task 2-33 Task 8-1



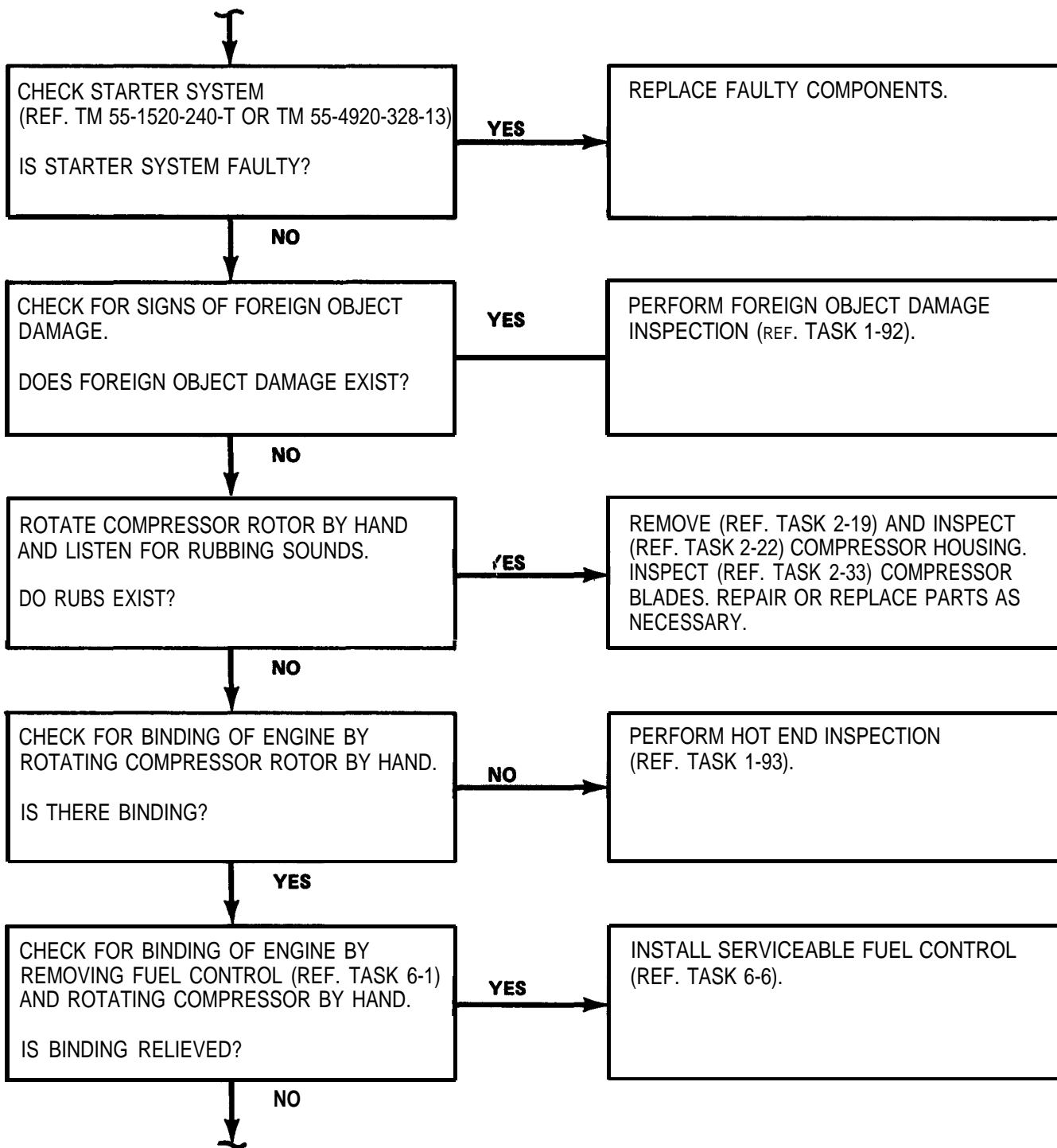
A-1182-1-34/1



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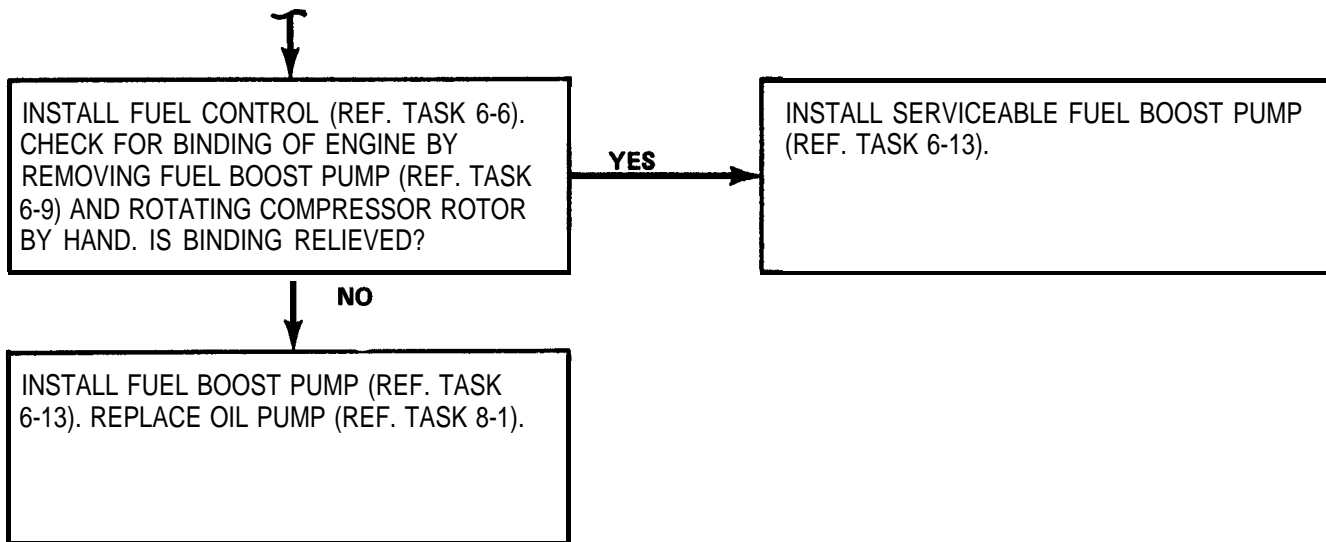
1-34 STARTER DOES NOT TURN ENGINE OR ENGINE CRANKING SPEED IS SLOW (Continued)

1-34



GO TO NEXT PAGE

1-34 STARTER DOES NOT TURN ENGINE OR ENGINE CRANKING SPEED IS SLOW (Continued)



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-35 ENGINE DOES NOT START - NO SNAPPING SOUND IS HEARD WHEN STARTING SYSTEM IS ACTIVATED

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

Tape (E54)

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B20 Aircraft Powerplant Repairer

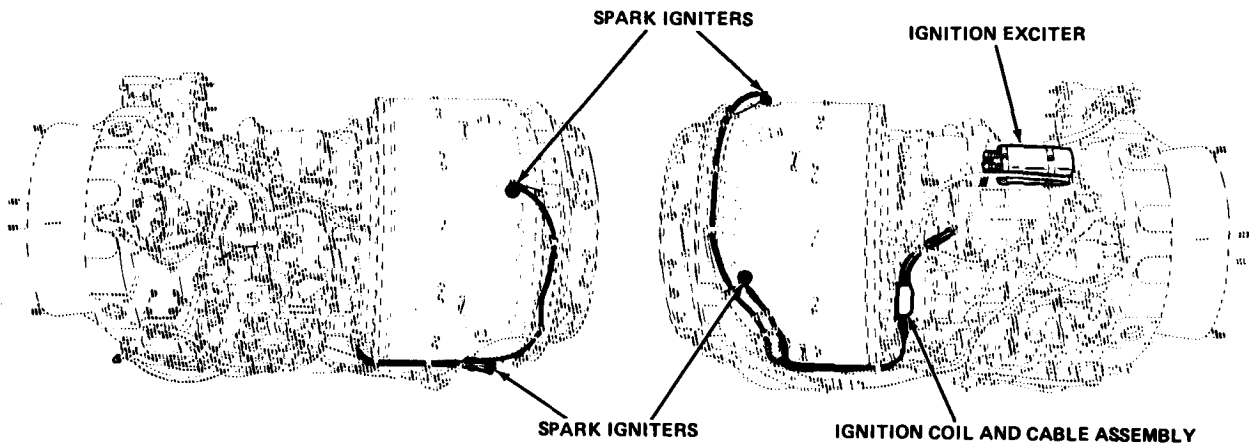
References:

TM 55-1520-240-10 TM 55-4920-328-13
TM 55-1520-240-T
Task 1-107 Task 7-6 Task 7-11
Task 7-1 Task 7-10

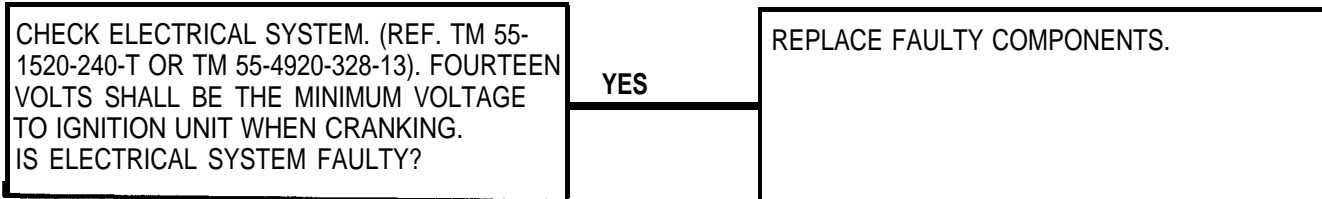
General Safety Instructions:

WARNING

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



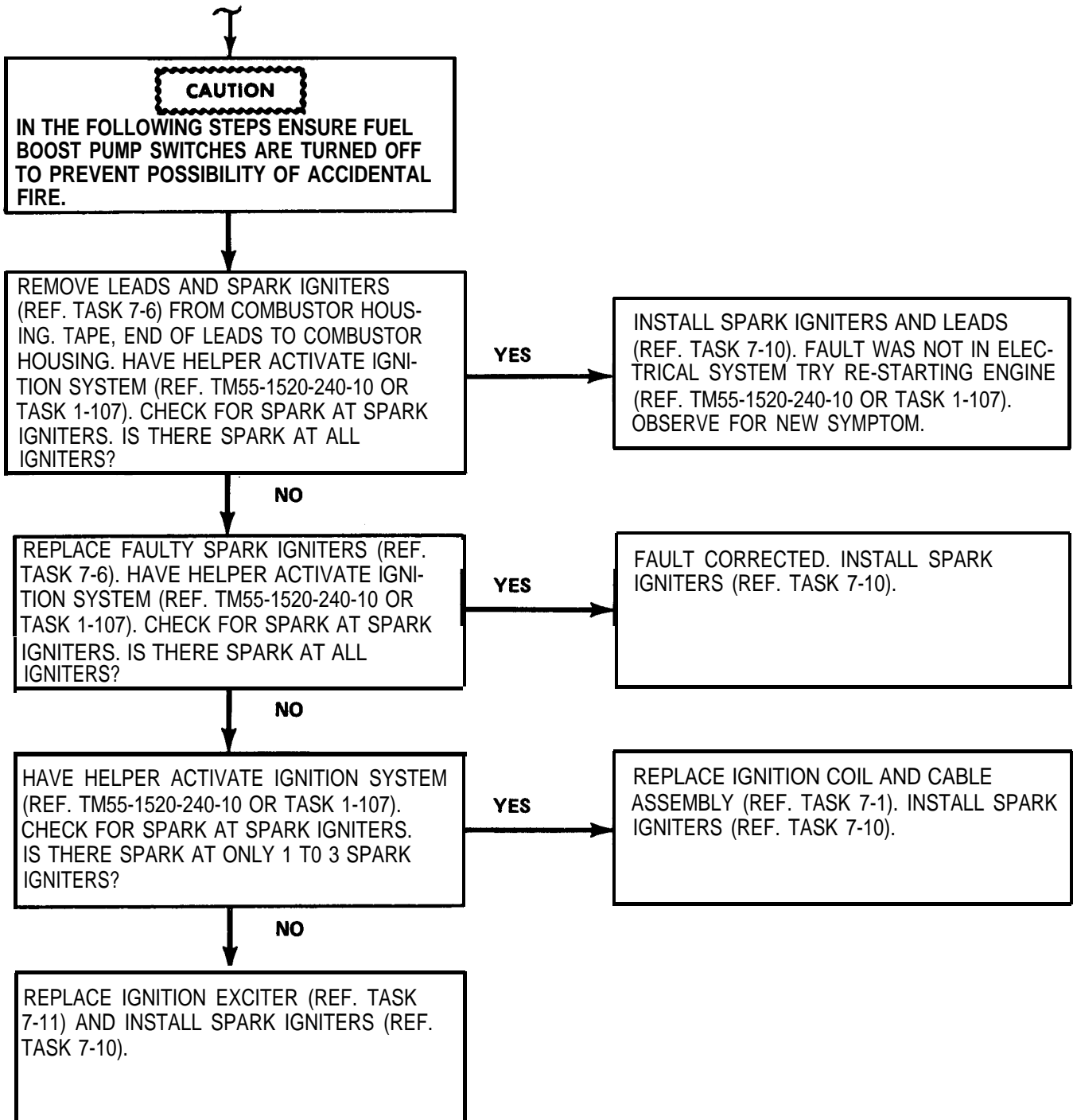
A-1182-1-35/1



GO TO NEXT PAGE

1-35 ENGINE DOES NOT START - NO SNAPPING SOUND IS HEARD WHEN STARTING SYSTEM IS ACTIVATED (Continued)

1-35



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-36 NO COMBUSTION DURING START -IGNITION SYSTEM NORMAL - VISUAL CHECK

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

- TM 55-1520-240-T
- TM 55-4920-328-13
- Task 1-85
- Task 1-102
- Task 1-103

Tools:

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

Materials:

None

TASK

RESULT

CAUTION

In the following two steps if differential pressure indicator button becomes extended more than once within each period of engine operation inspect contaminated fuel system (Ref. Task 1-65).

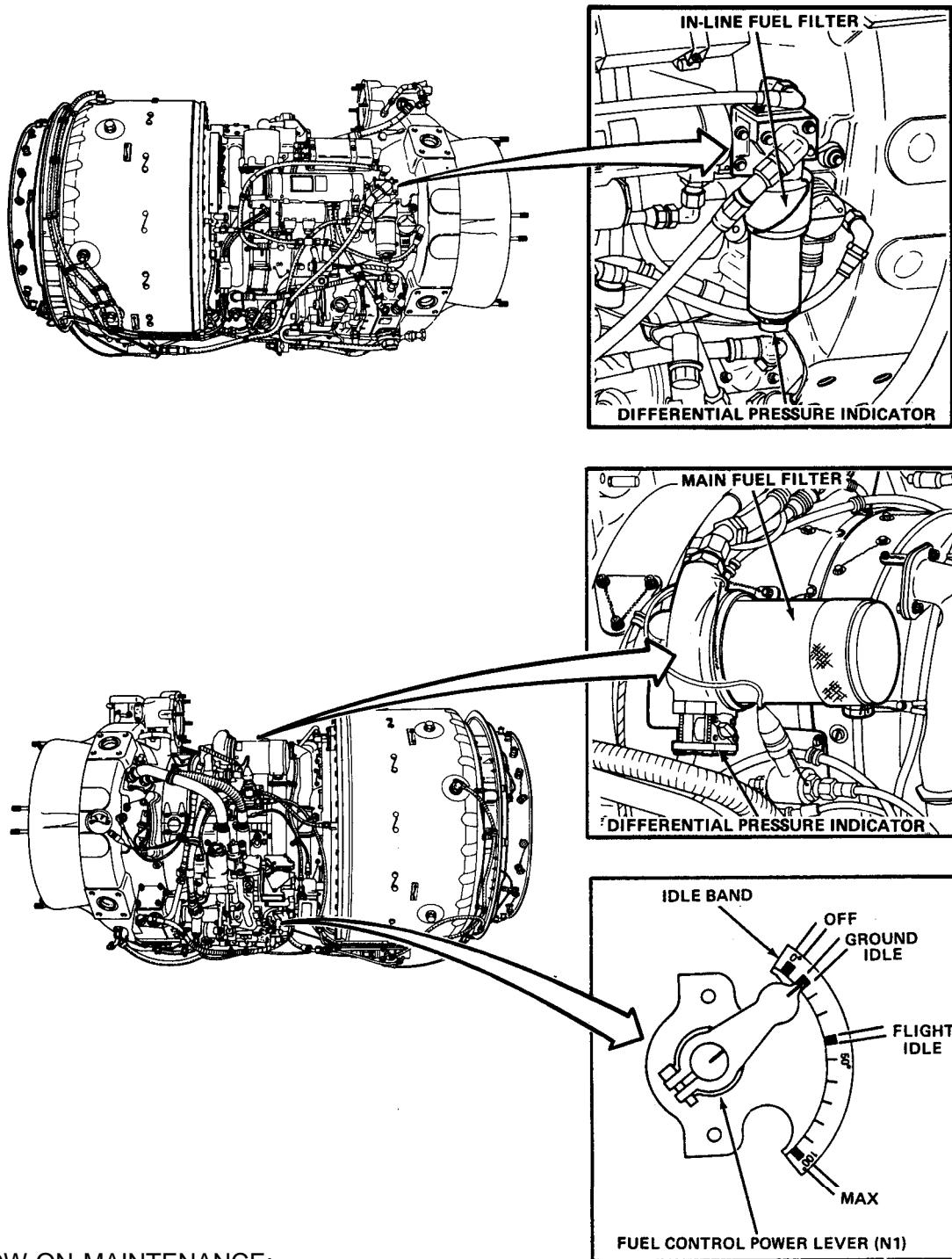
1. Check inline fuel filter differential pressure indicator button.
2. Check main fuel filter differential pressure indicator button.
3. Check fuel control power lever (N1) for position.

- If differential pressure indicator button is extended service filter and reset button (Ref. Task 1-103).
- If differential pressure indicator button is extended service filter and reset button (Ref. Task 1-102).
- If lever is not in middle of ground idle band adjust linkage as needed (Ref. TM 55-1520-240-T or TM 55-4920-328-13).

GO TO NEXT PAGE

1-36 NO COMBUSTION DURING START - IGNITION SYSTEM NORMAL - VISUAL CHECK (Continued)

1-36



FOLLOW-ON MAINTENANCE:

None

END OF TASK

A-1182-1-36/1

1-37 NO COMBUSTION DURING START - IGNITION SYSTEM NORMAL

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

None

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B20 Aircraft Powerplant Repairer

References:

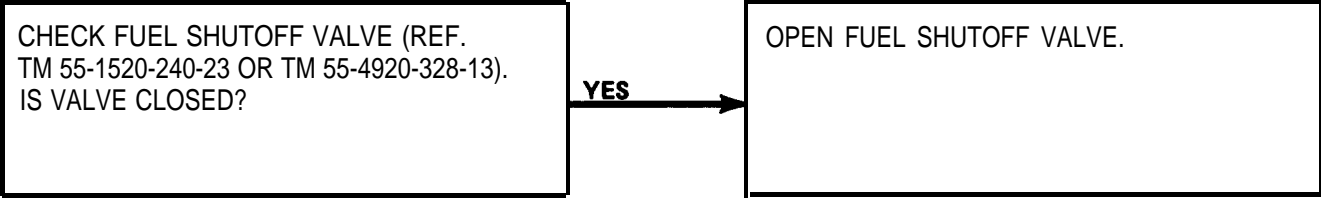
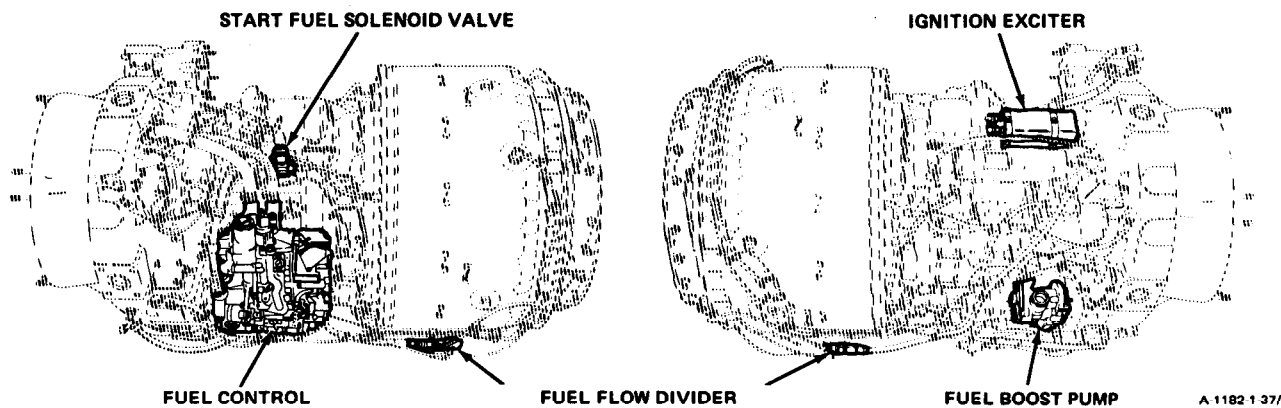
TM 55-1520-240-10 TM 55-4920-328-13
TM 55-1520-240-23 Task 1-107
TM 55-1520-240-T Task 6-1

Task 6-9	Task 6-54	Task 6-61
Task 6-15	Task 6-55	Task 6-64
Task 6-25	Task 6-56	Task 6-65
Task 6-27	Task 6-57	Task 6-67
Task 6-28	Task 6-58	Task 6-68
Task 6-42	Task 6-59	Task 6-69
Task 6-49	Task 6-60	Task 6-70
		Task 6-72
		Task 6-73

General Safety Instructions:

WARNING

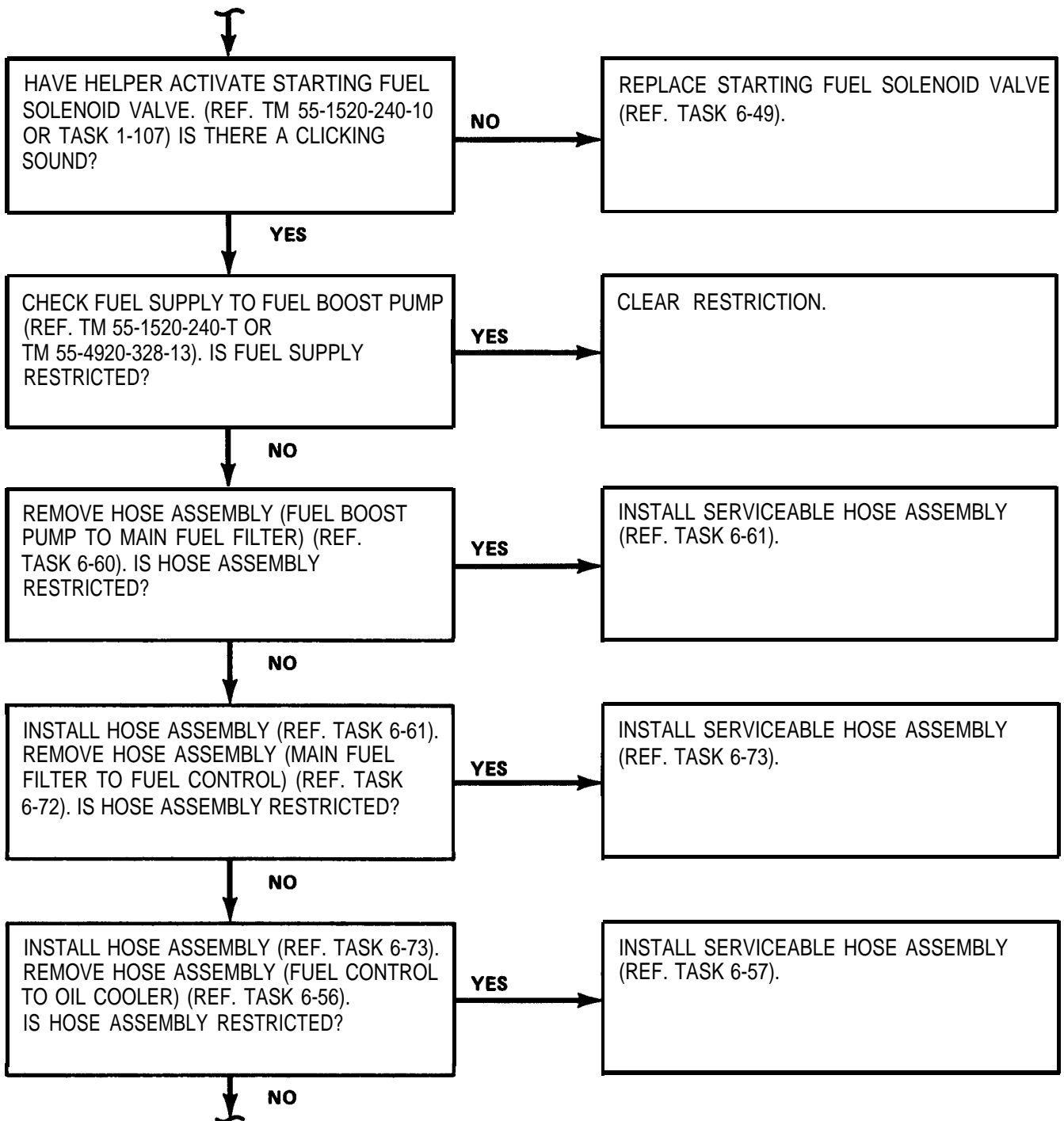
Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area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



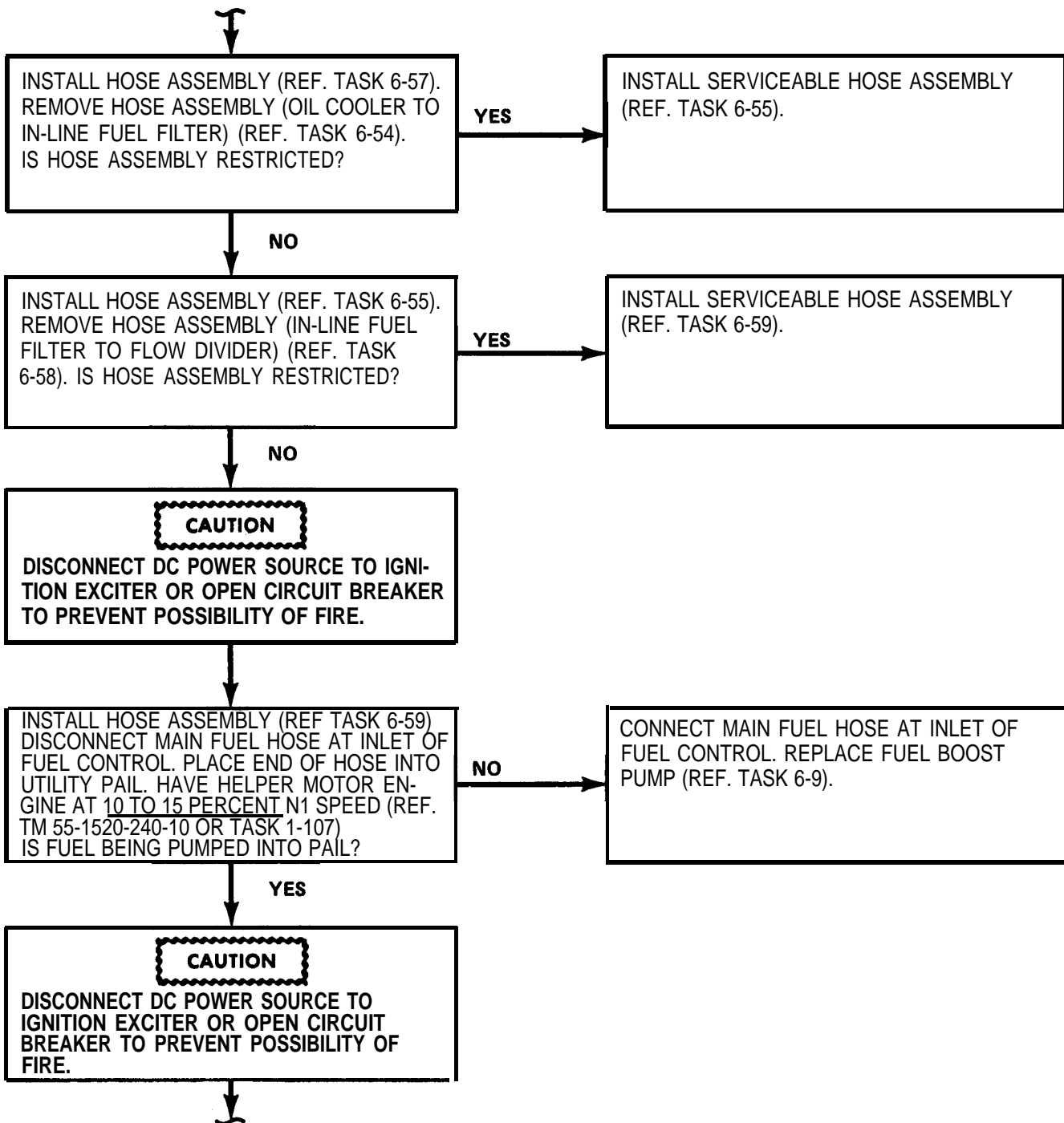
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1-37 NO COMBUSTION DURING START - IGNITION SYSTEM NORMAL (Continued)

1-37



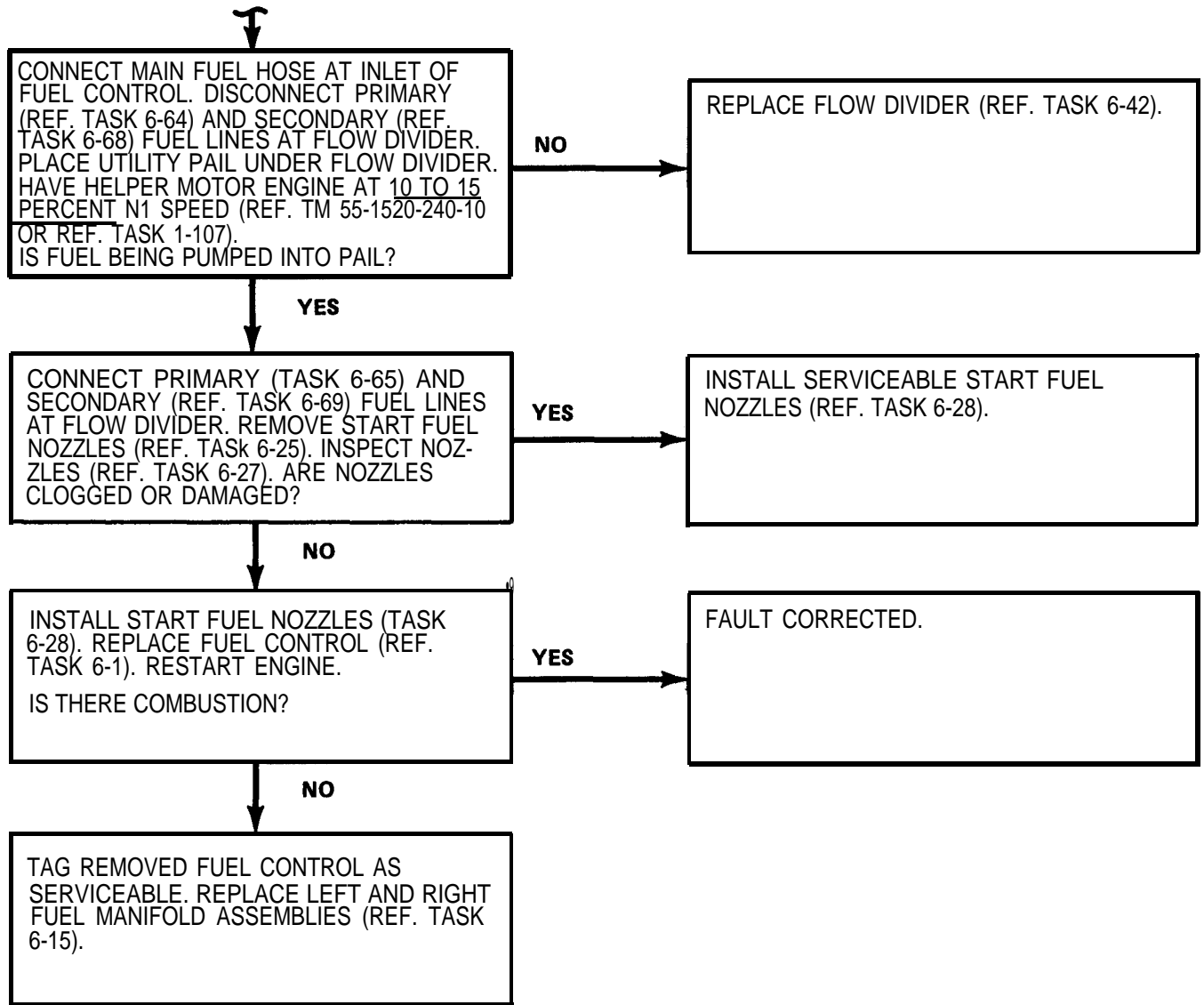
GO TO NEXT PAGE



GO TO NEXT PAGE

1-37 NO COMBUSTION DURING START - IGNITION SYSTEM NORMAL (Continued)

1-37



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-38 TORCHING STARTS - VISUAL CHECK

1-38

INITIAL SETUP

Materials:

None

Applicable Configurations:

All

Personnel Required:

68620 Aircraft Powerplant Repairer

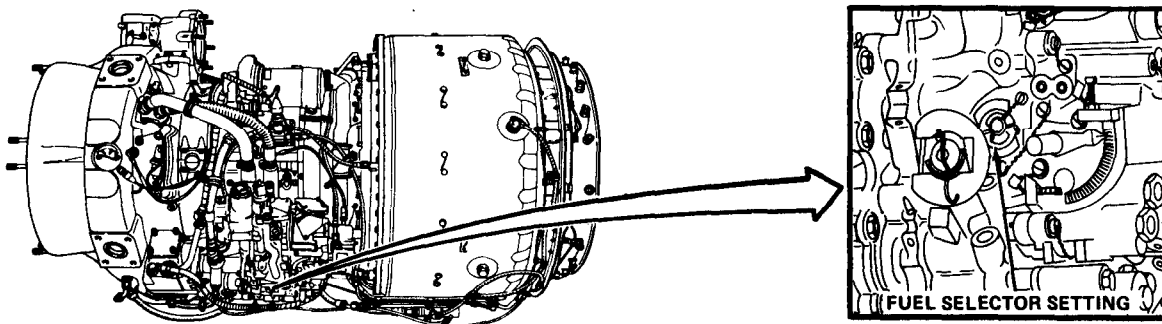
Tools:

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

References:

Task 1-108

TASK	RESULT
1. Check fuel selector setting on fuel control.	If fuel selector setting is not on JP-4, adjust as needed (Ref. Task 1-108).



A-1182-1-38/1

FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

General Safety Instructions:

Applicable Configurations:

All

WARNING

Tools:

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

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 contracted area of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

Materials:

Tape (E54)

Personnel Required:

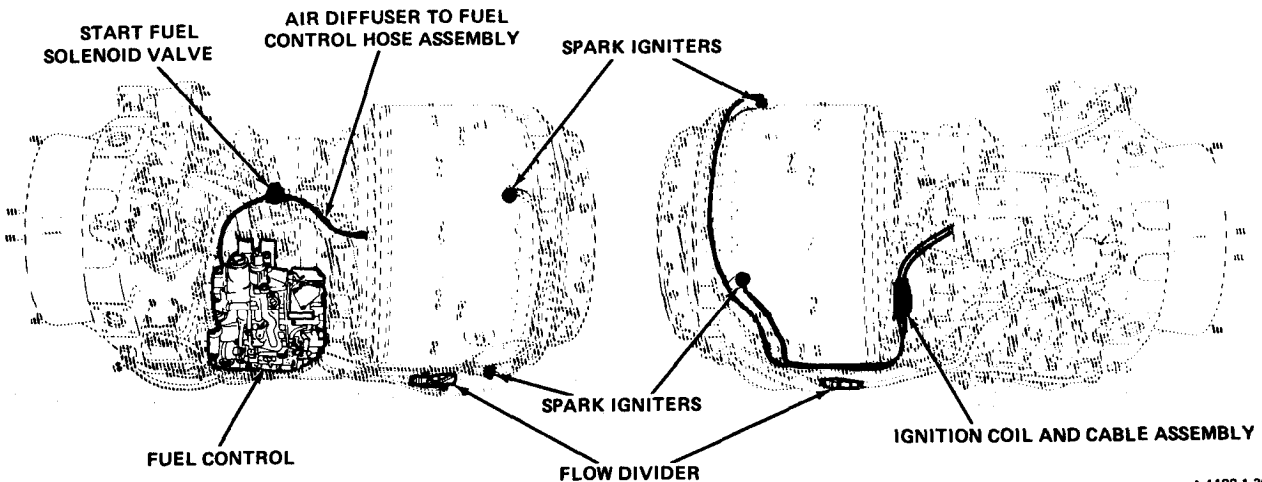
68B10 Aircraft Powerplant Repairer
68B20 Aircraft Powerplant Repairer

References:

- | | | |
|-------------------|-----------|-----------|
| TM 55-1520-240-10 | | |
| TM 55-1520-240-T | | |
| TM 55-4920-328-13 | | |
| Task 1-107 | Task 6-1 | Task 6-64 |
| Task 2-79 | Task 6-25 | Task 6-65 |
| Task 2-80 | Task 6-26 | Task 6-68 |
| Task 3-1 | Task 6-27 | Task 6-69 |
| Task 3-3 | Task 6-28 | Task 7-1 |
| Task 3-4 | Task 6-42 | Task 7-6 |
| | Task 6-49 | Task 7-10 |

WARNING

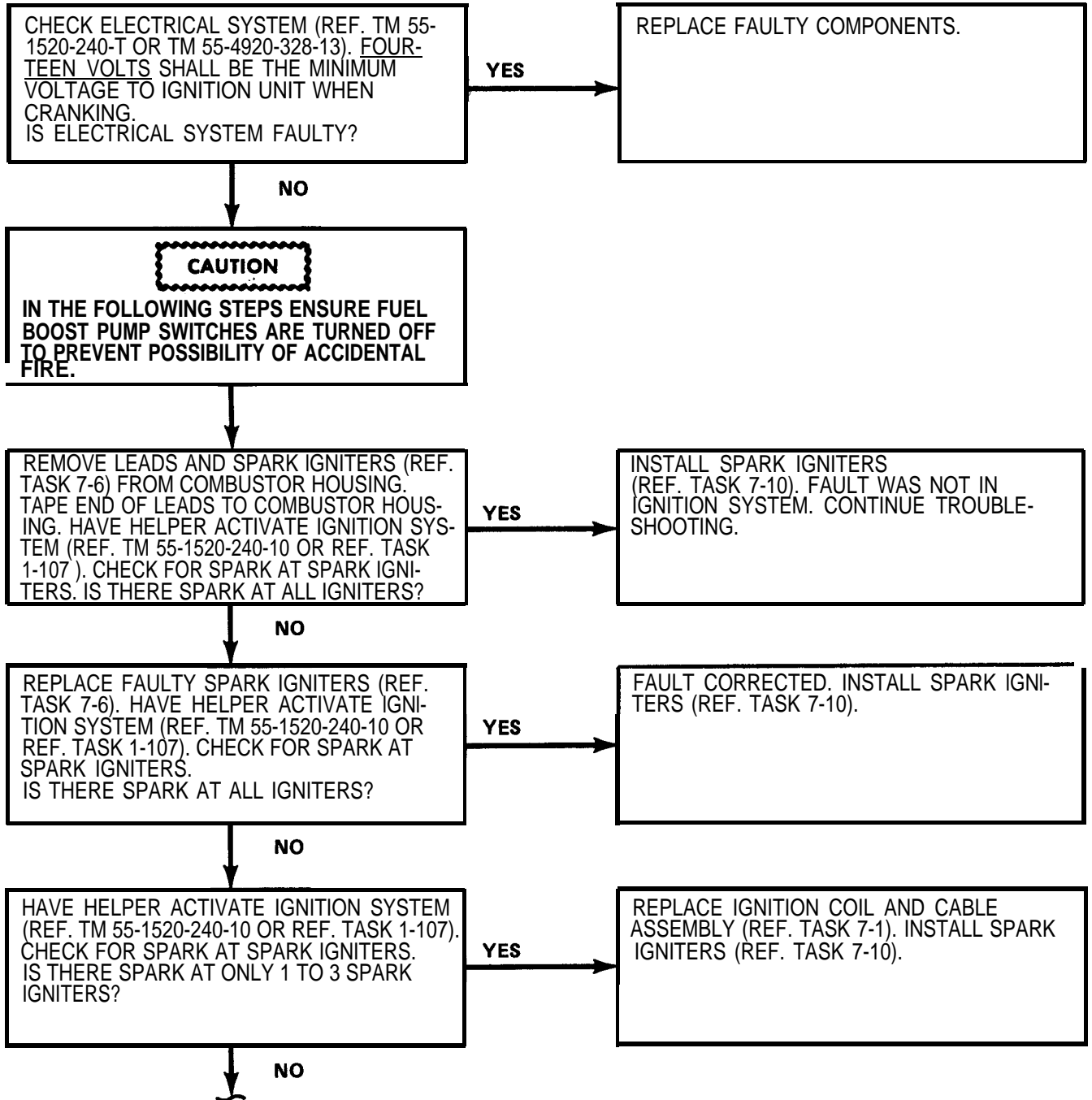
The ignition exciter stores very high and possibly fatal voltage. Use extreme care when working around ignition exciter or spark igniters. Serious injury could result if exciter or spark igniters are accidentally grounded. Do not probe inside of output receptacles with fingers or metal object. Discharge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



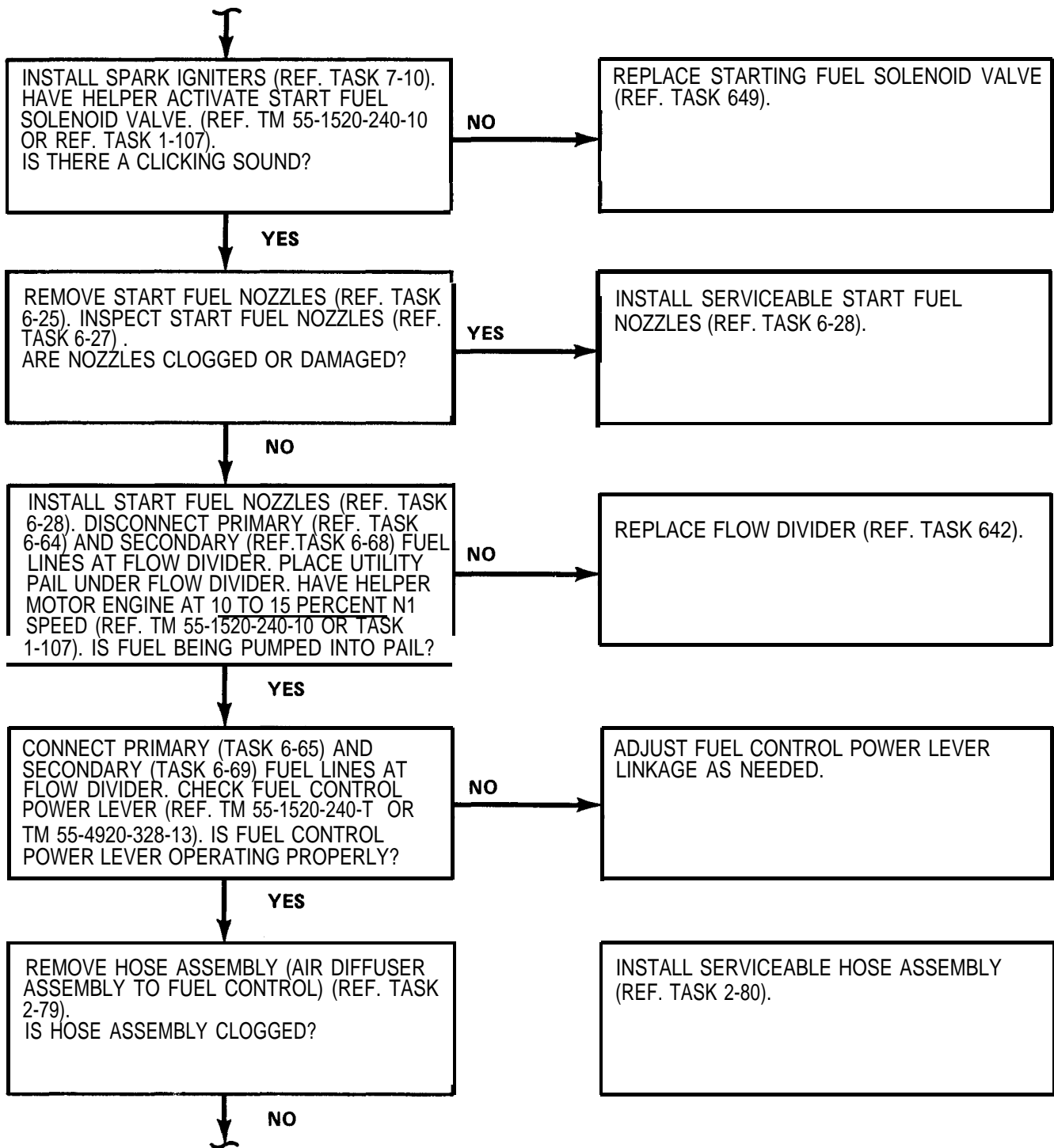
A-1182-1-39/1

GO TO NEXT PAGE

1-39 TORCHING STARTS (Continued)



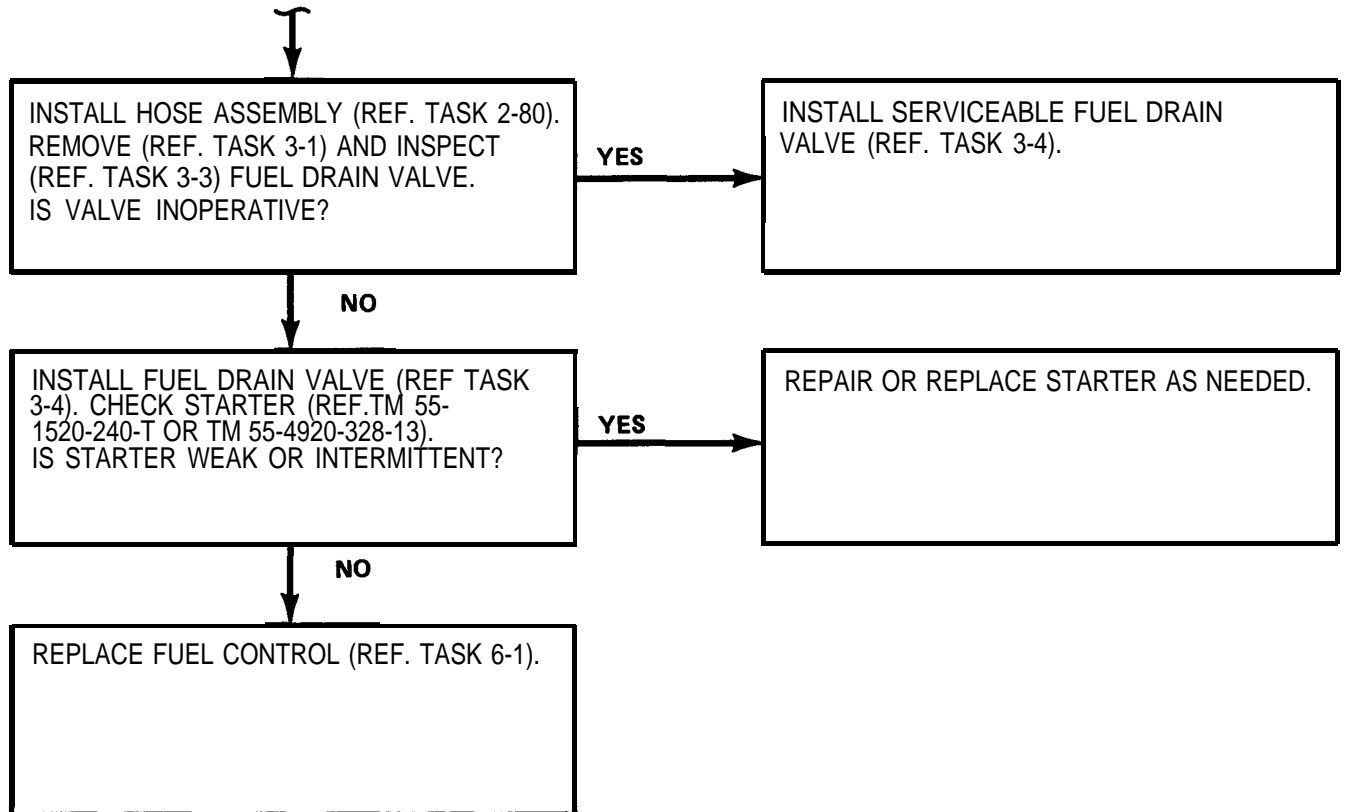
GO TO NEXT PAGE



GO TO NEXT PAGE

1-39 TORCHING STARTS (Continued)

1-39



FOLLOW-ON MAINTENANCE:

NONE

END OF TASK

1-40 WITH POWER LEVER (N1) IN GROUND IDLE POSITION, ENGINE DOES NOT REACH GROUND IDLE SPEED - VISUAL CHECK 1-40

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

Tools:

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

References:

TM 55-1520-240-T
TM 55-4920-328-13
Task 1-85
Task 1-102
Task 1-103

Materials:

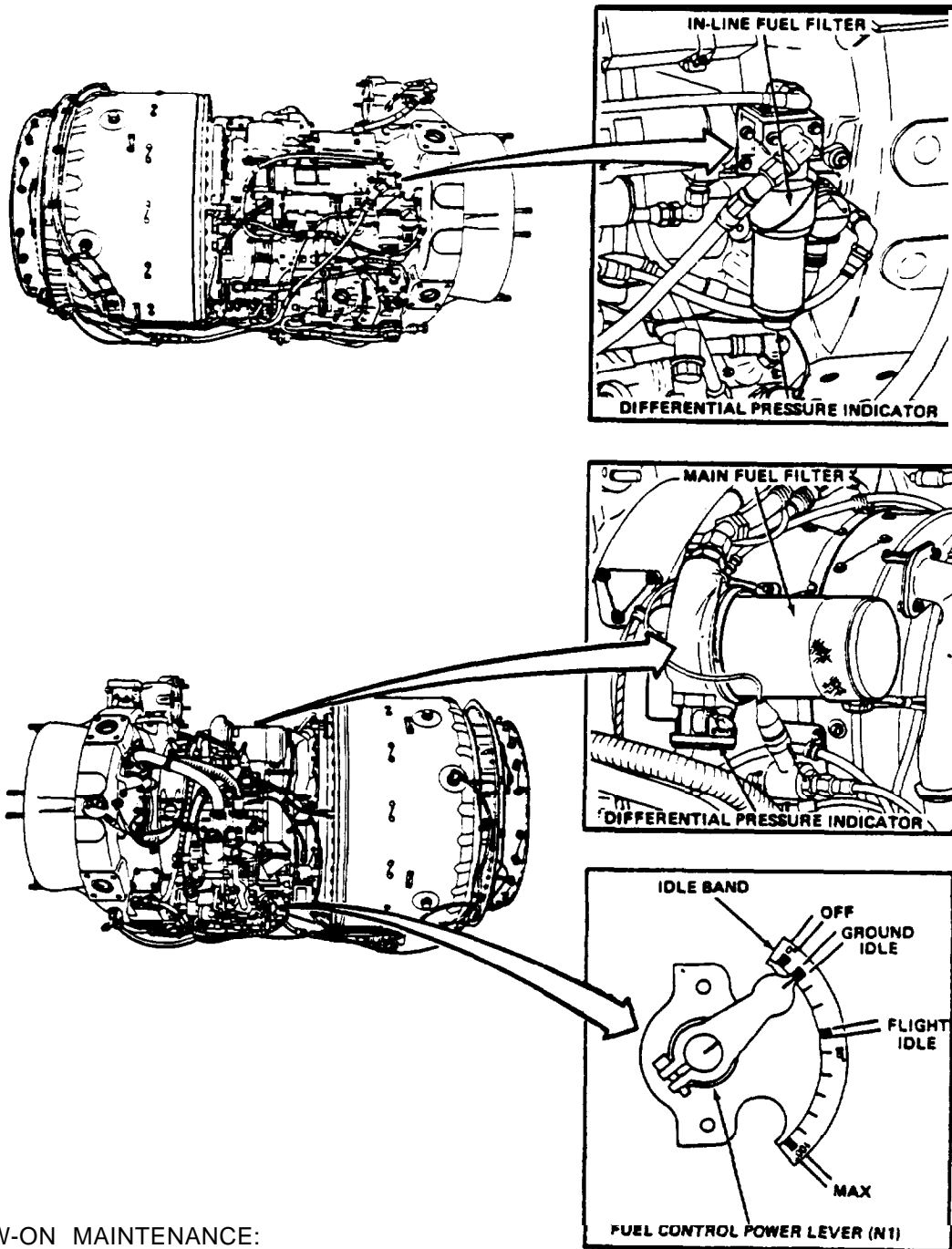
None

TASK	RESULT
<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;">CAUTION</div>	
<p>1. Check in-line fuel filter differential pressure indicator button.</p>	<p>If differential pressure indicator button is extended service in-line filter (Ref. Task 1-103) and reset button.</p>
<p>2. Check main fuel filter differential pressure indicator button.</p>	<p>If differential pressure indicator button is extended service main fuel filter (Ref. Task 1-102) and reset button.</p>
<p>3. Check fuel control power lever for position.</p>	<p>If lever is not in middle of ground idle band adjust linkage as needed (Ref. TM 55-1520-240-T or TM 55-4920-328-13).</p>

GO TO NEXT PAGE

1-40 WITH POWER LEVER (N1) IN GROUND IDLE POSITION, ENGINE DOES NOT REACH GROUND IDLE SPEED -VISUAL CHECK (Continued)

1-40



42 x 46

FOLLOW-ON MAINTENANCE:

None

END OF TASK

A-1182-1-40/1

1-41 WITH POWER LEVER (N1) IN GROUND IDLE POSITION,
REACH GROUND IDLE SPEED

1-41

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

None

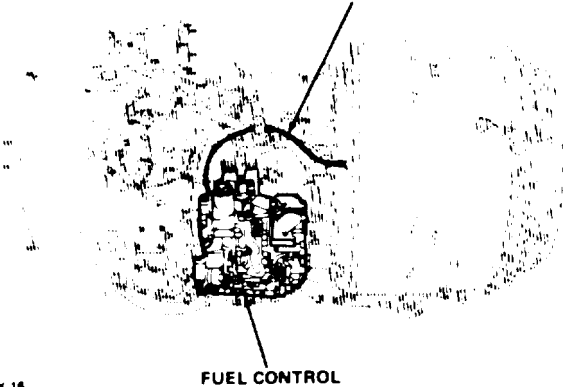
Personnel Required:

68B20 Aircraft Powerplant Repairer

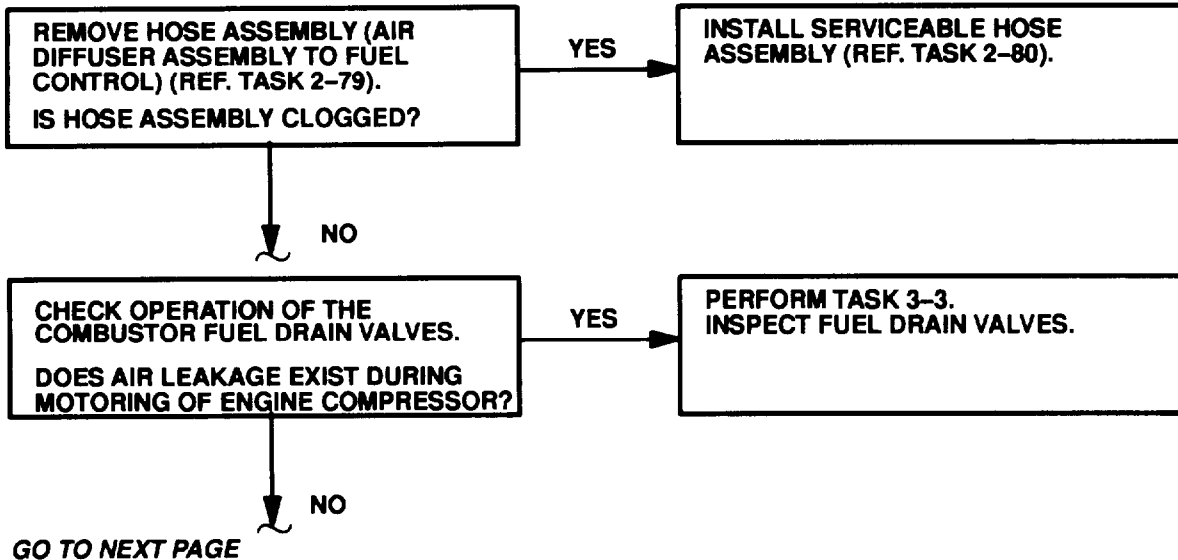
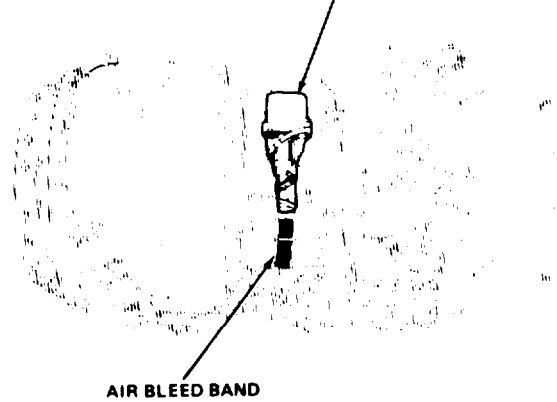
References:

Task 1-92	Task 2-19	Task 2-80
Task 1-108	Task 2-22	Task 3-3
Task 2-1	Task 2-33	
Task 2-8	Task 2-79	

AIR DIFFUSER TO FUEL CONTROL HOSE ASSEMBLY

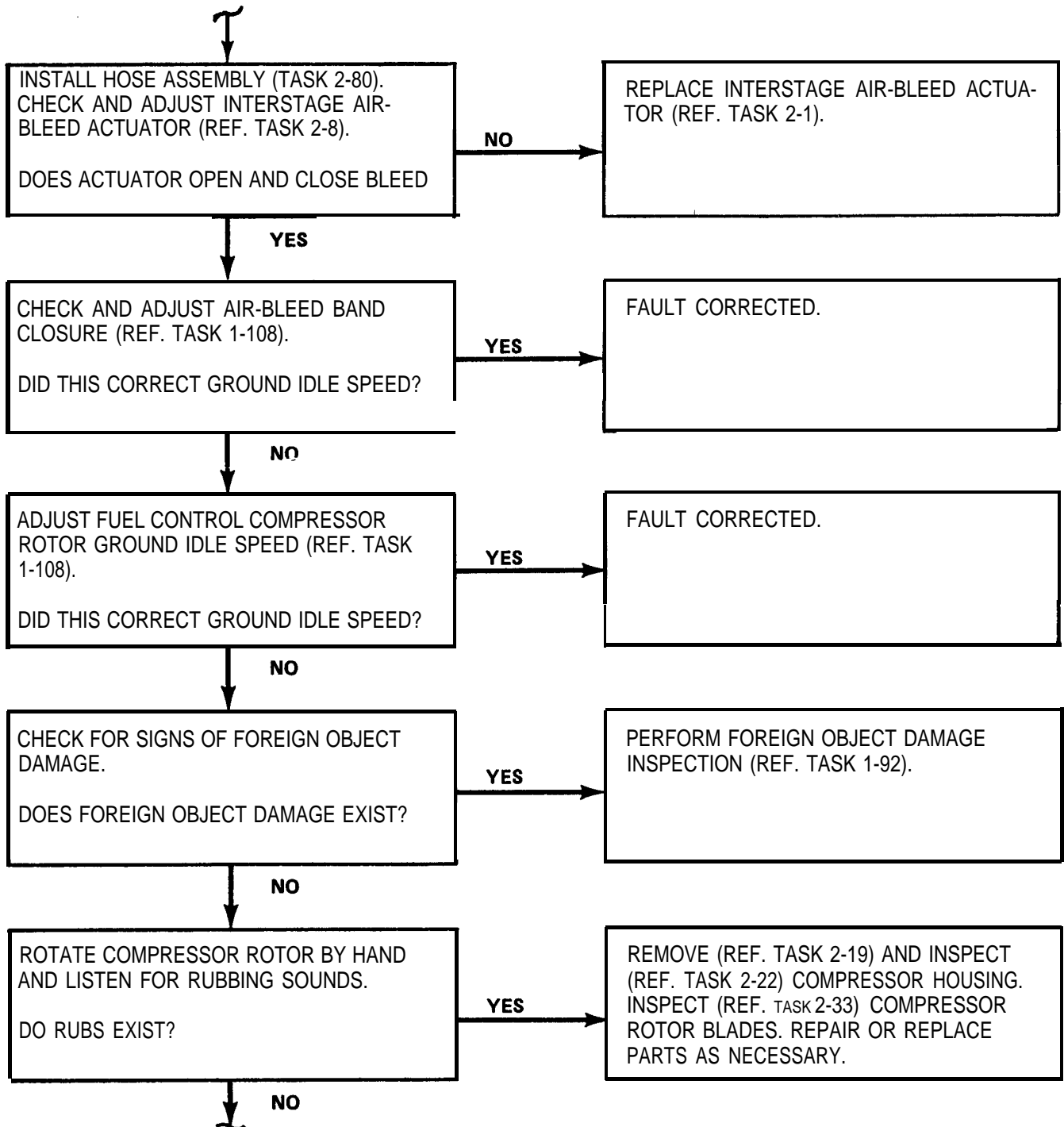


INTERSTAGE AIR-BLEED ACTUATOR



1-41 WITH POWER LEVER (N1) IN GROUND IDLE POSITION, ENGINE DOES NOT REACH GROUND IDLE SPEED (Continued)

1-41



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-42 GROUND IDLE SPEED IS INCORRECT - VISUAL CHECK

1-42

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

TM 55-1520-240-T

TM 55-4920-328-13

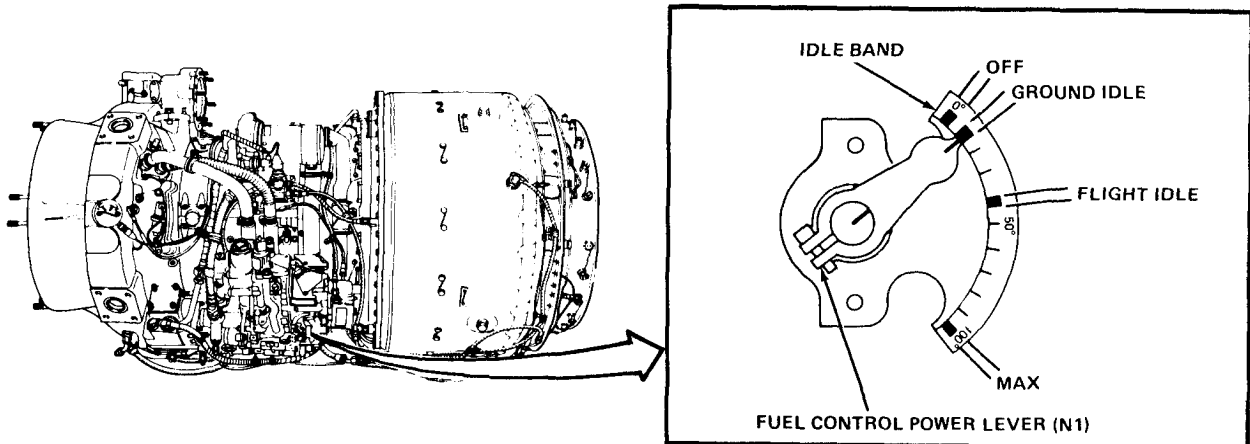
Tools:

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

Materials:

None

TASK	RESULT
1. Check fuel control power lever position.	If lever is not in middle of idle band, adjust as required (Ref. TM 55-1520-240-T or TM 55-4920-328-13).



A-1182-1-42/1

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-43 GROUND IDLE SPEED IS INCORRECT

1-43

INITIAL SETUP

Applicable Configurations:
All

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

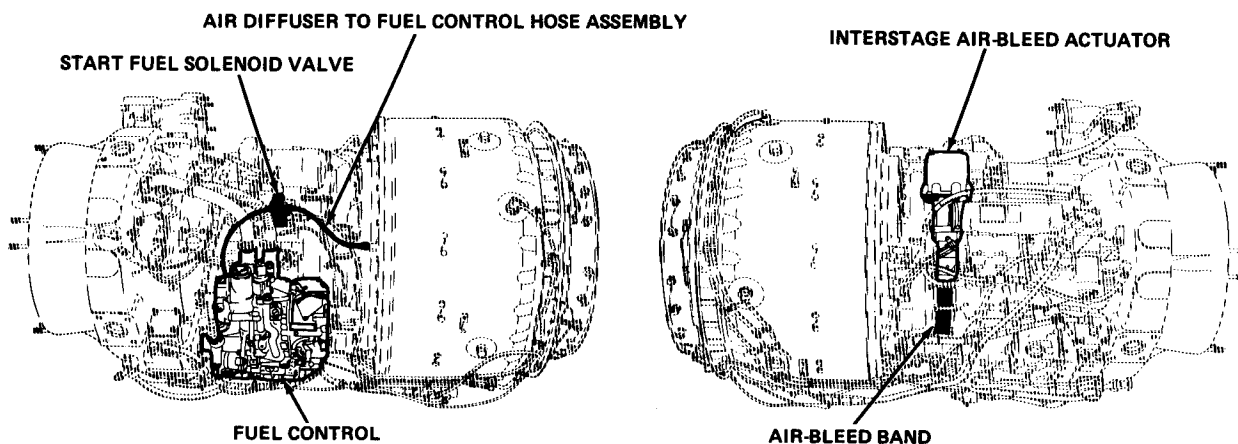
Materials:
None

Personnel Required:

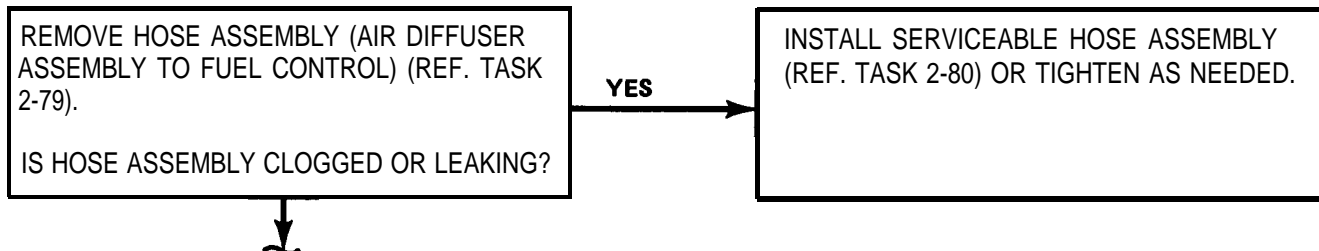
68B10 Aircraft Powerplant Repairer
68B20 Aircraft Powerplant Repairer

References:

TM 55-1520-240-10
Task 1-107 Task 2-79
Task 1-108 Task 2-80
Task 2-1 Task 6-1
Task 2-8 Task 6-49



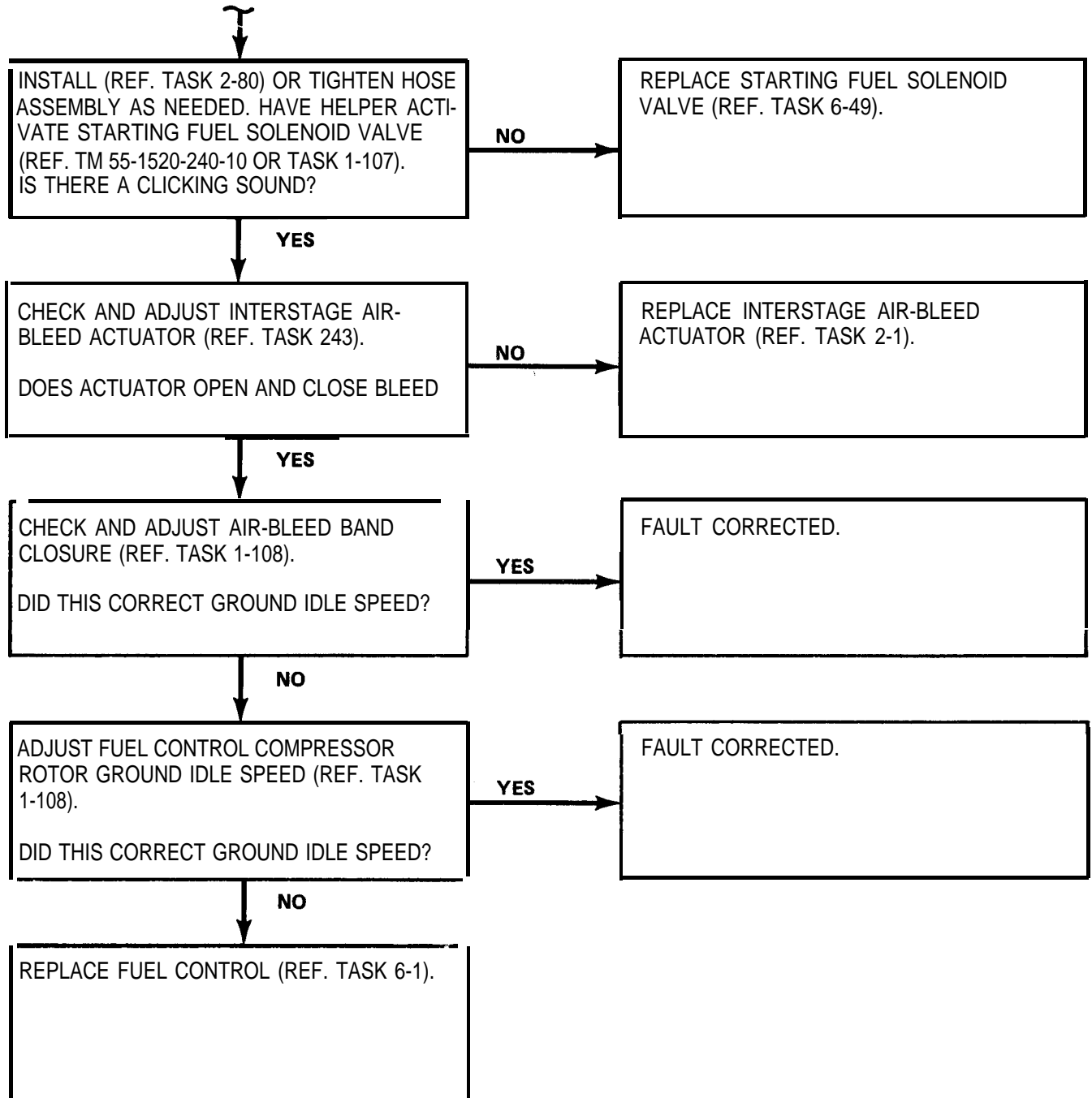
A-1182-1-43/1



GO TO NEXT PAGE

1-43 GROUND IDLE SPEED IS INCORRECT (Continued)

1-43



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-44 TORQUE LOW AT MAXIMUM POWER LEVER (N1) SETTING - VISUAL CHECK

1-44

INITIAL SETUP

Personnel Required:
68B20 Aircraft Powerplant Repairer

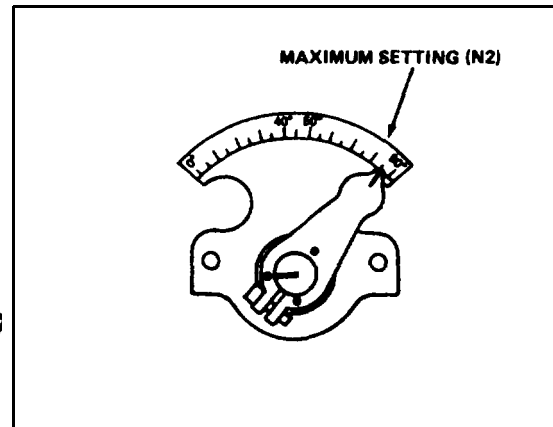
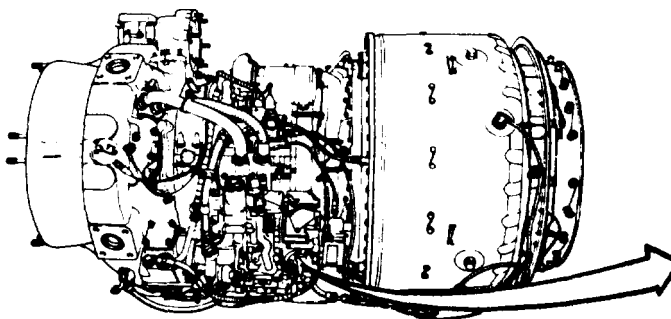
Applicable Configurations:
All

References:
TM 55-1520-240-T
TM 55-4920-328-13

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

Materials:
None

TASK	RESULT
1. Check N2 lever position.	If lever is not at maximum position, set lever to maximum position. (Ref. TM 55-1520-240-T or TM 55-4920-328-13).



A-1182-1-44/1

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-45 TORQUE LOW AT MAXIMUM POWER LEVER (N1) SETTING

INITIAL SETUP

References:

Applicable Configurations:

All

Tools:

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

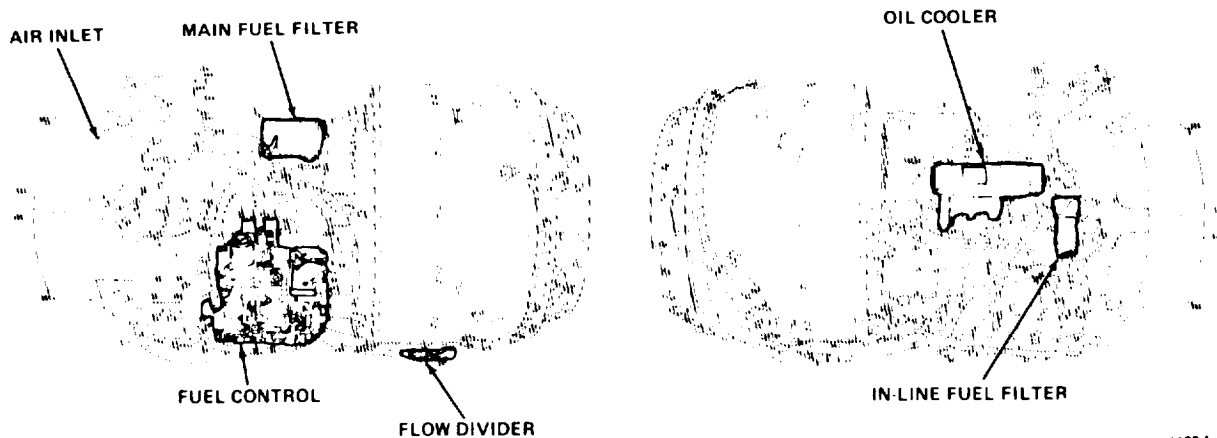
Materials:

None

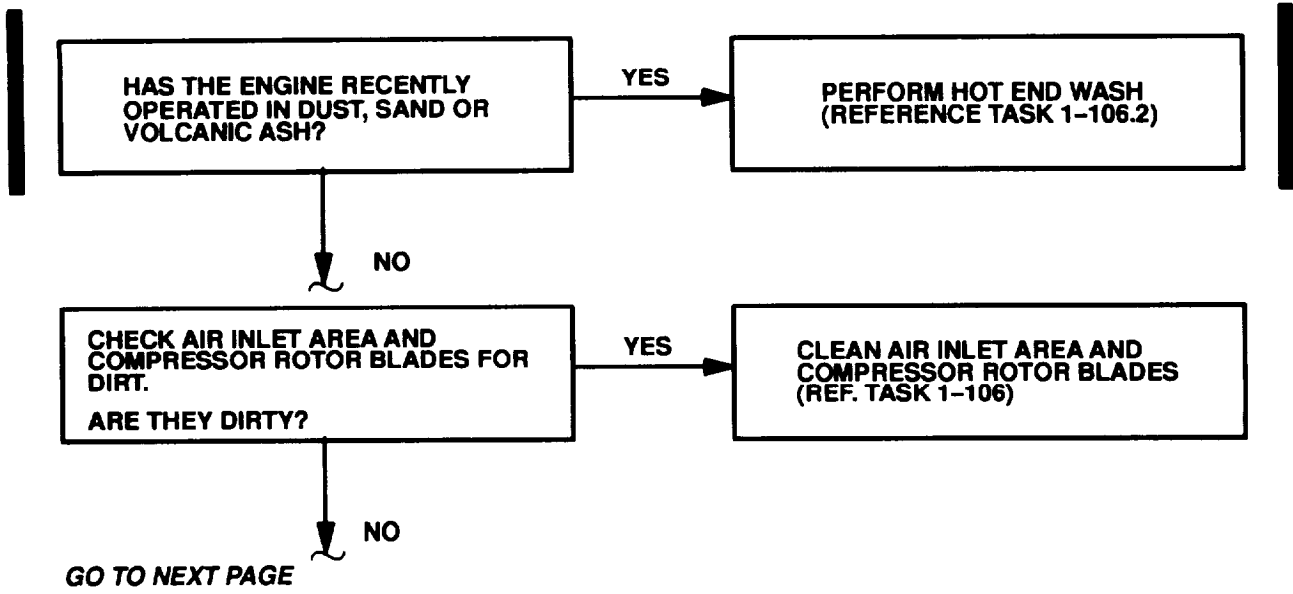
Personnel Required:

68B20 Aircraft Powerplant Repairer

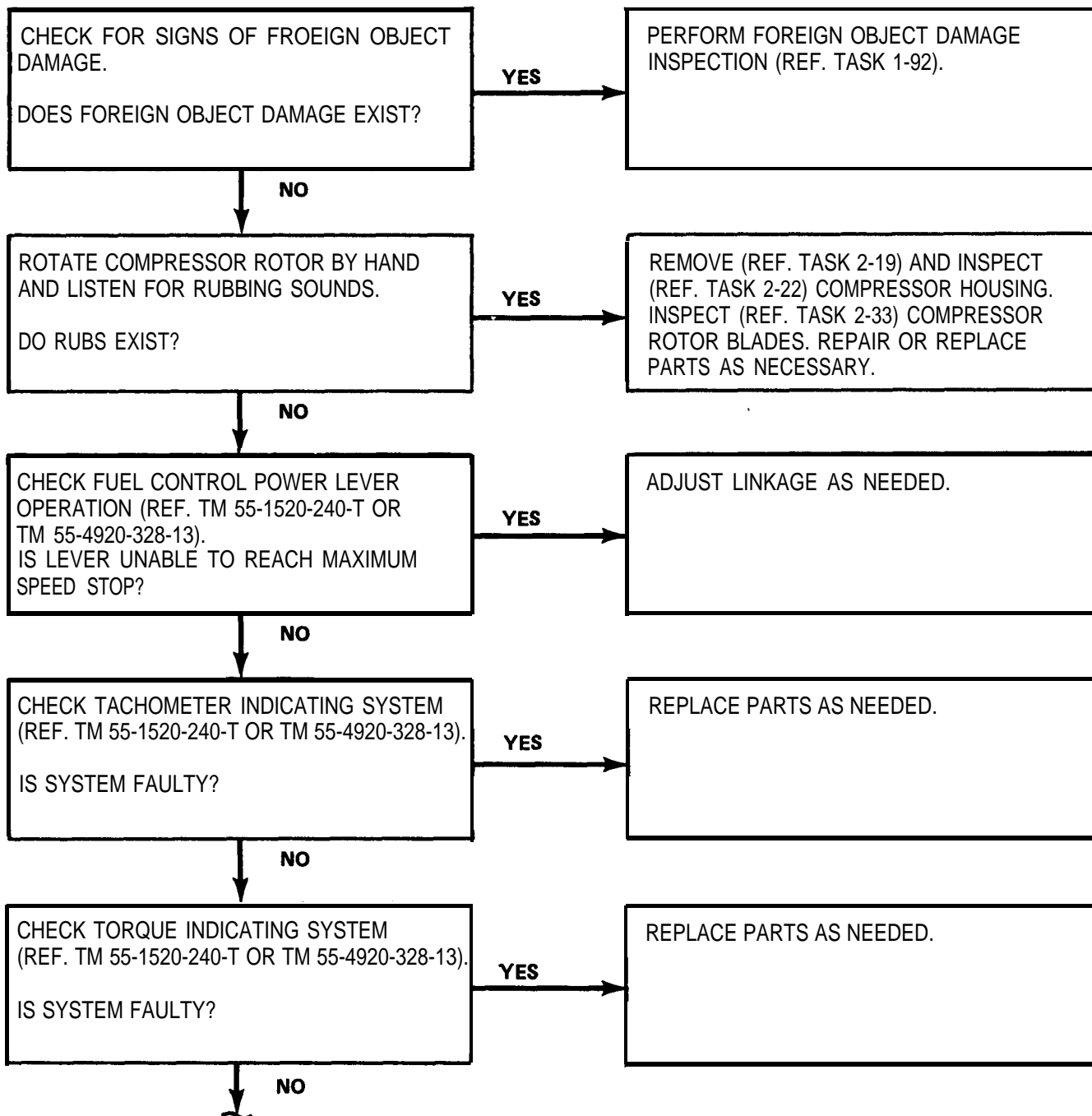
- TM 55-1520-240-T
- TM 55-4920-328-13
- Task 1-92 Task 6-18 Task 6-59
- Task 1-93 Task 6-20 Task 6-60
- Task 1-106 Task 6-54 Task 6-61
- Task 2-19 Task 6-55 Task 6-72
- Task 2-22 Task 6-56 Task 6-73
- Task 2-33 Task 6-57
- Task 6-1 Task 6-58
- Task 6-16



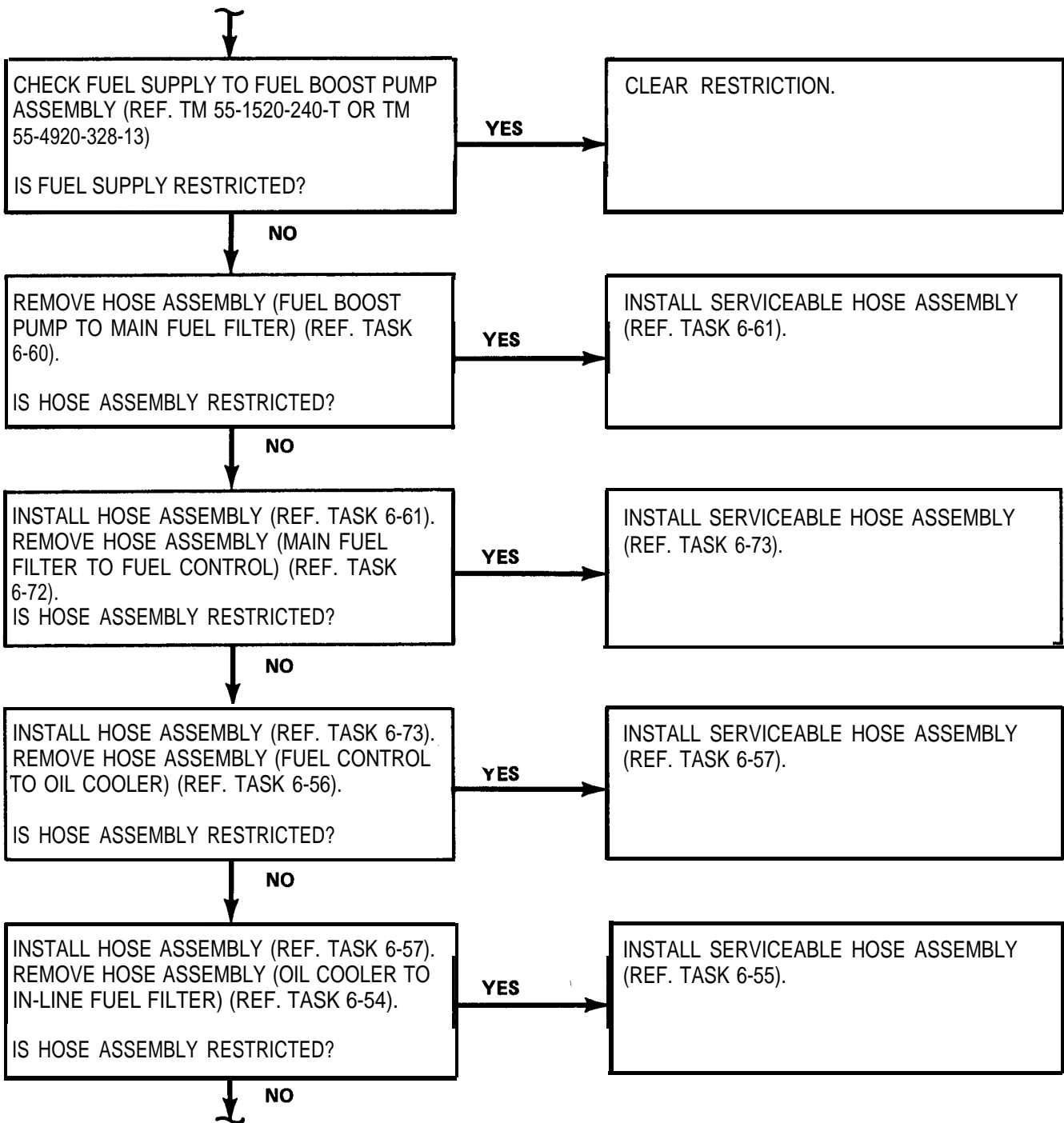
A-1182-1-45/1



1-45 TORQUE LOW AT MAXIMUM POWER LEVER (N1) SETTING (Continued)



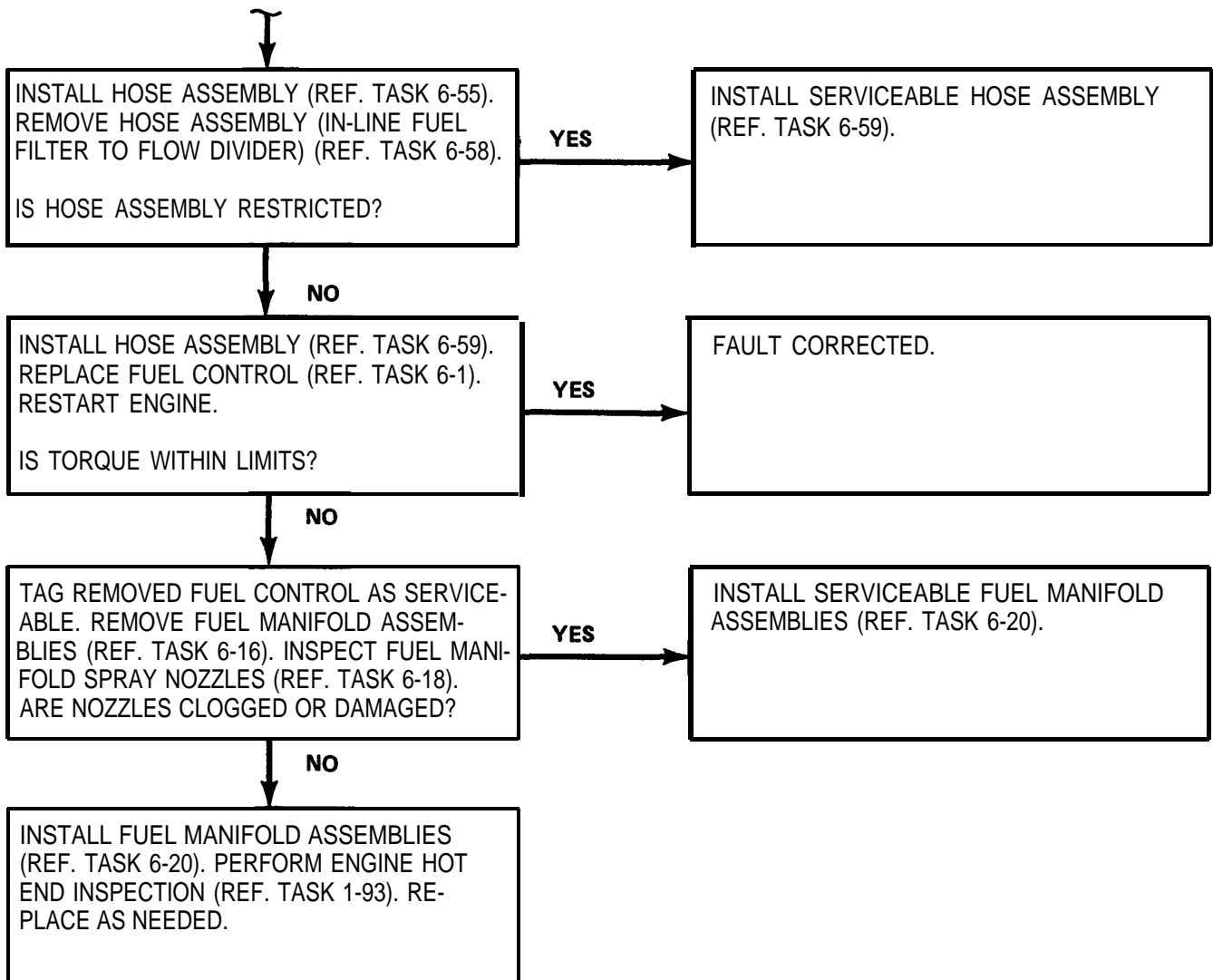
GO TO NEXT PAGE



GO TO NEXT PAGE

1-45 TORQUE LOW AT MAXIMUM POWER LEVER (N1) SETTING (Continued)

1-45



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-46 TORQUE HIGH AT MAXIMUM POWER LEVER (N1) SETTING

1-46

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

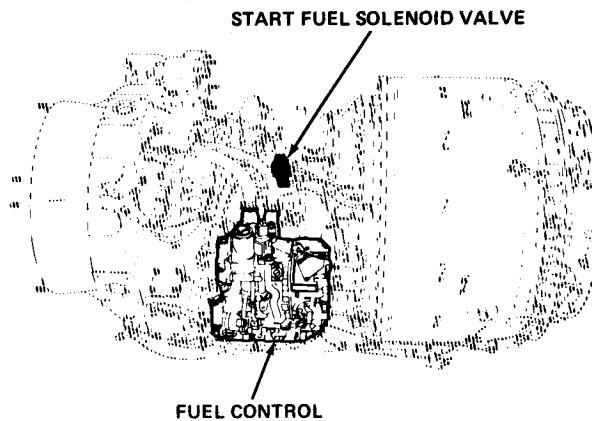
None

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B20 Aircraft Powerplant Repairer

References:

TM 55-1520-240-10
TM 55-1520-240-T
TM 55-4920-328-13
Task 1-107
Task 1-108
Task 6-1
Task 6-49



A-1182-1-46/1

CHECK TACHOMETER INDICATING SYSTEM
(REF. TM 55-1520-240-T OR TM 55-4920-328-13).

IS SYSTEM FAULTY?

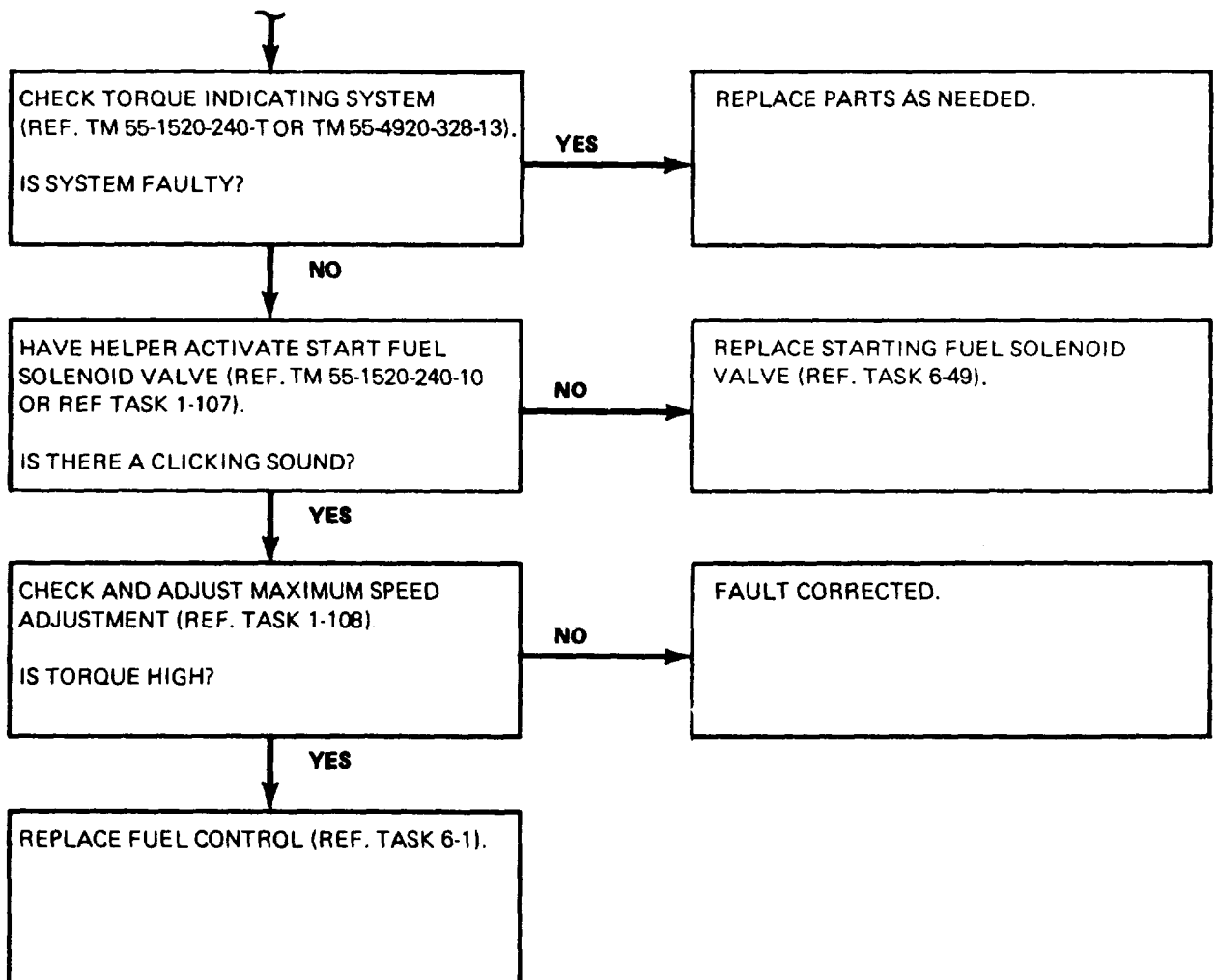
YES

REPLACE PARTS AS NEEDED.

GO TO NEXT PAGE

1-46 TORQUE HIGH AT MAXIMUM POWER LEVER (N1) SETTING (Continued)

1-48



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-47 COMPRESSOR SURGES OR BLEED BAND POPPING ON ACCELERATION 1-47

INITIAL SETUP

Personnel Required
68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

- | | |
|------------|-----------|
| Task 1-92 | Task 2-19 |
| Task 1-101 | Task 2-22 |
| Task 1-106 | Task 2-33 |
| Task 1-108 | Task 6-1 |

Tools:

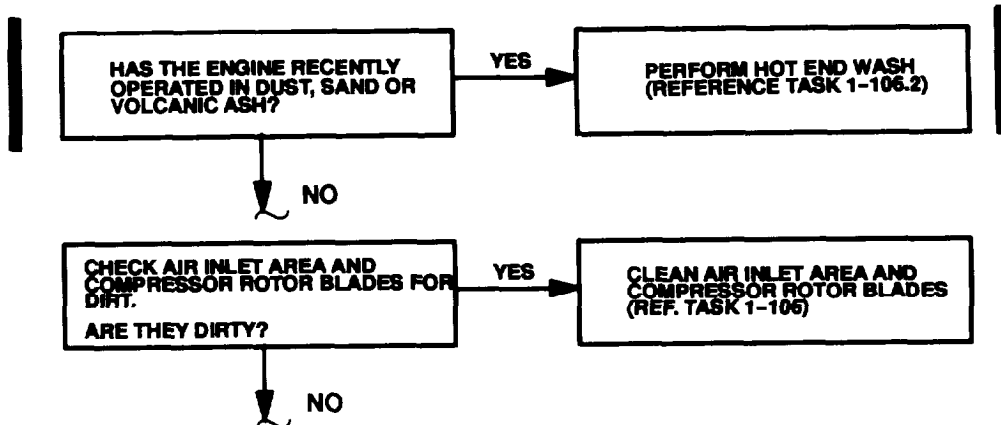
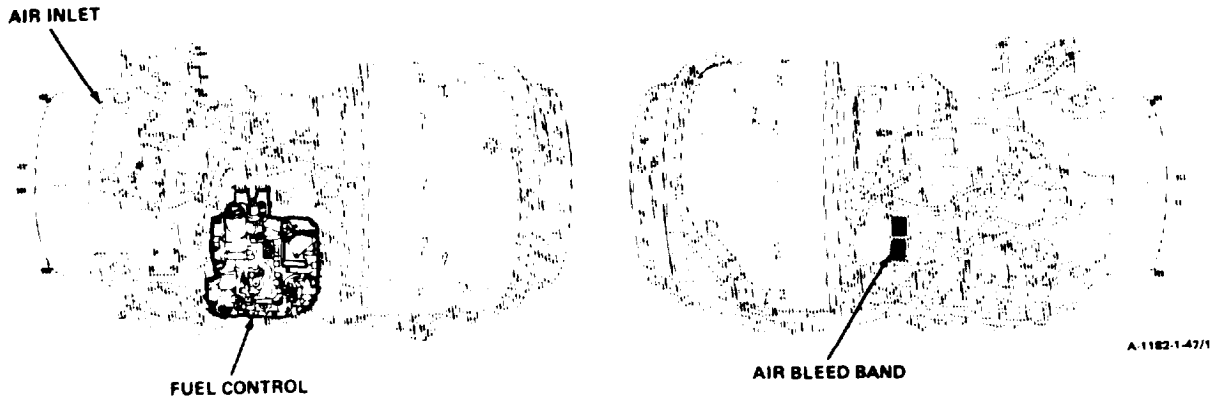
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

None

NOTE

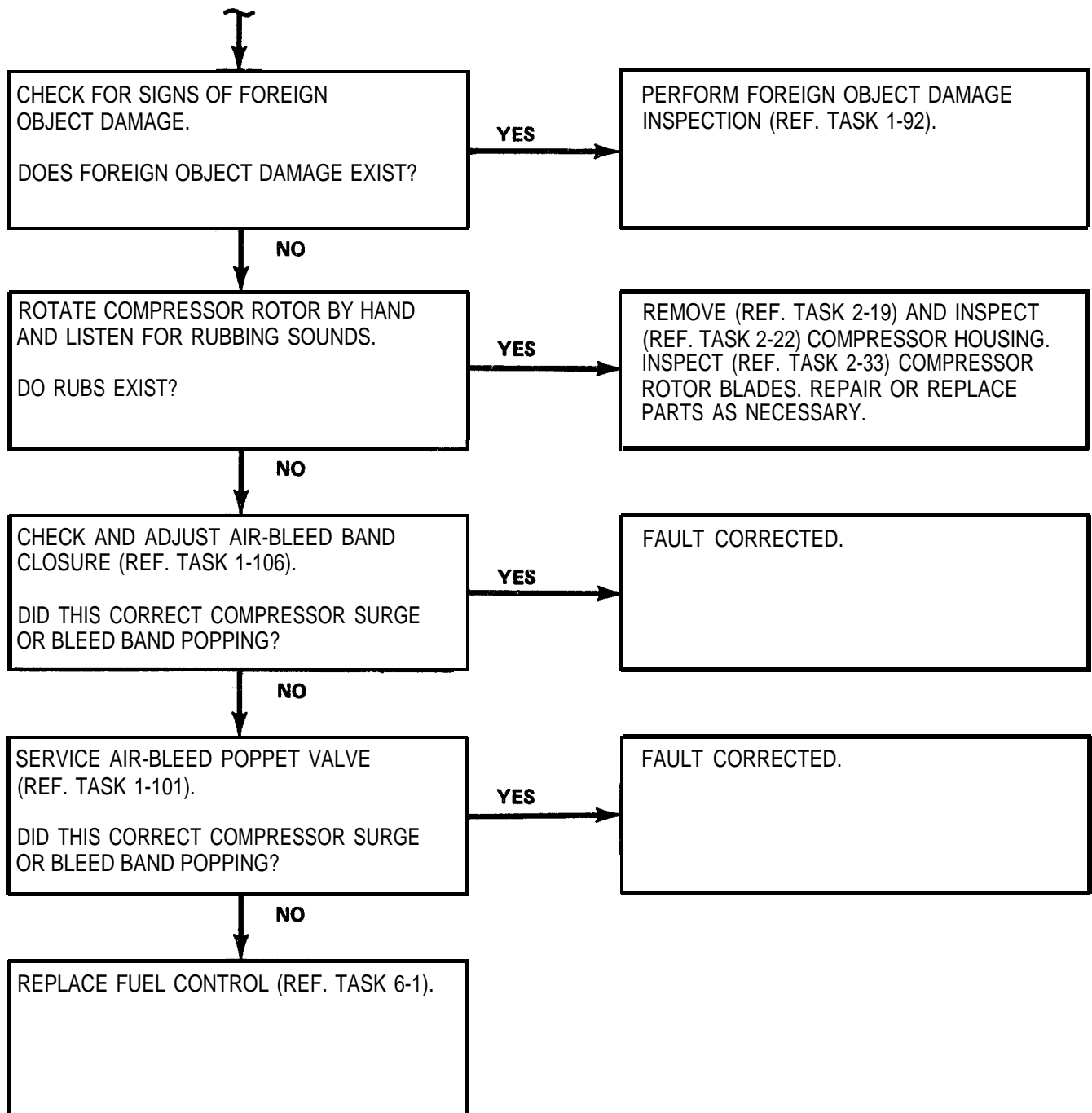
TS5-L-712 engines exhibit slight roughness or unstable operation during engine deceleration through 30 percent normal rated power range. This characteristic is due to momentary unstable air flow which occurs during deceleration, just prior to the opening of interstage airbleed system. No attempt should be made to change this deceleration characteristic of the T55-L-712 engine.



GO TO NEXT PAGE

1-47 COMPRESSOR SURGES OR BLEED BAND POPPING ON ACCELERATION
(Continued)

1-47



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-48 COMPRESSOR BLEED BAND REMAINS OPEN

1-48

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

Tools:

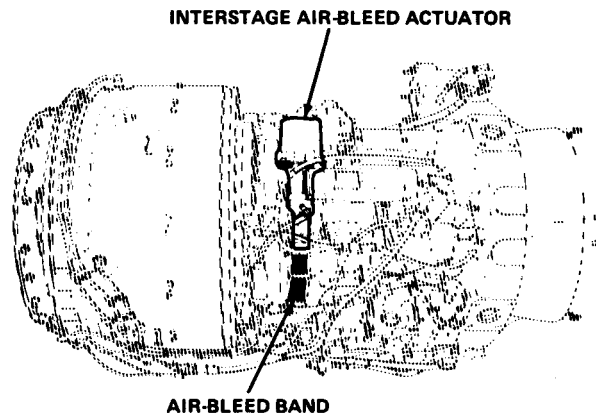
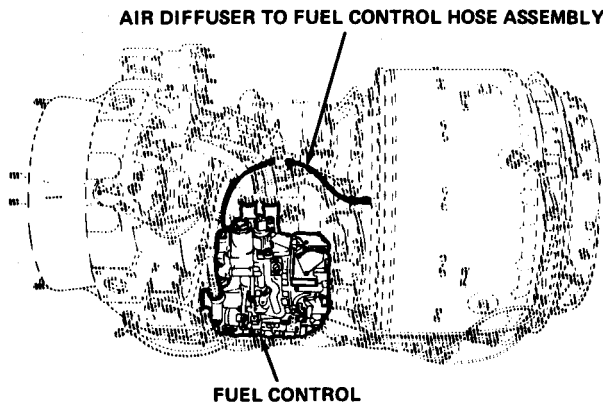
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

References:

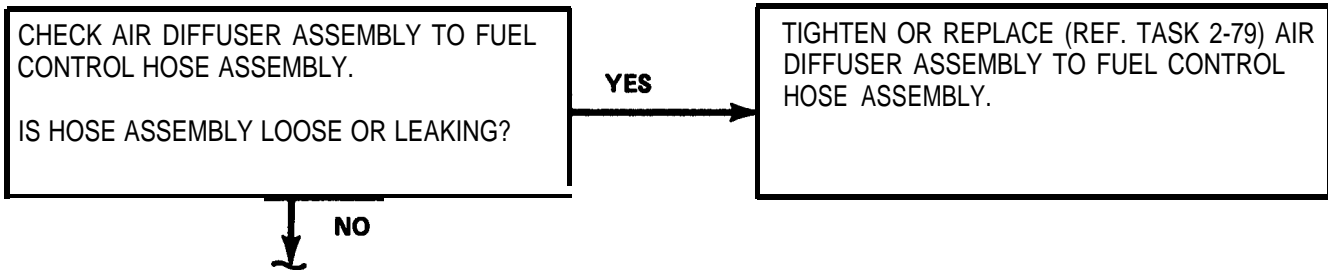
Task 1-101	Task 2-3	Task 6-1
Task 1-108	Task 2-8	
Task 2-1	Task 2-73	
Task 2-2	Task 2-79	

Materials:

None



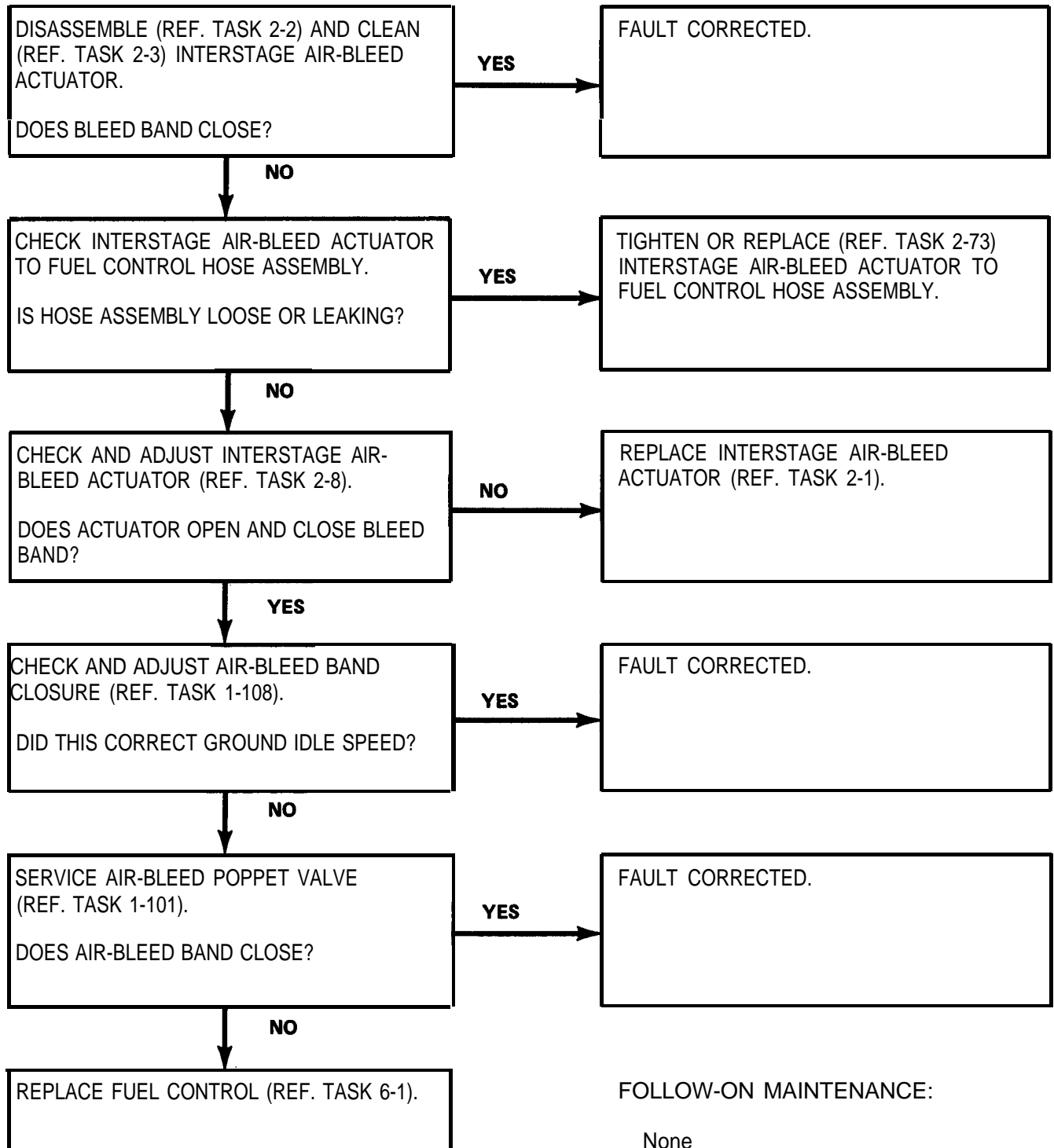
A-1182-1-48/1



GO TO NEXT PAGE

1-48 COMPRESSOR BLEED BAND REMAINS OPEN (Continued)

1-48



END OF TASK

FOLLOW-ON MAINTENANCE:

None

1-49 N1 TRANSIENT OVERSHOOTS - N2 SPEED CANNOT BE REACHED - VISUAL CHECK

1-49

INITIAL SETUP

Personnel Required:

68620 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

TM 55-1520-240-T

TM 55-4920-328-13

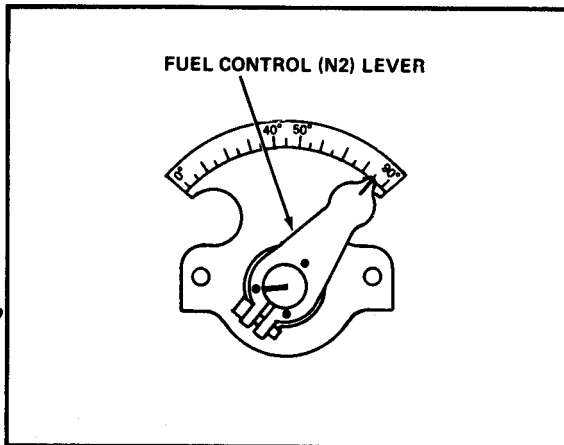
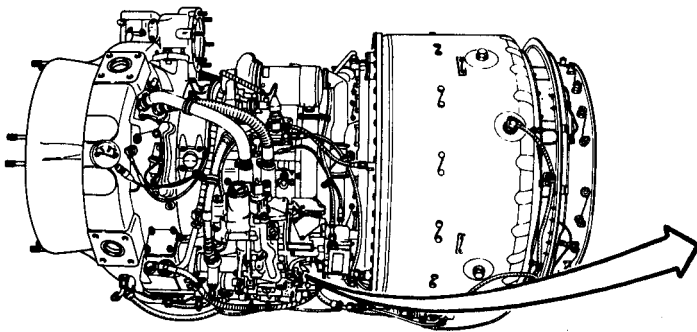
Tools:

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

Materials:

None

TASK	RESULT
1. Check fuel control N2 lever position.	If lever is not positioned properly, adjust linkage as necessary (Ref. TM 55-1520-240-T or TM 55-4920-328-13).



A-1182-1-49/1

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-50 N1 TRANSIENT OVERSHOOTS - N2 SPEED CANNOT BE REACHED

1-50

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

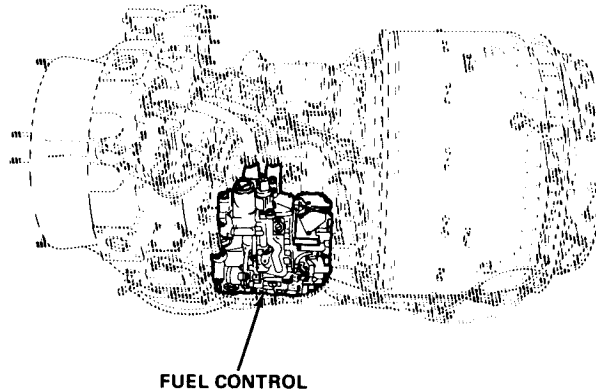
- TM 55-1520-240-T
- TM 55-4920-328-13
- Task 1-109
- Task 6-1

Tools:

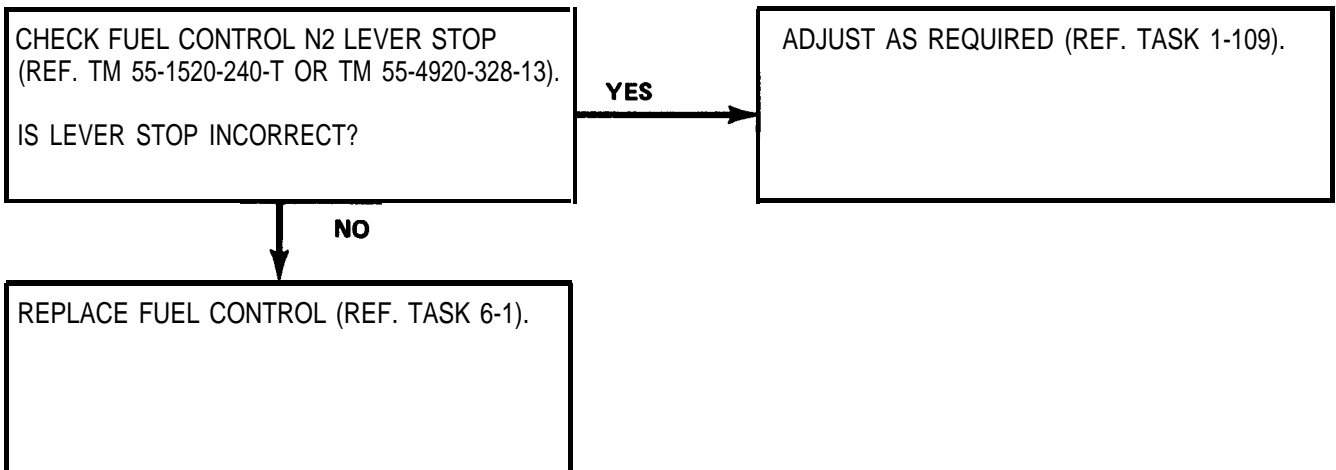
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

None



A-1182-1-50/1



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-51 N2 OVERSHOOTS OR UNDERSHOOTS

INITIAL SETUP

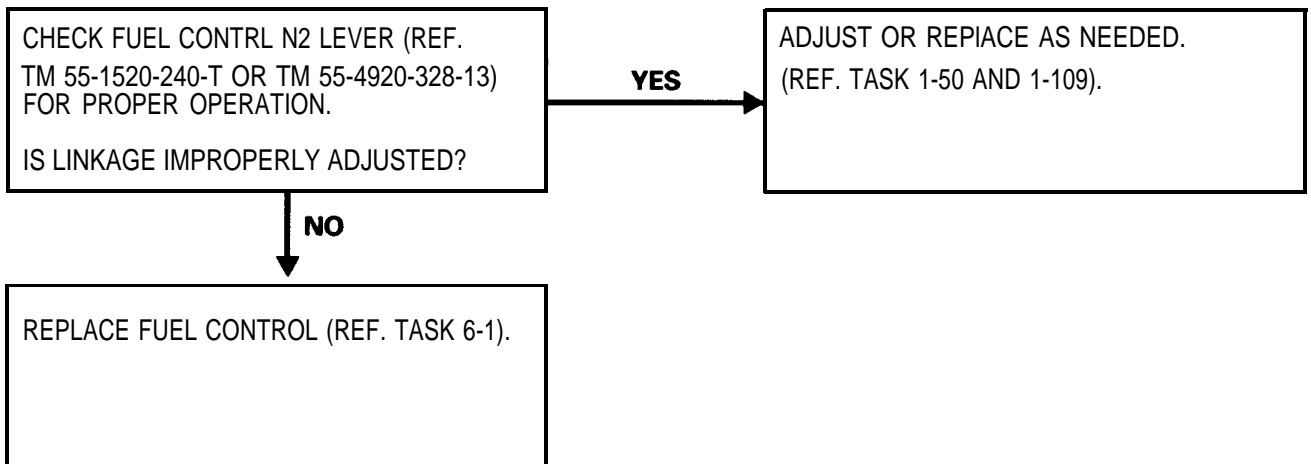
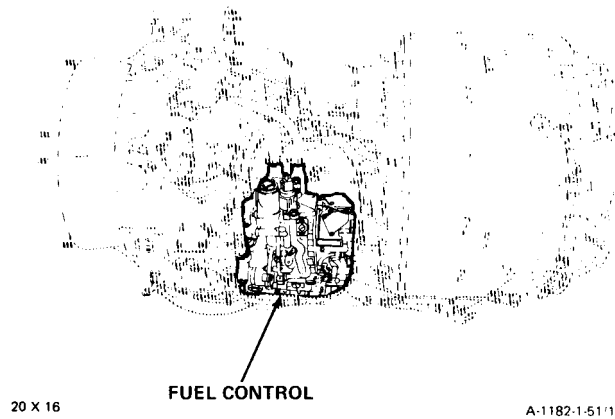
Personnel Required:
68B20 Aircraft Powerplant Repairer

Applicable Configurations:
All

References:
TM 55-1520-240-T
TM 55-4920-328-13
Task 6-1

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

Materials:
None



FOLLOW-ON MAINTENANCE:

None

END OF TASK

**1-52 ERRATIC OR OSCILLATING N1 SPEED WHILE ENGINE IS TOPPED OUT
(GOVERNING ON N1)**

1-52

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

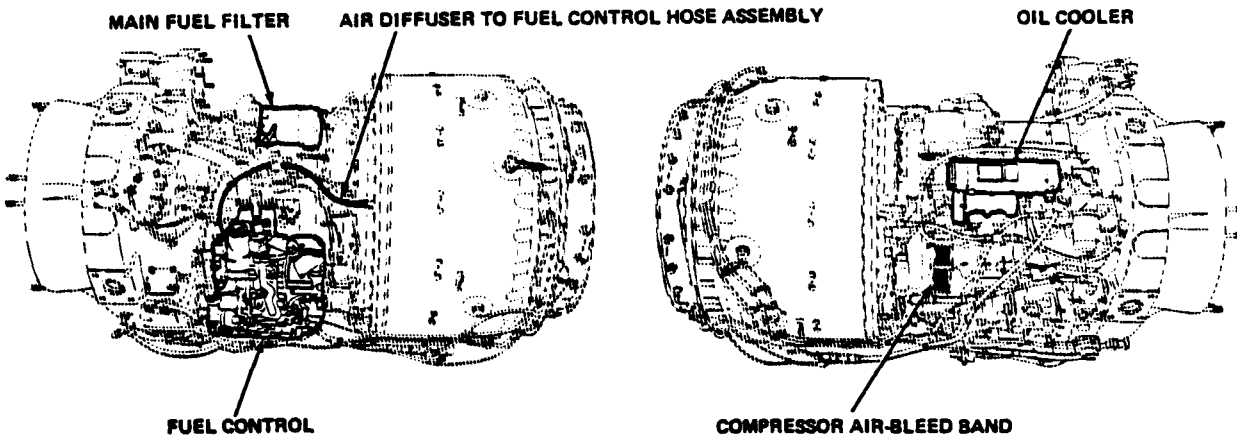
None

Personnel Required:

68B20 Aircraft Powerplant Repairer

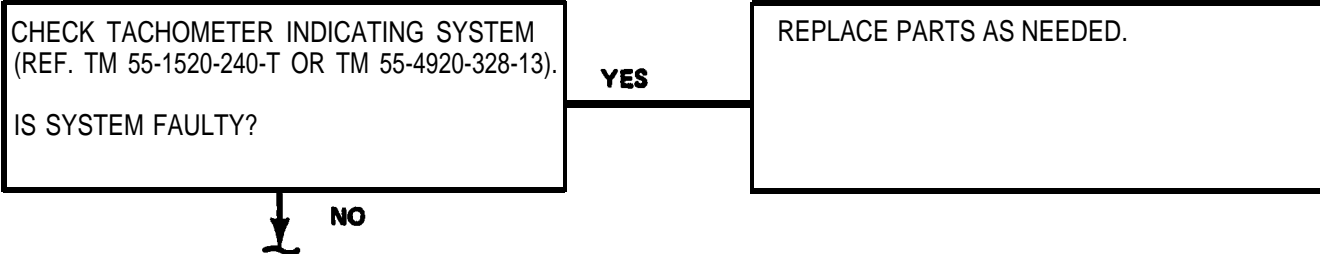
References:

- TM 55-1520-240-23
- TM 55-1520-240-T
- TM 55-4920-328-13
- Task 1-85 Task 6-56
- Task 1-108 Task 6-57
- Task 2-8 Task 6-58
- Task 2-73 Task 6-59
- Task 2-79 Task 6-60
- Task 6-1 Task 6-61
- Task 6-54 Task 6-72
- Task 6-55 Task 6-73



42 X 18

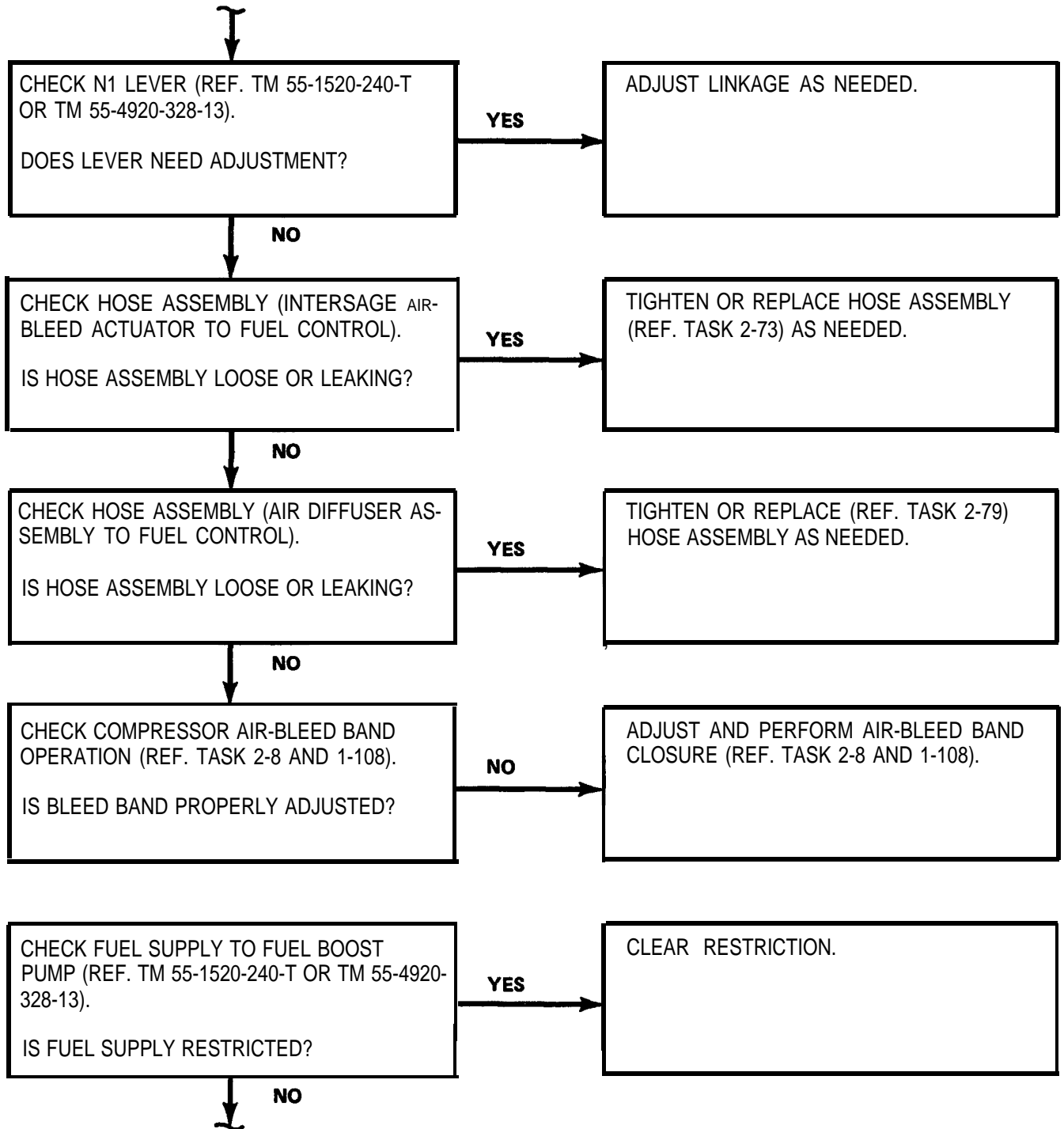
A-1182-1-52/1



GO TO NEXT PAGE

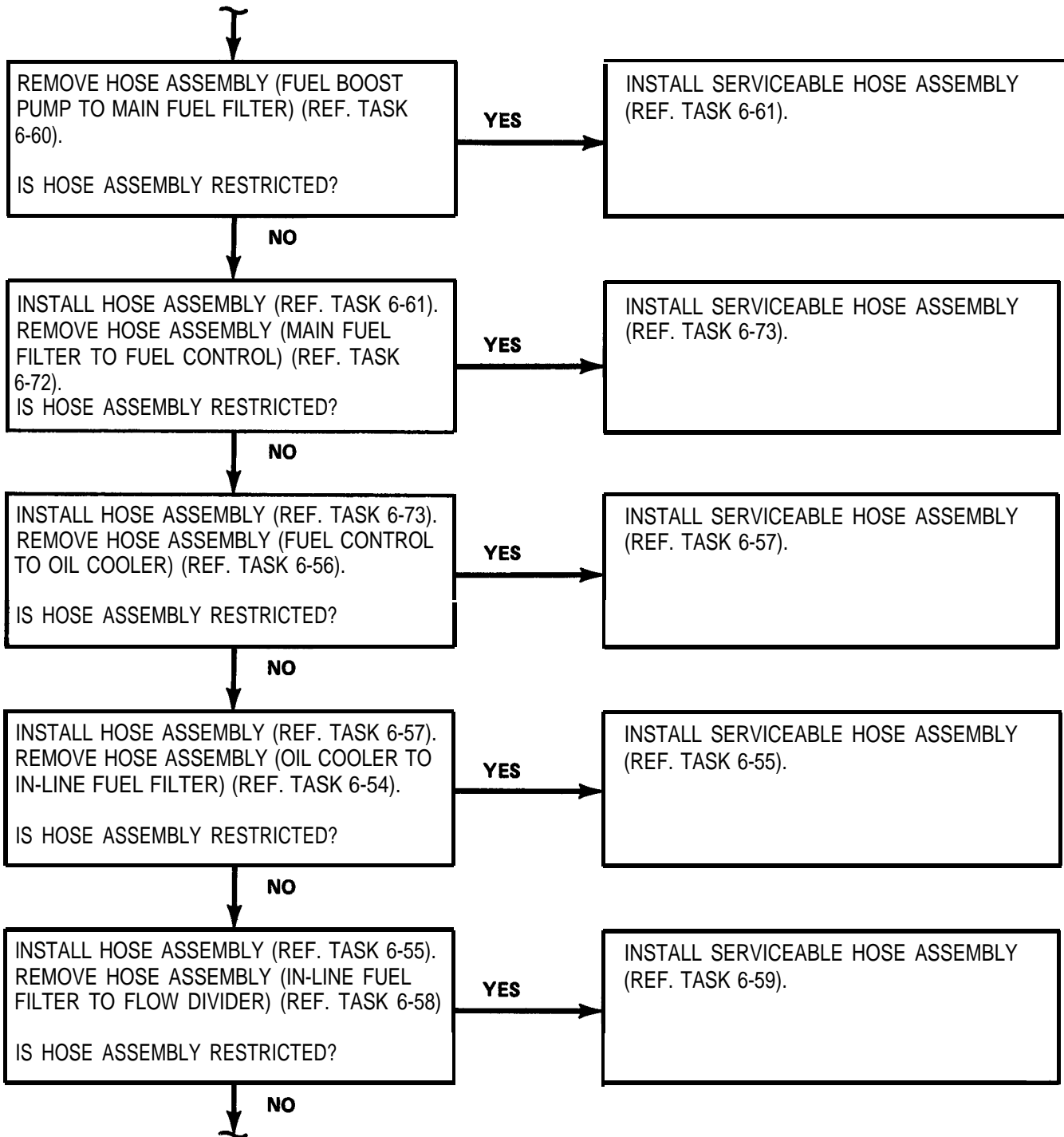
**1-52 ERRATIC OR OSCILLATING N1 SPEED WHILE ENGINE IS TOPPED OUT
(GOVERNING ON N1) (Continued)**

1-52



GO TO NEXT PAGE

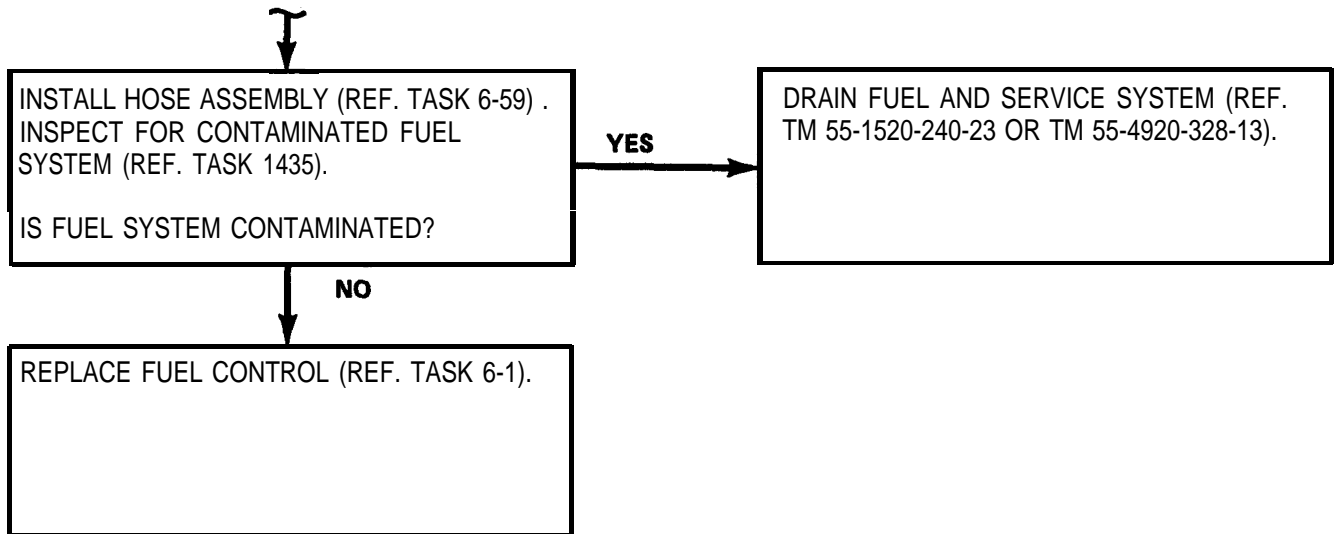
1-52 ERRATIC OR OSCILLATING N1 SPEED WHILE ENGINE IS TOPPED OUT
(GOVERNING ON N1) (Continued)



GO TO NEXT PAGE

**1-52 ERRATIC OR OSCILLATING N1 SPEED WHILE ENGINE IS TOPPED OUT
(GOVERNING ON N1) (Continued)**

1-52



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-53 ERRATIC OR OSCILLATING N2, PTIT, TORQUE, OR N1 WHILE GOVERNING ON N2

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

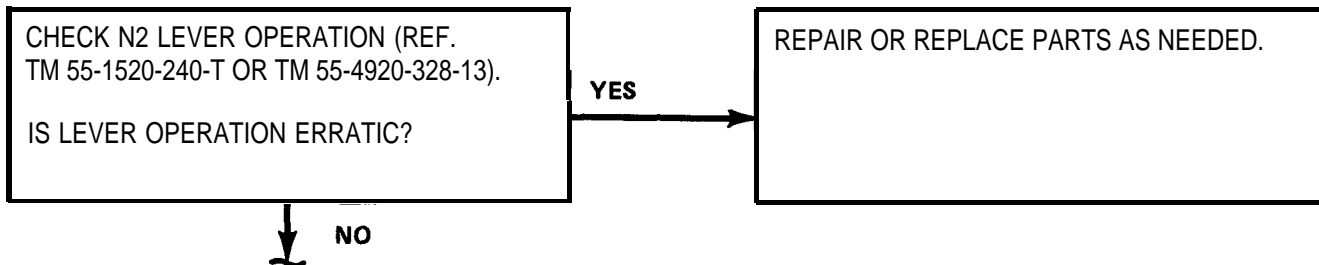
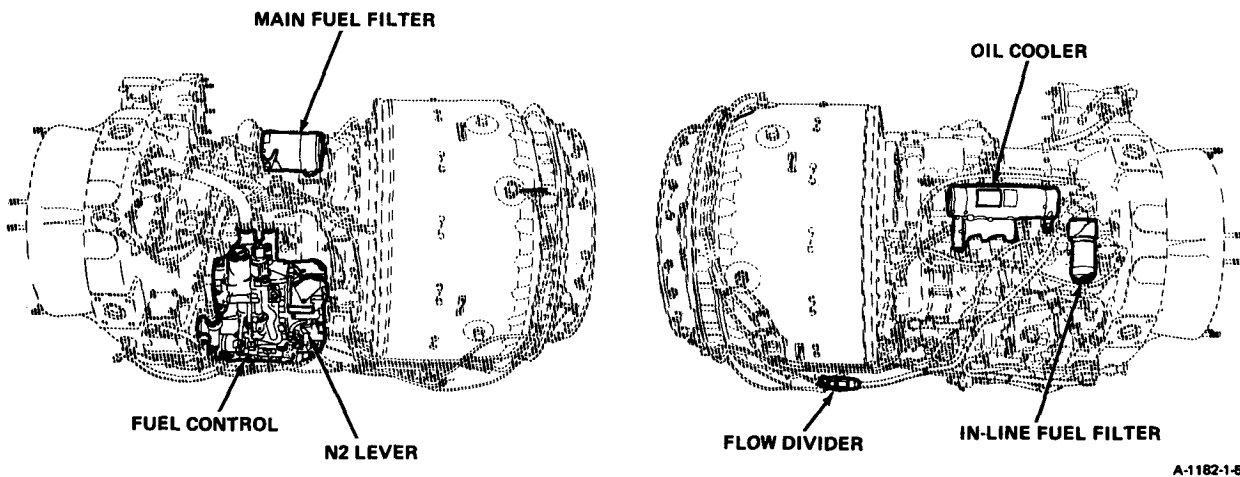
TM 55-1520-240-23	Task 6-54	Task 6-59
TM 55-1520-240-T	Task 6-55	Task 6-60
TM 55-4920-328-13	Task 6-56	Task 6-61
Task 1-85	Task 6-57	Task 6-72
Task 6-1	Task 6-58	Task 6-73

Tools:

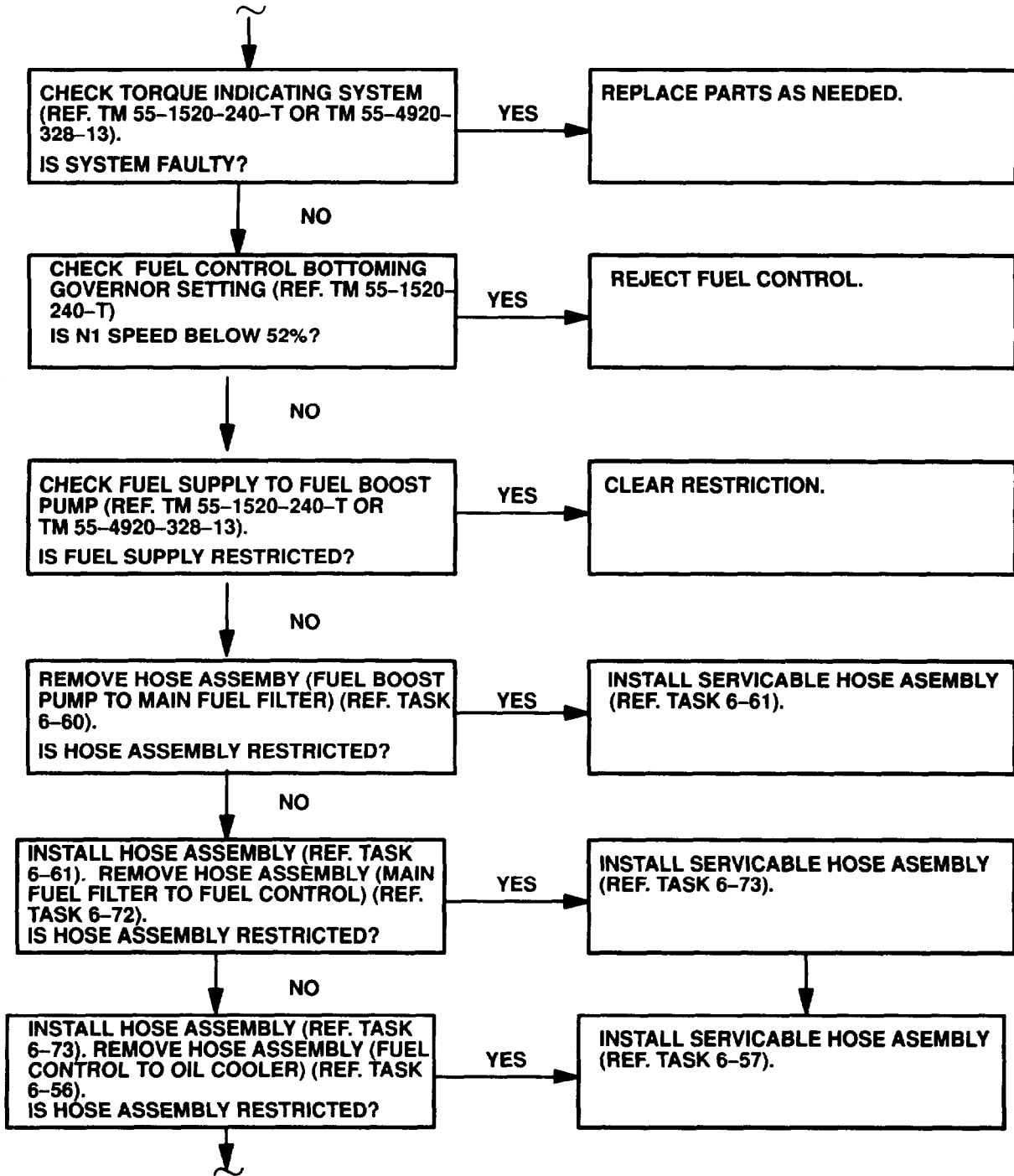
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

None

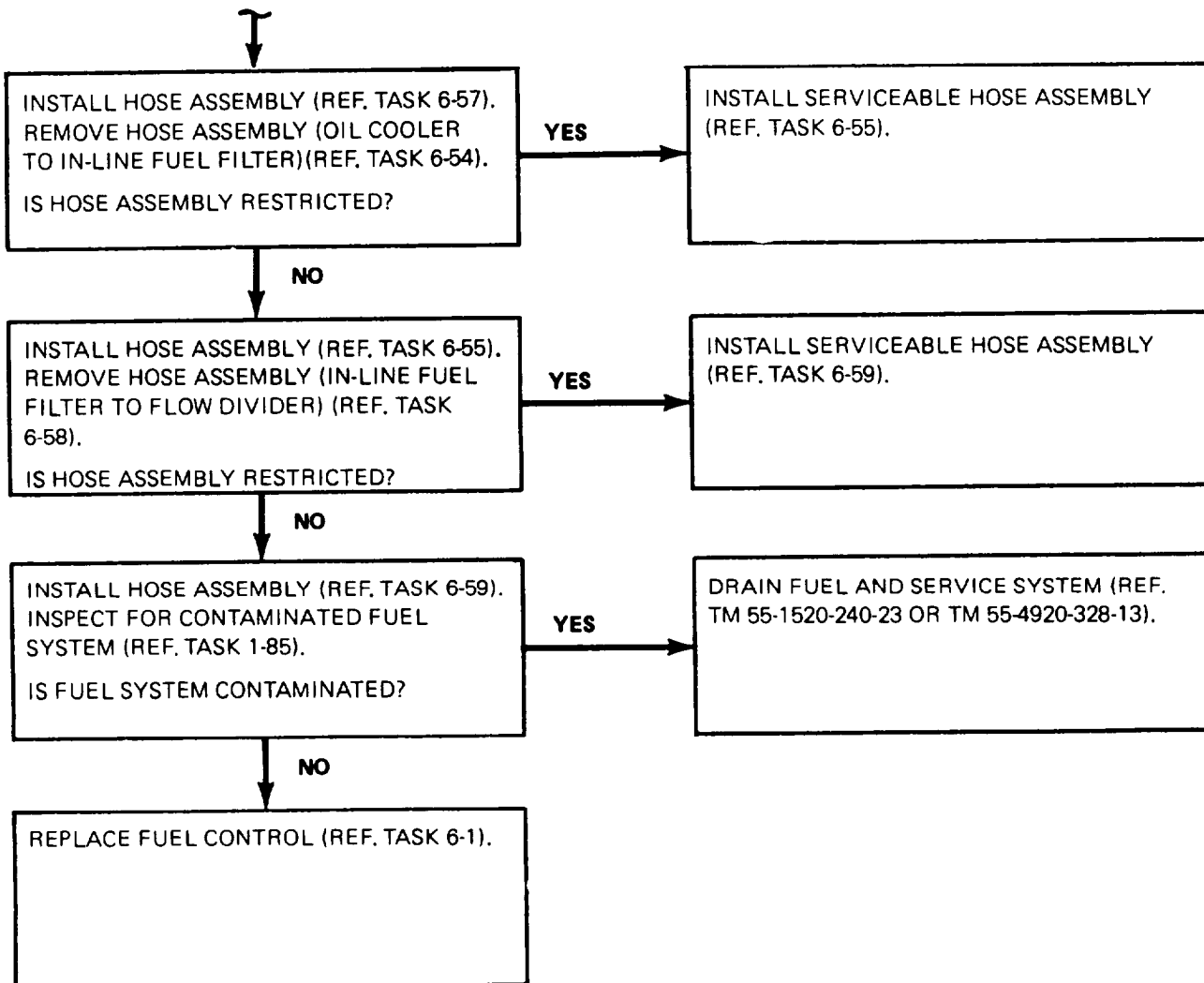


GO TO NEXT PAGE



GO TO NEXT PAGE

1-53 ERRATIC OR OSCILLATING N2, PTIT, TORQUE, OR N1 WHILE GOVERNING ON N2 (Continued)



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-54 FLAMEOUT - VISUAL CHECK

1-54

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

- TM 55-1520-240-T
- TM 55-4920-328-13
- Task 1-85
- Task 1-102
- Task 1-103

Tools:

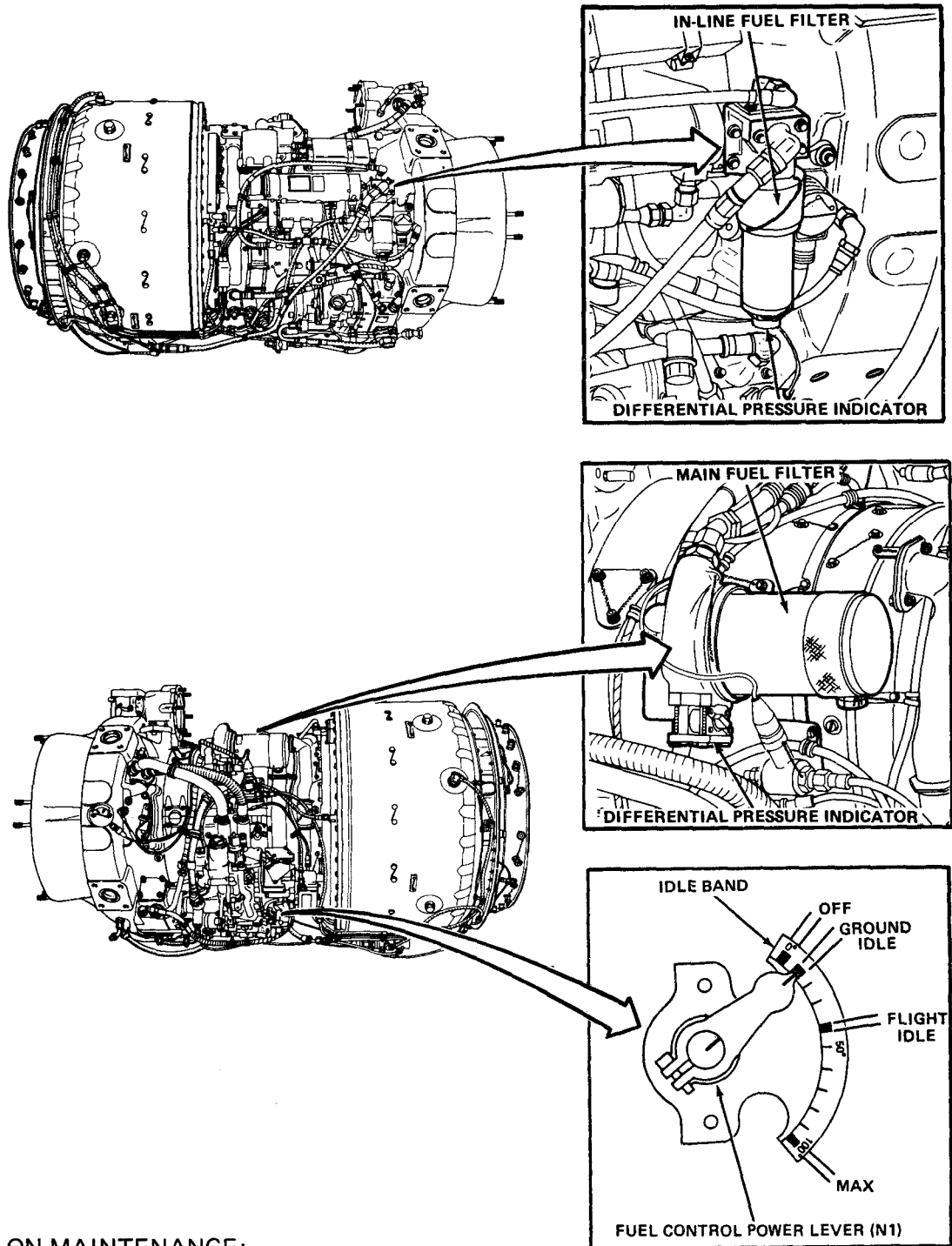
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

None

TASK	RESULT
<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;">CAUTION</div>	
<p>In the following two steps if differential pressure indicator button becomes extended more than once within each period of engine operation inspect contaminated fuel system (Ref. Task 1-85).</p>	
<p>1. Check in-line fuel filter differential pressure indicator button.</p>	<p>If differential pressure indicator button is extended service in-line fuel filter (Ref. Task 1-103) and reset button.</p>
<p>2. Check main fuel filter differential pressure indicator button.</p>	<p>If differential pressure indicator button is extended service main fuel filter (Ref. Task 1-102) and reset button,</p>
<p>3. Check fuel control power lever for position.</p>	<p>If lever is not below ground idle band adjust linkage as needed (Ref. TM 55-1520-240-T or TM 55-4920-328-13).</p>

GO TO NEXT PAGE



FOLLOW-ON MAINTENANCE:

None

END OF TASK

A-1182-1-54/1

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

None

Personnel Required:

68610 Aircraft Powerplant Repairer
68620 Aircraft Powerplant Repairer

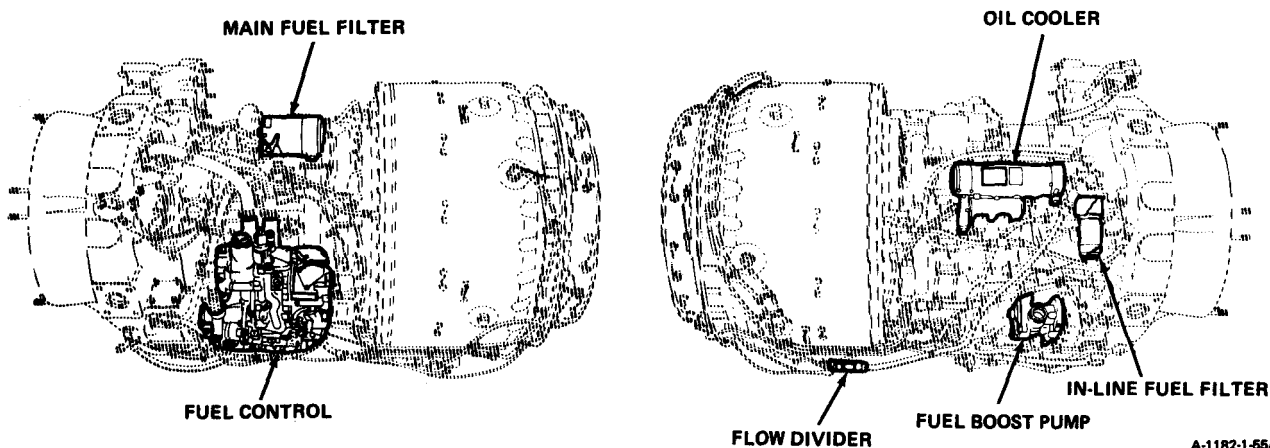
References:

TM 55-1520-240-10 TM 55-1520-240-T
TM 55-1520-240-23 TM 55-4920-328-13
Task 1-107 Task 6-55 Task 6-64
Task 6-1 Task 6-56 Task 6-68
Task 6-9 Task 6-57 Task 6-72
Task 642 Task 6-58 Task 6-73
Task 6-54 Task 6-59

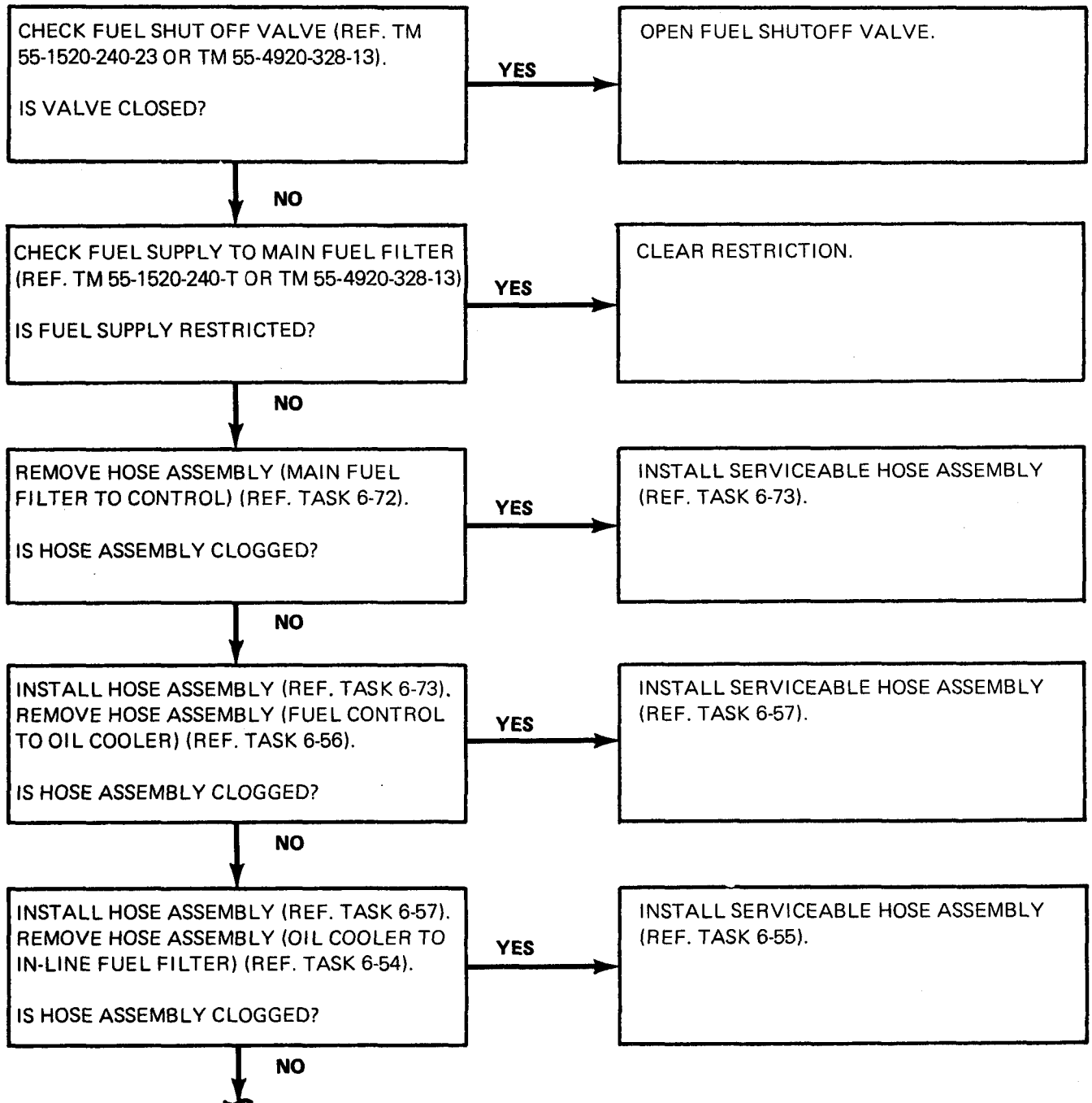
General Safety Instructions:

WARNING

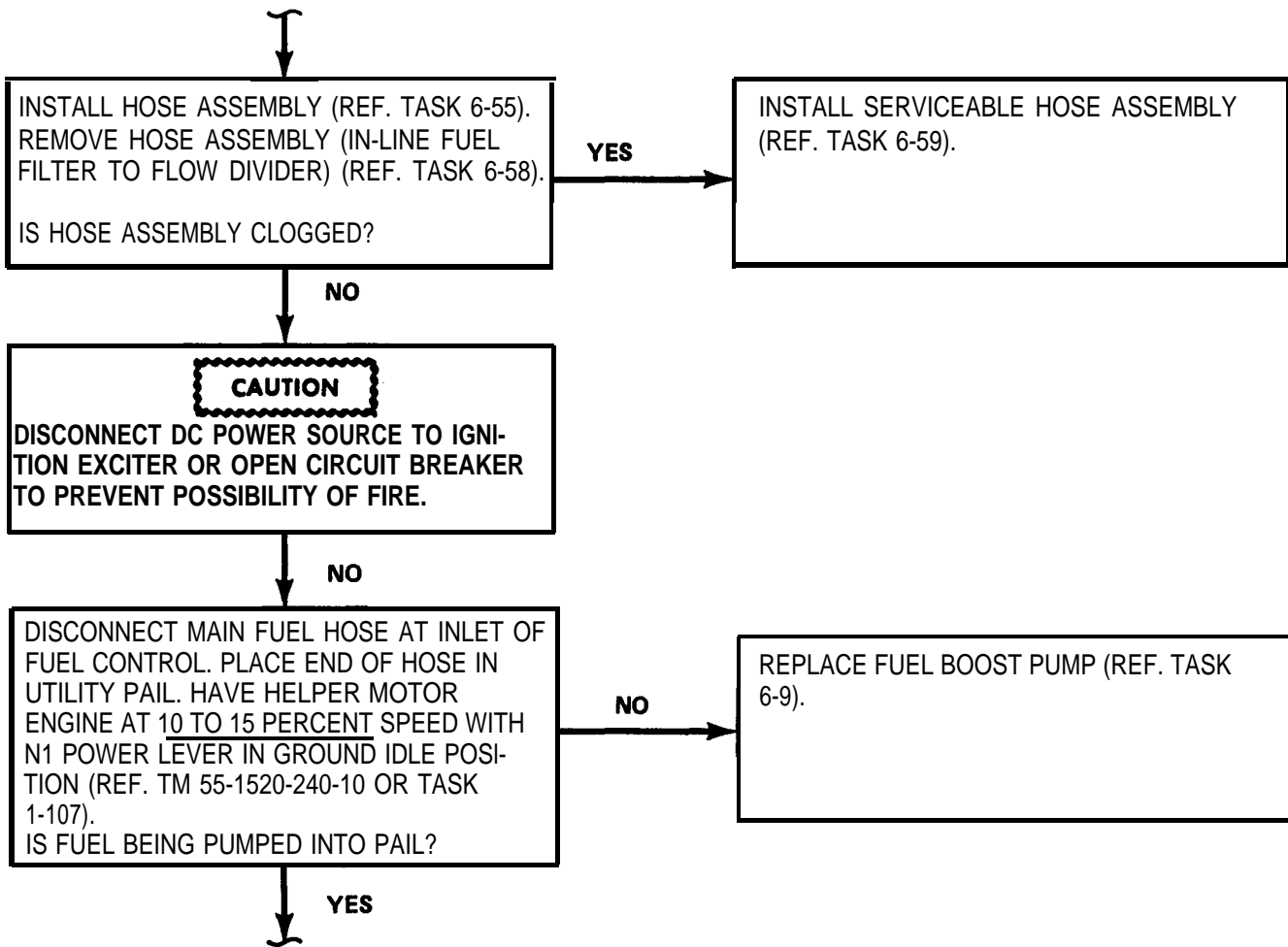
Turbine fuels are very flammable. They may cause drying and irritation of skin or eyes. Handle only in well-ventilated areas away from heat and open flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted area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



GO TO NEXT PAGE



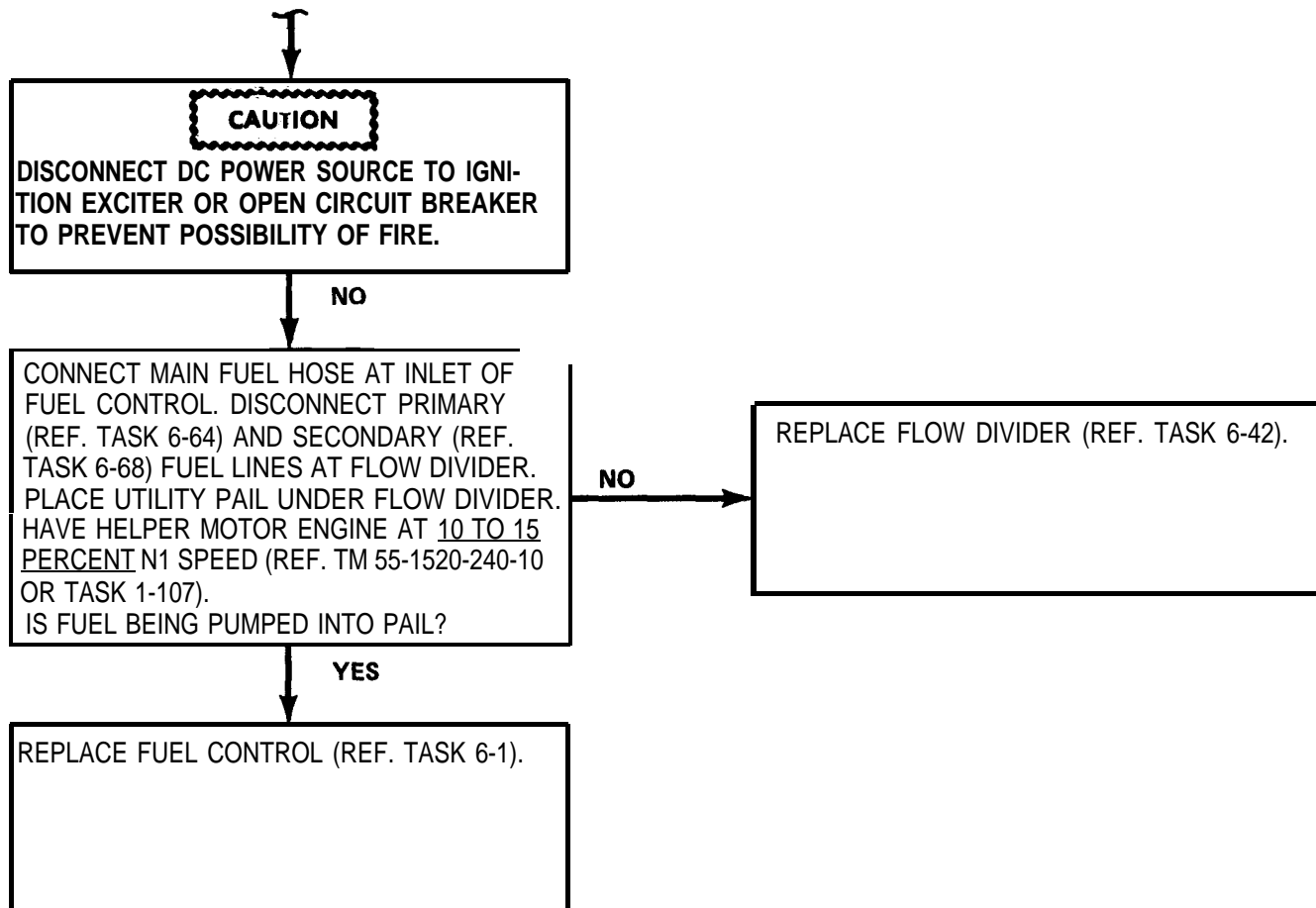
GO TO NEXT PAGE



GO TO NEXT PAGE

1-55 FLAMEOUT (Continued)

1-55



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-56 OIL PRESSURE INDICATING LOW OR HIGH - VISUAL CHECK

1-56

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

Lubricating Oil (E32 or E33)

Wiping Rag (E58)

Personnel Required:

68620 Aircraft Powerplant Repairer

References:

Task 1-74

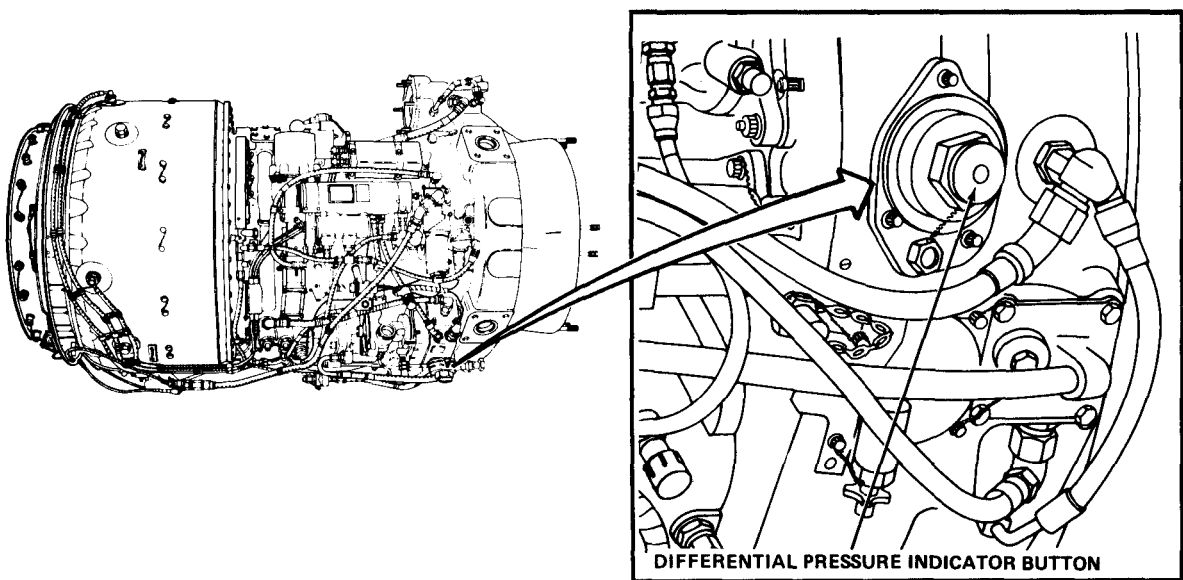
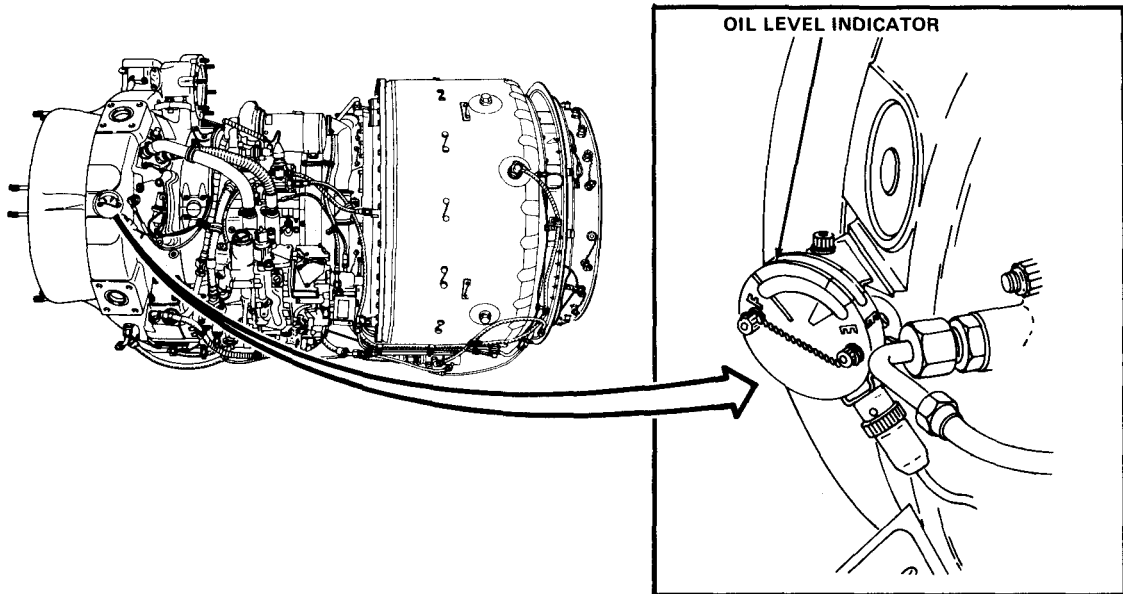
Task 1-99

TASK	RESULT
1. Check oil level indicator.	If oil tank level is too low, service engine oil system (Ref. Task 1-74).
2. Check differential pressure indicator button.	If button is extended service oil filter cap and stem assembly and oil filter element (Ref. Task 1-99).

GO TO NEXT PAGE

1-56 OIL PRESSURE INDICATING LOW OR HIGH - VISUAL CHECK (Continued)

1-56



A-1182-1-56/1

FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

General Safety Instructions:

Applicable Configurations:
All

WARNING

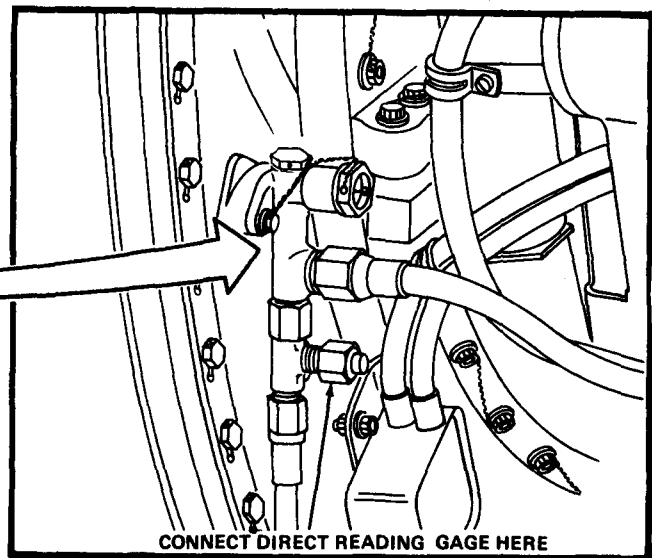
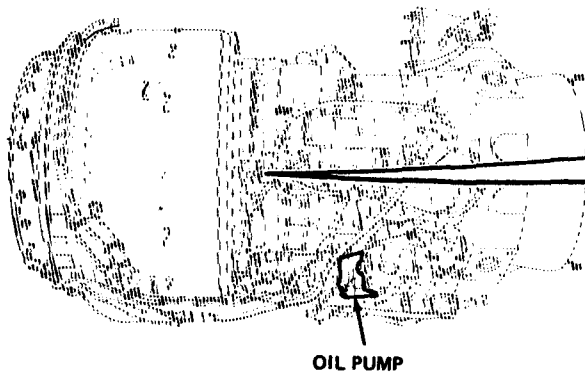
Tools:
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Dial Indicating Pressure
Gage, 0-200 PSIG

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

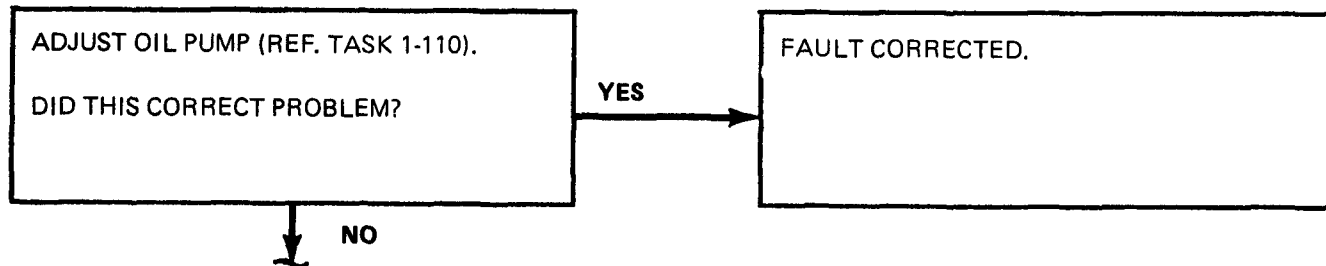
Personnel Required:
68B20 Aircraft Powerplant Repairer

Materials:
None

References:
TM 55-1520-240-T Task 1-110 Task 8-78
TM 55-4920-328-13 Task 8-1 Task 8-82
Task 1-86 Task 8-74



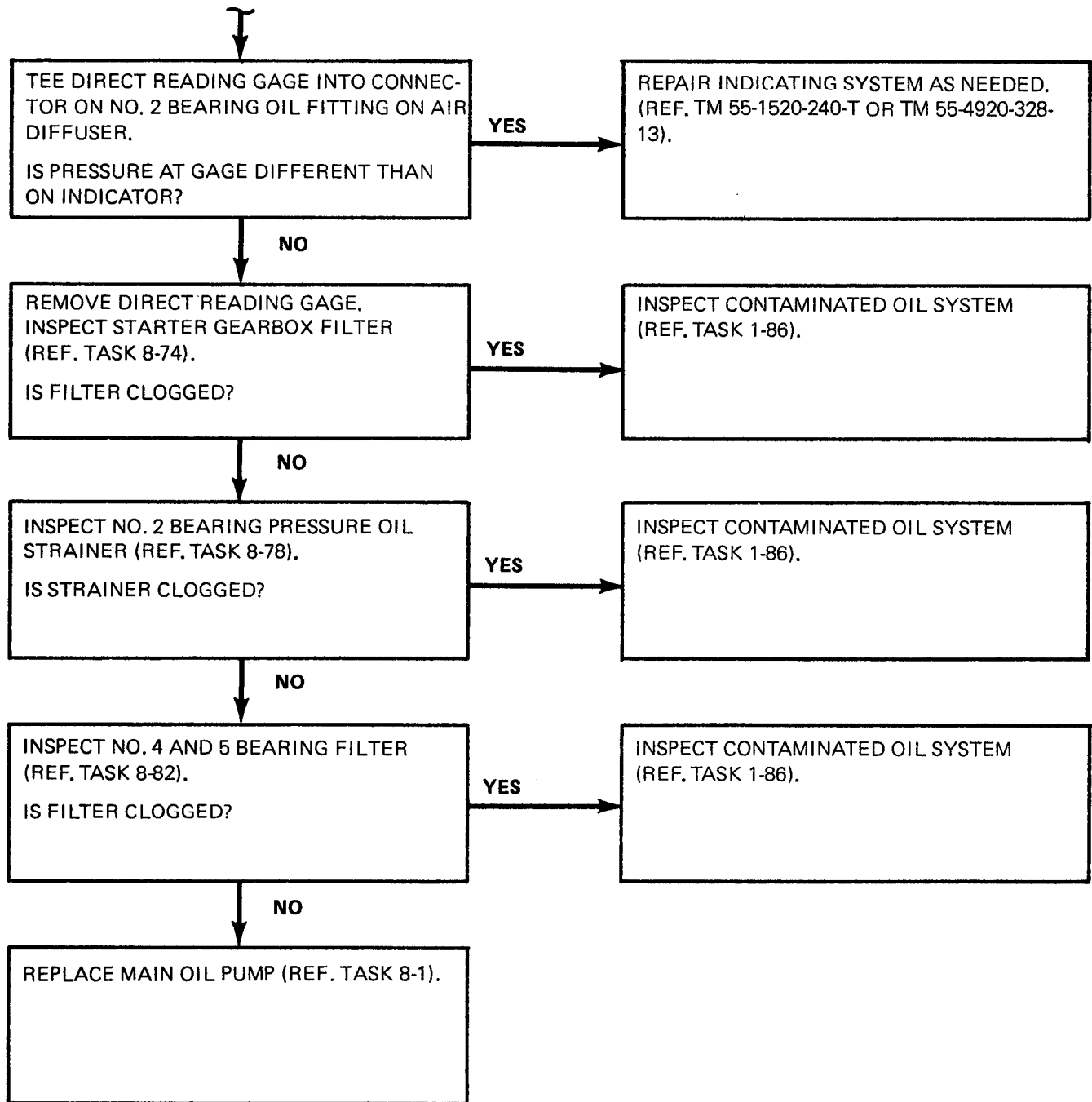
A-1182-1-57/1



GO TO NEXT PAGE

1-57 OIL PRESSURE INDICATING LOW OR HIGH (Continued)

1-57



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-58 OIL PRESSURE FLUCTUATION (TOTAL NEEDLE OSCILLATION OF MORE THAN 10 PSI) - VISUAL CHECK

1-58

INITIAL SETUP

Materials:

None

Applicable Configurations:

All

Personnel Required:

68B20 Aircraft Powerplant Repairer

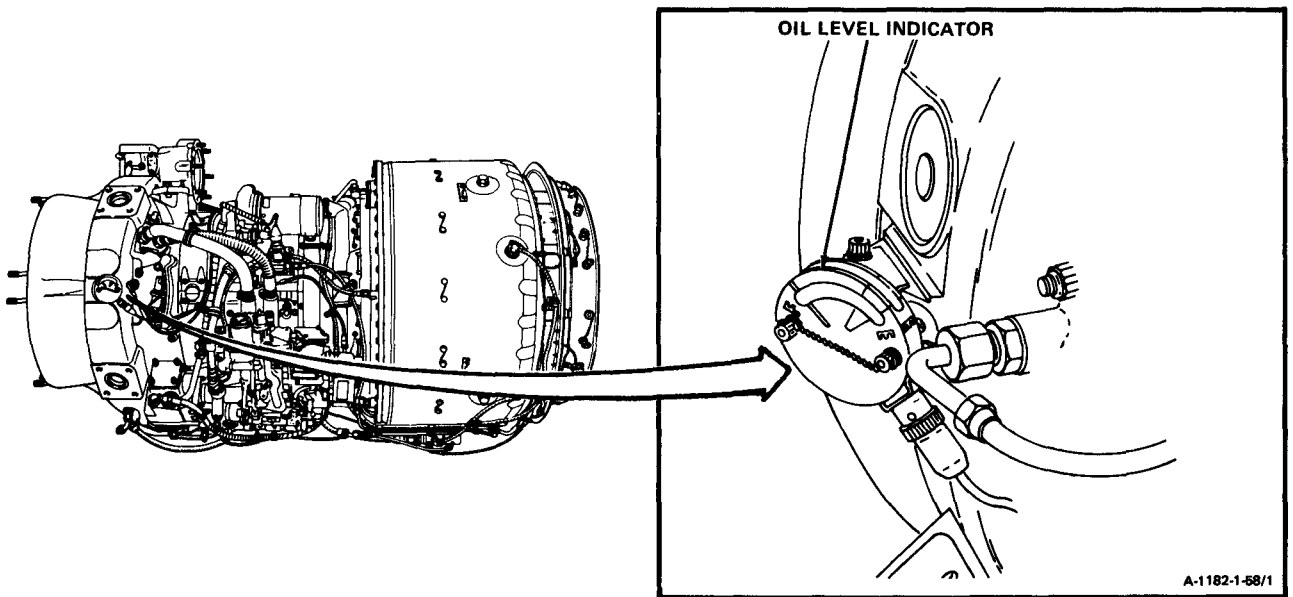
Tools:

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

Reference:

Task 1-74

TASK	RESULTS
1. Check oil level indicator.	If oil tank level is too low, service oil system (Ref. Task 1-74).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-59 OIL PRESSURE FLUCTUATION (TOTAL NEEDLE OSCILLATION OF MORE THAN 10 PSI)

INITIAL SETUP

General Safety Instructions:

Applicable Configurations:

All

WARNING

Tools:

- Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
- Dial Indicating Pressure
Gage, 0-200 PSIG

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

Materials:

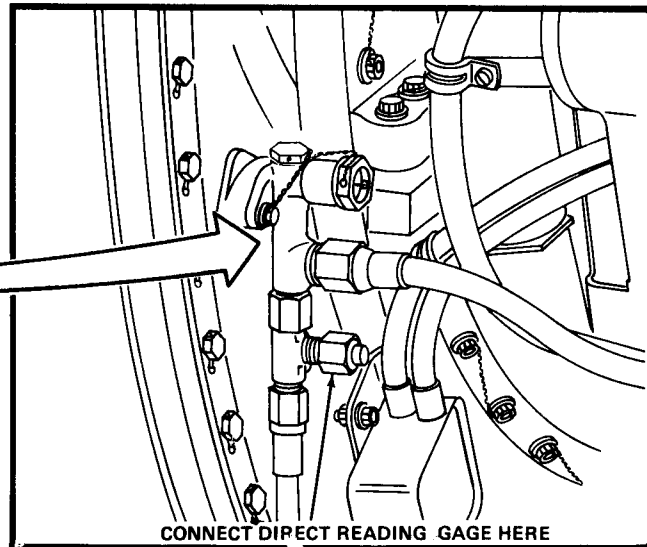
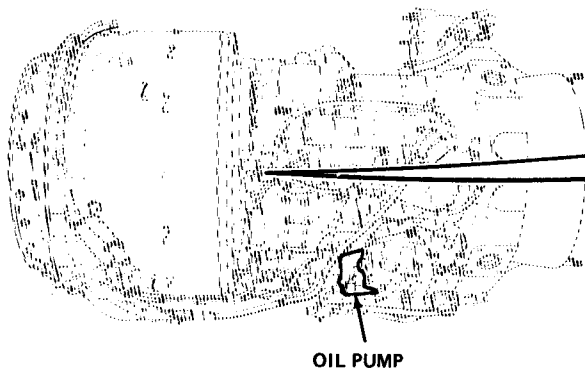
- Lubricating Oil (E32 or E33)
- Wiping Rag (E58)

Personnel Required:

68B20 Aircraft Powerplant Repairer

References:

- TM 55-1520-240-T Task 1-110
- TM 55-4920-328-13 Task 8-1

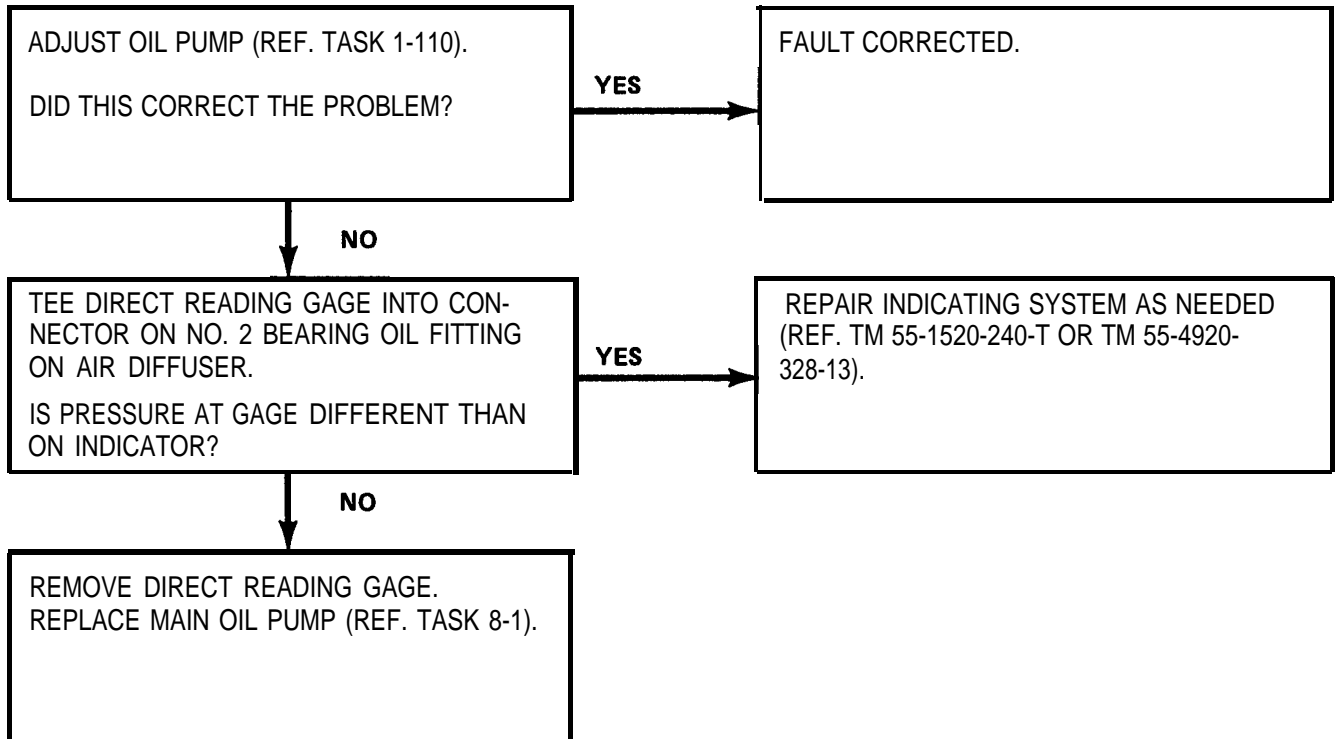


A-1182-1-59/1

GO TO NEXT PAGE

1-59 OIL PRESSURE Fluctuation (TOTAL NEEDLE OSCILLATION OF MORE THAN 10 PSI) (Continued)

1-59



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-60 HIGH OIL TEMPERATURE INDICATION - VISUAL CHECK

1-60

INITIAL SETUP

Materials:

None

Applicable Configurations:

All

Personnel Required:

68620 Aircraft Powerplant Repairer

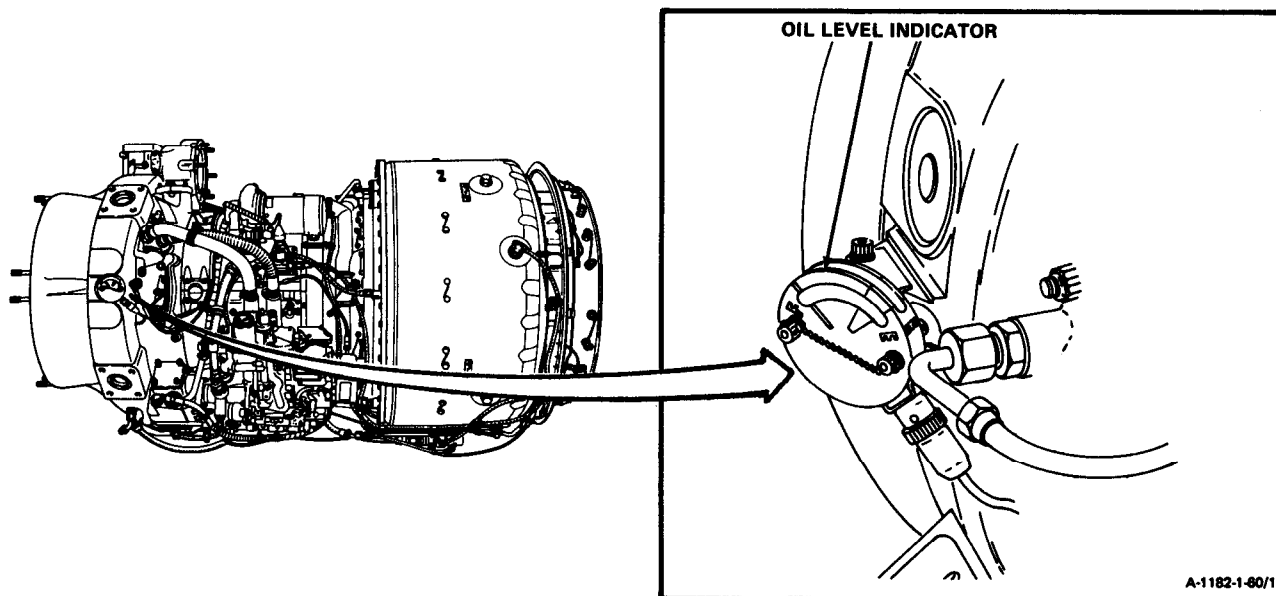
Tools:

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

Reference:

Task 1-74

TASK	RESULT
1. Check oil level indicator.	If oil tank level is too low, service engine oil system (Ref. Task 1-74).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-61 HIGH OIL TEMPERATURE INDICATION

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

Tools:

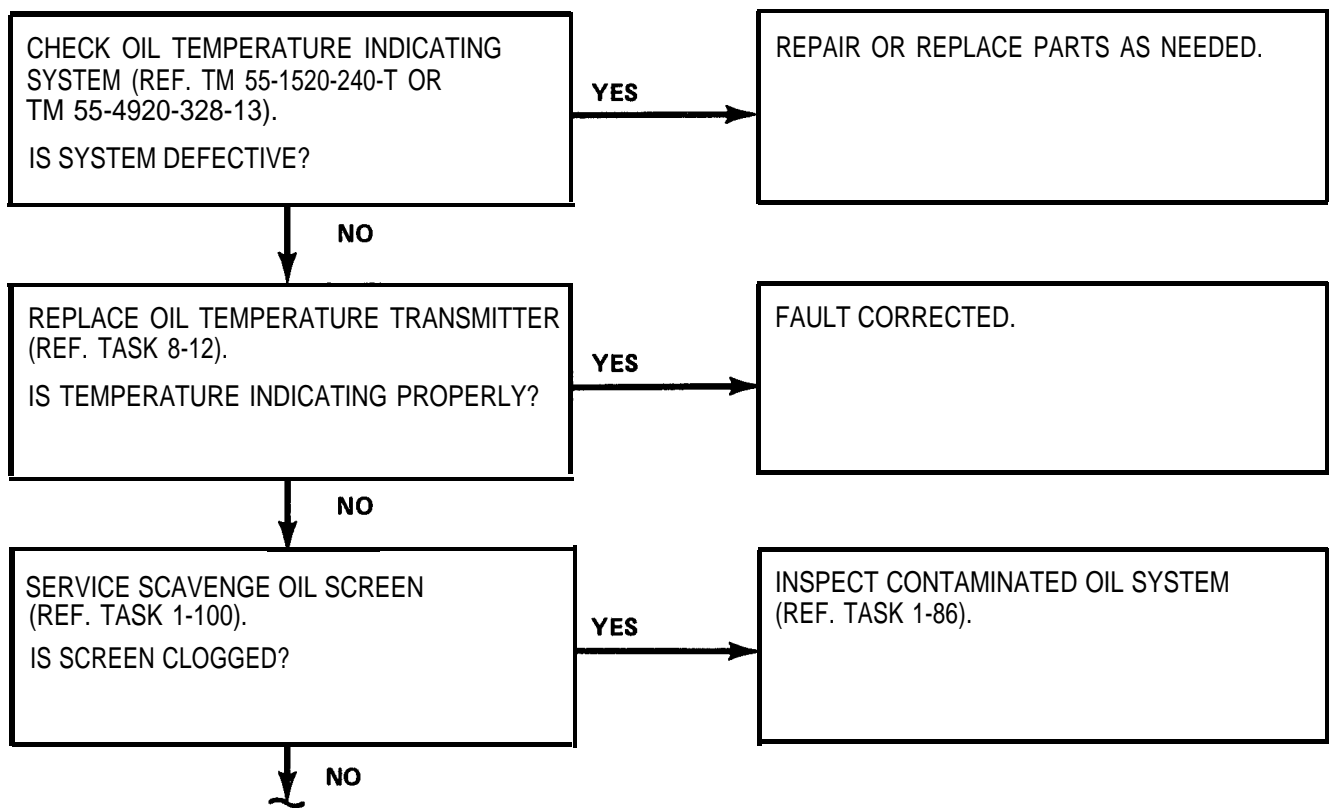
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

None

References:

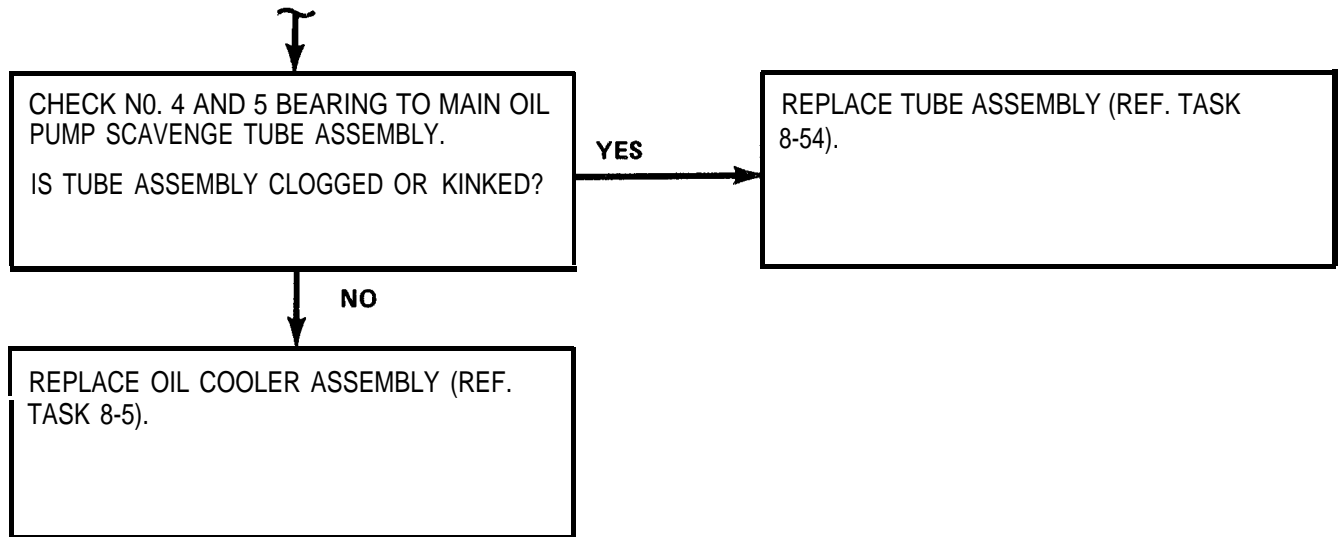
- TM 55-1520-240-T
- TM 55-4920-328-13
- Task 1-86
- Task 1-100
- Task 8-5
- Task 8-12
- Task 8-54



GO TO NEXT PAGE

1-61 HIGH OIL TEMPERATURE INDICATION (Continued)

1-61



FOLLOW-ON MAINTENANCE

None

END OF TASK

1-62 STATIC OIL LEAKAGE AT COMBUSTION CHAMBER DRAIN VALVE OR BLEED BAND CAUSED BY INTERNAL OIL SEEPAGE - VISUAL CHECK

1-62

INITIALSETUP

Materials:

None

Applicable Configurations:

All

Personnel Required:

68B20 Aircraft Powerplant Repairer

Tools:

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

Reference:

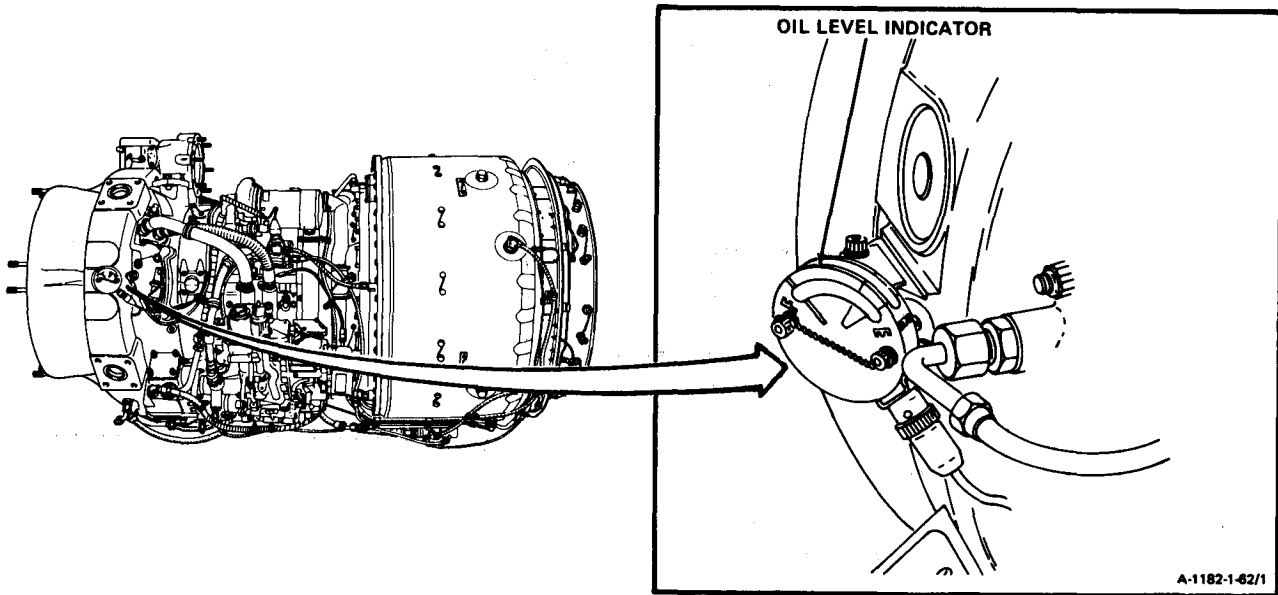
Task 1-75

TASK

RESULT

1. Check oil level indicator.

If oil level is too high, correct by draining engine oil system as necessary (Ref. Task 1-75).



A-1182-1-62/1

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-63 STATIC OIL LEAKAGE AT COMBUSTION CHAMBER DRAIN VALVE OR BLEED BAND CAUSED BY INTERNAL OIL SEEPAGE

1-63

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

Ail

References:

Task 1-89

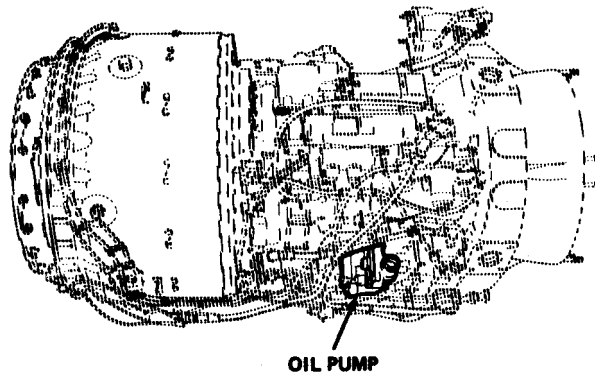
Task 8-1

Tools:

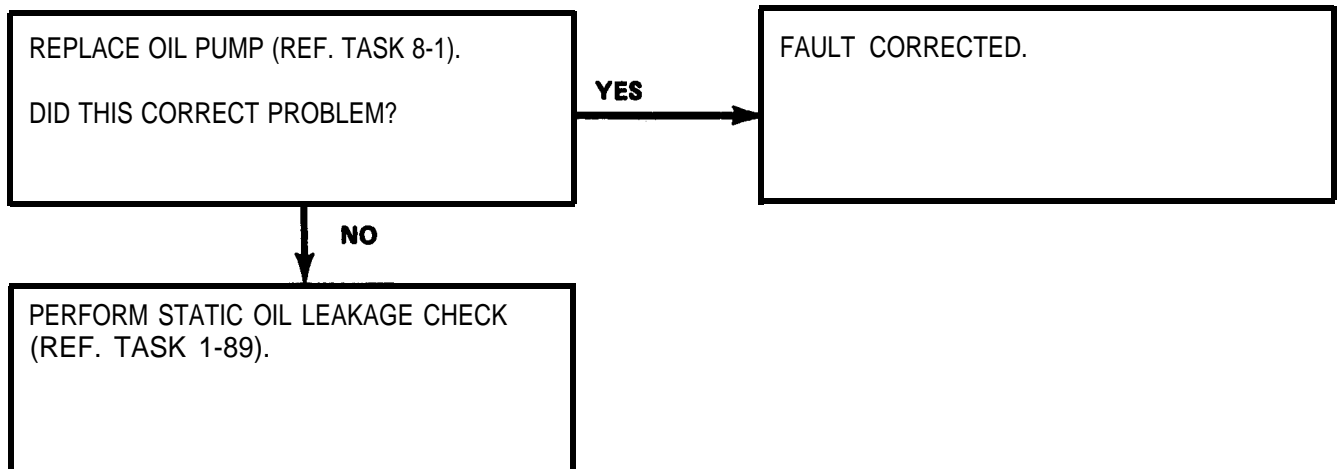
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

None



A-1182-1-63/1



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-64 EXCESSIVE CHIPS FOUND ON OIL FILTER ELEMENT AND/OR CHIP DETECTORS

1-64

INITIAL SETUP

Personnel Required:

Applicable Configurations:

68B20 Aircraft Powerplant Repairer

All

Tools:

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

Reference:

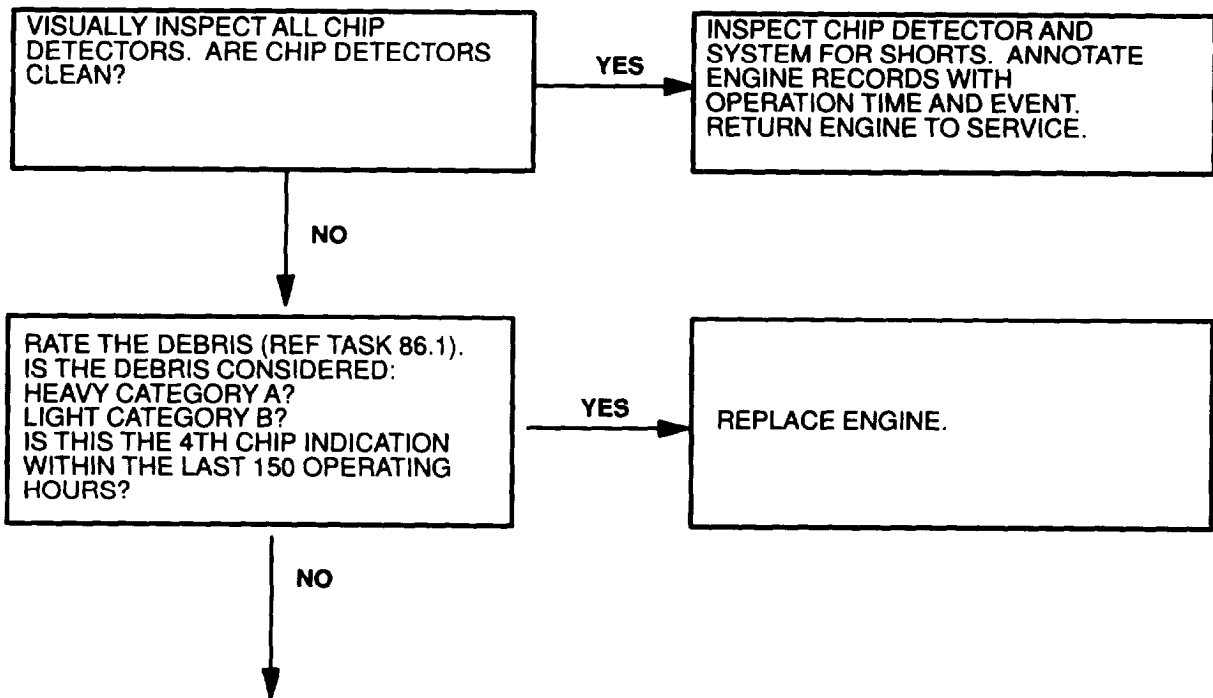
Task 1-86
Task 1-97
Task 1-98

Material:

None

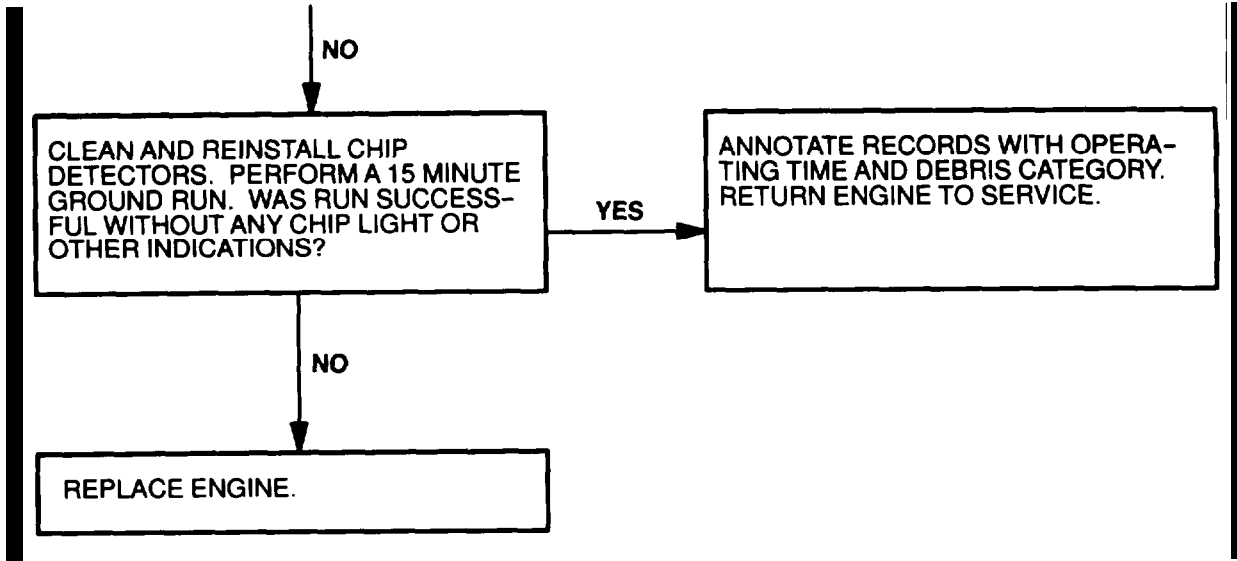
NOTE

Observe all engine operating limits during ground runs, and abort if engine operation is abnormal and/or chip detector light comes on.



GO TO NEXT PAGE

1-64 EXCESSIVE CHIPS FOUND ON OIL FILTER ELEMENT AND/OR CHIP DETECTORS (Continued)



FOLLOW-ON MAINTENANCE:
None

END OF TASK

1-65 HIGH OR ERRATIC PTIT DURING STEADY STATE OPERATION

1-65

INITIAL SETUP

Personnel Required:

Applicable Configurations:

All

68B20 Aircraft Powerplant Repairer

Tools:

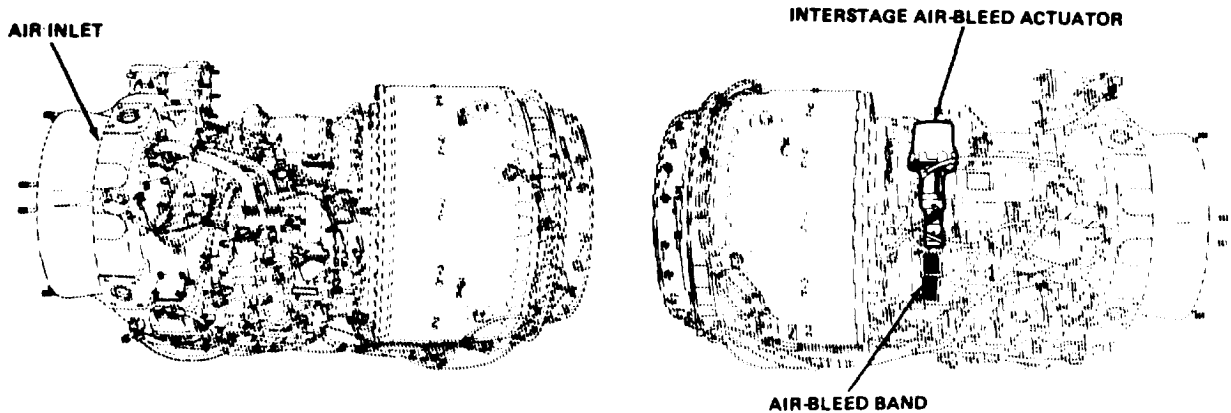
Powerplant Mechanic's Tool Kit
NSN 5180-00-323-4944

References:

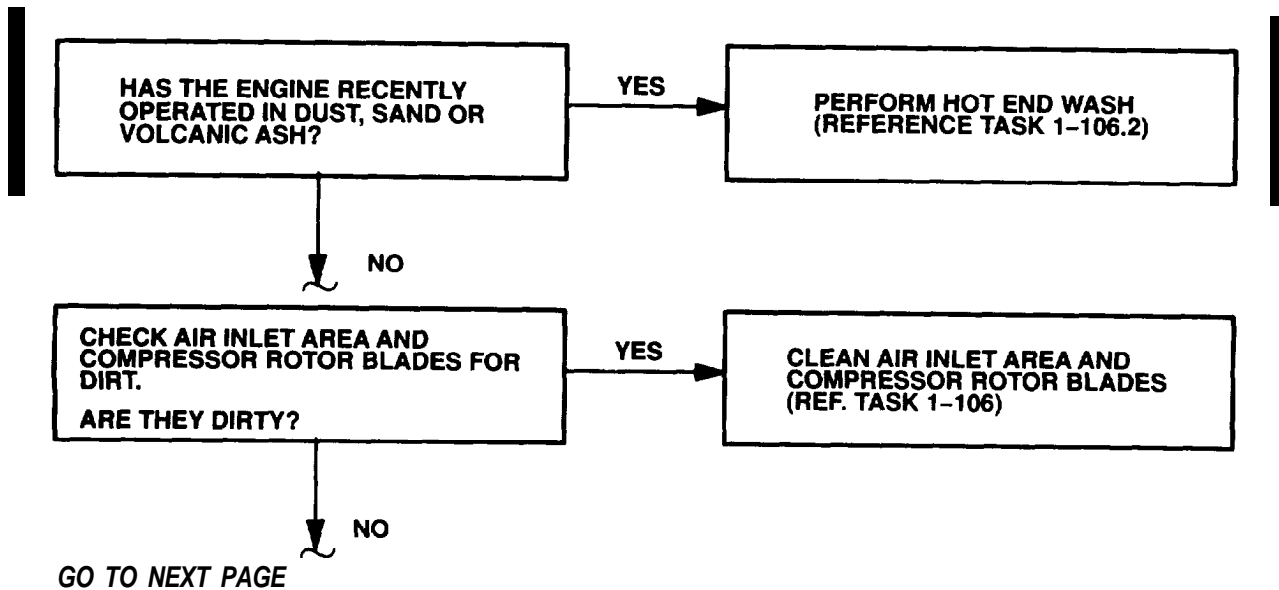
TM 55-1520-240-T
TM 55-4920-328-13
Task 1-92 Task 2-8 Task 4-5
Task 1-93 Task 2-19 Task 4-10
Task 1-106 Task 2-22 Task 4-24
Task 1-108 Task 2-33 Task 6-1
Task 2-1 Task 2-73

Materials:

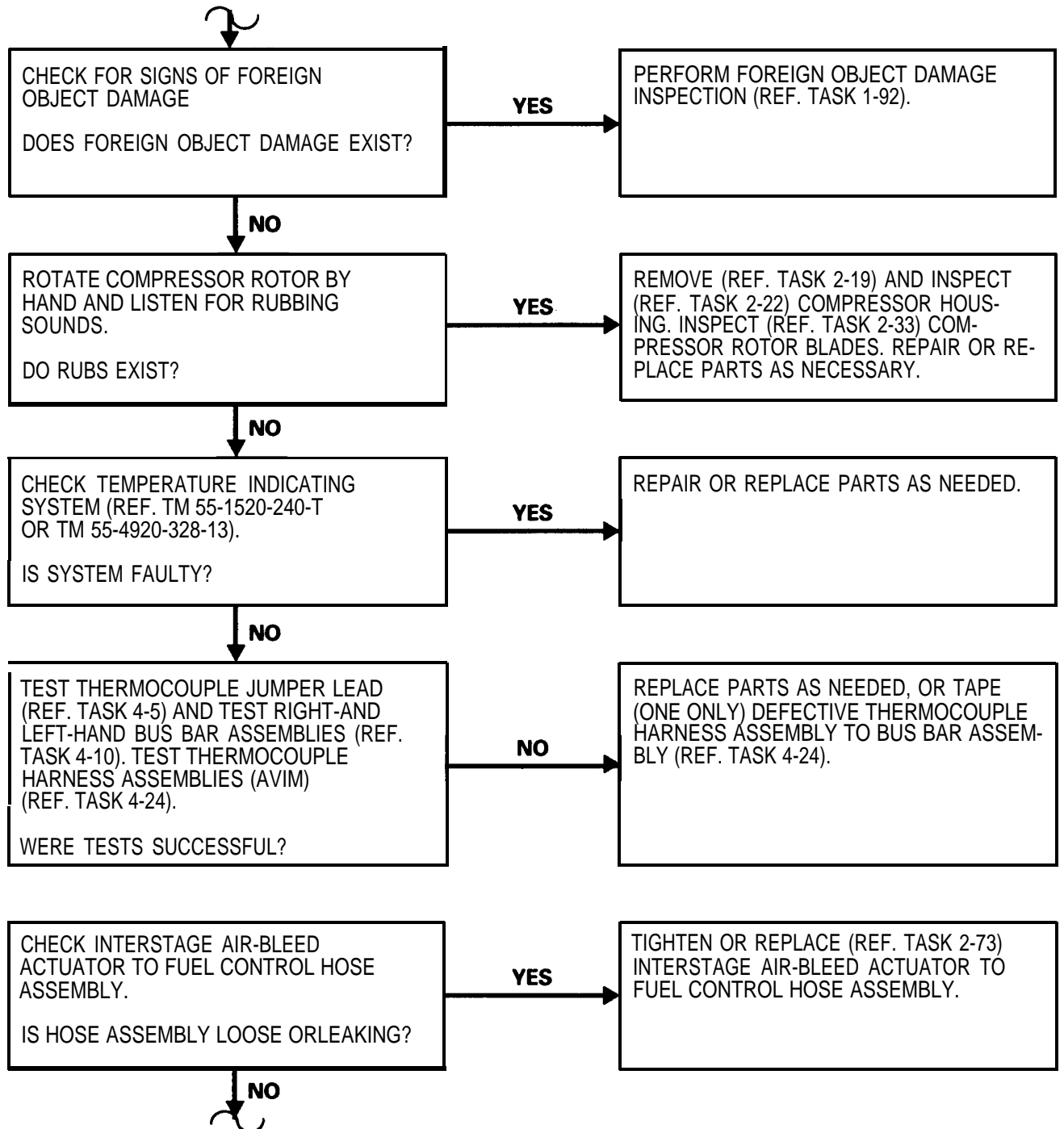
None



A-1182-1-65/1

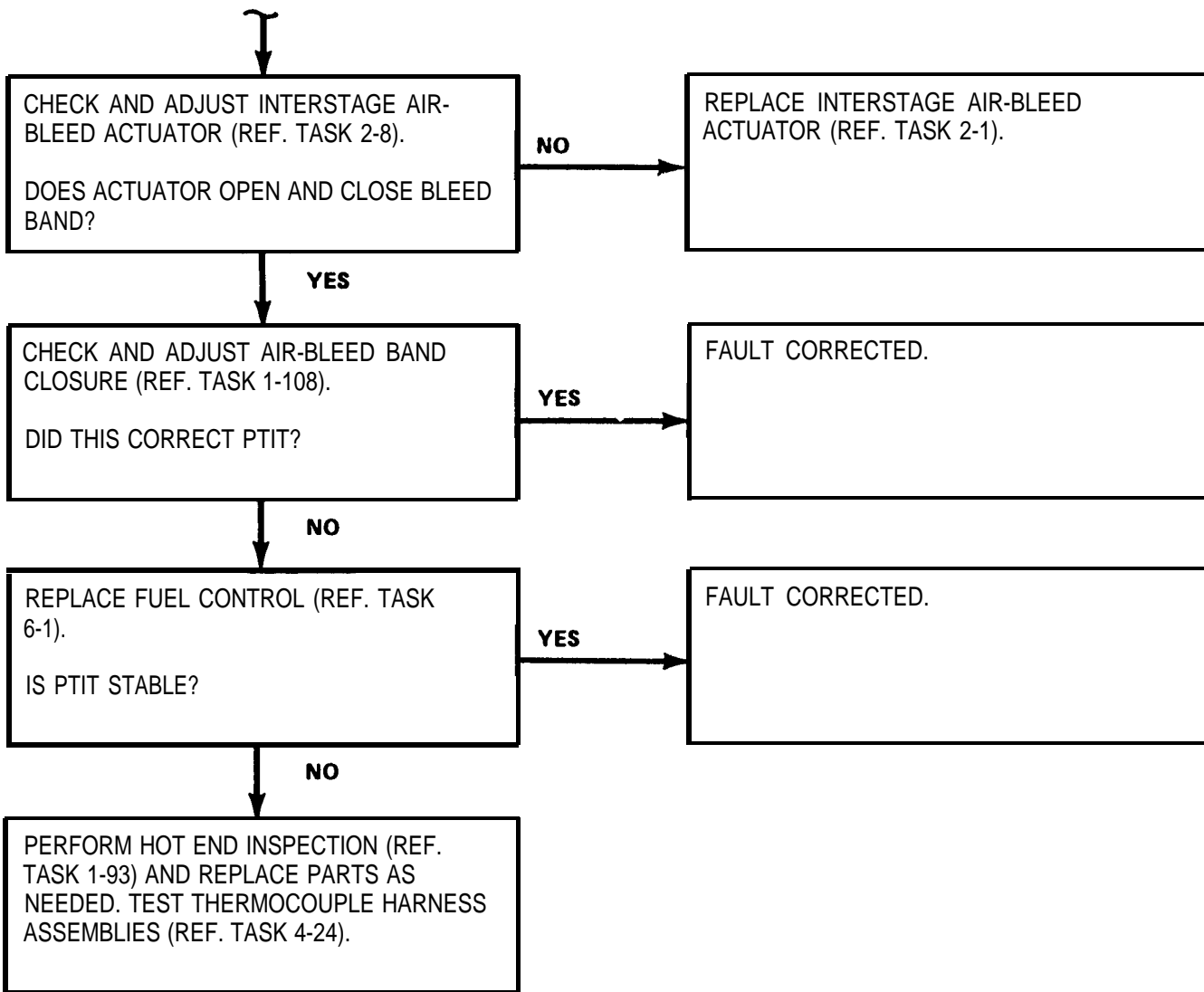


1-65 HIGH OR ERRATIC PTIT DURING STEADY STATE OPERATION (Continued)



GO TO NEXT PAGE

1-65 HIGH OR ERRATIC PTIT DURING STEADY STATE OPERATION (Continued)



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-66 HIGH PTIT DURING STARTS - VISUAL CHECK

1-66

INITIAL SETUP

Materials:
None

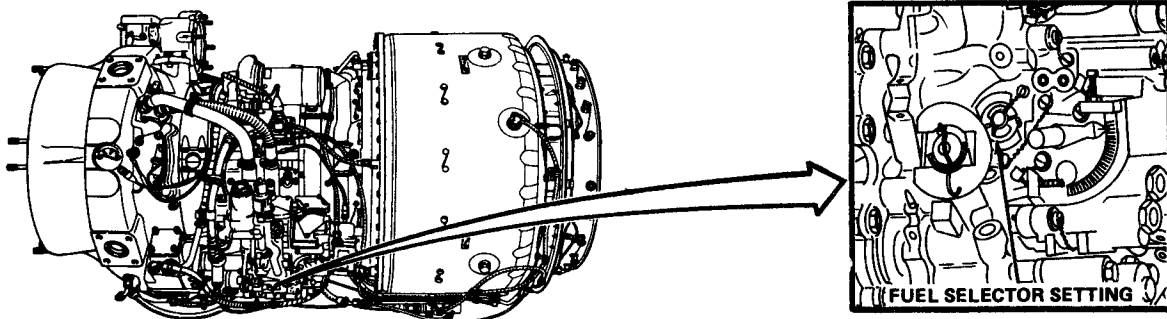
Applicable Configurations:
All

Personnel Required:
68B20 Aircraft Powerplant Repairer

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

Reference:
Task 1-108

TASK	RESULT
1. Check fuel selector setting on fuel control.	If fuel selector setting is not on JP-4, adjust as necessary (Ref. Task 1-108).



A-1182-1-66/1

FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

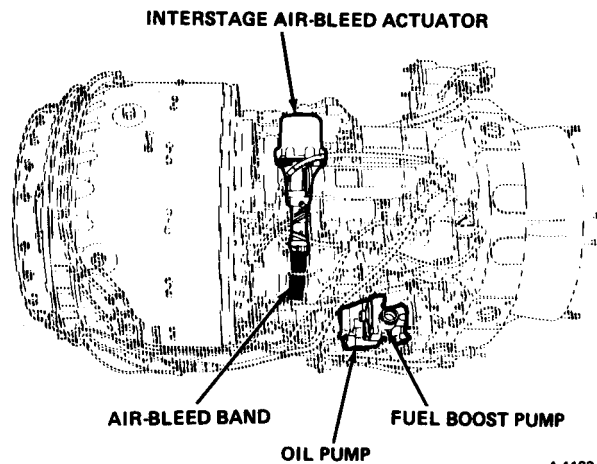
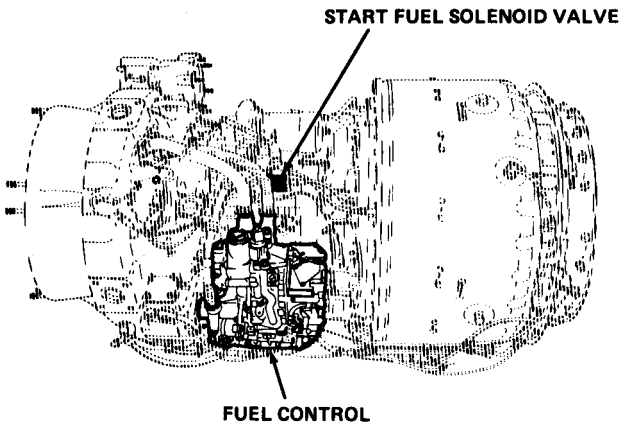
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Personnel Required:

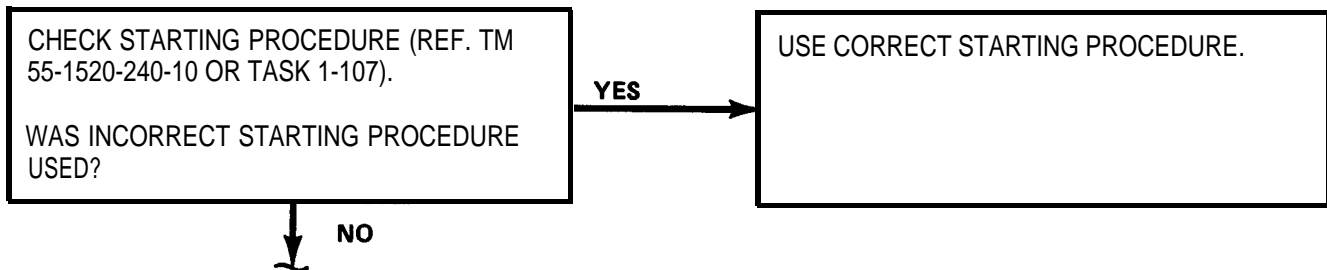
68B10 Aircraft Powerplant Repairer
68B20 Aircraft Powerplant Repairer

References:

TM 55-1520-240-10	TM 55-1520-240-T	
TM 55-1520-240-23	TM 55-4920-328-13	
Task 1-92	Task 2-22	Task 6-13
Task 1-93	Task 2-33	Task 6-25
Task 1-107	Task 3-1	Task 6-27
Task 1-108	Task 3-3	Task 6-28
Task 2-1	Task 3-4	Task 6-49
Task 2-8	Task 6-1	Task 8-1
Task 2-19	Task 6-9	



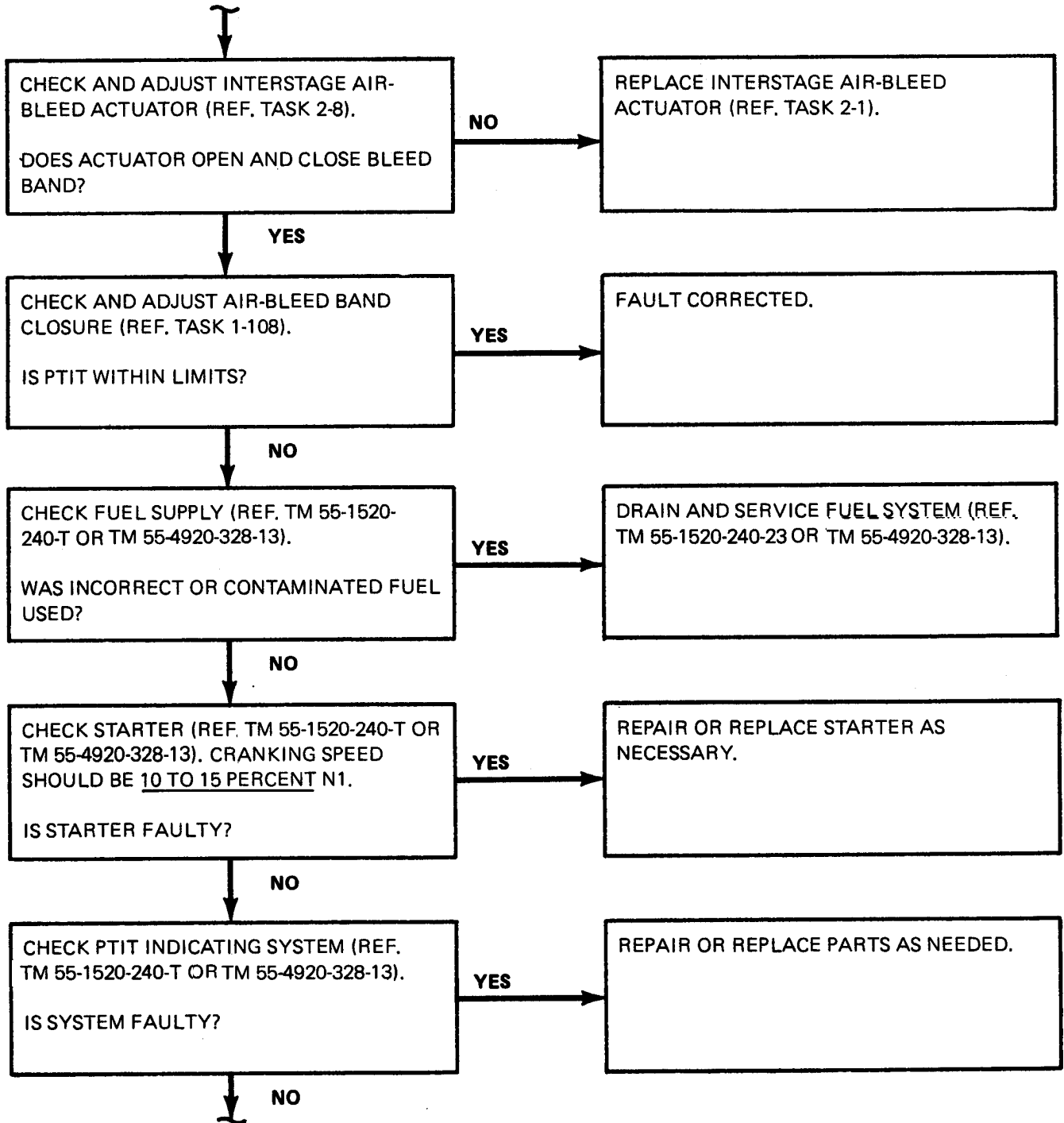
A-1182-1-67/1



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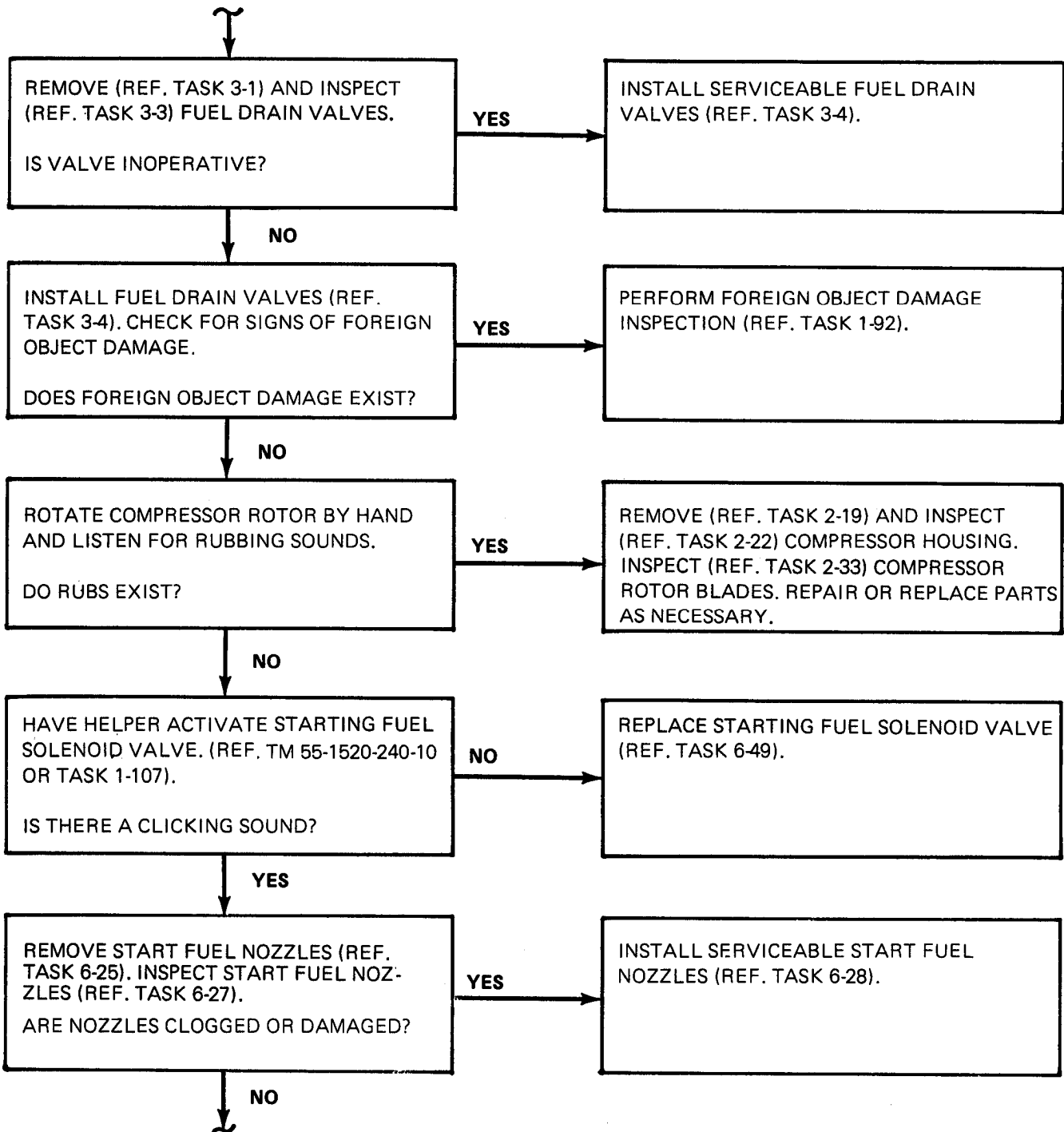
1-67 HIGH PTIT DURING STARTS (Continued)

1-67



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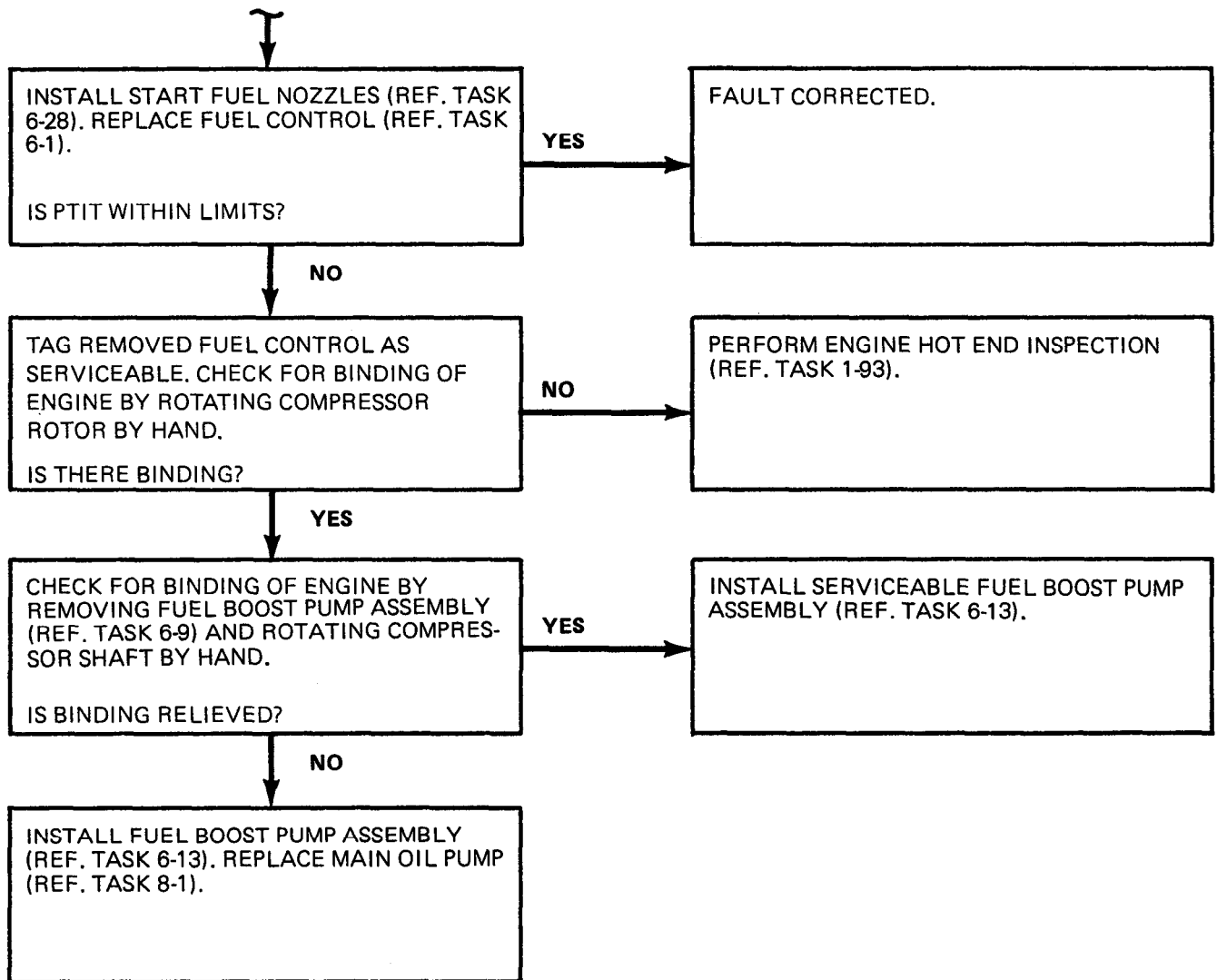
1-67 HIGH PTIT DURING STARTS (Continued)



GO TO NEXT PAGE

1-67 HIGH PTIT DURING STARTS (Continued)

1-67



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-68 HIGH PTIT DURING ACCELERATIONS - VISUAL CHECK

1-68

INITIAL SETUP

Materials:
None

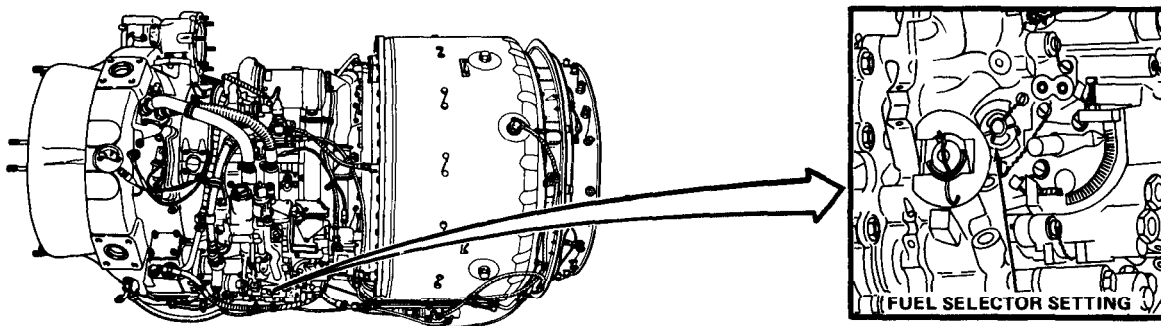
Applicable Configurations:
All

Personnel Required:
68B20 Aircraft Powerplant Repairer

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

Reference:
Task 1-108

TASK	RESULT
1. Check fuel selector setting on fuel control.	If fuel selector setting is not on JP-4, adjust as necessary (Ref. Task 1-108).



A-1182-1-68/1

FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

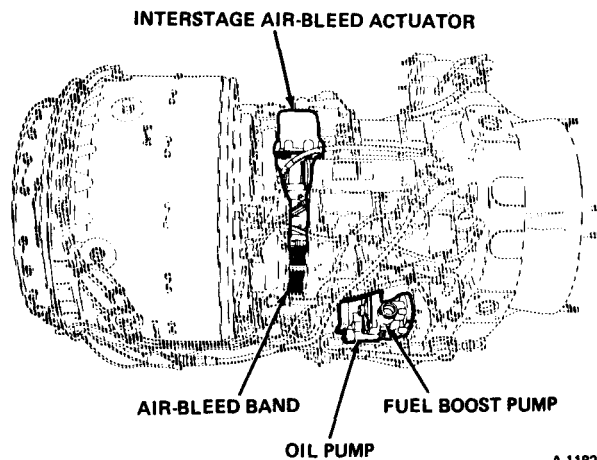
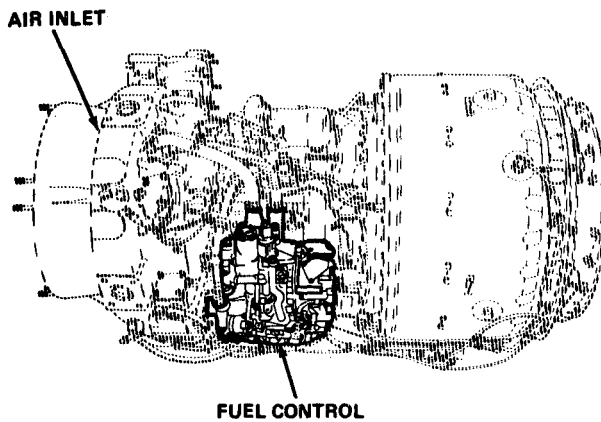
Applicable Configurations:
All

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

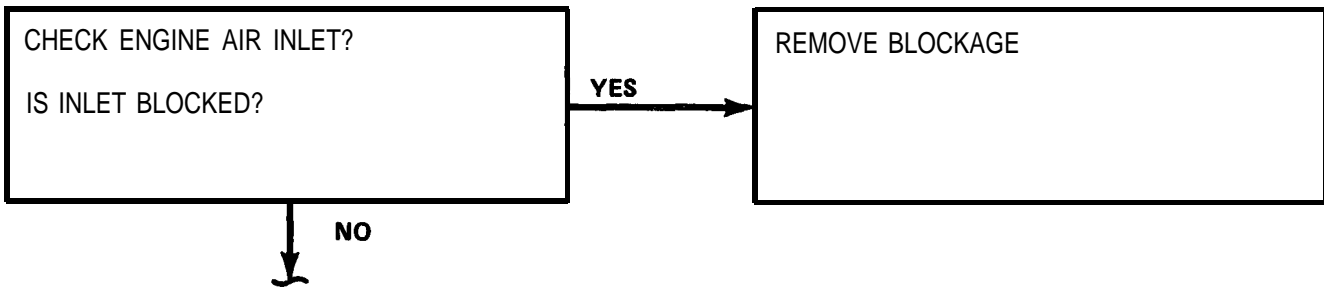
Materials:
None

Personnel Required:
68B20 Aircraft Powerplant Repairer

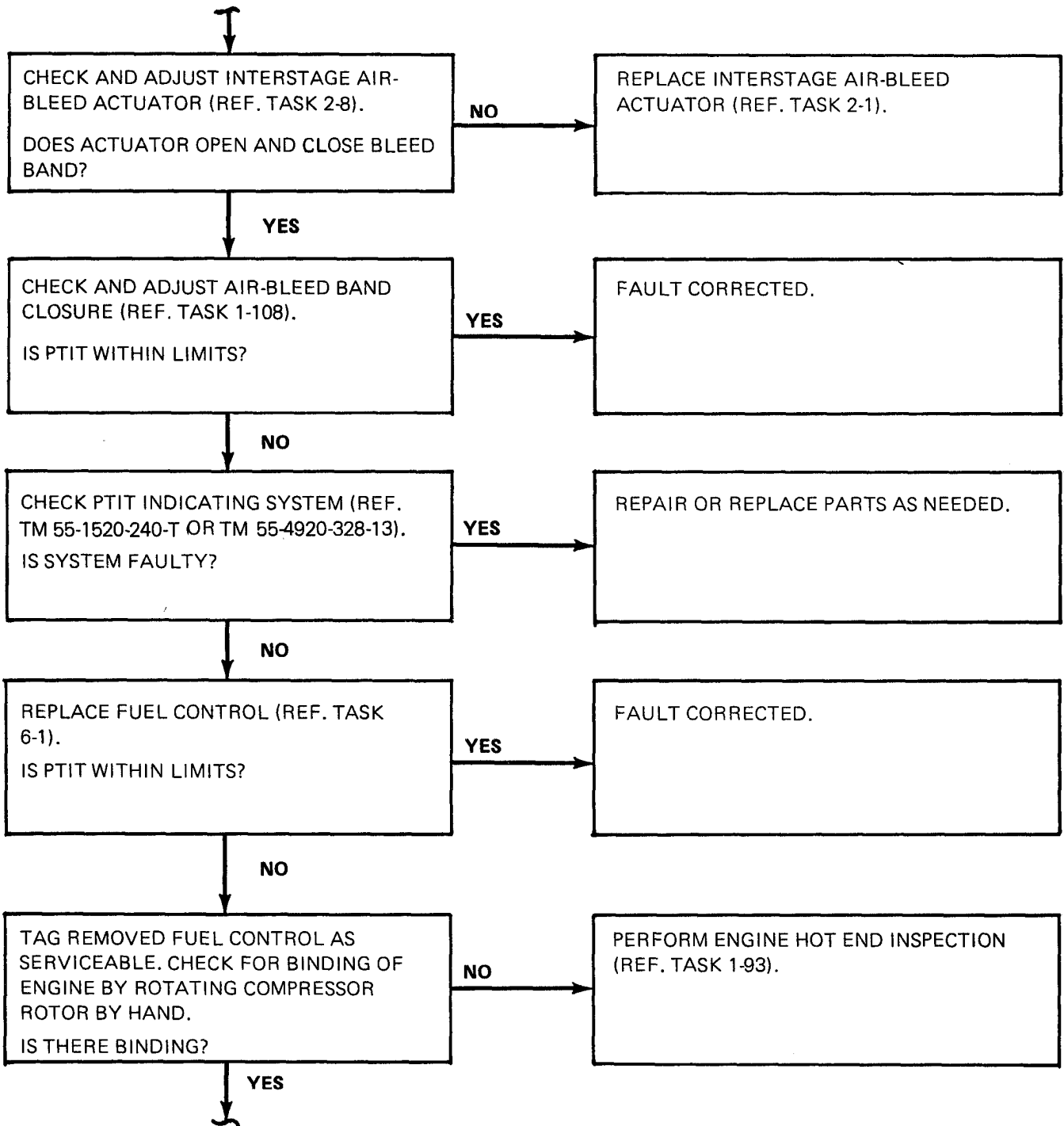
References:
TM 55-1520-240-T
TM 55-4920-328-13
Task 1-93 Task 2-8 Task 6-13
Task 1-108 Task 6-1 Task 8-1
Task 2-1 Task 6-9



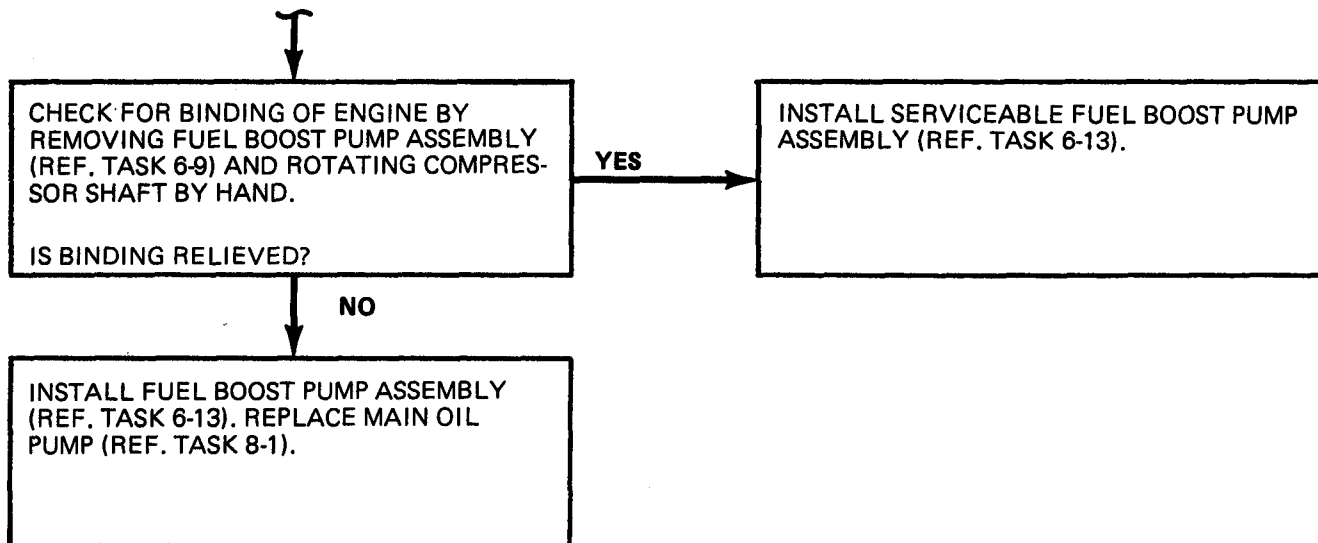
A-1182-1-69/1



GO TO NEXT PAGE



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FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

TM 55-1520-240-23

Task 1-87

Task 1-88

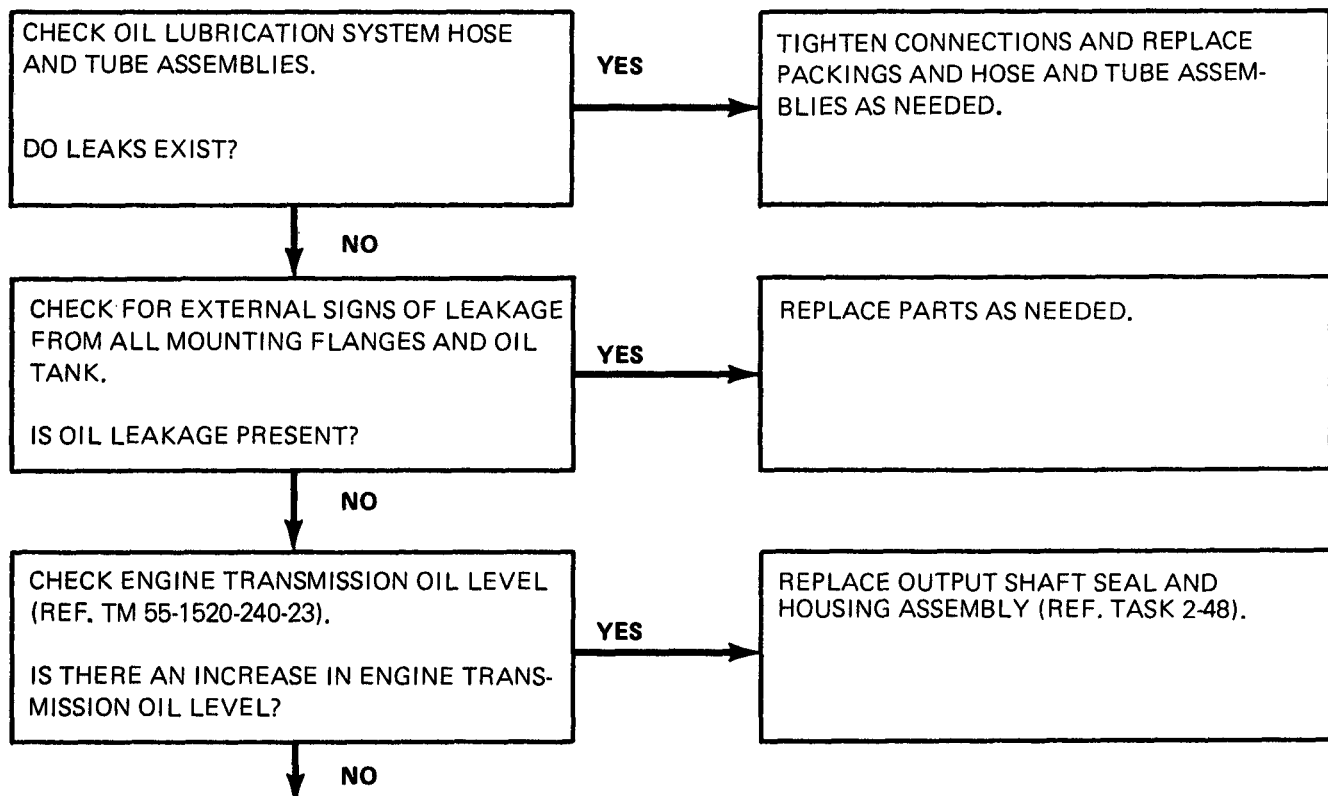
Task 2-48

Tools:

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

Materials:

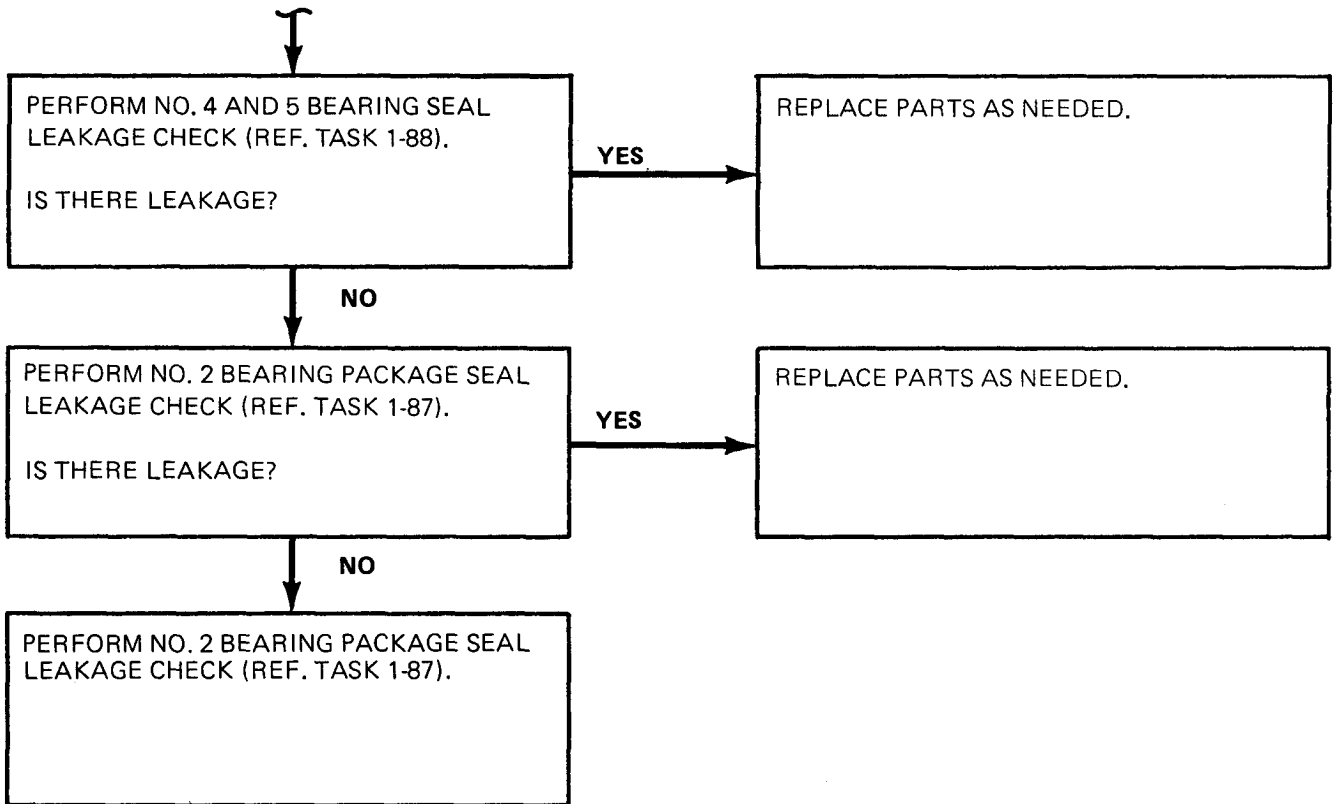
None



GO TO NEXT PAGE

1-70 HIGH OIL CONSUMPTION (MORE THAN 2 QUARTS PER HOUR) (Continued)

1-70



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-71 N1 OVERSPEED

1-71

INITIAL SETUP

Personnel Required:

68620 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

TM 55-1520-240-T
TM 55-4920-328-13
Task 6-1

Tools:

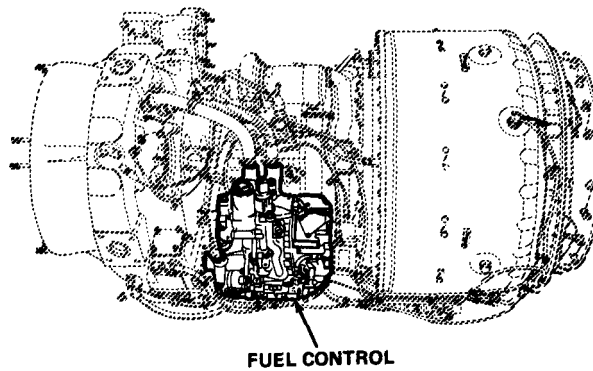
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Equipment Condition:

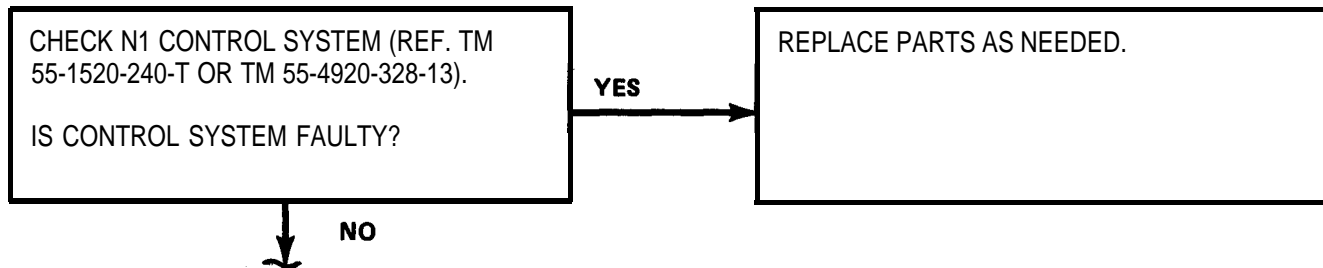
Engine Inspected After N1 Overspeed
(Task 1-79)

Materials:

None



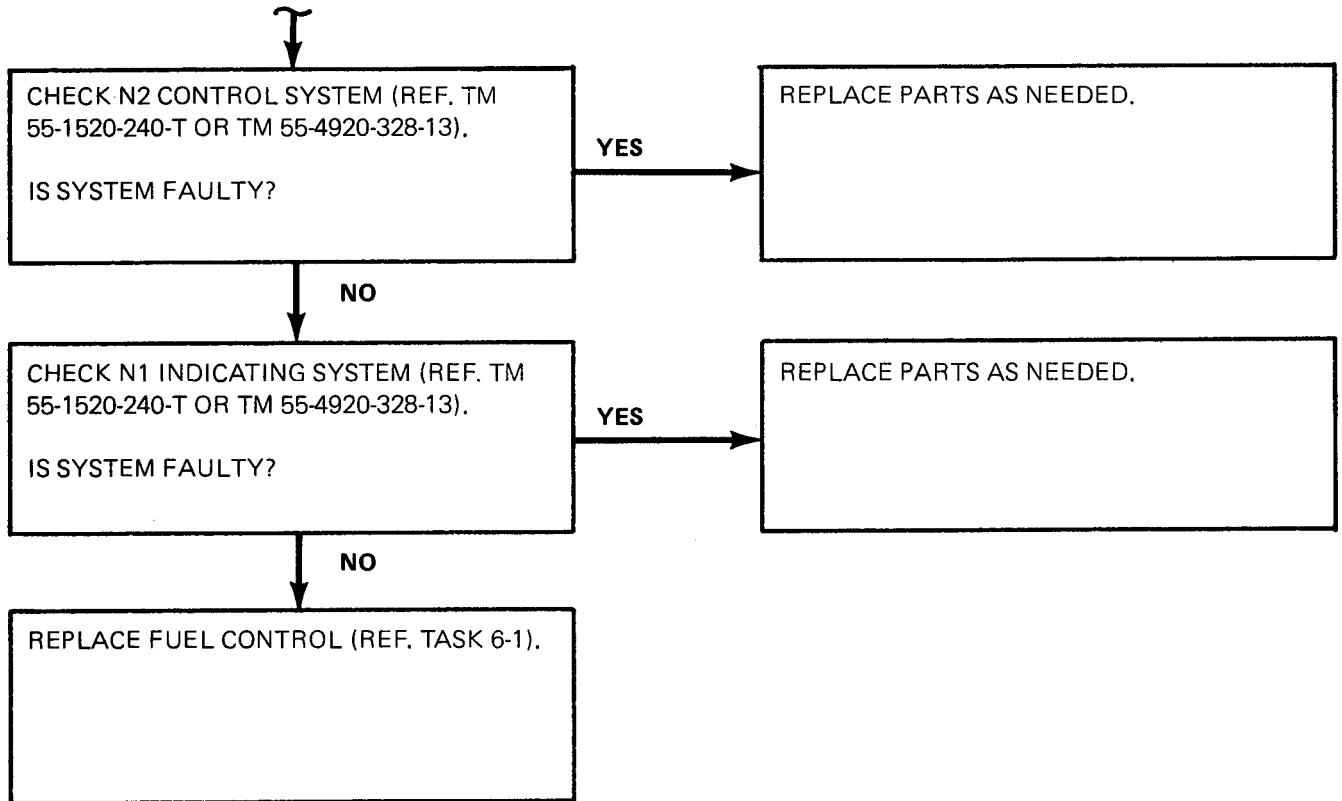
A-1182-1-71/1



GO TO NEXT PAGE

1-71 N1 OVERSPEED (Continued)

1-71



FOLLOW-ON MAINTENANCE:

None

END OF TASK

INITIAL SETUP

Personnel Required:

68B20 Aircraft Powerplant Repairer

Applicable Configurations:

All

References:

TM 55-1520-240-T

TM 55-4920-328-13

Task 2-58

Task 2-63

Task 5-23

Task 2-61

Task 5-17

Task 6-1

Task 2-62

Task 5-20

Tools:

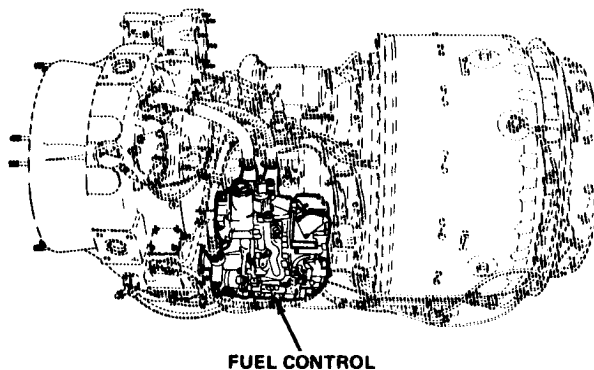
Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944

Materials:

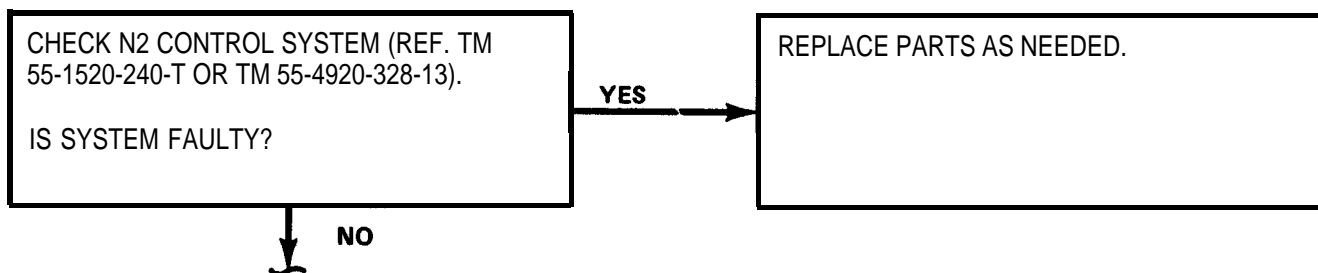
None

Equipment Condition:

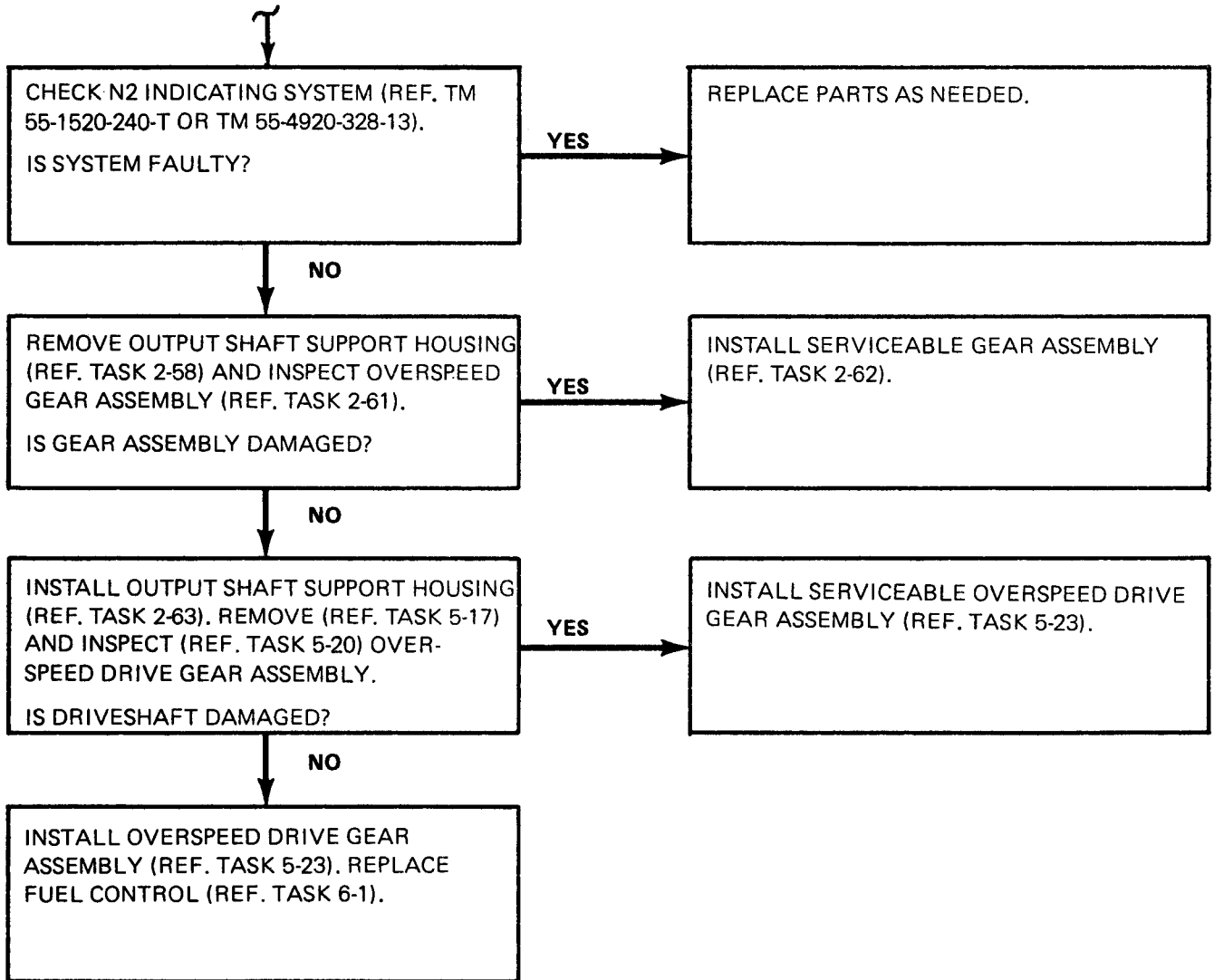
Engine Inspected After N2 Overspeed
(Task 1-80)



A-1182-1-72/1



GO TO NEXT PAGE



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-73 ABNORMAL ENGINE COASTDOWN NOISE OR TIME (LESS THAN 25 SECONDS)

1-73

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

Materials:

None

Personnel Required:

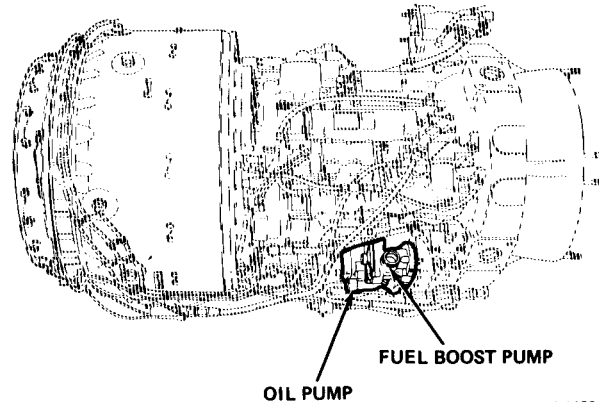
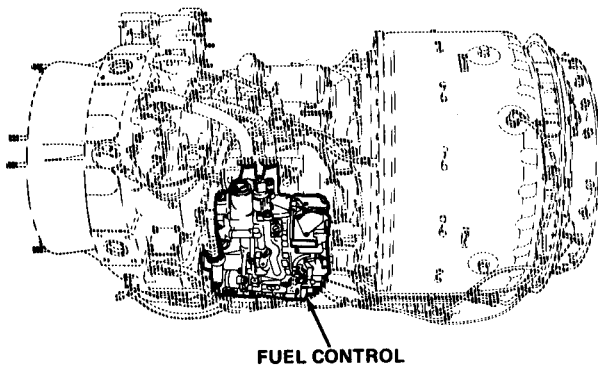
68B20 Aircraft Powerplant Repairer

Equipment Condition:

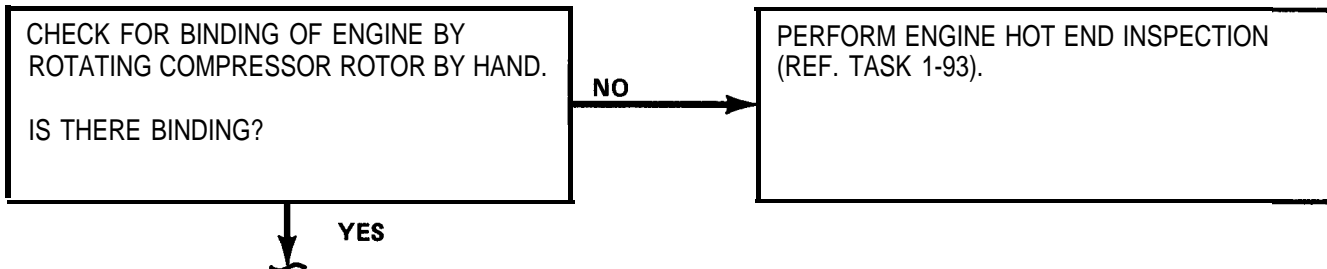
Engine Coastdown Time Checked (Task 1-81)

References:

Task 1-93
Task 6-1
Task 6-6
Task 6-9
Task 6-13
Task 8-1



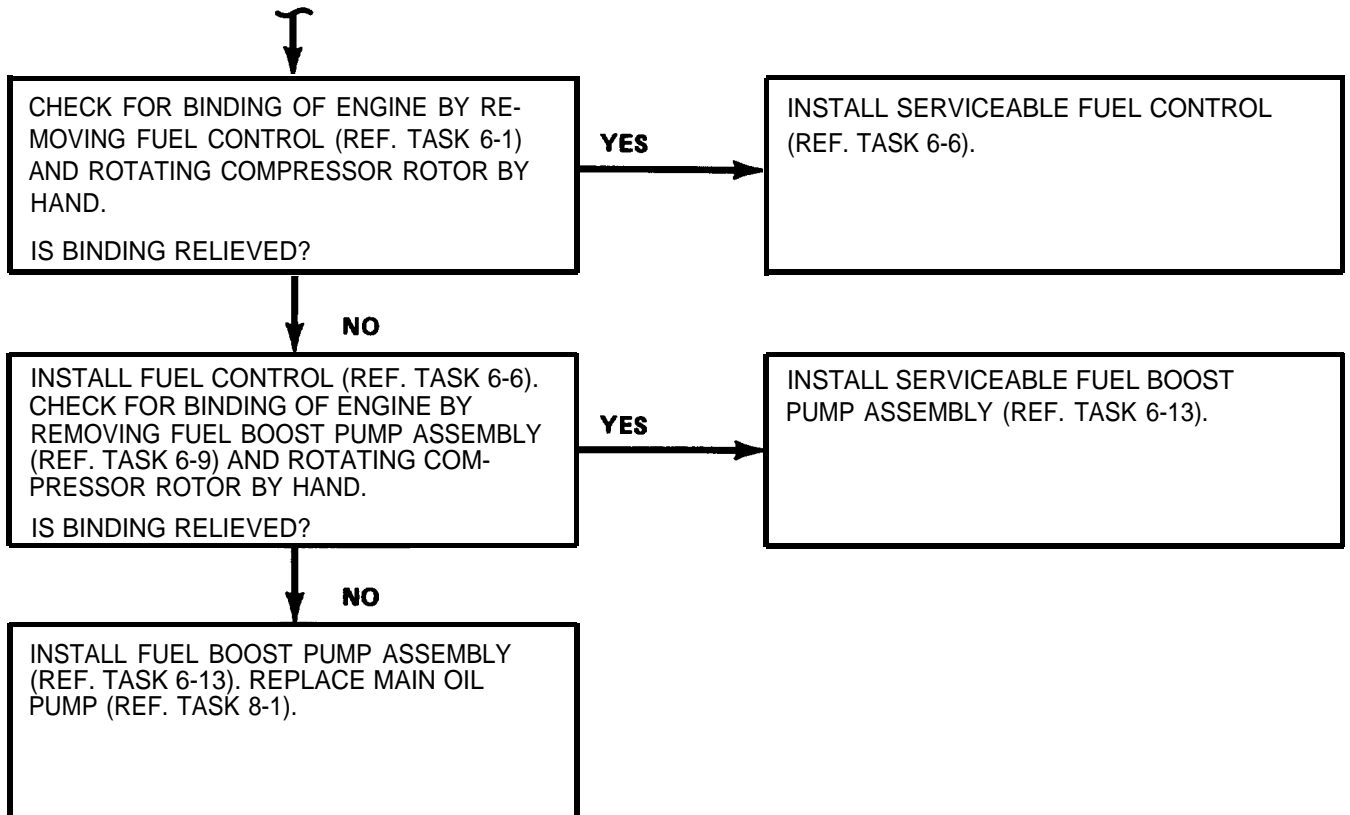
A-1182-1-73/1



GO TO NEXT PAGE

**1-73 ABNORMAL ENGINE COASTDOWN NOISE OR TIME
(LESS THAN 25 SECONDS) (Continued)**

1-73



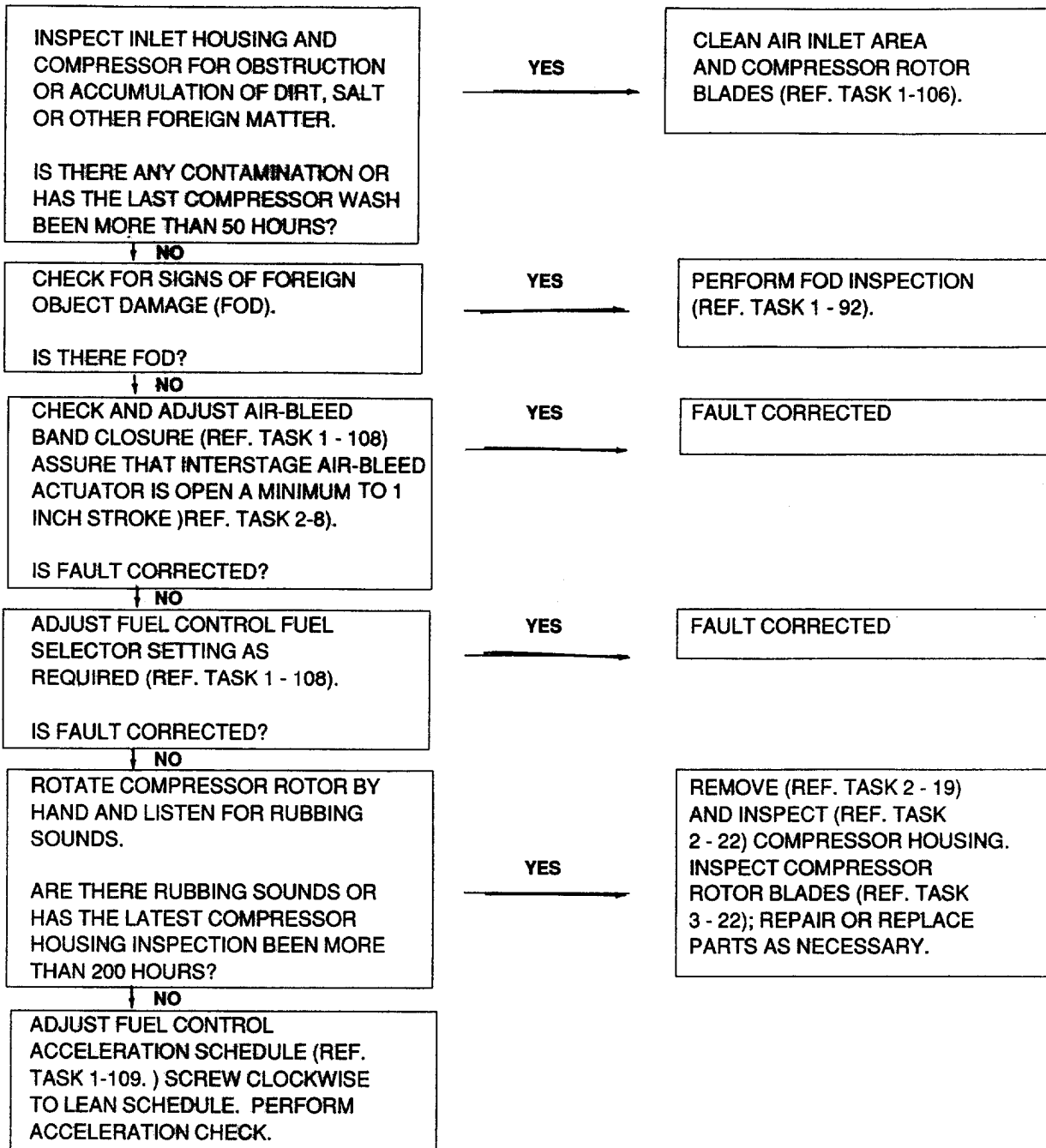
FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-73.1 ENGINE FAILS TO ACCELERATE DURING START WITH HIGH PTIT

1.73.1



FOLLOW-ON MAINTENANCE:

None

END OF TASK

Section VIII. SERVICING

This section contains general procedures for filling oil system to proper level and draining oil system, It also has procedures for changing from lubricating oil (E32) to lubricating oil (E33) or from lubricating oil (E33) to lubricating oil (E32). It is divided into the following tasks:

LIST OF TASKS

N U M B E R	T A S K	P A G E
1-74	Service Engine Oil System	1-221
1-75	Drain Engine Oil System	1-226
1-76	Change From MIL-L-7808 to MIL-L-23699 Lubricating Oil	1-234
1-77	Change From MIL-L-23699 to MIL-L-7808 Lubricating Oil	1-237

1-74 SERVICE ENGINE OIL SYSTEM

1-74

INITIAL SETUP**Applicable Configurations:**

All

Tools:

None

Materials:

Lubricating Oil (E32)
Lubricating Oil (E33)
Wiping Rag (E58)

Personnel Required:

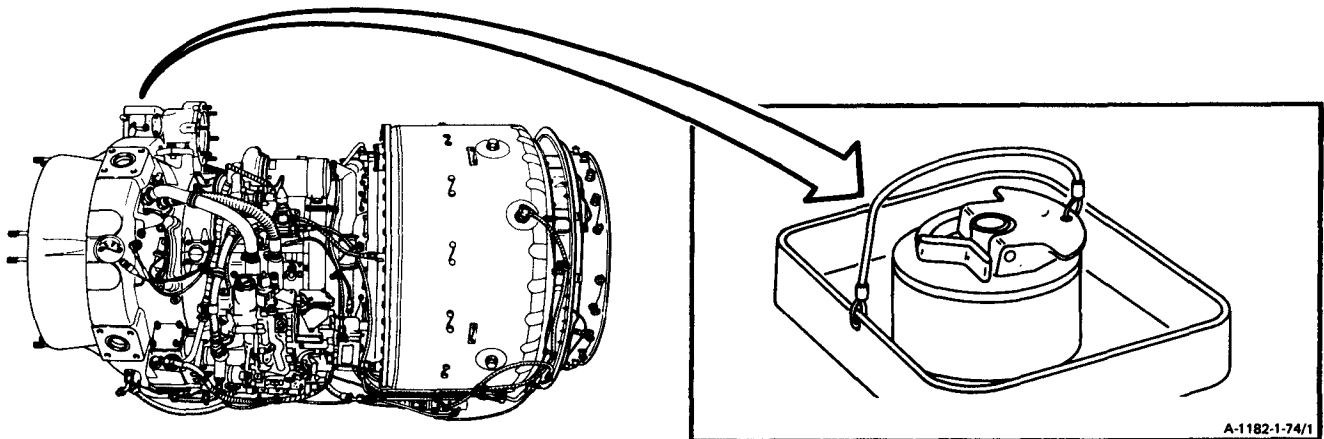
68B10 Aircraft Powerplant Repairer

References:

TM 55-1520-240-10
Task 1-76
Task 1-77
Task 1-107

General Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

**GO TO NEXT PAGE**

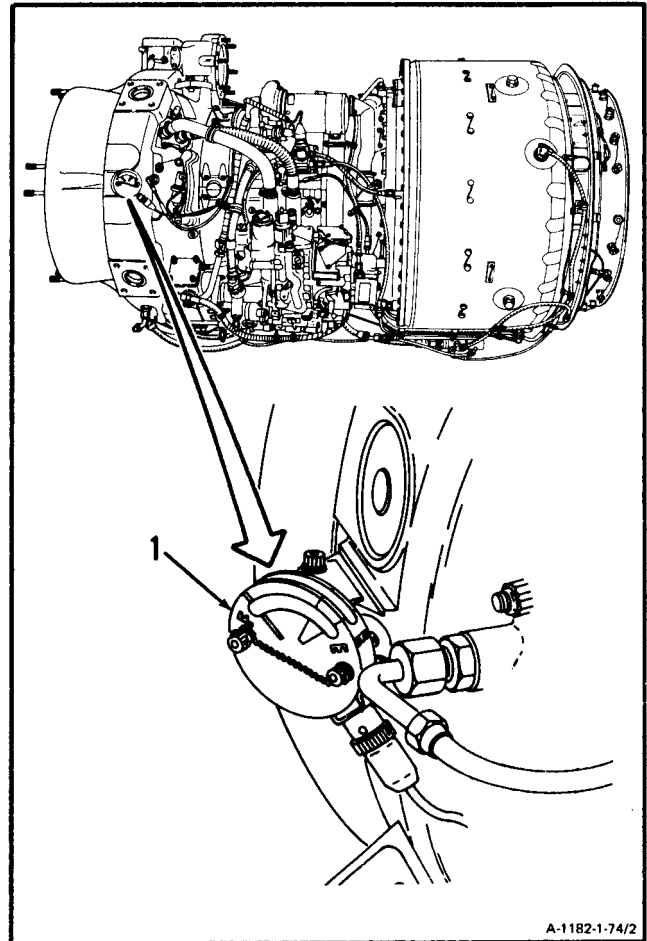
NOTE

Lubricating oil (E32) is satisfactory for engine starting down to -65° F (-54° C).
Lubricating oil (E33) is satisfactory for engine starting down to -40° F (-40° C).

NOTE

If engine has not been operated in the preceding 24 hours, run engine before checking oil level. (Ref. TM 55-1520-240-10 or Task 1-107) Otherwise an inaccurate oil level may be indicated.

1. **Check oil level on oil level indicator (1).** If oil level is full, omit following steps. If oil level is not full, proceed to following steps.



GO TO NEXT PAGE

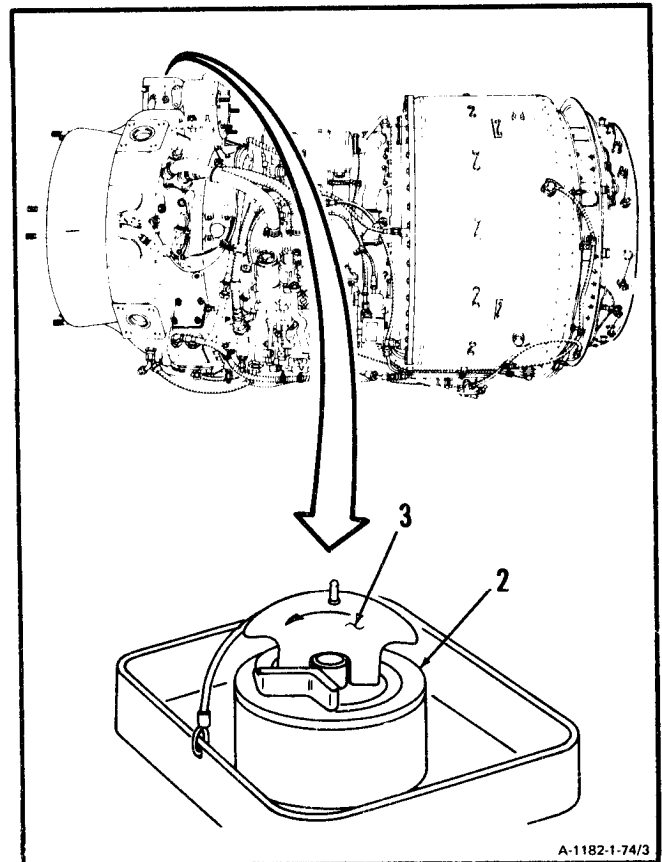
CAUTION

Intermixing of different types of lubricating oil (E32 or E33) should be avoided. Intermixing of different types of lubricating oil (E32 and E33) is not permitted except in an emergency. If intermixing of oil types becomes necessary, flush engine oil system within six hours of engine operation. (Ref. Task 1-76 or 1-77.) Use the desired type of oil (E32 or E33). There is no easily recognized difference in appearance between the two types of oil. Determine which type oil is in engine by checking service records.

CAUTION

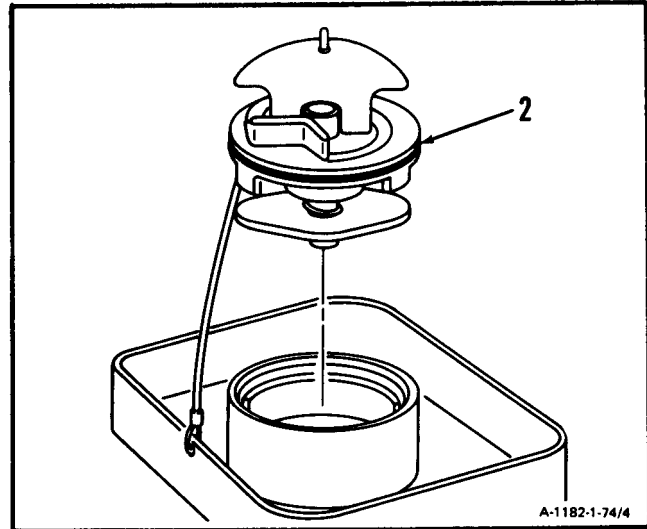
To prevent oil contamination, use unopened cans only. Synthetic lubricating oils (E32 and E33) may soften paint or stain clothing. If synthetic oil is spilled on painted surfaces, it should be cleaned off immediately.

2. Remove cap assembly (2) as follows:
 - a. Lift handle (3), and turn handle (3) counter-clockwise.

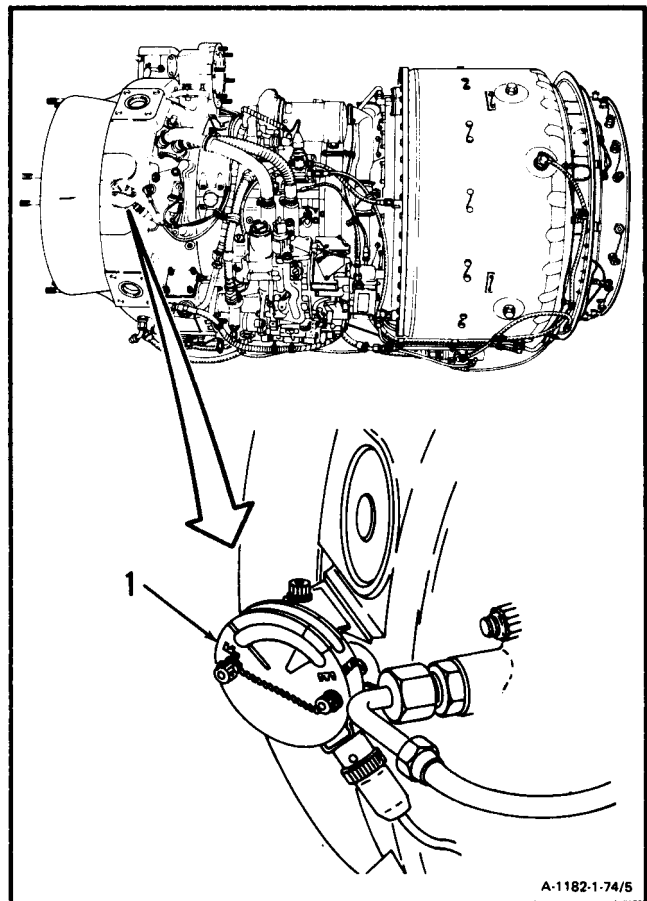


GO TO NEXT PAGE

b. Remove cap assembly (2).



3. **Fill engine oil system** with lubricating oil (E32 or E33), as applicable, until oil level indicator (1) shows full. Do not overfill.

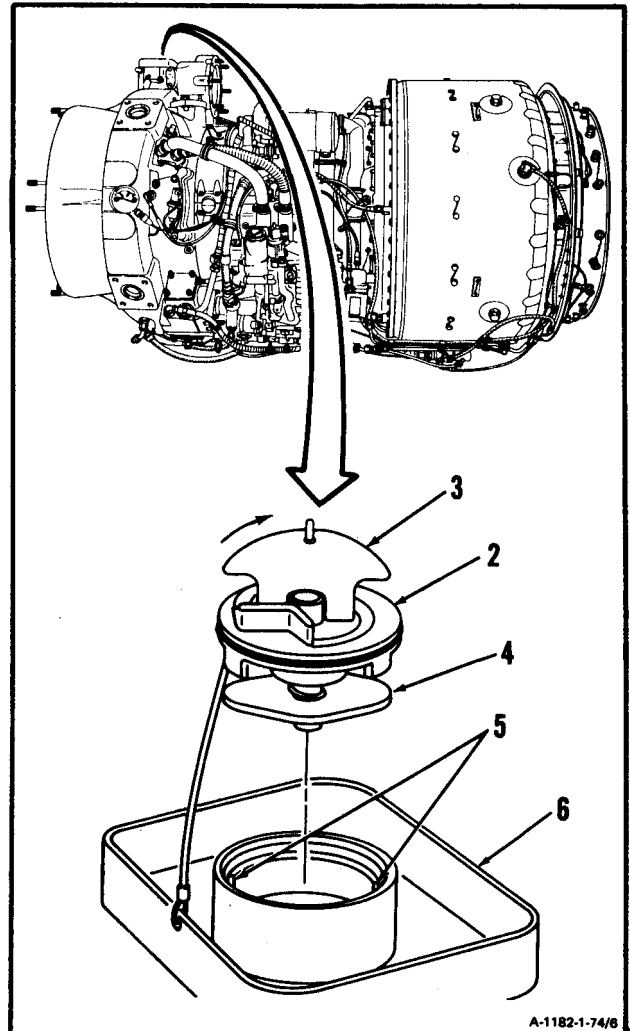


GO TO NEXT PAGE

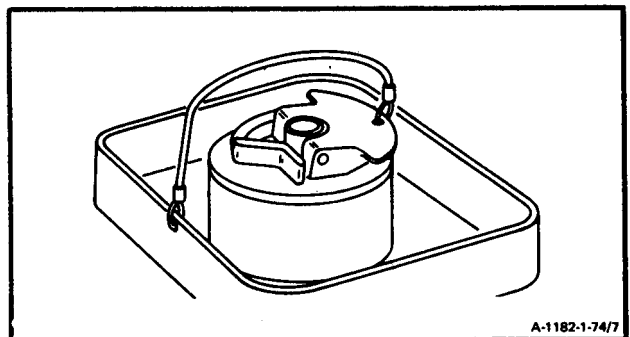
1-74 SERVICE ENGINE OIL SYSTEM (Continued)

1-74

4. Install cap assembly (2) as follows:
- Align ends of lug (4) with slots (5), and install cap assembly (2) in adapter (6).
 - Turn handle (3) clockwise and press handle (3) down.

**FOLLOW-ON MAINTENANCE:**

None

**END OF TASK**

1-75 DRAIN ENGINE OIL SYSTEM

1-75

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
- Utility Pail, 14 Quart
- Crowfoot Attachment, 7/8-Inch
- Torque Wrench, 30-150 Inch-Pounds
- Approved Metal Safety Container

Materials:

- Lockwire (E29)
- Tag (E53)
- Wiping Rag (E58)

Parts:

- Packing
- Cable Tie

Personnel Required:

- 68B10 Aircraft Powerplant Repairer
- 68B30 Aircraft Powerplant Inspector

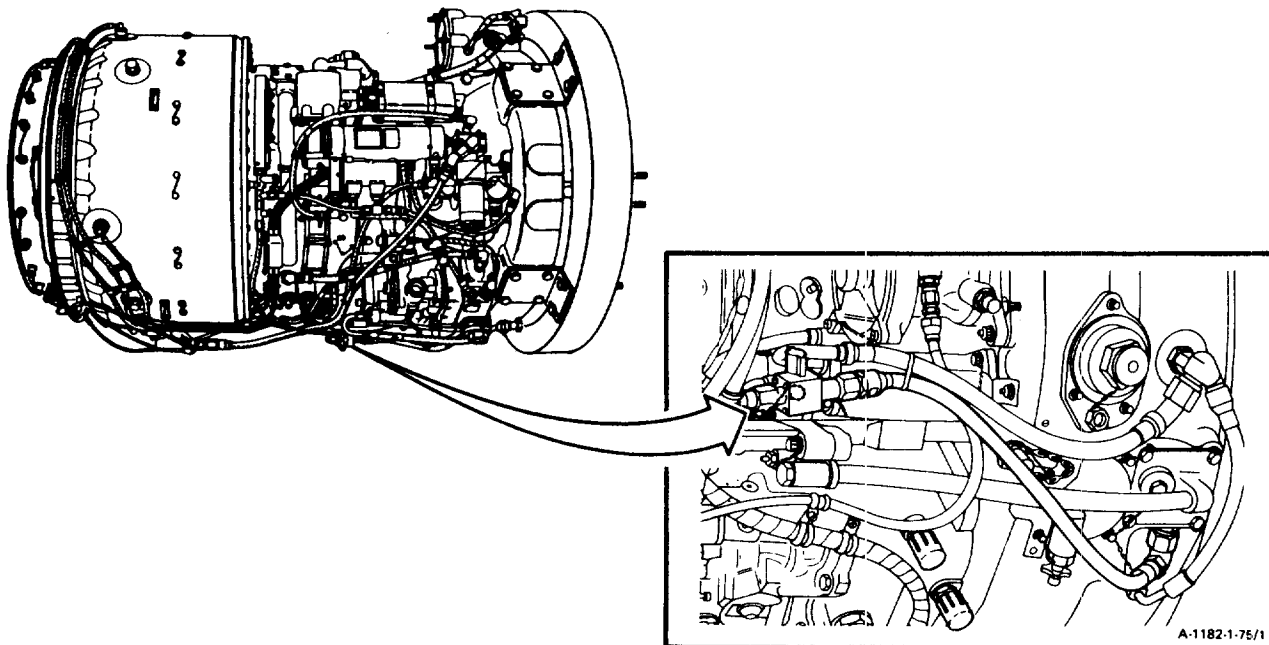
References:

- TM 55-2840-254-23P
- Task 8-23 Task 8-89
- Task 8-27 Task 8-90
- Task 8-91 Task 8-93

General Safety Instruction:

WARNING

Lubricating oils, (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



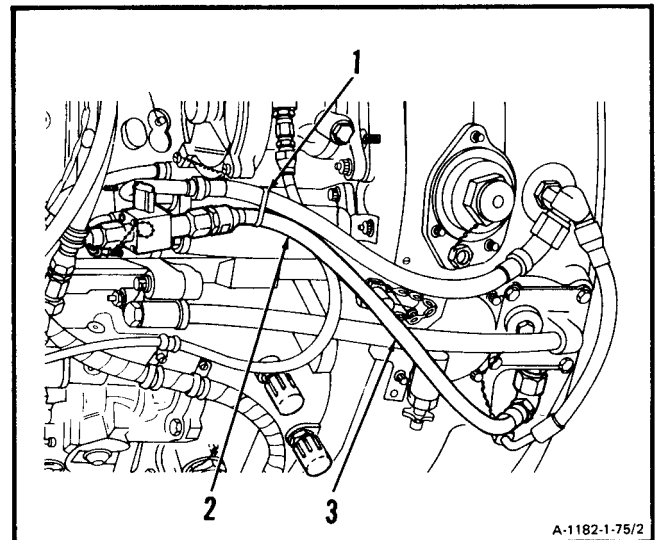
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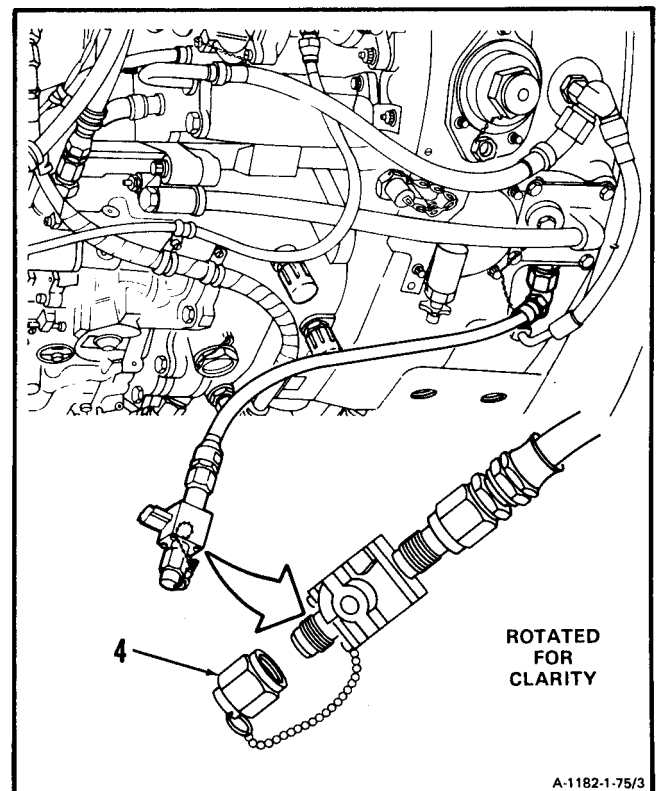
1-75 DRAIN ENGINE OIL SYSTEM (Continued)

1-75

1. Remove cable tie (1) and lower free end (2) of hose assembly (3).

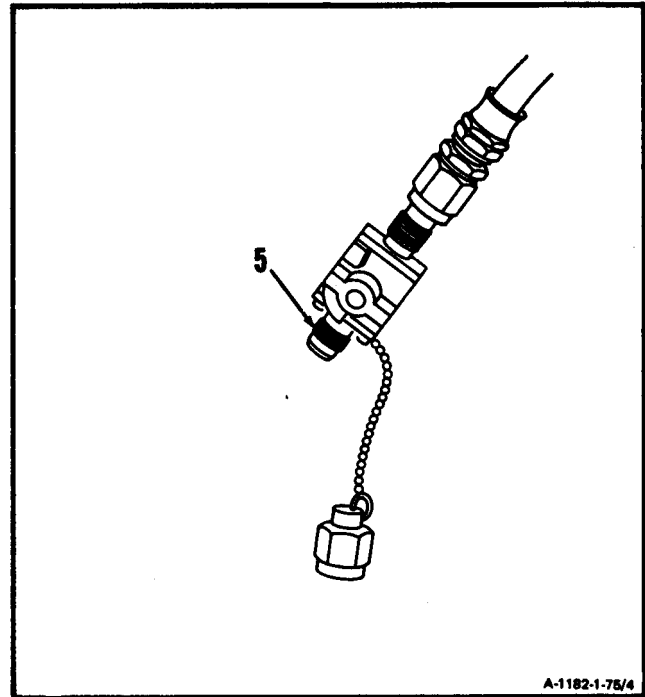


2. Remove cap (4).

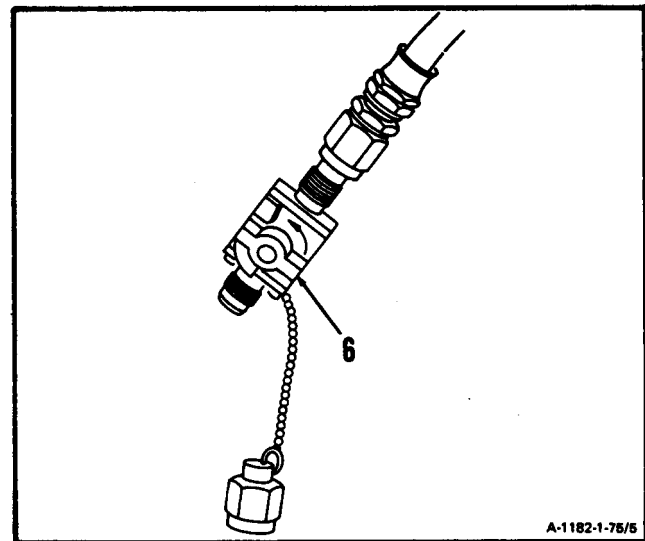


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3. Insert drain cock fitting (5) into suitable approved metal safety container.



4. Turn oil drain cock valve (6) 1/4 turn counter-clockwise to OPEN position.

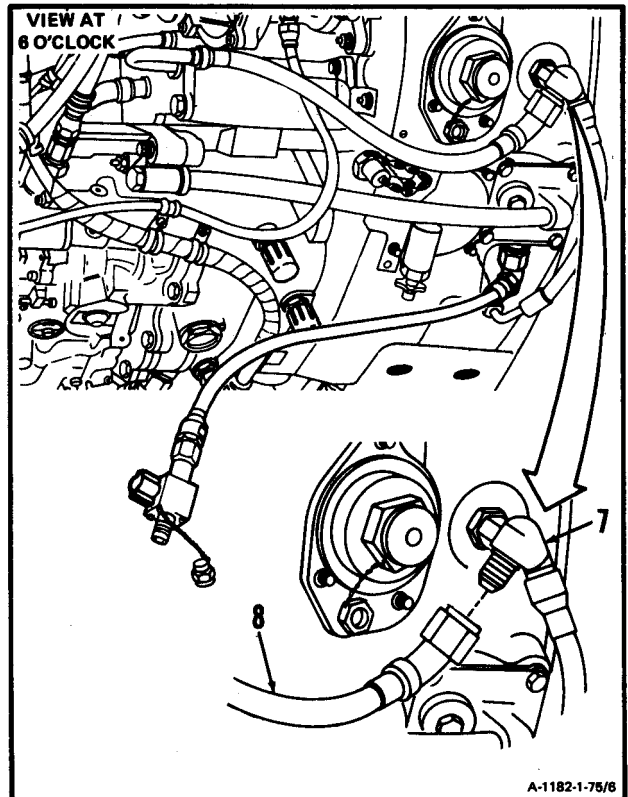


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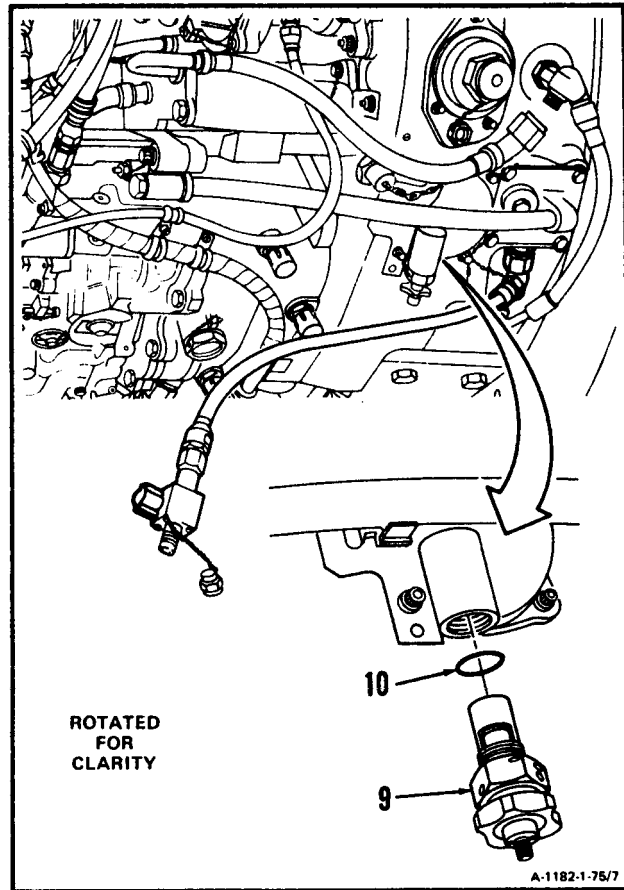
1-75 DRAIN ENGINE OIL SYSTEM (Continued)

1-75

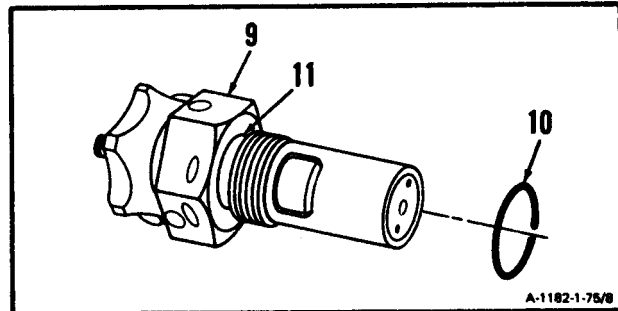
5. Position utility pail under inlet housing oil scavenge tee (7).
6. **Disconnect hose assembly (8)** at inlet housing oil scavenge tee (7).
7. Allow oil to drain from system.

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8. Remove lockwire, chip detector (9) and packing (10).
9. Disassemble chip detector (Task 8-89).
10. Clean chip detector (Task 8-90).
11. Inspect chip detector (Task 8-91).
12. Assemble chip detector (Task 8-93).
- 12.1. Replace engine oil filter element: (Task 8-23 and 8-27)
- 12.2. If oil contamination is suspect: (Refer to Task 1-86)



13. Install packing (10) in groove (11) on chip detector (9).

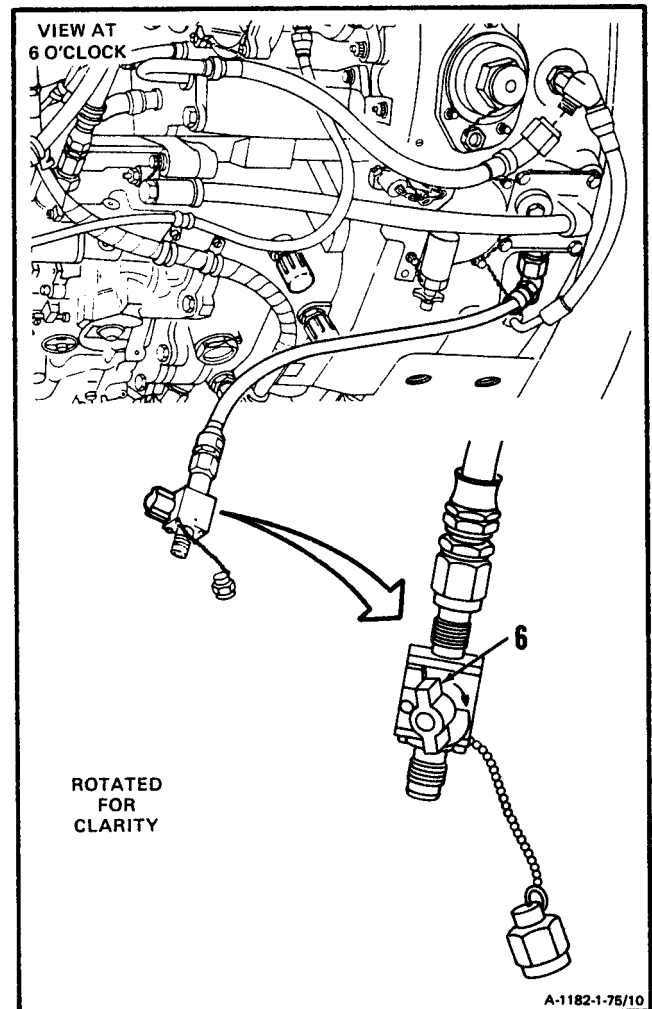
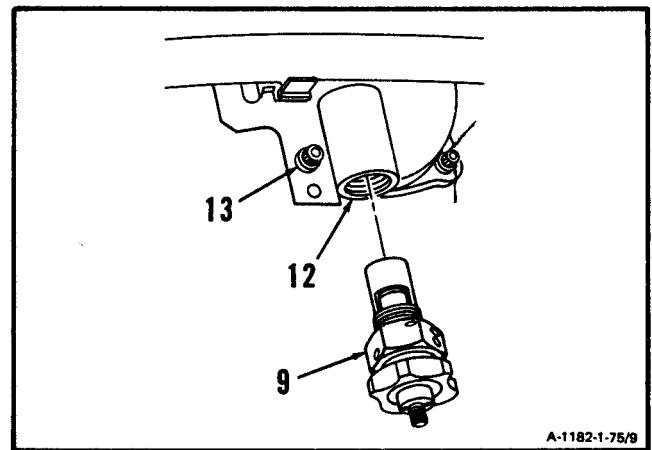


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1-75 DRAIN ENGINE OIL SYSTEM (Continued)

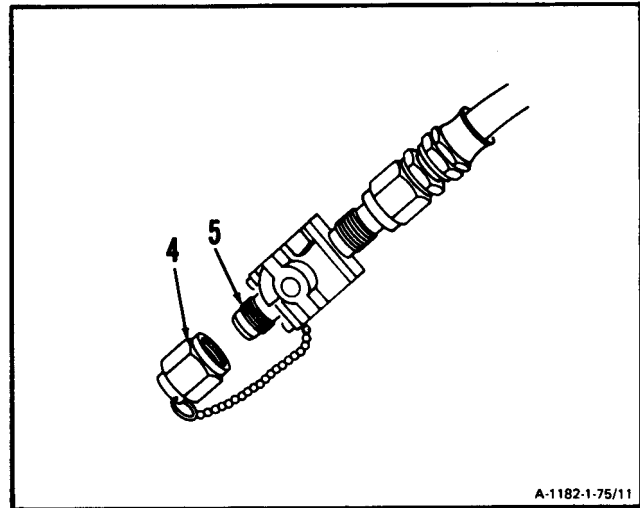
1-75

14. Install chip detector (9) in housing (12).
Torque to **95 inch-rounds**. Use crowfoot attachment.
15. Lockwire chip detector (9) to bolt (13). Use lockwire (E29).
16. Turn oil drain cock valve (6) $\frac{1}{4}$ turn clockwise to **CLOSED** position.

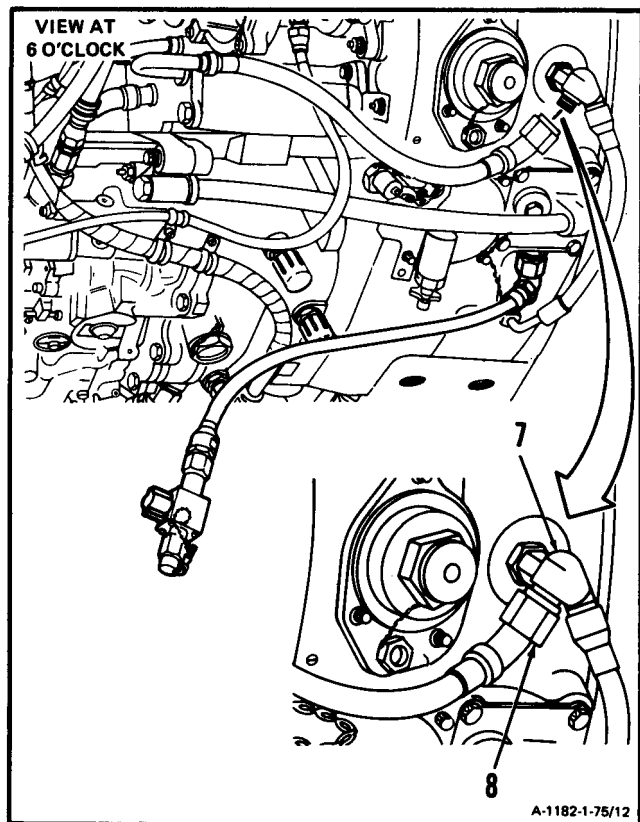


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17. Install cap (4) on oil drain cock fitting (5).



18. Connect hose assembly (8) to inlet housing oil scavenge tee (7).



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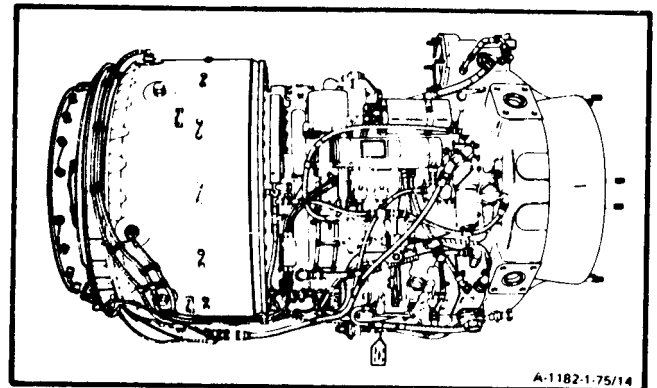
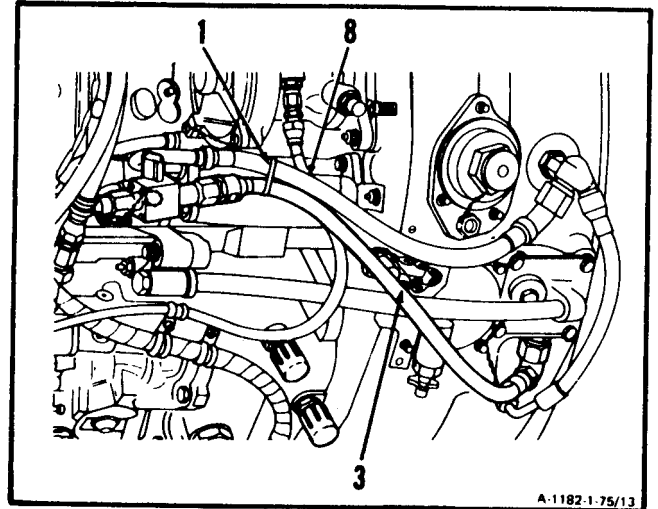
1-75 DRAIN ENGINE OIL SYSTEM (Continued)

1-75

19. Position hose assembly (3) along side of hose assembly (8) and **install cable tie (1)**.
20. **Tag engine** to indicate ENGINE OIL SYSTEM DRAINED. Use tag (E53).

INSPECT**FOLLOW-ON MAINTENANCE:**

None

**END OF TASK**

INITIAL SET-UP

Applicable Configurations:

All

Tools:

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

Materials:

Lubricating Oil (E33)
Marking Pencil (E34)
Wiping Rag (E58)

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-1520-240-10		
Task 1-74	Task 8-3	Task 8-73
Task 1-75	Task 8-18	Task 8-74
Task 1-107	Task 8-19	Task 8-77
Task 5-19	Task 8-23	Task 8-78
Task 5-20	Task 8-25	Task 8-81
Task 8-2	Task 8-27	Task 8-82

General Safety Instructions:

WARNING

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

CAUTION

Intermixing of oils of different brands should be avoided if possible. Intermixing of oils of different types (E32 or E33) may cause coking in the oil system and is not recommended except in an emergency. If intermixing of oil types becomes necessary, the oil system must be flushed as soon as possible, using the desired type of oil. When oils approved by Textron Lycoming are not available and other oils must be substituted, consult with:

Textron Lycoming
Product Support Department
550 Main Street
Stratford, Connecticut 06497
Attention: Manager, T55
Customer Service

1. **Drain lubricating oil (E32)** from engine oil system (Ref. Task 1-75).
2. **Inspect and clean oil filters and strainers** (Ref. Tasks 5-19, 5-20, 8-2, 8-3, 8-18, 8-19, 8-25, 8-73, 8-74, 8-77, 8-78, 8-81, and 8-82). **Replace oil filter element** (Ref. Tasks 8-23 and 8-27).

GO TO NEXT PAGE

1-76 CHANGE FROM MIL-L-7808 TO MIL-L-23699 LUBRICATING OIL (Continued)

1-76

3. **Service engine oil system** with lubricating oil (E33) (Ref. Task 1-74).
4. **Operate engine** for 30 minutes to 1 hour after engine reaches operating temperature (Ref. TM 55-1520-240-10 or Task 1-107). This will dislodge carbon and lacquer deposits.
5. **Shut down engine** (Ref. TM 55-1520 - 240-10 or Task 1-107).
6. **Inspect main oil filter element.** (Ref. Task 8-25). If contamination of oil filter element is noted, drain oil from engine (Ref. Task 1-75). Repeat steps 2 through 6. If little or no contamination of oil filter is noted, drain oil from engine (Ref. Task 1-75) and proceed with steps 7. and 8.
7. **Service engine oil system** with new lubricating oil (E33) (Ref. Task 1-74).
8. Using marking Pencil (E34), mark engine to indicate type of oil used. **Release engine** for service and return to normal inspection intervals.

INSPECT

9. Deleted.
10. Deleted.
11. Deleted.

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-77 CHANGE FROM MIL-L-23699 TO MIL-L-7808 LUBRICATING OIL

1-77

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:

Lubricating Oil (E32)
Marking Pencil (E34)
Wiping Rag (E58)

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-1520-240-10
Task 1-74
Task 1-75
Task 1-107
Task 5-19
Task 5-20
Task 8-2
Task 8-3
Task 8-18
Task 8-19
Task 8-23
Task 8-24
Task 8-25
Task 8-27
Task 8-73
Task 8-74
Task 8-77
Task 8-78
Task 8-81
Task 8-82

General Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

CAUTION

Intermixing of oils of different brands should be avoided if possible. Intermixing of oils of different types (E32 or E33) may cause coking in the oil system and is not recommended except in an emergency. If intermixing of oil types becomes necessary, the oil system must be flushed as soon as possible, using the desired type of oil.

When oils approved by Textron Lycoming are not available and other oils must be substituted, consult with:

Textron Lycoming
Product Support Department
550 Main Street
Stratford, Connecticut 06497
Attention: Manager, T55
Customer Service

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1. **Drain lubricating oil (E33)** from engine oil system (Ref. Task 1-75).
2. **Inspect and clean oil filters and strainers** (Ref. Tasks 5-19, 5-20, 8-2, 8-3, 8-18, 8-19, 8-25, 8-73, 8-74, 8-77, 8-78, 8-81, and 8-82), **Replace oil filter element** (Ref. Tasks 8-23 and 8-27).
3. **Service engine oil system** with lubricating oil (E32) (Ref. Task 1-74).
4. **Operate engine** until oil reaches operating temperature (Ref. TM 55-1520-240-10 or Task 1-107).
5. **Shut down engine** (Ref. TM 55-1520-240-10 or Task 1-107).
6. **Inspect and clean main oil filter element** (Ref. Tasks 8-24 and 8-25).
7. Using marking pencil (E34), mark engine to indicate type of oil used. **Release engine** for service use and return to normal inspection intervals.

INSPECT

8. Deleted.
9. Deleted.
10. Deleted.

FOLLOW-ON MAINTENANCE:

None

END OF TASK

Section IX. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

1-78 SPECIAL INSPECTIONS

This section supplements the scheduled inspections as outlined in applicable aircraft inspection checklists. It includes inspection of items which are required to be inspected because of specific conditions or incidents that may happen. These have nothing to do with airframe operating time or inspection intervals. It is divided into the following tasks:

LIST OF TASKS

NUMBER	TASK	PAGE
1-79	Inspect Engine After N1 Overspeed (AVIM)	1-241
1-80	Inspect Engine After N2 Overspeed (AVIM)	1-243
1-81	Check Engine Coastdown Time	1-245
1-82	Inspect Engine Subjected to Excessive G-Loads	1-247
1-83	Inspect Dropped Engine	1-249
1-84	Inspect Engine After Power Turbine Overtorque (AVIM)	1-253
1-85	Inspect Contaminated Fuel System	1-255
1-85.1	Inspect Engine Serviceability	1-262.1
1-86	Inspect Contaminated Oil System	1-264
1-87	Check for Seal Leakage (No. 2 Bearing Package) (AVIM)	1-273
1-88	Check for Seal Leakage (No. 4 and 5 Bearing) (AVIM)	1-283
1-89	Check for Static Oil Leakage	1-300
1-90	Inspect Engine After Compressor Stall (Surge)	1-306
1-91	Inspect Engine After Check Runs	1-308
1-92	Inspect Engine After Foreign Object Ingestion	1-309
1-93	Inspect Engine Hot End (AVIM)	1-313

1-79 INSPECT ENGINE AFTER N1 OVERSPEED (AVIM)

1-79

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:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-1520-240-10		
Para. 1-32	Task 2-23	Task 8-23
Task 1-86	Task 2-24	Task 8-27
Task 1-93	Task 2-25	Task 8-28
Task 1-107	Task 2-28	Task 8-35
Task 2-19	Task 2-29	Task 8-88
Task 2-20	Task 2-33	Task 8-94
Task 2-22	Task 2-34	

NOTE

An engine overspeed exists under the conditions described in Operating Instructions, TM 55-1520-240-10 or Engine Test (Ref. Task 1-107).

1. If N1 overspeed limits are exceeded, proceed as follows:
 - a. **Remove oil filter cap and stem assembly and oil filter element** (Ref. Task 8-23). Check for metal chips or other foreign material.
 - b. **Install oil filter element, and install oil filter cap and stem assembly.** (Ref. Task 8-27).
 - c. **Remove chip detector** (Ref. Task 8-88), and check for metal chips.
 - d. **Install chip detector** (Ref. Task 8-94).
 - e. **Remove dual chip detector** (Ref. Task 8-28), and check for metal chips.
 - f. **Install dual chip detector** (Ref. Task 8-35).
 - g. **If chips are found in oil filter, chip detector, or dual chip detector, inspect contaminated oil system** (Ref. Task 1 -86).
 - h. **Inspect engine hot end** (Ref. Task 1 -93).

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WARNING

Turn compressor rotor very slowly. Do not keep fingers between compressor rotor blades once rotation of rotor is attained. Failure to comply could result in injury, If injury occurs get medical attention.

- i. **Check compressor rotor by slowly turning rotor**, through inlet housing and listening for rubbing sounds. If rubbing sounds are heard, proceed as follows:
 - (1) **Remove compressor housing** (Ref. Task 2-19 or 2-20).
 - (2) **Inspect compressor housing** (Ref. Task 2-22). If necessary repair compressor housing (Ref. Task 2-23).
 - (3) **Inspect compressor rotor blades** (Ref. Task 2-33). If necessary, repair compressor rotor blades (Ref. Task 2-34).
 - (a) **Inspect stator vane assemblies** (Ref. Task 2-28). If necessary, repair stator vane assemblies (Ref. Task 2-29).
 - (4) **Install compressor housing** (Ref. Task 2-24 or 2-25).
- j. **Determine and correct cause of Overspeed** (Ref. Task 1-32).
- k. **Perform initial check run** (Ref. TM 55-1520-240-10 or Task 1-107). If no discrepancies are noted, engine is serviceable.

INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-80 INSPECT ENGINE AFTER N2 OVERSPEED (AVIM)

1-80

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:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-1520-240-10
Task 1-32 Task 8-23
Task 1-86 Task 8-27
Task 1-93 Task 8-28
Task 1-107 Task 8-35
Task 4-36 Task 8-88
Task 4-78 Task 8-94
Task 4-82

NOTE

An engine overspeed exists under the conditions described in Operating Instructions, TM 55-1520-240-10 or Engine Test (Ref. Task 1-107).

1. If N2 overspeed limits are exceeded, proceed as follows:
 - a. **Remove oil filter cap and stem assembly and oil filter element** (Ref. Task 8-23). Check for metal chips or other foreign material.
 - b. **Install oil filter element and oil filter cap and stem assembly** (Ref. Task 8-27).
 - c. **Remove chip detector** (Ref. Task 8-88), and check for metal chips.
 - d. **Install chip detector** (Ref. Task 8-94).
 - e. **Remove dual chip detectors** (Ref. Task 8-28), and check for metal chips.
 - f. **Install dual chip detectors** (Ref. Task 8-35).
 - g. **If chips are found in oil filter, chip detector, or dual chip detector, inspect contaminated oil system** (Ref. Task 1-86).

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- h. **Remove exit vane assembly** (Ref. Task 4-78).
- (1) **Visually inspect fourth stage power turbine rotor for damaged or missing blades.**
 - (2) **Perform tip clearance check on fourth stage power turbine rotor blades** (Ref. Task 4-36, step 17).
 - (3) If discrepancies are not noted in preceding steps h. (1) and h. (2), install exit vane assembly (Ref. Task 4-82) and go to step j.
- i. **If discrepancies are noted** in preceding step h., **inspect engine hot end** (Ref. Task 1-93).
- j. **Determine and correct cause of Overspeed** (Ref. Task 1-32).
- k. **Perform initial check run** (Ref. TM 55-1520-240-10 or Task 1-107). If no discrepancies are noted, engine is serviceable.

INSPECT**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

1-81 CHECK ENGINE COASTDOWN TIME

1-81**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
Stop Watch
NSN 6645-00-250-4680

Materials:

None

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-1520-240-10
Task 1-32 Task 8-28
Task 1-86 Task 8-35
Task 1-107 Task 8-88
Task 8-23 Task 8-90
Task 8-27 Task 8-94

1. **Operate engine** long enough to ensure that all engine parts have reached normal operating temperatures (Ref. TM 55-1520-240-10 or Task 1-107).
2. **Move engine power lever (N1)** to GRD IDLE (Ref. TM 55-1520-240-10 or Task 1-107). Run engine for a minimum of 2 minutes to stabilize engine rpm and temperature.

NOTE

Coastdown time normally exceeds &
seconds.

3. **Shut down engine (Ref. TM 55-1520-240-10 or Task 1-107)**, and **check the elapsed time** of coastdown.
4. If coastdown time is less than 25 seconds, proceed as follows:

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1-81 CHECK ENGINE COASTDOWN TIME (Continued)

1-81

- a. **Remove chip detector** (Ref. Task 8-88) and check for metal chips.
- b. **Install chip detector** (Ref. Task 8-94).
- c. **Remove dual chip detectors** (Ref. Task 8-28) and **check for metal chips**.
- d. **Install dual chip detectors** (Ref. Task 8-35).
- e. **Remove oil filter cap and stem assembly and oil filter element** (Ref. Task 8-23). **Check for metal chips**.
- f. **Install oil filter element and oil filter cap and stem assembly** (Ref. Task 8-27).
- g. **If metal chips are found in oil filter, chip detector or dual chip detector, inspect contaminated oil system** (Ref. Task 1-86).
- h. **Determine and correct cause of abnormal engine coastdown time** (Ref. Task 1-32).
- i. **Perform initial check run** (Ref. TM 55-1520-240-10 or Task 1-107). If no discrepancies are noted, engine is serviceable.

INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-82 INSPECT ENGINE SUBJECTED TO EXCESSIVE G-LOADS

1-82

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:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

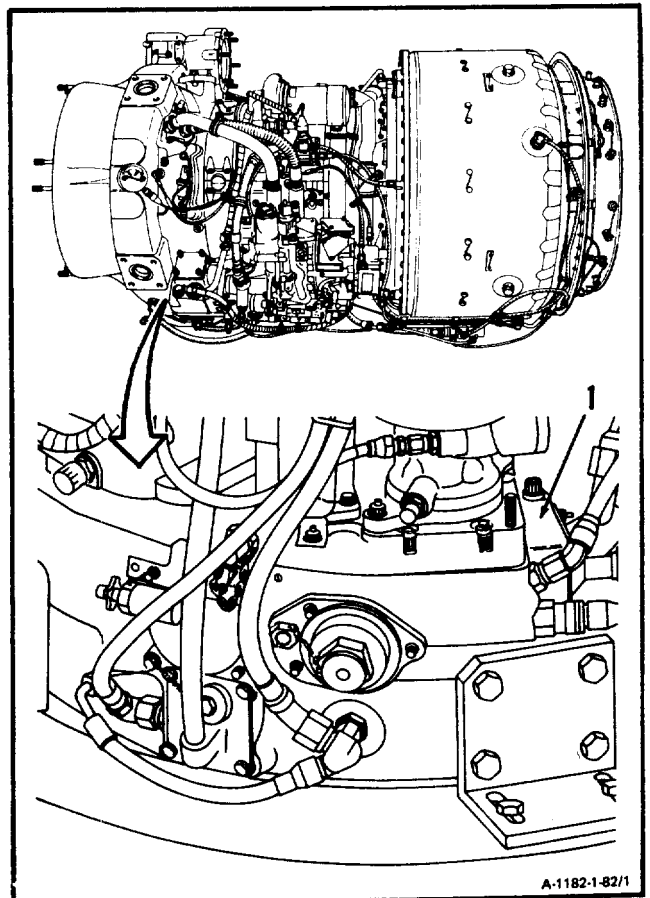
TM 55-1520-240-10
Task 1-86
Task 1-100
Task 8-23
Task 8-27

1. If it is suspected that excessive G-loads have been imposed on engine, proceed as follows:

NOTE

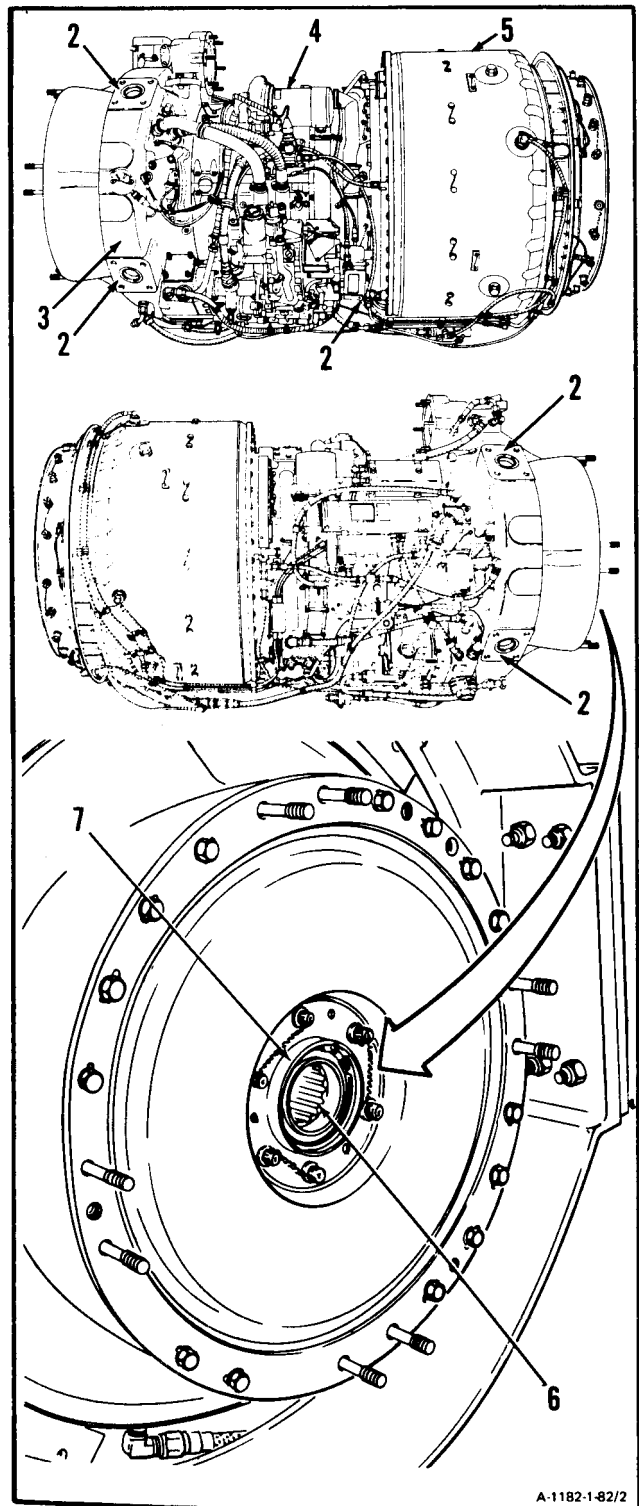
G-load limits are defined in Operating Instructions TM 55-1520-240-10. The following inspections shall be made immediately after the flight during which the excessive G-loads occurred.

- a. Check accessory drive gearbox (1). There shall be no cracked flanges.



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- b. **Check engine mounting pads (2).** There shall be no cracks or damage.
 - c. **Check air, oil, and fuel hose connections.** There shall be no looseness.
 - d. **Check all engine mounted accessories.** There shall be no loose bolts, nuts, connections, or cracked flanges.
 - e. **Check inlet housing (3), compressor housing (4), and combustor housing (5).** There shall be no cracks or loose bolts.
 - f. **Remove oil filter cap and stem assembly and oil filter element (Ref. Task 8-23).** Check oil filter element. There shall be no chips, lint or other foreign material.
 - g. **Install oil filter element, and oil filter cap and stem assembly (Ref. Task 8-27).**
 - h. **Service scavenge oil screen (Ref. Task 1-100).**
 - i. **Inspect contaminated oil system (Ref. Task 1-86).**
 - j. **Check power output shaft splines (6) for damaged splines.** There shall be no chips in splines (6).
 - k. **Check output shaft seal and seal housing (7) for oil leaks.** There shall be no leaks.
2. **If engine is found unsatisfactory, for further operation, repair or replace components as required.**



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-83 INSPECT DROPPED ENGINE

1-83

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:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

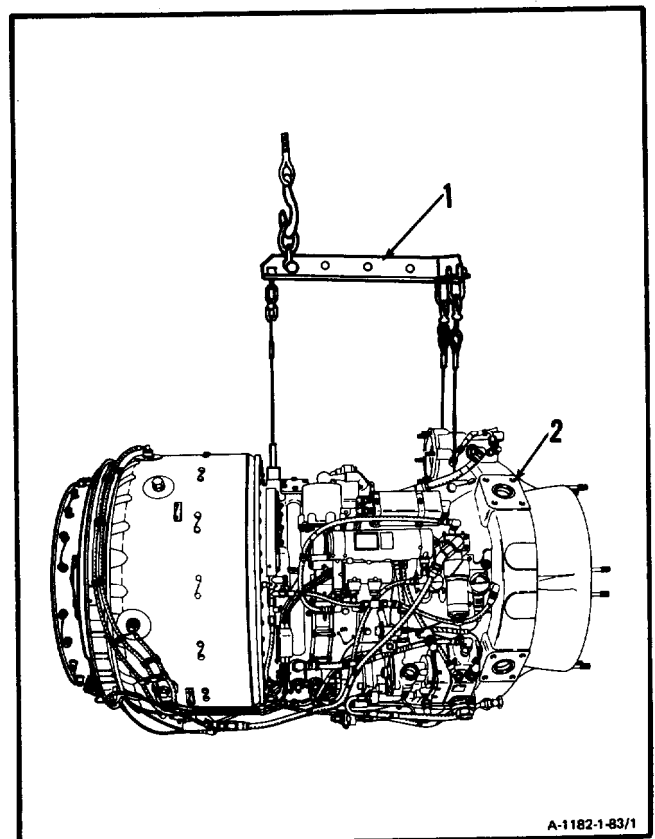
References:

TM 55-1520-240-MTF
Task 1-28 Task 1-97
Task 1-30 Task 1-98
Task 1-81 Task 1-99
Task 1-86 Task 1-101
Task 1-95 Task 1-107

NOTE

A dropped engine condition exists when an engine has been dropped during handling. This condition may have occurred when engine was inside shipping container or it may have occurred when engine was being handled during routine maintenance.

1. If an engine has been dropped during handling, proceed as follows:
 - a. Install engine maintenance sling (1) (Ref. Task 1-30).
 - b. Inspect four engine mounting pads (2). There shall be no cracks.
 - c. Install engine on maintenance stand (Ref. Task 1-28).

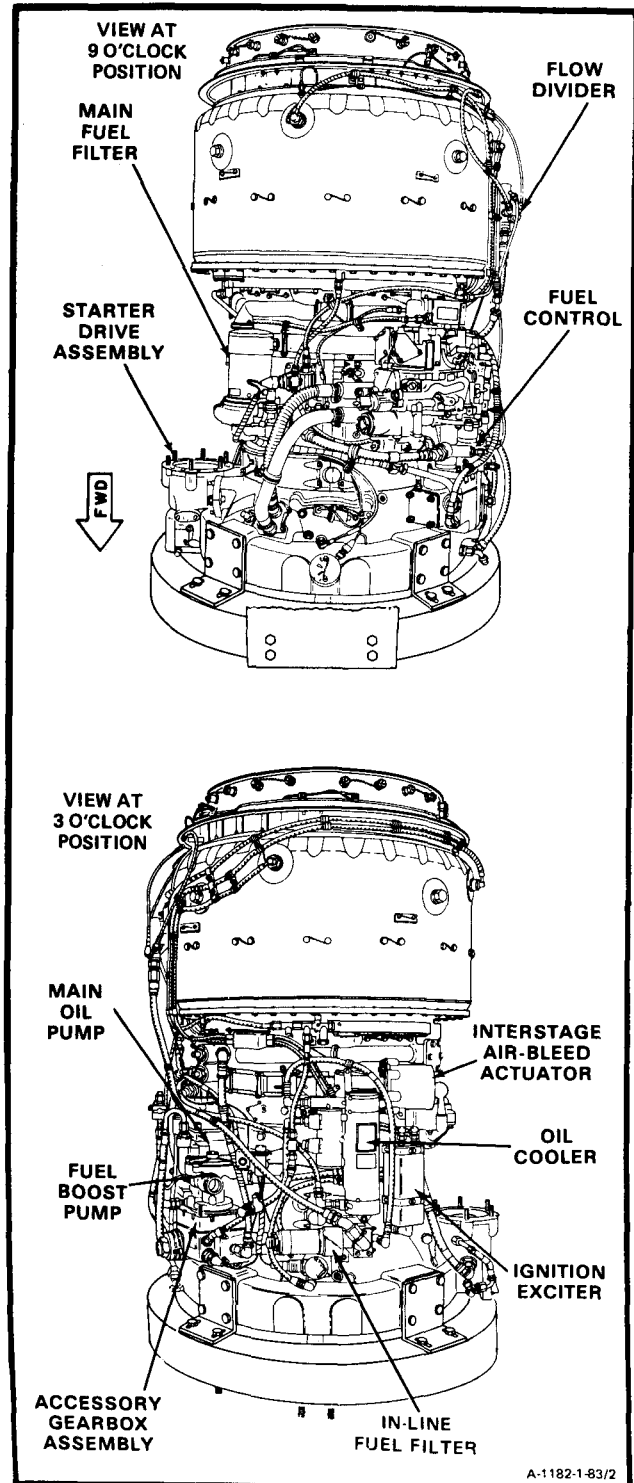


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d. Inspect all engine accessories as follows:

- (1) There shall be no cracked mount flanges.
- (2) There shall be no loose bolts and nuts.
- (3) There shall be no loose connections.

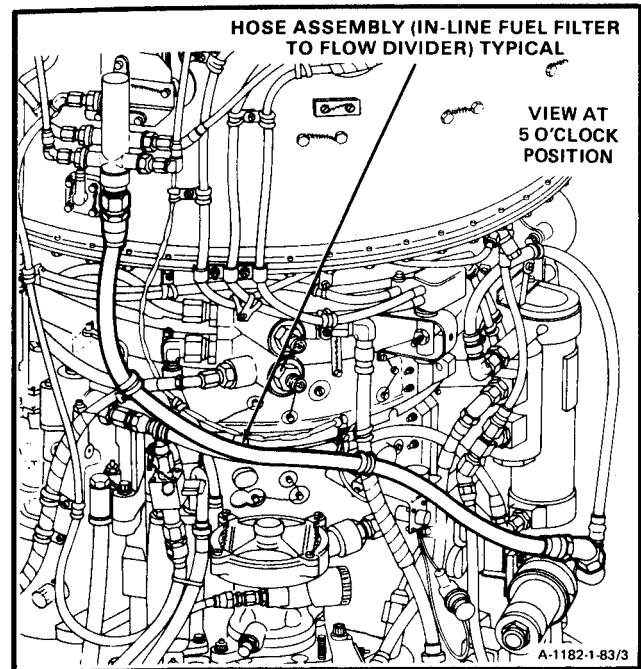


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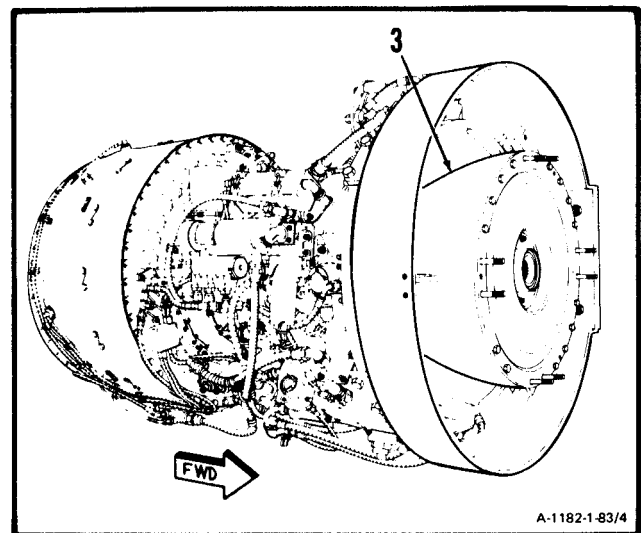
1-83 INSPECT DROPPED ENGINE (Continued)

1-83

- e. **Inspect all hose and tube assemblies.** There shall be no bends, kinks or loose connections,
- f. **Rotate engine to horizontal position.**



- g. **Inspect inlet housing assembly (3)** as follows:
- (1) There shall be no cracks.
 - (2) There shall be no loose bolts.
- h. **Rotate engine to vertical position.**



GO TO NEXT PAGE

i. **Inspect combustion chamber housing (4)** as follows:

- (1) There shall be no cracks.
- (2) There shall be no loose bolts.

j. **If damage is evident** on items called out in steps b., d., e., g., and i., **replace engine.**

k. **If no damage is apparent, proceed as follows:**

NOTE

Minimum test time is 30 minutes. Vibration levels must be within established limits. If no discrepancies are noted, engine is considered serviceable.

(1) **perform complete engine operational check run.** Include vibration and coast-down checks (Ref. Task 1-81 and 1-107 or Ref. TM 55-1520-240-MTF).

(2) Perform the following:

Service starter gearbox filter (Ref. Task 1-95).

Service No. 2 bearing pressure oil filter (Ref. Task 1-97).

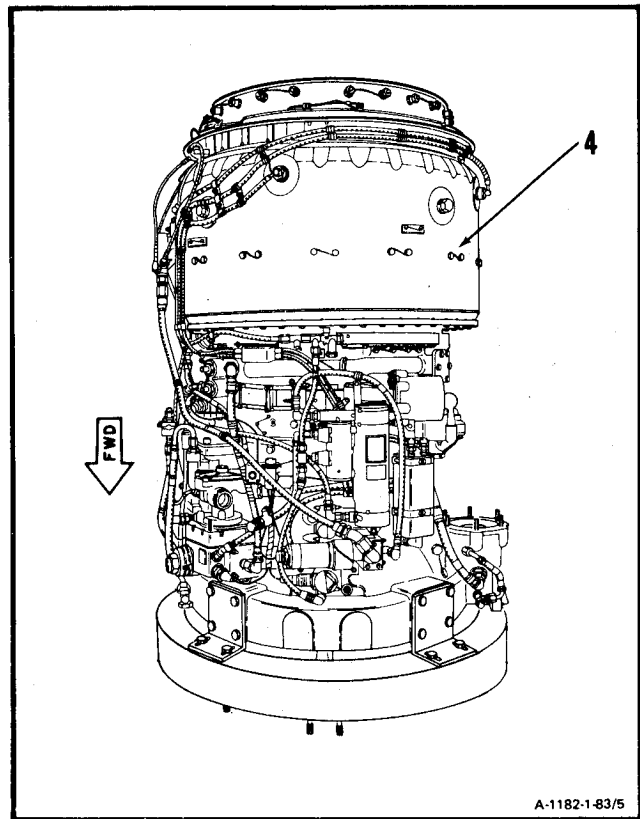
Service No. 4 and 5 bearing oil filter (Ref. Task 1-98).

Service oil filter cap and stem assembly and oil filter element (Ref. Task 1-99).

Service fuel control filters and strainers (Ref. Task 1-101).

Service chip detector (Ref. Task 1-86, step 13).

Service dual chip detectors (Ref. Task 1-86, step 14).



A-1182-1-83/5

INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-84 INSPECT ENGINE AFTER POWER TURBINE OVERTORQUE (AVIM)

1-84

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:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-1520-240-10
Task 1-86 Task 3-7
Task 1-107 Task 3-8
Task 3-5 Task 9-6
Task 3-6 Task 9-10

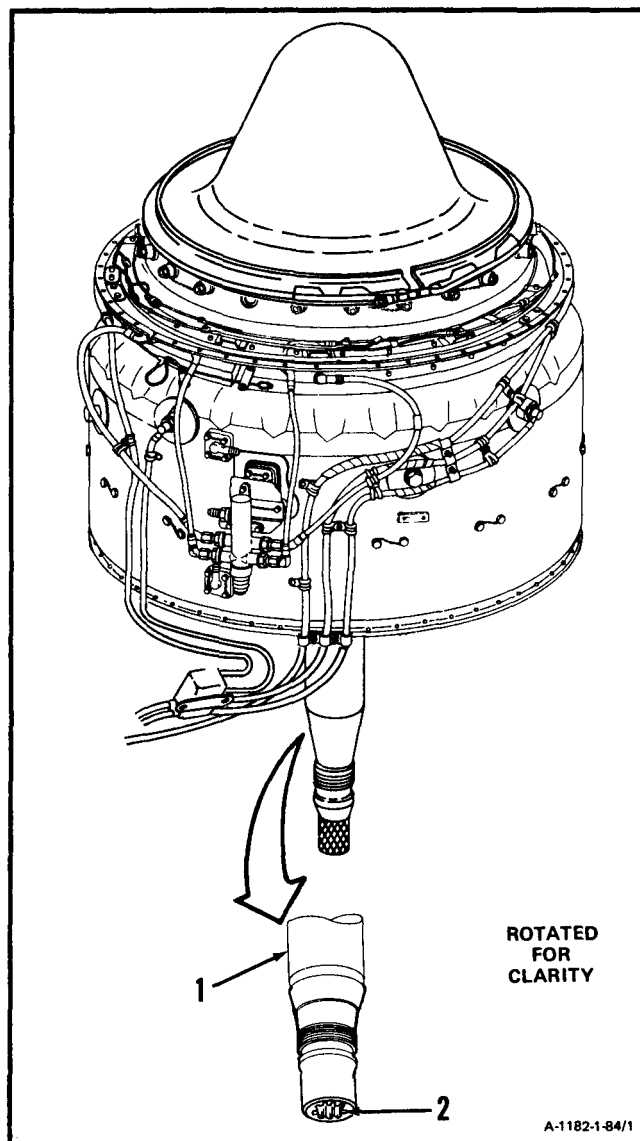
NOTE

An overtorque condition exists when torque exceeds the limits specified in operating instructions (Ref. TM 55-1520-240-10) or engine test (Ref. Task 1-107).

1. When an engine has exceeded the torque limits specified in operating instructions (Ref. TM 55-1520-240-10) or engine test (Ref. Task 1-107), proceed as follows:
 - a. **Inspect contaminated oil system** (Ref. Task 1-86).

GO TO NEXT PAGE

- b. **Remove combustion section and power turbine** (Ref. Task 3-5). **Inspect shaft (1)** for cracks, and evidence of damage in spline area (2). **Replace power turbine assembly** (Ref. Tasks 3-6 and 3-7) if shaft is damaged. **Install combustion section and power turbine** (Ref. Task 3-8).
- c. **Remove output shaft** (Ref. Task 9-6), and **inspect for cracks and for evidence of twist**. **Replace output shaft** (Ref. Task 9-10) if damaged.
- d. **Perform engine test** (Ref. TM 55-1520-240-10 or Task 1-107), and **repeat step a**. If no metal or foreign material is found, release engine for normal operation.

INSPECT**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

1-85 INSPECT CONTAMINATED FUEL SYSTEM

1-85

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
Strap Wrench

Materials:

Lockwire (E29)
Wiping Rag (E58)

Parts:

Packings
Filter Elements

Personnel Required:

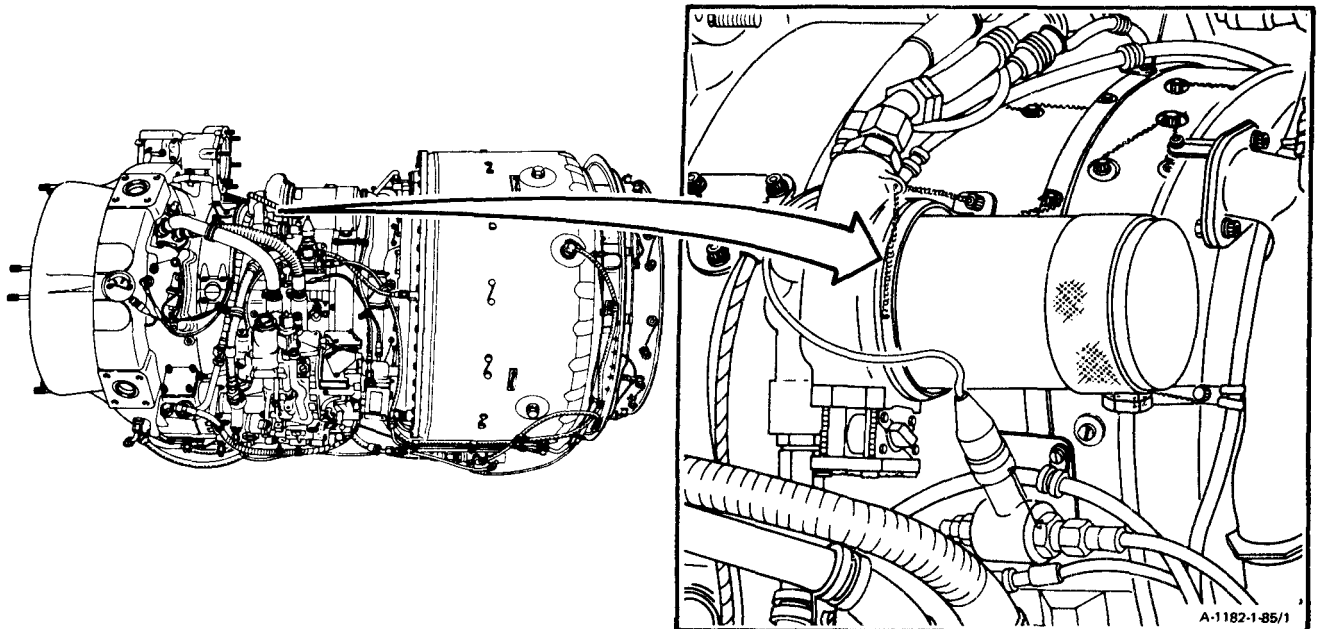
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector
68B30 Aircraft Powerplant Supervisor

References:

TM 55-1520-240-T
TM 55-2840-254-23P
TM 55-4920-328-13
TM 55-1520-240-10
TM 55-1520-240-23
Task 1-101
Task 1-107

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.

**GO TO NEXT PAGE**

1-85 INSPECT CONTAMINATED FUEL SYSTEM (Continued)

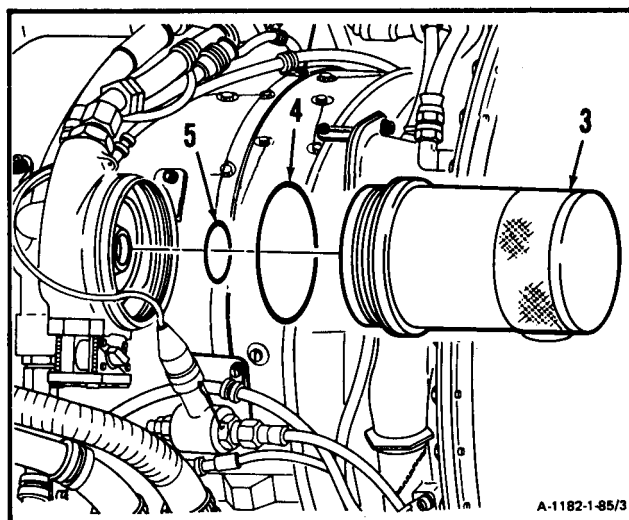
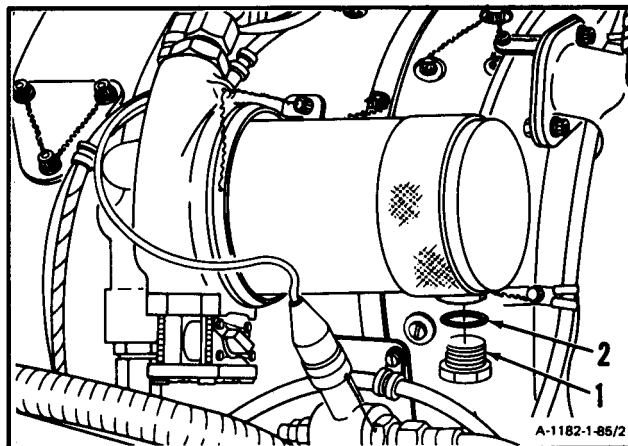
1-85

NOTE

A contaminated fuel system exists when main fuel filter, fuel control filter, or in-line fuel filter becomes clogged. Contamination will cause impending by-pass indicators on the main and/or in-line fuel filters to pop out.

1. Inspect contaminated fuel system as follows:

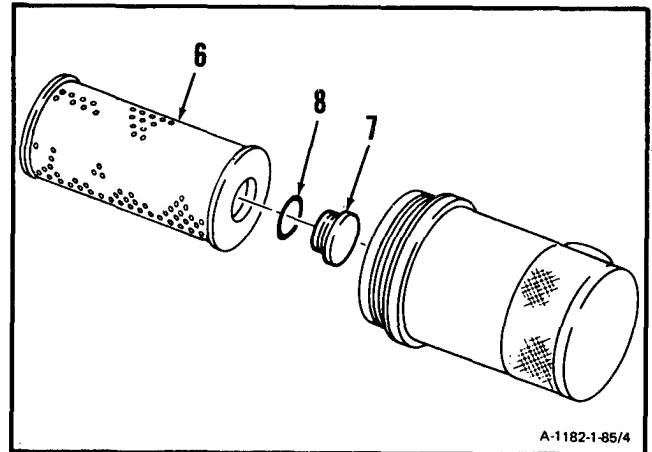
- a. Place wiping rag (E58) under plug (1).
- b. Remove lockwire, drain plug (1) and packing (2).
- c. Remove lockwire, main filter bowl (3), and packings (4 and 5). Use strap wrench.

**GO TO NEXT PAGE**

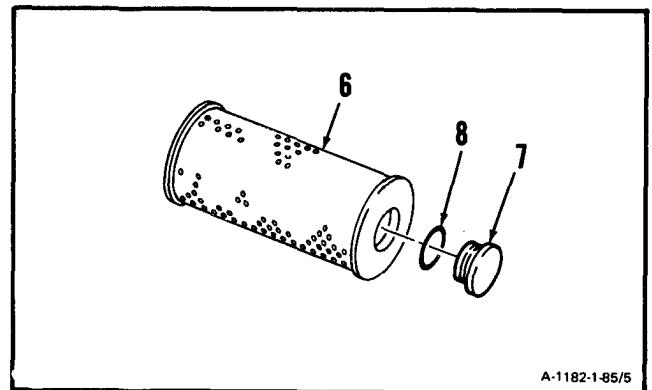
- d. Remove filter element (6), plug (7), and packing (8),

NOTE

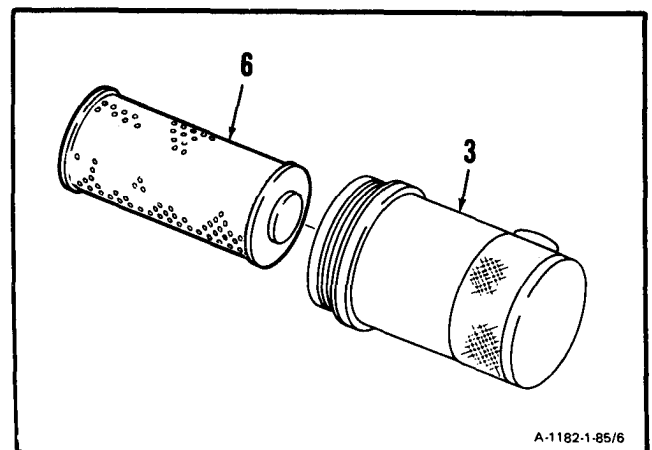
On new type filter, plug is part of filter.



- e. Install packing (8) and plug (7) in serviceable filter element (6).

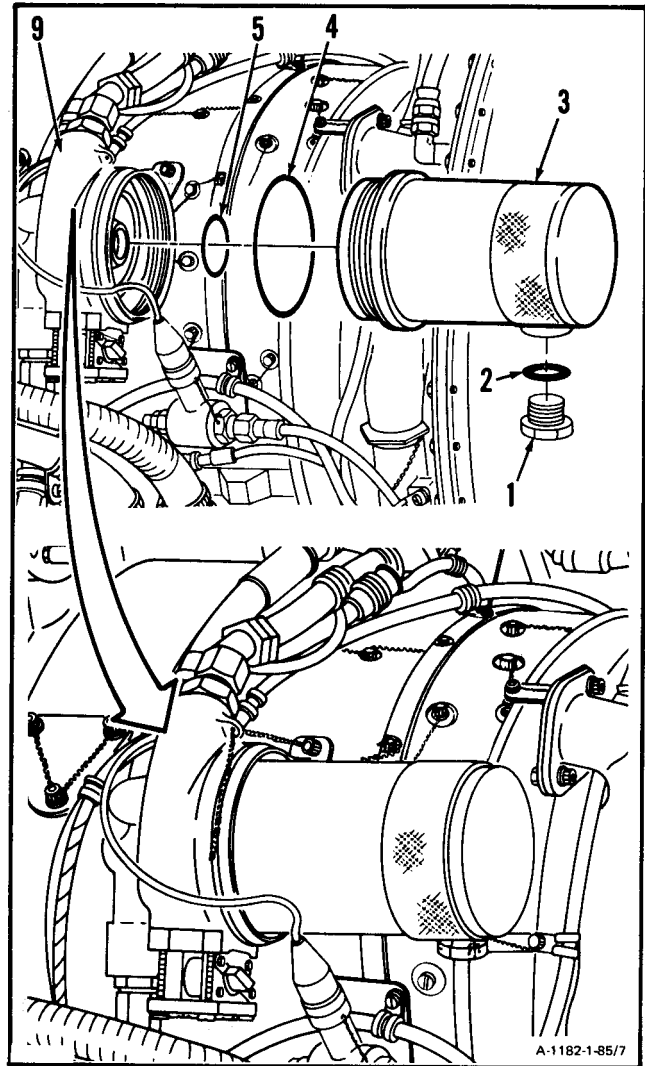


- f. Place serviceable filter element (6) in main filter bowl (3).



GO TO NEXT PAGE

- g. Install packings (4 and 5) on filter head (9). Install filter bowl (3) on filter head (9). Turn by hand until bottomed, then hand tighten. Lockwire filter bowl (3). Use lockwire (E29).
- h. Install packing (2) on plug (1) and install plug (1) into filter bowl (3). Lockwire plug (1). Use lockwire (E29).

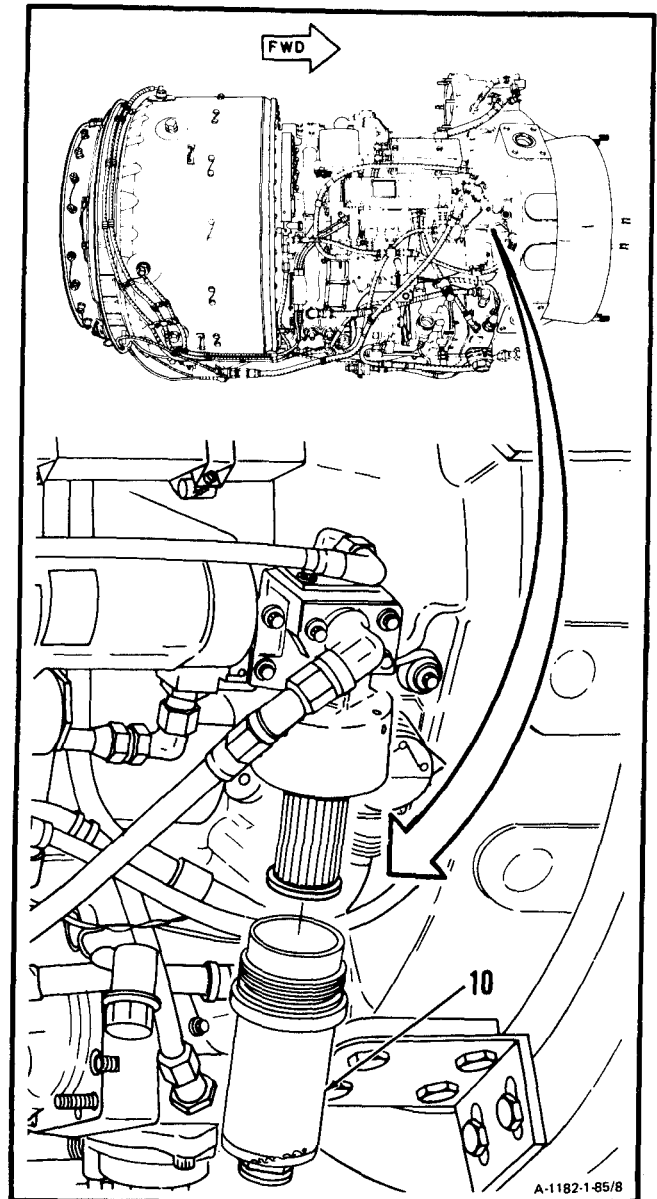


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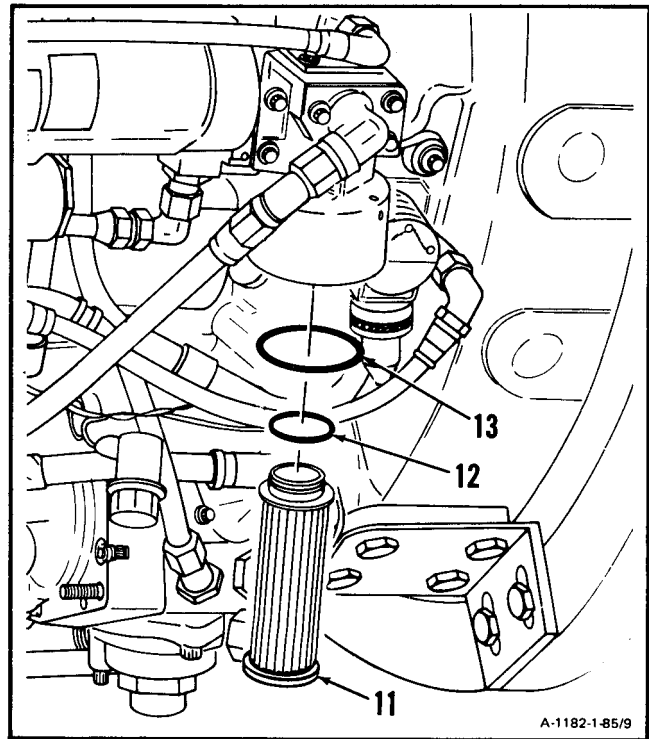
1-85 INSPECT CONTAMINATED FUEL SYSTEM (Continued)

1-85

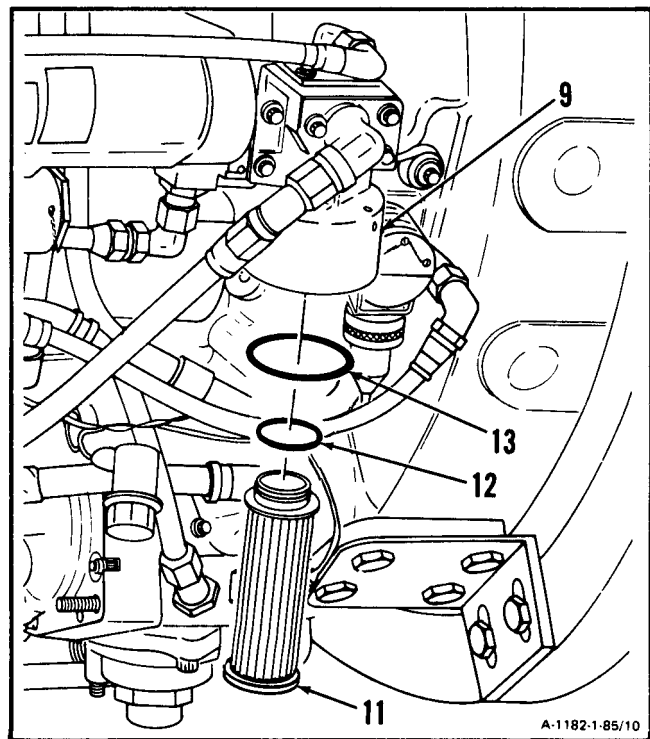
- i. Remove lockwire and unscrew filter bowl (10). Use strap wrench.

**GO TO NEXT PAGE**

- j. Remove filter element (11). Remove packings (12 and 13).



- k. Install packing 12) on new filter element (11).
- l. Install packing (13) and filter element (11) in filter head (9).

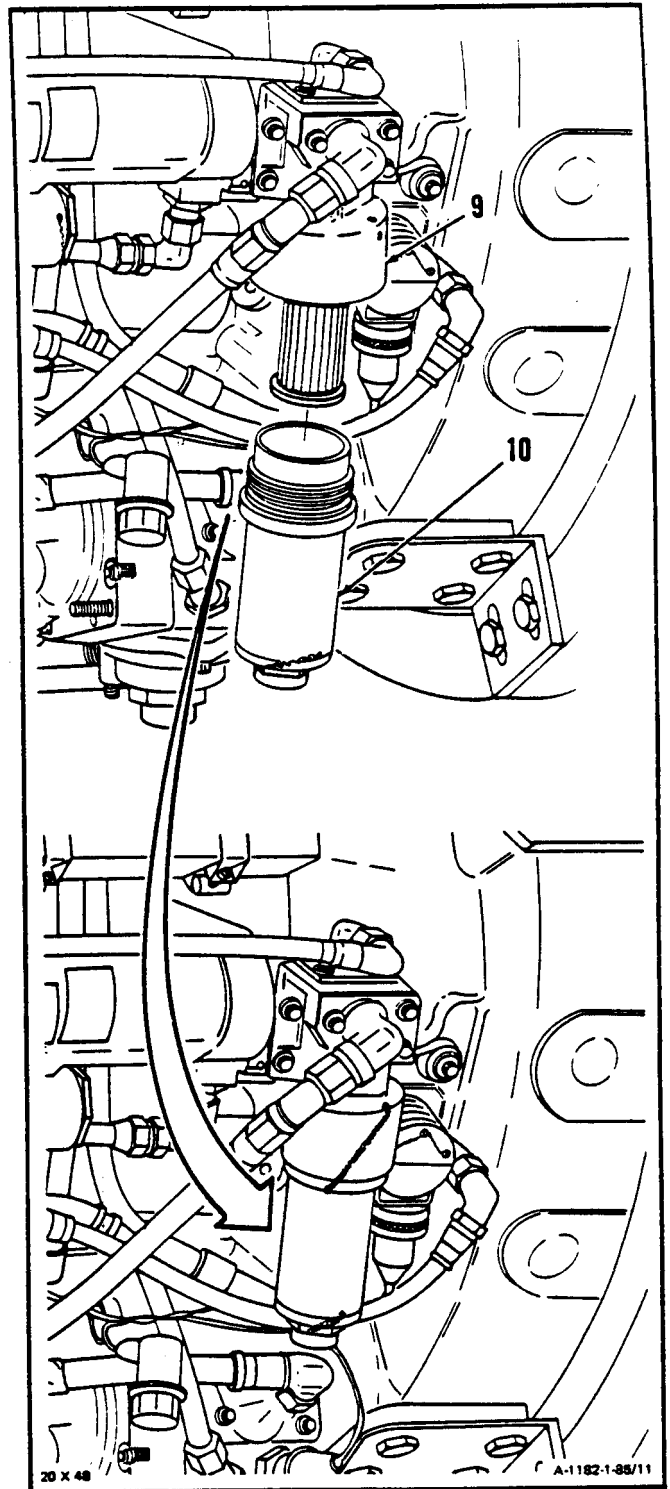


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CAUTION

Do not use wrench on indicator to tighten bowl or damage to bowl may occur.

- m. Install filter bowl (10) in filter head (9). Turn by hand until bottomed, then hand tighten. Lockwire filter bowl (10). Use lockwire (E29).



GO TO NEXT PAGE

- n. **Service fuel control filters** and strainers (Ref. Task 1-101).

NOTE

If any filters inspected in previous steps were contaminated, or if differential pressure indicator has popped, a bypass may have occurred.

- o. **If filters are contaminated and bypass may have occurred; perform the following:**
- p. **Check fuel tanks and supply lines for contamination** (Ref. TM 55-1520-240-T or TM 55-4920-328-13).
- q. **Service fuel tanks with dean fuel** (Ref. TM 55-1520-24023 or TM 55-4920-32813).
- r. **Perform initial check run** (Ref. TM 55-1520 240-10 or Task 1-107), **and repeat steps la. thru 1n.**
2. **If contamination still exists and bypass indicators actuated, repeat step 1a. thru 1n., and perform initial check run** (Ref. TM 55-1520-240-10 or Task 1-107).
3. **If contamination still exists and bypass indicators actuated, determine and replace the defective components that are generating the contamination. Service/flush any components downstream of defective component that may have been contaminated and repeat initial check run, step r.**

INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-262 **Change 8**

1-85.1 INSPECT ENGINE SERVICEABILITY

1-85.1

INITIAL SETUP

Applicable Configurations:

To be performed following an AOAP recommendation of serviceability

Tools:

- Powerplant Mechanic's Tool Kit, NSN 5180-00-323-4944
- Technical Inspection Tool Kit, NSN 5180-00323-5114
- Oil Sample Bottle
- Approved Metal Safety Container
- Compressed Air Source
- Goggles
- Utility Pail

Materials:

- Dry Cleaning Solvent (E17)
- Gloves (E20)
- Lint-Free Cloth (E26)
- Lockwire (E29)
- Wiping Rag (E58)

Parts:

- Packings

Personnel Required:

- 68B10 Aircraft Powerplant Repairer
- 68B30 Aircraft Powerplant Inspector

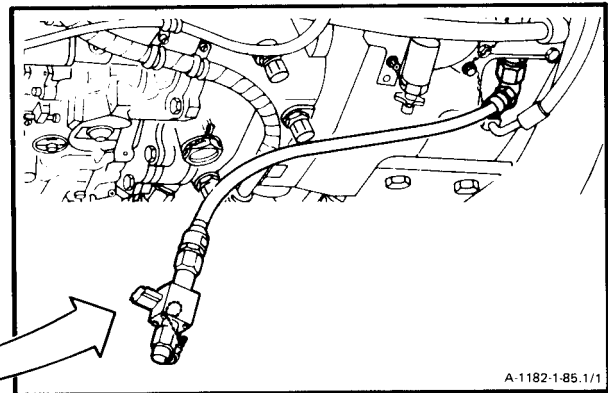
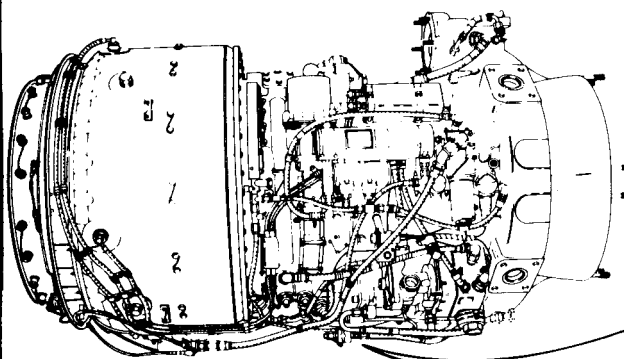
General Safety Instructions:

WARNING

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

WARNING

Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



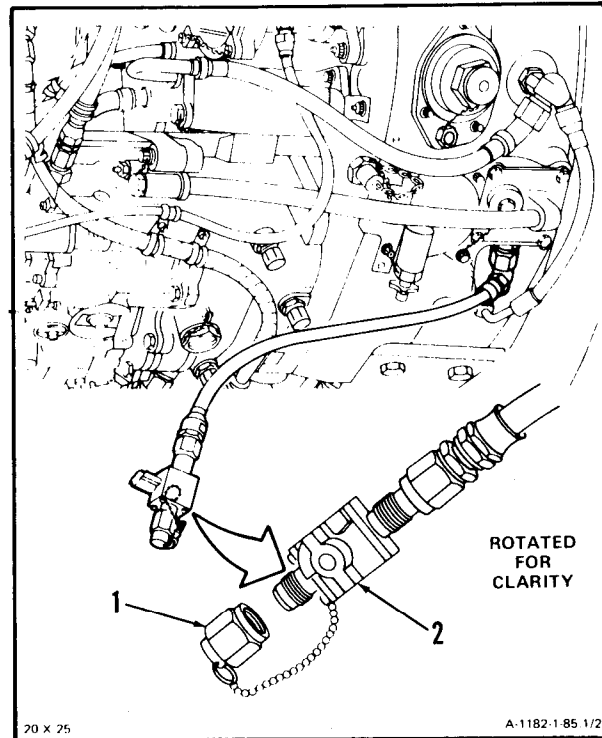
42 X 14

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1-85.1 INSPECT ENGINE SERVICEABILITY (Continued)**1-85.1**

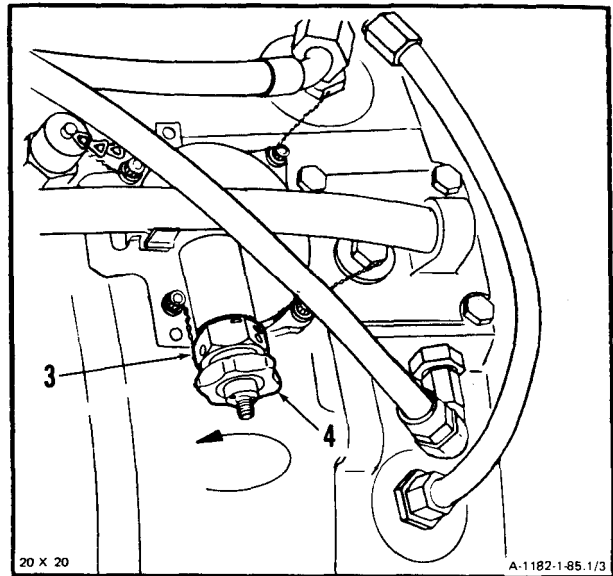
1. Remove cap (1) from drain cock fitting (2).
2. Drain engine oil system (Ref. Task 1-75).
3. Service starter gearbox filter (Ref. Task 1-95).
4. Service No. 2 bearing pressure oil strainer (Ref. Task 1-97).
5. Service No. 4 and 5 bearing oil filter (Ref. Task 1-98).
6. Service oil filter cap and stem assembly and oil filter element (Ref. Task 1-99).
7. Clean overspeed drive and outlet cover assembly (Ref. Task 519).
8. Inspect overspeed drive and outlet cover assembly (Ref. Task 5-20).
9. Clean main oil pump and scavenge oil screen (Ref. Task 8-2).
10. Inspect main oil pump and scavenge oil screen (Ref. Task 8-3).
11. Clean oil filler assembly and oil filler strainer (Ref. Task 8-18).
12. Inspect oil filler assembly and oil filler strainer (Ref. Task 8-19).
13. Inspect oil filler cap and stem assembly and oil filter element (Ref. Task 8-25).
14. Clean starter gearbox filter (Ref. Task 8-73).
15. Inspect statter gearbox filter (Ref. Task 8-74).

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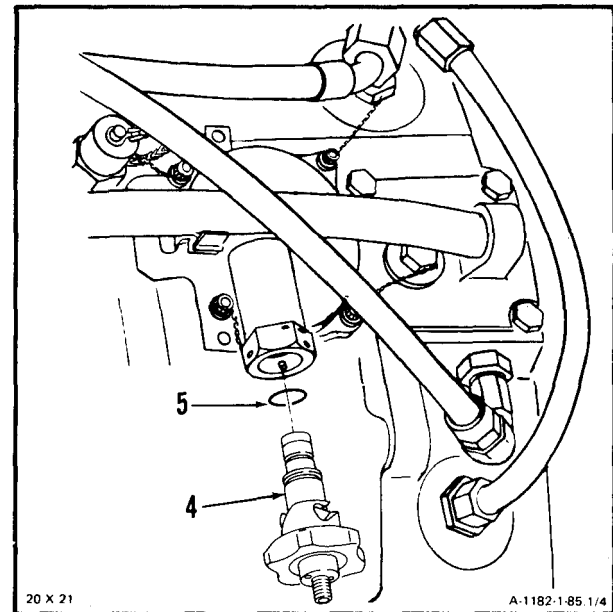
1-85.1 INSPECT ENGINE SERVICEABILITY (Continued)

1-85.1

16. Clean No. 2 bearing pressure oil strainer (Ref. Task 8-77).
17. Inspect No. 2 bearing pressure oil strainer (Ref. Task 8-78).
18. Clean No. 4 and 5 bearing filter (Ref. Task 8-81).
19. Inspect No. 4 and 5 bearing filter (Ref. Task 8-82).



20. Service chip detector (3) as follows:
 - a. Unlock plug (4) and turn counterclockwise.
 - b. Remove plug (4) and packing (5).



GO TO NEXT PAGE

Change 8 1-262.3

WARNING

Dry cleaning solvent (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.

c. Clean plug (4) as follows:

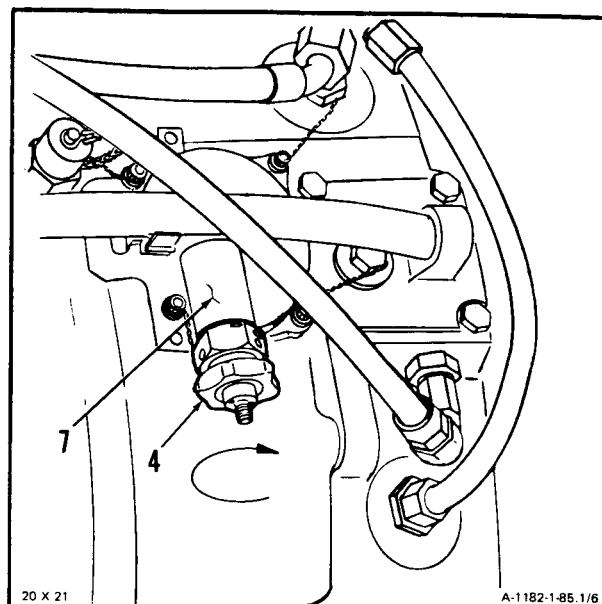
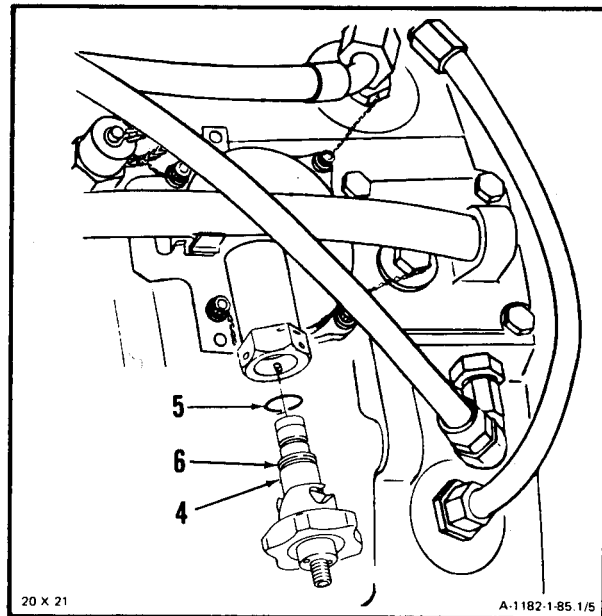
- (1) Wear gloves (E20). Immerse plug (4) in dry cleaning solvent (E17) and agitate. Use brush on external surfaces.
- (2) Use lint-free cloth (E26) to remove solvent.

d. Install packing (5) in groove (6) on plug (4).

CAUTION

Plug shall be fully seated and firmly locked into housing. A loose fitting plug will cause oil leakage resulting in engine damage.

e. Install plug (4) in housing (7) by pushing and turning plug 1/8 turn clockwise.



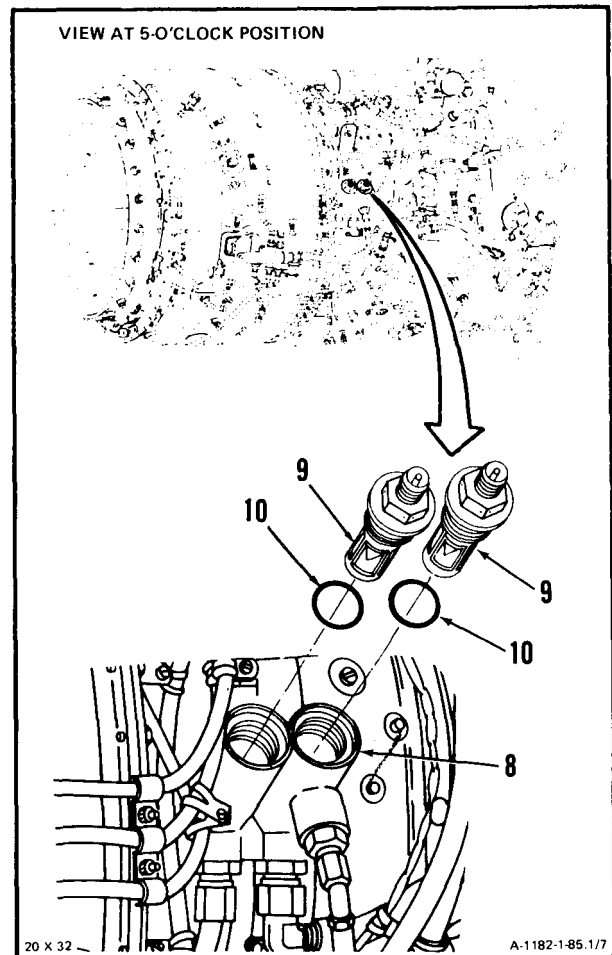
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1-85.1 INSPECT ENGINE SERVICEABILITY (Continued)

1-85.1

21. Service dual chip detector (8) as follows:

- a. Remove lockwire, two chip detectors (9) and packings (10).



GO TO NEXT PAGE

Change 8 1-262.5

NOTE

Following procedure applies to both chip detectors. One is shown.

CAUTION

When removing filter from connector, be careful not to push in or deform screen of filter. Pushed in or deformed screen is cause for rejection.

- b. Unscrew and remove filter (11) from connector (12).

WARNING

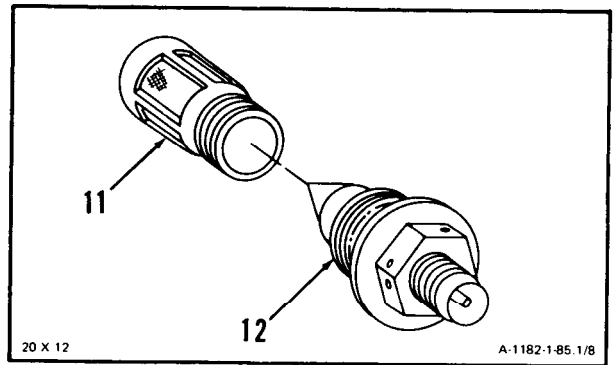
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

- c. Wear gloves (E20). Clean filter (11). Use dry cleaning solvent (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.

- d. Wear goggles. Dry filter (11) using clean, dry compressed air.
- e. Clean connector (12) with lint-free cloth (E26) dampened in dry cleaning solvent (E17).



GO TO NEXT PAGE

1-85.1 INSPECT ENGINE SERVICEABILITY (Continued)

1-85.1

CAUTION

When installing filter on connector, be careful not to push in or deform screen of filter. Pushed in or deformed screen may cause false chip indications

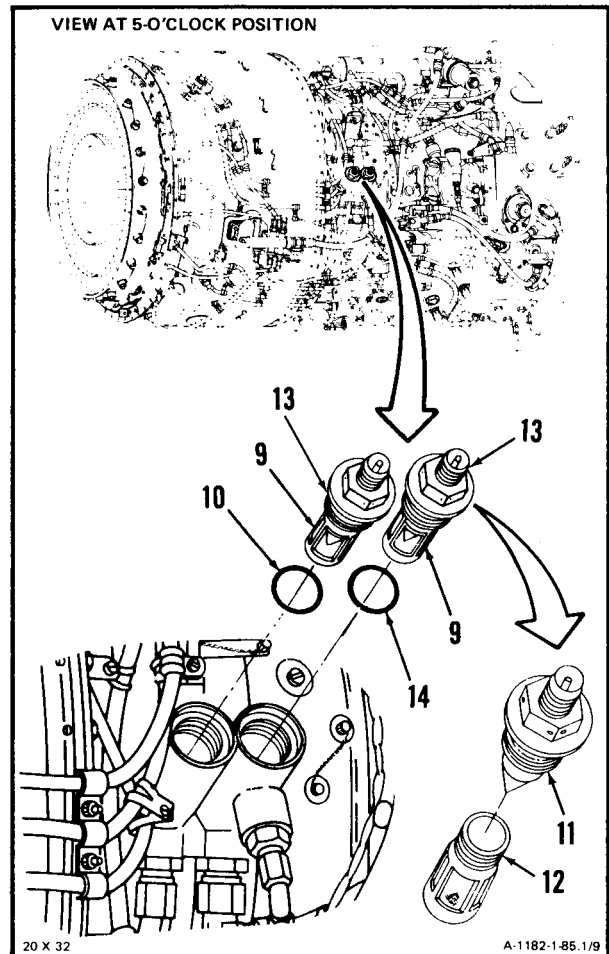
- f. Install filter (11) on connector (12).
 - g. Install packings (10) in grooves (13) on chip detectors (9).
 - h. Install chip detectors (9) in housing (14).
Lockwire chip detectors. Use lockwire (E29).
22. **Service Engine Oil System** (Ref. Task 1-74).
23. Start and run engine for five minutes (Ref. TM 55-1520-240-10 or Task 1-107).
24. Shut down engine using normal shutdown procedure (Ref. TM 55-1520-240-10 or Task 1-107).
25. Inspect chip detector, oil filter, and bearing filters.
- a. If quantity of chips are not significantly less, replace defective component or engine.
 - b. If quantity of chips are significantly less, return engine to service.

NOTE

If during the above steps chips are found at the last chance filters, replace engine.

INSPECT**FOLLOW-ON MAINTENANCE:**

None

END OF TASK

INITIAL SETUP

General Safety Instructions:

Applicable Configurations:

All

WARNING

Tools:

- Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
- Technical Inspection Tool Kit,
NN 5180-00-323-5114
- Oil Sample Bottle
- Approved Metal Safety Container
- Compressed Air Source
- Goggles
- Utility Pail

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

Materials:

- Dry Cleaning Solvent (E17)
- Gloves (E20)
- Lint-Free Cloth (E26)
- Lockwire (E29)
- Wiping Rag (E58)

WARNING

Parts:

- Packings

Dry cleaning solvent (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.

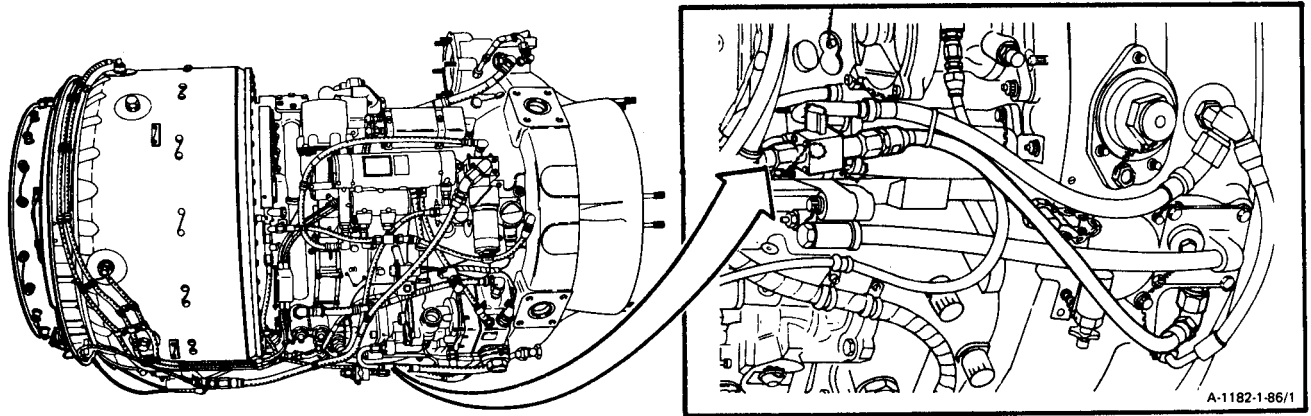
Personnel Required:

- 68B10 Aircraft Powerplant Repairer
- 68B30 Aircraft Powerplant Inspector

References

- TM 55-2840-254-23P
- Task 1-74 Task 1-97
- Task 1-75 Task 1-98
- Task 1-95 Task 1-99
- Task 5-19 Task 8-19
- Task 5-20
- Task 8-2 Task 8-25
- Task 8-3 Task 8-73
- Task 8-18 Task 8-74
- Task 8-81 Task 8-77
- Task 8-82 Task 8-78

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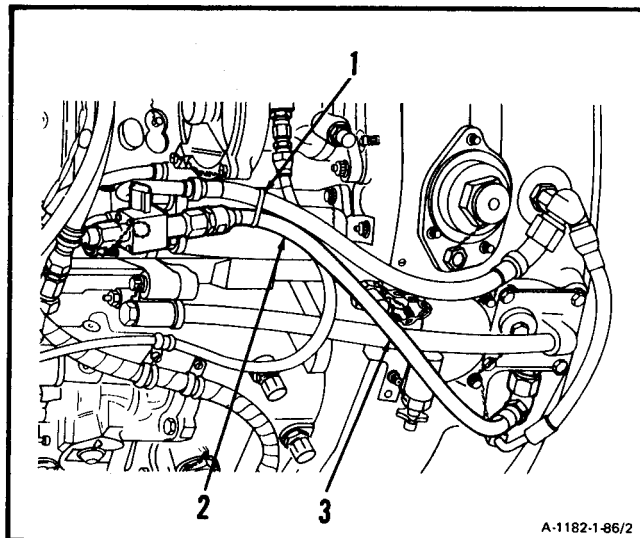
1. Remove cable tie (1) and lower free end (2) of hose assembly (3).

NOTE

For servicing accessory gearbox chip detector, go to step 13.

NOTE

For servicing dual chip detector, go to step 14.

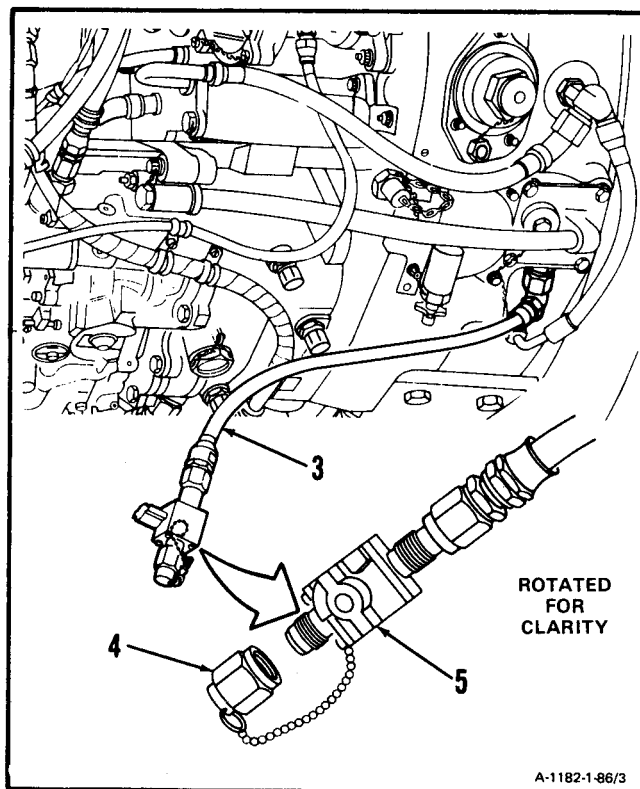


2. Remove cap (4).

NOTE

In following step, oil sample shall be taken within 10 minutes of engine shut-down.

3. Turn oil drain cock (5) 1/4 turn counterclockwise to open position. **Allow a minimum of 1 quart of oil to drain** from hose assembly (3) into utility pail.
4. Fill oil sample bottle and install cap.
5. Turn oil drain cock (5) 1/4 turn clockwise to closed position.



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1-86 INSPECT CONTAMINATED OIL SYSTEM (Continued)

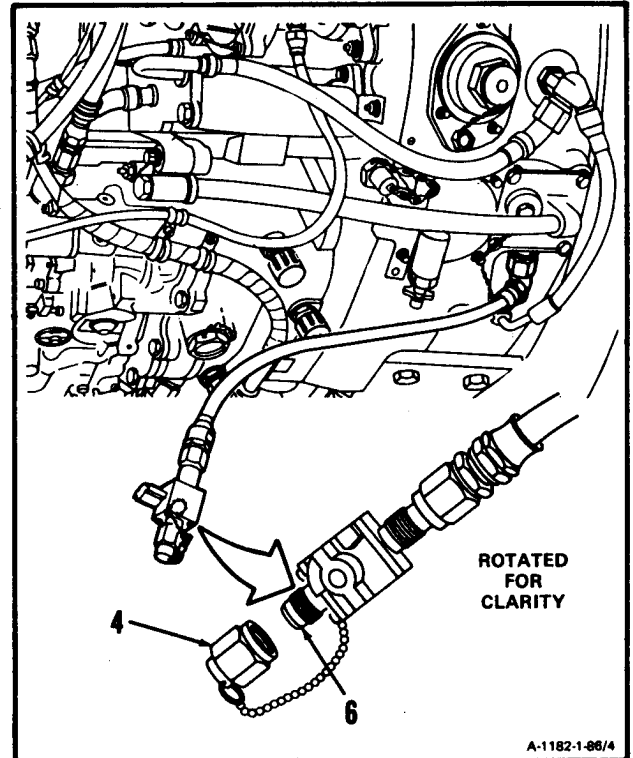
1-86

6. Install cap (4) on oil drain cock fitting (6).
7. Forward oil sample to oil analysis laboratory.

NOTE

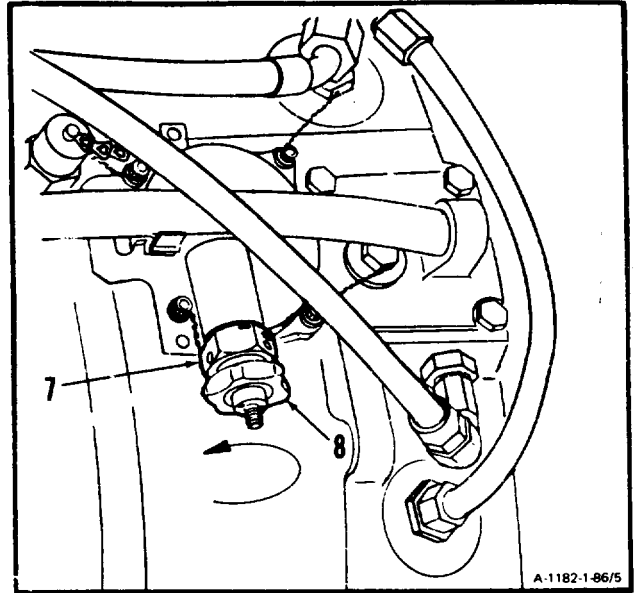
Wait for lab results before proceeding with following steps. If lab results are acceptable, then proceed with following steps.

8. Drain engine oil system (Ref. Task 1-75).
9. Service starter gearbox filter (Ref. Task 1-95).
10. If not previously done, **service No. 2 bearing pressure oil strainer** (Ref. Task 1-97).
11. If not previously done, **service No. 4 and 5 bearing oil filter** (Ref. Task 1-98).
12. If not previously done, **service oil filter cap and stem assembly and oil filter element** (Ref. Task 1-99).
- 12.1 If not previously done, **clean overspeed drive and outlet cover assembly** (Ref Task 5-19).
- 12.2 If not previously done, **inspect overspeed drive and outlet cover assembly** (Ref Task 5-20).
- 12.3 If not previously done, **clean main oil pump and scavenge oil screen** (Ref Task 8-2).
- 12.4 If not previously done, **inspect main oil pump and scavenge oil screen** (Ref Task 8-3).
- 12.5 If not previously done, **clean oil filler assembly and oil filler strainer** (Ref Task 8-18).
- 12.6 If not previously done, **inspect oil filler assembly and oil filler strainer** (Ref Task 8-19).

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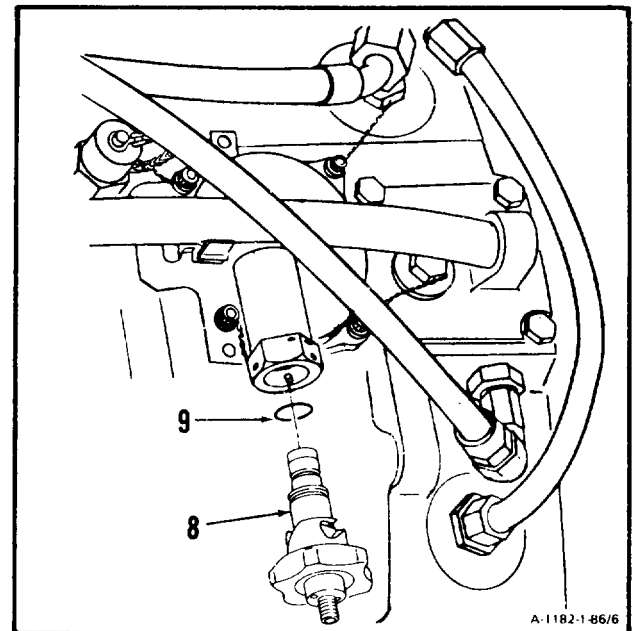
1-66 INSPECT CONTAMINATED OIL SYSTEM (Continued)

- 12.7. If not previously done, **inspect oil filter cap and stem assembly and oil filter element** (Ref Task 8-25)
- 12.8. If not previously done, **clean starter gearbox filter** (Ref Task 8-73).
- 12.9. If not previously done, **inspect starter gearbox filter** (Ref Task 8-74).
- 12.10. If not previously done, **clean No. 2 bearing pressure oil strainer** (Ref Task 8-77).
- 12.11. If not previously done, **inspect No. 2 bearing pressure oil strainer** (Ref Task 8-78).
- 12.12. If not previously done, **clean No 4 and 5 bearing filter** (Ref Task 8-81).
- 12.13. If not previously done, **inspect No. 4 and 5 bearing filter** (Ref Task 8-82).



13. Service chip detector (7) as follows:

- a. Unlock plug (8) and turn counterclockwise.
- b. Remove plug (8) and packing (9).



GO TO NEXT PAGE

WARNING

Dry cleaning solvent (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.

c. Clean plug (8) as follows:

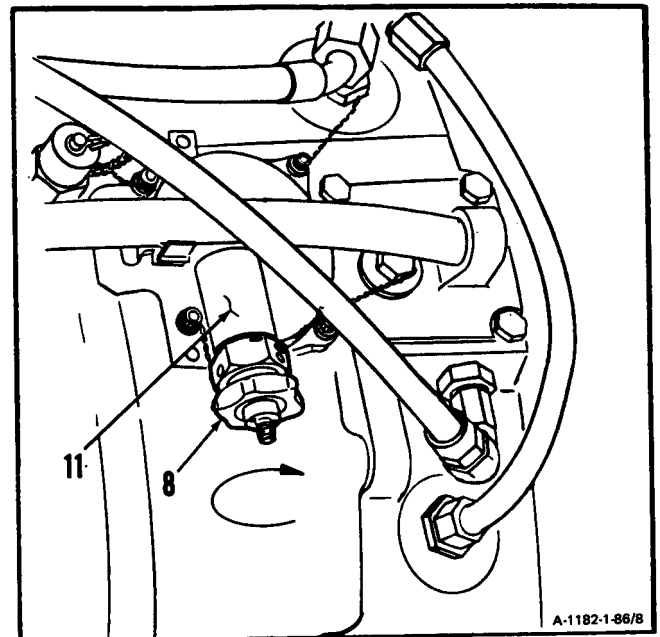
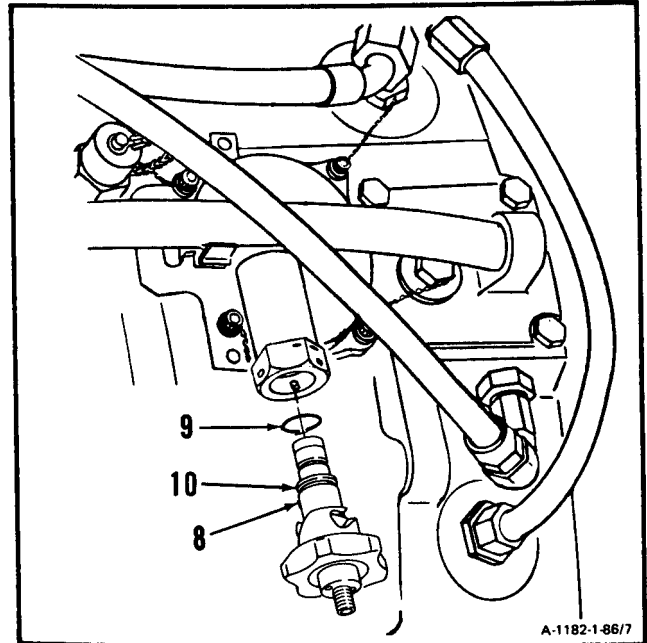
- (1) Wear gloves (E20). Immerse plug (8) in dry cleaning solvent (E17) and agitate. Use brush on external surfaces.
- (2) Use lint-free cloth (E26) to remove solvent.

d. Install packing (9) in groove (10) on plug (8).

CAUTION

Plug shall be fully seated and firmly locked into housing. A loose fitting plug will cause oil leakage resulting in engine damage.

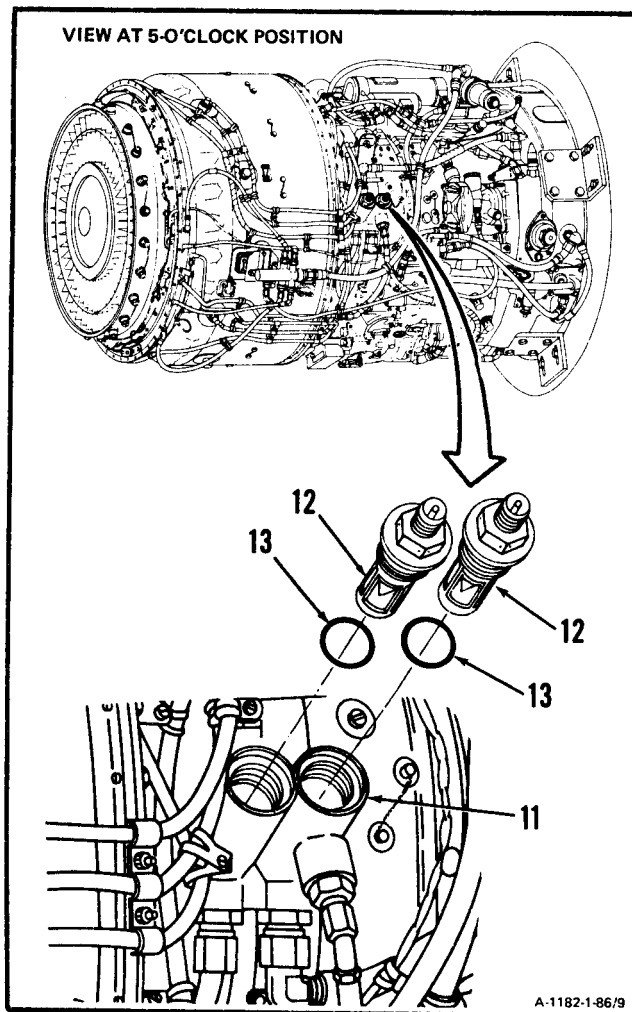
e. Install plug (8) in housing (11) by pushing and turning plug 1/8 turn clockwise.



GO TO NEXT PAGE

14. Service dual chip detector (11) as follows:

- a. Remove lockwire, two chip detectors (12) and packings (13).



GO TO NEXT PAGE

NOTE

following procedure applies to both chip detectors. One is shown.

CAUTION

When removing filter from connector, be careful not to push in or deform screen of filter. Pushed in or deformed screen is cause for rejection.

- b. Unscrew and remove filter (14) from connector (15).

WARNING

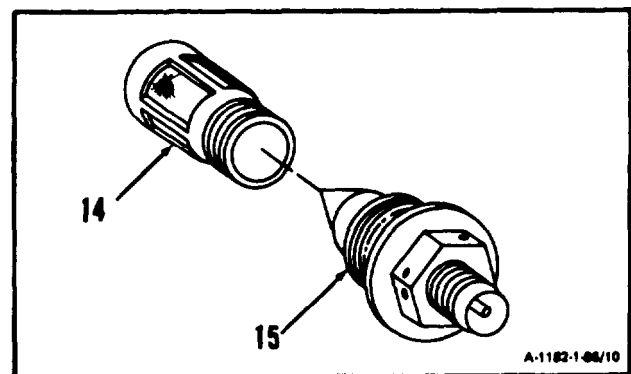
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

- c. Wear gloves (E20). Clean filter (14). Use dry cleaning solvent (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.

- d. Wear goggles. Dry filter (14) using clean, dry compressed air.
- e. Clean connector (15) with lint-free cloth (E26) dampened in dry cleaning solvent (E17).



1-86 INSPECT CONTAMINATED OIL SYSTEM (Continued)

CAUTION

When installing filter on connector, be careful not to push in or deform screen of filter. Pushed in or deformed screen may cause false chip indications.

- f. Install filter (14) on connector (15).
- g. Install packings (13) in grooves (16) on chip detectors (12).
- h. Install chip detectors (12) in housing (17). Lockwire chip detectors. Use lockwire (E29).

15. **Service Engine Oil System.** (Ref. Task 1-74.)

16. Start and run engine for 5 minutes. (Ref. TM 55-1520-240-10 or Task 1-107.)

17. Shutdown engine using normal shutdown procedure. (Ref. TM 55-1520-246-10 or Task 1-107.)

18. Inspect chip detector, oil filter, and bearing filters.

- a. If quantity of chips are not significantly less, replace defective component or engine.
- b. If quantity of chips are significantly less, return engine to service.

NOTE

If during the above steps chips are found at the last chance filters, replace engine.

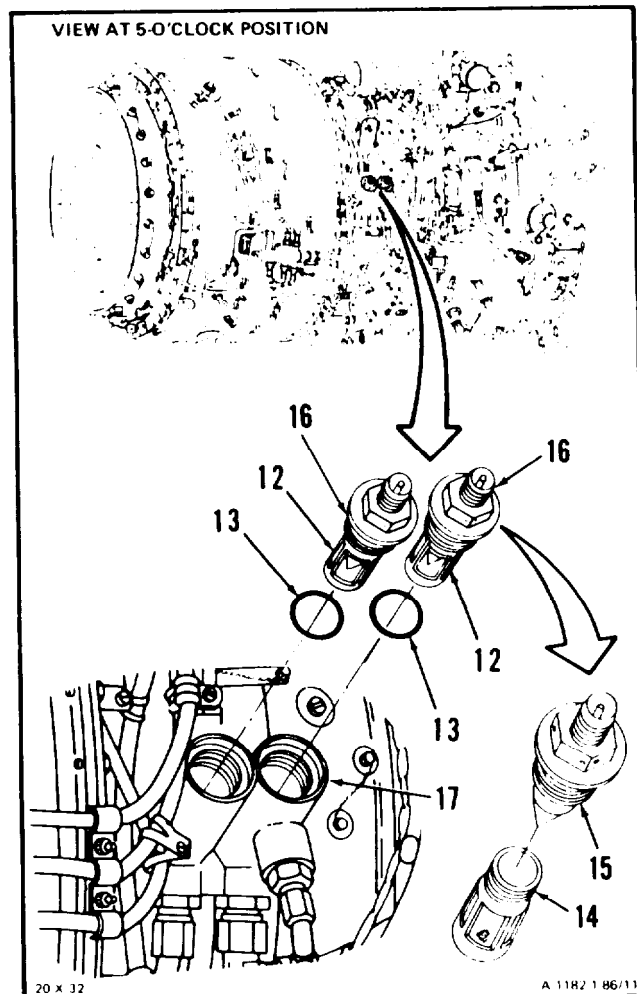
INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-272 Change 10



1-66.1 CHIP DETECTOR CONTAMINATION

1-66.1

INITIAL SETUP**Applicable Configurations:**

All

Tools:

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

Materials:

None

Personnel Required:

68B20 Aircraft Powerplant Repairer

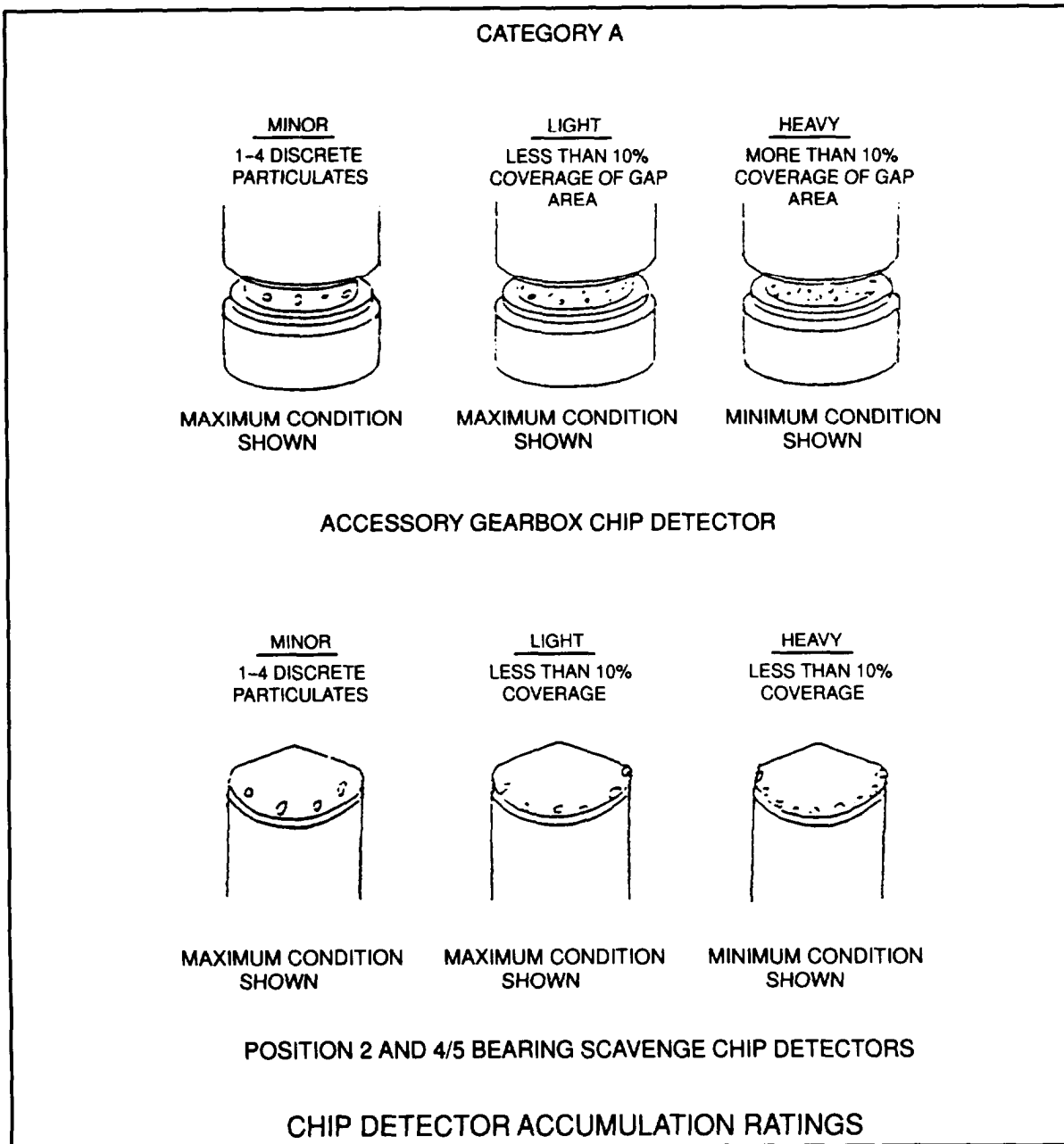
References:

Task 1-64

CONTAMINATION CATEGORY RATING GUIDE

CATEGORY	DESCRIPTION
A	Single chip larger than 0.120 X 0.120.
B	Chips larger than 0.025 inch. Refer to Chip Detector Chip Chart.
C	Fuzz and/or chips smaller than 0.025 inch. Refer to Chip Detector Chip Chart.

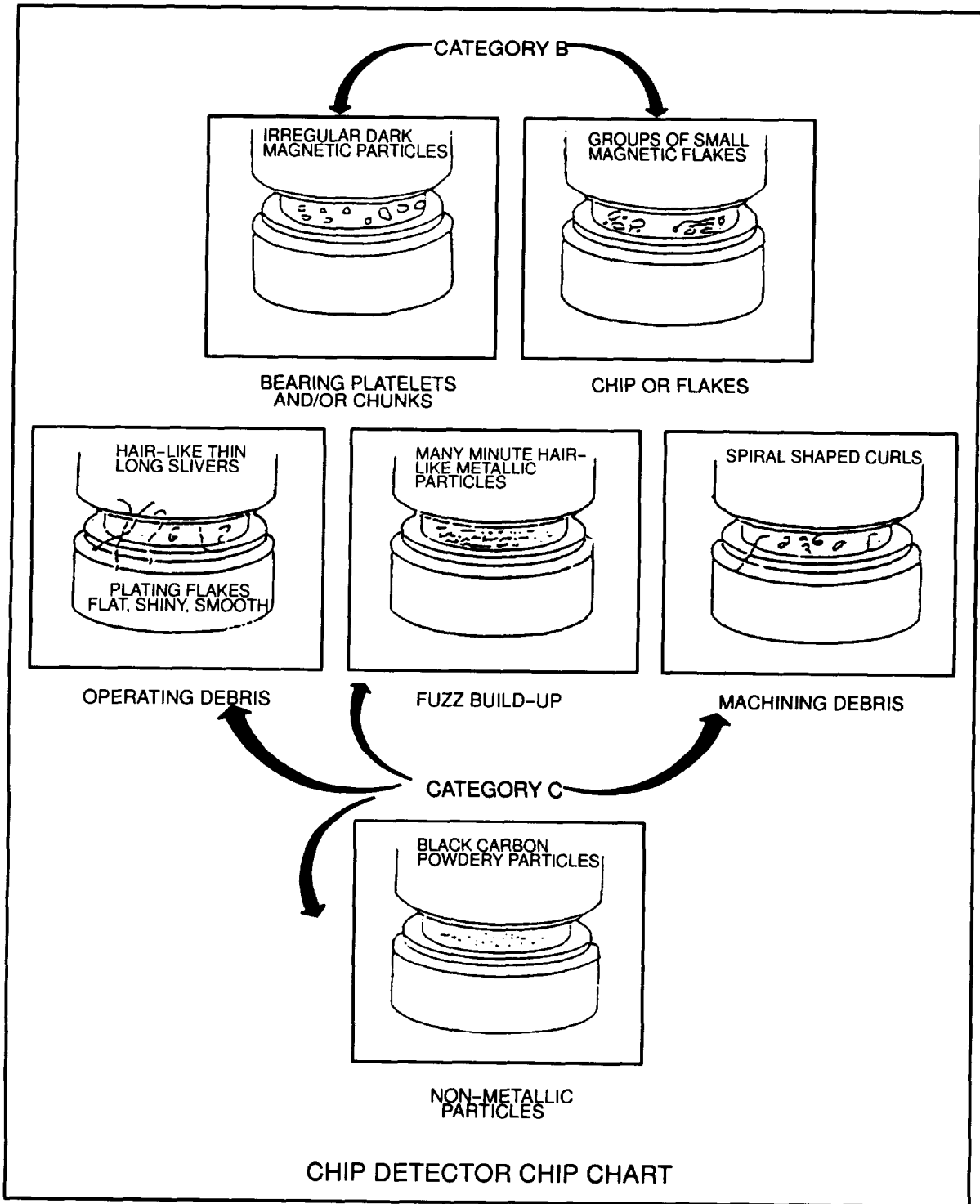
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1-66.1 CHIP DETECTOR CONTAMINATION (Continued)

1-66.1



END OF TASK

1-87 CHECK FOR SEAL LEAKAGE (NO. 2 BEARING PACKAGE) (AVIM)

1-87

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
Seal Leakage Tester (T44)
Stopwatch

Materials:

Wiping Rag (E58)
Pressure Cap

Personnel Required:

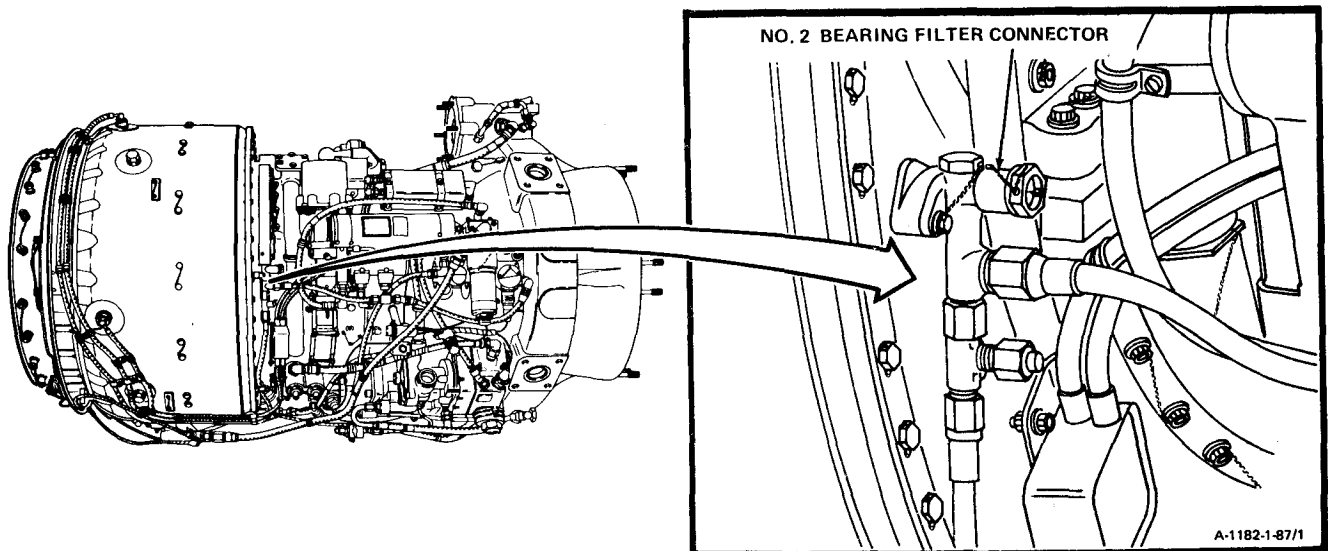
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

Task 2-40	Task 2-45
Task 2-42	Task 2-46
Task 2-43	Task 2-47
Task 2-44	

General Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

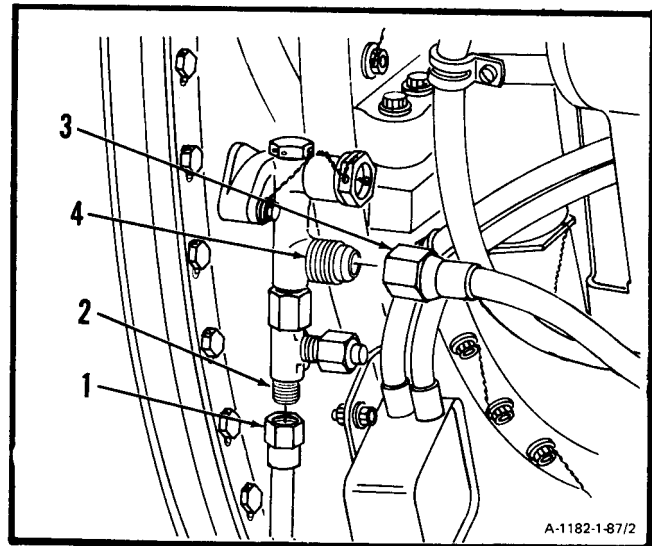


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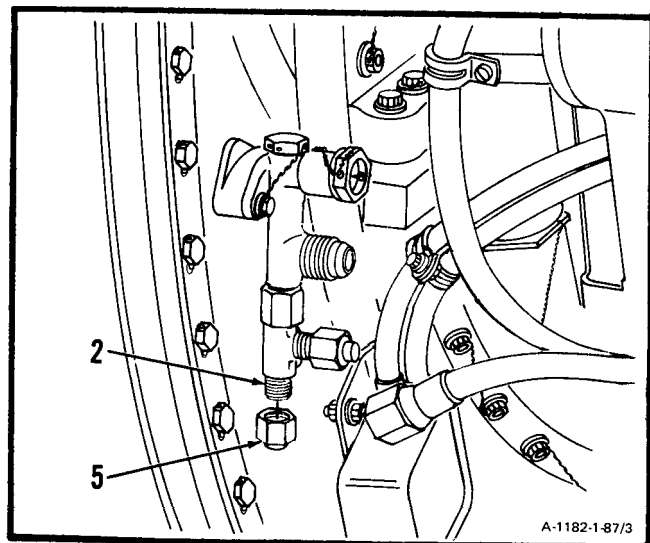
NOTE

Following procedure may be performed on the aircraft, on modular engine test stand or on the engine "L" stand. Procedure with engine installed on engine "L" stand is shown.

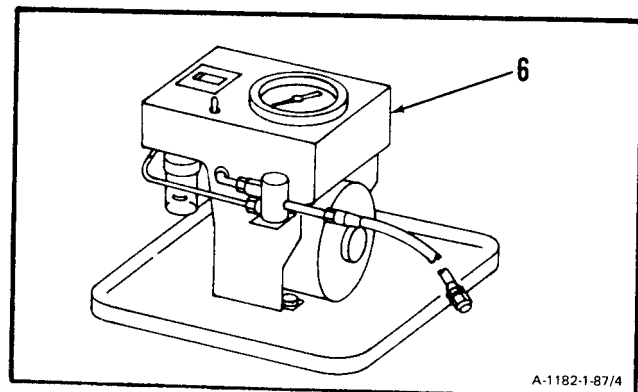
1. **Disconnect hose (1)** from fitting (2).
2. **Disconnect hose (3)** from fitting (4).



3. **Install cap (5)** on fitting (2).



4. **Check seal leakage tester (T44) (6)** as follows:

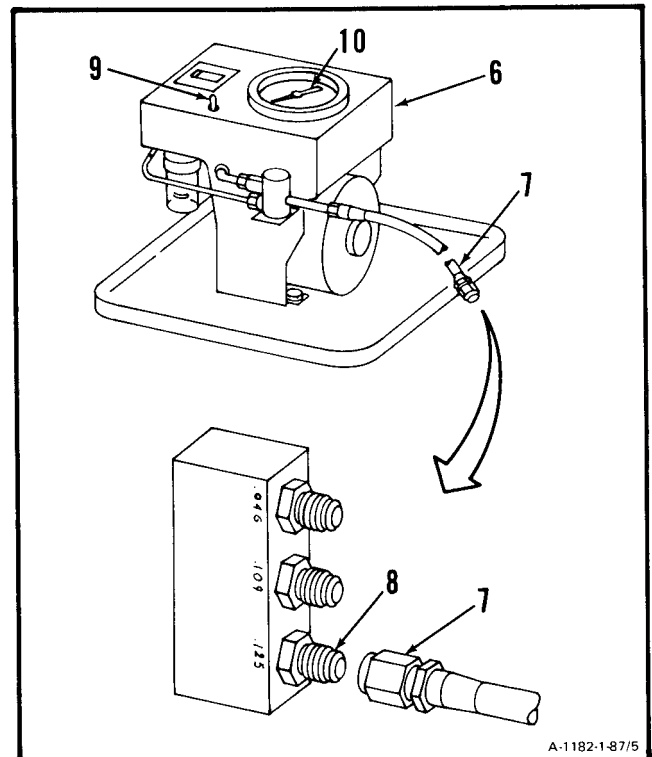


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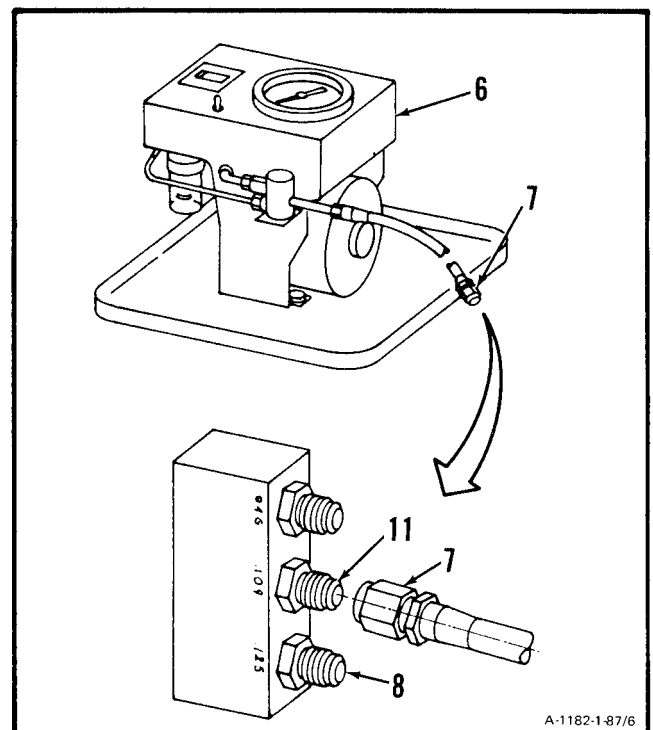
1-87 CHECK FOR SEAL LEAKAGE (NO. 2 BEARING PACKAGE) (AVIM) (Continued)

1-87

- a. Connect hose (7) of seal leakage tester (T44) (6) to calibration block fitting (8).
- b. Turn vacuum pump switch (9) to ON position and run for one minute.
- c. Record reading on vacuum gage (10).
- d. Turn vacuum pump switch (9) to OFF position. Wait one minute.
- e. Turn vacuum pump switch (9) to ON position and run for one minute.
- f. Record readings on vacuum gage (10).
- g. Turn vacuum pump switch (9) to OFF position.

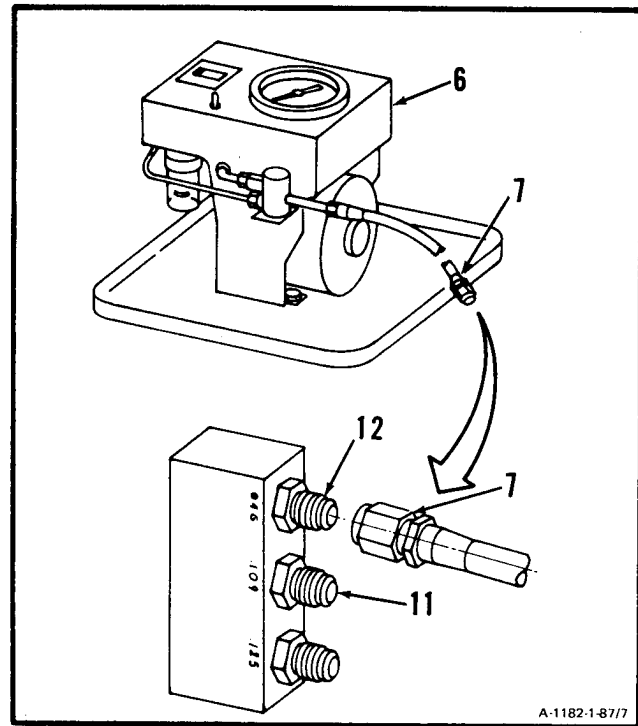


- h. Compare readings recorded in steps c. and f. If either reading is below 7 inches Hg, replace seal leakage tester (T44) (6).
- i. Disconnect hose (7) from calibration block fitting (8).
- j. Connect hose (7) to calibration block fitting (11).
- k. Repeat steps b. thru g. Compare readings recorded in steps c. and f. If either reading is below 11 inches Hg, replace seal leakage tester (T44) (6).



GO TO NEXT PAGE

- l. Disconnect hose (7) from calibration block fitting (11).
- m. Connect hose (7) to calibration block fitting (12).
- n. Repeat steps b. thru g. Compare readings recorded in steps c. and f. If either reading is below 23 inches Hg, replace seal leakage tester (T44) (6).
- o. Disconnect hose (7) from calibration block fitting (12).

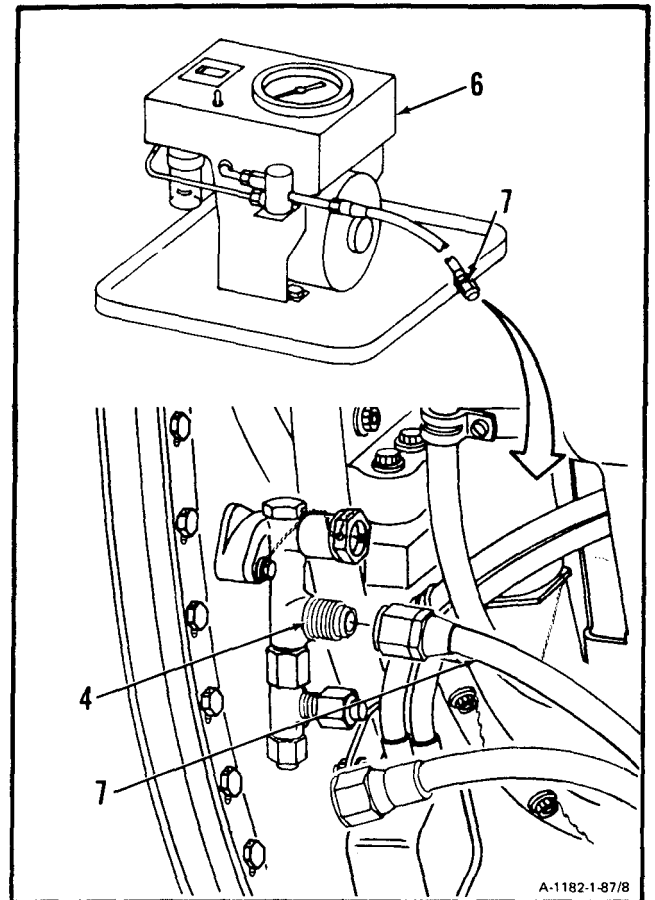


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1-87 CHECK FOR SEAL LEAKAGE (NO. 2 BEARING PACKAGE) (AVIM) (Continued)

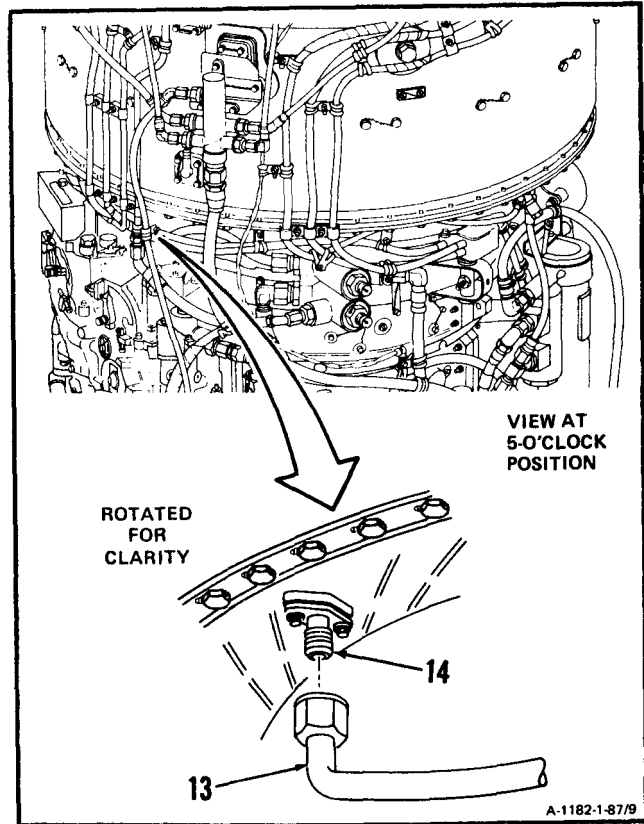
1-87

5. Install seal leakage tester (T44) (6) hose (7) on fitting (4).

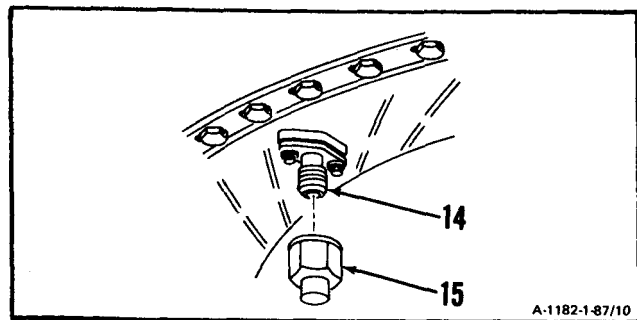


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6. Disconnect hose (13) from adapter (14).



7. Install cap (15) on adapter (14).



GO TO NEXT PAGE

CAUTION

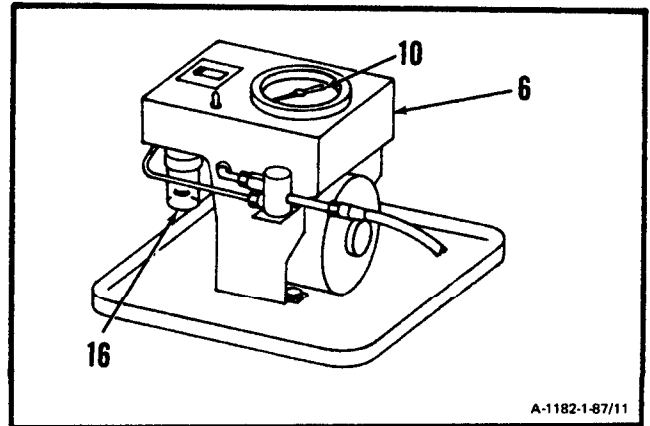
Oil level in filter bowl when tester is running should not be over one-half full. An overfilled filter bowl will allow oil to get into tester and cause damage.

8. **Start seal leakage tester (T44) (6)** and let it run for one minute. Do not record reading at this time.

NOTE

If tester is ever shut down to drain oil from bowl, test procedure must be repeated starting from step 8.

9. If filter bowl (16) is ever over half-full when testing, shut down tester and drain oil.
10. **Shut down tester (T44) (6)** and wait one minute.
11. **Start seal leakage tester (T44) (6)** and let it run for one minute. At end of one minute, take readings on vacuum gage (10) while tester is still running. Record readings.
12. **Repeat steps 10 and 11.**
13. **If either recorded gage reading is 18 inches Hg or higher, the seals are acceptable.** Omit the following steps 14, 15, 16, and 17; proceed with step 18.
14. **If both recorded gage readings are below 18 inches Hg., rotate the compressor one full revolution counterclockwise.**
15. **Perform steps 8 thru 12.** If readings are still below 18 inches Hg., proceed as follows:
- a. **Repair air diffuser assembly** (Ref. Task 2-40, steps 1 thru 4).
16. **Repeat steps 8 thru 13.** If gage readings are still below 18 inches Hg., proceed as follows:

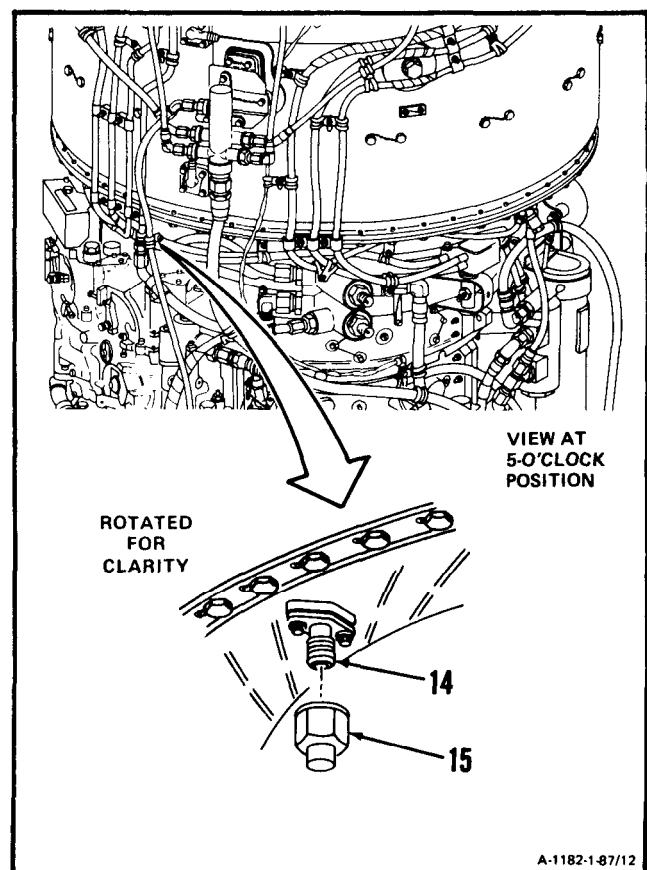


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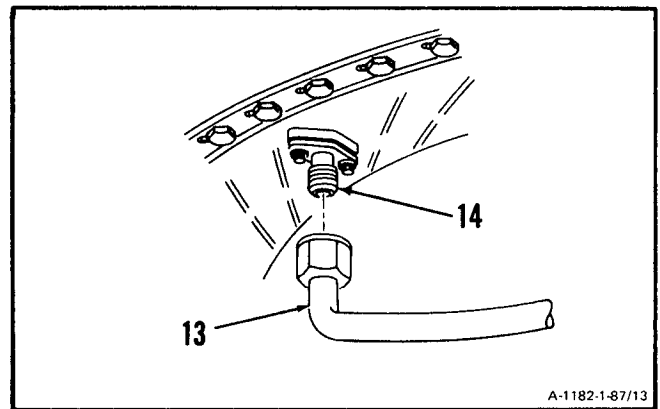
1-87 CHECK FOR SEAL LEAKAGE (NO. 2 BEARING PACKAGE) (AVIM) (Continued)

1-87

- a. **Remove No. 2 Bearing Package** (Ref. Task 2-42).
 - b. **Disassemble No. 2 Bearing Package** (Ref. Task 2-43).
 - c. **Clean No. 2 Bearing Package** (Ref. Task 2-44).
 - d. **Inspect No. 2 Bearing Package** (Ref. Task 2-45).
 - e. **Assemble No. 2 Bearing Package** (Ref. Task 2-46).
 - f. **Install No. 2 Bearing Package** (Ref. Task 2-47).
17. **Repeat steps 1 thru 13**, If readings are still below 18 inches Hg., replace the engine.
18. **Remove cap (15)** from adapter (14).

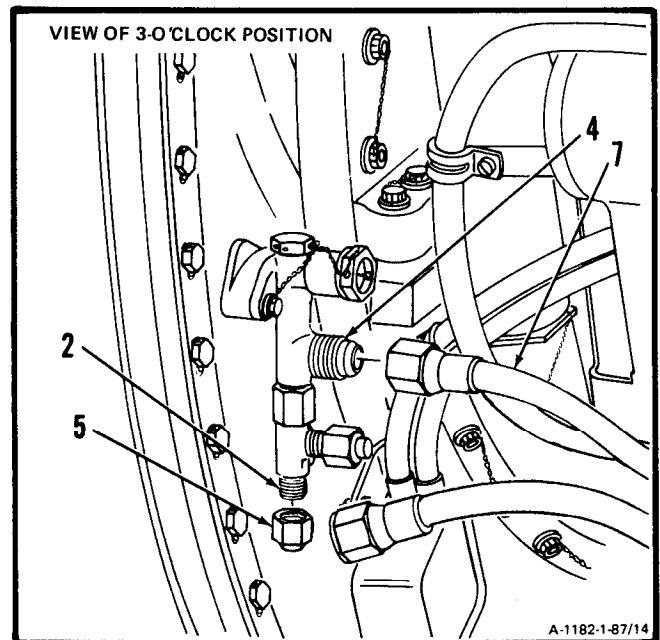
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19. Connect hose (13) to adapter (14).



20. Remove hose (7) from fitting (4).

21. Remove cap (5) from fitting (2).

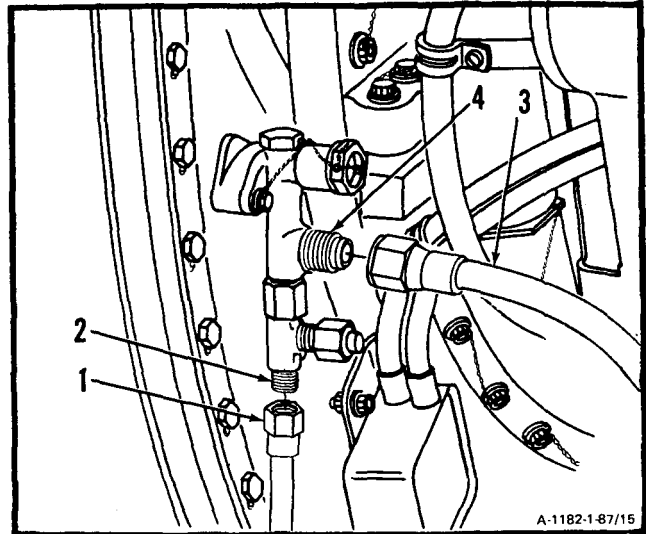


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22. Install hose (3) to fitting (4).

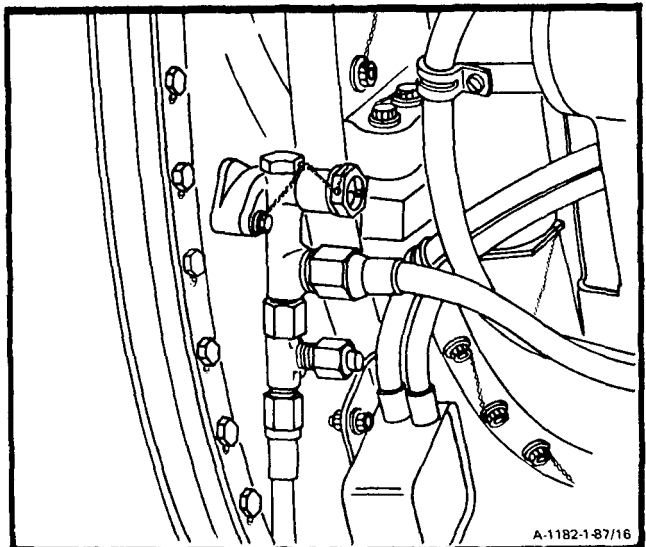
23. Install hose (1) to fitting (2).

INSPECT



FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-88 CHECK FOR SEAL LEAKAGE (NO. 4 AND 5 BEARING) (AVIM)

1-88

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
Stopwatch
Seal Leakage Tester (T44)
Open-End Wrench (T53)

Materials:

Lockwire (E29)
Wiping Rag (E58)
Pressure Cap

Personnel Required:

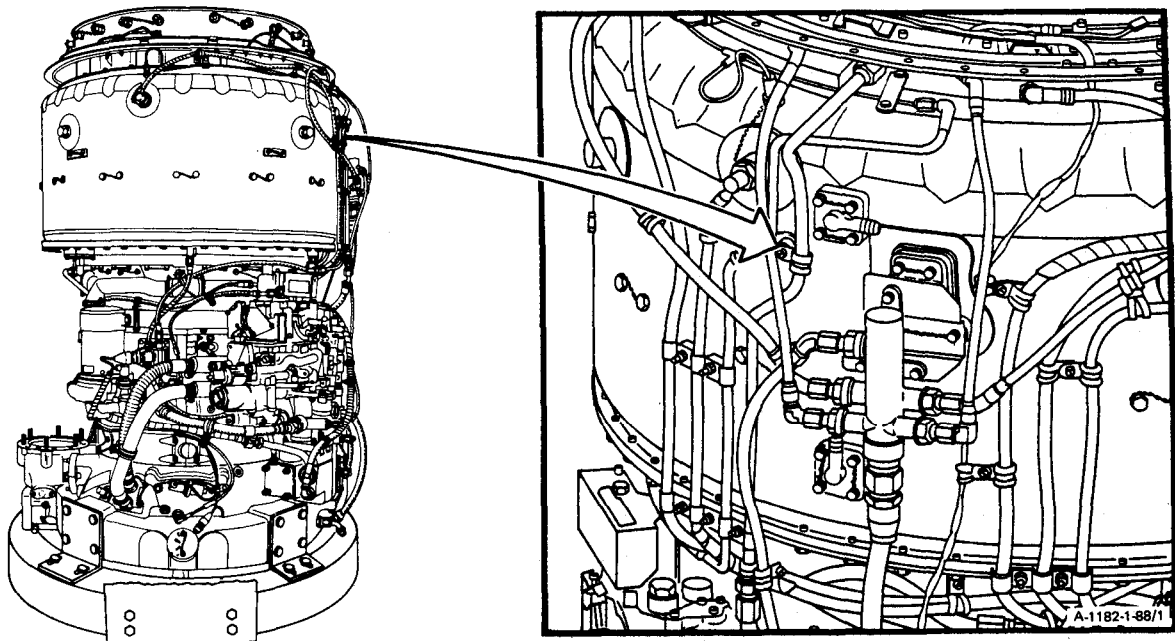
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

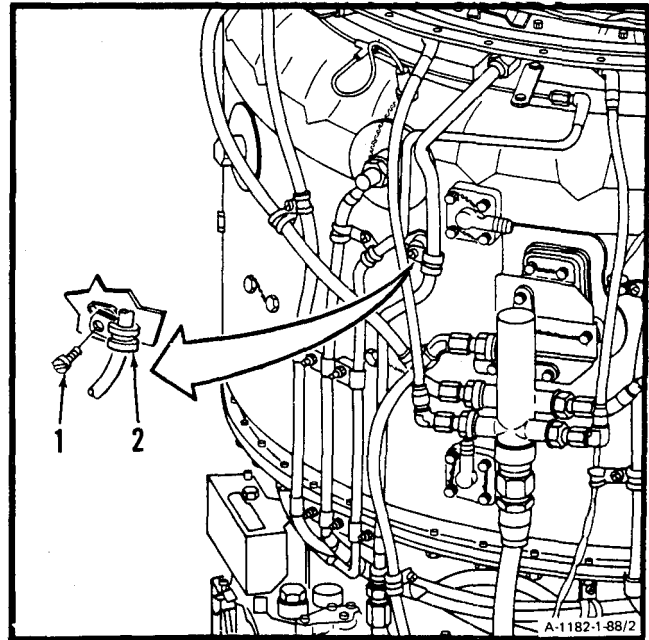
Task 3-6	Task 4-39	Task 4-42
Task 3-7	Task 4-40	Task 4-43
Task 4-37	Task 4-41	Task 4-44
Task 4-38		

General Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

**GO TO NEXT PAGE**

1. Remove lockwire, screw (1), and clamp (2).

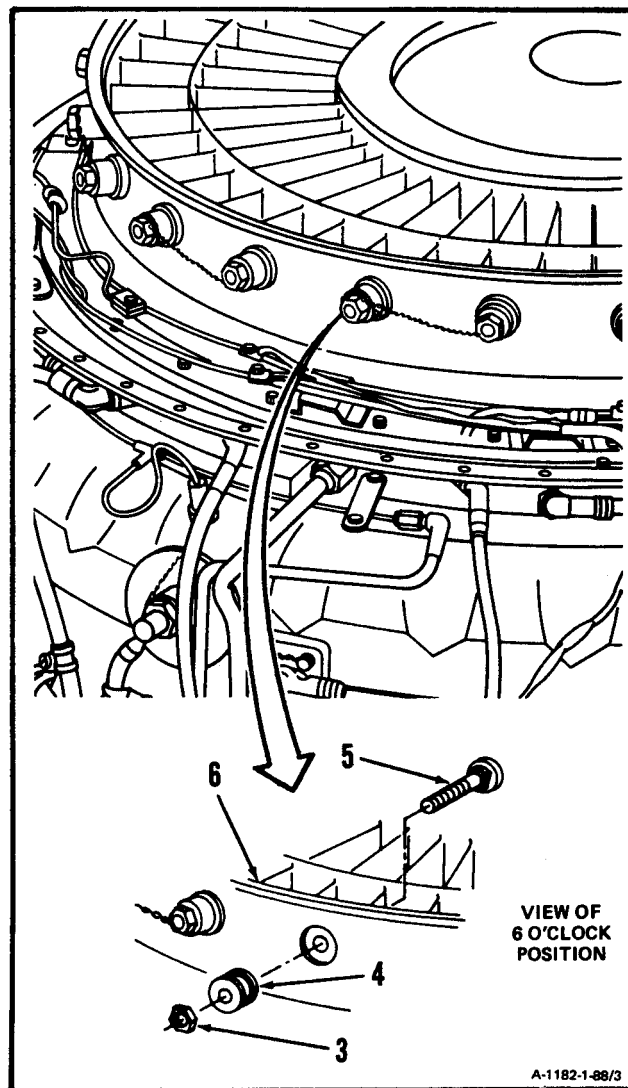


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1-88 CHECK FOR SEAL LEAKAGE (NO. 4 AND 5 BEARING) (AVIM) (Continued)

1-88

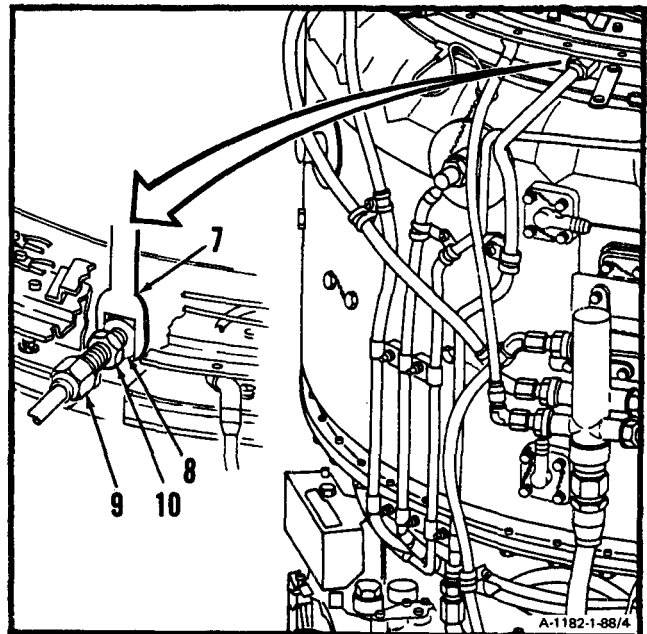
2. Remove lockwire, nut (3), spacer (4), and bolt (5) from exit vane assembly (6).

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CAUTION

In following step, hold No. 4 and 5 bearing scavenge adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

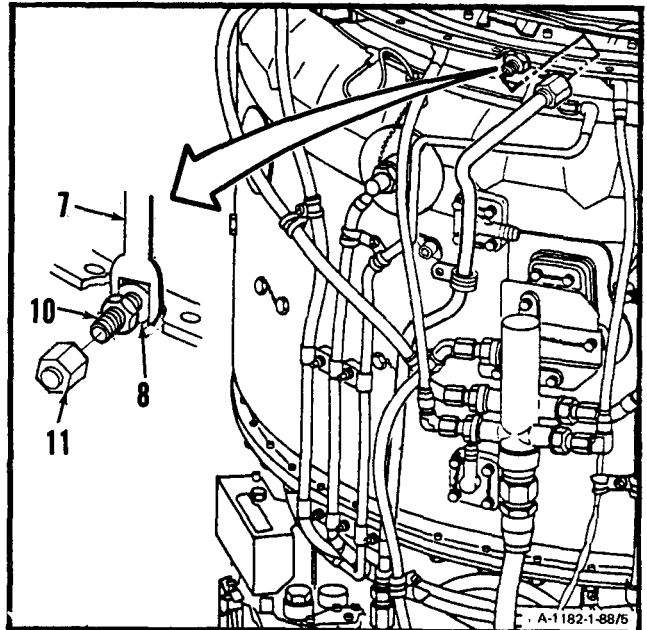
3. Place open-end wrench (T53) (7) on No. 4 and 5 bearing scavenge adapter (8).
4. **Disconnect tube assembly (9) from reducer (10).**



CAUTION

In following step, hold No. 4 and 5 bearing scavenge adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

5. Place open-end wrench (T53) (7) on No. 4 and 5 bearing scavenge adapter (8).
6. **Install pressure cap (11) on reducer (10).**

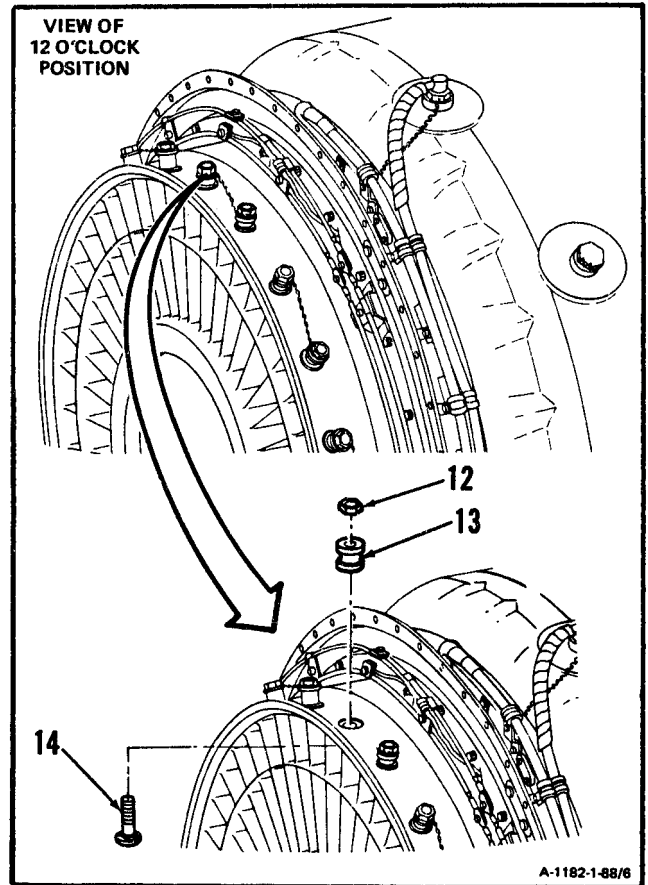


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1-88 CHECK FOR SEAL LEAKAGE (NO. 4 AND 5 BEARING) (AVIM) (Continued)

1-88

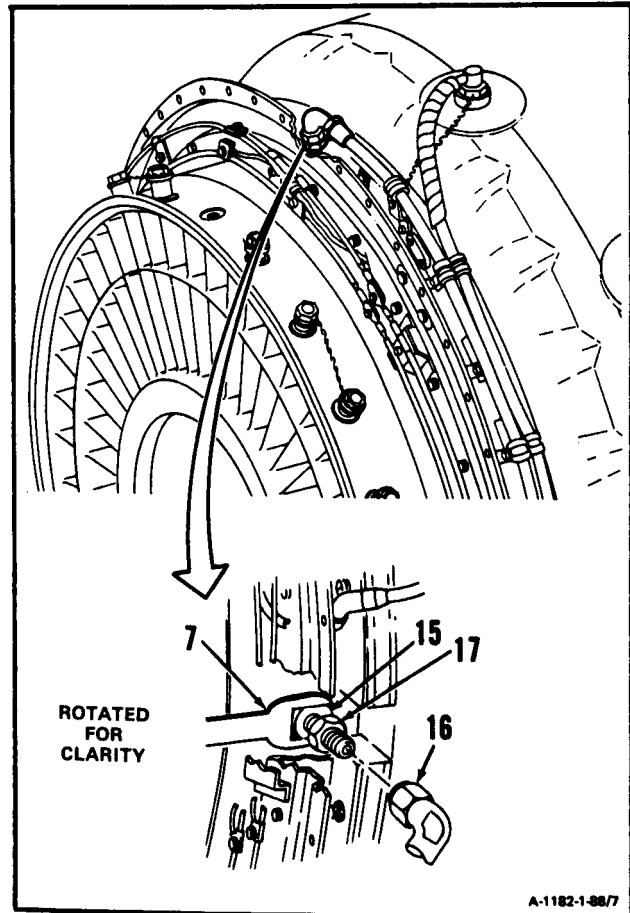
7. Rotate engine 90 degrees to horizontal position.
8. Remove lockwire, nut (12), spacer (13), and bolt (14).

**GO TO NEXT PAGE**

CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

9. Place open-end wrench (T53) (7) on No. 4 and 5 bearing lube adapter (15).
10. Disconnect hose assembly (16) from reducer (17).



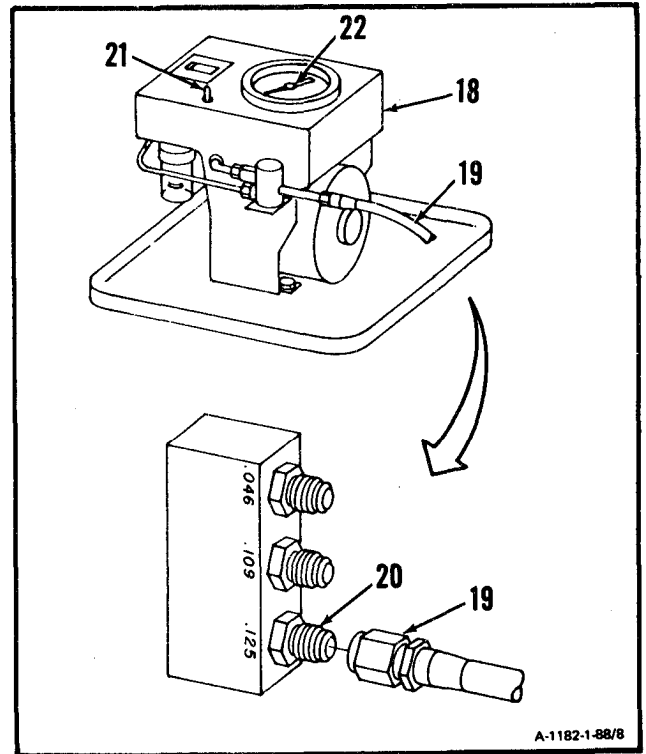
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1-88 CHECK FOR SEAL LEAKAGE (No. 4 AND 5 BEARING) (AVIM) (Continued)

1-88

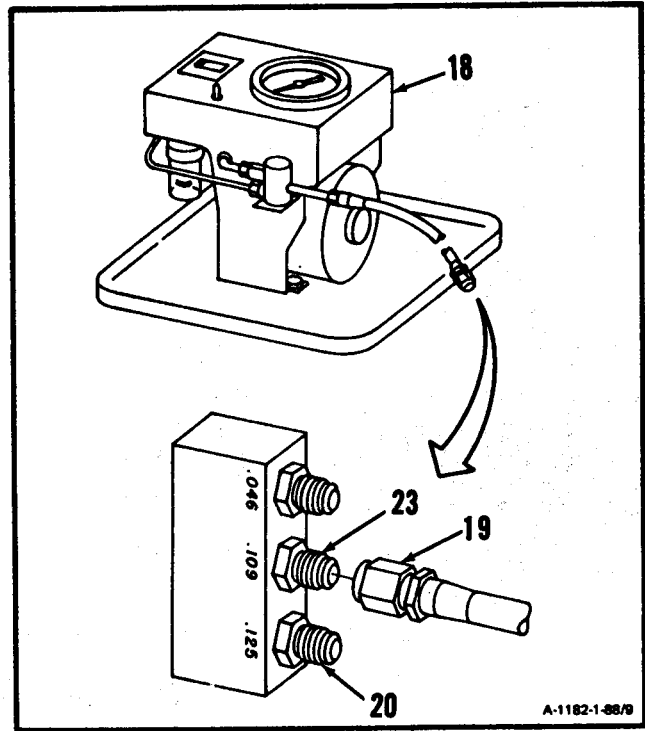
11. Check seal leakage tester (T44) (18) as follows:

- a. Connect hose (19) of seal leakage tester (T44) (18) to calibration block fitting (20).
- b. Turn vacuum pump switch (21) to ON position and run for one minute.
- c. Record reading on vacuum gage (22).
- d. Turn vacuum pump switch (21) to OFF position. Wait one minute.
- e. Turn vacuum pump switch (21) to ON position and run for one minute.
- f. Record reading on vacuum gage (22).
- g. Turn vacuum pump switch (21) to OFF position.
- h. Compare readings recorded in steps c. and f. If either reading is below 7 inches Hg., replace seal leakage tester (T44) (18).

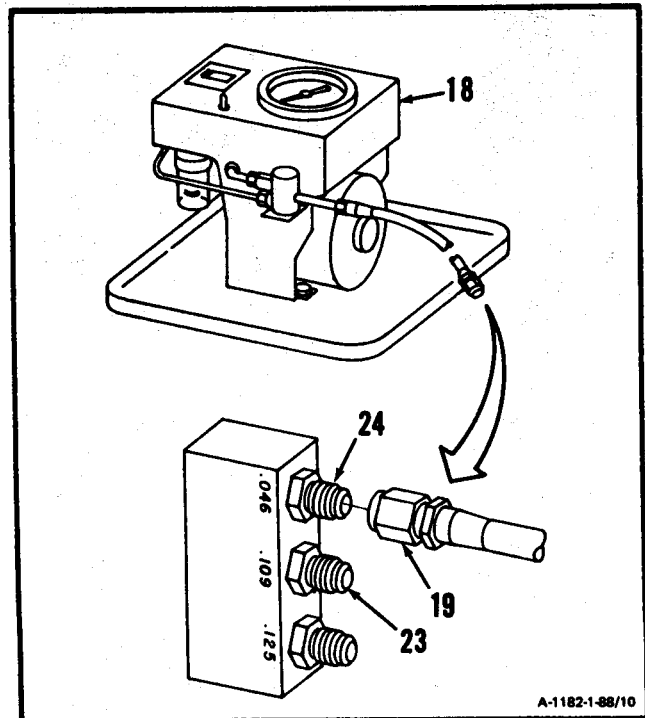


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- i. Disconnect hose (19) from calibration block fitting (20).
- j. Connect hose (19) to calibration block fitting (23).
- k. Repeat steps b. Thru g. Compare readings recorded in steps c. and f. If either reading is below 11 inches Hg., replace seal leakage tester (T44) (18).



- l. Disconnect hose (19) from calibration block fitting (23).
- m. Connect hose (19) to calibration block fitting (24).
- n. Repeat steps b. thru g. Compare readings recorded in steps c. and f. If either reading is below 23 inches Hg., replace seal leakage tester (T44) (18).
- o. Disconnect hose (19).

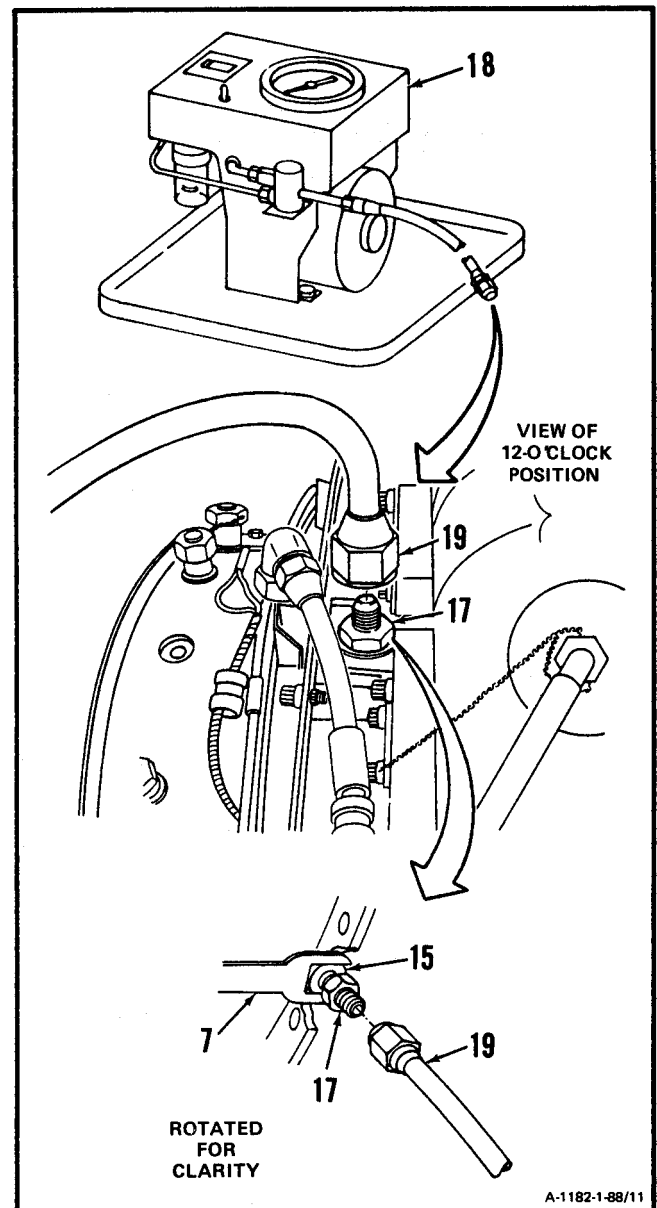


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CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

12. Place open-end wrench (T53) (7) on No. 4 and 5 bearing lube adapter (15).
13. Install hose (19) from seal leakage tester (T44) (18) on reducer (17).



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CAUTION

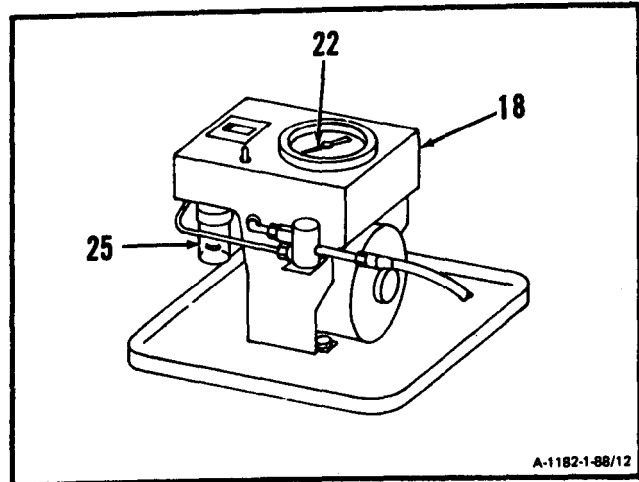
Oil level in filter bowl when tester is running should not be over one-half full. An overfilled filter bowl will allow oil to get into tester and cause damage.

14. **Start seal leakage taster (T44) (18)** and let it run for one minute. Do not record reading at this time.

NOTE

If tester is ever shut down to drain oil from bowl, test procedure must be repeated starting from step 13.

15. If filter bowl (25) is ever over half-full when testing, shutdown tester and drain oil.
16. **Shut down tester (T44) (18)** and wait one minute.
17. **Start seal leakage tester (T44) (18)** and let it run for one minute. At end of one minute, **take reading on vacuum gage (22)** while tester is still running. Record reading.
18. **Repeat steps 16. and 17.**
19. **If either recorded reading is 18 inches Hg. or higher, the seals are acceptable.** If seals are acceptable, do steps 21, a, thru o. and omit steps 21, p. thru x,
20. **If both recorded readings are below 18 inches Hg., rotate fourth stage power turbine rotor clockwise one full revolution and repeat steps 13. thru 16.**
21. **If both readings are still below 18 inches Hg., proceed as follows:**



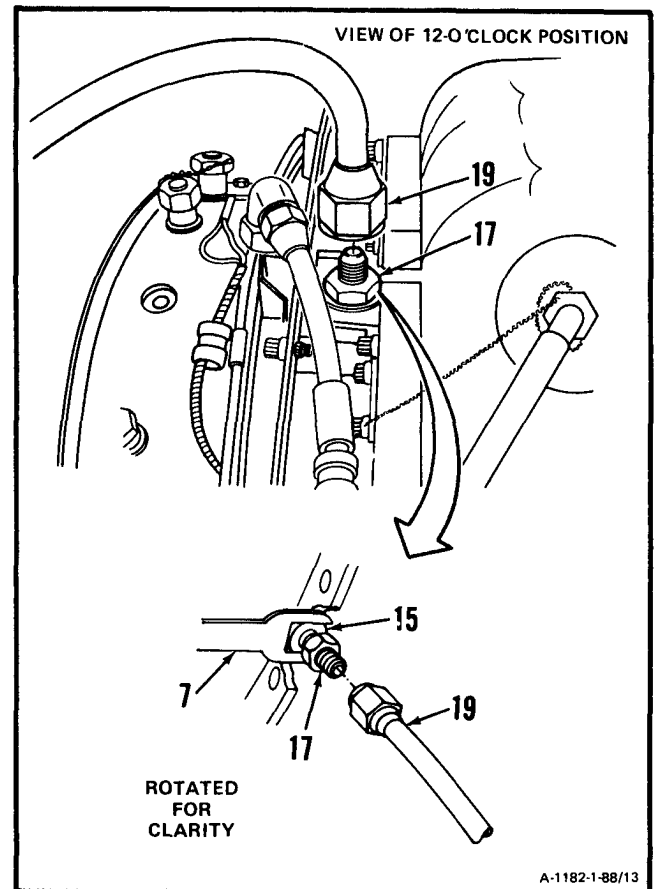
A-1182-1-88/12

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CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

- a. Place open-end wrench (T53) (7) on No. 4 and 5 bearing lube adapter (15).
- b. **Remove seal leakage taster hose (19) from reducer (17).**



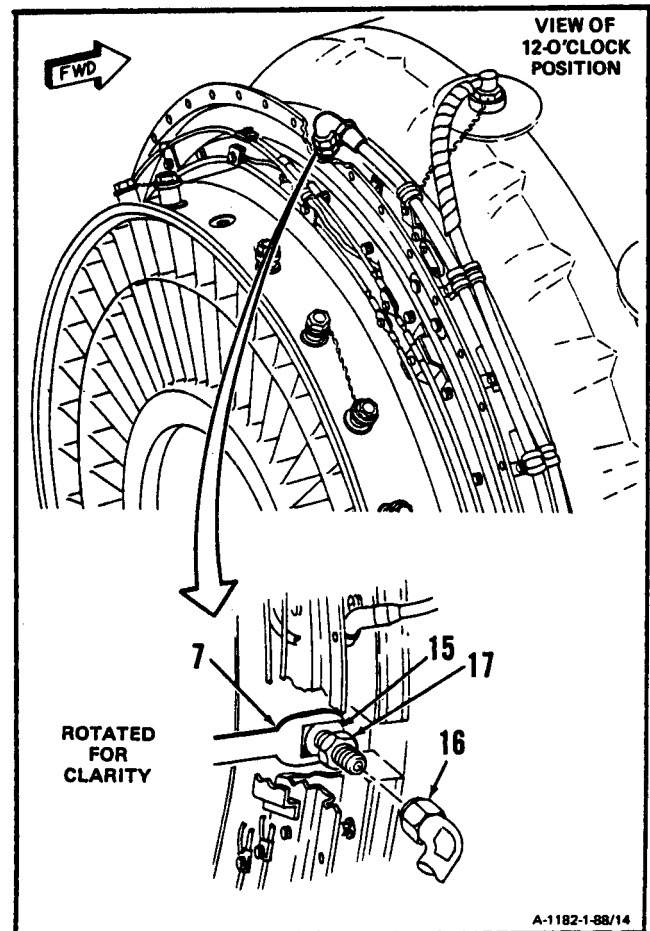
A-1182-1-88/13

GO TO NEXT PAGE

CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

- c. Place open-end wrench (T53) (7) on No. 4 and 5 bearing lube adapter (15).
- d. **Connect hose assembly (16) to reducer (17).**

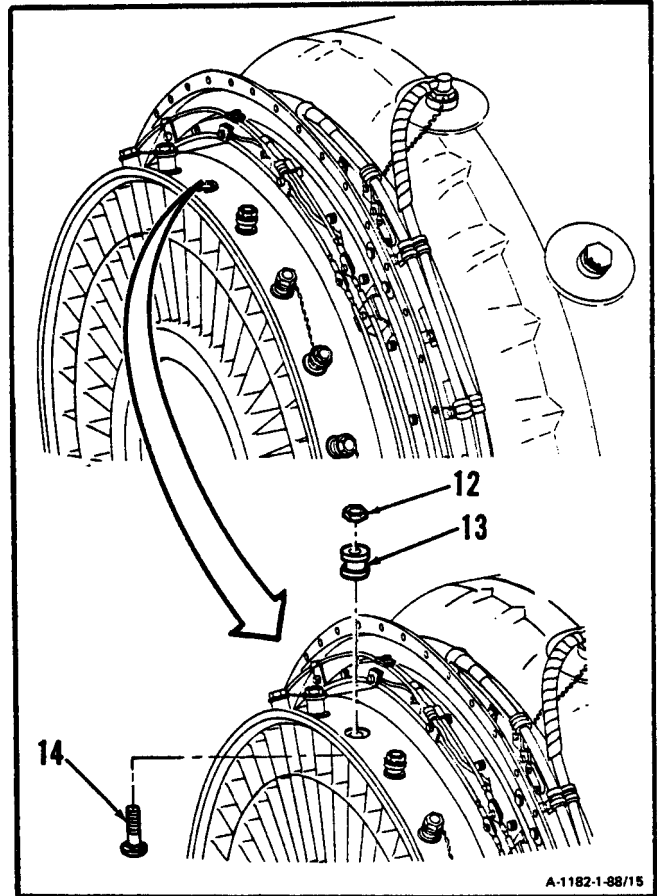


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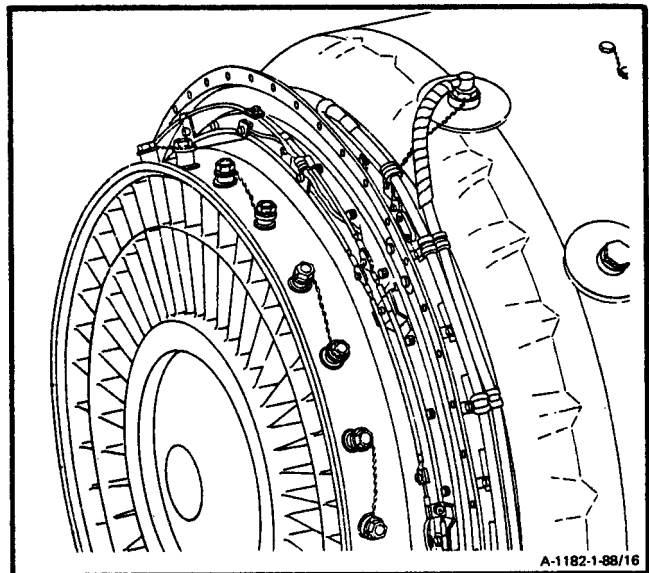
1-88 CHECK FOR SEAL LEAKAGE (NO. 4 AND 5 BEARING) (AVIM) (Continued)

1-88

- e. Install bolt (14), spacer (13), and nut (12).
Torque nut to 125 inch-pounds.
- f. Lockwire nut (12). Use lockwire (E29).



- g. Rotate engine 90 degrees to vertical position.

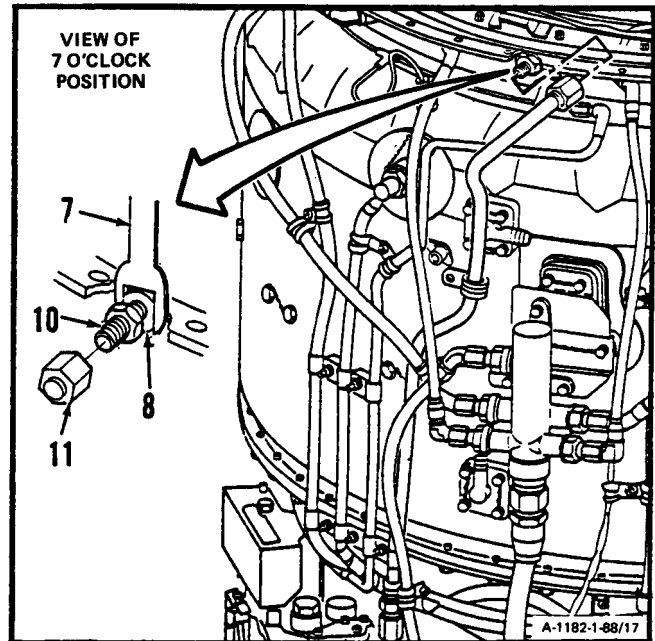


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CAUTION

In following step, hold No. 4 and 5 bearing scavenge adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

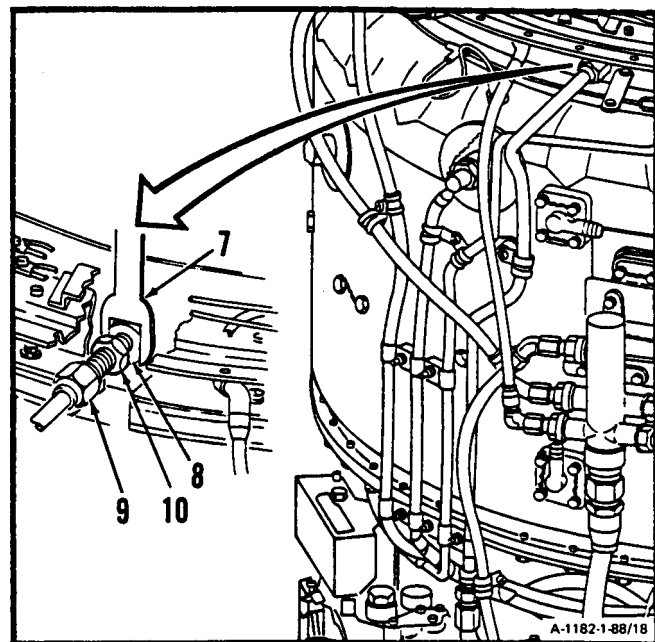
- h. Place open-end wrench (T53) (7) on No. 4 and 5 bearing scavenge adapter (8).
- i. Remove pressure cap (11) from reducer (10).



CAUTION

In following step, hold No. 4 and 5 bearing scavenge adapter using open-end wrench (T53), Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

- j. Place open-end wrench (T53) (7) on No. 4 and 5 bearing scavenge adapter (8).
- k. Connect tube assembly (9) to reducer (10).



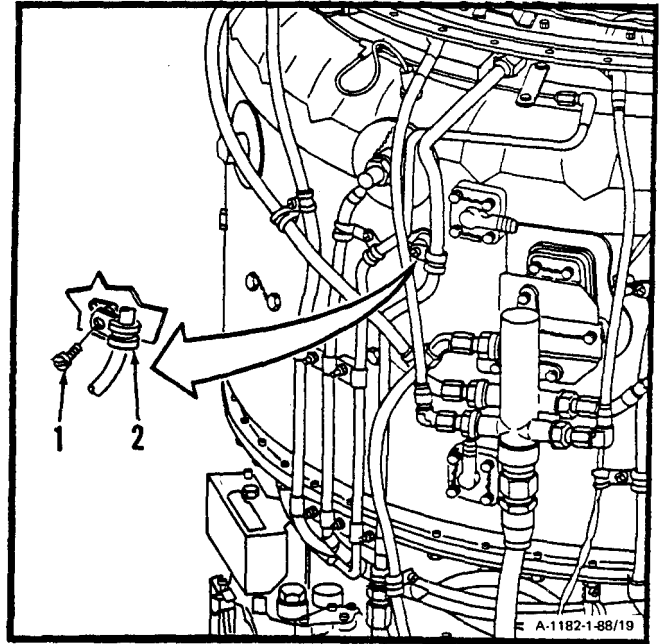
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1-88 CHECK FOR SEAL LEAKAGE (NO. 4 AND 5 BEARING) (AVIM) (Continued)

1-88

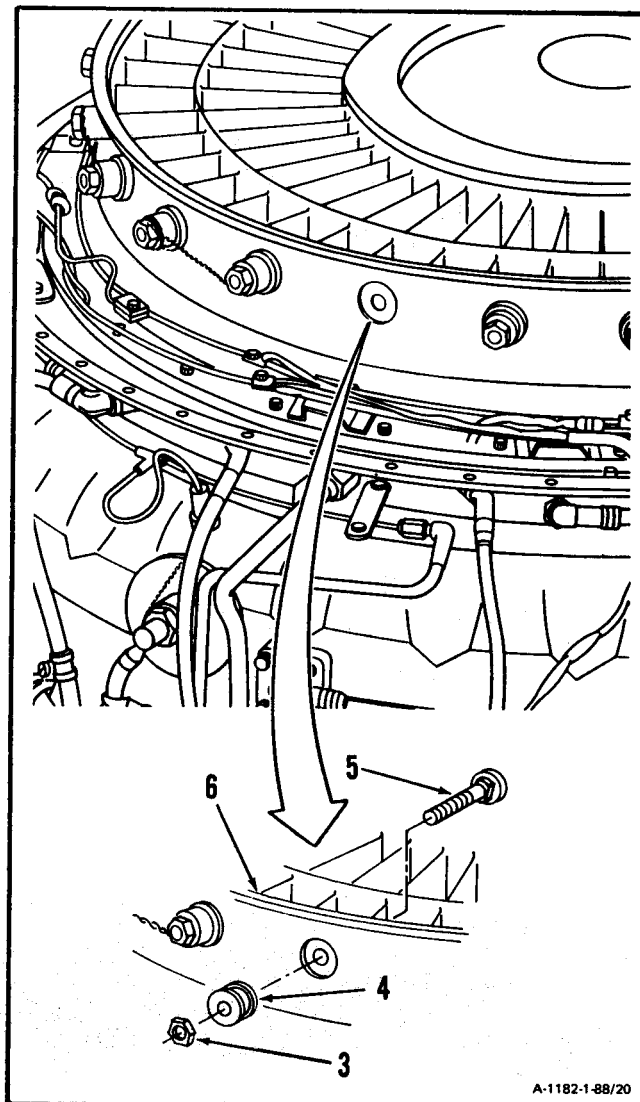
l. Install **clamp (2)** with screw (1).

m. Lockwire screw (1). Use lockwire (E29).



GO TO NEXT PAGE

- n. Install bolt (5), spacer (4), and nut (3) in exit vane assembly (6). Torque nut (3) to 125 inch-pounds.



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1-88 CHECK FOR SEAL LEAKAGE (NO. 4 AND 5 BEARING) (AVIM) (CONTINUED) 1-88

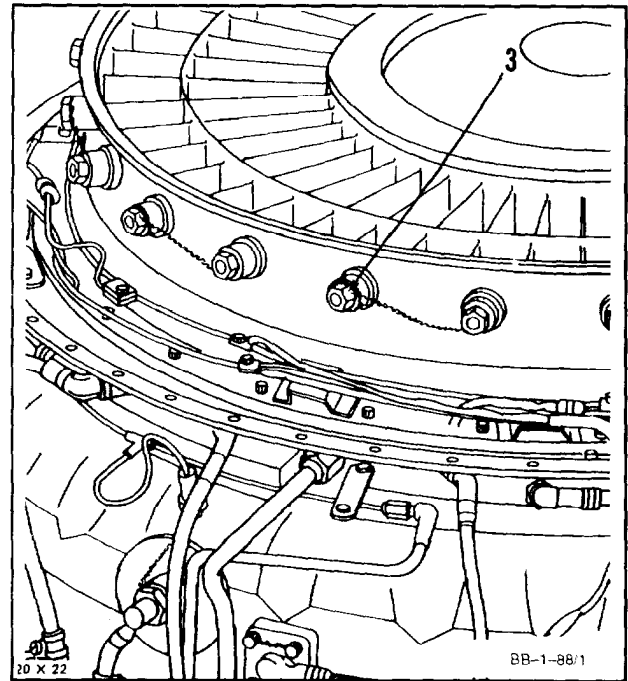
- o. **Lockwire nut (3).** Use lockwire (E29).

INSPECT

- p. **Remove No. 4 and 5 bearing package seals** (Ref. Task 4-37)
- q. **Remove No. 4 and 5 bearing oil tubes** (Ref. Task 441).
- r. **Clean No. 4 and 5 bearing oil tubes** (Ref. Task 442).
- s. **inspect No. 4 and 5 bearing oil tubes** (Ref. Task 443).
- t. **Install No. 4 and 5 bearing oil tubes** (Ref. Task 444).
- u. **Clean No. 4 and 5 bearing package** (Ref. Task 4-38).
- v. **Inspect No. 4 and 5 bearing package** (Ref. Task 4-39).
- w. **Install No. 4 and 5 bearing package seals** (Ref. Task 4-40).
- x. **Repeat steps 1 thru 21. If both readings are still below 18 inches Hg., replace power turbine** (Ref. Tasks 3-6 and 3-7).

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, 718-Inch
 Torque Wrench, 30-150 Inch-Pounds
 Container, 1 Quart
 Stopwatch

Materials:

Lockwire (E29)
 Wiping Rag

Parts:

Packing

Personnel Required:

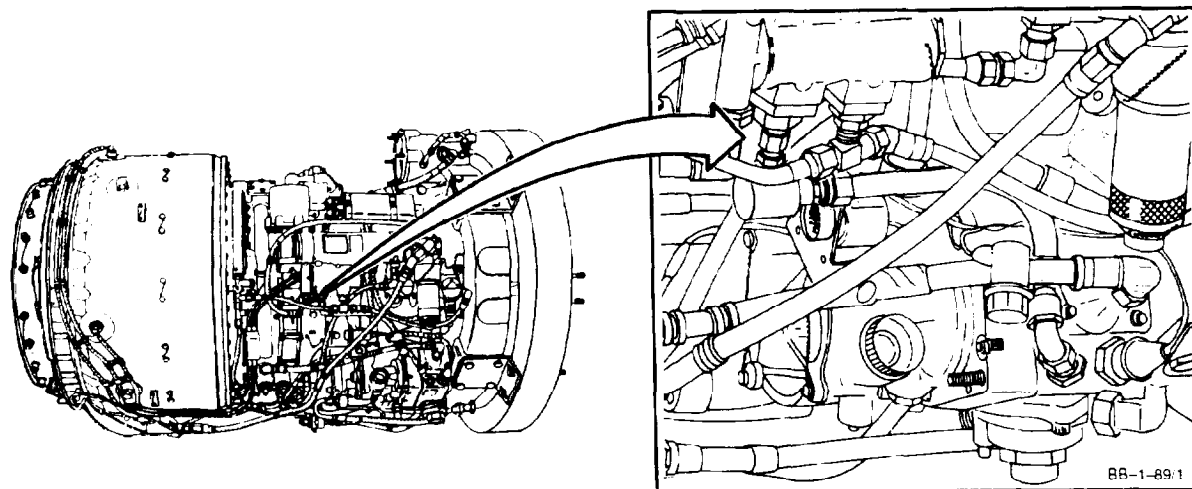
68B10 Aircraft Powerplant Repairer
 68B30 Aircraft Powerplant Inspector

References:

TM 55-2840-254-23P
 Task 2-58 Task 2-63

General/ Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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.



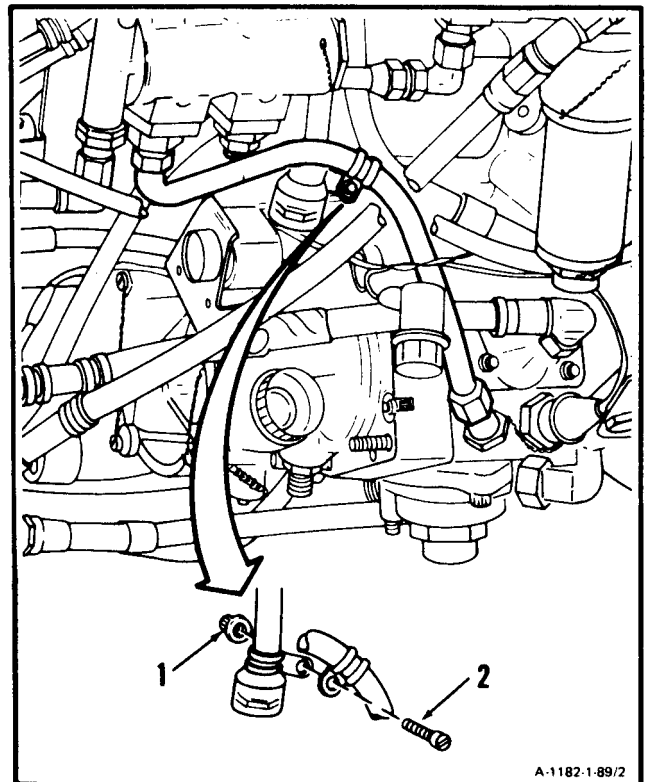
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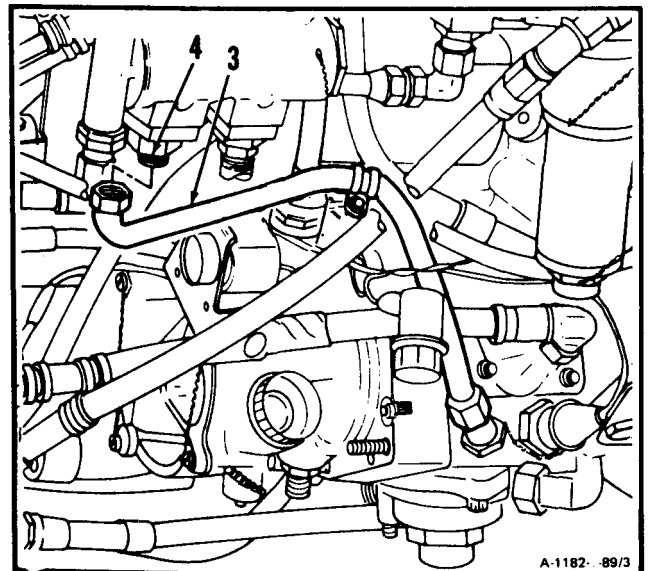
1-89 CHECK FOR STATIC OIL LEAKAGE (Continued)

1-89

1. Remove nut (1) and screw (2).

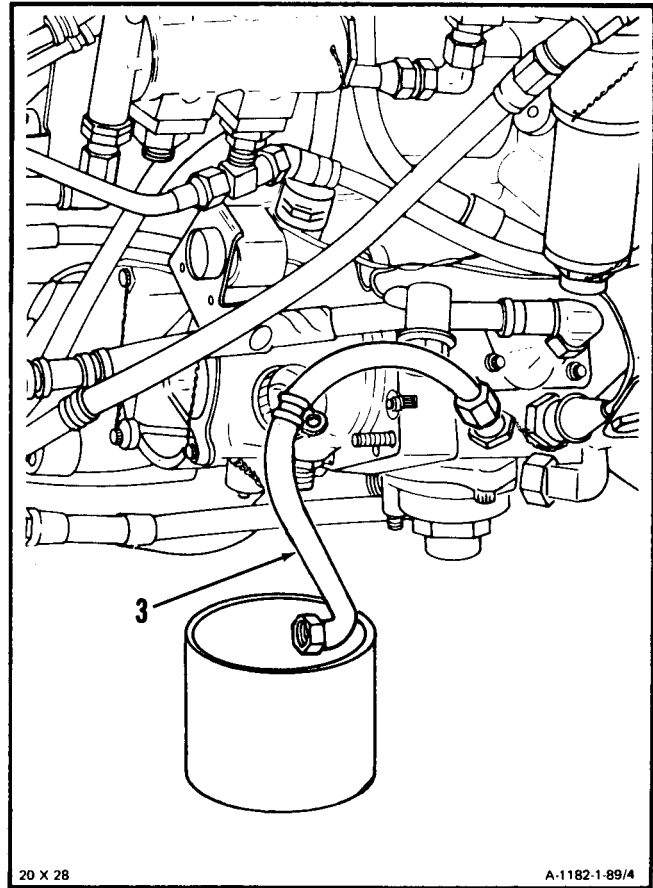


2. Disconnect hose assembly (3) from connector (4).

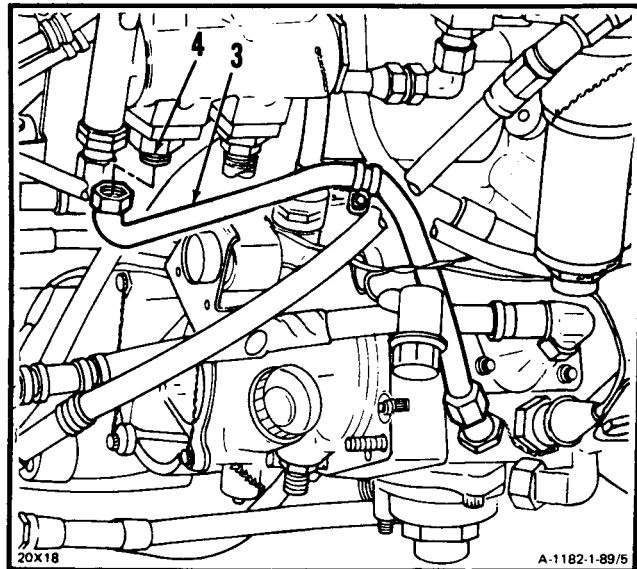


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3. Let end of hose assembly (3) hang below engine as shown and into container. Allow to drain for one hour. If, after one hour, one drop of oil falls every fifteen seconds or less, replace oil pump check valve (Ref. Tasks 8-4.1 and 8-4.2).



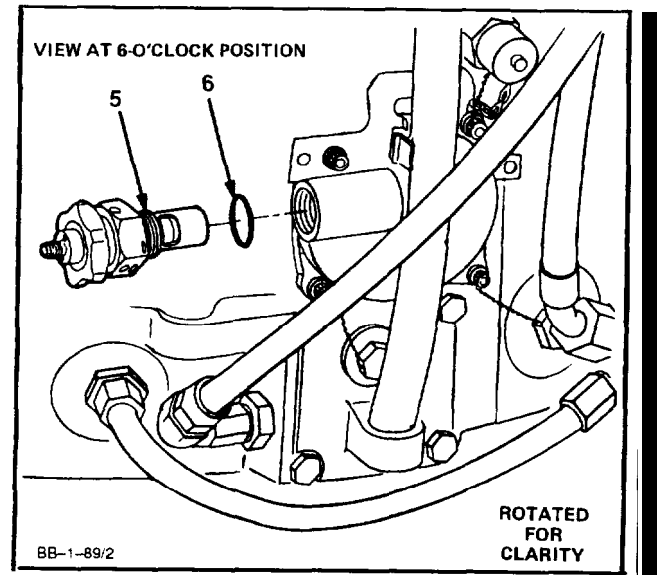
4. Connect hose assembly (3) to connector (4).



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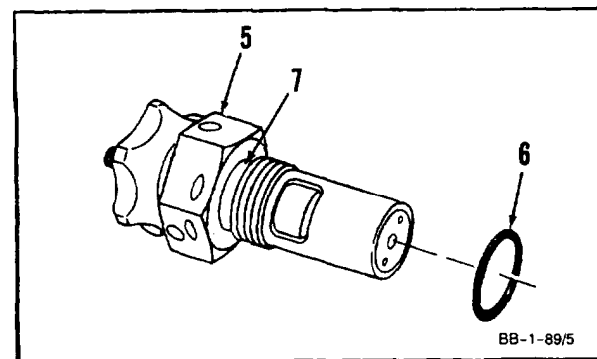
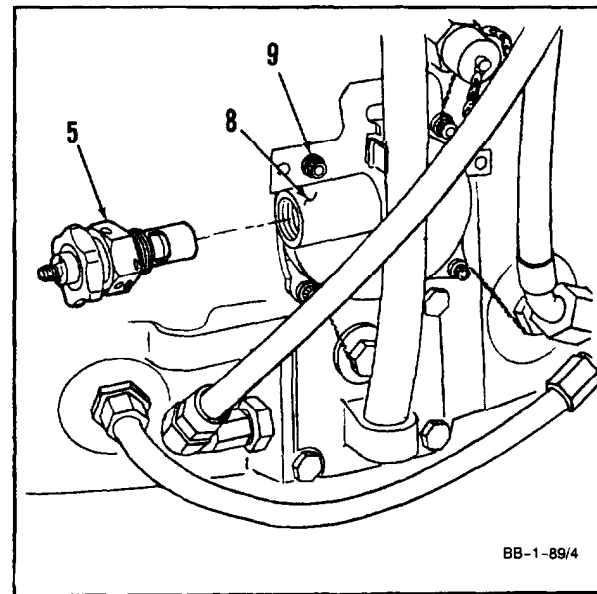
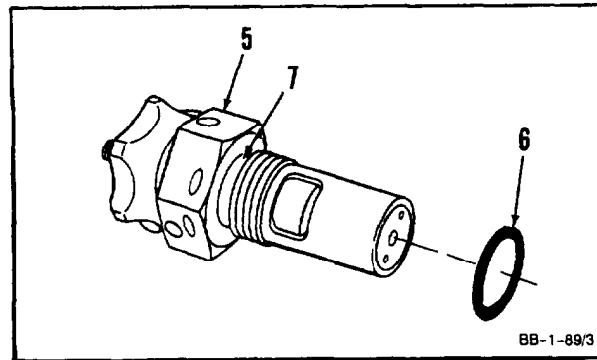
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6. Remove lockwire, chip detector (5) and packing (6) from accessory drive gearbox and allow oil to drain into container for one hour.



GO TO NEXT PAGE

7. After one hour, if there is more than 15 seconds between drops, go to step 9. If there is less than 15 seconds between drops, proceed as follows:
 - a. Install packing (6) in groove (7) on chip detector (5).
 - b. **Install chip detector (5) in housing (8).**
Torque to 95 inch pounds. Use crowfoot attachment. Lockwire chip detector (5) to bolt (9). Use lockwire (E29).
 - c. **Replace output shaft support housing**
 (Ref. Tasks 2-58 and 2-63).
8. If output shaft support housing is replaced, repeat steps 6. and 7..
9. **Install packing (6) in groove (7) on chip detector (5).**

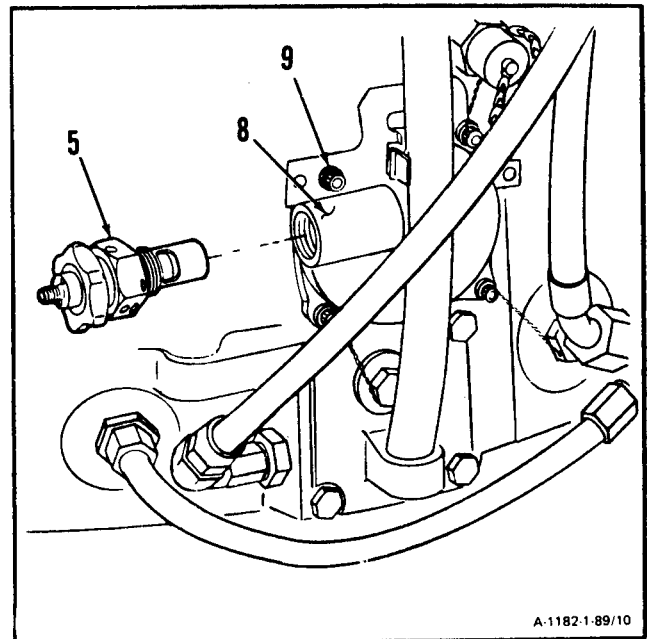


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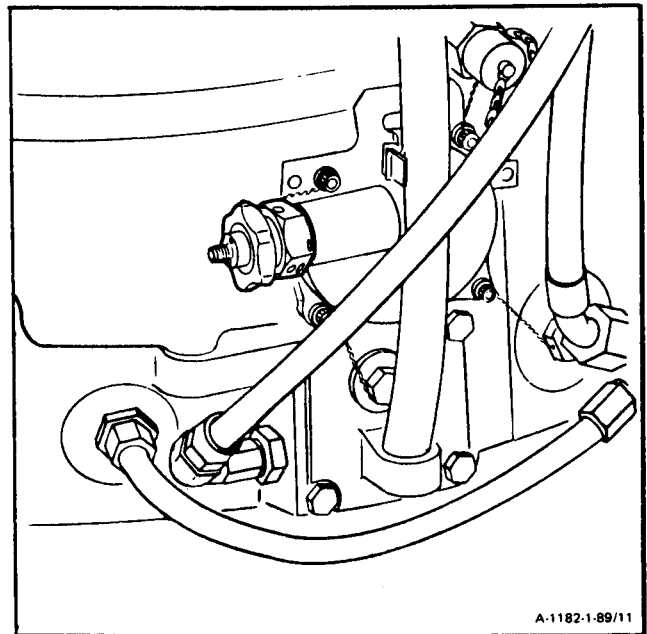
1-89 CHECK FOR STATIC OIL LEAKAGE (Continued)

1-89

10. **Install chip detector (5)** in housing (8). **Torque to 95 inch-pounds.** Use crowfoot attachment. Lockwire chip detector (5) to bolt (9). Use

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

Service Engine Oil System (Task 1-74).

**END OF TASK**

1-90 INSPECT ENGINE AFTER COMPRESSOR STALL (SURGE)

1-90

INITIAL SETUP**Materials:**

None

Applicable Configurations:

All

Personnel Required:

68B10 Aircraft Powerplant Repairer

68B30 Aircraft Powerplant Inspector

Tools:

Powerplant Mechanic's Tool Kit,

NSN 5180-00-323-4944

Technical Inspection Tool Kit,

NSN 5180-00-323-5114

References:

Task 1-47

Task 2-19

Task 1-92

Task 2-24

NOTE

Compressor stall (surge) is characterized by sharp rumbles or loud sharp reports and severe engine vibration. A rapid rise in measured gas temperature is also noted, depending on how severe the surge is.

1. If it is suspected that compressor surge has occurred, proceed as follows:
 - a. **Inspect aircraft and engine records** to determine any history related to the suspected compressor surge condition.
 - b. **Discuss suspected compressor surge condition** with pilot concerned or maintenance chief to evaluate surge circumstances.
 - c. Check the following items:
 - (1) **Inspect inlet housing and compressor** for obstruction or accumulation of dirt, salt, or other foreign matter.

GO TO NEXT PAGE

1-90 INSPECT ENGINE AFTER COMPRESSOR STALL (SURGE) (Continued)

1-90

- (2) **Inspect first stage compressor rotor blades** through inlet ducts for evidence of erosion or foreign object damage (Ref. Task 1-92).
- (3) **Determine that improper adjustment or operation of interstage air-bleed actuator and bleed band are not causing surge** (Ref. Task 1-47).

GO TO NEXT PAGE

1-90 INSPECT ENGINE AFTER COMPRESSOR STALL (SURGE) (Continued)

1-90

- (4) **Determine that improper adjustment or operation of fuel control is not causing surge** (Ref. Task 1 -47).
- (5) **Remove upper compressor housing** (Ref. Task 2-19). **Inspect leading edges and tip areas** of compressor rotor blades and vanes for cutback due to erosion.
- (6) **Install upper compressor housing** (Ref. Task 2-24).

INSPECT

- 2. If the preceding checks reveal no defects, or if defects cannot be corrected, **replace engine**.

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-91 INSPECT ENGINE AFTER CHECK RUNS

1-91

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:

68B10 Aircraft Powerplant Repairer
68630 Aircraft Powerplant Inspector

References:

TM 55-1520-240-10
Task 1-107
Task 8-23
Task 8-27

-
1. **Inspect engine** after normal, acceleration, and margin check runs (Ref. TM 55-1520-240-10 or Task 1-107) as follows:
 - a. **Inspect** for leaks and security of mounting provisions, hoses, and accessories.
 - b. **Remove Oil Filter Cap and Stem Assembly and Oil Filter Element** (Ref. Task 8-23).
 - c. **Inspect for accumulation of foreign material.**
 - (1) If foreign material is present, **install oil filter cap and stem assembly and new oil filter element** (Ref. Task 8-27).
 - (2) If no foreign material is present, **install oil filter cap and stem assembly and oil filter element** (Ref. Task 8-27).

INSPECT**FOLLOW-ON MAINTENANCE:**

Service Engine Oil System (Task 1-74).

END OF TASK

1-92 INSPECT ENGINE AFTER FOREIGN OBJECT INGESTION

1-92

INITIAL SETUP**Materials:**

None

Applicable Configurations:

All

Personnel Required:

68B10 Aircraft Powerplant Repairer

68B30 Aircraft Powerplant Inspector

Tools:

Powerplant Mechanic's Tool Kit,

NSN 5180-00-323-4944

Technical Inspection Tool Kit,

NSN 5180-00-323-5114

Extension Light

Flat Hand File

References:

Task 1-93

Task 2-28

Task 2-19

Task 2-33

Task 2-22

Task 3-5

NOTE

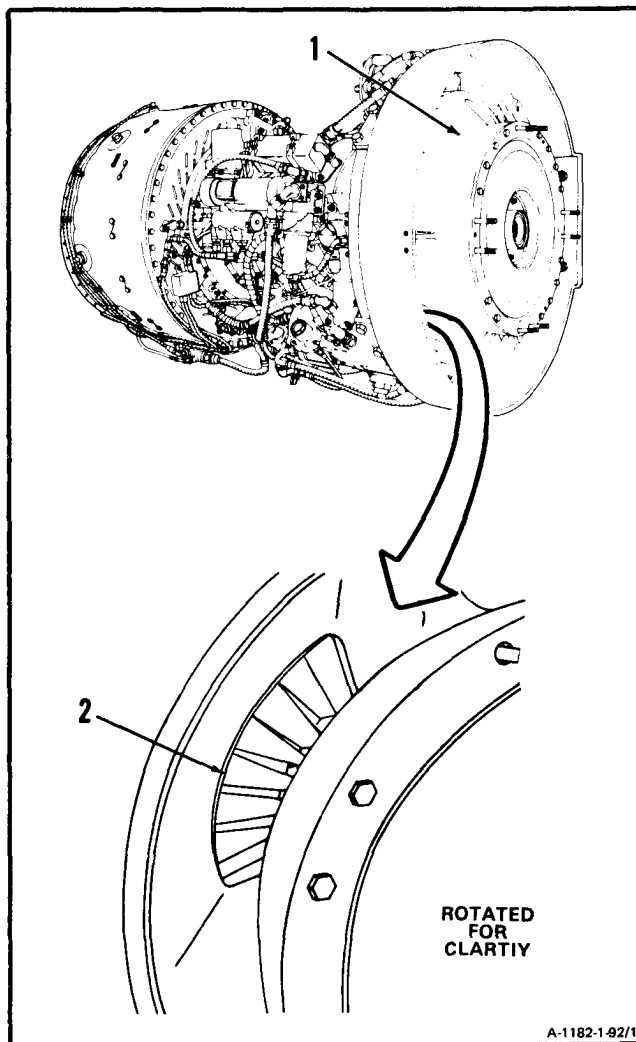
Perform foreign object ingestion inspection using a strong light and a mirror to determine extent of foreign object ingestion.

1. Inspect inlet housing assembly (1) as follows:

- a. There shall be no cracks.
- b. Damaged paint (although an indication of FOD) can be repaired by applying engine gray enamel (E22). Refer to Task 1-119.
- c. If cracks are found engine must be returned to depot.

2. Inspect first stage insert (2) as follows:

- a. There shall be no cracks.
- b. There shall be no dents.
- c. If cracks or dents are found, proceed to step 5.

**GO TO NEXT PAGE**

3. Inspect first stage compressor rotor blades (3)
as follows:

- a. There shall be no cracks.
- b. There shall be no bends or distortion.
- c. Surface nicks or dents shall not exceed limits shown in Task 2-33. Minor nicks or dents including minor leading or trailing edge damage can be repaired if limits in Task 2-33, Paragraph 1D, F, H, I, J & K have not been exceeded and no FOD is detected on first stage vane Assy. If FOD is detected on first stage stator vane proceed to Step 5.

NOTE

Repair of 1st stage compressor blade minor nicks or dents including the leading or trailing edge can be accomplished without removing the compressor housing. Repair will be performed through the inlet housing.

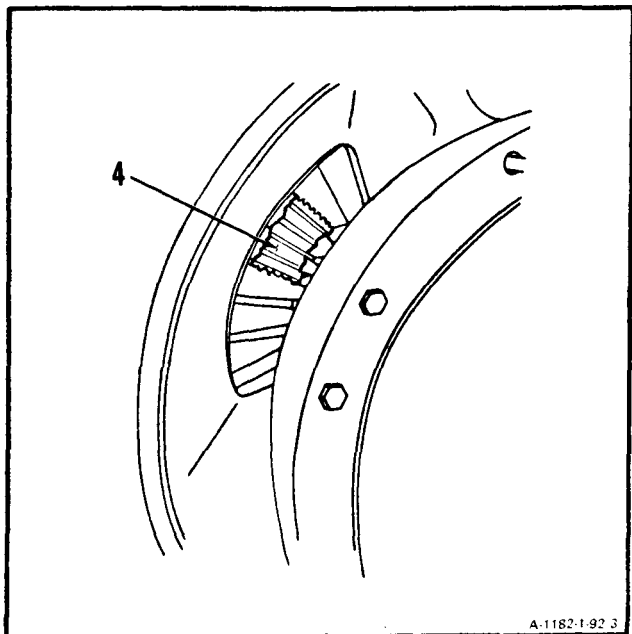
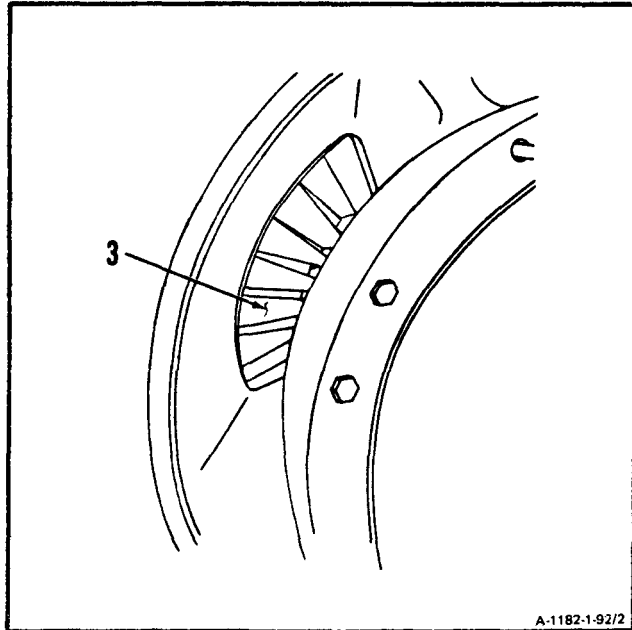
To assist in damage determination criteria, modeling clay or certa wax (E63) can be used to mold damage from blade. This is then removed and measured.

Refer to Task 2-34 for repair of compressor rotor blades.

- d. If cracks, bends or distortions are found, proceed to Step 5.

NOTE

This procedure applies to both top and bottom stator vane assemblies.



4. Inspect stator vane assemblies (4) as follows:

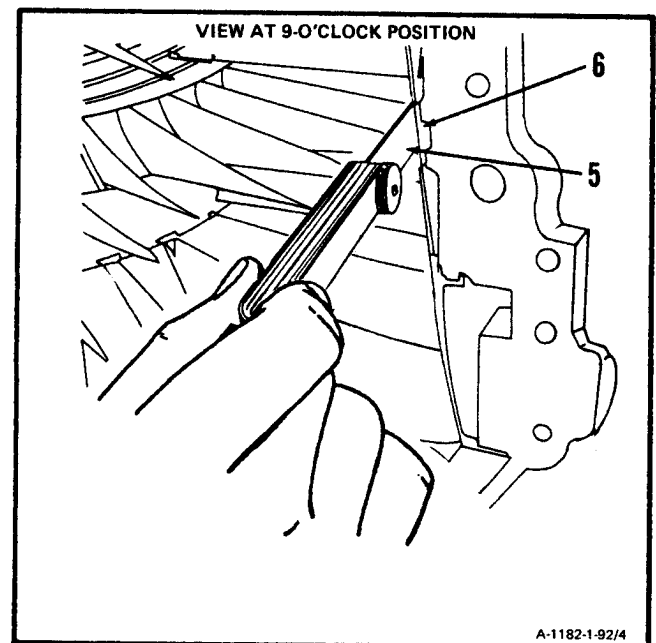
- a. There shall be no cracks.
- b. There shall be no nicks, burrs, pits or dents.
- c. If cracks, nicks, burrs, pits or dents are found, proceed to step 5.

GO TO NEXT PAGE

NOTE

If it is determined that foreign object damage has occurred to inlet housing, first stage insert, compressor blades, or stator vane assemblies, a thorough inspection of compressor blades, stator vane assemblies, centrifugal compressor, and compressor housings must be performed. If foreign object damage is not evident, omit step 5.

5. **Remove upper compressor housing** (Ref. Task 2-19) and proceed as follows:
 - a. **inspect compressor rotor blades** (Ref. Task 2-33).
 - b. **Inspect centrifugal impeller** (Ref. Task 2-33).
 - c. **Inspect compressor housing** (Ref. Task 2-22).
 - d. **Inspect stator vane assemblies** (Ref. Task 2-28).
 - e. **Check clearance between compressor housing and first through seventh stage compressor rotor blades as follows:**
 - (1) Using thickness gage (5), check right and left sides of compressor housing (6).
 - (2) Tip clearance shall not be less than 0.019 inch for all stages.



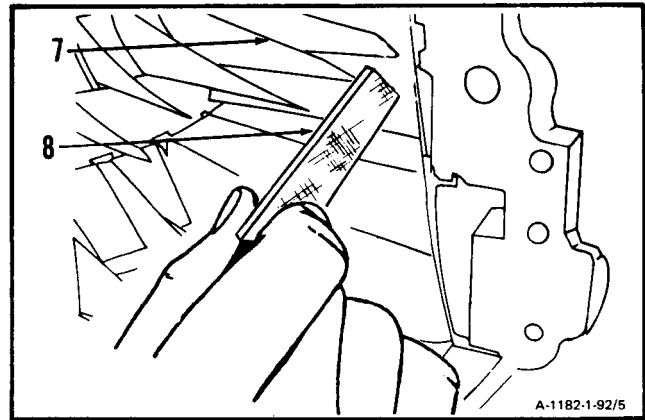
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CAUTION

Do not use power grinder to remove metal from blade. Power grinder could easily damage blade.

- (3) If tip clearance is less than 0.019 inch file tip of blade (7) with file (8) to obtain tip clearance same as two adjacent blades.



- f. If centrifugal impeller is damaged but is within repair limits, **remove combustion section and power turbine** (Ref. Task 3-5) and **inspect engine hot end** (Ref. Task 1-93).
- g. If any of the above inspections indicate damage beyond repair limits, replace engine.

INSPECT**FOLLOW-ON MAINTENANCE:**

Install Upper Compressor Housing (Task 2-24).

END OF TASK

1-93 INSPECT ENGINE HOT END (AVIM)

1-93

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
- Aircraft Group Cover (T24)
- Clamp Coupling Half (T37)
- Outside Micrometer Caliper Set
- Thickness Gage (Appendix E)

Materials:

- Aluminum Oxide Cloth (E4)
- Marking Pencil (E34)
- Vexar Nylon Webbing (E56)

Equipment Condition:

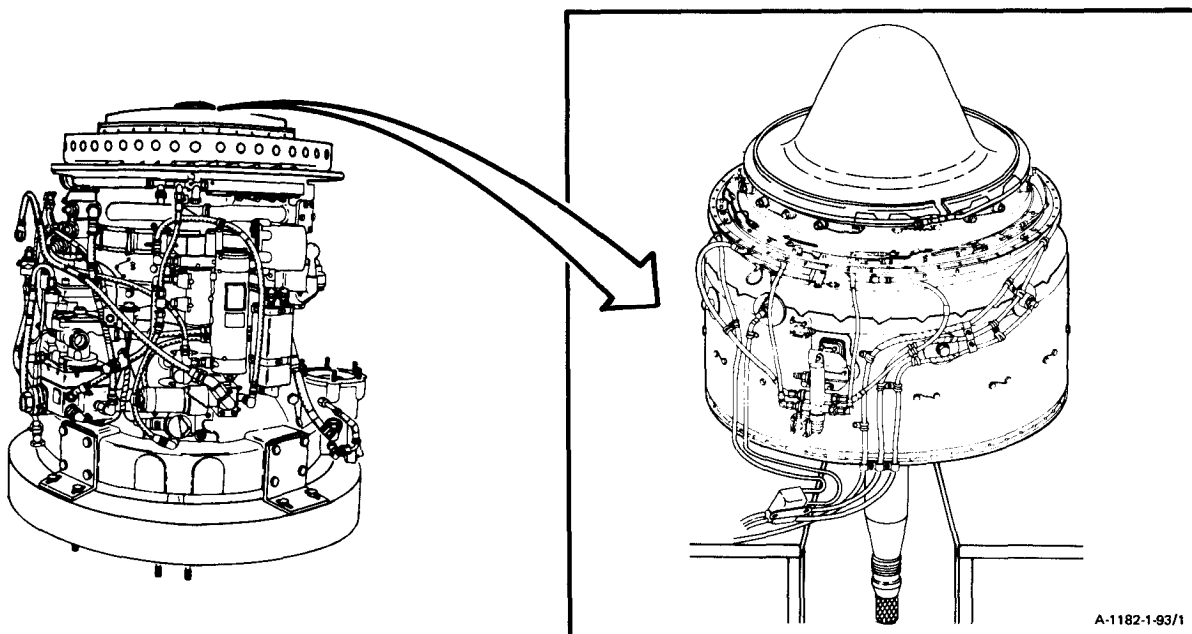
- Off Engine Task
- Engine Oil System Drained (Task 1-75)
- Combustion Section and Power Turbine
Removed (Task 3-5)

Personnel Required:

- 68B10 Aircraft Powerplant Repairer (2)
- 68B30 Aircraft Powerplant Inspector

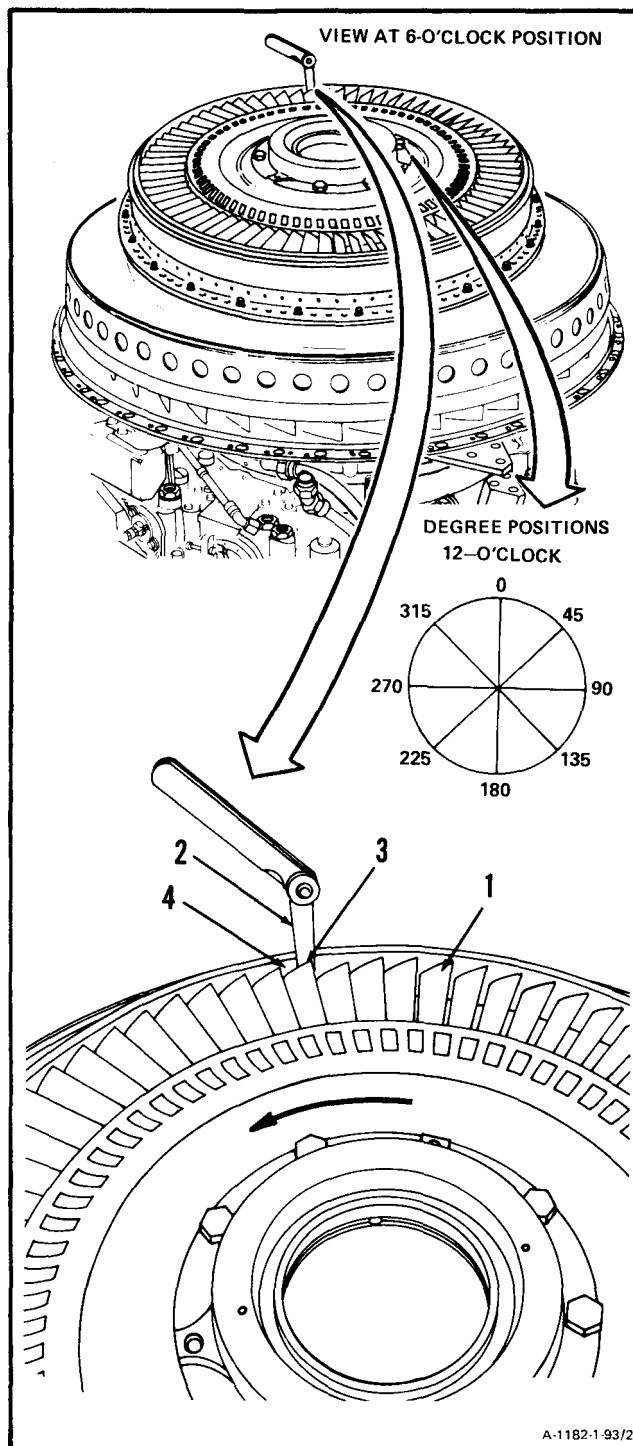
References:

<u>Tasks</u>	<u>Tasks</u>	<u>Tasks</u>	<u>Tasks</u>	<u>Tasks</u>	<u>Tasks</u>
1-118	3-20	4-31	4-55	4-71	6-22
3-1	4-12	4-32	4-57	4-73	6-23
3-2	4-13	4-33	4-58	4-74	6-24
3-3	4-14	4-34	4-59	4-75	6-25
3-4	4-15	4-35	4-60	4-76	6-26
3-6	4-20	4-36	4-61	4-77	6-27
3-7	4-21	4-45	4-62	4-78	6-28
3-9	4-22	4-46	4-63	4-79	6-42
3-10	4-23	4-47	4-64	4-80	6-43
3-13	4-24	4-48	4-65	4-82	6-44
3-14	4-25	4-49	4-66	6-16	6-45
3-16	4-26	4-50	4-67	6-17	7-6
3-17	4-27	4-51	4-68	6-18	7-7
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3-19	4-29	4-53	4-70	6-21	7-10
	4-30				



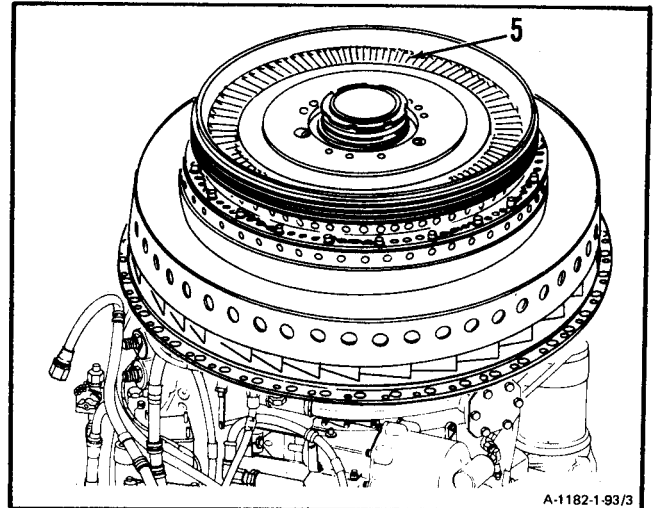
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1. Rotate engine 45 degrees. **Measure second turbine disc assembly clearance** at 0, 45, 90, 135, 180, 225, 270 and 315 degree positions as follows:
 - a. Insert thickness gage (2) between blade tip (3) and second turbine nozzle inside diameter (4).
 - b. **Measure and record minimum tip clearance** while rotating second turbine disc assembly (1) counterclockwise one revolution for each check.
 - c. Tip clearance shall be 0.025 inch minimum. Record clearance.
 - d. **If tip clearance is less than 0.025 inch repair second turbine nozzle** (Ref. Task 4-60).
2. **Remove and inspect second turbine disc assembly (1)** (Ref. Tasks 4-53 and 4-55).



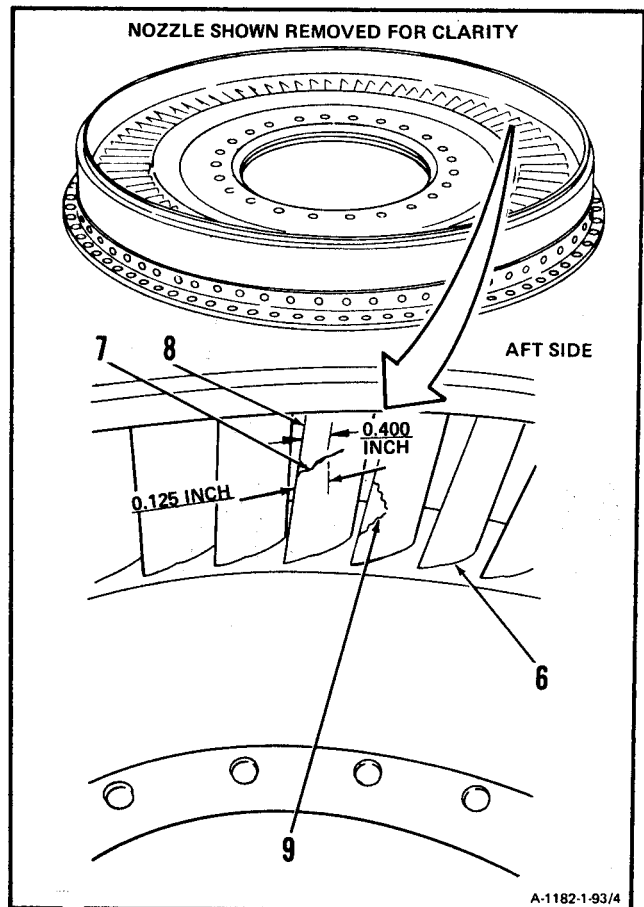
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3. Inspect second turbine nozzle (5) as follows:



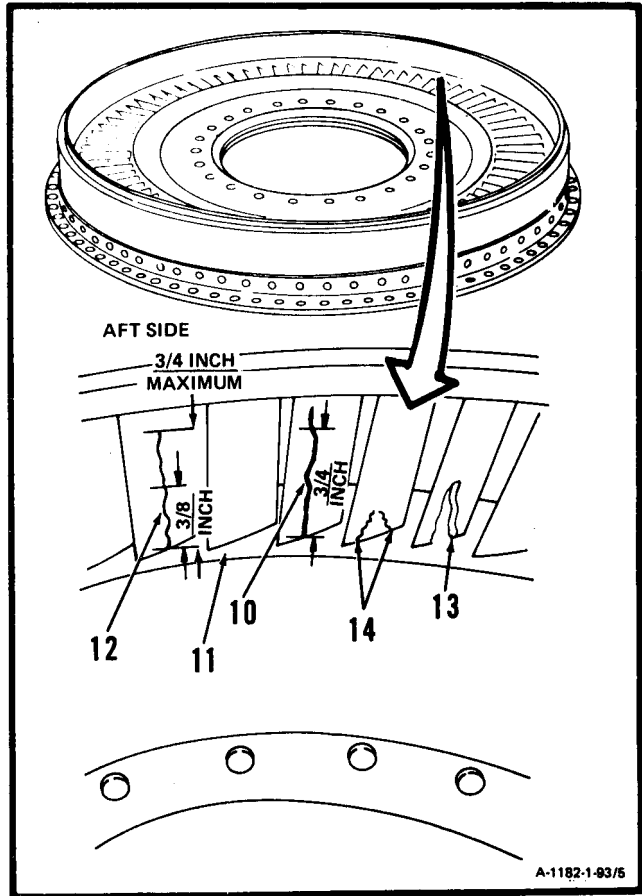
a. Inspect 77 vanes (6) as follows:

- (1) There shall be no cracks (7) in trailing edge (8) longer than 0.400 inch.
- (2) There shall be no more than one crack (7) in trailing edge (8) of each vane longer than 0.125 inch.
- (3) There shall be no converging cracks (9) in trailing edge (8).
- (4) There shall be no missing or burned off material.



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- (5) There shall be no radial cracks (10) from inner shroud (11) longer than 3/4 inch.
- (6) There shall be no more than one radial crack (12) on each vane from inner shroud (11) longer than 3/8 inch.
- (7) There shall be no more than four vanes with radial cracks (12) from inner shroud (11) longer than 3/8 inch.
- (8) There shall be no cracks (13) with vane core visible.
- (9) There shall be no converging radial cracks (14).
- (10) There shall be no vane with more than three radial cracks longer than 3/8 inch.

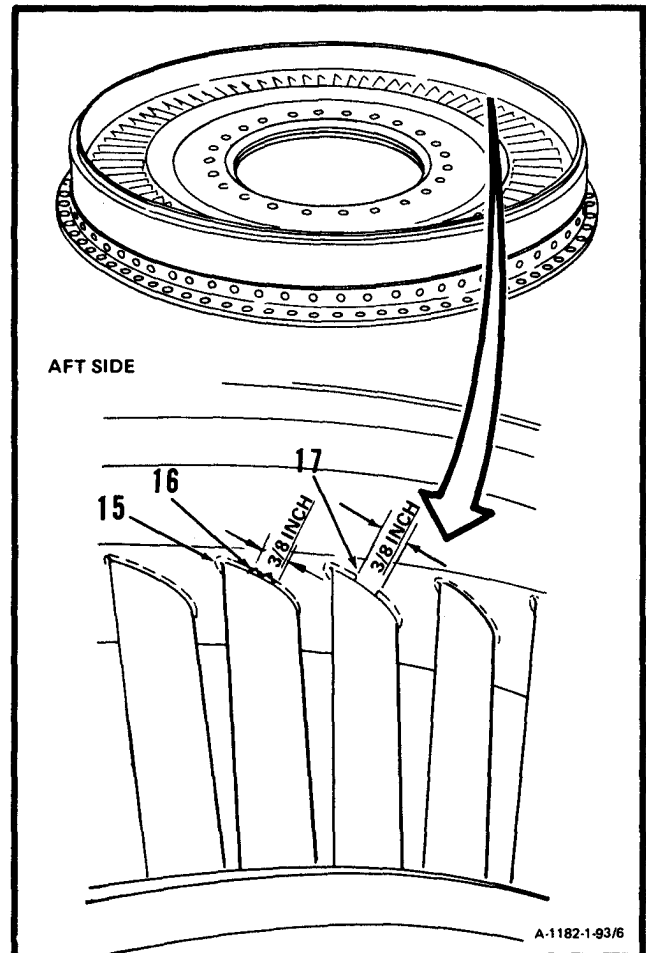


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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

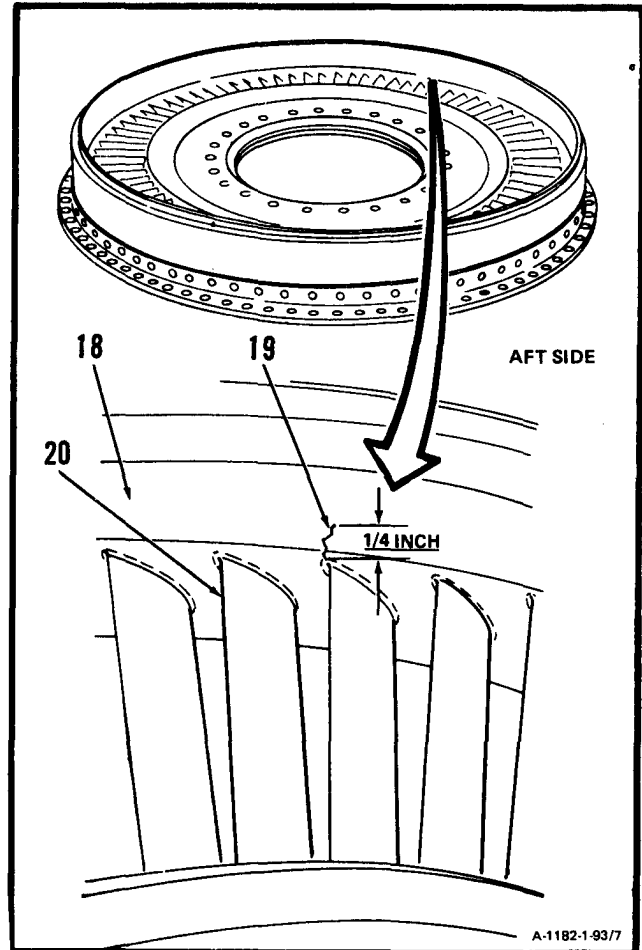
1-93

- b. **Inspect brazement (15).** There shall be no cracks (16) or voids (17) longer than 3/8 inch.



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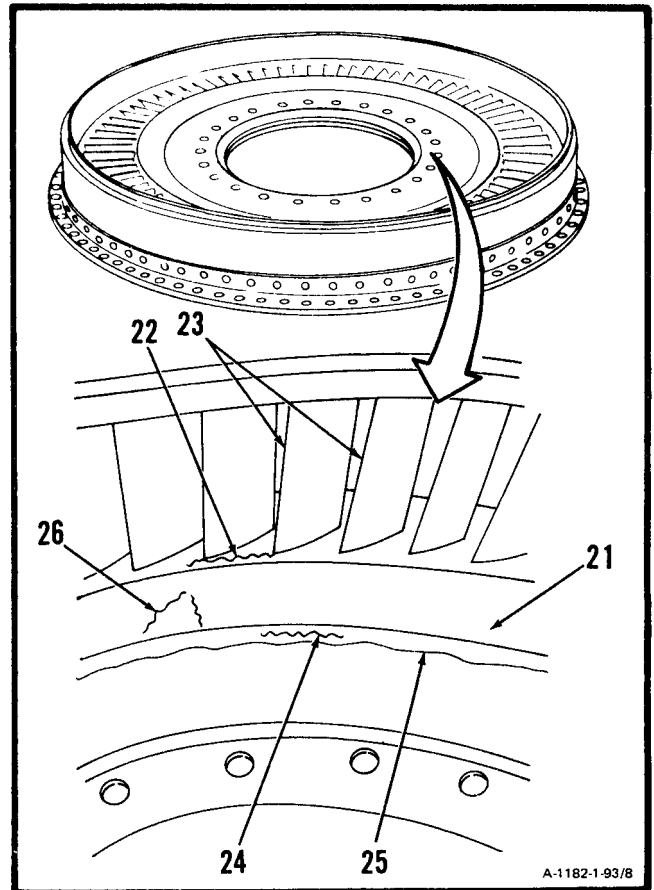
c. **Inspect outer shroud (18).** There shall be no axial cracks (19) from vane trailing edge (20) longer than 1/4 inch.



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d. Inspect inner shroud (21) as follows:

- (1) There shall be no cracks (22) between trailing edges of vanes (23).
- (2) There shall be no circumferential cracks (24) in inner shroud to support brazement (25).
- (3) There shall be no converging cracks (26).

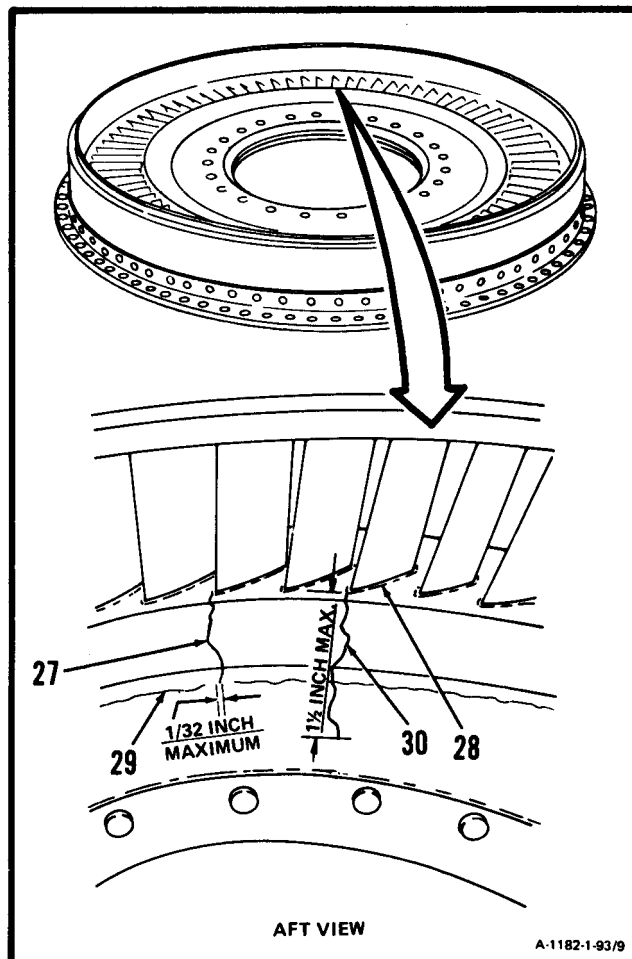


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NOTE

In following steps (4) and (5), cracks between 3/8 inch and 1-1/2 inches long shall not be less than four vanes apart.

- (4) There shall be no more than 12 cracks (27) between cutout (28) and brazement (29). They shall not be wider than 1/32 inch.
- (5) Of these 12 cracks, there shall be no more than seven cracks (30) which progress radially down vertical face. These cracks shall be no longer than 1-1/2 inches.



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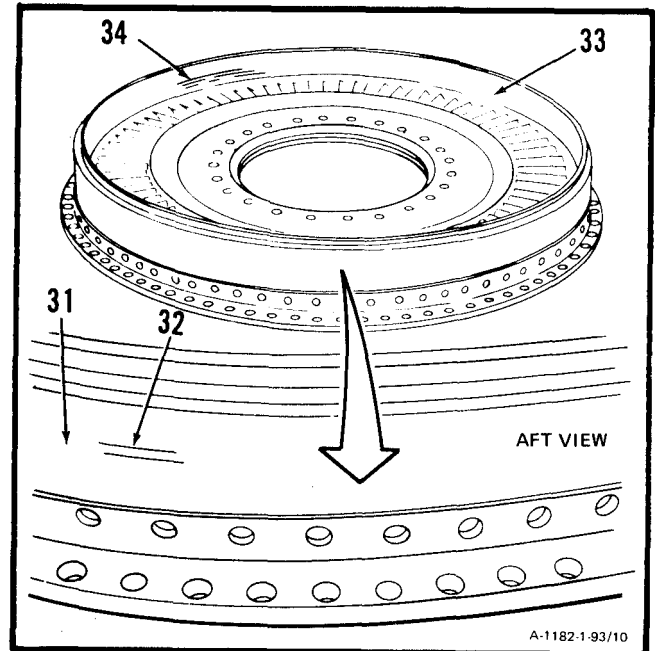
1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

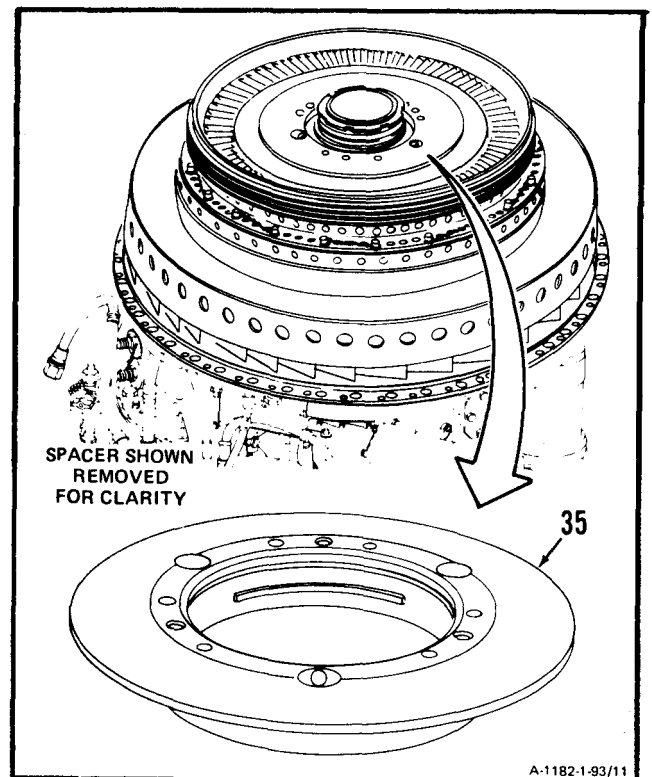
e. **Inspect outer shroud cylinder (31).** There shall be no grooves (32) deeper than 0.010 inch.

f. **Inspect cylinder inner diameter (33)** as follows:

- (1) There shall be no cracks.
- (2) There shall be no rubs (34) deeper than 0.010 inch.
- (3) **If rubs are deeper than 0.010 inch and less than 0.028 inch, repair second turbine nozzle** (Ref. Task 4-60).



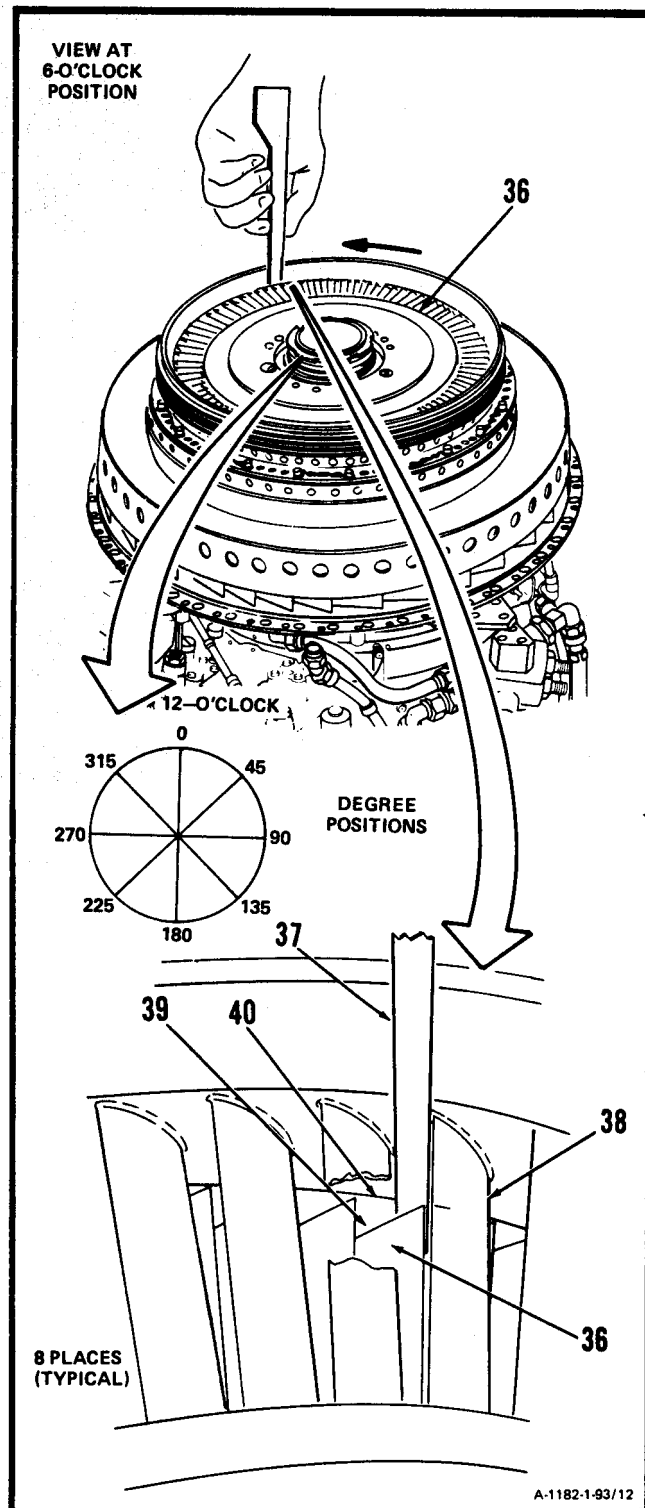
4. **Inspect turbine spacer (35).** There shall be no cracks. There shall be no dents deeper than 1/8 inch.



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5. Measure first turbine disc assembly (36) tip clearance at 0, 45, 90, 135, 180, 225, 270, and 315 degree positions as follows:

- a. Insert thickness gage (Appendix E) (37) between second turbine nozzle vanes (38) and between blade tip (39) and turbine rotor case inside diameter (40).
- b. Rotate first turbine disc assembly (36) 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 repair first turbine rotor case (Ref. Task 4-70).



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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

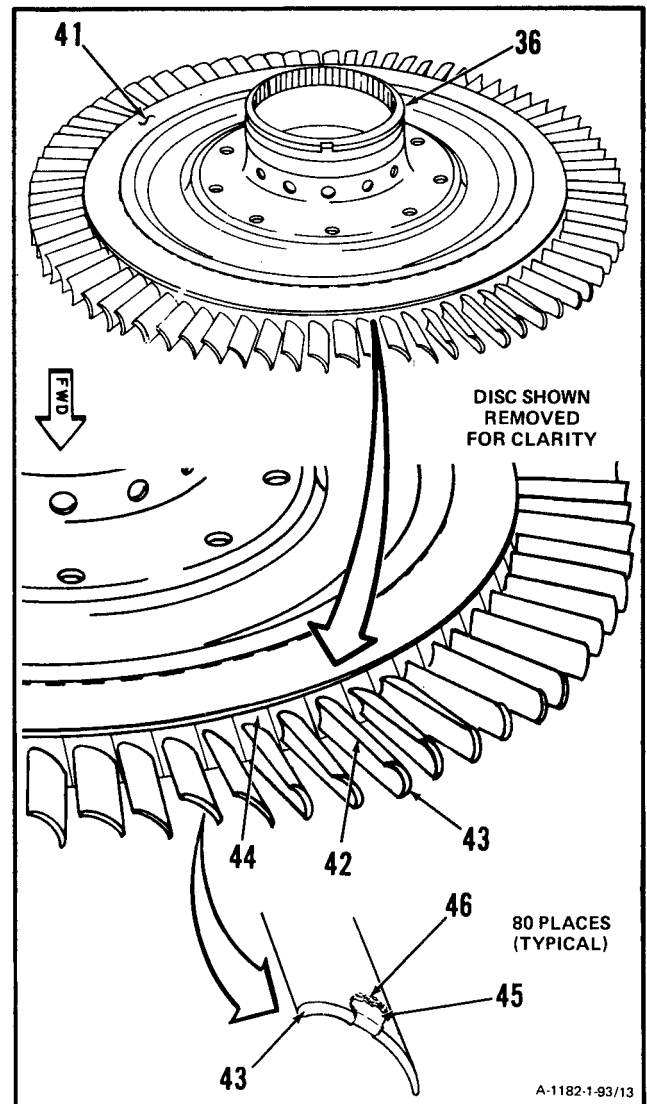
6. Inspect aft side (41) of first turbine disc assembly (36) as follows:

NOTE

Do not remove first turbine disc assembly unless it fails to meet these inspection limits.

a. Inspect blades (42).

- (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 (43) or blade platform (44) deeper than 0.015 inch.
- (5) There shall be no loss of material due to burning.
- (6) There shall be no material rollover (45) on blade tips (43).
- (7) There shall be no bluish-black discoloration in area (46) adjacent to rollover (45).



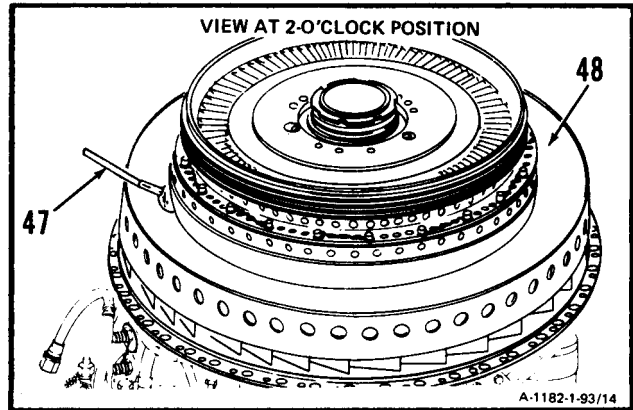
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7. Inspect first turbine nozzle as follows:

NOTE

Do not remove first turbine nozzle unless it fails to meet the following inspection limits.

a. Insert mirror (47) inside of diffuser curl (48).

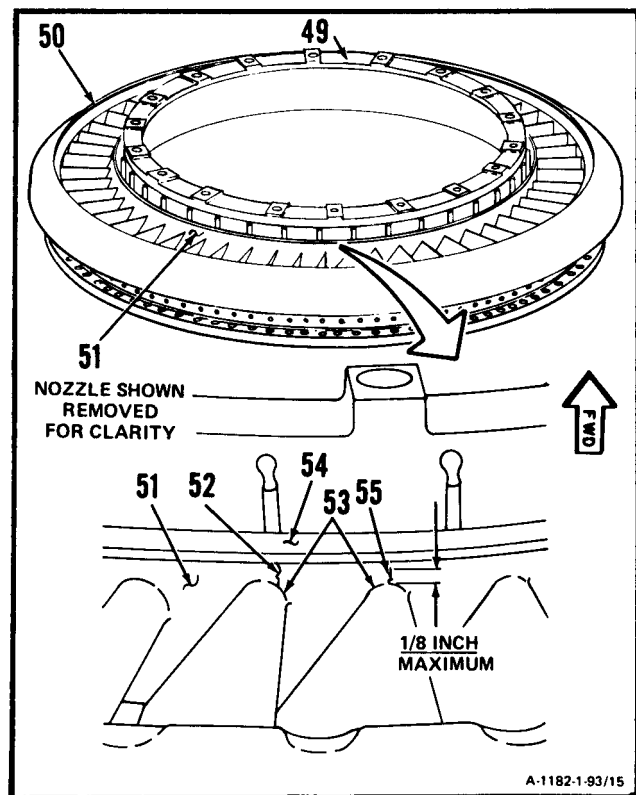


(1) Using flashlight, inspect forward side (49) of nozzle (50) as follows:

(a) Inspect inner shroud (51).

1 There shall be no more than five cracks (52) extending from vane leading edge (53) to forward face (54).

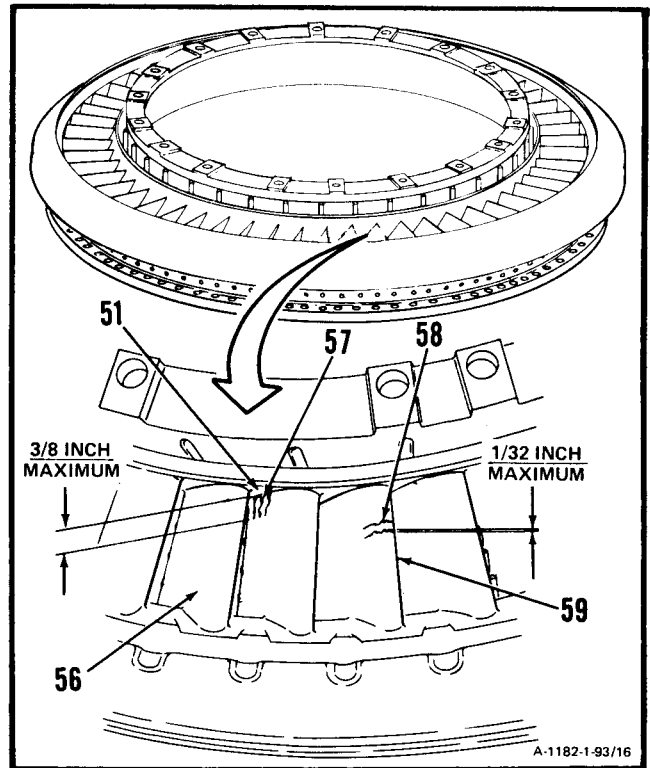
2 There shall be no other cracks (55) from vane leading edge (53).



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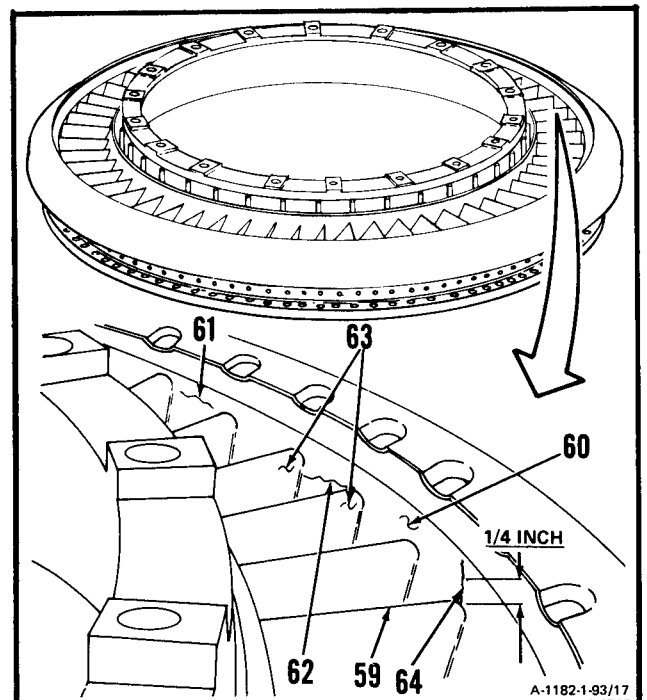
(b) Inspect 55 vanes (56).

- 1 There shall be no burning or loss of material.
- 2 There shall be no more than three, 3/8 inch maximum length cracks (57) in any vane from inner shroud (51). There shall be no more than 20 vanes with these cracks (57).
- 3 There shall be no cracks (58) from vane leading edge (59) wider than 1/32 inch.



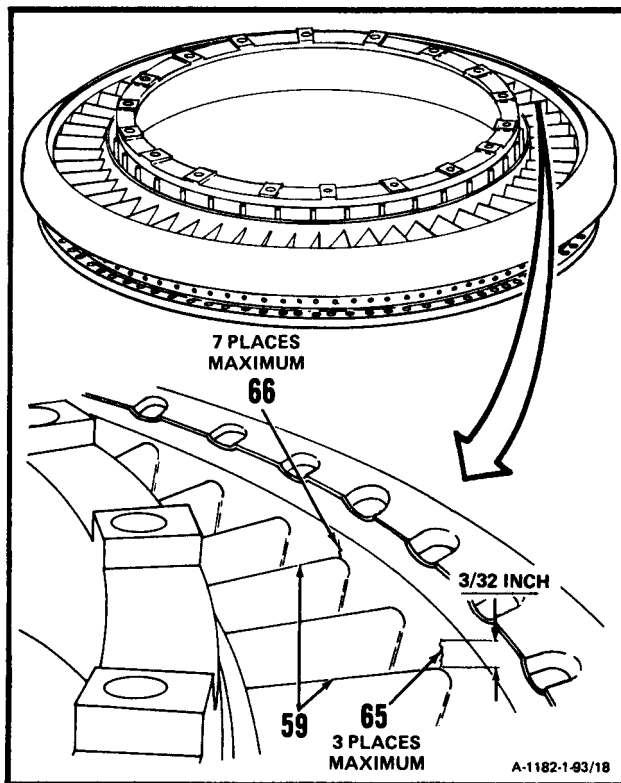
(c) Inspect outer shroud (60).

- 1 There shall be no circumferential cracks (61).
- 2 There shall be no cracks (62) between vanes (63).
- 3 There shall be no cracks (64) from vane leading edge (59) longer than 1/4 inch.

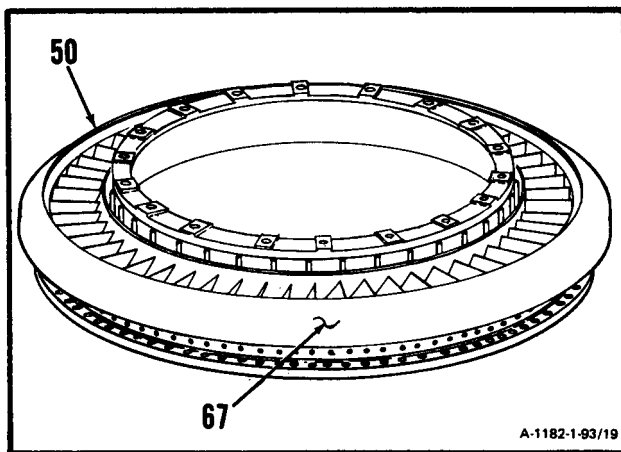


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- 4 There shall be no more than three cracks (65) longer than $\frac{3}{32}$ inch.
- 5 There shall be no more than seven additional cracks (66) from vane leading edge (59).



- (2) Inspect forward and aft sides of curl (67) on nozzle (50). Use mirror for forward side. There shall be no cracks.
- (3) Inspect all accessible areas of nozzle (50). There shall be no sharp edges around nicks and dents. Nicks and dents without sharp edges are allowed.

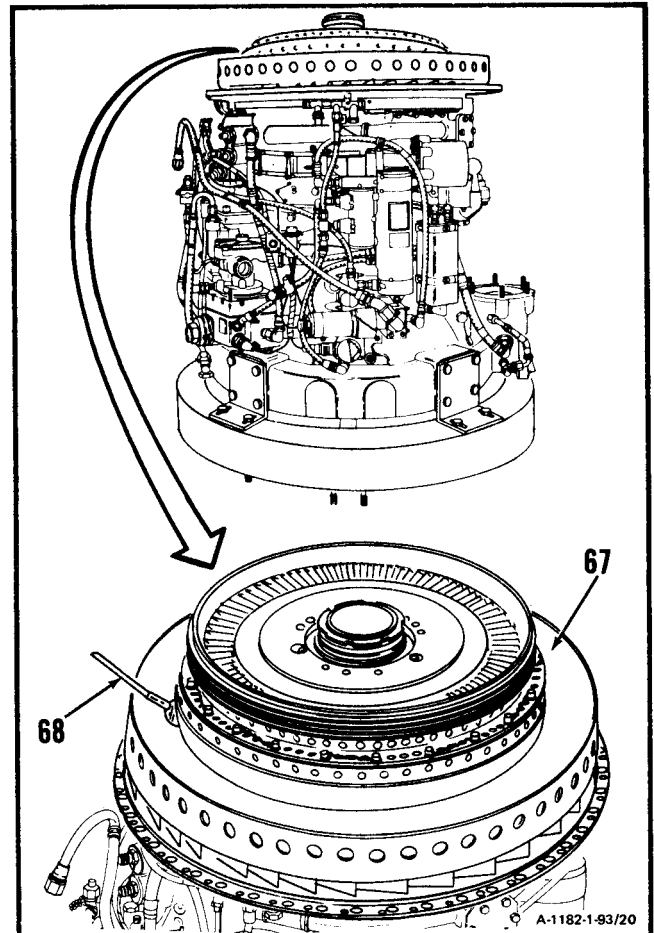


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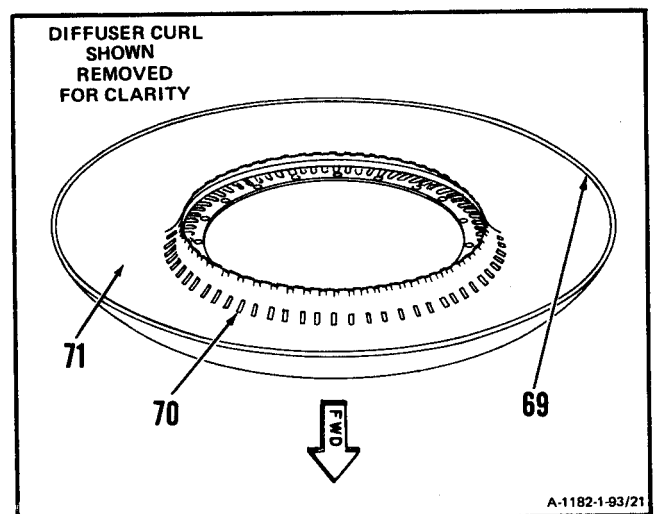
1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

8. Inspect aft side of diffuser curl (67) using flashlight and mirror (68) as follows:



- a. There shall be no burn-through.
- b. There shall be no foreign object break-through damage.
- c. The total length of cracks in area next to outer flange seam weld (69) shall not be more than 7 inches.
- d. There shall be no more than eight broken spot welds (70). Cracks in spot welds (70) are acceptable.
- e. There shall be no foreign metallic material on surface (71) of curl.



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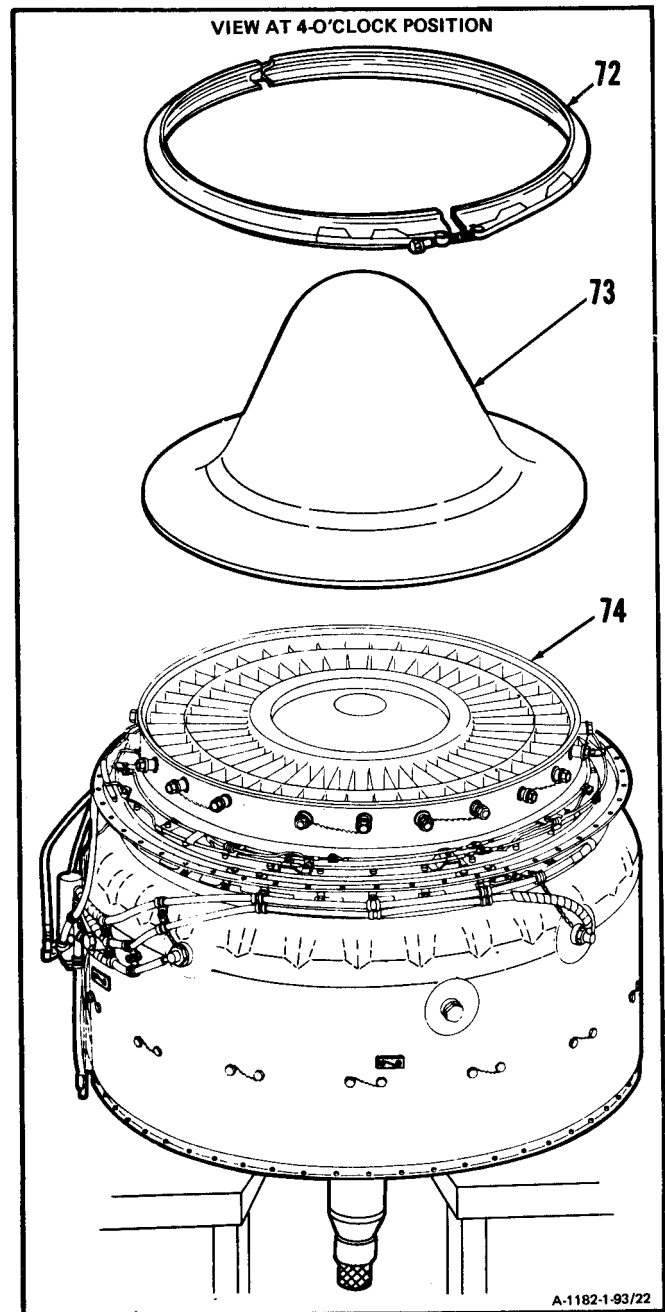
9. If inspection criteria in steps 3. thru 8. are not met, remove, clean, inspect, repair or replace defective parts. Refer to following tasks as needed:
- a. **Remove, clean, inspect, repair, and install second turbine nozzle, spacer, and case** (Ref. Tasks 4-57, 4-58, 4-59, 4-60 and 4-61).
 - b. **Remove, clean, inspect, repair, and install first turbine disc assembly** (Ref. Tasks 4-62, 4-63, 4-64, 4-65 and 4-66).
 - c. **Remove, clean, inspect, and install first turbine nozzle** (Ref. Tasks 4-67, 4-68, 4-69, and 4-71).
 - d. **Remove, clean, inspect, repair, and install diffuser curl** (Ref. Tasks 4-73, 4-74, 4-75, 4-76, and 4-77).

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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

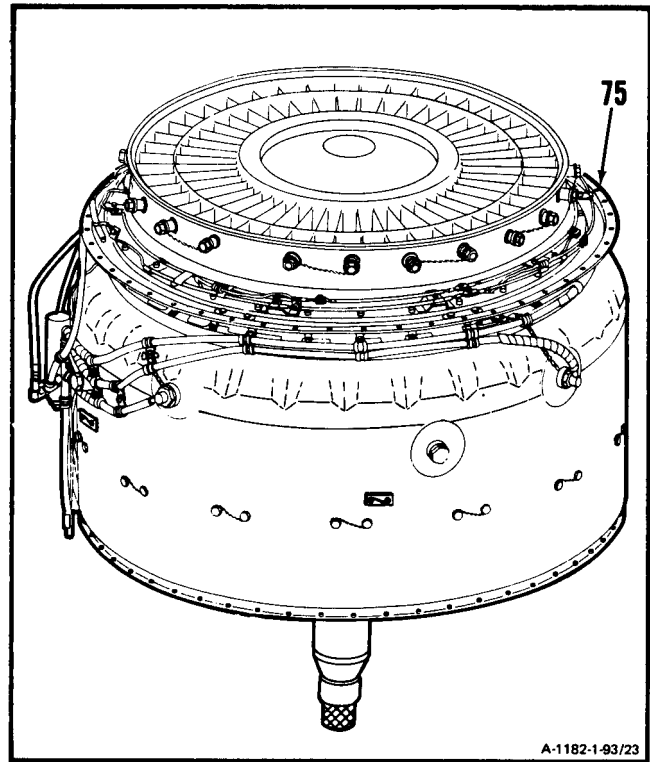
1-93

10. Remove clamp coupling half (T37) (72) and group aircraft cover (T24) (73) from combustion section and power turbine (74).



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11. Inspect fire shield assembly (75). There shall be no cracks or bends.



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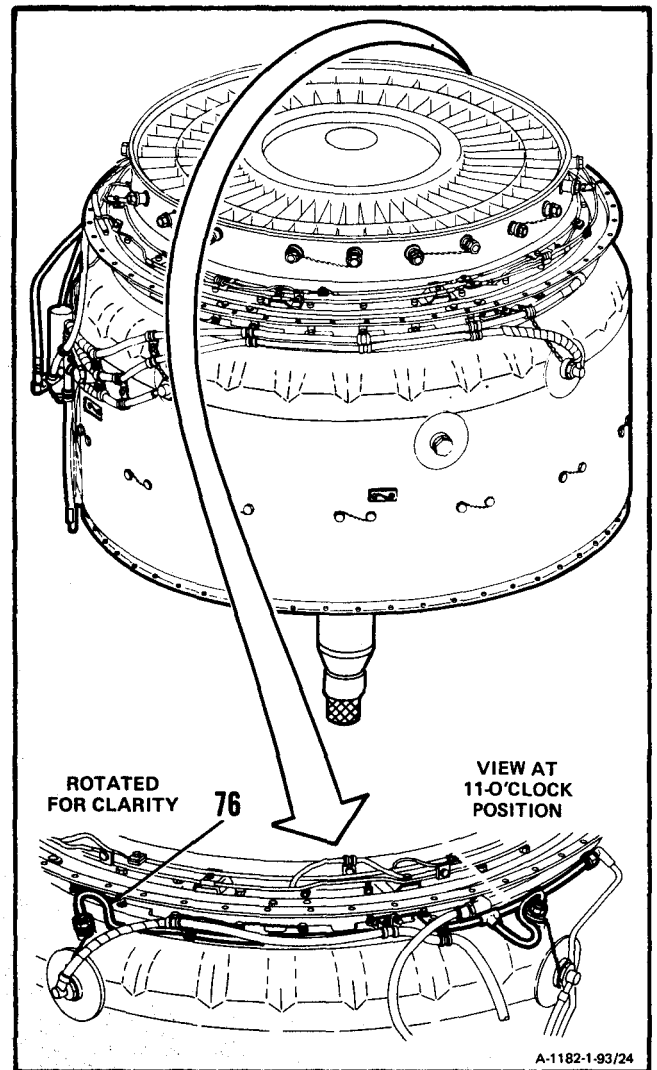
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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

12. **Inspect primer tube assembly (76)** as follows:

- a. There shall be no cracks.
- b. There shall be no chafing wear deeper than 0.002 inch.



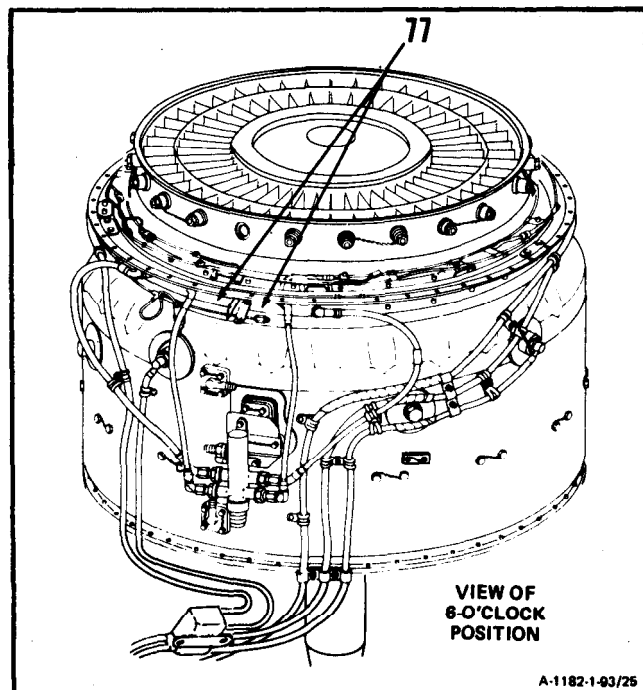
13. **Remove start fuel nozzles** (Ref. Task 6-25).

14. **Clean start fuel nozzles** (Ref. Task 6-26).

15. **Inspect start fuel nozzles** (Ref. Task 6-27).

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16. Inspect left and right-hand fuel manifold assemblies (77). There shall no cracks.

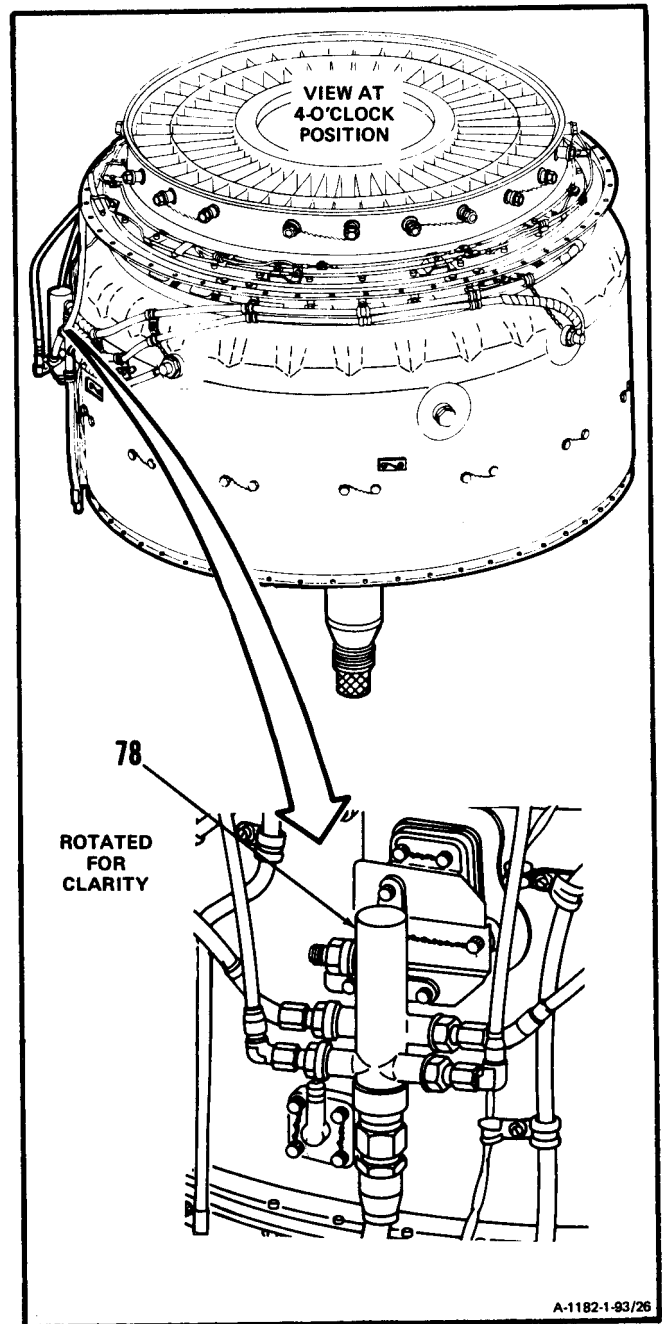


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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

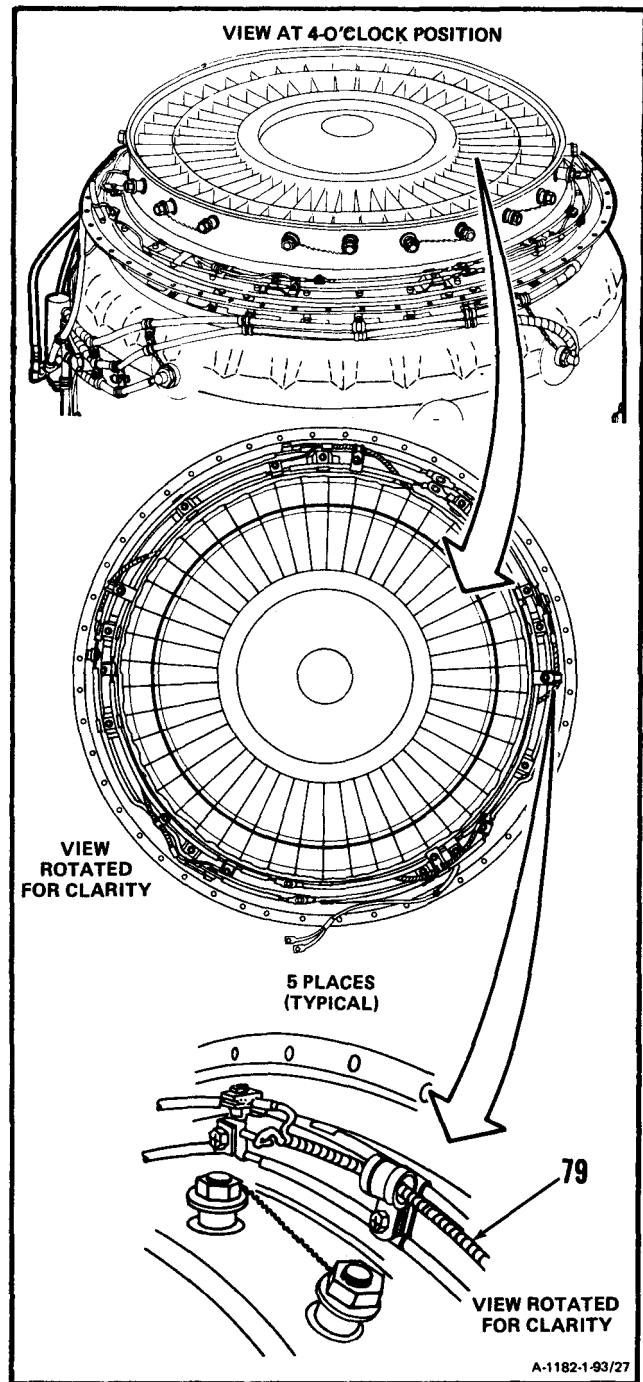
17. **Inspect flow divider (78).** There shall be no cracks.



18. **Remove spark igniters** (Ref. Task 7-6).
19. **Clean spark igniters** (Ref. Task 7-7).
20. **Inspect spark igniters** (Ref. Task 7-8).

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21. Inspect thermocouple harness assemblies (79) as follows:

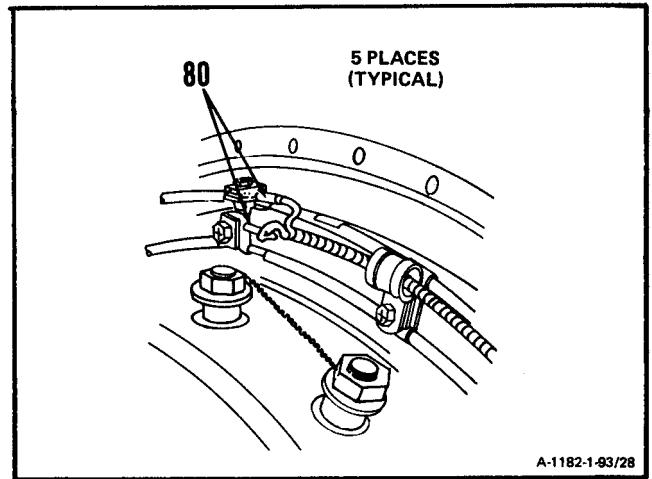


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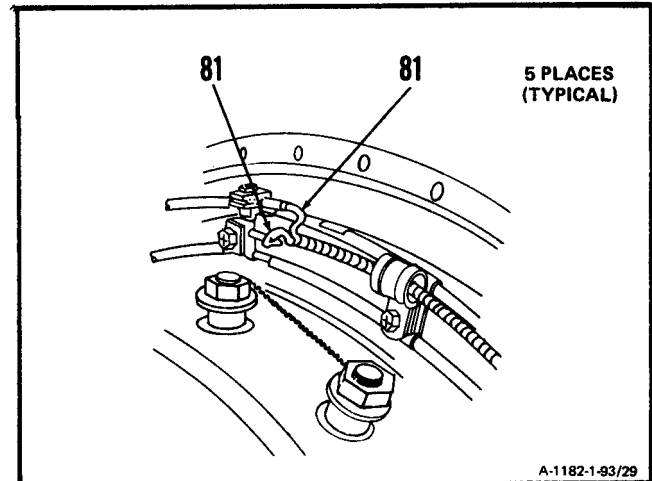
1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

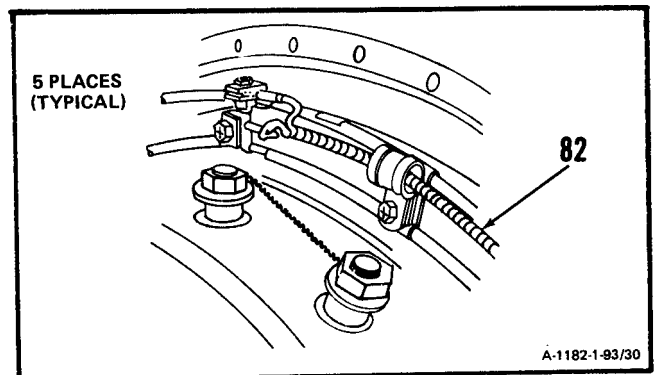
- a. **Inspect pins (80) (5 places).** There shall be no cracks, corrosion, broken, or missing pins.



- b. **Inspect pin leads (81) (5 places).** There shall be no frayed or broken wires.

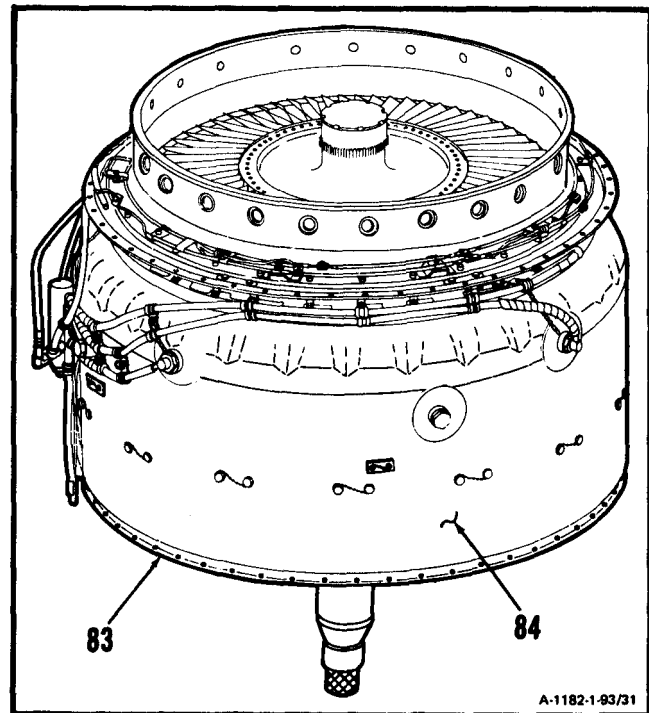


- c. **Inspect outer shield (82).** There shall be no cracks or gouges.

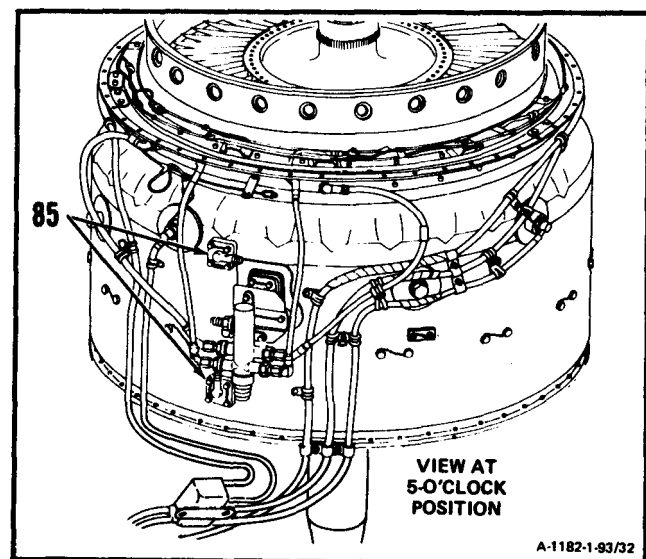


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- 22. Remove exit vane assembly (Ref. Task 4-78).
 Clean exit vane assembly (Ref. Task 4-79).
 Inspect exit vane assembly (Ref. Task 4-80).
- 23. Inspect combustion chamber housing (83) as follows:
 - a. Inspect external surfaces (84). There shall be no cracks.

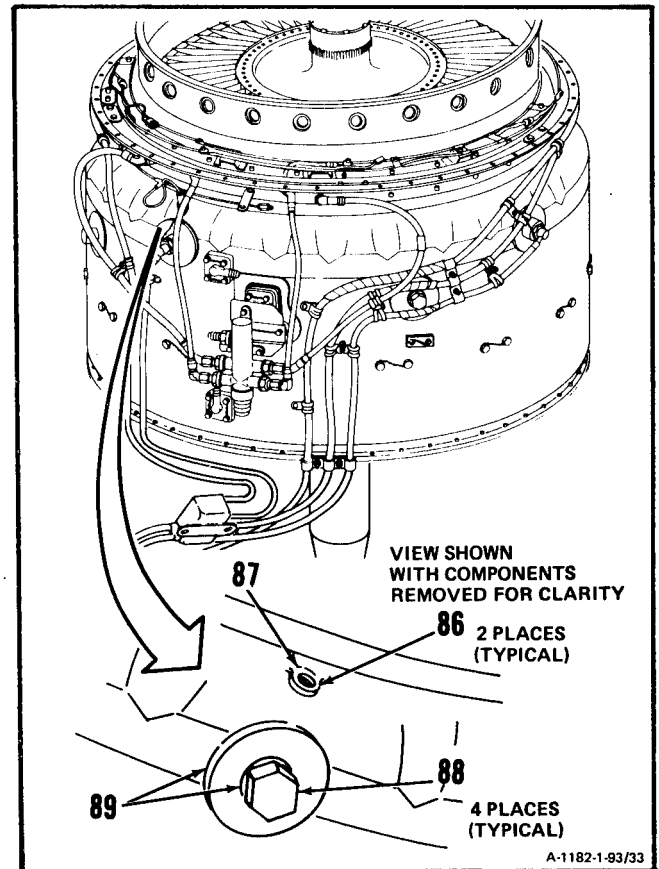


- b. Inspect two drain valves (85). They shall be mounted securely. There shall be no cracks.



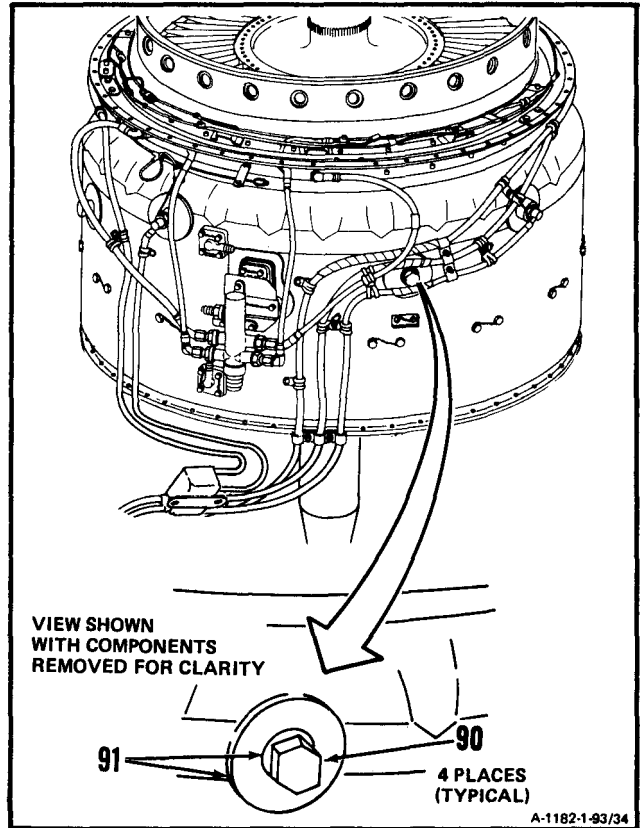
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- c. Inspect two start fuel nozzle bosses (86) and weldment (87). There shall be no cracks.
- d. Inspect four spark igniter bosses (88) and weldments (89). There shall be no cracks.

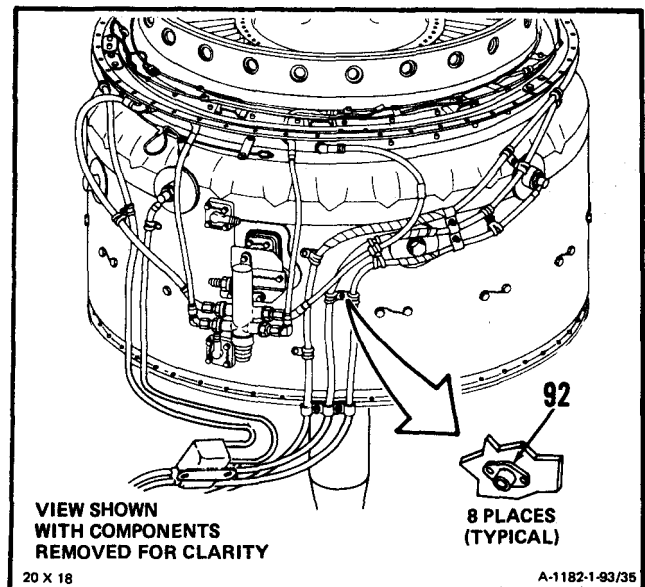


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- e. Inspect four liner mounting bosses (90) and weldments (91). There shall be no cracks.



- f. Inspect sight nut plates (92). They shall not be missing or broken. They shall be mounted securely.



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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

24. Install start fuel nozzles (Ref. Task 6-28).

25. Install spark igniters (Ref. Task 7-10).

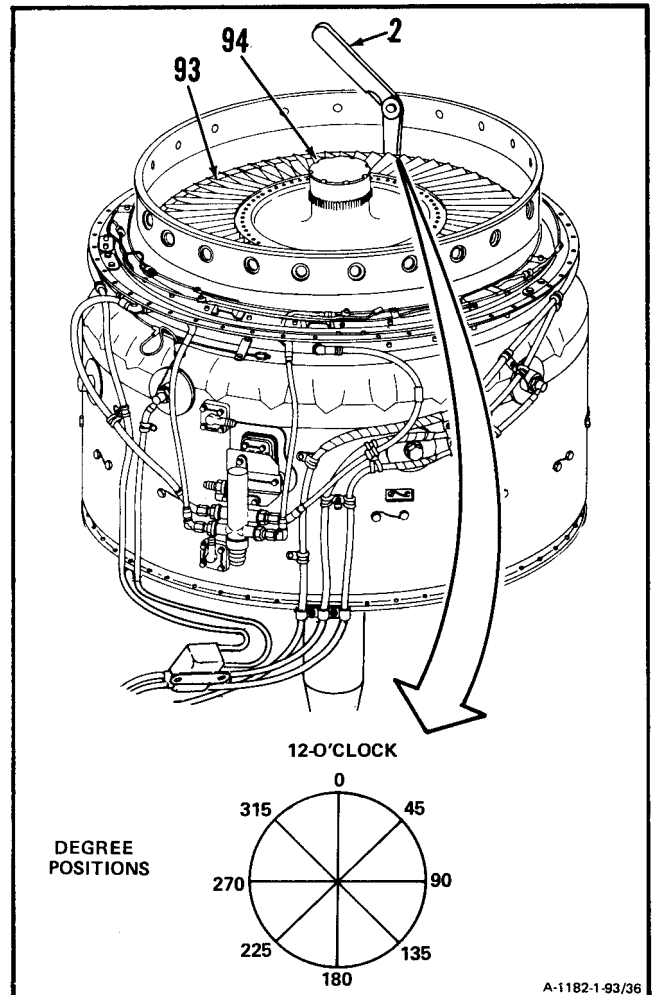
26. Measure fourth stage power turbine rotor (93) tip clearance at 0, 45, 90, 135, 180, 225, 270 and 315 degree positions as follows:

- a. Insert thickness gage (2) between blade tip (94) and fourth turbine nozzle inside diameter.
- b. Measure and record tip clearance while rotating fourth turbine disc assembly (93) clockwise one revolution for each check.
- c. Tip clearance shall be 0.020 inch minimum.
- d. If tip clearance is not at least 0.020 inch, proceed as follows:
 - (1) Mark area in which clearance is not met. Use marking pencil (E34).
 - (2) Remove fourth stage power turbine rotor (Ref. Task 4-33).

CAUTION

Do not blend into parent metal. Metal to metal contact could occur.

- (3) Remove material from area marked to allow proper clearance. Use 180 grit aluminum oxide cloth (E4).
- (4) Install fourth stage power turbine rotor (Ref. Task 4-36).
- (5) Recheck tip clearance.

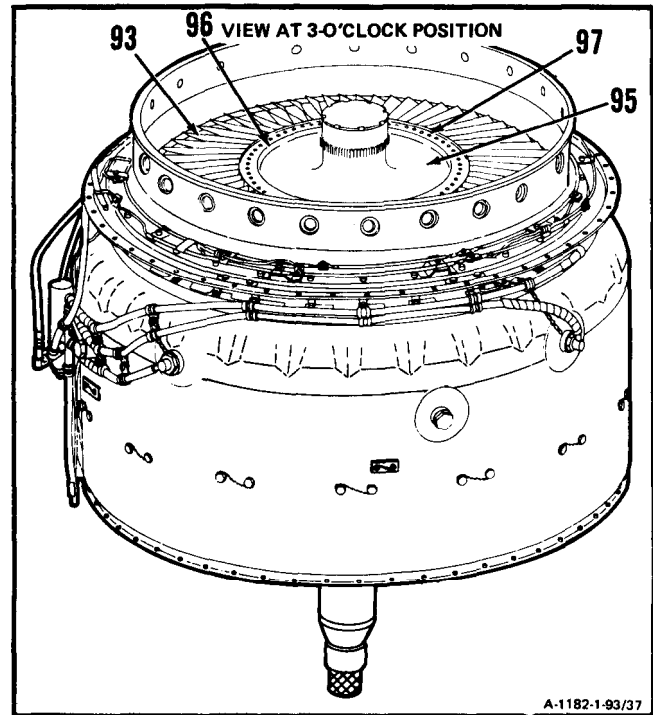


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27. Inspect fourth stage power turbine rotor (93)
as follows:

a. Inspect disc (95).

- (1) There shall be no cracks.
- (2) There shall be no burns.
- (3) There shall be no pitting, nicks, or rubs deeper than 0.010 inch except for balance grind marks (96).
- (4) There shall be no loose or cracked pins (97).



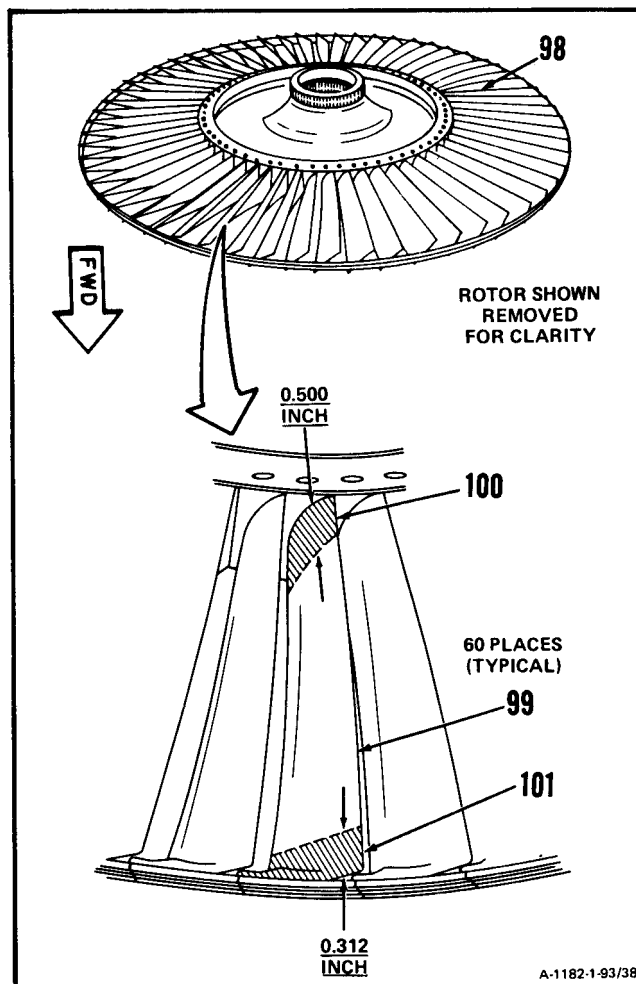
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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

b. **Inspect aft side (98) of 60 blades (99)**, 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 in non-critical area.
- (6) There shall be no pitting, nicks or dents in inner critical area (100) or outer critical area (101).



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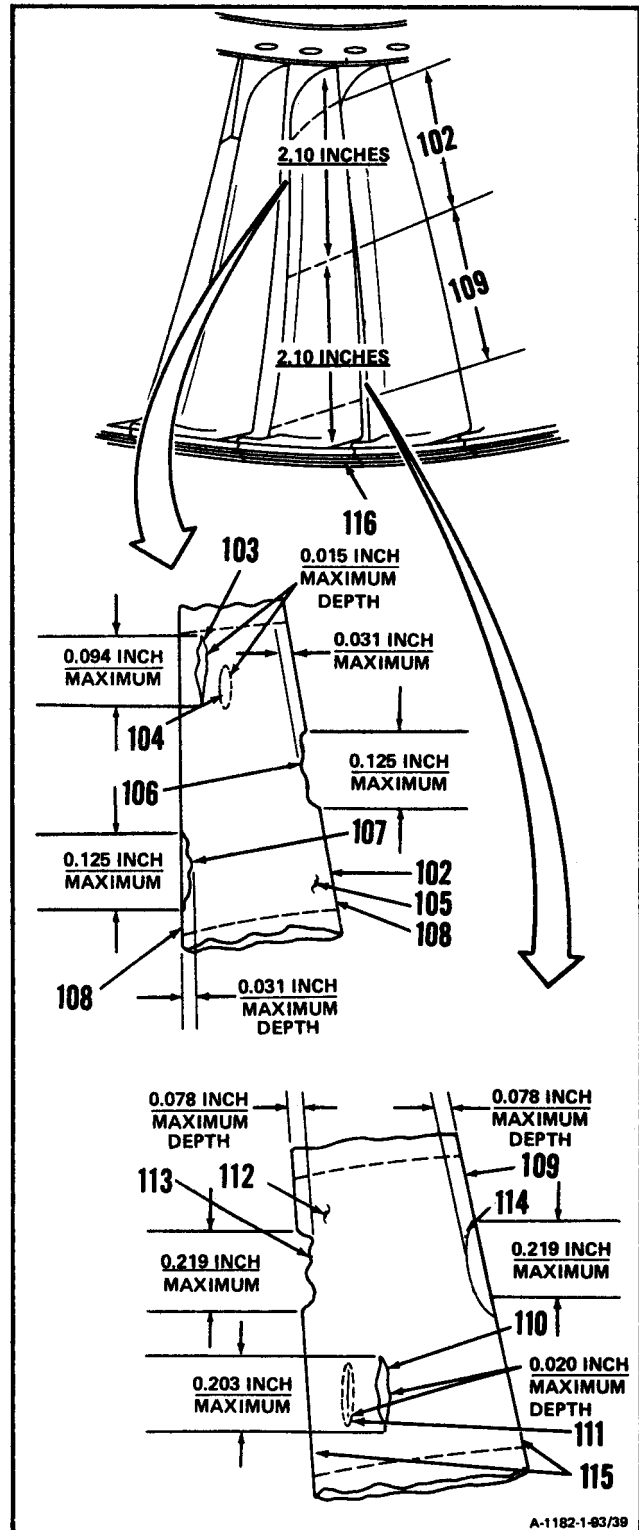
(7) **Inspect inner half non-critical area (102)** as follows:

- (a) There shall be no more than four nicks (103) or dents (104) in surface (105) longer than 0.094 inch or deeper than 0.015 inch.
- (b) There shall be no more than two nicks (106) or dents (107) on leading or trailing edges (108) longer than 0.125 inch or deeper than 0.031 inch.

(8) **Inspect outer half non-critical area (109)** as follows:

- (a) There shall be no more than four nicks (110) or dents (111) in surface (112) longer than 0.203 inch or deeper than 0.020 inch.
- (b) There shall be no more than two nicks (113) or dents (114) on leading or trailing edges (115) longer than 0.219 inch or deeper than 0.078 inch.

(9) **Inspect tip labyrinth (116).** There shall be no nicks deeper than 0.015 inch.



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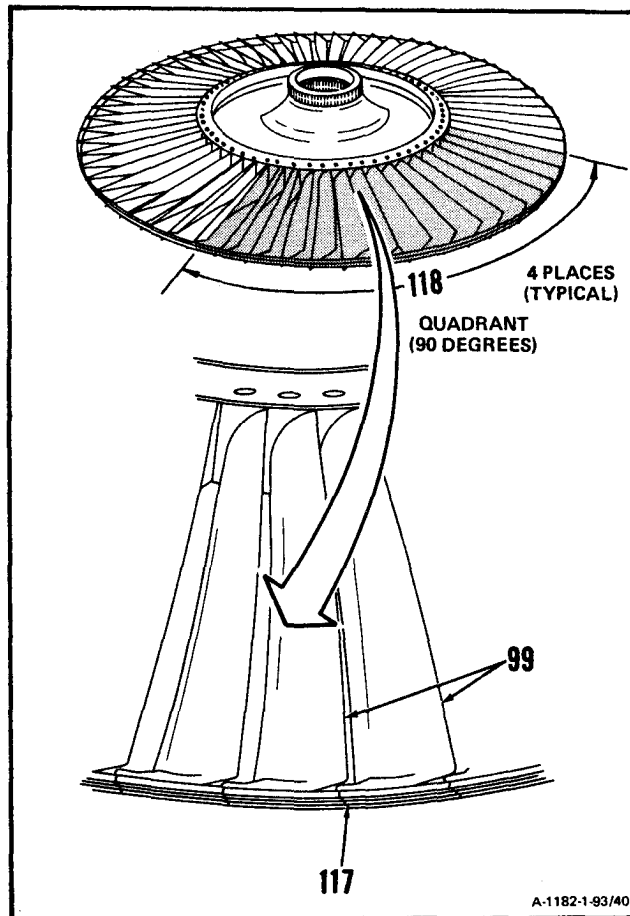
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1-93 INSECT ENGINE HOT END (AVIM) (Continued)

1-93

c. Measure gap (117) between blades (99). Use thickness gage.

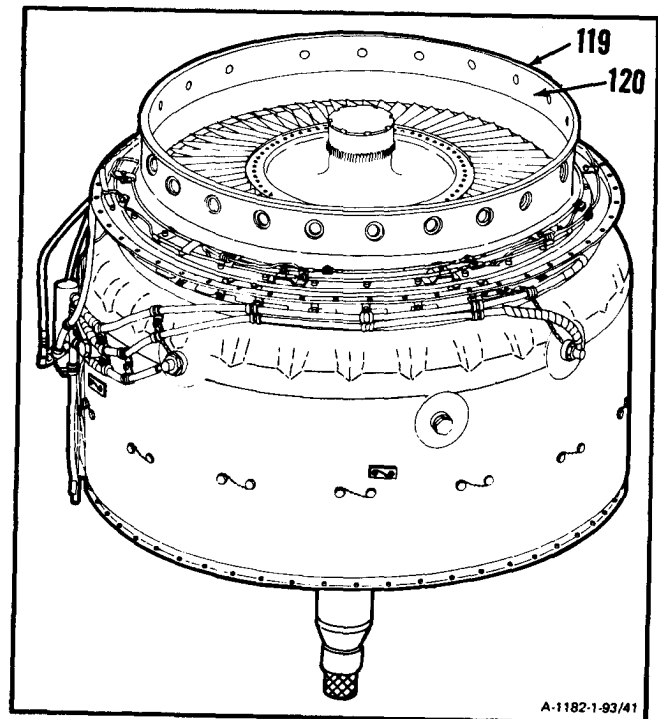
- (1) Total gap between all blades shall be no greater than 0.120 inch.
- (2) Total gap between all blades in any 90-degree quadrant (118) shall be no greater than 0.030 inch.
- (3) There shall be no gap greater than 0.012 inch. There shall be no more than one 0.022 inch gap in any quadrant.



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28. Inspect aft side of fourth stage power turbine nozzle (119) as follows:

- a. Inspect rear flange area (120). There shall be no cracks or indications of burning.



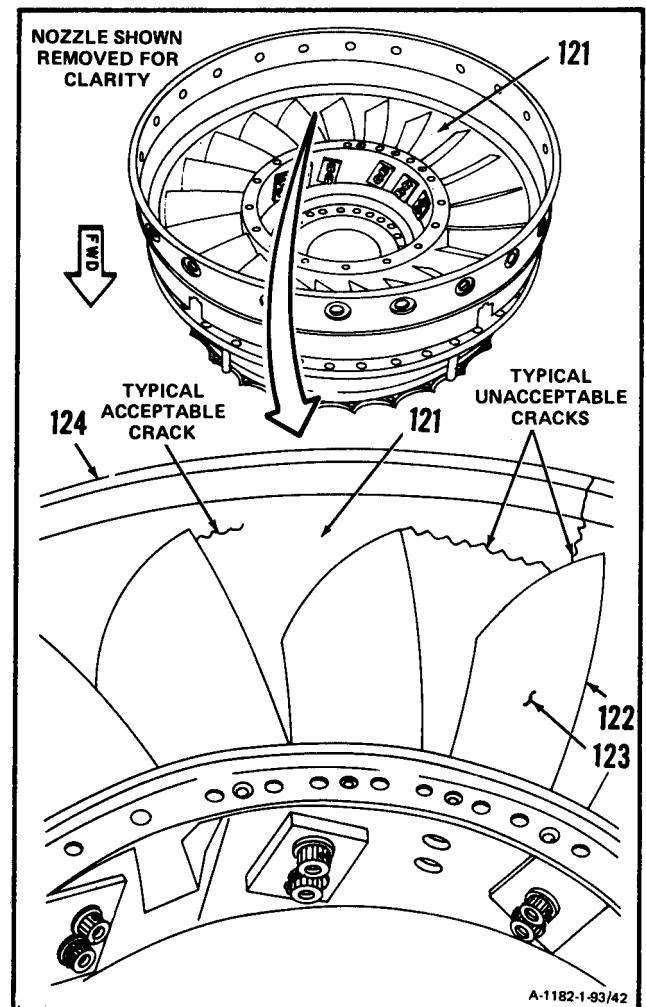
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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

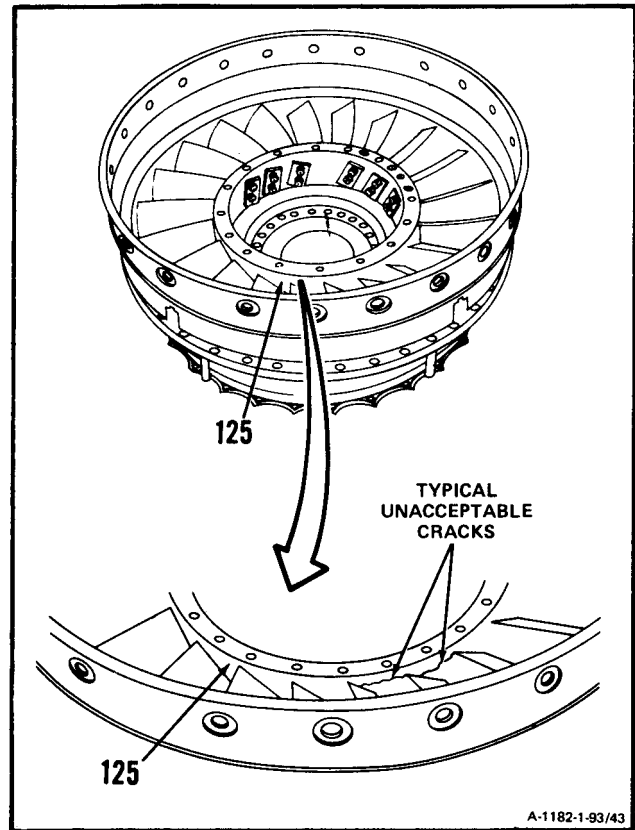
b. Use flashlight and look between fourth stage turbine rotor blades. **Inspect outer shroud (121).**

- (1) There shall be no cracks extending from trailing edge (122) of vane (123) into weldment (124).
- (2) There shall be no vane-to-vane cracks.

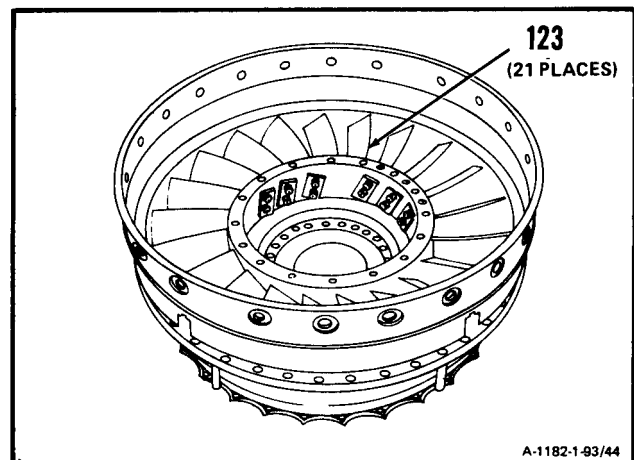


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c. **Inspect inner shroud (125).** There shall be no vane-to-vane cracks.



d. **Inspect 21 vanes (123).** There shall be no punctures or cracks.

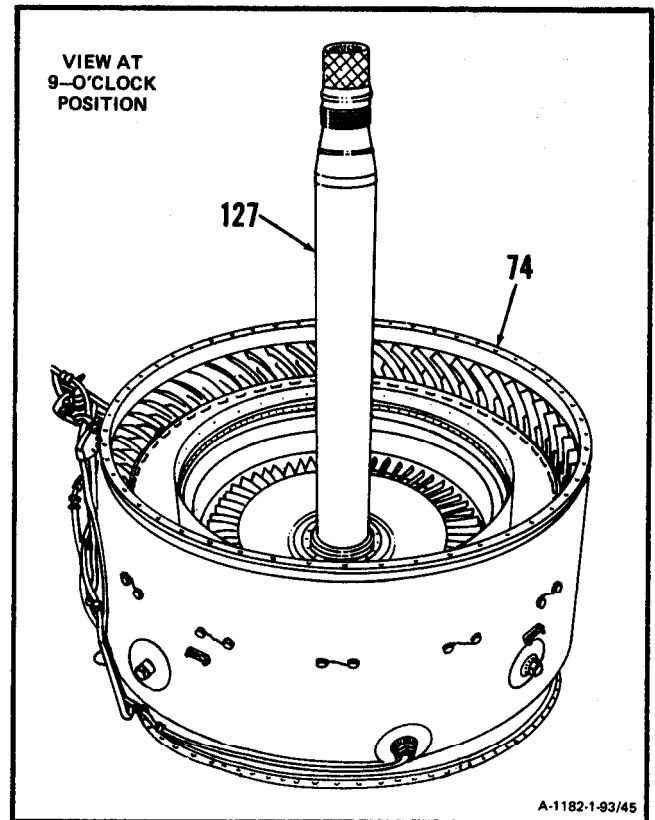


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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

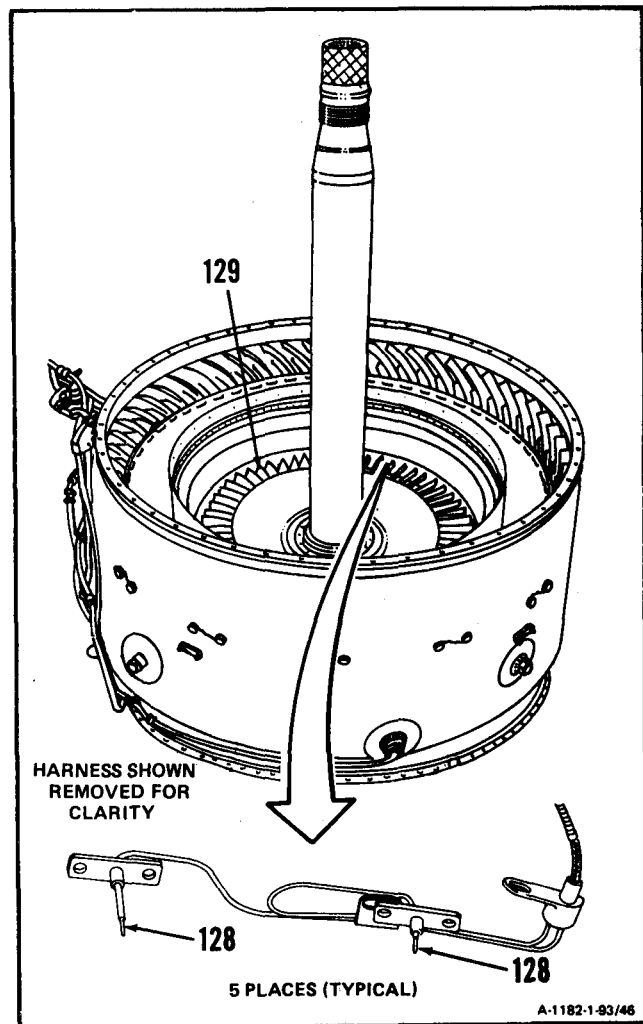
1-93

29. Using helper, turn combustion section and power turbine (74) so that power shaft (127) is pointing up.



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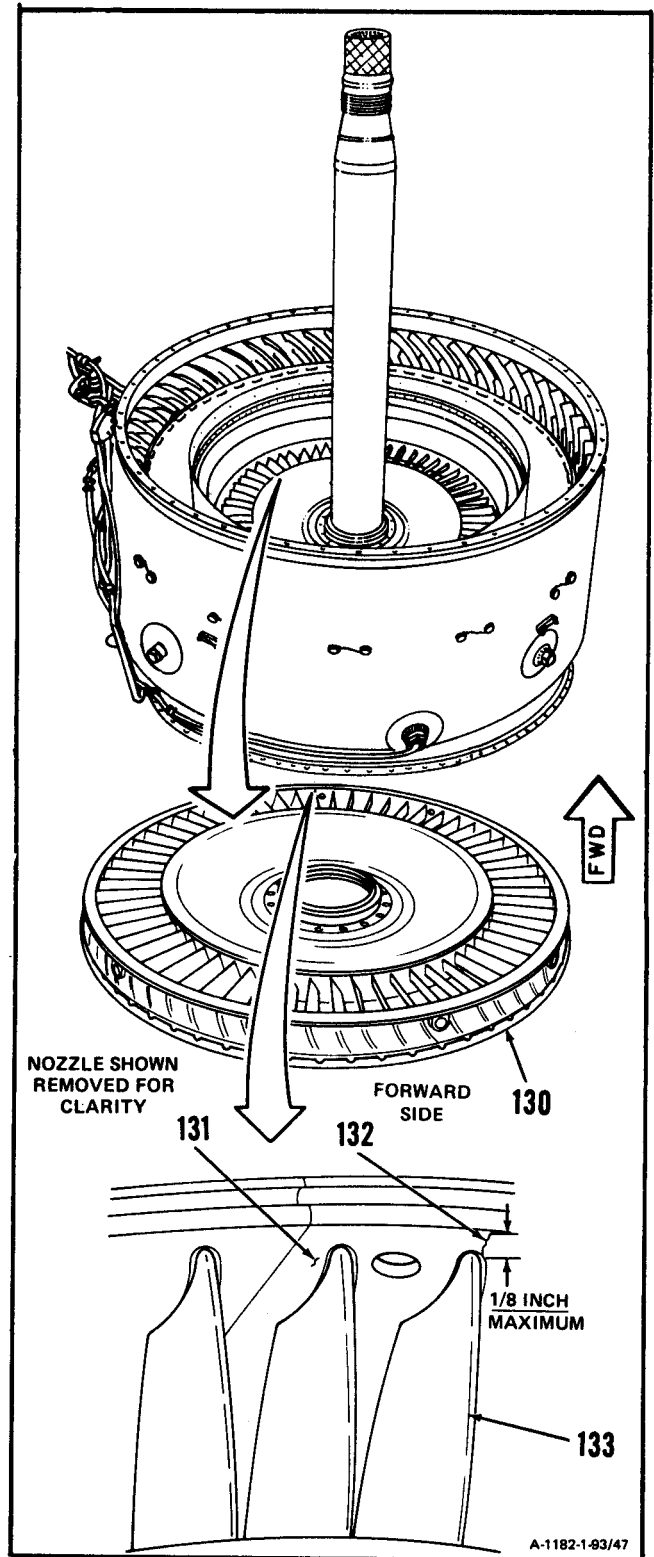
30. Inspect five pairs of probes (128) by looking between third stage nozzle vanes (129). There shall be no missing or broken probes (128). There shall be no cracks or corrosion.



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31. Inspect forward side of third turbine nozzle (130) as follows:

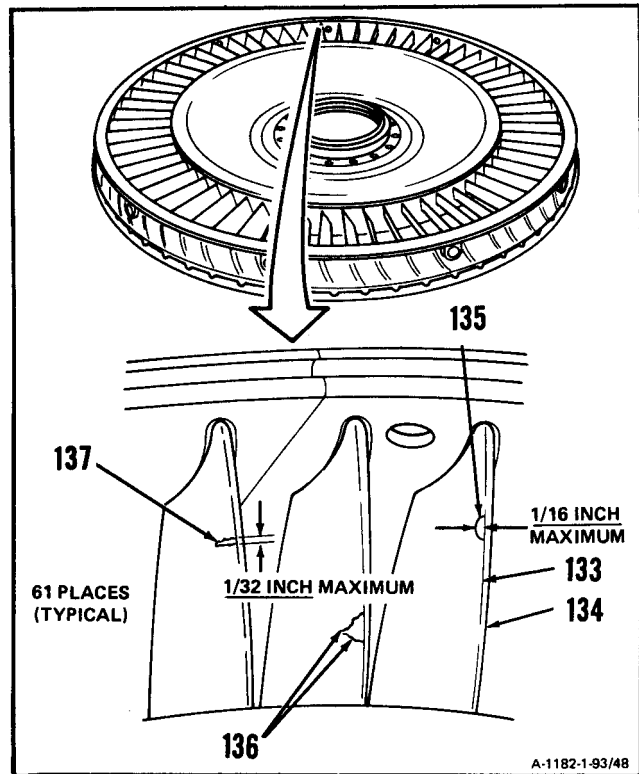
- a. Inspect outer shroud (131). There shall be no cracks (132) from vane leading edge (133) longer than 1/8-inch.



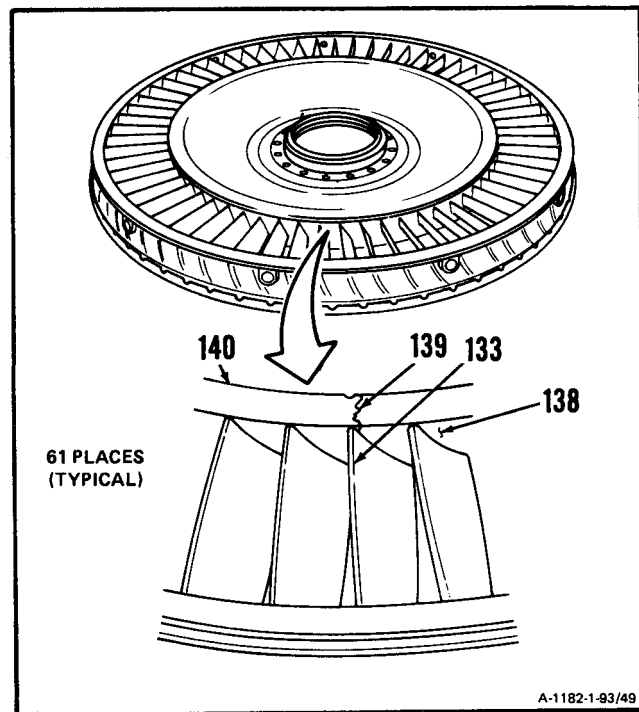
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b. Inspect 61 vanes (134) as follows:

- (1) There shall be no nicks (135) in leading edge (133) deeper than 1/16-inch.
- (2) There shall be no material burned off.
- (3) There shall be no converging cracks (136).
- (4) There shall be no cracks (137) wider than 1/32-inch.
- (5) There shall be no cracks in any area where vane has been bent.



c. Inspect inner shroud (138). There shall be no more than one crack (139) from each vane leading edge (133) to braze line (140).

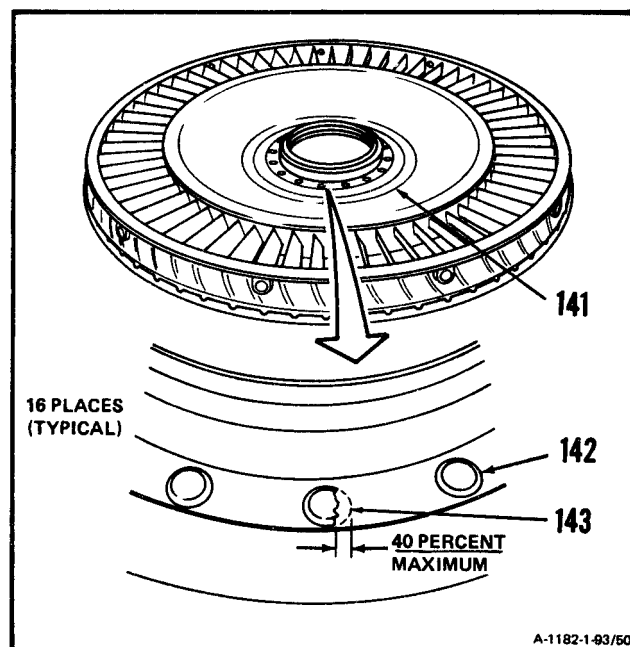


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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

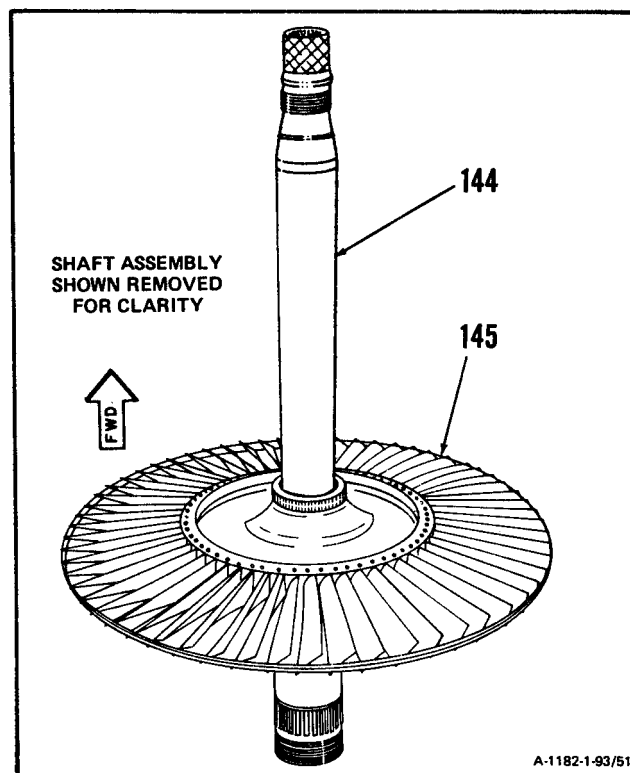
1-93

- d. **Inspect forward support (141).** There shall be no cracks.
- e. **Inspect 16 rivets (142).** There shall not be more than 40 percent missing material (143).



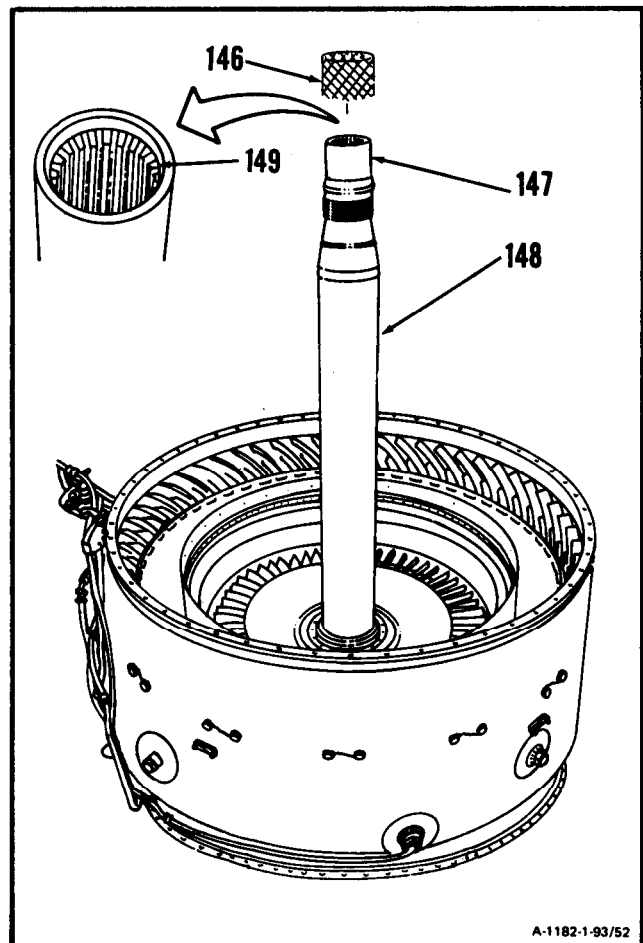
32. **Inspect forward side of integral shaft assembly (144)** as follows:

- a. Use flashlight and look between third stage turbine nozzle vanes. Inspect 64 blades (145).
- (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.



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- b. Remove vexar nylon webbing (E56) (146) from shaft journal area (147).
- c. Inspect all visible areas of shaft (148). There shall be no cracks.
- d. Inspect shaft journal area (147).
- (1) There shall be no pitting or nicking.
 - (2) Measure outside diameter, Use outside micrometer caliper. Outside diameter shall not be less than 2.0425 inches.
- e. Inspect spline (149) (Ref. Task 1-118). There shall be no wear deeper than 0.005 inch.
- f. Install vexar nylon webbing (E56) (146) on shaft journal area (147).



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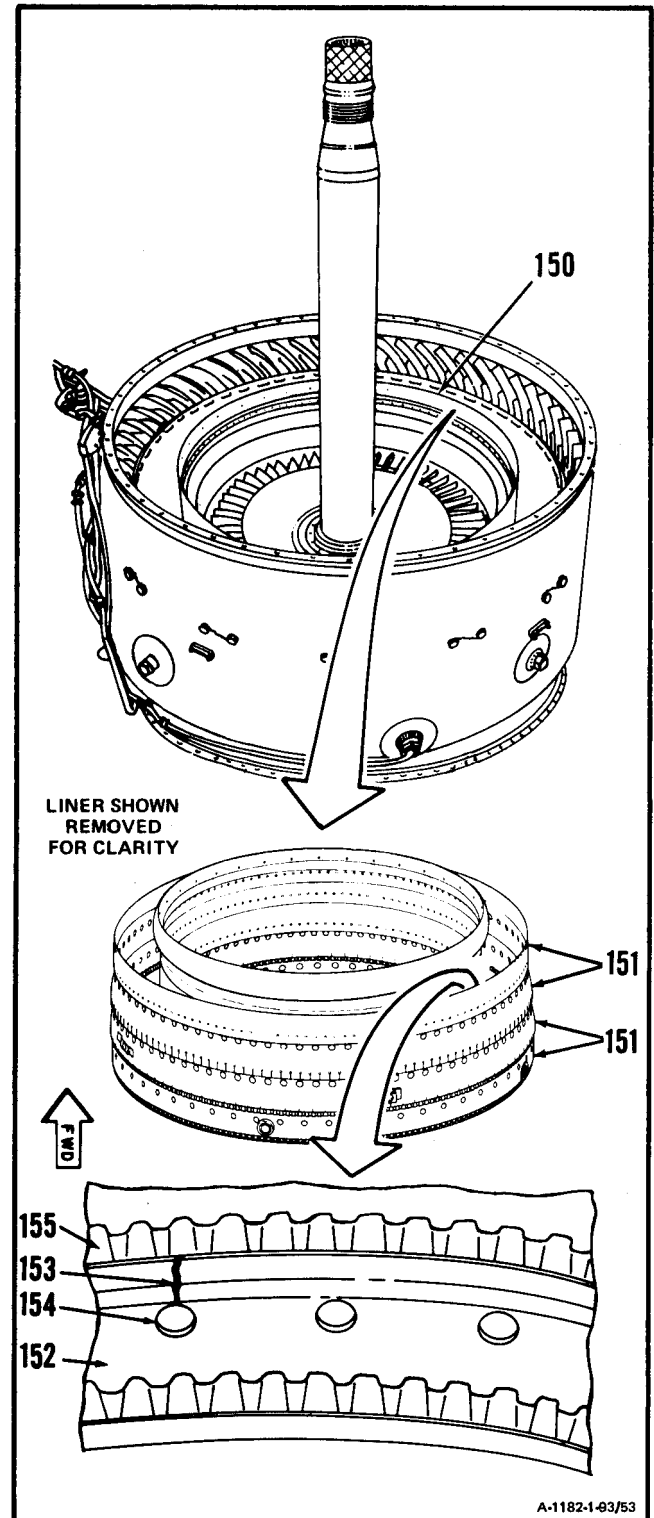
33. Inspect liner (150) as follows:

NOTE

Coke buildup on liner is acceptable.

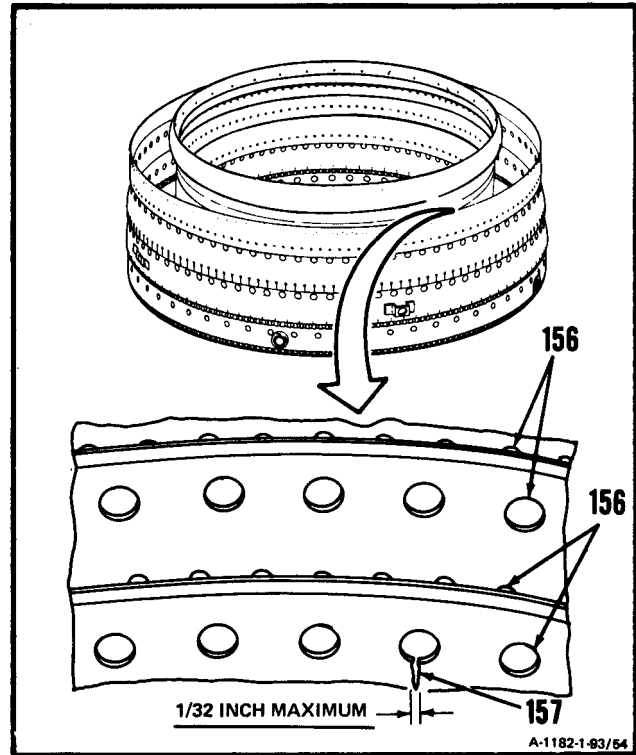
a. Inspect outer liners (151) as follows:

- (1) Inspect inner portion of aft outer liner (152). There shall be no more than one crack (153) per hole (154) reaching to forward edge (155).

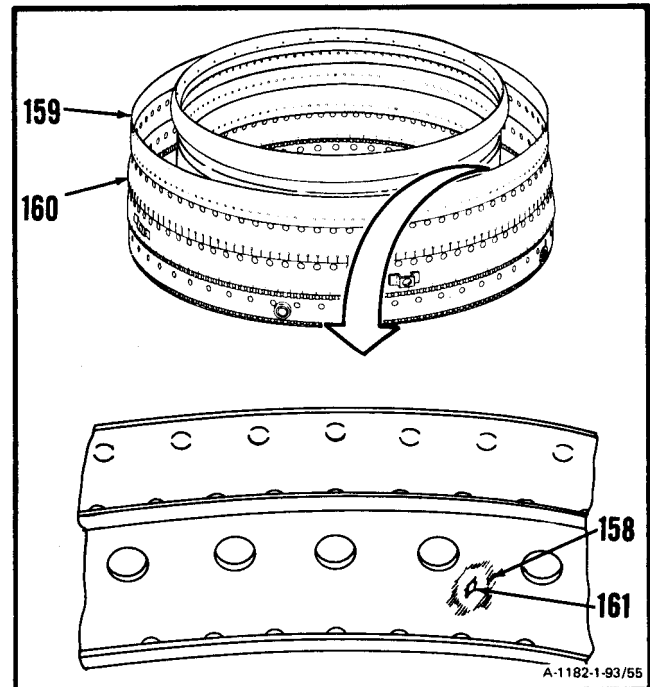


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- (2) **Inspect air holes (156).** There shall be no more than one crack (157) per hole. These cracks shall not be more than 1/32-inch wide.

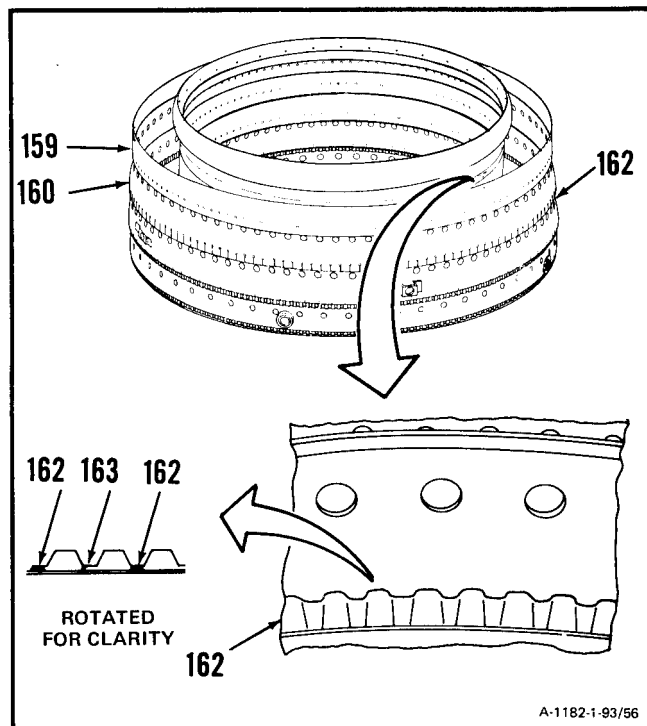


- (3) **Inspect for burned areas (158)** on inside of outer liners (159) and (160). There shall be no holes (161).



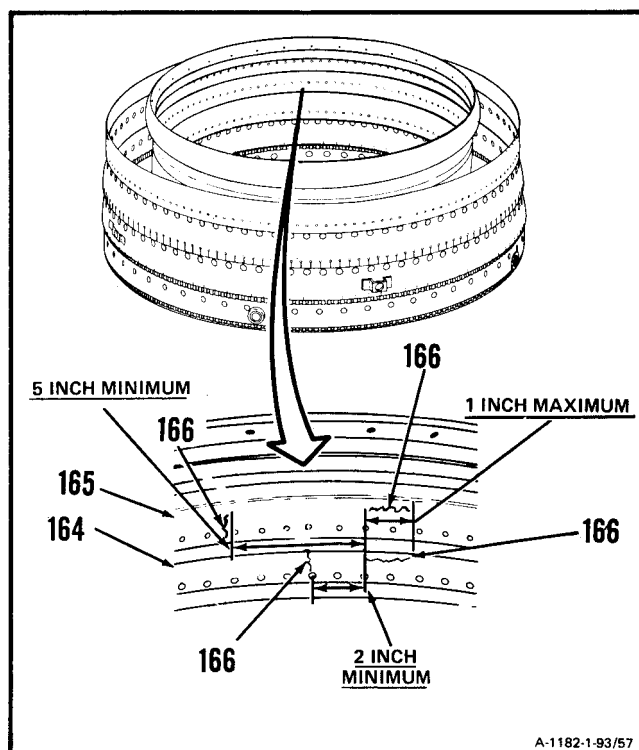
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- (4) **Inspect joints (162) on inside of outer liners (159 and 160).** There shall be no separation or broken spot welds (163).



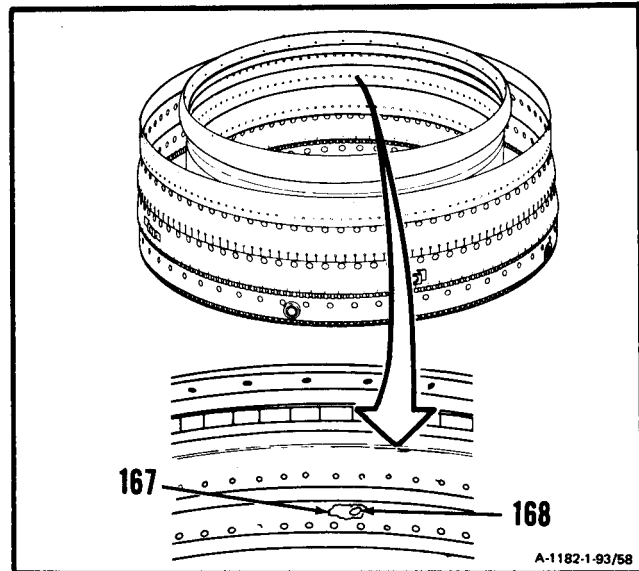
b. **Inspect inner liners (164 and 165) as follows:**

- (1) There shall be no cracks (166) longer than 1-inch. There shall be no cracks less than 5-inches apart on liner (165) or less than 2-inches apart on liner (164).



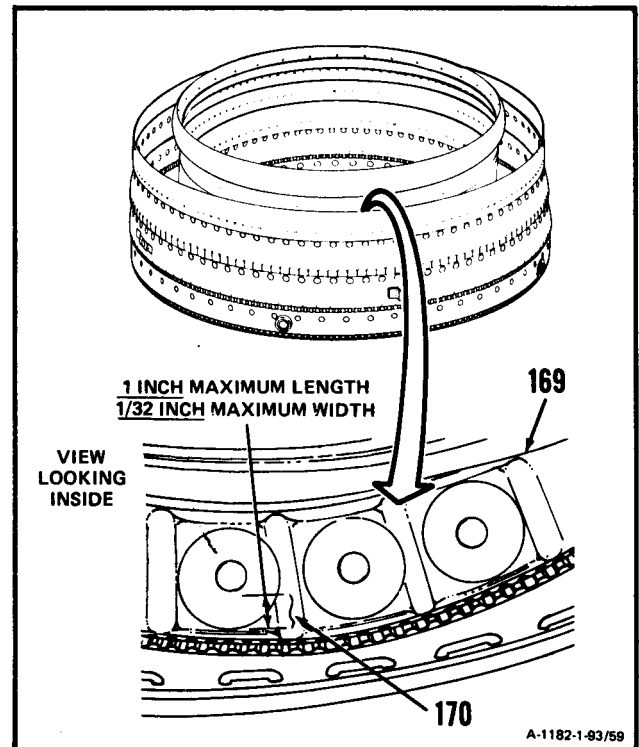
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- (2) **Inspect for burned areas (167).** There shall be no holes (168).



c. **Inspect liner end (169)** as follows:

- (1) There shall be no cracks (170) longer than 1-inch or wider than 1/32-inch. The total length of all cracks shall not exceed 10-inches.

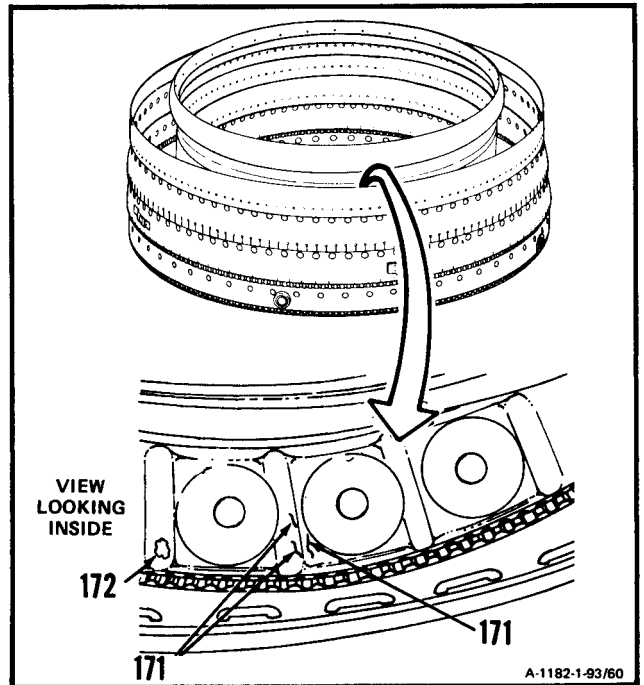


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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

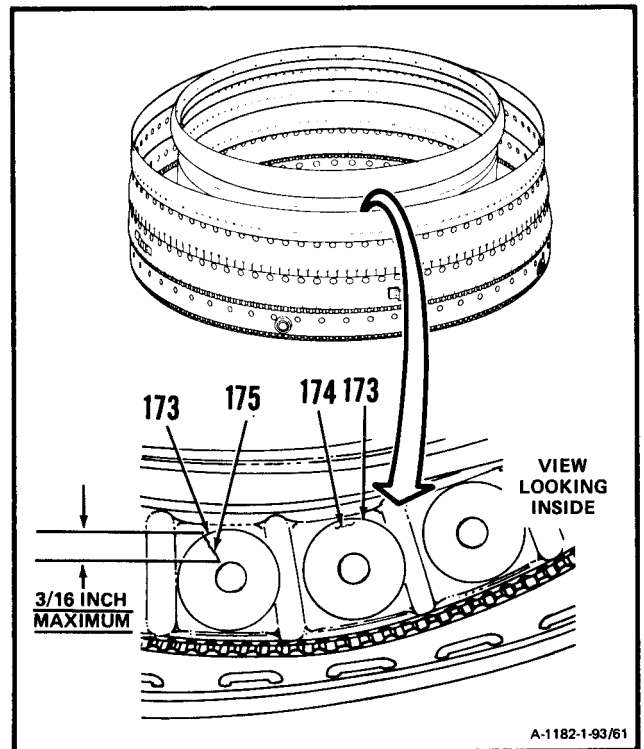
1-93

- (2) There shall be no converging cracks (171) which could result in loss of material.
- (3) There shall be no holes (172) burned through.



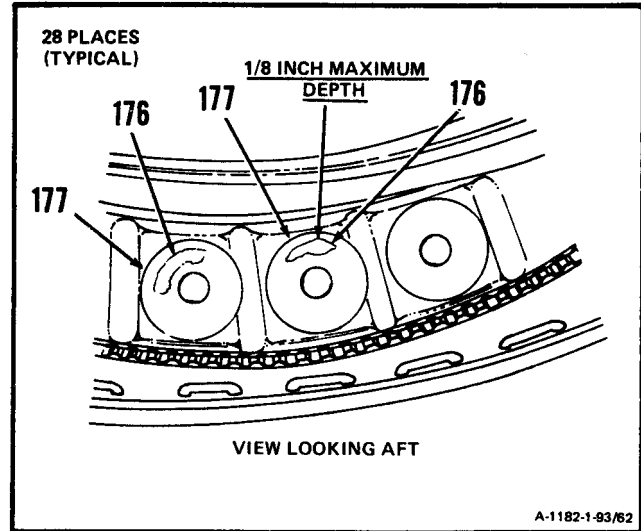
d. Inspect swirler cup outer edges (173) as follows :

- (1) There shall be no circular cracks (174).
- (2) There shall be no radial cracks (175) longer than 3/16-inch.

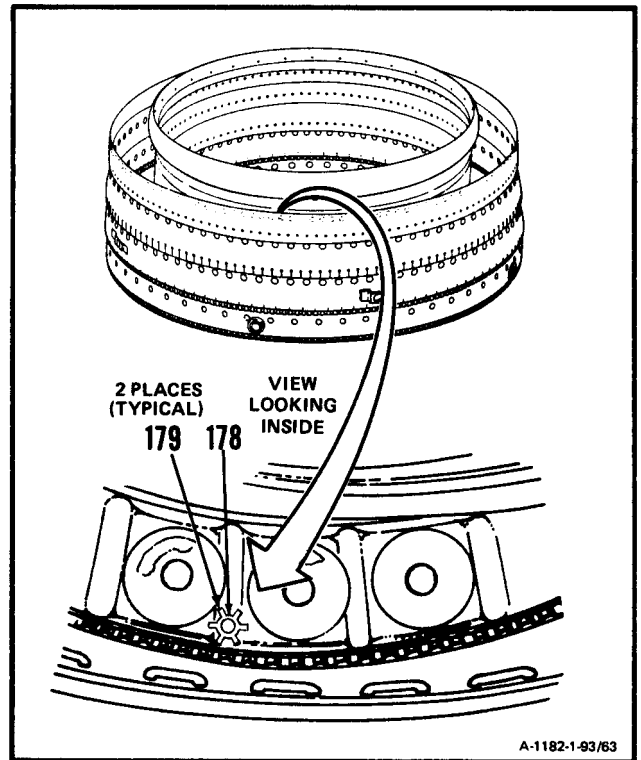


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- (3) There shall be no burns (176) deeper than 1/8-inch.
- (4) Burned area (176) shall not exceed more than one-quarter of the way around swirler cup (177).



- e. Inspect two guides (178). There shall be no broken, cracked, or missing tabs (179).

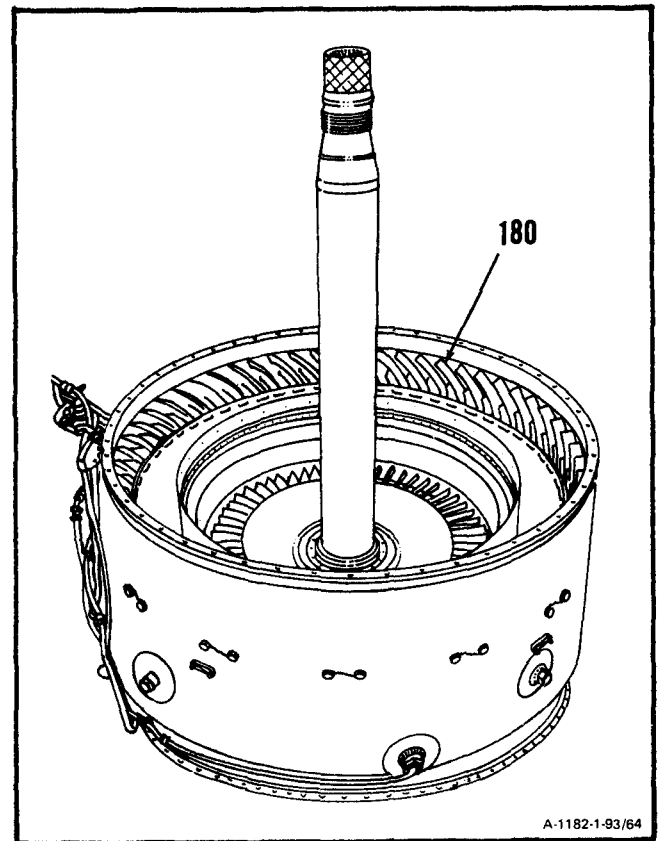


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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

34. Inspect combustion chamber vane assembly (180) as follows:



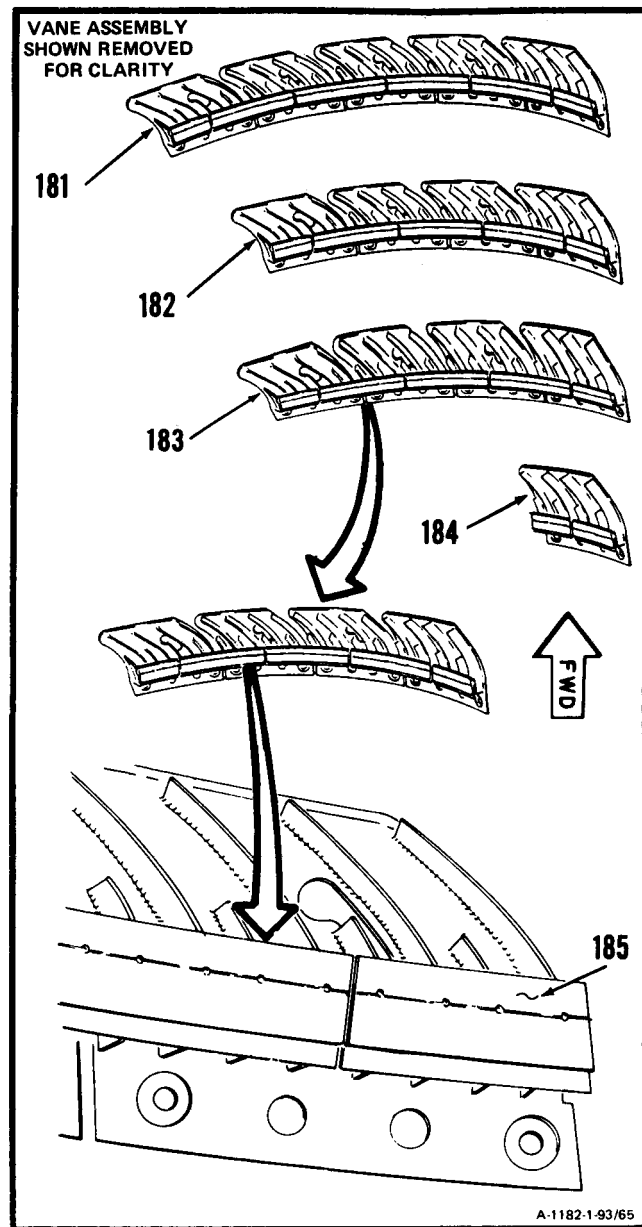
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a. Inspect four vane segments (181, 182, 183, and 184) as follows:

NOTE

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

(1) Inspect inner shroud (185) as follows:

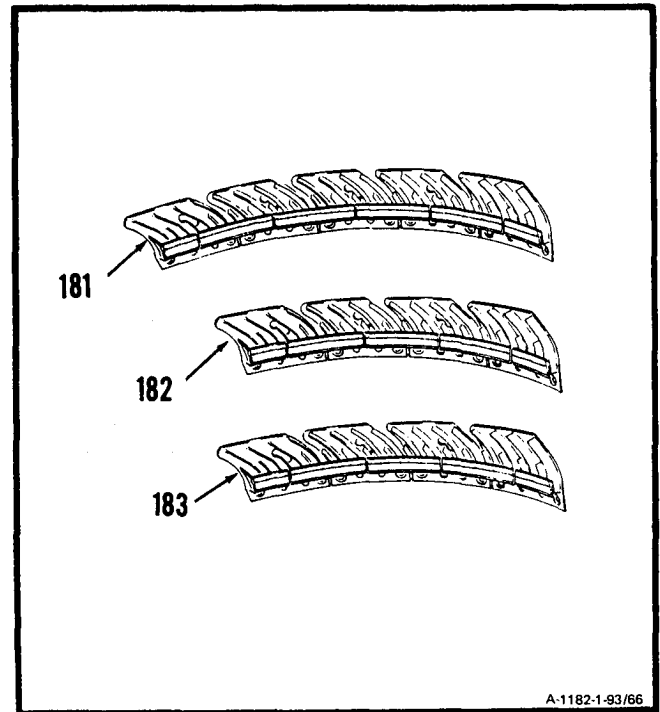


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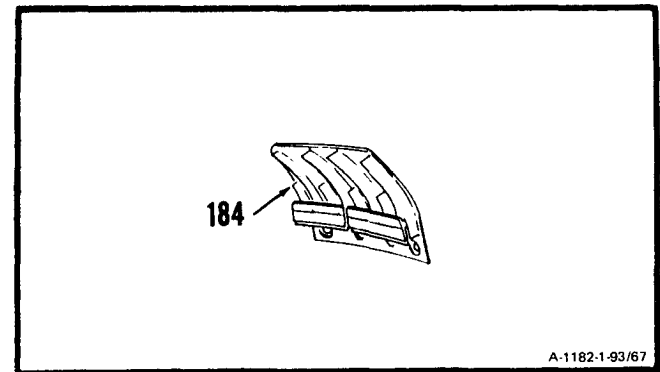
1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

- (a) The total length of all cracks in the three longer vane assemblies (181, 182, and 183) shall not be greater than 6-inches.



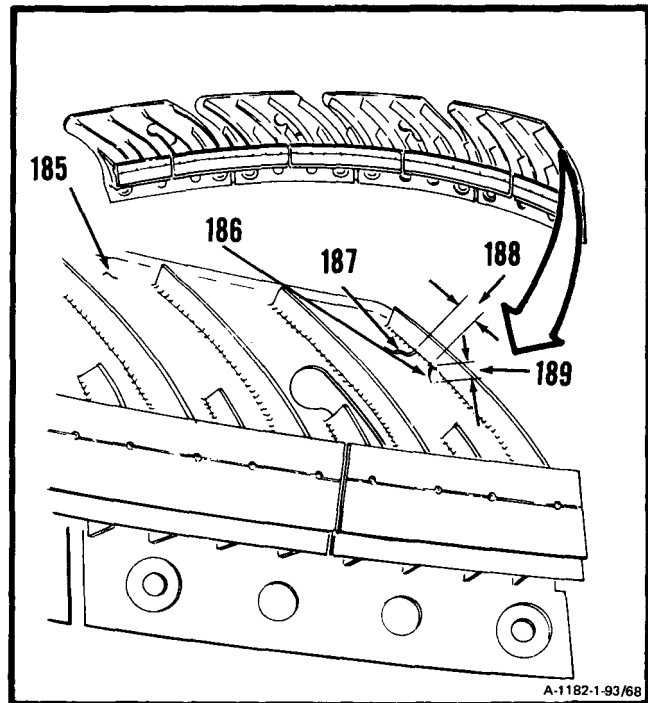
- (b) The total length of all cracks in the shorter vane assembly (184) shall not be greater than 2-inches.



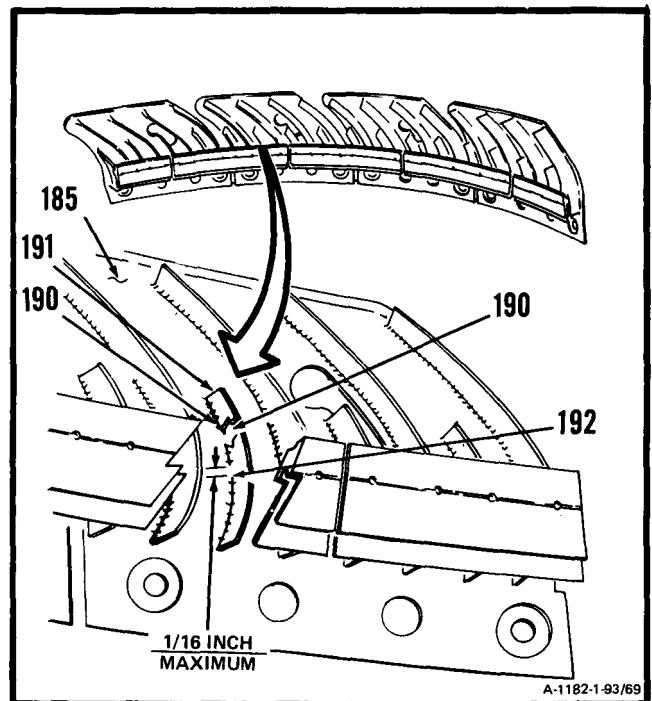
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(2) Inspect outer shroud (185) as follows:

- (a) There shall be no cracks (186 and 187) which do not have minimum separation (188). Minimum separation (188) shall be equal to the length (189) of shorter crack (186).



- (b) Inspect brazement (190) between short vane (191) and outer shroud (185). There shall be no cracks or lack of braze (192) longer than 1/16-inch.

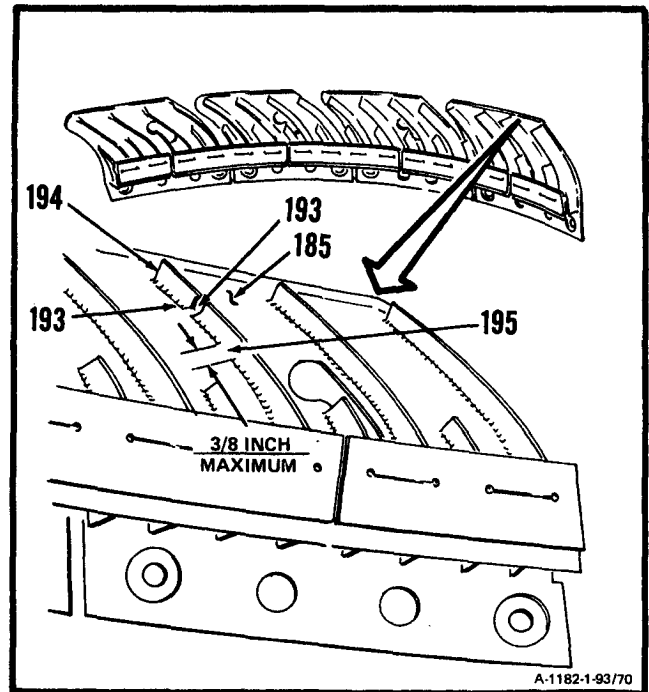


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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

- (c) Inspect brazement (193) between long vane (194) and outer shroud (185). There shall be no cracks or lack of braze (195) longer than 3/8-inch.



35. If inspection criteria in steps 11. thru 34. are not met, remove, clean, inspect, repair or replace defective parts. Refer to following tasks as needed.
- Remove, clean, inspect, and install fireshield assembly** (Ref. Tasks 4-12, 4-13, 4-14, and 4-15).
 - Remove, clean, inspect, and install primer tuba assembly** (Ref. Tasks 6-21, 6-22, 6-23, and 6-24).
 - Remove, clean, inspect, repair, and install left- and right-hand fuel manifold assemblies** (Ref. Tasks 6-16, 6-17, 6-18, 6-19, and 6-20).
 - Remove, clean, inspect, and install flow divider and bracket** (Ref. Tasks 6-42, 6-43, 6-44, and 6-45).

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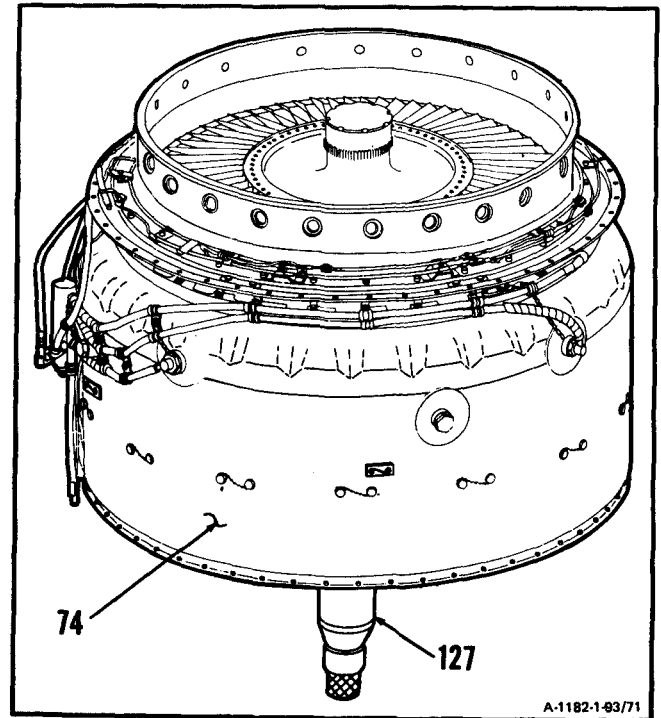
- e. **Disassemble and assemble combustion section and power turbine** (Ref. Tasks 3-6 and 3-7).
- f. **Remove, clean, inspect, repair, test, and install thermocouple harness assemblies** (Ref. Tasks 4-20, 4-21, 4-22, 4-23, 4-24, and 4-25).
- g. **Disassemble and assemble combustion section** (Ref. Tasks 3-9 and 3-10).
- h. **Clean and inspect combustion chamber vane assembly** (Ref. Tasks 3-13 and 3-14).
- i. **Clean, inspect, and repair combustion chamber liner** (Ref. Tasks 3-16, 3-17, and 3-18).
- j. **Clean and inspect combustion chamber housing** (Ref. Tasks 3-19 and 3-20).
- k. **Remove, clean, inspect, and install fuel drain valves** (Ref. Tasks 3-1, 3-2, 3-3, and 3-4).
- l. **Remove, clean, inspect, and install fourth stage power turbine rotor** (Ref. Tasks 4-33, 4-34, 4-35, and 4-36).
- m. **Remove, clean, inspect, repair and install fourth stage power turbine nozzle** (Ref. Tasks 4-45, 4-46, 4-47, 4-48, and 4-49).
- n. **Remove, disassemble, clean, inspect, repair, assemble, and install third turbine nozzle and support** (Ref. Tasks 4-26, 4-27, 4-28, 4-29, 4-30, 4-31, and 4-32).
- o. **Clean, inspect, and repair third stage power turbine rotor** (Ref. Tasks 4-50, 4-51, and 4-52).

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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

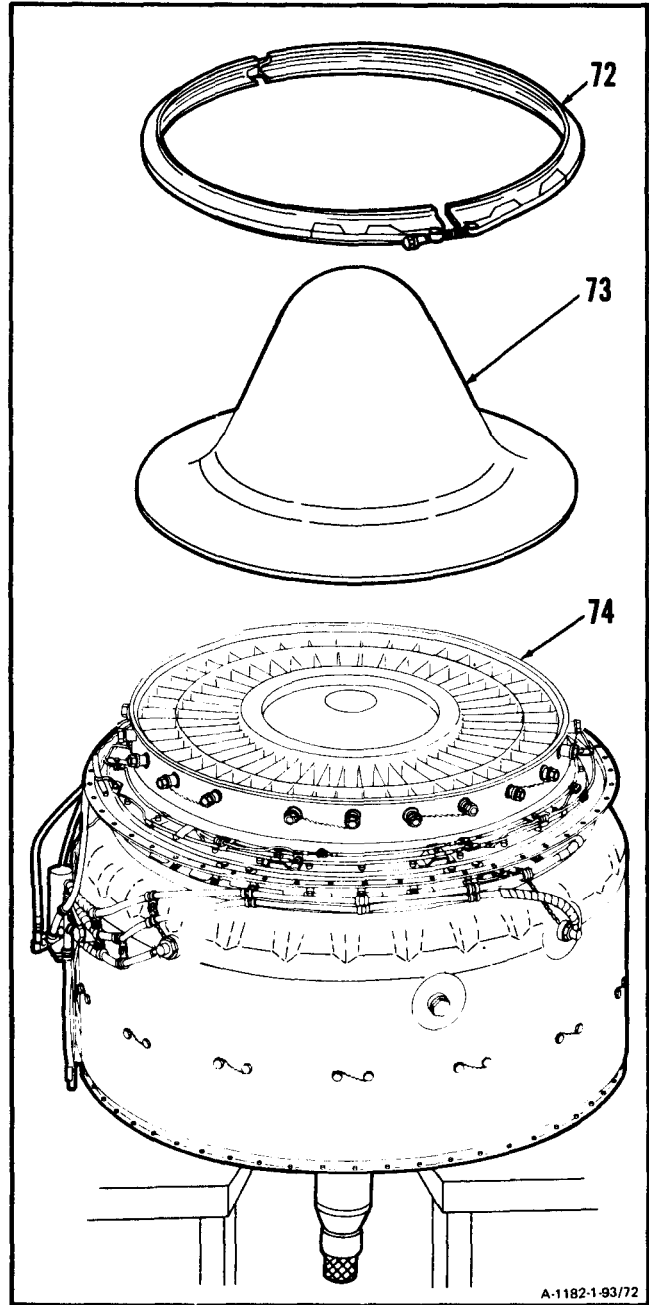
36. Using helper, turn combustor section and power turbine (74) so that power shaft (127) is pointing down.
37. **Install exit vane assembly** (Ref. Task 4-82).



GO TO NEXT PAGE

38. Install group aircraft cover (T24) (73) and clamp coupling half (T37) (72) on combustion section and power turbine (74).

INSPECT



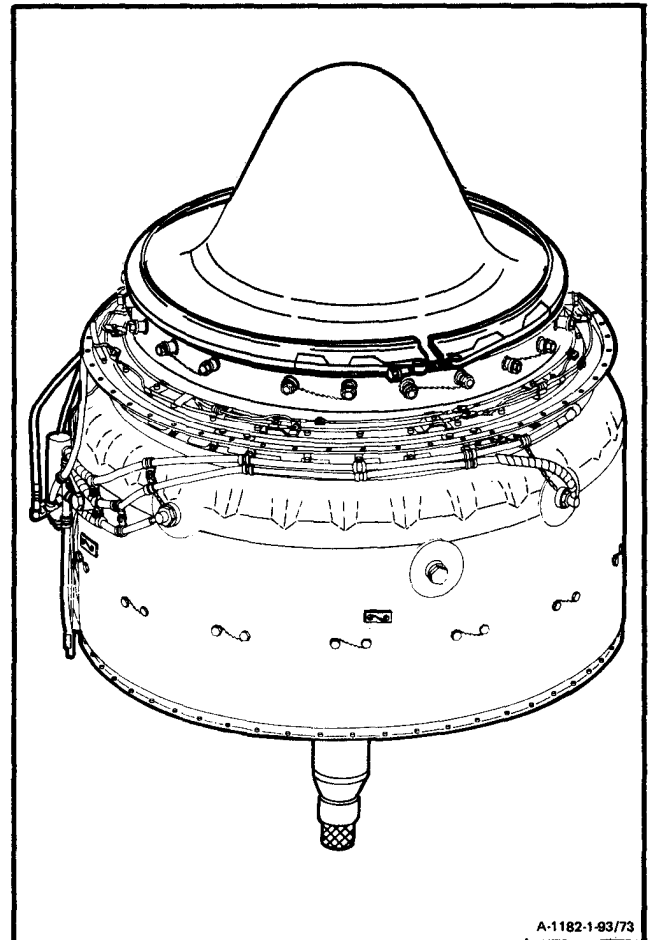
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1-93 INSPECT ENGINE HOT END (AVIM) (Continued)

1-93

FOLLOW-ON MAINTENANCE:

Install Combustion Section and Power Turbine
(Task 3-8).
Service Engine Oil System Task 1-74).

**END OF TASK**

1-94 MINOR SERVICING

This section provides instructions for performing maintenance checks and services to keep engine systems serviceable. These checks and services include removal, cleaning, inspection, and installation of items related to, but not necessarily covered in engine accessory maintenance procedures. These checks and services may be part of scheduled or special inspections or they may stand alone. They are divided into the following tasks:

LIST OF TASKS

NUMBER	TASK	PAGE
1-95	Service Starter Gearbox Filter	1-371
1-96	Service Oil Filler Strainer	1-375
1-97	Service No. 2 Bearing Pressure Oil Strainer	1-380
1-98	Service No. 4 and 5 Bearing Oil Filter	1-384
1-99	Service Oil Filter Cap and Stem Assembly and Oil Filter Element	1-397
1-100	Service Scavenge Oil Screen	1-402
1-101	Service Fuel Control Filter and Air-Bleed Poppet Valve	1-414
1-102	Service Main Fuel Filter	1-425
1-103	Service In-Line Fuel Filter	1-429
1-104	Service Interstage Air-Bleed Actuator Strainer	1-434

1-95 SERVICE STARTER GEARBOX FILTER

1-95

INITIAL SETUP**Applicable Configurations:**

All

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

Goggles

Compressed Air Source

Materials:

Dry Cleaning Solvent (EI 7)

Gloves (E20)

Lockwire (E29)

Wiping Rag (E58)

Parts:

Packing

Personnel Required:

68B10 Aircraft Powerplant Repairer

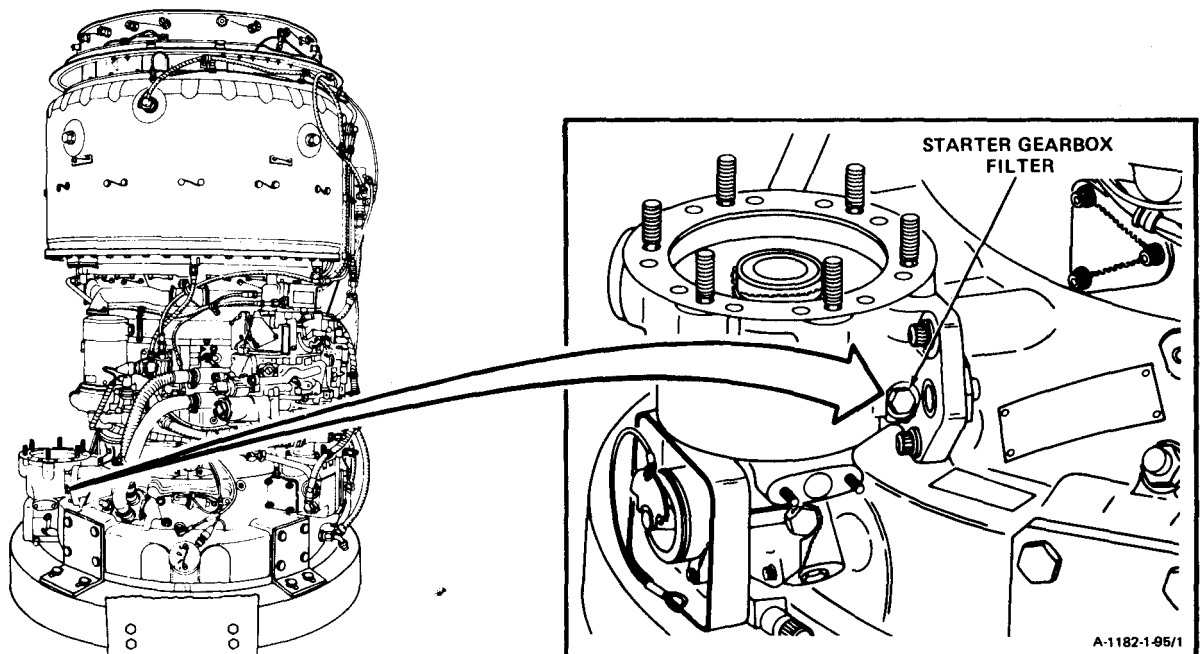
68B30 Aircraft Powerplant Inspector

References:

TM 55-2840-254-23P

General Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

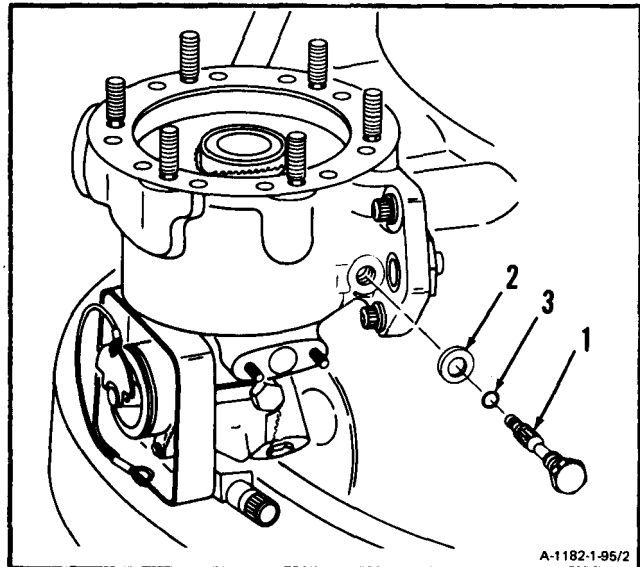


GO TO NEXT PAGE

1. Remove lockwire, starter gearbox filter (1), washer (2) and packing (3).
2. Clean starter gearbox filter (1) as follows:

WARNING

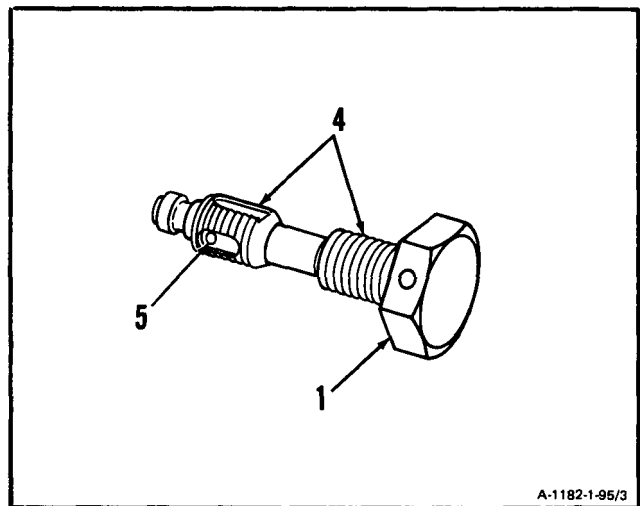
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.



- a. Wear gloves (E20). Immerse filter in dry cleaning solvent (E17) and agitate. Use brush on threads (4).

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 starter gearbox filter (1) and internal passage (5). Use clean, dry compressed air.

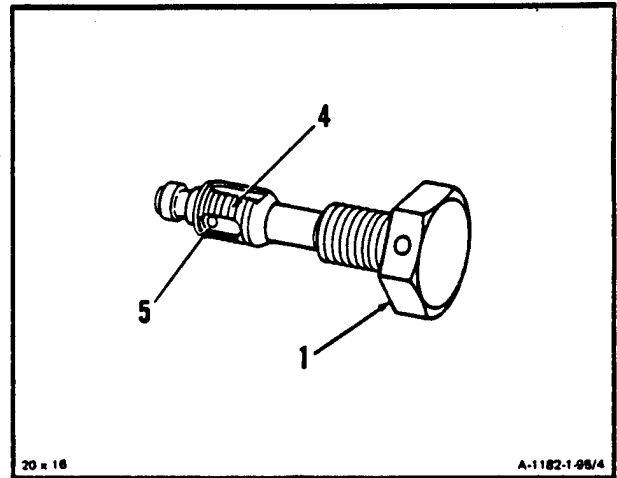
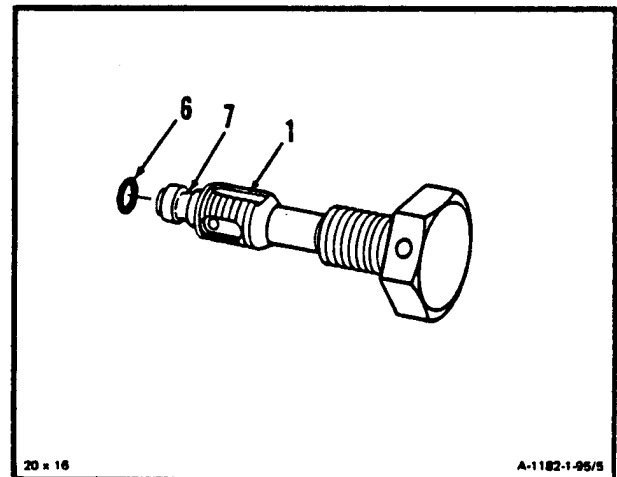
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1-95 SERVICE STARTER GEARBOX FILTER (Continued)

1-95

3. Inspect starter gearbox filter (1).

- a. There shall be no cracks.
- b. There shall be no clogging of threads (4) or internal passages (5).

**4. Install new packing (6) in groove (7) on starter gearbox filter (1).**

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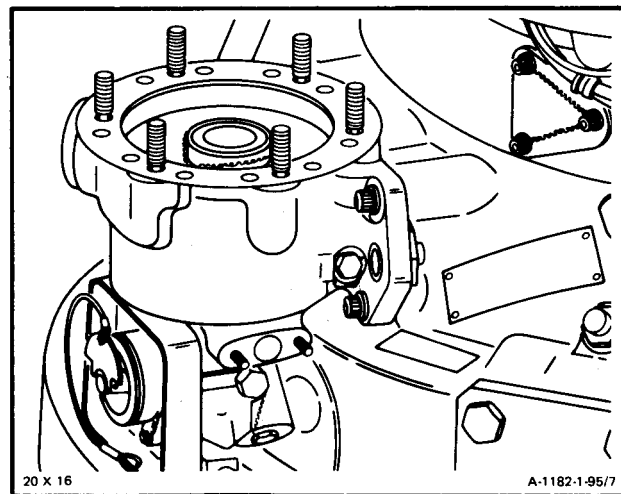
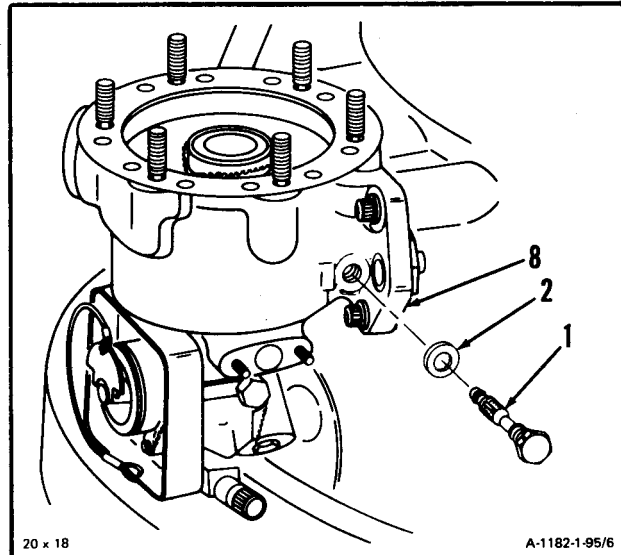
1-95 SERVICE STARTER GEARBOX FILTER (Continued)

5. **Install** washer (2) and at **starter gearbox filter (1)** in housing (8). **Torque starter gearbox filter (1) 20 to 25 inch-pounds.** Lockwire starter gearbox filter (1). Use lockwire (E29).

INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-96 SERVICE OIL FILLER STRAINER

1-96

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:

Dry Cleaning Solvent (E17)
Gloves (E20)
Lockwire (E29)
Wiping Rag (E58)

Parts:

Packing

Personnel Required:

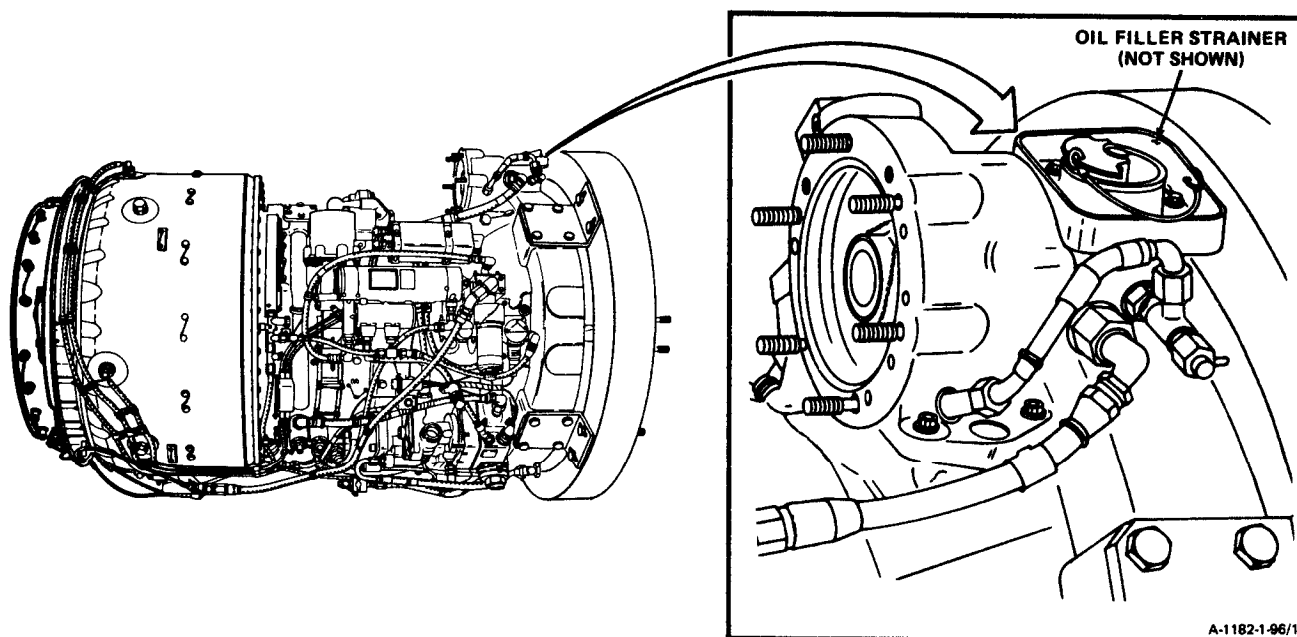
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-2840-254-23P

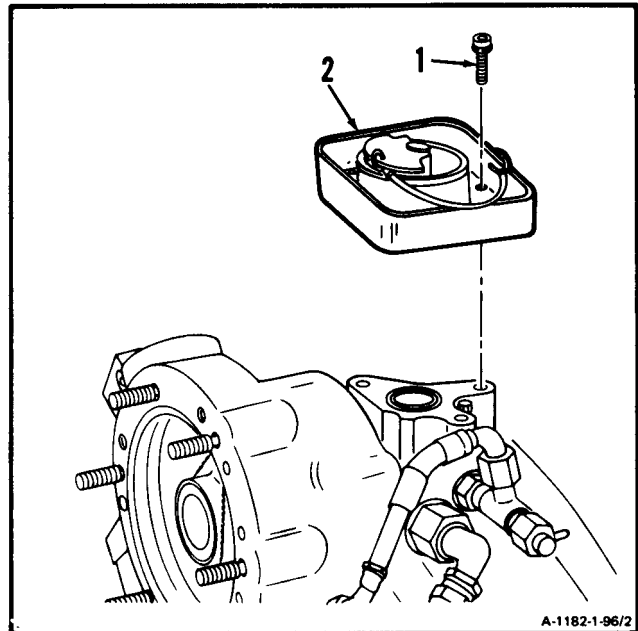
General Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

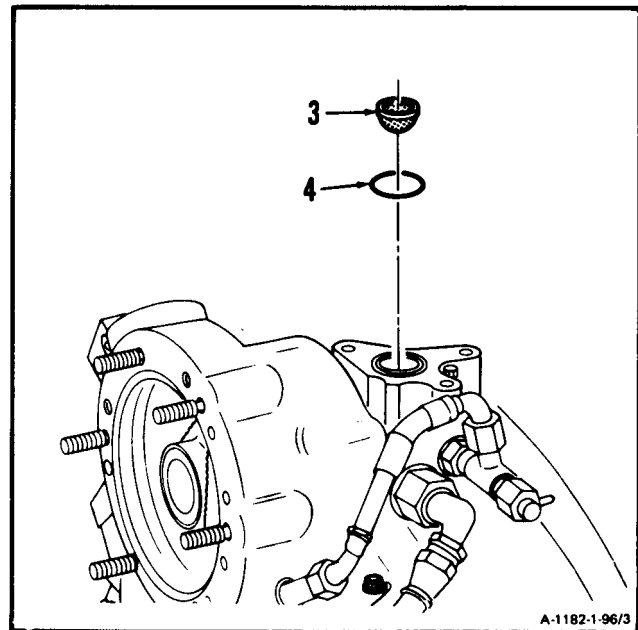


GO TO NEXT PAGE

1. Remove lockwire, three bolts (1) and oil filler assembly (2).



2. Remove oil filler strainer (3) and packing (4).



GO TO NEXT PAGE

3. Clean oil filler strainer (3) as follows:

WARNING

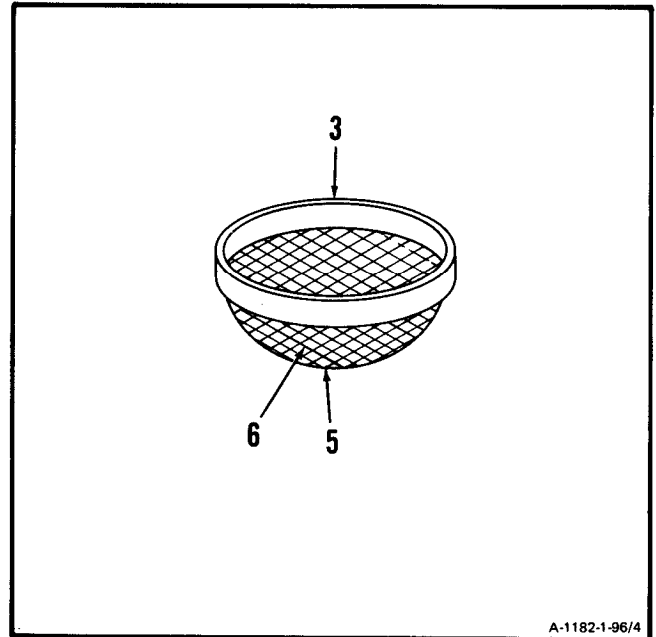
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

- a. Wear gloves (E20). Immerse in dry cleaning solvent (E17) and agitate. Use brush on screen (5).

WARNING

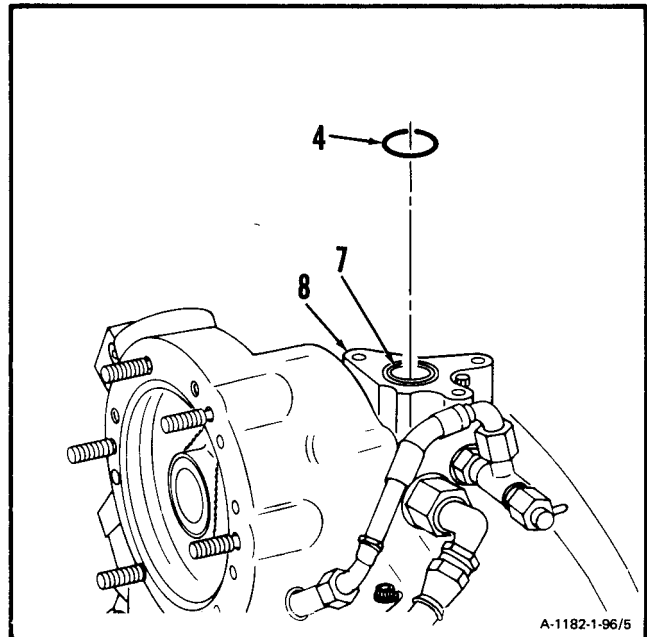
When using compressed air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

- b. Wear goggles. Blow dry screen (5). Use clean, dry compressed air.
4. **Inspect oil filler strainer (3)**. There shall be no broken wires (6).

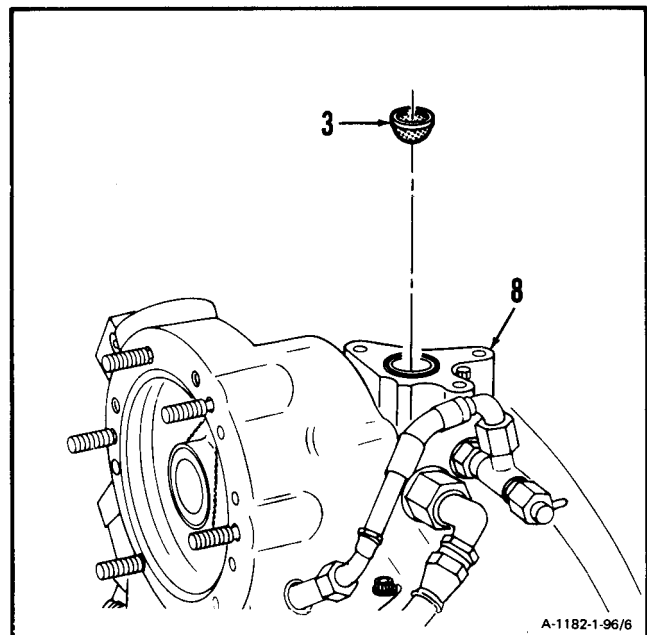


GO TO NEXT PAGE

5. Install packing (4) in groove (7) of housing (8).



6. Install oil filler strainer (3) in housing (8).



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1-96 SERVICE OIL FILLER STRAINER (Continued)

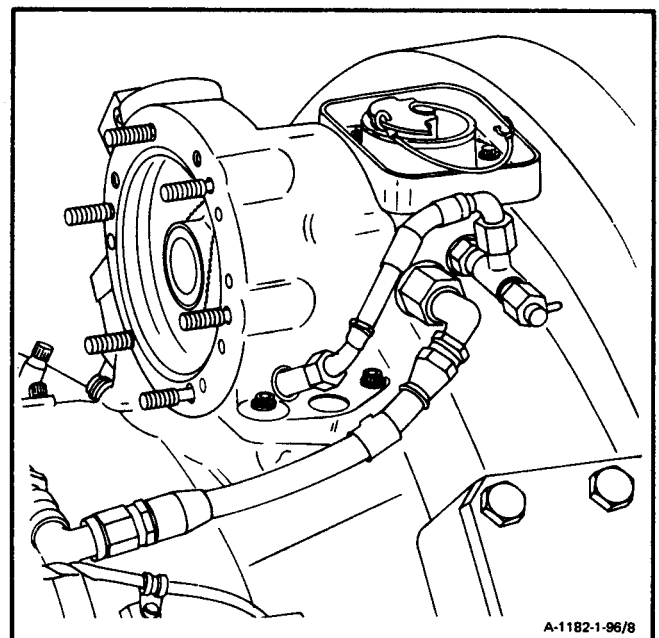
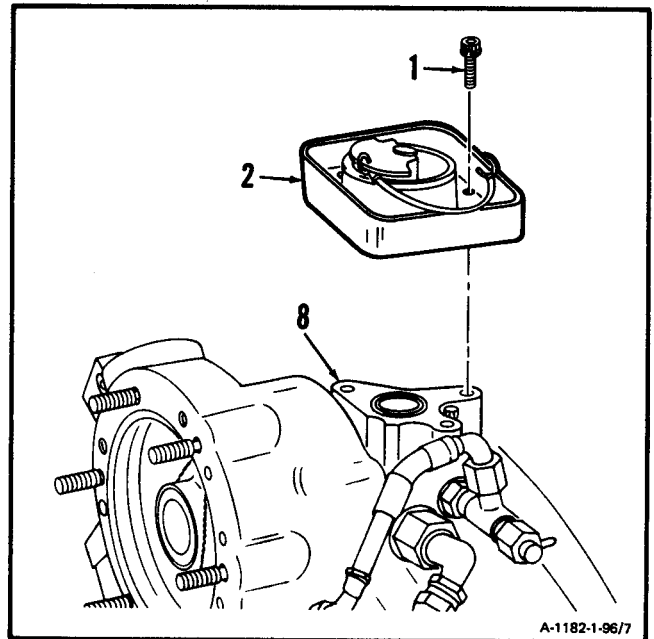
1-96

7. Install oil filler assembly (2) and three bolts (1) on housing (8). Lockwire bolts (1). Use lockwire (E29).

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
Goggles
Compressed Air Source

Materials:

Dry Cleaning Solvent (E17)
Gloves (E20)
Lockwire (E29)
Wiping Rag (E58)

Parts:

Packing

Personnel Required:

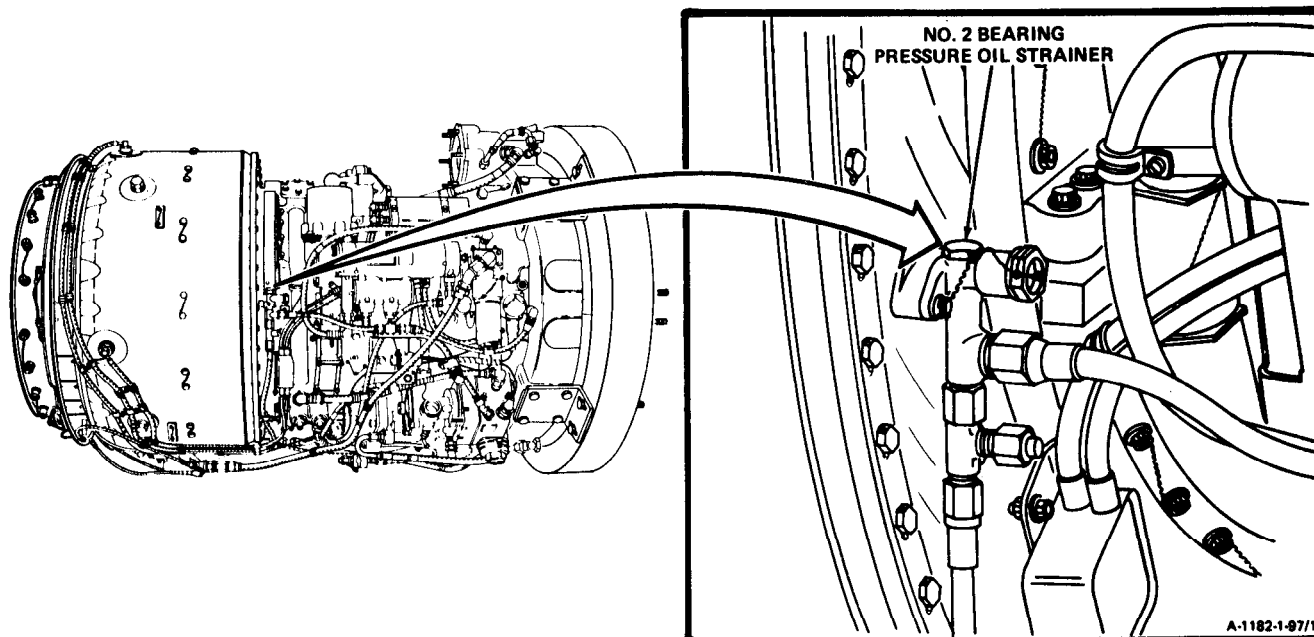
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-2840-254-23P

General Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

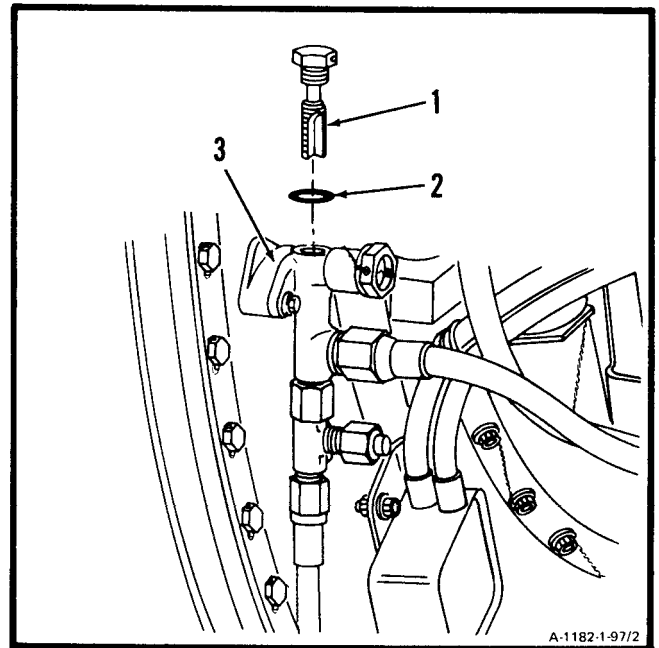


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1-97 SERVICE NO. 2 BEARING PRESSURE OIL STRAINER (Continued)

1-97

1. Remove lockwire, No. 2 bearing pressure oil strainer (1) and packing (2) from connector (3).



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WARNING

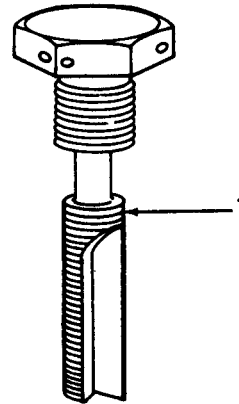
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

2. Wear gloves (E20). **Clean strainer (1)** using soft brush and dry cleaning solvent (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.

3. Wear goggles. **Blow dry strainer (1)** using clean, dry compressed air.



A-1182-1-97/3

4. **inspect strainer (1).**
 - a. There shall be no cracks.
 - b. There shall be no clogged threads.

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1-97 SERVICE NO. 2 BEARING PRESSURE OIL STRAINER (Continued)

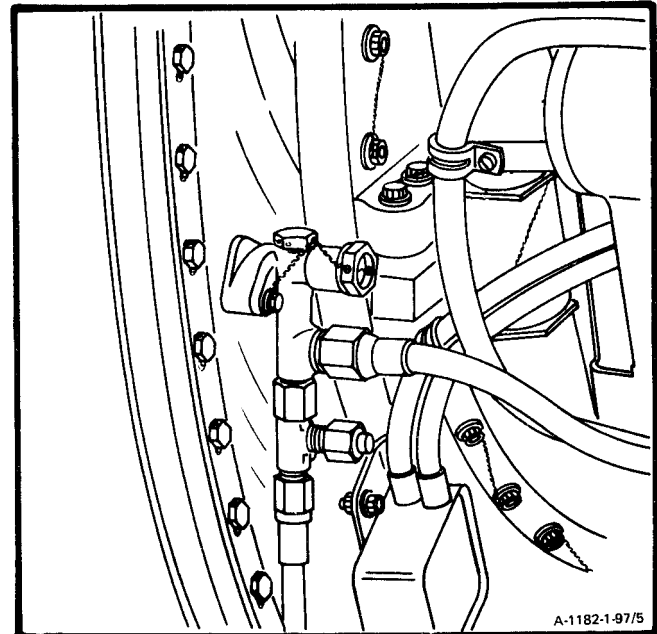
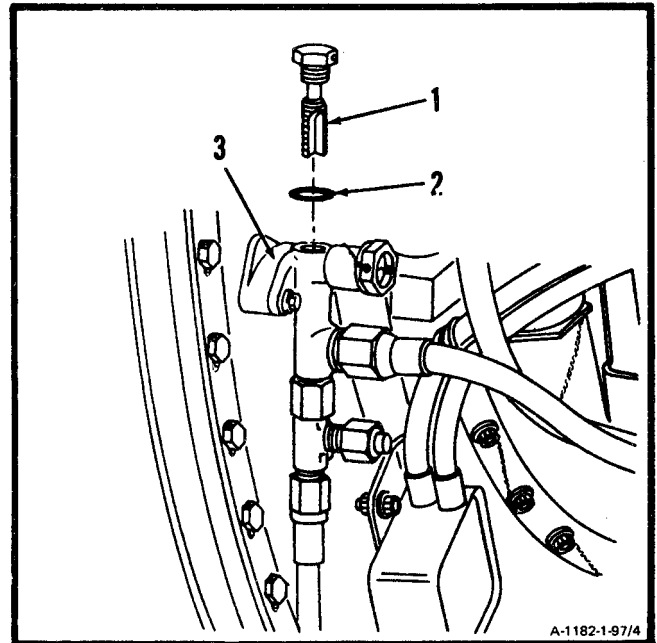
1-97

5. Install packing (2) and No. 2 bearing pressure oil strainer (1) in connector (3). Lockwire strainer (1). Use lockwire (E29).

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
- Compressed Air Source
- Open-End Wrench (T53)
- Goggles
- Screw, 0.0730-64NC-2B x 1 inch
- Outside Micrometer Set
- Torque Wrench, 30 to 150 Inch-Pounds

Materials:

- Dry Cleaning Solvent (E17)
- Gloves (E20)
- Lockwire (E29)
- Wiping Rag (E58)

Parts:

- Shim
- Reducer

Personnel Required:

- 68610 Aircraft Powerplant Repairer
- 68630 Aircraft Powerplant Inspector

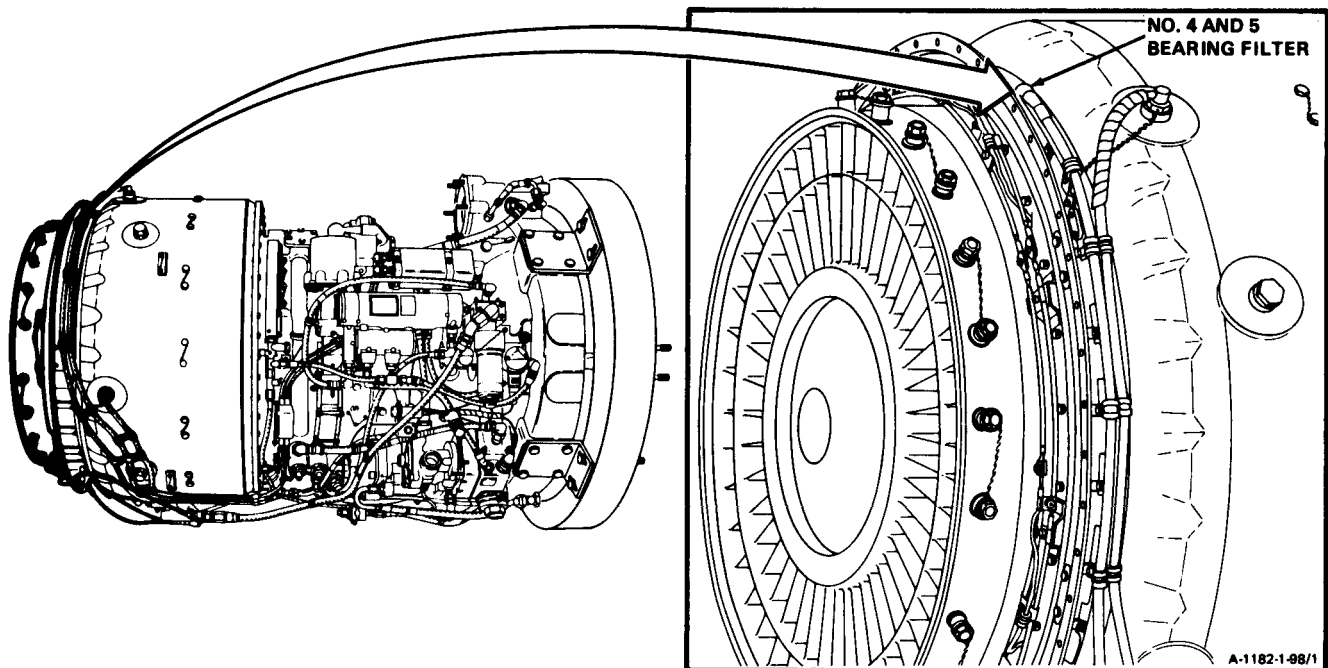
References:

- TM 55-2840-254-23P

General Safety Instructions:

WARNING

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

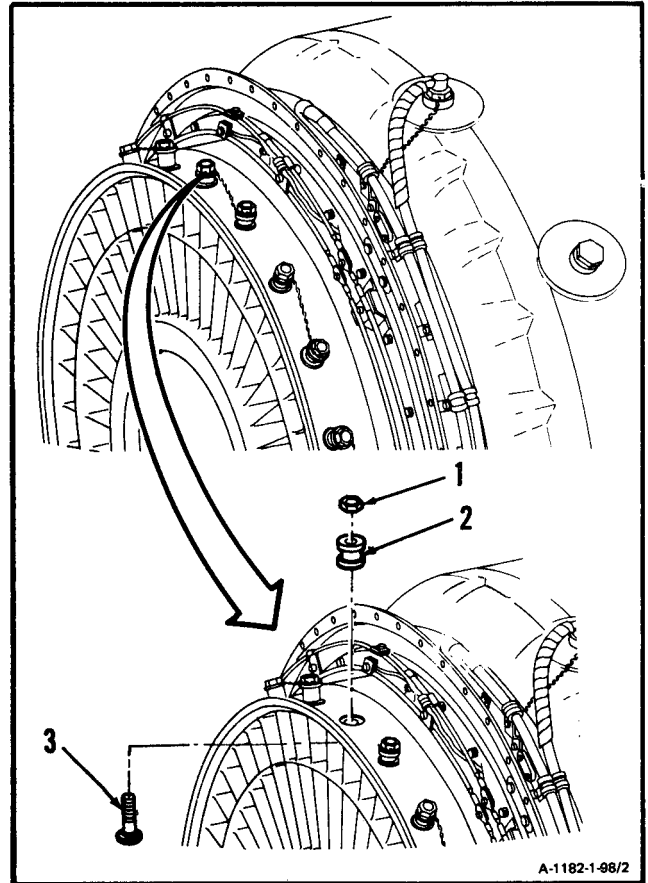


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1-98 SERVICE NO. 4 AND 5 BEARING OIL FILTER (Continued)

1-98

1. Remove lockwire, nut (1), spacer (2), and bolt (3).

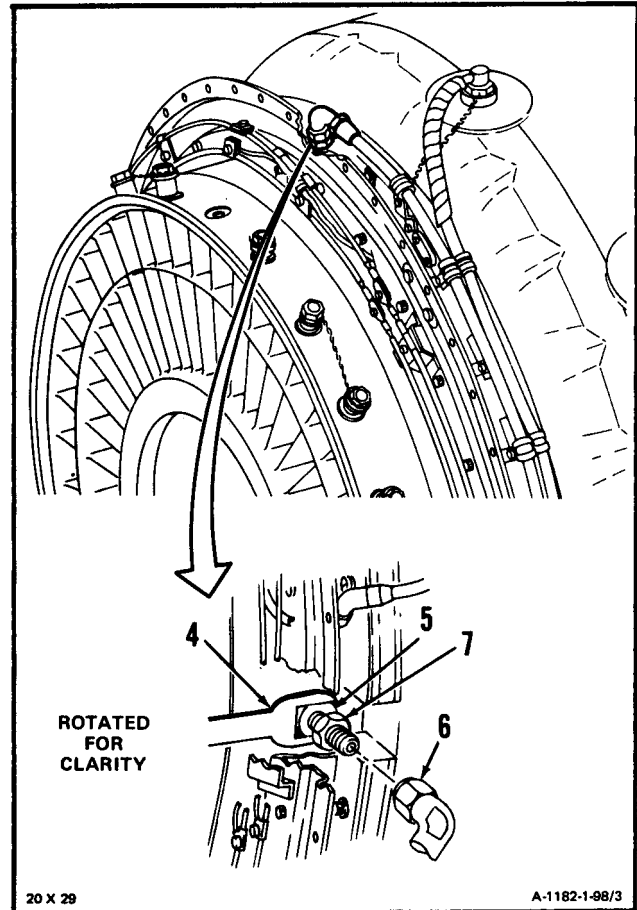


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CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

2. Place open-end wrench (T53) (4) on No. 4 and 5 bearing lube adapter (5).
3. Disconnect hose assembly (6) from reducer (7).



GO TO NEXT PAGE

1-98 SERVICE NO. 4 AND 5 BEARING OIL FILTER (Continued)

1-98

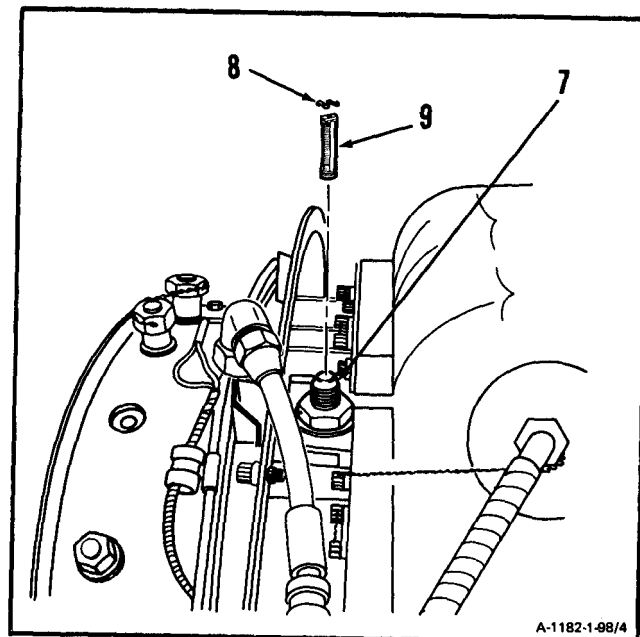
WARNING

In following step, goggles should be worn when removing spring. Spring may fly apart when removed. Failure to comply may cause serious eye injury. Get medical attention if injury to eyes occurs.

4. Wear goggles and remove spring (8).
5. Remove No. 4 and 5 bearing oil filter (9) from reducer (7). Use screw.

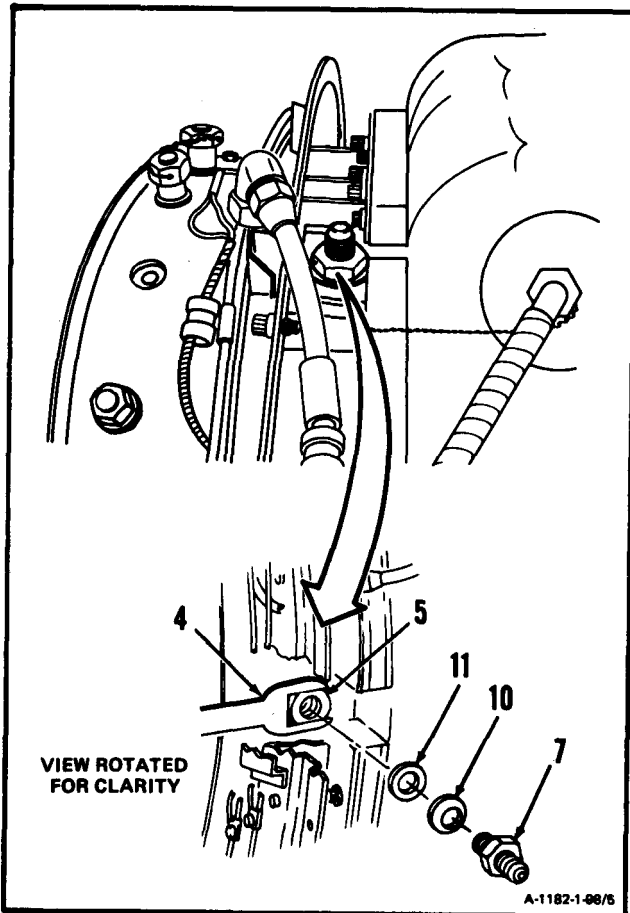
NOTE

If you cannot remove filter from reducer, do steps 6. thru 8. If filter has been removed, omit steps 6. thru 8.

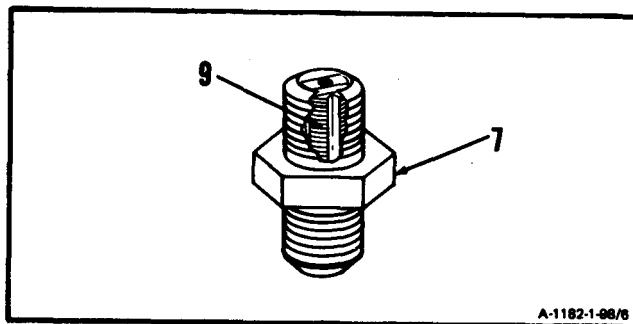


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- 6. Place open-end wrench (T53) (4) on No. 4 and 5 bearing lube adapter (5).
- 7. **Remove** lockwire, **reducer (7)**, washer (10), and shim (11).



- 8. **Discard reducer (7) and filter (9)** if filter (9) could not be removed from reducer (7).



GO TO NEXT PAGE

WARNING

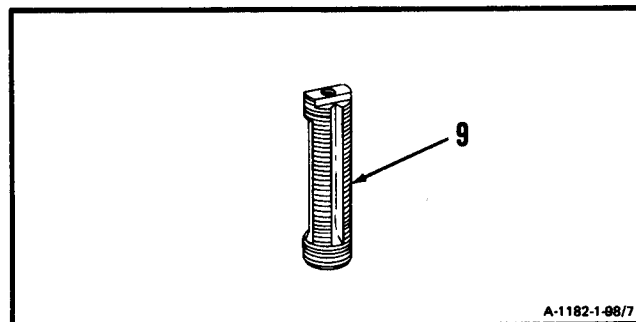
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

9. Wear gloves (E20). **Clean No. 4 and 5 bearing filter (9)**. Use brush and dry cleaning solvent (E17).

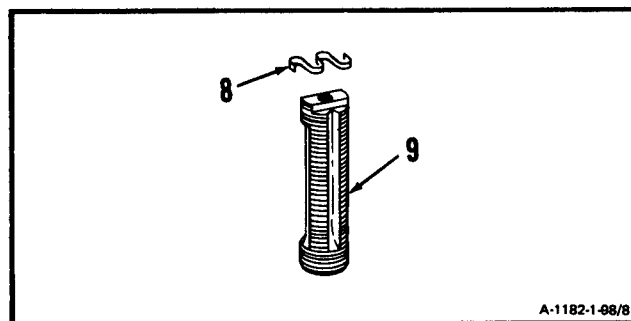
WARNING

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.

10. Wear goggles. **Blow dry No. 4 and 5 bearing filter (9)** using clean, dry compressed air.
11. **Inspect spring (8)**. There shall be no nicks, tears or cracks.
12. **Inspect filter (9)**. There shall be no cracks or clogged threads.



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NOTE

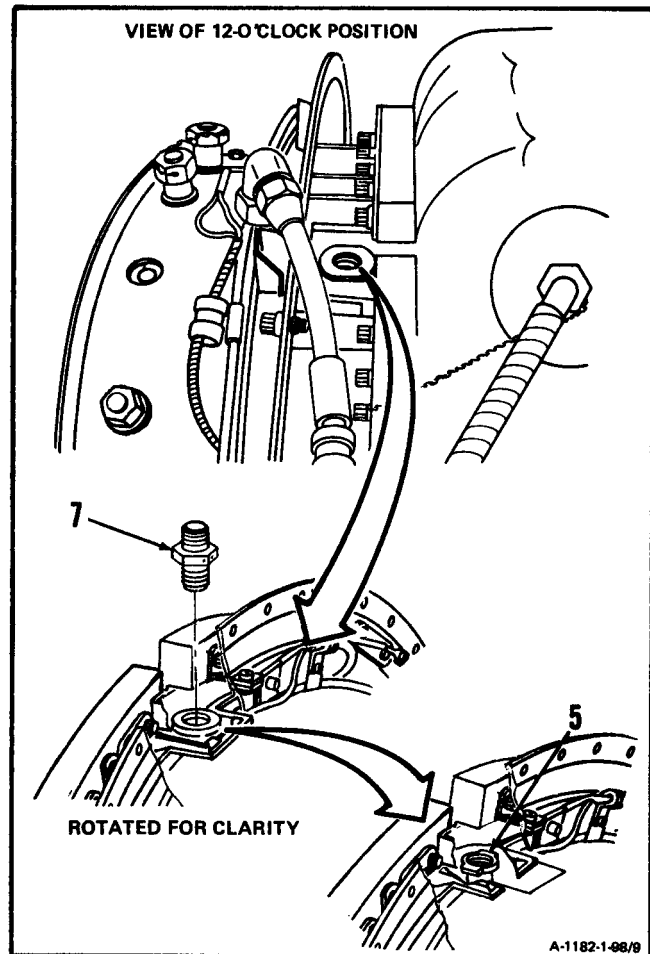
If reducer was not removed, omit steps 13,14, 15, and 16.

13. Determine shim needed under reducer (7) as follows:

CAUTION

Do not tighten reducer in following step. Tightening of reducer may damage internal oil tube.

- a. Thread reducer (7) in adapter (5) until it is seated.

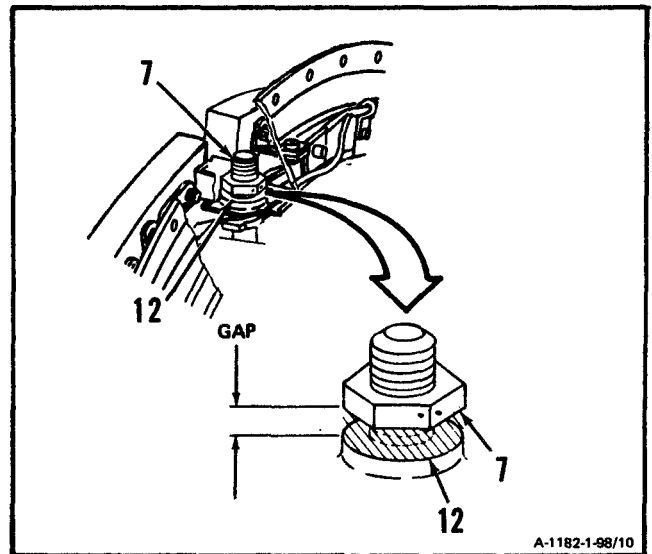


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CAUTION

In following step, fireshield must be seated against adapter to obtain correct measurement. Failure to do so will result in incorrect gap.

- b. Seat adapter. Measure gap between fireshield (12) and reducer (7).



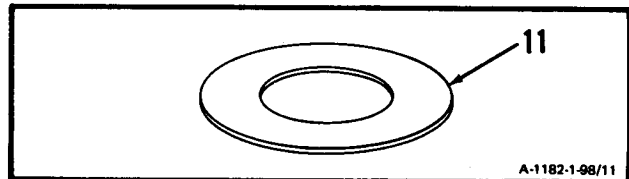
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c. Find gap measured in shim selection table.
Read across table to find thickness of shim(s) needed.

SHIM SELECTION TABLE

IF GAP MEASURES	SHIM THICKNESS REQUIRED
INCHES	INCHES
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 (11) and check against Shim Selection Table. Use outside micrometer caliper.



A-1182-1-98/11

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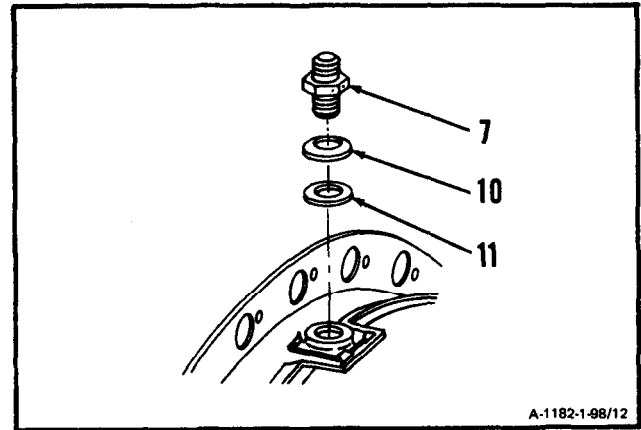
CAUTION

Concave side of washer must face fire shield section. Failure to comply will place wrong tension on internal oil tube.

CAUTION

Do not tighten reducer in following step. Tightening of reducer may damage internal oil tube.

14. Remove reducer (7). Loosely install shim (11) washer (10), concave side down, and reducer (7).

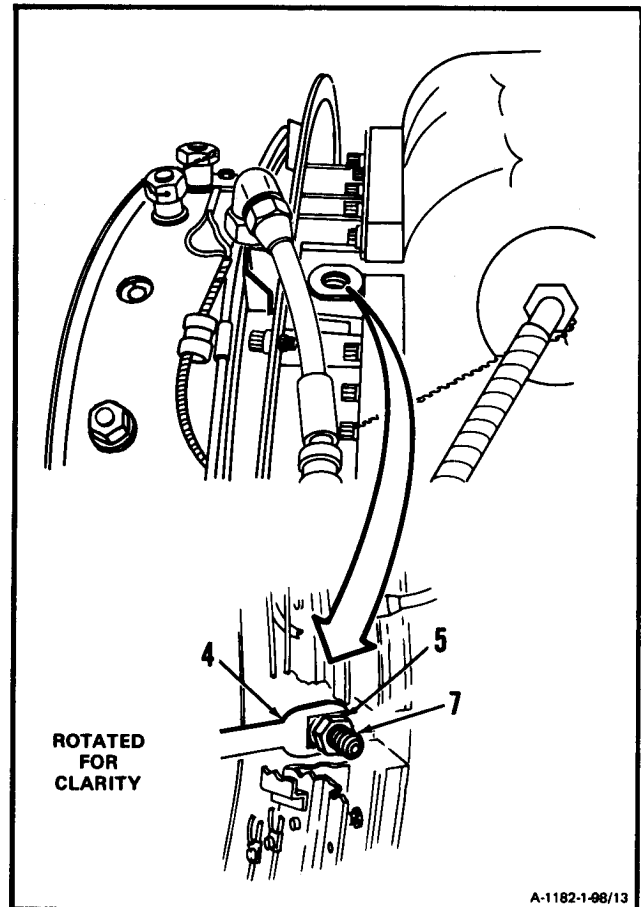


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CAUTION

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

15. Place open-end wrench (T53) (4) on No. 4 and 5 bearing lube adapter (5).
16. **Torque reducer (7) to 115 inch-pounds.** Lock-wire reducer (7). Use lockwire (E29).



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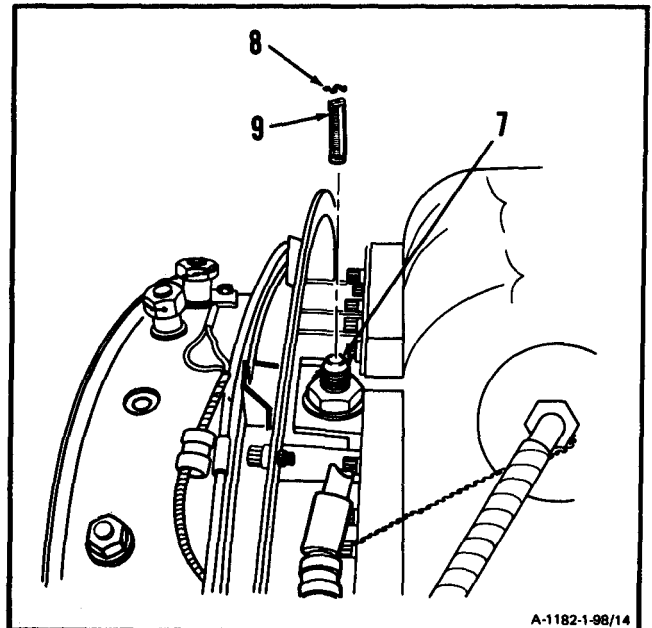
1-98 SERVICE NO. 4 AND 5 BEARING OIL FILTER (Continued)

1-98

CAUTION

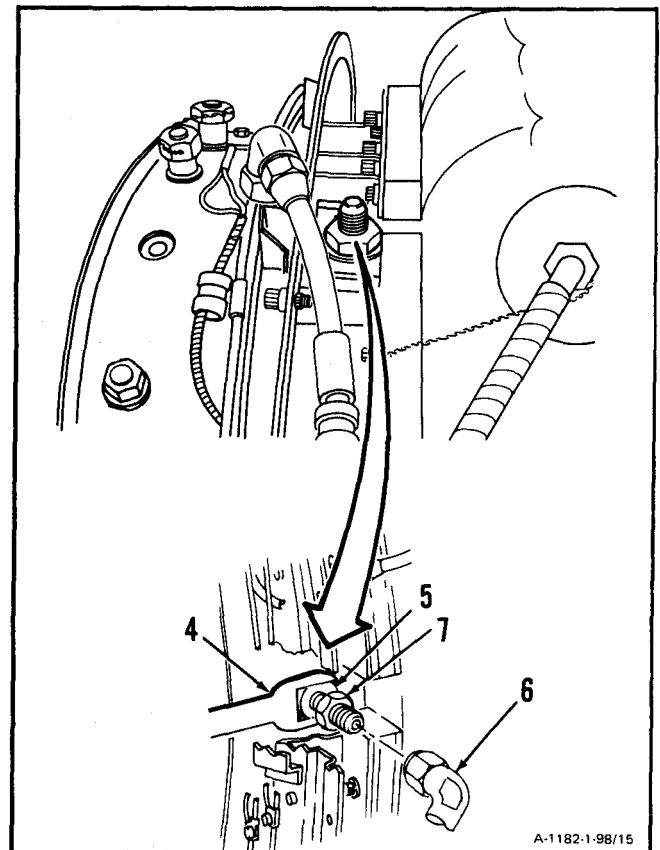
In following step, be sure that filter is installed in reducer with small diameter hole facing up. Failure to comply will cause less oil flow to bearings and result in bearing failure.

17. Install No. 4 and 5 bearing filter (9) into reducer (7).
18. Install spring (8).

**CAUTION**

In following step, hold No. 4 and 5 bearing lube adapter using open-end wrench (T53). Failure to use wrench may result in damage and dislocation of oil transfer tube resulting in oil leaks.

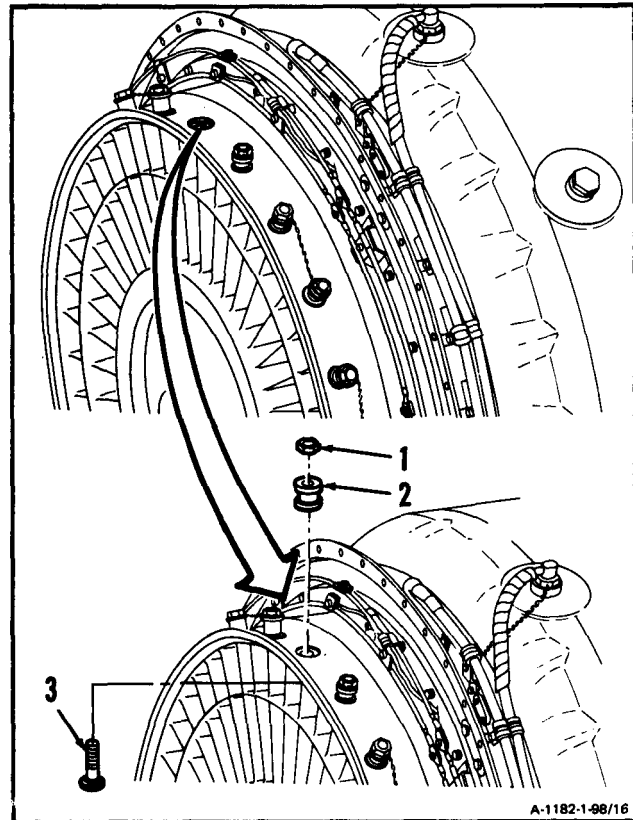
19. Place open-end wrench (T53) (4) on No. 4 and 5 bearing lube adapter (5).
20. Install hose assembly (6) on reducer (7).



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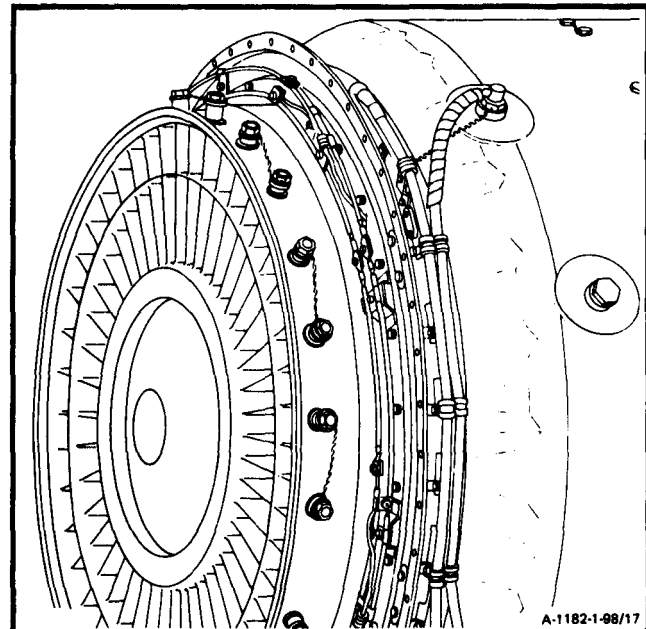
21. Install bolt (3), spacer (2), and nut (1). Torque nut (1) to **125 inch-pounds**. Lockwire nut (1). Use lockwire (E29).

INSPECT



FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-99 SERVICE OIL FILTER CAP AND STEM ASSEMBLY AND OIL FILTER ELEMENT

1-99

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
Torque Wrench, 30-150 Inch-Pounds
Deep Style Socket, 1-5/16 Inch
Container, 1 Quart

Materials:

Dry Cleaning Solvent (E17)
Gloves (E20)
Lint-Free Cloth (E26)
Lockwire (E29)
Wiping Rag (E58)

Parts:

Packings
Filter Element

Personnel Required:

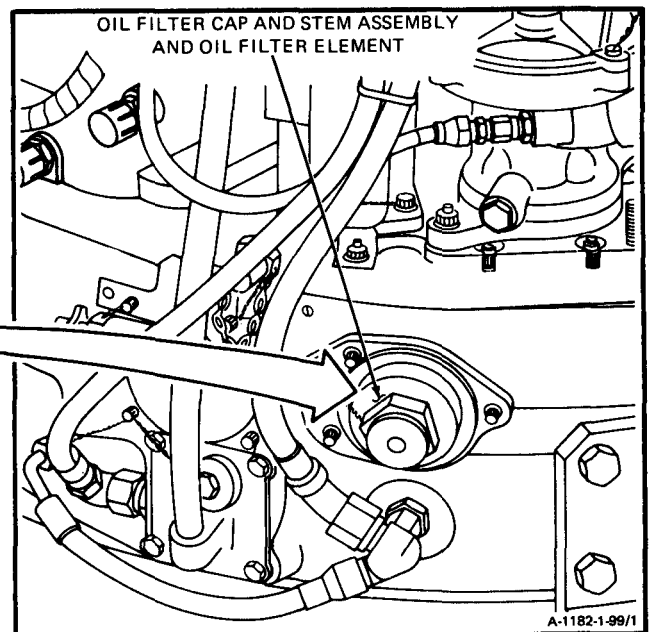
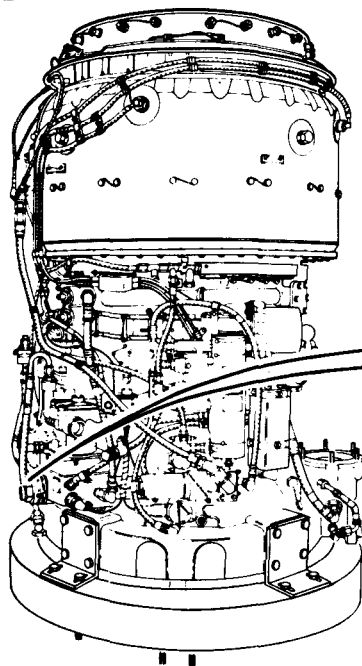
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-2840-254-23P
Task 1-86

General Safety Instructions:**WARNING**

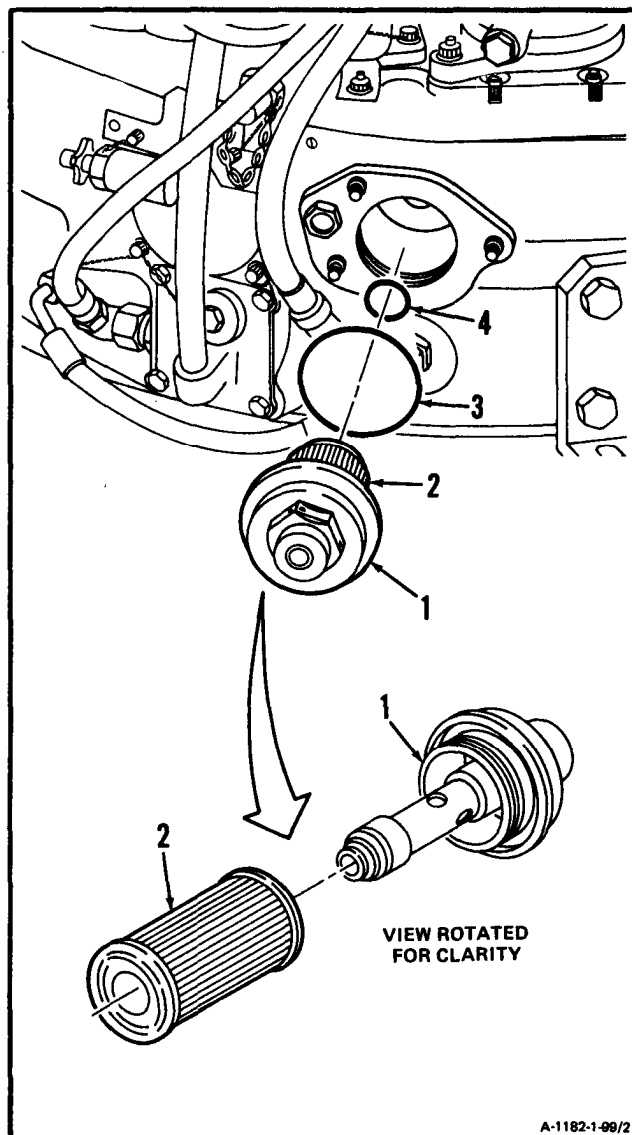
Lubricating oils (E32 and E33) cause paralysis if swallowed. Prolonged contact with them may irritate the skin. Handle only in well-ventilated areas away from heat and flame. Drain and store in approved metal safety containers. Avoid prolonged or repeated contact with skin and do not take internally. Wash contacted areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

**GO TO NEXT PAGE**

1-99 SERVICE OIL FILTER CAP AND STEM ASSEMBLY AND OIL FILTER ELEMENT (Continued)

1-99

1. Remove lockwire and **oil filter cap and stem assembly (1)** with **oil filter element (2)**. Use 1-5/16 inch deep style socket.
2. Remove packings (3 and 4).
3. Remove **oil filter element (2)** from oil filter cap and stem assembly (1).
4. If not previously done, check oil filter element (2) for contamination. If contaminated, inspect contaminated oil system (Ref. Task 1-86).
5. Discard oil filter element (2).

**GO TO NEXT PAGE**

1-99 SERVICE OIL FILTER CAP AND STEM ASSEMBLY AND OIL FILTER ELEMENT (Continued)

1-99

6. Clean oil filter cap and stem assembly (1) as follows:

WARNING

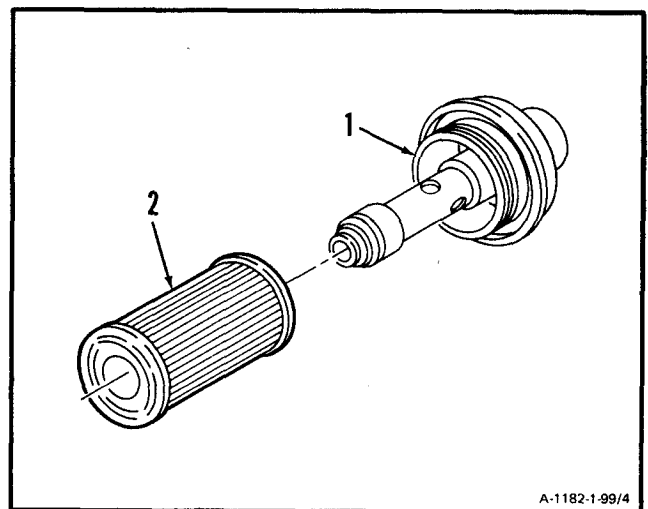
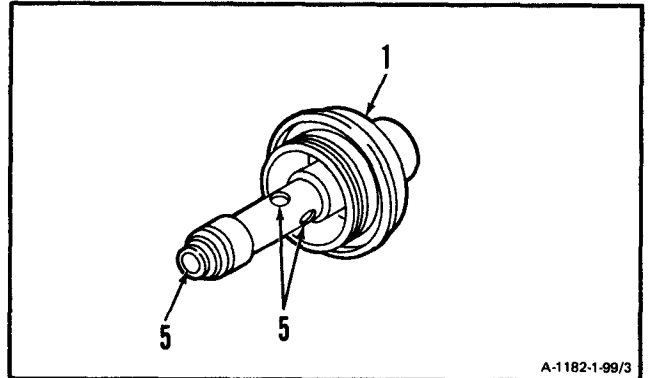
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

- a. Wear gloves (E20). Immerse and agitate cap and stem assembly (1) in dry cleaning solvent (E17). Use brush on outside surfaces.
- b. Wipe outside surfaces dry with clean, dry, lint-free cloth (E26).

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 (5)** using clean, dry compressed air.
7. Install oil filter element (2) on oil filter cap and stem assembly (1).



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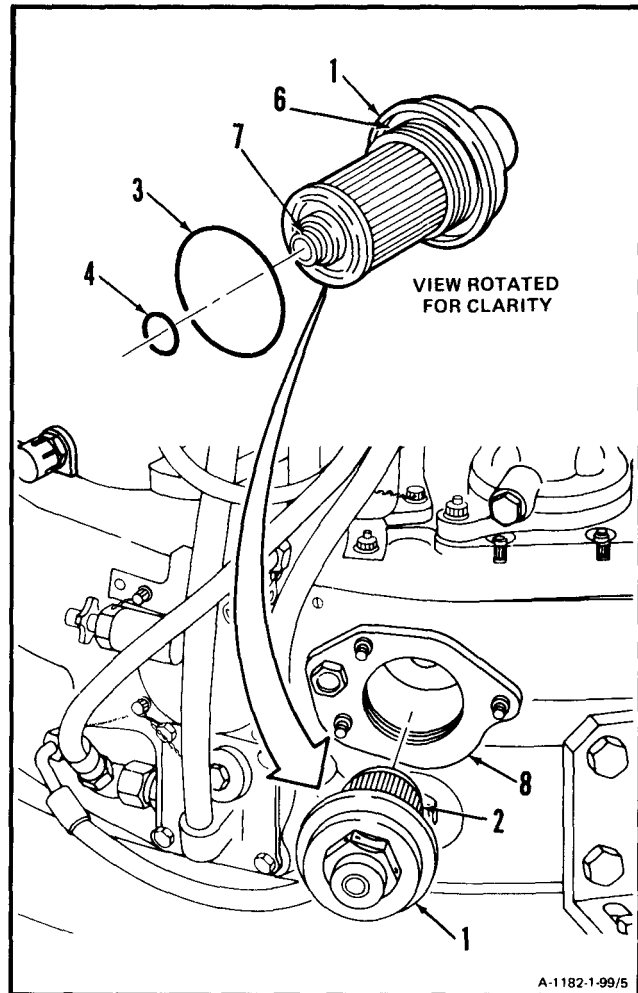
1-99 SERVICE OIL FILTER CAP AND STEM ASSEMBLY AND OIL FILTER ELEMENT (Continued)

8. Install packings (3 and 4) in grooves (6 and 7) on cap and stem assembly (1).

CAUTION

Do not torque cap and stem assembly more than 50 inch-pounds. Failure to comply may cause damage to oil filter cover.

9. Install cap and stem assembly (1), with filter element (2), on oil filter cover (8). **Torque cap and stem assembly (1) to 50 inch-pounds**. Use 1-5/16 inch deep style socket. Lockwire cap and stem assembly (1). Use lockwire (E29).



INSPECT

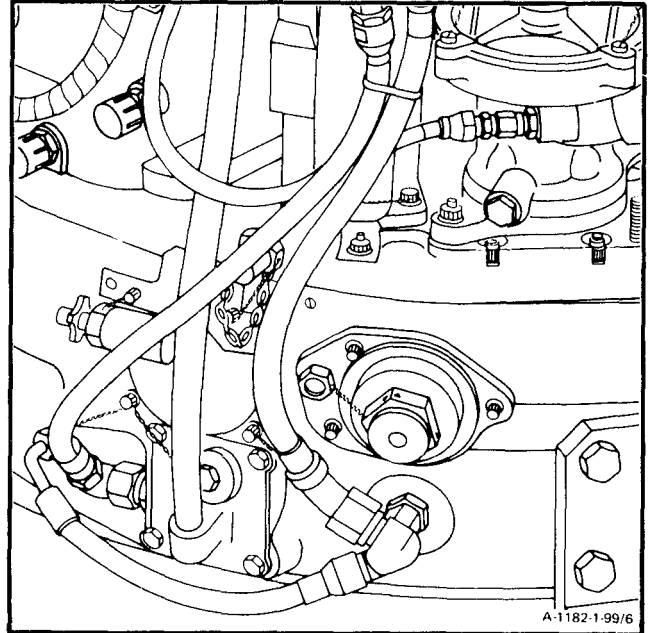
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1-99 SERVICE OIL FILTER CAP AND STEM ASSEMBLY AND OIL FILTER ELEMENT (Continued)

1-99

FOLLOW-ON MAINTENANCE:

Service Engine Oil System (Task 1-74).

**END OF TASK**

INITIAL SETUP

Applicable Configurations:

All

Tools:

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

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

Goggles

Compressed Air Source

Container, 1 Quart

Materials:

Dry Cleaning Solvent (E17)

Gloves (E20)

Lockwire (E29)

Wiping Rag (E58)

Parts:

Packings

Personnel Required:

68B10 Aircraft Powerplant Repairer

68B30 Aircraft Powerplant Inspector

References:

TM 55-2840-254-23P

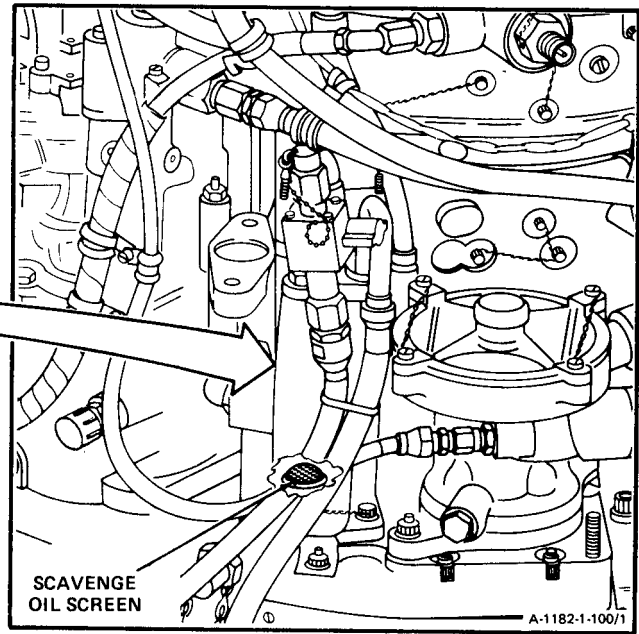
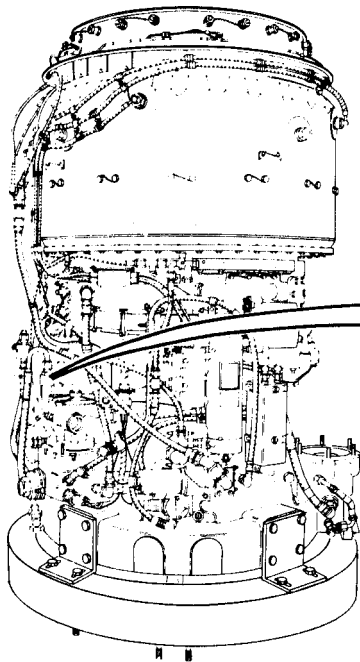
Equipment Condition:

Tube Assembly (Inlet Housing to Main Oil
Pump) Removed (Task 8-50)

General Safety Instructions:

WARNING

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention, Get medical attention for eyes.

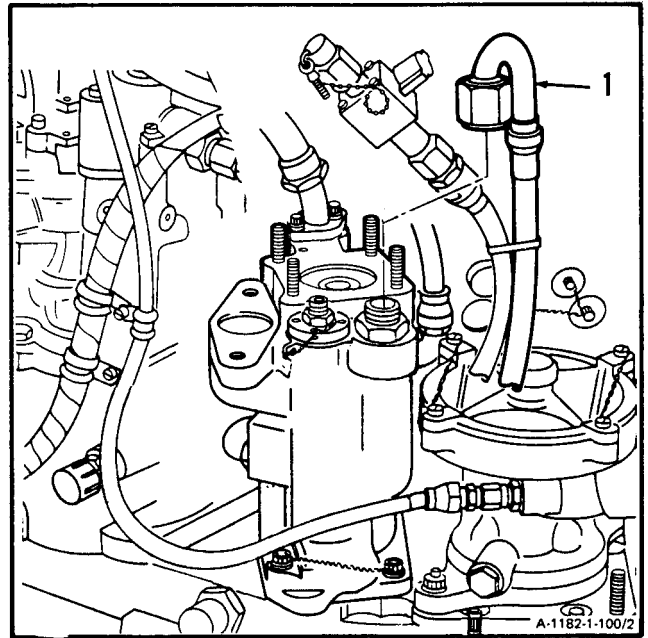


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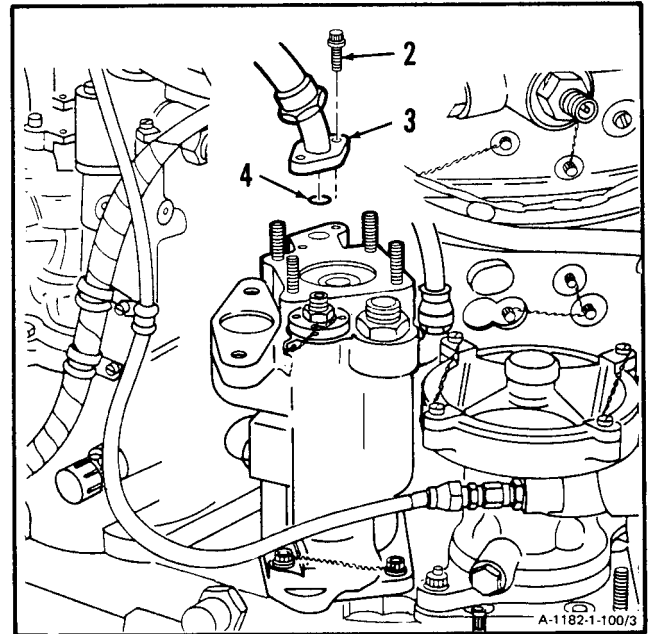
1-100 SERVICE SCAVENGE OIL SCREEN (Continued)

1-100

1. Disconnect tube assembly (1).

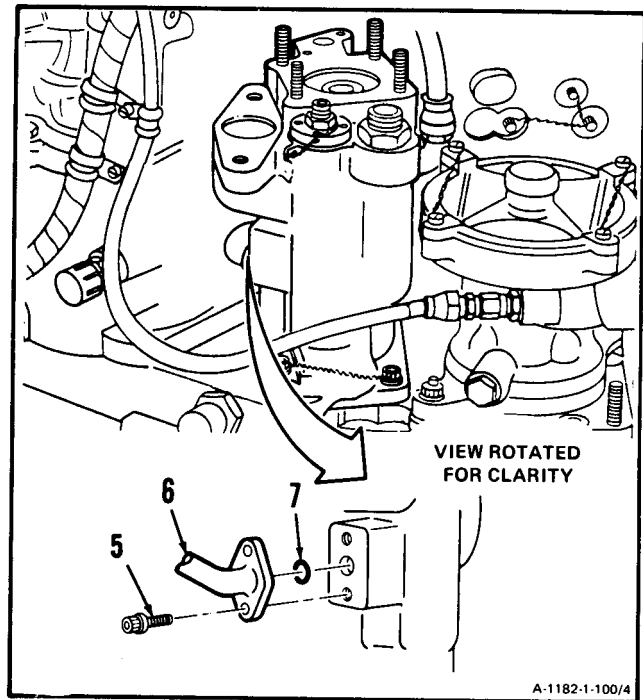


2. Remove lockwire, two bolts (2), end of tube assembly (3), and packing (4).

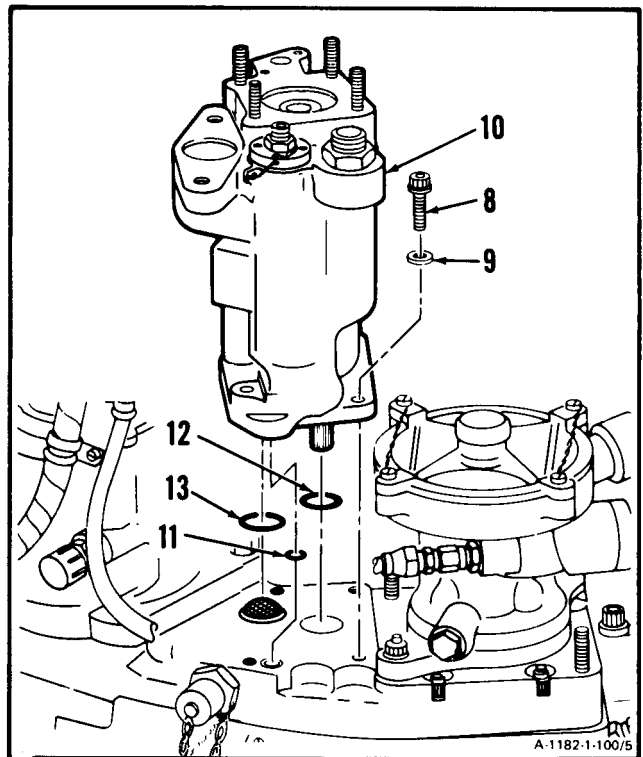


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3. Remove lockwire, two bolts (5), end of tube assembly (6), and packing (7).



4. Remove lockwire, four bolts (8), washers (9), main oil pump (10), and packings (11, 12, and 13).

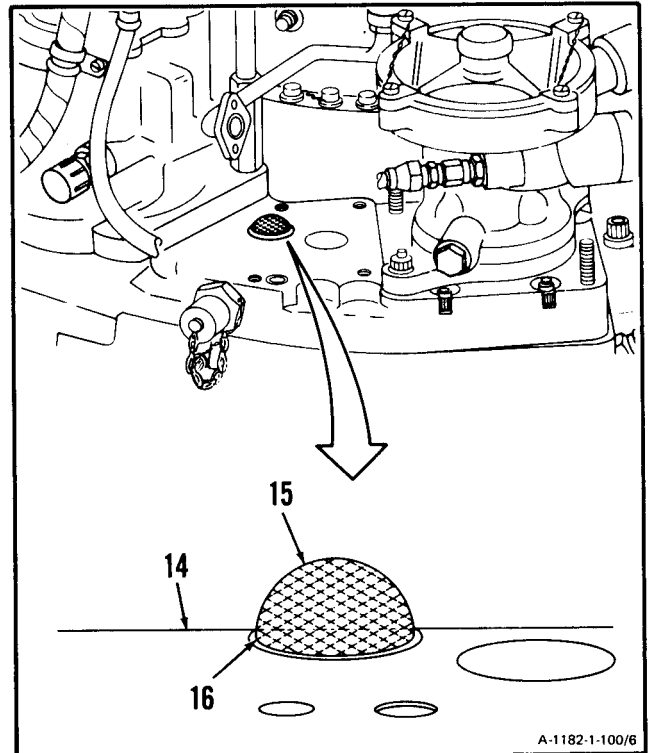


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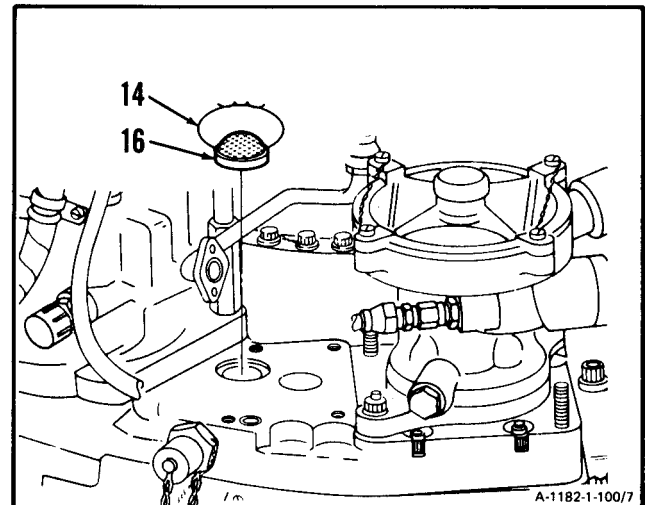
1-100 SERVICE SCAVENGE OIL SCREEN (Continued)

1-100

5. Insert 9-inch length of lockwire (E29) (14) through center of screen (15) near base of scavenge oil screen (16) and form loop by twisting ends.



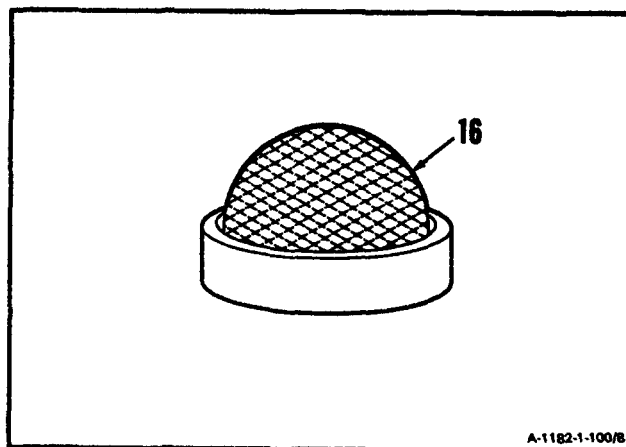
6. Using lockwire (14), remove scavenge oil screen (16). Remove lockwire (14).

**GO TO NEXT PAGE**

WARNING

Dry cleaning solvent (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.

7. Wear gloves (E20). **Clean scavenge oil screen (16).** Use dry cleaning solvent (E17) and brush.

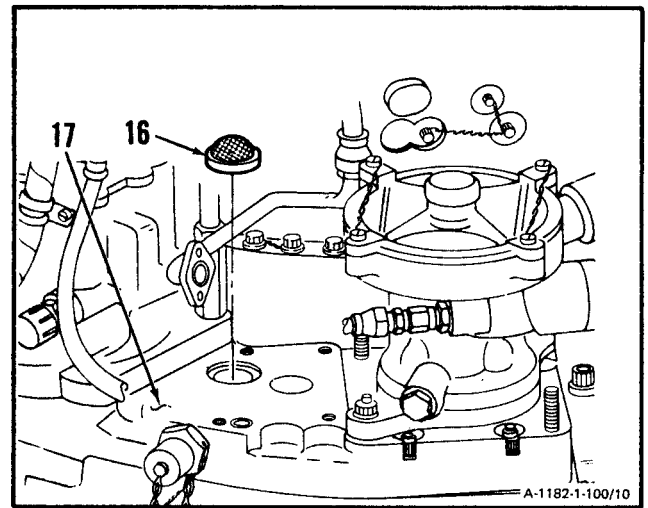
**WARNING**

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 injuries to eyes or skin. In case of injury, get medical attention.

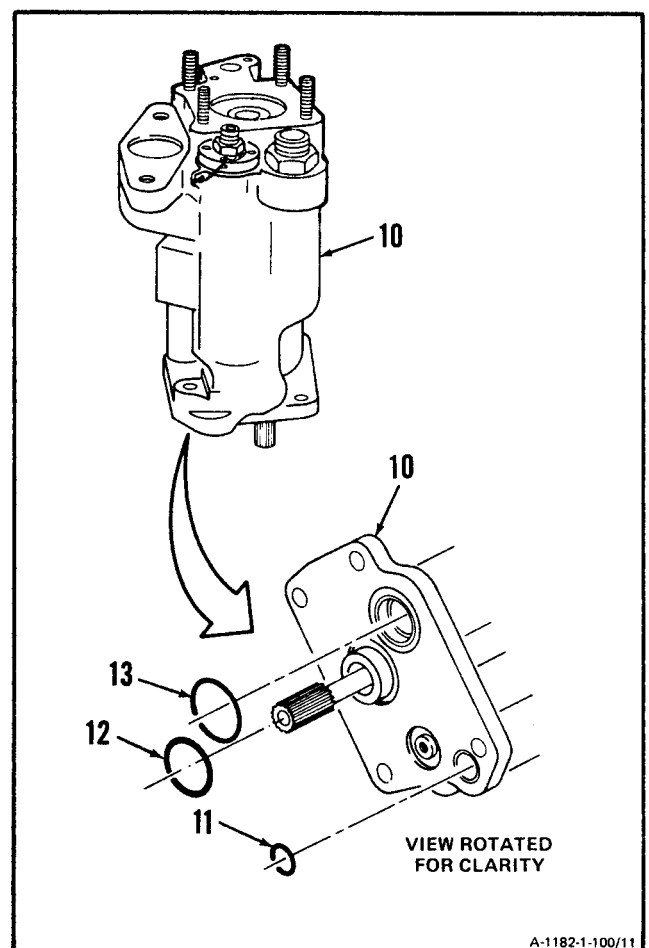
8. Wear goggles. **Blow dry scavenge oil screen (16).** Use clean, dry compressed air.
9. **Inspect scavenge oil screen (16).** There shall be no tears in screen.

GO TO NEXT PAGE

10. Install scavenge oil screen (16) in accessory gear-box assembly (17).



11. Install packings (13, 12, and 11) on main oil pump (10).

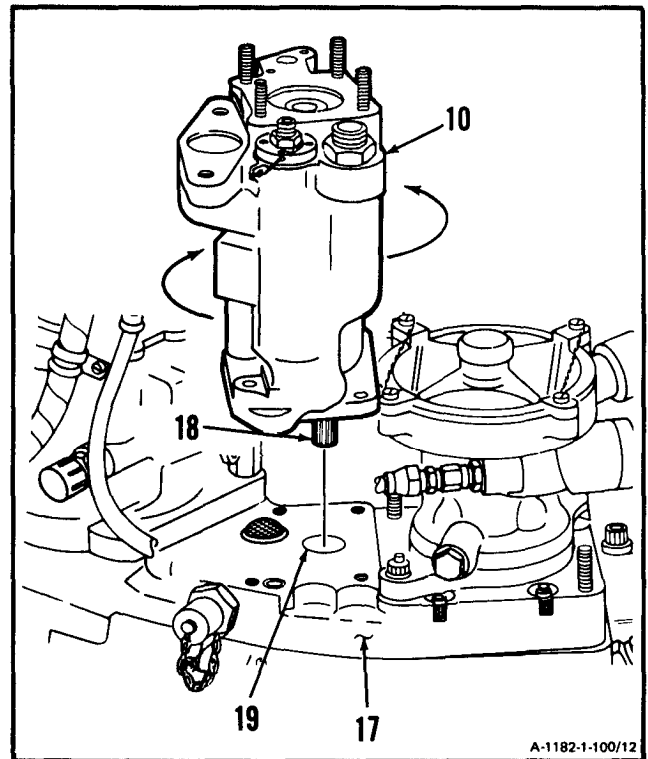


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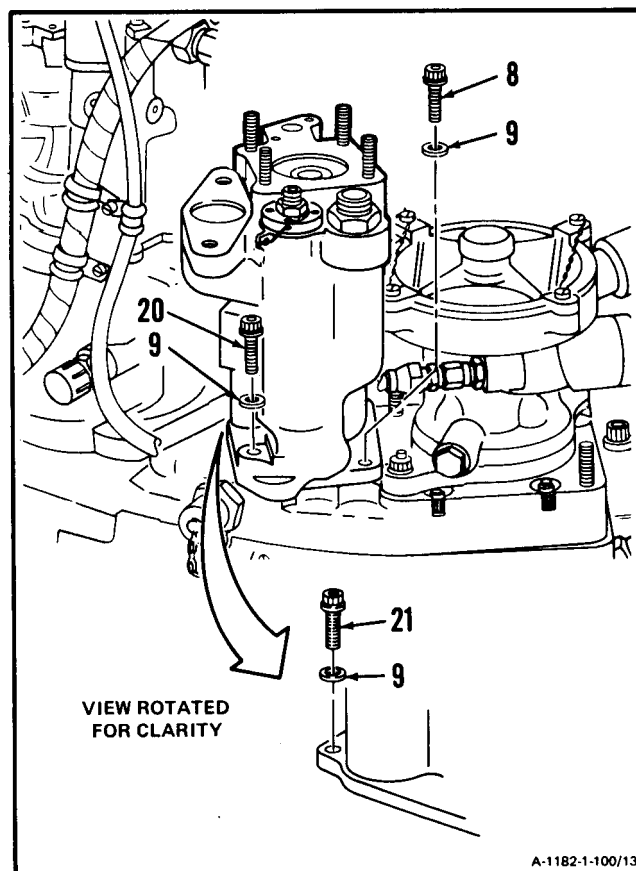
1-100 SERVICE SCAVENGE OIL SCREEN (Continued)

1-100

12. Position main oil pump (10) over accessory gearbox assembly (17).
13. If required, rotate main oil pump (10) slightly left or right to align splines (18) with coupling in hole (19).
14. **Install main oil pump (10)** on accessory gearbox assembly (17).

**GO TO NEXT PAGE**

15. Install bolt (8), bolt (20), two bolts (21), and four washers (9). Lockwire bolts (8 and 20). Use lockwire (E29).

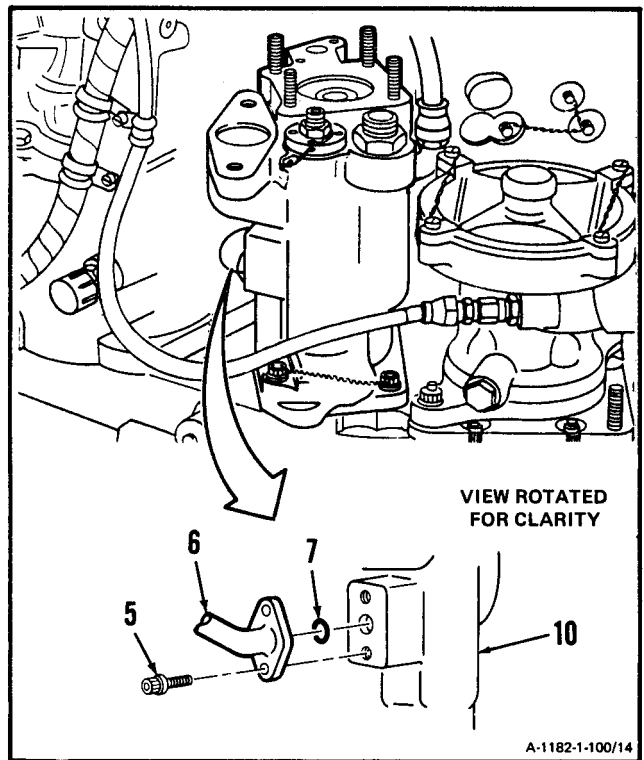


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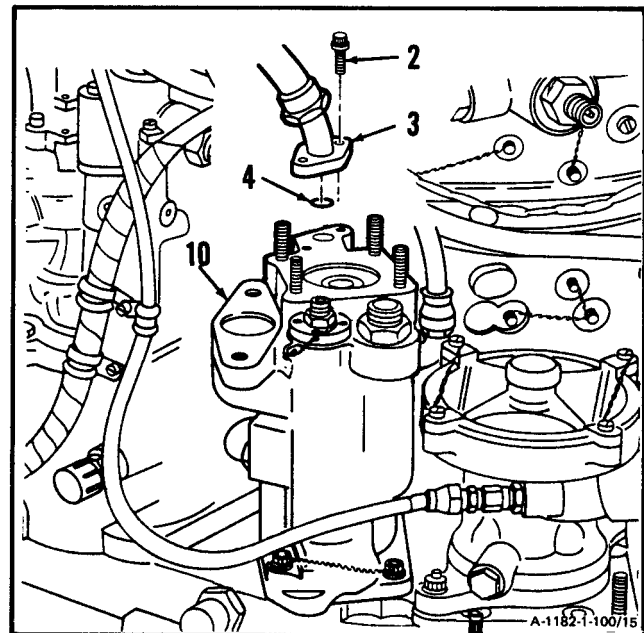
1-100 SERVICE SCAVENGE OIL SCREEN (Continued)

1-100

16. Install packing (7), flange of tube assembly (6), and two bolts (5) on main oil pump (10). Lockwire bolts (5). Use lockwire (E29).

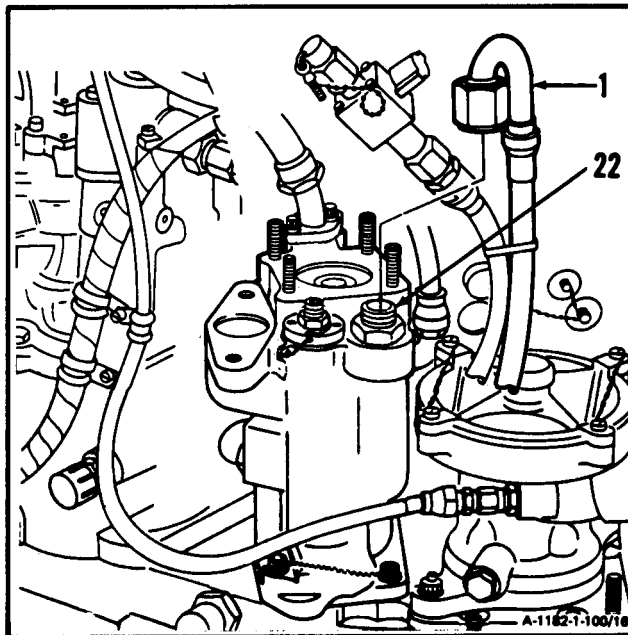


17. Install packing (4), flange of tube assembly (3), and two bolts (2) on main oil pump (10). Lockwire bolts (2). Use lockwire (E29).



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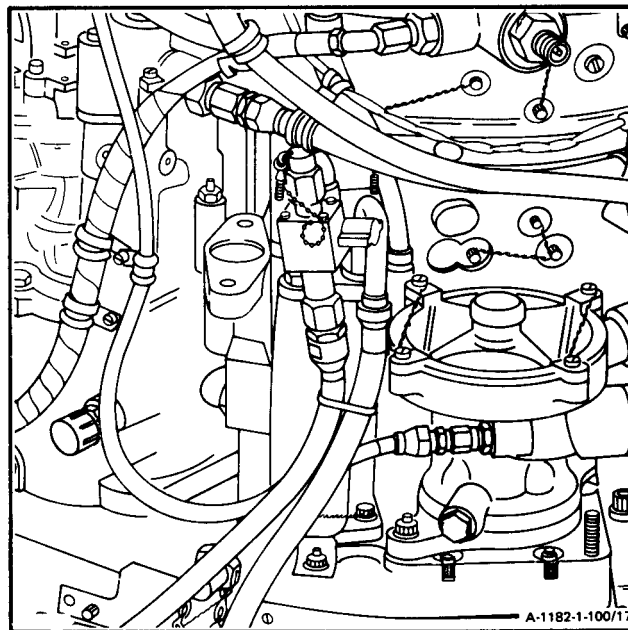
18. Connect tube assembly (1) to nipple (22).



INSPECT

FOLLOW-ON MAINTENANCE:

Install Tube Assembly (Inlet Housing to Main Oil Pump) (Task 8-51).



END OF TASK

INITIAL SETUP

Reference:

TM 55-2840-254-23P

Applicable Configurations:

All

General Safety Instructions:

Tools:

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



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.

Materials:

Corrosion Preventive Compound (E14)
Dry Cleaning Solvent (E17)
Gloves (E20)
Lockwire (E29)
Wiping Rag (E58)

Parts:

Packings

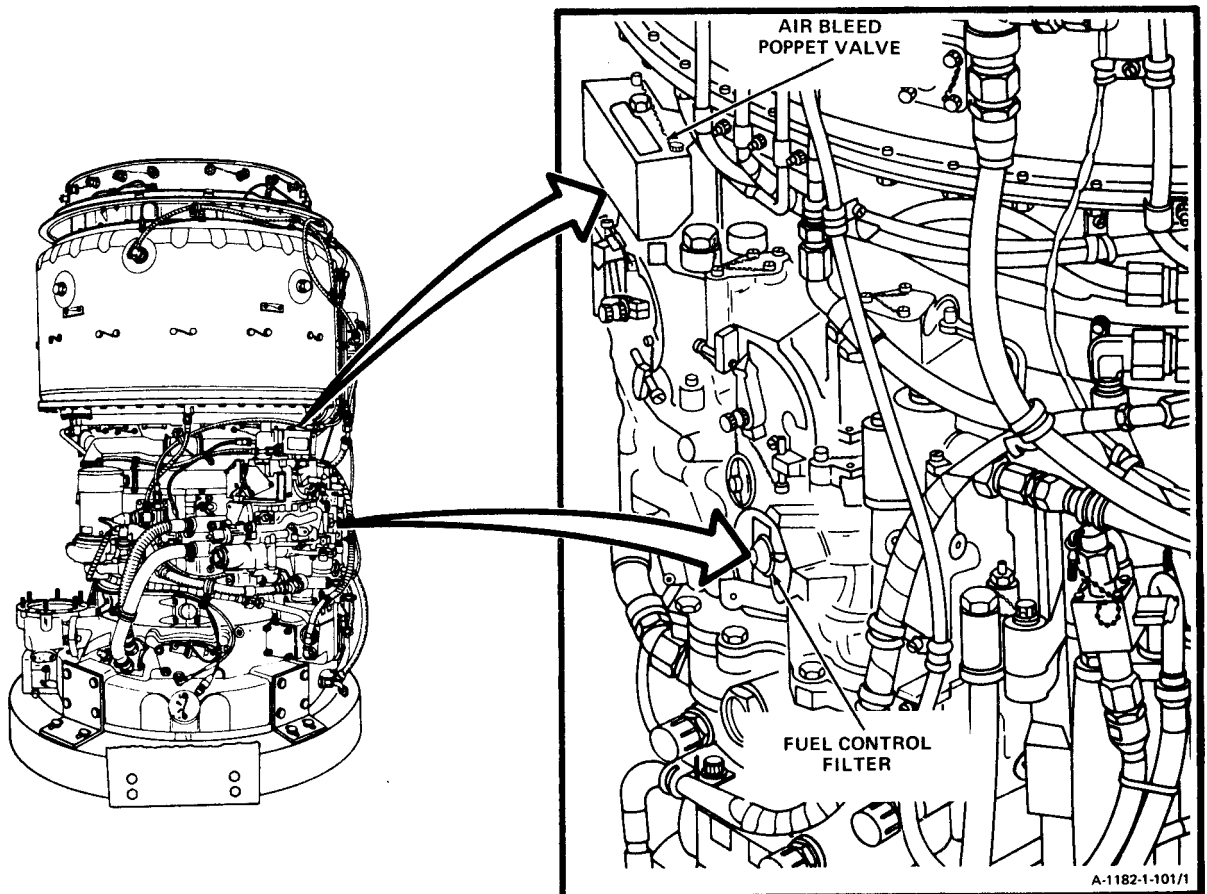


Personnel Required:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

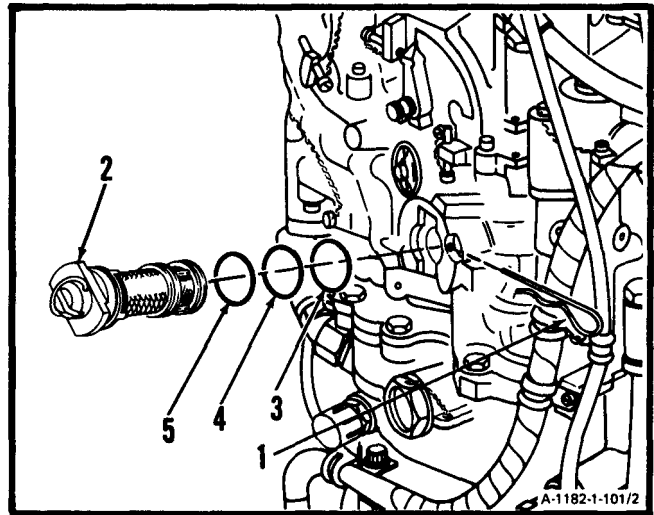
When using compressor air for cleaning, use approved protective equipment for eyes and face. Do not use more than 30 psig air pressure. Do not direct air toward yourself or another person. Failure to comply could result in injury to eyes or skin. In case of injury, get medical attention.

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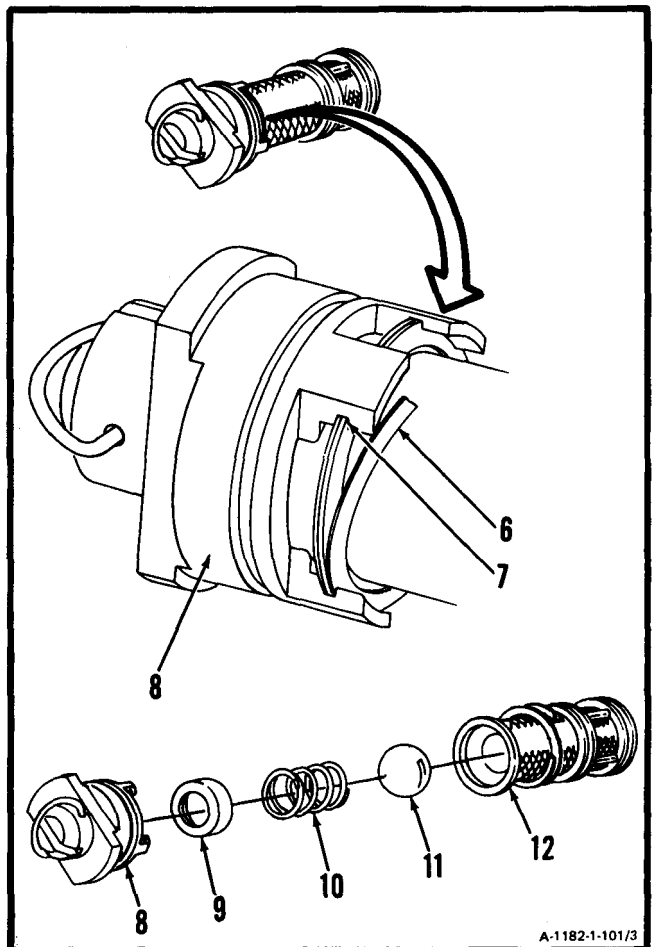


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1. Remove lockwire and lockpin (1).
2. Rotate filter (2) counterclockwise, 90 degrees.
Remove filter (2).
3. Remove packings (3, 4, and 5).



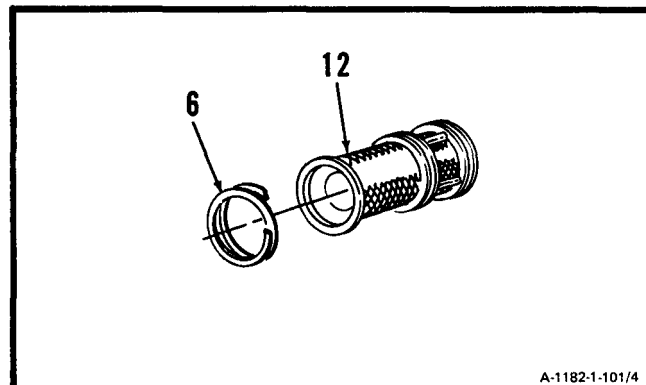
4. Push retaining ring (6) out of cover groove (7) and **separate retaining ring (6) from cover (8)**.
5. **Remove cover (8), retainer (9), spring (10), and ball (11) from strainer (12).**



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1-101 SERVICE FUEL CONTROL FILTER AND AIR-BLEED POPPET VALVE (Continued) 1-101

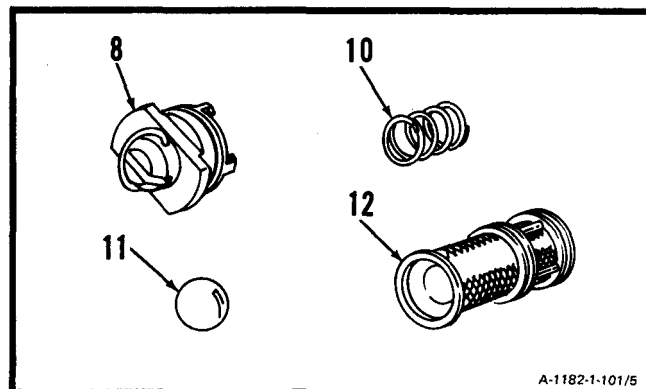
6. Remove retaining ring (6) from strainer (12).



WARNING

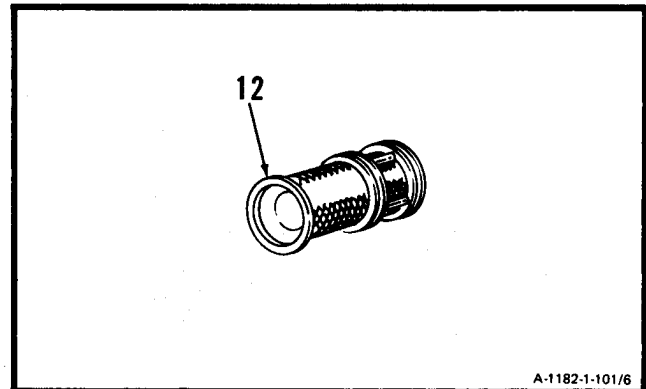
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

7. Wear gloves (E20). Clean strainer (12), ball (11), cover (8), and spring (10). Use dry cleaning solvent (E17).
8. Wear goggles. Blow dry strainer (12) using clean, dry compressed air.

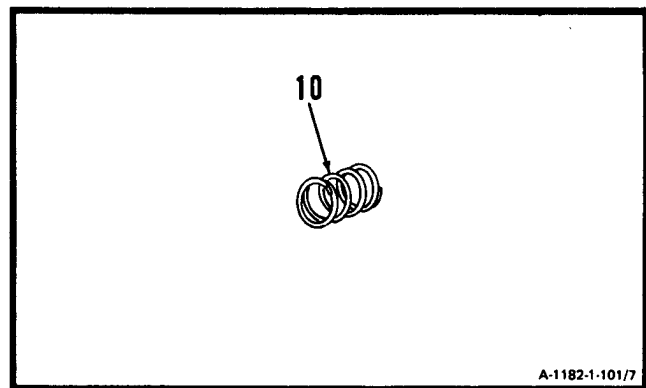


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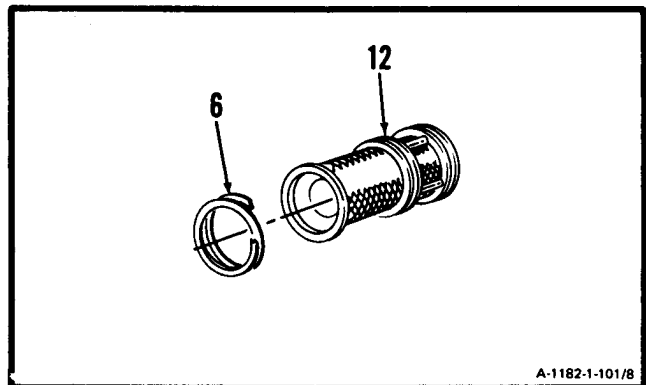
9. **Inspect strainer (12).** There shall be no tears, punctures, or broken wires in screen.



10. **Inspect spring (10).** There shall be no broken coils.



11. **Slide retaining ring (6) on strainer (12).**

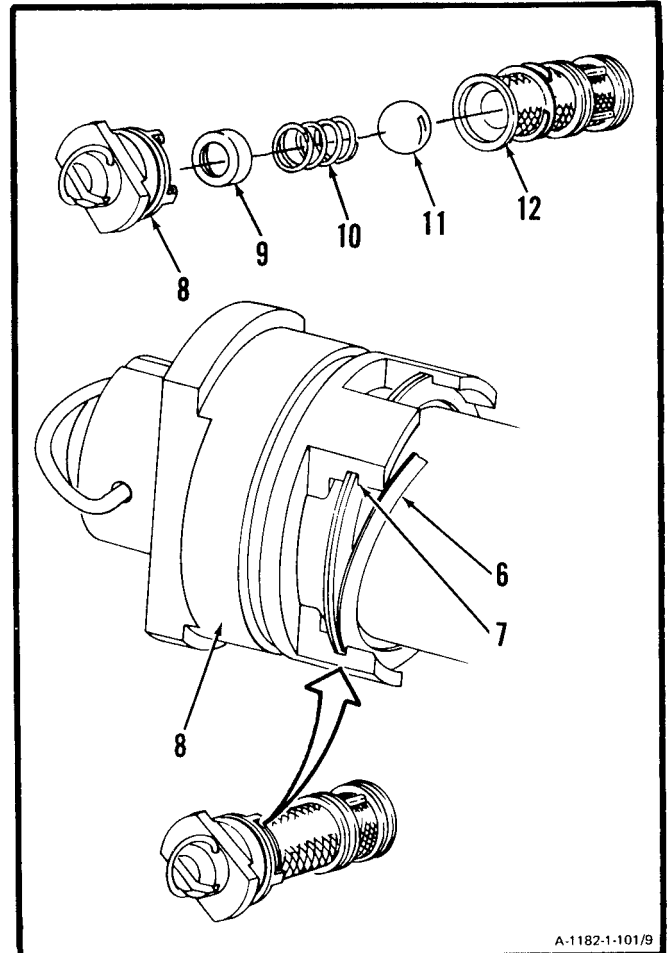


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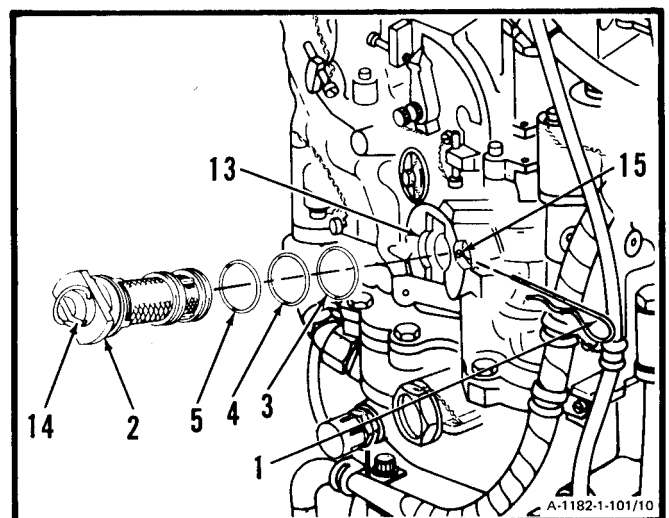
1-101 SERVICE FUEL CONTROL FILTER AND AIR-BLEED POPPET VALVE (Continued)

1-101

12. Install ball (11), spring (10), retainer (9), and cover (8) in strainer (12).
13. Push end of retaining ring (6) into cover groove (7) on cover (8) and install retaining ring (6).

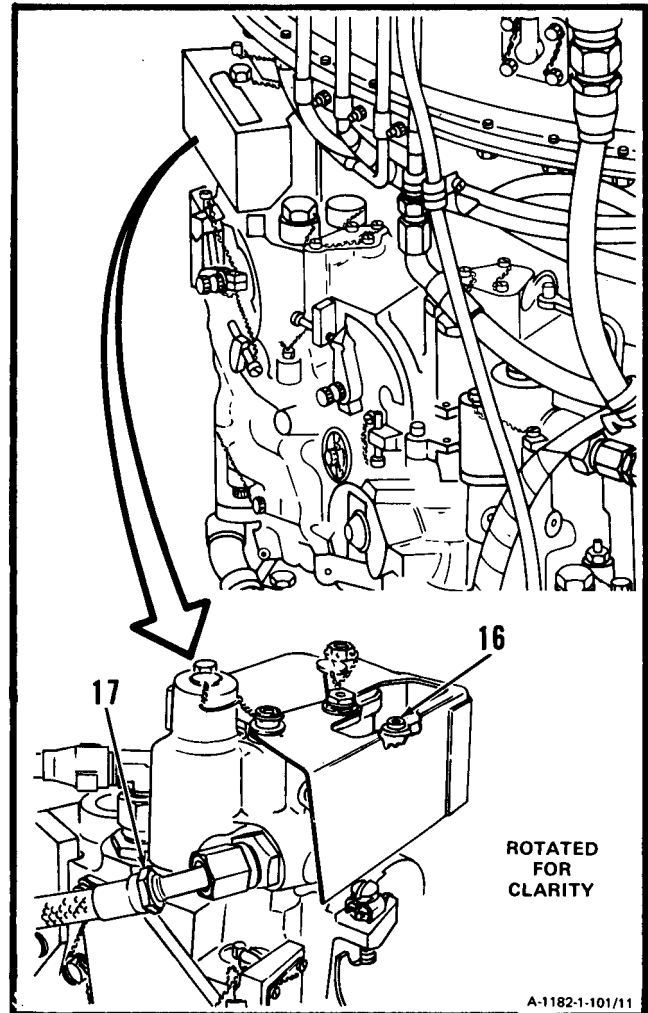


14. Install packings (5, 4, and 3) on filter (2).
15. Push and seat filter (2) into fuel control seat (13). Rotate filter (2) clockwise, 90 degrees, and align filter (2) lockpin groove (14) with fuel control lockpin hole (15).
16. Install lockpin (1) and lockwire lockpin. Use lockwire (E29).

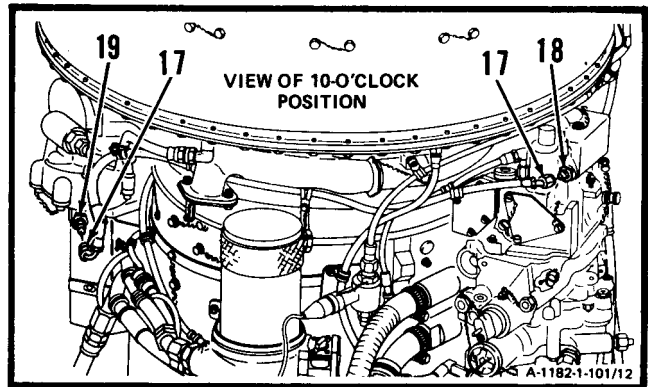


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17. Clean air-bleed poppet valve (16) and hose assembly (17) as follows:



a. Disconnect hose assembly (17) from fuel control (18) and interstage air-bleed actuator (19).

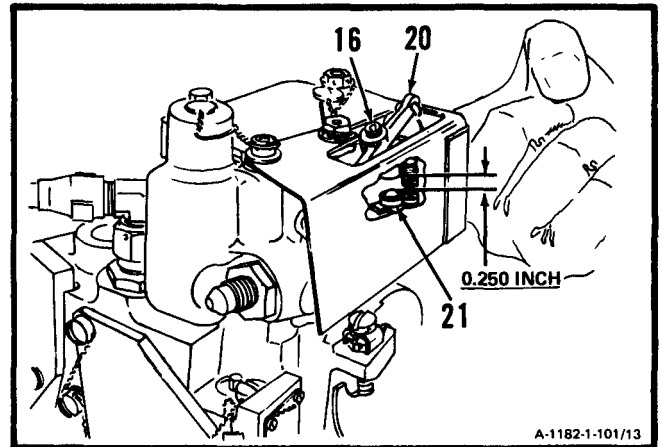


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CAUTION

In following steps b., c., and d. be sure to lift actuating lever carefully and evenly. Spring could be easily stretched. This would result in air leakage and engine low power.

- b. Wear gloves (E20) and goggles. **Unseat poppet valve (16)** by gently lifting actuating lever (20) at spring end. Lift actuating lever (20) off seat (21) 0.250 inch.

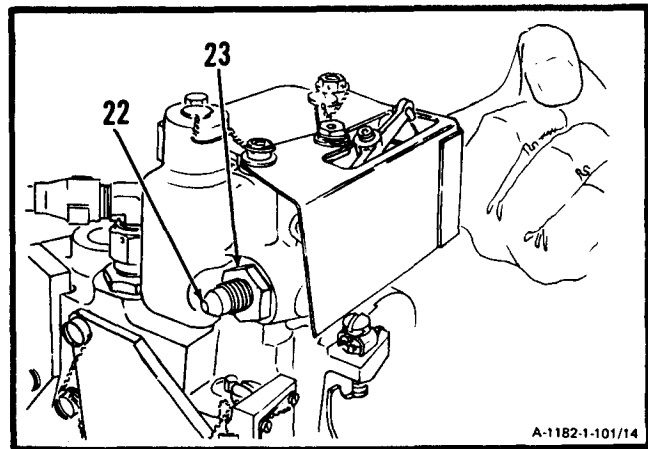


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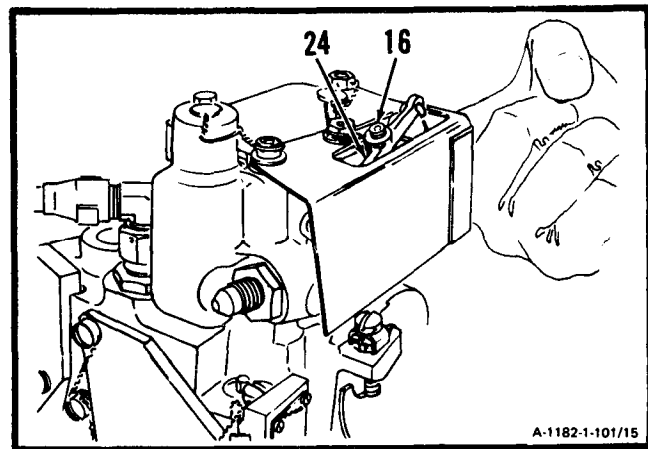
WARNING

Corrosion preventive compound (E14) is flammable and toxic. Use only in well-ventilated area away from heat, sparks and open flames. If swallowed do not induce vomiting. Get medical attention. In case of contact immediately flush skin and eyes with water for 15 minutes. Get medical attention for eyes.

- c. **Clean poppet valve air passage (22).** Spray corrosion preventive compound (E14) through air passage hole (22) in fitting (23).



- d. **Clean poppet valve (16).** Spray corrosion preventive compound (E14) through opening in shield (24). Release poppet valve (16).

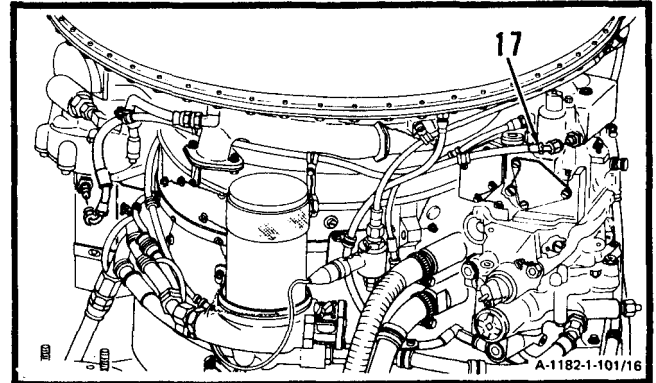


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CAUTION

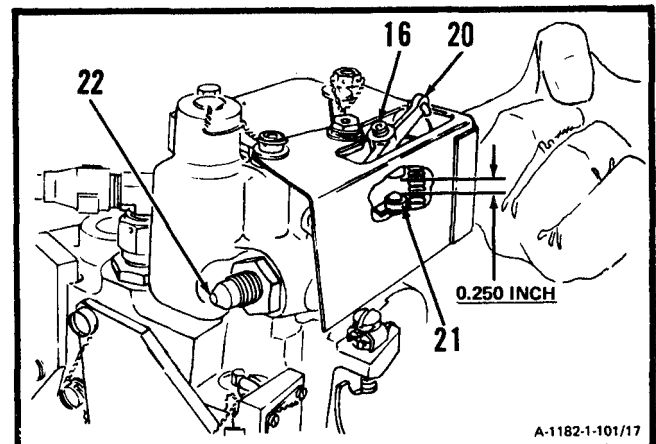
Do not spray corrosion preventative compound (E14) into air-bleed actuator hose fitting. Failure to comply, may cause damage to the actuator.

- e. **Clean hose assembly (17).** Spray corrosion preventive compound (E14) into both ends of hose assembly (17).
- f. Allow corrosion preventive compound (E14) to **soak for 10 minutes.**
- g. Wear goggles and gloves (E20). **Blow dry hose assembly (17)** using clean, dry compressed air.

**CAUTION**

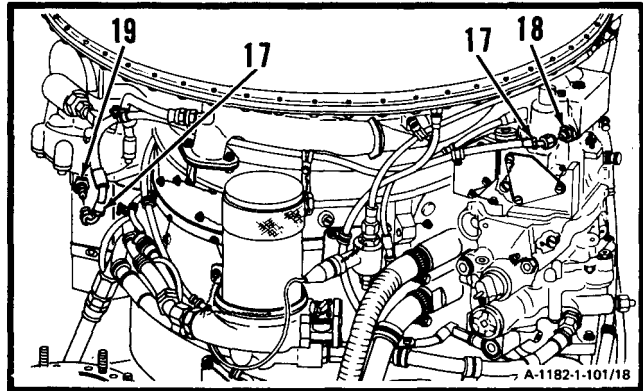
Be sure to lift actuating lever carefully and evenly. Spring could be easily stretched. This would result in air leakage and engine low power.

- h. Unseat poppet valve (16) by gently lifting actuating lever (20) at spring end. Lift actuating lever (20) off seat (21) 0.250 inch.
- i. **Blow dry poppet valve air passage (22)** using clean, dry compressed air.



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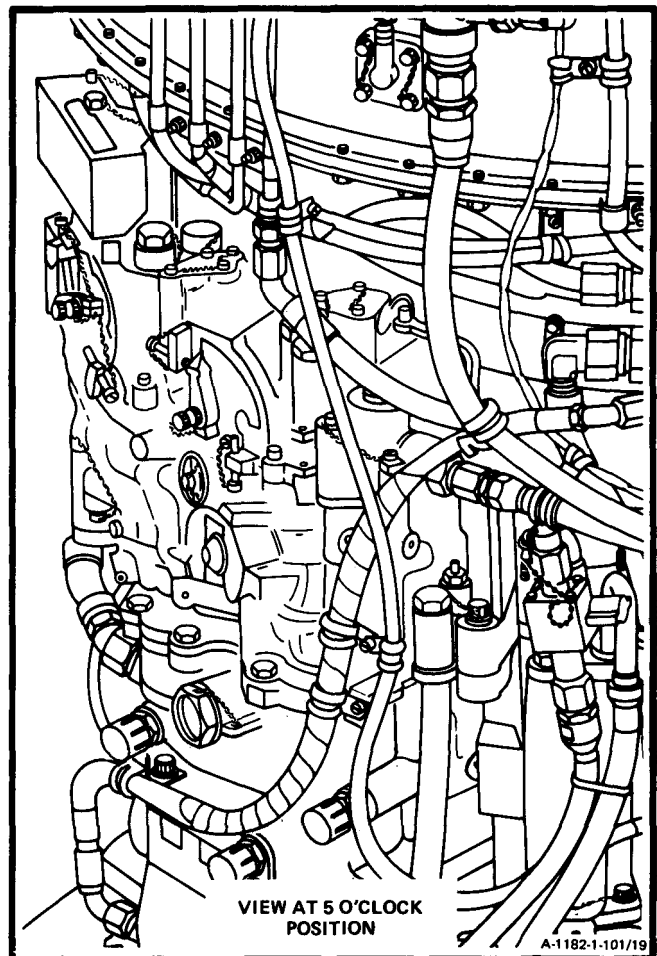
- j. Connect hose assembly (17) to fuel control (18).
- k. Connect hose assembly (17) to interstage air-bleed actuator (19).



INSPECT

FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-102 SERVICE MAIN FUEL FILTER

1-102

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
Strap Wrench

Materials:

Lockwire (E29)
Wiping Rag (E58)

Parts:

Packings
Filter Element

Personnel Required:

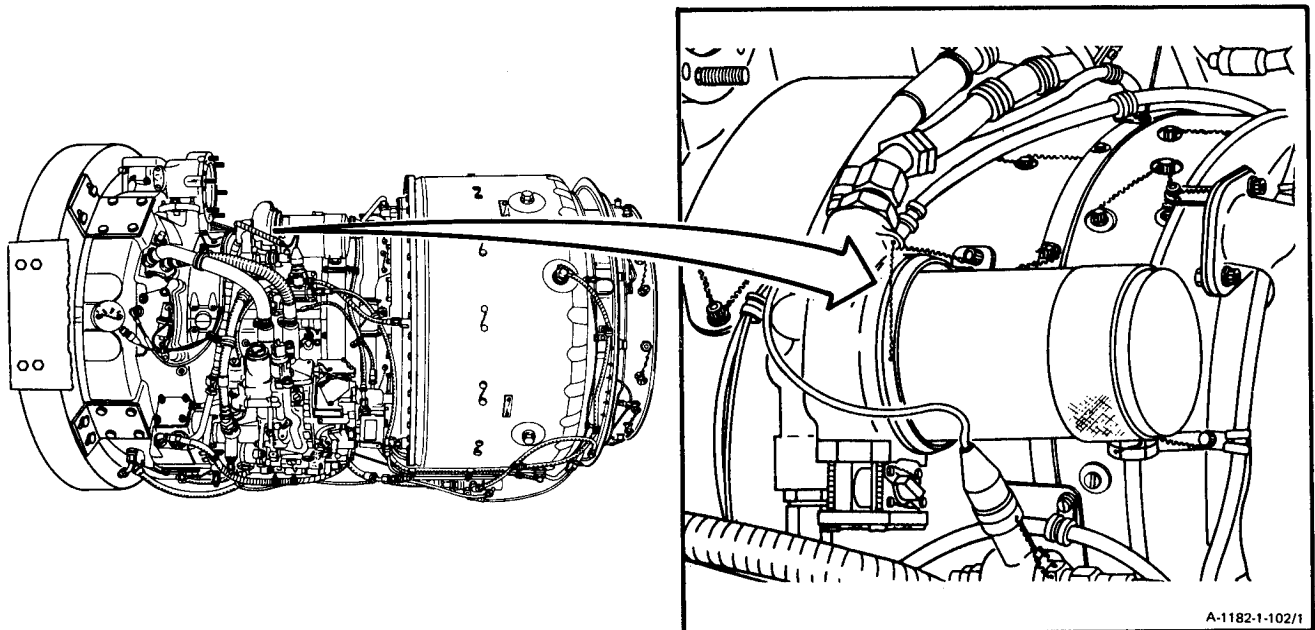
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-2840-254-23P

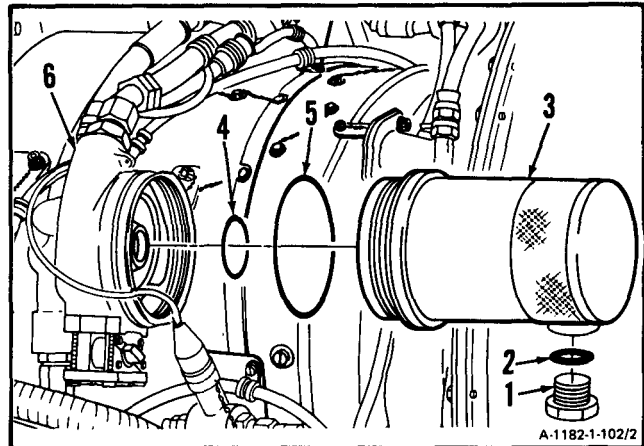
General Safety Instructions:**WARNING**

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.

**GO TO NEXT PAGE**

1. **Service filter** as follows:

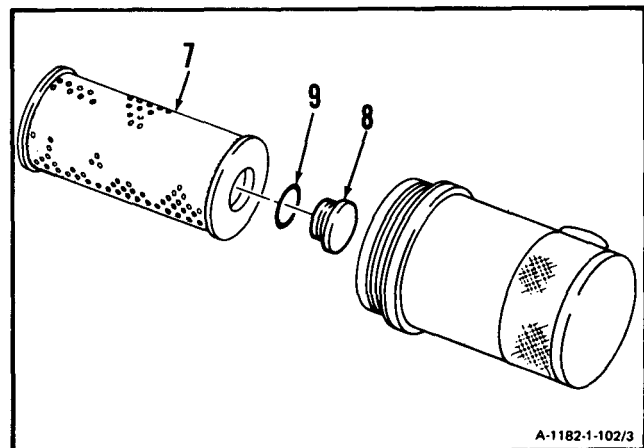
- a. Place wiping rag (E58) under plug (1).
- b. **Remove lockwire, plug (1) and packing (2).** Allow fuel to drain from filter assembly.
- c. **Remove lockwire, filter bowl (3) and packings (4 and 5)** from filter head (6). Use strap wrench.



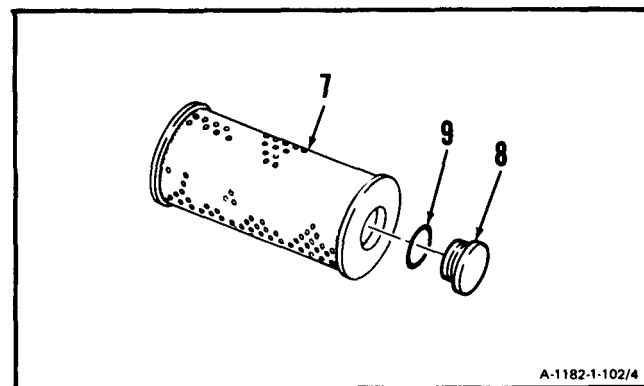
- d. **Remove filter element (7), plug (8), and packing (9).**

NOTE

On new type filter, plug is part of filter.



- e. **Install packing (9) and plug (8) in serviceable filter element (7).**

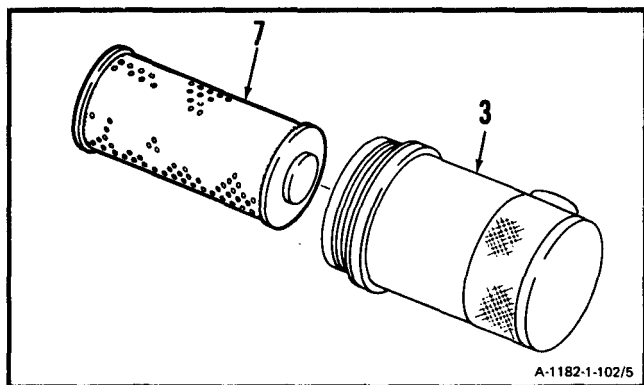


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1-102 SERVICE MAIN FUEL FILTER (Continued)

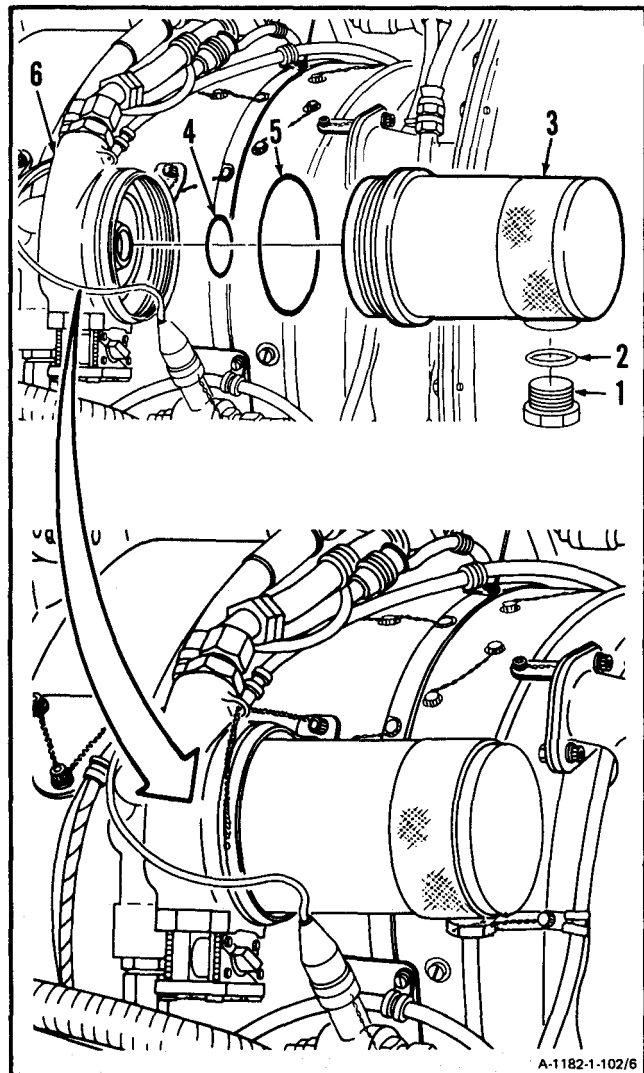
1-102

- f. Place serviceable **filter element (7)** in filter bowl (3).



A-1182-1-102/5

- g. **Install packings (4 and 5)** on filter head (6). Install filter bowl (3). Turn by hand until bottomed, then hand-tighten. Lockwire filter bowl (3). Use lockwire (E29).
- h. **Install packing (2)** on plug (1) and install plug (1) into filter bowl (3). Lockwire plug (1). Use lockwire (E29).



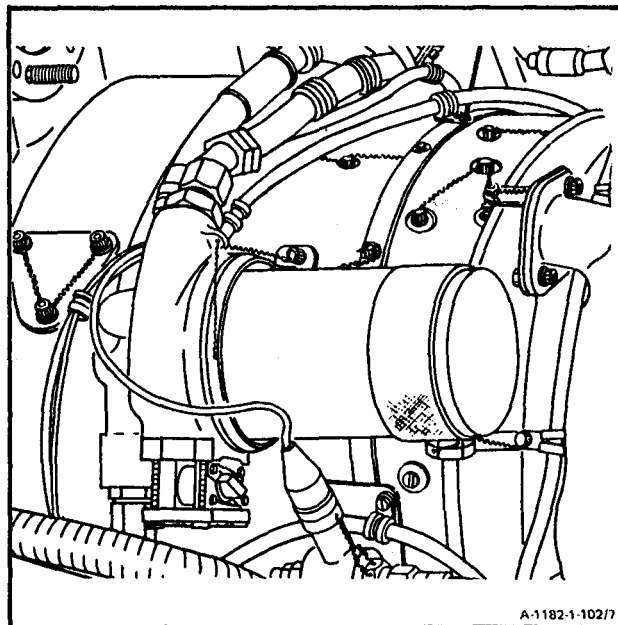
A-1182-1-102/6

INSPECT

GO TO NEXT PAGE

FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-103 SERVICE IN-LINE FUEL FILTER

1-103

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
Strap Wrench

Materials:

Lockwire (E29)

Parts:

Packings
Filter Element

Personnel Required:

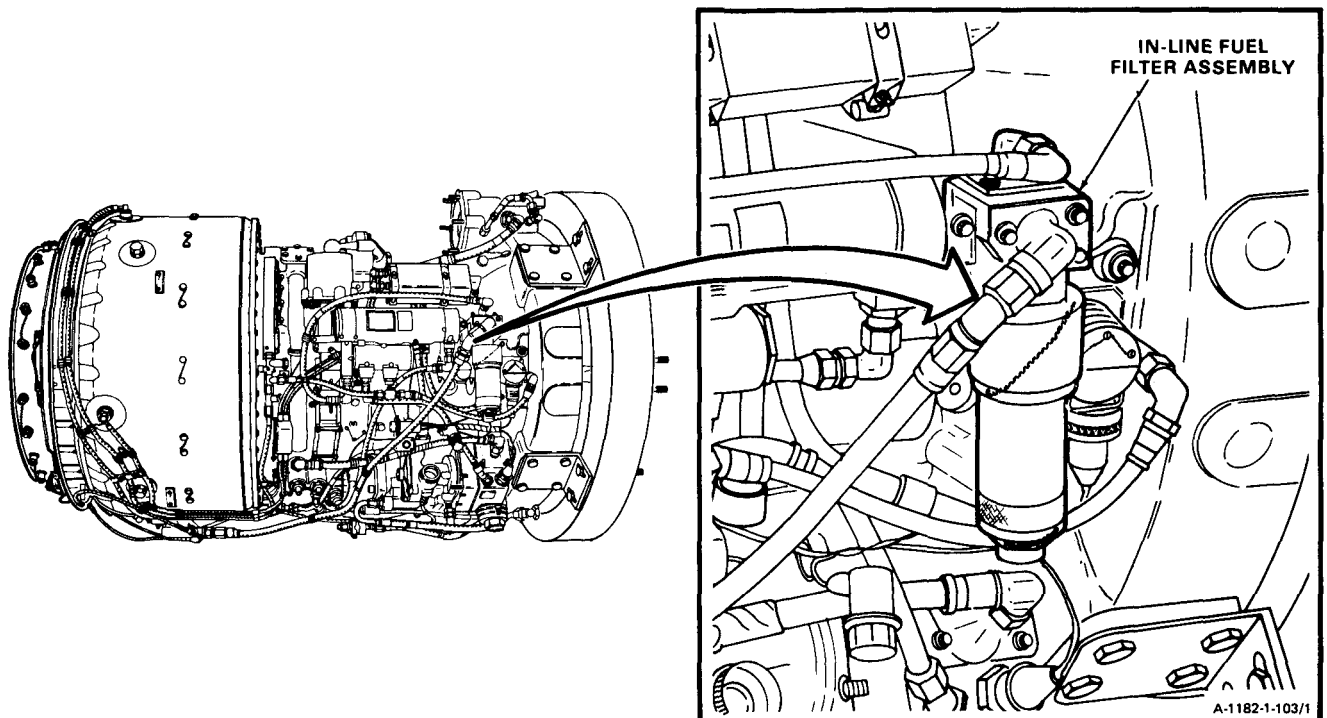
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

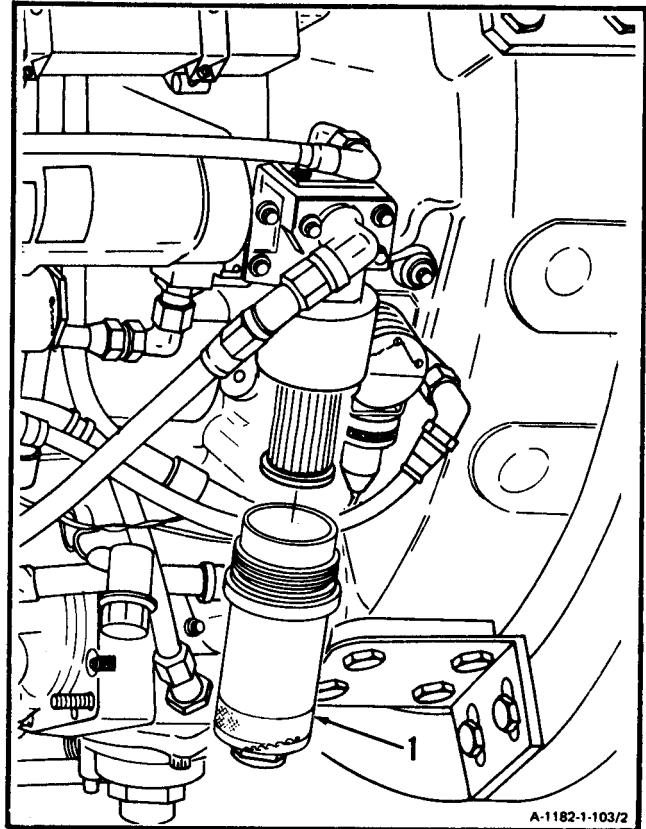
TM 55-2840-254-23P

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.

**GO TO NEXT PAGE**

1. Remove lockwire and **unscrew filter bowl (1)**.
Use strap wrench.

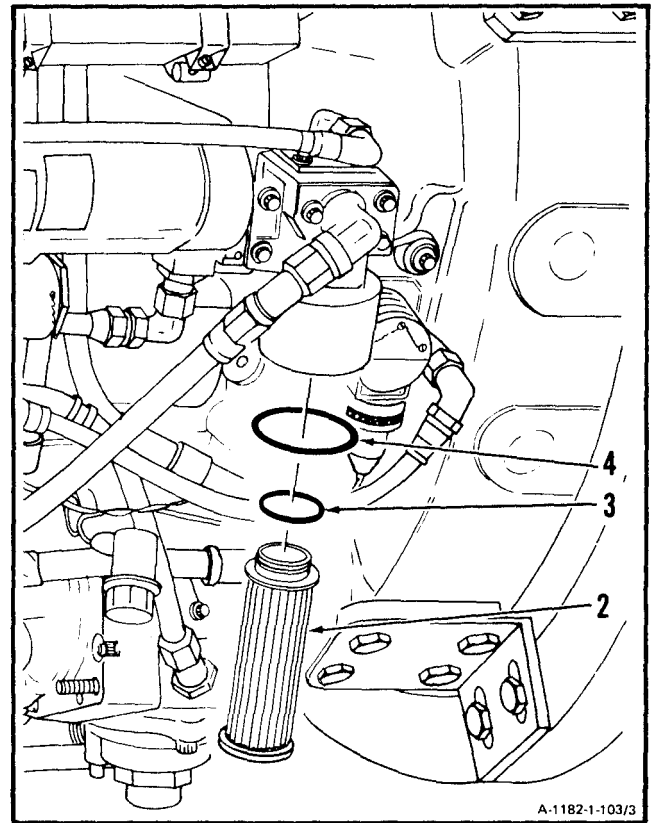


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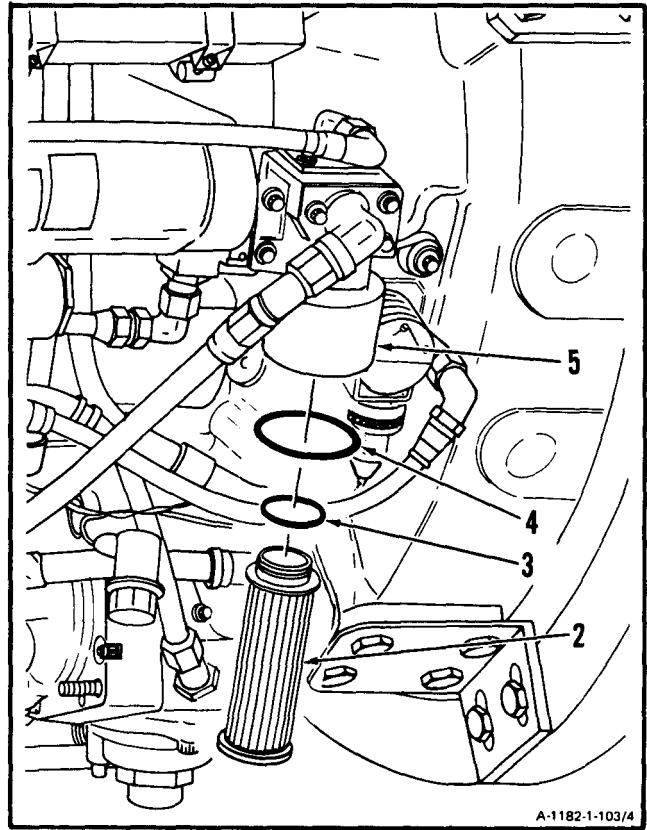
1-103 SERVICE IN-LINE FUEL FILTER (Continued)

1-103

2. Remove filter element (2). Remove packings (3) and (4).

**GO TO NEXT PAGE**

3. Install packing (3) on serviceable filter element (2).
4. **Install** packing (4) and **filter element (2)** in filter head (5).



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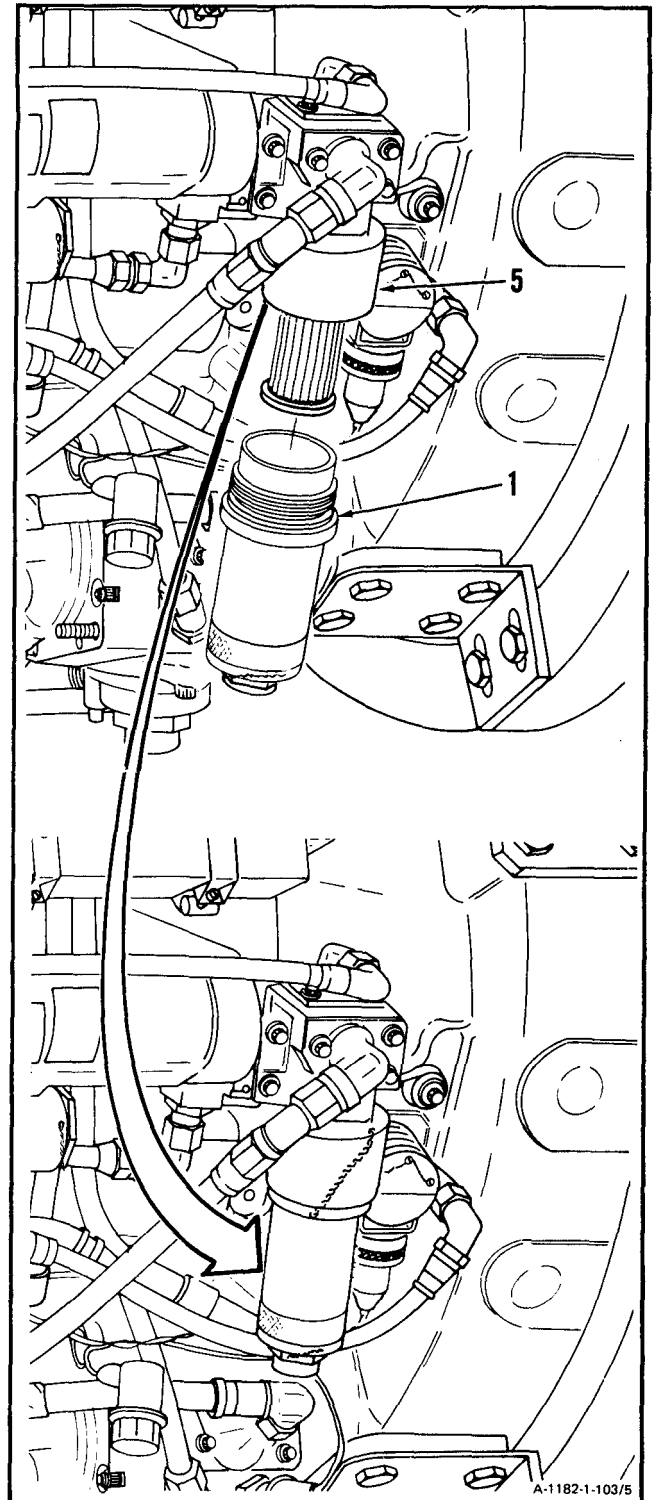
1-103 SERVICE IN-LINE FUEL FILTER (Continued)

1-103

CAUTION

Do not use wrench on indicator to tighten bowl or damage may occur.

5. Install filter bowl (1) in filter head (5). Turn by hand until bottomed, then hand-tighten.
6. Lockwire filter bowl (1). Use lockwire (E29).

**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

Goggles

Compressed Air Source

Materials:

Dry Cleaning Solvent (E17)

Gloves (E20)

Parts:

Packing

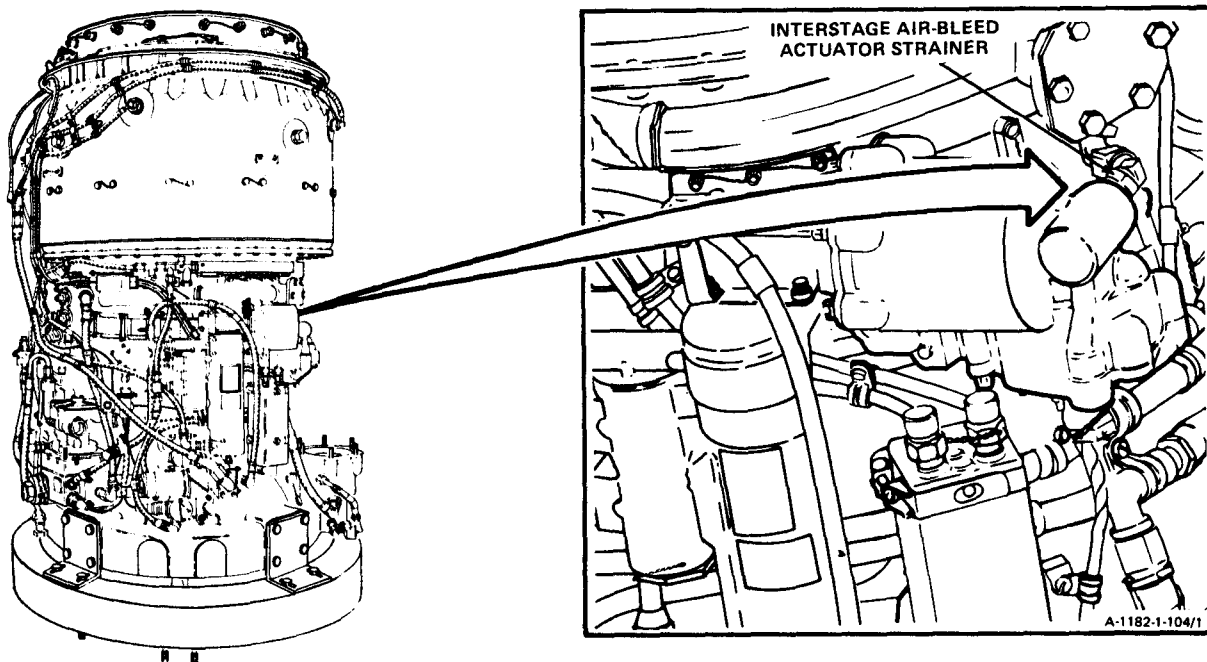
Personnel Required:

68610 Aircraft Powerplant Repairer

68630 Aircraft Powerplant Inspector

References:

TM 55-2840-254-23P

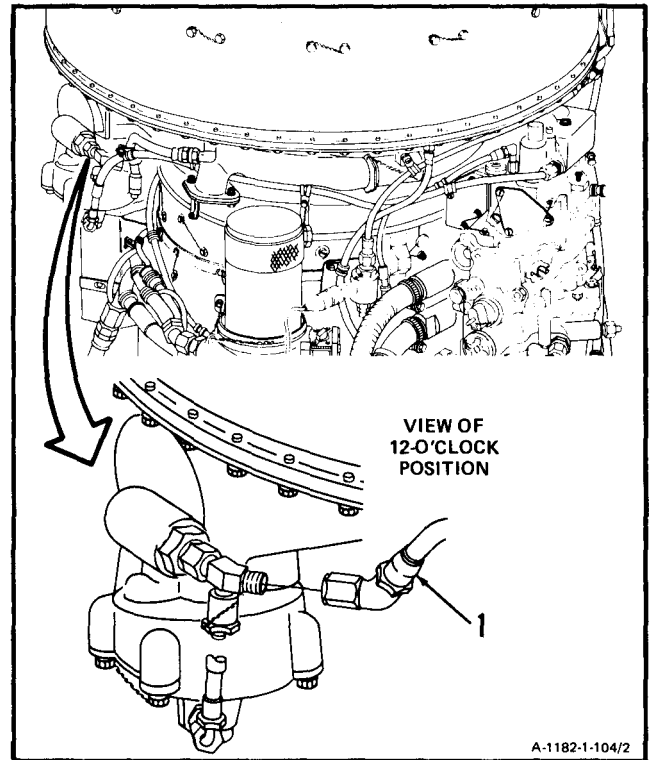


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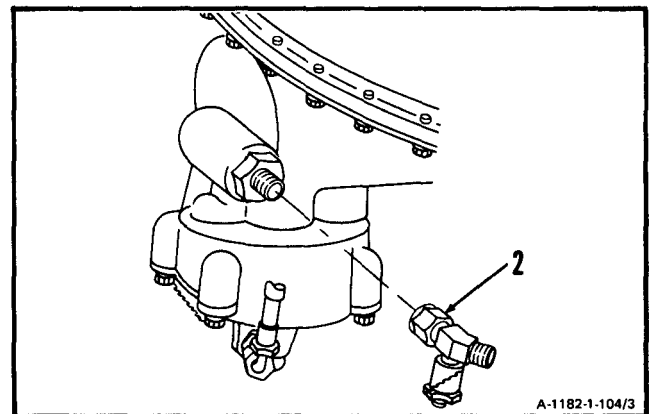
1-104 SERVICE INTERSTAGE AIR-BLEED ACTUATOR STRAINER (Continued)

1-104

1. Disconnect hose assembly (1).

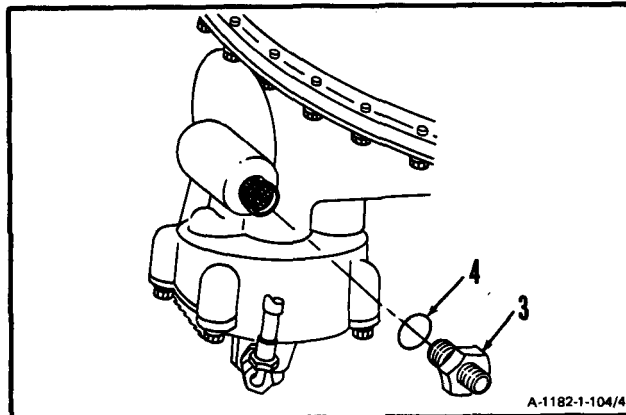


2. Remove tee (2).

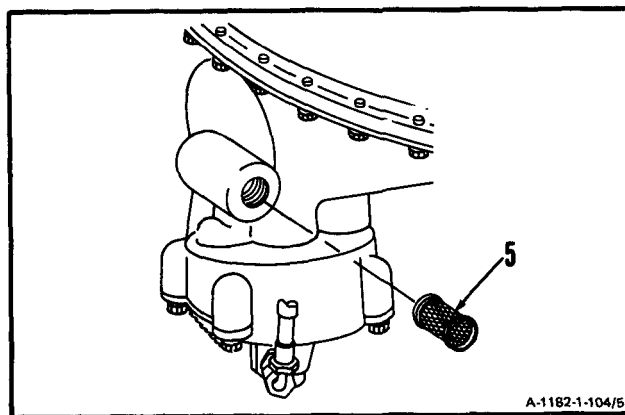


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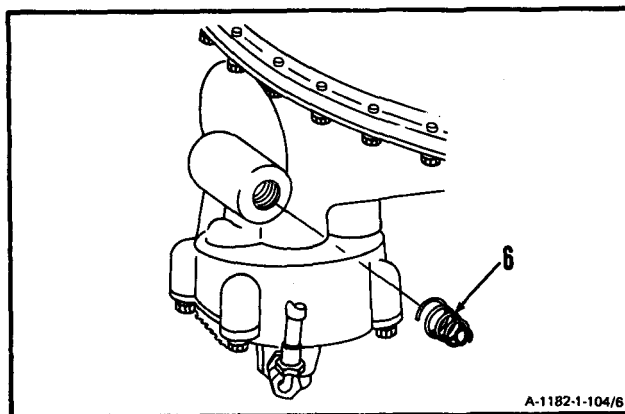
3. Remove reducer (3) using deep style socket. Remove packing (4).



4. Remove strainer element (5).



5. Remove spring (6).



GO TO NEXT PAGE

1-104 SERVICE INTERSTAGE AIR-BLEED ACTUATOR STRAINER (Continued)

1-104

WARNING

Dry cleaning solvent (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.

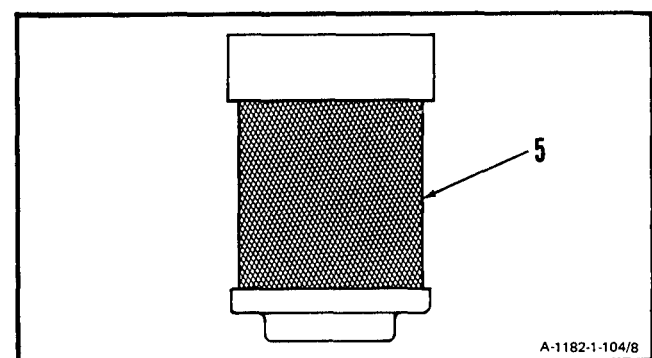
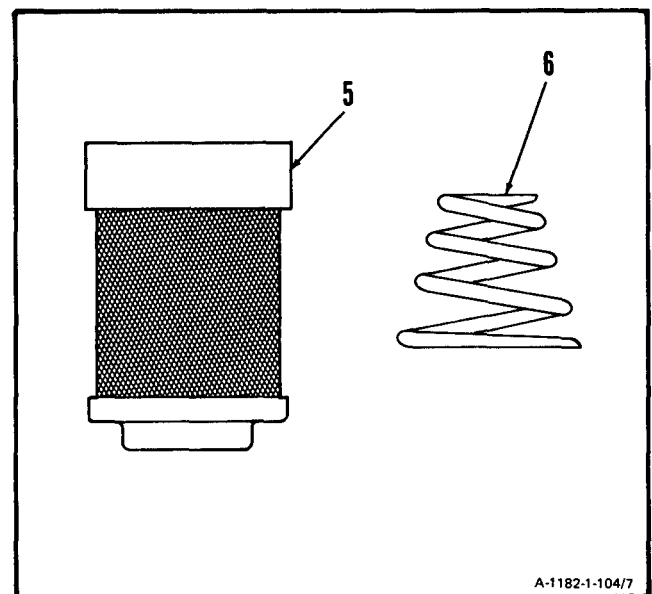
6. Wear gloves (E20). Clean strainer element (5) and spring (6). Use dry cleaning solvent (E17).

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.

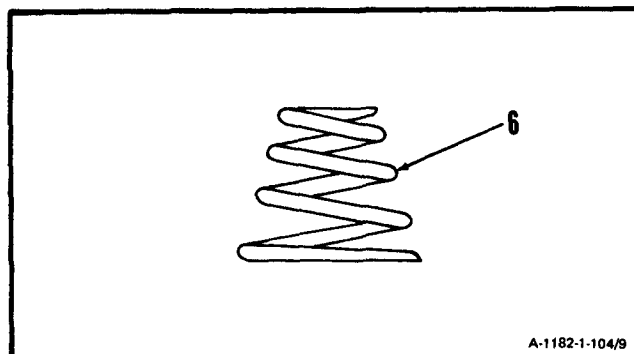
7. Wear goggles. Blow dry strainer element (5) and spring (6) using clean, dry compressed air.

8. Inspect strainer element (5). There shall be no tears, punctures, or broken wires in screen.



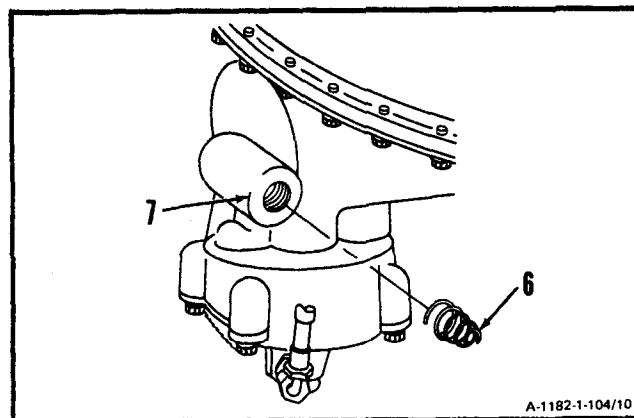
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9. **Inspect spring (6).** There shall be no broken coils.



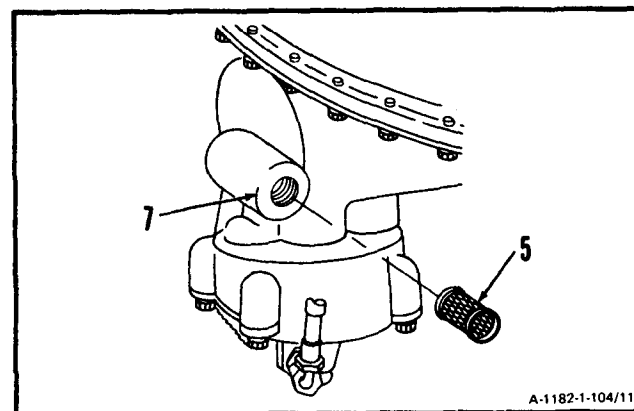
A-1182-1-104/9

10. **Install spring (6)** in housing (7), large end in.



A-1182-1-104/10

11. **install strainer element (5)** in housing (7), open end out.



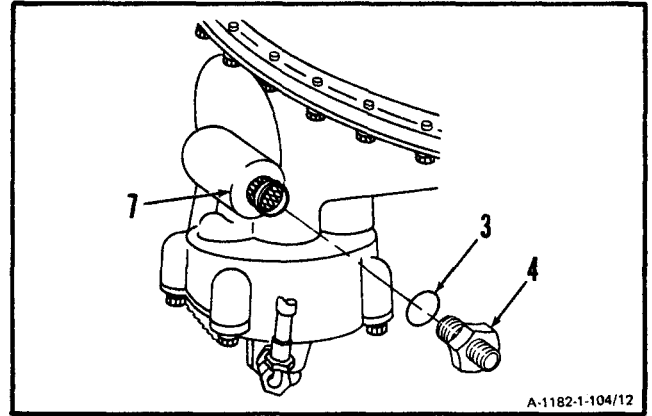
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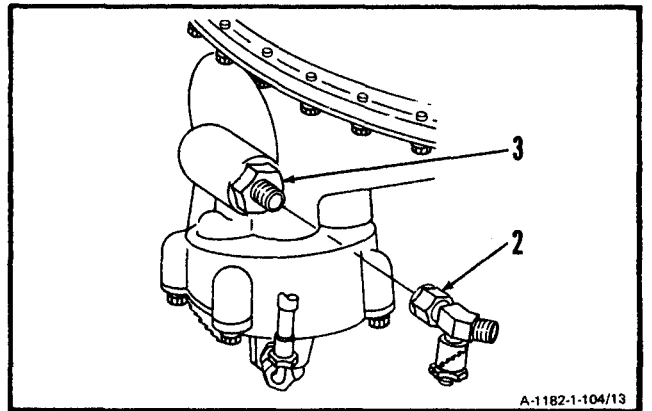
1-104 SERVICE INTERSTAGE AIR-BLEED ACTUATOR STRAINER (Continued)

1-104

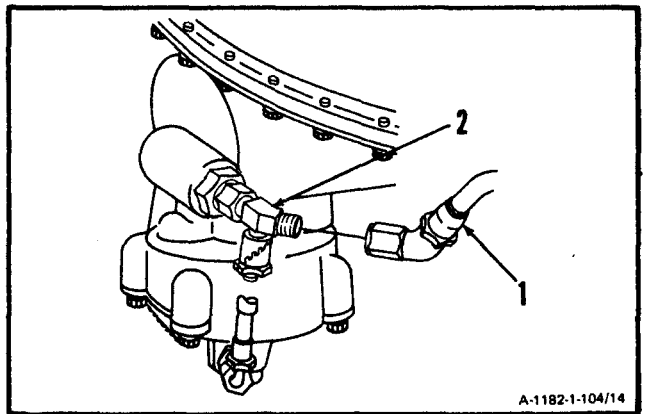
12. **Install** packing (3) and **reducer** (4) in housing (7). Use deep style socket.



13. **Install** tee (2) on reducer (3).



14. **Connect** hose assembly (1) to tee (2).

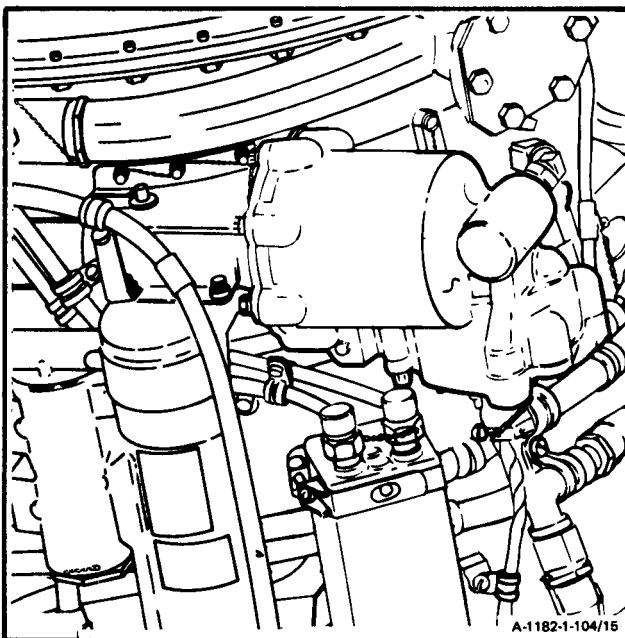


INSPECT

GO TO NEXT PAGE

FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-105 OVERHAUL AND RETIREMENT SCHEDULE

Table 1-2 provides a list of units of operating equipment that are to be overhauled or retired at the period specified. Removal of equipment for overhaul may be accomplished at the inspection nearest the time when overhaul is due unless otherwise specified in TM 55-1500-328-25. Upon replacement of items listed, all applicable forms, records and worksheets will be completed and updated as required, Refer to DA Pamphlet 738-751 for applicable forms and records.

Table 1-2. Overhaul and Retirement Schedule

COMPONENT	PART NUMBER	OVERHAUL INTERVAL (HOURS)	RETIREMENT INTERVAL (HOURS)	REF PARAGRAPH
T55-L-712 Engine	2-001-020-23	2400		
*Fuel Control	2-161-620-56	2400		
*Fuel Control	2-161-620-57	2400		
*Fuel Control	2-161-620-64	2400		
*Fuel Control	2-161-620-68	2400		
<p>*NOTE: Inspect engine records to determine engine operating hours since last repair at Depot. If no Depot repair exists, use Time Since Overhaul (TSO); if no TSO exists, use total time since new.</p>				

Section X. MAINTENANCE PROCEDURES

This section contains general procedures for maintaining the engine. It has instructions for cleaning, testing, and adjusting the engine. It is divided into the following tasks:

LIST OF TASKS

NUMBER	TASK	PAGE
1-106	Wash Compressor	1-445
1-107	Test Engine (AVIM)	1-457
1-108	Adjust Fuel Control	1-526
1-109	Adjust Fuel Control (AVIM)	1-538
1-110	Adjust Oil Pump	1-542

Section X. MAINTENANCE PROCEDURES

**1-106 WASH COMPRESSOR (WITHOUT WATER WASH KIT
P/N 2-200-071-54 INSTALLED)**

1-106

INITIAL SETUP

Applicable Configurations:

All

Tools:

- Powerphmt Mechanic's Tool Kit
NSN 5180-00-323-4944
- Technical Inspection Tool Kit,
NSN 5180-00-323-5114
- Compressed Air Source
- Air Pressure Regulator
- Solvent Gun
- Utility Pail (2)

Materials:

- Anti-detonating injection fluid
mixture (E4.1)
- Cleaning Solution (E11)

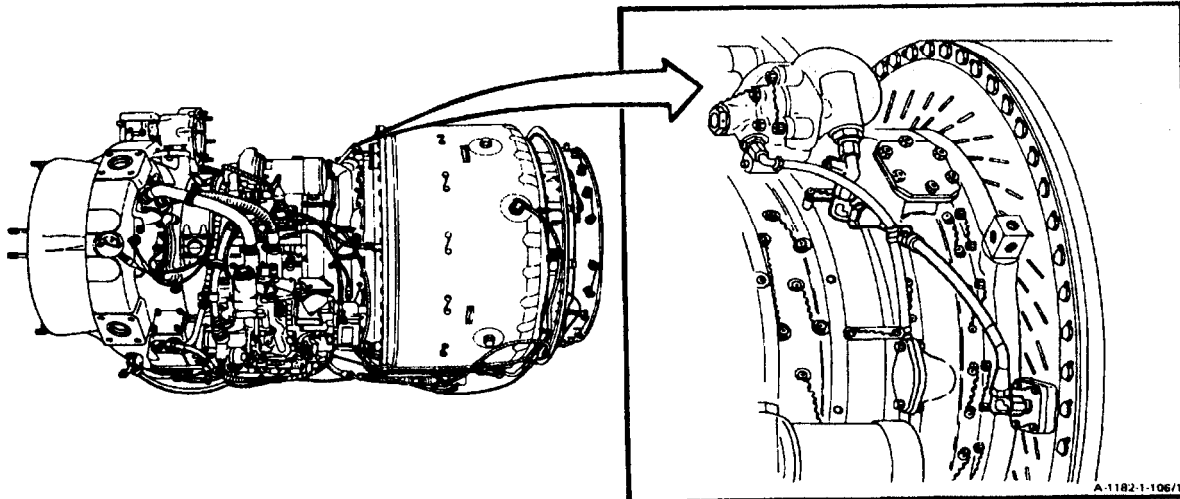
- Dry Cleaning Solvent (E17)
- Lockwire (E29)
- Methanol (E35.1)
- Rust Inhibitor and Preservative (E44)
- Protective Caps
- Cleaning Solution (E63)
- Cleaning Solution (E64)
- Cleaning Solution (E65)
- Cleaning Solution (E66)

Personnel Required:

- 68B10 Aircraft Powerplant Repairer
- 68B30 Aircraft Powerplant Inspector
- 68B30 Aircraft Powerplant Supervisor

References:

- TM 55-1520-240-10
- TM 55-4920-328-13
- Task 1-107



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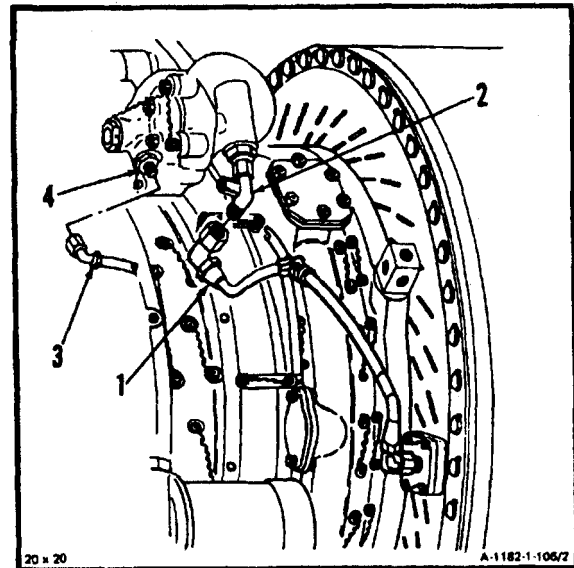
**106 WASH COMPRESSOR (WITHOUT WATER WASH KIT
P/N 2-200-071-54 INSTALLED) (Continued)**

NOTE

Currently B & B 3100 (MIL-C-85704, Type I) is the primary cleaner for Army turbine engines and remains an approved cleaner for environmental restrictions permit. Where environmental restrictions preclude its use MIL-C-85704, Type II and Type IIA should be used. Continue to use B&B 3100 where not restricted.

1. Disconnect hose (1) from acuator tee (2).
2. Disconnect hose (3) from union (4).

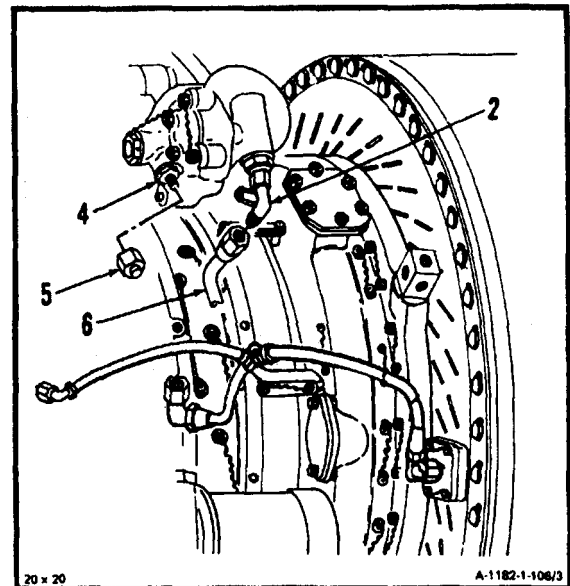
3. Install high pressure cap (5) on union (4).



CAUTION

Do not exceed 60 psi air pressure or damage to bleed band actuator diaphragm may occur.

4. Connect air pressure hose (6), with an air pressure regulator and a source of 60 psig maximum to actuator tee (2).

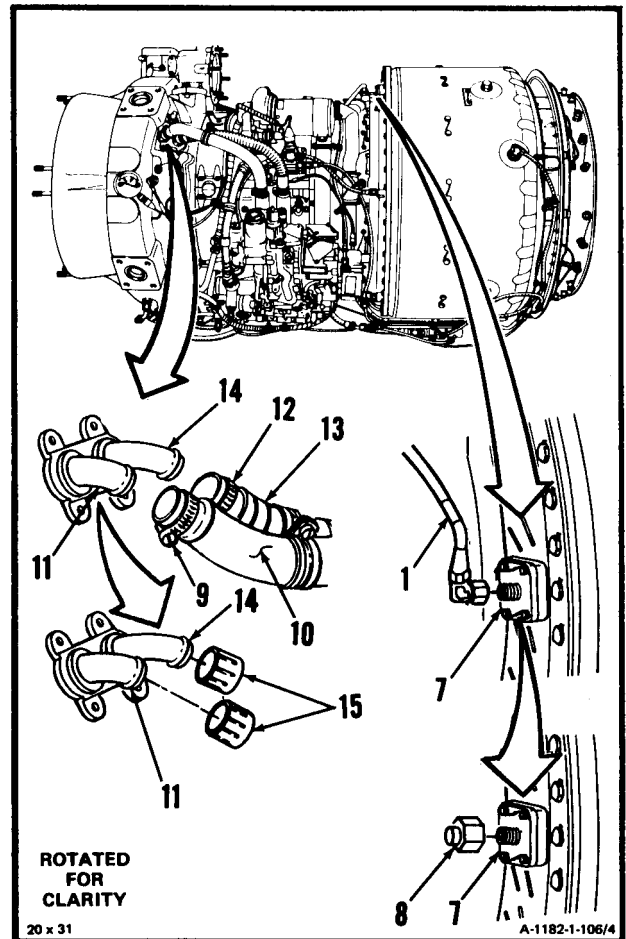


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**1-106 WASH COMPRESSOR (WITHOUT WATER WASH KIT P/N 2-200-071-54
 INSTALLED) (Continued)**

1-106

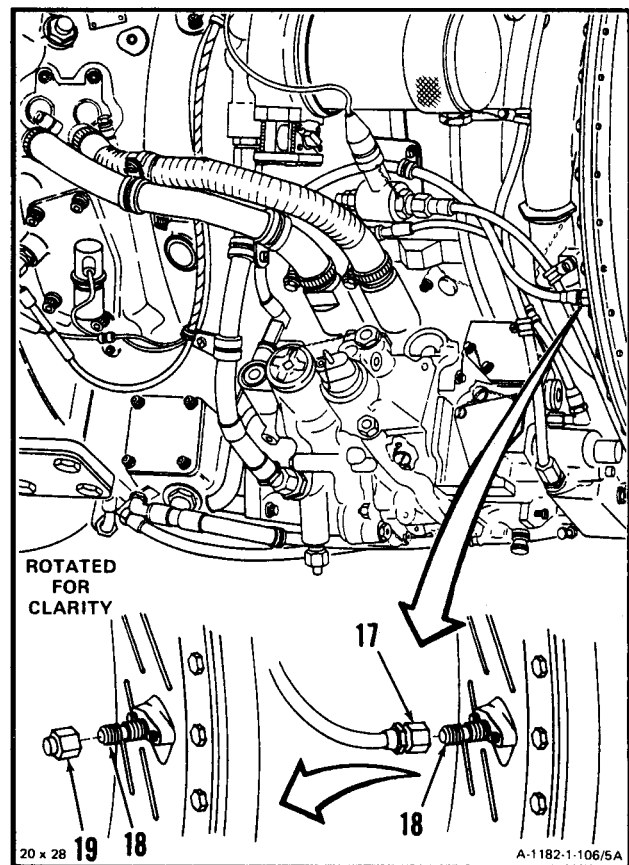
5. **Disconnect hose (1)** from adapter (7).
6. **Install protective cap (8)** on adapter (7).
7. Loosen clamp (9) and **remove hose (10)** from tube (11).
8. Loosen clamp (12) and **remove hose (13)** from tube (14).
9. **Install protective caps (15)** on tubes (11 and 14).
10. **Adjust air pressure** on regulator to 60 psig maximum to close compressor bleed band.



GO TO NEXT PAGE

11. Deleted.

12. **Disconnect hose (17)** from union (18) and
install protective cap (19) on union (18).



GO TO NEXT PAGE

**1-106 WASH COMPRESSOR (WITHOUT WATER WASH KIT P/N 2-200-071-54 1-106
INSTALLED) (Continued)**

13. Prepare for compressor wash as follows:

- a. Place empty utility pail (20) under combustor drain valves (21).

CAUTION

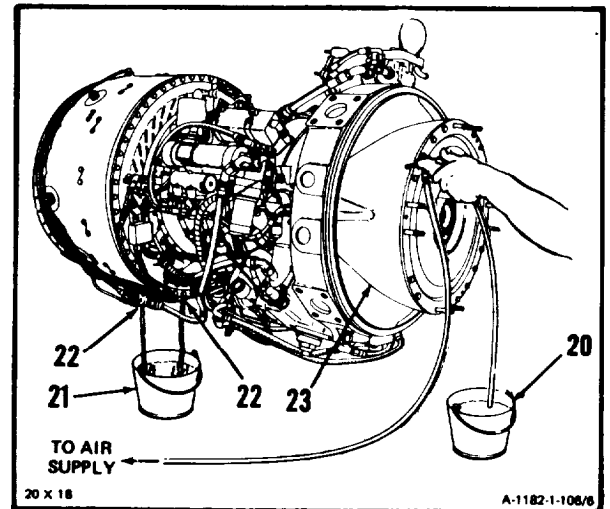
Ensure end of solvent gun is tight and does not come into contact with compressor rotor blades.

CAUTION

Do not spray cleaning solution into a hot engine or damage to engine may occur.

WARNING

Dry cleaning solvent (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.



GO TO NEXT PAGE

WARNING

Cleaning solution (E11) is not toxic but fumes may cause irritation. Use only with adequate ventilation. Avoid prolonged or repeated breathing of vapors.

NOTE

In following step b., cleaning solution (E11) may be used for removal of light oil and dirt. Dry Cleaning solvent (E17) may be used for removal of oil, grease or dirt. if used go to step c. Clean fresh water may be used for removal of dirt and salt deposits. if used go to step e.

- b. Mix a solution of cleaning solution (E11) with water. Mix four quarts of water to one quart of solution in a clean utility pail (22).
- c. While engine is cold and with ignition circuit breaker pulled out, have helper motor engine while spraying cleaning solution (E11 and E17) evenly through ail sections of the inlet housing (23). (Ref. TM 55-1520-240-10 or Task 1-107.)
- d. Stop motoring engine. Let stand for 20 minutes to loosen deposits.

NOTE

In following step e., to avoid freezing at ambient temperatures below 35°F, use antidetonating injection fluid mixture (E4.1) or a mixture of 40 percent methanol (E35.1) and 60 percent water instead of fresh water.

- e. While engine is cold and with ignition circuit breaker pulled out, have helper motor engine while spraying fresh water evenly through ail sections of inlet housing (23) at the rate of 2 and 1/2 gallons per minute for approximately 2 minutes

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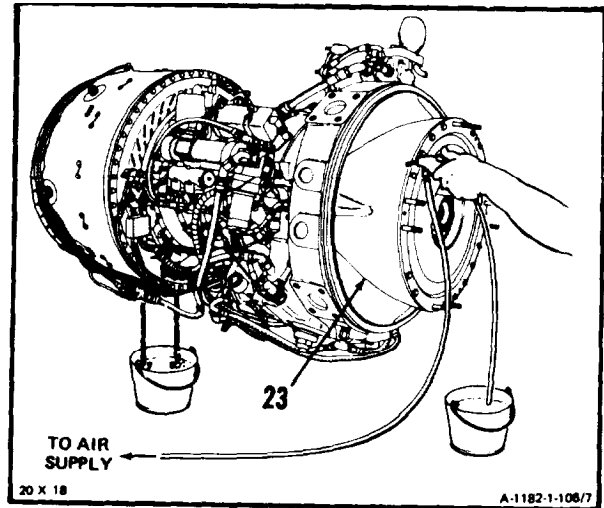
**1-106 WASH COMPRESSOR (WITHOUT WATER WASH KIT PIN 2-200-071-54 1-106
INSTALLED) (Continued)**

14. Rinse engine as follows:

NOTE

in following step a., to avoid freezing at ambient temperature below 35°F use anti-detonating injection fluid mixture of 40 percent methanol (E35.1) and 60 percent water instead of fresh water.

- a. With ignition circuit breaker pulled out, have helper motor engine while spraying clean fresh water evenly through all sections of the inlet housing (23) at the rate of 2 1/2 gallons per minute for approximately 2 minutes.
- b. Repeat steps 13. and 14., if required.
- c. Stop motoring engine. Decrease air pressure to air-bleed actuator to zero.

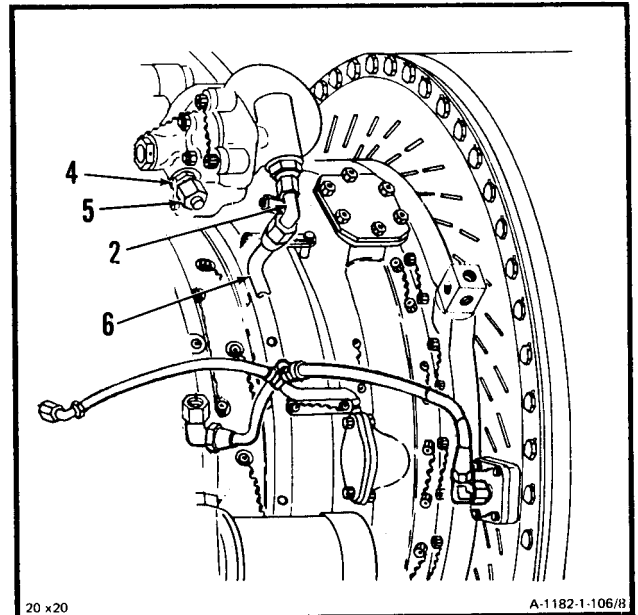


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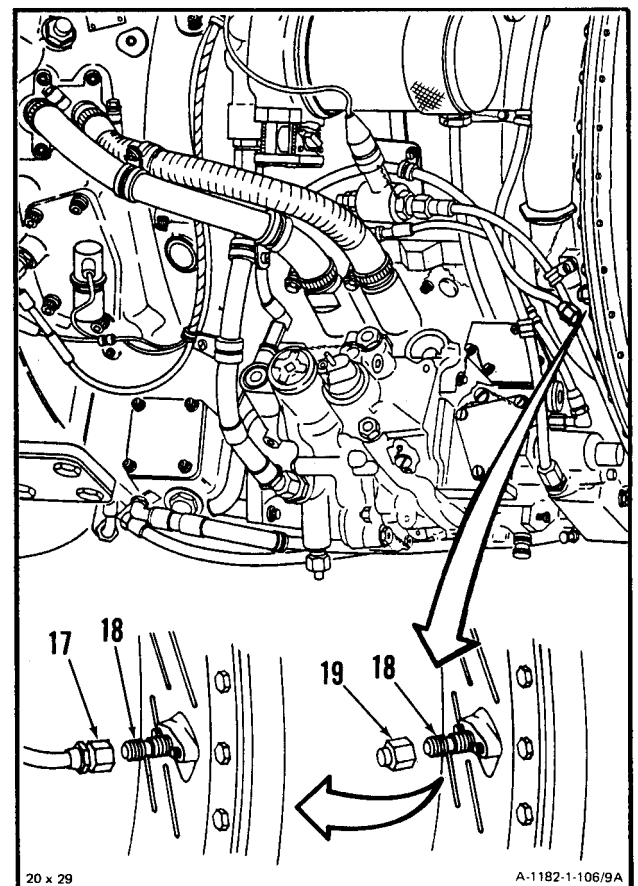
**1-106 WASH COMPRESSOR (WITHOUT WATER WASH KIT P/N 2-200-071-54
INSTALLED) (Continued)**

1-106

- 15. Remove air pressure hose (6) from actuator tee (2).
- 16. Remove high pressure cap (5) from union (4).

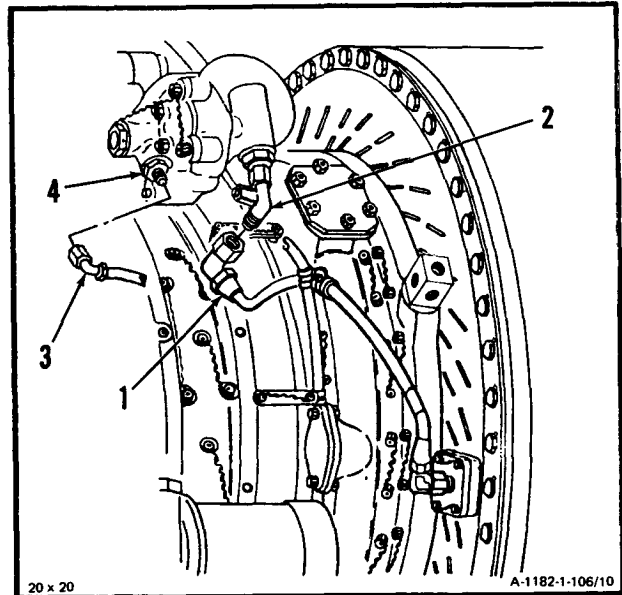


- 17. Remove protective cap (19) from union (18) and connect hose (17) to union (18).



GO TO NEXT PAGE

- 18. Connect hose (1) to actuator tee (2).
- 19. Connect hose (3) to union (4).



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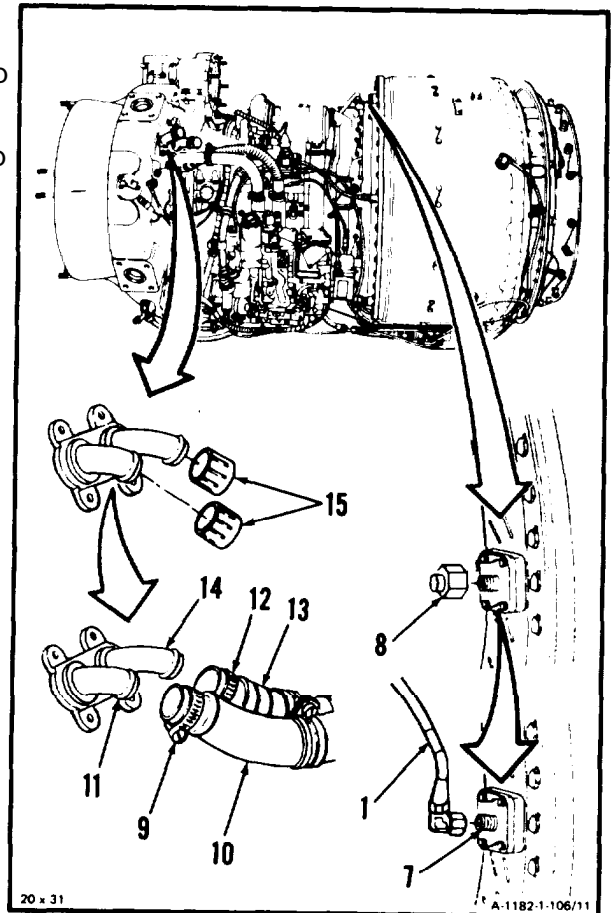
**1-106 WASH COMPRESSOR (WITHOUT WATER WASH KIT P/N 2-200-071-54
 INSTALLED) Continued)**

1-106

20. Remove two protective caps (15).
21. Connect hose (13) to tube (14). Tighten clamp (12).
22. Connect hose (10) to tube (11). Tighten clamp (9).
23. Remove protective cap (8).
24. Connect hose assembly (1) to adapter (7).
25. Push in engine igniter circuit breaker and start engine. (Ref. TM 55-1520-240-10 or Task 1-107). Run at ground idle for a minimum of 2 minutes to dry engine and shut down engine.
26. Repeat steps 1. thru 12.

CAUTION

To prevent corrosion after cleaning, rust inhibitor and preservative must be applied to the compressor.



GO TO NEXT PAGE

Change 8 1-453

1-106 WASH COMPRESSOR (WITHOUT WATER WASH KIT P/N 2-200-071-54 1-106
INSTALLED) (Continued)

27. Preserve compressor after cleaning as follows:

NOTE

Engine must cool for 45 minutes before preserving compressor.



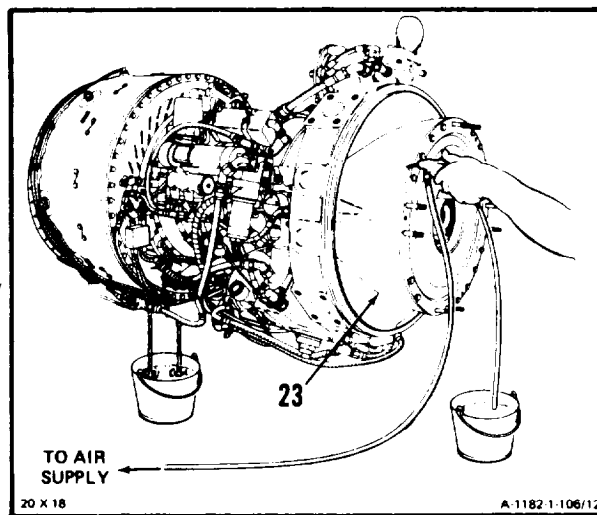
Do not spray rust inhibitor and preservative into a hot engine or damage to engine may occur.

- a. With engine igniter circuit breaker pulled out; have helper motor engine to 10 percent N1 and allow to coast down.



Rust inhibitor and preservative (E44) is flammable and toxic. Use only in well-ventilated area away from heat, sparks and open flames. If swallowed do not induce vomiting. Get medical attention. In case of contact, immediately flush skin and eyes with water for 15 minutes. Get medical attention for eyes

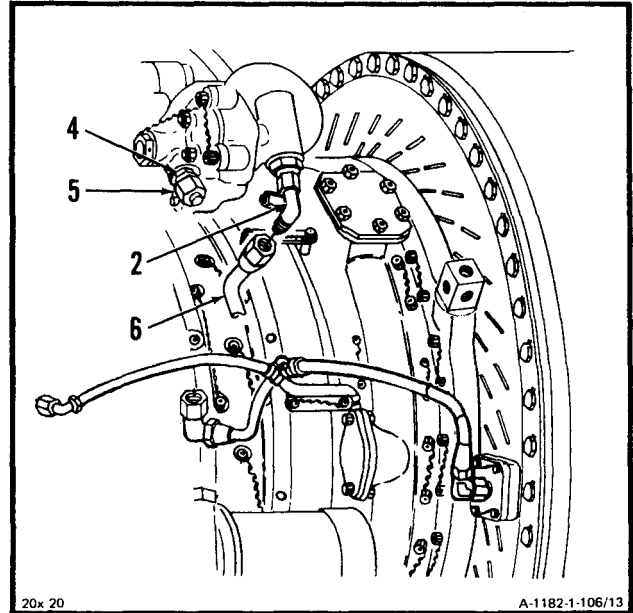
- b. While engine is coasting down, evenly spray 1/2 pint of rust inhibitor and preservative (E44) through air sections of inlet housing (23).
- c. Push in engine igniter circuit breaker.
- d. Decrease air pressure to air-bleed actuator to zero.



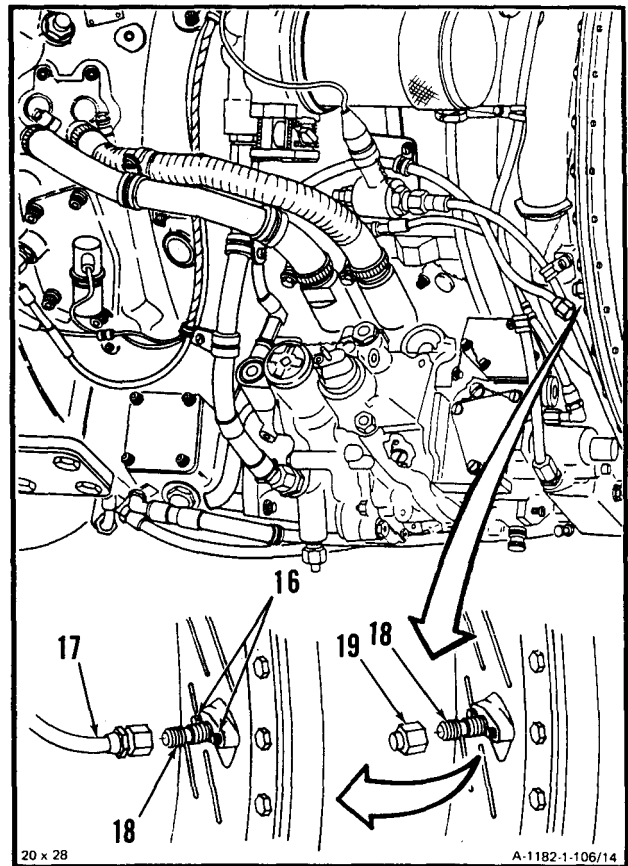
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**1-106 WASH COMPRESSOR (WITHOUT WATER WASH P/N 2-200-071-541-106
INSTALLED) (Continued)**

- 28. Remove air pressure hose (6) from actuator tee (2).
- 29. Remove high pressure cap (5) from union (4).

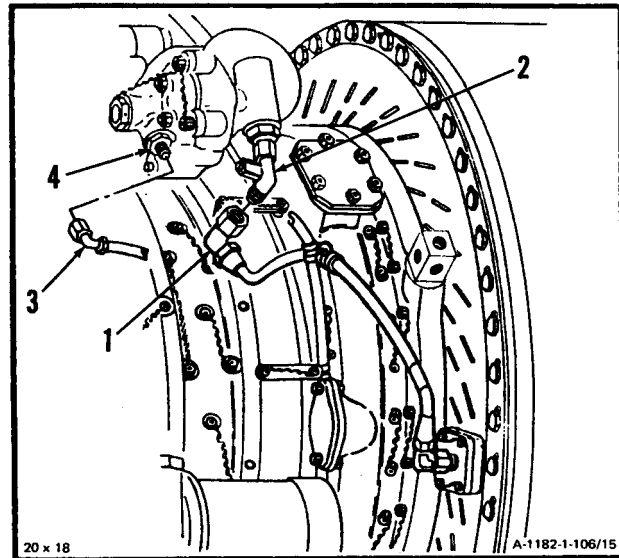


- 30. Remove protective cap (19) from union (18) and connect hose (17) to union (18). Lockwire bolts (16). Use lockwire (E29).

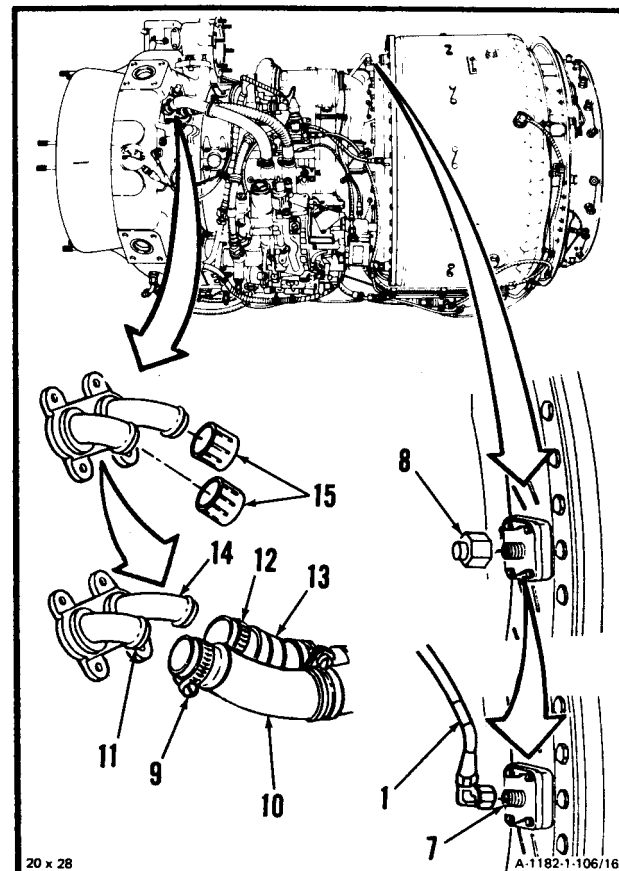


GO TO NEXT PAGE

- 31. Connect hose (1) to actuator tee (2).
- 32. Connect hose (3) to union (4).



- 33. Remove two protective caps (15).
- 34. Connect hose (13) to tube (14). Tighten clamp (12).
- 35. Connect hose (10) to tube (11). Tighten clamp (9).
- 36. Remove protective cap (8) and connect hose assembly (1) to adapter (7).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

Section X. MAINTENANCE PROCEDURES

**1-106.1 WASH COMPRESSOR (WITH WATER WASH KIT
P/N 2-200-271-54 INSTALLED)**

1-106.1

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
- Compressed Air Source
- Air Pressure Regulator
- Solvent Gun
- Utility Pail (2)

Materials:

- Anti-detonating injection fluid
mixture (E4.1)
- Cleaning Solution (E11)

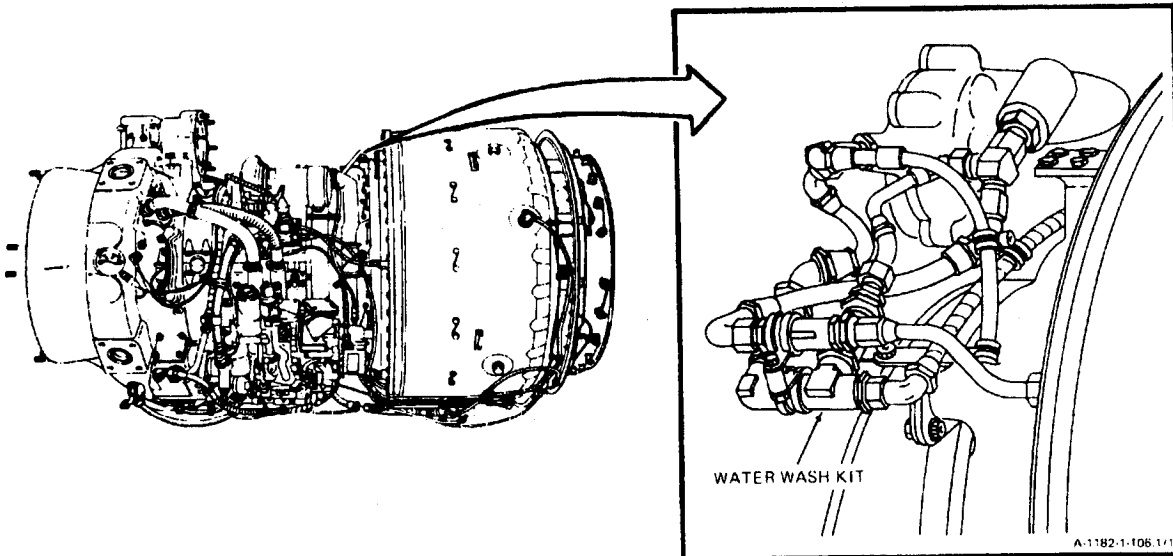
- Dry Cleaning Solvent (E17)
- Lockwire (E29)
- Methanol (E35.1)
- Rust Inhibitor and Preservative (E44)
- Protective Caps
- Cleaning Solution (E63)
- Cleaning Solution (E64)
- Cleaning Solution (E65)
- Cleaning Solution (E66)

Personnel Required:

- 68B10 Aircraft Powerplant Repairer
- 68B30 Aircraft Powerplant Inspector
- 68B30 Aircraft Powerplant Supervisor

References:

- TM 55-1520-240-10
- TM 55-4920-328-13
- Task 1-107



NOTE

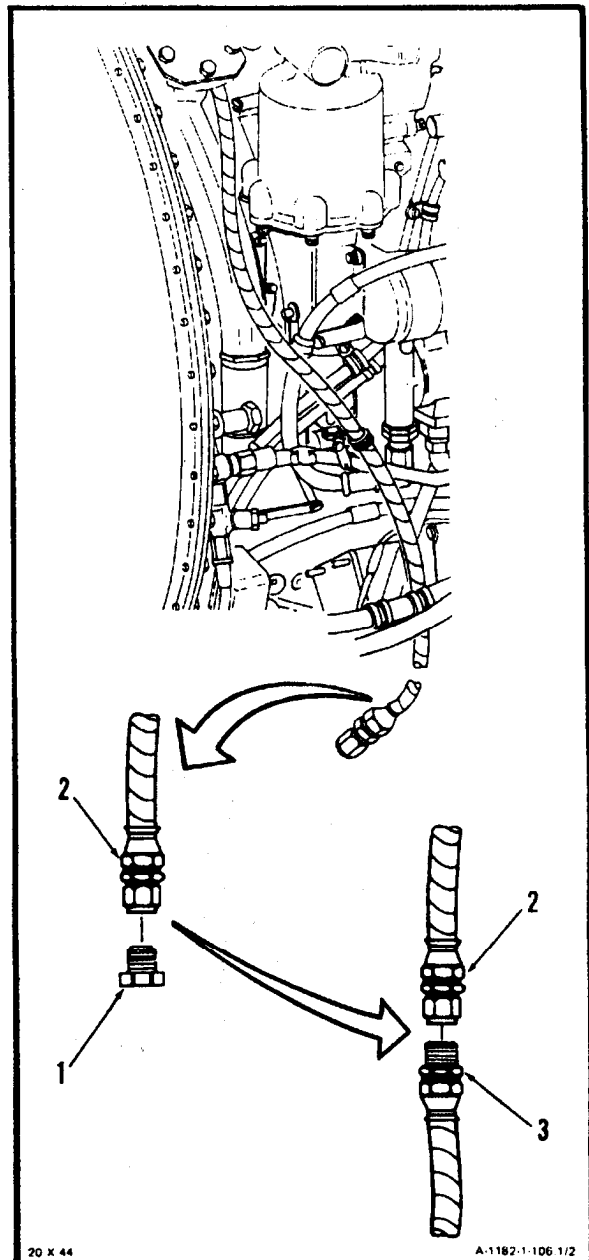
Currenty B & B 3100 (MIL-C-85704, Typr I) is the primary cleaner for Army turbine engines and remains an approved cleaner for environmental restrictions permit. Where environmental restrictions preclude its use ML-C-85704, Type II and Type IIA should be used. Continue to use B & B 3100 where not restricted. Approved Type II and Type IIA cleaners shall be used in accordance with the existing washing procedure, however, they are less effective than Type I cleaners, therefore, more frequent engine washes may be required to achieve satisfactory results. Type IIA cleaners do not require dilution with water.

1. Disconnect protective plug (1) from water wash system hose assembly (2).

CAUTION

Do not exceed 60 psi air pressure or damage to bleed band actuator diaphragm may occur.

2. Connect air pressure hose (3) with air pressure regulator and a source of 60 psig to water wash system hose assembly (2).
3. Adjust air pressure on regulator to 60 psig maximum to close compressor bleed band.



GO TO NEXT PAGE

**1-106.1 WASH COMPRESSOR (WITHOUT WATER WASH KIT
P/N 2-200-271-54 INSTALLED) (Continued)**

1-106.1

4. Prepare for compressor wash as follows:

CAUTION

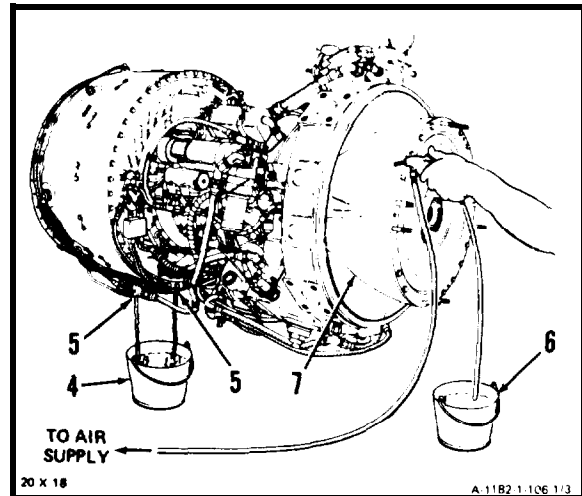
Ensure end of solvent gun is tight and does not come into contact with compressor rotor blades.

CAUTION

Do not spray cleaning solution into a hot engine or damage to engine may occur.

WARNING

Dry cleaning solvent (E17) is flammable and toxic. It can initiate skin and cause burn Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin of eyes with water for at least 14 minutes Get medical attention for eyes.



GO TO NEXT PAGE

WARNING

Cleaning solution (E11) is not toxic but fumes may cause irritation. Use only with adequate ventilation. Avoid prolonged or repeated breathing of vapors

NOTE

In following step b., cleaning solution (E11) may be used for removal of light oil and dirt. Dry Cleaning solvent (E1 7) may be used for removal of oil, grease or dirt. If used go to step c. Clean fresh water may be used for removal of dirt and salt deposits. If used go to step e.

- b. Mix a solution of cleaning solution (E11) with water. Mix four quarts of water to one quart of solution in a clean utility pail (6).
- c. While engine is cold and with ignition circuit breaker pulled out, have helper motor engine while spraying cleaning solution (E11 or E17) evenly through all sections of the inlet housing (7). (Ref. TM 55-1520-240-10 or Task 1-107).
- d. Stop motoring engine. Let stand for 20 minutes to loosen deposits.

GO TO NEXT PAGE

1-456.4 Change 8

**1-106.1 WASH COMPRESSOR (WITHOUT WATER WASH KIT
P/N 2-200-271-54 INSTALLED) (Continued)**

1-106.1

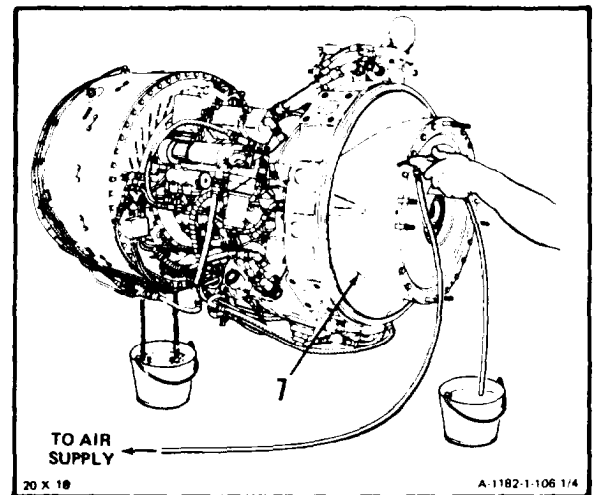
- e. While engine is cold and with ignition circuit breaker pulled out, have helper motor engine while spraying fresh water evenly through all sections of inlet housing (23) at the rate of 2 and 21/2 gallons per minute for approximately 2 minutes

5. Rinse engine as follows:

NOTE

In following step e., to avoid freezing at ambient temperatures below 35°F use antidetonating injection fluid mixture (E4.1) or a mixture of 40 percent methanol (E35.1) and 60 percent water instead of fresh water.

- a. With ignition circuit breaker pulled out, have helper motor engine while spraying clean fresh water evenly through all sections of the inlet housing (7).
- b. Repeat steps 4. and 5., if required.
- c. Stop motoring engine. Decrease air pressure to air-bleed actuator to zero.

**GO TO NEXT PAGE****Change 10 1-456.5**

1-106.1 WASH COMPRESSOR (WITH WATER WASH KIT P/N 2-200-271-54 1-106.1 INSTALLED) (Continued)

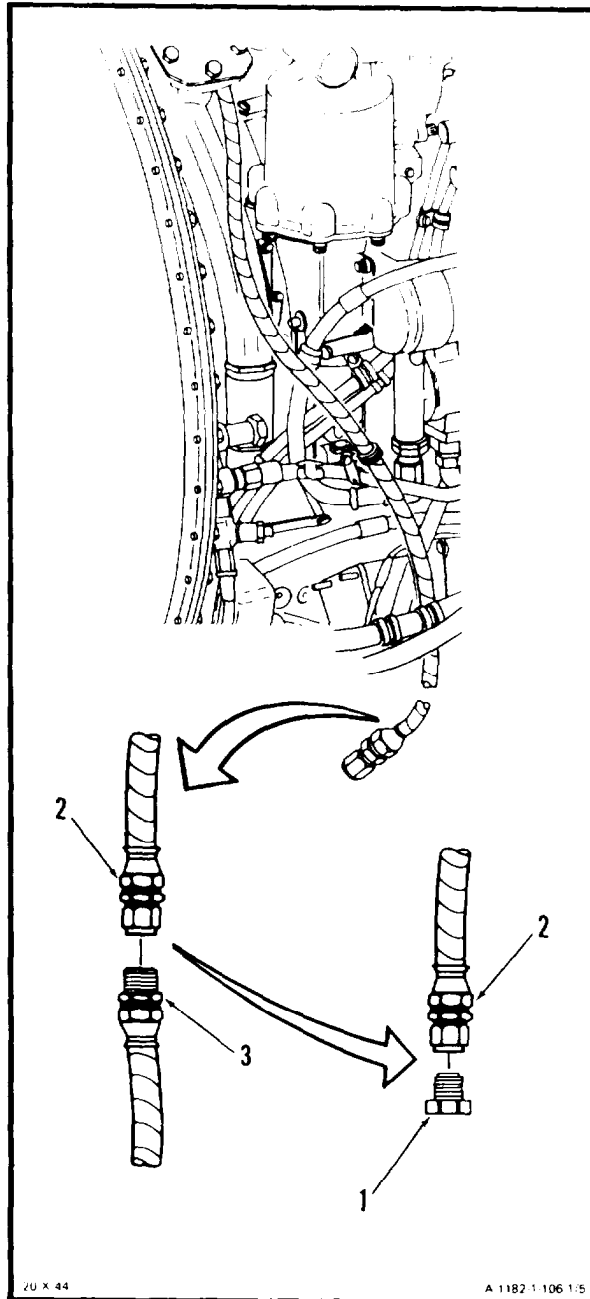
6. Remove air pressure hose (3) from water wash system hose assembly (2).
7. Install protective plug (1) on water wash system hose assembly (2).

Push in engine igniter circuit breaker and start engine. (Ref. TM 55-1520-240-10 or Task 1-107). Run at ground idle for a minimum of 2 minutes to dry engine and shut down engine.

Repeat steps 1., 2., and 3.

CAUTION

To prevent corrosion after cleaning, rust inhibitor and preservative must be applied to the compressor.



GO TO NEXT PAGE

**1-106.1 WASH COMPRESSOR (WITHOUT WATER WASH KIT
P/N 2-200-271-54 INSTALLED) (Continued)**

1-106.1

8. **Preserve compressor** after cleaning as follows:

NOTE

Engine must cool for 45 minutes before preserving compressor.

CAUTION

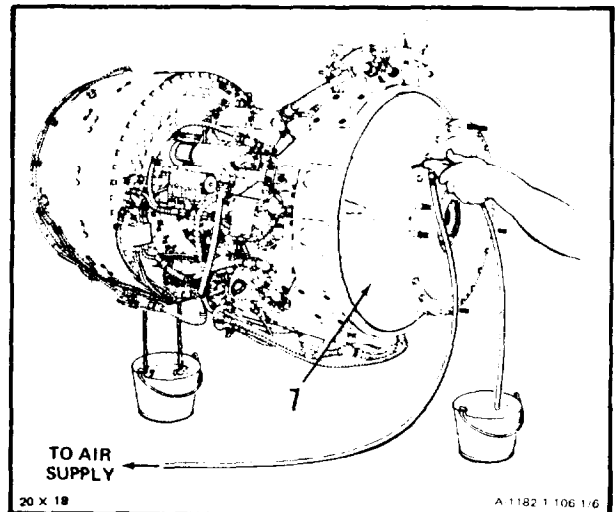
Do not spray rust inhibitor and preservative into a hot engine or damage to engine may occur.

- a. **With engine igniter circuit breaker pulled out**; have helper motor engine to 10 percent N1 and allow to coast down.

WARNING

Rust inhibitor and preservative (E44) is flammable and toxic. Use only in well ventilated area away from heat, sparks and open flames. If swallowed do not induce vomiting. Get medical attention. In case of contact immediately flush skin and eyes with water for 15 minutes. Get medical attention for eyes.

- b. While engine is coasting down, evenly spray 1/2 pint of rust inhibitor and preservative (E44) through all sections of inlet housing (7).
- c. Push in engine igniter circuit breaker.
- d. Decrease air pressure to air-bleed actuator to zero.

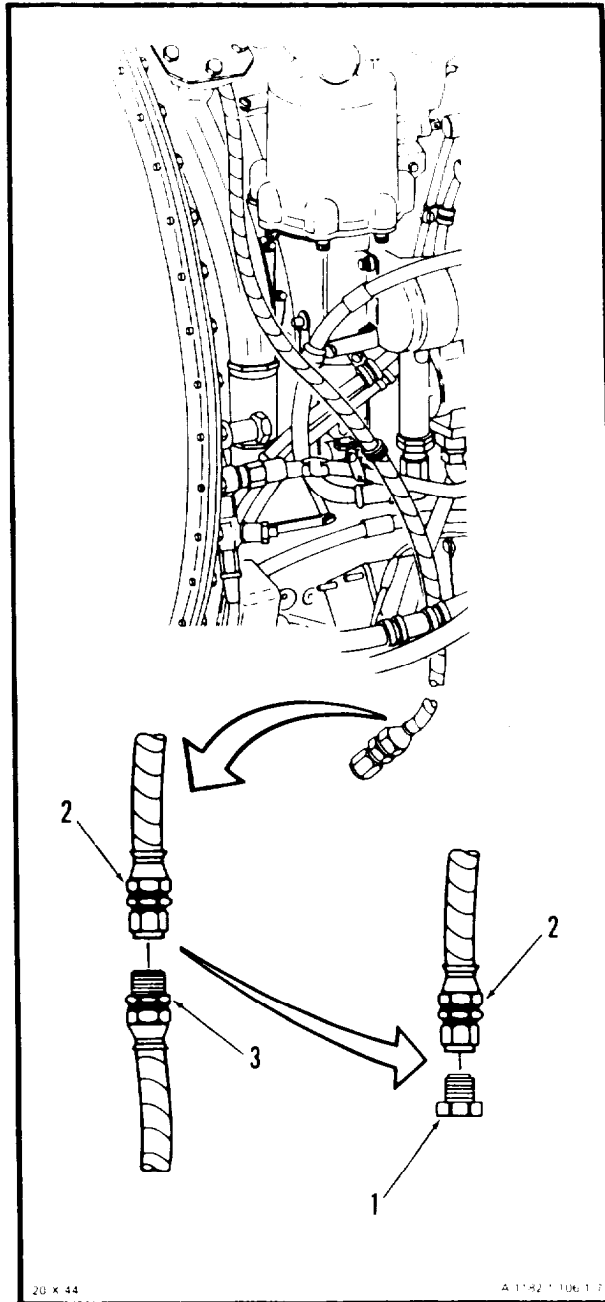


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Change 10 1-456.7

1-106.1 WASH COMPRESSOR (WITH WATER WASH KIT P/N 2-200-271-54 1-106.1 INSTALLED) (Continued)

- 9. Remove air pressure hose (3) from water wash system hose assembly (2).
- 10. Install protective plug (1) on water wash system hose assembly (2).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-456.8 Change 8

Section X. MAINTENANCE PROCEDURES

1-106.2 HOT END WASH

1-106.2

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
- compressed Air source
- Air Pressure regulator
- Solvent Gun
- Utility Pail (2)
- LTCT 12870-01
- Hot End Water Wash Wand
NSN 4820-01-356-6903

Materials:

- Cleaning Solution (E11)
- Dry Cleaning Solvent (EI 7)
- Lockwire (E29)
- Rust Inhibitor and Preservative (E44)
- Protective Caps

Personnel Required:

- 68B10 Aircraft Powerplant Repairer
- 88B30 Aircraft Powerplant Inspector
- 68B30 Aircraft Powerplant Supervisor

References:

- TM 55-1520-240-10
- TM 55-4920-328-13
- Task 1-107

NOTE

Initial setup is the same as Task 1-106 except for the addition of one tool: LTCT 12870-01, Hot End Water Wash Wand.

1. Run engine at ground idle for 5 minutes and shut down engine. (Ref. TM 55-1520-240-10 or Task 1-107.)
2. Let engine cool down by motoring the engine with the starter until PTIT is between 302° and 482°F (150° and 200°C).
3. Mix a solution of cleaning solution (E11) with water, mix 3 quarts of water to 1 quart of solution in a clean utility pail. Place an empty utility pail under combustion drain valve and under the tail pipe.

4. Connect air pressure hose with an air pressure regulator and a source of 55 psig. Connect solvent gun to water wash wand, LTCT 12870-01.
5. Remove 12 o'clock and 4 o'clock ignitor plugs to gain access for water wash wand, LTCT 12870-01.

NOTE

On left side installed engines, remove 9 o'clock and 12 o'clock ignitor plugs.

6. Insert wand into combustor through the 12 o'clock ignitor port and spray for 30 seconds. Remove wand and insert in 4 o'clock or 9 o'clock port and spray for 30 seconds. Rotate wand while spraying to obtain maximum coverage.
7. Insert spray wand into 12 o'clock ignitor port and spray for 30 seconds while motoring engine.

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1-106.2 HOT END WASH**1-106.2**

8. Spray through 12 o'clock port for 1 minute while rotating spray wand 90 degrees. Before removing wand spray forward for an additional 10 seconds.
9. Allow solution to soak for 10 minutes.
10. Insert wand into 12 o'clock port and motor engine for 30 seconds while spraying fresh water. Repeat as necessary until clear water is observed coming from tail pipe.
11. Install ignitors and run engine for 5 minutes.
12. Hot end wash may be performed with the engine installed in the airframe or a test cell (METS).

INSPECT

FOLLOW-ON MAINTENANCE:
NONE

END OF TASK

1-107 TEST ENGINE (AVIM)

1-107

INITIAL SETUP**Applicable Configurations:**

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Special Screwdriver (T33)
Modular Engine Test Stand
Special Cable Assembly (T43)
Shorting Jumper
Vibration Filters (AR)
Cold Weather Trim Tool (T67)

Materials:

Black Baking Enamel (E8)
Lockwire (E28)
Lubricating Oil (E32 or E33)

Personnel Required:

68620 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Supervisor

References:

TM 55-4920-328-13 Task 1-87 Task 1-108
Task 1-32 Task 1-88 Task 1-110
Task 1-74 Task 1-93 Task 1-111

Equipment Condition:

If Required, Engine Activated After
Storage (Task 1-27)
Engine On METS

General Safety Instructions:**WARNING**

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.

1. INTRODUCTION

This section contains instructions and data for testing engines after maintenance to determine engine flight readiness, using mobile trailer assembly.

- a. **Graph Reading.** To read any of the graphs presented in this section, locate the applicable unit at the bottom of the graph, project vertically from this unit to the level that intercepts the required curve line; then read the results given at the left. Definitions for curves on the graphs are:
- (1) Maximum Power is the maximum power the engine will consistently deliver at specified ground or flight conditions for an incremental duration of 10 minutes.
 - (2) Intermediate Power is the highest power which the engine will consistently deliver at specific ground or flight conditions for an incremental duration of at least 30 minutes, and a total duration as specified for demonstration during qualification tests or preliminary flight rating tests.

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- (3) Maximum Continuous Power is the highest power which the engine will consistently deliver at specific ground or flight conditions for continuous operation.
 - (4) Seventy-five Percent Maximum Continuous Power is the highest power which the engine will consistently deliver at 75 percent for specific ground or flight conditions for continuous operation.
 - (5) Forty percent Maximum Continuous Power is the highest power which the engine will consistently deliver at 40 percent for specific ground or flight conditions for continuous operation.
- b. Recording Data. Throughout this section, when told to take instrument readings, all readings must be recorded on the engine test log.

2. PRESTART CHECK PROCEDURE

Complete the following check list before starting the engine.

- a. Position MASTER SWITCH to ON.
- b. Position DC switch to ON.
- c. Using slip of paper, check that fuel control N1 and N2 lever pointers are contacting both of their respective stops.
- d. Check N1 master hydronic control in control compartment against throttle position indicator: full hydronic control travel shall be 99.5 to 100.5 degrees: full retard shall be zero.
- e. Install N1 maximum trim stop 2-161-201-02: full hydronic control travel shall be 86 to 89 degrees: full retard shall be zero.
- f. Check torquemeter indicator zero setting as follows:
 - (1) Position torquemeter indicator power switch to ON.
 - (2) Turn ZERO adjustment screw to set torquemeter indicator at static zero
 - (3) Position R/CAL switch to ON. Indicator should indicate torque reading obtained during calibration; this reading is taped to front of torquemeter indicator case. Adjust SPAN as required.
 - (4) Repeat preceding step (3).
 - (5) Using water-in master hydronic control, supply full water flow through water brake. The zero indication on indicator shall not vary more than ± 25 pound-inches.
 - (6) Manually exert torque on water brake clockwise (looking forward), then gradually release this torque. The zero indication on indicator shall not vary more than ± 25 pound-inches.

GO TO NEXT PAGE

NOTE

Zero must repeat. If zero does not repeat, check for interference from inner bellmout, instrumentation lines, or water brake lines or connections.

g. Zero engine torquemeter indicator as follows:

- (1) Turn off power and remove electrical cable connector from engine torque meter junction box and install electrical cable assembly (T43) between junction box connector and cable connector.
- (2) Apply power to engine torquemeter system and adjust indicator to zero.

NOTE

The only time the indicator must read zero is when the shorting cable is installed.

- (3) Turn off power and remove cable assembly. Reconnect cable connector to junction box.

h. Position torque inverter switch to ON. Check that engine torque system inverter output is within prescribed limits by depressing PRESS TO TEST switch.

NOTE

Reading on output meter should be zero ± 10 units. A reading in excess of 10 units either side of zero indicates a torquemeter inverter problem. Corrective action must be taken.

- (1) Disconnect flight harness lead from torquemeter junction box.
 - (2) Connect shorting jumper (LTCT10797) between junction box and aft deck console.
 - (3) Using potentiometer located on rear of torque indicator, adjust indicator to read zero percent.
 - (4) Remove shorting jumper and reconnect flight harness.
- i. Check inlet housing for proper locking to engine stand; test trailer hardware; ensure freedom from foreign objects.
- j. Check starter hydraulic pump system to ensure that pressure drop across hydraulic starter will not exceed 3400 psig. Adjust pressure regulator as required.
- k. Position FUEL CONT and FUEL SOL switches to ON to pressurize fuel control.
- l. Position N 1 master hydronic control in off (zero degree throttle position), then actuate START switch. Without starting engine, crank engine to 13 percent N1 speed minimum, then deenergize starter. Check that No. 2 bearing feed and oil pump discharge pressure gages are indicating.

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m. Check engine for leaks, and listen for any unusual noises during engine coastdown.

NOTE

No fuel should come from engine combustion chamber drain valves.

n. Place test log on control room panel bench.

o. Add oil as necessary to refill engine oil reservoir. Record amount added.

NOTE

Engine oil level indicator should be reading slightly less than full.

p. Empty all seal drain bottles.

q. Position FUEL CONT and FUEL SOL switches to OFF,

3. ENGINE STARTING PROCEDURE

CAUTION

Observe starter limitations as recommended by manufacturer. Failure to comply may cause damage to starter.

a. Position MASTER SWITCH and 400 CYCLE switches to ON.

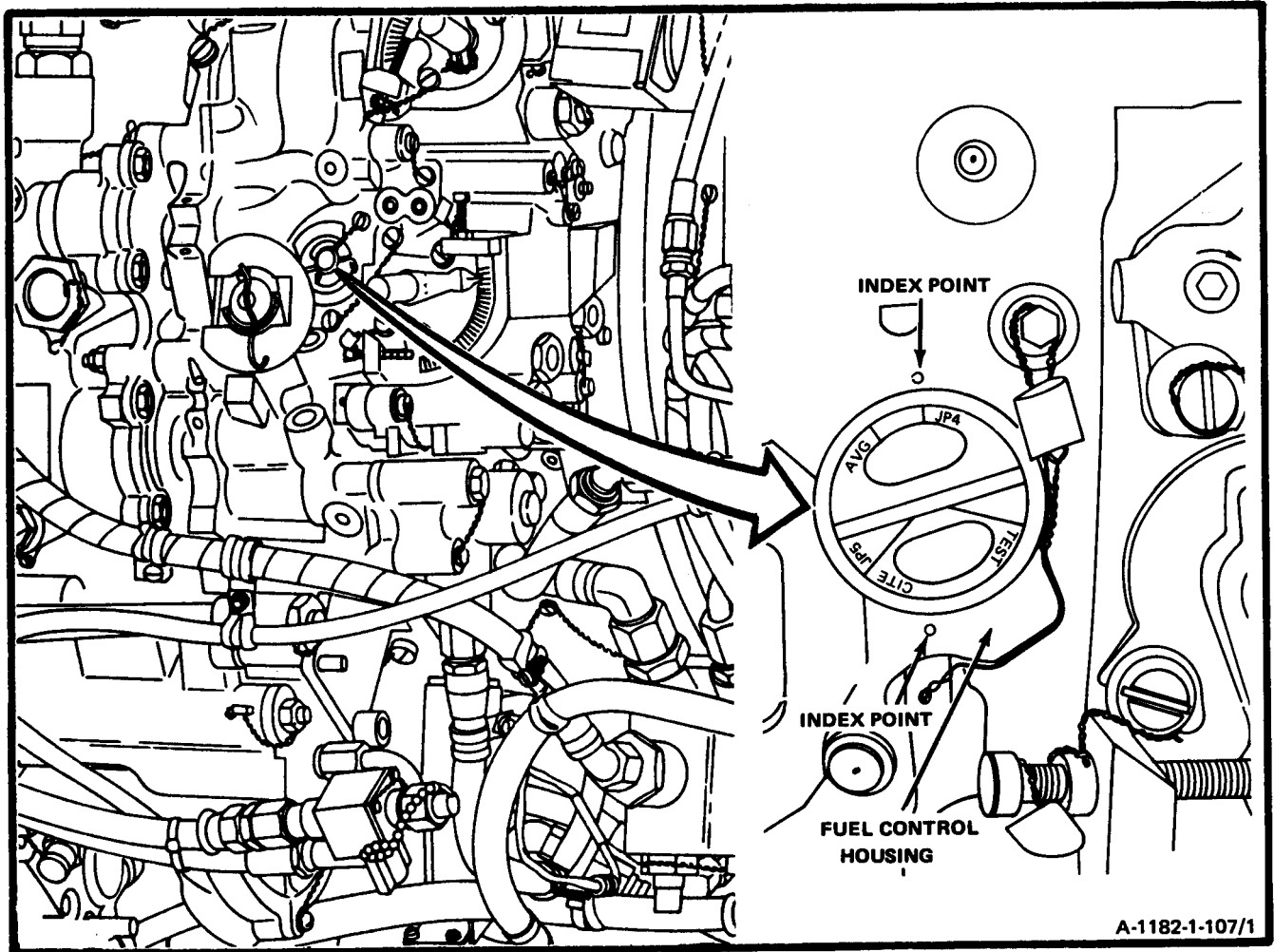
b. Allow fuel to flow to fuel control by placing fuel solenoid switch to ON.

c. Preset N1 master hydronic control to OFF.

d. Preset power turbine master hydronic control to fully retarded (minimum) position,

GO TO NEXT PAGE

e. Check that fuel selector on fuel control is in JP-4 position.



Fuel Control Fuel Selector

GO TO NEXT PAGE

- f. Position water back pressure master ydronic control fully open.
- g. Press water brake pump, brake lube pump, and cooling tower start buttons and cooling fan forward or reverse button (whichever is applicable). Supply 25 psig air pressure to water brake assembly. Check torque panel, R/CAL, oil pump discharge pressure, compressor discharge pressure, gearbox pressure, number 2 bearing pressure, fuel supply pressure, fuel control discharge pressure, fuel pump pressure, and fuel manifold pressure.
- h. Turn on start system on test stand.

CAUTION

In following step, hydraulic pressure drop across starter must not exceed 3400 psig, if applicable. Damage to engine may result.

- i. Simultaneously energize starter, igniters, and timer.

NOTE

All lever movements shall be made in 0.5 second or less.

- j. At 10 to 15 percent N1 speed, set N1 master hydronic control to ground idle (15 degrees).
- k. When power turbine inlet temperature is between 600° and 800° F (315° and 425° C), release ignition switch. Continue to observe PTIT.
- l. When 50 percent N1 speed is reached, release starter switch to OFF.

CAUTION

If start is aborted for any reason, wait 15 seconds after coastdown before attempting a restart. Hot start may result.

- m. Record acceleration time to 45 to 50 percent N1 speed.
- n. Record maximum PTIT. Maximum power turbine inlet temperature shall not exceed 1720° F (938° C) once nor shall it exceed 1450° F (788° C) for more than 5 seconds, three times. If limits are exceeded Inspect Engine Hot End (Ref. Task 1-93) and determine cause for overtemperature (Ref. Task 1-32).
- o. Turn off test stand start system.

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1-107 TEST ENGINE (AVIM) (Continued)

1-107

- p. Set fuel specific gravity K factor on readout.
- q. Check engine for external leaks. If leakage exceeds limits, stop test and repair engine, as required, to prevent leakage.
- (1) Oil leakage shall not exceed 2 cc per hour per seal.
 - (2) Total fuel leakage, or fuel oil leakage from fuel control seal, shall not exceed 120 cc per hour maximum from all seals.
 - (3) Total fuel leakage from fuel boost pump seal shall not exceed 30 cc per hour.

4.GROUND IDLE CHECK

- a. Move power turbine master hydronic control to maximum position.
- b. Check that N1 speed is 60 to 63 percent at 10 to 15 degrees N1 hydronic control position.

NOTE

Do not adjust ground idle speed until after maximum power trim has been set.

- c. Oil pump discharge pressure shall be 60 to 80 psig (reference), as oil temperature becomes stabilized.

CAUTION

In following step, pressure fluctuation of more than ± 5 psig is not acceptable. Damage to engine may result.

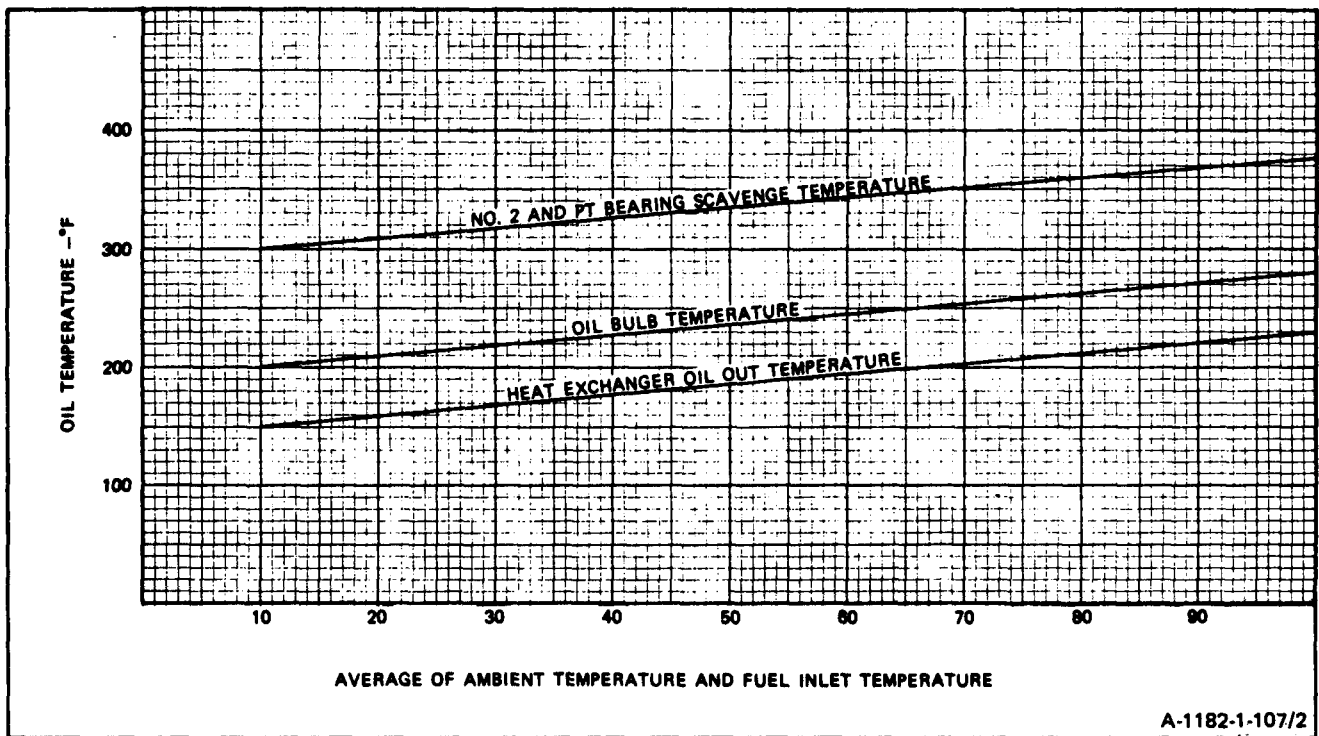
- d. Check that rear bearings oil feed pressure is 25 psig minimum.

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e. Check bearing scavenge oil temperatures. Temperatures should be gradually rising toward stabilization.

NOTE

Oil system temperature limits are given below.



Maximum Oil Temperature Limits Versus Average Fuel and Inlet Air Temperature

GO TO NEXT PAGE

1-107 TEST ENGINE (AVIM) (Continued)

1-107

f. Check vibration meter, using 200 Hz filter, for indications from all transducers and that vibration is within limits given below.

Position	Velocity (Inches/Second)
Water Brake*	0.94
Front Vertical	0.63
Rear Vertical	0.84
Axial	0.94

*For indication of water brake condition only. Do not reject engine if this position exceeds limit.

g. Check engine for external leaks. If leakage exceeds limits, stop, test, and repair engine, as required, to prevent leakage.

(1) Oil leakage shall not exceed 2 cc per hour per seal.

(2) Total fuel leakage, or fuel oil leakage from fuel control seal, shall not exceed 120 cc per hour maximum from all seals.

(3) Total fuel leakage from fuel boost pump seal shall not exceed 30 cc per hour.

h. Check all pressure and temperature instrumentation for indications.

i. If gearbox pressure is over 5 psi or rear bearing scavenge oil temperature indication is high, shut down engine (Paragraph 21) and check No. 2 bearing package for seal leakage (Ref. Task 1-87).

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j. Advance water in master hydronic control until 30 percent N2 speed has been obtained. Calculate power and fuel rate using table below.

NOTE

Obtain compensated SHP and compensated Wf from METS torquemeter and fuel flow indicators.

Actual SHP = Compensated SHP x		Actual Wf = Compensated Wf x	
Corrected Barometer	Compensating Factor (δ)	Corrected Barometer	Compensating Factor (δ)
28.50	0.9525	29.90	0.9993
28.60	0.9559	29.92	1.000
28.70	0.9592	30.00	1.003
28.80	0.9626	30.10	1.006
28.90	0.9659	30.20	1.009
29.00	0.9693	30.30	1.013
29.10	0.9726	30.40	1.016
29.20	0.9759	30.50	1.019
29.30	0.9793	30.60	1.023
29.40	0.9826	30.70	1.026
29.50	0.9860	30.80	1.029
29.60	0.9893	30.90	1.033
29.70	0.9926	31.00	1.036
29.80	0.9960		

GO TO NEXT PAGE

1-107 TEST ENGINE (AVIM) (Continued)

1-107

Check that power and fuel rate do not exceed following limits.

- (1) Compensated G.I maximum SHP limit is 200.
- (2) Deleted.
- (3) Compensated maximum Wf limit is 440 pounds per hour.

k. Take a short reading, as follows, and record results.

- (1) N1
- (2) N2
- (3) Ambient temperature
- (4) Wf
- (5) Torque
- (6) SHP
- (7) Throttle position
- (8) PTIT
- (9) Fuel control discharge pressure
- (10) Engine torquemeter and torque system reading
- (11) Gearbox pressure.

l. Service engine oil system (Ref. Task 1-74). Record amount added.

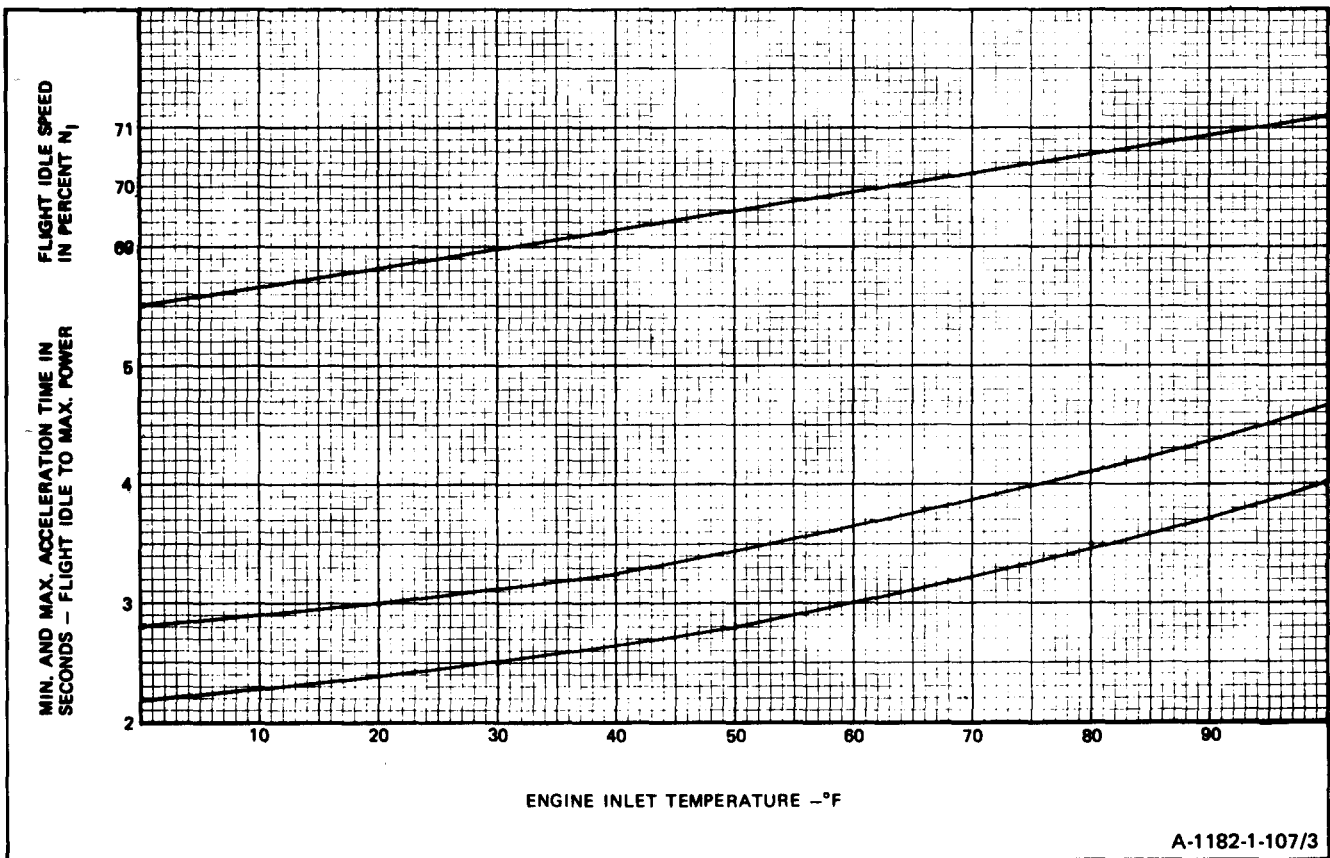
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5. FLIGHT IDLE CHECK

- a. N1 speed, as indicated on gas producer turbine speed indicator, shall be determined from graph below within ± 1 percent.

NOTE

Set N2 master hydronic control to the maximum position, then slowly advance the N1 master hydronic control until the correct flight idle speed is obtained.

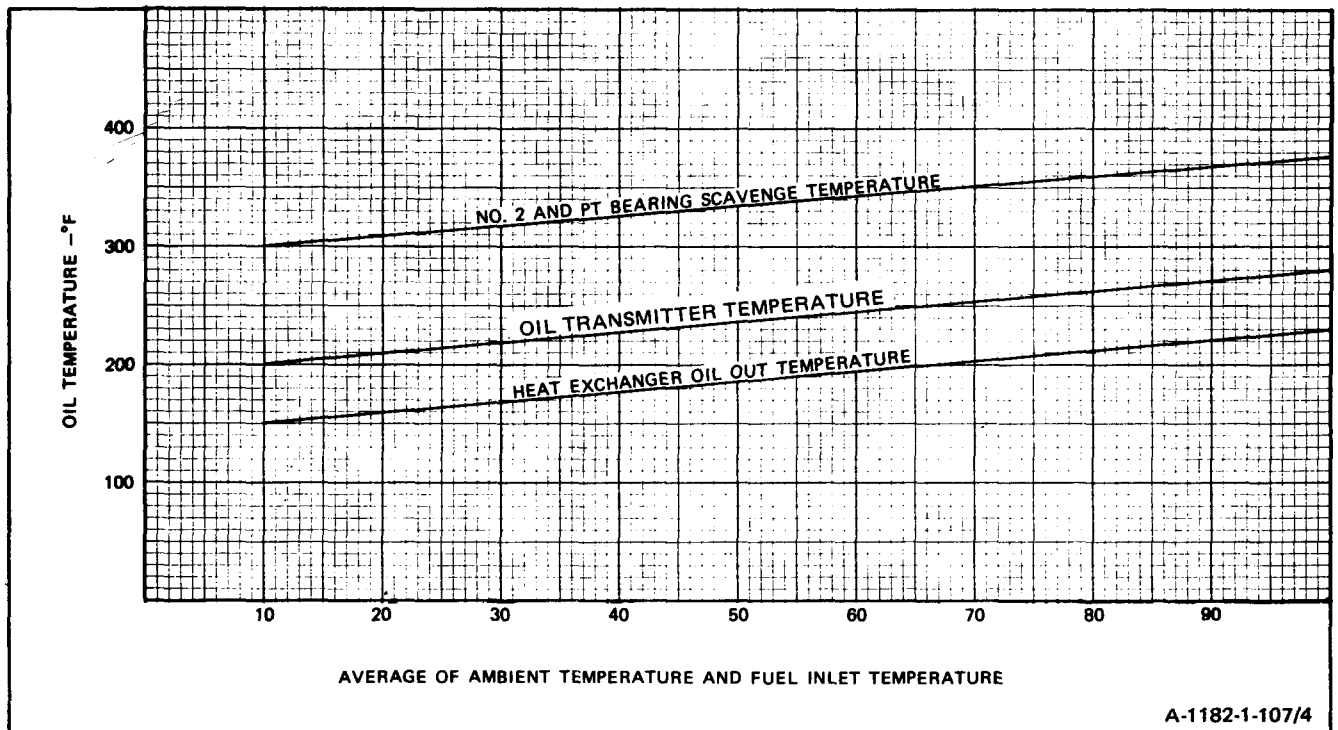


A-1182-1-107/3

Nominal Flight Idle (No Load) Gas Producer Speed and Acceleration Time Limits Versus Engine Inlet Temperature

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- b. Check that rear bearing oil feed pressure is 35 to 90 psig (reference).
- c. Check that scavenge oil temperatures are slowly increasing toward stabilization within limits given below.



Maximum Oil Temperature Limits Versus Average Fuel and Inlet Air Temperature

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1-107 TEST ENGINE (AVIM) (Continued)

1-107

- d. Check calibration of vibration meter and check for indications from all transducers; indications shall not exceed limits given below.

Position	Velocity (Inches/Second)
Water Brake*	0.94
Front Vertical	0.63
Rear Vertical	0.84
Axial	0.94
*For indication of water brake condition only. Do not reject engine if this position exceeds limit.	

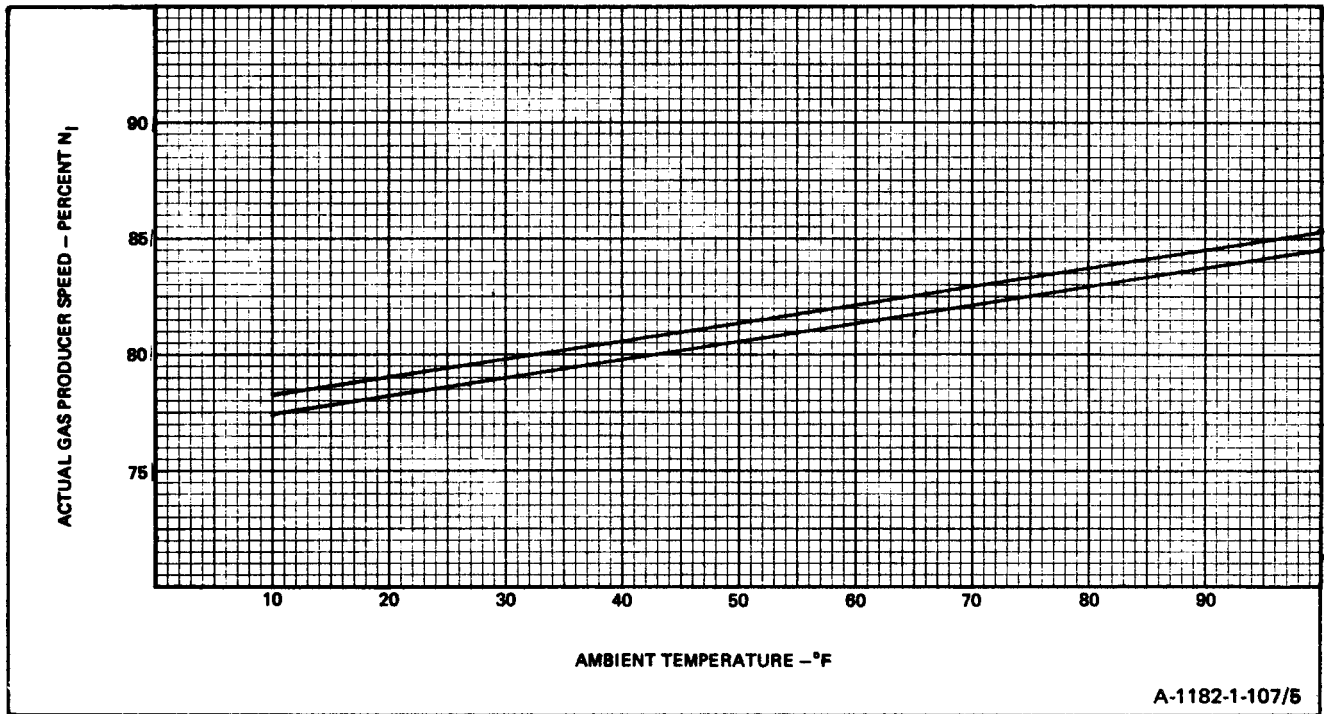
- e. Visually check engine for external leaks.
- f. Check all pressure and temperature indicators.
- g. If gearbox pressure is greater than 5 psig or if No. 2 bearing oil temperature indication is high, shut down engine (Ref. Paragraph 21) and check No. 2 bearing package for seal leakage (Ref. Task 1-87).
- h. Maintain speed for 2 minutes and take a short reading.
- i. Mark oil level on engine oil level indicator.
- j. Ensure N2 master hydronic control is advanced to maximum position before proceeding with test.

6. BLEED BAND CLOSURE CHECK**NOTE**

When bleed band closes, a distinctive change in engine pitch will be noted. Bleed band closure shall be gradual within 3 to 6 percent. To properly check bleed band operation, station helper at engine during following test to physically check for air movement past bleed band.

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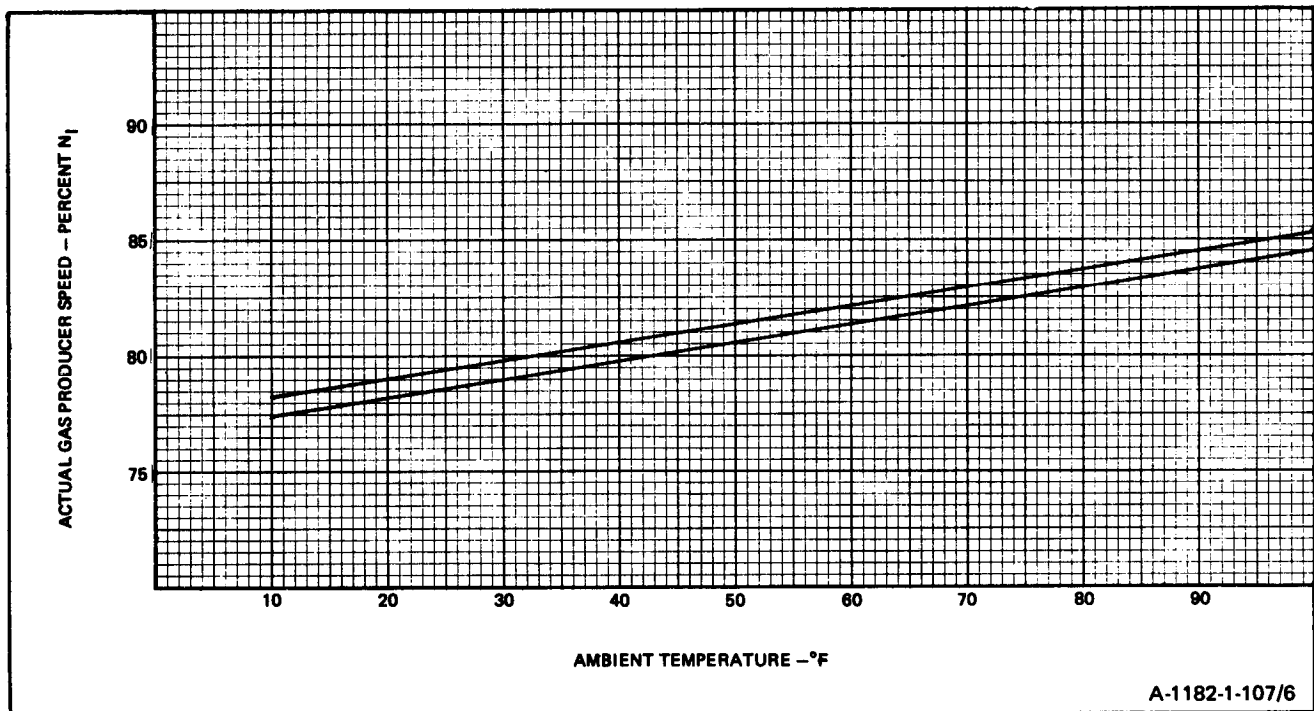
- a. Ensure N1 control is at flight idle, and slowly advance N1 master hydronic control until bleed band closes. Full closure shall be within limits given below.



Bleed Band Closure Limits Versus Ambient Temperature

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- b. Record N1 speed at point of bleed band closure.
- c. Set N2 speed at 91.5 to 92.5 percent.
- d. Record full reading just above bleed band closure.
- e. Full bleed band closure shall occur within limits given below.



Bleed Band Closure Limits Versus Ambient Temperature

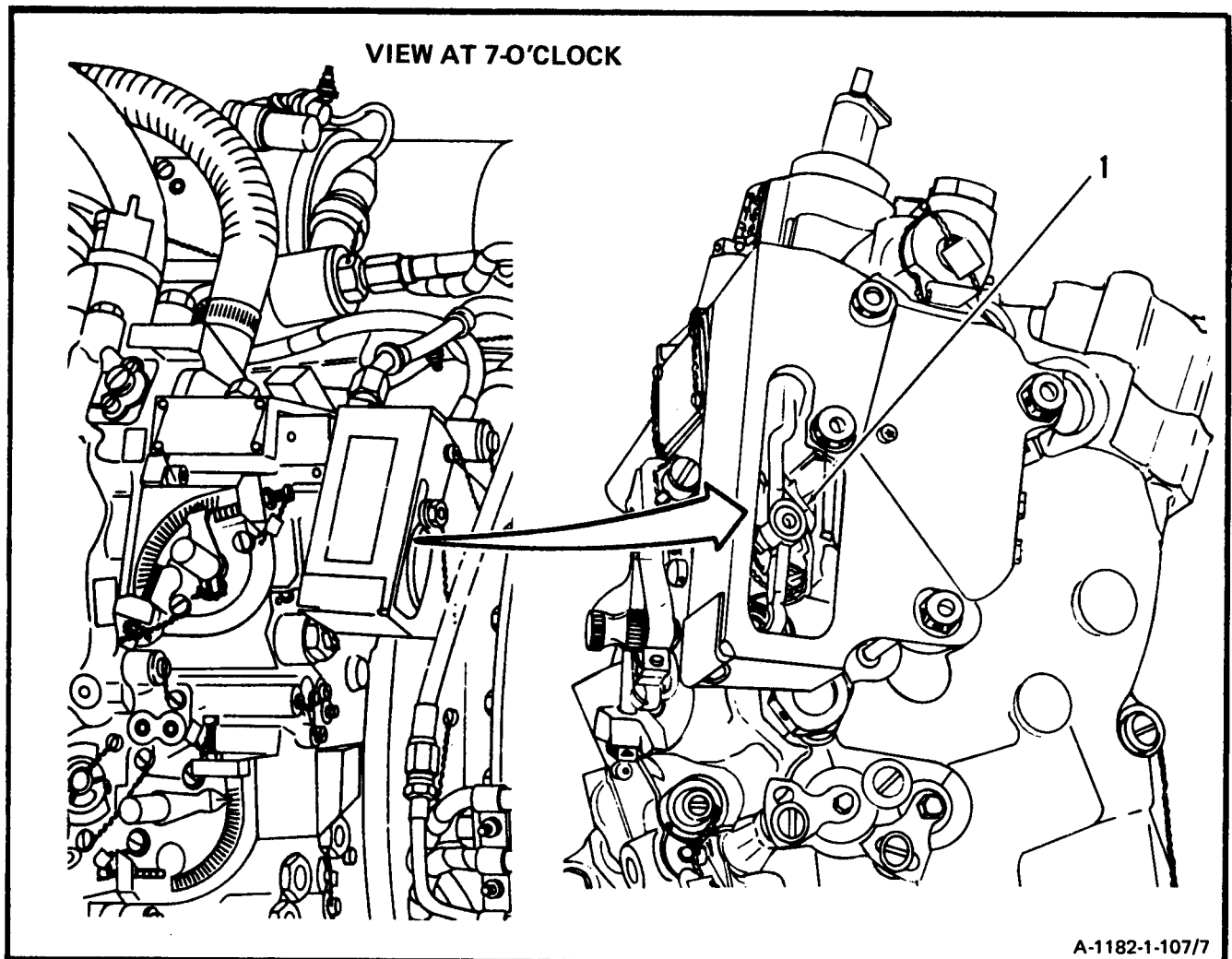
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Adjust compressor air-bleed speed adjustment screw (1) as required.

NOTE

One complete turn counterclockwise will increase N1 speed for full closure by 5 percent.

- f. Set ground idle and be certain bleed band is open. If bleed band is not open, it is necessary to retrim bleed band to upper closure limit or troubleshoot to determine cause. (Ref. Task 1-48).



Compressor Air-Bleed Speed Adjustment

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7. VIBRATION TEST

The engine test determines the vibration level of an engine through the range of N1 and N2 speeds. Vibration transducers, attached to adapters mounted on the engine and water brake, transmit electrical impulses to the vibration meter. The meter must indicate velocity in inches per second. Standard engine test procedures for overhauled or repaired engines require that the vibration meter needle stabilizes at one point on the scale before vibration readings are recorded.

- a. Because engine temperatures, including oil temperature, affect engine vibration, all temperatures must stabilize before engine vibration can stabilize. This may require at least 2 minutes of constantly maintained speed at each level of N1 and N2 speeds to be checked.

NOTE

In following step, if water brake vibration reading exceeds limits, replace water brake. Also, a high meter reading may indicate an intermittent problem in engine, a loose adapter or bracket, or a defective vibration meter or transducer. In any event, cause of a high vibration meter reading should be investigated and problem corrected.

Engine vibration shall be checked at the following conditions using a 200 Hz filter:

<u>N1 Speed in Percent</u>	<u>N1 Speed</u>
93	101.3 to 103.3
95	94.2 to 96.2

- b. In some cases the vibration meter needle tends to oscillate or fluctuate between two readings; if this happens, the average of the two readings should be recorded. In other cases where the needle may tend to stabilize at given readings, with short excursions into other values, the reading at which needle tends to stabilize is considered average and should be recorded. Meter readings shall be compared to the maximum allowable vibration limits given below.

Position	Velocity (Inches/Second)
Water Brake*	0.94
Front Vertical	0.63
Rear Vertical	0.84
Axial	0.94
*For indication of water brake condition only. Do not reject engine if this position exceeds limit.	

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1-107 TEST ENGINE (AVIM) (Continued)

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- c. If level of vibration varies with N2 speed, check power turbine assembly for damage and improper runouts and blade tip clearances. Replace or repair as necessary.
- d. If level of vibration varies with N1 speed, check gas producer and compressor sections for damage and improper runouts and blade tip clearances.
- e. If engine vibration exceeds limits after performing preceding steps c. and d., forward engine to a higher level of maintenance. Ensure that the completed vibration test data sheets are kept with engine records.

8. VIBRATION METER CHECK

Recheck adjustment of vibration meter after the vibration test.

CAUTION

To ensure accuracy of vibration test, adjust vibration meter using same power source that is to be used during vibration test. Inaccurate readings may result.

NOTE

Vibration meter must contain a 70 Hz high pass filter in INPUT socket 1 and a 200 Hz filter in INPUT socket 2; initial preparations of vibration meter may require installation of filters LTCT23842-01 and LTCT23843-01.

- a. If battery power supply LTCT22030-01 is used, proceed as follows:
 - (1) Set SELECTOR switch to OFF. Battery voltage is sufficient when meter reading on 0 to 5 scale is one volt or greater.
 - (2) Set SELECTOR switch to BATT. Any battery voltage must be one volt or greater.
- b. Check continuity of transducer circuits by placing RANGE switch to 500, setting SELECTOR switch to CONT., and depressing selected channels on CHANNEL SELECTOR. If circuit is satisfactory, meter will read within green zone. If channel is open, indicator will deflect full scale. When circuit is shorted, indication should zero.
- c. Set SELECTOR switch to CA LIB and adjust OSC LEVEL for full scale meter deflection.
- d. Set SELECTOR switch to SENS ADJ.
- e. Depress CHANNEL SELECTOR 1 and set SENSITIVITY control to 10.5 indication on 0 to 15 scale.

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1-107 TEST ENGINE (AVIM) (Continued)

1-107

- f. Adjust channel gain potentiometer (small setscrew immediately above CHANNEL SELECTOR) for channel 1 to obtain a full scale deflection indication.
- g. Repeat steps b. through e. for remaining channels 2 and 3.

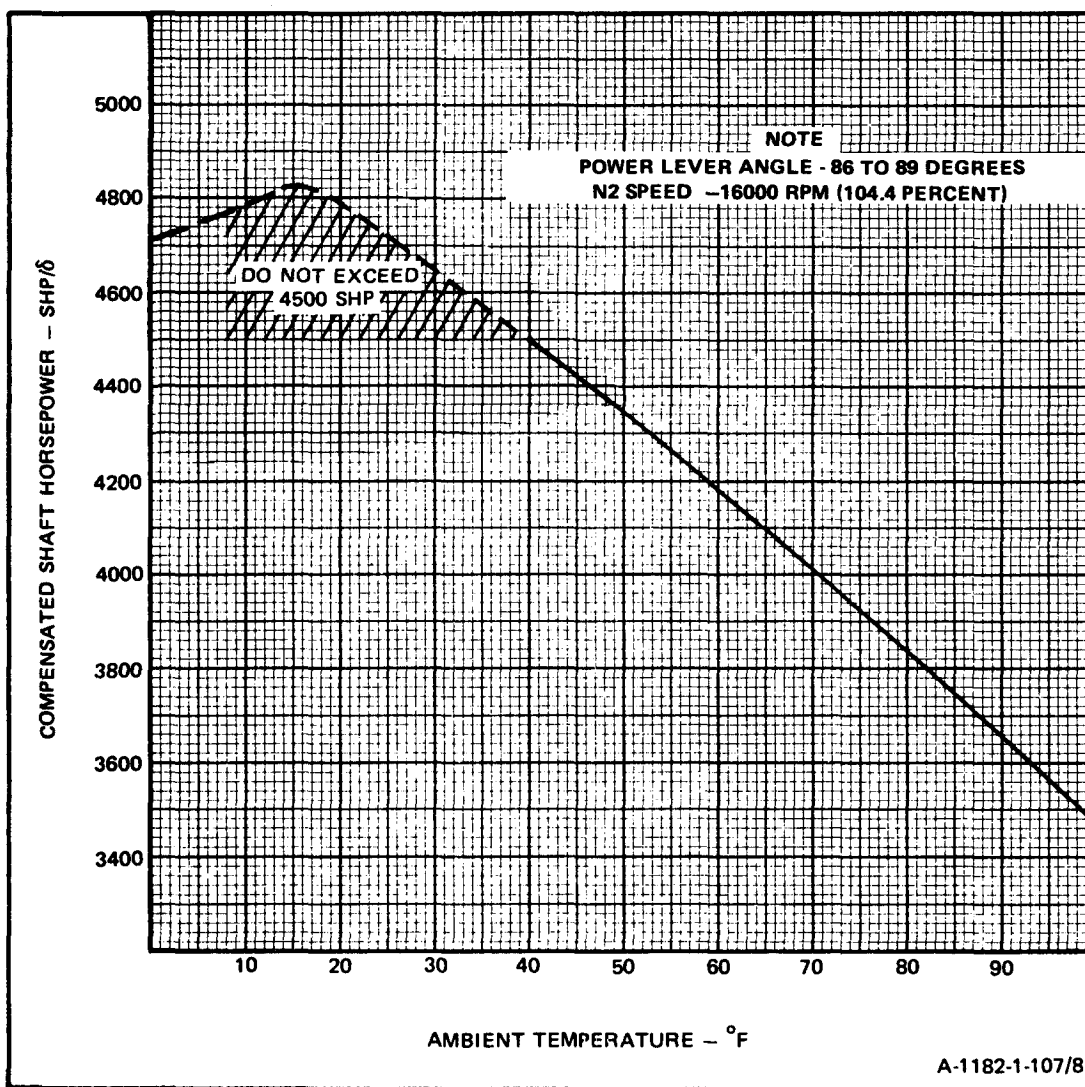
If check after testing discloses that adjustment of meter has changed more than 1/16 inch higher than the full scale readings, it must be assumed that some of the meter indications recorded during test were inaccurate. In this case, the entire vibration test must be conducted again. If defective transducers are suspected of producing incorrect meter indications, replace transducers and check their operation with a trial vibration test, conducted at only one combination of N1 and N2 speeds. If comparison with recorded indications on engine test log discloses a defective transducer, the entire test must be conducted again with transducers known to be good.

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9. ADJUST MAXIMUM TRIM

NOTE

Maximum Trim refers to power along curve shown below which defines setting of fuel control maximum trim. Maximum Trim will be higher than Maximum Power except at a temperature of 95° F (35° C) and above. Fuel flow, speed, and gas temperature limits shown for maximum power do not apply at maximum trim.



Maximum Trim Versus Ambient Temperature

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NOTE

In the following step, SHP required should be obtained from the preceding Maximum Trim Versus Ambient Temperature graph located at beginning of this paragraph.

- a. Using formula, Torque = $\frac{\text{(SHP Required} \times 411)}{104.4\% \text{ N2}}$, determine torque required.

NOTE

If N2 speed exceeds 104.4 percent at steady state or 109.6 percent transient, Ref. Task 1-72.

NOTE

During cold weather operation, if maximum trim power is limited by maximum torque, adjust trim.

- b. Calculate actual SHP

To determine actual SHP from test stand indications, multiply torque (expressed in pound-inches) by percent N2 speed, divided by 411. Obtain torque value used in this computation from water brake torque system. Example:

$$\text{Actual SHP} = \frac{\text{Torque (pound-inches)} \times \text{Percent N2 Speed}}{411}$$

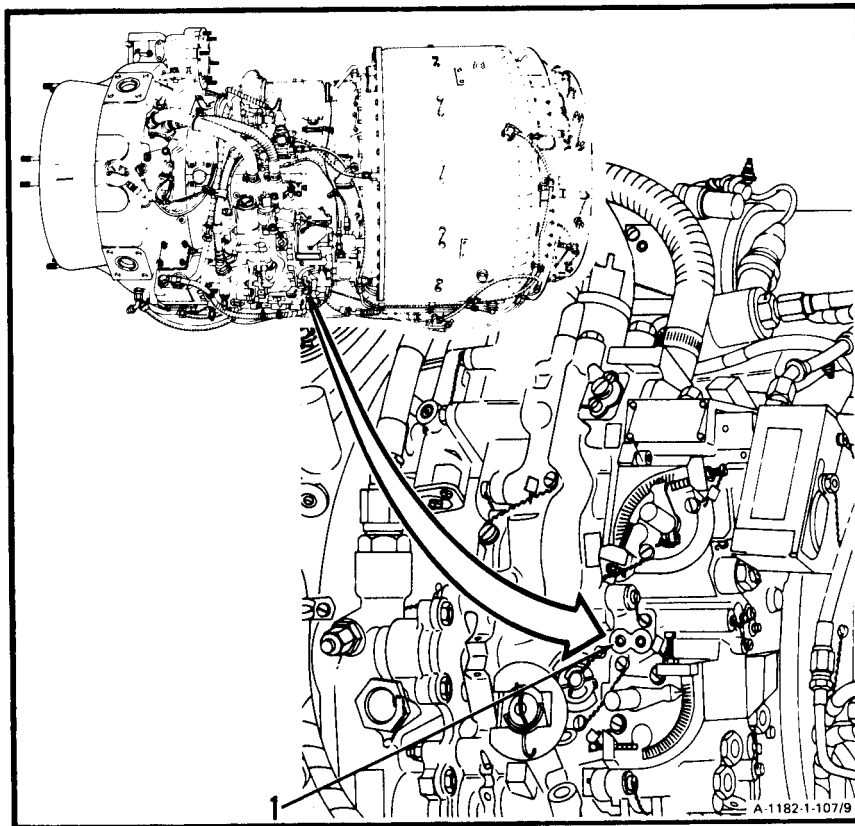
- c. Check that PTIT does not exceed 1630°F (889°C) at any time. If exceeded, Ref. Task 1-32 and 1-93. PTIT along this line should normally exceed 1600°F (871°C).
- d. Advance N1 master hydronic control until torque required in preceding step a. is obtained. Check that N1 speed does not exceed 10zrcent. If exceeded determine cause (Ref, Task 1-71).
- e. Adjust fuel control maximum power trim, as required, to produce shaft horsepower of + 50/-0 SHP at the throttle stop. Record a full reading.
- f. If necessary, increase N2 governor lever travel to obtain 104.4 percent N2 speed. Record adjustment made and tag fuel control.

NOTE

In following step, for purposes of setting maximum power trim speed screw, it is permissible to operate engine up to, but not in excess of, 4500 compensated S H P.

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- g. If maximum power trim cannot be set because required power is in excess of 4500 compensated SHP, proceed as follows:
- (1) Adjust fuel control maximum trim so that engine produces not more than 4500 SHP nor less than 4300 SHP. Record actual power after a 2 minute stabilization period.
 - (2) Remove maximum power trim stop 2-161-201-02 and replace with cold weather trim tool LTCT5985-01, T67.
 - (3) With power lever against cold weather trim tool, run engine for 2 minutes for stabilization; then record shaft horsepower and N1 speed.



Fuel Control Maximum Power Trim Speed Adjustment

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1-107 TEST ENGINE (AVIM) (Continued)

1-107

- (4) Subtract shaft horsepower and N1 speed determined in preceding step (3) from power determined in preceding step (1). Result is Δ shaft horsepower and Δ N1 speed.
- (5) Subtract Δ shaft horsepower from power for existing ambient temperature corrected by barometric correction factor.
- (6) With power lever against cold weather trim tool turn fuel control maximum power trim speed adjustment screw (1) until SHP determined in preceding step (5), + 50/ -0 SHP is obtained.
- (7) If preceding steps (1) through (6) were necessary to set maximum power trim, do not remove cold weather trim tool until accelerations are completed.

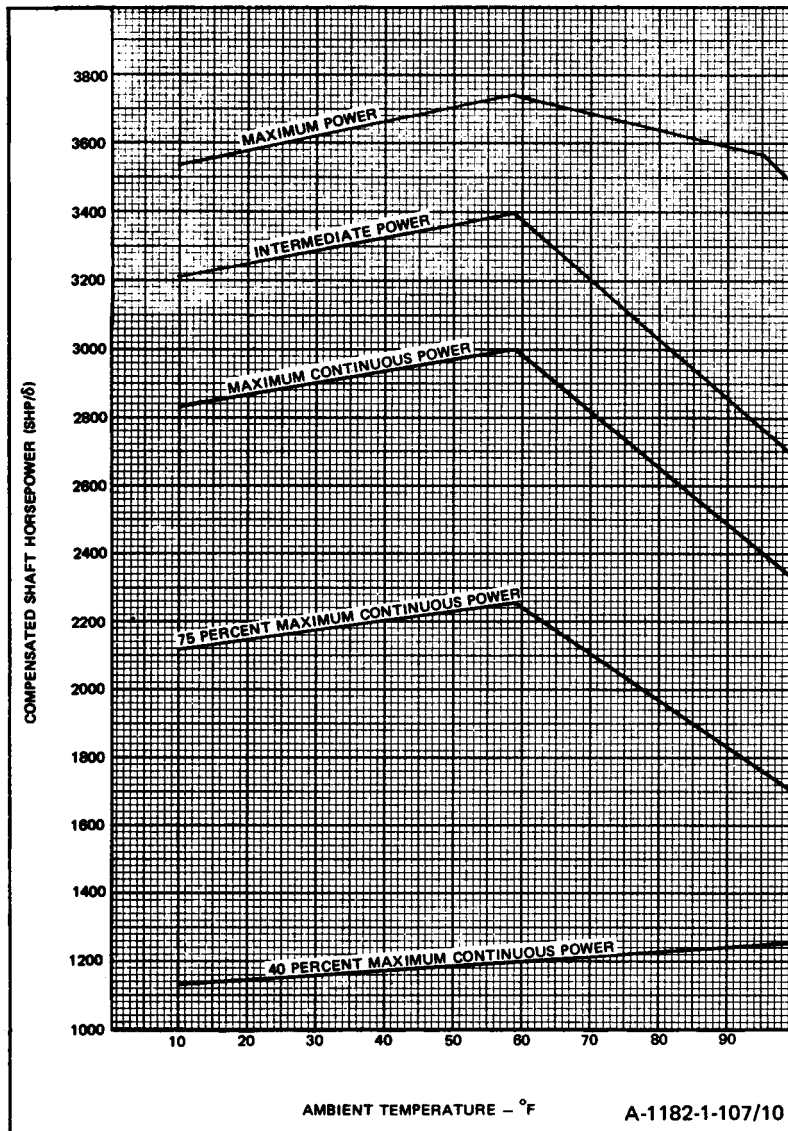
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10. ADJUST MAXIMUM POWER

NOTE

The term Maximum Power will refer to points on maximum power line shown below which are used to demonstrate thermodynamic performance of engine.

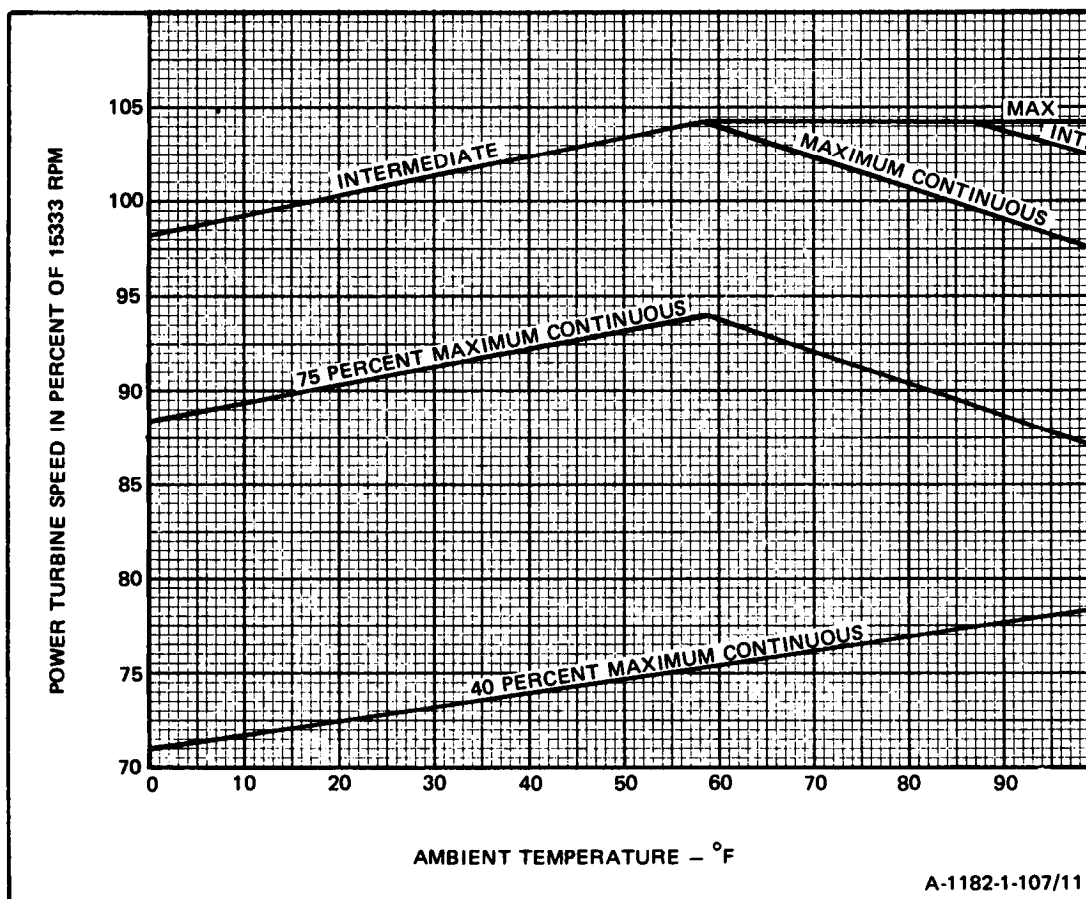
- a. Determine compensated shaft horsepower required for ambient temperature from graph below.



Maximum Compensated SHP Versus Ambient Temperature

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b. Determine N2 speed required for ambient temperature from graph below.



NOTE

If N2 speed exceeds 104.4 percent at steady state or 109.6 percent transient, Ref. Task 1-72.

Guide to N2 Speed Selection Versus Ambient Temperature

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NOTE

In the following step, SHP required and % N2 were determined in previous steps a. and b.

c. Using formula, Torque = $\frac{\text{SHP Required} \times 411}{\% \text{N2}}$, determine torque required.

d. Advance N1 master hydronic control until torque required in preceding step c. is obtained at the speed determined in preceding step b.

e. Adjust oil pressure as required (Ref. Task 1-110).

NOTE

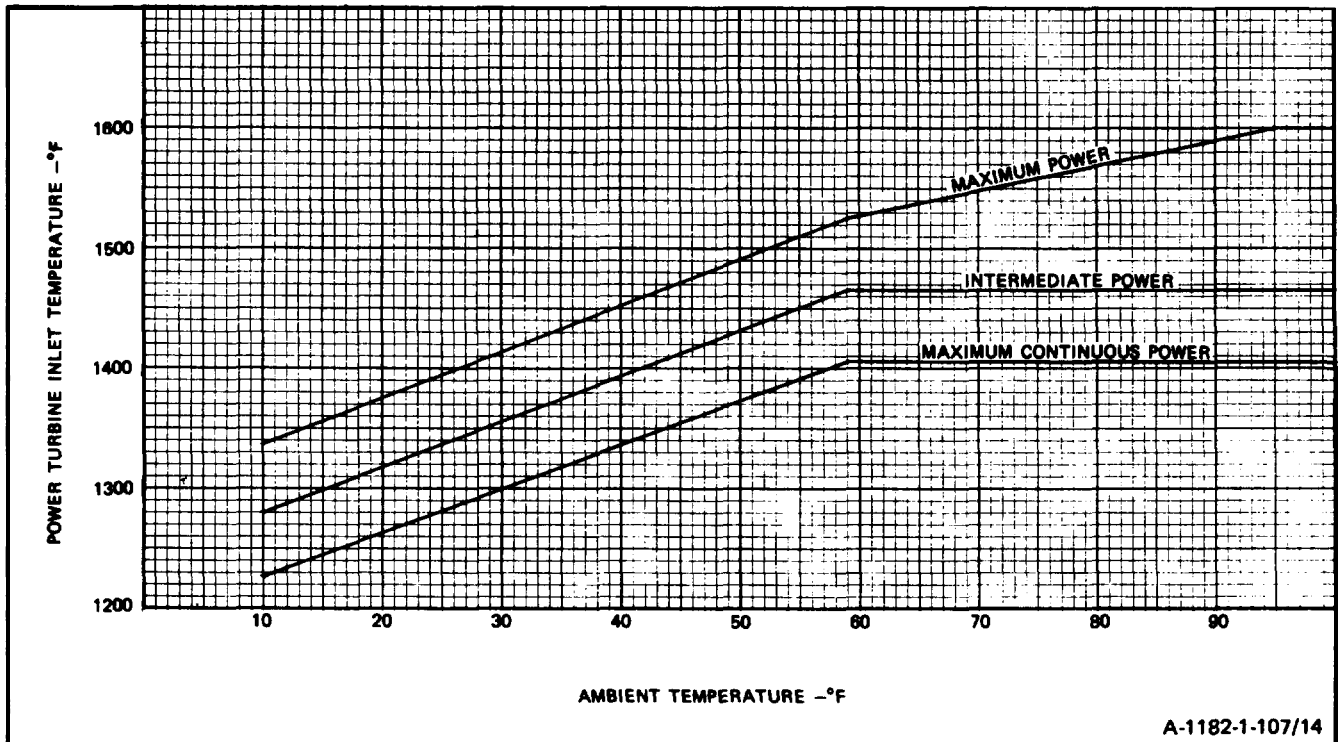
Oil pressure should be 50 to 90 psig at 80% N1 speed and above 35 psig minimum at 70 to 80% N1 and 20 psig minimum at ground idle speed.

f. Deleted.

GO TO NEXT PAGE

All data on page 1-484, including graph, is deleted.

j. Determine maximum PTIT allowed for ambient temperature using graph below.



k. Compare actual Wf and PTIT to maximum allowable Wf and PTIT. Record results.

l. Adjust engine torquemeter system as follows:

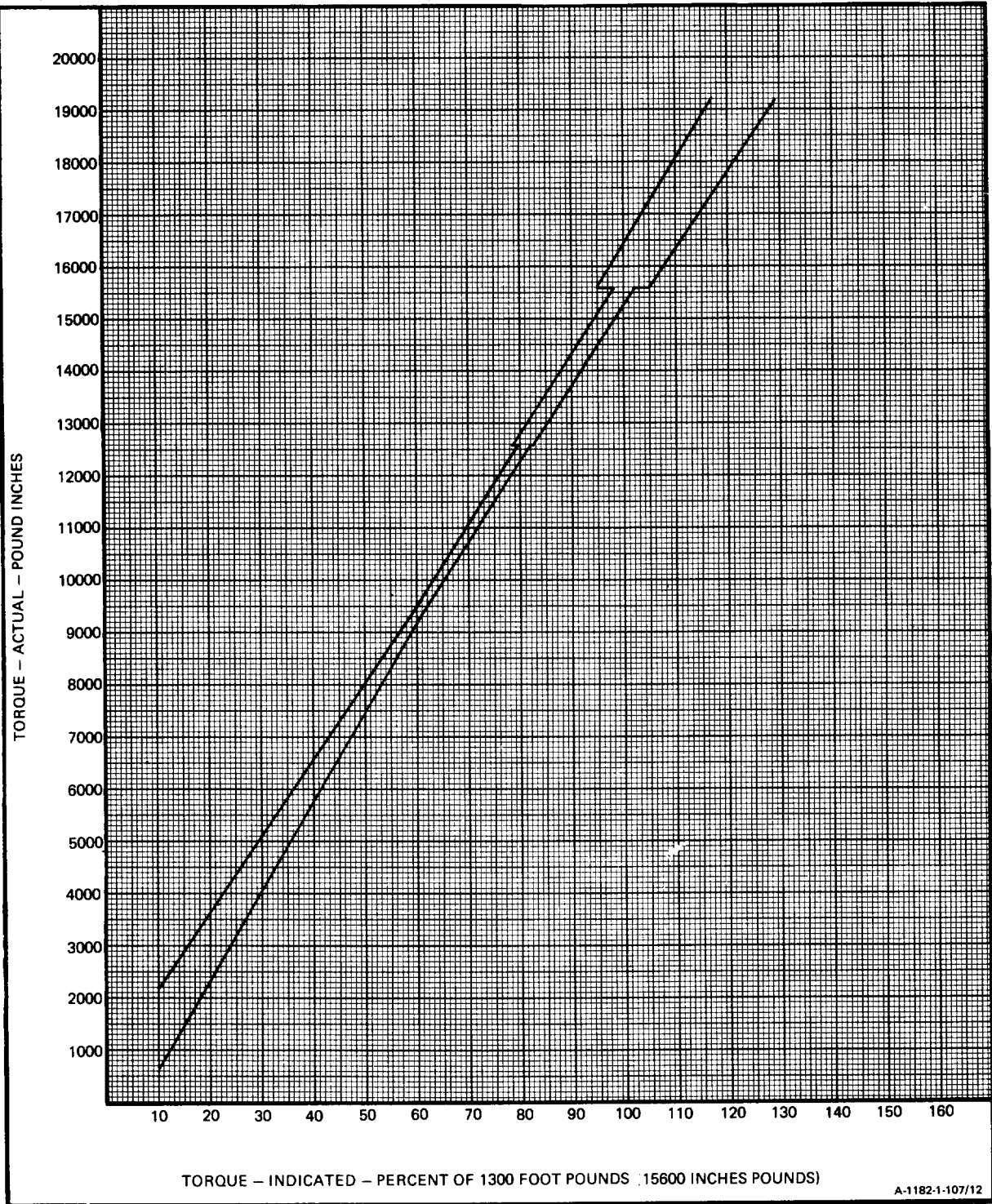
- (1) Reset power turbine master hydronic control to its maximum position.
- (2) Operate engine at ground idle, flight idle, 75 percent maximum continuous power, and maximum power.
- (3) Plot torque on curve of output shaft torque limits at each power setting obtained in step (2).

NOTE

BAL screw shifts slope of curve right or left. SENS screw changes angle of slope.

- (4) If torque does not fall within curve of following graph adjust engine torquemeter junction box BAL and SENS screws as required.

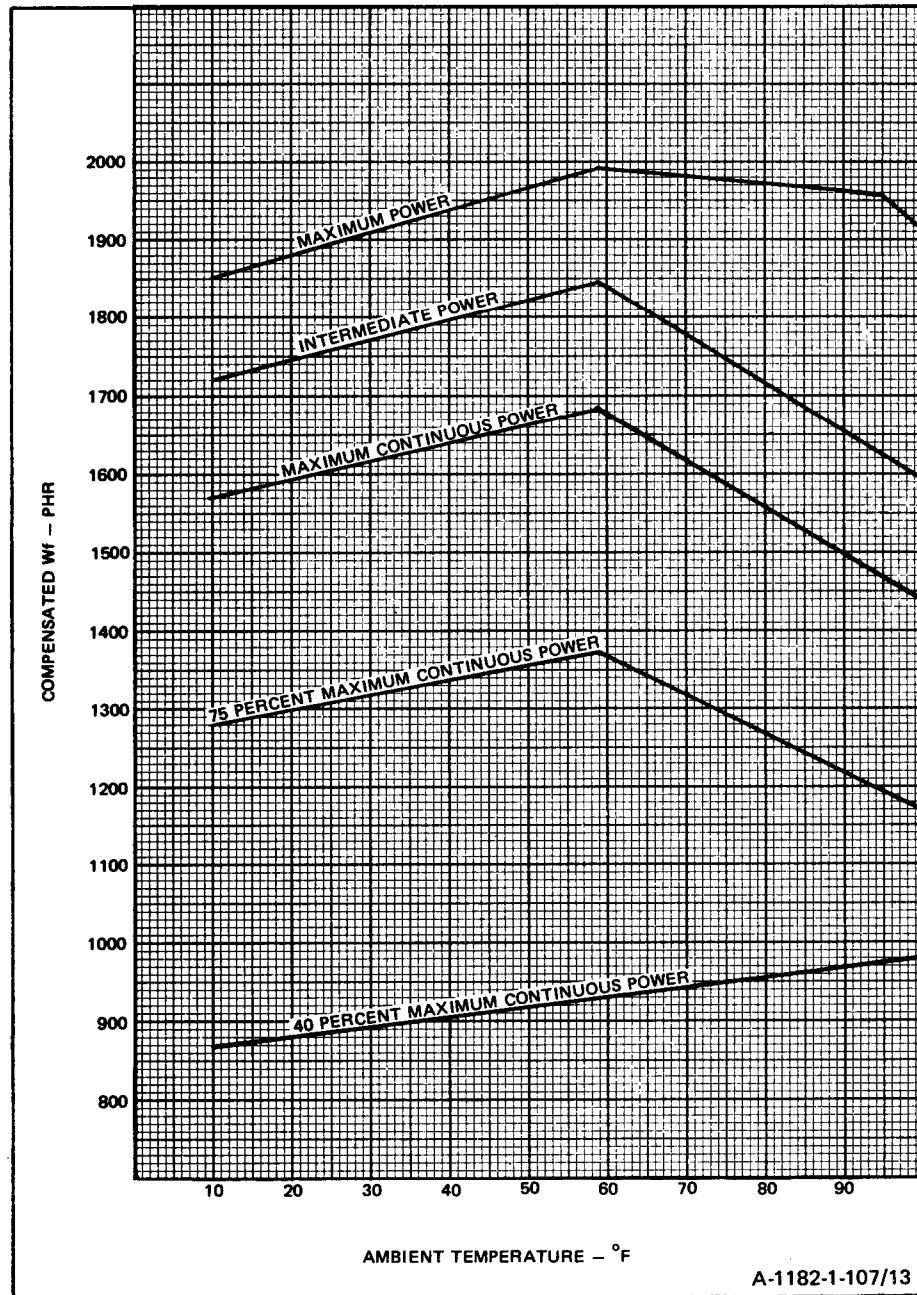
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Output Shaft Torque Limits

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- g. Run engine at maximum power for 5 minutes. Take a full reading.
- h. Determine maximum Wf allowed for ambient temperature using graph below.



Maximum Compensated Wf Versus Ambient Temperature

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i. Calculate maximum actual Wf permitted at maximum power. Required actual Wf is determined by using graph below at existing ambient (compressor inlet) temperatures.

To determine maximum actual Wf permitted, multiply compensated Wf (determined in step h.) by compensating factor(δ) given below.

NOTE

Compensating factors vary with barometric pressure.

Actual AHP = Compensated SHP x		Actual Wf = Compensated Wf x	
Corrected Barometer	Compensating Factor (δ)	Corrected Barometer	Compensating Factor (δ)
28.50	0.9525	29.90	0.9993
28.60	0.9559	29.92	1.000
28.70	0.9592	30.00	1.003
28.80	0.9626	30.10	1.006
28.90	0.9659	30.20	1.009
29.00	0.9693	30.30	1.013
29.10	0.9726	30.40	1.016
29.20	0.9759	30.50	1.019
29.30	0.9793	30.60	1.023
29.40	0.9826	30.70	1.026
29.50	0.9860	30.80	1.029
29.60	0.9893	30.90	1.033
29.70	0.9926	31.00	1.036
29.80	0.9960		

Record actual Wf and ensure that it does not exceed maximum actual Wf permitted.

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1-107 TEST ENGINE (AVIM) (Continued)

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- (5) Repeat preceding steps (2) through (4), as necessary, to bring torque within band of graph.
- (6) After adjustments have been made, paint BAL and SENS screws of torque meter junction box with gray enamel (E22); then install box cover and lockwire cover attaching screws. Use lockwire (E28) Install anti-tampering lead seal.

NOTE

Engine stability at all recorded points should be within plus or minus one percent of maximum power for ambient temperature recorded during test.

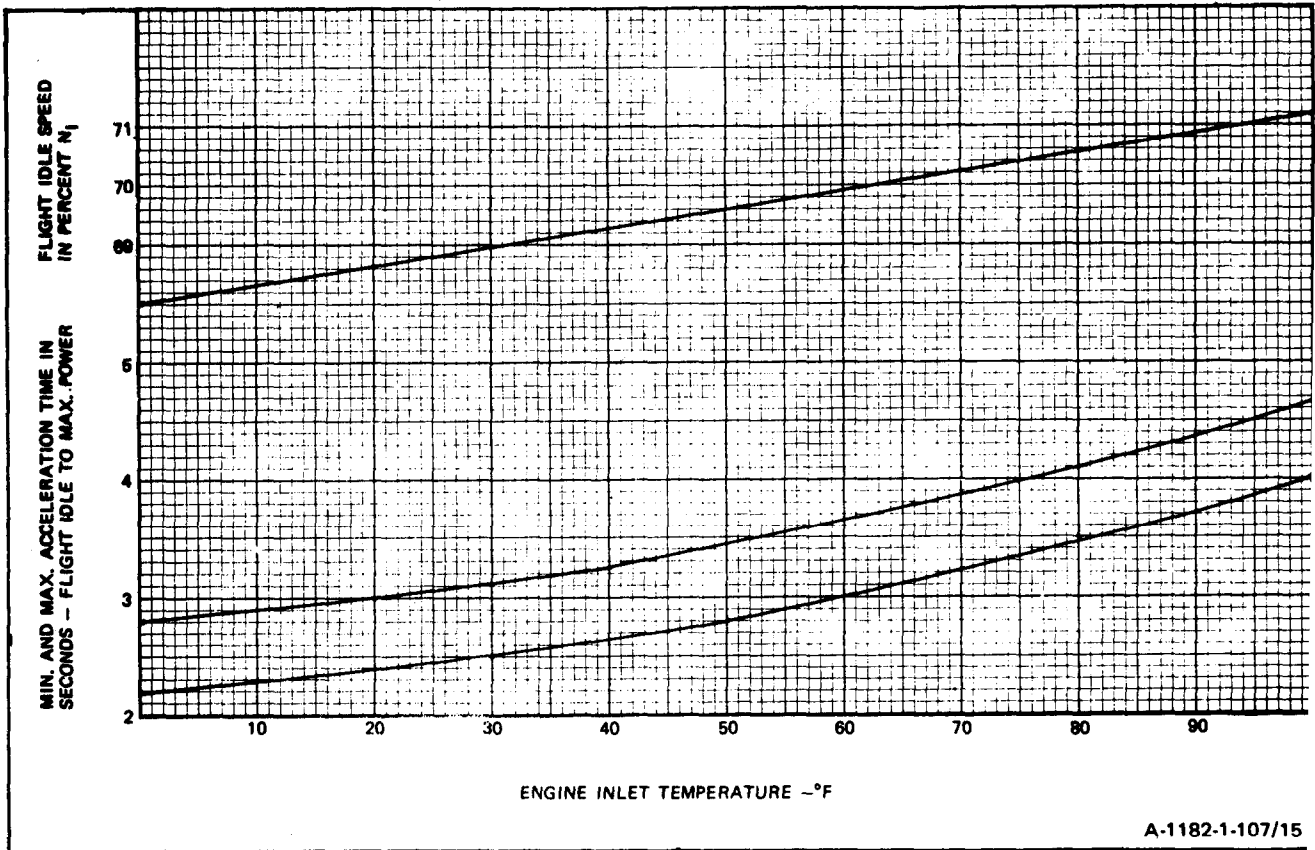
11. GROUND IDLE TRIM CHECK

- a. Without changing water in master hydronic control position, retard N1 master hydronic control to ground idle (10 to 15 degrees) (60 to 63 percent N1).
- b. Check ground idle trim and adjust if required (Ref. Task 1-108).
- c. Record a full reading.

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12. FLIGHT IDLE CHECK

- a. Select N1 speed for flight idle from graph below; then slowly advance N1 master hydronic control to flight idle speed determined.
- b. Maintain speed for 2 minutes. After 2 minutes have elapsed, take a short reading.



A-1182-1-107/15

Nominal Flight Idle (No Load) Gas Producer Speed and Acceleration Time Limits Versus Engine Inlet Temperature

13. ACCELERATION CHECKS

NOTE

Maximum power trim stop 2-161-201-02 or cold weather trim tool LTCT5985 must be in place to limit power lever travel to maximum power flat spot.

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NOTE

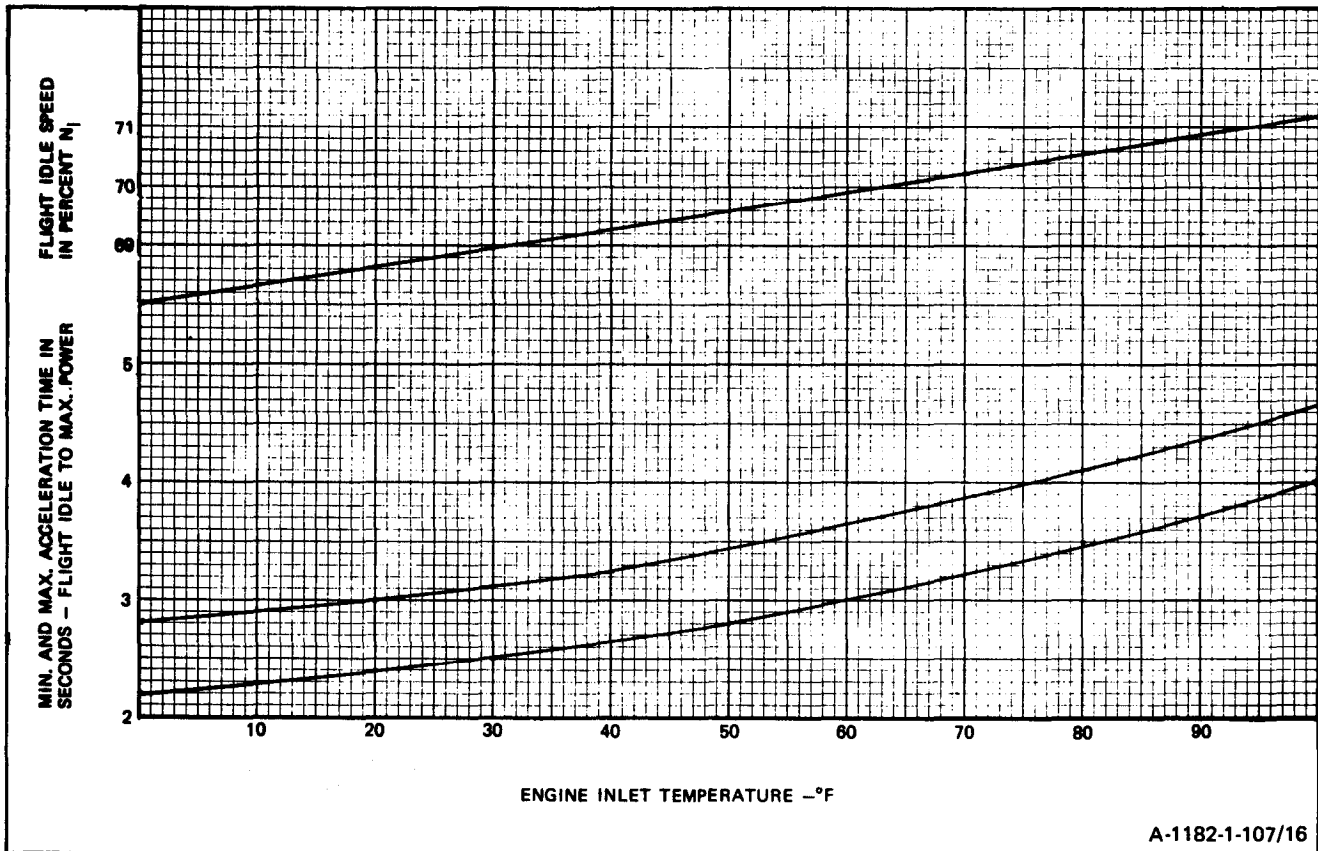
If surge occurs, immediately retard N1 master hydronic control as required to get out of surge. Using special screwdriver (T33), reset fuel control acceleration schedule three clicks for 0.1 second change (clockwise - increase; counterclockwise - decrease) as required by amount of surge. Repeat accelerations. Combustor static pressure may be calibrated at steady state to indicate completion of acceleration. To determine percent N1 speeds required for accelerations as stated above, use the following calculations as a guide.

CALCULATIONS:

3750 (SHP accelerations are timed to)	=	99.0 percent N1 speed
Subtract Ground Idle Speed	=	63.0 percent N1 speed
Result	=	36.0 percent N1 speed
Multiply result by percent		
of Power	=	0.95 percent of power
Result	=	34.2 percent N1 speed
Add original Ground Idle speed		
to Result	=	63.0 percent N1 speed
Result is percent N1 speed		
to be obtained at 95 percent		
power change	=	97.2 percent N1 speed

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- a. Simultaneously jam N1 master hydronic control from flight idle to hydronic control position determined in the preceding NOTE, and depress timer start switch. Hydronic control movements shall be accomplished in 0.5 second or less.
- b. At the point where engine reaches desired SHP, stop timer. Record acceleration time and maximum power turbine inlet temperature. Acceleration time shall be within limits given in graph below.

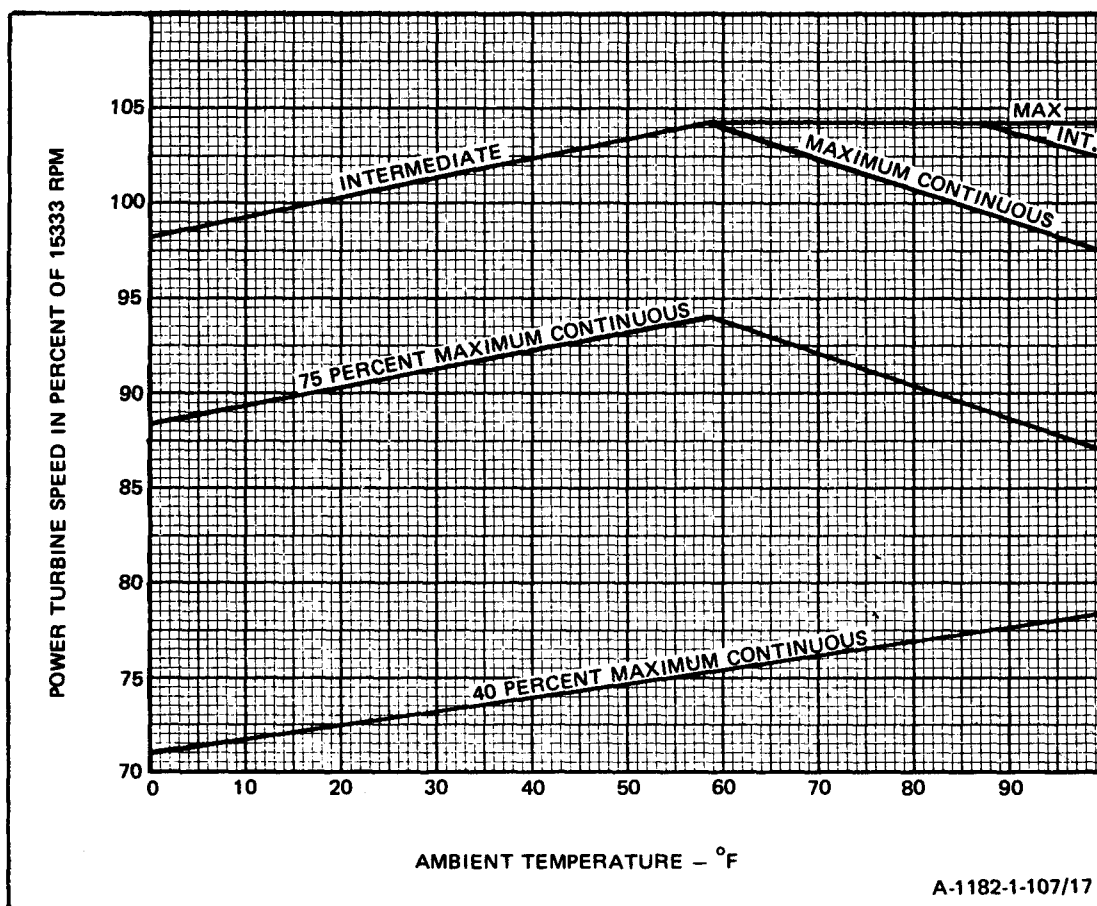


A-1182-1-107/16

Nominal Flight Idle (No Load) Gas Producer Speed and Acceleration Time Limits Versus Engine Inlet Temperature

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- c. Retard N1 master hydronic control to ground idle (10 to 15 degrees) and allow engine temperatures and speed to stabilize.
- d. Advance N1 and N2 master hydronic controls to maximum power setting determined in graph below. Run engine at maximum power for 2-1/2 minutes; then record a short reading.



Guide to N2 Speed Selection Versus Ambient Temperature

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1-107 TEST ENGINE (AVIM) (Continued)

1-107

- e. Snap N1 master hydronic control to flight idle and open customer air-bleed port. Time for deceleration shall not exceed 6 seconds. Record time,
- f. Retard N1 master hydronic control to ground idle (10 to 15 degrees) and close customer air-bleed port. Run engine at ground idle for 2-1/2 minutes; then record a full reading.
- g. Check accelerations to maximum power as specified in preceding step a., using criteria specified in NOTE preceding step a.
- h. Repeat steps f. and g. Record snap deceleration time from maximum power to ground idle; time shall not exceed 8 seconds.
- i. Advance N1 master hydronic control to flight idle and open customer air-bleed port,
- j. Advance N1 master hydronic control to PTIT obtained during preceding maximum power check (step d.).

NOTE

Bleed band must remain closed during one minute operation at this setting.

- k. Retard N1 master hydronic control to flight idle and close customer air-bleed port.

14. WAVEOFF CHECK

- a. Run engine at maximum trim throttle position for 2 minutes.
- b. Perform a series of waveoffs in rapid succession from 90, 85, 80, 75, and 70 percent N1 speeds.

NOTE

To perform waveoffs, snap N1 master hydronic control lever from maximum trim power position to allow N1 speed to decelerate; then return hydronic control lever to maximum trim power position for each of the speeds specified above.

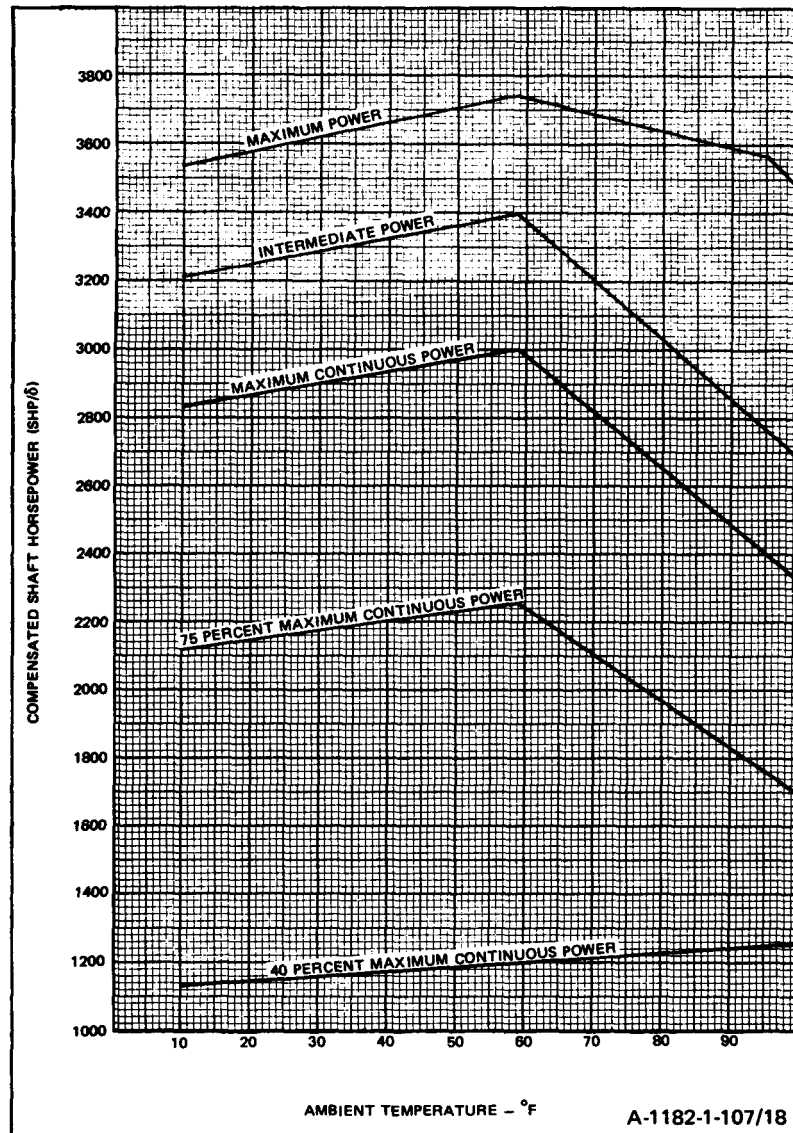
Waveoffs shall be surge free.

- (1) N1 master hydronic control lever movement in either direction shall be accomplished in not more than 0.5 second.
- (2) Bleed band should open on snap deceleration and on jam to maximum trim power.

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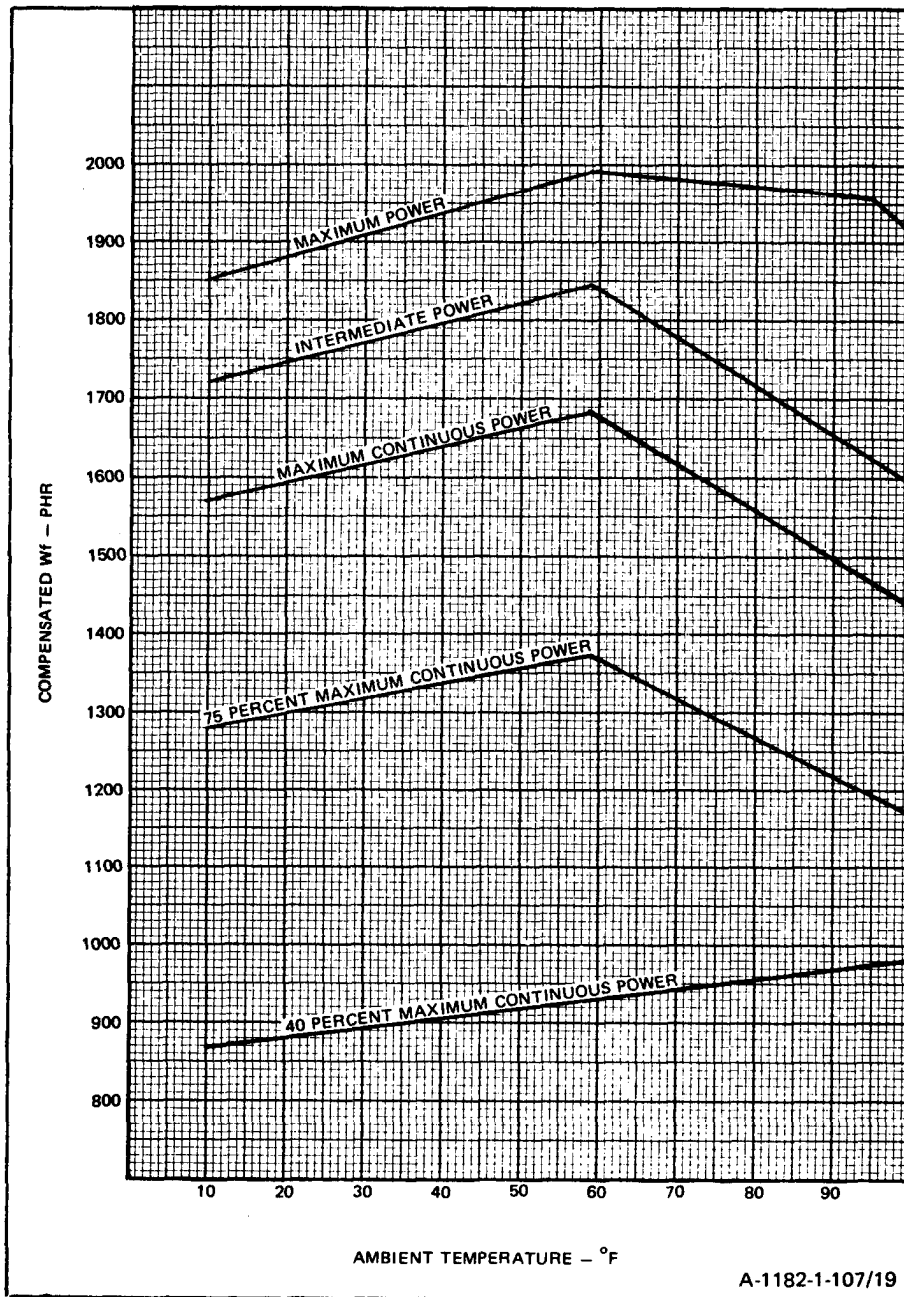
15. SEVENTY-FIVE PERCENT MAXIMUM CONTINUOUS POWER CHECK

- a. Calculate actual maximum Wf and actual minimum SHP required at 75 percent maximum continuous power. Required actual SHP and Wf are determined by using the following graphs at existing ambient (compressor inlet) temperatures.



Maximum Compensated SHP Versus Ambient Temperature

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Maximum Compensated Wf Versus Ambient Temperature

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1-107 TEST ENGINE (AVIM) (Continued)

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To determine actual SHP required, or maximum actual Wf permitted, multiply compensated SHP or compensated Wf by compensating factor (δ) given below.

NOTE

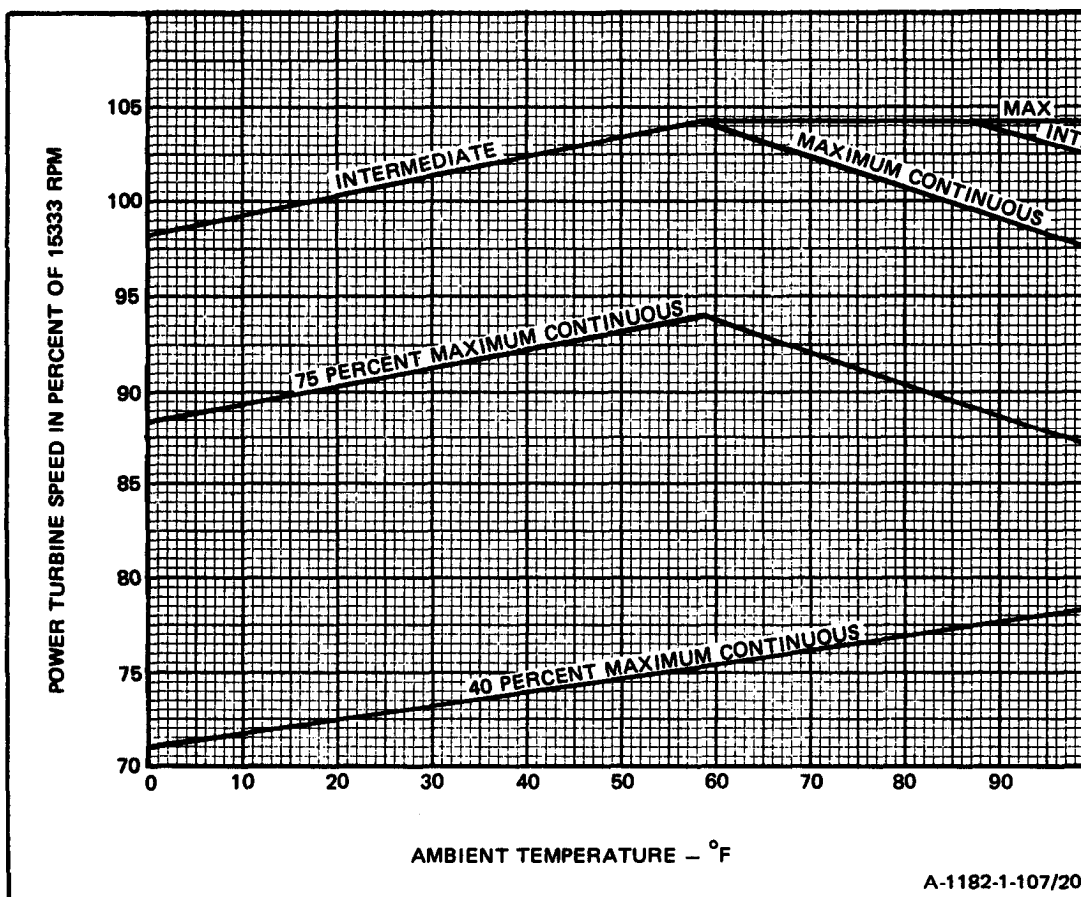
Compensating factors vary with barometric pressure. Compensated SHP and compensated Wf were determined in step a.

Actual SHP = Compensated SHP x		Actual Wf = Compensated Wf x	
Corrected Barometer	Compensating Factor (δ)	Corrected Barometer	Compensating Factor (δ)
28.50	0.9525	29.90	0.9993
28.60	0.9559	29.92	1.000
28.70	0.9592	30.00	1.003
28.80	0.9626	30.10	1.006
28.90	0.9659	30.20	1.009
29.00	0.9693	30.30	1.013
29.10	0.9726	30.40	1.016
29.20	0.9759	30.50	1.019
29.30	0.9793	30.60	1.023
29.40	0.9826	30.70	1.026
29.50	0.9860	30.80	1.029
29.60	0.9893	30.90	1.033
29.70	0.9926	31.00	1.036
29.80	0.9960		

Record results obtained.

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b. Determine N2 speed required for ambient temperature from graph below.



Guide to N2 Speed Selection Versus Ambient Temperature

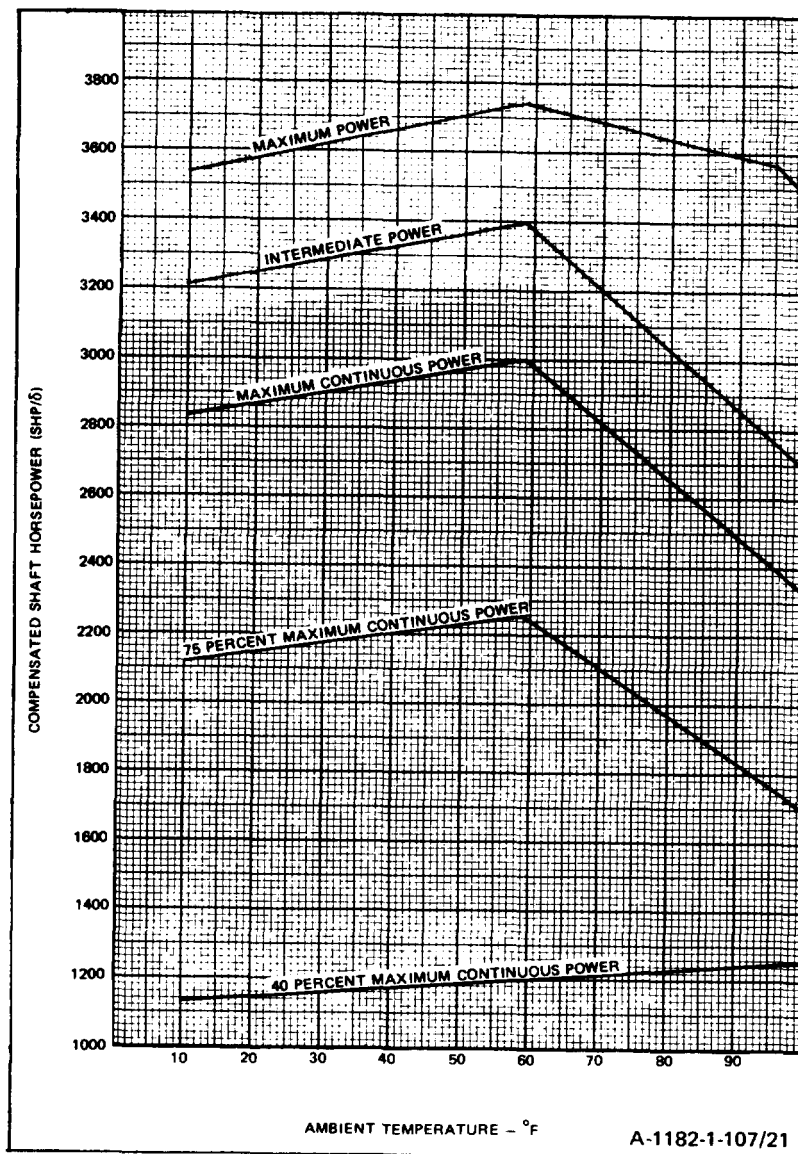
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16. MAXIMUM CONTINUOUS POWER CHECK

- a. Calculate actual maximum Wf and actual minimum SHP required at maximum continuous power, Required actual SHP and Wf are determined by using the following graphs at existing ambient (compressor inlet) temperatures.

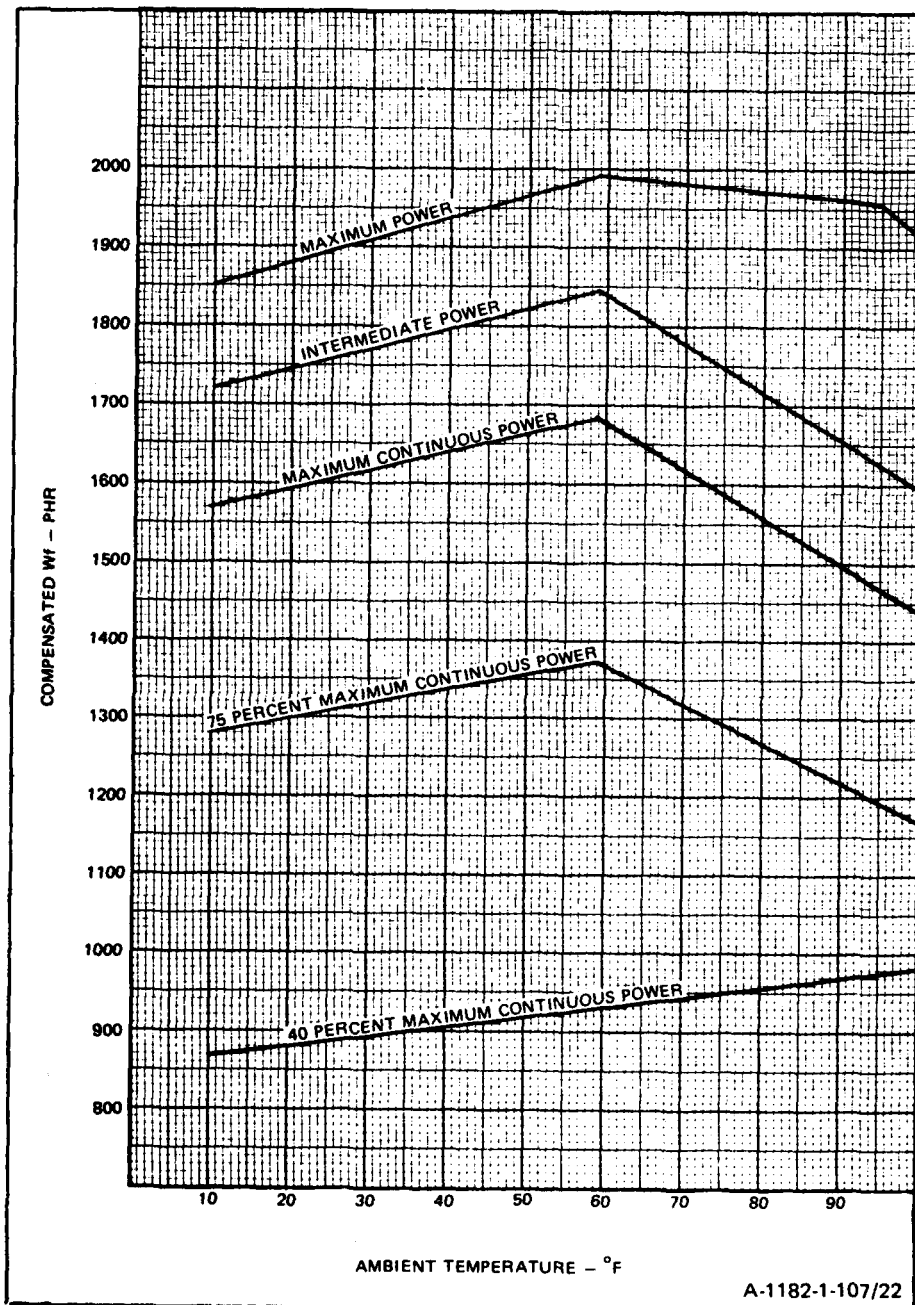
NOTE

Do not exceed maximum PTIT allowed at ambient temperature determined from graph in previous step 10.j.



Maximum Compensated SHP Versus Ambient Temperature

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Maximum Compensated Wf Versus Ambient Temperature

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1-107 TEST ENGINE (AVIM) (Continued)

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To determine actual SHP required, or maximum actual Wf permitted, multiply compensated SHP or compensated Wf by compensating factor (δ) given below.

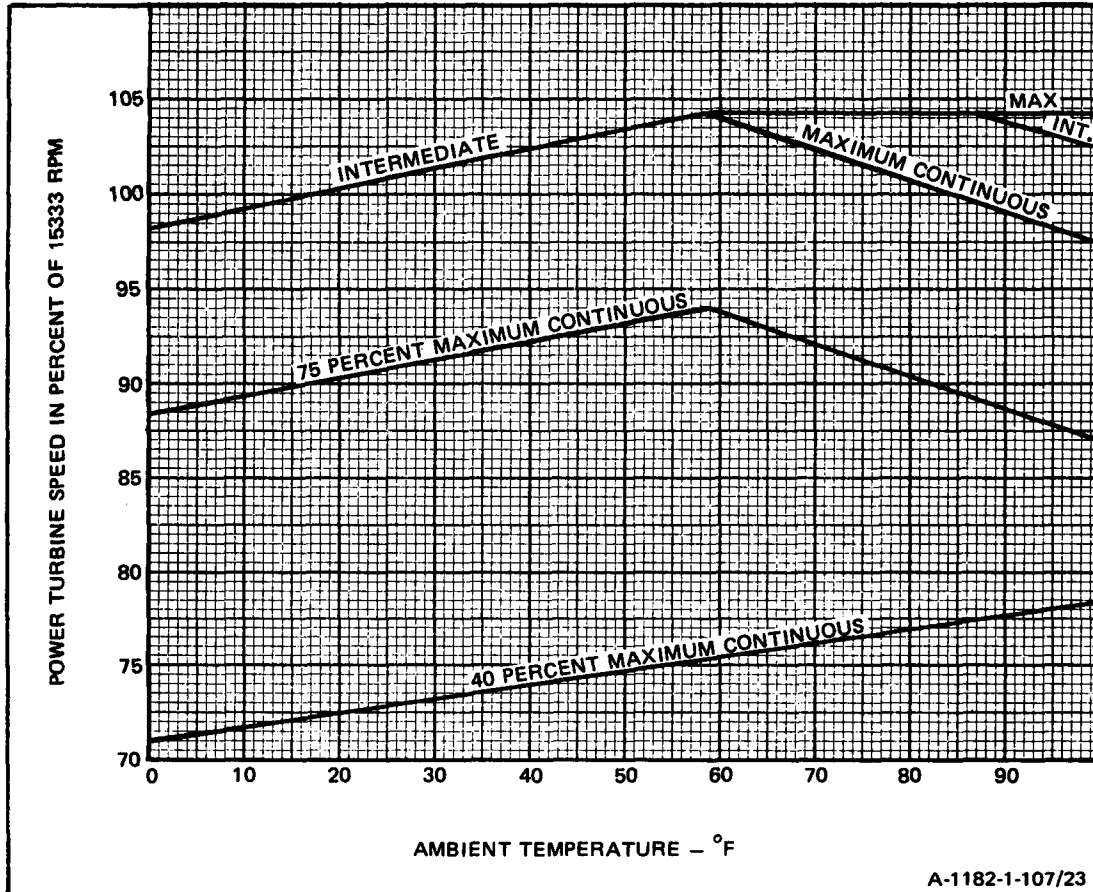
NOTE

Compensating factors vary with barometric pressure. Compensated SHP and compensated Wf were determined in step. a.

Actual SHP = Compensated SHP x		Actual Wf = Compensated Wf x	
Corrected Barometer	Compensating Factor (δ)	Corrected Barometer	Compensating Factor (δ)
28.50	0.9525	29.90	0.9993
28.60	0.9559	29.92	1.000
28.70	0.9592	30.00	1.003
28.80	0.9626	30.10	1.006
28.90	0.9659	30.20	1.009
29.00	0.9693	30.30	1.013
29.10	0.9726	30.40	1.016
29.20	0.9759	30.50	1.019
29.30	0.9793	30.60	1.023
29.40	0.9826	30.70	1.026
29.50	0.9860	30.80	1.029
29.60	0.9893	30.90	1.033
29.70	0.9926	31.00	1.036
29.80	0.9960		

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b. Determine N2 speed required for ambient temperature from graph below.



NOTE

If N2 speed exceeds 104.4 percent at steady state or 109.6 percent transient, Ref. Task 1-72.

Guide to N2 Speed Selection Versus Ambient Temperature

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NOTE

In the following step, SHIP required and % N2 were determined in previous steps a. and b.

- c. Using formula, Torque = $\frac{\text{SHIP required} \times 411}{\% \text{ N2}}$, determine torque required.
- d. Advance N1 master hydronic control until torque determined in preceding step c. is obtained.
- e. Using water in master hydronic control, adjust load on engine until required N2 speed (step b.) is obtained.
- f. Maintain maximum continuous power for 10 minutes. After 5 minutes have elapsed, take a full reading.
- g. Compare SHP and Wf recorded in step f. with SHP and Wf calculated in step a.

NOTE

Actual SHP recorded in step f. shall compare with SHP calculated in step a. within +50/ -0 SHP. Wf recorded in step f. shall not exceed Wf calculated in step a.

- h. Retard N1 master hydronic control to ground idle (10 to 15 degrees).
- i. Allow temperatures to stabilize; then shut down engine (Ref. Paragraph 21).

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17. MAXIMUM POWER CHECK

- a. After engine has been shut down for 5 minutes, restart engine (Ref. Paragraph 3)

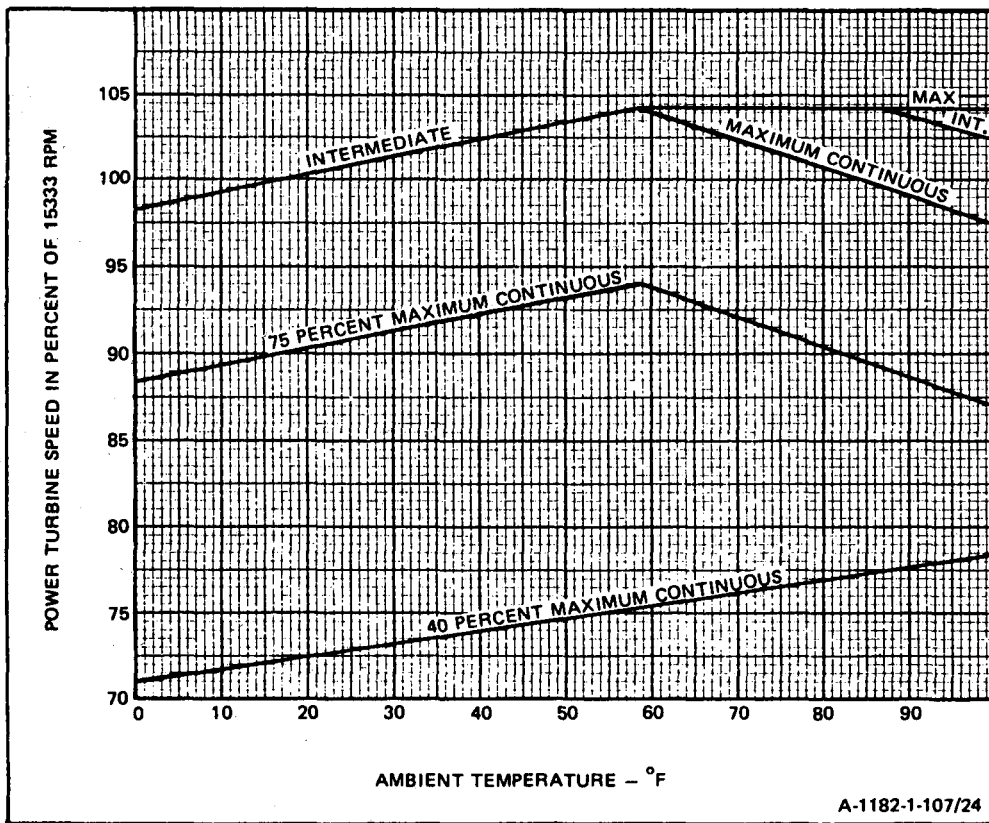
NOTE

Do not exceed maximum PTIT allowed at ambient temperature determined from graph in previous step 10.j.

NOTE

Maximum trim can be affected by idle speed trim adjustment performed in Paragraph 11.

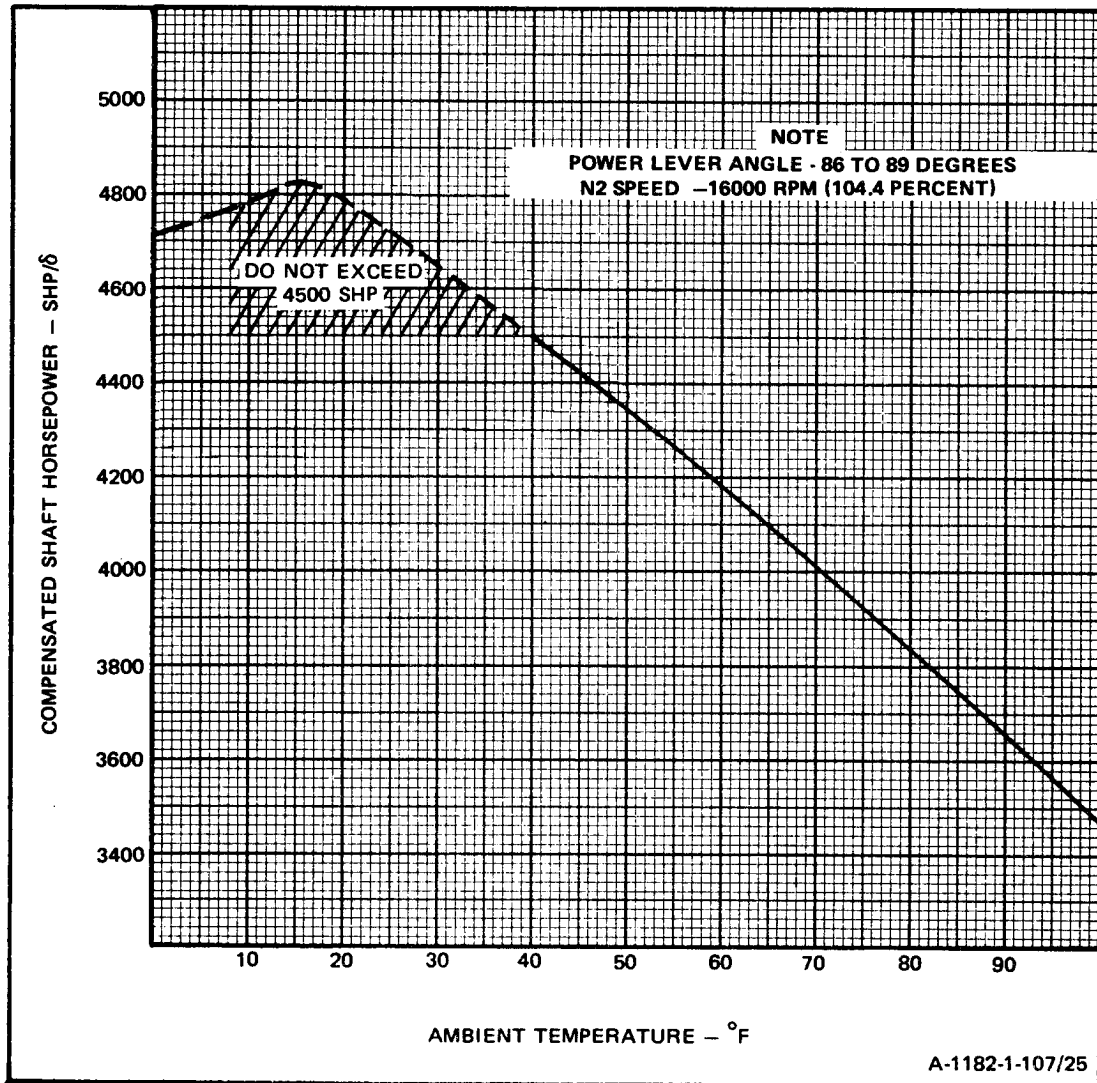
- b. Advance N1 master hydronic control to maximum trim stop or cold weather trim tool. Run engine at Maximum trim for one minute
- c. Select lower turbine (N2) speed from graph below; then record a short reading.



Guide to N2Speed Selection Versus Ambient Temperature

GO TO NEXT PAGE

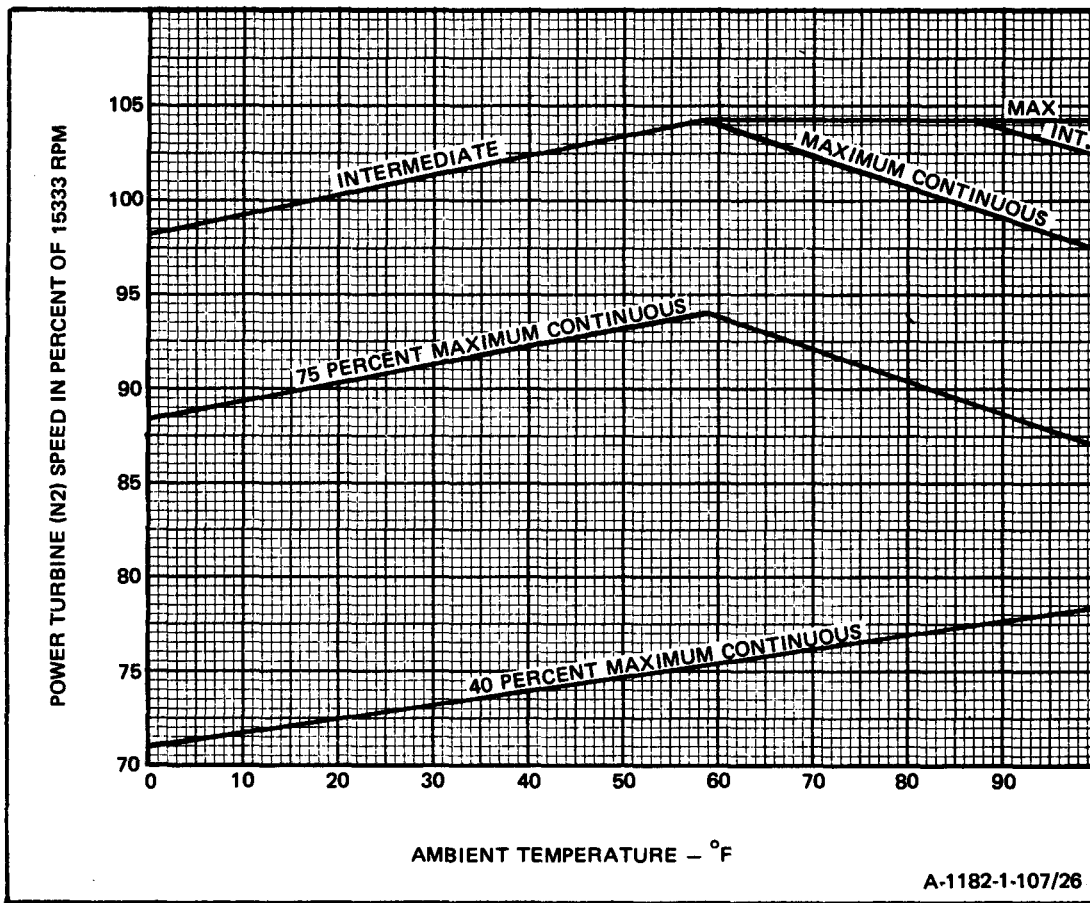
d. If necessary, readjust maximum trim to power determined in graph below, $\pm 50/-0$ SHP. If cold weather trim tool is used, trim to power determined in graph below minus Δ SHP obtained with cold weather trim tool. Use Δ SHP determined in Paragraph 9.



Maximum Trim SHP Versus Ambient Temperature

GO TO NEXT PAGE

- e. Perform a snap deceleration from maximum power to flight idle without changing water brake load. Record time for deceleration from maximum power to flight idle.
- f. Run engine for 2 minutes at flight idle; then take a short reading. If cold weather trim tool LTCT5985 is being used, remove cold weather trim tool and install maximum power trim stop 2-161-201-02.
- g. Determine power turbine (N2) speed required at maximum power for ambient temperature from graph below.

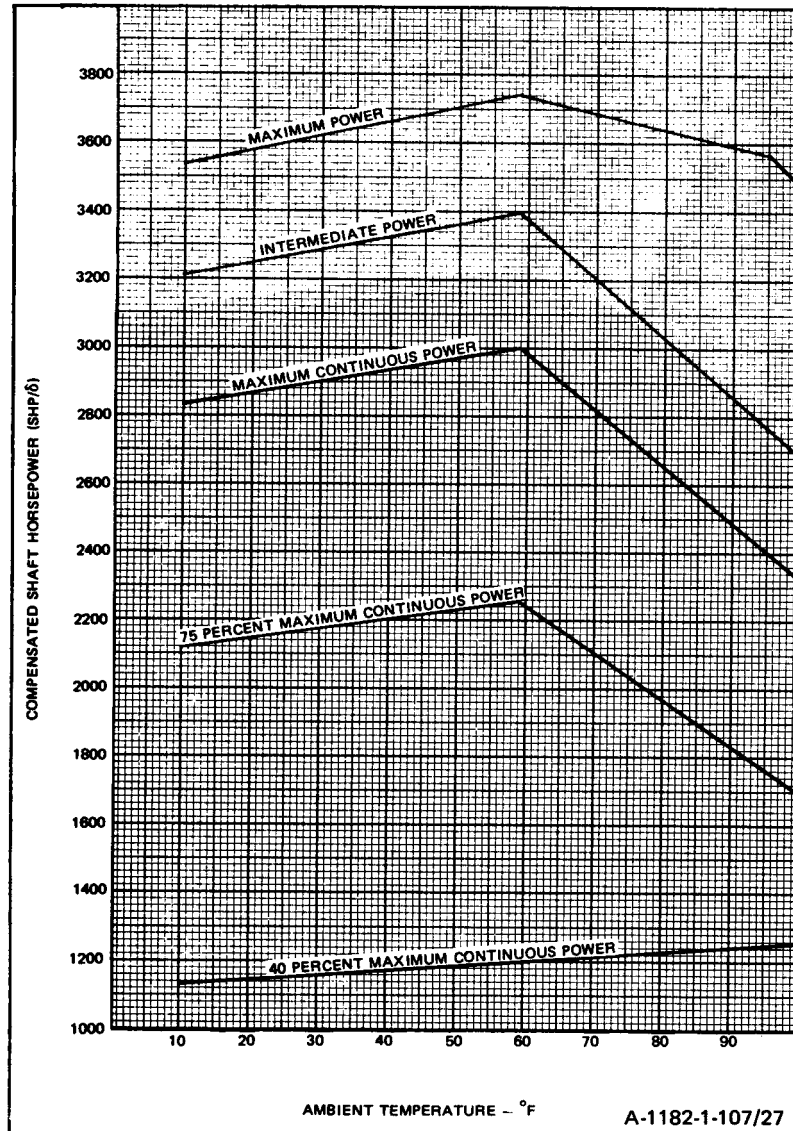


Guide to N2 Speed Selection Versus Ambient Temperature

GO TO NEXT PAGE

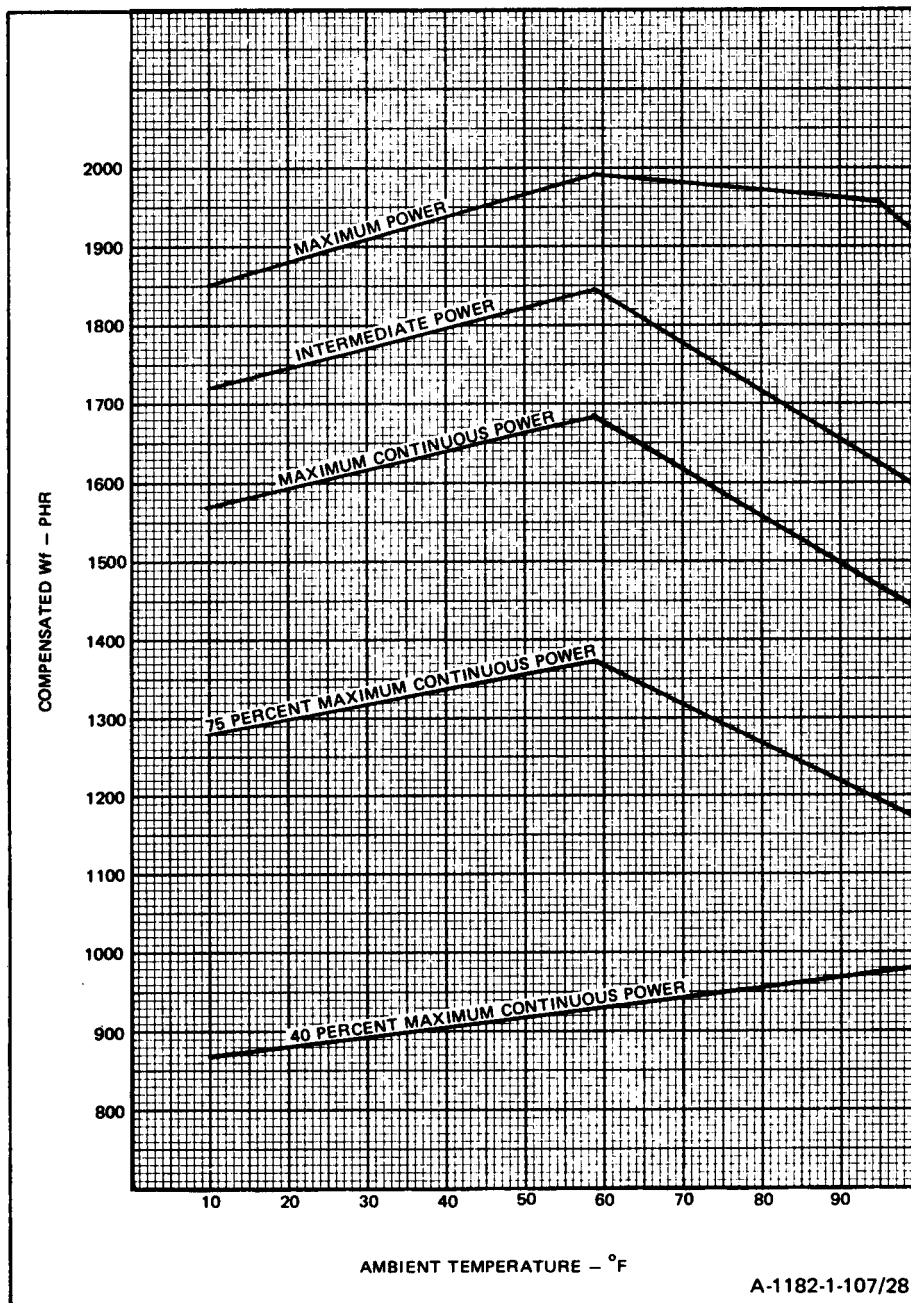
18. FORTY PERCENT MAXIMUM CONTINUOUS POWER CHECK

- a. Calculate actual maximum Wf and minimum SHP required at 40 percent maximum continuous power. Required actual SHP and Wf are determined by using the following graphs at existing ambient (compressor inlet) temperatures.



Maximum Compensated SHP Versus Ambient Temperature

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Maximum Compensated Wf Versus Ambient Temperature

GO TO NEXT PAGE

1-107 TEST ENGINE (AVIM) (Continued)

1-107

To determine actual SHP required, or maximum actual Wf permitted, multiply compensated SHP or compensated Wf by compensating factor (δ) given below.

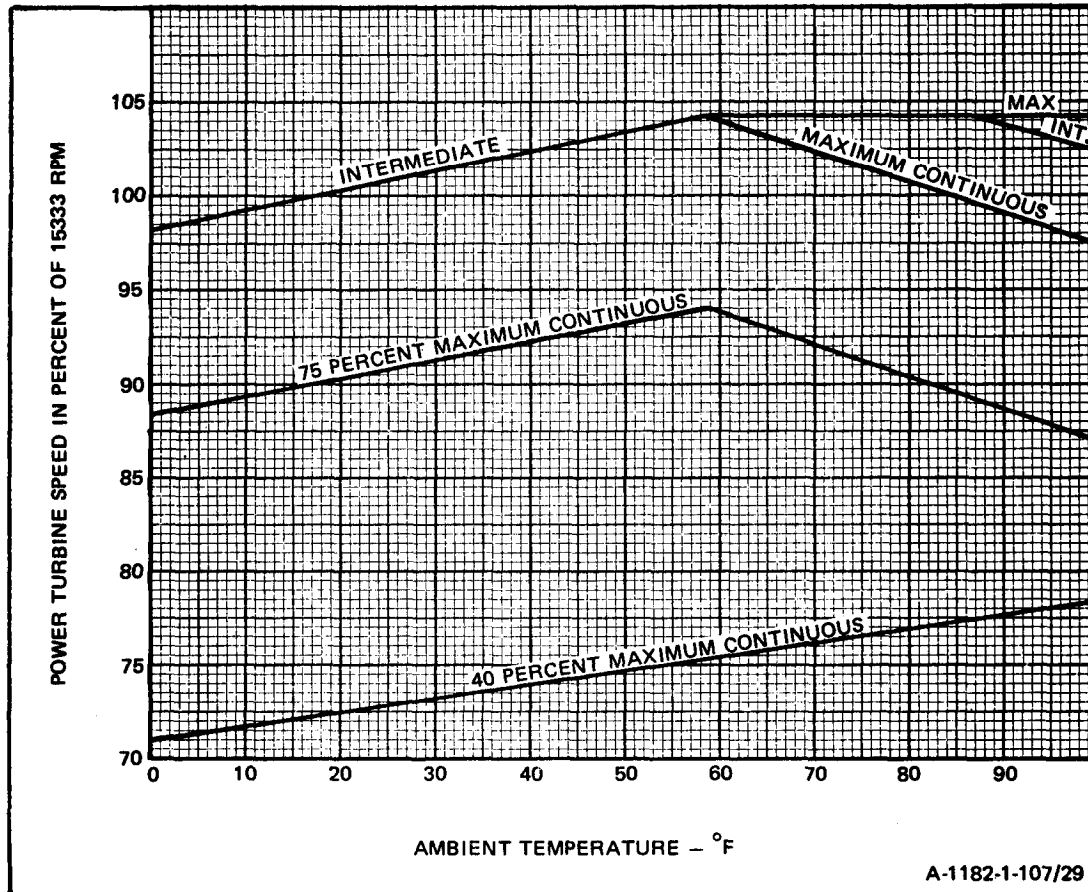
NOTE

Compensating factors vary with barometric pressure. Compensated SHP and compensated Wf were determined in step a.

Actual SHP = Compensated SHP x		Actual Wf = Compensated Wf x	
Corrected Barometer	Compensating Factor (δ)	Corrected Barometer	Compensating Factor (δ)
28.50	0.9525	29.90	0.9993
28.60	0.9559	29.92	1.000
28.70	0.9592	30.00	1.003
28.80	0.9626	30.10	1.006
28.90	0.9659	30.20	1.009
29.00	0.9693	30.30	1.013
29.10	0.9726	30.40	1.016
29.20	0.9759	30.50	1.019
29.30	0.9793	30.60	1.023
29.40	0.9826	30.70	1.026
29.50	0.9860	30.80	1.029
29.60	0.9893	30.90	1.033
29.70	0.9926	31.00	1.036
29.80	0.9960		

GO TO NEXT PAGE

b. Determine power turbine (N2) speed required for ambient temperature from graph below.



Guide to N2 Speed Selection Versus Ambient Temperature

GO TO NEXT PAGE

NOTE

In following step, SHP required and % N2 were determined in previous steps a. and b.

- c. Using formula, Torque = $\frac{\text{SHP required} \times 411}{\% \text{ N2}}$, determine torque required.
- d. Retard N1 master hydronic control until torque determined in step c. is obtained.
- e. Using water in master hydronic control, adjust load on engine until required N2 speed (step b.) is obtained.
- f. Maintain power for 5 minutes. After 2 minutes have elapsed, record a full reading.

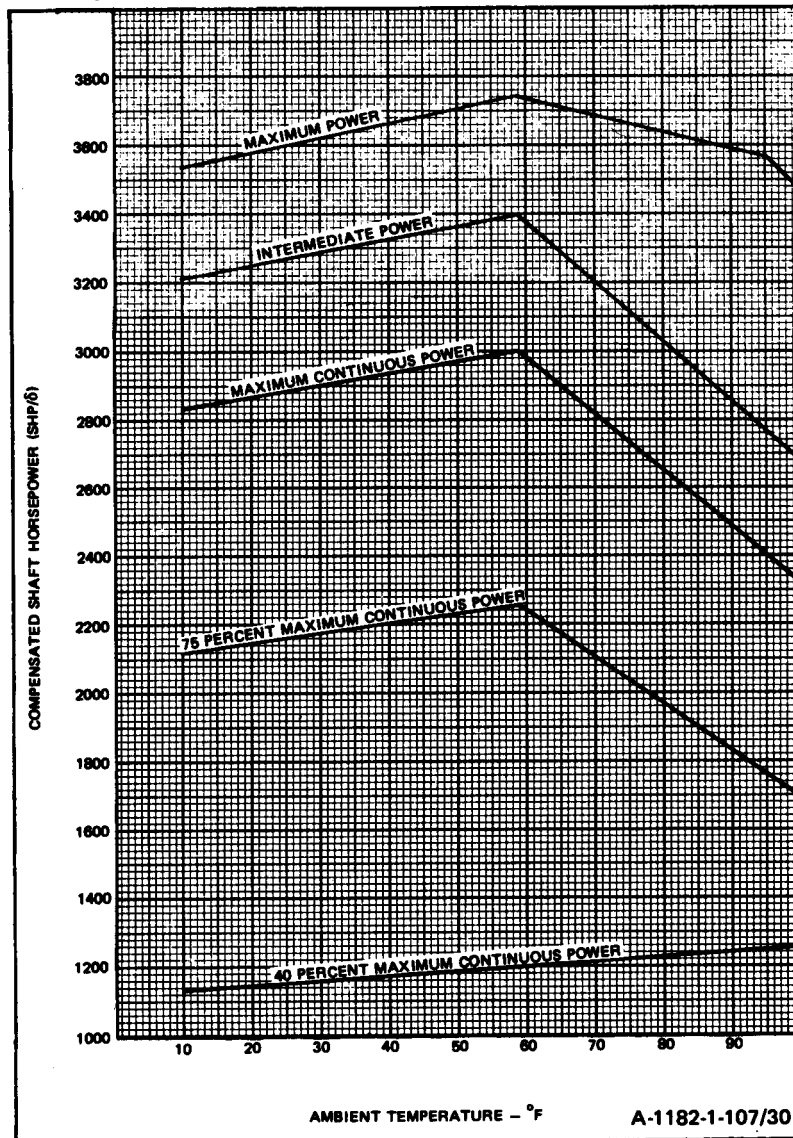
GO TO NEXT PAGE

19. INTERMEDIATE POWER CHECK

- a. Calculate actual Wf and minimum SHP required at intermediate power. Required actual SHP and Wf are determined by using the following graphs at existing ambient (compressor inlet) temperatures.

NOTE

Do not exceed maximum PTIT allowed at ambient temperature determined from graph in previous step 10.j.



Maximum Compensated SHP Versus Ambient Temperature

GO TO NEXT PAGE

1-107 TEST ENGINE (AVIM) (Continued)

1-107

To determine actual SHP required, or maximum actual Wf permitted, multiply compensated SHP or compensated Wf by compensating factor (δ) given below.

NOTE

Compensating factors vary with barometric pressure. Compensated SHP and compensated Wf were determined in step a.

Actual SHP = Compensated SHP x		Actual Wf = Compensated Wf x	
Corrected Barometer	Compensating Factor (δ)	Corrected Barometer	Compensating Factor (δ)
28.50	0.9525	29.90	0.9993
28.60	0.9559	29.92	1.000
28.70	0.9592	30.00	1.003
28.80	0.9626	30.10	1.006
28.90	0.9659	30.20	1.009
29.00	0.9693	30.30	1.013
29.10	0.9726	30.40	1.016
29.20	0.9759	30.50	1.019
29.30	0.9793	30.60	1.023
29.40	0.9826	30.70	1.026
29.50	0.9860	30.80	1.029
29.60	0.9893	30.90	1.033
29.70	0.9926	31.00	1.036
29.80	0.9960		

GO TO NEXT PAGE

NOTE

In following step, SHP required and % N2 were determined in previous step a.

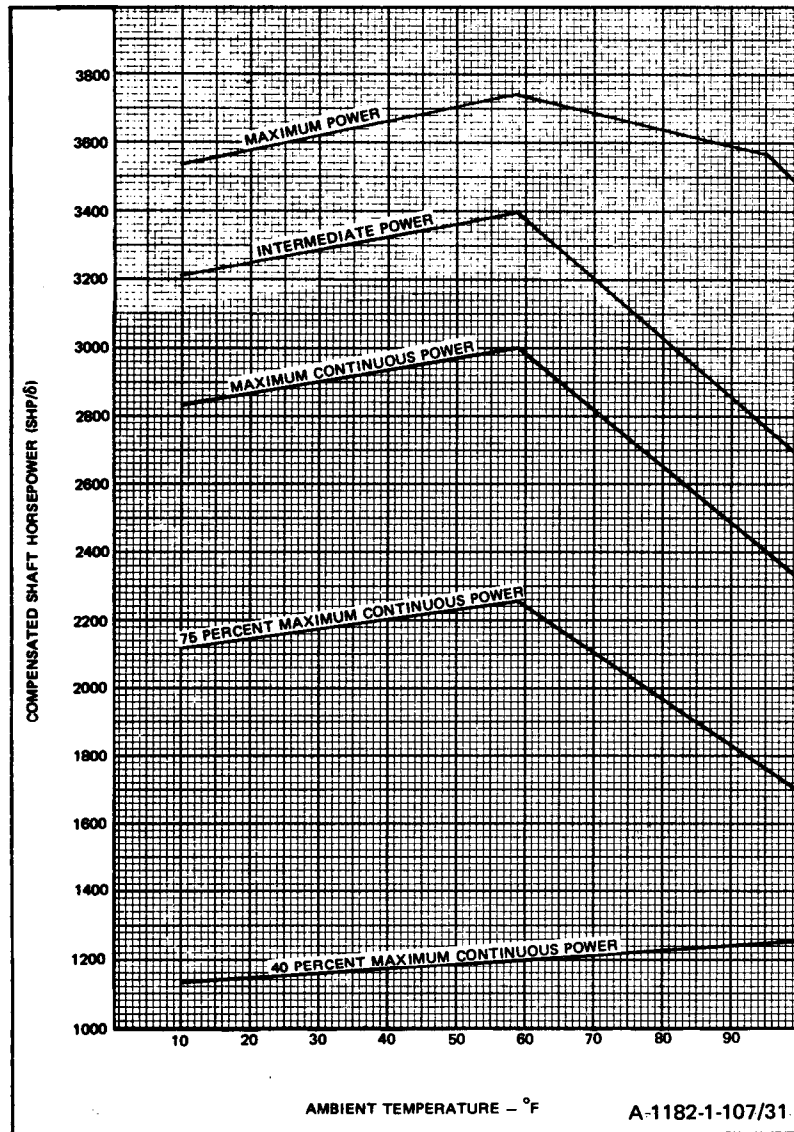
- b. Using formula, Torque= $\frac{\text{SHP required} \times 411}{\% \text{ N2}}$, determine torque required.
- c. Advance N1 master hydronic control until torque determined in step b. is obtained.
- d. Using water in master hydronic control, adjust load on engine until required N2 speed (step b.) is obtained.
- e. Maintain power for 5 minutes. After 2 minutes have elapsed, take a full reading.

20. N2 GOVERNOR OPERATION CHECK**NOTE**

If adjustment was made to N2 lever travel on previous test run, return N2 lever stop screw to original adjustment and remove tag on fuel control.

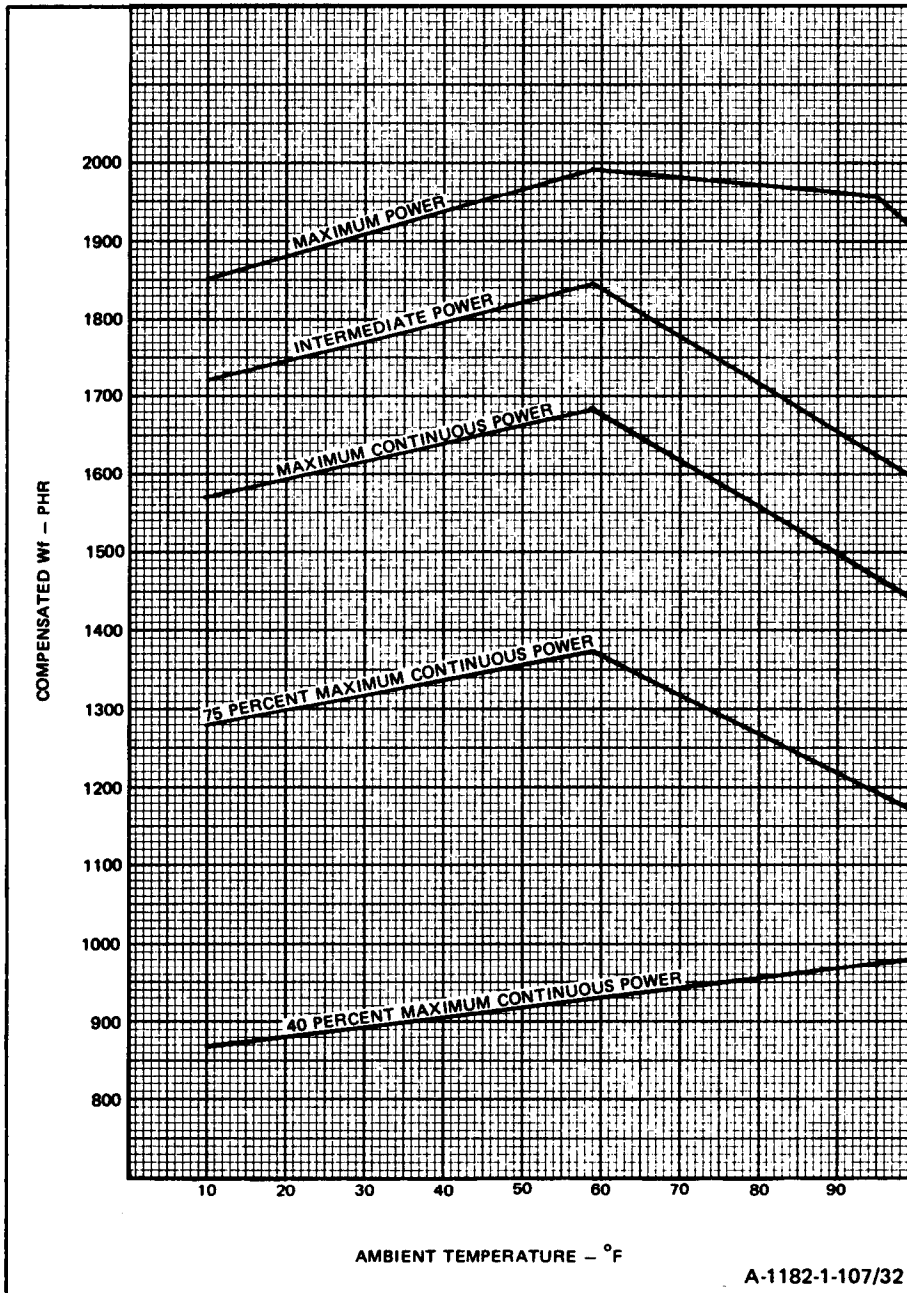
- a. Calculate actual maximum fuel flow and minimum SHP required at maximum power. Required actual SHP and Wf are determined by using the following graphs at existing ambient (compressor inlet) temperatures.

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Maximum Compensated SHP Versus Ambient Temperature

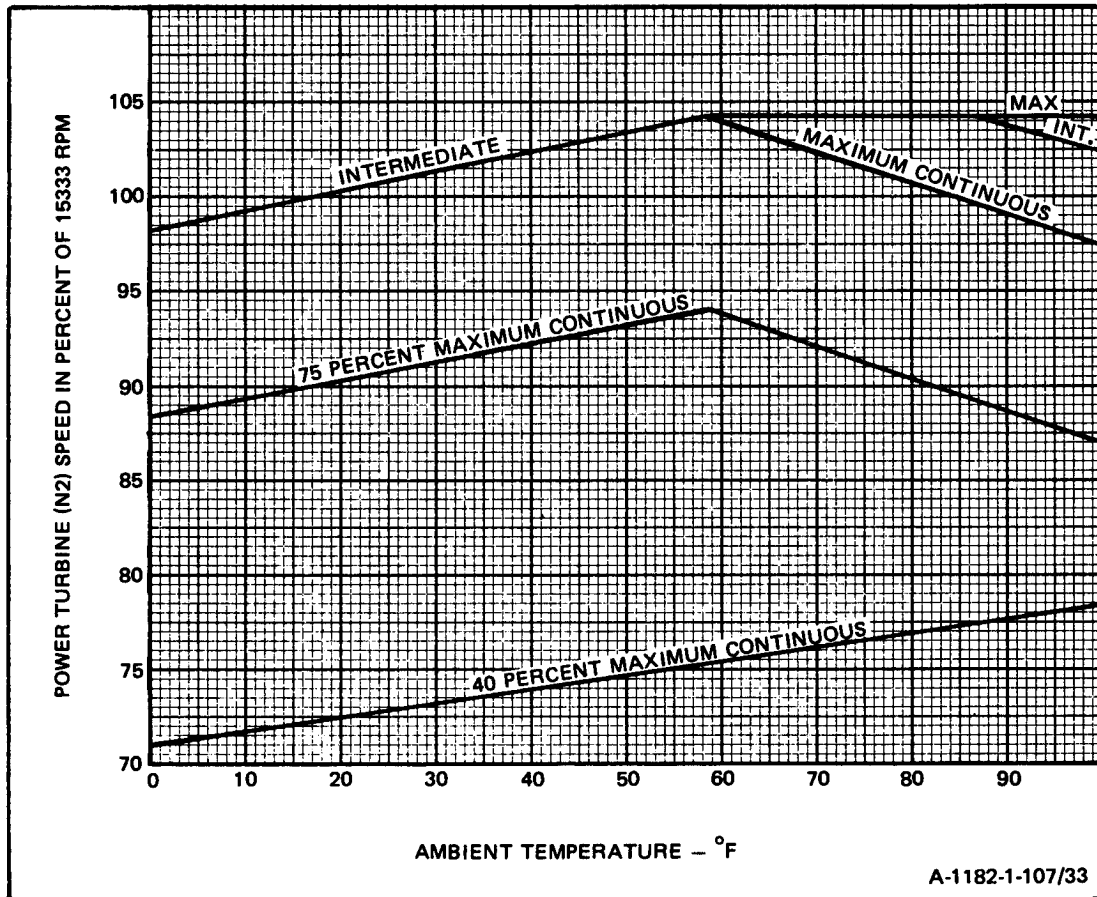
GO TO NEXT PAGE



Maximum Compensated Wf Versus Ambient Temperature

GO TO NEXT PAGE

b. Determine power turbine (N2) speed required for ambient temperature from graph below.



Guide to N2 Speed Selection Versus Ambient Temperature

GO TO NEXT PAGE

NOTE

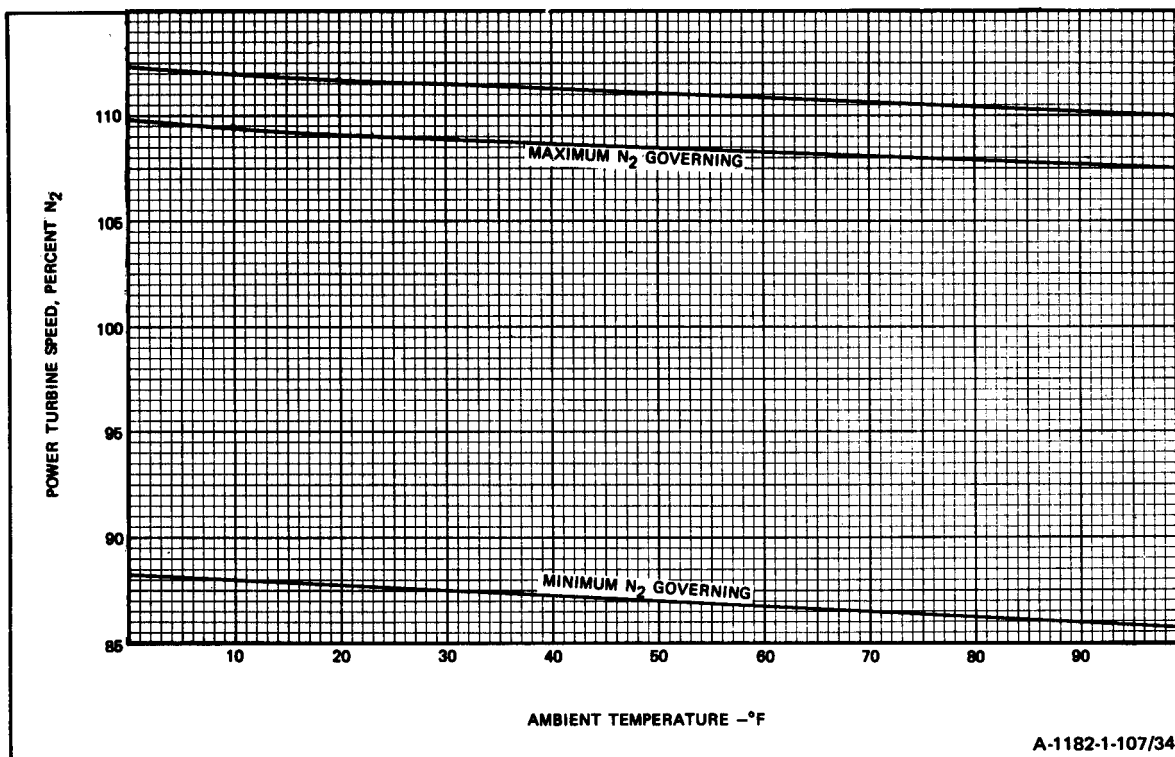
In following step, SHP required and % N2 were determined in previous step a.

- c. Using formula, $\text{Torque} = \frac{\text{SHP required} \times 411}{\% \text{ N2}}$, determine torque required.
- d. Advance N1 master hydronic control until torque, determined in step c. for maximum power, is obtained.
- e. With N2 master hydronic control in its maximum position and water in master hydronic control set to provide maximum power, adjust N1 master hydronic control until a Wf of 1750 phr is indicated.

NOTE

In following step, N1 speed should gradually increase to a maximum value within tolerance range shown below.

- f. Using water in master hydronic control, unload engine until overspeed governor decreases Wf to 1685 to 1715 phr.



Overspeed Governor Limits

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NOTE

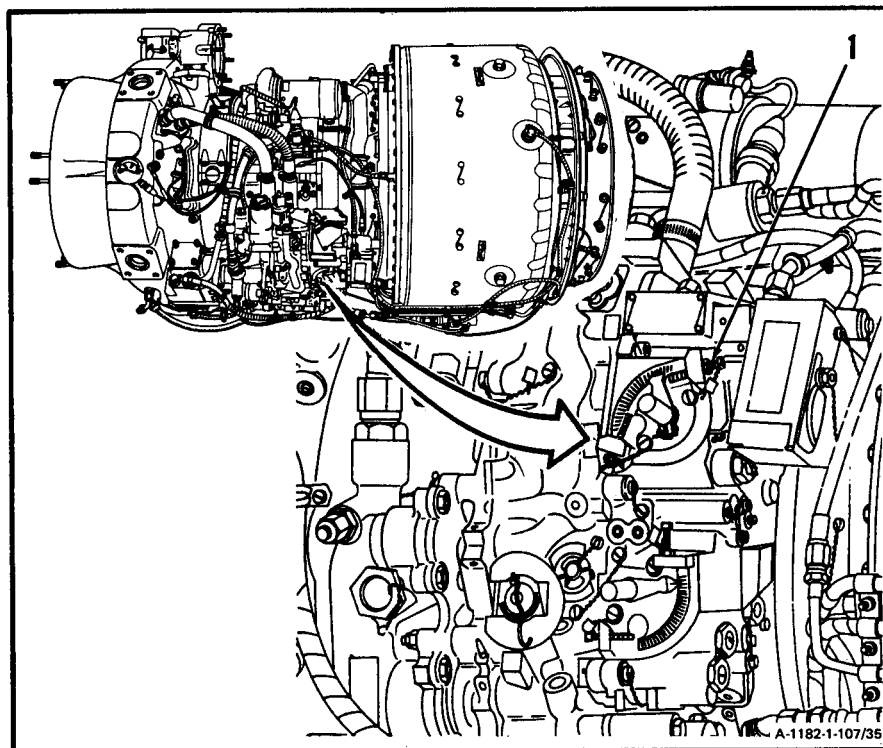
In following step, one complete turn counterclockwise will increase N2 speed by approximately 0.5 percent.

- g. Adjust maximum N2 lever stop screw (1), if necessary, with hydronic control retarded to ground or flight idle.

CAUTION

Do not adjust N2 lever stop screw to a position that will allow pointer to indicate a setting greater than 80 degrees. Malfunction of fuel control may result.

- h. Record N1 and N2 speeds, Wf, combustor static pressure, and ambient temperature.



Maximum N2 Lever Stop Screw Adjustment

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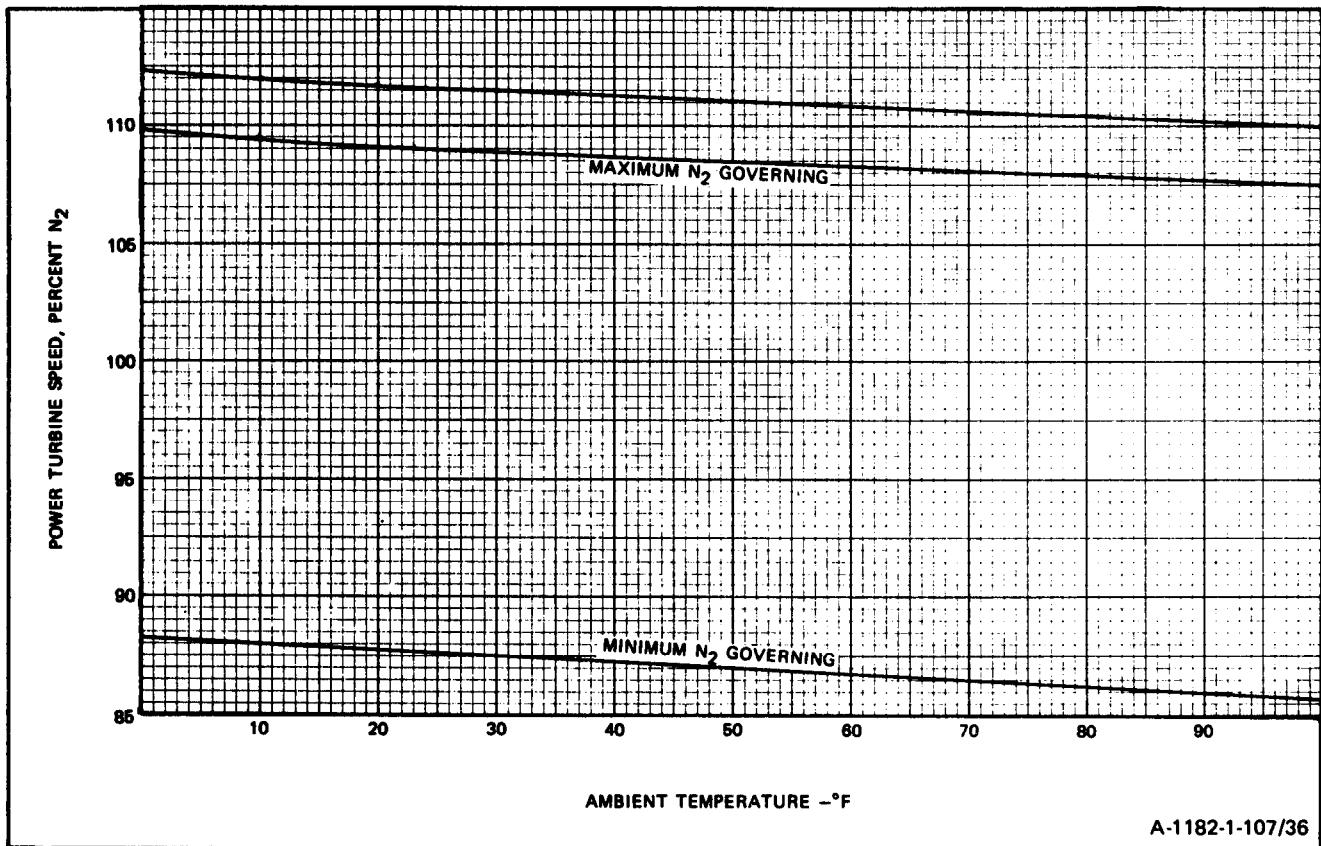
NOTE

In following step, do not exceed water brake temperature limits.

- i. Retard N2 master hydronic control to minimum governing position; then adjust water in master hydronic control to obtain 1185 to 1215 phr; N2 speed should not exceed limit given below. Adjust minimum N2 lever stop as required.

CAUTION

Do not adjust N2 lever stop screw to a position that will allow pointer to indicate a setting less than 10 degrees. Malfunction of fuel control may result.



Overspeed Governor Limits

GO TO NEXT PAGE

NOTE

In following step, approach each point with decreasing Wf.

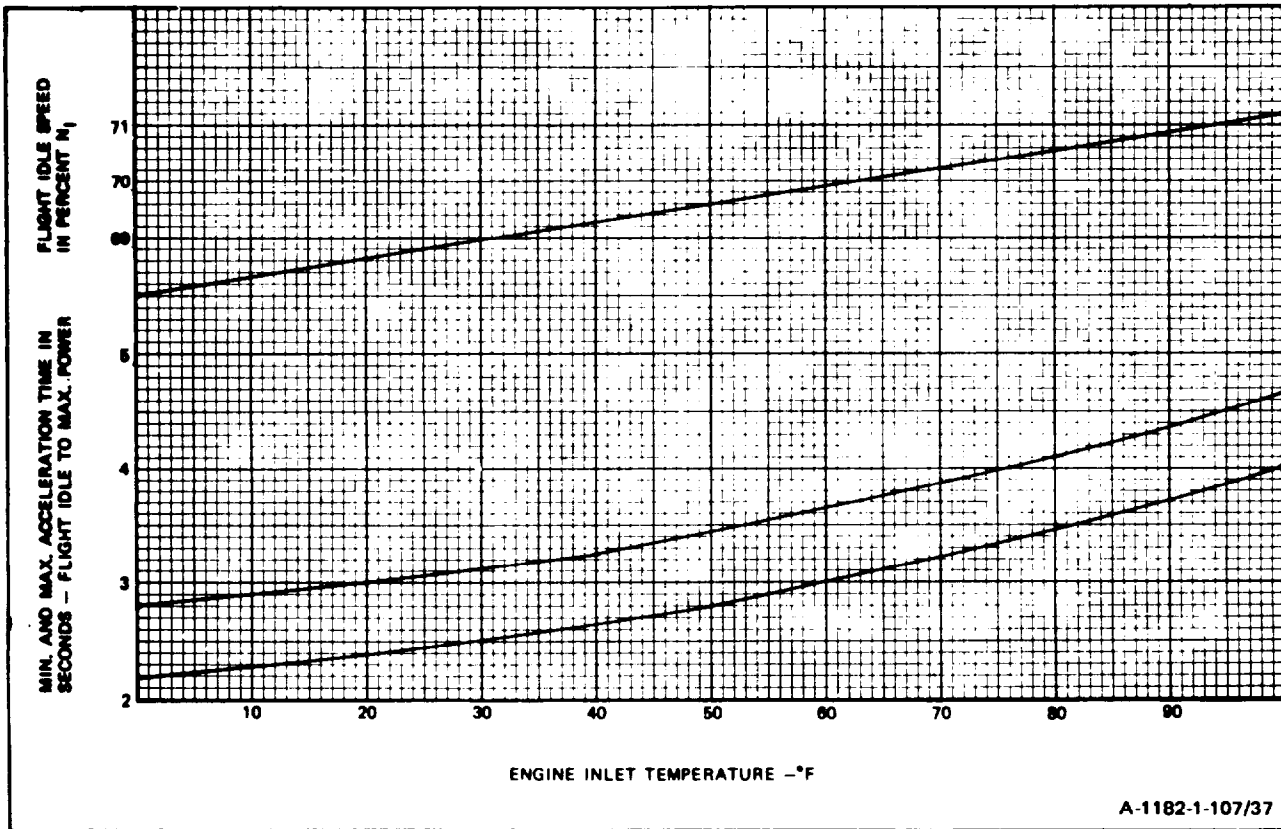
- j. Record N1 and N2 speeds, Wf, combustor static pressure, and ambient temperature.
- k. Check fuel control power lever protractor. Total travel between minimum stop and maximum stop, after adjustments have been made, shall be 78 to 82 degrees. Travel is to be measured with respect to the stop screws, not the travel of the pointer.
- l. If requirement in preceding step k. cannot be met, replace fuel control.

NOTE

Engine stability at all recorded points should be within plus or minus one percent of maximum power for ambient temperature recorded during test.

GO TO NEXT PAGE

- m. Retard N1 master hydronic control to flight idle as shown below. Run engine at flight idle for 5 minutes; then, after 2 minutes have elapsed, record a full reading.
- n. Mark oil level on indicator and record oil consumption.



Nominal Flight Idle (No Load) Gas Producer Speed and Acceleration Time Limits Versus Engine Inlet Temperature

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21. NORMAL SHUTDOWN PROCEDURE

- a. Retard N1 master hydronic control to ground idle (10 to 15 degrees).
- b. Place fuel control switch to OFF.
- c. Simultaneously place N1 master hydronic control to shutoff position, and depress timer start switch. Listen for abnormal noises.

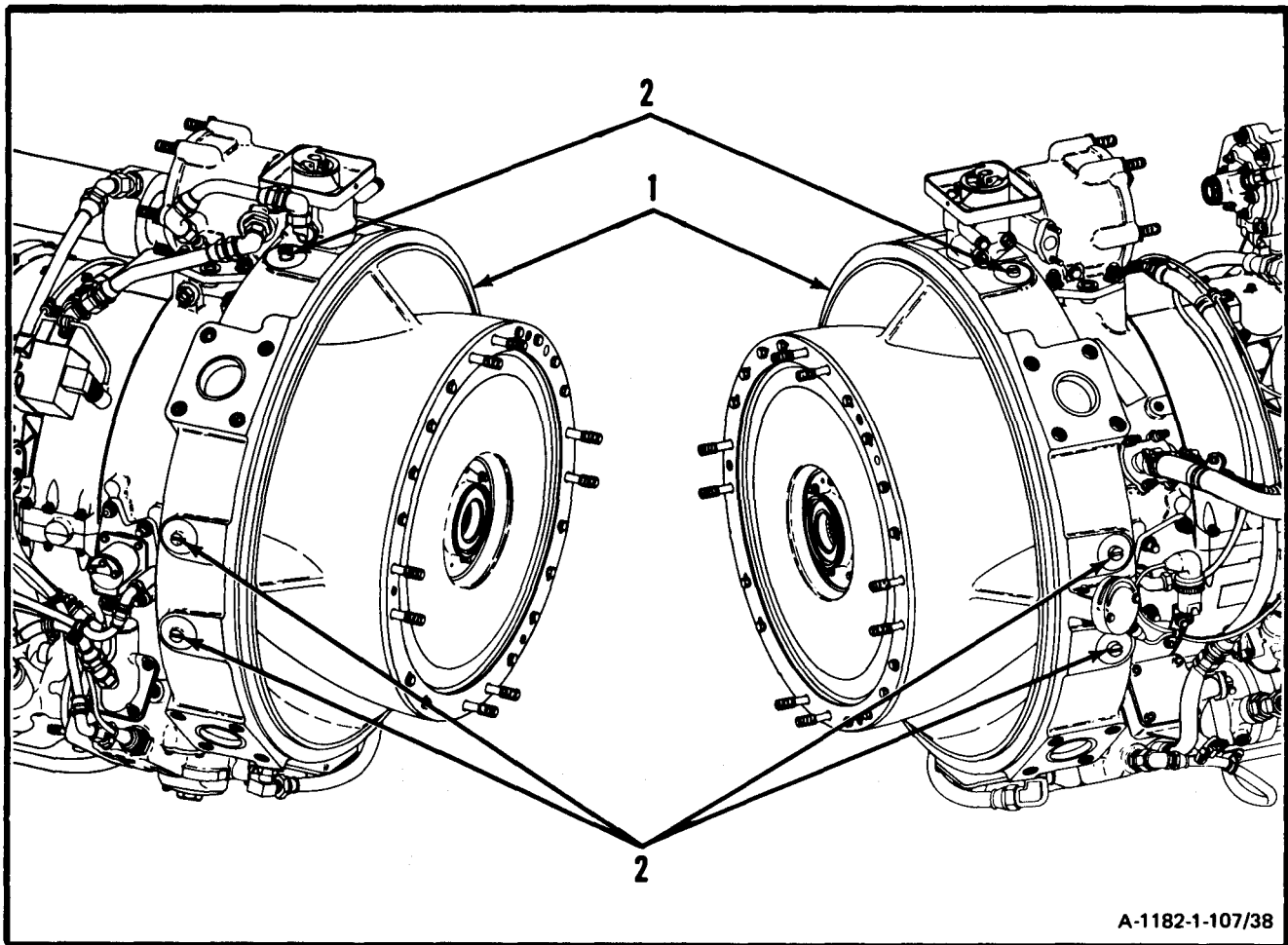
NOTE

A light to moderate amount of smoke emission during and immediately subsequent to coastdown is normal and acceptable provided oil leakage and consumption is within acceptable limits.

- d. Record N1 coastdown time. If N1 coastdown time is less than 25 seconds or abnormal noises are heard, check engine coastdown time (Ref. Task 1-81).
- e. Press water pump, cooling tower, and cooling fan buttons off. Shut off air pressure to water brake assembly.
- f. Place fuel solenoid, 400 cycle, and DC switches to OFF.
- g. Check engine for excessive oil leakage through combustion chamber overboard drain or oil streaks on engine exhaust section. This condition indicates possible oil leakage past No. 4 and 5 bearing seals. If leakage is indicated, check seal leakage, No. 4 and 5 bearing (Ref. Task 1-88).

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h. Inspect inlet housing (1) for oil leakage past core plugs (2). There shall be no oil leakage.



Inlet Housing Core Plugs

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22. ENGINE RATING

Accepted engines shall be rated for N1 speed and PTIT by using data record on engine test log. The rating states the speed and temperature which will be obtained at sea level, standard conditions with power lever in maximum power position when fuel control is trimmed in accordance with adjust maximum trim (Ref. Paragraph 9).

This trim setting is designed to produce required power on a 95° F (35° C) day, and will give 4200 SHP on a sea level standard day instead of the rated maximum power of 3750 SHP.

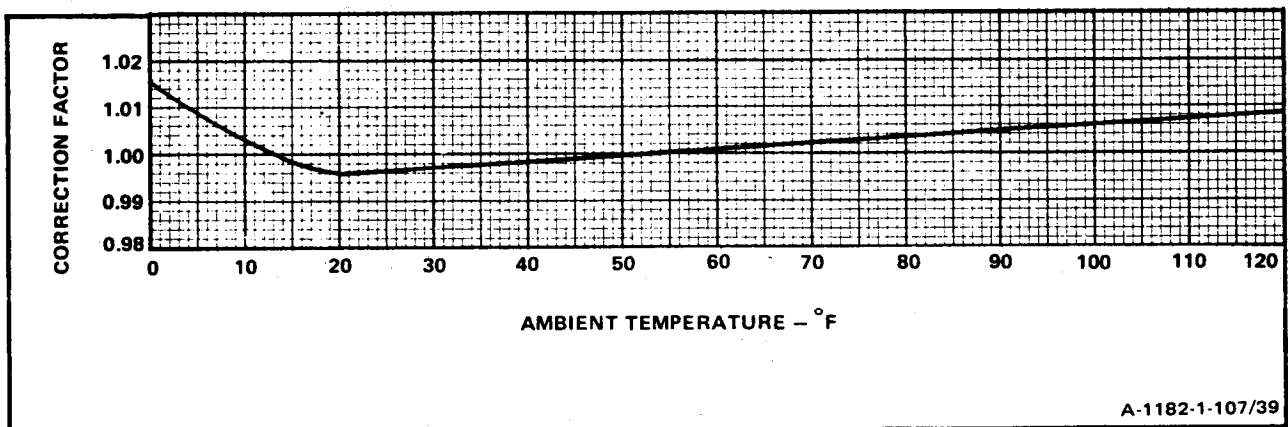
a. Determine rated N1 speed as follows:

- (1) Locate N1 speed and ambient temperature readings recorded at maximum trim adjustment' (Ref. Paragraph 9, step e).

NOTE

If cold weather stop was used in maximum trim adjustment (Ref. Paragraph 9), use following step (2) instead of prior step (1). If not disregard step (2).

- (2) Add N1 speed determined in maximum trim adjustment (Ref. Paragraph 9, step g. (4)) to N1 speed determined in maximum trim adjustment (Ref. Paragraph 9, step g. (6)).
- (3) Using following graph, determine correction factor for recorded Test ambient temperature.
- (4) Multiply N1 speed determined in preceding step by correction factor determined in preceding step.
- (5) Result is corrected gas producer (N1) speed.
- (6) Record corrected N1 speed on engine log sheet and data plate.



Correction Factor for Determining Standard Day N1 Speed

GO TO NEXT PAGE

b. Determine maximum PTIT as follows:

- (1) Find PTIT and ambient temperature readings recorded in maximum trim adjustment (Ref. Paragraph 9, step e.).

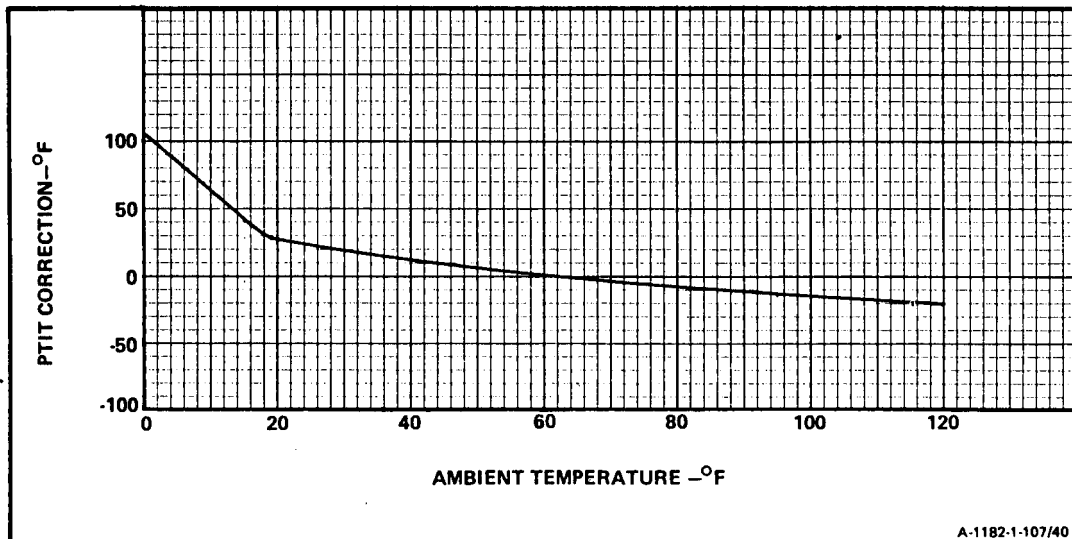
NOTE

If cold weather stop was used in maximum trim adjustment (Ref. Paragraph 9), use following step (2) instead of prior step (1). If not disregard step (2).

- (2) If cold weather stop has been used to set maximum trim, multiply N1 speed determined in maximum trim adjustment Paragraph 9, step g. (4) by 2.9°F, and add this number to PTIT recorded in maximum trim adjustment (Ref. Paragraph 9, step g. (6)).
- (3) Using following graph find PTIT correction for ambient recorded.
- (4) Add PTIT correction to PTIT obtained in preceding step.
- (5) Result obtained in step (3) is maximum trim PTIT for a standard day.
- (6) Convert °F to °C ($^{\circ}\text{C} = (^{\circ}\text{F} - 32) \div 1.8$) and record rated power turbine inlet temperature on engine log sheet.

c. Enter on Engine Log Sheet, the necessary information to complete the following sentence:

“The engine will produce maximum trim power at _____ % N1 speed with a _____ °C PTIT under standard sea level conditions.”



Correction Factor for Determining Standard Day PTIT

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1-107 TEST ENGINE (AVIM) (Continued)

1-107

23. ENGINE IDENTIFICATION

Following a successful engine test, add standard day sea level N1 speed at maximum rated power to engine data plate, if different from value existing on data plate.

FOLLOW-ON MAINTENANCE:

If required, Preserve and Prepare Engine for Shipment or Storage (Ref. Task 1-111).

END OF TASK

INITIAL SETUP

Applicable Configurations:

All

Tools:

Powerplant Mechanic's Tool Kit,

NSN 5180-00-323-4994

Technical Inspection Tool Kit,

NSN 5180-00-323-5114

Deleted

Materials:

Lockwire (E29)

Parts:

Packing

Personnel Required:

68B10 Aircraft Powerplant Repairer

68B30 Aircraft Powerplant Inspector

References:

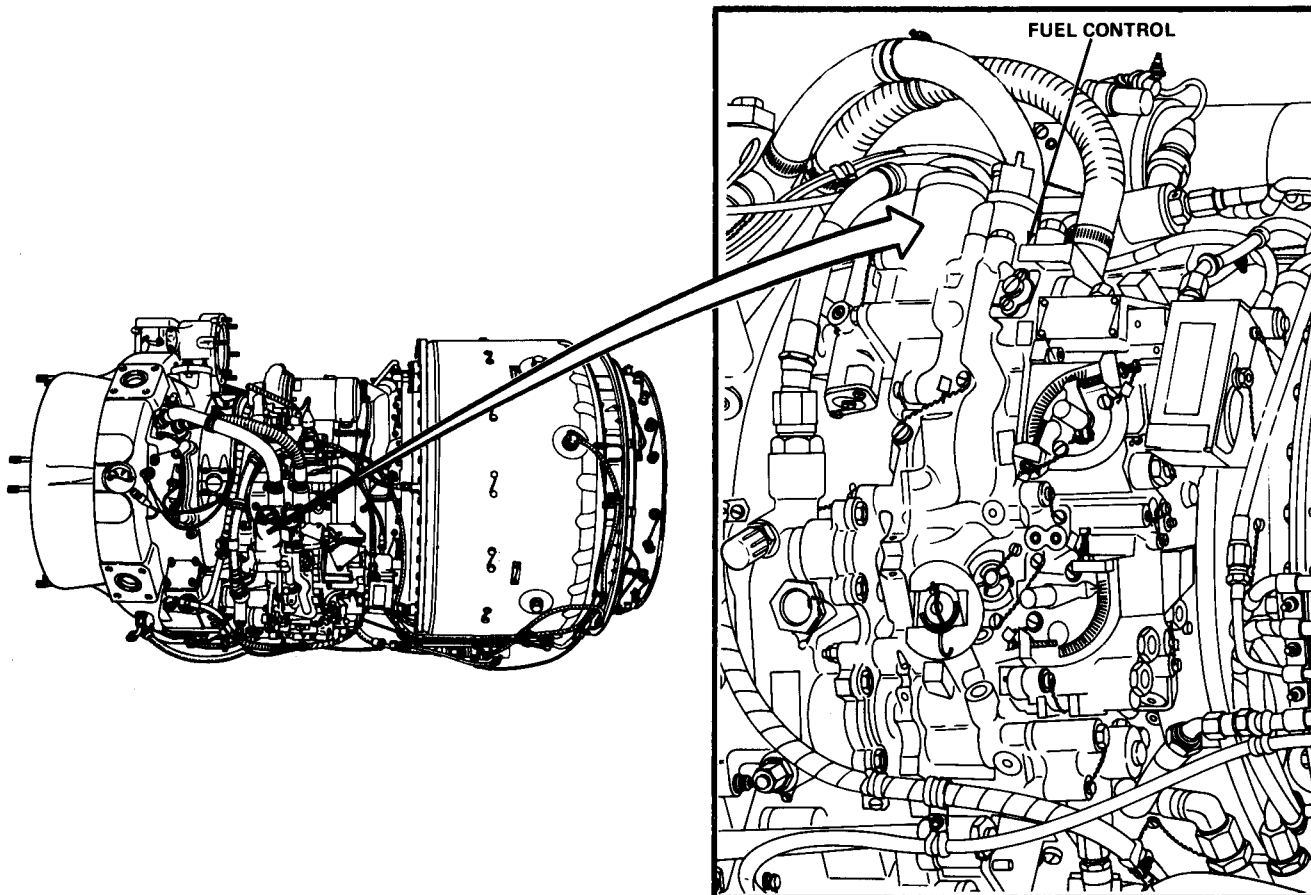
TM 55-1520-240-10

TM 55-1520-240-23

TM 55-2840-254-23P

TM 55-4920-328-13

Task 1-107



A-1182-1-108/1

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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

Ensure that maximum power trim stop is installed when adjusting or checking maximum speed setting. Ensure that maximum power trim stop is removed after adjustment or check is completed.

NOTE

Ensure that linkage systems are properly set prior to making fuel control adjustments. (Ref. TM 55-1520-240-23 or TM 55-4920-328-13).

NOTE

Maximum and ground idle speed settings of compressor rotor are interacting. Adjustment of one requires a compensating adjustment to the other. To allow for backlash in adjustment screw, always approach final setting in counterclockwise direction.

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- Adjustment of fuel selector (A1) is factory set for JP-4 fuel. If fuel being used is JP-5, JP-8, JET A, or JET A-1; and the engine fails to accelerate with high PTIT during starting (hung starts), the fuel selector (A1) maybe adjusted for the JP-5 setting.

NOTE

If one of the alternate fuels are primarily used with occasional usage of JP-4 fuel, the fuel selector may be left in the JP-5 setting.

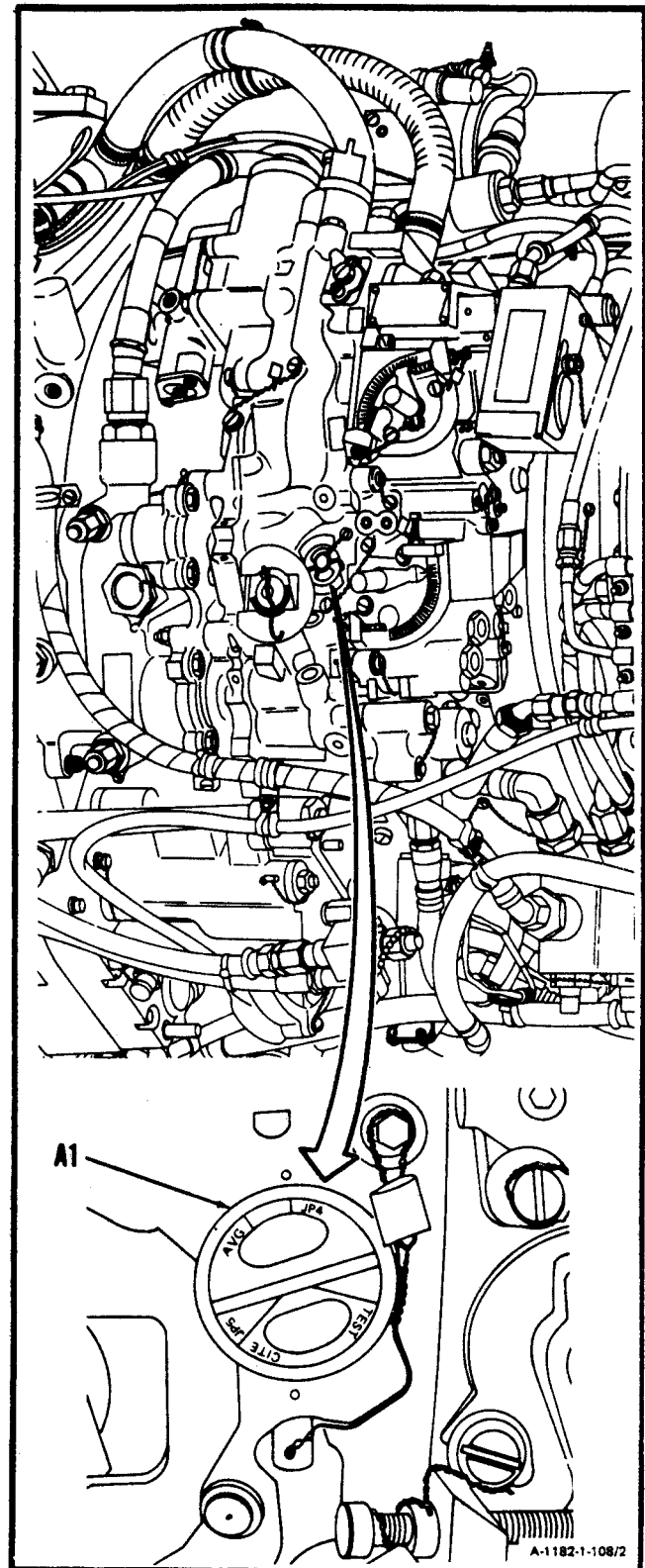
- If fuel selector switch is not in the correct setting, cut lockwire. Adjust fuel selector (A1) to the JP-4 or JP-5 position (DO NOT use avg, cite, or test positions). Use screwdriver.
- Lockwire (E29) fuel selector (A1).

NOTE

Perform an acceleration check after initial adjustment of fuel selector setting from JP-4 to JP-5 regardless of type of fuel used and every 200 hours thereafter.

WARNING

Adjusting the fuel selector setting from JP-4 to JP-5 results in a lower fuel schedule, thereby reducing compressor stalls that are induced by rich fuel schedules especially during starting. However, lower fuel schedules will result in longer acceleration times during transients. It is essential that acceleration times are in accordance with the acceleration check to prevent excessive N2/Rotor Droop.

INSPECT**GO TO NEXT PAGE**

1-108 ADJUST FUEL CONTROL (Continued)**1-108**

2. Adjust compressor rotor ground idle speed by turning adjustment screw (1).

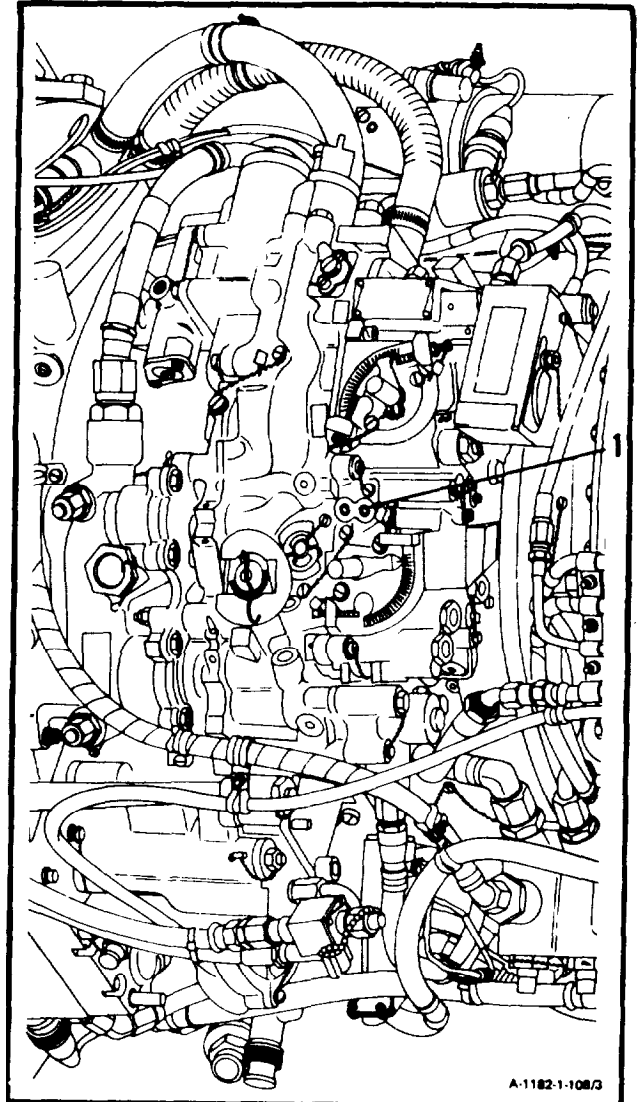
NOTE

Adjustment screw must be turned one-half turn beyond desired setting; then returned one-half turn to desired setting. This will eliminate backlash on adjustment screw. One full turn of adjustment screw will result in change of approximately ten percent of compressor rotor speed when power selector level is in ground idle position.

- a. Start engine. (Ref. TM 55-1520-240-10 or Task 1-107).
- b. Turn adjustment screw (1) clockwise to increase ground idle speed.
- c. Turn adjustment screw (1) counter-clockwise to decrease ground idle speed.
- d. Stop engine. (Ref. TM 55-1520-240-10 or Task 1-107).

NOTE

Adjustments of ground idle speed in excess of 2% require a turbine engine analysis check and baseline hit check (Ref TM 55-1520-240-23-1). Adjustments of less than 2% do not require a TEAC or baseline hit check provided it is the first such adjustment since the engine was last baselined.



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GO TO NEXT PAGE**Change 10 1-529**

3. **Adjust air-bleed band closure** as follows:

NOTE

Fuel control (2) is equipped with an adjustment that is used to set the air-bleed operating ranges.

NOTE

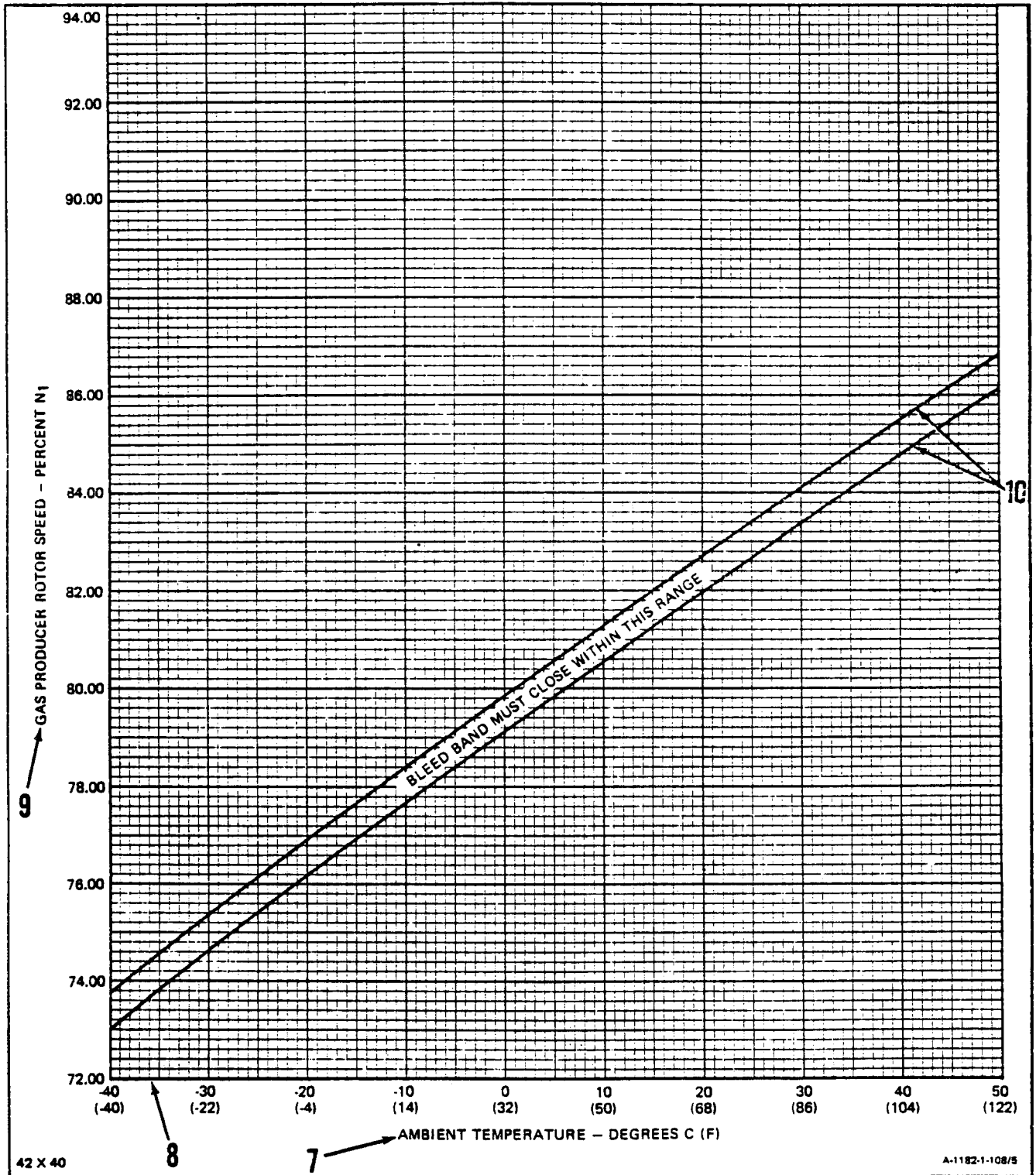
Engine acceleration may not be satisfactory if bleed band closure is not within specified N1 speed. If N1 speed for bleed band closure is above that specified, an unacceptable increase in fuel consumption will result until bleed band closes. If bleed band does not close at all or opens again at high power, the engine will suffer loss of maximum power.

- a. **Start engine and operate at ground idle to allow temperatures to stabilize.** (Ref. TM 55-1520-240-10 or Task 1-107).
- b. Set collective lever at minimum beep and thrust.
- c. Set engine condition lever to flight.
- d. Slowly increase power demand until bleed band closes.

GO TO NEXT PAGE

- e. Note N1 speed percentage and ambient temperature when the bleed band closes.
- f. Determine the correct N1 speed percentage required for closure as follows:
 - (1) Find the ambient temperature (7) noted in step e. on chart (8).
 - (2) Find N1 speed (9) noted in step e. on chart (8).
 - (3) Locate actual closure point on chart (8) where N1 speed percentage (9) and ambient temperature (7) meet.
 - (4) Actual closure point shall be within bleed band closure curve (10).

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NOTE

In following step, one full turn of adjustment screw counterclockwise will increase N1 speed percentage at bleed band closure approximately five percent.

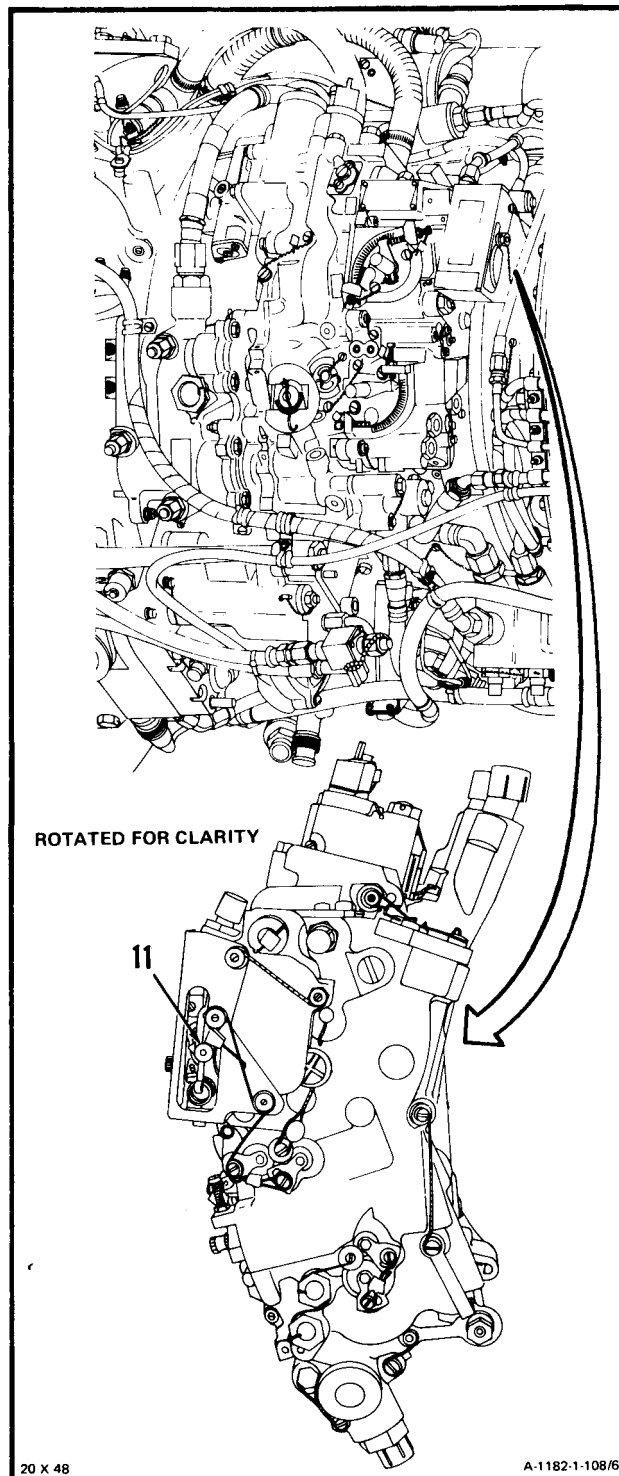
- g. If actual closure point obtained in previous step f. (4) is below closure curve, loosen jam nut and turn adjustment screw (11) counterclockwise. Tighten jam nut.

NOTE

In following step, one full turn of adjustment screw clockwise will decrease N1 speed percentage at bleed band closure approximately five percent.

- h. If actual closure point obtained in previous step f. (4) is above closure curve, loosen jam nut and turn adjustment screw (11) clockwise. Tighten jam nut.

- i. **Stop engine.** (Ref. TM 55-1520-240-10 or Task 1-107).



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4. Adjust compressor rotor maximum speed by turning adjustment screw (1).

CAUTION

Unretracted maximum power trimming of engine will result in exceeding power turbine inlet temperature limit. (Ref. TM 55-1520-240-10 or Task 1-107).

NOTE

Adjustment screw must be turned one-half turn beyond desired setting; then returned one-half turn to desired setting. This will eliminate backlash on adjustment screw. One full turn of adjustment screw will result in change of approximately four percent of compressor rotor speed when power selector lever is in maximum continuous position.

- Turn adjustment screw (1) clockwise to increase maximum setting.
- Turn adjustment screw (1) counterclockwise to decrease maximum speed setting.
- Check compressor rotor ground idle speed adjustment if compressor rotor adjustment screw (1) is turned.

NOTE

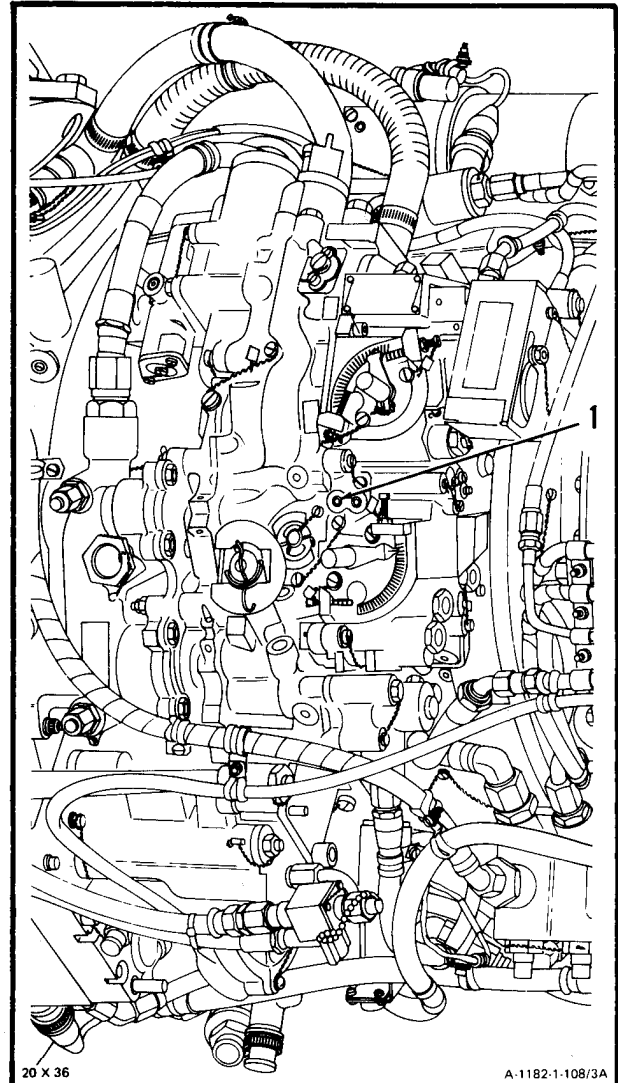
After adjustment of compressor rotor maximum speed a turbine engine analysis check and baseline hit check are required (Ref. TM 55-1520-240-23-1).

FOLLOW-ON MAINTENANCE:

None

END OF TASK

All data on page 1-536, including figure, and all data on page 1-537 is deleted.



1-109 ADJUST FUEL CONTROL (AVIM)

1-109

INITIAL SETUP

Applicable Configurations:

All

Tools

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

Technical Inspection Tool Kit,
NSN5180-00-323-5114

Special Screwdriver (T33)

Materials:

Lockwire (E29)

Tag (E54)

Personnel Required:

68B10 Aircraft Powerplant Repairer

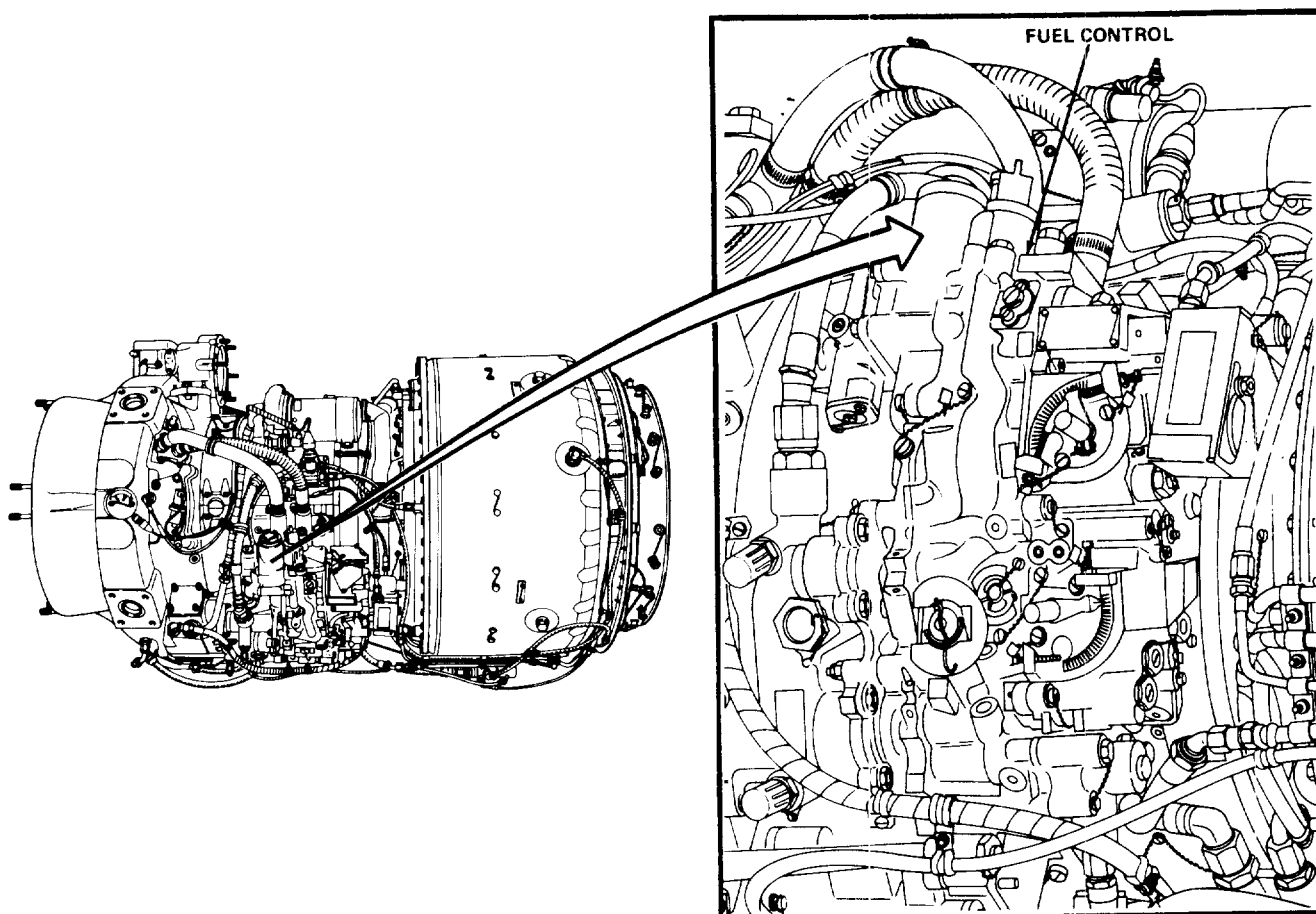
68B30 Aircraft Powerplant Inspector

References

TM 55-1520-240-23

TM 55-4920-328-13

Task 1-108



A-1182-1-109/1

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NOTE

Ensure that maximum power trim stop is installed when adjusting or checking maximum speed setting. Ensure that maximum power trim stop is removed after adjustment or check is completed.

NOTE

Ensure that linkage systems are properly set prior to making fuel control adjustments. (Ref. TM 55-1520-240-23 or TM 55-4920-328-13.)

Maximum and ground idle speed settings of compressor rotor are interacting. Adjustment of one requires a compensating adjustment to the other. To allow for backlash in adjustment screw, always approach final setting in counterclockwise direction.

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1. Adjust power turbine (N2) speed in accordance the applicable airframe manual.

NOTE

The fuel control has two adjustable speed settings to govern the power turbine maximum and minimum speeds.

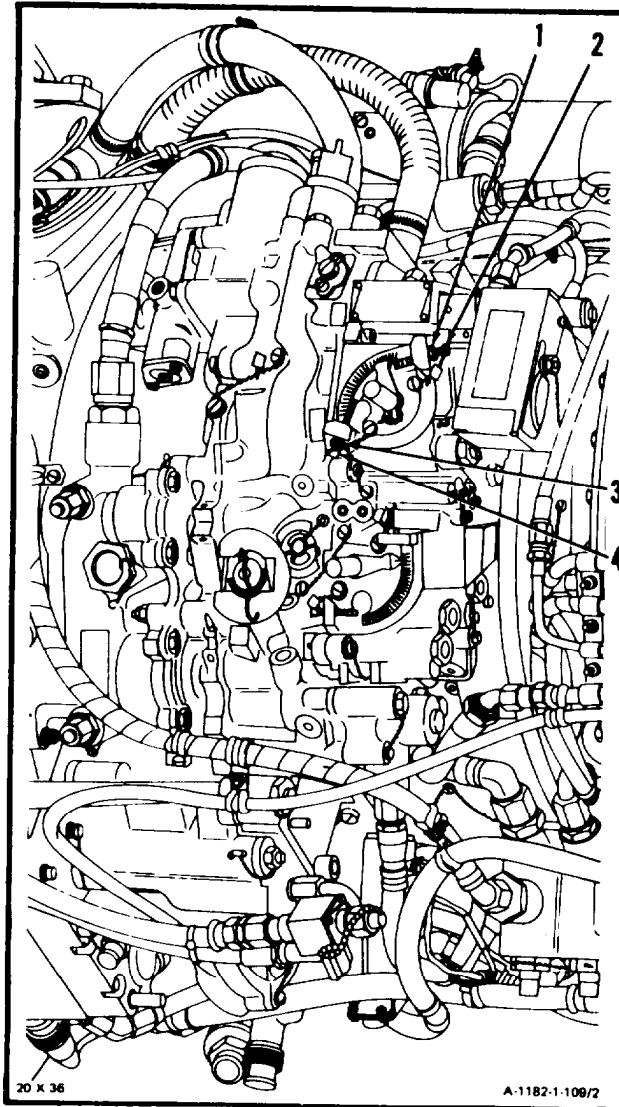
CAUTION

Maximum speed adjustment shall not be adjusted to allow pointer to indicate a setting greater than 80 degrees on fuel control configurations other than 2-161-620-64 or 2-161-620-68. The pointer shall not indicate a setting less than 86 degrees on 2-161-620-64 or 2-161-626-68 fuel controls.

NOTE

When using speed settings, two degrees travel of power turbine speed selector lever results in power turbine speed change of approximately one percent.

- a. To increase power turbine maximum speed, remove lockwire, loosen jam nut (1) and turn adjustment screw (2) counterclockwise. Tighten jam nut (1). Lockwire jam nut (1). Use lockwire (E29).
- b. To decrease power turbine maximum speed, remove lockwire, loosen jam nut (1), and turn adjustment screw (2) clockwise. Tighten jam nut (1). Lockwire jam nut (1). Use lockwire (E29).



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CAUTION

Minimum speed adjustment shall not be adjusted to allow pointer to indicate a setting less than 10 degrees on fuel control configurations other than 2-161-620-64 or 2-161-620-68. The pointer shall not indicate a setting less than 3 degrees on 2-161-620-64 or 2-161-620-68 fuel controls.

- c. To increase power turbine minimum speed, remove lockwire, loosen jam nut (3) and turn adjustment screw (4) clockwise. Tighten jam nut (3). Lockwire jam nut (3). Use lockwire (E29).
- d. To decrease power turbine minimum speed, remove lockwire, loosen jam nut (3) and turn adjustment screw (4) counter clockwise. Tighten jam nut (3). Lockwire jam nut (3). Use lockwire (E29).

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2. Adjust acceleration schedule as follows:

NOTE

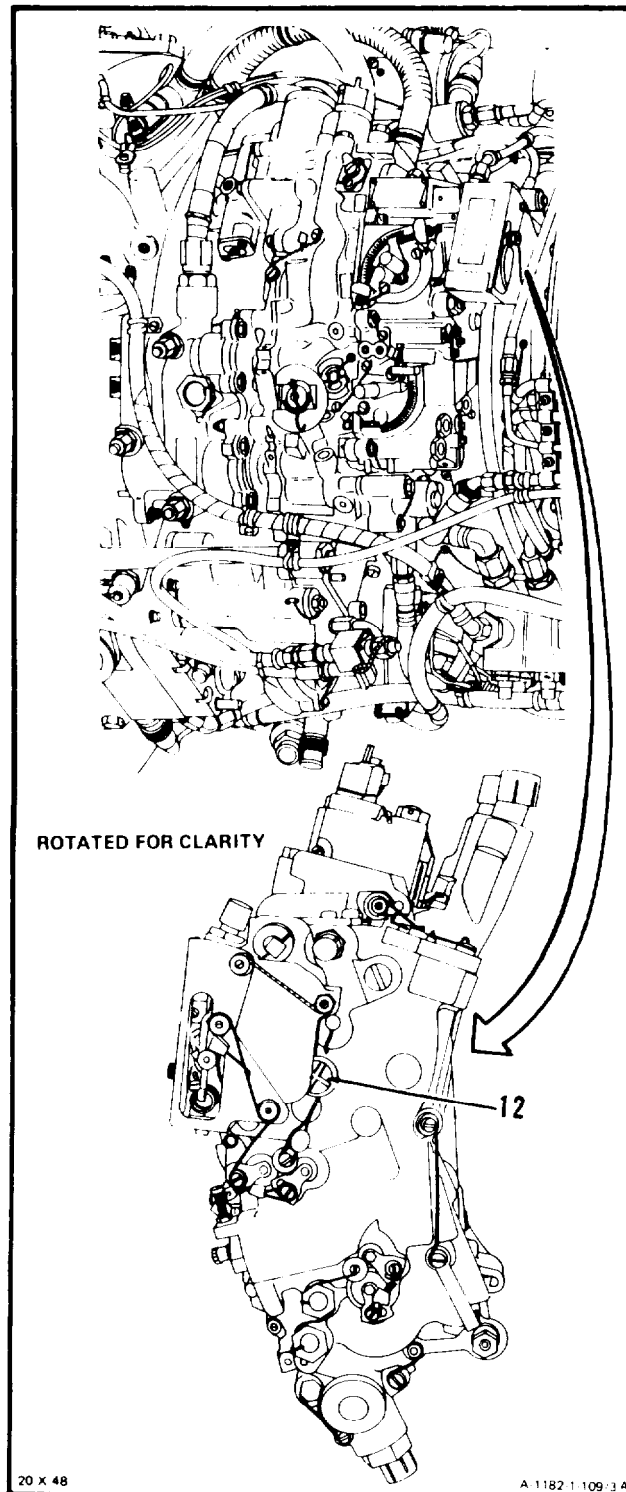
The acceleration schedule adjustment must be made with the engine shut down. Fuel boost pumps must be off. The adjustment screw is located under plug (12) on the rear side of fuel control (2).

NOTE

Acceleration schedule adjustment may be performed with the engine installed on the aircraft.

NOTE

Adjustment of the acceleration schedule is absolutely limited to the following conditions: No adjustment is allowed until the airbleed operation has been thoroughly checked. If necessary, adjust in compliance with maintenance instructions. (Ref. Task I-I 08.) Every time the acceleration adjustment screw is turned it will make a clicking noise; like the noise a ratchet makes when it is turned. Total adjustment used in service life of the fuel control shall not exceed ten clicks in either direction. The adjustment shall be recorded in engine historical records. Whenever the fuel control is changed to a different engine, transfer the number of clicks and direction adjusted to new engine historical record. Whenever the fuel control is being returned to depot or storage transfer number of clicks and direction adjustment to tag (E-54) and keep tag with fuel control.



GO TO NEXT PAGE

1-109 ADJUST FUEL CONTROL (AVIM) (Continued)

1-109

- a. Remove lockwire and plug (12).
- b. Insert special screwdriver (T33) into hole exposed by plug removal, and engage adjustment screw.

NOTE

One click of the adjustment screw will change the acceleration time approximately one-tenth second. Number of clicks and direction turned to adjustment screw shall be logged in engine historical records.

- c. To increase acceleration time (slower rate), turn adjustment screw clockwise.
- d. To decrease acceleration time (faster rate), turn adjustment screw counterclockwise.
- e. Install packing and plug (12). Lockwire plug (12). Use lockwire (E29).

NOTE

Perform an acceleration check after adjustment . (Ref to TM 55-1520-240-MTF).

INSPECT**FOLLOW-ON MAINTENANCE**

NONE

END OF TASK

All data on page 1-541 is deleted.

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
- Mobile Engine Test Stand (T38)
- Pressure Gage Tube Assembly (Appendix E) (2)
- 1 Quart Container
- Dial Indicating Pressure
Gage, 0-200 psig (2)
- Union (AN 815-4D)

Materials:

Lockwire (E29)

Parts:

Packing

Personnel Required:

- 68B10 Aircraft Powerplant Repairer
- 68B30 Aircraft Powerplant Inspector

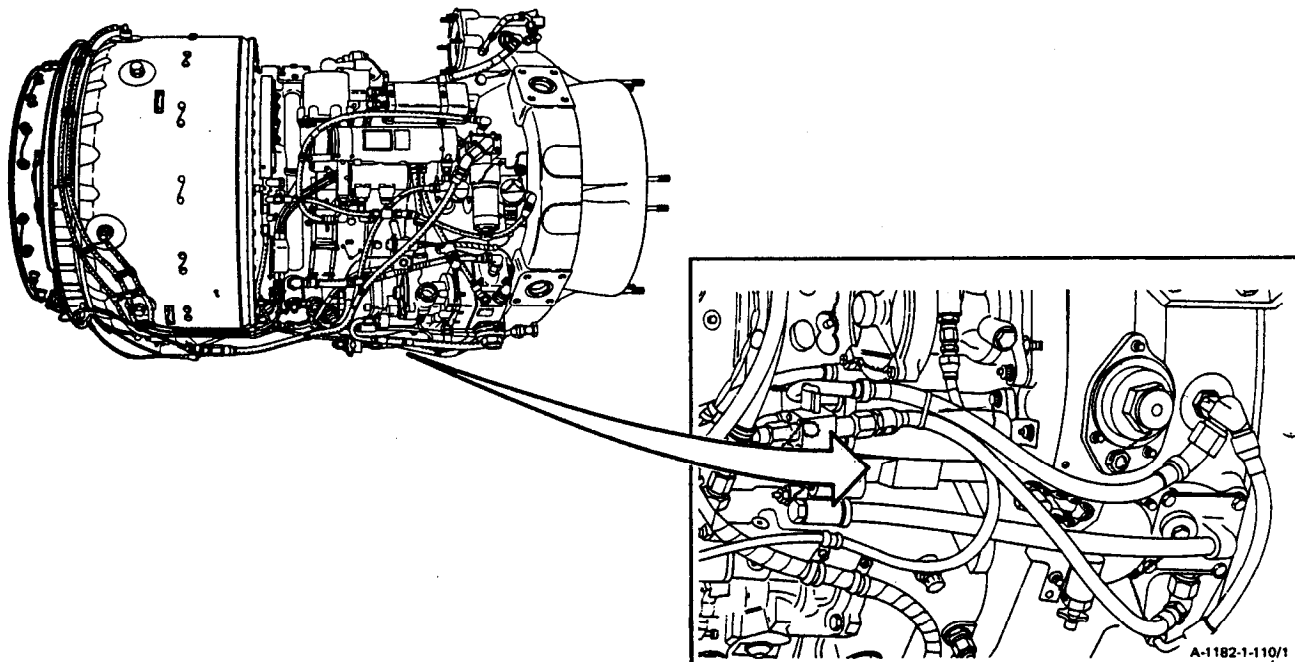
References:

- TM 55-1520-240-10
- TM 55-1520-240-23
- TM 55-2840-254-23P
- TM 55-4920-328-13
- Task 1-86
- Task 1-107

General Safety Instructions:

WARNING

Lubricating oils (E32 and E33) 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 areas of skin thoroughly after handling. If irritation of skin results, get medical attention. Get medical attention for eyes.



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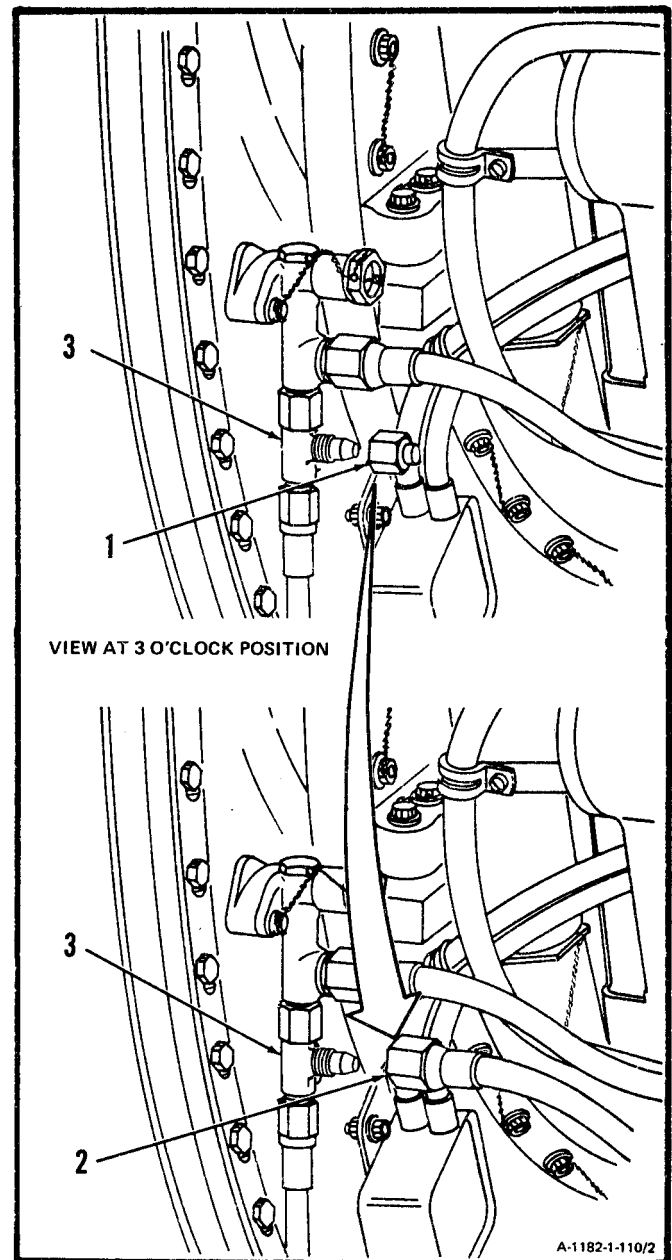
1-110 ADJUST OIL PUMP (Continued)

1-110

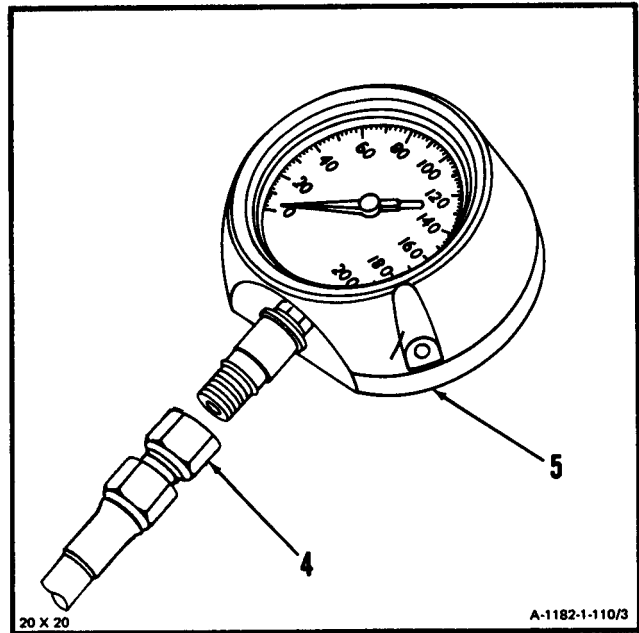
NOTE

Before making adjustments, perform steps 1 thru 4. This will determine if adjustments are necessary, or if Mobile Engine Test Stand/Airframe indicating systems are faulty.

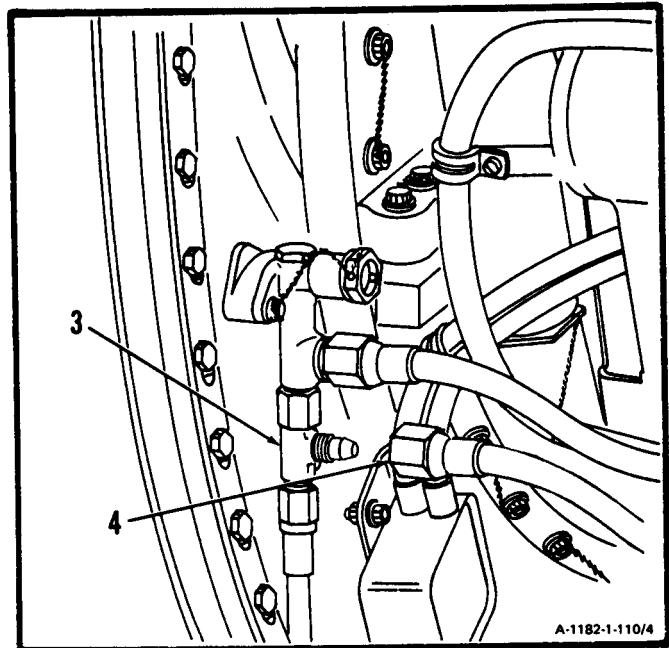
1. Remove cap (1) or disconnect hose assembly (2), if connected, from No. 2 bearing oil pressure tee and snubber (3) (Ref. TM 55-1520-240-23 or TM 55-4920-328-13).

**GO TO NEXT PAGE**

2. Attach pressure gage tube assembly (Appendix E) (4) to direct reading 0 to 200 psi pressure gage (5).



3. Connect pressure gage tube assembly (Appendix E) (4) to tee and snubber (3).

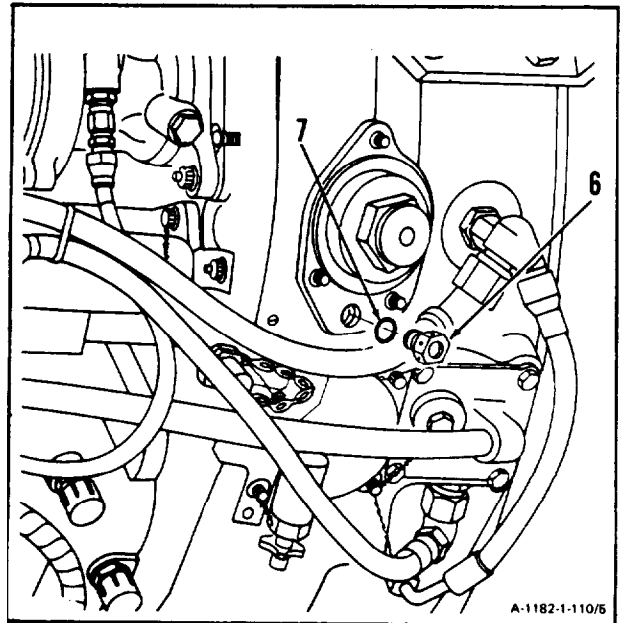


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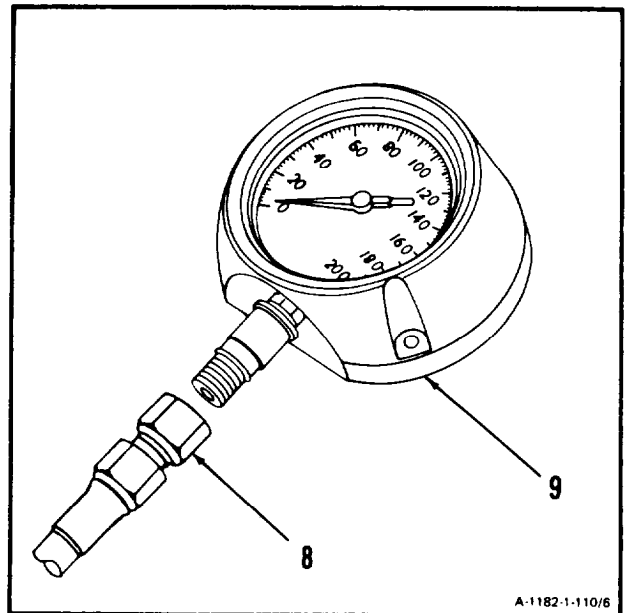
1-110 ADJUST OIL PUMP (Continued)

1-110

4. Operate engine until oil pressure has stabilized. (Ref. TM 55-1520-240-10 or Task 1-107.) Oil pressure should be 50 to 90 psig at 95 percent N1 and above; 35 psig minimum at 5 percent and 20 psig minimum at ground idle.
5. **Stop engine.**
6. **If oil pressure is not within limits,** check pump output as follows:
 - a. Remove lockwire, main oil filter drain plug (6) and packing (7).



- b. Attach pressure gage tube assembly (Appendix E) (8) to 0 to 200 psi direct reading pressure

**GO TO NEXT PAGE**

1-110 ADJUST OIL PUMP (Continued)

1-110

- c. **Install** packing (7) and **union (10)** in main oil filter drain hole (1 1).
- d. **Connect pressure gage tube assembly (Appendix E) (8)** to union (10).
- e. **Operate engine** (Ref. TM 55-1520-240-10 or Task 1-107). Engine oil pressure shall be 100 to 130 psig at 95 percent N1 and above. **If oil pressure is not within limits shut engine down.**

7. **Adjust oil pump** as follows:

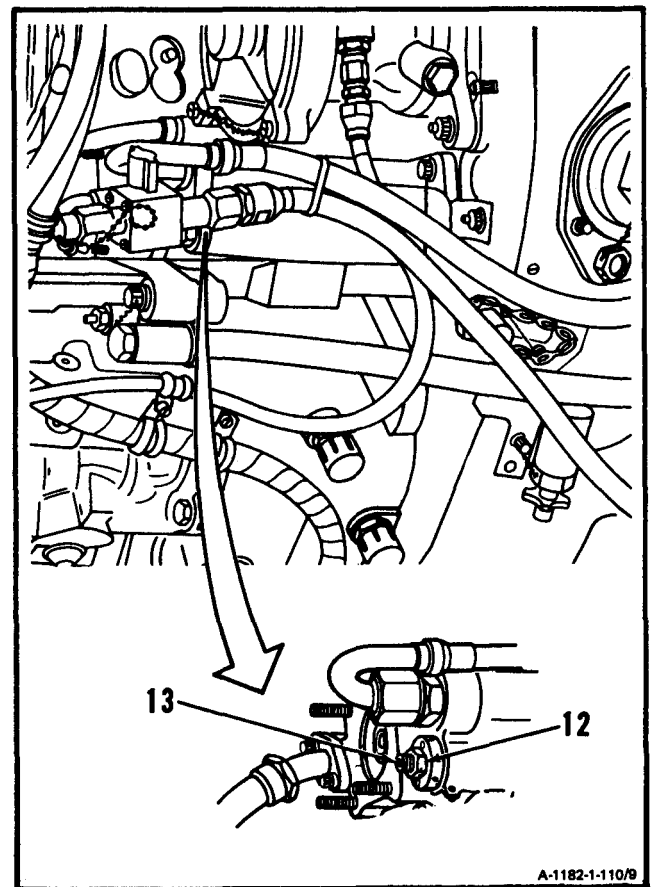
- a. Remove lockwire and **loosen adjusting screw locknut (12).**

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NOTE

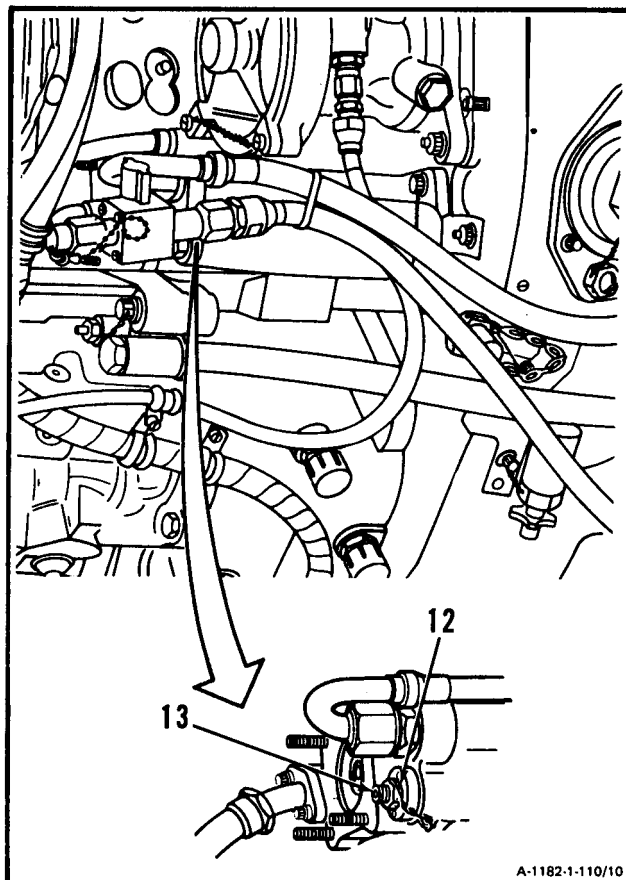
One full turn of adjustment screw (13) will change the pressure approximately 10 psig.

- b. Turn adjustment screw (13) clockwise to increase pressure if oil pressure is lower than 100 psig.
- c. Turn adjustment screw (13) counterclockwise to decrease pressure if oil pressure is higher than 130 psig.
- d. Tighten locknut (12) and operate engine to check oil pressure. If adjustment is still necessary, repeat step 7a., 7b., and 7c.
- e. Check oil pressure at No. 2 bearing connection pressure gage.

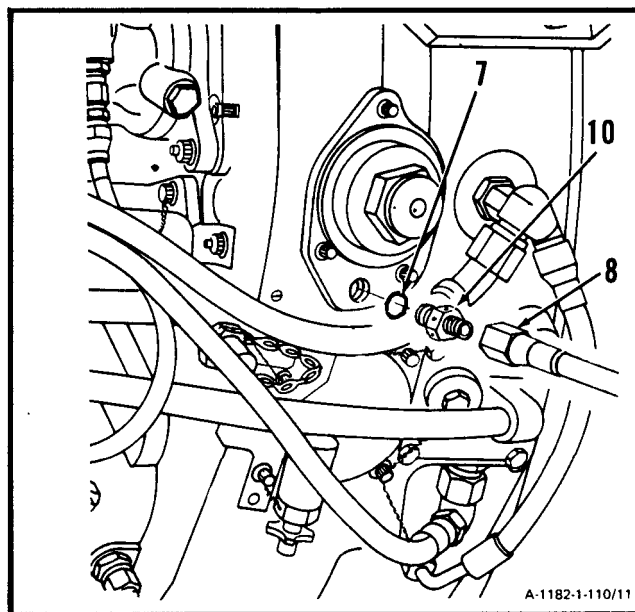


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8. If oil pump pressure at the filter drain is within limits and pressure at the No. 2 bearing connection is less than the limits outlined in step 4, inspect contaminated oil system (Ref. Task 1-86).
9. When the adjustment is properly reached between 100 to 130 psig, **tighten locknut (12)**. Lockwire locknut (12) using lockwire (E29).



10. Remove pressure gage tube assembly (Appendix E) (8), union (10) and packing (7).

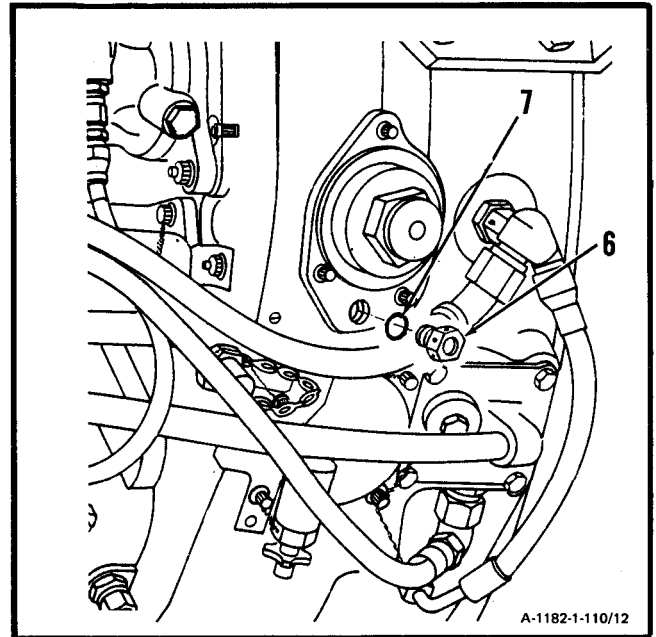


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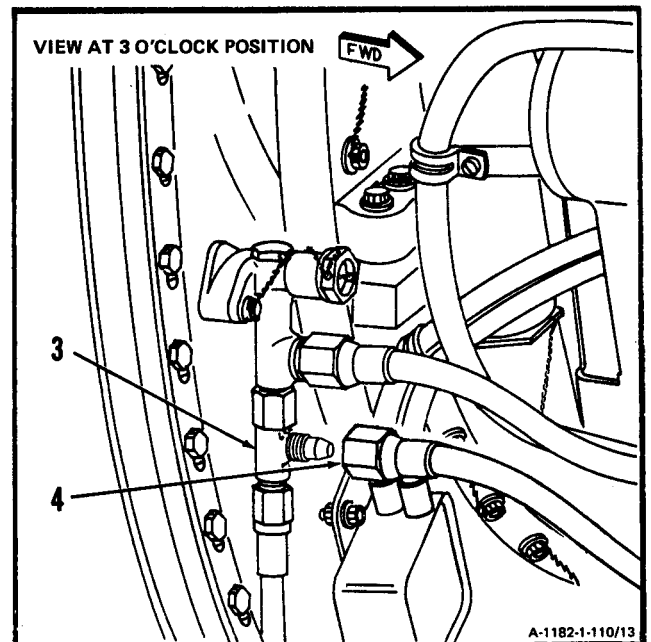
1-110 ADJUST OIL PUMP (Continued)

1-110

11. Install packing (7) and main oil filter drain plug (6). Lockwire plug (6). Use lockwire (E29).

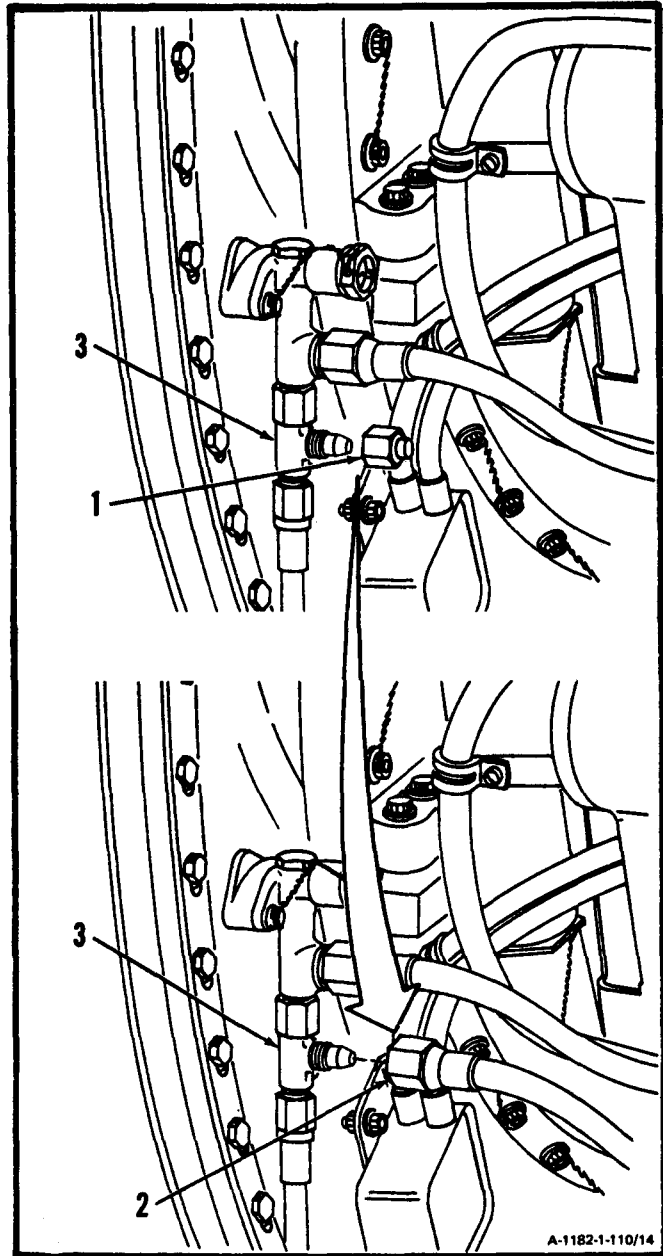


12. Remove pressure gage tube assembly (Appendix E) (4) from tee and snubber (3).



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13. Install cap (1) or connect hose assembly (2) to tee and snubber (3) (Ref. TM 55-4920-328-13 or TM 55-1520-240-23).



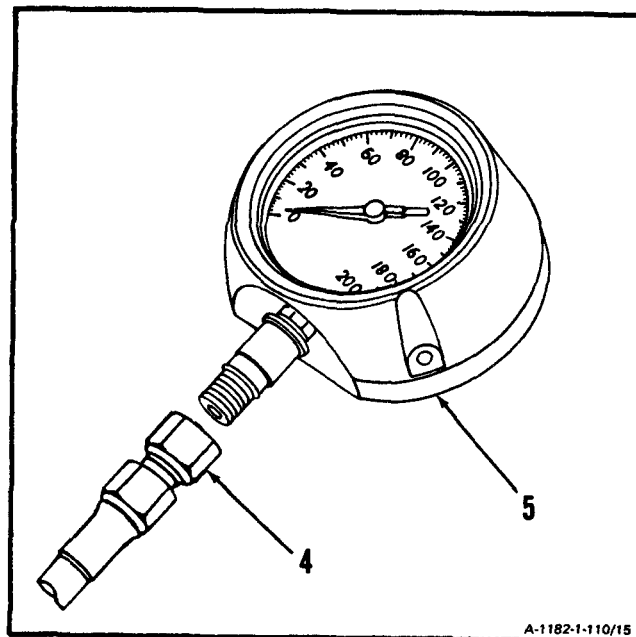
INSPECT

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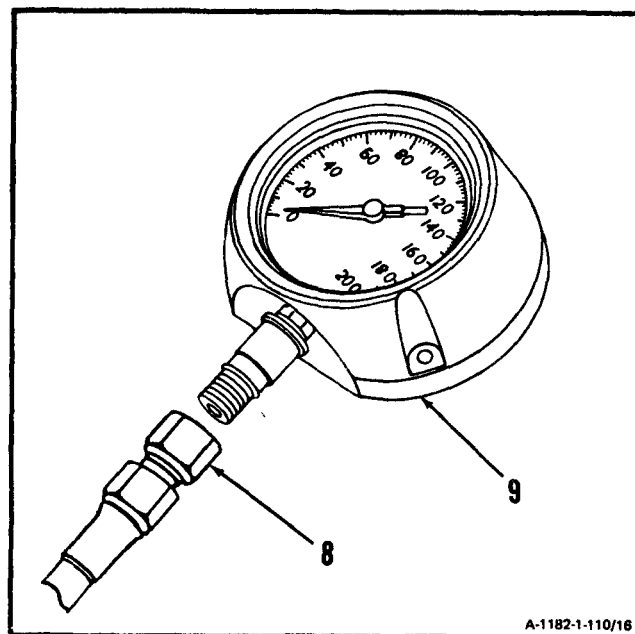
1-110 ADJUST OIL PUMP (Continued)

1-110

14. Disconnect pressure gage tube assembly (Appendix E) (4) from direct reading oil pressure gage (5).



15. Disconnect pressure gage tube assembly (Appendix E) (8) from direct reading oil pressure gage (9).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

Section XI. PREPARATION FOR STORAGE AND SHIPMENT

This section contains general procedures for proper handling of engine to be shipped or stored. It has instructions for preparing and installing engine in container. It also contains instructions for inspecting, preparing and marking container. Represerving engine stored for six months is also covered. They are divided into the following tasks:

LIST OF TASKS

NUMBER	TASK	PAGE
1-111	Preserve and Prepare Engine for Shipment or Storage	1-555
1-112	Prepare and Inspect Shipping and Storage Container	1-581
1-113	Install Engine Into Shipping and Storage Container	1-589
1-114	Mark Shipping and Storage Container	1-615
1-115	Represerve Engine in Storage Over Six Months	1-620

1-111 PRESERVE AND PREPARE ENGINE FOR SHIPMENT OR STORAGE

1-111

INITIAL SETUP**Applicable Configurations:**

All

Tools:

Powerplant Mechanic's Tool Kit,
NSN 5180-00-323-4944
Drain Hose (Appendix E)
Drain Hose (Appendix E)
Hose Assembly (Appendix E)
Container, 2 Gallon

Materials:

Barrier Material (E6)
Corrosion Preventive Compound (E14)
Lubricating Oil (E31)
Plastic Cover (E41)
Tape (E42)
Wiping Rag (E58)

Personnel Required

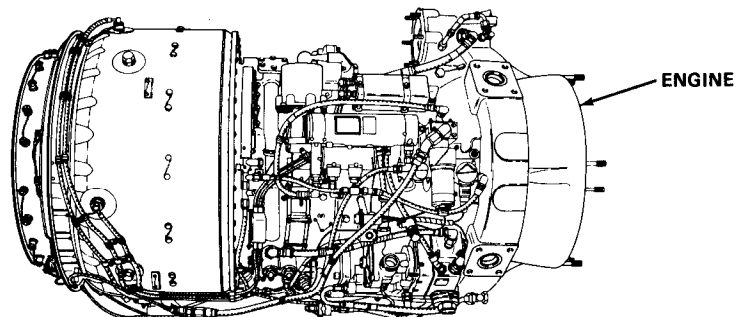
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

TM 55-1520-240-10
Task 1-74 Task 1-113
Task 1-75 Task 6-2
Task 1-101 Task 6-3
Task 1-107 Task 6-5

General Safety Instructions:**CAUTION**

Lubricating oil (E31) causes paralysis if swallowed. Turbine fuels are very flammable. Oils and fuels may cause 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.



A-1182-1-111/1

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1. **Preserve engine that can be motored** as follows:

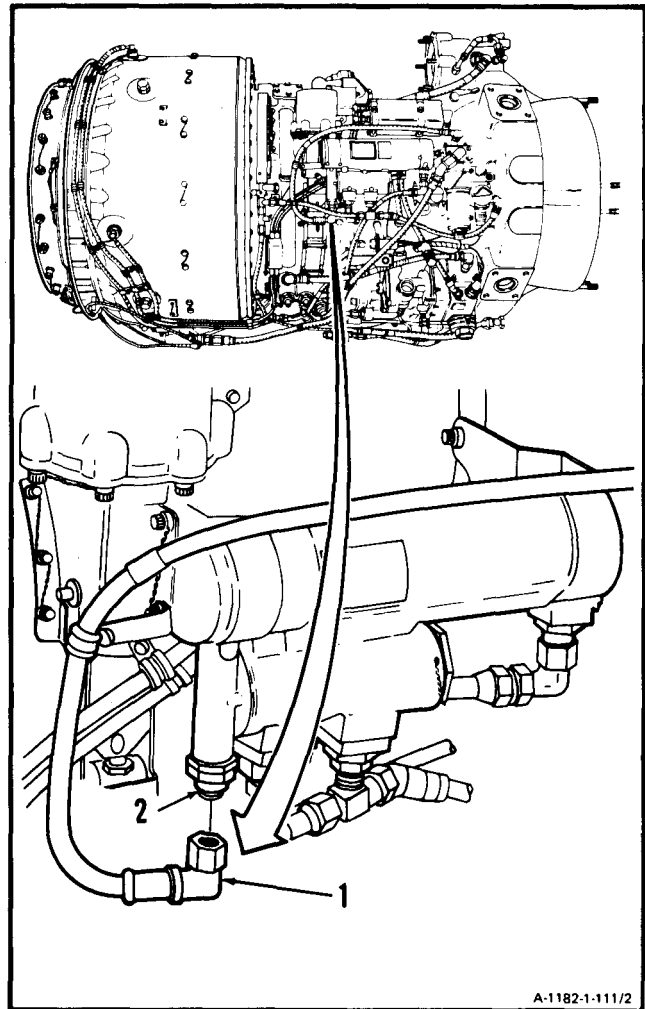
NOTE

Add corrosion preventive concentrate to oil system (Ref. TB 55-9150-200-25). Record data of preservation and maintenance during preservation on historical record, DA form 2408-16.

NOTE

This preservation procedure must be repeated every 45 days if engine is not installed in container.

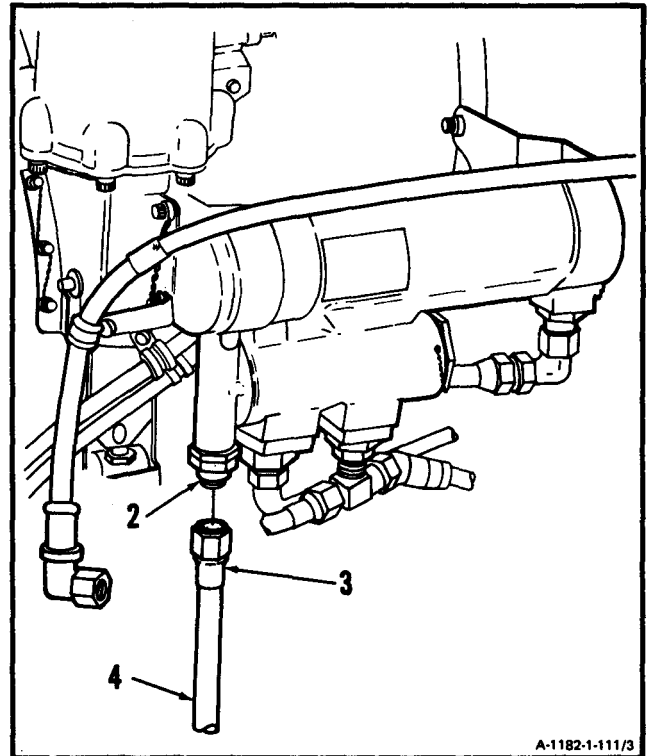
- a. **Service fuel control filter** (Ref. Task 1-101).
- b. **Service engine oil system to half full** (Ref. Task 1-74 or Task 1-75).
- c. **Disconnect main fuel hose (1)** from oil cooler assembly tube assembly fuel outlet port (2).



A-1182-1-111/2

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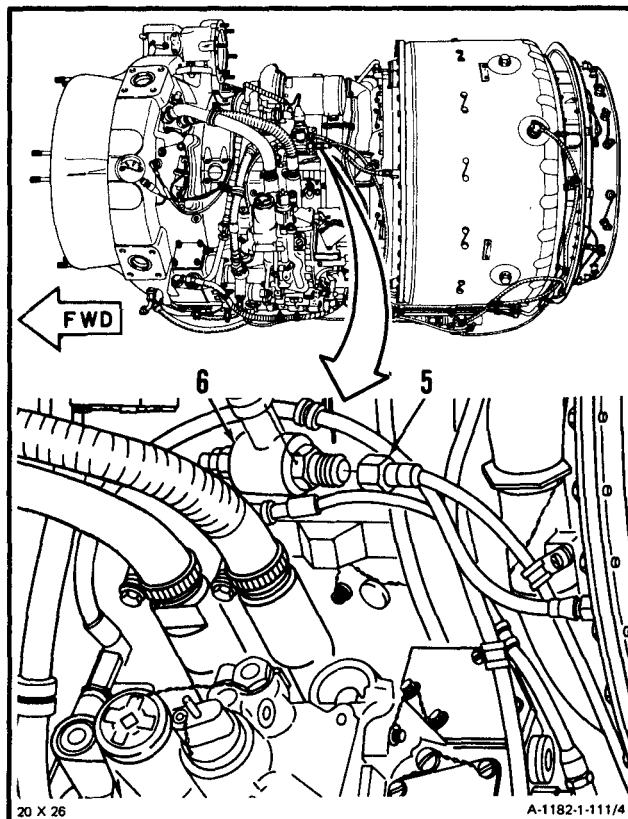
- d. Attach drain hose (Appendix E) (3) to oil cooler assembly tube assembly fuel outlet port (2).
- e. Insert free end (4) of drain hose (Appendix E) (3) into suitable approved metal safety container.



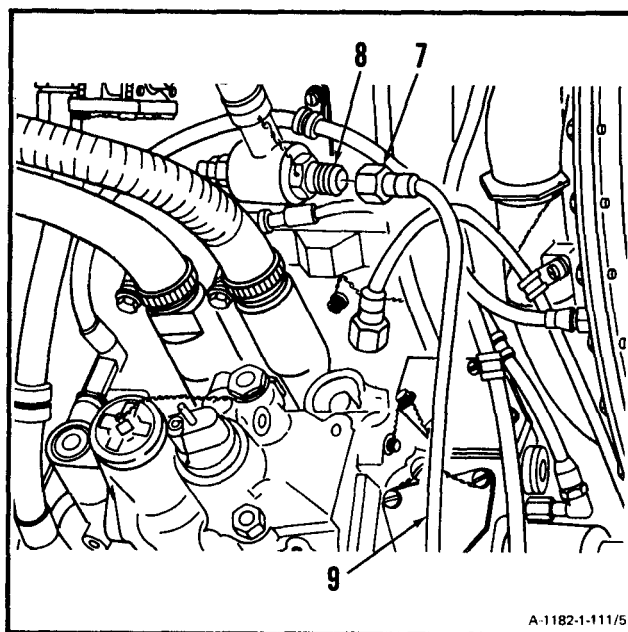
A-1182-1-111/3

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- f. Disconnect starting fuel hose assembly (5) from starting fuel solenoid valve (6).



- g. Attach drain hose (Appendix E) (7) to fuel solenoid valve outlet port (8).
- h. Insert free end (9) of drain hose (Appendix E) (7) into suitable approved metal safety container.

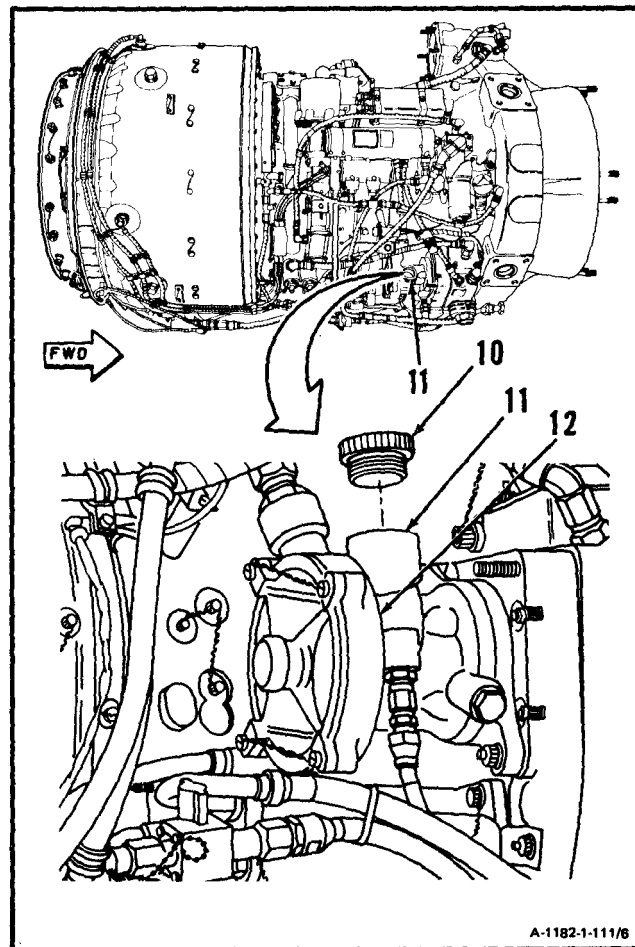


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1-111 PRESERVE AND PREPARE ENGINE FOR SHIPMENT OR STORAGE (Continued)

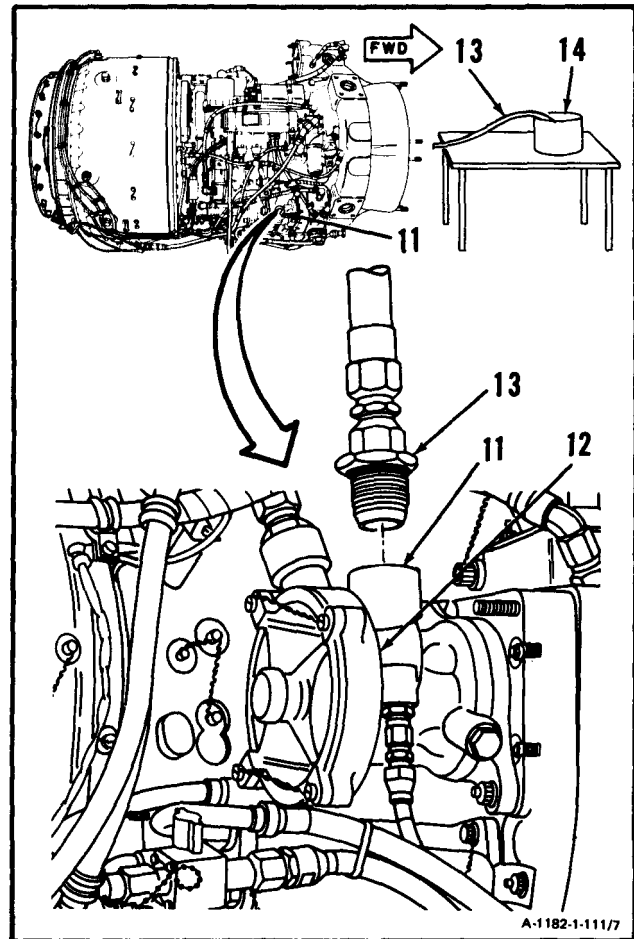
1-111

- i. Remove plug (10) from fuel boost pump inlet port (11) on fuel boost pump (12).



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- j. **Attach hose (Appendix E) (13) from container (14) of lubricating oil (E31) to fuel boost pump inlet port (11) on fuel boost pump (12).**



CAUTION

Make sure engine IGNITION circuit breaker is open (pulled out). This will prevent accidental engine start. Tag circuit breaker. Do not close circuit breaker (Ref. TM 55-1520-240-10 or Task 1-107).

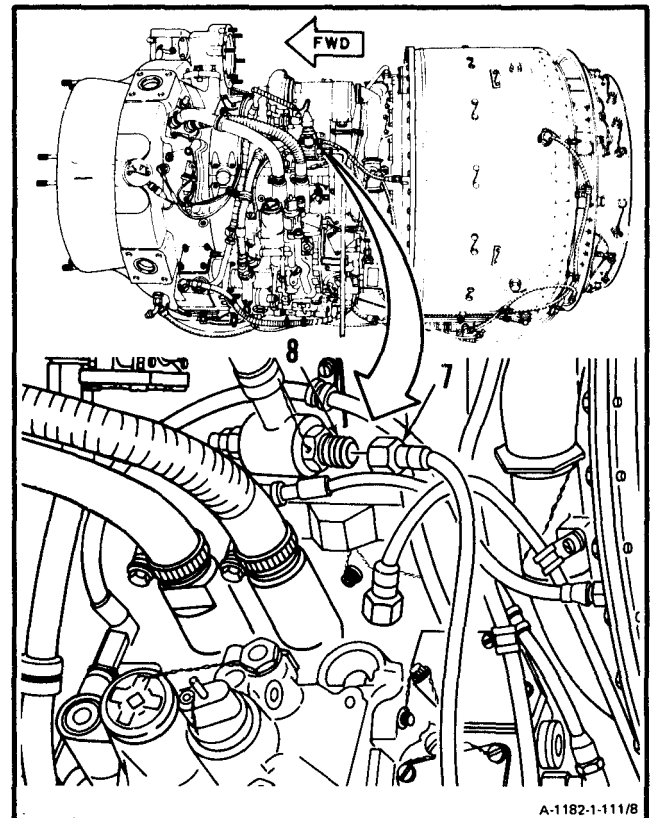
- k. **Set power lever N1 at GRDIDLE and energize starting fuel solenoid valve** (Ref. TM 55-1520-240-10 or Task 1-107).
- l. **Motor engine to at least 12 percent N1 speed to flush fuel system with lubricating oil (E31). Continue motoring until approximately one gallon of lubricating oil (E31) has passed through system.** (Ref. TM 55-1520-240-10 or Task 1-107).

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1-111 PRESERVE AND PREPARE ENGINE FOR SHIPMENT OR STORAGE (Continued)

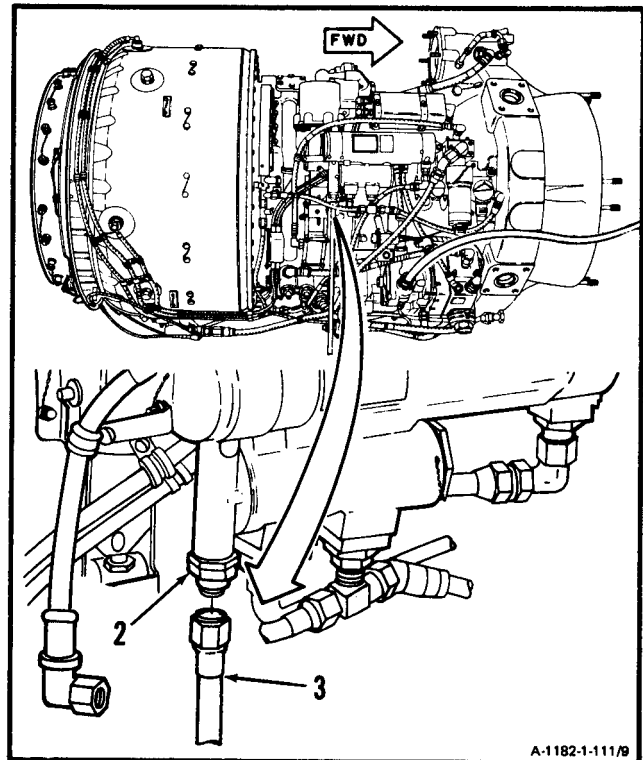
1-111

- m. Move power lever (N1) to OFF position and reenergize starting fuel solenoid valve (Ref. TM 55-1520-240-10 or Task 1-1 07).
- n. Wait **10 minutes** after motoring engine. This will allow time for lubricating oil to drain into container.
- o. Remove drain hose (Appendix E) (7) from fuel solenoid valve outlet port (8).



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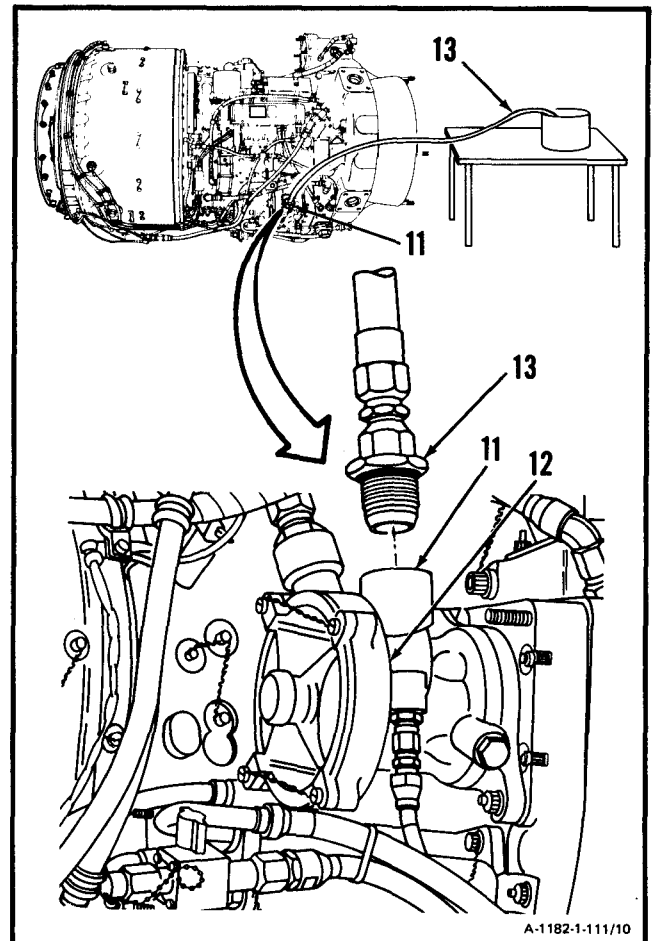
- p. Remove drain hose (Appendix E) (3) from oil cooler assembly tube assembly outlet port (2).



A-1182-1-111/9

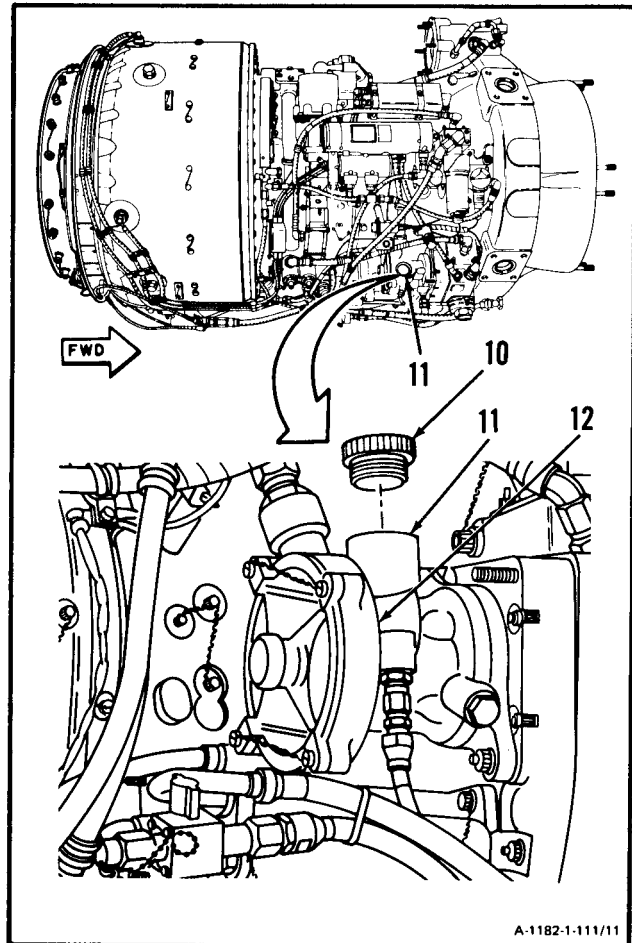
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- q. Remove hose assembly (Appendix E) (13) from engine fuel boost pump inlet port (11) on fuel boost pump (12).



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- r. Install plug (10) in fuel boost pump inlet port (11) on fuel boost pump (12).

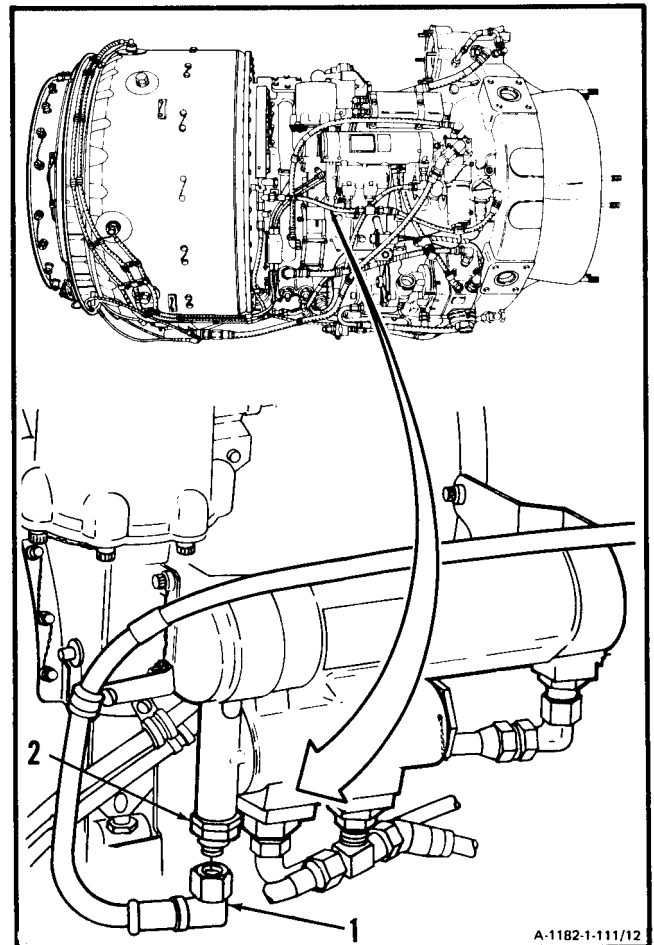


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1-111 PRESERVE AND PREPARE ENGINE FOR SHIPMENT OR STORAGE (Continued)

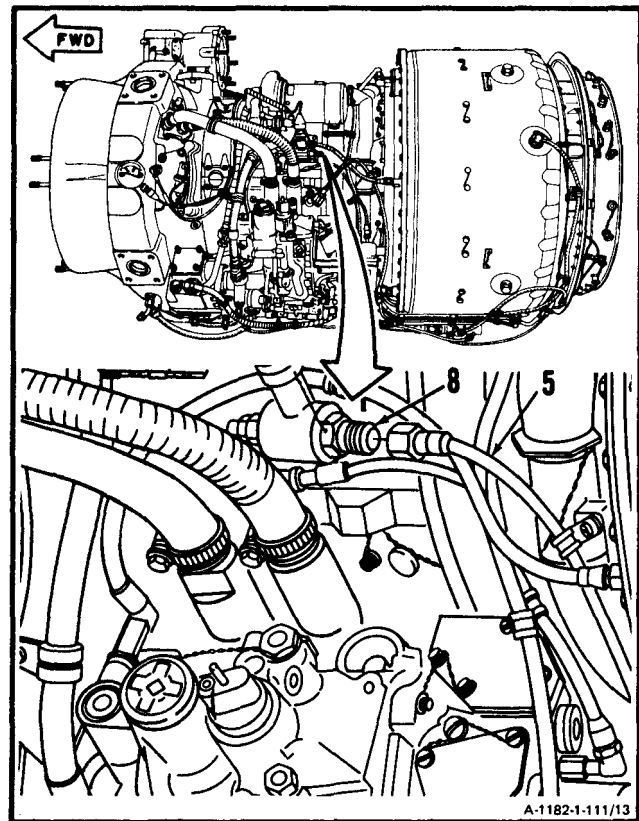
1-111

- s. **Connect main fuel hose (1)** to oil cooler assembly tube assembly fuel outlet port (2).



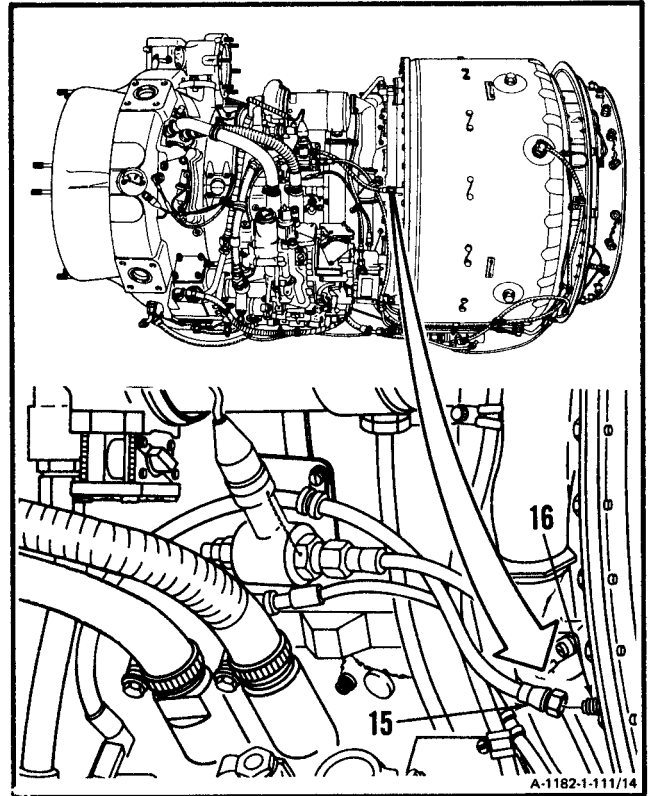
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- t. Connect starting fuel hose assembly (5) to starting fuel solenoid valve outlet port (8).

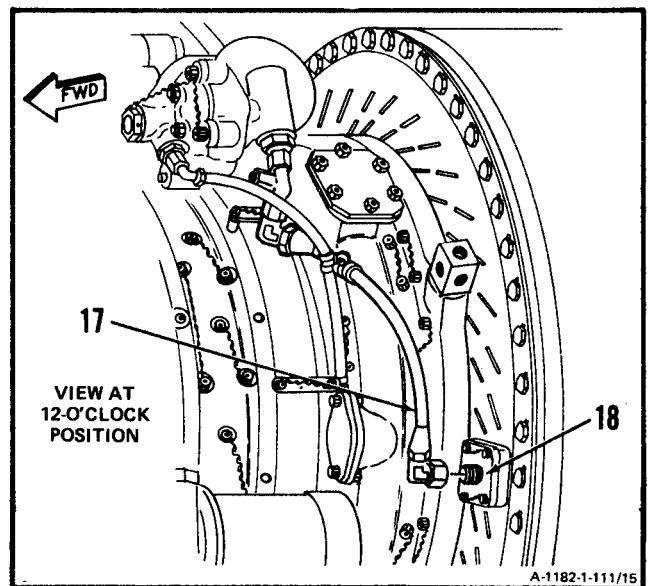


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- u. **Disconnect** {air diffuser to fuel control) **hose assembly (15)** from diffuser housing port (16).



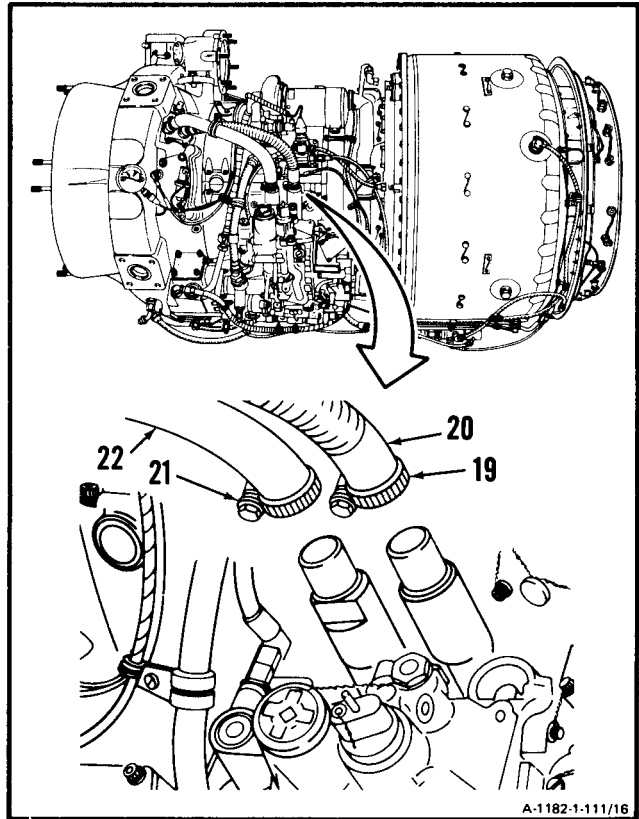
- v. **Disconnect** (interstage air-b lced actuator) **hose assembly (17)** from diffuser housing port (18).



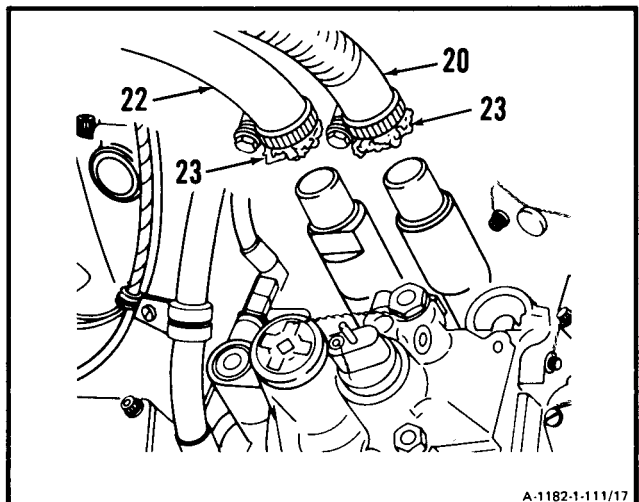
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w. Loosen clamp (19) and **disconnect hose (20)**.

x. Loosen clamp (21) and **disconnect hose (22)**.



y. **Cover open ends of hoses (20 and 22)** with barrier material (E6) (23).



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WARNING

Corrosion preventive compound (E14) is flammable and toxic. Use only in well-ventilated area away from heat, sparks and open flames. If swallowed do not induce vomiting. Get medical attention. In case of contact immediately flush skin and eyes with water for 15 minutes. Get medical attention for eyes.

z. Spray compressor blades as follows:

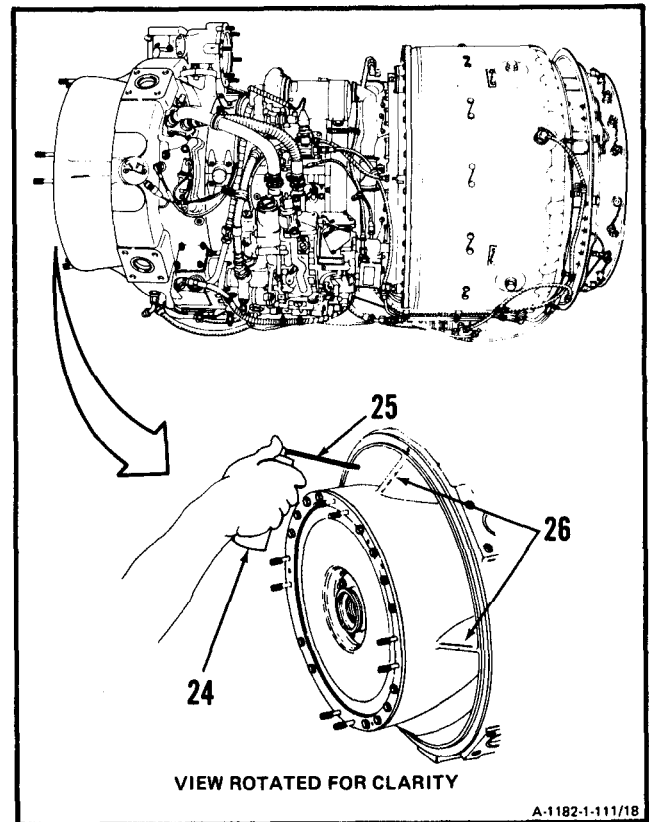
CAUTION

Wait until engine is cool before proceeding with this step. Failure to do so could result in ignition.

NOTE

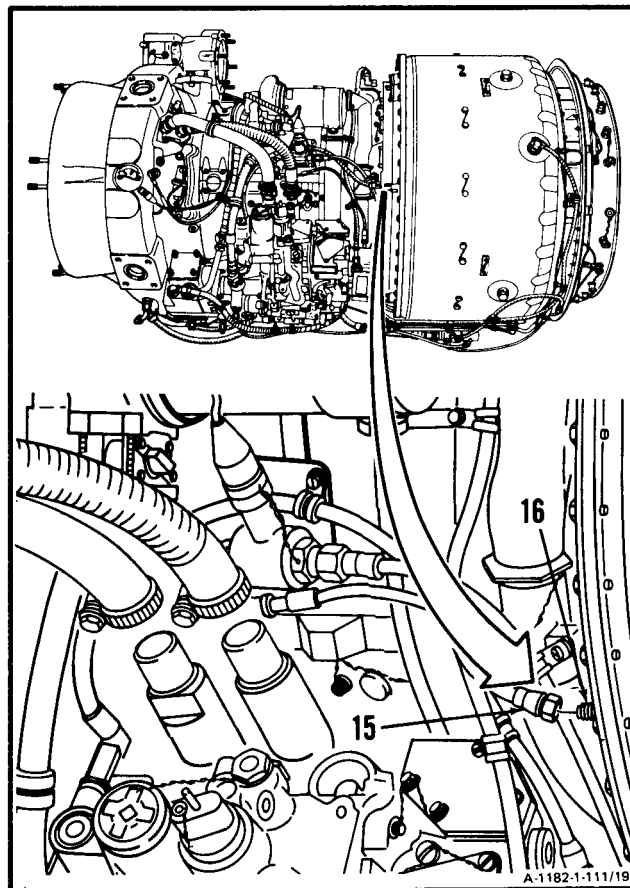
Following steps will assure corrosion preventive compound (E14) covers as much of compressor blades as possible.

- (1) Using starter, **motor engine to 12 percent N1 rpm. With power lever off, permit engine to coast down.** (Ref. TM 55-1520-240-10 or Task 1-107).
- (2) **While engine is coasting down, spray corrosion preventive compound (E14) (24) into inlet housing.** Use a 16-ounce can of corrosion preventive compound (E14) (24) with snorkel tube (25). **Project snorkel tube (25) into areas between inlet housing struts (26).** Direct jet stream of corrosion preventive compound (E14) (24) onto rotating compressor blades. Move jet stream from base to tip of compressor blades. Apply jet stream for 30 seconds.

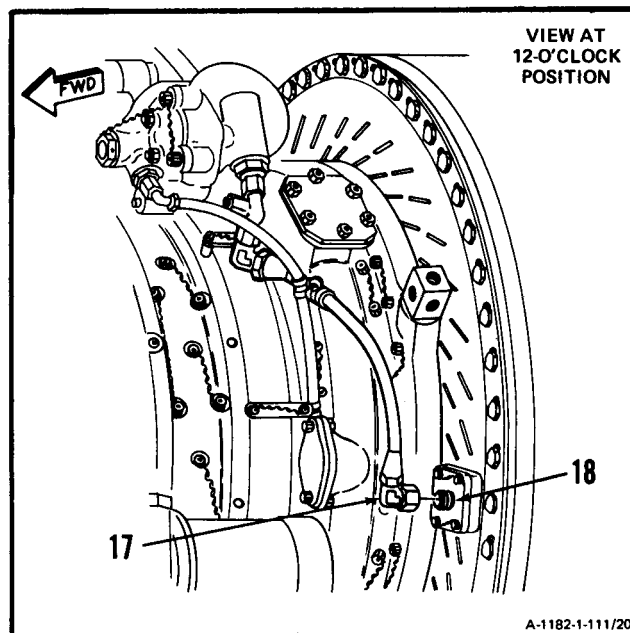


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aa. Connect hose assembly (15) to diffuser housing port (16).

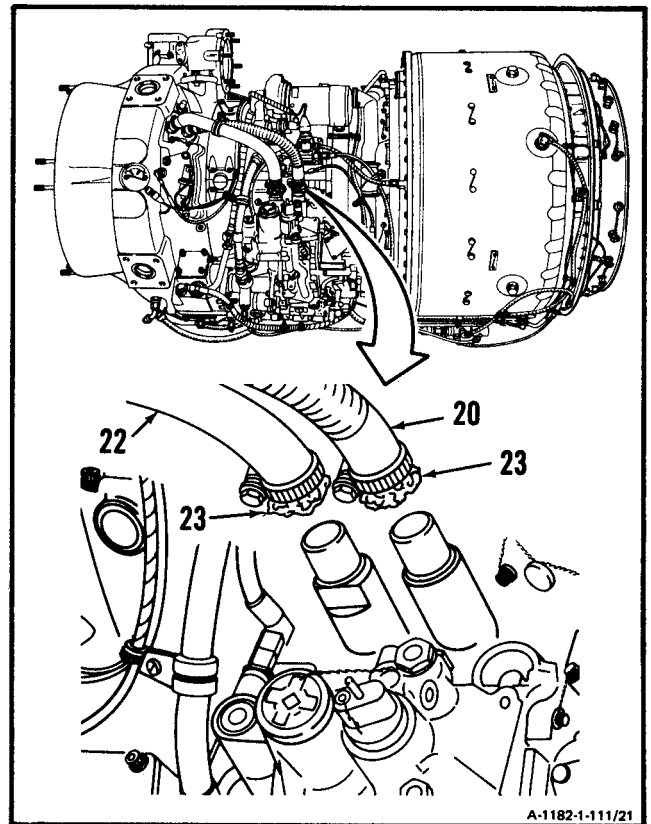


ab. Connect hose assembly (17) to diffuser housing port (18).



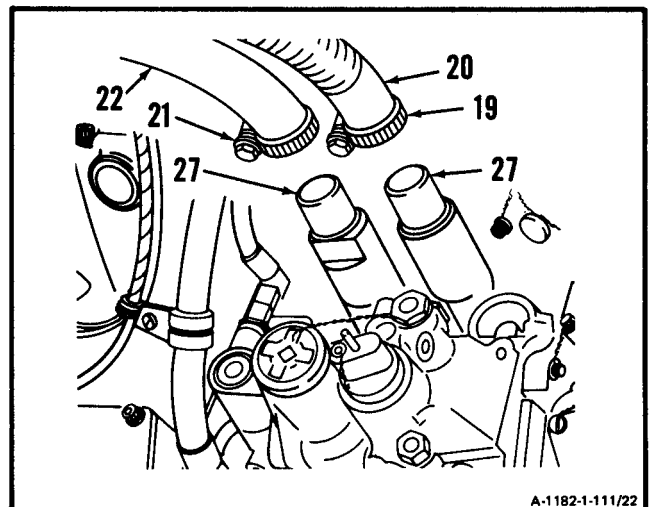
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- ac. Remove barrier material (E6) (23) from hoses (20 and 22).



- ad. Install hose (20) to temperature sensing adapter (27) and secure with clamp (19).

- ae. Install hose (22) to temperature sensing adapter (27) and secure with clamp (21).

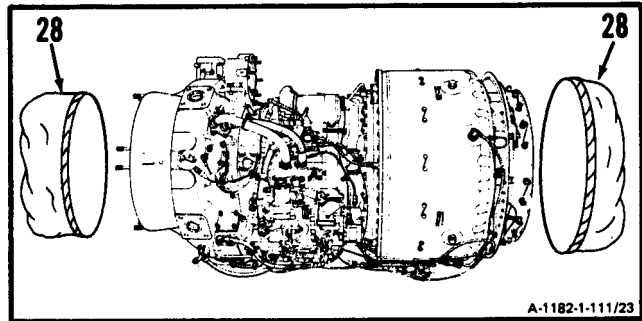


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- af. **Install plastic cover (E41) (28)** over inlet end of engine. **Install second plastic cover (E41) (28)** over exhaust end of engine. Secure covers with tape (E42).

NOTE

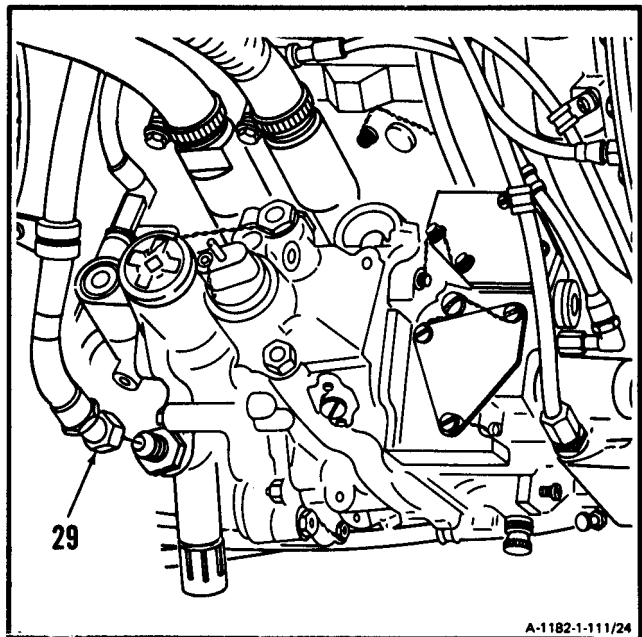
If engine is to be inactive for more than 180 days, install engine into shipping and storage container (Ref. Task 1-113).



2. **Preserve engine that cannot be motored** as follows:

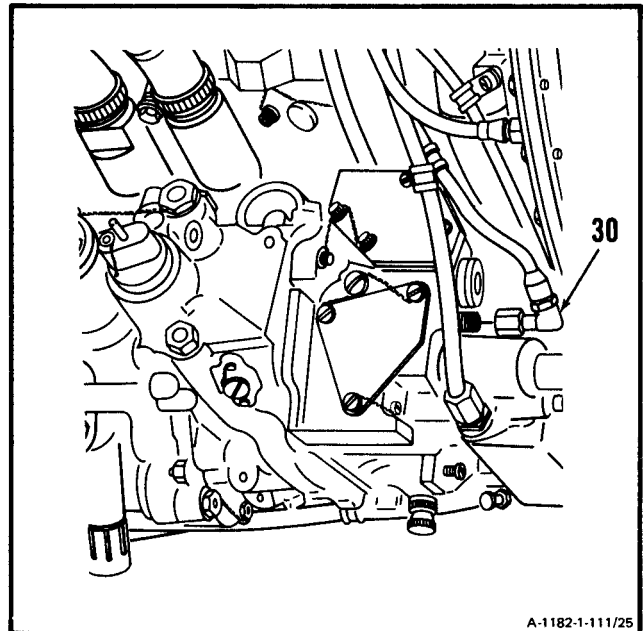
- a. **Disconnect hose assemblies from fuel control** as follows:

- (1) **Disconnect** (main fuel filter to fuel control) **hose assembly (29)**.

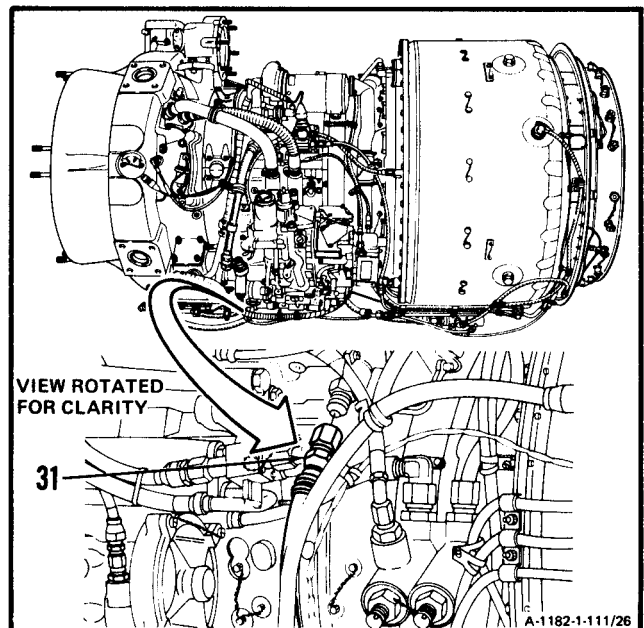


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- (2) **Disconnect** (starting fuel solenoid to fuel control) hose assembly (30).

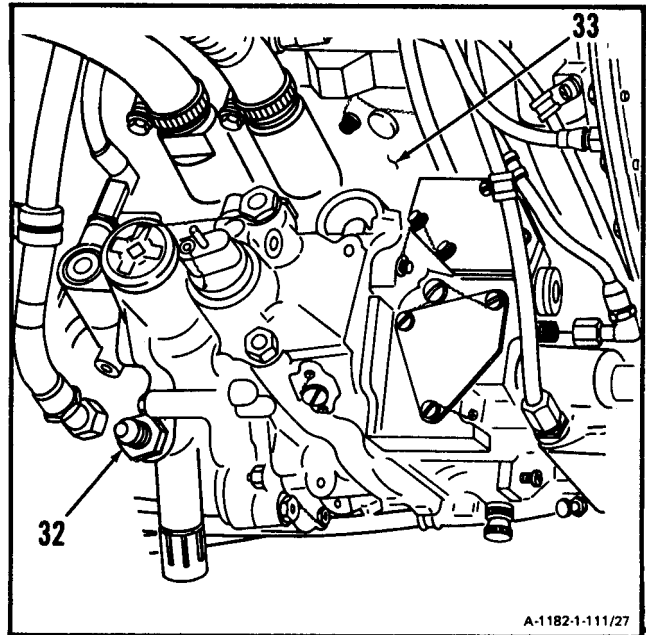


- (3) **Disconnect** (oil cooler to fuel control) hose assembly (31).

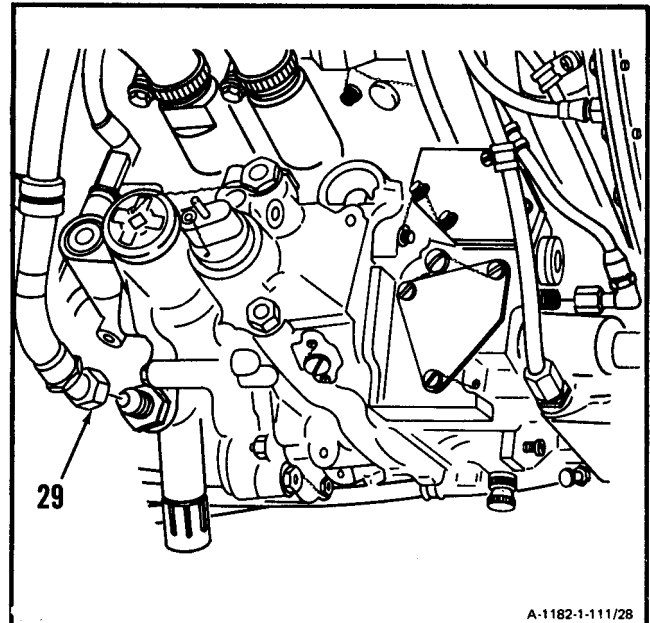


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- b. Remove fuel control filter (Ref. Task 6-2).
- c. Clean fuel control filter (Ref. Task 6-3, steps 2 and 3).
- d. Reinstall fuel control filter (Ref. Task 6-5).
- e. Allow fuel to drain out of all previously disconnected hose assemblies.
- f. Pour lubricating oil (E31) into fuel inlet port (32) on fuel control assembly (33).

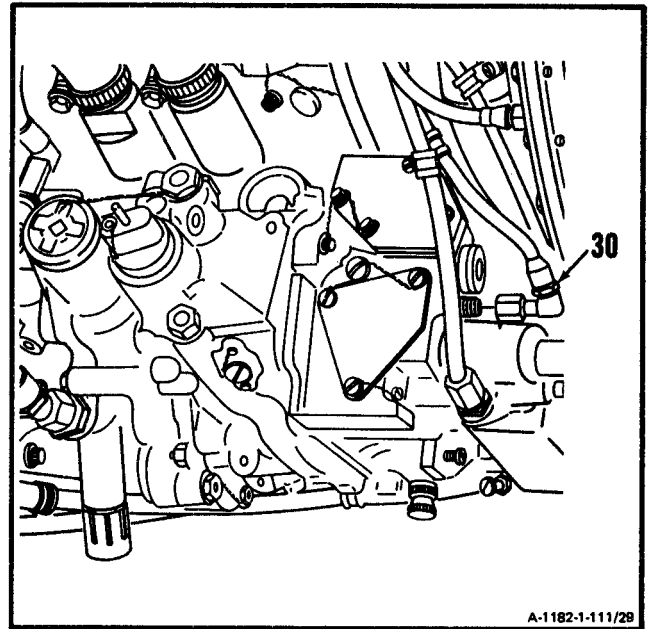


- g. Connect hose assemblies to fuel control as follows:
 - (1) Connect hose assembly (29).

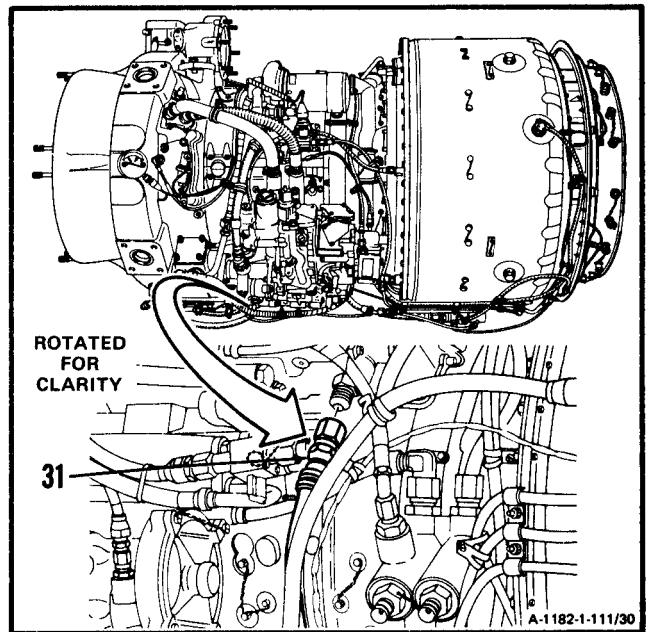


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(2) Connect hose assembly (30).

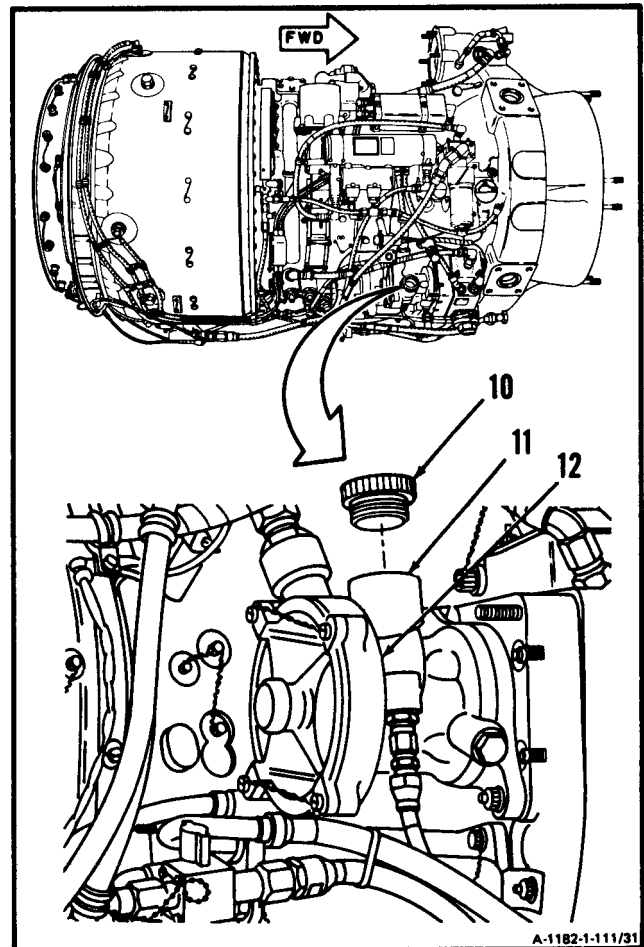


(3) Connect hose assembly (31).



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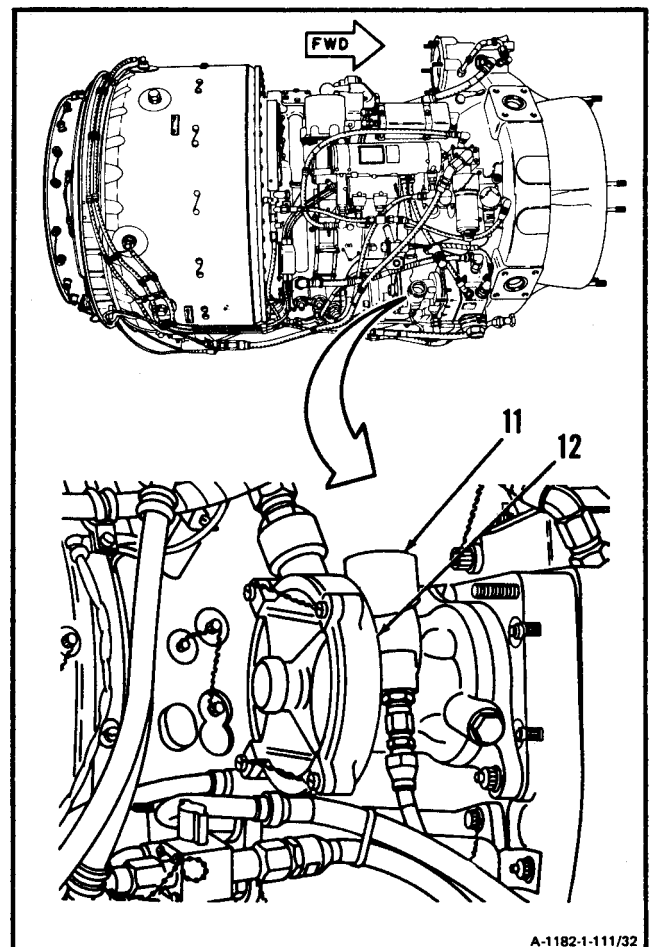
- h. Remove plug (10) from fuel boost pump inlet port (11) on fuel boost pump (12).



A-1182-1-111/31

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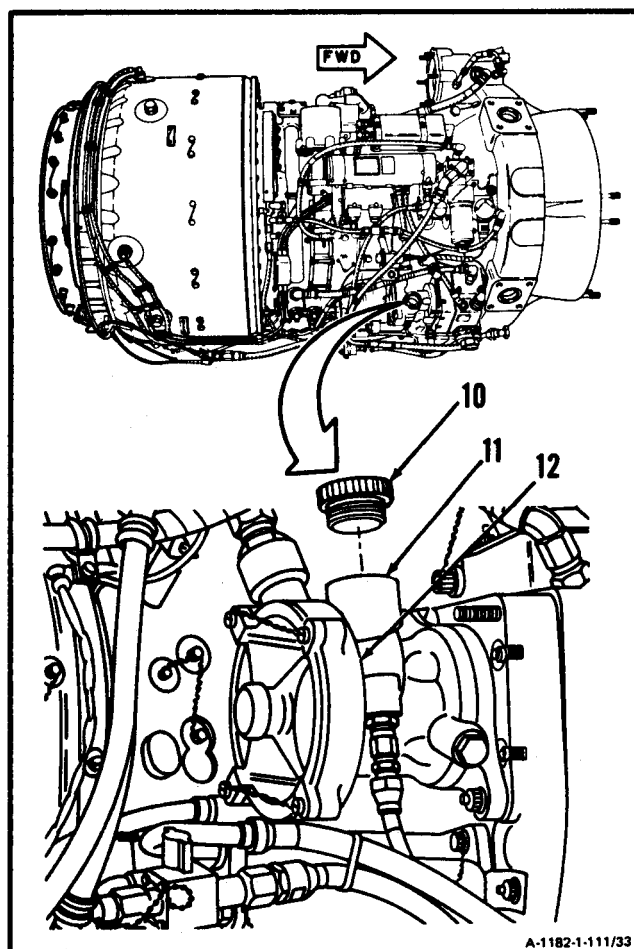
- i. Pour lubricating oil (E31) into fuel system through fuel boost pump inlet port (11) on fuel boost pump (12).



A-1182-1-111/32

GO TO NEXT PAGE

- j. install plug (10) in fuel boost pump inlet port (11) on fuel boost pump (12).



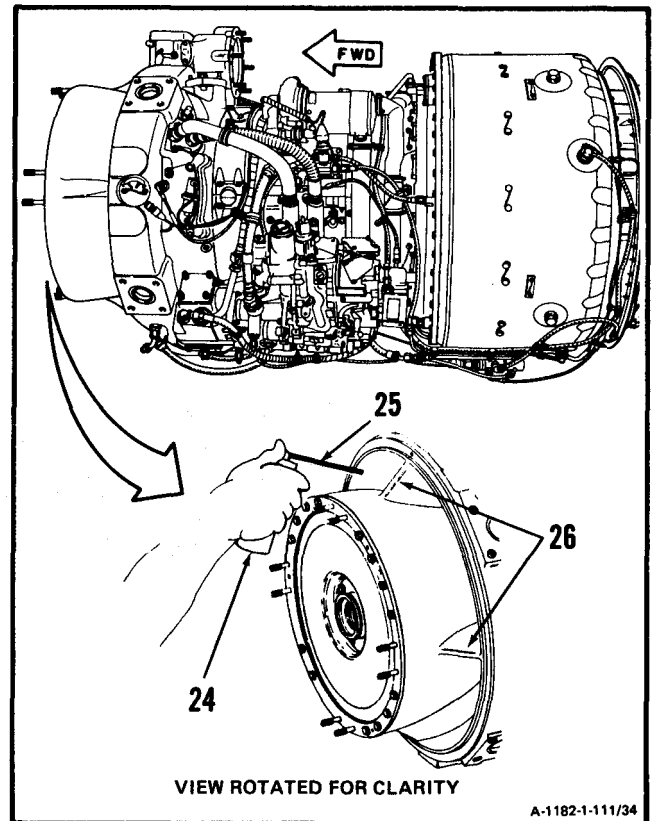
A-1182-1-111/33

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WARNING

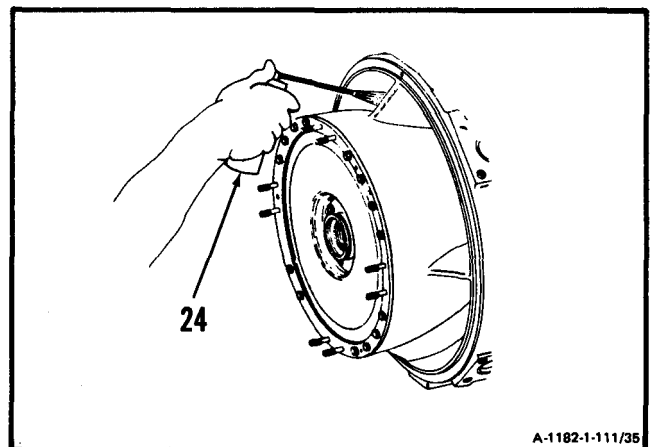
Corrosion preventive compound (E14) is flammable and toxic. Use only in well-ventilated area away from heat, sparks and open flames. If swallowed do not induce vomiting. Get medical attention. In case of contact immediately flush skin and eyes with water for 15 minutes. Get medical attention for eyes.

- k. Hold 16-ounce can of corrosion preventive compound (E14) (24) with snorkel tube (25) so that it projects into areas between inlet housing struts (26).

**NOTE**

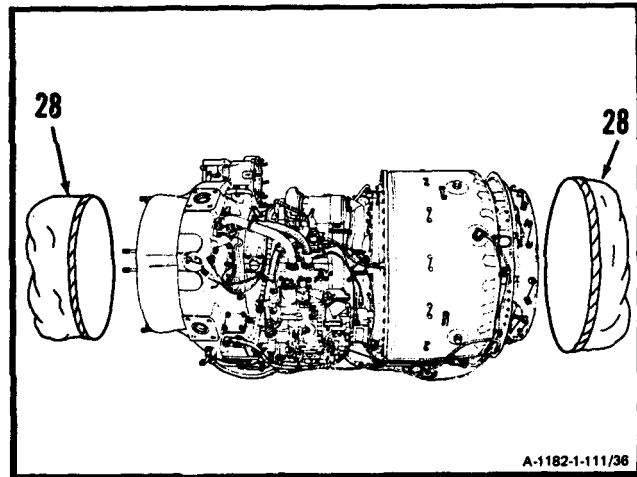
Following step will assure corrosion preventive compound (E14) covers as much of compressor blades as possible.

- l. **Direct jet stream of corrosion preventive compound (E14) (24) onto compressor blades.** Move jet stream from base to tip of compressor blades. **Apply jet stream for 30 seconds.**



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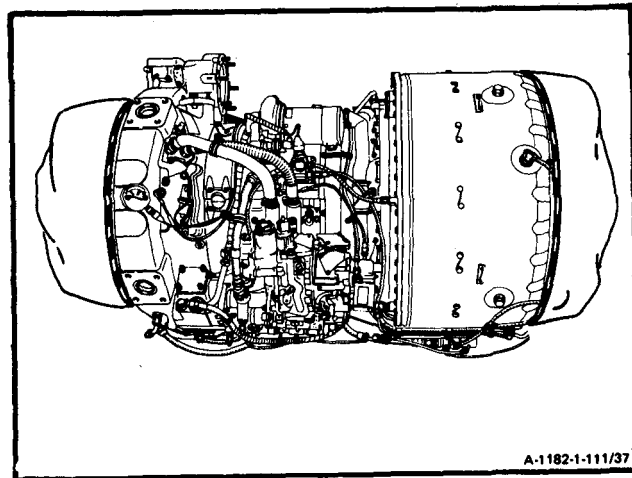
- m. Install plastic cover (E41) (28) over inlet end of engine. Install second plastic cover (E41) (28) over exhaust end of engine, Secure covers with tape (E42).



- n. If engine is to be inactive for more than 180 days, install engine into shipping and storage container (Ref. Task 1-113).

FOLLOW-ON MAINTENANCE:

None



END OF TASK

1-112 PREPARE AND INSPECT SHIPPING AND STORAGE CONTAINER

1-112

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
Chain with Hooks (Appendix E)
Vacuum Cleaner
Wire Brush
Half-Round File
Hoist

Materials:

Glycerol (E21)
Lint-Free Cloth (E26)

Parts:

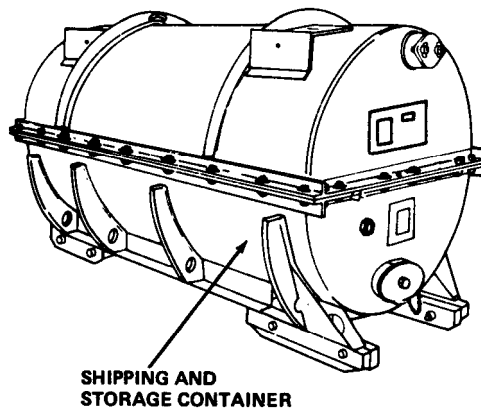
Packing
Humidity Indicator Card

Personnel Required:

68B10 Aircraft Powerplant Repairer (2)
68B30 Aircraft Powerplant Inspector

Equipment Condition:

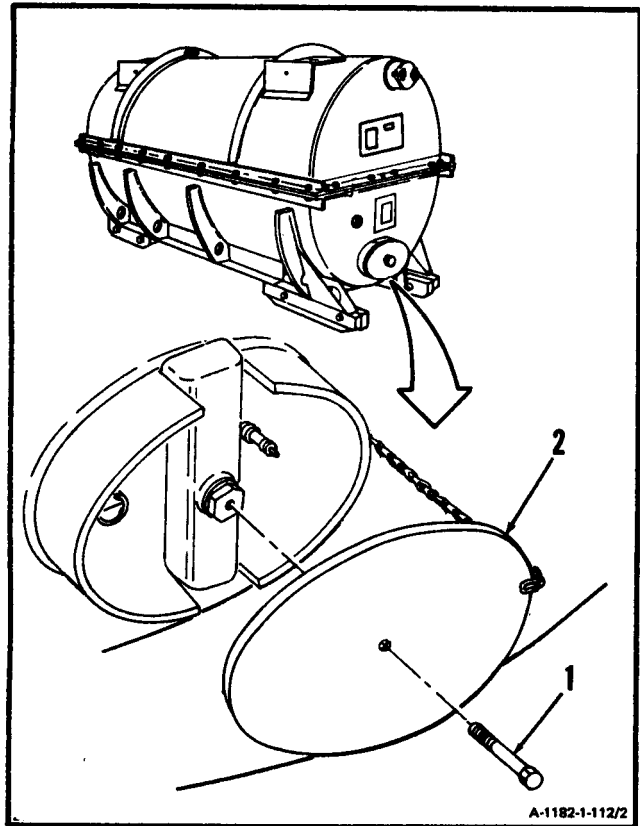
Engine Removed from Shipping and Storage
Container (Task 1-26)
Engine Preserved and Prepared for Shipment
or Storage (Task 1-111)



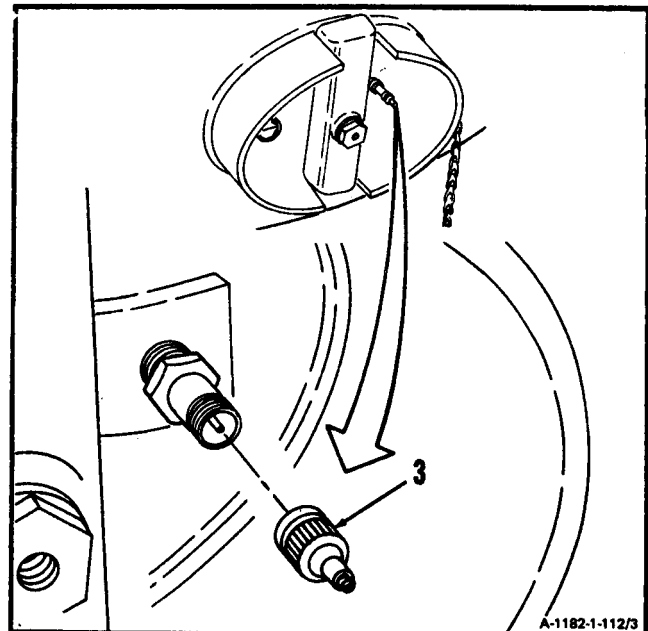
A-1182-1-112/1

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1. Remove bolt (1) and cover (2).



2. Remove valve cap (3).



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WARNING

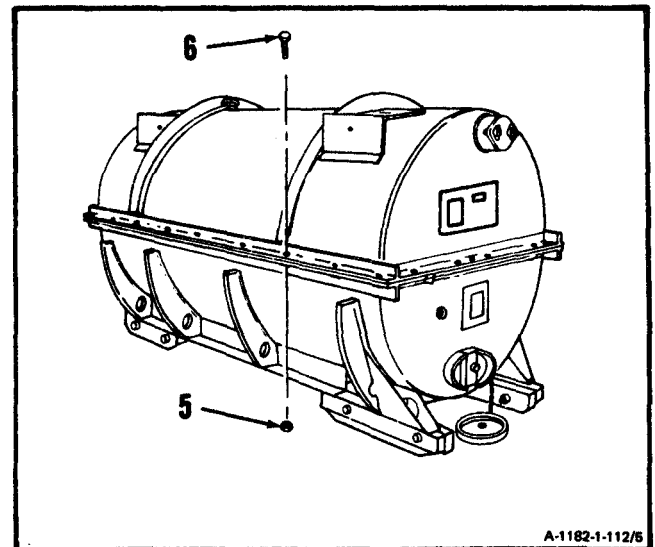
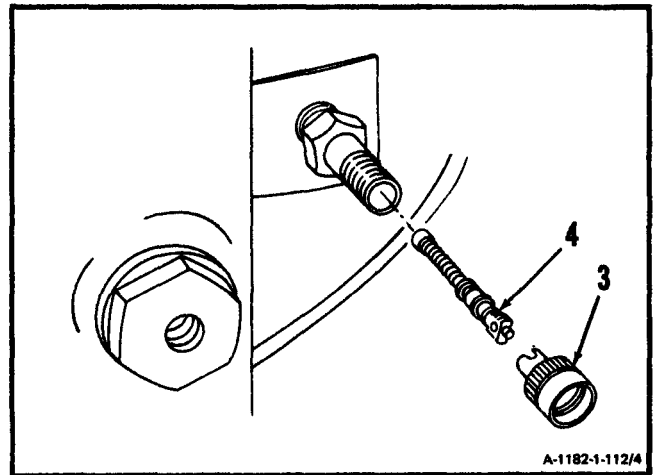
Shipping container is pressurized. Use care during removal of valve stem. Injury to personnel can result. Get medical attention.

3. Remove valve stem (4). Use slotted end of valve cap (3).

WARNING

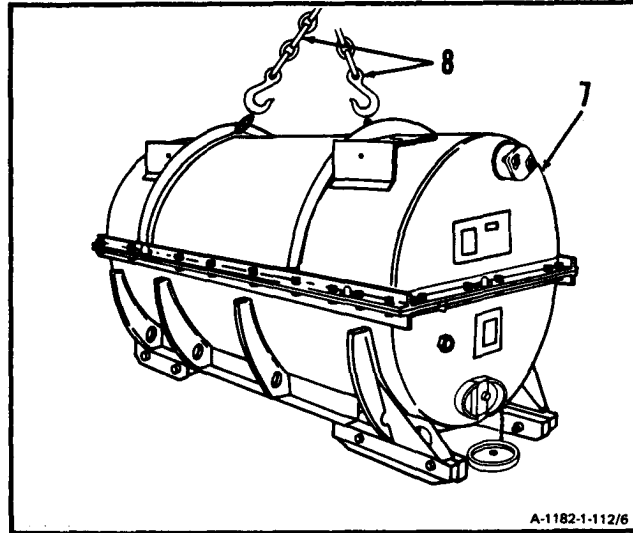
Be sure all air pressure has been released from container before loosening nuts. If nuts are loosened before pressure is released, internal pressure could blow cover off and cause serious injury. If injury occurs, get medical attention.

4. Remove 30 nuts (5) and bolts (6).

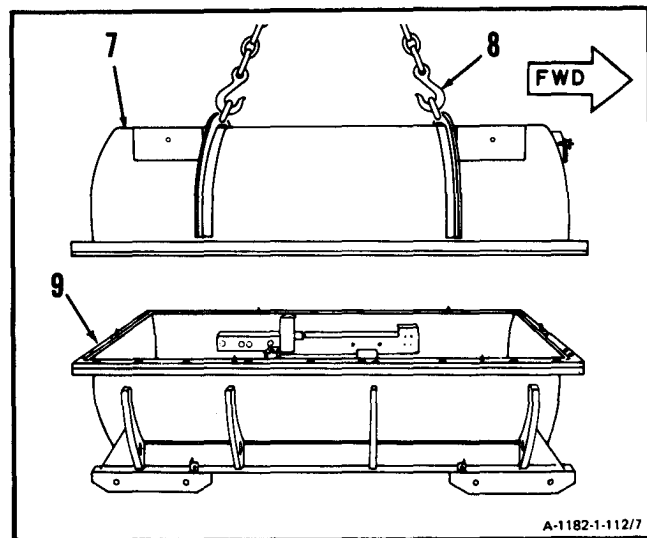


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5. Install hoist and chain with hooks (Appendix E) (8) on cover assembly (7).



6. Using helper, **remove cover assembly (7)** from base assembly (9). Use hoist and chain with hooks (Appendix E) (8).

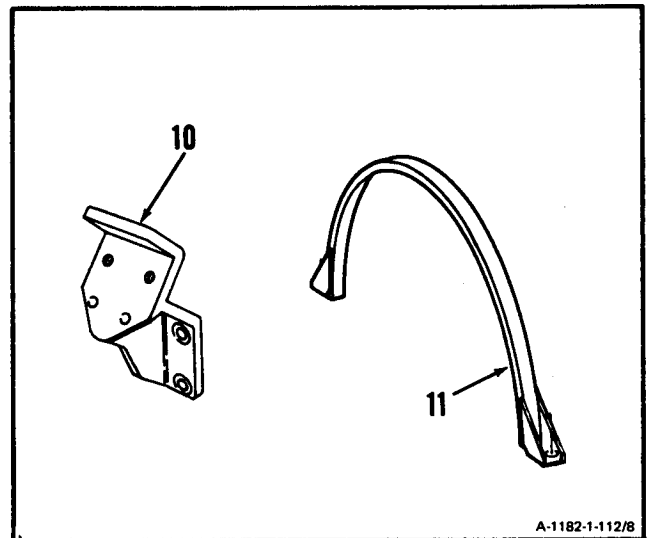


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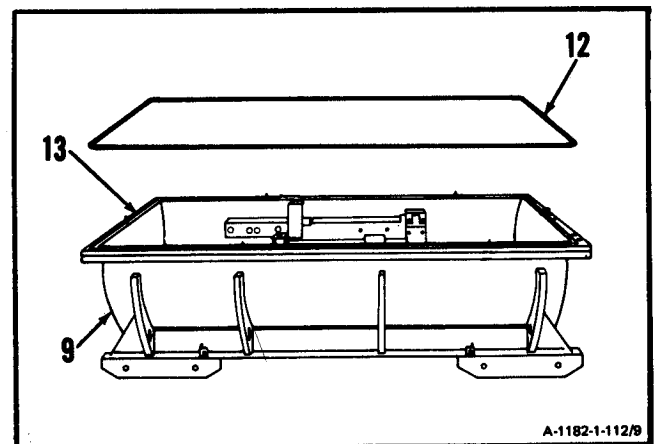
1-112 PREPARE AND INSPECT SHIPPING AND STORAGE CONTAINER (Continued)

1-112

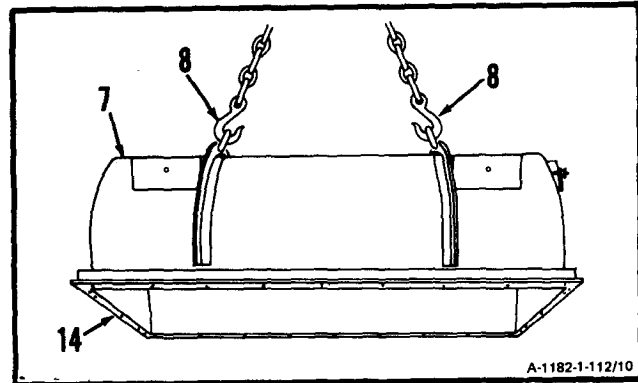
7. Remove two mounting brackets (10), clamp (11), and attaching hardware from bottom of shipping container.



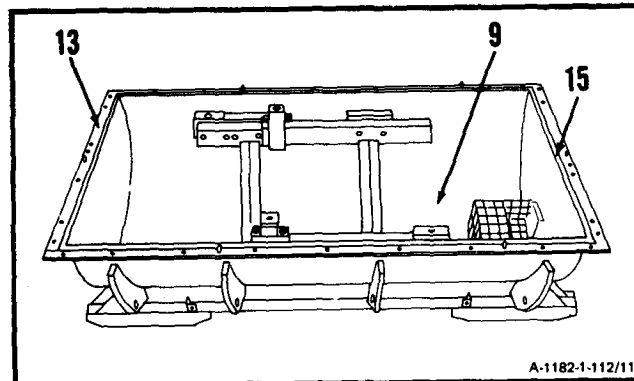
8. Remove sealing gasket (12).
9. **Inspect sealing gasket (12).** There shall be no material missing, breakage or foreign material stuck to gasket.
10. **Inspect flange surface (13) for rust or foreign material. If rust or foreign material is found, clean flange surface (13) as follows:**
- Clean flange surface (13) on all four sides of base assembly (9), Use wire brush.
 - If rough projections exist, smooth projections out. Use half-round file.

**GO TO NEXT PAGE**

11. **Clean flange surface (14)** on all four sides of cover assembly (7). Use wire brush. If rough projections exist, smooth projections out using half-round file.
12. Lower cover assembly (7) to floor and remove chain with hooks (Appendix E) (8).



13. **Remove dirt and other debris** from inside of base assembly (9), flange surface (13), and gasket groove (15). Use vacuum cleaner.

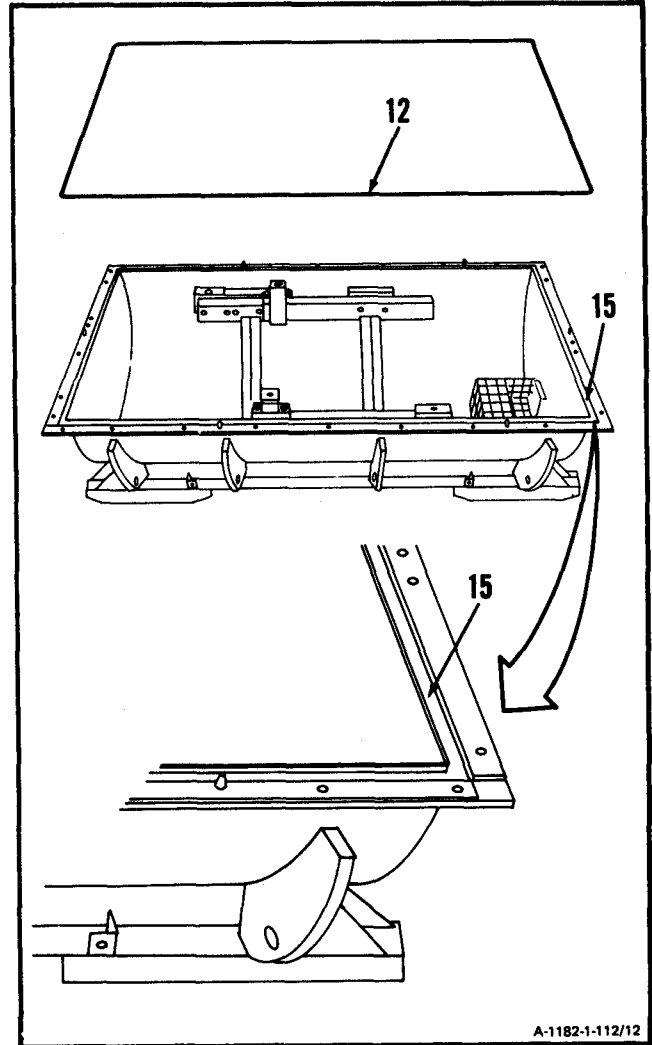


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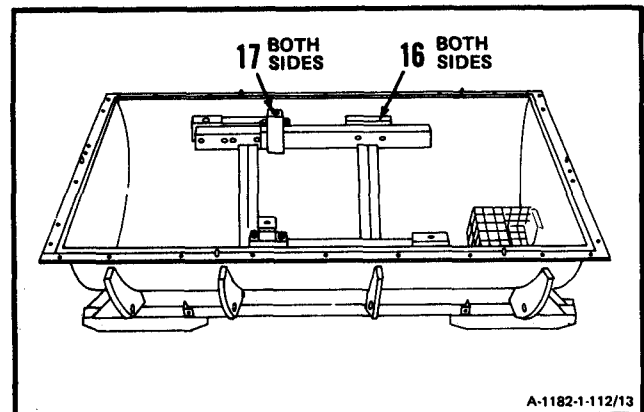
1-112 PREPARE AND INSPECT SHIPPING AND STORAGE CONTAINER (Continued)

1-112

14. Wipe sealing gasket (12) clean, using lint-free cloth (E26).
15. Apply light coat of glycerol (E21) on sealing gasket (12). **Install sealing gasket (12) in gasket groove (15).**

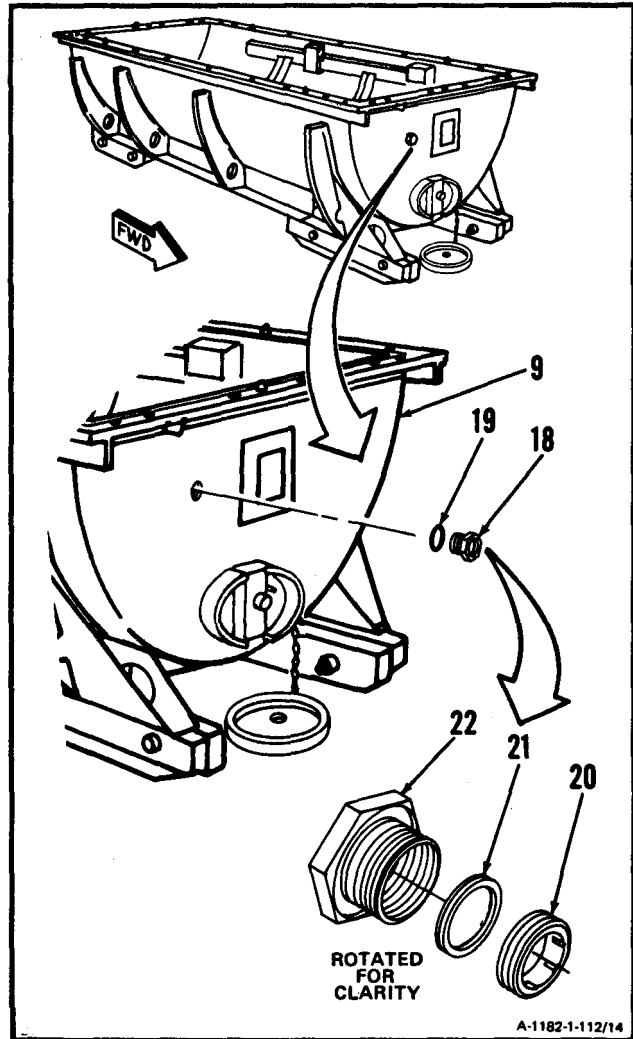


16. **Inspect security of sheer mounts (16) and side mounts (17).** There shall be no looseness.



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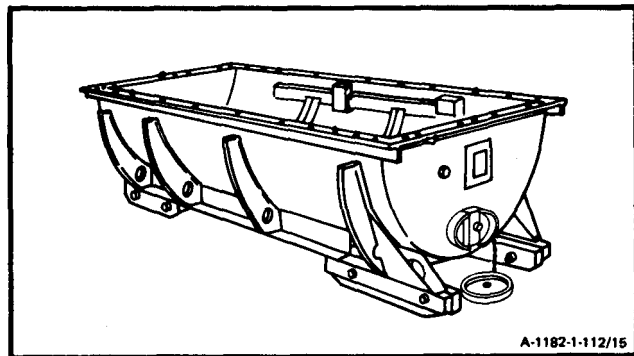
17. Remove humidity indicator (18) and packing (19).
18. Remove bushing (20) and humidity indicator card (21).
19. Install new humidity indicator card (21) and bushing (20) in housing (22).
20. Install packing (19) and humidity indicator (18) in base assembly (9).



INSPECT

FOLLOW-ON MAINTENANCE:

- Install Engine Into Shipping and Storage Container (Task 1-113).
- Mark Shipping and Storage Container (Task 1-114).



END OF TASK

1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER

1-113

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, 100-750 Inch-Pounds.
Chain With Hooks (Appendix E)
Hoist
Compressed Air Source

Materials:

Bonding Seal (E9)
Desiccant (E16)
Liquid Soap (E27)
plastic Cover (E41)
Tape (E35)
Tar (E55)

Personnel Required:

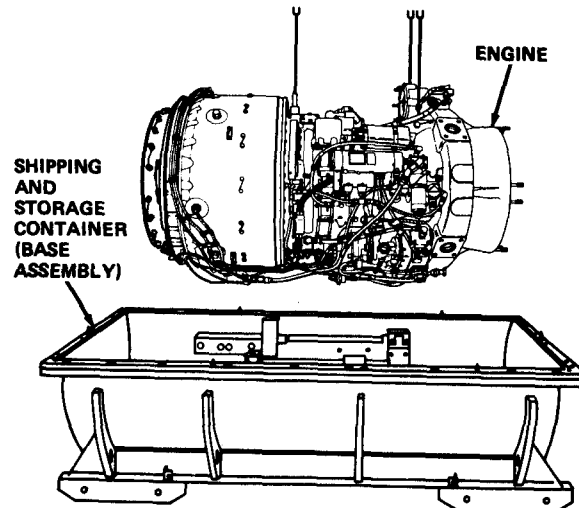
68B10 Aircraft Powerplant Repairer (2)
68B30 Aircraft Powerplant Inspector

References:

TB 55-1500-307-25
TM 38-750
Task 1-25
Task 1-31

Equipment Condition:

Engine Preserved and Prepared for Shipment or
Storage (Ref. Task 1-111)
Shipping and Storage Container Prepared and
Inspected (Ref. Task 1-112)
Engine Maintenance Sling Installed (Ref. Task
1-30)



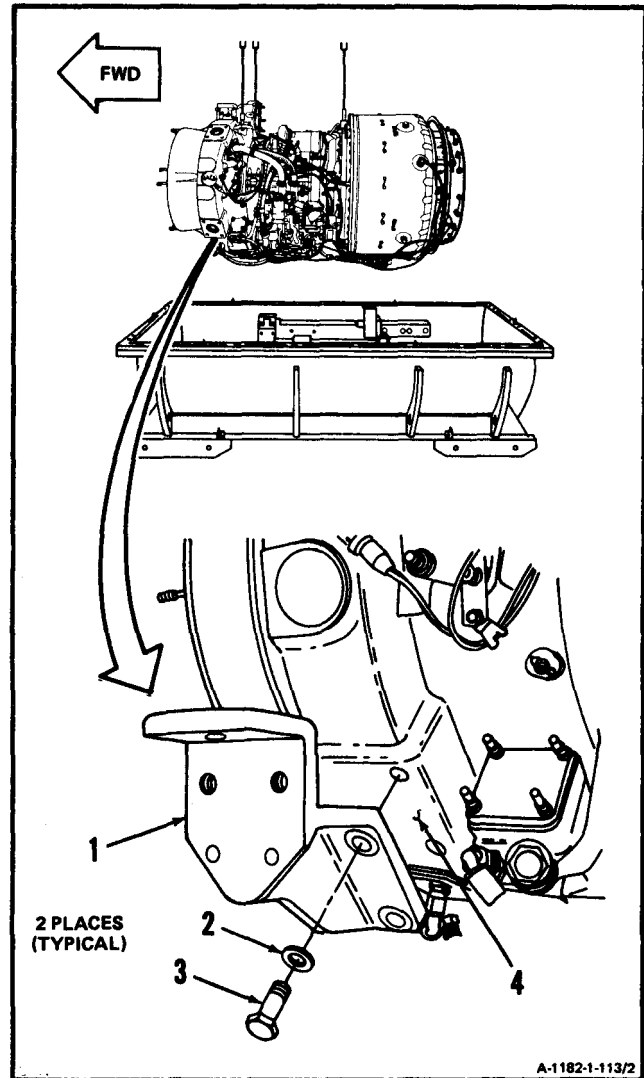
A-1182-1-113/1

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NOTE

Procedures for installing left- and right-hand shipping container brackets on engine are the same. Procedure for installing left-hand shipping container bracket is given.

1. **Loosely install bracket (1)**, four washers (2), and bolts (3) on bottom inlet housing pad (4).

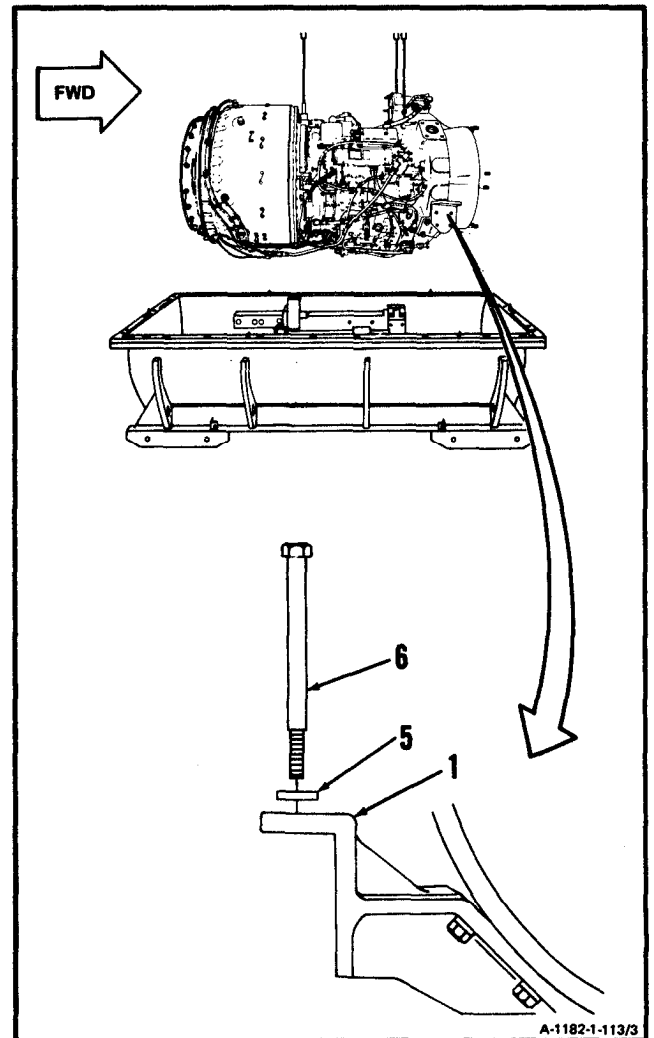


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1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

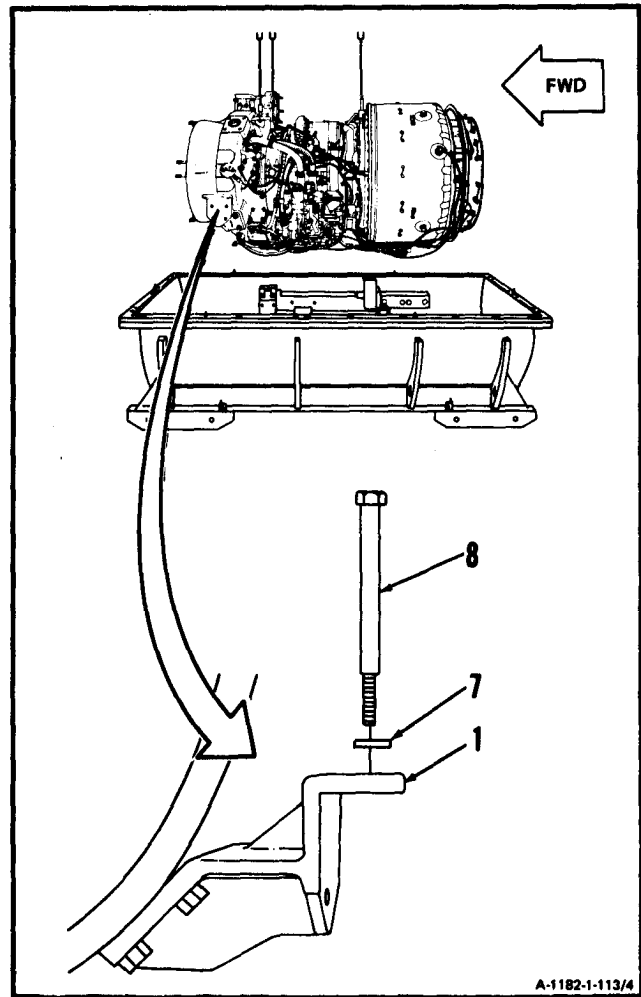
1-113

2. Install washer (5) and bolt (6) in bracket (1).

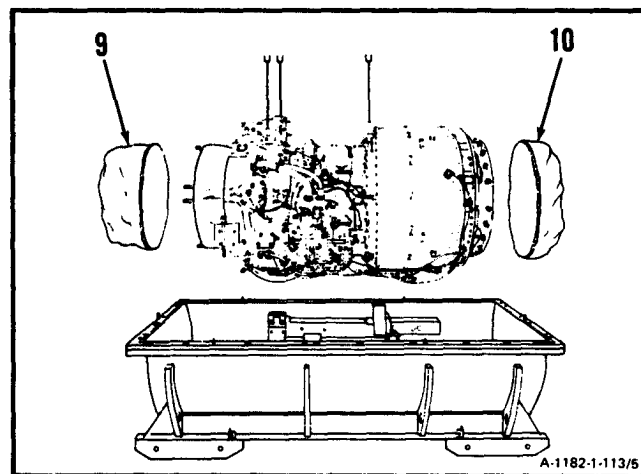


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3. Install washer (7) and bolt (8) in bracket (1).



4. Install plastic cover (E41) (9) over inlet end of engine. Install second plastic cover (E41) (10) over exhaust end of engine. Secure covers with tape (E35).

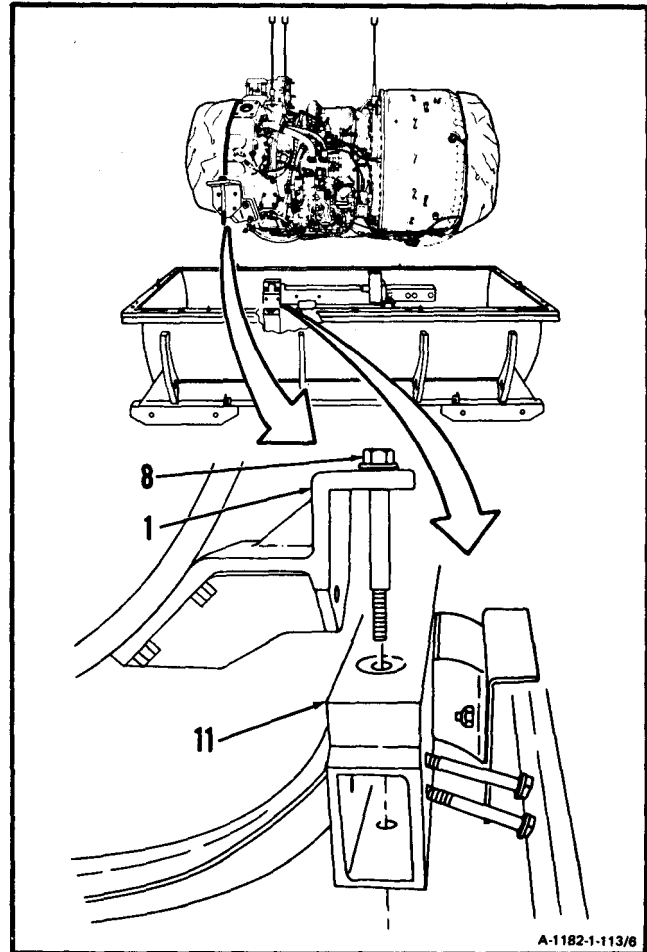


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CAUTION

Do not allow lines and cables to contact or snag container during installation. Failure to comply will cause damage to lines and cables.

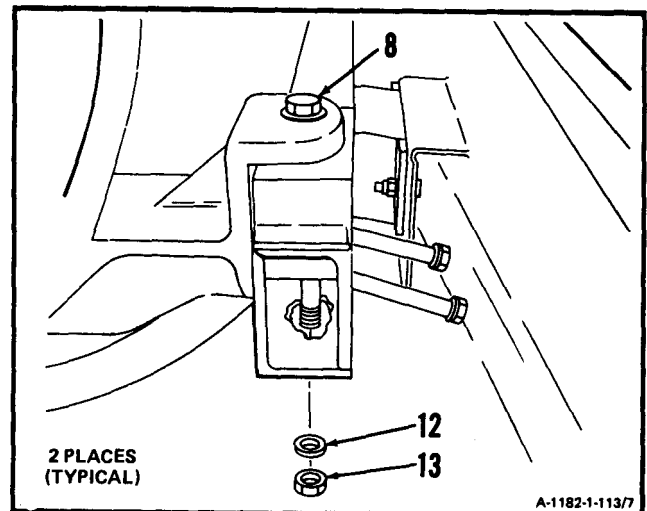
- Using helper, keep lines and cables free of container. Lower engine on frame assembly (11) using bolt (8), installed in bracket (1), as guide.



NOTE

Procedures for securing left- and right-hand mounting brackets to shipping container are the same. Procedures for securing left-hand mounting bracket is given.

- Loosely install washer (12) and nut (13) on bolt (8).

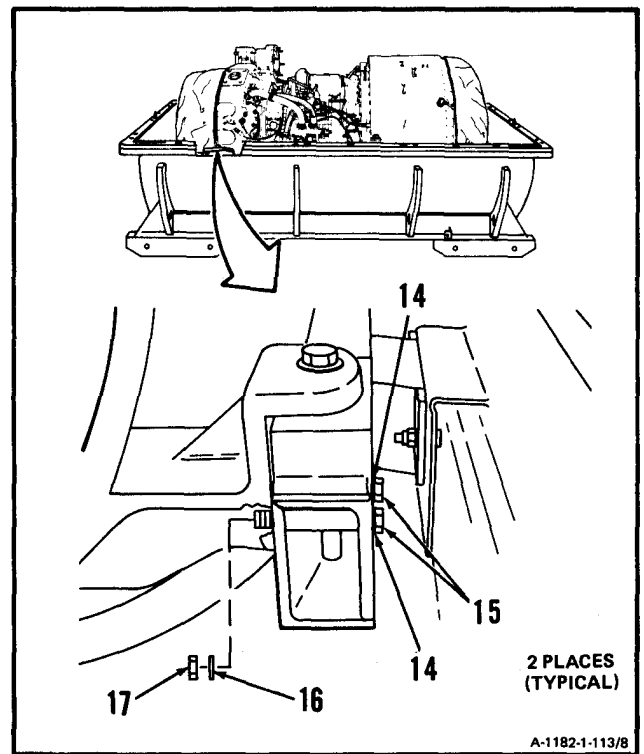


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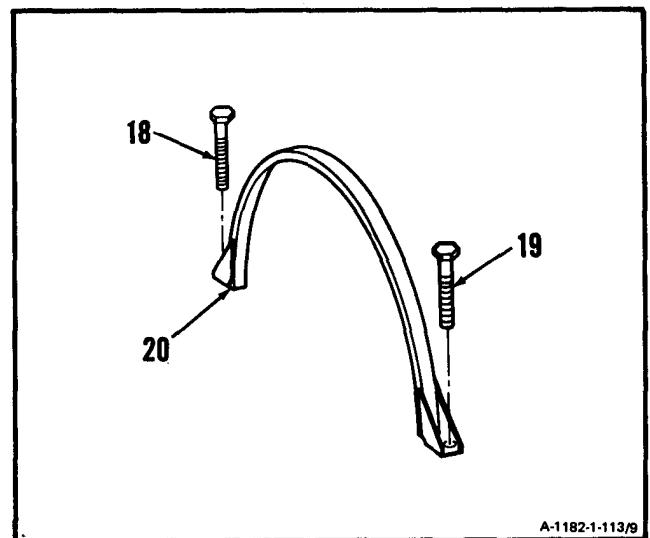
1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

1-113

7. Loosely install two washers (14), bolts (15), washers (16), and nuts (17).

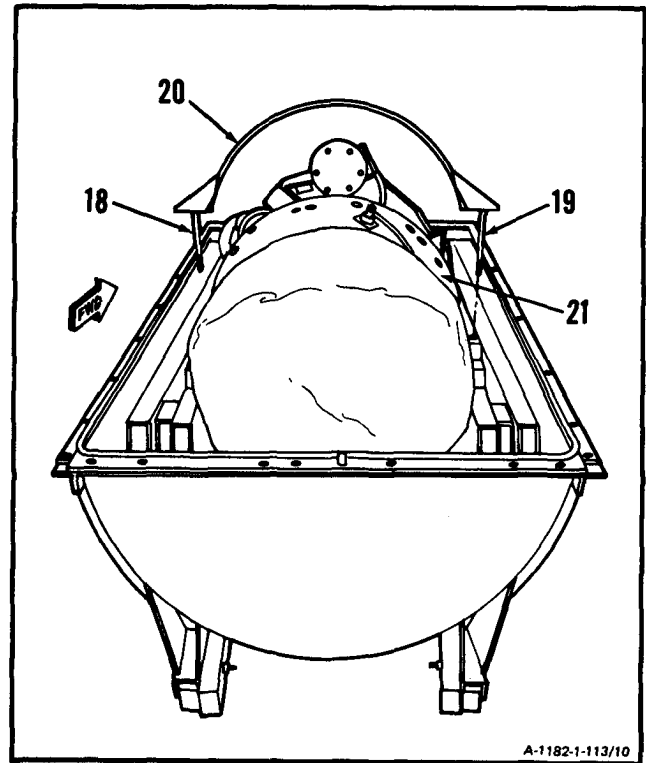


8. Install bolts (18 and 19) in clamp (20).



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9. Install clamp (20) with bolts (18 and 19) over engine combustor section (21).



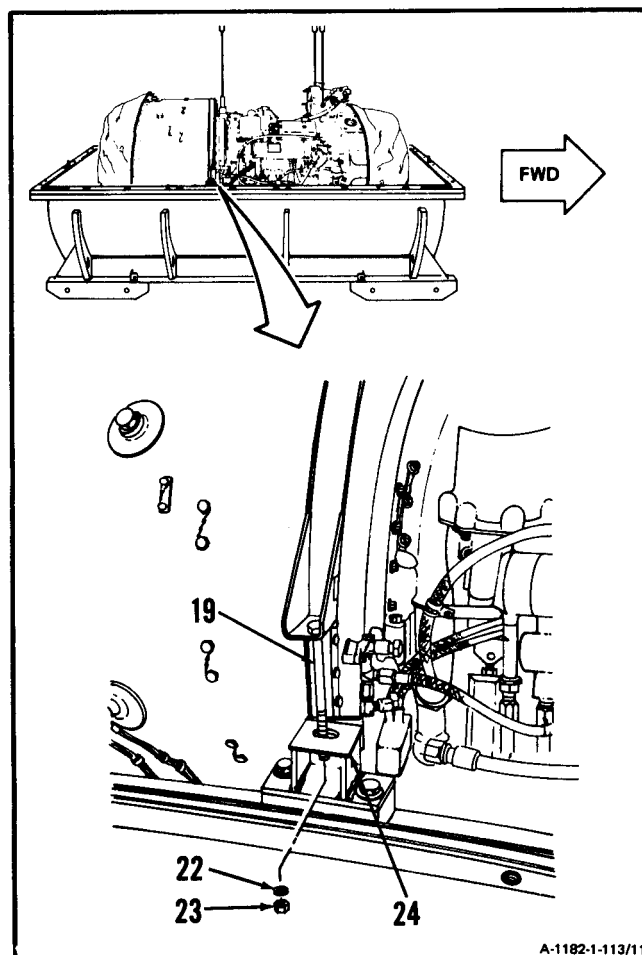
A-1182-1-113/10

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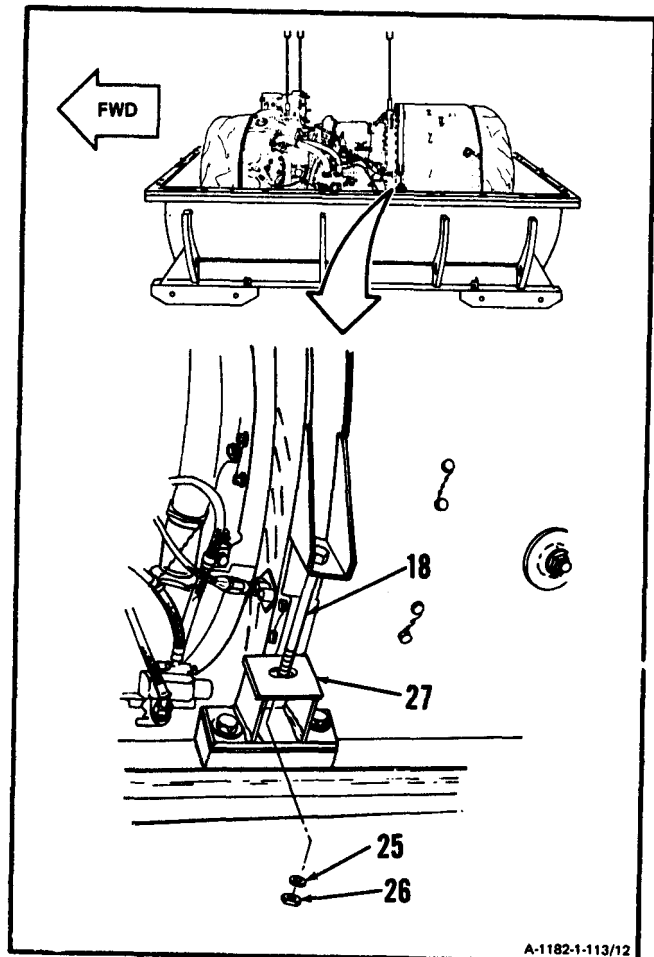
1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

1-113

10. Loosely install bolt (19), washer (22), and nut (23) on bracket (24).

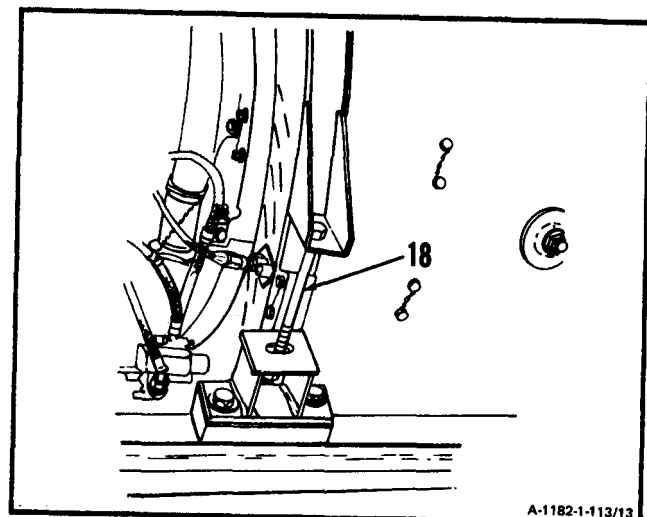
**GO TO NEXT PAGE**

11. Loosely install bolt (18), washer (25), and nut (26) on bracket (27).



A-1182-1-113/12

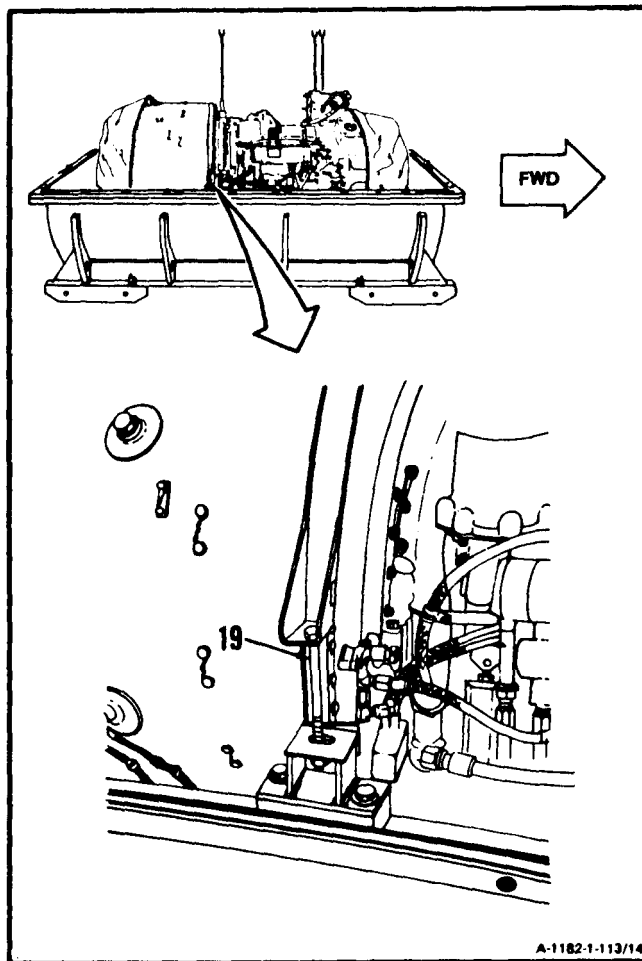
12. Torque bolt (18) to 170-inch-pounds.



A-1182-1-113/13

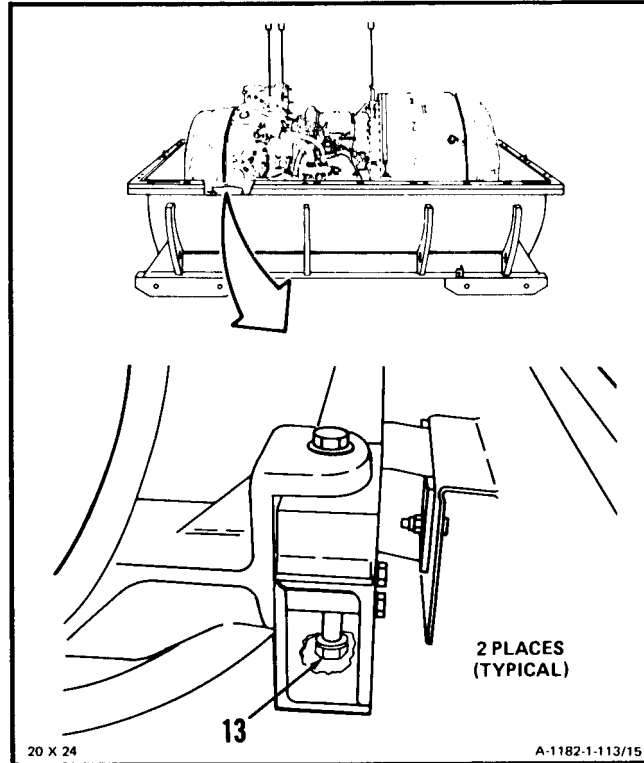
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13. Torque bolt (19) to 170 inch-pounds.

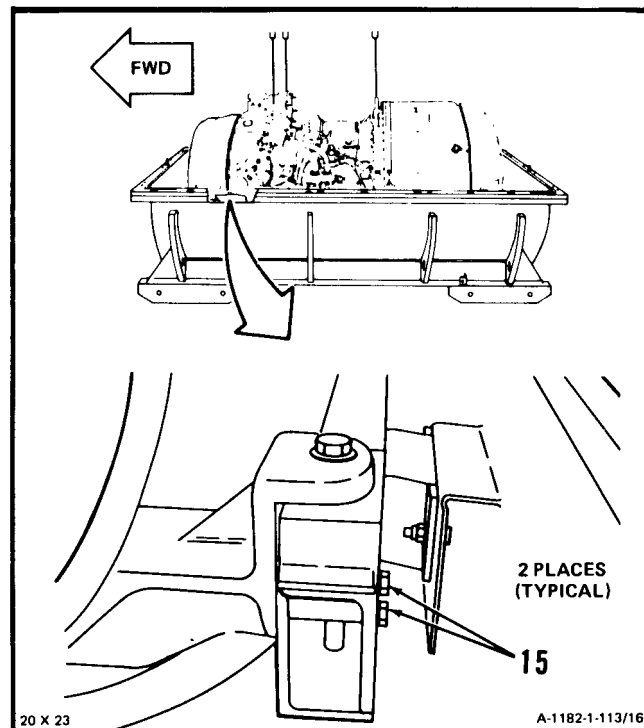


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14. Torque two nuts (13) to 265 to 285 inch-pounds.



15. Tighten four bolts (15) to 265 to 285 inch-pounds.

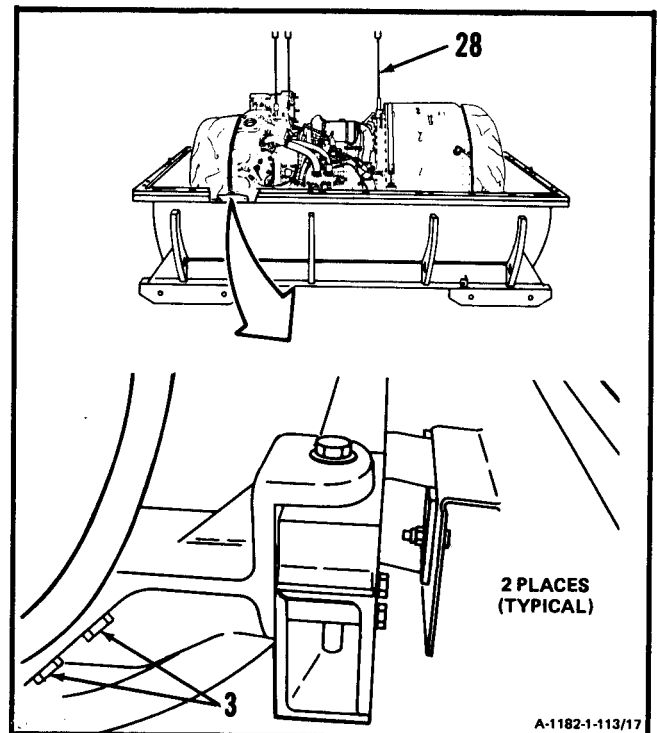


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1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

1-113

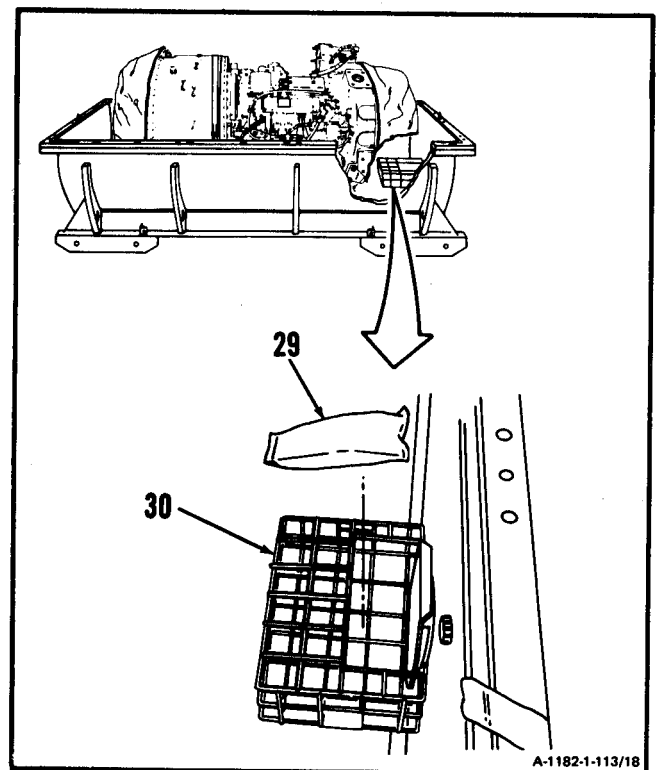
- 16. Torque eight bolts (3) to 250 inch-pounds.
- 17. Remove engine maintenance sling (28)
(Ref. Task 1-31).



NOTE

Step 18 shall be performed before cover assembly is lowered onto base assembly.

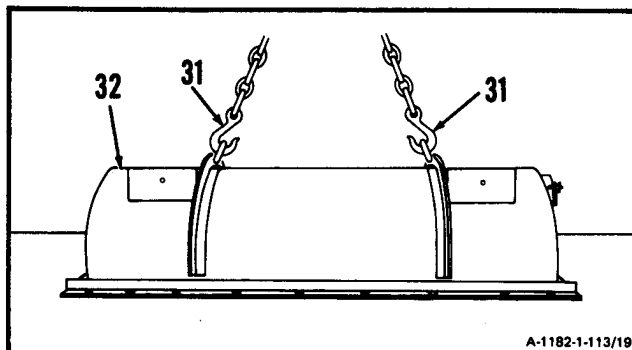
- 18. Install five bags of desiccant (E16) (29)
in desiccant basket (30).



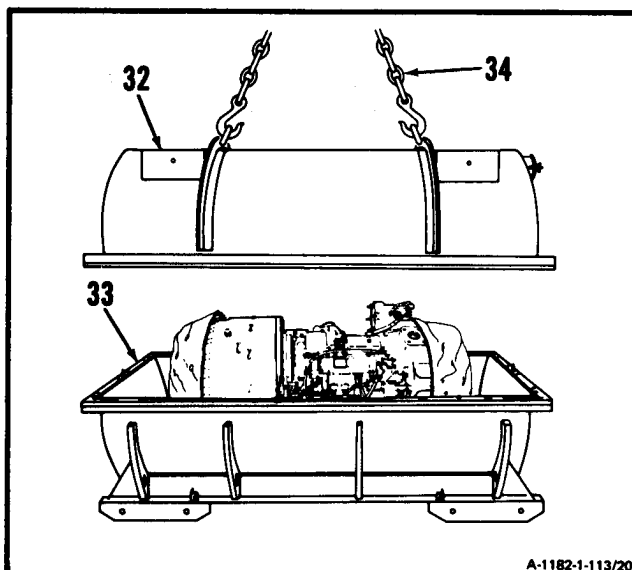
INSPECT

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19. Insert hooks (31) of chain into rings of cover assembly (32).



20. Position cover assembly (32) over base assembly (33). Use hoist and chain with hooks (Appendix E) (34).

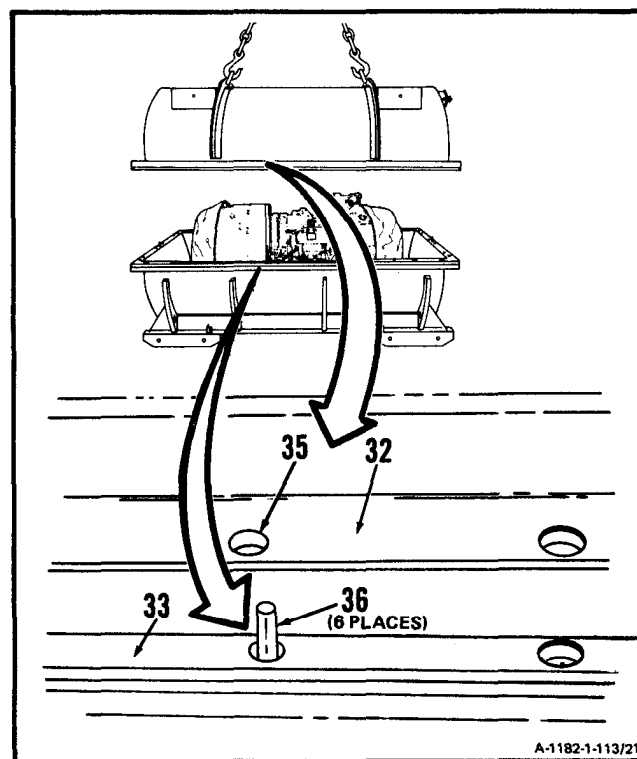


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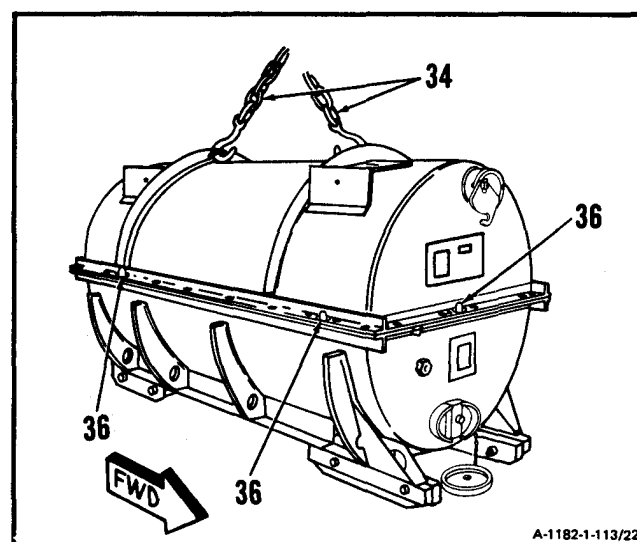
1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

1-113

21. Using helper, align six holes (35) in cover with six locating pins (36) on base. Lower and install cover assembly (32) on base assembly (33).

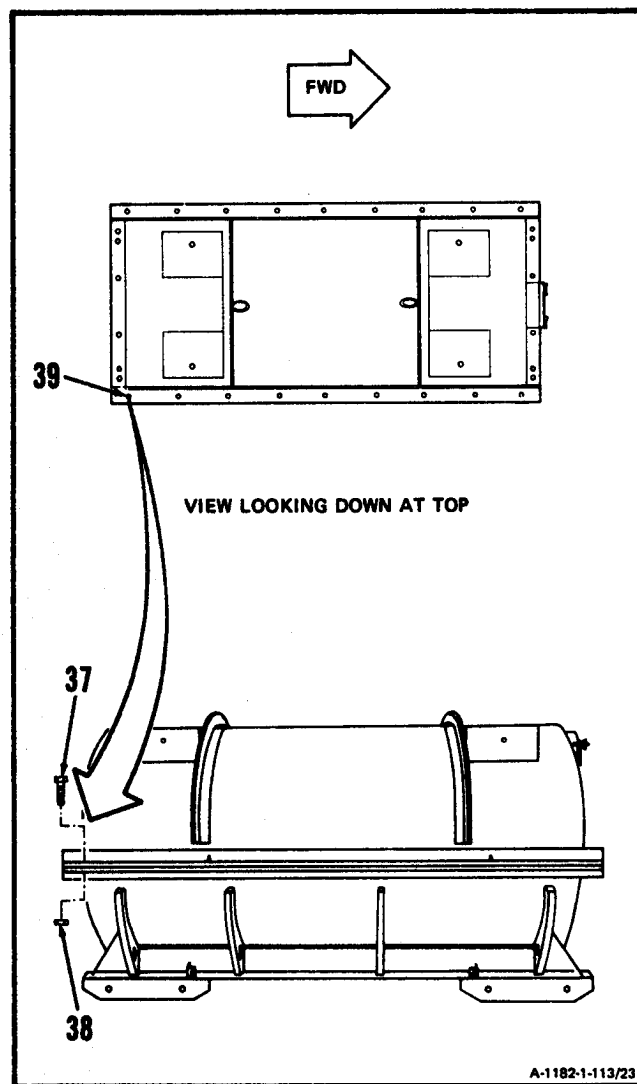


22. Check alignment of six locating pins (36). Release tension in chain with hooks (Appendix E) (34). Remove chain with hooks.



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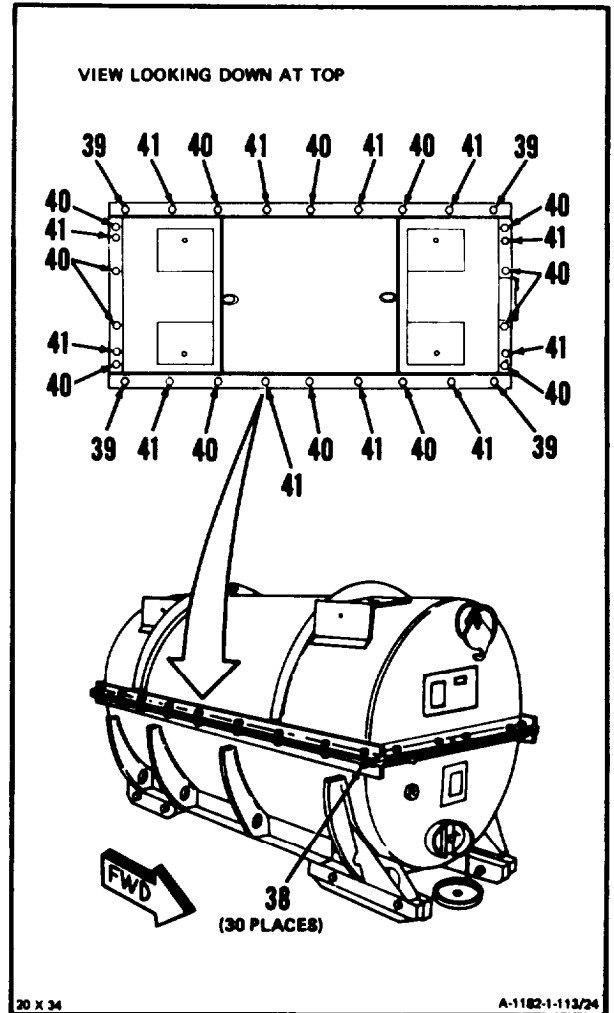
23. Install 30 bolts (37) and nuts (38) in holes (39).
Finger-tighten nuts.



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1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued) 1-113

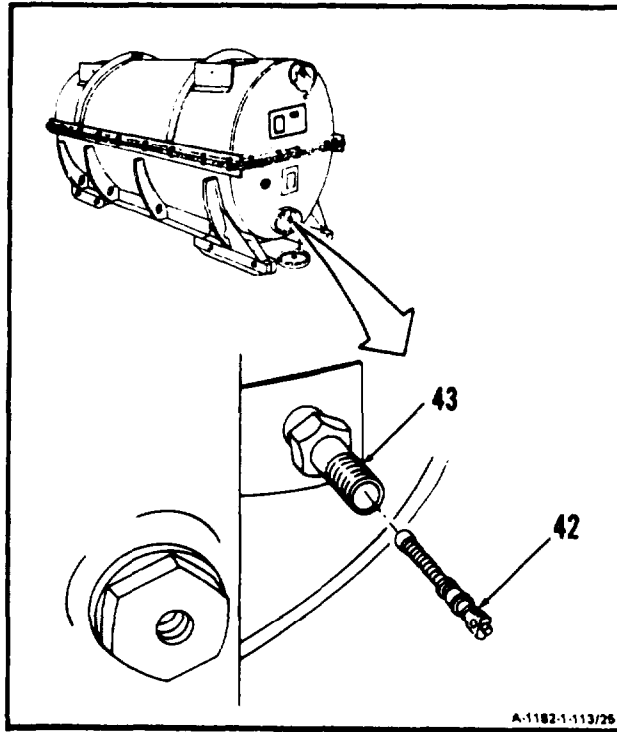
24. Torque 30 nuts (38) at bolt holes (39,40, and 41), in that order, 265 to 285 pounds.



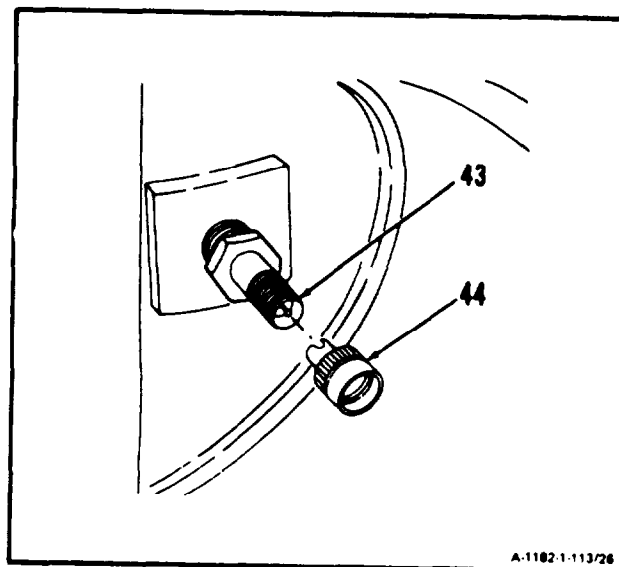
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1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued) 1-113

25. Install valve stem (42) in valve (43).



26. Install slotted end of valve cap (44) in valve (43).

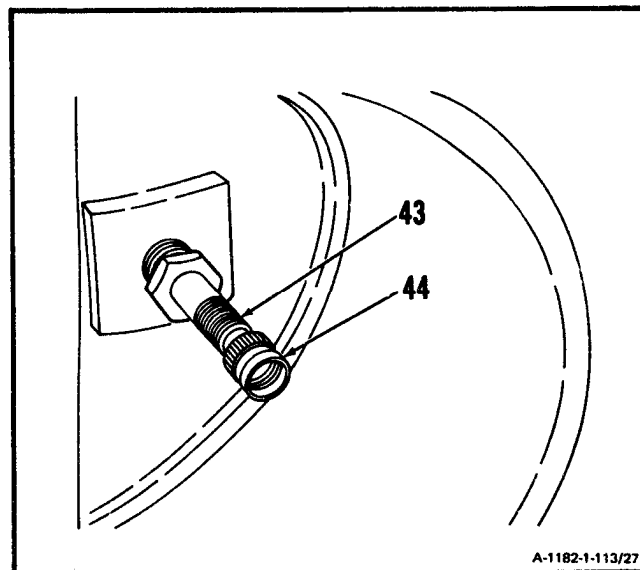


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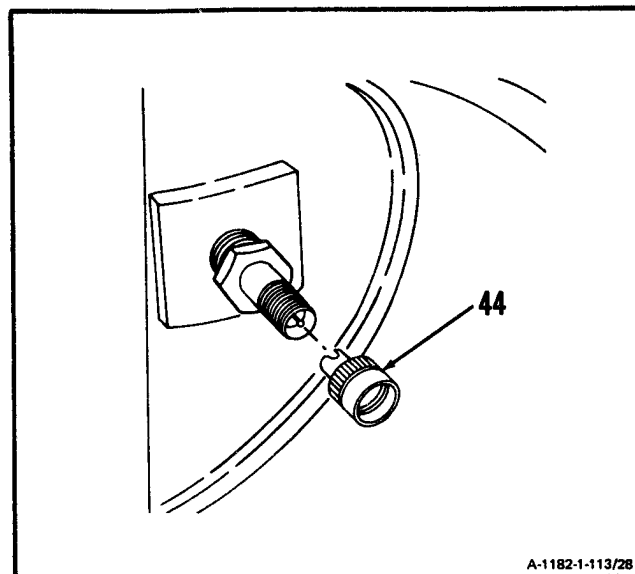
1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

1-113

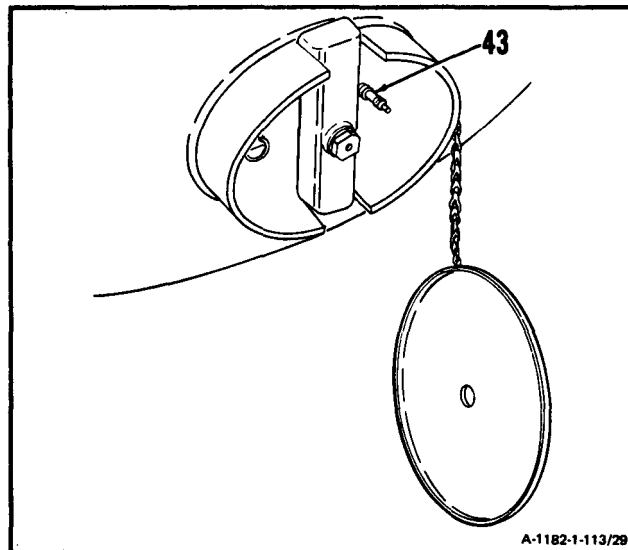
27. Engage valve stem located inside valve (43) with valve cap (44). Turn valve cap (44) clockwise until valve stem is tight.



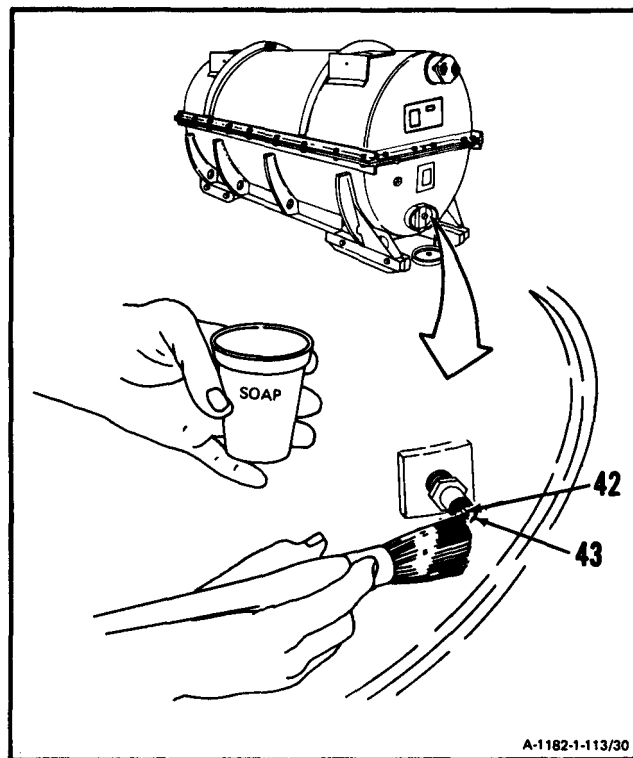
28. Remove valve cap (44).

**GO TO NEXT PAGE**

29. Apply 5 Psig air pressure to valve (43). Use clean, dry compressed air.



30. Inspect for leaks by applying liquid soap (E27) to valve (43) and valve stem (42).



GO TO NEXT PAGE

1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

1-113

31. If leak exists at valve stem (42), replace valve stem (42) as follows:

WARNING

Use care during removal of valve stem. Injury to personnel can result. If injury occurs, get medical attention.

- a. Remove valve stem (42) from valve (43). Use slotted end of valve cap (44).
 - b. Install serviceable valve stem (42) in valve (43). Use slotted end of valve cap (44).
32. If leaks exist at valve (43), tighten valve (43). If valve (43) still leaks, replace valve (43) as follows:

WARNING

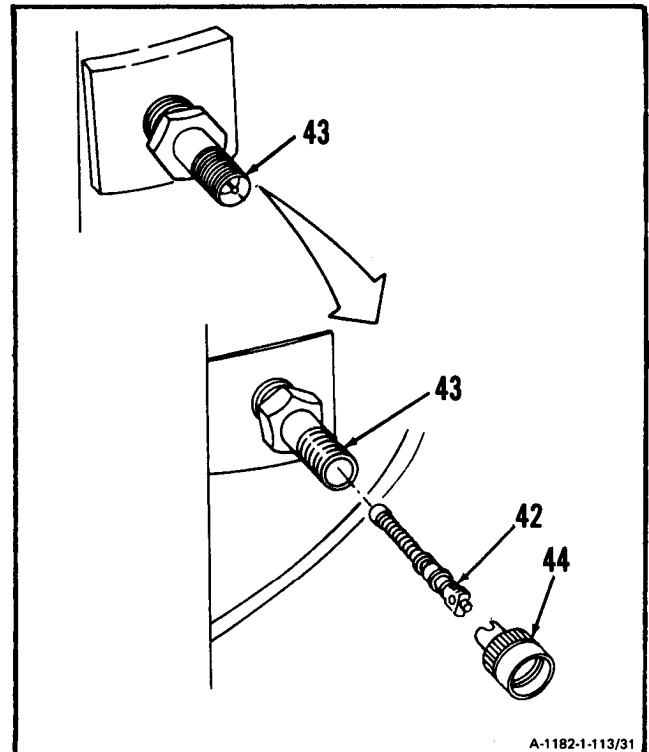
Use care during removal of valve. Injury to personnel can result. If injury occurs, get medical attention.

- a. Remove valve (43).
- b. Install serviceable valve (43).

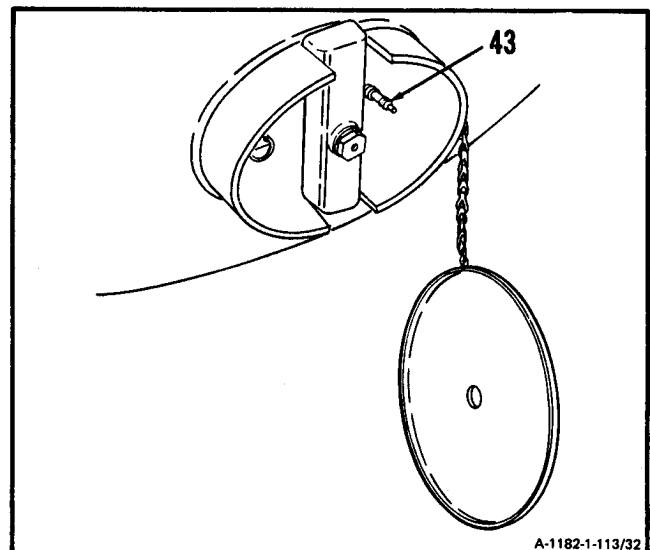
NOTE

Following step only applies if valve stem or valve were replaced. If valve or valve stem were not replaced, omit step 33.

33. Apply 5 psig air pressure to valve (43). Use clean, dry compressed air.



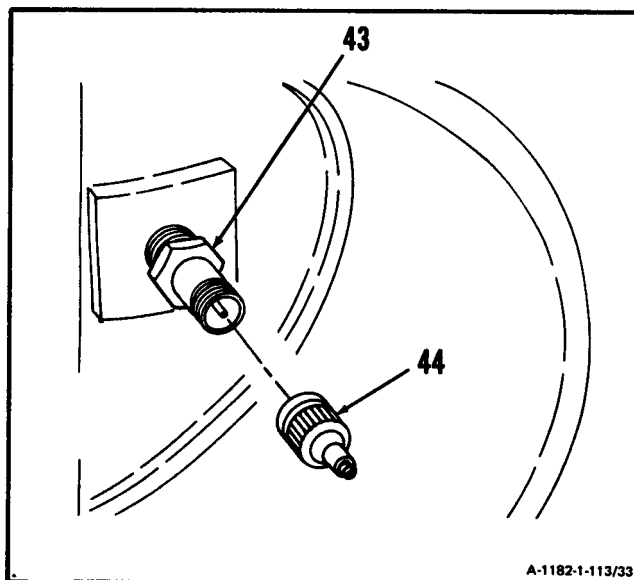
A-1182-1-113/31



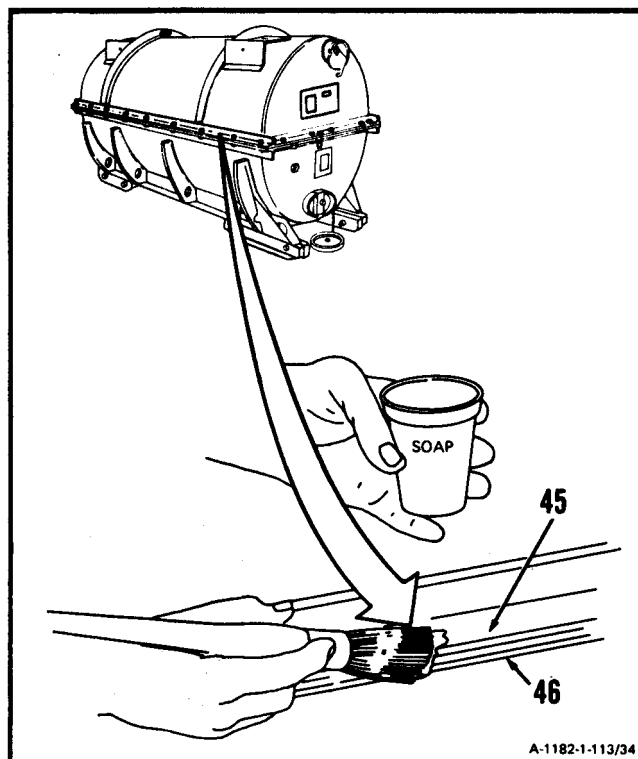
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34. Install valve cap (44) on valve (43).



35. **Check for leaks** by applying liquid soap (E27) to shipping container mating flanges (45 and 46). There shall be no leaks. **If leak exists, inspect pressurized shipping and storage container** (Ref. Task 1-25).



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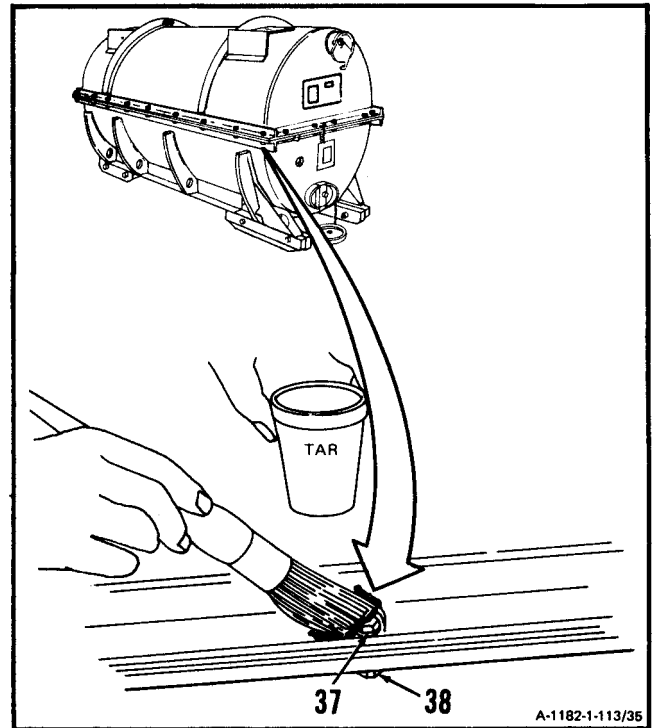
1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

1-113

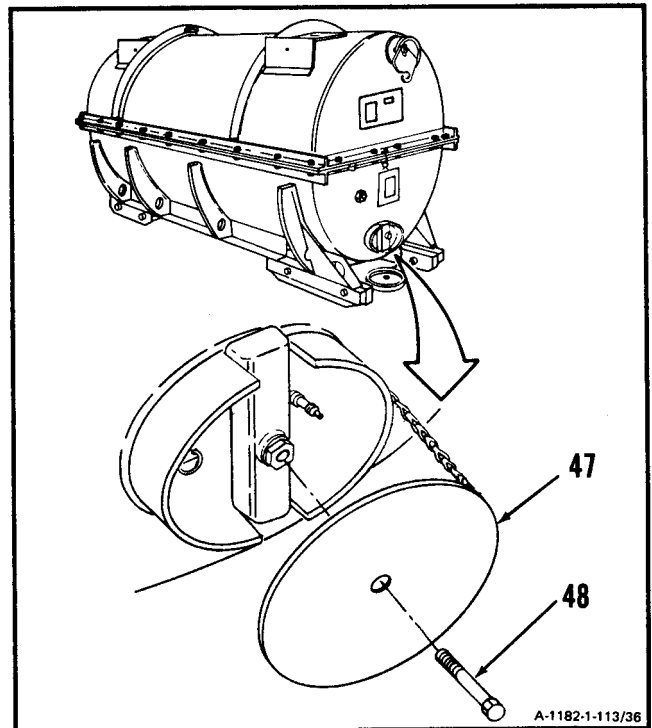
NOTE

In following step 36., tar is applied to prevent corrosion.

36. Apply tar (E55) to 30 bolts (37) and nuts (38).



37. Install cover (47) and bolt (48).



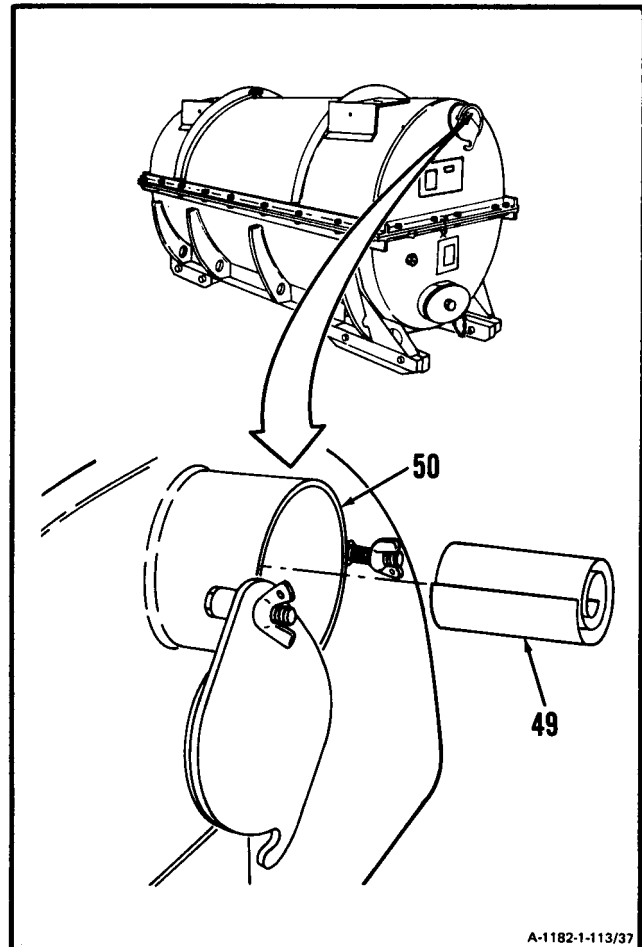
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38. Install complete engine records (49) in record receptacle (50). (Ref. TM 38-750).

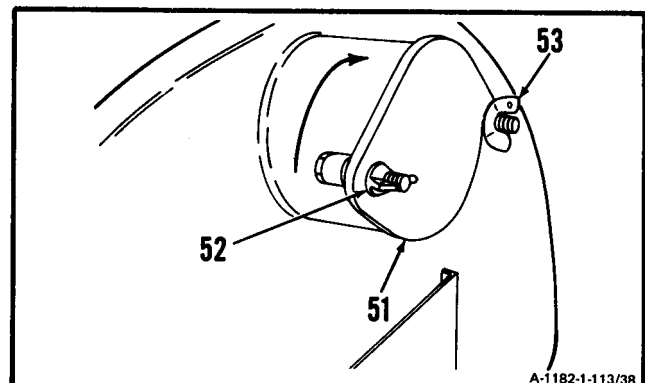
NOTE

Historical records shall include:

- a. DA Form 2410, Component Removal and Repair/Overhaul Record.
- b. DA Form 2408-5, Equipment Modification Record.
- c. DA 2408-16, Aircraft Component Historical Record for Selected Aircraft Components. (Refer to TB 55-1500-307-25.)
- d. DA 2408-19, Aircraft Engine Wheel Historical Record (one for each turbine disc).
- e. Q806, Final Engine Test Log Sheets.
- f. SG-371, Rating Sheet.



39. Close cover (51) and tighten wing nut (52) and wing nut (53).

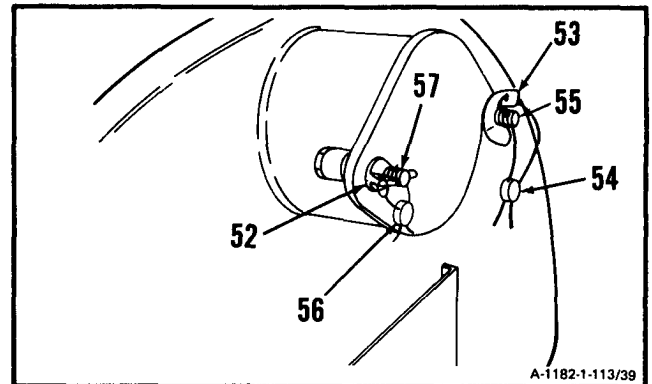


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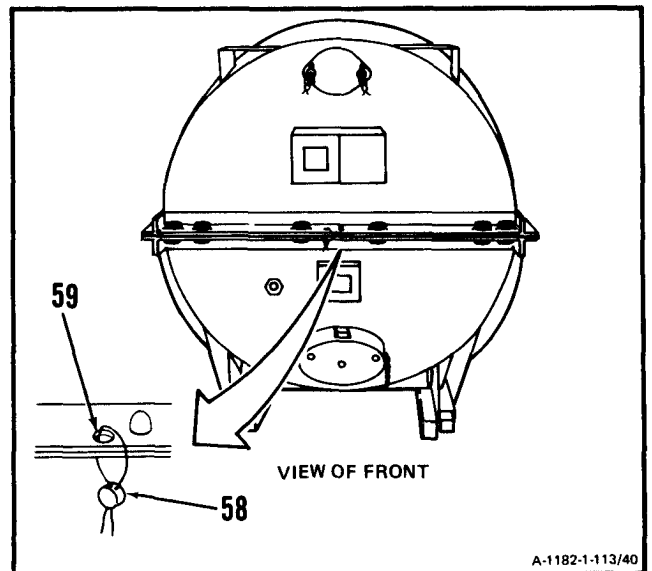
1-113 INSTALL ENGINE INTO SHIPPING AND STORAGE CONTAINER (Continued)

1-113

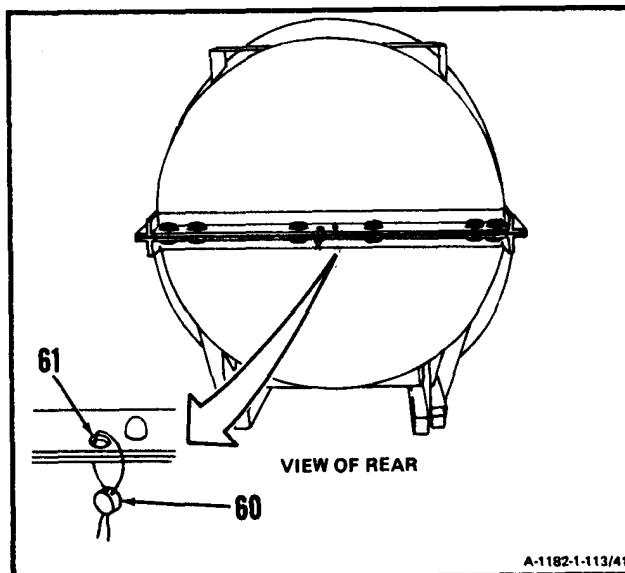
40. Install bonding seal (E9) (54) through hole in bolt (55), and-hole in wing nut (53). Install one bonding seal (E) (56) through hole in wing nut (52) and hole in bolt (57).



41. Install bonding seal (E9) (58) through hole (59) on forward end of shipping container.

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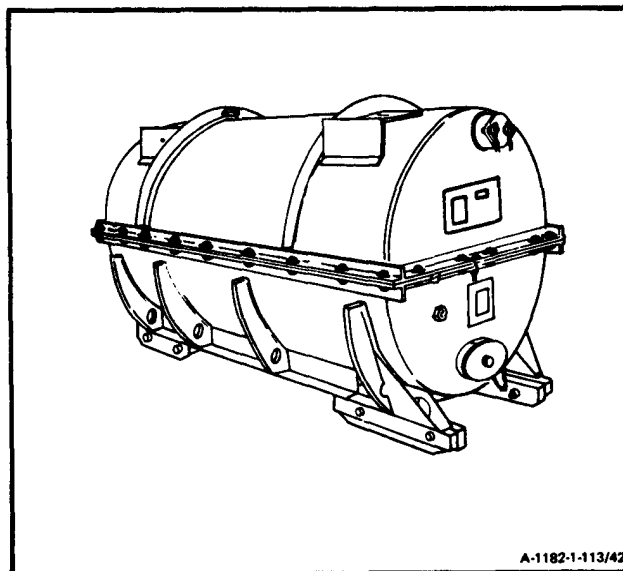
42. Install bonding seal (E9) (60) through hole (61) on aft end of shipping container.



INSPECT

FOLLOW-ON MAINTENANCE:

Mark Shipping and Storage Container (Task 1-114).



END OF TASK

1-114 MARK SHIPPING AND STORAGE CONTAINER

1-114

INITIAL SETUP

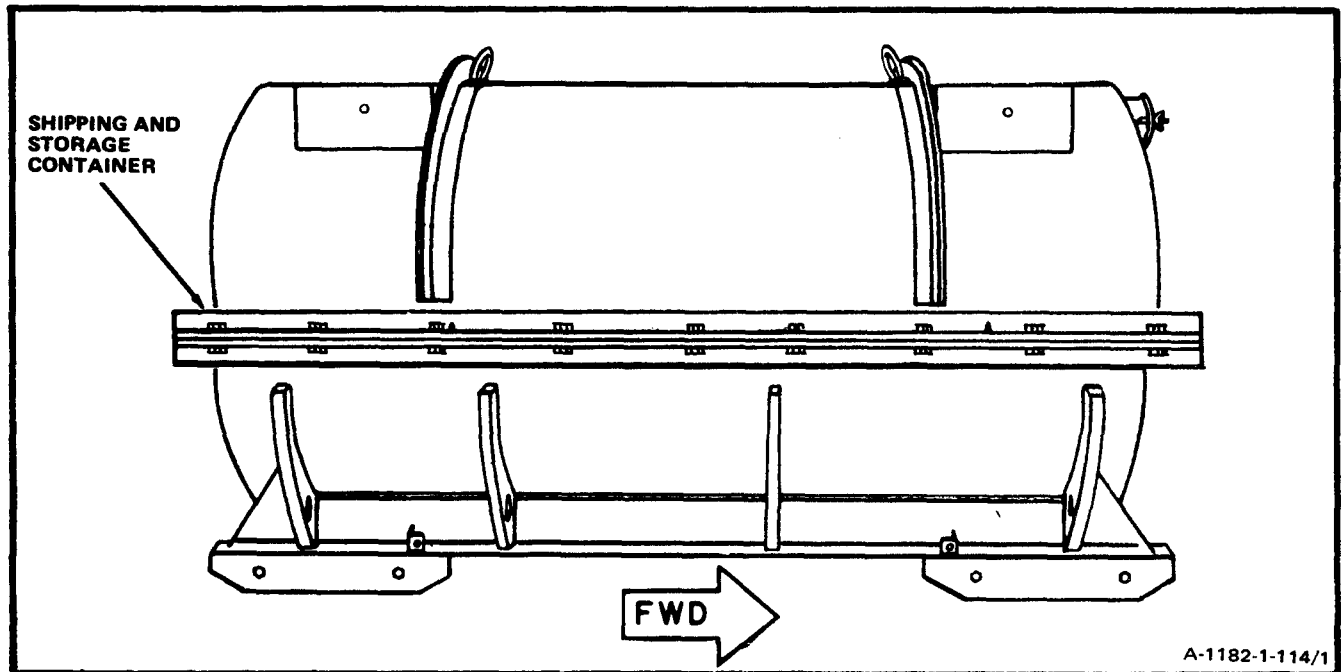
Applicable Configurations:
All

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

Materials:
Black Baking Enamel (E8)
White Enamel (E57)

Personnel Required:
68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

Equipment Condition:
Engine Installed in Shipping and Storage
Container (Task 1-113)

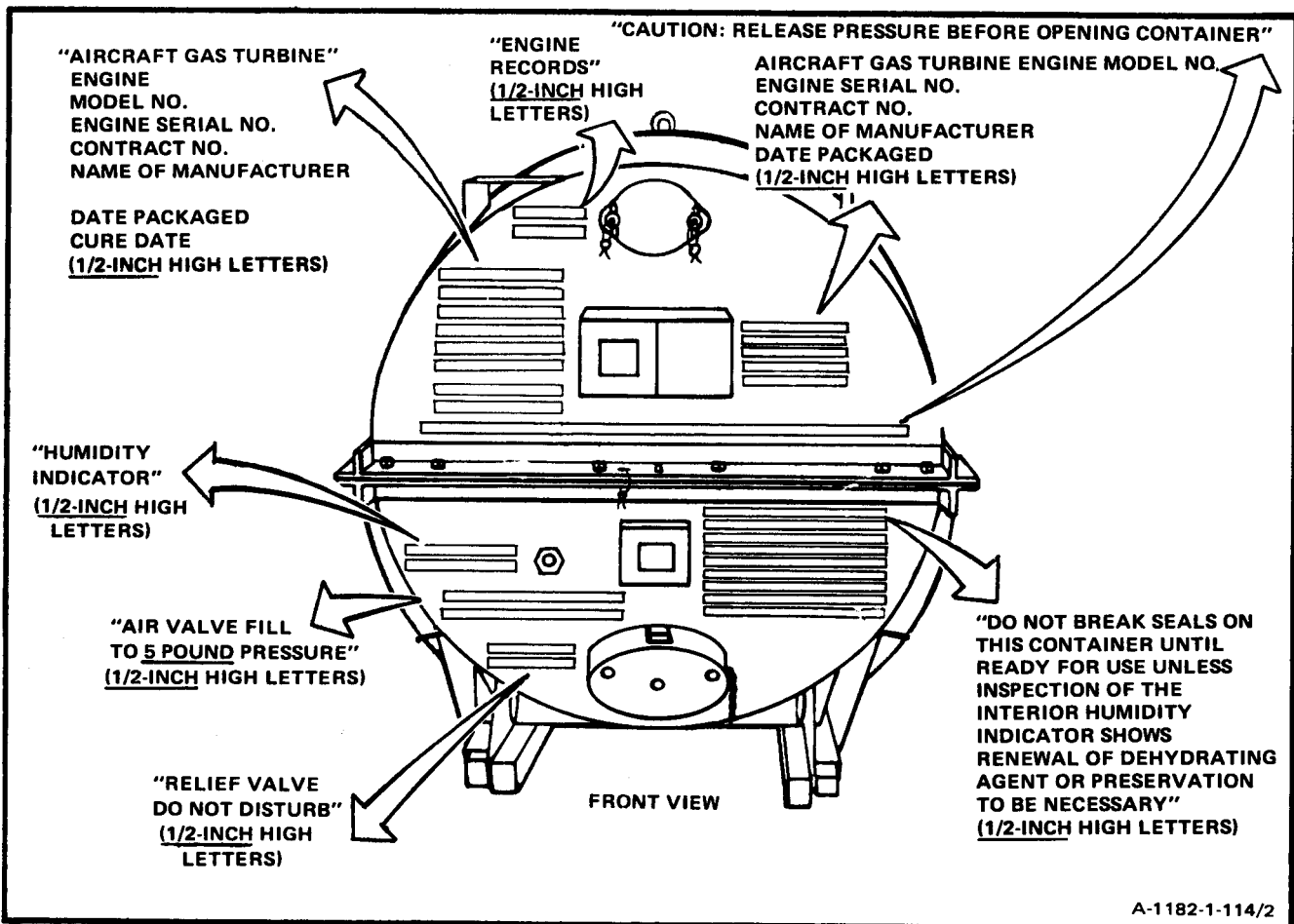


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NOTE

Shipping and storage containers shall be marked as shown.

1. Stencil front of shipping and storage container, using white enamel (E57) as shown.

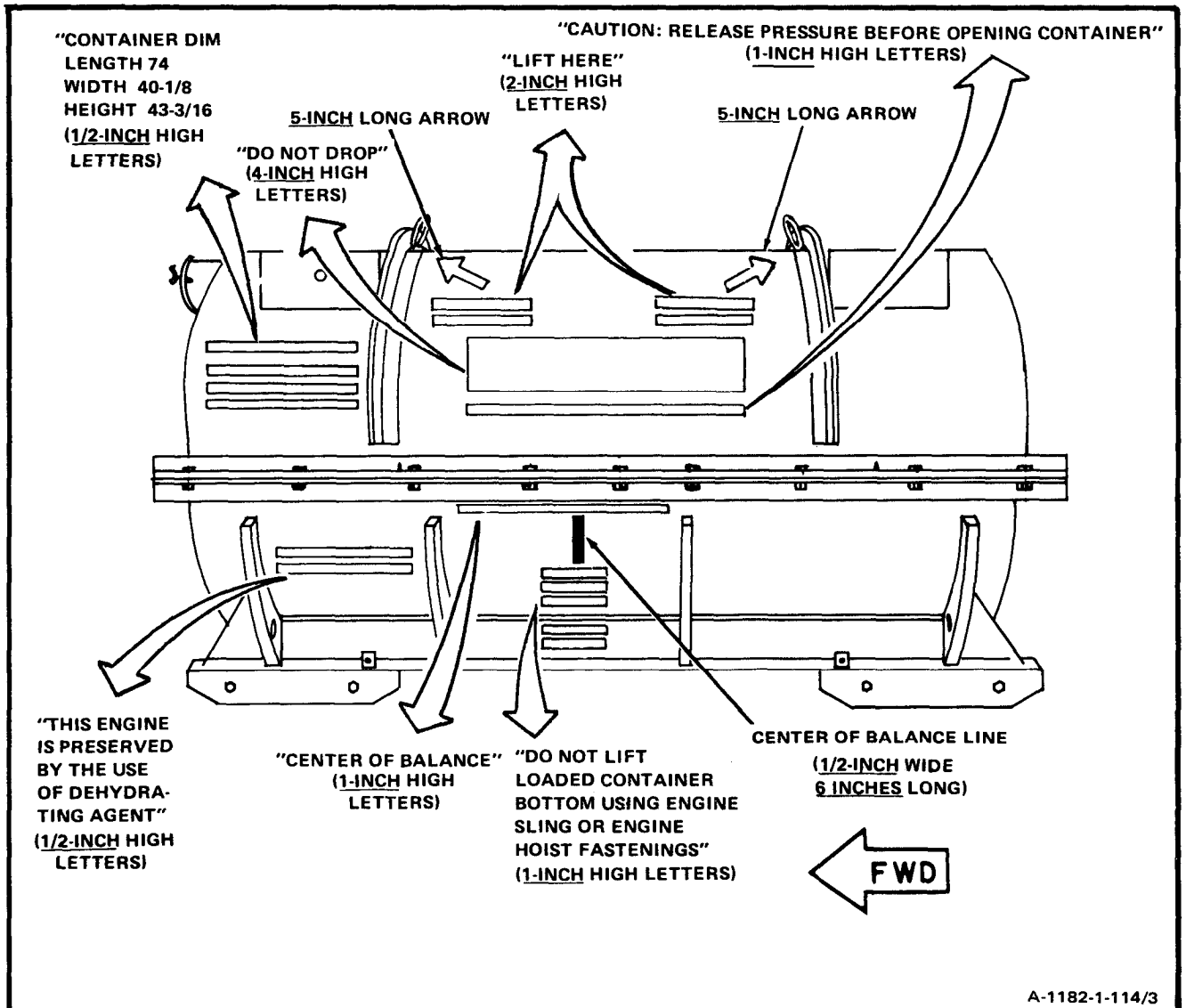


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1-114 MARK SHIPPING AND STORAGE CONTAINER (Continued)

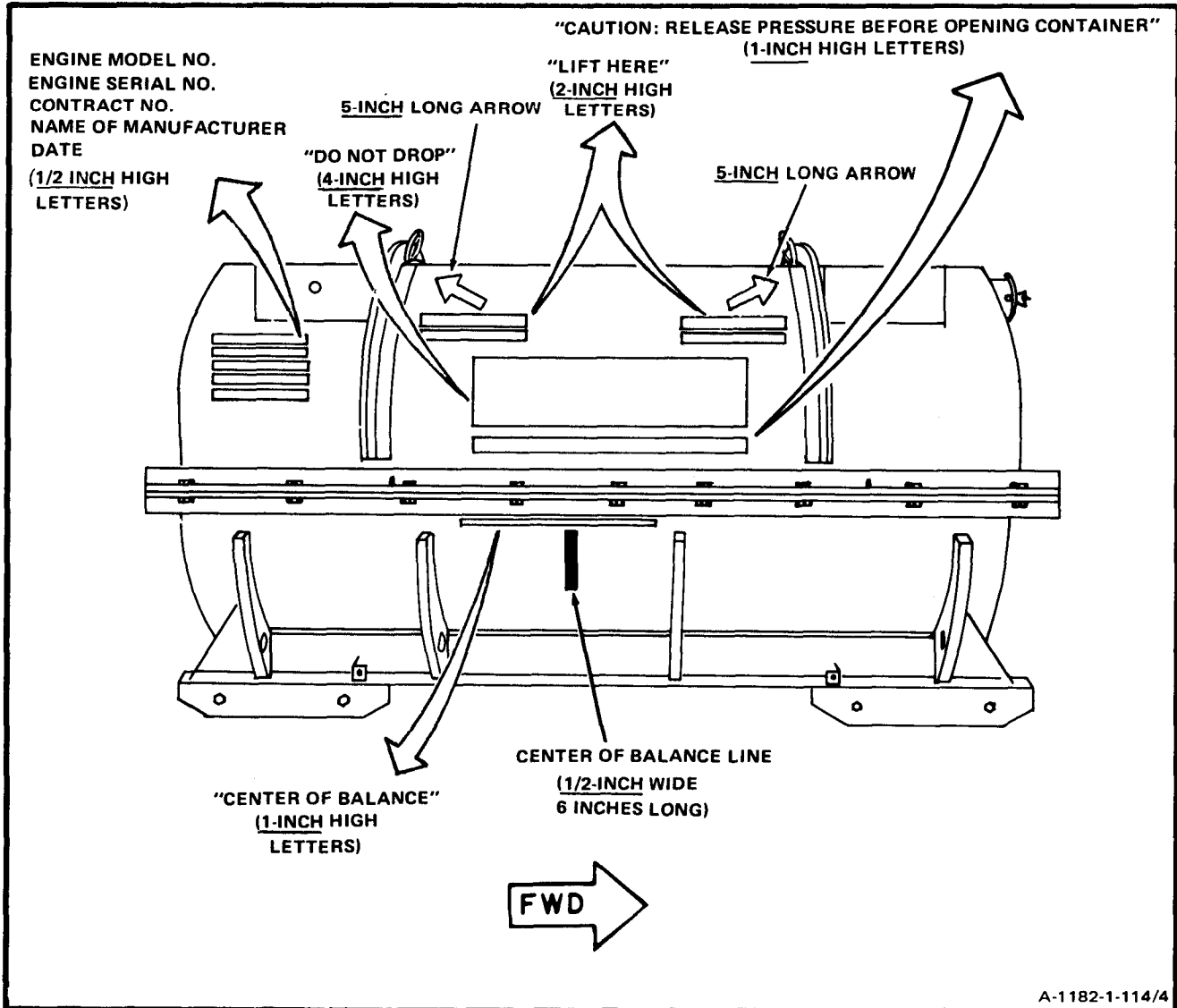
1-114

2. Stencil left side of shipping and storage container, using white enamel (E57) as shown.



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- 3. Stencil right side of shipping and storage container, using white enamel (E57) as shown.

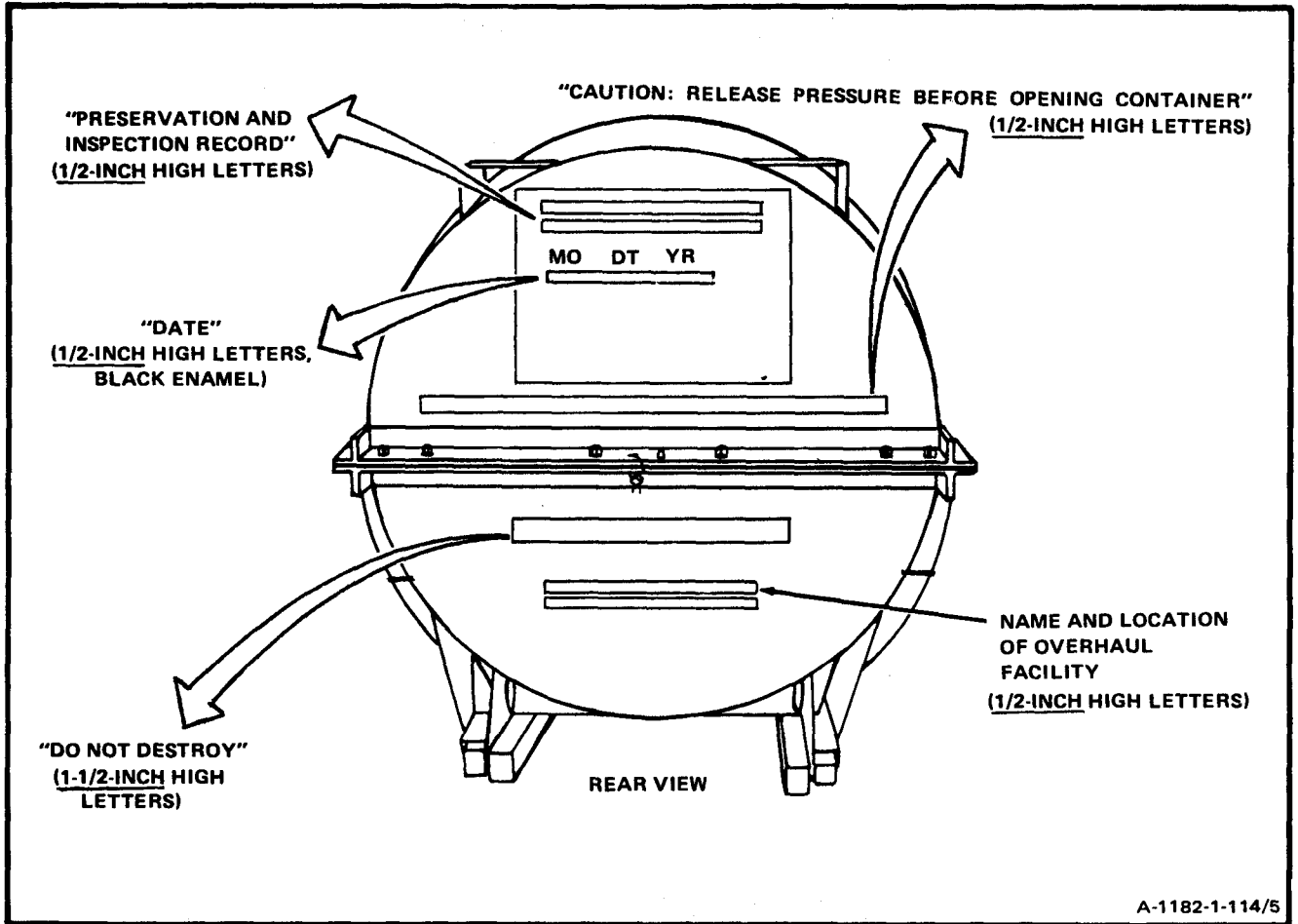


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1-114 MARK SHIPPING AND STORAGE CONTAINER (Continued)

1-114

4. Stencil rear of shipping and storage container, using white enamel (E57) and black enamel (E8).



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:
Black Baking Enamel (E8)
White Enamel (E57)

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

References:

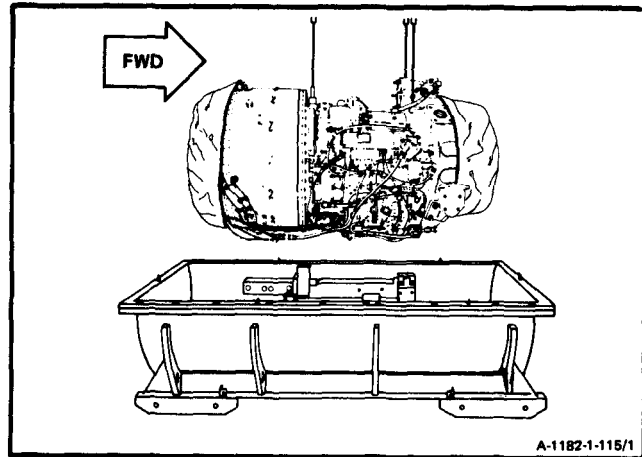
Task 1-25 Task 2-32 Task 2-56
Task 1-111 Task 2-33 Task 4-34
Task 2-21 Task 2-34 Task 4-35
Task 2-22 Task 2-54
Task 2-23 Task 2-55

Equipment Condition:

Engine Removed From Shipping and Storage
Container (Ref. Task 1-26).

NOTE

Represervation of engine may be repeated as often as necessary.

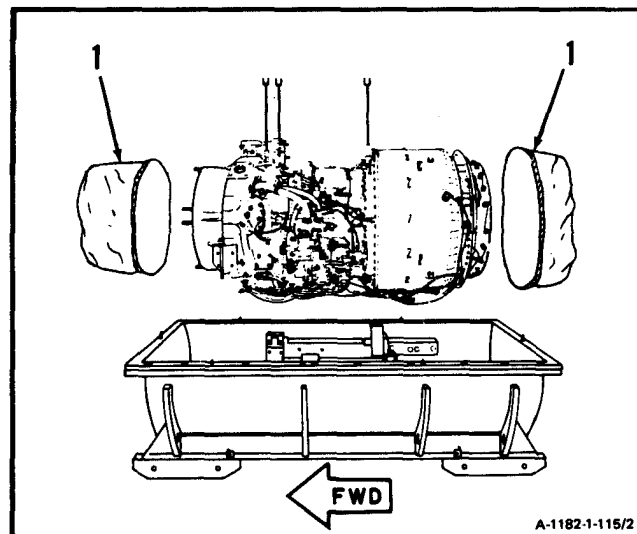


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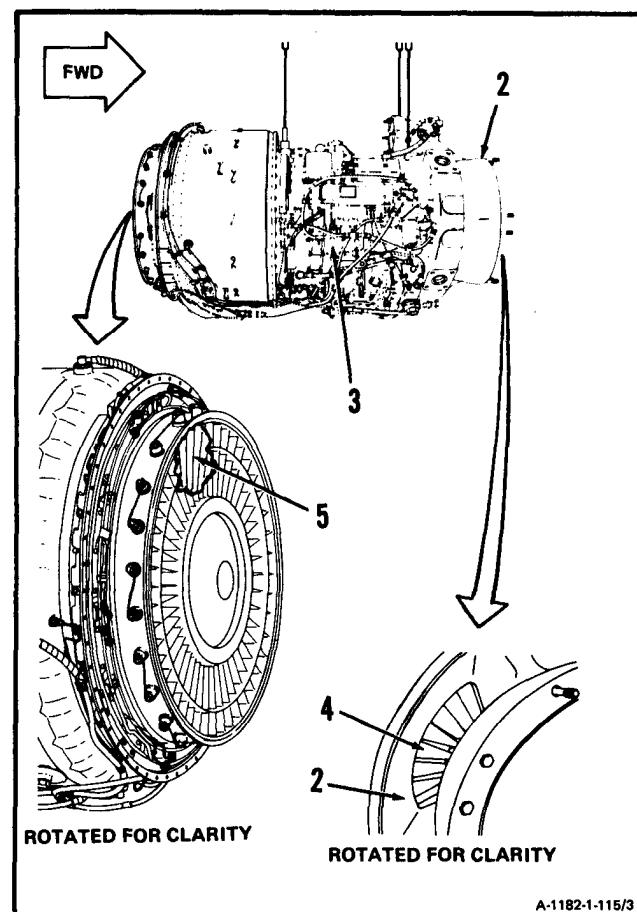
1-115 REPRESENTATIVE ENGINE IN STORAGE OVER SIX MONTHS (Continued)

1-115

1. Remove two plastic covers (1).

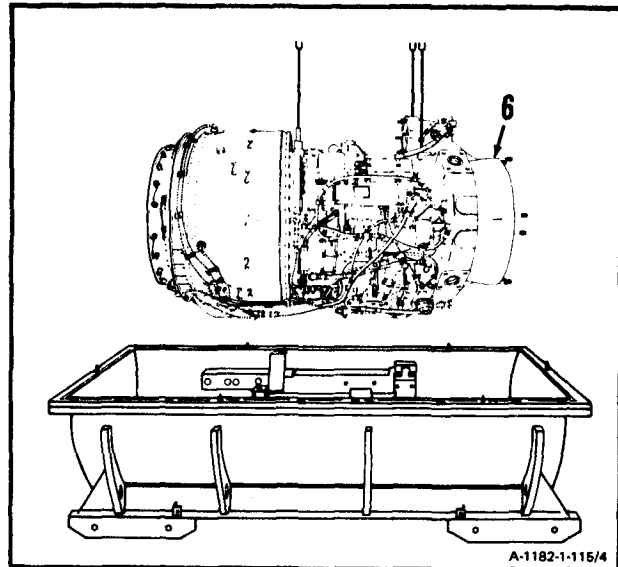


2. Inspect inlet (2), compressor housing (3), compressor rotor blades (4), and fourth turbine rotor blades (5). There shall be no corrosion. If corrosion exists, do steps 3., 4., 5., 6., or 7., as applicable, otherwise go to step 8.
3. If corrosion exists on inlet housing, clean, inspect, and repair (Ref. Tasks 2-54, 2-55 and 2-56).
4. If corrosion exists on compressor housing, clean, inspect and repair (Ref. Tasks 2-21, 2-22, and 2-23).
5. If corrosion exists on compressor rotor blades, clean, inspect, and repair (Ref. Tasks 2-32, 2-33, and 2-34).
6. If corrosion exists on fourth turbine rotor blades, clean and inspect (Ref. Tasks 4-34 and 4-35).
7. Inspect shipping and storage container (Ref. Task 1-25).

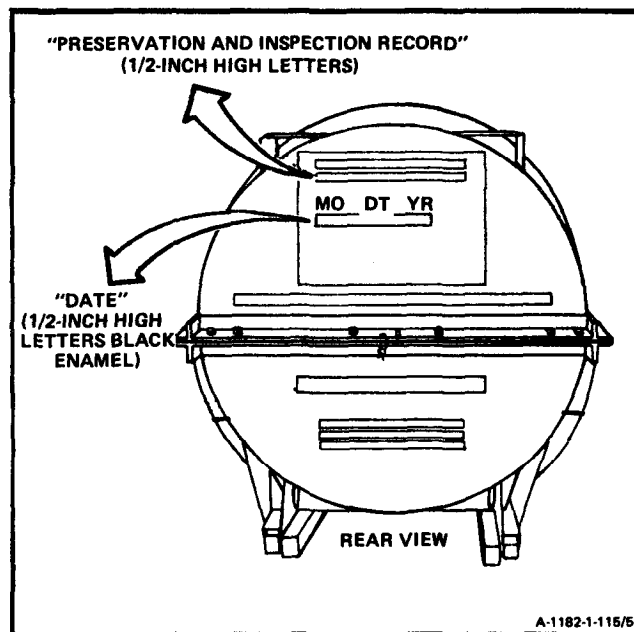


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8. Preserve and prepare engine (6) for shipment or storage (Ref. Task 1-111).



9. Stencil new preservation and inspection date on rear of shipping and storage container using white enamel (E57) and black enamel (E8) as shown.



INSPECT

FOLLOW-ON MAINTENANCE:

- Install Engine Into Shipping and Storage Container (Task. 1-113).
- Mark Shipping and Storage Container (Task 1-114).

END OF TASK

Section XII. STANDARD TORQUE LIMITS

1-116 STANDARD TORQUE VALUES

1-116

This section lists standard torque values for general type screws, nuts, and bolts; pipe thread fittings and plugs; flared tubing nuts; jam nuts and bolts; and straight and stepped studs. These values, listed in Tables 1-3 thru 1-9, will apply when special torque values are not specified in procedures. Torque wrenches needed are listed at the end of each table. For additional information, refer to TM 55-1500-204-25/1.

Table 1-3. Standard Torque for General Steel Screws, Bolts, and Nuts

THREAD SIZE	SLOTTED-HEAD SCREWS (INCH-POUNDS)	HEXAGON-HEAD BOLTS AND NUTS (INCH-POUNDS)
2-56	3	
3-48	4	
4-40	6	
5-40	7	
6-32	9	
8-32	12	
10-32	20	45
7/32-24	25	70
1/4-28	35	85
5/16-24	45	145
3/8-24	60	290
7/16-20	85	440
1/2-13	105	600
1/2-20	105	600
9/16-18		875
5/8-18		1200
Torque Wrench, 0-30 Inch-Pounds Torque Wrench, 30-150 Inch-Pounds Torque Wrench, 100-750 Inch-Pounds Torque Wrench, 700-1600 Inch-Pounds		

1-116 STANDARD TORQUE VALUES (Continued)

Table 1-4. Standard Torque for Steel Taper Pipe Thread Fittings and Plugs

SIZE	IN STEEL CASE (INCH-POUNDS)	IN MAGNESIUM OR ALUMINUM CASE (INCH-POUNDS)
1/16-27	40	15
1/8-27	100	35
1/4-18	225	80
3/8-18	365	105
1/2-14	475	150
3/4-14	550	185
1-11-1/2	650	245
Torque Wrench, 0-30 Inch-Pounds Torque Wrench, 30-150 Inch-Pounds Torque Wrench, 100-750 Inch-Pounds		

Table 1-5. Standard Torque for Tube and Hose End Fittings (B-Nuts)

DASH NO. REF.	TUBING OD INCHES	FLARED TUBING NUTS		HOSE END FITTINGS
		ALUMINUM ALLOY TUBING (INCH-POUNDS)	STEEL TUBING (INCH-POUNDS)	STEEL (INCH-POUNDS)
-3	3/16	-	95	85
-4	1/4	55	145	95
-5	5/16	70	190	130
-6	3/8	100	285	175
-8	1/2	200	475	315
-10	5/8	275	675	390
-12	3/4	400	950	675
-16	1	600	1300	925
-20	1-1/4	750	-	-
-24	1-1/2	750	-	-
Torque Wrench, 30-150 Inch-Pounds Torque Wrench, 100-750 Inch-Pounds Torque Wrench, 700-1600 Inch-Pounds				

1-116 STANDARD TORQUE VALUES (Continued)

1-116

Table 1-6. Standard Torque for Jam Nuts for Bulkhead Fittings

TUBING OUTSIDE DIAMETER	THREAD SIZE	TORQUE (INCH-POUNDS)
1/8	5/16-24	45
3/16	3/8-24	75
1/4	7/16-20	95
5/16	1/2-20	115
3/8	9/16-18	135
1/2	3/4-16	260
5/8	7/8-14	350
3/4	1-1/16-12	550
1	1-5/16-12	830
1-1/8	1-5/8-12	1080
1-1/2	1-7/8-12	1320

Torque Wrench, 30-150 Inch-Pounds
 Torque Wrench, 100-750 Inch-Pounds
 Torque Wrench, 700-1600 Inch-Pounds

Table 1-7. Standard Torque for Jam Nuts, Bolts, and Fittings Used With Gaskets

TUBING OUTSIDE DIAMETER	THREAD SIZE	NUTS (MS9099, MS910, MS9200, MS9201); PLUG (MS9015); UNION (AN815); AND BOLT-UNIVERSAL BANJO FITTING (AN774 AND AN775) (INCH-POUNDS)
1/8	5/16-24	50
3/16	3/8-24	65
1/4	7/16-20	95
5/16	1/2-20	125
3/8	9/16-18	155
1/2	3/4-16	290
5/8	7/8-14	390
3/4	1-1/16-12	575
1	1-5/16-12	850
1-1/8	1-5/8-12	950
1-1/2	1-7/8-12	950

Torque Wrench, 30-150 Inch-Pounds
 Torque Wrench, 100-750 Inch-Pounds
 Torque Wrench, 700-1600 Inch-Pounds

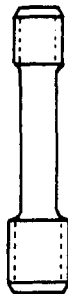
TABLE 1-8. STANDARD TORQUE FOR STEPPED STUDS

THREAD SIZE		TYPE X (INCH-POUNDS)	TYPE Y (INCH-POUNDS)	TYPE Z (INCH-POUNDS)
NUT END	STUD END			
10-32	1/4-20	35		
1/4-28	5/16-18	80	65	110
5/16-24	3/8-16	170	130	225
3/8-24	7/16-14	300	250	395
7/16-20	1/2-13	485	385	625
1/2-20	9/16-12	775	625	950
9/16-18	5/8-11	1125	875	1350
5/8-18	11/16-11	1650	1300	2000

Torque Wrench, 30-150 Inch-Pounds
 Torque Wrench, 100-750 Inch-Pounds
 Torque Wrench, 700-1600 Inch-Pounds
 Torque Wrench, 100-500 Foot-Pounds

STUDS

TYPES X AND Y ARE
DRIVEN FROM NUT END.
TYPE Z IS DRIVEN FROM
FLAT ON STUD.



TYPE X



TYPE Y



TYPE Z

TABLE 1-9. STANDARD TORQUE FOR STRAIGHT STUDS

THREAD SIZE		TYPE X (INCH-POUNDS)	TYPE Y (INCH-POUNDS)	TYPE Z (INCH-POUNDS)
NUT END	STUD END			
4-48	4-40	5		
6-40	6-32	10		
8-36	8-32	20		
10-32	10-24	30		
1/4-32	1/4-20	75	75	80
5/16-24	5/16-18	165	165	175
3/8-24	5/8-16	275	275	290
7/16-20	7/16-14	450	325	475
1/2-20	1/2-13	700	550	750
9/16-18	9/16-12	1025	725	1100
5/8-18	5/8-11	1450	1050	1450

Torque Wrench, 0-30 Inch-Pounds
 Torque Wrench, 30-150 Inch-Pounds
 Torque Wrench, 100-750 Inch-Pounds
 Torque Wrench, 700-1600 Inch-Pounds

Section XIII. STANDARD PRACTICES AND PROCEDURES

This section contains Standard Maintenance Practices and Standard Procedures. Standard maintenance practices are those which you should do automatically when doing a task. Instructions for standard maintenance practices will not normally be included in task steps. Standard procedures are common detail procedures you may have to do to complete a task. Initial setup tables list task numbers of standard procedures when you need them. Task steps tell you when to use standard procedures.

1-117 STANDARD MAINTENANCE PRACTICES

1-117

A. General disassembly practices areas follows:

- (1) Record and tag defective parts. Record reason for rejection (exclude parts that are normally replaced such as gaskets, packings, etc.).
- (2) When disconnecting electrical connectors or hose and tube fittings, remove clamps or brackets, as required, to gain slack and to avoid damage to connectors and fittings.
- (3) Tag lines before they are disconnected. Protect all lines, fittings, and ports with clean caps, foil or plugs. If plastic caps and plugs are used, be sure that no chips are generated during installation.
- (4) Wear gloves (E20) when handling lubricating oils or turbine fuels. Wear gloves (E20) during removal and disassembly tasks for all lubricating oil or fuel related components and lines.
- (5) During removal tasks, allow fuel and oil lines and components to drain into suitable containers. Storage and disposition of fuel and oil shall be in accordance with proper Army regulations. Wipe up spilled fuels and oils using wiping rag (E58). When required, specific instructions for draining components are included in tasks.
- (6) Tie lines and related parts out of the way with twine, not lockwire.
- (7) Record thickness of removed shims and tag them, when applicable.



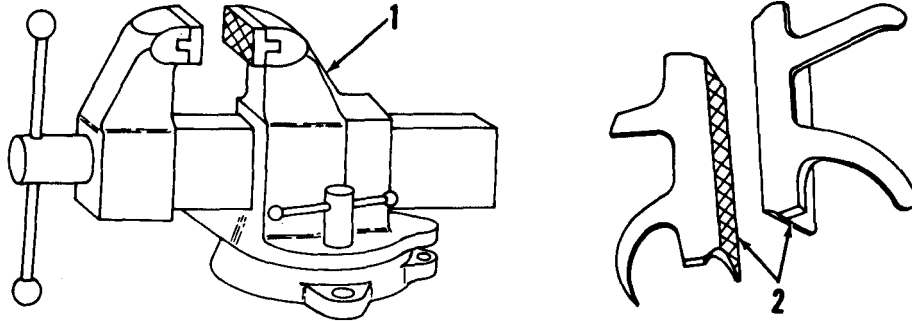
CAUTION

Never use a lead (graphite) pencil to matchmark hot end parts. Lead will contaminate the metal and cause cracks. Damage to engine will occur.

- (8) Prior to removal or disassembly, matchmark all hot end parts for proper installation with marking pencil (E34).
- (9) Apply penetrating oil (E39) to parts (especially those exposed to high temperatures) to make removal easier. On parts to be reinstalled, remove all penetrating oil from part by cleaning with dry cleaning solvent (E17).

(10) Discard removed packings, cotter pins, retainers, tabwashers, etc.

(11) During disassembly tasks, components may be held in vise (1) with soft jaw caps (2) unless task steps instruct otherwise.



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(12) In Disassembly tasks, components are removed and wires and hoses disconnected.

(13) Disassembly procedures reflect the total breakdown of a part as it is authorized. You may not need to disassemble a part as far as described in the task. Follow the steps to disassemble only as far as necessary to replace worn or damaged parts.

B. General assembly practices are as follows:

(1) Remove corrosion preventive compounds from parts which are bathed by the engine lubrication system.

(2) Be sure to install all parts properly as tagged at removal or disassembly. Be sure all necessary tolerances are met.

(3) Use new packings, cotter pins, retainers, tabwashers, etc.

(4) Coat packings, before installing, in accordance with the following:

(a) Petrolatum (E40) for fuel system packings.

(b) Shortening compound (E46) for lubrication system packings.

(c) Grease (E23) for pneumatic system packings.

(5) When torquing hardware, observe compliance with torque procedures as required in General Maintenance Manual (Ref. TM 55-1500-204-25/1).

(6) Tables in paragraph 1-116 provide standard torque limits for general type screws, nuts, and bolts; pipe thread fittings and plugs; flared tubing nuts; jam nuts and bolts; and stepped studs. The word install is used when a standard torque is required. If additional tools are required such as crowfoot wrenches, they are listed in the task INITIAL SETUP. These standard torque values apply only when special torque values are not specified in procedures in this manual. A special torque will be cited when the words torque to are used in this manual. Included in the torque tables are the applicable torque wrenches.

1-117 STANDARD MAINTENANCE PRACTICES (Continued)

1-117

- (7) When a cotter pin is required, cotter pin holes will be aligned within allowable torque range.
- C. When a nut is tightened or loosened on a bolt, the bolt head will be held with a wrench.
- D. Guide lines will be used when any item is hoisted overhead.
- E. Manufactured item specifics are listed in Appendix E.
- F. Before a component or the parts of a component are inspected, they are to be cleaned as required.
- G. Nicks, burrs, and scratches are acceptable unless specific criteria is called out in inspection task steps. Sharp projections shall be blend repaired, within specific criteria.
- H. Blend-repair shall be accomplished using small files and Carborundum stones (E10), Use crocus cloth (E15) for final polishing; do not use power tools. Blend all repairs and finish smoothly. Lines, scratches, or sharp edges, which are sharp bottomed, are not permitted. The finish stroke of all compressor and turbine blade repair work shall be parallel to leading and trailing edges of blade. When blade is repaired on leading or trailing edges, blend edges with smooth radius as part of repair.
- I. Components and installation area will be inspected for condition before installation.
- J. Prior to installation, paint will be touched up as required.
- K. Following maintenance, work area will be inspected for foreign objects.
- L. Test setups are shown as schematics. Specific attaching hardware is not listed to allow you flexibility in using equivalent equipment.
- M. General maintenance procedures such as magnetic particle inspection and threaded insert replacement are not included in maintenance instructions. A reference is made to applicable general maintenance manual for procedures.

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
Inside Caliper
Outside Caliper
Inside Micrometer Caliper Set
Outside Micrometer Caliper Set
Goggles
Compressed Air Source

Materials:

Carborundum Stone (E10)
Crocus Cloth (E15)
Dry Cleaning Solvent (E17)
Gloves (E20)
Lint-Free Cloth (E26)

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

GO TO NEXT PAGE

1-118 CLEAN, INSPECT AND REPAIR SPLINES AND GEARS (Continued)

1-118

1. Clean external splines (1), internal splines (2), and gears (3) as follows:
 - a. Wear gloves (E20) and remove all traces of grease and dirt.

WARNING

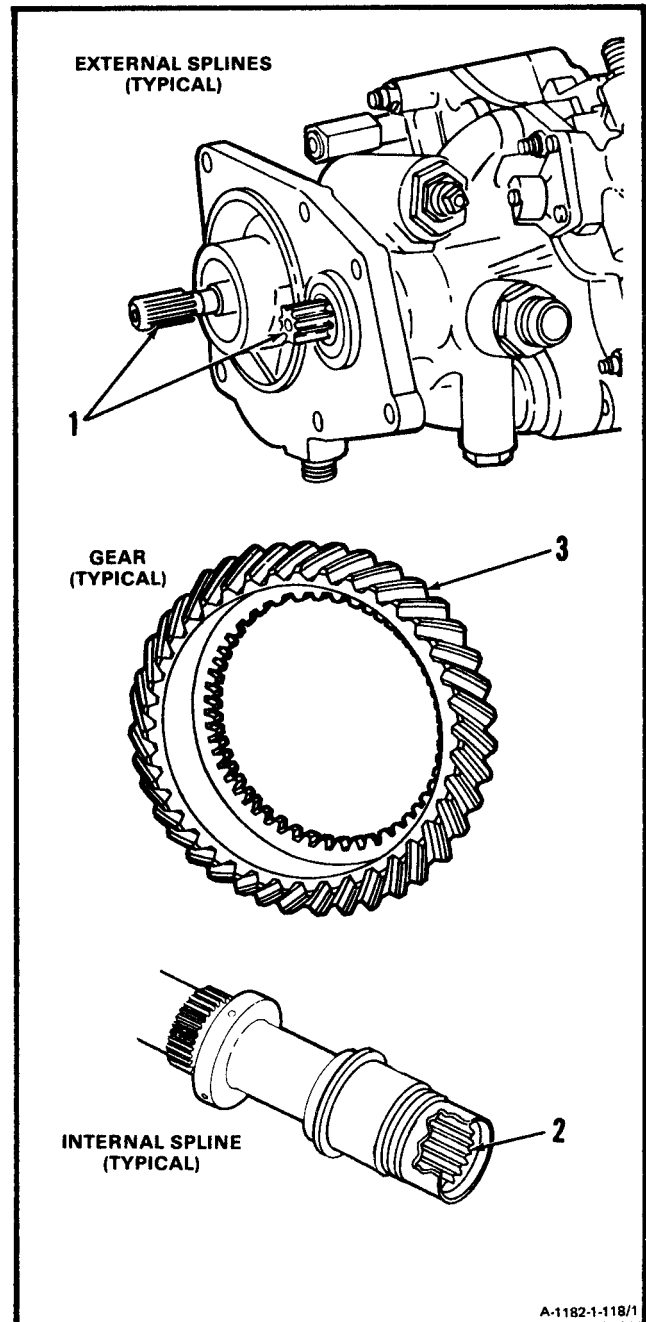
Dry cleaning solvent (E17) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

- b. Use dry cleaning solvent (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.

- c. Dry with lint-free cloth (E26), or wearing goggles, blow dry as needed, with clean, dry compressed air.



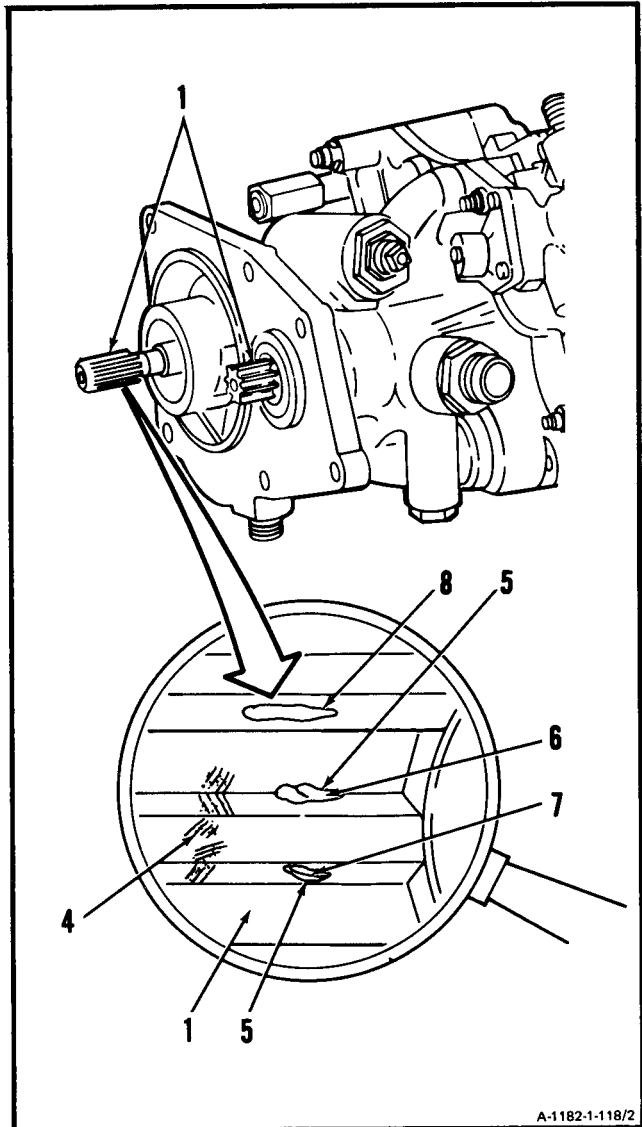
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NOTE

The following inspection procedure applies to both external and internal splines.

2. Inspect splines (1) as follows:

- a. There shall be no rust (4).
- b. There shall be no rough edges (5) caused by chipping (6) or gouging (7).
- c. Inspect for wear (8). If wear is noted, perform steps d. or e.

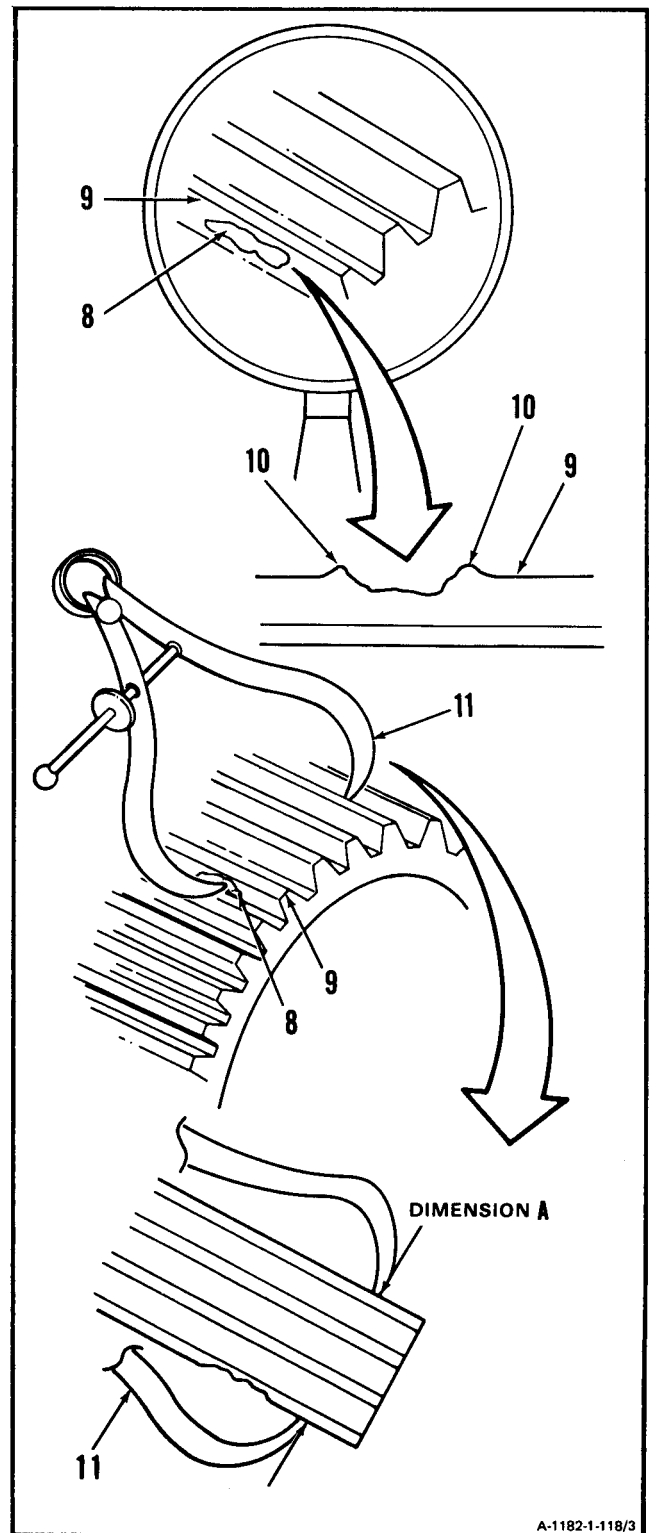


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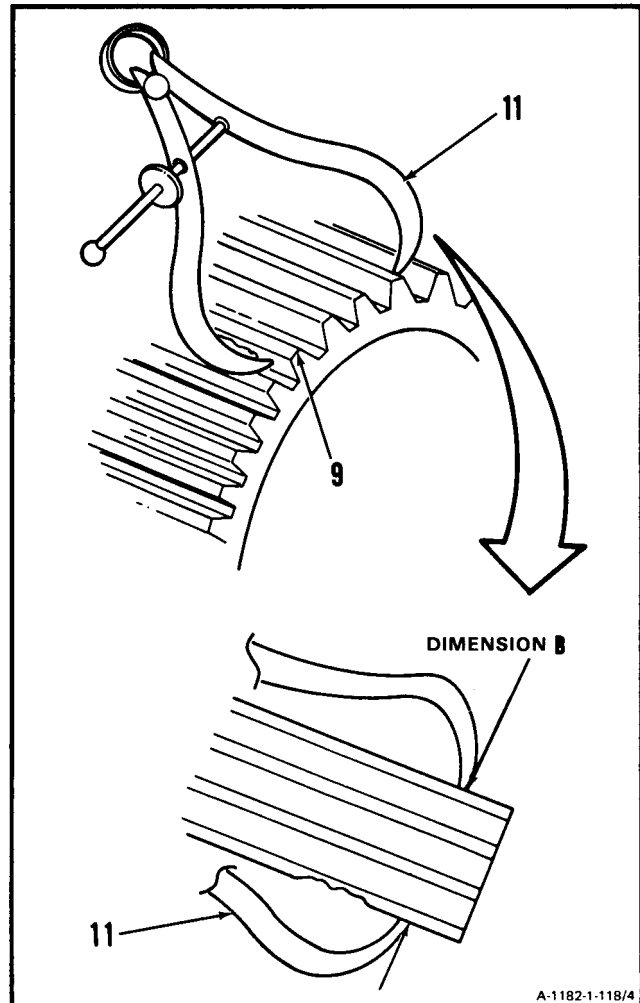
d. Determine depth of wear (8) on external splines (9) as follows:

- (1) Remove projecting material (10) on spline (9) by blending. Use Carborundum stone (E10).
- (2) Determine thickness of spline (9) at area of wear (8). Use outside caliper (11).
- (3) Measure set thickness on outside caliper (11). Use thickness gage or inside micrometer caliper. Record as Dimension A.



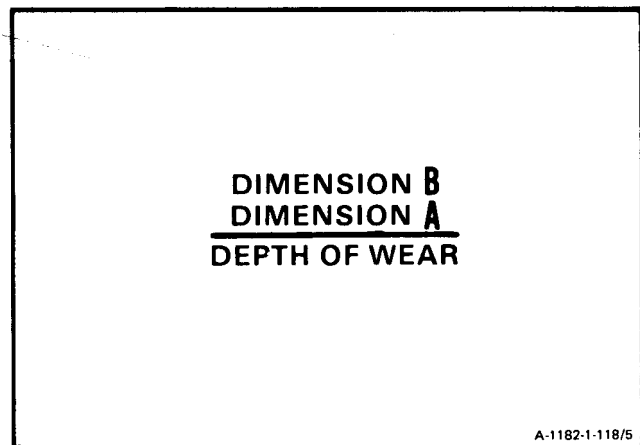
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- (4) Determine thickness of undamaged area of spline (9). Use outside caliper (11).
- (5) Measure set thickness on outside caliper (11). Use thickness gage or inside micrometer caliper. Record as Dimension B.



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- (6) Subtract Dimension A from Dimension B. Result is depth of wear.
- (7) Depth of wear shall not exceed dimension given in detail inspection task.

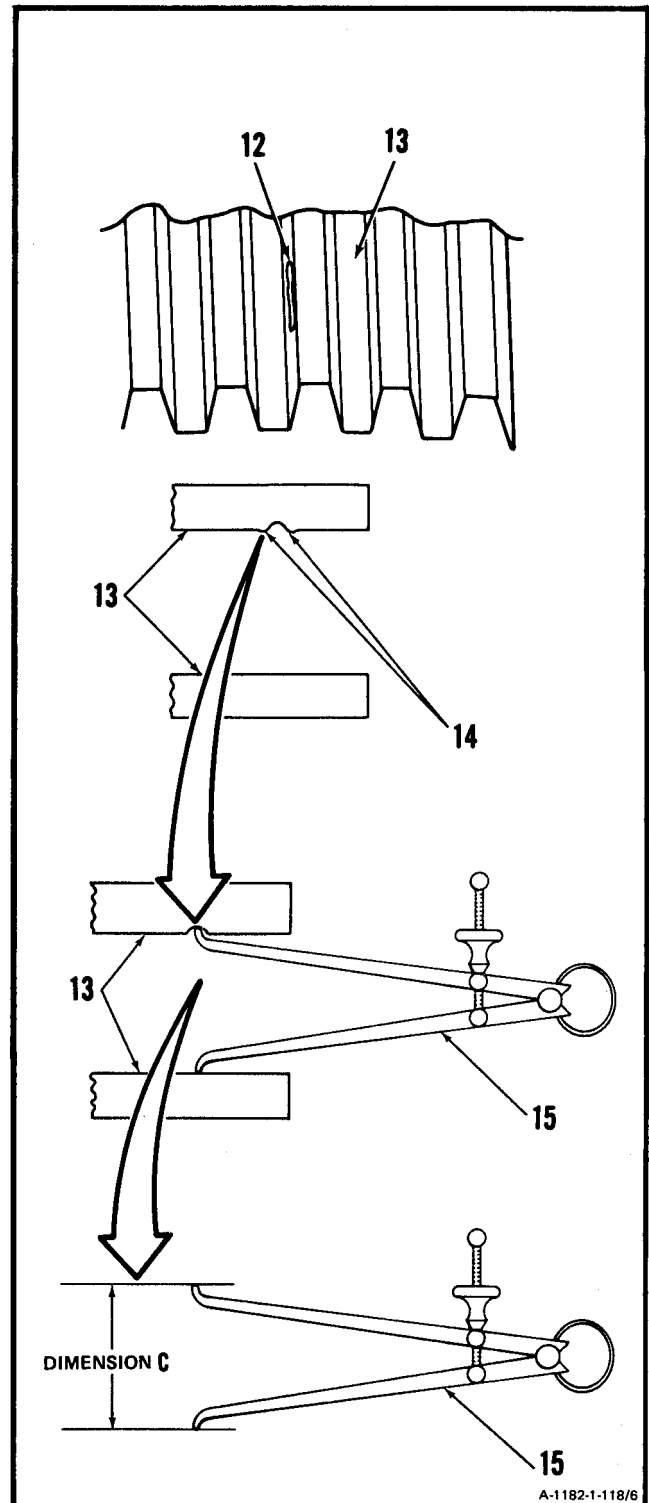


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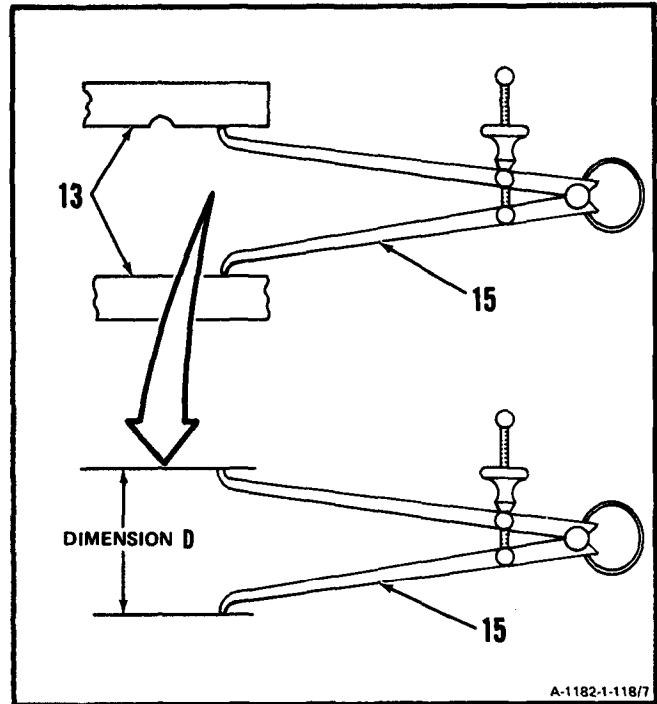
e. **Determine depth of wear (12) on internal splines (13) as follows:**

- (1) Remove projecting material (14) on spline (13) by blending. Use carborundum stone (E10).
- (2) Determine distance between splines (13) at wear (12) with inside caliper (15).
- (3) Measure set thickness on inside caliper (15). Use outside micrometer caliper. Record as Dimension C.



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- (4) Determine distance between splines (13) in undamaged area. Use inside caliper (15).
- (5) Measure set thickness on inside caliper (15). Use outside micrometer caliper. Record as Dimension D.



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- (6) Subtract Dimension D from Dimension C. Result is depth of wear.
- (7) Depth of wear shall not exceed dimension given in detail inspection task.

$$\frac{\text{DIMENSION C}}{\text{DIMENSION D}} = \text{DEPTH OF DAMAGE}$$

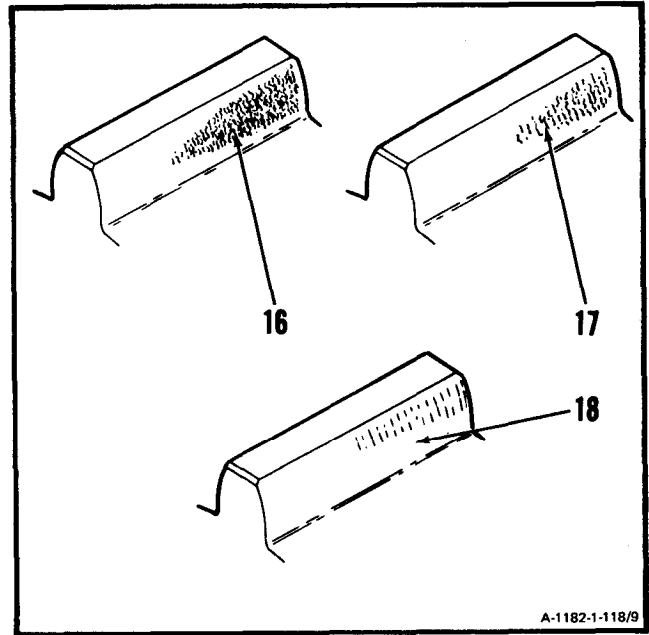
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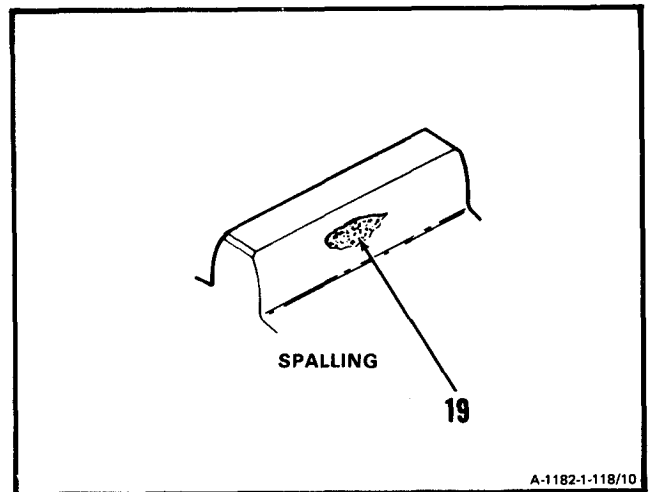
1-118 CLEAN, INSPECT AND REPAIR SPLINES AND GEARS (Continued)

1-118

f. There shall be no heavy scoring (16) or medium scoring (17), Light scoring (18) is acceptable.

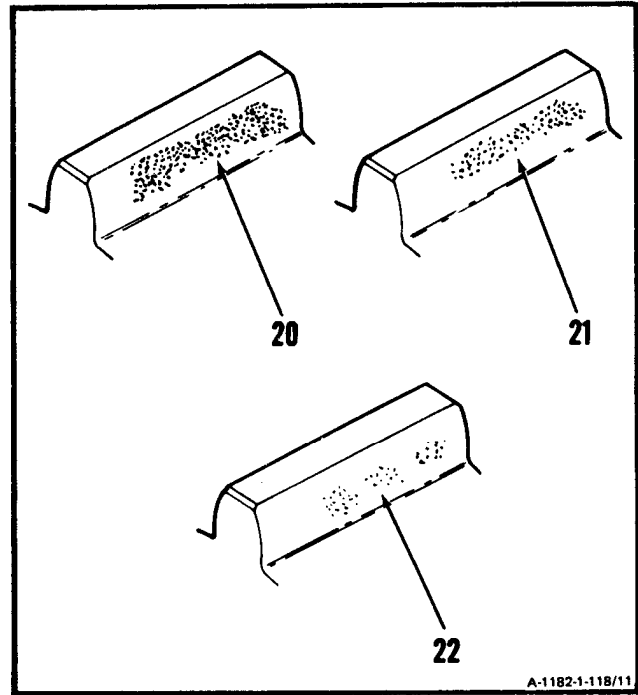


g. There shall be no spalling (19).



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- h. There shall be no heavy pitting (20) or medium pitting (21). Light pitting (22) is acceptable.

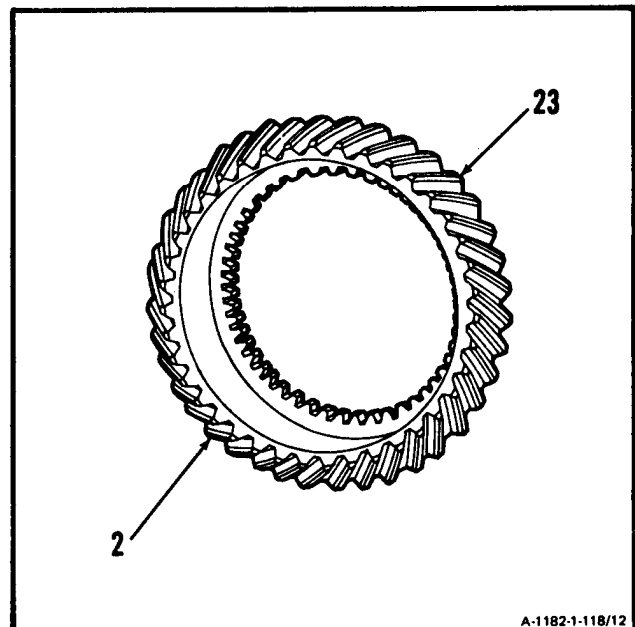


NOTE

The following inspection procedure applies to all gears. Accessory drive pinion gear is shown,

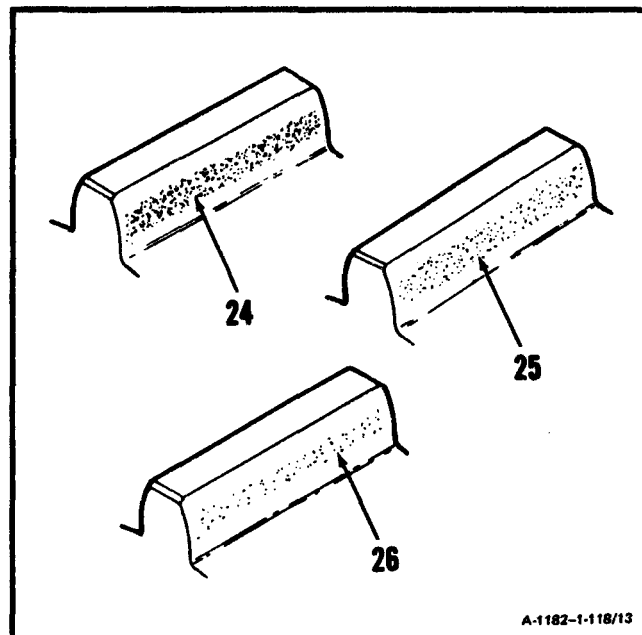
3. Inspect gear (2).

- a. There shall be no broken teeth (23).
- b. There shall be no overheating condition as indicated by a blue or purple color.

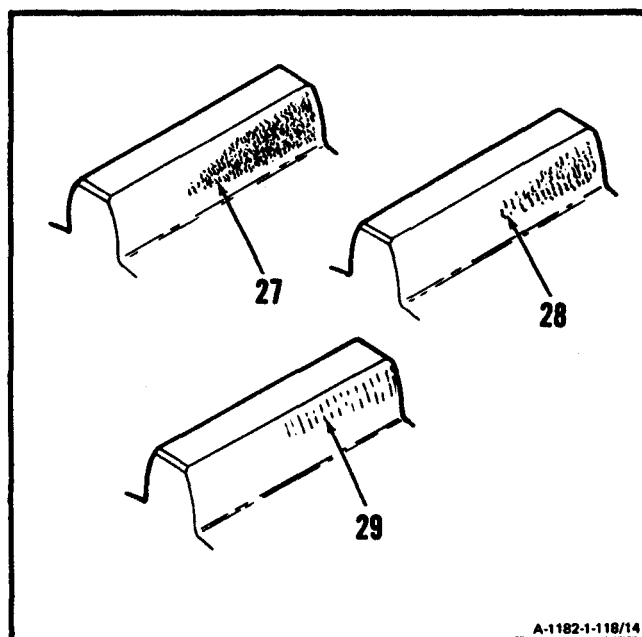


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c. There shall be no heavy frosting (24) or medium frosting (25) on gear splines, Light frosting (26) is acceptable.

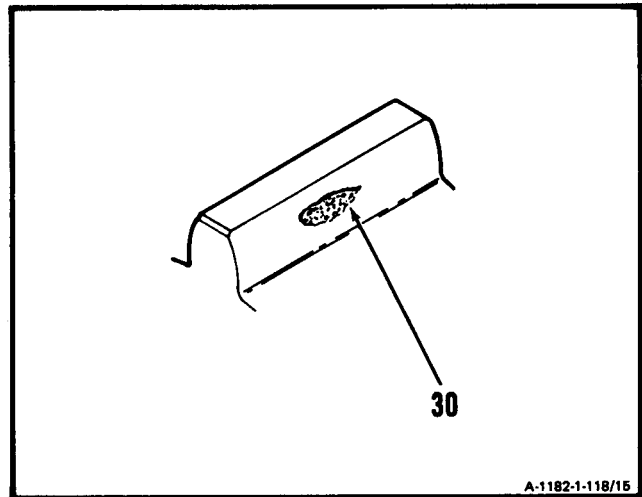


d. There shall be no heavy scoring (27) or medium scoring (28) on gear splines, Light scoring (29) is acceptable.

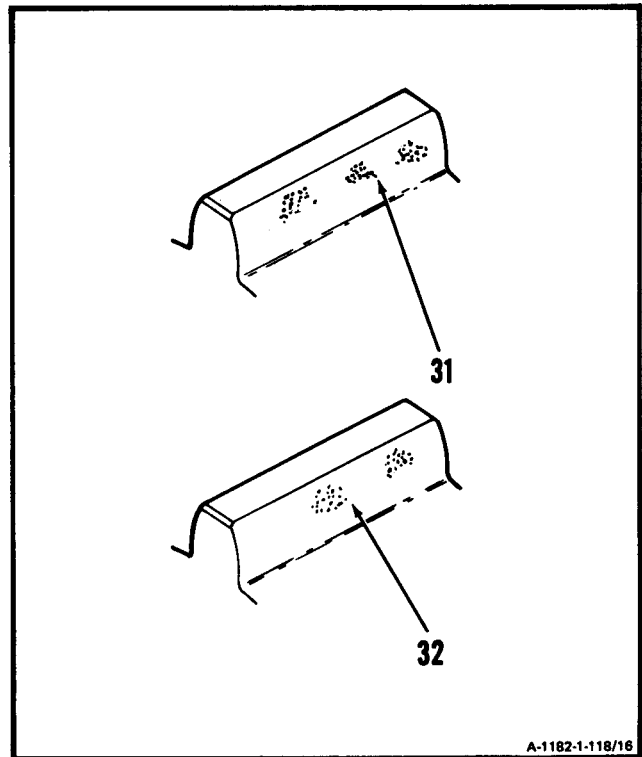


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e. There shall be no spalling (30) on gear splines.



f. There shall be no medium pitting (31) on gear splines. Light pitting (32) is acceptable.



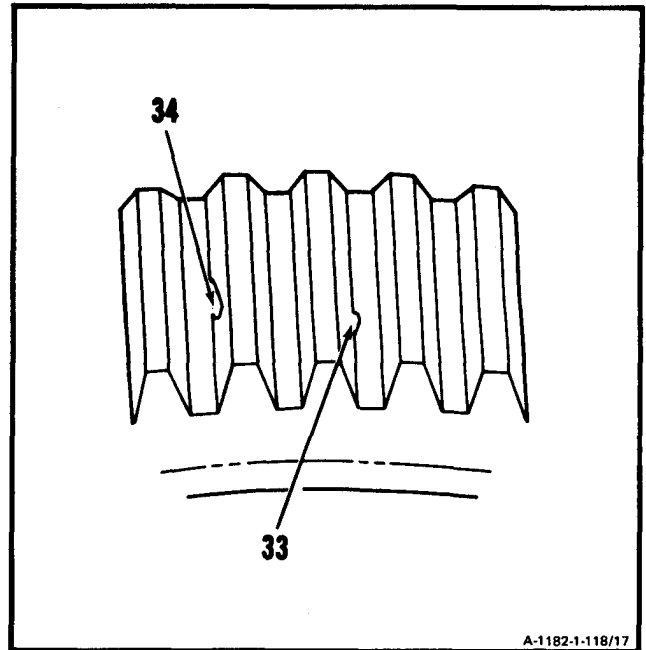
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1-118 CLEAN, INSPECT AND REPAIR SPLINES AND GEARS (Continued)

1-118

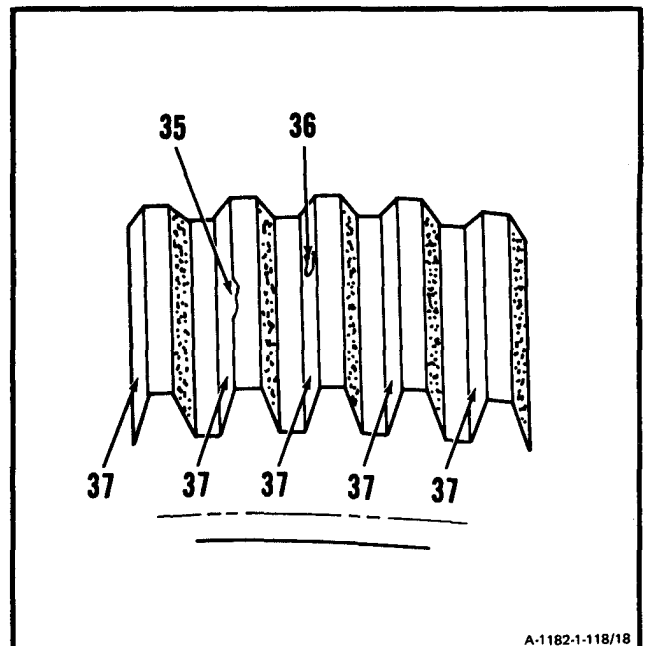
4. Repair external and internal splines as follows:

- a. Remove nicks (33) and burrs (34). Use carborundum stone (E10).
- b. Polish repaired area. Use crocus cloth (E15).



5. Repair gear teeth as follows:

- a. Remove nicks (35) and burrs (36) from non-active surfaces (37). Use Carborundum stone (E10).
- b. Polish repaired area. Use crocus cloth (E15).



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
Goggles
Wooden Stirring Rod (Appendix E)
Pail, 2-1/2 Gallon
Respirator
Gun Type Heater
Apron
Face Shield

Materials:

Acetone (E1)
Acid Swabbing Brush (E2)
Aluminum Oxide Abrasive Paper (E3)
Gloves (E20)
Engine Gray Enamel (E22)
Lint-Free Cloth (E26)
Masking Tape (E35)
Methyl Ethyl Ketone (E36)
Nitric Acid (E38)
Sodium Bichromate (E48)

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

Equipment Condition:

Off Engine Task

NOTE

The magnesium and magnesium alloy parts used in the T55-L-712 engines have different original finishes, such as Epoxy, HAE, Synthetesine and Enamel. The following touch up procedure applies to all magnesium and magnesium alloy parts. The purpose of the touch up procedure is to prevent corrosion on these parts.

NOTE

The following steps show a typical touch up procedure on the upper compressor housing.

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1. Remove corrosion (1) from damaged area (2).
Use aluminum oxide abrasive paper (E3).

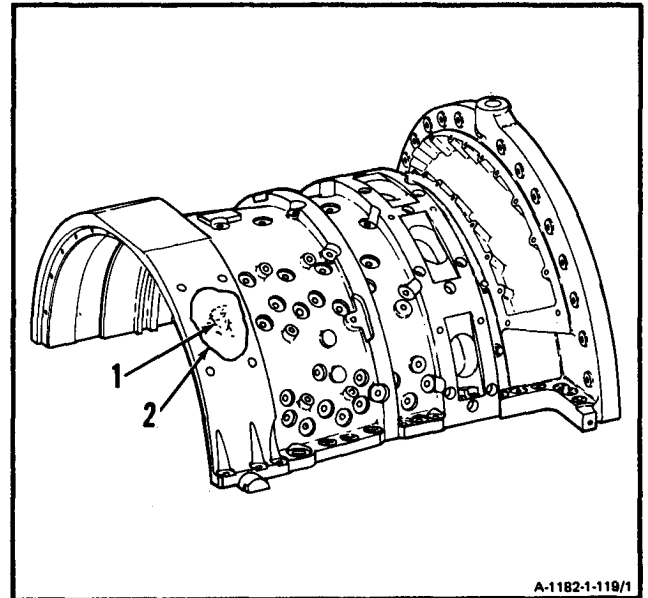
WARNING

Methyl ethyl ketone (E36) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. get medical attention for eyes.

WARNING

Acetone (E1) is flammable and toxic. It can irritate skin and cause burns. Use only in well-ventilated area, away from heat and open flame. In case of contact, immediately flush skin or eyes with water for at least 15 minutes. Get medical attention for eyes.

2. Wear gloves (E20) and **clean damaged area (1)**.
Use methyl ethyl ketone (E36) followed by acetone (E1). Use acid swabbing brush (E2) and lint-free cloth (E26).
3. Let area dry for about 15 minutes.



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4. **Mix chrome pickling solution** as follows:

- a. Wear goggles, gloves (E20), and respirator.
- b. Put 1 gallon of water into a pail.

WARNING

Sodium bichromate is highly toxic, do not take internally. Use only with adequate ventilation. Avoid prolonged or repeated contact with skin. Wear approved gloves and goggles, or face shield and apron, and wash hands thoroughly after handling. Wear respirator if sodium bichromate is in powdered form. In case of contact, immediately flush skin and eyes with water for at least 15 minutes. Get medical attention.

- c. Add 1-1/2 pounds of sodium bichromate (E48) to water. Stir solution with wooden stirring rod (Appendix E).

WARNING

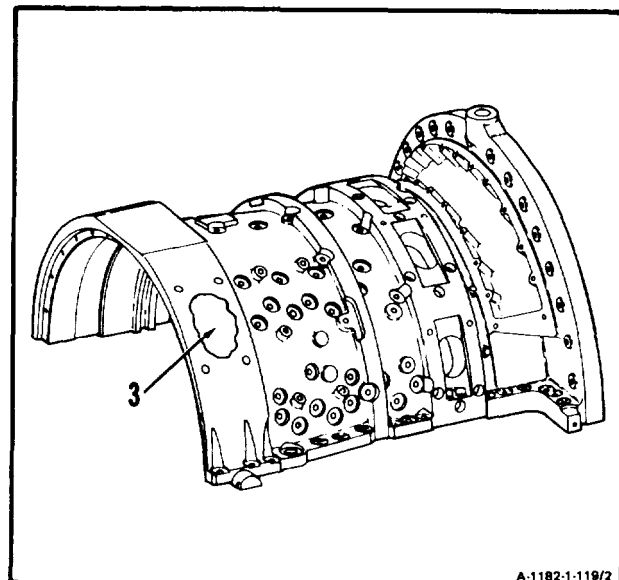
Both nitric acid and its vapors are a personnel hazard. Avoid contact with skin, eyes or clothing. Avoid inhalation of vapors. In case of contact, immediately flush skin and eyes with water for at least 15 minutes. Get medical attention.

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1-119 TOUCH UP MAGNESIUM AND MAGNESIUM ALLOYS (Continued)

1-119

- d. Add 1-1/2 pints of nitric acid (E38) to sodium dichromate and water solution. Stir solution with wooden stirring rod (Appendix E).
5. Brush seven coats of solution on bare magnesium surface (3). Make sure solution stays on surface for 2 to 5 minute. Use acid swabbing brush (E2).
6. Wipe bare magnesium surface (3). Use clean lint-free cloth (E26).
7. Dry bare magnesium surfaces (3) to 10 to 15 minutes. Use gun-type heater.



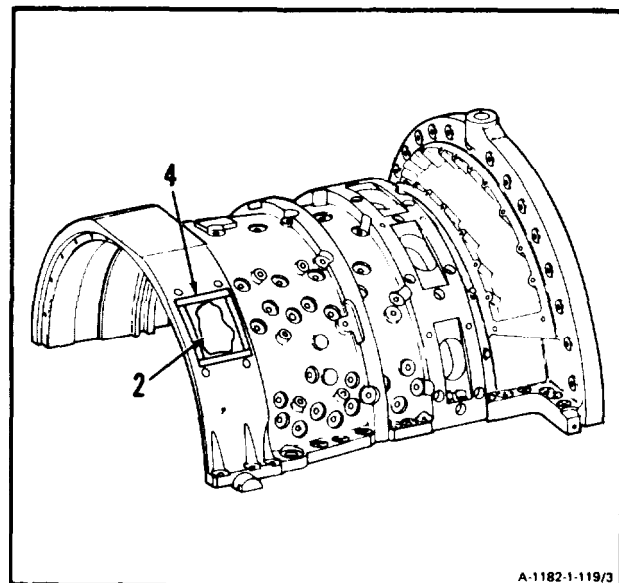
A-1182-1-119/2

8. Place masking tape (E35) (4) around damaged area (2).
- 8.1. Using an acid swabbing brush (E2) apply clear synthetic sealant (E12) to affected area. Smoothly blend sealant with original coating.

NOTE

A 250 watt reflector heat lamp placed 2 to 4 inches from surface will cure sealant in approximately 3 hours provided the surface temperature reaches 120°F (49°C) by the end of cure cycle.

9. Brush on engine gray enamel (E22) over damaged area (2). Use acid swabbing brush (E2).
10. Let area air dry for a minimum of 4 hours.
11. Remove masking tape (E35) (4).



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INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-120 DETERMINE DEPTH OF DAMAGE FROM CHAFING, DENTING, SCRATCHING, 1-120 GOUGING, OR WEAR

INITIAL SETUP

Applicable Configurations:

All

Tools:

Technical Inspection Tool Kit,
NSN 5180-00-323-5114
Dial Indicating Depth Gage
Inside Micrometer Caliper Set
Outside Micrometer Caliper Set

Dial Indicator
Thickness Gage
Hand-File Set
Wire Gages

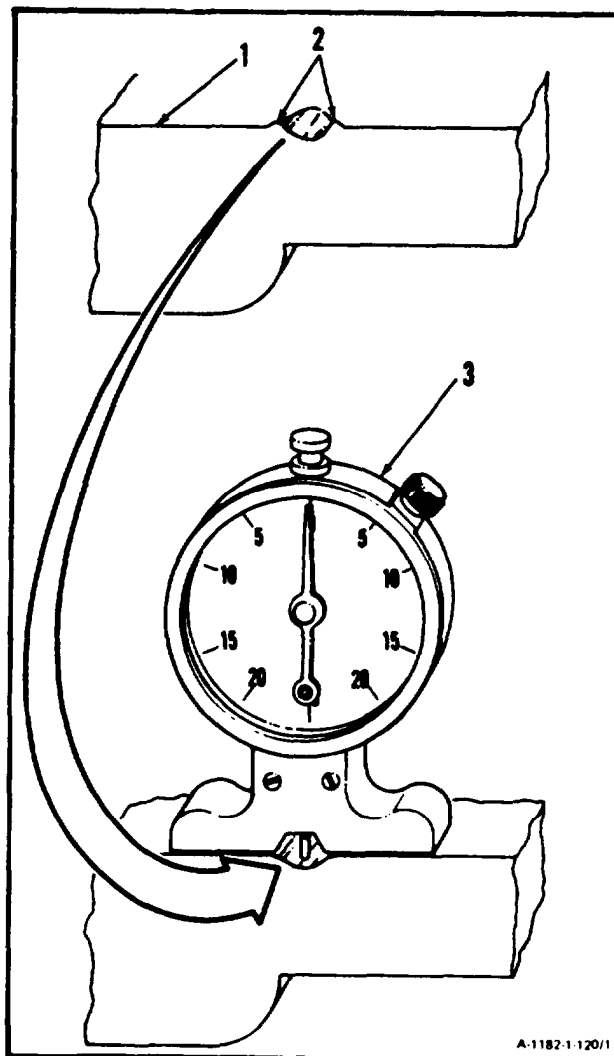
Materials:

Carborundum Stone (E10)

Personnel Required:

68B30 Aircraft Powerplant Inspector

1. Determine depth of damage on flat surfaces (1) as follows:
 - a. Remove projecting material (2) by blending. Use carborundum stone (E10).
 - b. Measure depth of damage. Use dial indicating depth gage (3).

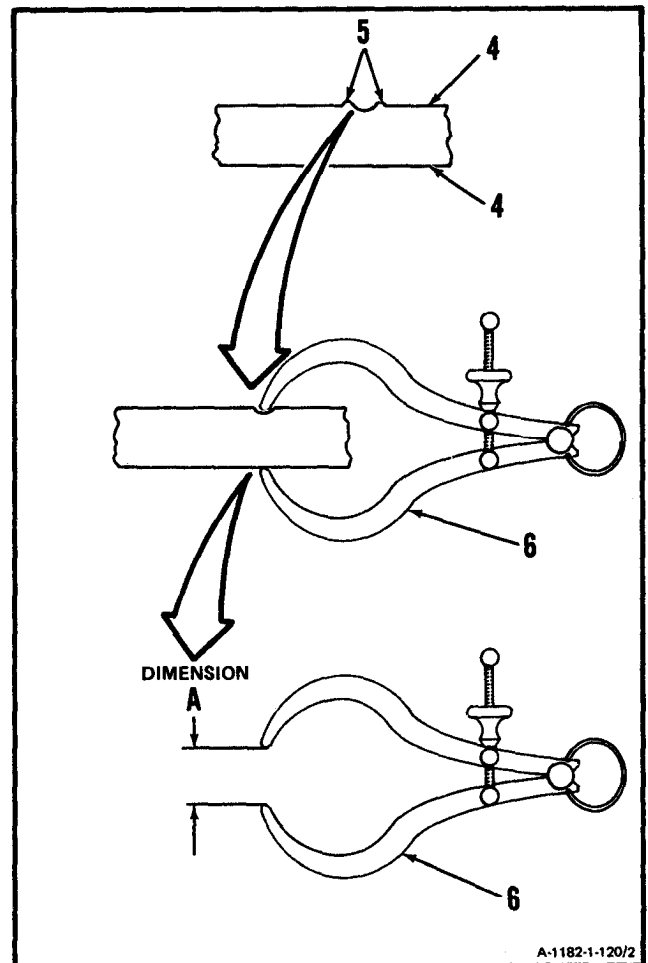


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**1-120 DETERMINE DEPTH OF DAMAGE FROM CHAFING, DENTING, SCRATCHING,
GOUGING, OR WEAR (Continued)**

1-120

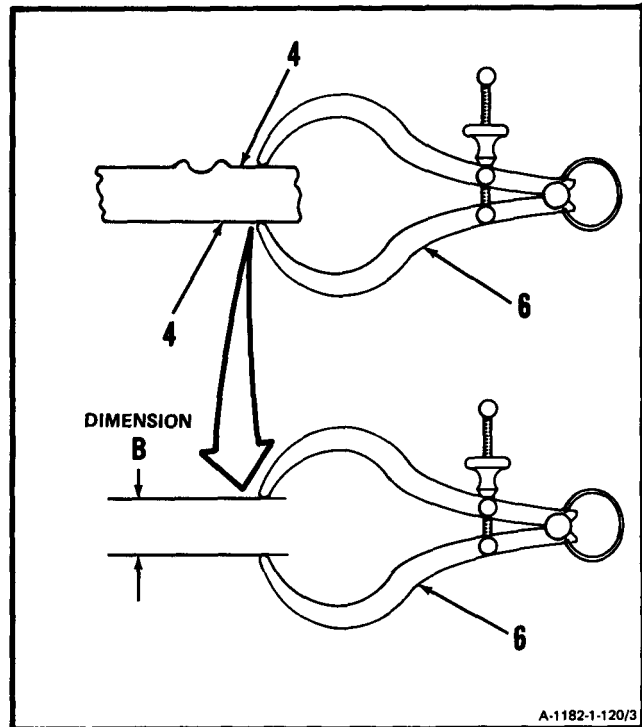
2. Determine depth of damage on external parallel surfaces (4) using outside caliper as follows:
 - a. Remove projecting material (5) by blending. Use Carborundum stone (E10).
 - b. Determine thickness of part at damage. Use outside caliper (6).
 - c. Measure set thickness on outside caliper (6). Use thickness gage or inside micrometer caliper. Record as Dimension A.

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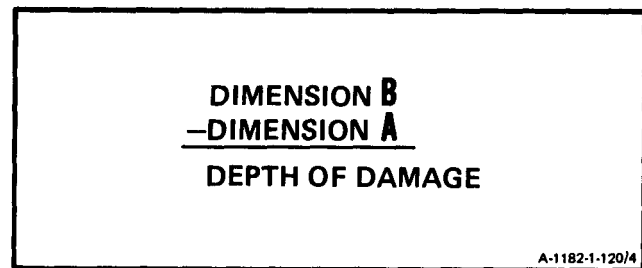
1-120 DETERMINE DEPTH OF DAMAGE FROM CHAFING, DENTING, SCRATCHING, GOUGING, OR WEAR (Continued)

1-120

- d. Determine thickness of undamaged area of surfaces (4). Use outside caliper (6).
- e. Measure set thickness on outside caliper (6). Use thickness gage or inside micrometer caliper. Record as Dimension B.



- f. Subtract Dimension A from Dimension B. Answer is depth of damage.

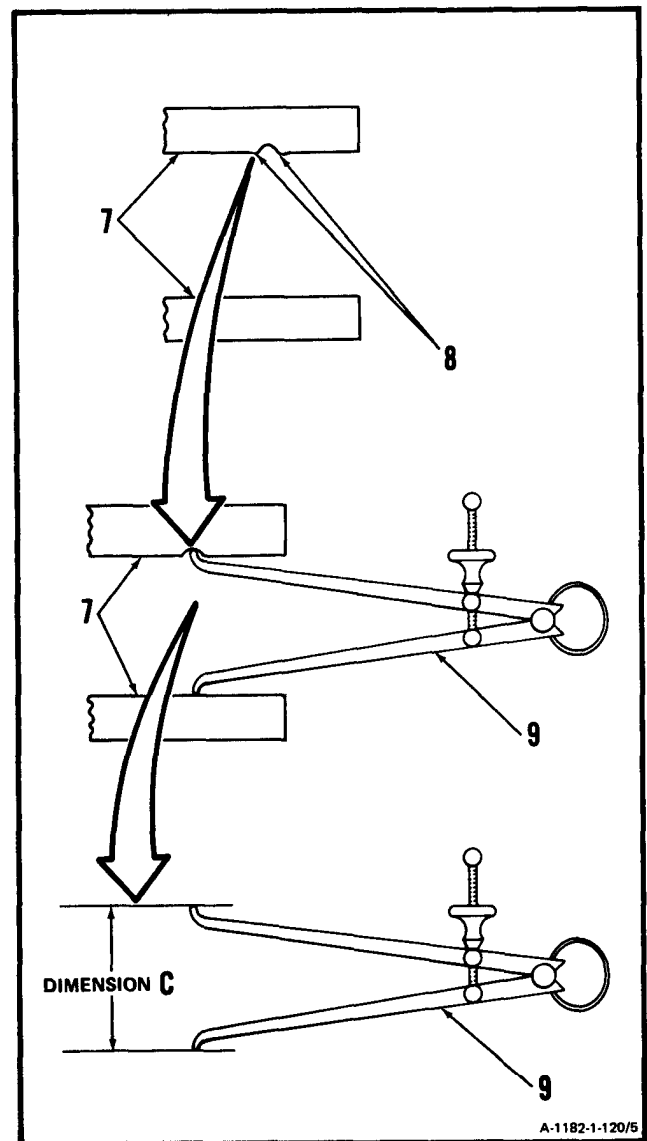


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1-120 DETERMINE DEPTH OF DAMAGE FROM CHAFING, DENTING, SCRATCHING, GOUGING, OR WEAR (Continued)

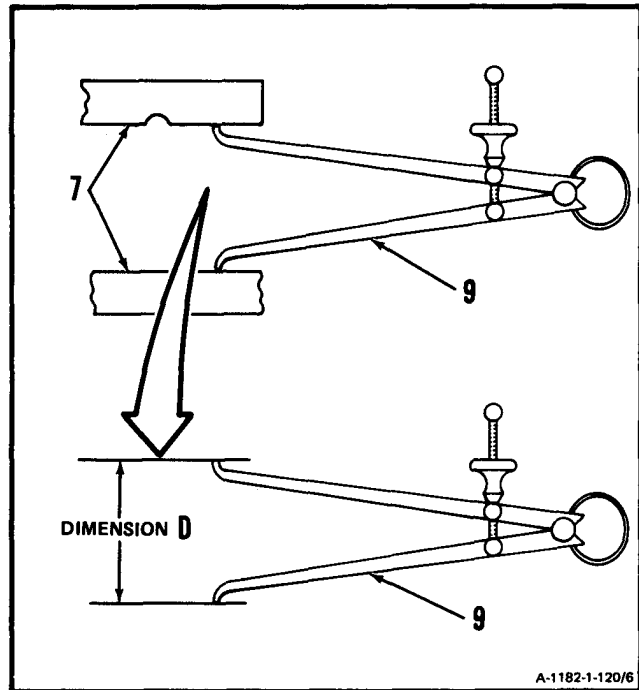
1-120

3. Determine depth of damage on internal surfaces (7) using inside caliper as follows:
 - a. Remove projecting material (8) by blending. Use hand-file.
 - b. Determine distance between surfaces (7) at damage. Use inside caliper (9).
 - c. Measure set thickness on inside caliper (9). Use outside micrometer caliper. Record as Dimension C.

**GO TO NEXT PAGE**

1-120 DETERMINE DEPTH OF DAMAGE FROM CHAFING, DENTING, SCRATCHING, GOUGING, OR WEAR (Continued)

- d. Determine distance between surfaces (7) in undamaged area. Use inside caliper (9).
- e. Measure set thickness on inside caliper (9). Use outside micrometer caliper. Record as Dimension D.



- f. Subtract Dimension D from Dimension C. Answer is depth of damage.

$$\begin{array}{r}
 \text{DIMENSION C} \\
 - \text{DIMENSION D} \\
 \hline
 \text{DEPTH OF DAMAGE}
 \end{array}$$

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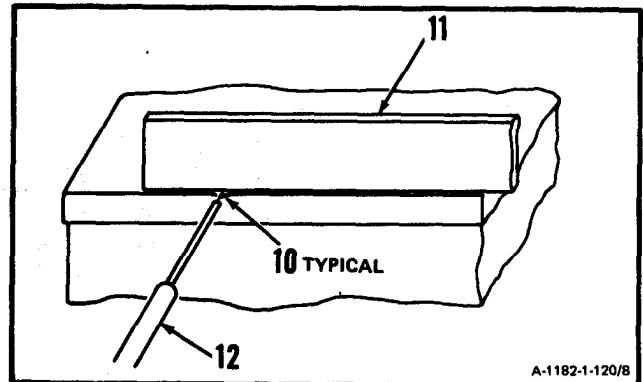
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1-120 DETERMINE DEPTH OF DAMAGE FROM CHAFING, DENTING, SCRATCHING, GOUGING, OR WEAR (Continued)

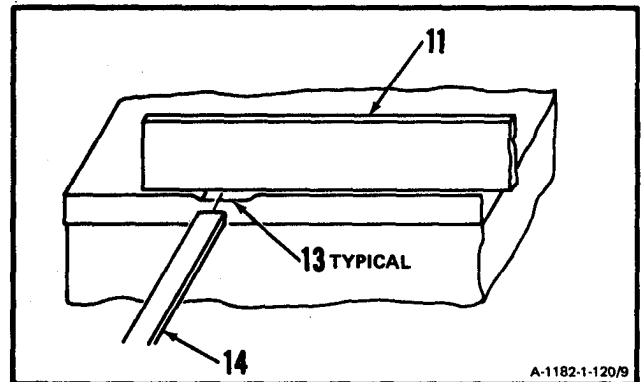
1-120

4. Determine depth of damage by measuring distance between straight edge and bottom of damage. Use wire gage, thickness gage or 6-inch steel rule for applicable damage as follows:

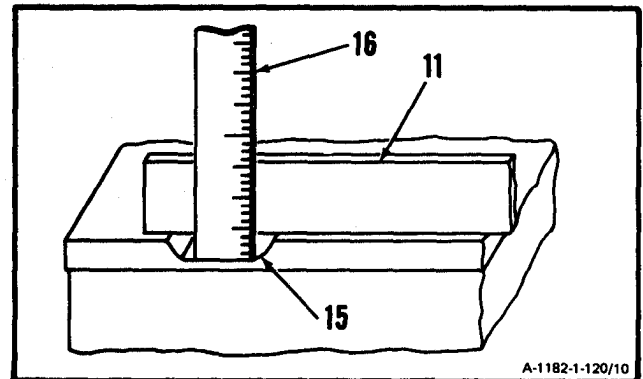
a. For small round shaped damage (10), install straight edge (11) over damage, and insert wire gage (12).



b. For long flat shaped damage (13), install straight edge (11) over damage, and insert thickness gage (14).



c. For large areas of damage (15), install straight edge (11) over damage. Measure between bottom of damage and straight edge (11). Use 6-inch steel rule (16).



FOLLOW-ON MAINTENANCE:

None

END OF TASK

1-121 INSTALL SPIRAL CHAFING SLEEVE ON HOSES

1-121

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

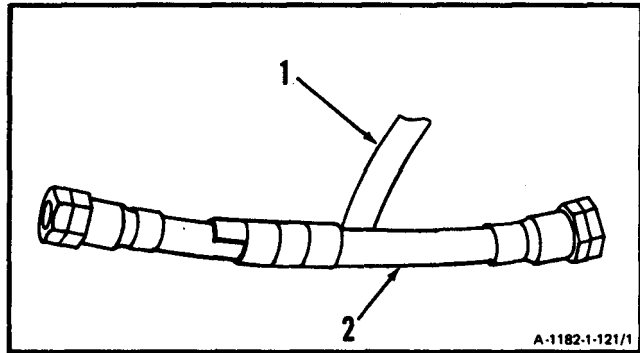
Materials:

Spiral Chafing Sleeve (E50)
Spiral Chafing Sleeve (E51)
Spiral Chafing Sleeve (E52)

Personnel Required:

68B10 Aircraft Powerplant Repairer
68B30 Aircraft Powerplant Inspector

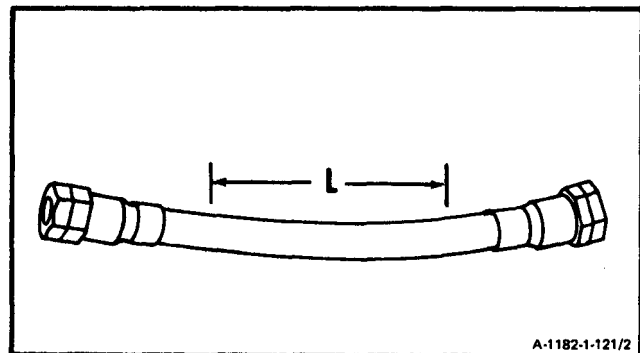
1. if installed, **remove old chafing sleeve (1)** from hose (2).



2. **Measure length of hose (2) to be covered.** Record length as L.

NOTE

Spiral wrap should be installed where chafing would occur.



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1-121 INSTALL SPIRAL CHAFING SLEEVE ON HOSES (Continued)

1-121

3. Determine how much chafing sleeve is needed as follows:

a. Find spiral constant and chafing sleeve needed in spiral chafing sleeve table. Record spiral constant as C.

SPIRAL CHAFING SLEEVE TABLE

HOSE SIZE	DIAMETER (INCHES)	SPIRAL CONSTANT (C)	CHAFING SLEEVE
-3	3/16	1.2	E50
-4	1/4	1.5	E50
-5	5/16	1.8	E50
-6	3/8	2.1	E50
-8	1/2	1.7	E51
-10	5/8	2.0	E51
-12	3/4	2.4	E52
-16	1	2.4	E52
-20	1-1/4	2.9	E52
-24	1-1/2	3.6	E52

b. Multiply length of hose to be covered (L) by spiral constant (C). Answer is amount of sleeve needed to cover hose.

Sample:

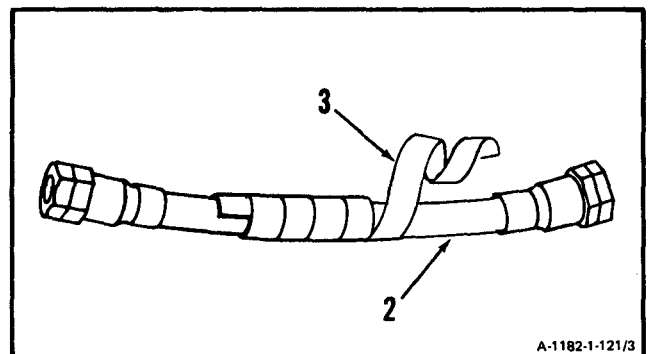
To cover 6-inches of -5 hose, multiply 6 times spiral constant, 1.8.

$$L \times C = \text{LENGTH NEEDED}$$

$$\begin{array}{r} \text{Sample: } 1.8 \\ \times 6 \\ \hline 10.8 \end{array} \quad \begin{array}{l} \text{INCHES OF} \\ \text{SLEEVE (E50)} \\ \text{NEEDED} \end{array}$$

4. Cut length of sleeve (3) needed.

5. Install sleeve (3) on hose (2).



INSPECT

FOLLOW-ON MAINTENANCE:

None

END OF TASK

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By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

DISTRIBUTION:

To be distributed in accordance with DA Form 12-31, Organizational Maintenance requirements for CH-47B/C&D Aircraft.

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@avma27.army.mil>
To: mpmt%avma28@st-louis-emh7.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 EQUIPMENT TECHNICAL PUBLICATIONS



THEN... JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
 CDR, 1st Br, 65th ADA
 ATTN: SP4 J. Brown
 Key West, FL 33040

DATE SENT
 10 Jun 79

PUBLICATION NUMBER
 TM 9-1430-550-34-1

PUBLICATION DATE
 7 Sep 72 .

PUBLICATION TITLE Unit of Radar Set
 AN/MPQ-50 Tested at the HFC

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
9-19		9-5	
21-2	step 1C	21-2	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.

Reads: Multimeter B indicates 600 K ohms to 9000 K ohms.

Change to read: Multimeter B indicates 600 K ohms minimum.

Reason: Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

TEAR ALONG PREPRINTED LINE

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SP4 J.T. Brown, Jr.

SIGN HERE

SP4 James Brown, Jr.

DA FORM 2028-2
 2 JUL 79

REPLACES DA FORM 2028-2 1 APR 78 WHICH WILL BE USED UNTIL EXHAUSTED
 AMM/V M Overprint 3, 1 Mar 91

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

FILL IN YOUR
UNITS ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER
U.S. ARMY AVIATION AND TROOP COMMAND
ATTN: AMSAT-I-MP
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

TEAR ALONG PERFORATED LINE

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS



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FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER

TM 55-2840-254-23-1

PUBLICATION DATE

26 APRIL 1983

PUBLICATION TITLE

ENGINE, GAS TURBINE
MODEL T55-L-712

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA. GRAPH	FIGURE NO	TABLE NO
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IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

DO NOT WRITE IN THESE SPACES

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER

SIGN HERE

DA FORM 2028-2
1 JUL 79

PREVIOUS EDITIONS ARE OBSOLETE

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FILL IN YOUR
UNITS ADDRESS



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DEPARTMENT OF THE ARMY

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ATTN: AMSAT-I-MP
4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

TEAR ALONG PERFORATED LINE

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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