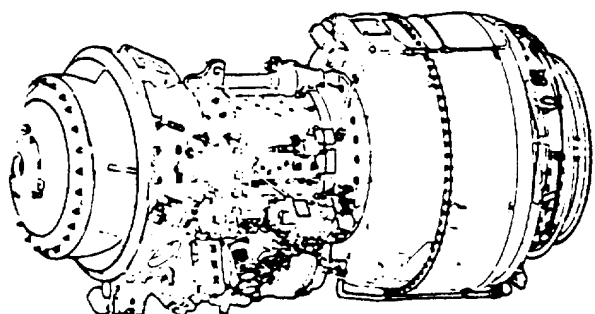


**TECHNICAL MANUAL**

**AVIATION UNIT  
AND  
AVIATION INTERMEDIATE  
MAINTENANCE MANUAL**

**ENGINE  
ASSEMBLY**



**MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-22**

**MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-100-060-10A**

**MODEL T53-L-703  
NSN 28404-0-621-1860  
PART NUMBER 1-000-060-23**

This manual together with TM 55-2840-229-23-2  
9 MARCH 1981, supersedes TM 55-2840-229-24,  
23 APRIL 1971.

	<b>ENGINE - GENERAL</b>
	<b>COMPRESSOR SECTION</b>
	<b>COMBUSTION SECTION</b>
	<b>TURBINE SECTION</b>
	<b>ACCESSORY GEARBOX</b>
	<b>FUEL SYSTEM</b>
	<b>ELECTRICAL SYSTEM</b>
	<b>OIL SYSTEM</b>
	<b>DRIVE SYSTEM</b>
<b>APPENDIX A</b>	<b>REFERENCES</b>
<b>APPENDIX B</b>	<b>MAINTNEANCE ALLOCATION CHARTS</b>
<b>APPENDIX C</b>	<b>SPECIAL TOOLS AND SUPPORT EQUIPMENT</b>
<b>APPENDIX D</b>	<b>EXPENDABLE SUPPLIES AND MATERIALS LIST</b>
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<b>APPENDIX F</b>	<b>ILLUSTRATED LIST OF MANUFACTURED ITEMS</b>
<b>APPENDIX G</b>	<b>OVERHAUL AND RETIREMENT SCHED GENERAL MAINTENANCE</b>
<b>APPENDIX H</b>	<b>GENERAL MAINTENANCE PRACTICES</b>
	<b>GLOSSARY</b>
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## WARNING AND FIRST AID PAGE

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

### MOTORING ENGINE

Disconnect 28-vdc power supply to ignition unit. After motoring engine, do not attempt to start engine until residual fuel has drained from combustion chamber drain valve.

### STARTING ENGINE

Danger areas around aircraft must be free of personnel, other aircraft, and all vehicles before engine is started. The high temperature and velocity of the exhaust are extremely dangerous. Prior to starting engine in aircraft, refer to paragraph titled "Before Starting Engine" in applicable manual.

### USE OF LUBRICATING OIL

Prolonged contact with lubricating oil MIL-L-23699 or MIL-L-7808 may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum. Lubricating oil may soften paint upon contact. If lubricating oil is spilled on painted surfaces, these surfaces should be thoroughly washed.

### CLEANING

The toxic and volatile nature of most cleaning agents requires that skin contact with, and inhalation of, vapors be avoided. Protective clothing, such as gloves, boots, coveralls, and face shields shall be worn during cleaning operations. Adequate ventilation shall be provided. Accidentally spilled acids shall be immediately treated according to prescribed remedial instructions. Flames shall not be exposed within 50 feet of cleaning areas, and firefighting and safety equipment shall be readily available to all personnel involved in cleaning operations.

### SOLVENT-IMMERSION CLEANING

If carbon-removing compound comes in contact with skin, eyes, or clothing, flush area with running water. Observe all previously indicated cleaning precautions.

### **VAPOR BLASTING**

After vapor blasting, it may be necessary to remove remaining contaminants by hand scrubbing with a brush. Because of toxicity of some deposited materials, keep both part and brush wet with soap and water to prevent dust from becoming airborne.

### **CHROME PICKLING**

The solution used as a chrome pickle bath is poisonous. Do not allow this solution to touch the skin. Serious illness will result if the poison enters the body through cuts and bruises. Immediately remove any solution from the skin. Thoroughly wash the contacted area with soap and water.

### **DEPRESSURIZING SHIPPING CONTAINER**

Make certain that air pressure has been released before loosening nuts. Internal pressure could blow off cover, if nuts are removed before pressure is released.

### **HANDLING LEAD-CONTAMINATED PARTS**

When handling combustion chamber internal parts that have been exposed to fuels containing tetraethyl lead, insure that the byproduct (poisonous lead oxide) is not inhaled or taken into the body through cuts or other external openings. If accidental exposure occurs, drench affected area with large amounts of clear water, and obtain immediate medical attention. Gloves and a face mask shall be worn at all times when handling contaminated parts.

### **HANDLING IGNITION UNIT**

The ignition unit on T53 Series Engines contains a very small amount of radioactive material (Cesium-Barium 137) and normally requires no handling precautions. However, severely damaged units that have been broken open must be handled with forceps or gloves, and disposed of in accordance with AR 385-11.

### **REMOVING ELECTRICAL SYSTEM COMPONENTS**

Before removing an component of the electrical system, insure that all electrical power is disconnected.

### **DRYCLEANING**

Dry cleaning solvent P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 138°F (38°C - 59°C).



### **USE OF BROMOCHLOROMETHANE**

Fire extinguishing agent bromochloromethane (CB) is a toxic, corrosives agent and dilution with water increases its corrosive effect on metal. If the engine has been subjected to CB, immediately purge the exposed engine and airframe surfaces with clean dry air and wash with dry cleaning solvent. Clean engine compressor, using dry cleaning solvent method only. Avoid inhalation of CB fumes. If CB contacts skin or eyes, immediately flush with running water; then wash thoroughly with soap and water.

### **HANDLING COMPONENTS CONTAINING THORIUM**

The engine components listed in Appendix I contain Thorium, a radioactive material. Maintenance of these components is limited to their replacement unless other maintenance is specifically authorized and is covered by a valid U.S. Nuclear Regulatory Commission license. Dispose of nonreparable Magnesium-Thorium parts as radioactive waste in accordance with AR 385-11.

### **USE OF JP-4 AND JP-5 FUEL**

Contact with JP-4 or JP-5 fuel (MIL-T-5624) may cause a skin rash. Those areas of skin or clothing that come in contact with fuel should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which fuel is used should be adequately ventilated to keep mist and fumes to a minimum. If fuel is spilled, all spilled fuel will immediately be cleaned up.

### **TOOLS**

Use only chrome plated steel or unplated steel tools for disassembly or reassembly procedures. Because the platings are prone to chipping and flaking, the use of cadmium or zinc plated tools is not permitted. If these chips or flakes become embedded in aircraft parts, galvanic corrosion will result. If these chips or flakes enter fuel or oil wetted components, they may eventually clog the filter or produce intergranular attack of nickel or titanium base alloys at elevated temperatures. Regardless of the type of plating, all tools must be serviceable and free of chipping.

## FLIGHT SAFETY PARTS

This manual identifies flight safety parts and their critical characteristics. Critical characteristics may be identified as dimensions, tolerances, finishes, materials, assembly or inspection procedures. This manual contains procedures for assembly, disassembly, inspection, repair and handling required for flight safety parts.

Flight safety parts shall not be used when the inspection limits of their critical characteristics are exceeded or when there is any damage to bolt holes, piloting diameters or surface finish. These parts must be replaced.

CHANGE  
NO. 26

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 10 May 2004

## Aviation Unit and Intermediate Maintenance Manual

for

### ENGINE ASSEMBLY

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-22

MODEL T53-L-13BA  
NSN 2840-00-093-7451  
PART NUMBER 1-000-060-10A

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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WASHINGTON, D.C., 25 March 1999

## AVIATION UNIT AND INTERMEDIATE MAINTENANCE MANUAL

for

### ENGINE ASSEMBLY

MODEL T53-L-138  
NSN 2640-00-134-4803  
PART NUMBER 1-000-060-22

MODEL T53-L-13BA  
NSN 2840-00-093-7451  
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## AVIATION UNIT AND INTERMEDIATE MAINTENANCE MANUAL

for

## ENGINE ASSEMBLY

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-22

MODEL T53-L-13BA  
NSN 2840-00-093-7451  
PART NUMBER 1-100-060-10A

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NSN 2840-00-621-1860  
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NO. 23

Aviation Unit and Intermediate Maintenance Manual

for

**ENGINE ASSEMBLY**

**MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-22**

**MODEL T53-L-13BA  
NSN 2840-01-093-7451  
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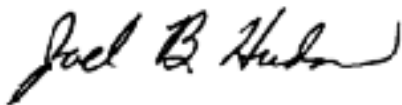
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NO. 22

Aviation Unit and Intermediate Maintenance Manual

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**ENGINE ASSEMBLY**

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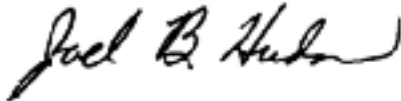
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NO. 21

## Aviation Unit and Intermediate Maintenance Manual

for

### ENGINE ASSEMBLY

**MODEL T53-L-11C**  
**NSN 2840-00-102-3967**  
**PART NUMBER 1—000-080-12**

**MODEL T53-L-13B**  
**NSN 2840-00-134-4803**  
**PART NUMBER 1-000-060-22**

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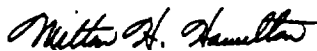
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Aviation Unit and Intermediate  
Maintenance Manual

## ENGINE ASSEMBLY

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PART NUMBER 1-000-080-12

MODEL T53-L-11D  
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2-3 through 2-6  
2-6.1 /(2-6.2 blank)  
2-9 through 2-14  
2-14.1 and 2-14.2  
2-30.1 /(2-30.2 blank)  
2-33 and 2-34  
2-35 through 2-38  
2-49 and 2-50  
2-50.1 /(2-50.2 blank)  
2-99 and 2-100  
2-117 and 2-118  
2-118.1 /(2-1 18.2 blank)  
2-119 and 2-220  
2-124.1 /(2-1 24.2 blank)

Remove pages

2-125 and 2-126  
2-126.1 (/2-1 26.2 blank)  
2-127 and 2-128  
2-207 and 2-208  
2-208.1 /(2-208.2 blank)  
2-241 and 2-242  
3-311 and 3-312

Insert pages

2-125 and 2-126  
2-126.1 and 2-126.2  
2-127 and 2-128  
2-207 and 2-208  
2-208.1 (/2-208.2 blank)  
2-241 and 2-242  
3-311 and 3-312

2. Retain these sheets in front of manual for reference purposes.

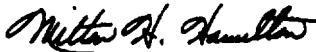
TM 55-2840-229-23-1

T.O. 2J-T53-16

C20

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TM 55-2840-229-23-1

T.O. 2J-T53-16-1

C 19

CHANGE

NO. 19

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND AIR FORCE  
WASHINGTON, D.C., 22 December 1992

Aviation Unit and Intermediate  
Maintenance Manual

For

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-000-060-10A

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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Remove pages

1-65 and 1-66  
1-67 and 1-68

Insert pages

1-65 and 1-66  
1-67 and 1-68

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CHANGE }  
NO. 18 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
WASHINGTON, D.C., 30 JUNE 1991

Aviation Unit and Intermediate  
Maintenance Manual

For

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-000-060-10A

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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Remove pages

1-301 and I-302  
2-99 and 2-100

Insert pages

1-301 and 1-302  
2-99 and 2-100

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TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 17

CHANGE  
NO. 17

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
WASHINGTON, D.C., 27 August 1990

Aviation Unit and Intermediate  
Maintenance Manual

For

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

**MODEL T53-L-13B**  
**NSN 2840-00-134-4803**  
**PART NUMBER 1-000-060-10**

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-000-060-10A

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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Remove pages

1-99 and 1-100  
1-291 and 1-292  
1-307 and 1-308  
1-311 through 1-314  
2-99 and 2-100

Insert pages

1-99 and 1-100  
1-291 and 1-292  
1-307 and 1-308  
1-311 through 1-314  
2-99 and 2-100

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

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TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 17

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**TM 55-2840-229-23-1**  
**T.O. 2J-T53-16-1**  
**C 16**

CHANGE }  
NO. 16 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
WASHINGTON, D.C., 30 May 1990

## Aviation Unit and Intermediate Maintenance Manual

For

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-000-060-10A

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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### Remove pages

1-301 and 1-302  
1-302.1 and 1-302.2  
1-303 through 1-314

### Insert pages

1-301 and 1-302  
-----  
1-303 through 1-314

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

**TM 55-2840-229-23-1**

**T.O. 2J-T53-16-1**

**C 16**

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**TM 55-2840-229-23-1**  
**T.O. 2J-T53-16-1**  
**C 15**

CHANGE }  
NO. 15 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
WASHINGTON, D.C., 16 April 1990

## Aviation Unit and Intermediate Maintenance Manual

For

### ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-000-060-10A

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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Remove pages

2-241 and 2-242  
- - -

Insert pages

2-241 and 2-242  
2-242.1/2-242.2

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

**TM 55-2840-229-23-1**

**T.O. 2J-T53-16-1**

**C 15**

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CHANGE }  
NO. 14 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
WASHINGTON, D.C., 13 April 1990

Aviation Unit and Intermediate  
Maintenance Manual

For

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-000-060-10A

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

TM 55-2840-229-23-1/T.O. 2J-T53-16-1, 9 March 1981, is changed as follows:

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Remove pages

c/d  
i and ii  
1-3 and 1-4  
1-17 and 1-18  
1-33 and 1-34  
1-53 and 1-54  
1-61 and 1-62  
1-65 through 1-68  
1-73 and 1-74  
1-87 and 1-88  
1-91 through 1-94  
1-99 and 1-100  
1-103 and 1-104  
-----  
1-105 through 1-108  
1-129 and 1-130  
1-133 and 1-134  
1-145 through 1-148  
1-155 and 1-156  
-----  
1-176.1 and 1-176.2  
1-177 and 1-178  
1-191 through 1-194  
1-203 through 1-206  
1-213 and 1-214  
1-219 through 1-222  
1-275 and 1-276

Insert pages

c/d  
i and ii  
1-3 and 1-4  
1-17 and 1-18  
1-33 and 1-34  
1-53 and 1-54  
1-61 and 1-62  
1-65 through 1-68  
1-73 and 1-74  
1-87 and 1-88  
1-91 through 1-94  
1-99 and 1-100  
1-103 and 1-104  
1-104.1/1-104.2  
1-105 through 1-108  
1-129 and 1-130  
1-133 and 1-134  
1-145 through 1-148  
1-155 and 1-156  
1-156.1/1-156.2  
1-176.1 and 1-176.2  
1-177/1-178  
1-191 through 1-194  
1-203 through 1-206  
1-213 and 1-214  
1-219 through 1-222  
1-275 and 1-276

Remove pages

1-292.1/1-292.2  
1-293/1-294 through 1-300  
2-1 and 2-2  
2-2.1/2-2.1  
2-3 through 2-14  
2-14.3 and 2-14.4  
2-29 and 2-30  
2-30.1/2-30.2  
2-31 through 2-34  
-----  
2-35 through 2-38  
2-41 and 2-42  
2-42.1/2-42.2  
2-43 through 2-48  
2-51 through 2-54  
2-89 and 2-90  
2-117 through 2-120  
2-125 and 2-126  
2-126.1/2-126.2  
2-127 and 2-128  
2-129 through 2-132  
2-132.1 and 2-132.2  
2-133 and 2-134  
-----  
2-171 and 2-172  
2-195 through 2-198  
2-203 and 2-204  
2-217 and 2-218  
2-240.1 and 2-240.2  
3-55 through 3-58  
3-61 through 3-68  
3-71 through 3-74  
3-93 and 3-94  
2028s and envelopes

Insert pages

1-292.1/1-292.2  
1-293/1-294 through 1-300  
2-1 and 2-2  
2-2.1 and 2-2.2  
2-3 through 2-14  
2-14.3 and 2-14.4  
2-29 and 2-30  
2-30.1/2-30.2  
2-31 through 2-34  
2-34.1/2-34.2  
2-35 through 2-38  
2-41 and 2-42  
2-42.1/2-42.2  
2-43 through 2-48  
2-51 through 2-54  
2-89 and 2-90  
2-117 through 2-120  
2-125 and 2-126  
2-126.1/2-126.2  
2-127 and 2-128  
2-129 through 2-132  
2-132.1 and 2-132.2  
2-133 and 2-134  
2-134.1/2-134. 2  
2-171 and 2-172  
2-195 through 2-198  
2-203 and 2-204  
2-217 and 2-218  
2-240.1 and 2-240.2  
3-55 through 3-58  
3-61 through 3-68  
3-71 through 3-74  
3-93 and 3-94  
2028s and envelopes

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# URGENT

TM 55-2840-229-23-1

T.O. 2J-T53-16-1

C 13

CHANGE }  
NO. 13 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, DC., 5 July 1989

Aviation Unit and Intermediate  
Maintenance Manual  
for  
ENGINE ASSEMBLY

MODEL T53-L-IIC  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-IID  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-100-060-10A

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

TM 55-2840-229-23-1/T.O. 2J-T53-16-1, 9 March 1981 is changed as follows:

1. Title is changed as shown above.
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Remove pages

1-291 and 1-292  
- - -  
1-302.1 and 1-302.2

Insert pages

1-291 and 1-292  
1-292.1/1-292.2  
1-302.1 and 1-302.2

3. Retain this sheet in front of manual for reference purposes.

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**WILLIAM J. MEEHAN 11**  
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T53-L-703.

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TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 12

CHANGE }  
NO. 12 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D.C., 20 January 1989

Aviation Unit and Intermediate  
Maintenance Manual  
for

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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Remove pages

1-321 and 1-322

Insert pages

1-322

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TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 12

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# URGENT

TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 11

CHANGE :  
NO. 11 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D.C., 11 April 1988

## Aviation Unit and Intermediate Maintenance Manual for

### ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

TM 55-2840-229-23-1/T.O. 2J-T53-16-1, 9 March 1981 is changed as follows:

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

#### Remove pages

1-103 and 1-104  
1-107 through 1-110  
1-301 and 1-302  
- -  
1-305 and 1-306  
1-309 and 1-310  
1-313 and 1-314  
1-321 and 1-322  
2-64.1/2-64.2  
2-203 and 2-204  
2-240.1 and 2-240.2

#### Insert pages

1-103 and 1-104  
1-107 through 1-110  
1-301 and 1-302  
1-302.1 and 1-302.2  
1-305 and 1-306  
1-309 and 1-310  
1-313 and 1-314  
1-321 and 1-322  
2-64.1/2-64.2  
2-203 and 2-204  
2-240.1 and 2-240.2

2. Retain these sheets in front of the manual for reference purposes.

URGENT

TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 11

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DISTRIBUTION:

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# URGENT

NOTE: THIS CHANGE HAS BEEN PRINTED AND DISTRIBUTED OUT OF SEQUENCE. IT SHOULD BE INSERTED IN THE MANUAL AND USED. UPON RECEIPT OF THE EARLIER SEQUENCED CHANGE INSURE A MORE CURRENT CHANGE PAGE IS NOT REPLACED WITH A LESS CURRENT PAGE.

TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 10

CHANGE }  
NO. 10 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D.C., 13 August 1987

Aviation Unit and Intermediate  
Maintenance Manual  
for

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

TM 55-2840-229-23-1/T.O. 2J-T53-16-1, 9 March 1981 is changed as follows:

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

Remove

1-107 through 1-110  
1-191 and 1-192  
1-319 through 1-322  
---  
2-land 2-2  
---  
2-3 and 2-4

Insert

1-107 through 1-110  
1-191 and 1-192  
1-319 through 1-322  
1-322.1 and 1-322.2  
2-1 and 2-2  
2-2.1 /2-2.2  
2-3 and 2-4

2. Retain these sheets in front of the manual for reference purposes.

# URGENT



TM 55-2840-229-23-1  
T.O 2J-T53-16-1  
C 10

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CHANGE }  
NO. 9 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
WASHINGTON, D.C., 20 July 1987

Aviation Unit and Intermediate  
Maintenance Manual  
for

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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

Remove pages

a through c/d  
i and ii  
1-29 and 1-30  
- - -  
1-31 and 1-32  
1-69 through 1-72  
- - -  
1-97 and 1-98  
1-107 and 1-108  
1-129 and 1-130  
1-133 and 1-134  
1-155 and 1-156  
1-169 and 1-170  
1-175 through 1-176.1/1-176.2  
1-203 through 1-206  
1-211 and 1-212  
1-235 and 1-236  
1-243 and 1-244  
1-303 through 1-314  
1-315 through 1-322  
2-1 through 2-6  
2-9 and 2-10  
2-14.1 through 2-14.4  
2-31 and 2-32  
2-63 and 2-64  
- - -  
2-65 and 2-66  
2-69 and 2-70

Insert pages

a through c/d  
i and ii  
1-29 and 1-30  
1-30.1/1-30.2  
1-31 and 1-32  
1-69 through 1-72  
1-72.1/1-72.2  
1-97 and 1-98  
1-107 and 1-108  
1-129 and 1-130  
1-133 and 1-134  
1-155 and 1-156  
1-169 and 1-170  
1-175 through 1-176.2  
1-203 through 1-206  
1-211 and 1-212  
1-235 and 1-236  
1-243 and 1-244  
1-303 through 1-314  
1-321/1-322  
2-1 through 2-6  
2-9 and 2-10  
2-14.1 through 2-14.5/2-14.6  
2-31 and 2-32  
2-63 and 2-64  
2-64.1/2-64.2  
2-65 and 2-66  
2-69 and 2-70

Remove pages

- - -  
2-78.1/2-78.2  
2-127 and 2-128  
- - -  
2-129 through 2-132  
- - -  
2-133 and 2-134  
2-173 through 2-176  
- - -  
2-180.1 through 2-182  
2-185 through 2-188  
2-195 through 2-208  
2-221 through 2-230  
2-233 through 2-236  
- - -  
2-237 through 2-240  
- - -  
2-241 and 2-242  
3-113 and 3-114

Insert pages

2-70.1/2-70.2  
2-78.1/2-78.2  
2-127 and 2-128  
2-128.1/2-128.2  
2-129 through 2-132  
2-132.1 and 2-132.2  
2-133 and 2-134  
2-173 through 2-176  
2-176.1/2-176.2  
2-180.1 through 2-182  
2-185 through 2-188  
2-195 through 2-208  
2-221 through 2-230  
2-233 through 2-236  
2-236.1 through 2-236.3/2-236.4  
2-237 through 2-240  
2-240.1 and 2-240.2  
2-241 and 2-242  
3-113 and 3-114

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CHANGE }  
NO. 8 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D.C., 22 June 1987

Aviation Unit and Intermediate  
Maintenance Manual  
for  
ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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

Remove pages

1-307 and 1-308  
1-319 and 1-320  
2-63 through 2-66  
2-69 and 2-70  
2-117 and 2-118  
2-131 and 2-132  
2-203 and 2-204  
2-235 and 2-236  
2-239 and 2-240

Insert pages

1-307 and 1-308  
1-319 and 1-320  
2-63 through 2-66  
2-66 and 2-70  
2-117 and 2-118  
2-131 and 2-132  
2-203 and 2-204  
2-235 and 2-236  
2-239 and 2-240

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TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
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**U R G E N T**

TM 55-2840-229-23-1

T.O. 2J-T53-16-1

C 7

CHANGE }  
NO. 7 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D.C., 7 January 1987

Aviation Unit and Intermediate  
Maintenance Manual  
for  
ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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Remove pages

1-301 and 1-302

Insert pages

1-301 and 1-302

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**U R G E N T**



CHANGE

NO. 6

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D.C., 18 August 1986

Aviation Unit and Intermediate  
Maintenance Manual  
for  
ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

TM 55-2840-229-23-1/T.O. 2J-T53-16-1, 9 March 1981 is changed as follows:

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

Remove pages

iv and v  
1-85 through 1-90  
1-97 and 1-98  
- - -  
1-99 and 1-100  
- - -  
1-101 and 1-102  
2-1 and 2-2  
2-25 and 2-26  
2-41 and 2-42  
2-77 and 2-78  
- - -  
2-99 and 2-100  
2-125 and 2-126  
- - -  
2-127 and 2-128  
2-181 and 2-182  
2-241 and 2-242

Insert pages

iv and v  
1-85 through 1-90  
1-97 and 1-98  
1-98.1/1-98.2  
1-99 and 1-100  
1-100.1/1-100.2  
1-101 and 1-102  
2-1 and 2-2  
2-25 and 2-26  
2-41 and 2-42  
2-77 and 2-78  
2-78.1/2-78.2  
2-99 and 2-100  
2-125 and 2-126  
2-126.1/2-126.2  
2-127 and 2-128  
2-181 and 2-182  
2-241 and 2-242

2. Retain these sheets in front of manual for reference purposes.



TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 6

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# URGENT

TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 5

CHANGE }  
NO. 5 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D. C., 22 April 1986

Aviation Unit and Intermediate  
Maintenance Manual  
for  
ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUBMER 1-000-060-23

TN 55-2840-229-23-1/T.O. 2J-T53-16-1, 9 March 1981, is changed as follows:

1. Remove and Insert pages as indicated below. Newer changed text material is indicated by a vertical bar in the margin. An Illustration change is indicated by a miniature pointing hand.

Remove pages

1-291 and 1-292  
1-301 and 1-302

Insert pages

1-291 and 1-292  
1-301 and 1-302

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CHANGE }  
 NO. 4 }

HEADQUARTERS  
 DEPARTMENTS OF THE ARMY AND  
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 WASHINGTON, D.C., 8 April 1985

AVIATION UNIT AND INTERMEDIATE  
 MAINTENANCE MANUAL  
 FOR  
 ENGINE ASSEMBLY

MODEL T53-L-11C  
 NSN 2840-00-102-3967  
 PART NUMBER 1-000-080-12

MODEL T53-L-13B  
 NSN 2840-00-134-4803  
 PART NUMBER 1-000-060-10

MODEL T53-L-11D  
 NSN 2840-00-102-3968  
 PART NUMBER 1-000-080-13

MODEL T53-L-703  
 NSN 2840-00-621-1860  
 PART NUMBER 1-000-060-23

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

Remove pages

i through iv  
 1-1 and 1-2  
 1-9 and 1-10  
 1-23 through 1-28  
 1-67 and 1-68  
 1-91 and 1-92  
 1-111 and 1-112  
 1-121 through 1-126  
 1-139 and 1-140  
 1-149 through 1-156  
 1-161 through 1-164  
 1-169 through 1-176  
 ---  
 1-177 and 1-178  
 1-191 and 1-192  
 1-195 through 1-200  
 1-203 and 1-204  
 1-215 and 1-216  
 1-229 through 1-234  
 1-253 and 1-254  
 1-257 through 1-260  
 1-267 through 1-270  
 1-291 and 1-292  
 1-293 and 1-294  
 1-295 and 1-296  
 1-297 and 1-298  
 ---

Insert pages

i through iv  
 1-1 and 1-2  
 1-9 and 1-10  
 1-23 through 1-28  
 1-67 and 1-68  
 1-91 and 1-92  
 1-111 and 1-112  
 1-121 through 1-126  
 1-139 and 1-140  
 1-149 through 1-156  
 1-161 through 1-164  
 1-169 through 1-176  
 1-176.1/1-176.2  
 1-177 and 1-178  
 1-191 and 1-192  
 1-195 through 1-200  
 1-203 and 1-204  
 1-215 and 1-216  
 1-229 through 1-234  
 1-253 and 1-254  
 1-257 through 1-260  
 1-267 through 1-270  
 1-291 and 1-292  
 1-293/1-294  
 1-295/1-296  
 1-297 and 1-298  
 1-300.1/1-300.2

Remove pages

1-305 through 1-321/1-322  
2-9 through 2-14  
2-14.3 and 2-14.4  
2-15 and 2-16  
2-29 and 2-30  
---  
2-31 and 2-32  
2-39/2-40  
2-41 and 2-42  
---  
2-53 and 2-54  
2-61 through 2-66  
2-69 and 2-70  
2-75 and 2-76  
2-85 and 2-86  
2-99 and 2-100  
2-129 through 2-136  
2-179 and 2-180  
2-209 and 2-210  
2-213 through 2-216  
3-5 and 3-6  
---  
3-7 and 3-8  
3-63 and 3-64  
3-111 and 3-112

Insert pages

1-305 through 1-322  
2-9 through 2-14  
2-14.3 and 2-14.4  
2-15 and 2-16  
2-29 and 2-30  
2-30.1/2-30.2  
2-31 and 2-32  
2-39/2-40  
2-41 and 2-42  
2-42.1/2-42.2  
2-53 and 2-54  
2-61 through 2-66  
2-69 and 2-70  
2-75 and 2-76  
2-85 and 2-86  
2-99 and 2-100  
2-129 through 2-136  
2-179 and 2-180  
2-209 and 2-210  
2-213 through 2-216  
3-5 and 3-6  
3-6.1/3-6.2  
3-7 and 3-8  
3-63 and 3-64  
3-111 and 3-112

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*Logistics Command*

**CHARLES A. GABRIEL, General, USAF**  
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**DISTRIBUTION:**

To be distributed in accordance with DA Form 12-31, Organizational, Direct Support and General Support Maintenance requirements for AH-1G/TH-1G, UH-1B, UH-1C/M, UH-1D/H/V/EH-1H, AH-1S(MOD), and AH-1S(PROD)(ECAS) aircraft.

# URGENT

TM 55-2840-229-23-1  
T.O. 2J-T53-16-1  
C 3

CHANGE }  
NO. 3 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D.C., 31 August 1984

AVIATION UNIT AND INTERMEDIATE  
MAINTENANCE MANUAL  
FOR  
ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-10

MODEL T53-L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

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Remove pages

1-275 through 1-278

1-285 and 1-286  
- - -

1-301 and 1-302  
- - -

Insert pages

1-275 through 1-278

1-278.1/1-278.2

1-285 and 1-286

1-286.1/1-286.2

1-301 and 1-302

1-302.1/1-302.2

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TM 55-2840-229-23-1

T.O. 2J-T53-16-1

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CHANGE }  
NO. 2 }

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND  
THE AIR FORCE  
WASHINGTON, D.C., 21 March 1984

AVIATION UNIT AND INTERMEDIATE  
MAINTENANCE MANUAL  
FOR  
ENGINE ASSEMBLY

<b>MODEL T53-L-11C</b>	<b>MODEL T53-L-13B</b>
<b>NSN 2840-00-102-3967</b>	<b>NSN 2840-00-134-4803</b>
<b>PART NUMBER 1-000-080-12</b>	<b>PART NUMBER 1-000-060-10</b>
<b>MODEL T53-L-11D</b>	<b>MODEL T53-L-703</b>
<b>NSN 2840-00-102-3968</b>	<b>NSN 2840-00-621-1860</b>
<b>PART NUMBER 1-000-080-13</b>	<b>PART NUMBER 1-000-060-23</b>

TM 55-2840-229-23-1/T.O. 2J-TS3-16-1, 9 March 1981, is changed as follows:

1. Air Force T. O. numbers have been changed to T. O. 2J-T53-16-1, which covers chapters 1 through 3 and T. O. 2J-T53-16-2, which covers chapters 4 through 9.
2. Remove and insert pages as indicated below.

	<b>Remove pages</b>	<b>Insert pages</b>
Chapter 1	1-1 and 1-2 1-73 thru 1-76 1-89 thru 1-92 1-97 thru 1-100 1-107 and 1-108 1-111 and 1-112 1-125 and 1-126 1-131 and 1-132 1-145 and 1-146 1-149 and 1-150 1-169 and 1-170 1-177 and 1-178 1-195 and 1-196 1-199 thru 1-202 1-205 and 1-206 1-221 thru 1-224 1-233 and 1-234 1-239 and 1-240 1-291 and 1-292 1-297 and 1-298 1-301 thru 1-308	1-1 and 1-2 1-73 thru 1-76 1-89 thru 1-92 1-97 thru 1-100 1-107 and 1-108 1-111 and 1-112 1-126 and 1-126 1-131 and 1-132 1-145 and 1-146 1-149 and 1-160 1-169 and 1-170 1-177 and 1-178 1-195 and 1-196 1-190 thru 1-202 1-205 and 1-206 1-221 thru 1-224 1-233 and 1-234 1-239 and 1-240 1-291 and 1-292 1-297 and 1-298 1-301 thru 1-308
Chapter 2	2-3 thru 2-14 2-31 and 2-32 2-35 and 2-36 2-71 and 2-72 2-87 and 2-88	2-3 thru 2-14.4 2-31 and 2-32 2-35 and 2-36 2-71 and 2-72 2-87 and 2-88



	<b>Remove pages</b>	<b>Insert pages</b>
	2-107 and 2-108	2-107 and 2-108
	2-111 and 2-112	2-111 and 2-112
	2-117 and 2-118	2-117 and 2-118
	2-123 and 2-124	2-123 and 2-124
	2-129 thru 2-132	2-129 thru 2-132
	2-180.1 and 2-180.2	2-180.1 and 2-180.2
	2-203 thru 2-210	2-203 thru 2-210
Chapter 3	3-81 and 3-82	3-81 and 3-82
	3-91 and 3-92	3-91 and 3-92
	3-99 thru 3-106	3-99 thru 3-106

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CHANGE }  
No. 1 }

HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 11 February 1982

AVIATION UNIT AND INTERMEDIATE  
MAINTENANCE MANUAL  
FOR  
ENGINE ASSEMBLY

MODEL T53-L-11C	MODEL T53-L-13B
NSN 2840-00-102-3967	NSN 2840-00-134-4803
PART NUMBER 1-000-080-12	PART NUMBER 1-000-060-10

MODEL T53-L-11D	MODEL T53-L-703
NSN 2840-00-102-3968	NSN 2840-00-621-1860
PART NUMBER 1-000-080-13	PART NUMBER 1-000-060-23

TM 55-2840-229-23-1, 9 March 1981, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Chapter 1	1-89 thru 1-92	1-89 thru 1-92
	1-101 and 1-102	1-101 and 1-102
	1-105 and 1-106	1-105 and 1-106
	1-111 thru 1-114	1-111 thru 1-114
	1-169 and 1-170	1-169 and 1-170
	1-199 and 1-200	1-199 and 1-200
	1-203 thru 1-206	1-203 thru 1-206
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	1-221 and 1-222	1-221 and 1-222
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	2-151 and 2-152	2-151 and 2-152
	2-179 and 2-180	2-179 thru 2-180.2
	2-208A/2-208B	2-208.1/2-208.2

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TECHNICAL MANUAL  
NO. 55-2840-229-23-1  
T.O. 2J-T53-16

HEADQUARTERS  
DEPARTMENTS OF THE ARMY AND THE AIR FORCE  
WASHINGTON D.C., 9 MARCH 1981

AVIATION UNIT AND INTERMEDIATE  
MAINTENANCE MANUAL

ENGINE ASSEMBLY

MODEL T53-L-11C  
NSN 2840-00-102-3967  
PART NUMBER 1-000-080-12

MODEL T53-L-13BA  
NSN 2840-01-093-7451  
PART NUMBER 1-100-060-10A

MODEL T53L-11D  
NSN 2840-00-102-3968  
PART NUMBER 1-000-080-13

MODEL T53-L-13B  
NSN 2840-00-134-4803  
PART NUMBER 1-000-060-22

MODEL T53-L-703  
NSN 2840-00-621-1860  
PART NUMBER 1-000-060-23

**NOTE:**

This manual is printed in two volumes as follows:

TM 55-2840-229-23-1, consisting of Warning Page, Table of Contents, Chapters 1 through 3.

TM 55-2840-229-23-2, consisting of Chapters 4 through 9, Appendixes A through H, Glossary, and Alphabetical Index.

The Table of Contents, Warning Page, Alphabetical Index applicable to the -1 and -2.

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Insert latest changed pages; dispose of superseded pages in accordance with regulations.

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TECHNICAL MANUAL  
NO. 55-2840-229-23-1  
T.O. 2J-T53-16

HEADQUARTERS  
DEPARTMENT OF THE ARMY AND THE AIRFORCE  
WASHINGTON, D.C.. 9 March 1981

Technical Manual  
Aviation Unit and Intermediate Maintenance Manual

Model	Engine Assembly NSN	Part No.
T53-L-13B	2840-00-134-4803	1-000-060-22
T53-L-13BA	2840-01-093-7451	1-100-060-10A
T53-L-703	2840-00-621-1860	1-000-060-23

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of any way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5230. A reply will be furnished to you. You may also send in your comments electronically to our e-mail address: ls-lp:@redstone.army.mil or by fax 256-842-6546/DSn 788-6546. 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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**CHAPTER 1**  
**ENGINE - GENERAL**

**OVERVIEW**

This chapter contains information and descriptions pertaining to the T53-L-11 and T53-L-11D (hereafter referred to as T53-L-11 Series Engine), T53-L-13B and T53-L-703 (hereafter referred to as T53-L-13B/703 Engines) engines systems, system components, major assemblies, leading particulars and operation. General maintenance and support information is also provided for inspection, servicing, maintenance, troubleshooting and testing of the complete engine.

Section		<u>Page</u>
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II.	Equipment Description and Data	1-4
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**1-1. SCOPE.**

The shaft turbine T53-L-11 series engines and T53-L-13B/703 engines (figs. 1-1 and 1-2) are maintained on three levels of maintenance.

- a. Aviation Unit Maintenance (AVUM).
- b. Aviation Intermediate Maintenance (AVIM).
- c. Depot Maintenance.

This manual entails coverage for the first two levels of maintenance only (AVUM and AVIM).

The engine is broken down into eight areas of maintenance:

- a. Accessory Gearbox Assembly
- b. Compressor Assembly
- c. Combustor Assembly
- d. Turbine Section
- e. Electrical System
- f. Fuel System
- g. Lubrication System
- h. Drive System

Maintenance categories have been assigned to each task area and only personnel qualified to perform those tasks shall perform work in those areas. Refer to Appendix B, Maintenance Allocation Chart (MAC) for a complete description of maintenance levels and associated tasks.

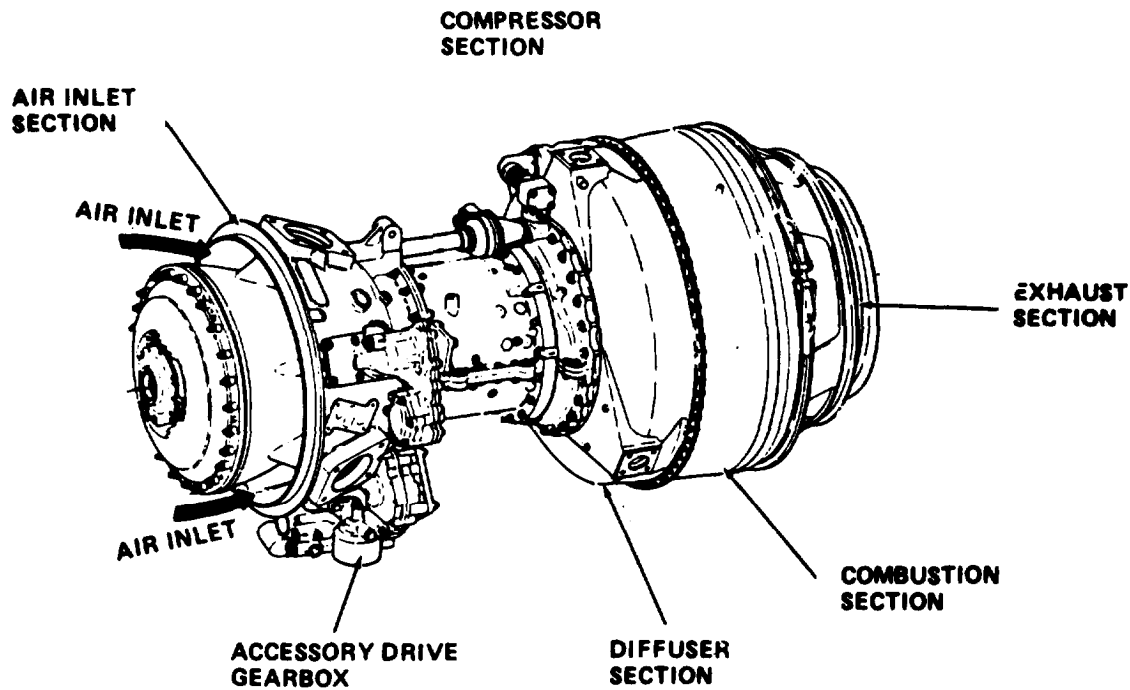


Figure 1-1. T53-L-11 Series Engines



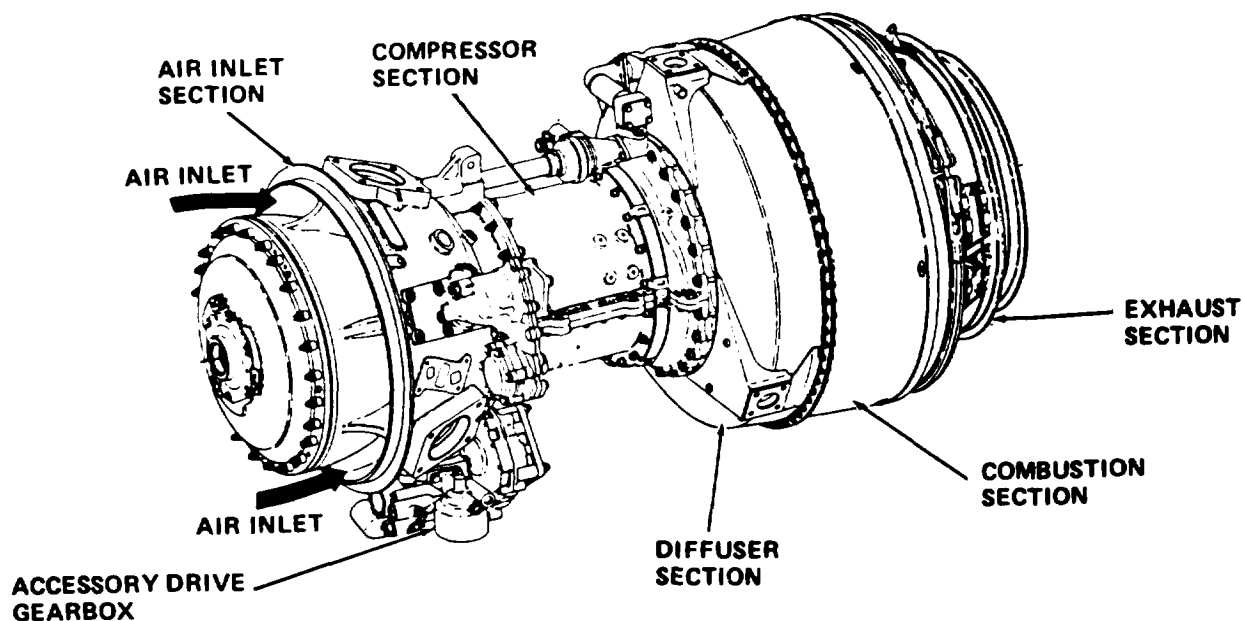


Figure 1-2. T53-L-13B/703 Engines

General Descriptions consists of:

- Engine
- Systems
- Components
- Accessories

Engine Procedures contained in this manual consist of:

- Removal
- Disassembly
- Cleaning
- Repair and replacement
- Assembly
- Installation
- Preservation
- Storage
- Activation of uninstalled engines

Airframe Procedures contained in airframe organizational maintenance manuals (table 1-1) consist of:

- Reservation
- Storage
- Activation of installed engines

**Table 1-1. Applicable Airframe Organizational Manuals**

T53-L-11 Series	TM 55-1520-210
	TM 55-1520-219
	TM 55-1520-220
T53-L-13B	TM 55-1520-210
	TM 55-1520-220
	TM 55-1520-221
T53-L-703	TM 55-1520-234
	TM 55-1520-236
	TM 55-1520-239

For general maintenance practices refer to TM 55-1500-204-25/1.

---

## **1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS.**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751, The Army Maintenance Management System.

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## **1-3. DESTRUCTION OF ARMY MATERIAL TO PREVENT ENEMY USE.**

Destroy engine when evacuation to safety is not possible to prevent use by enemy. Refer to TM 750-224-5.

a. Demolition of Engine by Explosives. Use explosives to destroy engine. Place explosives, whenever possible, in Inlet and exhaust opening of engine. Detonate when personnel have withdrawn to a safe distance or cover. Explosives may also be detonated under an engine stored in a shipping container.

b. Demolition of Engine Using Mechanical Means. Smash all cast parts to destroy engine mechanically. A smashed compressor housing will cause engine to become inoperable. Other parts and accessories may be smashed or crushed as time permits. When more than one engine is to be destroyed mechanically, ensure similar parts on each engine are destroyed.

c. Demolition of Engine by Fire. An incendiary grenade or any other source of intense and sustained combustion may be used to destroy the engine by fire.

---

## **1-4. ADMINISTRATIVE STORAGE.**

Requirements are part of maintenance instructions.

## **Section II. EQUIPMENT DESCRIPTION AND DATA**

	<u>Page</u>
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Directional References	1-7
Differences Between Models	1-8
Description of Major Assemblies and Systems	1-8

	<u>Page</u>
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## **1-5. EQUIPMENT PURPOSE CAPABILITIES AND FEATURES.**

a. Purpose of Engine, Shaft Turbine. Military models T53-L-11 series engines and T53-L-13B/703 engines are free-type power turbine turboshaft engine designed for helicopter aircraft.

b. Capabilities and Features.

- Engine design allows greater intervals between internal (hot end) inspections.
- Engines have a long life between overhauls.
- A gas producer turbine drives a combination axial-centrifugal compressor.
- An external annular type combustor is incorporated in each model.
- Major sections:
  1. Air inlet section
  2. Compressor section
  3. Diffuser section
  4. Combustion section
  5. Exhaust section

- Major assemblies:
  1. Inlet housing assembly
  2. Accessory drive gearbox assembly
  3. Output reduction carrier and gear assembly
  4. Compressor and impeller housing assemblies
  5. Compressor rotor assembly
  6. Diffuser housing
  7. Combustor turbine assembly
  8. Overspeed governor and tachometer drive assembly
  9. Piping and accessories
  
- Major systems:
  1. Starting fuel system
  2. Main fuel system
  3. Lubrication system
  4. Electrical system
  5. Internal cooling and pressurization system
  6. Anti-icing system
  7. Interstage air bleed system
  8. Variable inlet guide vane system
  
- All components are covered separately in this manual.

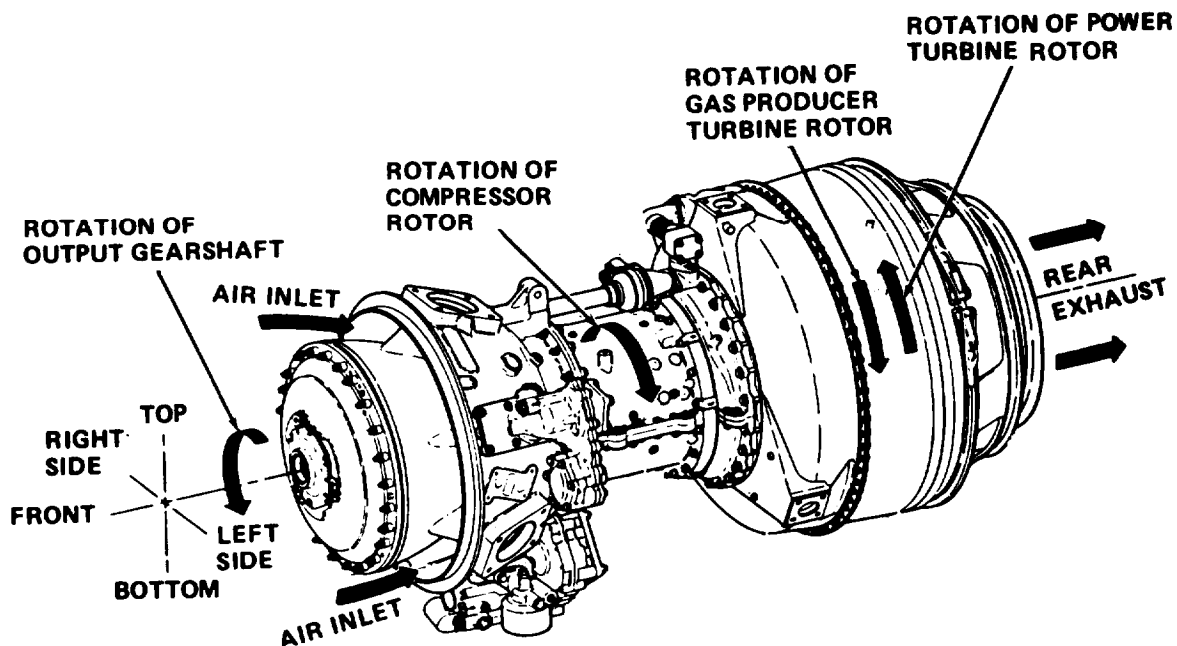


Figure 1-3. Directional References (T53-L-11 Series Engines)

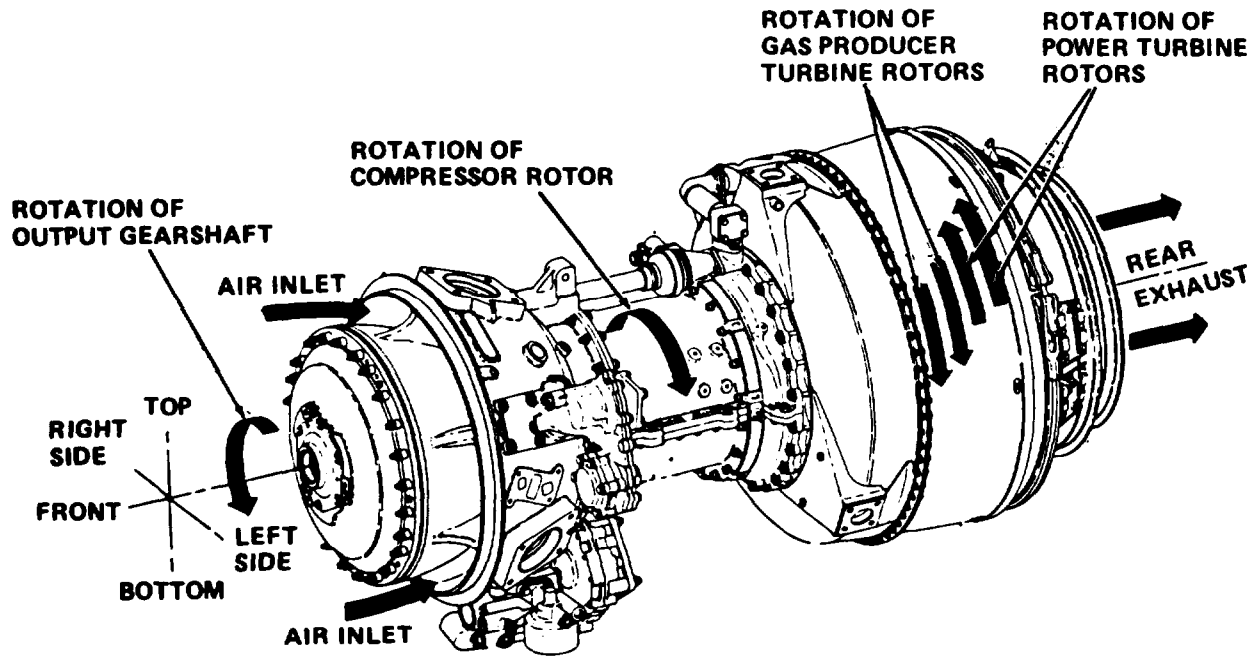


Figure 1-4. Directional References (T53-L-13B/703 Engines)

**1-6. DIRECTIONAL REFERENCES.**

Directional references (figs. 1-3 and 1-4) used in this manual are listed in table 1-2.

Table 1-2. Directional References	
Direction	Description
Front	End of engine from which output power is extracted.
Rear	End of engine from which exhaust gases are expelled.
Right and Left	Determined by observing engine from exhaust end.
Bottom	Determined by location of accessory drive gearbox.
Top	Directly opposite, 180° from, accessory drive gearbox (hot air solenoid valve is at top of engine).
Direction of Rotation	Determined as viewed from rear of engine. Direction of rotation of compressor rotor and gas producer turbine(s) is counterclockwise. Power turbine(s) and power output gearshaft rotate clockwise.
O'clock	Position expressed as viewed from rear of engine.

**1-7. DIFFERENCES BETWEEN MODELS.**

Major differences which exist between engine turbine shaft T53-L-11 series engine and T53-L-13B/703 engines are listed in table 1-3. T53-L-13B/703 engines are the same except where indicated.

**Table 1-3. Differences Between Models**

T53-L-11 Series Engines	T53-L-13B Engine	T53-L-703 Engine
<p>Single-stage gas producer turbine.</p> <p>Single-stage power turbine</p> <p>Shaft horsepower developed at takeoff (Military) power rating at sea level and standard day conditions is 1100</p>	<p>Two-stage gas producer turbine.</p> <p>Shaft horsepower developed at takeoff (Military) power rating at sea level and standard day condition is 1400.</p> <p>No. 1 bearing seal.</p> <p>No. 2 bearing aft seal cooling gas producer section.</p>	<p>Shaft horsepower developed at takeoff (Military) power rating at sea level end standard day condition is 1485.</p> <p>Incorporates a steel centrifugal compressor housing.</p> <p>Pinned No. 2 and No. 3 bearing outer races.</p> <p>TGT harness giving temperature indications at first power turbine nozzle.</p>

**1-8. DESCRIPTION OF MAJOR ASSEMBLIES AND SYSTEMS.**

**1-9. Combustion Section (T53-L-11 Series Engine) (See figure 1-5).**

**A** COMBUSTOR TURBINE ASSEMBLY. Houses the following components:

- V-band assembly
- Power turbine nozzle and cylinder assembly
- Second stage turbine support
- Fire shield assembly
- Support cone assembly

**B** COMBUSTION CHAMBER ASSEMBLY. Consists of the following components:

- Combustion chamber housing
- Combustion chamber liner
- Fuel vaporizers

**C** SECOND STAGE TURBINE ROTOR ASSEMBLY. Consists of the following:

- Second stage turbine disk and blades
- No. 3 and No. 4 bearing
- No. 3 bearing seal

**D** EXHAUST DIFFUSER. Makes up second stage turbine support. It contains hollow struts through which cooling air is supplied to No. 3 and No. 4 bearing housing and rear face of second stage turbine disk.

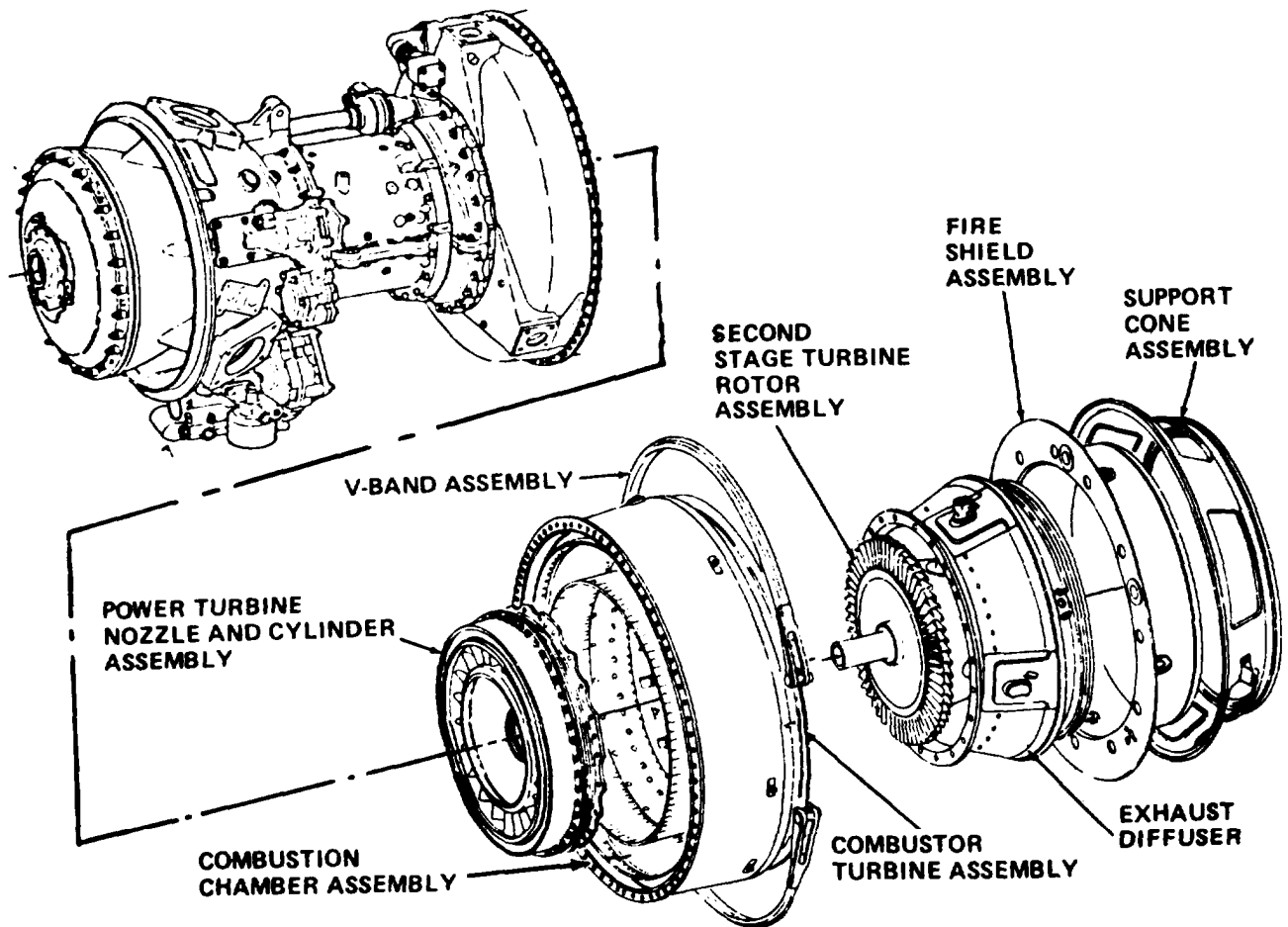


Figure 1-5. Combustion Section (T53-L-11 Series Engines)

---

1-10. Combustion Section (T53-L-13B/703 Engines) (See figure 1-6.)

---

A COMBUSTOR TURBINE ASSEMBLY. Consists of the following components:

- Exhaust diffuser
- Power turbine rotor and bearing housing assembly
- Combustion chamber assembly
- Fuel manifold assembly
- Fire shield assembly
- Exhaust diffuser
- V-band assembly
- Second stage power turbine nozzle
- First stage power turbine rotor
- First stage power turbine nozzle

B EXHAUST DIFFUSER SUPPORT CONE ASSEMBLY. Supports the tail cone exhaust and the fireshield at the rear of the engine.

**C** POWER TURBINE ROTOR AND BEARING HOUSING ASSEMBLY. Consists of the following:

- Second stage power turbine rotor
- No. 3 and No. 4 bearings
- No. 3 bearing seal
- No. 3 and No. 4 bearing housing

**D** COMBUSTION CHAMBER ASSEMBLY. Consists of the following:

- Combustion chamber liner
- Combustion chamber housing

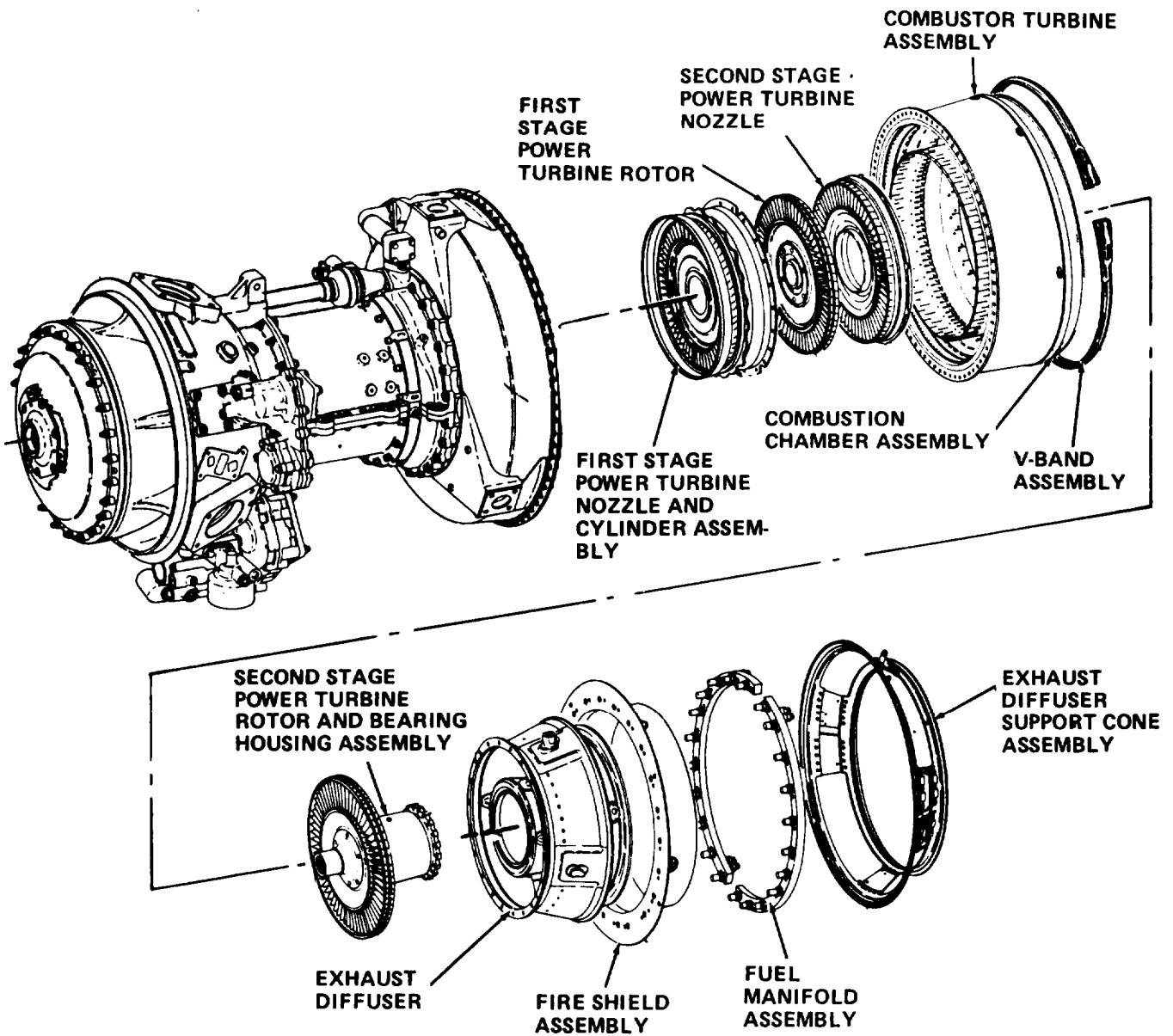


Figure 1-6. Combustion Section (T53-L-13B/703 Engines)



**1-11. Compressor Section (T53-L-II Sries Engine) (See figure 1-7.)**

- A** COMPRESSOR ROTOR ASSEMBLY. Encloses power shaft, but is not connected to it. Compressor rotor sleeve retains the following items:
- Compressor rotor disk assemblies (5)
  - Spacers (5)
  - Centrifugal compressor
  - Impeller assembly
- B** COMPRESSOR AND IMPELLER HOUSING ASSEMBLY. Encloses rotor assembly. Rear of compressor housing is machined to accommodate bleed band. This covers air bleed holes. Air bleed connecting manifold provides flow patch for bleed air adapter assembly. Located on port in upper half of impeller housing. Adapter assembly makes customer air available. Directs anti-icing air through a port in impeller housing. Interstage bleed actuator assembly is mounted on right side of impeller housing.

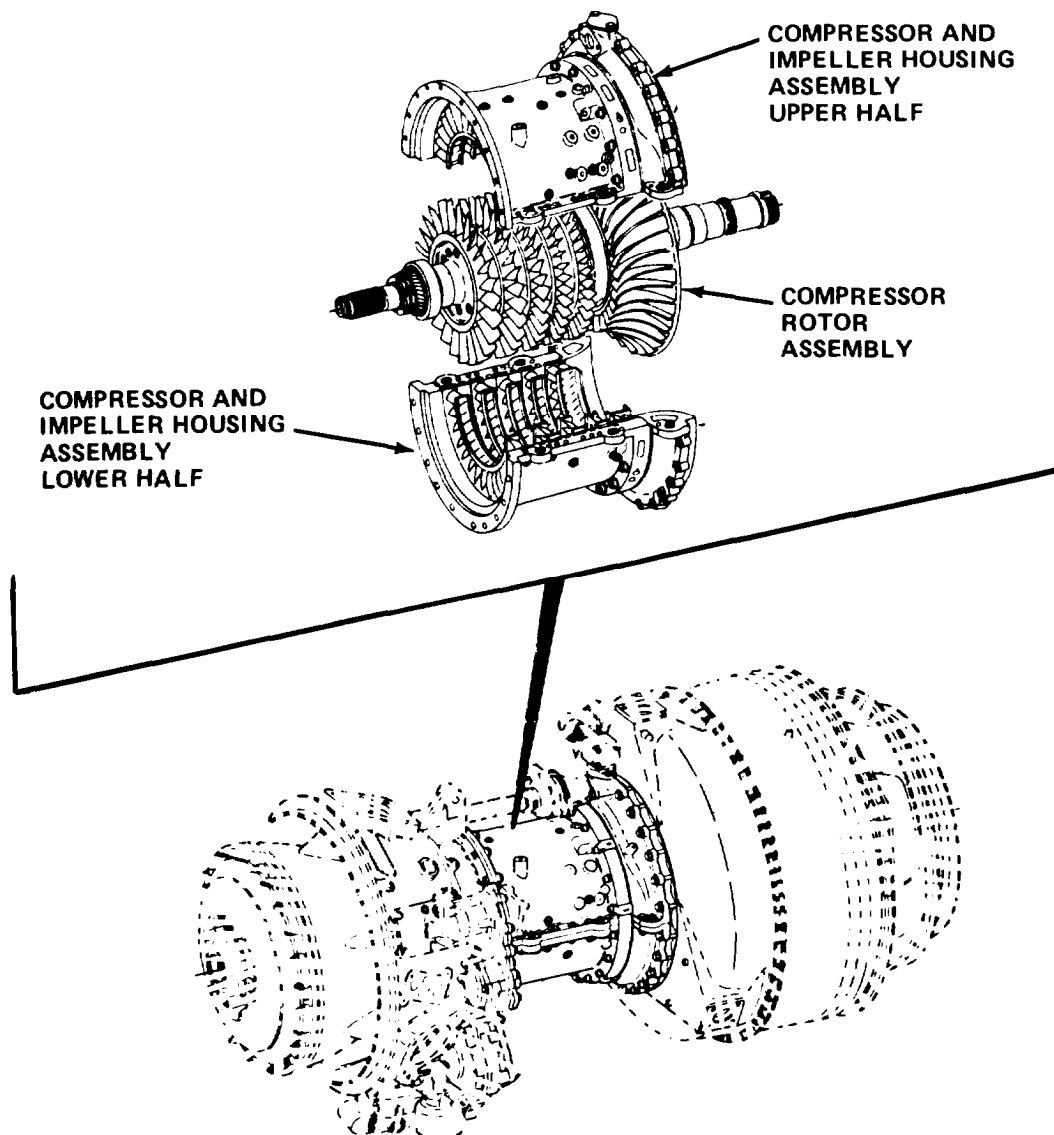


Figure 1-7. Compressor Section (T53-L-11 Series Engines)

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**1-12. Compressor Section (T53-L-13B/703 Engines) (See figure 1-8.)**

---

- A** ROTOR ASSEMBLY. Consists of second through fifth stages of axial compressor spool. Bolted to it are the following items:
- Stainless steel front shaft assembly.
  - Stainless steel compressor rear shaft
  - One-piece titanium impeller
- B** COMPRESSOR AND IMPELLER HOUSING ASSEMBLY. Same description as T53-L11 series engines. (Refer to paragraph 1-11.)

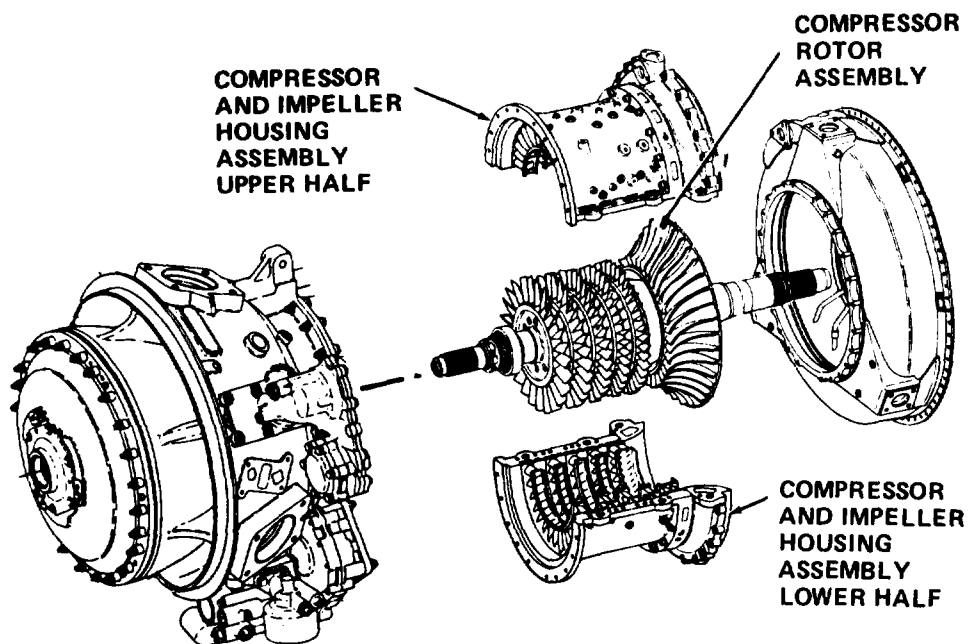


Figure 1-8. Compressor Section (T53-L-13B/703 Engines)

**1-13. Diffuser Section (T53-L-11 Series Engine) (See figure 1-9.)**

- A**    **DIFFUSER HOUSING.** Conducts air from compressor to combustion chamber. Air is bled through holes in aft face of certain diffuser vanes, through connecting manifold, to supply anti-icing and customer bleed air.
- B**    **REAR BEARING HOUSING.** Supported by diffuser housing.
- C**    **COMBUSTION CHAMBER DEFLECTOR.** Supported by diffuser housing.
- D**    **FIRST STAGE TURBINE NOZZLE AND FLANGE.** Supported by diffuser housing.
- E**    **FIRST STAGE TURBINE ROTOR.** Supported by diffuser housing.

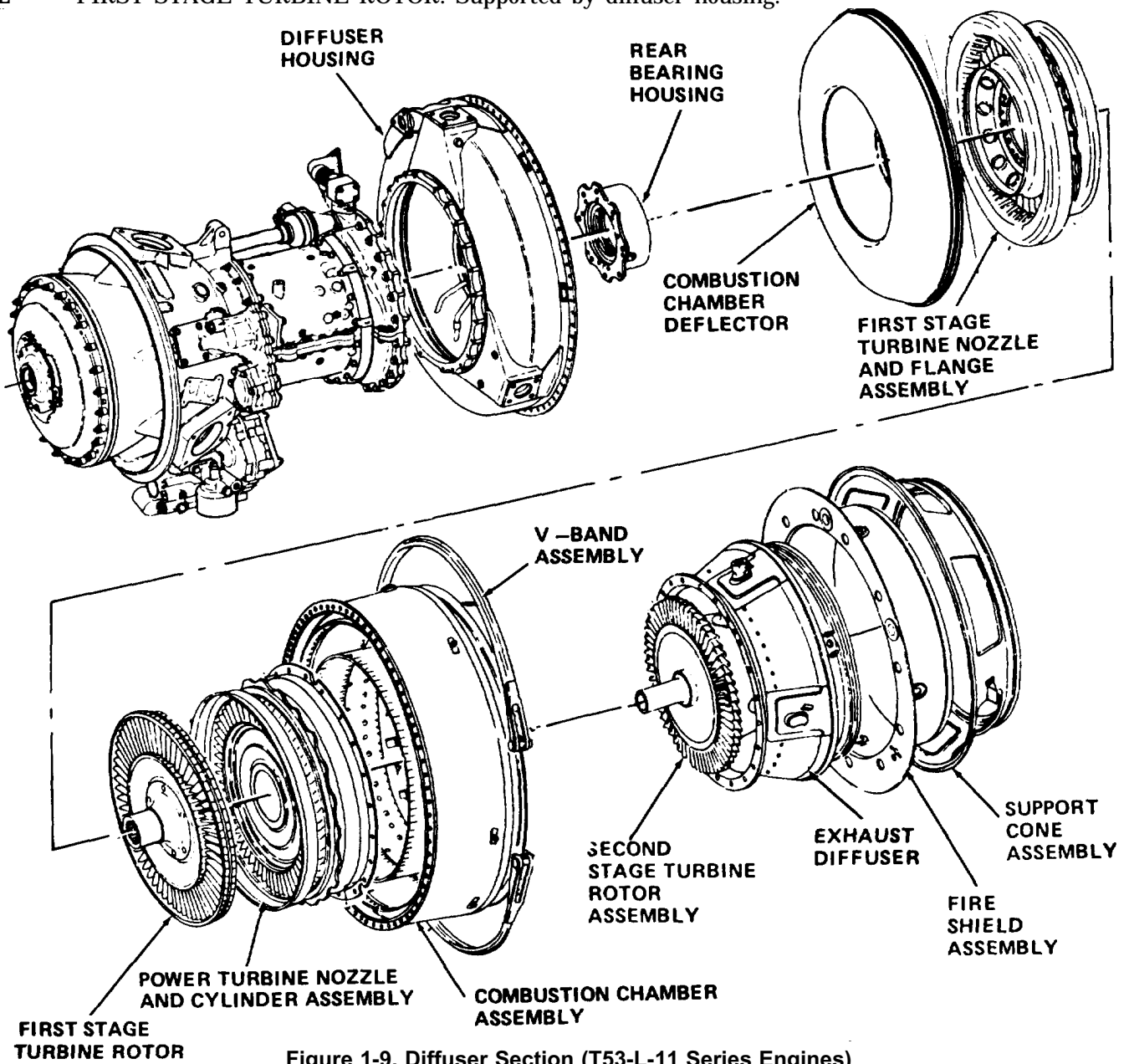


Figure 1-9. Diffuser Section (T53-L-11 Series Engines)

1-14. Diffuser Section (T53-L-13B/703 Engines) (See figure 1-10.)

- A DIFFUSER HOUSING. Description of the support is the same as TS3-L-11 series engine. Refer to paragraph 1-13.
- B FIRST STAGE GAS PRODUCER TURBINE ROTOR ASSEMBLY. Mounted on compressor shaft.
- C SECOND STAGE GAS PRODUCER TURBINE ROTOR ASSEMBLY. Mounted on compressor shaft.

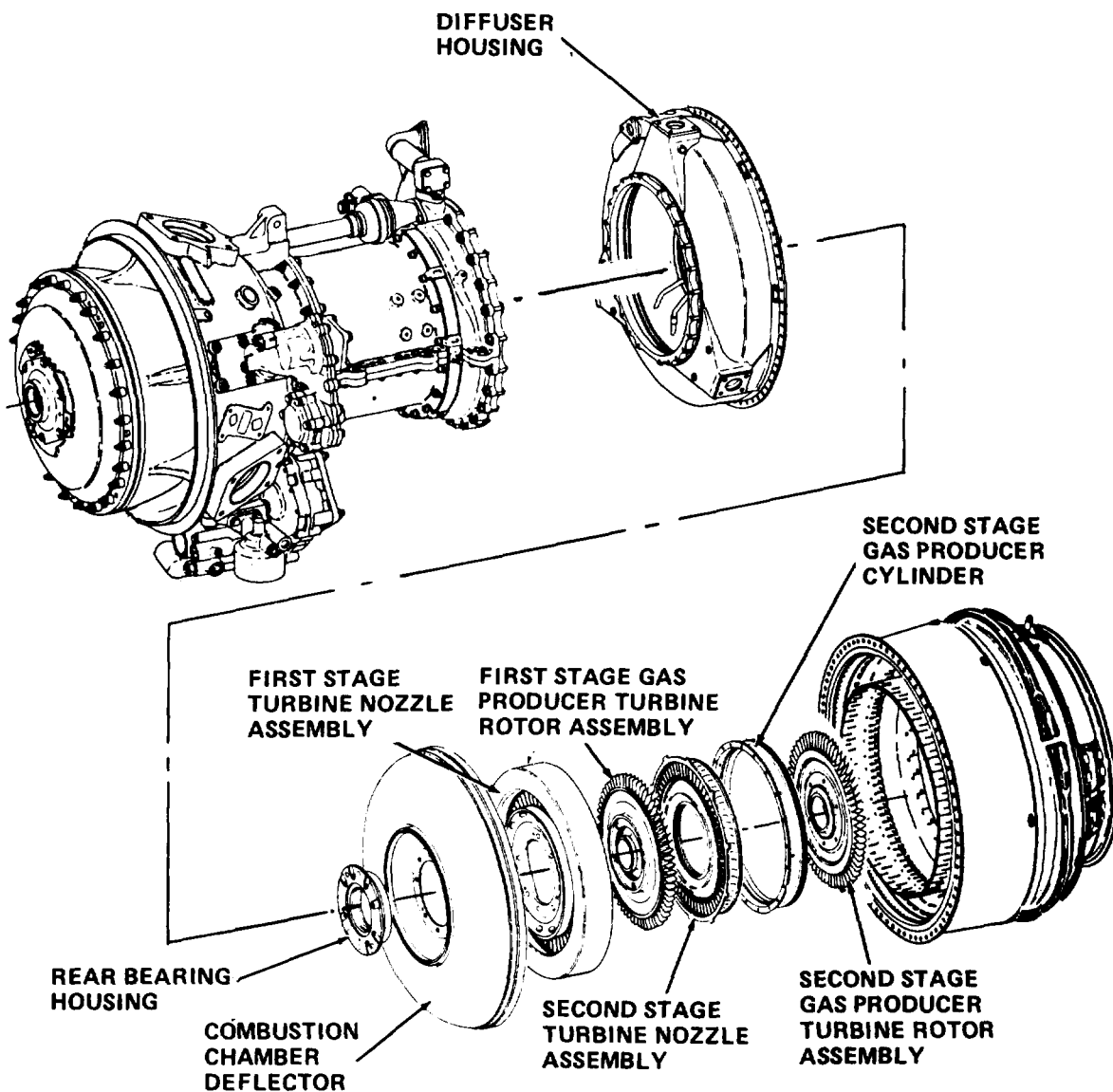
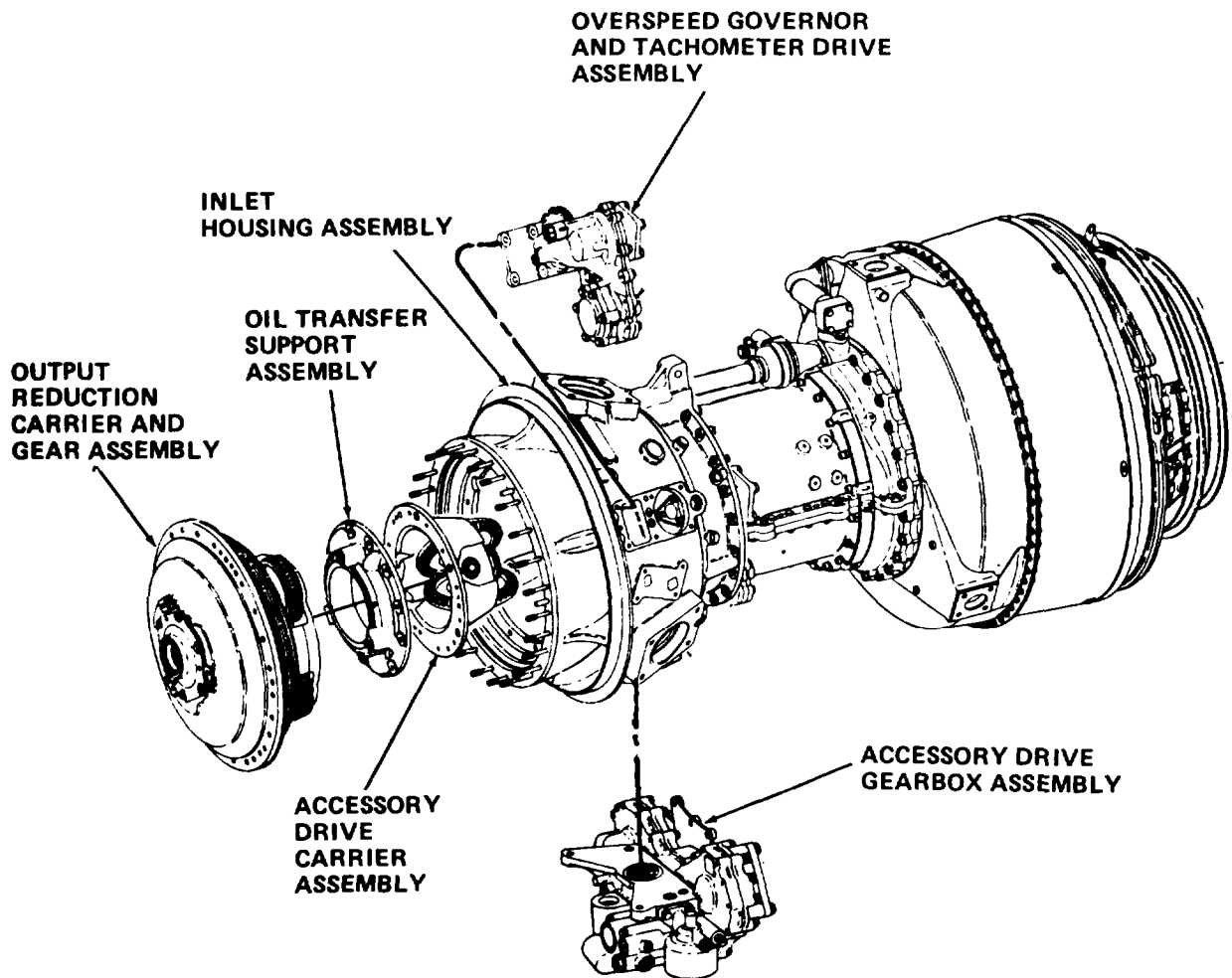


Figure 1-10. Diffuser Section (T53-L-13B/703 Engines)

**1-15. Air Inlet Section. (See figure 1-11.)**

- A** **INLET HOUSING ASSEMBLY.** Provides mounting for overspeed governor and tachometer drive assembly and accessory drive gearbox. Outer housing and inner housing divide inlet housing assembly into two main areas. Outer housing forms outer wall of air inlet area and houses deicing manifold. Inner housing assembly encloses output reduction carrier and gear assembly. It also encloses No. 1 main bearing, torquemeter valve and cylinder, and variable inlet guide vane (T53-L-13B/703 engine only).



**Figure 1-11. Air Inlet Section**

- B** OIL TRANSFER SUPPORT ASSEMBLY. Enclosed in inner housing.
- C** ACCESSORY DRIVE CARRIER ASSEMBLY. Enclosed in inner housing.
- D** OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY. Mounted at 10 o'clock position on exterior of inlet housing. It is driven through shafts and gearing from power shaft. Mounts and drives for power tachometer (N2) generator and power driven rotary (booster) pump are provided. Drive assembly drives fuel control overspeed governor. Strainer and metering cartridge for lubrication of drive gear train are included. Torquemeter relief valve is located on upper portion of housing. This allows for adjustment of torquemeter boost oil pressure.
- E** ACCESSORY DRIVE GEARBOX ASSEMBLY. Mounted on exterior of inlet housing at 6 o'clock position. It is driven through shaft and gearing from compressor forward shaft. Mounted on the gearbox are power driven rotary (oil) pump, oil filter, fuel control, compressor rotor (N1) tachometer, and starter-generator. A chip detector drainplug is installed in bottom of gearbox.
- F** OUTPUT REDUCTION CARRIER AND GEAR ASSEMBLY. Mounted at front of inlet housing. Consists of the following:
- Support housing
  - Carrier assembly
  - Torquemeter assembly
  - Output gearshaft

The sun gearshaft, splined to the power shaft, drives three planetary gears, mounted in carrier which in turn, drives the output gearshaft.

**1-16. Starting Fuel System (T53-L.11 Series Engine).** During engine start this system (fig. 1-12) delivers starting fuel to combustion chamber. Actuating primer fuel switch opens starting fuel solenoid valve. This allows fuel from the control to flow through starting fuel manifold, two starting fuel nozzles, and into combustion chamber where it is ignited by two igniter plugs. When N1 reaches sufficient speed, ignition system is deenergized. Solenoid valve closes and stops flow of starting fuel, Starting fuel nozzles are self-purging and automatically remove excess fuel. At low ambient temperatures, JP-5 fuel may cause slow engine starts.

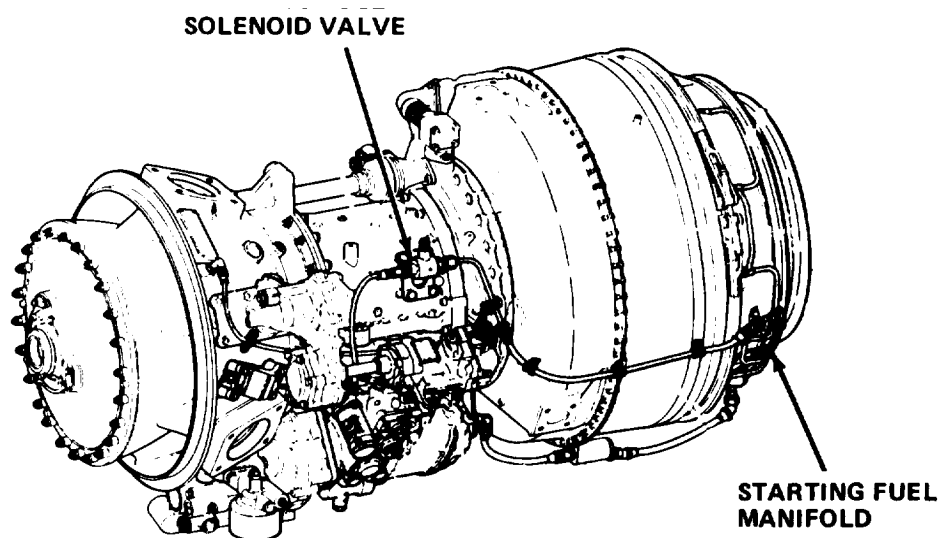


Figure 1-12. Starting Fuel System (T53-L-11 Series Engines)

- A **STARTING FUEL SOLENOID VALVE.** Mounted on a bracket secured to compressor housing at the 10-o'clock position. When energized, valve allows starting fuel from fuel regulator to flow to starting fuel nozzles. When N1 reaches sufficient speed, starting fuel solenoid valve is deenergized and flow of starting fuel is shut off.
- B **STARTING FUEL MANIFOLD.** Bracketed to main fuel manifold and mounted at rear of combustion chamber housing. Receives fuel from fuel control, through starting fuel solenoid valve, and delivers it to two starting fuel nozzles. Starting fuel nozzles are located at the 4- and 8-o'clock positions in rear of combustion chamber housing. Nozzles deliver fuel to combustion chamber during starting period. A ball check valve within nozzle permits air from combustion chamber to purge nozzle when starting fuel stops flowing.

**1-17. Starting Fuel System (T53-L-13B/703 Engines).** During engine start, turn on start fuel switch which opens starting fuel solenoid valve. This allows starting fuel from fuel control to flow through starting fuel manifold, four starting fuel nozzles, and into combustion chamber where it is ignited by four igniter plugs. When N1 attains sufficient speed, ignition system is deenergized causing solenoid valve to close and stop flow of starting fuel. After engine starts, residual fuel left in starting fuel nozzles is purged by air from combustion chamber through a check filter valve. (See figure 1-13.)

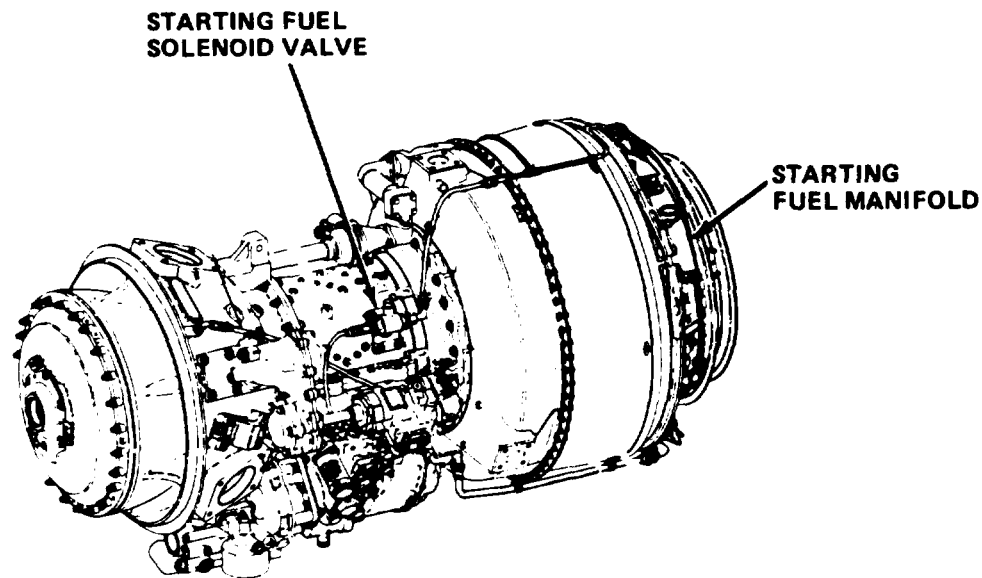


Figure 1-13. Starting Fuel System (T53-L-13B/703 Engines)

- A **STARTING FUEL SOLENOID VALVE.** Mounted on a bracket and secured to compressor housing at the 10 o'clock position. When energized, allows starting fuel from fuel control to flow to starting fuel nozzles.
- B **STARTING FUEL MANIFOLD.** Mounted at rear of combustion chamber housing and secured to support cone. Receives fuel from fuel control through starting fuel solenoid valve. Delivers fuel to starting fuel nozzles. Starting fuel nozzles are located at the 2, 4, 8 and 10-o'clock positions in rear of combustion chamber housing. Nozzles deliver fuel to combustion chamber during starting.

**1-18. Main Fuel System (T53-L-11 Series Engine).** Delivers fuel to combustion chamber. Minimum fuel pressure in fuel control needed to actuate main fuel outlet foot valve is obtained at 8 to 13 percent N1 speed. Metered fuel from fuel control flows through main fuel manifold. It is discharged through fuel vaporizers into combustion chamber where it is ignited by burning starting fuel. (See figure 1-14.)

- A **MAIN FUEL MANIFOLD.** Bracketed to starting fuel manifold. Both are mounted at rear of combustion chamber housing. Main fuel manifold receives fuel from fuel control through main fuel hose and delivers it to fuel vaporizers.

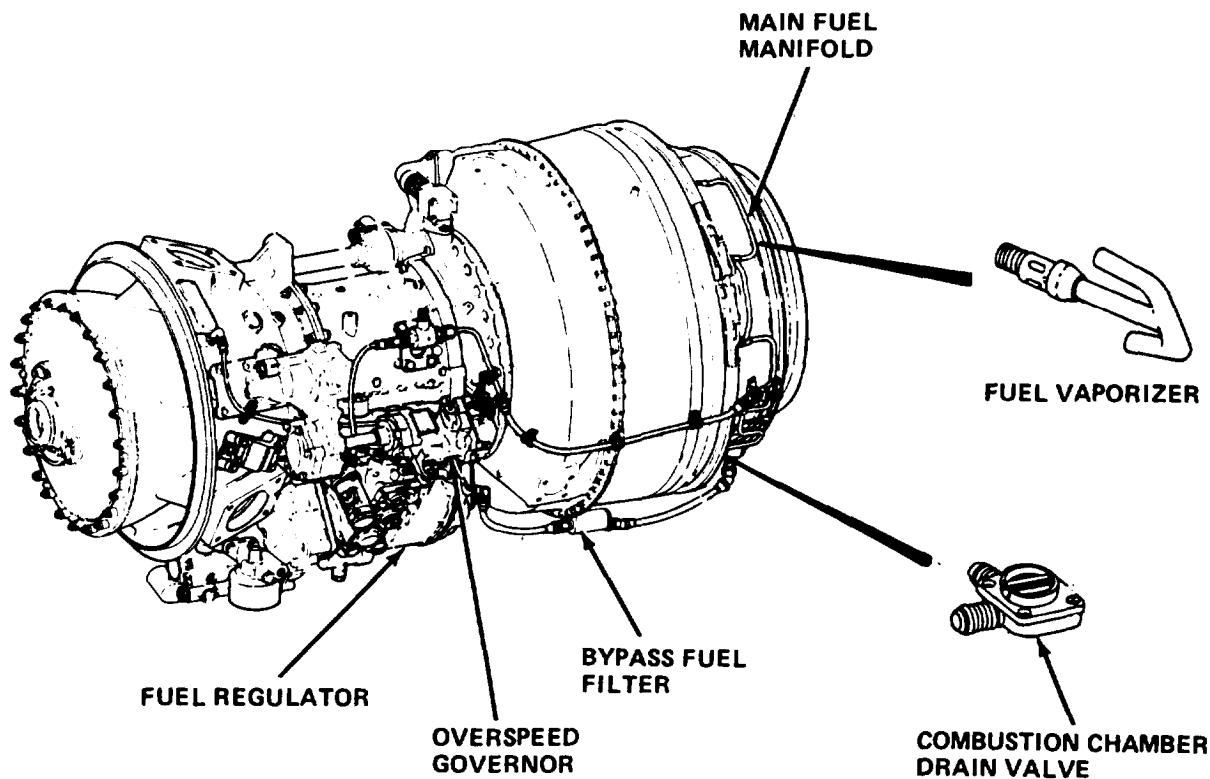


Figure 1-14. Main Fuel System (T53-L-11 Series Engines)

- B **BYPASS FUEL FILTER.** Located on lower left side of combustion chamber housing. Filters fuel from fuel control through a corrosion-resistant, 200 mesh, stainless steel element. As fuel passes through filter element contaminants are deposited on its inner wall. If clogging of element occurs, fuel will bypass around element into a hollow annulus within filter housing, and will be supplied to main fuel manifold.



- C** FUEL VAPORIZERS. Equally spaced inside main fuel manifold. Delivers main fuel to combustion chamber. Fuel vaporizers receive fuel from main fuel manifold and combine it with compressed air. They deliver vaporized fuel and air to combustion chamber.
- D** COMBUSTION CHAMBER DRAIN VALVE. Located at 6 o'clock position on combustion chamber housing. Drain valve is spring-loaded open to allow drainage of residual fluids after engine shutdown.. Internal pressure during engine operation keeps valve closed.
- E** FUEL CONTROL. Fuel control assembly consists of the following components:
- Metering section
  - Computer section
  - Overspeed governor

Metering section is driven at a speed proportional to N1 speed. Fuel is pumped to engine through main metering valve. When main system fails to operate fuel is pumped through emergency metering valve positioned directly by the power lever. Computer section determines rate of main fuel delivery by biasing main metering valve opening for the following:

- N1 speed
- Inlet air temperature and pressure
- Power lever position

Operation of compressor air bleed system is also controlled by computer section. Overspeed governor is driven at a speed proportional to N2 speed. It biases main metering valve opening to maintain a constant selected power output shaft rpm. In the event of power turbine overspeed decrease valve opening will reduce fuel to engine. If automatic fuel control system fails, a change-over to emergency (manual) fuel system should be made in accordance with airframe instructions. When transfer valve is in emergency position, fuel flows through and is metered by emergency (manual) metering valve. Fuel pressure is controlled by emergency pressure - regulating valve. Fuel is delivered through open shutoff valve to fuel discharge and then to the engine. Area of valve opening and resulting flow of fuel are determined by position of power lever controlled from cockpit.

**NOTE**

Emergency fuel system does not affect operation of starting fuel system if engine restart is required.

Power lever on fuel control modulates engine from off to takeoff power. Total travel of lever is 100 degrees. There is a three-degree dwell at ground idle and military positions. A four-degree dwell exists at flight idle position, Indexed positions on fuel control quadrant areas follows:

OFF		0 Degrees
Ground Idle		23 to 26 degrees
Flight Idle		38 to 42 degrees
Normal		83 degrees
Military		90 to 93 degrees
Takeoff		100 degrees

**1-19. Main Fuel System (T53-L-13B/703 Engines).** Delivers fuel to combustion chamber. Minimum fuel pressure in fuel control needed to actuate main fuel outlet foot valve is obtained at 8 to 13 percent N1 speed. Metered fuel from fuel control flows through main fuel manifold. It is discharged through 22 fuel nozzles into combustion chamber where it is ignited by burning starting fuel. (See figure 1-15.)

- A** **FLOW DIVIDER ASSEMBLY.** Mounted under exhaust diffuser support cone at the 6 o'clock position. Receive fuel from fuel control and delivers it to main fuel manifold through two passages. Flow divider sends fuel through primary system of manifold at low N1 speeds. As N1 speed increases, fuel pressure increases and flow divider opens ports to secondary system of main fuel manifold. Flow divider is equipped with drain port to drain fuel from main fuel manifold and flow divider during engine shutdown.
- B** **MAIN FUEL MANIFOLD.** Two manifolds are secured to rear of combustion chamber housing. Fuel from flow divider assembly is received by manifolds and delivered to fuel nozzles through primary and secondary fuel passages. Fuel nozzles contain two separate passages connected to corresponding passages in main fuel manifolds. Fuel nozzles atomize fuel and deliver it into combustion chamber.

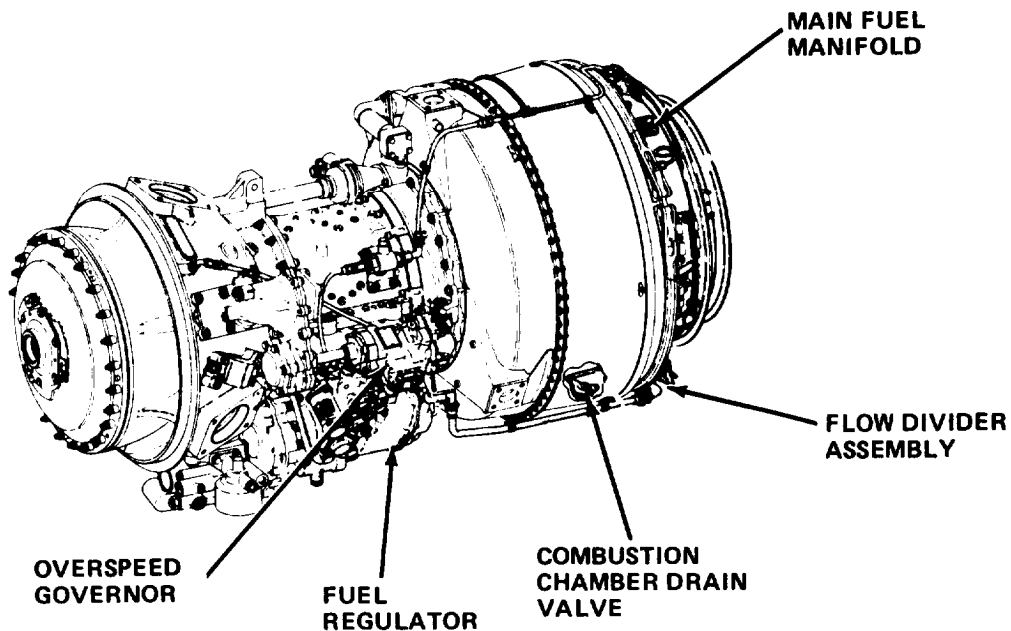


Figure 1-15. Main Fuel System (T53-L-13B/703 Engines)

**C** COMBUSTION CHAMBER DRAIN VALVE. Located at 6 o'clock position in combustion chamber housing. Valve is spring-loaded open to allow drainage of residual fluids during engine shutdown. Internal pressure during engine operation keeps valve closed. A port, located at the side of drain valve housing, allows unburned fuel to drain from flow divider assembly through drain valve during engine shutdown.

**D** FUEL CONTROL. Fuel control assembly consists of the following components:

- Metering section
- Computer section
- Overspeed governor

Metering section is driven at a speed proportional to N1 speed. Fuel is pumped to engine through main metering valve. When main system fails to operate fuel is pumped through emergency metering valve positioned directly by the power lever. Computer section determines rate of main fuel delivery by biasing main metering valve opening for the following:

- N1 speed
- Inlet air temperature and pressure
- Power lever position

Operation of compressor air bleed system is also controlled by computer section. Overspeed governor is driven at a speed proportional to N2 speed. It biases main metering valve opening to maintain a constant selected power output shaft rpm. In the event of power turbine overspeed decrease valve opening will reduce fuel to engine. If automatic fuel control system fails, a change over to emergency (manual) fuel system should be made in accordance with airframe instructions. When transfer valve is in emergency position, fuel flows through and is metered by emergency (manual) metering valve. Fuel pressure is controlled by emergency pressure-regulating valve. Fuel is delivered through open shutoff valve to fuel discharge and then to the engine. Area of valve opening and resulting flow of fuel are determined by position of power lever controlled from cockpit. Power lever on fuel control modulates engine power from OFF to Military power. The total travel of lever is 100 degrees. There is a three-degree dwell at ground idle position and a four-degree dwell at flight idle position. Indexed positions on fuel control quadrant areas follows:

OFF	0 Degrees
Ground Idle	23 to 26 degrees
Flight Idle	38 to 42 degrees
Normal	94 degrees (T53-L-13B)
	89 degrees (T53-L-703)
Military	100 degrees

**1-20. Lubrication System.** Consists of main oil pressure supply system and oil scavenge system. Principal components are as follows:

- lube oil filter assembly
- power driven rotary (oil) pump
- power-driven rotary (booster) pump
- associated external hose assemblies and internal passages

Lubrication system will operate satisfactorily with engine oil inlet temperature between -40°F to +200°F (-40°C to +93°C) using lubricating oil, Military Specification MIL-L23699. For lubricating oil, Military Specification MIL-L-7808, oil inlet temperature shall be between -65°F to +200°F (-54°C to +93°C). Engine lubricating oil is supplied from an aircraft mounted oil tank. See figures 1-16 and 1-17 for oil flow schematic diagrams.

a. Lubricating Oil. Supplied from an aircraft-mounted oil tank. Oil enters powerdriven rotary (oil) pump mounted on accessory drive gearbox. Then it is discharged through internal passages to lube oil filter assembly. Filtered oil is directed into two main flow paths.

b. Internal Oil Flow Path. Oil passages through internal passages in inlet housing supplying lubricating oil to front section of engine, including the following items:

- (1) reduction gearing
- (2) torquemeter
- (3) accessory drive gearing
- (4) No. 1 main bearing
- (5) power shaft forward bearing

c. External Oil Flow Path. Oil passes through external oil pressure hose assemblies to rear section of engine for lubrication of main bearing Nos. 2, 3, and 4.

d. Oil Transfer Support Assembly. Oil is directed through accessory drive carrier flange into annular passage of oil support assembly. From this passage, oil is directed to three oil transfer tubes for forced feed spray lubrication of reduction gears and sun gear to power shaft splines. Oil sprayed from an orifice in oil transfer support assembly lubricates power shaft support bearings on engines incorporating improved output reduction carrier and gear assembly.

e. Reduction Gear Cover Passages. Provide lubrication to output shaft bearings.

f. Power-Driven Rotary (Booster) Pump. Mounted on and driven by overspeed governor and tachometer drive assembly. Transfer passage from accessory drive carrier is directed up through air inlet housing to pump. A pressure-regulating valve located in overspeed governor and tachometer drive assembly governs output pressure of power-driven rotary (booster) pump by circulating excess pressurized oil back to inlet housing. Pressurized oil from pump is directed back through inlet housing strut and a strainer to torquemeter valve located on torquemeter cylinder.

g. Overspeed Governor Mounting Flange. Offset passage supplies oil to strainer and metering cartridge in overspeed governor which directs metered oil to overspeed governor and tachometer drive gear train.

h. Oil-Pressure Port. Located at 5-o'clock position on inlet housing through external flexible oil hose assembly to lube pressure manifold mounted on diffuser housing. Supplies oil flow to rear section of engine.

i. Strainer. Located on bottom of air diffuser. Feeds oil from lube pressure manifold to No. 2 bearing.

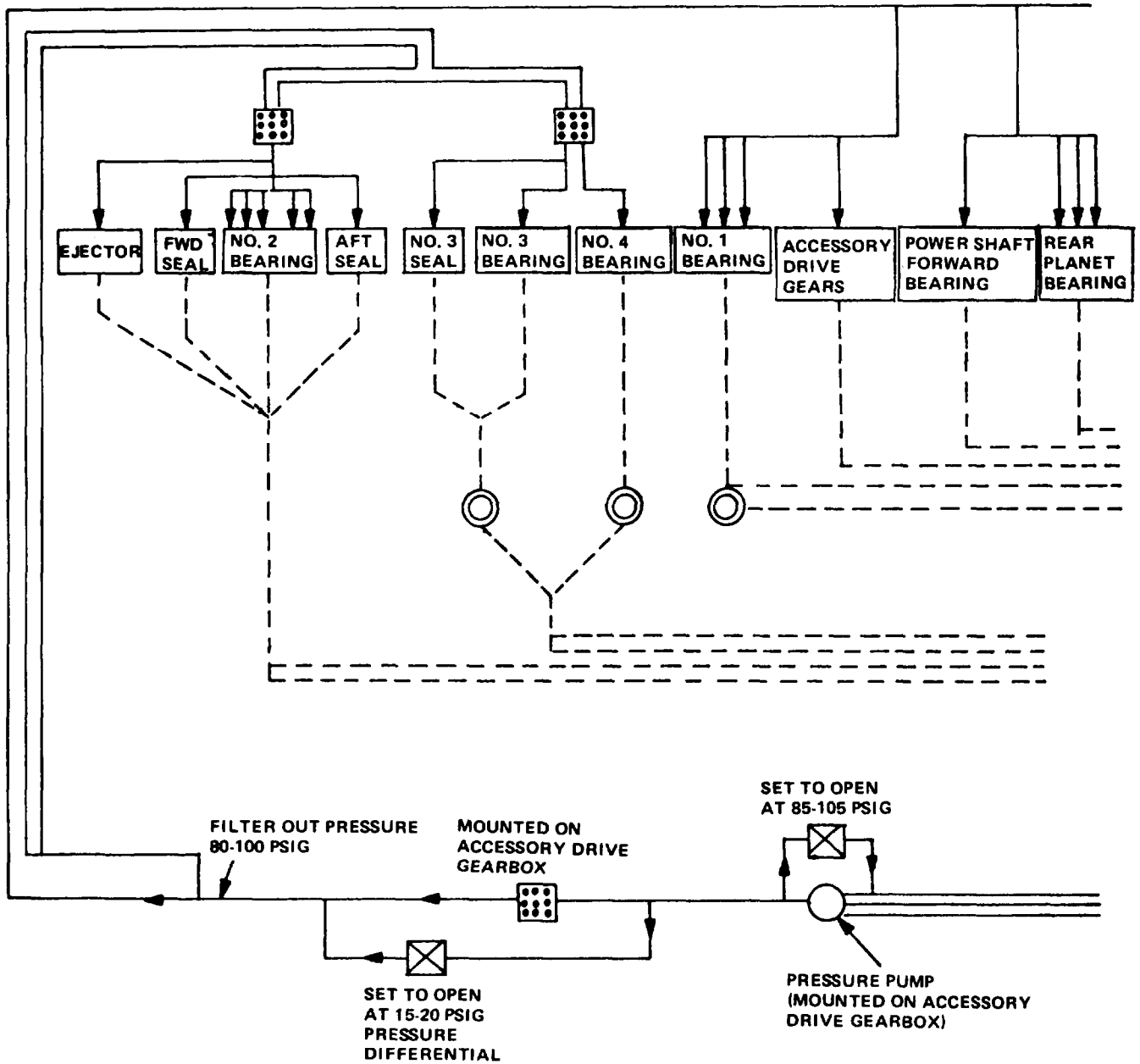
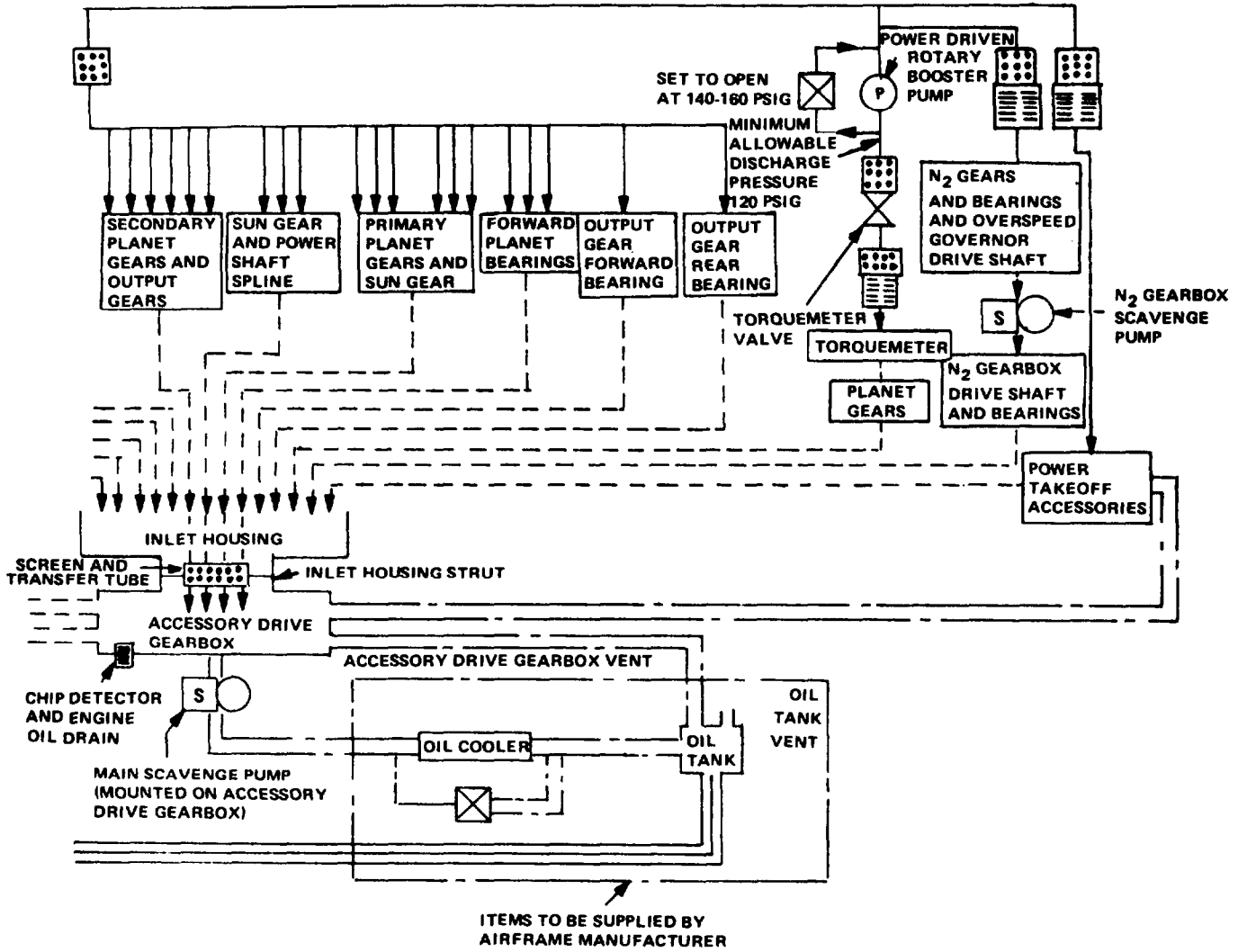


Figure 1-16. Lubrication System Diagram (T53-L-13B/703 Engines) (Sheet 1 of 2)



LEGEND

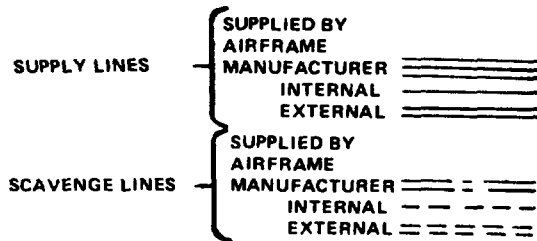
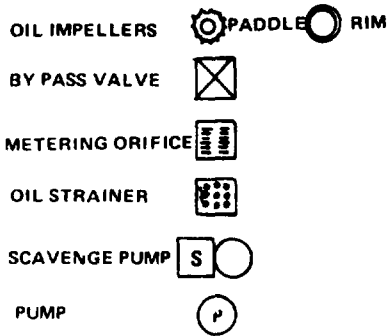


Figure 1-16. Lubrication System Diagram (T53-L-13B/703 Engines) (Sheet 2 of 2)

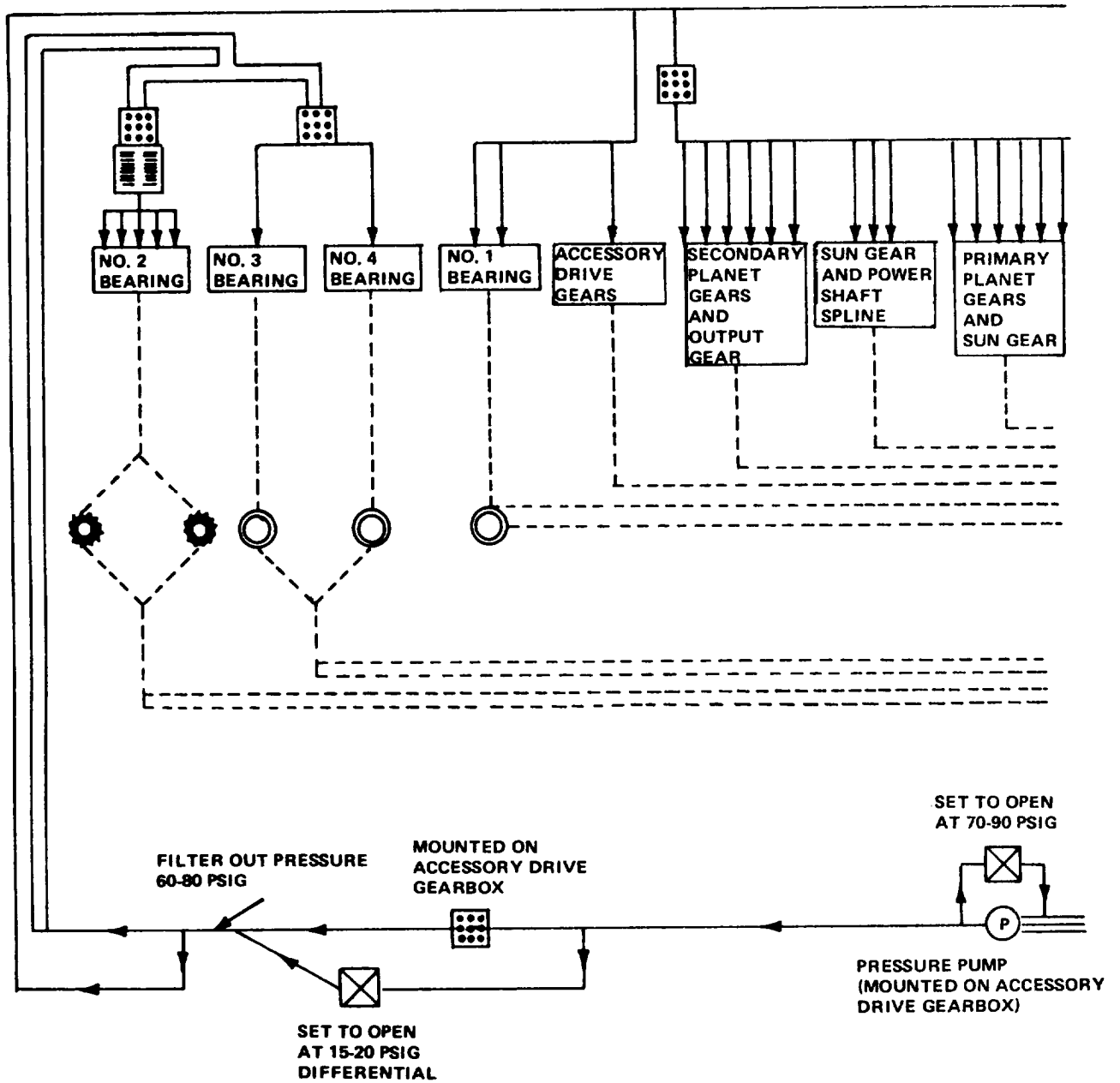


Figure 1-17. Lubrication System Diagram (T53-L-11 Series Engines) (Sheet 1 of 2)

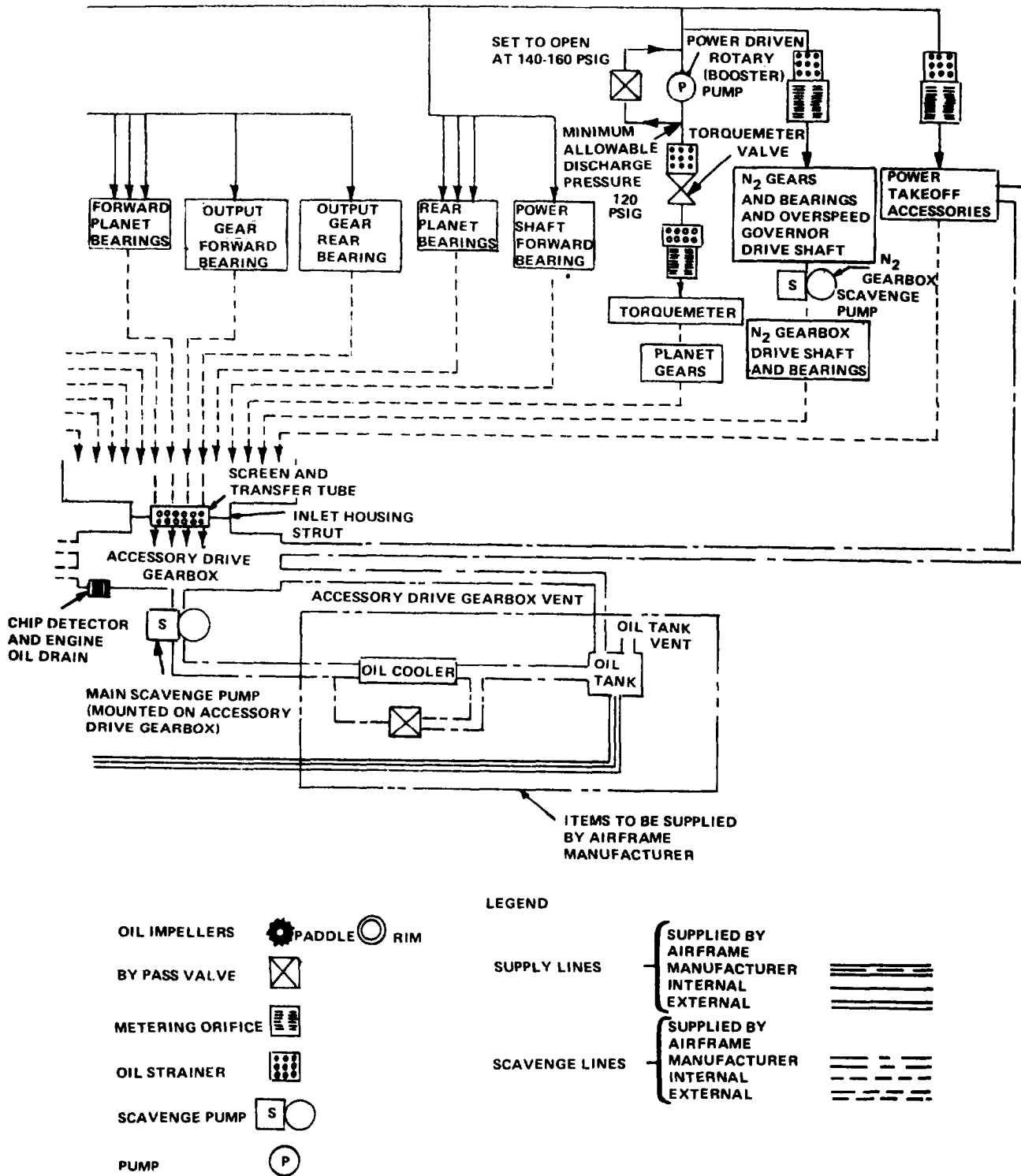


Figure 1-17. Lubrication System Diagram (T53-L-11 Series Engines) (Sheet 2 of 2)



j. External Plumbing. Directs oil to No. 3 and No. 4 bearings through a strainer located on exhaust diffuser upper strut.

k Bearing Oil. Used on T53-L13B/703 engines as a seal runner coolant.

l. Scavenge Oil Flow. Internal scavenge oil from inlet housing section drains through hollow support strut at 6-o'clock position in inlet housing. Oil passes through screen and transfer tube into accessory drive gearbox.

m. No. 1 Main Bearing. Scavenge oil is pumped to inlet housing struts by impeller mounted on rear of bearing.

n. No. 2 Main Bearing. Scavenge oil flows through scavenge oil tube in diffuser housing. External scavenge oil hose assembly directs oil into accessory drive gearbox. T53-L-11 series engine scavenge oil flow is aided by two paddle pumps.

o. No. 3 and No. 4 Bearings. Scavenge oil flow is aided by two impellers located in bearing housing. Flow is conducted through oil tube extended through bottom of exhaust diffuser. External scavenge oil hose assembly directs flow to accessory drive gearbox.

p. Power-Driven Rotary (Oil) Pump. Scavenge portion returns scavenge oil from accessory drive gearbox through aircraft oil cooler and back to oil storage tank. Accessory drive gearbox is vented to oil storage tank which, in turn, is vented to atmosphere.

q. Torquemeter. Hydro-mechanical torque-measuring device, located in reduction gearing section of inlet housing, consists of the following:

- (1) stationary forward plate
- (2) movable rear plate attached to planet carrier.
- (3) 18 steel balls positioned in conical pockets.

Torquemeter uses lubricating oil boosted to high pressure by power-driven rotary (booster) pump. Resistance to rotation of planetary gears, due to load on output shaft, causes carrier-mounted plate to rotate slightly. Displacement of torquemeter balls from individual pockets forces rear torquemeter plate to move rearward. Force causing rearward motion of plate is equalized when motion unseats a spring-loaded poppet valve, permitting high-pressure oil to enter torquemeter cylinder chamber. Torquemeter oil pressure from cylinder and accessory drive gearbox air pressure are directed to torquemeter gage. Gage indicates differential torque oil pressure in psi. Pressure is proportional to torque delivered to output gearshaft.

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#### **1-21. Lubrication System External Components. (See figures 1-18 and 1-19.)**

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**A** LUBE OIL FILTER ASSEMBLY. Bolted to accessory drive gearbox. Contains bypass valve set to open at 15 psi to 20 psi (1.05 kg/sq cm to 1.40 kg/sq cm) differential. Bypass valve allows oil flow to bypass filter elements and supply oil to engine if filter elements are clogged.

- B** POWER-DRIVEN ROTARY (OIL) PUMP. A two-element vane-type pump. One element supplies lubricating oil pressure; the other element returns scavenge oil to aircraft-mounted oil tank. Both elements are driven by a common splined drive shaft. Pressure relief valve in oil pump is adjusted to deliver 60 psi to 80 psi (4.21 kg/sq cm to 5.62 kg/sq cm) for T53-L-11 series engine. For T53-L-13B/703 engines pressure relief valve in oil pump is adjusted to deliver 80 psi to 100 psi (5.62 kg/sq cm to 7.03 kg/sq cm). Oil pressure is measured at oil filter discharge port at normal rated power and above. This setting is rated for maximum inlet oil temperature of 200° F (93°C). At pressure below relief valve setting, oil pressure is directly proportional to compressor rotor speed.
- C** POWER-DRIVEN ROTARY (BOOSTER) PUMP. Mounted on overspeed governor and tachometer drive assembly. Pressure and scavenge elements are contained within pump. Each individual element is a pumping unit that draws oil from a separate source. Pressure element for T53-L-11 series engine receives engine lubricating oil at 60 psi to 80 psi (4.21 kg/sq cm to 5.62 kg/sq cm). For T53-L-13B/703 engine, pressure element receives engine lubricating oil at 80 psi to 100 psi (5.62 kg/ sq cm to 7.03 kg/sq cm). Lubricating oil is delivered through a filter to torquemeter valve at minimum pressure of 120 psi (8.78 kg/sq cm) and above. Excess oil flows back to inlet side of booster pump. Relief valve in overspeed governor and tachometer drive assembly sets booster pump outlet pressure. Scavenge element receives oil from overspeed governor and tachometer drive gear housing and delivers it to oil return passages in inlet housing assembly.
- D** CHIP DETECTOR. Installed in lower right side of accessory gearbox. Provides an indication of the presence of metal particles in engine lubrication system when a continuity check is performed. It is easily removed for cleaning and inspection. Provisions exist for airframe wiring to provide inflight indication of contamination. An oil system breather connection is furnished on right side of accessory drive gearbox. This vent is connected to aircraft oil tank, which is vented by oil tank overboard breather.

**NOTE**

The following list of items are located in the lubrication system for T53-L-11 engine and aid in lubrication flow throughout engine. See figure 1-18.

- E** NO. 3 AND NO. 4 BEARING OIL STRAINER HOUSING ADAPTER
- F** CLAMP
- G** OIL PRESSURE HOSE
- H** LUBRICATION PRESSURE MANIFOLD
- I** MANIFOLD MOUNTING BRACKET
- J** CLAMP
- K** OIL PRESSURE HOSE
- L** NO. 2 BEARING OIL SCAVENGE HOSE
- M** INLET HOUSING OIL OUTLET PRESSURE HOSE

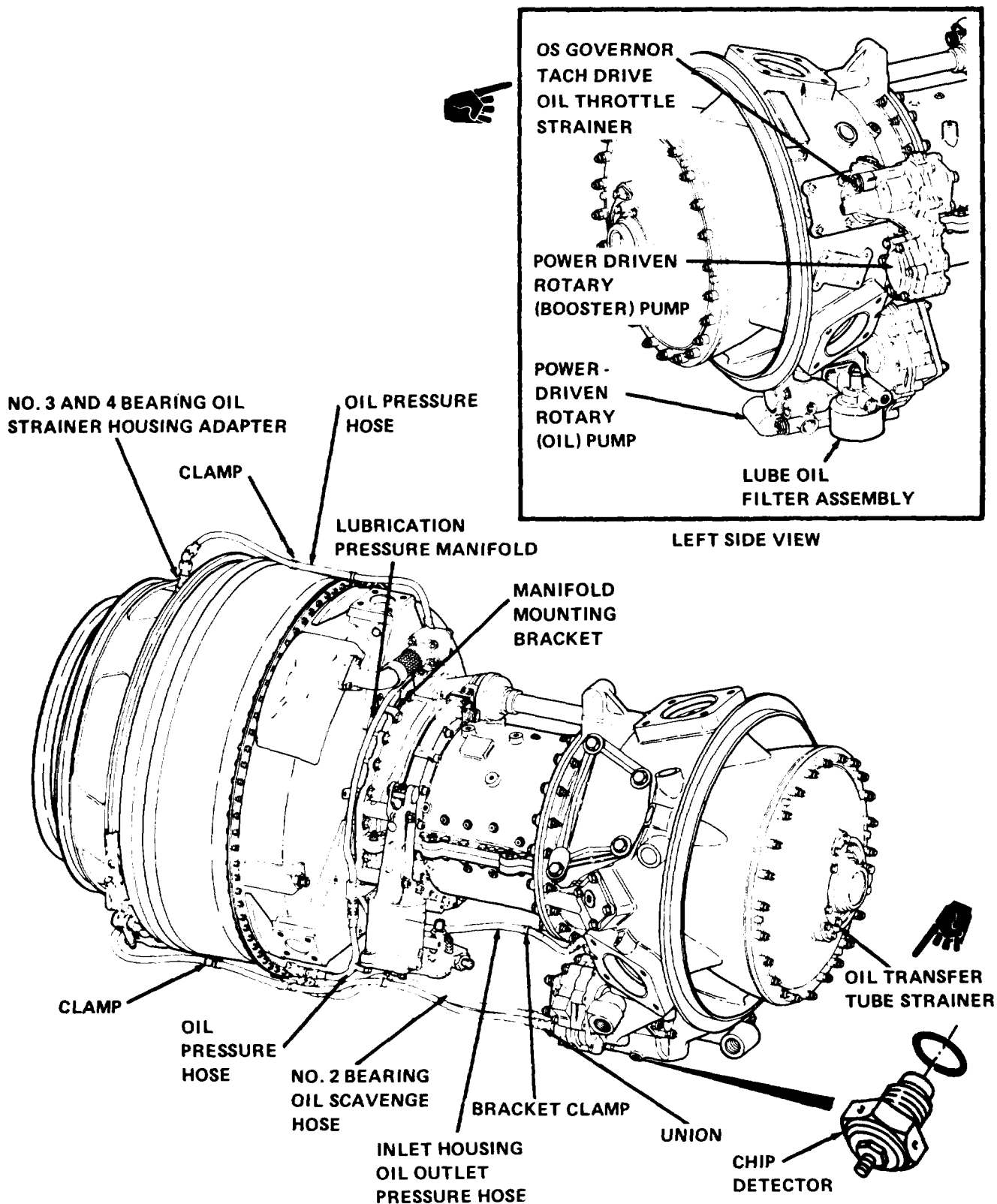


Figure 1-18. Lubrication System External Components (T53-L-11 Series Engines)

- N BRACKET CLAMP
- O UNION
- P OIL TRANSFER TUBE STRAINER
- Q OS GOVERNOR AND TACHOMETER DRIVE OIL THROTTLE STRAINER

**NOTE**

The following list of items are located in the lubrication system for T5 3-L- 13B/703 engines and aid in lubrication flow throughout engine. (See figure 1-19.)

- E OIL PRESSURE HOSE ASSEMBLY TO NO. 3 AND 4 BEARINGS
- F OIL PRESSURE HOSE ASSEMBLY TO LUBE PRESSURE MANIFOLD
- G OIL SCAVENGE HOSE ASSEMBLY FROM NO. 2 BEARING
- H OIL PRESSURE HOSE ASSEMBLY TO NO. 2 BEARING
- I LUBE PRESSURE MANIFOLD
- J OIL SCAVENGE HOSE ASSEMBLY FROM NO. 3 AND 4 BEARINGS
- K NO. 3 AND 4 BEARING OIL STRAINER HOUSING CONNECTOR
- L OIL TRANSFER TUBE STRAINER
- M OS GOVERNOR AND TACHOMETER DRIVE OIL THROTTLE STRAINER

**1-22. Electrical System.** Provides circuitry for starting, ignition, and for all electrical accessories. See figures 1-20 thru 1-221

a. Main Wiring Harness. Incorporates quickdisconnect type connectors for the following:

- (1) airframe electrical input
- (2) engine ignition unit
- (3) hot-air solenoid valve
- (4) starting fuel solenoid valve
- (5) inlet oil temperature bulb
- (6) emergency fuel transfer solenoid valve
- (7) power turbine and gas producer tachometer generators

b. Ignition System. Consists of ignition unit, ignition lead, coil assembly, and igniter plugs. The system requires 24 volts dc nominal input at 3.0 amperes for T53-L-13B/703 engines. Nominal input for T53-L-11 series engine is 2.0 amperes.

c. Thermocouple Harness Assembly. T53-L-11 series engine contains a three-probe thermocouple harness assembly. T5 3-L-13 engine contains a six-probe harness assembly. T53-L-703 engine contains a 12-probe harness assembly. Harness assembly consists of the following:



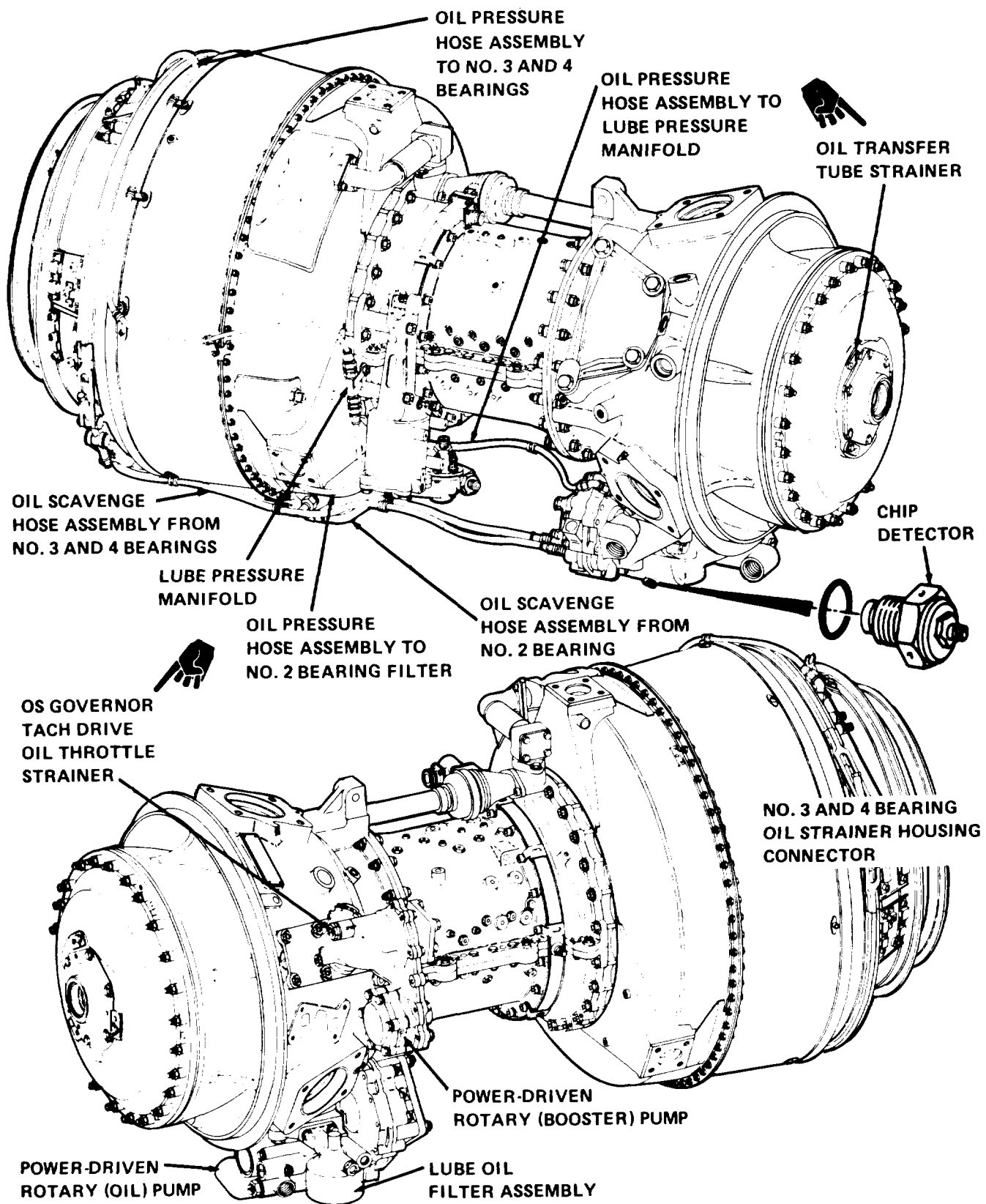


Figure 1-19. Lubrication System External Components (T53-L-13B/703 Engines)

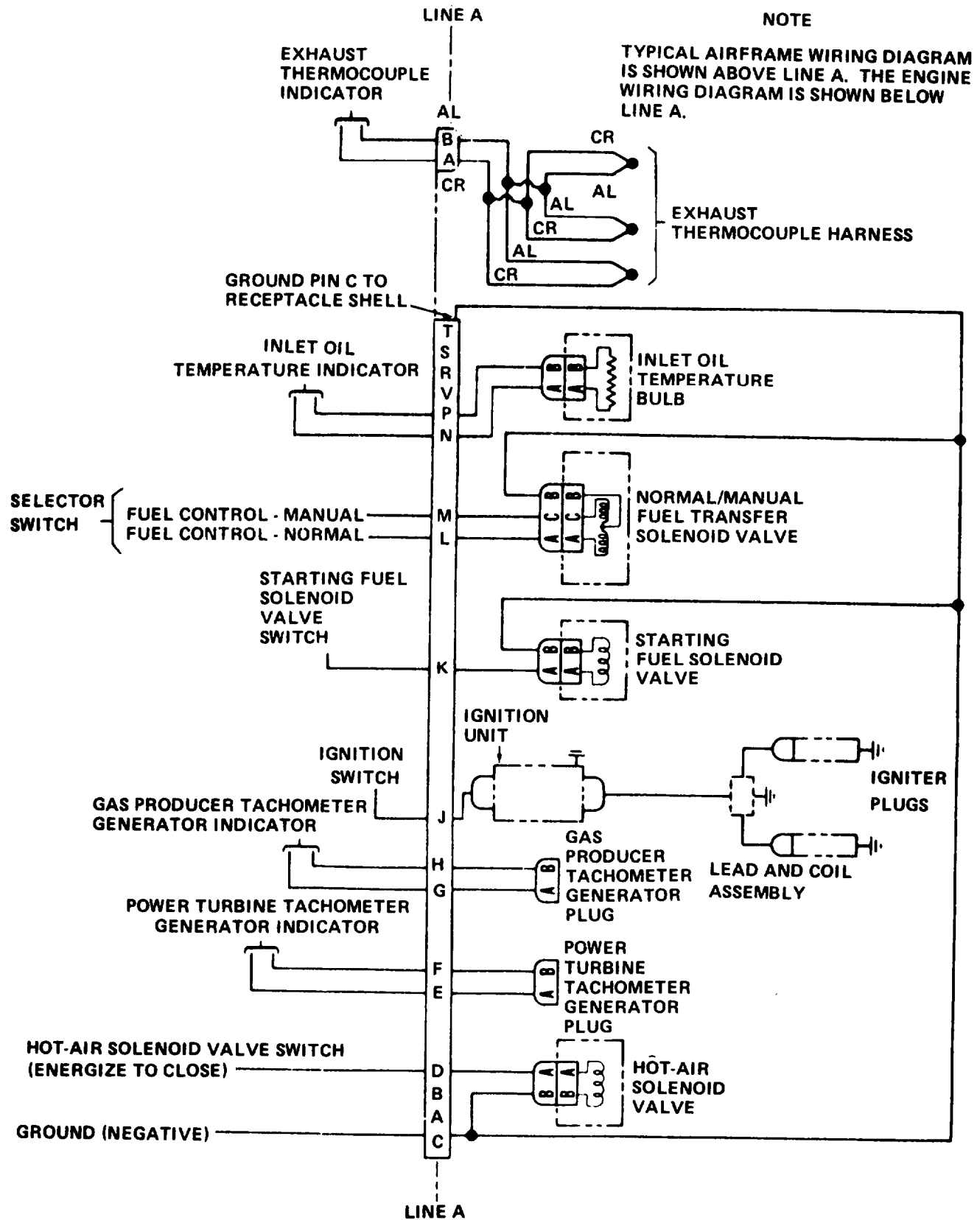


Figure 1-20. Electrical System Schematic (T53-L-11 Series Engine)



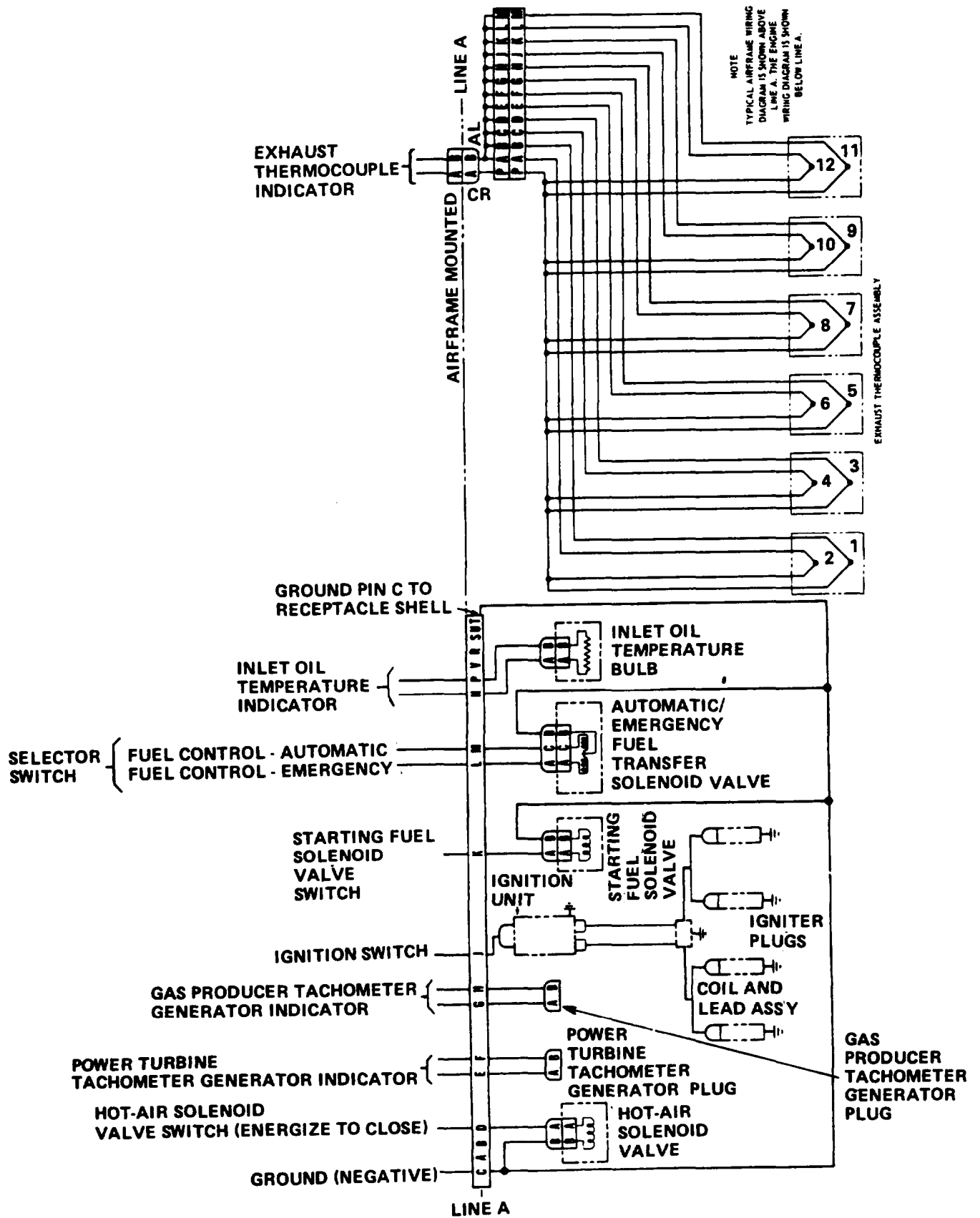


Figure 1-21. Electrical System Schematic (T53-L-13B Engine)

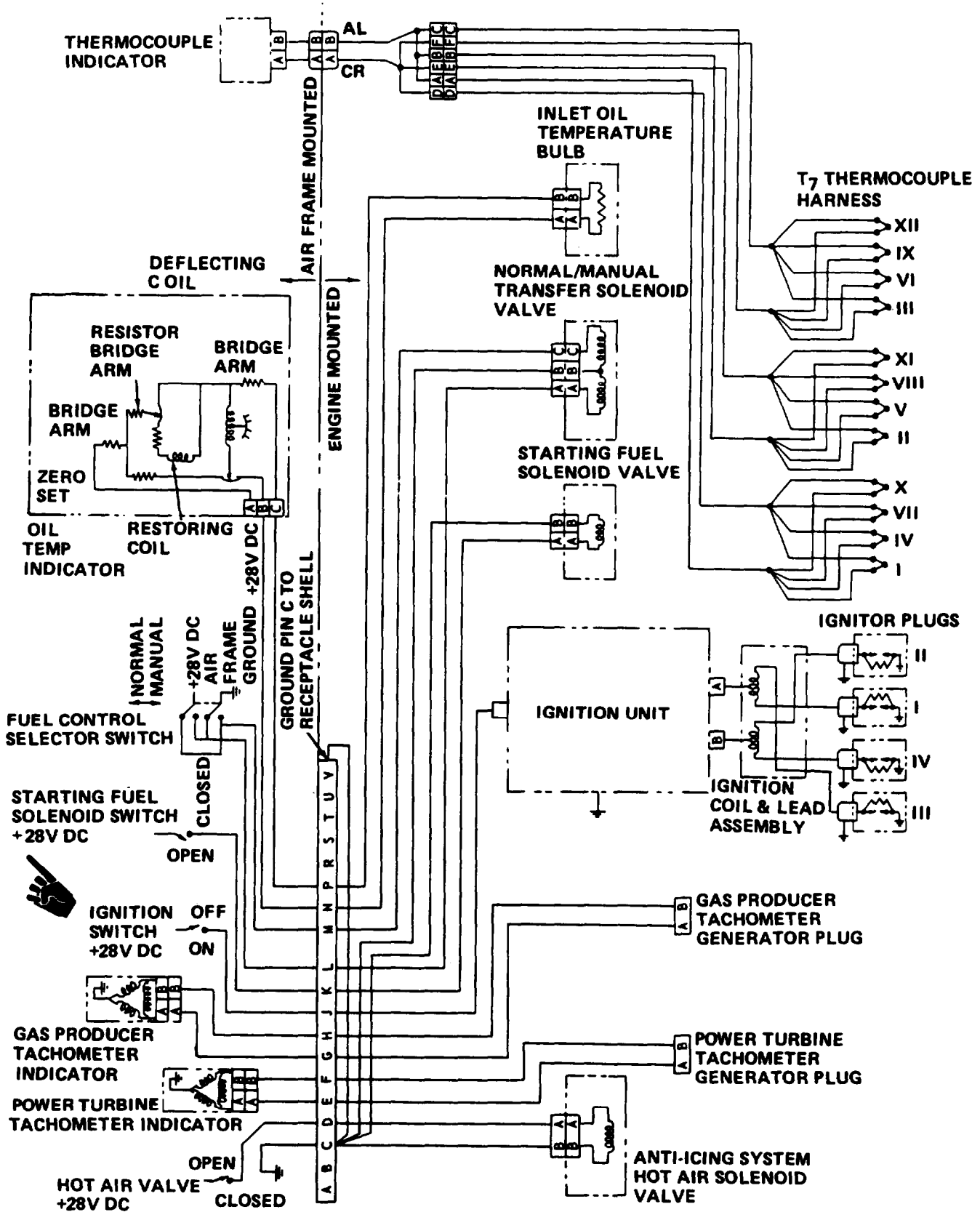


Figure 1-22. Electrical System Schematic (T53-L-703 Engine)

- (1) electrical connector
- (2) shielded manifold

For T53-L-11 and T53-L-13B engines, chromel-alumel thermocouples are inserted through exhaust diffuser into path of exhaust gas. This transmits voltage generated by thermocouples to cockpit indicator. For T53-L-703 engine, thermocouples are mounted of first stage power turbine nozzle protruding between nozzle vanes.

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### **1-23. Electrical System External Components. (See figures 1-23 and 1-24.)**

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- A** IGNITION UNIT. Attached w bracket at 10-o'clock position on impeller housing rear flange. Converts low voltage, through a vibration transformer, to a high voltage that passes through ignition lead and coil assembly. The high voltage produced ionizes a gap in each igniter plug to produce a spark.
- B** IGNITION LEAD AND COIL ASSEMBLY. Transmits high voltage from ignition unit to igniter plugs in combustion chamber. Spark splitter coil, located below ignition unit, distributes electrical current equally to each igniter plug.
- C** IGNITER PLUGS. For T53-L-11 series engines, two igniter plugs are installed in receptacles in aft end of combustion chamber at 4-o'clock and 8-o'clock positions. For T53-L-13B/703 engines, four igniter plugs are installed in receptacle in aft end of combustion chamber at 2-o'clock, 4-o'clock, 8-o'clock, and 10-o'clock positions. Igniter plugs provide a gap for high voltage sparks to ignite fuel/air mixture in combustion chamber during starting sequence.
- D** INLET OIL TEMPERATURE BULB. Installed in power-driven rotary (oil) pump. Connected through wiring harness to cockpit indicator.

**1-24. Internal Cooling and Pressurization System (T53-L-11 Series Engine). (See figure 1-25.)** Air for internal cooling and pressurization is obtained from five sources which are:

- fourth stage spacer area
- edge of combustion chamber deflector
- tip of centrifugal compressor impeller
- first stage gas producer nozzle assembly
- hollow struts of exhaust diffuser

Compressed air is bled from tip of centrifugal compressor impeller to cool forward face of diffuser housing and pressurize No. 2 bearing forward and aft seals. Then it passes through holes in rear compressor shaft into space between compressor rotor assembly and power shaft. Compressed air splits into three separate flow paths.

a. Compressed Air Flow Path. Air from one flow path flows forward over power shaft and into center of seal behind No. 1 bearing to intershaft located forward of No. 1 bearing. Another path conducts air flow aft over power shaft. Air emerges at back end of rear compressor shaft to cool rear face of second stage gas producer turbine rotor, forward face of first stage power turbine rotor, and first stage power turbine nozzle. Air then passes into exhaust stream. Power shaft receives remainder of compressed air flow. Air flows aft through hole drilled in bolt of power shaft. Flow path continues into hollow

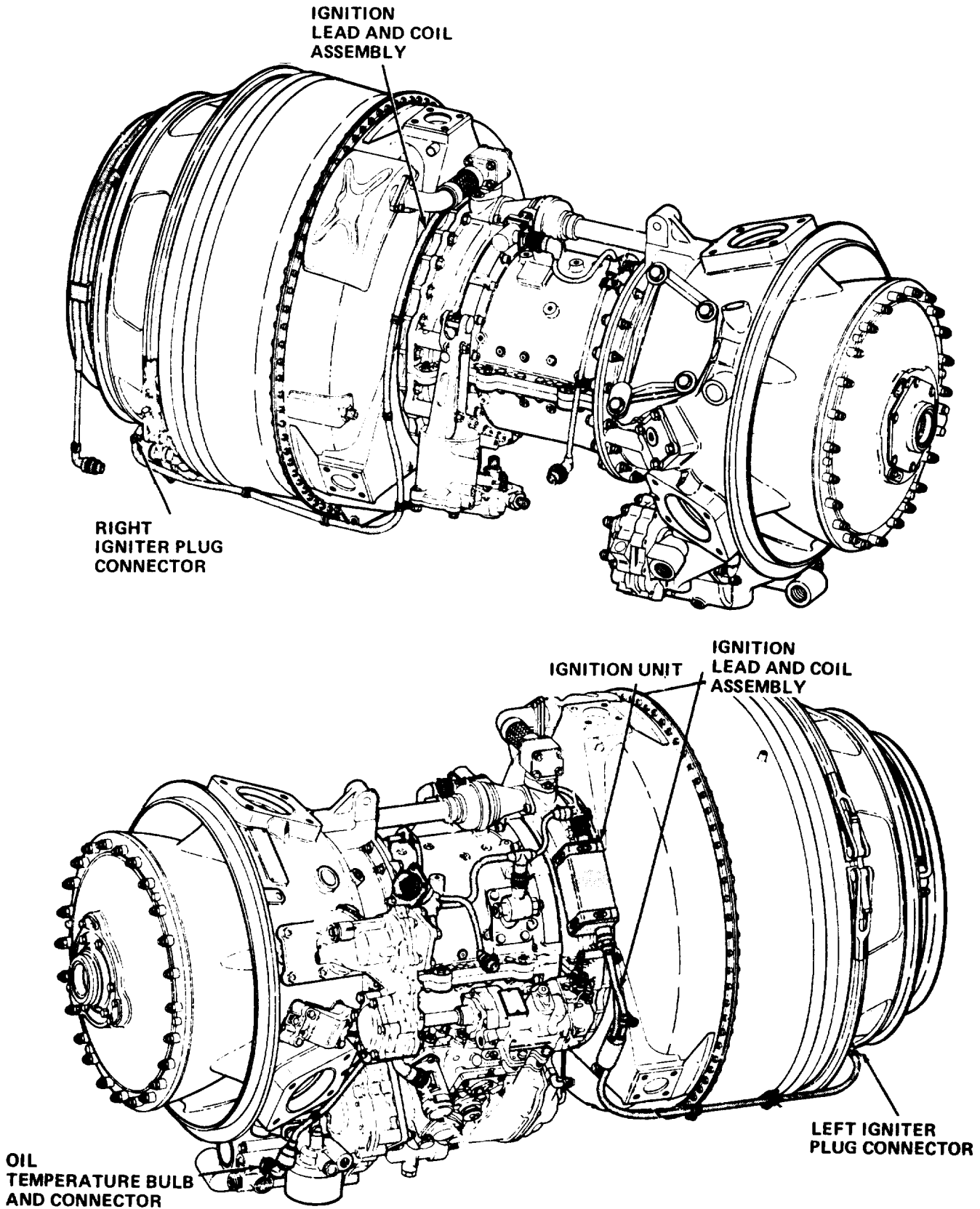


Figure 1-23. Electrical System External Components (T53-L-11 Series Engines)

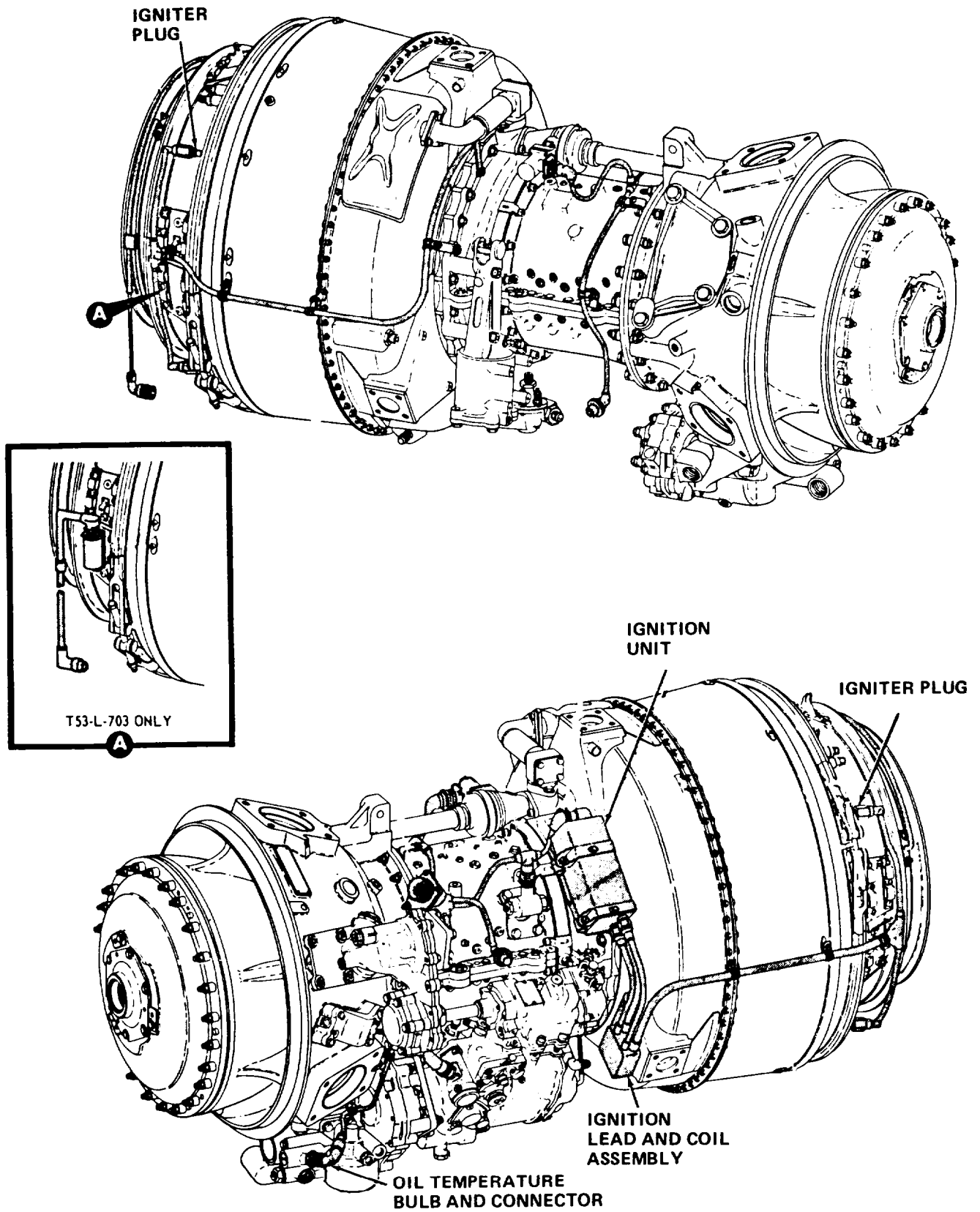


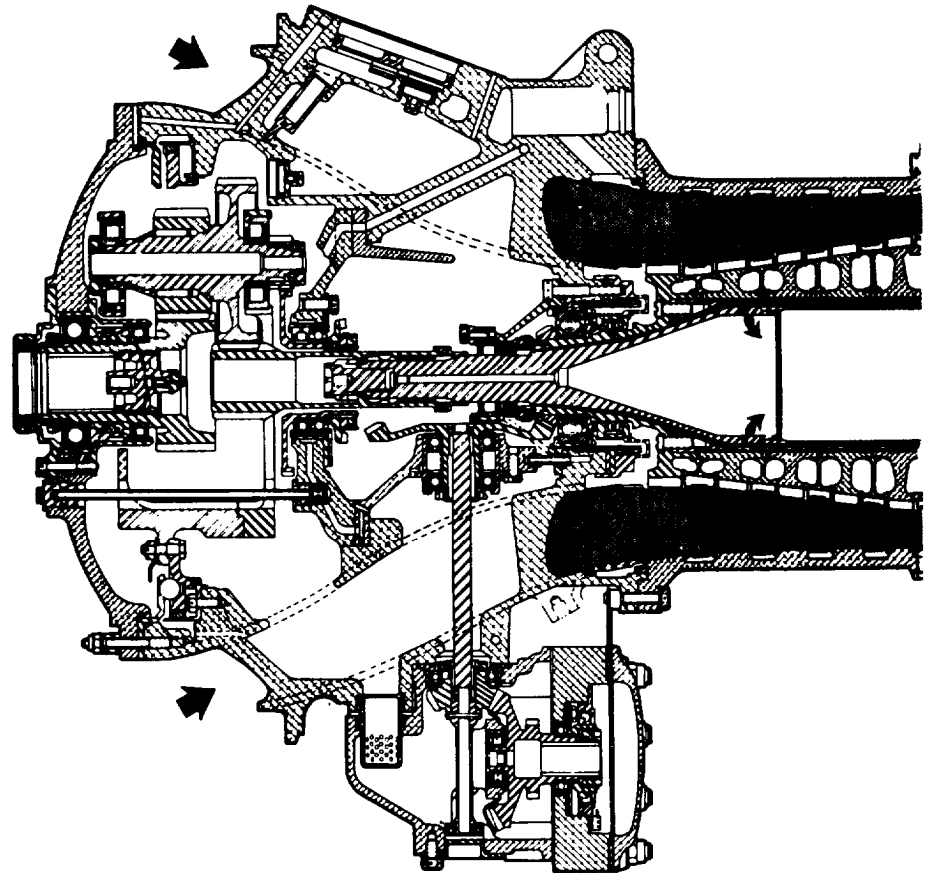
Figure 1-24. Electrical System External Components (T53-L-13B/703 Engines)

interior and forward surface of second stage power turbine rotor assembly, and both faces of second stage gas producer nozzles. Compressed air bled from edge of combustion chamber deflector cools forward face of deflector and passes through to cool the No. 2 bearing housing and aft seal. Air splits into two flow paths. One flow path cools the following:

- (1) forward face and blade roots of first stage gas producer rotor assembly
- (2) forward face of first stage gas producer sealing disk

After cooling these items, air passes into exhaust stream. Remainder of air flows through first stage gas producer turbine rotor assembly to cool lower parts of rear face of first stage gas producer turbine rotor, and out into exhaust stream through inner diameter of second stage gas producer turbine rotor.

b. **Cooling Process.** Compressed air passes through and cools first stage gas producer nozzle assembly. Inner shroud and deflector of first stage gas producer nozzle assembly receives air and then it passes into exhaust stream. Compressed air passes through holes in second stage gas producer nozzle assembly and between two inner deflectors. Next, the compressed air goes out to cool rear face of first stage gas producer rotor assembly, or front face of second stage gas producer turbine rotor assembly. Flow passes out into the exhaust stream. Ambient air enters exhaust diffuser struts and passes through exhaust diffuser support cone into area around No. 3 and 4 bearing housing. Cooling air moves forward over No. 3 and 4 bearing housing, past rear face of second stage power turbine rotor assembly, and into exhaust stream. Air is bled in through holes in fourth stage spacer and into area between disk bores and compressor sleeve. First stage disk receives air that passes forward along compressor sleeve. Air passes up through slots in first and second stage spacer and into inlet air stream. A seal is located between the centrifugal compressor impeller compressor sleeve. Seal prevents high-temperature air, which bleeds through aft face of impeller, from entering compressor disk area.

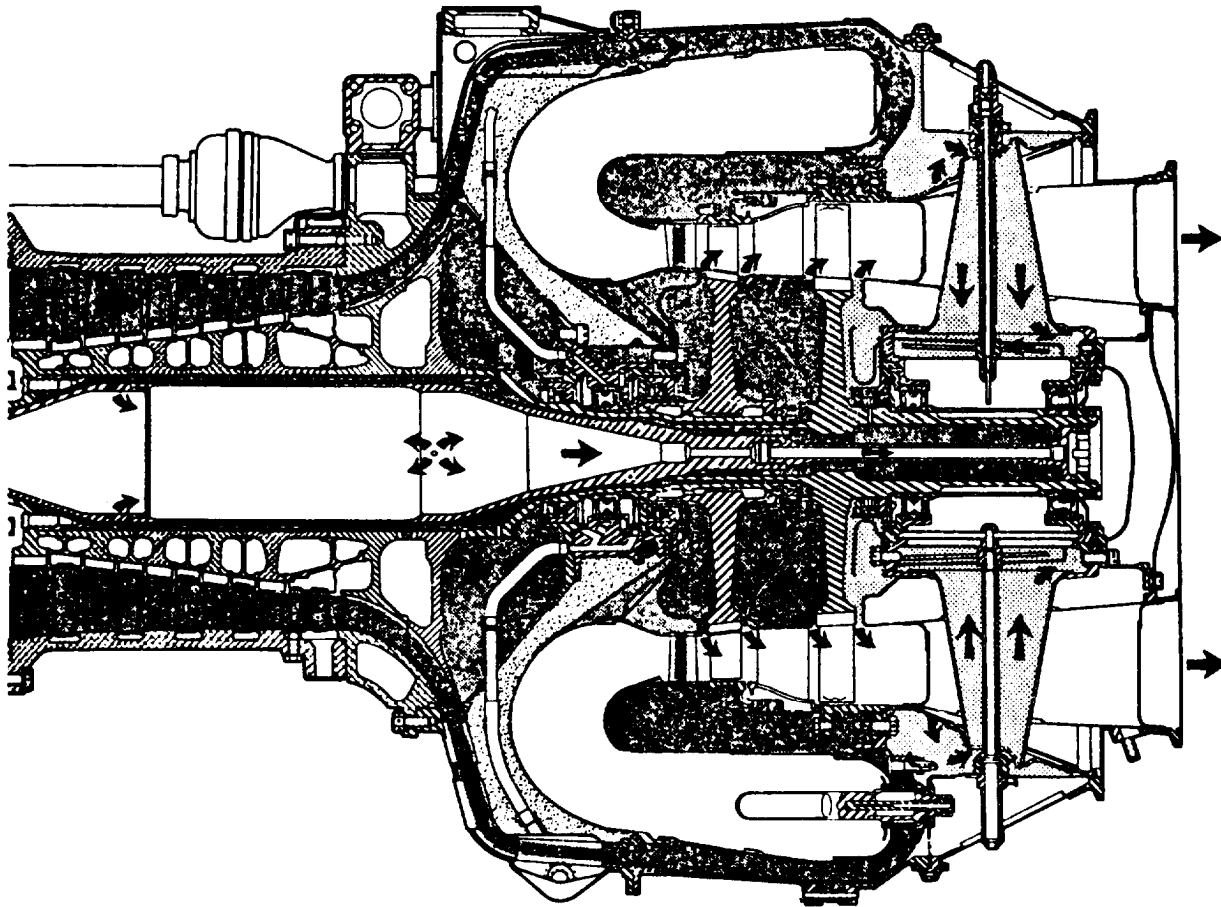


**LEGEND**



**INTERNAL COOLING AND PRESSURIZATION AIR**

Figure 1-25. Internal Cooling and Pressurization System (T53-L-11 series Engines) (Sheet 1 of 2)



**LEGEND**




-  INTERNAL COOLING AND PRESSURIZATION AIR
-  AMBIENT COOLING AIR
-  STATIC AIR

Figure 1-25. Internal Cooling and Pressurization System (T53-L-11 Series Engines) (Sheet 2 of 2)



**1-25. Internal Cooling and Pressurization System (T53-L-13B Engine).** (See figure 1-26.) Air for internal cooling and pressurization is obtained from five sources which are:

- fourth stage spacer area
- edge of combustion chamber deflector
- tip of centrifugal compressor impeller
- first and second stage gas producer nozzle assembly
- hollow struts of exhaust diffuser

Compressed air is bled from tip of centrifugal compressor impeller. To cool forward face of diffuser housing and pressurize No. 2 bearing forward and aft seals. Then it passes through holes in rear compressor shaft into space between compressor rotor assembly and power shaft. Compressed air splits into three separate flow paths.

**a.** Compressed Air Flow Path. Air from one flow path flows forward over power shaft and into center of seal behind No. 1 bearing to intershaft located forward of No. 1 bearing. Another path conducts air flow aft over power shaft. Air emerges at back end of rear compressor shaft to cool rear face of second stage gas producer turbine rotor, forward face of first stage power turbine nozzle. Air then passes into exhaust stream. Power shaft receives remainder of compressed air flow. Air flows aft through hole drilled in bolt of power shaft. Flow path continues into hollow interior and forward surface of second stage power turbine rotor assembly, and both faces of second stage gas producer nozzles. Compressed air bled from edge of combustion chamber deflector cools forward face of deflector and passes through to cool the No. 2 bearing housing and aft seal. No. 2 bearing housing is cooled. Air splits into two flow paths. One flow path cools the following:

- (1) forward face and blade roots of first stage gas producer rotor assembly
- (2) forward face of first stage gas producer sealing disk

After cooling these items, air passes into exhaust stream. Remainder of air flows through first stage gas producer turbine rotor assembly to cool lower parts of rear face of first stage gas producer turbine rotor, and out into exhaust stream through inner diameter of second stage gas producer turbine rotor.

**b.** Cooling Process. Compressed air passes through and cools first stage gas producer nozzle assembly. inner shroud and deflector of first stage gas producer nozzle assembly receives air and then it passes into exhaust stream. Compressed air passes through holes in second stage gas producer nozzle assembly and between two inner deflectors. Next, the compressed air goes out to cool rear face of first stage gas producer rotor assembly or front face of second stage gas producer turbine rotor assembly. Flow passes out into the exhaust stream. Ambient air enters exhaust diffuser struts and passes through exhaust diffuser support cone into area around No. 3 and 4 bearing housing. Cooling air moves forward over No. 3 and 4 bearing housing, past rear face of second stage power turbine rotor assembly, and into exhaust stream. Air is bled in through holes in fourth stage spacer and into area between disk bores and compressor sleeve. First stage disk receives air that passes forward along compressor sleeve. Air passes up through slots in first and second stage spacer and into inlet air stream. A seal is located between the centrifugal compressor impeller compressor sleeve. Seal prevents high-temperature air, which bleeds through aft face of impeller, from entering compressor disk area.

**1-26. Internal Cooling and Pressurization System (T53-L-703 Engines).** (See figure 1-27.) Air for internal cooling and pressurization is obtained from five sources which are:

- fourth stage spacer area
- edge of combustion chamber deflector
- tip of centrifugal compressor impeller
- first and second stage gas producer nozzle assembly
- hollow struts of exhaust diffuser

Compressed air is bled from tip of centrifugal compressor impeller to cool forward face of diffuser housing and pressurize No. 2 bearing forward and aft seals. Then it passes through holes in rear of compressor shaft into space between compressor rotor assembly and power shaft. Compressed air splits into three separate flow paths.

**a.** Compressed Air Flow Path. Air from one flow path flows forward over power shaft and into intershaft seal located forward of No. 1 bearing. Another path conducts air flow aft over power shaft. Air emerges at back end of rear compressor shaft to cool rear face of second stage gas producer turbine rotor, forward face of first stage power turbine nozzle. Air then passes into exhaust stream. Power shaft receives remainder of compressed air flow. Air flows through hole drilled in bolt of power shaft. Flow path continues into hollow interior and forward surface of second stage power turbine rotor assembly, and both faces of second stage gas producer nozzles. Compressed air bled from edge of combustion chamber deflector cools forward face of deflector and passes through to cool No. 2 bearing housing and aft seal. Air splits into two flow paths. One flow path cools forward face of first stage gas producer sealing disk; compressed air then passes into exhaust system. Air in this flow path also cools the following:

**(1)** forward face of first stage gas producer rotor.

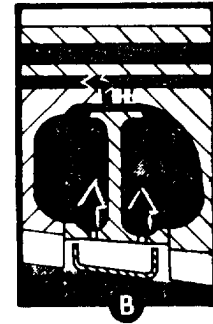
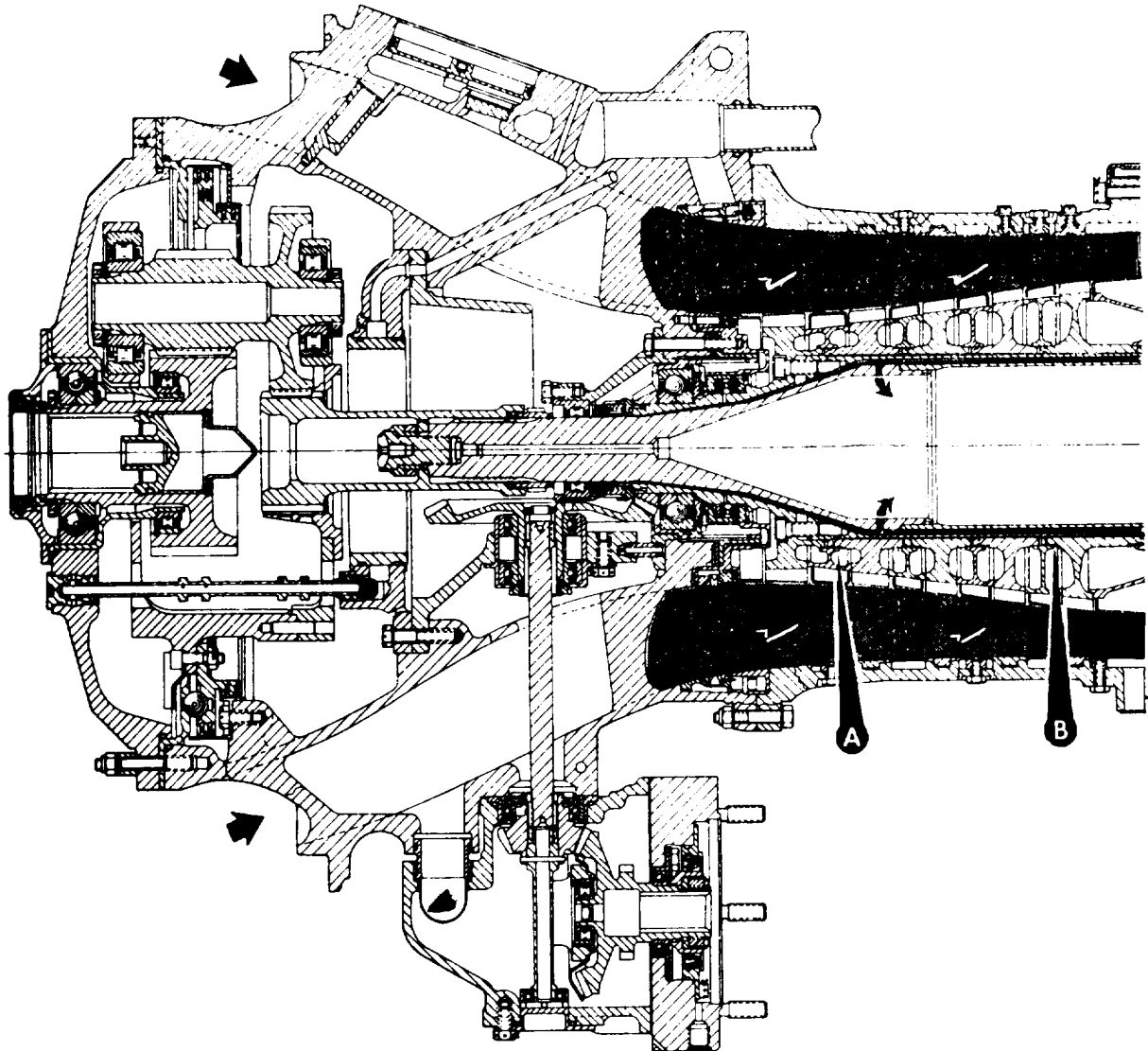
**(2)** blade roots.

**(3)** blades (air passes between sealing disk and rotor, through holes in blade roots).

**(4)** exhaust system (air passes through holes in blades).

.Remainder of air flows through first stage gas producer turbine rotor assembly to cool lower parts of rear face of first stage gas producer turbine rotor, and out into exhaust stream through inner diameter of second stage gas producer turbine rotor. Air flow also passes behind second stage gas producer turbine rotor sealing disk, cooling forward face of rotor, and then passes into exhaust stream.

**b.** Cooling Process. Compressed air passes through and cools first stage gas producer nozzle assembly. Inner shroud and deflector of first stage gas producer nozzle assembly receives air. It then passes into exhaust stream. Compressed air passes through holes in second stage gas producer nozzle assembly and between two inner deflectors. Then it goes out to cool rear face of first stage gas producer rotor assembly, front face of second stage gas producer turbine rotor sealing disk. Flow passes out into the exhaust stream. Ambient air enters exhaust diffuser struts and passes through exhaust diffuser support cone into area around No. 3 and 4 bearing housing. Cooling air moves forward over No. 3 and 4 bearing housing, past rear face of second stage power turbine rotor assembly, and into exhaust stream. Air is bled in through holes in fourth stage spacer and into area between disk cores and compressor sleeve. First stage disk receives air that passes forward along compressor sleeve. Air passes up through slots in first and second spacer and into inlet air stream. A seal is located between the centrifugal compressor impeller compressor sleeve. Seal prevents high-temperature air, which bleeds through aft face of impeller, from entering compressor disk area.



**LEGEND**  
■ INTERNAL COOLING AND PRESSURIZATION AIR

Figure 1-26. Internal Cooling and Pressurization System (T53-L-13B Engine) (Sheet 1 of 2)

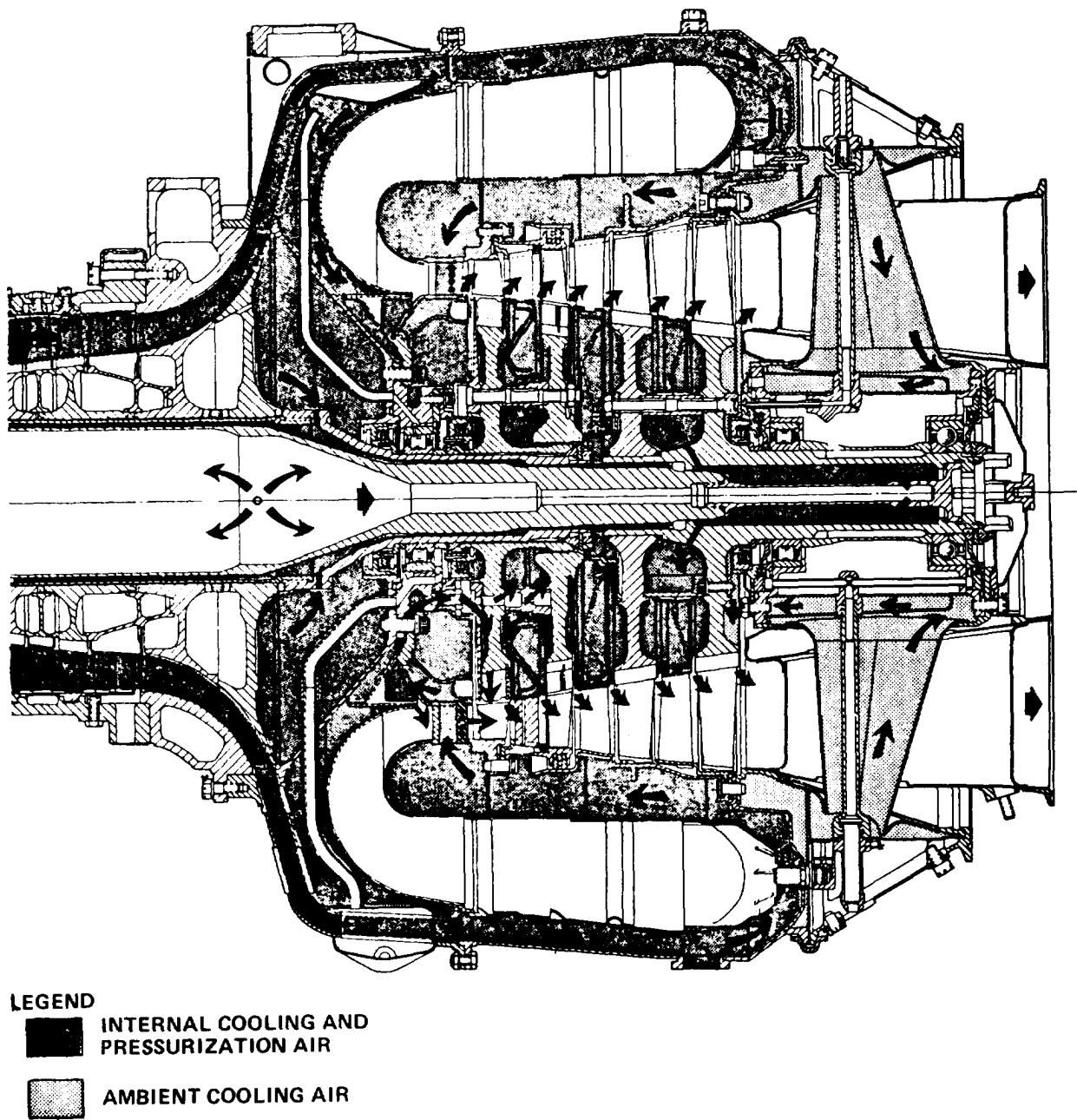


Figure 1-26. Internal Cooling and Pressurization System (T53-L-13B Engine) (Sheet 2 of 2)

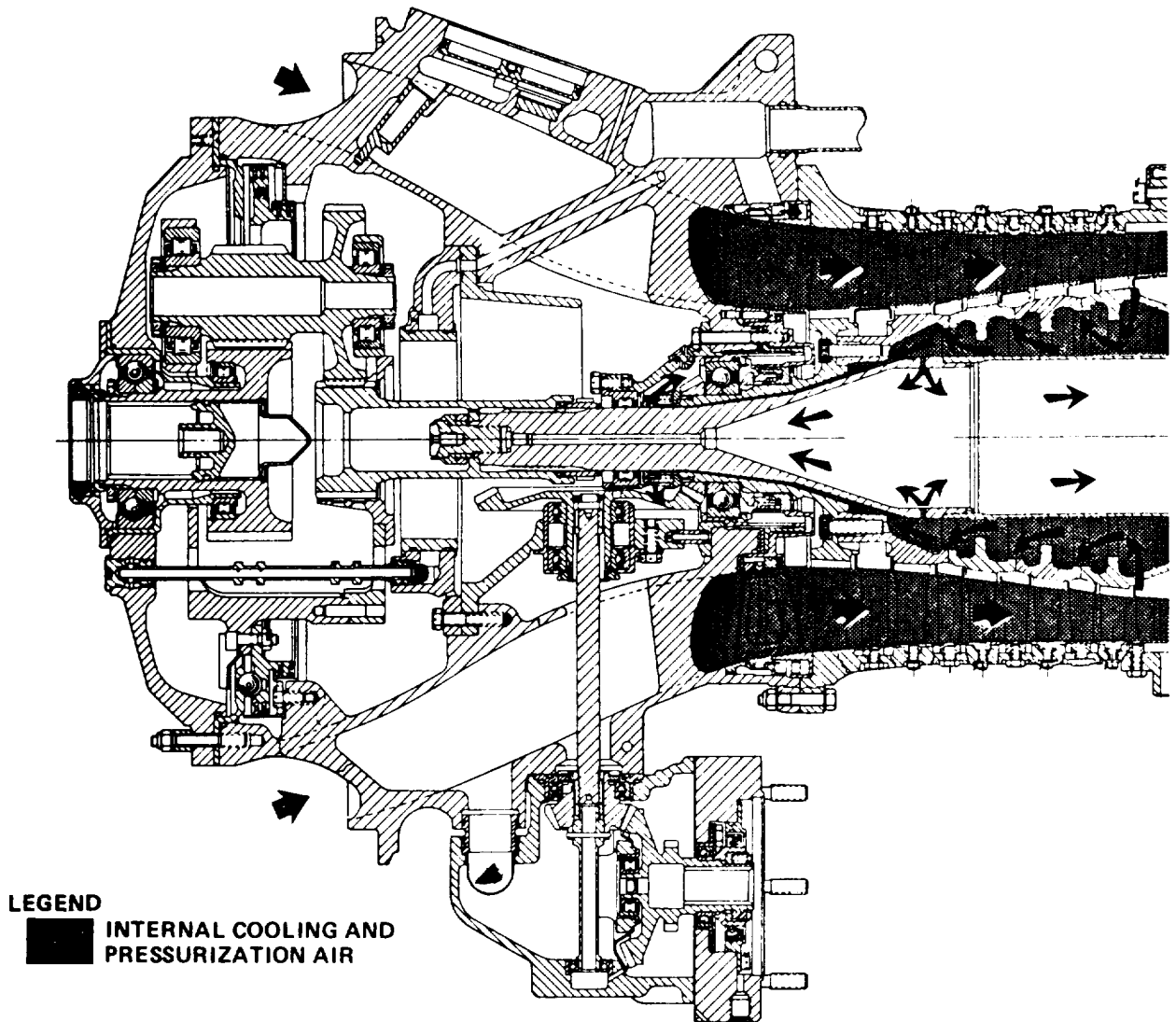


Figure 1-27. Internal Cooling and Pressurization System (T53-L-703 Engine) (Sheet 1 of 2)

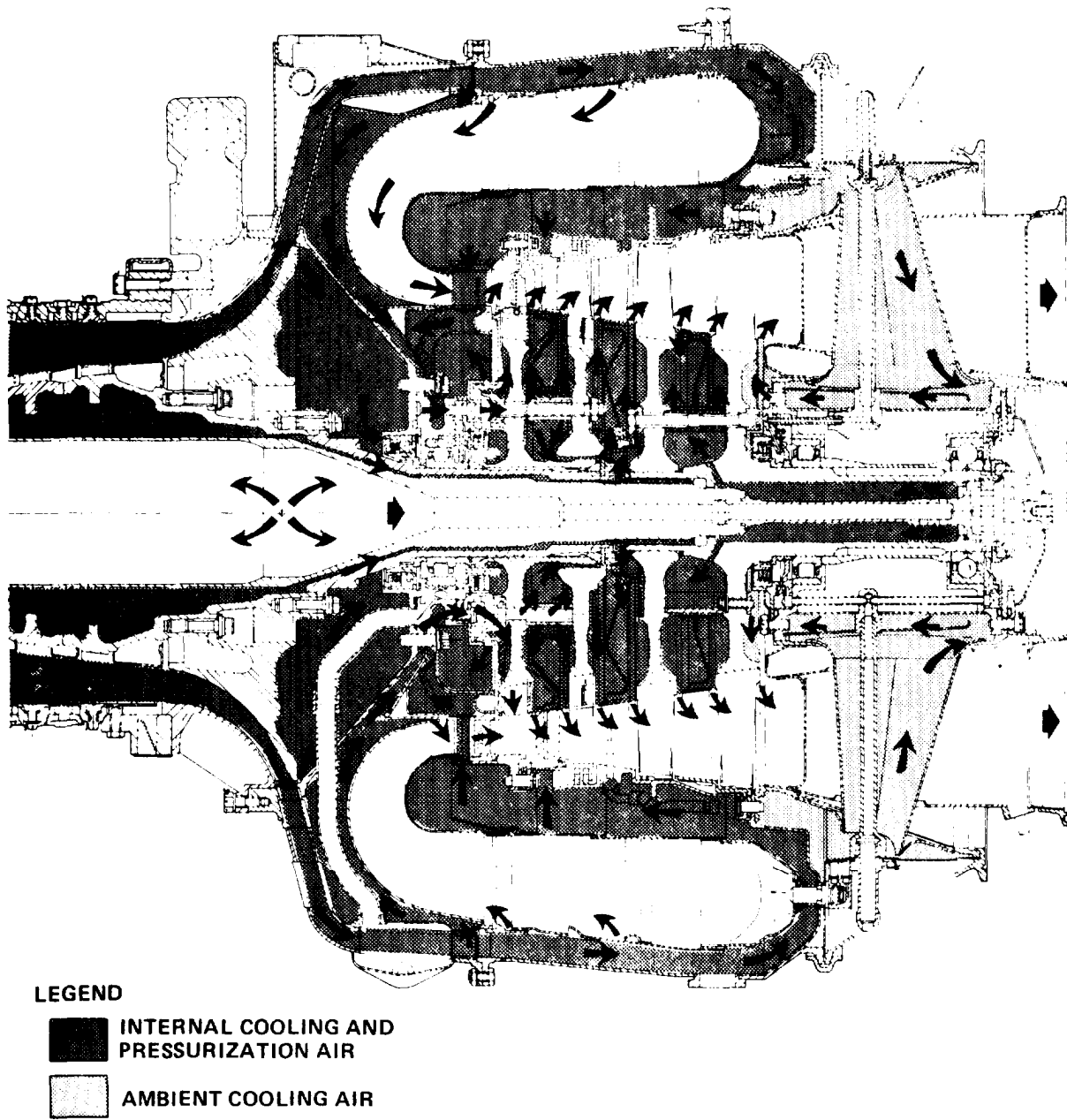


Figure 1-27. Internal Cooling and Pressurization System (T53-L-703 Engines) (Sheet 2 of 2)

**1-27. Anti-Icing System. (See figure 1-28.)**

- A **AIR DIFFUSER EXTERNAL BLEED AIR MANIFOLD.** Located at the 1-o'clock position on diffuser housing. Pressurized hot air from air diffuser flows through holes in trailing edge of diffuser vanes. Hot air collects in air diffuser internal bleed air manifold and passes to air diffuser external bleed air manifold.
- B **ELBOW.** Connected to external bleed air manifold.
- C **TUBE.** Connected to external bleed air manifold.
- D **CUSTOMER BLEED AIR ADAPTER ASSEMBLY.** Located on top of impeller housing. Elbow and tube are connected to assembly. Delivers air through hot-air solenoid valve. Serves as a source of customer air.
- E **HOT-AIR SOLENOID VALVE.** Mounted on forward face of compressor and impeller housing assembly. Controls flow of anti-icing hot air from diffuser housing to inlet housing. This prevents the formation of ice. Valve is energized in CLOSED position during engine operation. Valve is deenergized to OPEN position when anti-icing air is required. This is done by manually activating a switch in cockpit. In the event of an electrical power failure, the fail-safe, spring-loaded valve returns to OPEN position to provide continuous anti-icing air.

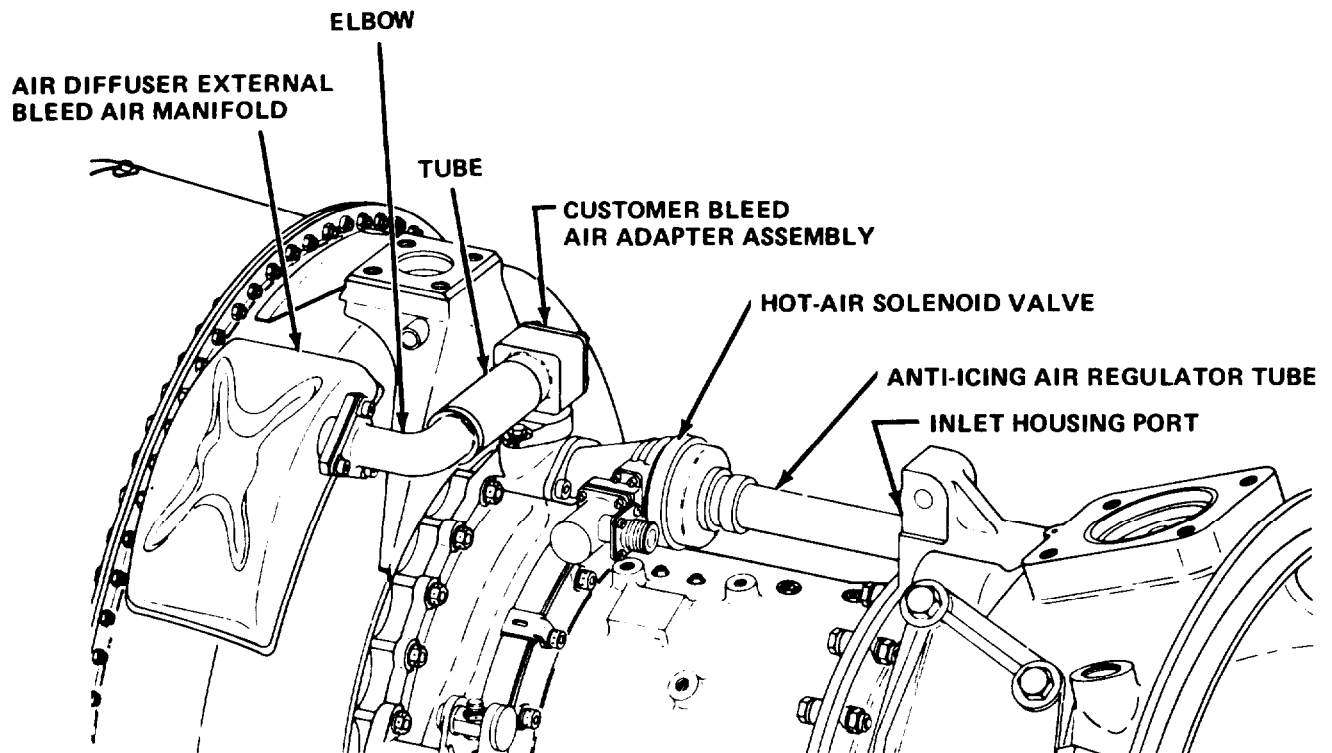


Figure 1-28. Anti-Icing System

- F ANTI-ICING AIR REGULATOR TUBE. Anti-icing air flows forward through this tube after it leaves hot-air solenoid valve.
- G INLET HOUSING PORT. Anti-icing air enters port. It is circulated through five of six hollow inlet housing support struts to prevent ice formation in inlet housing area. Anti-icing air flows into the annulus in rear of inlet housing where it passes through hollow inlet guide vanes to prevent icing. After air passes through inlet guide vanes, it exits in front of them. Flow continues into compressor area. Hot scavenge oil draining through lower strut into accessory drive gear box prevents ice formation in bottom of inlet housing area.

**1-28. Interstate Airbleed System. (See figure 1-29.) Facilitates acceleration of compressor rotor assembly.**

- A INTERSTAGE AIRBLEED ACTUATOR. Operation controlled by a signal from fuel control assembly. When control valve in fuel assembly is open, one side of diaphragm vents to atmosphere (PA). Air from compressor discharge (P3) creates a pressure drop across diaphragm. This allows actuator valve to open, venting actuator housing to atmosphere (PA). The spring-loaded actuator piston moves down, opening the bleed band. When control valve in fuel assembly is closed, pressure on both sides of diaphragm will be equal. This closes the actuator. Air from compressor discharge (P3) enters actuator housing. Actuator piston moves up, closing bleed band.
- B BLEED BAND ASSEMBLY. Consists of two band halves bolted together. Positioned around rear portion of axial compressor housings. Secured by clips bolted to compressor housing. Looped ends of assembly are attached to airbleed actuator.

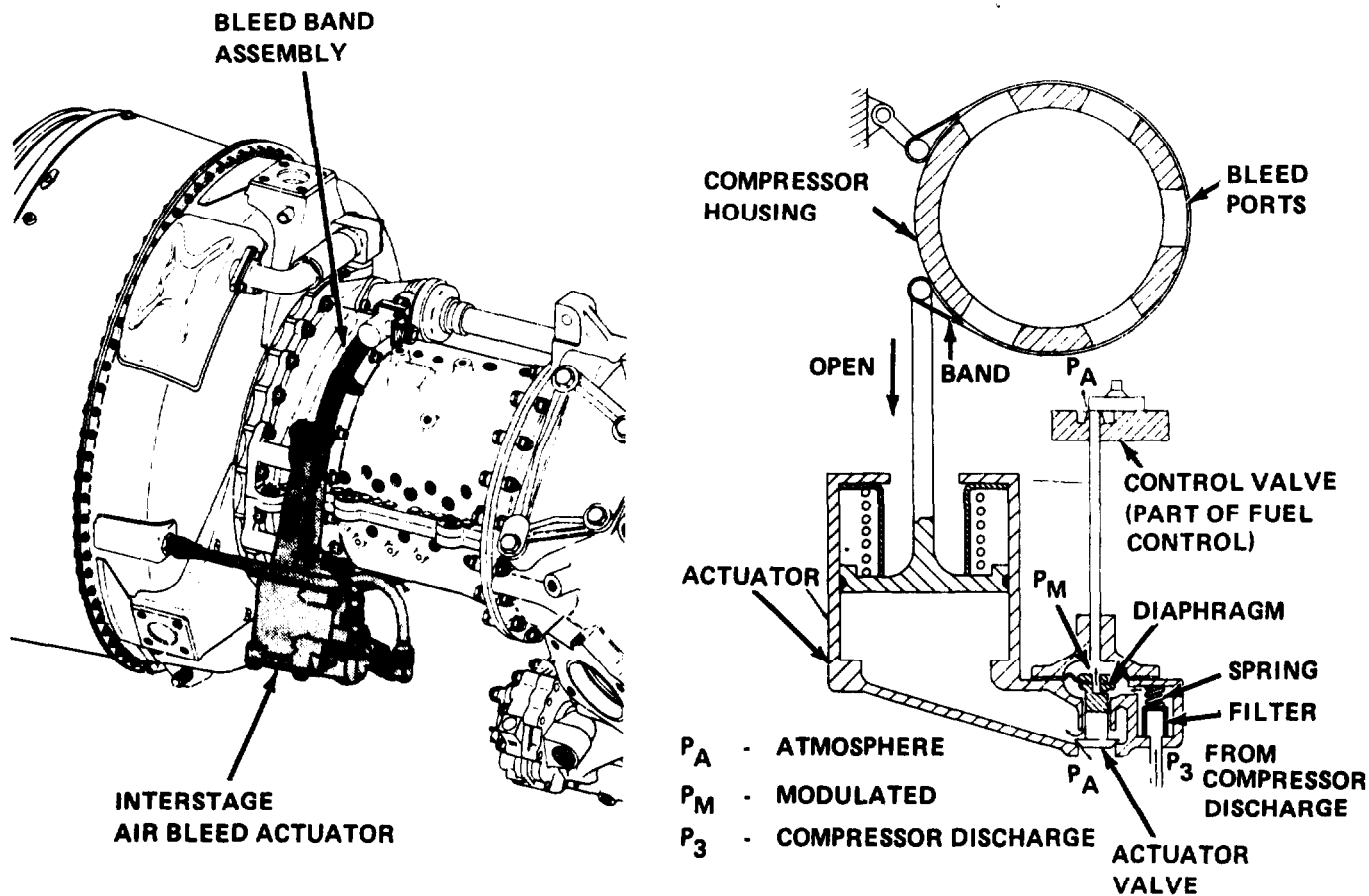


Figure 1-29. Interstate Airbleed System



1-29. **Variable Inlet Guide Vane System (T53-L-13B/703 Engines).** (See figures 1-30 and 1-31.) Vanes change angle of attack between inlet air and first stage compressor rotor blades to maintain airflow requirements of compressor rotor assembly.

- A FUEL CONTROL TO INLET GUIDE VANE ACTUATOR CLOSING HOSE. At low N1 speeds during standard day, sea level condition vanes are in a closed position.
- B FUEL CONTROL TO INLET GUIDE VANE ACTUATOR OPENING HOSE. N1 speed which inlet guide vanes are full open varies with ambient temperature. Inlet guide vanes are positioned by inlet guide vane actuator through synchronizing ring. Position of inlet guide vane actuator piston is controlled by inlet guide actuator valve.
- C VARIABLE INLET GUIDE VANE ACTUATOR. The position of the inlet guide vane actuator piston is controlled by the inlet guide vane actuator valve located in the fuel control as a function of N1 speed and compressor inlet temperature. Mounted on right side of compressor housing assembly at front flange.
- D EXTERNAL FEEDBACK CONTROL ROD. When positioning guide vanes actuator relays change in position back to fuel control through external feedback control rod. This acts to null the fuel-out pressure signal, so that at any steady state N1 speed, inlet guide vanes will assume a constant position.
- E SEAL DRAIN HOSE. Drains fuel seal leakage. After fuel drains through hose it goes out the starter generator drive seal drain port on accessory drive gearbox. Actuator is operated by servo pressure from fuel control.

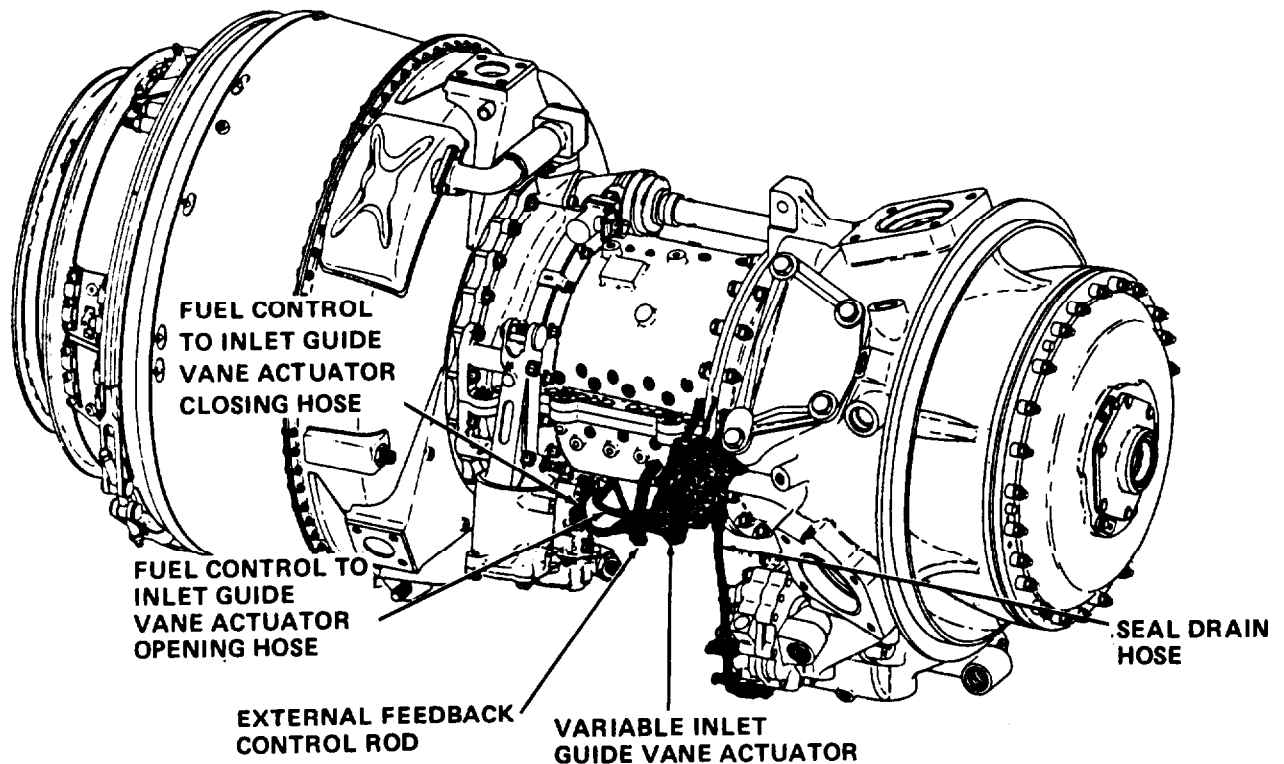
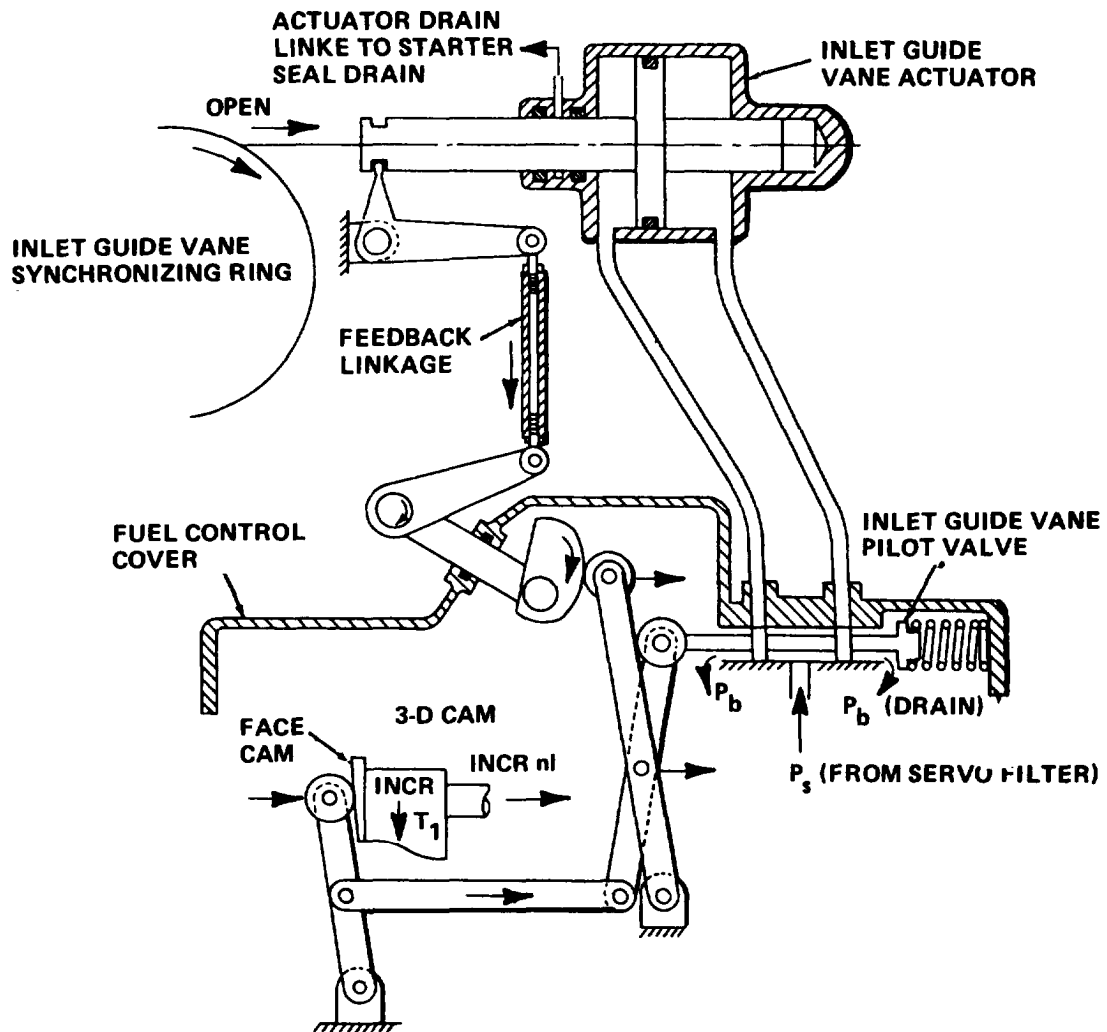


Figure 1-30. Variable Inlet Guide Vane System



- P<sub>b</sub>** - BOOST PRESSURE
- P<sub>s</sub>** - SERVO PRESSURE
- T<sub>1</sub>** - COMPRESSOR INLET TEMPERATURE

Figure 1-31. Inlet Guide Vane Control System Diagram

1-30. Equipment Data (T53-L-11 Series Engine). See table 1-4 for performance data including numerical and other specification data.

**Table 1-4. Engine Leading Particulars (T53-L-11 Series Engine)**

---

MODEL	
Military	T53-L-11C
Military	T53-L-11 D
TYPE	
Application	Helicopter Powerplant
Mounting points	Minimum of Three Required for Installation
DIMENSIONS	
Overall Length	47.608 Inches (120.924 cm) (T53-L11 Series Engines)
Maximum Nominal Diameter	23.00 Inches (58.42 cm) (T53-L-11 Series Engines)
Maximum Radius	13.550 Inches (24.417 cm) (T53-L-11 Series Engines)
WEIGHT	
Specification Weight (Dry)	499 Pounds (226.55 kg) (T53-L-11C and L11D)
Estimated Weight of Residual Fluids	Oil - 3 Pounds (1.36 kg) Fuel - 2 Pounds (0.90 kg)
ROTATIONAL DIRECTIONS	
Compressor Rotor	Counterclockwise
First Stage Turbine	Counterclockwise
Second Stage Turbine	Clockwise
Power Output Gearshaft	Clockwise
TYPE FUEL	
Specified	MIL-T-5624 (Grade JP-4 or JP-5)
TYPE OIL	
	MIL-L-23699 (at ambient temperature down to -32°C (-25°F)) or MIL-L-7808 (at ambient temperature below -25°F (-32°C))
MISCELLANEOUS	
Combustion Chamber	External Annular
Compressor Ratio	6 to 1
Altitude	25,000 Feet Minimum Guaranteed
Operating Temperature (Ambient) Range	-65°F to +130°F (-54°C to +54°C)

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1-31. Equipment Data (T53-L-13B/703 Engines). See table 1-5 for performance data including numerical and other specification data.

**Table 1-5. Engine Leading Particulars (T53-L-13B/703 Engines)**

---

<b>MODEL</b>	
Military	T53-L-13B
Military	T53-L-703
<b>TYPE</b>	
Application	Helicopter Powerplant
Mounting Points	Minimum of Three Required for Installation
<b>DIMENSIONS</b>	
Overall Length	47.602 Inches (120.909 cm)
Maximum Nominal Diameter	23.00 Inches (58.42 cm)
Maximum Radius	13.550 Inches (34.417 cm)
<b>WEIGHT</b>	
Specification Weight (Dry)	540 Pounds (245.16 kg) (T53-L-13B) 545 Pounds (247.43 kg) (T53-L-703)
Estimated Weight of Residual Fluids	Oil -3 Pounds (1.36 kg) Fuel -2 Pounds (0.90 kg)
<b>ROTATIONAL DIRECTIONS</b>	
Compressor Rotor	Counterclockwise
Gas Producer Turbines	Counterclockwise
Power Turbines	Clockwise
Power Output Gearshaft	Clockwise
<b>TYPE FUEL</b>	MIL-T-5624 (Grade JP-4 or JP-5)
<b>TYPE OIL</b>	MIL-L-23699 (at ambient temperature down to -25°F (-32°C) or MIL-L-7808 (at ambient temperatures below -25°F (-32°C)).
<b>MISCELLANEOUS</b>	
Combustion Chamber	External Annular
Compressor Ratio	7-to 1
Altitude	25,000 Feet Minimum Guaranteed
Operating Temperature (Ambient) Range	-65°F to +135°F (-54°C to +57°C)

---

**Section III. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT**

**1-32. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT**

Spares and repair parts are listed and illustrated in the repair parts and special tools list covering organizational maintenance for this equipment (CI 55-2840-229-23P and TM 55-2840-247-23P).

**Section IIIA. FLIGHT SAFETY PARTS**

	<u>Page</u>
Flight Safety Parts	1-52.1
Flight Safety Parts Program	1-52.1

**1-32.1 FLIGHT SAFETY PARTS**

The T53 flight safety parts inclusion in this manual will be restricted to the flight safety parts section, including table 1-5.1. Warnings will not be included throughout the manual, FSPs require special handling during maintenance and compliance to all maintenance procedures are mandatory.

**1-32.2 FLIGHT SAFETY PARTS PROGRAM**

a. A flight safety part 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 the destruction of, or serious damage to, the helicopter and/or serious injury or death to the crew members.

b. A critical characteristic is any dimension, tolerance, finish, material, manufacturing, assembly or other feature which, if nonconforming or missing could cause failure or malfunction of the critical item.

c. Table 1-5.1 identifies parts, assemblies, or installations under the flight safety parts program, requiring special handling during maintenance. This table lists all current flight safety parts and may not be repairable at field level.

**Change 22 1-52.1**

Table 1-5.1 Flight Safety Parts Program Component List

Part Number	Nomenclature
1-000-060-10	Engine, Aircraft, Turbine
1-000-060-23	Engine. Aircraft, Turbine
1-000-080-13	Engine, Aircraft Turbine
1-020-166-01	Gear, Helical
1-020-167-01	Gear. Helical
1-020-169-01	Gear, Internal
1-020-171-01	Gear, Helical
1-020-187-01	Gear. Internal
1-020-290-04	Shaft, Turbine, Turbine
1-020-320-01	Gearshaft, Helical
1-020-500-04	Reduction Gear Assembly 701A
1-030-191-11	Gearshaft, Helical
1-030-192-04	Gearshaft, Helical
1-030-193-01	Gearshaft, Helical
1-030-350-12	Reduction Gear Assembly
1-060-088-03	Fairing, Inlet Guide
1-060-190-01	Housing, Antifriction
1-060-250-03	Fairing Assembly, Inlet
1-060-260-07	Vane, Compressor Stator
1-060-270-05	VIG Vane Assembly
1-060-340-01	Unison Ring Assembly
1-070-062-04	Gear, Spur
1-070-063-02	Gearshaft. Bevel
1-070-064-04	Gear, Bevel
1-070-072-03	Gear, Spur
1-070-072-04	Gear, Spur
1-070-140-01	Gearshaft. Bevel
1-070-210-01	Carrier and Cap Assembly
1-080-250-16	Gearbox, Accessory Drive
1-080-250-25	Gearbox, Accessory Drive
1-080-260-01	Gear Ouster, Spur
1-080-270-04	Gearshaft. Spur
1-080-280-02	Gearshaft, Spur
1-080-280-03	Gearshaft Assembly
1-080-310-01	Gearshaft. Multiple
1-080-320-01	Shaft Gear Assembly
1-080-340-08	Housing, Gearbox, Turbine

Table 1-5.1 Flight Safety Parts Program Component List (Continued)

Part Number	Nomenclature
1-080-370-01	Gearshaft, Spur
1-100-034-01	Nut, Plain, Round
1-100-063-05	Disk, Turbine, Turbine
1-100-078-07	Compressor Rotor, Centrifugal
1-100-078-13	Rotor, Compressor, Gage
1-100-118-07	Blade, Turbine Rotor
1-100-132-06	Blade, Turbine Rotor
1-100-133-01	Disk, Turbine, Turbine
1-100-135-03	Disk, Turbine Rotor
1-100-212-01	Gear, Bevel
1-100-286-08	Blade Set, Compressor
1-100-286-09	Blade Set, Compressor
1-100-292-02	Bolt Externally Relieved
1-100-293-01	Nut, Plain, Hexagon
1-100-294-03	Spacer, Sleeve
1-100-361-05	Blade Set, Compressor
1-100-361-06	Blade Set, Compressor
1-100-362-06	Blade Set, Compressor
1-100-383-04	Blade Set, Compressor
1-100-383-05	Blade Set, Compressor
1-100-384-04	Blade Set, Compressor
1-100-384-05	Blade Set, Compressor
1-100-385-04	Blade Set, Compressor
1-100-385-05	Blade Set, Compressor
1-100-423-01	Lockring, Compressor
1-100-495-07	Disk and Hub, Axial
1-100-501-01	Shaft, Turbine, Turbine
1-100-502-02	Bolt, Externally
1-100-506-02	Bolt, Internal Wrench
1-100-544-03	Disk, Turbine Rotor
1-100-545-03	Disk, Turbine Rotor
1-100-546-02	Spacer, Sleeve
1-100-563-01	Blade, Turbine Engine
1-100-800-04	Shaft, Turbine, Turbine
1-100-820-08	Turbine Rotor, Turbine
1-100-880-12	Turbine Rotor, Turbine

Table 1-5.1 Flight Safety Parts Program Component List (Continued)

Part Number	Nomenclature
1-100-890-03	Ring, Retaining
1-100-890-07	Ring, Retaining
1-101-020-01	Vane Assembly, Stator
1-101-030-01	Stator Vane 4th
1-101-040-01	Vane Assembly, Stator
1-101-100-08	Turbine Rotor Assembly 1st
1-101-110-07	Vane Assembly, Stator
1-101-120-03	Vane Assembly, Stator
1-101-250-04	Disk and Hub, Gas Turbine
1-101-360-04	Turbine Rotor, Turbine
1-101-370-03	Case. Centrifugal Compressor
1-110-230-15	Housing. Diffuser
1-110-470- !3	Housing, Antifriction
1-110-520-19	Nozzle, Turbine, Turbine
1-110-710-06	Nozzle, Turbine Turbine
1-120-000-14	Nozzle, Turbine, Turbine
1-120-050-03	Nozzle, Turbine, Turbine, Turbine
1-130-730-02	Manifold Assembly, Compressor
1-140-061-01	Nut, Power Turbine Rotor
1-140-067-14	Shaft, Shouldered
1-140-144-02	Clamp. Synchronized
1-140-168-03	Bolt, Externally Related
1-140-169-04	Spacer. Sleeve
1-140-272-04	Disk and Hub, Turbine
1-140-273-03	Blade, Turbine Rotor
1-140-274-02	Blade. Turbine Rotor
1-140-470-05	Nozzle, Turbine. Turbine
1-140-550-07	Turbine Rotor, Turbine
1-140-590-07	Housing. Antifriction
1-140-590-09	Housing, Antifriction
1-150-240-06	Diffuser, Exhaust
1-160-419-02	Gear, Spur
1-160-422-02	Gear, Spur
1-160-423-02	Gear, Spur
1-160-480-01	Gearshaft, Bevel
1-160-490-01	Gearshaft, Bevel
1-160-500-04	Drive Assembly Overspeed



Table 1-5.1 Flight Safety Parts Program Component List (Continued )

Part Number	Nomenclature
1-160-636-01	Gear. Spur
1-170-050-08	Actuator Assembly, Inlet
1-170-050-12	Actuator Assembly, Inlet
1-170-520-01	Gearshaft, Spur
1-170-530-01	Drive Assembly, Governor
1-180-150-01	Actuator Assembly, Inlet
1-180-190-03	Valve, Linear, Direct
1-190-007-07	Blade, Turbine Rotor
1-190-008-04	Blade. Turbine Rotor
1-190-009-05	Disk, Turbine, Turbine
1-190-010-03	Turbine Rotor. Turbine
1-190-050-07	Nozzle, Turbine, Turbine
1-300-002-01	Bearing, Ball, Annular
1-300-003-01	Bearing, Ball, Annular
1-300-003-02	Bearing, Ball, Annular
1-300-003-03	Bearing, Ball, Annular
1-300-004-01	Bearing, Ball, Annular
1-300-004-02	Bearing, Ball, Annular
1-300-004-04	Bearing, Ball, Annular
1-300-004-05	Bearing, Ball, Annular
1-300-005	Bearing, Ball. Annular
1-300-006-01	Bearing. Ball, Annular
1-300-006-02	Bearing. Ball, Annular
1-300-012-01	Bearing, Roller, Cylinder
1-300-012-02	Bearing, Roller, Cylinder
1-300-015-02	Bearing, Roller, Annular
1-300-015-04	Bearing, Roller, Annular
1-300-031	Bearing, Ball, Annular
1-300-031-01	Bearing, Roller, Cylinder
1-300-032	Bearing, Ball, Annular
1-300-032-01	Bearing, Roller, Cylinder
1-300-032-03	Bearing. Roller, Cylinder
1-300-082-03	Bearing, Roller, Cylinder
1-300-212-04	Pump. Rotary
1-300-268-02	Pin Spring
1-300-329-01	Bearing, Ball, Annular

Table 1-5.1 Flight Safety Parts Program Component List (Continued)

Part Number	Nomenclature
1-300-329-02	Bearing, Ball, Annular
1-300-335	Bearing, Ball, Annular
1-300-407-02	Bearing, Ball, Annular
1-300-407-03	Bearing, Ball, Annular
1-300-408	Bearing, Roller, Cylinder
1-300-584	Bearing, Ball, Annular
1-300-584-01	Bearing, Roller, Cylinder
1-300-665-01	Bearing, Roller, Cylinder
100770A4	Fuel Control, Main, Turbine
101770A1	Governor Assembly, Turbine
103100-A1	Governor, Overspeed
106000A1	Fuel Control, Main, Turbine
106500A1	Fuel Control, Main, Turbine
2-300 023	Bearing, Ball, Annular
2-300-023-01	Bearing, Ball, Annular
2-300-023-02	Bearing, Ball, Annular
2-300-041-05	Bearing, Roller, Cylinder
2-300-933-01	Bearing, Ball, Annular
2-300-933-02	Bearing, Ball, Annular
2-300-941-01	Bearing, Ball, Annular

1-52.6 Change 22

1-34. Pressurized Containers - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
5. Shipping Container		<b>Repressurize</b> by opening air filling valve at front of container.
<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div>		
<b>Do not disturb relief valve.</b>		
6. Shipping Container		<b>Allow</b> air pressure to return to zero.
7. Bolts and Nuts	Bolts and nuts secure container halves together.	<b>Remove.</b>
8. Cover		<b>Remove</b> from container.
9. Engine	Any presence of corrosion on the inlet, or compressor housings or on other visible exterior surfaces, or on the compressor or turbine blades or vanes, is cause to render the engine as unserviceable.	<b>Inspect</b> to determine serviceability of engine.
10. Engine	Perform this action if engine is found to be serviceable. Refer to paragraph 1-39 for preservation.	<b>Remove</b> from container. <b>Preserve</b> or place it in service.
11. Engine	Perform this action if engine is found to be unserviceable. Refer to applicable paragraphs within this manual as authorized by Maintenance Allocation Chart.	<b>Inspect.</b> Repair to a like-new corrosion-free condition.
12. Engine		If not repairable, <b>ship</b> to Depot.

1-35 Shipping Container - Repressurizing

INITIAL SETUP

**Applicable Configuration**  
All

1-35. Shipping Confiner Depressurizing - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

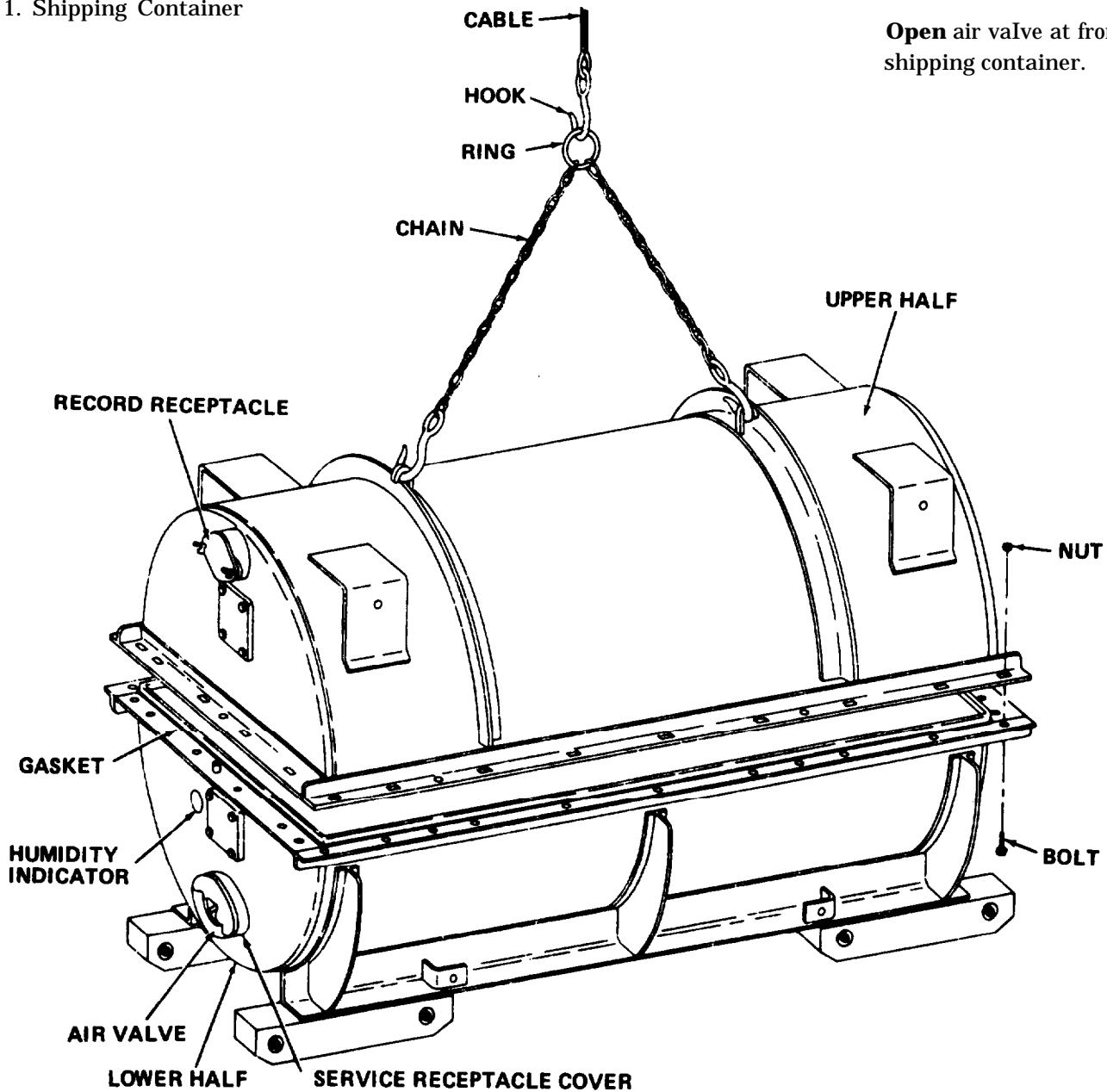
ENGINE/

**WARNING**

Prior to removing engine from container, make sure both sections of container are grounded and the container is opened in a well ventilated area.

1. Shipping Container

Open air valve at front of shipping container.



### 1-36. Engine - Removal

#### INITIAL SETUP

**Applicable Configuration**  
All

**Special Tools**  
Engine Sling (LTCT773 or LTCT384)

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/

1. Engine Records

**Remove** from envelope compartment on container.

**WARNING**

**Make certain that all air pressure has been released before loosening nuts in action for following item 2. If nuts are removed before pressure is released, internal pressure could blow off cover.**

2. Shipping Container

**Remove** nuts and bolts that secure upper and lower halves of shipping container.

**CAUTION**

**When removing cover in following action for item 3., insure upper half of shipping container does not strike engine**

3. Shipping Container cover

**Attach** a suitable chain to lifting eyes on upper half of shipping container. Using a suitable hoist, **attach** to chain, **lift** upper half of shipping container from lower half and **set** to one side.

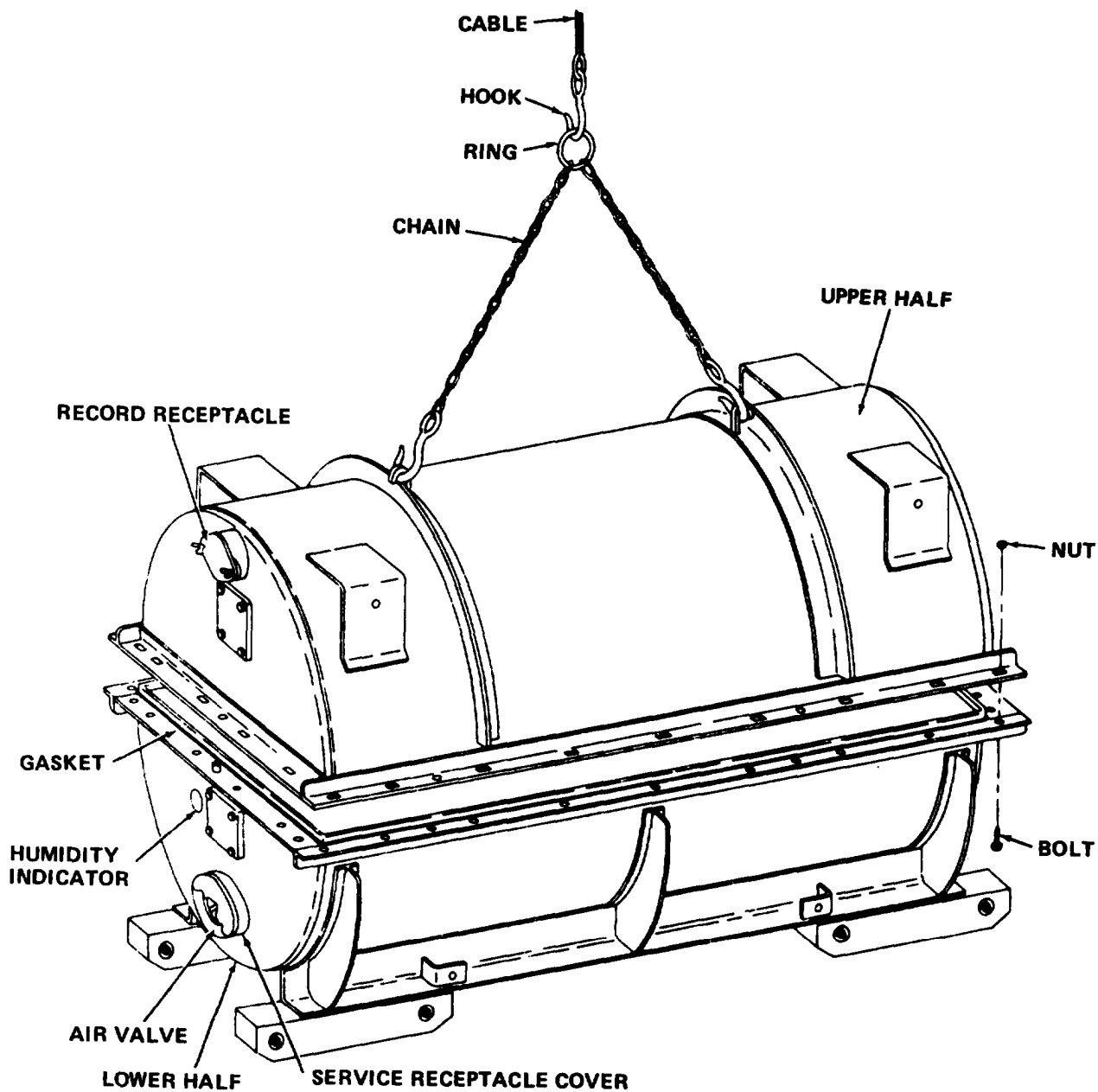
4. Diffuser Housing Mounting Boss

**Insert** 7/16-inch diameter by a 6 1/2 inch long bolt through diffuser housing mounting boas.

1-36. Engine - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued



5. Cables

Use engine sling (LTCT773 or LTCT384)

**Attach** two cables from engine sling on each end of bolt.

6. Engine sling  
Cables

**Secure** with nuts and 1 1/2 inch diameter washers. **Tighten** nuts.

1-36. Engine - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
7. Bolt	Bolt is 7/16-inch diameter by 5-inch long.	<b>Insert</b> through inlet housing mounting boss.
8. Cables	Use two cables. Use engine sling (LTCT773 or LTCT384).	<b>Attach</b> from engine sling. One cable on each end of bolt.
9. Engine Sling Cable	Use washers 1 1/2-inch diameter.	<b>Secure</b> with nuts and washers. <b>Tighten</b> nuts.
10. Engine Sling		<b>Attach</b> to suitable hoist.
11. Nuts and Washers	These items secure four shipping trunnions to four shock-resistant mounts in lower half of shipping container.	<b>Remove.</b>
<b>CAUTION</b>		
<b>When removing engine, insure that engine does not strike shipping container.</b>		
12. Engine		<b>Remove</b> from shipping container.
13. Desiccant		<b>Remove</b> from desiccant basket.
<b>CAUTION</b>		
<b>Trunnion bolts used in shipping, are not to be used for installing engine into aircraft.</b>		
14. Shipping Trunnions		<b>Remove</b> from engine mount pads.
15. Shipping Trunnions		<b>Remove</b> in bottom half of shipping container.
16. Shipping Container		<b>Lower</b> top half onto bottom half.

1-36. Engine - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
17. Shipping Container	Use four bolts and nuts.	<b>Install</b> bolts and nuts in shipping container, one at each corner. <b>Finger-tighten.</b>
18. Top and Bottom Halves of Shipping Container		<b>Check</b> alinement.
19. Upper and Lower Flange Bolt Holes		<b>Check</b> alinement.
20. Bolts and Nuts		<b>Install</b> at midpoints of sides and ends of shipping container flanges. <b>Install</b> bolts and nuts at midpoints between ends of shipping container flanges. <b>Install</b> all remaining bolts and nuts.
21. Bolts		<b>Tighten</b> sufficiently to prevent loosening.
22. Service Receptacle Cover		<b>Install.</b>

1-37. Engine Into Stand - Installation

INITIAL SETUP

**Applicable Configuration**

All

**Special Tools**

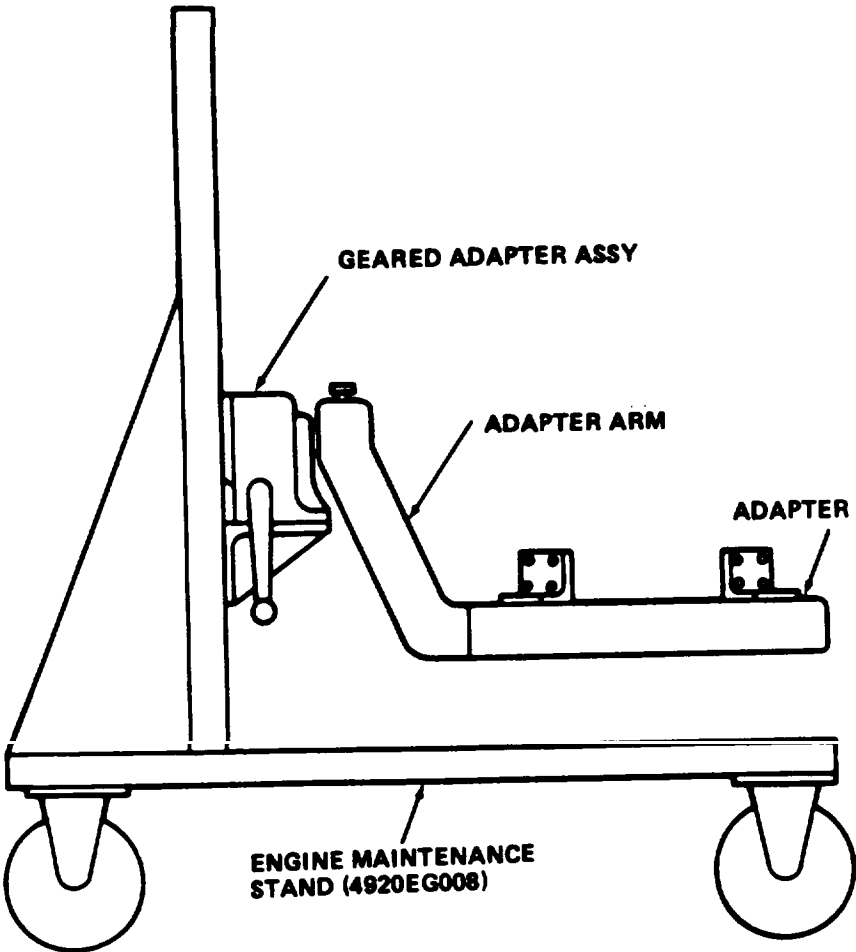
Engine Intake Protector (LTCT862)

Engine Maintenance Stand (4920EG008)

LOCATION/ITEM	REMARKS	ACTION
ENGINE/		
1. Engine Stand		<b>Prepare</b> with appropriate hardware.
2. Hoist		<b>Adjust</b> as necessary. <b>Guide</b> engine into stand.



1-37. Engine Into Stand - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
3. Engine	 <p>GEARED ADAPTER ASSY</p> <p>ADAPTER ARM</p> <p>ADAPTER BASE</p> <p>ENGINE MAINTENANCE STAND (4920EG008)</p>	<p><b>Loosen</b> nuts or bolts that secure the clamps to the ring of the stand. <b>Slide</b> clamps toward the outside diameter of the plate. <b>Secure</b> the clamps.</p>
4. Engine		<p><b>Guide</b> front end into the opening of the plate so that the inlet housing flange is flush against rear of plate.</p>
5. Clamps		<p><b>Position</b> over the inlet housing flange and <b>tighten</b> to secure the engine to the plate.</p>
6. Lifting Sling		<p><b>Remove.</b></p>
7. Residual Engine Oil		<p><b>Drain.</b></p>
8. Engine Intake Protector (LTCT862)		<p><b>Install.</b></p>

1-38. Engine - Activation After Storage

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Dry Cleaning Solvent (item 24, Appendix D)

**References**  
TB55-1500-200-40/2 and -40/3  
Para 8-4, 8-7, 6-11, 1-64, 6-13 and 1-74

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	NOTE	
	<p>Install engine quick-change accessories which were removed in accordance with TB55-1500-200-40/2 and -40/3. Activate the engine according to the following actions.</p>	
	<p><b>CAUTION</b></p>	
	<p>insure that P1 bellow cavity is filled with damping fluid (sillcone) (Item 100, Appendix D) prior to engine operation. Refer to paragraph 6-5.</p>	
<p>1. Bleed Band, inlet and Exhaust Cover and Barrier Material</p>	<p><b>WARNING</b></p>	<p>Remove.</p>
	<p>Dry Cleaning solvent P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).</p>	
<p>2. Openings</p>		<p>Inspect openings for foreign material and corrosion. Wipe clean with dry cleaning solvent (item 24, Appendix D).</p>
<p>3. 28-vdc Power Supply</p>		<p>Disconnect from ignition unit to prevent accidental firing of engine.</p>
<p>4. Power Level</p>		<p>Set to flight idle position.</p>

1-38. Engine -Activation After Storage-Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
5. Main Fuel Hoses	T53-L-11 series engine only.	<b>Disconnect</b> from main fuel manifold and starting fuel hose from starting fuel solenoid. <b>Install</b> temporary hoses and insert ends into a container of approximately 2 gallon capacity (7.6 liters).
6. Main Fuel Hoses	T53-L-13B/703 engines only.	<b>Disconnect</b> from flow divider assembly and starting fuel hose from starting fuel solenoid. <b>Install</b> temporary hoses and insert ends into a container of approximately 2-gallon (7.6 liters) capacity.
7. Oil Level		<b>Check</b> oil level; service if necessary.

**CAUTION**

To prevent damage to starter, do not exceed starter limitations when motoring engine in following item 8.

8. Aircraft Boost Pump

**Operate** aircraft boost pump to prime fuel system and motor engine with starter.

**NOTE**

Engine lubrication system is fully primed when oil pressure gage shows a steady positive indication.

1-38. Engine - Activation After Storage - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
9. Power Level Arm, Starting Fuel Solenoid		<b>Move</b> power level arm to maximum, and activate starting fuel solenoid until solid stream of fuel without air bubbles, is observed flowing from temporary hoses into container. At least one gallon (3.79 liters) of fuel must flow into container.
10. Main Fuel Hoses	T53-L-11 series engine only.	<b>Connect</b> main fuel hose to main fuel manifold and starting fuel solenoid. <b>Inspect</b> engine for leakage.
11. Main Fuel Hoses	T53-L-13B/703	<b>Connect</b> to flow divider assembly and starting fuel hose to starting fuel solenoid. <b>Inspect</b> engine for leakage.
12. 28-vdc Power Supply		<b>Connect</b> to ignition unit. <b>Lockwire</b> connector.
13. Engine		<b>Start and operate</b> for 5 minutes at approximately 75 percent N1.
14. Engine		<b>Shut down.</b>
15. Oil Filter cover Assembly		<b>Remove.</b>
16. Oil Filter Cover Assembly		<b>Check</b> for excessive contamination, <b>clean</b> , re-assemble, and <b>reinstall</b> . (Refer to paragraphs 8-4 and 8-7.)
17. Chip Detector		<b>Remove.</b>
18. Chip Detector		<b>Check</b> for excessive contamination; <b>clean</b> and <b>reinstall</b> .

1-38. Engine - Activation After Storage - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
19. Fuel Inlet and Pump Discharge Strainer to Servo Supply Filter		<b>Remove.</b>
20. Fuel Inlet and Pump Discharge Strainer to Servo Supply Filter	If no contamination is evident, engine is ready for ground test.	<b>Check</b> for contamination, <b>clean</b> and <b>reinstall</b> . (Refer to paragraphs 1-64, 6-11 and 6-13.)
21. Oil System	If oil system contamination is slight, perform this action.	<b>Drain</b> the oil and <b>refill</b> system with new oil.
22. Oil System	If there is evidence of continued contamination, refer to paragraph 1-74. In addition to requirements specified in preceding actions, a vibration test must be performed. (Refer to Chapter on Vibration Test.)	<b>Repeat</b> preceding actions for items 13 thru 20.

1-39. Engine - Preservation and Installation In a Metal Reusable Shipping and Storage Container

INITIAL SETUP

**Applicable Configuration**

All

**Special Tools**

Engine Sling (LTC1773 or LTCT384)

**Consumable Materials**

Corrosion Preventive Concentrate (item 97, Appendix D)  
 Dry Cleaning Solvent (item 24, Appendix D)  
 Rust inhibitor Item 70, Appendix  
 Lubricating Oil (item 44, Appendix D)  
 Tape (item 79, Appendix D)  
 Lubricating Oil (item 46 or 47, Appendix D)  
 Barrier Material (item 9, appendix D)  
 Glycerol (item 23, Appendix D)  
 Desiccant (item 23, Appendix D)  
 Liquid Soap (item 40, Appendix D)  
 Plastilube Moly No. 3 (item 67, Appendix D)  
 Lockwire (Item 41, 42, or 43, Appendix D)

**References**

TB55-9150-200-24  
 TB55-8100-200-24  
 TB55-1500-200-40/2 and -40/3

1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION										
ENGINE/	<div style="border: 2px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"><b>WARNING</b></div> <p>The fuel system of all engines that are to be placed in containers (less accident-involved engines) shall be thoroughly drained, purged, and preserved. All disconnected lines shall be capped or plugged. Tape shall not be used in lieu of caps or plugs.</p> <p>AU engines, which are prepared for storage or shipment, shall be preserved and packed in a metal reusable shipping and storage container P/N 8115-CON-024-01, NSN 8115-00-772-7866, in accordance with the following procedures. Refer to the following table for shipping container leading particulars.</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Length</td> <td>74-5/8 inches (184.55 cm)</td> </tr> <tr> <td>Width</td> <td>39-3/4 inches (100.97 cm)</td> </tr> <tr> <td>Height</td> <td>43-1/8 inches (109.54 cm)</td> </tr> <tr> <td>Weight of Shipping Container</td> <td>657 pounds (298 Kg) (approx)</td> </tr> <tr> <td>Combined Weight of Engine and Shipping Container</td> <td>1143 pounds (518.5 Kg) (approx) (T53-L-11 Series Engines) 1207 pounds (547.5 Kg) (approx) (T53-L-13B Engine) 1202 pounds (545.2 Kg) (approx) (T53-L-703 Engine)</td> </tr> </table>	Length	74-5/8 inches (184.55 cm)	Width	39-3/4 inches (100.97 cm)	Height	43-1/8 inches (109.54 cm)	Weight of Shipping Container	657 pounds (298 Kg) (approx)	Combined Weight of Engine and Shipping Container	1143 pounds (518.5 Kg) (approx) (T53-L-11 Series Engines) 1207 pounds (547.5 Kg) (approx) (T53-L-13B Engine) 1202 pounds (545.2 Kg) (approx) (T53-L-703 Engine)	
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1-30. Engine-Preservation and Installation in a Metal Reusable Shipping end storage Container - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/-Continued	<b>NOTE</b>	
	To preserve an operable engine, perform actions for items 1 thru 32.	
1. Engine Oil Supply	Flushing of the engine is not required during activation of the engine after storage.	<b>Check oil level and service if necessary.</b>
2. 28-vdc Power Supply		<b>Disconnect from ignition unit.</b>
3. Fuel Inlet and Pump Discharge Strainers and Servo Supply Filter	<b>WARNING</b>	<b>Remove.</b>
	Dry cleaning Solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).	
4. Fuel Inlet and Pump Discharge Strainers and Servo Supply Filter		Clean with dry emulsion vent (item 24, Appendix D); then reinstall.
5. Compressor Blades		Preserve with rust inhibitor (item 70, Appendix D).
6. Compressor Blades Use a 16-ounce aerosol can with		Spray as prescribed in actions for items 7 thru 10.
7. Engine	Use starter when performing this action.	Motor engine to starting rpm. with power level off, apply material as engine coasts down.

1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container.  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
8. Inlet Housing struts		<b>Hold</b> aerosol can and snorkel tube so that it projects between inlet housing struts.
9. Inlet Guide Vanes		<b>Direct</b> jet stream between two inlet guide vanes onto rotating compressor blades.
10. Compressor Blades	<b>Perform</b> this action to <b>insure</b> that material covers as much of the blades as possible.	<b>Move</b> jet stream from base to tip of blades. <b>Apply</b> jet stream for 30-seconds.
11. Main Fuel Hose	T53-L-11 series engine only.	<b>Disconnect</b> breakaway fitting at filter and remove from main fuel manifold.
12. Main Fuel Hose	T53-L-13B/703 engines only.	<b>Disconnect</b> breakaway fitting at filter and remove from flow divider.
13. Starting Fuel Hose		<b>Disconnect</b> from starting fuel manifold and over-speed governor bleed line. Install temporary line to allow drainage into suitable container. <b>Attach</b> a hose from a source of lubricating oil (item 44, Appendix D) to fuel control inlet fitting.
14. Power Lever Arm	AN APU may be used to allow for a higher starter speed.	<b>Place</b> in full open position. <b>Motor</b> engine with starter to <b>pump</b> lubricating oil into fuel control.
15. Starting Fuel Solenoid		<b>Open</b> while motoring <b>Continue</b> motoring until lubricating oil can be observed draining from starting fuel hose.



1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
16. Starting Fuel Solenoid Valve		Close.
17. Main Fuel Hose		Allow oil to drain.
<b>NOTE</b>		
Initial procedures may require the fuel control change over solenoid to be in the emergency position until oil starts to flow from the oil storage container.		
18. Engine Quick-Change Accessories	These accessories were installed in accordance with TB55-1500-200-40/2 and -40/3.	<b>Remove.</b>
19. Lubricating Oil Hose		<b>Remove</b> from fuel control.
20. Fuel Inlet Hose Assembly		<b>Connect.</b>
21. Fuel Hoses	T53-L-11 series engine only.	<b>Remove</b> temporary lines. <b>Connect</b> fuel hose to main fuel manifold.
22. Starting Fuel Hose	T53-L-11 series engines only.	<b>Connect</b> to starting fuel manifold.
23. Fuel Hoses	T53-L-13B/703 engines only.	<b>Remove</b> temporary lines. <b>Connect</b> main fuel hose to flow divider assembly.
24. Starting Fuel Hose	T53-L-13B/703 engines only.	<b>Connect</b> to starting fuel manifold.
25. 28-vdc Power supply		<b>Reconnect</b> to ignition unit. <b>Lockwire</b> connector.
26. Bleed Band and Compressor Housing	Use tape (item 79, Appendix D).	<b>Seal</b> gap between these items by encircling engine with a narrow strip of barrier material. <b>Seal</b> with tape.

1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container - Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

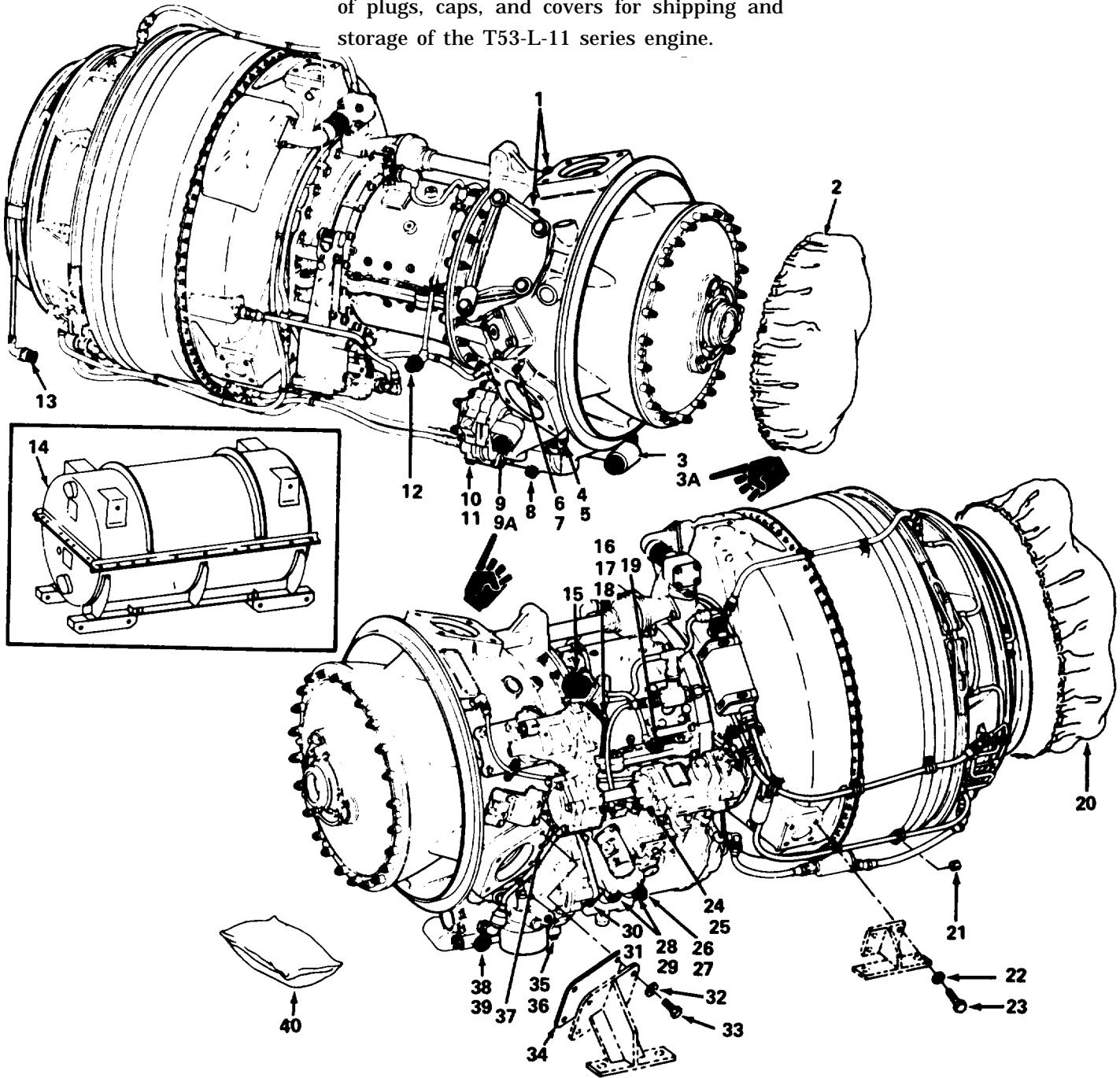
27. Engine

Visually check.

28. Holes

The following figure illustrates the location of plugs, caps, and covers for shipping and storage of the T53-L-11 series engine.

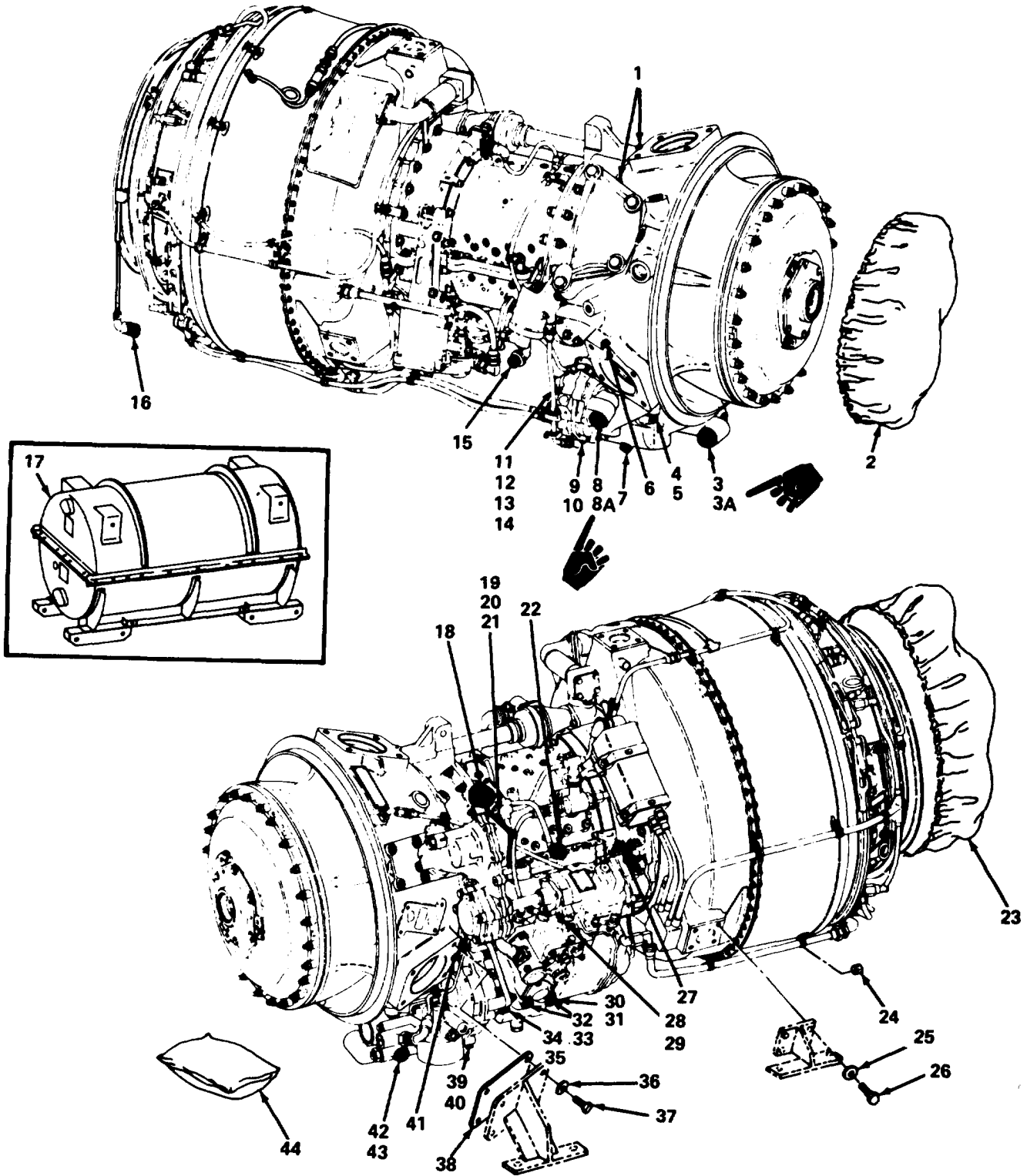
Plug.



1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
1. Plug (NAS816-11) 2. Protective Cover (1-010-021-02) 3. Plug (NAS818-12) 3A. Packing (MS29512-12) 4. Plug (NAS818-4) 5. Packing (M83248/1-904) 6. Plug (STD3021-04) 7. Packing (M83248/1-904) 8. Cap (NAS816-17) 9. Plug (NAS818-12) 9A. Packing (MS29512-12) 10. Plug (MS9404-03) 11. Packing (M83248/1-903) 12. Cap (MS25177-12) 13. Cap (MS25177-12) 14. Shipping Container Assembly (416B1) 15. Cap (MS25178-22) 16. Nut (MS21042-4) 17. Cover (AN100043) 18. Gasket (AN4045-1) 19. Cap (MS25177-12)	20. Protective Cover ( 1-010-021-02) 21. Plug (NAS817-4) 22. Washer (AN960-816) 23. Bolt (AN104009) 24. Plug (NAS818-3) 25. Packing (M83248/1-903) 26. Cap (NAS817-10) 27. Packing (M83248/1-910) 28. Bolt (MS9015-04) 29. Packing (M83248/1-904) 30. Plug (NAS818-4) 31. Packing (M83248/1-904) 32. Washer (AN960-616) 33. Bolt (MS9534-16) 33. Forward Mounting Pad Gasket (1-010-092-01) 35. Plug (NAS818-2) 36. Packing (M83248/1-902) 37. Plug (NAS816-23) 38. Plug (NAS818-10) 39. Packing (M83248/1-910) 40. Desiccant, Bagged (MIL-D-3464)	

The following figure illustrates the location of plugs, caps, and covers for shipping and storage of the T5 3-L-13B/703 engines.



1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

1.	Plug (NAS816-11)	22.	Cap (MS25177-12)
2.	Protective Cover (1-010-021-02)	23.	Protective Cover (1-010-021-02)
3.	Plug (NAS818-12)	24.	Plug (NAS817-4)
3A.	Packing (MS29512-12)	25.	Washer (AN960-616)
4.	Plug (NAS818-4)	26.	Bolt (AN104009)
5.	Packing (M83248/1-904)	27.	Plug (NAS817-4)
6.	Plug (NAS818-4)	28.	Plug (NAS818-3)
7.	Cap (NAS816-17)	29.	Packing (M83248/1-903)
8.	Plug (NAS818-12)	30.	Cap (NAS817-10)
8A.	Packing (MS29512-12)	31.	Packing (M83248/1-910)
9.	Plug (MS9404-03)	32.	Packing (MS9015-04)
10.	Packing (M83248/1-903)	33.	Packing (M83248/1-904)
11.	Nut (MS20365-624)	34.	Plug (NAS818-4)
12.	Washer (AN960-616L)	35.	Packing (M83248/1-904)
13.	Cover (AN100041)	36.	Washer (AN960-816) I
14.	Gasket (1-080-026-01)	37.	Bolt (MS9534-16)
15.	Cap (MS25177-12)	38.	Forward Mounting Pad Gasket (1-010-092-01)
16.	Cap (MS25177-12)	39.	Plug (NAS818-2)
17.	Shipping Container Assembly (4161B1)	40.	Packing (M83248/1-902)
18.	Cap (MS25178-22)	41.	Plug (NAS816-23)
19.	Nut (MS21042-4)	42.	Plug (NAS818-10)
20.	Cover (AN100043)	43.	Packing (M83248/1-910)
21.	Gasket (AN4045-1)	44.	Desiccant, Bagged (MIL-D-3464)

Change 22 1-72..1(1-72.2 blank)



1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
29. Ports		Cap.
30. External Parts		<b>Check</b> to see parts are complete and properly torqued.
31. Covers	Prior to installation of starter drive spline cover, lubricate starter spline socket with a liberal amount of Plastlube Moly No. 3 (Item 67, Appendix D). Do not pack socket.	<b>Install</b> covers that are applicable.
32. Engine		<b>Record</b> date of preservation. <b>Record</b> date of maintenance during preservation on engine historical form DA Form 2406-16. <b>Annotate</b> records that a corrosion preventive concentrate has been added to the engine oil system in accordance with TB 55-9150-200-24. <b>Annotate</b> that flushing is not required during activation.
<b>NOTE</b>		
To preserve an Inoperable engine, perform actions for items 33 thru 49.		
33. Fuel lines and Drain plugs		<b>Disconnect</b> from fuel control.
34. Pump Pressure Fittings, Pump Inlet Pressure Tap, Fuel Inlet Port, Main and Stating Fuel Outlet Ports and Drain Port		<b>Drain</b> all fuel.
35. Fuel Inlet and Pump Discharge Strainers and Servo Supply Filter		<b>Remove.</b>

1-39. Engine. preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

**WARNING**

Drycleaning solvent, P-D-680), used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

36. Fuel Inlet and Pump Discharge Strainers and Servo Filter	Use drycleaning solvent (item 24, Appendix D).	Clean with drycleaning solvent. <b>Reinstall</b> items.
37. Overspeed Governor		<b>Remove.</b>
38. Lines and Plugs		<b>Reinstall.</b>
39. Power Lever		<b>Lockwire</b> in closed position.
40. Lubricating Oil	Use lubricating oil (item 44, Appendix D).	<b>Pour</b> into openings made accessible by removal of overspeed governor until fuel control is filled.
41. Overspeed		<b>Pour</b> lubricating oil into overspeed governor while rotating drive shaft by hand.
42. Overspeed Governor		<b>Reinstall.</b>
43. Compressor Blades	<b>Use</b> rust inhibitor and preservative (item 70, Appendix D). Apply with 16-ounce can and snorkel tube.	<b>Preserve</b> with rust inhibitor and preservative.
44. Inlet Housing Struts and Compressor Blades		<b>Spray</b> aerosol material in area between inlet housing struts. Direct jet stream evenly on



1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

all compressor blades.  
Apply jet stream for  
30 seconds.

**WARNING**

Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

45. Turbine Rotors

Use lubricating oil (items 46 or 47, Appendix D).

Spray turbine rotors through exhaust with sufficient amount of lubricating oil to cover blades.

46. Engine

Inspect to insure the following:

- a. All drain plugs are installed and lockwired.
- b. All lines are in place and connected.
- c. All attaching parts are tightened to required torque values.

47. Caps and Plugs

Close all openings with these items.

48. Covers

Install those that are applicable.

49. Engine

Use historical form DA Form 2408-16.

Record date of preservation and maintenance during preservation.

1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
50. Bleed Band and Compressor Housing	Use barrier material (item 9, Appendix D) and tape (item 79, Appendix D).	Seal gap between these items by encircling engine with a narrow strip of barrier material. Seal with tape.
<p><b>NOTE</b></p> <p>To install engine in container perform actions for items 51 thru 85.</p>		
51. Shipping Container		Release air pressure
52. Shipping Container Flange Nuts and Bolts		Remove.
53. upper Half of Shipping Container	Use suitable hoist and chain when performing this action.	Remove.
54. Sealing Gasket		

1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
55. Mating Flange Sur- faces and Interior of Shipping Container		Clean.
56. Flanges		File rough projections.
57. Sealing Gasket	Use glycerol (item 32, Appendix D).	Examine. Discard and replace if badly cracked. Clean and dry. Apply a light coat of glycerol.
58. Shock Mounts		Check all bolts and nuts for tightness.
59. Forward and Aft Engine Mounting Brackets		Remove.
60. Engine Mounting Brackets	Prior to installation of mounting brackets on inlet housing inspect inserts in inlet housing mounting pads to insure tangs of insert are broken off. If tangs are not broken use tang breakoff tool, 3581-8 (NSN 5120-00-793-1086) to break tang, and retrieve with a magnet.	Bolt to engine pads. Lockwire bolts.
61. Gaskets	Perform this action to prevent metal-to- metal contact between engine mounting brackets and corresponding container brackets.	Install on container mounting bracket.
<b>CAUTION</b>		
<b>When installing gasket in following action for item 62, make certain that gasket does not twist lengthwise.</b>		
62. Gasket		Place on flange of shipping container lower half.

1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued	<b>WARNING</b>	
	<b>Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).</b>	
63. Exterior of Engine	Use drycleaning solvent (item 24, Appendix D).	<b>Clean</b> if necessary with drycleaning solvent.
64. Humidity Indicator Card		<b>Check</b> condition and <b>replace</b> as necessary.
65. Inlet Housing Mounting Boss		<b>Insert</b> a 7/16 inch diameter by 5 inch long bolt through inlet housing mounting boss. <b>Attach</b> two cables from engine sling (LTCT773 or LTCT384), one on each end of bolt.
66. Engine Sling Cables		<b>Secure</b> with nuts on 1-1/2 inch diameter washers. <b>Tighten</b> nuts.
67. Diffuser Housing Mounting Boss		<b>Insert</b> a 7/16 inch diameter by 6-1/2 inch long bolt through diffuser housing mounting boss, <b>Attach</b> two cables from engine sling (LTCT773 or LTCT384), one on each end of bolt.
68. Engine Sling Cables		<b>Secure</b> with nuts and 1-1/2 inch diameter washers. <b>Tighten</b> nuts.

1-39. Engine - Preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued	<p><b>CAUTION</b></p> <p>When installing engine in container, insure that engine does not strike shipping container.</p>	
69. Engine Sling	Use suitable hoist attached to engine sling when performing this action.	Carefully <b>guide</b> engine into place.
70. Engine Mounting Brackets		<b>Bolt</b> to corresponding container brackets.
	<p><b>CAUTION</b></p> <p>When installing top half of containers, insure that container does not strike engine.</p>	
71. Shipping Container	Use 48 units of desiccant (item 23, Appendix D).	<b>Place</b> desiccant in desiccant basket in bottom of shipping container.
72. Top Half of Shipping Container	Use a suitable chain when performing this action.	<b>Lower</b> onto bottom half of shipping container.
73. Bolts and Nuts	Use four of each.	<b>Install</b> one at each corner. <b>Finger-tighten.</b>
74. Top and Bottom Halves of Shipping Container		<b>Check</b> alinement.
75. Upper and Lower Flange Bolt Holes		<b>Check</b> alinement.
76. Shipping Container Flanges		<b>Install</b> bolts and nuts at midpoints of sides and ends of shipping container flanges.
77. Shipping Container Flange		<b>Install</b> bolts and nuts at the midpoints between shipping container flanges,

1-39. Engine - preservation and Installation in a Metal Reusable Shipping and Storage Container -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
78. Shipping Container		Install remaining bolts and nuts. Tighten in order of installation to 500 pound-inches to 640 pound-inches (5.8 kgm to 7.5 kgm) torque.
79. Shipping Container	Use clean dehydrated air.	Pressurize with 4 psi to 6 psi (0.28 kg/sq cm to 0.42 kg/sq cm).
80. Container seals		<p>Check to insure they are airtight. Perform check as follows:</p> <p>a. Apply liquid soap (item 40, Appendix D).</p> <p>b. Observe for bubbles.</p> <p>c. If container is not airtight, refer to TB55-8100-200-25 for corrective procedures,</p>
81. Engine Records		Place in record receptacle.
82. Cover		Relace.
83. Bonding Seal		Fasten through record holder cover plates and two seals through shipping container flange.
84. Service Receptacle cover		Install.

1-40. Damaged, Cannibalized, or Failed Engines - Preservation. Inoperable engines that are idle because they require parts maintenance, or overhaul, shall be preserved and stored in a metal reusable shipping and storage container, or in a clean, dry area, adequately protected from dirt and physical damage.

**1-41. Accident-Involved Engines - Preservation**

INITIAL SETUP

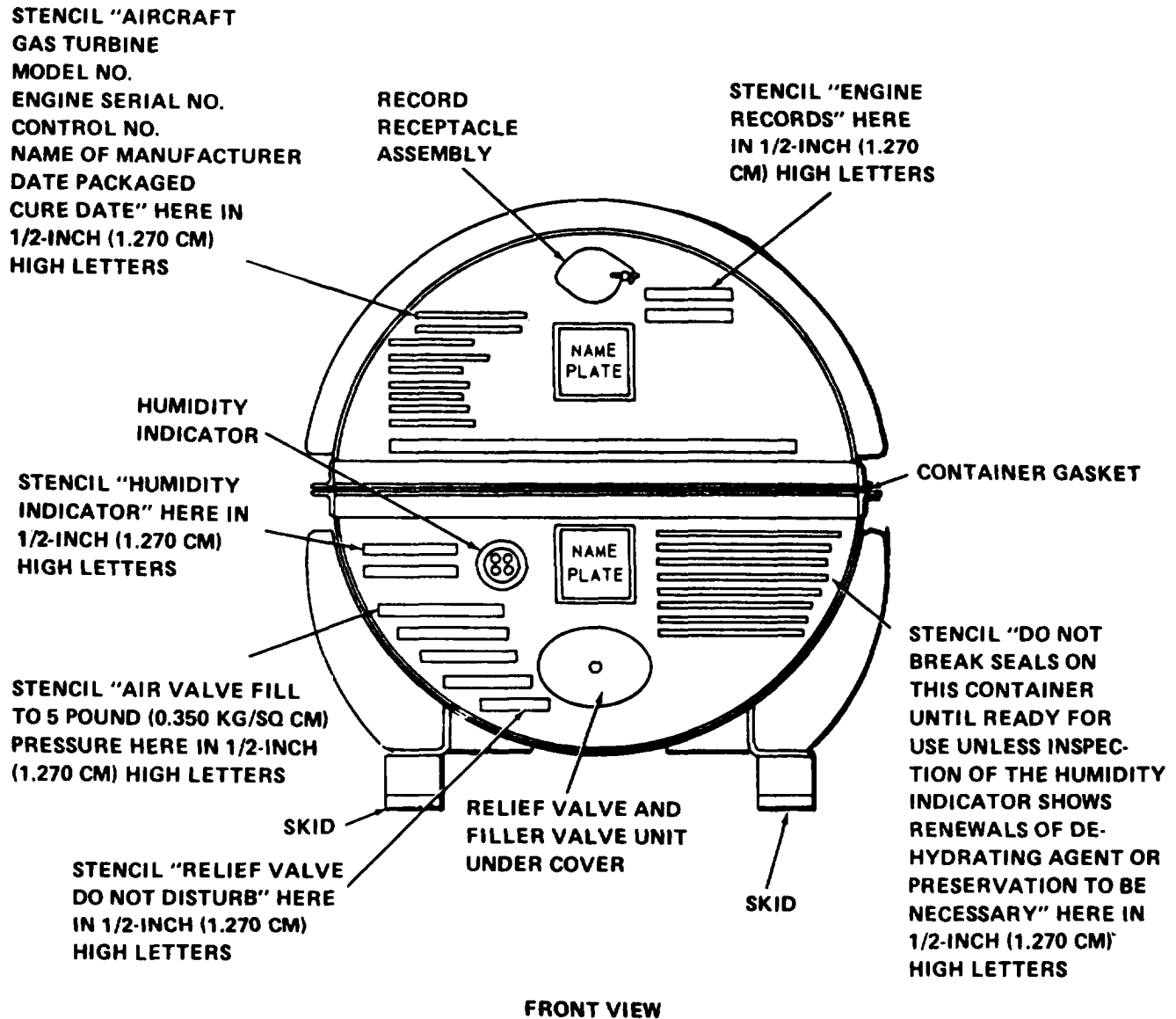
**Applicable Configuration**  
All

**Consumable Materials**  
Tape PPP-T-60 (item 79, Appendix D)

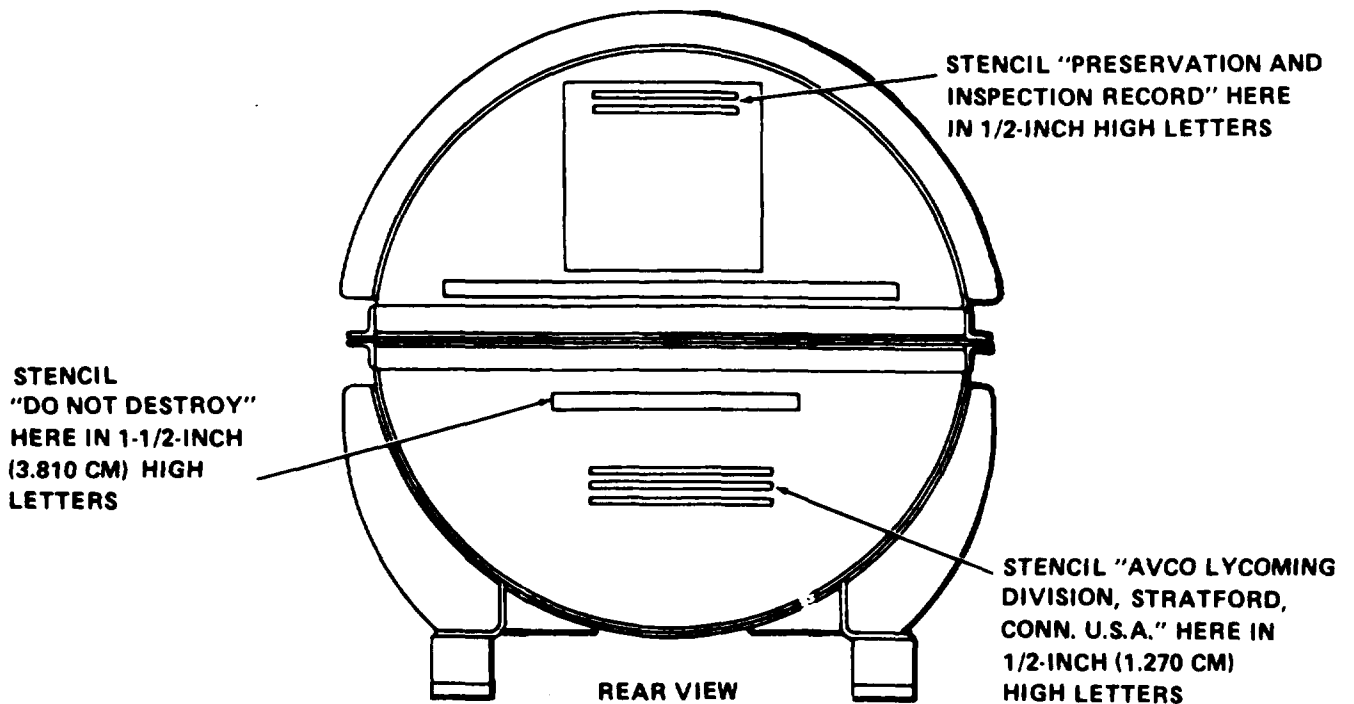
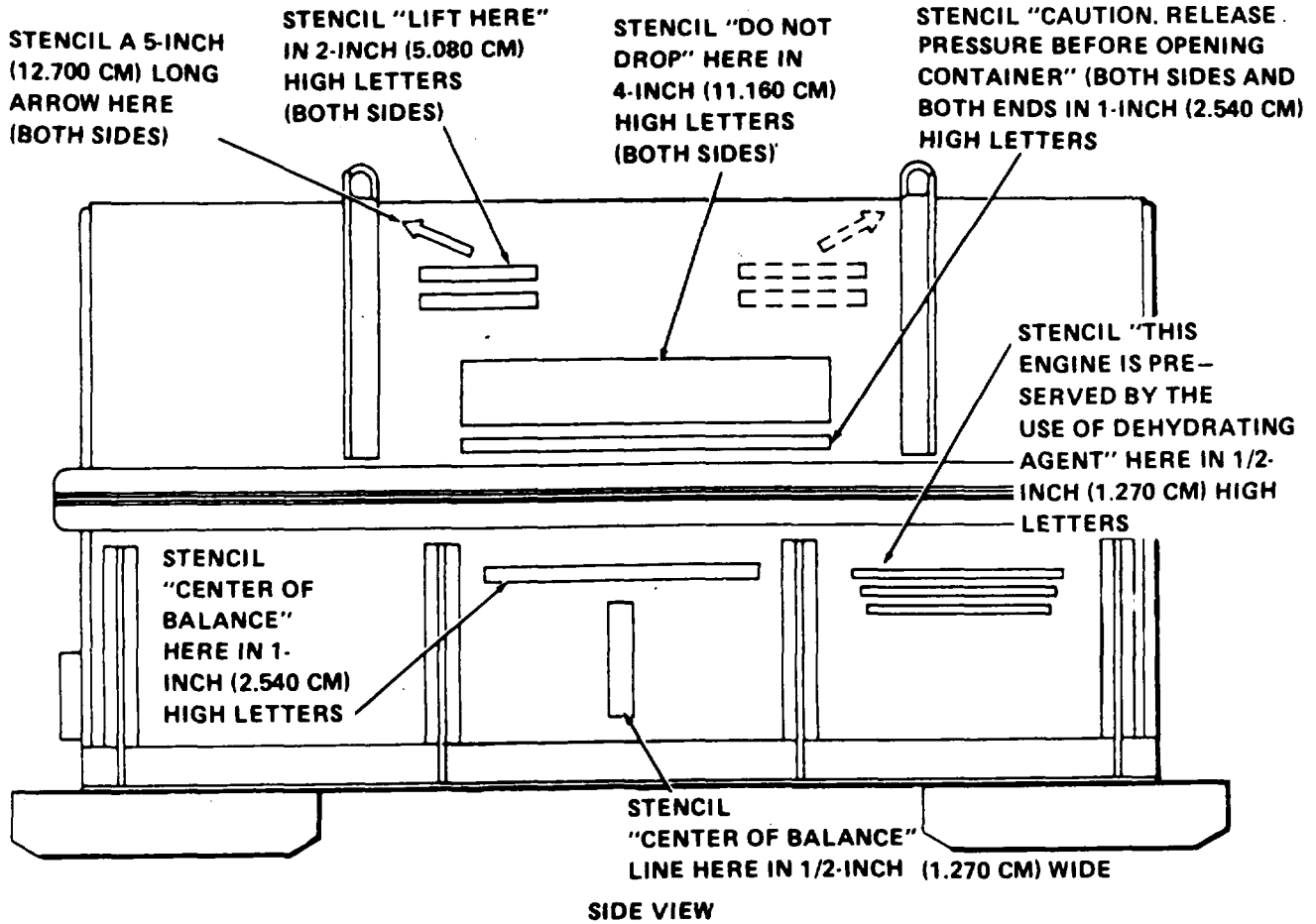
**References**  
Para 1-39

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<b>NOTE</b>	
	<p>When an engine that has been involved in an accident is removed from an aircraft, and its failure or malfunction is known or suspected to have been a factor, do not treat it with a corrosion protective coating. No attempt should be made to operate, motor or disassemble an accident-involved engine. All accident-involved engines must be transported to an overhaul depot <i>or</i> a designated investigation area within ten days after the accident.</p>	
1. Lines or Fittings		<p><b>Do not disconnect.</b> Make every effort to <b>prevent</b> remaining fuel and oil from leaking out.</p>
2. Ports		<p><b>Plug.</b></p>
3. Fittings and Lines		<p><b>cap.</b></p>
4. All Openings		<p><b>Seal</b> with applicable covers.</p>
5. Engine	<p>Refer to paragraph 1-39 for installation.</p>	<p><b>Install in</b> bottom half of metal reusable shipping and storage container.</p>
6. Engine	<p><b>Perform</b> this action to <b>prevent</b> a possible explosion of dangerous vapors which may be ignited by static electricity or a spark. Use tape PPP-T-60 (item 79, Appendix D).</p>	<p><b>Ground</b> to container. <b>secure all</b> loose metal components to container with tape PPP-T-60 to <b>prevent</b> a possible spark during shipment.</p>

1-42. Shipping Containers - Marking for Shipment. Mark in accordance with MIL-STD-129. Special marking shall reflect required information. (See illustration below. )







**1-43. Materials Subject High temperatures -Marking.** Marking on materials subject to high temperatures should be done only with one of the following: marking pencil (yellow) Colorbrite No. 2107 (Item 54, Appendix D), marking ink (black) (item 52, Appendix D) marking ink pencil (red) (item 53, Appendix D), or felt ink marker ( black) (item 28, Appendix D).

**WARNING**

**FLIGHT SAFETY PARTS**

**Use of nonapproved marking materials such as common lead pencils on engine components in or near the hot end will cause cracking of those components when subjected to high temperatures. This can lead to engine failure.**

**Section V. PREVENTIVE MAINTENANCE INSPECTIONS**

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**1-44. GENERAL INFORMATION.**

This section contains inspections for the preventive maintenance of the engine. It also contains special inspection information for use when engine overlimit conditions occur.

**1-45. PREVENTIVE MAINTENANCE INFORMATION.**

The preventive maintenance contained in the following paragraphs is designed to detect minor defects before they develop into serious problems. Information is not provided for troubleshooting, adjustment, or repair of the engine in this section.

1-46. Dropped Engine - Inspection (AVIM)

INITIAL SETUP

**Applicable Configuration**

All

**References**

Section VIII

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<b>NOTE</b>	
	If the engine is dropped during handling, perform the following inspection and tests.	
1. Accessory Drive Gearbox		<b>Inspect</b> for cracked flanges.
2. Overspeed Governor and Tachometer Drive		<b>Inspect</b> for cracks, distortion and bent shafts.
3. Oil Falter		<b>Inspect</b> for damage.
4. Power-Driven Rotary (Oil) Pump		<b>Inspect</b> for loose bolts and cracked flanges.
5. Fuel control		<b>Inspect</b> for cracked flanges.
6. Engine Mounting Pads		<b>Inspect</b> for cracks.
7. Air, Oil, and Fuel Hose		<b>Check</b> connections for Security.
8. Accessories		<b>Check</b> for loose bolts, nuts and connections.
9. Engine		If no visual damage is apparent, engine may be operationally checked either in airframe or in mobile engine test unit. (Refer to section VIII.) Minimum test time is 30 minutes and vibration test must be performed. Vibration levels must be within established limits. If no defects are noted, engine is considered serviceable.

1-47. Engines In Storage For Over 6 Calendar Months - Inspection

INITIAL SETUP

**Applicable Configuration**  
All

**References**  
Para 1-39, 1-35, 1-36

**Special Tools**  
Installing Tool (LTCT4650, NSN4920-00-842-6040)

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued	<div style="border: 1px solid black; padding: 5px; margin: 0 auto;"><b>WARNING</b></div> <p><b>Make certain that all air pressure has been released before loosening nuts. If nuts are removed before pressure is released, Internal pressure could blow off cover.</b></p>	
1. Engine Shipping Container		<b>Refer</b> to para 1-35 and 1-36 for opening procedures.
2. Engine Nose Section		<b>Install</b> tool kit (LTCT 4650, NSN4920-00-642-6040), on engine nose section.
3. Nose Case and Internal Splines, N2		<b>Index</b> a point on the nose case and internal splines from this Index point, <b>rotate</b> the N2 at least one complete revolution and stop approximately 90° from indexing point.
4. N1	Use a 1/4 Inoh drive ratchet with extension, speed handle or equivalent tool inserted in N1 tachometer drive spline.	<b>Index</b> and <b>rotate</b> the N1 in a similiar manner as in action for item 3, above.
5. Engine and Engine Shipping Container	Refer to paragraph 1-39.	<b>Represerve.</b>

**1-48. SPECIAL INSPECTIONS INFORMATION.**

A special inspection is conducted when overlimit conditions occur. The overlimit conditions include overtemperature, overspeed, overtorque operation and excessive G-loads.

**1-49. Suspected Engine Compressor Stall - Special Inspection.**

INITIAL SETUP

**Applicable Configuration**  
All

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING ASSEMBLY/	<b>NOTE</b>	
	<p>Engine compressor stall (surge) is characterized by a sharp rumble or a series of loud, sharp reports, severe engine vibration, and a rapid rise in exhaust gas temperature (EGT), depending on the severity of the surge. When a surge has been reported, perform the following actions for Items as necessary to determine the cause of the stall (surge).</p>	
1. Inlet Guide Vane and First Stage Compressor Rotor Blades	Repair of foreign object damage is within limits.	<p><b>Inspect</b> for evidence of severe erosion and/or foreign object damage, <b>Check</b> root areas of compressor blades for cutback due to erosion. <b>Check</b> for dirty or obstructed Inlet housing. <b>Insure</b> compressor and Inlet are clean.</p>
2. Compressor Rotor Blades	Refer to paragraph 2-35.	<p><b>Inspect</b> for evidence of erosion and/or foreign object damage.</p>
3. Variable Inlet Guide Vane System	<p>When performing this action for T53-L-13B/703 engines, include rigging. Blade shift is unacceptable.</p>	<p><b>Insure</b> that variable inlet guide vane system, bleed band, airbleed actuator, or fuel control, are not causing the stall.</p>
4. Engine		<p><b>Ship</b> to Depot if compressor stall cannot be corrected by preceding actions.</p>

1-50. Inlet Blockage - Special Inspection.

INITIAL SETUP

**Applicable Configuration**  
All

**References**  
Para 2-39, 1-94 and 2-40

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING ASSEMBLY/	<div style="text-align: center; border: 2px dashed black; padding: 5px; margin-bottom: 10px;"><b>CAUTION</b></div> <p>Any time the aircraft is flown in a loose grass/foilage environment, the engine shall be inspected for grass/foilage or other blockage to detect the presence of any foreign object accumulation in the area of the inlet housing struts and inlet guide vanes. If foreign object accumulation is evident, the first and/or second stage compressor blades must be inspected. Failure to perform this inspection could result in possible failure of compressor blades.</p>	
1. Inlet Housing	<p>Refer to applicable airframe manual when performing this action</p> <p>Inspect for corrosion.</p>	<p>Gain access to inlet housing struts and each Inlet guide vane. Visually <b>inspect</b> for presence of grass or foliage or any other foreign object blockage.</p>
2. Inlet Struts and Guide Vanes	<p>If air particle separator is installed, <b>remove</b> upper half to accomplish this inspection. If blockage is evident, the lower half of the separator must be removed to insure complete removal of foreign material.</p> <p>Inspect for FOD.</p>	<p>Completely <b>remove</b> any foreign material that may be lodged on the Inlet struts or guide vanes, paying particular attention to the lower (4- through 8-o'clock) portion of the vane assembly. (Refer to paragraph 2-10.)</p>
3. Deleted.		
4. Air Particle Separator	<p>Refer to applicable airframe manual.</p>	<p>If removed, reinstall.</p>

**1-50. Inlet Blockage - Special Inspection - Continued**

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING ASSEMBLY - Continued	<b>NOTE</b> Perform actions for items 5 and 6 on the T53-L-13B/703 engines if blockage is evident.	
5. First and Second Stage Compressor Blades	Refer to paragraph 2-35.	Replace if inspection criteria are not met.
6. Air Particle Separator		If removed, reinstall. (Refer to Chapter on engine vibration test.)

**1-51. Sand and Dust Ingestion (Hot End) (T53-L-13B/703 Engines) - Special Inspection**

INITIAL SETUP

**Applicable Configuration**  
T53-L-138/703 Engine

**References**  
Appendix G, Table G-6, Reference Number 27, Reference Number 29  
Para 4-12, 4-14 and 4-19

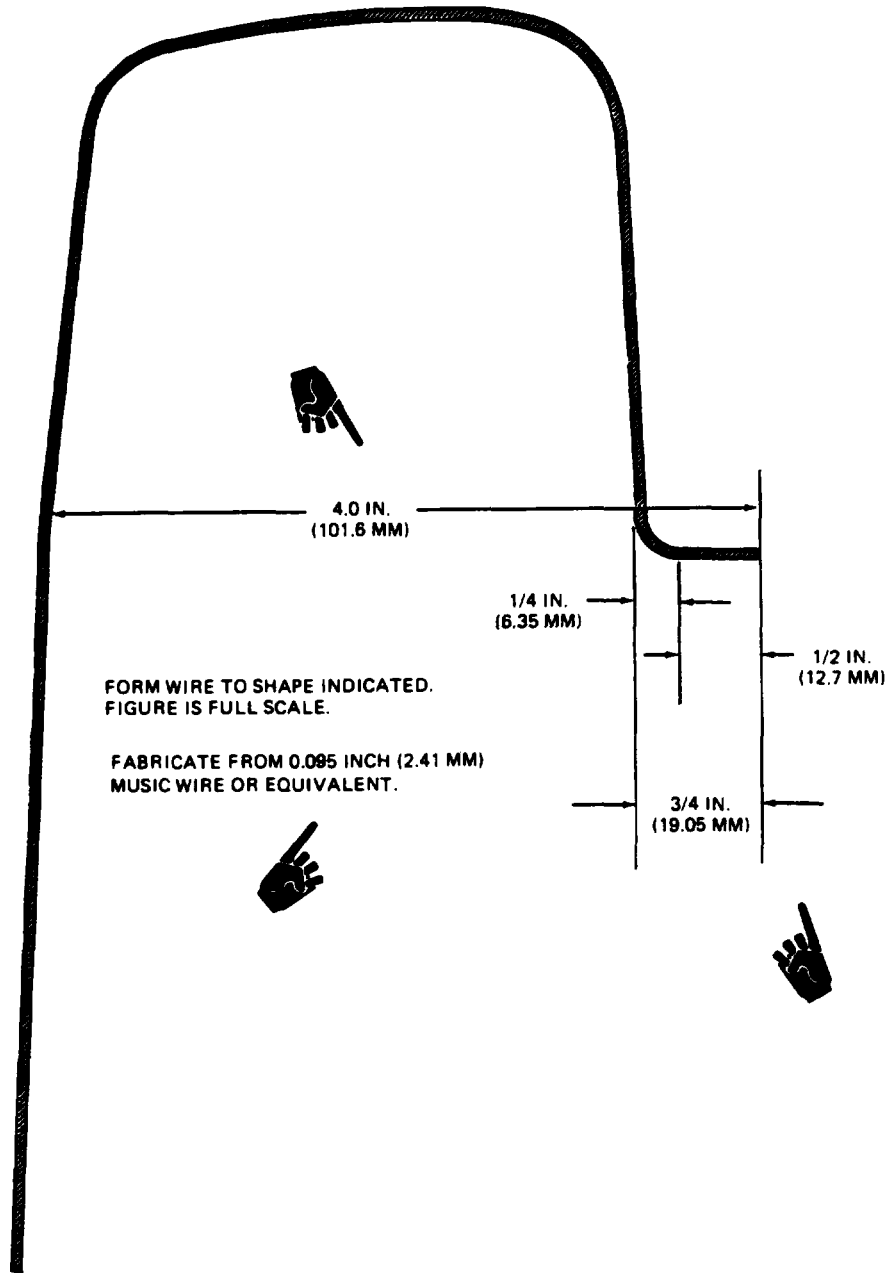
LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<b>NOTE</b> The following inspection shall be performed at the next hot end Inspection whenever an aircraft has flown for an extended period of time in heavy sand and dust environment, or when access is gained to the first stage gas producer turbine rotor for any reason.	
1. Engine	Use suitable music wire.	Fabricate a special gage using 0.095 inch minimum to 0.120 maximum diameter wire.



1-51. Sand In d Dust Ingestion (Hot End) (T53-L-13B/703 Engines) - Special Inspection -  
Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued



1.51. Sand and Dust Ingestion (Hot End) (T53-L-13S/703 Engines) - Special Inspection - Continued

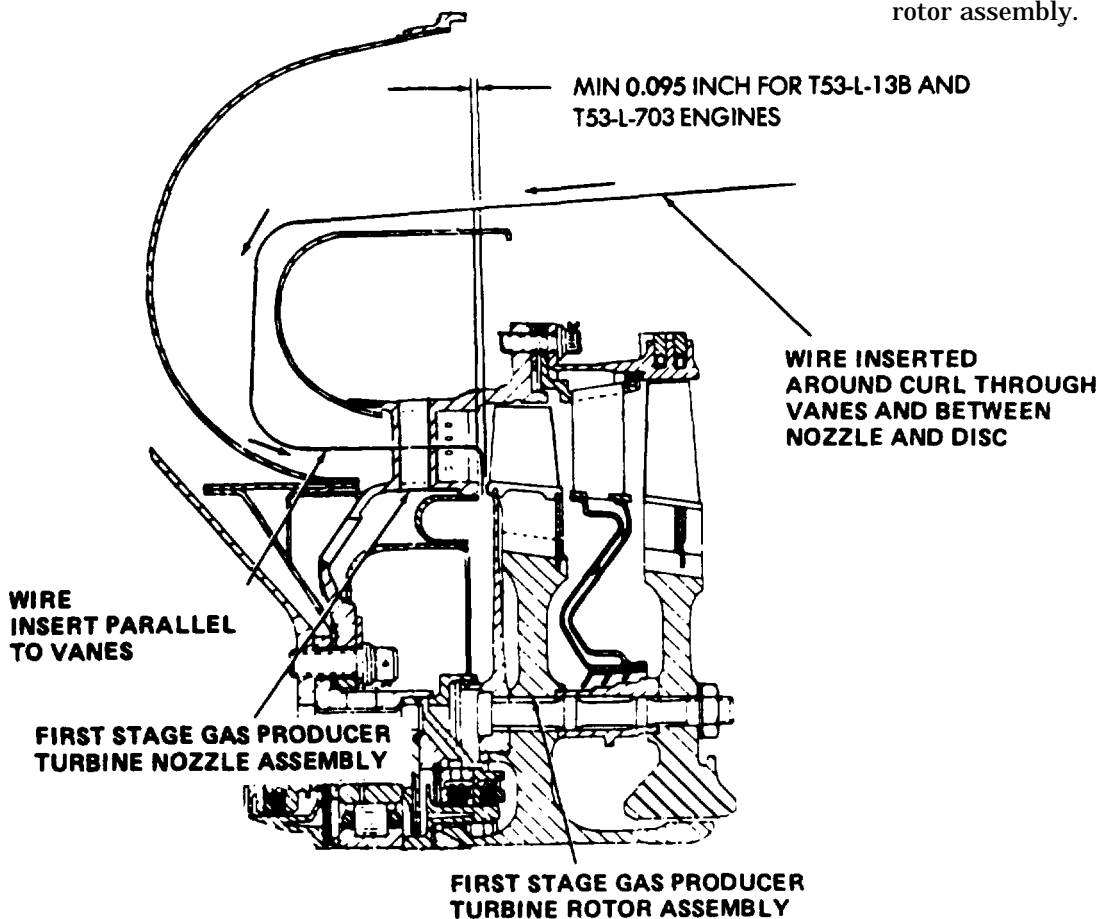
LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

2. First Stage Gas Reducer Turbine Nozzle Assembly

Use a suitable mirror and light when performing this action.

**Insert** gage around first stage gas producer turbine nozzle assembly liner (curl) through nozzle vanes and between first stage gas producer turbine nozzle assembly and first stage gas producer turbine rotor assembly.



3. Second Stage Gas Reducer Turbine Assembly

Minimum clearance shall be as given in Appendix G, table G-6, reference number 27. If clearance is within limits, no further inspection is required.

Rotate 360 degrees. Check minimum clearance.

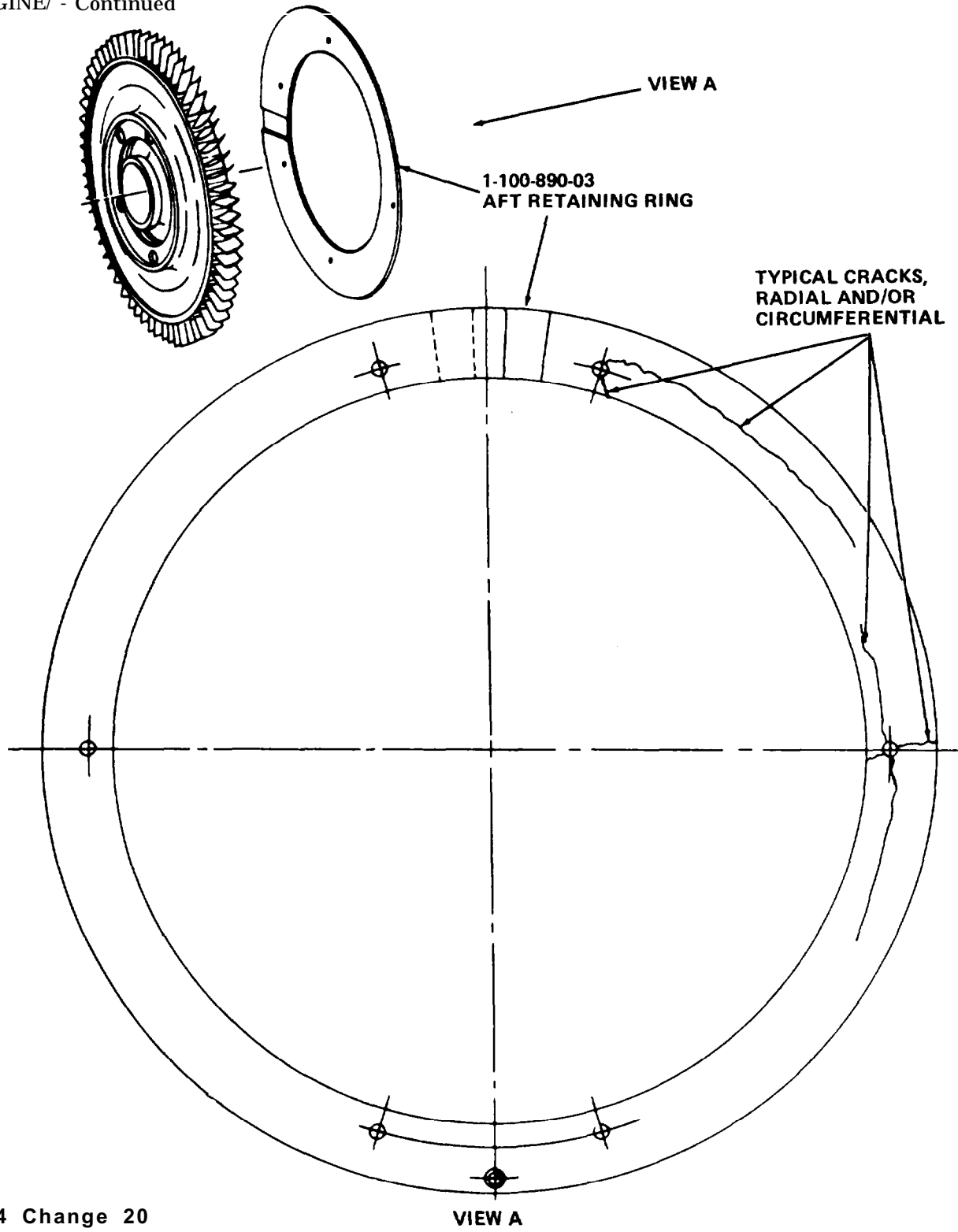
1-51. Sand and Dust Ingestion (Hot End) (T53-L-13B/703 Engines) - Special Inspection -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/- Continued	<b>NOTE</b>	
	Perform actions for items 4 thru 6 if clearance is not within limits (below minimum).	
4. Second Stage Gas Producer Turbine Rotor and Nozzle Assemblies	Refer to paragraph 4-12.	<b>Remove.</b>
5. First Stage Gas Producer Turbine Rotor Blades and First Stage Gas Producer Turbine Nozzle Assembly Cylinder Flange	Refer to paragraph 4-12. Tip clearances shall be as given in Appendix G, Table G-6, reference number 29.	<b>Check</b> and record tip clearance between these items.
6. First Stage Gas Producer Turbine Rotor Assembly	Refer to paragraph 4-12. In step a., the aft retaining ring is secured to the rotor assembly by means of a snap fit. Do not remove the retaining ring from the rotor assembly for this inspection. The retaining ring is shown removed for clarity only. The following figure illustrates inspection areas of aft retaining ring.	<p><b>Remove. Inspect</b> as follows:</p> <p>a. Visually Inspect aft retaining ring for cracks and bowing. If cracks and/or bowing are evident, replace first stage gas producer turbine rotor assembly.</p> <p>b. Deleted.</p>

1-51. Sand and Dust Ingestion (Hot End) (T53-L-13B/703 Engines) - Special Inspection -  
Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued



1-51. Sand and Dust Ingestion (Hot End) (T53-L-13B/703 Engines) - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
7, First Stage Gas Producer Turbine Rotor Assembly	For step a., refer to paragraph 4-14. For step b., refer to paragraph 4-19.	<p>If the first stage gas producer turbine rotor assembly has axial and tip clearances below minimum, but is within limits of preceding action for item 6, <b>proceed</b> as follows:</p> <p>a. <b>Shim</b> rotor assembly to <b>obtain</b> required dimensions if axial clearance is under minimum limits.</p> <p>b. <b>Grind</b> nozzle cylinder to <b>obtain</b> required dimensions if tip clearance is under minimum limits.</p>
8. Bleed Band Actuator	Perform this action on bleed band actuator only. Refer to paragraph 2-57.	<p><b>Remove</b> and <b>disassemble</b>. <b>Clean</b> piston and housing bore with drycleaning solvent. <b>Reassemble</b> and <b>reinstall</b> actuator. <b>Rig</b> system.</p>

1-52. **Combustor Turbine Assembly (Hot End) (T53-L-11 Series Engines) - Special Inspection.** An internal inspection of the combustor turbine assembly may be required if performance degradation is noted on the Health Indicator Teat (HIT) and if the cause is not found in other areas of the engine, or in the engine instrumentation. A visual inspection can be made with a mirror and light. If the visual inspection reveals a need for repair or replacement, refer to applicable paragraphs for the particular component. Disassemble combustor turbine assembly only as far as necessary to correct a defective condition. A combustor turbine inspection shall include the following:

- a. Power shaft bolt flange depth measurement. (Refer to paragraph 4-39.)
- b. A tip clearance check of the gas producer rotor, using a 0.025 inch feeler gage and of the power turbine rotor, using 0.025 inch diameter wire.

Table 1-6 is a checklist for internal (hot end) inspection.

Table 1-6. Internal (Hot End) Inspection Checklist (T53-L-11 Series Engines)

COMPONENT	INSPECT FOR	REMARKS
Internal components in general	Indications of uneven combustion (e.g., heat damage or uneven carbon buildup)	Visually inspect. (Refer to paragraph 4-6.)
Power shaft rear internal threads	Damage	Visually inspect.
First stage turbine wheel	1. Tip clearance	1. Minimum clearance is 0.025 (0.63 mm) inch. (Refer to paragraph 4-37.)
	2. Blade damage	2. Visually inspect. (Refer to paragraph 4-29.)
	3. Disc damage	3. Visually inspect. (Refer to paragraph 4-29.)
First stage nozzle and flange assembly	1. Nozzle for burning, distortion, and cracks	1. Visually inspect. (Refer to paragraph 4-35.)
	2. Flange for distortion	
	3. Bolts for security	
Deflector curl	Cracks	Visually inspect.
Air diffuser	1. Third row vanes for nicks, dents, burrs, cracks, and minor punctures.	1. Visually inspect. (Refer to paragraph 2-43.)
	2. Third row vane brazements for minor cracks, voids, and crack-like indications.	2. Visually inspect. (Refer to paragraph 2-43.)
	3. Broken oil lines.	3. Check lower portion of diffuser for evidence of oil.
Power turbine assembly	1. Blade tip clearance	1. Minimum clearance is 0.025 inch (0.63 mm). (Refer to paragraph 4-48.)
	2. Blade damage	2. Visually inspect. (Refer to paragraph 4-24.)
	3. Disc damage	3. Visually inspect. (Refer to paragraph 4-24.)
	4. No. 3 seal leakage	4. Check inner cone of exhaust diffuser from forward face aft for evidence of oil streaks. Check aft face of disc by use of mirror and light inspection.

Table 1-6. Internal (Hot End) Inspection Checklist (T53-L-11 Series Engines) - Continued

COMPONENT	INSPECT FOR	REMARKS
Power turbine oil tubes	Leakage	Visually inspect. (Refer to paragraph 3-33.)
Power turbine nozzle and cylinder assembly	<ol style="list-style-type: none"> <li>1. Nozzle for burning, distortion and cracks</li> <li>2. Cylinder for distortion</li> </ol>	<ol style="list-style-type: none"> <li>1. Visually inspect. (Refer to paragraph 4-57.)</li> <li>2. Refer to paragraph 4-48.</li> </ol>
Combustion chamber assembly	Cracks, hot spots, burned areas, or buckling	Visually inspect. (Refer to paragraph 3-2.)
Combustion chamber drain valve	Torque of 35 to 40 pound-inches (0.4 kg/m to 0.5 kg/m) on attaching bolts	If bolts are loose, remove valve; replace gasket and check for cleanliness and proper operation. (Refer to paragraph 3-24.) Reinstall
Combustion chamber liner	<ol style="list-style-type: none"> <li>1. Cracks or burn damage</li> <li>2. Vaporizer seals for damage</li> <li>3. Liner brackets for damage</li> </ol>	<ol style="list-style-type: none"> <li>1., Visually inspect. (Refer to paragraph 3-6.).</li> <li>2. Check for excessive movement</li> <li>3. Check liner for excessive movement</li> </ol>
Fuel vaporizers	Cracks, burn damage, clogging, and warpage	Visually inspect. (Refer to paragraph 6-24.)
Starting fuel nozzles	Evidence of clogging and improper operation	Visually inspect. (Refer to paragraph 6-42.)
Igniter plugs	Cracks in ceramic and evidence of contact with liner	Remove and clean igniter plugs and visually inspect. (Refer to paragraph 7-44.)
V-band coupling	<ol style="list-style-type: none"> <li>1. Cracks</li> <li>2. Proper torque of bolts</li> </ol>	<ol style="list-style-type: none"> <li>1. Visually inspect. (Refer to paragraph 3-2.)</li> <li>2. Use torque wrench</li> </ol>
Exhaust diffuser	cracks, burns, and buckling	Visually inspect. (Refer to paragraph 3-26.)

Note: Perform vibration test (paragraph 1-93) and Jetcal test (paragraph 1-75) following engine reassembly,

**1-53. Combustor Turbine Assembly (Hot End) (T53-L-13B/703 Engines) - Special Inspection.**

An internal inspection of the combustor turbine assembly may be required if performance degradation is noted on the Health Indicator Test (Hill) and if the cause is not found in other areas of the engine, or in the engine instrumentation. A visual inspection can be made with a mirror and light. If the visual inspection reveals a need for repair or replacement, refer to applicable paragraphs for the particular component. A combustor turbine Inspection shall Include the following:

- a. Power shaft bolt flange depth measurement. (Refer to paragraph 4-40.)
- b. A tip clearance check of the second stage gas producer rotor, using a 0.020 inch feeler gage and of the second stage power turbine rotor, using a 0.025 inch diameter wire.

Table 1-7 is a checklist for internal (hot end) inspection.

Table 1-7. internal (Hot End) Inspection Checklist (T53-L-13B/703) Engines)

COMPONENT	INSPECT FOR	REMARKS
Internal components in general	Indications of uneven combustion (e.g., heat damage or uneven carbon buildup)	Visually inspect. (Refer to paragraph 4-7.)
Power shaft rear internal threads	Damage	Visually inspect.
Power shaft mating splines	Wear or fretting	Visually inspect. (Refer to paragraph 4-3.1.)
Second stage gas producer rotor assembly and second stage gas producer cylinder	<ol style="list-style-type: none"> <li>1. Tip clearance</li> <li>2. Blade damage</li> <li>3. Disc damage.</li> <li>4. Cylinder damage.</li> <li>5. Replace bolts with P/N MS9705-11</li> </ol>	<ol style="list-style-type: none"> <li>1 Minimum clearance is 0.020 inch (0.508 mm). (Refer to paragraph 4-12.)</li> <li>2. Visually inspect. (Refer to paragraph 4-15.)</li> <li>3. Visually inspect. (Refer to paragraph 4-1 5.)</li> <li>4. Visually inspect. (Refer to paragraph 4-17.</li> <li>5. Visually inspect.</li> </ol>
Second stage gas producer nozzle assembly	<ol style="list-style-type: none"> <li>1. Burning, distortion, and cracks</li> <li>2. Axial clearance between nozzle and second stage gas producer rotor assembly at blade roots.</li> </ol>	<ol style="list-style-type: none"> <li>1. Visually inspect. (Refer to paragraph 4-1 7.)</li> <li>2. Minimum clearance is 0.120 inch (0.305 cm) T53-L-13B engine. Minimum clearance is 0.050 inch (0.127 cm) T53-L-703 engine. Measure bent wire (Refer to paragraph 4-14).</li> </ol>



1-53. Combustor Turbine Assembly (Hot End) (T53-L-13B/703 Engines) - Special Inspection - Continued

Table 1-7. Internal (Hot End) Inspection Checklist (T53-L-13B/703) Engines) - Continued

COMPONENT	INSPECT FOR	REMARKS
First stage gas producer rotor assembly	<ol style="list-style-type: none"> <li>1. Blade damage and loss off parent metal and FOD. Loss of metal not acceptable.</li> <li>2. Blade displacement, leading edge tip 0.030 inch maximum.</li> <li>3. Sealing disc for rubs.</li> </ol>	<ol style="list-style-type: none"> <li>1. Visually Inspect. (Refer to paragraph 4-18.)</li> <li>2. Perform sand and dust Ingestion inspection. (Refer to paragraph 1-51.)</li> <li>3. No rub damage allowed. (Refer to paragraph 4-18.)</li> </ol>



Table 1-7. Internal (Hot End) Inspection Checklist (T53-L-13B/703 Engines) - Continued

COMPONENT	INSPECT FOR	REMARKS
First stage gas producer nozzle assembly	<ol style="list-style-type: none"> <li>1. Cracks in curl</li> <li>2. Uneven liner wear on curl</li> <li>3. Cracks in vane brazements and outer shroud</li> <li>4. Cracks in cylinder</li> <li>5. Check for interference fit between curl and combustion chamber liner</li> <li>6. Rubs are acceptable on inner shroud.</li> <li>7. Cracks in braze joint associated with rubs are not acceptable</li> </ol>	<ol style="list-style-type: none"> <li>1. Visually inspect. (Refer to paragraph 4-43. )</li> <li>2. Visually inspect. (Refer to paragraph 4-43. )</li> <li>3. Visually inspect. (Refer to paragraph 4-43.)</li> <li>4. Visually inspect. (Refer to paragraph 4-43.)</li> <li>5. Dimples on ID of liner must contact OD of curl. Verify by applying iron-blue pigment, (item 37, Appendix D) to liner dimples and mating nozzle and liner to simulate hot end installation. If contact is not evident through 360 degrees, carefully bend liner tab(s) inward as required.</li> <li>6. Visually Inspect. (Refer to paragraph 3-16.)</li> <li>7. Visually inspect. (Refer to paragraph 3-16.)</li> </ol>
No. 2 bearing housing	Corrosion on shroud	Visually inspect. (Refer to paragraph 2-75.)
Combustion chamber deflector	Cracks	Visually inspect. (Refer to paragraph 2-75.)
Air diffuser	<ol style="list-style-type: none"> <li>1. Third row vanes for nicks, dents, burrs, cracks and minor punctures</li> <li>2. Third row vane brazements for minor cracks, voids, and crack-like indications</li> <li>3. Deleted</li> </ol>	<ol style="list-style-type: none"> <li>1. Visually inspect. (Refer to paragraph 2-44.)</li> <li>2. Visually inspect. (Refer to paragraph 2-44.)</li> <li>3. Deleted</li> </ol>
First and second stage power turbine nozzle assemblies	Burning, cracks, and distortion Metallization deposits are acceptable	Visually inspect. (Refer to paragraphs 4-58 and 4-44.)

**Table 1-7. Internal (Hot End) Inspection checklist (T53-L-13B/703 Engines) - Continued**

COMPONENT	INSPECT FOR	REMARKS
First stage power turbine rotor assembly	<ol style="list-style-type: none"> <li>1. Blade damage</li> <li>2. Bolts for security</li> </ol>	Visually inspect. (Refer to paragraph 4-32.)
Second stage power turbine rotor and bearing housing assembly	<ol style="list-style-type: none"> <li>1. Tip clearance</li> <li>2. Blade damage</li> <li>1. Bearing housing, corrosion on baffle.</li> </ol>	<ol style="list-style-type: none"> <li>1. Minimum tip clearance 0,025 (0.635 mm) inch. (Insert wire through rear of exhaust diffuser.)</li> <li>2. Visually inspect, (Refer to paragraph 4-53.1</li> <li>3. Visually inspect. (Refer to paragraph 4-53.)</li> </ol>

**Table 1-7. Internal (Hot End) Inspection Checklist (T53-L-13B/103 Engines) - Continued**

COMPONENT	INSPECT FOR	REMARKS
First stage power turbine rotor assembly	<ol style="list-style-type: none"> <li>1. Blade damage</li> <li>2. Bolts for security</li> </ol>	Visually Inspect. Refer to paragraph 4-32.)
Second stage power turbine rotor and bearing housing assembly	<ol style="list-style-type: none"> <li>1. Tip clearance</li> <li>2. Blade damage</li> <li>3. Bearing housing, corrosion on baffle.</li> </ol>	<ol style="list-style-type: none"> <li>1. Minimum tip clearance 0.025 Inch (0.635 mm). (insert wire through rear of exhaust diffuser.)</li> <li>2. Visually inspect. (Refer to paragraph 4-53.)</li> <li>3. Visually inspect. (Refer to paragraph 4-53.)</li> </ol>

Table 1-7. Internal (Hot End) Inspection Checklist (T53.L-13B/703 Engines) - Continued

COMPONENT	INSPECT FOR	REMARKS
Combustion chamber housing	Cracks, hot spots, burned areas, or buckling	Visually inspect. (Refer to paragraph 3-3.)
Combustion chamber drain valve	Torque of 35 to 40 pound-inches on attaching bolts	If bolts are loose, remove valve; replace gasket and check for cleanliness and proper operation. (Refer to paragraph 3-25.) Reinstall.
Combustion chamber liner	1. Cracks or burn damage  2. Liner brackets for damage  3. Check for interference fit between combustion chamber liner and first stage gas producer nozzle curl.	1. Visually inspect. (Refer to paragraph 3-7.)  2. Check liner for excessive movement  3. Dimples on ID of liner must contact OD of curl. Verify by applying iron-blue pigment, (item 37 or 109, Appendix D) to liner dimples and mating nozzle and liner to simulate hot end installation. If contact is not evident through 360 degrees, carefully bend liner tab(s) inward as required.
Main fuel nozzles	Chafing and clogging.	Visually inspect. (Refer to paragraph 6-58.)
Starting fuel nozzles	Evidence of clogging and improper operation	Visually inspect. (Refer to paragraph 6-43.)
Igniter plugs	Cracks in ceramic and evidence of contact with liner	Visually inspect. (Refer to paragraph 7-46.)
V-band coupling	1. Cracks  2. Proper torque of bolts	1. Visually inspect. (Refer to paragraph 3-35.)  2. Use torque wrench. (Refer to paragraph 4-27.)
Exhaust diffusers	Cracks, burns, and buckling	Visually inspect. (Refer to paragraph 3-27.)
Starting Fuel purge system bracket and clamp assembly	Cracks in and adjacent to welded joints	Visual and fluorescent penetrant. (Detailed in paragraph H-20)

**Note:** Perform vibration test (paragraph 1-93). Perform Jetcalt test (paragraph 1-75) following engine reassembly.



**1-54. Inlet Housing and Compressor Assembly (T53-L-13B/703 Engines) - Special Inspection.**

An internal inspection of the compressor assembly may be required if performance degradation is noted on the Health Indicator Test (HIT) and if the cause is not found in other areas of the engine, or in the engine instrumentation. If the visual inspection reveals a need for repair or replacement, refer to applicable paragraphs for the particular component.

Table 1-7.1 is a checklist for compressor assembly inspection:

Table 1-7.1. Internal (Cold Section) Inspection Checklist (T53-L-13B/703 Engines)

COMPONENT	INSPECT FOR	REMARKS
Inlet Housing	Corrosion	Visually inspect (refer to para 2-3).
Guide Vanes	Vane damage and binding	Visually inspect (refer to para 2-9).
Compressor Housing	Corrosion and cracking	Visually inspect (refer to para 2-26).
Stator Vanes	FOD, cracks and distortion	Visually inspect (refer to para 2-26).
Blades	FOD and erosion	Visually inspect (refer to para 2-35). Record rotor assembly number 1-100 -720- on engine records.
Rotor Hub	Cracks, rubs and damage	Visually inspect (refer to para 2-36).
Impeller Housing	Rubs, cracks and corrosion	Visually inspect (refer to para 2-26).
Impeller	FOD and erosion	Visually inspect (refer to para 2-41).
Air Diffuser-First Row Vanes	FOD and erosion	Visually inspect (refer to para 2-44).
Inlet Guide Vane Actuator Assembly	Binding, distortion or excessive wear	Visually inspect (refer to para 2-13).
Bleed Band Actuator Assembly	Binding, distortion and scoring	Visually inspect (refer to para 2-58).

**Note:** Perform inlet guide vane actuator operational check (para 2-11) and a bleed band closure check (para 2-62) following engine assembly.

**1-55. First Stage Turbine Rotor Blade Displacement (T53-L-11 Series Engines) - Special Inspection INITIAL SETUP**

**Applicable Configuration**  
T53-L-11 Series Engines

**References**  
Para 4-28 and 4-29



1-55. First Stage Turbine Rotor Blade Displacement (T53-L-11 Series Engines) - Special Inspection -  
Continued

LOCATION/ITEM	REMARKS	ACTION
FIRST STAGE TUR- BINE ROTOR ASSEMBLY/		
1. First Stage Turbine Rotor Assembly	Perform this action when the combustion turbine is removed for any reason.	Visually inspect the aft side of first stage turbine rotor assembly for blades or blade wedges that have moved forward in the disc.
2. First Stage Turbine Rotor Blade	Observe the following limits:  a. Blade roots that are recessed (moved forward) 0.025 inch (0.63 mm) or less are acceptable.  b. One or more blades or blade wedges that are recessed more than 0.025 inch (0.63 mm) are unacceptable and first stage tur- bine rotor assembly must be removed and repaired. (Refer to paragraphs 4-28 and 4-29.)	Observe limits given.

1-56. No. 3 Bearing Seal - Special Inspection

INITIAL SETUP

Applicable Configuration  
All

References  
Para 4-22, 4-23, 4-24 and 4-53

LOCATION/ITEM	REMARKS	ACTION
POWER TURBINE ROTOR AND BEARING HOUSING ASSEMBLY/		
1. No. 3 Bearing Positive Contact Seal	Inspect seal under the following conditions:  a. Engine oil consumption is excessive.  b. Oil is observed dripping from aft end of engine or tailpipe after shutdown.	Inspect according to conditions given.

1-56 No. 3 Bearing Seal - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
POWER TURBINE ROTOR AND BEARING HOUSING ASSEMBLY/ - Continued	<p>c. Excessive exhaust smoke is noticed during engine operation.</p> <p>d. If thick deposit of soft wet carbon is evident on cooling air deflector in area of bolt holes.</p>	
2. Second Stage Turbine Rotor Assembly	Refer to paragraph 4-22 or 4-23.	Disassemble.
3. No.3 Bearing Seal	Refer to paragraph 4-24 or 4-53.	Impact for evidence of damage. Replace seal if damaged. Replace seal if oil leakage has been noted in preceding action for item 1.

1-57. Ovarspeed - Special Impaction

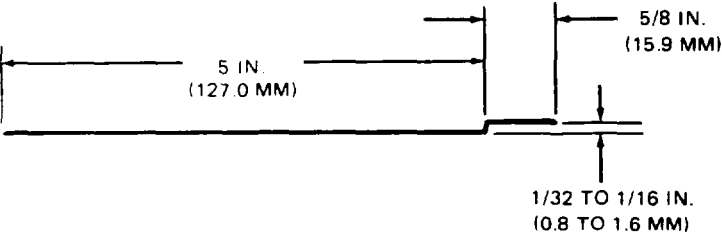
INITIAL SETUP

Applicable Configuration All	References Para 1-66	
LOCATION/ITEM	REMARKS	ACTION
NOTE		
If overspeed limits are exceeded, the following inspection must be performed. Replace engine if N <sub>2</sub> RPM exceeds 7200 (109%).		
1. Chip Detector		Check for metal chips.
2. oil Filter	If chips are noted during inspection, refer to paragraph 1-86.	Check for metal chips, lint, or other foreign material.

1-57. Overspeed - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<b>NOTE</b>		
If N1 limit has been exceeded, perform actions for items 3 thru 6.		
3. Combustor Turbine		Perform an internal (hot end) inspection.
4. Gas Producer Turbine Rotor Assembly	OnT53-L-13B/703 engines, check only second stage gas producer rotor assembly.	Perform tip clearance check.
5. Compressor Rotor Assembly		Check by rotating and listening for rubbing sounds. If rubbing is noted, inspect compressor and impeller housings.
6. Combustor Turbine	Engine is serviceable if no discrepancies are noted.	Determine and correct cause of overspeed. Perform initial check run.
<b>NOTE</b>		
If N2 limit of 6700 (101.5%) rpm has been exceeded, perform actions for items 7 thru 9.		
7. Power Turbine Rotor	Perform this action by tailpipe access.	Visually inspect for damage or missing blades.

1-57. Overspeed - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
8. Power Turbine Blades	<p>Perform this action without removal or disassemble of combustor turbine assembly on T53-L-13B/703 engines, check only second stage power turbine blades.</p> 	<p>Using 0.025 Inch (0.64 mm) diameter wire, fabricate a bent wire gauge and insert through exhaust diffuser to check minimum clearance at tip of second stage power turbine blade shrouded tip and second stage power turbine nozzle cylinder. Check clearance at a minimum of 4 locations at various clock positions and rotate rotor to ensure minimum clearance is present. If rubbing is evident, tip clearance is unacceptable and combustor turbine disassembly is required.</p>
9. Combustor Turbine	<p>If no discrepancies are noted, the engine is serviceable.</p>	<p>Determine and correct cause of overspeed. Perform initial check run.</p>

**NOTE**

If N2 m has exceeded maximum limit of 6,900 rpm (104.5%), perform actions for items 10 thru 12.



**1-57. Overspeed - Special Inspection - Continued**

LOCATION/ITEM	REMARKS	ACTION
10. Combustor Turbine		Perform an internal (hot-end) inspection.
11. Power Turbine Rotor Discs	No cracks are permitted.	Perform fluorescent-penetrant inspection, as detailed in paragraph H-20.
12. Combustor Turbine	Engine is serviceable if no discrepancies are noted.	Determine and correct cause of overspeed. Perform initial check run.

**1-58. Overspeed Limits - Special Inspection. An engine overspeed exists when the following limits are exceeded:**

- a. Compressor Rotor speed (N1).
  - (1) T53-L-11 series engines and T53-L-13B engines; 101.5 percent.
  - (2) T53-L-703 engines; 106 percent.
- b. Output Shaft Speed (N2).
  - (1) T53-L-11 Series Engines.
    - (a) Maximum limit: 6900 RPM.
    - (b) Maximum transient: 6900 RPM, for 3 seconds above 85 percent N1 speed.
    - (c) Maximum continuous: 6700 RPM above 85 percent N1 speed or 6900 RPM at 85 percent N1 speed or less.
  - (2) T53-L-13B Engines.
    - (a) Maximum limit: 6900 RPM.
    - (b) Maximum transient: 6900 RPM, for 3 seconds above 15 psi torque.
    - (c) Maximum continuous 6700 RPM above 15 psi torque or 6900 RPM at 15 psi torque or less.
  - (3) T53-L-703 Engines.
    - (a) Maximum limit: 6900 RPM (104.5 percent).
    - (b) Maximum transient: 6900 RPM (104.5 percent) for 10 seconds above 750°C TGT.
    - (c) Maximum continuous: 6700 RPM (101.5 percent above 750°C TGT or 6900 RPM (104.5 percent) at 750°C or less.

1-59. Inspection Following the Use of Emergency Fuels - Special Inspection

INITIAL SETUP

Applicable Configuration  
All

References  
TB 55-9150-200-24  
Para 4-2, 4-4, 4-28, 6-4, H-6, H-10, and H-11

LOCATION/ITEM	REMARKS	ACTION
ENGINE	<b>NOTE</b>	
	<p>After an engine has been operated on emergency fuels (gasoline, all types) for a cumulative total of 50 hours, a complete inspection of the combustor section is required (refer to TB 55-9150-200-24). The using activity will determine the necessity for performing the inspection.</p>	
1. Combustor Turbine Assembly	Refer to paragraphs 4-2 and 4-4.	Remove and disassemble.
2. Gas Producer Turbine Rotor	Refer to paragraphs 4-28 and 6-4.	Remove gas producer turbine rotors, air deflector and nozzle(s).
<div style="border: 2px solid black; padding: 5px; display: inline-block;"><b>WARNING</b></div>		
	<p>When an engine has operated on leaded fuel the internal parts of the combustion chamber will be coated with poisonous lead-oxide deposits in powder form. Use all possible precaution to prevent the powder from entering any cuts or body openings, particularly the mouth and nostrils. Because of possible absorption, the lead-oxide powder must not be allowed to remain on the skin. Always wear gloves and a face mask when disassembling a contaminated engine.</p>	
3. Engine	<p>T53-L-11 series engines only. Clean all engine parts according to the following methods.</p> <p>a. Ceramic-coated parts, using solvent immersion method. (Refer to paragraph H-10.)</p>	Clean parts.

**1-59. inspection Following the Use of Emergency Fuels - Special Inspection**

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued	<p>b. SAC-coated or aluminized parts (first turbine nozzle and first turbine rotor), using dry cleaning solvent method. (Refer to paragraph H-6.</p> <p>c. All other affected pans, using vapor blasting (liquid honing) method. (Refer to paragraph H-11.)</p>	<p>Clean all parts using vapor blasting (liquid honing) method. Refer to paragraph H-11.)</p>
4. Engine	<p>T53-L-13B/-703 engines only. This action pertains to a engine parts with the exception of the first and second stage gas producer nozzle assemblies and first and second stage gas producer turbine rotor assemblies.</p>	<p>Clean all parts using vapor blasting (liquid honing) method. Refer to paragraph H-11.)</p>
5. Engine		<p>Perform a thorough inspection of all parts. Refer to applicable paragraphs for instructions on inspection, repair, and replacement of each affected component.</p>

**1-60. Overtemperature Limits (T53-L-11 Series Engines) - Special Inspection. An overtemperature condition exists under the following specifications.**



**An Internal (hot-end) Inspection Is required following an overtemperature condition in following step a.**

- a. During starts and accelerations, under the following conditions:
  - (1) When EGT exceeds 640°C for more than 5 seconds.
  - (2) When EGT exceeds 760°C at any time.
- b. At takeoff power when EGT exceeds 640°C.
- c. At military power when EGT exceeds 640°C.
- d. At normal rated power, when EGT exceeds 620°C.



**CAUTION**

**If the engine cannot be operated without exceeding takeoff, military, or normal rated power EGT limits, this is an indication of operation in excess of normal capabilities, engine malfunction, or instrument error. Refer to troubleshooting, Section VI to determine cause and corrective action.**

e. When an engine has been subjected to an overtemperature condition, an internal (hot end) inspection shall be performed (refer to paragraph 1-52. )

**1-61. Overtemperature Limits (T53-L-13B Engine) - Special Inspection.** An overtemperature condition exists under the following specifications.

**CAUTION**

**A hot end Inspection is required following on overtemperature condition in following Stop A. Replace engine if temperature exceeds 900°C.**

a. During starts and accelerations, under the following conditions.

(1) When EGT exceeds 625°C for more than 10 seconds.

(2) When EGT exceeds 675°C for more than 5 seconds.

(3) When EGT exceeds 760°C at any time.

b. When 30 minute limit is exceeded between 611 and 625° C.

c. Deleted

**CAUTION**

**If the engine cannot be operated without exceeding EGT limits, this is an indication of operation in excess of normal capabilities, engine malfunction, or instrument error. Refer to troubleshooting Section VI to determine cause and corrective action.**

d. When an engine has been subjected to an overtemperature condition, an internal (hot end) inspection shall be performed (refer to paragraph 1-53.).

**1-62. Overtemperature Limits (T53-L-703 Engine) - Special Inspection.** An overtemperature condition exists-under the following specifications.

a. During starts or accelerations when turbine as temperature TGT exceeds 950°C at any time, or when TGT exceeds 880°C for more than 5 seconds.



**If the above temperature Is exceeded, a hot end Inspection must be performed. Replace engine if temperature exceeds 1000°C.**

b. When 30 minute limit is exceeded between 821° and 880°C.

c. Deleted.



**If the engine cannot be operated without exceeding TGT limits, this Is an indication of operation In excess of normal capabillities, engine malfunction, or instrument error.**

d. When an engine has been subjected to an overtemperature condition, an internal (hot end) inspection shall be performed (refer to paragraph 1 -53).

**1-63. Heat Damage and Distortion (T53-L-11 Series Engines) - Special Inspection.**

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

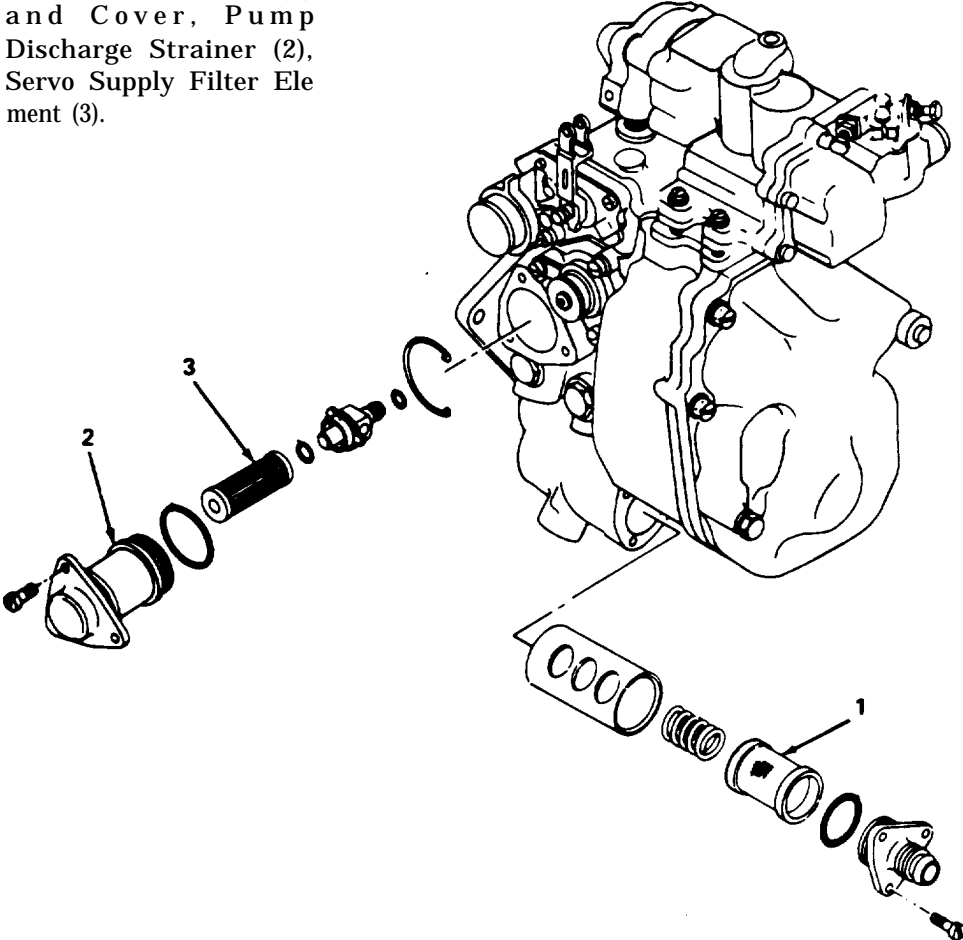
LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER HOUSING/	<p style="text-align: center;"><b>NOTE</b></p> <p>When the combustor turbine assembly is removed for any reason, inspect the first stage turbine nozzle and combustion chamber liner for localized burning and distortion, Burning and distortion are most frequently caused by uneven fuel distribution due to clogging of fuel system components.</p>	

I-63 Heat Damage and Distortion (T53-L-11 Series Engines) - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMBUSTION  CHAMBER HOUSING/ -  Continued</p>		
<p>1. Vaporizer Assembly</p>	<p>Vaporizer flow divider is clogged or is not centered or the splitter (partition) within the tube when the following conditions exist:</p> <ul style="list-style-type: none"> <li>a. excessively burned exit legs</li> <li>b. heavy carbon formation in an uneven overall pattern</li> <li>c. one of the liner baffle discs corresponding to the exit legs of this vaporizer is soot-free, while the other is heavily carboned.</li> </ul>	<p>Inspect for excessively burned exit legs and heavy carbon formation in an uneven overall pattern. Replace vaporizer.</p>
<p>2. Vaporizer</p>	<p>If a particular set of baffle discs shows no evidence of soot buildup as compared to the remaining baffle discs, the vaporizer flow divider, the fuel injector in the fuel manifold connector, or the fuel manifold itself is clogged.</p>	<p>Inspect for general condition of all baffle discs corresponding to vaporizer exit legs. Replace vaporizer and affected fuel manifold segment,</p>
<p>3. Starting Fuel Nozzle and Manifold</p>		<p>Inspect for burning and/or heat distortion in line with a starting fuel nozzle. If this condition exists replace starting fuel nozzles and check manifold for clogging.</p>
<p>4. Vaporizer Seals</p>		<p>Check axial movement by reaching into liner and pulling on seal. Remove liner and replace seal if seal is loose.</p>

1-64. Contaminated Fuel Control Strainers and Filter - Special Inspection Requirements

INITIAL SETUP

Applicable Configuration All	References Para 6-11,6-12 and 6-13	
LOCATION/ITEM	REMARKS	ACTION
<p>FUEL CONTROL/  Fuel Inlet Strainer (1) and Cover, Pump Discharge Strainer (2), Servo Supply Filter Element (3).</p>		<p>Inspect and clean fuel inlet strainer (1) and cover and pump discharge strainer (2), and replace servo supply filter element (3) at the following intervals.</p> <ul style="list-style-type: none"> <li>a. Completion of initial ground runup.</li> <li>b. After first 5 hours of engine operation.</li> <li>c. After first 15 hours of engine operation.</li> <li>d. If contamination persists, or climatic conditions are adverse, operating authorities may require more frequent inspection. Replace servo supply filter element at each inspection.</li> </ul>

Refer to paragraphs 6-11, 6-12, and 6-13. All required new packings and filter are supplied in fuel and oil system inspection kit (1-200-030-27).

**1-64. Contaminated Fuel Control Strainers and Filter - Special Inspection Requirements - Continued**

LOCATION/ITEM	REMARKS	ACTION
FUEL CONTROU- Continued		

**1-65. Oil Overtemperature Limits - Special Inspection.**

INITIAL SETUP

Applicable Configuration  
All

LOCATION/ITEM	REMARKS	ACTION
	<b>NOTE</b>	
	An engine oil overtemperature condition exist when limits given are exceeded.	
1. Engine	<p>Observe the following limits for normal operating conditions:</p> <p>a. At ambient temperatures below 30°C the maximum (red line) "Oil In" temperature is 93°C.</p> <p>b. At ambient temperatures of 30°C and above a steady state engine "Oil In" temperature of 94° to 100°C is acceptable provided the following requirements and limitations are observed.</p>	<p>Inspect oil filter when the oil temperature exceeds 93° for more than 10 minutes.</p> <p>Inspect oil filter after 50 hours of engine operation for excessive accumulation of carbon or metal particles.</p>

1-65. Oil Overtemperature Limits - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
	<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>CAUTION</b> </div> <p style="text-align: center;"><b>It must be clearly understood that there is a possibility that mechanical components may suffer damage if engine operating conditions are extended beyond limits given in item 2.</b></p>	
2. Engine	<p>Under abnormal conditions such as an oil cooling system malfunction or failure, the following engine "Oil In" temperature limits will minimize the risk involved in operating an engine which has exceeded temperature limits.</p>	
	a. 101°C to 130°C for ten minutes or less	Check engine oil screens and main oil filter.
	b. 101°C for more than 10 minutes but less than 30 minutes.	Change oil. Clean all screens and main oil filter. Ground run engine for 30 minutes and recheck main oil filter for carbon and metal particles. If contamination is found clean oil screens and oil filter. Repeat oil change and ground run engine.
	c. 101°C to 130°C for more than 30 minutes	Return engine to depot.
	d. 131°C and above.	Return engine to depot.

1-66 Inspections and Source Determination of Contaminated Oil - Special Inspection

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Drycleaning Solvent (item 24, Appendix D)  
Lubricating Oil (item 46 or 47, Appendix D)

**References**  
Para 1-67  
TB43-0106

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/

**NOTE**

**Perform spectrometric oil analysis in accordance with TB 43-0106.**

**NOTE**

**Whenever an engine inspection has revealed a continuance or an increase of metal chips in the oil filter or on the chip detector, perform the inspection following.**

**This inspection is intended to determine the source of visible metal chips in the oil system normally resulting from the rapid disintegration or failure of an internal part. For the evaluation of microscopic metal contamination observed as the result of spectrometric examination of engine oil, refer to paragraph 1-67.**

**If composition of visible metal chips can be determined, refer to paragraph 1-67 for probable source areas.**

1-66. Inspections and source Determination of Contaminated Oil - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/		
1. Main Oil Filter Elements		Check for chip accumulation which could have placed filter into bypass. Clean and reinstall.
2. No. 2 Bearing strainer and No. 3 and 4 Bearing Strainer	No. 3 and 4 bearing strainer is strainer bore on T53-L-13B/703 engines.	Remove. Inspect for metal chips.
3. Reduction Gear Oil Transfer Tube Strainers and Over-speed Governor and Tachometer Drive Oil Throttle Strainer	Perform this action if chips are present.	Remove and inspect.
4. Engine	Perform this action if metal chips have clogged more than one third of flow area of any one of previously mentioned.	Ship to depot.
5. Engine	Perform this action if amount of chips is not excessive.	Clean, Reinstall strainers. Proceed to action for item 6.
6. Oil Filter	Presence of chips in previously mentioned strainers indicates bypass of oil filter has occurred.	Replace.
7. No. 2 Bearing Scavenge Line		Check for metal contamination.
8. Engine	T53-L-11 series engines only.	If chips are evident, ship engine to depot for bearing replacement.

**WARNING**

**Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).**



1-66. Inspections and Source Determination of Contaminated Oil - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
9. Engine	T53-L-13B/703 engines only. Use dry-cleaning solvent (item 24, Appendix D).	If chips are evident, inspect and replace bearing if required. Flush components with drycleaning solvent. Reinstall.
10. No. 3 and 4 Bearing Scavenge Line		Check for metal contamination,

**WARNING**

**Drycleaning solvent, P-D-660, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C)**

11. Combuator Turbine Assembly	Perform this action if chips are evident in No. 3 and 4 bearing scavenge line. Use drycleaning solvent (item 24, Appendix D).	Remove. Disassemble power turbine and bearing housing assembly. Inspect bearings. Replace if required. Flush components with dry-cleaning solvent. Reassemble components.
--------------------------------	---	---

**WARNING**

**Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).**

12. Reduction Gearing	Use drycleaning solvent (item 24, Appendix D).	Remove and inspect its condition. Replace if required. Flush components with dryckaning solvent. Reassemble components.
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1-66. Inspections and Source Determination of Contaminated Oil - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
13. Accessory Drive Gearbox Assembly		<b>Remove.</b>
14. Shaftgear Assembly	Take note of condition of upper and lower bearings on this shaft.	<b>Remove and inspect.</b>
<b>WARNING</b>		
<b>Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).</b>		
15. Scavenge Strainer		<b>Inspect and clean.</b>
16. Shaftgear Assembly	Use drycleaning solvent (item 24, Appendix D).	<b>Flush</b> shaftgear assembly and internal components of gearbox with drycleaning solvent. <b>Reassemble</b> components.
AIRFRAME/		
17. Oil System		<b>Flush.</b>
18. Oil Cooler		<b>Replace</b> on airframe not equipped with auxiliary external oil filter.

**WARNING**

**Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.**

1-66 Inspections and Source Determination of Contaminated Oil - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

**NOTE**

Use lubricating oil (item 46 or 47, Appendix D). It is not advisable to mix MIL-L-23699 oil with MIL-L-7808 oil, except in case of emergency. If it becomes necessary to mix the oil, flush system within 6 hours.

ENGINE/

19. Engine

**Service** oil system with lubricating oil. **Operate** engine at 70 to 80 percent N1 for 5 minutes. **Shut down** engine. Allow to cool.

20. Chip Detector and Oil Filter Strainers

Amount of chips noted during this inspection should be less than the original amount.

**Inspect** for chips. **Repeat** actions for items 17 thru 19, increasing engine operating time to 10 minutes.

21. Engine

When performing this action, increase operating time to 30 minutes. If no appreciable amount of chips is noted, engine may be returned to service. If amount of chips remains the same or increases, ship engine to depot.

**Repeat** inspection, servicing, and operating cycle.

1-67. Spectrometric Oil Inspection - Special Inspection

INITIAL SETUP

Applicable Configuration All	References Para 4-23 and 1-66	
LOCATION/ITEM	REMARKS	ACTION

**NOTE**

Perform actions within this paragraph when a spectrometric inspection of engine oil indicates the presence of metal contamination.

1-67. Spectrometric Oil Inspection - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/		
AIRFRAME/		
1. Airframe Components		<b>Check</b> to determine if contamination results from defective starter generator cooling fan or other components which could contaminate engine oil supply.
2. Airframe		<b>Check</b> for improperly cleaned airframe.
3. Engine		<b>Check</b> engine lubrication system components such as oil tank, oil cooler, filters, and lines for residual contamination resulting from a previous failure.
4. Engine	<p>If actions for items 1 thru 3 do not indicate the source of trouble, perform this action. Spectrometric analysis is as follows:</p> <p>a. Silver predominating metal,</p> <p>(1) Silver alone is not cause for engine rejection.</p> <p>(2) On T53-L13B engine it is common to find indications of silver. Usual discrepant areas are the impellers (1-100-140-01, 1-100-140-02, 1-140-189-02, or 1-140-191-02). (Refer to paragraph 4-23.)</p> <p>(3) Loss of silver in these areas is not detrimental to engine operation. However, if corrective action is deemed necessary due to a high silver contamination level in the oil, the impellers can be replaced or repaired and the engine returned to service following completion of action for items 5 thru 7.</p>	<b>Evaluate</b> the contamination in accordance with the predominating metal as indicated by the spectrometric analysis.

1-67. Spectromtric Oil Inspection - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued	<p>b. Silver/copper or silver/iron predominating metal.</p> <p>(1) This condition may be an indication of pending bearing failure. Visually <b>determine</b> condition of bearings,</p> <p>(2) If defective bearings cannot be replaced or if secondary damage has occurred, ship engine to depot.</p> <p>c. Copper predominating metal.</p> <p>(1) <b>Inspect</b> spherical washer of sun gear retainer for wear. (Not applicable to T53-L-13B, T53-L703, or engines having washer 1-030-138-04 installed.)</p> <p>(2) <b>Replace</b> washer if defective.</p> <p>d. Iron predominating metal.</p> <p>(1) <b>Check</b> torquemeter cylinder for wear.</p> <p>(2) <b>Check</b> reduction gears for wear.</p> <p>(3) <b>Replace</b> defective parts.</p>	
<b>NOTE</b>		
<p>Since extremely low concentration of metal particles can be separately identified and measured by spectrometric analysis, it must be recognized that detected metal particles are of microscopic size, invisible to the naked eye, cannot be felt between the fingers, and capable of passing freely through the oil filters. This presents a problem in troubleshooting since the failing part may be undetectable unless carefully examined.</p>		
5. Engine	Refer to paragraph 1-67.	<b>Flush</b> engine oil system.

1-07. Spectrometric Oil Inspection - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - <i>Continued</i>		
6. Engine	Obtain oil analysis samples from the oil tank filler neck soon after shutdown utilizing tube from sampling kit.	<b>Monitor</b> effectiveness of repair with successive spectrometric oil analysis tests.
7. Engine		If contamination level does not subside, <b>ship</b> engine to depot, flush airframe oil system, oil cooler and oil tank. Refer to applicable airframe manual.

1-68 Initial Check Run - Special Inspection Before and After

INITIAL SETUP

Applicable Configuration

All

Consumable Materials

Drycleaning Solvent (item 24, Appendix D)  
Lubricating Oil (item 46 or 47, Appendix D)

References

Para 1-87,1-89,1-66

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<b>NOTE</b>	
	Procedures contained within this paragraph are for preparing an engine for check runs.	
	<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;"><b>WARNING</b></div> <p>Drycleaning solvent, P-D-660, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).</p>	
I. Main Oil Filter Cover Assembly	Use drycleaning solvent (item 24, Appendix D).	<b>Remove. Clean</b> using drycleaning solvent.

1-66. Initial Check Run - Special Inspection Before and After - Continued

LOCATION/ITEM	REMARKS	ACTION
<b>WARNING</b>		
<b>Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.</b>		
<b>CAUTION</b>		
2. Aircraft Oil Tank	Use lubricating oil (item 46 or 47, Appendix D).	<b>Fill</b> with lubricating oil.
3. Engine	Motor engine; if necessary, as outlined in paragraph 1-87, Refer to paragraph 1-89 with starting engine.	<b>Start</b> engine.
4. Engine		<b>Operate</b> for several minutes at flight idle and then <b>shut down</b> .
5. Engine		<b>Inspect</b> for leaks and security of mounting of hoses and accessories.
6. Engine		<b>Start. Run</b> at flight idle for 3 minutes. <b>Accelerate</b> gradually until highest power is obtained without gaining flight attitude and temperatures have stabilized.

1-66. Initial Check Run - Special Inspection Before and After - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
7. Engine		<b>Decelerate</b> engine to flight idle and run to allow EGT to stabilize for 2 minutes. <b>Shut down</b> engine.
8. Engine		<p><b>Inspect</b> for the following:</p> <p>a. Leaks and security of mounting provisions, hoses, and accessories.</p> <p>b. Accumulation of metal chips, lint, or other foreign material in oil filter, or on chip detector.</p>
9. Engine	Perform this action if there is no accumulation of metal chips, lint, or other foreign materiel.	<b>Continue</b> engine ground operation checks.
10. Engine	Perform this action if there is alight accumulation of metal chips, lint, or foreign material.	<p><b>Clean</b> and <b>reinstall</b> chip detector and oil filters. <b>Restart</b> engine and perform second run for several minutes at highest power obtainable without gaining flight attitude. If further accumulation is found, proceed to following action for item 11.</p>
11. Engine	Perform this action if there is excessive accumulation of metal chips, lint, or other foreign material. Refer to paragraph 1-66. If contamination is present refer to paragraph 1-64.	<b>Determine</b> source of contamination.
12. Fuel Regulator Filters		<b>Remove, inspect, clean, reinstall or replace.</b>



1-69. Overtorque Limits-Special Inspection

INITIAL SETUP

Applicable Configuration All	References Para 1-66	
LOCATION/ITEM	REMARKS	ACTION

OUTPUT REDUCTION  
AND GEAR ASSEMBLY/

**CAUTION**

**The following limits are engine torque limits only. Pilot monitoring may be necessary to prevent the engine from exceeding these limits and airframe limits.**

<p>1. Engine</p>	<p>On T53-L11 series engines output shaft torque shall not exceed the following values:</p> <p>a. Takeoff (5 minutes) -50 psi (926 pound-feet).</p> <p>b. Military (30 minutes) -48 psi (888 pound-feet).</p> <p>c. Normal (continuous) -46 psi (850 pound-feet).</p> <p>d. Transient operation (2 seconds or less) - 77 psi (1410 pound-feet).</p>	<p><b>Observe</b> given limits.</p>
<p>2. Engine</p>	<p>On T53-L13B/703 engines output shaft torque shall not exceed the following values:</p> <p>a. Military (30 minutes) 64 psi (114%)</p> <p>b. Normal (continuous) 60 psi (107%)</p> <p>c. Transient operation (2 seconds or less) 86 psi (153%)</p>	<p><b>Observe</b> given limits.</p>

**NOTE**

When engine output shaft torque limits have been exceeded, perform actions for items 3 thru 8.

1-69. Overtorque Limits - Special Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
OUTPUT REDUCTION AND GEAR ASSEMBLY/ - Continued		
9. Output reduction carrier and gear assembly	Refer to paragraph 9-6.	<b>Inspect.</b>
4. Chip detector	Refer to paragraph 5-9.	<b>Inspect</b> for metal chips.
5. oil filter	Refer to paragraph 8-6.	<b>Inspect</b> for metal chips or other foreign matter.
6. Chip detector and oil filter	Perform this action if normal accumulation of metal or foreign matter is observed. If excessive accumulation of metal or foreign matter is observed, perform oil contamination inspection as outlined in paragraph 1-66.	<b>Clean.</b> Operate engine for 10 minutes. <b>Repeat</b> preceding actions for items 4 and 5.
7. Engine		<b>Repeat</b> action for item 6, increasing engine operation time to 30 minutes.
8. Engine	If no excessive accumulation of metal or foreign matter is noted, engine maybe re-lead for normal operation.	<b>Perform</b> flight test. <b>Repeat</b> actions for items 4 and 5.

1-70. Sudden Stoppage-Special Inspection.

INITIAL SETUP

Applicable Configuration All	References Paras 1-57 and 1-69	
LOCATION/ITEM	REMARKS	ACTION

OUTPUT REDUCTION  
CARRIER AND GEAR  
ASSEMBLY/

**NOTE**

Sudden stopping of main rotor with power on requires inspection using the following procedures.

1. Output reduction carrier and gear assembly

Perform this action if sudden stopping does not result in separation of transmission shaft (Short shaft).

**Inspect** output reduction and gear assembly. **Perform** overtorque inspection {refer to paragraph 1-69).

2. Output reduction carrier and gear assembly

Perform this action if sudden stopping results in separation of transmission shaft (short shaft). Refer to paragraphs 1-69 and 1-57.

**Inspect. Perform** both an overtorque and overspeed inspection.

**1-71. After Excessive G Loads - Special Inspection.**

INITIAL SETUP

Applicable Configuration  
All

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

**NOTE**

If it is suspected that excessive G loads have been imposed on engine perform procedures within this paragraph. Maximum G loads of specified forces are as follows:

Vertical	10 G's
Side	4 G's
Forward	3 G's
Aft	4 G's

1. Engine

Perform this action if it is suspected that excessive G loads have been imposed on engine.

**Inspect** immediately after flight during which excessive loads occurred, as follows:

- a. **Check** overspeed governor and tachometer drive assembly for cracks, distortion, and bent shafts.
- b. **Check** engine mounting pads for cracks.
- c. **Check** fuel control, accessory drive gearbox assembly oil filter, and all accessories for cracked flanges, loose bolts, nuts, and hose connections for cracks.
- d. **Perform** initial check run and vibration check on engine.

**1-72. Engine Involved in Aircraft Mishap - Inspection.** If engine is involved in a mishap, perform same inspection as required for engine dropped during handling. (Refer to paragraph 1-46.)

Section VI. TROUBLESHOOTING

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General Troubleshooting	1-128
Symptom Index	1-128
Lubrication System Contamination Troubleshooting Procedure	1-169
Exhaust Thermocouple Assembly System	1-170

**1-73. GENERAL TROUBLESHOOTING.**

It is essential to have a thorough knowledge of specified fuel flow, oil pressure, exhaust gas temperature and other important specifications of normal engine operation to discover troubles. Having a record of prior trouble and work performed is essential information when troubleshooting.

Check each possible source of trouble. Isolate the area by a process of elimination. Systematic checking of suspect areas is essential.

The troubleshooting charts listed in table 1-8, Symptom Index, provide for systematic fault isolation of the engine and its systems.

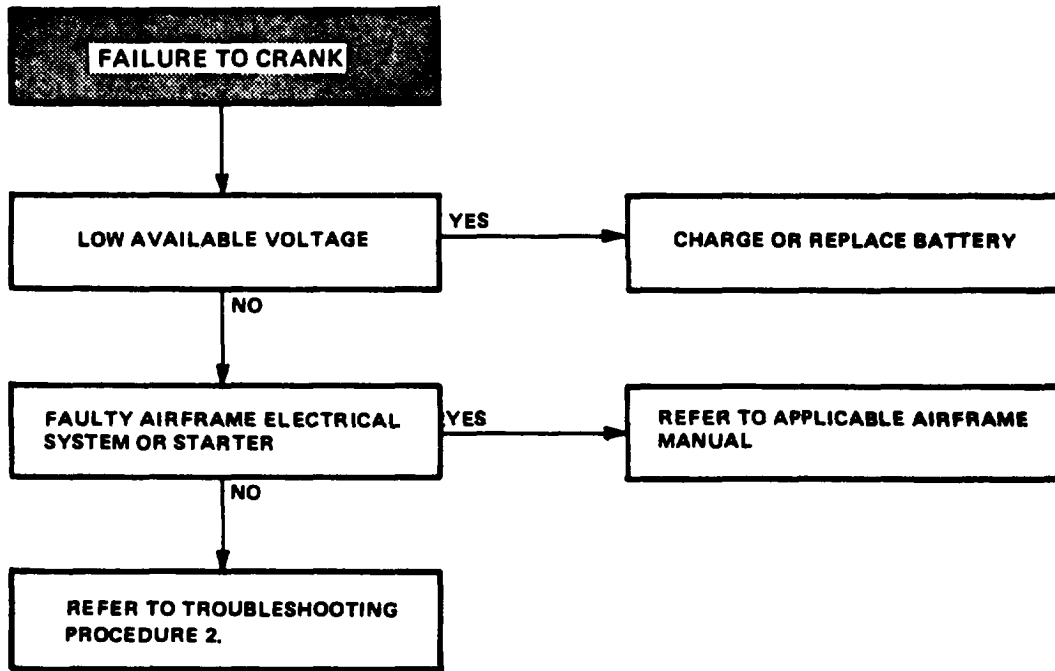
**Table 1-8. Symptom Index**

Engine	Troubleshooting Procedure
Coastdown Noisy	33
Engine Fails to Shutdown or Power Lever Stiff	31
Engine Surge During Acceleration or Bleed Band Cycling (Rapid Opening and Closing) at High N1 Speeds	21
Erratic Bleed Band Operation	32
Excessive Vibration	34
Excessive Droop of N2 Speed	13
Excessive Engine Oil Consumption 0.3 Gal/Hr or 2.4 Pta/Hr or More	29
Excessive Time in Starting	4
Failure to Crank	1
Failure to Crank or Difficulty Encountered in Cranking	2
Failure to Start	3

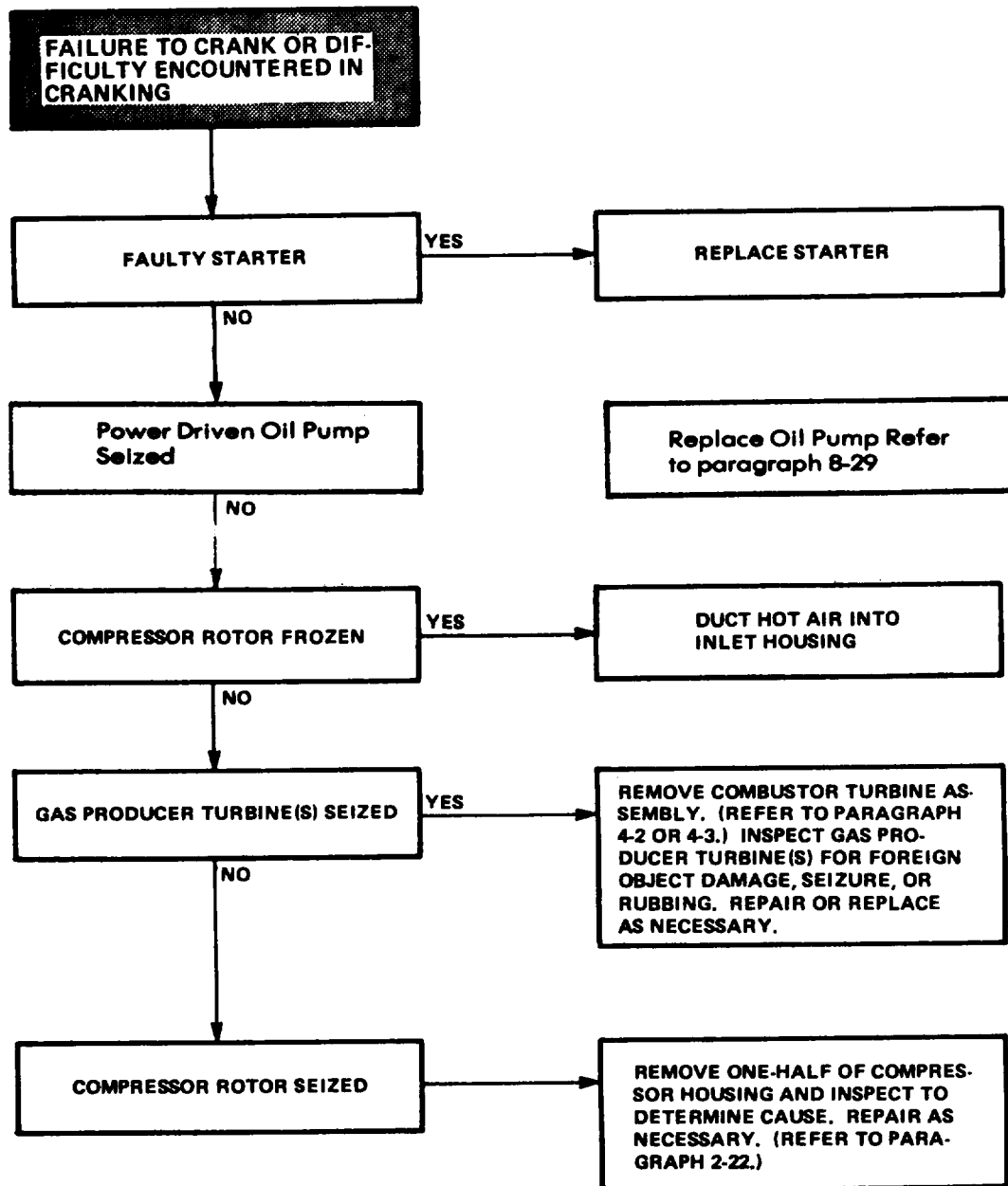
Table 1-8. Symptom Index - Continued

Engine	Troubleshooting Procedure
Flameout During Start	11
Fluctuation In Exhaust Gas Temperature N1 and N2 Speeds and Torquemeter Pressure	18
Fluctuation or No Indication of Exhaust Gas Temperature	19
Fuel Control Fails to Return to Auto When Fuel Selector Positioned to Auto	14
High Engine Oil Pressure	27
High Engine Oil Temperature	28
High Exhaust Gas Temperature During Acceleration	17
High Exhaust Gas Temperature During Steady State Operation	16
High Torquemeter Indicator	23
Hot Start (Exhaust Gas Temperature Limit Has Been Exceeded)	6
Hung Start, N1 Speed Fails to Accelerate Beyond Approximately 30 Percent and Exhaust Gas Temperature Rapidly Approaches Overtemperature Limit	5
Low N2 Speed	12
Low Oil Pressure	26
Low Torquemeter Indication	22
N2 Overspeed	15
No Oil Pressure	25
Oil Appearing at Split Line and Bleed Band, But Oil Consumption Not Excessive	30
Slow Acceleration	20
Speed High With Power Lever in Flight Idle Position	9
Speed Low With Power Lever in Flight Idle Position	8
Torching Start (Flames Shoot From Exhaust)	7
Torque Above or Below Engine Specified Torque Value	10
Torquemeter Response Slow	24

Troubleshooting Procedure 1. Failure to Crank

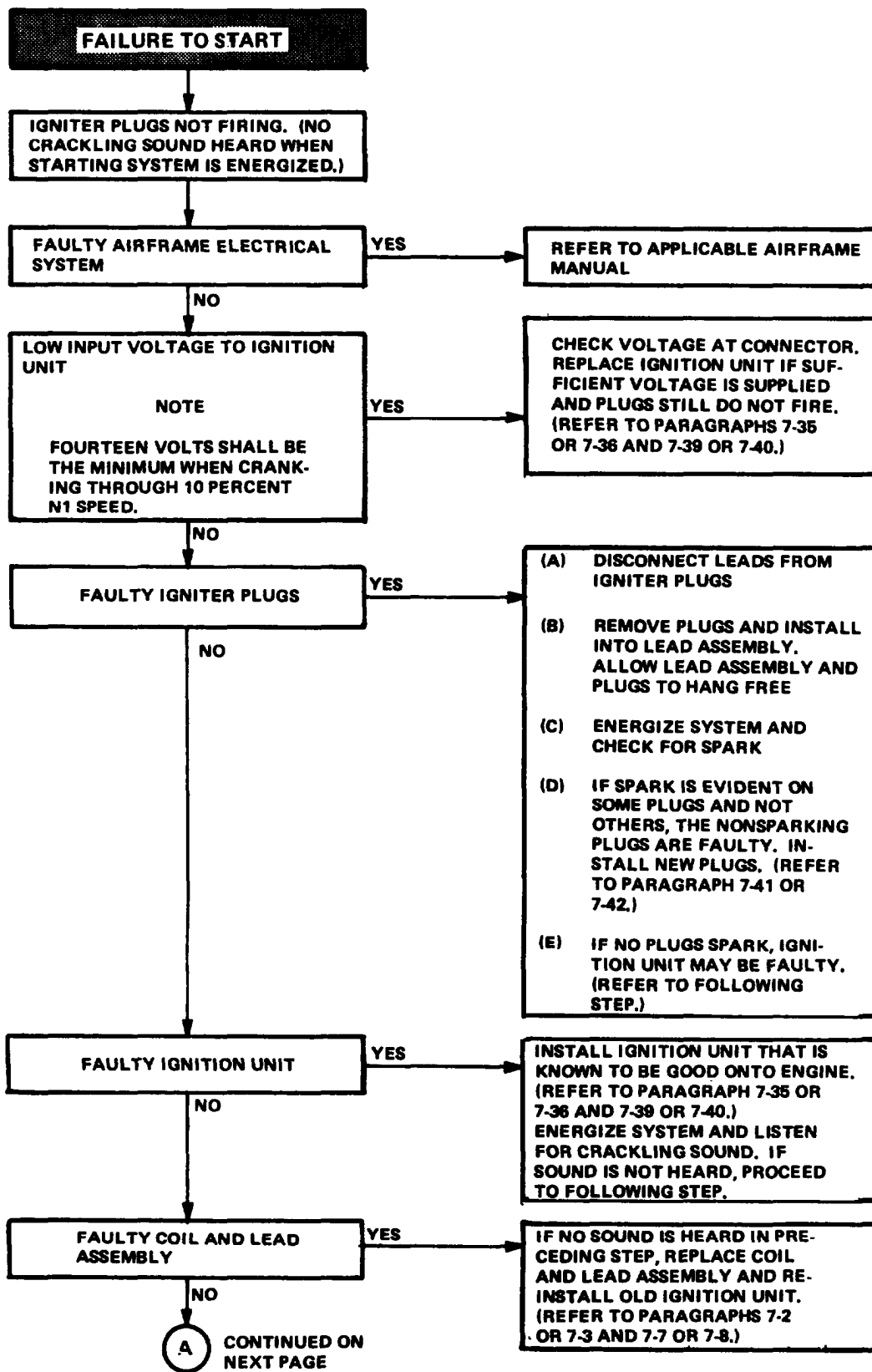


Troubleshooting Procedure 2. Failure to Crank or Difficulty Encountered in Cranking

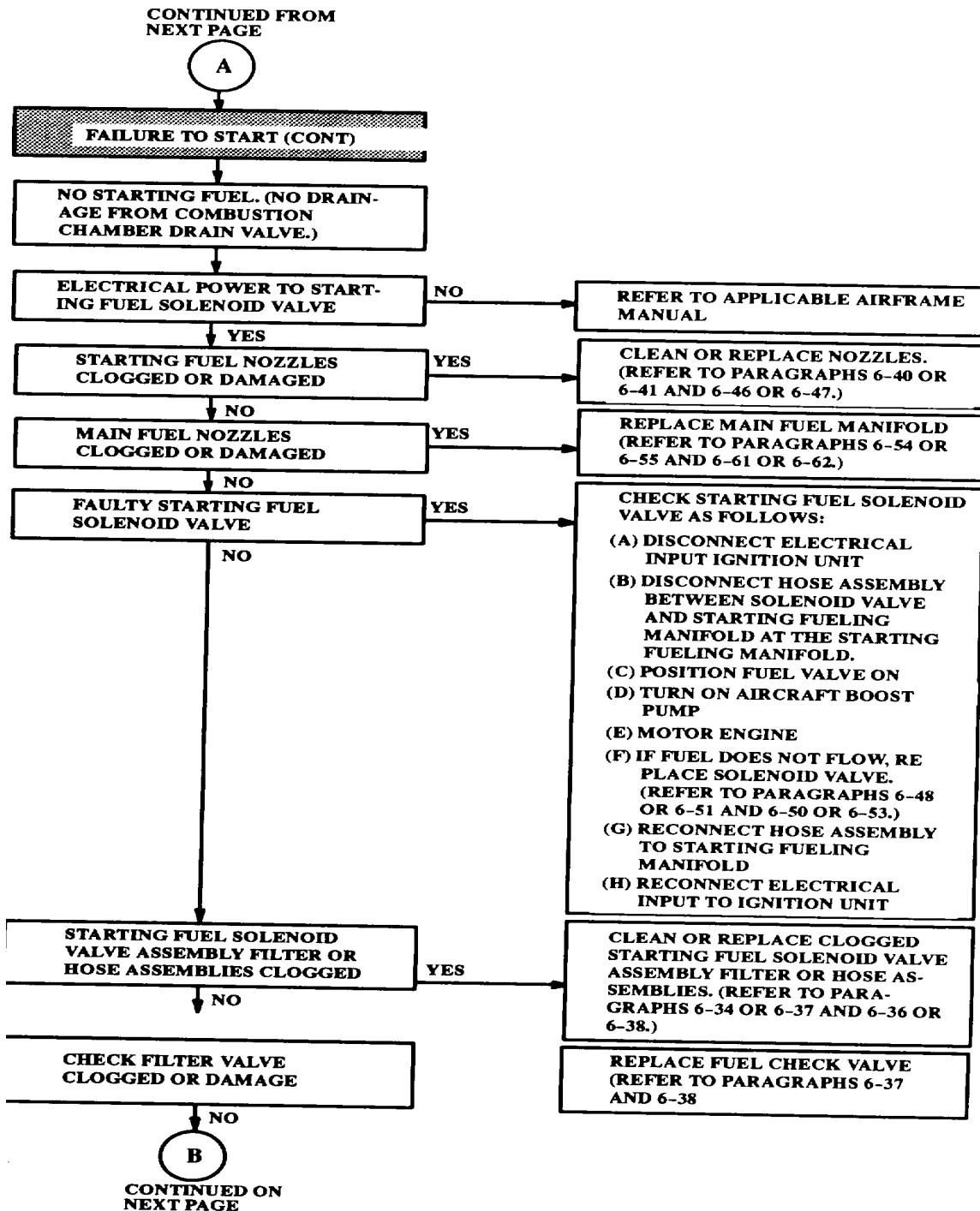




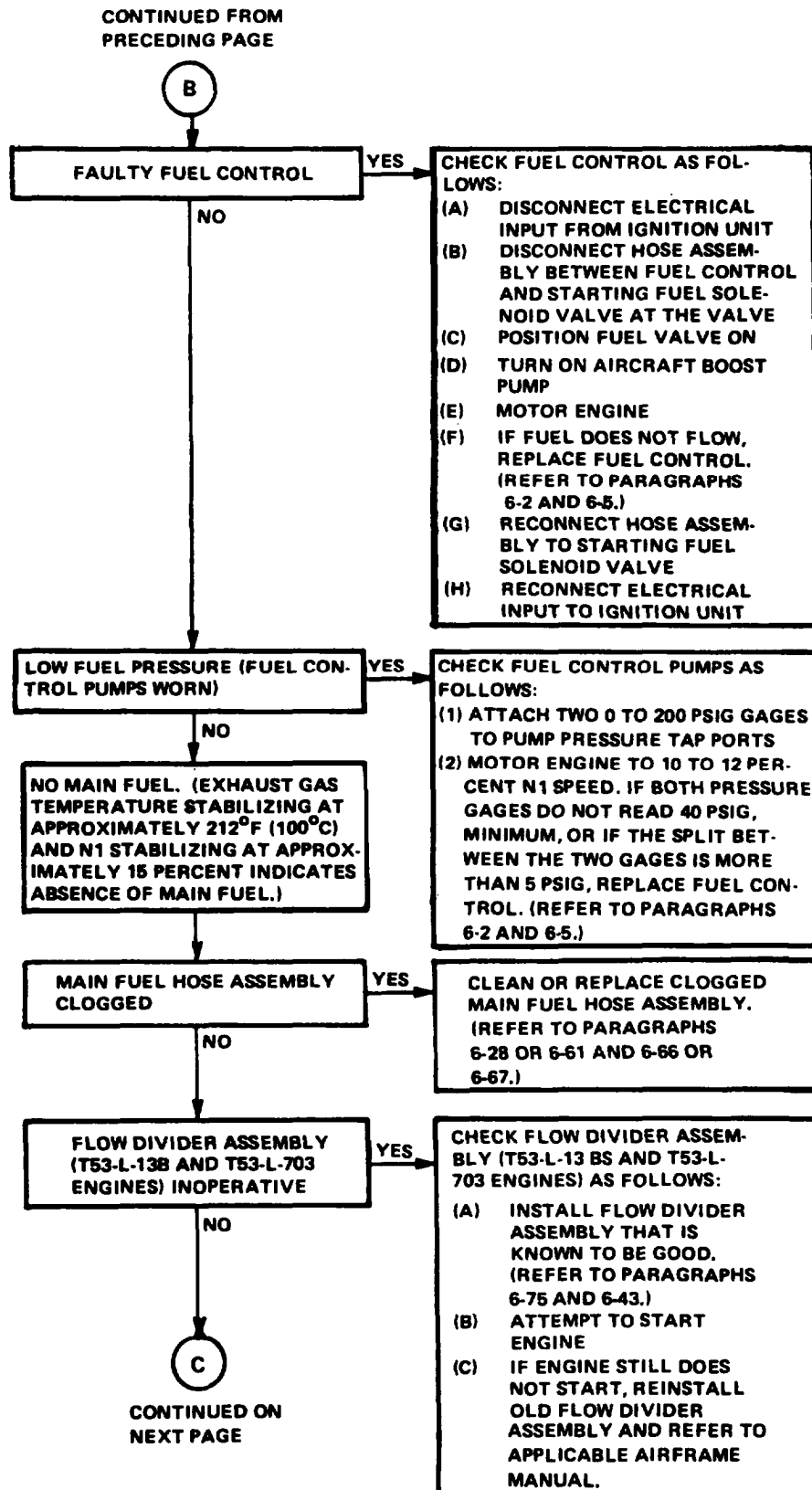
Troubleshooting Procedure 3. Failure to Start



Troubleshooting Procedure 3. Failure to Start - Continued

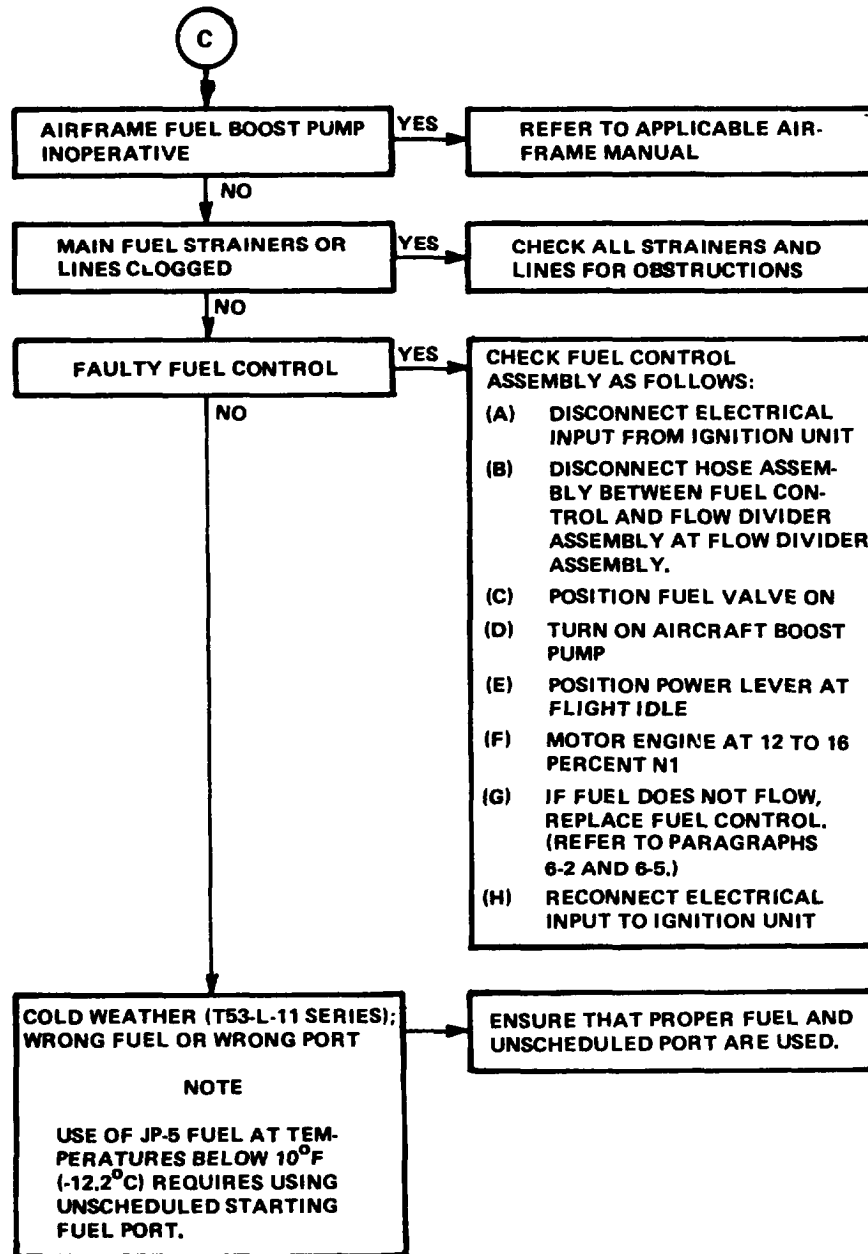


Troubleshooting Procedure 3. Failure to Start - Continued

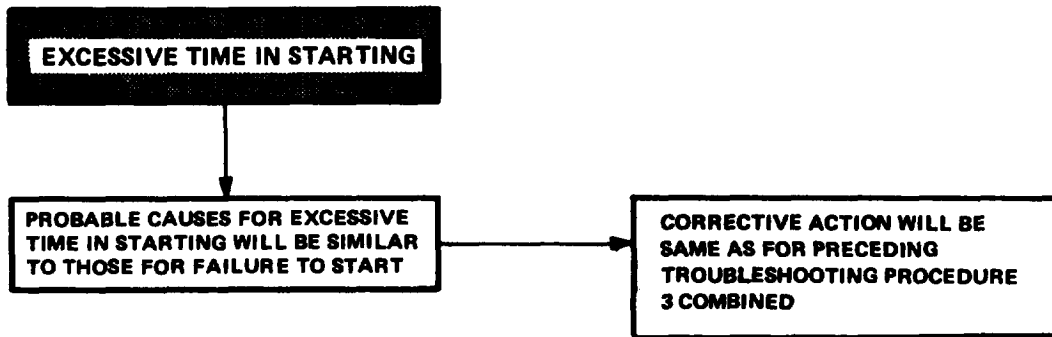


Troubleshooting Procedure 3. Failure to Start - Continued

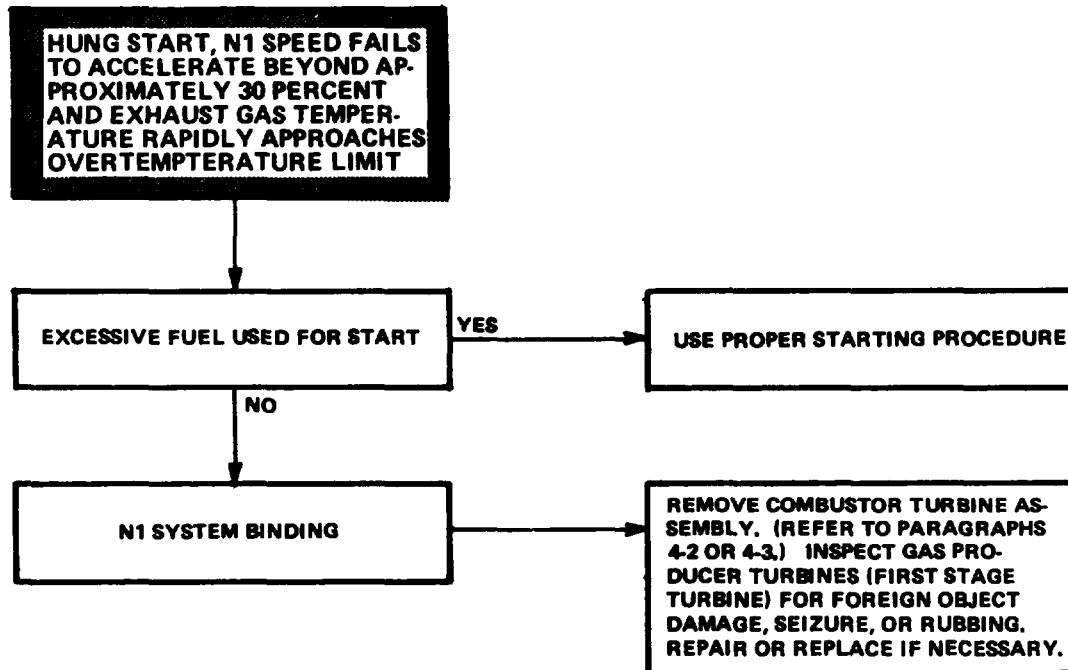
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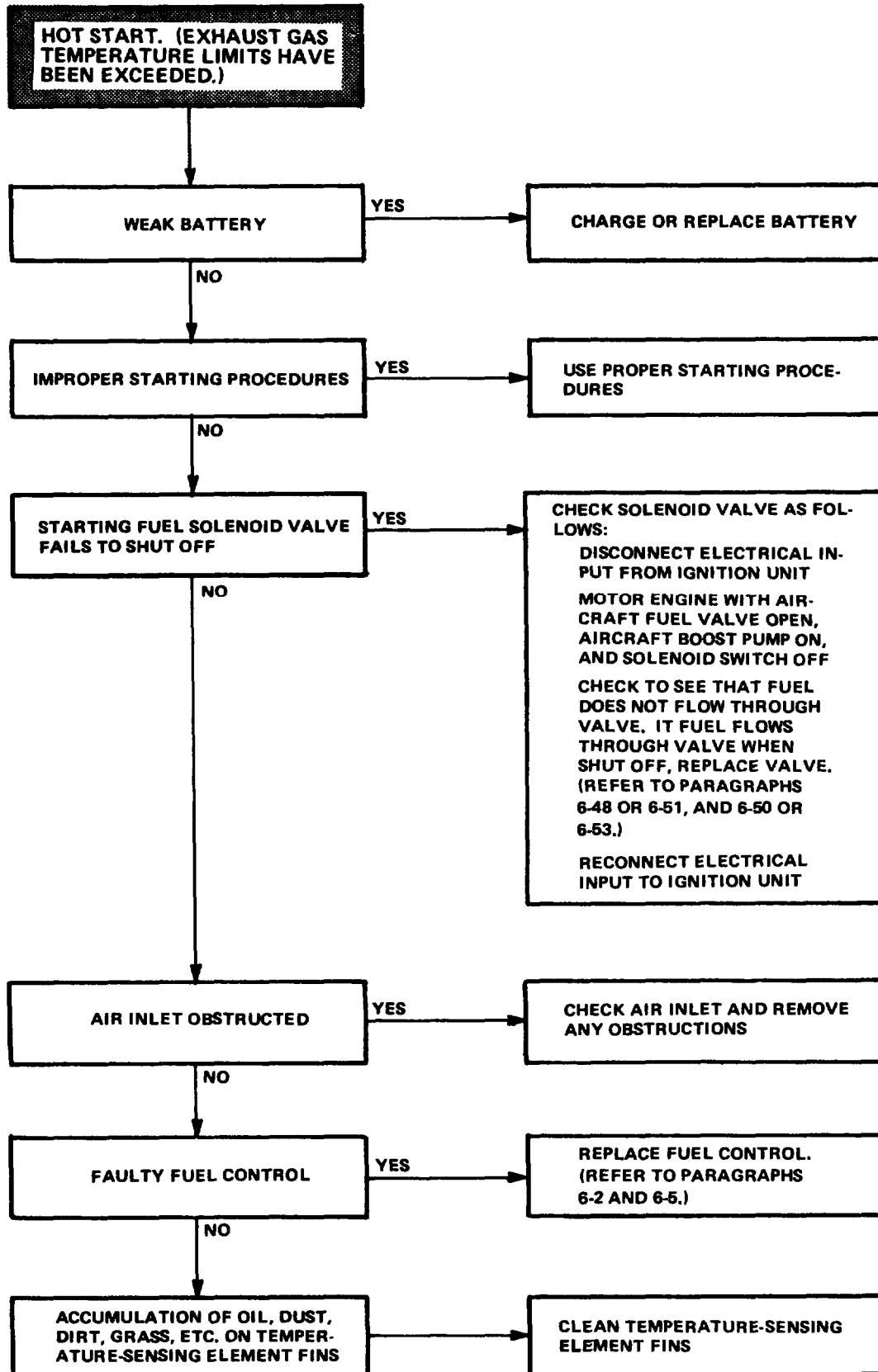
Troubleshooting Procedure 4. Excessive Time in Starting



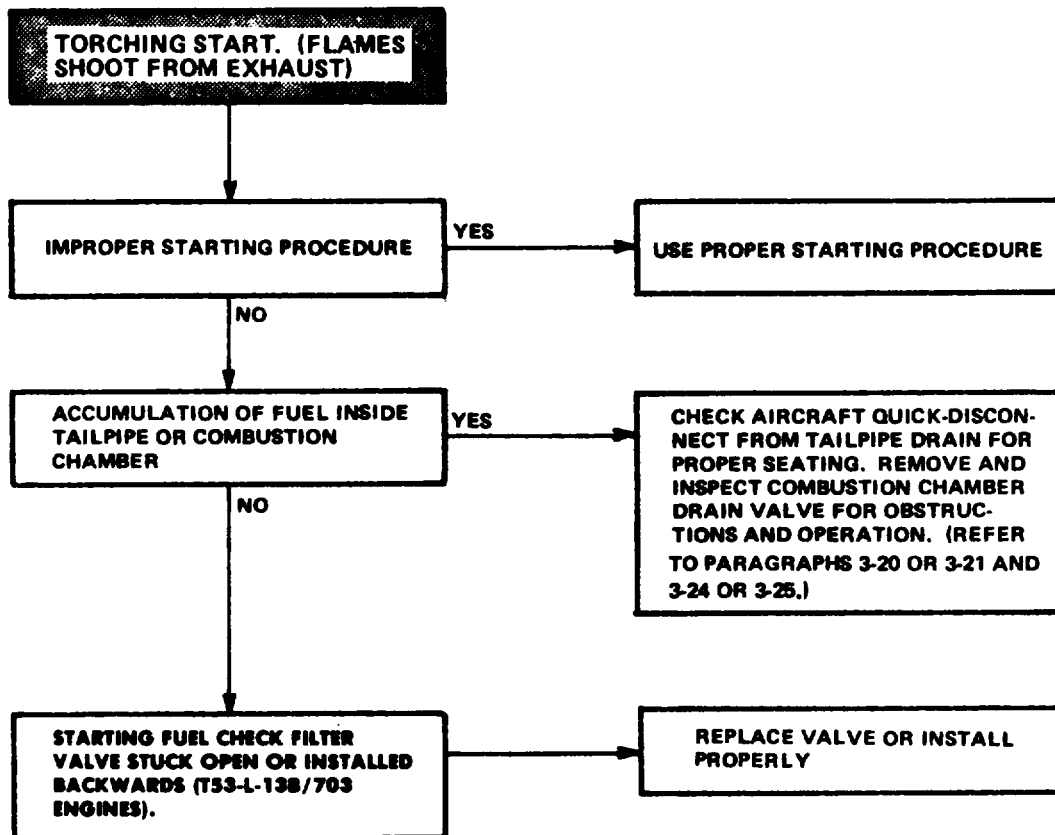
Troubleshooting Procedure 5. Hung Start. N1 Speed Fails to Accelerate Beyond Approximately 30 Percent and Exhaust Gas Temperature Rapidly Approaches Overtemperature Limit



Troubleshooting Procedure 6. Hot Start. Exhaust Gas Temperature Limits Have Been Exceeded

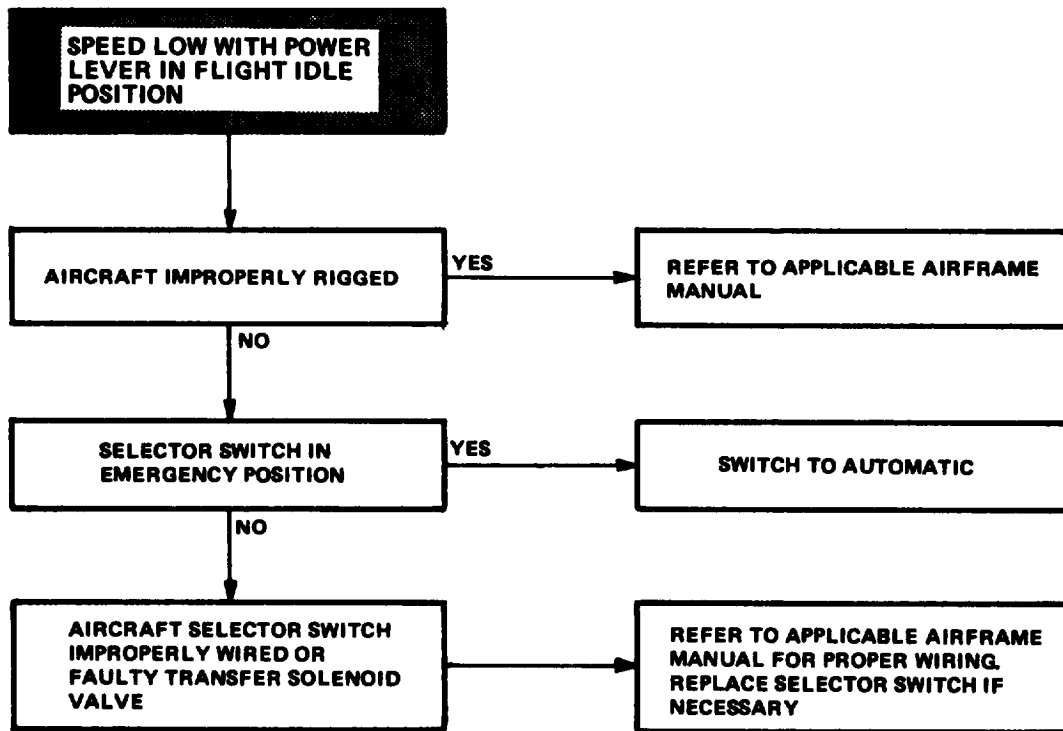


Troubleshooting Procedure 7. Torching Start (Flames Shoot From Exhaust)

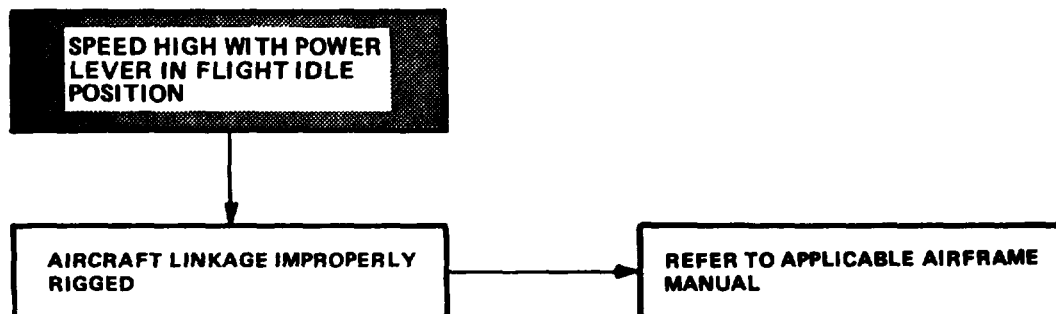




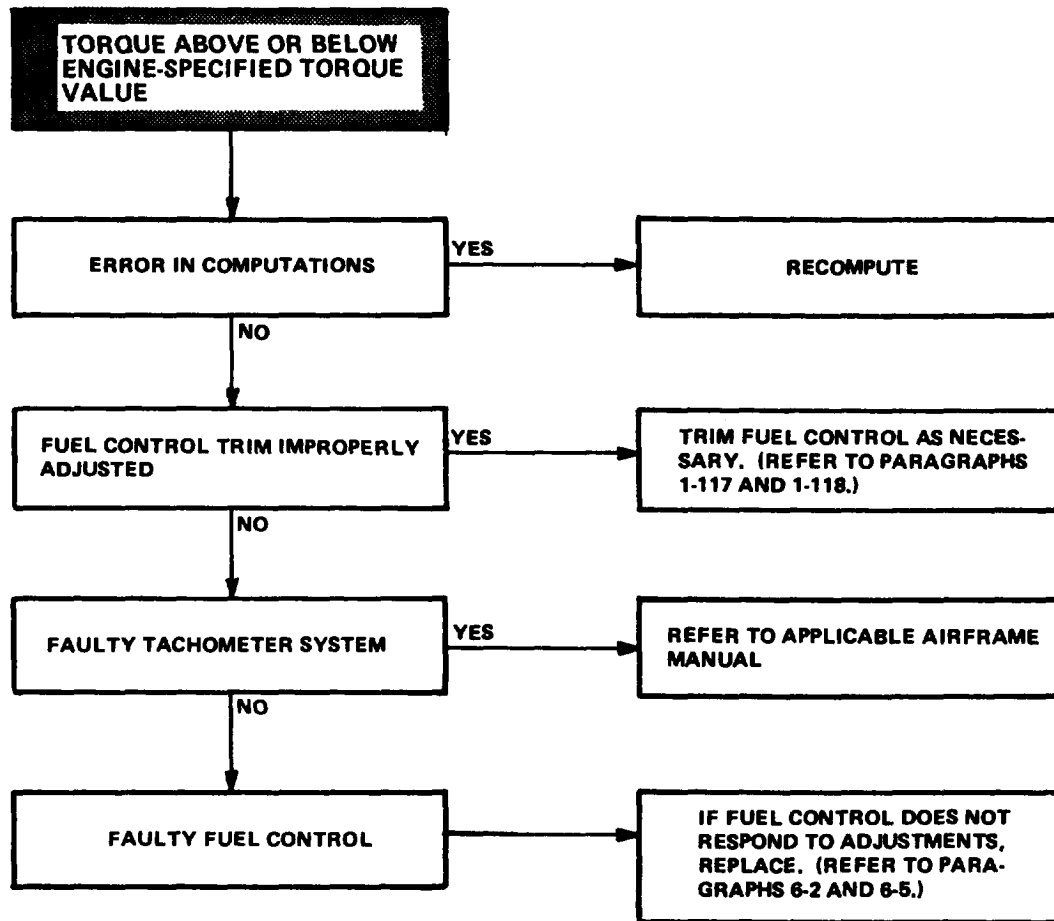
Troubleshooting Procedure 8. Speed Low With Power Lever in Flight Idle Position



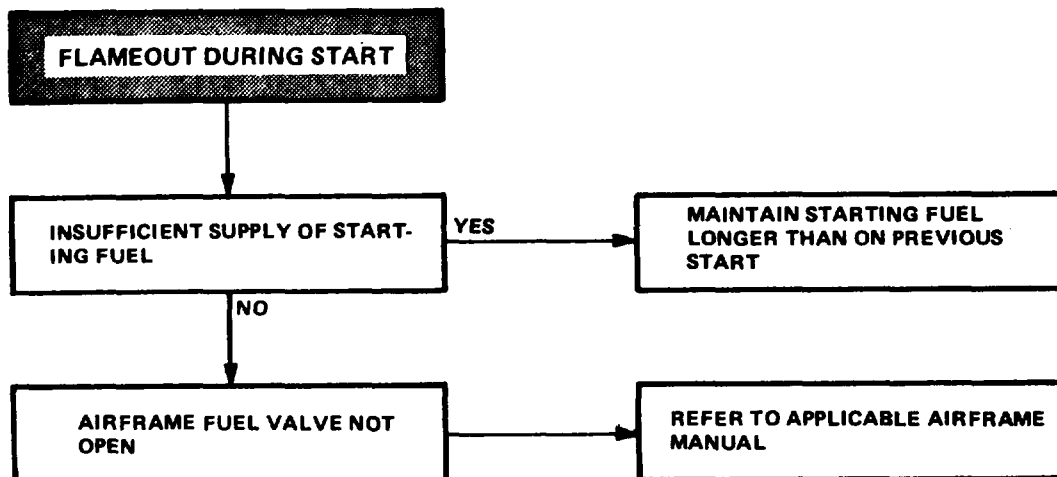
Troubleshooting Procedure 9. Speed High With Power Lever in Flight Idle Position



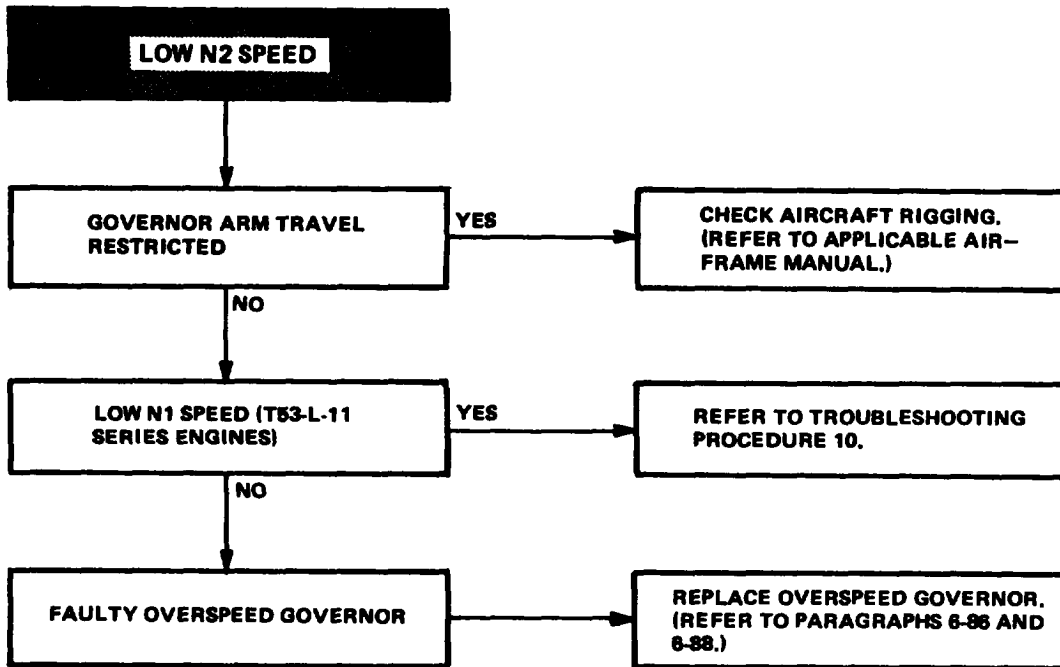
Troubleshooting Procedure 10. Torque Above or Below Engine - Specified Torque Value



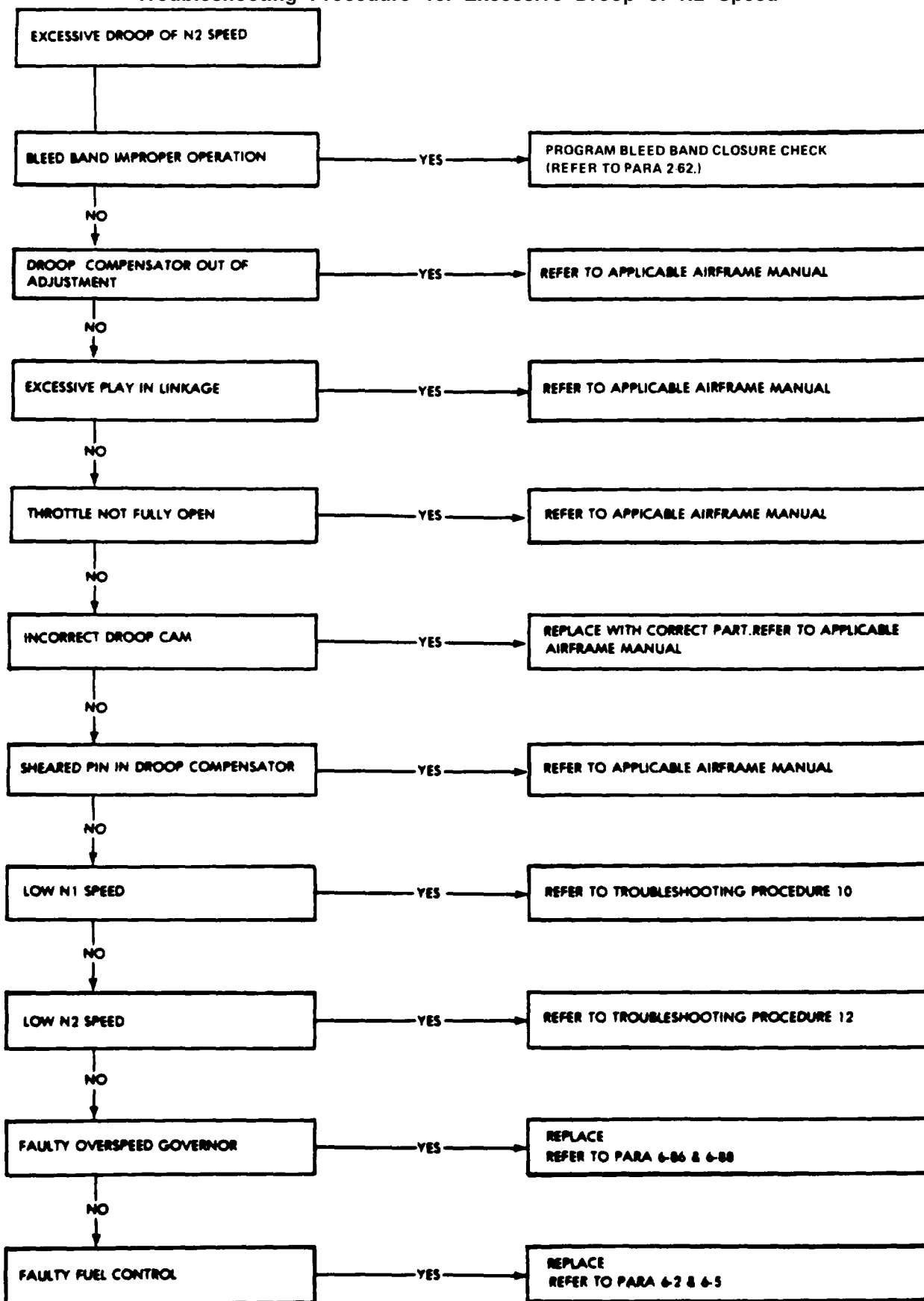
Troubleshooting Procedure 11. Flameout During Start



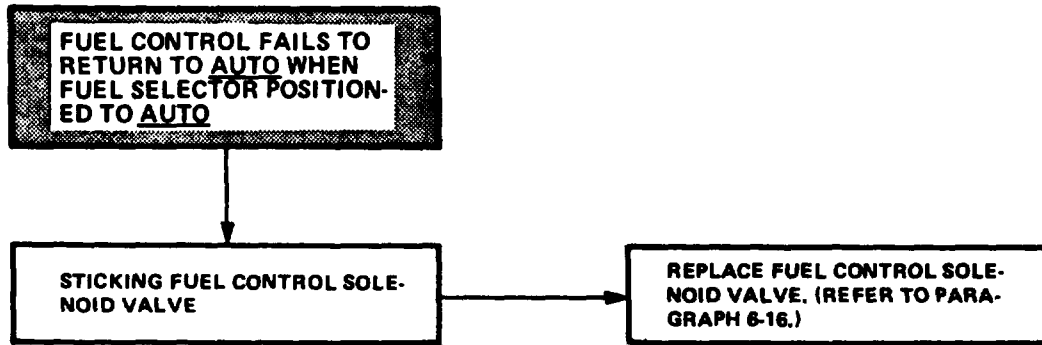
Troubleshooting Procedure 12. Low N2 Speed



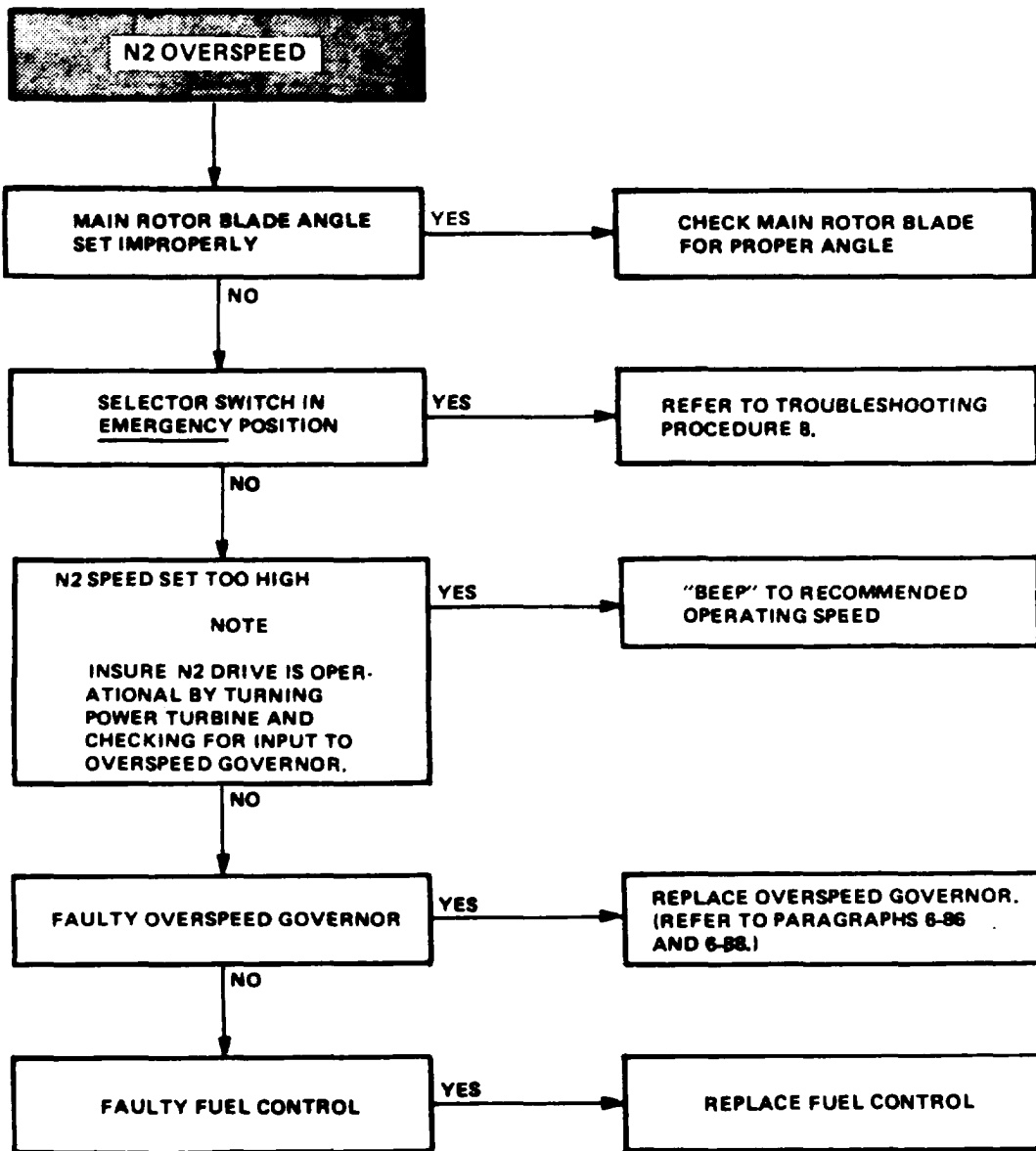
Troubleshooting Procedure 13. Excessive Droop of N2 Speed



Troubleshooting Procedure 14. Fuel Control Fails to Return to AUTO When Fuel Selector Positioned to AUTO

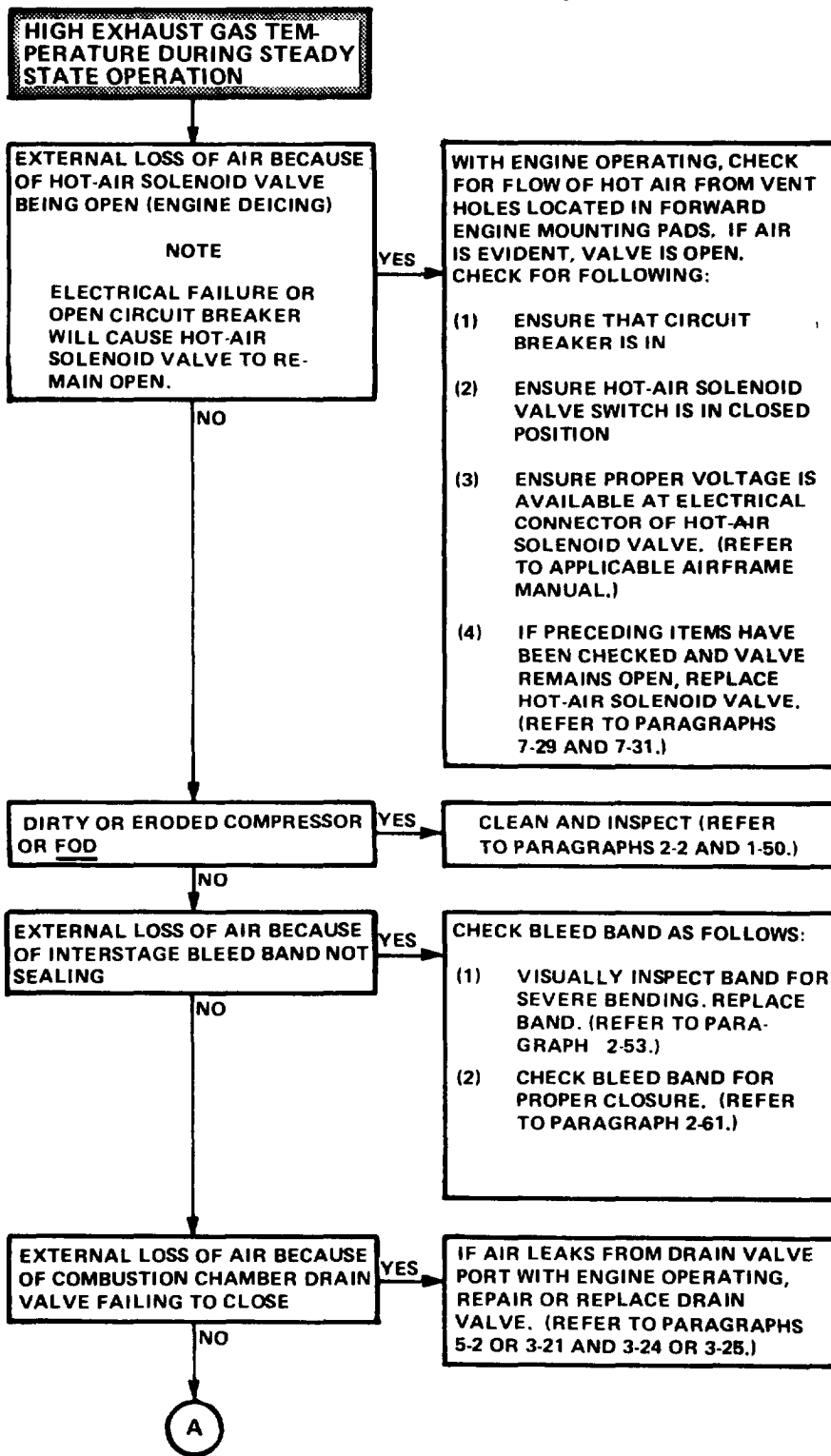


Troubleshooting Procedure 15. N2 Overspeed



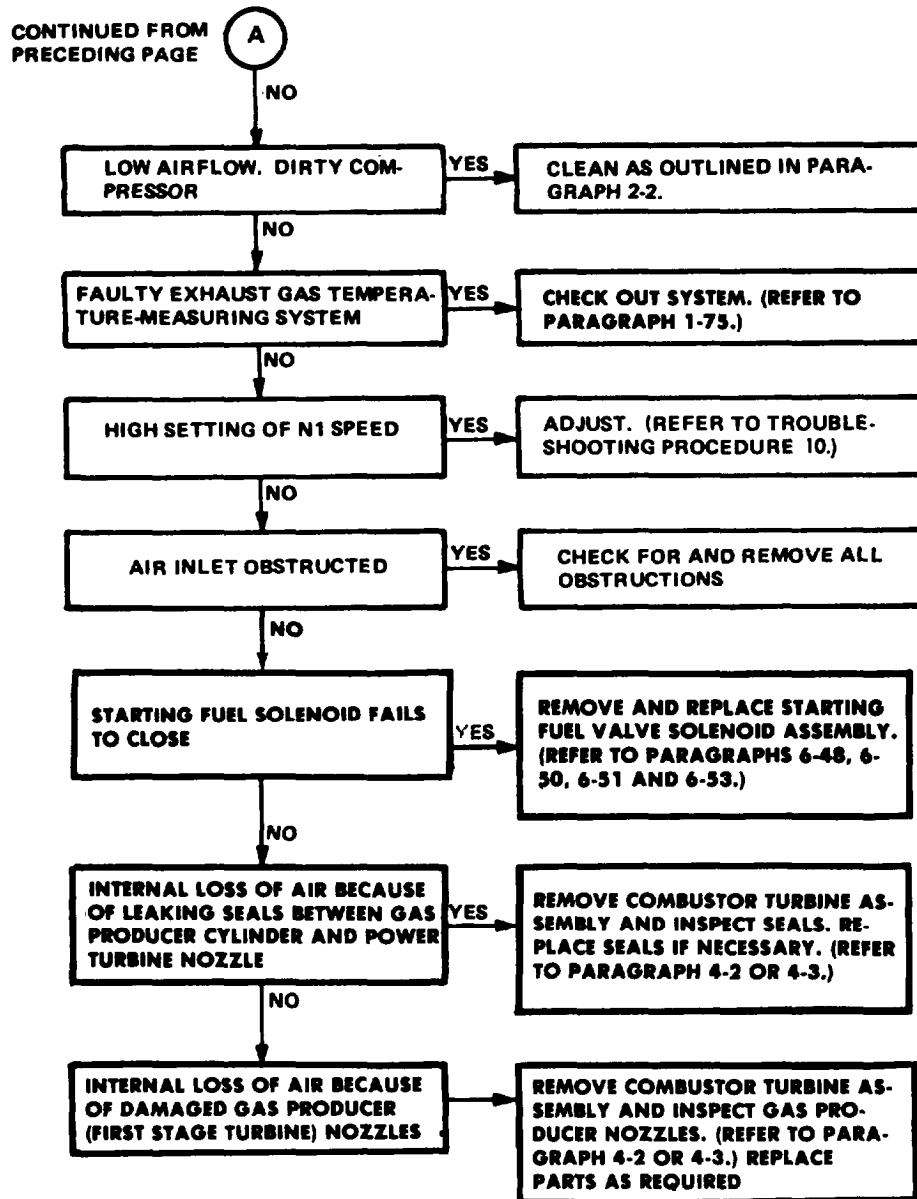


### Troubleshooting Procedure 16. High Exhaust Gas Temperature During Steady State Operation

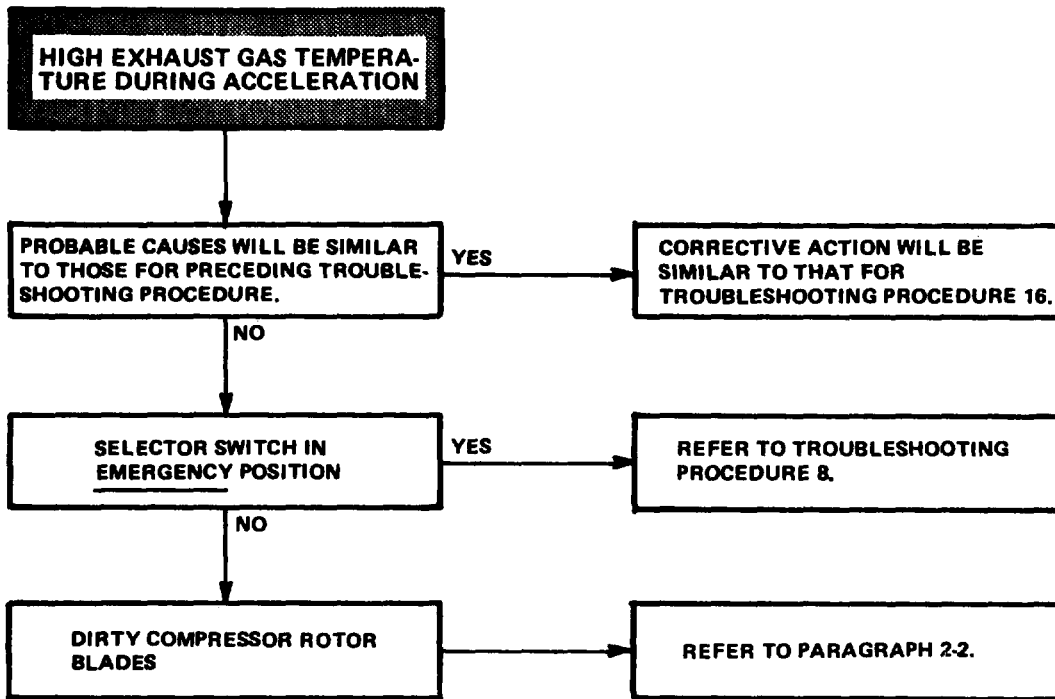


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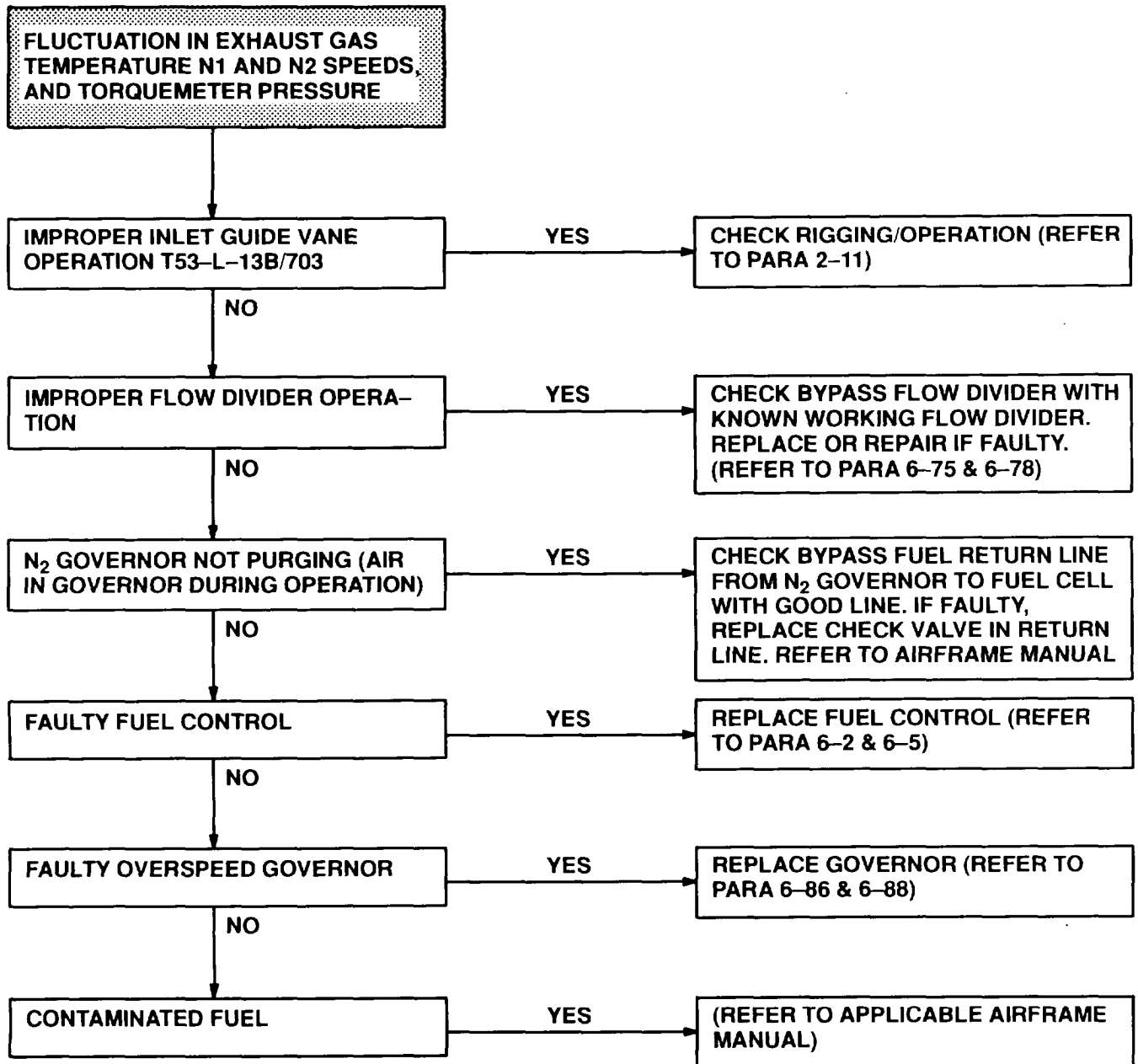
Troubleshooting Procedure 16. High Exhaust Gas Temperature During Steady State Operation-Continued



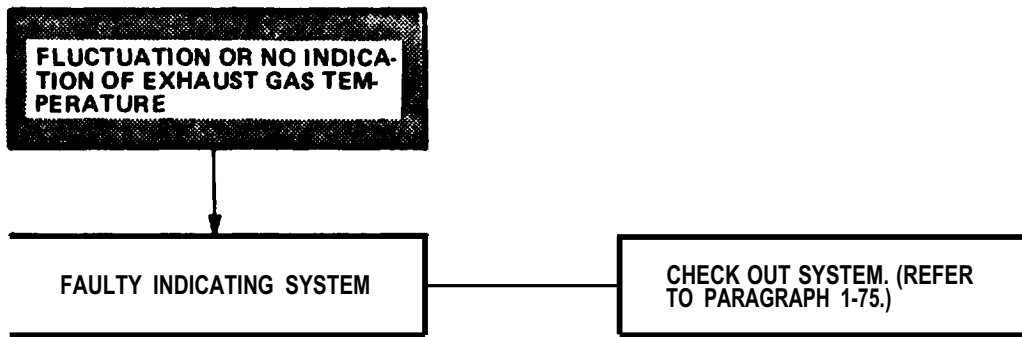
Troubleshooting Procedure 17. High Exhaust Gas Temperature During Acceleration



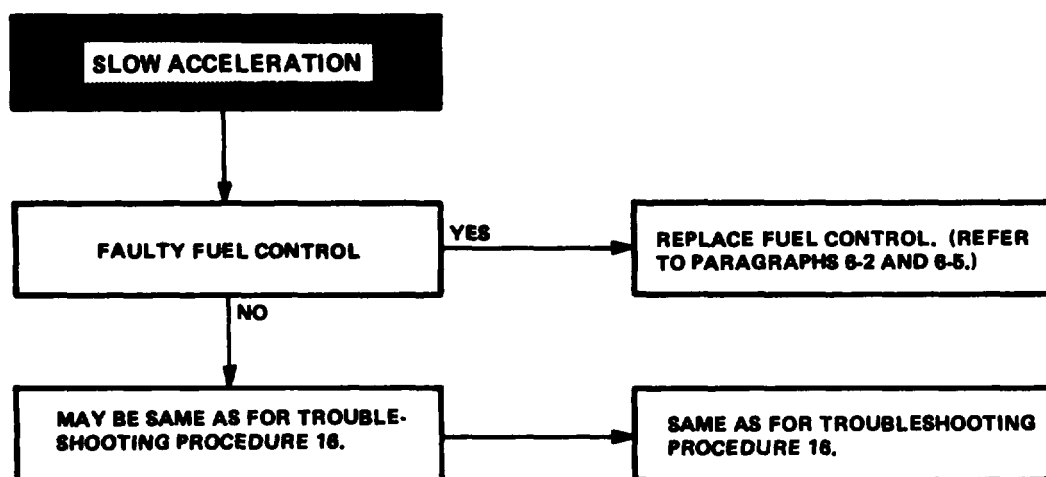
Troubleshooting Procedure 18. Fluctuation In Exhaust Gas Temperature, N1 and N2 Speeds, and Torquemeter Pressure



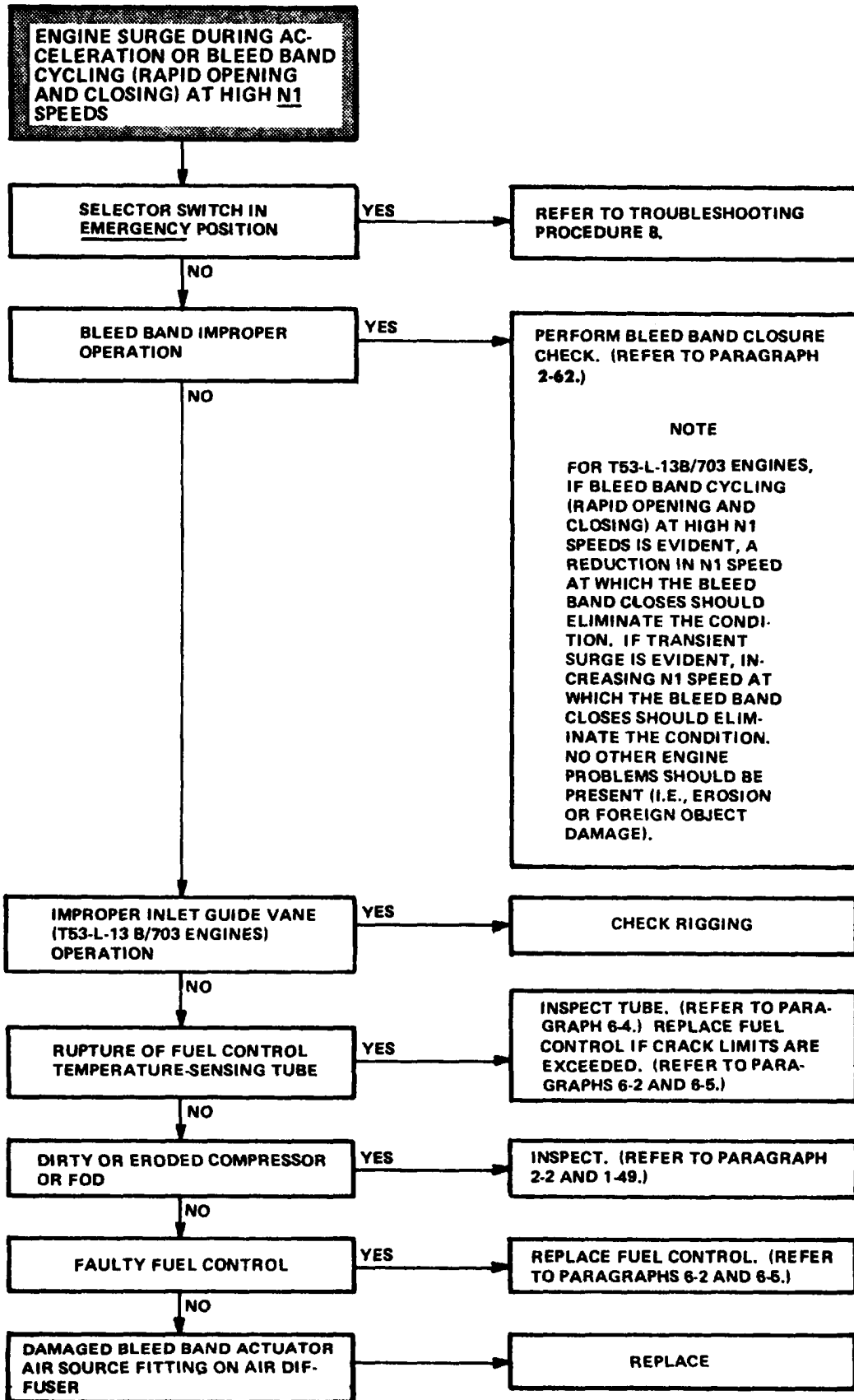
Troubleshooting Procedure 19. Fluctuation or No Indication of Exhaust Gas Temperature



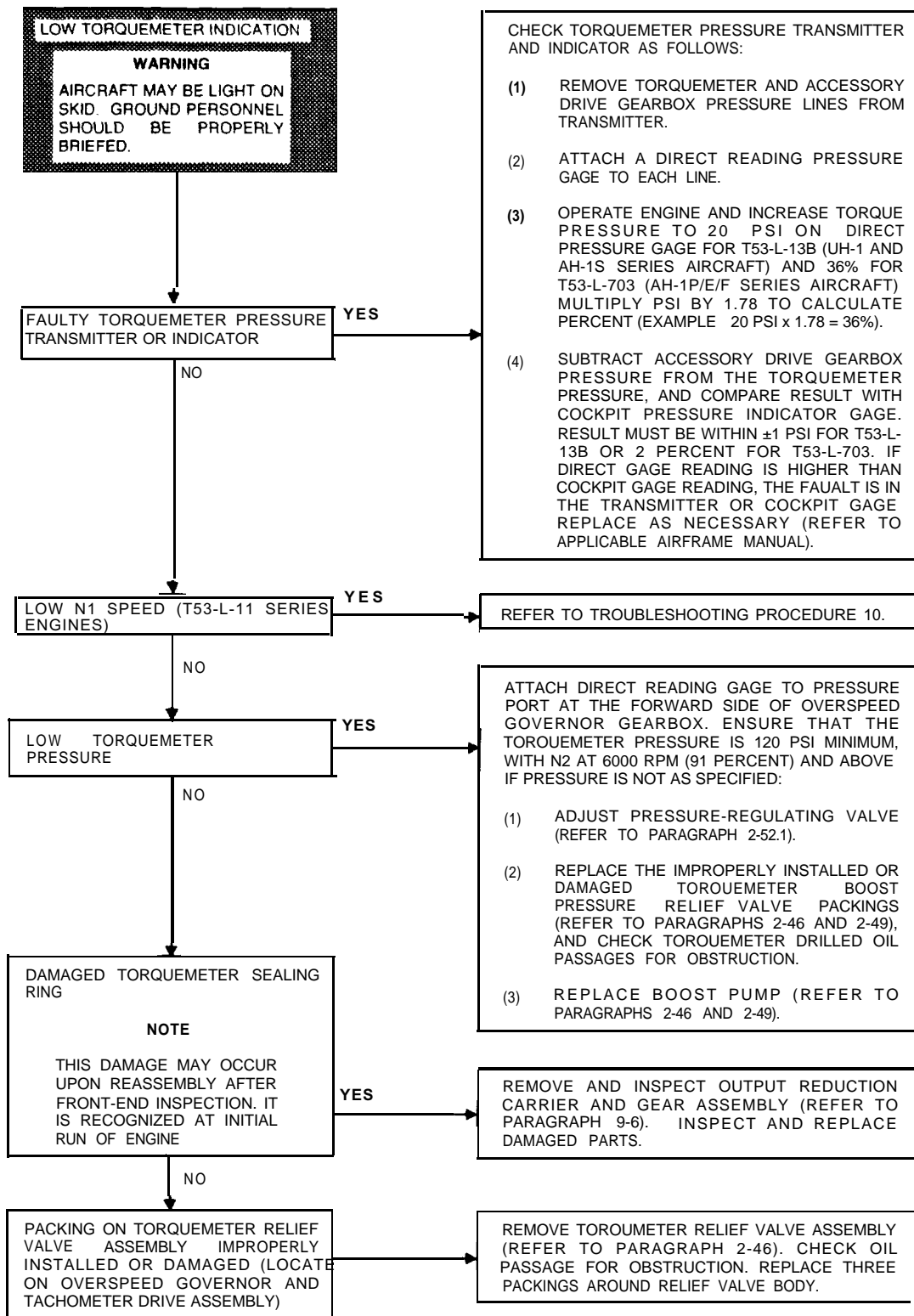
Troubleshooting Procedure 20. Slow Acceleration



Troubleshooting Procedure 21. Engine Surge During Acceleration or Bleed Band Cycling (Rapid Opening and Closing) at High N1 Speeds

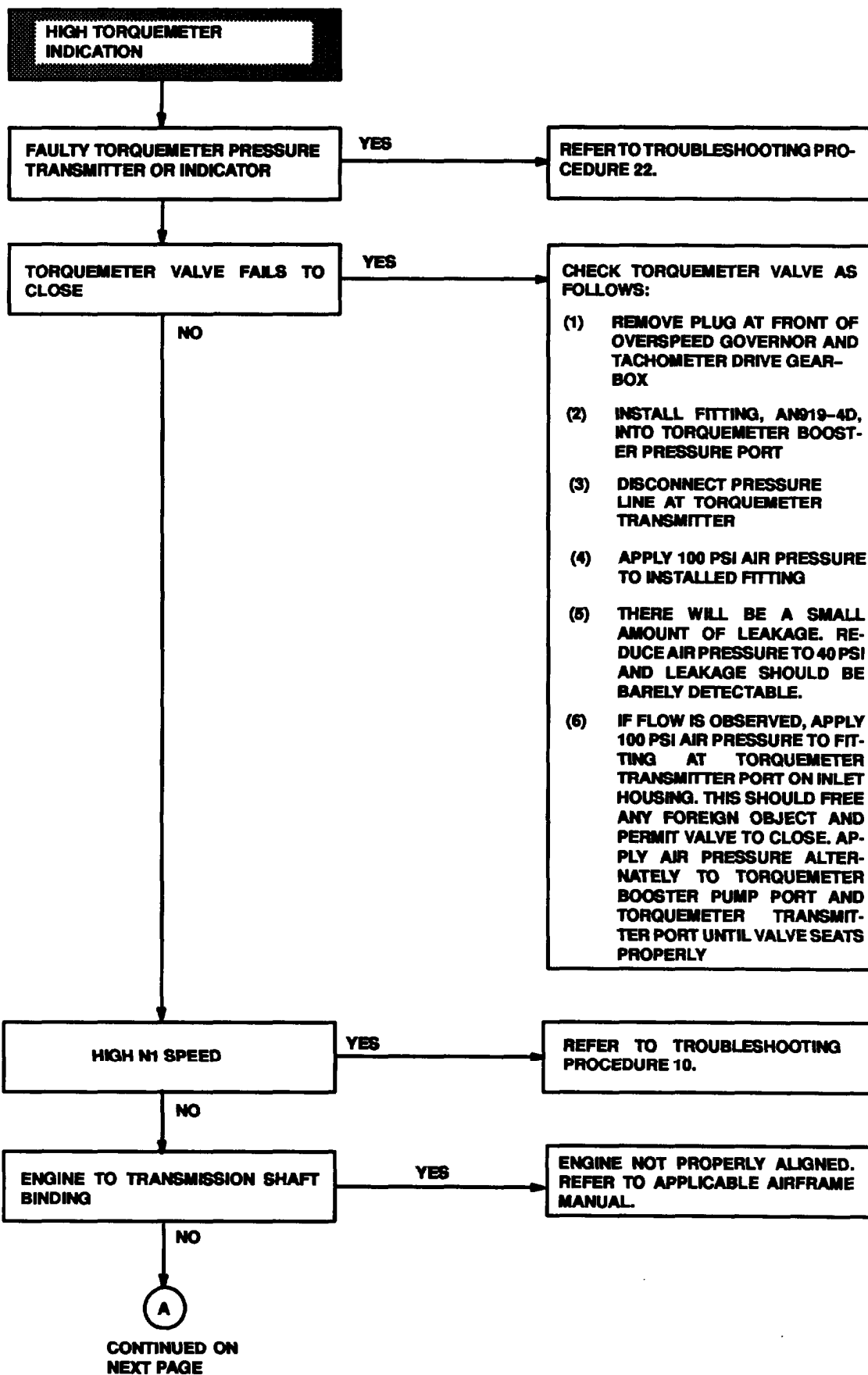


**Troubleshooting Procedure 22. Low Torquemeter Indication**

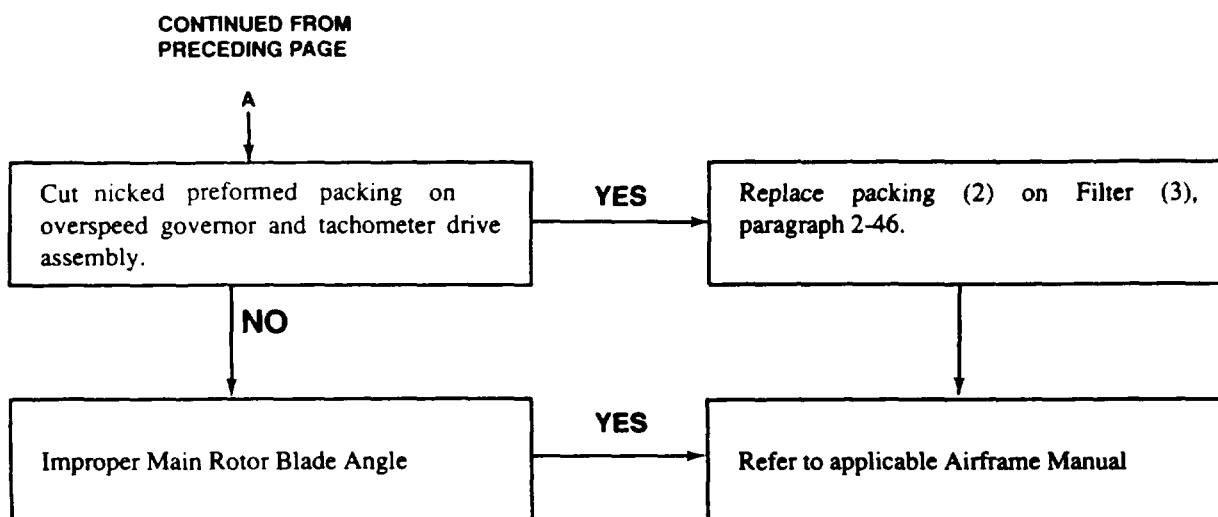




Troubleshooting Procedure 23. High Torquemeter Indication

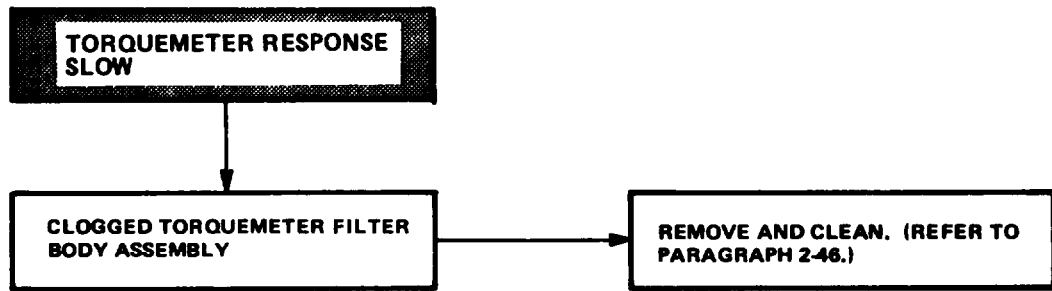


Troubleshooting Procedure 23. High Torquemeter Indication - Continued

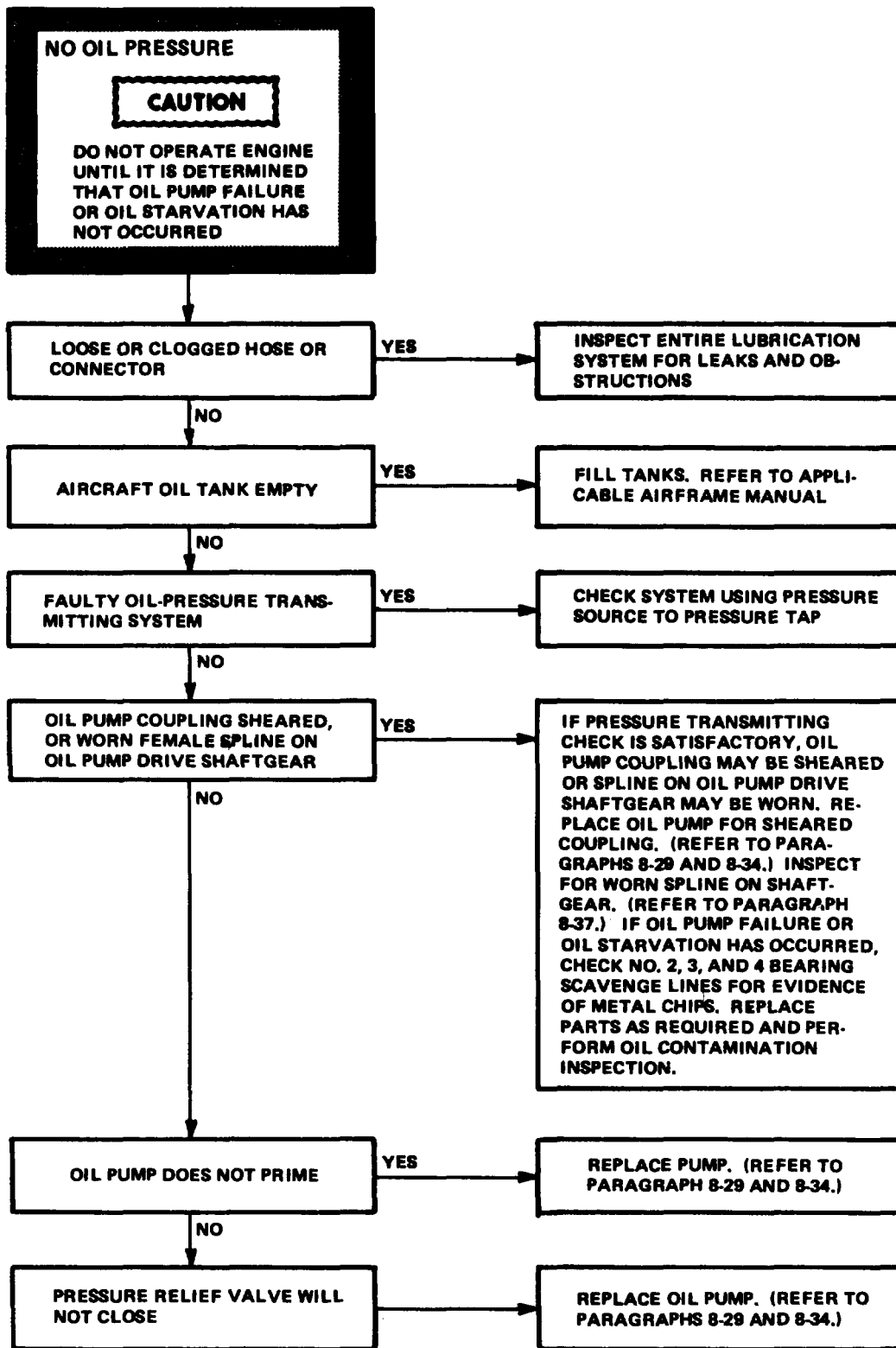




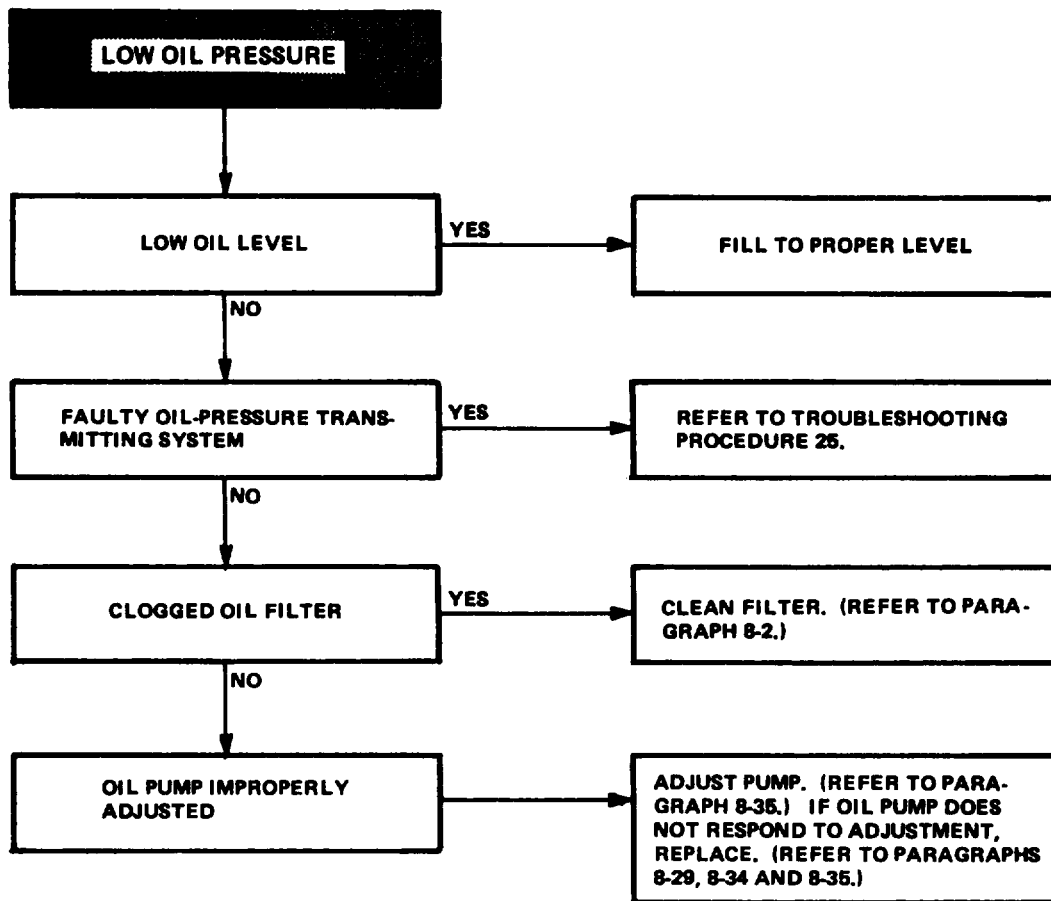
Troubleshooting Procedure 24. Torquemeter Response Slow



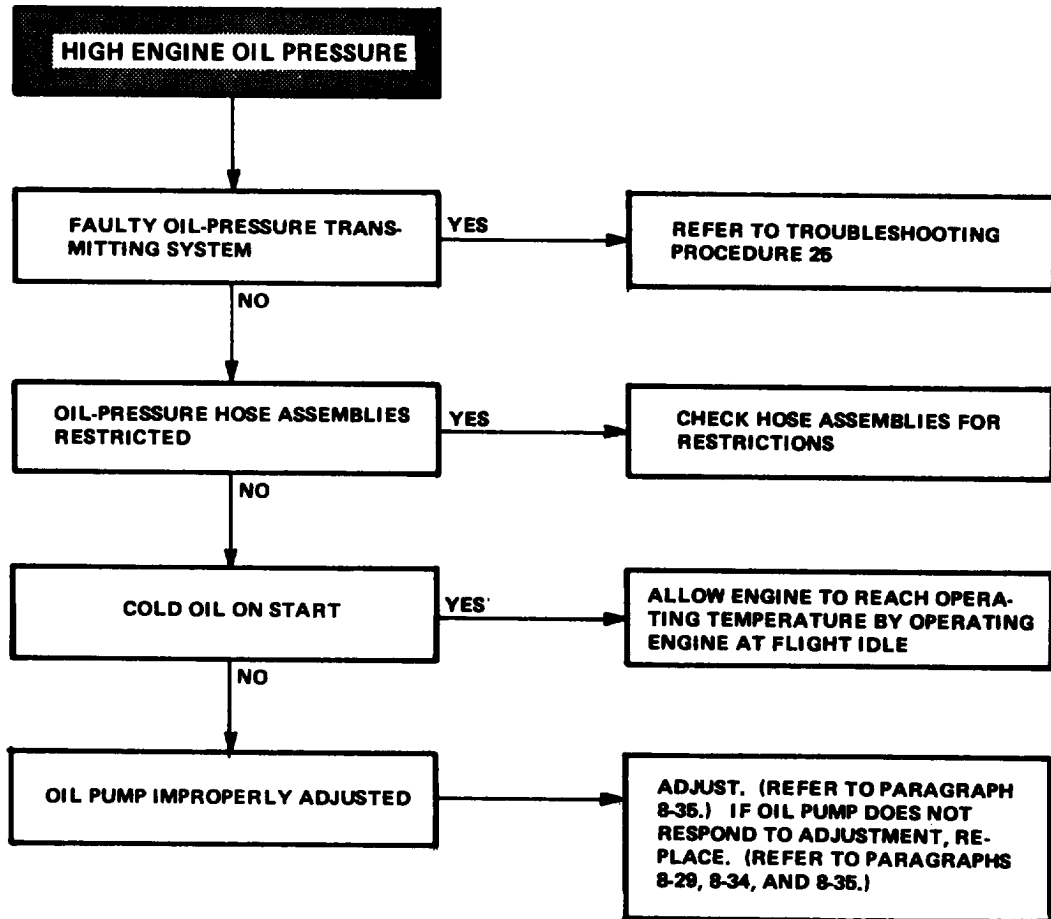
Troubleshooting Procedure 25. No Oil Pressure



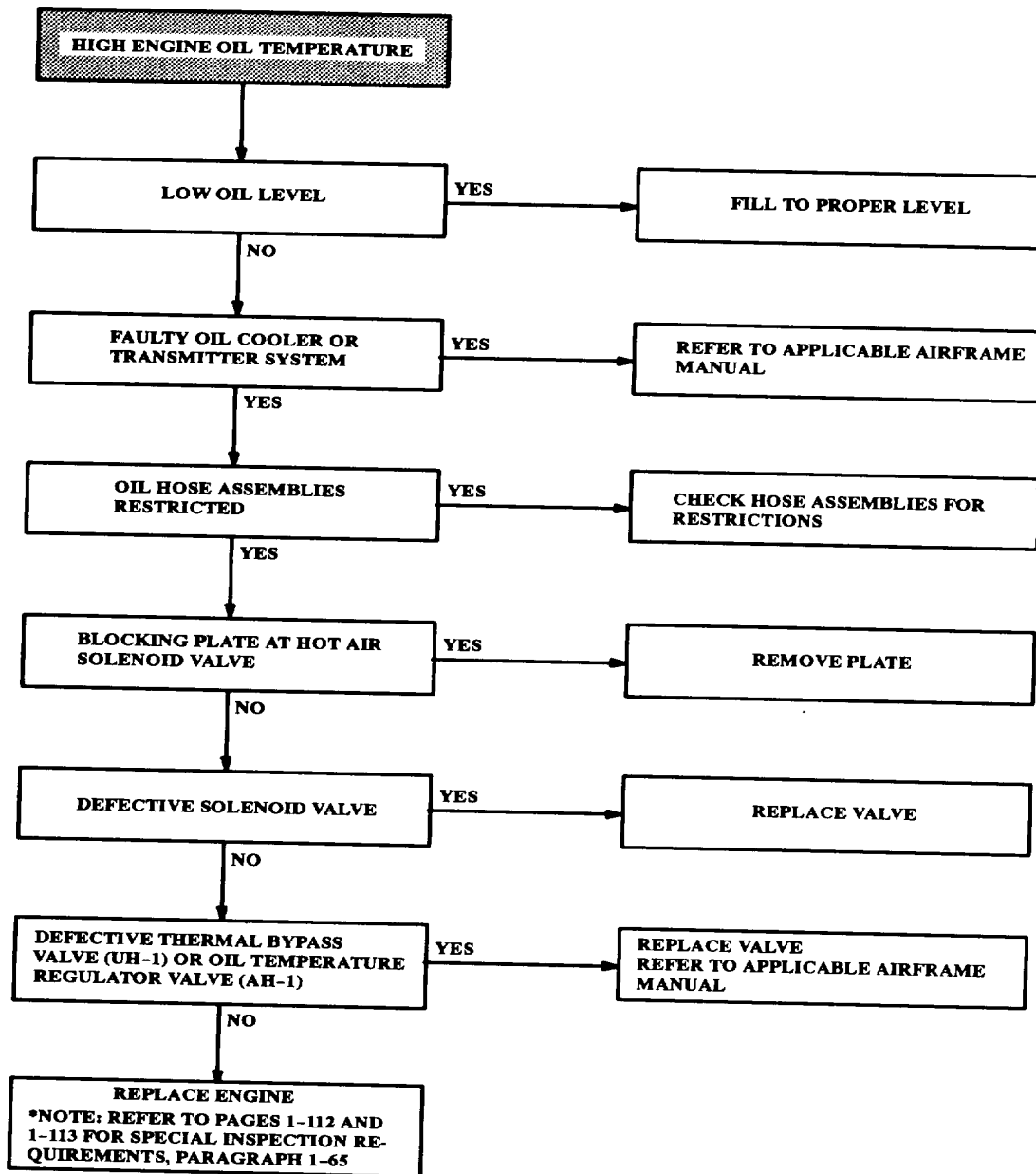
Troubleshooting Procedure 20. Low Oil Pressure



Troubleshooting Procedure 27. High Engine Oil Pressure

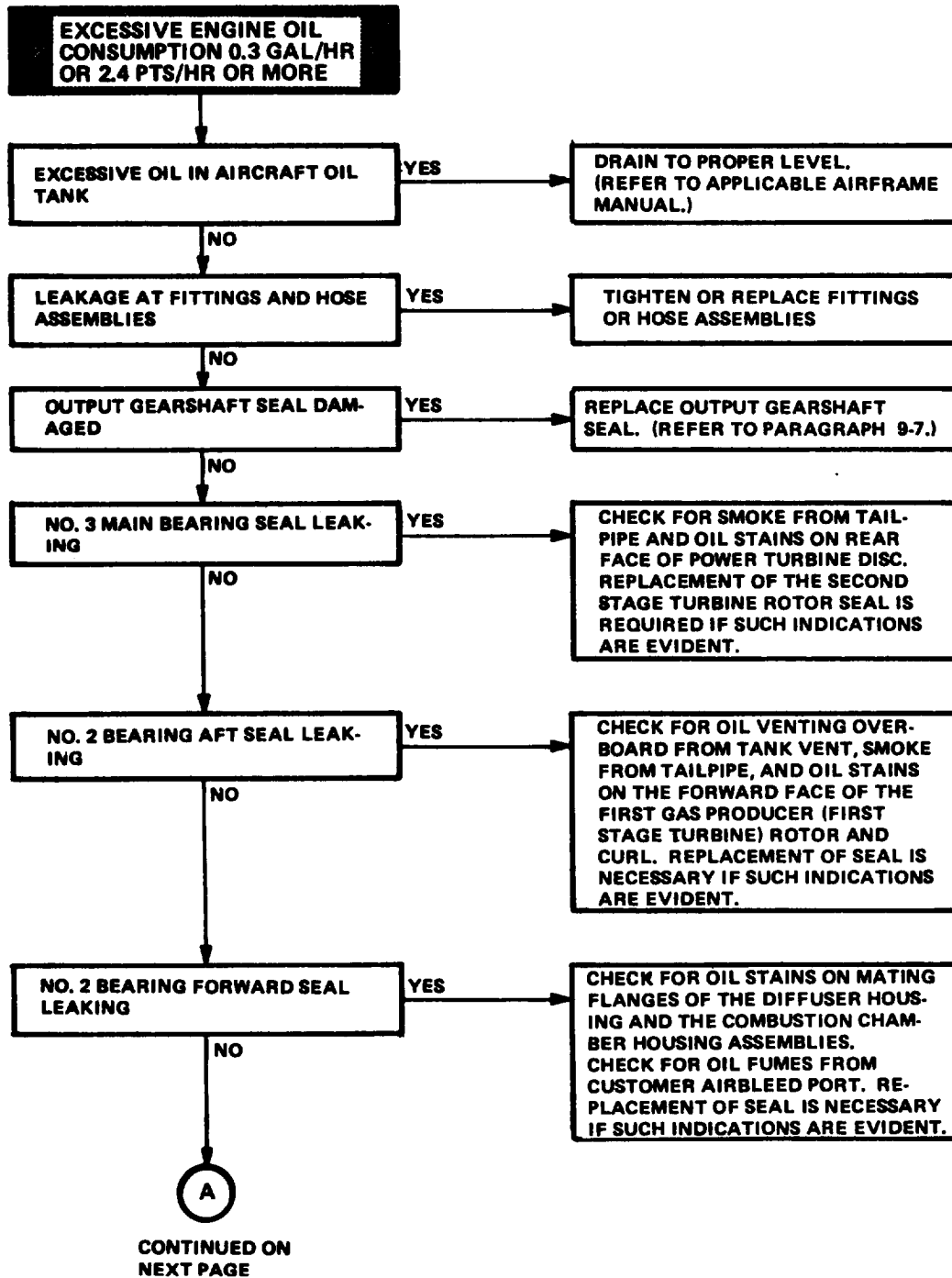


Troubleshooting Procedure 28. High Engine Oil Temperature

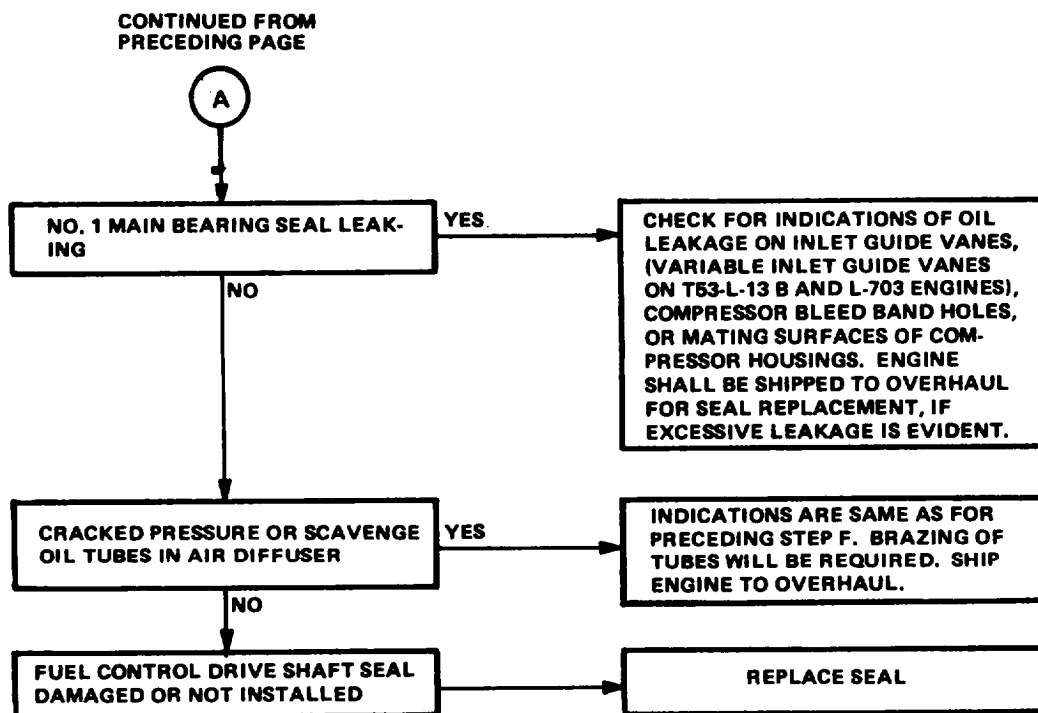




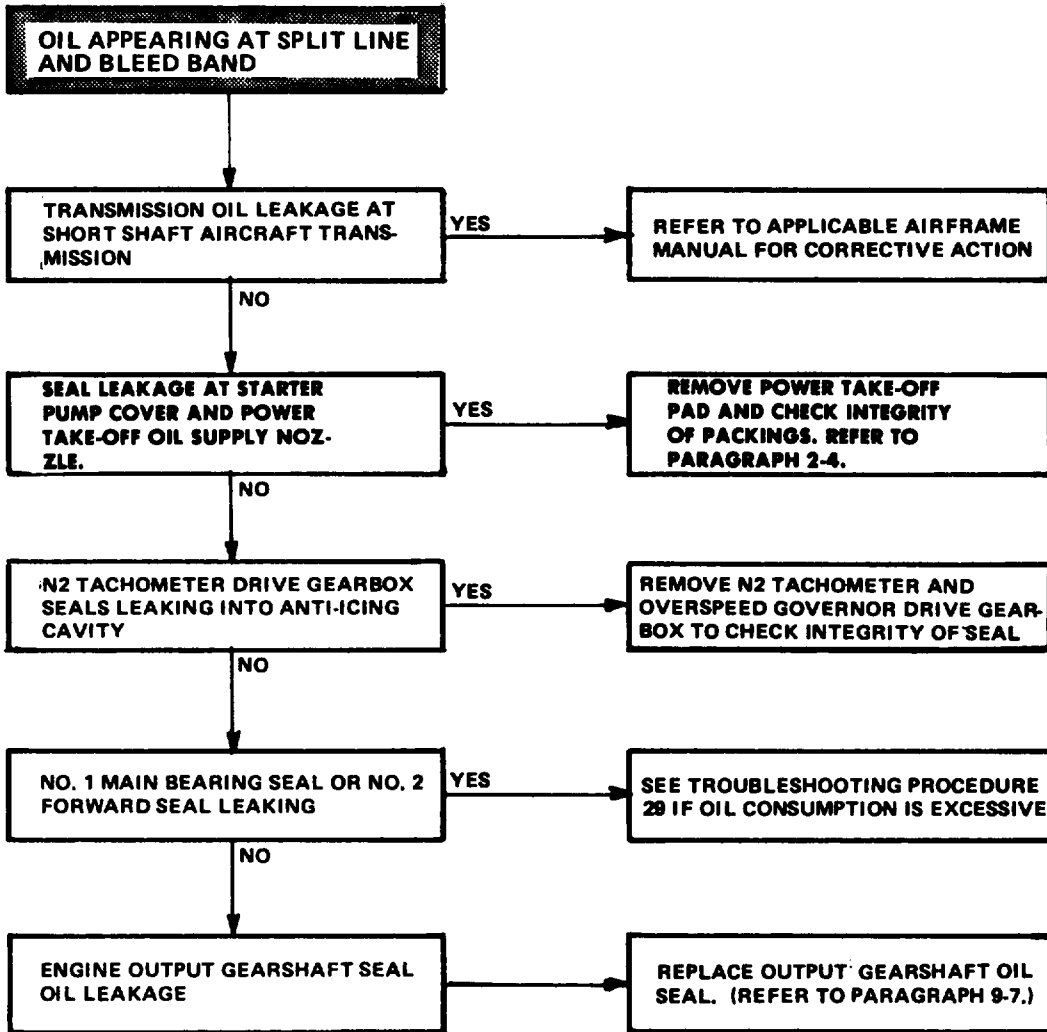
Troubleshooting Procedure 29. Excessive Engine Oil Consumption 0.3 Gal/Hr or 2.4 Pts/Hr or More



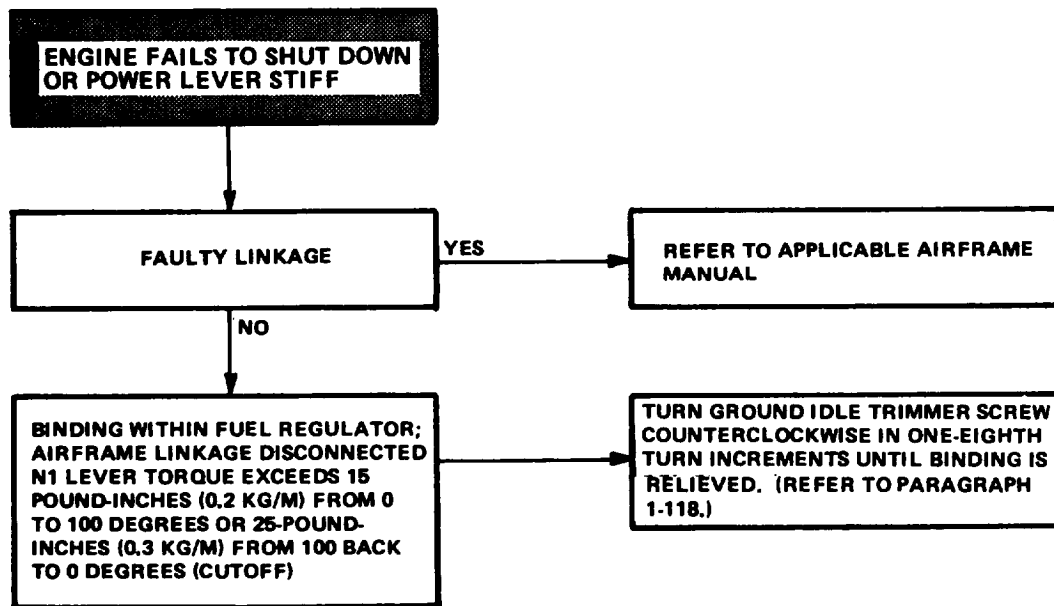
Troubleshooting Procedure 29. Excessive Oil Consumption 0.3 Gal/Hr or 2.4 Pts./Hr or More -  
Continued



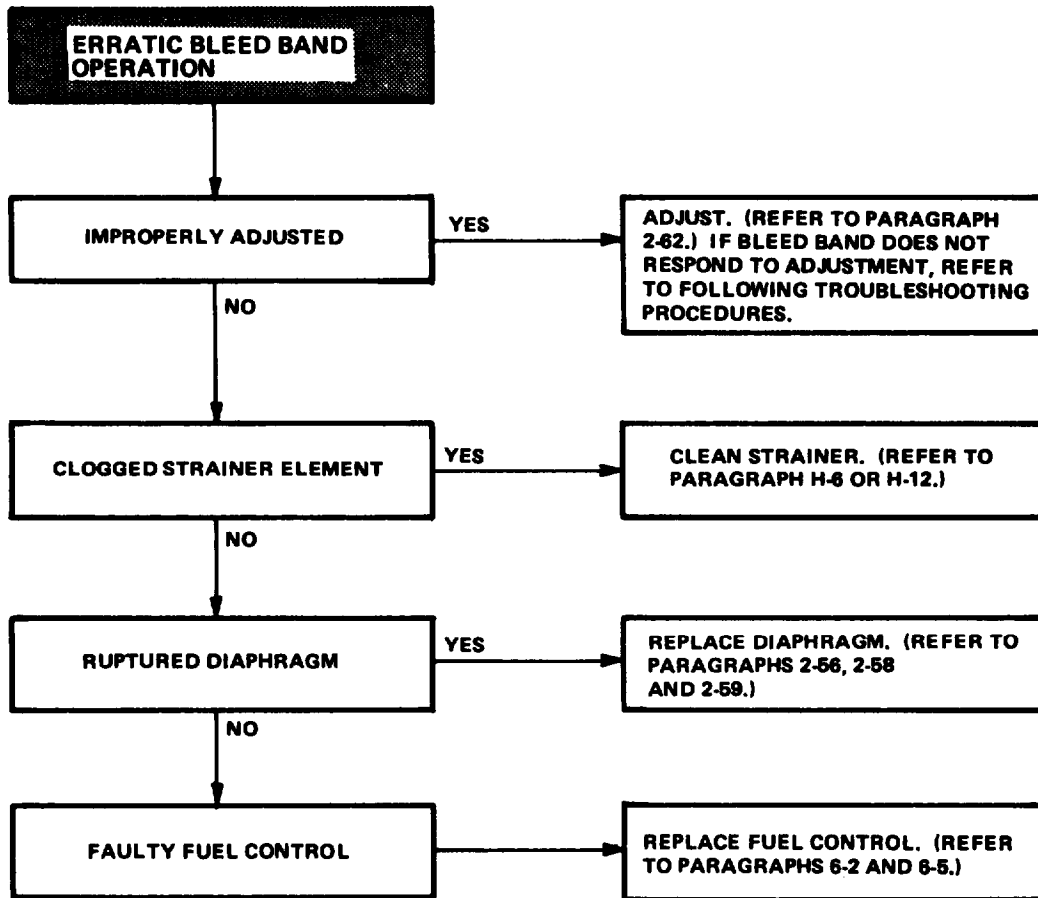
Troubleshooting Procedure 30. Oil Appearing at Split Line and Bleed Band



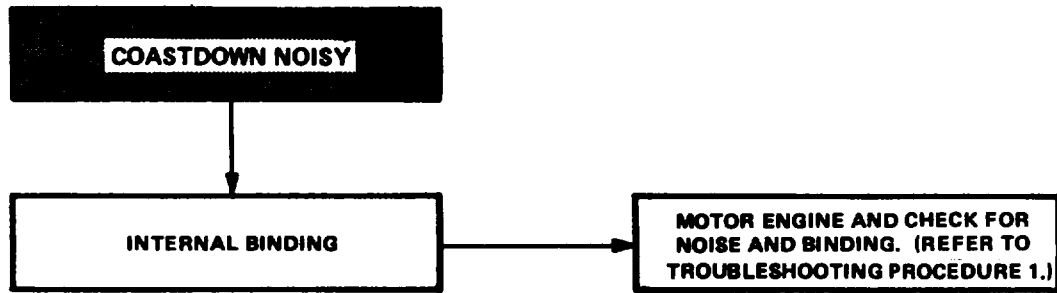
Troubleshooting Procedure 31. Engine Fails to Shut Down or Power Lever Stiff



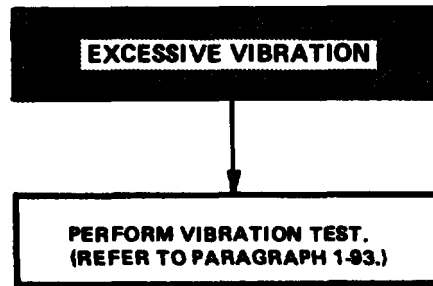
Troubleshooting Procedure 32. Erratic Bleed Band Operation



Troubleshooting Procedure 33. Coastdown Noisy



Troubleshooting Procedure 34. Excessive Vibration



**1-74. LUBRICATION SYSTEM CONTAMINATION TROUBLESHOOTING PROCEDURE.** If an excessive amount of metal chips is found on the engine oil filter element and/or chip detector but the output reduction carrier and gear assembly has freedom of movement and emits no unusual noises, proceed as outlined in following steps a. through j. If contamination is caused by carbon particles, refer to following step k.

**WARNING**

Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

**CAUTION**

Lubricating oil (item 46 or 47, Appendix D) may soften paint upon contact. If lubricating oil is spilled on painted surfaces, these surfaces should be thoroughly washed.

- a. Remove chips from oil filter element and retain for analysis. Clean filter elements and reinstall. Tighten filter housing attaching bolt. (Refer to Appendix G, table G-3 or G-4, reference number 52.
- b. Drain all oil from accessory drive gearbox and airframe oil tank and oil cooler
- c. Remove chips, if any, from chip detector and retain for analysis. Clean chip detector and reinstall
- d. Remove and inspect No. 2 bearing strainer and No. 3 and 4 bearing strainer (strainer bore on T53-L13B/703 engines) for metal chips. If chips are present, remove and inspect three reduction gear oil transfer tube strainers and overspeed governor and tachometer strainer. (Refer to paragraph 9-4.) Ship engine to Depot if metal chips have clogged more than one-third of flow area of any one of previously mentioned strainers. If amount of chips is not excessive, clean and reinstall strainers and proceed to following step e.
- e. Presence of chips in previously mentioned strainers indicates bypass of oil filter has occurred. Replace oil filter.
- f. Disconnect scavenge hose assemblies for No. 2 bearing and No. 3 and 4 bearings and determine if residual oil in hose assemblies is contaminated with chips. If so, ship engine to Depot for bearing replacement.
- g. Refill oil tank to capacity with new oil.

**CAUTION**

Any fluctuation in oil pressure in excess of plus or minus 5 psi, or rapid rise in oil temperature at any preset power setting, is cause for immediate engine shutdown.



- h. Start engine and run at flight idle until temperatures have stabilized. Check instruments for proper engine operation. Increase speed to 70 to 80 percent N1 rpm and maintain for 5 minutes.
- i. Shut down engine and again inspect oil filter elements, chip detector, and strainers.

**NOTE**

Chips in filter may come from oil supply tank; chips on chip detector from engine.

j. If quantity of chips remains the same after second engine run, do not clean filter, strainers, or chip detector. Ship engine to depot for tear down and analysis. Flush airframe oil system, oil cooler and oil tank. Refer to applicable airframe manual.

k. If amount of carbon particles found on engine oil filter element is in excess of that shown in figure 1-32, proceed as follows:

(1) Clean and reinstall oil filter assembly. Tighten filter housing attaching bolt. (Refer to Appendix G, table G-3 or G-4. reference number 52).

(2) Drain all oil from accessory drive gearbox, oil tank, and oil cooler.

(3) Remove and inspect No. 2 bearing strainer and No. 3 and 4 bearing strainer (strainer bore on T53-L-13B/703 engines). If carbon particles are present, oil filter has been bypassed. Remove, clean, and reinstall reduction gear oil transfer tube strainers and overspeed governor and tachometer drive oil throttle strainer. (Refer to paragraphs 9-4 and 2-46.) Clean and reinstall No. 2 bearing strainer and No. 3 and 4 bearing strainers.

(4) Perform preceding step e.

(5) Replenish oil system.

(6) Start engine and run at 70 to 80 percent N1 rpm for 15 minutes.

(7) Shut down engine/remove. inspect. and clean oil filter and strainers. Reinstall filter and strainers.

(8) If contamination is excessive, repeat procedure until filter is clean after run.

**1-75. EXHAUST THERMOCOUPLE ASSEMBLY SYSTEM TROUBLESHOOTING PROCEDURE.** This troubleshooting procedure applies to exhaust thermocouple harness assemblies installed on the engine and the engine installed in the airframe. This procedure must be accomplished whenever exhaust thermocouple assembly system accuracy is questionable, whenever an engine is removed, whenever a component of the engine or airframe EGT or TGT is replaced., or whenever the EGT or TGT circuit is disconnected. The Jetcal Analyzer, P/N BH112JB53 will be utilized in accordance with TM 55-4920-401-13 & P to accomplish these troubleshooting procedures.

a. For the T53-L11 Series engines, install three heater probe elements, P/N BH9%9640. on thermocouple probes. Connect junction box, P/N BH361-8, BH361-10, or BH361-12 to heater probe elements and Jetcal Analyzer, P/N BH1 12B153. Operate Jetcal Analyzer for a check of complete system (cockpit indicator, airframe wiring, and engine harness). Advance actual temperature by the rheostat on Jetcal Analyzer to 600° C and allow temperature to stabilize. Cockpit indicator shall read 600°C ± 5°C. If reading is not within limits, proceed as follows:

**1-170 Change 22**

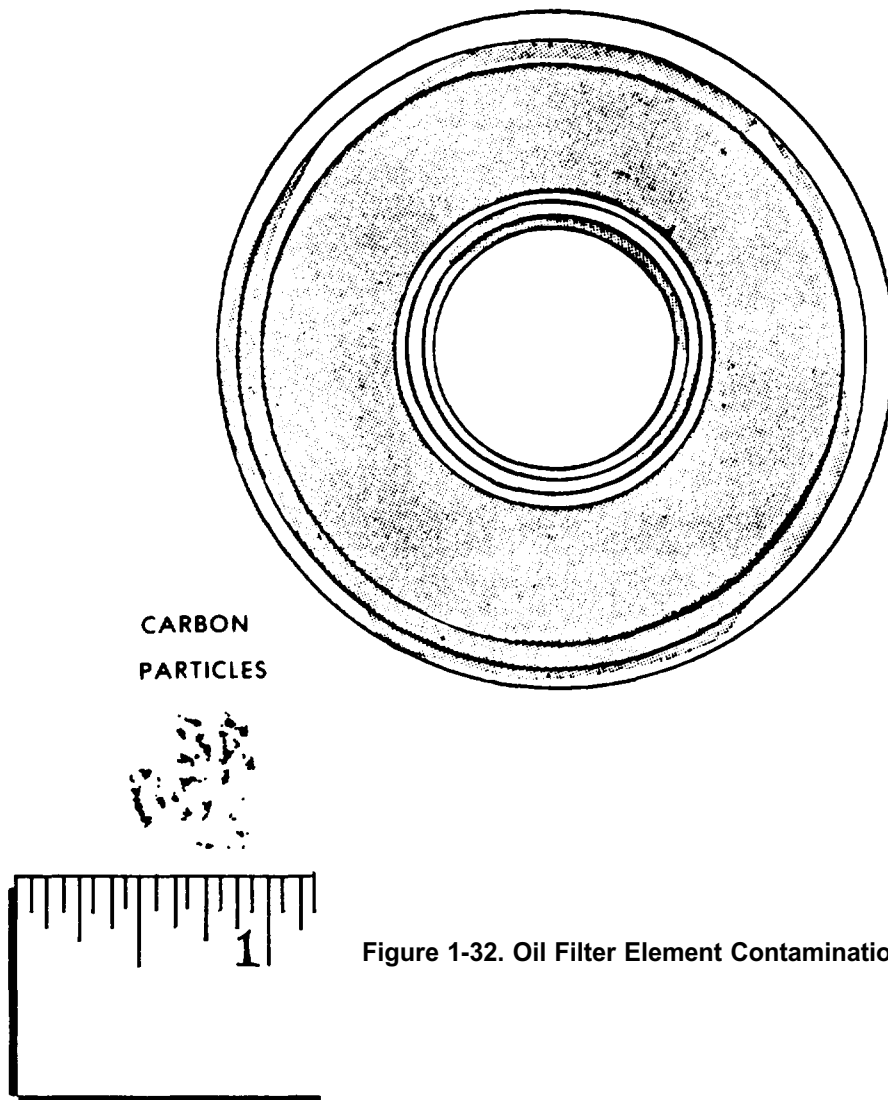


Figure 1-32. Oil Filter Element Contamination

- (1) Check each individual thermocouple to ensure that all thermocouples are operative. As heat is applied to each thermocouple, the airframe EGT indicator must show a temperature rise.
- (2) Perform a cockpit EGT indicator check. (Refer to applicable airframe manual and TM55-4920-244-14.)
- (3) Perform an engine exhaust thermocouple assembly resistance check as follows:
  - (a) Disconnect engine harness from airframe leads at engine/airframe firewall. Set range of scale of multimeter, P/N AN/USM223 or equivalent, to either 0.0 to 1.0 ohms or 1.0 to 5.0 ohms. Insert probes of multimeter into engine harness jacks.
  - (b) If engine harness resistance is not within limits at particular ambient soak temperature as shown in figure 1-33, replace thermocouple harness assembly.
  - (c) Reconnect thermocouple harness assembly to airframe leads at engine/airframe firewall.

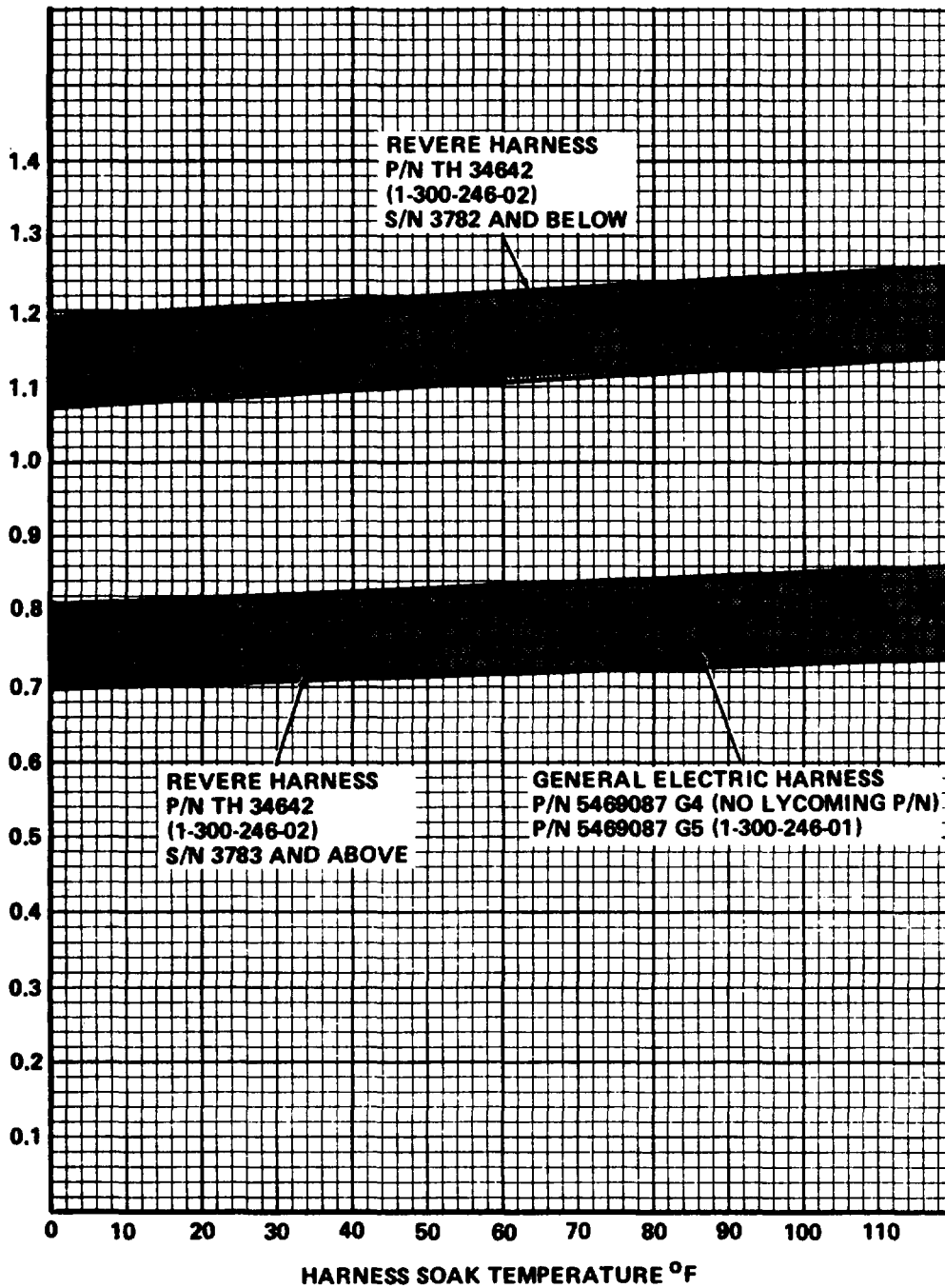


Figure 1-33. Harness Soak Temperature/Resistance (T53-L-11 Series Engines)

(4) Perform a resistance check of the complete EGT circuit and adjust airframe variable resistance spool as required. (Refer to appropriate airframe manual and TM 55-4920-401-13&P).

(5) Connect and operate Jetcal Analyzer for a complete system check. (Refer to preceding step a.)

b. For the T53-L-13B engines incorporating the 6-probe harness (P/N 1-300-177-01), install three heater probe elements P/N BH77434R-40 (right side), and three heater probe elements, P/N BH 7434L-40 (left side), on thermocouple probes. Connect junction box, P/N BH361-8, BH361-10, or BH361-12, to heater probe elements and Jetcal Analyzer, P/N BH112JB53. Operate Jetcal Analyzer for a check of complete system (cockpit indicator, airframe wiring, and engine harness). Advance actual temperature by rheostat on Jetcal Analyzer to 600°C and allow temperature to stabilize. Cockpit indicator shall read 600°C ± 10°C. If reading is not within limits, proceed as follows:

(1) Check each individual thermocouple to ensure that all thermocouples are operative. As heat is applied to each thermocouple, the airframe EGT indicator must show a temperature rise.

(2) Perform a cockpit EGT indicator check. (Refer to applicable airframe manual and TM 55-4920-401-13&P).

(3) Perform an engine exhaust thermocouple assembly resistance check as follows:

(a) Disconnect engine harness from airframe leads at engine/airframe firewall. Set range scale of multimeter, P/N AN/USM223 or equivalent, to either 0.0 to 1.0 ohms or 1.0 to 5.0 ohms. Insert probes of multimeter into engine harness jacks. Thermocouple harness is polarity sensitive. In order to read correct harness resistance, the multimeter negative (common) probe must be connected to either the "P" pin on the engine harness or "A" pin on the adapter when taking resistance reading.

(b) If engine harness resistance is not within limits at particular ambient soak temperature as shown in figure 1-34, replace thermocouple harness assembly.

(c) Reconnect thermocouple harness assembly to airframe leads at engine/airframe firewall.

(4) Perform a resistance check of the complete EGT circuit and adjust airframe variable resistance spool as required. (Refer to appropriate airframe manual and TM 55-4920-401-13&P).

(5) Connect and operate Jetcal Analyzer for a complete system check. (Refer to preceding step b.)

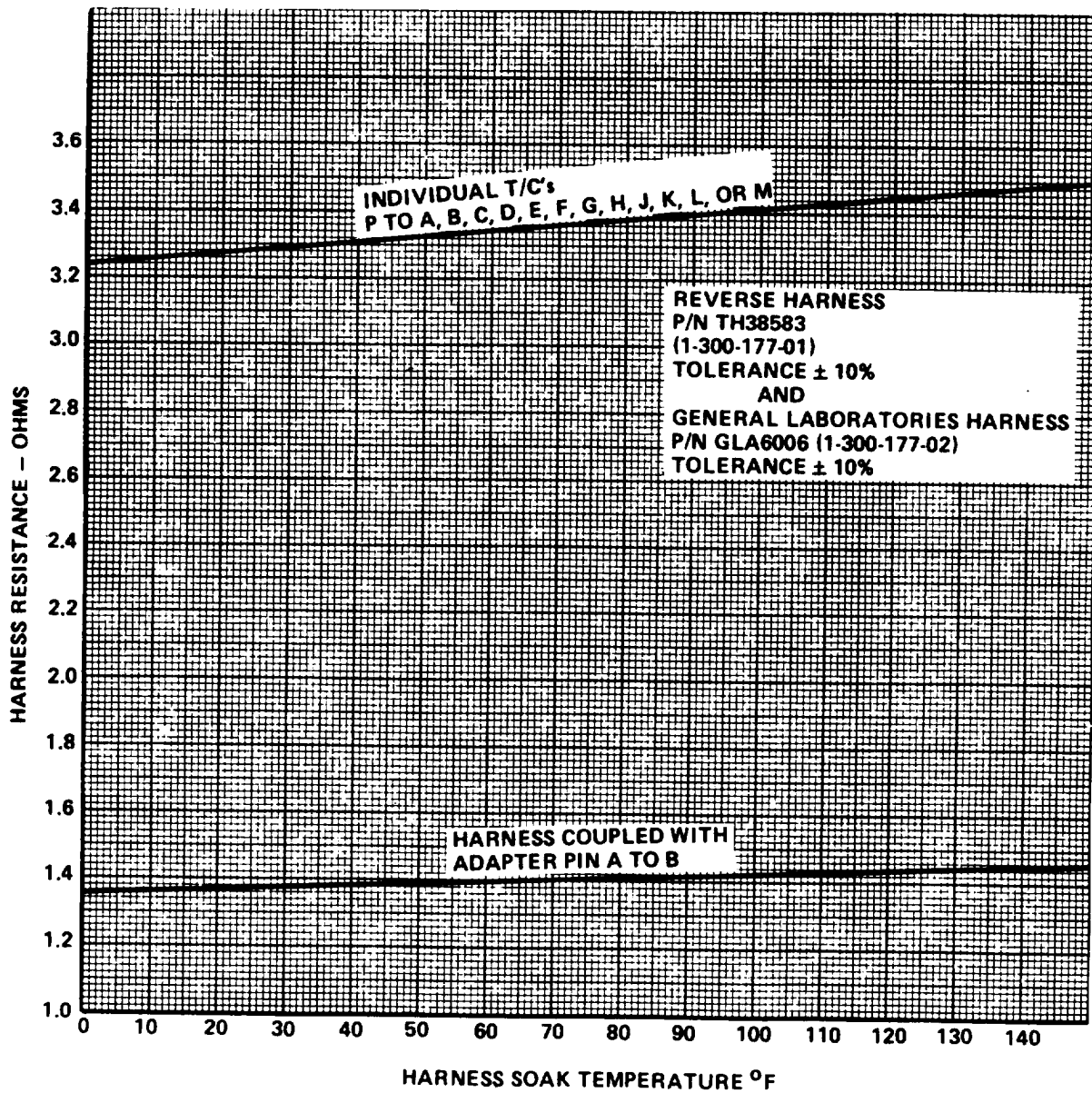
#### NOTE

Check the cockpit indicator and resistance first before checking the overall system.

c. For T53-L-13B engines incorporating the 6-probe harness (P/N 1-300-177-02), proceed as follows:

#### NOTE

The present 6-probe harness is not dimensionally compatible with existing heater elements. In order to perform a heater check of the EGT system, the heater elements require a support clip to be attached. Instructions for fabricating and attaching this support clip are contained in Appendix F. With the support clip attached, the heater elements will not slip off the thermocouple probes. Future models of the thermocouple harness P/N 1-300-177-02 will have modified probes, compatible with the heater elements. All of the thermocouple configurations shown in figure 1-35 will have the same part number; i.e., 1-300-177-02.



**NOTE**

Harness PNs 1-300-177-02, SNS 0001 to 2986, when coupled with adapter are acceptable with a resistance of 0.7 ohms minimum.

Figure 1-34. Harness Soak Temperature/Resistance (T53-L-13B Engines)

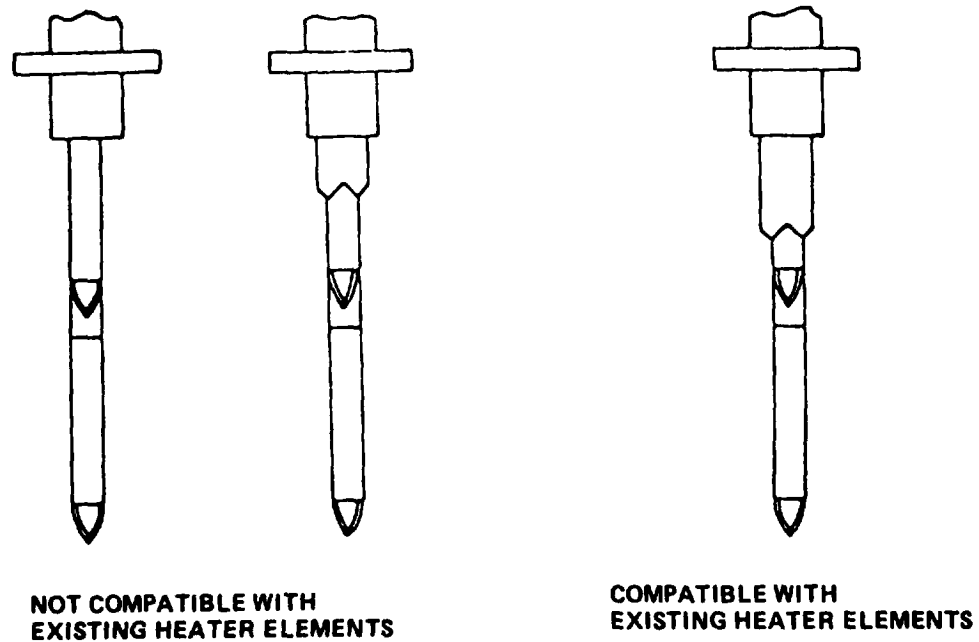


Figure 1-35. Exhaust Thermocouple Assembly (1-300-177-02) - Configurations

(1) If modified harness is installed, install three heater probe elements, P/N BH7434R-40 (right side), and three heat probe elements, P/N BH7434L-40 (left side), on thermocouple probes. Connect junction box, P/N BH361-8, BH361-10, or BH361-12, to heater probe elements and Jetcal Analyzer, P/N BH112JB53. Operate Jetcal Analyzer for a check of complete system (cockpit indicator, airframe wiring, and engine harness). Advance actual temperature by rheostat on Jetcal Analyzer to 600°C and allow temperature to stabilize. Cockpit indicator shall read 600°C ± 10°C. If reading is not within limits, perform the following steps (2) through (5). If an unmodified harness is installed, steps (2) through (5) must be accomplished to ensure proper functioning of the engine thermocouple assembly system.

(2) Determine that all thermocouples are operative.

(a) For unmodified harnesses, apply an external heat source as a soldering iron to each individual thermocouple.

(b) For modified harnesses, use Jetcal heater probe element to heat each individual thermocouple.

#### NOTE

As heat is applied to each thermocouple the airframe EGT indicator must show a temperature rise.

(3) I perform a cockpit EGT indicator check. (Refer to applicable airframe manual and TM 55-4920-401-13&P.)

(4) Perform an engine exhaust thermocouple assembly resistance check as follows:

(a) Disconnect engine harness from airframe leads at engine/airframe firewall. Set range scale of multimeter, P/N AN/USM223 or equivalent, to either 0.0 to 1.0 ohms or 1.0 to 5.0 ohms. Insert probes of multimeter into engine harness jacks.

(b) If engine harness resistance is not within limits at particular ambient soak temperature as shown in figure 1-34, replace thermocouple harness assembly.

(c) Reconnect thermocouple harness assembly to airframe leads at engine/airframe firewall.

(4.1) Perform an insulation resistance check. If reading is less than 10,000 ohms replace engine thermocouple harness. (Refer to TM 55-4920-244-14 and/or manufacturer's service manual.)

(5) Perform a resistance check of the complete EGT circuit, and adjust airframe variable resistance spool as required. (Refer to appropriate airframe manual and TM 55-4920-401-13&P.

(6) For modified harness, connect and operate Jetcal Analyzer for a complete system check. (Refer to preceding step c. (1).)

d. For T53-L-703 engines, proceed as follows:

(1) Perform a cockpit TGT indicator check. (Refer to applicable airframe manual and TM55-4920-244-14.)

(2) Perform thermocouple harness assembly resistance check as follows: (See figures 1-35A and 1-36.)

(a) Disconnect thermocouple lead at airframe interface connector and check for total system resistance between Pin A and Pin B to Curve "A".

1. If resistance is within specification limits, system is OK.

2. If resistance is out of limits, then proceed as follows:

(b) Disconnect lead connector from junction box and check individual circuits at junction box connector to Curve "B".

Pin A to D

Pin B to E

Pin C to F

1. If resistance is within specification limits, then check lead resistance as follows:

2. Connect Pins A and B at lead interface connector with a short jumper wire and check resistance of lead at input connector to Curve "D" as follows.

Pin A to D, E and F

Pin B to D, E and F

Pin C to D, E and F

3. If lead resistance is out of specification limits, replace lead.

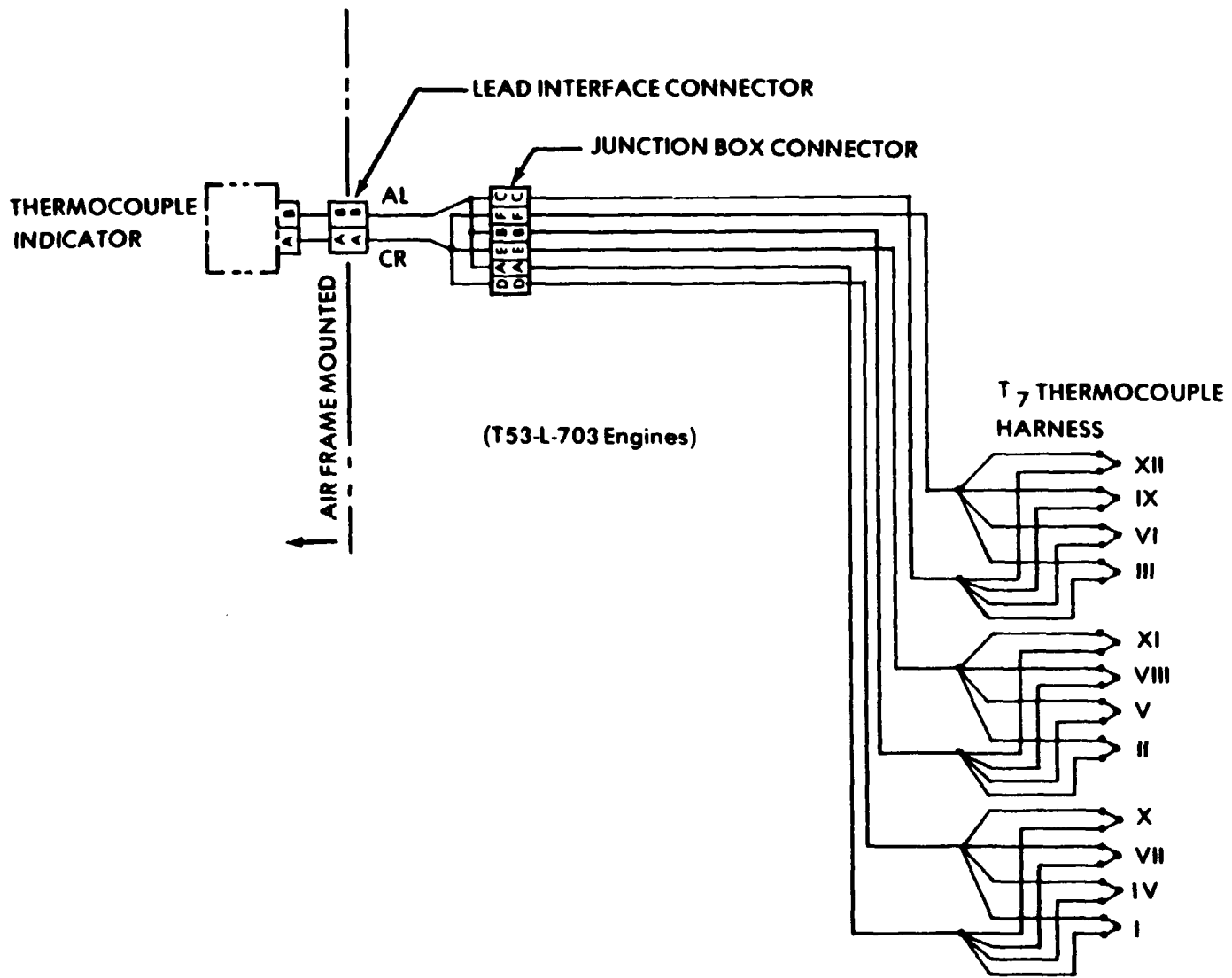


Figure 1-35A. Thermocouple Harness Assembly (T53-L-703 Engines)



4. If one or more of the circuits indicates an open circuit, open junction box and measure harness circuits at harness connector. (Rings) Use Curve "C". The first two rings, the middle two rings, and the last two rings comprise the three circuits to be checked.

5. If individual circuit resistance is within limits, clean ring contacts on harness connector and "V" contacts in junction box with fine emery paper then recheck per step (b).

5.1 If one individual circuit indicates an open circuit, reassemble system and replace harness at next engine teardown. If one circuit is out of limits or indicates a short circuit, isolate this circuit by installing Insulator, small piece of match cover will do, between rings and "V" contacts for that circuit and reassemble system. Replace harness at next engine teardown.

#### NOTE

The engine can be run with one of the three circuits out of the system. However, the accuracy of the system is somewhat impaired and replacement of the harness is mandatory at the next engine teardown.

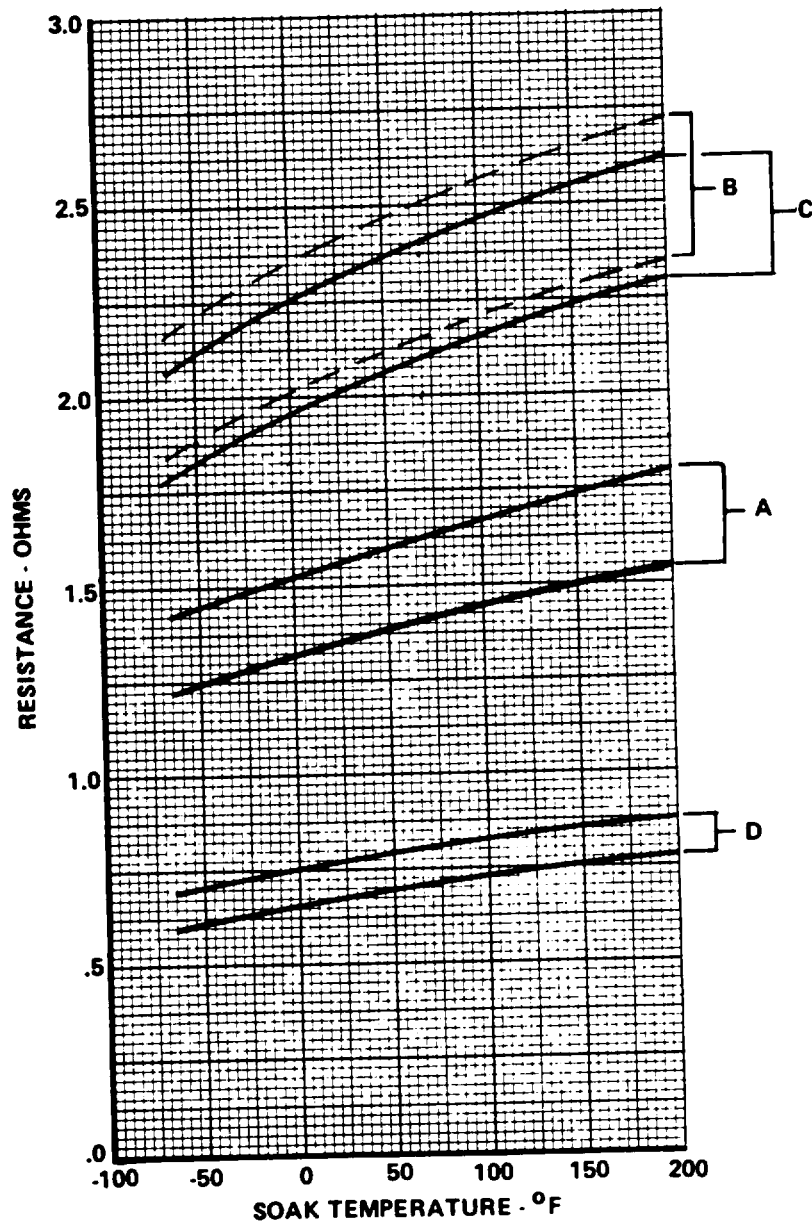
(c) Reconnect thermocouple harness assembly to airframe leads at engine/airframe firewall, or harness junction box.

(d) Perform a resistance check of the complete MGT circuit and adjust airframe variable resistance spool as required. (Refer to appropriate airframe manual and TM 55-4920-401-13/-13P).

6. if still out of limits, replace junction box.

**T53-L-103 TEMPERATURE MEASURING SYSTEM  
ELECTRICAL RESISTANCE VS SOAK TEMP.  
HARNES P/N 1-300-563-01 (TH-40513X)  
JUNCTION BOX P/N 1-300-564-01 (TLM-40510)  
LEAD P/N 1-300-499-01 (TLM-41089)**

- A - TOTAL SYSTEM RESISTANCE MEASURED AT AIRFRAME INTERFACE CONNECTOR**
- B - INDIVIDUAL T/C CIRCUIT RESISTANCE MEASURED AT JUNCTION BOX CONNECTOR**
- C - INDIVIDUAL T/C CIRCUIT RESISTANCE MEASURED AT T/C HARNES CONNECTOR (RINGS)**
- D - LEAD RESISTANCE (TOTAL BOTH CONDUCTORS)**



XA-853-154

Figure 1-36. Harness Soak Temperature/Resistance (T53-L-703 Engines)



## Section VII. GENERAL MAINTENANCE PROCEDURES

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### 1-76 GENERAL MAINTENANCE INFORMATION

This section contains general information and practices that maintenance personnel shall become familiar with before attempting to work on the engine. Refer to Appendix G for torque values for bolts, nuts, and connectors used on the engine.

**WARNING**

#### FLIGHT SAFETY PARTS

Certain engine parts that are critical to the flight safety of the engine, airframe and associated personnel are identified in this manual. These parts must be handled in accordance with maintenance practices and instructions given to ensure their reliability.

Disassembly and assembly of engine parts identified as flight safety parts must be done in accordance with proper maintenance practices which include:

- a. Use of the correct tool(s) for removal and assembly. These tools must be used for the purpose they were designed for.
- b. During maintenance activities and when handling, use caution to ensure that flight safety parts are not damaged.
- c. When flight safety parts are removed from the engine, place them in individual nonmetallic containers. Protect blade tips from damage caused during handling by use of protective blade wrap material.

## 1-77. GENERAL MAINTENANCE PRACTICES

a. Engines removed for unscheduled repair, require only that work necessary to return the engine to service.

b. During disassembly, examine all parts and assemblies for serviceability. Look for indications of work done incorrectly during previous maintenance or overhaul. Report any such indications.



**Never allow fuel or oil to contact electrical connectors. Do not use pliers to tighten connectors. Use only specified solvent to clean connectors. Other solvents might damage connectors.**

c. Use extreme care when disconnecting electrical leads. Cap all ends to prevent entrance of dirt, oil, and moisture. Use only the recommended protector caps. Never cover electrical connectors with plastic bags.

d. Before disconnecting tubes and hoses, remove locknuts and bolts from cushion clamps. This prevents damage to fittings. If the same lines are going to be reinstalled, reassembly will be easier if clamps are not removed from lines. Remove locknut and bolt that secure the clamp, free the clamp, then reinstall bolt and locknut loosely in the clamp.

e. When connecting or disconnecting tubes and hoses, use caution to prevent damage and twisting action. When possible, use a backup wrench on fitting. As tubes and hoses are disconnected, cap or cover openings to prevent entrance of foreign material.

f. To aid in reassembly, keep bolts together as they are removed from each bolt circle.

g. Dispose of unserviceable parts in accordance with current regulations. Discard all preformed packings (O-rings) and gaskets that are removed during disassembly. Do not discard adapter gasket (sheetmetal plate with Integral seals) used on sequence valve, on oil cooler, or on oil manifold unless sealing material is damaged.

h. Keywashers are not reusable. Once used, they must be replaced by new keywashers in all applications.

i. All used locknuts will be tried for self-locking capabilities before being reused. Manually thread used locknut onto bolt or stud until it stops turning. Replace locknut if bolt or stud threads go past end of locknut.

Use care when assembling bolts to shank-type locknuts. Aline the bolts and engage the first few threads manually to avoid dislodging the locknut from its seat.

k. During assembly, be careful not to drop nuts, washers, or other objects into the subassembly. If an object is dropped, do not proceed further until it is removed.

l. Do not use excessive force to assemble mating parts. If excessive force appears necessary, inspect mating surfaces for burrs or pickups. Remove any such defects and repair or replace defective parts.

m. The special tools identified in this manual are designed specifically for use on this engine. Avoid the use of makeshift tools.

**CAUTION**

**Do not use brass or lead tools when installing or disassembling hot section parts. Brass and lead contaminants can ultimately lead to part failure.**

n. Before using tools, be sure that they are clean and free from nicks, dents, or burrs that could damage engine parts.

**CAUTION**

**Do not use cadmium-plated tools on titanium parts. Doing so may cause parts to fall during subsequent use.**

o. Do not use screwdrivers or sharp metal rods to separate engine parts. If engine parts are bound or seized, use wooden wedges to separate them.

p. Do not use hammers with metal heads to drive any tool on any part of the engine; instead, use hammers with plastic, nylon, or rawhide heads when driving is required.

q. Do not leave tools or parts on any part of the engine, particularly near inlet, during maintenance. Return each tool to its proper place immediately after use.

r. Always use approved thermally insulated gloves when handling hot or chilled engine parts.



- s. Lift all heavy parts with proper lifting devices to prevent damage to the part or injury to personnel. Do not use engine components as handles when moving the engine.

**CAUTION**

Never mark engine parts with a lead pencil. Such deposits can cause corrosion and burn-out of parts. Do not use either the electrolytic-etch or electric-arc scribe methods to mark engine parts.

- t. Use marking pencil (item 54, Appendix D) or equivalent to temporarily mark engine parts.

**1-78. Cleanliness.**

- a. Keep dirt and other foreign material out of the engine. Use the recommended covers to seal openings in the dismantled engine and in disassembled parts.
- b. Place each engine part on a clean surface as it is removed from the engine. Wrap small parts in barrier material (item 9, Appendix D), seal with tape (item 79), and tag (or otherwise identify) the package with engine and module serial number, part nomenclature, and part number.
- c. Do not remove wrappings, protectors or covers until the part is ready to be installed.

**1-79. Engine - Draining Oil**

INITIAL SETUP

Applicable Configuration  
All

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<b>NOTE</b>	
	There are no special servicing instructions necessary for engine operation other than insuring that the oil level is sufficient.	
1. Container		<b>Place</b> a suitable container under the accessory drive gearbox.
2. Magnetic Chip Detector Drain Plug		<b>Remove</b> from accessory drive gearbox.
3. Scavenge Oil Hose		<b>Disconnect</b> from the accessory drive gearbox.
4. Lubricating System		<b>Drain.</b>



1-79. Engine - Draining Oil - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/ - Continued

5. Engine

After draining is completed, replace and re-connect items removed or disconnected.

1-80. Lubricating Oil - Changing From MI L-L-7808 to MI L-L-23699

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Lubricating Oil (item 46, Appendix D)  
Lubricating Oil (item 47, Appendix D)

**References**

Para 8-2,8-9,8-10,8-14,8-15, 8-11,  
8-29,8-16,8-3,8-4,8-7, 8-12,8-13,  
8-17 and 8-35

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/

**WARNING**

Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

**CAUTION**

Lubricating Oil (item 46 or 47) may soften paint on contact. If lubricating oil is spilled on painted surfaces, these surfaces should be thoroughly washed.

1. Lubricating Oil

Use lubricating oil (item 46, Appendix D).

Drain from engine oil system.

1-86. Lubricating Oil - Changing From MI L-L-7808 to MI L-L-23699 - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
2. Oil Filters and Strainers	Refer to paragraphs 8-2,8-14,8-15,8-11, 8-16,8-29,8-3,8-4,8-7, 8-12,8-13,8-17, 8-18, 8-34 and 8-35.	<b>Inspect</b> and clean.
3. Engine Oil System	Use lubricating oil (item 47, Appendix D).	<b>Fill</b> with lubricating oil.
4. Engine	Perform this action to heat the oil to operating temperature which will promote the dislodging of MIL-L-7808 residual carbon and lacquer deposits.	<b>Operate</b> for a period of 30 minutes to one hour.
5. Engine		<b>Shut down</b> .
6. Oil Filters and Strainers	Refer to paragraphs 8-2,8-9,8-14,8-10, 8-15,8-11,8-16, 8-3, 8-4,8-7,8-12,8-13 and 8-18.	<b>Inspect</b> and clean.

**NOTE**

If heavy contamination of filters and strainers is noted, proceed with following actions for items 7 thru 11. If little or no contamination of filters and strainers is noted, release aircraft for service use and proceed with following actions for items 10 and 11.

7. Lubricating Oil	Use lubricating oil (item 47, Appendix D).	<b>Drain</b> from engine oil system. <b>Discard</b> .
8. Engine Oil System	Use lubricating oil (item 47, Appendix D).	<b>Refill</b> with new lubricating oil.
9. Engine		<b>Release</b> for service use.
10. Oil Filters and strainers	This action is required after 5 and 15 hours of engine operation following the oil change-over.	<b>Inspect</b> and clean.

**NOTE**

It is not advisable to mix MIL-L-23699 oil with MIL-L-7808 oil except in cases of emergency. If this becomes necessary, it is required that the system be flushed within 6 hours as outlined in preceding actions for items 1 thru 9.

1-80. Lubricating Oil - Changing From MI L-L-7808 to MI L-L-23699 - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
11. Oil Filters and Strainers	Perform this action after 15-hour inspection.	Revert to normal inspection interval.

1-81. Lubricating Oil - Changing From MI L-L-23699 to MI L-L-7808

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Lubricating Oil (item 47, Appendix D)  
Lubricating Oil (item 46, Appendix D)

**References**

Para 8-2,8-9,8-14,8-10,8-15, 8-11,  
8-16,8-29,8-3,8-4,8-7, 8-12,8-13,  
8-17,8-18, and 8-34

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/ -

**WARNING**

Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

**CAUTION**

Lubricating oil (item 46 or 47, Appendix D) may soften paint upon contact. If lubricating oil is spilled on painted surfaces, these surfaces should be thoroughly washed.

1-81. Lubricating Oil - Changing From MIL-L-23809 to MIL-L-7808 - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
1. Engine Oil System	Use lubricating oil (item 47, Appendix D).	<b>Drain</b> lubricating oil from the engine oil system.
2. Oil Filters and Strainers	Refer to paragraphs 8-2,8-14,8-15,8-11, 8-16,8-29,8-3,8-4,8-7, 8-12,8-18,8-17, 8-18 and 8-34.	<b>Inspect</b> and clean.
3. Engine Oil System	Use lubricating oil (item 46, Appendix D).	<b>Fill</b> with lubricating oil.
4. Engine		<b>Operate</b> until oil reaches operating temperature.
5. Engine		<b>Shut down.</b>
6. Oil Filters and Strainers	Refer to paragraphs 8-2,8-9,8-14,8-10, 8-15,8-11,8-16,8-3,8-4, 8-7,8-12,8-13 and 8-18.	<b>Inspect</b> and <b>clean.</b>
7. Aircraft		<b>Release</b> for service use.
8. Engine Oil Filters and Strainers	This action is required after 5 and 15 hours of engine operation following the oil changeover.	<b>Inspect</b> and <b>clean.</b>
<b>NOTE</b>		
It is not advisable to mix MIL-L-23699 Oil with MIL-L-7808 Oil except in cases of emergency. If this becomes necessary, it is required that the system be flushed within 6 hours as outlined in preceding actions for items 1 thru 8.		
9. Engine Oil Filters and Strainers	Perform this action after 15-hour inspection.	<b>Revert</b> to normal inspection interval.

**1-82. Lockwiring.** Lockwiring is a method of safeying two or more installed parts together to prevent loosening. Unless assembly instructions recommended special safe tying methods, the following general practice shall be used.

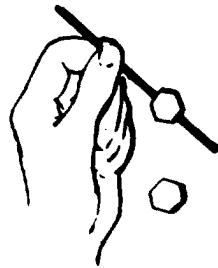
a. Corrosion-Resistant Steel Lockwire, Military Standard MS-20995-C20 or MS-20995-C32, eight twists to the inch, is recommended for use throughout engine assembly unless otherwise noted. (Refer to TM 55-1500-20425/1.)

b. Be certain that parts are tightened to the correct torque and wire passages are parallel. If parts cannot be positioned properly within specified torque limits, replace parts until the required positions are obtained.

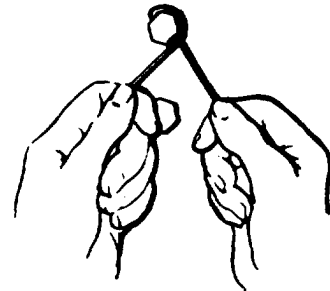
c. Insure that holes of the parts to be lockwired are parallel. (See step 1 of following figure.) Always install lockwire to tighten and keep parts in place. Pull and twist lockwire tightly to prevent excessive vibration or rubbing. During lockwire procedure, do not loosen or tighten parts to manipulate wire.



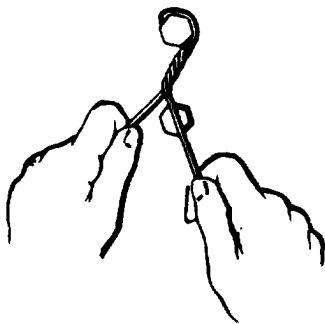
**1. LOCKWIRE HOLES PARALLEL**



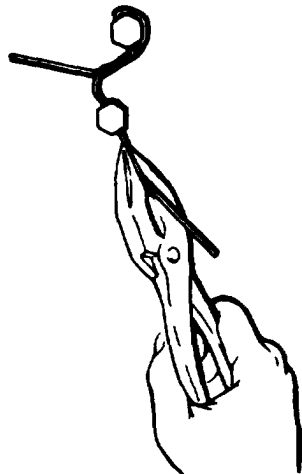
**2. INSERTING WIRE**



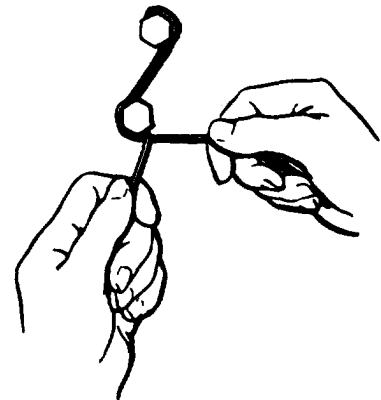
**3. BENDING WIRE AROUND BOLT**



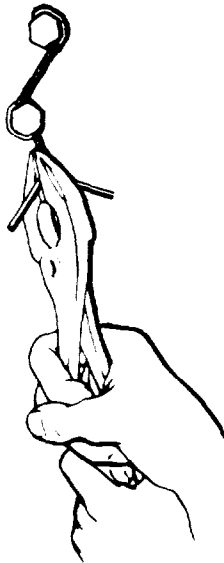
**4. TWISTING WIRE**



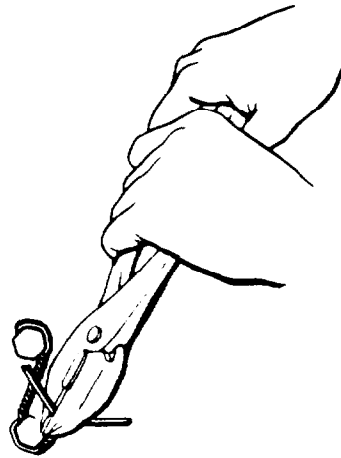
**5. PULLING WIRE**



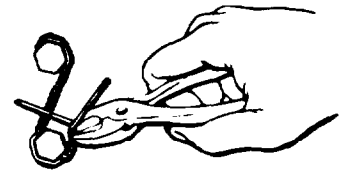
**6. BENDING WIRE AROUND BOLT**



7. TWISTING WIRE

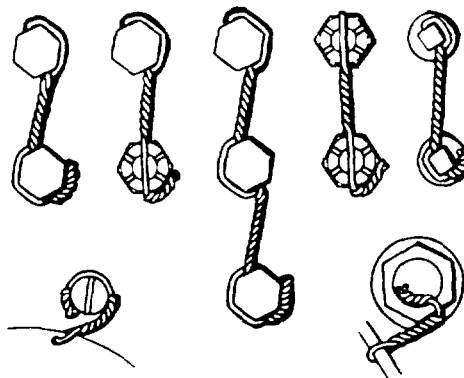


8. BENDING TWISTED WIRE



9. CUTTING EXCESS WIRE


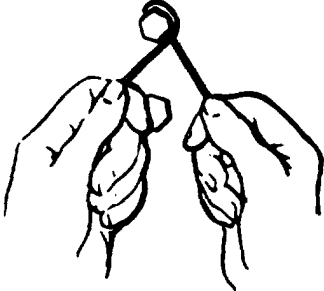
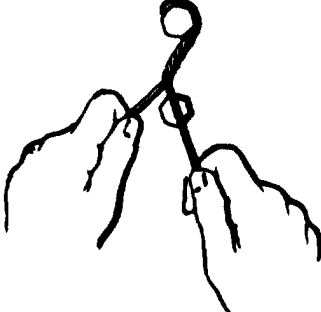
d. Lockwiring applications are shown in the following figure. When lockwiring is completed, allow at least three complete turns of wire to remain before cutting excess wire.



1-83. Lockwire Procedures

INITIAL SETUP

Applicable Configuration  
All

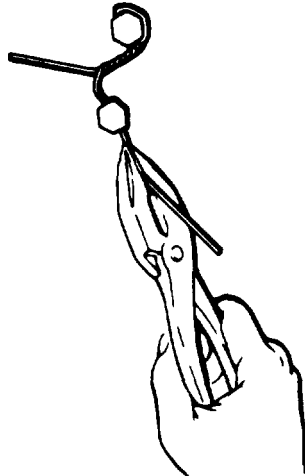
LOCATION/ITEM	REMARKS	ACTION
ENGINE/	NOTE	
	<p>When parts have been tightened to the proper torque positioned and inspected, use the following procedure. (Procedures in following figure will be referred to as steps.)</p>	
1. wire	 <p>1. LOCKWIRE HOLES PARALLEL      2. INSERTING WIRE</p>	<p>Insert through hole in first bolt (step 2) in following figure.</p>
2. Wire	 <p>3. BENDING WIRE AROUND BOLT</p>	<p>Bend wire to the right around the head of the bolt and under the other end of the lockwire. Tighten wire around head of bolt (step 3).</p>
3. Wire	 <p>4. TWISTING WIRE</p>	<p>Keeping wire tight around head of first bolt, twist wire strands around each other until twisted length is just short of hole in second bolt (step 4).</p>

1-83. Lockwire Procedures - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/ - Continued

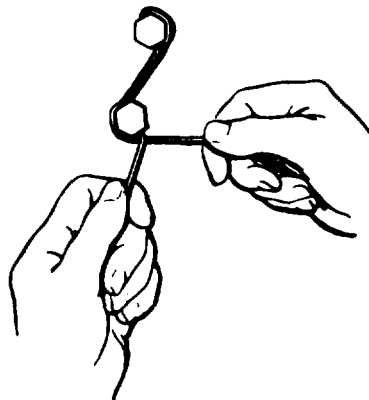
4. wire



5. PULLING WIRE

**Insert** one end of the wire through the hole in the second bolt and **pull** with pliers (step 5) until tight.

5. wire



6. BENDING WIRE AROUND BOLT

**Bring** other end of the wire around head of bolt and under lockwire protruding from bolt (step 6).



1-83. Lockwire Procedures - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

6. Wire



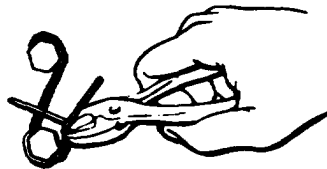
7. TWISTING WIRE



8. BENDING TWISTED WIRE

Keep tight, twist ends together (step 7). During final twist bend twisted wire down and around head of bolt (step 8).

7. wire



9. CUTTING EXCESS WIRE

Cut excess and remove, Bend sharp ends in toward engine (step 9).

**1-84. Seal Leakage Limits**

INITIAL SETUP

**Applicable Configuration**

All

LOCATION/ITEM	REMARKS	ACTION
ACCESSORY DRIVE GEARBOX/		
<b>NOTE</b>		
Total oil consumption internal and/or external shall not exceed .3 gal./hr or 2.4 pts/hr.		
1. N1 Tachometer Drive seal		2 cc/hr or 30 drops/hr.
2. Starter Generator Drive Seal		2 cc/hr or 30 drops/hr.
3. Fuel Control Drive seal		2 cc/hr or 30 drops/hr.
4. Fuel and Oil Mixture		120 cc/hr or 1800 drops/hr.
5. Fuel Control and Overspeed Governor		0.1-2 cc/hr or 30 drops/hr.
OVERSPEED GOVERNOR TACHOMETER DRIVE ASSEMBLY/		
1. N2 Tachometer Drive		2 cc/hr or 30 drops/hr.
OUTPUT REDUCTION CARRIER AND GEAR ASSEMBLY/		
1. Output Gearshaft seal		2 cc/hr or 30 drops/hr.
ENGINE INLET HOUSING FLANGE/		
1. Variable Inlet Guide Vane Actuator		60 cc/hr or 900 drops/hr.

**NOTE**

1 cc= Approximately 15 drops.

**Section VIII. ENGINE TESTING**

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**1-85. TESTING OF ENGINE IN AIRCRAFT.**

Paragraphs 1-86 through 1-106 contain instructions for normal ground operation of engine installed in aircraft to determine flight readiness. These paragraphs also contain specific operational and visual component checks that must be performed in addition to normal ground operation. Performance of a shaft turbine engine is affected by barometric pressure and ambient air temperature. Since it is not practical to provide identical values determined by test under prevailing atmospheric conditions, engine steady state operating limits under all ambient conditions are provided in tables 1-9, 1-10 and 1-11.

**Table 1-9. Engine Steady-State Operating Limits Under All Ambient Conditions (T53-L-11 Series Engines)**

Compressor Rotor Power Rating	(N1)Speed (Percent)	Max Shaft Speed (RPM) ***	Max Exhaust Gas Temp	Max Torque Indicated (Psig)	Max Inlet Oil Temp	Oil Pressure Limits NRP and Above (Psig)
TAKEOFF (5 Min)	*101.5	6700	1185°F (640°C)	50	200°F (93°C)	60 to 80
MILITARY (30 Min)		6700	1185°F (640°C)	48	200°F (93°C)	60 to 80
NORMAL		** 6700	1150°F (620°C)	46	200°F (93°C)	60 to 80

\*This red line limit shall not be exceeded as a steady-state N1 speed.

\*\*At an N1 speed of 85 percent or less, a steady-state output shaft speed of 6900 is permissible.

\*\*\*If shaft speed is exceeded, refer to paragraph 1-58.

**Table 1-10. Engine Steady-State Operating Limits Under All Ambient Conditions (T53-L-13B Engines)**

Compressor Rotor Power Rating	(N1)Speed (Percent)	Max output Shaft Speed (RPM) ****	Max Exhaust Gas Temp	Max Torque Indicated (Psig)	Max Inlet Oil Temp ***	Oil Pressure Limits NRP and Above (Psig)
MILITARY (30 Min)	*101.5	6700	1160°F (625°C)	64	200°F (93°C)	80 to 100
NORMAL (Continuous)		**6700	1130°F (610°C)	60	200°F (93°C)	80 to 100

\*This red line limit shall not be exceeded as a steady-state N1 speed.

\*\*At torque pressure of 15 psi or less, a steady-state output shaft speed of 6900 is permissible.

\*\*\*If these limits are exceeded, refer to paragraph 1-65.

\*\*\*\*If shaft speed is exceeded, refer to paragraph 1-58.

Table 1-11. Engine Steady-State Operating Limits Under All Ambient Conditions (T53-L-703 Engine)

Mechanical Power Rating	Max Compressor Rotor Speed (N1) (Percent)	Max Output Shaft Speed (RPM)	Max Turbine Gas Temp	Max Torque indicated (Psi)	Max Inlet Oil Temp	Oil Pressure Limits NRP and Above (Psig)
MILITARY (30 Min)	106	6700 (101.5%)	880°C	64	200°F (93°C)	80 to 100
NORMAL (Continuous)	101.5	6700 (101.5%)	820°C	60	200°F (93°C)	80 to 100

**NOTE:** 100% N1 = 25,150 rpm  
100% N2 = 6,567 Output Shaft rpm  
21,084 Turbine rpm

1-86. Engine - Pretest Inspection and Checks

INITIAL SETUP

Applicable Configuration

Consumable Materials

Lubricating Oil (item 46 or 47, Appendix D)

Test Equipment

Ohmmeter (WV77E, FSCM49671)

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<p style="text-align: center;"><b>NOTE</b></p> <p>Perform necessary abnormal weather maintenance.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Insure that P1 bellow cavity is filled with damping fluid (silicone)(item 100 ,Appendix D) prior to engine operation. Refer to paragraph 6-5.</p>	
1. Engine		Remove inlet and exhaust protective covers.
2. Engine inlet		Inspect for rags, tools, or other foreign objects.

1-86. Engine - Pretest Inspection and Checks - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/ - Continued

**WARNING**

Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

**CAUTION**

Lubricating oil (item 46 or 47, Appendix D) may soften paint on contact. Thoroughly wash painted surfaces if lubricating oil is spilled on them.

**NOTE**

Use lubricating oil (item 46 or 47, Appendix D). It is not advisable to mix MIL-L-23699 oil with MIL-L-7808 oil, except in case of emergency. If it becomes necessary to mix the oil, flush system within 6 hours.

3. Engine	Use lubricating oil (item 46 or 47, Appendix D).	<b>Check</b> that aircraft oil tank is filled to proper level.
4. Engine		Visually <b>inspect</b> for leaks.
5. Chip Detector	Measure resistance using ohmmeter. If less than 400,000 ohms, remove and inspect chip detector. Determine source of contamination.	<b>Check</b> for presence of foreign material.

1-88. Engine - Pretest Inspection and Checks - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

AIRFRAME/

6. Cockpit Engine Controls

Power lever and speed selector lever should move freely between stops on control and through full arc. (Refer to applicable airframe manual).

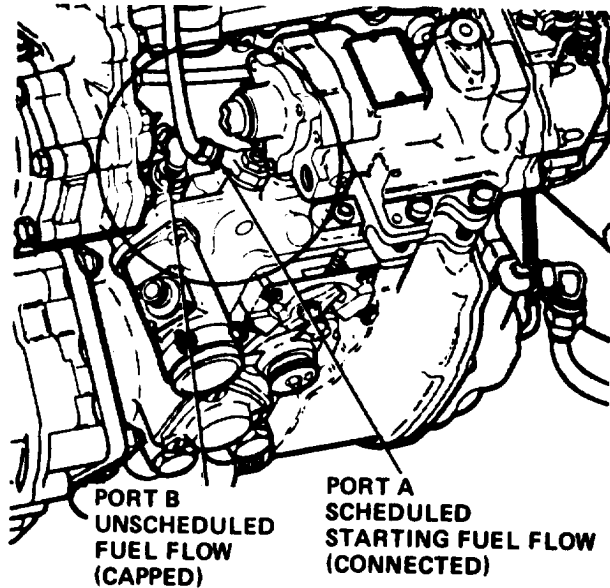
**Check** for freedom of movement.

ENGINE/

7. Starting Fuel Line

T53-L-11 series engines only.

**Insure** starting fuel line is connected to proper port.



**WARNING**

Cap unused port, and lockwire cap before starting engine.

**CAUTION**

Under most ambient conditions, port (A) is used for operation with all fuels. If engine fails to start at low ambient temperatures with JP-5/JP-8 fuel, starting fuel line must be connected to port (B). Starting procedure is the same for this configuration as for port (A).

8. Engine

**Insure** that all personnel are well clear of engine air inlet and exhaust sections.

### 1-87. Engine Motoring

#### INITIAL SETUP

Applicable Configuration  
All

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/

#### NOTE

Motor the engine during fuel control priming or if other maintenance operations require it.

1. Engine

Refer to applicable aircraft manual.

**Motor** engine as follows:

- a. **Disconnect** 28-vdc power supply from ignition unit.
- b. **Connect** external power supply to starter.
- c. **Check** power lever to insure it is in OFF position.
- d. **Motor** engine with starter.



1-88. Fuel Control Priming

INITIAL SETUP

Applicable Configuration  
All

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<b>NOTE</b>	
	Perform this check only if fuel control has been drained of fuel or is removed or replaced.	
	<b>WARNING</b>	
	To prevent accidental firing, disconnect 28-vdc power supply from ignition.	
1. Fuel Control		<b>Insure</b> proper linkage rigging.
2. Fuel Control		<b>Disconnect</b> starting fuel hose assembly downstream from solenoid valve. <b>Disconnect</b> main fuel hose assembly downstream from fuel control.
3. Fuel Control		<b>Disconnect</b> governor bleed hose assembly downstream from governor.
4. Fuel Control Switch		<b>Set</b> switch on AUTO-MATIC.
5. Power Lever (N1)		<b>Set</b> to flight idle.
6. Fuel Boost Pump		<b>Turn</b> ON.

1-88. Fuel Control Priming Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
7. Engine	Refer to applicable aircraft manual.	<b>Motor</b> with starter.
8. Starting Fuel Solenoid Valve		<b>Energize</b> and hold.
9. Power Lever (N1)		<b>Cycle</b> power lever (N1) from flight idle to military and back several times. Continue this procedure until clear fuel is flowing from main and starting fuel discharge lines.
10. Engine	Engine speed should beat least 12 percent N1 rpm. Engine should coast down with no indication of robbing or unusual noises.	<b>Deenergize</b> starter.
11. Engine		<b>Turn off</b> starting fuel solenoid valve. <b>Move</b> power lever (N1) to OFF position, Turn fuel boost pump OFF.
12. Ignition Unit		<b>Connect</b> 28-vdc power source to ignition unit and lockwire.
13. Fuel Control		<b>Remove</b> drain lines. <b>Connect</b> governor bleed hose assembly. <b>Connect</b> fuel and starting hose assemblies.
14. Engine		Visually <b>inspect</b> for leaks at next start.
15. Fuel Control	<b>Refer to paragraph 6-12 for Fuel Control strainer and Filter Inspection.</b>	

1-89. Engine - Initial Check Run

INITIAL SETUP

Applicable configuration  
All

Consumable Materials  
Drycleaning Solvent (item 24, Appendix D)  
Lubricating Oil (item 46 or 47, Appendix D)

References  
Pare 1-87 and 1-88

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/

**NOTE**

Prepare the engine for check run according to the following procedures within this paragraph.

**WARNING**

**Drycleaning solvent, P-D-880, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).**

1. Lube Oil Filter  
Cover Assembly

Use drycleaning solvent (item 24, Appendix D).

**Remove. Clean in drycleaning solvent. Reinstall.**

**NOTE**

Use lubricating oil (item 46 or 47, Appendix D), It is not advisable to mix MIL-L-23699 Oil with MIL-L-7808 oil, except in case of emergency. If it becomes necessary to mix the oil, flush system within 6 hours.

2. Aircraft Oil Tank

Use lubricating oil (item 46 or 47, Appendix D).

**Fill with oil.**

1-89. Engine - Initial Check Run - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/ - Continued

NOTE

Motor engine to prime fuel control if necessary, as outlined in paragraphs 1-87 and 1-88.

8. Engine	Refer to applicable airframe manual when starting engine.	<b>Start. Operate</b> engine for several minutes at flight idle; then <b>shut down</b> .
4. Engine		<b>Inspect</b> for leaks. <b>Insure</b> hoses and accessories are mounted securely.
5. Engine		<b>Start.</b> Run at flight idle for 3 minutes. <b>Accelerate</b> gradually until highest power without gaining flight attitude is obtained. Run engine until temperatures have stabilized.
6. Engine		<b>Decelerate</b> engine to flight idle. Run for 2 minutes to allow EGT to <b>stabilize</b> .

1-90. Inspection After Initial Check Run

INITIAL SETUP

Applicable Configuration  
All

References  
Para 1-66

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/

NOTE

Inspect for the following im-

1-90. Inspection After Initial Check Run - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
1. Engine		<b>Inspect</b> for leaks and security of mounting provisions, hoses, and accessories.
2. Engine	If there is no accumulation of metal chips line or other foreign material, continue with engine ground operation check	<b>Inspect</b> for the accumulation of metal chips, lint, or other foreign materials in chip detector and lube oil filter.
3. Engine	If there is a slight accumulation of metal chips, lint or other foreign material, perform this action.	<b>Clean and reinstall</b> chip detector. <b>Inspect</b> No. 2, No. 3, and No. 4 bearing oil strainers. <b>Restart engine</b> and perform a second run for several minutes until highest power without gaining flight attitude is obtained. If further accumulation is found, <b>proceed</b> with following action for item 4.
4. Engine	If there is an excessive accumulation of metal chips lint or other foreign material perform this action. Refer to paragraph 1-66.	<b>Determine</b> source of foreign material.
5. Engine	<b>NOTE</b> If contamination is not noted on servo supply filter, it may be reinstalled.	<b>Remove</b> , impact, clean, and <b>reinstall</b> fuel control filters. <b>Refer to</b> paragraph 6-12.

1-91. Operational Check of Emergency (Manual) Fuel System.

INITIAL SETUP

Applicable Configuration  
All

LOCATION/ITEM	REMARKS	ACTION
ENGINE	NOTE	
	<p>Perform the actions within this paragraph after installing an engine or a fuel control during phase maintenance or general maintenance test flight when a special verification of the proper operation of the fuel control emergency (manual) system is required.</p>	
	<p><b>CAUTION</b></p>	
	<p>These instructions apply only to this operational check of the fuel control.</p>	
1. Engine	<p>Refer to applicable airframe manual for engine starting procedures.</p>	Start.
2. Engine		<p>With fuel selector switch in the AUTO position, stabilize engine at 68 to 72 percent N1 speed.</p>
3. Fuel Control Selector Switch		<p>Move to the EMER position.</p>
	<p><b>CAUTION</b></p>	
	<p>The power lever must not be moved with fuel selector switch in EMER position.</p>	
4. Engine	<p>Note the N1 speed indicated. It should drop 2 to 5 percent. N1 speed shall return to 70 to 72 percent and stabilize.</p>	<p>Return fuel selector to the AUTO position within 5 seconds.</p>

**1-92. Engine Ground Operation Checks After Initial Installation, Repair, or Replacement of Internal Engine Components or Fuel Control.**

INITIAL SETUP

Applicable Configuration

References

All

Para 1-93, 1-89, 2-61, 1-117, 1-119, 2-11, 1-91 and 1-90

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	Perform engine vibration test after initial installation of engine in aircraft, after removal of combustor turbine assembly (hot end), after any maintenance that requires removal and reinstallation of an engine for any reason, when excessive engine vibration is suspected, or when any maintenance has been performed that may affect engine to transmission alignment such as removal of engine mounts, airframe mounts, shims, or pillow blocks.	Perform engine vibration test.
1. Engine	Refer to paragraph 1-89.	Perform initial test run.
2. Engine	T53-L-11 series engines only.	Start. Stabilize at flight idle. Check for 59 to 65 percent N1 speed. Insure oil pressure indicates 25 psig minimum.
3. Engine	T53-L-13B/703 engines only.	Start Stabilize at flight idle. Check for 68 to 72 percent N1 speed. Insure oil pressure indicates 25 psig minimum.
4. Engine	Refer to paragraph 2-61.	Perform bleed band closure checks.
5. Engine	T53-L-11 Series engines only. (Refer to paragraph 1-117 for both types of engine checks.)	Perform part power check, takeoff rpm trim adjustment (N1 topping flight check) and acceleration check.
6. Engine- Deleted		

1-92. Engine Ground Operation Checks After Initial Installation, Repair, or Replacement of Internal Engine Components or Fuel Control - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
7. Engine	T53-L-13B/703 engines only. Refer to paragraph 1-119 and paragraph 2-11 respectively.	<b>Perform</b> power check and trim adjustment. <b>Perform</b> inlet guide vane check.
8. Anti-Icing System	A slight rise in EGT will indicate that anti-icing system is operating. This check is to insure that anti-icing system is operating and that hot air solenoid valve is closed during normal engine operation.	<b>Check.</b> Open hot air solenoid valve.
9. Engine	Refer to paragraph 1-91 for operational check procedures. Refer to applicable airframe manual when performing engine shutdown. Refer to paragraph 1-90 for inspection procedures.	<b>Check</b> operation of emergency (manual) fuel system. <b>Shut</b> down engine. <b>Inspect engine.</b>



**1-94. Engine Vibration Test.** An engine vibration test using vibration check tool kit (LTCT484) or vibration test set (LTCT2059601 or LTCT14664-07), measures vibration at specified NI and N2 operating speeds. See figures 1-37 and 1-38. Vibration pickups, attached to adapters mounted on the engine, transmit electrical impulses through cables to a vibration meter. The vibration meter indicates the total amount of engine movement (peak-to-peak displacement) in mils. Meter indications are recorded on an Engine Vibration Test Data Sheet. The recorded figures are compared with the figures given on the data sheet for maximum permissible engine vibration. If these maximum figures are exceeded, the cause of the excessive vibration must be found and corrected before the engine can be accepted for unrestricted flight.

**NOTE**

Reference can be made to TM 55-4920-243-15, which contains the tool kit part number and National Stock Number and to the manual included in vibration test set (LTCT20596-01 or LTCT14664-07).

**NOTE**

Perform engine vibration test after initial installation of engine in aircraft, after removal of combustor turbine assembly (hot end), after any maintenance that requires removal and reinstallation of an engine for any reason, when excessive engine vibration is suspected, or when any maintenance has been performed that may affect engine to transmission alignment such as removal of engine mounts, airframe mounts, shims, or pillow blocks.

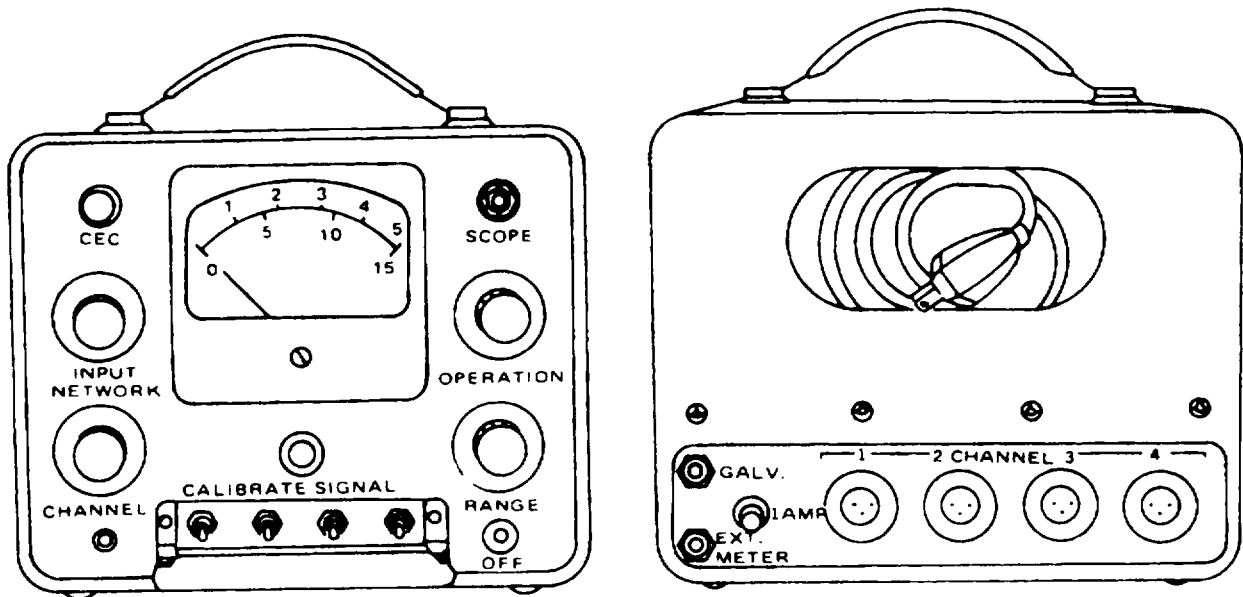
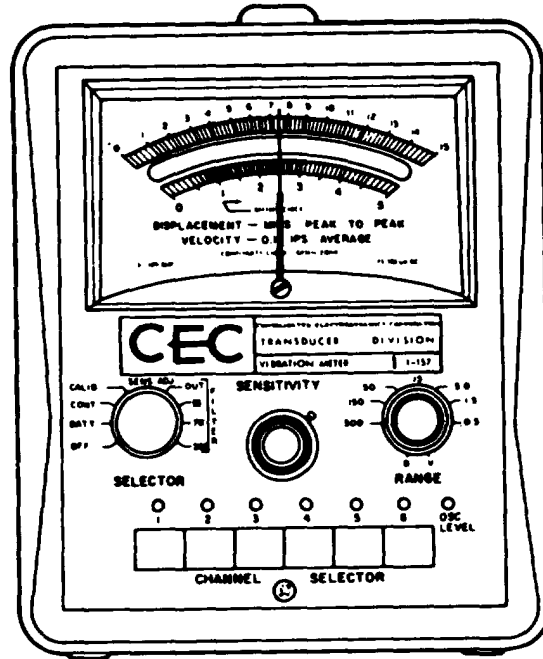
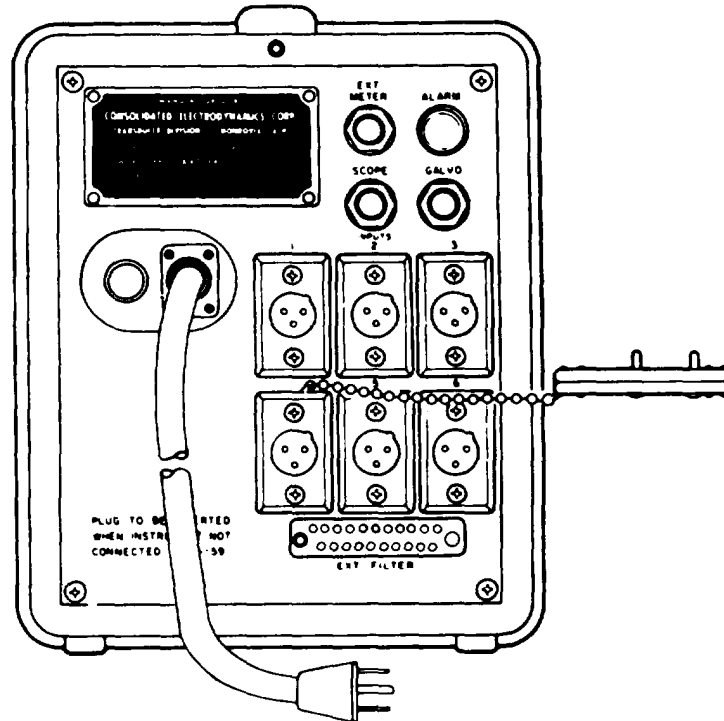


Figure 1-37. Vibration Spectrum Analyzer - Typical



FRONT VIEW



REAR VIEW

Figure 1-38. Vibration Meter - Typical

**1-94. Vibration Test Preparations.** Each of the following procedural steps, including checks and adjustments of the vibration equipment, must be repeated each time the equipment is assembled for an engine vibration test. AU equipment required, with the exception of adapter (LTCT6756) (required for certain T53-L-13B airframe applications), is included in vibration check tool kit (LTCT484) or vibration test set (LTCT20596). Each of these sets contains a vibration indicator: vibration meter (LTCT22031-01) included in test set (LTCT20596) or spectrum analyzer (LTCT9281) included in tool kit (LTCT484). Proceed with following vibration test, using applicable procedures in accordance with the specific vibration indicator being used. Operational requirements for vibration check tool kit (LTCT484) or vibration test set (LTCT20596) are as follows:

- a. Filter inspection (LTCT484 only). (Refer to paragraph 1-95.)
- b. Preliminary vibration spectrum analyzer warmup (LTCT484 only). (Refer to paragraph 1-96.)
- c. Operational check of vibration pickups (transducers). (Refer to paragraph 1-97.)
- d. Installation of vibration equipment. (Refer to paragraph 1-98.)
- e. Adjustment of spectrum analyzer or vibration meter. (Refer to paragraph 1-99 or 1-100.)
- f. Vibration test. (Refer to paragraph 1-101.)
- g. Check of spectrum analyzer. (Refer to paragraph 1-102.)
- h. Evaluation of vibration test data. (Refer to paragraph 1-103.)
- i. Correcting vibration. (Refer to paragraph 1-104.)

1-95. Vibration Spectrum Analyzer Filter Inspection

INITIAL SETUP

Applicable configuration  
Au

Test Equipment  
Vibration Spectrum Analyzer (LTCT9281)

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/

NOTE

Perform filter inspection (LTCT484 only) to insure proper filters are at the proper locations. If filters are not in proper locations install according to the actions following.

1. Engine

- a. **Remove** housing.
- b. **Plug** 70 Hz high pass filter (CEC1-003-0070) into INPUT NETWORK socket number 1.
- c. **Plug** 200 Hz high pass filter (CEC1-003-0200) into INPUT NETWORK socket number 3.
- d. **Secure** filters with screws provided.
- e. **Install** analyzer housing.

1-96. Preliminary Vibration Spectrum Analyzer (CEC1-1 17-0105, LTCT9281) - Warmup

INITIAL SETUP

**Applicable Configuration**  
All

**Test Equipment**  
Vibration Spectrum Analyzer (LTCT9281)

ENGINE/

**WARNING**

When connecting analyzer to power source (action for item 1), set analyzer power switch to OFF position to prevent a possible hazard to personnel and damage to equipment.

1. Spectrum Analyzer

Connect power lead to suitable source of electrical power (105 volts to 125 Volts, 50/60/400 Hz, 30 watts).

2. Spectrum Analyzer

Perform this action with power switch on.

**Allow** approximately 1/2 hour for temperature to stabilize within the analyzer,

1-97. Operational Check of Vibration Pickups (Transducers)

INITIAL SETUP

**Applicable Configuration**  
All

**Test Equipment**

Cable Assemblies (CEC49657-0300 or LTCT9283-02)  
Vibration Pickups (CEC4118-0107, LTCT9282 or CEC4-128-0101)  
Spectrum Analyzer (CEC1-117-0105, LTCT9281)  
Vibration Meter (CEC1-157-0103, LTCT22031-01)  
Vibration Test Set (LTCT20596)

1-97, Operational Check of Vibration Pickups (Transducers) - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<p><b>CAUTION</b></p> <p>Handle vibration pickups with care. If a pickup is dropped, or struck with force, its accuracy may be impaired.</p>	
1. Transducers	Perform this action while indicator is warming up.	Lay out three cable assemblies (CEC49657-0300 or LTCT9283-02) and three vibration pickups (CEC4-118-0107, LTCT9282 or CEC4-128-0101).
	<p><b>CAUTION</b></p> <p>Sensitivity settings differ with each type of transducer; therefore, they cannot be intermixed. Use either three each CEC4-118-0107, LTCT9282 or three CEC4-128-0101 transducers,</p>	
2. Spectrum Analyzer or Vibration Meter		Connect cables to pickups and to proper CHANNEL receptacle in spectrum analyzer or vibration meter.
3. Spectrum Analyzer	Steps contained within this action pertain to spectrum analyzer (CEC1-117-0105, LTCT9281) Only.	<p>Perform the following steps:</p> <p>a. Set INPUT NETWORK selector to OUT.</p> <p>b. Set OPERATION selector to D X 1.0.</p> <p>c. Set CHANNEL selector to 1.</p> <p>d. Set RANGE selector to 5.</p>

1-97. Operational Check of Vibration Pickups (Transducers) - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		<p>e. Slowly <b>move</b> number 1 pickup by hand while <b>observing</b> analyzer. The indicator should <b>jog</b> or <b>show</b> a slight movement,</p>
		<p>f. If the indicator does not move, <b>check</b> condition of pickup, connectors, cable and analyzer receptacle. <b>Interchange</b> components until the defective unit is found. <b>Replace</b> defective component.</p>
		<p>g. <b>Set</b> CHANNEL selector to 2, then to 3, Using the same procedures aforementioned, <b>check</b> operation of remaining pickups.</p>
4. Vibration Meter	<p>Steps contained within this action apply to the vibration test set (CEC1-157-0103, LTCT22031 -01, or LTCT23844-01. Vibration meter contains an internal plug-in power supply (AC), The AC power supply may be wired for high or low voltage by changing the transformer strapping from the 115V range to the 230 V range. A battery (18 vdc) power supply is also included in the vibration test set (LTCT20596-01 or LTCT14664-07).</p>	<p><b>Perform</b> the following steps:</p> <p>a. <b>Connect</b> vibration meter to power source to be used. (If batteries are not to be used.)</p> <p>b. <b>Insure</b> that connector plug at rear of vibration meter chassis is inserted into the external filter receptacle.</p> <p>c. <b>Set</b> SELECTOR switch to OUT position.</p> <p>d. <b>Depress</b> CHANNEL selector 1.</p> <p>e. <b>Set</b> MODE switch (inner part of RANGE switch) to D (displacement) position.</p>

1-97. Operational Check of Vibration Pickups (Transducers) - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		<p>f. Set RANGE switch to 5.</p> <p>g. Slowly move number 1 pickup by hand while observing meter indication. The indicator should jog or show slight movement.</p> <p>h. If the indicator does not move, check position of pickup, connectors, cable and analyzer receptacle. Interchange components until the defective unit is found. Replace defective component.</p> <p>i. Repeat the preceding steps for the remaining CHANNELS (2 and 3) in use.</p>

1-98. Vibration Equipment- Installation

INITIAL SETUP

**Applicable Configuration**  
All

**Test Equipment**  
Spectrum Analyzer (CEC-111 7-0105,  
LTCT9281 )

**Special Tools**  
Adapter (LTCT6756)

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/

NOTE

in following action for item 1, cable and pickup to CHANNEL 1 will connect to front lifting eye adapter. Cable and pickup to CHANNEL 2 will conned to diffuser flange adapter. Cable and pickup to CHANNEL 3 will connect to oil scavenge line adapter, or to No. 3 and 4 bearing oil strainer housing adapter on T53-L-13B engines only.



1-98. Vibration Equipment - Installation - Continued

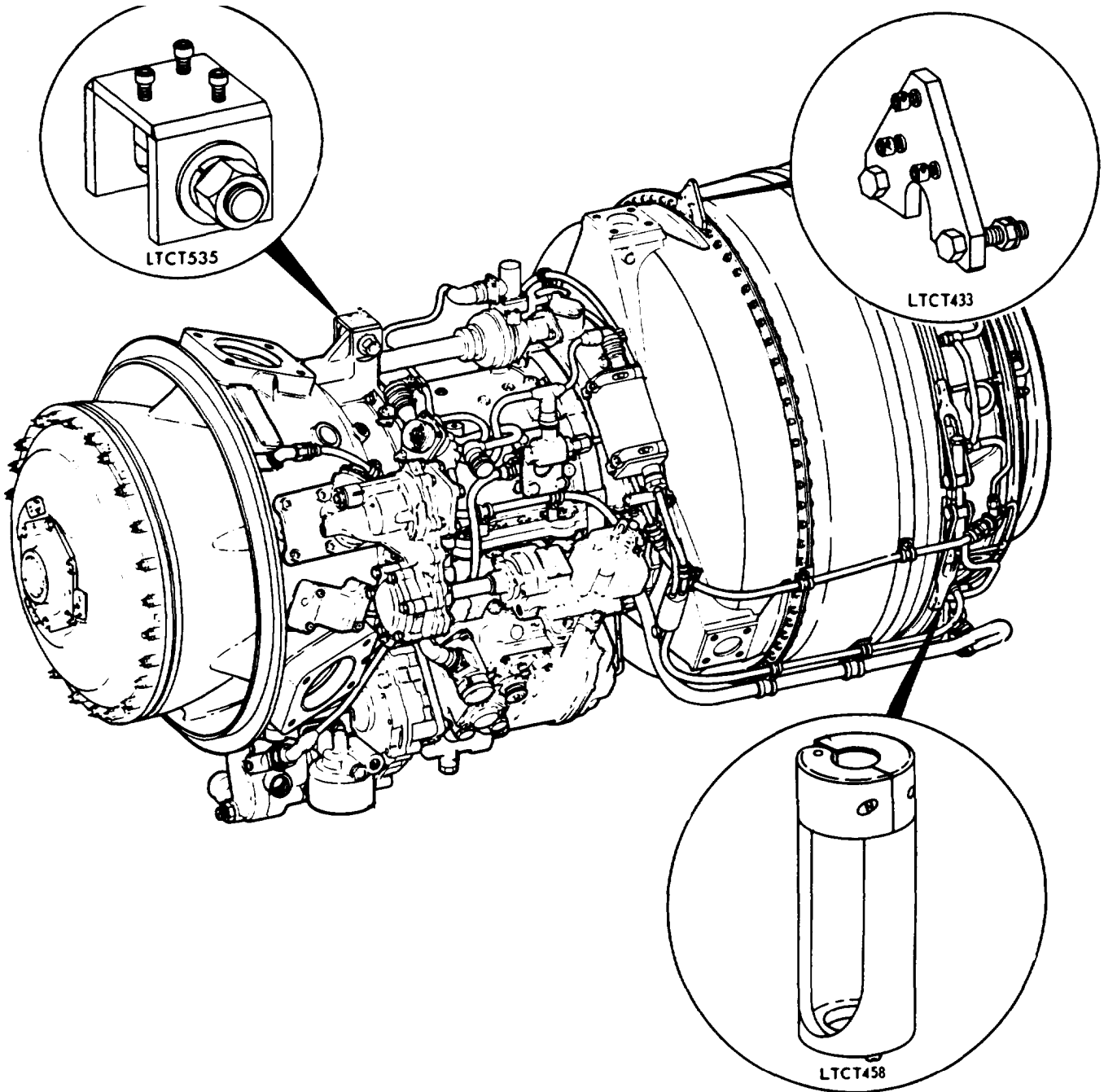
LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

1. Transducer Mounting Adapters

When performing this action on T53-L-13B engines, adapter (LTCT6756) is used as an alternate to oil scavenge adapter for certain airframe applications. The following figure illustrates the location of engine vibration adapters for the T53-L-11 series engines.

**Secure** to required mounting locations. **Secure** each pickup to its adapter with three 4-40 screws and suitable lockwashers.

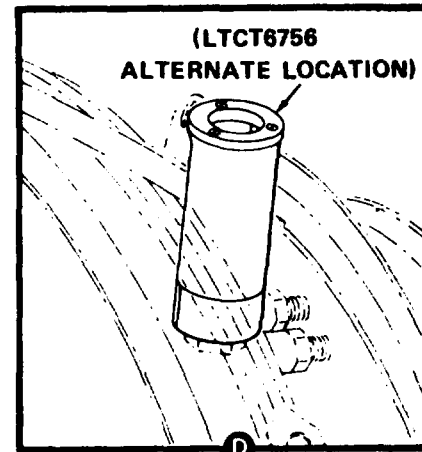
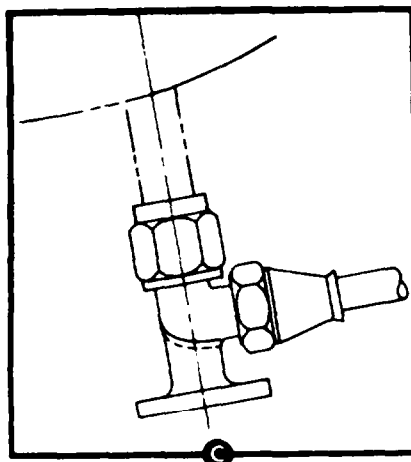
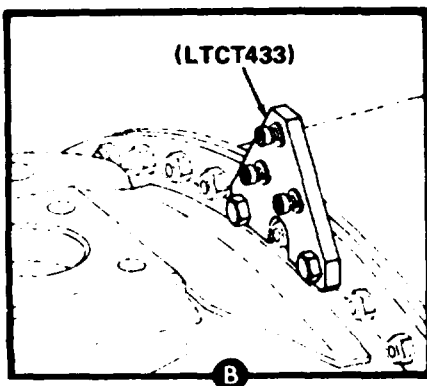
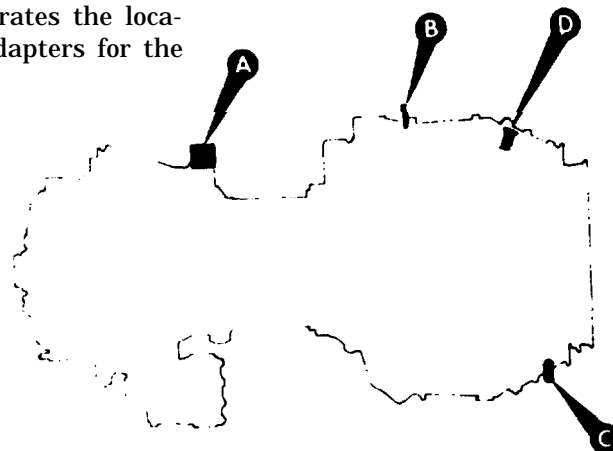
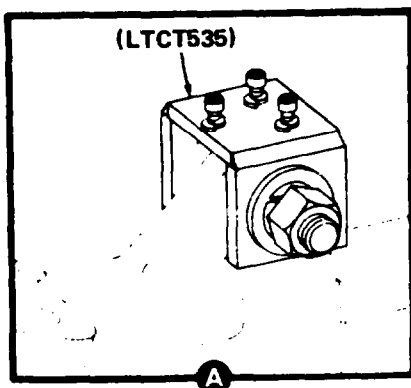


1-98. Vibration Equipment - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

The following figure illustrates the location of engine vibration adapters for the T53-L-13B/703 engine.



**CAUTION**

When Performing action for item 3, leave enough slack in cable to prevent unnecessary strain on pickups and connectors. Avoid conditions that would cause cables to deteriorate from heat or abrasion.

1-98. Vibration Equipment - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE / - Continued		
2. Transducers	Identify adapter and cable connections with numbers or colors to make certain that pickups will be connected to proper meter CHANNEL receptacles.	<b>Connect</b> proper cable to each pickup.
3. Engine and Aircraft		<b>Secure</b> cable assemblies to engine and side of aircraft with screws and clamps.
<b>WARNING</b>		
<b>When breaking or making a connection to a source of electrical power, set power meter switch in the OFF position. This action will prevent a possible hazard to personnel and damage to equipment.</b>		
4. Spectrum Analyzer	This action applies to spectrum analyzer (CEC1-117-0105, LTCT9281).	<b>Disconnect</b> from source of power used for preliminary meter warmup. Immediately <b>connect</b> spectrum analyzer to aircraft electrical power (105 volts to 125 volts, 50/60/400 Hz, 30 watts).
6. Vibration Meter or Spectrum Analyzer		<b>Secure</b> with bungee cord (shock cord), or other suitable means, to a cushioned, protected location in aircraft cabin.
6. Cable Assemblies	To prevent cooling off of the vibration meter, it must not be without a source of power for more than a few minutes.	<b>Connect</b> cable assemblies to proper CHANNEL receptacles.

1-90. Vibration Spectrum Analyzer (CEC1-117-0105,LTCT9281) - Adjustment

INITIAL SETUP

Applicable Configuration  
All

Test Equipment  
Vibration Pickups (CEC4118-0107;  
LTCT9282) of (CEC4128-128-0101)  
Vibration Spectrum Analyzer (CEC1-117-0105;  
LTCT9281)

LOCATION/ITEM	REMARKS	ACTION
VIBRATION SPECTRUM ANALYZER/		
1. OPERATION selector	When performing this action, vibration analyzer indicator should awing toward right-hand side of scale.	<b>Set to c.</b>
<b>NOTE</b>		
With OPERATION selector set at C, the INPUT NETWORK selector and RANGE selector may be in any position.		
2. CHANNEL Selector		<b>Set selector 1.</b>
3. CALIBRATE SIGNAL Control	CEC4-118-0107 (LTCT9282) tranducer only.	<b>Push in control. Turn</b> until analyzer indication is 10.5. <b>Read</b> on the 0 to 15 scale. <b>Release</b> control carefully without turning.
4. CALIBRATE SIGNAL Control	CEC4-128-0101 transducer only.	<b>Push in control. Turn</b> until analyzer indication is 6.0. <b>Read</b> on the 0 to 15 scale. <b>Release</b> control carefully without turning.
5. CALIBRATE SIGNAL Control		<b>Push in calibrate signal control, Turn</b> until analyzer indication is 10.5 for the CEC4-118-0107, or 6.0 for the CEC4-128-0101 transducers. <b>Read</b> on the 0 to 15 scale.

1-99. Vibration Spectrum Analyzer (CEC1-117-0106; LTCT9281) - Adjustment - Continued

LOCATION/ITEM	REMARKS	ACTION
VIBRATION SPECTRUM ANALYZER/ - Continued		
6. SENSITIVITY Control	Open panel to expose sensitivity controls. If an indication of 15.0 cannot be obtained, vibration analyzer must be recalibrated internally by qualified personnel.	<b>Turn</b> control for CHANNEL 1 to obtain analyzer indication of 15.0
7. Vibration Spectrum Analyzer		<b>Confirm</b> proper adjustment of CHANNEL 1 by <b>pushing</b> in and <b>releasing</b> CALIBRATE SIGNAL control. <b>Observe</b> analyzer for consistent indication of 10.5 (CEC4-118-0107) or 6.0 (CEC4-128-0101) and 15.0.
8. Vibration Spectrum Analyzer	Only one setting of 10.5 (or 6.0) made at CHANNEL 1, is necessary for use with all channel.	<b>Obtain</b> analyzer indication of 15.0 for remaining channels by <b>setting</b> CHANNEL selector to proper number and <b>turning</b> SENSITIVITY control for that channel.

1-100. Vibration Meter (CEC1-157-0103, LTCT22031-01) - Adjustment

INITIAL SETUP

Applicable Configuration  
All

Test Equipment  
Vibration Meter (CEC1-157-0103,  
LTCT22031-01)  
Transducer (CEC4-118-0107, CEC4-128-0101)

LOCATION/ITEM	REMARKS	ACTION
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VIBRATION METER/

**CAUTION**

To insure accuracy of vibration test, adjust vibration meter using same power source that is to be used during vibration test.

**NOTE.**

If using battery power supply, set SELECTOR switch in OFF position. The battery voltage is sufficient when meter reading on 0 to 5 scale is one volt or greater. Set SELECTOR switch in the BATT position. Battery voltage must be one volt or greater.

1. Vibration Meter	If batteries are not to be used, perform this action.	<b>Connect</b> power source to be used.
2. Transducer Circuits	If circuit is satisfactory, the meter will read within the green zone. If channel is open, indicator will deflect full wale. When circuit is shorted, indication will be ZERO.	<p><b>Check</b> continuity of transducer circuits by the following procedures:</p> <p>a. <b>Place</b> RANGE switch to 500.</p> <p>b. <b>Set</b> SELECTOR switch to CONT position.</p> <p>c. <b>Depress</b> selected channels on CHANNEL SELECTOR.</p>

1-100. Vibration Meter (CEC1-157-0103, LTCTZ22031-01) - Adjustment - Continued

LOCATION/ITEM	REMARKS	ACTION
VIBRATION METER/ - Continued		
3. Vibration Meter		<b>Place</b> SELECTOR switch to CALIB. <b>Adjust</b> OSC LEVEL for full scale meter deflection. Place SELECTOR switch to SENS ADJ.
4. Vibration Meter		<b>Depress</b> CHANNEL SELECTOR1. <b>Set</b> Sensitivity control to the correct transducer sensitivity for the type of transducer in use (either 10.5 or 6.0 for the CEC4-118-0107 or the CEC4-128-0101 transducers respectively).
5. Channel Gain Potentiometer	Channel gain potentiometer is the smallest setscrew immediately above the CHANNEL SELECTOR.	<b>Adjust</b> for CHANNEL 1 to obtain a full scale deflection indication.
6. Vibration Meter	Adjust the Sensitivity control on CHANNEL 1 only to the correct setting for the type of transducers in use. This adjustment will suffice for the remainder of the channels in use. The CHANNEL GAIN, however, located above the CHANNEL SELECTOR buttons, must be adjusted for each channel in use individually.	<b>Repeat</b> preceding action for item 4, for the remaining CHANNELS (2 and 3).

1-101. Vibration Test

INITIAL SETUP

Applicable Configuration  
All

Test Equipment  
Vibration Meter (CEC1-157-0103,  
LTCT22031-01 or LTCT23844-01)  
Vibration Spectrum Analyzer  
(CEC1-117-0105, LTCT9281)

LOCATION/ITEM	REMARKS	ACTION
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AIRFRAME/

**NOTE**

Check airframe engine mounts for looseness, wear, or insufficient torque before attempting vibration test. Insure that Marman clamps, inlet screens, exhaust pipe, and ail clamps, lines, and hoses are secure.

**NOTE**

Before performing vibration test, prepare Engine Vibration Test Data Sheet for engine to be tested. Insure that applicable information is supplied at the top of the data sheet.

1. Vibration Meter

The steps within this action apply to vibration meter CEC1-157-0103, LTCT 22031-01 or LTCT23844-01. If not using batteries, insure that vibration meter power source is on.

**Perform** the following procedures:

- a. **Set** SELECTOR switch to proper number for filter to be used as required by data sheet.
- b. **Set** MODE switch to D position.
- c. **Rotate** RANGE switch for maximum on-scale meter deflection (usually 5.0).
- d. **Depress** CHANNEL SELECTOR to CHANNEL 1.



1-101. Vibration Test - Continued

LOCATION/ITEM	REMARKS	ACTION
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AIRFRAME/-  
Continued

<b>ENGINE VIBRATION TEST DATA SHEET</b>						
Engine Serial No. _____		(TSN) _____				
Lost Overhaul Location _____		(TSLO) _____				
Aircraft Serial No. _____		A/C Time _____				
Test Location _____		Date _____				
Tested By _____		Observer _____				
Engine Passed Test - Accepted <input type="checkbox"/>		Engine Failed Test <input type="checkbox"/>				
<sup>n</sup> 11 Speed in RPM Percent ± 50 RPM ± 1%	$\eta_1$ Speed in Percent (±0.5%)	No. 1 Pickup S/N _____		No. 2 Pickup S/N _____	No. 3 Pickup S/N _____	REMARKS
		(70 cps Filter)	(200 cps Filter)	(200 cps Filter)	(200 cps Filter)	
6200 94%	90	(2.5)	(2.5)	(2.5)	(3.7)	
6400 97%	85	(2.5)	(2.5)	(2.5)	(3.7)	
6400 97%	90	(2.5)	(2.5)	(2.5)	(3.7)	
6400 97%	95	(2.5)	(2.5)	(2.5)	(3.7)	
6400 97%	MAX.	(2.5)	(2.5)	(2.5)	(3.7)	
6600 100%	90	(2.5)	(2.5)	(2.5)	(3.7)	
<b>Note:</b> The figures given in Parentheses are the maximum permissible engine vibration.						

**1-102. Operating Parameters Using Mobile Trailer Assembly.** Observe the limits for all operating parameters during test. See table 1-13.

**Table 1-13. Operating Limits - Mobile Test Stand**

Item	Limit	Remarks
Shaft Horsepower (Actual) Maximum	As specified in figures 1-39 thru 1-41 + 25 - 0 shp  If required shp exceeds 1200 (T53-L-11 Series) or 1485 (T53-L-13B/703), perform cold-weather trim check	Multiply value from figure by compensating factor ( ) from table 1-17 to obtain actual shp required. For purpose of setting trim only, operate up to 1200 (T53-L-11 Series) or 1485 (T53-L-13B/703) compensated shaft horsepower
Shaft Horsepower at Flight Idle	110 shp Maximum (T53-L-11) 150 shp Maximum (T53-L-703/13B)	At 38-42 degree throttle position
Shaft Horsepower at Ground Idle	35 shp Maximum (T53-L-11 Series) 40 shp Maximum (T53-L-13B/703)	At 23-26 degree throttle position
Emergency Fuel Flow (Maximum Power)	650 - 700 phr (T53-L-11 Series) 740 phr maximum (T53-L-13B/703)	
Fuel Flow Flight Idle	222 phr maximum (T53-L-11 Series) 260 phr maximum (T53-L-703) 220 phr maximum (T53-L-13B Series)	
Ground Idle	140 phr maximum (T53-L-11 Series) 150 phr maximum (T53-L-13B series) 160 phr maximum (T53-L-703)	
Flight Idle Emergency	95 - 125 phr.	
(T53-L-11 Series) Flow Rate Versus Manifold Pressure 600 ± 50 phr	As specified in figure 1-42	
N1 at Point of Bleed Band Closure	As specified in figures 1-43 thru 1-45	
Torque		
Continuous	10,200 in. lb	
30 Minutes	11,112 in lb T53-L-11 Series	
Maximum (2 Sec)	16,920 in. lb	
Continuous	13,320 in. lb	
30 Minutes	14,100 in. lb T53-L-13B/703	
Maximum (2 Sec)	19,200 in. lb	
N1 Maximum Ground Idle	See figures 1-47 thru 1-49 40- 44% (T53-L-11 Series) 48- 52% (T53-L-13B/703)	At 23 to 26 degree throttle position

Table 1-13. Operating Limits - Mobile Test Stand - Continued

Item	Limits	Remarks
Oil Pressure at Oil Filter Outlet	60-80 psig (T53-L-11 Series)	At normal rated power and above
	80-100 psig (T53-L-13B/703)	At normal rated power and above
	10 psig minimum	At ground idle
Torquemeter Boost Pump Pressure	120 psig minimum	At normal rated power and above
Scavenge Pump Back Pressure	55-60 psig	At maximum power
Oil Inlet Temperature	190°F - 210°F (88°C to 90°C)	
Oil Outlet Temperature	300°F (149°C) maximum	
Power Turbine Bearing Scavenge Temperature	400°F (204°C) maximum	
No. 2 Bearing Scavenge Temperature	400°F maximum (204°C) (T53-L-11 Series)	
	(T53-L-13B) 410°F maximum (210°C) (T53-L-703)	
Oil Consumption	1.5 pounds per hour maximum	
Exhaust Gas Temperature Steady State	See figures 1-51 thru 1-53.	
Flight Idle	59 - 65% (T53-L-11 Series) 63 - 68% (T53-L-13B) 67- 72% (T53-L-703)	At 38 to 42 degree throttle position
N2	104% maximum	
Starting and Acceleration	Shall not exceed 1400°F (760°C) Shall not exceed 1472°F (950°C) See figure 1-53 (T53-L-11 Series) Shall not exceed 1250°F (677°C) for more than 5 seconds (T53-L-13B)	Two occurrences of starting or transient temperature in excess of following figure (T53-L-11 Series) or 1250°F (677°C) (T53-L-13B) for over 5 seconds. or one occurrence in excess of 1400°F (750°C) shall because for hot end inspection.

**1-103. Evaluation of Vibration Test Data.** Evaluate vibration test according to the following criteria:

a. Compare indications recorded on Engine Vibration Test Data Sheet with figures given in the parentheses column for the maximum permissible engine vibration. If all recorded figures are below the maximum permissible vibration, the engine, as installed, has passed the vibration test.

b. Vibration measured with the 70 Hz filter will include installation or airframe vibration. If the recorded indication using the 70 Hz filter exceeds the maximum permissible engine vibration figures, but using the 200 Hz filter is within permissible figures, the excessive vibration is caused by the airframe. Corrective action must be taken before the aircraft is again tested for vibration, prior to acceptance for unrestricted flight.

c. Vibration measured with the 200 Hz filter represents engine vibration only. If the recorded indication exceeds the maximum permissible engine vibration figures, corrective action must be taken before the engine is again tested for vibration, prior to acceptance for unrestricted flight.

**NOTE**

If any vibration reading exceeds the engine operating limits, this operational point should be repeated. Running at this point, vary N1 while holding a constant N2. Then vary N2 while holding a constant N1. This procedure will isolate any defective engine system.

**1-104. Correcting Vibration.** See table 1-12 for vibration sources and corrective action. Refer to paragraphs 1-105 and 1-106 for specific corrective actions.

**Table 1-12. Vibration Sources and Corrective Actions**

Possible Source of Excessive Vibration	Corrective Action
<b>GENERAL</b>	
Inlet	Inspect for foreign object damage
Exhaust and power turbine	Inspect for metal chips or signs of damage incurred while running engine
Airframe engine mounts, inlet screens, clamps, and hoses	Check for proper installation and torque. If necessary, reinstall properly and tighten as required.
<b>GAS PRODUCER N1 VIBRATION</b>	
Second stage gas producer rotor not within runout limits (T53-L-13B Engines)	Reposition rotor
First stage gas producer rotor not within runout limits (T53-L-13B Engines)	Reposition rotor or replace forward and aft cones
Gas producer rotor not within runout limits (T53-L-11 Series Engines)	Reposition rotor or replace forward and aft cones

Table 1-12. Vibration Sources and Corrective Actions - Continued

Possible Source of Excessive Vibration	Corrective Action
No. 1 and 2 bearings	Replace defective No. 2 bearing (T53-L-13B Engine) or ship engine to depot
Foreign object damage in compressor	Inspect inlet guide vane assembly and first stage compressor rotor. If damage exceeds field limits, replace rotor blades as required
Compressor rotor assembly not within-runout limits.	Ship engine to depot
Compressor rotor out of balance	Ship engine to depot

POWER TURBINE N2 VIBRATION

Loose V-band assembly clamp or exhaust pipe	Check for proper installation and tighten as required
First stage power turbine rotor not within runout limits or out of balance (T53-L-13B Engines)	Reposition rotor in relation to second stage power turbine
Second stage power turbine rotor not within runout limits or out of balance (T53-L-13B Engine)	Replace rotor
No. 3 and 4 bearings	Check for wear and replace
Power shaft bolt bent or shims not proper installed	Check that power shaft bolt is not bent and shims are properly seated
Damaged rear internal threads of power shaft	Forward engine to next higher level of maintenance
Power turbine rotor location (T53-L-13B Engine)	Relocate in relation to power shaft
Power turbine rotor to power turbine cylinder clearance is low, causing rub	Replace cylinder
Combustion chamber to support cone pilot diameters out of squareness or concentricity	Replace parts
Unbalanced power turbine rotor assembly	Replace rotor assembly
Power shaft out of balance	Ship engine to depot

1-105. Gas Producer (N1) - Correcting Vibration

INITIAL SETUP

Applicable Configuration  
All

References  
Para 2-22, 4-2, 4-3, 4-14, 4-31, 4-10 and 4-11

Special Tools  
Dial Indicator

LOCATION/ITEM	REMARKS	ACTION
ENGINE/		
1. Upper Half of Compressor and Impeller Housing	Refer to para 2-22 for removal procedures.	<b>Remove.</b>
2. Centrifugal Impeller	<p>Use dial indicator to perform this action. Observe the following limits:</p> <p>a. Maximum allowable runout of each spacer land is 0.003 inch TIR. However, any two lands may have a runout up to 0.0033 inch TIR.</p> <p>b. Maximum allowable runout on centrifugal impeller OD is 0.0035 inch TIR.</p>	<b>Check</b> concentricity of all spacer lands and OD.
3. Compressor		<b>Ship</b> to depot for corrective action if runouts are exceeded.
4. Compressor	Perform this action if runouts are within limits.	<b>Remove</b> combustor turbine assembly (para 4-2 or 4-3). <b>Check</b> second stage gas producer turbine wheel (T53-L-13B engine) and face runouts (para 4-14). <b>Check</b> first stage turbine wheel hub and face runouts (para 4-31 and 4-14). <b>Compare</b> runouts with those obtained during engine buildup.
5. Turbine Rotor	Perform this action if runouts have been exceeded.	<b>Reseat</b> turbine rotor (para 4-31 and 4-14). <b>Recheck</b> runouts.
6. Combustor Turbine Assembly	Refer to paragraphs 4-10 and 4-11 for installation.	<b>Reinstall. Repeat</b> vibration test.

1-106. Power Turbine (N2) - Correcting Vibration

INITIAL SETUP

Applicable Configuration  
All

References  
Para 4-2,43,1-43,410 and 4-11

LOCATION/ITEM	REMARKS	ACTION
ENGINE/	<b>NOTE</b>	
	Do not remove combustor turbine assembly completely. Raise it only enough to allow rotation of power turbine rotors without disturbing position of power shaft.	
1. Combustor Turbine Assembly	Refer to paragraph 4-2 or 4-3.	<b>Remove.</b>
	<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div> <p>Do not use lead pencil when marking power shaft and turbine rotor in following action for item 2. Markings on high temperature materials shall only be done with approved marker. (Refer to paragraph 1-43.)</p>	
2. Power Turbine Rotors	Perform this action before disengaging power turbine rotors from power shaft.	<b>Mark</b> power shaft spline and turbine rotor journal to provide an indication for turbine rotor relocation.
3. Power Turbine Rotor(s)		Rotate 180 degrees.
4. Combustor Turbine Assembly	Refer to paragraph 4-10 or 4-11 for installation.	<b>Install.</b>
5. Engine		<b>Start. Repeat</b> test at point where vibration was discovered.

1-106. Power Turbine (N2) - Correcting Vibration - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
6. Power Turbine	<p>Vibration meter indications will either be within specified limits, or will greatly exceed the original readings. If meter indications are still in excess of specified limits, a second relocation must be accomplished. Perform procedures in this action.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>If the engine does not operate within specified vibration limits following the second relocation, relocate the power turbine rotor(s) an additional 180 degrees. If engine fails to check out following the third relocation, ship engine to depot.</p>	<p>Perform the following steps:</p> <p>a. <b>Repeat</b> preceding actions for items 1 and 2.</p> <p>b. <b>Rotate</b> power turbine rotor(s) 90 degrees.</p> <p>c. <b>Repeat</b> preceding actions for items 4 and 5.</p>



**1-107. GROUND TESTING OF ENGINE USING MOBILE TRAILER ASSEMBLY (AVIM)**

The following paragraphs contain instructions for ground testing to determine flight readiness of an engine after maintenance. Ground operation, or testing, of an engine will be performed in the mobile trailer assembly (LTCT744, TE12062 or LTCT10465-02). This section also includes specific component checks, both operational and visual, that must be performed. The mobile trailer assembly provides engine testing facilities similar to those available in an engine test cell. The mobile trailer assembly increases engine availability by eliminating most of the need to ship engines to depot for testing. For all information on the mobile trailer assembly refer to TM 55-4920-317-15 or TM 55-4920-328-14. During engine testing, observe all testing requirements and operating limits.

**1-108. Instrumentation Requirements Using Mobile Trailer Assembly.** Testing of engine on a mobile test stand, which includes maximum power rating, requires the following:

**NOTE**

Depending on level of testing required, certain instrumentation may be omitted.

- a. A strain-gaged water brake support or torque shaft, or an electric dynamometer.
- b. Accessory gearbox pressure.
- c. Fuel manifold pressure (T53-L-11 Series Engines).
- d. Fuel inlet pressure.
- e. Fuel control pump pressure (No. 1 and No. 2).
- f. Oil filter-out pressure.
- g. Oil scavenge pressure.
- h. Torquemeter pressure.
- i. Torquemeter boost pump pressure.
- j. Compressor discharge temperature.
- k. Power turbine bearing scavenge oil temperature.
- l. No. 2 bearing scavenge oil temperature.
- m. Scavenge oil pump outlet temperature.
- n. Engine oil inlet temperature.
- o. Oil pump discharge temperature.
- p. Exhaust gas temperature.
- q. Vibration test equipment.

- r. Throttle position indicator.
- s. Inlet guide vane position indicator (T53-L-13B).
- t. Chip detector (continuity).
- u. Ambient temperature.

1-109. Fluid and Electrical Supply Requirements Using Mobile Trailer Assembly.

- a. Turbine fuel (item 31, Appendix D) shall be used for testing.
- b. Fuel inlet pressure shall be 5 psig (0.35 kg/sq cm) minimum.

**NOTE**

The test stand overspeed governor bleed shall be open at all times, except when reading fuel flow.

- c. Lubricating oil (item 46 or 47, Appendix D) shall be used for testing. Do not mix oils.
- d. Oil inlet pressure shall be 0 psig to 5 psig (0.35 kg/sq cm) at maximum power.
- e. Oil supply temperature shall be 190°F to 210°F (88°C to 99°C).
- f. Change oil at intervals of 100 hours engine operation.
- g. Clean oil filters after 25 hours. Change oil filters when oil is changed or when positive engine oil inlet pressure cannot be maintained with the oil boost pump operating.
- h. When engine failure occurs (i.e., gear failure, bearing failure, etc.) oil will become contaminated. In this event the oil system must be immediately drained, flushed, and refilled with new oil. Insert a new oil filter cartridge regardless of operating time on the oil.
- i. A 28-vdc, 800 ampere power source is required for starter. Ac and dc power sources are required to support the instrumentation.

**1-110. Drainage Requirements Using Mobile Trailer Assembly. Attach drain lines, bottles, or containers to the following seal drains and ports.**

- a. Starter.
- b. Overspeed governor.
- c. Fuel control.
- d. Power output shaft.
- e. Tachometer generator.
- f. Inlet guide vane actuator. (Disconnect line and cap fitting on accessory gearbox.)
- g. Combustion chamber drain valve.

1-111. Ground Testing of Engine Using Mobile Trailer Assembly - Preparation for Test (AVIM)

INITIAL SETUP

**Applicable Configuration**

All

**References**

TM 55-4920-317-15

TM 55-4920-328-14

**Test Equipment**

Trailer Assembly (LTCT744 or TE12062)

LOCATION/ITEM	REMARKS	ACTION
MOBILE TRAILER ASSEMBLY/	<b>NOTE</b>	
	Inspect engine to insure operability and serviceability by examining maintenance records and performing actions for items within this paragraph.	
1. Engine		<b>Clean</b> if dirty, <b>paying special attention</b> to air inlet area and inlet guide vanes.
2. Compressor Vanes and Blades		<b>Inspect</b> for FOD and erosion.
3. Compressor	Perform this action before testing engine.	<b>Clean</b> , if dirty.
4. Engine	If condition of hot end is unknown, perform hot end inspection.	<b>Inspect</b> for missing or improperly installed components, lockwire, etc. <b>Rotate</b> compressor and power turbine to check for rubs and foreign objects.
5. Engine	Use trailer assembly (LTCT744 or TE12062) and refer to TM 55-4920-317-15. Or, use test system LTCT10462-02 and refer to TM 55-4920328-14. Control room N1 lever should indicate 0 degree to 3 degrees in cutoff and 99 degrees to 101 degrees at full throttle.	<b>Install</b> on mobile trailer assembly or <b>test</b> system. <b>Insure</b> that control room N1 and N2 levers are rigged to hit both stops on the fuel control and overspeed governor quadrants.

**1-112. Operating Parameters Using Mobile Trailer Assembly.** Observe the limits for all operating parameters during test. See table 1-13.

**Table 1-13. Operating Limits - Mobile Test Stand**

ITEM	LIMIT	REMARKS
Shaft Horsepower (Actual) Maximum	As specified in figures 1-39 thru 1-41 +25 -0 shp  If required shp exceeds 1200 (T53-L-11 Series) or 1485 (T53-L-13B/703), perform cold-weather trim check	Multiply value from figure by compensating factor ( ) from table 1-17 to obtain actual shp required. For purpose of setting trim only, operate up to 1200 (T53-L-11 Series) or 1485 (T53-L-13B/703) compensated shaft horsepower
Shaft Horsepower at Flight Idle	110 shp Maximum (T53-L-11) 150 shp Maximum (T53-L-703/13B)	At 38-42 degree throttle position
Shaft Horsepower at Ground Idle	35 shp Maximum (T53-L-11 Series) 40 shp Maximum (T53-L-13B/703)	At 23-26 degree throttle
Emergency Fuel Flow (Maximum Power)	650-700 phr (T53-L-11 Series) 740 phr Maximum (T53-L-13B/703)	
Fuel Flow Flight Idle	222 phr Maximum (T53-L-11 Series) 260 phr Maximum (T53-L-703) 220 phr Maximum (T53-L-13B Series)	
Ground Idle	140 phr Maximum (T53-L-11 Series) 150 phr Maximum (T53-L-13B Series) 160 phr Maximum (T53-L-703)	
Flight Idle Emergency	95-125 phr	
T53-L-11 Series) Flow Rate Versus Manifold Pressure 600 ± 50 phr	As specified in figure 1-42	
N1 at Point of Bleed Band Closure	As specified in figures 1-43 thru 1-45	
Torque Continuous 30 Minutes Maximum (2 Sec)	10,200 in. lb 11,112 in. lb T53-L-11 Series 16,920 in. lb	
Continuous 30 Minutes Maximum (2 Sec)	13,320 in. lb 14,100 in. lb T53-L-13B/703 19,200 in. lb	
N1 Maximum Ground Idle	See figures 1-47 thru 1-49 40-44% (T53-L-11 Series) 48-52% (T53-L-13B/703)	At 23 to 26 degree throttle position

**Table 1-13. Operating Limits - Mobile Test Stand - Continued**

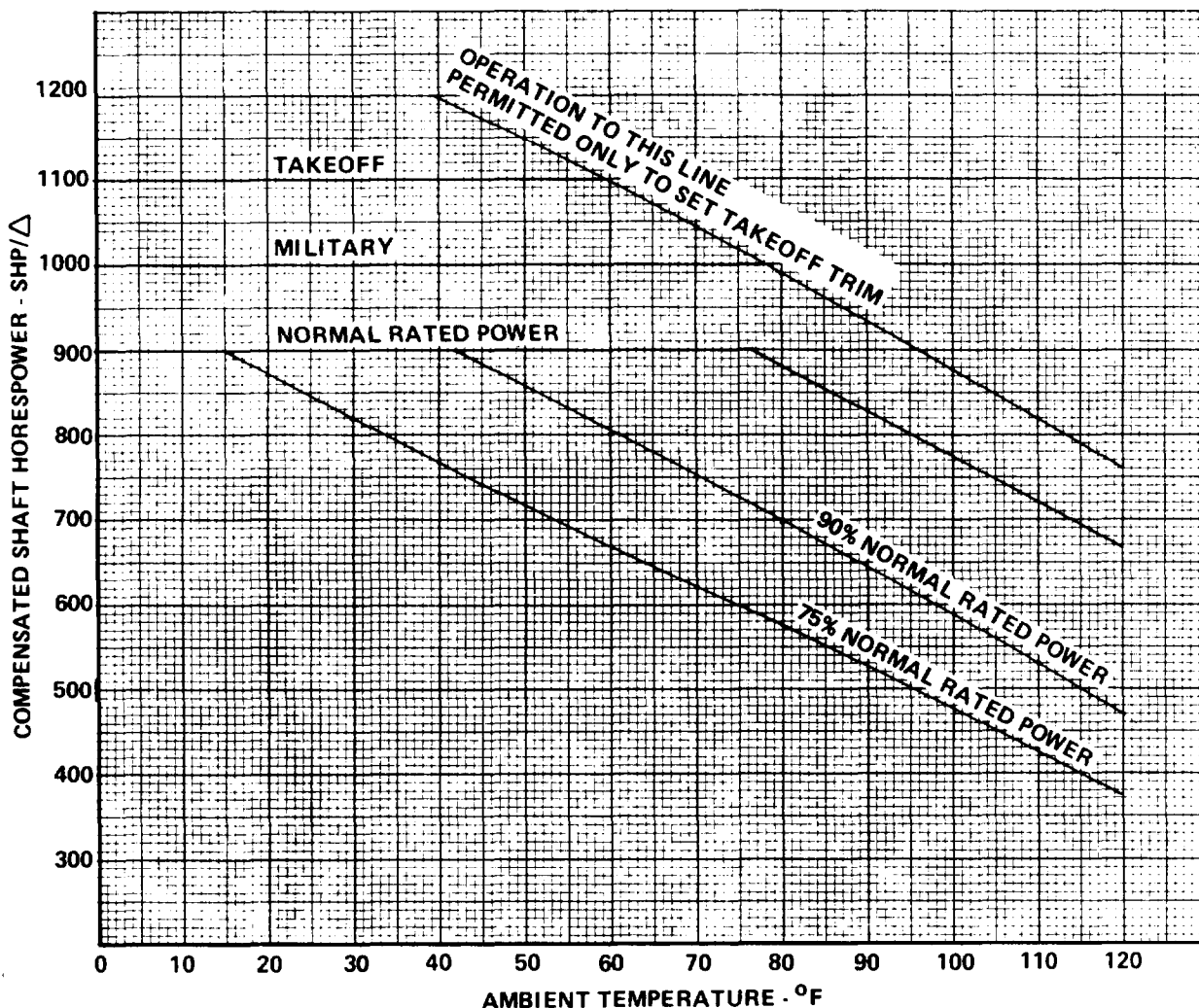
ITEM	LIMIT	REMARKS
Oil Pressure at Oil Filter Outlet	60-80 psig (T53-L-11 Series) 80-100 psig (T53-L-13B/703) 10 psig minimum	At normal rated power and above At normal rated power and above At ground idle
Toquemeter Boost Pump Pressure	120 psig minimum	At normal rated power and above
Scavenge Pump Back Pressure	55-60 psig	At maximum power
Oil Inlet Temperature	190°F-210°F (88°C to 90°C)	
Oil Outlet Temperature	300°F (149°C) maximum	
Power Turbine Bearing Scavenge Temperature	400°F (204°C) maximum	
No. 2 Bearing Scavenge Temperature	400°F maximum (204°C) (T53-L-11 Series)	
Oil Consumption	See figure 1-49 (T53-L-13B) 410°F maximum (210°C) (T53-L-703)	
Exhaust Gas Temperature Steady State	1.5 pounds per hour maximum	
Flight Idle	See figures 1-51 thru 1-53	
N2	59-65% T53-L-11 Series) 63-68% T53-L-13B) 67-72% T53-L-703)	At 38 to 42 degree throt- tle position
Starting and Acceleration	104% maximum  Shall not exceed 1400°F (760°C) Shall not exceed 1742°F (950°C) See figure 1-53 (T53-L-11 Series) Shall not exceed 1250°F (677°C) for more than 5 seconds (T53-L-13B)	Two occurrences of start- ing or transient tempera- ture in excess of follow- ing figure (T53-L-11 Series) or 1250°F (677°C) (T53-L-13B) for over 5 sec- onds, or one occurrence in excess of 1400°F (750°C) shall be cause for hot end inspection.

**Table 1-13. Operating Limits - Mobile Test Stand - Continued**

ITEM	LIMIT	REMARKS
Vibration	<p>See figure 1-55 (T53-L-11/-13B Series Engines)</p> <p>For T53-L-703</p> <p>Front Vertical:            1.7 IN./SEC from idle to 80% N1</p> <p>   1.3 IN./SEC above 80%</p> <p>Axial:                            1.7 IN./SEC</p> <p>Power Turbine:            2.5 IN./SEC</p>	
Accelerations Ground Idle to Maximum	<p>8 seconds maximum T53-L-11 (9 seconds T53-L-13B)</p> <p>11 seconds maximum (T53-L-703)</p>	
Flight Idle to Maximum	<p>5 seconds maximum</p>	
Miscellaneous Accessory Gear- box Pressure	<p>3.5 psig maximum</p>	
Seal Leakage	<p>Oil -2 cc/hour maximum</p> <p>Oil and fuel (from fuel control or overspeed governor) 120 cc/ hour maximum.</p> <p>Fuel (from inlet guide vane actuator) 60 cc/hour maximum (T53-L-13B/703)</p>	
Torque Accuracy	<p>See figures 1-56 and 1-57</p>	<p>At all required log entry check points, plot output shaft torque, measured in pound-inches, versus differential torquemeter pressure (torquemeter pressure minus gearbox pressure) read in psi. The average line of plotted points shall fall within limits of the following figures. These are engine torquemeter system accuracy limits.</p>

**Table 1-13. Operating Limits - Mobile Test Stand - Continued**

ITEM	LIMIT	REMARKS
Optimum Power Turbine Speed (T53-L-13B) (T-53-L-703)	See figures 1-58 and 1-59	A torquemeter not correlating within limits requires checking and corrective action. Check all instrumentation for proper calibration. If no discrepancy exists, repair or replace torquemeter components.
Overspeed Governor	See figures 1-60 and 1-61	



**Figure 1-39. Compensated Shaft Horsepower Versus Ambient Temperature (T53-L-11 Series Engines)**

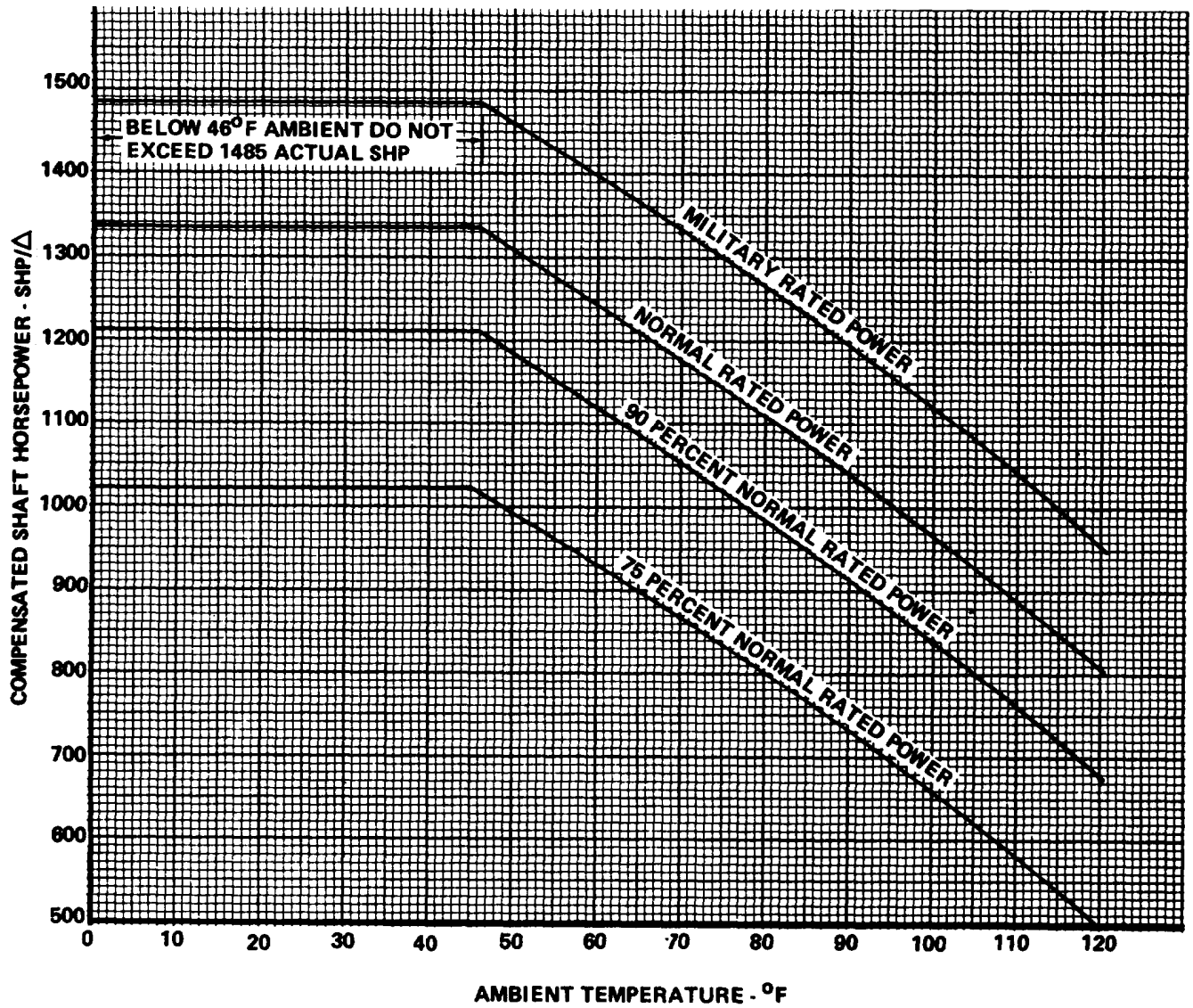


Figure 1-40. Compensated Shaft Horsepower Versus Ambient Temperature (T53-L-13B Engine)



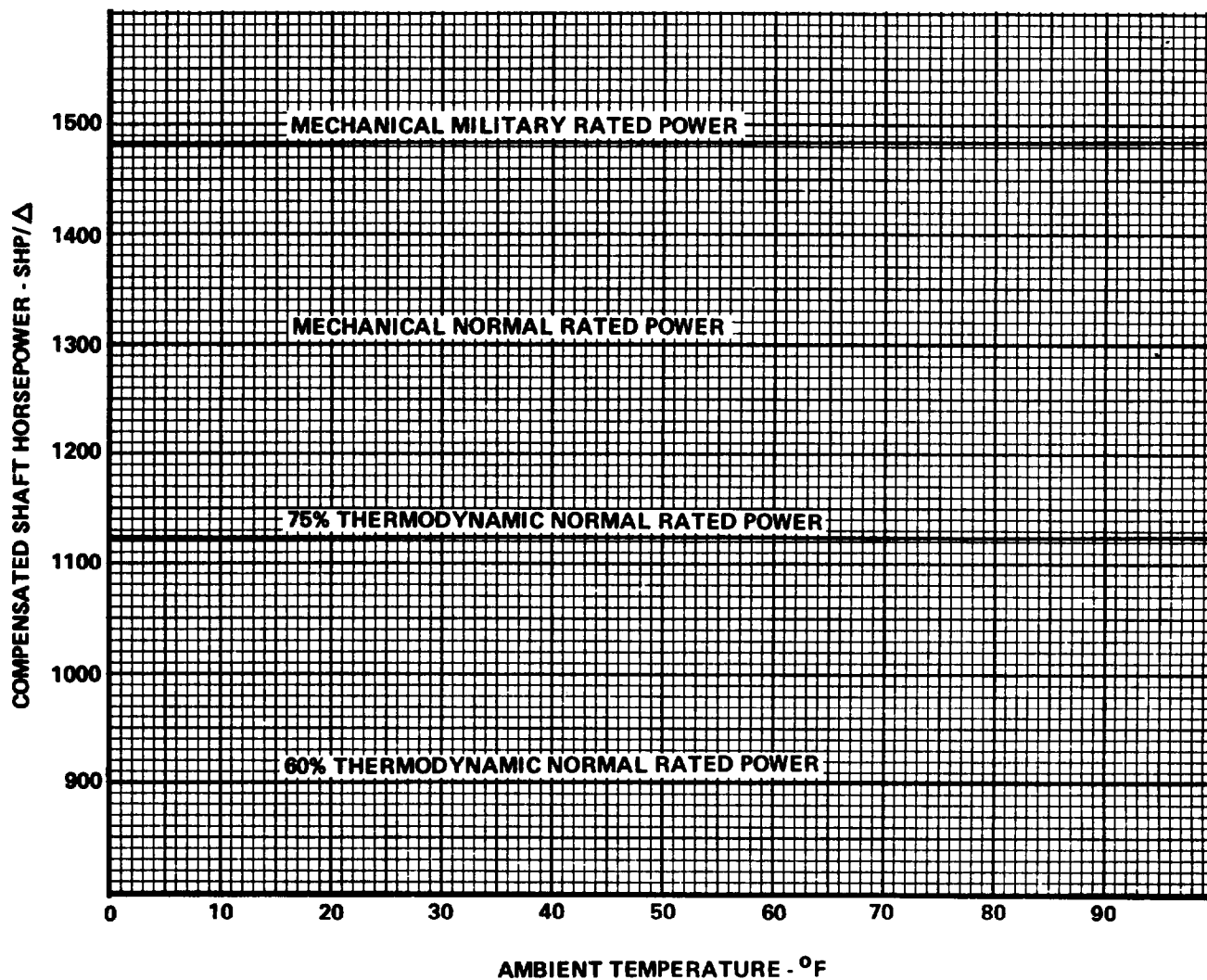


Figure 1-41. Compensated Shaft Horsepower Versus Ambient Temperature (T53-L-703 Engine)

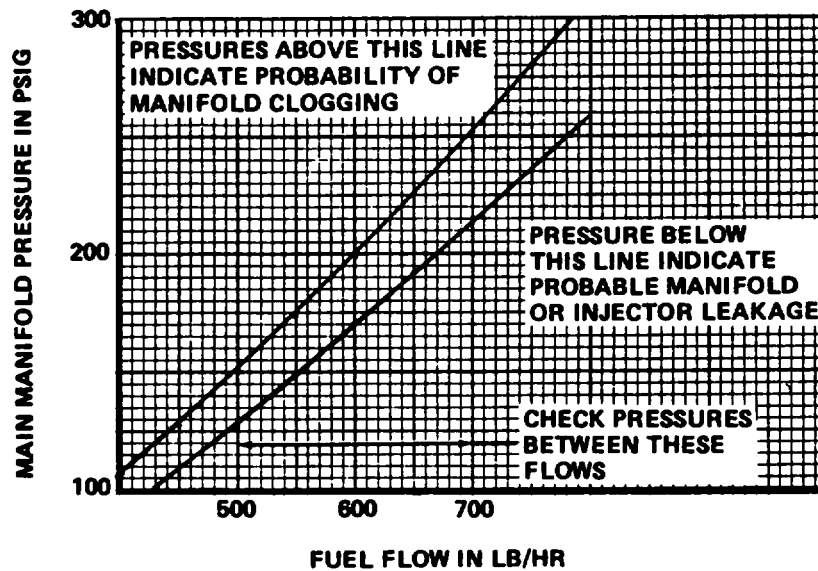


Figure 1-42. Fuel Flow Compared With Fuel Manifold Pressure (T53-L-11 Series Engines)

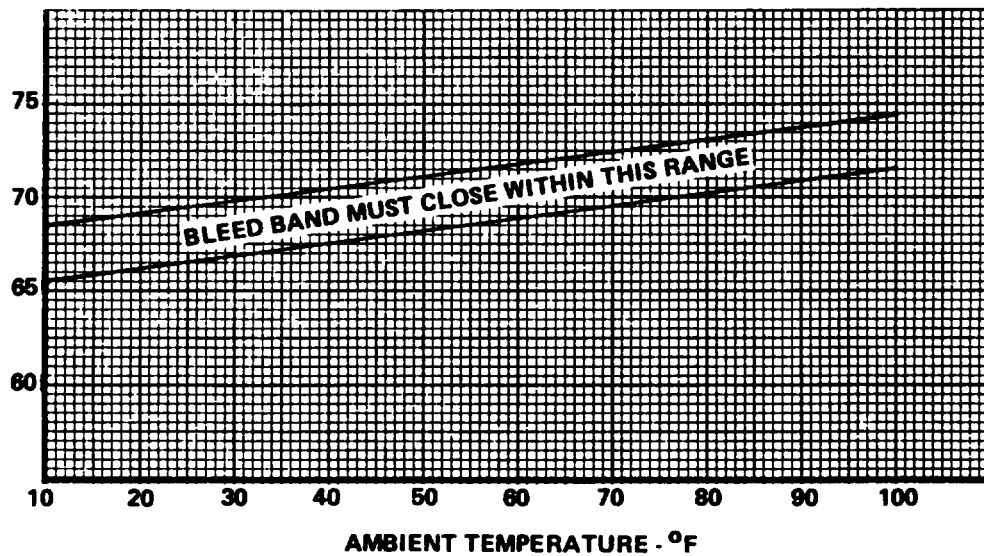
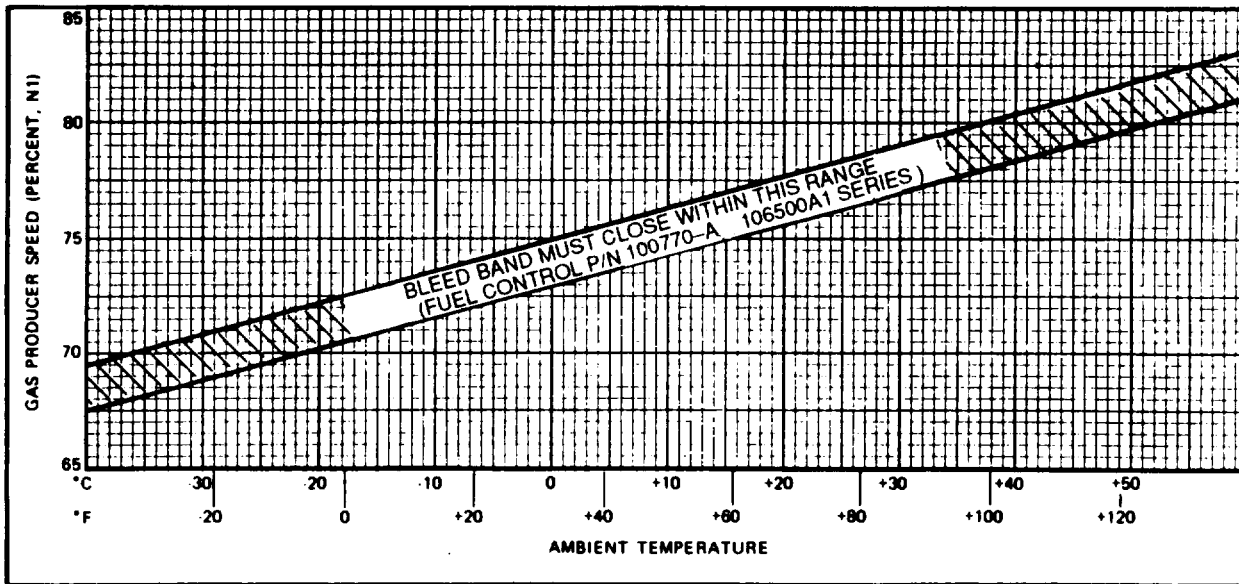
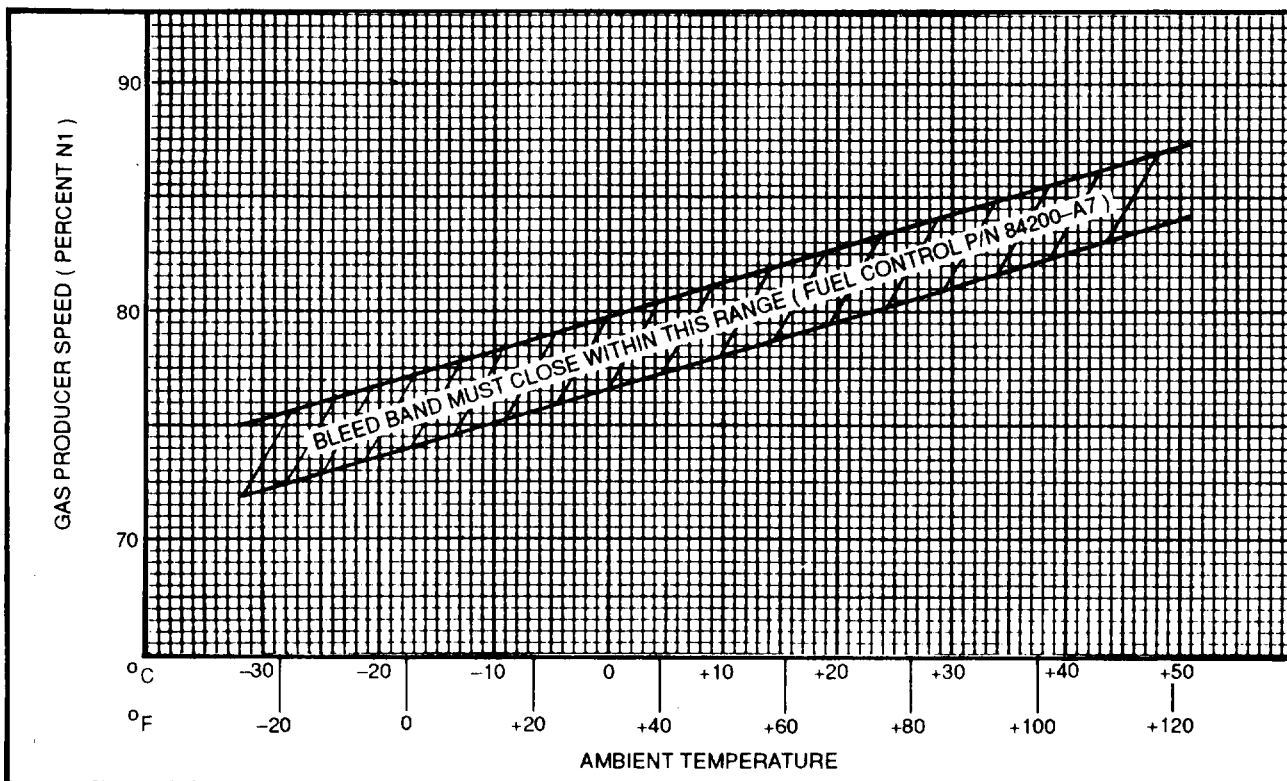


Figure 1-43. Bleed Band Closure Range (T53-L-11 Series Engines)



**Figure 1-44. Bleed Band Closure Range Ambient Temperature Versus N1 Speed) (T53-L-13B/703 Engines), With Fuel Control P/N 100770A, 106500A1 Series**



**Figure 1-45. Bleed Band Closure Range (Ambient Temperature Versus N1 Speed) (T53-L-13B Engine), With Fuel Control P/N 84200A7**

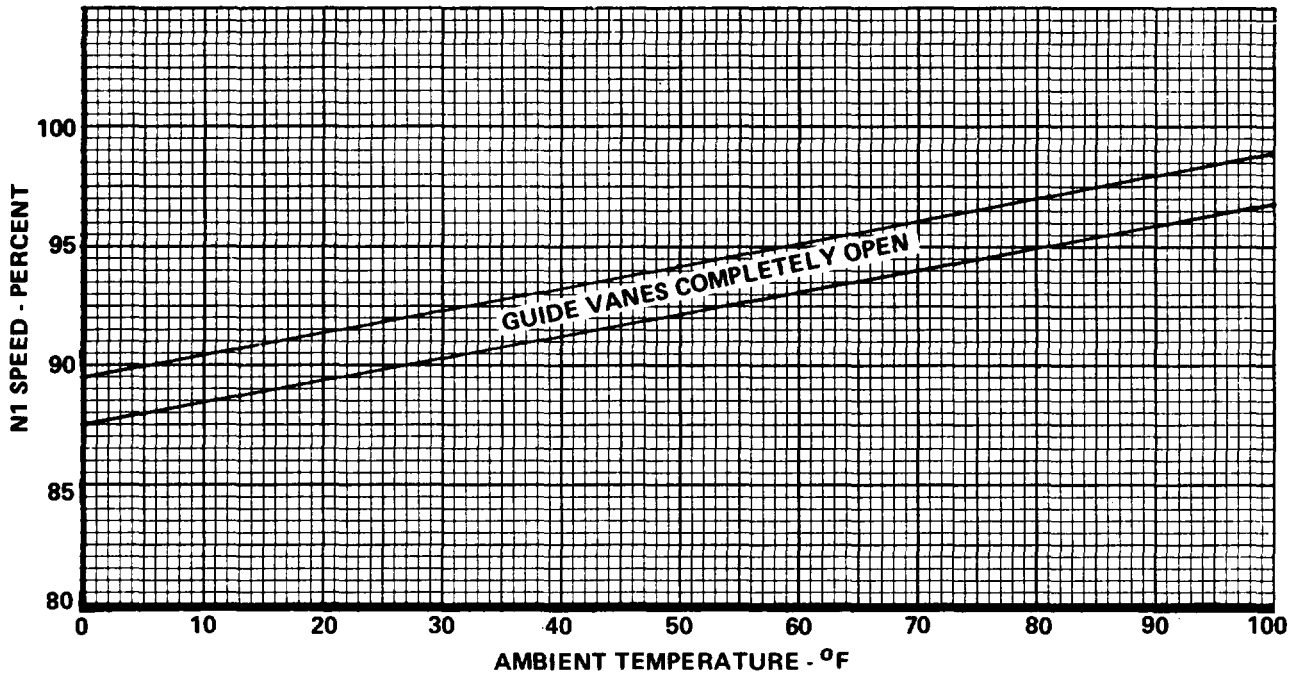


Figure 1-46. N1 Speed at Which Inlet Guide Vane Operates Versus Ambient Temperature (T53-L-13B/703 Engines)

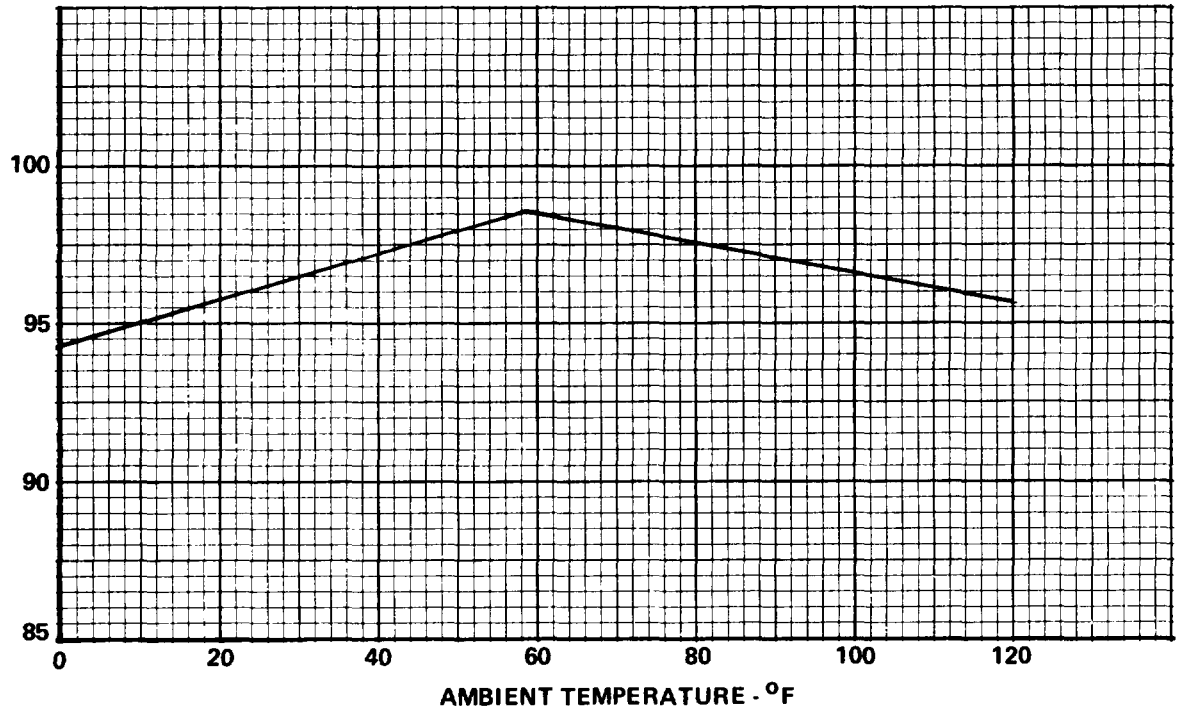


Figure 1-47. Permissible N1 Speed Versus Ambient Temperature at Takeoff Power (T53-L-11 Series Engines)

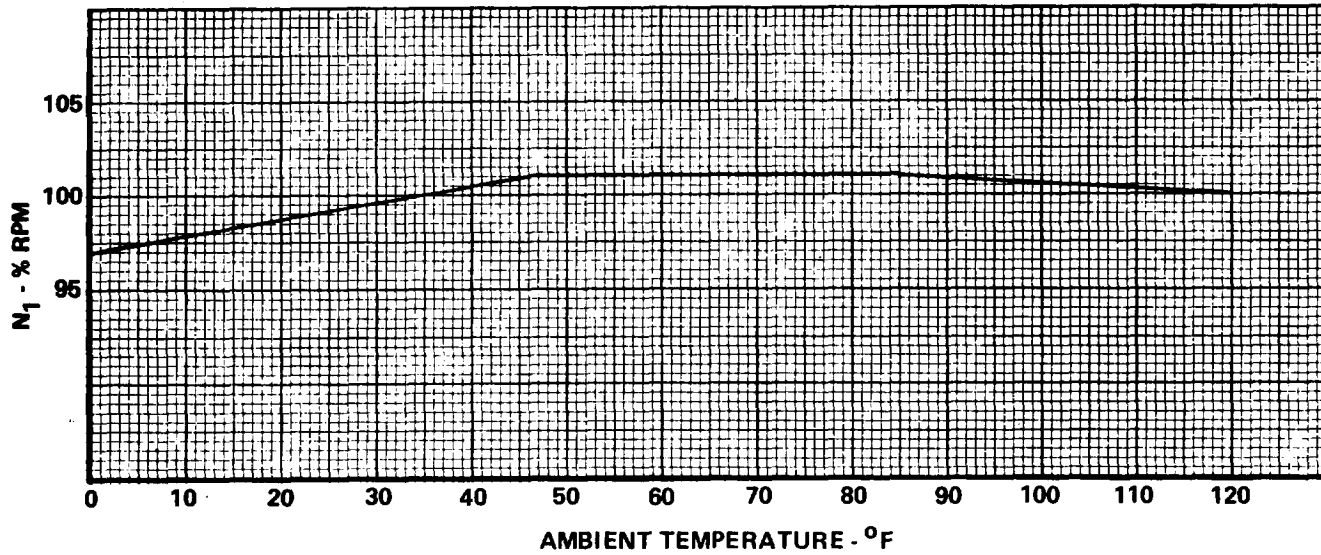


Figure 1-48. Permissible N1 Speed Versus Ambient Temperature at Military Power (T53-L-13B Engine)

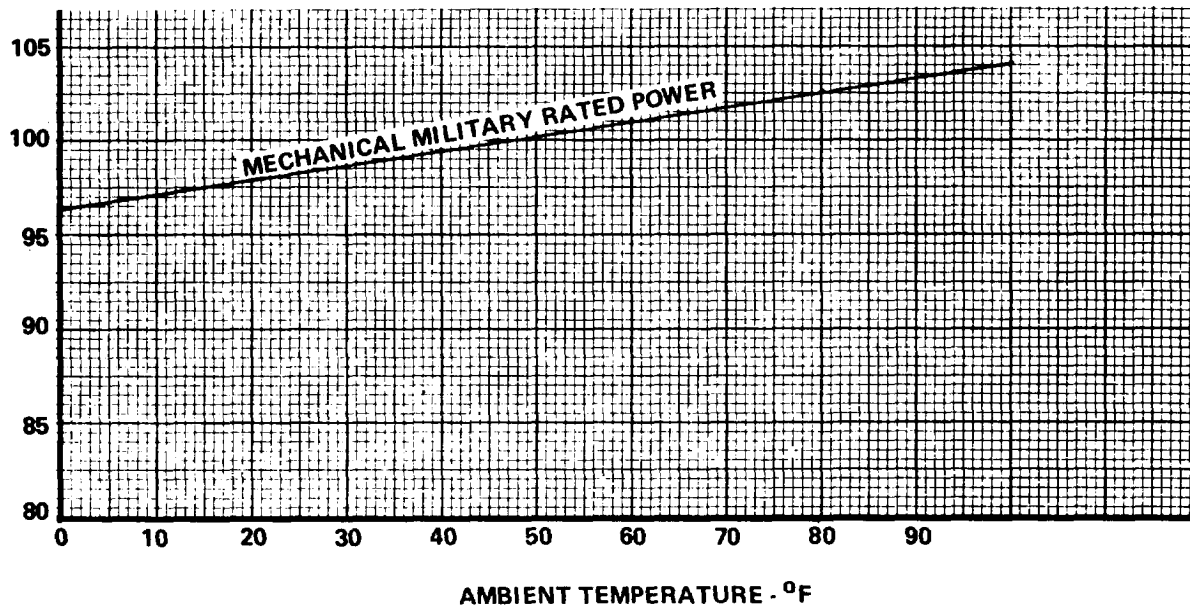


Figure 1-49. Maximum Permissible N1 Speed at Military Rated Power Versus Ambient Temperature (T53-L-703 Engine)

Figure 1-50. Deleted

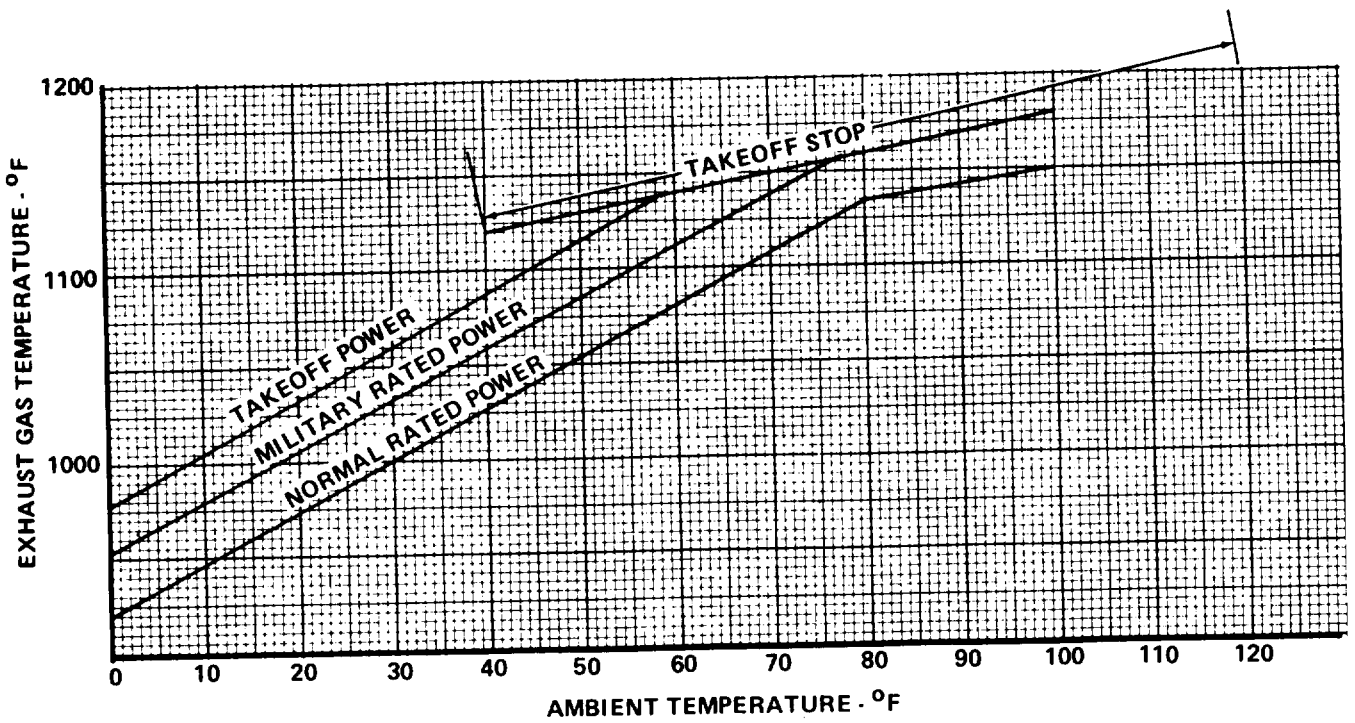


Figure 1-51. Maximum Allowable Gas Temperature Versus Ambient Temperature  
(T53-L-11 Series Engine)

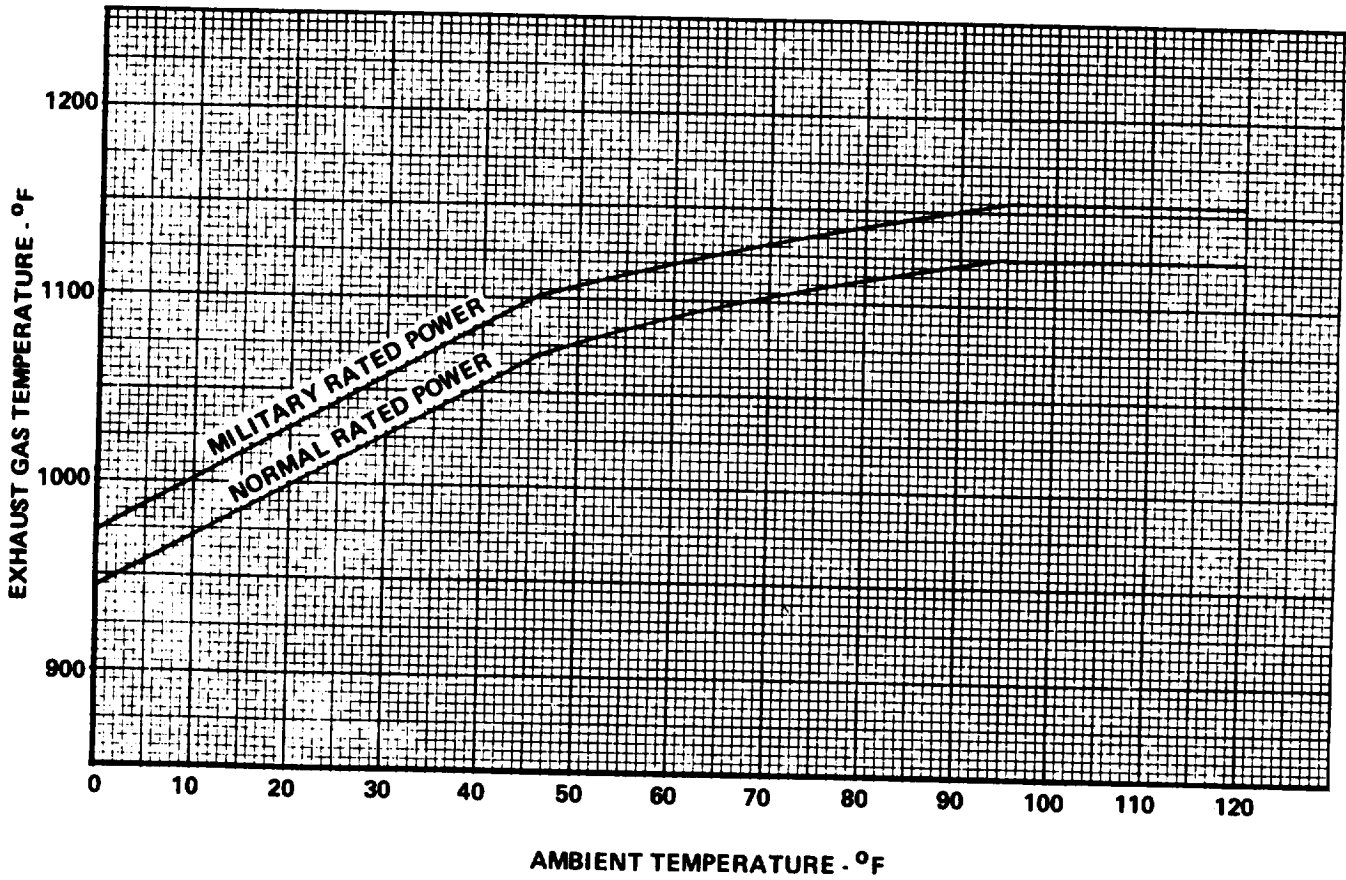


Figure 1-52. Maximum Allowable Exhaust Gas Temperature Versus Ambient Temperature (T53-L-13B Engine)

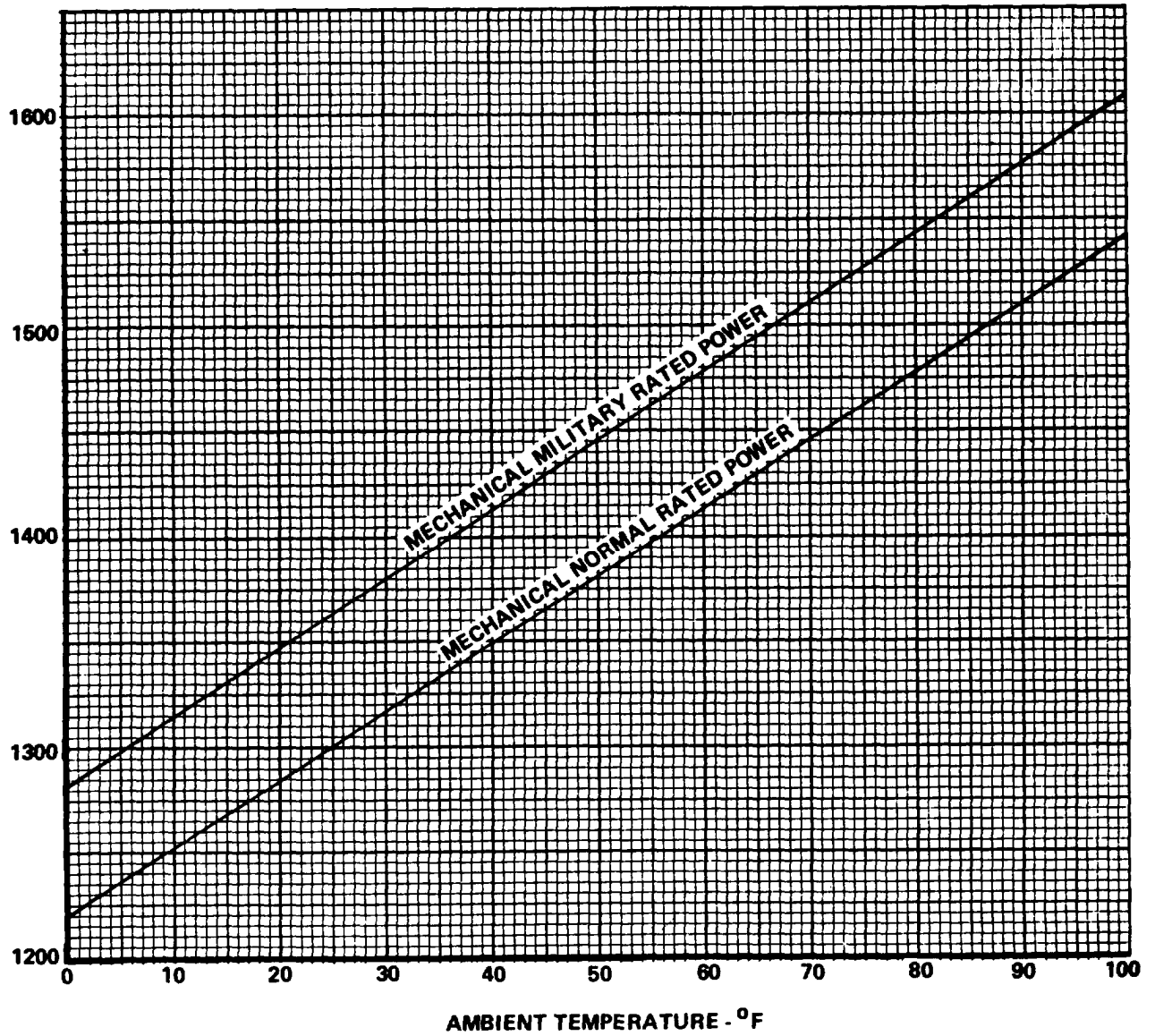


Figure 1-53. Maximum Allowable TGT Versus Ambient Temperature (T53-L-703 Engine)



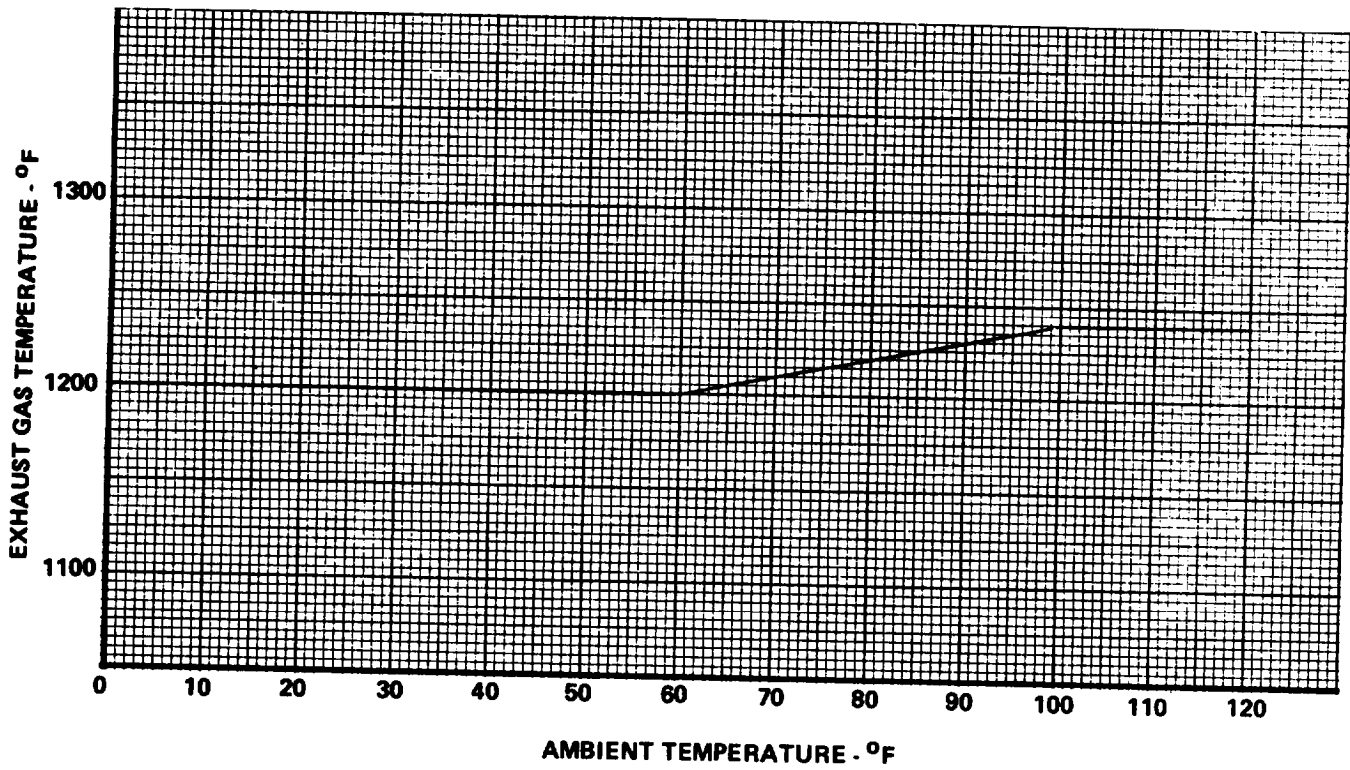
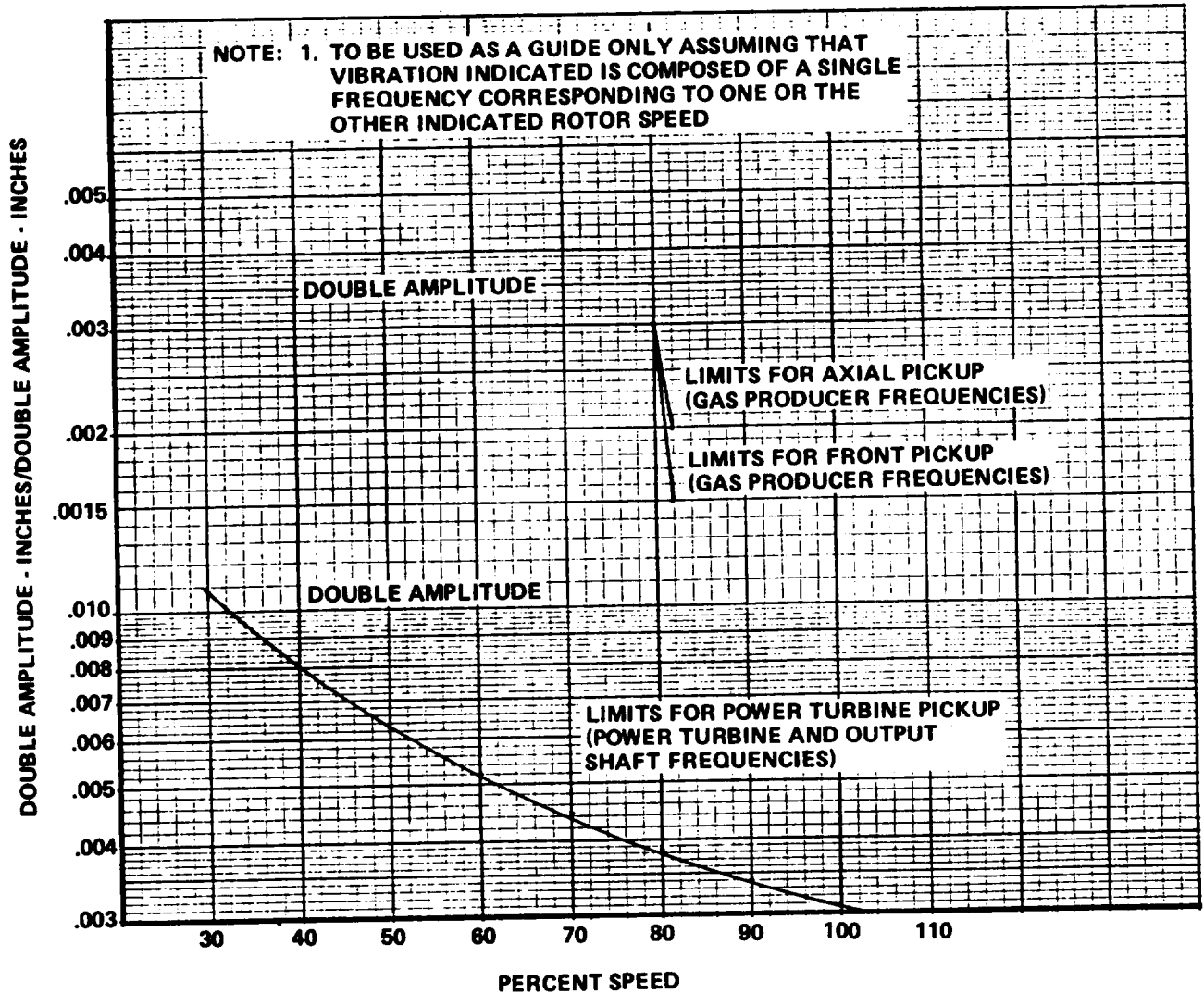


Figure 1-54. Starting and Acceleration Exhaust Gas Temperature Limit Not To Be Exceeded for More than 5 Seconds (T53-L-11 Series Engines)



**NOTE: DO NOT PERFORM VIBRATION CHECK AT SPEED SETTINGS OTHER THAN THOSE LISTED UNDER PARAGRAPH 1-115, ACTION ITEM 9.**

**Figure 1-55. Vibration Limits For T53-L-11 Series Engines and T53-L-13B Engine**

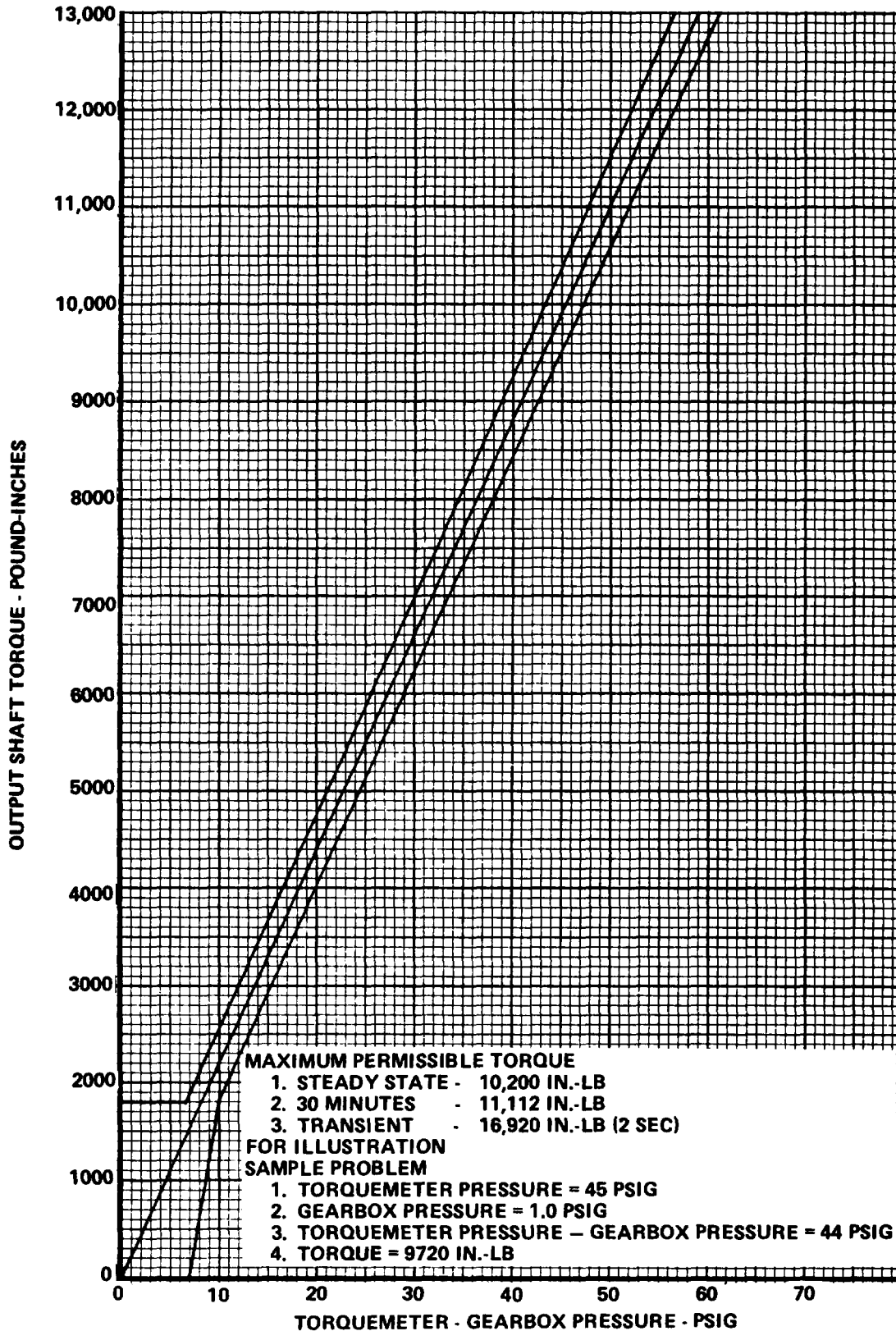


Figure 1-56. Output Shaft Torque Versus Torquemeter-Gearbox Pressure (T53-L-11 Series Engines)

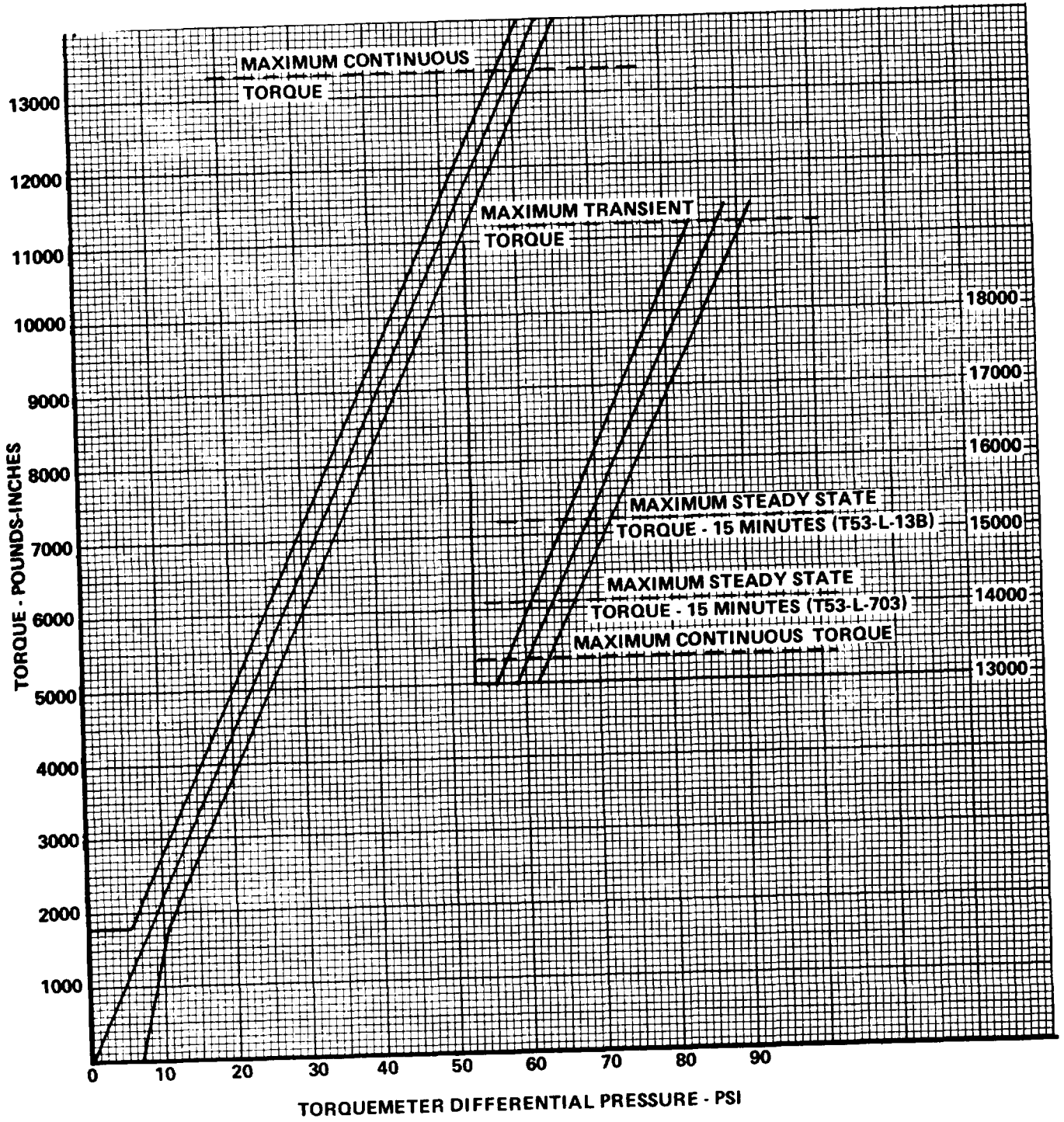


Figure 1-57. Output Shaft Torque Versus Torquemeter - Gearbox Pressure (T53-L-13B/703 Engines)

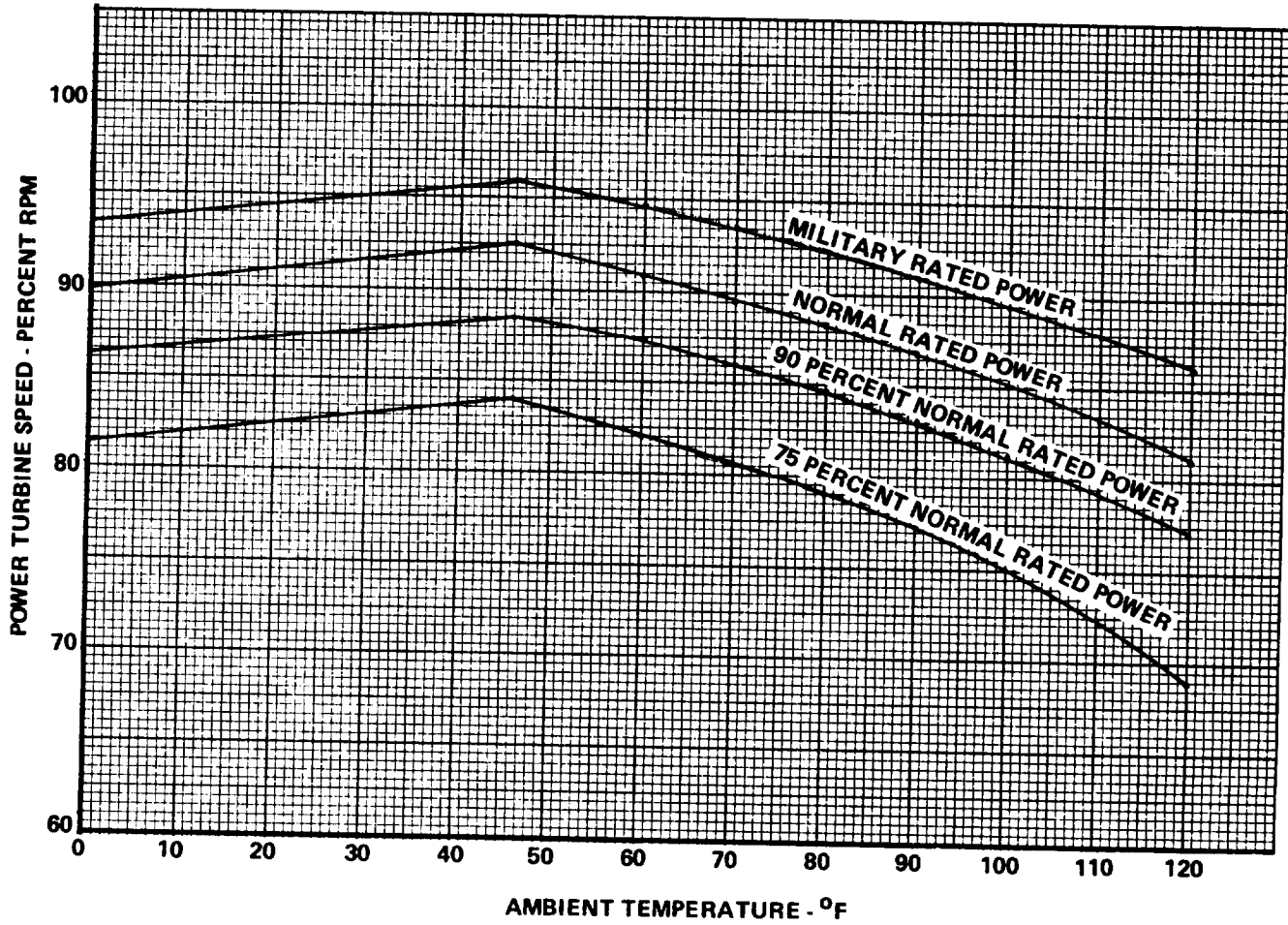


Figure 1-58. Optimum Power Turbine Speed Versus Ambient Temperature (T53-L-13B Engines)

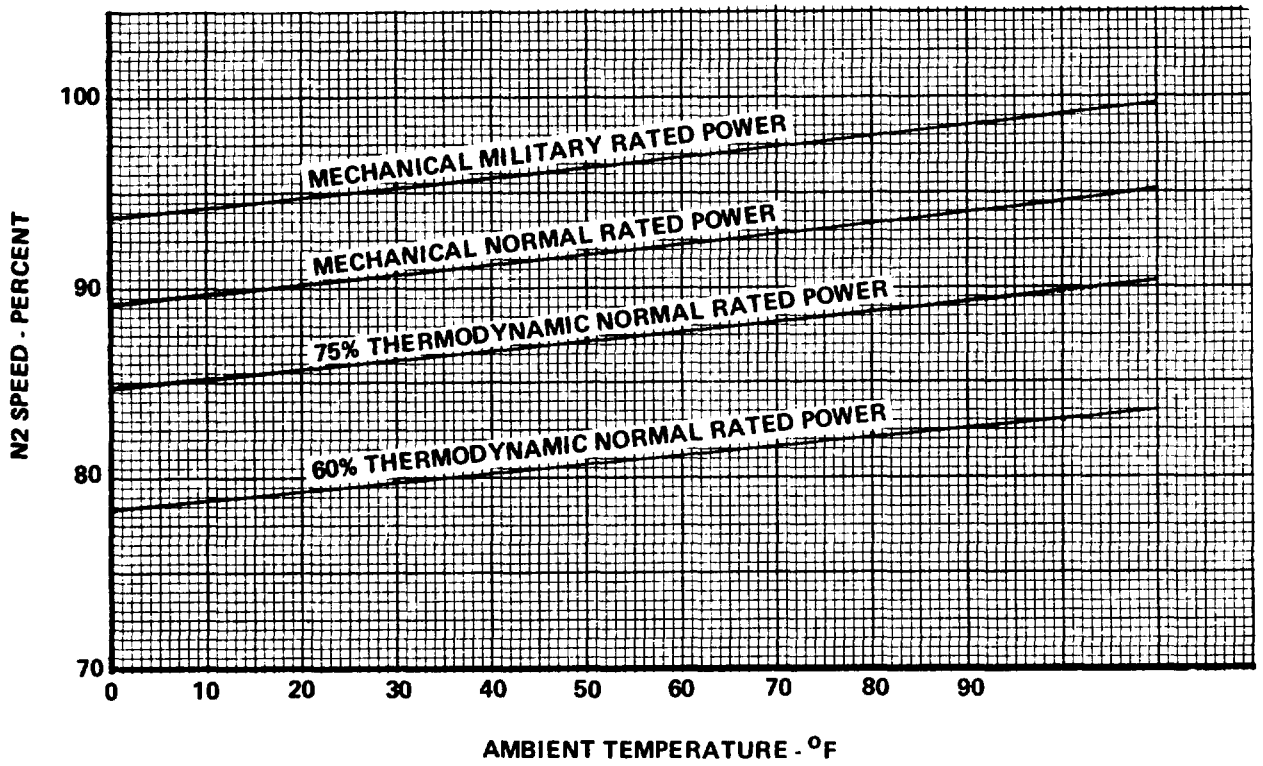


Figure I-59. Optimum N2 Speed Versus Ambient Temperature (T53-L-703 Engine)

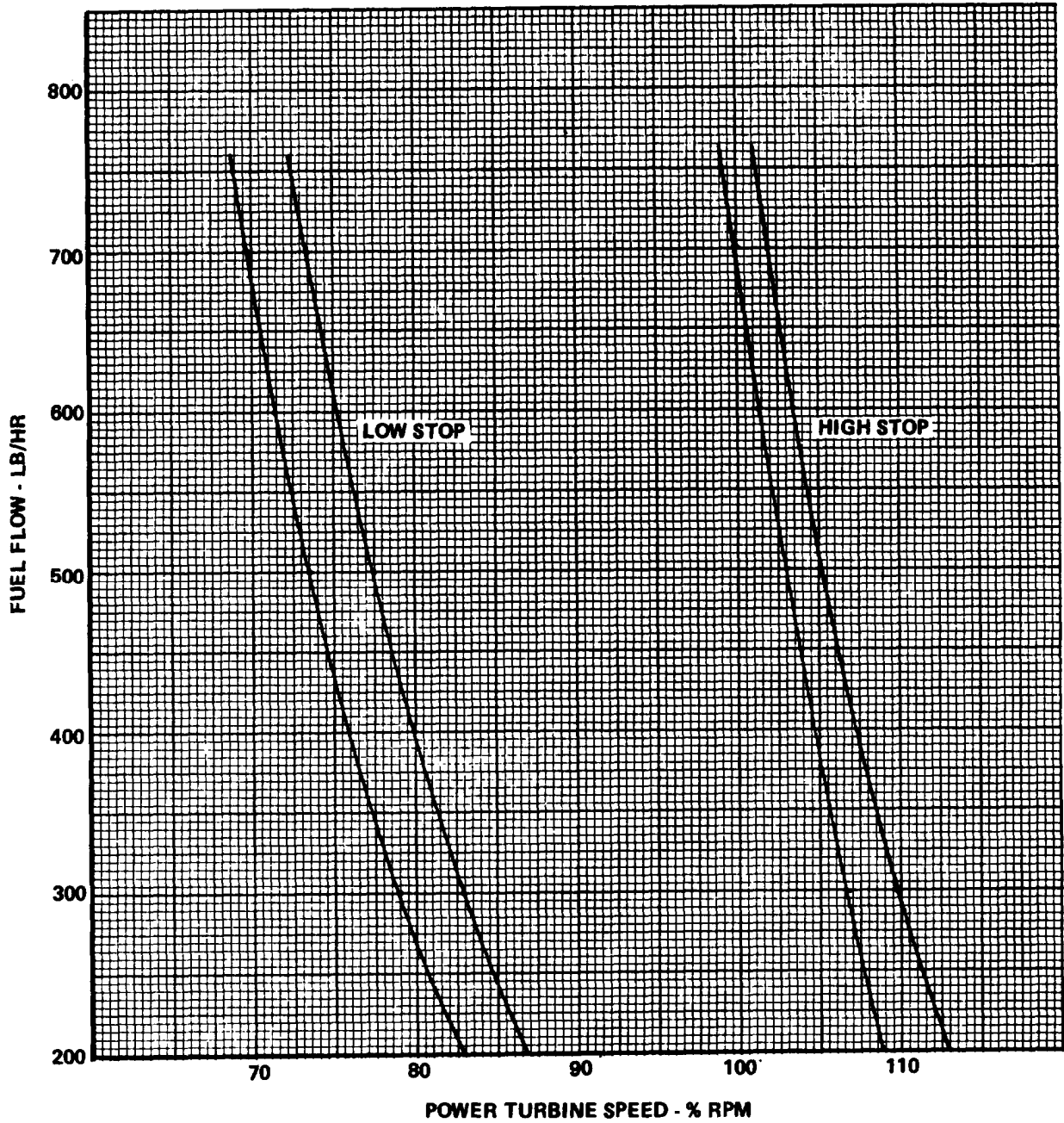


Figure 1-60. Fuel Flow Compared With Power Turbine Speed (T53L-11 Series Engine)

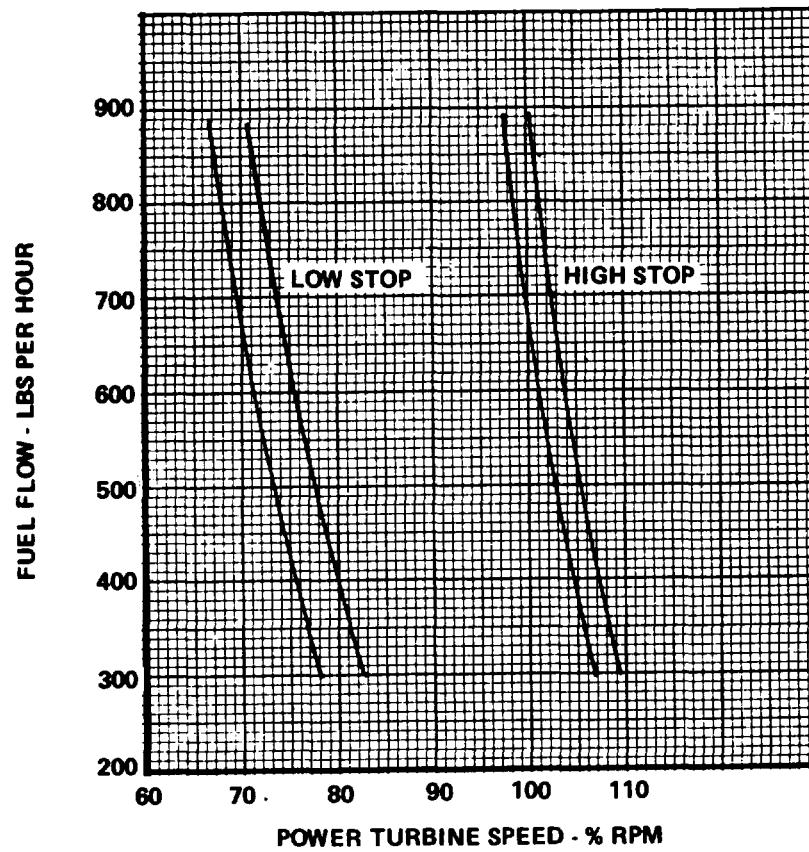


Figure 1-61. Fuel Flow Compared With Power Turbine Speed (T53-L-136 Engine)



**1-113. Level of Testing Using Mobile Trailer Assembly.** The level of testing required varies, depending on the repairs made or parts replaced on the engine. Table 1-14 gives the testing required by referring to the functional test paragraph and the test schedule sequence number or numbers which are to be accomplished. See table 1-15 for test schedule sequence numbers referred to in table 1-14. Functional test is not required on new parts or parts which have operated satisfactorily on other engines.

The sequence numbers given in table 1-14 constitute the minimum test required. Consideration should be given to the fact that additional defects may be detected by accomplishment of a few additional test sequences.

Table 1-14. Test Requirements

Parts Replaced or Repaired	Functional Test Paragraph	Performance Test Sequence	Remarks
Hoses, Associated Piping and Fittings	A-31	None	Check for leaks at first runup.
Inlet Guide Vane Actuator (T53-L-13B/703)	2-18	2 and 4	
Air-Bleed Actuator	2-63,2-64	2 and 4	
Hot-Air Valve	7-34	None	Check operation at first runup.
Oil Temperature Bulb	5-14	None	Check for leaks and indication at first runup
Igniter Plugs	7-47	2	
Ignition Unit	7-38	2	
Ignition Lead and Coil	7-6	2	
Electrical Cable	7-26	2 and 9	Check engine oil pressure and temperature indications
Exhaust Thermocouple	7-15,7-17	2 and 7	
Power-Driven Rotary (Booster) Pump	8-36	2 and 7	
Power-Driven Rotary (Oil) Pump	8-33	2 and 7	
Lube Oil Filter	8-8	2	
Main Fuel Manifold (T53-L-11 Series)	6-59	2,6 and 7	

**Table 1-14. Test Requirements - Continued**

Parts Replaced or Repaired	Functional Test Paragraph	Performance Test Sequence	Remarks
Main Fuel Manifold (T53-L-13B/703)	6-60	2 and 7	
Combustion Chamber Drain Valve	3-23	None	Check for leaks at first shutdown.
Flow Divider and Dump Valve (T53-L-13B/703)	6-82	2 and 7	
Starting Fuel Nozzle	6-44,6-45	2	
Starting Fuel Manifold	6-30,6-31	None	Check for leaks at first start
Bypass Fuel Filter (T53-L11 series)	6-72	2	
Starting Fuel Solenoid Valve	6-52	2	
Check Filter Valve (T53-L-13B/703)	6-84	2	
Fuel Control		2, 3, 4 (T53-L13B/703), 7, 8, 9, 11, 12, and 13	
Fuel Control Solenoid Valve		2 and 9	
Overspeed Governor		2, 7 and 8	
Accessory Drive Gearbox		2	
Overspeed Governor and Tachometer Drive Assembly		2	
Gas Producer Nozzle		2, 5, 7, 12, 13, 14 and 15	Only if nozzle is replaced
Combustor Turbine Assembly (Hot End)		2, 5 and 7	2 and 5 are required any time hot end is removed and reinstalled.

**Table 1-15. Test Schedule**

Sequence Number	Operation Performed	Remarks
1	Motor Engine for 10 seconds.	
2	Start engine, check leaks, ground and flight idle; hot-air valve closed.	
3	Bleed band closure check.	
4	(T53-L-13B/703). Variable inlet guide vane check.	
5	Vibration check.	
6	(T53-L11 Series). Fuel flow versus fuel manifold pressure check.	
7	Maximum power check. (Takeoff rated power T53-L-11 Series). (Military rated power T53-L-13B/703).	
8	Overspeed governor cut-in check.	
9	Emergency fuel system check.	
10	Maximum power vibration check.	
11	Flight idle check.	
12	Acceleration check.	
13	Waveoff check.	
14	Evaluate performance.	
15	Rate engine.	
16	Preserve engine.	

**1-114. Penalty Applications Using Mobile Trailer Assembly.** Following successful completion of a rating performance run, certain test sequences must be reaccomplished if specific parts required removal or replacement. See table 1-16.

**Table 1-16. Penalty Applications**

Part	Test Required if Part is Replaced	Test Required if Removed Part is Reinstalled	Remarks
Hoses, Associated Piping, and Fittings	None	None	Check for leaks at first runup
Inlet Guide Vane Actuator (T53-L13B/703)	2 and 4	2 and 4	
Air-Bleed Actuator	2 and 3	None	
Hot-Air Valve	None	None	Check operation at first runup
Oil Temperature Bulb	None	None	Check for leaks and indication at first run
Igniter Plugs	2	None	
Ignition Unit	2	None	
Ignition Lead and Coil	2	None	
Electrical Cable	2 and 9	None	
Exhaust Thermo-couple	2 and 7	2 and 7	
Power-Driven Rotary (Booster) Pump	2 and 7	None	Check for leaks at first runup
Power-Driven Rotary (oil) Pump	2 and 7	None	Check for leaks and adjust pressure at first runup
Lube Oil Filter	2	2	
Main Fuel Manifold (T53-L11 series)	2, 6, and 7	None	Check for leaks at first runup
Main Fuel Manifold (T53-L13B/703)	2 and 7		
Combustion Chamber Drain Valve	None	None	Check for leaks at first runup

Table 1-16. Penalty Applications - Continued

Part	Test Required if Part is Replaced	Test Required if Removed Part is Reinstalled	Remarks
Flow Divider and Dump Valve (T53-L-13B/703)	2 and 7	None	Check for leaks at first runup
Starting Fuel Nozzle	2	2	
Starting Fuel Manifold	None	None	Check for leaks at first runup
Bypass Fuel Filter (T53-L-11 Series)	2	None	Check for leaks at first runup
Starting Fuel Solenoid Valve	2	None	Check for leaks at first runup
Check Filter Valve (T53-L-13B/703)	2	None	Check for leaks at first runup
Fuel Control	2, 3, 4, (T53-L-13B/703) 7, 8, 9, 11, 12 and 13	None	Check for leaks at first runup. If adjustments are made to bleed band closure point at any time, recheck 3, 12, and 13
Fuel Control Solenoid Valve	2 and 9	2 and 9	
Overspeed Governor	2, 7 and 8	None	Check for leaks at first runup
Accessory Drive Gearbox	2	None	Check for leaks at first runup
Overspeed Governor and Tachometer Drive Assembly	2	None	Check for leaks at first runup
Gas Producer Nozzle	2, 5, 7, 12, 13, 14 and 15	None	
Combustor Turbine Assembly (Hot End)	2,5 and 7	2 and 5	

Parts removed to gain access to other parts or areas shall invoke the same penalty, in accordance with the table of penalty applications, as parts removed to correct deficiencies and malfunctions. In the event that more than one penalty is invoked, the most severe shall apply.

1-115. Test Schedules and Procedures Using Mobile Trailer Assembly (AVIM).

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Plastic Lube Moly No. 3 (02307) (or equivalent)  
(item 67, Appendix D)

**References**  
Para 1-92, 1-103, 1-104, 1-113, 1-112, 1-39,  
Chapter 1

LOCATION/ITEM	REMARKS	ACTION
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**NOTE**

Table 1-14 in paragraph 1-113 lists the sequence of operations to be performed during complete engine test, performance evaluation, sequence 14 and rating sequence 15. This paragraph contains detailed instructions for these operations.

1. Engine

**Calculate** horsepower as follows:

1-115. Test Schedules and Procedures Using Mobile Trailer Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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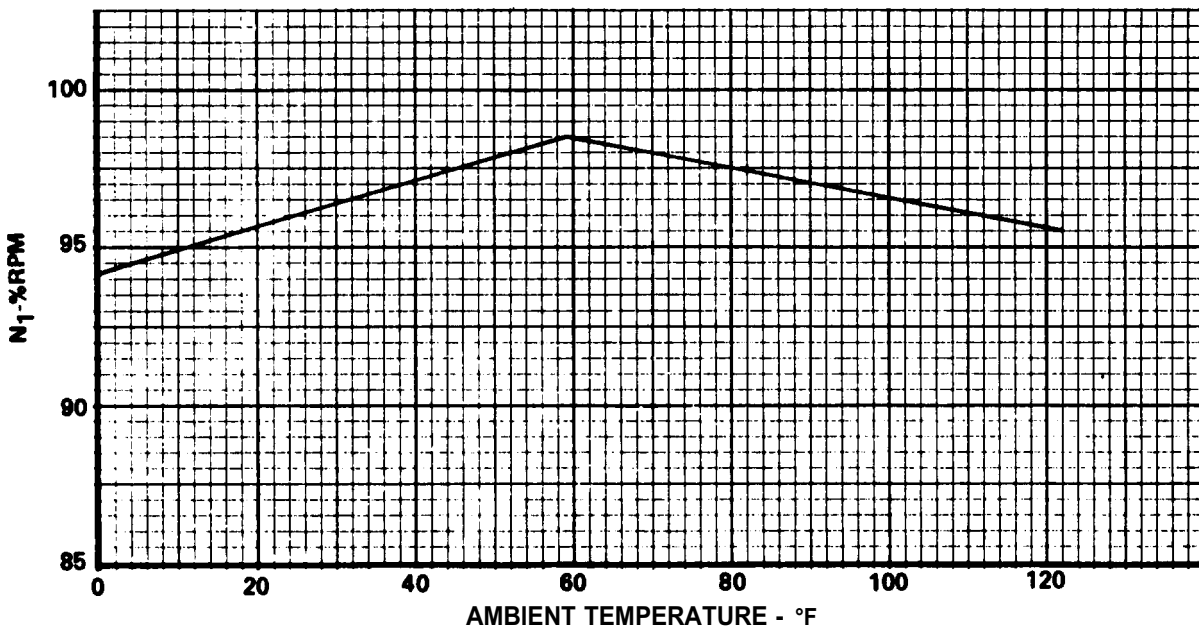
a. To determine required shaft horsepower, **locate** existing ambient temperature in figure covering engine in question. **Project** vertically and **read** compensated shaft horsepower at left.

b. To **determine** actual shaft horsepower **multiply** compensated value by compensation factor given in table shown after item 1.

The following figure illustrates permissible N1 speed versus ambient temperature at takeoff power.

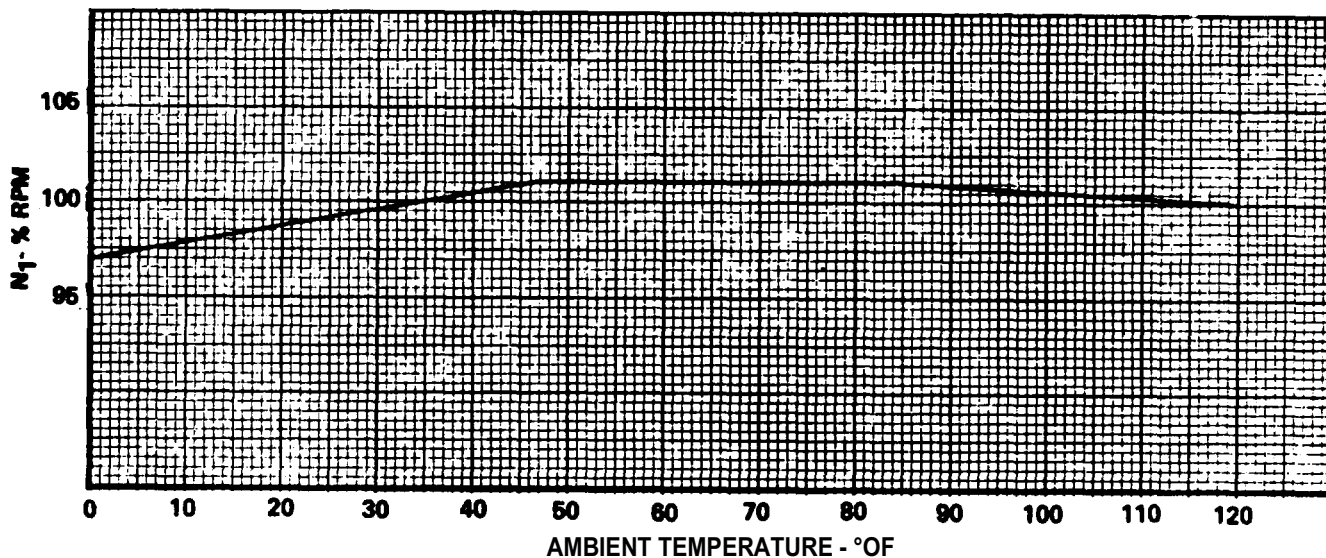
c. To **determine** actual shaft horsepower from test indications, **use** the following formula.

$$SHP = \frac{\text{Torque (lb-inches)} \times \text{Percent N2}}{9.60}$$

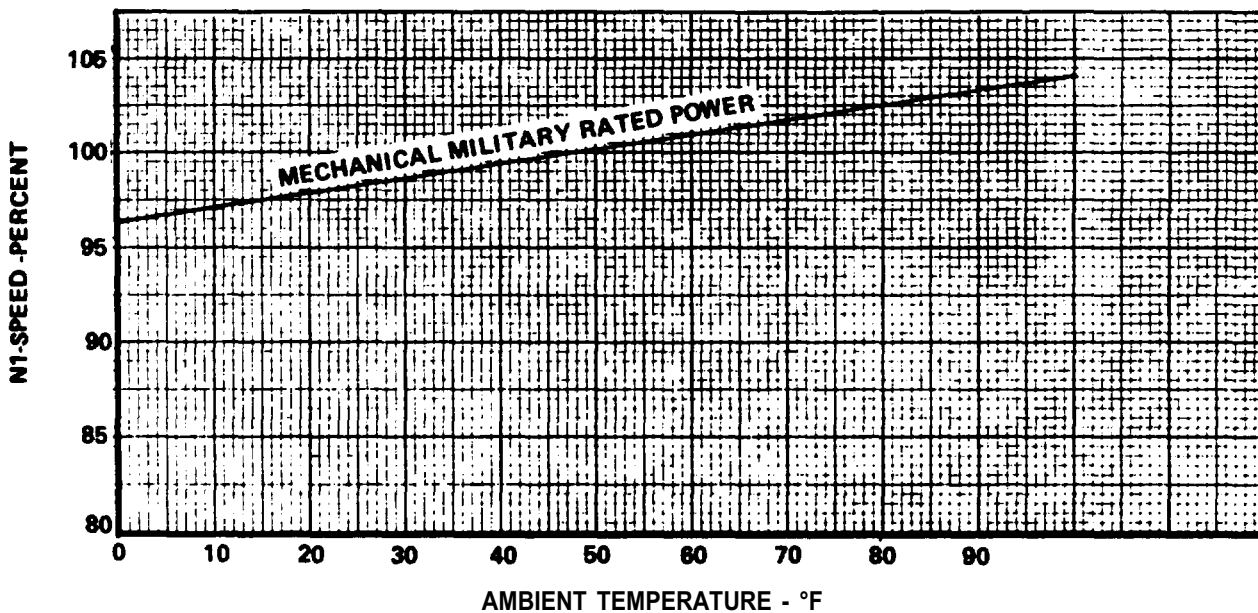


Permissible N1 Speed Versus Ambient Temperature at Takeoff Power (T53-L-11 Series Engines)

1-115. Test Schedules and Procedures (AVIM) - Continued



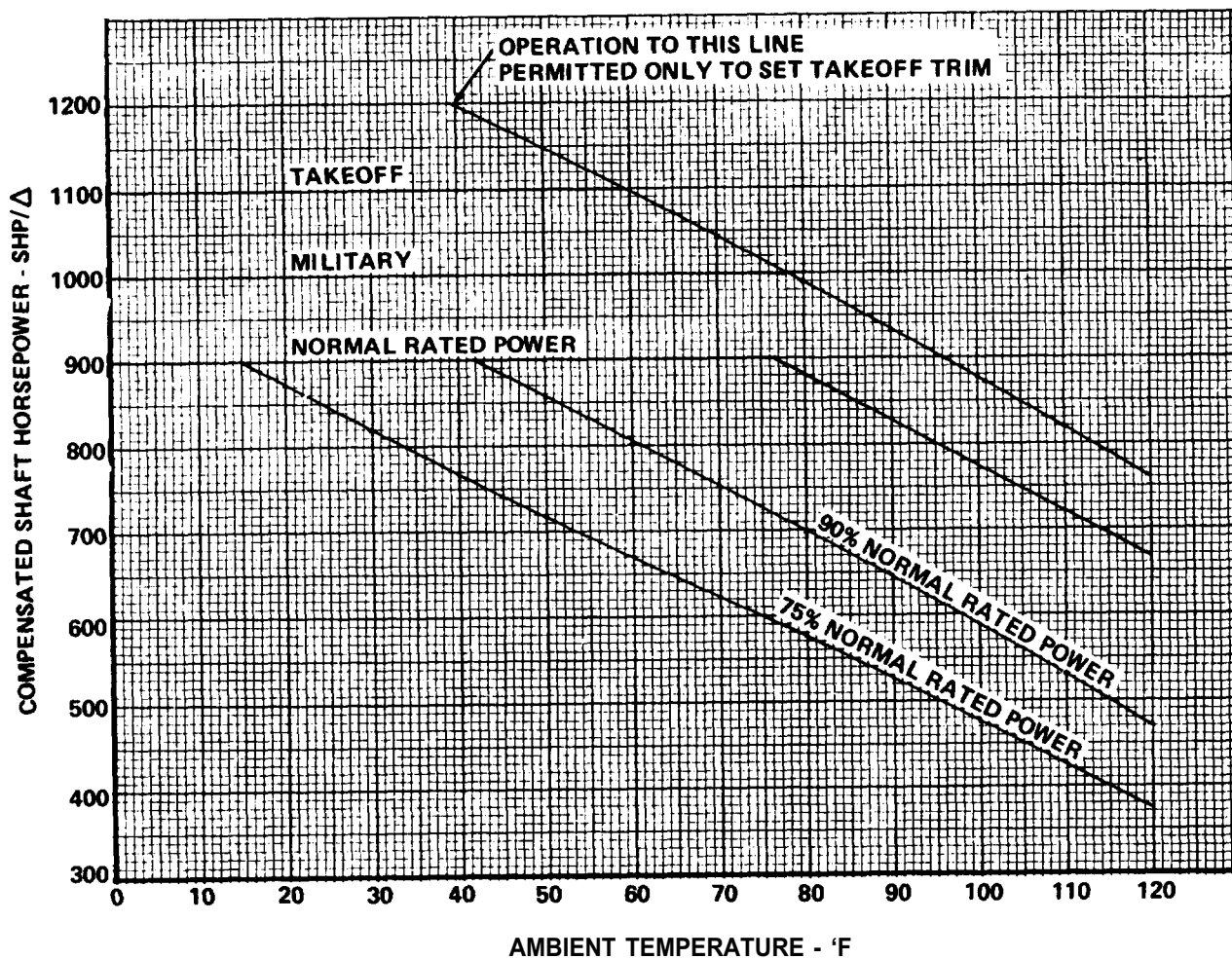
Maximum Permissible N1 Speed At Military Rated Power Versus Ambient Temperature (T53-L-13B Engine)



Maximum Permissible N1 Speed at Military Rated Power Versus Ambient Temperature (T53-L-703 Engine)

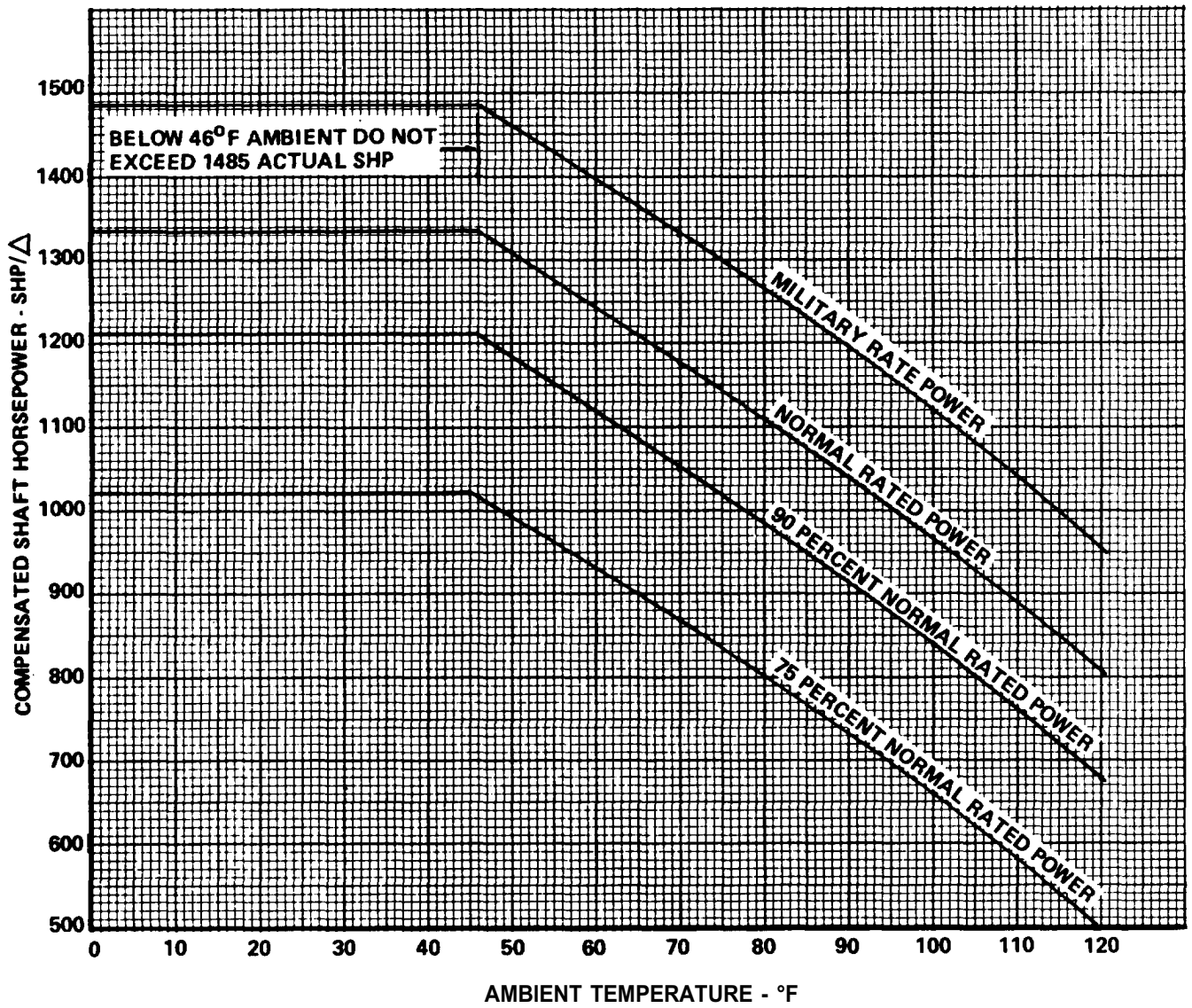


1-115. Test Schedules and Procedures (AVIM) - Continued



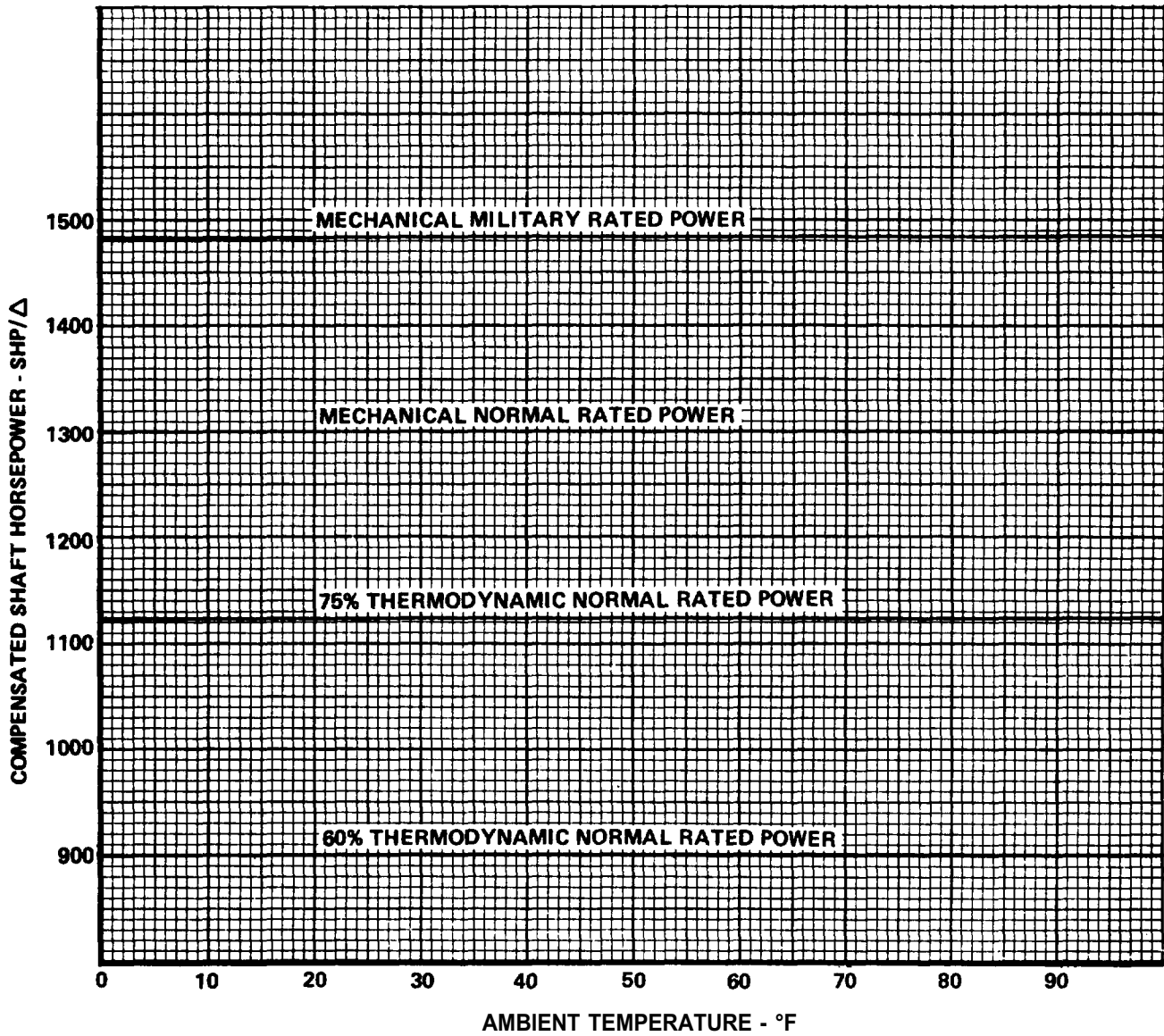
Compensated Shaft Horsepower Versus Ambient Temperature (T53- L-11 Series Engines)

1-115. Test Schedules and Procedures (AVIM) - Continued



Compensated Shaft Horsepower Versus Ambient Temperature (T53-L-13B Engine)

1-115. Test Schedules and Procedures (AVIM) -Continued



Compensated Shaft Horsepower Versus Ambient Temperature (T53-L-703 Engine)

1-115. Test Schedules and Procedures (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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Table 1-17. Compensating Factors for Calculating Actual Horsepower and Fuel Flow From Compensated Values

Actual HP = Compensated HP x $\Delta$		Actual Fuel Flow = Compensated Fuel Flow x $\Delta$	
Compensated HP = Actual HP / $\Delta$		Compensated Fuel Flow = Actual Fuel Flow / $\Delta$	
Barometer	$\Delta$	Barometer	$\Delta$
28.48	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		

2. Water Brake

Water brake operating limits are as follows:

**Observe** limits given.

a. Rear bearing temperature: 120°F (49°C) maximum.

b. Water brake out temperature: 140°F to 180°F (60°C to 82°C). If temperature is not within limits, decelerate to ground idle and open water back pressure slightly to cool; close slightly to heat water.

1-115. Test Schedules and Procedures (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
3. Engine	Refer to applicable paragraphs in other chapters of manual if adjustments are required during test.	If engine is suspected of high oil consumption, <b>extend</b> maximum power run to 15 minutes to <b>check</b> consumption rate.

**NOTE**

Actions for items 4 thru 24 pertain to testing, evaluation, and rating of engine.

4. Engine

**Motor** engine for 10 seconds and **check** for rubs, leaks, and oil pressure indication.

5. Engine

If engine is to be rated, test log entries shall be made on AMSAV-E Form 86 at all check points (following figure).

**Start** engine and **perform** idle checks as follows:

- a. **Set** N1 lever to ground idle position (23° to 26° on fuel control quadrant), and **insure** that automatic fuel system is selected.
- b. **Set** N2 lever to low stop.
- c. **Set** WATER-IN CONTROL lever partially open.
- d. **Set** WATER-BACK PRESSURE lever to half open.

**CAUTION**

Do not operate starter for more than 40 seconds. Allow 3 minutes cooling time between starter engagements.



1-115. Test Schedule and Procedures Using Mobile Trailer Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
		<p>e. <b>Energize</b> START switch. When indication is observed on N1 percent indicator energize IGNITION switch</p> <p>f. <b>De-energize</b> start and ignition at 40 percent N1 unless EGT reaches 1200°F (649°C) (T53-L-11 Series), 1472°F (950°C) (T53-L-703), or 1250°F (677°C) (T53-L-13B) at which time, de-energize ignition only. Check engine for leaks.</p>
<div> </div> <p><b>Check that parameters do not exceed limits given in table 1-13.</b></p>		
		<p>g. <b>Set</b> N2 lever to high stop.</p> <p>h. <b>Adjust</b> water-in control to obtain 25 percent to 30 percent N2.</p> <p>i. Do not adjust ground idle until military rated power is checked.</p> <p>j. <b>Check</b> all parameters indicating they are within limits.</p> <p>k. <b>Check</b> that automatic fuel system is in operation by <b>advancing</b> THROTTLE N1 lever slightly and observing N1 speed indicator N1 speed will increase if automatic system is in operation.</p>

1-115. Test Schedules and Procedures Using Mobile Trailer Assembly (AVIM) - Continued

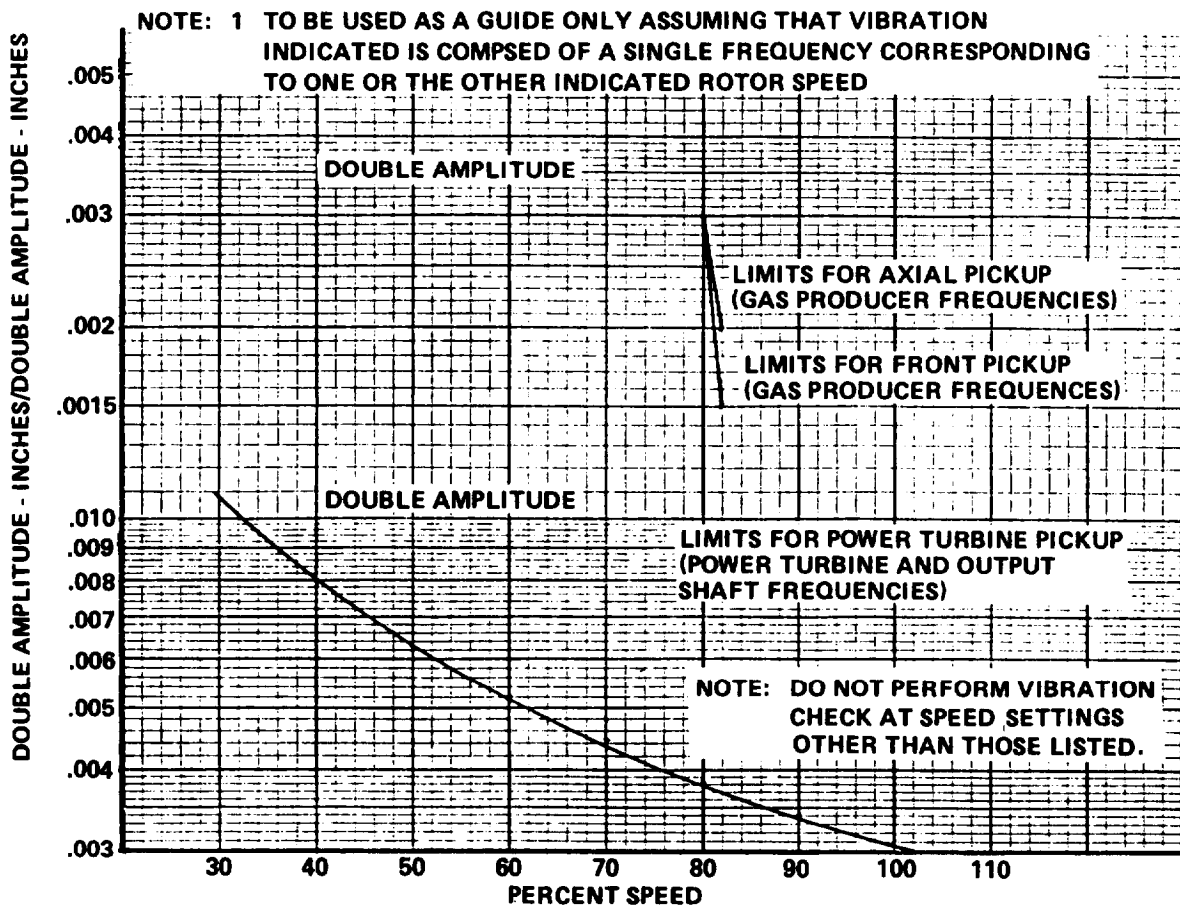
LOCATION/ITEM	REMARKS	ACTION
		<p>1. Simultaneously <b>advance</b> N1 lever and <b>WATER IN CONTROL</b> lever. <b>Stop</b> N1 lever at 38 to 42 degrees on fuel control quadrant. <b>Position</b> <b>WATER IN CONTROL</b> lever to maintain N2 speed below 50 percent rpm.</p> <p>m. Do not adjust ground idle until military rated power is checked.</p>
6. Bleed Band	<p>The difference in N1 speed for bleed band opening and closing shall be 2 to 8 percent for T53-L-11 Series Engines.</p> <p>Bleed band must also remain closed at normal rated power with anti-ice on and customer air open for one minute.</p>	<p><b>Perform</b> bleed band closure check as follows:</p> <p>a. <b>Accelerate</b> slowly to check bleed band closure N1 speed.</p> <p>b. <b>Adjust</b>, if required, and <b>recheck</b>.</p> <p>c. <b>Decelerate</b> slowly and <b>check</b> bleed band open N1 speed.</p>
7. Variable Inlet Guide Vane	T53-L-13B/703 engine only.	<p><b>Check. Accelerate slowly. Check</b> N1 speed at the following points:</p> <p>a. When inlet guide vanes begin to open.</p> <p>b. When inlet guide vanes are fully open.</p>
8. Variable Inlet Guide Vane	If guide vane operation is not within limits of figure 1-46, adjust feedback rod as required.	<b>Decelerate</b> slowly. Check N1 speed at the following points:



1-115. Test Schedules and Procedures (AVIM) - Continued

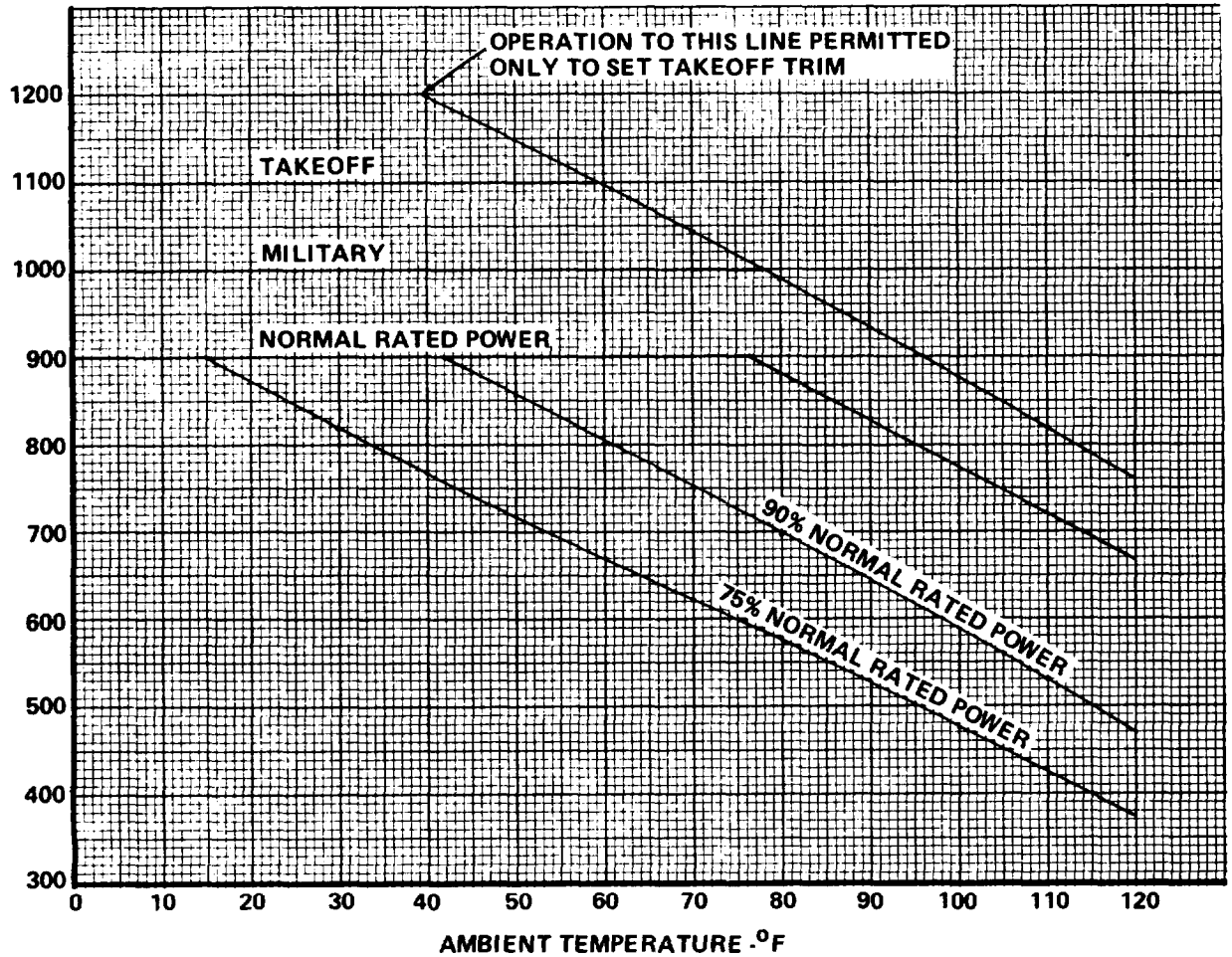
LOCATION/ITEM	REMARKS	ACTION						
9. Engine	<p>All readings must be within limits when using 110 cps filter. For evaluation and correction, refer to paragraphs 1-103 and 1-104.</p> <p>(N1) (N2) T53-L-11 Series and T53-L-13B/703 Engine</p>	<p>a. When inlet guide vanes begin to close.</p> <p>b. When inlet guide vanes are fully closed.</p> <p>Perform vibration check. <b>Adjust</b> N1 lever to each of the following N1 Speed settings. <b>Adjust</b> WATER IN CONTROL to obtain the indicated N2 speeds.</p>						
	<table border="0"> <tr> <td>85</td> <td>97.3</td> </tr> <tr> <td>90</td> <td>94.8, 97.3, 100.4</td> </tr> <tr> <td>95</td> <td>97.3</td> </tr> </table>	85	97.3	90	94.8, 97.3, 100.4	95	97.3	
85	97.3							
90	94.8, 97.3, 100.4							
95	97.3							

The following figure illustrates vibration limits.



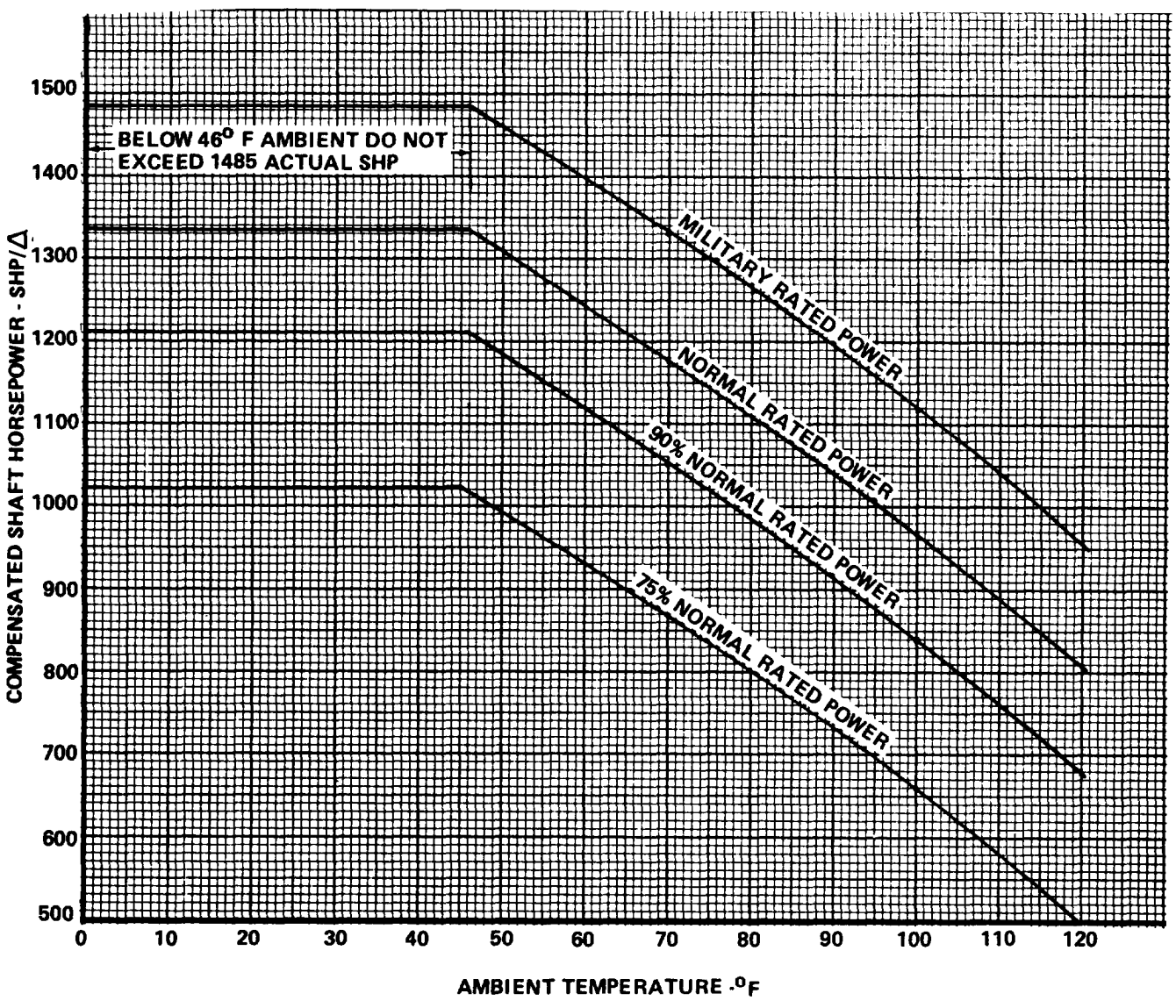
1-115. Test Schedules and Procedures (AVIM) - Continued

LOCATION /ITEM	REMARKS	ACTION
10. FUEL MANI-FOLD SOL Switch	T53-L-11 series engines only.	<b>Set</b> switch to ON. <b>Check</b> fuel flow rate versus fuel manifold pressure. If not within limits, <b>check</b> as indicated.
11. Engine	T53-L-11 series engines (takeoff) and T53-L-13B/703 engine (military).	<b>Perform</b> the following:  a. <b>Determine</b> compensated shaft horsepower required as shown in figure.



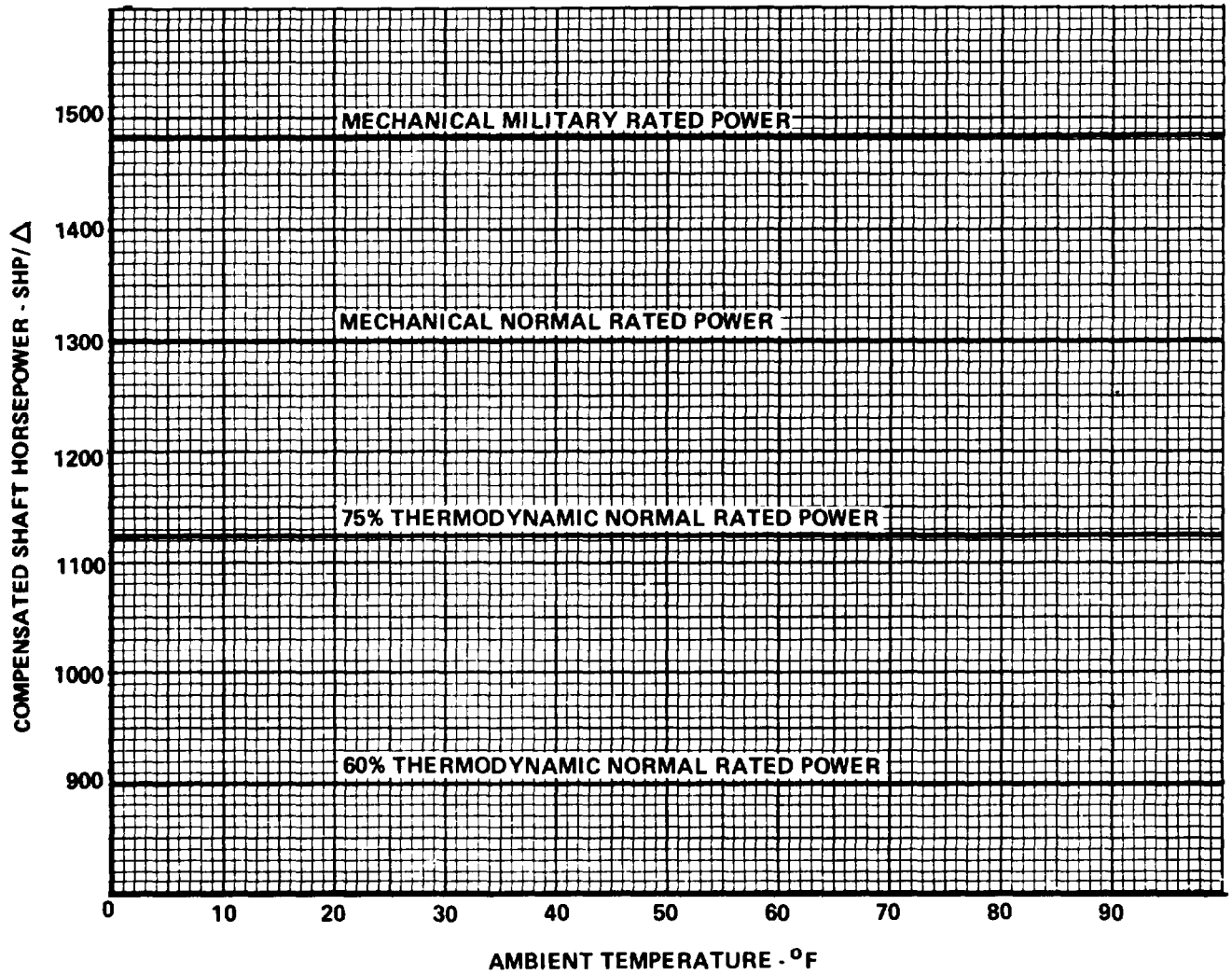
Compensated Shaft Horsepower versus Ambient Temperature (T53- L-11 Series Engines)

1-115. Test Schedules and Procedures (AVIM) - Continued



Compensated Shaft Horsepower Versus Ambient Temperature (T53- L-13B Engines)

1-115. Test Schedules and Procedures (AVIM) - Continued



Compensated Shaft Horsepower Versus Ambient Temperature (T53-L-703 Engine)

1-115. Test Schedules and Procedures (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
12. Engine	<p>For purposes of setting maximum N1 speed, it is permissible to operate up to but not exceeding 1200 compensated shp (TS3-L 11 Series) or 1485 (T53-L-13B/703). Perform this action if maximum N1 speed cannot be set because the required compensated shaft horsepower exceeds 1200 (T53-L-11 series engines) or 1485 (T53-L-13B/703).</p>	<p>b. <b>Multiply</b> compensated shaft horsepower by compensating factor given in table in REMARKS column for item 1. Result is actual shaft horsepower required.</p> <p>c. <b>Advance</b> N1 lower to maximum and compute actual shaft horsepower developed. <b>Adjust</b> WATER IN CONTROL lever to obtain 100.4 +0.5 or -0.5 percent N2 speed (T53-L-11 Series) or per following figure for (T53-L13B).</p> <p>d. <b>Increase</b> maximum N1 speed if actual shaft horsepower is low. <b>Decrease</b> maximum N1 speed if actual shaft horsepower exceeds minimum required shaft horsepower by more than 25 shaft horsepower.</p> <p><b>Perform</b> the following procedures:</p> <p>a. <b>Trim</b> fuel control so that, at 100° power lever position, the engine does not produce more than 1200 compensated shaft</p>

**CAUTION**

N1 and WATER IN CONTROL levers should be actuated simultaneously to reduce possibility of power turbine overspeed.

1-115. Test Schedules and Procedures Using Mobile Trailer Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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The following figure illustrates cold weather trim speed calculation for T53-L-11 series engines.

**CAUTION**

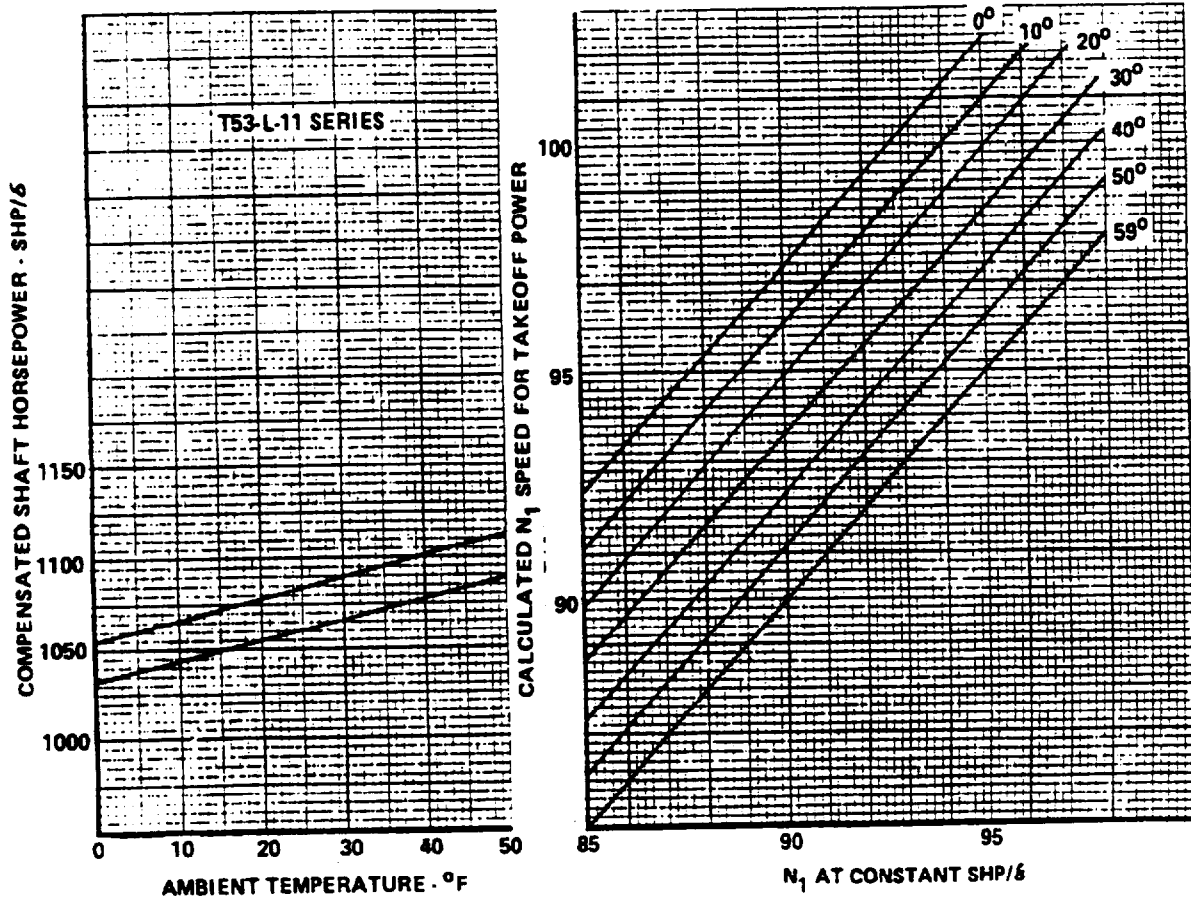
The cold weather trim speed calculation charts that follow are to be used for METS operation only.

horsepower (T53-L-11 Series) or 1485 (T53-L-13B/703).

b. Record N1 speed at 100 degree throttle position.

c. Select compensated shaft horsepower to fall in band of curve at left of figures given

d. Multiply compensated SHP from step c. by compensating factor from table 1-17 and set this actual power.



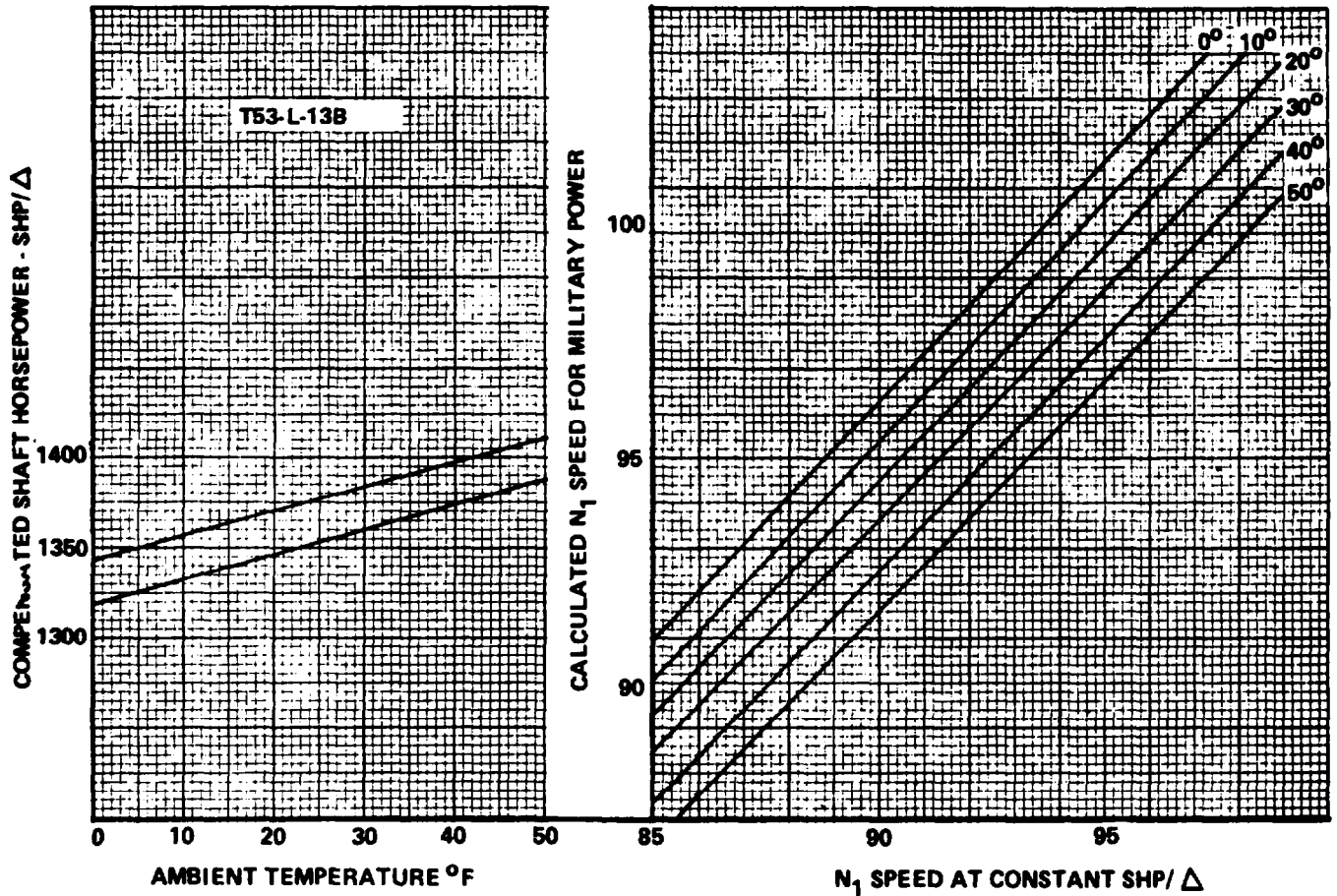
Cold Weather Trim Speed Calculation Chart For T53-L-11 Series Engine

1-115. Test Schedules and Procedures Using Mobile Trailer Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
	<p>The following figures illustrate cold weather trim speed calculations for T53-L-13B and T53-L-703 engines.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Cold weather trim procedure will not be used at or above 46°F(7.8°C)for the T53-L-13B. Cold weather trim will be used at all ambient temperatures for the T53-L-703.</p> <div style="text-align: center; border: 1px dashed black; padding: 5px; width: fit-content; margin: 10px auto;"> <p><b>CAUTION</b></p> </div> <p>The cold weather trim speed calculation charts that follow are to be used for METS operation only.</p>	<p>e. <b>Record</b> (N1) speed.</p> <p>f. <b>Repeat</b> step b. <b>Enter</b> bottom of curve at right, project to the ambient temperature line. <b>Note</b> calculated N1 speed at left.</p> <p>g. Install cold week stop (LTCT763) on fuel control maximum mechanical stop.</p> <p>h. With power lever against cold weather stop, <b>record</b> N1 speed.</p> <p>i. <b>Subtract</b> N1 speed determined in step h from the N1 speed determined in step e. to get <math>\Delta</math> N1.</p> <p>j. <b>Subtract</b> <math>\Delta</math> N1 from calculated N1 speed determined in step f.</p> <p>k. With power lever against stop, <b>trim</b> maximum N1 speed to that speed determined in step j.</p> <p>1. <b>Remove</b> LTCT6763 stop.</p> <p><b>Run</b> 5 minutes at maximum power. <b>Check</b> all parameters within limits after 2 minutes.</p>
<p>13. Engine</p>		

1-115. Test Schedules and Procedures using Mobile Trailer Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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Cold Weather Trim Speed Calculation Chart For T53-L13B Engine

14. Overspeed Governor

Insure that N2 lever is against high stop. Retarding the WATER IN CONTROL lever will result in an increase in N2 speed. Governor cut-in will be indicated by a decrease in N1 speed and fuel rate. Do not exceed 104 percent N2 speed. The following figure illustrates fuel flow compared with power turbine speed for T53-L-11 series engines.

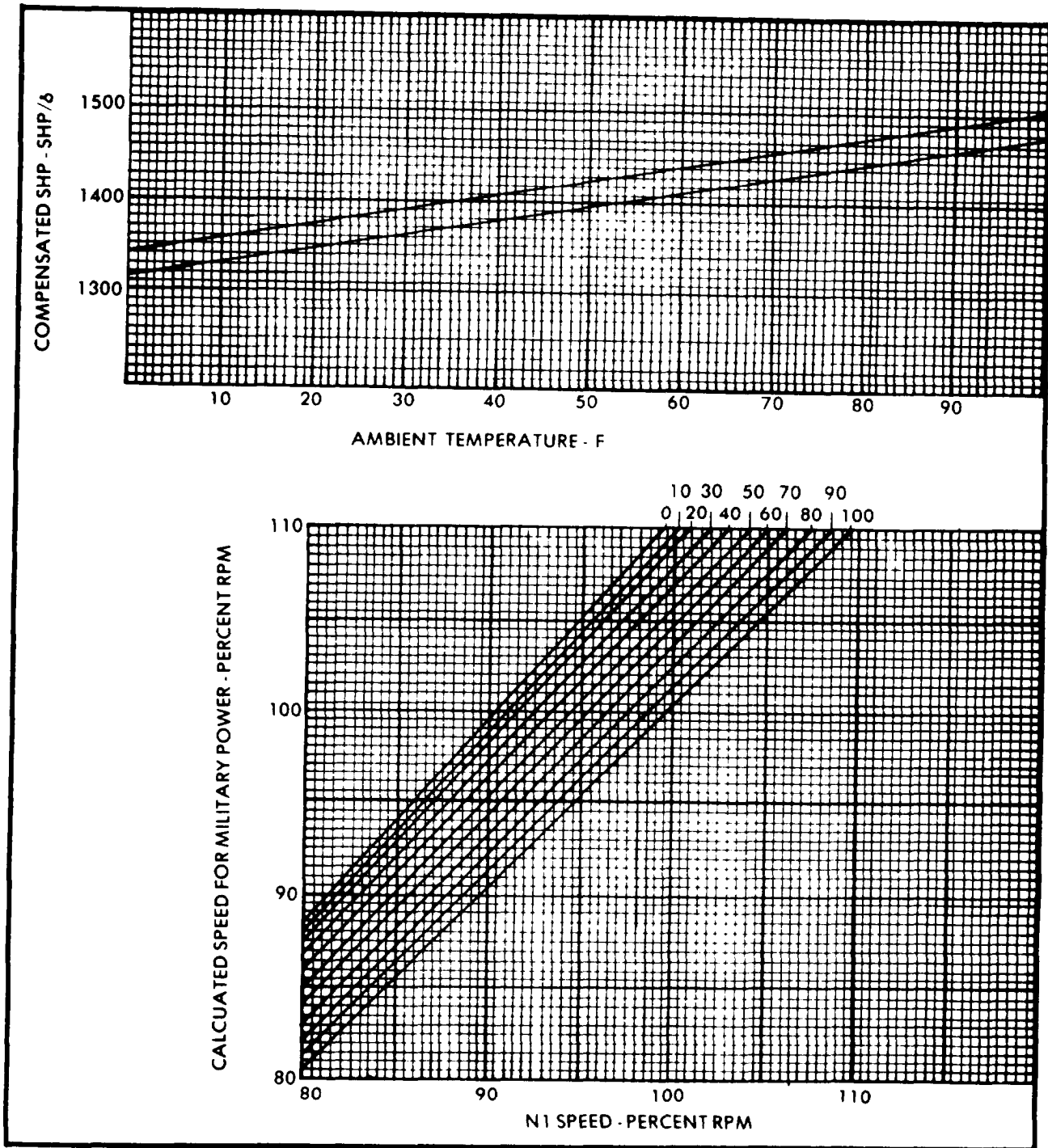
**Check** cut-in as follows:

- a. **Check** that N1 lever is in maximum position, and WATER IN CONTROL lever is set to obtain 100 percent N2 speed (T53-L-11 Series Engines) or 98 percent N2 speed (T53-L-13B/703 Engine).



1-115. Test Schedules and Procedures using Mobile Trailer Assembly (AVIM) Assembly

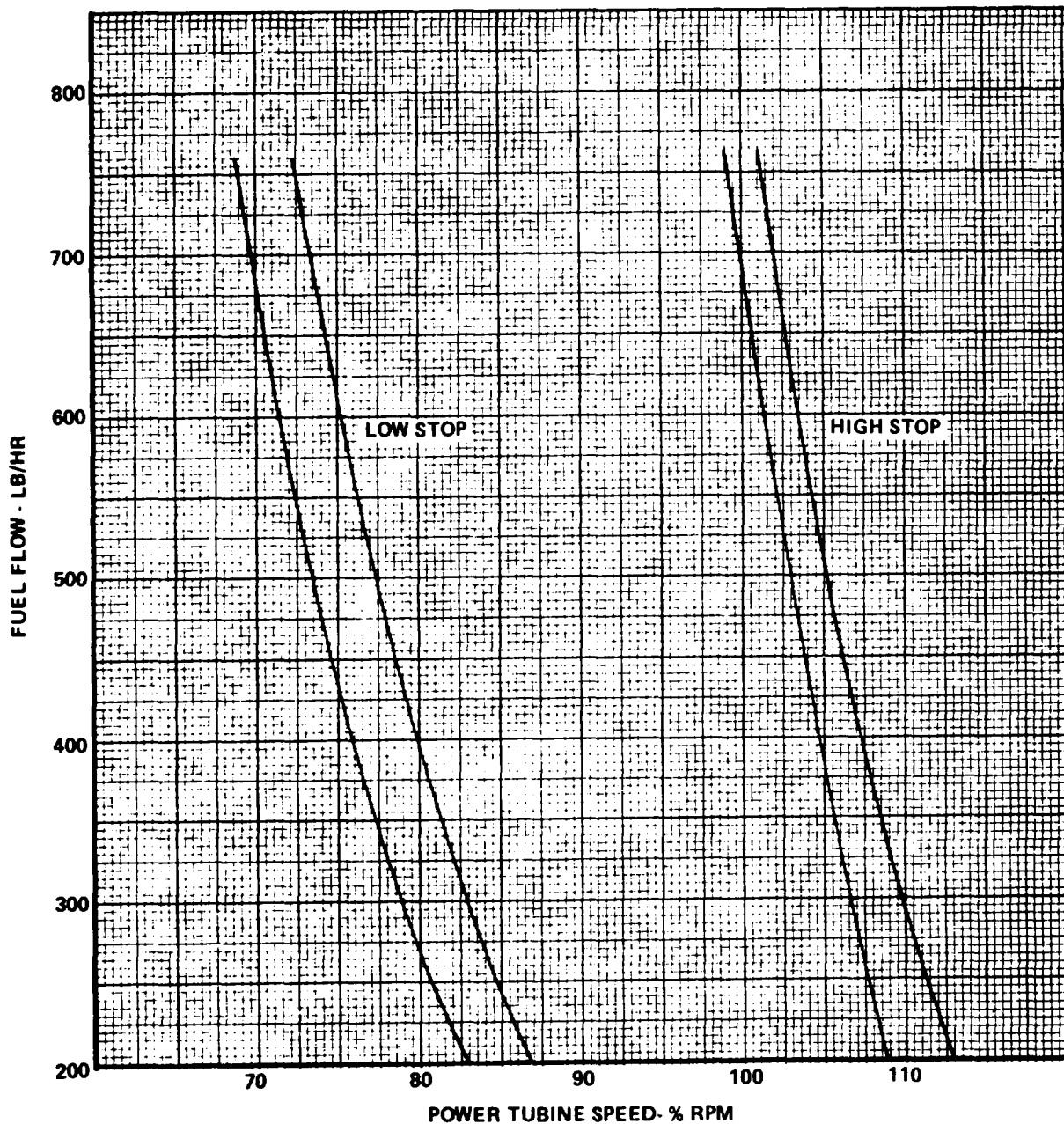
LOCATION/ITEM	REMARKS	ACTION
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Cold Weather Trim Speed Calculation Chart For T53-L-703 Engine.

1-115. Test Schedules and Procedures using Mobile Trailer Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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Fuel Flow Compared With Power Turbine Speed (T53-L-11 Series Engine)



1-115. Test Schedules and Procedures (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
		<p>b. <b>Unload</b> engine by <b>retarding</b> WATER IN CONTROL lever until overspeed governor cuts in.</p> <p>c. <b>Check</b> average fuel flow and N2 Speed within high stop range limits. (See figures)</p> <p>d. <b>Adjust</b> WATER IN CONTROL lever to obtain 100 percent N2 speed (T53-L13B Engine) or 98 percent N2 speed (T53-L13B/703 Engine).</p> <p>e. <b>Retard</b> N2 lever to minimum stop. <b>Check</b> average fuel flow and N2 speed within low stop range (see figures).</p>

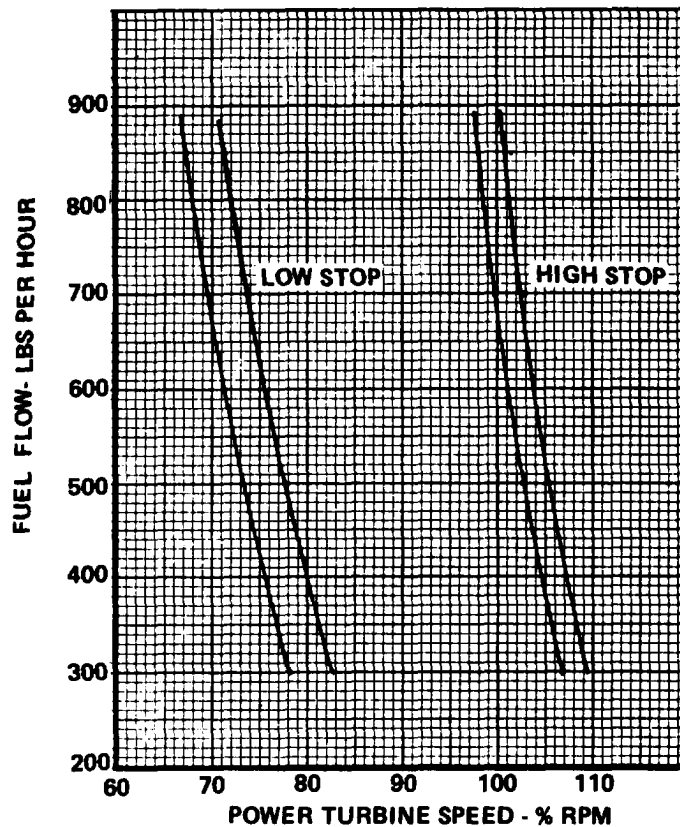
The following figure illustrates fuel flow compared with power turbine speed for T53-L-13B/703 engine.

**NOTE**

In the event that governor operation is unstable, and N2 speed fluctuation exceeds +10 percent or -10 percent, check water brake and overspeed governor.

1-115. Test Schedules and Procedures (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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Fuel Flow Compared With Power Turbine Speed (T53-L-13B/703 Engine)

15. Emergency Fuel System

On T53-L13B/703 Engine, bleed band may open or cycle during emergency check.

**Check** as follows:

- a. With N1 and N2 levers at maximum, adjust water in control to obtain 100 percent N2 speed (T53-L-11 Series Engines) or 98 percent N2 speed (T53-L-13B/703 Engine).

**CAUTION**

At ambient temperatures colder than 59°F (15°C) (T53-L-11 Series) or 460F (8°C) (T53-L-13B/703), retard N1 lever to flight idle before switching to emergency. Accelerate slowly to maximum N1. This also applies if ambient temperature is above 80°F (27°C).

1-115. Test Schedules and Procedures (AVIM) - Continued

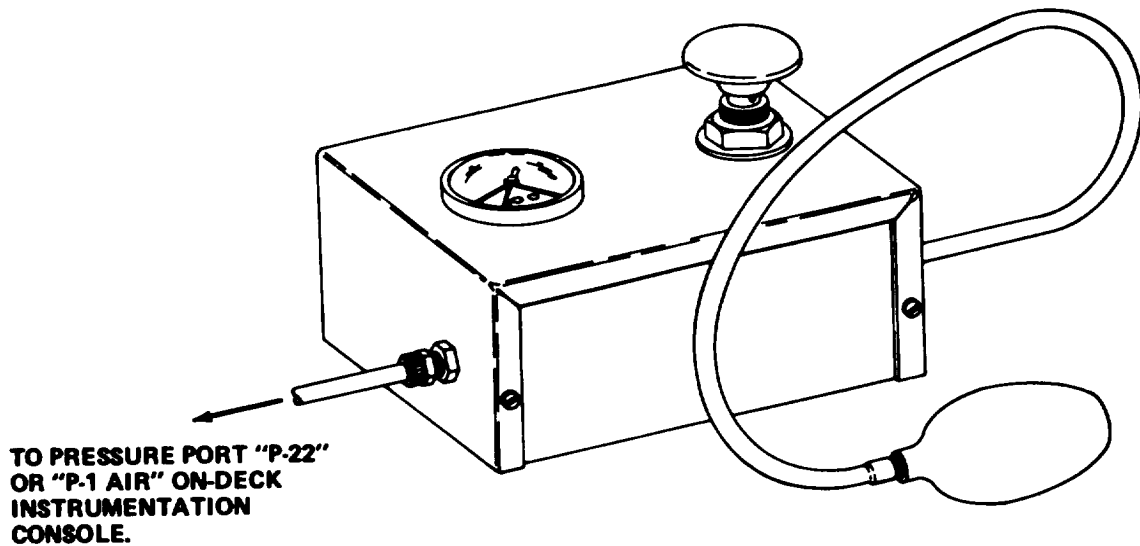
LOCATION/ITEM	REMARKS	ACTION
16. Engine		<p>b. <b>Switch</b> to emergency. <b>Check</b> all parameters within limits.</p> <p>c. <b>Decelerate</b> to flight idle. <b>Check</b> all parameters within limits, then <b>decelerate</b> to ground idle and <b>switch</b> back to automatic.</p> <p><b>Perform</b> vibration check as follows:</p> <p>a. <b>Set</b> maximum power with N2 speed at 97.3 percent.</p> <p>b. <b>Check</b> vibration within limits.</p>
17. Engine		<p><b>Perform</b> flight idle check as follows:</p> <p>a. <b>Set</b> maximum power. Lock water-in control.</p> <p>b. <b>Decelerate</b> to flight idle.</p> <p>c. <b>Check</b> all parameters within limits.</p> <p>d. <b>Adjust</b> if required.</p>
18. Engine	<p>Accelerations will be limited to the N1 speed at which 95 percent of maximum power is obtained, provided the ambient temperature is above 59°F (15°C) for T53-L-11 Series Engines and 49°F (9°C) for T53-L13B/703 Engines. If ambient temperature is below 59°F (15°C) (T53-L11 Series Engines), limit throttle movement to position at which 1100 shp is obtained and time acceleration to the N1 speed at which 1045 shp is attained. If</p>	<p><b>Perform</b> acceleration check as follows:</p> <p>a. <b>Set</b> water-in control at maximum power position and <b>lock</b>. <b>Retard</b> N1 to flight idle.</p> <p>b. <b>Close</b> fuel manifold pressure valve.</p>

1-115 Test Schedules and Procedures (AVIM) - Continuoed

LOCATION/ITEM	REMARKS	ACTION
	<p>ambient temperature is below 49°F (9°C) (T58-H3B/708 Engines) limit throttle movement to position at which 1400 shp is obtained and time acceleration to the N1 speed at which 1330 shp is obtained. If a surge is experienced during the acceleration check immediately retard the throttle to ground idle position and check compressor airbleed operation. Proper operation is indicated by bleed band remaining open during most of the acceleration and closing just before the acceleration is completed.</p>	<p>c. <b>Simultaneously Jam</b> N1 lever to throttle position as determined in preceding note, and <b>depress</b> TIMER-START switch.</p> <p>d. <b>Stop</b> clock and <b>record</b> time and maximum exhaust gas temperature. Maximum time for acceleration from flight idle is 5 seconds.</p> <p>e. <b>Shut down</b> engine.</p>
<p>19. Engine</p>	<p>The WATER IN CONTROL lever shall be locked in position during the waveoff checks.</p>	<p><b>Perform</b> waveoff check as follows:</p> <p>a. <b>Disconnect</b> fuel control ram air tube from inlet housing and <b>connect</b> to P-1 bellows pressurizing system.</p> <p>b. <b>Start</b> engine and <b>set</b> maximum power.</p> <p>c. <b>Set</b> MANIFOLD SOL switch to ON (valve Closed).</p> <p>d. <b>Check</b> that N2 lever is at high setting.</p> <p>e. <b>Operate</b> engine at maximum power for 2 minutes.</p> <p>f. <b>Perform</b> a series of waveoffs in rapid succession from 90, 85, 80, and 70 percent N1 speed on T53-L-13B/703 engine, and 85, 75, 70, 65,60 and 56 percent N1 speed on T63-L-11 Series Engines.</p>

1-116. Test Schedules and Procedures (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
	<p>Snap N1 lever from maximum power to allow N1 speed to decelerate, and return N1 lever to maximum power for each of the N1 speeds. On T53-L-11 Series Engines, THROTTLE N1 lever movement in either direction shall be accomplished in less than one second. On T53-L13B/703 Engines, allow N1 to decelerate and stabilize before jamming throttle.</p> <p>The bleed band should open when throttle is returned to maximum power position and should remain open until acceleration is completed. The bleed band may or may not open on a waveoff from 85 percent N1 speed.</p> <p>Use portable P-1 pressure unit on test trailers which do not incorporate pressure system.</p>	<p>g. If surge is encountered, immediately <b>retard</b> N1 lever until engine operates normally. <b>Remove</b> and <b>replace</b> fuel control if bleed band and VIGV operation is unsatisfactory. If bleed band fails to open, <b>check</b> air-bleed system before replacing fuel control. If replacement of the fuel control fails to correct the surge, <b>reject</b> the engine.</p> <p>h. If no surge is encountered, <b>apply</b> 20 + 0.5 inch or -0.5 inch (508.0 mm+ 1.27 mm or -1.27 mm) H<sub>2</sub>O to P-1 bellows.</p>

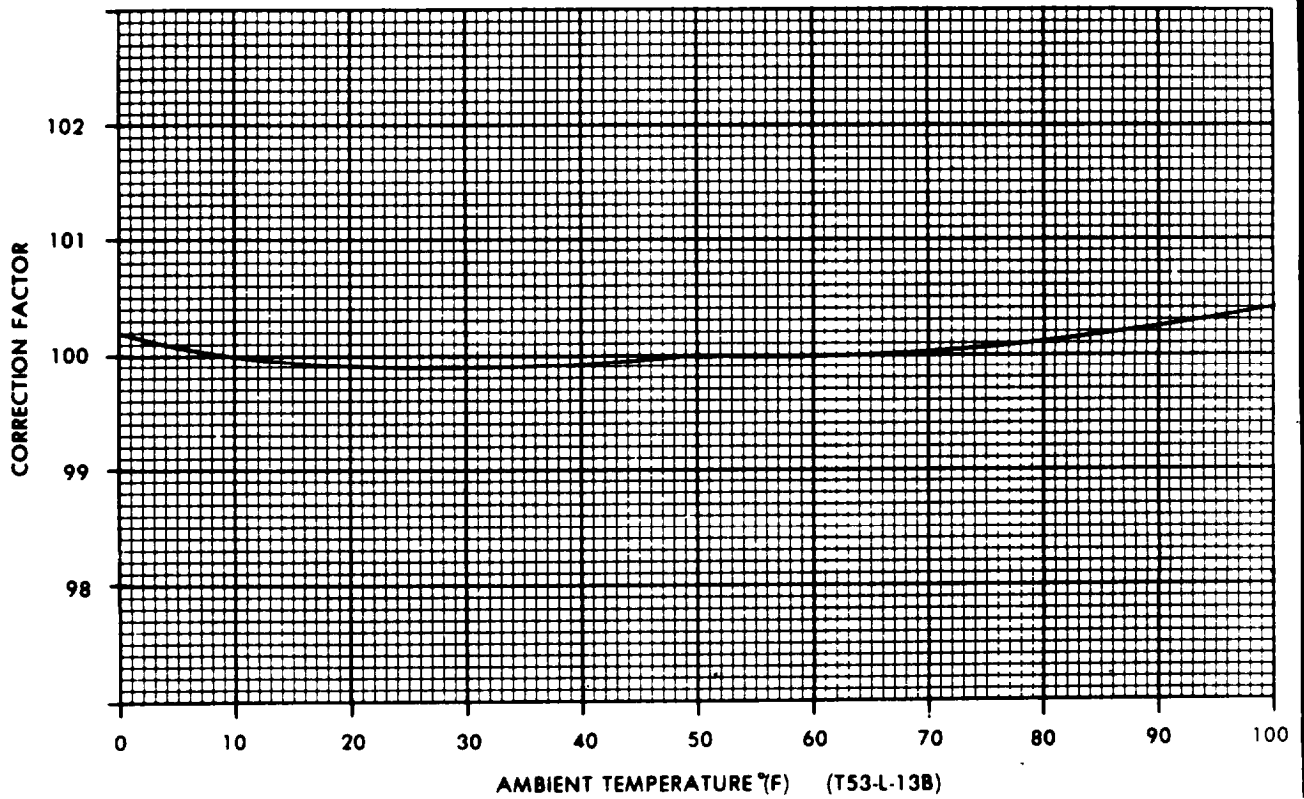
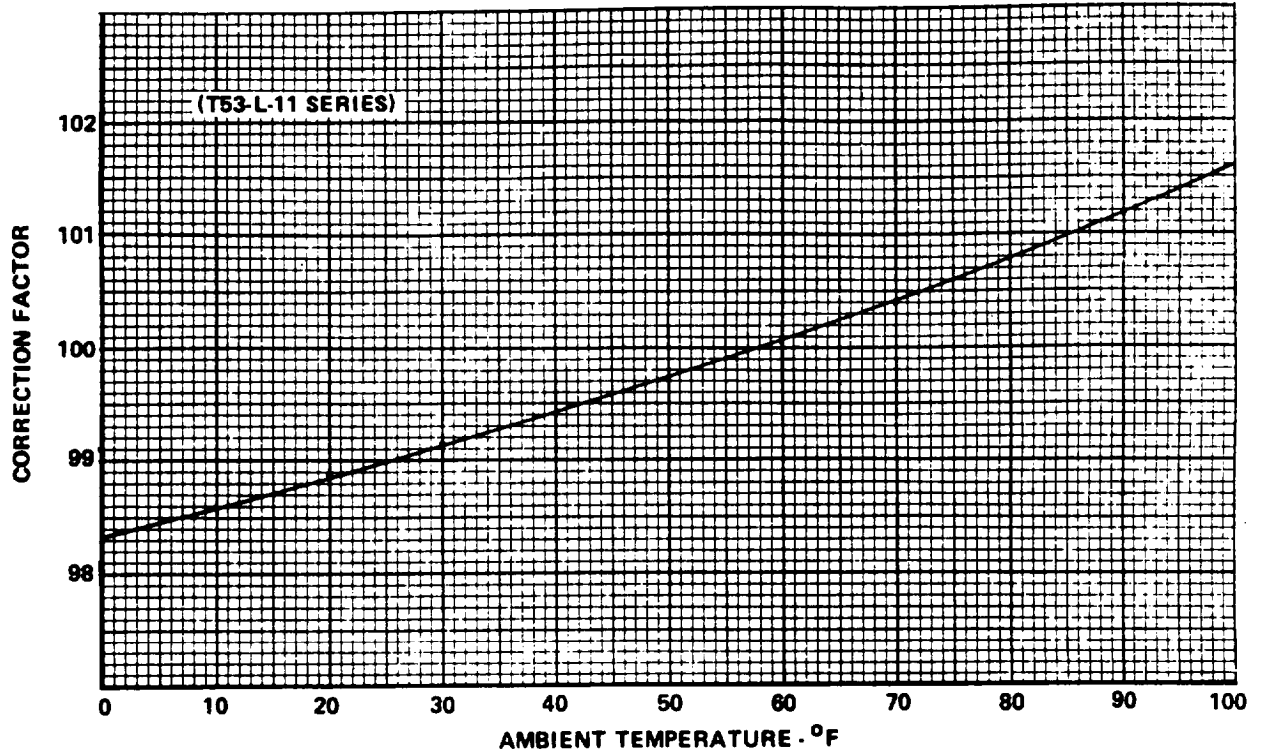




1-115. Test Schedules and Procedures (AVIM) - Continued

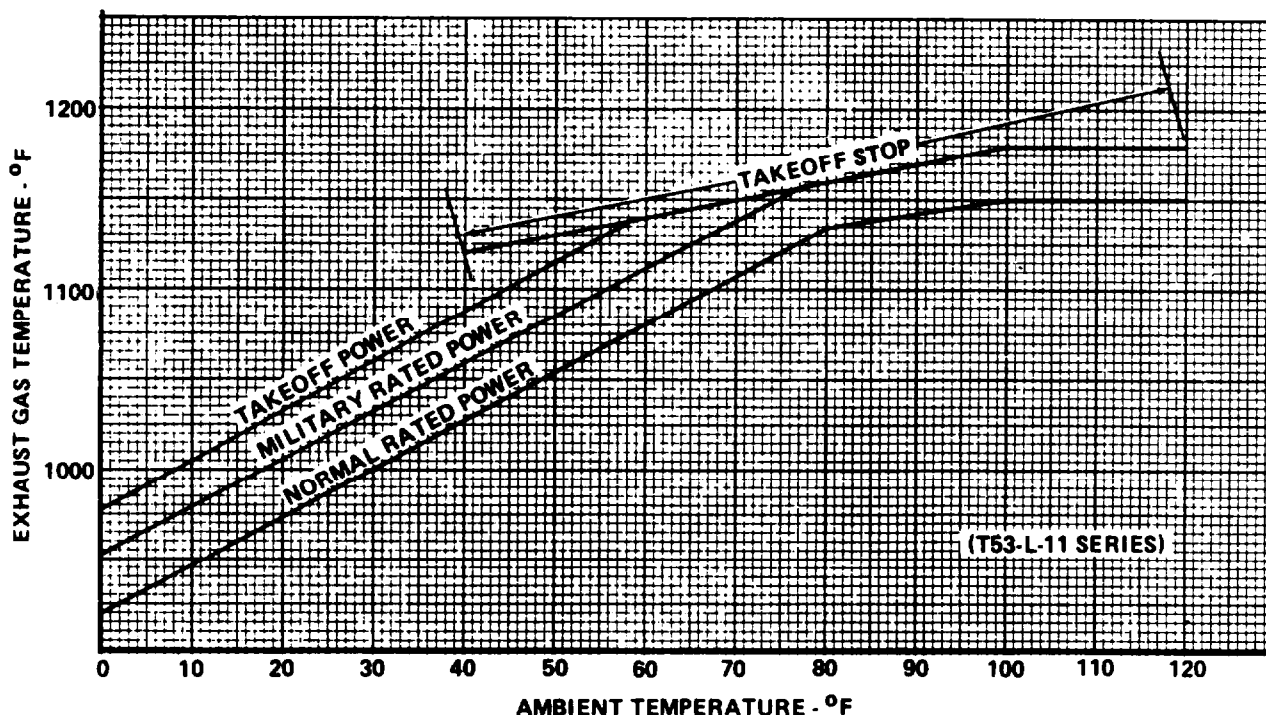
LOCATION/ITEM	REMARKS	ACTION
		<p>i. <b>Repeat</b> waveoffs as outlined in preceding steps.</p> <p>j. <b>Remove</b> and <b>replace</b> fuel control if bleed band operation is unsatisfactory and if waveoffs cannot be accomplished without surge with 20 +0.5 inch or -0.5 inch (508.0 mm + 1.27 mm or .1.27 mm) H<sub>2</sub>O applied to P-1 bellows.</p> <p>k. If replacement of the fuel control fails to correct the surge <b>reject</b> engine.</p> <p>l. <b>Shut down</b> engine.</p> <p>m. <b>Disconnect</b> P-1 pressure.</p> <p>n. <b>Connect</b> fuel control ram air tube to inlet housing.</p>
20. Engine	Parameters must be within limits at all required points.	<b>Evaluate.</b>
<b>NOTE</b>		
Rate engine according to actions for items 21 thru 23.		
21. Engine	Test log entries must be complete if engine is to be rated. The following figures illustrate correction factor for determining standard day N1 speed for T53-L-11 series engines and T53-L13B/703 engine respectively.	<p>Determine standard day N1 speed as follows:</p> <p>a. If maximum N1 speed was set without using cold weather stop, multiply by compensating factor (given in figures) at test ambient temperature.</p>

1-115. Test Schedules and Procedures using Mobile Trailer Assembly (AVIM) - Continued



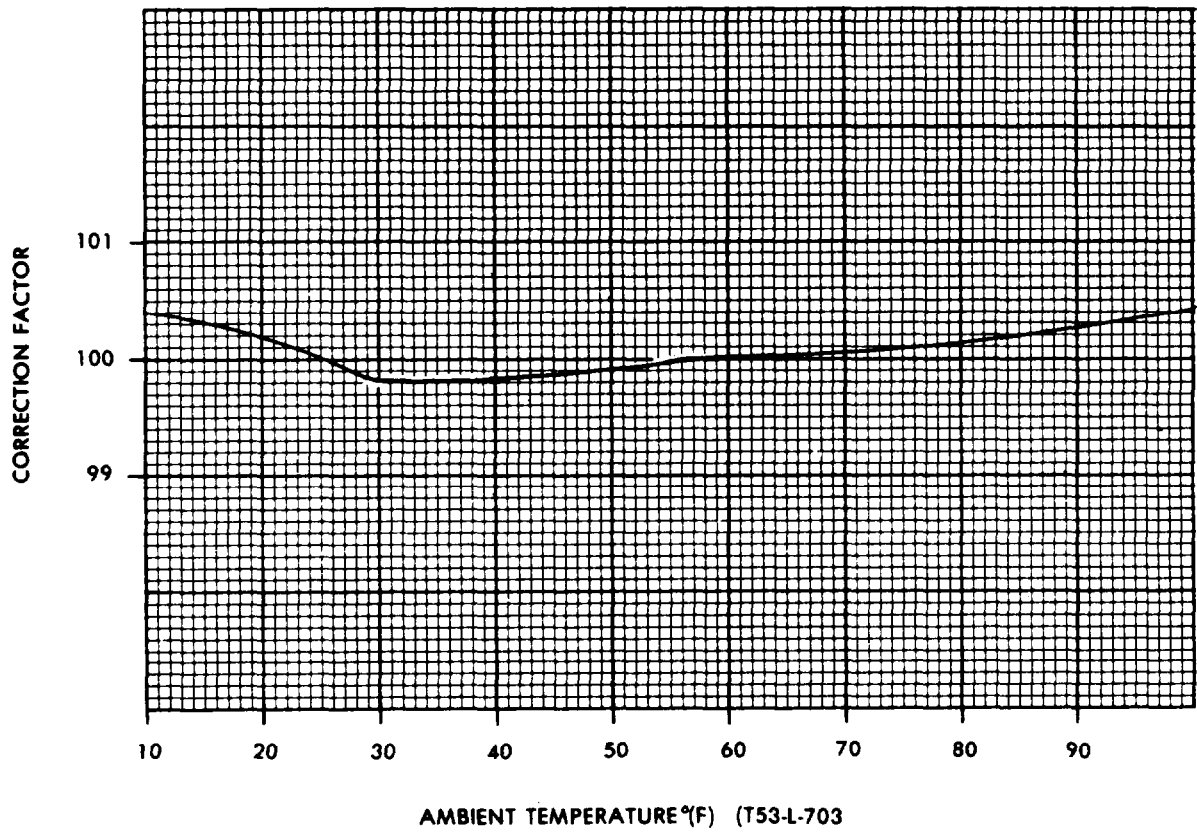
1-115. Test Schedules and Procedures Using Mobile Trailer Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
22. Engine	The following figures illustrate maximum allowable exhaust gas temperature versus ambient temperature for T53-L-11 series engines and T53-L-13B/703 engine respectively.	<p>b. if maximum N1 speed was set using cold weather stop, multiply the N1 speed recorded in preceding step 12.i. by compensating factor (given in figures) at test ambient temperatures.</p> <p><b>Determine</b> standard day exhaust gas temperature as follows:</p> <p>a. <b>Subtract</b> maximum power EGT recorded during test from the maximum allowable EGT per figures at test ambient.</p> <p>b. <b>Subtract</b> this difference from the maximum allowable per figures at 59°F(15°C).</p>



1-115. Test Schedules and Procedures using Mobile Trailer Assembly (AVIM) - Continued

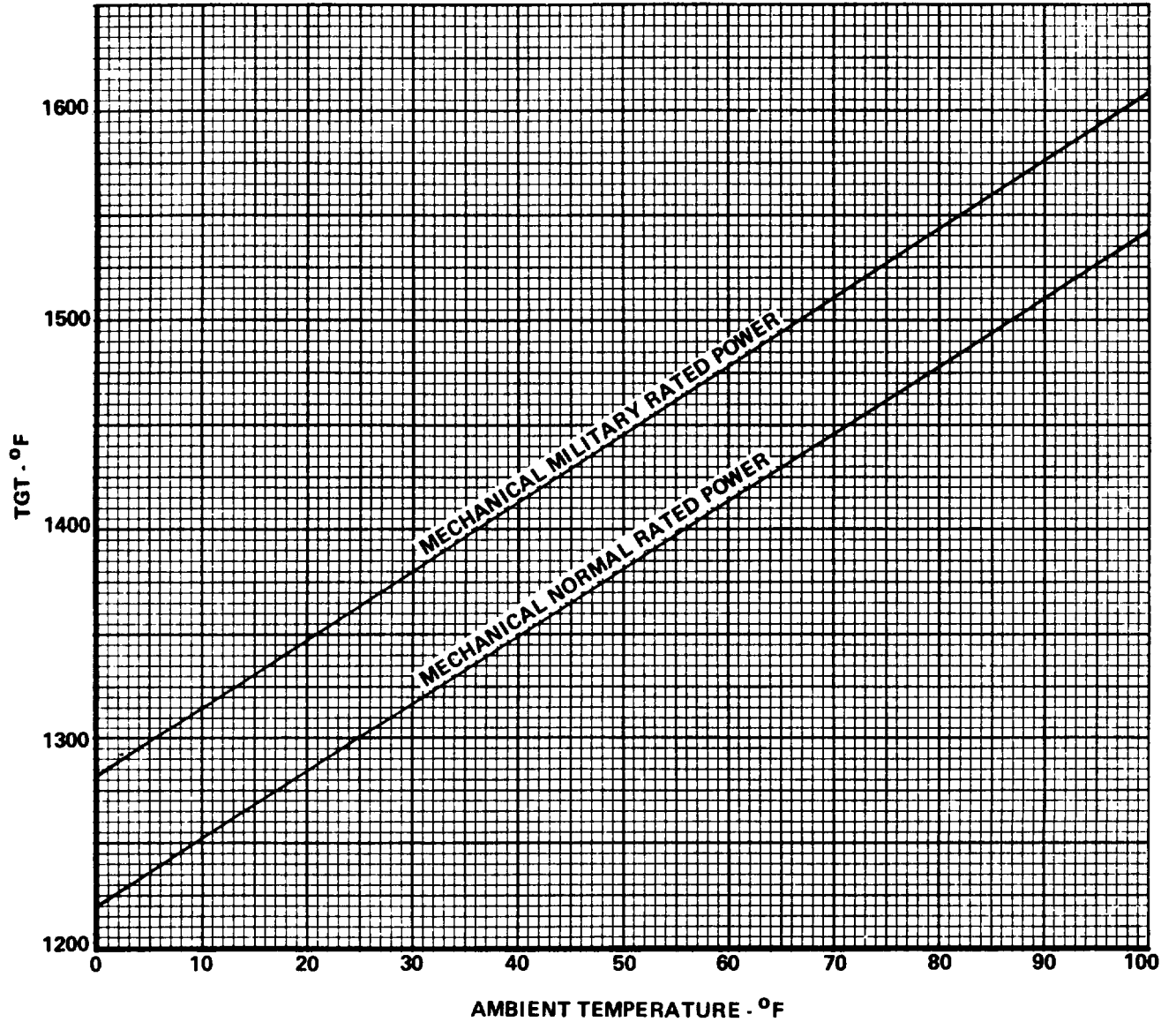
LOCATION/ITEM	REMARKS	ACTION
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1-115. Test Schedules and Procedures (AVIM) - Continued

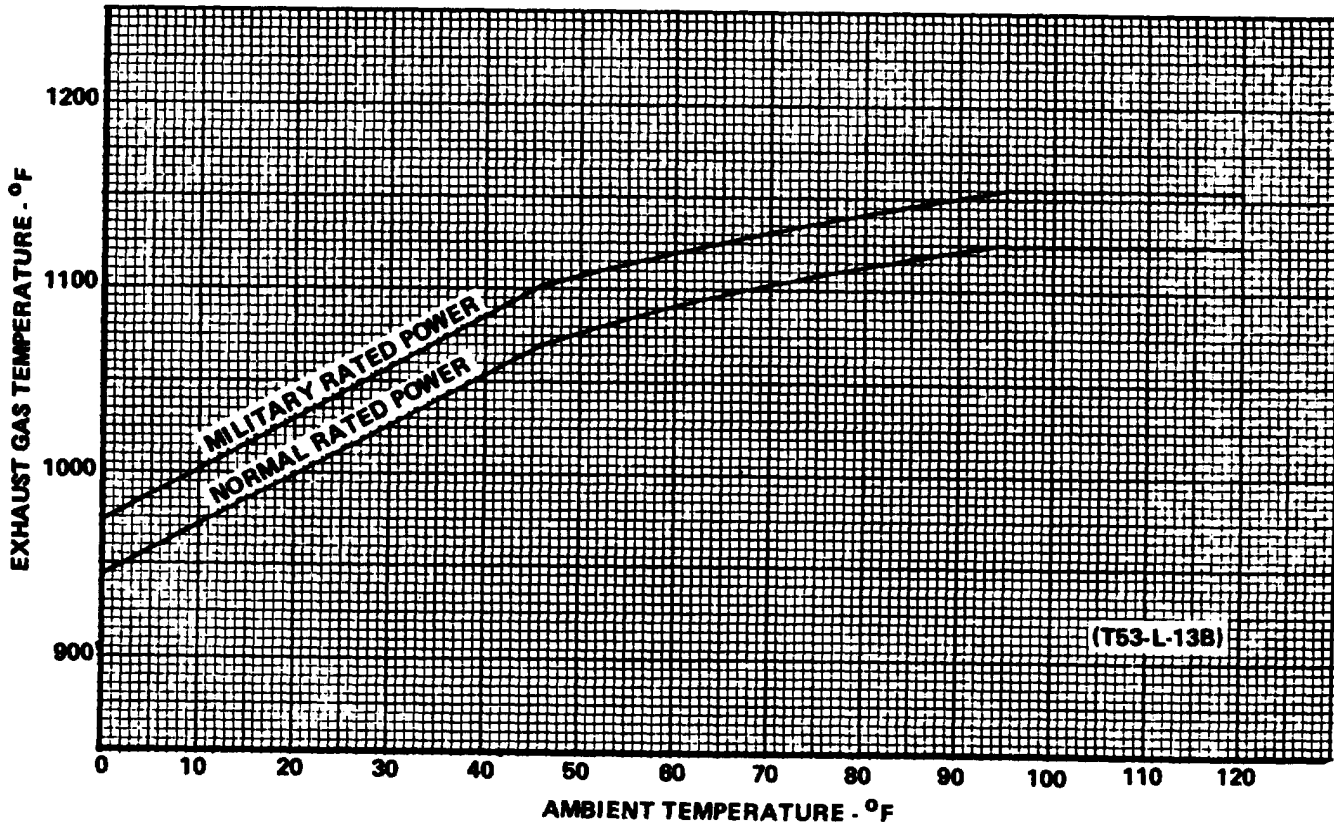
LOCATION/ITEM	REMARKS	ACTION
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Maximum Allowable TGT Versus Ambient Temperature (T53-L-703 Engine)

1-115. Test Schedules and Procedures (AVIM)- Continued

LOCATION/ITEM	REMARKS	ACTION
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29. Engine

Refer to table 1-13 in paragraph 1-112 and corresponding figures. If data determined in preceding actions for items 21 and 22, differs from present data plate data, stamp new.

**Determine** torque-meter psi at 875 pound-feet (10,500 pound-inches) (121.0 kg/m) for T53-L-11 series engines,  
**Determine** torque-meter psi at 1,125 pound-feet (13,500 pound-inches) (195.5 kg/m) for T53-L-13B/703 engine.  
**Extend** torque-meter plot average line to the above pound feet values if required. On T53-L-13/703 series engines, determine torque in psi for a standard day as follows:

1-115. Tut Schedules and Procedures (AVIM) - Continued

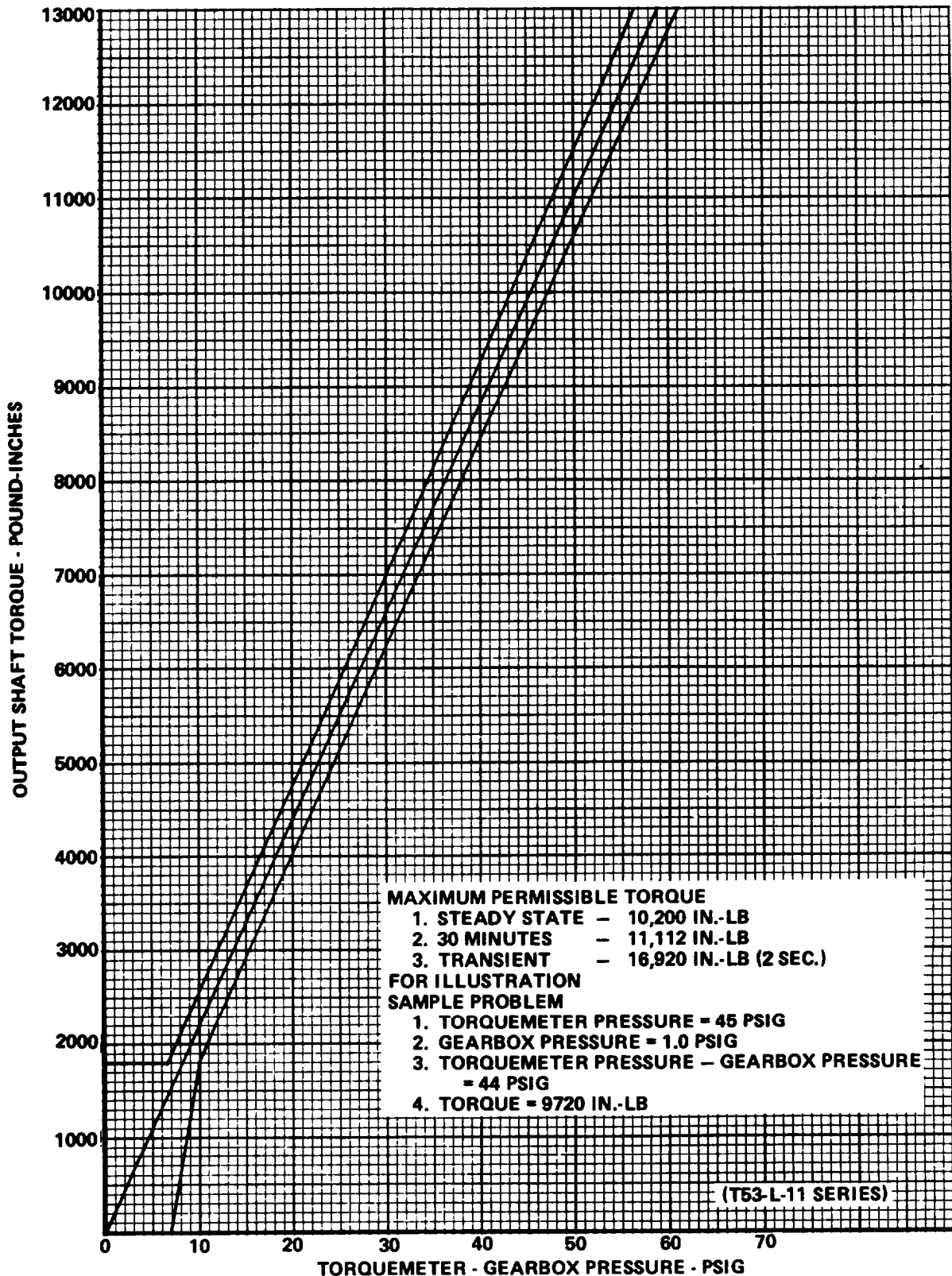
LOCATION/ITEM	REMARKS	ACTION
		a. Determine torque is psi at Military rated power (from test log) and subtract gearbox pressure.
		b. Multiply result obtained in step (1) by 13,500 and divide by torque in pound-inches at Military rated power (from test log).





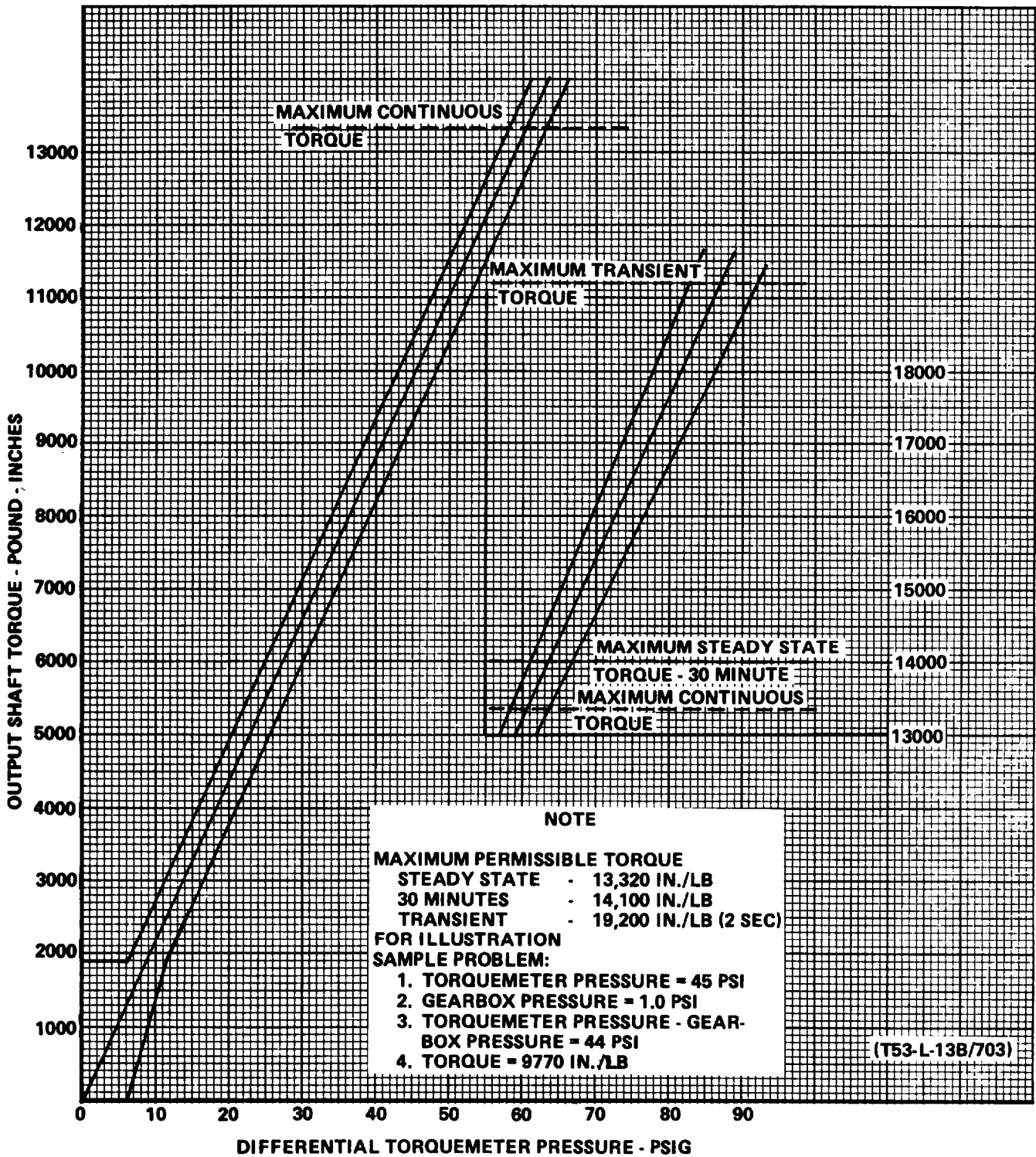
1-115. Test Schedules and Procedures (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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1-115. Test Schedules and Procedures (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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1-115. Test Schedules and Procedures Using Mobile Trailer Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
24. Engine	Engine may be preserved before removing from test stand	<p>Preserve as follows:</p> <p>a. Remove engine from test stand and remove test instrumentation and accessories.</p> <p>b. Check starter cavity for foreign matter and lubricate splines (plastic lube. Appendix D. item 67).</p> <p>c. Install engine in shipping container. Preserve engine. Refer to paragraph 1-39, Chapter 1.</p>

**1.116. Health Indicator Test (HIT).** The HIT is the method by which the aviator, in day-to-day flying, monitors the aircraft engine condition. This is accomplished by the aviator selecting an N1 setting, predicating upon an existing OAT, From the HIT log. The EGT/TGT indicated at that N1 setting must then related to a predicated value (baseline temperature value) within a certain tolerance. EGT/TGT variations from baseline values are logged by the aviator on the appropriate HIT log. This log is then used by maintenance personnel as an aid in monitoring engine performance/health.

**CAUTION**

Reading less than the established baseline (minus indications) may be an indication of inaccuracies in the EGT/TGT, N1, or OAT indicating system and should be investigated and corrected since such readings may indicate within limit operation during operation outside normal limits. (For example, a HIT indication of -15 degrees would mean that the indicating system may be indicating a lower value than is actually present. if the engine is operated at or near an N1 or EGT/TGT limit, it may well be operating above/beyond that limit due to indicating system error) On the other hand, readings greater than the established baseline (plus indications) are an indication of possible engine degradation, bleed air problems, or indicating system error and should be appropriately investigated.

### 1-116. Health Indicator Test (HIT) - Continued

When a difference between a recorded EGT/TGT and baseline EGT/TGT is + or - 20 degrees C, the aviator will make an entry on DA Form 2408-13 to notify the Maintenance Officer, and should not immediately ground the aircraft. HIT checks which yield indications from 20 to 29 degrees C require Diagnosis, Troubleshooting, and corrective actions to be taken AFTER the completion of the mission day, and then it should be restricted for further use of that aircraft for any mission/training operations. A difference of + or - 30 degrees C or greater is cause for grounding the aircraft. These conditions must be investigated and corrected before possible catastrophic degradation occurs. A new baseline standard HIT is required upon initial installation of a new or overhauled engine into an aircraft, or when any maintenance has been performed that affects the fuel flow, air flow, or gas path of that engine. A HIT baseline shall only be established in conjunction with a valid baseline TEAC, performed in accordance with paragraph 1-116. Under no circumstances will a new baseline HIT be established without first completing baseline TEAC requirements to include topping, if possible, which will verify proper engine operation/health. When a baseline TEAC is deferred due to low ambient temperatures, a temporary baseline HIT should be established to monitor engine performance until baseline TEAC requirements can be completed.

#### NOTE

In cold climates or during periods of low ambient temperature operation, the topping portion of the baseline TAC may not be possible. When the T53-L-70 engine is utilized, and baseline values are predicated upon existing new installation conditions, the only information available to the pilot/maintenance officer that may indicate degraded engine performance will be the HIT check information obtained during daily HIT checks.

**1-116. Health Indicator Test (HIT) Continued**

a. Establish the HIT baseline EGT (TGT) values as follows:

- (1) Perform normal engine run-up and cockpit procedures in accordance with applicable -10 manuals.

**NOTE**

The HIT baseline EGT (TGT) data should not be established until the compressor has been cleaned, inspected for FOD and air leaks and Jet Cal/Inspection of EGT (TGT) system has been accomplished. This baseline procedure should follow the completion of all other pretakeoff procedures to ensure stabilized instruments and a warmed engine. At very low ambient temperatures when the specified N1 speed will not maintain N2 speed at 6000 RPM, the HIT check may be waived.

- (2) If temperature is -22°F (-30°C) or higher, maintain N2 at 6600 RPM. If temperature is below -22°F (-30°C), maintain N2 at 6000 RPM.

- (3) Turn off all bleed air.

- (4) Turn aircraft into the wind, with rotor turning, read the free air temperature from cockpit to OAT gage.

(5) Utilizing a blank HIT baseline EGT (TGT) worksheet (figures 1-62, 1-64 or 1-66, as applicable), locate OAT in first column nearest to the free air temperature reading on the cockpit OAT gage. Circle this OAT. If OAT falls between two temperatures on the OAT gage or on the worksheet, use the higher reading.

- (6) Set N1% at the value indicated in column 2 opposite this OAT. Allow EGT (TGT) to stabilize.

- (7) Read EGT (TGT) from indicator. Record EGT (TGT) beside the circled OAT.

- (8) Repeat steps (2) thru (7) two additional times. Average the three EGT (TGT) values.

(9) Apply the EGTA (TGTA) correction factor in column 3 adjacent to the circled OAT to the average indicated EGT (TGT) from step (8) and record the result in the open space in column 4 headed EGT (TGT).

- (10) Apply the EGTB (TGTB) correction factor in column 5 to the value in column 4. Record results for each of the OAT/NI combinations in column 8.

(11) Enter baseline information in the respective columns of the HIT EGT (TGT) Log (figures 1-63, 1-65 or 1-67, as applicable).

b. The HIT EGT (TGT) log should be placed in the logbook. The HIT Baseline EGT (TGT) worksheet should be retained until new baseline EGT (TGT) data is established.

c. Information recorded on a completed aircraft EGT (TGT) Trend Log (HIT), should be plotted on the Engine Performance Trend Log, refer to figure 1-68. The Engine Performance Trend Log aids in monitoring performance trends and in troubleshooting. After this information has been plotted and a new EGT (TGT) HIT Log has been placed in the Aircraft Logbook, the old HIT Log will be mailed to Corpus Christi Army Depot, AMN: AMSAT-I-MED, STOP 55, Corpus Christi, TX 78419-5260.

- d. Establish in-flight health indicator test (HIT).

**NOTE**

The in-flight baseline is affected by engine inlet condition (i.e. particle separator). Therefore a new baseline is required when the configuration of the engine inlet is changed in-addition to anytime the ground HIT baseline is re-established.

- (1) Fly straight and level, out of ground effect at 6600 N2 RPM.

- (2) Turn off all bleed air.

- (3) Read free air temperature (FAT).

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**T.O. 2J-T53-16**

- (4) Enter OAT line at FAT value or nearest greater value.
- (5) Set NI at value indicated in N1% line. (collective may be required to be lowered to set NI).
- (6) Read EGT/TGT from indicator.

(7) Apply the EGTA/TGTA correction factor in column 3 adjacent to the OAT indicated by the EGT/TGT value from step 6, record result in open space in column 4.

(8) Apply the obtained EGTA/TGTA correction factor in column 5 to the value in column 4. Record results for each of the OAT/N1 combinations in column 8.

(9) Enter baseline information in the respective columns of the HIT LOG (figure 1-62, 1-64 or 1-66 as applicable).

(10) Enter aircraft or engine hours and verbage "in-flight baseline" in columns 8 at bottom of HIT LOG.

- e. Perform in-flight Health Indicator Test (HIT).

**NOTE**

If adverse environmental conditions exist, (i.e. blowing snow, dust, sand) an inflight Health Indicator Test (HIT) can be performed in lieu of a ground hit. If any engine maintenance has been performed since the last return flight a ground hit check is mandatory prior to next flight.

- (1) Fly straight and level, out of ground effect, at 6600 N2 RPM.
- (2) Turn off all bleed air.
- (3) Read free air temperature (FAT).
- (4) Enter OAT line at FAT value or nearest greater value.
- (5) Set NI at value indicated in N1% line (collective may be required to be lowered to set N1).
- (6) Read EGT/TGT from indicator.
- (7) Compare EGT value indicated in line labeled "baseline EGT".
- (8) Record aircraft hours and difference (+/-) between indicated EGT and baseline EGT in EGT trend LOG.
- (9) A +/- reading of 20 degrees celsius requires entry to DA Form 2408-13 to notify maintenance officer.

(10) A +/- reading of 30 degrees celsius or greater will necessitate system status of red "X" in DA Form 2408-13 and immediate aircraft grounding until troubleshooting determines the cause(s) of the EGT/TGT change.

**NOTE**

UH-IB/C/D, aircraft use HIT/EGT worksheet and LOG in figures 1-62 and 1-63. For UH1H/M, AH-IG and TH-1G aircraft, use worksheet and LOG located in figures 1-64 and 1-65. AH-1S use HIT EGT worksheet and LOG in figures 1-66 and 1-67.















**INSTRUCTIONS TO MAINTENANCE OFFICER:**

1. FACE AIRCRAFT INTO WIND AND TURN OFF ALL BLEED AIR.
2. WITH ROTOR TURNING READ FREE AIR TEMPERATURE FROM COCKPIT GAGE.
3. ENTER LINE 1 AT OAT NEAREST FREE AIR TEMPERATURE. (SEE PARAGRAPH 1-116.a.(5).)
4. SET N1% AT VALUE INDICATED IN LINE 2.
5. MAINTAIN N2 AT 8600 RPM AND STABILIZE INSTRUMENTS.
6. READ TGT FROM INDICATOR.
7. APPLY  $\Delta$  TGT<sub>A</sub> CORRECTION FACTOR IN LINE 3 TO INDICATED TGT AND RECORD RESULT IN OPEN SPACE IN LINE 4.
8. APPLY  $\Delta$  TGT<sub>B</sub> CORRECTION FACTORS IN LINE 5 TO TGT IN LINE 4 AND RECORD RESULTS IN LINE 6 FOR CORRESPONDING COLUMNS.
9. ENTER BASELINE INFORMATION IN THE RESPECTIVE COLUMNS OF THE TGT HIT LOG.
10. ENTER AIRCRAFT OR ENGINE HOURS AND WORD "BASELINE" IN LOG SECTION AT BOTTOM OF ENGINE HIT LOG.

AIRCRAFT S/N \_\_\_\_\_  
 ENGINE S/N \_\_\_\_\_  
 AIRCRAFT HRS \_\_\_\_\_  
 ENGINE HRS \_\_\_\_\_

OAT °C	N1%	$\Delta$ TGT <sub>A</sub>	TGT/0	$\Delta$ TGT <sub>B</sub>
-40	77.4	+225		-225
-36	77.5	+229		-229
-32	78.1	+223		-223
-28	78.5	+216		-216
-24	78.8	+210		-210
-20	79.2	+204		-204
-16	79.6	+198		-198
-12	79.9	+191		-191
-8	80.2	+185		-185
-4	80.6	+178		-178
0	81.0	+172		-172
4	81.3	+166		-166
8	81.6	+160		-160
12	82.0	+154		-154
16	82.3	+147		-147
20	82.7	+141		-141
24	83.0	+135		-135
28	83.3	+129		-129
32	83.7	+122		-122
36	84.0	+116		-116
40	84.4	+110		-110
44	84.6	+104		-104
48	85.0	+97		-97
52	85.4	+91		-91
56	85.7	+85		-85
60	86.0	+78		-78
64	86.3	+72		-72
68	86.7	+66		-66
72	87.0	+60		-60
76	87.3	+53		-53
80	87.6	+47		-47
84	87.9	+41		-41
88	88.3	+35		-35
92	88.6	+28		-28
96	88.9	+22		-22
100	89.2	+16		-16
104	89.5	+9		-9
108	89.8	+3		-3
112				
116				
120				
124				
128				
132				
136				
140				
144				
148				
152				
156				
160				
164				
168				
172				
176				
180				
184				
188				
192				
196				
200				

OAT °C	N1%	Baseline TGT
-40	77.4	
-36	77.5	
-32	78.1	
-28	78.5	
-24	78.8	
-20	79.2	
-16	79.6	
-12	79.9	
-8	80.2	
-4	80.6	
0	81.0	
4	81.3	
8	81.6	
12	82.0	
16	82.3	
20	82.7	
24	83.0	
28	83.3	
32	83.7	
36	84.0	
40	84.4	
44	84.6	
48	85.0	
52	85.4	
56	85.7	
60	86.0	
64	86.3	
68	86.7	
72	87.0	
76	87.3	
80	87.6	
84	87.9	
88	88.3	
92	88.6	
96	88.9	
100	89.2	
104	89.5	
108	89.8	
112		
116		
120		
124		
128		
132		
136		
140		
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192		
196		
200		

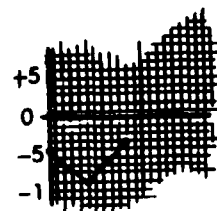


PLOT TEMPERATURE DIFFERENCE FOR EACH HIT  
ON AIRCRAFT EGT (TGT) TREND LOG i. e.  
COMPLETED HIT SHEET FROM AIRCRAFT LOGBOOK

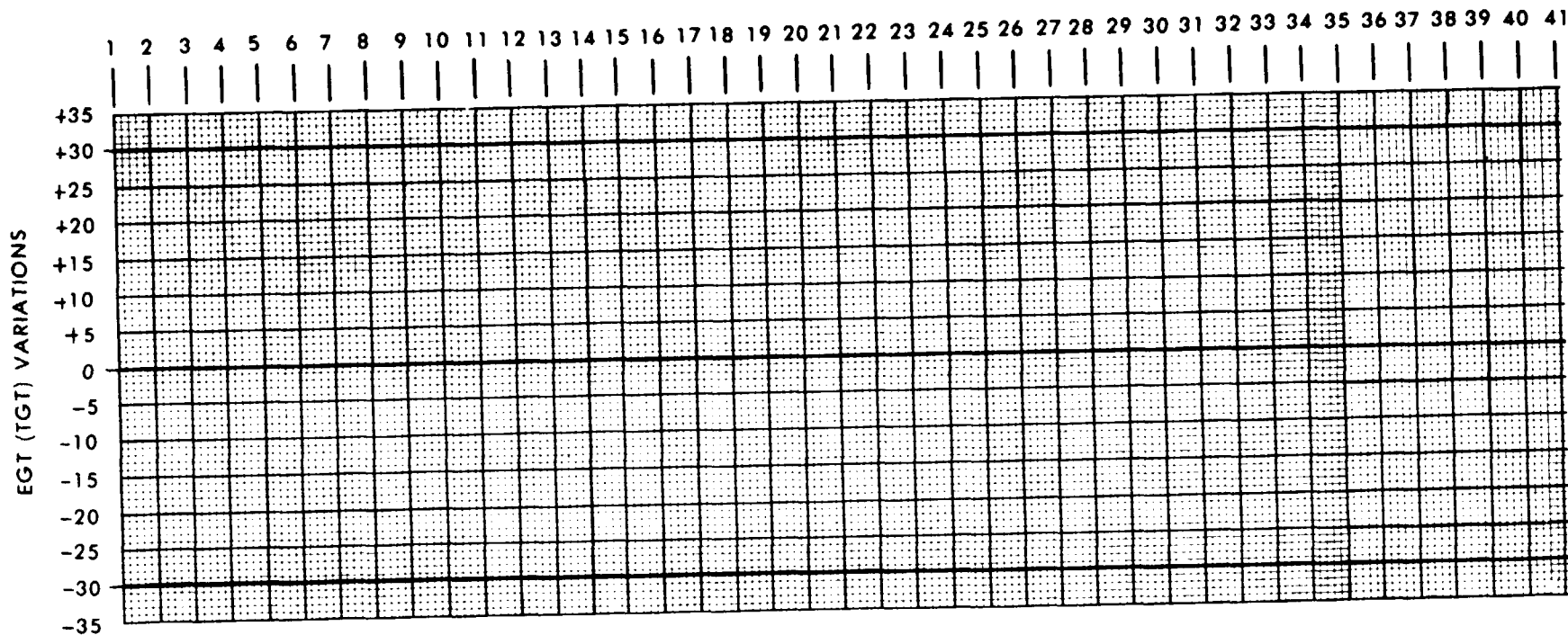
AIRCRAFT S/N \_\_\_\_\_

ENGINES S/N \_\_\_\_\_

EXAMPLE: FIRST HIT -4°  
SECOND HIT -8°  
THIRD HIT -3°



HITS FROM AIRCRAFT LOGBOOK



Change 4 1-300.1/(1-300.2 blank)

Figure 1-68. T-53 Series Engine Performance Trend Log







1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim Adjustments (Continued).

INITIAL SETUP:	Applicable Configuration All	<b>References</b> TM 55-1520-244-MTF TM 55-1520-236-MTF TM 55-1520-242-MTF REFER TO THE APPROPRIATE AIRCREW TRAINING MANUAL
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LOCATION/ITEM	REMARKS	ACTION
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**NOTE**

Under certain climatic conditions, the **topping** portion of the TEAC procedure may not be possible. Weather phenomenon, such as low ceilings and visibility, may not allow a climb to appropriate topping altitude. When such conditions exist, the test pilot may elect to verify engine power by climbing to the highest obtainable altitude (Weather permitting) and confirming that **maximum** torque is available **without exceeding any engine limits**. Maximum torque will be determined from the appropriate -10 operators manual based on existing or predicted Pressure Altitude and Temperature for that flight period (Max Torque Available (Indicated) from the PPC). The engine **must provide** at least maximum torque **without N<sub>2</sub> bleed or exceeding any engine limits**. Completion of this check will be entered on the reverse side of the DA Form 2406-19-1. For example, "Unable to reach topping altitude (WX); (6000 ft. PA, -2 degrees C, 100% torque, 100.2% N<sub>1</sub>, 840 degrees TGT, date and sign the entry. If this performance check is complied with and the engine produces appropriate power, units are authorized to utilize the aircraft for normal mission flights until climatic condition improve with respect to TEAC completion (Topping). This procedure will not be considered as authority to defer TEAC completion but rather an interim check pending TEAC completion. Further, the TEAC DUE entry on the DA Form 2408-13 shall remain active until actual TEAC completion. The Maintenance Officer will make sure that the completion of TEAC procedure is accomplished at the earliest possible date. Aircraft will be allowed on deferred status for no more than 50 hours. After 50 hours aircraft will be attempted to be topped again for minimum/maximum power available.

Page 1-302.1 and 1-302.2 are deleted.

1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim Adjustments - Continued

LOCATION ITEM	REMARKS	ACTION
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**NOTE**

**T53-L-703**

The T53-L-703 Power Chart (page 1-312) provides engine performance data for conditions up to and including 11,000 feet of pressure altitude and +5 degree C. inlet air temperature (F.A.T. +3 degreesC). If topping does not occur prior to reaching maximum chart altitude and FAT at that altitude is less than +5 degrees C., topping may have to be deferred until atmospheric conditions become better suited for completion of the topping procedure. At a minimum, the engine must produce required torque (from the power chart, P. 1-312, based on pressure altitude and inlet temperature) before it can be released for normal mission flight. (If required torque cannot be achieved prior to reaching an N1 or TGT limit, additional troubleshooting is required). An appropriate entry will be made (IAW DA Pam 738-751) to the DA Form 2408-29-1 (Overprint) indicating the results of the attempted topping. For example, 'Engine would not Top', 11,000 ft PA, - 8 degreesC, 99% Torque, 102.7% N1, 870 TGT, date and sign the entry. The topping portion of TEAC may now be deferred until atmospheric conditions become better suited to engine topping. The Maintenance Officer will ensure that this deferral is not used as a means of deleting the topping requirement but rather a maintenance management tool which may be used to minimize aircraft down time as a result of unfavorable atmospheric conditions. The TEAC DUE entry on the DA Form 2408-13 shall remain active until actual TEAC completion.

**NOTE**

**T53-L-13B**

The T53-L-13B Power Chart (page 1-311) provides engine performance data for conditions up to and including 10,000 feet of pressure altitude and -15 degrees C. Inlet air temperature (F.A.T. +3 degrees). If topping does not occur prior to reaching maximum chart altitude and F.A.T. at that altitude is less than -15 degrees C., topping may have to be deferred until atmospheric conditions become better suited for completion of the topping procedure. At a minimum the engine must produce required torque (from the power chart, P. 1-311, based on pressure altitude and inlet temperature) before it can be released for normal mission flight. (If required torque cannot be achieved prior to reaching an N1 or EGT limit, additional troubleshooting is required). An appropriate entry will be made (IAW DA Pam 738-751) to the DA Form 2408-19-1 (Overprint) indicating the results of the attempted topping. For example, 'Engine would not Top', 10,000 ft. PA, -18 degrees c., 50 PSI Torque, 101.0% N1, 570 EGT date and sign the entry. The topping portion of TEAC may now be deferred until atmospheric conditions become better suited to engine topping. The Maintenance officer will ensure that this deferral is not used as a means of deleting the topping requirement but rather a maintenance management tool which may be used to minimize aircraft down time as a result of atmospheric conditions. The TEAC DUE entry on the DA Form 2408-13 shall remain active until actual TEAC completion.

**NOTE**

If a Baseline TEAC is deferred and it has been more than 12.5 hours since the Pre-Checks for Baseline were last accomplished, repeat Pre Checks again for TEAC prior to performing the Baseline TEAC procedures.

1-117. Turbine Engine Analysis Check (TEAC) - Rechecks - and Fuel Control Trim Adjustments - Continued

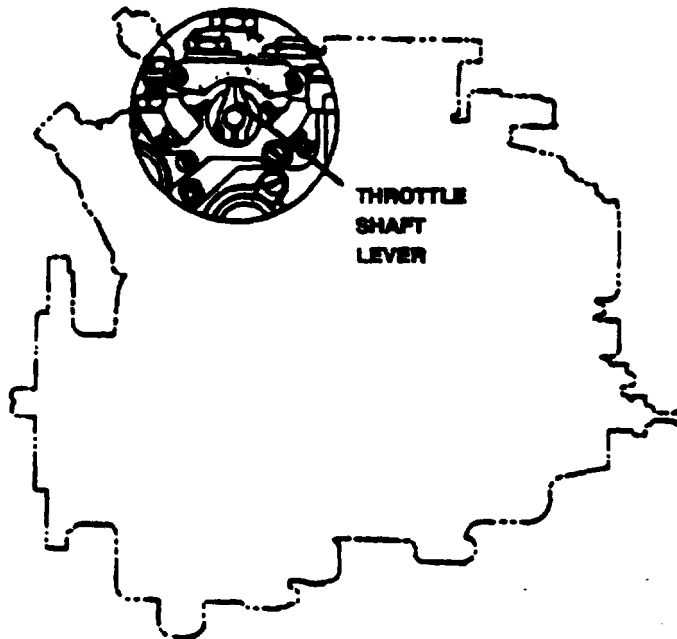
LOCATION/ITEM	REMARKS	ACTION
1. Engine Inlet. Compressor. Particle Separator. Aircraft Inlet Screens	Refer to paragraph 2-2 and applicable airframe manual.	Inspect for restrictions and cleanliness. Remove any restrictions and clean the compressor if necessary.

**WARNING**

In following step 2. do not reposition throttle shaft lever to acquire travel through full arc (Stop to Stop). If lever does not contact both stops, refer to applicable airframe manual for basic rigging.

2. Throttle Shaft Lever

Insure that throttle shaft lever on fuel control is hitting both stop and has freedom of travel through full arc.



3. Cockpit Free Air Temperature Gage (FAT)	Refer to applicable airframe manual	Check FAT gage for accuracy.
4. Exhaust Gas Temperature or Turbine Gas Temperature (TGT)	Refer to paragraph 1-75.	Check system for accuracy utilizing Jetcal Analyzer.
5. N1 System	Refer to TM 55-4920-401-13&P.	Check N1 indicator for accuracy utilizing Jetcal Analyzer.

1-117. Turbine Engine Analysis Check (TEAC) - Rechecks - and Fuel Control Trim Adjustments - Continued

LOCATION/ITEM	REMARKS	ACTION
6. Torquemeter System	Use Troubleshoot Procedure No. 22.	<b>Check</b> torquemeter system accessory gearbox pressure lines and torquemeter boost pump output pressure for accuracy.
7. Variable Inlet Guide Vane System (VIGV)	Refer to paragraph 2-11,	<b>Perform</b> static and operational check of VIGV system.
8. Bleed Band	Refer to paragraph 2-62.	<b>Perform</b> bleed band closure check.
9. Engine Data Plate	Data plates should be stamped with a ft-lb torque value of 1125 ft-lb (115.5 kg/m) torque value for 153-L-13B/703 engine.	<b>Record</b> torque pressure (psi) taken from engine data plate (DPT).
<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div>		
<p><b>Do not exceed maximum N1 torque, or EGT/TGT limits.</b></p>		
10. Aircraft	Refer to the appropriate Aircrew Training Manual.	<b>Perform</b> topping check in accordance with the appropriate Aircrew Training Manual.
11. Evaluation of TEAC Data Recorded in Flight	<p style="text-align: center;"><b>NOTE</b></p> <p>If N1 increases as N2 droops from 6600 (100%) to 6400 (97%) or from 6400 (97%) to 6200 (94%) RPM, the droop cam is probably worn or out of adjustment and the engine is not topping out. If this condition exist, the droop cam must be adjusted or replaced before an accurate topping check can be completed.</p>	<p>a. <b>Enter</b> power adjustment chart at compensated temperature at test flight altitude (FAT +3°C) recorded in flight.</p> <p>b. <b>Go</b> vertically up to test pressure altitude bias line for pressure altitude recorded in flight.</p> <p>c. <b>Proceed</b> horizontally left to data plate torque pressure (PSI) bias line which is closest to data plate torque pressure (Stamped on engine data plate).</p> <p>d. Then proceed downward to determine required torque pressure (PSI) at 6400 N2 RPM or upward to % conversion line, then left to read % of torque required.</p>

1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim Adjustments  
Continued

LOCATION/ITEM	REMARKS	ACTION
11. Evaluation of TEAC Data Recorded in Flight-Continued		<p>e. The torque pressure (PSI) or % recorded in flight must be within 0 to +3 PSI (L-1 3) or 0 to +5% (L-703) of the torque plotted on the chart.</p> <p>f. If the torque pressure is not within limits trim the fuel control as outlined in following steps.</p>

**NOTE**

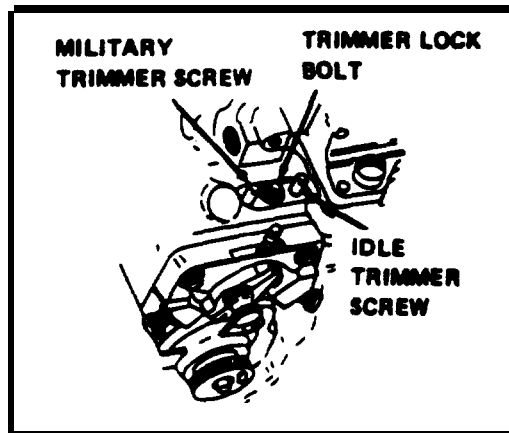
If a normal TEAC was performed and torque pressure is not within limits. **DO NOT TRIM THE FUEL CONTROL.** Refer to TEAC Troubleshooting procedures. correct the cause and perform a new Baseline Standard, if required.

**WARNING**

Adjustments to fuel control may affect safety of flight. only qualified personnel shall be permitted to perform this adjustment.

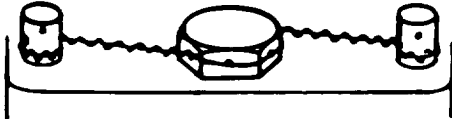
12. Fuel Control Trimmer Lock Bolt

Remove lockwire and loosen trimmer lock bolt.



Fuel Control Adjustments (T53-L-13B/703)

1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim Adjustments - Continued

LOCATION/ITEM	REMARKS	ACTION
13. Fuel Control Military Trimmer Screw	<p><b>NOTE</b></p> <p>Deleted</p>	<p>a. <b>Increase</b> torque pressure (and N1 speed) by turning the trimmer screw counterclockwise or <b>decrease</b> by turning the trimmer screw clockwise.</p>
	<p>Lockwire, Item 41, Appendix D.</p> <p><b>NOTE</b></p> <p>Lockwire trimmer lock bolt pulling in a clockwise direction using trim screws. Trim screws should be saftied in a neutral position since they are adjusted in either direction. You are lockwiring the lockbolt, not the screws, so a positive lockwiring of the bolt is the primary purpose with a secondary purpose of keeping the screws locked in place.</p>	<p>b. <b>Torque</b> trimmer lock bolt 26 to 30 pound-inches. <b>Lockwire</b> trimmer lock bolt and trimmer screws.</p>
		<p>c. <b>Repeat</b> TEAC check and trim adjustments until torque pressure is within limits.</p>
	<p><b>NOTE</b></p> <p>1/8th of a turn of the military trimmer screw is equal to approximately 1% N1 change and 3.5 PSI (6%) torque change.</p>	



1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim  
Adjustments - Continued

LOCATION/ITEM	REMARKS	ACTION
14. Baseline Computations		
N1 Speed	<b>NOTE</b>  Use baseline TEAC column when establishing a baseline TEAC.   Use Normal TEAC column for all other TEAC checks.	Establish installed engine baseline indication as follows and record the results in engine historical records. Refer to DA PAM 738-751.  N1 Speed:  T53-L-13B/703: If the compensated temperature at test altitude (OAT +3°C) is +3°C and above, or -20°C and below, add 0.5% to the N1 speed recorded in flight. This is the new baseline N1 speed for the installed engine.
EGT	<b>NOTE</b>  The TGT indicating system on the L-703 engine is not affected by ambient temperature and requires no correction factor.	
	EGT Adjustment Factors - T53-L-1 3B Engines	
Compensated OAT °C	Normal TEAC °C	Baseline TEAC °C
50	+35	-35
45	+30	-30
40	+25	-25
35	+20	-20
30	+15	-15
25	+10	-10
20	+ 5	- 5
15	0	0
10	- 5	+ 5
5	-10	+10
0	-15	+15
- 5	-20	+20
-10	-25	+25
-15	-30	+30
-20	-35	+35
-25	-40	+40
-30	-45	+45
-35	-50	+50
-40	-55	+55
		EGT: (Refer to Table). <b>Use</b> the OAT listed in in the table nearest the temperature recorded in flight (OAT +3°C to <b>determine</b> the EGT adjustment factor from the baseline TEAC column. <b>Apply</b> this factor to the EGT RECORDED in flight. The result is the baseline EGT for the installed engine. Baseline TGT is that TGT recorded in flight. (No correction required)

1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim  
Adjustments - Continued

LOCATION/ITEM	REMARKS	ACTION
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**NOTE**

After completion of TEAC, record information on DA Form 2408-19-1/2408-19-1E, Engine Historical Record, in accordance with DA Pam 738-751.

15. Normal TEAC Computations

16. Torque Pressure

17. N1 Speed

18. EGT

Refer to line 11.

T53-L-13B/703: If the FAT at test altitude (+3 degrees C) is +30 degrees C and above or -20 degrees C and below, subtract 0.5% from the previous baseline data.

Refer to EGT adjustment table in preceding item 14. Use the OAT listed in the table nearest the temperature recorded in flight (OAT +3°C) to determine the EGT adjustment factor in the normal TEAC column. Apply this factor to the baseline EGT.

**Determine** torque.

**Determine** speed adjustment factor.

**Determine** EGT adjustment factor.



1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim  
Adjustments - Continued

LOCATION/ITEM	REMARKS	ACTION
19. Analysis	<p>Compare the actual performance of the engine with the adjusted data as calculated in remarks for Items 16, 17 and Item 18. The values recorded in flight should agree with the adjusted baseline values within the following tolerances.</p> <p>a. Torque Pressure: 0 to +3 PSI (T53-L-13) 0 to +5% (T53-L-703) tolerance for trimming fuel control).</p> <p>b. N1 Speed: ± 1.0%</p> <p>c. EGT:± 20°C/TGT:± 20°C</p>	Perform analysis.
	<p style="text-align: center;">NOTE</p> <p>Generally, if two of the performance parameters are correct within tolerance, the indicating system of the third is probably faulty. If, however, two parameters are beyond allowable tolerance, engine degradation or malfunctions should be suspected. Table in item 20 Includes possible symptoms and probable cause.</p>	
	<p style="text-align: center;">NOTE</p> <p>Indicating system error (gage error) may be a factor in determining Individual engine performance standards in some circumstances and must be considered prior to accepting or rejecting an engine based on TEAC or HIT data.</p>	

1-117. Turbine Engine Analysis Chock (TEAC) - Prochecks - and Fuel Control Trim Adjustments  
Continued

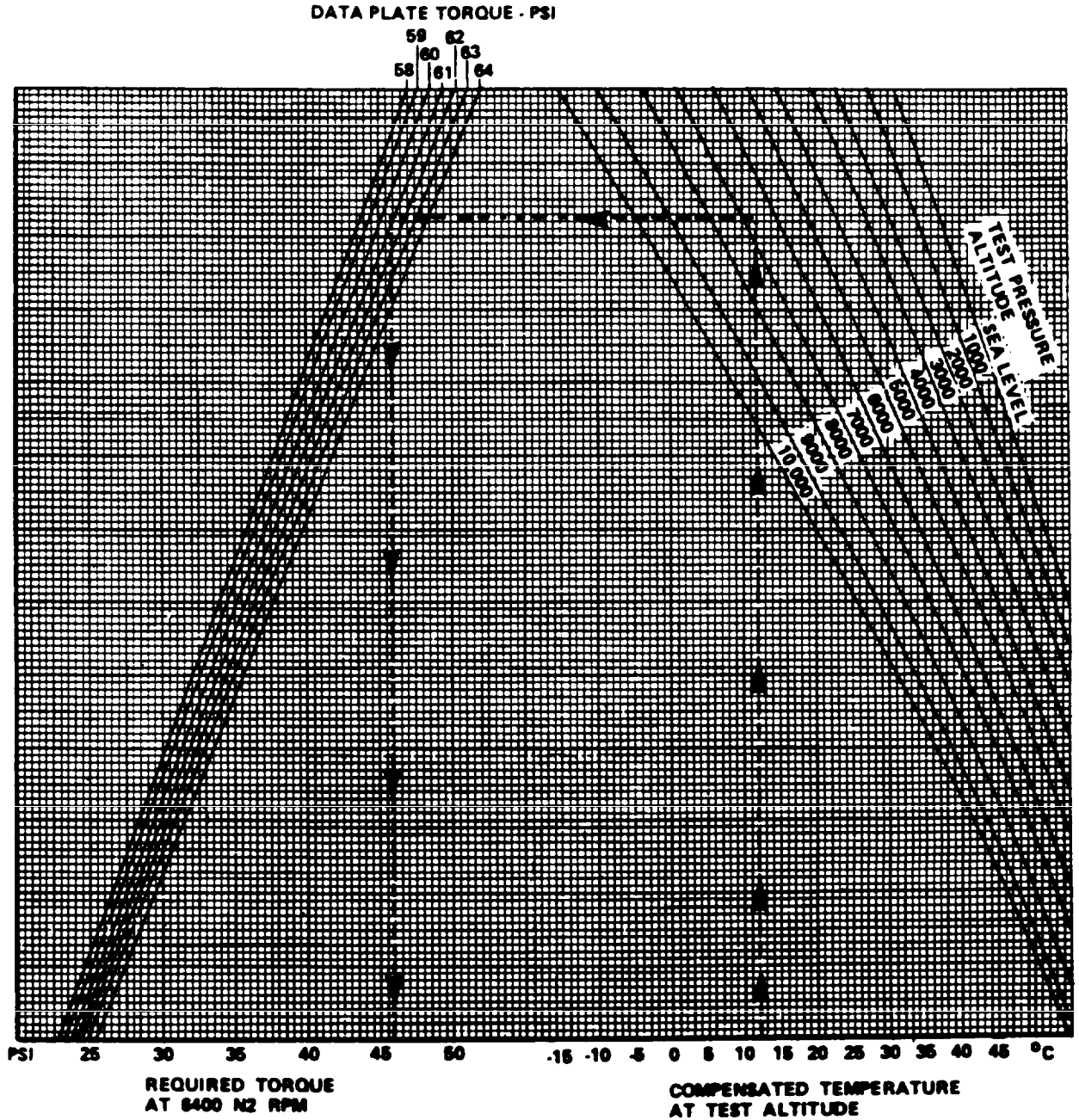
LOCATION/ITEM	REMARKS	ACTION
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20. TEAC Troubleshooting Data

%N1	Torque Pressure PSI	Exhaust Gas Temperature	Probable Cause
Correct (within tolerance)	Low 2 to 3 PSI	High 25 to 45 degees	Dirty inlet and/or compressor Bleed band leaking Leaks in anti-icing or customer air Foreign Object Damage (FOD) Erosion Damaged combustor section
Low	Low	Low	Calculation error Engine not properly topped N1 not rigged properly Fuel control take-off trim adjustment
High	High	High	Calculation error Fuel control take-off trim adjustment
Comet (within tolerance)	High 2 to 3 PSI	High 30 to 50 degrees	N1 system indicating error
Correct (within tolerance)	Low 5 to 8 PSI	High 50 to 80 degrees	Bleed bank stuck open Severe FOD or erosion in compressor Excessively dirty inlet and/or compressor Severe damage in combustion section
Correct (within tolerance)	Low 2 to 3 PSI	High 50 to 80 degrees	Anti-icing valve open Damaged and combustor section EGT indicating system Combustor chamber drain valve open
Correct (within tolerance)	Low	Correct (within tolerance)	Low torque boost pump pressure Torquemeter valve clearance Torquemeter sealing ring broken or damaged VIGV's set at wrong angle when full open (L-13B/703 engines)
High	Low	Low	Inlet guide vane fails to math full open. See paragraph 2-11.

1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim Adjustments.  
Continued

LOCATION/ITEM	REMARKS	ACTION
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T53-L-138

1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim Adjustments - Continued

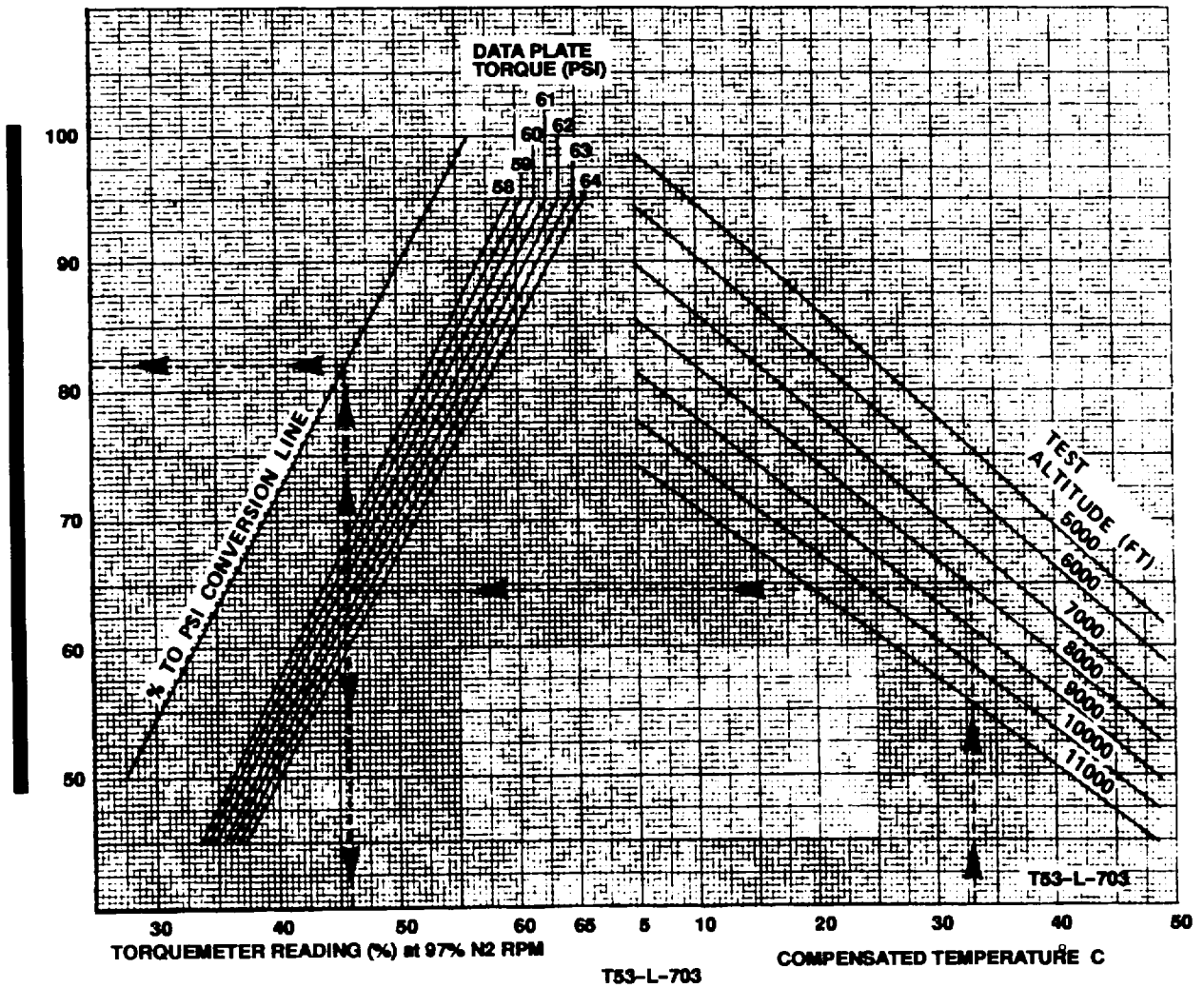
LOCATION/ITEM	REMARKS	ACTION
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NOTE

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NOTE

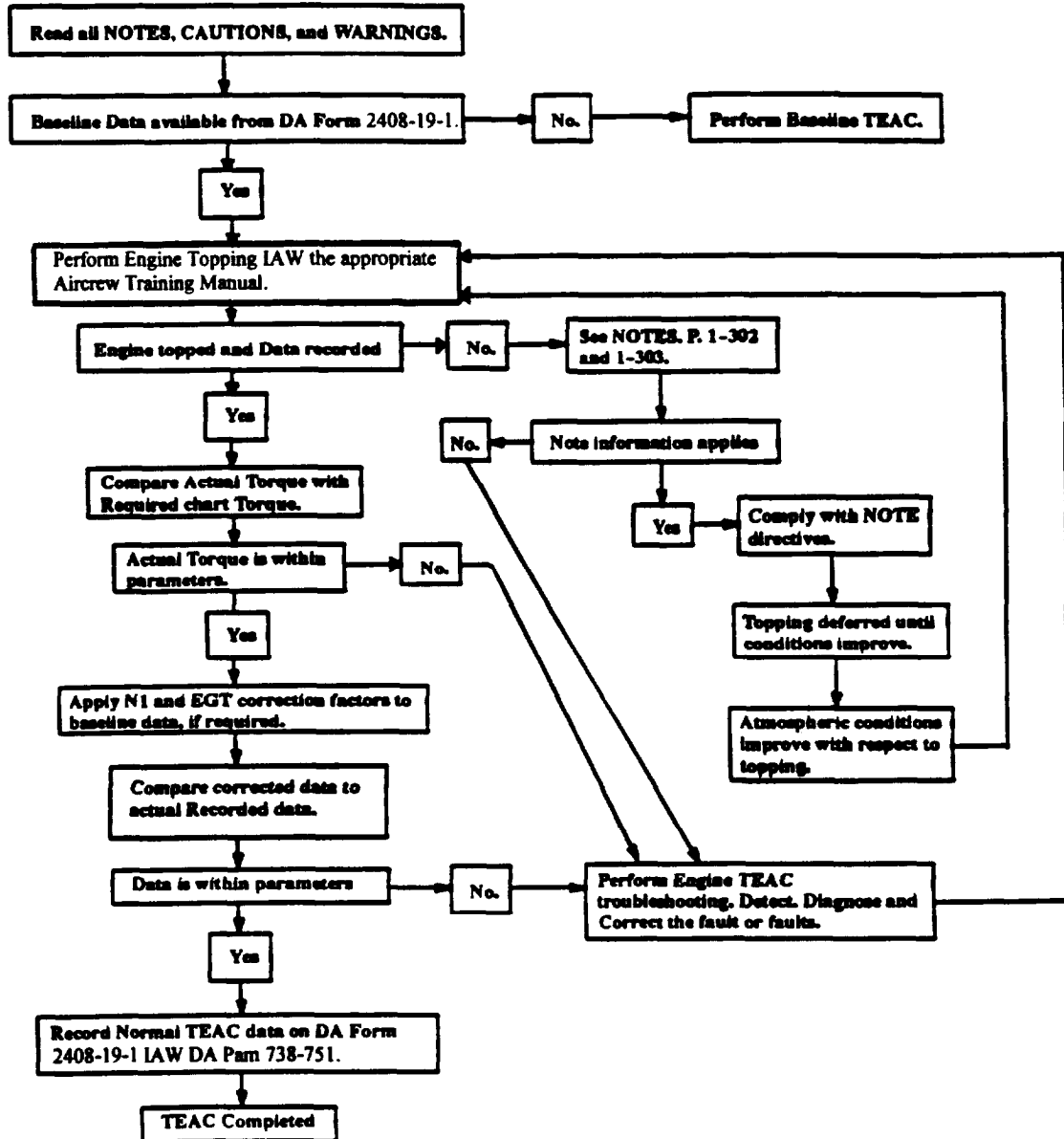
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1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim Adjustments - Continued

LOCATION/ITEM	REMARKS	ACTION
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**TEAC Procedure Chart**  
**NORMAL TEAC**

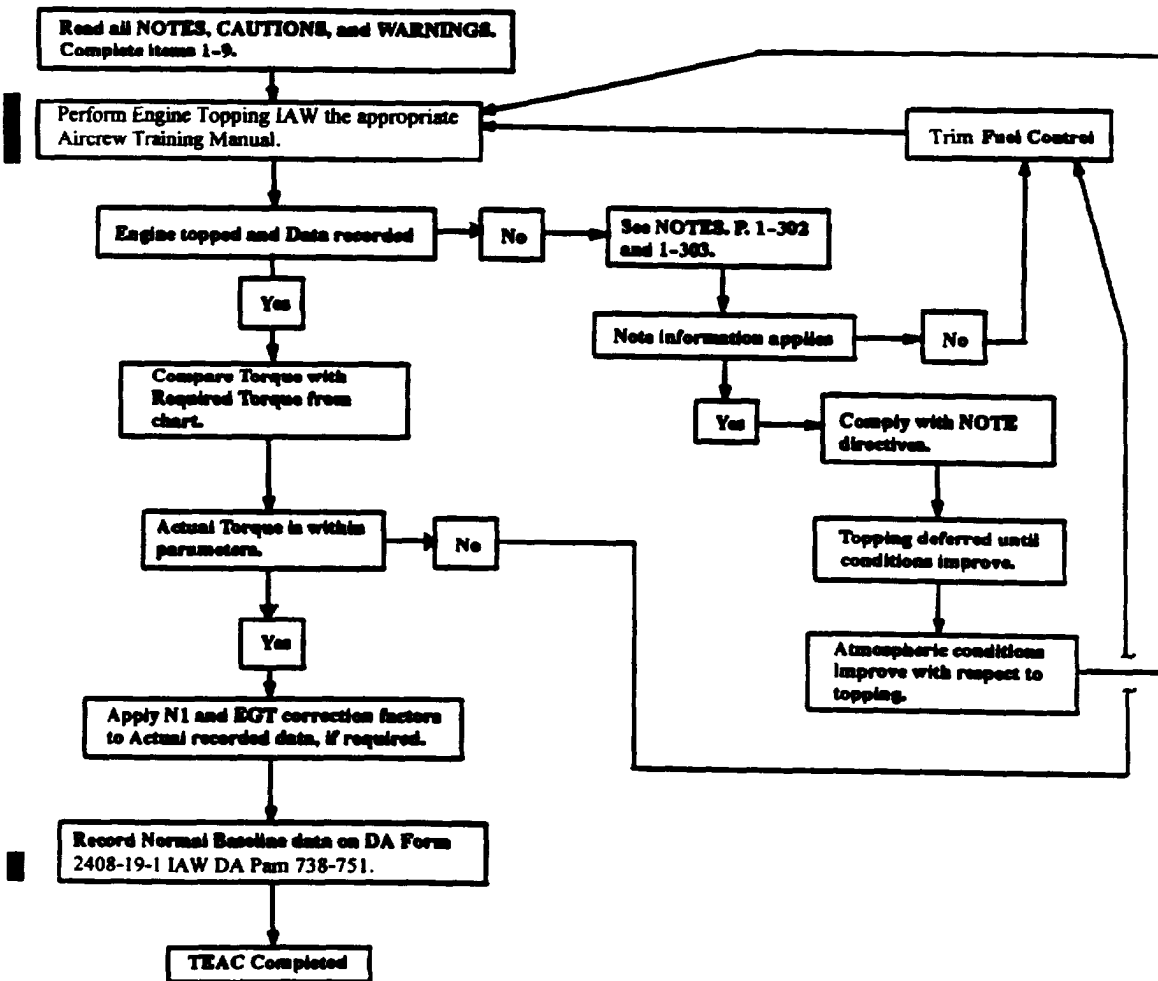




1-117. Turbine Engine Analysis Check (TEAC) - Prechecks - and Fuel Control Trim Adjustments - Continued

LOCATION/ITEM	REMARKS	ACTION
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**TEAC Procedure Chart**  
**BASELINE TEAC**



Pages 1-315 through 1-320 Deleted.



1-118. Idle Trimmer to Relieve Power Lever Binding - Adjustment. This adjustment is to be made only after a thorough check of the airframe throttle linkage to assure the complete absence of any binding in the system.

Binding of the fuel control power lever may be relieved by one-eighth turn counterclockwise adjustments to the idle trimmer screw. Adapter, P/N STD 63556, is used with a standard torque wrench to check the torque. Torque limits are up to 15 pound-inches (0.2 KGM) for the 0° to 100° travel and 25 pound-inches (0.3KGM) from 100° to 0° travel (cutoff). Limits of adjustment are reached when cutoff cannot be obtained; however, all adjustments should be kept small and Military Trim should be rechecked after the Idle trimmer adjustment.

**1-119. Part Power Trim Check (Fuel Control)**

INITIAL SETUP

**Applicable Configuration**  
T53-L-703 Engine

**Special Tools**  
Part Power Trim (PPT)  
Tool P/N4920T53-002

**References**  
Applicable Aircraft Operator's Manual

LOCATION/ITEM	REMARKS	ACTION
AIRFRAME/ ENGINE	<b>NOTE</b>	
	This procedure will permit the Military N1 speed trim to be checked or adjusted during ground operation of the engine and is a TRIM CHECK ONLY. The PPT tool is sized to stop the throttle at an N1 speed that is 11% less than what the engine would produce if operated at a full-open (100 degrees) throttle position. Make the Part Power Trim (PPT) check as follows:	
AIRFRAME		
1. Control Stick		Attach a warning flag to the pilot's control stick. This note shall read: WARNING Maintenance tool installed on the Fuel Control.
ENGINE		
2. Interstate Bleed-band Actuator P3 Air Hose		Remove P3 hose at air diffuser tee fitting. Do not cap P3 fitting.

1-119. Part Power Trim Check (Fuel Control) - Continued

LOCATION/ITEM	REMARKS	ACTION
AIRFRAME/ ENGINE - Continued	NOTE	
	This action will prevent bleed band closure and will reduce engine torque about 18% so that aircraft will not lift off. Accuracy of the PPT check is not affected.	
3. Fuel Control		Install PPT tool 4920T53-002 on Mil Pwr throttle stop screw. Roll throttle cap up to insure contract and return throttle to shutoff.
AIRFRAME	<b>WARNING</b>	
	<b>The aircraft may lift off during this check if not sufficiently loaded.</b>	
	NOTE	
	If aircraft becomes light on its skids, open anti-icing system ENG DEICE switch and ECS controls to bleed maximum amount of P3 air from engine. Monitor TGT and Oil Temp gages to avoid possible limit exceedences.	
4. Start engine in accordance with Operator's Manual		Roll throttle to contact PPT tool and beep N2 to 100%
	NOTE	
	In the absence of droop compensator or rotor blade flat pitch adjustment problems, failure of the N2 to beep to 100% indicates that the N1 has topped. Confirm this by increasing collective. If N2 droops and N1 does not increase the engine has topped.	

1-119. Part Power Trim Check (Fuel Control) - Continued

LOCATION/ITEM	REMARKS.	ACTION
<b>AIRFRAME/ENGINE</b> - Continued		
<b>AIRFRAME-Continued</b>		<b>Increase</b> collective until N-2 droops to 97%. Note N-1 speed and increase collective to droop N-2 to 95% to insure N-1 has topped. Repeat topping check two more times to obtain nominal N-1 topping speed,
<b>ENGINE</b>		
<b>NOTE</b>		
A minimum of 93% N-1 must be obtained with the PPT tool installed to insure that the engine will be able to produce specification power in all operating environments.		
<b>6. Fuel Control</b>	If less than 93% was obtained, adjust fuel control as required.	<b>If 93% or more N-1 was obtained</b> , no further action is required, <b>DO NOT TRIM DOWN</b> fuel control if more than 93% N-1 was or could be obtained.
<b>7. Shutdown Engine</b>		<b>Loosen</b> trimmer locking screw and turn Mil Pwr trimmer to obtain required N-1. (1/8 turn = 1% N-1) Repeat PPT check to verify trim adjustment.
<b>8. Fuel Control</b>		<b>Remove</b> warning flag from pilot's control stock.  <b>Remove</b> PPT tool and safety trimmer screws.
<b>9. Air Diffuser</b>		<b>Reinstall</b> P3 air line to Tee fitting.

CHAPTER 2  
COMPRESSOR SECTION

**OVERVIEW**

This chapter contains procedures for the maintenance and preservation of the compressor section. Paragraphs following outline disassembly, inspection, repair, and additional requirements needed to maintain the compressor section and related parts. Procedures requiring maintenance on the Aviation Intermediate Maintenance (AVIM) level are specified and must be performed as such. Paragraphs in which the maintenance level is not specified shall be considered Aviation Unit Maintenance (AVUM) and may be performed at this level or a higher level of maintenance.

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## **2-1. GENERAL MAINTENANCE INFORMATION**

Visually inspect all subassemblies and accessories removed from the compressor section. Check for loose or missing parts. Note any damage or excessive wear. Repair damaged parts where possible. Replace damaged parts that cannot be repaired. Disassembly procedures provided enable required cleaning, inspection, repair or replacement of compressor and its assemblies.

During reassembly of the engines subassemblies and accessories discard all of the following parts and replace with new parts:

seals	Tabwashers
Gaskets	Lockpins
Packing	Lockwashers
Cotter Pins	Lockwire

## **2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Kotor Blades - Cleaning**

### **INITIAL SETUP**

#### **Applicable Configuration**

All

#### **Consumable Materials**

Water-Soluble Cleaner (item 89, Appendix D)  
 Dry Cleaning Solvent (item 25, Appendix D)  
 Methanol (item 55, Appendix D)  
 Type II (items 105 or 106, Appendix D)  
 Type IIA (items 107 or 108, Appendix D)

#### **References**

Applicable aircraft operators manual  
 Applicable aircraft airframe manual  
 Paragraph 2-11,2-73,2-74,6-2,6-5



2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/	<p>The compressor shall be cleaned (washed) every 25 flight hours or 30 days, whichever comes first. when operated in:</p> <ul style="list-style-type: none"><li>a. A salt water environment</li><li>b. A volcanic ash environment.</li></ul> <p>The compressor shall be cleaned;</p> <ul style="list-style-type: none"><li>a. Every 25 flight hours when operating in a dusty. sandy or loose-grass environment</li><li>b. At each phased maintenance.</li><li>c. Whenever engine performance decreases.</li></ul>	

**NOTE**

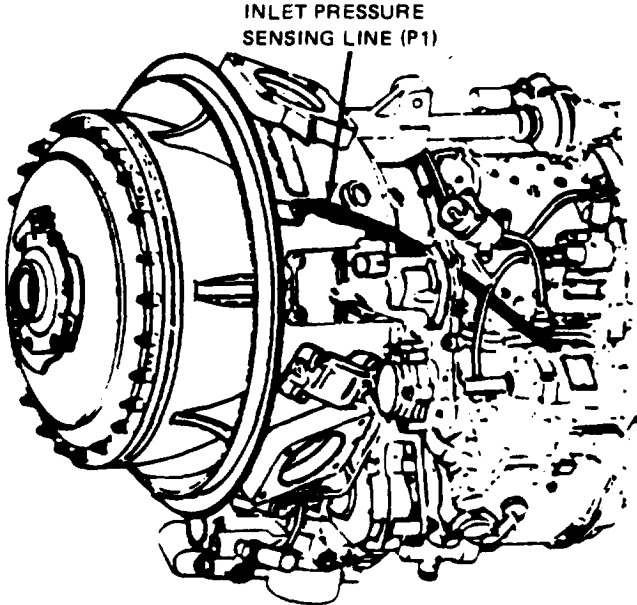
B & B 3100 (MIL-C-85704. Type I) is the primary cleaner for Army turbine engines and remains an approved cleaner for locales where environmental restrictions permit. Engine cleaners that conform to MIL-C-85704, Type II and Type IIA are also acceptable engine cleaners and meet EPA environmental requirements. Continue use of B & B 3100 where not restricted. Where restrictions apply use MIL-C-85704. Type II and Type IIA cleaners. Approved Type II and Type IIA cleaners shall be used in accordance with the existing washing procedures. Type IIA cleaners do not require dilution with water. Both types of cleaners are less effective than Type I cleaners. Therefore more frequent engine washes may be required to achieve satisfactory results.

2-2.2 Change 22

**2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued**

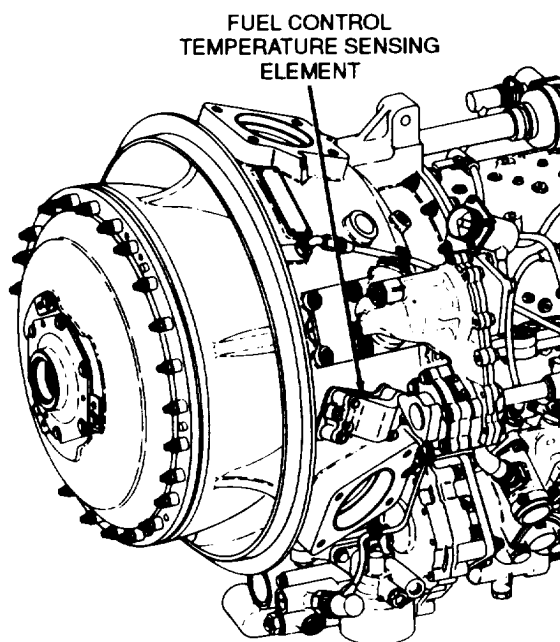
LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/ - Continued	d. Whenever exhaust gas temperature (EGT) or turbine gas temperature (TGT) or daily Health Indicator Test (HIT) increases steadily during normal operations.	
	<p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;"><b>Once the cleaning procedure is started, it is imperative that all procedures be followed as directed without interruption until the final procedure is completed.</b></p>	
	<p style="text-align: center;"><b>NOTE</b></p> <p>A daily water rinse may be applicable on aircraft with the improved inlet Particle Separator (IPS) equipped with wash ring installed or where facilities for a bird bath wash exist, provided engine is operated with anti-ice on for a minimum of two minutes after rinse.</p>	
1. Airframe air inlet screens, upper and lower halves of particle separator.	Refer to applicable airframe manual.	<b>Remove.</b>
	<p style="text-align: center;"><b>NOTE</b></p> <p>The improved inlet particle separator (IPS) need not be removed for engine cleaning or inspection.</p>	
	<p style="text-align: center;"><b>WARNING</b></p> <p><b>A fire guard with proper fire fighting equipment will be standing by during all engine compressor operations.</b></p>	

2-2 Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning -  
Continued

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR - Continued		
2. Starter generator.	Refer to applicable airframe manual.	<b>Place</b> a rubber sheet (approximately 6 x 8 inches, 15.2 x 20.3 cm) between statier generator and bleed band ports to prevent cleaner from entering starter generator.
3. Voltage regulator and electrical connections	Refer to applicable airframe manual.	Cover voltage regulator and electrical connections with plastic bag to prevent cleaner from entering.
4. Anti-icing valve.	Refer to applicable aircraft operators manual.	<b>Position</b> anti-icing switch in cockpit to closed position.
5. ignition circuit breaker.	Refer to applicable aircraft operators manual.	<b>Pull out</b> circuit breaker.
6. Start fuel circuit breaker	Refer to applicable aircraft operators manual.	<b>Pull out</b> circuit breaker.
7. Main fuel switch.	Refer to applicable aircraft operators manual.	<b>-Position</b> main fuel switch to off position.
8. Auxiliary power unit (APU).	Refer to applicable aircraft operators manual.	<b>Connect</b> If not available use airframe battery.
9. Fuel control inlet pressure sensing line (P1)		<b>Disconnect</b> at the Inlet housing fitting. <b>cap</b> fitting. and <b>plug</b> sensing line.

**2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades-Cleaning - Continued**

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/- Continued	<p style="text-align: center;"><b>CAUTION</b></p> <p>Exercise extreme care in removing and handling of the temperature sensing element. Nicks, dents, or sharp bends may destroy the capillary action of the tube.</p>	
10. Fuel control temperature sensing element.	<p>Refer to paragraph 6-2. Refer to paragraph 6-4 for the inspection and to paragraph 6-5 for the re-assemble instructions.</p> <p style="text-align: center;"><b>WARNING</b></p> <p>Dry-cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).</p>	a. Remove.
	<p>Dry-cleaning solvent (item 25a, Appendix D.).</p>	b. Clean using dry-cleaning solvent and soft fiber brush. Dry using compressed air (20 psi maximum). Do not reinstall at this time.



2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
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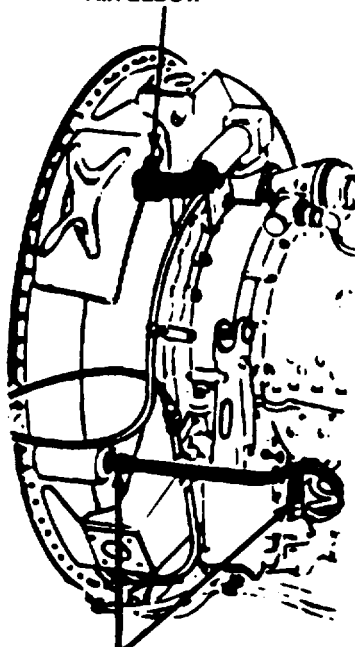
AIR INLET AND  
COMPRESSOR/- Continued

11. Customer bleed air.

**CUSTOMER BLEED  
AIR ELBOW**

Disconnet airbled adapter elbow at upper right hand engine mounting flange of diffuser housing by removing three bolts. Insert blocking plate locally manufactured from .032" aluminum sheet or suitable material. Temporarily install bolts.

**CUSTOMER BLEED  
AIR ELBOW**



**BLEED BAND  
PRESSURE LINES (P3)**

**NOTE**

Bleed band should be closed to permit thorough cleaning of the centrifugal compressor.

**2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning-Continued**

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/ - Continued		
12. Bleed band pressure line (P3) from diffuser.		Disconnect at diffuser fitting. Cap diffuser fitting.
13. Bleed band pressure line (P3) to fuel control.	If a source of metered compressed air is not available, proceed to Item 15.	Disconnect at bleed band fitting. Cap fitting and plug line.



2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
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**AIR INLET AND  
COMPRESSOR/ -  
Continued**

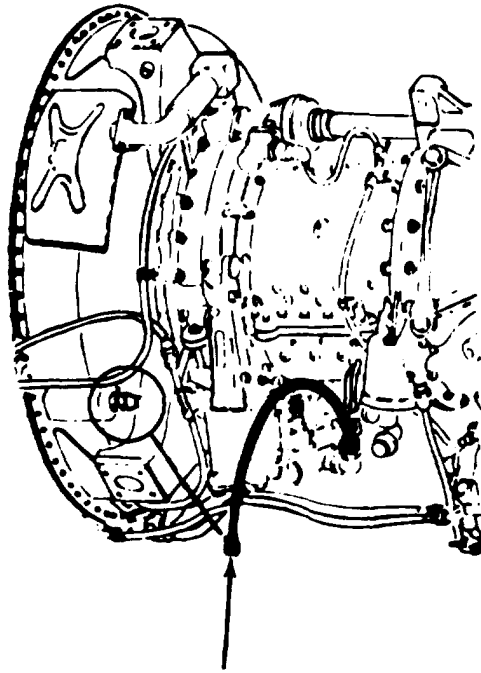
**CAUTION**

Do not exceed 60 psi air pressure when closing the bleed band or damage to actuator diaphragm may occur .

14. Bleed band pressure line (P3) from diffuser.

**Bleed band should close when air pressure (approximately 40 psi to 60 psi) is applied.**

**Connect source of metered compressed air to Pressure line (P3). Apply air pressure.**



Bleed Band  
Pressure Line (P3)

**WARNING**

Dry-cleaning solvent , P-D-680 used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact . Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138° F (38° C to 59° C).



2-2. Air Inlet Area, Inlet Gulde Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
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AIR INLET AND  
COMPRESSOR/-  
Continued

**CAUTION**

Damage to painted surfaces, bonding, plastics, or rubber items may occur from excessive use or long dwell time of cleaning solvents.

**WARNING**

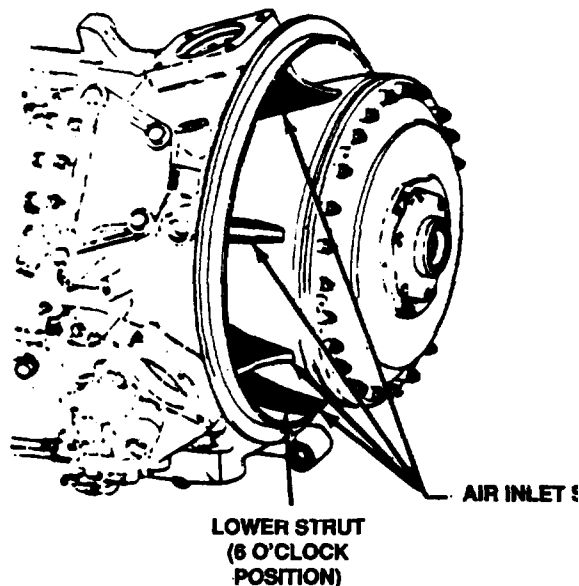
Ensure that dry cleaning solvent, water soluble cleaner or rinse water is not directed at the top of the interstage bleed band actuator. The fluid can be trapped on the top side of the actuator piston and cause corrosion to the actuator bore or in climatic conditions freeze. sluggish action or failure of the bleed band actuator may result.

15. Air inlet area and Struts.

Special attention shall be given to the lower strut (6 o'clock position) that is not readily accessible for inspection and cleaning. Use water-soluble cleaner (item 89, Appendix D.) or dry-cleaning solvent (item 25, Appendix D.).

a. Clean using a soft cloth or stiff fiber (NOT WIRE) brush and cleaner or solvent.

b. Rinse With and inspect, Repeat as necessary to remove packed or caked dirt.



2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/- Continued	<p style="text-align: center;"><b>NOTE</b></p> <p>Make sure that variable inlet guide vanes (VIGV) are fully open prior to cleaning compressor.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>To preclude damage/distortion to VIGV components, insure that "B" nuts to CYL 1 and CYL 2 lines at actuator are removed.</p>	
16. Variable inlet guide vanes (VIGV)	<p>Refer to paragraph 2-11.</p> <p style="text-align: center;"><b>WARNING</b></p> <p>JP-4, JP-5 and JP-8 fuel is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near fire or excessive heat. If fuel comes in contact with eyes, flush with running water, get medical help.</p> <p style="text-align: center;"><b>WARNING</b></p> <p>Make sure dry cleaning solvent, water soluble cleaner or rinse water is not applied directly onto the VIGV actuator. Sluggish action or bearing failure may result from fluids entering the bearing area.</p> <p style="text-align: center;">PREFERRED METHOD OF CLEANING IS WATER-SOLUBLE CLEANER (ITEM 89, APPENDIX D). ACTION ITEMS 17 AND 18.</p>	<p>a. Place container to catch fuel being drained from lines and actuator. Wipe up any spilled fuel with a rag to eliminate any probability of fire.</p> <p>b. Remove "B" nuts to CYL 1 and CYL 2 lines at actuator.</p> <p>c. Position vanes to full open by moving feedback arm at actuator towards fuel control.</p> <p>d. Visually inspect through inlet. Insure that vanes are fully open.</p> <p>e. Plug "B" nuts and cap ports on actuator.</p>

2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/- Continued	<p style="text-align: center;"><b>CAUTION</b></p> <p>Maximum starter energize time for (UH-1) is 40 seconds with a three-minute cooling time between start attempts with three attempts in any one hour.</p> <p>Maximum starter energize time for (AH-1) is 35 seconds with a one-minute cooling time between start attempts with three attempts in one hour.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Water-soluble cleaner (item 89, Appendix D) is non-flammable. No special fire safety pre-cautions need be taken.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Damage to painted surfaces, bonding, plastics or rubber items may occur from excessive use or long-dwell time of cleaning solvents.</p>	
17. Water-soluble cleaner.	<p>Any type of pressure spray equipment may be used to apply water-soluble cleaner (item 89, Appendix D), provided the cleaner and water are mixed to a ratio of one part cleaner to four parts water and the spray nozzle can be adjusted to flow approximately 2-1/2 gallons (9.46 liters) per minute.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Make sure that main rotor tiedown straps are removed and secured and engine inlet area is clear of foreign objects prior to motoring engine or damage to the engine may occur.</p>	<p>Mix 1/2 gallon (1.89 liters) of cleaner with 2 gallons (7.57 liters) of water and pour into sprayer.</p>
18. Engine Inlet and compressor	<p>Refer to applicable aircraft operators manual for starter limitations.</p>	<p>a. Motor engine while spraying cleaning solution evenly into inlet housing. Direct spray completely around engine inlet housing to insure uniform application throughout compressor.</p>

2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
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AIR INLET AND  
COMPRESSOR/ -  
Continued

**NOTE**

At an ambient temperature below 35°F (2°C), use a 40 percent Methanol (item 55, Appendix D) and 60 percent water mixture. This will prevent freezing.

**No static stand time is necessary for water-soluble cleaner (item 89, Appendix D). Refer to applicable aircraft operators manual for starter limitations.**

b. Motor engine while spraying clean fresh water evenly into inlet housing. Direct spray completely around engine inlet housing to insure uniform application throughout compressor. A minimum of 2 1/2 gallons (9.46 liters) of water shall be used.

c. Visually inspect compressor for cleanliness. Several spray applications may be required. Repeat item 18 as necessary and proceed with item 21.

**ALTERNATE METHOD OF CLEANING IS DRY-CLEANING SOLVENT (ITEM 25, APPENDIX D). ACTION ITEM 19.**



**Dry-cleaning solvent P-D-680.** used to clean parts potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame **or excessive heat**. Flash of solvent is 100°F to 138°F (38°C to 59°C).

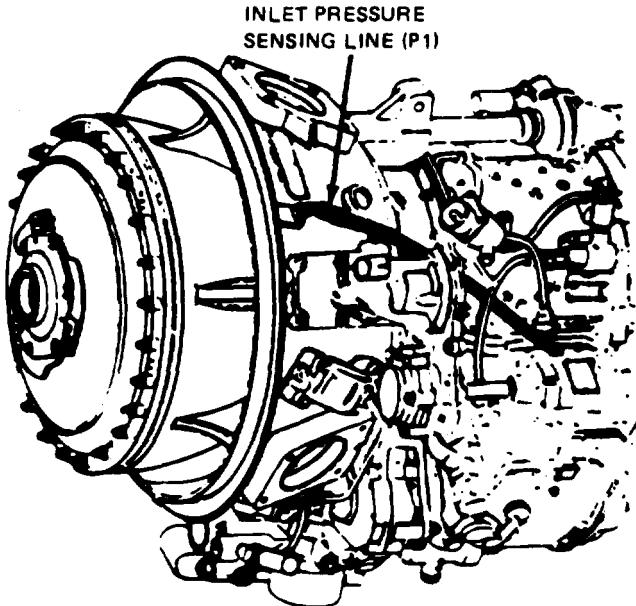
2-2. Air Inlet Area, Inlet Wide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>AIR INLET AND COMPRESSOR- Continued</p>	<p style="text-align: center;"><b>CAUTION</b></p> <p>Damage to painted surfaces, bonding, plastics or rubber items may occur from excessive use or long-dwell time of cleaning solvents.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Make sure that main rotor tiedown straps are secured and engine inlet area is clear of foreign objects prior to motoring engine or damage to engine may occur.</p>	
<p>19. Engine inlet and compressor.</p>	<p>Any type of pressure spray equipment may be used to apply dry cleaning solvent (item 25, Appendix D), provided the spray nozzle can be adjusted to flow approximately 2-1/2 gallons (9.46 liters) per minute. Refer to applicable aircraft operator's manual for starter limitations.</p> <p style="text-align: center;">NOTE</p> <p>A one hour minimum static stand time of the engine is required to permit solvent to loosen dirt.</p> <p style="text-align: center;">NOTE</p> <p>At an ambient temperature below 35°F (2°C), use a 40 percent Methanol (item 55, Appendix D) and 60 percent water mixture. This will prevent freezing. Refer to applicable aircraft operators manual for starter limitations.</p>	<p>a. Motor engine while spraying a minimum of 1 to 2 pints (0.047 to 0.095 liters) of solvent evenly into inlet housing. Direct spray completely around engine inlet housing to insure uniform application throughout compressor.</p> <p>b. Motor engine while spraying clean fresh water evenly into inlet housing. Direct spray completely around engine inlet housing to insure uniform application throughout compressor. A minimum of 2-1/2 gallons (9.46 liters) of water shall be used.</p>

2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/ - Continued	<p>ALTERNATE METHOD OF CLEANING IS WITH WATER IF WATER SOLUBLE CLEANER (ITEM 89, APPENDIX D) OR DRY CLEANING SOLVENT (ITEM 25, APPENDIX D) IS NOT AVAILABLE. THIS METHOD IS PREFERRED TO REMOVE SALT DEPOSITS AND/OR VOLCANIC ASH.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>At ambient temperatures below 35°F (2° C), use a 40 percent Methanol (item 55, Appendix D) and 60 percent water mixture. This will prevent freezing.</p> <div style="text-align: center; border: 2px dashed black; padding: 5px; width: fit-content; margin: 10px auto;"> <p><b>CAUTION</b></p> </div> <p><b>Make sure that main rotor tiedown straps are removed and secured and engine inlet area is clear of foreign objects prior to motoring engine or damage to the engine may occur.</b></p>	<p>c. Visually inspect compressor for cleanliness. Several spray applications may be required. Repeat item 19 as necessary and proceed with item 21.</p>
20. Engine inlet and compressor	<p>Any type of pressure spray equipment may be used provided the nozzle can be adjusted to flow approximately 2-1/2 gallons (9.46 liters) per minute. Refer to applicable aircraft operators manual for starter limitations.</p>	<p>a. Motor engine while spraying clean fresh water into inlet housing. Direct spray completely around engine inlet housing to insure uniform application throughout compressor. Approximately 2-1/2 gallons (9.46 liters) minimum of water shall be used.</p>

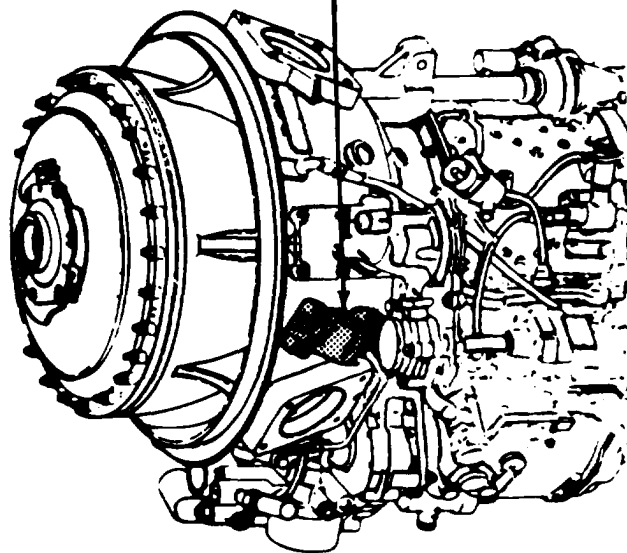
**2-2 Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning-  
Continued**

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR- Continued	<p align="center"><b>NOTE</b></p> <p>If available preserve compressor blades and vanes using rust inhibitor and preservative (Item 70, Appendix D). Refer to paragraph 1-39, step 5.</p>	<p>b. Visually Inspect compressor for cleanliness. Several spray applications may be required. Item 20 as necessary and proceed with Item 21.</p>
21. Airframe air Inlet screens, upper and lower halves of particle separator.	Refer to applicable airframe manual.	Install.
22. Starter generator.	Refer to applicable airframe manual.	Remove rubber sheet between starter generator and bleed band ports.
23. Main and stand-by voltage regulators.	Refer to applicable airframe manual.	Remove plastic bag covering voltage regulators.
24. Anti-icing valve.	Refer to applicable aircraft operators manual.	Position anti-icing switch in cockpit to open position.
25. Ignition circuit breaker.	Refer to applicable aircraft operators manual.	Push In circuit breaker.
26. Start fuel circuit breaker.	Refer to applicable aircraft operators manual.	Push In circuit breaker.
27. Fuel control Inlet pressure sensing line (P1).		<p>a. Remove cap from fitting on inlet housing and plug from pressure sensing line (P1).</p>
27.1 VIGV Actuator		<p>b. Install pressure sensing line P1 and tighten as required.</p> <p>a. Remove plugs from CYL 1 and CYL2 lines and caps from actuator ports.</p> <p>b. Install CYL 1 and CYL 2 lines on actuator and tighten as required.</p>

2-2 Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/-continued	<div style="border: 1px dashed black; padding: 5px; display: inline-block;"><b>CAUTION</b></div> Exercise extreme care installing and handling temperature sensing element. Nicks, dents, or sharp bends may destroy the capillary action of the tube.	
28. Fuel control temperature sensing	Refer to paragraph 6-5.	Install.
28.1. Bleed band actuator strainer assembly.	Refer to paragraph 2-58.	Inspect.

Fuel Control  
Temperature Sensing  
Element



29. Customer bleed air	Refer to paragraphs 2-73 and 2-74.	a. Remove blocking plate from air bleed adapter elbow at upper right hand engine mounting flange of diffuser housing.
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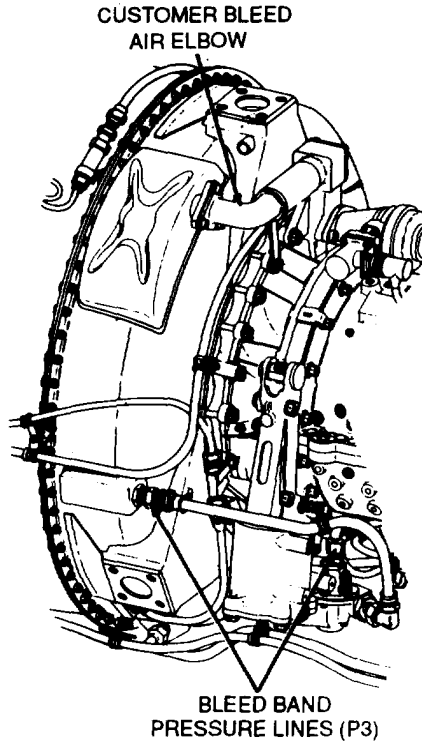
2-2. Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM

REMARKS

ACTION

AIR INLET AND  
COMPRESSOR/-  
Continued



b. Secure elbow with bolts, tighten bolts as required, and lockwire. Refer to paragraphs 2-73 and 2-74.

30. Bleed band pressure line (P3) to diffuser

a. Disconnect source of metered air pressure from pressure line (P3).

b. Remove cap from diffuser fitting. Install pressure line (P3) on diffuser fitting. Tighten as required.

31. Bleed band pressure line (P3) to fuel control.

a. Remove cap from actuating and plug from pressure line (P3).

b. Install pressure line (P3) on actuator fitting. Tighten as required.

2-2 Air Inlet Area, Inlet Guide Vanes, and Compressor Rotor Blades - Cleaning - Continued

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/- continued	<p style="text-align: center;"><b>CAUTION</b></p> <p>Damage to painted surfaces, bonding, plastic or rubber. Items may occur from excessive use or long-dwell time of cleaning solvents.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Trapped solvent or cleaner in compartment interior or equipment areas is not allowed. The aircraft shall not be released for operation until the following action item 32 has been accomplished.</p>	
32. Aircraft equipment areas and compartment Interiors	Refer to applicable aircraft manual.	<p>a. Inspect equipment areas and compartment interiors for trapped cleaner or solvent.</p> <p>b. Remove by clearing blocked compartment drain holes. Wipe dry or use low pressure (10 to 15 psi) compressed air to evaporate solvent or cleaner.</p>
	<p style="text-align: center;"><b>CAUTION</b></p> <p>Insure that main rotor tie-down strap is removed, particle separator installed and that inlet area is clear of FOD or damage to engine and aircraft may occur.</p>	

2-2. Air Inlet Area, Inlet Guide Vane, and Compressor Rotor Blades - Cleaning -  
Continued

LOCATION/ITEM	REMARKS	ACTION
AIR INLET AND COMPRESSOR/- Continued		
33. Aircraft	Refer to applicable aircraft operators manual:	<p>a. <b>Start</b> engine and run at flight idle. Allow engine to operate at flight idle while cycling anti-icing system several times for a minimum of two (2) minutes to remove moisture from inlet. The engine may be operated at flight idle as 10 as needed to check for leaks, proper rigging, and correct installation of components.</p> <p>b. <b>Remove</b> auxillary power unit (APU) if used.</p>

2-3. Inlet Housing Assembly - Inspection

INITIAL SETUP

Applicable Configuration	References Para H-13	
LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING ASSEMBLY	<div style="border: 2px solid black; padding: 2px; text-align: center; margin-bottom: 10px;"><b>WARNING</b></div> <p>All repair of damaged threads and corrosion maintenance and repair will be in accordance with Nuclear Regulatory Commission source material license number "STB-1433" issued to AVSCOM.</p> <p>The following part numbers contain Magnesium Thorium (MG-TH), a radioactive material:</p> <p style="margin-left: 40px;">1-060-100-07 Inlet Housing Assembly 1-060-220-03 Inlet Housing Assembly 1-060-390-05 Front Cover Housing Assembly</p>	

2.3 Inlet Housing Assembly - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING ASSEMBLY/ - Continued		
1. Studs on Inlet Housing Flange		Inspect for crossed or damaged threads.
		Return engine to depot for repair or replacement of defective studs.
2. Inlet Housing Assembly		Inspect for corrosion.
	Observe the following repair limitations:	
	Active corrosion without breakthrough or causing external leakage, is acceptable after repair. Proceed as follows:	
<div> <p><b>CAUTION</b></p> </div>		
	Use care when brushing with fiber brush so as not to mar finish of nonaffected surrounding parts.	



2-3. Inlet Housing Assembly - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING ASSEMBLY/ - Continued	Refinish according to paragraph H-13.	
<b>3. Repair Area</b>	<p>Observe the following limits:</p> <p>a. Corrosion with pitting but not causing external leakage should be repaired according to paragraph H-13 instructions but using Preferred Method epoxy sealant application,</p> <p>b. Corrosion creating external leakage is non-repairable and is cause for return of engine to overhaul.</p> <p>c. All corrosive pitting on the outer mounting flange is acceptable, provided there is no functional interference with the mating part.</p> <p>d. Refinish according to paragraph H-13.</p> <p>e. Complete refinishing according to paragraph H-13.</p>	Finish repair according to paragraph H-13.

2-4. Starter Pump Cover and Power Take-Off Oil Supply Nozzle Assembly - Removal and Disassembly (AVIM)

INITIAL SETUP

Applicable Configuration  
All

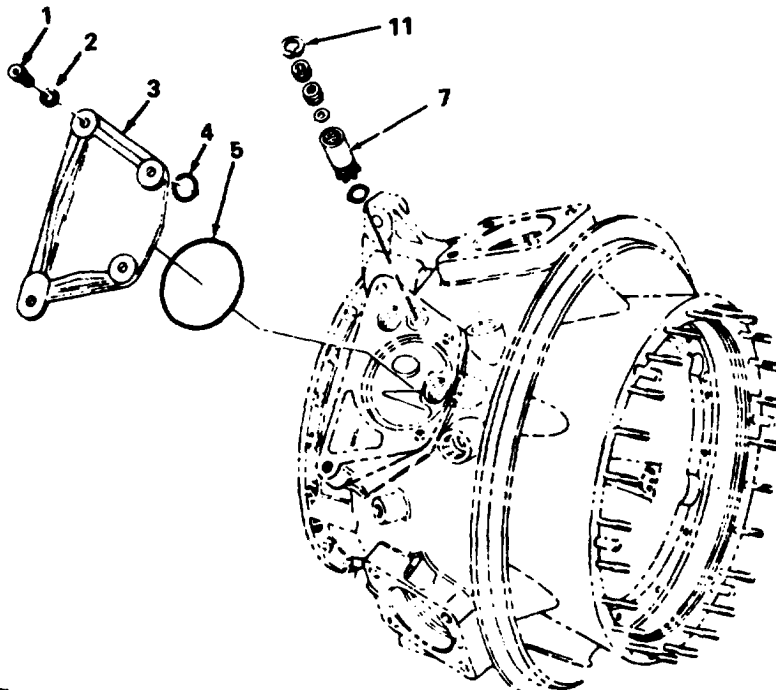
LOCATION/ITEM	REMARKS	ACTION
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INLET HOUSING ASSEMBLY/

1. Bolts (1) and washers (2)

Bolts 1) and washers (2) secure starter and pump pad cover (3) to inlet housing assembly.

Remove.



2. Pump Pad Cover (3) and Packings (4 and 5)

Remove from inlet housing.

3. Retaining Ring (11)

Remove ring that secures oil supply nozzle in housing.

4. Power Takeoff Oil Supply Nozzle Assembly

Remove by inserting a 5/16-24 screw into oil supply filter (7). Withdraw power takeoff oil supply nozzle assembly from inlet housing assembly.

2-4. Starter Pump Cover and Power Take-off Oil Supply Nozzle Assembly - Removal end Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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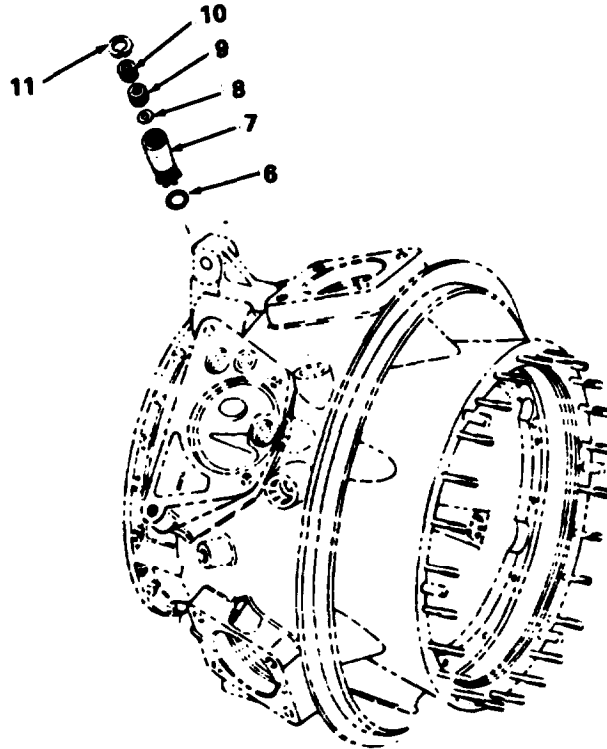
INLET HOUSING ASSEMBLY/-  
Continued

5. Setscrews (9 and 10)  
and Disc (8)

Remove from filter (7).

6. Packing (6)

Remove from filter.





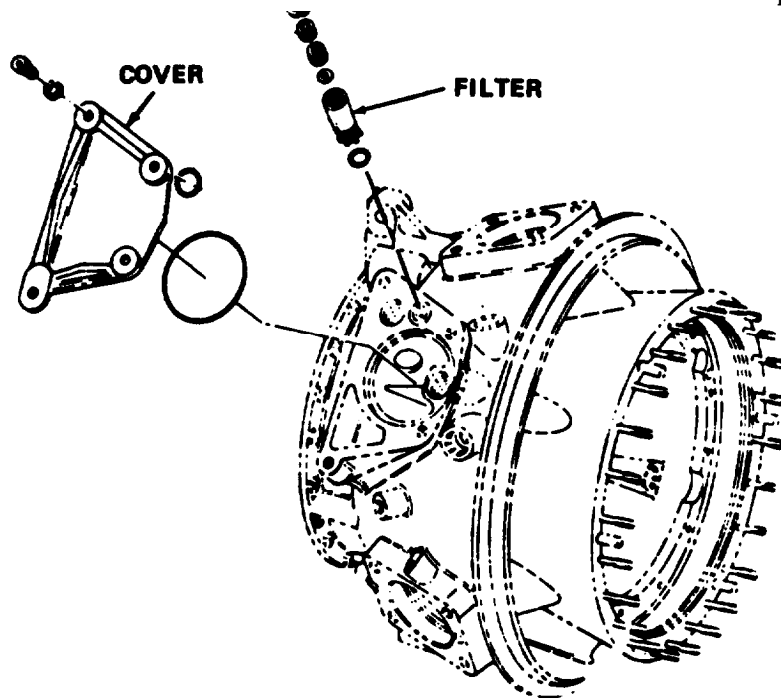
**2-5. Starter Pump Cover and Power Take-Off Oil Supply Nozzle Assembly - Inspection (AVIM)**

**INITIAL SETUP**

**Applicable Configuration**  
**All**

**References**  
**Pam H-25**

<b>LOCATION/ITEM</b>	<b>REMARKS</b>	<b>ACTION</b>
1. starter and Pump Pad Cover		Inspect for cracks, nicks, burrs and scratches.
2. starter and Pump Pad Cover		If cracked, replace starter and pump pad cover. Blend-repair nicks, burrs, and scratches as outlined in paragraph H-25.



**8. Filter**

Inspect for cracks, crossed or damaged threads. Replace filter if cracked or if threads are crossed or damaged.

**4. Filter**

Refer to paragraph H-25 for blend-repair Procedures.

Inspect for cuts and dents Blend-repair.

**2-6. Starter Pump Cover and Power Take-Off Oil Supply Nozzle Assembly - Assembly and Installation (AVIM)**

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**

Lubricating Oil (item 46 or 47, Appendix D)  
Lockwire (item 41,42, or 43, Appendix D)

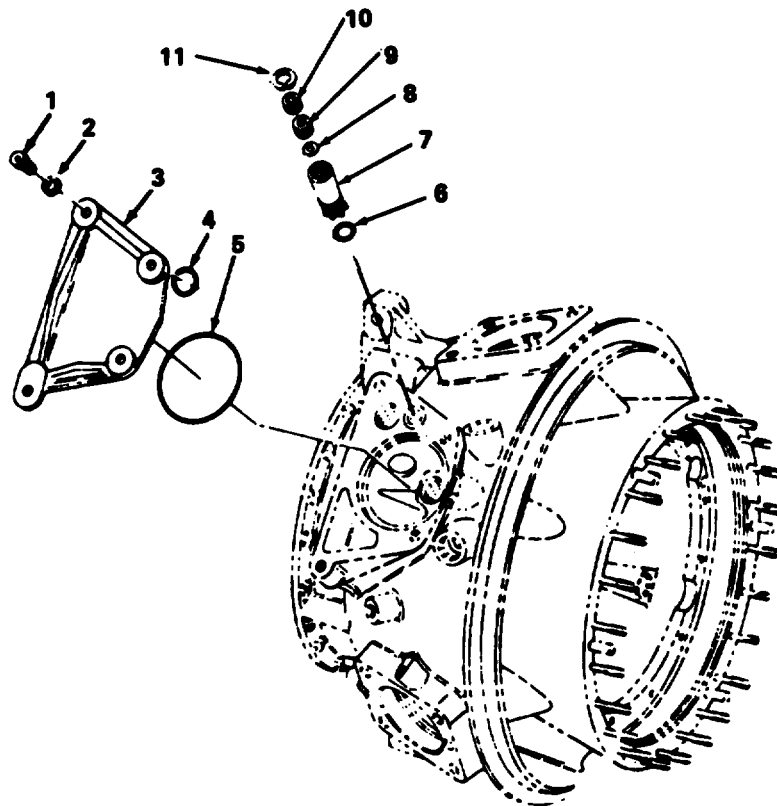
**Test Equipment**  
Test Fixture (LTCT216)  
Oil Flow Stand (LTCT313)

**References**

Appendix G, Table G-3, Reference Number 56, 57 or Table G-4, Reference Number 35, 36

**Special Tools**  
Allen Wrench  
Disassembly Fixture (LTCT413)

LOCATION/ITEM	REMARKS	ACTION
<b>INLET HOUSING ASSEMBLY/</b>		
1. Filter (7)	Use disassembly fixture (LTCT413).	Install in disassembly fixture.



2-6. Starter Pump Cover and Power Take-off Oil Supply Nozzle Assembly - Assembly and Installation (AVIM) - Continued

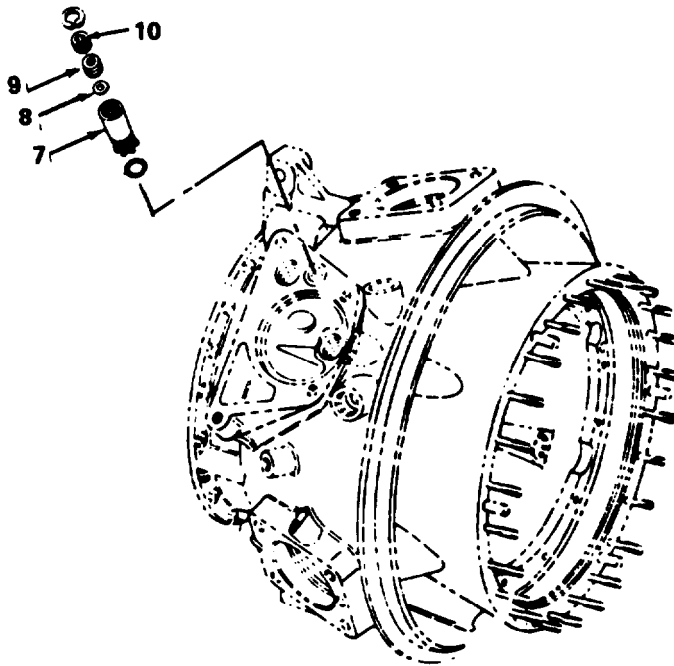
LOCATION/ITEM	REMARKS	ACTION
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INLET HOUSING ASSEMBLY/ -  
Continued

2. Disc (8) and Set-screw (9)

Refer to Appendix G, table G3, reference number 57 or table G-4, reference number 36 for tightening requirement.

Install into filter (7).  
Tighten screw as required.



**CAUTION**

Do not allow Allen wrench to enter setscrew (9) when tightening setscrew (10) in following action for item 3.

3. Setscrew (10)

Refer to Appendix G, table G3, reference number 56 or table G4, reference number 35 for tightening requirements.

Install into filter.  
Tighten as required.  
Remove filter from fixture.

4. Power Takeoff Oil Supply Nozzle Assembly

Use teat fixture assembly (LTCT216).

Flow-check power take-off oil supply nozzle assembly from dotted end. Attach oil pressure line from oil flow atand (LTCT313) to adapter assembly.

2-6. Starter Pump Cover and power Take-Off Oil Supply Nozzle Assembly - Assembly and Installation (AVIM) - Continued

LOCATION /ITEM	REMARKS	ACTION
INLET HOUSING ASSEMBLY/- Continued		
5. Oil Pressure Valve Knob		Turn until supply pressure gage indicates 28 psi to 32 psi (1.97 kg/sq cm to 2.11 kg/sq cm) at temperature range of 95°F to 100°F (35°C to 38°C).
6. Graduated Beaker, Power Takeoff Oil Supply Nozzle Assembly, Oil		Place graduated beaker under power takeoff oil supply nozzle assembly and obtain quantity of oil for one minute.

This quantity shall be 480 to 530 cc if lubricating oil (item 46, Appendix D) is used, or 456 to 503 cc if lubricating oil (item 47, Appendix D) is used.

**WARNING**

prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

2-6. Starter Pump Cover and Power Take-Off Oil Supply Nozzle Assembly - Assembly and Installation (AVIM) - Continued

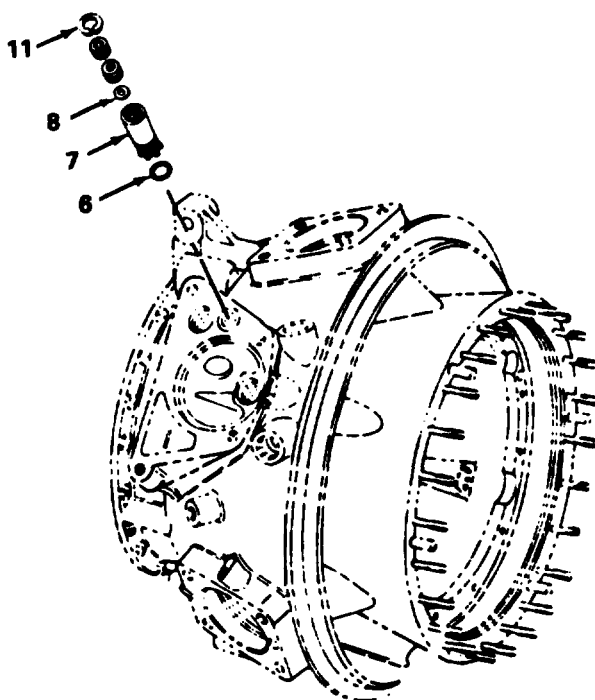
LOCATION/ITEM	REMARKS	ACTION
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INLET HOUSING  
ASSEMBLY/-  
Continued

7. Oil Supply Nozzle,  
Disc (8)

If desired quantity cannot be obtained, per-  
form this action.

**Disassemble** oil supply  
nozzle and **raplace**  
disc (8). **Reassemble**  
and repeat test.

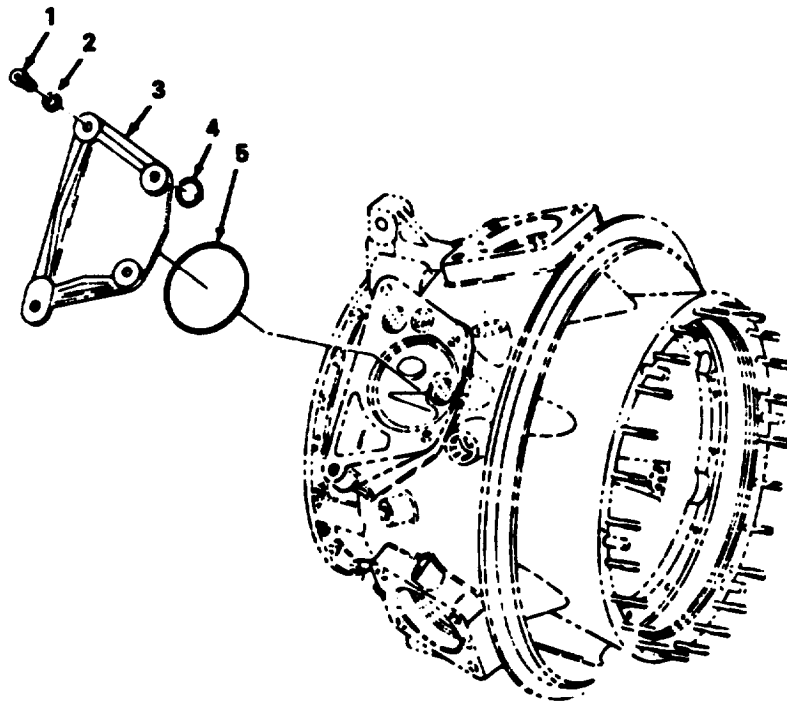


8. Packing (6), Filter  
(7), Power Takeoff  
Oil Supply Nozzle  
Assembly

**Place** packing (6) on out-  
side of filter (7), and  
**insert** power takeoff oil  
supply nozzle assembly  
into inlet housing and  
**secure** with retaining  
ring (11).

2-6. Starter Pump Cover and Power Take-Off Oil Supply Nozzle - Assembly and Installation (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
<b>INLET HOUSING ASSEMBLY/-</b> <b>Continued</b>		
<b>9. Packings (4 and 5), Starter and Pump Pad cover</b>		<b>Place</b> packings (4 and 5) in starter pad. <b>Secure</b> starter and pump pad cover (3) of inlet housing with bolts (1) and washers (2). <b>Tighten</b> bolts as required and <b>lockwire</b> .



2-7. Inlet Guide Vanes - Cleaning

Refer to paragraph 2-2 for cleaning procedure.

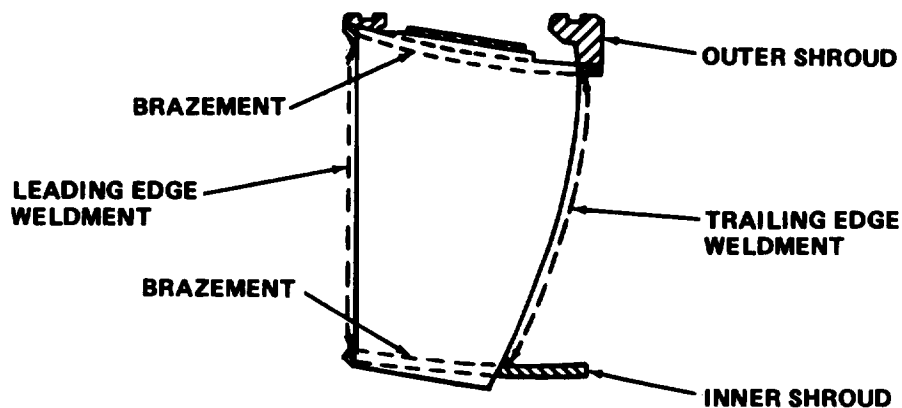
2-8. Air Inlet Guide Vane Assembly (T53-L-11 Series Engines) - Impaction

INITIAL SETUP

Applicable Configuration  
T53-L11 Series Engines

References  
Para H-25

LOCATION/ITEM	REMARKS	ACTION
VARIABLE INLET GUIDE VANE/		
1. Air Inlet Vane		Visually <b>inspect as far as possible by looking into inlet</b> housing. Use magnifying glass and lights as necessary.
2. Vane		<b>Inspect</b> each vane for cracks, nicks, dents, pits and distortion.



Observe the following limits:

- a. Vane leading or trading edge nicks, dents and pita are acceptable up to 0.050 inch (1.27 mm) in depth with no core penetration, and up to 0.300 inch (7.62 mm) radial length are acceptable. Defects which penetrate to the vane core are not permitted.
- b. Vane airfoil surface nicks, dents, and pita up to 0.040 inch (1.01 mm) in depth and 0.300 inch (7.62 mm) in length are acceptable.

2-8. Air Inlet Guide Vane Assembly (T53-L-11 Series Engines - Inspection - Continued)

LOCATION/ITEM	REMARKS	ACTION
VARIABLE INLET GUIDE VANE/ - Continued	<p>c. Only one crack not exceeding 0.250 inch (6.37 mm) in length is acceptable without repair in vane leading or trailing edge weldments.</p> <p>d. No cracks are permitted in vane parent metal.</p> <p>e. Vane distortions up to 0.060 inch (1.52 mm) on leading edges and 0.030 inch (0.76 mm) on trailing edge are acceptable without repair.</p>	<p><b>Inspect</b> cracks not exceeding 0.250 inch (6.37 mm) in length are acceptable.</p>
8. shrouds and Vane-to-Shroud Brazements		

**CAUTION**

Defects shall be blend-repaired only to the extent of removing protrusions that affect the flow.

**4. Air Inlet Vane Assembly**

**Blend-repair** nicks, burrs, pits and dents. **Refer** to paragraph H-25. If limits are exceeded, **tag** engine end **ship** to overhaul.

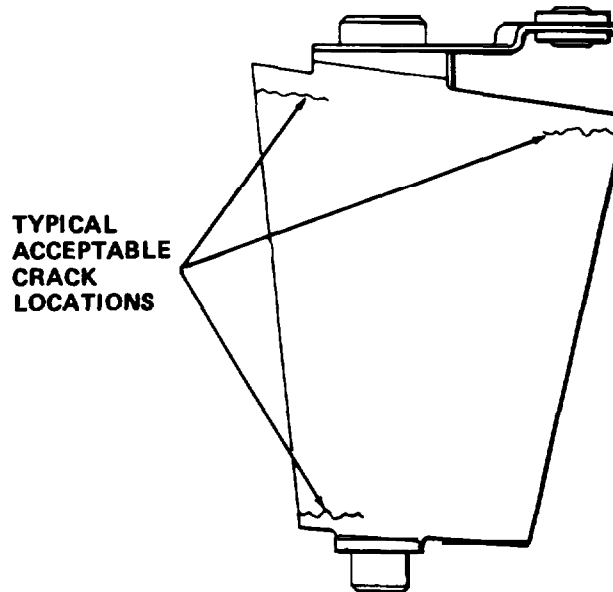




2-9. Variable Inlet Guide Vane Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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GUIDE VANE  
ASSEMBLY/-  
Continued



**NOTE**

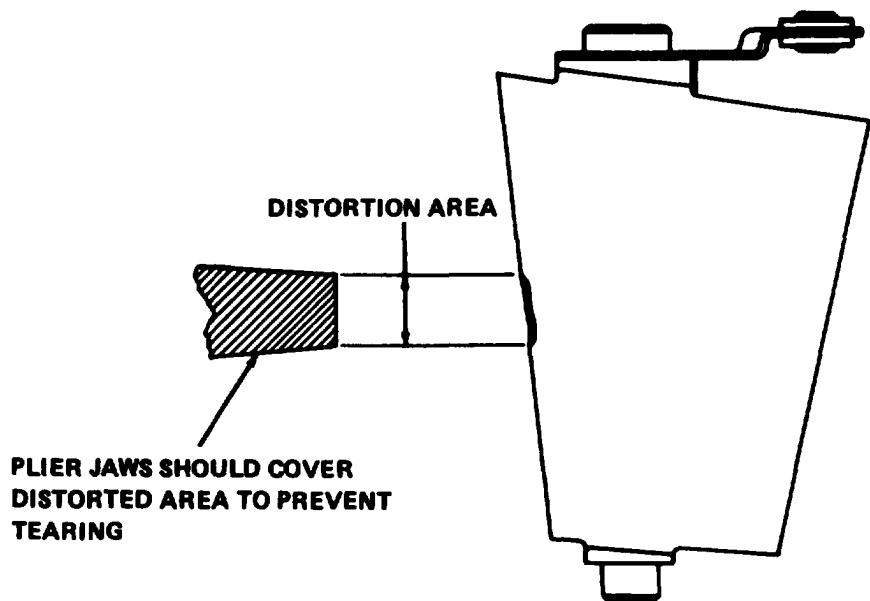
Perform extended inspection, if required, according to actions for items 2 thru 5.

2. vanes	Refer to paragraph 2-10.	Cold-straighten or <b>inspect if necessary</b> .
3. Compressor Housing	If compressor housing removal is impractical, further investigation of vane defects can be accomplished using a borescope (National Electric Instrument Div. of Engelhard Industries, Inc., or equivalent).	<b>Remove</b> upper or lower half.
4. vanes	Perform this action provided no cracks will be generated by repair. Refer to paragraph 2-10.	<b>Cold-straighten distorted</b> vanes.
5. Vanes	Brazement voids are acceptable provided loss of brazement does not cause separation of mating surfaces. This condition is also acceptable if the requirements of preceding items 2 thru 4 are met.	<b>Inspect</b> brazed areas where end caps join airfoil halves. <b>Inspect</b> for brazement voids.

2-10. Variable Inlet Guide Vane Assembly (T53-L-13B/703 Engines) - Repair

Applicable Configuration  
T53-L-13B/703 Engines

LOCATION/ITEM	REMARKS	ACTION
<b>GUIDE VANE ASSEMBLY/</b>		
1. Guide Vanes	Distorted vanes can be cold-straightened, provided no cracks are generated by the repair. Use a long-handled, padded duck-billed type of pliers for straightening.	<b>Cold-straighten.</b>



## 2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Operational Check.

### INITIAL SETUP

**Applicable Configuration**

T53-L13B/703 Engines

**Consumable Materials**

Lockwire (item 41,42, or 43, Appendix D)

**Test Equipment**

Coupling Assembly (LTCT13725,  
detail of switch and coupling kit  
LTCT13726)

**References**

Para 1-117

An operational check of the inlet guide vane actuator assembly must be performed whenever the fuel control is replaced, inlet guide vane actuator assembly is replaced, improper operation of the actuator is suspected, or when basic rigging of VIGV actuator has been performed.

Improperly adjusted variable inlet guide vanes (VIGV) will have an adverse effect on engine operation. If the inlet guide vanes fail to reach the "full open" position, the engine will exhibit low torque, low exhaust or turbine gas temperature (EGT or TGT) and high N1 speed. Should the inlet guide vanes reach the "full open" position at too low an N1 speed, any rapid N1 speed changes could induce surge. Since the "full open" point is most critical in regard to engine performance, this has been the traditional adjustment point. Testing has shown that the inlet guide vanes can be adjusted in most cases at the point where they begin to open. While adjustment at this point is not as conclusive as adjustment at the "full open" position, it has the advantage of not requiring a flight test and, therefore, is less time consuming.

It is suggested that adjustment of the inlet guide vanes be performed at the "begin to open" point. If this adjustment is not sensitive enough, adjustment at the "full open" position should be made.

Adjustment of the VIGV can be performed anywhere within the allowable range and should be done in increments of one percent N1 speed. For example: If an engine exhibits low power, low EGT, and high N1 Speed, and the VIGV adjustment point falls at the upper portion of the allowable range, the adjustment point may be lowered (within the range) in one percent increments until the problem is solved.

**2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Operational Check-Continued**

LOCATION/ITEM	REMARKS	ACTION
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**ACTUATOR ASSEMBLY/**

**1. Inlet Guide Vane Actuator**

**Perform an actuator piston static check to insure freedom of travel within the housing.**

**NOTE**

Perform static check according to action for item 2.

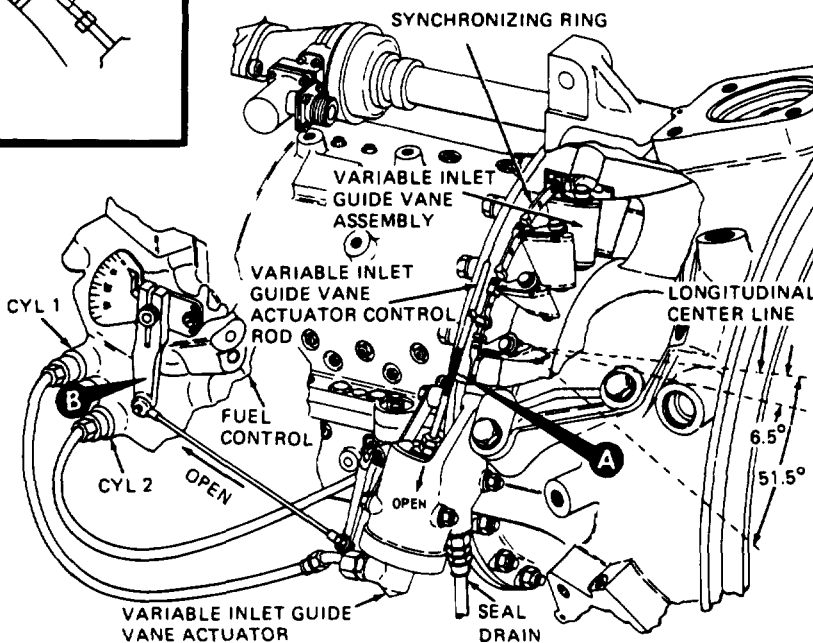
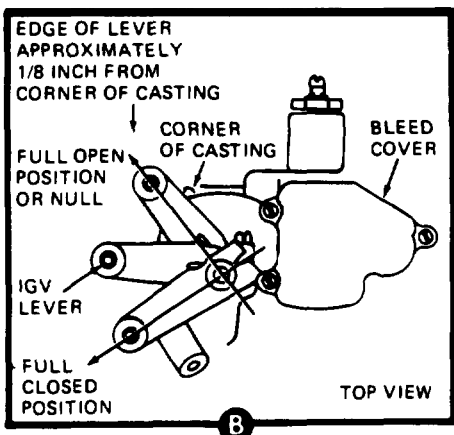
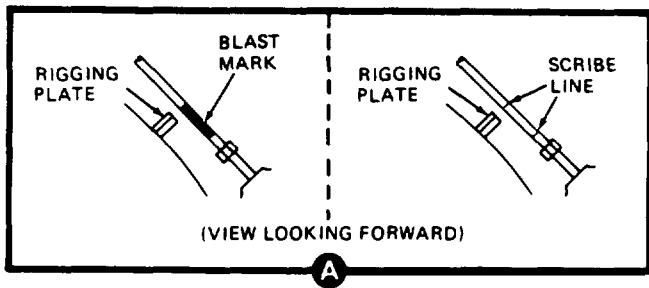
**CAUTION**

**To preclude damage/distortion to VIGV components, insure that torque on "B" nuts to CYL 1 and CYL 2 lines at actuator is released.**

**2. Inlet Guide Vane Actuator**

Fuel Controls P/N 84200A7A Only

**Move to full open position. Align blast mark or scribe line on actuator control with scribe line on rigging plate. See detail A in following figure.**



XA 853 164

2-11. Inlet Guide Vane Actuator Assembly(T53-L-13B/703 Engines) - Operational Check -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/ - Continued		
2.1. Inlet Guide Vane Actuator	Fuel controls P/N 100770A4 and 106500A series only	<p>a. <b>Move</b> to fullopen position. <b>Align</b> blast mark or scribe line on actuator control with scribe line on rigging plate. Refer to figure in step 2.</p> <p>b. <b>Move</b> the IGV lever on fuel control to the full open (NULL) position. See Detail B.</p> <p>c. <b>Adjust</b> feedback rod ends to proper length.</p>

**NOTE**

Step b. is for basic rigging only and a VIGV operational check with coupling switch LTCT13725 is required.



2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703Engines) - Operational Check.

LOCATION/ITEM	REMARKS	ACTION
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ACTUATOR ASSEMBLY/-  
Continued

**CAUTION**

Position the assembly to provide adequate clearance with the feedback rod and arm in the following Item 3.

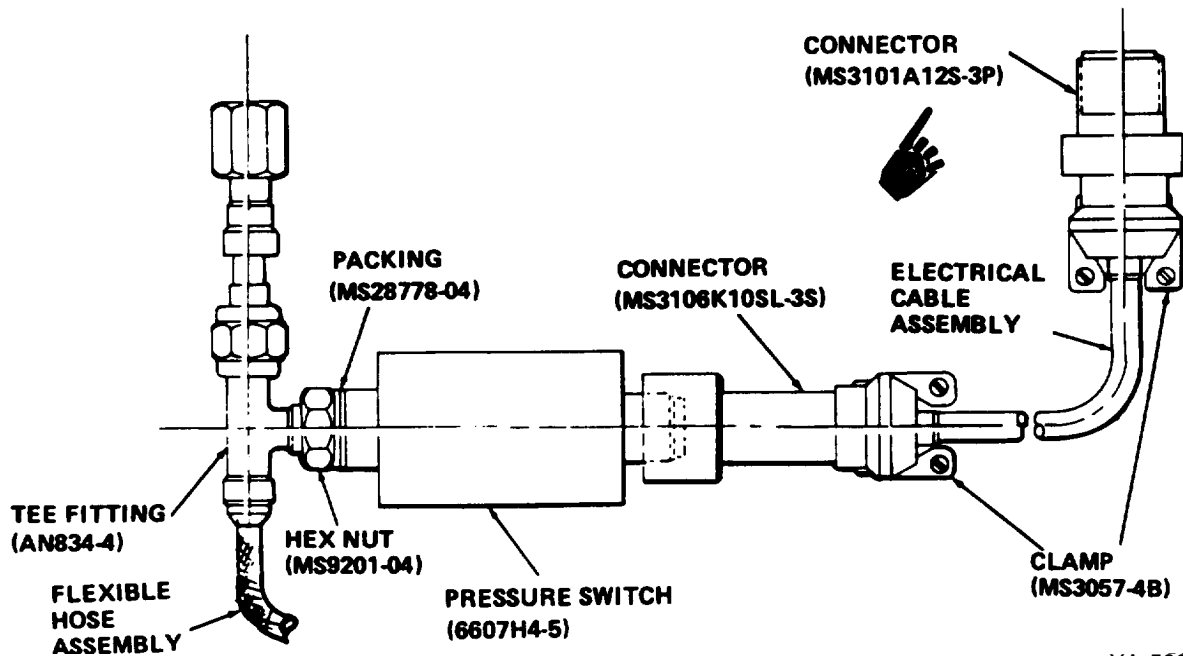
**NOTE**

The pressure switch in following Item 3 should be set to indicate between 70 and 80 psi (4.9 kg/sq cm to 5.6 kg/sq cm). See Item 26, paragraph 2-11.

3. Inlet Guide Vane Actuator

Perform this action to adjust VIGV at "begin to open" point. Use coupling assembly (LTCT13725, detail of switch and coupling kit LTCT13726). Repositioning of CYL 2 line may be required to allow installation of switch and coupling assembly.

Install switch and coupling assembly between VIGV actuator and CYL 2 line. Tighten "B" nut on CYL 2 line to required torque.



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2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines). Operational Check - Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/ . Continued		
4. Inlet Guide Vane Actuator	Use switch and coupling assembly (LTCT 13725, detail of switch and coupling kit LTCT13726).	<b>Remove</b> cannon plug from engine low oil pressure warning light switch (for UH-1 Series aircraft) or transmission low oil pressure warning light switch (for AH-1 Series aircraft) and <b>connect</b> lead from switch and coupling assembly. <b>Tighten</b> all lines to required torque.

**CAUTION**

The engine oil pressure gage or transmission oil pressure gage must be visually monitored because the warning light is disconnected.

5. Engine		<b>Start</b> and allow to stabilize at flight idle. <b>Check</b> for fuel leaks.
6. Anti-Icing System, Heater System, and Air-Conditioning System	Refer to applicable air-frame manual.	<b>Insure</b> these systems are off .

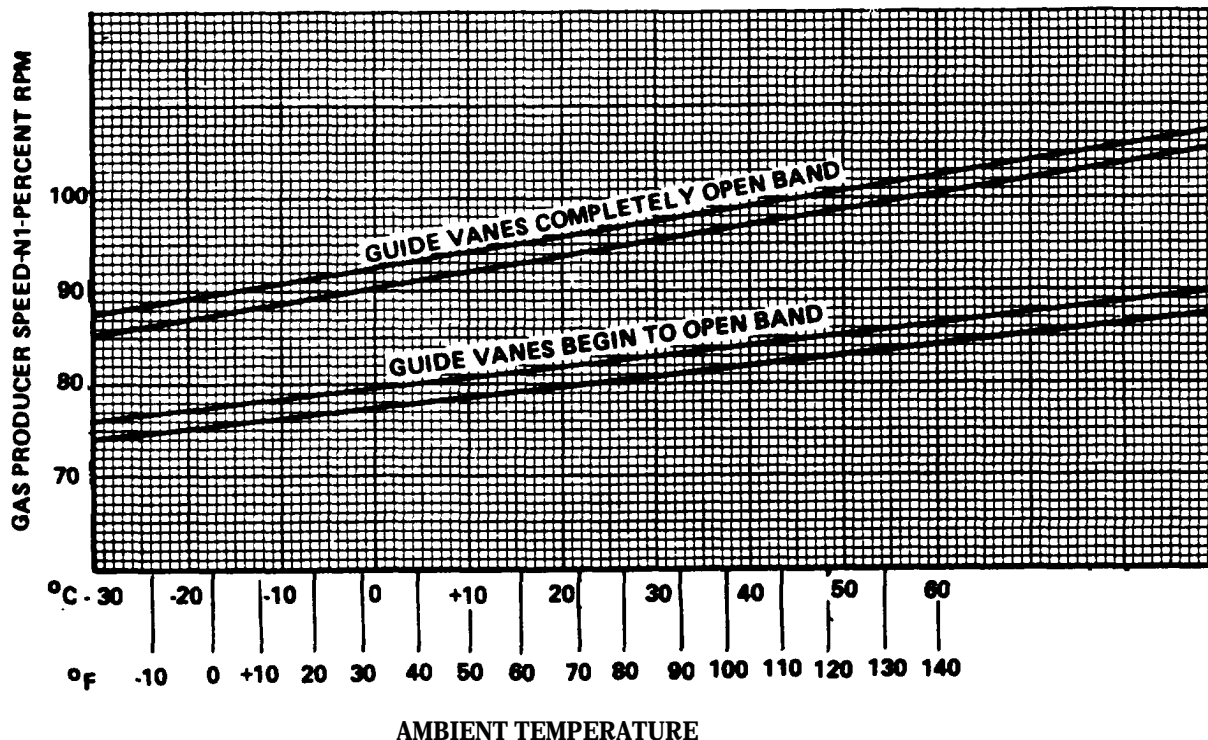
**NOTE**

Due to internal differences of switch and coupling assembly (LTCT13725) the low oil pressure warning light may come on or go out.

7. Engine	The following graph illustrates gas producer speed at which inlet guide vane operates versus ambient temperature. Enter graph at the lower band at N1 speed and OAT obtained in this action. (Add 3°C in temperature recorded in this action. OAT +3°C equals compensated temperature.) Determine that N1 speed falls within this band.	<b>Increase</b> N1 speed above flight idle. <b>Record</b> N1 speed and outside air temperature (OAT) when low oil pressure warning light actuates. <b>Repeat</b> this check three times to obtain a mean N1 speed.
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2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Operational Check - Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/ - Continued		



8. Inlet Guide Vane

Adjustments should be made in increments of one percent N1 speed. See figure in item 7.

**Adjust** if N1 speed does not fall within the allowable band.

**NOTE**

Perform inlet guide vane adjustment according to actions for items 8 thru 11.

9. Feedback Rod

**Adjust** as follows:

- a. **Disconnect**.
- b. **Loosen** rod end jam-nut.
- c. **Adjust** rod length.

2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Operational Check -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/ Continued		
10. Feedback Rod		<p><b>Shorten</b> to decrease N1 speed at which guide vanes 'begin to open." <b>Lengthen</b> rod to <b>Increase</b> "begin to open" N1 speed.</p>
<b>NOTE</b>		
	<p>Make sure that a minimum of five rod end threads are engaged in feedback tube ends. If thread engagement 'is insufficient, the feedback lever on the fuel regulator may be indexed one or two splines counterclockwise in relation to its shaft.</p>	
11. Feedback Rod	<p>Five turns will result in approximately a 2 percent N1 change.</p>	<p><b>Adjust</b> both rod ends if necessary to maintain the same amount of thread engagement. <b>Repeat</b> actions for items 4 thru 11.</p>
12. Switch and Coupling Assembly	<p>Use switch and coupling assembly (LTCT13725, detail of switch and coupling kit LTCT13726).</p>	<p><b>Remove</b> at completion of check.</p>
13. CYL 2 Line		<p><b>Reconnect</b> to actuator.</p>
14. Inlet Guide Vane Actuator		<p><b>Tighten</b> "B" nut CYL 2 line to required torque.</p>
15. Inlet Guide Vane Actuator		<p><b>Reconnect</b> low oil pressure warning switch cannon plug. <b>Perform</b> a leak check prior to releasing aircraft for flight.</p>
16. Inlet Guide Vane Actuator	<p>Prior to performing a VIGV check at the "full "open" point, make sure that the rigging is correct. Use switch and coupling assembly (LTCT13725, detail of switch and coupling kit LTCT1 3726). See figure in item 3.</p>	<p><b>Adjust</b> at "full open" point. <b>Install</b> switch and coupling assembly between the VIGV actuator and the CYL 1 line.</p>

2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Operational Check -  
Continued

LOCATION/ITEM	REMARKS	ACTION
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ACTUATOR ASSEMBLY/-  
continued

NOTE

Perform procedures outlined in preceding actions for items 9 thru 11.

**CAUTION**

When the engine is run do not exceed maximum N1 (101.5 percent) torque (50 psig), or EGT limits.

17. Inlet Guide Vane Actuator

Refer to paragraph 1-117.

**Perform** power check and trim adjustment for low oil pressure warning light. **Note** when low oil pressure warning light goes out (guide vanes completely open). Simultaneously **read** N1 speed and outside air temperature (°C). **Repeat** this check three times to obtain a VIGV mean "full open" N1 speed.



2-11. Inlet Guide Vane Actuator Assembly (T53-L-136/703 Engines) - Operational Check -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/ - Continued		
18. Aircraft		<b>Land.</b>
19. Inlet Guide Vane Actuator		<b>Add 3°C</b> to temperature recorded in action for Item 17 to <b>compensate</b> for temperature rise through inlet duct (OAT plus 3°C equals compensated temperature).
<b>NOTE</b>		
Plot on graph (figure in Item 7) the N1 speed determined in preceding item 17 and the compensated OAT. Make sure that N1 speed falls within the upper band. If not, adjust according to action items 20 and 21.		
<b>NOTE</b>		
Make sure that a minimum of five rod end threads are engaged in feedback tube ends. If thread engagement is insufficient, the feedback lever on the fuel regulator may be indexed one or two splines counterclockwise in relation to its shaft.		
20. Feedback Rod  position.	Five turns of the rod will change the N1 speed approximately 2 percent.	<b>Shorten</b> to <b>decrease</b> N1 speed at which inlet guide vanes reach "full open"
21. Feedback Rod		<b>Lengthen</b> to <b>increase</b> N1 speed at which inlet guide vanes reach "full open" position.

2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Operational Check - Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/- Continued		
22. Inlet Guide Vane Actuator	Perform this action upon completion of adjustments.	<b>Disconnect</b> low oil pressure light switch and coupling assembly (LTCT 13725, detail of switch and coupling kit (LTCT 13726). <b>Reconnect</b> cannon plug and lockwire.
23. Inlet Guide Vane Actuator Line		<b>Remove</b> assembly from inlet guide vane actuator and CYL 1 line. <b>Reconnect</b> line to actuator. <b>Tighten "B" nut CYL 1</b> line to required torque. <b>Perform</b> a leak check prior to releasing aircraft for flight. <b>Lockwire</b> connections previously lockwired.
24. Feedback Rod	Perform this action if switch end coupling assembly (LTCT13725, detail of switch end coupling kit LTCT13726) are not available and low power complaint or surge are experienced.	<b>Perform</b> trial-and-error method of shortening or lengthening feedback rod with a subsequent test flight to <b>determine</b> engine performance is recommended.
25. Inlet Guide Vane Actuator	If a fuel control change is necessary and the switch end coupling assembly (LTCT13725, detail of switch and coupling kit LTCT13726) or the pressure switch and tee fitting assembly are not available, perform these actions.	a. <b>Rig</b> feedback rod to <b>align</b> VIGV protractor. <b>Position</b> indicator with zero on fuel quadrant plate and VIGV full open.  b. <b>Perform</b> a power check and trim adjustment (para 1-117). If engine exhibits low torque, low EGT, and high N1 speed, <b>shorten</b> feedback rod accordingly.

2-11. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Operational Check -  
Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/ Continued	Switch and coupling assembly (LTCT13725), detail of switch and coupling kit (LTCT13726).	<p><b>Perform</b> a 180 day (or as needed) functional check to make sure of proper operation. <b>Use</b> the following method:</p> <p>a. <b>Cap</b> off one end of switch fitting. <b>Attach</b> a controllable (pressure) source of filtered air to other end.</p> <p>b. <b>Connect</b> a continuity meter to each pin of pressure switch.</p> <p>c. <b>Apply</b> filtered air pressure to switch. <b>Observe</b> to make sure of continuity between ins. <b>Pressure</b> should indicate 70 psi to 80 psi (4.9 kg/sq cm to 5.6 kg/sq cm).</p> <p>d. <b>Replace</b> switch if defective.</p>



2-12. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Removal

INITIAL SETUP

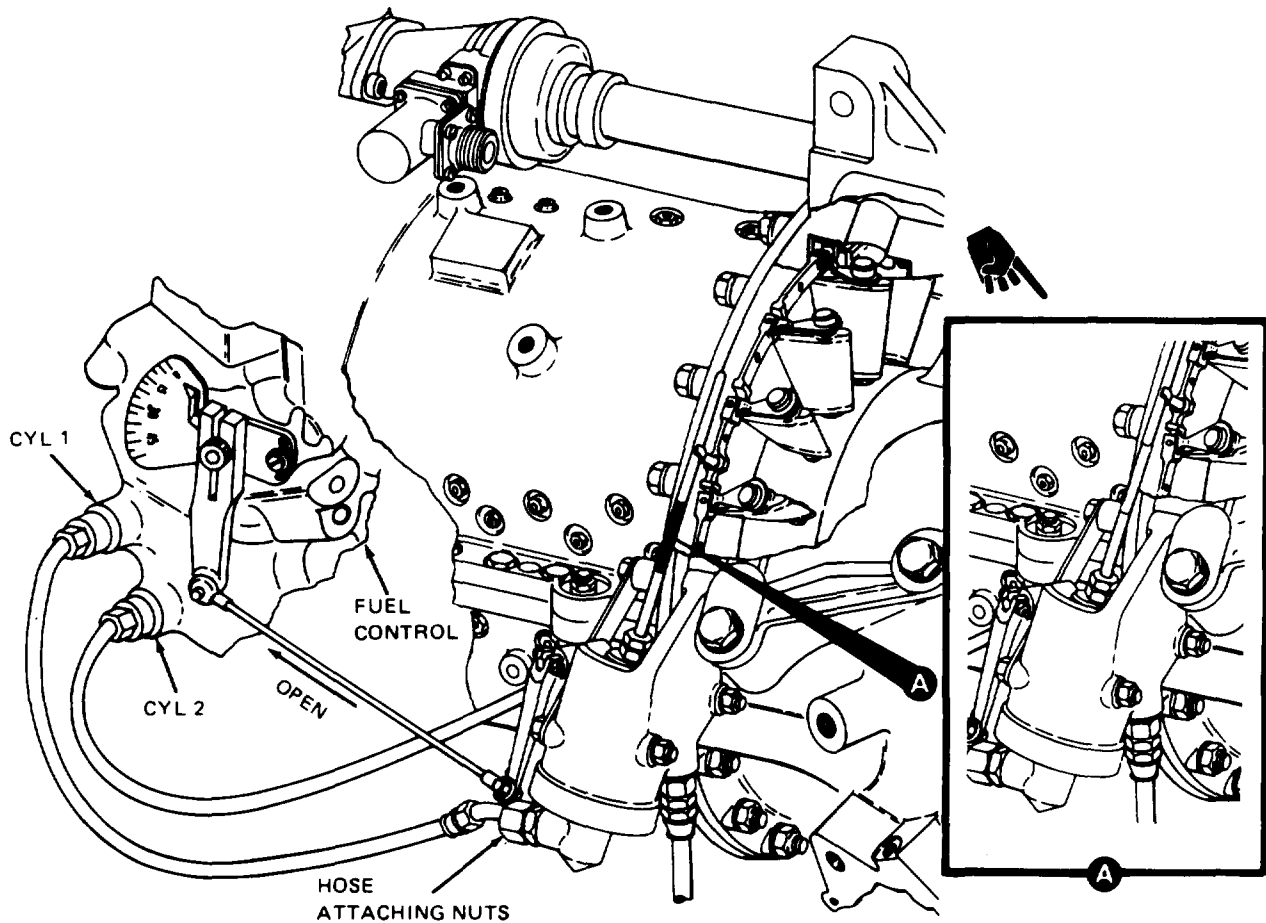
Applicable Configuration  
T53-L-13B/703 Engines

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR HOUSING ASSEMBLY/

1. Hose Attaching Nuts

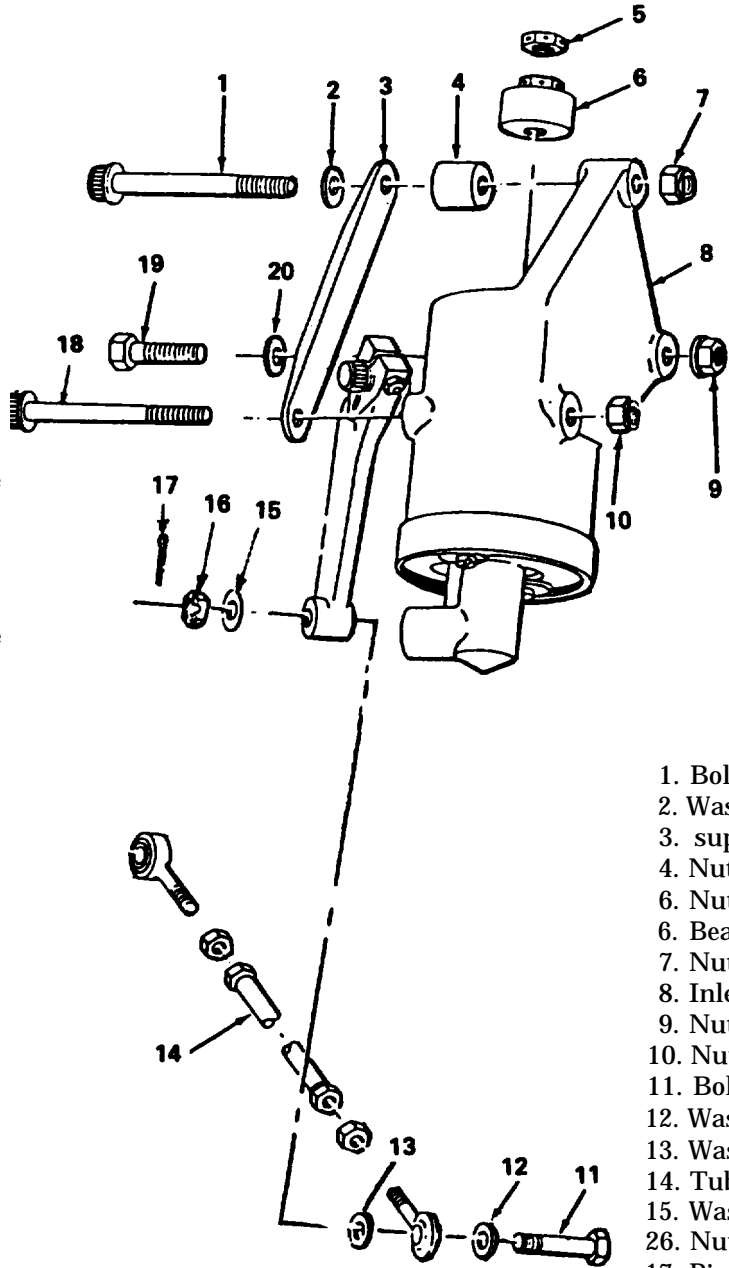
**Release** torque on hose attaching nuts to CYL 1 and CYL 2 lines at actuator. **Position** actuator to vane full open position. **Record** variable inlet guide vane degree position on fuel control indicator plate.



The hose attaching nuts secure the line to the actuator.

2-12. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR HOUSING ASSEMBLY/ - Continued</p>		
<p>2. Tube Assembly (14)</p>		<p><b>Remove</b> nut (16), pin (17), washers (12, 13 and 15) and bolt (11) that secure tube assembly (14).</p>
<p>3. Inlet Guide Vane Actuator Assembly (8)</p>		<p><b>Cut</b> lockwire and <b>loosen</b> nut (5). <b>Unscrew</b> bearings (6) from connector.</p>
<p>4. Hose Assemblies</p>		<p><b>Disconnect</b> from inlet guide vane actuator assembly.</p>
<p>5. Inlet Guide Vane Actuator Assembly (8)</p>		<p><b>Remove</b> nuts (7, 9 and 10), washers (2 and 20), support (3), spacer (4) and bolts (1, 18 and 19).</p>
<p>6. Inlet Guide Vane Actuator Assembly (8)</p>		<p>Carefully remove from engine.</p>



- 1. Bolt
- 2. Washer
- 3. support
- 4. Nut
- 6. Nut
- 6. Bearing
- 7. Nut
- 8. Inlet Guide Vane Actuator Assy
- 9. Nut
- 10. Nut
- 11. Bolt
- 12. Washer
- 13. Washer
- 14. Tube Assy
- 15. Washer
- 16. Nut
- 17. Pin
- 18. Bolt
- 19. Bolt
- 20. Washer



2-13. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703

**References**  
Para H-26, H-29, and 2-15

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/		
1. All Parts	Refer to paragraph H-26 for blend-repair procedures.	<b>Inspect</b> for nicks, burrs, and scratches. <b>Blend-repair</b> nicks, burrs and scratches.
2. All Threaded Parts	Refer to paragraph H-29 for repair procedures.	<b>Inspect</b> for damaged threads. <b>Repair</b> damaged threads as outlined. <b>Replace</b> parts having threads damaged beyond repair.
3. All Parts		<b>Inspect</b> for cracks, distortion and excessive wear. <b>Replace</b> all cracked, distorted or excessively worn parts.
4. Bearings		<b>Inspect</b> for scoring, binding or other damage. <b>Replace</b> if damaged.
5. Bearing Connector	Refer to paragraph 2-15 for replacement procedures.	<b>Inspect</b> retaining screw for proper staking.
6. Control Lever		<b>Inspect</b> for excessive play in circumferential directions of feedback control lever (max. is 0.030 inch or 0.76 mm). Measure from tip of housing bottom to center-line of bolt hole in feedback control lever. <b>Replace</b> excessively worn or distorted parts.

2-13. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Inspection  
- Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/ - Continued		<b>Inspect</b> for bent actuator lever (measure from tip of housing bottom to center line of bolt hole on feedback control lever) (distance may be 3-7/8 to 4-1/8 inch). <b>Replace</b> feedback control lever.

2-14. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Disassembly

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

LOCATION/ITEM	REMARKS	ACTION
GUIDE VANE ACTUATOR ASSEMBLY/		
1. Screws (20), Washers (19), Retainer (18), and Retaining Ring (17)		<b>Remove.</b>
2. Housing(16)		<b>Remove</b> from housing (7).
3. Packing(15)		<b>Remove</b> from housing (16).
4. Retainer (5)	<b>Straighten</b> to permit removal of screw (4).	
5. Screw (4)	Use 3/8-inch wrench on hex end of piston (14) to prevent it from turning while removing screw (4).	<b>Remove.</b>
6. Retainer(5)		<b>Remove.</b>
7. Piston(14)		<b>Remove</b> from housing (7). <b>Remove</b> packings (8 and 9) from piston.
8. Connector (6)		<b>Remove.</b>
9. Lever (24 and 2)	Use etching tool.	<b>Etch</b> a mark on face of lever (24) and splined end of lever (2) to <b>insure</b> proper reassembly.

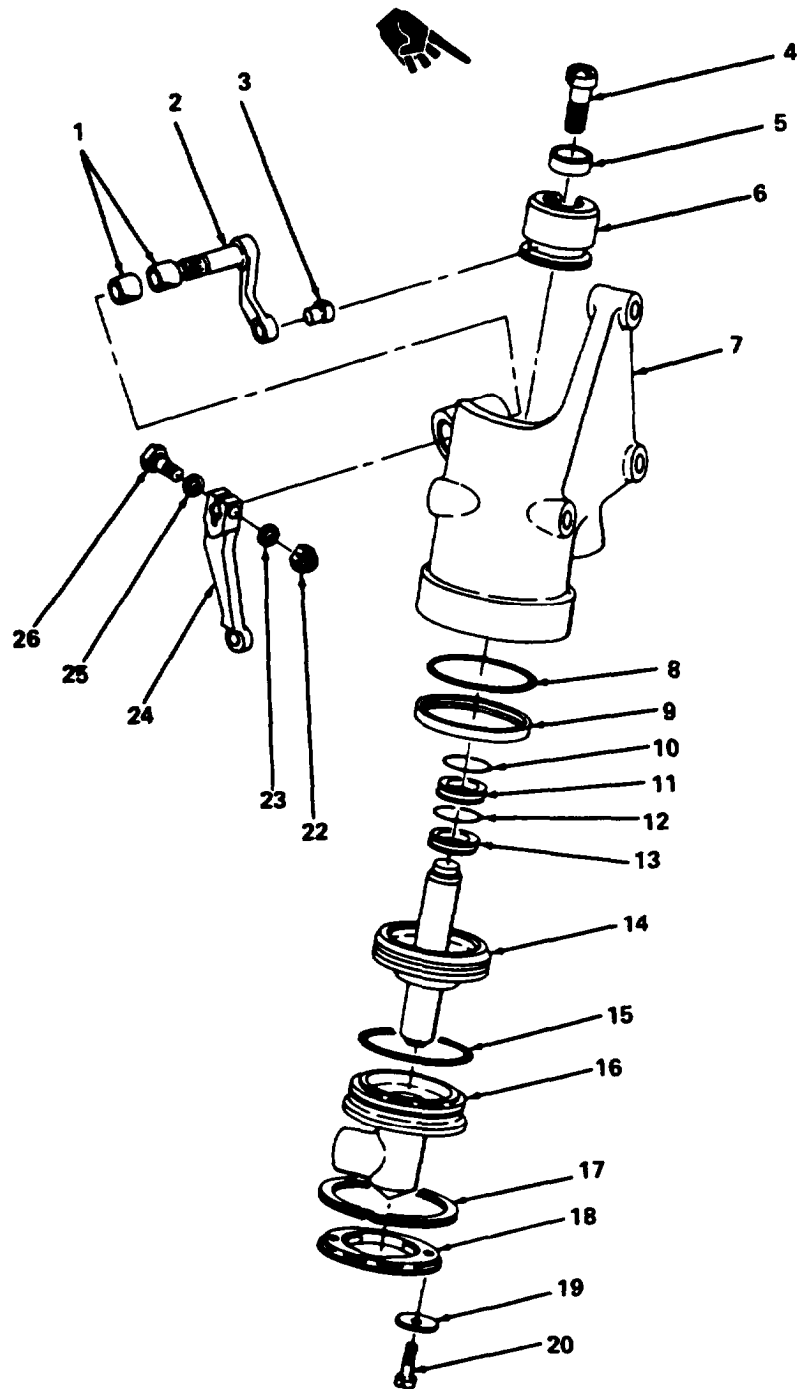


2-14. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Disassembly-  
Continued

LOCATION/ITEM	REMARKS	ACTION
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GUIDE VANE  
ACTUATOR ASSEMBLY/-  
Continued

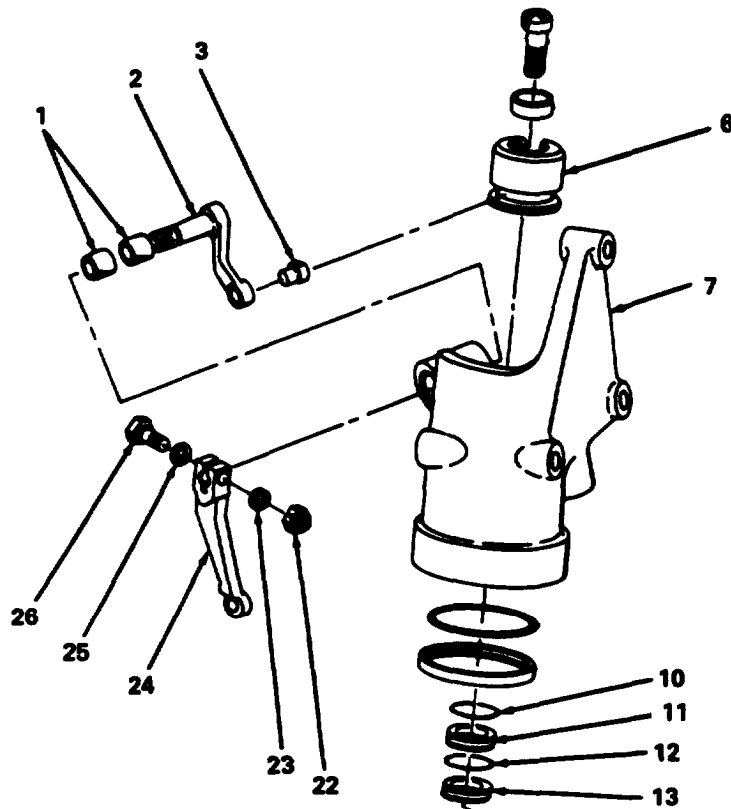
1. Bearing
2. Lever
3. Pin
4. screw
5. Retainer
6. Connector
7. Housing
8. Packing
9. Packing
10. Packing
11. Packing
12. Packing
13. Packing
14. Piston
15. Packing
16. Housing
17. Retaining Ring
18. Retainer
19. Washer
20. Screw
21. Deleted
22. Nut
23. Washer
24. Lever
25. Washer
26. Bolt





2-14. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engine) - Disassembly - Continued

LOCATION/ITEM	REMARKS	ACTION
GUIDE VANE ACTUATOR ASSEMBLY/ - Continued		
10. Nut (22), Washer (25), Bolt (26) and Washer (23)		<b>Remove.</b>



11. Lever (24)

12. Lever (2)

13. Pin (3)

14. Packings (10, 11, 12, and 13)

**Separate** from lever (2).

**Remove** from bearing (1).

**Remove** from lever (2).

**Remove** from housing (7).

**NOTE**

It is not necessary to remove bearings (1) from housing (7) unless the bearings are damaged.

**2-15. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Repair**

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**Special Tools**  
Suitable Drift and Mallet  
Soft-Faced Mallet

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/		
1. Bearings		Replace damaged bearings.
<div style="border: 2px dashed black; padding: 5px; display: inline-block;"><b>CAUTION</b></div>		
<b>Do not damage housing bore.</b>		
2. Bearings	Use suitable drift and mallet.	Drive bearings out of housing,
3. Bearings	Use soft-faced mallet.	Tap new bearings into housing.

2-16. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Assembly

INITIAL SETUP

Applicable Configuration  
T53-L-13B/703 Engines

Consumable Materials  
Lockwire (Items 41,42, and 43, Appendix D)

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/		
1. Actuator Assembly		<b>Insert</b> lever (1) into housing (6). <b>Install</b> lever (22) on lever (1) so matchmarks on levers are aligned. <b>Secure</b> lever (22 to lever (1) with washers (21 and 23), bolt (24), and nut (20).
2. Actuator Assembly		<b>Install</b> packings (9, 10, 11, and 12) into housing (6) . Install packings (7 and 8) on piston (13).
3. Actuator Assembly		<b>Insert</b> piston (13) into housing (6). <b>Insert</b> pin (2) into lever (1) and <b>engage</b> connector (5) with pin. <b>Lower</b> connector onto piston (13).

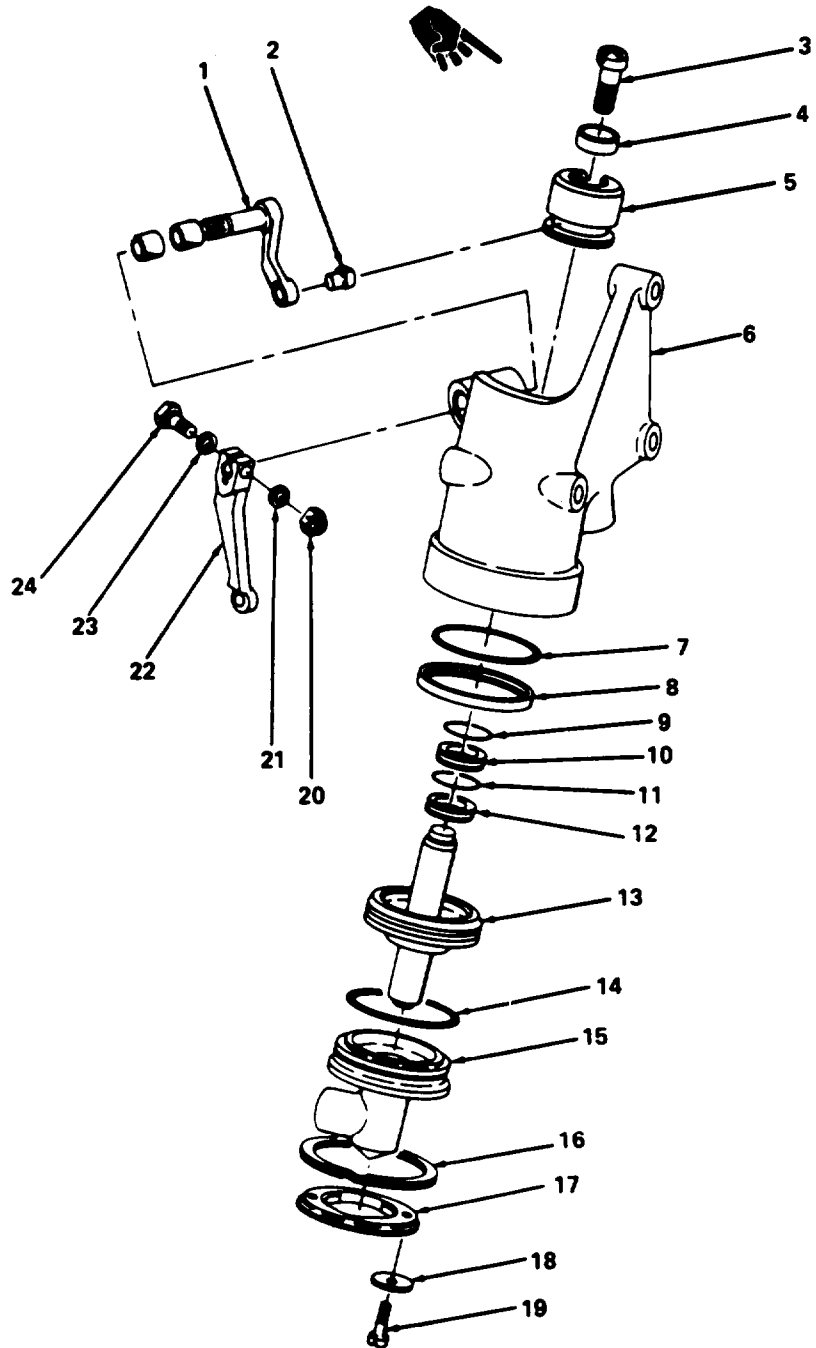
NOTE

Several screws may have to be tried in following item 4, to obtain proper alinement

- |              |             |                    |             |
|--------------|-------------|--------------------|-------------|
| 1. Lever     | 8. Packing  | 15. Housing        | 22. Lever   |
| 2. Pin       | 9. Packing  | 16. Retaining Ring | 23. Washer  |
| 3. Screw     | 10. Packing | 17. Retainer       | 24. Bolt    |
| 4. Retainer  | 11. Packing | 18. Washer         | 25. Deleted |
| 5. Connector | 12. Packing | 19. Screw          |             |
| 6. Housing   | 13. Piston  | 20. Nut            |             |
| 7. Packing   | 14. Packing | 21. Washer         |             |

2-16. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Assembly -  
Continued

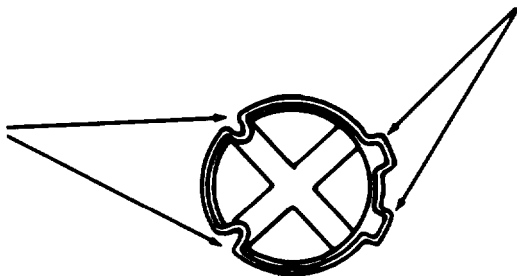
LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/ - Continued		



2-16. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Assembly -  
 Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/- continued		
4. Actuator Assembly		<b>Install</b> retainer (4) and <b>secure</b> with screw (3). <b>Check</b> for proper alinement of screw slots and connector (5).
5. Actuator Assembly		Using 3/8 inch wrench on hex end of piston, <b>tighten</b> screw (3). <b>Stake</b> retainer (4) in four places.

STAKE RETAINER INTO SCREW SLOTS  
 IN 2 PLACES FARTHEST AWAY FROM  
 LOCKING DETENT IN CONNECTOR.  
 SHEARING RETAINER IS PERMISSIBLE.



STAKE RETAINER INTO 2 PLACES  
 SHEARING RETAINER IS PERMISSIBLE

2-16. Inlet Guide Vane Assembly (T53-L-13B/703 Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/- Continued	<b>NOTE</b>  The seal drain is the port which is at 45-degree angle to housing.	
6. Actuator Assembly		<b>Using</b> wrench on hex end of piston (13), <b>turn</b> piston so cutout in connector (5) is facing toward' s&l drain port.
7. Actuator Assembly		<b>Install</b> packing (14) on housing (15). <b>Place</b> housing (15) into housing (6). <b>Install</b> retaining ring (16).
8. Actuator Assembly		<b>Insert</b> retainer (17) into housing (6), and <b>aline</b> retainer with housing to allow installation of washers (18).
9. Actuator Assembly		<b>Rotate</b> housing (15) to <b>aline</b> screw holes in housing with screw holes in retainer (17). <b>Install</b> washers (18) and screws (19). <b>Lockwire</b> screws.

## 2-17. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) -Installation

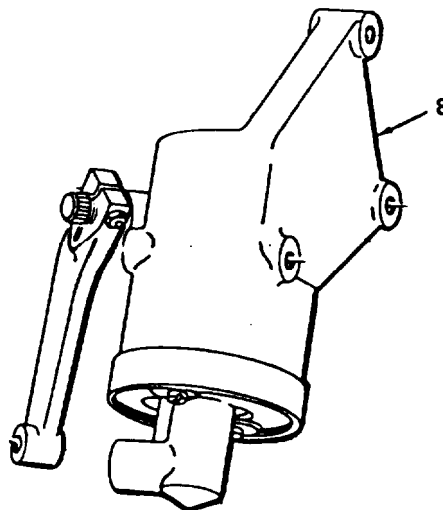
### INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**Consumable Materials**  
Lockwire (item 41, 42, and 43, Appendix D)

**References**  
Para 2-12 and 2-11

LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING/  1. Inlet Guide Vane Actuator Assembly (8)		Position inlet guide vane actuator assembly (8) on rear flange of inlet housing.



### NOTE

When securing actuator assembly, use washers (2) as required to prevent threaded end of bolt from rubbing against inlet housing.

2-17. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Installation

LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING/ Continued		
2. Actuator Assembly		<p><b>Secure</b> actuator assembly with bolts (1, 22, and 23), washers 2 and 24), support (3), spacer 4), and nuts (7, 9, and 10). <b>Tighten</b> nuts as required. If installed, remove covers or liners from actuator fittings.</p>
3. Bearing (6)	<p style="text-align: center;"><b>NOTE</b></p> <p><b>Scribe mark has replaced the blast marks on connector rods. Use the scribe marks when applicable.</b></p>	<p><b>Thread</b> bearing (6) onto connector. <b>Hold</b> actuator full open; (piston retracted) <b>adjust</b> bearing.</p>



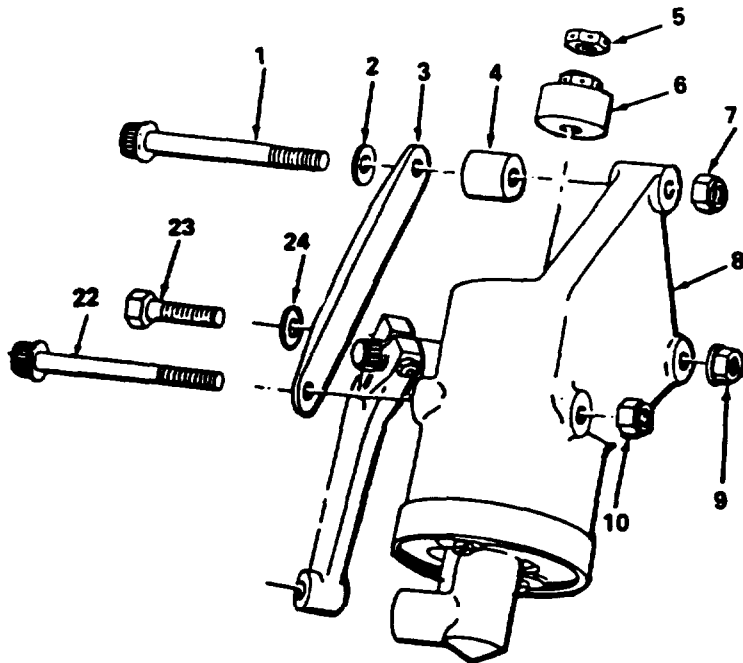


2-17. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Installation -

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

INLET HOUSING/ -  
Continued

until upper end of blast-mark area or scribe line on connector aligns with open scribe mark on rigging plate (located on inlet housing). **Tighten** nut (5) as required and **secure** with lockwire.



**NOTE**

When connecting tube assembly (16) to actuator, use quantity of washers (19) as required to obtain minimum clearance between cotter pin (21) and nut (20).

4. Tube Assembly

**Connect** tube assembly (16) to actuator lever with tube positioned between lever and actuator assembly, (inboard side), with bolt (11), washers (12, 13, and 19), nut (20) and cotter pin (21).

5. Actuator

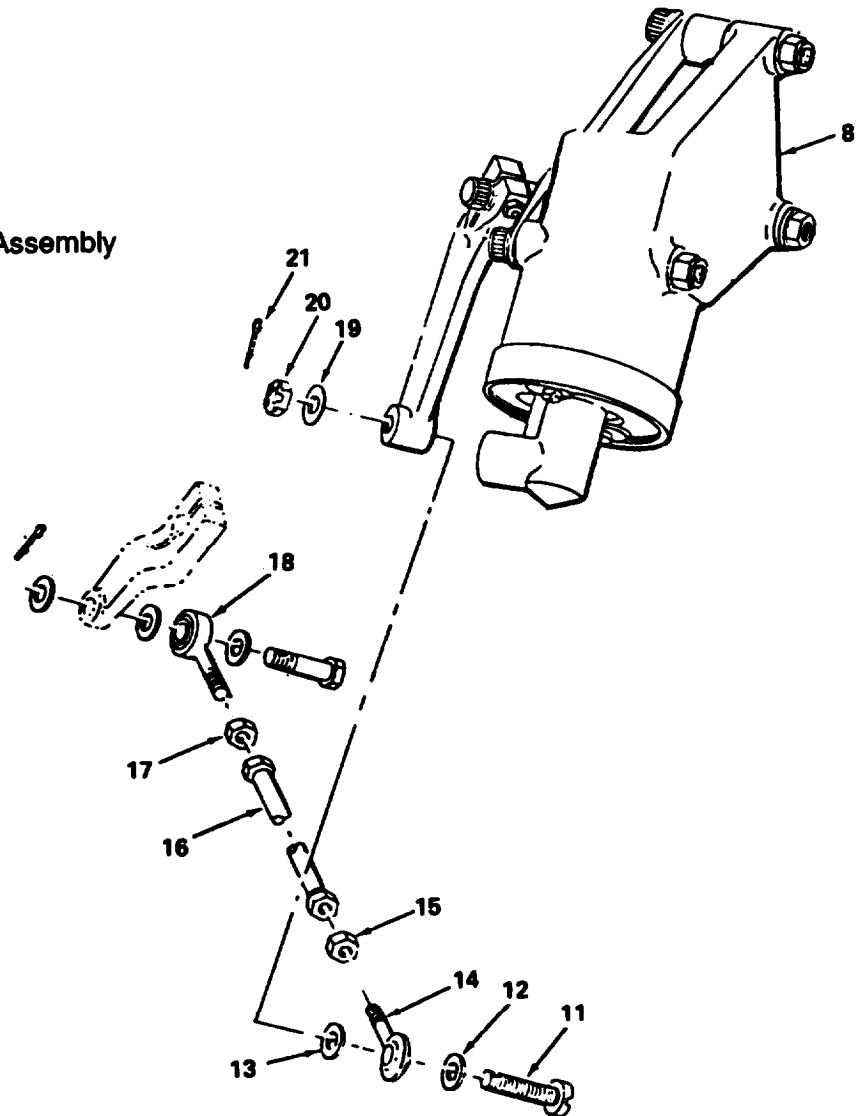
**Hold** actuator in full open position.

2-17. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Installation -  
 Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

INLET HOUSING/-  
 Continued

1. Bolt
2. Washer
3. Support
4. Spacer
5. Nut
6. Bearing
7. Nut
8. Inlet Guide Vane Actuator Assembly
9. Nut
10. Nut
11. Bolt
12. Washer
13. Washer
14. Rod End Bearing
15. Nut
16. Tube Assembly
17. Nut
18. Rod End Bearing
19. Washer
20. Nut
21. Cotter Pin
22. Bolt
23. Bolt
24. Washer



2-17. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Installation -  
Continued

LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING/ - Continued	<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"> <p><b>CAUTION</b></p> </div> <p>For proper engagement of parts, ensure threads of rod end bearings can be seen through inspection holes in tube assembly.</p>	
6. Rod End Bearings		<p><b>Adjust</b> rod end bearings (14 and 18) until indicator of fuel control lever aligns with previously recorded position on fuel control indicator plate (<b>refer</b> to paragraph 2-12).</p>
7. Tube Assembly (16)	<p><b>NOTE</b></p> <p>If a replacement inlet guide vane actuator is installed, an operational check is required. Refer to paragraph 2-11.</p>	<p><b>Center</b> tube assembly (16) and <b>tighten</b> nuts (15 and 17) as required and <b>lockwire</b>. <b>Tighten</b> nut (20) as required. <b>Install</b> pin (21).</p>
	<p><b>NOTE</b></p> <p>Following action item 8 applies If feedback rod is removed from fuel control lever.</p>	
8. Feedback Rod		<p><b>Connect</b> rod end bearing (18) as shown. <b>Insert</b> bolt through washer and rod end bearing with washer between rod end bearing and inboard side of fuel control lever. <b>Install</b> one or more washers and secure with cotter pin.</p>

2-18. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Functional Test (AVIM)

Text Deleted

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T.O. 2J-T53-16

**2-18. Inlet Guide Vane Actuator Assembly (T53-L-13B/703 Engines) - Functional Test (AVIM) - Continued**

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2-19. Inlet Guide Vane Actuator Hose Assembly (T53-L-13B/703 Engines) - Removal

INITIAL SETUP

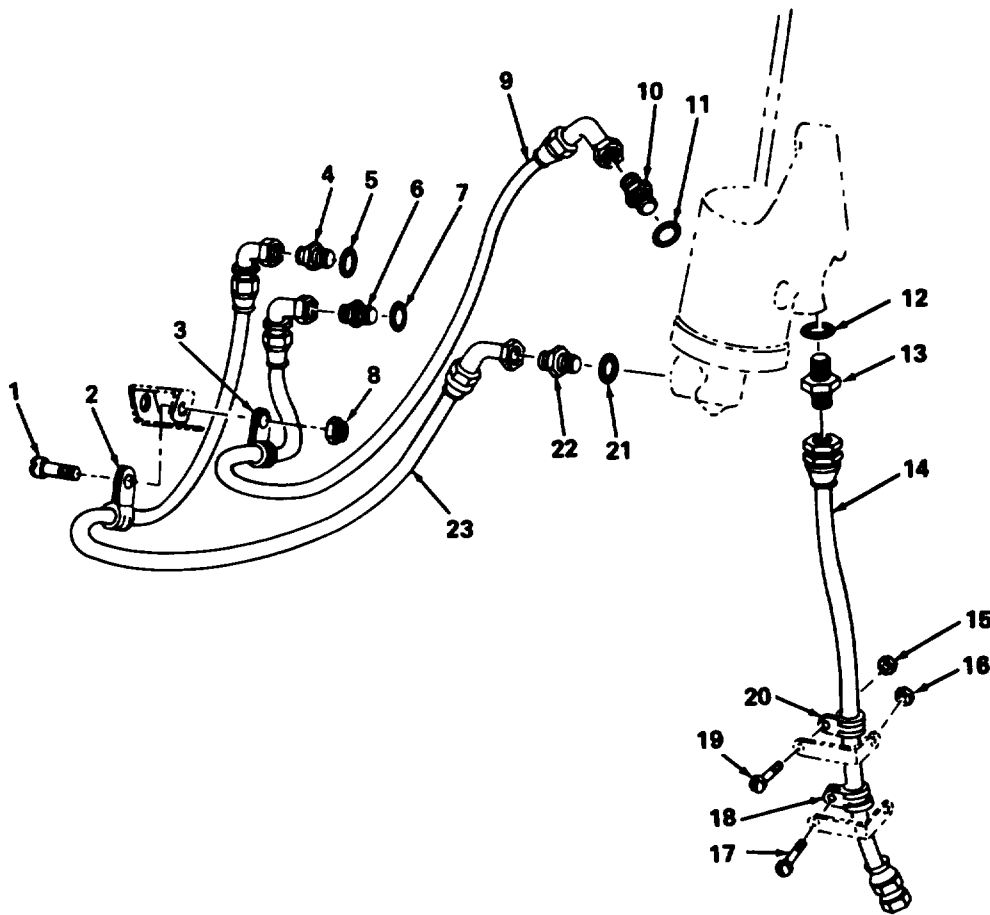
Applicable Configuration  
T53-L-13B/703 Engines

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR  
HOUSING/

1. Clamp (20)

**Remove** screw (19) and nut (15) that secure clamp (20) to bracket on accessory drive gear-box assembly.

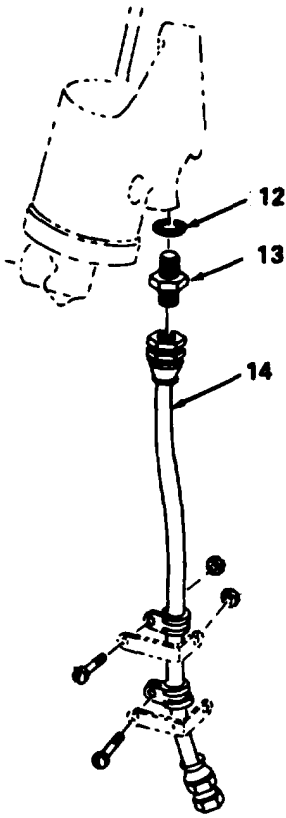


- |                  |                   |                   |
|------------------|-------------------|-------------------|
| 1. Screw         | 10. Union         | 19. Screw         |
| 2. Clamp         | 11. Packing       | 20. Clamp         |
| 3. Clamp         | 12. Packing       | 21. Packing       |
| 4. Union         | 13. Reducer       | 22. Union         |
| 5. Packing       | 14. Hose Assembly | 23. Hose Assembly |
| 6. Union         | 15. Nut           |                   |
| 7. Packing       | 16. Nut           |                   |
| 8. Nut           | 17. Screw         |                   |
| 9. Hose Assembly | 18. Clamp         |                   |

2-19. Inlet Guide Vane Actuator Hose Assembly (T53-L-13B/703 Engines) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/ - Continued		
2. Clamp (18)		<b>Remove screw (17) and nut (16) that secure clamp (18) to bracket on accessory drive gearbox assembly.</b>
3. Hose Assembly (14)		<b>Tag to identify port connection from which it will be removed.</b>
4. Hose Assembly (14)		<b>Disconnect from reducer (13) and accessory drive gearbox assembly and remove hose assembly. Cap open port on gearbox assembly.</b>

5. Actuator Assembly



**Remove reducer (13) with packing (12) from inlet guide vane actuator assembly. Remove packing from reducer. Plug open port on actuator assembly.**

2-19. Inlet Guide Vane Actuator Hose Assembly (T53-L-13B/703 Engines) - Removal - Continued

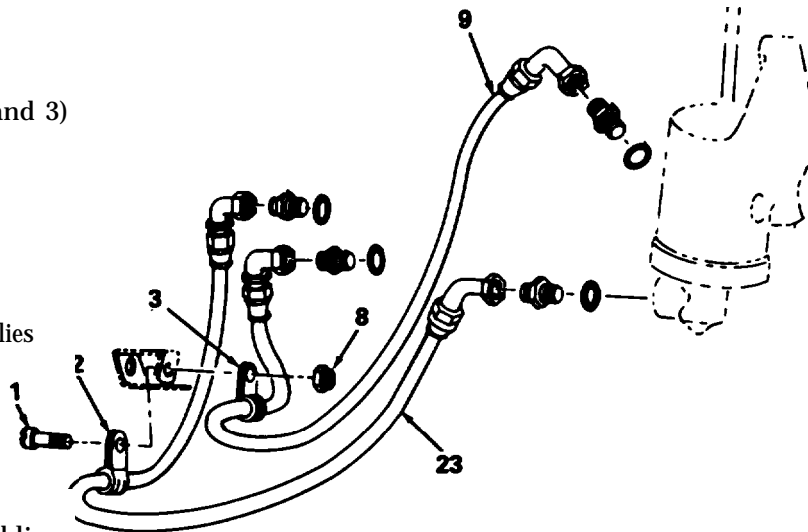
LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR  
HOUSING/ -  
Continued

6. Clamps (2 and 3)

7. Hose Assemblies  
(9 and 23)

8. Hose Assemblies



**Remove** screw (1) and nut (8) that secure clamps (2 and 3) to **clamp on** bottom rear flange of compressor housing.

**Tag** to identify port connections from which they will be removed.

**Disconnect** hose assembly (9) from unions (6 and 10) and hose assembly (23) from unions (4 and 22) and **remove** hose assemblies.

9. Unions (10 and 22), Packings (11 and 21), Unions (4 and 6), Packings (5 and 7)

**Remove** unions (10 and 22) with packing (11 and 21) from inlet guide vane assembly and unions (4 and 6) with packing (5 and 7) from fuel control. **Remove** packings from unions. **Plug all** open ports.



**2-20. Inlet Guide Vane Actuator Hose Assembly (T53-L-13B/703 Engines) - Inspection**

INITIAL SETUP

Applicable Configuration  
T53-L-13B/703 Engines

References  
Para H-22 and 7-5

LOCATION/ITEM	REMARKS	ACTION
INLET GUIDE VANE ACTUATOR ASSEMBLY/		
1. Inlet Guide Vane Actuator Hose Assemblies	<b>Refer to paragraph H-22 for inspection procedures. Refer to paragraph 7-5 for repair and replacement procedures.</b>	Inspect, repair or replace <b>damaged hose assemblies.</b>

**2-21. Inlet Guide Vane Actuator Hose Assembly (T53-L-13B/703 Engines) - Installation**

INITIAL SETUP

Applicable Configuration  
T53-L-13B/703 Engines

Consumable Materials  
Chafing Sleeve

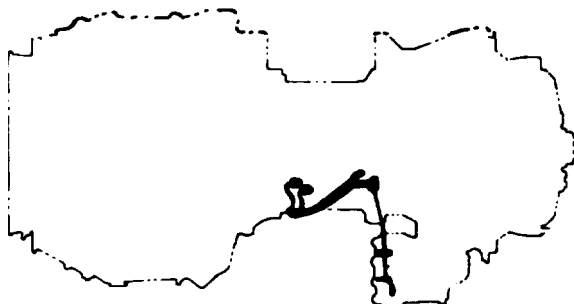
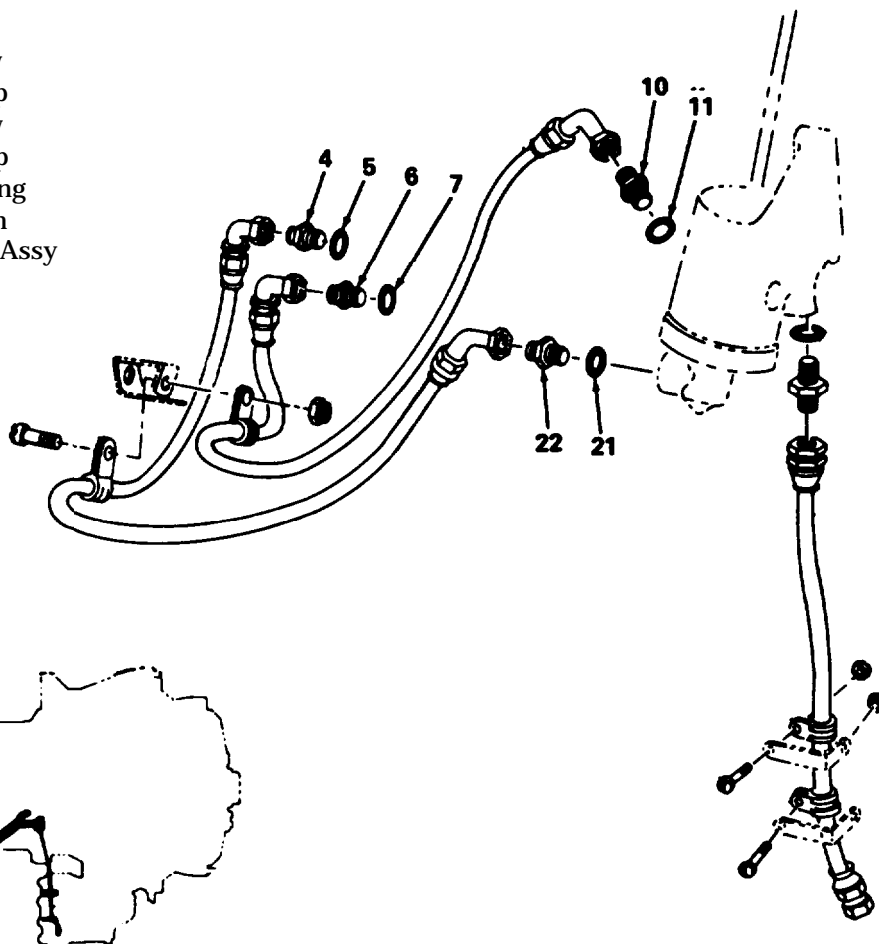
LOCATION/ITEM	REMARKS	ACTION
INLET GUIDE VANE ACTUATOR AND COMPRESSOR HOUSING ASSEMBLY/		
1. Fuel Control		<b>Position</b> packings (5 and 7) onto unions (4 and 6) and <b>install</b> unions into fuel Control. <b>Tighten</b> unions as required.
2. Inlet Guide Vane Actuator Assembly		<b>Position</b> packings (11 and 21) onto unions (10 and 22) and install unions into inlet guide vane actuator assembly. <b>Tighten</b> unions as required.

2-21. Inlet Guide Vane Actuator Hose Assembly (T53-L-13B/703 Engines) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

INLET GUIDE VANE  
ACTUATOR AND  
COMPRESSOR HOUS-  
ING ASSEMBLY/-  
Continued

- |               |               |
|---------------|---------------|
| 1. Screw      | 17. Screw     |
| 2. Clamp      | 18. Clamp     |
| 3. Clamp      | 19. Screw     |
| 4. Union      | 20. Clamp     |
| 5. Packing    | 21. Packing   |
| 6. Union      | 22. Union     |
| 7. Packing    | 23. Hose Assy |
| 8. Nut        |               |
| 9. Hose Assy  |               |
| 10. Union     |               |
| 11. Packing   |               |
| 12. Packing   |               |
| 13. Reducer   |               |
| 14. Hose Assy |               |
| 15. Nut       |               |
| 16. Nut       |               |



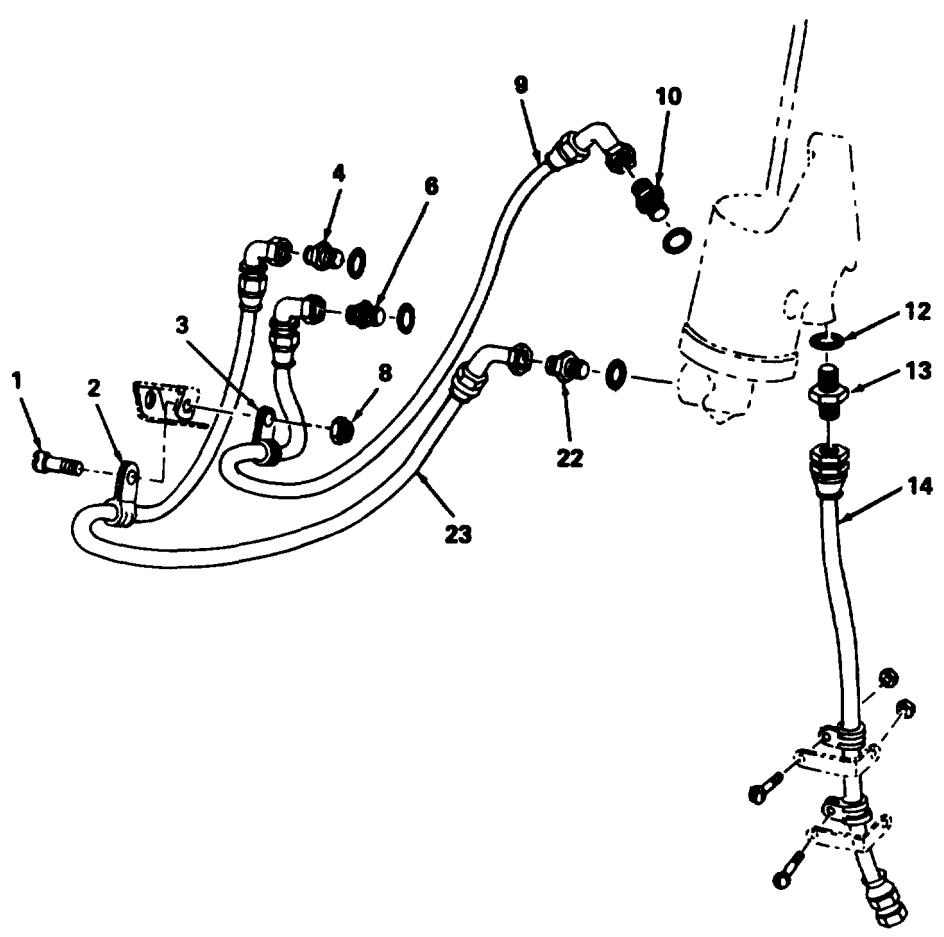
**NOTE**

Prior to installation of hose assemblies (9 and 23) insure that chafing sleeve is installed and positioned to prevent rubbing against nearby hoses, impeller housing, airbleed housing or other hoses.

Refer to identification tags installed at removal to insure hose assemblies are connected to proper port.

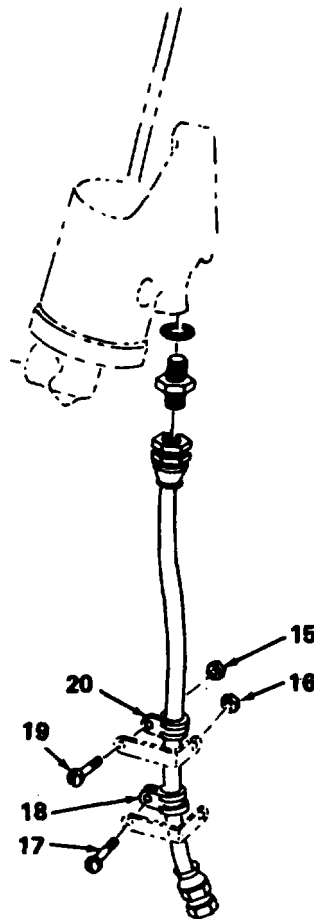
2-21. Inlet Guide Vane Actuator Hose Assembly (T53-L-13B/703 Engines) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
INLET GUIDE VANE ACTUATOR AND COMPRESSOR HOUSING ASSEMBLY/ - Continued		
3. Hose Assembly (9), Unions (6 and 10), Hose Assembly (23), and Unions (4 and 22)		Connect hose assembly (9) to unions (6 and 10) and hose assembly (23) to unions (4 and 22). Tighten hose connectors as required.



2-21. Inlet Guide Vane Actuator Hose Assembly (T53-L-13B/703 Engines) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
INLET GUIDE VANE ACTUATOR AND COMPRESSOR HOUSING ASSEMBLY/ - Continued		
4. Clamps (2 and 3)		<b>Secure</b> clamps (2 and 3) to bracket on bottom rear flange of compressor housing with screw (1) and nut (8).
5. Packing (12) and Reducer (13)		<b>Position</b> packing (12) onto reducer (13) and <b>install</b> reducer into inlet guide vane actuator assembly. <b>Tighten</b> reducer as required.
6. Hose Assembly (14) and Reducer (18)		<b>Connect</b> hose assembly (14), to reducer (13) and accessory drive gearbox assembly. <b>Tighten</b> hose connectors as required.
7. Clamp (20)		<b>Secure</b> clamp (20) to bracket on accessory drive gearbox assembly with screw (19) and nut (15).
8. Clamp (18)		<b>Secure</b> clamp (18) to bracket on accessory drive gearbox assembly with screw (17) and nut (16).



**2-22. Compressor and Impeller Housing Assembly - Removal**

INITIAL SETUP

**Applicable Configuration**  
All

**References**  
Para 2-31

**Special Tools**

- Pin Removal Tool (LTCT4895)
- Removal Tool (LTCT504)
- Pin Removal Backup Tool (LTCT488)
- Mechanical Puller (LTCT1218)
- Adapter (LTCT6740)

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/

**CAUTION**

Remove only one compressor housing half at any one time. Do not disturb the bolts that secure the compressor and impeller housing half that is not being removed from the diffuser and inlet housing. Use the following procedure to remove either compressor half.

The shim found between the compressor housing assembly and the impeller housing assembly, and the extra washers between the bleed band actuator and the mounting boss on the impeller housing, must be reinstalled after repairs are completed. However, if a new impeller housing is being installed, the shim and extra washers are to be discarded.

**NOTE**

When a bracket is released by removal of a bolt, secure bolt, washer, and nut to bracket until ready for installation. To facilitate installation of housings, identify and mark position of all removed items.

**NOTE**

To facilitate removal of lower compressor housing half, remove Accessory Drive Gearbox. (Refer to paragraph 5-2).

**Remove** all necessary lines, hoses, and accessories.

1. Compressor and Impeller Housing Assemblies

2-22 Compressor and Impeller Housing Assembly - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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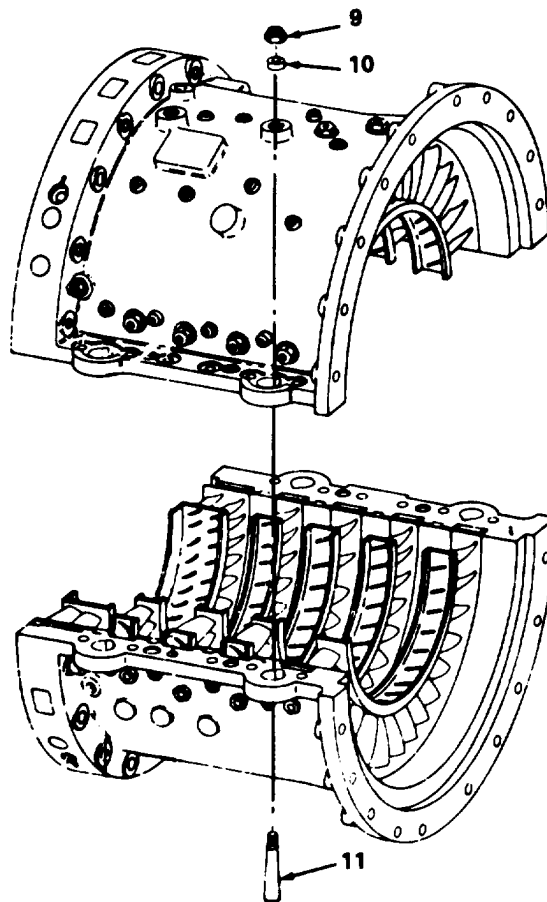
ENGINE/ -  
Continued

NOTE

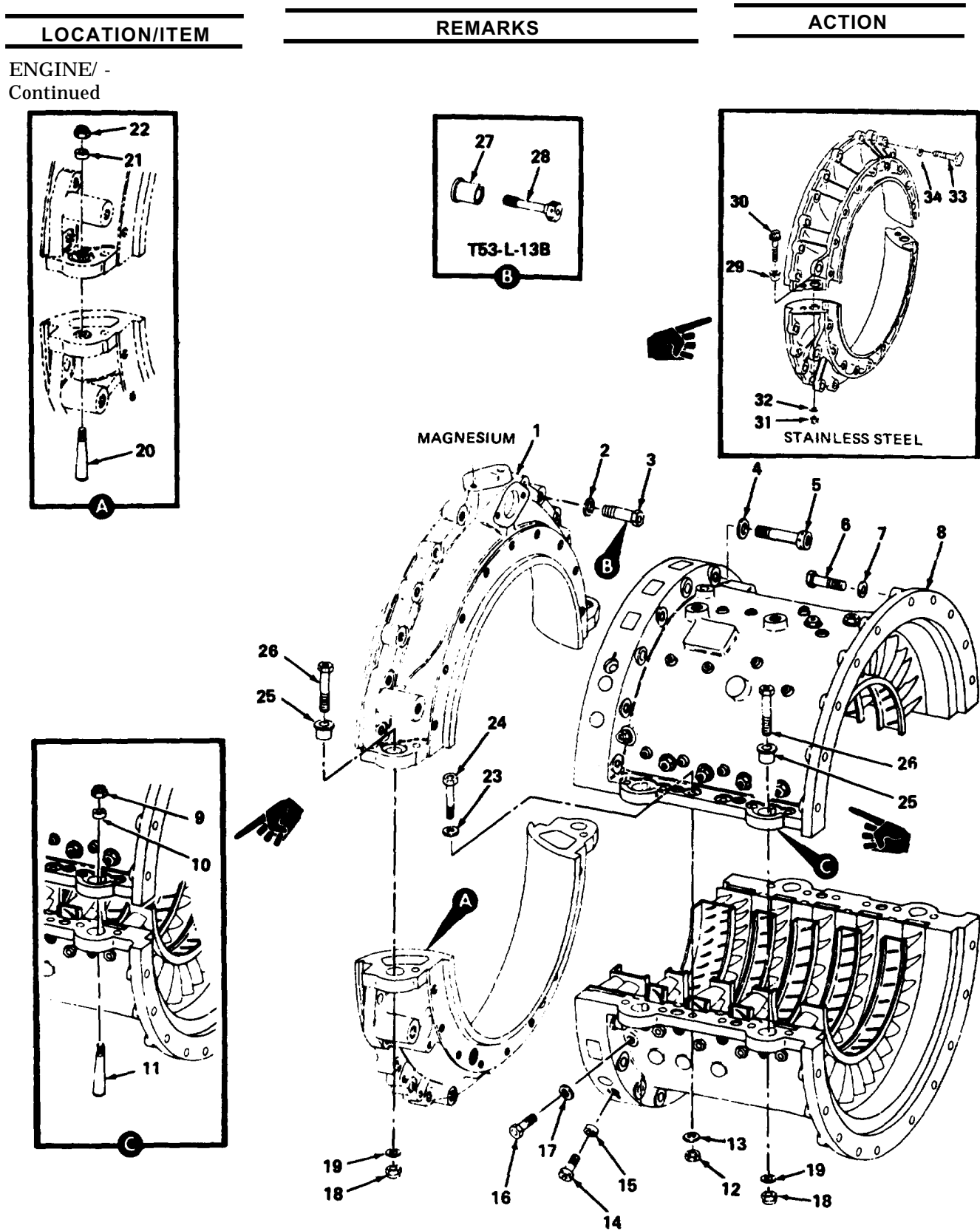
Following action items 2,3, and 4 apply to compressor housing with taper pins.

2. Compressor  
Housing Assembly

**Remove** nuts (9) and washers (10) from four locating pins (11).



2-22. Compressor and Impeller Housing Assembly - Removal - Continued



2-22. Compressor and Impeller Housing Assembly - Removal - Continued

LOCATION/ITEM	REMARKS		ACTION
ENGINE/ - Continued			
1. Impeller Housing Assembly 2. Washer 3. Bolt 4. Washer 5. Bolt 6. Bolt 7. Washer 8. Compressor Housing Assembly	9. Nut 10. Washer 11. Taper Pin 12. Nut 13. Washer 14. screw 15. Bolt Retainer 16. Bolt 17. Washer	18. Nut 19. Washer 20. Taper Pin 21. Washer 22. Nut 23. Washer 24. Bolt 25. Dowel 26. Bolt 27. Bushing	28. Bolt 29. Dowel (1.100-538-01) 30. Bolt (MS99151) 31. Nut (STD3064-4) 32. Washer (AN960-416) 33. Bolt (MS9630"09) 34. Washer (AN960-416) Impeller Housing Assembly 1-101-370-03 (Steel)





2-22 Compressor and Impeller Housing Assembly - Removal - Continued

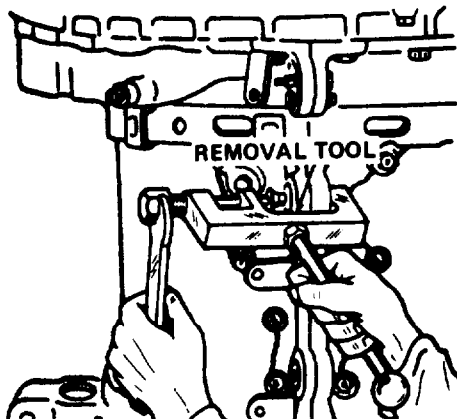
LOCATION/ITEM	REMARKS	ACTION
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ENGINE/-  
Continued

3. Compressor  
Housing Assembly

Use pin removal tool (LTCT4895).

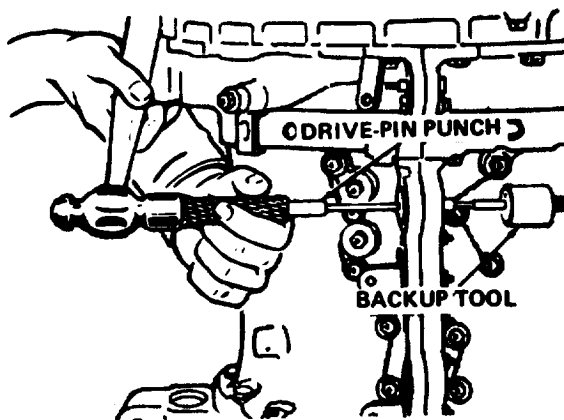
**Remove** taper pins (11)  
with removal tool.



Taper pins may also be removed by  
threading removal tool (LTCT504)  
onto taper pins. Use pin removal backup  
tool (LTCT488) to back up compressor  
housing flange.

4. Compressor  
Housing  
Assembly

**Remove** taper pins by  
striking punch with  
hammer.



2-22. Compressor and Impeller Housing Assembly . Removal - Continued

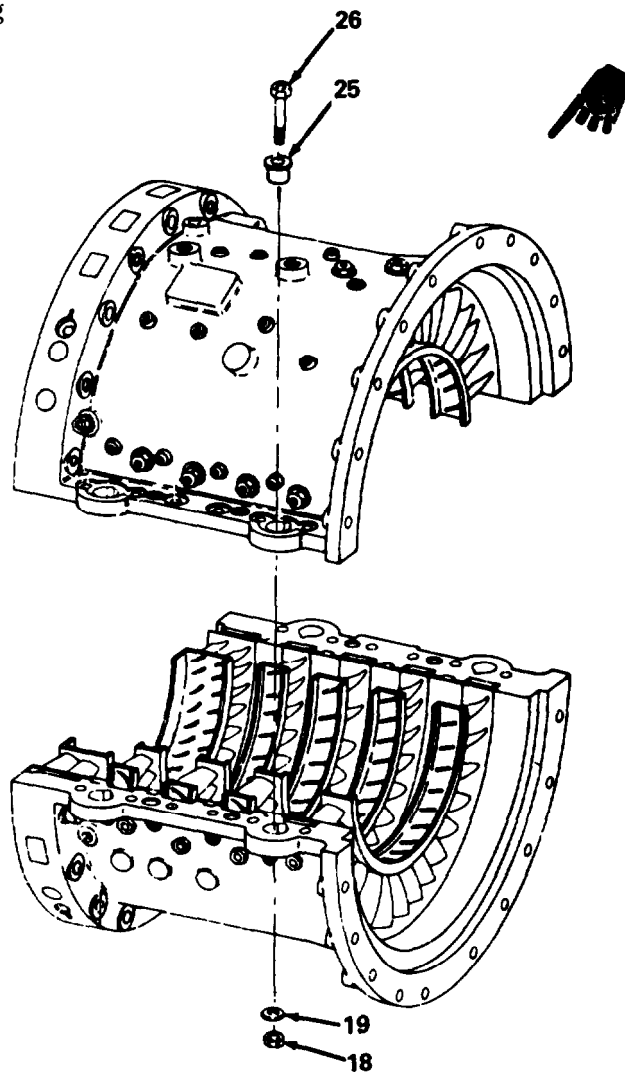
LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ -  
Continued

NOTE

Action items 5 and 6 apply to compressor housing assembly with hollow dowels.

5. Compressor Housing Assembly



**Remove** nuts (18), washers (19), and bolts (26) on flange of compressor housing assembly.

6. Compressor Housing Assembly

Use mechanical puller (LTCT12 18) with removal tool (LTCT6740).

**Remove** dowels (25).

2-22 Compressor and impeller Housing Assembly - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
7. Inlet Housing Assembly		<p><b>Remove</b> ten bolts (6) and washers (7) that secure housing half to inlet housing.</p>
8. Compressor Housing Assembly		<p><b>Remove</b> 12 nuts (12), bolts (24), and 24 washers (13 and 23) that secure compressor housing upper half to lower half.</p>
9. Compressor Housing Assembly		<p><b>Remove</b> bolts (5) and washers (4) that secure compressor housing assembly half to impeller housing assembly.</p>

**2-22. Compressor and Impeller Housing Assembly - Removal - Continued**

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

ENGINE/ -  
Continued

**CAUTION**

The impeller housing assemblies have pilot flanges that fit into the compressor and diffuser housing assemblies. To prevent damaging these flanges during disassembly, always remove compressor housing assembly half before attempting to remove impeller housing assembly.

10. Compressor Housing Half

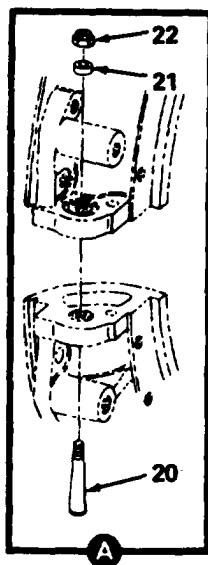
Use four 1/428 bolts (AN-4) as jackscrews.

**Remove.**

**NOTE**

The following actions for items 11 and 12 apply to impeller housings with taper pins.

11. Impeller Housing Assembly



**Remove** nuts (22), washers (21) from two locating taper pins (20) on impeller housing assembly.

12. Impeller Housing Assembly

Use pin removal tool (LTCT4895).

Using pin removal tool, remove taper pins (20). Taper pins may also be removed by threading removal tool (LTCT504) onto taper pins. Using pin removal backup tool (LTCT488) to

2-22. Compressor and Impeller Housing Assembly - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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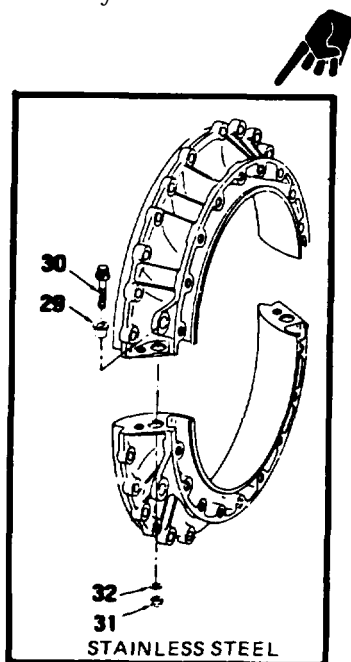
ENGINE/ -  
Continued

back up impeller housing flange, **remove** taper pins by striking punch with hammer.

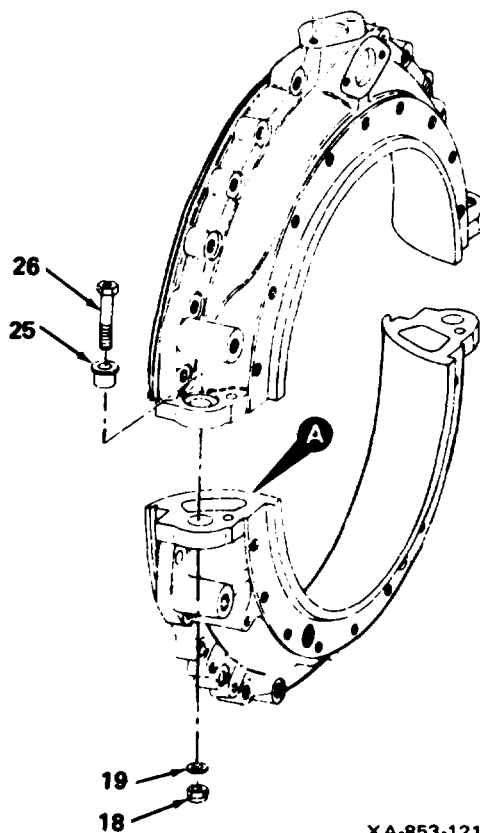
**NOTE**

Action items 13 and 14 apply to impeller housing assembly with hollow dowels.

13. Impeller Housing Assembly



MAGNESIUM



**Remove** nuts (18), washers (19), and bolts (26) on flange of magnesium impeller housing assembly. For stainless steel impeller housing assembly, remove nuts (31), washers (32), and bolts (30) on flange of impeller housing assembly.

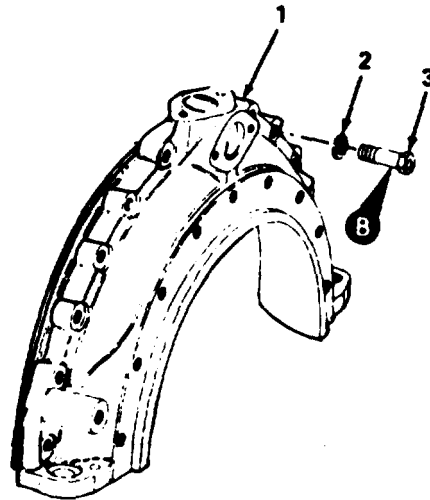
14. Impeller Housing Assembly

Use mechanical puller (LTCT12 18) with removal tool (LTCT6740).

Remove dowels (25) on flange of magnesium impeller housing assembly. For stainless steel impeller housing assembly remove dowels (29).

2-22. Compressor and Impeller Housing Assembly - Removal - Continued

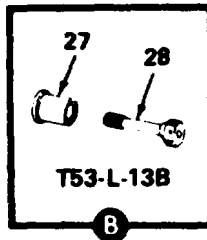
LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
15. Upper Half of Impeller Housing Assembly		<b>Remove</b> three bolts that secure upper half of impeller housing assembly to diffuser housing assembly to release ignition unit mounting bracket. Index bracket location,
16. Impeller Housing Assembly	T53-L-11 series only.	<b>Remove</b> 12 bolts (3) and washers (2) that secure impeller housing assembly (1) to diffuser housing assembly.



17. Impeller Housing Assembly

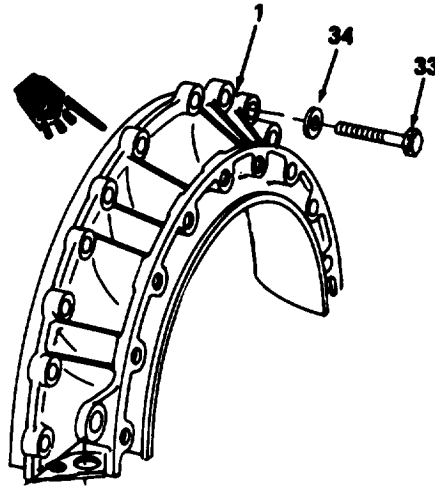
T53-L-13B engines only with magnesium housing.

Remove six bolts (3), six washers (2), six bolts (28), and six bushings (27) that secure impeller housing assembly (1) to diffuser housing assembly.



2-22. Compressor and Impeller Housing Assembly - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued  18. Impeller Housing Assembly	T53-L-13B and T53-L-703 engines with stainless steel housing.	<b>Remove</b> 10 bolts (33) and washers (34) that secure stainless steel impeller housing assembly ( 1 ) to diffuser housing assembly.







2-22. Compressor and Impeller Housing Assembly - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ -  
Continued

**CAUTION**

When removing impeller housing assembly, do not allow impeller housing assembly to strike impeller or compressor blades. Such contact may damage blades or inner surface of housing assembly.

**CAUTION**

On T53-L-13B engines only, if shims are removed from impeller housing actuator mounting bosses, they must be retained for actuator installation.

**NOTE**

Recording of compressor rotor and centrifugal impeller clearances at this time is recommended but not mandatory. The record of these clearances will serve as a checklist at assembly. The procedure for taking clearances is explained in paragraph 2-23.

18. Impeller  
Housing Assembly

**Move** impeller housing assembly forward toward inlet housing assembly; then **lift and remove**.

**2-23. Compressor Rotor and Centrifugal Impeller - Clearance Check**

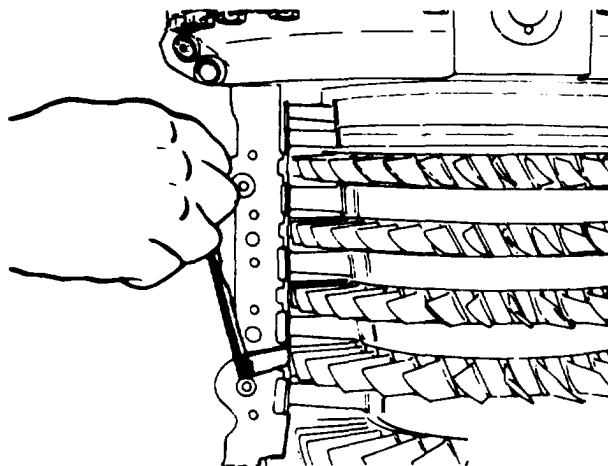
INITIAL SETUP

**Applicable Configuration**  
Au

**References**

Para 2-22 and 2-43  
Appendix G, Table G5, Reference Numbers 16 thru 26 and Reference Numbers 28 thru 37  
Appendix G, Table G6, Reference Numbers 8 thru 15 and Reference Numbers 17 thru 26

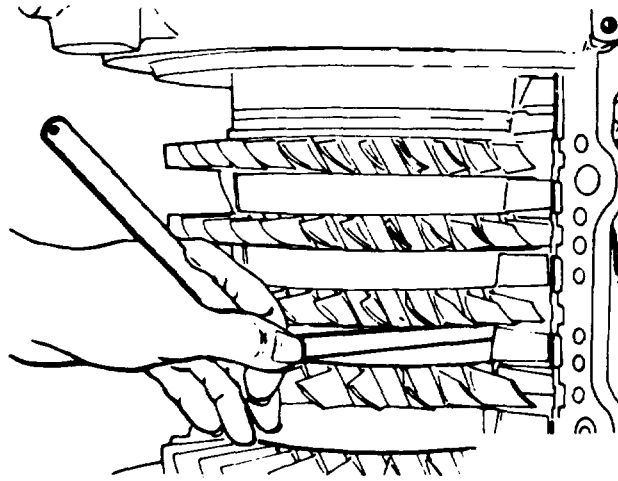
LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR AND IMPELLER HOUSING/		
1. Compressor and Impeller Housings	Refer to paragraph 2-22.	<b>Remove</b> if installed.
2. Compressor Rotor and Centrifugal Impeller	Use 12-inch feeler gage.	<b>Insert</b> feeler gage 1 /4 inch to 1/2 inch (6.4 mm to 12.7 mm) below the compressor rotor housing flange line.
3. Compressor Rotor and Centrifugal Impeller		<b>Take</b> all radial, axial, and circumferential clearances at two points 180 degrees apart as follows:  <b>a. Check</b> radial clearance between compressor rotor blades and interstage bleed compressor housing.



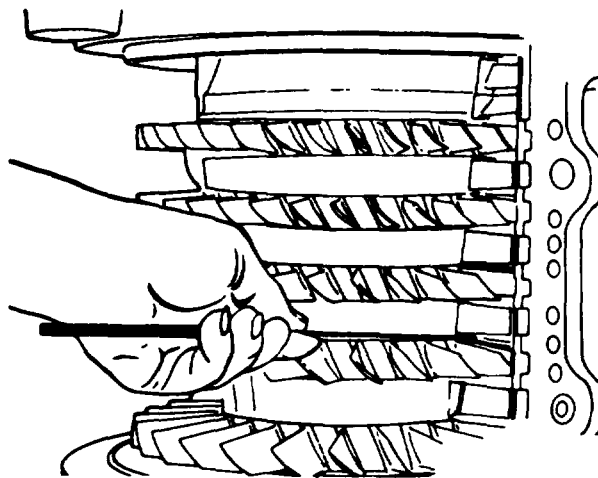
2-23. Compressor Rotor and Centrifugal Impeller - Clearance Check - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR AND  
IMPELLER  
HOUSING/ - Continued



b. Check radial clearance between compressor vane and compressor rotor spacer.



c. Check axial clearance between compressor rotor disc and compressor rotor vane.

4. Compressor Rotor

Clearances shall be as given in Appendix G, table G-5, referent; numbers 16 through 26 and reference numbers 28 through 37. Clearances shall also be as given in table G-6, reference numbers 8 through 15 and reference numbers 17 through 26.

**Rotate** one full turn while taking clearance readings.

5. Compressor Rotor and Centrifugal Compressor Impeller

Perform this action if compressor rotor and centrifugal compressor impeller clearances are within specified limits and no further repair to the engine is required. Refer to paragraph 2-43.

**Reinstall** compressor and impeller housings.

**2-24. Compressor and Impeller Housing Assembly-Cleaning**

Refer to paragraph 2-2 for cleaning procedures.

**2-25. Compressor and Impeller Housing Assembly (T53-L-11 series Engines) - Inspection**

INITIAL SETUP

**Applicable Configuration**  
T53-L11 Series Engines

**References**  
Para 2-28, H-25, H-13, H-29

LOCATION/ITEM	REMARKS	ACTION
ENGINE/		
1. Compressor and Impeller Housings	Refer to paragraph H-25 for blend-repair procedures.	Visually inspect for nicks, burrs and scratches. Blend-repair.
2. Compressor and Impeller Housings	<p>observe the following repair limits:</p> <p>a. Corrosion, including light pitting to a depth of 0.020 inch (0.51 mm) is acceptable after repair, Refer to paragraph H-13 for refinishing and fired repair procedures.</p>	Inspect mating flanges for corrosion.

**CAUTION**

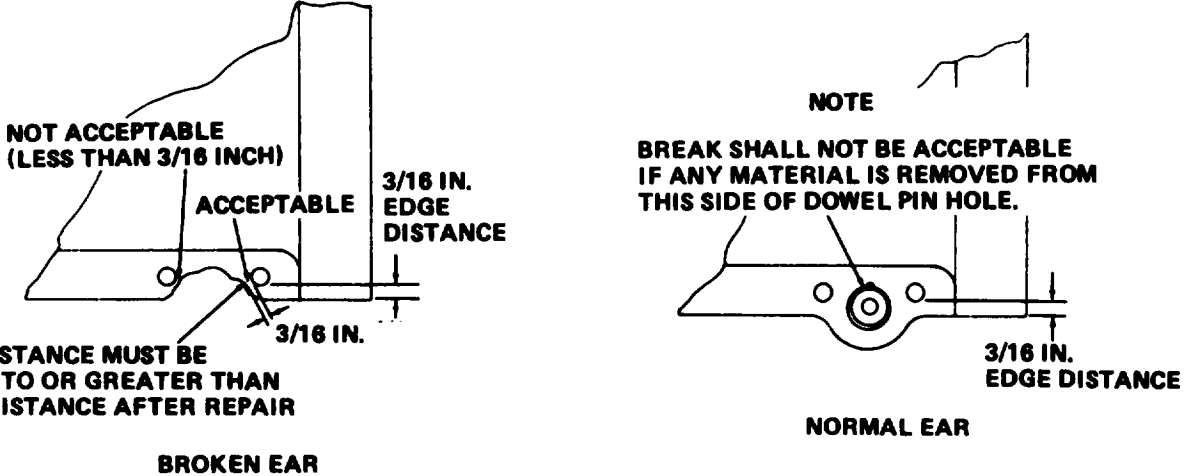
Use care when brushing with a fiber brush so as not to mar finish of non-affected surrounding parts.

- b. Corrosion, with pitting greater than 0.020 inch (0.51 mm) in depth but not causing external leakage or possibility of material fallout, should be repaired according to paragraph H-13. Use Preferred Method epoxy sealant application when performing repair procedures.
- c. Corrosion creating external leakage or a possibility of material fallout is nonrepairable and is cause for replacement.

2-25. Compressor and Impeller Housing Assembly (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
3. Compressor and Impeller Housings	Refer to paragraph H-29 for repair of damaged threads and replacement of inserts. For repair procedures concerning steps b. and c., refer to paragraph 2-28.	<p>a. <b>Inspect</b> all threaded parts for crossed or damaged threads. <b>Repair</b> damaged threads. <b>Replace</b> damaged thread inserts. <b>Replace</b> parts having irreparable threads.</p> <p>b. <b>Inspect</b> leading and trailing edges of each vane for nicks, burrs, pits, and dents.</p> <p>c. <b>Check</b> each vane for bending or distortion.</p> <p>d. <b>Inspect</b> vanes in inner and outer shroud brazements. Cracks in inner and outer shroud brazement are permitted if they do not exceed 1/8 inch (3.2 mm) in length and do not affect any more than five vanes per assembly half. Cracks that extend into parent metal are not permitted.</p>
4. Compressor Housing Halves	One broken ear for housing half is permissible. If each housing half has a broken ear, they must be mating ears.	Visually <b>inspect</b> for broken tapered pin hole ears. <b>Repair</b> housing.

2-25. Compressor and Impeller Housing Assembly (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued	 <p><b>BROKEN EAR</b></p> <p><b>NORMAL EAR</b></p>	

5. Compressor and Impeller Housings

Repair as outlined in paragraph 2-28

Visually inspect parts for distortion. **Repair.**

2-26. Compressor and Impeller Housing Assembly (T53-L-13B/703 Engines) - Inspection

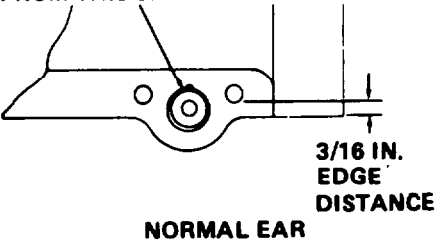
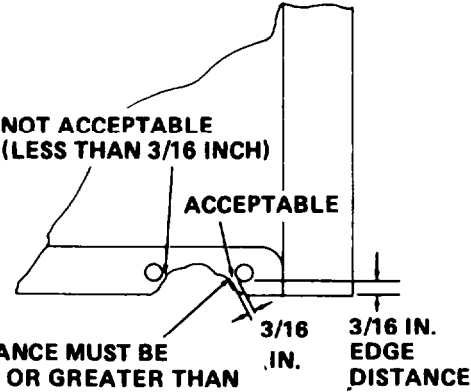

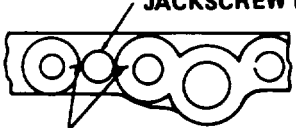
INITIAL SETUP

Applicable Configuration  
T53-L-13B/703 Engines

Referencea  
Para 2-22,2-29, H-13, H-29, H-25

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/	<p><b>NOTE</b></p> <p>For exploded view, see figure in paragraph 2-22, item 2.</p> <p><b>NOTE</b></p> <p>In following step, corrosion creating external leakage or a possibility of material fall out is non-repairable. Pitting is acceptable. However, all pitting and corrosion shall be removed and magnesium touched up. Refer to paragraph H-13, steps 2 through 5.</p>	
1. Compressor and Impeller Housings	Refer to paragraph 2-29 for repair.	Visually inspect for nicks, burrs and cracks. <b>Repair.</b>
2. Mating Flanges of Compressor and Impeller Housings		<b>Inspect</b> for corrosion. <b>Observe</b> the following repair limitations:

2-26, Compressor and Impeller Housing Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR HOUSING/ - Continued</p>	<p><b>NOTE</b></p> <p><b>BREAK SHALL NOT BE ACCEPTABLE IF ANY MATERIAL IS REMOVED FROM THIS SIDE OF DOWEL PIN HOLE.</b></p>  <p><b>3/16 IN. EDGE DISTANCE</b></p> <p><b>NORMAL EAR</b></p>  <p><b>NOT ACCEPTABLE (LESS THAN 3/16 INCH)</b></p> <p><b>ACCEPTABLE</b></p> <p><b>3/16 IN. EDGE DISTANCE</b></p> <p><b>THIS DISTANCE MUST BE EQUAL TO OR GREATER THAN EDGE DISTANCE AFTER REPAIR</b></p> <p><b>BROKEN EAR</b></p>  <p><b>JACKSCREW HOLE</b></p> <p><b>ACCEPTABLE CRACK</b></p> <p><b>ACCEPTABLE</b></p>  <p><b>JACKSCREW HOLE</b></p> <p><b>UNACCEPTABLE CRACKS</b></p> <p><b>UNACCEPTABLE</b></p>	<p>a. Corrosion, including light pitting to a depth of 0.020 inch (0.508 mm) without breakthrough or causing external leakage, is acceptable after repair.</p> <p>b. Corrosion with pitting greater than 0.020 inch (0.508 mm) in depth but not causing external leakage or possibility of material fallout should be repaired according to paragraph H-13. Use Preferred Method epoxy sealant application.</p> <p>c. Corrosion creating external leakage or a possibility of material fallout is nonrepairable and is cause for replacement.</p>
<p>3. All Threaded Parts</p>	<p>Refer to paragraph H-29 for replacement of damaged thread inserts.</p>	<p><b>Inspect. Repair</b> damaged threads. <b>Replace</b> damaged thread inserts. <b>Replace</b> parts having irreparable threads.</p>
<p>4. Stator Vane</p>	<p>Refer to paragraph 2-29 for repair procedures.</p>	<p><b>Inspect</b> leading and trailing edges of each stator vane for nicks, burrs, pits and dents. <b>Repair.</b></p>
<p>5. Stator Vane</p>	<p>Refer to paragraph 2-29 for repair procedures.</p>	<p><b>Check</b> for bending or distortion. <b>Repair.</b></p>
<p>6. Stator Vane</p>	<p>Cracks are permitted in inner and outer shroud brazement if they do not exceed 1/8-inch (3.2 mm) in length and affect no more than five vanes per assembly half. Cracks that extend into parent metal are not permitted.</p>	<p><b>Inspect</b> for cracks in inner and outer shroud brazements.</p>

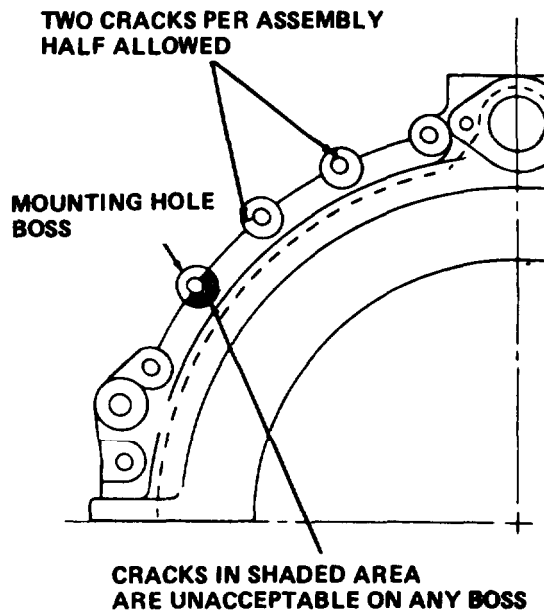


2-26. Compressor and Impeller Housing Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/ - Continued	T53-L-13B engine only. Refer to paragraph 2-29 for repair procedures.	Visually <b>inspect</b> for cracks in housing to air diffuser mounting hole bosses. Two tight-lipped cracks per housing half are acceptable, provided they do not occur on the same hole and are located on the outboard portion of the boss. <b>Repair</b> housing assembly.

Slight rubs up to 0,010 inch (0.26mm) in depth are allowed.

Visually inspect for corrosion. (Refer to paragraph 2.26.)



2-26. Compressor and Impeller Housing Assembly (T53-L-13B/703 Engines) - Inspection - Continued

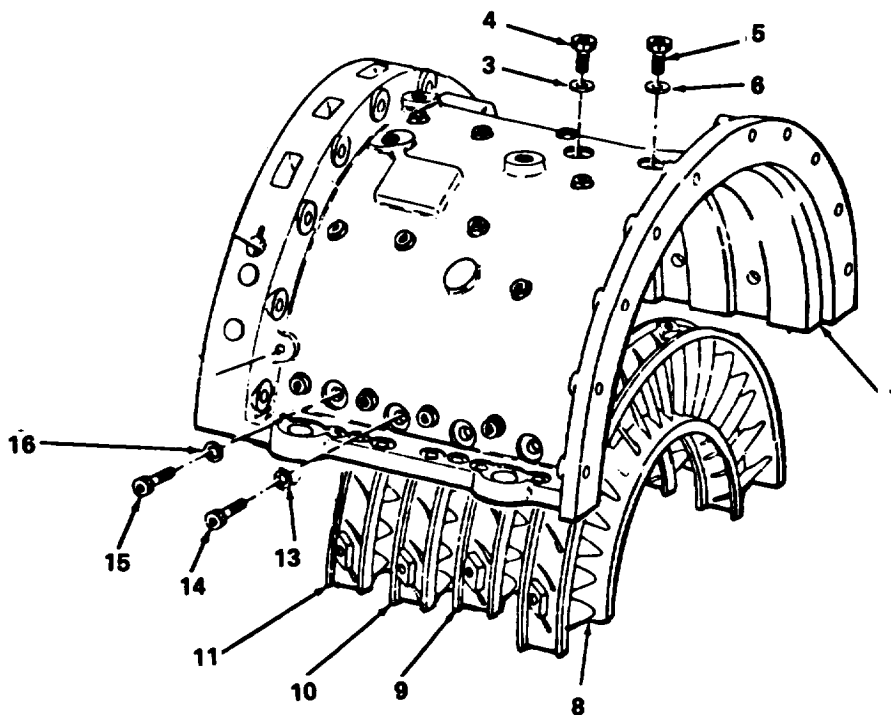
LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/ - Continued	<p>T53-L-13B and T53-L-703 engines.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Surface defects (nicks and burrs) on exterior of housing may be blend-repaired. Refer to paragraph H-25.</p>	<p><b>Inspect</b> for nicks, dents, and rubs. <b>Observe</b> limits as follows:</p> <p>a. Small scattered nicks and dents up to 0.010 inch (0.25 mm) in depth allowed. <b>Blend-repair</b> nicks.</p> <p>b. Slight rubs up to 0.005 inch (0.13 mm) in depth are allowed.</p>



2-27. Compressor Housing Assembly - Disassembly

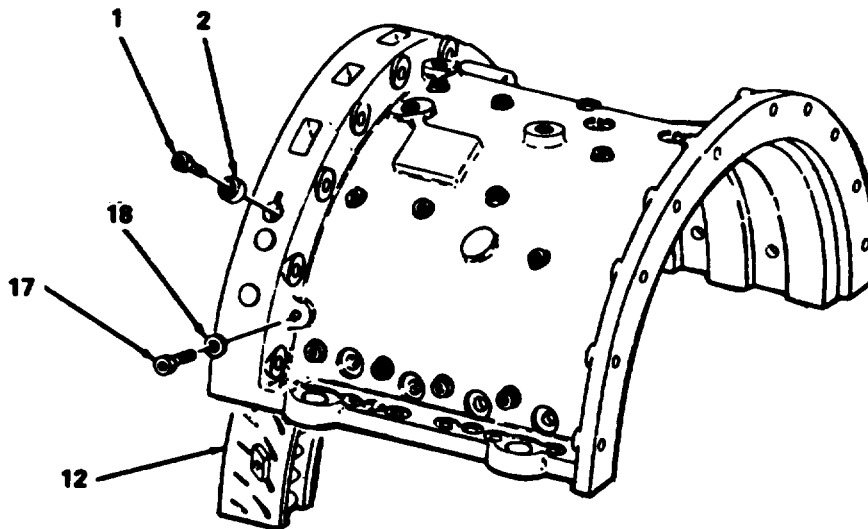
INITIAL SETUP

Applicable Configuration All	References Para 2-22	
LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING ASSEMBLY/		
1. Compressor Housing Assembly	Refer to paragraph 2-22.	<b>Remove</b> upper or lower half of compressor housing assembly.
2. Compressor Housing Assembly		<b>Place</b> compressor housing assembly half (7) on bench. <b>Secure</b> to bench to prevent movement.
3. Compressor Housing Assembly		<b>Remove</b> capscrews and bolts (4, 5, 14, and 15) and washers (3, 6, 13, and 16) that secure first through fourth stage compressor vane assemblies (8, 9, 10 and 11) to compressor housing assembly half (7).



2-27. Compressor Housing Assembly - Disassembly - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING ASSEMBLY/- Continued		
4. Compressor Vane Assemblies (8, 9, 10, and 11)		Remove.
5. Exit Guide Vane Assembly (12)		Remove bolts (17), washers (18), capscrew (1) and bolt retainer (2) that secure exit guide vane assembly (12) to compressor housing assembly half.
6. Exit Guide vanes		Remove from compressor housing half.



2-28. Compressor and Impeller Housing Assembly (T53-L-11 series Engines) - Repair

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**Consumable Materials**  
India or Carborundum Stones  
Abrasive Crocus Cloth (item 21, Appendix D)

**Special Tools**  
Diesinker Type Files

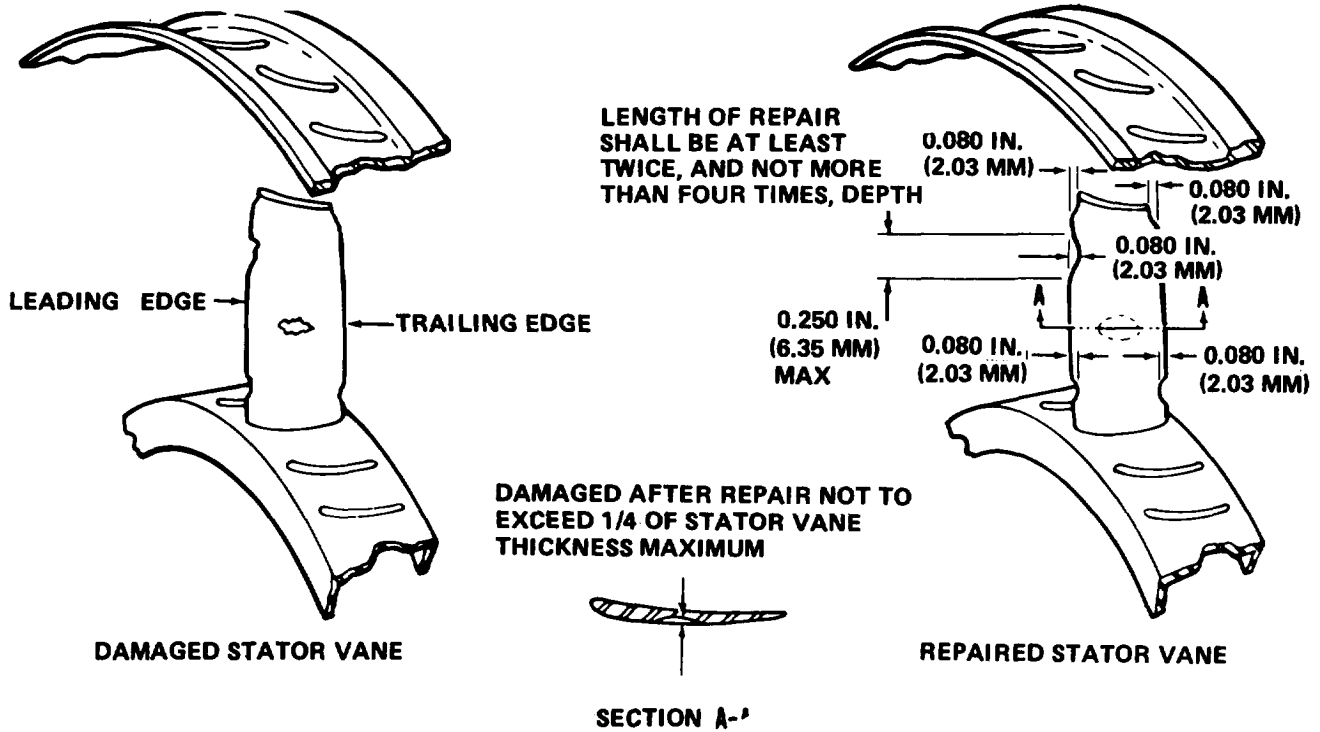
**References**  
Para H-13 and H-25

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/		
1. Compressor Housing	If either half is damaged beyond repair, both halves must be replaced.	<b>Replace</b> if necessary.
2. Compressor Vane Assembly	If damage on only one half exceeds the maximum permissible limits, only that affected assembly half shall be replaced.	<b>Replace</b> half that is affected by damage.
3. Stator Vane Halves	Stator vane halves remaining after other halves have been rejected can be matched with another serviceable half.	<b>Match</b> with another serviceable half.
<b>NOTE</b>		
Repair shall be made with small Swiss type files, India or Carborundum stones. Abrasive crocus cloth (item 21, Appendix D) shall be used for final polishing. Power tools shall not be used. All repairs shall be blended and finished smoothly. The finish strokes of all repair work shall be parallel to the longitudinal axis of the vane.		
<b>NOTE</b>		
Repair vanes as follows in actions for items 4 thru 8.		
4. vanes	Dents with smooth contours are acceptable without rework, provided they do not exceed repair limits.	<b>Observe</b> repair limits.
5. Airfoil	Blend-repair as shown in following figure provided damage after repair does not exceed one-quarter vane thickness.	<b>Blend-repair</b> nicks, burrs, pits and rough dents.

2-28. Compressor and Impeller Housing Assembly (T53-L-11 Series Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR HOUSING/ -  
Continued



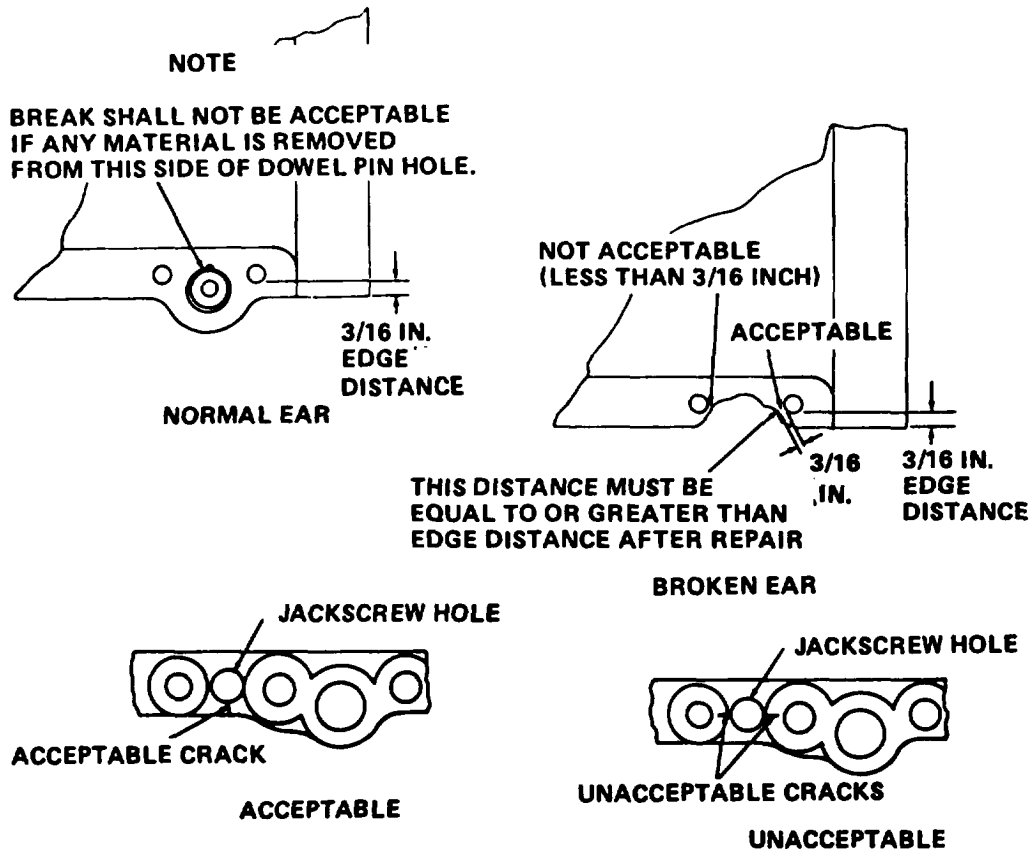
6. Leading and Trailing Edge	Nicks and dents up to 0,080 inch (2.0 mm) deep after repair are permitted. Length of repair shall be at least twice and not more than four times the depth.	Observe repair limits.
7. Vanes	Nicks and dents on vanes in inaccessible areas of repair are acceptable without re-work, provided they do not exceed maximum permissible limits.	Observe repair limits.
8. Vanes	Use padded pliers or equivalent to perform this action. If straightening causes cracks in vanes, the assembly half shall be replaced.	Straighten bent vanes.

**NOTE**

Repair housings as follows in actions for items 9 thru 14.

2-28. Compressor and Impeller Housing Assembly (T63-L-11 Series Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/ - Continued		
9. Impeller and Compressor Housing	Refer to paragraph H-13.	Remove nicks and burrs. Touch up reworked areas.
10. Compressor or Impeller Housing	During blend repair, removal of metal shall not exceed a depth of 0.010 inch (0.254 mm). Tight-lipped cracks less than one inch in the area of the compressor or impeller housing mating pad taper or dowel pin holes are acceptable, provided they can be removed by blend-repair and a 3/16 inch (4.8 mm) minimum edge distance is maintained. Refer to paragraph H-25.	Reinspect by fluorescent-penetrant method for cracks as detailed in paragraph H-20.



11. Housing	Refer to paragraph H-13.	Refinish blend-repaired area if reinspection does not reveal cracks.
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**2-28. Compressor and Impeller Housing Assembly (T53-L-11 Series Engines) - Repair - Continued**

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/ - Continued 12. Parts		Replace those that have irreparable cracks, crossed threads, or distortion.
13. Compressor Housing		Replace if a broken ear has removed material past original limit of pin hole.

**CAUTION**

Do not remove both compressor halves at same time.

14. Painted Surfaces	Refer to paragraph H-13.	Refinish.
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**2-29. Compressor and Impeller Housing Assembly (T53-L-13B/703 Engines) - Repair**

INITIAL SETUP

**Applicable Configuration**

T53-L-13B/703 Engines

**Consumable Materials**

Abrasive Crocus Cloth (item 21, Appendix D)  
India or Carborundum Stones

**Special Tools**

Padded Pliers or Equivalent  
Diesinker Type Files

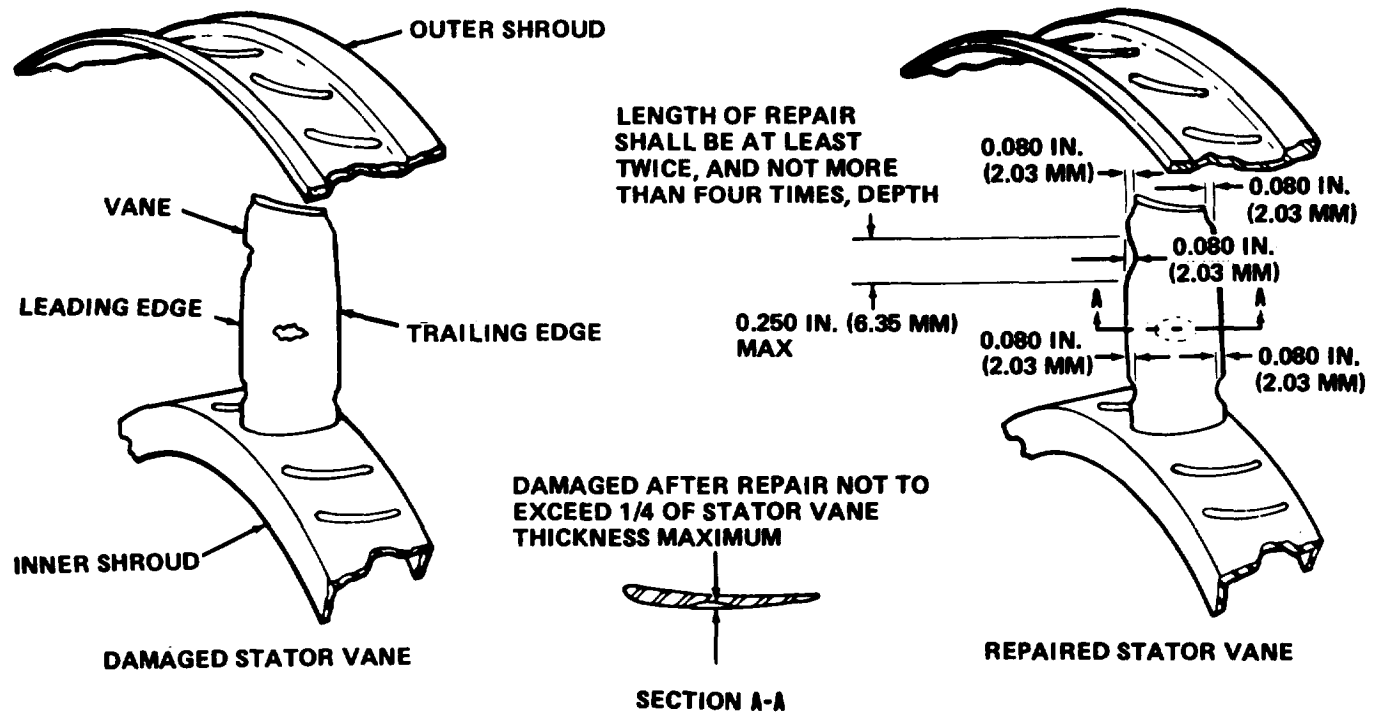
**References**

Para H-13

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/	<p style="text-align: center;"><b>NOTE</b></p> <p>If either half of axial compressor housing is damaged beyond repair, both halves must be replaced.</p> <p>If damage on only one half of a compressor vane assembly exceeds the maximum permissible limits, only that affected assembly half shall be replaced. Stator vane halves remaining after other halves have been rejected can be matched with another serviceable half.</p>	

2-29. Compressor and Impeller Housing Assembly (T53-L-13B/703 Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/- Continued	Rematched stator vane assemblies shall meet all assembly requirements. Halves of rematched stators should have the same degree of foreign object damage or erosion wear, within established limits, (an eroded stator half should not be rematched with a noneroded half).	
1. Stator Vanes	<b>Repair</b> shall be made with small Swiss type files, India or Carborundum stones. Abrasive crocus cloth (item 21, Appendix D) shall be used for final <b>polishing</b> . Power tools shall not be used. All repairs shall be <b>blended</b> and <b>finished</b> smoothly. The finish strokes of all repair work shall be parallel to the longitudinal axis of the vane.	<b>Observe</b> REMARKS when performing repairs.
2. Stator Vanes	Dents with smooth contours are acceptable without rework provided that they do not exceed repair limits.	<b>Observe</b> repair limits.



2-29. Compressor and Impeller Housing Assembly (T53-L-13B/703 Engine - Repair - Continued)

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/- Continued		
3. Airfoil	Performance of this action shall be done provided damage does not exceed 1/4 vane thickness.	<b>Blend-repair</b> nicks, bumps, pits and rough dents.
4. Leading and Trailing Edge	a. Nicks and dents up to 0.080 inch (2.03 mm) deep after repair are permitted on the leading and trailing edge.  b. Length of repair shall be at least twice and not more than four times the depth.  c. Nicks and dents on vanes in inaccessible areas of repair are acceptable without rework, provided that they do not exceed maximum permissible limits.	<b>Observe</b> limits given.
5. Stator Vanes	Use padded pliers or equivalent, If straightening causes a crack in the vane the assembly half shall be replaced.	<b>Straighten</b> bent vanes.
6. Compressor and Impeller Housings	Refer to paragraph H-13.	<b>Remove</b> nicks and burrs from impeller and compressor housing. Touch up reworked areas on magnesium housings only.
7. Compressor and Impeller Housings		<b>Replace</b> parts that have irreparable cracks, crossed threads or distortions.
8. Impeller Housing		<b>Replace</b> both impeller housing halves if crack limits in the housing to air diffuser mounting hole bosses are exceeded or open cracks are evident.
9. Painted Surfaces		<b>Refinish</b> painted surfaces. (Refer to paragraph H-13.) Steel impeller housings do not require refinishing.

2-30. Compressor Housing Assembly - Assembly

INITIAL SETUP

Applicable Configuration  
All

Consumable Materials

Lockwire (item 41,42, and 43, Appendix D)

References

Appendix G, Table G-3, Reference Number  
18,19

Table G-4, Reference Number 12,13

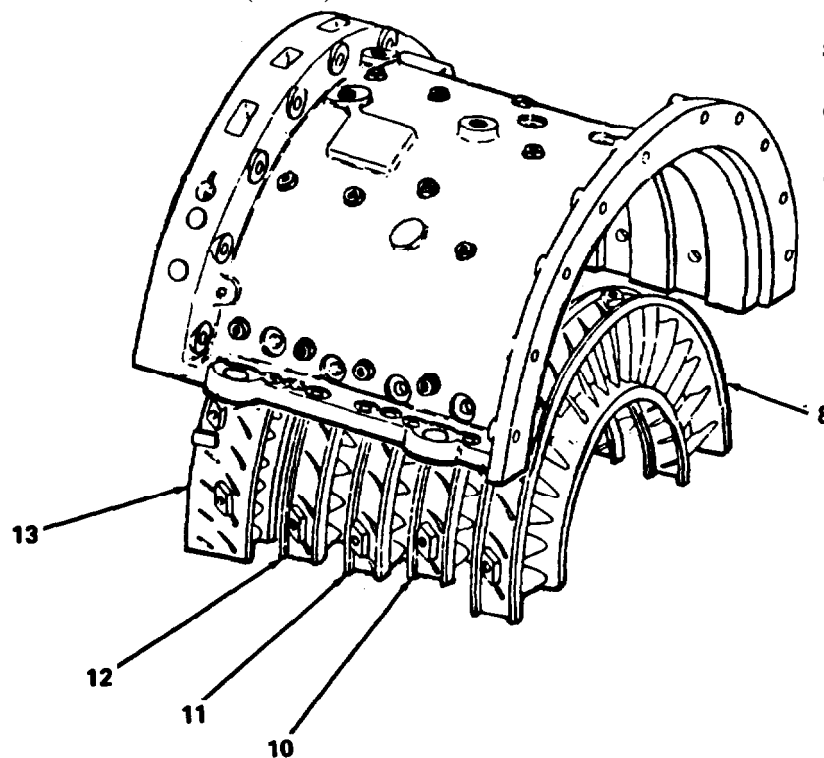
Table G-6, Reference Number 12

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING ASSEMBLY/	<p style="text-align: center;"><b>CAUTION</b></p> <p>Incorrect installation of stator assemblies will cause binding that damages stator and assemblies. After installation of compressor halves, insure that compressor rotates freely with no unusual noise.</p> <p style="text-align: center;"><b>NOTE</b></p>	

1. Compressor Housing Assembly

Assembly procedures contained within this paragraph apply to upper or lower half of compressor housing assembly (7 or 9).

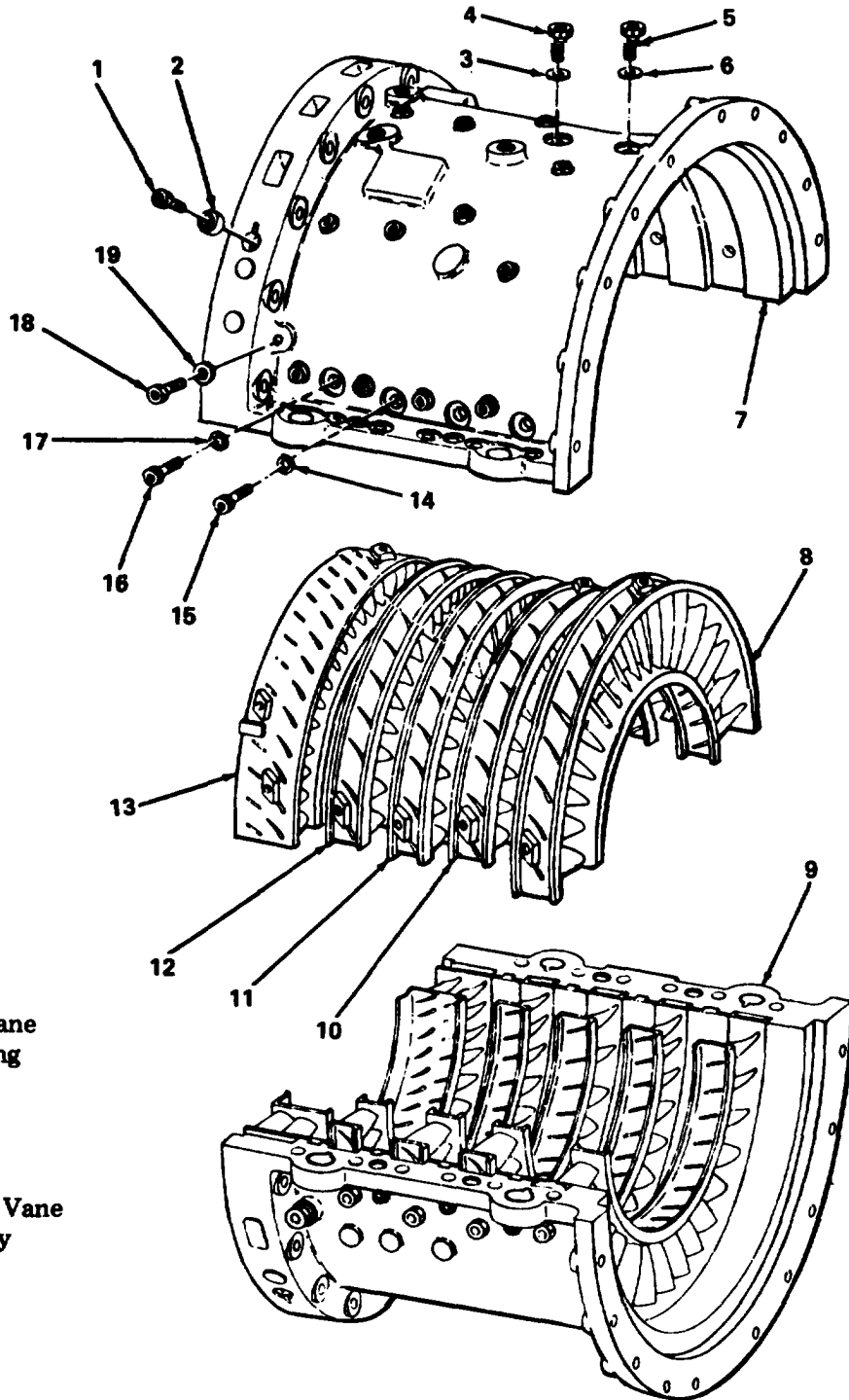
Place removed half of compressor housing assembly on bench. Reinsert first thru fourth stage compressor vanes (8, 10,11, and 12) and exit guide vane assembly (13) into their appropriate slots.



2-30. Compressor Housing Assembly - Assembly - Continued

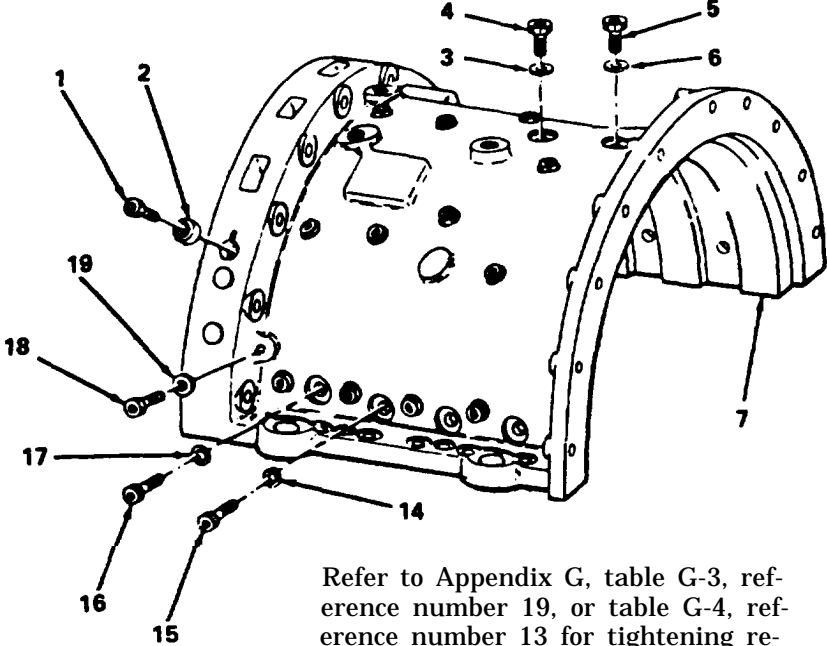
LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR  
HOUSING  
ASSEMBLY/-  
Continued



- 1. Cap Screw
- 2. Bolt Retainer
- 3. Washer
- 4. Cap Screw
- 5. Cap Screw
- 6. Washer
- 7. Upper Compressor Housing
- 8. First Stage Compressor Vane
- 9. Lower Compressor Housing
- 10. Second Stage Compressor Vane
- 11. Third Stage Compressor Vane
- 12. Fourth Stage Compressor Vane
- 13. Exit Guide Vane Assembly
- 14. Washer
- 15. Bolt
- 16. Bolt
- 17. Washer
- 18. Bolt
- 19. Washer

2-30. Compressor Housing Assembly - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR HOUSING ASSEMBLY/ - Continued</p>		
<p>2. Compressor Vane Assemblies</p>	<p>Rematched stator vane assemblies shall meet ail assembly requirements. Halves of rematched stators should have the same degree of foreign object damage or erosion wear within established limits (an eroded stator half should not be rematched with a noneroded half).</p>	<p><b>Secure</b> to compressor housing assembly half as follows:</p>
	<p>Refer to Appendix G, table G-3, reference number 19, or table G-4, reference number 13 for tightening requirements in step b.</p> <p>Refer to Appendix G, table G-6, reference number 12 for dimensional limits.</p>	<p>a. <b>Tighten</b> first through fourth stage vane assemblies with bolts (4, 5, 15, and 16), washers (3, 6, 14, and 17). Tighten as required. (Refer to Appendix G, table G-3, reference number 18, or table G-4, reference number 12).</p>
		<p>b. <b>Tighten</b> exit guide vane assembly with bolts (18), washers (19), cap-screws (1), and bolt retainers (2). <b>Tighten</b> as required. (Refer to Appendix G, table G-3, reference number 18.)</p>
<p>3. Interstage Bleed Compressor Housing Assembly</p>		<p>c. Visually <b>inspect</b> exit guide vane assembly to <b>insure</b> outer shroud is firmly seated on compressor land. <b>insure</b> that proper gap exists between exit guide vane and fifth stage insert. Refer to Appendix G, table G-6, reference number 12 for dimensional limits.</p>
		<p><b>Lockwire</b> bolts and <b>deform</b> retainers into slot in cap screw and slot in housing.</p>

**2-31. Compressor Section - Clearance Check**

LOCATION/ITEM	REMARKS	ACTION
	Refer to paragraph 2-23 for clearance check procedures to be utilized after assembly.	

**2-32. Compressor Rotor Blades - Cleaning**

LOCATION/ITEM	REMARKS	ACTION
	Refer to paragraph 2-2 for cleaning procedure.	

**2-33. Compressor Rotor Blades (T53-L-11 Series Engines) - Inspection**

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**Consumable Materials**  
Marking Pencil (Yellow) Colorbrite No. 2107 (item 54, Appendix D)

**Special Tools**  
Dial Indicator

**References**  
Para 2-22,2-37,2-39 and 2-43

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/	With compressor housing half removed from engine (paragraph 2-22), proceed as follows:	

**NOTE**

All damage or defects shall be identified and marked with a marking pencil (yellow) Colorbrite No. 2107 (item 54, Appendix D).

1. Compressor Rotor Blade

**Check** each for bends or distortion. Replace bent or distorted blades.

2. Compressor Rotor Blades

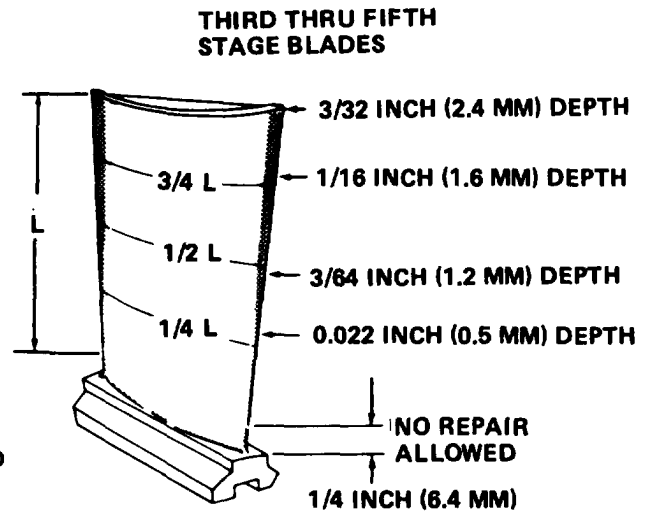
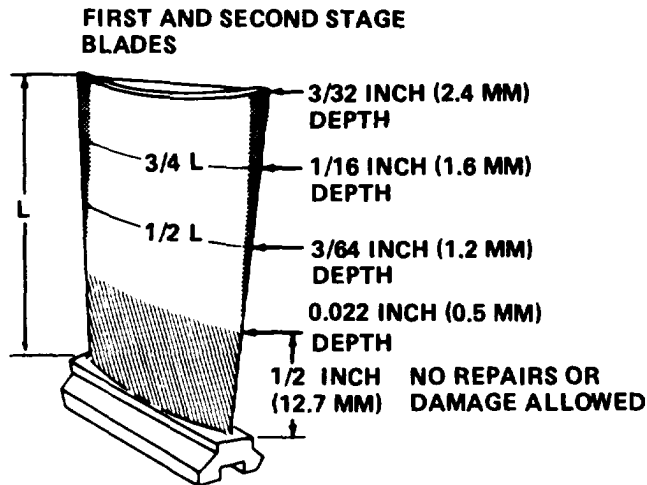
Repair as outlined in paragraph 2-37.

**Inspect** leading trailing and tip edges and airfoil surfaces of each blade for nicks, burrs, pits, dents, or cracks and foreign object damage.

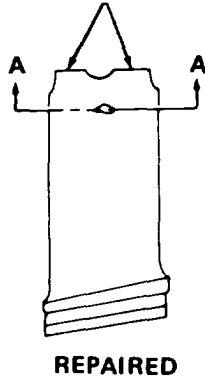
2-33. Compressor Rotor Blades (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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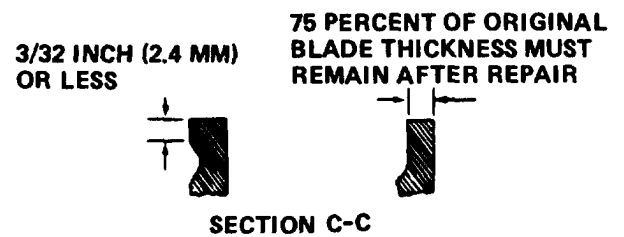
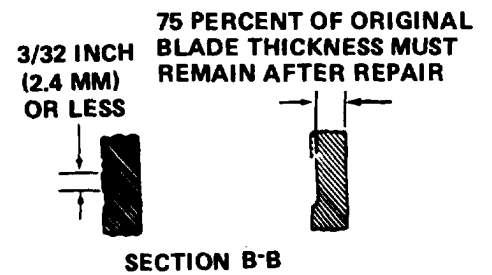
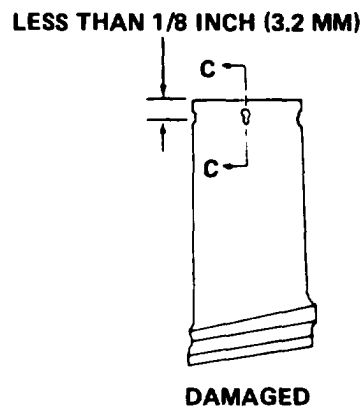
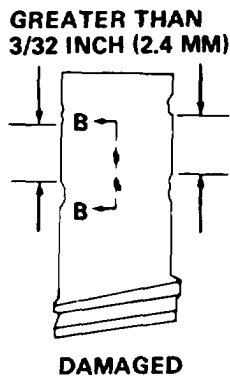
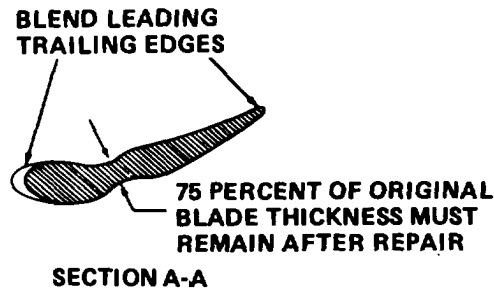
COMPRESSOR  
ROTOR ASSEM-  
BLY/ - Continued



MINIMUM OF  $1/2$  TIP CHORDAL WIDTH MUST REMAIN AFTER REPAIR



COMPRESSOR BLADE MAXIMUM ALLOWABLE DEPTHS AFTER BLADE REPAIR





2-33. Compressor Rotor Blades (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/ Continued	<p><b>NOTE</b></p> <p>Actions for items 3 thru 5 pertain to inspection of blades for tip-shake (circumferential movement).</p>	
3. Compressor Rotor Assembly		<b>Secure</b> to prevent rotational movement.
4. Dial Indicator		<b>Mount</b> so that contact arm of indicator is against blade 0.5 inch (1.27 cm) above blade root.
5. Compressor Rotor Blades	Maximum acceptable tip-shake for all stages is 0.004 inch (0.10 mm).	<b>Measure</b> tip shake for each blade,
6. Compressor Rotor Blades	Refer to paragraph 2-37 for repair procedures.	<b>Repair</b> tip shake if necessary.
7. Compressor Rotor Blades	If any blade protrudes further than 0.015 inch (0.38 mm), repair as outlined in paragraph 2-37.	<b>Inspect</b> for protrusion forward or aft of disc faces.
8. Compressor Rotor Blades	Varnish will appear as dark film, consisting of oil and dirt deposits that have hardened on blade surfaces. Refer to paragraph 2-37 for removal of varnish.	<b>Inspect</b> for evidence of varnish buildup. Remove varnish.
9. Upper Half of Compressor Housing	Refer to paragraph 2-43.	<b>Reinstall.</b>

**2-34. Compressor Rotor and Discs (T53-L-11 Series Engines) - Inspection**

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/		
1. Spacers	Minor nicks, dents, and rubs are acceptable.	Inspect for nicks, dents, and rubs.
2. Discs		Inspect for cracks, nicks, dents and gouges.

**2-35. Compressor Rotor Blades (T53-L-13B/703 Engines) - Inspection**

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703

**Consumable Materials**  
Marking Pencil (Yellow) Colorbrite No. 2107 (item 54, Appendix D)  
Graphite Collodial DAG Dispersion (item 33, Appendix D)

**References**  
Para 2-22, 2-33, 2-38  
AMS3132

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/	<b>NOTE</b>	
	Mark all damages or defects with a marking pencil (yellow) Colorbright No. 2107 (Appendix D, item 54).	
1. Compressor Housing Half	Refer to paragraph 2-22.	<b>Remove</b> from engine to perform the following procedures.
2. First Stage Blades		<b>Inspect</b> for evidence of compressor inlet blockage.
3. First and Second Stage	perform this step if blockage is confirmed by the presence of foreign material such as gram, rags, etc.	<b>Remove and replace</b>

2-35. Compressor Rotor Blades (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR  
ASSEMBLY/ -  
Continued

**NOTE**

If available facilities do not permit the following inspection and graphite treatment, remove defective blades and replace with acceptable blades. Forward used blades to depot for determination of serviceability.

4. First Stage Blades

Perform this action if blockage is suspected but not confirmed. Apply graphite coating (Appendix D, item 33) to acceptable blades.

**Inspect** as follows:

a. **Rotate** rotor. **Inspect** visually for bent or distorted blades. **Replace** bent or distorted blades.

b. **Remove** blades for magnetic-particle inspection (**refer** to paragraph 2-33). **Remove** graphite varnish coating as per AMS3132, if blades are coated. **Inspect** for cracks.

**CAUTION**

If cracks are found on any first stage blade, scrap all first and second stage blades and replace with new blades.

**NOTE**

Repairs shall be made with small Swiss type files, India or Carborundum stones. Abrasive crocus cloth (item 21, Appendix D) shall be used for final polishing. Power tools shall not be used. All repairs shall be blended and finished smoothly. Lines, scratches, or sharp edges that might cause a concentration of stress are not permitted. Finish strokes of all repair work shall be parallel to the

2-35. Compressor Rotor Blades (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR ROTOR ASSEMBLY/ - Continued</p>	<p>longitudinal axis of the blade. When the blade is repaired on the leading and trailing edges, the edge shall be blended to a smooth radius as part of the repair. The following illustration shows a typical compressor rotor blade damage before and after repair,</p>	<p>Inspect for sand and dust erosion as follows:</p>
<p>5. First Stage Blades</p>	<p>Use standard inspection equipment.</p>	<p>a. <b>Inspect</b> leading edge of blades for undercutting, erosion roughness, and slight rolled-over effect. To <b>detect</b> rolled-over effect, <b>run</b> fingernail along airfoil on convex side until leading edge is contacted.</p>
	<p><b>RUN FINGERNAIL IN THIS DIRECTION TO DETECT ROLL OVER</b></p>	<p>b. <b>Place</b> a straight edge (6-inch or 152.4 mm scale or equivalent) slightly above platform radius. <b>Use</b> a 0.0156 inch wire gage as a "Go" or "No-Go" device, <b>Determine</b> the degree of undercutting. A maximum of 0.0156 inch is permissible along leading edge area between platform radius and tip. A wavy pattern (more than one undercut area) is unacceptable. <b>Repair</b> within limits by <b>stoning</b> blades on leading edge only (from blade tip to platform radius). <b>Remove</b> sharp projections. Strokes shall be parallel to leading edge.</p>
	<p><b>ROUGHNESS, SLIGHT UNDERCUT AND ROLLED-OVER EFFECT ON LEADING EDGE</b></p>	

2-35. Compressor Rotor Blades (T53-L-13B/703 Engines) - Inspection - Continued

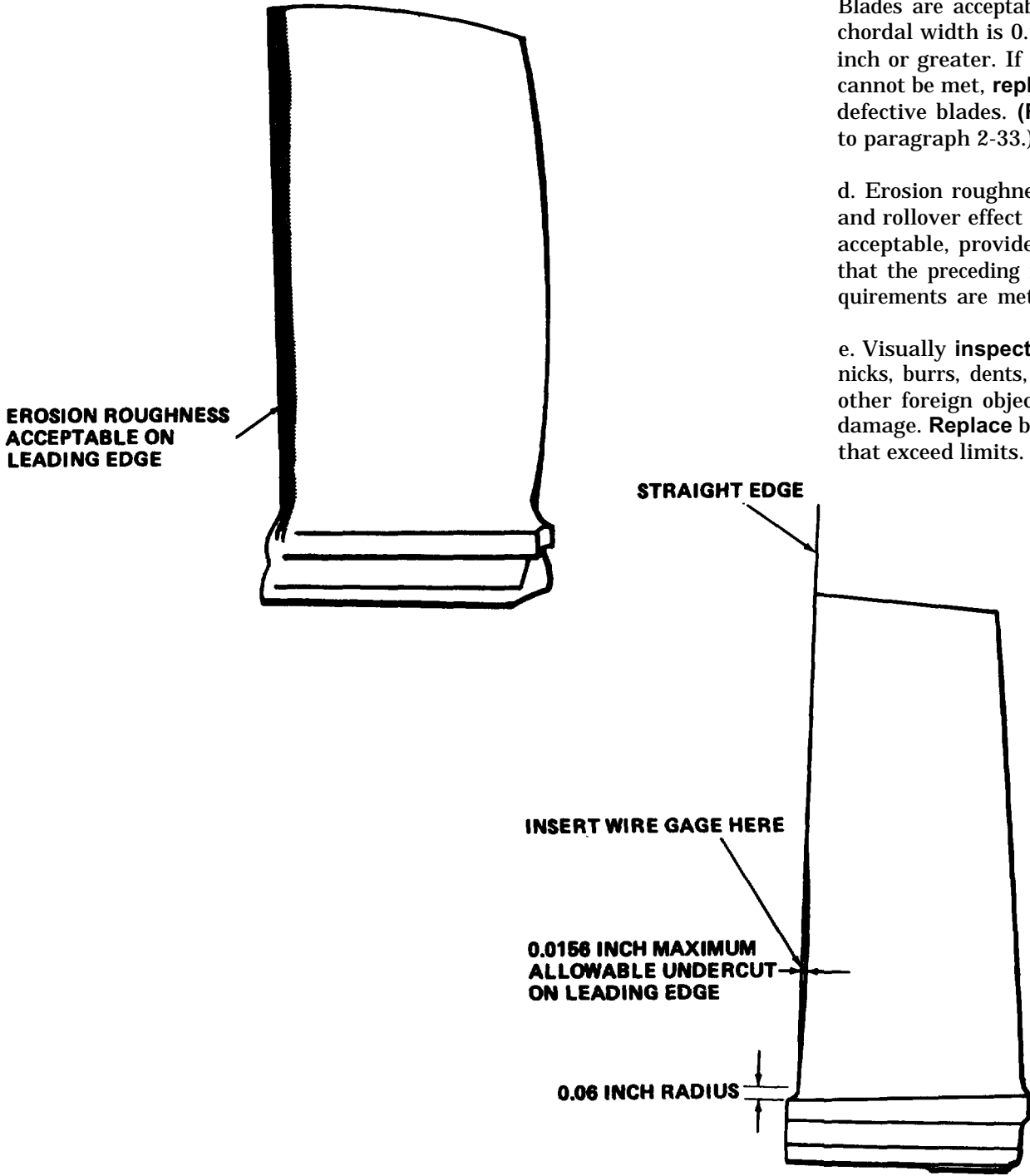
LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR  
ASSEMBLY/-  
Continued

c. **Measure** chordal width at midpoint of blades. Blades are acceptable if chordal width is 0.962 inch or greater. If limit cannot be met, **replace** defective blades. (Refer to paragraph 2-33.)

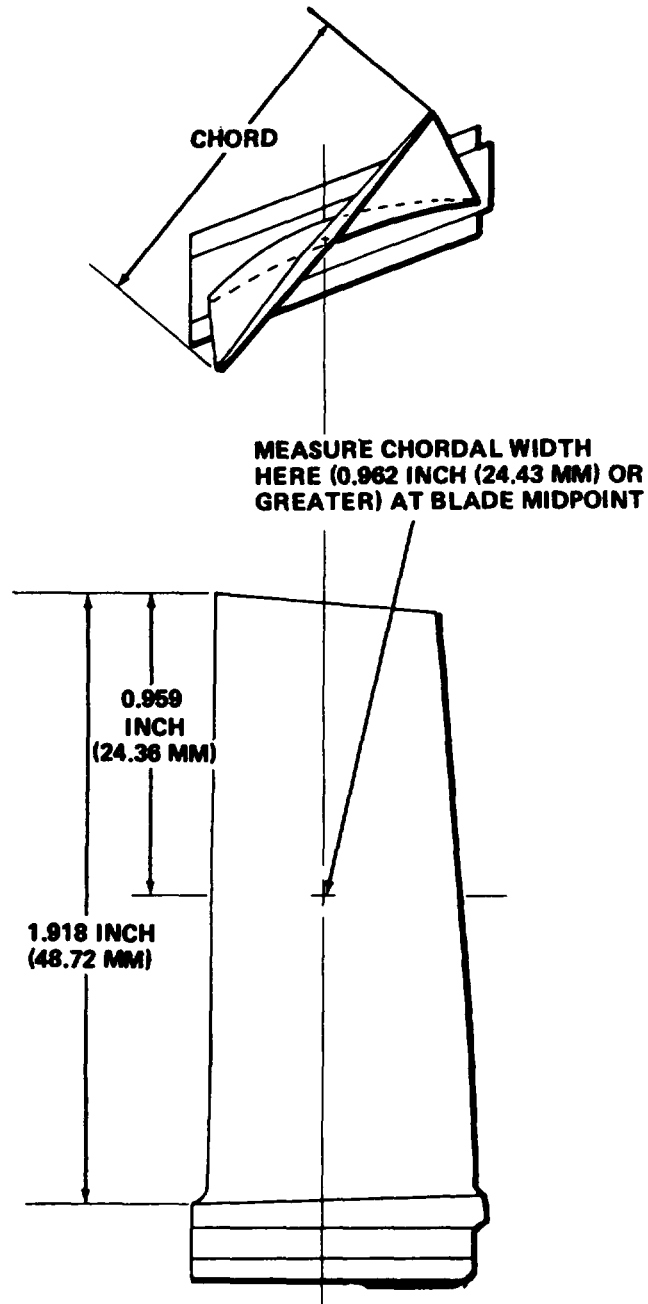
d. Erosion roughness and rollover effect is acceptable, provided that the preceding requirements are met.

e. Visually **inspect** for nicks, burrs, dents, and other foreign object damage. **Replace** blades that exceed limits.



2-35 Compressor Rotor Blades (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/- Continued		

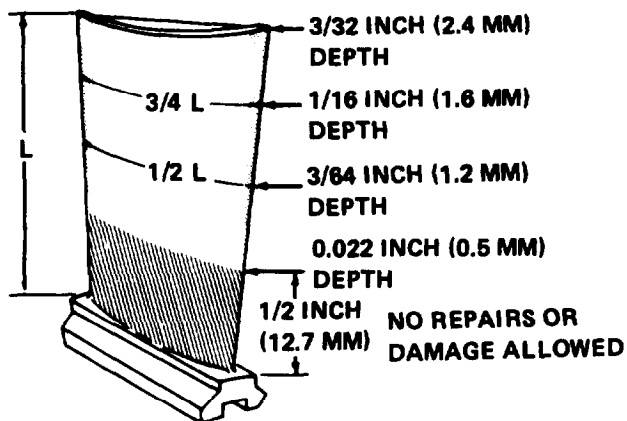


2-35. Compressor Rotor Blades (T53-L-13B/703 Engines) - Inspection - Continued

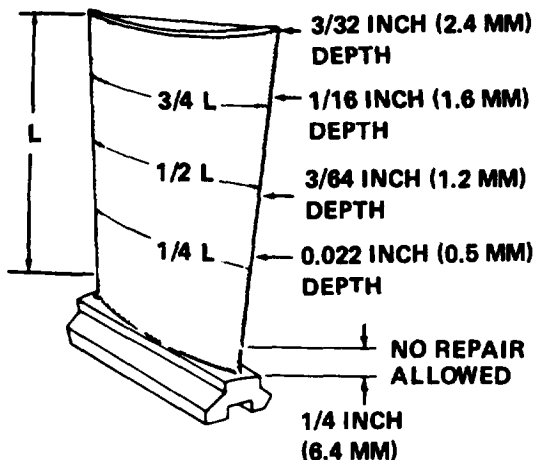
LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR  
ASSEMBLY/-  
Continued

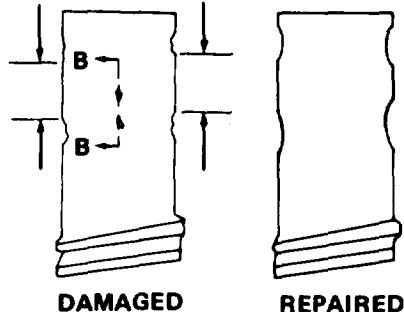
**FIRST AND SECOND STAGE  
BLADES**



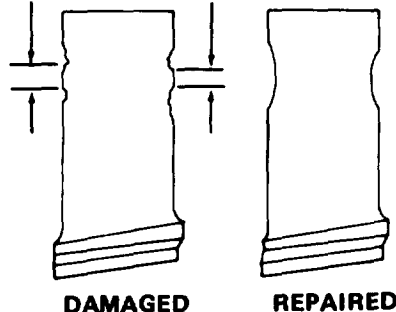
**THIRD, FOURTH A  
STAGE BLADES**



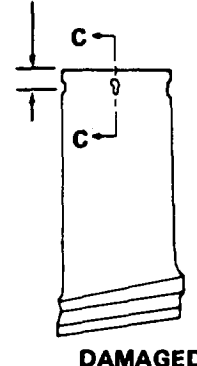
**GREATER THAN  
3/32 INCH (2.4 MM)**



**3/32 INCH (2.4 MM)  
OR LESS**



**LESS THAN 1/8 INCH (3.2 MM)**

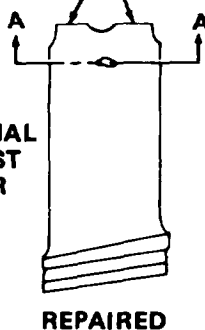


**75 PERCENT OF ORIGINAL  
BLADE THICKNESS MUST  
REMAIN AFTER REPAIR**

**3/32 INCH (2.4 MM)  
OR LESS**



**MINIMUM OF 1/2 TIP  
CHORDAL WIDTH MUST  
REMAIN AFTER REPAIR**



**COMPRESSOR BLADE MAXIMUM ALLOWABLE  
DEPTHS AFTER BLADE REPAIR**

**BLEND LEADING  
TRAILING EDGES**



**75 PERCENT OF ORIGINAL  
BLADE THICKNESS MUST  
REMAIN AFTER REPAIR**

**SECTION A-A**

**75 PERCENT OF ORIGINAL  
BLADE THICKNESS MUST  
REMAIN AFTER REPAIR**

**3/32 INCH (2.4 MM)  
OR LESS**



246.35 Compressor Rotor Blades (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR ROTOR ASSEMBLY/ - Continued</p>		
<p>6. First and Second Stage Blades</p>	<p>Use a strong light source.</p>	<p>Visually inspect for pitting. If pitting is suspected, confirm using a scribe. No corrosion pitting is acceptable. Replace defective blades.</p>
<p>7. Blades</p>	<p>Refer to paragraph 2-38 for repair procedures.</p>	<p>Inspect all blades as follows:</p> <p>a. Visually inspect each blade for bends or distortion. Replace bent or distorted blades.</p> <p>b. Visually inspect leading trailing tip edges and airfoil surfaces of each blade for nicks, burrs, pits, dents or cracks and foreign object damage.</p> <p>c. Inspect blades for protrusions forward or aft of disc faces. If any blade protrudes further than 0.015 inch, repair.</p> <p>d. Visually inspect each blade for evidence of varnish buildup. Remove varnish.</p> <p>e. Visually inspect each blade for cracks. Replace defective blades if cracked. If cracks are suspected in a compressor rotor blade, refer to TM 1-1520-255-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for AH-1 Helicopter Series.</p>
	<p>Varnish will appear as dark film consisting of oil, dirt, and deposits that have hardened on blade surfaces, Refer to paragraph 2-38 for removal of varnish procedures.</p>	



2-36. Compressor Rotor Subassembly (T53-L-13B Engine) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B Engine

**Special Tools**  
Swiss Files

**Consumable Materials**  
India or Carborundum Stones  
Abrasive Crocus Cloth  
(item 21, Appendix D)  
Aluminum Oxide, Grade 400  
(item 6, Appendix D)

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR ASSEMBLY/

**WARNING**

**FLIGHT SAFETY PARTS**

Axial Disk and Hub (Front Compressor Rotor Shaft)  
Axial Disk and Hub (Compressor Assembly Rotor)

After removal of protective covering, handle with caution during inspection. Inspection limits must be observed.

1. Compressor Rotor Subassembly

Cracks are not allowed any area.

Inspect for cracks, nicks, dents, rubs, and damage. (Record rotor part number.)

**NOTE**

Pay particular attention to blade retention areas of disks.

2. Compressor Rotor Subassembly

Minor, random (well spaced) nicks, and dents are acceptable.

Blend nicks only to the extent of removing sharp projections.

3. Compressor Rotor Subassembly

Surface rubs 0.030 inch maximum depth or 0.762 mm) are acceptable in areas where rotor has rubbed stationary components, except in disk tenon face. Deep rubs resulting in obvious metal displacement are not allowed in any area.

Blend-repair only to the extent of removing surface projections.

4. Compressor Rotor Subassembly

Ship engine to Depot for repair if limits are exceeded.

**2-37. Compressor Rotor Blach(T53-L-11 Series Engines) - Repair**

INITIAL SETUP

**Applicable Configuration**  
T53-L11 Series Engines

**special Tools**  
Swiss Files

**Consumable Materiels**  
India or Carborundum Stones  
Abrasive Crocus Cloth (item 21, Appendix D)  
Aluminum Oxide, Grade 400 (item 6, Appendix D)  
Cutting Oil (item 22, Appendix D)  
Drycleaning Solvent (item 24, Appendix D)

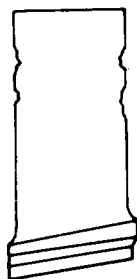
**References**  
Para 1-93 and 2-39

LOCATION/ITEM	REMARKS	ACTION
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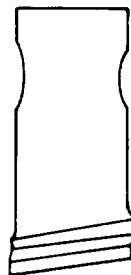
COMPRESSOR ROTOR ASSEMBLY/

**NOTE**

Repairs shall be made with small swiss type files, India or Carborundum stones. Abrasive crocus cloth (item 21, Appendix D) shall be used for final polishing. Power tools shall not be used. All repairs shall be blended and finished smoothly. Lines, scratches, or sharp edges that might cause a concentration of stress are not permitted. Finish strokes of all repair work shall be parallel to the longitudinal axis of the blade, When the blade is repaired on the leading and trailing edges, the edge shall be blended to a smooth radius as part of the repair. The following illustration shows a typical compressor rotor blade damage before and after repair.



**DAMAGED**



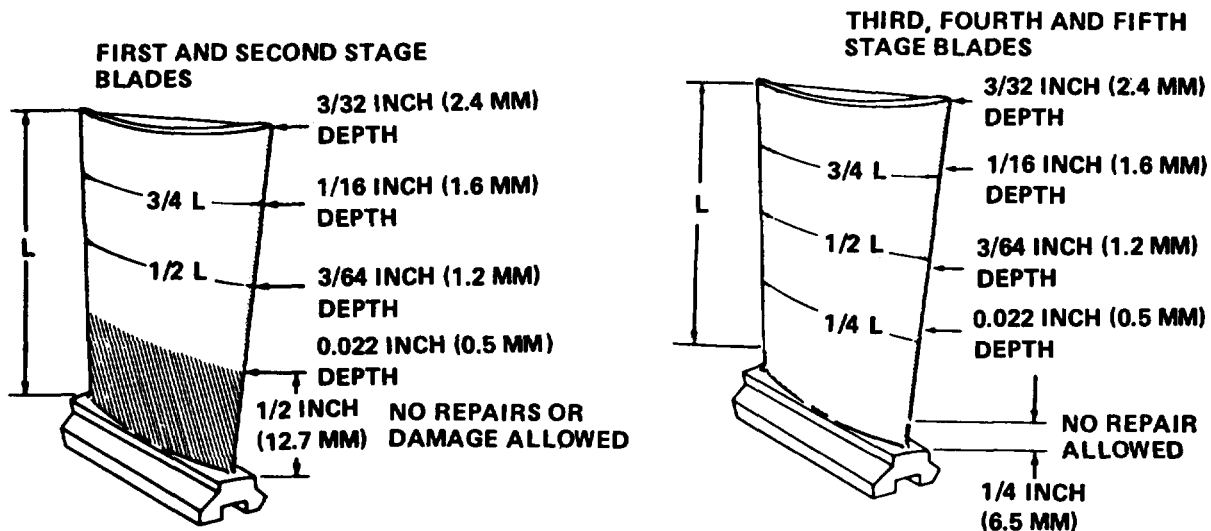
**REPAIRED**

2-37. Compressor Rotor Blades (T53-L-11 Series Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/ - Continued	<p>Limits are as follows:</p> <p>a. No repairs are allowed within 1/4 inch (6.4 mm) from blade root in any area. Smooth dents not exceeding 1/32 inch (0.8 mm) on longest side and 0.010 inch (0.254 mm) deep are acceptable without rework.</p> <p>b. Maximum allowable repair depth on leading and trailing edges are shown in figure in preceding note.</p> <p>c. All defects in noncritical areas shall be reworked with the exception of smooth dents where burrs are not evident.</p>	Observe limits given,
1. Leading or Trailing Edges		

NOTE

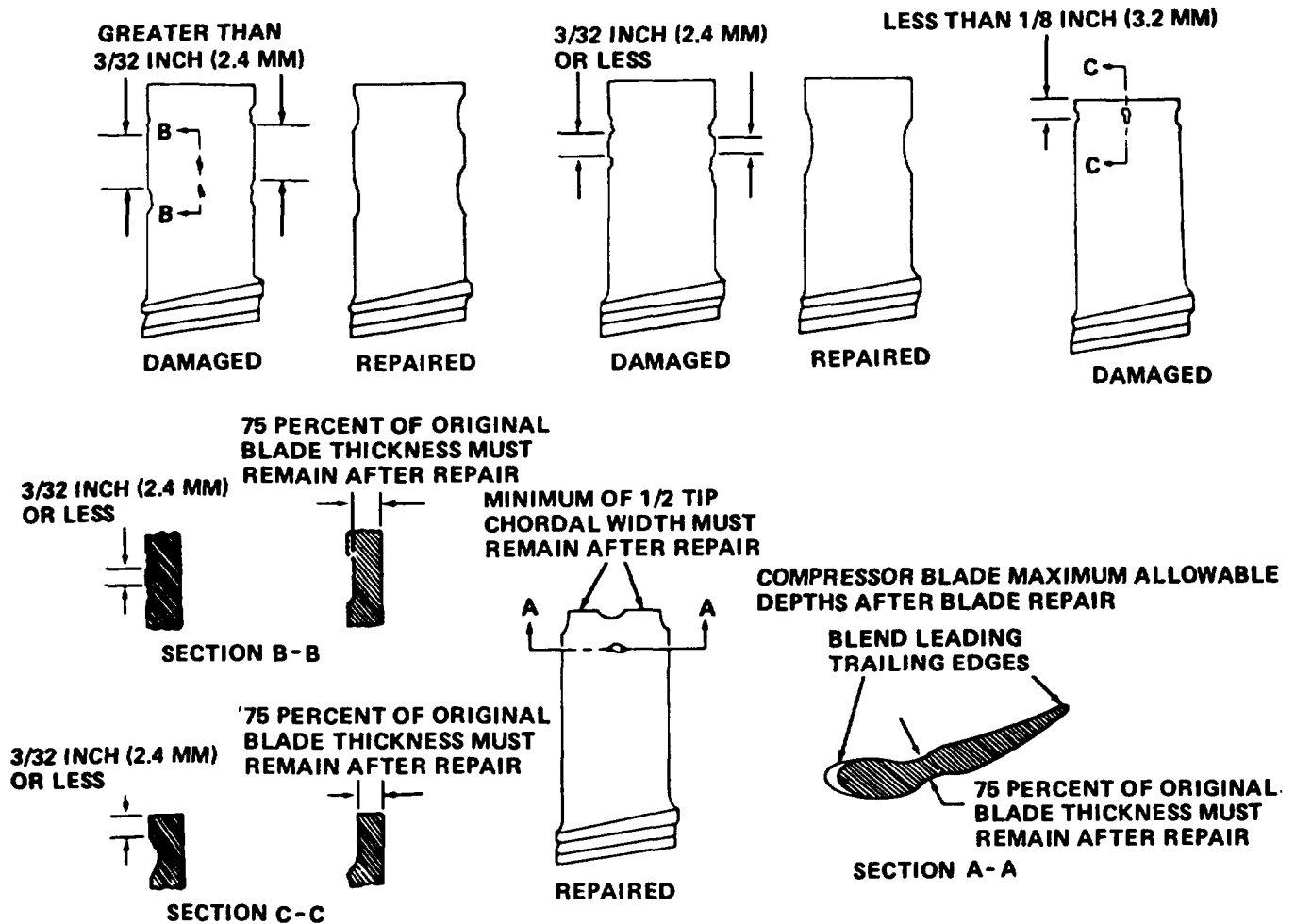
Maximum allowable repair depth decreases as distance L decreases.



2-37. Compressor Rotor Blades (T53-L-11 Series Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR  
ASSEMBLY/ -  
Continued



**NOTE**

On engines that have had greater than 20 percent of the total number of blades blend repaired to the maximum limits, perform vibration check as outlined in paragraph 1-93. Engines that do not pass vibration test requirements shall be shipped to Depot for repair.

2-37. Compressor Rotor Blades (T53-L-11 Series Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/- Continued		
2. Blade Tip	Repairs to damage within 1/8 inch (3.2 mm) shall be continued to the tip.	<b>Repair.</b>
3. Leading or Trailing Edges	If distance between two damaged areas is less than 3/32 inch (2.4 mm) perform this action.	Make only one <b>blend repair.</b>
4. Leading or Trailing Edges	If distance between two damaged areas is greater than 3/32 inch (2.4 mm) perform this action.	<b>Repair</b> damaged areas separately.
5. Blade Tip Edges	Limits are as follows:  Maximum allowable repair depth is 3/32 inch (2.4 mm).  Length of repair shall be at least three times repair depth.  If damage is closer to tip edge more than 1/16 inch (1.6 mm) blend repair from leading or trailing edge.	<b>Observe</b> limits given for finished repairs.
<b>NOTE</b>		
A minimum of one-half of blade tip chordal width must remain after blend repairs.		
6. Blade Airfoil Surfaces	Limits are as follows:  a. Minimum airfoil thickness after repair shall be 75 percent of original thickness.  b. If distance between two damaged areas is less than 3/32 inch (2.4 mm), make one blend repair.  c. If distance is greater than 3/32 inch (2.4 mm), make separate repairs.  d. Maximum allowable repair length on blade airfoil surfaces 13/32 inch (10.3 mm).	<b>Observe</b> limits given for finished repairs.

2-37. Compressor Rotor Blades (T53-L-11 Series Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION																												
COMPRESSOR ROTOR ASSEMBLY/- Continued																														
7. Airfoil Areas	No more than 20 percent of total blade material may be removed during repairs.	<b>Remove</b> scratch or lines in airfoil areas to within repair limits.																												
8. Blade		<b>Replace</b> blade if damage cannot be repaired within limits in preceding actions for items 1 thru 7.																												
9. Locking Plate	<b>Replace</b> locking plate with one of greater thickness given in following table.	<b>Repair</b> excessive tip shake by <b>replacing</b> locking plate with one of greater thickness.																												
	<table border="1"> <thead> <tr> <th>Locking Plate Number</th> <th>Thickness (± 0.0005 inch)</th> </tr> </thead> <tbody> <tr><td>1-100-237-01</td><td>0.018 inch</td></tr> <tr><td>1-100-237-02</td><td>0.019 inch</td></tr> <tr><td>1-100-237-03</td><td>0.020 inch</td></tr> <tr><td>1-100-237-04</td><td>0.021 inch</td></tr> <tr><td>1-100-237-05</td><td>0.022 inch</td></tr> <tr><td>1-100-237-06</td><td>0.023 inch</td></tr> <tr><td>1-100-237-07</td><td>0.024 inch</td></tr> <tr><td>1-100-287-08</td><td>0.025 inch</td></tr> <tr><td>1-100-237-09</td><td>0.026 inch</td></tr> <tr><td>1-100-237-10</td><td>0.027 inch</td></tr> <tr><td>1-100-237-11</td><td>0.028 inch</td></tr> <tr><td>1-100-237-12</td><td>0.029 inch</td></tr> <tr><td>1-100-237-13</td><td>0.030 inch</td></tr> </tbody> </table>	Locking Plate Number	Thickness (± 0.0005 inch)	1-100-237-01	0.018 inch	1-100-237-02	0.019 inch	1-100-237-03	0.020 inch	1-100-237-04	0.021 inch	1-100-237-05	0.022 inch	1-100-237-06	0.023 inch	1-100-237-07	0.024 inch	1-100-287-08	0.025 inch	1-100-237-09	0.026 inch	1-100-237-10	0.027 inch	1-100-237-11	0.028 inch	1-100-237-12	0.029 inch	1-100-237-13	0.030 inch	
Locking Plate Number	Thickness (± 0.0005 inch)																													
1-100-237-01	0.018 inch																													
1-100-237-02	0.019 inch																													
1-100-237-03	0.020 inch																													
1-100-237-04	0.021 inch																													
1-100-237-05	0.022 inch																													
1-100-237-06	0.023 inch																													
1-100-237-07	0.024 inch																													
1-100-287-08	0.025 inch																													
1-100-237-09	0.026 inch																													
1-100-237-10	0.027 inch																													
1-100-237-11	0.028 inch																													
1-100-237-12	0.029 inch																													
1-100-237-13	0.030 inch																													
10. Blade		<b>Replace</b> if tip shake cannot be eliminated.																												
11. Blade	Perform this action if blade protrudes 0.016 inch (0.38 mm) forward or aft of disk face. Refer to paragraph 2-39.	<b>Repair</b> as follows: a. <b>Remove</b> blade. b. <b>Inspect</b> pin. c. using locking plate of proper thickness as indicated in preceding action for item 9, <b>reinstall</b> blade.																												

2-37. Compressor Rotor Blades (T53-L-11 Series Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR ROTOR ASSEMBLY/ - Continued</p>	<p>12. Airfoil Surfaces</p> <p>Use lapping compound. Prepare lapping compound by mixing one part aluminum oxide, Grade 400 (item 6, Appendix D), by volume with three parts cutting oil (item 22, Appendix D).</p> <div style="border: 2px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;"> <p><b>CAUTION</b></p> </div> <p>In step b. of item 12, make sure that blades are rubbed only in a radial direction (parallel to leading edge).</p> <div style="border: 2px solid black; padding: 5px; text-align: center; width: fit-content; margin: 10px auto;"> <p><b>WARNING</b></p> </div> <p>Drycleaning solvent, P-D-680, used to clean parts in step e. of item 12, is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).</p>	<p><b>Remove</b> varnish as follows:</p> <p>a. <b>Place</b> lapping compound on soft cotton cloth.</p> <p>b. Using thin piece of wood or plastic to support the cloth, <b>rub</b> coated blades to <b>remove</b> varnish buildup.</p> <p>c. <b>Reinspect</b> all blades to insure that varnish buildup has been completely removed.</p> <p>d. <b>Repeat</b> preceding steps a. and b. if necessary.</p> <p>e. <b>Remove</b> all traces of lapping compound with soft cotton cloth moistened with drycleaning solvent (item 24, Appendix D),</p>

## 2-38. Compressor Rotor Blades (T53-L-13B/703 Engines) - Repair

### INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**Special Tools**  
Swiss Files

**Consumable Materials**  
Abrasive Crocus Cloth (item 21, Appendix D)  
India or Carborundum Stones  
Aluminum Oxide, Grade 400 (item 6, Appendix D)  
Cutting Oil (item 22, Appendix D)  
Drycleaning Solvent (item 24, Appendix D)

**References**  
Para 1-93

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR ASSEMBLY/

#### NOTE

Observe the following actions for items 1 thru 4 when performing compressor rotor blade repairs.

1. Compressor Rotor Blades

Use abrasive crocus cloth (item 21, Appendix D) for final polishing.

Repair using small Swiss type files, India or Carborundum stones.

#### NOTE

Lightly apply pigment, paint product to repaired surface of blades, (Item 37 or 109, Appendix D) to prevent a repaired blade from being mistaken as damaged on FOD inspections.

2. Compressor Rotor Blades

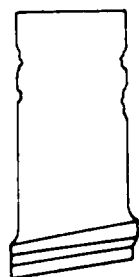
Lines, scratches, or sharp edges that might cause a concentration of stress are not permitted. Finish strokes of all repair work shall be parallel to the longitudinal axis of the blade.

Blend and finish smoothly all repairs.

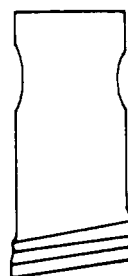
3. Leading and Trailing Edges of Blade

The following illustration shows a typical compressor rotor blade damage before and after repair.

Blend edges to a smooth radius as part of the repair,



**DAMAGED**



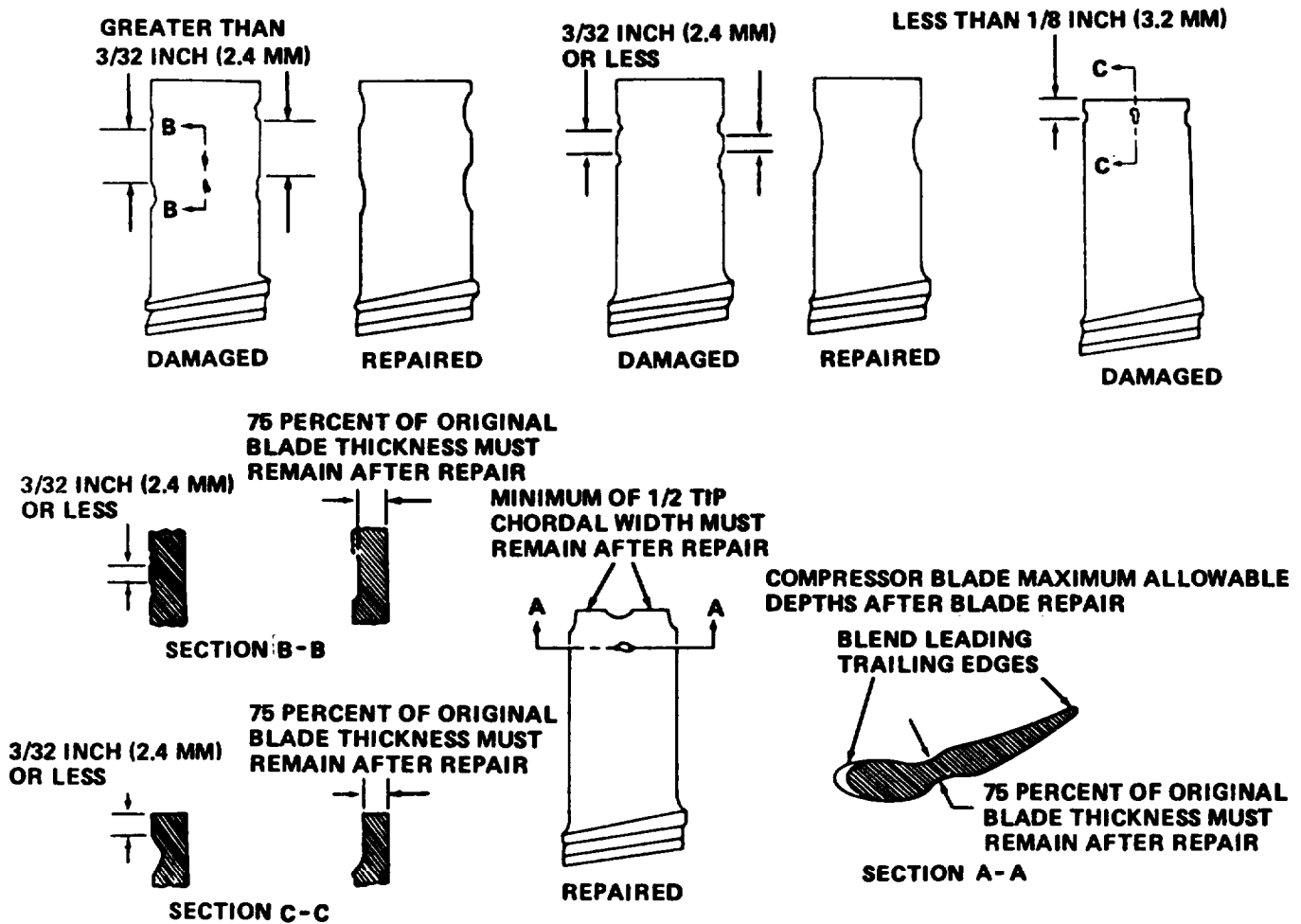
**REPAIRED**



2-38. Compressor Rotor Blades (T53-L-13B/703 Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR ASSEMBLY/-  
Continued



4. Compressor Rotor Blades

Repair all defects in non-critical areas with the exception of smooth dents where burrs are not evident.

2-38. Compressor Rotor Blades (T53-L-13B/703 Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR ASSEMBLY/-  
Continued

**NOTE**

On engines that have had greater than 20 percent of the total number of blades blend repaired to the maximum limits, perform vibration check as outlined in paragraph 1-93. Engines that do not pass vibration test requirement shall be shipped to Depot for repair.

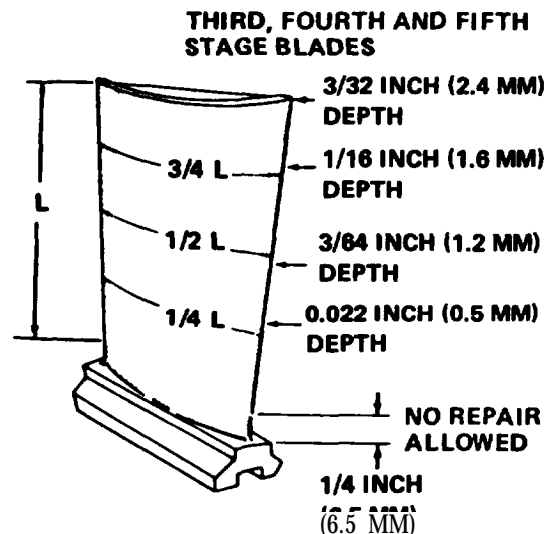
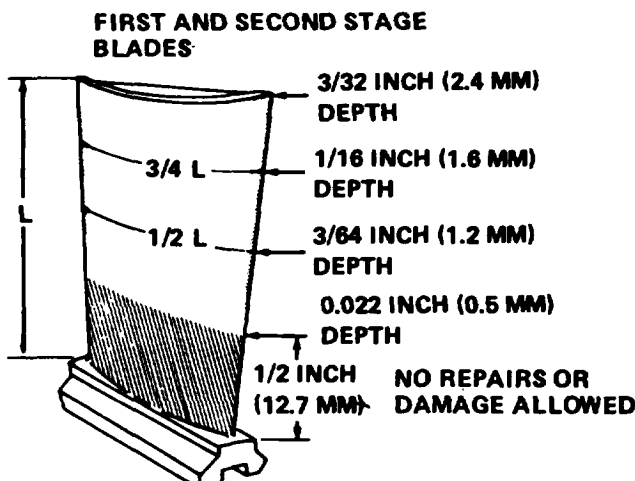
**NOTE**

Finished repairs to leading or trailing edges shall be limited as follows in actions for items 5 thru 10.

5. First and Second Stage Blade

No repairs or damage allowed within first 1/2 inch (12.7 mm) of blade span as measured from blade root in any area of first and second stage blade.

Observe allowable limits.



6. Third, Fourth, and Fifth Stage Blades

No repairs are allowed within 1/4 inch (6.4 mm) from blade root in any area of these blades. Smooth dents not exceeding 1/32 inch (0.8 mm) on longest side and 0.010 inch (0.25 mm) deep are acceptable without rework.

Observe allowable limits.

2-38. Compressor Rotor Blades (T53-L-13B/703 Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/- Continued		
7. Leading and Trailing Edges of Blades	Maximum allowable repair depth decreases as distance L, given in figure decreases.	<b>Observe</b> maximum allowable depth of repair.
8. Blade Tip		<b>Continue</b> repairs to damage within 1/8 inch (3.2 mm) to tip.
9. Compressor Rotor Blades	Perform this action if distance between two damaged areas is less than 3/32 inch (2.4 mm).	<b>Make one blend repair.</b>
10. Compressor Rotor Blades	Perform this action if distance between two damaged areas is greater than 3/32 inch (2.4 mm).	<b>Repair</b> damaged areas separately.
<b>NOTE</b>		
Finished repairs on blade tip edges shall be limited as follows in actions for items 11 thru 13.		
11. Blade Tip Edges	Maximum allowable repair depth is 3/32 inch (2.4 mm).	<b>Observe</b> allowable limits.
12. Blade Tip Edges	Length of repair shall be at least three times repair depth.	<b>Observe</b> allowable limits.
13. Leading or Trailing Edge	Perform this action if damage is closer to tip edge than 1/16 inch (1.6 mm).	<b>Blend repair</b> to whichever edge applies.
<b>NOTE</b>		
A minimum of one-half of blade tip chordal width must remain after blend repairs.		
<b>NOTE</b>		
Finished repairs to blade airfoil surfaces shall be limited as follows in actions for items 14 thru 18.		
14. Airfoil	Minimum thickness after repair shall be 75 percent original thickness.	<b>Observe</b> allowable limits.

2-38. Compressor Rotor Blades (T53-L-13B/703 Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/ - Continued		
15. Airfoil	Perform this action if distances between two damaged areas is less than 3/32 inch (2.4 mm).	<b>Make one blend repair.</b>
16. Airfoil	Perform this action if distance between two damaged areas is greater than 3/32 inch (2.4 mm).	<b>Make separate repairs.</b>
17. Blade Airfoil Area	Maximum allowable repair length shall be 13/32 inch (10.3 mm).	<b>observe</b> allowable limits.
18. Airfoil Areas	Repairs shall be within limits. No more than 20 percent of total blade material may be removed during repairs.	<b>Remove</b> scratches or lines.
19. Blade		<b>Replace</b> if damage cannot be repaired within limits specified in preceding actions for items 1 thru 18.
<b>NOTE</b>		
Repair blade that protrudes further than 0.015 inch (1.27 mm) forward or aft disk face as follows in actions for items 20 thru 23.		
20. Blade		<b>Remove.</b>
21. Pin	Pin must protrude a minimum of 0.050 inch (1.27 mm).	<b>Inspect.</b>
22. Blade	Use new locking plate when performing this action.	<b>Reinstall.</b>
<b>NOTE</b>		
Remove varnish on airfoil surface as follows in actions for items 23 thru 26.		
23. Airfoil Surface	Lapping compound is prepared by mixing one part aluminum oxide, Grade 400 (item 6A, Appendix D) by volume with three parts cutting oil (item 22, Appendix D).	Place lapping compound on soft cotton cloth.

2-38. Compressor Rotor Blades (T53-L-13B/703 Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR ROTOR ASSEMBLY/- Continued</p>		
<p>24. Blades</p>	<p>Use thin piece of wood or plastic to support the cloth.</p>	<p>Rub <b>coated</b> blades to <b>remove</b> varnish buildup.</p>
	<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div> <p>Make sure that blades are rubbed only in a radial direction (parallel to leading edge).</p>	
<p>25. Blades</p>		<p><b>Reinspect.</b> Insure that varnish buildup has been completely removed. <b>Repeat</b> preceding actions for items 23 and 24 if necessary.</p>
	<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;"><b>WARNING</b></div> <p>Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38° C to 59°C).</p>	
<p>26. Lapping Compound</p>		<p><b>Remove</b> all traces with soft cotton cloth moistened with drycleaning solvent (item 24, Appendix D).</p>

2-39. Compressor Rotor Blades(T53-L-11 Series Engines) - Replacement

INITIAL SETUP

**Applicable Configuration**

T53-L-11 Series Engines

**References**

Para 2-22,2-31,2-43, and 1-93

**Special Tools**

Drift (LTCT1643)

Drift (LTCT1644)

Pin Installer (LTCT256)

Installation Tool (LTCT4179)

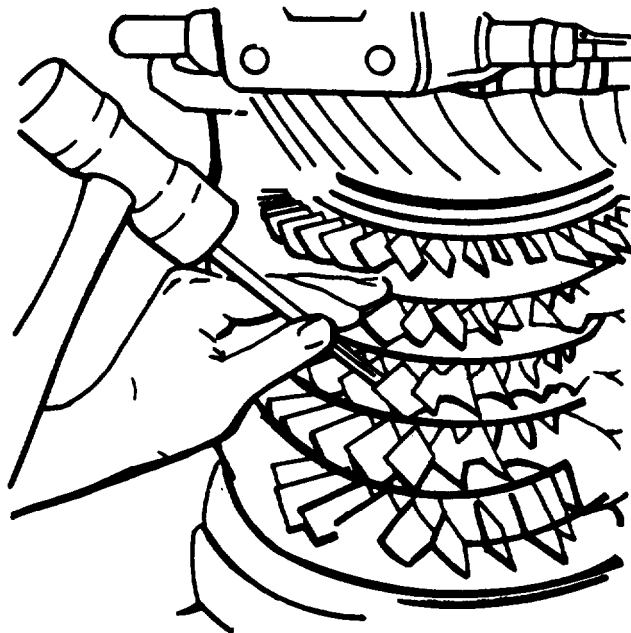
LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/	<p><b>NOTE</b></p> <p>Actions for items 1 thru 10 pertain to removal of compressor rotor blades to enable replacement.</p>	
1. Compressor Rotor Blades	<p>All blades replaced in the field shall be replaced in pairs, 180 degrees apart, using special field (short type) blade sets. Any number of blades may be changed in all stages of the compressor rotor assembly, provided the total number of blades per engine does not exceed so at any one repair.</p>	<p><b>Remove.</b></p>
2. Upper Compressor and Impeller Housing	<p>Refer to paragraph 2-22.</p>	<p><b>Remove.</b></p>
	<p><b>NOTE</b></p> <p>The first stage rotor blades are removed rearward. Actions for items 3 thru 6 relate to this procedure.</p>	
3. First Stage Rotor Blade	<p>Use drift (LTCT1643).</p>	<p><b>Insert</b> drift through front of inlet housing and through inlet guide vane to <b>contact</b> base of damaged first stage rotor blade.</p>

**CAUTION**

**Make certain to hold locking plate and blade securely to avoid dropping them between the inlet guide vane and the first stage disc or into the compressor rotor housing. Do not allow tools to contact compressor rotor disk.**

2-39. Compressor Rotor Blades (T53-L-11 Series Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/-Continued		
4. Drift (LTCT1643)		Gently <b>tap</b> to <b>remove</b> blade from disk.
5. Locking Plate		<b>Remove</b> and discard.
6. Pin		<b>Remove</b> if damaged.
7. Compressor Rotor	To perform this action, refer to procedures in actions for items 3 thru 6.	<b>Remove</b> 180 degrees from damaged blade.
<b>NOTE</b>		
The second through fifth stage rotor blades are removed in a forward direction. Actions for items 8 thru 10 relate to this procedure.		
8. Second through Fifth Stage Rotor Blades	Use drift (LTCT1644).	Gently <b>tap</b> blade out of disk.
9. Locking Plate		<b>Remove</b> and discard.
10. Pin		<b>Remove</b> if damaged.



2-39. Compressor Rotor Blades (T53-L-11 Series Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION												
<p>COMPRESSOR ROTOR ASSEMBLY/- Continued</p>	<p><b>NOTE</b></p> <p>Installation of compressor rotor blades shall be done according to actions for items 11 thru 22. All blades replaced in the field shall be replaced in pairs, 180 degrees apart, using special field (short-type) blade sets.</p>													
	<table border="0"> <thead> <tr> <th style="text-align: left;">Stage</th> <th style="text-align: left;">Part Number</th> </tr> </thead> <tbody> <tr> <td>First</td> <td>1-100-236-13 or 1-100-381-02</td> </tr> <tr> <td>Second</td> <td>1-100-241-13 or 1-100-382-02</td> </tr> <tr> <td>Third</td> <td>1-100-243-15 or 1-100-383-02</td> </tr> <tr> <td>Fourth</td> <td>1-100-245-12 or 1-100-384-02</td> </tr> <tr> <td>Fifth</td> <td>1-100-247-12 or 1-100-385-02</td> </tr> </tbody> </table>	Stage	Part Number	First	1-100-236-13 or 1-100-381-02	Second	1-100-241-13 or 1-100-382-02	Third	1-100-243-15 or 1-100-383-02	Fourth	1-100-245-12 or 1-100-384-02	Fifth	1-100-247-12 or 1-100-385-02	
Stage	Part Number													
First	1-100-236-13 or 1-100-381-02													
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Fourth	1-100-245-12 or 1-100-384-02													
Fifth	1-100-247-12 or 1-100-385-02													
<p>11. First stage Compressor Rotor Blades</p>		<p>Install from the rear in a forward direction.</p>												
<p>12. Second through Fifth Stage Com- pressor Rotor Blades</p>		<p>Install from the front in a rearward direction.</p>												
<p>13. Field Replace- ment Blades</p>	<p>These blades are indicated by the symbol "O" vibropeened on rear face of blade root, In the event of subsequent damage to one of these blades, it may be replaced without violating the maximum allowable limits. If a blade carries the symbol "O" with an X through it, that blade has been a field maintenance replacement at one time, but has been through overhaul and may now be considered as having no symbol.</p>	<p>Before installing insure these blades are marked "O" on blade root. If not done, mark blades before installing with vibropeen marking tool.</p>												
<p>14. Pin</p>	<p>Use pin installer (LTCT256). Use new pin.</p>	<p>Install in disk if previously removed in action for item 6. Insure pin bottoms in disk.</p>												
<p>15. Pin</p>	<p>Insure pins are fully installed and not deformed or otherwise damaged. Pin must protrude a minimum of 0.050 inch (1.27 mm).</p>	<p>Visually inspect.</p>												



2-39. Compressor Rotor Bides(T53-L-11 Series Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR ROTOR ASSEMBLY/- Continued</p>		
16. Locking Plate	This action pertains to locking plates 1-100-237-01 thru 1-100-237-13. Refer to following item 18.	<b>Select</b> new locking plate of proper thickness to <b>obtain</b> proper installation.
17. Locking Plate		<b>Position</b> on pin.
<b>NOTE</b>		
<p>If in following action for item 18 interference is noted when installing new blade, remove blade and select thinner locking plate or, using small file, remove material from tang on base of blade. If an excess of material has been removed, use next larger locking plate and reinstall blade.</p>		
18. Blade	Use installation tool (LTCT4179) and torque wrench.	<b>Apply</b> force of 80 pound-inches to 180 pound-inches (0.9 kgm to 2.1 kgm). Gently <b>push</b> blade into slot disk until blade comes into contact with pin in center of disk.
19. Locking Plate		<b>Bend</b> against blade root. <b>Check</b> to see that it is flush with disk on either aide.
20. Compressor Rotor Blade	Refer to paragraph 2-31.	<b>Check</b> tip clearances.
21. Compressor and Impeller Housing	Refer to paragraph 2-43.	<b>Install.</b>
22. Blades	Perform this action on engines that have had more than five sets of blades changed in any one stage or have had more than 20 percent of the total number of blades blend repaired to the maximum limit. Refer to paragraph 1-93. Engines that do not pass the vibration teat requirements shall be shipped to Depot for repair.	<b>Perform</b> vibration check.

2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replacement

T.O. 2J-T53-16

INITIAL SETUP

Application Configuration  
T53-L-13B/703 Engine

References  
Para 2-22,2-21, and 2-43

Special Tools  
Drift (LTCT1643)  
Soft-Faced Mallet  
Drift (LTCT1644)  
Pin Installer (LTCT256)  
Suitable Brass Drift  
Installation Tool (LTCT4179)

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/	<b>NOTE</b>	
	Remove compressor rotor blades according to actions for items 1 thru 9.	
1. Upper Compressor and Impeller Housing		Remove. (Refer to paragraph 2-22.)
	<b>NOTE</b>	
	The first stage rotor blades are removed rearward as outlined in actions items 2 and 3. The second through fifth stage rotor blades of compressor rotor subassembly are removed in a forward direction as outlined in actions for ittems 6 thru 9.	
	<b>CAUTION</b>	
	Make certain to hold locking plate and blades securely to avoid dropping them between the inlet guide vane and first stage compressor rotor disc or into lower compressor rotor housing. Do not allow tools to contact compressor disc area.	
2. Locking Plate	Use drift and soft-faced mallet.	Straighten tab of locking plate of blade to be removed fromfirst stage disc.

2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/ - Continued		
3. Inlet Guide Vanes	Use drift (LTCT1643).	<p><b>Insert</b> through front of inlet housing and through inlet guide vane to contact base of damaged first stage rotor blade. Inlet guide vanes may be repositioned as necessary to facilitate blade removal. Gently <b>tap</b> to <b>remove</b> blade from disc. <b>Remove</b> and <b>discard</b> locking plate after removal. <b>Remove</b> pin if damaged.</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"><b>WARNING</b></div>		
<b>FLIGHT SAFETY PARTS</b>		
<p><b>Do not allow tools to contact compressor disk area.</b></p>		
<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div>		
<p><b>When a damaged first stage rotor blade is to be replaced, the 16th blade, counting damaged blade as number 1 in counterclockwise direction (viewed from rear of first stage rotor disk), must also be replaced to maintain proper rotor balance.</b></p>		
4. Blade	Use procedures in preceding actions for items 2 and 3.	Remove 16th blade located counterclockwise from the damaged blade location, as viewed from rear of first stage rotor.
5. Blades		Repeat procedures in actions for items 2,3, and 4 until all blades that are to be replaced have been removed from first stage rotor.

2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR ASSEMBLY/ - Continued

**NOTE**

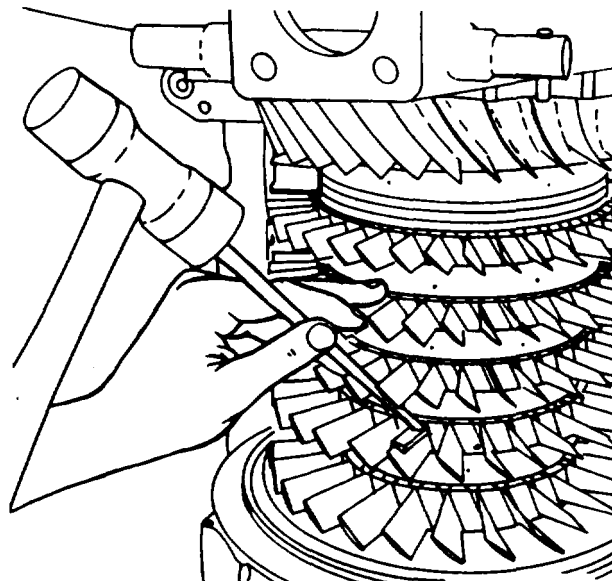
If more than 10 blade sets are damaged (either repairable or non-repairable), replace all blades in the first stage.

6. Locking Plate

Use drift and soft-faced mallet.

**Straighten** tab of locking plate to be removed from compressor subassembly.

7. Compressor Rotor Subassembly



On the second through fifth stage rotor blades of compressor rotor subassembly, **use** drift (LTCT1644) and gently **tap** blade out of disk. **Remove** and **discard** locking plate after blade removal. **Remove** pin if damaged.

**WARNING**

**FLIGHT SAFETY PARTS**

Do not allow tools to contact compressor rotor subassembly during removal and installation of blades.



**2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replacement - Continued**

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ROTOR ASSEMBLY/ - Continued	<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div> <p>When a damaged second through fifth stage rotor blade is to be replaced by a field replacement blade, the blade located 180 degrees diametrically opposite to the damaged blade must also be replaced to maintain proper rotor balance.</p>	
8. Rotor Blade	Using procedures in preceding actions for items 6 and 7. This blade is located 180 degrees diametrically opposite from damaged blade.	Remove rotor blade located 180 degrees diametrically opposite from the damaged blade.
9. Blades		Repeat the procedures in actions for items 7 and 8 until all blades that are to be replaced have been removed from second, third, fourth, or fifth compressor rotor assembly.

**WARNING**

**FLIGHT SAFETY PARTS**

**On second through fifth stages, there is no limit to the number of blade sets that may be replaced.**

2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION												
COMPRESSOR ROTOR ASSEMBLY/ - Continued														
10. Compressor Rotor Blades	All blades replaced in the field shall be replaced in pairs, using special field (short-type) blade sets. Following is a list of field replacement blade sets.	Replace blades used in the field according to the table given.												
	<table> <thead> <tr> <th>Stage</th> <th>Part Number</th> </tr> </thead> <tbody> <tr> <td>First</td> <td>1-100-361-05</td> </tr> <tr> <td>Second</td> <td>1-100-286-08</td> </tr> <tr> <td>Third</td> <td>1-100-383-04</td> </tr> <tr> <td>Fourth</td> <td>1-100-384-04</td> </tr> <tr> <td>Fifth</td> <td>1-100-385-04</td> </tr> </tbody> </table>	Stage	Part Number	First	1-100-361-05	Second	1-100-286-08	Third	1-100-383-04	Fourth	1-100-384-04	Fifth	1-100-385-04	
Stage	Part Number													
First	1-100-361-05													
Second	1-100-286-08													
Third	1-100-383-04													
Fourth	1-100-384-04													
Fifth	1-100-385-04													

**NOTE**

Install compressor rotor blades according to actions for items 11 thru 25.

11. First Stage Compressor Rotor Blades

Install from rear in a forward direction.

12. Second Through Fifth Stage Compressor Rotor Blades

Install from front in a rearward direction.

13. Field Replacement Blades

These blades carry the symbol 'O' vibropeened on the rear face of the blade root. In the event of subsequent damage to one of these blades, it may again be replaced without violating the maximum allowable limits. If a blade carries the symbol 'O' with an X through it, that blade has been to field maintenance at one time but has since been through overhaul and may be considered as having no symbol.

Mark on blade root with an 'O' using a vibropeen marking tool, if not already marked.

**NOTE**

Perform actions for items 14 thru 16 for blade installation of compressor front shaft assembly (first stage disc). The compressor front shaft assembly has a complement of 31 blades and requires a special

2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR ROTOR ASSEMBLY/- Continued</p>	<p>assembly procedure. The following steps must be performed for blade installation of the first stage compressor disc only.</p> <p>Blade weight to the nearest 0.1 gram is stamped on the convex side of each blade. Two blades marked with equal weights are a set. Blades within 0.1 gram of each other will be considered to be equal weight.</p> <p>Blades of equal weight are to be kept together.</p>	
<p>14. Blade Sets</p>	<p>Blade sets are to rearranged in a row according to ascending weights.</p> <p style="text-align: center;">STEP 1</p> <p style="text-align: center;">EXAMPLE</p> <p>Set 1-2-3-4-5-6-7-8*-9-10-11-12-13-14-16 Grams 16.6 16.8 . . . . . 17.6 17.8</p> <p>*One blade must be added to set number 8 to make this a set of three equal weights within 0.2 gram of each other</p>	<p><b>Arrange</b> according to ascending weights.</p>
<p>15. Blade Set Number 2</p>	<p>Starting with set number 2, remove every other set and with these sets make a second row keeping sets in order of descending weights.</p> <p style="text-align: center;">STEP II</p> <p style="text-align: center;">EXAMPLE</p> <p>Row I 1-3-6-7-9-11-13-15 Row II 14-12-10-8*-6-4-2</p> <p>*Set number 8 has three blades of equal weight within 0.2 gram of each other.</p> <p>Reposition Row II to the right of Row I to form a single row of blade sets that are in assembly order.</p> <p>Final Row 1-3-5-7-9-11-13-15-14-12-10-8*-6-4-2</p>	<p><b>Remove.</b></p>



2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replcement - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR ROTOR  
ASSEMBLY/-  
Continued

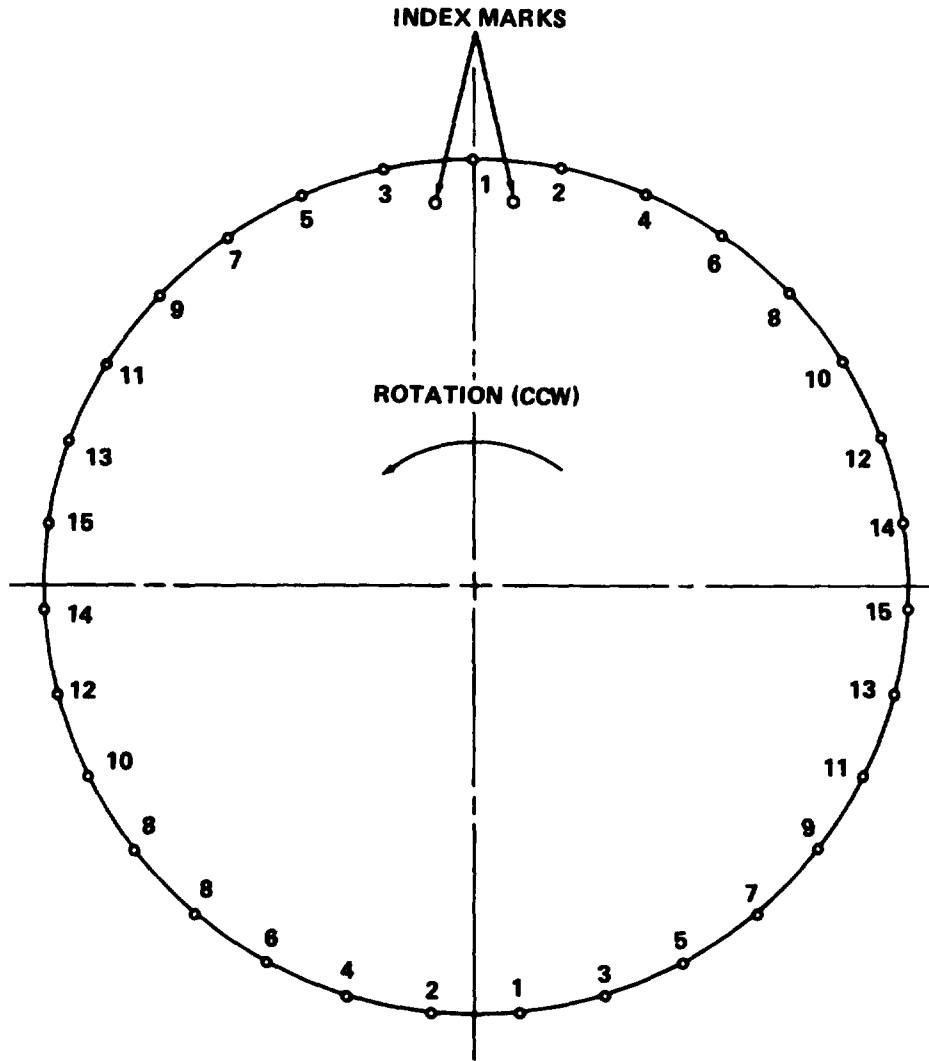
NOTE

Set number 8 has three blades of equal weight within 0.2 gram of each other.

16. Blades

The following figure illustrate first stage disc arrangement.

**Assemble** blades into disc so that each blade is in sequence.



2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMPRESSOR ROTOR  
ASSEMBLY/-  
Continued

**CAUTION**

If a blade must be replaced, replace with matched act. One blade to replace the damaged blade and the other to replace the 16th blade, counting damaged blade as number 1 in counterclockwise direction (viewed from rear of first stage rotor disc).

17. Compressor Rotor  
Blades

Pin must protrude a minimum of 0.050 inch (1.27 mm).

Using pin installer (LTCT 256), **install** new pin if required.

18. Locking Plate  
(1-100-505-02)

**Install** on pin in root of disc.

**NOTE**

When installing blades, press thumb against blade root until blade is seated against pin.

19. Locking Plate

**Using installation tool (LTCT4179), bend tabs against blade roots.**

**NOTE**

Install second through fifth stage blades according to actions for item 20.

**CAUTION**

**Do not allow tool to contact compressor disc area.**

20. Blade Sets

Blade sets for each stage are to be selected from random order. No systematic grouping is required.

**Assemble** blade sets for each stage into proper disc so that each blade in a set is 180 degrees from its mate.

2-40. Compressor Rotor Blades (T53-L-13B/703 Engines) - Replacement - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMPRESSOR ROTOR  
ASSEMBLY/-  
Continued

**CAUTION**

If a blade must be replaced, replace with a matched blade set.

21. Compressor Rotor  
Blades

Use pin installer (LTCT256). Pin must protrude a minimum of 0.050 inch (1.27 mm).

**Install** new pins if required.

22. Locking Plate  
(1-100-505-02)

**Install** locking plate (1-100-505-02) on pin in root of disc.

**NOTE**

When installing blades, press thumb against blade root until blade is seated against pin.

23. Locking Plate

**Using installation tool (LTCT4179), bend tabs against blade roots.**

**CAUTION**

Do not allow tool to contact compressor disc area.

24. Compressor  
Rotor Blade

**Check** tip clearance as outlined in paragraph 2-31.

25. Compressor and  
Impeller Housings

**Install as outlined in paragraph 2-30.**

**2-41. Centrifugal Compressor Impeller Assembly (T53-L-11 Series and T53-L-13B/703 Engines  
- Inspection**

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines  
T53-L-13B Engine  
T53-L-703 Engine

**References**  
Para 2-42

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMPRESSOR/

**WARNING**

**FLIGHT SAFETY PARTS**

**CE Compressor Rotor  
(Centrifugal Compressor Impeller)**

**After removal of protective covering,  
handle with caution during inspection.  
inspection limits and repair instruc-  
tions must be observed.**



2-41. Centrifugal Compressor Impeller Assembly (T53-L-11 Series and T53-L-13B/703 Engines - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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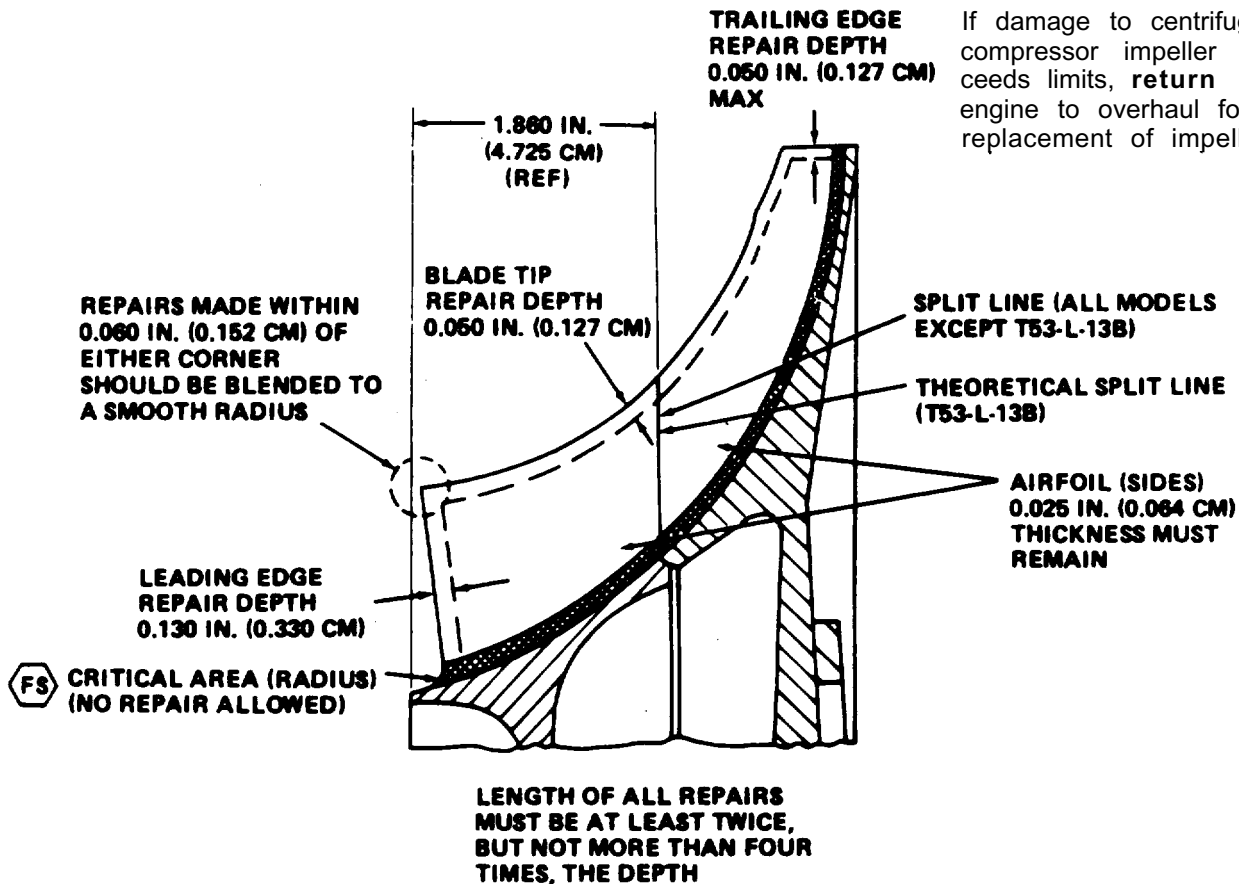
**NOTE**

No cracks or blade bending is permitted. Length of all repairs must be at least two but not more than four times the depth.

1. Centrifugal Compressor

**Inspect** for nicks, burrs, dents, cracks, and bending. See illustration for blend repair limits.

If damage to centrifugal compressor impeller exceeds limits, **return** engine to overhaul for replacement of impeller.



**FS** FLIGHT SAFETY PART CRITICAL CHARACTERISTIC

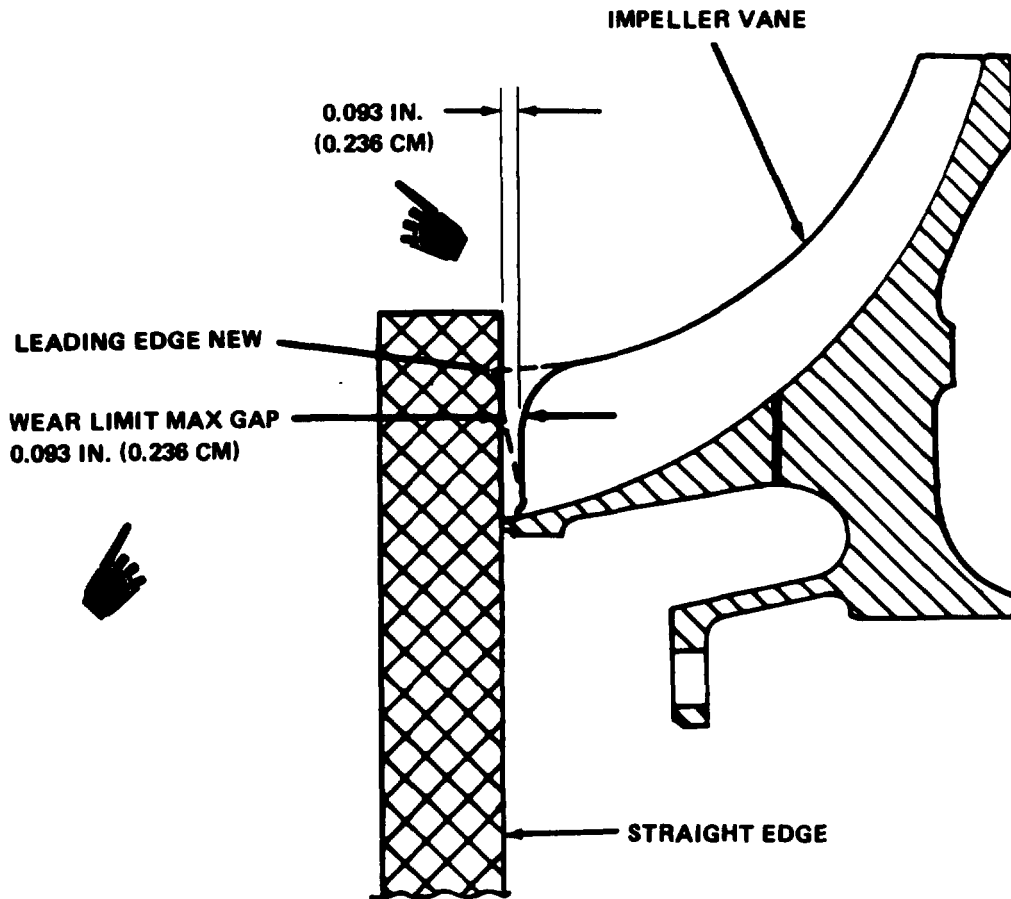
**2-41. Centrifugal Compressor Impeller Assembly - Inspection - Continued**

INITIAL SETUP

Applicable Configuration  
All

References  
Para 2-42

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR/- Continued		
2. Centrifugal Compressor	Refer to paragraph 2-42.	If limits are not exceeded, blend repair impeller.



With the top compressor housing half removed, position a straight edge across the forward lip of the centrifugal impeller.

The maximum gap between straight edge and closest point on Impeller blade shall not exceed 0.093 Inch (0.236 cm).

**2-42. Compressor Impeller Assembly (T53-L-13B/703 Engines) - Repair**

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Crocus Cloth (Item 21, Appendix D)  
India or Carborundum Stone  
Carbide Burr

**Special Tools**  
Portable Drill or Rotary File

**References**  
Para 2-31

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMPRESSOR/

**WARNING**

**FLIGHT SAFETY PARTS**

**CE Compressor Rotor  
(Centrifugal Compressor Impeller)**

**After removal of protective covering,  
handle with caution on during repair.  
Limits and repair Instructions must  
be observed.**



2-42. Compressor Impeller Assembly (T53-L-13B~3 Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR - Continued	<div style="border: 2px dashed black; padding: 5px; display: inline-block;"><b>CAUTION</b></div>	
	<p><b>When making repairs, make sure that foreign material does not enter engine.</b></p>	
	<p><b>NOTE</b></p>	
	<p>To accomplish blend repair of impeller, observe limits in this paragraph.</p>	
	<p>Use portable drill or rotary file for repair procedures. Rotary file shall be equipped with carbide burr. If these items are not available, an India or Carborundum stone may be used. Use crocus cloth (item 21, Appendix D) for final polishing.</p>	
1. Centrifugal Compressor Impeller Assembly	<p>Lines, scratches, or sharp edges that might cause a concentration of stress are not permitted. Sharp projections should be avoided.</p>	<p><b>Blend and finish</b> all repairs.</p>
2. Blade	<p>Nicks are not allowed in critical area. Smooth dents not exceeding 0.040 inch (1.016 mm).</p>	<p><b>Observe</b> allowable limits.</p>
3. Leading Edge of Blade	<p>No repair is allowed in critical area. Depth of repaired damage shall not exceed 0.130 inch (3.302 mm).</p>	<p><b>Observe</b> allowable limits.</p>
4. Trailing Edge of Blade	<p>Distance between repaired area must be equal to or greater than the length of the shortest repair. Depth of repaired damage shall not exceed 0.050 inch (1.270 mm).</p>	<p><b>Repair</b> damage.</p>

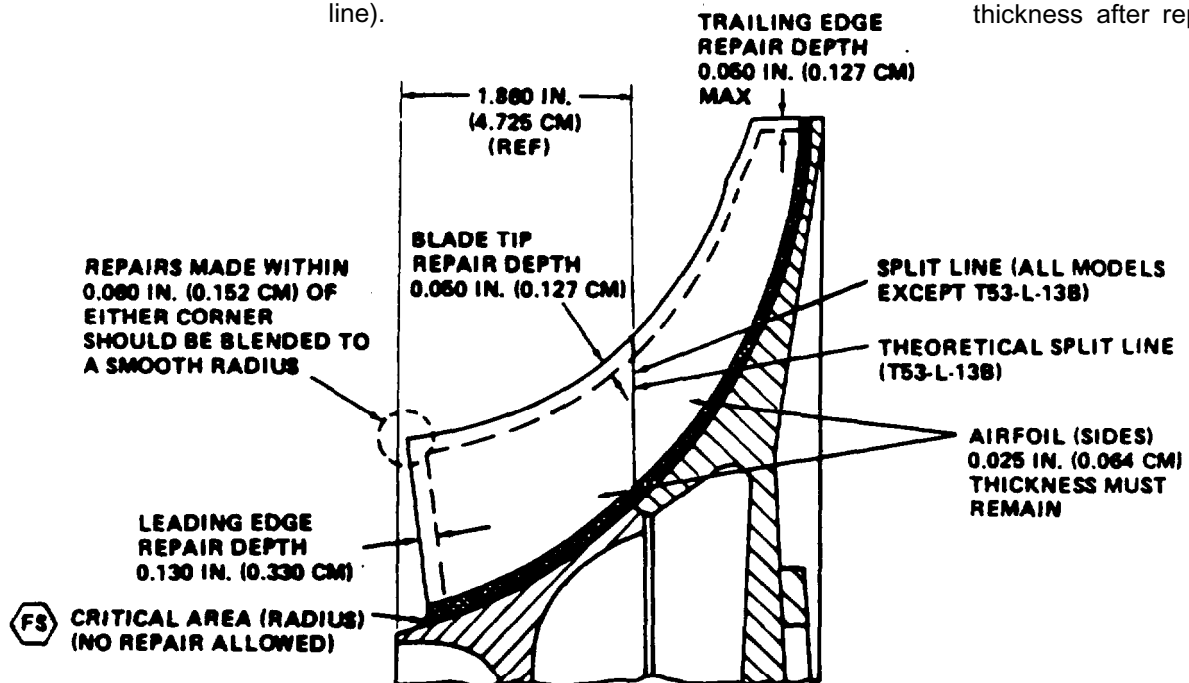
2-42. Compressor Impeller Assembly (T53-L-13B/703 Engines) - Repair - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR/-  
Continued

5. Blade Tip	Distance between repaired areas must be equal to or greater than the length of the shortest repair. Depth of repaired damage may not exceed 0.050 inch (1.270 mm).	Repair damage.
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6. Airfoil (Sides)	Distance between repaired areas must be at least 1/4 inch (6.4 mm). Repair depth is governed by blade thickness on inducer area (forward of split line).	Maintain tip clearance (para 2-3). Leave 0.025 inch (0.635 mm) blade thickness after repair.
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**FS FLIGHT SAFETY PART CRITICAL CHARACTERISTIC**

7. Blade Airfoil - Impeller Area (Aft Split line or Theoretical Split line)	Nicks and dents are permitted without repair, provided a 0.025 inch (0.635 mm) blade thickness remains.	Blend repair of burrs permitted only.
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8. Blade Corners	Distance between repaired areas must be at least 1/4 inch (6.4 mm). Perform this action provided damage is within 0.060 inch (1.524 mm) of either corner.	Repair damage to smooth radius.
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**2-43. Compressor and Impeller Housing Assembly - Installation**

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Aluminum Alloy (item 5, Appendix D)

**Special Tools**  
Depth Vernier Gage

**References**  
Appendix G, Table G-3, Reference Number 55  
Table G-4, Reference Number 59  
Table G-5, Reference Number 28  
Table G-6, Reference Number 16

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/

**NOTE**

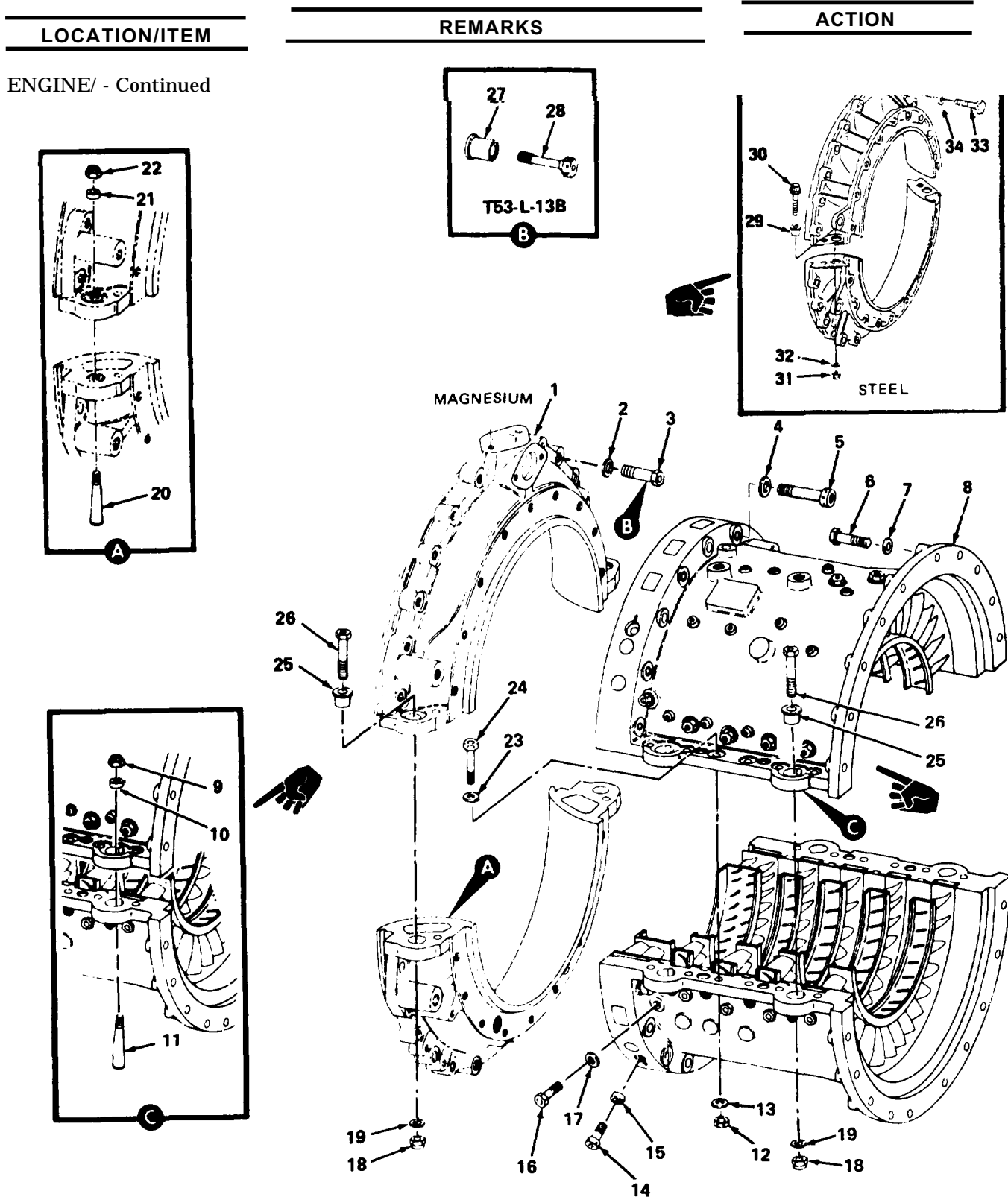
On T53-L-13B, if magnesium impeller housing 1-100-090-06 or 1-100-090-07 is used, the axially threaded hole in the lower housing, located at the 8-o'clock position as viewed from the front face, must be plugged with self-locking setscrew, MS 18063, installed flush.

1. Impeller Housing Assembly

**CAUTION**

If a shimmed (impeller housing to compressor housing mating surface) housing is being reinstalled, insure shims were retained for air-bleed actuator mounting bosses. If actuator shims were not retained, fabricate two new shims 0.040 inch (1.02 mm) thick, 1.00 inch (25.4 mm) OD, with 0.500 inch (12.7 mm) hole from aluminum alloy (item 5, Appendix D) and retain with impeller housing for use during actuator installation. (T53-L-11 series and L-138 engines only.)

2-43. Compressor and Impeller Housing Assembly - Installation - Continued





2-43. Compressor and Impeller Housing Assembly - Installation - Continued

LOCATION/ITEM	REMARKS		ACTION
ENGINE/ - Continued			
1. Impeller Housing Assembly 2. Washer 3. Bolt 4. Washer 5. Bolt 6. Bolt 7. Washer 8. Compressor Housing Assembly	9. Nut 10. Washer 11. Taper Pin 12. Nut 13. Washer 14. screw 15. Bolt Retainer 16. Bolt 17. Washer	18. Nut 19. Washer 20. Taper Pin 21. Washer 22. Nut 23. Washer 24. Bolt 25. Dowel 26. Bolt 27 .Bushing	28. Bolt 29. Dowel 30. Bolt 31. Nut 32. Washer 33. Bolt 34. Washer

2-43. Compressor and Impeller Housing Assembly - Installation - Continued

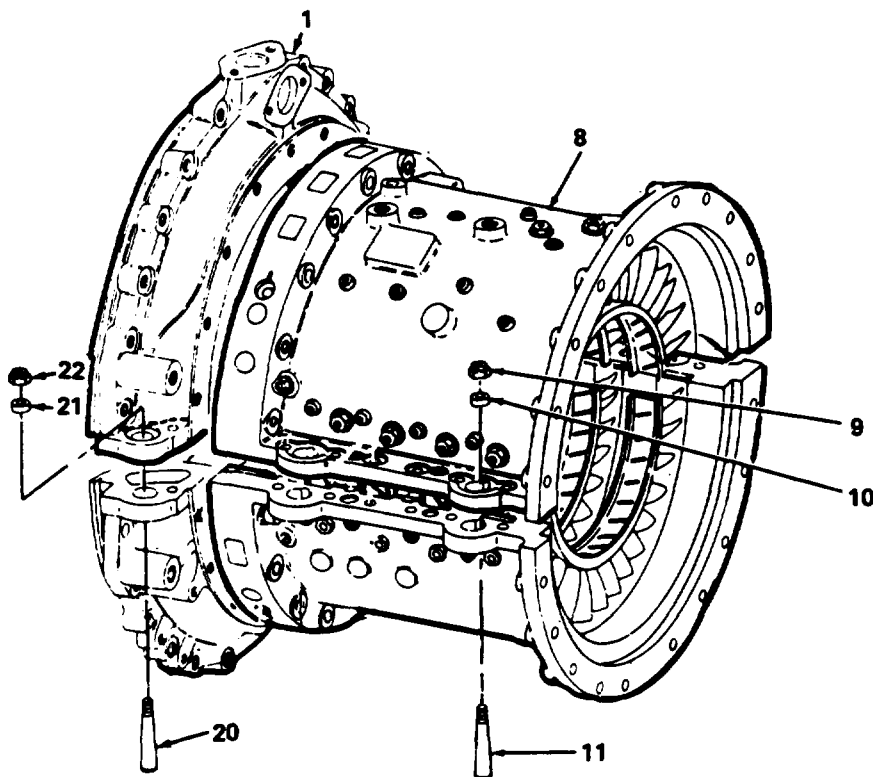
LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued  2. Upper Compressor Housing and Impeller Housing Assemblies	Use a depth vernier gage.	<b>Insure</b> that minimum gap will exist between outer shroud ends of mating vane assemblies before compressor housing installation. Gap shall be as given in Appendix G, table G-5, reference number 28 or table G-6, reference number 16. <b>File</b> shroud ends as required to obtain clearance. <b>Install</b> impeller housing, then <b>install</b> compressor housing.

**NOTE**

Following item 3 applies to housings with taper pins.

3. Threaded Taper Pins (11 and 20)

**Install** threaded taper pins (11 and 20) in compressor (8) and impeller housing (1) flanges. **Install** washers (10 and 21) and nuts (9 and 22) on threaded taper pins. **Tighten** nuts as require. (Refer to Appendix G, table G-3, reference number 79.)



2-43. Compressor and Impeller Housing Assembly - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
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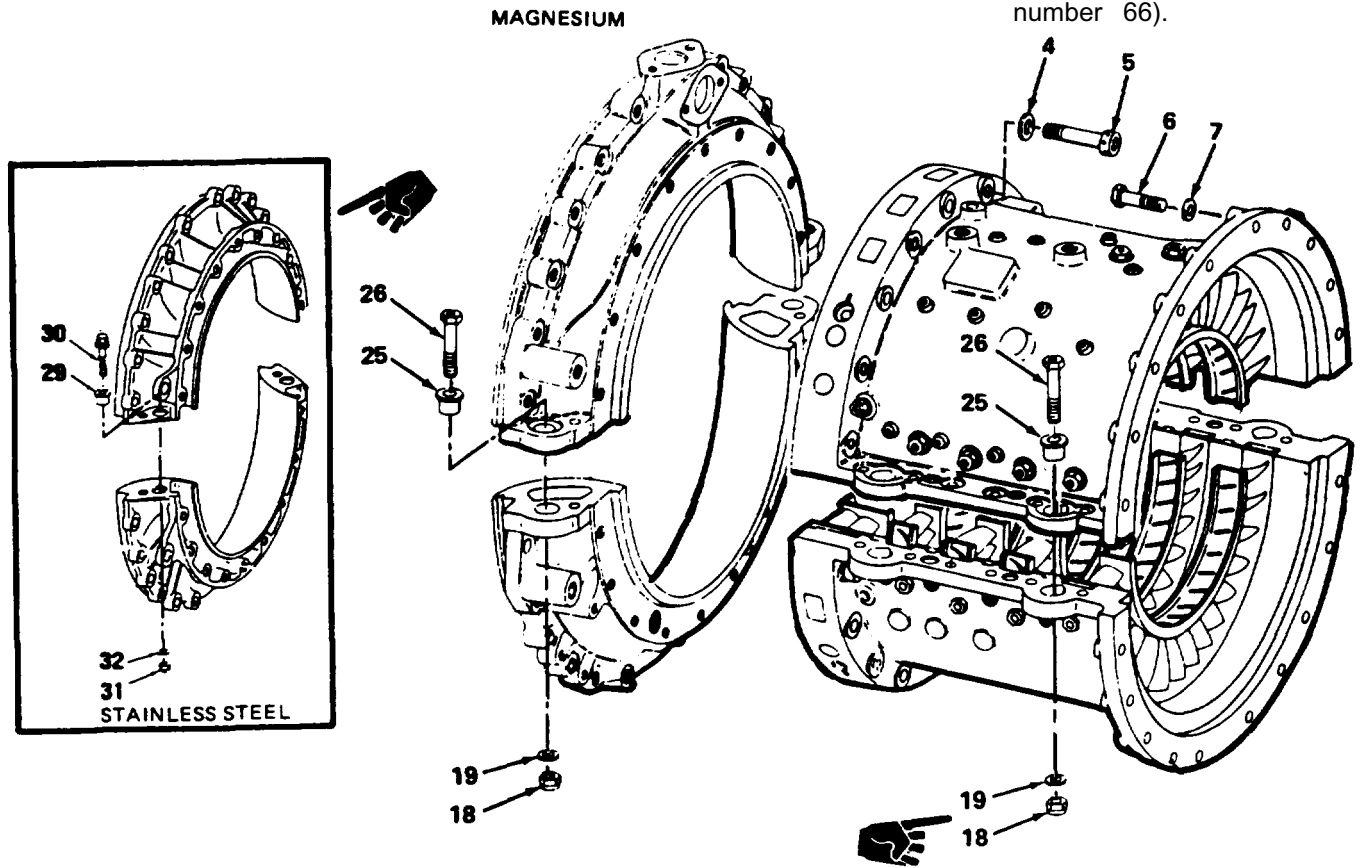
ENGINE/ - Continued

4. Upper and Lower Sections of Compressor and Impeller Housings

**NOTE**

Action Item 4 applies to housing with hollow dowels.

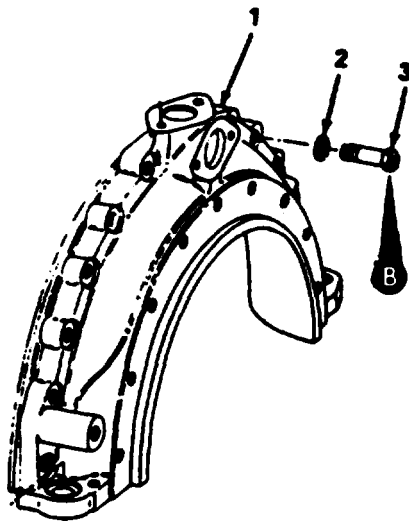
**Secure** upper and lower sections of compressor housing with four nuts 18, washers (19), bolts 26, and hollow dowels 25. **Secure** upper and lower sections of magnesium impeller housing with two nuts (18), washers (19), bolts (26), and hollow dowels (25) or **secure** upper and lower sections of stainless impeller housing with two nuts (31), washers (32), bolts 30, and dowels 29). **Tighten** all nuts. Refer to Appendix G, Table G-3, reference number 55 or Appendix G, Table G-4., reference number 66).





2-43. Compressor and Impeller Housing Assembly - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
5. Bolts (6), Washers (7)		<b>Install</b> bolts (6) and washers (7) that secure compressor housing to Inlet housing.
6. Clips for Airbleed Band, Bolts (5), Washer (4)		<b>Position</b> clips for air-bleed band on proper bolts. <b>Install</b> bolts (5) and washers (4) that secure compressor housing to impeller housing. <b>Tighten</b> bolts to proper torque ( <b>refer</b> to Appendix G, table G-4, reference number 13A) and <b>lockwire</b> .
7. Bolts (3), Washers (2)	T53-L-11 Series only.	<b>Install</b> 12 bolts (3), and 12 washers (2), that secure impeller housing assembly to diffuser housing assembly.



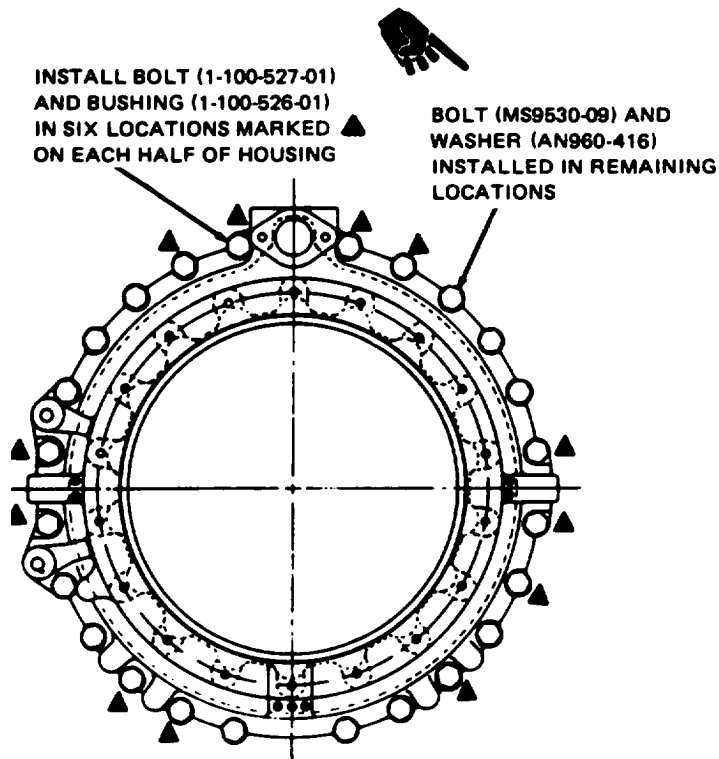
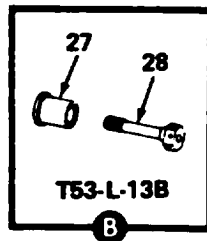
**NOTE**

In following Item 8, position flange of bushing (27) toward flange of Impeller housing.

Position bracket for the ignition exciter on three of the bolts (3) at approximately the 10-o'clock position.

2-43. Compressor and Impeller Housing Assembly - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued	T53-L-13B engine only with magnesium housing.	Install six bushings (27), six bolts (28), six washers (2), and six bolts (3) that secure impeller housing assembly to diffuser housing assembly. Tighten bolts (28) as required. (Refer to Appendix G, table G-4, reference number 59.) Lockwire bolts. Tighten bolts (3) and lockwire.



2-43. Compressor and Impeller Housing Assembly - Installation - Continued

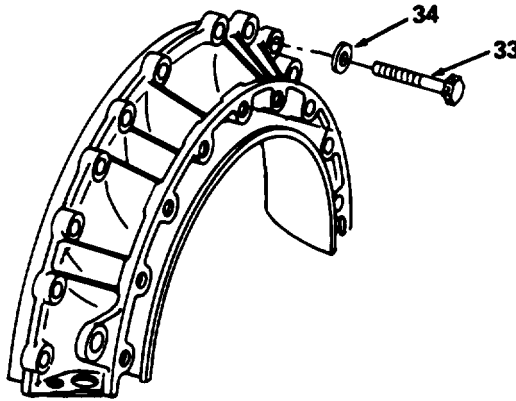
LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued

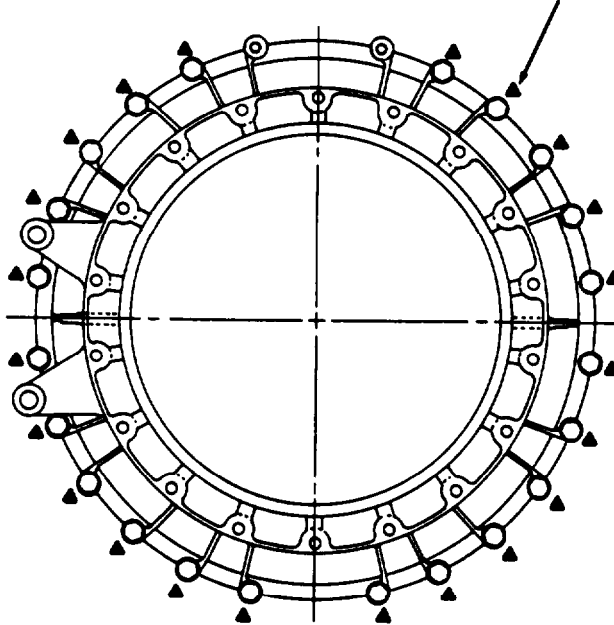
8A. Bolts (33), Washers (34)

T53-L-13B and T53-L-703 engines with stainless steel housing.

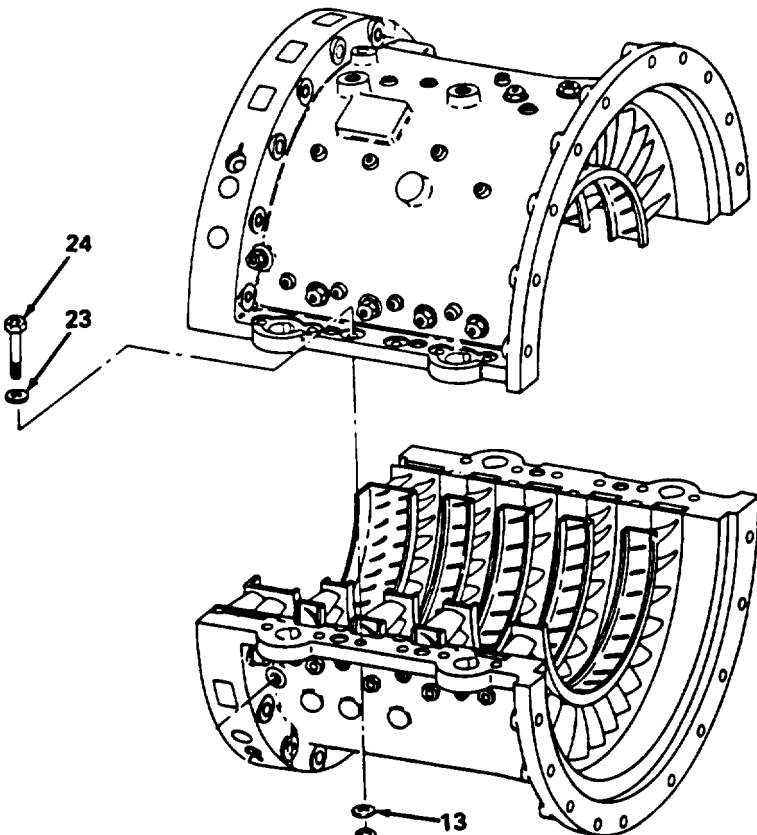
**Install** 22 washers (34) and 22 bolts (33) that secure impeller housing assembly to diffuser housing assembly. **Tighten** bolts (33) and lockwire.



**INSTALL BOLTS (MS9958-09)  
AND WASHERS (AN960-416)  
IN TWENTY-TWO LOCATIONS  
MARKED ▲**



2-43. Compressor and Impeller Housing Assembly - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>ENGINE/ - Continued</p> <p>9. Upper and Lower Halves of Compressor Housing</p>		<p>Install remaining bolts (24), washers ( 13 and 23) and nuts (12) that secure upper and lower halves of compressor housing. Tighten all bolts.</p>
<p>10. Brackets, Lines, Hoses and Accessories</p>	<p>Insure that all removed brackets have been installed, and install all removed lines, hoses, and accessories.</p>	

2-44. Air Diffuser-Inspection

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Brazeing Flux (item 30, Appendix D)  
Brazeing Alloy (item 3, Appendix D)  
Dry Cleaning Solvent (item 24, Appendix D)

**References**  
Para H-17, H-26, H-20 H-28

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/	All repairs to the diffuser section are AVIM TASK.	
1. Vanes	Minor nicks, dents and burrs are acceptable for repair provided mutilation has not occurred. Blend-repair as outlined in paragraph H-26,	Inspect for minor nicks, dents, or burrs.
2. Vanes	Minor punctures are acceptable provided engine performance has not been affected.	Inspect for punctures.
	Maximum allowable erosion depth of leading edge of first row of vanes is 0.025 inch (0.635 mm).	Inspect for erosion.
3. Vane Brazements	Minor cracks, voids and crack-like indications are acceptable provided all other inspection requirements are met.	Inspect for minor cracks, voids and cracklike indications. If cracks are suspected in a diffuser housing vane brazement, refer to TM 1-1520-255-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for AH-1 Helicopter Series.

**WARNING**

Dry cleaning solvent P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

2-44. Air Diffuser- Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - continued		
4. Vane Brazements	If cracks in external vane brazements are cause for leakage, perform these actions. Use brazing flux (Item 30, Appendix D) for T53-L-11 engine and brazing alloy (item 93, Appendix D) for T53-L-13B/703 engines when performing step c. of this action.	<p>Repair as follows:</p> <p>a. Use stainless steel wire brush and dry cleaning solvent (item Y4, Appendix D). Clean area to be repaired.</p> <p>b. Inspect suspected area by fluorescent penetrant inspection method detailed in paragraph H-20. If cracks are suspected in a diffuser housing bazement, refer to TM 1-1520-225-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Non-destructive Inspection Procedures for AH-1 Helicopter Series.</p>



2-44. Air Diffuser - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

DIFFUSER HOUSING/ -  
Continued

c. (AVIM) Repair leaking area by torch silver-braze method detailed in paragraph H-27.

**CAUTION**

After repair, insure that air passages are free of excess braze material. Do not attempt to repair base metal defects by using this method.

**WARNING**

Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 138°F (38°C - 59°C).

5. Air Diffuser

Blend-repair surface defects. Remove sharp projections on vane where access permits. Refer to paragraph H-26.

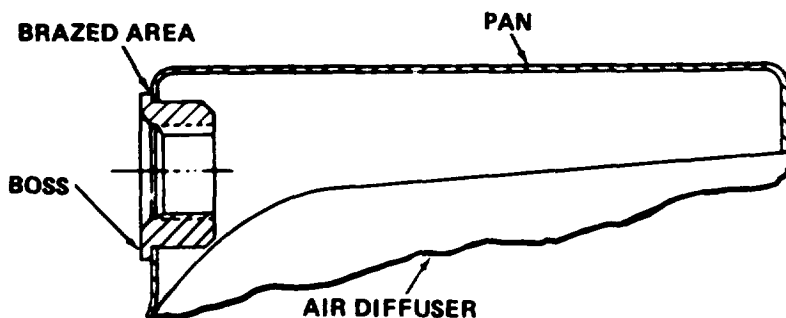
6. Air Outlet Assembly

If cracks are suspected on the brazed joint of the air outlet pan assembly boss (P3 fitting), proceed with these actions. Use brazing flux (item 30, Appendix D) and brazing alloy (item 3, Appendix D) for T53-L-11 series engines, brazing alloy (item 4, Appendix D) for T53-L-13B/703 engines when performing step c. of this action.

a. Clean area to be inspected. Use stainless steel wire brush and dry-cleaning solvent (item 24, Appendix D).

b. Inspect brazed area for cracks. Use fluorescent - penetrant inspection. Refer to TM 1-1520-255-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for AH-1 Helicopter Series.

c. (AVIM) Repair cracked braze joint of air outlet pan assembly boss (P3 fitting) by torch silver-braze repair as outlined in paragraph H-27. Use a fine tipped torch (no. 100).





244. Air Diffuser - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued	<p><b>NOTE</b></p> <p>After torch braze repairing, insure that the air passages are not clogged with braze material.</p>	
7. Air Diffuser	One crack up to 1/2 inch in length is acceptable.	Inspect weldment area between the engine mount assemblies and diffuser housing for cracks.

**WARNING**

Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 138°F (38°C - 59°C).

8. Air Diffuser	External surface corrosion is allowable. Heavy corrosion resulting in metal break-through is cause for rejection and engine shall be shipped to Depot.	Inspect for corrosion. Wire brush to remove surface scale. Clean with drycleaning solvent (item 24, Appendix D). Touch up as outlined in paragraph H-17.
-----------------	--	--

**2-45. Overspeed Governor and Tachometer Drive Assembly - Removal**

INITIAL SETUP

**Applicable Configuration**  
All

**References**  
Para 8-36

**Special Tools**  
8-32 Threaded Rod

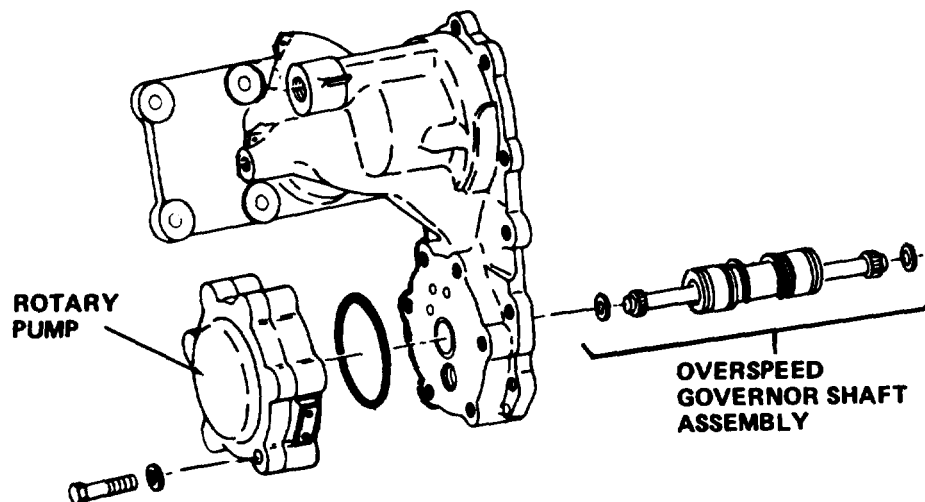
LOCATION/ITEM	REMARKS	ACTION
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INLET HOUSING/

1. Power-Driven Rotary (Booster) Pump

Refer to paragraph 8-36.

Remove.



2. Overspeed Governor Drive Shaft

Use 8-32 threaded rod. Screw rod into end of overspeed governor drive shaft.

**Pull** drive shaft through overspeed governor and tachometer drive housing.

**NOTE**

Nuts (shims) removed in following actions for item 3, may or may not be installed.

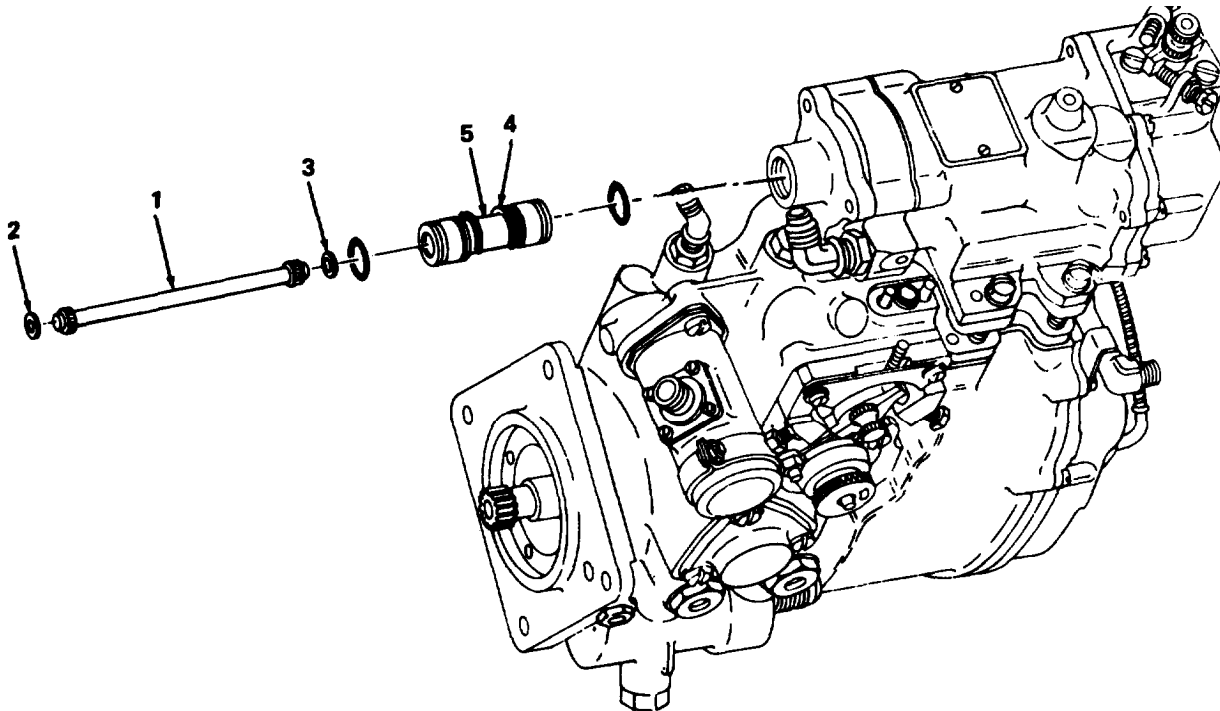
2-45. Overspeed Governor and Tachometer Drive Assembly - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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INLET HOUSING/ -  
 Continued

3. Overspeed Governor Shaft (1)

Remove spline nuts (shims) (2 and 3) and tag according to their positions.



4. Overspeed Governor Drive Shaft

Expand snapring (4) and slide to center of shaft tube (5).

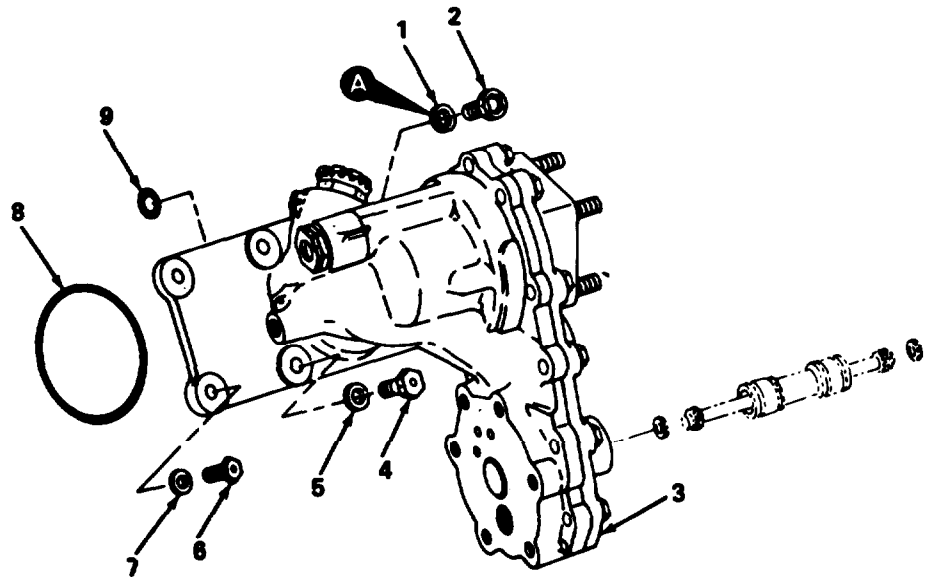
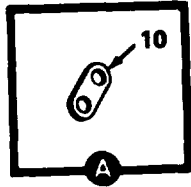
5. Overspeed Governor Shaft

Slide shaft tube (5) aft into overspeed governor housing.

2-45. Overspeed Governor and Tachometer Drive Assembly - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

INLET HOUSING/ -  
Continued



6. Overspeed Governor  
and Tachometer Drive  
Assembly (3)

**Remove** bolts (2, 4, and 6), washers (1, 5, and 7), and bracket (10) that secure overspeed governor and tachometer assembly (3) to mounting pad on inlet housing.

7. Overspeed Governor  
and Tachometer Drive  
Assembly

**Remove. Discard** packings (8 and 9).

8. Inlet Housing

**withdrew** shaft.

**2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM)**

INITIAL SETUP

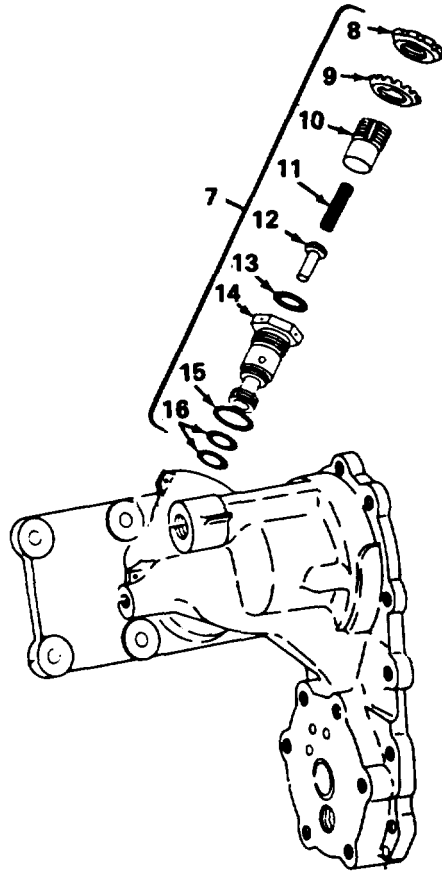
**Applicable Configuration**  
 All

- Special Tools**  
 Wrench (LTCT215)  
 Sleeve Bushing (LTCT3640)  
 Bearing Puller (LTCT675)  
 Mechanical Puller (LTCT916)  
 Wrench (LTCT1109)  
 Holder (LTCT2037)  
 Wrench (LTCT2161)  
 Bearing Removal Tool (LTCT231)

LOCATION/ITEM	REMARKS	ACTION
<p>OVERSPEED GOVERNOR AND TACHOMETER ASSEMBLY/</p>		<p><b>Remove</b> bolts (47) and washers (46) that secure power-driven rotary (booster) pump (45) to housing (43).</p>
<p>1. Power Driven Rotary (Booster) Pump</p>		<p><b>Remove.</b></p>
<p>2. Power Driven Rotary (Booster) Pump (45) and Packing (44)</p>		<p><b>Remove</b> plug (62) and packing (63).</p>
<p>3. Overspeed Governor and Tachometer Drive Assembly</p>		<p><b>Remove</b> plug (62) and packing (63).</p>

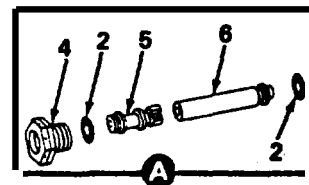
2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
4. Overspeed Governor and Tachometer Drive Assembly	Use wrench (LTCT215).	<b>Straighten</b> tabs on tab-washer (9). <b>Remove</b> nut (8).
5. Relief Valve Assembly (7)		<b>Remove.</b>
6. Relief Valve Assembly (7)		<b>Unscrew</b> adjusting screw (10). <b>Remove.</b>
7. Relief Valve Assembly (7)		<b>Remove</b> relief valve spring (11), relief valve plunger (12), packing (13), relief valve body (14), and packings (15 and 16).



2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

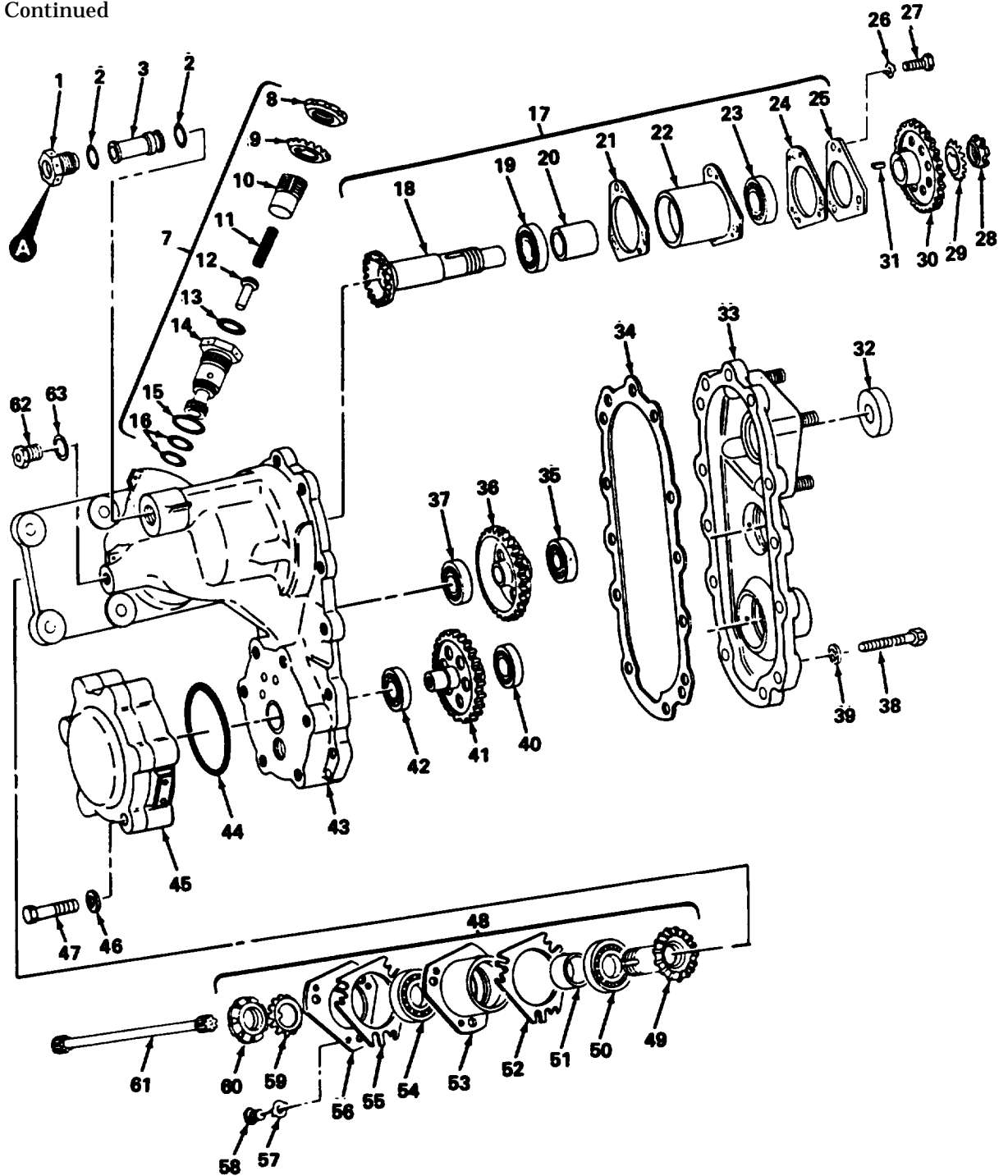
LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
1. Plug	23. Bearing	44. Packing
2. Packing	24. Shim	45. Power Driven Rotary
3. Filter Assembly	25. Bearing Retainer	(Booster) Pump
4. Plug	26. Tabwasher	46. Washer
5. Filter	27. Bolt	47. Bolt
6. Throttle Assembly	28. Spanner Nut	48. Upper Drive Shaftgear
7. Relief Valve Assembly	29. Tabwasher	and Liner Assembly
8. Nut	30. Tachometer Shaftgear	49. Upper Drive Shaftgear
9. Tabwasher	31. Key	50. Ball Bearing
10. Adjusting Screw	32. Seal	51. Bearing Spacer
11. Relief Valve Spring	33. Cover Assembly	52. Shim
12. Relief Valve Plunger	34. Housing Gasket	53. Bearing Liner
13. Packing	35. Bearing	64. Ball Bearing
14. Relief Valve Body	36. Overspeed Governor and	55. Shim
15. Packing	Tachometer Drive Inter-	56. Bearing Retainer
16. Packing	mediate Gear	57. Tabwasher
17. Tachometer Drive Shaft-	37. Bearing	58. Bolt
gear and Liner Assembly	38. Bolt	59. Tabwasher
18. Tachometer Drive Shaft-	39. washer	60. Spanner Nut
gear	40. Bearing	61. Spline Shaft
19. Bearing	41. Overspeed Governor Drive	62. Plug
20. Spacer	Shaftgear	63. Packing
21. Shim	42. Bearing	
22. Bearing Liner	43. Housing	



2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED  
GOVERNOR AND  
TACHOMETER  
DRIVE ASSEM-  
BLY/ - Continued





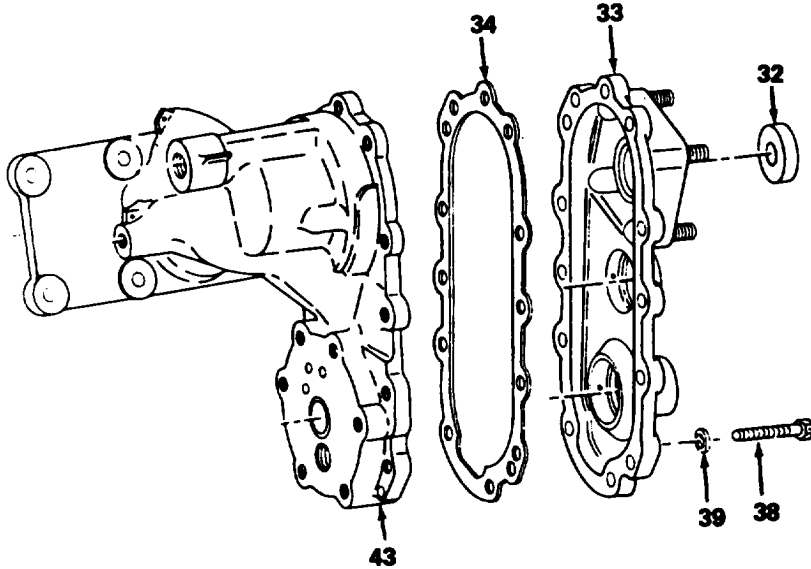
2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

8. Cover Assembly (33)

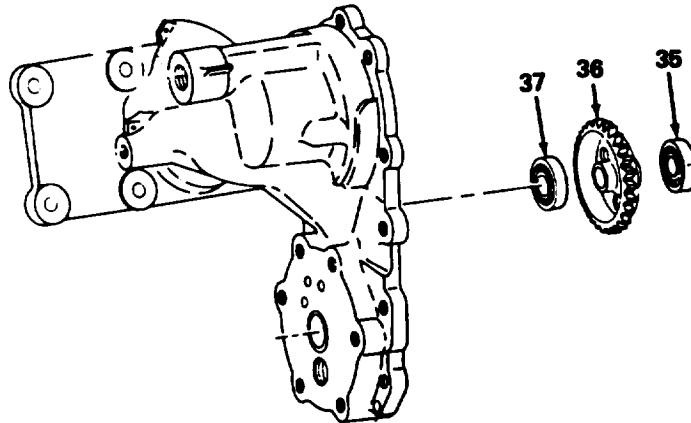
Remove bolts (38), washers (39), cover assembly (33), and housing gasket (34).



9. Oil Seal (32)

Use sleeve bushing (LTCT3640).

Press oil (32) out of housing with arbor press and sleeve bushing.



10. Overspeed Governor and Tachometer Drive Intermediate Gear (36)

Leave bearings (35 and 37) installed.

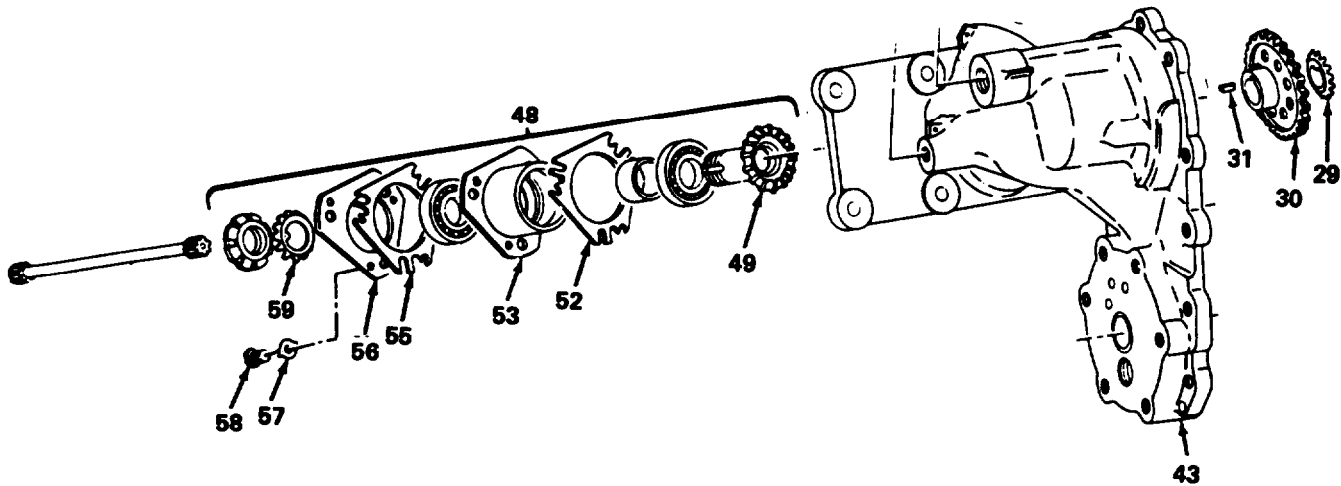
Remove intermediate gear (36).

2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued</p>		
<p>11. Bearings (35 and 37)</p>	<p>Use bearing puller (LTCT675).</p>	<p><b>Remove</b> from overspeed governor and tachometer drive intermediate gear (36).</p>
<p>12. Overspeed Governor Drive Shaftgear (41)</p>	<p>Leave bearings (40 and 42) installed.</p>	<p><b>Remove.</b></p>
<p>13. Bearings (40 and 42)</p>	<p>Use mechanical puller (LTCT916).</p>	<p><b>Remove</b> from overspeed governor drive shaftgear (41). Use mechanical puller (LTCT916).</p>
<p>14. Upper Drive Shaftgear (49)</p>	<p>Use holding device (LTCT2044).</p>	<p><b>Install</b> holding device meshing splines of device with internal splines of upper drive shaft (49).</p>

2-46. Overspeed Governor and Tachometer Drive Assembly- Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
15. Spanner Nut (28)	Use wrench (LTCT1109).	<b>Straighten</b> tabwasher (29). <b>Remove</b> spanner nut (28) with wrench.
16. Tabwasher (29), Tachometer, Shaftgear (30), and Key (31)		<b>Remove.</b>



17. Holding Device

**Remove.**

18. Upper Drive Shaftgear and Liner Assembly (48)

**Straighten** tabwashers (57).  
**Remove** bolts (58).  
**Remove** assembly from housing (43).

19. Bearing Retainer (56) and Shims (52) and (55)

**Remove.**

2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued</p>	<p><b>CAUTION</b></p> <p>Do not drop upper drive shaftgear (49) while removing bearing in following action for item 20.</p>	
<p><b>NOTE</b></p>	<p>To facilitate reassembly, record thickness of each shim and the side of bearing liner (53) from which it was removed.</p>	
<p>20. Upper Drive shaftgear (49)</p>	<p>Use holder (LTCT2037).</p>	<p>Place in holder. Straighten tabs on tabwasher (59).</p>
<p>21. Spanner Nut (60)</p>	<p>Use wrench LTCT2161.</p>	<p>Remove with wrench.</p>
<p>22. Tabwasher (59)</p>		<p>Remove.</p>
<p>23. Upper Drive Shaftgear (49)</p>	<p>Use arbor press. Leave bearings (50) installed.</p>	<p>Push upper drive shaftgear (49) out of bearing liner (53).</p>
<p>24. Bearing Liner (53)</p>	<p>Use bearing removal tool (LTCT231). Use puller (LTCT675).</p>	<p>Remove bearing spacer (51). Push ball bearing (54) out of liner. Remove ball bearing (50) from upper drive shaftgear (49).</p>

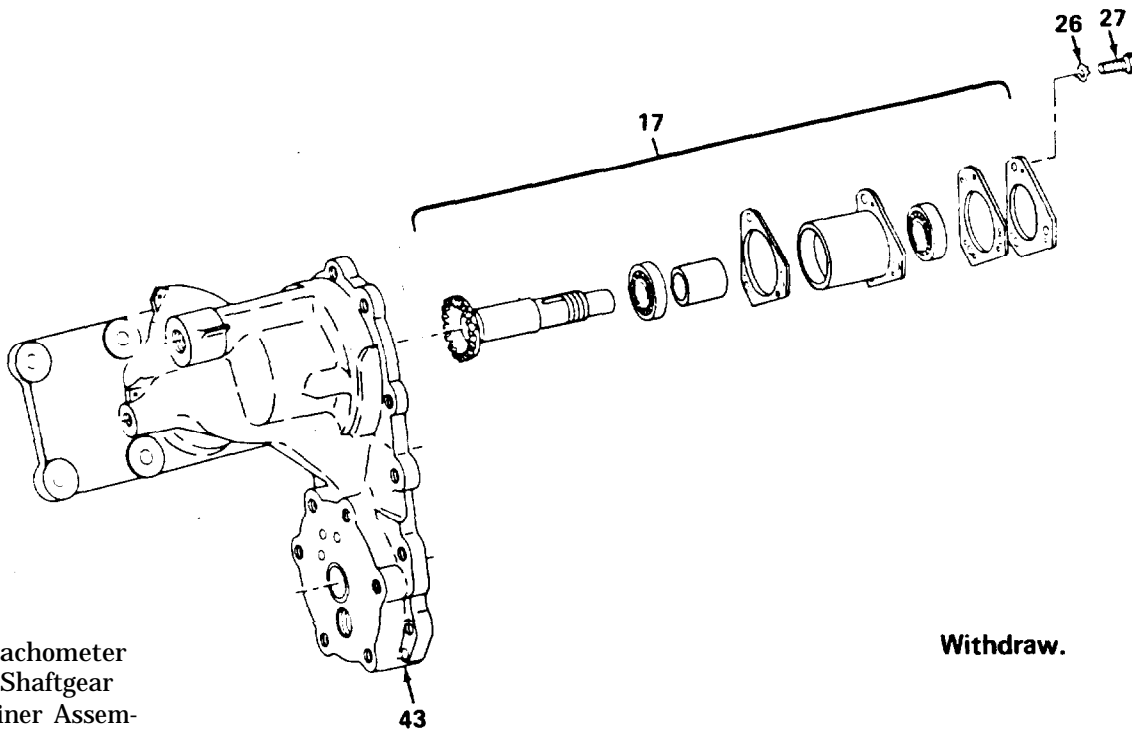
2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

25. Tachometer Drive Shaftgear and Liner Assembly (17)

Remove bolts (27) and tabwashers (26) securing tachometer drive shaftgear and liner assembly (17) to housing (43).



26. Tachometer Drive Shaftgear and Liner Assembly (17)

Withdraw.

NOTE

To facilitate reassembly, record thickness of each shim and the side of bearing liner (22) from which it was removed.

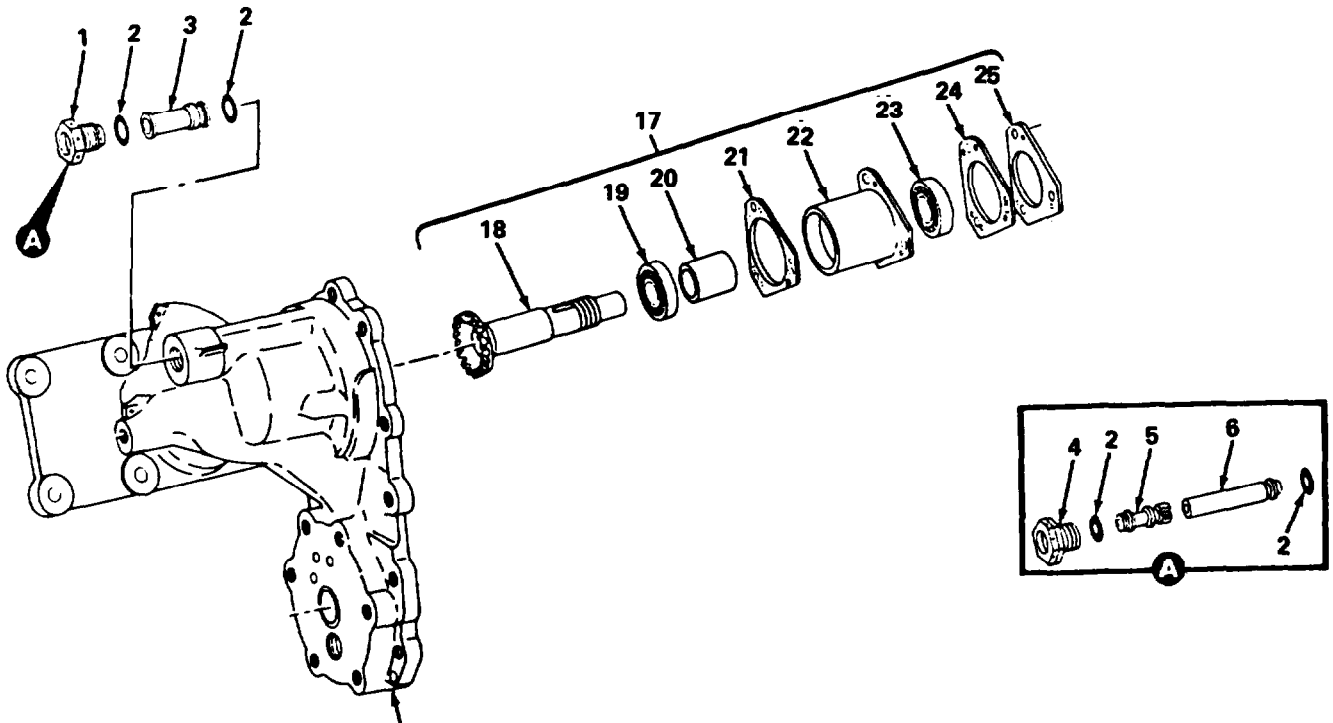
2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED  
GOVERNOR AND  
TACHOMETER  
DRIVE ASSEM-  
BLY/ - Continued

27. Bearing Retainer  
(25) and Shims (21  
and 24)

Remove.



28. Tachometer Drive  
Shaftgear (18)

Use arbor press. Leave bearing (19) in-  
stalled.

Push out of bearing liner  
(22).

29. Spacer (20)

Remove.

30. Bearing (23)

Use puller (LTCT675).

Remove out of liner.

31. Bearing (19)

Use puller (LTCT675).

Remove from shaftgear.

32. Plug (1 or 4)

Remove from housing  
(43).

33. Packing (2)

Remove from plug.

2-46. Overspeed Governor and Tachometer Drive Assembly - Disassembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

**NOTE**

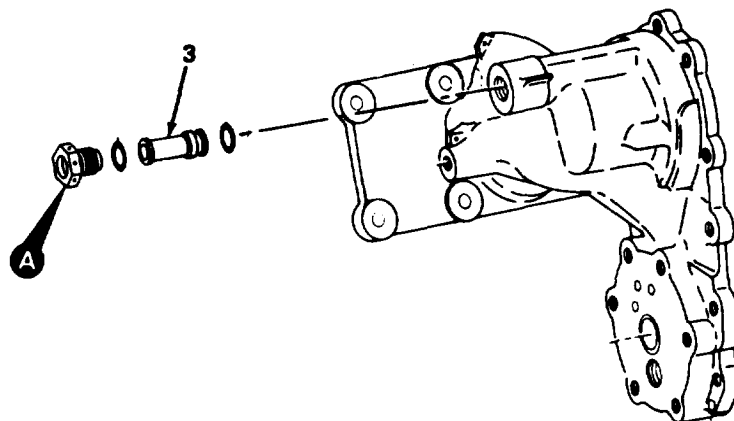
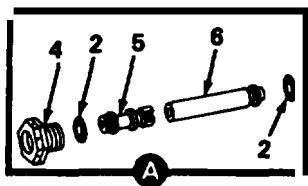
When filter assembly (3) is installed, filter (5) and throttle assembly (6) are not installed.

34. Filter Assembly (3) or Filter (5) and Throttle Assembly (6)

Remove.

35. Filter Assembly or Throttle Assembly (6)

Remove packing (2).



2-47. Overspeed Governor and Tachometer Drive Assembly - Inspection

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Lubricating Oil (item 46 or 47, Appendix D)

**Test Equipment**  
Handle (LTCT2170, detail of LTCT216)  
Union (LTCT2169, detail of LTCT216)  
Oil Flow Stand (LTCT313)

**References**  
Para 2-48, H-26 and H-29

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED  
GOVERNOR AND  
TACHOMETER  
DRIVE ASSEM -  
BLY/

**NOTE**

All repairs to overspeed governor tachometer drive shaft are AVIM task.

1. Overspeed Governor and Tachometer Drive Assembly

Refer to paragraph H-22 and H-25 for blend-repair procedures.

**Inspect** all parts for nicks, burrs, wear, cracks and distortion. **Blend-repair** nicks and burrs. **Replace** parts if cracked or distorted.

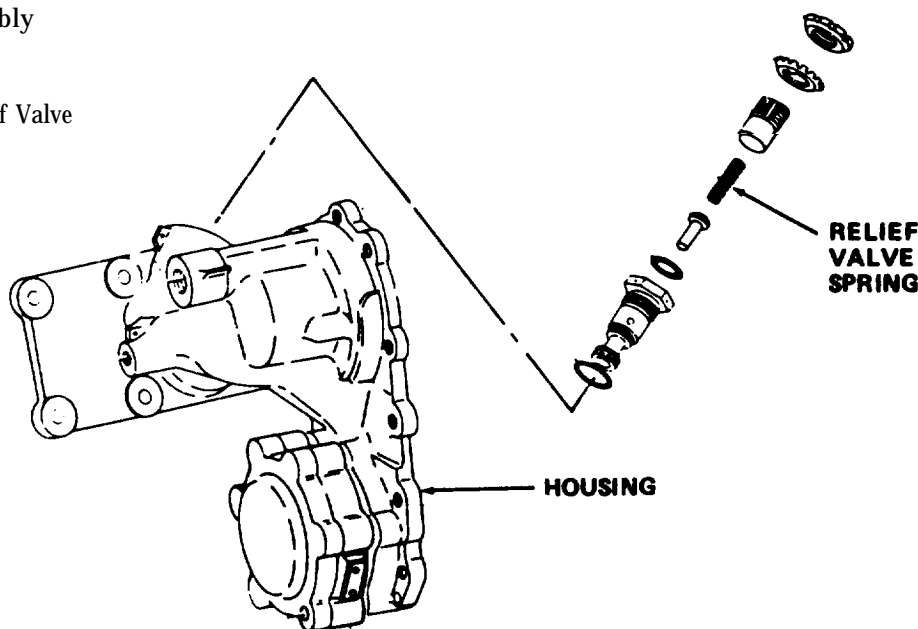
2. Overspeed Governor and Tachometer Drive Assembly

Refer to paragraph H-22 and H-29 for repair procedures.

**Inspect** threaded parts for damaged or crossed threads. **Repair** damaged threads.

3. Relief Valve spring

(AVIM) **Inspect** for damage.





2-47. Overspeed Governor and Tachometer Drive Assembly - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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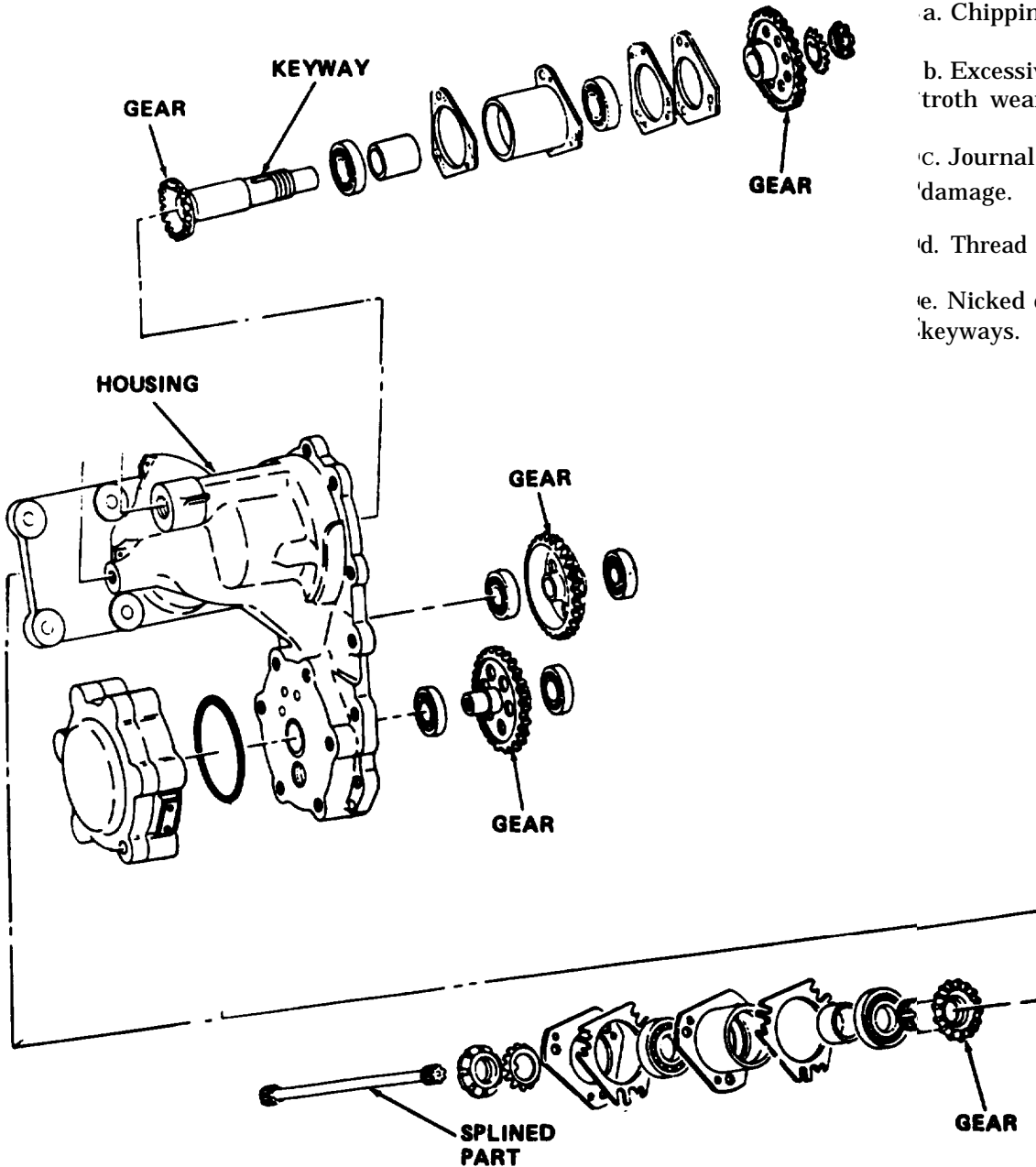
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/

4. Gears and Splined Parts

Refer to paragraph H-22 for gear and spline inspection.

(AVIM) **Inspect** for the following:

- a. Chipping or flaking.
- b. Excessive or uneven tooth wear.
- c. Journal wear or damage.
- d. Thread damage.
- e. Nicked or burred keyways.



2-47. Overspeed Governor and Tachometer Drive Assembly - Inspection - Continued

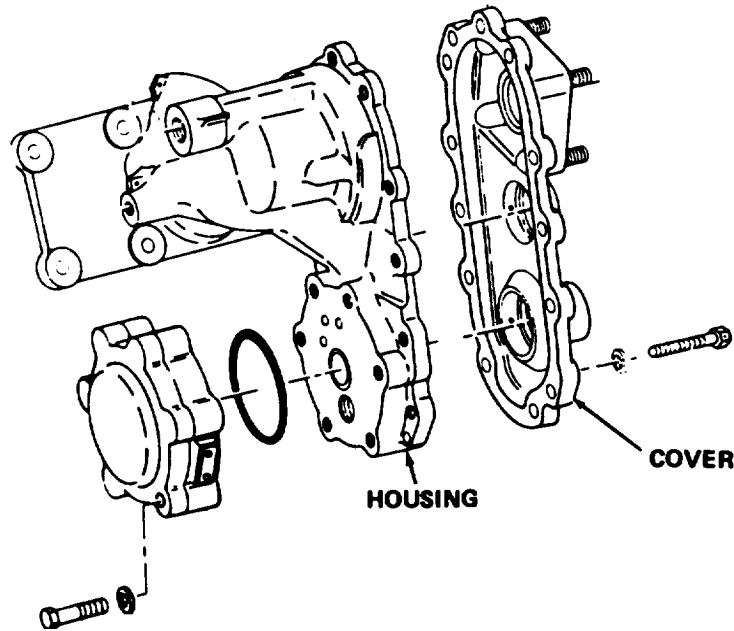
LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

5. Housing

Refer to paragraph H-29 for repair procedures.

Inspect for damaged screw thread inserts.



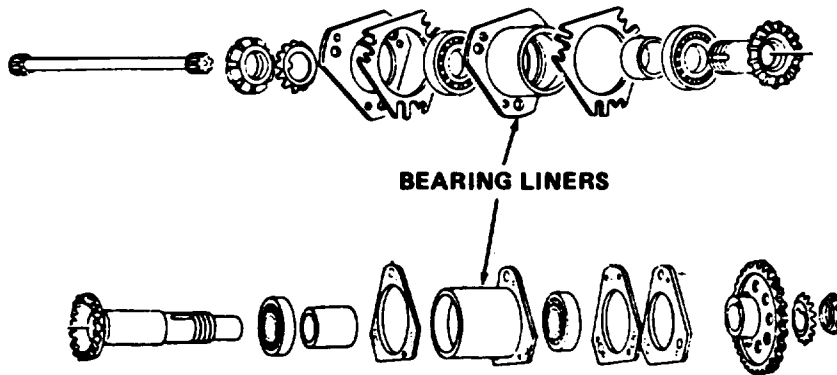
6. Bearing Liners

(AVIM) Inspect for heavy scoring or other damage. Replace liners that are scored or otherwise damaged.

7. Bearing Liners

Refer to paragraph 2-48.

(AVIM) Inspect inside diameters. Replace any liner that has an ID measuring over 1.1031 inch (2.8019 cm).



2-47. Overspeed Governor and Tachometer Drive Assembly - Inspection - Continued

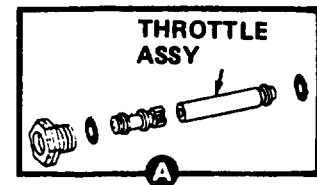
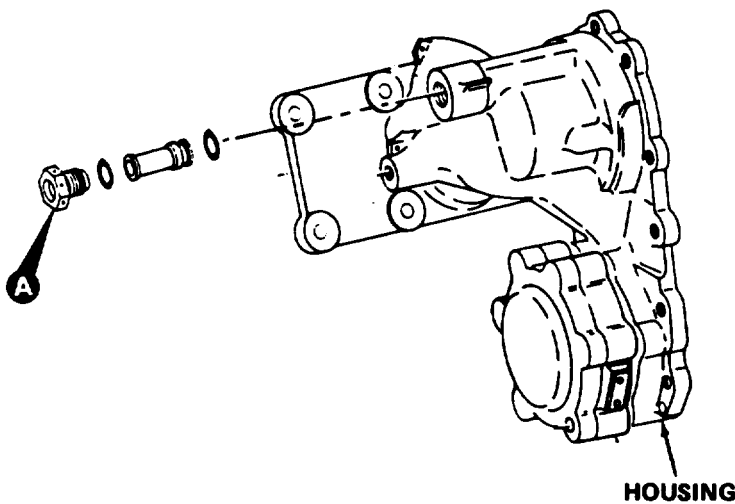
LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		

**NOTE**

Actions for items 8 thru 13 pertain to flow check procedures for the throttle assembly.

8. Throttle Assembly

(AVIM) Perform flow check.



9. Throttle Assembly

Use handle (LTCT2170, detail of LTCT216).

(AVIM) **Install** into handle.

10. Packing

Use packing P/N MS29561-013. Use union (LTCT2169, detail of LTCT216).

(AVIM) **Install** on short side of union. install union into handle.

11. Union and Handle

Use oil flow stand (LTCT313).

(AVIM) **Connect** to oil flow stand with hose.

2-47. Overspeed Governor and Tachometer Drive Assembly - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED  
GOVERNOR AND  
TACHOMETER  
DRIVE ASSEM-  
BLY/ - Continued

**WARNING**

Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

12. Overspeed Governor and Tachometer Drive Assembly

Use lubricating oil (item 46 or 47, Appendix D). Flow shall be 125cc to 175cc per minute if lubricating oil (item 46, Appendix D) is used. If lubricating oil (item 47, Appendix D) is used, flow shall be 119cc to 166cc.

(AVIM) **Supply** lubricating oil at 95°F to 100°F (35°C to 38°C) and to 68 psi to 72 psi (4.78 kg/sq cm to 5.06 kg/sq cm).

13. Throttle Assembly

**Replace** if it does not meet flow requirements.

2-48. Overspeed Governor and Tachometer Drive Assembly - Repair (AVIM)

INITIAL SETUP

**Applicable Configuration**

All

**Special Tools**

Number 53 Drill

**Consumable Materials**

Yellow Marking Pencil Colorbrite No. 2107

(item 54, Appendix D)

Zinc-Chromate Primer (item 96, Appendix D)

Drycleaning Solvent (item 24, Appendix D)

Alcohol

248. Overspeed Governor and Tachometer Drive Assembly - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/		
1. Bearing Liners		Replace.
2. Overspeed Governor and Tachometer Drive Cover or Housing		Mount in suitable lathe.

**CAUTION**

Do not nick or score the bore of the casting.

3. Bearing Liner		Machine until wall is thin enough to buckle and peel away from cover.
4. Bearing Liner		Remove from casting.
5. Lockpins		Grind two lockpins in the casting. Flush with bore.
6. Overspeed Governor and Tachometer Drive Cover or Housing		Remove from lathe. Place on bench.
7. Lockpins	Use yellow marking pencil Colorbrite No. 2107 (73865) or equivalent (item 54, Appendix D).	Mark positions on face of castings.

**WARNING**

Wear approved thermally insulated gloves when handling dry ice.

8. Bearing Liner		Place new liner into mixture of dry ice and alcohol for 30 minutes.
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248. Overspeed Governor and Tachometer Drive Assembly - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
9. Casting Bore	Use zinc-chromate primer (item 96, Appendix D).	<b>Apply</b> thin coat of zinc-chromate primer to casting bore before installing liner.

**CAUTION**

During pressing operation in following action for item 10, properly support casting from underneath.

**NOTE**

When installing liner into housing, insure the lockpin holes are not alined with old lockpin locations.

**WARNING**

**Wear approved thermally insulated gloves when handling dry ice.**

10. Bearing Liner	Use suitable adapter and press.	<b>Remove</b> from alcohol and dry ice mixture. <b>Insert</b> bearing liner quickly, chamfered face first, into bore. <b>Press</b> bearing liner into casting until it bottoms.
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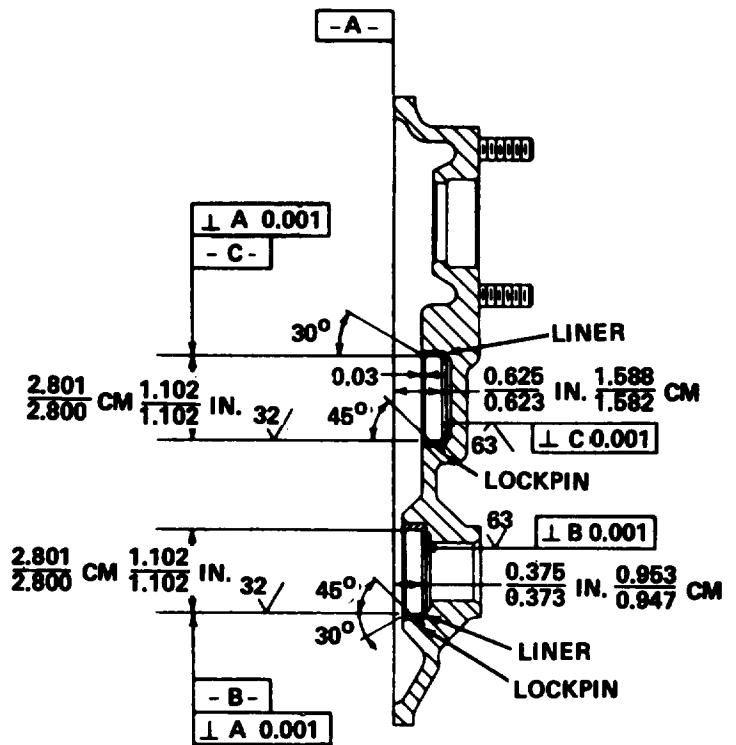
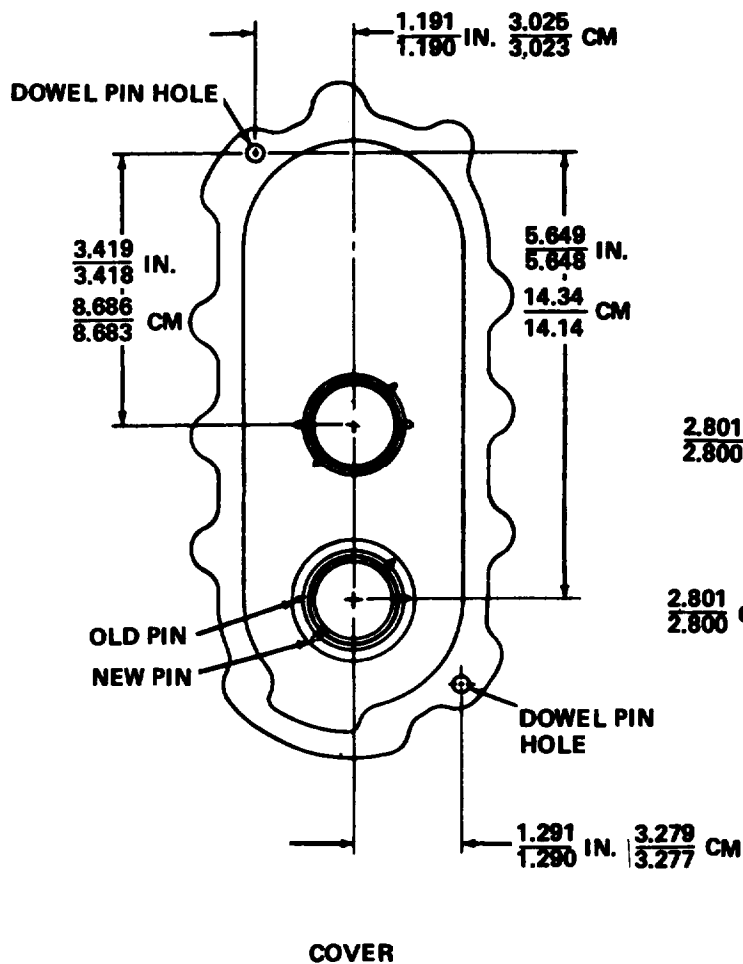
2-48. Overspeed Governor and Tachometer Drive Assembly - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		

11. Bearing Liner

Use number 53 drill.

Drill two holes through bearing liner into casting 0.030 inch (0.76 mm) deep at angle shown in following illustration.



248. Overspeed Governor and Tachometer Drive Assembly - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
12. Housing	Use drill to place lockpin holes.	Drill lockpin holes 180° apart and 90° from original holes.
13. Cover	Use drill to place lockpin holes.	Drill lockpin holes 180° apart and 45° from original holes.

**WARNING**

Use approved personnel protective equipment to protect eyes and face when using compressed air. Maximum allowable air pressure for cleaning operations is 30 psi. Do not direct air stream toward yourself or toward another person.

14. Lockpin Holes		Ream to 0.0610 inch to 0.0615 inch (0.1549 cm to 0.1562 cm) diameter, 0.280 inch deep (0.0026 cm). Blow chips from holes with compressed air.
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**CAUTION**

Do not damage liner when driving lockpins.

15. Lockpins	Use zinc-chromate primer (item 96, Appendix D). Use suitable drift.	Apply thin coat of zinc-chromate primer to lockpins. Drive lockpins flush with ID of liner.
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**NOTE**

When grinding bearing liner, item 16, locate bearing from dowel pin holes. See illustrations pertaining to items 11 and 18.

16. Bearing Liner		Grind to dimensions shown in illustrations in item 11 and item 18.
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**2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM)**

INITIAL SETUP

Applicable Configuration  
All

Special Tools  
Soft-Faced Mallet  
Arbor Press and Bushing (LTCT3640 or LTCT68-10, detail of LTCT68)  
Holder Assembly (LTCT2037)  
Wrench (LTCT213)  
Wrench ( LTCT1109)  
Backlash Gage (LTCT716)  
Holding Device (LTCT2044)  
Installing Tool (LTCT501)

Consumable Materials  
Shortening Compound (item 74, Appendix D)  
Red Lead (item 69, Appendix D)  
Iron Blue Pigment (item 37 or 109, Appendix D)  
Drycleaning Solvent (item 24, Appendix D)  
Lubricating Oil (item 46 or 47, Appendix D)  
Lockwire (item 41, 42, or 43, Appendix D)

References  
Appendix G, Table G-3, Reference Number 35 or Table G-4, Reference Number 39  
Appendix G, Table G-3, Reference Number 36 or Table G-4, Reference Number 40  
Appendix G, Table G-5, Reference Number 52, 51, Table G-6, Reference Number 51, 50, 52  
Appendix G, Table G-3, Reference Number 76, 75, 74, 44, 45  
Para 5-8, 8-37, and 6-89

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/		

**CAUTION**

In following action for item 1, hold filter in vise with soft-jaw covers to avoid damage to outer surface.

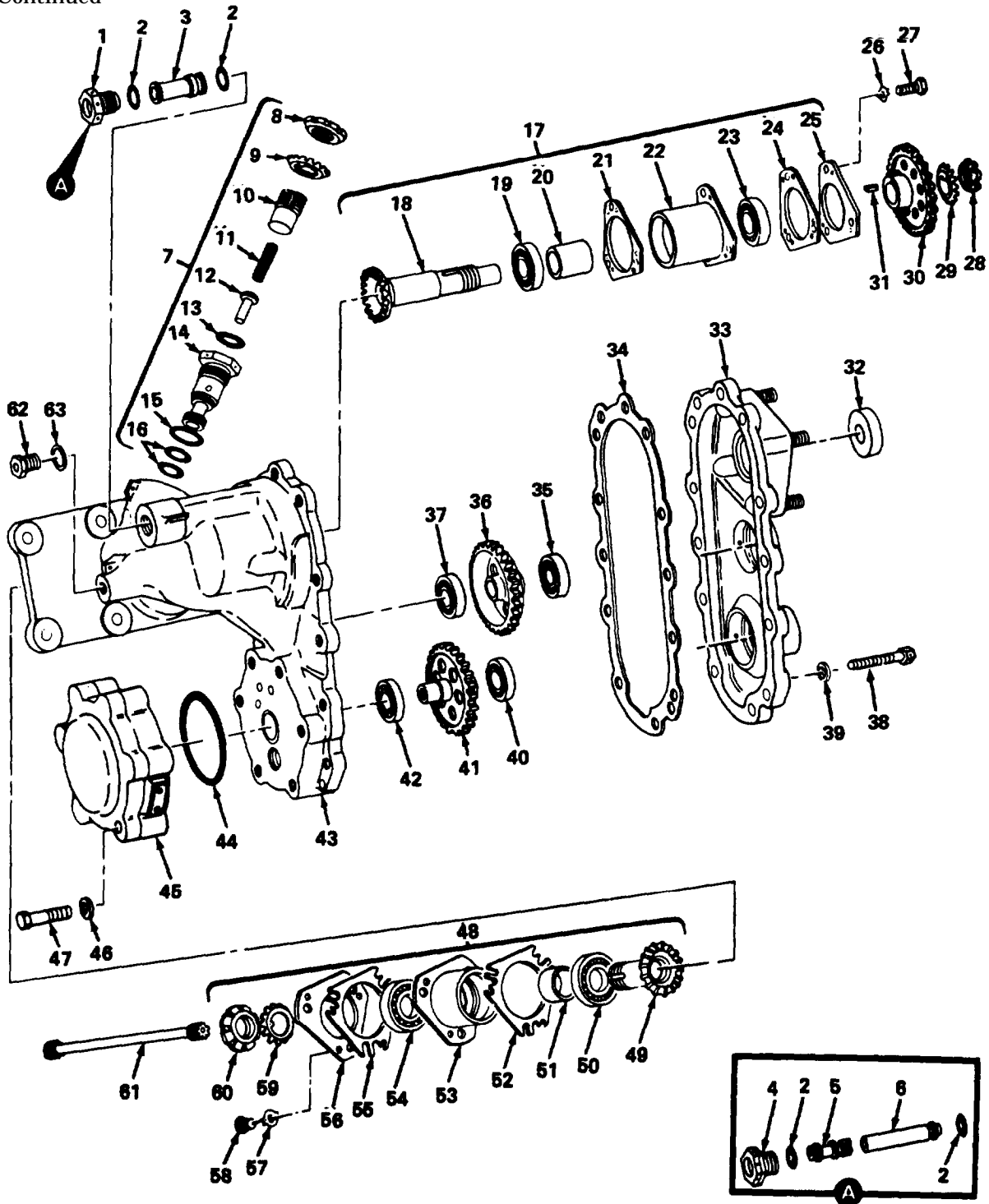
**NOTE**

If filter (5) is to be installed, perform actions for items 1 thru 4. Use filter (5) and throttle assembly (6) to depletion. If filter assembly (3) is to be installed, perform actions for items 5 and 6.

249. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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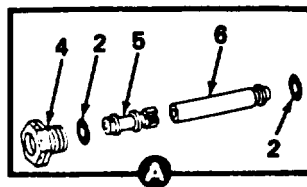
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued



2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
<ol style="list-style-type: none"> <li>1. Plug</li> <li>2. Packing</li> <li>3. Filter Assembly</li> <li>4. Plug</li> <li>5. Filter</li> <li>6. Throttle Assembly</li> <li>7. Relief Valve Assembly</li> <li>8. Nut</li> <li>9. Tabwasher</li> <li>10. Adjusting Screw</li> <li>11. Relief Valve Spring</li> <li>12. Relief Valve Plunger</li> <li>13. Packing</li> <li>14. Relief Valve Body</li> <li>15. Packing</li> <li>16. Packing</li> <li>17. Tachometer Drive Shaftgear and Liner Assembly</li> <li>18. Tachometer Drive Shaftgear</li> <li>19. Bearing</li> <li>20. spacer</li> <li>21. Shim</li> <li>22. Bearing Liner</li> </ol>	<ol style="list-style-type: none"> <li>23. Bearing</li> <li>24. Shim</li> <li>25. Bearing Retainer</li> <li>26. Tabwasher</li> <li>27. Bolt</li> <li>28. Spanner Nut</li> <li>29. Tabwasher</li> <li>30. Tachometer Shaftgear</li> <li>31. Key</li> <li>32. Seal</li> <li>33. Cover Assembly</li> <li>34. Housing Gasket</li> <li>35. Bearing</li> <li>36. Overspeed Governor and Tachometer Drive Intermediate Gear</li> <li>37. Bearing</li> <li>38. Bolt</li> <li>39. Washer</li> <li>40. Bearing</li> <li>41. Overspeed Governor Drive Shaftgear</li> <li>42. Bearing</li> <li>43. Housing</li> </ol>	<ol style="list-style-type: none"> <li>44. Packing</li> <li>45. Power Driven Rotary (Booster) Pump</li> <li>46. Washer</li> <li>47. Bolt</li> <li>48. Upper Drive Shaftgear and Liner Assembly</li> <li>49. Upper Drive Shaftgear</li> <li>50. Ball Bearing</li> <li>51. Bearing Spacer</li> <li>52. Shim</li> <li>53. Bearing Liner</li> <li>54. Ball Bearing</li> <li>55. Shim</li> <li>56. Bearing Retainer</li> <li>57. Tabwasher</li> <li>58. Bolt</li> <li>59. Tabwasher</li> <li>60. Spanner Nut</li> <li>61. Spline Shaft</li> <li>62. Plug</li> <li>63. Packing</li> </ol>

1. Filter (5)



Install in plug (4).  
Tighten as required.  
Refer to Appendix G, table G3, reference number 35 or table G4, reference number 39.

2. New Packings (2)

Position on plug (4) and throttle assembly (6).

3. Throttle Assembly (6)

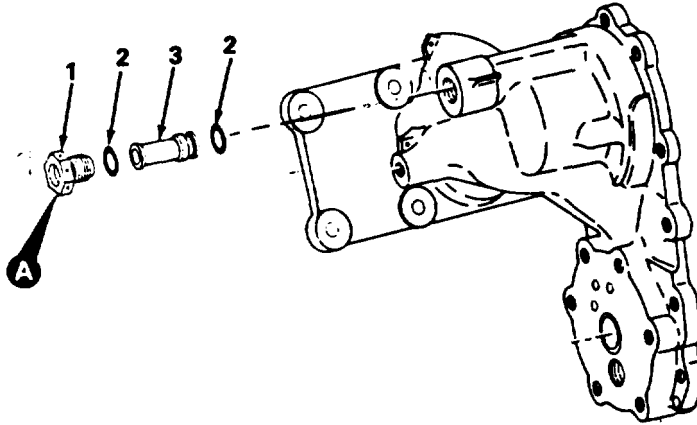
Lubricate with shortening compound, item 74, Appendix D. Insert into housing.

2-49. Overspaad Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

4. Plug (1)



Install in housing and tighten as required. Refer to Appendix G, table G-3, reference number 36 or table G-4 reference number 40. Lockwire plug.

5. Packings (2)

Use new packings.

Position on plug (1) and filter assembly (3).

6. Filter Assembly Plug

Install in housing. Tighten plug as required. (Refer to Appendix G, table G-3, reference number 36 or table G-4, reference number 40.) Lockwire plug.

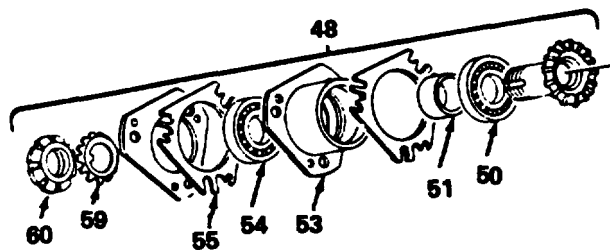
7. Ball Bearing (54)

Use soft-faced mallet.

Tap gently into bearing liner (53) with mallet.

8. Depth Micrometer

Measure distance from top of bearing to surface of inner flange.



249. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEM- BLY/ - Continued</p>		
<p>9. Shim (55)</p>		<p>Select to obtain 0.002 inch to 0.004 inch (0.05 mm to 0.10 mm) pinch fit on bearing as given in Appendix G, table G-5 reference number 52, or table G-6 reference number 51.</p>
<p>10. Ball Bearing (50), Bearing Spacer (51), Bearing Liner (53)</p>	<p>Use bearing liner (53) with ball bearing (54) installed.</p>	<p><b>Press</b> using arbor press and bushing LTCT3640 or LTCT68-10, detail of LTCT68. <b>Check</b> for rotational freedom of shaft gear within liner. If necessary, gently <b>tap</b> shaftgear with soft-faced mallet to eliminate sticking or tightness.</p>
<p>11. Upper Drive Shaft gear and Liner Assembly (48)</p>		<p><b>Place</b> in gear holder assembly (LTCT2037).</p>
<p>12. Tabwasher (59) Spanner Nut (60)</p>		<p><b>Install. Tighten</b> nut as required, using wrench (LTCT213), (<b>Refer</b> to Appendix G, table G-3, reference number 76.)</p>
<p>13. Tabwasher (59)</p>		<p><b>Do not</b> bend tabs until pattern backlash and pattern have been checked.</p>
<p>14. Upper Drive Shaftgear (49)</p>		<p><b>Coat</b> teeth with red lead item 69, Appendix D.</p>
<p>16. Shim (52)</p>	<p>Shim shall correspond in thickness to shim removed in disassembly.</p>	<p><b>Install</b> on underside of bearing liner (53),</p>

2-46. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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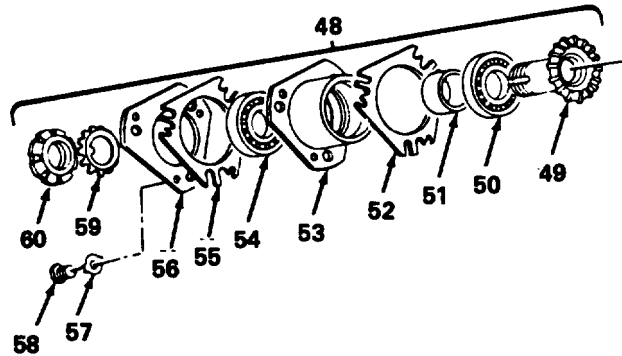
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

16. Shim (52), Upper Shaftgear and Liner Assembly (48), Shim (56), and Bearing Retainer (56)

Use upper shaftgear and liner assembly with tabwasher (59) and spanner nut (60) installed.

**Insert** into housing (43). **Tap** liner and shaftgear assembly gently **using** soft-faced mallet to **insure** proper seating.

17. Tabwashers (57) and Bolts (58)



**Install. Tighten** as required. Refer to Appendix G, table G-3, reference number 75. **Do not band** tabs on tabwashers (57) until backlash and patterns have been **checked**.

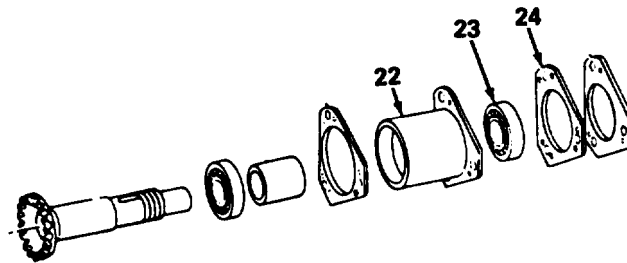
18. Holding Device (LTCT2044)

**Install** on upper drive gearshaft (49). **secure** to housing (43) with bolts, washers and nuts.

19. Bearing (23)

**Tap** gently into bearing liner (22) until seated using soft-faced mallet.

20. Bearing (23)



**Measure** distance from top to surface of liner flange and **select** shim (24) using depth micrometer to **obtain** pinch fit on bearing as given in Appendix G, table G-5, reference number 50 or table G-6, reference number 48.

21. Bearing (19), Spacer (20), and Bearing Liner (22)

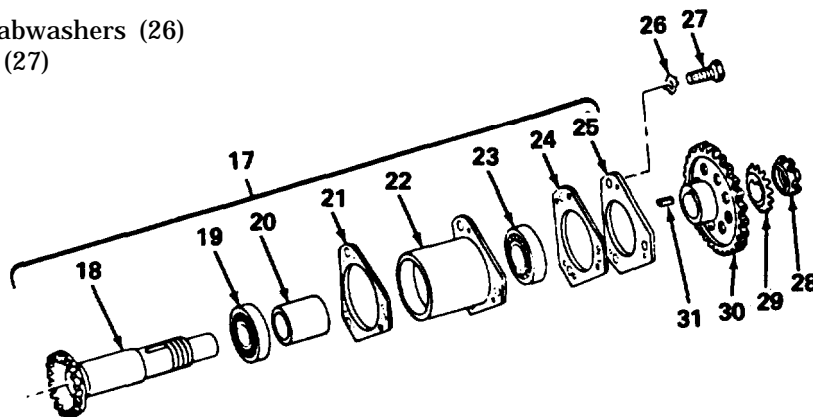
Use bearing liner (22) with bearing (23) installed.

**Press** on tachometer drive gearshaft (18) using arbor press and bushing (LTCT3640 or LTCT68-10 detail of LTCT68). **Check** for rotational freedom of shaftgear within liner. **Tap** shaftgear gently if necessary with soft faced mallet to eliminate sticking or tightness.

2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
22. Tachometer Drive Shaftgear (18)		Coat teeth with iron-blue pigment (item 37 or 109, Appendix D).
23. Shim (21)	Shim shall correspond in thickness to shim removed during disassembly.	Install on underside of bearing liner (22).
24. Tachometer Drive Shaftgear and Liner Assembly (17), Shim (24) and Bearing Retainer (25)	Use tachometer drive shaftgear and liner assembly (17) with shim (21) installed.	Insert into housing carefully. Mesh tachometer drive shaftgear (18) with upper drive shaftgear (49).

25. Tabwashers (26)  
Bolts (27)



Install. Tighten as required. (Refer to Appendix G, table G-3, reference number 75. Do not bend tabs on tabwashers (26) until backlash and pattern have been checked.

**CAUTION**

Insure that key (31) does not shift during installation of shaftgear in following action for item 26.

26. Key (31)

Insert in tachometer drive gearshaft (18). Mate key with keyway in tachometer shaftgear (30).

27. Shaftgear (30),  
Tabwasher (29), and  
Spanner Nut (28)

Install.

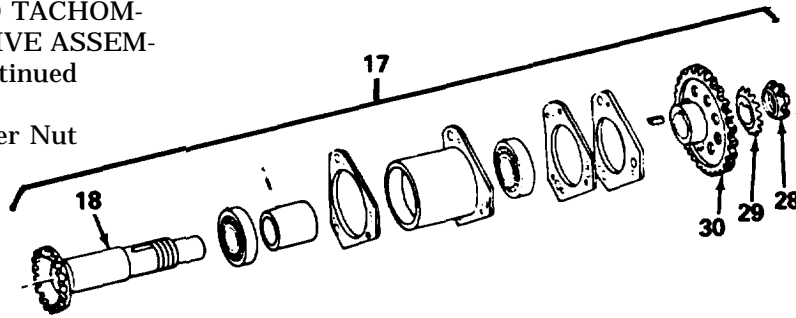


2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ -Continued

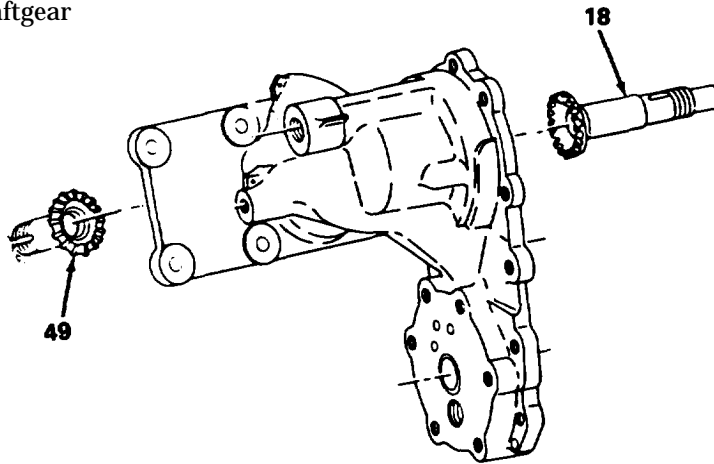
28. Spanner Nut (28)



Tighten as required using wrench (LTCT1109). (Refer to Appendix G, table G-3, reference number 74). Do not band tabs on tabwasher (29) until backlash and gear pattern have been checked.

29. Tachometer Drive Shaftgear (18) and Upper Drive Shaftgear (49)

Use backlash gage (LTCT716).



Check backlash between tachometer drive shaftgear (18) and upper drive shaftgear as follows:

- a. Insert backlash gage into tachometer drive shaftgear (18).
- b. Using dial indicator make contact with scribe line marked "1-160-412 and 1-160-401-01" backlash gage pointer.
- c. Using fingers, rotate backlash gage pointer to either extreme and set dial indicator to zero.
- d. Using fingers rotate backlash on dial indicator. Backlash shall be as given in Appendix G, table G-5, reference number 51, or table G-6, reference number 50.

2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

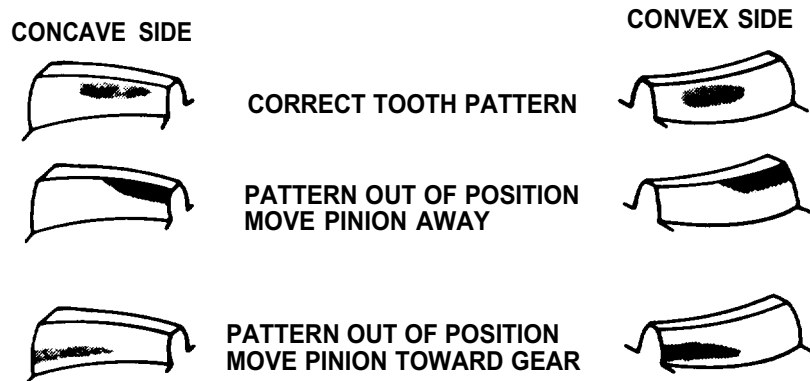
LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

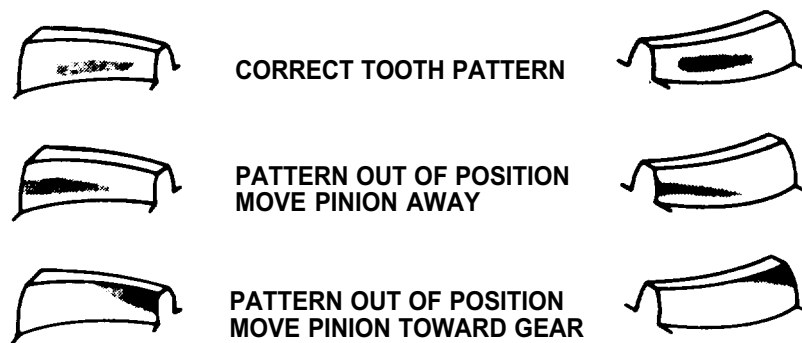
30. Holding Device (LTCT2044)

Remove and rotate shaftgears to obtain tooth pattern.

PATTERN ON PINION



PATTERN ON GEAR



31. Tachometer Drive Shaftgear and Liner Assembly (17) Upper Drive Shaftgear and Liner Assembly (48)

Refer to paragraph 5-8 for procedures to establish correct pattern.

Remove. Check pattern.

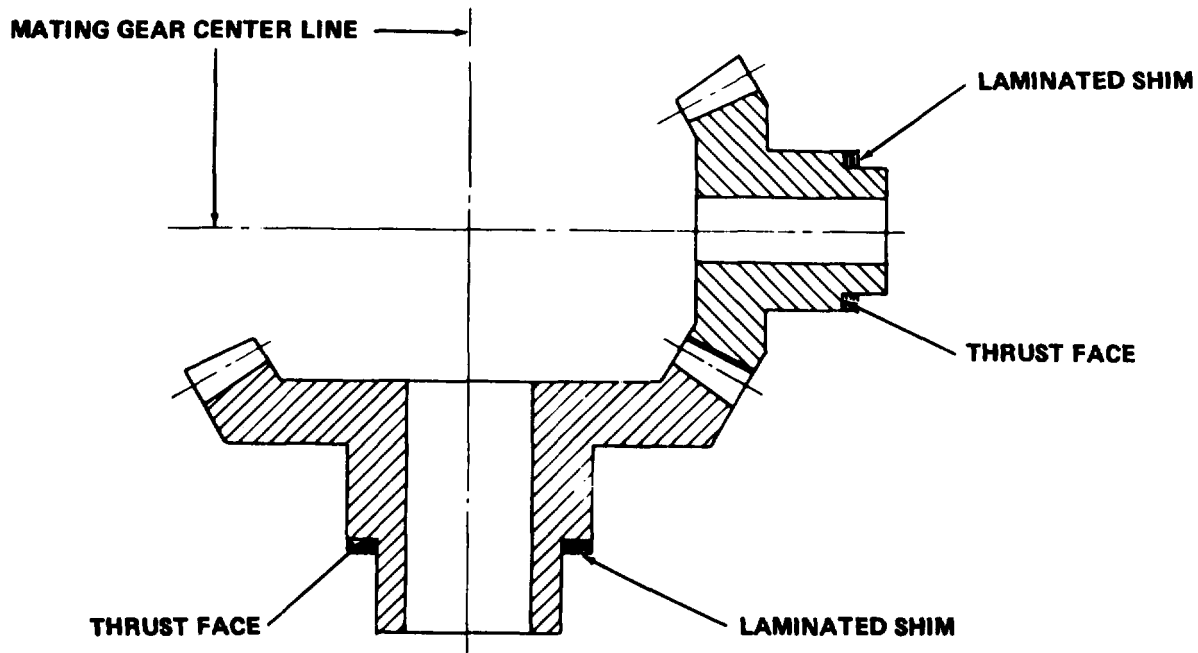
2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

32. shims (21 and 52)

Correct backlash and pattern. Adjust thickness of shims. Reassemble and recheck backlash and pattern until correct.



**WARNING**

Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F - 138°F (38°C - 59°C).

33. Gears

Perform this action when correct backlash and tooth pattern have been established.

Wash with drycleaning solvent (item 24, Appendix D).

2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

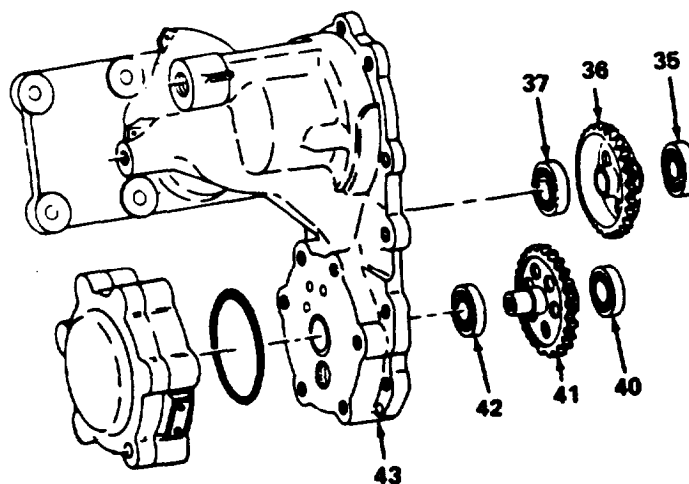
LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
34. Tachometer Drive Shaftgear and Liner Assembly (17) and Upper Drive Shaftgear and Liner Assembly (48)		Reinstall with appropriate shims (21 and 52). Tighten all nuts and bolts to proper torque. Bend tabs on all tab-washers.
35. Bearings (35 and 37)	Use arbor press and bushing (LTCT3640).	Press on overspeed governor and tachometer drive intermediate gear (36).
36. Bearings (40 and 42)	Use arbor press and bushing (LTCT3640).	Press on overspeed governor drive shaftgear (41).
37. Liners	Use shortening compound (item 74, Appendix D) for lubrication.	Lubricate in housing.
38. Overspeed Governor and Tachometer Drive Intermediate Gear (36)		Insert with bearings (35 and 37) installed into housing (43).

**CAUTION**

When installing overspeed governor drive shaft gear (41) ensure that long portion of splined shaft is inserted inboard to housing (43) engaging male splined shaft of power driven rotary (Booster Pump).

39. Overspeed Governor Drive Shaftgear (41)

Insert with bearings (40 and 42) installed, into housings (43).



2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

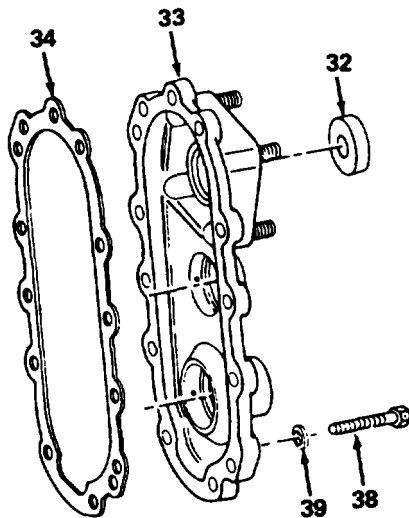
40. Overspeed Governor and Tachometer Drive Intermediate Gear (36) and Overspeed Governor Drive Shaftgear (41)

Hold intermediate gear to prevent turning, Use tapered feeler gage.

Check for backlash between intermediate gear and each shaftgear. Backlash shall be as given in Appendix G, table G-5, reference number 52 or table G-6, reference number 52.

41. Housing Gasket (34)

42. Cover Assembly (33)



Lubricate. Position on cover (33).

Lubricate all holes.

**WARNING**

Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

43. Seal (32)

Use lubricating oil (item 46 or 47, Appendix D). Use installing tool (LTCT501).

Lubricate lip. Press into cover assembly with arbor press.

2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued

44. Cover Assembly

**Position** on housing. Tap down gently with soft-faced mallet. **Secure** to housing with washers (39) and bolts (38).

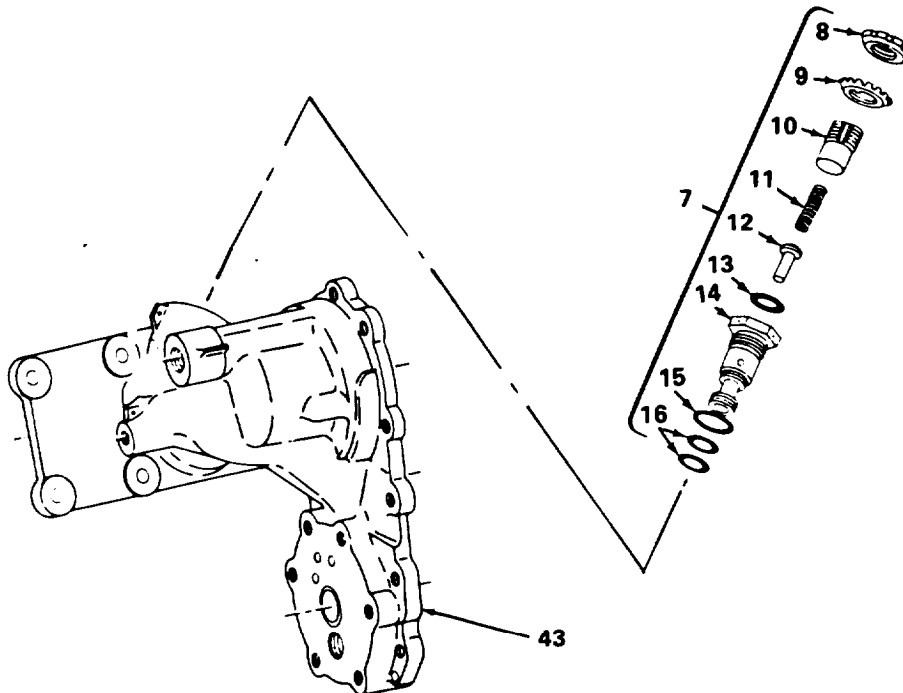
**CAUTION**

Improper installation of relief valve assembly in following action for item 45 may result in damaged packing. This may cause sections of the packing to enter oil passages which would result in a low torque-meter reading.

45. Packing (15 and 16)

Use shortening compound (item 74, Appendix D) for lubrication. Refer to Appendix G, table G-3, reference number 44 for tightening requirements.

**Lubricate.** Place on relief valve body (14). **Lubricate** inside of valve body with shortening compound. **Insert** packing (13), relief valve plunger (12), relief valve spring (11), and adjusting screw (10) into body. **Install** relief valve assembly (7) into housing (43). **Tighten** as required.



2-49. Overspeed Governor and Tachometer Drive Assembly - Assembly (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY/ - Continued		
46. Tabwasher (9) and Nut (8)		<b>Install.</b> Position adjusting screw (10) so that six screw threads are visible above the head of the nut. <b>Tighten</b> nut as required. <b>Do not bend</b> tabs on tabwasher (9) until torque-meter oil pressure has been checked and adjusted,
47. Nut (8)	Refer to Appendix G, table G-3, reference number 46 for tightening requirements.	<b>Tighten</b> after adjusting.
48. Tabwasher (9)		<b>Bend</b> tabs against relief valve body (14) and into nut (8).
49. Plug (62) and Packing (63)		<b>Install.</b>
50. Power-Driven Rotary (Booster) Pump (45), Packing (44), Washer (47), and Bolt (46).	Refer to paragraph 8-39 for installation of power-driven rotary (booster) pump and attaching parts.	<b>Install.</b>
51. Spline Shaft (61)	Refer to paragraph 6-89 for installation of spline shaft and establishment of end float.	<b>Install.</b>

2-50. Overspeed Governor and Tachometer Drive Assembly - Installation

INITIAL SETUP

**Applicable Configuration**  
All

**Consumable Materials**  
Lockwire (item 41,42, or 43, Appendix D)

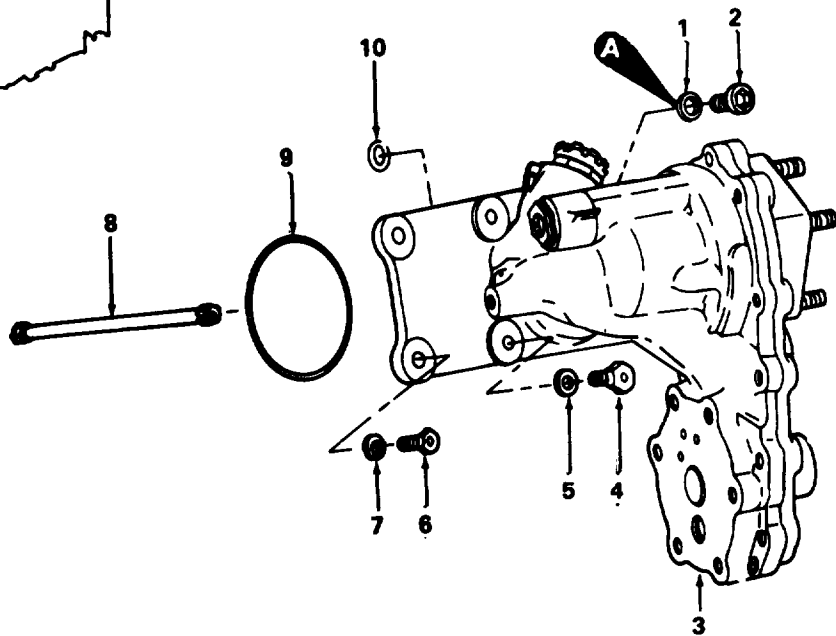
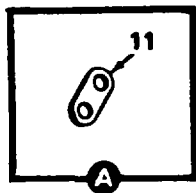
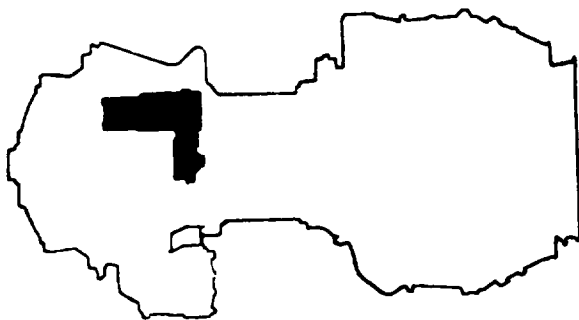
**References**  
Para 8-37 and 6-89

LOCATION/ITEM	REMARKS	ACTION
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INLET HOUSING/

1. Shaft (8)

Insert into inlet housing mounting pad.



2. Overspeed Governor and Tachometer Drive Assembly (3)

Use new packings (9 and 10).

Item 9 and 10 install in recessed ports on the engine inlet housing mounting pad and secure with bolts (2, 4, and 6) and washers (1, 5, and 7) and bracket (11). Lockwire bolts.



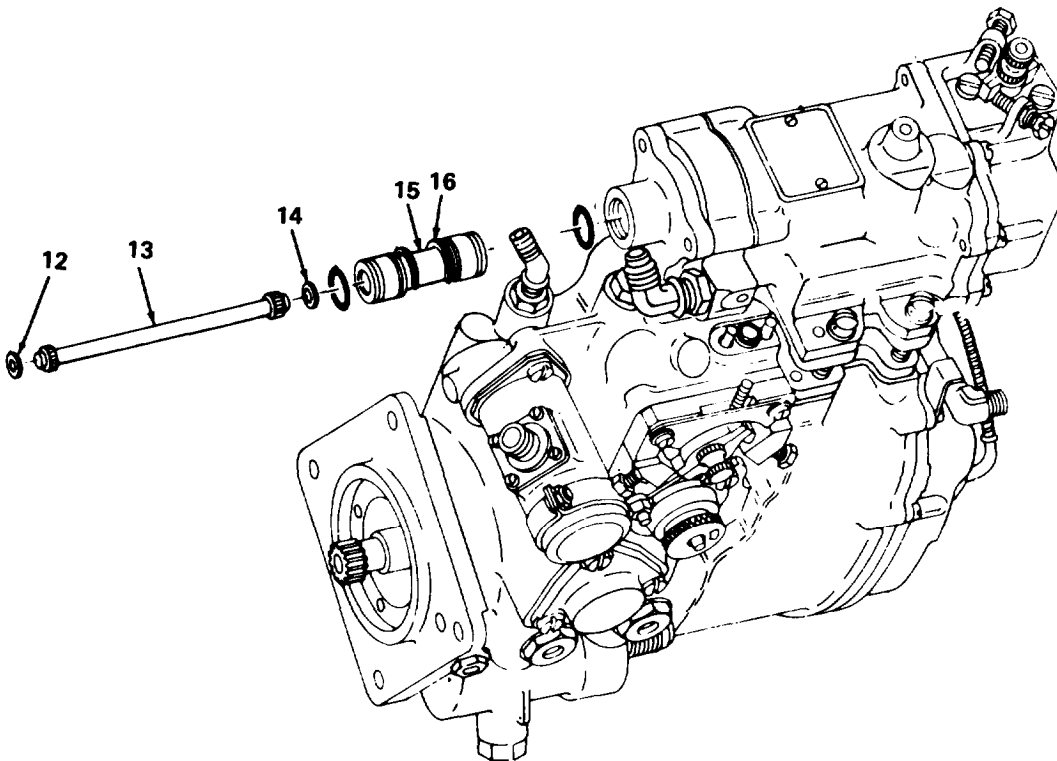
2-50. Overspeed Governor and Tachometer Drive Assembly - Installation - Continued

LOCATION/TEM	REMARKS	ACTION
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INLET HOUSING/ -  
 Continued

3. Shaft Tube (15)

Slide forward into over-speed governor and tachometer drive assembly. Expand and slide snap-ring (16) into place.



4. Aft Nuts (14)

Install if necessary.

**NOTE**

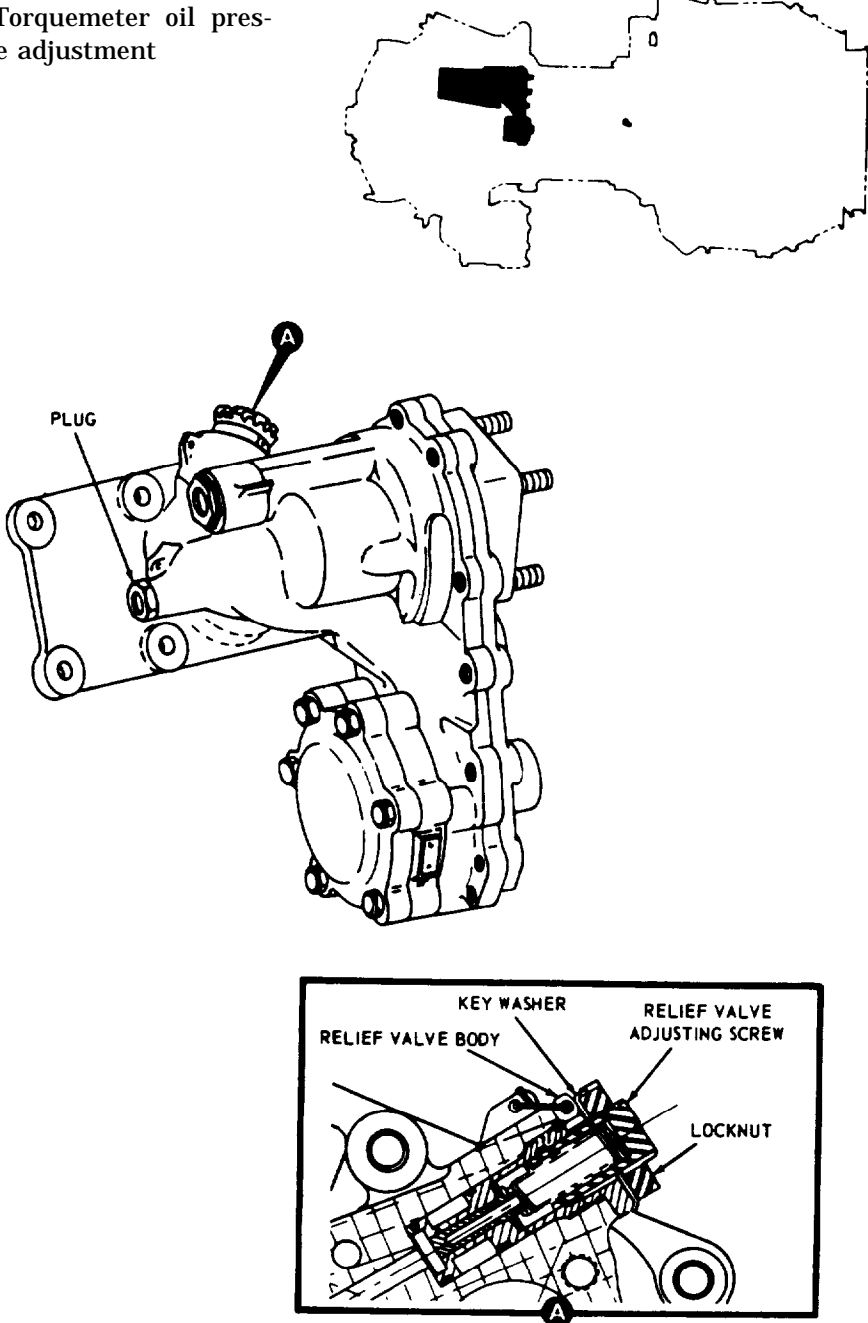
If a new overspeed governor and tachometer drive assembly is being installed, establish the end float of the overspeed governor drive shaft before performing this action. Para 6-89.

2-50. Overspeed Governor and Tachometer Drive Assembly - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING/ - Continued		
5. Overspeed Governor Shaft (13)		<b>Insert</b> overspeed governor shaft (13). <b>Add</b> forward nuts (12), if necessary.
6. Power-Driven Rotary Booster Pump	Refer to paragraph 8-39.	Install.



2-52.1. Adjustment of Torquemeter (oil pressure) (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
3. Torquemeter oil pressure checks		Operate engine and check torquemeter oil pressure.
4. Torquemeter oil pressure adjustment		<p>Shut down the engine and make the following adjustments:</p> <ol style="list-style-type: none"> <li>Straighten tang on key washer.</li> <li>Loosen adjusting screw locknut using wrench (LTCT215).</li> <li>Turn adjusting screw clockwise to increase pressure or counterclockwise to decrease pressure. One full turn will change pressure approximately 10 psi.</li> <li>Using wrench (LTCT215), tighten adjusting screw locknut as required. (Refer to table G-3, reference number 45; or table G-4, reference number 36.)</li> <li>Restart engine. Recheck oil pressure, and repeat preceding step (3) as necessary.</li> <li>Bend tangs on key washer.</li> </ol> <p>Remove pressure gage and reinstall plug.</p>

2-51. Overspeed Governor and Tachometer Drive Assembly - Pressure Test (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING/ - Continued		
3. Suitable Line Fitting		<b>Install</b> into housing.
4. Overspeed Governor and Tachometer Drive Assembly		<b>Install</b> holding device (LTCT2044). <b>Secure</b> with bolts and washers.
5. Plug		<b>Install</b> into overspeed governor drive port.
6. Regulated Air Source		<b>Connect</b> to line fitting at 8 psi to 12 psi (0.56 kg/sq cm to 0.84 kg/sq cm).

**WARNING**

Prolonged contact with lubricating oil (item 46 or 47, Appendix D) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed immediately. Saturated clothing should be removed immediately. Areas in which lubricating oil is used should be adequately ventilated to keep mist and fumes to a minimum.

7. Seals		<b>Apply</b> Lubricating Oil (item 46 or 47, Appendix D) or leak test solution (item 39, Appendix D) to all seals and mating surfaces.
8. Seals		<b>Check</b> for leakage. If leakage is apparent, repair by lapping surfaces or replacing seals.

**2-51. Overspeed Governor and Tachometer Drive Assembly - Pressure Test (AVIM) - Continuat**

LOCATION/ITEM	REMARKS	ACTION
INLET HOUSING/ - Continued		
9. Fixtures, Line Fitting Power- Driven Rotary (Booster) Pump		<b>Remove</b> after <b>completing</b> pressure test.
10. Packing (4)		<b>Lubricate</b> with shorten- ing compound (item 74, Appendix D). <b>Position</b> on plug (62).
11. Plug		<b>Install</b> in housing. <b>Tighten</b> as required. (Refer to Appendix G, table G-3, reference num- ber 37, or table G-4, reference number 40).

**2-52. Overspeed Governor Drive Shaft - End Float Establishment**

**Refer to paragraph 6-89 for procedure  
establishing end float for the overspeed  
governor drive shaft.**

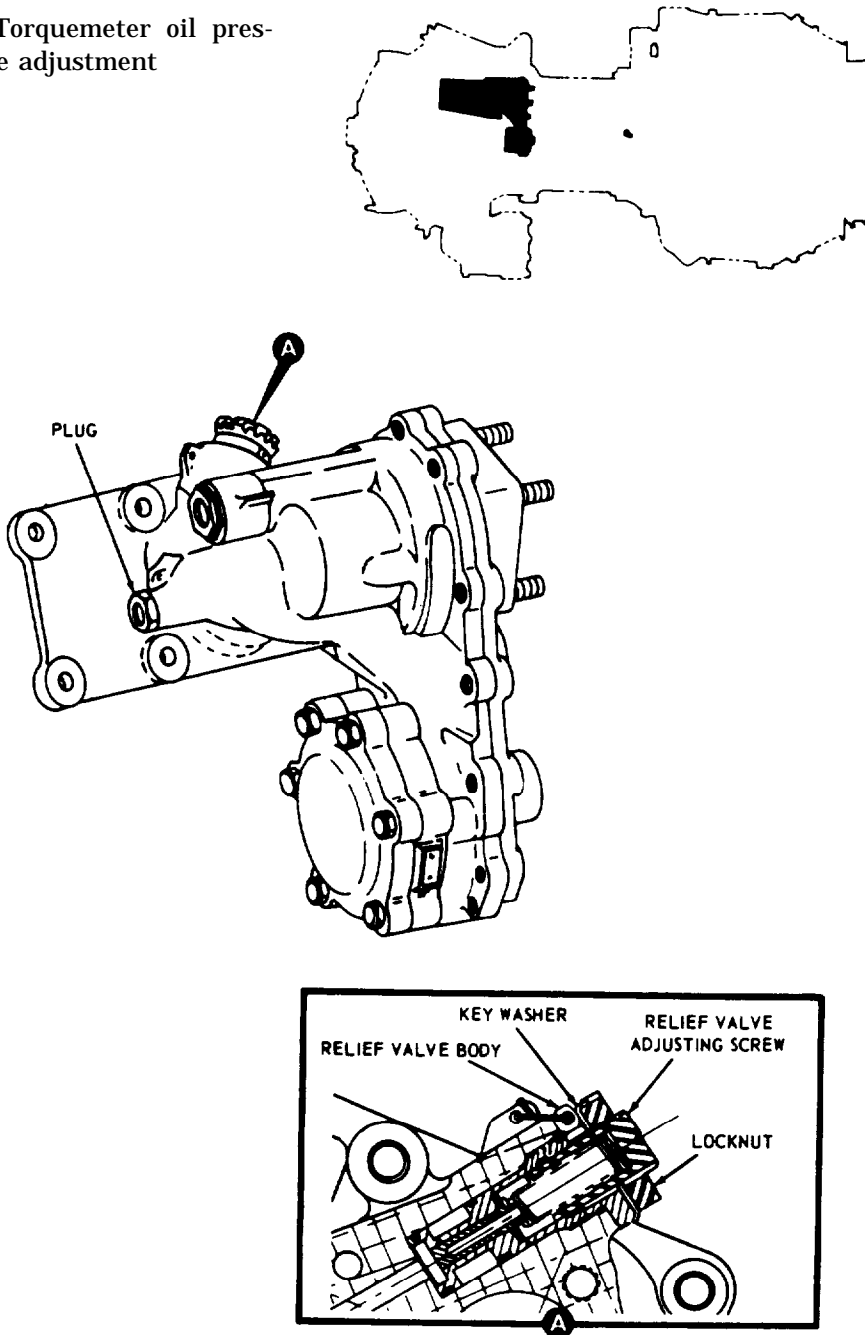
**2-52.1. Adjustment of Torquemeter (oil pressure) (AVIM).**

1. Plug	Plug, MS9404-02 Machine thread .4375 (7/16)-20UNF30	Remove plug from overspeed governor and tachometer drive.
2. Pressure gage		Install pressure gage that provides readings from 0 to 200 PSI.

**NOTE**

Normal pressures at test connection  
should be 120 psi minimum with N2  
rpm at 6000 or more. The readings  
should be taken after the oil pressure  
and temperature have stabilized.

2-52.1. Adjustment of Torquemeter (oil pressure) (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
3. Torquemeter oil pressure checks		Operate engine and check torquemeter oil pressure.
4. Torquemeter oil pressure adjustment	 <p>The diagram consists of three parts: a top-down view of the relief valve assembly showing a key washer and an adjusting screw; a side view of the torquemeter with a plug and an adjusting screw labeled 'A'; and a detailed cross-sectional view of the relief valve assembly with labels: KEY WASHER, RELIEF VALVE BODY, RELIEF VALVE ADJUSTING SCREW, and LOCKNUT. A small 'A' is also present in the bottom right of this diagram.</p>	<p>Shut down the engine and make the following adjustments:</p> <ol style="list-style-type: none"> <li>Straighten tang on key washer.</li> <li>Loosen adjusting screw locknut using wrench (LTCT215).</li> <li>Turn adjusting screw clockwise to increase pressure or counterclockwise to decrease pressure. One full turn will change pressure approximately 10 psi.</li> <li>Using wrench (LTCT215), tighten adjusting screw locknut as required. (Refer to table G-3, reference number 45; or table G-4, reference number 36.)</li> <li>Restart engine. Recheck oil pressure, and repeat preceding step (3) as necessary.</li> <li>Bend tangs on key washer.</li> </ol> <p>Remove pressure gage and reinstall plug.</p>

**2-52.1. Adjustment of Torquemeter (oil pressure) (AVIM) - Continued**

**NOTE**

Bend one tang against locknut and  
one tang against valve body.

**2-53. Interstage Bleed Actuator Assembly and Bleed Band - Removal**

INITIAL SETUP

**Applicable Configuration**

All



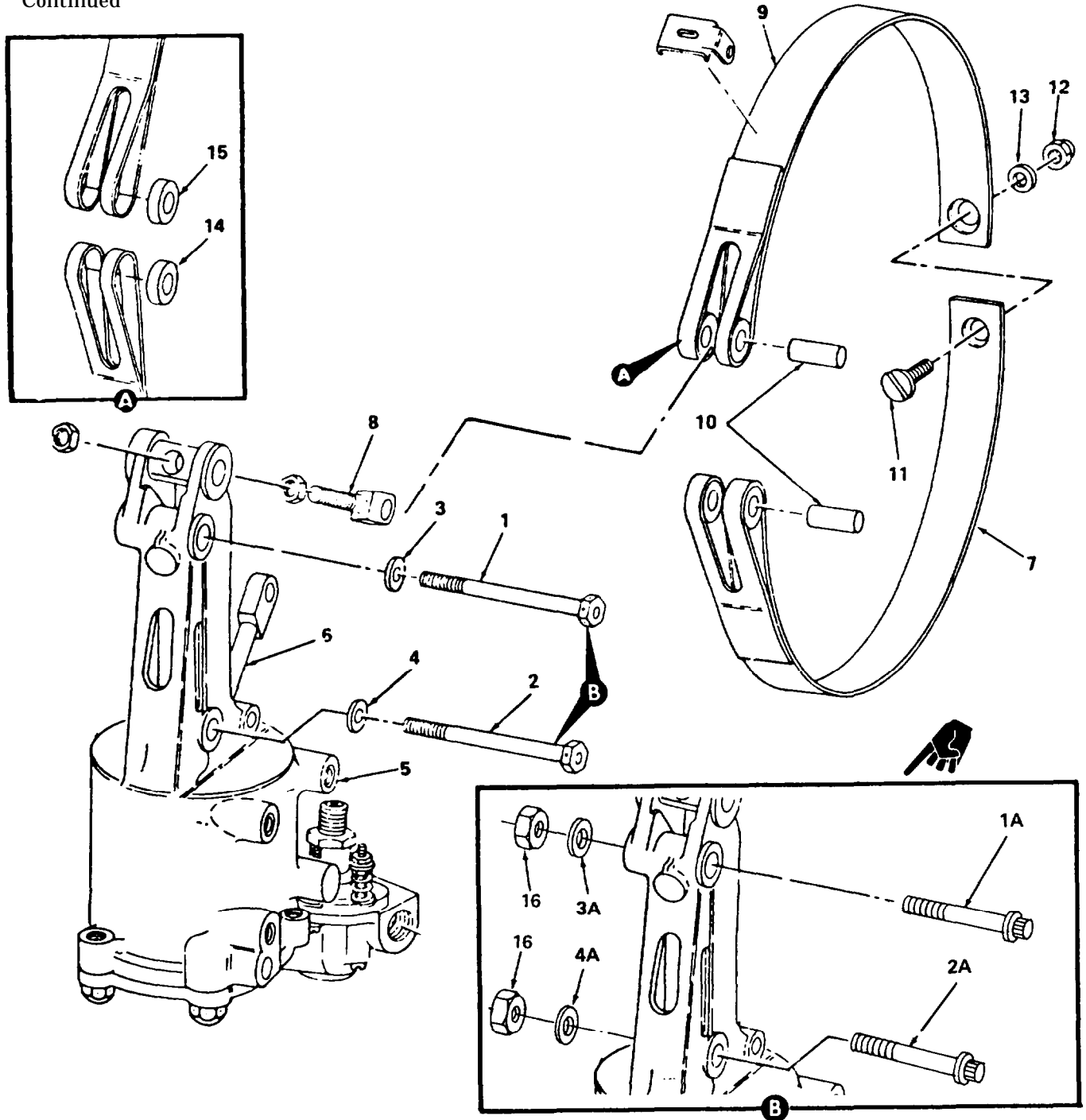
2-53. Interstage Bleed Actuator Assembly and Bleed Band - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR HOUSING/</p>		
<p>1. P3 Hoses and Lubrication Hose Clamp</p>		<p><b>a. Remove</b> P3 hose at diffuser housing. <b>Remove</b> P3 hose (from actuator to fuel control) at actuator. <b>Remove</b> lubrication hose clamp from bottom of actuator.</p>
	<div style="border: 1px dashed black; padding: 2px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div>	
	<p><b>If shims are removed from impeller housing actuator mounting bosses, they must be retained for actuator installation (T53-L-11 series and L-13B engines only).</b></p>	
<p>2. Adapter Assembly</p>		<p><b>Remove</b> bolts (1 and 2) and washers (3 and 4) or bolts (1A and 2A), washers (3A and 4A) and nuts (1 6).</p>
<p>3. Interstage Bleed Actuator Assembly (5)</p>		<p><b>Pull</b> away from compressor housing to <b>expose</b> connection of piston (6) and lower band (7), and connection of rod end (8) and upper band (9).</p>
<p>4. Actuator</p>		<p><b>Support</b> actuator and <b>remove</b> pins (10) that secure bleed bands to rods. <b>Remove</b> actuator.</p>
		<p>On bleed band assembly 1-160-820-04, <b>remove</b> bushings (14 and 15).</p>
<p>5. Bleed Bands</p>	<p><b>NOTE</b></p>	
	<p>Exercise care in removing bands to prevent twisting or bending. If the bands are separated, mark the upper and lower bands for identification.</p>	<p><b>Hold</b> screw (11) that secures bleed bands and <b>remove</b> nut (12). <b>Remove</b> screw and washer (13). <b>Slide</b> bands through clips and remove bands.</p>

2-53. Interstate Bleed Actuator Assembly and Bleed Bands - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR  
HOUSING/ -  
Continued



2-54. Interstage Bleed Band - Inspection

INITIAL SETUP

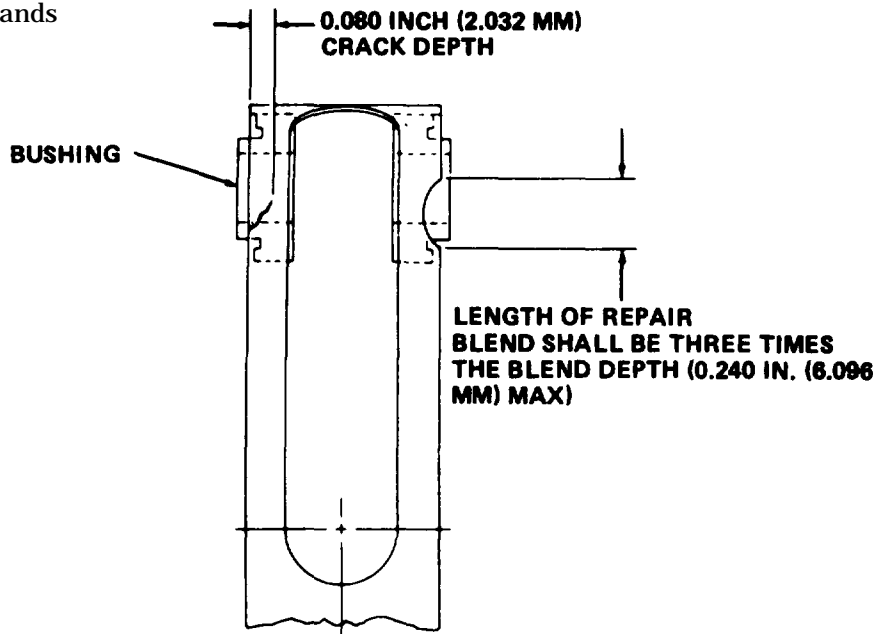
Applicable Configuration All	References Para H-26	
LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED BAND /		
1. Actuator Housing		Visually inspect for cracks. Replace if defective.
2. Actuator		Inspect for proper functioning during engine operation.  Perform bleed band closure check. (Refer to paragraph 2-62).
3. Interstate Bleed Actuator Assembly and Bleed Bands		Inspect threaded parts for damage, springs for distortion and rods for bending. Replace damaged parts.
4. Strainer		Inspect for damage. Replace damaged strainer.
5. Bleed Band Assembly 1-160-820-01		Inspect for worn or elongated captive bushings. Replace bleed band assembly.
6. Bleed Band Assembly 1-160-820-04		Inspect for worn or elongated bushings. Replace bushings if defective.
7. Bleed Bands		Inspect for bending that may cause improper seating on compressor housing. Replace bent bleed bands.

2-54. Interstage Bleed Band - Inspection - Continued

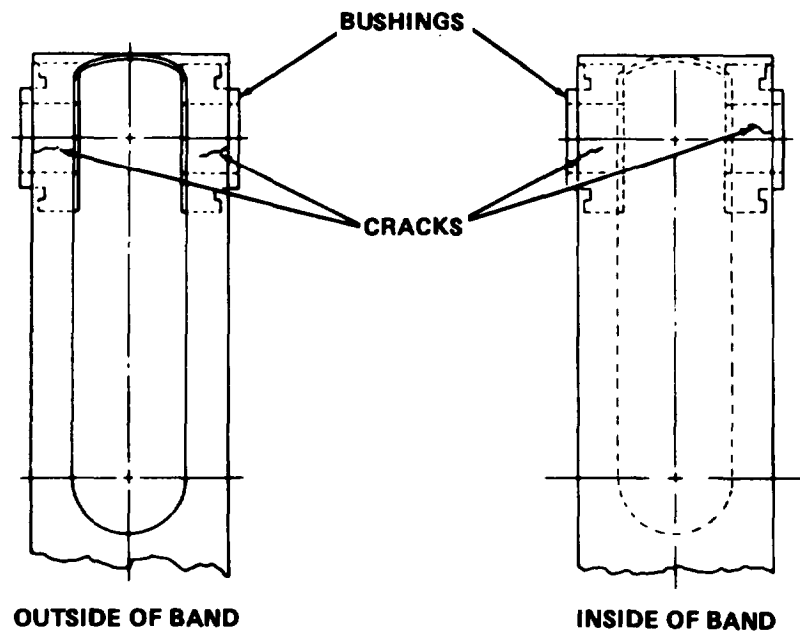
LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE  
BLEED BAND/ -  
Continual

8. Bleed Bands



Inspect for cracks in band to bushing weld by dye-penetrant method. (Refer to paragraph H-26 or alternatively refer to TM 1-1520-255-23, Technical Manual Aviation unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for AH-1 Helicopter series. Blend-repair cracks on inside of band that extend more than 0.080 inch into the band. Reinspect band by fluorescent penetrant H20 method.



2-55. Interstage Bleed Actuator Assembly - Minor Servicing

INITIAL SETUP

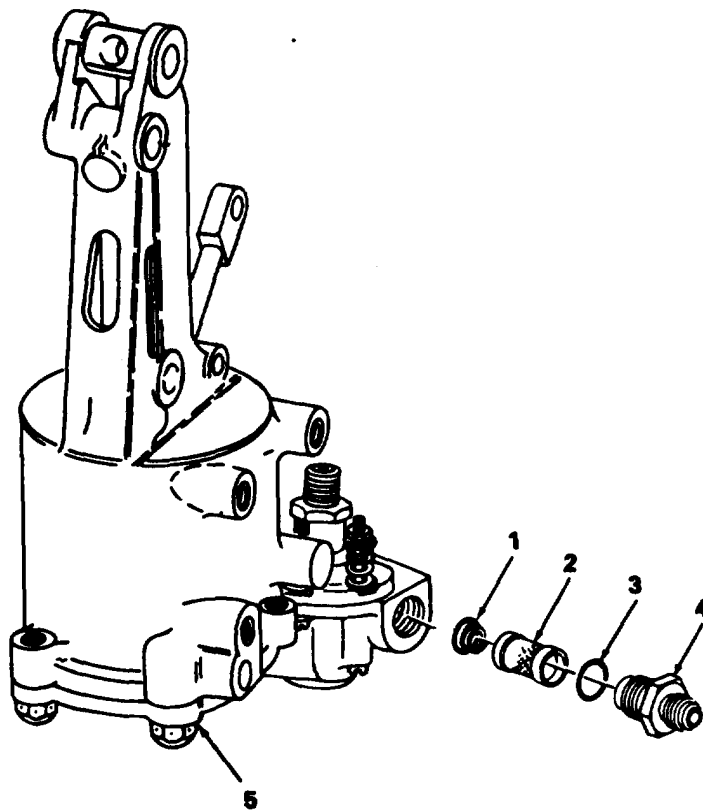
Applicable Configuration  
All

Consumable Materials  
Drycleaning Solvent (item 24, Appendix D)  
Pneumatic System Grease (item 68, Appendix D)

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

INTERSTAGE  
BLEED ACTUATOR  
ASSEMBLY/

1. Strainer Element



Remove strainer (2) from actuator by removing reducer (4) and packing (3).

2. Strainer end Spring

Withdraw spring (1). Remove spring from strainer.

2-55. Interstate Bleed Actuator Assembly - Minor Servicing - Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued	<p><b>WARNING</b></p> <p>Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact, Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).</p>	
3. Parts		<b>Clean</b> parts with drycleaning solvent (item 24, Appendix D).
4. Parts		<b>Inspect</b> for physical damage, <b>Replace</b> damaged parts.
5. Strainer Element		<b>Install</b> tapered end of spring (1) on flange of strainer element.
6. Large Diameter of Spring and Strainer		<b>Insert</b> large diameter of spring and strainer into interstage bleed actuator assembly (5).
<p><b>CAUTION</b></p>		
<p>When lubricating packing (3) in following action for item 7, only specified grease shall be used.</p>		
7. New Packing (3)		<b>Lightly coat</b> new packing (3) with pneumatic system grease (item 68, Appendix D) and <b>install</b> on reducer.
8. Strainer and Spring		<b>Insure</b> that strainer and spring are seated properly in actuator. <b>Install</b> reducer and <b>tighten</b> .

2-56. Interstage Bleed Actuator Assembly(T53-L-11 Series Engines) - Disassembly

INITIAL SETUP

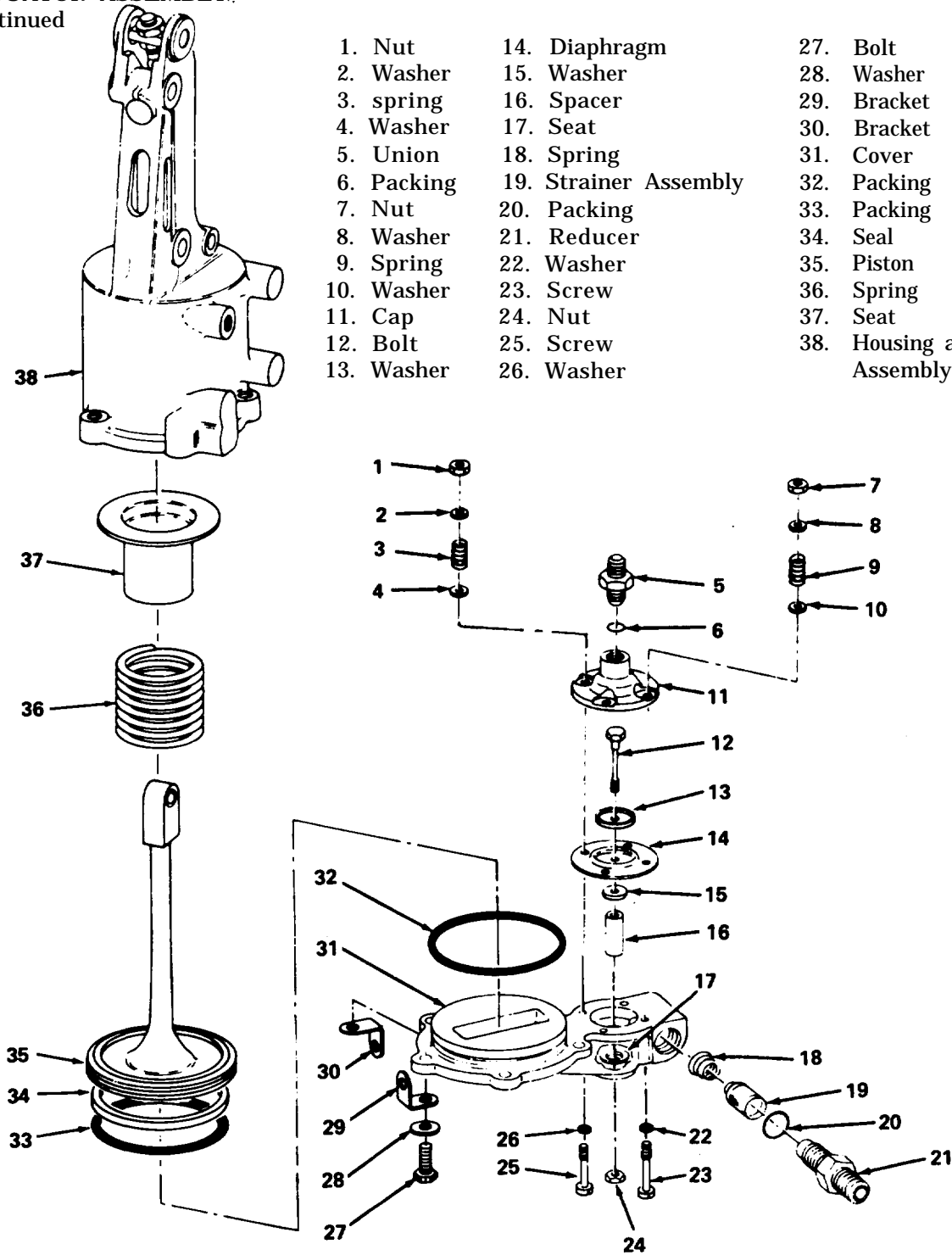
**Applicable Configuration**  
T53-L-11 Series Engine

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/	<p style="text-align: center;"><b>NOTE</b></p> <p>Upon disassembly of airbleed actuator, inspect for presence of a rubber boot used to encase the actuator spring and intended to reduce scoring of the actuator bore by sand and debris. Any boot that is found shall be removed and discarded.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p><b>Boot material can deteriorate and cause operational and mechanical difficulties.</b></p> <p style="text-align: center;"><b>NOTE</b></p> <p>Note position of each bracket (29 and 30) for reassembly.</p>	<p><b>Remove.</b></p> <p><b>Separate</b> from cover (31).  <b>Remove</b> piston (35).  <b>Remove</b> spring (36).  <b>Remove</b> seat (37).</p> <p><b>Remove</b> from piston (35).</p> <p><b>Remove</b> packing (32).  <b>Remove</b> union (5).  <b>Remove</b> packing (6).  <b>Remove</b> nuts (1 and 7).  <b>Remove</b> washers (2 and 8).  <b>Remove</b> screws (23 and 25).  <b>Remove</b> washers (22 and 26). <b>Remove</b> springs (3 and 9). <b>Remove</b> washers (4 and 10).</p>
1. Bolts (27), Washers (28), Brackets (29) and (30)		
2. Housing and Screw Assembly (38)		
3. Packing (33) and Seal (34)		
4. Cover (31)		

2-56. Interstage Bleed Actuator Assembly (T53-L-11 Series Engines) - Disassembly - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
ACTUATOR ASSEMBLY/ -  
Continued



- |            |                       |                                   |
|------------|-----------------------|-----------------------------------|
| 1. Nut     | 14. Diaphragm         | 27. Bolt                          |
| 2. Washer  | 15. Washer            | 28. Washer                        |
| 3. Spring  | 16. Spacer            | 29. Bracket                       |
| 4. Washer  | 17. Seat              | 30. Bracket                       |
| 5. Union   | 18. Spring            | 31. Cover                         |
| 6. Packing | 19. Strainer Assembly | 32. Packing                       |
| 7. Nut     | 20. Packing           | 33. Packing                       |
| 8. Washer  | 21. Reducer           | 34. Seal                          |
| 9. Spring  | 22. Washer            | 35. Piston                        |
| 10. Washer | 23. Screw             | 36. Spring                        |
| 11. Cap    | 24. Nut               | 37. Seat                          |
| 12. Bolt   | 25. Screw             | 38. Housing and Screw<br>Assembly |
| 13. Washer | 26. Washer            |                                   |



**2-56. Interstate Bleed Actuator Assembly (T53-L-11 Series Engines) - Disassembly - Continued**

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY / - Continued	<div style="border: 2px dashed black; padding: 5px; display: inline-block;"><b>CAUTION</b></div> Use care when removing diaphragm (14) in following action for item 5.	
5. Nut(24)	Lift off cap (11).	Remove.
6. Bolt (12) and Washer (13)		Remove.
7. Diaphragm (14) and Washer (15)		Remove.
8. Spacer (16)	1-170-059-09	Remove from cover (11). Shake valve seat (17) out of oblong hole in cover.
9. Reducer (21), Packing (20), Strainer Assembly (19), and Spring (18)		Remove from cover (31).

**2-57. Interstage Bleed Actuator Assembly (T53-L-13B/703 Engines) - Disassembly**

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY /	<p><b>NOTE</b></p> Upon disassembly of airbleed actuator, inspect for presence of a rubber boot used to encase the actuator spring and intended to reduce scoring of the actuator bore by sand and debris. Any boot that is found shall be removed and discarded.	

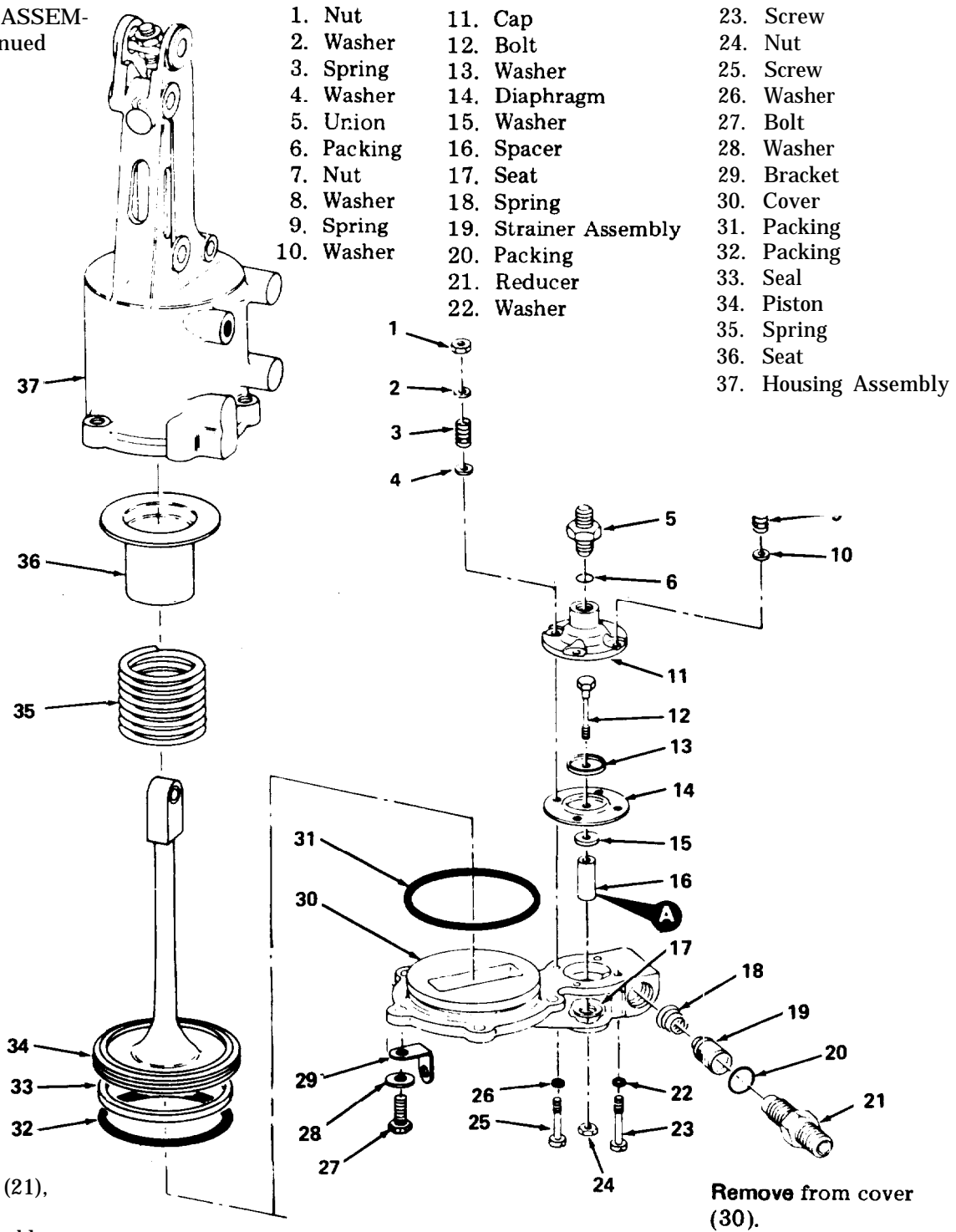
2-57. Interstage Bleed Actuator Assembly (T53L-13B/703 Engines) - Disassembly - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued</p>		
<p><b>CAUTION</b></p>		
<p>Boot material can deteriorate and cause operational and mechanical difficulties.</p>		
<p>1. Interstate Bleed Actuator Assembly</p>		<p>Remove bolts (27), washers (28), and bracket (29).</p>
<p>2. Housing Assembly (37)</p>		<p>Separate from cover (30).</p>
<p>3. piston (34), Spring (35), and Seat (36)</p>		<p>Remove from housing assembly (37).</p>
<p>4. Piston (34)</p>		<p>Remove packing (32) and seal (33).</p>
<p>5. Cover (30)</p>		<p>Remove packing (31).</p>
<p>6. Union (5), Packing (6), Nuts (1 and 7), and Washers (2 and 8)</p>		<p>Remove.</p>
<p>7. Screws (23 and 25), Washers (22 and 26), Springs (3 and 9), and Washers (4 and 10)</p>		<p>Remove.</p>
<p><b>CAUTION</b></p>		
<p>Use care when removing diaphragm (14) in following item 8.</p>		
<p>8. Nut (24), Bolt (12), washer (13), Diaphragm (14), Washer (15), and Spacer (16)</p>	<p>Lift off cap (11).</p>	<p>Remove.</p>
<p>9. Cover (30)</p>		<p>Shake seat (17) out of oblong hole.</p>

2-57. Interstage Bleed Actuator Assembly (T53-L-13B/703 Engines) - Disassembly - Continua

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
ACTUATOR ASSEM-  
BLY/ - Continued



- 1. Nut
- 2. Washer
- 3. Spring
- 4. Washer
- 5. Union
- 6. Packing
- 7. Nut
- 8. Washer
- 9. Spring
- 10. Washer
- 11. Cap
- 12. Bolt
- 13. Washer
- 14. Diaphragm
- 15. Washer
- 16. Spacer
- 17. Seat
- 18. Spring
- 19. Strainer Assembly
- 20. Packing
- 21. Reducer
- 22. Washer

- 23. Screw
- 24. Nut
- 25. Screw
- 26. Washer
- 27. Bolt
- 28. Washer
- 29. Bracket
- 30. Cover
- 31. Packing
- 32. Packing
- 33. Seal
- 34. Piston
- 35. Spring
- 36. Seat
- 37. Housing Assembly

10. Reducer (21),  
Packing (20),  
Strainer Assembly  
(19) and Spring (18)

**Remove** from cover  
(30).

**2-58. Interstage Bleed Actuator Assembly - Inspection**

INITIAL SETUP

Applicable Configuration All	References Para H-26, 2-56, 2-57, H-29	
LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/	Refer to paragraph 2-66 or 2-57.	<b>Disassemble</b> housing.
1. All Parts	Refer to paragraph H-25 for repair.	<b>Inspect</b> all parts for nicks, burrs and scratches. Bland-repair nicks, burrs and scratches.
2. All Threaded Parts	Refer to paragraph H-29 for repair.	<b>Inspect</b> all threaded parts for damaged or crossed threads. <b>Repair</b> damaged threads. <b>Replace</b> parts having threads damaged beyond repair.
3. All Parts		<b>Inspect</b> all parts for cracks, bending, distortion and excessive wear. <b>Replace</b> all cracked, bent, distorted or excessively worn parts.
4. Rod End		<b>Inspect</b> for worn or elongated bushings. <b>Replace</b> defective bushings.
5. Piston		Visually <b>inspect</b> for worn or elongated bushings. <b>Raplace</b> defective bushings.
6. Housing and Screw Assembly	Refer to paragraph H-29 for repair or replacement.	<b>Inspect</b> for damaged screw thread inserts. <b>Repair</b> or <b>replace</b> screw thread inserts.
7. Strainer Assembly		Visually <b>inspect</b> for cuts and dents.

2-58. Interstage Bleed Actuator Assembly - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEM- BLY/ - Continued		
8. Seal Packings		Visually <b>inspect</b> for cuts, tears and deterioration. <b>Replace</b> defective seal and packings.
9. Diaphragm		Visually <b>inspect</b> for cuts, tears and deterioration. <b>Replace</b> defective diaphragm.
10. Springs		<b>Inspect</b> for damage. <b>Replace</b> damaged springs.
11. Inner Wall of Housing and Screw Assembly and Housing Assembly		<b>Inspect</b> for scoring in area affected by piston travel. scoring up to 0.005 inch is acceptable. Scoring beyond 0.005 inch is unacceptable; <b>replace</b> assembly.

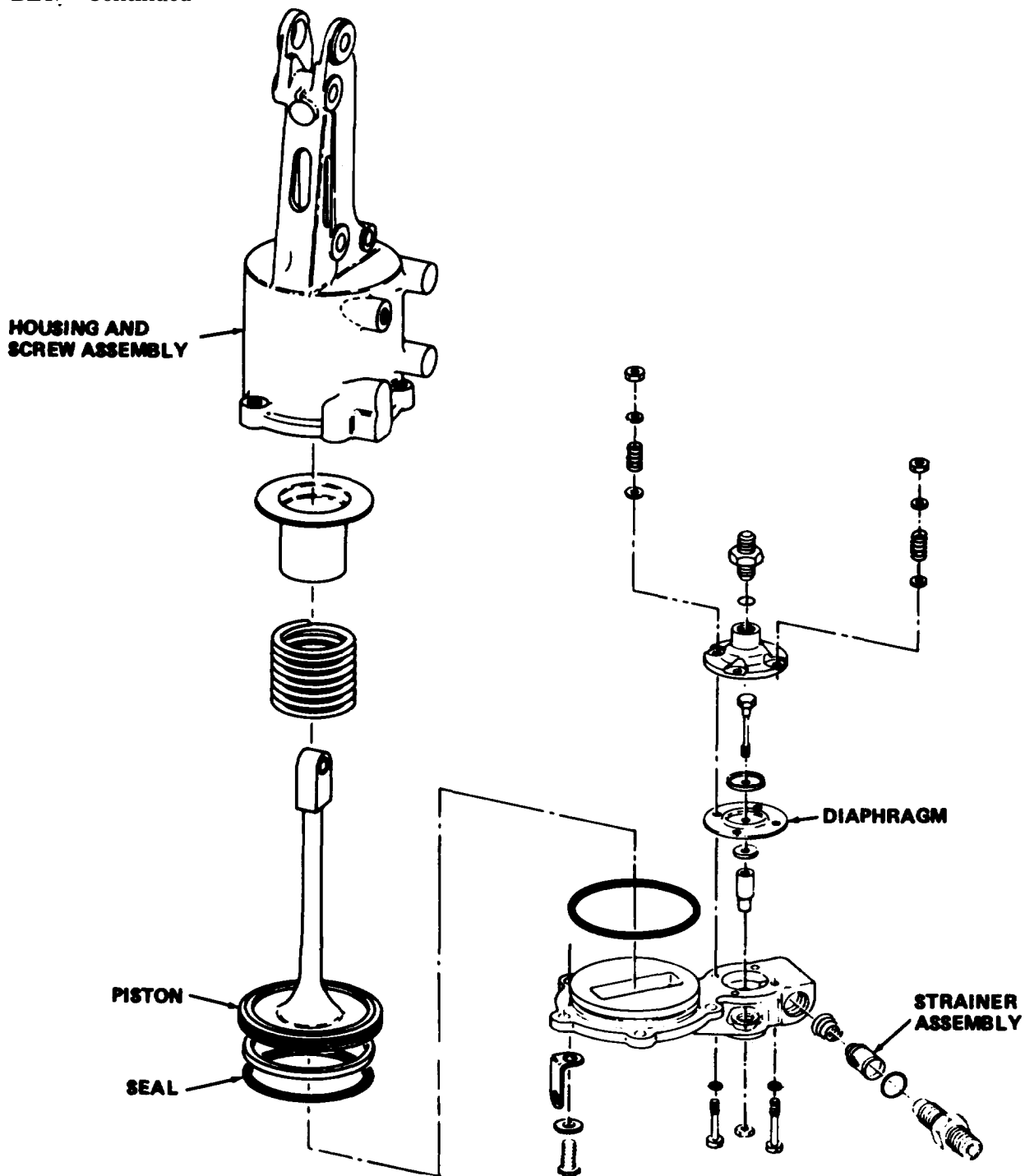
**NOTE**

The following illustration pertains to the T53-L-11 series engine.

2-58. Interstage Bleed Actuator Assembly - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
ACTUATOR ASSEM-  
BLY/ - Continued



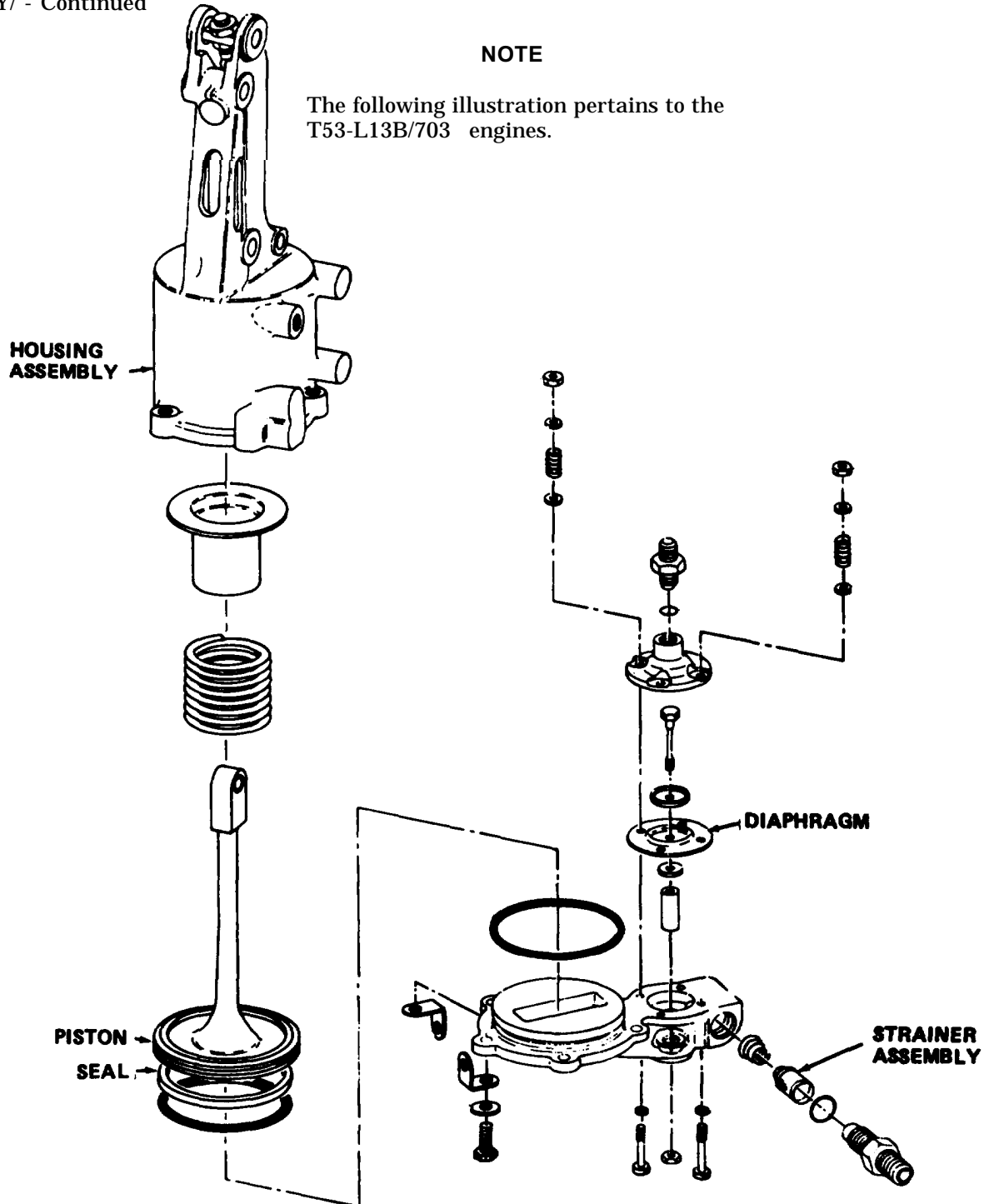
2-58. Interstage Bleed Actuator Assembly - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
 ACTUATOR ASSEM-  
 BLY/ - Continued

**NOTE**

The following illustration pertains to the  
 T53-L13B/703 engines.



2-59. Interstage Bleed Actuator Assembly(T53-L-11 Series Engines) - Assembly

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**Consumable Materials**  
Grease (item 34, Appendix D)  
Lapping Compound (Item 38, Appendix D)

**Special Tools**  
Ring Compressor (RC40C)

**References**  
Military Standard MIL-STD-130

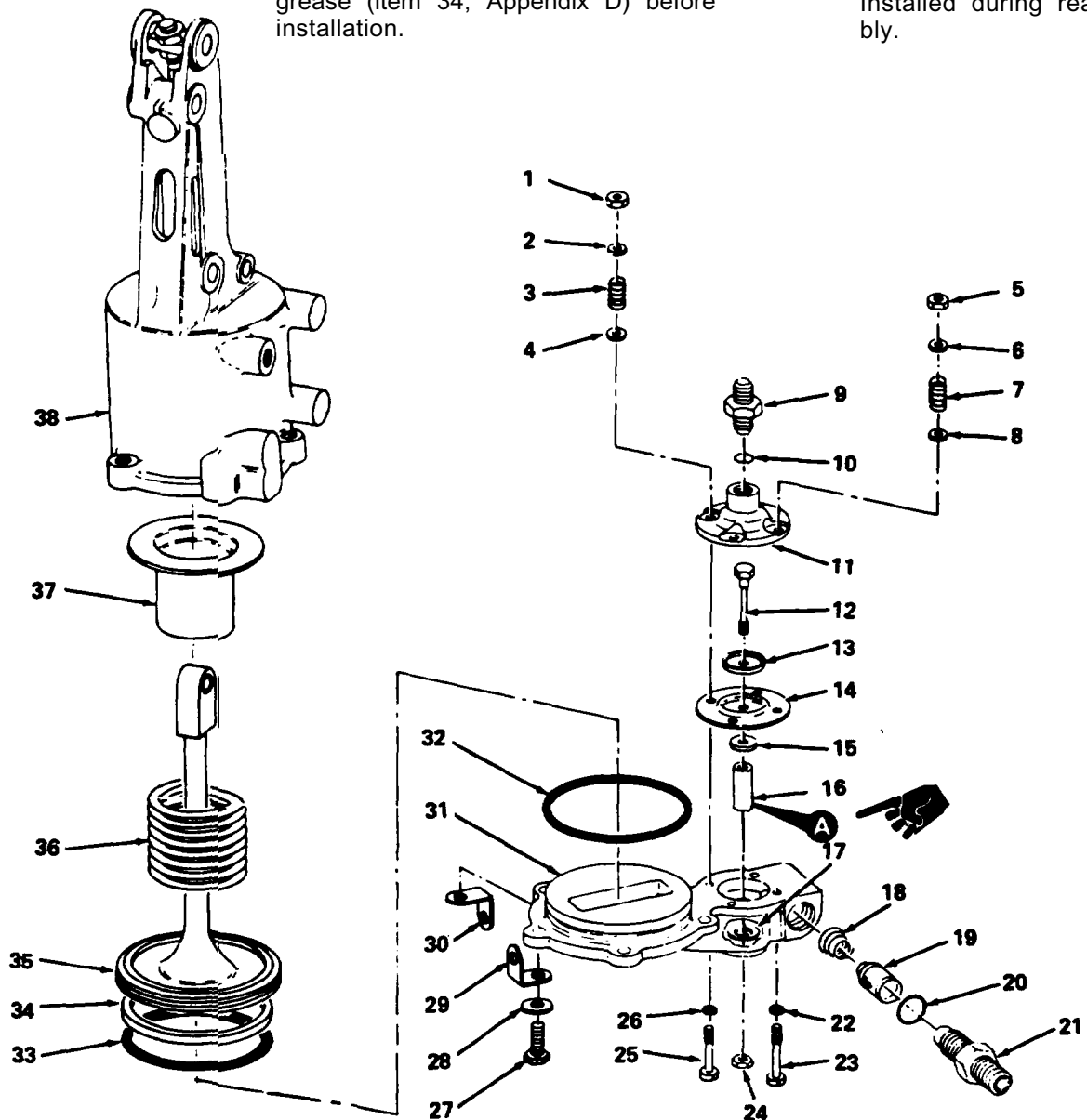
LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED ACTUATOR ASSEMBLY/

1. All Packings

Packings shall be lubricated with grease (item 34, Appendix D) before installation.

Lubricate all packings Installed during reassembly.





2-59. Interstage Bleed Actuator Assembly (T53-L-11 Series Engines) - Assembly - Continued

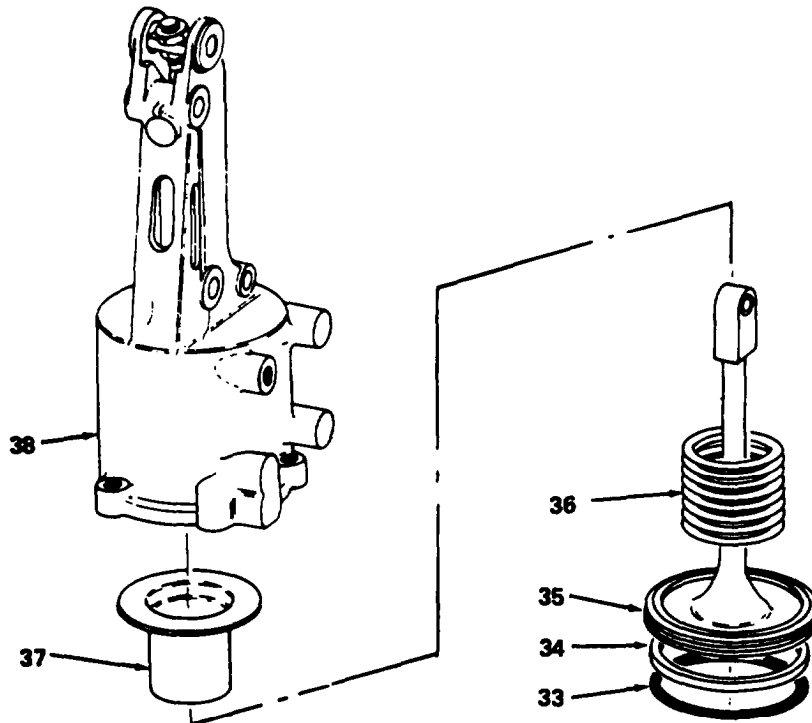
LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued		
1. Nut 2. Washer 3. Spring 4. Washer 5. Nut 6. Washer 7. Spring 8. Washer 9. Union 10. Packing 11. Cap 12. Bolt 13. Washer 14. Diaphragm 15. Washer 16. Spacer 17. Seat 18. Spring 19. Strainer Assembly 20. Packing 21. Reducer	22. Washer 23. Screw 24. Nut 25. Screw 26. Washer 27. Bolt 28. Washer 29. Bracket 30. Bracket 31. Cover 32. Packing 33. Packing 34. Seal 35. Piston 36. Spring 37. Seat 38. Housing and Screw Assembly 39. Stem 40. Seal 41. Spacer 42. Seat	
2. Spring (18) and Sediment Strainer Assembly (19)		<b>Insert</b> into cover (31).
3. Packing (20)	Use grease (item 34, Appendix D) to coat packing.	<b>Install</b> on reducer (21).
4. Reducer (21)		<b>Install.</b>
<b>NOTE</b>		
Actions for items 5 thru 12 pertain to preparation of valve seal (17) for installation.		
5. Valve Seat (17)		<b>Prepare</b> for installation.
6. Valve Seat (17)		<b>Install</b> through oblong hole in cover (31). <b>Position</b> seat with recessed surface facing upward.

2-59. Interstate Bleed Actuator Assembly (T53-L-11 Series Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued		
7. Spacer (16)	Stem (39), seal (40), spacer (41), and seat (37) are part of actuator assembly 1-170-050-10 and are not interchangeable with actuator 1-170-050-09.	<b>Install</b> , cross-hole end upward, through top of cover and into recess of valve seat (17) or (42).
8. Spacer (41)	T53-L-11 series engines only.	<b>Install</b> into recess of valve seat. <b>Install</b> seal (40) and valve stem (39) on spacer.
9. Bolt (12) and Washer (15)		<b>Install</b> through spacer. <b>secure</b> with nut (24).
10. Valve Seat (17)	<b>Insure</b> valve seat (17) is pressure-tight when seated. If necessary, <b>lap</b> valve seat, using lapping compound (item 38, Appendix D).	<b>Rotate</b> assembly, using a wrench on head of bolt.
11. Valve Seat		<b>Disassemble</b> parts. If valve seat was lapped, <b>remove</b> all traces of lapping compound.
12. Valve Seat	Refer to actions for items 5 thru 12, diaphragm (14) and washer (13), prior to installation of bolt.	<b>Reassemble</b> parts in sequence.
13. Relay Valve Cap (11)		<b>Secure</b> to cover(31) with washers (4 and 8), springs (3 and 7), washers (2 and 6), nuts (1 and 5), washers (22 and 26), and screws (23 and 25).

2-59. Interstate Bleed Actuator Assembly (T53-L-11 Series Engines) - Assembly -  
Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued		
14. Screw		<b>Tighten</b> 1-1/2 to 1-3/4 turns after engaging springs (four places).
15. Packing (10)		<b>Install</b> on union (9).
16. Union (9)		<b>Install</b> in relay valve cap(11).
17. Packing (32)	<b>CAUTION</b>	<b>Install</b> on cover (31).
	Do not use lubricant on seal (34) in following item 18.	
	<b>CAUTION</b>	
	Insure that the ID of the loop clamp or the ring compressor has no sharp edges or burrs that may cut or damage the teflon seal.	
18. Seal (34)	Use ring compressor, P/N RC40C (Snap-On Tools Corp.) or equivalent.	<b>Compress</b> over packing (33) on piston (35).



2-59. Interstate Bleed Actuator Assembly (T53-L-11 Series Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued		
19. Spring (36)		<b>Install</b> on seat (37).
20. Spring (36) and Seat (37)		<b>Install</b> on piston with flared end of seat away from piston head.
21. Guide, Spring (36) and Piston (35), and Housing and Screw Assembly (38).		<b>Insert.</b>

**CAUTION**

Do not damage packing (32) during installation of cover (31).

22. Cover (31)

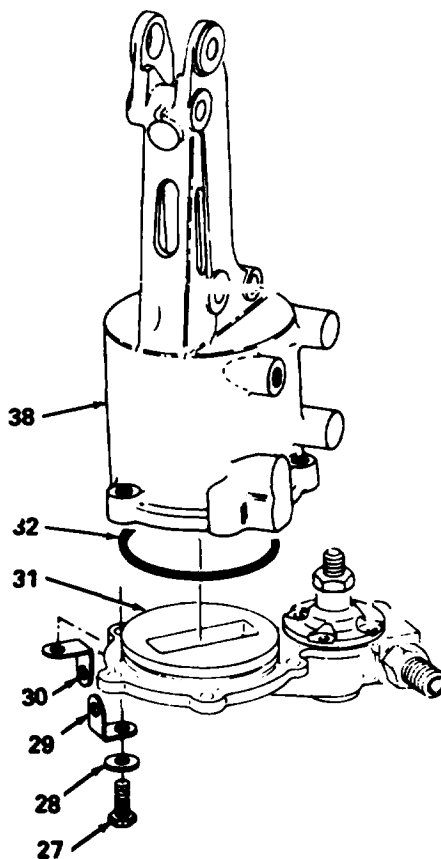
**Secure** to housing and screw assembly (38) with washer (28), brackets (29 and 30), and bolts (27).

23. Brackets

**Install** in positions noted during disassembly.

24. Bolts

**Lockwire.**



2-60. Interstage Bleed Actuator Assembly (T53-L-13B/703 Engines) - Assembly

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703

**Consumable Materials**

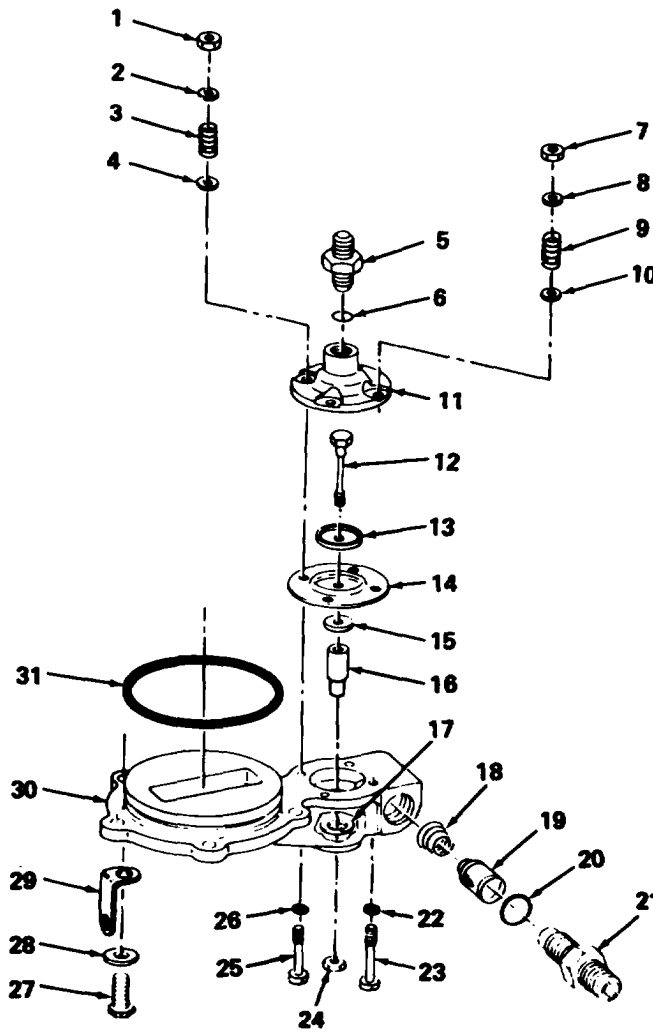
Lapping Compound (item 38, Appendix D)  
Lockwire (item 41, 42, or 43, Appendix D)

**Special Tools**

Loop Clamp (LTCT4718)

INTERSTAGE BLEED  
ACTUATOR ASSEM-  
BLY/

1. Nut
2. Washer
3. Spring
4. Washer
5. Union
6. Packing
7. Nut
8. Washer
9. Spring
10. Washer
11. Cap
12. Bolt
13. Washer
14. Diaphragm
15. Washer
16. Spacer
17. Seat
18. Spring
19. Strainer Assembly
20. Packing
21. Reducer
22. Washer
23. Screw
24. Nut
25. Screw
26. Washer
27. Bolt
28. Washer
29. Bracket
30. Cover
31. Packing



2-60. Interstate Bleed Actuator Assembly (T53-L-13B/703 Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued</p>		
<p>1. Packing (20)</p>		<p><b>Install</b> on reducer (21). <b>Insert</b> spring (18), strainer assembly (19) and reducer into cover (30).</p>
<p>2. Seat (17)</p>		<p><b>Install</b> as follows:</p> <p>a. <b>Install</b> seat (17) through oblong hole in cover (30). <b>Position</b> with recessed surface facing upward. <b>Install</b> spacer (16), cross-hole end upward, through top of cover and into recess of seat.</p> <p>b. <b>Install</b> bolt (12) and washer (15) through spacer and <b>secure</b> with nut (24).</p>
<p><b>NOTE</b></p> <p>Seat (17) must be pressure-tight when seated. If necessary, lap seat using lapping compound (item 38, Appendix D). Rotate assembly, using a wrench on head of bolt.</p>		
<p>3. Seat (17)</p>		<p><b>Disassemble</b> parts if seat (17) was lapped, <b>remove</b> all traces of lapping compound.</p> <p><b>Reassemble</b> parts in sequence outlined above, with the addition of diaphragm (14) and washer (13) prior to installation of bolt.</p>

2-60. Interstage Bleed Actuator Assembly (T53-L-13B/703 Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
 ACTUATOR ASSEM-  
 BLY/ - Continued

4. Cap (11)

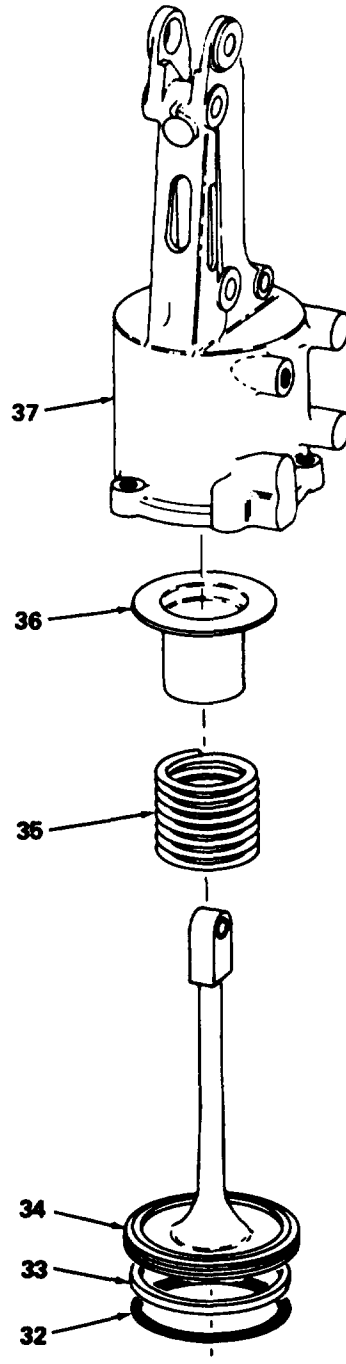
**Secure** to cover (30) with washers (4 and 10), springs (3 and 9), washers (2 and 8), nuts (1 and 7), washers (22 and 26) and screws (23 and 25). **Tighten** screws 1-1/2 to 1-3/4 turns after engaging springs (four places).

5. Packing (6)

**Install** on union (5).  
**Install** union on cap.  
**Install** packing on cover (30).

6. Piston

**Install** packing (32) on piston (34).



- 32. Packing
- 33. Seal
- 34. Piston
- 35. Spring
- 36. Seat
- 37. Housing Assembly

2-60. Interstage Bleed Actuator Assembly (T53-L-13B/703 Engines) - Assembly -  
Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued	<p style="text-align: center;"><b>CAUTION</b></p> <p>Do not use lubricant on seal (33) in following item 7.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Insure that the ID of the loop clamp or the ring compressor has no sharp edges or burrs that may cut or damage the teflon seal.</p>	
7. Seal (33)	Use loop clamp (LTCT4718).	<b>Compress</b> over packing (32) on piston (34).
8. Spring (35)		<b>Install</b> on seat (36). <b>Install</b> spring (35) seat on piston with flared end of seat away from piston head.
9. Housing Assembly (37)	<p style="text-align: center;"><b>CAUTION</b></p> <p>Do not damage packing (31) during installation of cover in following action for item 10.</p>	<b>Insert</b> guide spring and piston into housing.
10. Cover (30)		<b>Secure</b> cover (30) to housing assembly (37) with bracket (29), washers (28), and bolts (27). <b>Lockwire</b> bolts.



2-61. Interstage Bleed Actuator Assembly and Bleed Band - Installation

INITIAL SETUP

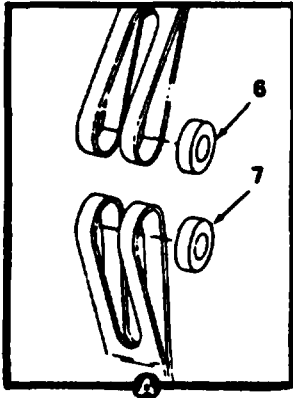
**Applicable Configuration**  
 All

**Consumable Materials**  
 Lockwire (items 41, 42, or 43, Appendix D)

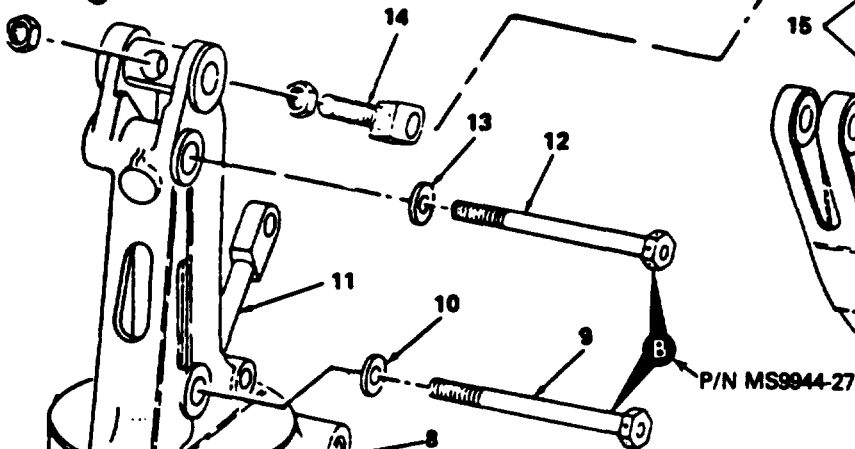
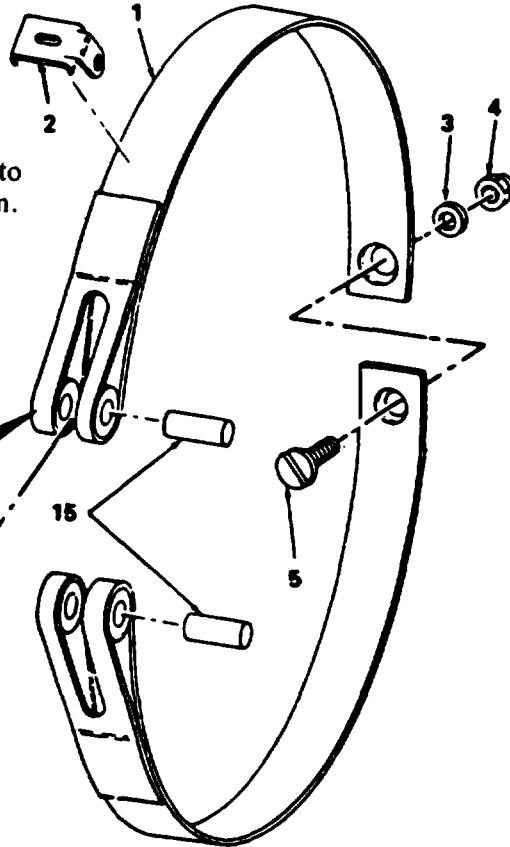
**References**  
 Para 2-63

LOCATION/ITEM	REMARKS	ACTION
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**COMPRESSOR ASSEMBLY/**



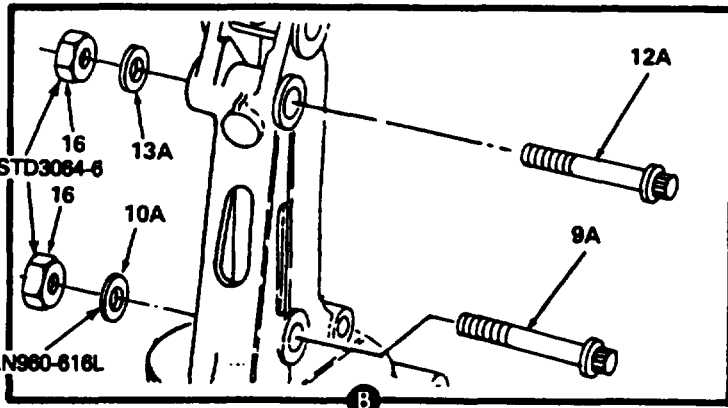
**NOTE**  
 Handle bleed bands with care to avoid twisting or bending them.



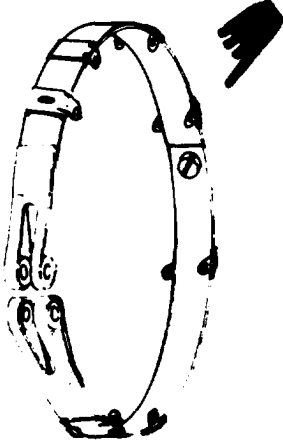
P/N MS9844-27

P/N STD3084-6

P/N AN980-616L



2-61. Interstage Bleed Actuator Assembly and Bleed Band - Installation - Continual

LOCATION/ITEM	REMARKS	ACTION
<p>COMPRESSOR ASSEMBLY/ - Continued</p>	<p style="text-align: center;"><b>NOTE</b></p> <p>The clip is properly installed when the legs are so positioned as not to cause bleed band binding. Check all legs and reposition or bend as required. Check assembled bleed band in open and closed position.</p>	<p><b>Insert</b> upper band (1) through clips (2) on upper half of compressor housing. <b>Insure</b> clips are properly installed.</p>
<p>1. Upper Band (1)</p>		<p><b>Place</b> space end of upper band over end of lower band. <b>Align</b> holes and install flat-head screw (5) from inside of bands. Install washer (3) and nut (4). <b>Hold</b> screw and <b>tighten</b> nut.</p>
<p>2. End of Upper Band</p>	<p>Bleed band assembly 1-160-820-04.</p>	<p>On bleed band assembly 1-160-820-04, <b>install</b> bushings (6 and 7).</p>
<p>3. Bleed Band Assembly</p>	<p>4. Interstage Bleed Actuator Assembly (8)</p>	<p><b>Support</b> interstage bleed actuator assembly (8) and <b>attach</b> bleed bands to piston (11) and rod end (14) with pins (15). <b>Push</b> rod end and piston into actuator housing.</p>

**CAUTION**

**Inspect impeller housing to compressor housing mating surface to determine if shim is installed. If shim is installed, shims shall also be bonded to actuator mounting bosses on impeller housing. If a**

2-61. Interstage Bleed Actuator Assembly and Bleed Band - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR ASSEMBLY/ - Continued	shimmed impeller housing is installed and there are no shims on actuator mounting bosses, or they were not retained when actuator was removed, fabricate two new shims 0.040 inch (1.02 mm) thick, 1.00 inch (25.4 mm) OD with a 0.500 inch (12.7 mm) hole from aluminum alloy (item 5, Appendix D), and install between actuator and impeller housing (T53-L-13B engines only).	
5. Actuator	Steel impeller housing only	<b>Secure</b> actuator to impeller housing with bolts (12A and 9A), washers (13A and 10A), and nuts (16). <b>Torque</b> to 115 to 125 pound-inches.
6. Actuator	Magnesium impeller housing only	<b>Secure</b> actuator to impeller housing with bolts (12 and 9), washers (13 and 10). <b>Torque</b> to 115 to 125 pound-inches. <b>Lockwire</b> bolts.
7. Bleed Bands		<b>Adjust</b> bleed bands (refer to paragraph 2-63).
8. P3 Hoses and Lubrication Hose Clamp		<b>Install.</b>

2-62. Interstage Bleed Band Closure - Closure Check

INITIAL SETUP

**Applicable Configuration**

All

**Consumable Materials**

Dry Cleaning Solvent (item 24, Appendix D)

Liquid Soap (item 40, Appendix D)

Lockwire (item 41, 42, or 43, Appendix D)

**References**

Appendix G, Table G-3, Reference Number 48  
or Table G-4, Reference Number 45

Appendix G, Table G-3, Reference Number 50  
or Table G-4, Reference Number 46

Para 9-4 and 9-69

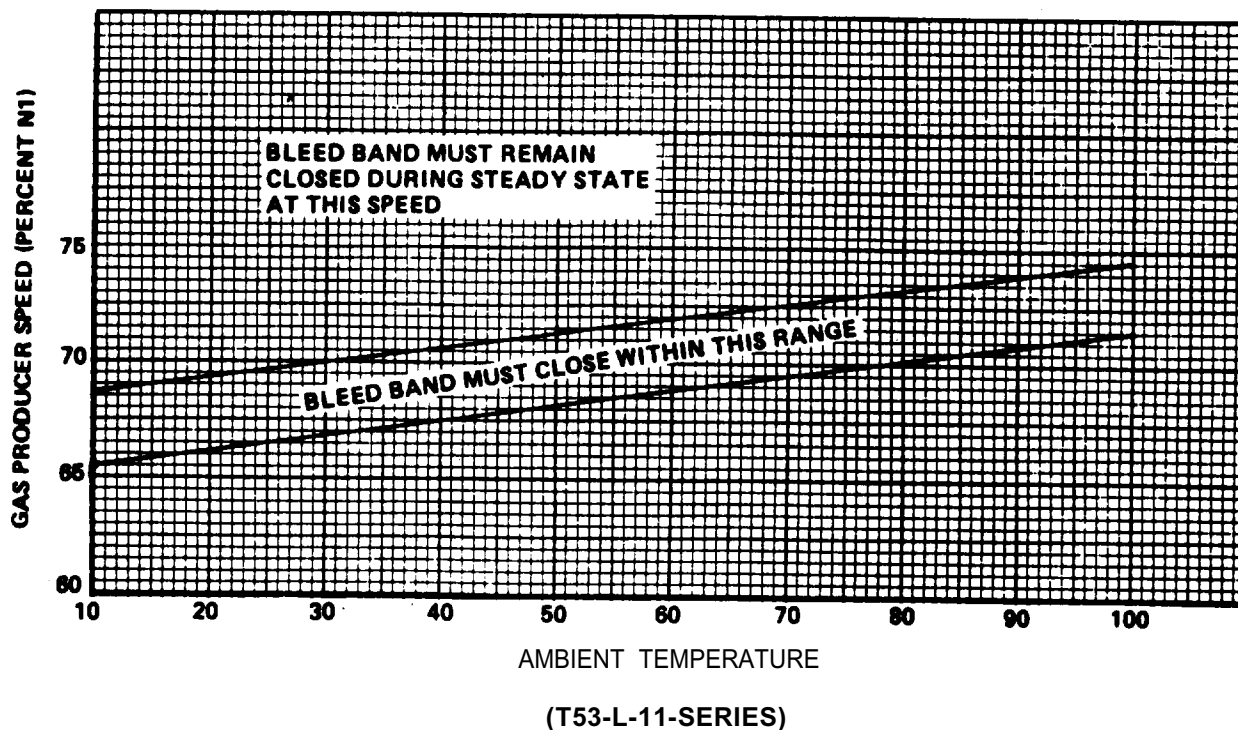
2-62. Interstage Bleed Band Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued	<p style="text-align: center;"><b>NOTE</b></p> <p>A bleed band closure check should be performed for the following conditions.</p> <ul style="list-style-type: none"> <li>a. When an interstage bleed actuator has been repaired or replaced.</li> <li>b. When a fuel control has been replaced.</li> <li>c. When airbleed system malfunction is suspected.</li> </ul>	
	<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;"><b>WARNING</b></div>	
	<p><b>Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.</b></p>	
1. Engine		<p><b>Start and stabilize</b> for two minutes at Flight Idle. <b>Insure</b> that the anti-icing and customer airbleed are off.</p>
		<p><b>Note</b> outside air temperature (OAT) in degrees centigrade from cockpit indicator, add 3°C and <b>record</b>.</p>
2. Bleed Band		<p><b>Open</b> power lever slowly. <b>Note</b> N1 speed at which bleed band closes.</p>
3. Bleed Band Opening-Closing Limits		<p><b>See</b> illustrations for correct limits.</p>
4. Bleed Band Closure Range		<p><b>See</b> following illustrations for correct temperature recorded in action for item 1.</p>

2-62. Interstate Bleed Band Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
ACTUATOR ASSEM-  
BLY/ - Continued

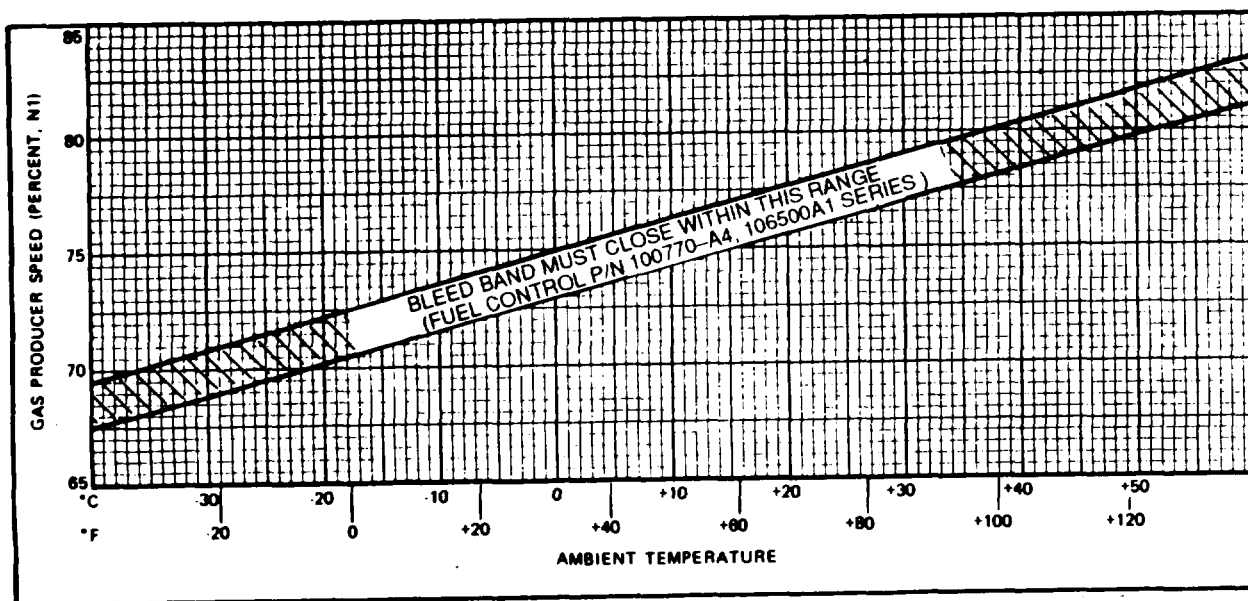
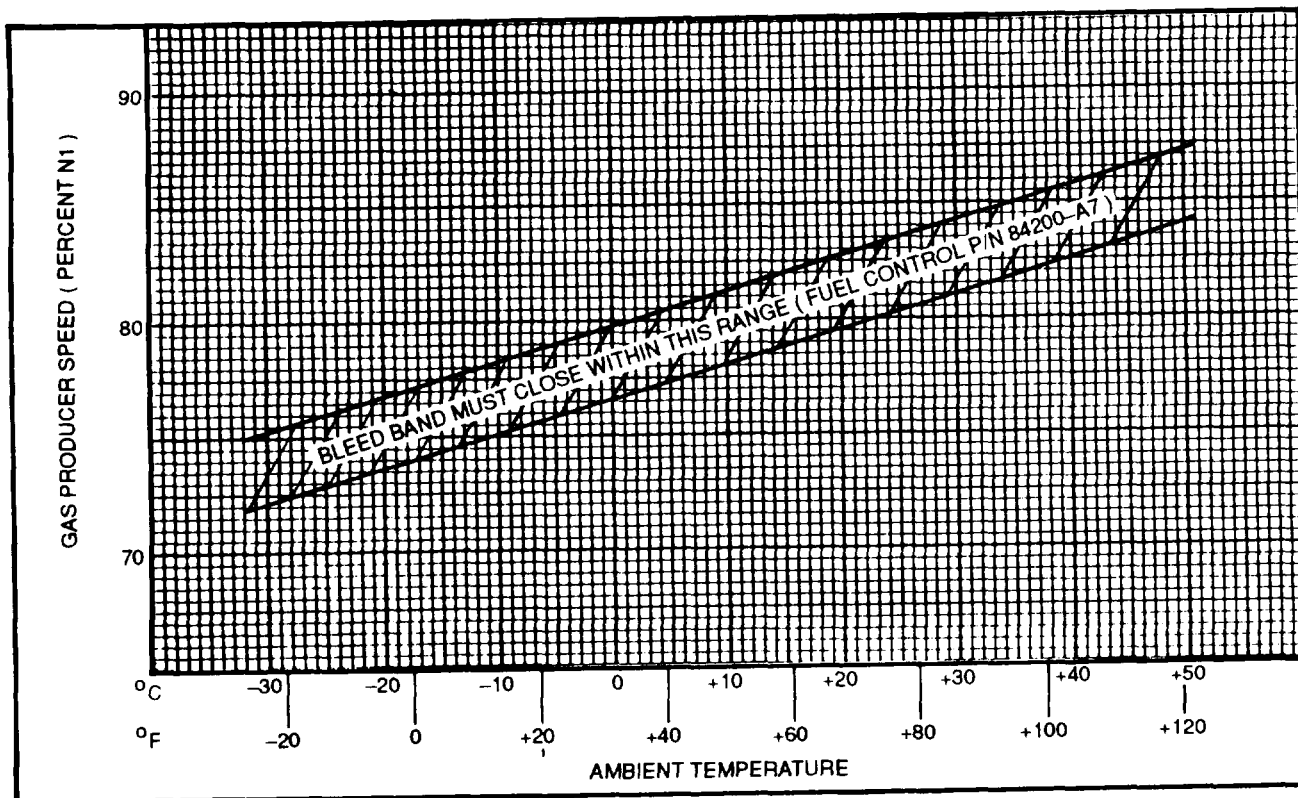


**NOTE**

Illustrations for items 3 and 4 are valid regardless of airframe Inlet configuration (i.e., sand and dust separator and/or foreign object damage screen). Adjustment shall be made in one percent increments. The bleed band closing speed for fuel regulators (84200A7A) may be reduced to the limit of fuel regulators (10070A and 106500A Series) only if necessary to relieve bleed band cycling problems.

2-62. Interstate Bleed Band Closure- Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
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2-62. Interstage Bleed Band Closure - Closure Check - Continued

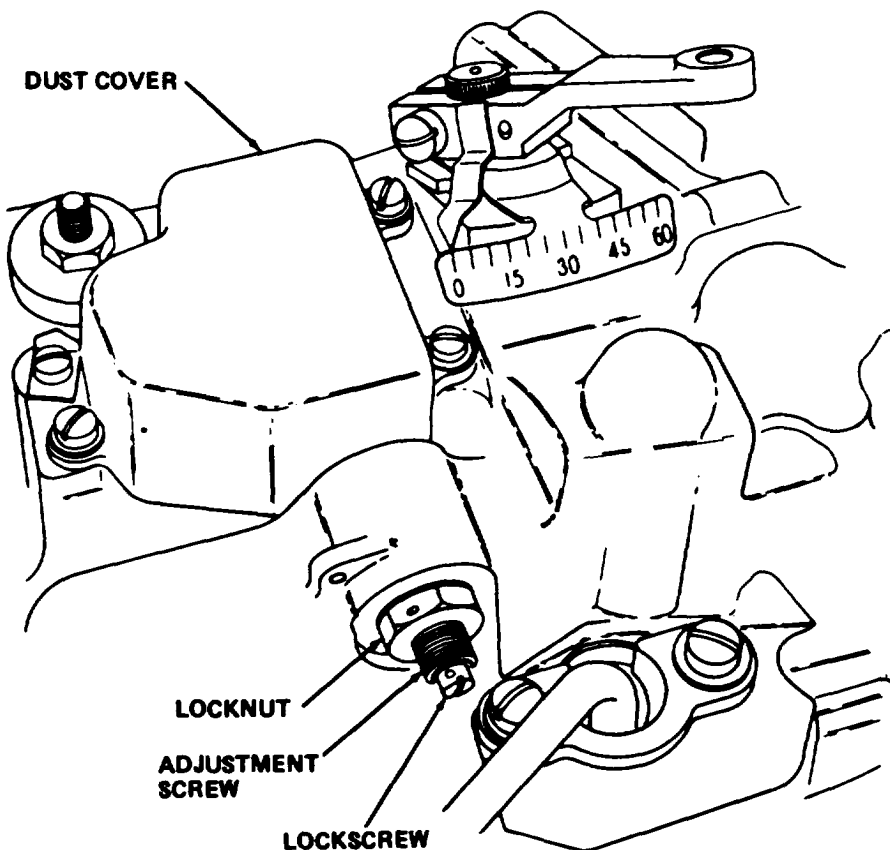
LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued

5. Bleed Band Closure

If the closure point does not fall within the allowable limits, shut down the engine and adjust the bleed band closure.

**Adjust** as follows:



a. **Remove** safety wire and seal from locknut.

b. **Back out** slotted back screw three-quarters of a revolution from the center of the adjustment screw.

c. **Hold** the adjustment screw.

d. **Release** the torque on the locknut.

e. **Rotate** the adjustment screw as required (one-eighth turn equals approximately one percent N1 speed). Turning adjustment screw clockwise will shift the closure point to a higher N1 speed. Turning screw counterclockwise will shift the closure point to a lower N1 speed.

**NOTE**

Turning adjustment screw clockwise will shift the bleed band closure point to a higher N1 speed. Turning counterclockwise will shift the bleed band closure point to a lower N1 speed.

f. **Hold** adjustment screw and **tighten** the locknut as required, (Refer to Appendix G, table G-4, reference number 45.

g. **Tighten** the slotted lock screw as required. (Refer to Appendix G, table G-3, reference number 49.

h. **Start** engine and **run up** to verify correct adjustment, (**Repeat** preceding steps b. through g. if required.)



2-62. Interstage Bleed Band Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued

6. Interstage Air-bleed System

If interstage airbled system does not function properly, check for defects.

i. **Lockwire associated** component.

**Check** for following defects:

a. Leaks or obstructions in hoses or fittings.

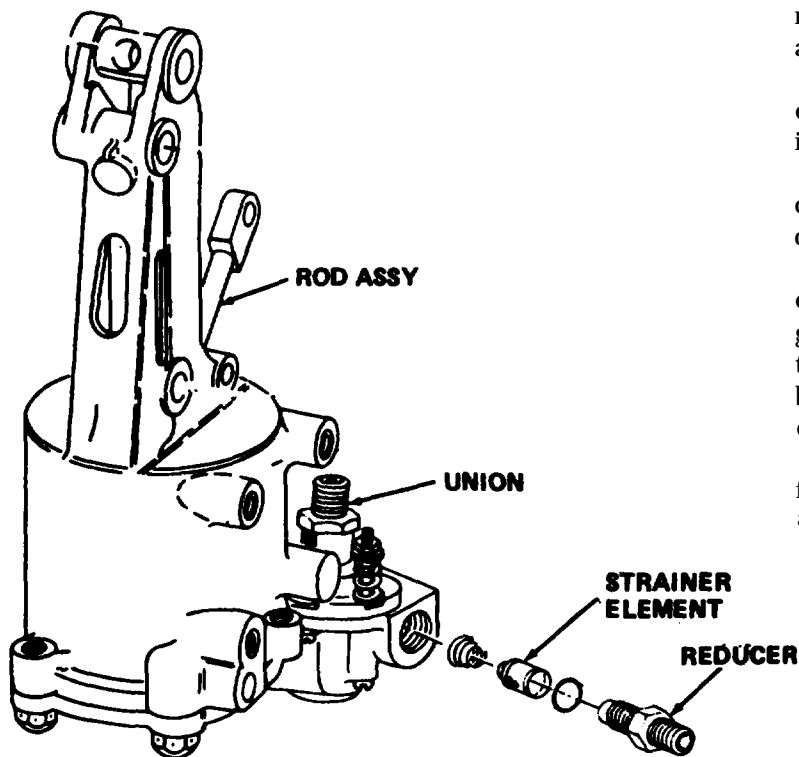
b. Clogged strainer element interstage bleed actuator.

c. Sticking of piston in airbled actuator.

d. Improper adjustment of bleed band.

e. Deposit of dirt and gum that prevents operation of fuel control air-bleed valve on fuel control.

f. Ruptured airbled actuator diaphragm.



7. Interstage Air-Bleed System

**Correct** defects listed in preceding action for item 6:

a. **Disconnect** hose between air diffuser and actuator at actuator fitting.

2-62. Interstage Bleed Bend Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
ACTUATOR ASSEMBLY/ - Continued

**WARNING**

Use approved personnel protective equipment to protect eyes and face when using compressed air. Maximum allowable air pressure for cleaning operations is 30 psi. Do not direct air stream toward yourself or toward another person.

b. Connect a source of compressed air to hose. Blow air through hose to determine that hose and diffuser housing port are unobstructed.

c. If hose and diffuser housing port are clear, disconnect airbled hose between fuel control and at actuator fitting. Blow air through hose to determine that hose is unobstructed.

d. Connect the source of compressed air to reducer in actuator.

**NOTE**

When pressure is applied in following action e., actuator should close. Closing will be indicated by rise of rod assembly.

For steps e thru j, see illustration for item 6.

e. Supply 60 psi (4.22 kg/sq cm) maximum metered air pressure to reducer and block union.

**NOTE**

When union is uncovered, actuator should open. Opening will be indicated by drop of rod assembly.

2-62. Interstate Bleed Band Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued		<p>f. Uncover union.</p> <p>g. If diffuser housing port is obstructed, determine cause and clean. Recheck actuator for proper operation.</p> <p>h. If hoses are obstructed, replace. Check strainer and clean if obstructed. Recheck actuator for proper operation.</p> <p>i. If actuator does not open and close as indicated in preceding action items 4 thru 5, replace actuator. Check new actuator for proper operation.</p> <p>j. If hoses and port are clear and actuator opens and closes as indicated in preceding action items 4 thru 5, inspect airbleed valve of fuel control as described in preceding action for item 6.</p>

**WARNING**

**Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°F to 59°C).**

2-62. Interstage Bleed Band Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued</p>		
<p>8. Fuel Control. Airbleed Valve</p>		<p><b>Remove</b> dust cover and <b>clean</b> with drycleaning solvent (item 24, Appendix D).</p>
<p>9. Airbleed Hose</p>	<div> </div>	<p><b>Connect</b> to fuel control P<sub>3</sub> port.</p>
<p>10. Hose</p>	<p>See illustration for item 9.</p>	<p><b>Introduce</b> in the form of spray, drycleaning solvent (item 24, Appendix D) through the open end of the hose while simultaneously <b>rotating</b> the leaf spring, block and valve button assembly.</p>

**CAUTION**

The leaf spring block and valve button assembly must be rotated manually. Use of tools is not permitted.

2-62. Interstage Bleed Band Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
ACTUATOR ASSEM-  
BLY/ - Continued

**WARNING**

Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°F to 59°C).

11. Leaf Spring,  
Block, and Valve  
Button Assembly

**Spray** exterior area with drycleaning solvent.  
**Repeat** action for item 10.

12. Airbled Hose

**Reconnect** to airbled actuator.

13. Bleed Band  
Closure

**Perform** a check. **Refer** to preceding item h.  
**Reinstall** dust cover over fuel control trigger mechanism.

14. Fuel Control

Perform this action if bleed band still does not function properly.

**Remove. Place** on a suitable workbench.  
**Refer** to paragraph 6-2.

**CAUTION**

Do not use tools to rotate the leaf spring block, and valve button assembly.

15. Leaf Spring and  
Block Assembly

Perform this action manually. See illustration for item 9.

**Rotate** to center the valve button over orifice in valve housing.

2-62. Interstage Bleed Band Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
ACTUATOR ASSEM-  
BLY/ - Continued

**WARNING**

Use approved personnel protective equipment to protect eyes and face when using compressed air. Maximum allowable air pressure for cleaning operations is 30 psi. Do not adjust air stream toward yourself or toward another person.

**CAUTION**

When removing valve button in following action for item 16, insure that the leaf spring does not contact the surface of the valve housing (see illustration for item 9).

16. Interstage Bleed  
Actuator Assembly

Use liquid soap (item 40, Appendix D). See illustration for item 9.

**Apply** small amount of liquid soap around valve button. **Apply** shop air at 60 psig to P<sub>3</sub> port. **Observe** button for signs of air leakage. **Remove** and replace button, P/N 76285, if leakage is evident.

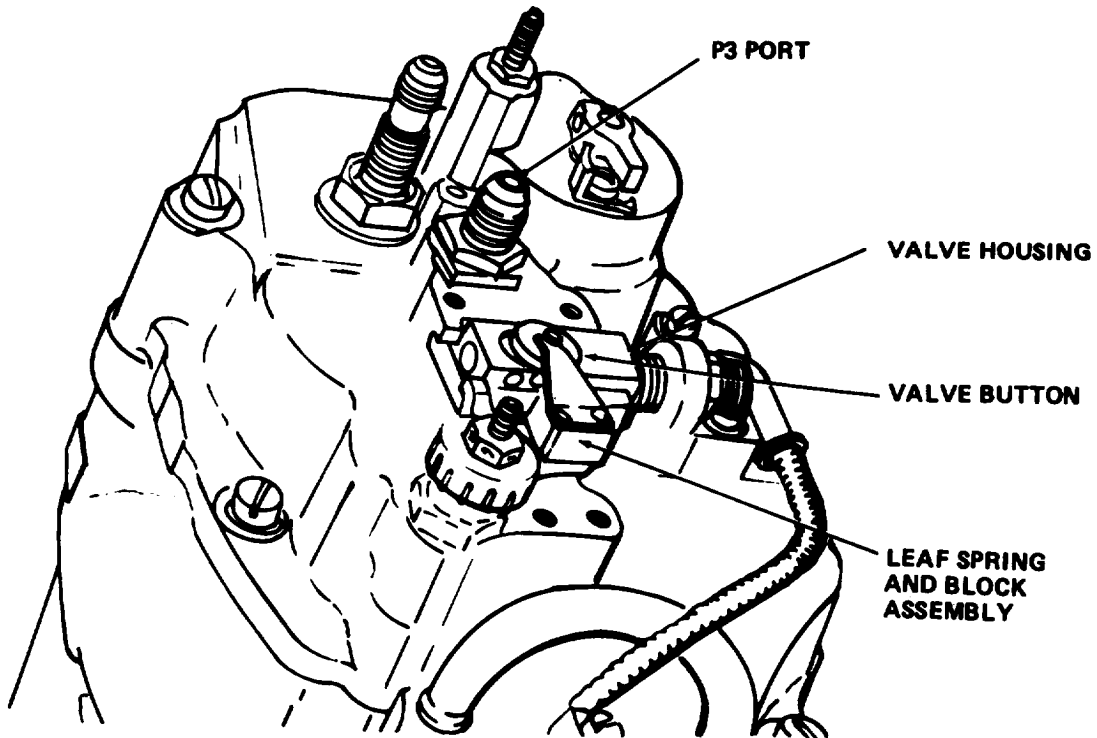
17. Valve Housing

If valve housing is scored it will create an abrasive action to erode the button contact surface and cause excessive leakage. See the following for illustration.

**Inspect** contact surface for scoring. **Replace** fuel control if valve housing is heavily scored.

2-62. Interstage Bleed Band Closure - Closure Check - Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED ACTUATOR ASSEMBLY/ - Continued		
18. Fuel Control	Refer to paragraph 6-5.	Reinstall.



2-63. Interstate Bleed Bands - Adjustment

INITIAL SETUP

**Applicable Configuration**  
All

LOCATION/ITEM	REMARKS	ACTION
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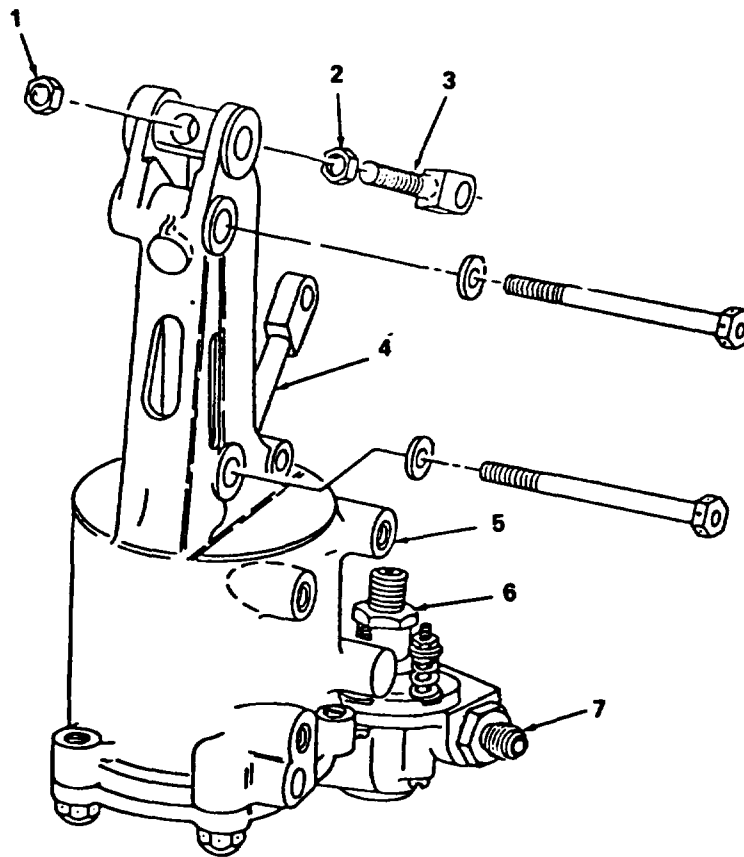
INTERSTAGE BLEED  
BAND ASSEMBLY/

**NOTE**

The bleed bands shall be adjusted whenever a new band assembly or interstate airbleed actuator is installed. The travel of the piston (4) and the tightness of the band assembly are adjusted by altering the position of the rod end (3).

**NOTE**

Rod end is secured to a pivoting shaft with nuts (1 and 2).





2-63. Interstate Bleed Bands - Adjustment - Continued

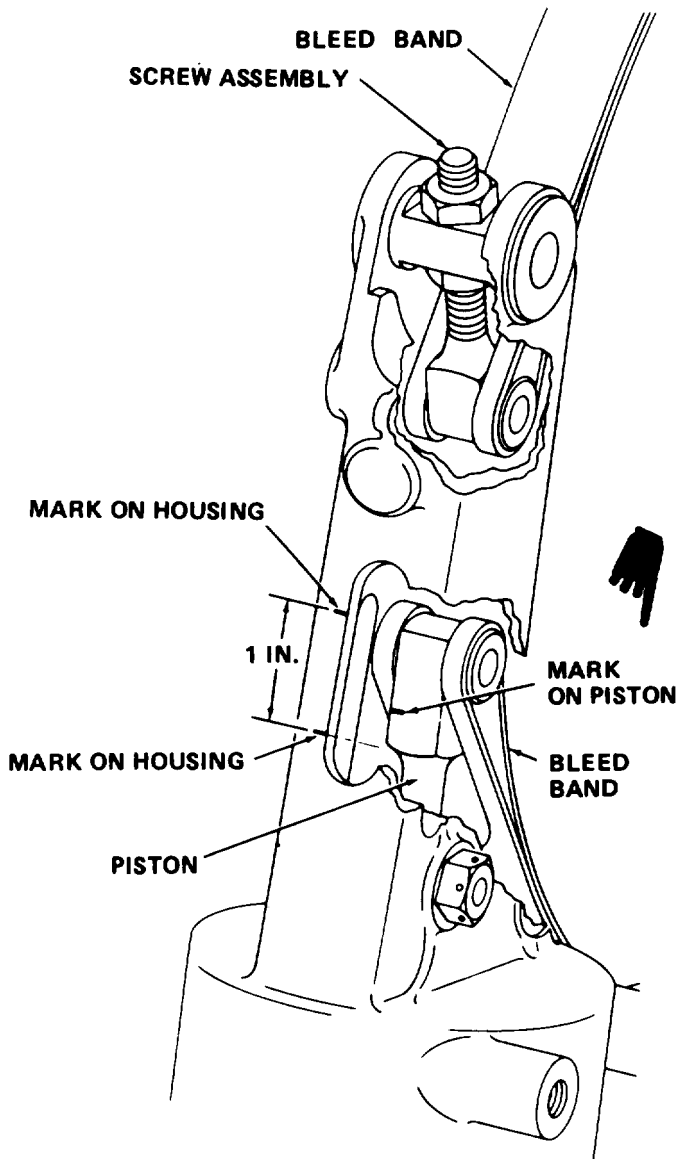
LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED BAND ASSEMBLY/-  
 Continued

1. Bleed Band

2. Hose Assembly Connectors

3. Pivoting Shaft



**Determine** horizontal centerline of bleed band pin in piston rod and **mark** this centerline on actuator housing. **Place** another mark on housing exactly one inch above the first mark.

**Disconnect** hose assembly connectors from union (6) and reducer (7) on the actuator.

**Cut** lockwire that secures nuts on either side of pivoting shaft at bottom of rod end (3). **Back off** nut (1) to end of threads.

At least one thread shall show beyond nut at all times.

2-63. Interstage Bleed Bands - Adjustment - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE BLEED  
BAND ASSEMBLY/ -  
Continued

**WARNING**

Use approved personnel protective equipment to protect eyes and face when using compressed air. Maximum allowable air pressure for cleaning operations is 30 psi. Do not direct air stream toward yourself or toward another person.

4. Piston

**Apply** 60 psig regulated air pressure to reducer (7) to actuate piston (4) to full travel. This is accomplished by using a finger to close off union on interstate bleed actuator assembly (6).

**NOTE**

A travel of less than 1.0 inch or more than 1.2 inches is unacceptable.

5. Bleed Band

**Tighten** nut (2) until bleed band is snug against compressor housing.

**NOTE**

The bleed band is positioned properly when torque on nut increases.

After releasing finger from union in following action for item 6, actuator should open. Opening will be indicated by drop of rod assembly.

6. Bleed Band

**Release** finger from union and **tighten** nut (1). Reapply pressure.

2-63. Interstage Bleed Bands - Adjustment - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>INTERSTAGE BLEED BAND ASSEMBLY/ - Continued</p> <p>7. Band Assembly or Actuator Assembly</p>		<p>If rod travel is less than 1.0 inch, <b>replace</b> whichever assembly is required and <b>repeat</b> preceding actions for items 1 thru 5.</p>
<p>8. Bleed Band</p>		<p><b>Continue</b> to tighten nut (2) until within limits, if rod travel is more than 1.2 inches.</p>
<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;"><b>WARNING</b></div>		
<p><b>Use approved personnel protective equipment to protect eyes and face when using compressed air. Maximum allowable air pressure for cleaning operations is 30 psi. Do not direct air stream toward yourself or toward another person.</b></p>		
<p>9. Bleed Band</p>		<p><b>Close</b> using 60 psig regulated air pressure. Using 0.002 inch feeler gage, <b>check</b> clearance between compressor housing and bleed band.</p>
<p><b>NOTE</b></p>		
<p>Clearance between bleed band and compressor housing at 60 psig air pressure must not exceed a 0.002 drag fit. This requirement applies in all accessible bleed port areas.</p>		
<p>10. Bleed Band</p>		<p><b>Adjust</b> nuts (1 and 2) to obtain required clearance by either of the following methods:</p> <p>a. <b>Tighten</b> band by loosening nut (1) and <b>tighten</b> nut (2).</p>

**2-63. Interstage Bleed Bands - Adjustment - Continued**

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE BLEED BAND ASSEMBLY/ - Continued		
11. Bleed Band	When proper clearance has been established, perform this action.	b. <b>Loosen</b> band by loosening nut (2) and <b>tighten</b> nut (1). <b>Tighten</b> locknut. <b>Lock-wire</b> both nuts together.
12. Air Pressure Supply		<b>Disconnect</b> from union on airbleed valve or from reducer on the actuator. <b>Connect</b> each airbleed hose assembly connector to its respective union or reducer.
13. Bleed Band	Refer to paragraph 2-62.	<b>Perform</b> closure check.

**2-64. Interstage Bleed Actuator Assembly (T53-L-11 Series Engines) - Functional Test**

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**Test Equipment**  
Test Fixture (LTCT10440)  
Test Stand (LTCT421)

LOCATION/ITEM	REMARKS	ACTION
ACTUATOR ASSEMBLY/		
1. Interstage Bleed Actuator Assembly	Use test fixture (LTCT10440) and test stand (LTCT421).	<b>Place</b> test fixture on test stand .

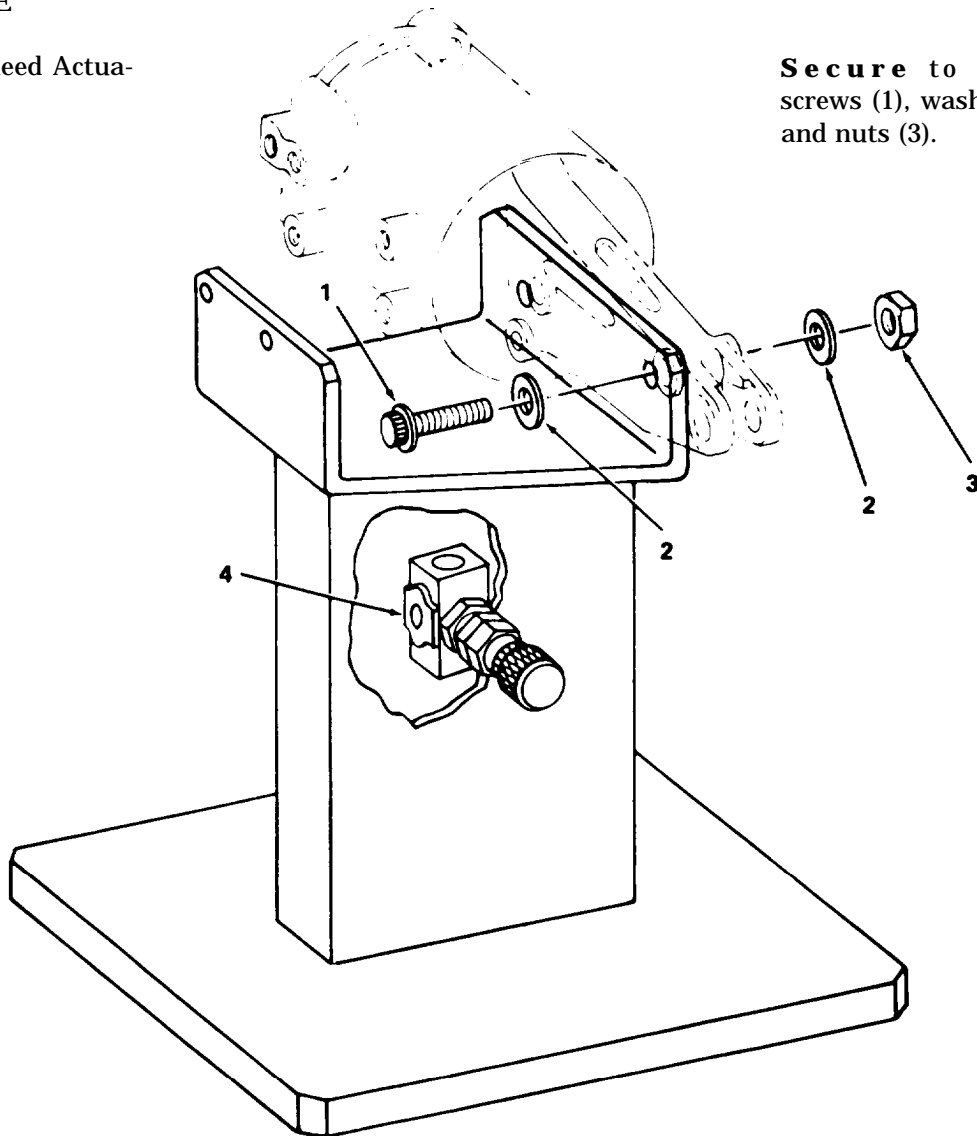
2-64. Interstage Bleed Actuator Assembly (T53-L-11 Series Engines) - Functional Test - Continued

LOCATION/ITEM	REMARKS	ACTION
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AIRBLEED ACTUATOR  
TEST FIXTURE

2. Interstage Bleed Actuator Assembly

**Secure** to test fixture with screws (1), washers (2), and nuts (3).



3. No. 6 Hose

Hose is 3/8 inch in diameter. Use tee AN824-6.

**Connect** to L-2 OUTLET on test stand. **Install** tee in other end of hose.

4. Actuator Inlet Reducer

Use No. 6 hose 3/8 inch in diameter.

**Connect** No. 6 hose from one leg of tee to actuator inlet reducer.

2-64. Interstate Bleed Actuator Assembly (T53-L-11 Series Engines) - Functional Test - Continued

LOCATION/ITEM	REMARKS	ACTION
AIRBLEED ACTUATOR TEST FIXTURE/ - Continued		
5. L-2 GAGE Port	Use reducer AN919-6 and No. 4 hose ( 1/4 inch in diameter).	<b>Install</b> reducer in remaining leg of tee. <b>Connect</b> No. 4 hose from reducer to L-2 GAGE port on test stand.
6. Vernier Control Valve (4)	Use tee AN825-4.	<b>Connect</b> tee.
7. Actuator Union	Use No. 4 hose (1/4-inch diameter).	<b>Connect</b> hose from one leg of the tee to actuator union.
8. L-4 Gage Port	Use No. 4 hose (1/4-inch diameter).	<b>Connect</b> hose from other leg of tee to L-4 GAGE and test stand.
9. Vernier Control Valve		<b>Close.</b>
10. L-2 (Supply Pressure) and L-4 (PSIG) (Signal Pressure) Indicator Shut-off Valves		<b>Close.</b>
11. L-2 Selector Valve		<b>Position</b> to PRESSURE.
12. L-2 PRESSURE CONTROL Regulator Valve		<b>Open</b> until L-2 GAGE and L-4 GAGE indicate pressures of 50 inches to 70 inches Hg absolute (10 psig to 20 psig).
13. Vernier Control Valve	Piston should move to the extended or closed position when vernier control valve is closed, and move to the retracted or open position when valve is open. When no pressure is applied, piston should be in the open position.	<b>Open</b> and <b>close</b> several times. <b>Observe</b> actuator piston.
14. Vernier Control Valve	Perform this action if sticking or erratic action occurs during action for item 13.	<b>Stop</b> test. <b>Disassemble</b> unit. <b>Replace</b> defective parts.

2-64. Interstate Bleed Actuator Assembly(T53-L-11 Series Engines) - Functional Test - Continued

LOCATION/ITEM	REMARKS	ACTION
AIRBLEED ACTUATOR TEST FIXTURE/ - Continued		
15. L-2 Gage Pressure		<b>Build</b> pressure to 150 inches Hg absolute (60 psig).
16. Vernier Control Valve	Observe pressure as indicated on L-4 GAGE to insure that it is not less than 147 inches Hg absolute (58.8 psig).	<b>Close. Maintain</b> pressure acquired in preceding action for item 15, for three minutes.
17. Interstage Bleed Actuator Assembly		<b>Check</b> for leaks.
18. Interstage Bleed Actuator Assembly	Leakage is determined by pressure indication on L-2 GAGE. If gage indicates less than 147 inches Hg absolute (58.8 psig) actuator is leaking. If leakage is indicated during action for item 17, perform this action.	<b>Replace</b> defective parts as necessary to stop leakage.
19. Vernier Control Valve	Perform this action with the L-2 pressure at 150 inches Hg absolute (60 psig).	<b>Open</b> until piston retracts. Record L-4 and L-2 GAGE readings. <b>Check</b> readings against curves shown in following figure.

**NOTE**

L-2 gage readings are plotted along bottom of figure in item 19 and are projected up. L-4 readings are plotted along vertical scale and projected across. The intersection of projected points must fall between the lines marked OPEN and CLOSE. The OPEN and CLOSE on chart refer to opening and closing of actuator piston.

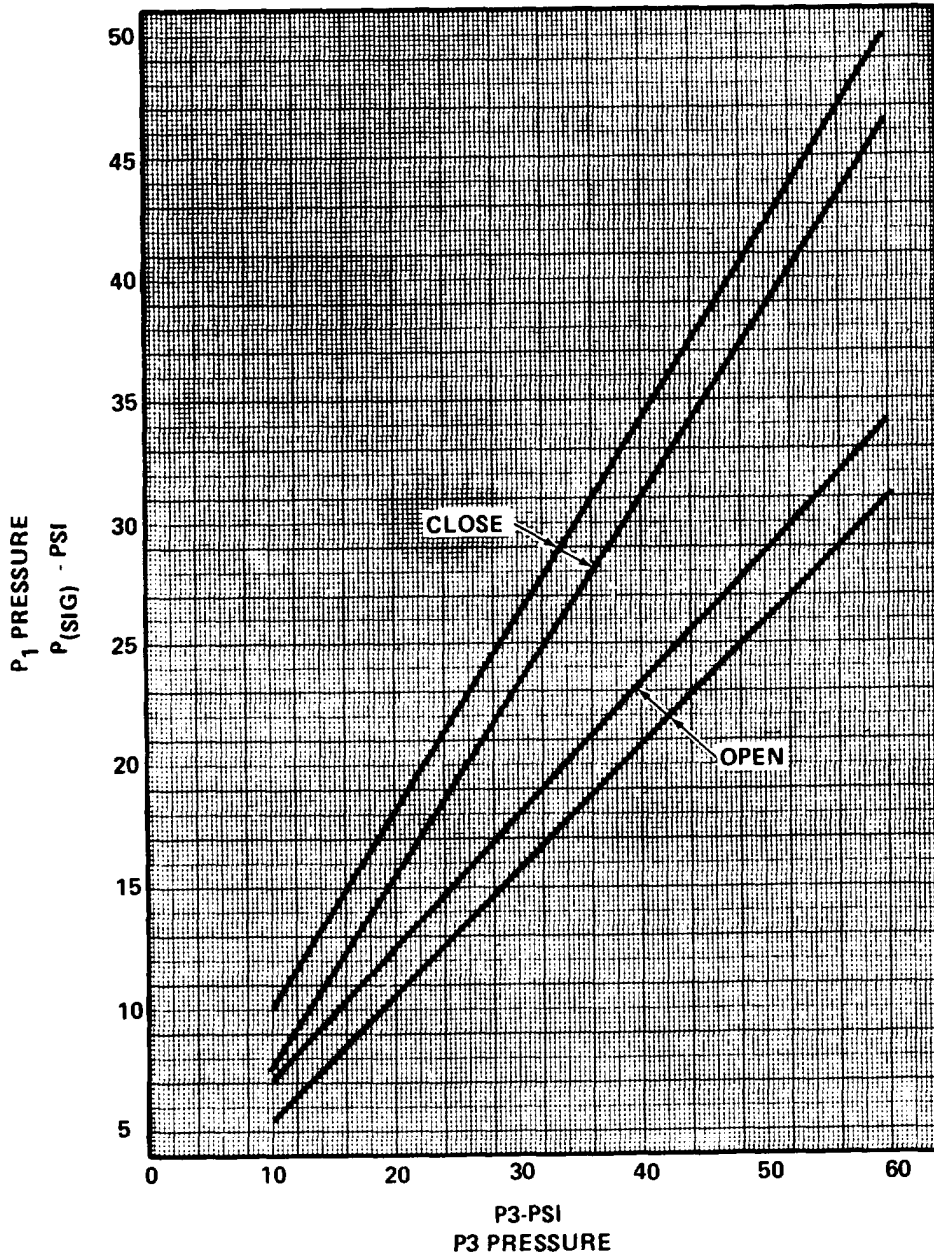
To convert inches of mercury (absolute) to the pounds per square inch (gage) pressure shown in figure in item 19, multiply by 0.491 and subtract atmospheric pressure in psi (absolute) from the results.

2-64. Interstage Bleed Actuator Assembly (T53-L-11 Series Engines) - Functional Test - Continued

LOCATION/ITEM	REMARKS	ACTION
AIRBLEED ACTUATOR TEST FIXTURE/ - Continued		

EXAMPLE:

When calibrating the closing action of the piston, the intersection of the projected points must fall between the CLOSE lines on the chart.





**2-64. Interstage Bleed Actuator Assembly (T53-L-11 Series Engines) - Functional Test - Continued**

LOCATION/ITEM	REMARKS	ACTION
AIRBLEED ACTUATOR TEST FIXTURE/ - Continued		
20. Vernier Control Valve	Use L-2 pressure of 90 inches Hg absolute (30 psig).	<b>Repeat</b> preceding action for item 19.
21. Interstage Bleed Actuator Assembly		<b>Repair</b> or <b>replace</b> , if limits cannot be met.

**2-65. Interstage Bleed Actuator Assembly (T53-L-13B/703 Engines) - Functional Test**

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

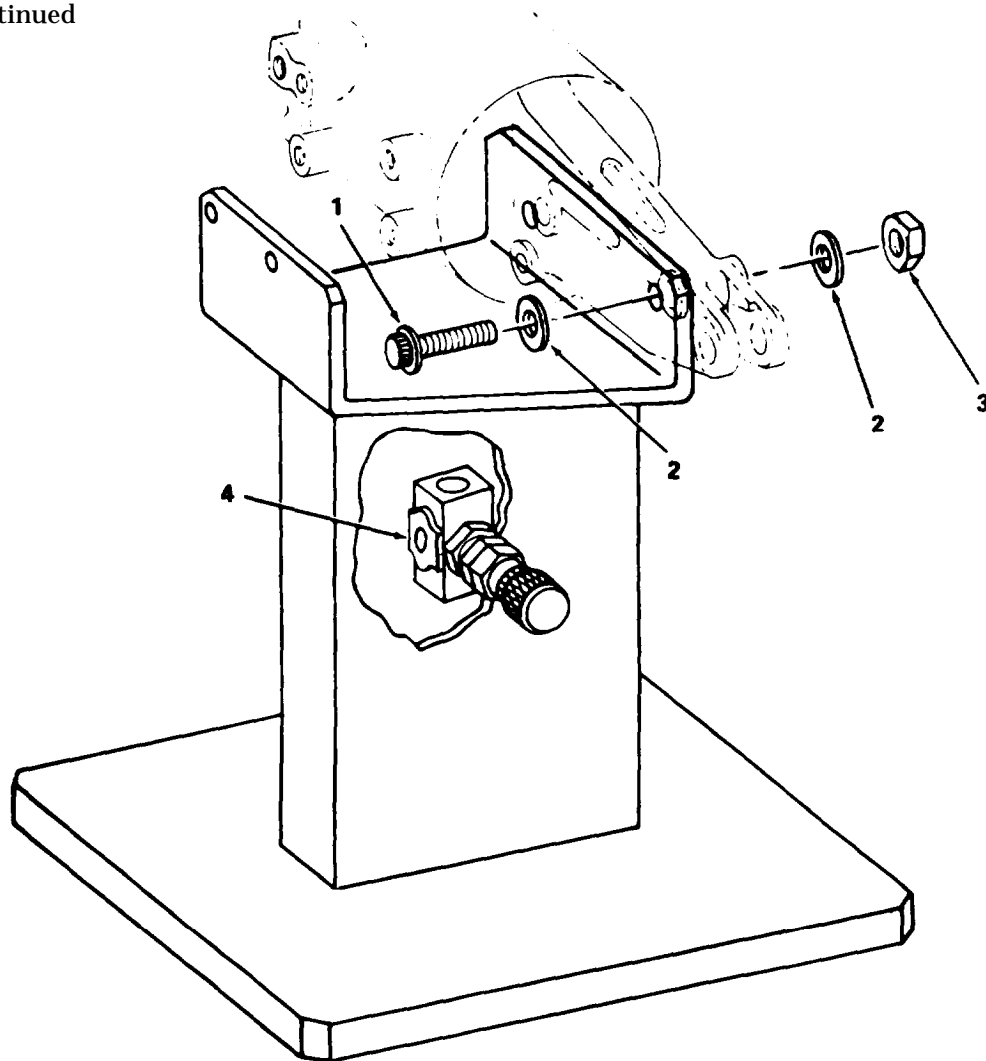
**Test Equipment**  
Test Fixture (LTCT10440)  
Test Stand (LTCT421)

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/		
1. Interstage Bleed Actuator Assembly	Use airbleed actuator test fixture (LTCT 10440) and compressor bleed valve test stand (LTCT421).	<b>Place</b> airbleed actuator test fixture on compressor bleed valve test stand.
TEST FIXTURE/		
2. Interstage Bleed Actuator Assembly	Use test fixture (LTCT10440).	<b>Secure</b> to test fixture with screws (1), washer (2), and nuts (3).

2-65. Interstate Bleed Actuator Assembly (T53-L-13B/703 Engines) - Functional Test - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR HOUSING/ - Continued



3. Test Stand	Use test stand (LTCT421 ). Use No. 6 hose (3/8-inch diameter).	<b>Connect</b> hose to L-2 OUT-LET on test stand. <b>Install</b> tee, AN824-6, in opposite end of hose.
4. Actuator Inlet Reducer	Use No. 6 hose (3/8-inch diameter).	<b>Connect</b> hose from one leg of tee to actuator inlet reducer.
5. Reducer	Use reducer, AN919-6. Use No. 4 hose (1/4-inch diameter).	<b>Install</b> in remaining leg of tee. <b>Connect</b> hose from reducer to L-2 GAGE port on test stand.

2-65. Interstage Bleed Actuator Assembly (T53-L-13B/703 Engines) - Functional Test - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/ - Continued		
6. Vernier Control Valve (4)	Use tee AN925-4.	<b>Connect</b> tee to vernier control valve.
7. No. 4 Hose	Use No. 4 hose (1/4-inch diameter).	<b>Connect</b> from one leg of tee to union.
8. L-4 GAGE Port	Use No. 4 hose (1/4-inch diameter).	<b>Connect</b> hose from opposite leg of tee to L-4 GAGE port on test stand.
9. Vernier Control Valve		<b>Close.</b>
10. L-4 (PSIG) (Signal Pressure) and L-2 (Supply Pressure ) Indicator Shutoff Valves		<b>Close.</b>
11. Test Stand		<b>Turn on.</b>
12. L-2 Selector Valve		<b>Turn to PRESSURE.</b>
13. L-2 PRESSURE CONTROL Regulator Valve		<b>Open</b> until L-4 gage and L-2 gage indicate pressure of 50 inch to 70 inch Hg absolute pressure (10 psig to 20 psig).
14. Vernier Control Valve	Piston should move to the extended position when vernier control valve is closed and move to the retracted or open position when the valve is open.	<b>Open</b> and <b>close</b> several times, <b>Observe</b> actuator piston.
15. Vernier Control Valve	This action applies only if sticking or erratic action occurs when performing preceding action for item 14.	<b>Stop</b> test, <b>Disassemble</b> unit. <b>Replace</b> defective part.

2-65. Interstage Bleed Actuator Assembly (T53-L-13B/703 Engines) - Functional Test - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR HOUSING/ - Continued		
16. Vernier Control Valve		<b>Build</b> L-2 gage pressure to 150 inches Hg absolute (60 psig). <b>Close</b> vernier control valve. <b>Maintain</b> this pressure for 3 minutes. <b>Observe</b> that pressure, as indicated on L-4 gage, is not less than 147 inches Hg absolute (58.8 psig).
17. Interstate Bleed Actuator Assembly	Leakage is determined by pressure indication of L-4 gage. If gage indicates less than 147 inches Hg absolute (58.8 psig) actuator is leaking. Perform this action if leakage is indicated.	<b>Check</b> for leaks. <b>Replace</b> defective parts as necessary to stop leakage.
18. Vernier Control Valve	Perform this action while maintaining L-2 pressure at 90 inches Hg absolute (30 psig).	<b>Open</b> until piston retracts. <b>Record</b> L-2 and L-4 gage readings.
<b>NOTE</b>		
Vernier opening on test fixture (LTCT 10440) must be within 0.010 inch to 0.014 inch (0.25 mm to 0.36 mm).		
19. Vernier Control Valve	Perform this action while maintaining L-2 pressure at 90 inches Hg absolute (30 psig). Closing pressure must exceed opening pressure by no less than 1.0 psig.	<b>Close</b> until piston extends. <b>Record</b> L-2 and L-4 gage readings.
<b>NOTE</b>		
To convert inches of mercury (absolute) to the pounds per square inch (gage), multiply inches of mercury by 0.491, and subtract atmospheric pressure, in psi (absolute) from the result.		
20. Interstage Bleed Actuator Assembly		<b>Repair</b> or <b>replace</b> if limits cannot be met.

2-66. Interstate Bleed Actuator Hose Assembly - Removal

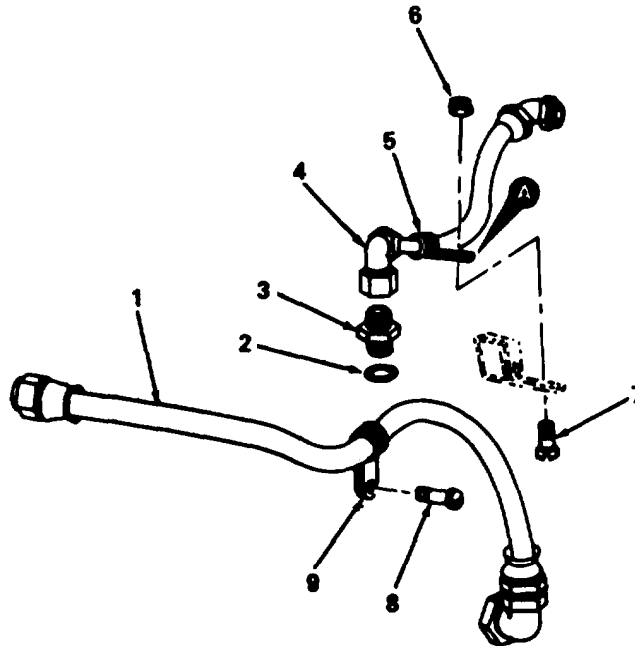
INITIAL SETUP

**Applicable Configuration**  
All

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE AIR-BLEED ACTUATOR/

1. Actuator Hose Assembly

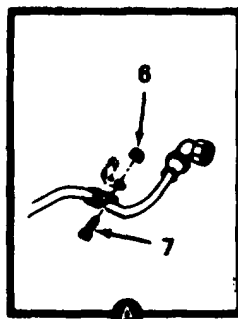


**Remove** screw (8) that secures clamp (9) to actuator housing assembly.

2. Hose Assembly (1)

**Disconnect** from diffuser housing and interstage bleed assembly. **Remove** hose assembly. **Cap** all open ports,

3. Compressor Housing



**Remove** screw (7) and nut (6) that secure clamp (5) to bracket on bottom rear flange of compressor housing.

4. Hose Assembly (4)

**Disconnect** from fuel control and interstage bleed actuator assembly. **Remove** hose assembly. **Cap** all open ports.

T53-L-11 SERIES ENGINE

5. Actuator Assembly

**Remove** union (3) and packing (2).

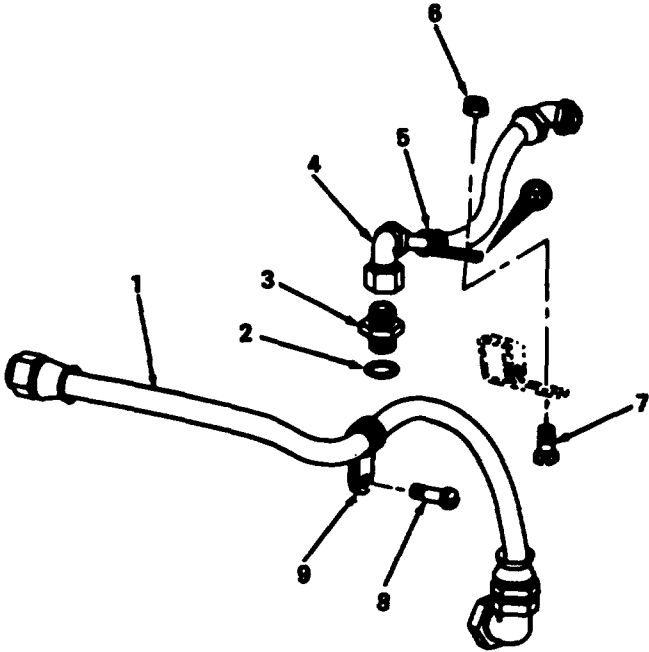
**2-67. Interstage Bleed Actuator Hose Assembly - Inspection**

INITIAL SETUP

Applicable Configuration All	References Para H-21 and 7-5	
LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE AIR-BLEED ACTUATOR/  1. Interstate Bleed Actuator Hose Assembly	Refer to paragraph H-21 for inspection and paragraph 7-5 for repair.	<b>Inspect. Repair</b> damaged hose assemblies.

**2-68. Interstage Bleed Actuator Hose Assembly - Installation**

INITIAL SETUP

Applicable Configuration All		
LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE AIR-BLEED ACTUATOR/  1. Actuator Assembly		<b>Install</b> union (8) and packing (2) into actuator assembly and <b>tighten.</b>

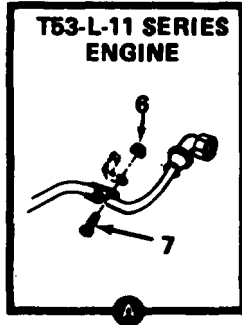
2-68. Interstage Bleed Actuator Hose Assembly - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
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INTERSTAGE AIR BLEED ACTUATOR/ - Continued

2. Hose Assembly (4)

Prior to installation, insure that chafing sleeve is installed and positioned to prevent rubbing against nearby hoses and area of contact with aircraft generator. Refer to table below.



Chafing Sleeve Specifications

Hose Size	Spiral Constant	Chafing Sleeve
-3	1.2	94835-1
-4	1.5	
-5	1.8	
-6	2.1	
-8	1.7	94835-2
-10	2.0	
-12	2.4	
-16	2.4	94835-3
-20	2.9	
-24	3.6	

EXAMPLE: To determine the proper length of spiral sleeve required to cover a 6 inch length of -5 hose, multiply the hose length (6 inches) by the spiral constant (1.8). The sleeve length is the product of these two (6 x 1.8 = 10 inches) using the 94835-1 sleeve.

3. Bracket

**Secure** clamp (5) to bracket on bottom rear flange of compressor housing with screw (7) and nuts (6).

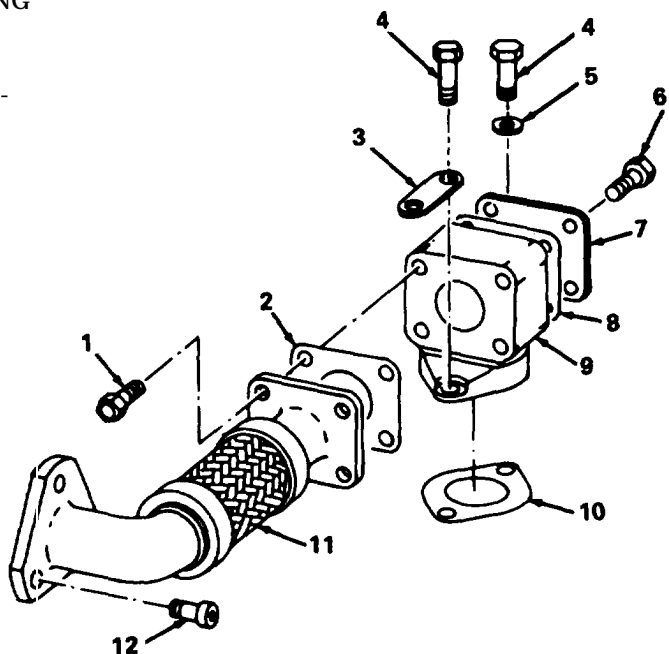
2-68. Interstate Bleed Actuator Hose Assembly - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
INTERSTAGE AIR-BLEED ACTUATOR/ - Continued		
4. Hose Assembly (1)		<b>Connect</b> hose assembly (1) to diffuser housing and interstage bleed actuator assembly. <b>Tighten</b> hose connectors.
5. Interstage Bleed Actuator Assembly		<b>Secure</b> clamp (9) to interstate bleed actuator assembly with screw (8).

2-69. Airbleed Connecting Manifold and Adapter (T53-L-11 Series Engines) - Removal

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES/		
1. Airbleed Connecting Manifold (11)		<b>Remove</b> bolts (12) that secure the airbleed connecting manifold (11) to the diffuser housing.



**2-69. Airbleed Connecting Manifold and Adapter (T53-L-11 Series Engines) - Removal - Continued**

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES/ - Continued		
2. Connecting Manifold (11)		<b>Remove</b> bolts (1) that secure the airbleed connecting manifold (11) to adapter assembly (9), <b>Remove</b> the connecting manifold and gasket (2).
3. Adapter Assembly		<b>Remove</b> bolts (4), bracket (3), and washer (5) that secure adapter assembly to the impeller housing. <b>Remove</b> the adapter and gasket (10).
4. Airbleed Connecting Manifold and Adapter		<b>Remove</b> bolts (6), gaskets (8), and cover (7).

**2-70. Elbow, Tube, and Bleed Air Adapter Assembly (T53-L-13B Engine) - Removal**

INITIAL SETUP

**Applicable Configuration**

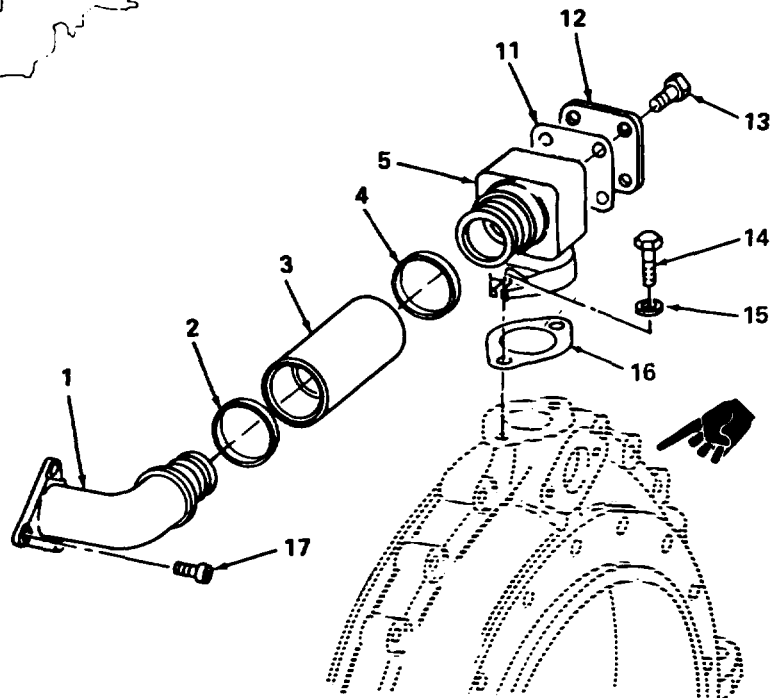
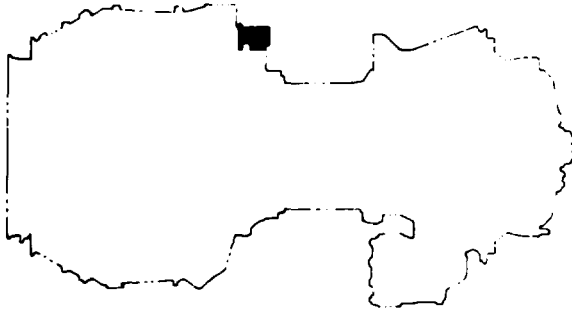
T53-L-13B with Magnesium  
 Impeller Housing Assembly

LOCATION/ITEM	REMARKS	ACTION
IMPELLER HOUSING/		
1. Diffuser Housing		<b>Remove</b> bolts (17) that secure airbleed adapter elbow (1) to diffuser housing.

2-70. Elbow, Tuba, and Bleed Air Adapter Assembly (T53-L-13B Engine) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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IMPELLER HOUSING/ -  
Continued



2. Bleed Air Adapter Assembly

Using **twisting** motion, **remove** elbow (1) and air-bleed crossover tube (3) from bleed air adapter assembly (5). **Separate** elbow and tube (3) and **remove** gasket ring (2) from elbow.

3. Adapter Assembly

**Remove** gasket ring (4) from flange of adapter assembly.

2-70. Elbow, Tube, and Bleed Air Adapter Assembly (T53-L-13B Engine) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
IMPELLER HOUSING/ - Continued		
4. Bleed Air Adapter Assembly		<b>Remove</b> bolts (14) and washers (15) that secure bleed air adapter assembly (5) to impeller housing.
5. Deleted		
6. Adapter Assembly and Gasket (16)		<b>Remove</b> adapter assembly (5) and gasket (16) from impeller housing.
7. Bleed Air Adapter Assembly	When required, perform this action.	<b>Remove</b> bolts (13), cover (12) and gasket (11).

2-70.1. Elbow, Tube, and Bleed Air Adapter Assembly (T53-L-13B/703 Engines) - Removal

INITIAL SETUP

**Applicable Configuration**

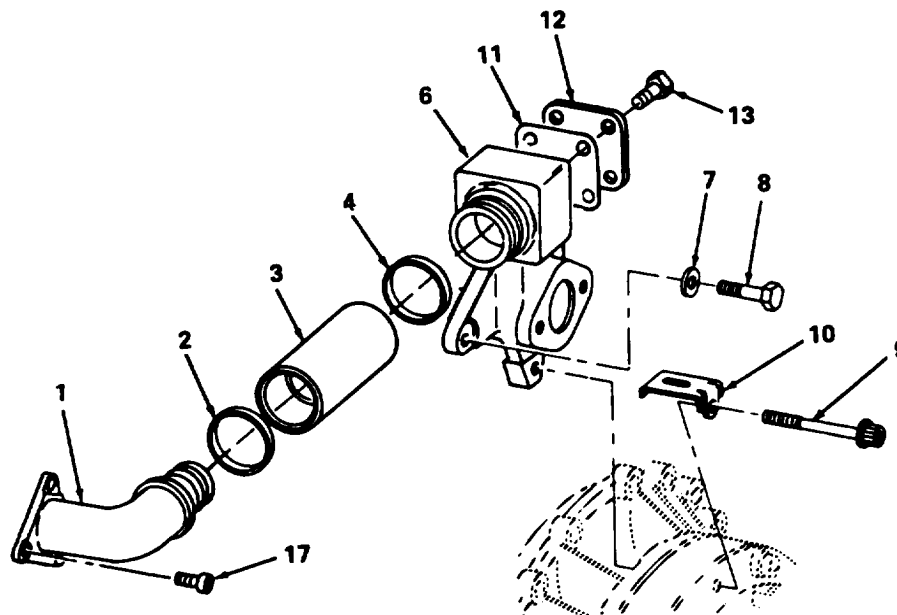
T53-L-13B/703 Engines with Stainless Steel Impeller Housing Assembly

LOCATION/ITEM	REMARKS	ACTION
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IMPELLER HOUSING/

1. Diffuser Housing

**Remove** bolts (17) that secure airbleed adapter elbow (1) to diffuser housing.



2. Bleed Air Adapter Assembly

Using **twisting** motion, **remove** elbow (1) and air-bleed crossover tube (3) from bleed air adapter assembly (6). **Separate** elbow, and tube (3) and **remove** gasket ring (2) from elbow.

3. Adapter Assembly

**Remove** gasket ring (4) from flange of adapter assembly.

2-70.1. Elbow, Tube, and Bleed Air Adapter Assembly (T53-L-13B/703 Engines) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
IMPELLER HOUSING/ - Continued		
4. Bleed Air Adapter Assembly		<b>Remove</b> bolts (8 and 9), washers (7) and clip (10) that secure bleed air adapter assembly (6) to air diffuser and compressor housing assembly.
5. Adapter Assembly		<b>Remove</b> adapter assembly (6) from impeller housing and compressor housing assembly.
6. Bleed Air Adapter Assembly	When required, perform this action.	<b>Remove</b> bolts (13), cover (12) and gasket (11).

2-71. Airbleed Connecting Manifold and Adapter (T53-L-11 Series Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**References**  
Para 2-69

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES/		
1. Air Bleed Connect- ing Manifold and Adapter	See figure in paragraph 2-69.	<b>Inspect</b> wire braid for cracks, warping, and fraying.
2. Air Bleed Connect- ing Manifold and Adapter		<b>Replace</b> damaged parts.

2-72. Elbow, Tube, and Bleed-Air Adapter Assembly (T53-L-13B/703 Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**References**  
Para H-29

LOCATION/ITEM	REMARKS	ACTION
IMPELLER HOUSING/	<div style="border: 2px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"><b>WARNING</b></div> <p>All repair of damaged threads and corrosion maintenance and repair will be in accordance with Nuclear Regulatory Commission source material license number "STB-1433" issued to AVSCOM.</p> <p>The following part number contains Magnesium Thorium (MG-TH), a radioactive material:</p> <p style="text-align: center;"><b>1-170-220-01 Adapter Assembly</b></p>	
1. Elbow, Tube, and Bleed-Air Adapter Assembly	See figure in paragraph H-29.	<b>Inspect. Replace</b> damaged parts.
2. Adapter Assembly	Refer to paragraph H-29 for replacement of screw thread inserts.	<b>Inspect</b> for stripped and/or damaged threads. <b>Replace</b> screw thread inserts.



2-73. Airbleed Connecting Manifold and Adapter (T53-L-11 Series Engines) - Installation

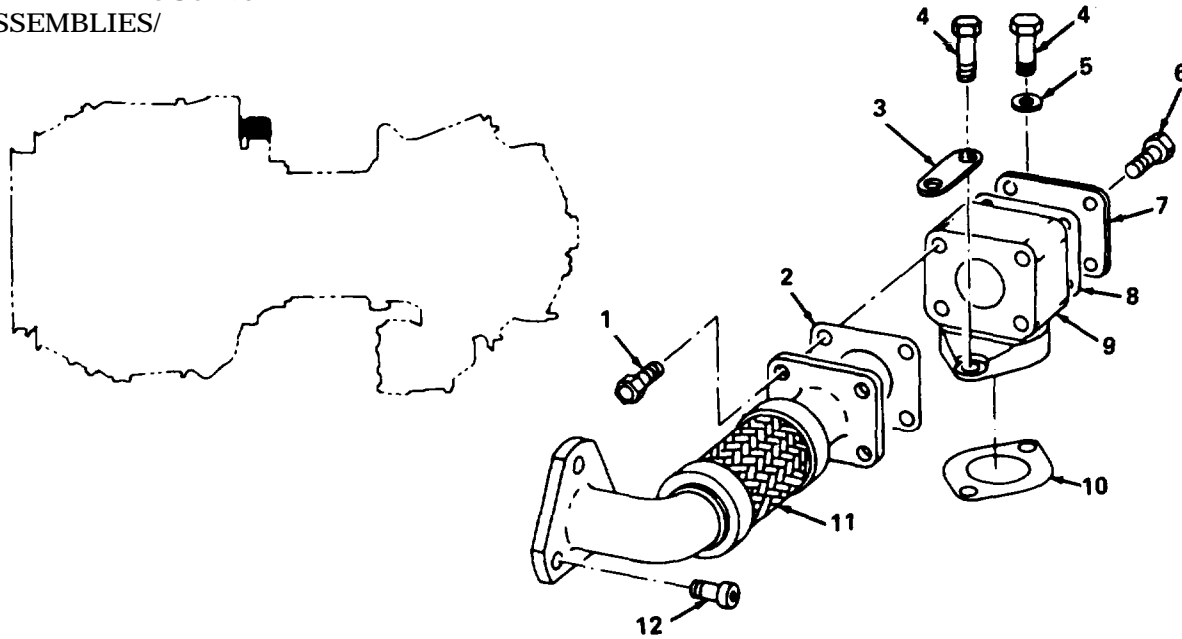
INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**Consumable Materials**  
Lockwire (item 41, 42, or 43, Appendix D)  
Antiseize thread compound (item 58, Appendix D)

LOCATION/ITEM	REMARKS	ACTION
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COMPRESSOR AND  
IMPELLER HOUSING  
ASSEMBLIES/



1. Adapter Assembly (9)

**Place** gasket (8) and cover (7) on adapter assembly (9).

2. Adapter Assembly (9)

**Insert** bolt (6) and **tighten**.



2-73. Airbleed Connecting Manifold and Adapter (T53-L-11 Series Engines) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES/ - Continued		
3. Centrifugal Impeller Assembly		<b>Place</b> gasket (10) on mounting pad of centrifugal impeller assembly.
4. Adapter Assembly (9)		<b>Place</b> adapter assembly (9) on gasket (10).
5. Bracket (3), Washers (5), and Bolts (4)	When installing brackets, position ignition lead bracket and clamp under right-hand mounting bolt (4) of the adapter.	<b>Place</b> bracket (3) and washers (5) in position. <b>Insert</b> bolts (4). <b>Tighten</b> and <b>lockwire</b> bolts (4).
6. Airbleed Connecting Manifold (11)		<b>Place</b> gasket (2) on adapter. <b>Insert</b> bolts (1) through flange of airbleed connecting manifold (11) and into adapter. <b>Tighten</b> and <b>lockwire</b> bolts.
7. Airbleed Manifold		<p>a. <b>Coat</b> threads of bolts (12) with anti-seize thread compound (item 58, Appendix D).</p> <p>b. <b>Insert</b> bolts (12) through triangular flange of airbleed manifold. <b>Tighten</b> and <b>lockwire</b> bolts.</p>

2-74. Elbow, Tube, and Bleed Air Adapter Assembly (T53-L-136 Engine) - Installation

INITIAL SETUP

**Applicable Configuration**

T53-L-13B Engines with Magnesium Impeller Housing Assembly

**Consumable Materials**

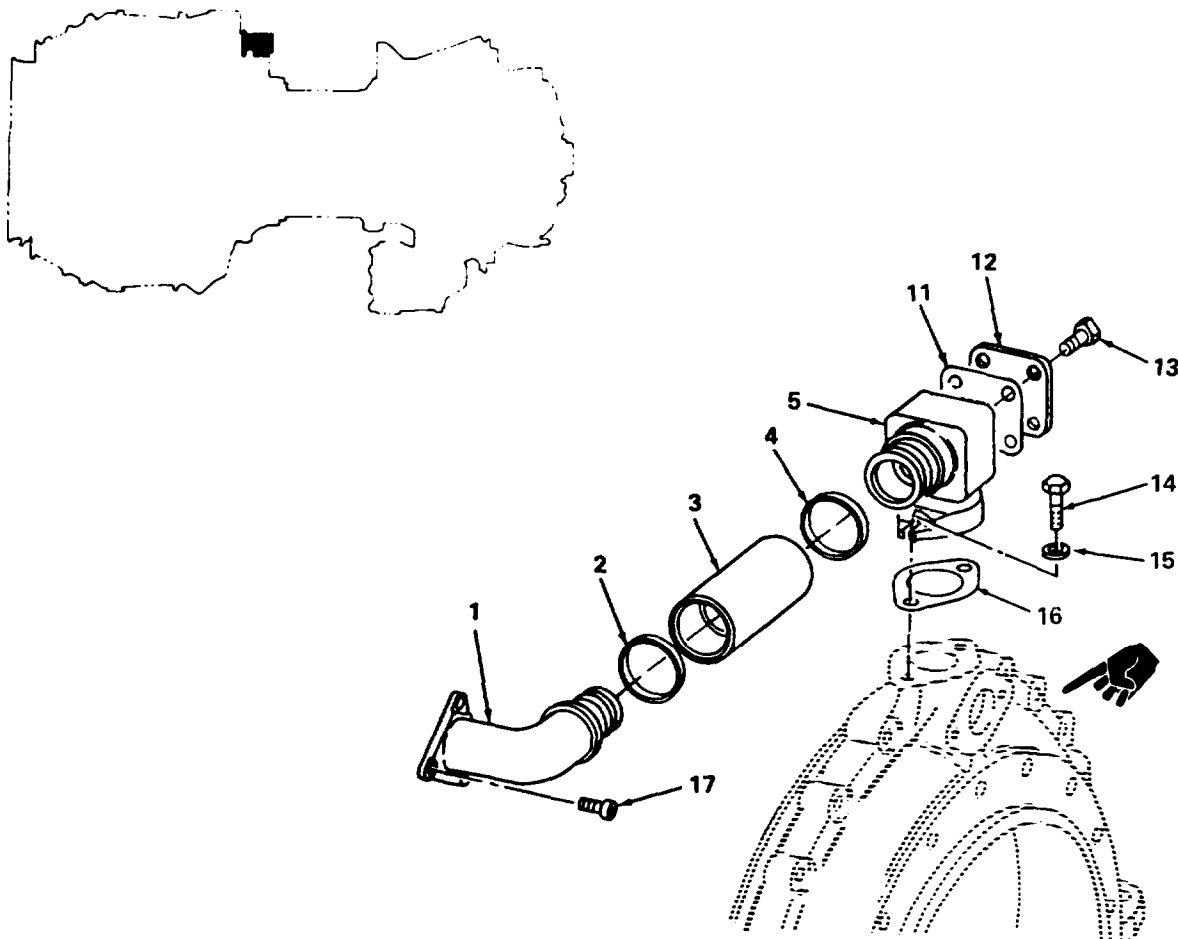
Lockwire (item 41, 42, or 43, Appendix D)  
Antiseize thread compound (item 58, Appendix D)

LOCATION/ITEM	REMARKS	ACTION
IMPELLER HOUSING/		
1. Bleed Air Adapter Assembly (5).		<b>Place</b> gasket (11) and cover (12) on bleed air adapter assembly (5). <b>Secure</b> with bolts (13).

2-74. Elbow, Tube, and Bleed Air Adapter Assembly (T53-L-13B Engine) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
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IMPELLER HOUSING/ -  
Continued



**NOTE**

When installing bleed air adapter assembly (5), position flange port toward right side of engine.

2. Adapter Assembly (5)

**Position** gasket (16) and adapter assembly on impeller housing. **Secure** with bolts (14) and washers (15).

2-74. Elbow, Tube, and Bleed Air Adapter Assembly (T53-L-13B Engine) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
IMPELLER HOUSING/ - Continued		
3. Deleted		
4. Adapter Assembly		<b>Position</b> gasket ring (4) on flanged port of adapter assembly.
5. Airbleed Adapter Elbow (1) and Airbleed Crossover Tube (3)		<b>Position</b> gasket ring (2) on flange of airbleed adapter elbow (1). <b>Slide</b> airbleed crossover tube (3) over elbow.
6. Airbleed Crossover Tube (3)		<b>Slide</b> airbleed crossover tube (3) over flanged port of bleed air adapter assembly (5) and <b>position</b> flange of airbleed adapter.
7. Elbow		<p>a. <b>Coat</b> threads of bolts (17) with antiseize thread compound (item 58, Appendix D).</p> <p>b. <b>Secure</b> elbow with bolts (17). <b>Tighten</b> bolts as required and <b>lockwire</b>.</p>

2-74.1 Elbow, Tube, and Bleed Air Adapter Assembly (153-L-13 B/703 Engines) - Installation

INITIAL SETUP

**Applicable Configuration**

T53-L-136/703 Engines with Stainless Steel Impeller Housing Assembly

**Consumable Materials**

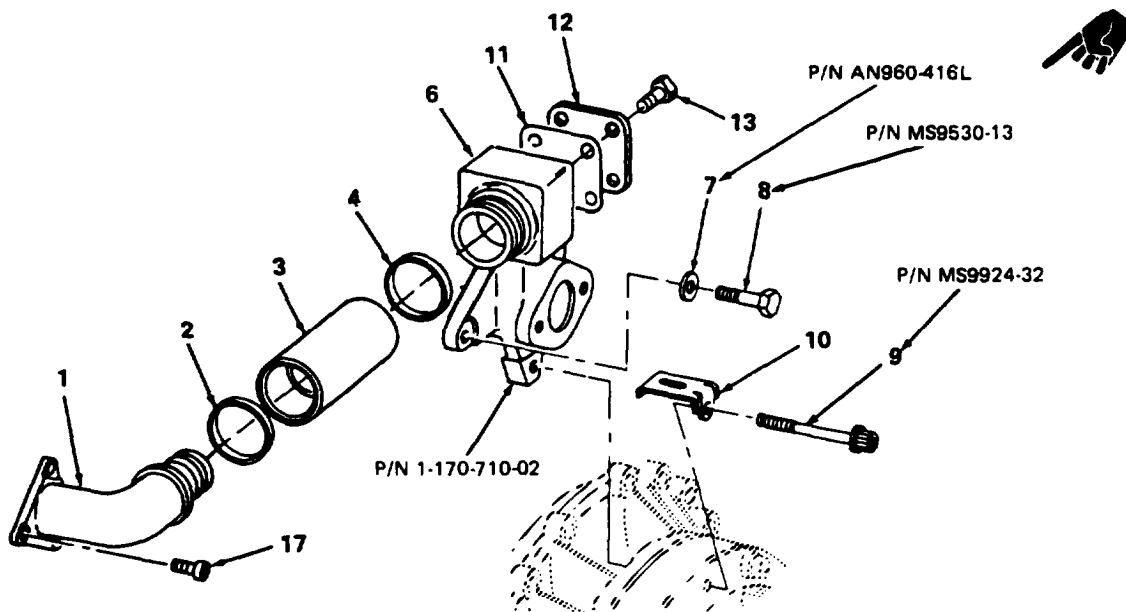
Lockwire (Item 41,42, or 43, Appendix D)  
Antiseize thread compound (item 58, Appendix D)

LOCATION/ITEM	REMARKS	ACTION
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IMPELLER HOUSING/

1. Bleed Air Adapter Assembly (6)

**Place** gasket (11) and cover (12) on bleed air adapter assembly (6).  
**Secure** with bolts (13).



2. Adapter Assembly (6)

**Position** adapter assembly (6) on compressor housing assemblies and **secure** with bolts (8 and 9), washers (7) and clip (10).

3. Adapter Assembly

**Position** gasket ring (4) on flanged port of adapter assembly.

2-74.1. Elbow, Tube, and Bleed Air Adapter Assembly (T53-L-13B/703 Engines) - Installation -  
Continued

LOCATION/ITEM	REMARKS	ACTION
IMPELLER HOUSING/ - Continued		
4. Airbleed Adapter El- bow (1) and Airbleed Crossover Tube (3)		<b>Position</b> gasket ring (2) on flange of airbleed adapter elbow (1). <b>Slide</b> airbleed crossover tube (3) over elbow.
5. Airbleed Crossover Tube (3)		<b>Slide</b> airbleed crossover tube (3) over flanged port of bleed air adapter as- sembly (6) and <b>position</b> flange of airbleed adapter.
6. Elbow		<p>a. <b>Coat</b> threads of bolts (17) with antiseize thread compound (item 58, Ap- pendix D).</p> <p>b. <b>Secure</b> elbow with bolts (17). <b>Tighten</b> bolts as re- quired and <b>lockwire</b>.</p>

2-75. Rear Compressor Bearing Oil Seal Retainer, Aft Seal, Rear Bearing Housing Assembly, Roller  
Bearing, Forward Oil Ring, and Forward Seal (T53-L-13B/703 Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**References**  
Para H-26, 1-82, and 2-76

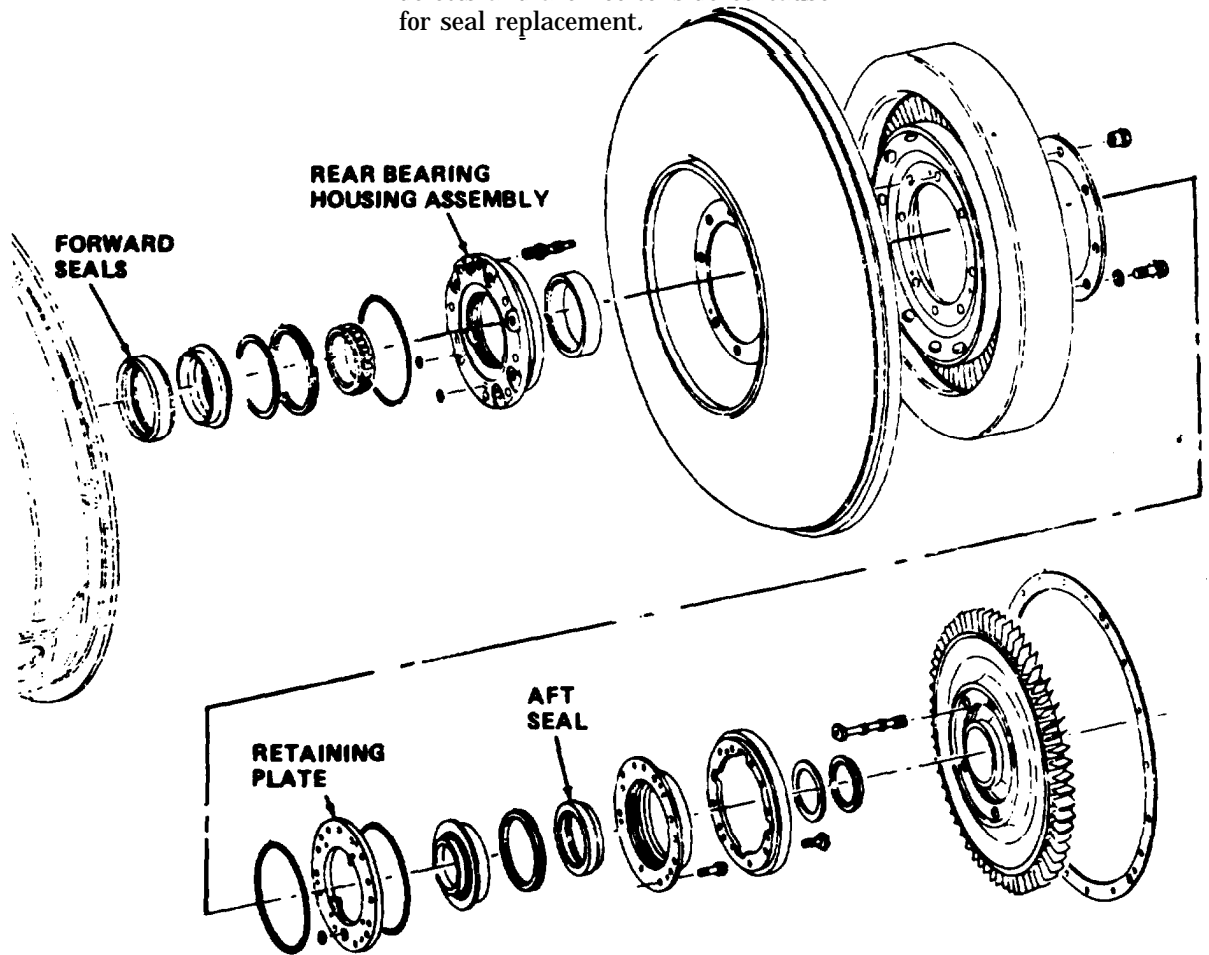
2-75. Rear Compressor Bearing Oil Seal Retainer, Aft Seal, Rear Bearing Housing Assembly, Roller Bearing, Forward Oil Ring, and Forward Seal (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/

NOTE

Aft seals 1-300-174-02 and -03 are manufactured with a fracture at one of the slot locations on the air side carbon element. This fracture is not a defect and is not considered cause for seal replacement. Forward and aft seals (1-300-174-02 and 1-300-174-03) are manufactured with three splits, 120 degrees on the carbon elements. These splits are not defects and are not considered cause for seal replacement.



2-75. Rear Compressor Bearing Oil Seal Retainer, Aft Seal, Rear Bearing Housing Assembly, Roller Bearing, Forward Oil Ring, and Forward Seal (T53-L-13B/70 Engines) - Inspection  
- Continued

LOCATION/ITEM	REMARKS	ACTION
ENGINE/ - Continued		
1. All Parts		<b>Inspect</b> all parts for nicks, burrs, and scratches. <b>Blend-repair</b> as outlined in paragraph H-26.
2. Rear Bearing Housing Assembly	Air shroud corrosion is acceptable. Break-through is not acceptable.	<b>Inspect</b> rear bearing housing assembly for damaged threads. <b>Repair</b> as outlined in paragraph H-29. <b>Replace</b> housing assembly if threads are damaged beyond repair.
3. All Parts		Visually <b>inspect</b> all parts for cracks, distortion, and excessive wear. <b>Replace</b> all cracked, distorted or excessively worn parts.
4. Bearing Retaining Plate		<b>Inspect</b> bearing retaining plate for restricted oil passages. <b>Clear</b> oil passages using suitable rod.
5. Aft Seal		<b>Inspect</b> aft seal for damage. Replace damaged aft seal as outlined in paragraph 2-76.
6. No. 2 Bearing		<b>Inspect</b> bearing pins. Loose pins are acceptable.

2-76. No. 2 Bearing Aft Seal (T53-L-13B/703 Engines) - Replacement (AVIM)

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**Special Tools**  
Seal Installation Tool (LTCT3825)  
Base (LTCT3826) detail of (LTCT3825)  
Clamp (LTCT3875) detail of (LTCT3825)

**NOTE**

T53-L13B engines only. Whenever retainer and seal assembly 1-110-600-05, or any of its components; retaining ring 1-300-14041, seal, plain encased 1-300-174-02 and -03, and retainer, oil seal 1-110-194-04 are to be replaced, all will be replaced with retainer and seal assembly 1-110-720-02 and with these components: retaining ring 1-300-359-01, seal, plain encased 1-300-616-01, and retainer, oil seal 1-110-252-03. Retainer and seal assembly 1-110-720-02 must be used with bearing housing 1-110-470-13 and ring, gas producer seal 1-110-398-01 to prevent higher engine operating temperature.





2-76 No. 2 Bearing Aft Seal (T53-L-13B-/703 Engines) - Replacement (AVIM) - Continued

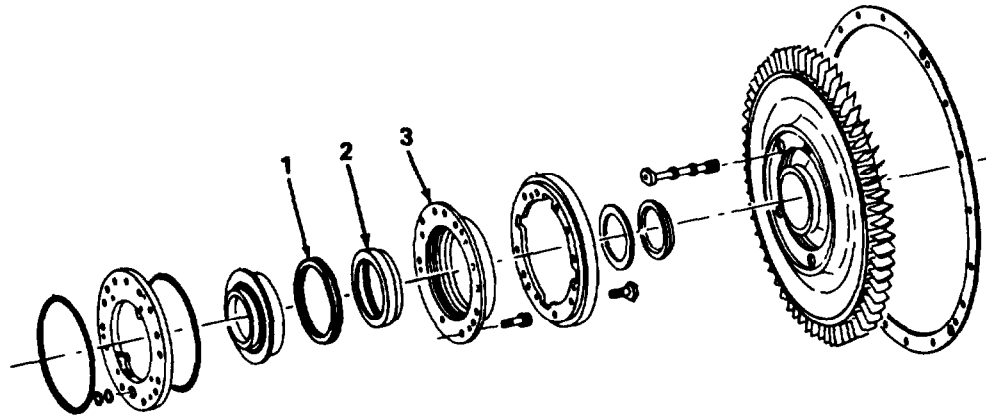
LOCATION/ITEM	REMARKS	ACTION
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BEARING HOUSING/

Aft seal 1300-174-02 and -03 is manufactured with a fracture at one of the slot locations on air side carbon element. This fracture is not a defect and is not considered cause for seal replacement. Aft seals 1-300-17402 and 1-300-174-03 are manufactured with three splits, 120 degrees apart, on oil side carbon element. Aft seal 1-300-616-01 is manufactured with three splits, 120 degrees apart, on the carbon element. These splits are not defects and are not considered cause for seal replacement.

**1. Retaining Ring**

**Remove** retaining ring (1).



**2. Aft Seal**

Using arbor press and installation tool (LTCT 3826), remove seal (2).

**3. Aft Seal**

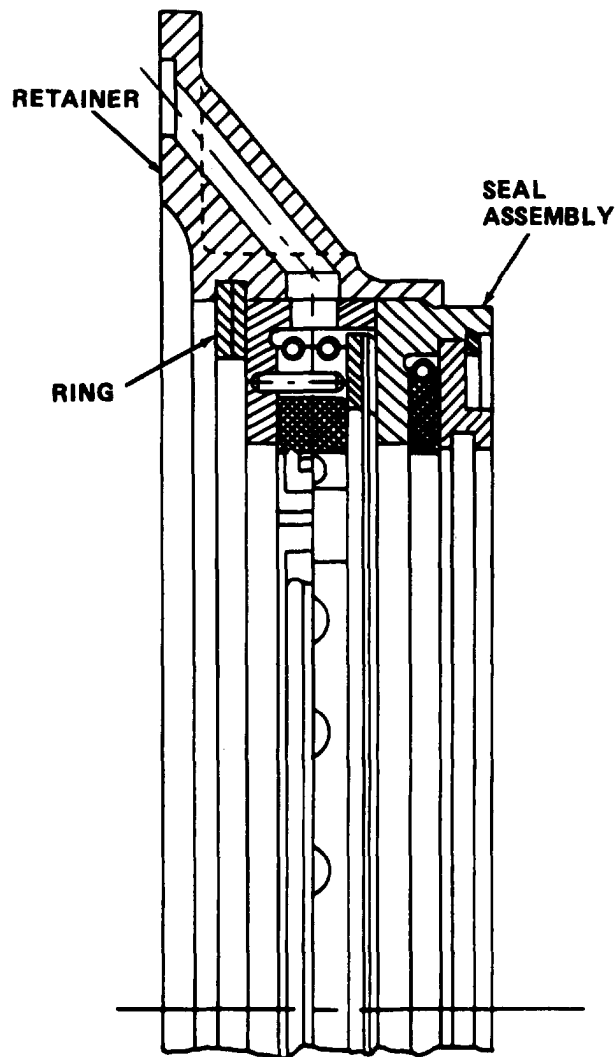
**Install** new seal on base (LTCT3826, detail of LTCT3825) and secure with clamp (LTCT3875, detail of LTCT3825). **Place** seal with base and clamp in arbor press

**WARNING**

Use approved thermally insulated glove for handling hot, parts.

2-76. No. 2 Bearing Aft Seal (T53-L-13B/703 Engines) - Replacement (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
BEARING HOUSING/ - Continued		
4. Retainer		<b>Heat</b> retainer (3) in oven to 300°F to 380°F (149°C to 193°C) for 20 to 30 minutes.
5. Retainer		<b>Remove</b> retainer (3) from oven and <b>place</b> onto seal. <b>Position</b> anvil (LTCT 3827, detail of LTCT 3825) onto retainer and <b>seat</b> firmly with arbor press.
6. Retaining Ring	RETAINER	<b>Reinstall retaining ring</b> (1).
7. Seal Assembly	RING	<b>Inspect</b> for proper installation.
	SEAL ASSEMBLY	



**CHAPTER 3**  
**COMBUSTION SECTION**

**OVERVIEW**

**This** chapter contains procedures for the maintenance and preservation of the combustion section. Paragraphs following outline disassembly, inspection, repair, and additional requirements needed to maintain the combustion section and related part. Procedures requiring maintenance on the Aviation Intermediate Maintenance (AVIM) level are specified and must be performed as such. Paragraphs in which the maintenance level is not specified shall be considered Aviation Unit Maintenance (AVUM) and may be performed at this level or a higher level of maintenance.

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### **3 - 1 . GENERAL MAINTENANCE INFORMATION.**

Visually inspect all subassemblies and accessories removed from the engines combustion section. Check for loose or missing parts. Note any damage or excessive wear. Repair damaged parts where possible. Replace damaged parts that cannot be repaired. Disassembly procedures provided enable required cleaning, inspection, repair or replacement of combustion section and its accessories.

During reassembly of the engines subassemblies and accessories discard all of the following parts and replace with new parts:

Seals	Tabwashers
Gaskets	Lockpins
Packing	Lockwashers
Cotter Pins	Lockwire

#### **3-2. Combustion Chamber (T53-L-11 Series Engines) - Inspection**

##### **INITIAL SETUP**

**Applicable Configuration**  
T53-L-11 series Engine

**References**  
Para 3-4

3-2 Combustion Chamber (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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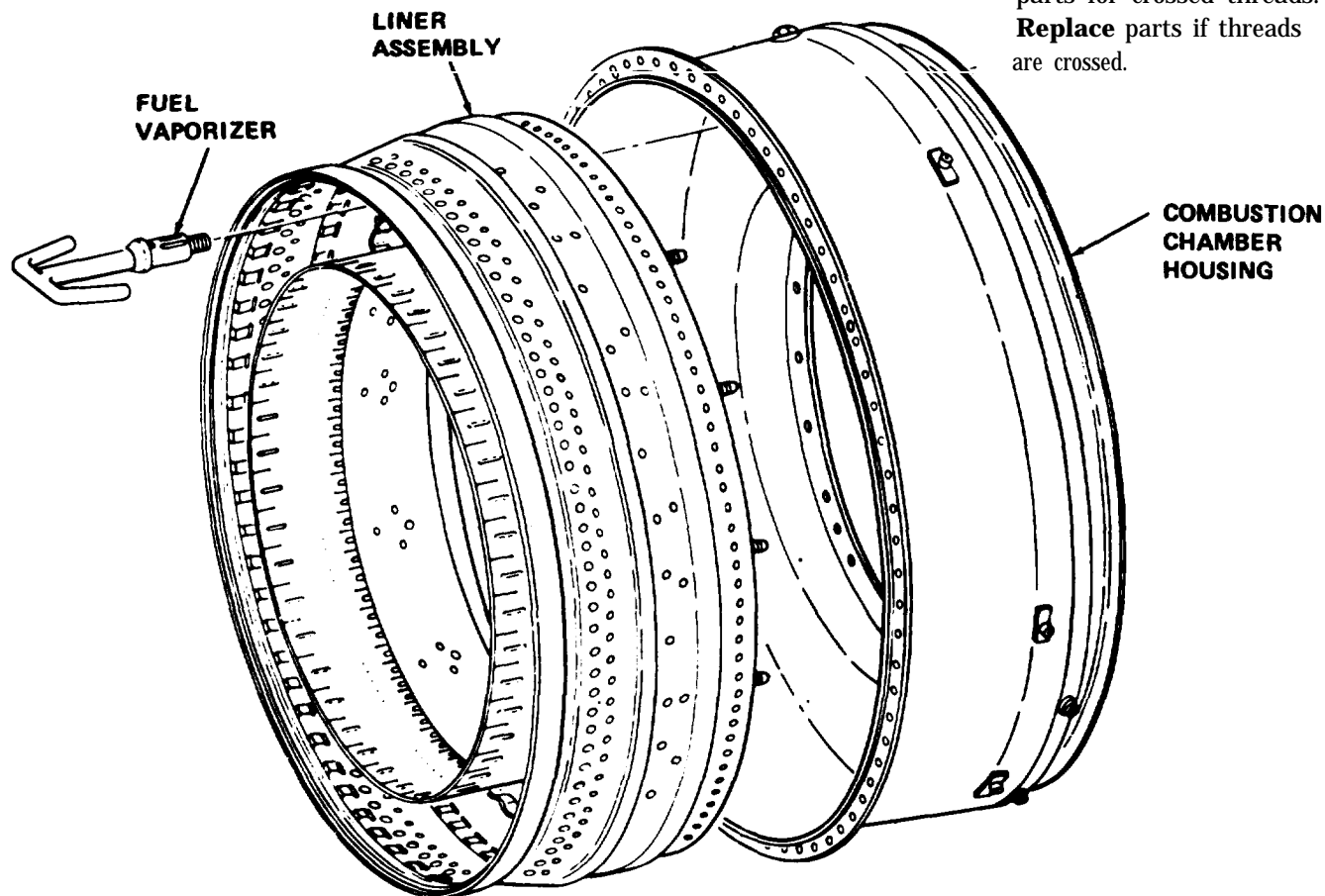
COMBUSTION  
CHAMBER/

**WARNING**

When handling combustion chamber internal parts that have been exposed to fuels containing tetraethyl lead, insure that the byproduct (poisonous lead oxide) is not inhaled or taken into the body through cuts or *other* external openings. If accidental exposure occurs, drench affected area with large amounts of clean water and obtain immediate medical attention.

1. Threaded Parts

Visually **inspect** threaded parts for crossed threads. **Replace** parts if threads are crossed.



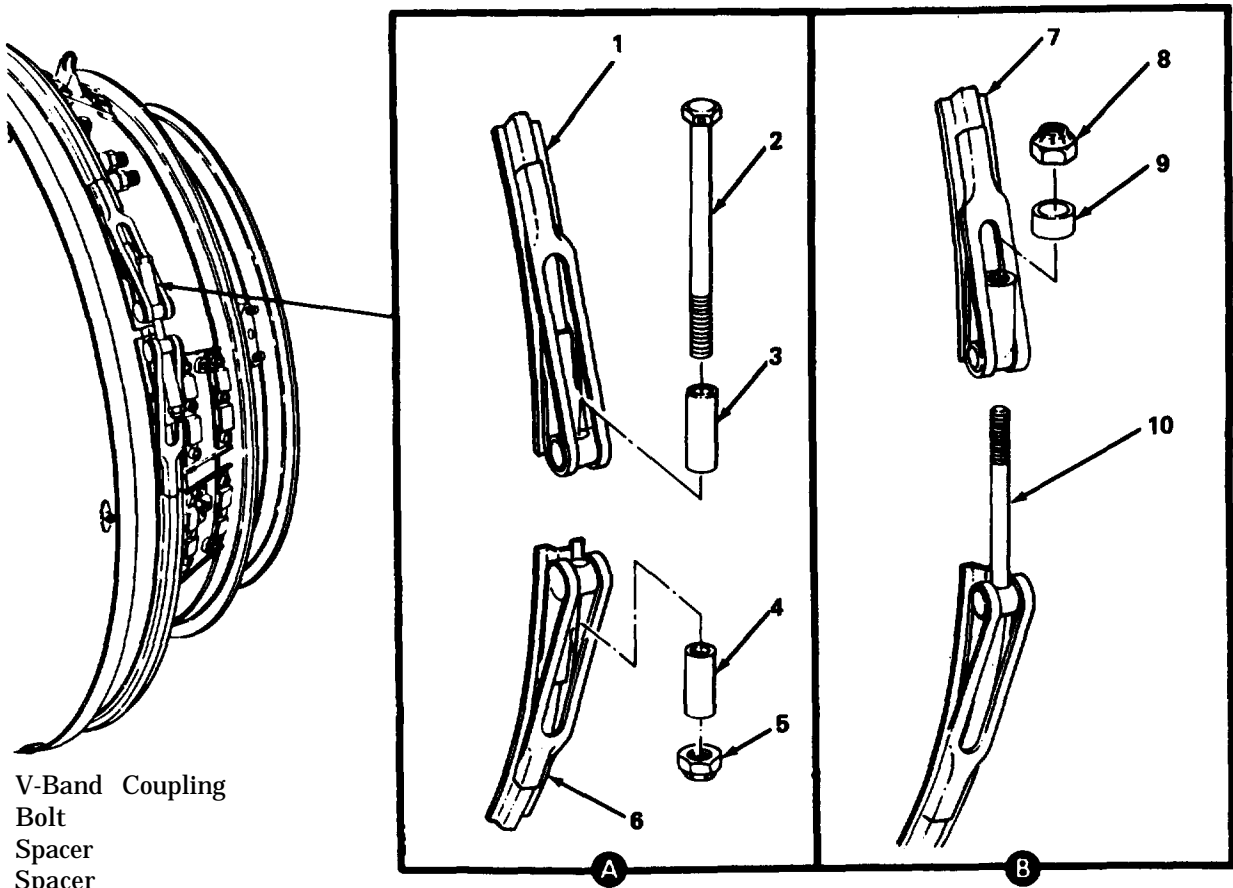
3-2. Combustion Chamber (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMBUSTION  
CHAMBER/ -  
Continued

2. V-Band Coupling

**inspect** V-band coupling for wear, dents, and cracks. **Replace** coupling if **damaged**:



- 1. V-Band Coupling
- 2. Bolt
- 3. Spacer
- 4. Spacer
- 5. Nut
- 6. V-Band Coupling
- 7. V-Band Coupling
- 8. Nut
- 9. Spacer
- 10. V-Band Coupling

3. Combustion Chamber Housing

With aid of magnifying glass of at least 5-power and a good light.

**Determine** location and length of all boss area cracks in combustion chamber housing by close visual **inspection**.

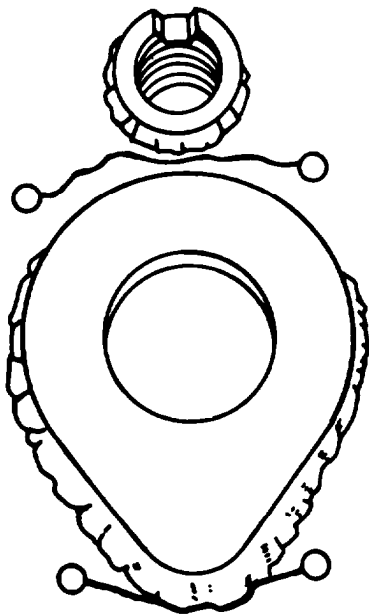
3-2 Combustion Chamber (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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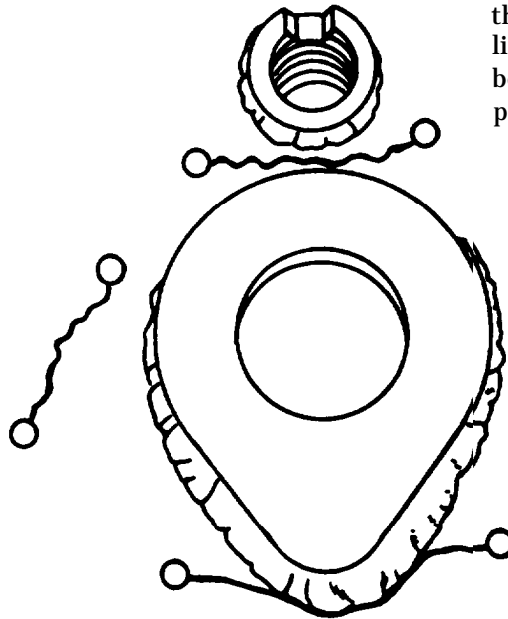
COMBUSTION  
CHAMBER/ -  
Continued

4. Housings

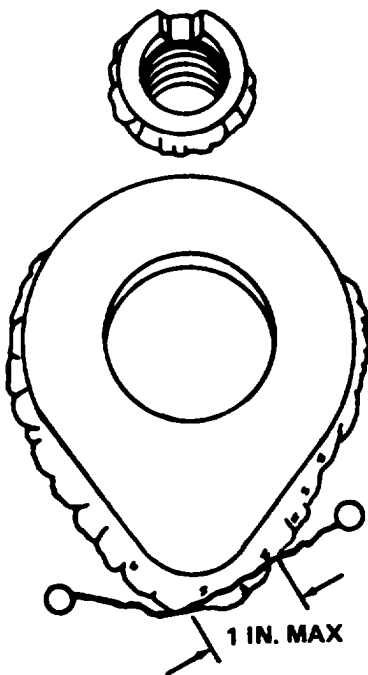
Housings with cracks at fuel vaporizer bosses that do not exceed the limits in the figure, may be repaired by AVIM personnel as outlined in



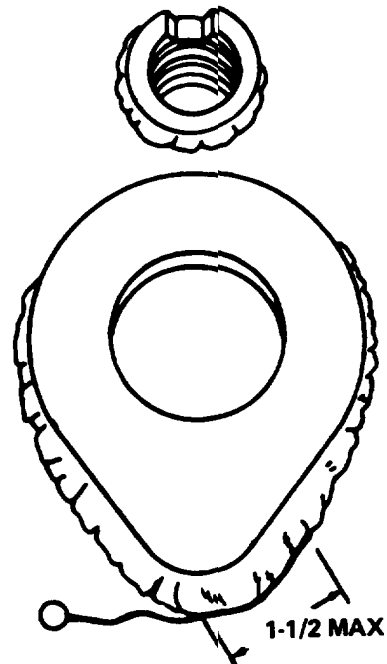
DETAIL A



DETAIL B



DETAIL C



DETAIL D



**3-2. Combustion Chamber (T53-L-11 Series Engines). Inspection - Continued**

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER/- Continued  5. Bolts Securing Combustion Chamber Housing To Diffuser	No corrosion allowed.	<b>I n s p e c t</b> bolts for corro- sion.

3-3. Combustion Chamber Housing (T53-L-13B/703 Engines)-Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L13B/703 Engines

**References**  
Para H-25, H-29 and 3-5

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

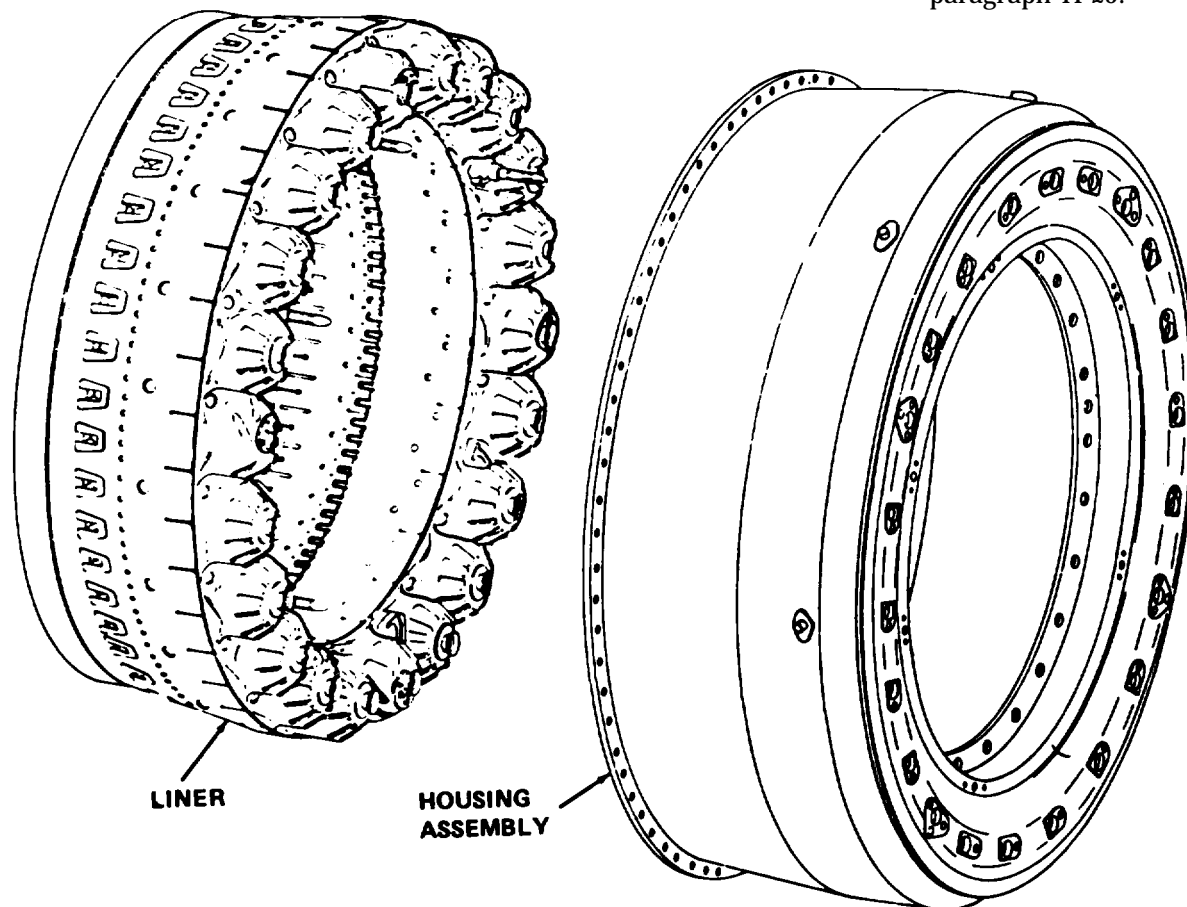
COMBUSTOR TUR-  
BINE ASSEMBLY/

**NOTE**

All combustion chamber housing repairs are AVIM task.

1. Combustion Chamber Housing Assembly

**Inspect** combustion chamber housing assembly for nicks, burrs, and scratches. Bland-repair nicks, burrs, and scratches as outlined in paragraph H-25.





### 3-3 Combustion Chamber Housing (T53-L- 13B/703 Engines) - Inspection - Continued

COMBUSTOR TUR-  
BINE ASSEMBLY/ -  
Continued

**WARNING**

**When handling combustion chamber internal parts that have been exposed to fuels containing tetraethyl lead, insure that the byproduct (poisonous lead oxide) is not inhaled or taken into the body through cuts or other external openings. If accidental exposure occurs, drench affected area with large amounts of clean water and obtain immediate medical attention.**

2. Housing Assembly

**Inspect** for damaged threads. **Repair** damaged threads as outlined in paragraph H-29. If threads are damaged beyond repair **replace** housing assembly. (AVIM)

3. Housing Assembly

**Inspect** for damaged liner supports. **Replace** missing or damaged liner supports as outlined in paragraph 3-5. (AVIM)

4. Housing Assembly

Visually **inspect** housing assembly for cracks and distortion. **Replace** housing if cracks are noted. Replace housing if distorted beyond repair. (AVIM)

5. Bolts Securing  
Combustion Chamber  
Housing To Diffuser

No corrosion allowed.

**Inspect** bolts for corrosion.

**3-4 Combustion Chamber Housing (T53-L-11 Series Engines) - Repair (AVIM)**

INITIAL SETUP

**Applicable Configuration**  
 T53-L-11 Engines

**References**  
 Para 3-2

LOCATION/ITEM	REMARKS	ACTION
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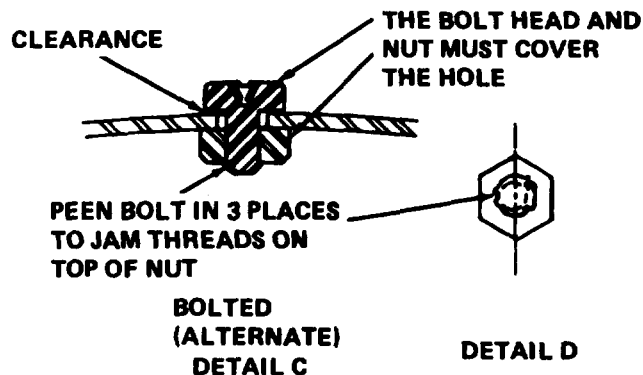
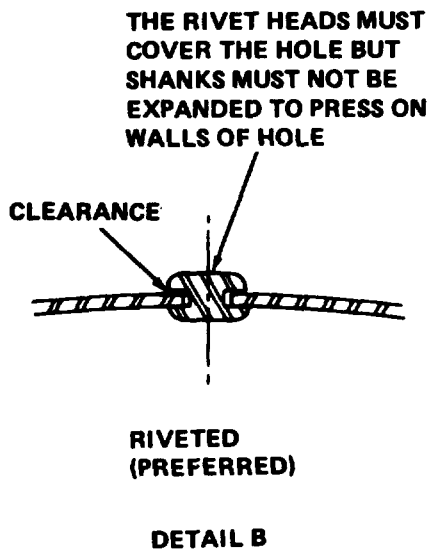
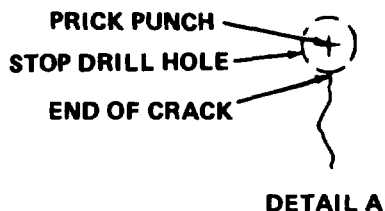
COMBUSTION  
 CHAMBER  
 ASSEMBLY/

Housings with cracks at fuel vaporizer bosses that do not exceed the limits in paragraph 3-2 may be repaired as follows:

1. Combustion Chamber Housing

Use center punch.

**Indent** housing beyond ends of each crack so that when stop-drilled the cracks will terminate at the hole (**see** detail A).



3-4. Combustion Chamber Housing (T53-L-11 Series Engines) - Repair (AVIM) - Continued

COMBUSTION  
CHAMBER  
ASSEMBLY/-  
Continued

2. Combustion Cham-  
ber Housing

Use 1/8 No. 30 or No. 29 drill.

**Stop-drill** parent metal  
at punch marks. **Deburr**  
inner and outer edges of  
each hole.

**NOTE**

If a crack extends beyond a hole when  
reinspected in following action for item  
3, a second-stop-drilled hole may be  
drilled beyond the end of the crack,  
provided that the total length of crack  
between the two extreme holes of the  
crack does not exceed three inches.

3. Combustion Cham-  
ber Housing

Use magnifying glass.

**Reinspect** housing to  
**insure** that stop-drilled  
holes have completely  
terminated the cracks.

**NOTE**

Close each stop-drilled hole as directed  
in items 4 and 5.

**NOTE**

Closing the stop-drilled holes prevents  
an excessive loss of air through the  
holes. Stop-drilled holes made at the  
edge of the weld fillets need not be  
closed when rivet heads or bolt heads  
will overlap the weld fillet.

4. Combustion Cham-  
ber Housing

Use corrosion resistant steel rivet P/N  
AN125439.

**Insert** rivet into the hole  
from the convex side of  
the housing.

**CAUTION**

**In following action for item 5, do not  
upset the rivet enough to expend the  
shank against the wall of the drilled  
hole. When the rivet is headed, some  
movement is permissible, provided  
that the heads cover the hole.**

3-4. Combustion Chamber Housing (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION															
COMBUSTION CHAMBER ASSEMBLY/- Continued	If the preferred rivet cannot be obtained, one of the following alternate rivets may be used:	<b>Head</b> the rivet on the concave side of the housing sufficiently to <b>close</b> the hole and <b>draw</b> both heads against the surfaces of the housing.															
5. Combustion Cham- ber Housing	See detail B in figure for item 1.	<b>Head</b> the rivet on the concave side of the housing sufficiently to <b>close</b> the hole and <b>draw</b> both heads against the surfaces of the housing.															
<table border="0"> <thead> <tr> <th style="text-align: center;"><u>Number</u></th> <th colspan="2" style="text-align: center;"><u>Stop Drill size</u></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">AN125421</td> <td style="text-align: center;">0.109</td> <td style="text-align: center;">7/64</td> </tr> <tr> <td style="text-align: center;">AN125440</td> <td style="text-align: center;">0.140</td> <td style="text-align: center;">9/64</td> </tr> <tr> <td style="text-align: center;">AN125457</td> <td style="text-align: center;">0.172</td> <td style="text-align: center;">11/64</td> </tr> <tr> <td style="text-align: center;">AN125475</td> <td style="text-align: center;">0.203</td> <td style="text-align: center;">13/64</td> </tr> </tbody> </table>	<u>Number</u>	<u>Stop Drill size</u>		AN125421	0.109	7/64	AN125440	0.140	9/64	AN125457	0.172	11/64	AN125475	0.203	13/64		
<u>Number</u>	<u>Stop Drill size</u>																
AN125421	0.109	7/64															
AN125440	0.140	9/64															
AN125457	0.172	11/64															
AN125475	0.203	13/64															
<b>NOTE</b>	The stop-drilled holes maybe closed by using the alternate procedure in items 6 thru 9.																
6. Combustion Cham- ber Housing	Use bolt P/N MS35216-11. See detail C in figure for item 1.	<b>Insert</b> bolt into the hole from the convex side of the housing.															
7. Combustion Cham- ber Housing	Use nut P/N MS35649-44.	<b>Install</b> nut on the bolt. <b>Tighten</b> nut by hand, or with maximum of five pound-inches of torque.															
8. Combustion Cham- ber Housing	See detail D in figure for item 1.	<b>Lock</b> the nut in place by <b>peening</b> exposed threads of bolt against tip of nut in three places.															
9. Combustion Cham- ber Housing	Use magnify glass.	<b>Reinspect</b> housing to <b>in-</b> <b>sure</b> that no cracks ex- tend beyond the closures.															

3-4. Combustion Chamber Housing (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER ASSEMBLY/- Continued	<b>NOTE</b>	
	Replace cracked liner supports on combustion chamber housing 1-130-020-08 as directed in items 10 thru 14.	
10. Damaged Liner Supports	Use rotary grinder.	<b>Remove</b> by <b>grinding</b> off heads of rivet, and <b>punching</b> rivets from housing.
	<b>NOTE</b>	
	Position liner support in following item 11, with keyway towards the center of the combustion chamber housing.	
11. New Liner Support 1-130-230-01		<b>Position</b> new liner support in the place from which the damaged support was removed.
12. Liner support		Temporarily <b>secure</b> to combustion chamber housing with nut and bolt.
13. Liner support	Use. No. 30 (1/8 in. diameter) drill.	<b>Drill</b> through liner support. <b>Back-up</b> support with block of wood.
41. Liner Support		<b>Secure</b> to combustion chamber housing with two universal head rivets P/N AN125439.



3-5 Combustion Chamber Housing (T53-L-13B/703 Engines) - Repair (AVIM)

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B and T53-L-703 Engines

**Special Tools**  
Locating Bar (LTCT153)  
Drift (Number 30)

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMBUSTION  
CHAMBER  
ASSEMBLY/

**NOTE**

To properly position the combustion chamber liner in the combustion chamber housing assembly, the dimension from the rear flange of the combustion chamber housing assembly to the forward faces of the installed liner support assemblies 1-130-710-01 must be maintained at 1.095 to 1.105 inches. Improperly installed liner support assembly can result in preloading and eventual cracking of the combustion chamber liner and also chafing of the fuel manifold nozzles. (See figure in action item 1.)

**CAUTION**

**In following step b, use care to grind only that portion of the rivet that protrudes through the liner support assembly and not the housing parent metal.**

1. Liner supports

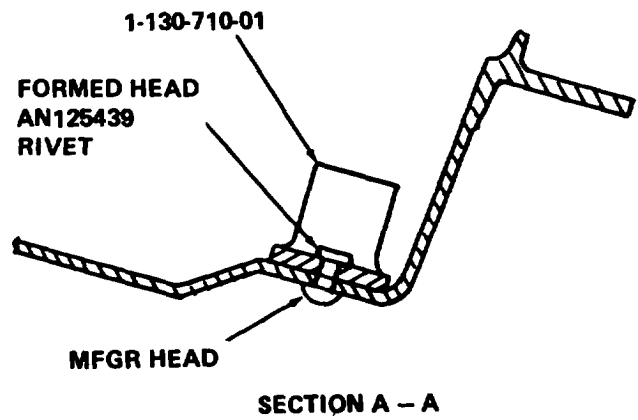
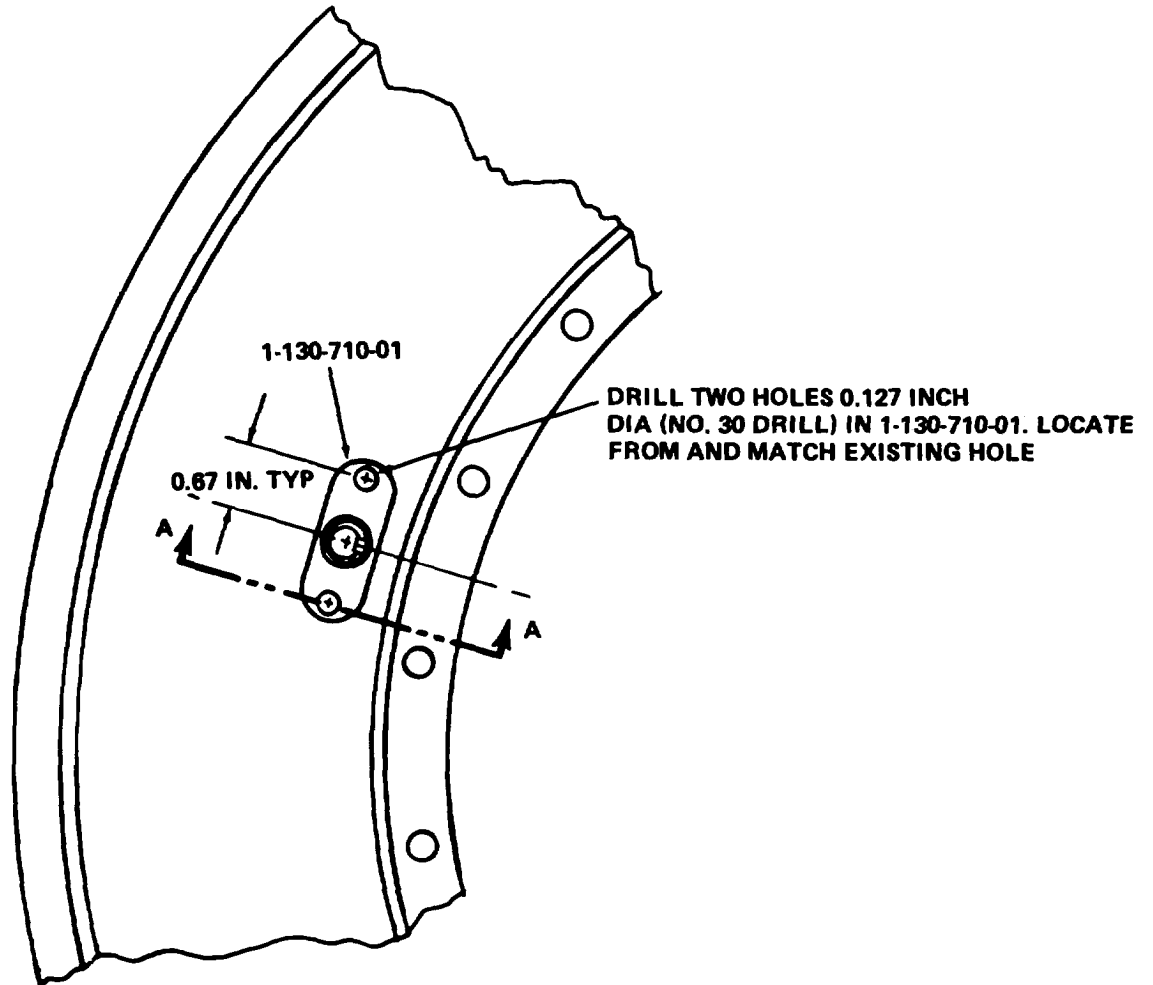
a. **Fabricate** liner support holding fixture. Refer to Appendix F, figure F-6, page 6.

b. **Grind** existing rivets to remove formed heads. Using a 1/8 inch diameter pin punch, **drive** rivets from holes and **remove** damaged support.

3-5. Combustion Chamber Housing (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMBUSTION  
CHAMBER ASSEM-  
BLY/ - Continued

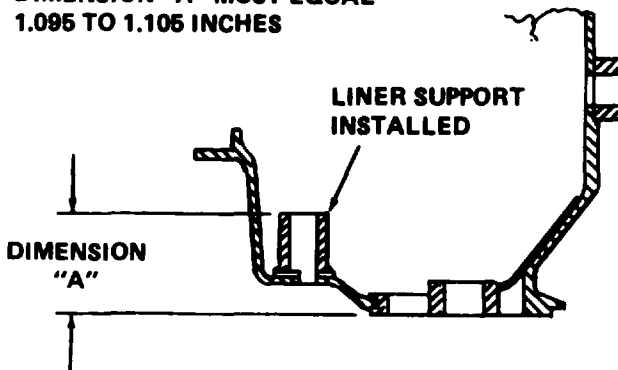


3-5. Combustion Chamber Housing (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMBUSTION  
CHAMBER  
ASSEMBLY/-  
Continued

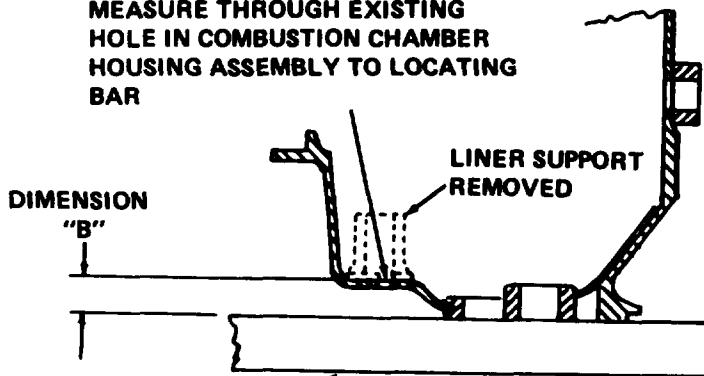
**DIMENSION "A" MUST EQUAL  
1.095 TO 1.105 INCHES**



c. **Remove** all grinding residue and foreign matter from affected surfaces. **Place** a locating bar (LTCT153) across rear flange of combustion chamber housing. Using a vernier depth gauge **measure** through the housing to the locating bar and **record** as dimension B.

d. **Subtract** dimension B from 1.100 inches (2.80 cm). Result will be dimension C.

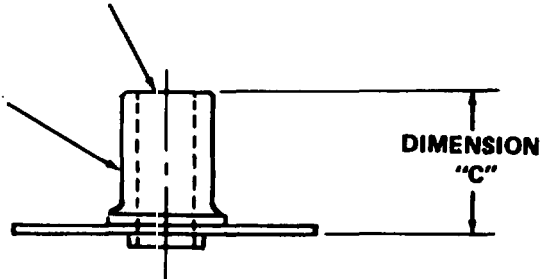
**MEASURE THROUGH EXISTING  
HOLE IN COMBUSTION CHAMBER  
HOUSING ASSEMBLY TO LOCATING  
BAR**



**LOCATING BAR PLACED ACROSS  
REAR FLANGE ON COMBUSTION  
CHAMBER HOUSING ASSEMBLY**

**EXCESS MATERIAL TO BE  
REMOVED FROM THIS END**

1-130-710-01



**DIMENSION "B" PLUS DIMENSION "C"  
EQUALS DIMENSION "A"**

3-5. Combustion Chamber Housing (153-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
---------------	---------	--------

COMBUSTION  
CHAMBER  
ASSEMBLY/-  
Continued

**CAUTION**

The following step e, insures reworked liner support assembly shoulder remains 90 degrees to the perpendicular.

**NOTE**

The combined length of the liner support assembly plus dimension B should equal dimension A (1.095 inch to 1.105 inch (2.78 cm to 2.81 cm)).

e. **Using** a suitable lathe and the holding fixture fabricated in preceding action for item 1, **machine** length of replacement liner support assembly to dimension C.

f. If not previously accomplished, **drill** two holes in the replacement liner support assembly, **matching** holes with existing holes in the combustion chamber housing. **Use** No. 30 drill.

g. **Aline** holes in the liner support assembly with holes in housing and secure with rivets AN125439.

h. **Repeat** as necessary steps b. through g. for replacement of any additional damaged or missing liner support assemblies.

### 3-6. Combustion Chamber Liner (T53-L-11 Series Engines) - Inspection

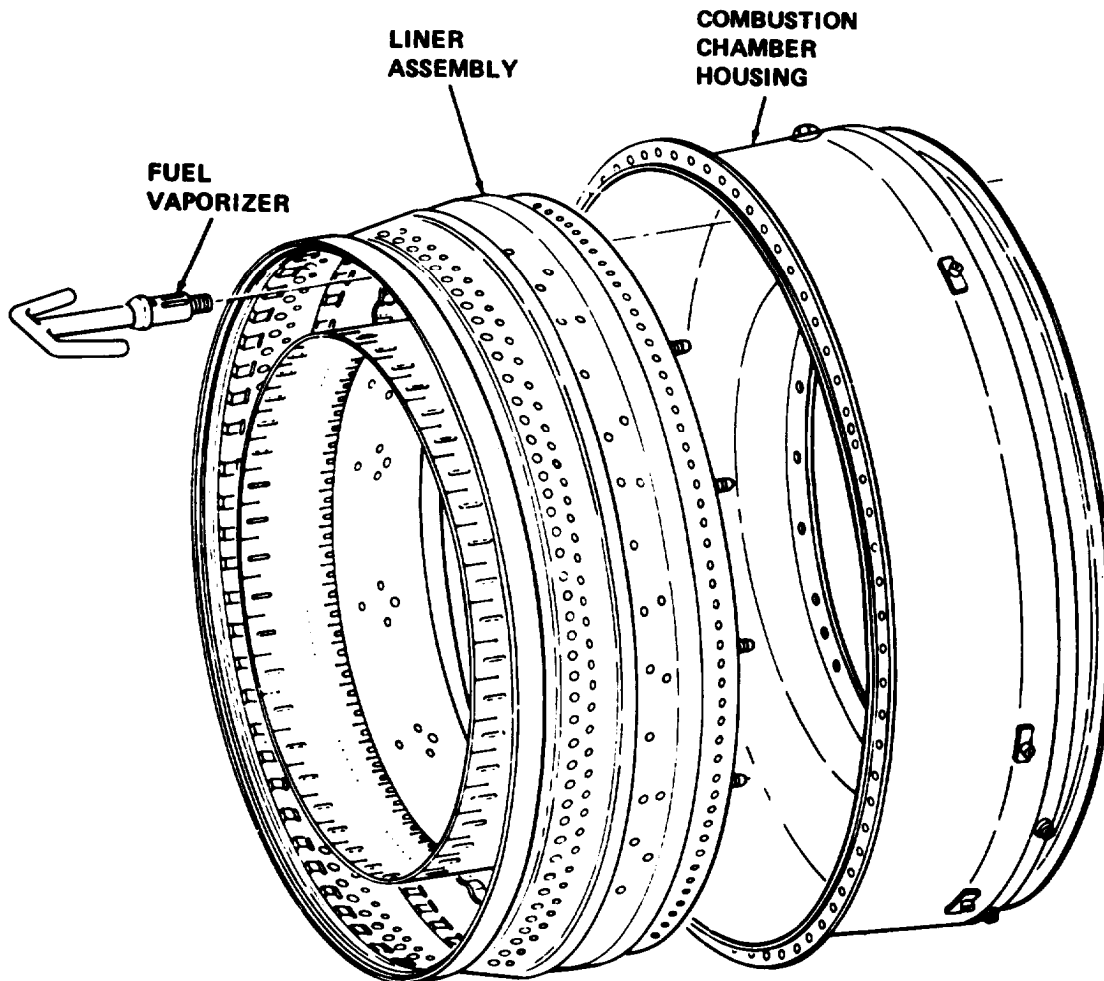
#### INITIAL SETUP

**Applicable Configuration**  
T53-L11 Series Engines

**Consumable Materials**  
Trichloroethylene (item 84, Appendix D)  
Turco Dy/Chek (item 86, Appendix D)  
Turco Dy/Mark Developer (item 87, Appendix D)

**References**  
Para H-10, H-n, and 3-8

#### COMBUSTION CHAMBER ASSEMBLY/



3-6. Combustion Chamber Liner (753-L-1 1 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMBUSTION CHAMBER ASSEMBLY/ - Continued</p>	<p>1. Combustion Chamber Liner</p> <p>Unless a preliminary inspection of the combustion chamber liner indicates extensive damage or carbon buildup, it is not necessary to remove the vaporizers to inspect the liner nor is it necessary to remove liner from combustion chamber housing. If liner must be removed, it should be cleaned before inspection.</p>	<p>If necessary, <b>clean</b> as follows:</p> <p>a. <b>Use</b> solvent-immersion method. (<b>Refer</b> to paragraph H-10.)</p> <p>b. If further cleaning is required, <b>use</b> vapor-blasting (liquid honing) method. (<b>Refer</b> to paragraph H-11.)</p>

**NOTE**

If crack indications are questionable or crack ends are difficult to determine, the inspection methods described in following action for item 2 are recommended.

**WARNING**

- Trichloroethylene vapors are harmful-do not use near open flames, or on very hot surfaces.
- Do not use near welding areas, a source of concentrated ultraviolet rays. Intense ultraviolet rays can cause the formation of phosgene gas, which is injurious to the lungs.
- Use only with adequate ventilation.
- Avoid prolonged or repeated breathing of vapors.
- Avoid prolonged or repeated contact with skin. Wear approved gloves and goggles (or face shield) when handling and wash hands thoroughly after handling.
- Do not take internally.
- Do not smoke when using it.
- Store in approved metal safety containers.

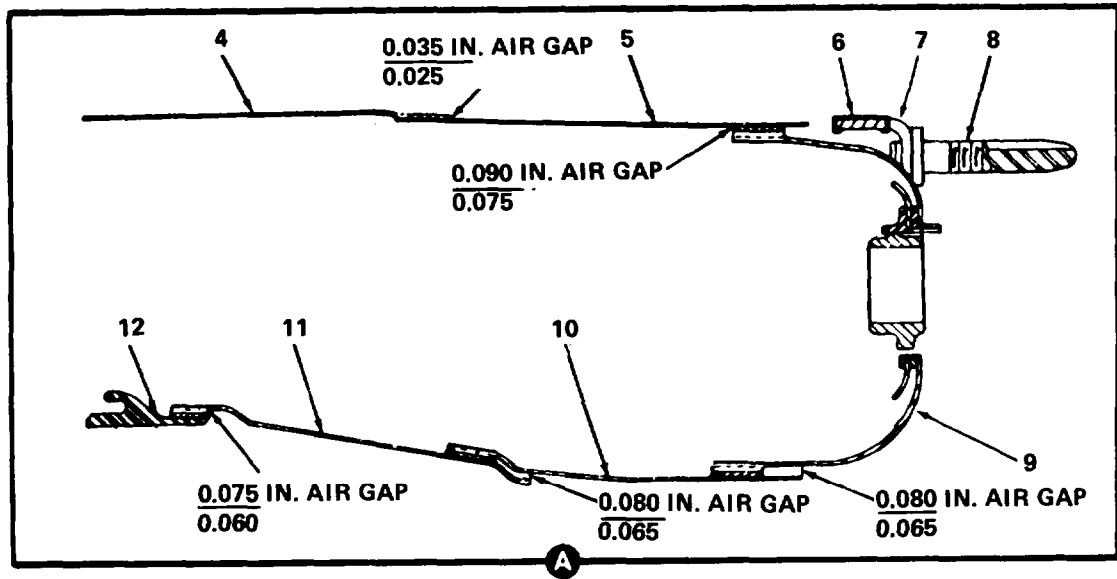
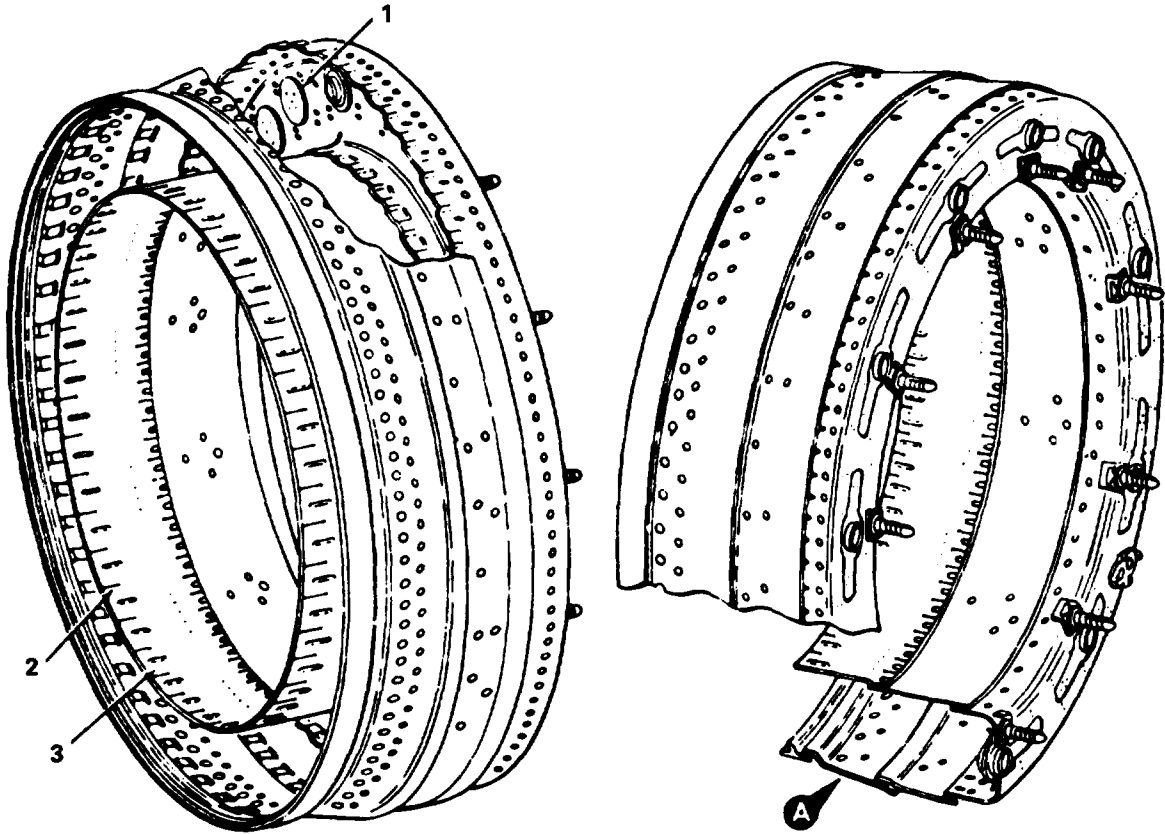
3-6. Combustion Chamber Linear (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMBUSTION CHAMBER ASSEMBLY/ - Continued</p>		
<p>2. Liner</p>		<p><b>Clean</b> area with trichloroethylene (item 84, Appendix D). <b>Wipe</b> dry and proceed as follows:</p> <p>a. With clean brush apply Turco Dy/Chek (item 86, Appendix D).</p> <p>b. <b>Allow</b> 10 minutes for dye to dry, and <b>wipe off</b> with cloth soaked in trichloroethylene (item 84, Appendix D).</p> <p>c. <b>Spray</b> area with Turco Dy/Mark Developer (item 87, Appendix D) until dull white film appears. Cracks will appear as red line.</p>
<p>3. Liner</p>	<p>If carbon buildup is excessive, perform this action.</p>	<p><b>Clean</b> as specified in action for item 1. If limits are exceeded, replace liner,</p>
<p>4. Combustion Chamber Liner</p>	<ol style="list-style-type: none"> <li>1. Disc</li> <li>2. Sawcut</li> <li>3. Tab</li> <li>4. Forward Inner Liner</li> <li>5. Rear Inner Liner</li> <li>6. Retainer Plate</li> <li>7. Mounting Bracket</li> <li>8. Stud</li> <li>9. Plate and End Liner Assembly</li> <li>10. Rear Outer Liner</li> <li>11. Forward Outer Liner</li> <li>12. Flange</li> </ol>	<p><b>Inspect</b> for cracks, burns, deposits, warpage, and other defects. If limits are exceeded, replace liner.</p>

3-6. Combustion Chamber Liner (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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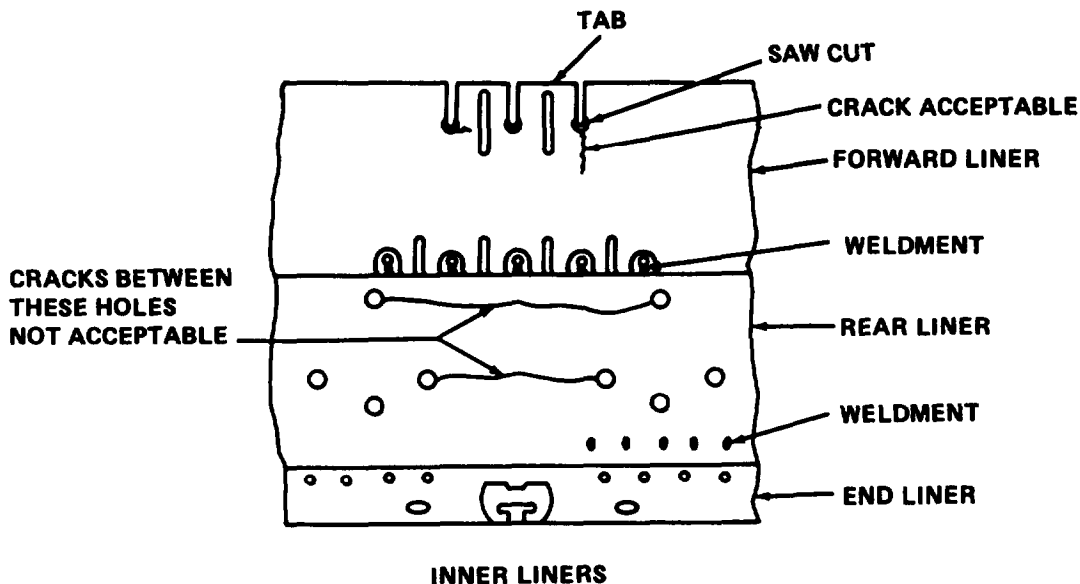
COMBUSTION  
CHAMBER ASSEM-  
BLY/ - Continued





3-6. Combustion Chamber Liner (T53-L-11 Series Engines) - Inspection - Continued

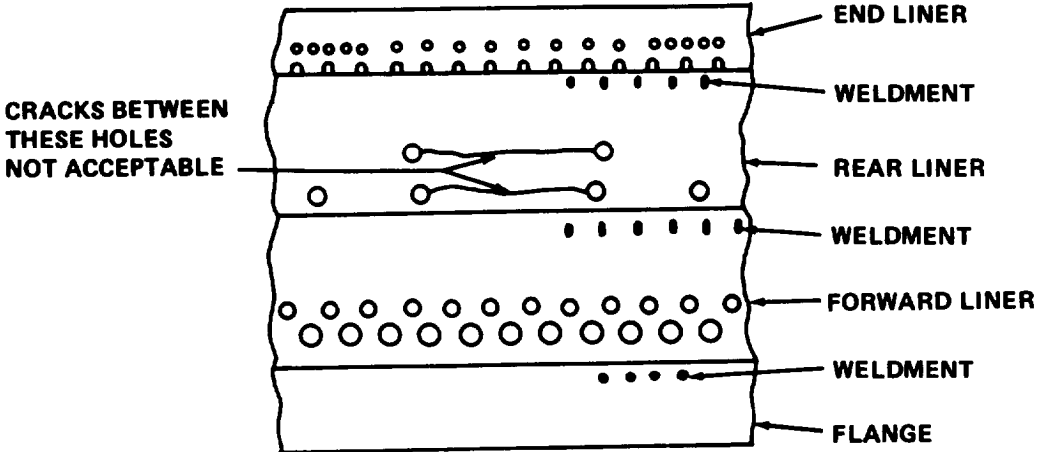
LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER ASSEMBLY/ - Continued		
5. Liner	<p>Crack limits for all areas follows:</p> <p>a. Converging cracks that create possibility of material fallout are not acceptable. Converging cracks shall be separated by 1-1/4 inch (31.8 mm) of unaffected material.</p> <p>b. Any number of cracks up to 1/2 inch (12.7 mm) in length are acceptable.</p>	<p>Replace if limits are exceeded.</p>
6. Inner Liners and Outer Liners	<p>Damage limits for inner liners and outer liners are as follows:</p> <p>a. Cracks between two holes are acceptable without repair except in areas shown in figure (below). Ten nonadjacent cracks per assembly are allowed.</p>	<p>Repair liners (para 3-8). Replace if limits are exceeded.</p>



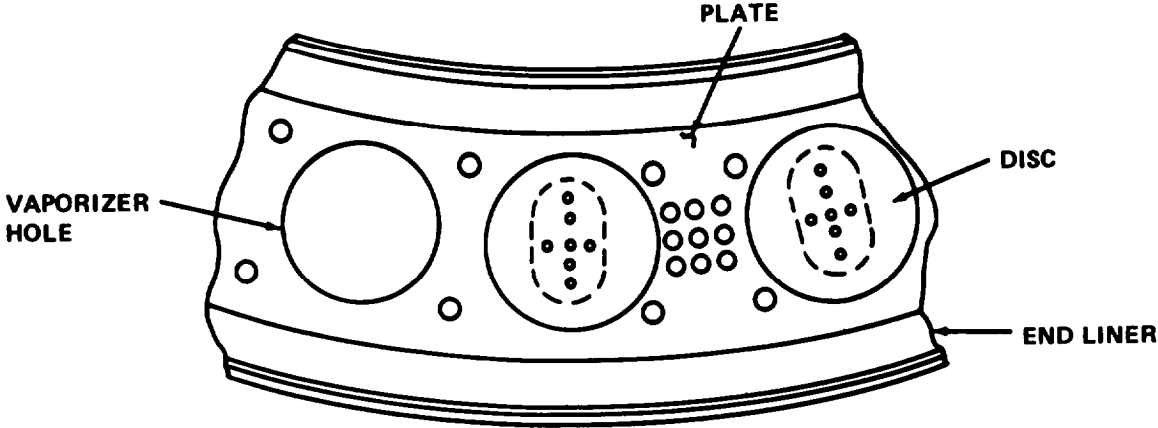
3-6. Combustion Chamber Liner (T53-L-11 Series Engines) - Inspection .Continued

LOCATION/ITEM	REMARKS	ACTION
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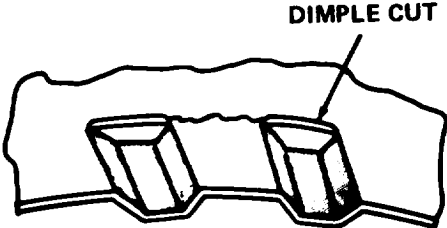
COMBUSTION  
CHAMBER  
ASSEMBLY/-  
(Continued



OUTER LINERS



C  
PLATE



D  
WELDMENT DIMPLE SERIES

3-6. Combustion Chamber Lines (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER ASSEMBLY/ - Continued	<p>b. Divergent cracks between 1/2 inch and 2 inches (12.7 mm and 50.8 mm) in length are acceptable provided that accumulated crack length does not exceed 10 inches (25.4 cm) on inner and outer layers combined.</p> <p>c. Cracks in a total of 30 resistance welds are acceptable without repair in each liner-to-liner or liner-to-flange weldment, provided that no more than four adjacent welds are affected.</p> <p>d. One 3/8 inch (9.5 mm) long crack emanating from sawcut into inner forward tab is acceptable without repair. No more than two nonadjacent tabs may be affected.</p> <p>e. Cracks in parent metal between resistance weldment dimple cuts are acceptable in 20 percent of each dimple series, provided that no more than five consecutive cuts are affected.</p> <p>f. Burn through shall not exceed one square inch (6.45 square cm) per assembly.</p> <p>g. Five weldment dimpleas per series may be burned through without repairs.</p> <p>h. Only one missing tab on forward inner liner is acceptable.</p> <p>i. Moderate warpage or buckling is acceptable if no interference of mating parts occurs.</p>	
7. Plate and Liner Assembly	<p>Damage limits for plate and liner assembly are as follows:</p> <p>a. Cracks between two holes are acceptable without repair in eight places, provided that the pairs of holes are not adjacent. (See figure in item 6.)</p>	<p><b>Replace</b> liner if limits are exceeded.</p>

3-6. Combustion Chamber Liner (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER ASSEMBLY/- Continued	<p>b. Cracks extending from edge of plate to vaporizer hole or disc weldments are acceptable.</p> <p>c. Cracks up to 1/2 inch (12.7 mm) long originated at edge of plate and do not terminate at a hole are acceptable.</p> <p>d. Converging cracks in all areas shall be separated by at least 1/2 inch (12.7 mm) of unaffected metal.</p> <p>e. Burn through are acceptable on plate up to 1/2 square inch (3.2 square cm) per assembly.</p>	
8. End Liner	<p>Damage limits for end liner are as follows:</p> <p>a. Cracks between two holes are acceptable in eight locations without repair, provided the pairs of holes are not adjacent to one another. (See figure in item 6.)</p> <p>b. Cracks between 1/2 inch and 2 inches (12.7 and 50.8 mm) in length are acceptable after stop-drilling, provided accumulative crack length does not exceed 10 inches (25.4 cm) and distance between two adjacent cracks is equal to or longer than the length of the longer crack.</p> <p>c. Two cracks in each igniter plate boss weldment are acceptable without repair.</p> <p>d. One crack in each of two nonadjacent mount stud brackets or bracket weldments is acceptable without repair.</p> <p>e. Cracks in parent metal between dimple cuts are acceptable in 20 percent of each dimple series, provided that no more than five consecutive cuts are affected.</p>	<p><b>Replace</b> if limits are exceeded.</p>

3-6. Combustion Chamber Liner (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER ASSEMBLY/- Continued	f. Burn throughs are acceptable on end liner up to 1/2 square inch (3.2 square cm) per assembly.	Replace if limits are exceeded (para 3-8).
9. Stud Mount Brackets and Vaporizer Seals	Wear limits are as follows:  a. Mounting stud wear shall not exceed 0.015 inch (0.38 mm).  b. Stud bracket wear shall not exceed 50 percent of original thickness.  c. Wear on tabs of vaporizer seals and igniter plates shall not exceed 50 percent of original thickness.	Replace if limits are exceeded (para 3-8).
10. Liner	Slight distortion or buckling is permitted. Distortion of air gaps that exceed limits (shown in figure in item 4, above) is not permitted.	Adjust distorted air gaps. Use a suitable prying tool.

3-7. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Inspection

INITIAL SETUP

Applicable Configuration  
T53-L-13B/703 Engines

References  
Para 3-17 and 3-9

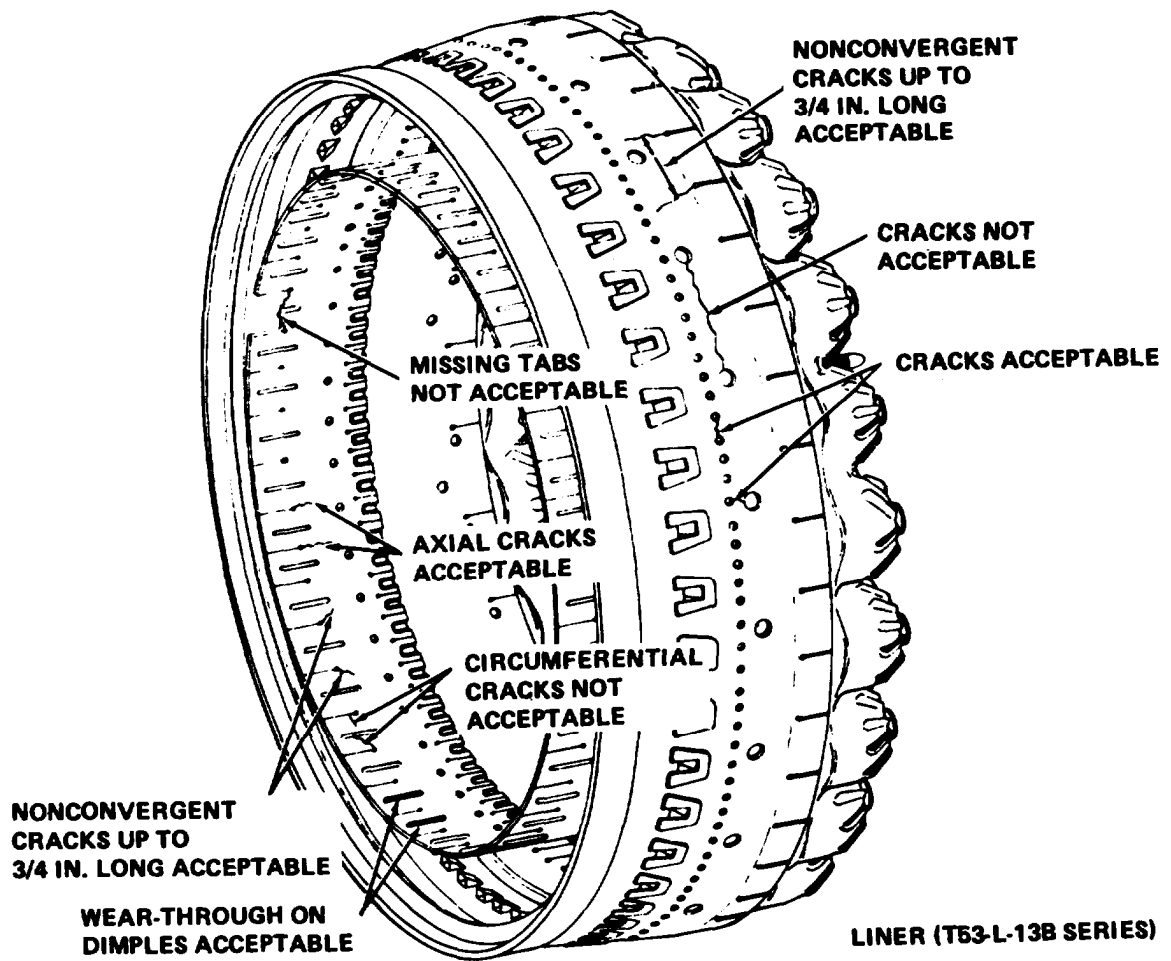
LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION  
CHAMBER LINER  
ASSEMBLY/

See paragraph 3-17 for detailed figure of combustion chamber assembly.

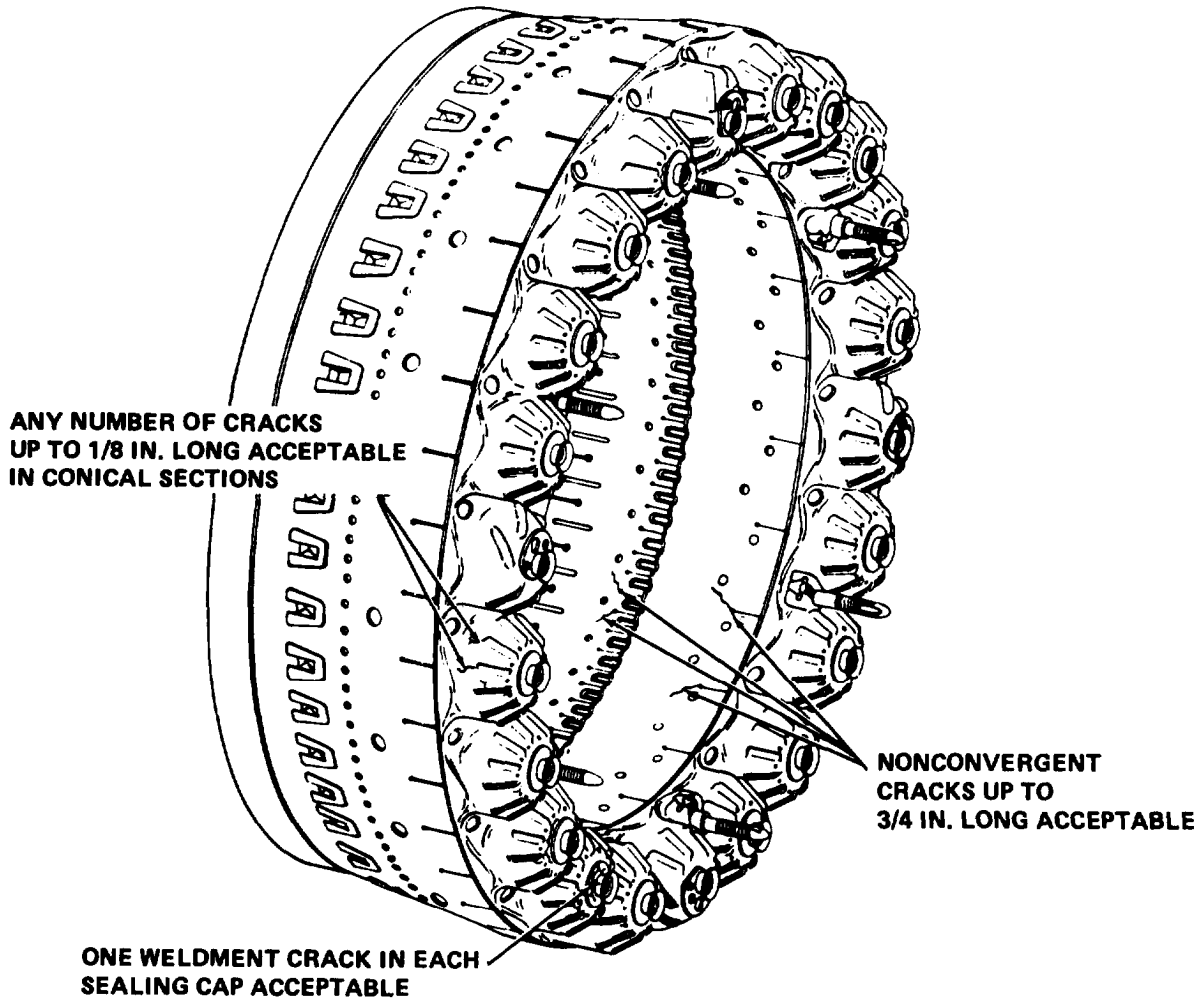
1. Combustion chamber Liner

Visually inspect combustion chamber liner for cracks. Replace liner if cracks exceed the following limits.



3-7. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued		



**LINER (T53-L-13B SERIES)**

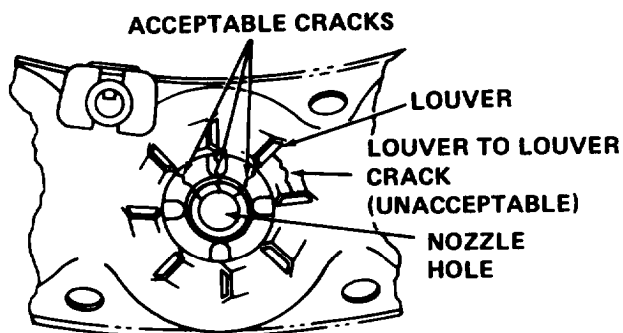
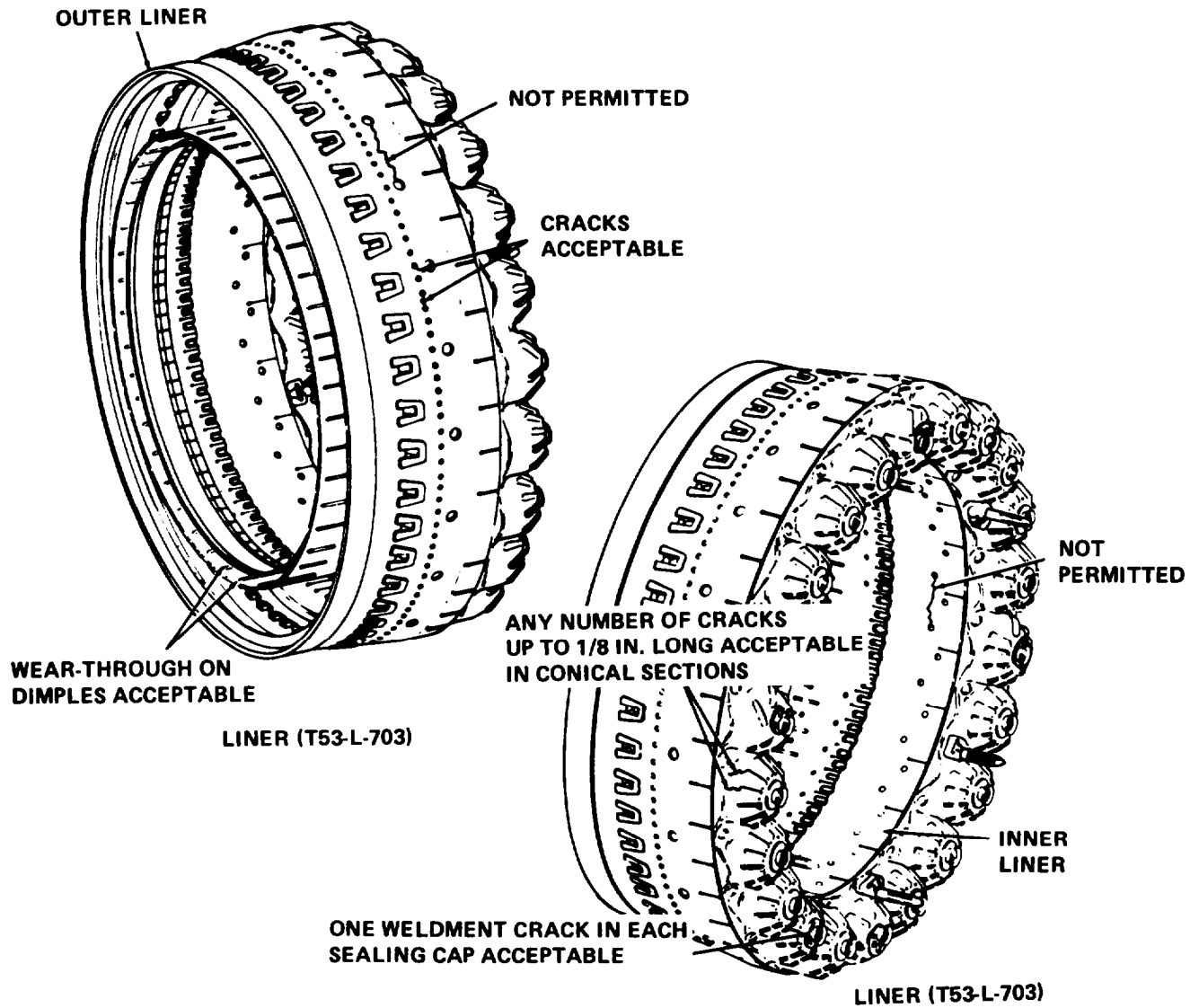
Any number of 1/8 inch (3.2 mm) long cracks are allowed at conical section louvers.

2. Combustion Chamber Liner

Any number of cracks progressing from nozzle holes to louvers in end liner are acceptable provided louver to louver cracks which could result in material fallout are not present. Cracks extending up to or adjacent to air holes are acceptable.

37. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued		





3-7. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION  
 CHAMBER LINER  
 ASSEMBLY/-  
 Continued

Damage limits for inner and outer liners are as follows:

**CAUTION**

On T53-L-13B engines, when cracks appear in the inner tab area emanated from the base of adjacent sawcuts, only axial and nonconvergent cracks are allowed. Reject liner if circumferential or convergent cracks are present. Circumferential or convergent cracks may result in material fallout.

**NOTE**

A total of five cracks up to one inch in length on both inner and outer liners are acceptable provided cracks are nonconvergent, tight-lipped and there is no possibility of material fallout.

Cracks between two holes are acceptable without repair except in areas shown in figures in item 1. Ten non-adjacent cracks per assembly are allowed.

On T53-L-13B engines only, cracks up to 3/4 inch (19.1 mm) in length originating at the base of the sawcuts are acceptable on all sawcuts provided cracks that emanate from any two adjacent sawcuts are nonconvergent. Only one crack is allowed per sawcut. Do not stop-drill cracks.

Cracks in a total of 30 resistance welds are acceptable without repair in each liner-to-liner or liner-to-flange weldment provided no more than four adjacent welds are affected.

3-7. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION  
CHAMBER LINER  
ASSEMBLY/-  
Continued

**CAUTION**

**Burning, distortion or uneven carbon buildup is an indication of malfunction or clogging of fuel system components. Investigate and replace malfunctioning or clogged components.**

**NOTE**

Areas of metal discoloration are acceptable.

**3. Liner**

Burn-through shall not exceed 3/4 square inch (4.84 square cm) per assembly.

**Replace** liner if burn-through exceeds specified limit or crack progression will cause material fallout.

**NOTE**

The following CAUTION and item 4 do not apply to T53-L-703 engines.

**CAUTION**

**Missing tabs could cause improper sealing between the inner liner and mating N 1 nozzle with resultant "downstream" damage.**

**4. Liners**

Missing tabs on liners are not acceptable,

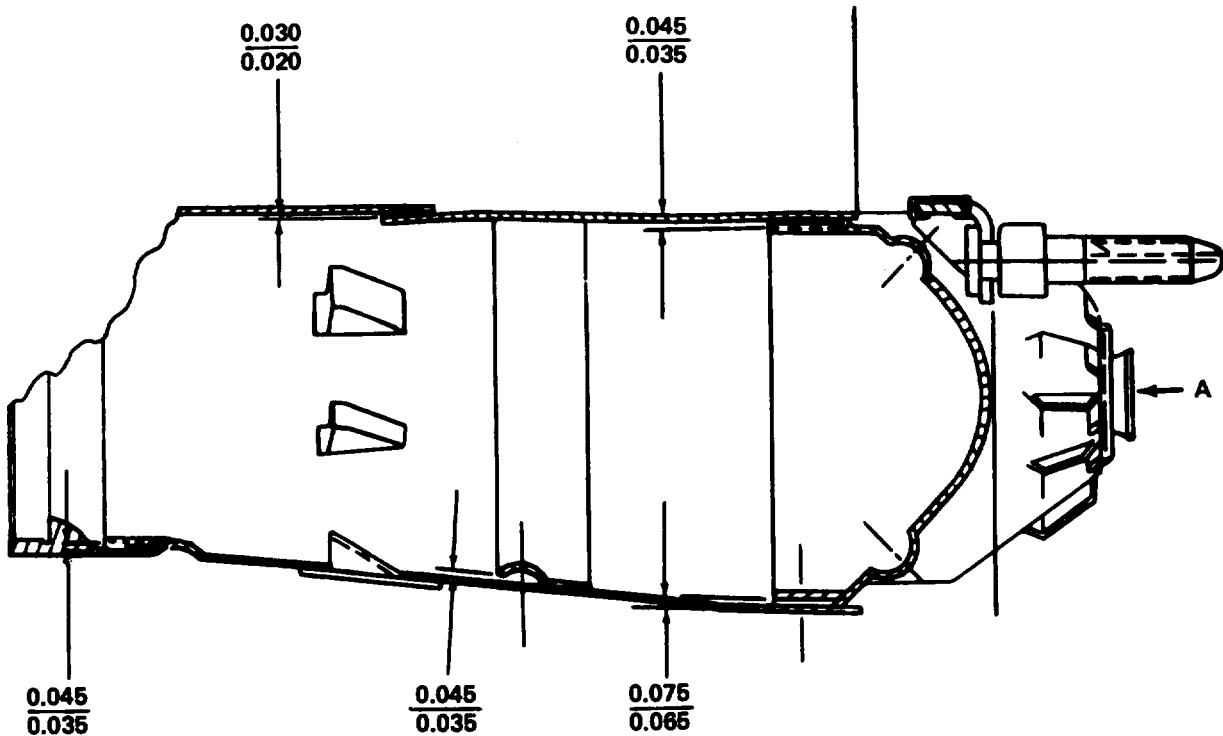
**Replace** liner if one or more tabs are missing.

Moderate warpage or buckling is acceptable, provided no interference of mating parts occurs.

On T53-L-13B engines only, buckling and warpage of inner liner walls is acceptable provided no associated cracks are evident.

3-7. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued		
5. Inner Liner Dimples	Wear through on any number of dimples is permitted.	Visually <b>inspect</b> for wear.
6. Liner Bracket and Studs		<b>Inspect</b> for wears. <b>Replace</b> liner bracket or stud if wear exceeds 1/4 of original thickness.
7. Air Gaps and Holes		<b>Inspect</b> for clogging. <b>Re-clean</b> liner assembly if air gaps or holes are clogged.
8. Air Gap	Air gap shall be as shown in figures below.	<b>Adjust</b> air gap as required, <b>using</b> suitable prying tool.



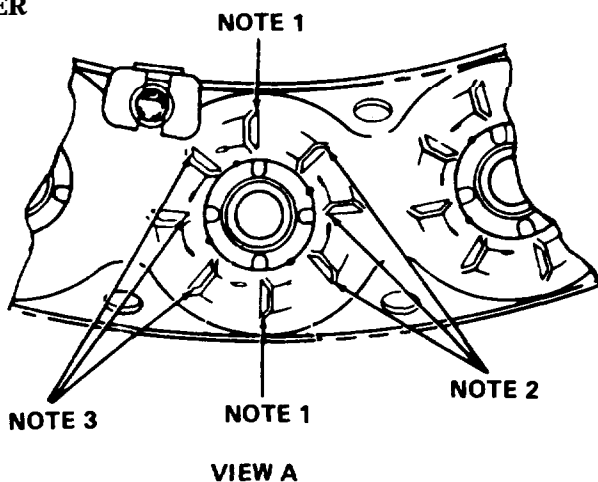
ALL DIMENSIONS ARE IN INCHES

(T53-L-13B/703 ENGINE)

3-7. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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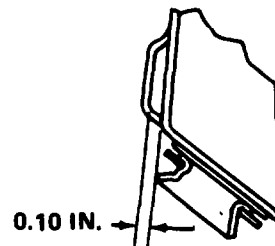
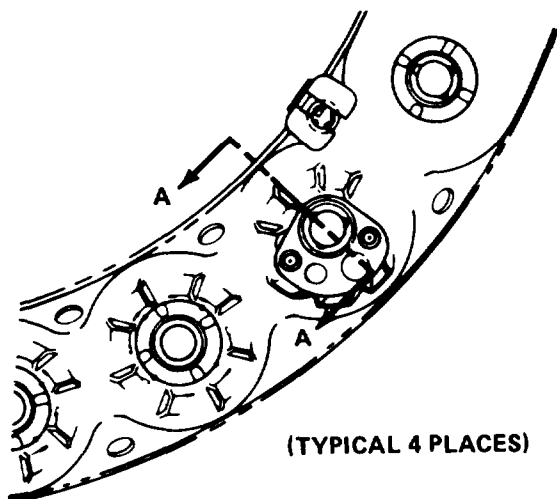
**COMBUSTION CHAMBER LINER ASSEMBLY/-**  
Continued



(T53-L-13B/703 ENGINE)

NOTES	AIR GAP (INCHES) (TYPICAL 18 PLACES)
1	0.075
2	0.050
3	0.100

ALL DIMENSIONS ARE IN INCHES



9. Studs

Inspect studs for damaged threads. If threads are damaged, replace studs as outlined in paragraph 3-9.

10. Seal Guides

One tab missing from each seal guide is acceptable.

Inspect seal guides for wear, missing tabs, and other damage. Replace seal guide(s) if worn or damaged or more than one tab is missing. (Refer

3-8 Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM)

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Engines

**Consumable Materials**  
Alloy Wire (item 93, Appendix D)

**Special Tools**  
Welding Fixture Studs (LTCT783)  
Welding Fixture (LTCT780)

**References**  
Para H-12, H-26, H-20 and 3-39

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAM-  
BER LINER ASSEM-  
BLYI

**NOTE**

Repair outer liner according to action for items 1 and 2.

1. Combustion chamber Liner

**Determine ends of crack.**

2. Combustion Chamber Liner

Use 1/16 in. diameter drill.

**Stop-drill** crack 1/16 in. beyond crack ends. Deburr both sides of stop-drilled holes.

**NOTE**

Replace worn or damaged studs according to actions for items 3 thru 5.

3. Retainer Plate

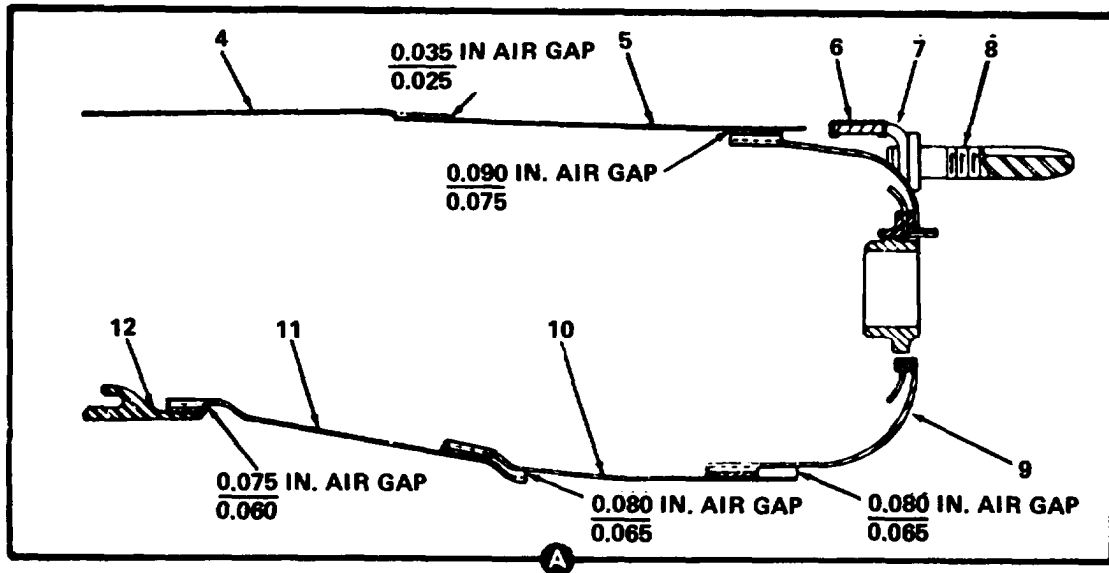
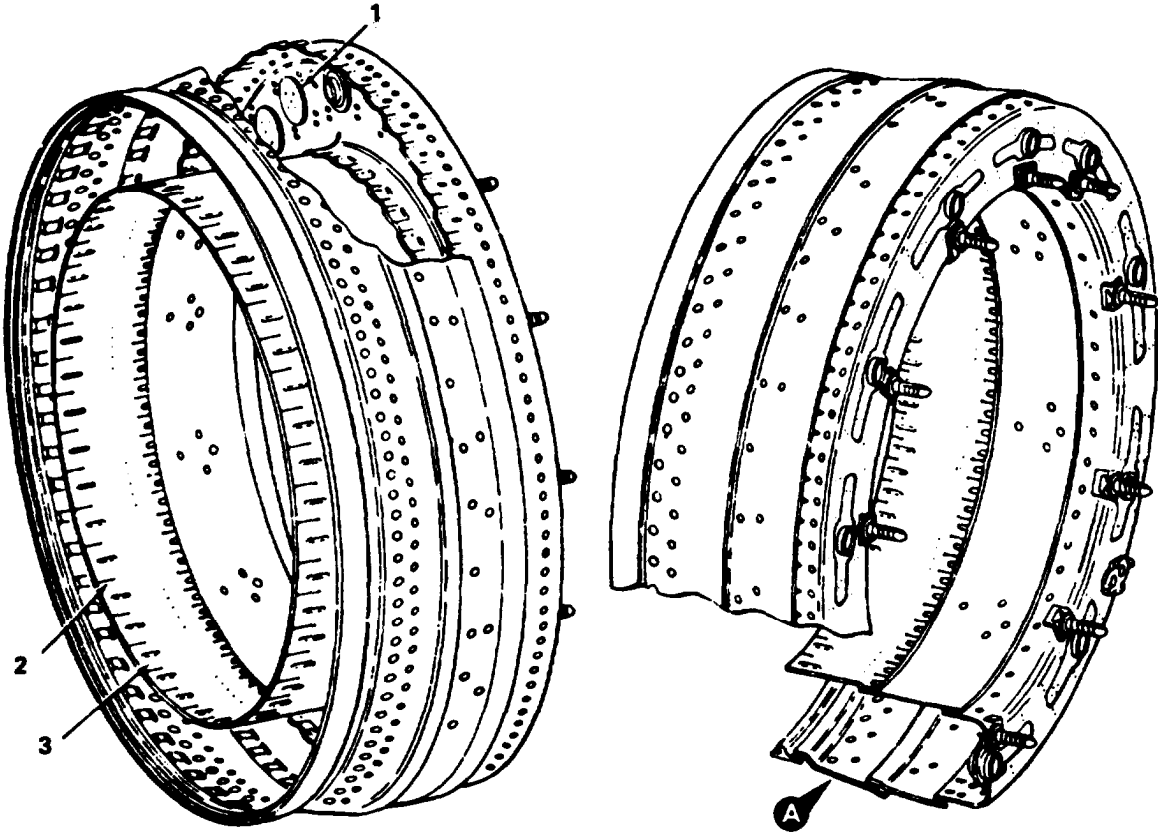
Retainer plate secures stud to bracket.

**Remove.**




1. Disc
2. Sawcut
3. Tab
4. Forward Inner Liner
5. Rear Inner Liner
6. Retainer Plate
7. Mounting Bracket
8. Stud
9. Plate and End Liner Assembly
10. Rear Outer Liner
11. Forward Outer Liner
12. Flange

3-8. Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM) - Continual

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued		



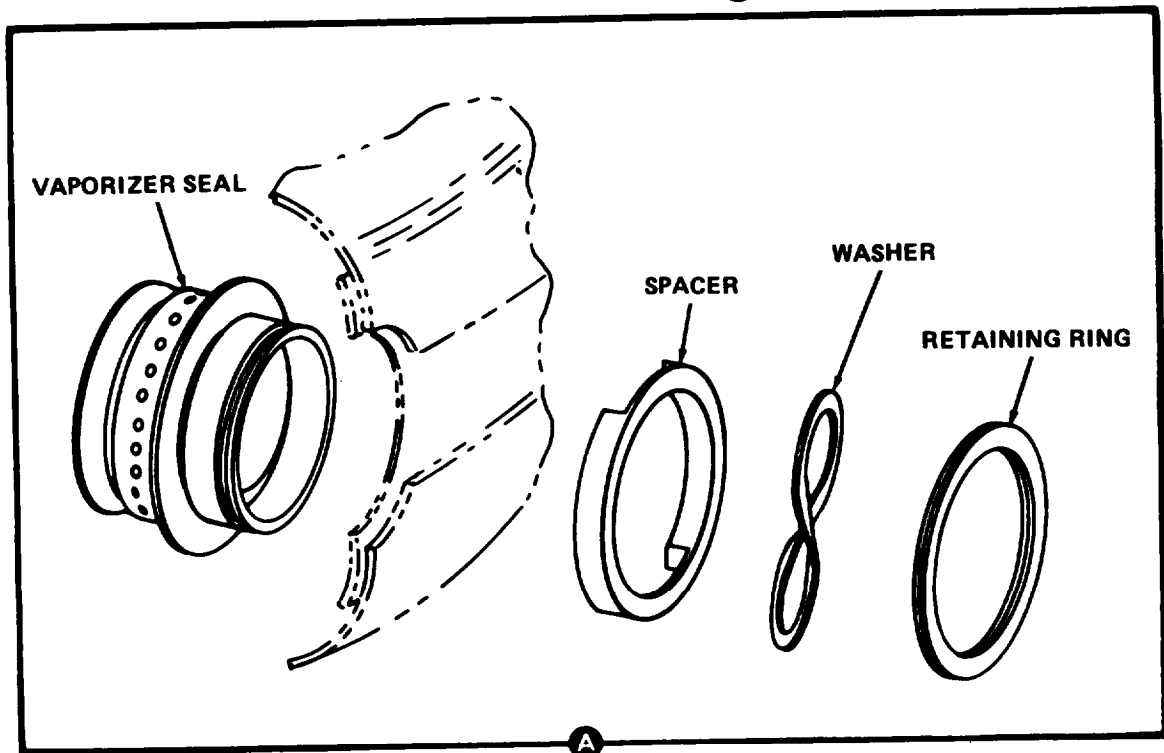
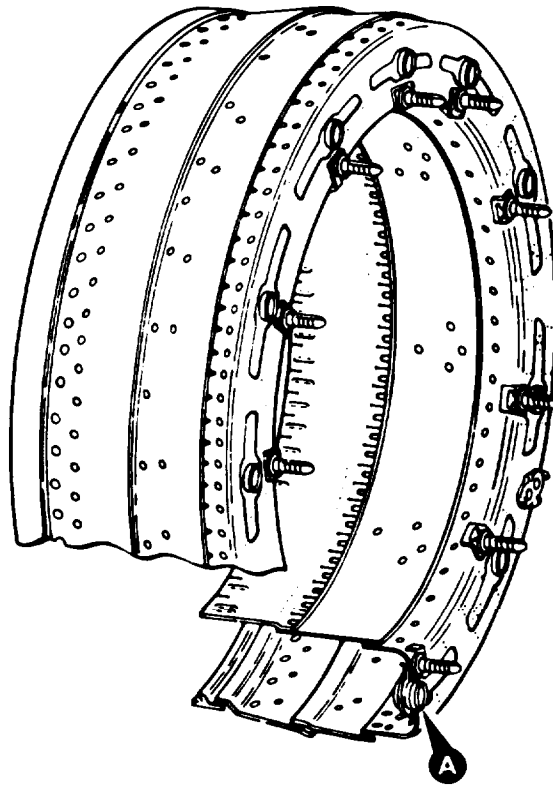
3-8 Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued</p>	<p>Studs must have the same part numbers as those they replace. See figure following for part numbers.</p>	<p><b>Withdraw</b> defective stud, and <b>replace</b> with new stud with key slot towards outer edge of liner.</p>
<p>4. Stud</p>	 <p>(1-130-096-01)</p>	
	 <p>(1-130-096-02)</p>	
<p>5. Retainer Plate</p>	 <p>(1-130-096-03)</p>	<p><b>Install</b> new retainer plate and <b>bend</b> tabs to lock stud in place.</p>
	<p><b>NOTE</b></p>	
	<p>On liner assembly 1-130-600-03, replace worn vaporizer seal according to actions for items 6 and 7.</p>	
<p>6. Retaining Ring, Washer, Spacer and Defective Seal</p>		<p><b>Remove.</b></p>

3-8. Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued





3& Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued

7. Vaporizer Seal	Secure these parts with waaher and retaining ring.	Replace with new seal 1-130-094-05. Install seal in forward end of liner assembly, and position spacer flange end facing liner on seal from aft end of liner assembly.
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**NOTE**

Replace mounting brackets that are worn beyond allowable limits, damaged or distorted according to actions for items 8 thru 18.

8. Retainer Plate and studs	See figure in item 3.	Remove.
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When removing weld, do not grind into Parent matal or liner assembly.

9. Mounting Brackets	Use hand grinder.	Remove damaged mounting brackets from liner assembly.
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10. Vaporizer Scala	Refer to note following item 5.	Ramove from three locations in liner assembly to accommodate welding fixture locating pins.
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11. Mounting Brackets	Insure that area of liner assembly to be welded is clean.	Vapor-degrease replace ment mounting brackets. (Refer to paragraph H-12.)
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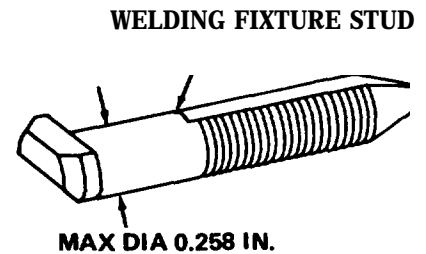
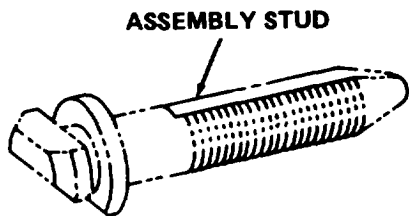
**NOTE**

Welding fixture studs installed in following actions for item 12, are part of welding fixture assembly and have oversize shanks (0.258 inch maximum) to aline mounting brackets positively. A welding fixture stud is shown in detail in following figure.

3-8. Combustion Chamber Liner (733-L-1 1 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued



NOTE:  
WELDING FIXTURE STUD IS ASSEMBLY STUD ALTERED AS INDICATED.

12. Mounting Brackets

Loosely install welding fixture studs (LTCT783) in welding fixture (LTCT 780). Place liner assembly on bench with forward end down, and position welding fixture on liner assembly.

NOTE

Some mounting brackets installed in following action for item 13 may require slight rework (filing) to fit radius of liner assembly.

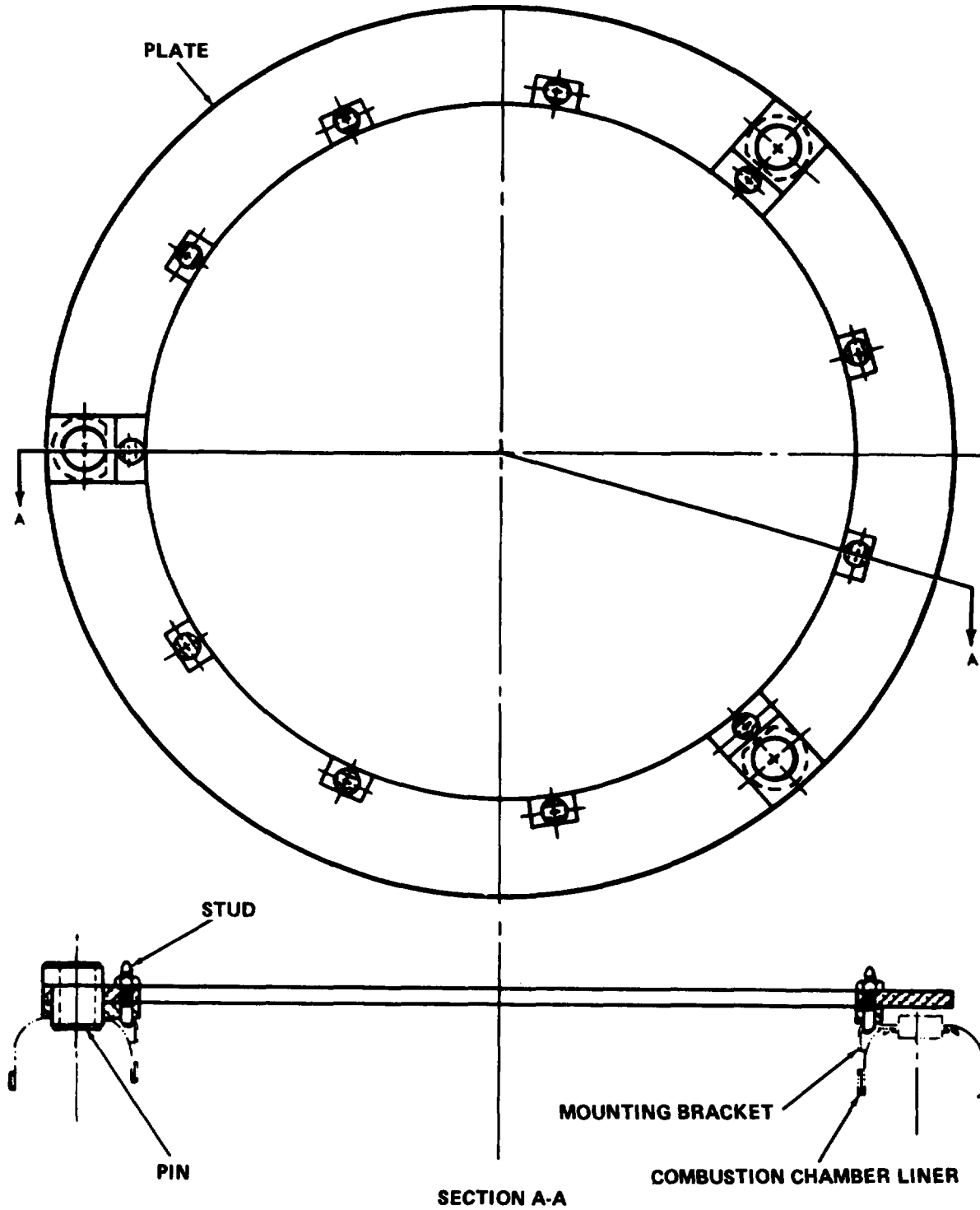
13. Mounting Brackets

Slide replacement mounting brackets under heads of corresponding welding fixture studs until brackets are seated against radius of liner assembly annulus. Tighten nuts to secure brackets.

3-8. Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued



3-8. Combustion Chamber Liner (T53L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued

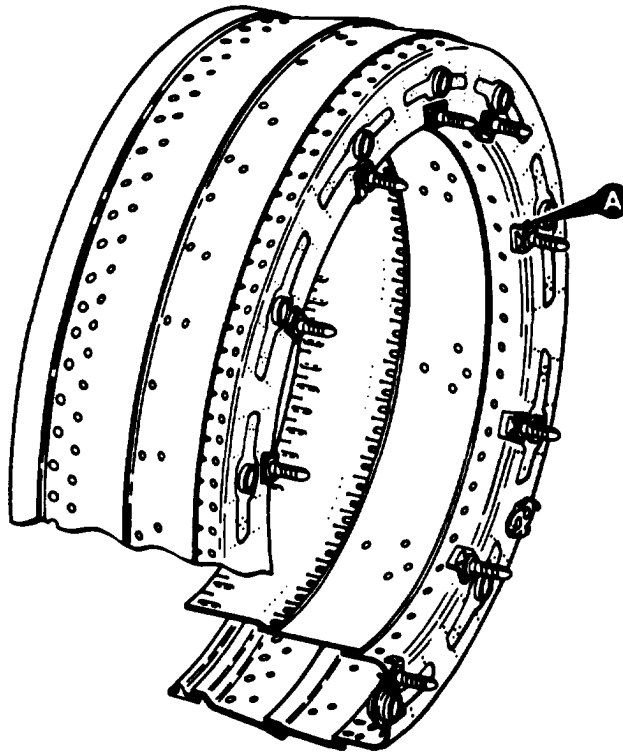
**CAUTION**

To prevent burn-through of liner assembly during welding, concentrate bulk of heat toward mounting bracket. If necessary, back up parent metal with brass or copper.

14. Mounting Brackets

Use alloy wire (item 93, Appendix D). Refer to paragraph H-26.

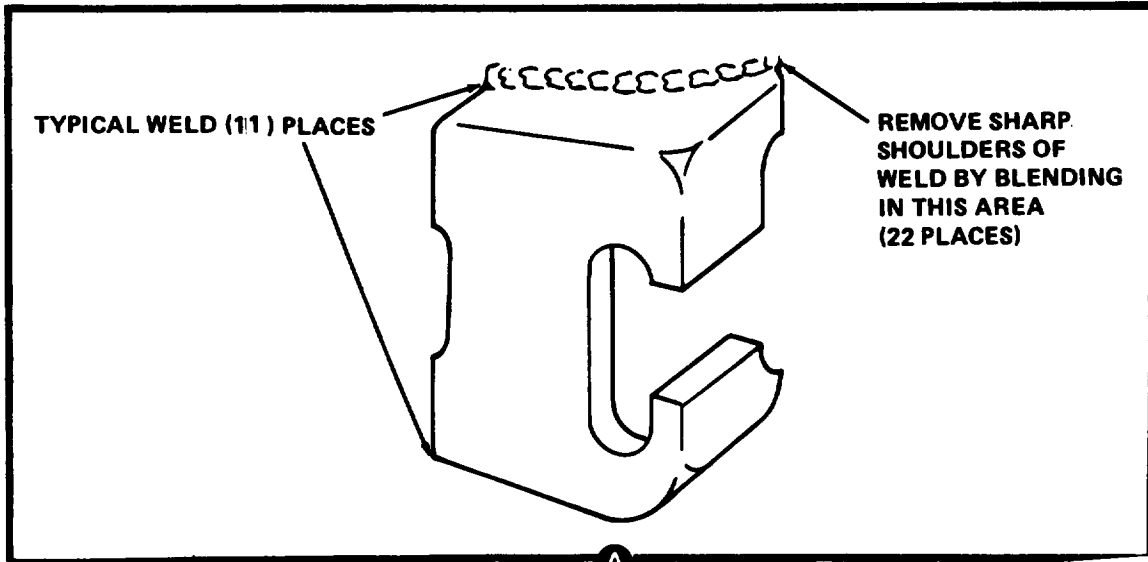
Weld mounting brackets to liner assembly with 0.040 to 0.060 in. (0.102 to 0.152 cm) fillets. Weld as much as possible without removing fixture.



3-6. Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued



**N O T E**

When completing weld in following action for item 15, weld fillet must not extend into opening at bracket base.

15. Mounting Brackets

See figure in item 14.

**Remove** nuts from welding fixture studs and **lift off** fixture. **Remove** studs and complete weld. **Blend-weld** to remove sharp shoulder at bracket corners.

16. Weld

Observe the following limits for inspection:

- a. Weld beads shall be reasonably smooth and free from irregularities in accordance with good aircraft quality welding practice. The weld bead shall blend into adjacent parent metal in gradual, smooth curves.
- b. Overlapping and lack of weld fusion are not acceptable.
- c. Cracks and cracklike indication are not acceptable.

**Inspect** visually by fluorescent-penetrant method. (**Refer** to paragraph H-20.)

3-8. Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM) - Continued

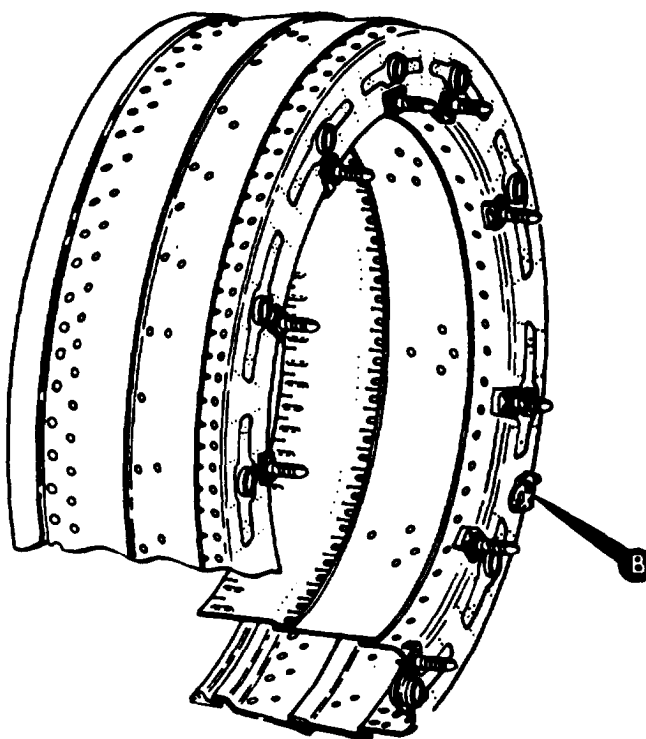
LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued		
17. Studs		<b>Install</b> in liner mounting brackets. <b>Secure</b> studs with new retaining plates.
18. Vaporizer Scala	See note following item 5.	<b>Install</b> vaporizer seals removed to accommodate welding fixture.

**NOTE**

Replace worn or damaged seal plates according to actions for items 19 thru 21.

19. Seal Plates

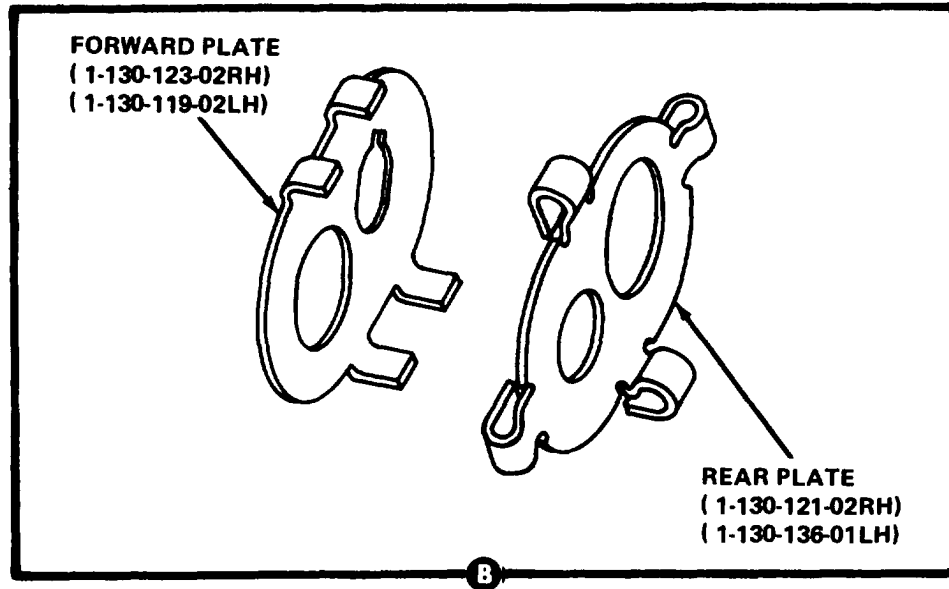
**Replace** plates by **bending** tangs on rear plate over sealing disk flange using needle nose pliers, and **remove** from liner assembly.



3-8. Combustion Chamber Liner (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER LINER ASSEMBLY/ - Continued



**NOTE**

Plates are identified (TOP LEFT HAND) and (TOP RIGHT HAND). When installing new plates, insure that they are placed in proper location.

20. Seal Plates

**Align** tops of new form forward and rear plates, identification side up, and **assemble** by **bending** tangs on forward plate over rear plate.

**NOTE**

After installation of plates in following item 21, plates will have some freedom of movement.

21. Seal Plates

**Install** plates on liner assembly, top of plates facing inside diameter of liner, and **secure** by **banding** tangs of rear plate under sealing disc flange.

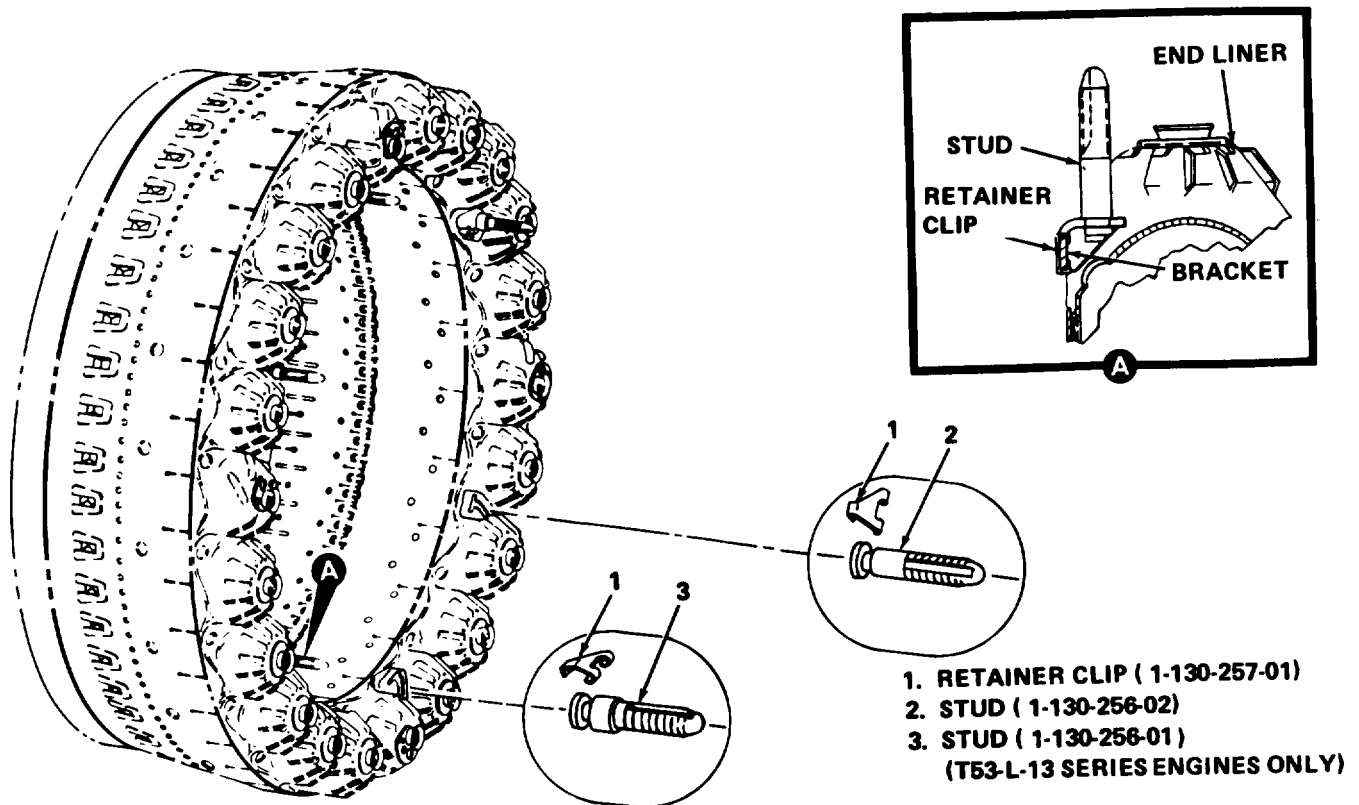
3-9. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Repair (AVIM)

INITIAL SETUP

Applicable Configuration  
T53-L-13B/703 Engines

Consumable Materials  
Welding Wire (item 92, Append&D)

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/		
1. Combustion Chamber Liner Assembly	When performing step b., new stud must have same part number as old stud.	<p>Replace damaged studs as follows:</p> <p><b>a. Remove</b> retainer clip (1) that secures stud (2 or 3) to bracket.</p> <p><b>b. Remove</b> damaged stud, <b>Replace</b> with new stud.</p> <p><b>c. Install</b> new retainer clip. <b>Band</b> tabs to lock stud in place.</p>





3-9. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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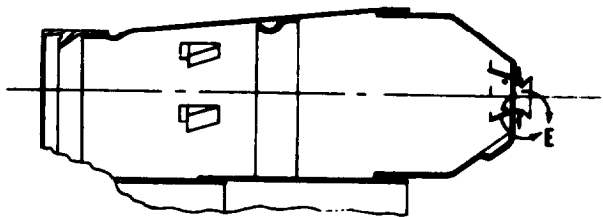
COMBUSTOR TUR-  
BINE ASSEMBLY/-  
Continued

2. Combustion Cham-  
ber Liner Assembly

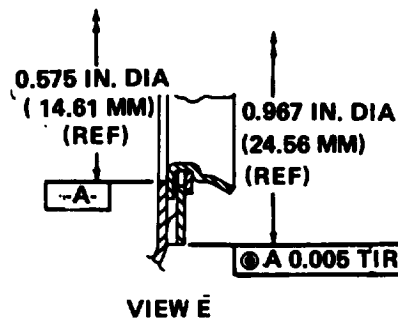
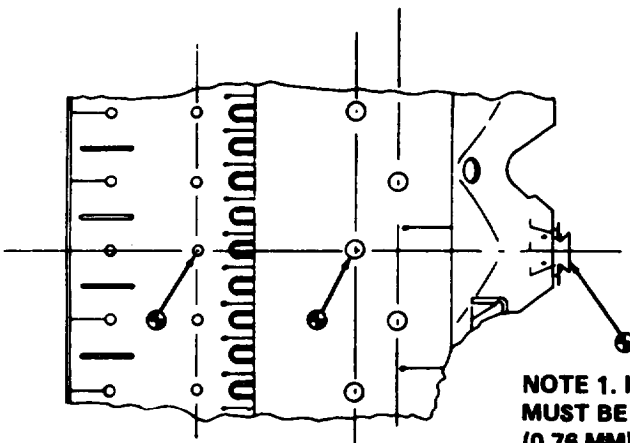
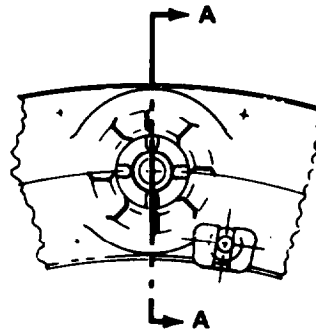
This action pertains to seal guides 1-130-790-01 or 1-130-790-02. Use scribe when performing step a.

Replace worn or dam-  
aged seal guides as  
follows:

a. Outline position of  
seal guide being re-  
placed.



VIEW A-A



NOTE 1. HOLES MARKED  $\odot$   
MUST BE IN LINE WITHIN 0.03 INCH.  
(0.76 MM)

3-9. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION TURBINE ASSEMBLY/- Continued		

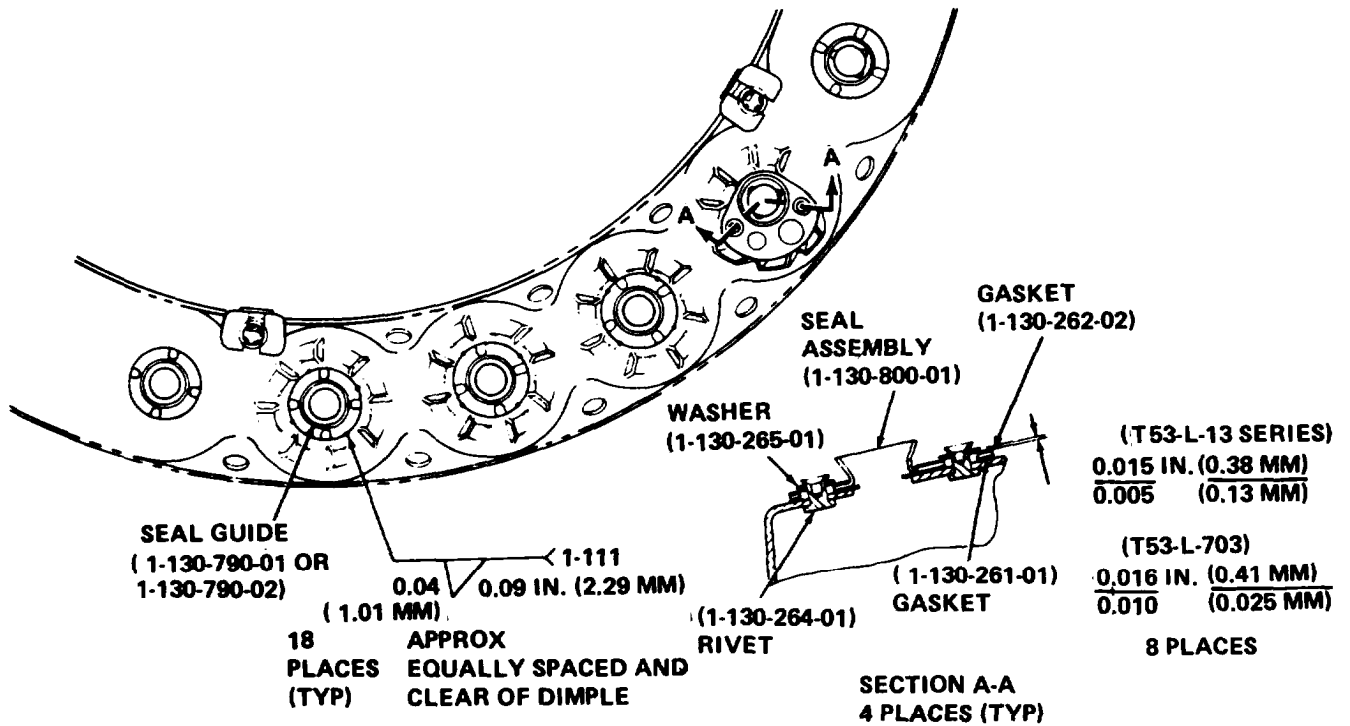
**CAUTION**

In step b., use care not to grind parent metal of liner.

b. (AVIM) Using Carbide burr, **grind** tack weld and **remove** worn or damaged guide.

Use welding wire (item 92, Appendix D).

c. (AVIM) **Position** new seal guide assembly. **Tack weld** in four places.



3. Combustion Chamber Liner

This action pertains to seal guide 1-130-800-01. See figure in item 2, step c. Loose rivets and/or elongated rivet holes are acceptable and not cause for guide or rivet replacement.

Replace worn or damaged seal guide as follows:

a. Remove rivets by grinding formed heads.

3-9. Combustion Chamber Liner Assembly (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TUR- BINE ASSEMBLY/ - Continued	<p style="text-align: center;">See figure in item 2, step c.</p>	<p>b. <b>Remove</b> damaged seal guide assembly, rivets, washers, <b>and</b> gaskets.</p> <p>c. <b>Install</b> new gaskets (1-180-261-01 and 1-180-261-02), seal assembly (1-130-800-01), and rivets (1-130-284-01) and washer (1-130-265-01).</p> <p>d. <b>Head</b> over rivets. <b>Maintain</b> 0.005 inch to 0.015 inch (0.13 mm to 0.38 mm) gap by <b>temporarily inserting</b> shim stock while forming rivet heads.</p> <p>e. <b>Remove</b> shim stock and <b>check</b> seal guide assembly for freedom of movement.</p>

310. Air Deflector, First stage Turbine Nozzle and Flange Assembly, Combustion Chamber Deflector, Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - Removal

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engine

**References**  
Para 4-2,4-28  
Appendix G, Table G-5, Reference Number 38

**Special Tools**  
Rear Bearing Liner Puller (LTCT843)

3-10. Air Deflector, First Stage Turbine Nozzle and Flange Assembly, Combustion Chamber Deflector, Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/	<p style="text-align: center;"><b>NOTE</b></p> <p style="text-align: center;">It is necessary to remove these parts only to correct visible damage or to replace parts.</p> <p>1. Combustor Turbine Assembly and First Stage Turbine Rotor</p> <p>See paragraphs 4-2 and 4-28.</p>	<p style="text-align: center;">Remove.</p>

**CAUTION**

Break torque on all bolts before removing first bolt. The parts secured by these bolts should be shifted or rotated as necessary to relieve binding of bolts and to prevent damage to parts or threaded holes upon removal.

2. Air Deflector and First Stage Turbine Nozzle and Flange Assembly

Bolts secure air deflector (11) and first stage turbine nozzle and flange assembly (10) to rear bearing support housing.

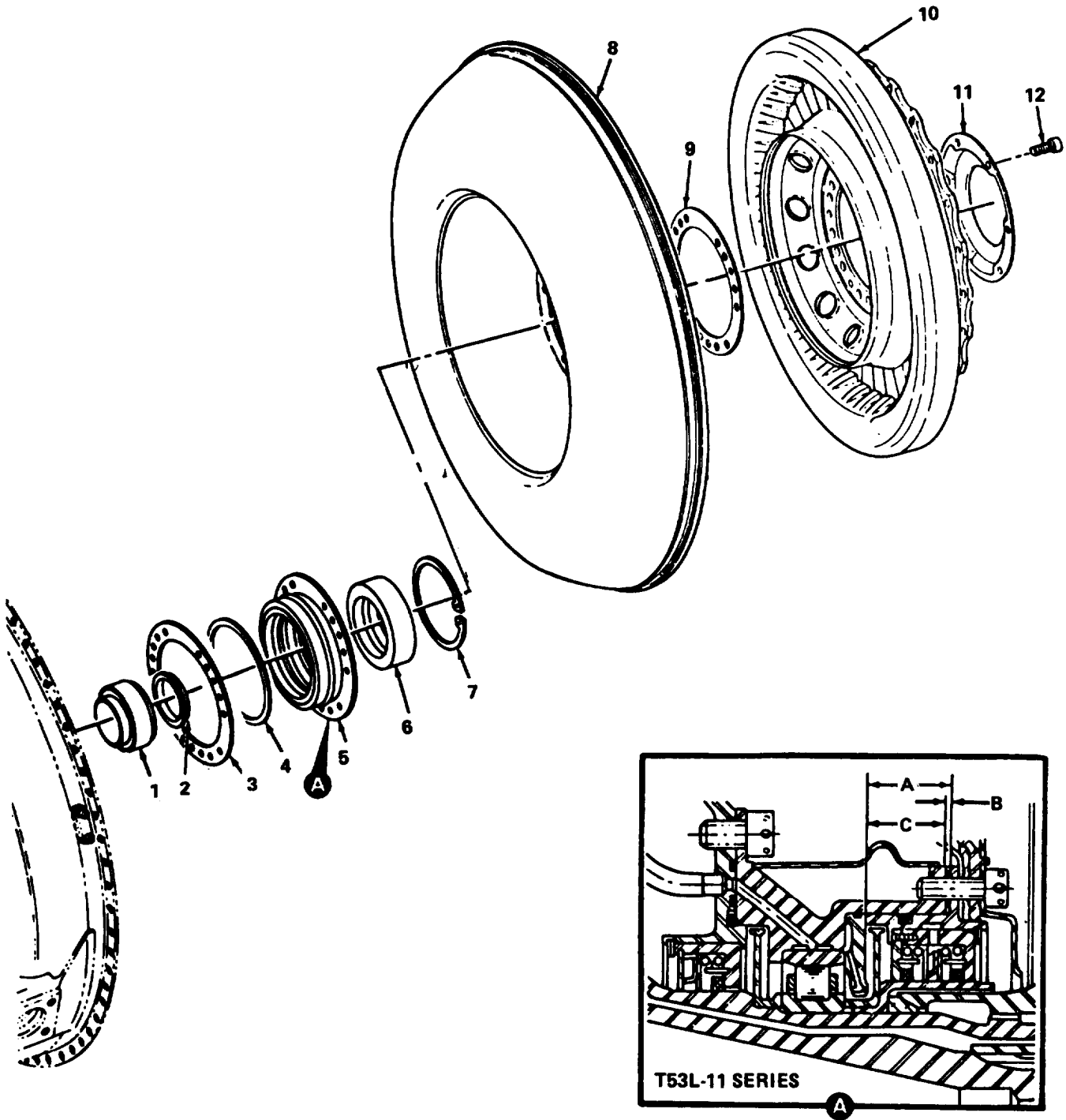
Remove and retain for seal housing removal.

**WARNING**

When handling combustion chamber internal parts that have been exposed to fuels containing tetraethyl lead, insure that the byproduct (poisonous lead oxide) is not inhaled or taken into the body through cuts or other external openings. If accidental exposure occurs, drench affected area with large amounts of clean water and obtain immediate medical attention.

3-10. Air Deflector, First Stage Turbine Nozzle and Flange Assembly, Combustion Chamber Deflector, Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued		



**3-10. Air Deflector, First Stage Turbine Nozzle and Flange Assembly, Combustion Chamber Deflector, Rear Bearing Seal end Seal Housing (T53L-11 Sales Engines) - Removal - Continued**

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued		
3. Air Deflector (11) and First Stage Tur- bine Nozzle and Flange Assembly (10)		<b>Remove.</b>
4. shim (9)		<b>Remove</b> and <b>record</b> shim thickness.
6. Combustion Cham- ber Deflector (8)		<b>Remove.</b>
NOTE		
Do not remove seal housing (5) and seal (5), even though there may be carbon on seal face, unless engine oil consumption is excessive, and there is no evidence of loss through leaks in other parts of engine. If it is nec- essary to remove seal housing and seal, proceed with following action for items 9 and 10.		
6. Seal Housing (5)		<b>Remove</b> using three bolts (12) as pullers. <b>Discard</b> bolts.
7. Snapring (7)		<b>Remove</b> from housing.
8. Seal (6)		<b>Press</b> from housing with arbor press. <b>Remove</b> packing (4).
9. shim (3)		<b>Remove</b> and <b>record</b> shim thickness (dimen- sion B) for reassembly.
10. Seal Housing (6)	Perform this action if necessary.	<b>Replace</b> as follows:  a. <b>Record</b> dimension A (distance from mating flange surface to forward end of replacement seal housing).

310. Air Deflector, First Stage Turbine Nozzle and Flange Assembly, Combustion Chamber Deflector, Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued		<p>b. <b>Record</b> dimension C (distance from bearing housing rear flange to bearing retainer).</p>

**NOTE**

Be certain that bearing retainer is not cocked, and is bottomed against outer race.

c. **Subtract** dimension C from dimension A to determine dimension B. **Subtract** 0.010 to 0.014 inch from dimension B to **determine** thickness of shim required to provide pinch fit on bearing outer race, pinch fit shall be as given in Reference No. 38, table G-5, Appendix G.

11. Liner (1)

Liner is installed on rear compressor shaft. If not damaged do not remove liner, If damaged, remove liner, using rear bearing liner puller (LTCT843).

**Wipe and inspect** for scoring of plated area or other damage.

**NOTE**

Cone (2) will be removed with liner.

3-11. Air Deflector and Combustion Chamber Deflector (T53-L-11 Series Engines) - Inspection

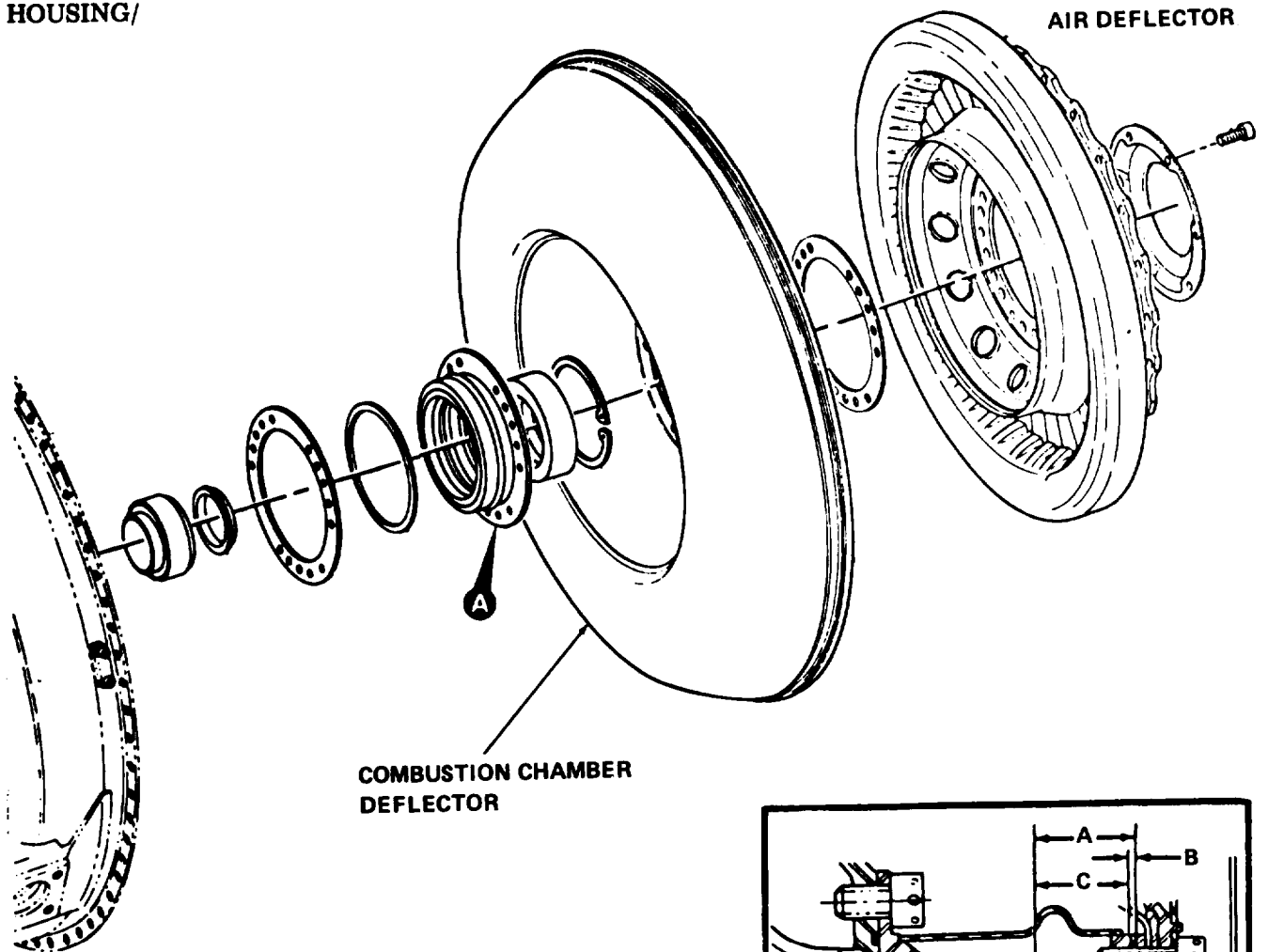
INITIAL SETUP

**Applicable Configuration**  
T53-L11 Series Engines

**References**  
Pam 3-12

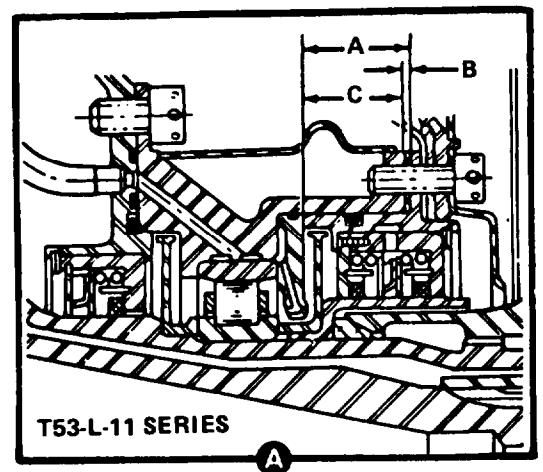
LOCATION/ITEM	REMARKS	ACTION
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**DIFFUSER  
HOUSING/**



**COMBUSTION CHAMBER  
DEFLECTOR**

**AIR DEFLECTOR**





3-11. Air Deflector and Combustion Chamber Deflector (T53-L-11 Series Engines) - Inspection.

Continued

LOCATION/ITEM	REMARKS	ACTION
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DIFFUSER HOUSING/ - Continued

**WARNING**

When handling combustion chamber internal parts that have been exposed to fuels containing tetraethyl lead, insure that the byproduct (poisonous lead oxide) is not inhaled or taken into the body through cuts or other external openings. If accidental exposure occurs, drench affected area with large amounts of clean water and obtain immediate medical attention.

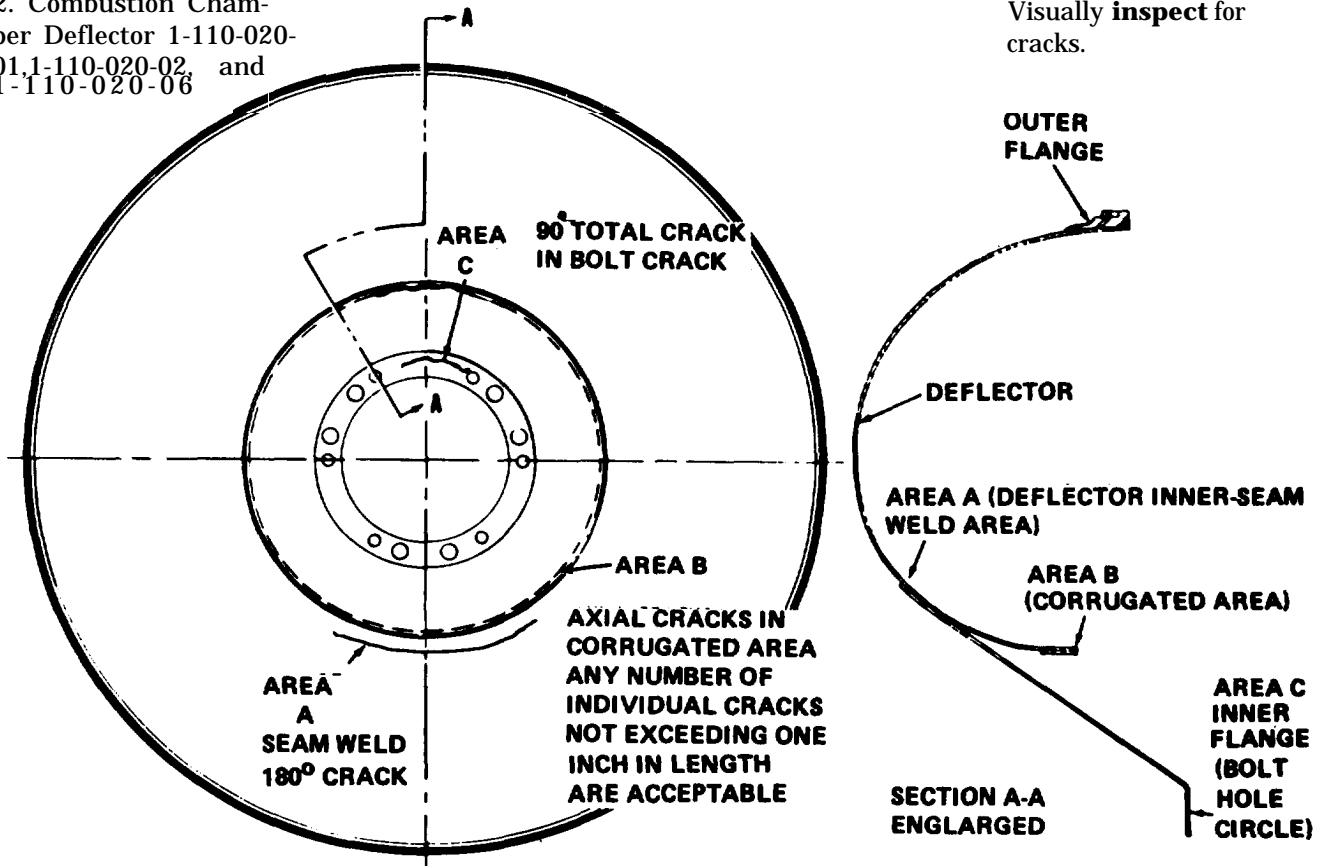
1. First Stage Turbine Rotor Air Deflector

Observe the following limits:

Visually inspect for cracks. Replace if cracks are observed.

2. Combustion Chamber Deflector 1-110-020-01, 1-110-020-02, and 1-110-020-06

Visually inspect for cracks.



**3-11. Air Deflector and Combustion Chamber Deflector (T53-L-11 series Engines) - Inspection - Continued**

LOCATION/ ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued	<p>a. Cracks in or next to deflector inner seam weld (Area A) less than 180 degrees are acceptable without repair.</p> <p>b. Cracks in or next to inner seam weld which are in excess of 180 degrees, but less than 300 degrees, shall be repaired as outlined in paragraph 3-12.</p> <p>c. Any number of axial cracks, not exceeding one inch (25.4 mm) are allowed in corrugated area (Area B).</p> <p>d. Cracks are allowed in bolt hole circle (Area C), provided they do not total more than 90 degrees.</p> <p>e. If length of cracks 1/8 inch (3.2 mm) wide or wider exceeds 180 degrees, combustion chamber deflector shall be rejected.</p>	
3. Combustion Chamber Deflector (1-110-440-01 and 1-110-440-02)	Cracks in spot-welds adjacent to corrugated area are acceptable, provided support is not separated from deflector (curl).	Visually inspect for Cracks.

**3-12. Air Deflector and Combustion Chamber Deflector (T53-L-11 Series Engines) - Repair (AVIM)**

INITIAL SETUP

<b>Applicable Configuration</b> T53-L-11 Series Engines	<b>Consumable Materials</b> Welding Wire (items 90 and 91, Appendix D) Alloy Wire (item 93, Appendix D)	
LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/		

3-12, Air Deflector and Combustion Chamber Deflector (T53-L-11 Series Engines) - Repair (AVIM) -  
Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued		
1. Combustion Chamber Deflector	Cracks in or next to inner seam weld which are in excess of 180 degrees, but less than 300 degrees shall be repaired.	<b>Repair.</b>
2. Cracks	Perform this action on each end of cracks in excess of 30 degrees. Whenever possible, provide additional tack-welds, equally distributed, to maintain alinement for fusion welding.	<b>Tack-weld.</b>
3. Cracks	Perform this action on open cracks 1/8 inch (3.2 mm) in width. Use vise clamps or blocks to push halves of cracks together.	<b>Tack-weld</b> only at crack ends. <b>Diminish</b> crack opening by <b>pushing</b> halves together.
4. Cracks	Use filler material specified in following table.	<b>Fusion-weld</b> between tack-welds.
<u>Nomenclature</u>	<u>Detail of Part Number</u>	<u>Filler Material</u>
Deflector	1-110-020-01	Welding Wire (item 91, Appendix D)
Deflector	1-110-020-02	Welding Wire (item 91, Appendix D)
Deflector	1-110-020-06	Alloy wire (item 93, Appendix D)
Inner Flange	All	Welding Wire (item 90, Appendix D)
Outer Flange	All	Welding Wire (item 90, Appendix D)
5. Inner Flange (Bolt Hole Ring and Surrounding Parent Metal)	Use filler material specified in preceding table.	Repair cracks by fusion-welding process.

**3-13. Air Deflector, First Stage Turbine Nozzle Assembly, Combustion Chamber Deflector, and Rear Bearing and Seal Housing(T53-L-11 Series Engines) - Installation**

INITIAL SETUP

**Applicable Configuration**  
T53-L-1 1 Series Engines

**Special Tools**  
Installing Tool (LTCT4013)

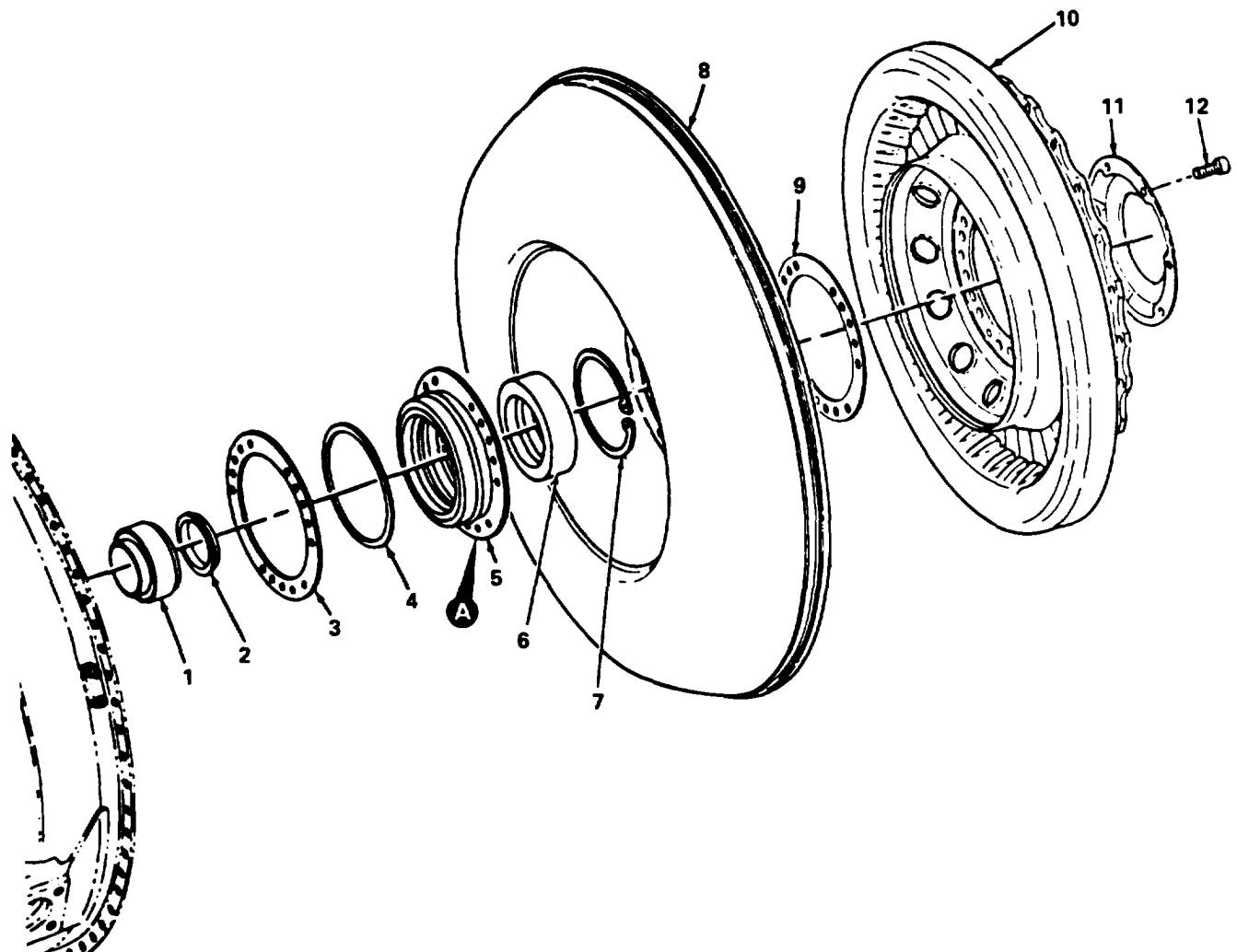
**Consumable Materials**

Molykote Anti-Seize Thread Compound (Item 56, Appendix D)  
Anti-Seize, 767 (item 102, Appendix D)  
Nickel-Ease (item 103, Appendix D)  
Lockwire (items 41,42, or 43, Appendix D)

**References**

Para 3-10  
Appendix G, Table G-3, Reference Number 20  
Appendix G, Table G-5, Reference Number 42

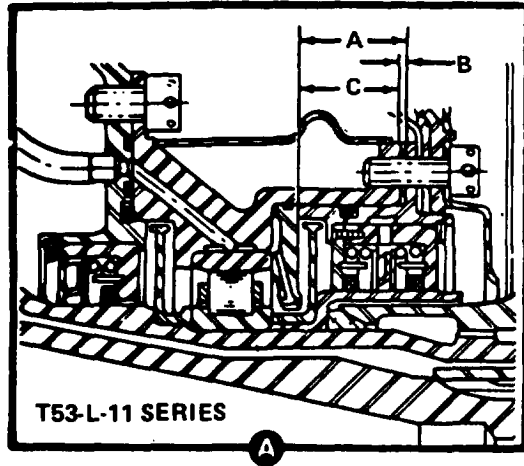
LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/		



3-13. Air Deflector, First Stage Turbine Nozzle Assembly, Combustion Chamber Deflector, and Rear Bearing Seal and Seal Housing (753-L-1 1 series Engines) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
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DIFFUSER HOUSING/ -  
 Continued



**CAUTION**

In following action for item 1, do not tap liner (1) to install.

1. Liner (1)

If liner (1) and cone (2) have been removed.

**Insure** that impeller is in place and install liner on rear compressor shaft.

**CAUTION**

In following action for item 2, insure that cone is not tilted during installation. Check alinement of liner with impeller.

2. Cone

**Position** cone with beveled edge facing aft on rear compressor shaft. **Using** installing tool (LTCT4013), **drive** cone into shaft until bottomed.

3-13. Air Deflector, First Stage Turbine Nozzle Assembly, Combustion Chamber Deflector, and Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - installation - Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued	<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div> <p>Before installing in following item 3, insure that liners of seal (6) and seal housing (5) are free from burrs and varnish buildup. Insure that graphite rings in seal are not damaged. Graphite rings in seal must be kept dry during assembly.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>If new shim or seal housing is to be installed, determine thickness as outlined in paragraph 3-10.</p>	<p><b>Press</b> rear bearing seal (6) into seal housing (5), and <b>install</b> snapping (7). <b>Install</b> new packing (4) on seal housing.</p> <p><b>Position</b> seal, housing and shim over liner and <b>push</b> seal and housing as far forward into rear housing assembly as possible. <b>Aline</b> bolt holes in seal housing with bolt holes in rear bearing housing assembly.</p> <p><b>Position</b> on compressor rear bearing housing assembly and <b>aline</b> holes in deflector with holes in rear bearing housing assembly.</p> <p><b>Select</b> a laminated shim the same thickness as that recorded during removal. (<b>Refer</b> to paragraph 3-10)</p>
3. Rear Bearing Seal (6)	Use arbor press.	
4. Seal Housing and Shim		
5. Combustion Chamber Deflector (8)		
6. Laminated Shim		

3-13. Air Deflector, First Stage Turbine Nozzle Assembly, Combustion Chamber Deflector, and Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - Installation  
-Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ Continued		
7. Shim		<b>Position</b> shim (9) against combustion chamber deflector. <b>Aline</b> holes in shim with holes in deflector.
8. First Stage Turbine Nozzle Assembly (Nozzle and Flange)		<b>Position</b> on shim.
9. Air Deflector(11)		<b>Position</b> on nozzle assembly, with the dished portion up.
10. Holes of First Stage Turbine Nozzle and Deflector		<b>Aline</b> holes of first stage turbine nozzle and deflector with holes in shim and combustion chamber deflector.
11. New Bolts (12)		<b>Apply</b> Molykote Anti-Seize Thread Compound (item 56, Appendix D) or Anti-Seize, 767, (item 102, Appendix D), or Nickel-Ease (item 103, Appendix D) to new bolts (12)
<b>NOTE</b>		
Always use new bolts (12) for reassembly In following action for item 12.		
12. Shim, Nozzle, Air Deflector, and Combustion Chamber Deflector	Refer to Appendix G, table G-3, reference number 20.	<b>Secure</b> to compressor rear bearing housing assembly with bolts (12). <b>Tighten</b> bolts as required.

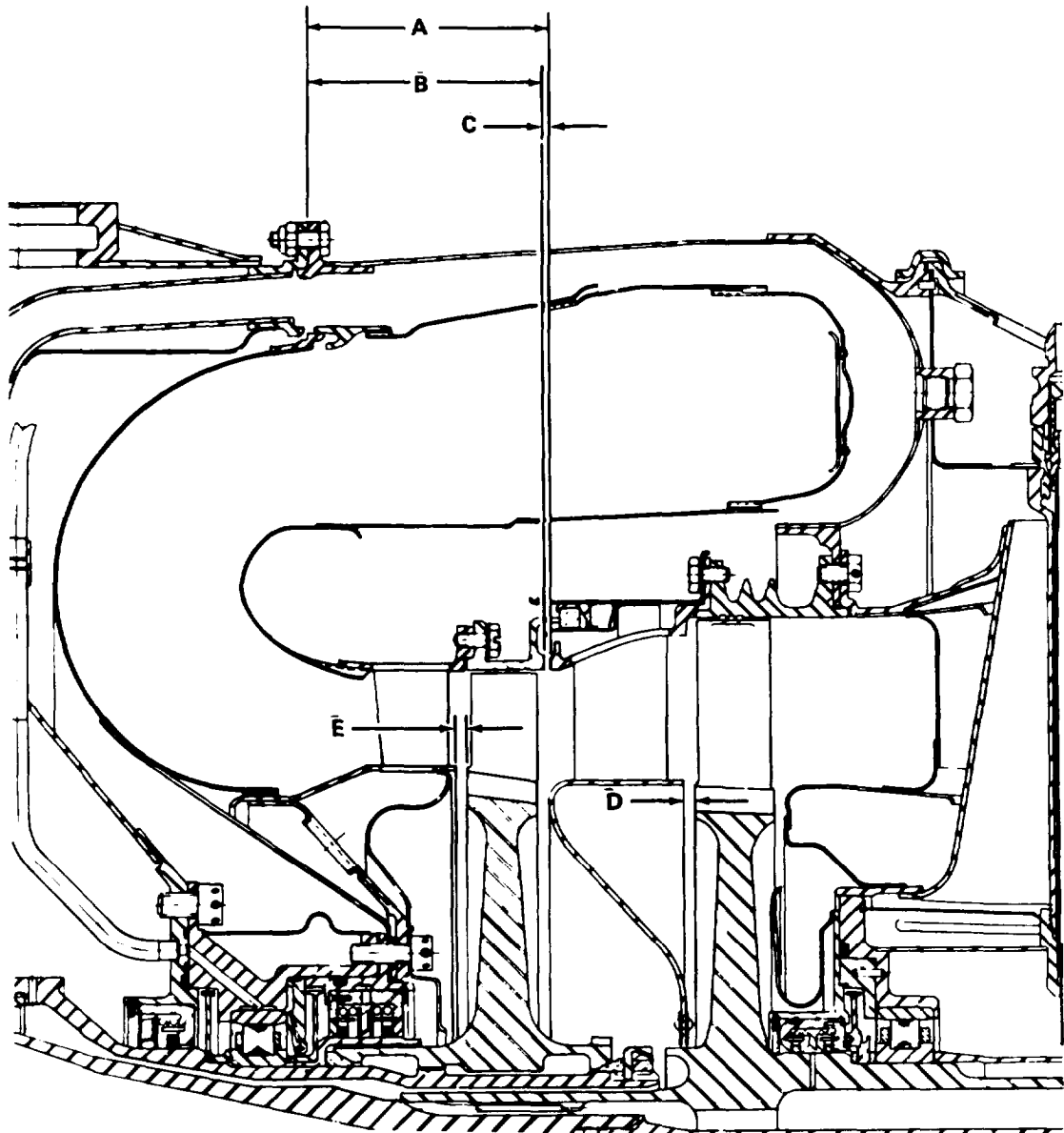
3-13. Air Deflector, First Stage Turbine Nozzle Assembly, Combustion Chamber Deflector and Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
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DIFFUSER  
HOUSING/ -  
Continued

NOTE

Determine gap as given in Appendix G, table G-5, reference number 42, between first stage turbine nozzle flange and second stage nozzle as follows:





3-13. Air Deflector, First Stage Turbine Nozzle Assembly, Combustion Chamber Deflector, and Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued		
13. Gap		<p><b>Measure</b> dimension <b>B</b> in following figure from diffuser flange face to first stage nozzle flange rear face. <b>Record</b> distance in four 90-degree positions for an average dimension.</p>
14. Gap	Take measurements from the completely assembled combustion chamber only.	<p><b>Measure</b> dimension (A, figure for item 13) from combustor flange face to forward end of second stage nozzle outer shroud. <b>Record</b> distance in four 90-degree positions for an average dimension.</p>
15. Gap		<p><b>Subtract</b> the average dimension in action for item 13 from average dimension in action for item 14. The difference (C) must be 0.030 inch (0.76 mm) minimum to 0.070 inch (1.78 mm) maximum.</p>

**NOTE**

In the following action for item 16, the laminated shim (9) is 0.070 inch (1.78 mm) thick with 0.002 inch (0.05 mm) laminations.

**3-13. Air Deflector, First Stage Turbine Nozzle Assembly, Combustion Chamber Deflector, and Rear Bearing Seal and Seal Housing (T53-L-11 Series Engines) - Installation - Continued**

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued		
16. Shim (9)		<b>Remove</b> from or <b>add</b> to the shim (9) under first stage nozzle to <b>obtain</b> required gap.
17. Shim of Correct Thickness		<b>Position</b> on combustion chamber deflector and <b>repeat</b> preceding action items 8 thru 12.
18. Bolts	Use lockwire (items 41, 42, or 43, Appendix D). After establishing gap and tightening bolts perform this action.	<b>Lockwire</b> bolts that secure nozzle and deflector to compressor rear bearing housing.

**3-14. Combustion Chamber Assembly (T53-L-11 Series Engines) - Disassembly**

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**References**  
Para 4-2,44

**Special Tools**  
Wrench (LTCT57)

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/	<div style="border: 2px solid black; padding: 5px; text-align: center; margin-bottom: 10px;"><b>WARNING</b></div> <p>When handling combustion chamber internal parts that have been exposed to fuels containing tetraethyl lead, insure that the byproduct (poisonous lead oxide) is not inhaled or taken into the body through cuts or other external openings. If accidental exposure occurs, drench affected area with large amounts of clean water and obtain immediate medical attention.</p>	

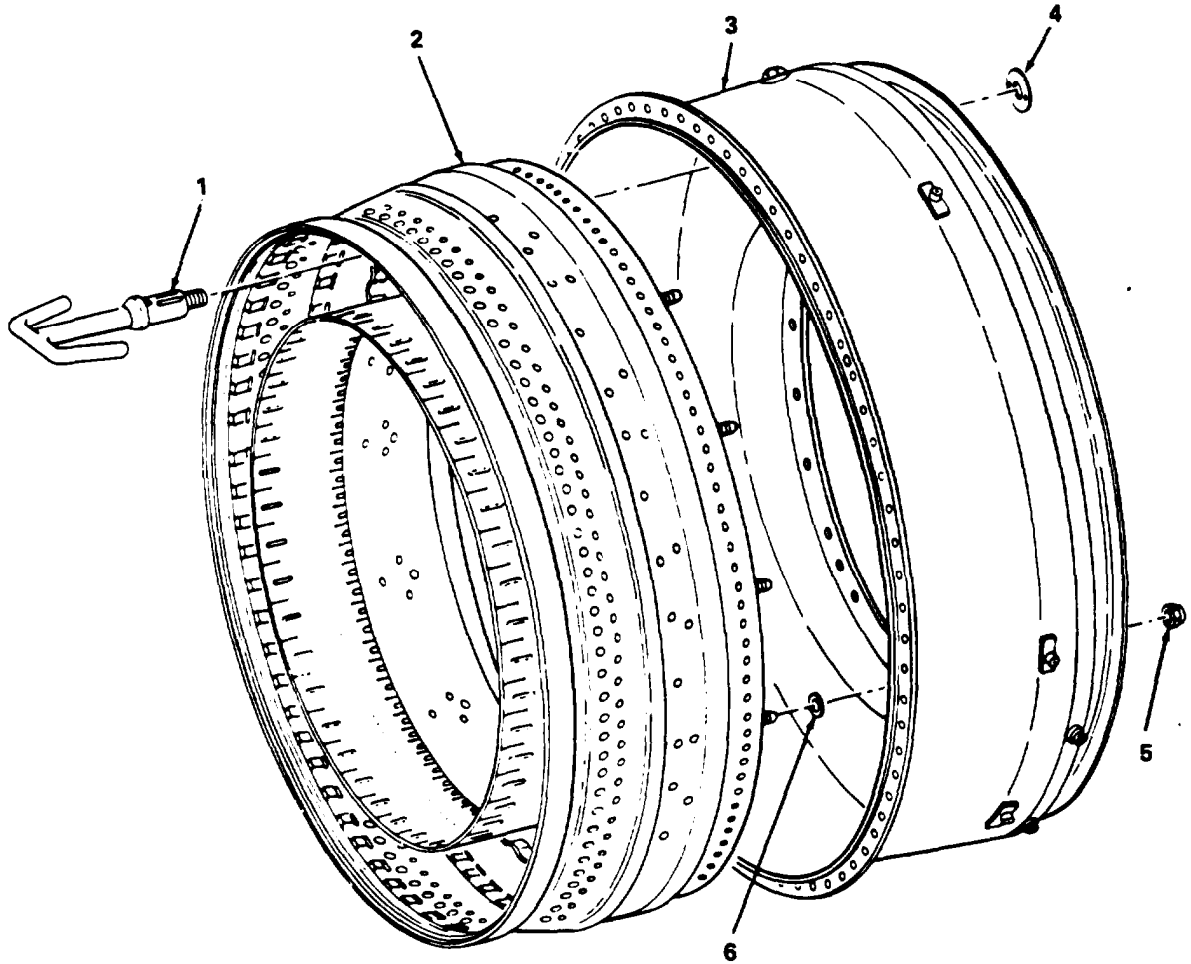
3-14. Combustion Chamber Assembly (T53-L-11 Series Engines) - Disassembly -  
Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/- Continued		
1. Combustor Turbine Assembly	Refer to paragraph 4-2 and 4-4.	<b>Remove and disassemble.</b>
2. Fuel Vaporizer Locking Nuts (4)	Use wrench (LTCT57).	<b>Engage</b> pins of tool with holes in locking nut. <b>Loosen</b> nuts. <b>Position</b> combustion chamber on its side. <b>Support</b> each fuel vaporizer assembly (1). <b>Remove</b> locking nut that secures each fuel vaporizer assembly to combustion chamber liner assembly (2) and combustion chamber housing (3), <b>Cap</b> and <b>Index</b> vaporizers. <b>Remove. Place</b> in suitable rack.
3. Combustion Liner Assembly (2)		<b>Remove</b> nuts (5) securing combustion liner assembly to combustion chamber housing. <b>Remove</b> liner assembly. <b>Remove</b> washer (6) from three studs.

3-14. Combustion Chamber Assembly (T53-L-11 Series Engines) - Disassembly - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTOR TUR-  
BINE ASSEMBLY I -  
Continued



3-15. Combustion Chamber Assembly (T53-L-13B/703 Engines)- Disassembly

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**References**  
Para 4-3,4-5,6-37

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTOR TURBINE ASSEMBLY/

**WARNING**

When handling combustion chamber internal parts that have been exposed to fuels containing tetraethyl lead, insure that the byproduct (poisonous lead oxide) is not inhaled or taken into the body through cuts or other external openings. If accidental exposure occurs, drench affected area with large amounts of clean water and obtain immediate medical attention.

1. Combustor Turbine Assembly

Refer to paragraph 4-3 and 4-5.

**Remove and disassemble.**

1.1. Combustion Chamber Liner Assembly (1)

**Straighten** tabs on key washers (2). **Remove** nuts (3) and key washers securing combustion liner assembly (1) to combustion chamber housing assembly (4). **Remove** liner assembly.

**NOTE**

Clip (8) secures studs (7) on-to combustion chamber liner assembly (1), and does not require removal to disassemble liner from housing assembly (4).

2. Spacer (5)

T53-L-13B engine only.

**Remove** from three liner assembly studs.

3. Spring (6)

T53-L-703 engine only.

**Remove** from six liner assembly studs (7).

4. Starting Fuel Hose Assemblies

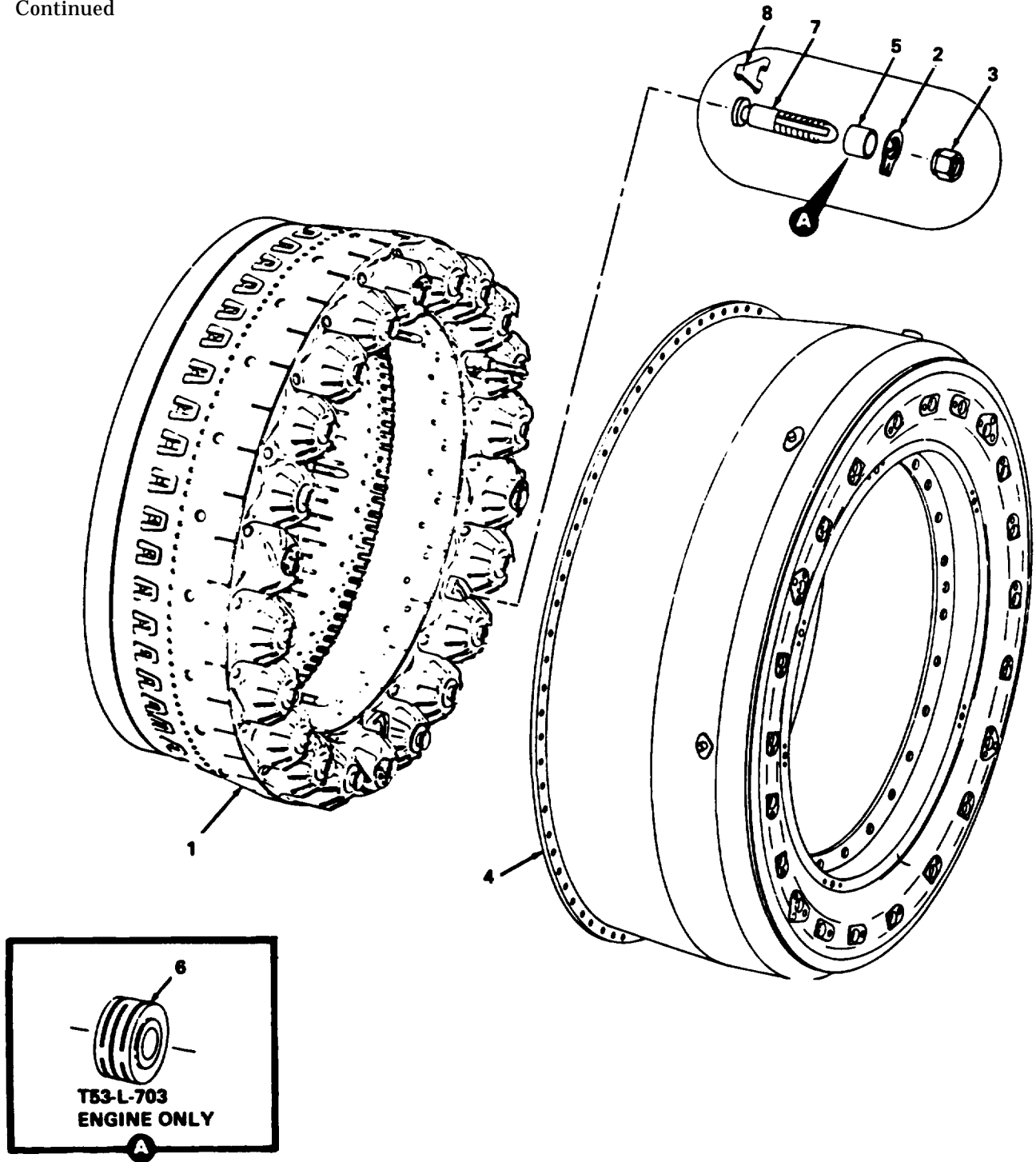
Refer to paragraph 6-37.

**Remove. Check** filter valve.

3-15. Combustion Chamber Assembly (T53-L-13B/703 Engines) - Disassembly - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTOR TUR-  
BINE ASSEMBLY/ -  
Continued



3-16. Combustion Chamber Deflector (T53-L-13B/703 Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**

T53-L-13B/703 Engines

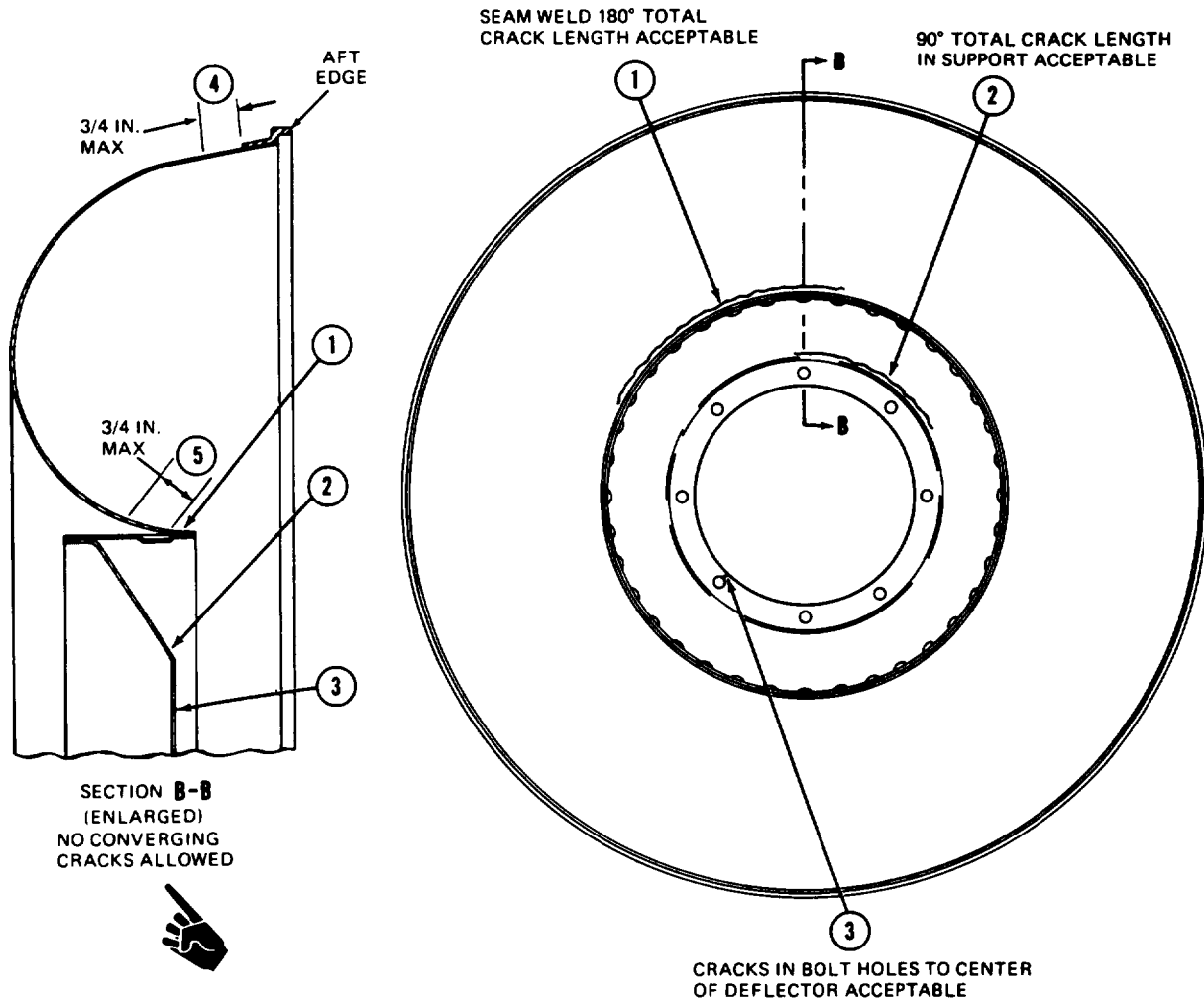
**Consumable Materials**

Alloy Wire (item 93, Appendix D)

**References**

Para H-26 and 3-15

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/		



3-16. Combustion Chamber Deflector (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
DIFFUSER HOUSING/ - Continued		
1. Deflector		Visually Inspect deflector for cracks. Repair deflector if crack limits are exceeded.
2. Seam Weld of Support to Deflector	Cracks totaling 180 degrees or less are acceptable.	Inspect for circumferential cracks at seam weld (1) of support to deflector.
3. Support	Cracks totaling 90 degrees or less are acceptable.	Inspect support for circumferential cracks (2).
4. Bolt Hole Circle	Cracks emanating from bolt holes to the center of deflector are acceptable	Inspect for cracks in bolt hole circle (3). Repair cracks in the support (bolt hole ring and surrounding parent metal) by fusion-welding as outlined in paragraphs H-26 and 3-15.
5. Outer Flange Area	Tight axial cracks are acceptable up to 3/4 inch (19.1 mm) in length as measured from flange forward edge. Circumferential cracking is not allowed.	Inspect inner flange area 5 and outer flange area (4) for cracks starting from aft edge and progressing forward through the seam weld. No converging cracks are allowed. Repair cracks that exceed limits by fusion weld (refer to paragraph H-26) using alloy wire (item 93, Appendix D).



3-17. Combustion Chamber Deflector (T53-L-13B/703 Engines) - Repair (AVIM)

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**Consumable Materials**  
Alloy Wire (item 93, Appendix D)  
Welding Wire (item 91, Appendix D)

**References**  
Para H-20

<b>LOCATION/ITEM</b>	<b>REMARKS</b>	<b>ACTION</b>
DIFFUSER HOUSING/		

**NOTE**

Cracks in or near deflector seam weld in excess of 180 degrees cumulative length shall be repaired according to actions for items 1 thru 3.

- |           |   |  |
|-----------|---|--|
| 1. Cracks | Close crack gap with clamps, vise, or blocks.                                   | Tack-weld each end exceeding 30 degrees. |
| 2. Cracks | Perform this action wherever possible to maintain alinement for fusion welding. | Distribute additional tricks equally.    |
| 3. Cracks | When performing this action use filler material given in the following table:   | Fusion-weld between tack-welds.          |

Area to be Reworked

Filler Material

Deflector

Alloy Wire  
(item 93, Appendix D)

Support Cylinder

Alloy Wire  
(item 93, Appendix D)

Inner Flange

Welding Wire  
(item 91, Appendix D)

- |                 |   |          |
|-----------------|---|----------|
| 4. Weld Repairs | When performing this action use non-destructive inspection (fluorescent-penetrant) method. Refer to paragraph H-20 or alternatively refer to TM 1-1520-255-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for AH-1 Helicopter Series. | Inspect. |
|-----------------|---|----------|

3-18. Combustion Chamber Assembly (T53-L-11 Series Engines) - Assembly

INITIAL SETUP

**Applicable Configuration**  
T53-L11 Series Engines

**Consumable Materials**  
Petrolatum (item 66, Appendix D)

**Special Tools**  
Wrench (LTCT57)

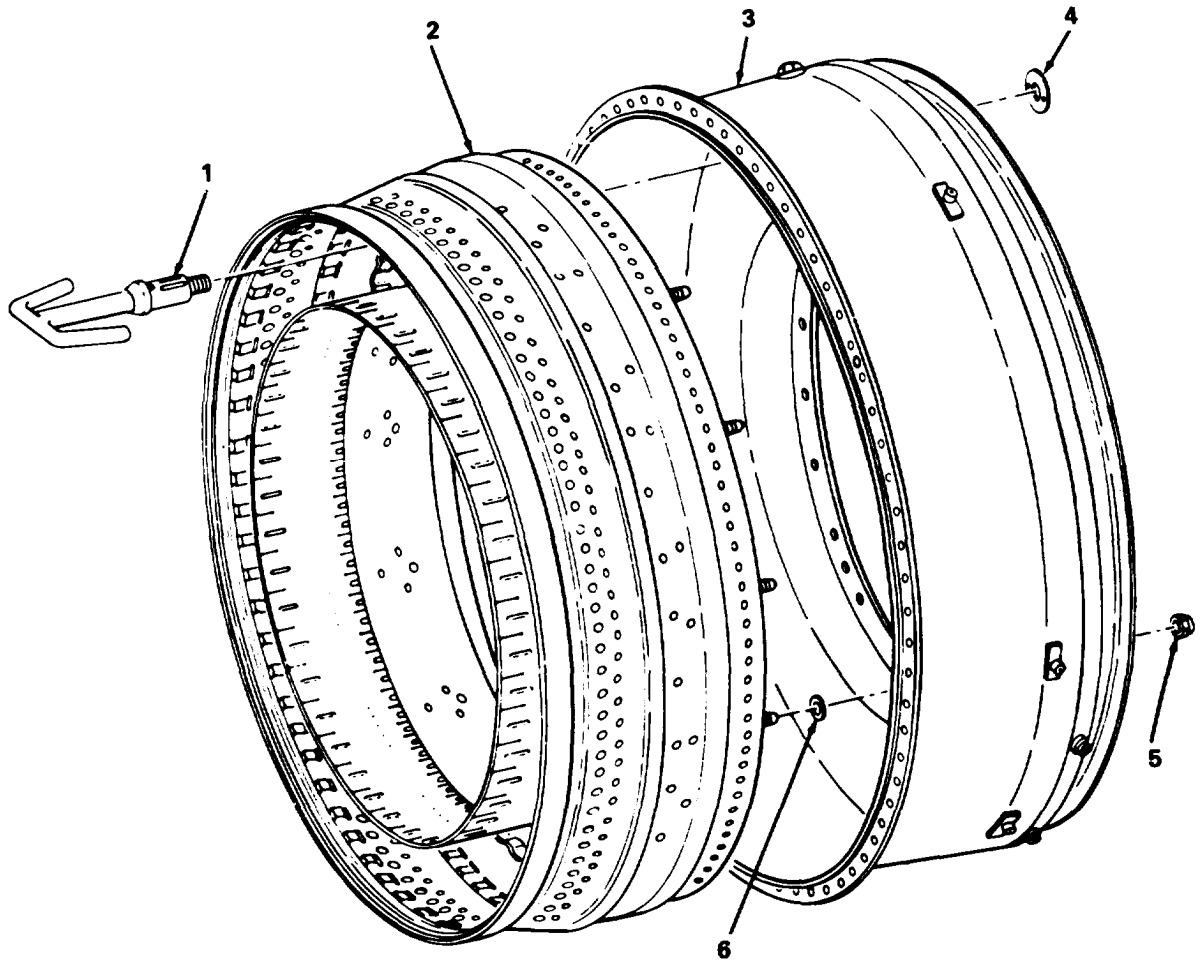
**References**  
Appendix G, Table G-3, Reference Number 33

LOCATION /ITEM	REMARKS	ACTION
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COMBUSTOR TUR-  
BINE ASSEMBLY/

**NOTE**

Studs are located at the 1-,5-, and 6-o'clock positions. Petrolatum (item 66, Appendix D) applied to bracket will hold washer in position during assembly. Do not lubricate studs.



3-18. Combustion Chamber Assambly (T53-L-11 Series Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURF BINE ASSEMBLY/ - Continued		
1. Washers (6)		<b>Position</b> on three studs of combustion chamber liner assembly (2) that do not have a flange.
2. Combustion Chamber Liner Assembly (2)		<b>Place</b> in combustion chamber housing (3). <b>Align</b> igniter ports.
3. Combustion Chamber Liner Assembly (2)		<b>Tighten</b> nuts approximately 180° opposite pairs of nuts on eight studs that do not have washers. <b>Tighten</b> nuts on three remaining studs.
4. Combustion Chamber Liner Assembly (2)		<b>Secure</b> to combustion chamber housing (3) with nuts (5).
5. Nuts (5)	Refer to Appendix G, table G-3, reference number 33.	<b>Tighten</b> as required.

**CAUTION**

When installing or alining fuel vaporizer assemblies, action item 6, insure tangs are not bent or broken.

6. Fuel Vaporizer Assemblies (1)		Install in combustion chamber assembly.
7. Locking Nuts (4)	Use wrench (LTCT57) to tighten locking nuts.	Proceeding clockwise, secure vaporizer assemblies to combustion chamber assembly with locking nuts (4). Install plastic caps to protect openings of vaporizers.

**3-19. Combustion Chamber Assembly (T53-L-13B/703 Engines) - Assembly**

INITIAL SETUP

**Applicable Configuration**

T53-L-13B/703 Engines

**Consumable Materials**

Petrolatum (item 68, Appendix D)

Iron-Blue Pigment (Item 37 or 109, Appendix D)


**Special Tools**

Alinement Fixtures (LTCT4174)

**References**

Para 6-38

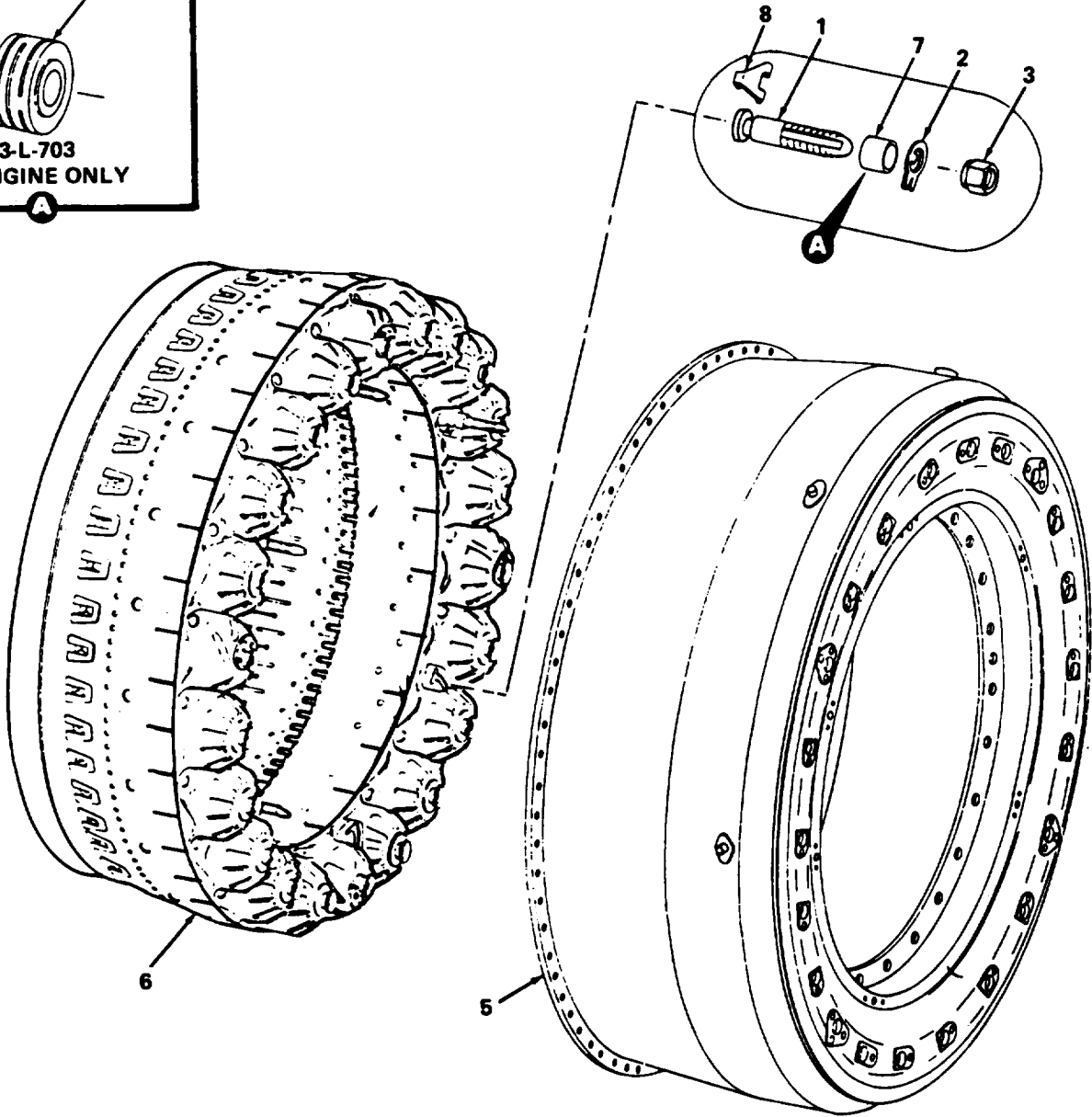
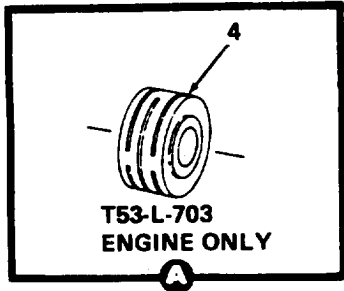
Appendix G, Table G-4, Reference Number 19

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/	<div style="text-align: center;">  <p><b>CAUTION</b></p> </div> <p>Before assembly Inspect as follows: Dimples on ID of combustion chamber liner must contact OD of first stage gas producer nozzle deflector. This may be accomplished by applying Iron-blue pigment (Item 37 or 109, Appendix D) to the liner dimples an mating the nozzle and liner to simulate hot end Installation. On T53-L-13B engine, If contact is not evident through 360 degrees, carefully bend liner tabs inward as required. On T53-L-703 engine, If contact is not evident through 360 degrees, carefully bend tabs on nozzle curl as required.</p>	
1. Starting Fuel Hose Assemblies	<p>Refer to paragraph 6-38.</p> <p>There are six studs in the liner assembly, but only three of the studs will accommodate the spacers In following action for item 2. Studs are secured to liner assembly with clips (8).</p>	<p>Install. Check filter valve.</p>
2. Combustion Chamber Liner Assembly (6)	<p>T53-L-13B e ins only. Use spacers 1-130-218-03) on studs 1-130-256-02). Use petrolatum (Item 66, Appendix D).</p>	<p>Place spacers (7) on three studs (1) of combustion chamber liner assembly (6). Retain with petrolatum.</p>

3-19. Combustion Chamber Assembly (T53-L-13B/703 Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTOR TUR-  
BINE ASSEMBLY/ -  
Continued



3. Spring (4)

T53-L-703 engine only. Use petrolatum  
(item 66, Appendix D).

Install on six liner as-  
sembly studs (1).  
Retain with petrolatum.

3-19. Combustion Chamber Assembly (T53-L-13B/793 Engines)- Assembly-Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/ - Continued	<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>CAUTION</b> </div> <p>In following action for Item 4, slots in studs must face radially inward or tangs in housing will be damaged.</p> <p>Do not force liner into housing. Check and reposition studs if required.</p>	
4. Combustion Chamber Liner Assembly (6)	<p><b>NOTE</b></p> <p>Do not lubricate studs(1).</p>	<p><b>Install</b> into combustion chamber housing assembly (5) with TOP Index at 12 o'clock on housing. <b>Align</b> igniter ports.</p>
5. Key Washers (2) and Nuts (3)	<p><b>NOTE</b></p>	<p><b>Install</b> on liner assembly studs. <b>Do not</b> tighten nuts.</p>
6. Combustion Chamber Liner Assembly (6) and Combustion Chamber Housing Assembly (5)	<p>Use alinement fixtures (LTCT4174).</p> <p><b>NOTE</b></p> <p>The following item 7 does not apply to T53-L-703 engines.</p>	<p><b>Install</b> two alinement fixtures on combustion chamber housing assembly. <b>Insure</b> proper alinement.</p>
7. Nuts (3)	<p>Refer to Appendix G, table G-4, reference number 19, for nut tightening requirements.</p>	<p><b>Tighten</b> nuts on three studs without spacers. <b>Tighten</b> nuts on three remaining studs as required. <b>Bend</b> tabs of key washers to secure nuts.</p>

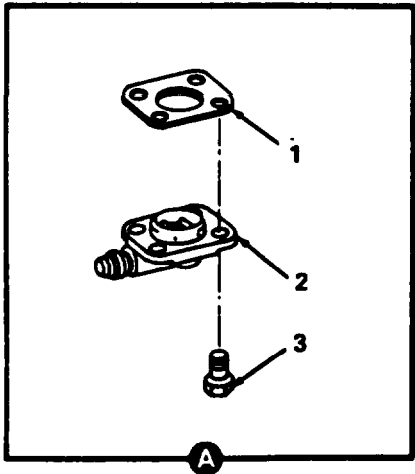
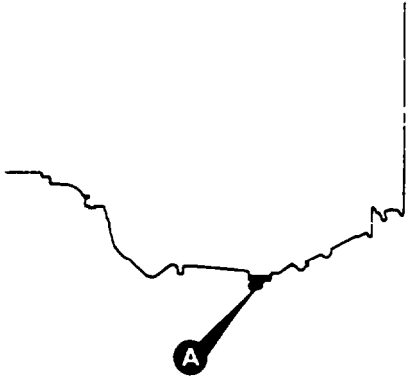
3-19. Combustion Chamber Assembly (T53-L-136/703 Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/ - Continued		
8. Nuts (3)	T53-L-703 engine only.	<b>Tighten</b> nuts on studs to 20 pound-inches to 30 pound-inches (0.2 kg/m to 0.3 kg/m). <b>Bend</b> tabs of key washers to secure nuts.
<p><b>NOTE</b></p> <p>Protrusion of stud threads beyond nut is not required.</p>		
9. Alinement Fixtures (LTCT4174)		<b>Remove.</b>

3-20. Combustion Chamber Drain Valve Assembly (T53-L-11 series Engines) - Removal

INITIAL SETUP

Applicable Configuration  
T53-L-11 Series Engines

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER HOUSING/		
1. Combustion Chamber Drain Valve		<p><b>Remove</b> mounting bolts (3), combustion chamber drain valve (2) and gasket (1).</p> 

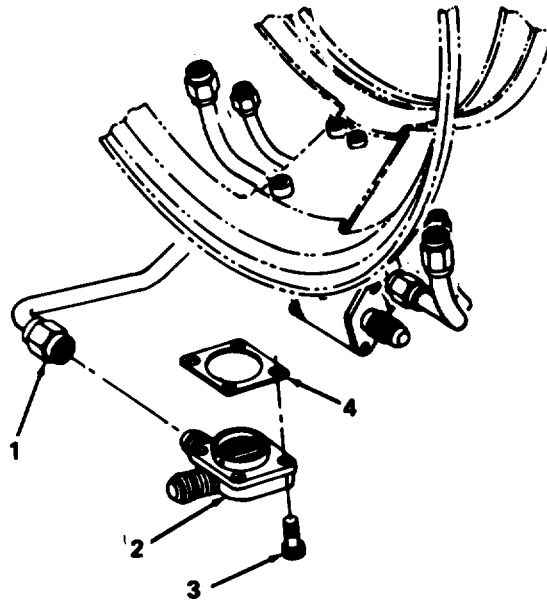
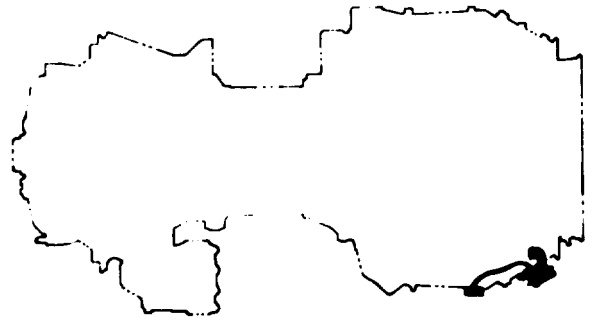
**3-21. Combustion Chamber Flow Divider and Drain Valve Assembly (TB3-L-13B/703 Engines) - Removal**

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER HOUSING/



1. Hose Assembly  
(1)

2. Drain Valve  
Assembly (2)

**Disconnect** from combustion chamber drain valve assembly (2) and **plug** hose.

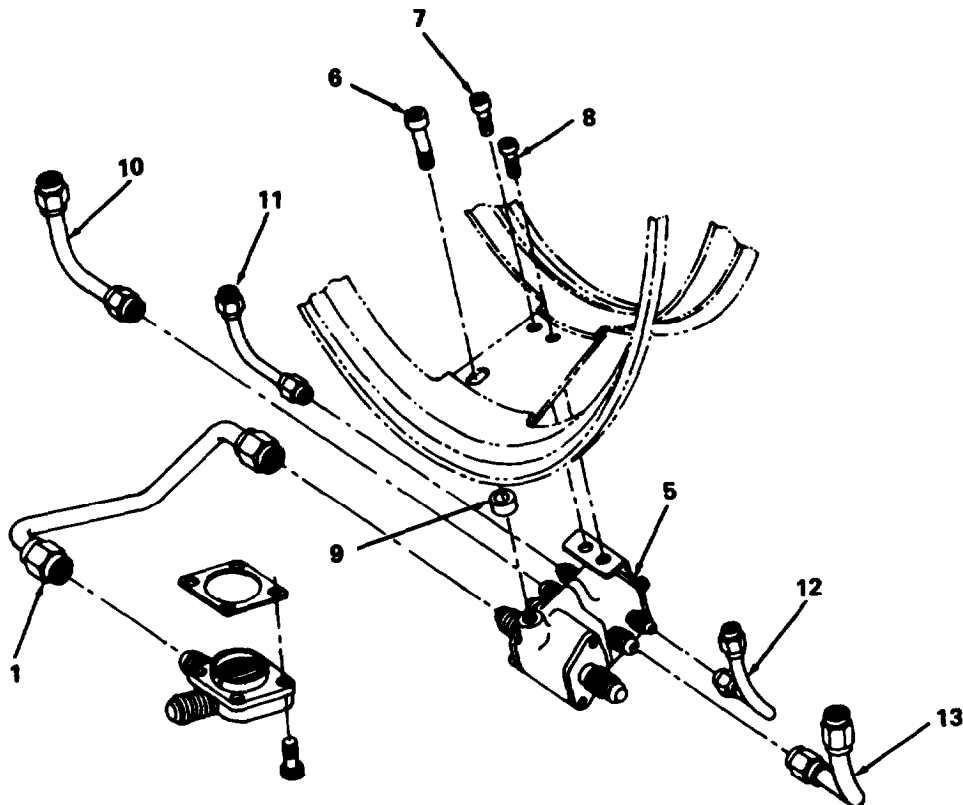
**Remove** bolts (3) that secure drain valve to combustion chamber housing.



3-21. Combustion Chamber Flow Divider and Drain Valve Assembly (T53-L-13B/703 Engines) -  
Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION CHAMBER HOUSING/ -  
Continued



9. Drain Valve Assembly (2)

**Remove** with gasket (4).

4. Flow Divider (5)

**Remove** hoses (1, 10, 11, 12, and 13) and plug.

5. Flow Divider (5)

**Remove** from combustion chamber housing by removing screws (6, 7, and 8), and spacer (9).

3-22. Combustion Chamber Drain Valve - Inspection

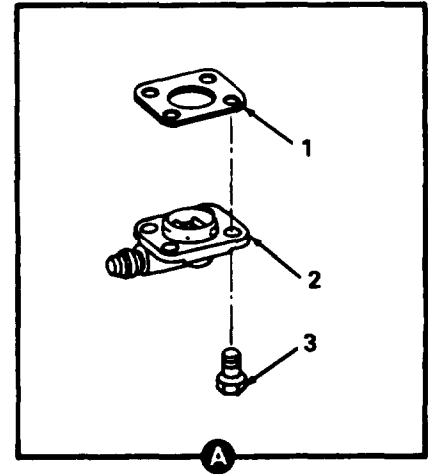
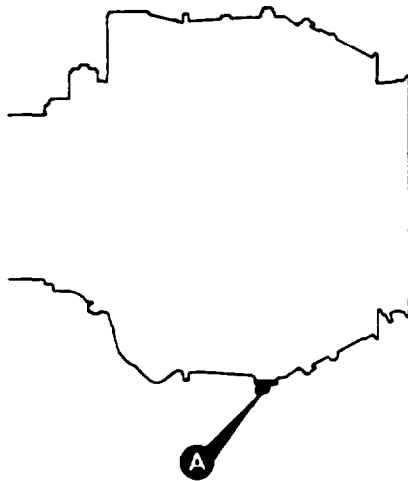
INITIAL SETUP

**Applicable Configuration**  
All

**References**  
Paras H-26 and H-30

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION  
CHAMBER  
HOUSING/



1. Mounting Flange

Inspect for warpage and cracks. **Replace** valve if warpage or cracks are noted.

2. Valve

If plate does not return to original position, reclean or replace valve.

**Check** functioning by depressing plate.

ENGINE/

3. Valve

**Inspect** for damaged threads. **Replace** valve if threads are damaged.

4. Valve

**Inspect** for clogging of outlet. **Reclean** if necessary.

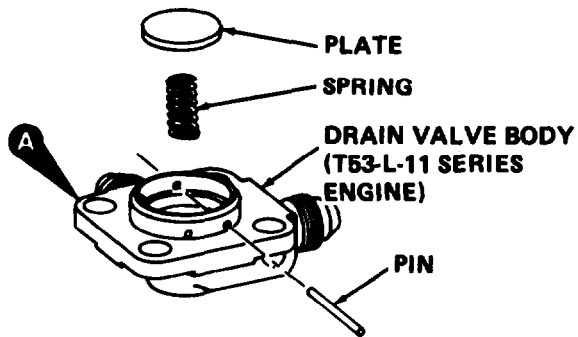
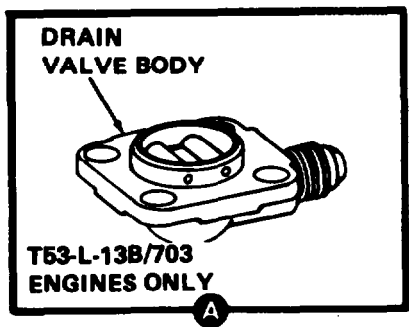
5. Plate

Refer to paragraph H-25 for blend-repair procedures.

**Inspect** for nicks, burrs and scratches. **Blend-repair**. **Replace** plate if damaged.

3-22. Combustion Chamber Drain Valve - Impaction - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER HOUSING/ - Continued		
6. Body	Refer to paragraph H-29 for inspection procedures.	<b>Inspect</b> for damaged threads. <b>Replace</b> body if threads are damaged beyond repair.
7. All Parts		<b>Inspect</b> visually for cracks, distortion and excessive wear. <b>Replace</b> all cracked, distorted, or excessively worn parts.



**3-23. Combustion Chamber Drain Valve Assembly - Functional Test (AVIM)**

INITIAL SETUP

**Applicable Configuration**

All

**Consumable Materials**

Lapping Compound (item 38, Appendix D)

Crocus Cloth (item 21, Appendix D)

Calibrating Fluid (item 11, Appendix D)

**Test Equipment**

Test Fixxture (LTCT859)

Test Stand (LTCT314)

LOCATION/ITEM	REMARKS	ACTION
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TEST STAND/

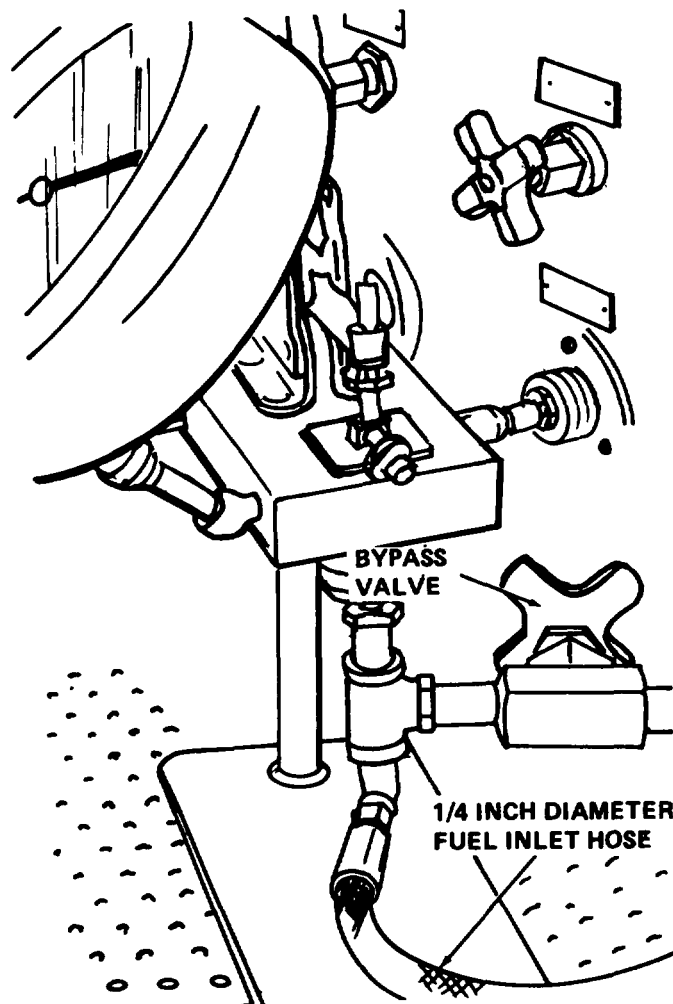
**NOTE**

To perform the following test use calibrating fluid (item 11, Appendix D), heated to 60°F to 120°F (16°C to 49°C).

1. Combustion Chamber Drain Valve

Use test fixture (LTCT859).

Install in test fixture.



3-23. Combustion Chamber Drain Valve Assembly - Functional Test (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
TEST STAND/ - Continued	<p><b>NOTE</b></p> <p>The combustion chamber drain valve assembly is normally open, therefore, under a nonpressure condition and depending upon spring tension, valve will remain open from 0 psig to 0.6 psig.</p>	
2. Hose	Use No. 4 (1/4 inch diameter) hose. Hose length shall be as short as possible. Use test stand (LTCT314).	<b>Connect</b> from OUTLET NO. 2 LOW PRESSURE port of test stand to connector on fixture.
3. Low PRESSURE SHUTOFF Valve		<b>Open.</b>
4. Combustion Chamber Drain Valve Assembly		<b>Observe</b> to <b>insure</b> it closes at differential pressure of 0.6 psig to 3 psig.
5. LOW PRESSURE SHUTOFF Valve		<b>Adjust</b> to obtain a pressure of 9 psig to 11 psig.
6. Calibrated Measuring Cup	Perform this action if leakage is observed.	<b>Position</b> at combustion chamber drain valve assembly port. <b>Allow</b> combustion chamber drain valve assembly to drain for one minute.
7. Calibrated Measuring cup		<b>Check</b> that fluid level does not exceed 10 cc.
8. Combustion Chamber Drain valve	Valve shall open at 3 psig maximum.	<b>Slowly</b> release pressure.
9. Combustion Chamber Drain Valve	If any of the above limits are exceeded, perform this action.	<p><b>Remove</b> scratches and pita that may cause excessive leakage as follows:</p> <p>a. <b>Lap</b> or <b>polish</b> valve and valve seat. <b>Use</b> lapping compound (item 38, Appendix D) or crocus cloth (item 21, Appendix D).</p>

**3-23. Combustion Chamber Drain Valve Assembly - Functional Test (AVIM) - Continued**

LOCATION/ITEM	REMARKS	ACTION
TEST STAND/ - Continued		
10. Combustion Cham- ber Drain Valve		<b>b. Functional-test</b> combustion chamber drain valve assembly.
11. Test Stand		<b>Reject</b> if limits are still exceeded.
12. Combustion Cham- ber Drain valve Assembly		<b>Return</b> to pretest con- ditions.
		<b>Remove</b> from teat stand.

**3-24. Combustion Chamber Drain Valve Assembly (T63-L-11 Series Engines) - Installation**

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series

**Consumable Materials**

Lockwire (items 41,42, or 43, Appendix D)

**References**

Appendix G, Table G-3, Reference Number 60

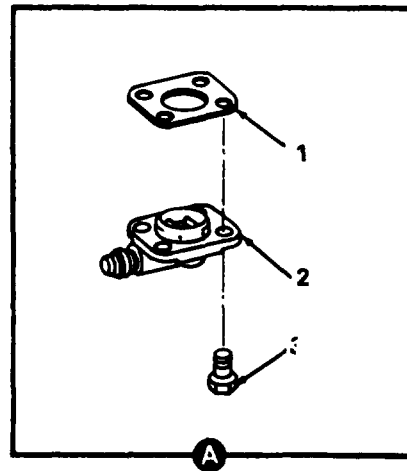
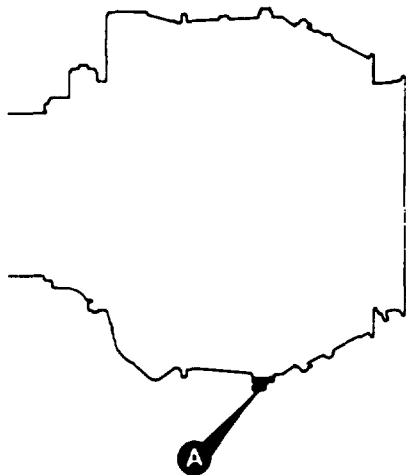
LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER HOUSING/	<b>NOTE</b>	
	Combustion chamber drain valve faces aft on T53-L-11 series engines.	
1. New Gasket (1) 1-160-045-01 and Com- bustion Chamber Drain Valve Assembly (2)		<b>Position.</b>

**CAUTION**

Insure that bolts do not exceed 3/8  
inch in length.

3-24. Combustion Chamber Drain Valve Assembly (T53-L-11 Series Engines) - Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER HOUSING/ - Continued		<p><b>Secure</b> with bolts (3). Tighten bolts as required. (<b>Refer</b> to Appendix G, table G3, reference number 60). <b>Lockwire.</b> (<b>Refer</b> to Appendix D, items 41, 42, or 43.)</p>



3-25 Combustion Chamber Flow Divider and Drain Valve Assembly (T53-L-13B/703 Engines) - Installation

INITIAL SETUP

**Applicable Configuration**  
T53-L13B/703 Engines

**Consumable Materials**  
Lockwire (items 41,42, or 43, Appendix D)

**References**  
Appendix G, Table G-4, Reference Number 61

LOCATION/ITEM	REMARKS	ACTION
COMBUSTION CHAMBER HOUSING/  1. Gasket and Combustion Chamber Drain Valve Assembly (2)	Use new gasket 1-160-045-01.	<b>Position</b> gasket (3) on combustion chamber housing.

3-25. Combustion Chamber Flow Divider and Drain Valve Assembly (T53-L-13B/703 Engines) -  
Installation - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTION  
CHAMBER HOUSING/ -  
Continued

**CAUTION**

Insure that bolts do not exceed 3/8  
inch in length.

2. Combustion Chamber  
Drain Valve Assembly (2)

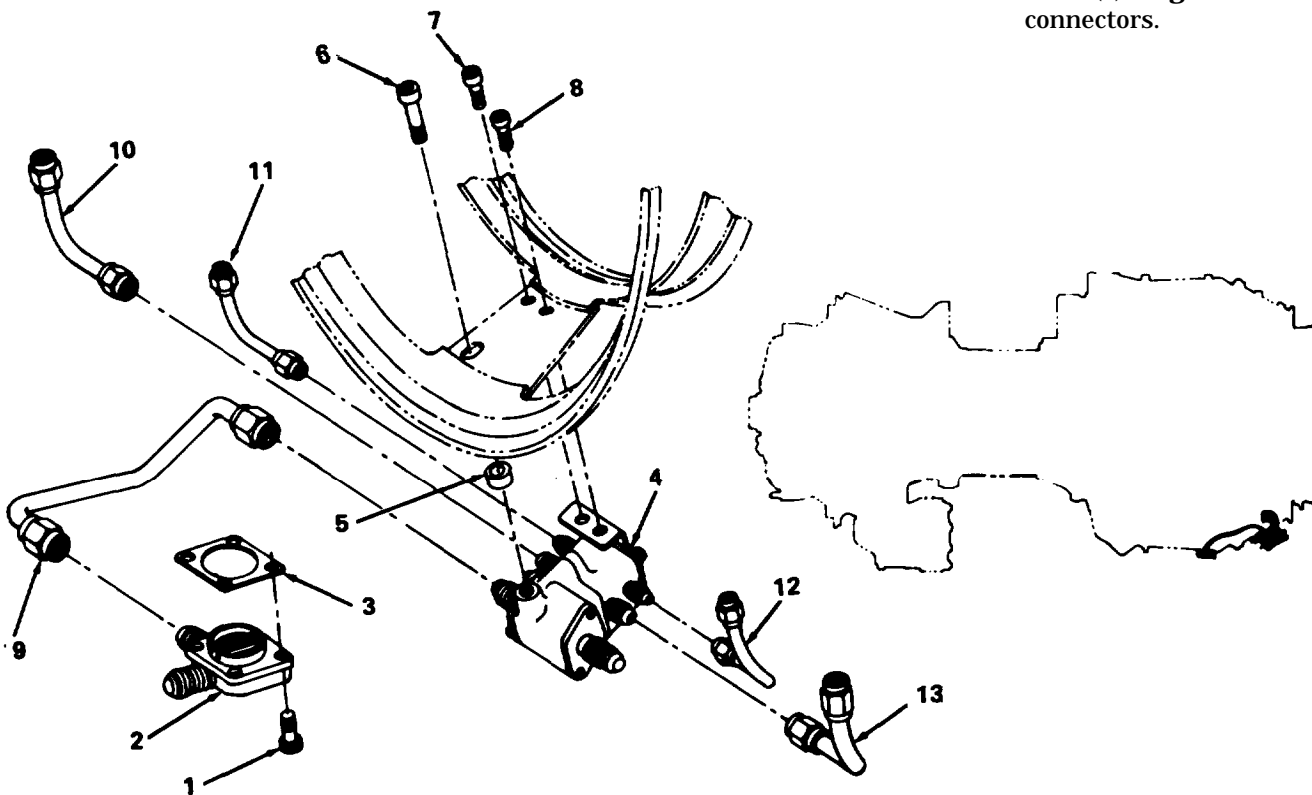
**Secure** with bolts (1).  
**Tighten** bolts as re-  
quired. (**Refer** to Ap-  
pendix G, table G-4,  
reference number 61)  
**Lockwire** bolts.

3. Flow Divider  
Valve (4)

**Secure** to combustion  
chamber housing, using  
spacer (5) and screws  
(6, 7, and 8) and **lock-  
wire**.

4. Hose Assemblies  
(9, 10, 11, 12, and 13)

**Connect** to drain valve  
(2) and flow divider  
valve (4). **Tighten** hose  
connectors.





3-26. Exhaust Diffuser (T52-L-11 Series Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L11 Series Engines

**Consumable Materials**

Drycleaning Solvent (item 24, Appendix D)  
Marking Pencil Colorbright (item 54, Appendix D)

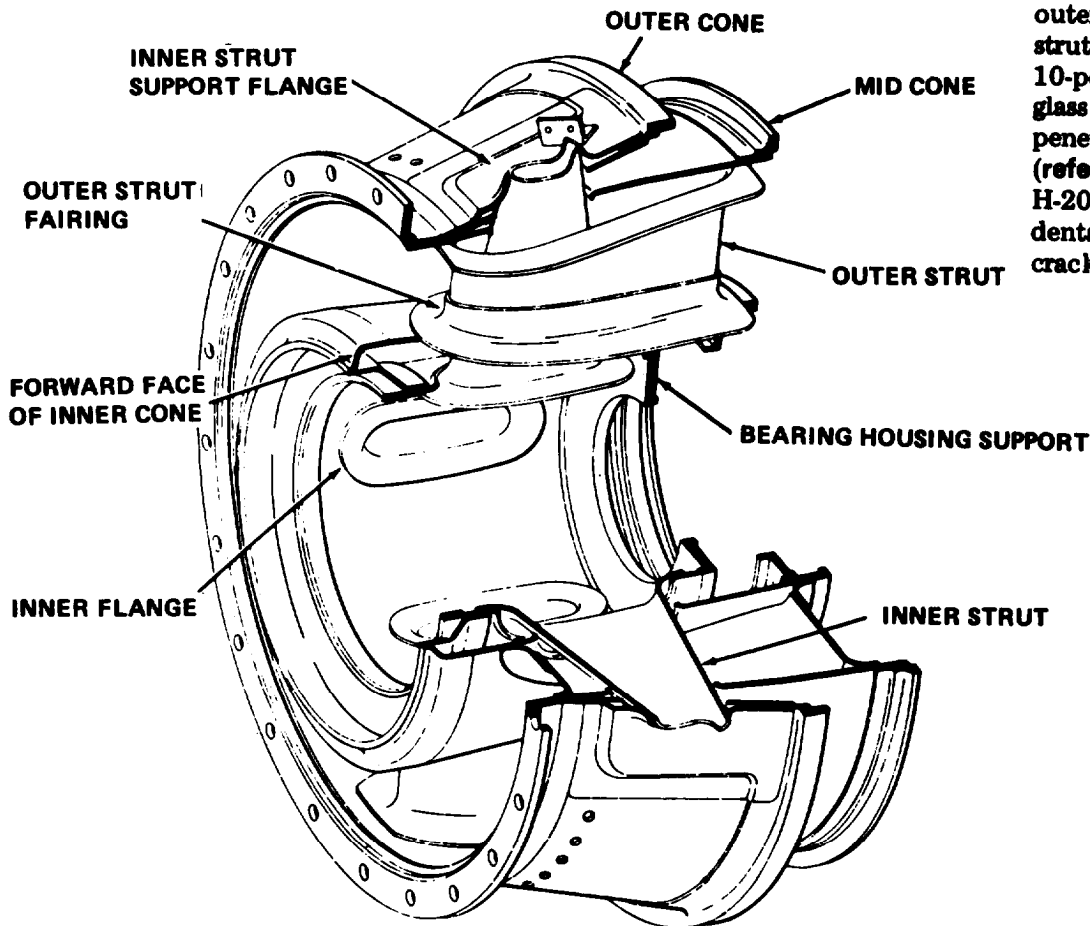
**References**

Para H-17, H-20, H-26, H-26 and 3-28

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/		

1. outer struts

**Inspect for dents that can deform outer strut and produce a gap greater than 1/16 inch (1.6 mm) between outer strut and outer strut fairing. Using 10-power magnifying glass or fluorescent penetrant method (refer to paragraph H-20). Inspect such dents for possible cracks.**

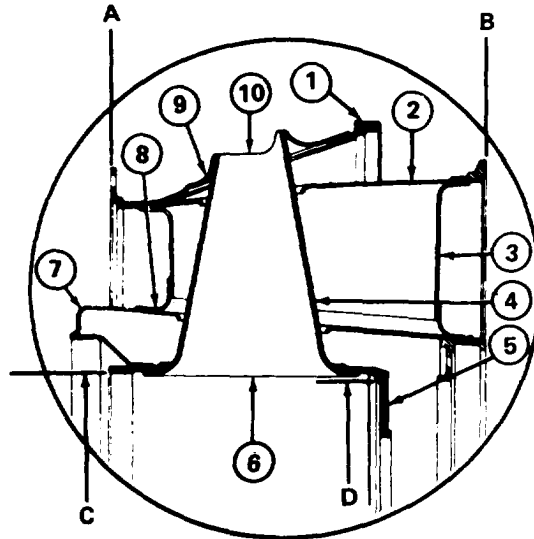


3-26. Exhaust Diffuser (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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SECOND STAGE  
TURBINE SUPPORT  
ASSEMBLY/ -  
Continued

1. Outer Cone
2. Mid Cone
3. Outer Strut
4. Inner Strut
5. Bearing Housing Support
6. Inner Flange
7. Inner Cone
8. Outer Stint Fairing
9. Support Flange
10. Flange Weldments



2. Marking Pencil

Marking Pencil Colorbright (item 54, Appendix D).

Using approved marking pencil, (**refer** to item 54, Appendix D), **mark** all cracks within maximum permissible limits and **tag** exhaust diffuser for stop drilling. If limits are exceeded, AVIM personnel only may **weld-repair** as outlined in paragraph 3-28.

3. All Areas

Observe the following limits:

- a. Nicks are acceptable without repair in all areas except inner strut and inner strut flange, provided there is no interference between mating parts,
- b. Minor dents and distortions are acceptable without repair, provided that no interference of mating parts occurs.

Visually **inspect** all areas for cracks, nicks, dents, burning, distortion, deteriorated paint, corrosion, and foreign object damage.

3-26. Exhaust Diffuser (T63-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued		
<div style="border: 2px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <b>WARNING</b> </div>		
4. Exhaust Diffuser 1-150-110-01	<p>Metal breakthrough as a result of heavy corrosion is cause for rejection, and engine shall be shipped to Depot.</p> <p>Major damage or associated distortion is cause for rejection of exhaust diffuser. Forward diffuser to next higher echelon for evaluation.</p>	<p>Surface corrosion on exhaust diffuser 1-150-110-01 is allowable and <b>shall be removed</b> by wire brushing to remove surface scale, the area <b>cleaned</b> with dry-cleaning solvent (item 24, Appendix D) and <b>touched up</b> as outlined in paragraph H-17.</p>
5. Outer Cone	<p>Any number of tight-lipped cracks not exceeding 1/2 inch (12.7 mm) in length that do not affect weldments are acceptable without repair.</p> <p>Two tight-lipped, nonconvergent cracks up to one inch (25.4 mm) long that do not affect weldments are acceptable after atop drilling.</p>	<p><b>Inspect</b> outer cone for cracks.</p>
6. Mid and Inner Cones	<p>Any number of tight-lipped, nonconvergent cracks up to 1/2 inch (12.7 mm) in length that do not affect weldments are acceptable without repair.</p> <p>No burn throughs are permitted.</p>	<p><b>Inspect</b> mid and inner cones for cracks and burning.</p> <p>AVIM personnel only, may <b>weld-repair</b> as outlined in paragraph H-26.</p>

3-26. Exhaust Diffuser (T53-L-11 Series Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued		
7. Bearing Housing Support	Two tight-lipped nonconvergent cracks up to 1/2 inch (12.7 mm) in length that do not affect weldments are acceptable without repair.	<b>Inspect</b> bearing housing support for cracks.
8. Outer Strut and outer strut Fairing	<p>Observe the following limits:</p> <p>a. Nicks and dents that could prevent expansion movement of strut and fairing shall be repaired. Blend-repair (AVIM personnel only) as outlined in paragraph H-25).</p> <p>b. All nonconverging cracks on outer strut fairing of exhaust diffuser are acceptable without repair, provided they do not extend into spot-welded area at base of fairing.</p> <p>c. On exhaust diffuser 1-150-200-03, one crack per strut fairing is allowed up to 1-1/2 inches (38.1 mm) in length without repair. If limits are exceeded, replace exhaust diffuser.</p> <p>d. Any number of tight-lipped, nonconvergent cracks not exceeding 1/2 inch (12.7 mm) in length that do not affect weldments are acceptable on outer strut without repair.</p>	<b>Inspect</b> for nicks and dents, cracks, and burning.
9. Outer Strut and Outer Strut Fairing	No burn throughs are permitted.	<b>Weld-repair</b> (AVIM personnel only) as outlined in paragraph H-26.
10. Inner Strut Flange	<p>Any number of cracks not exceeding 1/2 inch (12.7 mm) in length that do not affect weldments are acceptable after stop-drilling.</p> <p>Two tight-lipped, nonconvergent cracks up to one inch (25.4 mm) long that do not affect weldments are acceptable on each of two struts after stop-drilling.</p>	<b>Inspect</b> inner strut flange for cracks.

3-26. Exhaust Diffuser (T53-L-11 Sales Engines) - Inspection - Continued

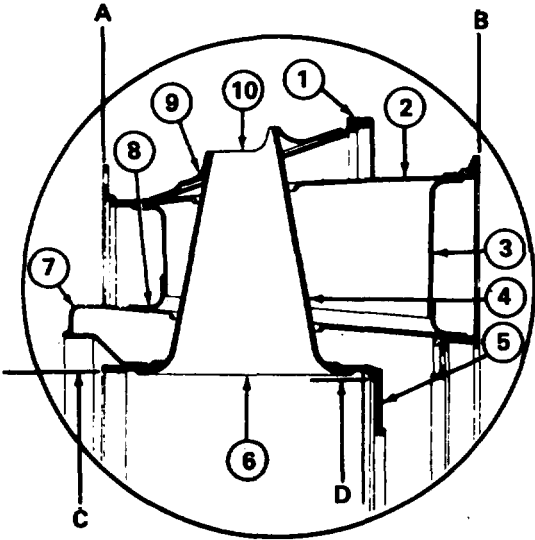
LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued		
11. Thermocouple Mounting Studs		<p><b>Inspect</b> thermocouple mounting studs on exhaust diffuser 1-150-200-01 for damage or stripped threads. <b>Replace</b> (AVIM personnel only) as outlined in paragraph 3-28.</p>

3-27. Exhaust Diffuser Assembly (T53-L13B/703 Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L13B/703 Engines

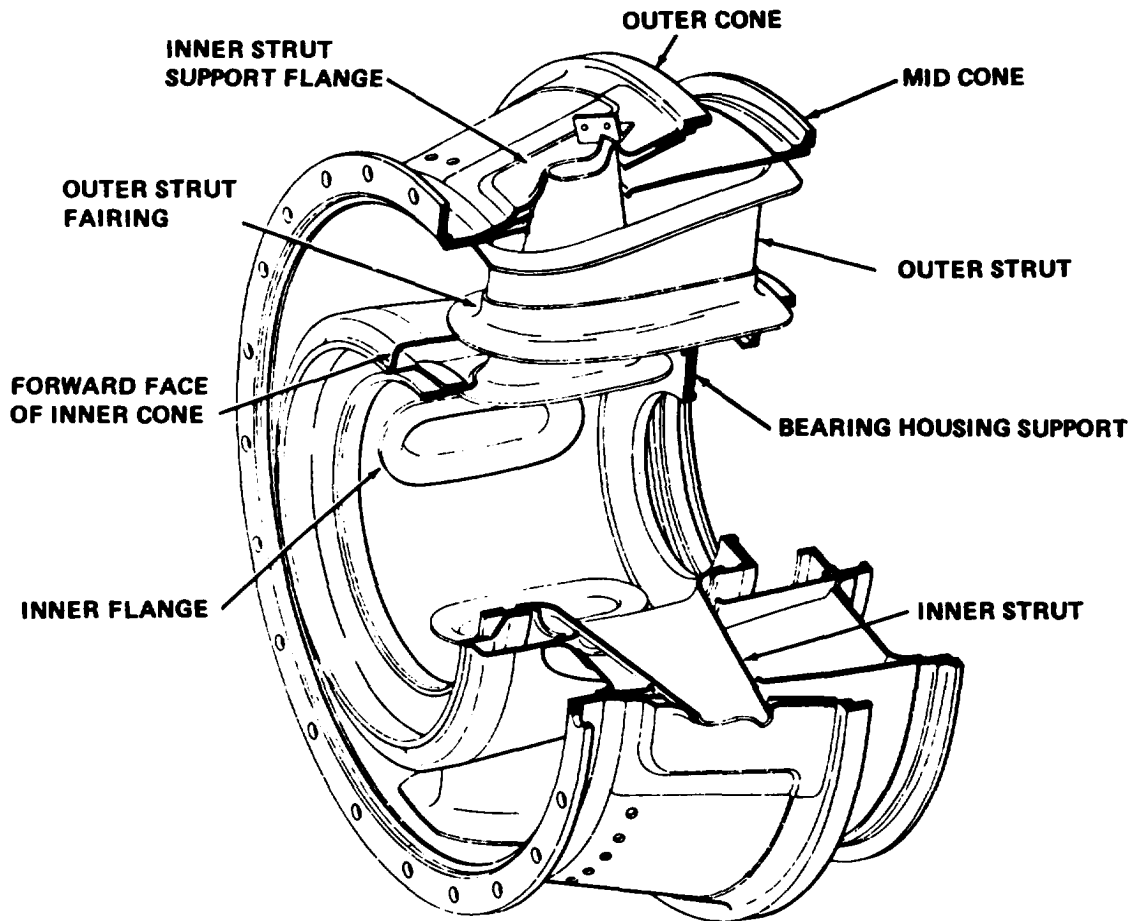
**References**  
Para H-20 and 3-29

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/		
1. outer struts		<p><b>Inspect</b> outer struts for dents that can deform outer strut and produce a gap greater than 3/32 inch (2.4 mm) between outer strut and outer strut fairing. using 10-power magnifying glass or fluorescent penetrant method, (<b>refer</b> to paragraph H-20), <b>inspect</b> such dents for possible cracks.</p>
<p>1. Outer Cone 2. Mid Cone 3. outer strut 4. Inner strut 5. Bearing Housing Support 6. Inner Flange 7. Inner Cone 8. Outer Strut Fairing 9. Support Flange 10. Flange Weldments</p>		

3-27. Exhaust Diffuser Assembly (T53+-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
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SECOND STAGE  
TURBINE SUPPORT  
ASSEMBLY/ -  
Continued



2. All Areas

a. Nicks are acceptable without repair in all areas except inner strut and inner strut flange, provided they do not interfere with part performance.

b. Minor dents and distortions are acceptable without repair, provided no interference of mating parts occurs.

c. Major distortion or damage associated with distortion is a cause for rejection of exhaust diffuser. Forward diffuser to next higher echelon for evaluation.

Visually **inspect** all areas for nicks, dents, and distortion.

3-27. Exhaust Diffuser Assembly (153-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued</p>		
<p>3. Outer Cone</p>	<p>No cracks allowed.</p>	<p><b>Inspect</b> outer cone for cracks.</p>
<p>4. Mid and Inner Cones</p>	<p>a. Any number of tight-lipped, nonconvergent cracks up to 1/2 inch (12.7 mm) in length, which do not affect weldment, are acceptable without repair. Circumferential cracks adjacent to mounting flange are not permitted,</p> <p>b. No burn-throughs are permitted. Replace diffuser.</p>	<p><b>Inspect</b> mid and inner cones for cracks and burning.</p>
<p>5. Bearing Housing support</p>	<p>Two tightlipped, nonconvergent cracks up to 1/2 inch (12.7 mm) in length, which do not affect weldments, are acceptable without repair.</p>	<p><b>Inspect</b> bearing housing support for cracks.</p>
<p>6. Outer Strut and Outer Strut Fairing</p>	<p>Observe the following limits:</p> <p>a. All nonconverging cracks on the outer strut fairing are acceptable without repair, provided they do not extend into the spot-welded area at the base of the fairing.</p> <p>b. One crack per stint fairing is allowed up to 1-1/2 inch (3.81 cm) in length without repair. If limits are exceeded, replace exhaust diffuser.</p> <p>c. No burn-throughs are permitted. Replace diffuser.</p> <p>d. Any number of tight-lipped nonconvergent cracks in the outer strut, not exceeding 1/2 inch (12.7 mm) in length, are acceptable without repair, provided weldments are not affected.</p> <p>e. Replace exhaust diffuser if crack limits are exceeded.</p>	<p><b>Inspect</b> outer strut and outer strut fairing for nicks, dents, cracks, and burning as follows and <b>repair</b> as outlined in paragraph 3-29.</p> <p>Repair nicks and dents which could prevent expansion movement of strut and fairing.</p>

3-27. Exhaust Diffuser Assembly (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued		
7. Inner Strut Flange		<b>Inspect</b> inner strut flange for cracks. Two cracks, 1/2 inch (12.7 mm) in length are acceptable without repair on each inner strut outer flange.
8. Flange of Inner strut	No cracks are allowed.	<b>Inspect</b> flange of inner strut for cracks.
9. Mounting Flange		<b>Inspect</b> mounting flange for damaged or missing nuts.
10. Diffuser	Using a suitable faceplate or engine lathe, check mounting bolt hole flange for flatness of 0.002 inch (0.05 mm) TIR.  Check that surface of rear flange is parallel to mounting flange within 0.002 inch (0.05 mm) TIR.	Check diffuser for distortion and concentricity as follows and replace diffuser if limits are exceeded.
<b>NOTE</b>		
Item 11 does not apply to T53-L-703 engines.		
11. Thermocouple Mounting Studs		<b>Inspect</b> thermocouple mounting studs on exhaust diffuser 1-150-240-03 for damage or stripped threads. <b>Replace</b> as outlined in paragraph 3-29.



3-28. Exhaust Diffuser (T53-L-11 Series Engines) - Repeir(AVIM)

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**Consumable Materials**  
Filler Wire (item 29, Appendix D)

**Special Tools**

- Fixture (LTCT324)
- Drill (1/16 DIA)
- Bottom Tap (1/4 x 28 UNF-3B)
- Rotary File
- Carbide Drill (No. 8)
- Twist Drill (No. 43) P/N MS15444-43

**References**

Para H-15

LOCATION/ITEM	REMARKS	ACTION
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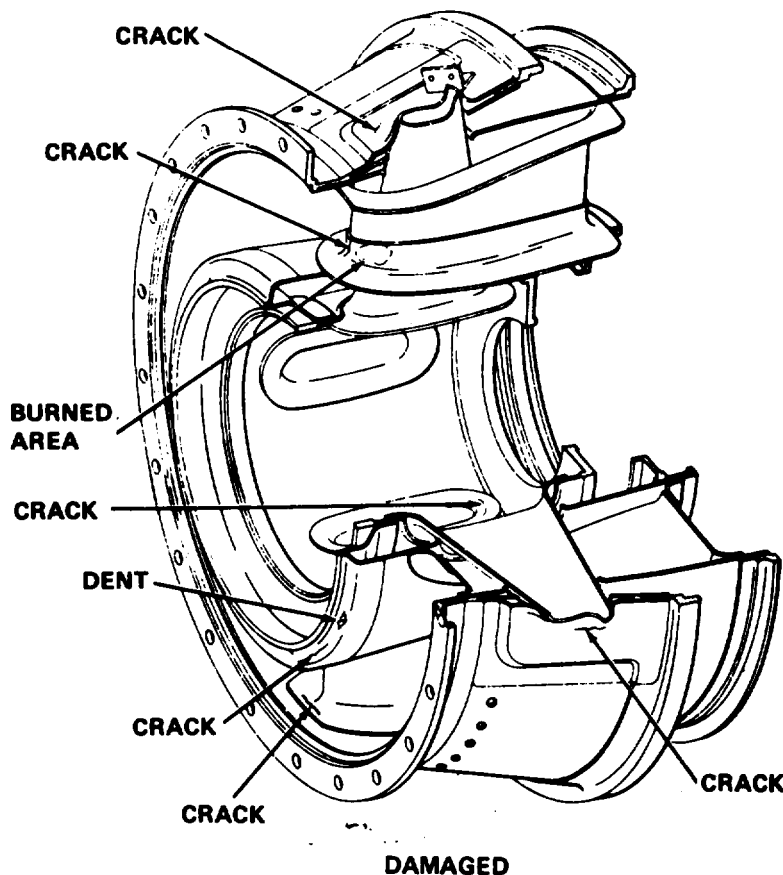
SECOND STAGE  
TURBINE SUPPORT  
ASSEMBLY/

Repair cracks and dents within permissible limits as follows:

1. Exhaust Diffuser

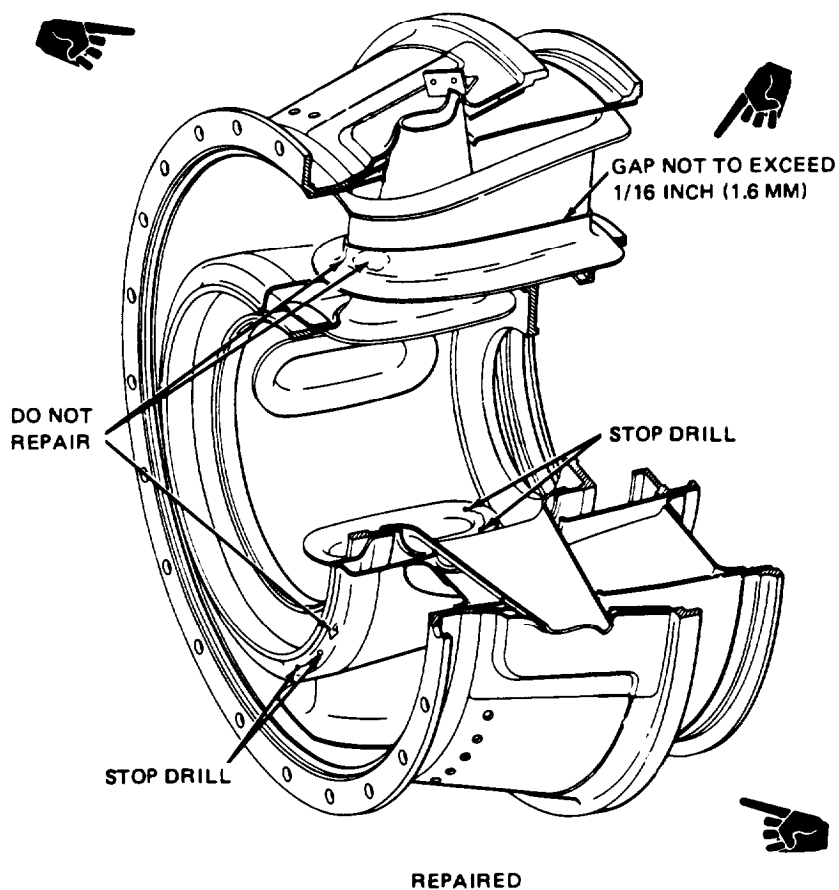
Use fine abrasive.

**Remove** paint from cracked area of painted diffuser.



3-26. Exhaust Diffuser (T53-L-11 Series Engines) - Repair (AVIM) - Continued

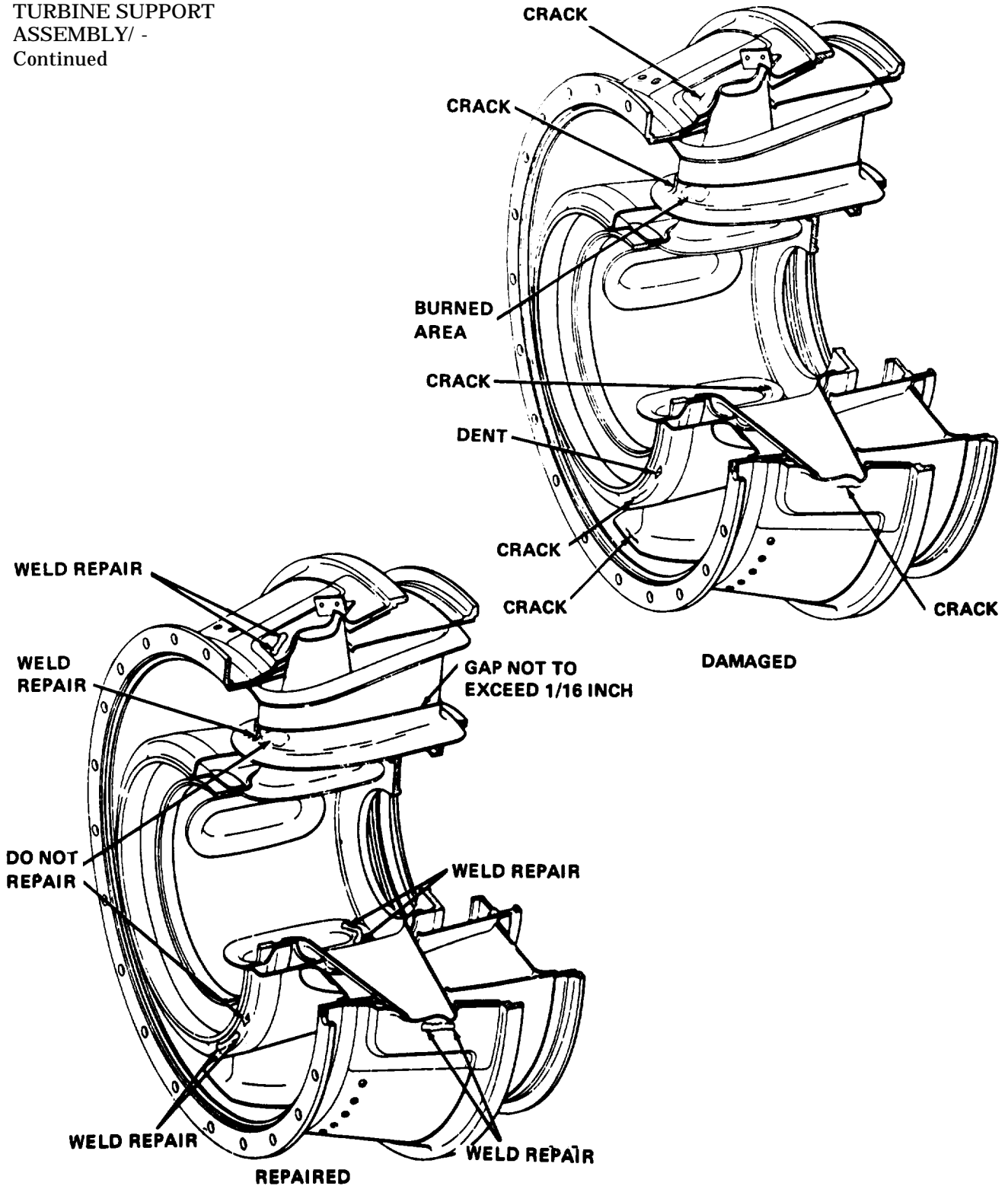
LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/- Continued		



3-28. Exhaust Diffuser (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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SECOND STAGE  
 TURBINE SUPPORT  
 ASSEMBLY/ -  
 Continued



3-28. Exhaust Diffuser (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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SECOND STAGE  
TURBINE SUPPORT  
ASSEMBLY/-  
Continued

**CAUTION**

**Where more than one thickness of metal is present, be careful not to drill through second thickness in following action for item 2.**

2. Exhaust Diffuser	Use 1/16 in. diameter drill.	<b>Stop-drill</b> ends of cracks, except those in outer strut fairing.
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**NOTE**

**Repair dents that create gap greater than 1/16 in. (1.6 mm) between outer strut and strut fairing according to actions for items 3 thru 9.**

3. Exhaust Diffuser	Use fine abrasive or vapor-blast.	<b>Remove</b> paint from dented areas of painted diffuser.
4. Exhaust Diffuser	Use rubber or leather-headed mallet.	<b>Deform</b> flange or strut fairing as close to outer strut as possible.
5. Exhaust Diffuser	Use filler wire (item 29, Appendix D). Tack welds shall be approximately 0.045 in. (0.114 cm) long and 180 degrees apart.	<b>Tack-weld</b> threaded end of 1/4 in. diameter by 1 in. long low alloy steel hex head bolt to center of dent by inert-gas temperature method.
6. Exhaust Diffuser		<b>Apply</b> outward pressure under head of bolt until dented area conform (after pressure is released) to contour of undamaged strut and strut fairing areas adjacent to dent.

3-28. Exhaust Diffuser (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued	<div style="border: 2px dashed black; padding: 5px; width: fit-content; margin: 0 auto;"><b>CAUTION</b></div> <p><b>During grinding in following action for item 7, do not reduce strut wall thickness.</b></p>	
7. Exhaust Diffuser		<b>Remove</b> bolt by grinding away tack-welds.
<b>NOTE</b>		
AVIM facilities may make the following weld repairs (actions for items 10 thru 14) to the exhaust diffuser inner strut, inner flange, and support flange. (See second figure in item 1.)		
8. Exhaust Diffuser		Visually <b>inspect</b> repaired areas to insure that strut and strut fairing mating surfaces are closed within allowable limits.
9. Exhaust Diffuser	Refer to paragraph H-15.	<b>Repaint</b> repaired surface.
10. Former Face Inner Cone and Outer Strut Fairing	AU cracks shall be routed out prior to weld repair.	<b>Route</b> cracks.
11. Exhaust Diffuser	This action does not apply to stainless steel exhaust diffuser 1-150-200-01.	<b>Preheat</b> crack area to 350°F to 400°F (177°C to 204°C).
12. Exhaust Diffuser	Use filler wire (item 29, Appendix D).	<b>Weld</b> Cracks.
13. Exhaust Diffuser		<b>Blend-repair</b> area with rotary file.
14. Exhaust Diffuser		<b>Stress-relieve</b> diffuser at 500°F (260°C) for one hour at temperature buildup of 200°F (93°C) per hour. <b>Cool down</b> gradually to 400°F (204°C) and then to room temperature.

3-28. Exhaust Diffuser (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued		
15. Inner Strut Support Plate	Cracks up to 2 inches (5.08 cm) shall be weld repaired, however, accumulated total length of all cracks shall not exceed 4 inches (10.16 cm).	<b>Weld repair</b> cracks.
16. Exhaust Diffuser		<b>Strip</b> paint from area to be weld repaired.
17. Exhaust Diffuser		<b>Route out</b> cracks to be weld repaired.
18. Exhaust Diffuser	Use filler wire (item 29, Appendix D).	<b>Weld</b> cracks.
19. Exhaust Diffuser	Use rotary file.	<b>Blend</b> cracks.
20. Exhaust Diffuser		<b>Place</b> in fixture (LTCT 324).
21. Exhaust Diffuser		<b>Stress-relieve</b> at 1100°F (593°C) for two hours at a temperature build-up of 200°F (93°C) per hour. <b>Cool down gradually</b> to 400°F (204°C) and then to room temperature.
22. Exhaust Diffuser	Observe the following limits:  a. Cracks in inner strut fairing that do not exceed 4 inches (10.16 cm) shall be weld repaired in accordance with actions for items 15 thru 22; however, not more than two cracks per strut on not more than two struts per diffuser are permissible.  b. Cracks in inner strut outer perimeter that do not exceed 2 inches (5.08 cm) in length shall be weld repaired in accordance with actions for items 15 thru 22; however, not more than two cracks per strut on not more than two cracked struts per diffuser are permissible.	<b>Remove</b> from fixture.

3-28. Exhaust Diffuser (T53-L-11 Series Engines) - Repair (AVIM) - Continued

SECOND STAGE  
TURBINE SUPPORT  
ASSEMBLY/ - Continued

c. Cracks between inner strut support plate and inner strut outer perimeter that do not exceed 3 inches (7.62 cm) shall be weld repaired. In this case, a crack that exceeds 2 inches (5.08 cm) in inner strut outer perimeter is cause for rejection of diffuser.

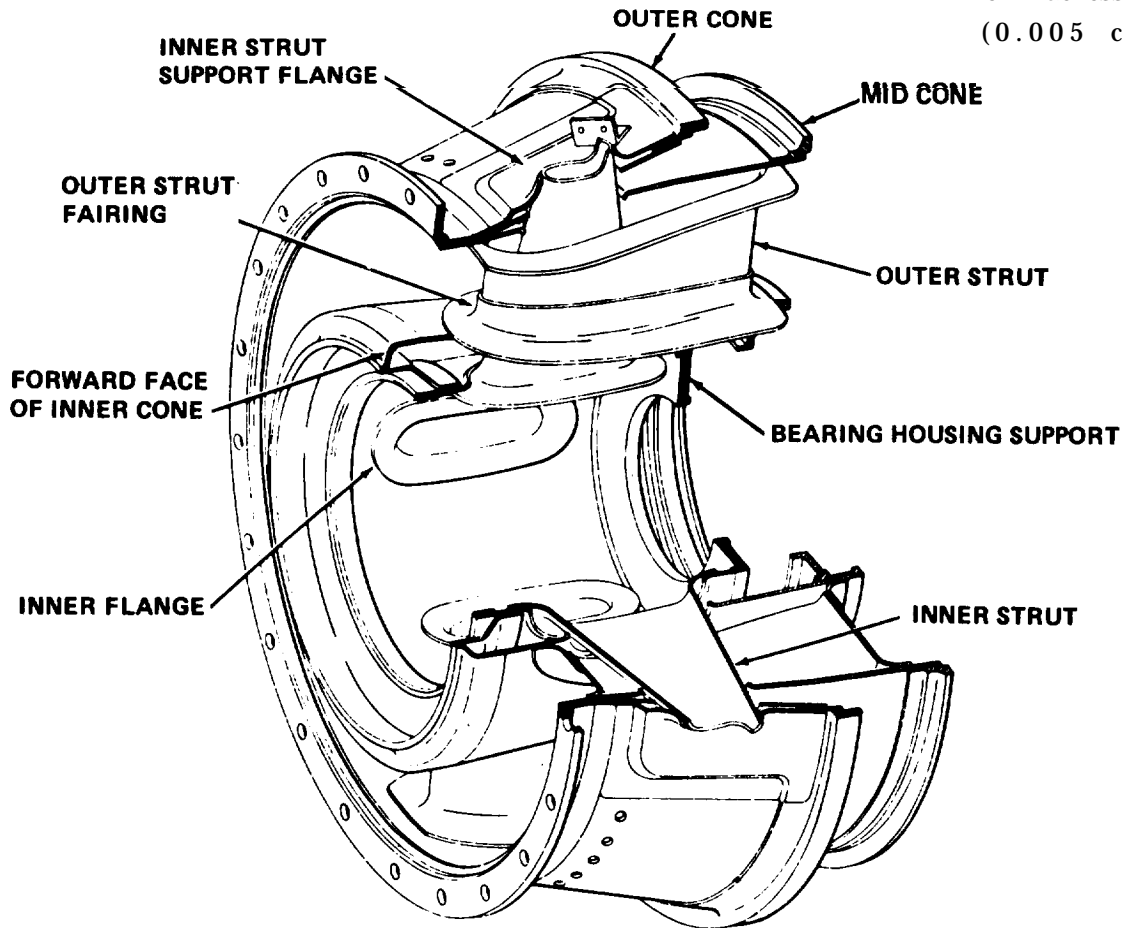
**NOTE**

After weld repair, check diffuser for distortion and concentricity in accordance with actions for items 23 thru 25.

23. Exhaust Diffuser

Use suitable faceplate or engine lathe. See following figure.

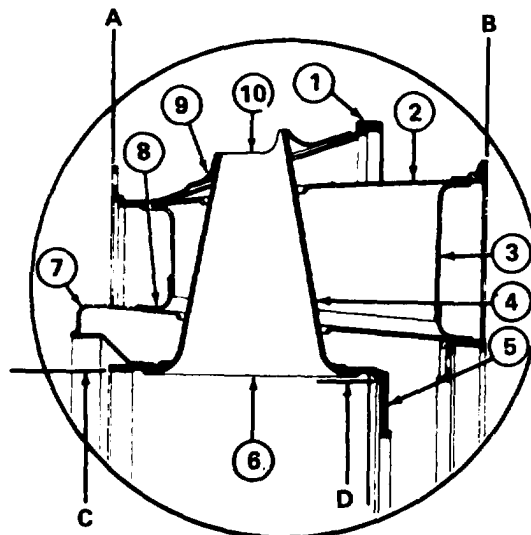
Check mounting bolt hole flange (surface A) for flatness of 0.002 in. (0.005 cm) TIR.



3-28. Exhaust Diffuser (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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SECOND STAGE  
TURBINE SUPPORT  
ASSEMBLY/ - Continued



- 1. Outer Cone
- 2. Mid Cone
- 3. outer strut
- 4. Inner Strut
- 5. Bearing Housing Support
- 6. Inner Flange
- 7. Inner Cone
- 8. Outer Strut Fairing
- 9. Support Flange
- 10. Flange Weldments

24. Exhaust Diffuser

**Check** that surface of rear flange (surface B) is parallel to mounting flange (surface A) within 0.002 in. (0.005 cm) TIR.

25. Exhaust Diffuser

**Check** that diameters C and D are concentric within 0.003 in. (0.008 cm) TIR.

26. Exhaust Diffuser

**Replace** if cracks or burns exceed limits or if distortion and concentricity limits are exceeded after any weld repair.

**NOTE**

Actions for items 27 thru 37 pertain to the replacement of damaged thermocouple studs located on exhaust diffuser 1-150-200-01.

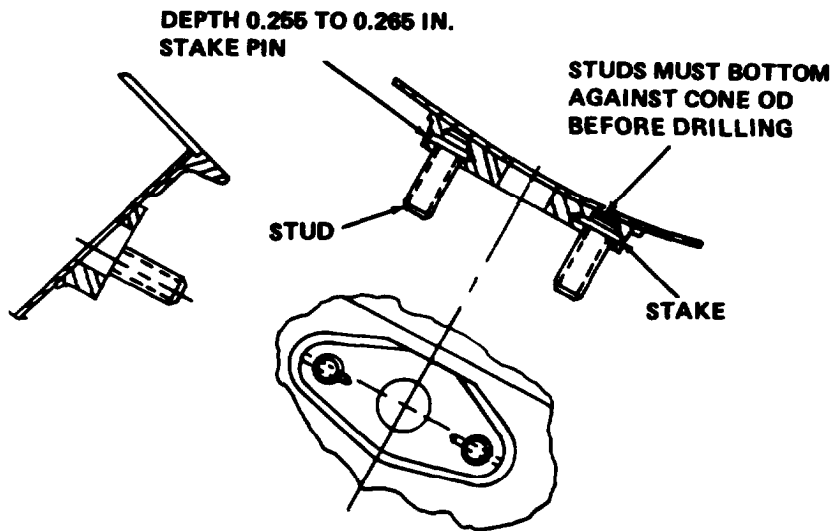


3-28. Exhaust Diffuser (T53.L.11 Series Engines) - Repair (AVIM) - Continued

SECOND STAGE  
TURBINE SUPPORT  
ASSEMBLY/ - Continued

27. Stud

Cut off flush to surface of boss.



28. Stud

Use a center drill.

Start a hole in remainder of stud.

29. Stud

Use a No. 8 carbide drill.

Drill into stud approximately 0.150 in. (0.381 cm) below face of boss (**cutting** through lockpin).

30. Exhaust Diffuser

Use a punch.

Drive part of lockpin into hole drilled in preceding item 25. Remove pin.

31. Exhaust Diffuser

Use a No. 43 twist drill.

Drill through existing pin hole and into remainder of pin in opposite wall of stud to a depth of approximately 0.380 in. (0.965 cm).

32. Stud

Use a suitable tool.

Remove stud from boss.

3-28. Exhaust Diffuser (T53-L-11 Series Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued		
33. Exhaust Diffuser	Use 1/4 x 28 UNF-3B bottom tap.	<b>Retap</b> stud hole. <b>Clean</b> threads with compressed air.
34. Exhaust Diffuser		<b>Install</b> new stud (1-150-007-01 ) and <b>tighten</b> to 70 to 95 pound-inches (0.8 to 1.1 kg/m) torque. <b>Secure</b> stud bottoms against cone OD.
35. Exhaust Diffuser	Use a No. 43 twist drill.	<b>Drill</b> through existing pin hole in boss to a depth of 0.255 to 0.265 in. (0.648 to 0.673 cm).
36. Stake Pin		<b>Install</b> new pin (1-140-285-01 ) flush with boss and stake.
37. Exhaust Diffuser	Refer to paragraph H-15.	<b>Repaint</b> repaired surface.

3-29. Exhaust Diffuser Assembly (T53-L-13B/703 Engines) - Repair (AVIM)

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**Consumable Materials**  
Welding Wire (item 92, Appendix D)

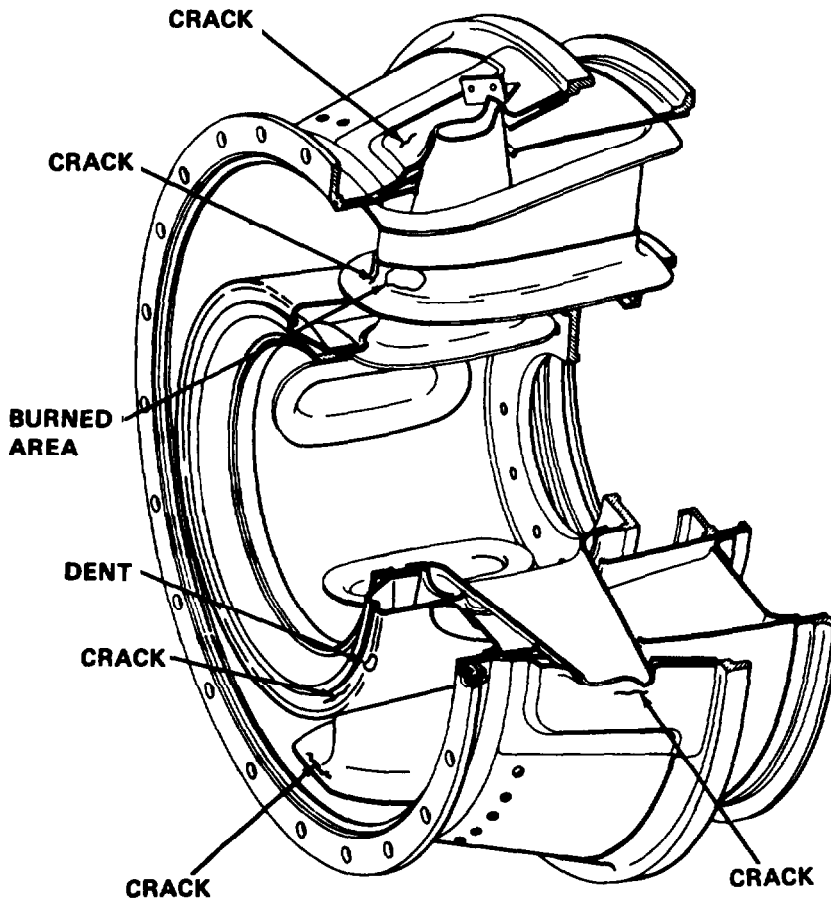
**Special Tools**  
Center Drill  
Carbide Drill No. 8  
Twist Drill No. 43, P/N MS15444-43  
Bottom Tap 1/4 x 28 UNF-3B

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/		<b>Repair</b> dents that create a gap greater than 1/16 inch (1.6 mm) between outer strut and strut fairing as follows:

3-29. Exhaust Diffuser Assembly (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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SECOND STAGE TUR-  
BINE SUPPORT ASSEM-  
BLY/ - Continued



1. Exhaust Diffuser Assembly

Use rubber or leather-headed mallet.

**Reform** flange or strut fairing as close to outer strut as possible.

2. Exhaust Diffuser Assembly

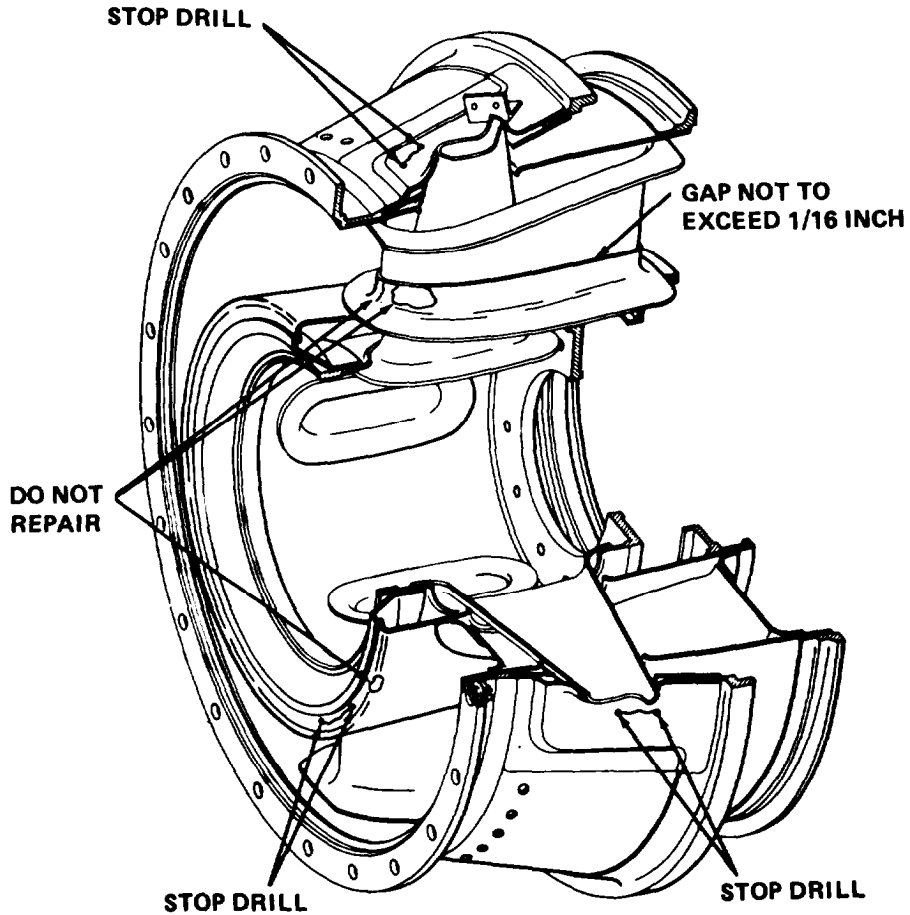
Use welding wire (item 92, Appendix D)). Tack-welds shall be approximately 0.045 inch (1.143 mm) long and 180 degrees apart.

**Tack-weld** threaded end of a 1/4 inch (6.4 mm) diameter by one inch (25.4 mm) long, low-alloy steel hex bolt to center of dent.

3-29. Exhaust Diffuser Assembly (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
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SECOND STAGE TUR-  
BINE SUPPORT ASSEM-  
BLY/ - Continued



3. Exhaust Diffuser  
Assembly

**Apply** an outward pressure under head of bolt until dented area *con-*forms (after pressure is released) to contour of undamaged strut and strut fairing areas adjacent to dent.

**CAUTION**

During grinding in following action for item 4, do not reduce strut wall thickness.

3-29. Exhaust Diffuser Assembly (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued		
4. Bolt		Remove by grinding away tack-welds.
5. Repaired Areas		Visually inspect to insure that strut and strut fairing mating surfaces are closed within allowable limits.
6. Thermocouple Studs		<p>Replace on exhaust diffuser 1-150-240-03 studs that are damaged or have stripped threads as follows:</p> <ul style="list-style-type: none"><li>a. Cut off stud flush to surface of boss.</li><li>b. Using a center drill, start a hole in remainder of stud.</li><li>c. Using No. 8 carbide drill, drill into stud approximately 0.150 inch (3.81 mm) below face of boss cutting through lockpin.</li><li>d. Using a punch, drive part of lockpin into hole drilled in preceding action for item 3. Remove pin.</li><li>e. Using No. 43 twist drill, drill through existing pin hole and into remainder of pin in opposite wall of stud, to a depth of approximately 0.380 inch (9.65 mm).</li><li>f. Using suitable tool, remove stud from boss.</li></ul>

3-29. Exhaust Diffuser Assembly (T53-L-13B/703 Engines) - Repair (AVIM) - Continued

LOCATION/ITEM	REMARKS	ACTION
SECOND STAGE TURBINE SUPPORT ASSEMBLY/ - Continued		<p>g. <b>Retap</b> stud hole using a 1/4 x 28 UNF-3B bottom tap. <b>Clean</b> threads with compressed air.</p> <p>h. <b>Install</b> new stud (1-150-007-02) and <b>tighten</b> to 70 to 95 pound-inches (0.8 to 1.1 kg/m) torque. <b>Insure</b> stud bottoms on cone OD.</p> <p>i. <b>Using</b> No. 43 twist drill, <b>drill</b> through existing pin hole in boss to a depth of 0.460 inch (11.68 mm).</p> <p>j. <b>Install</b> new pin (1-140-023-06), <b>flush</b> with boss and stake.</p>

3-30. Exhaust Diffuser Support Cone Assembly (T53-L-13B/703 Engines - Disassembly

INITIAL SETUP

Applicable Configuration  
T53-L13B/703 Engines

Consumable Materials  
Lockwire (items 41,42, or 43, Appendix D)

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/		

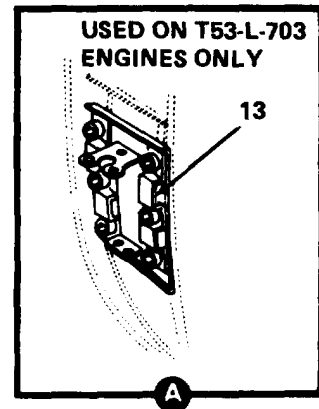
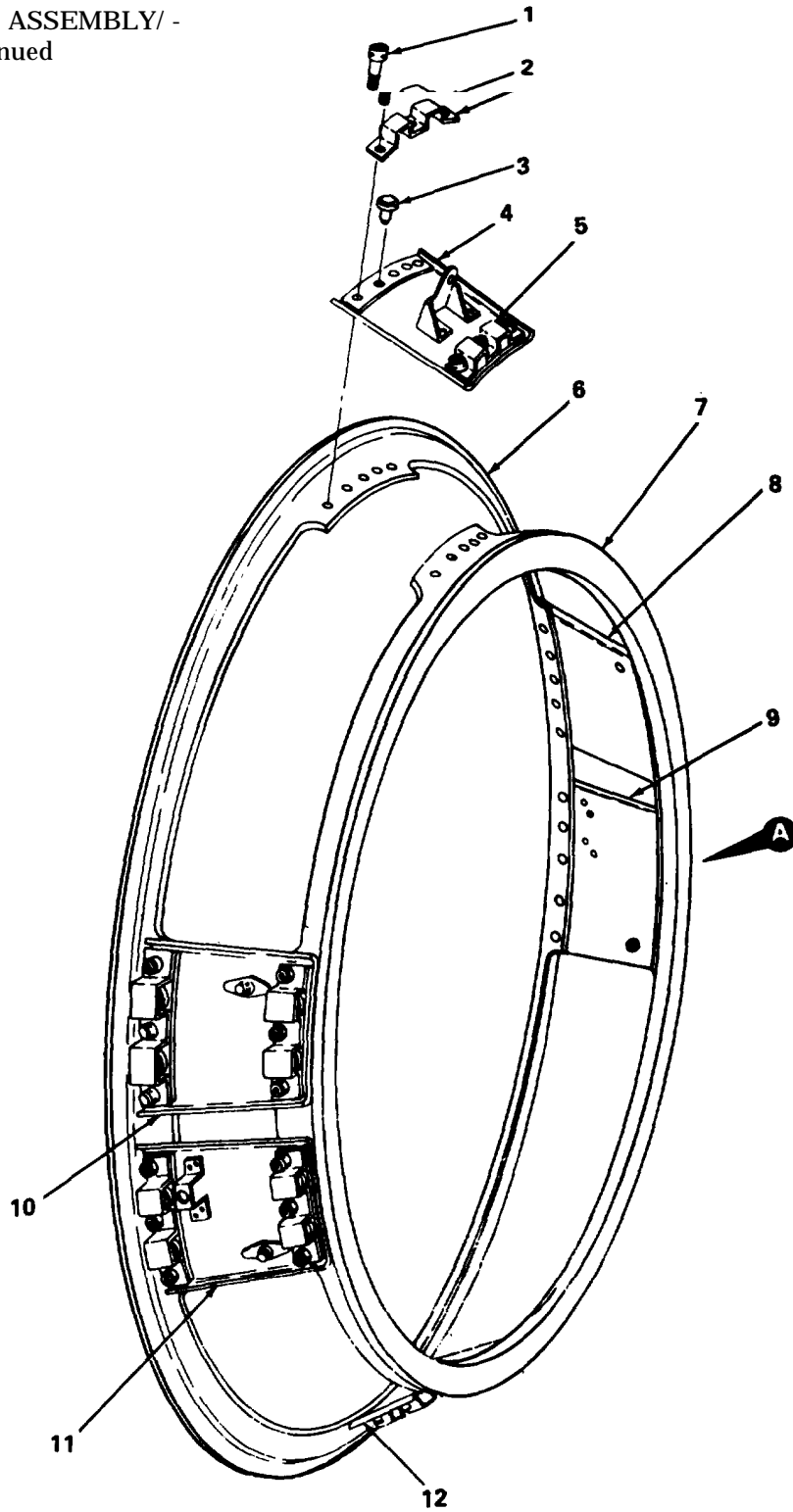
NOTE

Disassemble the exhaust diffuser support cone assembly only as required to correct visible damage or replace components.

3-30. Exhaust Diffuser Support Cone Assembly (T53-L-13B/70 Engines) - Disassembly - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTOR TUR-  
 BINE ASSEMBLY/ -  
 Continued



**3-30. Exhaust Diffuser Support Cone Assembly (T53-L-13B/703 Engines) - Disassembly - Continued**

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/ - Continued		
1. Bolts (1)		<b>Cut</b> lockwire. <b>Remove</b> .
2. Retainers (2 and 5)		<b>Remove</b> bolts securing retainers (2 and 5). <b>Remove</b> retainers.
<b>NOTE</b>		
Support assemblies must be tagged and flanges indexed for support location. Supports are not interchangeable.		
3. Support Assembly (4)		<b>Remove</b> pins (3).
4. Flanges (6 and 7)	Repeat preceding items 1 thru 4 for remaining support assemblies (8, 9, 10, 11,12 and 13).	<b>Remove</b> support assembly (4).

**3-31. Exhaust Diffuser Support Cone Assembly (T53-L-13B/703 Engines) - Inspection (AVIM)**

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**References**  
Para H-29

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/		
1. All Parts		Visually <b>inspect</b> all parts for cracks and distortion.
2. Threaded Parts		<b>Inspect</b> all threaded parts for damaged threads. <b>Repair</b> damaged threads as outlined in paragraph H-29. <b>Replace</b> parts having threads damaged beyond repair.



3-32. Exhaust Diffuser Support Cons Assembly (T53-L-13B/703 Engines) - Assembly

INITIAL SETUP

**Applicable Configuration**  
T53-L13B/703 Engines

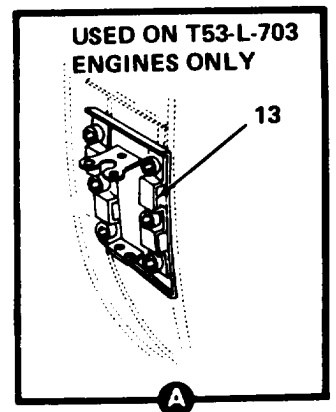
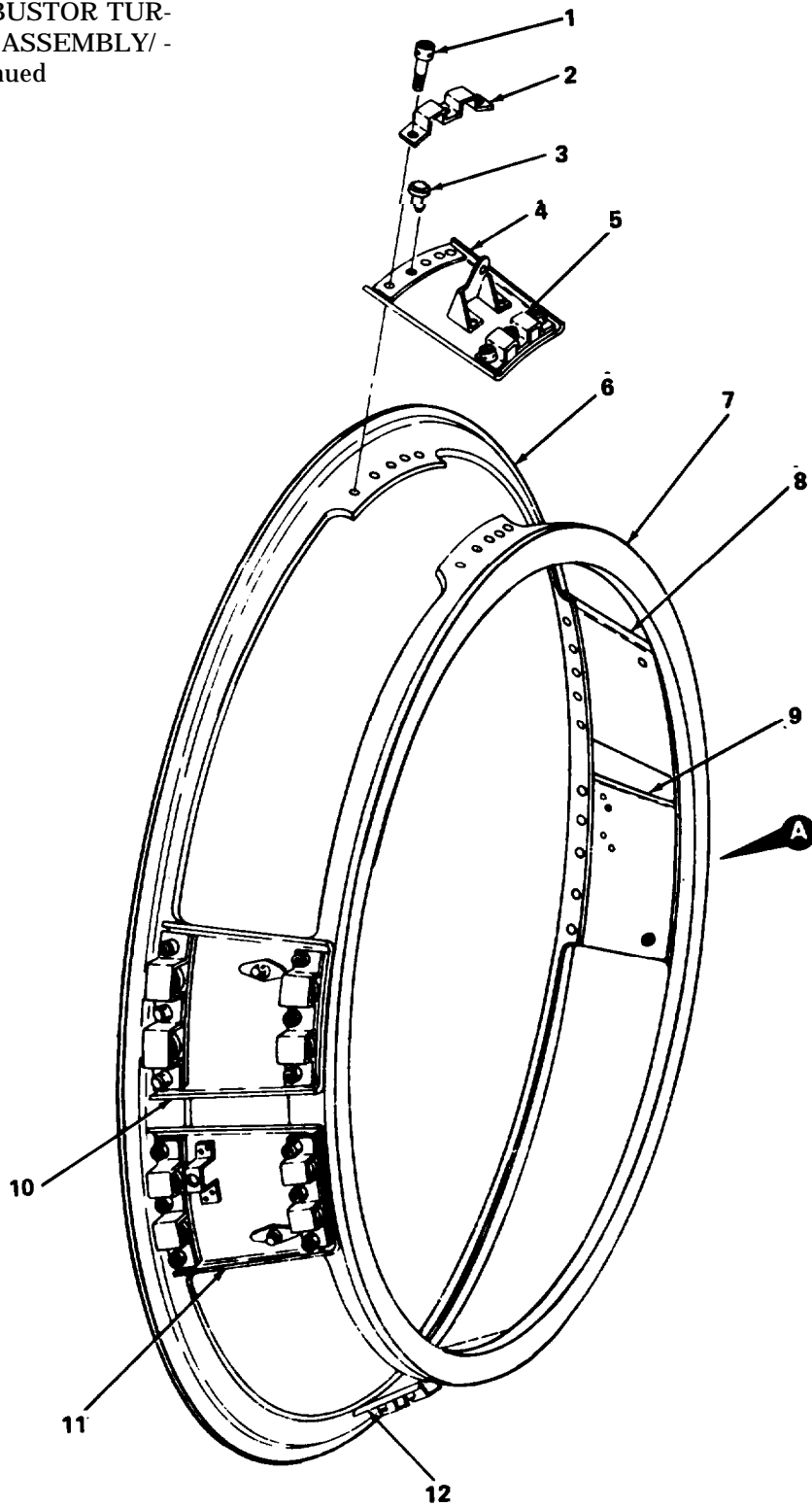
**Consumable Materials**  
Lockwire (items 41,42, or 43, Appendix D)

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/	<p><b>NOTE</b></p> <p>Refer to tags for support assembly location.</p>	
1. Support. Assembly (4)		<b>Position</b> on flanges (6 and 7).
2. Pins (3)		<b>Install</b> into support assembly (4).
3. Retainers (2 and 5)		<b>Position</b> on support assembly (4). <b>Secure</b> with bolts (1).
4. Bolts (1)		<b>Lockwire.</b>
5. Support Assemblies (8,9,10,11,12 and 13)		<b>Repeat</b> preceding actions (items 1 thru 4).

3-32. Exhaust Diffuser Support Cons Assembly (T53-L-13B/703 Engines) - Assembly - Continued

LOCATION/ITEM	REMARKS	ACTION
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COMBUSTOR TUR-  
BINE ASSEMBLY/ -  
Continued



3-33. Fireshield, Aft Diffuser Support Cone and Power Turbine Tubas and 011 Nozzle(TS3-L-11 Series Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L-11 Series Engines

**References**  
Para H-25 and H-26

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/	Inspection and replacement may be performed by AVUM personnel. Repair can only be performed by AVIM personnel.	
1. Parts	Refer to paragraph H-26 for blend-repair procedures (AVIM).	<b>Inspect</b> parts for nicks and burrs. <b>Blend-repair</b> nicks and burrs.
2. Fireshield	Refer to paragraph H-26 for weld procedure.	<b>Inspect</b> fireshield and igniter mounts of fireshield for cracks. Using <b>weld</b> procedure <b>repair</b> cracks on fireshield. <b>Replace</b> fireshield if any igniter boss cover converging cracks meet (360 degrees) or if a ring of metal breaks loose.
<b>NOTE</b>		
Converging cracks in the igniter boss cover on the fireshield are acceptable provided they do not meet. Nonconverging cracks are acceptable in excess of 360 degrees, provided a ring of metal cannot be broken free or removed from any of the igniter boss covers.		
3. Support Cone	Refer to paragraph H-26 for weld procedure. (AVIM)	Visually <b>inspect</b> support cone for cracks. Using welding procedure, <b>repair</b> cracks.
4. Threaded Parts		Visually <b>inspect</b> threaded parts for damaged threads. <b>Replace</b> power turbine tubes and

**3-33. Fireshield, Aft Diffuser Support Cone and Power Turbine Tubes and Oil Nozzle (T53-L-11 Series Engines) - Inspection - Continued)**

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/ - Continued		Igniter mounts, if cracked or crossed threads are found.
5. Parts		Visually Inspect parts for distortion. Replace parts if defective.

**3-34. Fireshield (T53-L-13B/703 Engines) - Repair (AVIM)**

INITIAL SETUP

**Applicable Configuration**  
T53-L-13B/703 Engines

**Consumable Materials**  
Welding Wire (Item 92, Appendix D)

**References**  
Para H-20, H-25, and H-26

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/		
<b>NOTE</b>		
If cracks in fireshield are within limits, repair as follows:		
1. Fireshield	Use welding wire (item 92, Appendix D).	<b>Weld-repair</b> cracks as outlined in paragraph H-26.
2. Fireshield		<b>Blend-repair</b> welds as outlined in paragraph H-25.
3. Fireshield	See paragraph H-20.	<b>Reinspect</b> weld areas for cracks by visual and fluorescent- penetrant method. <b>Refer</b> to paragraph H-20.)
4. Support! Cone	Refer to paragraph H-26 for weld procedure.	<b>Visually Inspect</b> support cone for cracks. Using welding procedure, repair cracks.

3-35. V-Band Coupling Assembly, Oil Strainer Housing Adapter, Power Turbine Tubes and  
 Fireshield (T53-L-13B/703 Engines) - Inspection

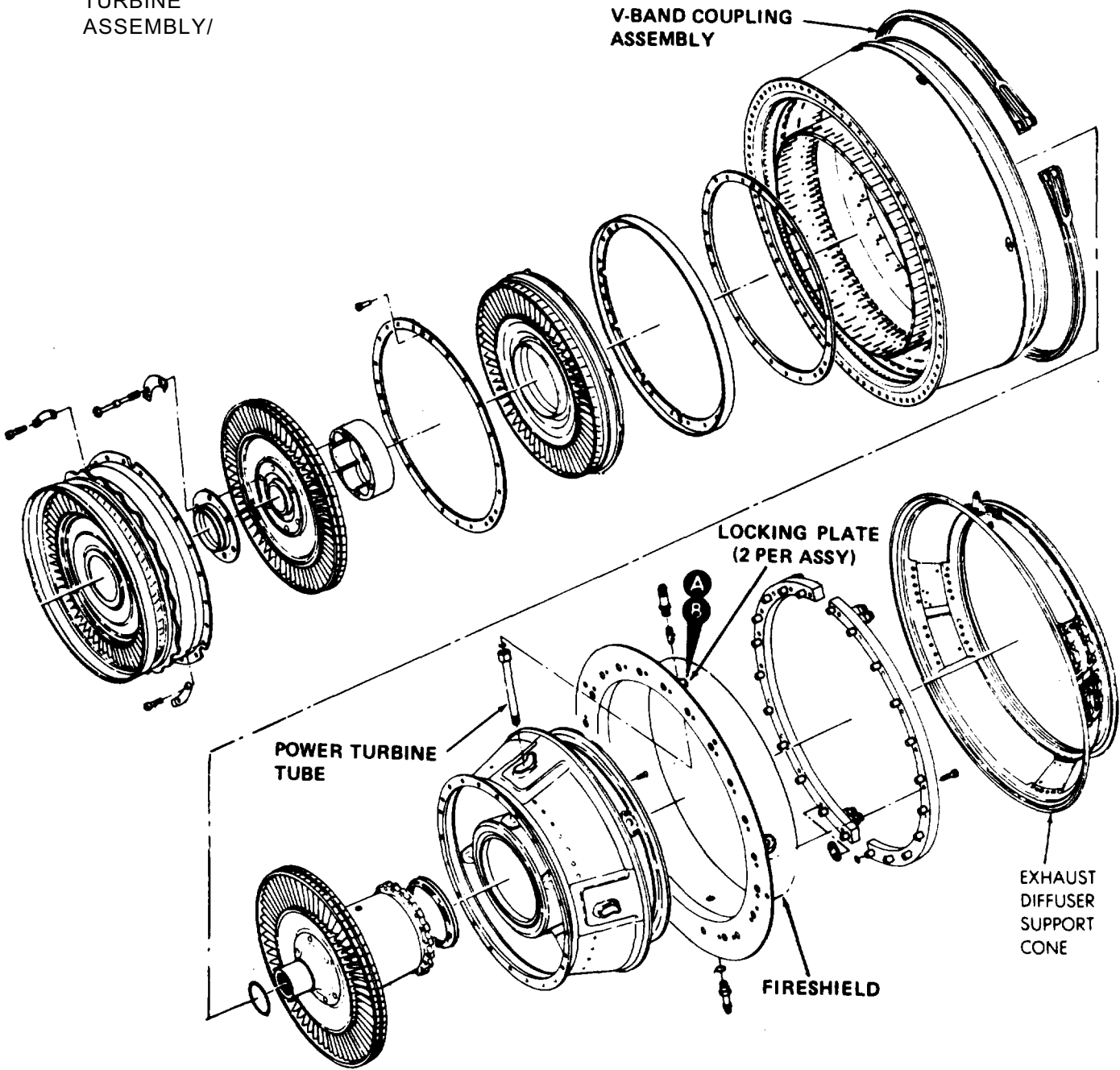
INITIAL SETUP

Applicable Configuration  
 T53-L-13B/703 Engines

References  
 Para H-29 and 3-34

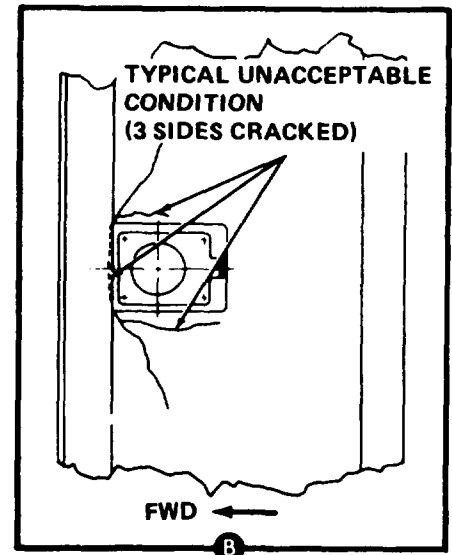
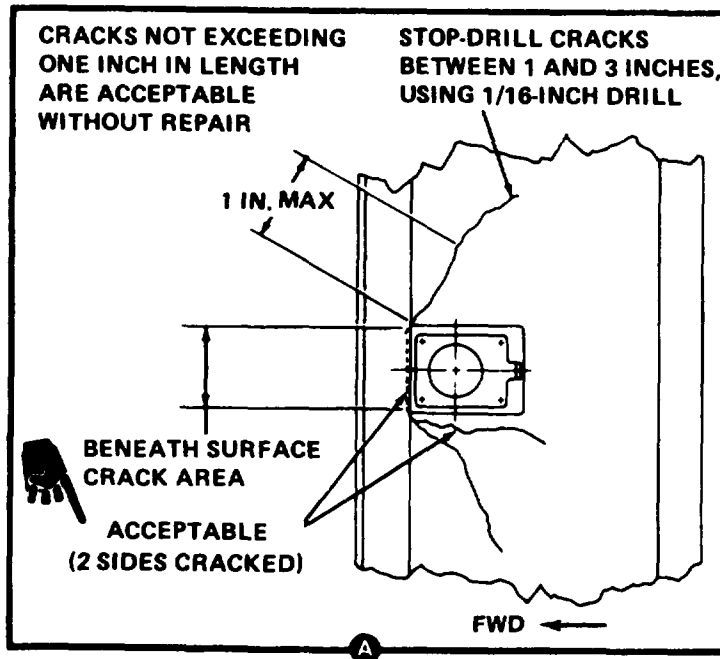
LOCATION/ITEM	REMARKS	ACTION
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COMBUSTOR  
 TURBINE  
 ASSEMBLY/



3-35. V-Band Coupling Assembly, Oil Strainer Housing Adapter, Power Turbine Tubes and Fireshield (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/ - Continued		
1. Threaded Parts	Refer to paragraph H-29 for repair of damaged threads.	Visually <b>inspect</b> for crossed or damaged threads.
2. All Parts		Visually <b>inspect</b> for cracks or distortion. <b>Replace</b> damaged or distorted parts beyond repair.



3. Fire shield	When circumferential cracks appear on both sides in forward area of lockplate, this indicates cracking beneath surface. When such cracks appear, consider crack to affect width (one side) of lockplate.	Visually <b>inspect</b> for cracks originating from the lockplate areas.
4. Fireshield	Cracks are acceptable extending along any two sides of each lockplate.	<b>Replace</b> if more than two sides of the lockplate are affected.

**3-35. V-Band Coupling Assembly, Oil Strainer Housing Adapter, Power Turbine Tubes and Fireshield (T53-L-13B/703 Engines) - Inspection - Continued**

LOCATION/ITEM	REMARKS	ACTION
COMBUSTOR TURBINE ASSEMBLY/ - Continued		
5. Lockplate	Cracks emanating from below forward area of backplate need not be stop-drilled unless visible portion is greater than 1 inch (25.4 mm). Cracks up to 1 inch (25.4 mm) in length are acceptable without repair, provided limits of preceding item 4 are not exceeded.	<b>Observe</b> allowable limits.
6. Fireshield	Cracks between 1 inch and 3 inches (25.4 mm to 76.2 mm) are acceptable provided they are stop-drilled and limits of preceding item 4 are not exceeded.	<b>Observe</b> allowable limits.
7. Fireshield	Refer to paragraph 3-34. If limits are exceeded, forward fireshield to next higher echelon for disposition.	<b>Repair</b> if cracks are within limits.

**3-36. Bracket and Clamp Assembly (T53-L-13B/703 Engines) - Removal**

INITIAL SETUP

**Applicable Configuration**

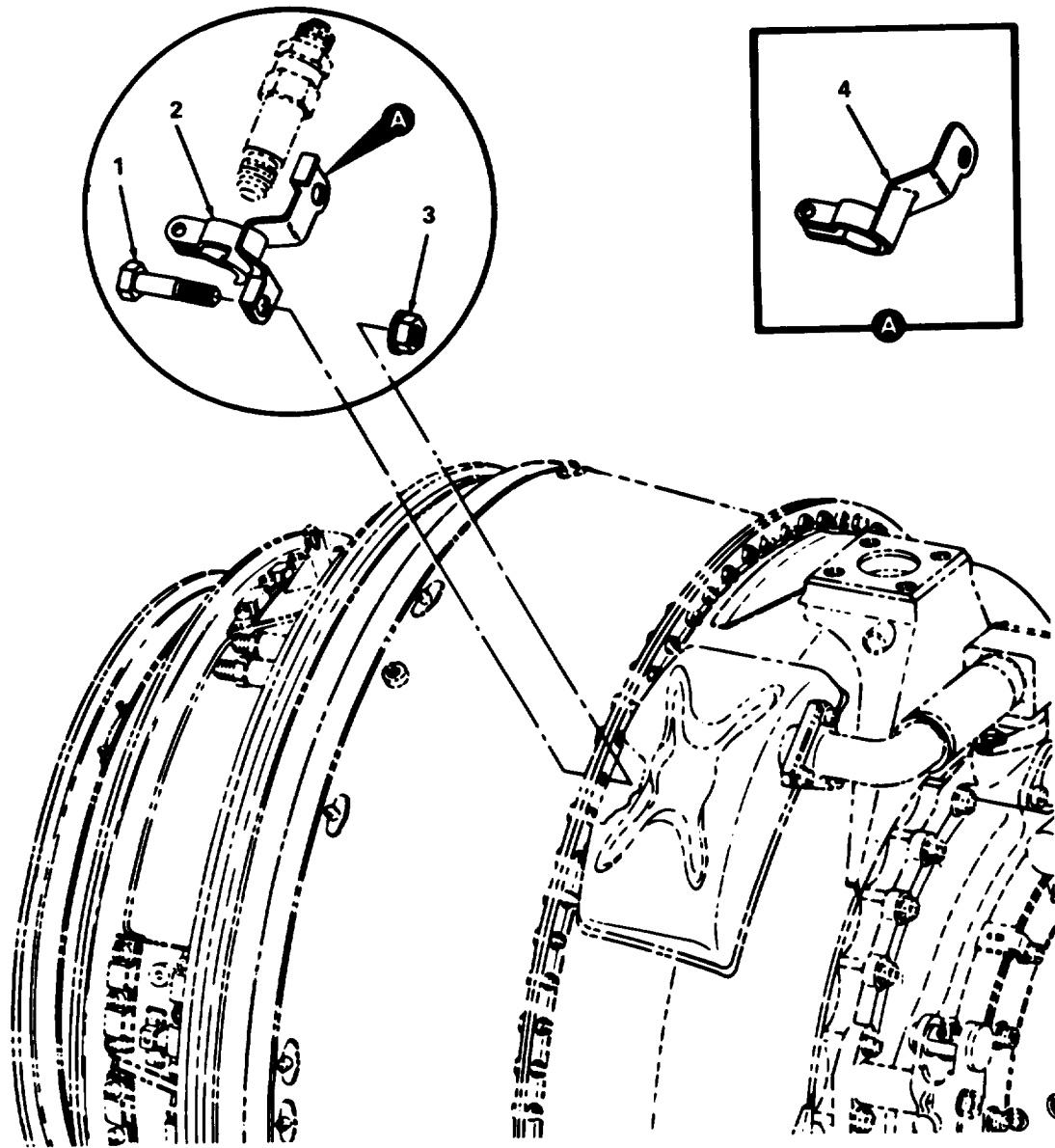
T53-L-13B/703 Engines

LOCATION/ITEM	REMARKS	ACTION
ENGINE/		
1. Nut (3) and Bolt (1)		<b>Remove</b> nut (3) and bolt (1) that secure bracket and clamp assembly.
2. Bracket and Clamp Assembly (2 or 4)		<b>Remove</b> from combustion chamber housing.

3-36. Bracket and Clamp Assembly (T53-L-13B/703 Engines) - Removal - Continued

LOCATION/ITEM	REMARKS	ACTION
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ENGINE/ - Continued



3-37. Bracket and Clamp (T53-L-13B/703 Engines) - Inspection

INITIAL SETUP

**Applicable Configuration**  
T53-L13B/703 Engines

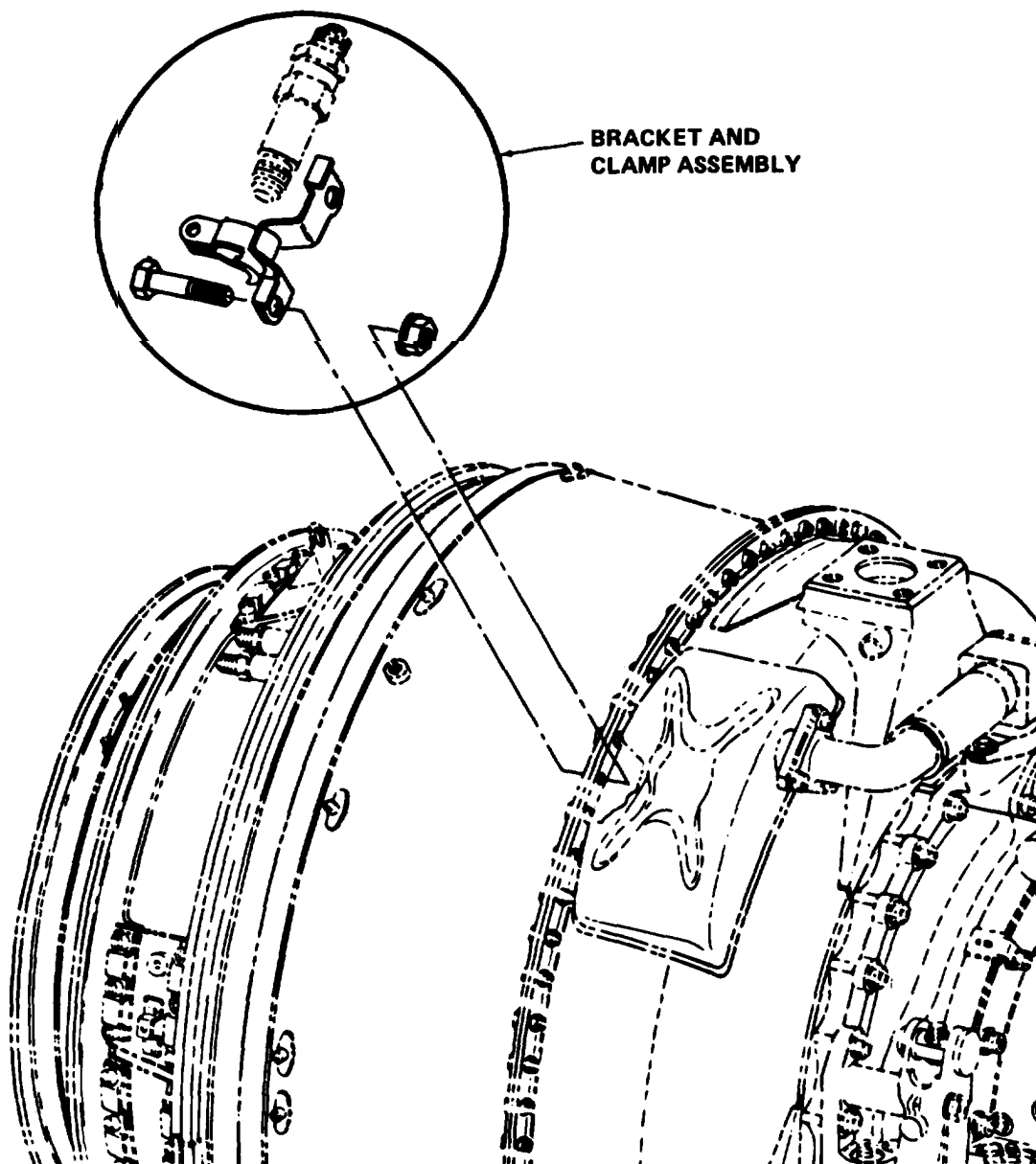
**Consumable Materials**  
Welding Wire (item 90, Appendix D)

**References**  
Para H-20 and H-26



3-37. Bracket and Clamp (T53-L-13B/703 Engines) - Inspection - Continued

LOCATION/ITEM	REMARKS	ACTION
<p>COMBUSTION CHAMBER/  1. Bracket and Clamp Assembly</p>	<p>Refer to paragraph H-20 or alternatively refer to TM 1-1520-255-23, Technical Manual Aviation Unit Maintenance (AVUM) and Aviation Intermediate Maintenance (AVIM) Manual Nondestructive Inspection Procedures for AH-1 Helicopter Series.</p>	<p>Inspect visually using fluorescent penetrant for cracks in and adjacent to welded joints.</p>



2. Bracket and Clamp Assembly

Use welding wire (item 90, Appendix D). Refer to paragraph H-26.

(AVIM) Weld-repair cracks in and adjacent to welded joints using welding wire.

3-38. Bracket and Clamp Assembly (T53-L-13B/703 Engines) - Installation

INITIAL SETUP

**Applicable Configuration**  
T53-L13B/703 Engines

LOCATION/ITEM	REMARKS	ACTION
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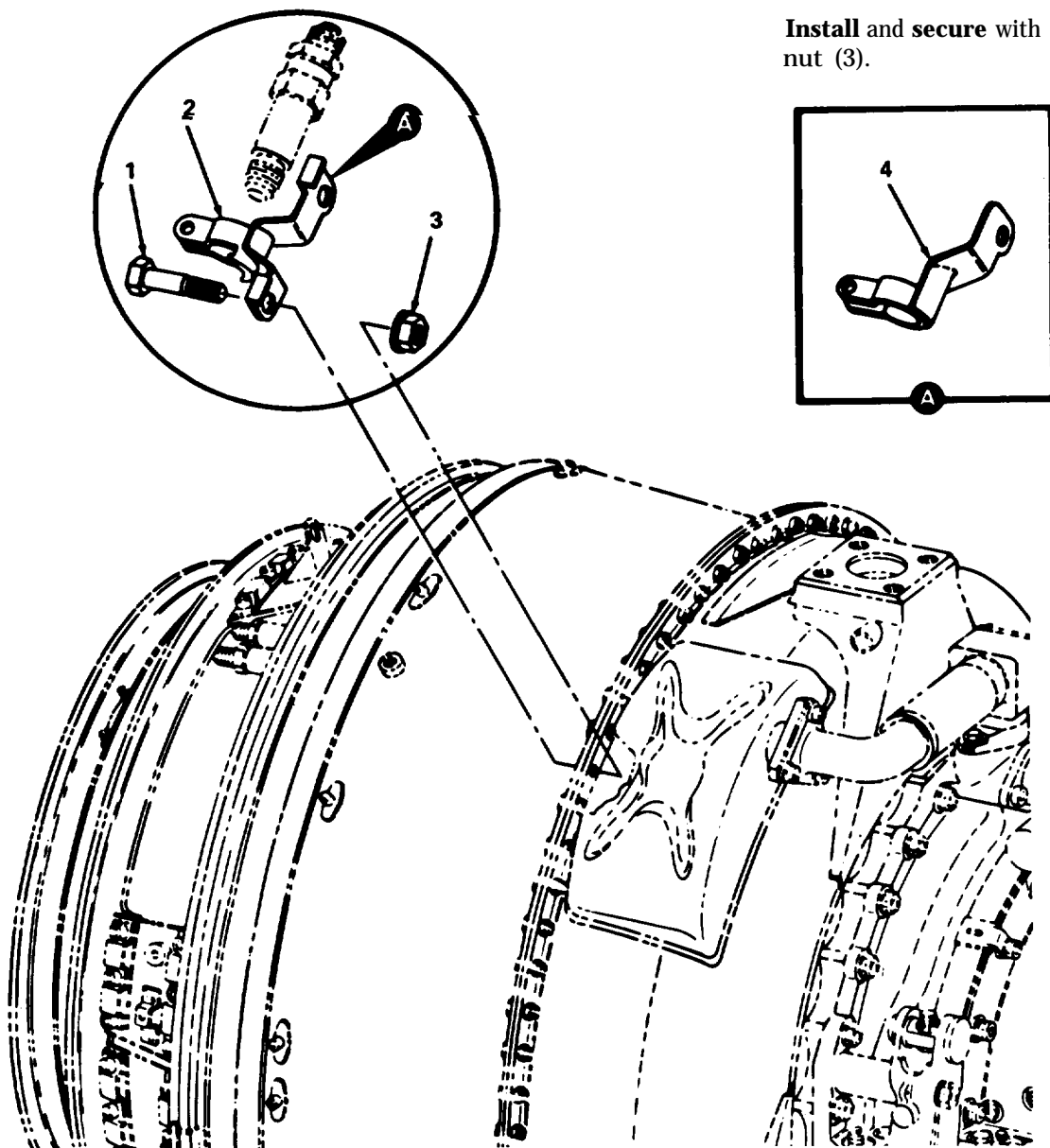
ENGINE/

1. Bracket and Clamp Assembly (2 or 4)

**Position** on flange of combustion chamber housing.

2. Bolt (1)

**Install and secure** with nut (3).





By Order of the Secretaries of the Army and Air Force:

**E. C. MEYER**  
*General, United States Army*  
*Chief of Staff*

Official:

**J. C. PENNINGTON**  
*Major General, United States Army*  
*The Adjutant General*

**LEW ALLEN, JR.**  
*General, USAF*  
*Chief of Staff*

**BRYCE POE III**  
*General, USAF*  
*Commander, Air Force Logistics Command*

**DISTRIBUTION:**

To be distributed in accordance with DA Form 12-31, Organizational Maintenance Requirements for AH-IG, UH-IB, UH-IC/M, UH-ID/H and EH-IH, AH-IS(MOD), and AH-IS(PROD) 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@wherever.army.mil>

To: 2028@redstone.army.mil

Subject: DA Form 2028

1. **From:** Joe Smith
2. **Unit:** home
3. **Address:** 4300 Park
4. **City:** Hometown
5. **St:** MO
6. **Zip:** 77777
7. **Date Sent:** 19-OCT-93
8. **Pub no:** 55-2840-229-23
9. **Pub Title:** TM
10. **Publication Date:** 04-JUL-85
11. **Change Number:** 7
12. **Submitter Rank:** MSG
13. **Submitter FName:** Joe
14. **Submitter MName:** T
15. **Submitter LName:** Smith
16. **Submitter Phone:** 123-123-1234
17. **Problem:** 1
18. **Page:** 2
19. **Paragraph:** 3
20. **Line:** 4
21. **NSN:** 5
22. **Reference:** 6
23. **Figure:** 7
24. **Table:** 8
25. **Item:** 9
26. **Total:** 123
27. **Text:**

This is the text for the problem below line 27.







<b>TO:</b> (Forward direct to addressee listed in publication) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, AL 35898	<b>FROM:</b> (Activity and location) (Include ZIP Code) MSG, Jane Q. Doe 1234 Any Street Nowhere Town, AL 34565	<b>DATE</b> 8/30/02
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**PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS**

PUBLICATION NUMBER			DATE	TITLE				
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

**PART III - REMARKS** (Any general remarks, corrections, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

**EXAMPLE**

TYPED NAME, GRADE OR TITLE MSG, Jane Q. Doe, SFC	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION 788-1234	SIGNATURE
---	--	-----------

<p align="center"><b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b></p> <p align="center">For use of this form, see AR 25-30; the proponent agency is ODISC4.</p>						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM)	DATE
TO: (Forward to proponent of publication or form)(Include ZIP Code) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, AL 35898						FROM: (Activity and location)(Include ZIP Code)	
<p align="center"><b>PART 1 - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b></p>							
PUBLICATION/FORM NUMBER						DATE	TITLE
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON	
<p align="center">* Reference to line numbers within the paragraph or subparagraph.</p>							
TYPED NAME, GRADE OR TITLE				TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	

<b>TO:</b> (Forward direct to addressee listed in publication) Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, AL 35898	<b>FROM:</b> (Activity and location) (Include ZIP Code)	<b>DATE</b>
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**PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS**

PUBLICATION NUMBER			DATE	TITLE				
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

**PART III - REMARKS** (Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)

--

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE

## The Metric System and Equivalents

### Linear Measure

1 centimeter = 10 millimeters = .39 inch  
 1 decimeter = 10 centimeters = 3.94 inches  
 1 meter = 10 decimeters = 39.37 inches  
 1 dekameter = 10 meters = 32.8 feet  
 1 hectometer = 10 dekameters = 328.08 feet  
 1 kilometer = 10 hectometers = 3,280.8 feet

### Weights

1 centigram = 10 milligrams = .15 grain  
 1 decigram = 10 centigrams = 1.54 grains  
 1 gram = 10 decigrams = .035 ounce  
 1 decagram = 10 grams = .35 ounce  
 1 hectogram = 10 decagrams = 3.52 ounces  
 1 kilogram = 10 hectograms = 2.2 pounds  
 1 quintal = 100 kilograms = 220.46 pounds  
 1 metric ton = 10 quintals = 1.1 short tons

### Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce  
 1 deciliter = 10 centiliters = 3.38 fl. ounces  
 1 liter = 10 deciliters = 33.81 fl. ounces  
 1 dekaliter = 10 liters = 2.64 gallons  
 1 hectoliter = 10 dekaliters = 26.42 gallons  
 1 kiloliter = 10 hectoliters = 264.18 gallons

### Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch  
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches  
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet  
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet  
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres  
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

### Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch  
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches  
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

## Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	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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