*DMWR 1-2840-113-1

DEPOT MAINTENANCE WORK REQUIREMENT

for

ENGINE, AIRCRAFT, TURBO–PROP

MODEL	PART NUMBER	NATIONAL STOCK NUMBER
T53–L–15	1–000–100–01	2840–00–957–2853
T53–L–701	1–000–110–01	2840–00–116–7134
T53–L–701A	1–000–110–03/07	2840–00–176–9132

and

ENGINE, AIRCRAFT, TURBO–SHAFT

MODEL	PART NUMBER	NATIONAL STOCK NUMBER
T53–L–13B	1–000–060–22	2840–00–134–4803
T53–L–703	1–000–060–23	2840–00–621–1860

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* This manual supersedes DMWR 1–2840–113–1 dated 30 September 1994, including all changes.

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US ARMY AVIATION AND
MISSILE COMMAND
15 JANUARY 1999

CHANGE

NO. 1

U.S. ARMY AVIATION AND
MISSILE COMMAND
REDSTONE ARSENAL, AL 35898-5230
26 MAY 2000

DEPOT MAINTENANCE WORK REQUIREMENT

for

ENGINE, AIRCRAFT, TURBO-PROP

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T53-L-15	1-000-100-01	2840-00-957-2853
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T53-L-703	1-000-060-23	2840-00-621-1860

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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	Insert Pages
A/(B blank)	A/(B blank)
xi through xvi	xi through xvi
xvii and xviii	xvii and xviii
xxxv through xxxviii	xxxv through xxxviii
xliii and xliv	xliii and xliv
li through lv/(lvi blank)	li through lv/(lvi blank)
2-11 and 2-12	2-11 and 2-12
2-21 and 2-22	2-21 and 2-22
2-27 and 2-28	2-27 and 2-28
3-3 and 3-4	3-3 and 3-4
3-19 through 3-22	3-19 through 3-22
4-103 and 4-104	4-103 and 4-104
4-115 and 4-116	4-115 and 4-116

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

FOR THE COMMANDER:

HERBERT M. CARR
Colonel, AD
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Director
Logistics Support Directorate
Integrated Materiel Management Center

Ch 2 posted 7-29-03 BA.E.B.

CHANGE

NO. 2

U.S. ARMY AVIATION AND MISSILE COMMAND
REDSTONE ARSENAL, AL 35898-5000
10 March 2003

DEPOT MAINTENANCE WORK REQUIREMENT

for

ENGINE, AIRCRAFT, TURBO-PROP

MODEL	PART NUMBER	NATIONAL STOCK NUMBER
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T53-L-701	1-000-110-01	2840-00-116-7134
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2. Retain this sheet in front of manual for reference purposes.

FOR THE COMMANDER:

JOHN B. SMITH
Colonel, QM
Chief of Staff

OFFICIAL:

Richard E. Turner

RICHARD E. TURNER
Deputy Director
Integrated Materiel Management Center

WARNING

WARNING AND FIRST AID DATA PAGE

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

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

WARNING

COMPRESSED AIR

Eyes can be permanently damaged by contact with liquid or large particles propelled by compressed air. Inhalation of air-blown particles or solvent vapors can damage lungs. At an air-exhausted workbench, wear approved goggles or face shield. At non air-exhausted work-benches, wear approved respirator and goggles.

To preclude personnel injury, do not direct air near or directly against skin.

To prevent damage or contamination when drying parts, do not use air under high pressure or from a source not having a moisture–trap/filter system.

To prevent personnel injury or bearing damage, do not roll bearings with compressed air.

WARNING

NOISE

Operation and maintenance personnel shall wear ear protection devices when working near or around an operating test stand. Ear plugs and sound attenuating headsets shall be available at all times to personnel in the vicinity of the test stand. Sound pressure levels in excess of 100dB are common.

WARNING

HANDLING HOT PARTS

To prevent injury to operator, asbestos gloves must be worn when removing gear from oven. Bare handling of heated parts may cause blistering and third degree burns. If skin is burned, immediately immerse the affected area in cold water for ten minutes. Seek medical attention if blistering or pain persists.

WARNING

EQUALIZING SHIPPING CONTAINER PRESSURE

Make certain that all air pressure has been released before loosening nuts. If nuts are removed before pressure is released, internal pressure could blow cover off and the high energy fragments may severely injure personnel.

WARNING

VAPOR-BLASTING (CLEANING)

Because of toxicity of some deposited material, when removing all remaining contaminants by hand scrubbing, keep both part and brush wet with water to prevent airborne dust.

WARNING

PROLONGED CONTACT WITH LUBRICATING OIL

Prolonged contact with lubricating oil may cause a skin rash. These 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.

WARNING

DANGEROUS CHEMICALS

When using nondiluted Magnus magnustrip or a solution in a ratio of 3 pounds of Turco compound per gallon of water, avoid direct contact of solution with skin or eyes. This solution is a strong caustic, and protective garments, to include agent resistive gloves, aprons, and face shields/goggles, should be worn when handling it. Ensure that tank is exhausted to outside atmosphere.

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

Molding compound, consisting of base compound and accelerator compound and lamp black is toxic and care should be exercised to avoid prolonged contact with skin. Keep containers closed, except when mixing and transferring material.

When using a solvent of four parts Magnus 61C solution by volume; one part Magnus 751 solution; four parts Oakite rust stripper; and 14 parts water, provide adequate ventilation around bath. If inhaled deeply the solution may be injurious to the lungs. Wear rubber gloves to protect hands from chemicals as skin will be harmed by prolonged contact.

When using Brulin 815 GD, Desoclean 45, DS-108, Positron, denatured alcohol or acetone, avoid prolonged inhalation of fumes. Perform cleaning operation in a well-ventilated area.

Use extreme care when handling ammonium nitrate, hydrochloric acid, concentrated nitric acid, sodium hydroxide pellets, hydrogen peroxide; ammonium bifluoride crystals, concentrated sulphuric acid and concentrated phosphoric acid; these chemicals are hazardous and require special handling. Solid ammonium bifluoride is crystalline and can be conveniently stored in a dry place.

Desoclean 45 is flammable. Do not use near open flames, near welding areas, or on hot surfaces. Do not smoke when using, and do not use where others are smoking. Vapors of this product are heavier than air and may collect in low or confined areas, forming explosive mixtures with air.

Contact with Desoclean 45 liquid or vapor can cause skin an eye irritation, dermatitis, and drowsiness. If there is any prolonged skin contact wash contacted area with soap and water. Remove solvent saturated clothing. If vapor causes drowsiness, get to fresh air. If irritation persists, get medical attention.

WARNING

CLEANING

When removing carbon by the solvent-immersion method, ensure that cleaning area is well ventilated. If carbon-removal compound comes in contact with skin, eyes, or clothing, thoroughly flush affected area with cold water.

When using dry cleaning solvent P-D-680, avoid prolonged inhalation of vapors. Wear rubber gloves and use hand cream to prevent contact with skin. Do not heat solution.

Solvent flash point must not be less than 100°F.

When handling Desoclean 45 at air exhausted workbench, wear approved gloves, goggles, and long sleeves. When handling liquid or liquid-soaked cloth in open unexhausted area wear approved respirator, wear approved gloves, goggles, and long sleeves. Dispose of liquid-soaked rags in approved metal container. Metal containers of solution must be grounded to maintain electrical continuity.

WARNING

EXPLOSIVE MATERIAL

Never attempt to burn more than a few particles of metal suspected to be magnesium. Magnesium powder or dust is explosive.

WARNING

TEST STAND OPERATION

Improper use of a test stand can cause severe damage to personnel or components. Test stands shall be operated by authorized personnel only.

WARNING

USE OF PIN DRIVER FIXTURE

To properly operate, control buttons must be activated simultaneously as a safety precaution to ensure the operator's hands are clear of driver sleeve.

WARNING

COMBUSTION CHAMBER INTERNAL PARTS

When handling internal parts of the combustion chamber that have been exposed to fuel containing tetraethyl lead, ensure 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 assistance.

WARNING

FLUORESCENT-PENETRANT INSPECTION

Wear rubber gloves when performing the fluorescent-penetrant inspection, as oil on the skin may cause skin inflammation. Presence of penetrating oil on the skin can be detected under ultraviolet (black) light. Developing powder is harmless if inhaled, but heavy concentration can be annoying.

WARNING

RADIOGRAPHIC (X-RAY) INSPECTION

To guard operating personnel from possible danger of X-ray absorption, cover rear side of film holder with a sheet of lead thick enough to absorb fully any secondary reflected radiographic rays. As a further precaution, all radiographic operating personnel shall wear a radiation detector-type badge or cylinder.

WARNING

RADIOACTIVE MATERIAL

Aircraft engine igniter exciters include electron tubes which contain a small amount of Cesium/Barium 137 or Krypton-85. No special handling precautions normally apply, however, personnel should consult their supporting Radiation Protection Officer in the event these tubes are severely damaged.

WARNING

MARKING OF ENGINE PARTS

To prevent detrimental chemical/material reactions which could cause cracks and/or parts failure, never use a lead (graphite) pencil to mark hot end parts. Use only approved marking materials on all engine parts.

WARNING

FLIGHT SAFETY PARTS

This manual contains procedures identifying critical characteristics of flight safety parts. Critical characteristics may be identified as dimensions, tolerances, finishes, materials, assembly, or inspection procedures. Some processes may require qualified sources. Flight Safety parts indicating a maximum allowable limit shall not be continued in use when limits have been exceeded. These parts must be replaced.

CAUTION

CURRENCY OF INFORMATION

The information in this manual is current for the T-53-L-13B and T-53-L-703 Engines **only**. The other models are not maintained in the U.S. Army inventory. Removal of these procedures was not feasible at the time of revision.

LIST OF EFFECTIVE PAGES

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

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

Dates of issue for original and changed pages are:

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Change 1	15 May 1984		

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DEPOT MAINTENANCE
WORK REQUIREMENT
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US ARMY AVIATION
AND MISSILE COMMAND
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REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

ENVIRONMENTAL/HAZARDOUS MATERIAL INFORMATION

This document has been reviewed for the presence of Class I Ozone Depleting Chemicals. As of 30 October 1998, the status is: All references to Class I Ozone Depleting Chemicals have been removed from this document by substitution with chemicals that do not cause atmospheric ozone depletion.

NOTE

This manual is printed in four volumes as follows:

DWMR 1-2840-113-1, consisting of Table of Contents (complete), Chapter 1, Chapter 2, Chapter 3, Chapter 4, and Chapter 5, pages 5-1 through 5-309.

DWMR 1-2840-113-2, consisting of Table of Contents (-2 only), Chapter 5, pages 5-310 through 5-991.

DWMR 1-2840-113-3, consisting of Table of Contents (-3 only), Chapter 5, pages 5-992 through 5-1370, and Chapter 6.

DWMR 1-2840-113-4, consisting of Table of Contents (-4 only), Chapter 7, Chapter 8, Chapter 9, and Chapter 10, Appendix A through Appendix F, and an Alphabetic Index.

The Appendices and Index are applicable to Volumes 1 through 4.

* This manual supersedes DMWR 1-2840-113-1 dated 30 September 1994, including all changes.

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CHAPTER 1
INTRODUCTION

SECTION I. GENERAL

1-1. SCOPE. These instructions are for use by Depot/contractor personnel. They apply to the T53-L-13B, T53-L-703 turboshaft, and T53-L-15, T53-L-701, and T53-L-701A turboprop engines.

a. This work requirement establishes the requirements for disassembly, cleaning, inspection, repair, modification, reassembly, servicing, and testing of the engine assembly. After the engine has been overhauled, tested, and accepted, the engine must be preserved, installed in a shipping container, and stored for future use.

b. Parts, components, subassemblies, or assemblies found worn or defective beyond the repairable limits established in this Work Requirement will be condemned/disposed/replaced as directed in supply provisions of the contract.

c. Repair and modification of the engine assembly and its components shall be accomplished in accordance with specific instructions identified in this Work Requirement. If instructions in this Work Requirement are in conflict with instructions specified in referenced documents, the instructions in the Work Requirement shall be followed.

d. Tolerances and limits specified herein are the acceptable standards. However, the repair procedures are not mandatory if the overhaul facility is able to develop procedures which are equal to or better than those specified. Any repair procedure developed by the overhaul facility shall be subject to approval by the contracting officer or his designated representative.

1-2. DEVIATIONS AND EXCEPTIONS.

a. Contractors

(1) These instruction are for use by contractor personnel. They apply to requests for work deviations and exceptions and take precedennce over similar proce3dures specified in the applications Depot Maintenance Work Requirement (DMWR). Care must be taken to assure that all active AMCOM Engineering Directives (AEDs) relevant to the DMWR have been considered.

(2) When any work segment as set forth in this Depot Maintenance Work Requirement (DMWR) cannot be accomplished or can be accomplished only in a manner other than specified, the contractor shall submit a Request for Depot Engineering Support (AMSAT-I-M Form 1379, located in the back of this manual), through the Contracting Officer to AMSAM-MMC-VS-EC with a copy to AMSAM-MMC-BM-D. The request shall state the problems, the reason for urgency, and give the specifics listed below.

(a) Serial Number (SN), if applicable, Part Number (PN), and National Stock Number (NSN) of the affected equipment.

(b) Work elements which will not be completed or which will not be accomplished as specified herein.

(c) Reason for non-accomplishment or deviation.

(d) Action taken to correct the condition causing non-accomplishment or need for deviation.

(e) Data relative to non-availability of parts required, if applicable.

(f) Estimated man-hours.

(g) Instructions and inspection required to maintain the integrity of the end item because of such omission or deviation.

(h) For Reporting of Errors submittal, refer to Table of Contents of this publication. Provide a copy of the DA Form 2028-2, located in the back of this manual to AMSAM-MMC-VS-EC .

b Depots Defects shall be processed in accordance with DESCOM-R-702-1.

1-3. MAINTENANCE FORMS AND RECORDS. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-751, Functional Users Manual for the Army Maintenance Management System-Aviation (TAMMS-A), and in the contract. DA Form 2410 and DA Form 2408-16 shall be maintained on the following items:

a. Fuel Regulator - P/N 84200A7A, NSN 2915-00-223-7004.

b. Fuel Regulator - P/N 100770A1 thru A4, NSN 2915-01-005-9197.

c. Fuel Regulator - P/N 98500A2, NSN 2915-00-223-6382.

d. Governor - P/N 81800A1, NSN 2915-00-994-2016.

e. Governor - P/N 103100A1, NSN 2915-01-005-9196.

f. Governor - P/N 81600A1, NSN 2915-00-992-1149.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR). EIRs will be prepared using SF 368, Quality Deficiency Report. Instructions for preparing EIRs are provided in DA PAM 738-751. The Army Maintenance Management System-Aviation (TAMMS-A). EIRs should be mailed directly to Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-RE-FD, Redstone Arsenal, AL 35898-5000. A reply will be furnished directly to you.

1-5. DESCRIPTION OF ENGINES. The engines are shaft turbine or turbo-prop engines, each containing a two-stage, free-type power turbine, a two-stage turbine that drives a combination axial-centrifugal compressor, and a reverse-flow annular combustor. The five major sections of the engines are: air inlet, accessory drive, compressor, diffuser and combustor, and power turbine and exhaust. The right- and left-side views of the engines are shown in figures 1-1 and 1-2.

1-6. DIRECTIONAL REFERENCES AND TERMS. (See figure 1-3).

a. FRONT - End of engine from which output power is extracted.

b. REAR - End of engine from which exhaust gases are expelled.

c. RIGHT and LEFT - Determined by observing engine from exhaust end.

d. BOTTOM - Determined by location of accessory drive gearbox.

e. TOP - Determined by location of hot-air solenoid valve.

f. DIRECTION OF ROTATION - Determined as viewed from rear of engine. Direction of rotation of the compressor rotor and first and second gas producer turbines is counterclockwise. The power turbines and power output gearshaft rotate clockwise.

g. O'CLOCK - Position expressed as viewed from rear of engine.

h. ACCESSORY - A separate component essential for engine operation such as the fuel control.

i. N_1 - Term used to specify compressor rotor rotational speed.

j. N_2 - Term used to specify power turbine rotational speed.

k. EGT - Exhaust Gas Temperature (T9).

l. TGT - Turbine Gas Temperature (Power Turbine) (T7) (T53-L-703).

m. PHR - Pounds per hour.

n. SFC - Specific fuel consumption.

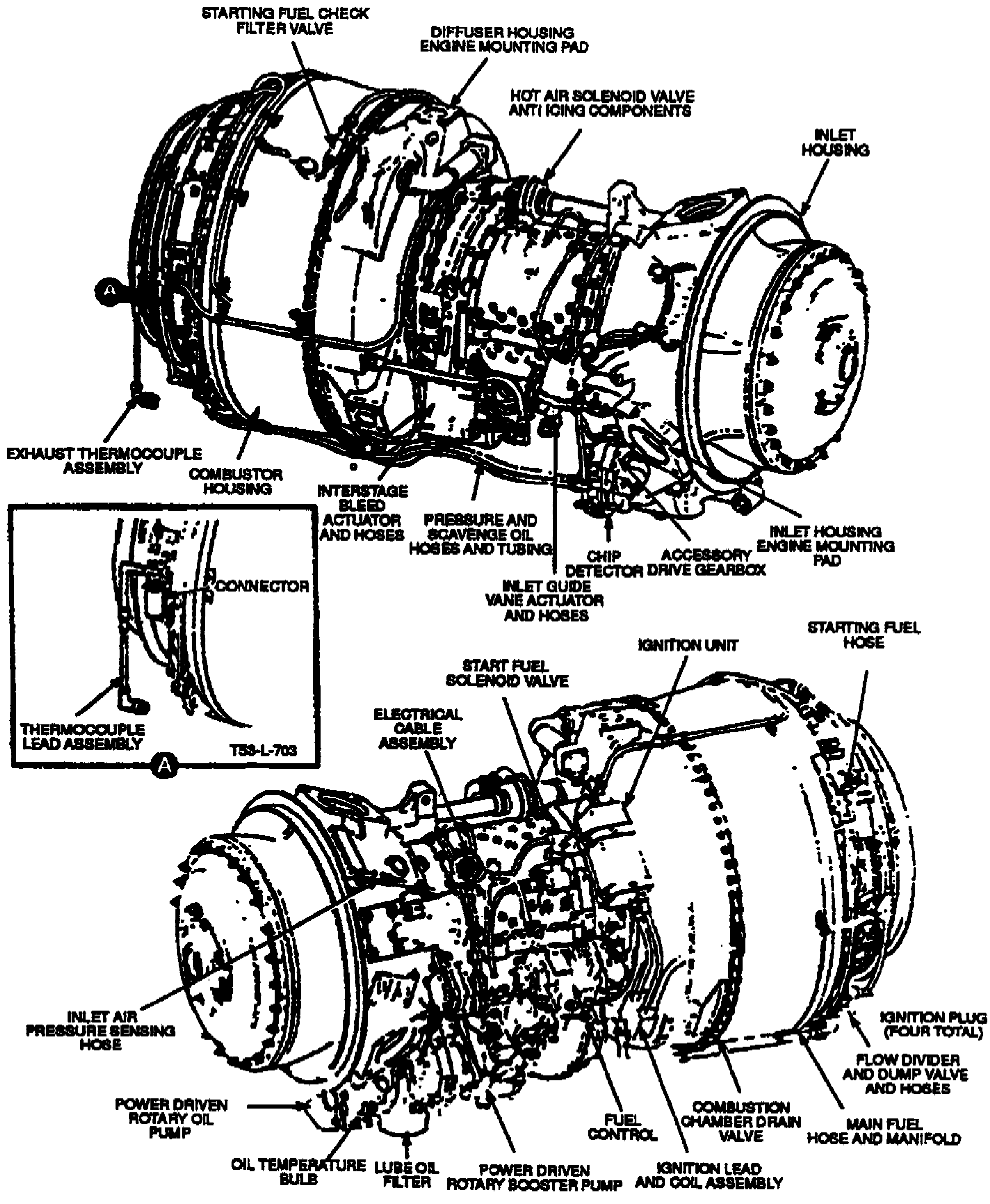


Figure 1-1. Engine - Right and Left Side Views (T53-L-13B, -703).

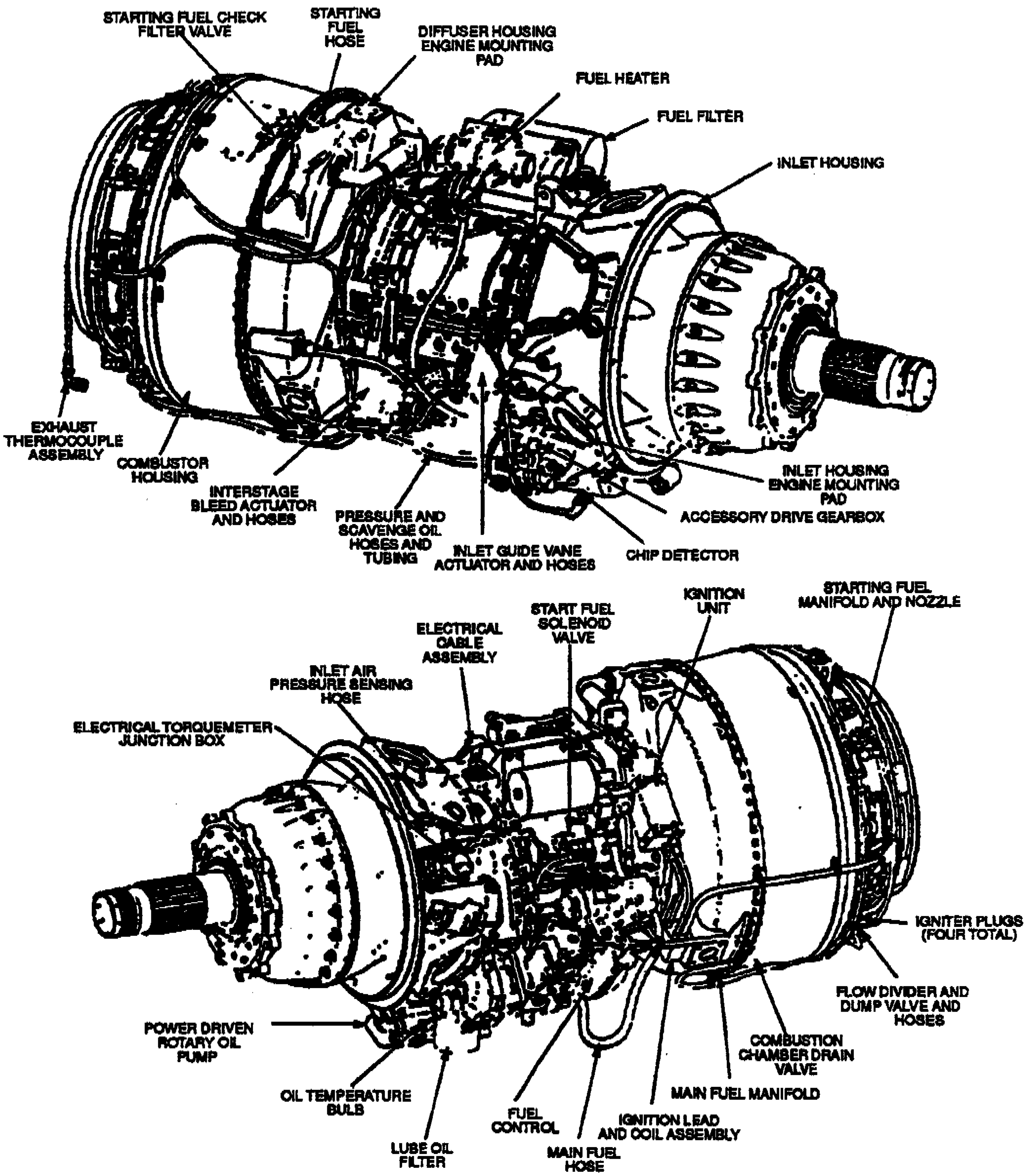


Figure 1-2. Engine-Right and Left Side Views (Typical) (T53-L-15, -701, -701A).

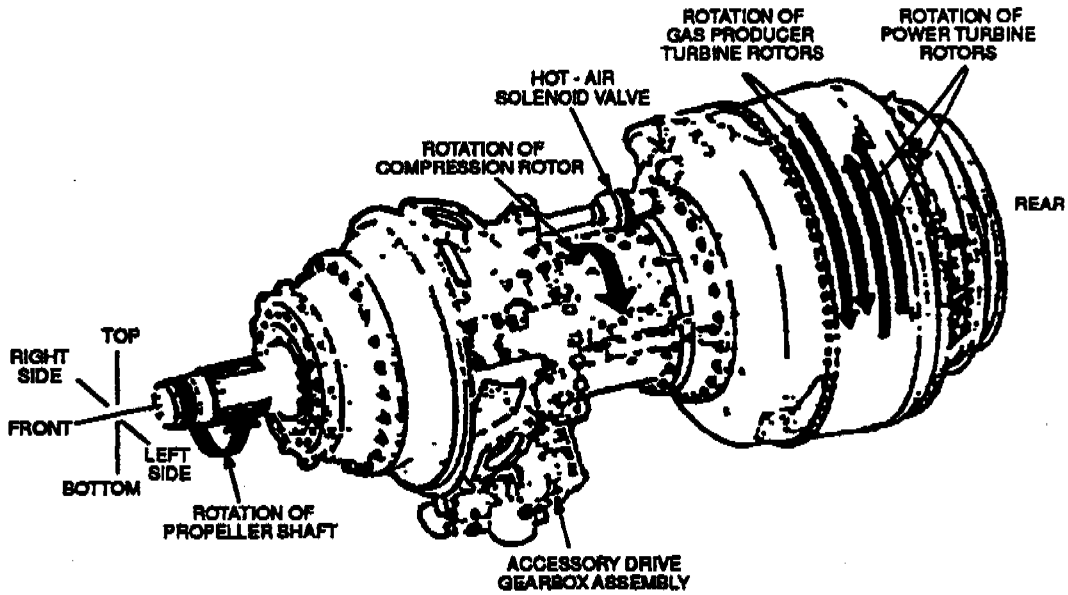


Figure 1-3. Directional References (Typical All Engines).

SECTION II. MAJOR ENGINE ASSEMBLY

1-7. DESCRIPTION OF MAJOR ENGINE ASSEMBLIES. Paragraphs 1-8 through 1-19 describe the major engine assemblies.

1-8. AIR INLET HOUSING. The inlet housing assembly (13, figure 1-4) is divided into two principal areas. The outer housing, supported by air struts, forms the outer wall of the air inlet area, and houses the de-icing manifold. The inner housing forms the inner wall of the air inlet area.

a. On T53-L-13B and -703 engines, the inner housing assembly encloses the output reduction carrier and gear assembly (1), the No. 1 main bearing, the oil transfer support assembly (7), the accessory drive carrier assembly (10), the torquemeter valve and cylinder, and the variable inlet guide vane assembly.

b. On T53-L-15 engines, the inlet housing assembly encloses the reduction gear assembly (3) which includes the propeller reduction internal gear. Also included in the inlet housing assembly are the accessory drive carrier assembly (10), torquemeter section, propeller shaft rear bearing support (9), and No. 1 main bearing.

c. On T53-L-701 and -701A engines, the inlet housing assembly encloses the reduction gear assembly (2), secondary carrier assembly, sun gear assembly (5), and rear bearing support assembly (8). The torquemeter electric wiring and torquemeter head assembly are also mounted within the inlet housing.

d. The accessory drive gearbox assembly (14) is mounted on the bottom of the inlet housing. The overspeed governor and tachometer drive assembly (11 or 12) is mounted on the exterior left side of inlet housing. The power takeoff pad is located on the upper right side of inlet housing.

1-9. OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY AND POWER-DRIVEN ROTARY BOOSTER PUMP (TORQUEMETER) (T53-L-13B, -15, -703). The overspeed governor and tachometer drive assembly (11, figure 1-4) is mounted at the 10-o'clock position on the exterior of the inlet housing and is driven, through shafts and gearing, from the power shaft. The drive assembly provides mounts and drive gears for the power turbine tachometer (N_2) generator and power-driven rotary (booster) pump, and a drive gear for the fuel control overspeed governor. The drive assembly incorporates a strainer and metering cartridge for lubrication of the drive gear train. A torquemeter relief valve, located on the upper portion of the housing, allows for the adjustment of the torquemeter boost oil pressure.

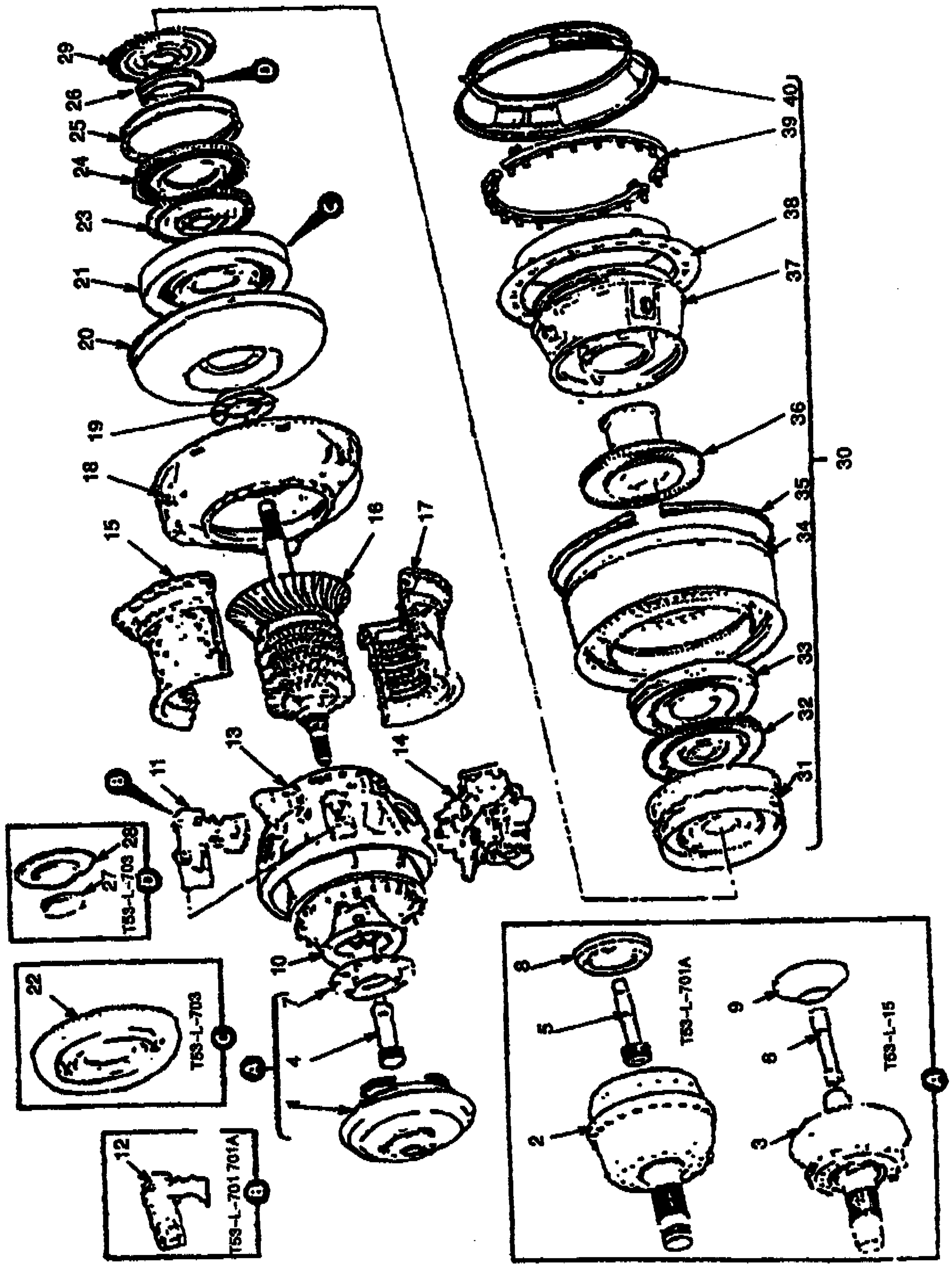


Figure 1-4. Engine Major Assemblies (Typical) (Sheet 1 of 2).

1.	Output reduction carrier and gear assembly T53-L-13B, -703)	21.	1st stage turbine nozzle assembly (T53-L-13B, -15, -701, -701A)
2.	Reduction gear assembly (T53-L-701, -701A)	22.	1st stage turbine nozzle (T53-L-703)
3.	Reduction gear assembly (T53-L-15)	23.	1st stage gas producer turbine rotor assembly
4.	Sun gearshaft (T53-L-13B, 703)	24.	2nd stage turbine nozzle assembly
5.	Sun gear assembly (T53-L-701, -701A)	25.	2nd stage gas producer cylinder
6.	Sun gearshaft (T53-L-15)	26.	Spacer (T53-L-13B, -15, -701, -701A)
7.	Oil transfer support assembly (T53-L-13B, -703)	27.	Spacer (T53-L-703)
8.	Rear bearing support assembly (T53-L-701, -701A)	28.	Sealing disc (T53-L-703)
9.	Propeller shaft rear bearing support (T53-L-15)	29.	2nd stage gas producer turbine rotor assembly
10.	Accessory drive carrier assembly	30.	Combustor turbine assembly
11.	Overspeed governor and tachometer drive assembly and power-driven rotary booster pump (T53-L-13B, -15, -703)	31.	1st stage power turbine nozzle
12.	Overspeed governor and tachometer drive assembly (T53-L-701, -701A)	32.	1st stage power turbine rotor
13.	Inlet housing assembly	33.	2nd stage power turbine nozzle
14.	Accessory drive gearbox assembly	34.	Combustion chamber assembly
15.	Compressor & impeller housing assembly upper half	35.	V-band assembly
16.	Compressor rotor assembly	36.	Power turbine rotor and bearing housing assembly
17.	Compressor & impeller housing assembly lower half	37.	Exhaust diffuser
18.	Diffuser housing	38.	Fire shield assembly
19.	Rear bearing housing	39.	Main fuel manifold assembly
20.	Combustion chamber deflector	40.	Exhaust diffuser support cone assembly

Legend for Figure 1-4

Figure 1-4. Engine Major Assemblies (Typical) (Sheet 2 of 2).

1-10. OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-701, -701A). The overspeed governor and tachometer drive assembly (12, figure 1-4) is mounted at the 10-o'clock position on the exterior of the inlet housing and is driven through shafts and gearing from the power shaft. The drive assembly drives the power turbine tachometer (N_2) generator and engine topping governor. The tachometer generator gives cockpit panel indication of speed while the topping governor, in conjunction with the fuel control, maintains power turbine speed within permissible limits. The junction box for the electric torque-meter is also mounted on the overspeed governor and tachometer drive assembly.

1-11. ACCESSORY DRIVE GEARBOX ASSEMBLY. The accessory drive gearbox assembly (14), is mounted at the 6-o'clock position on the exterior of the inlet housing. It is driven through a shaft and gear from the compressor forward shaft. Mounted on the gearbox are the power-driven rotary (oil) pump, and oil filter, fuel control, compressor rotor-tachometer (N1) generator, and starter-generator. A chip-detector drain plug is installed in the bottom of the gearbox.

1-12. OUTPUT REDUCTION CARRIER AND GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-13B, -703). The output reduction carrier and gear assembly (1) is mounted at the front of the inlet housing. It consists of the support housing, carrier assembly, three planetary gear assemblies, a torquemeter assembly, and an output gearshaft. The sun gearshaft (4), splined to the power shaft, drives the three planetary gears mounted in the carrier which, in turn, drive the output gearshaft.

1-13. REDUCTION GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-15, -701, -701A). The reduction gear assembly (2 and 3) is mounted at the front of the inlet housing. On T53-L-15 engines, the reduction gear consists of a front bearing support, propeller shaft and planet gear carrier, three planet gear assemblies, and a propeller internal reduction gear. On T53-L-701 and -701A engines, the reduction gear is a split-power reduction system.

NOTE

The descriptive data in the following paragraphs a and b, applies to T53-L-15 engines only.

a. The reduction gear is driven by the sun gearshaft (6), which is splined to the power shaft. The three planet gears are driven by the sun gear.

b. The planet gears mesh with the propeller internal reduction gear to drive the propeller shaft. The torquemeter plate assembly is secured between front bearing support and inlet housing.

NOTE

The descriptive data in the following paragraph c through e, applies to T53-L-701 and -701A engines.

c. The primary carrier rotates with the propeller shaft and contains four identical primary planet gears. These gears are driven by the sun gear assembly (5), which is splined to the power shaft. The propeller shaft (and primary carrier) assembly is supported by a ball bearing in the front support assembly and by a roller bearing in the rear, aft of the reduction gearing second stage.

d. The secondary carrier assembly, fixed in the inlet housing gear case, contains a sun gear, driven by the primary ring gear, which drives six identical planetary gears spaced uniformly around the common axis. The planetary gears drive the secondary ring, which is splined to the propeller shaft.

e. The ring gear of the primary planetary gear set is splined to the sun gear of the secondary set. The propeller shaft is driven both by the secondary planet gears acting on the secondary stage output ring gear, and by rotational force imparted to the propeller shaft through the mountings of the primary stage gears.

1-14. DIFFUSER HOUSING ASSEMBLY. The diffuser housing (18) conducts air from the compressor to the combustion chamber. Air is bled thru holes in the aft face of certain diffuser vanes through a connecting manifold, to support anti-icing and customer bleed air. The diffuser housing, supports the compressor rotor rear bearing housing (19), combustion chamber deflector (20), first stage turbine nozzle assembly (21 and 22), second stage turbine nozzle assembly (24), and second stage gas producer cylinder (25).

1-15. COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES. The compressor and impeller housing assemblies (15 and 17) enclose the compressor rotor assembly (16). The compressor stator vane assemblies and steel inserts are bolted to the compressor housing halves. The rear of the compressor housing is machined to accommodate a bleed band, which covers air-bleed holes through the housing. An air-bleed connecting manifold provides a flow path for bleed air from the diffuser housing to the bleed air adapter assembly. Customer air is available from this adapter assembly, which also directs anti-icing air through a port in the impeller housing. An interstage bleed actuator is mounted on the right side of the impeller housing.

1-16. COMPRESSOR ROTOR ASSEMBLY. The compressor rotor assembly (16) for the T53-L-15 and -701 engines consists of five compressor rotor disc assemblies, five spacers, and one centrifugal compressor impeller assembly, all retained upon the compressor rotor sleeve. The T53-L-13B, -701A, -703 compressor rotor assemblies consist of a stainless steel front shaft assembly, stainless steel compressor rear shaft, and a one-piece titanium impeller, all of which are bolted to a one-piece titanium axial compressor spool consisting of the second through fifth stages of axial compressor. The first stage gas producer turbine rotor assembly (23) and second stage gas producer turbine rotor assembly (29) are mounted on the rear compressor shaft of the compressor rotor assembly. The compressor rotor assembly encloses, but is not connected to, the power shaft.

1-17. COMBUSTOR TURBINE ASSEMBLY. The combustor turbine assembly (30) consists of exhaust diffuser support cone assembly (40), main fuel manifold (39), fire shield assembly (38), exhaust diffuser (37), power turbine rotor and bearing housing assembly (36), V-band assembly (35), combustion chamber (34), second stage power turbine nozzle (33), first stage power turbine rotor (32), and first stage power turbine nozzle (31). The power turbine rotor and bearing housing assembly consists of the second stage power turbine rotor, No. 3 and 4 bearings, No. 3 bearing seal, and No. 3 and 4 bearing housing. Exhaust diffuser contains hollow struts thru which cooling air is supplied to No. 3 and 4 bearing housing and rear face of second power turbine disc. The combustion chamber assembly (34) consists of combustion chamber liner and combustion chamber housing.

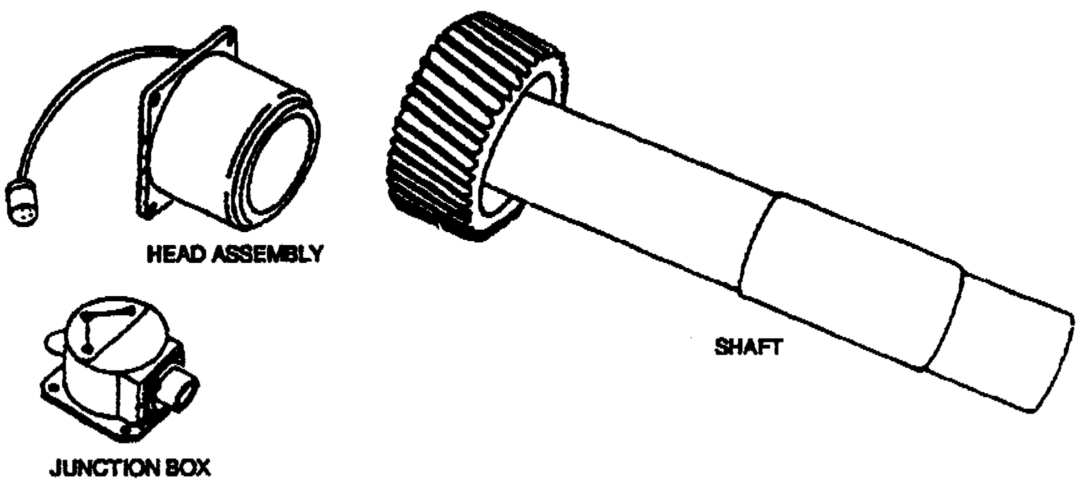


Figure 1-5. Torque System Components (T53-L-701, -701A).

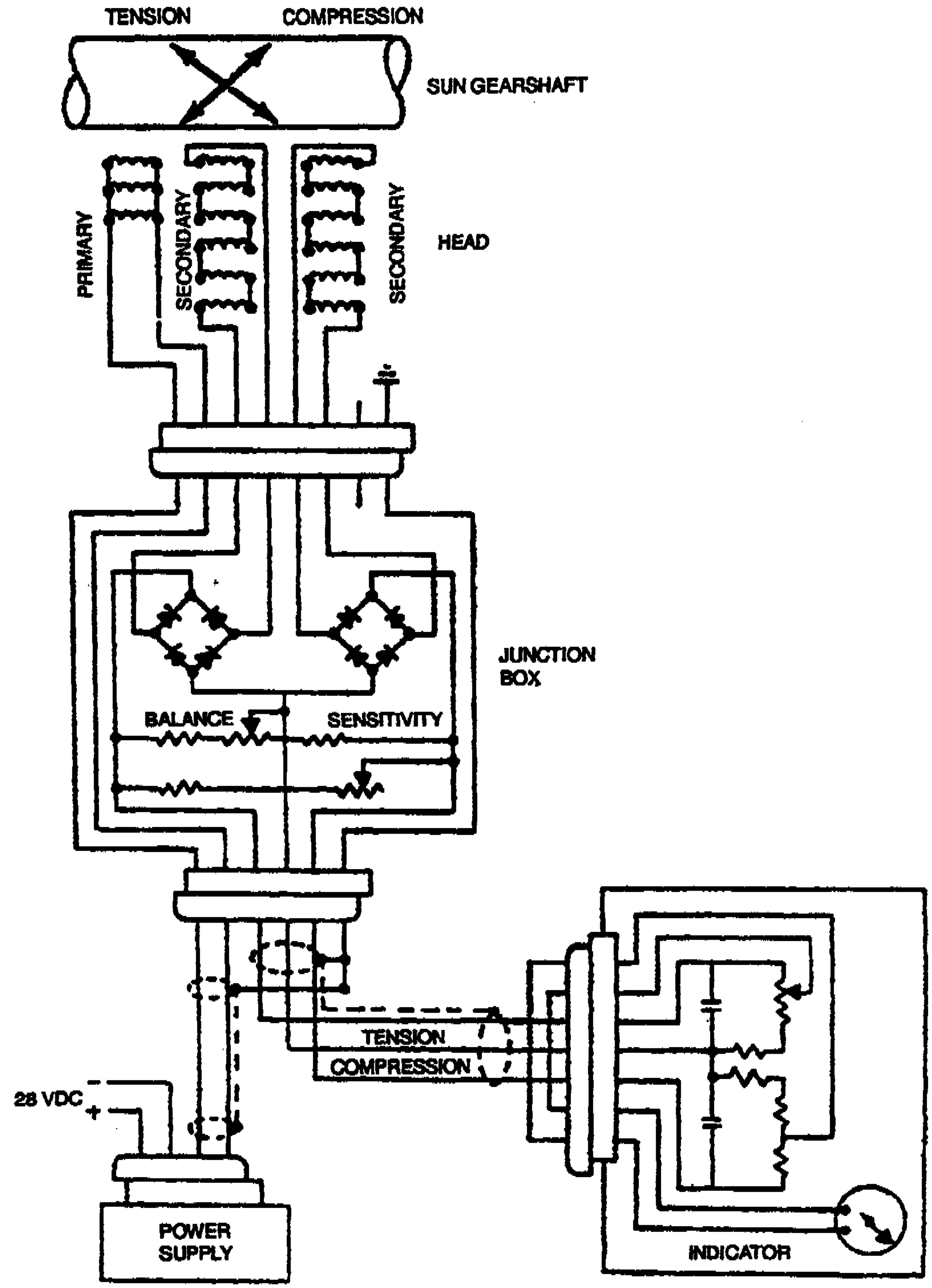


Figure 1-6. Electrical Torquemeter System Schematic (T53-L-701, -701A).

1-18. TORQUEMETER (T53-L-13B, -15, -703). The torquemeter is a hydromechanical torque-measuring device located in the reduction gearing section of inlet housing. The torquemeter uses lubricating oil boosted to a high pressure by the power driven rotary (booster) pump. It consists of a stationary forward plate and a movable rear plate attached to planet gear carrier, and 18 steel balls positioned in conical pockets located in both plates. Resistance to rotation of planetary gears, due to load on output shaft, causes carrier-mounted plate to rotate slightly. Torquemeter balls are displaced from their individual pockets, forcing rear torquemeter plate to move rearward. Rearward motion of torquemeter plate unseats a spring-loaded poppet valve, permitting high-pressure oil to enter torquemeter cylinder chamber and equalize force tending to cause rearward movement of torquemeter plate. Torquemeter oil pressure from cylinder and accessory drive gearbox air pressure are directed to aircraft torquemeter gage which indicates differential torque oil pressure in psi. Differential torque oil pressure is proportional to torque delivered to output gearshaft.

1-19. TORQUEMETER SYSTEM (T53-L-701, -701A). (See figures 1-5 and 1-6). The torquemeter system consists of a torquemeter head assembly and sun gear assembly mounted within the inlet housing, and a junction box, which is mounted on the tachometer drive assembly. The torquemeter system provides an electrical torque signal proportional to the amount of torque being developed and transmits it through a cable to the torquemeter junction box. The junction box transmits the signal to a torque indicator.

1-20. PIPING AND ACCESSORIES. (See figures 1-1 and 1-2 for location of the following piping and accessories.)

a. Pressure and scavenge oil hoses and tubing.

b. Power-driven rotary (oil) pump.

c. Lube oil filter.

d. Lubrication pressure manifold.

e. Power-driven rotary (booster) pump (T53-L-13B, -15, -703).

f. Hot-air solenoid valve and anti-icing components.

g. Starting and main fuel hoses.

h. Starting fuel solenoid valve.

i. Starting fuel manifold.

j. Main fuel manifold.

k. Starting fuel nozzles.

l. Starting fuel check filter valve.

m. Flow divider assembly hoses.

n. Flow divider and dump valve.

o. Fuel heater (T53-L-15, -701, -701A).

p. Fuel filter (T53-L-15, -701, -701A).

q. Combustion chamber drain valve.

r. Fuel control.

s. Inlet air pressure-sensing hose.

t. Electrical cable assembly

u. Ignition unit.

v. Ignition lead and coil assembly.

w. Igniter plugs.

x. Oil temperature bulb.

y. Exhaust thermocouple assembly.

z. Thermocouple lead assembly.

aa. Chip detector.

ab. Interstage bleed actuator and hoses

ac. Inlet guide vane actuator and hoses.

ad. Clamps, brackets, screws, and other attaching parts.

ae. Electrical torquemeter junction box (T53-L-701, -701A).

1-21. LEADING PARTICULARS. Table 1-1lists the leading particulars for T53-L-13B, -703, -15, -701A engines.

1-22. ENGINE DATA PLATE. The engine data plate is located at the 10 o'clock position on the inlet housing assembly. (See figure 1-7). The original engine data plate, installed on the inlet housing assembly at the time of engine manufacture, should remain on the engine. However, should the engine data plate become mutilitated or otherwise unserviceable, a new engine data plate should be installed. All data inscribed on the old plate must be transcribed to the new plate, including the original date of engine manufacture.

NOTE

The engine data plate must be removed prior to the stamping of the data.

Table 1-1. Leading Particulars.

MODEL	
Lycoming LTCIK-4F	Military T53-L-13B
Lycoming LTCIF-4	Military T53-L-15
Lycoming LTCIF-5	Military T53-L-701
Lycoming LTCIF-6	Military T53-L-701A
Lycoming LTCIK-4G	Military T53-L-703
TYPE	
Application (T53-L-13B, -703)	Helicopter Powerplant
Application (T53-L-15, -701, -701A)	Fixed Wing Aircraft
Mounting Points	Minimum of 3 Required for Installation
DIMENSIONS	
Overall Length	
T53-L-13B, -703	46.602 Inches
T53-L-15	58.377 Inches
T53-L-701, -701A	59.377 Inches
Maximum Nominal Diameter	
T53-L-13B, -703	23.00 Inches
T53-L-15	23.360 Inches
Basic Nominal Diameter	
T53-L-701, -701A	23.00 Inches
Maximum Radius	
T53-L-13B, -701, -701A, -703	13.550 Inches
T53-L-15	12.180 Inches

Table 1-1. Leading Particulars (Continued).

WEIGHT	
Specification Weight (Dry)	
LT53-L-13B	540 Pounds
T53-L-15	605 Pounds
T53-L-701, -701A	688 Pounds
LT53-L-703	545 Pounds
ROTATIONAL DIRECTIONS	
(See figure 1-3)	
TYPE FUEL	MIL-T-5624 (Grade JP-4 or JP-5)
TYPE OIL	MIL-L-23699 or MIL-L-7808
FUEL AND OIL CONSUMPTION	
Oil Consumption	0.2 Gallons/Hour
Fuel Consumption	
Military	
T53-L-13B	0.580 SFC
T53-L-15	0.620 SFC
T53-L-701, -701A	0.590 SFC
T53-L-703	0.596 SFC (30 Minutes)
Normal	
T53-L-13B	0.598 SFC
T53-L-15	0.650 SFC
T53-L-701, -701A	0.610 SFC
T53-L-703	0.620 SFC (Continuous)
90 Percent Normal	
T53-L-13B	0.617 SFC
T53-L-15	0.673 SFC
T53-L-701, -701A	0.630 SFC
75 Percent Normal	
T53-L-13B, -703	0.650 SFC
T53-L-15	0.725 SFC
T53-L-701, -701A	0.673 SFC
60 Percent Normal	
T53-L-703	0.703 SFC
Flight Idle	
T53-L-13B, -15	220 PHR
T53-L-701, -701A	200 PHR
T53-L-703	260 PHR
Ground Idle	
T53-L-13B, -15, -701, -701A	150 PHR

Table 1-1. Leading Particulars (Continued).

T53-L-703	160 PHR
MISCELLANEOUS	
Combustion Chamber	External Annular
Compression Ratio	7 to 1
Altitude	25,000 Feet Minimum Guaranteed
Operating Temperature Range	-54° to 57°C (-65° to 135°F)

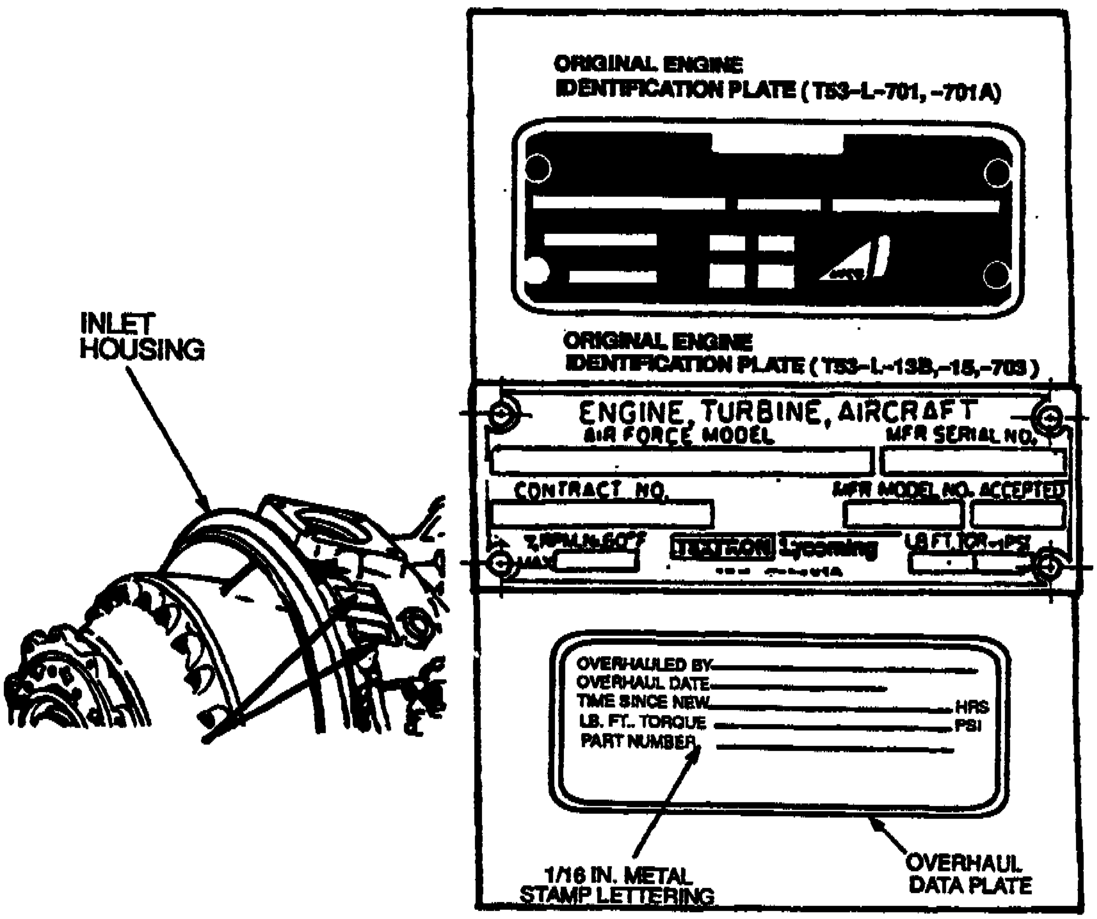


Figure 1-7. Data Plates.

1-23. OVERHAUL DATA PLATE. Engines going through overhaul for the first time require the addition of an overhaul data plate as shown in figure 1-7. On subsequent overhauls, a new overhaul data plate shall be installed to replace the existing one, as outlined in (paragraph 1-24). When installing overhaul data plate, do not remove original engine data plate. Stamping of the overhaul data plate shall include initials of the facility performing the overhaul or modification, date of overhaul or modification, total operating time since new, torquemeter pressure, and part number.

1-24. INSTALLATION OF OVERHAUL DATA PLATE.

a. Remove old overhaul data plate.

b. Stamp required information on new overhaul data plate. (Use torquemeter pressure determined in paragraph 7-56).

c. Mount overhaul data plate on inlet housing as shown in figure 1-7. Install using adhesive (item 14, table C–1). Use self-tapping screws P/N MS24621-7, NSN 5303-00-053-1111 as alternative method for attaching data plates. After screws are "threaded" into place, remove each screw and apply chrome pickle to threads, then apply primer (item 253, table C–1) to the threaded hole. Reinstall screws.

1-25. INSTALLATION OF ELECTRIC TORQUEMETER IDENTIFICATION PLATE.

a. Materials.

(1) Red Metal Label, P/N 8001(aluminum foil with modified acrylic adhesive backing) (item 33, table C–1).

(2) 320 grit sand paper or 400-420 grit aluminum oxide. (item 262), or (item 35, table C–1).

(3) Acetone (item 13, table C–1).

b. Fabrication and Installation.

(1) Fabricate the new metal ID plate by superimposing a picture of the original electric torquemeter junction box ID plate on the side of the Red Metal Label material which has no adhesive backing.

(2) Abrade to roughen surface of junction box where ID plate is to be attached. Use 320 grit sand paper or 400 to 420 grit aluminum oxide.

(3) Clean abraded area with acetone (item 13, table C–1) and then make sure all contaminants and loose particles have been removed.

(4) Let surface dry for about 5 minutes.

(5) Strip the barrier material from the adhesive side of the Red Metal Label material (para a(1)) and attach to the junction box by pressing the adhesive firmly to the junction box surface.

1-26. DIFFERENCES BETWEEN MODELS. Differences between all engine models covered by this DMWR are defined in the instructions provided in the following Chapters.

CHAPTER 2
REQUIREMENTS

SECTION I. GENERAL

2-1. FACILITIES. There are no special facilities required other than those normally available at an overhaul installation.

2-2. TOOLS AND EQUIPMENT. Tools and equipment used in this DMWR are listed in the following tables

a. Special tools and equipment are listed in table 2-1.

b. Inspection and test equipment are listed in table 2-2.

c. Fabricated tools and equipment are listed in table 2-3 (Not Applicable).

d. Bulk and expendable materials are listed in Appendix C.

e. Equivalent tools can be used.

2-3. FINITE LIFE ITEMS, TIME BETWEEN OVERHAUL (TBO) ITEMS, AND MANDATORY REPLACEMENT PARTS. Refer to Technical Manuals TM 55-2840-229-23 and TM 55-2840-233-24.

2-4. REPAIR PARTS. Repair and replacement parts required by this DMWR for overhaul, repair, and modification of the gas turbine engines covered are found in TM 1-2840-260-23P.

2-5. MODIFICATIONS. All Modification Work Orders (MWOs) applicable to gas turbine engines and accessories, and Engineering Orders (EOs) specified by the contract or work directive will be applied. Modifications required for engine conversions are specified in Appendix F.

2-6. QUALITY OF MATERIAL. Parts and material used for replacement, repair, or modification in accordance with this DMWR shall meet the requirements of equipment drawings and specifications.

2-7. MAN-HOUR STANDARDS. Information as to man-hour requirements is not available but will be furnished at a later date.

2-8. ELECTROMAGNETIC COMPATIBILITY STANDARDS. (Not applicable.)

2-9. WEAR LIMITS, FITS, AND TOLERANCES. Wear limits, fits, and tolerances specified in this DMWR will be complied with unless otherwise stated in the contract or work directive.

NOTE

Unless otherwise specified in this DMWR, dimensions given shall carry the following tolerances:

.X = ±0.02 inch (0.051 cm)
.XX = ±0.01 inch (0.025 cm)
.XXX = ±0.005 inch (0.0127 cm)
Angles = 2 degrees
Finish +125 microinches RMS or better

2-10. TIME CODED PARTS. Time coding is required for certain parts to provide a record of the total operating time on the particular part. Time is to be kept in the engine records (DA Form 2410). It is not necessary to etch the time on the individual parts. Time of parts shall be noted immediately upon removal from engine to prevent mixing of parts before recording. Table 2-4 and paragraph 3-15 list the parts that require time coding.

NOTE

Parts shall be coded to the nearest hour.

2-11. REPAIR PARTS. For repair parts and special tools refer to the manuals listed below:

a. TM 1-2840-260-23P, Aviation Unit and Intermediate Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools), Turbine Aircraft Engines, Models No. T53-L-13B and T53-L-703.

b. TM 55-2840-233-23P, Aviation Unit and Intermediate Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools), Engine, Aircraft, Gas Turboprop, Model No. T53-L-7, T53-L-7A, T53-L-15, T53-L-701, T53-L-701A (Rescinded).

2-12. FLIGHT SAFETY PARTS PROGRAM. Parts, assemblies or installations identified under the flight safety parts program require special handling during overhaul. Throughout the overhaul procedures, warnings will appear emphasizing critical instructions to be followed. These warnings are identified as "Flight Safety Parts" warnings and will be inserted whenever and wherever necessary.

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 serious injury or death of crew members and/or serious damage to the helicopter or aircraft.

b. A critical characteristic is any dimension, tolerance, finish, material, manufacturing, assembly or inspection process, or other feature which, if nonconforming or missing could cause failure or malfunction of the critical item. No deviation is allowed on a critical characteristic.

c. Flight safety parts are listed in table 2-5.

d. Flight Safety parts that are available for inspection will be verified at repair or overhaul, however, disassembly of components or subassemblies for sole purpose of verifiying a flight safety part critical characteristic is not required.

Table 2-1. Special Tools and Equipment.

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Ultrasonic Cleaning Unit	DR500AH	P5-187
Crimping and Bending Machine		P5-299
Wrench	GOE X 100	P4-26
Electric Discharge Machine	HRP 103 (Elox Corp or Equiv.)	P5-426, P5-473
Puller	LTCT33	P5-423
Driver	LTCT51	P5-453
Holding Fixture	LTCT55	P4-56, P5-428, P5-431
Holding Fixture	LTCT56	P5-431
Wrench	LTCT69	P5-453, P5-457
Holding Fixture	LTCT80	P5-453, P5-457
Bearing Puller	LTCT97	P5-185, P5-186
Sleeve Bushing	LTCT100	P5-233, P5-237

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Spanner Wrench	LTCT107	P5-233, P5-237
Installation Tool	LTCT108	P5-457
Holding Device	LTCT115	P5-233, P5-237
Balancing Cradle	LTCT123	P5-314
Mechanical Puller	LTCT142	P5-233, P5-237
Locating Bar	LTCT153	P5-246, P5-299, P6-8, P6-13, P6-15
Removal and Installation Tool	LTCT177	P5-357
Support Ring	LTCT179	P5-357
Hoisting Adapter	LTCT181	P4-48, P4-49, P6-23, P6-24
Handle	LTCT182	P5-353
Mechanical Puller	LTCT186	P5-353
Separator Tool	LTCT197	P5-423, P5-435
Holding Fixture	LTCT202	P5-431
Socket Wrench	LTCT213	P5-185, P5-186
Wrench	LTCT214	P5-185, P5-186, P5-192, P5-453, P5-457
Wrench	LTCT215	P5-185
Test Fixture	LTCT216	P5-190
Locking Plate	LTCT217	P6-12
Bearing Removal Tool	LTCT231	P5-185, P5-186
Holding Fixture	LTCT247	P4-49, P5-357, P5-364
Holding Fixture	LTCT251	P5-431, P5-443
Pin Installer	LTCT256	P5-427, P5-439
Driver Wrench	LTCT258	P4-46, P4-48, P4-49, P6-22, P6-23, P6-24
Gear Holding Assembly	LTCT277	P5-185, P5-186
Holding Device	LTCT278	P5-185, P5-186
Mounting Fixture	LTCT360	P5-423, P5-427
Sling	LTCT384	P7-27
Guide Pin	LTCT387	P6-4
Wrench	LTCT393	P6-15
Holding Fixture	LTCT413	P5-474
Balancing Arbor	LTCT456	P5-279, P5-317
Puller	LTCT483	P5-423, P5-431, P5-435

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Wrench	LTCT487	P5-423, P5-432, P5-435
Holding Fixture	LTCT496	P5-338, P5-342
Balance Shroud	LTCT499	P5-279, P5-317, P5-318
Seal Installation Tool	LTCT501	P5-192, P5-193, P5-233, P5-237
Wrench	LTCT505	P4-41, P6-15
Wrench	LTCT506	P4-41, P6-15
Tool Set	LTCT509	P4-46, P4-48, P4-49, P6-22, P6-23, P6-24
Seal Installer	LTCT511	P5-237
Puller	LTCT518	P5-468
Valve Installer and Remover	LTCT519	P5-470, P5-474
Alignment Fixture	LTCT526	P6-6
Socket Wrench	LTCT527	P6-7
Blade Removal Fixture	LTCT548	P5-406
Punch and Drift Set	LTCT552	P5-406
Socket and Pilot Assembly	LTCT557	P5-353
Bearing Puller	LTCT568	P5-353
Socket Wrench	LTCT569	P5-357
Holding Fixture	LTCT570	P6-23
Ring Assembly	LTCT571	P5-357
Hub and Adapter Assembly	LTCT576	P6-9
Hydraulic Press	LTCT590	P5-423, P5-429
Holding Fixture	LTCT645	P5-357
Bearing Puller	LTCT675	P5-185, P5-186, P5-233, P5-453
Puller	LTCT691	P4-42
Adjustment Fixture	LTCT692	P4-41
Wrench	LTCT696	P5-453, P5-457
Internal Wrench Bolts	LTCT718	P5-338
Bellmouth	LTCT727	P7-28
Puller	LTCT752	P5-338
Lifting Sling	LTCT773	P3-10, P7-27

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Installing Tool	LTCT791	P5-431, P6-8
Puller	LTCT818	P5-470
Holding Fixture	LTCT859	P5-82
Engine Intake Protector	LTCT862	P8-5
Mount Bracket	LTCT910	P6-9, P6-15
Support Assembly	LTCT911	4-53, P5-432, P6-7, P6-12
Wrench	LTCT915	P5-314
Bearing Puller	LTCT916	P5-185, P5-186, P5-233
Torque Adjustment Fixture	LTCT962	P4-41, P5-246, P6-15, P7-44
Wrench	LTCT1109	P5-185, P5-186, P5-192, P5-193, P5-453
Mechanical Puller	LTCT1218	P4-55, P5-414, P5-438, P6-7
T-Handle Bolt	LTCT1428	P4-49
T-Handle Bolt	LTCT1429	P4-49, P4-51
Drift Assembly	LTCT1643	P5-423, P5-427
Drift Assembly	LTCT1644	P5-427, P5-439
Mechanical Puller	LTCT2013	P5-353
Wrench Assembly	LTCT2019	P5-353, P5-360, P5-364
Maintenance Kit	LTCT2020	P6-9, P6-11
Puller	LTCT2021	P4-52, P4-53
Removal and Installation Tool	LTCT2022	P5-357
Bearing Housing Puller	LTCT2023	P5-310
Puller	LTCT2024	P5-453
Puller	LTCT2027	P5-423, P5-435
Puller	LTCT2028	P5-453
Adapter	LTCT2029	P5-357
Gear Assembly Holding	LTCT2037	P5-185, P5-186, P5-192, P5-193
Holding Device	LTCT2044	P5-185, P5-186, P5-192, P5-193, P5-194, P5-195
Holding Fixture	LTCT2045	P5-453
Pinion Gear Holder	LTCT2048	P4-53, P6-4, P6-12

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Holding Fixture	LTCT2049	P5-431
Puller	LTCT2067	P5-233
Puller	LTCT2073	P5-338
Sun Gear Holding Fixture	LTCT2075	P4-46, P6-22
Wrench	LTCT2079	P5-338, P5-342, P5-350
Wrench	LTCT2080	P5-342
Removing Tool	LTCT2086	P5-338, P5-342, P5-350
Sling	LTCT2096	P4-54, P6-6
Collet	LTCT2120	P5-317
Puller	LTCT2121	P4-45
Collet	LTCT2129	P5-279
Wrench	LTCT2133	P5-453, P5-457
Bearing Driver	LTCT2137	P5-431
Mechanical Puller	LTCT2142	P5-338
Wrench Base Assembly	LTCT2147	P5-435, P5-441
Locking Tab	LTCT2151	P5-430, P5-441
Locking Tools	LTCT2152	P5-430, P5-441
Plugging Fixture	LTCT2160	P5-117
Socket Wrench	LTCT2161	P5-185, P5-186, P5-192, P5-193
Sleeve Bearing	LTCT2712-03	P5-317, P5-318, P5-443
Sleeve Bearing	LTCT2712-39	P5-279, P5-317
Sleeve Bearing	LTCT2712-40	P5-465, P5-466
Sleeve Bearing	LTCT2712-42	P5-465, P5-466
Base	LTCT2966	P5-453
Fixture Assembly	LTCT3038	P5-480
Holding Fixture	LTCT3040	P5-453
Backlash Gage	LTCT3486	P5-192, P5-193
Sleeve Bushing	LTCT3492	P5-314, P6-8
Sleeve Bushing	LTCT3493	P5-314
Sleeve Bushing	LTCT3494	P5-314

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Sleeve Bushing	LTCT3636	P5-237, P5-453, P5-457
Sleeve Bushing	LTCT3637	P5-237
Installation Tool	LTCT3638	P5-338, P5-342
Sleeve Bushing	LTCT3640	P5-185, P5-186, P5-192, P5-193, P5-237, P5-457
Installation Tool	LTCT3646	P5-457
Removal Tool	LTCT3648	P5-233
Sleeve Bushing	LTCT3654	P5-233, P5-237
Sleeve Bushing	LTCT3658	P5-342
Sleeve Bushing	LTCT3659	P4-45
Sleeve Bushing	LTCT3660	P5-342
Sleeve Bushing	LTCT3661	P5-342
Sleeve Bushing	LTCT3663	P5-342
Sleeve Bushing	LTCT3664	P5-233, P5-338, P5-342
Combustor Hoisting Adapter	LTCT3665	P4-41, P6-15
Adapter and Guide	LTCT3685	P4-45, P6-8
Bearing Driver	LTCT3706	P5-431
Seal Installation Tool	LTCT3825	P5-420
Gearshaft Holder Assembly	LTCT3833	P5-233, P5-237
Plug Remover	LTCT3911	P5-473
Bracket	LTCT3955	P6-9, P6-15
Socket Wrench	LTCT4002	P4-53, P5-423, P5-431, P5-432, P5-435, P6-7, P6-12
Puller	LTCT4007	P4-57
Driver	LTCT4012	P5-453
Installing Tool	LTCT4013	P6-8
Balancing Arbor Assembly	LTCT4014	P5-317, P5-318
Ring Assembly	LTCT4016	P5-353
Base Plate	LTCT4018	P5-338, P5-342
Ring Assembly	LTCT4019	P5-338, P5-342
Wrench	LTCT4020	P5-453, P5-457

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Bearing Holder	LTCT4028	P5-317, P5-318, P5-443
Bearing Holder	LTCT4029	P5-279, P5-317, P5-465, P5-466
Locking Tools	LTCT4051	P5-430, P5-451
Holding Fixture	LTCT4078	P5-431, P5-443
Holding Fixture	LTCT4153	P5-413
Compressor	LTCT4155	P6-10
Adapter Kit	LTCT4172	P6-11
Alignment Fixture	LTCT4174	P5-246
Socket Wrench	LTCT4181	P4-42, P6-11
Lifting Fixture	LTCT4182	P4-46, P6-22
Spanner Wrench Assembly	LTCT4190	P5-338, P5-342
Support Assembly Fixture	LTCT4240	P5-350
Removal and Installation Tool	LTCT4510	P5-357, P5-360
Holding Fixture	LTCT4533	P4-44
Holding Fixture	LTCT4553	P5-245, P5-246, P5-310
Adapter	LTCT4558	P4-56, P6-4
Gear Alignment Fixture	LTCT4560	P5-342
Seal Puller	LTCT4568	P4-45
Arbor	LTCT4571	P4-45
Installation Tool	LTCT4576	P6-14
Guide	LTCT4602	P6-22, P6-23, P6-24
Hand Crank	LTCT4650	P5-336
Mechanical Puller	LTCT4670	P5-338
Nut and Cone Removal Kit	LTCT4676	P6-9
Mechanical Puller	LTCT4680	P5-245
Arms	LTCT4682	P5-245
Locating Pin Removal Tool	LTCT4692	P4-43
Installation and Removal Tool	LTCT4698	P5-477, P5-480
Mechanical Puller	LTCT4700	P5-310
Tool	LTCT4704	P5-423
Installation Tool	LTCT4705	P5-428

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Holding Fixture	LTCT4713	P5-423, P5-432, P5-444, P5-435
Ring Compressor	LTCT4718	P5-25
Removal Kit	LTCT4726	P5-318
Support	LTCT4728	P5-255, P5-318
Drift	LTCT4731	P5-318
Blade Removal Tool	LTCT4734	P5-255, P5-260, P5-318
Protractor	LTCT4750	P6-3
Mechanical Puller	LTCT4800	P5-245, P5-310
Fixture	LTCT4807	P5-313
Mechanical Puller	LTCT4809	P4-45, P5-431
Adapter	LTCT4815	P5-423
Mechanical Puller	LTCT4842	P4-42, P4-43
Mechanical Puller	LTCT4846	P4-45, P5-310
Installation Tool	LTCT4874	P5-318
Holding Fixture	LTCT4904	P5-237
Bushing Assembly	LTCT4947	P5-310, P5-314
Holding Assembly	LTCT4996	P5-453
Installing Tool	LTCT6000	P5-318
Press	LTCT6073	P5-279, P5-316, P5-317
Baffle Peening Fixture	LTCT6203	P5-317
Stop Assembly	LTCT6241	P5-160, P7-45
Compressor Rotor Blade Installation Fixture	LTCT6253	T 5-168
Compressor Rotor Blade Installation Fixture	LTCT6254	T 5-168
Compressor Rotor Blade Installation Fixture	LTCT6256	T 5-168
Split Plate	LTCT6296	P4-45
Compressor Rotor Blade Installation Fixture	LTCT6300	T 5-168
Compressor Rotor Blade Installation Fixture	LTCT6304	T 5-168

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Heater	LTCT6354	P5-364
Rear Cone Removal Tool	LTCT6465	P4-44
Oil Flow Fixture Assembly	LTCT6604	P5-364
Spanner Wrench	LTCT6605	P5-360, P5-364
Ring Assembly	LTCT6610	P5-364
Pin Driver Fixture Power Supply	LTCT6616	P5-279, P5-316, P5-317
Holding Fixture	LTCT6641	P5-435, P5-441
Pin Driver Fixture	LTCT6645	P5-317
Pin Driver Fixture	LTCT6646	P5-279, P5-316
Balancing Arbor	LTCT6722	P5-443
Mechanical Puller	LTCT6723	P5-360
Control Unit	LTCT6729	P5-364
Slide Hammer Adapter	LTCT6740	P4-55, P5-414, P6-7, P6-8
Seal Plate Punch	LTCT6905	P5-317
Special Wrench	LTCT6940	P6-8
Master Gage	LTCT6961	P5-318
Blade Selector Fixture	LTCT6962	P5-318
Holding Fixture	LTCT6985	P4-48, P4-49, P6-24
Holding Fixture	LTCT11043	P5-251, P5-406
Weld Repair Fixture	LTCT11049	P5-402
Bracket Welding Fixture	LTCT11069	P5-299
Grinding Fixture	LTCT11201	P5-341
Grinding and Checking Fixture	LTCT11209	P5-266
Grinding Fixture	LTCT11222	P5-291
Outer Shroud Electrode	LTCT11274	P5-266
Inner Shroud Electrode	LTCT11275	P5-266
Holding Fixture	LTCT11276	P5-266
Inner Shroud Electrode	LTCT11293	P5-251
Outer Shroud Electrode	LTCT11294	P5-251
Holding Fixture	LTCT11295	P5-251
Holding Fixture	LTCT11296	P5-251

Table 2-1. Special Tools and Equipment (Continued).

NOMENCLATURE	PART NUMBER	REFERENCE PARAGRAPH (P), FIGURE (F), OR TABLE (T) OF USE
Holding Fixture	LTCT11315	P5-266
Holding Fixture	LTCT11320	P5-291
Nozzle Assembly Fixture	LTCT11321	P5-291
Outer Shroud Electrode	LTCT11322	P5-291
Inner Shroud Electrode	LTCT11323	P5-291
Inner Shroud Electrode	LTCT11327	P 5-402
Outer Shroud Electrode	LTCT11328	P5-402
Drill Jig	LTCT11329	P5-331
Rework Fixture	LTCT11330	P5-395
Tack Weld Fixture	LTCT11366	P5-251
Outer Shroud Electode	LTCT11367	P5-251
Inner Shroud Electode	LTCT11368	P5-251
Holding Fixture	LTCT11397	P5-473
Fixture	LTCT11404-01	P5-438
Inner Vane Electrode	LTCT11445	P5-266
Outer Vane Electrode	LTCT11446	P5-266
Tack Welding Fixture	LTCT11448	P5-266
Fixture	LTCT12061	P5-404
Holding Fixture	LTCT13001	P4-56, P5-431, P5-435, P5-441
Guide Pins	LTCT13003	P5-441, P5-443
Grinding Fixture	LTCT13007	P5-317, P5-406
Installation Tool	LTCT13070	P6-8
Assembly and Disassembly Fixture	LTCT13095	P5-360, P5-364, P5-367
Installation Tool	LTCT13102	P6-16
Torque Fixture	LTCT13175	P4-42, P4-44, P6-9, P6-11
Sling	LTCT13340	P4-49
Punch Head and Table Assembly	LTCT13345	P5-317
Punch Head and Table Assembly	LTCT13356	P5-279
Punch Head and Table Assembly	LTCT13367	P5-316
Support Assembly Fixture	LTCT14240	P5-350
Clamping Tool	LTCT14503	P6-38, P6-39
Stacking Tool	LTCT14514	P5-443
Pin Puller	LTCT14647	P5-438
Puller	LTCT14716	P5-435
Gearshaft Bearing Disassembly Tool	LTCT30719	P5-453, P5-457
Bevel Gear/Duplex Bearing Assembly/ Disassembly Kit	LTCT30741	P5-453, P5-457
Air Gage Tool	DRXAD-D-0056,FMC 12575	P5-304
Grinding Wheel	Mackline 29A60-K-5-V6	P5-318
Spray Unit	Metco 3M	P5-463

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Medium Grit A/203 Grinding Wheel	Metco 46	P5-463
Dermitron Non-destructive Tester	Model D2 (Unit Process Assemblies Inc.)	
Automatic Magnakleen Cylsonic Cleaning System	Model MK-1000-10A	P5-304e(1)
Lapping Plate	Model LA88	
Burgess Vibro-Engraver	Model V-73	Various
Balancing Machine	Model 3S (Gishold Machine-Co.)	P5-316, P5-318, P5-431, P5-443, P5-465, P5-466
Magnometer	Model 2480	
Torque Wrench	PD2501 (Power-Dyne Div.)	P6-9, P6-11
Holding Collar	PH106-0-167	P5-304
Holding Fixture	PH106-1-102	P5-304
Crimping Tool	PH106-0-1020	P5-304
Pop Rivet Gun	PRG402	P5-331
Ring Compressor	RC40C	P5-25
Counterbore Tool	RCA56-687	P5-236
Step Drill	RCAD28-312	
Step Drill	RCAD38-453	
Step Drill	RCAD47-562	
Step Drill	RCAD56-687	
Step Drill	RCAD38-484	
Step Drill	RCAD56-641S	
Porting Tool	RZA12112PT	
Drive Tool	R206-D	
Drive Tool	R208-D	
Drive Tool	R209-D	
Drive Wrench	R1106-W	
Drive Wrench	R1108-W	
Drive Wrench	R1110-W	
Drive Wrench	R1111-W	

Table 2-1. Special Tools and Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Drive Tool	R1707-D	
Drive Tool	R1711-D	
Step Drill	SRW-25D	
Swage Tool	SRW25S-A	
Drive Wrench	SR25W4-A	
Power Wrench	SWE8100	P4-48, P4-49, P6-23, P6-24
Anchor Plate	SWE8473W	P4-48, P4-49, P6-23, P6-24
Socket	SWE8673L	P4-48, P4-49, P6-23, P6-24
Adapter Arm	SWE13852-1210	P3-11
Adapter Base	SWE13853-1010	P3-11
Geared Adapter Set	SWE13870	P3-11
Torque Wrench	TO-1	P5-216
Torquemeter	TQ-4AL	P5-160
Gas Control Unit	Type G	P5-266
Gas Flow Meter	Type GF	P5-266
Air Control Unit	Type 3A	P5-266
Metalizing Gun	Type 8E	P5-266, P5-395, P5-251
Internal Clearance Gaging Unit	Type 50-200MM	
Ultrasonic Cleaner	US3F-24185 (Branson Equipment Co., or Equiv.)	P5-304
Grinding Disc	WAGONB	P5-318
Carbide Bit	WA63 TPG432	P5-266, P5-251
Tang Breakoff Tool	3581-8	P8-8
Engine Buildup Stand	42M76	P3-11, P6-2
Nozzle	66SD	P5-248
Drill Fixture	67AMXAC-D-0246	P5-413
Fixture	67AMXAC-C-0191-1	P5-444
7/16, 6-Point Deep Socket	7014H	P5-303, P5-308
Die Straightening Tool	73SAVAE-D-0078	P5-299
Alignment Tool	73SAVAE-D-0079	P5-299

Table 2-2. Inspection and Test Equipment.

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Multimeter	AN/PSM6B	P5–145
Contour Gage	B3XM	T 5-154
Plugging Fixture	B4KA	P5-117
Stop Assembly	B5SM	P5-160, P7-45
Oil Flow Fixture Assembly Vibration Pickup Mount	B36A	P5-371
Console Tester (Jetcal Analyzer)	BH112JB53	P5-145
Junction Box	BH361-8	P5-145
Heater Probe Element	BH734L-40	P5-145
Heater Probe Element	BH734R-40	P5-145
Plugging Fixture	B4KA	P5-117
Oil Seal Drain Bottle	BLT709	P7-28
Filter	CEC1-003-110	P7-30
Spectrum Analyzer	CEC1-117-0105	P7-31
Filter	CEC1-300-200	P7-30
Vibration Pickup	CEC4-118-0107	P7-30, P7-32
Cable	CEC49657-0300	P5-90
Thermocouple	EXP1928-01	P7-27
Plug	EXP3728	P7-27
Adapter Assembly	EXP3729-01	P7-27
Junction Box	HB361-8	P5-145
Backlash Gage	LTCT205	P5-237
Test Fixture	LTCT207	P5-237
Test Fixture	LTCT216	P5-190, P5-474
Backlash Gage	LTCT311	P5-237
Oil Flow Check Stand	LTCT313	P5-190, P5-314, P5-343, P5-350, P5-357, P5-381, P5-395, P5-314, P5-474, T 5-188, P6-7, P7-3
Test Stand	LTCT314	P5-2, P5-12, P5-33, P5-54, P5-75, P5-82, P5-110, P5-131, P5-169, P5-308, P5-465
Test Stand	LTCT315	P5-223
Test Stand	LTCT316	P5-153

Table 2-2. Inspection and Test Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Test Stand	LTCT319	P5-160
Test Stand	LTCT340	P5-216
Inlet Valve Assembly	LTCT398	P7-33
Screen Assembly	LTCT403	P7-28
Stand Assembly	LTCT404	P7-28
Quadrant	LTCT407	P5-160
Spacer	LTCT407-3	P5-160
Screw	LTCT407-4	P5-160
Quadrant	LTCT407-7	P5-160
Test Stand	LTCT421	P5-216
Test Stand	LTCT422	P5-183, P5-230, P5-343, P5-467
Test Fixture Adapter	LTCT423	P5-26
Adapter	LTCT433	P7-32
Test Fixture	LTCT524	P5-465
Ring Assembly	LTCT531	P7-27, P7-55
Flexible Engine Mount	LTCT533	P7-27
Adapter	LTCT535	P7-32
Torque System	LTCT726	P7-28
Oil Filter Mounting Stand	LTCT865	P5-230
Oil Flow Test Fixture	LTCT912	P6-19
Engine Rotating Handle	LTCT1255	P7-3
Test Stand	LTCT1414	P5-117, P5-124
Test Unit	LTCT1452	P5-223
Test Fixture	LTCT2029	P5-343
Water Brake Assembly	LTCT2040	P7-28
Test Fixture	LTCT2052	P5-343
Adapter Assembly	LTCT2057	P7-28
Adapter Assembly	LTCT2058	P7-28
Backlash Gage	LTCT2099	P5-233, P5-237, P6-12
Mounting Bracket	LTCT2112	P7-27
Assembly Fitting	LTCT2144	P7-27
Assembly Fitting	LTCT2148	P7-27

Table 2-2. Inspection and Test Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Vibration Pickup	LTCT3187	P7-32
Adapter Torque System Kit	LTCT3525	P7-28
Pressure Test Fixture	LTCT3694	P5-314
Wrench	LTCT3938	P7-27
Transmitter	LTCT3963	P7-28
Coupling	LTCT3964	P7-28
Bracket	LTCT3965	P7-28
Inlet Housing Pressure Kit	LTCT4084	P5-475
Test Equipment Dolly	LTCT4522	P7-28
Pressure Fixture	LTCT4535	P5-395, P5-396
Ring Assembly	LTCT4599	P5-475
Backlash Flag	LTCT4564	P5-457
Gaging Fixture	LTCT4719	P5-430, P5-442, P5-443
Test Fixture	LTCT4087	P5-314
Test Fixture	LTCT4875	P5-475
Test Fixture	LTCT4900	P5-467
Digital Transducer	LTCT6339	T 5-71, T 5-80, T 5-89, T 5-151
Area Flow Comparator Set	LTCT6483	T 5-151
Comparator Set	LTCT6484	T 5-71
Area Flow Comparator Set	LTCT6485	T 5-80
Area Flow Comparator	LTCT6486	T 5-89
Assembly	LTCT6756	P7-32
Stop Assembly	LTCT6763	P5-160
Oil Flow Check Fixture	LTCT6872	P5-381
Paddle Gauge	LTCT6917	T 5-62
Torquemeter Test Set	LTCT6943	P5-202
Hub	LTCT7007Y	P7-28
Propeller Shaft Extension	LTCT7009Y-01	P7-28
Propeller Nut	LTCT7011Y-01	P7-28
Lockring Assembly	LTCT7012Y-01	P7-28
Torque Adapter	LTCT7018Y	P7-28
Lockpin	LTCT7020Y	P7-28
Warning Flag	LTCT7022Y-01	P7-28
Lock-Ring	LTCT8697-01	P7-28
Linkage Assembly	LTCT8764-01	P7-28
Linkage Assembly	LTCT8765-01	P7-28

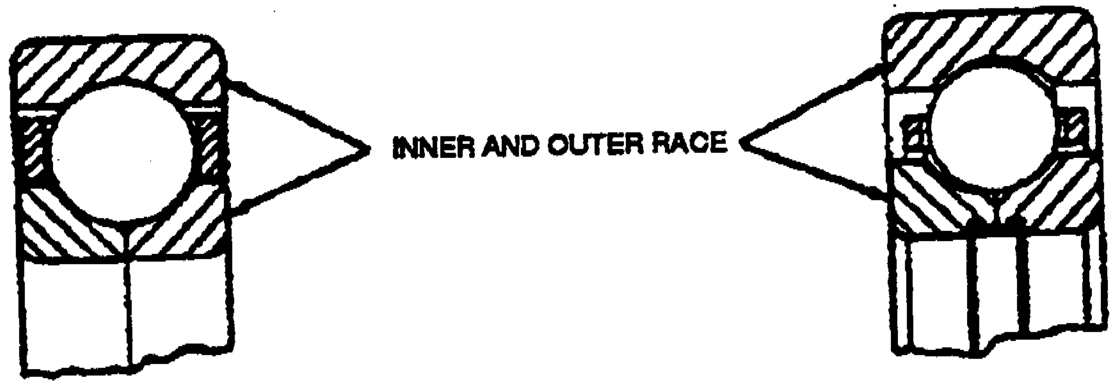
Table 2-2. Inspection and Test Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Hydronic Slave Unit	LTCT9006	P7-28
Thermocouple Assembly	LTCT9043	P7-28
Torquemeter Indicator	LTCT9386-01	P7-36
Clamp	LTCT9534	P7-28
Coupling	LTCT9535	P7-28
Transmitter	LTCT9536	P7-28
Digital Voltmeter	LTCT9835	P5-202
Spline Wear Gauge	LTCT9896	T 5-60
Inlet Guide Vane Position Jumper	LTCT10113	P7-28
Wrench Assembly	LTCT10316-01	P7-28, P7-55
Propeller Nut Wrench Assembly	LTCT10317-01	P7-28, P7-55
Test Fixture Assembly	LTCT10440-01	P5-26
Torque Element	LTCT10520-01	P7-28
Contour Template	LTCT11175	P5-413
Seal Leakage Test Fixture	LTCT11365	P5-432, P5-444
Inspection and Gapping Tool Set	LTCT13020	P5-299
Oil Flow Fixture	LTCT13270	P5-371
Engine Adapter	LTCT13379-01	P7-28
Inlet Screen	LTCT13381	P7-28
Ring Adapter	LTCT13382	P7-28
Seal Leakage Tester	LTCT13606	P5-432, P5-444
Test Fixture	LTCT13688	P5-308
Water Brake Adapter	LTCT21664-01	P7-28
Water Brake Assembly	LTCT21700-01	P7-28
Test Unit	LTCT23276	P5-138
Test Unit	LTCT23746-01	P5-138
Hobart Motor Generator	Model 925CC	P7-33
Propeller Nut	MS5001-50	P7-28
Front Cone	MS5007-40	P7-28
Front Cone	MS5007-50	P7-28
Rear Cone	MS5008-40	P7-28

Table 2-2. Inspection and Test Equipment (Continued).

Nomenclature	Part Number	Reference Paragraph (P), Figure (F), or Table (T) of Use
Rear Cone	MS5008-50	P7-28
Measuring Fixture	PH67-11-19	P5-304
Measuring Fixture	PH-67-11-132	P5-300
N2 Simulator	STD62526	P5-160
Fixture	STD62532	P5-160
Flexible Bellows	T-1-10	P7-28
Fitting	TE8429	P7-28
Adapter	11-6277	P5-96
Adapter	11-6532	P5-96
Test Stand (or Holding Fixture)	11-4700-1 Test set	P5-61, P5-89, P5-96, P5-103
Tachometer Generator	MS25038-4	P7-27
Starter	23064	P7-27
Starter	30E20-51	P7-27
V-Band Coupling	4320C1538-M	P7-27
V-Band Coupling	4432-1950-S	P7-28
Dial Caliper	599-57B	T5-165
Two Stage Turbine Grinder	7980	

Table 2-3. Fabricated Tools and Equipment.
Not Applicable



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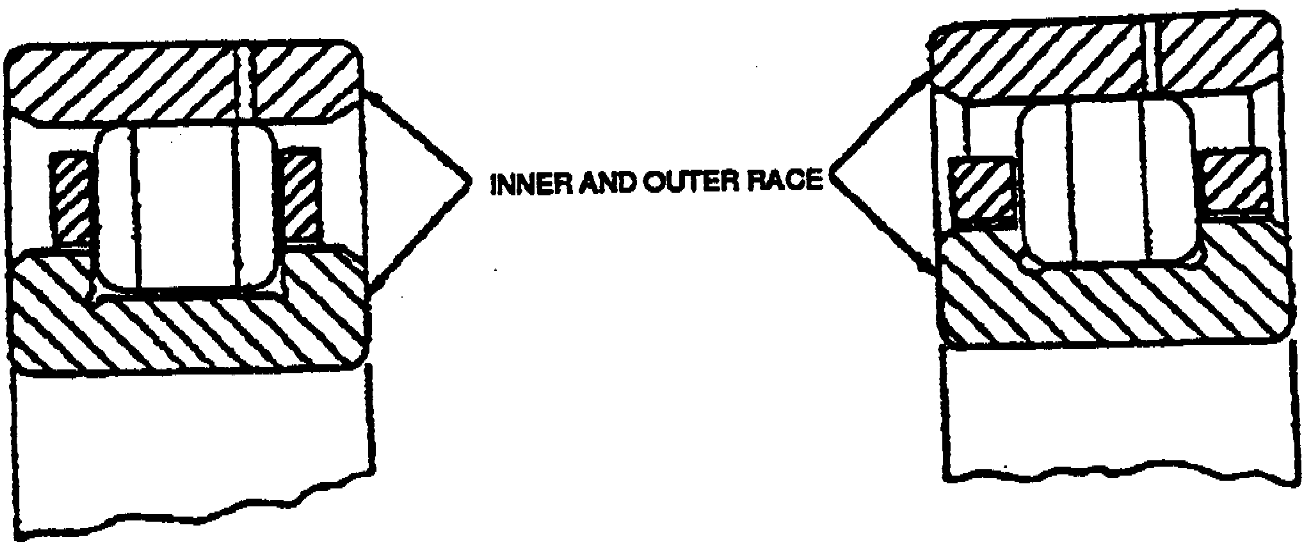

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Figure 2-1. Identification Areas for Time Coding.

Table 2-4. Parts Requiring Time Coding.

Part	Assembly	Refer to Figure and Index
		2-1
No. 1 Bearing (Ball) P/N 1-300-015	Compressor Rotor Assembly	*I
No. 2 Bearing (Roller) P/N 1-300- 665	Diffuser and Rear Bearing Housing	*J
No. 3 Bearing (Roller) P/N 1-300- 665	Power Turbine Rotor and Bearing Housing Assembly	*J
No. 4 Bearing (Ball) P/N 1-300-015	Power Turbine Rotor and Bearing Housing Assembly	* I
No. 21 Bearing (Roller) P/N 1-300-082	Power Shaft Support Assembly	*J
No. 22 Bearing (Roller) P/N 1-300-408	Reduction Gear Assembly	*J
No. 24 Bearing (Ball) P/N 1-300-407	Reduction Gear Assembly	*I
No. 45 Bearing (Ball) P/N 1-300-329	Carrier and Gear Assembly	*I

* Indicates prime area of identification. If lack of space is a problem, any area of outer or inner race, forward or rear face, may be utilized. On bearings with a separable inner race and cage, it is necessary to code only the inner race. See TM 55-1500-322-24 for further instructions.

Table 2-5. Flight Safety Parts.

NOMENCLATURE	PART NUMBER	CRITICAL CHARACTERISTIC
T53 Engine		Verification that engine meets acceptance test requirements
Primary planet gear (T53-L701A)	1-020-166-01	Verification that part is crack-free by magnetic particle inspection
		Verification of the 1.1806 - 1.1810 blueprint (1.1806 - 1.1811 overhaul dimension)
Secondary planet gear (T53-L701A)	1-020-167-01	Verification that part is crack-free by magnetic particle inspection
Primary ring gear	1-020-169-01	Verification that part is crack-free by magnetic particle inspection
Helical gear	1-020-171-01	Verification that part is crack-free by magnetic particle inspection
Secondary ring	1-020-187-01	Verification that part is crack-free by magnetic particle inspection
Propshaft (T53-L701A)	1-020-290-04	Verification that part is crack-free by magnetic particle inspection
		Verification of the 4.1345 - 4.1340 and 3.9375 - 3.9370 diameters
Sun gearshaft (T53-L701A)	1-020-320-01	Verification that part is crack-free by magnetic particle inspection
Reduction gear assembly	1-020-500-04	See detail parts
Rear carrier	1-030-181-01	Verification that part is crack-free by magnetic particle inspection
		Verification of the 2.4407 - 2.4412 diameter
Front reduction gear carrier	1-030-182-03	Verification that part is crack-free by magnetic particle inspection
		Verification of the 3.1494 - 3.1499 diameter
Output gearshaft	1-030-191-06/ -R09/-R10/-11	Verification that part is crack-free by magnetic particle inspection
		Verification of the 2.1654 - 2.1651 and 3.5429 - 3.5423 diameters
Output gearshaft	1-030-191-14	Verification that part is crack-free by magnetic particle inspection
Sun gearshaft	1-030-192-04	Verification that part is crack-free by magnetic particle inspection
Planetary gear shaft	1-030-193-01/-05	Verification that part is crack-free by magnetic particle inspection
Front reduction gear carrier	1-030-271-02	Verification that part is crack-free by magnetic particle inspection
		Verification of the 3.1494 - 3.1499 diameters
Planet gear carrier assembly	1-030-340-04/-05	Bore alignment and see detail parts
Reduction gear assembly	1-030-350-12/–18/–19	See detail parts
Fairing, variable inlet	1-060-088-03	Verification that part is crack-free by fluorescent penetrant inspection
Bearing housing, No. 1	1-060-190-01	Verification that part is crack-free by magnetic particle inspection
		Verification of the 3.5436 - 3.5432 blueprint (3.5438 - 3.5432 overhaul) diameter
Inner fairing assembly	1-060-250-03	Verification that part is crack-free by fluorescent penetrant inspection

Table 2-5. Flight Safety Parts (Continued).

NOMENCLATURE	PART NUMBER	CRITICAL CHARACTERISTIC
Vane assembly	1-060-260-07	Verification that cracks are within limits by fluorescent penetrant inspection
VIG vane assembly	1-060-270-05	See detail parts
Unison ring	1-060-340-01	Verification that part is crack-free by fluorescent penetrant inspection
Spur drive gear	1-070-062	Verification that part is crack-free by magnetic particle inspection
Gearshaft	1-070-063-02	Verification that part is crack-free by magnetic particle inspection
Gear	1-070-064-04	Verification that part is crack-free by magnetic particle inspection
Spur gear	1-070-072-03	Verification that part is crack-free by magnetic particle inspection
Spur gear	1-070-072-04	Verification that part is crack-free by magnetic particle inspection
Bevel gear	1-070-140-01	Verification that part is crack-free by magnetic particle inspection
Accessory drive carrier assembly	1-070-220-10	See detail parts
Carrier and cap assembly	1-070-230-01/ 1-070-210-01	Verification that part is crack-free by fluorescent penetrant inspection Verification that part has proper top bore alignment (2.0823 - 2.0843)
Accessory gearbox assembly	1-080-250	See detail parts
Oil pump gearshaft	1-080-260	Verification that part is crack-free by magnetic particle inspection
Fuel control gear	1-080-270-04	Verification that part is crack-free by magnetic particle inspection
Idle gearshaft	1-080-280	Verification that part is crack-free by magnetic particle inspection
Starter drive gear	1-080-310-01	Verification that part is crack-free by magnetic particle inspection
Gearshaft assembly	1-080-320-01	Verification that part is crack-free by magnetic particle inspection
Accessory gearbox housing	1-080-340-08	Verification that part is crack-free by fluorescent penetrant inspection
N1 tachometer gear	1-080-370-01	Verification that part is crack-free by magnetic particle inspection
Nut, GP rotor	1-100-034-01	Verification that part is crack-free by magnetic particle inspection Verification that there is no loss of silverplate on ID threads and forward face
Turbine disc, 2nd GP	1-100-063-05	Verification that part is crack-free by fluorescent penetrant inspection Verification of the 4.5000 - 4.5010 blueprint (4.4995 - 4.5010 overhaul) dimension Verification of the .03 radius when worn surface is repaired Verification that metal removal (for balancing) is within limits

Table 2-5. Flight Safety Parts (Continued).

NOMENCLATURE	PART NUMBER	CRITICAL CHARACTERISTIC
Centrifugal impeller	1–100–078	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 4.8694 - 4.8700 dimension
		Verification that metal removal (for balancing) is within limits
Turbine blade, 2nd GP	1-100-118-07	Verification that part is crack-free by fluorescent penetrant inspection
		Verification that critical area meets requirements
Turbine blade, 1st GP	1-100-132-06, 1-100-563-01	Verification that part is crack-free by fluorescent penetrant inspection
Turbine disc, 1st GP	1-100-133-01	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 4.1200 - 4.1205 dimension
		Verification of the 5.4995 - 5.5005 blueprint (5.4995 - 5.5010 overhaul) dimension
		Verification of the 2.195 - 2.200 blueprint (2.195 - 2.203 overhaul) dimension
		Verification of the .03 radius (two places) when worn surface is repaired
		Verification that metal removal (for balancing) is within limits
Disc, Sealing 1st GP	1-100-135-03	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 4.1190 - 4.1195 dimension
		Verification of the 63 RMS finish of the bolt hole bores after blend repair
N1 bevel gear	1-100-212-01	Verification that part is crack-free by magnetic particle inspection
Compressor blade, 2nd	1-100-286-09	Verification that part is crack-free by fluorescent penetrant inspection
		Verification that critical area meets requirements
Bolt, GP turbine	1-100-292-02	Verification that part is crack-free by fluorescent penetrant inspection
Nut, GP turbine	1-100-293-01	Verification that part is crack-free by fluorescent penetrant inspection
Spacer, GP turbine	1-100-294-03	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 5.5010 - 5.5015 and 4.4990 - 4.4995 dimensions
Compressor blade, 1st	1-100-361-06	Verification that part is crack-free by fluorescent penetrant inspection
		Verification that critical area meets requirements

Table 2-5. Flight Safety Parts (Continued).

NOMENCLATURE	PART NUMBER	CRITICAL CHARACTERISTIC
Turbine blade, 1st GP	1-100-362-06	Verification that part is crack-free by fluorescent penetrant inspection
Compressor blade, 3rd	1-100-383-05	Verification that part is crack-free by fluorescent penetrant inspection
		Verification that critical area meets requirements
Compressor blade, 4th	1-100-384-05	Verification that part is crack-free by fluorescent penetrant inspection
		Verification that critical area meets requirements
Compressor blade, 5th	1-100-385-05	Verification that part is crack-free by fluorescent penetrant inspection
		Verification that critical area meets requirements
Lock ring	1-100-423-01	Replaced 100%
Front compressor shaft	1-100-495-07	Verification that shaft is crack-free by fluorescent penetrant inspection
		Verification of the 3.3010 - 3.3017 dimension
		Verification of the 1.9685 - 1.9687 blueprint (1.9683 - 1.9687 overhaul) dimension (2 places)
		Verification that metal removal for balancing (of assembled compressor) is within limits
Rear compressor shaft	1-100-501-01	Verification of the 2.1655 - 2.1658, 2.1544 - 2.1551, and 1.9779 - 1.9786 dimensions and the 32 RMS finish on each
		Verification of the 3.7524 - 3.7530 dimension
		Verification that part is crack-free by magnetic particle inspection
		Verification that metal removal for balancing (of assembled compressor) is within limits
Bolt, rear compressor	1-100-502-02	Verification that part is crack-free by magnetic particle inspection
Bolt, forward compressor	1-100-506-02	Verification that part is crack-free by visual inspection
Disc, seal, 2nd GP	1-100-544-03	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 5.4700 - 5.4705 dimension
Disc, seal, 1st GP	1-100-545-03	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 4.3190 - 4.3195 dimension
Spacer, GP	1-100-546-02	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 4.4985 - 4.4995 dimension
		Verification of the 5.501 - 5.502 dimension
Power shaft	1-100-800-04	Verification that part is crack-free by magnetic particle inspection

Table 2-5. Flight Safety Parts (Continued).

NOMENCLATURE	PART NUMBER	CRITICAL CHARACTERISTIC
		Verification that metal removal (for balancing) is within limits
		Verification of the 1.4217 - 1.4222 diameter
Turbine rotor, 2nd GP	1-100-820-08	Verification that part is crack-free by fluorescent penetrant inspection
Turbine rotor assembly, 1st GP	1-100-880-12 , 1-101-530-01	Verification that part is crack-free by fluorescent penetrant inspection and that balance is within limits
Ring, retaining	1-100-890	Verification that part is crack-free by fluorescent penetrant inspection
Stator vane, 3rd	1-101-020	Verification that part is crack-free by fluorescent penetrant inspection
Stator vane, 4th	1-101-030-01	Verification that part is crack-free by fluorescent penetrant inspection
Stator vane, 5th	1-101-310 , 1-101-040-01	Verification that part is crack-free by fluorescent penetrant inspection
Turbine rotor assembly, 1st GP	1-101-100-08	Verification that part is crack-free by fluorescent penetrant inspection and that balance is within limits
Stator vane, 1st	1-101-110-07	Verification that part is crack-free by fluorescent penetrant inspection
Stator vane, 2nd	1-101-120-03	Verification that part is crack-free by fluorescent penetrant inspection
Compressor rotor	1-101-250-04	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 3.3000 - 3.3006 and 3.7500 - 3.7504 dimensions
Turbine rotor assembly, 2nd GP	1-101-360-04	Verification that part is crack-free by fluorescent penetrant inspection and that balance is within limits
Impeller housing	1-101-370-03	Verification that part is crack-free by fluorescent penetrant inspection
Air diffuser housing	1-110-230	Verification that cracks are within limits by fluorescent penetrant inspection
Bearing housing, No 2	1-110-470-13	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 3.5434 - 3.5430 diameter
Nozzle, 1st GP	1-110-520-19	Verification that cracks are within limits by fluorescent penetrant inspection
		Verification that liner contacts nozzle throughout 360° by applying iron-blue pigment
Nozzle, 1st GP	1-110-710-06	Verification that crack limits are met by fluorescent penetrant inspection

Table 2-5. Flight Safety Parts (Continued).

NOMENCLATURE	PART NUMBER	CRITICAL CHARACTERISTIC
Nozzle, 2nd GP	1-120-000-14	Verification that crack limits are met by fluorescent penetrant inspection
Nozzle, 2nd GP	1-120-050-03	Verification that crack limits are met by fluorescent penetrant inspection
Fuel manifold assembly	1-130-730-02	Verification that assembly passes functional test
Nut, PT rotor	1-140-061-01	Verification that part is crack-free by magnetic particle inspection
		Verification that there is no loss of silver plate
Bolt, power shaft	1-140-067-14	Verification that part is crack-free by magnetic particle inspection
Retainer plate, PT	1-140-144-02	Verification that part is crack-free by fluorescent penetrant inspection. Verification that there is no loss of aluminum paint
Bolt, PT turbine	1-140-168-03	Verification that part is crack-free by fluorescent penetrant inspection
Spacer, PT	1-140-169	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 4.9210 - 4.9215 dimension
Turbine disc, 2nd PT	1-140-272	Verification that part is crack-free by fluorescent penetrant inspection
		Verification of the 4.9190 - 4.9205 blueprint (4.9190 - 4.9210 overhaul) dimension
		Verification of the 63 RMS surface finish and .03/.06 radius on reworked bolt holes
Turbine blade, 2nd PT	1-140-273-03	Verification that part is crack-free by fluorescent penetrant inspection (may be inspected assembled to rotor)
		Verification that critical area meets requirements
Turbine blade, 2nd PT	1-140-274-02	Verification that part is crack-free by fluorescent penetrant inspection (may be inspected assembled to rotor)
		Verification that critical area meets requirements
Nozzle, 2nd PT	1-140-470-05	Verification that cracks are within limits by fluorescent penetrant inspection
Turbine rotor assembly, 2nd PT	1-140-550	Verification that part is crack free by fluorescent penetrant inspection
		Verification that material removal (for balancing) is within limits
		Verification that blade shroud gap is within limits
Bearing housing, 3 and 4	1-140-590-07	Verification that cracks are within limits by fluorescent penetrant inspection

Table 2-5. Flight Safety Parts (Continued).

NOMENCLATURE	PART NUMBER	CRITICAL CHARACTERISTIC
Bearing housing, 3 and 4 (Cont)		Verification that the 3.5434 - 3.5430 (3.5427 - 3.5434 overhaul) and 3.5436 - 3.5432 (3.5432 - 3.5438 overhaul) diameters are within limits
Exhaust diffuser housing	1-150-240	Verification that part is crack-free by fluorescent penetrant inspection
N2 tachometer gear	1-160-419-02	Verification that part is crack-free by magnetic particle inspection
Idle gear	1-160-422-02	Verification that part is crack-free by magnetic particle inspection
Spur gear	1-160-423-02	Verification that part is crack-free by magnetic particle inspection
Gearshaft	1-160-480-01	Verification that part is crack-free by magnetic particle inspection
Gearshaft	1-160-490-01	Verification that part is crack-free by magnetic particle inspection
Tachometer and governor gearbox	1-160-500-04	N/A. See detail parts
Idle gear (701A)	1-160-636-01	Verification that part is crack-free by magnetic particle inspection
Bleed band act	1-170-050-12	Verification that assembly passes functional test
Spur gear	1-170-520-01	Verification that part is crack-free by magnetic particle inspection
Tachometer and governor assembly	1-170-530-01	N/A. See detail parts
VIGV actuator assembly	1-180-150-01	Verification that assembly passes functional test
Flow divider assembly	1-180-190-03	Verification that assembly passes functional test
Turbine blade, 1st PT	1-190-007-07	Verification that part is crack-free by fluorescent penetrant inspection (may be inspected assembled to rotor)
Turbine blade, 1st PT	1-190-008-04	Verification that part is crack-free by fluorescent penetrant inspection (may be inspected assembled to rotor)
Turbine disc, 1st PT	1-190-009-05	Verification that disc is crack-free by fluorescent penetrant inspection
		Verification of the 4.9200 - 4.9205 blueprint (4.9200 - 4.9210 overhaul) dimension
Turbine rotor assembly, 1st PT	1-190-010	Verification that part is crack-free by fluorescent penetrant inspection and that balance is within limits
Nozzle 1st PT	1-190-050	Verification that cracks are within limits by fluorescent penetrant inspection
Bearing	1-300-002	Verification of the .4724 - .4721 bore diameter
Bearing	1-300-003	Verification of the .5906 - .5903 bore diameter
Bearing	1-300-004	Verification of the .6693 - .6690 bore diameter

Table 2-5. Flight Safety Parts (Continued).

NOMENCLATURE	PART NUMBER	CRITICAL CHARACTERISTIC
Bearing	1-300-006	Verification of the 1.1811 - 1.1809 bore diameter
Bearing	1-300-012	Verification of the .5906 - .5903 bore diameter
Bearing	1-300-015	Verification of the 1.9685 - 1.9683 bore diameter
Bearing	1-300-031	Verification of the 1.3780 - 1.3777 bore diameter
Bearing	1-300-032	Verification of the .9843 - .9841 bore diameter
Bearing	1-300-082	Verification of the 1.4232 - 1.4235 diameter inside the rollers
		Verification of the 2.1654 - 2.1651 diameter
Oil pump	1-300-212	Verification that assembly passes functional test
Pin, compressor blade	1-300-268-02	Verification that -02 pin (colored green) is installed
Bearing	1-300-329	Verification of the 2.1654 - 2.1651 bore diameter
Bearing	1-300-335	Verification of the 2.5591 - 2.5587 bore diameter
Bearing	1-300-407	Verification of the 4.1339 - 4.1336 bore diameter
Bearing	1-300-408	Verification of the 3.9370 - 3.9365 bore diameter
Bearing	1-300-665, 1-300-584	Verification of the 2.1654 - 2.1651 bore diameter and the absence of cracks around the pin in the outer ring by magnetic particle inspection
Fuel control	100770A4, 106500A1	Verification that part passes functional test
Governor, 701A	101770A1	Verification that part passes functional test
Governor, OS	103100-A1	Verification that part passes functional test
Fuel control, 701A	106000A1	Verification that part passes functional test
Bearing	2-300-023	Verification of the .9843 - .9839 bore diameter
Planet gear bearing, 701A	2-300-041-05	Verification of the 1.1811 - 1.1809 bore diameter
Bearing	2-300-933	Verification of the .9843 - .9839 bore diameter
Bearing	2-300-941-01	Verification of the .5906 - .5903 bore diameter

CHAPTER 3
PRESHOP ANALYSIS AND GENERAL MAINTENANCE

SECTION I. GENERAL

3-1. GENERAL. This chapter presents detail instructions necessary for the accomplishment of complete overhaul or rework of the T53-L-13B and T53-L-703 turboshaft engine, and T53-L-15, T53-L-701, and T53-L-701A turboprop engines.

a. As Required. The term "AR" indicates that as many of the parts as are required should be used. This abbreviation is used in the Illustrated Parts Breakdown Listing only.

b. Reference. The term "Ref" indicates that the item is a repetition of an item listed previously and required quantity is shown with the first listing.

c. Commerical and Government Entity (CAGE) Code. The following Federal Manufacturer's Codes are used in the Illustrated Parts Breakdown Listing of this Work Requirement.

COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGE)	NAME AND ADDRESS
00624	Aeroquip Corporation Aircraft Division Jackson Plant Jackson, Michigan 49203
00986	Joclin Manufacturing Company Wallingford, Connecticut 06492
01414	Aircraft Porous Media Inc. Glen Cove, New York 11542
05160	Michigan Dynamics Inc. Dynamics Filters Division Detroit, Michigan 48238
06320	Pye and Hogan Machine Company Meriden, Connecticut 06450
07060	C.E. Conover and Company, Inc. Fairfield, New Jersey 07006
07322	Minnesota Rubber Company Minneapolis, Minnesota 55416
08162	Bower Roller Bearing Division Federal Mongul Corporation Detroit, Michigan 48214
09055	Bal Seal Engineering Company La Habra, California 90631
10989	Mectron Industries Incorporated South El Monte, California 91733
11538	Champion Spark Plug Company Toledo, Ohio 43601
11599	Colt Industries, Incorporated Chandler-Evans Control Systems Div. West Hartford, Connecticut 06101

COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGE)	NAME AND ADDRESS
21335	The Fafnir Bearing Company Division of Textron Incorporated New Britain, Connecticut 06101
23474	Tec Seal Corporation Wilmington, California 90745
24664	Jonal Incorporated Meriden, Connecticut 06450
24981	Gits Brothers Manufacturing Company Chicago, Illinois 60623
36540	Lisle Corporation Clarinda, Iowa 51632
38443	Marlin-Rockwell Company Division of TRW Incorporated Jamestown, New York 14701
43334	New Departure-Hyatt Bearings Division General Motors Corporation Sandusky, Ohio 44870
43991	Norma-Hoffman Bearings Corporation Stamford, Connecticut 06904
48297	Jonal Incorporated Meriden, Connecticut 06453
50599	Resistoflex Corporation Roseland, New Jersey 07068
50625	Revere Corporation of America Wallingford, Connecticut
51600	Rollway Bearing Company, Incorporated Syracuse, New York 13088
51663	Lear Siegler, Incorporated Romec Division Elyria, Ohio 44038
52676	SKF Industries, Incorporated Philadelphia, Pennsylvania 19132
56878	Standard Pressed Steel Company Jenkintown, Pennsylvania
70040	AC Spark Plug Div. of General Motors Flint, Michigan 48556
71840	Clevite Corporation Cleveland Graphite Bronze Division Cleveland, Ohio 44110
71895	Delavan Manufacturing Company West Des Moines, Iowa 50265

COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGE)	NAME AND ADDRESS
72285	Exacto Industries, Incorporated San Fernando, California 91340
73134	The Heim Universal Division of North American Rockwell Corporation Fairfield, Connecticut 06430
73370	Fram Corporation Providence, Rhode Island 02916
73760	International Telephone and Telegraph Corporation ITT Aerospace Controls Burbank, California 91502
75370	Koppers Company, Incorporated Metal Products Division Piston Ring and Seal Department Baltimore, Maryland 21203
77602	Muskegon Piston Ring Company Muskegon, Michigan 49443
77200	Pesco Products Division of Borg-Warner Corporation Bedford, Ohio 44104
77820	The Bendix Corporation Electrical Components Division Sidney, New York 13838
77842	Sealol, Incorporated Providence, Rhode Island 02905
78118	MPB Corporation Split Ball Bearing Div 336 Mechanic St Lebanon, New Hampshire 03766–2627
78493	Standard Thomson Corporation Waltham, Massachusetts 02154
78570	Titeflex, Division of Atlas Corporation Springfield, Massachusetts 01109
78625	Summerill Tubing Company Carnegie, Pennsylvania
78493	United Aircraft Products Incorporated Dayton, Ohio
79689	Minnesota Rubber and Gasket Company Minneapolis, Minnesota 55416
80756	Ramsey Corporation St. Louis, Missouri
81482	Cooperative Industries, Incorporated Chester, New Jersey 07930
81996	U.S. Army Aviation and Missile Command, AMSAM-RD-SE-TD-SA-A, Redstone Arsenal AL 35898-5230
82495	Eddington Metal Specialty Company Eddington, Pennsylvania 19020
83086	New Hampshire Ball Bearing, Inc Hi Tech Division RTE: 202 South Peterborough, NH 03458

COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGE)	NAME AND ADDRESS
83259	Parker Seal Company Division of Parker-Hannifin Corp. Culver City, California 90231
83311	General Laboratory Associates Division of Simmonds Precision Products Inc. Norwich, New York 13815
83664	Anaconda American Brass Company Fabricated Metal Goods Division Waterbury, Connecticut 06720
86329	W.H. Nichols Company Waltham, Massachusetts 02154
90005	Bendix Corporation Filter Division Madison Heights, Michigan 48071
91251	International Packing Corporation Bristol, New Hampshire 03222
91547	Allied Signal Incorporated. 5505 S. Main St. Stratford, CT 06497–7593 (Formerly Textron Lycoming)
91587	Rex Chainbelt Incorporated Catriseal Division Wheeling, Illinois 60090
92798	Johns - Manville Products Corporation Manville, New Jersey
93835	National Waterlift Company Inc. Kalamazoo, Michigan 49001
94581	National Utilities Corporation Monrovia, California 91016
94592	Commercial Filters Corporation Fairfield Facility West Caldwell, New Jersey 07006
97424	General Electric Company Aerospace Electrical Equipment Department 40 West Lynn, Massachusetts 01905
97484	Technical Development Company Glenolden, Pennsylvania 19036
97625	Kraysons Manufacturing Company Inc. Brooklyn, New York
97968	The DSD Company Hamden, Connecticut 06518
98500	AGC Incorporated Meriden, Connecticut 06453

COMMERCIAL AND GOVERNMENT ENTITY CODE (CAGE)	NAME AND ADDRESS
98625	Aeroquip Corporation Marman Division Los Angeles, California 90064
99193	Allied Signal Engines 111 S. 34th St. Phoenix, AZ 85072–2181
99207	General Electric Company Aircraft Engine Group West Lynn, Massachusetts 01905
99643	Sterer Engineering and Mfg. Company Los Angeles, California 90039
98568	Eckel Valve Company San Fernando, California 91340

d. Usable on Code Column. Part variations within groups of engines covered by this Work Requirement are indicated by a letter symbol in the "Usable on Code" column. Letter symbols are explained below. Wherever the column is blank, the parts listed apply to all engines covered in this Work Requirement.

USABLE ON CODE	MODEL DESCRIPTION
A	T53-L-13B
B	T53-L-703
C	T53-L-15
D	T53-L-701
E	T53-L-701A

SECTION II. SAFETY

3-2. GENERAL. This section contains a general review of personnel safety equipment that should be used by personnel when performing operations, procedures, and practices which are contained in this work requirement. Also included are the various hazards that can be encountered when performing the operations, procedures, and practices contained in this work requirement.

WARNINGS and CAUTIONS are located throughout the text and should be complied with.

The WARNINGS and CAUTIONS located on the inside front cover should be read prior to performing any of the requirements of this manual.

If an accident occurs, send someone to obtain medical assistance, and remain with the victim in order to tell the medical personnel what happened.

WARNING

Conditions, practices, or procedures which must be observed to avoid are:
Personal Injury
Loss of Life
Long-Term Health Hazards

CAUTION

Conditions, practices, or procedures which must be observed to avoid are:
Damage to Equipment
Destruction of Equipment

3-3. PERSONNEL SAFETY EQUIPMENT.

The following items of personnel safety equipment should be available for use when performing the various requirements of this work requirement:

Goggles	Used to protect eyes from metal fragments
Face Shield	Used to protect head from chemicals and metal fragments
Ear Protection Devices	Used to protect against noise
Asbestos Gloves	Used to protect hands when handling heated parts
Rubber Gloves	Used to protect hands from chemicals and cleaning solution
Respirator	Used to protect from non air-exhausted work benches
X-Ray Clothing	Used to protect body from radiation
Protective Clothing	Used to protect body from chemicals
Apron	Used to protect body from chemicals
Rubber Boots	Used to protect feet from chemicals
Safety shoes	Used to protect feet from dropped equipment
Radiation Detector	Used to determine amount of X-Ray exposure

3-4. ELECTRICAL HAZARDS.

Injuries and hazards caused by electrical equipment are as follows:

WARNING

SAFETY PRECAUTIONS

Failure to observe posted safety precautions.

WARNING

EQUIPMENT MODIFICATIONS

Using equipment with unauthorized modifications.

WARNING

TEST EQUIPMENT

Using unauthorized test equipment.

WARNING

UNSAFE EQUIPMENT

Failure to report unsafe equipment.

WARNING

INTERLOCKS AND SAFETY DEVICES

Using equipment with altered or disconnected interlocks, safety devices, and circuit protection devices.

3-5. MECHANICAL HAZARDS.

Injuries and fatalities caused by mechanical devices are as follows:

WARNING

COMPRESSED AIR

- Eyes can be permanently damaged by contact with liquid or large particles propelled by compressed air. Inhalation of air-blown particles or solvent vapors can damage lungs. At an air-exhausted workbench, wear approved goggles or face shield. At non air-exhausted workbenches, wear approved respirator and goggles.
- To preclude personnel injury, do not direct air near or directly against skin.
- To prevent damage or contamination when drying parts, do not use air under high pressure or from a source not having a moisture-trap/filter system.
- To prevent personnel injury or bearing damage, do not roll bearings with compressed air.

WARNING

TEST STAND OPERATION

Improper use of a test stand can cause severe damage to personnel or components. Test stands shall be operated by authorized personnel only.

WARNING

NOISE

Operation and maintenance personnel shall wear ear protection devices when working near or around an operating test stand. Ear plugs and sound attenuating headsets shall be available at all times to personnel in the vicinity of the test stand. Sound pressure levels in excess of 100dB are common.

WARNING

USE OF PIN DRIVER FIXTURE

To properly operate, control buttons must be activated simultaneously as a safety precaution to ensure the operator's hands are clear of driver sleeve.

WARNING

REASSEMBLY

To prevent injury to operator, asbestos gloves must be worn when removing gear from oven.

WARNING

HANDLING HOT PARTS

To prevent injury to operator, asbestos gloves must be worn when removing gear from oven. Bare handling of heated parts may cause blistering and third degree burns. If skin is burned, immediately immerse the affected area in cold water for ten minutes. Seek medical attention if blistering or pain persists.

WARNING

EQUALIZING SHIPPING CONTAINER PRESSURE

Make certain that all air pressure has been released before loosening nuts. If nuts are removed before pressure is released, internal pressure could blow cover off and the high energy fragments may severely injure personnel.

WARNING

VAPOR-BLASTING(CLEANING)

Because of toxicity of some deposited material, when removing all remaining contaminants by hand scrubbing, keep both part and brush wet with water to prevent airborne dust.

3-6. CHEMICAL HAZARDS.

Injuries and fatalities caused by chemicals are as follows:

WARNING

DANGEROUS CHEMICALS

Desoclean 45 is flammable. Do not use near open flames, near welding areas, or on hot surfaces. Do not smoke when using it, and do not use where other are smoking. Vapors of this product are heavier than air and may collect in low or confined areas, forming explosive mixtures with air

WARNING

DANGEROUS CHEMICALS

Contact with Desoclean 45 liquid or vapor can cause skin and eye irritation, dermatitis, and drowsiness. If there is any prolonged skin contact wash contacted area with soap and water. Remove solvent saturated clothing. If vapor causes drowsiness, get to fresh air. If irritation persists, get medical attention,

WARNING

DANGEROUS CHEMICALS

When handling Desoclean 45 at air exhausted workbench, wear approved goggles, and long sleeves. When handling liquid or liquid–soaked cloth in open unexhausted area wear approved respirator, gloves, goggles, and long sleeves. Dispose of liquid–soaked rags in approved metal container. Metal containers of solution must be grounded to maintain electrical continuity.

WARNING

DANGEROUS CHEMICALS

When using nondiluted Magnus magnustrip or a solution in a ratio of 3 pounds of Turco compound per gallon of water, avoid direct contact of solution with skin or eyes. This solution is a strong caustic, and protective garments, to include agent resistive gloves, shields/goggles, should be worn when handling it. Ensure that tank is exhausted to outside atmosphere.

WARNING

DANGEROUS CHEMICALS

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

3-6. CHEMICAL HAZARDS. (Continued)

WARNING

DANGEROUS CHEMICALS

Molding compound, consisting of base compound and accelerator compound and lamp black is toxic and care should be exercised to avoid prolonged contact with skin. Keep containers closed, except when mixing and transferring material.

WARNING

DANGEROUS CHEMICALS

When using a solvent of four parts Magnus 61C solution by volume; one part Magnus 751 solution; four parts Oakite rust stripper; and 14 parts water, provide adequate ventilation around bath. If inhaled deeply the solution may be injurious to the lungs. Wear rubber gloves to protect hands from chemicals as skin will be harmed by prolonged contact.

WARNING

PROLONGED CONTACT WITH LUBRICATING OIL

Prolonged contact with lubricating oil may cause a skin rash. These 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.

WARNING

CLEANING

When removing carbon by the solvent-immersion method, ensure that cleaning area is well ventilated. If carbon-removal compound comes in contact with skin, eyes, or clothing, thoroughly flush affected area with cold water.

WARNING

DANGEROUS CHEMICALS

When using Brulin 815GD, Desoclean 45, DS–108, Positron, denatured alchohol or acetone, avoid prolonged inhalation of fumes. Perform cleaning operation in a well-ventilated area.

WARNING

DANGEROUS CHEMICALS

Use extreme care when handling ammonium nitrate, hydrochloric acid, concentrated nitric acid, sodium hydroxide pellets, hydrogen peroxide; ammonium biflouride crystals, concentrated sulphuric acid and concentrated phosphoric acid; these chemicals are hazardous and require special handling. Solid ammonium bifluoride is crystalline and can be conveniently stored in a dry place.

WARNING

COMBUSTION CHAMBER INTERNAL PARTS

When handling internal parts of the combustion chamber that have been exposed to fuel containing tetraethyl lead, ensure that the by product (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 assistance.

3-6. CHEMICAL HAZARDS. (Continued)

WARNING

CLEANING

When using dry cleaning solvent P-D-680, avoid prolonged inhalation of vapors. Wear rubber gloves and use hand cream to prevent contact with skin. Do not heat solution.

Solvent flash point must not be less than 100°F.

WARNING

EXPLOSIVE MATERIAL

Never attempt to burn more-than a few particles of metal suspected to be magnesium. Magnesium powder or dust is explosive.

WARNING

MARKING OF HOT END PARTS.

To prevent detrimental chemical/material reactions which could cause cracks and/or parts failure, never use a lead (graphite) pencil to mark hot end parts. Use only approved marking materials on all engine parts.

When using chemicals and cleaning compounds the following general safety precautions should be observed.

a. Wear rubber gloves, boots, apron or coveralls, and faceshield or goggles when working with or near cleaning solvents.

b. Use the least toxic cleaning materials that will satisfactorily accomplish the work.

c. Perform all cleaning operations in a well-ventilated area.

d. Periodically wash area floor thoroughly, particularly around tanks, with clean water, using a hose or mop.

e. Treat spilled acid immediately with a sufficient quantity of water and neutralizer, or as prescribed by manufacturer's instructions.

f. Ensure that adequate firefighting and safety equipment is conveniently located and readily available to all personnel.

g. Do not smoke or expose flame within 50 feet of cleaning area.

h. Use a stiff fiber brush for scrubbing operations. Do not use a steel brush.

3-7. RADIOGRAPHIC HAZARDS. Injuries and fatalities caused by radiographic equipment are as follows:

WARNING

RADIOGRAPHIC (X-RAY) INSPECTION

A hazard associated with exposure to ionizing radiation is that serious damage can be inflicted without pain, burning or other sense of discomfort during the exposure period. As a precaution, all radiographic operating personnel shall wear a pocket dosimeter or film badge.

WARNING

RADIOACTIVE MATERIAL

Aircraft engine igniter exciters include electron tubes which contain a small amount of Cesium/Barium 137 or Krypton-85. No special handling precautions normally apply, however, personnel should consult their supporting Radiation Protection Officer in the event these tubes are severely damaged.

SECTION III. REMOVAL OF ENGINE FROM CONTAINER

3-8. GENERAL. This section contains detailed procedures for the handling of the engine and associated parts prior to engine overhaul.

3-9. CARE OF RECORDS. Proceed as follows:

a. Break lockwire and loosen wing nuts (1, figure 3-1) and remove cover assembly (2). Remove historical records from receptacles.

b. Inspect forms per Preshop Analysis Requirements (see paragraph 3-15).

3-10. REMOVAL OF ENGINE FROM SHIPPING CONTAINER. (See figure 3-1)

a. Remove capscrew (12) and cover (13), and release air pressure through air filler valve (11).

WARNING

Make certain that all air pressure has been released before loosening hex nuts (10). If nuts are removed before pressure is released; internal pressure could blow cover off.

b. Remove 30 bolts (4), 60 washers (22), and 30 hex nuts (10) that secure upper and lower sections (3 and 9) of shipping container.

c. Attach suitable chain lifting eyes on upper half of shipping container. Using suitable hoist attached to chain, lift upper section cover (3) of shipping container from lower section container (9).

CAUTION

Ensure upper half of shipping container does not strike engine.

d. Insert 7/16 inch diameter by 6-1/2 inch long bolt through diffuser housing mounting boss. Attach two cables from hoisting beam sling (LTCT773 or LTCT240) one on each end of stud. Secure engine sling cables with nuts and 1-1/2 inch (3.81 cm) washers.

e. Insert 7/16 inch diameter by 5 inch long stud through inlet housing mounting boss. Attach two cables from hoisting beam sling (LTCT773 or LTCT240), one on each end of stud. Secure engine sling cables with nuts and 1-1/2 inch diameter washers.

f. Attach engine sling to suitable hoist.

g. Remove bolts (16), washers (23) and hex nuts (15) that secure rear mounting bracket (6) and forward mounting bracket and gasket (17) in lower section of shipping container.

h. Remove engine from shipping container.

i. Remove bolts (8 and 21) and washers (7 and 20) that secure rear mounting bracket (6) and forward mounting bracket and gasket (17) to the engine. Remove brackets.

j. Reinstall brackets in lower section of shipping container with bolts (16), washers (23) and hex nuts (15).

k. Lower the upper section cover (3) of shipping container onto lower section container (9). Install four bolts (4) and hex nuts (10), with eight washers (22), one set at each corner, and finger-tighten. Check alignment of top and bottom halves of shipping container and alignment of upper and lower flange bolt holes.

l. Install bolts (4), washers (22) and hex nuts (10) at midpoints of sides and ends of shipping container flanges, and bolts, washers, and nuts at midpoints between them; then install all remaining bolts, washers and nuts. Tighten, in order of installation, to 500 to 640 pound-inches (576 to 738 cm kgs) torque.

m. Using dehydrated air, pressurize shipping container in accordance with pressure chart (figure 8-4). Check container seals to ensure that they are airtight by applying soap (liquid solution) (item 180, table C–1) and observe for bubbles.

n. Remove engine rear and front protective covers (5 and 18).

CAUTION

Ensure that engine does not strike shipping container.

3-11. INSTALLATION OF ENGINE ONTO STAND.

a. Install geared adapter set, P/N SWE13870; adapter arm, P/N SWE13852-1210; and adapter base, P/N SWE13852-1010, or equivalent, onto suitable engine buildup stand, P/N 42M76, or equivalent (See figure 3-2).

b. Adjust hoist, as necessary, and guide engine onto stand.

c. Loosen nuts that secure four clamps to ring of stand, and slide clamps toward outside diameter of plate. Secure clamps.

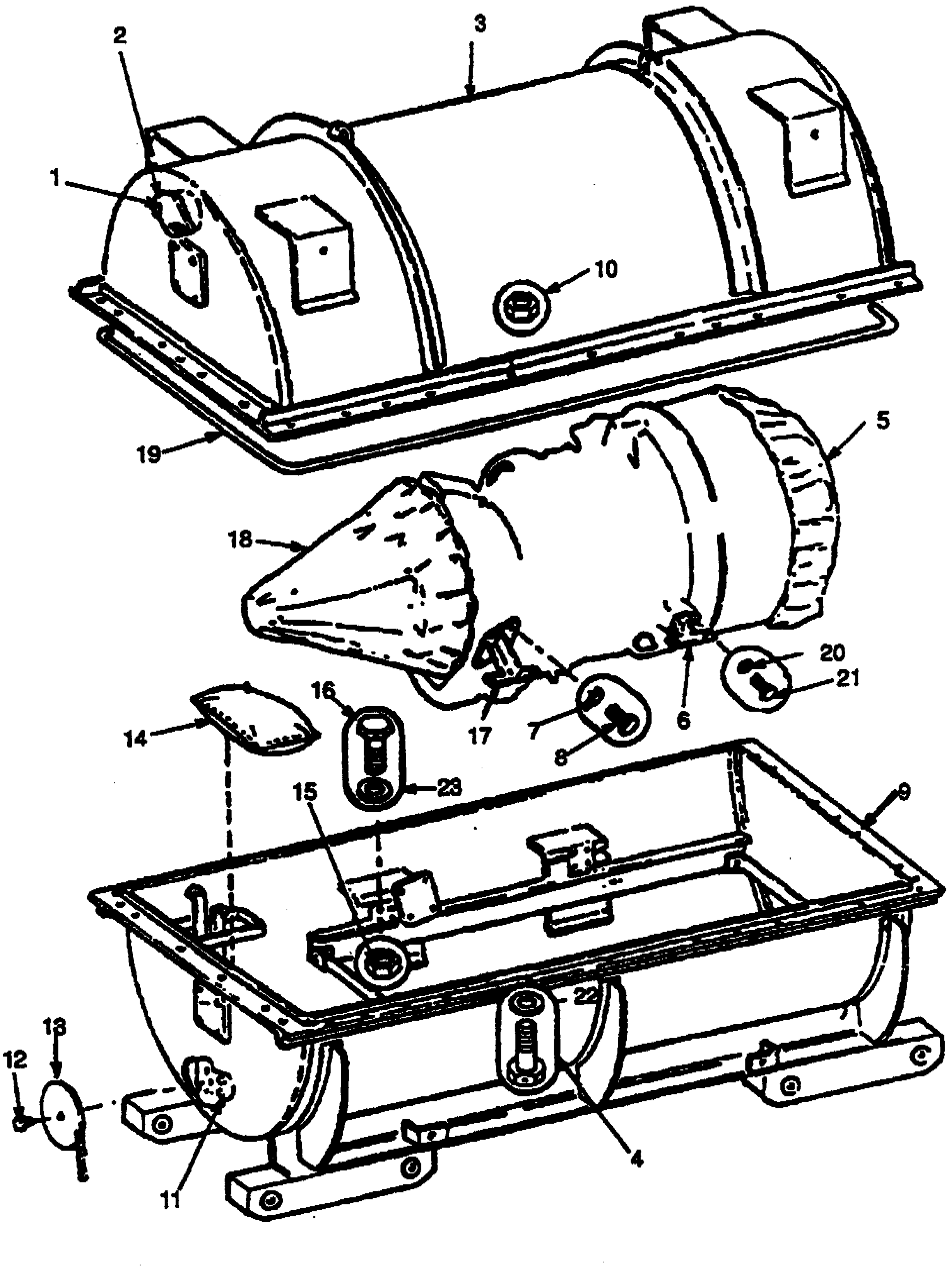


Figure 3-1. Engine Shipping Container and Attaching Parts (Typical).

Key to figure 3-1:

1. Wing Nut
2. Record Receptacle Cover
3. Upper Section Cover
4. Bolt
5. Rear Protective Cover
6. Rear Mount Bracket
7. Washer
8. Bolt
9. Lower Section Container
10. Hex Nut
11. Air Filler Valve
12. Capscrew
13. Cover
14. Desiccant
15. Hex Nut
16. Bolt
17. Forward Mounting Bracket with Gasket
18. Front Protective Cover
19. Container Gasket
20. Washer
21. Bolt
22. Washer
23. Washer

d. Guide front end of engine into opening of plate so that inlet housing flange is flush against rear of plate.

e. Position four clamps over inlet housing flange and tighten to secure engine to plate.

f. Remove lifting sling.

3-12. DRAINING ENGINE OIL.

a. Position suitable container under accessory drive gearbox.

WARNING

Lubricating oil (item 189 or 190, table C–1) 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 adequately be ventilated to keep mist and fumes to minimum.

CAUTION

Lubricating oil (item 189 or 190, table C–1) may soften paint upon contact. If lubricating oil is spilled on painted surfaces, these surfaces should be thoroughly washed.

b. Disconnect scavenge oil hose from union on rear face of accessory drive gear box.

c. Remove magnetic chip detector from accessory drive gearbox.

d. Inspect chip detector for accumulation of chips.

e. Drain lubrication system.

f. Clean oil hose and connections.

CAUTION

To prevent oil leaks, use care not to cross threads while replacing chip detector and scavenge line.

g. Reinstall magnetic chip detector. Do not tighten to full torque at this time.

h. Connect scavenge hose to union.

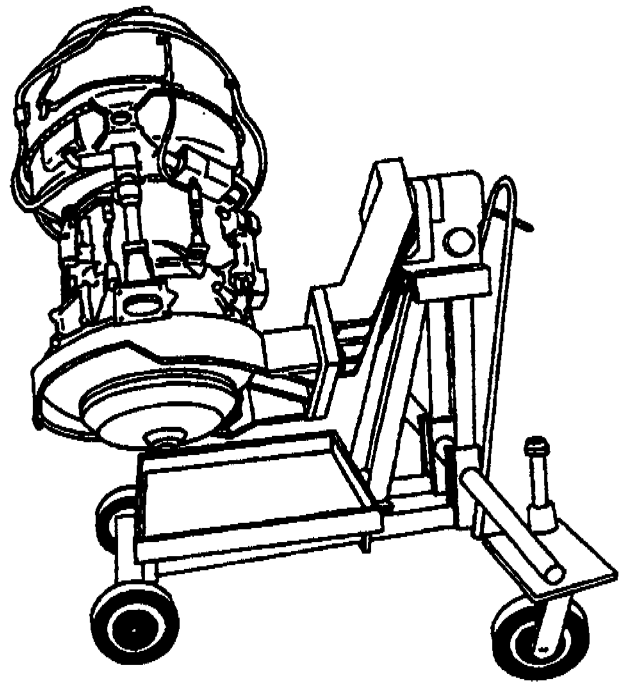


Figure 3-2. Installing Engine on Disassembly Stand (Typical).

3-13. PRELIMINARY CLEANING OF ASSEMBLED ENGINE. Proceed as follows:

a. The condition of the engine can be determined by examination prior to cleaning as outlined in paragraph 3-17.

b. If it is necessary to clean the external engine surfaces prior to disassembly, perform the following:

(1) Ensure that all openings are suitably protected to prevent entrance of foreign matter and cleaning solvents. This can best be accomplished by leaving the shipping caps, plugs, and covers installed until the external surfaces have been cleaned.

(2) Flush the external surfaces with dry cleaning solvent (item 134, table C–1) and blow or wipe dry. Ensure that the solvent does not enter the ID of the compressor case.

CAUTION

If inspection is to be delayed, use a temporary preservative to protect the engine from corrosion.

SECTION IV. PRESHOP ANALYSIS

3-14. PURPOSE. The purpose of preshop analysis is to determine, prior to the beginning of depot maintenance and at the highest assembly level possible, the extent of repair, modification, or part replacement required to return the engine to a completely serviceable condition, as specified herein, and to prepare estimates of work and parts required for performing the depot maintenance. (See table 3-1). If inspection at the highest level of assembly is precluded by missing, damaged, or diagnosed defective assemblies, consideration will be given to techniques that would allow continued inspection at that level. If this is not possible, inspection will proceed at the next lower level. A preshop analysis checklist will be used to record the results of the analysis and any required maintenance. All safety of flight and mandatory inspections and/or modifications will be accomplished. (See tables 3-2 and 3-3).

3-15. INSPECTIONS OF FORMS. Proceed as follows:

a. Check all tags and historical records accompanying engine to determine reason(s) for removal of engine from service. Record reason(s) and any other helpful data on the preshop analysis checklist, table 3-1. Do not remove tags from engine or any of its accompanying records. If reasons for removal are not available, contact U.S. Army AMCOM ATTN: AMSAM-MMC-RE-FC Redstone Arsenal, AL 35898-5000, (256) 876-6538, (DSN 746-6538), for instructions.

b. Unless otherwise prescribed, the following procedures will be adhered to in the event the operating-hour history of the component or its integral fatigue-life parts is unknown.

(1) When equipment (time-change or retirement-interval item) is received for overhaul, repair, or modification(s) and total hours since last overhaul or modification(s) or total operating time is not available, every effort shall be made to obtain this information from the shipping activity. In the event the time cannot be obtained, the depot maintenance activity shall request instructions from U.S. Army AMCOM ATTN: AMSAM-MMC-RE-FC Redstone Arsenal, AL 35898-5000, (256) 876-6538, (DSN 746-6538).

(2) If equipment received for overhaul, repair or modification(s) contains integral finite fatigue-life parts and total operating time of these parts is not available, the life-limited parts shall be replaced.)

(3) If equipment received for overhaul or modification(s) contains life-limited parts and the operating time remaining is less than the TBO period, replace the part.

Table 3-1. Preshop Analysis Checklist.

INSPECTION POINT	CONDITION	ACTION	REMARKS	DONE
<u>GENERAL</u> Engine Assembly	Reason(s) for removal from service	Record:		
	General overall condition	See paragraph 3-17		
	Battle, accident or crash damage	See paragraph 3-18		
	Dropped during handling	See paragraph 8-10		
	Engines with no records	See paragraph 3-20		
	Overspeed, overtorque, zero oil pressure	See paragraph 3-21, step a		
<u>MINOR REPAIR</u> Engine Assembly	Fifty percent or more TSO remaining, or if no TSO exists, less than 1,200 hours time since new.	See paragraph 3-21, step a		
	Engine oil over temperature indication	See paragraph 3-21, step o		
	Lightning strike	See paragraph 3-21, step p		
Hot Section Assembly (see paragraph 3-21, step 3-21j).	General - All visible areas internal/external for cracks, rust, corrosion, erosion, distortion, FOD, missing parts, loose fittings, etc.	Visual, repair/replace		
	Oil leak No. 3 seal, oil tubes and lines	Visual, repair/replace		
	Fuel leaks - damaged or twisted manifold and lines	Visual, repair/replace		
	Seal guide adapter, rivets and rivet holes for wear limit.	Visual, repair/replace		
	Erosion, cracks, rubs, burning, FOD, etc., on P.T. rotor blades and P.T. nozzle vanes in visible areas	Visual/SIE, repair/replace		

Table 3-1. Preshop Analysis Checklist (Continued).

INSPECTION POINT	CONDITION	ACTION	REMARKS	DONE
Hot Section Assembly (cont)	All other visible defects that might be detrimental to engine performance and/or safety of flight	Visual, repair/replace		
	Starting fuel nozzles	Clean, functional check, replace.		
Cold Section Assembly	1st GP rotor, P/N 1-100-880-09A/12 and 1st GP nozzle clearance, min 0.095 - max 0.120	Disassemble as necessary to dimensionally inspect. Repair/replace		
Air Diffuser	1st row vanes erosion	Visual/dimension check, table 5-145		
	3rd row vanes FOD	Visual, repair/replace		
	Oil/air leakage-pressure test (every time removed)	Paragraph 5-396		
Air Bleed Actuator	Presence of dust boot indicated by triangle (Δ) after part number	Paragraph 5-21 (first caution); remove boot, obliterate triangle (Δ) after P/N and functional test		
<u>LIMITED DISASSEMBLY OVERHAUL</u>				
Engine Assembly	Oil system contamination	See paragraph 3-22, step 3-22f		
Air Diffuser	1st row vanes erosion	Visual/dimension check, repair, table 5-145		
	3rd row vanes FOD	Visual, repair/replace		
	Cracks in base metal and braze joints	Visual check, repair, table 5-145		
	Bent oil tubes, evidence of leakage	Visual, repair/replace tubes, table 5-145		
	Air leakage test	Paragraph 5-396		
Fuel Control and Governor	Drive shaft spline wear	Visual, table 5-32		
	Loose screws (3 each) on main pressure regulator	Torque screws		
	Functional test	Paragraph 5-160		
Output Reduction Carrier and Gear Assembly T53-L-13B, -15, -703	Scoring, frosting, light pitting, spalling, cracking, output spline wear, turning bearings, broken rings	Table 5-113		
	Field allowed repairs (touchups)	Acceptable		
	Flow check (output seal leakage)	Paragraphs 5-342, 5-343		

Table 3-1. Preshop Analysis Checklist (Continued).

INSPECTION POINT	CONDITION	ACTION	REMARKS	DONE
Accessory Drive Assembly	Gears for cracks, spalling, chipping, fretting, nicks	Visual, table 5-177, repair/replace, paragraph 5-456		
	Clean strainer, transfer tubes and oil passages	Paragraph 5-454		
	Spline wear (especially fuel control spline and starter drive spline 0.012 inch maximum wear), corrosion	Visual/SIE, table 5-60		
	Leaks	Pressure test, paragraph 5-237, steps 5-237bf and bg		
Overspeed and Tachometer Drive	Wear to input governor drive gear	Visual, table 5-40 repair/replace		
	Clean and check filter and throttle assemblies	Paragraph 5-187, table 5-40 and paragraph 5-190, step 5-190e		
	Functional test	Paragraphs 5-194, 5-195		
First Stage Gas Producer Rotor Assembly	Dust impaction damage (cracks, distortion, retaining ring)	Disassemble (paragraph 5-318), clean with solvent. Visual inspect, tables 5-73/ 5-75		
	FOD, rub, wear, erosion, nicks, cracks (especially in retaining plate)	Visual, tables 5-73/ 5-75, repair/replace		
	Unbalanced-if damage is found or integrity is not maintained	Balance, paragraph 5-318, step 5-318d		
First Stage Gas Producer Nozzle 1–110–710–06		Identify nozzle Manufacturers Code (CAGE Code). Discard nozzles with a CAGE of S0100 (Deutsche Phillips GMBH).		
Second Stage Gas Producer Rotor Assembly	FOD, rub, wear, erosion, cracks, nicks, corrosion, dirt	Visual, tables 5-68/ 5-70		
	Unbalanced-if damage is found or integrity is not maintained	Balance, paragraph 5-317d		
Centrifugal Impeller Housing	Corrosion, cracks, wear, FOD, and rub.	Visual, tables 5-153/ 5-154		
Axial Compressor Housing	Corrosion, rub, erosion, FOD, cracks	Visual dimensional inspect when visual indicates wear, tables 5-153/ 5-154 (Minor FOD and corrosion may be touched up)		
Compressor Rotor Assembly	FOD, excessive carbon deposits, erosion, rubs, wear on journals and power shaft splines (both ends)	Visual, tables 5-162, 5-169 (Blades may be replaced per paragraph 5-427)		
	Balance	Paragraph 5-443		
Inlet Housing	Internal corrosion-remove core plug 6 o'clock position	Repair and pressure test, paragraph 5-474		
	Torquemeter valve, cleaning and pressure check	Cleaning SP No. 3002, Appendix E, visual inspect, table 5-189, pressure check		
	Leakage, corrosion, damaged studs, insets erosion, wear, cracks, (especially on helicoils)	Visual tables 5-188/ 5-189		

Table 3-1. Preshop Analysis Checklist (Continued).

INSPECTION POINT	CONDITION	ACTION	REMARKS	DONE
Variable Inlet Guide Vane (If) Inlet Housing Disassembled	Nicks, dents, pits, burrs in vanes, FOD, corrosion, wear	Visual, table 5-195 for limits		
	Vane distortion, separation, bowing	Visual, slight distortion acceptable if it does not interfere with full opening and closing of the vanes and does not occur on more than five vanes. Distortion or bowing that results in more than 1/8 inch deflection is not acceptable		
	Wear, cracks, bent lever, shafts	Visual, tables 5-193/5-195		
First Power Turbine Rotor	FOD, rub, wear, erosion, cracks, metalization, heat damage, blade protrusion	Visual, tables 5-81/5-82		
	Unbalanced - If damage is found or integrity is not maintained	Balance, paragraph 5-279c		
Second Power Turbine Rotor	FOD, rub, wear, erosion, cracks, disc pitting, metalization, heat damage	Visual, tables 5-98/5-102		
	Unbalanced - If damage is found or integrity is not maintained	Balance, paragraph 5-316c		

Table 3-2. Mandatory Inspections.

NOMENCLATURE & PART NUMBER	METHOD	REQUIREMENTS
Impeller P/N 1-100-078-07	Visual and Dye Penetrant	Dye penetrant inspect drain holes (two holes 180° apart) for cracks. No cracks allowed.
Nozzle P/N 1-110-710-06	Visual	Check for nozzles with manufacturers code (CAGE Code) of S0100 (Deutsche Phillips GMBH). Discard nozzle.
Output Gearshaft P/N 1-030-191-11	Visual	Check CAGE. Gears with CAGE 07749 are unacceptable for use. Remove from service. Annotate DA Form 2408-15.
Planet Gear Carrier Assembly P/N 1-030-340-04/-05	Dimensional	Alignment of front and rear bearing bores must be within 0.0005 inch. Refer to figures 5-339 and 5-340A.
Planetary Gear Shaft P/N 1-030-193-01	Visual	Check CAGE. Gears with CAGE 07749 are unacceptable for use. Gears with CAGE 21540 must be inspected and repaired as necessary per table 5-113.
Riveted Accessory Gearbox Gears* P/Ns 1-080-280-01/-02 and 1-080-260-01	Visual	Inspect for loose or missing rivets or elongated holes. If one of these conditions exist, gear must be modified to use 1-080-280-03 or 1-080-260-03.
2nd P.T. Nozzle* P/N 1-140-470-05	Visual	Visually inspect for aft retaining ring (doubler) at inner shroud. None allowed. Replace nozzle.
4th and 5th Stage Compressor Blades	Visual	Inspect for blade marked ◆ signifying modification. Modified blades and pins are unacceptable for use.

*Inspection required only when level of disassembly provides access.

Table 3-3. Modifications.

Modification Description		Applicability					
		Engine Applied				Maintenance	
Convert To	Requirements	L-15	L-13B	L-701A	L-703	Minor Repair	Overhaul
WARNING **FLIGHT SAFETY PART** **Replacement of pins is flight safety critical.**							
1. Compressor Rotor Assembly	Replace retention pin P/N 1-300-268-01 by P/N 1-300-268-02						
P/N 1-101-510-04			X	X	X	X	X
P/N 1-100-720-47			X	X		X	X
P/N 1-101-260-11			X	X		X	X
2. First Stage Gas Producer Rotor Assembly P/N 1-100-880-09A/12	Replaces P/N 1-100-880-01/09	X	X	X		X	X
3. Combustor Housing P/N 1-130-610-12	Replaces P/N 1-130-610-05	X	X	X			
4. Second Stage Power Turbine Nozzle							
Mounting Ring P/N 1-140-275-06	Replaces P/N 1-140-275-01	X	X	X			
5. Reduction Gear Assembly P/N 1-020-500-04	Replace bearing P/N 1-300-406-02 by P/N 2-300-041-05			X			X
6. Output Reduction Carrier and Gear Assembly P/N 1-030-350-12	Replace gear shaft P/N 1-030-191-06 by P/N 1-030-191-R09/R10 or P/N 1-030-191-11		X		X		X
7. Stainless Steel Impeller Housing P/N 1-101-370-03	Replace P/N 1-100-090-XX	X	X	X			X
8. Annular Ball Bearing P/N 2-300-933-01/02	Replaces P/N 1-300-005-01/02	X	X	X	X		
9. No.4 Bearing P/N 1-300-015	Replaces P/N 1-300-119	X	X				
10. Centrifugal Impeller P/N 1-100-078-07/08	Replaces P/N 1-300-078-03/09	X	X	X	X	X	X
11. Fuel Control and Governor							
a. 103100A1	a. Replaces 81800A1		X		X	X	[illegible]
b. 100770A4 or 106500A1	b. Replaces 84200A7		X		X	X	[illegible]

Table 3-3. Modifications (Continued).

Modification Description		Applicability					
		Engine Applied				Maintenance	
Convert To	Requirements	L-15	L-13B	L-701A	L-703	Minor Repair	Overha
12. Lube and Scavenge Pump P/N 1-300-212-04	Replace packing P/N RA17359 or RS26173.2133 by P/N RB25112	X	X	X	X	X	X
13. Second Stage Gas Producer Assembly P/N 1-101-360-04	Replace blade P/N 1-100-127-01 by P/N 1-100-118-07	X	X	X			X
14. Fuel Control 106000A1	Fuel control 81700-C6	X		X			X
15. Convert Bearing to P/N 1-300-082-03	Replaces P/N 1-300-082-01 and 1-300-082-02	X	X	X	X	X	X
16. Air Diffuser P/N 1-110-230-15	Replaces P/N 1-110-230-08		X				X
17. No.2 Bearing Housing P/N 1-110-470-13	Replaces P/N 1-110-590-02		X				X
18. Seal and Retainer Assembly, P/N 1-110-720-02	Replaces P/N 1-110-600-05		X				X
a. Seal P/N 1-300-616-01	a. Replaces P/N1-300-174-02/03		X				X
b. Seal Retainer P/N 1-110-252-03	b. Replaces P/N 1-110-194-04		X				X
19. Sealing Rings P/N 1-110-398-01	Replaces P/N 1-110-161-03		X				X
20. Disc and Hub Assembly P/N 1-100-495-07	Replaces P/N 1-100-495-03		X				X
Seal P/N 1-300-585	Replaces P/N 1-300-214		X				X
Face Plate P/N 1-300-588	Not Applicable		X				X
21. 1st Power Turbine Nozzle P/N 1-190-050-07	Replaces P/N 1-190-000-09		X				X
22. PT Spacer P/N 1-140-169-04	Replaces P/N 1-140-169-03		X				X
23. No. 3 and No. 4 Bearing Housing P/N 1-140-590-07	Replaces P/N 1-140-590-04		X	X		X	X

Table 3-3. Modification (Continued).

Modification Description		Applicability					
		Engine Applied				Maintenance	
Convert To	Requirements	L-15	L-13B	L-701A	L-703	Minor Repair	Overhaul
24. 1st PT Rotor P/N 1-190-010-03	Replaces P/N 1–190–010–02		X				X
a. Blade P/N 1-190-007-07	a. Replaces P/N 1-190-007-03		X				X
b Blade P/N 1-190-008-04	b. Replaces P/N 1–190–008–02		X				X
25. Bolt P/N 1–110–262–01	Replaces P/N MS9705–08		X				X
26. Bearings P/N 1–300–665	Replaces P/N 1–300–584 and P/N 1-300-176	X	X	X	X	X	X
27. Deleted							
28. Nipple Tube P/N MS24392J4	Replaces Union P/N AN815–4D	X	X	X	X	X	X
29. Reduction Gear Assembly P/N 1-030-350-18/-19	Convert from P/N 1-030-350-12		X		X	X	X
30. Accessory Drive Carrier Assembly P/N 1-070-220-10	Convert from P/N 1-070-220-03/-13/-14		X		X	X	X
31. Torquemeter Plate P/N 1-030-123-06 (Part of 1-030-350-19)	Convert from P/N 1-030-240-02		X		X	X	X

c. Review historical records to ensure correct documents are available (i.e., DA Form 2410, DD Form 1577-2, SF 368 etc). Complete Component/Airframe Disassembly Inspection Data Sheet on each component inducted, repaired, or overhauled as per instructions on back of form (figure 3-3). Copies of this data sheet will be forwarded to the following organization:

U.S. Army Aviation and Missile Command
ATTN: AMSAM-MMC-RE-FF, Bldg 5301
Redstone Arsenal, AL 35898–5230
DSN 746–5151, COMM (256) 876–5151

COMPONENT/AIRFRAME DISASSEMBLY INSPECTION DATA

1. NOMENCLATURE	2. SERIAL NO.	3. PART NO.	4. FAILURE CODE	5. PRIOR O/H
T53-L-13B	LE-1345R	1-000-000-2	372	0

6. USAGE SINCE NEW	7. USAGE SINCE O/H	8. RMVD FROM NOMENCLATURE	9. MODEL
603 hours	0	Helicopter	UH-1

10. SERIAL NO.	11. FIELD TAG STATED REASON
75-12345	Chip light and loss of oil pressure

12. MAG. PLUG: CLEAN CONTM	13. OIL FILTER: CLEAN CONTM	14. REMOVAL DATE
		12 Jan 92

15. PRIME CAUSE OF FAILURE

Spur gear that drives N2 gearbox failed

16. NOUN	PART NO.	SERIAL NO.	FAILURE MODE
Spur Gear	1-070-062-04	N1234	Fractured
Carrier Assy	1-070-210-1	29878	Damaged
Spur Gear	1-070-072-03	64655	Damaged

17. CONDITION/DISCREPANCY

The spur gear, P/N 1-070-062-04, was fractured due to fatigue (possibly overloaded) and caused secondry damage to the other spur gear and carrier assembly. Fractured chunks of metal also jammed the oil pump scavenger rotor. The manufacturer's code for the fractured spur gear is [illegible]8756.

18. SEQUENCE NO.	19. CONTRACT NO. (FCN)	20. INDUCTION DATE
011-345	JXPGN	12 Jan 92

21. PREPARED BY	22. PHONE NO.
Joseph Dunn	DSN 861-3414 (512) 939-3414

Figure 3-3. Inspection Data Form (Sheet 1 of 2).

INSTRUCTIONS

1. NOMENCLATURE OF COMPONENT BEING INDUCTED FROM DA Form 2410 BLOCK #1. EXAMPLE ENGINE T53-L-13BA
2. SERIAL NO. OF COMPONENT BEING INDUCTED FROM DA Form 2410 BLOCK #4.
3. PART NO. OF COMPONENT BEING INDUCTED FROM DA Form 2410 BLOCK #3.
4. FAILURE CODE STATED IN DA Form 2410 BLOCK #10.
5. PRIOR NO. OF OVERHAULS FROM DA Form 2410 BLOCK #6.
6. USAGE SINCE NEW FROM DA Form 2410 BLOCK #8.
7. USAGE SINCE OVERHAUL FROM DA Form 2410 BLOCK #9.
8. REMOVED FROM NOMENCLATURE FROM DA Form 2410 BLOCK #14.
9. AIRCRAFT MODEL FROM DA Form 2410 BLOCK #21.
10. AIRCRAFT SERIAL NO. FROM DA Form 2410 BLOCK #23.
11. FIELD TAG STATED REASON FOR REMOVAL.
12. INSPECT MAGNETIC PLUG & CIRCLE THE WORD DESCRIBING CONDITION. IF CONTAMINATED PROVIDE DESCRIPTION OF CONTAMINATION.
13. INSPECT OIL FILTER & CIRCLE THE WORD DESCRIBING CONDITION. IF CONTAMINATED PROVIDE DESCRIPTION OF CONTAMINATION.
14. REMOVAL DATE FROM FIELD TAG OR ANY OTHER DOCUMENT.
15. PRESHOP ANALYSIS DETERMINATION OF PRIMARY CAUSE OF FAILURE.
16. FAILED PARTS NOUN, PART NO., SERIAL NO. AND FAILURE MODE.
17. CONDITION OF COMPONENT BEING INDUCTED AND DISCREPANCIES DISCOVERED DURING TESTING, EVALUATION AND DISASSEMBLY.
18. SEQUENCE NO. IDENTIFICATION CODE FOR PROCESSED ITEMS.
19. CONTRACT NO. (PCN.)
20. INDUCTION DATE: DATE ITEM WAS INDUCTED FOR PROCESSING.
21. NAME OF THE PERSON THAT PREPARED THIS FORM.
22. TELEPHONE NO. OF THE PERSON THAT PREPARED THIS FORM.
23. COPY OF THIS DATA SHEET WILL BE FORWARDED TO THE FOLLOWING ADDRESS.

U.S. Army Aviation and Missile Command
ATTN: AMSAM-MMC-RE-FF, Bldg 5301
Redstone Arsenal, AL 35898-5230
DSN 746–5151, COMM (256) 876–5151

Figure 3-3. Inspection Data Form (Sheet 2 of 2).

3-16. PRESHOP ANALYSIS (GENERAL).

a. The evaluation criteria stipulated in the following paragraphs and in the preshop analysis checklist (table 3-1) include the guidelines to accomplish preshop analysis of the engine.

NOTE

Using the guidelines provided in the following paragraphs, preshop analysis will determine if the engine can be inducted and processed under the minor repair program. An engine inducted for minor repair will also receive convenience maintenance consistent with its own inherent weaknesses and overall condition. Specific requirements, along with guidelines, for processing the engine under a limited disassembly concept are contained in the following paragraphs, since such processing constitutes an overhaul for the engine, the engine records will reflect zero time since overhaul.

b. The condition of the engine can normally be determined without extensive testing and/or disassembly if the cause for removal from service is known. This information can normally be obtained by examination of the engine and/or engine records and any tags and forms attached to the engine.

3-17. GENERAL INSPECTION OF ENGINE.

a. Remove engine inlet and exhaust covers and inspect visible areas in engine inlet and exhaust for:

(1) Foreign objects

(2) Foreign object damage to blades/vanes

(3) Cracks, hot spots, erosion, etc.

(4) Signs of oil leaks

(5) Rotate turbine systems, checking for binding, rubbing, and unusual noises

(6) Any other discrepancies detrimental to engine operation

b. Remove main oil filter chip detector, power turbine bearing oil strainer and rear bearing oil strainer. Inspect for metal particles, carbon chips and any other contaminated particles.

c. Inspect overall external condition of engine for missing bolts and other parts, wrong parts, frayed fuel and electrical lines, oil leaks, loose fittings/nuts, corrosion and other visible damage.

3-18. BATTLE, ACCIDENT, AND CRASH DAMAGED ENGINES. Engines whose records indicate battle damage, accident damage or crash damage will be processed as follows:

a. Engine preshop analysis will attempt to determine the details of the accident i.e., hard landing, sudden stoppage, engine surge, etc.

b. The engine will be visually inspected to determine the extent of physical damage involved, the records will be reviewed, and a determination will be made concerning the extent of maintenance (check and test, minor repair, etc.) to be accomplished.

c. This decision will be entered on the routing documents by preshop analysis personnel and the component will be processed accordingly.

3-19. DROPPED ENGINES. Engines that have been dropped during handling shall be processed in accordance with paragraph 8-10 or inspection criteria in applicable maintenance manual.

3-20. ENGINES WITH NO RECORDS. Engines that have no records or records cannot be reconstituted (refer to paragraph 3-15, step 3-15b) shall be completely disassembled and inspected.

3-21. MINOR REPAIR.

a. Engines which are received with fifty percent or more time since overhaul (TSO) remaining, or if no TSO exists, less than 1,200 hours time since new (TSN), are candidates for minor repair. The Engines must have an operational history that is clear (I.E., engine records are complete and are accompanying the engine) and must not be covered under paragraph 3-18, 3-19 or 3-20. The engine shall be inspected and repaired as necessary to correct the deficiencies necessary to return the engine to serviceable status. The total cost of processing engines in this way must reflect more operational efficiency than processing the same engines by the requirements of paragraph 3-22 or by complete disassembly inspection and repair. Engine time since new or last overhaul will be indicated on DA FORM 2410 and not change after minor repair.

NOTE

Engines involved in overspeed or overtorque (per applicable limits in TM 55-2840-229-23 or TM 55-2840-233-24) damage or which have operated with zero oil pressure or oil contamination are not candidates for minor repair.

b. Engines may be given a "troubleshooting" block test run to determine the extent of repair required, especially engines which have been removed from service due to vibration, rotational noise, high oil consumption, or other such defects.

CAUTION

Precautionary inspection will be accomplished prior to troubleshooting run.

c. All disassembly, assembly, and engine testing shall be accomplished in accordance with this DMWR (see paragraph 3-22).

d. Applicable field maintenance manual serviceability limits which exceed the overhaul service limits in this DMWR shall be used for inspection of the engine unless otherwise specified.

e. Any part of the engine that is not within limits of the applicable field maintenance manual and can be restored to acceptable limits shall be repaired in accordance with this DMWR (see paragraph 3-22).

f. Check and test of engine accessories are not required unless a definite defect is suspected or confirmed or otherwise specified.

g. All turbine nozzles removed as a result of an engine failing test for performance shall be air flowed.

h. Modifications and inspections which are mandatory during minor repair are identified in tables 3-2 and 3-3.

i. All air diffusers, from engines disassembled to the extent that the air diffuser can be inspected and pressure tested, shall be dimensionally inspected for first row vane erosion and pressure tested for leaks per paragraph 5-396.

j. Hot end inspection, when required, shall be accomplished per the applicable field maintenance manual.

k. The following conditions apply when measuring turbine rotor tip clearance:

(1) Turbine rotors and turbine nozzles removed and processed per applicable field maintenance manual and reinstalled into the same serial number engine: the tip clearance shall be per the applicable field maintenance manual.

NOTE

The second stage gas producer nozzle may be replaced, but the original cylinder must be reinstalled.

(2) Turbine rotors and turbine nozzles that are new assemblies, new parts installed or gained from a different serial number engine: tip clearance shall be per this DMWR.

l. Inspect seal guides (P/N 1-130-800-01) on combustor liner, P/N 1-130-780-01/03, for cracks, burn damage, and distortion. Guides with one (1) hairline crack (crack with no measurable gap) are acceptable provided there is no burn damage or distortion and combustion liner does not require removal from combustor housing.

m. Check bleed band actuator housing for triangle mark after the part number. If triangle is legible, with no obliterating marks, disassemble and remove rubber dust boot that encases the spring. Obliterate the triangle marked after the part number on the housing and touch up surface. Reassemble and functionally test the bleed bend actuator assembly.

n. If engine is disassembled to the extent that the compressor blades can be inspected, use chordal width limits given in Appendix D, Depot Mobilization..

o. Engines removed from service due to an oil overtemperature indication will be analyzed as follows:

(1) Disassemble engine to a minimum amount so that an inspection can be made to determine if it experienced any damage due to an oil overtemperature condition and visually inspect for:

(a) Discoloration of gears and other oil-wetted rotating parts.

(b) Condition of oil (burned, coked, etc.).

(c) Any other evidence that may indicate whether the engine did experience a damaging oil overtemperature condition.

(2) If inspection indicates that the engine did not experience an oil overtemperature condition, test the engine by giving it a "penalty run". If the engine test exhibits an overtemperature condition, a complete disassembly and inspection are required.

(3) If the engine passes the above inspection and test, it will be considered as not having experienced an oil overtemperature condition and shall be processed accordingly.

p. Engines removed from service due to lightning strike must have the following performed:

(1) Disassemble engine completely; remove and process all bearings.

(2) All ferrous engine parts will be checked for magnetism and/or demagnetized.

q. If less than 75 hours remain before the engine is to receive a scheduled internal inspection, the inspection shall be accomplished during minor repair. If in the course of minor repair the hot section is completely disassembled, the scheduled internal inspection shall be accomplished.

3-22. LIMITED DISASSEMBLY OVERHAUL.

a. All engines inducted at depot shall be repaired in accordance with this paragraph except for engines covered under paragraphs 3-18 through 3-21. Engines processed in accordance with procedures outlined in this paragraph shall carry a zero time since overhaul designation. A corresponding entry shall be made in the engine log.

b. Visual inspection to authorized technical data for the items in step i shall be in lieu of penetrant or magnetic particle inspection unless specified as mandatory, the visual inspection indicates damage, or the part/assembly is processed for complete disassembly.

c. Component parts and/or assemblies shall require dimensional inspection <u>only</u> <u>as</u> <u>necessary</u> to assure the following:

(1) Required fitment, clearance, and alignment at final assembly. Component parts and/or assemblies may be considered as dimensionally mated within the engine received for repair. Remating of these parts and/or assemblies is not necessary unless:

(a) Parts are replaced, in which case dimensionally check only as necessary to assure fitment, clearance, and/or alignment of replacement part.

(b) Parts are repaired to the extent that dimensional integrity is questionable.

(c) Parts are visibly damaged to the extent that dimensional integrity is questionable.

(2) Structural integrity of damaged parts, as identified by visual inspection (i.e., depth of pitting; wall thickness of worn, corroded, or eroded parts, etc.)

d. Engine main shaft seals and bearings will be removed and processed. When the engine has been disassembled to the extent that other seals and bearings have been removed, they must also be processed. All main shaft bearings shall be time coded in accordance with paragraph 2-10 when removed from the engine and prior to processing.

CAUTION

Discard 1-110-710-06 nozzles with Manufacturers Code (CAGE Code) of S0100.

e. All turbine nozzles removed from the engine shall be visually inspected to determine if the nozzles are to be reused in the condition received or routed for repair. Turbine nozzles that meet technical requirements without repair shall be air flowed to determine flow area. Nozzles that require repair must be air flowed after repair is accomplished.

f. Reduction gear assemblies, accessory drive gear box assemblies, oil pumps, accessory drive carrier gear assemblies, overspeed governor and tachometer drive gear box assemblies, and all other "oil wetted" components from engines having experienced oil contamination shall be completely disassembled, hand cleaned, visually inspected, and repaired as found necessary by inspection. New or serviceable bearings and new seals, gaskets, and "O" rings shall be used in reassembly.

g. All engine gears found cracked shall be reported to U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-VS-ECP, Mail Stop 55, 308 Crecy St., Corpus Christi Army Depot, Corpus Christi, TX 78419–5260. and shall be identified as to engine serial number, TSN, TSO and cause for return.

h. Assemblies requiring disassembly to remove finite life items or to accomplish modification to latest configuration or to comply with mandatory inspections or modifications (see tables 3-2 and 3-3) do not require complete disassembly and processing unless complete disassembly is determined to be more cost effective.

i. Guidelines for determining the processing requirements of accessories, components, and/or assemblies are as follows:

NOTE

Assemblies which do not meet the criteria stipulated must be completely disassembled and processed.

(1) Output reduction carrier and gear assembly. Assemblies from engines with less than 1,800 hours, TSN or TSO , do not require disassembly, providing the following requirements are met :

(a) Visually inspect assembly for defects. Any degree of scoring, frosting, light pitting, or spalling and all cracking is not acceptable.

(b) Field-allowed repairs (touchups) shall be acceptable.

(c) Clean the face of the assembly using a cloth dampened in dry cleaning solvent (item 134, table C–1) and flow-check in accordance with the functional test requirements for this assembly. (Refer to paragraphs 5-342 and 5-343.)

(2) Inlet housing and related parts.

(a) There are no time limitations on this assembly.

(b) Remove inlet guide vane assembly to facilitate inspection.

1 Check to ensure that actuator arm is not bent.

2 All nicks, pits, and small isolated dents are acceptable.

3 Slight vane distortion is acceptable if it does not interfere with the full opening and closing of the vanes and does not occur on more than five vanes.

4 Distortion or bowing that results in more than 1/8 inch deflection is not acceptable.

5 Replace vane bushings where radial play indicates excessive wear.

(c) Remove torquemeter valve assembly (paragraphs 5-470), clean as outlined in SP No. 3002 in Appendix E, visually inspect (table 5-189), and pressure-check (except T53-L-701,-701A).

(d) Air Inlet Housing:

1 Inspect external surfaces of housing for corrosion or loss of paint protection. Remove core plugs from anti-icing air passages and use a borescope to inspect for corrosion. Repair corrosion damage or loss of paint protection per paragraph 5-472.

2 Touch up repair areas of erosion as outlined in paragraph 5-473.

3 Inspect as outlined in table 5-189.

(3) Accessory drive carrier assembly and related parts. Assemblies from engines with less than 1,800 hours TSN or TSO, do not require complete disassembly and processing providing the following requirements are met:

(a) Visually inspect gears for cracks, spalling, chipping or other visible gear tooth damage. None is allowed.

(b) Disassemble carrier as necessary to visually verify that bearing outer races are not spinning in the liners. If there are no indications of spinning or any other visible damage, the carrier may be immediately reassembled with existing bearings.

(c) Clean strainer, transfer tubes, and oil passages as outlined in paragraph 5-454.

(4) Accessory drive gearbox and related parts. Assemblies from engines with less than 1,800 hours TSN or TSO do not require disassembly, providing the following requirements are met:

(a) Inspect starter drive spline for corrosion and wear as outlined in SP No. 5013 in Appendix E.

(b) Pressure-check in accordance with paragraph 5-237, steps bf and bg.

(5) Overspeed governor and tachometer drive assembly. Assemblies from engines with less than 1,800 hours TSN or TSO do not require disassembly, providing the following requirements are met:

(a) Inspect input spline and governor drive gear for wear as outlined in SP No. 5013 in Appendix E.

(b) Clean (paragraphs 5-187) and check filter and throttle assemblies (table 5-40) and paragraph 5-190, step e.)

(c) Functional test assembly as outlined in paragraphs 5-194 and 5-195.

(6) Fuel control and related parts. Assemblies shall be routed for functional test in accordance with paragraph 5-160.

(7) Compressor rotor assembly.

(a) Assemblies from engines with less than 1,800 hours TSN or TSO, do not require complete disassembly, providing the following criteria are met:

1 No severe FOD of compressor blades

2 No FOD of rotor drum indicating the possibility of overstress cracking.

3 Bearing journal of forward shaft must meet the visual and dimensional requirements of tables 5-169 and 5-174.

(b) Visually and dimensionally inspect blades. Repair or replace as necessary.

(c) Partially disassemble compressor rotor to allow removal of power shaft. Power shaft must be completely inspected and processed to include removal of internal corrosion.

(d) Threads, seal surfaces, and bearing journals must meet the visual and dimensional requirements of tables 5-169 and 5-174.

(e) Balance compressor rotor in accordance with parargraph 5-443.

(8) Axial compressor housing and related parts.

(a) Remove stator vanes and stainless steel inserts. Clean; visually and dimensionally inspect. Repair as required.

(b) Inspect compressor housing for corrosion, especially in the grooves at stator vane and insert contact surfaces. For minor corrosion, use epoxy (DEVCON F (item 149, table C–1) or equivalent) as touch up. Inspect impeller housing for grooves due to erosion.

(c) Visually inspect housing for cracking, especially at hole adjacent to split line flange.

(d) Test installed inserts for torque requirement per tables 5-153 and 5-154.

(9) Air Diffuser housing.

(a) Visually inspect for cracks and FOD (table 5-142). Repair housing as outlined in paragraph 5-395.

(b) Inspect for erosion on first row vane tips (table 5-145) and repair (paragraph 5-395).

(c) Perform air leakage test as outlined in paragraph 5-396.

(10) First stage gas producer rotor assembly.

(a) Clean with solvent (item 134, table C–1) and visually inspect (tables 5-75 and 5-147), especially blade cooling slot configuration and overall condition.

NOTE

Rotor need not be debladed, except on T53-L-703 blade P/N 1-100-562-06 must be used.

(b) Measure pilot diameter (table 5-76); if minimum dimension exceeds overhaul limits, measure bore diameter (table 5-76). If bore diameter is acceptable, perform Q point inspection (figure 5-197).

(c) Replace retaining ring P/N 1-100-890-03.

NOTE

No individual rotor check balancing is permitted because the integrity of a balanced set would be invalidated. If a rotor must be balanced as a result of a repair, then the mate must be removed to comply with rotor set balancing requirements. Only rotor sets shall be check balanced.

(d) Check balance in accordance with paragraph 5-317 and 5-318.

(11) Second stage gas producer rotor assembly.

(a) Clean with solvent (item 134, table C–1) and visually inspect (table 5-70).

NOTE

Rotor deblading is not required.

(b) Measure pilot diameter (figure 5-141); if minimum dimension exceeds overhaul limits, measure bore diameter (figure 5-141). If bore diameter is acceptable, perform Q point inspection (paragraph 5-250).

NOTE

No individual rotor check balancing is permitted because the integrity of a balanced set would be invalidated. If a rotor must be balanced as a result of a repair, then the mate must be removed to comply with rotor set balancing requirements. Only rotor sets shall be check balanced.

(c) Check balance in accordance with paragraph 5-316.

(12) Second stage power turbine rotor assembly.

(a) Clean assembly as outlined in paragraph 5-311 and inspect (table 5-97).

NOTE

Rotor deblading is not required.

(b) Measure pilot diameter (table 5-98); if minimum dimension exceeds overhaul limits, measure bore diameter (table 5-85). If bore diameter is acceptable, perform Q point inspection (figure 5-180).

NOTE

No individual rotor check balancing is permitted because the integrity of a balanced set would be invalidated. If a rotor must be balanced as a result of a repair, then the mate must be removed to comply with rotor set balancing requirements. Only rotor sets shall be check balanced.

(c) Check balance in accordance with paragraph 5-316.

(13) First stage power turbine rotor assembly.

(a) Clean assembly (paragraph 5-271) and inspect (paragraph 5-272).

NOTE

Rotor deblading is not required.

(b) Measure pilot diameter (table 5-83); if minimum dimension exceeds overhaul limits, measure bore diameter. If bore diameter is acceptable, perform Q point inspection (figure 5-197).

NOTE

No individual rotor check balancing is permitted because the integrity of a balanced set would be invalidated. If a rotor must be balanced as a result of a repair, then the mate must be removed to comply with rotor set balancing requirements. Only rotor sets shall be check balanced.

(c) Check balance in accordance with paragraphs 5-279 and 5-312.

(14) All accessories not specifically covered above shall be visually inspected and functionally tested as outlined in Chapter 5.

3-23. GENERAL INSTRUCTIONS ON USE OF TORQUE WRENCHES. Torque wrenches shall be used for tightening parts to a specific torque value. The manufacturer's instructions on the care of torque wrenches shall be observed.

3-24. TORQUE WRENCH CALIBRATION. Torque wrenches must be calibrated frequently by using weights and a measured lever arm. Inaccurate readings may occur because of abuse or constant use. Do not check one wrench against another.

3-25. RECOMMENDED TORQUE WRENCH SIZES. Table 3-4 lists the recommended torque wrench sizes.

Table 3-4. Recommended Torque Wrench Sizes.

REQUIRED TORQUE	TORQUE WRENCH
0 to 25 lb-inches (0 - 28.8 kg cm)	30 lb-inches (34.6 kg cm)
25 to 140 lb-inches (28.8 - 161.3 kg cm)	150 lb-inches (172.8 kg cm)
140 to 550 lb-inches (161.3 - 633.7 kg cm)	600 lb-inches (691.3 kg cm)
30 to 140 lb-feet (4.1 - 19.4 kg m)	150 lb-feet (20.7 kg m)
140 to 240 lb-feet (19.4 - 33.2 kg m)	250 lb-feet (34.6 kg m)
240 to 1000 lb-feet (33.2 - 138.3 kg m)	1000 lb-feet (138.3 kg m)

3-26. TORQUE WRENCH EXTENSIONS AND ADAPTERS. Extensions or adapters may be used with any torque wrench. Because extensions or adapters change the length of the torque arm for which the scale is calibrated, torque applied at the end of the extension or adapter is not correctly indicated on the scale and must be calculated. When using extensions or adapters, apply the manual torque at the calculated arm length, which is the center of the handle. When substituting values in formulas, use inch units to get an answer in pound-inches, and foot units to get an answer in pound-feet. The centerline of the wrench and the wrench extension or adapter shall align as shown in figure 3-4. To determine the indicated torque, using extensions or adapters, use the formula shown in figure 3-4.

3-27. PROCEDURE FOR APPLYING TORQUE. Clean parts to be tightened in dry cleaning solvent (item 133, table C–1). Unless instructed otherwise, do not lubricate parts. Torque should be applied slowly and evenly until the specified torque value is reached, and then held at this value until the nut, bolt, or screw has stopped turning.

a. When applying torques, proceed in steps of gradually increasing tension. Tighten the bolts, screws, or nuts in a staggered sequence until the part is firmly seated; then apply a gradual increase in torque on each part until the specified torque value is reached.

b. When lockwiring holes are to be aligned, the following torque procedure is recommended:

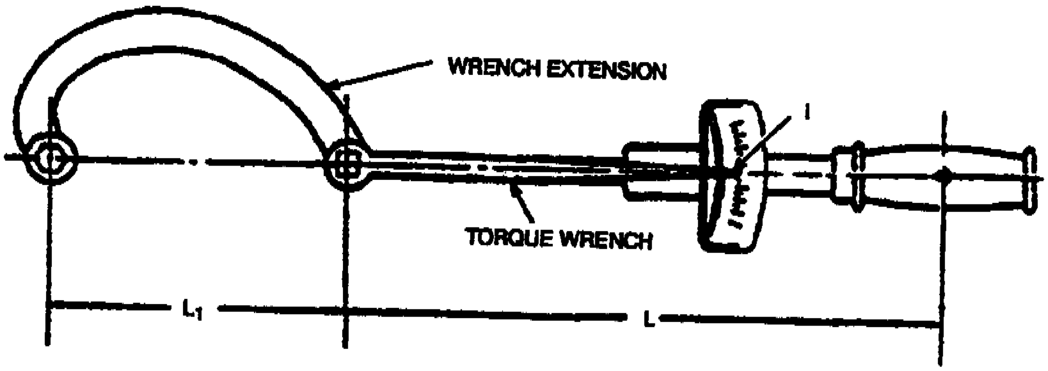
(1) First tighten nut or bolt to minimum torque value.

(2) If lockwiring holes do not align, continue to tighten the part until holes do align, but do not exceed maximum torque value specified for the operation.

(3) If holes still do not align, select another nut or bolt and retighten to the recommended torque value.

(4) For locking parts other than pins, a selection of parts may be necessary to obtain proper locking position in the specific torque range.

3-28. STANDARD TORQUE VALUES. Standard torque values for general application are listed in table 3-5. Standard torque values for stepped and straight studs are shown in figure 3-5.



$$I = \frac{RL}{L+L_1}$$

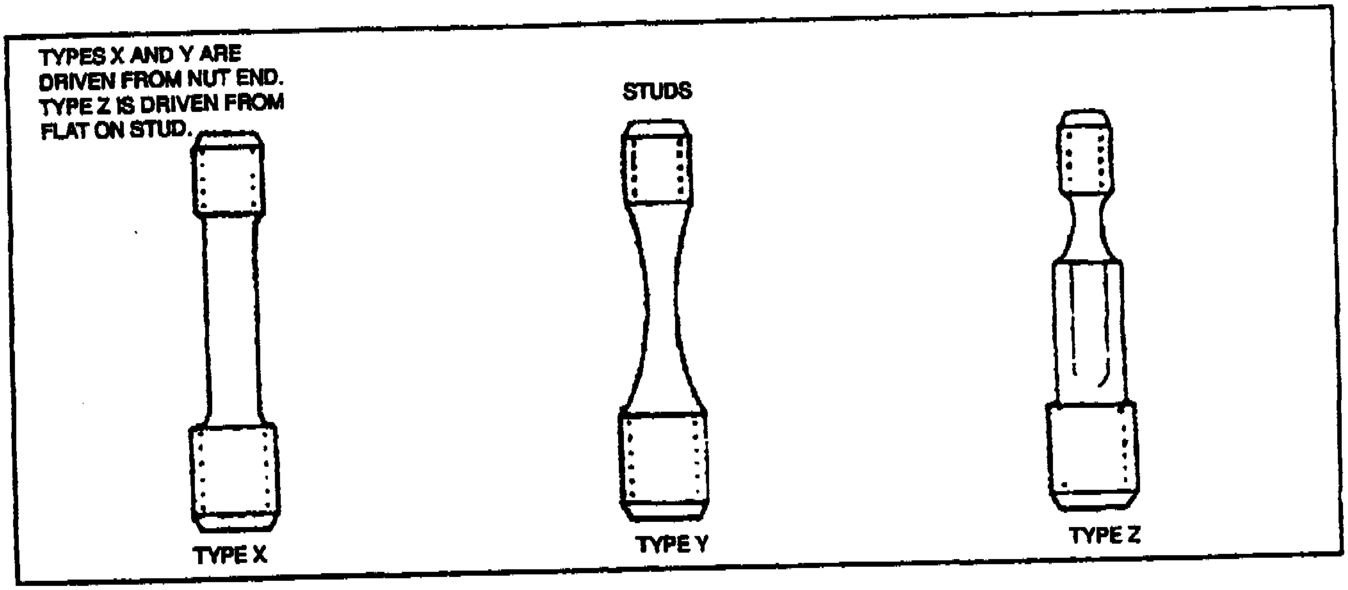
I = Indicated torque on wrench.

R = Required torque of bolt or nut.

L = Length of torque wrench (wrench head to midpoint of handle) in inches.

L_1 = Length of extension or adapter (center to center distance) in inches.

Figure 3-4. Application of Torque Wrench Extension Formula.



STEPPED STUD TORQUE VALUES
(POUND-INCHES)

THREAD SIZE NUT END	STUD END	TYPE X	TYPE Y	TYPE Z
10-32	1/4-20	20 to 50	50 to 75	50 to 165
1/4-28	5/16-18	50 to 110	100 to 160	100 to 350
5/16-21	3/8-16	100 to 240	175 to 325	175 to 600
3/8-21	7/16-14	175 to 475	250 to 525	250 to 1000
7/16-20	1/2-13	250 to 725	400 to 850	400 to 1500
1/2-20	9/16-12	400 to 1150	600 to 1150	600 to 2100
9/16-18	5/8-11	600 to 1650	900 to 1700	900 to 3100
5/8-18	11/16-11	900 to 2400		

STEPPED STUD TORQUE VALUES
(POUND-INCHES)

THREAD SIZE NUT END	STUD END	TYPE X	TYPE Y	TYPE Z
4-48	4-40	3 to 7		
6-40	6-32	8 to 14	50 to 95	50 to 105
8-36	8-32	18 to 25	100 to 225	100 to 250
10-32	10-24	25 to 35	175 to 375	175 to 400
1/4-28	1/4-20	50 to 95	250 to 400	250 to 700
5/16-24	5/16-18	100 to 225	400 to 700	400 to 110
3/8-24	3/8-16	175 to 375	500 to 1050	600 to 1600
7/16-20	7/16-14	250 to 650	700 to 1400	900 to 2200
1/2-20	1/2-13	400 to 1000		
9/16-18	9/16-12	600 to 1450		
5/8-18	5/8-11	900 to 2000		

Figure 3-5. Stepped and Straight Stud Torque Values.

Table 3-5. Standard Torque Value.

Standard Steel Screws, Bolts, and Nuts (Pound-Inches)		
Thread Size	Slotted-Head Screws	Hexagon-Head Bolts and Nuts
2-56	2-3	-
3-48	3-4	-
4-40	5-6	-
5-40	6-7	-
6-32	7-9	-
8-32	10-12	-
10-32	18-20	40-45
7/32-24	22-25	65-70
1/4-28	30-35	70-95
5/16-24	40-45	120-165
3/8-24	55-60	250-325
7/16-20	80-90	400-475
1/2-20 or -13	100-110	500-700
9/16-18	-	750-1000
5/8-18	-	1000-1400

Steel Taper Pipe-Thread Fittings and Plugs (Pound-Inches)		
Size	In Steel Case	In Magnesium or AluminumCase
1/16-27	35-40	10-15
1/8-27	75-125	30-40
1/4-18	200-250	70-85
3/8-18	300-375	95-110
1/2-14	400-500	140-160
3/4-14	500-600	175-200
1-1/2-11	600-700	230-260

Tube and Hose End Fittings ('B' Nuts)							
		Flared Tubing Nuts				Hose End Fittings	
Dash No. Ref.	Tubing OD Inches	Aluminum Alloy Tubing		Steel Tubing		Steel	
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
-3	3/16	-	-	90	100	70	100
-4	1/4	40	65	135	150	70	120
-5	5/16	60	80	180	200	85	180
-6	3/8	75	125	270	300	100	250
-8	1/2	150	250	450	500	210	420
-10	5/8	200	350	650	700	300	480
-12	3/4	300	500	800	1000	500	850
-16	1	500	700	1200	1400	700	1150
-20	1-1/4	600	900	-	-	-	-
-24	1-1/4	600	900	-	-	-	-

Table 3-5. Standard Torque Value (Continued).

Jamb Nuts For Bulkhead Fittings		
Tubing Outside Diameter	Thread Size	Torque (Pound-Inches)
1/8	5/16-24	35-50
3/16	3/8-24	65-80
1/4	7/16-20	85-105
5/16	1/2-20	105-125
3/8	9/16-18	120-150
1/2	3/4-16	240-280
5/8	7/8-14	320-380
3/4	1-1/16-12	500-600
1	1-5/16-12	780-880
1-1/8	1-5/8-12	960-1200
1-1/2	1-7/8-12	1200-1440
Jamb Nuts, Bolts, and Fittings Used With Gaskets (Pound-Inches)		
Tubing Outside Diameter	Thread Size	Nuts (MS9099, MS9100, MS9200, MS9201) Plug (MS9015) Union (AN815) Bolt-Universal (Banjo) Fitting (AN774 and AN775)
1/8	5/16-24	45-50
3/16	3/8-24	60-70
1/4	7/16-20	90-100
5/16	1/2-10	120-130
3/8	9/16-18	150-160
1/2	3/4-16	275-300
5/8	7/8-14	375-400
3/4	1-1/16-12	550-600
1	1-5/16-12	800-900
1-1/8	1-5/8-12	900-1000
1-1/2	1-7/8-12	900-1000

3-29. LUBRICATION. Lubricate parts during reassembly as required, using lubricants specified in this Work Requirement. Unless otherwise specified by the detailed requirements, lubricate components as indicated below:

a. Lubricate packings, gaskets, bearings, and seals which may come in contact with engine oil, with shortening compound (item 270, table C–1) to facilitate installation. When shortening compound is unavailable, castor oil is an acceptable substitute.

WARNING

Prolonged contact with lubricating oil (item 189 or 190, table C–1) may cause a skin rash. Those areas of skin and clothing that come in contact with lubricating oil should be thoroughly washed. The 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

To prevent damage to lip seals during dry-running periods or initial starts, dip all lip seals in lubricating oil (item 189 or 190, table C–1) before installation.

CAUTION

Lubricating oil (item 189 or 190, table C–1) may soften paint upon contact. If lubricating oil is spilled on painted surfaces, these surfaces should be thoroughly washed.

b. Lubricate packings used in the fuel system with petrolatum (item 197, table C–1) to facilitate installation.

c. Lubricate packings used in the pneumatic system with grease (item 166, table C–1) to facilitate installation.

3-30. PRESSURE READING PROCEDURE. A pressure reading may be taken by either of the following methods:

a. Locate a pressure gage directly at the inlet port of the item being flow-checked (engine part, subassembly, or assembly) or on the fixture being used. Obtain a pressure reading directly from this gage, which shall correspond to the pressure value given in the applicable paragraph for the item being flow-checked.

b. As an alternate to preceding step a, a pressure reading may be taken directly at the flow bench. A pressure drop existing between the flow bench pressure gage and the inlet port of the engine part, subassembly, assembly, or fixture shall be compensated for as follows:

(1) Assemble all hardware (hoses, fittings, and fixtures) required to perform a test.

(2) Flow oil only through the assembled hardware until the midpoints of the temperature and flow rate ranges given in the applicable paragraph for the item being tested have been reached.

(3) Record the pressure shown in the flow bench pressure gage.

(4) Add the pressure reading recorded in preceding step (3) to the pressure value given in the applicable paragraph for the item being tested to determine the compensating pressure to be used for the test.

CHAPTER 4
REMOVAL OF MAJOR ASSEMBLIES

SECTION I. GENERAL

4-1. **GENERAL.** This chapter contains instructions for complete dismantling of the engine into its major assemblies.

4-2. **PRECAUTIONS.** Care must be exercised to prevent the entrance of dirt and other foreign materials into the engine and components. Whenever practicable, temporary covers should be used to seal all openings in the dismantled engine. Index and tag location of all parts to be disconnected or removed from engine so that parts can be properly reinstalled; this is especially important when rotating parts are concerned. When removing or installing oil, fuel, and air hose assemblies, do not apply torque to narrow hex nut of sleeve or nipple. Torque must be applied only to wide hex nut. When loosening or tightening the wide hex nut, secure nipple or sleeve to prevent twisting of hose assembly. (See figure 4-1.) To assist in removal of hot-end parts, apply penetrating oil (item 191, table C–1), as required.

4-3. **MARKING OF MATERIALS SUBJECT TO HIGH TEMPERATURE.** (Refer to paragraph 3-6.)

SECTION II. LUBRICATION AND FUEL HOSE ASSEMBLIES

4-4. **GENERAL.** Prior to commencement of disassembly, drain engine oil (refer to paragraph 3-12).

4-5. **REMOVAL OF OIL SCAVENGE HOSE ASSEMBLIES.** Proceed as follows:

a. On T53-L-15,-701,-701A engines, remove oil scavenge hose assemblies as follows:

(1) Remove screw (15, figure 4-2) from clamp (14). Remove nut (2) and screw (10).

(2) Remove screw (13) and nut (11) from clamp (12).

NOTE

Cap all hoses and openings.

(3) Disconnect hose assembly (8) from connector at bottom of combustor turbine assembly, and from union (7) on accessory drive gearbox assembly, and remove hose assembly.

(4) Disconnect hose assembly (3) from diffuser housing assembly, and from union (4) on accessory drive gearbox assembly. Remove hose assembly.

(5) Remove unions (4 and 7) and packings (5 and 6) from accessory drive gearbox assembly. Remove packings from unions.

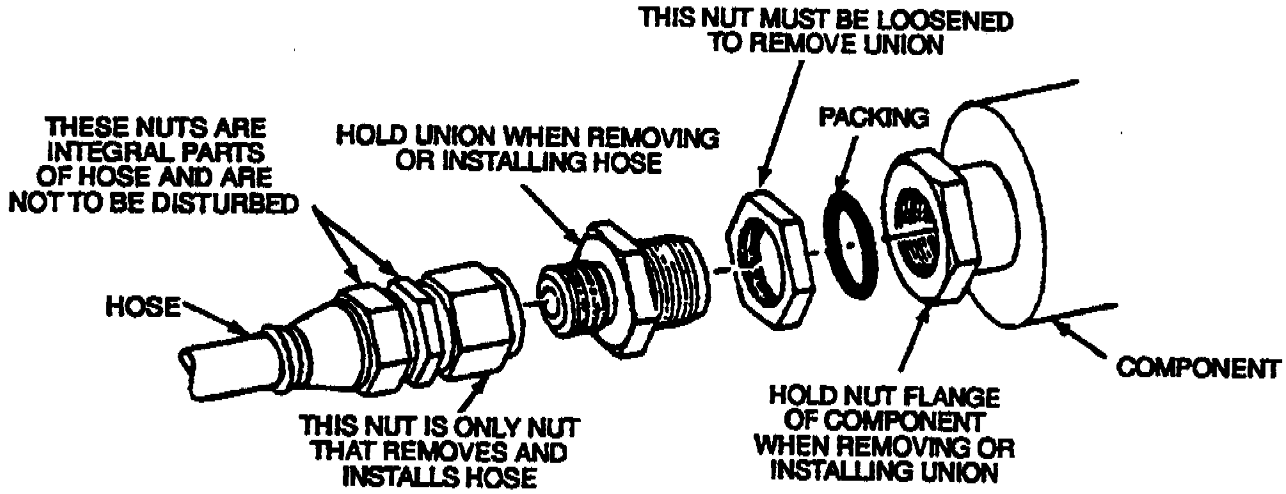
b. On T53-L-13B, -703 engines, remove oil scavenge hose assemblies as follows:

(1) Remove screw (14, figure 4-3) from clamp (13). Remove nut (10) and screw (12) from clamp (11). Remove nut (7) and screw (9) from clamp (8).

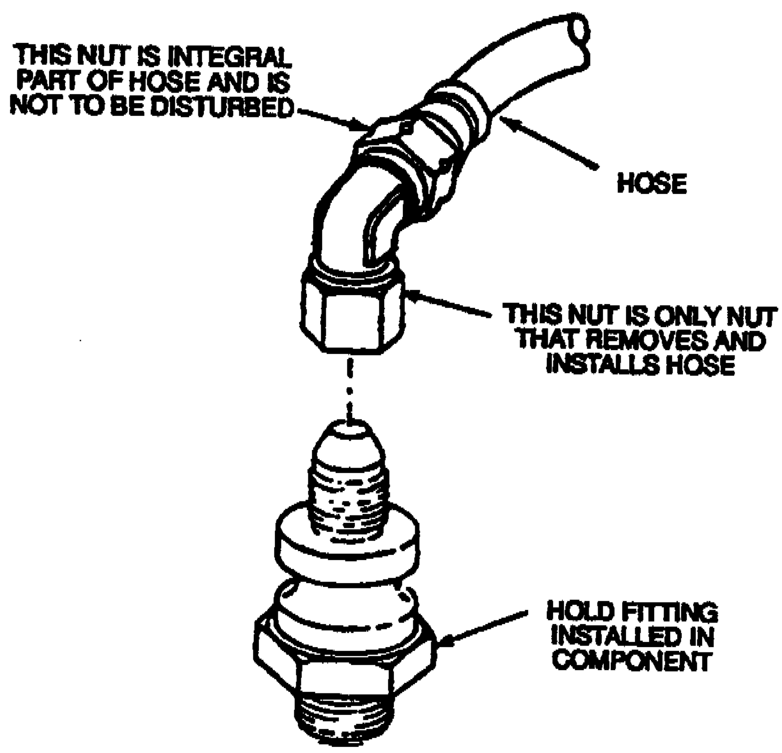
(2) Disconnect hose assembly (6) from connector at bottom of combustor turbine assembly, and from union (5) on accessory drive gearbox assembly. Remove hose assembly.

(3) Disconnect hose assembly (1) from diffuser housing assembly and from union (2) on accessory drive gearbox assembly. Remove hose assembly.

(4) Remove unions (2 and 5) and packings (3 and 4) from accessory drive gearbox assembly. Remove packings from unions.



WHEN FITTING IS NOT AN INTEGRAL PART OF HOSE



WHEN ELBOW IS AN INTEGRAL PART OF HOSE

Figure 4-1. Proper Removal and/or Installation of Hoses (Typical) (Sheet 1 of 2).

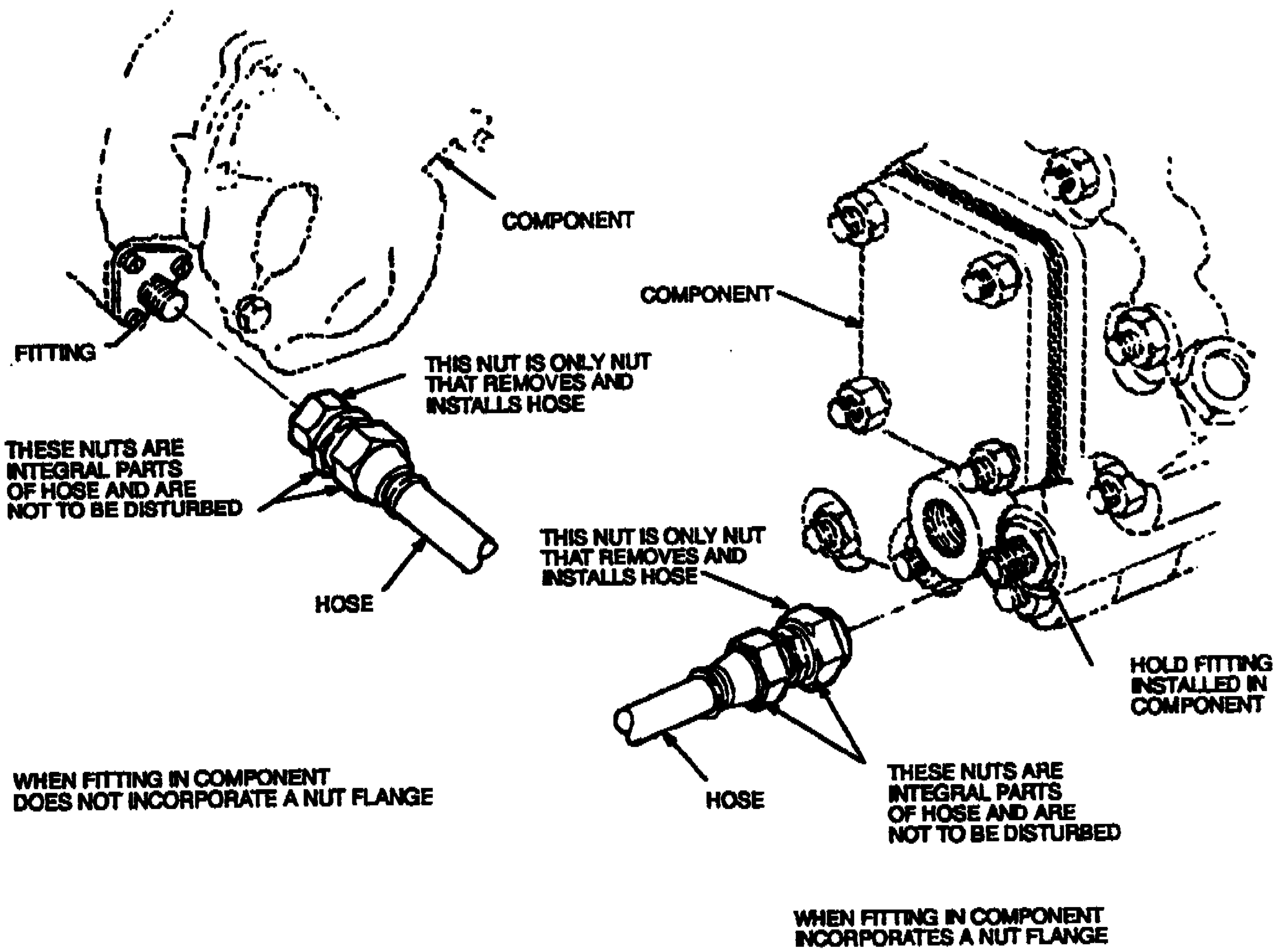


Figure 4-1. Proper Removal and/or Installation of Hoses (Typical) (Sheet 2 of 2).

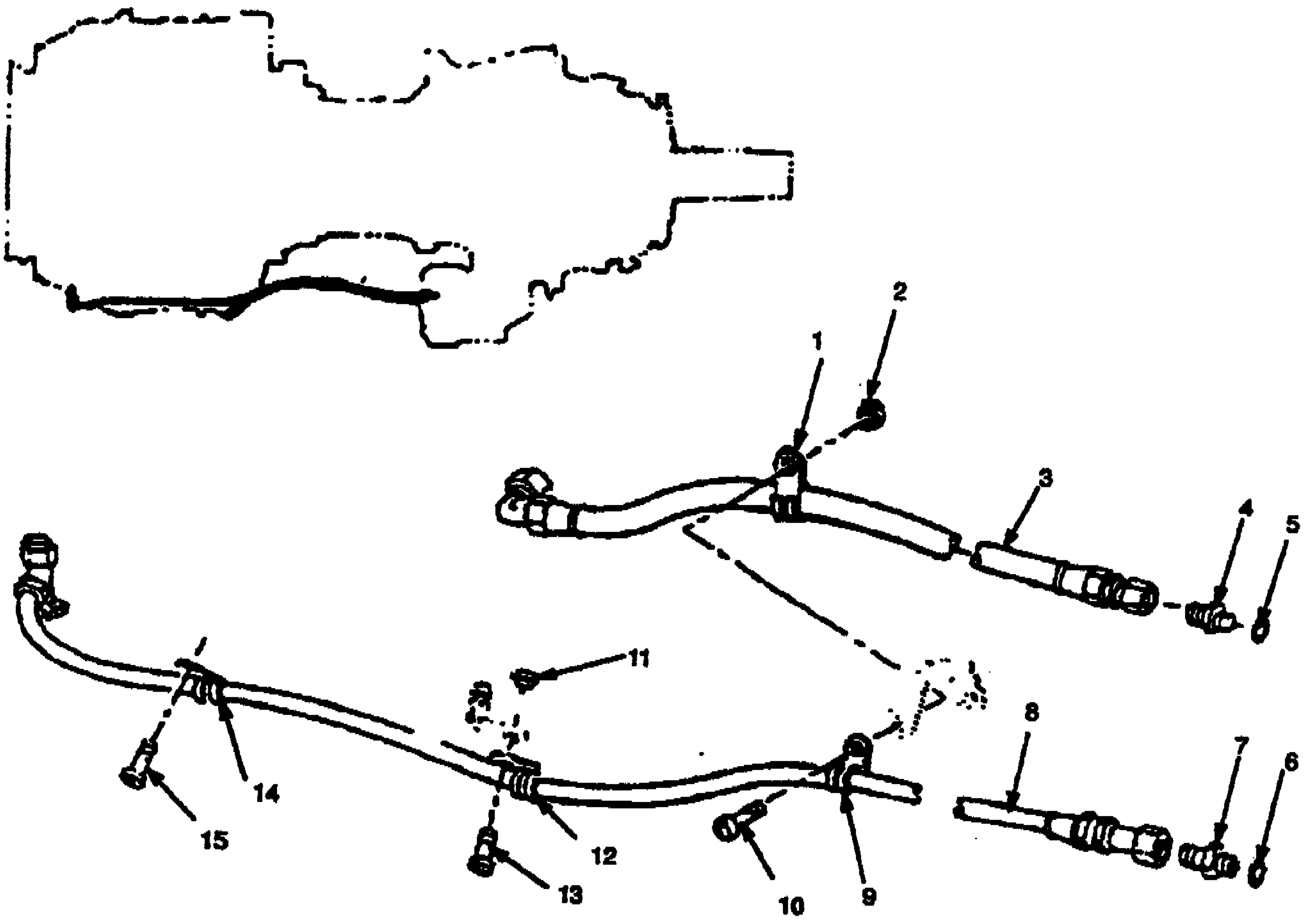


Figure 4-2. Oil Scavenge Hose Assemblies and Attaching Parts (T53-L-15, -701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-2	No Number	LUBRICATION PRESSURE MANIFOLD AND HOSE ASSEMBLIES (NHA 1-170-330-06 AND 1-170-330-09)	Ref	C,D,E
-1	8016510	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-09)	AR	C,D,E
-2	MS21042-3	. NUT, Self-locking	2	C,D,E
-3	96062	. HOSE ASSEMBLY, Low pressure (78570) (Lycoming Source Cont Dwg 1-300-377-01)	1	C,D,E
	R26285	. HOSE ASSEMBLY, Low pressure (50599) (Lycoming Source Cont Dwg 1-300-377-02)	1	C,D,E
	AE702601-2	. HOSE ASSEMBLY, Low pressure (00624) (Lycoming Source Cont Dwg 1-300-377-03)	1	C,D,E
-4	1-110-217-01	. UNION	1	C,D,E
-5	NAS617-8	. PACKING	1	C,D,E
-6	M83248/1-904	. PACKING	1	C,D,E
-7	MS24392J4	. UNION	1	C,D,E
-8	95738	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-134-01)	1	C,D,E
	AE700958-1	. HOSE ASSEMBLY, Nonmetallic (00624) (Lycoming Source Cont Dwg 1-300-134-02)	1	C,D,E
	R25709	. HOSE ASSEMBLY, Nonmetallic (50599) (Lycoming Source Cont Dwg 1-300-134-03)	1	C,D,E
-9	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-134-04)	3	C,D,E
-10	AN501-10-8	. SCREW, Machine	2	C,D,E
-11	MS21042-3	. NUT, Self-locking	2	C,D,E
-12	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	3	C,D,E
-13	AN501-10-8	. SCREW, Machine	2	C,D,E
-14	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	3	C,D,E
-15	AN501A10-4	. Screw, Machine	1	C,D,E

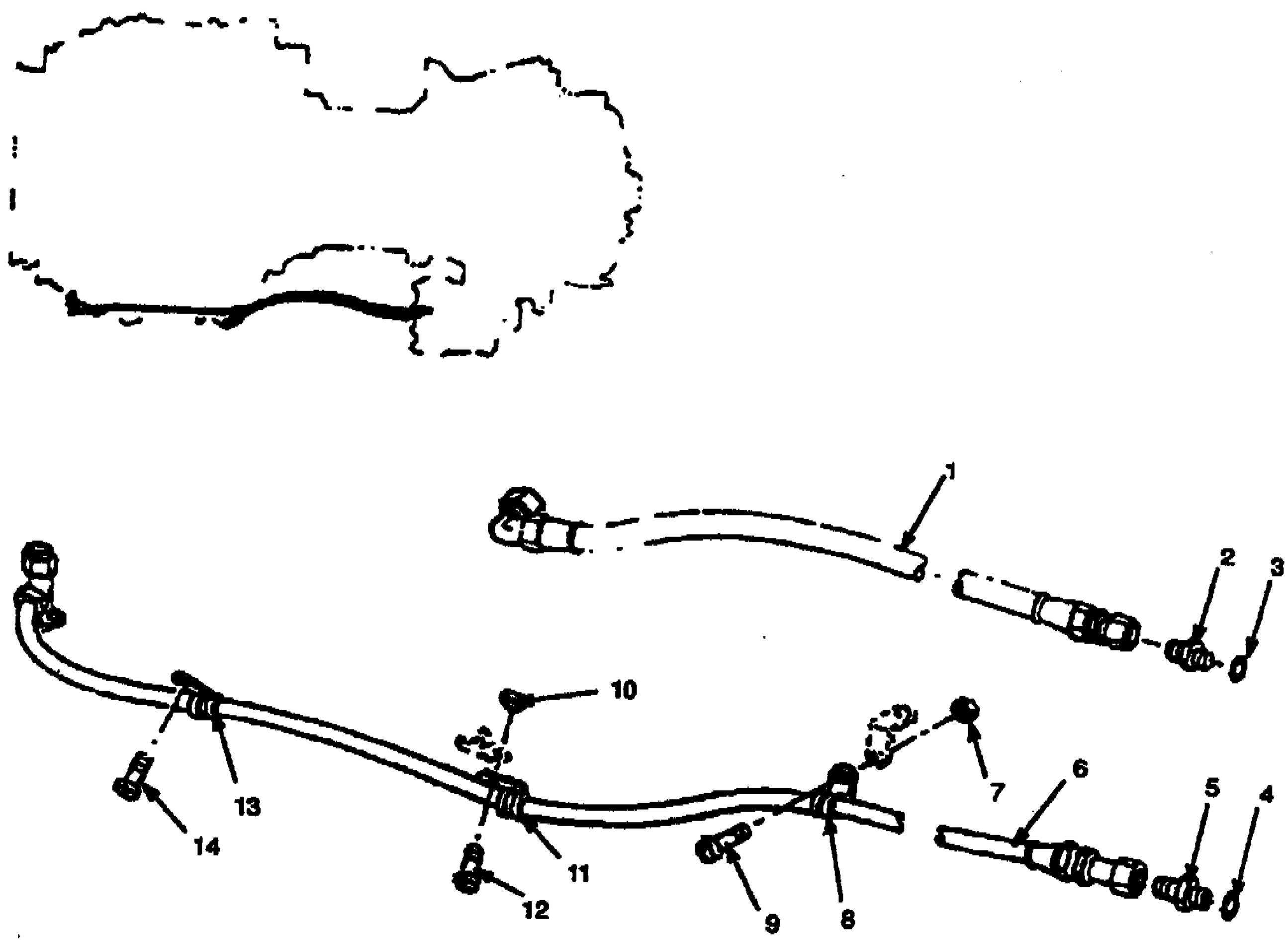


Figure 4-3. Oil Scavenge Hose Assemblies and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-3	No Number	LUBRICATION HOSES AND TUBING (NHA 1-170-330-13 and 1-170-330-21)	Ref	A,B
-1	660529-1	. HOSE ASSEMBLY, Nonmetallic (00624) (Lycoming Source Cont Dwg 1-300-227-01) (Replace with 96062)	1	A
	94073	. HOSE ASSEMBLY, Nonmetallic (78570) (Alternate) (Lycoming Source Cont Dwg 1-300-227-02) (Replace with 96062)	1	A,B
	TF60	. HOSE ASSEMBLY, Nonmetallic (70510) (Alternate) (Lycoming Source Cont Dwg 1-300-227-03) (Replace with 96062)	1	A,B
	R25129	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-227-04) (Replace with 96062)	1	A,B
	96062	. HOSE ASSEMBLY, Low pressure (78570) (Lycoming Source Cont Dwg 1-300-337-01)	1	A,B
	R26285	. HOSE ASSEMBLY, Low pressure (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-377-02)	1	A,B
-2	AN815-6D	. UNION (Replace with 1-110-217-01)	1	A
	1-110-217-01	. UNION	1	A,B
-3	NAS617-6	. PACKING (Replace with NAS617-8)	1	A
	NAS617-8	. PACKING	1	A,B
-4	NAS617-4	. PACKING (Replace with M83248/1-904)	1	A,B
	M83248/1-904	. PACKING	1	A,B
-5	AN815-4D	. UNION (Replace with MS24392J4)	1	A,B
	MS24392J4	. TUBE, Nipple	1	A,B
-6	95738	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-134-01)	1	A,B
	AE700958-1	. HOSE ASSEMBLY, Nonmetallic (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-134-02)	1	A,B
	R25709	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-134-03)	1	A,B
-7	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	2	A,B
	MS21042-3	. NUT, Self-locking	2	A,B
-8	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	3	A,B
-9	AN501-10-8	. SCREW, Machine	2	A,B
-10	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	2	A,B
	MS21042-3	. NUT, Self-locking	2	A,B
-11	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	3	A,B
-12	AN501-10-8	. SCREW, Machine	2	A,B
-13	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	3	A,B
-14	AN501A10-4	. SCREW, Machine	1	A,B

4-6. REMOVAL OF AIR INLET GUIDE VANE ACTUATOR HOSE ASSEMBLIES (T53-L-15,-701,-701A). Proceed as follows:

a. Remove nuts (4 and 5, figure 4-4) and screws (7 and 8) that secure clamps (6 and 9) to brackets on accessory drive gearbox assembly.

b. Disconnect hose assembly (3) from union (2) and accessory drive gearbox assembly. Remove hose assembly. Cap open port in accessory drive gearbox assembly.

c. Remove union (2) with packing (1) from air inlet guide vane actuator assembly. Remove packing from reducer. Plug open port in actuator assembly. Discard packing.

d. Remove screw (13) and nut (19) that secure clamp (14) to L-bracket located on interstage bleed actuator assembly.

e. Remove screw (16) and nut (23) that secure clamps (15 and 22) to U-bracket located on interstage bleed actuator assembly.

f. Remove screw (17) and nut (25) that secure clamps (18 and 24).

g. Before removal, tag hose assemblies (12 and 26) to facilitate installation to proper port connections.

h. Disconnect hose assembly (12) from unions (11 and 20) and hose assembly (26) from elbow (29) and union (27). Remove hose assemblies.

i. Remove union (11) and elbow (29) with packings (10 and 31) from air inlet guide vane actuator assembly. Remove packings from union and elbow. Plug open ports. Discard packings.

j. Remove unions (20 and 27) with packings (21 and 28) from fuel control. Remove packings from unions. Plug open ports. Discard packings.

4-7. REMOVAL OF AIR INLET GUIDE VANE ACTUATOR HOSE ASSEMBLIES (T53-L-13B, -703). Proceed as follows:

a. Remove nuts (4 and 5, figure 4-5) and screws (6 and 8) that secure clamps (7 and 9) to brackets (24) on accessory drive gearbox assembly.

b. Disconnect hose assembly (3) from union (2) and accessory drive gearbox assembly. Remove hose assembly. Cap open port on accessory drive gearbox assembly.

c. Remove union (2) with packing (1) from air inlet guide vane actuator assembly. Remove packing from reducer. Plug open port in actuator assembly. Discard packing.

d. Remove nut (20) and screw (15) that secure clamps (14 and 19) to bracket on aft side of lower compressor housing half.

e. Before removal, tag hose assemblies (16 and 23) to facilitate installation to proper port connections.

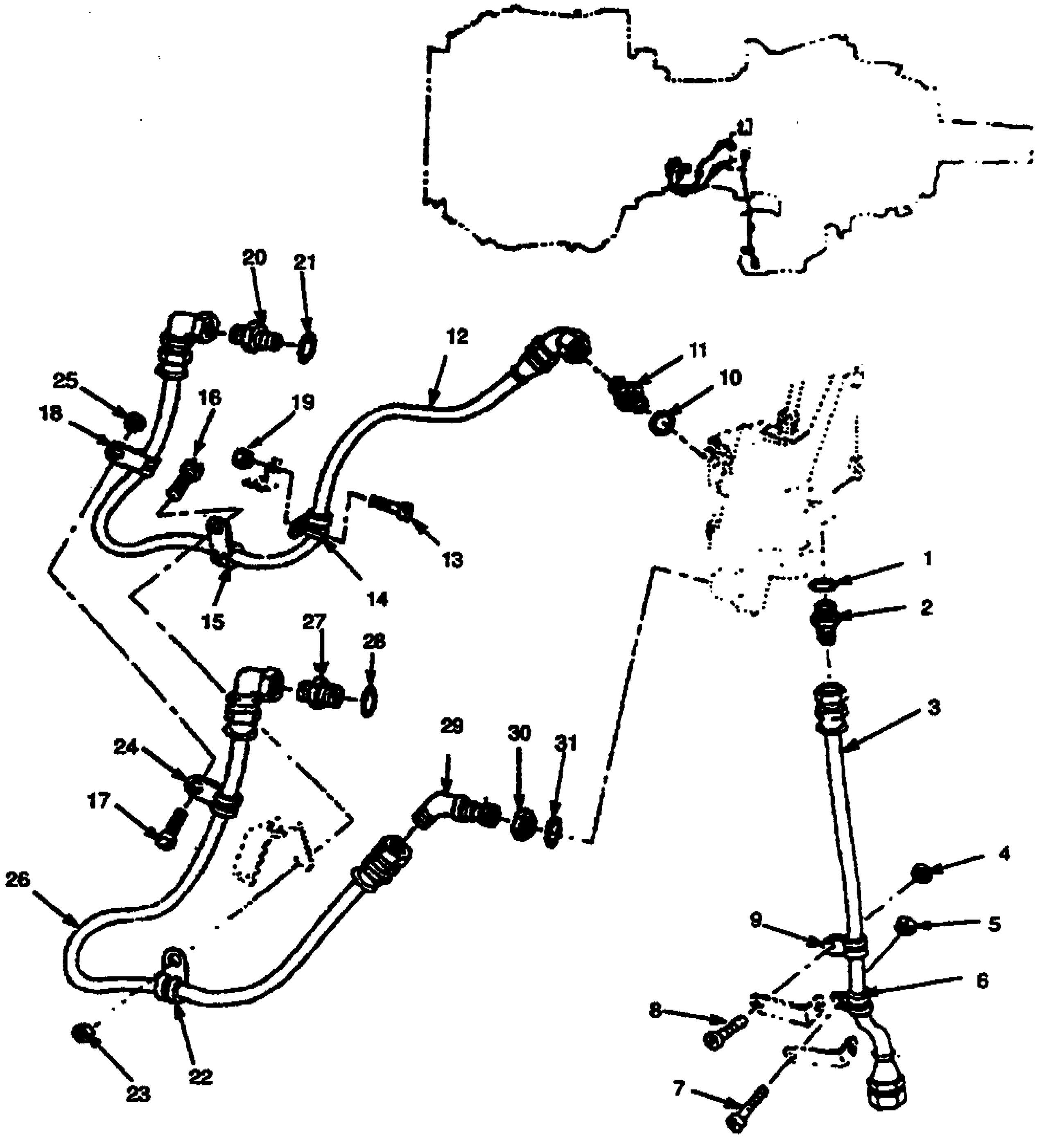


Figure 4-4. Air Inlet Guide Vane Actuator Hose Assemblies and Attaching Parts (T53-L-15, -701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-4	No Number	HOSE ASSEMBLY INLET GUIDE VANE (NHA 1-170-330-06 and 1-170-330-09)	Ref	C,D,E
-1	M83248/1-904	. PACKING, Fuel resistant	1	C,D,E
-2	MS24399D3	. UNION, Flared Tube	1	C
	AN919-2D	. UNION, Flared Tube	1	D,E
-3	95747	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-144-01)	1	C,D,E
	M666000-21	. HOSE ASSEMBLY, Nonmetallic (70128) (Alternate) (Lycoming Source Cont Dwg 1-300-144-02)	1	C,D,E
	R25743	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-144-03)	1	C,D,E
-4	MS21042-3	. NUT, Self-locking	1	C,D,E
-5	MS21042-3	. NUT, Self-locking	1	C,D,E
-6	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	C,D,E
-7	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D,E
-8	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D,E
-9	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	C,D,E
-10	M83248/1-904	. PACKING, Fuel resistant	1	C,D,E
-11	MS24392J4	. UNION, Flared tube	1	C,D,E
-12	96024	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-374-01)	1	C,D,E
	M666303-35	. HOSE ASSEMBLY, Nonmetallic (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-374-02)	1	C,D,E
	R26265	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-374-03)	1	C,D,E
-13	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D,E
-14	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	C,D,E
-15	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	C,D,E
-16	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D,E
-17	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D
-18	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	C,D,E
-19	MS21042-3	. NUT, Self-locking	1	C,D,E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-4-20	MS24392J4	. UNION, Flared Tube	1	C,D,E
-21	M83248/1-904	. PACKING, Fuel Resistant	1	C,D,E
-22	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	C,D,E
-23	MS21042-3	. NUT, Self-locking	1	C,D,E
-24	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	C,D,E
-25	MS21042-3	. NUT, Self-locking	1	C,D,E
-26	96025	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-375-01)	1	C,D,E
	M666301-63	. HOSE ASSEMBLY, Nonmetallic (Alternate) (Lycoming Source Cont Dwg 1-300-375-02)	1	C,D,E
	R26235	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-375-03)	1	C,D,E
-27	MS24392J4	. UNION, Flared Tube	1	C,D,E
-28	M83248/1-904	. PACKING, Fuel resistant	1	C,D,E
-29	AN837-4D	. ELBOW	1	C,D,E
-30	AN924-4D	. NUT	1	C,D,E
-31	STD3017E4	. PACKING	1	C,D,E

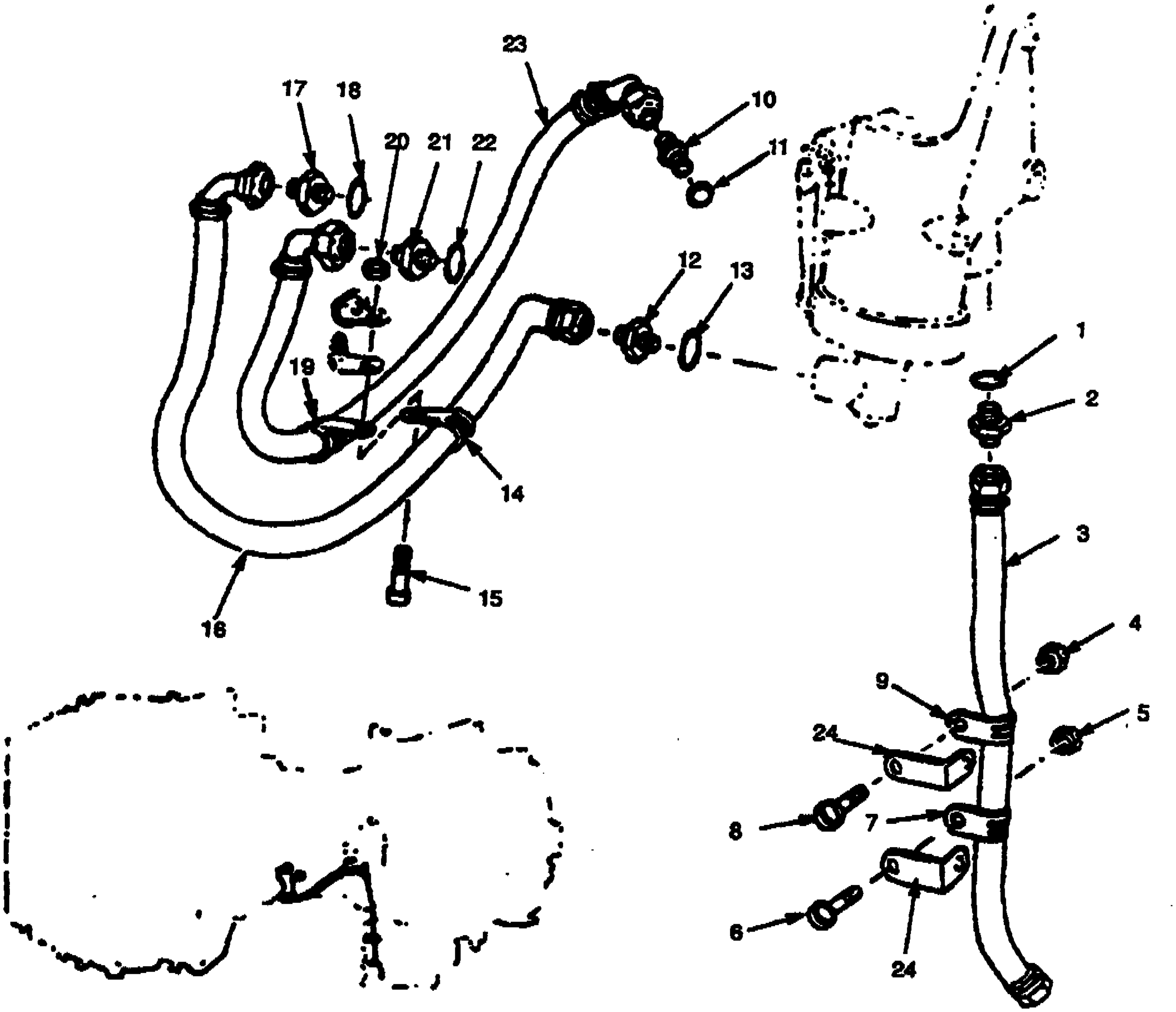


Figure 4-5. Inlet Guide Vane Actuator Hose Assemblies and Attaching Parts (T53-L-13B, -703).

f. Disconnect hose assembly (16) from unions (12 and 17) and hose assembly (23) from unions (10 and 21). Remove hose assemblies.

g. Remove unions (10 and 12) with packings (11 and 13) from air inlet guide vane actuator assembly.Remove packings from unions. Plug open ports. Discard packings.

h. Remove unions (17 and 21) with packings (18 and 22) from fuel control. Remove packings from unions. Plug open ports. Discard packings.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-5	No Number	INLET GUIDE VANE ACTUATOR HOSE ASSEMBLIES (NHA 1-170-330-13 and 1-170-330-21)	Ref	A,B
-1	M83248/1-904	. PACKING, Fuel resistant (Alternate) (Lycoming Source Cont Dwg 1-300-234-02)	1	A,B
-2	MS24399D3	. UNION, Flared Tube	1	A,B
-3	95717	. HOSE ASSEMBLY, Nonmetallic (78570) (Alternate) (Lycoming Source Cont Dwg 1-300-144-01)	1	A,B
	MS666000-21	. HOSE ASSEMBLY, Nonmetallic (70128) (Alternate) (Lycoming Source Cont Dwg 1-300-144-02)	1	A,B
	R25743	. HOSE ASSEMBLY, Nonmetallic (50599) (Lycoming Source Cont Dwg 1-300-144-03)	1	A,B
-4	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-5	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-6	AN501-10-8	. SCREW, Machine	1	A,B
-7	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg1-300-271-03)	1	A,B
-8	AN501-10-8	. SCREW Machine	1	A,B
-9	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	A,B
-10	AN815-4D	. UNION, Flared Tube (Replace with MS24392J4)	1	A,B
	MS24392J4	. TUBE, Nipple	1	A,B
-11	MS29512-04	. PACKING, Fuel resistant (Replace with M83248/1-109)	1	A,B
	M83248/1-904	. PACKING	1	A,B
-12	AN815-4D	. UNION, Flared Tube (Replace with MS24392J4)	1	A,B
	MS24392J4	. TUBE, Nipple	1	A,B
-13	MS29512-04	. PACKING, Fuel resistant (Replace with M83248/1-904)	1	A,B
	M83248/1-904	. PACKING	1	A,B
-14	8016S6	. CLAMP, Loop (72285) (Lycoming Spec Dwg 1-300-271-05)	1	A,B
-15	AN501-10-8	. SCREW, Machine	1	A,B
-16	95741	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-137-01)	1	A,B
	M666303-31	. HOSE ASSEMBLY, Nonmetallic (70128) (Alternate) (Lycoming Source Cont Dwg 1-300-137-02)	1	A,B
	BR25737	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-137-03)	1	A,B
-17	AN815-4D	. UNION, Flared Tube (Replace with MS24392J4)	1	A,B
	MS24392J4	. TUBE, Nipple	1	A,B

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-5-18	MS29512-04	. PACKING, Fuel resistant (Replace with M83248/1-904)	1	A,B
	M83248/1-904	. PACKING	1	A,B
-19	8016S6	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-05)	1	A,B
-20	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	Ref	A,B
	MS21042-3	. NUT, Self-locking	Ref	A,B
-21	AN815-4D	. UNION, Flared Tube (Replace with MS24392J4)	1	A,B
	MS24392J4	. TUBE, Nipple	1	A,B
-22	MS29512-04	. PACKING, Fuel resistant (Replace with M83248/1-904)	1	A,B
	M83248/1-904	. PACKING	1	A,B
-23	95740	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-136-01)	1	A,B
	M666303-26	. HOSE ASSEMBLY, Nonmetallic (70128) (Alternate) (Lycoming Source Cont Dwg 1-300-137-02)	1	A,B
	BR25736	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-136-03)	1	A,B
-24	1-160-625-0 1	. BRACKET	2	A,B

4-8. REMOVAL OF INTERSTAGE BLEED ACTUATOR HOSE ASSEMBLIES. Proceed as follows:

a. Rotate engine to a vertical position.

b. Remove screw (8, figure 4-6) that secures clamp (9) to actuator housing assembly.

c. Disconnect base assembly (1) from diffuser housing and interstage bleed actuator assembly and remove hose assembly. Cap all open ports. Remove tee tube (17), washer (15), and nut (16) on T53-L-15/701/701A or fluid bolt (12), washers (10) and multiple fluid connector (11) on T53-L-13B/703 from air diffuser housing.

d. Remove screw (7) and nut (6) that secure clamp (5) to bracket on bottom rear flange of compressor housing.

e. Disconnect hose assembly (4) from fuel control and interstage bleed actuator assembly, and remove hose assembly. Cap all open ports.

f. Remove union (3) and packing (2) from actuator assembly. Discard packings.

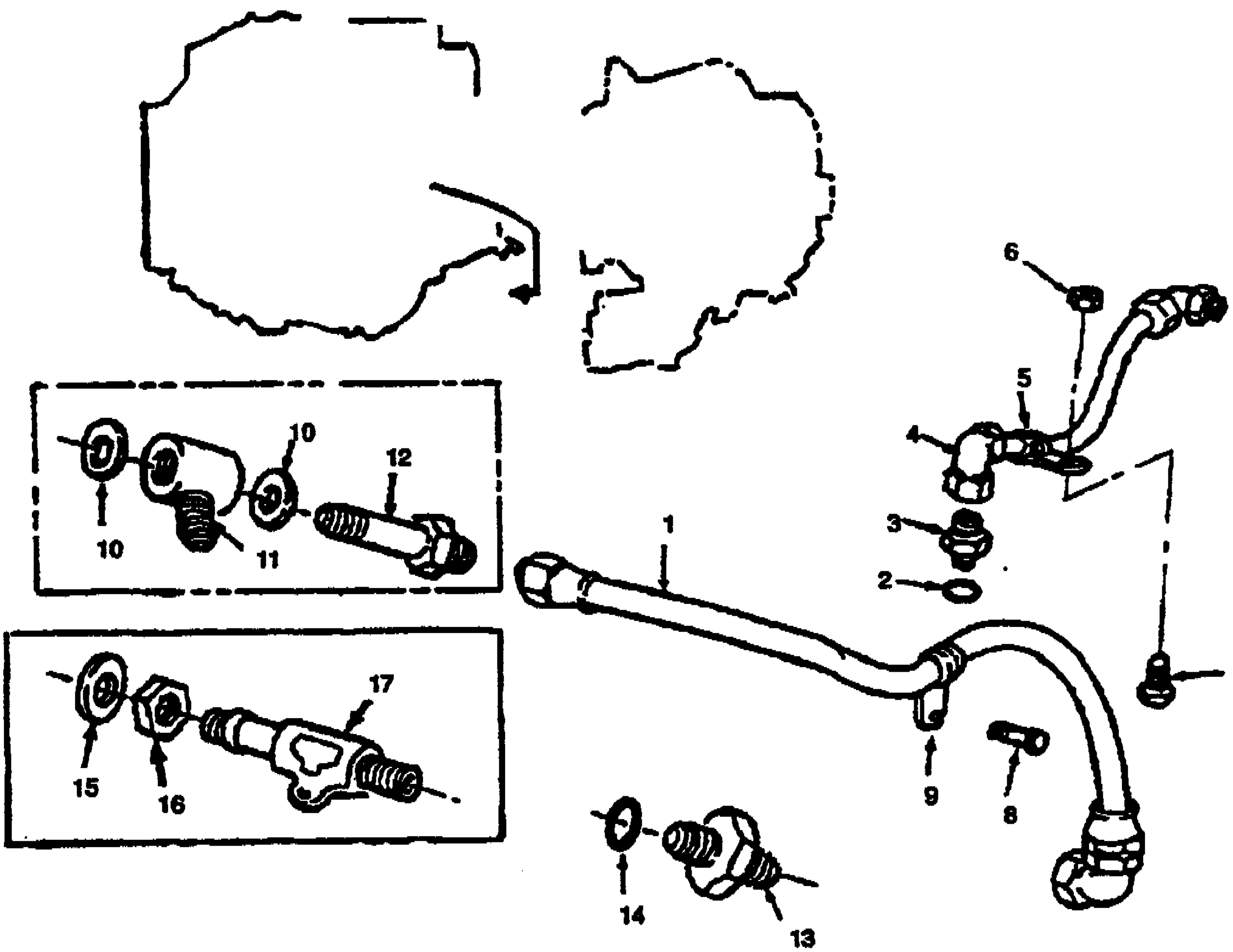


Figure 4-6. Interstage Bleed Actuator Hose Assemblies and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-6	No Number	INTERSTAGE BLEED ACTUATOR HOSES (NHA 1-170-330-06,1-170-330-09, 1-170-330-13 and 1-170-330-21)	Ref	A,B,C,D
-1	666301-11	. HOSE ASSEMBLY, Nonmetallic (70128) (Lycoming Source Cont Dwg 1-300-202-02)	1	
	94679	. HOSE ASSEMBLY, Nonmetallic (78570) (Alternate) (Lycoming Source Cont Dwg 1-300-202-03)	1	
	TF182	. HOSE ASSEMBLY, Nonmetallic (70510) (Alternate) (Lycoming Source Cont Dwg 1-300-202-04)	1	
	R25124	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-202-05)	1	A,C
-2	STD3017E4	. PACKING (Replace with M83248/1-904)	1	
	M83248/1-904	. PACKING	1	A,B
-3	AN815-4D	. UNION (Replace with MS24392J14)	1	
	MS24392J4	. TUBE, Nipple	1	
-4	95742	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-138-01)	1	
	M666304-35	. HOSE ASSEMBLY, Nonmetallic (70128) (Alternate) (Lycoming Source Cont Dwg 1-300-138-02)	1	
	R25738	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-138-03)	1	
-5	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	
-6	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A
	MS21042-3	. NUT, Self-locking	1	
-7	AN501-10-8	. SCREW, Machine	1	A,C
	MS35266-63	. SCREW, Machine	1	D
-8	AN501A10-5	. SCREW, Machine	1	A,C
	MS35266-61	. SCREW, Machine	1	D
-9	801657	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	1	
-10	AN901-6A	. WASHER	2	A,B
-11	AN776-6	. CONNECTOR Multiple Fluid	1	A,B
-12	AN774-6	. BOLT, Fluid	1	A,B
-13	MS24392-6	. NIPPLE	1	C,D,E
-14	M83248-1-906	. PACKING	1	C,D,E
-15	MS28773-06	. WASHER	1	C,D,E
-16	AN6289D6	. NUT	1	C,D,E
-17	MS24388-D6	. TEE-TUBE	1	C,D,E

4-9. REMOVAL OF INTERSTAGE BLEED ACTUATOR ASSEMBLY AND BLEED BAND. Proceed as follows:

a. Remove two bolts (8 or 11, figure 4-7) and two washers (9) or (12) that secure interstage bleed actuator assembly (14).

b. Pull actuator assembly (14) away from compressor housing to expose connections between rod end (1) and upper band (2), and piston (10) and lower band (5).

c. Support actuator assembly and remove two pins (7) that secure actuator assembly to bands. Remove actuator.

NOTE

Step d should be completed after paragraphs 4-30 or 4-31.

d. Hold screw (6) and remove nut (4) and washer (3) that secure bands (2 and 5) together. Remove screw (6). Slide bands through clips attached to compressor housing and remove bands.

4-10. REMOVAL OF LUBRICATION PRESSURE MANIFOLD AND HOSE ASSEMBLIES (T53-L-13B, -703). Proceed as follows:

a. Remove screws (2, 4, and 6, figure 4-8) from clamps (3, 5, and 7). Remove screw (8) and nut (10) from clamp (9).

b. Disconnect hose assembly (1) from oil strainer housing adapter on top of combustion chamber assembly and from lubrication pressure manifold (21). Remove hose assembly.

c. Disconnect hose assembly (20) from No. 2 bearing oil pressure fitting on diffuser housing assembly and from lubrication pressure manifold (21). Remove hose assembly.

d. Remove screw (17) and nut (11) from clamp (12).

e. Disconnect hose assembly (13) from adapter (14) and lubrication pressure manifold (21). Remove hose assembly.

f. Remove connector (16), packings (15), and adapter (14) from inlet housing. Discard packing.

g. Remove bolts (18 and 19) that secure lubrication pressure manifold (21) to engine. Remove manifold.

4-11. REMOVAL OF LUBRICATION PRESSURE MANIFOLD AND HOSE ASSEMBLIES (T53-L-15, -701, -701A). Proceed as follows:

a. Remove screws (2 and 4, figure 4-9) from clamps (3 and 5). Remove screw (6) and nut (8) from clamp (7).

b. Disconnect hose assembly (1) from oil strainer housing adapter on top of combustion chamber assembly and from lubrication pressure manifold (19). Remove hose assembly.

c. Disconnect hose assembly (18) from No. 2 bearing oil pressure fitting on diffuser housing assembly and from lubrication pressure manifold (19). Remove assembly.

d. Remove screw (15) and nut (9) from clamp (10).

e. Disconnect hose assembly (11) from adapter (12) and lubrication pressure manifold (19). Remove hose assembly.

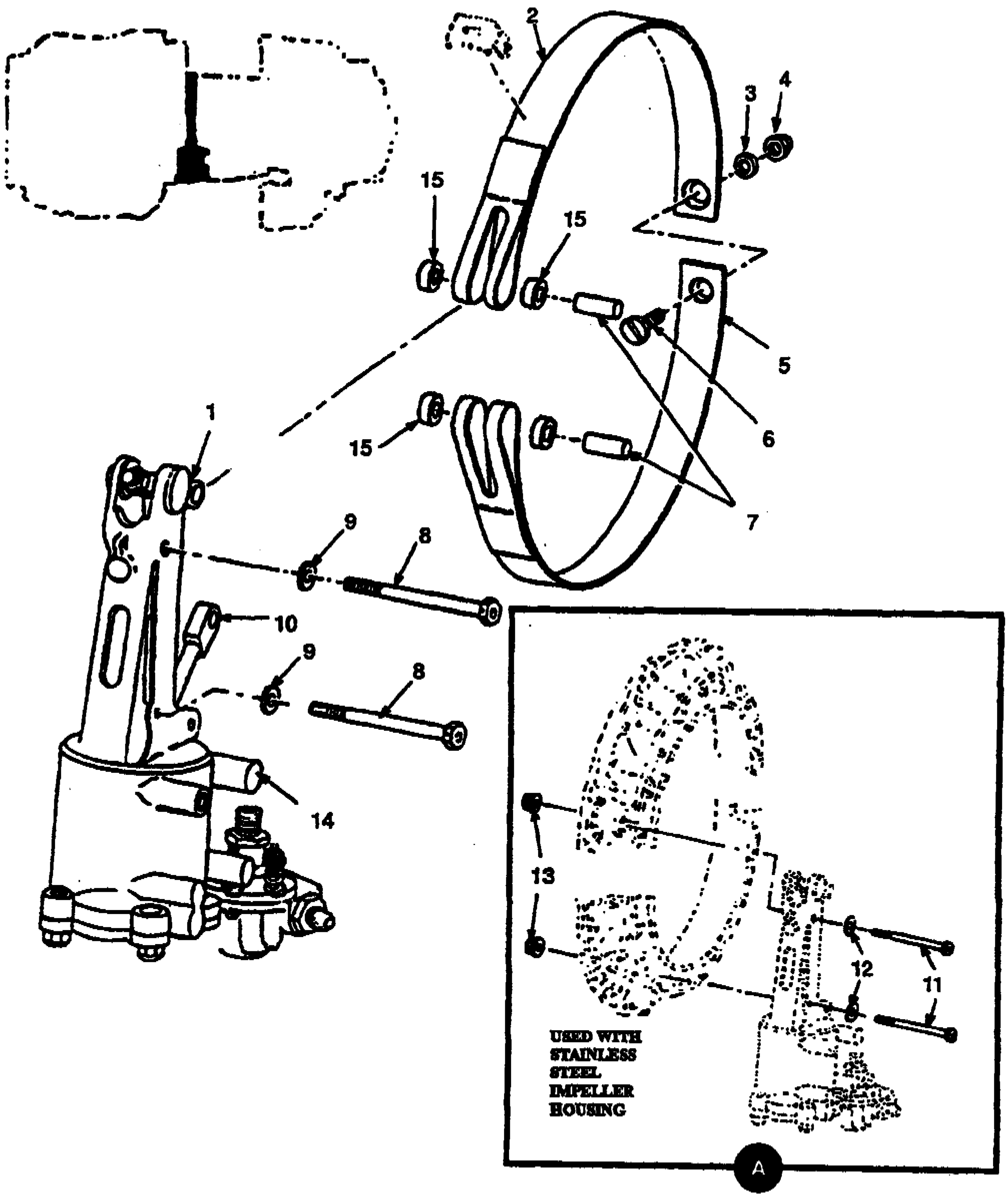


Figure 4-7. Interstage Bleed Actuator Assembly, Bleed Band and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-7	No Number	INTERSTAGE BLEED ACTUATOR (NHA 1-170-330-06,1-170-330-09, 1-170-330-13, and 1-170-330-21)	Ref	
-1	1-160-272-01	. NUT	2	
	1-160-920-01	. SCREW	1	
	1-160-254-01	. PIN	1	
	1-160-820-04	. BAND ASSEMBLY	1	
-2	1-160- 244-01	. . BAND Compressor	1	
-3	MS21042-5	. . NUT, Self-locking	1	
-4	AN960-516	. . WASHER, Flat	1	
-5	1-160-245-01	. . BAND, Compressor	1	
-6	1-160-265-01	. . SCREW, Machine	1	
-7	MS9390-57	. PIN	2	
-8	AN104026	. BOLT ASSEMBLY	2	A,C,D ,E
-9	AN960-416L	. WASHER, Flat	2	A,C,D ,E
-10	1-160-920-01	. SCREW ASSEMBLY	1	
-11	MS9944-27	. BOLT, Machine	2	
-12	AN960-616L	. WASHER, Flat	2	
-13	STD3064-6	. NUT	2	
-14	1-170-050-09	. ACTUATOR	1	A,C,D ,E
	1-170-050-12	. ACTUATOR	1	
-15	1-160-343-01	. BEARING, SLEEVE	4	

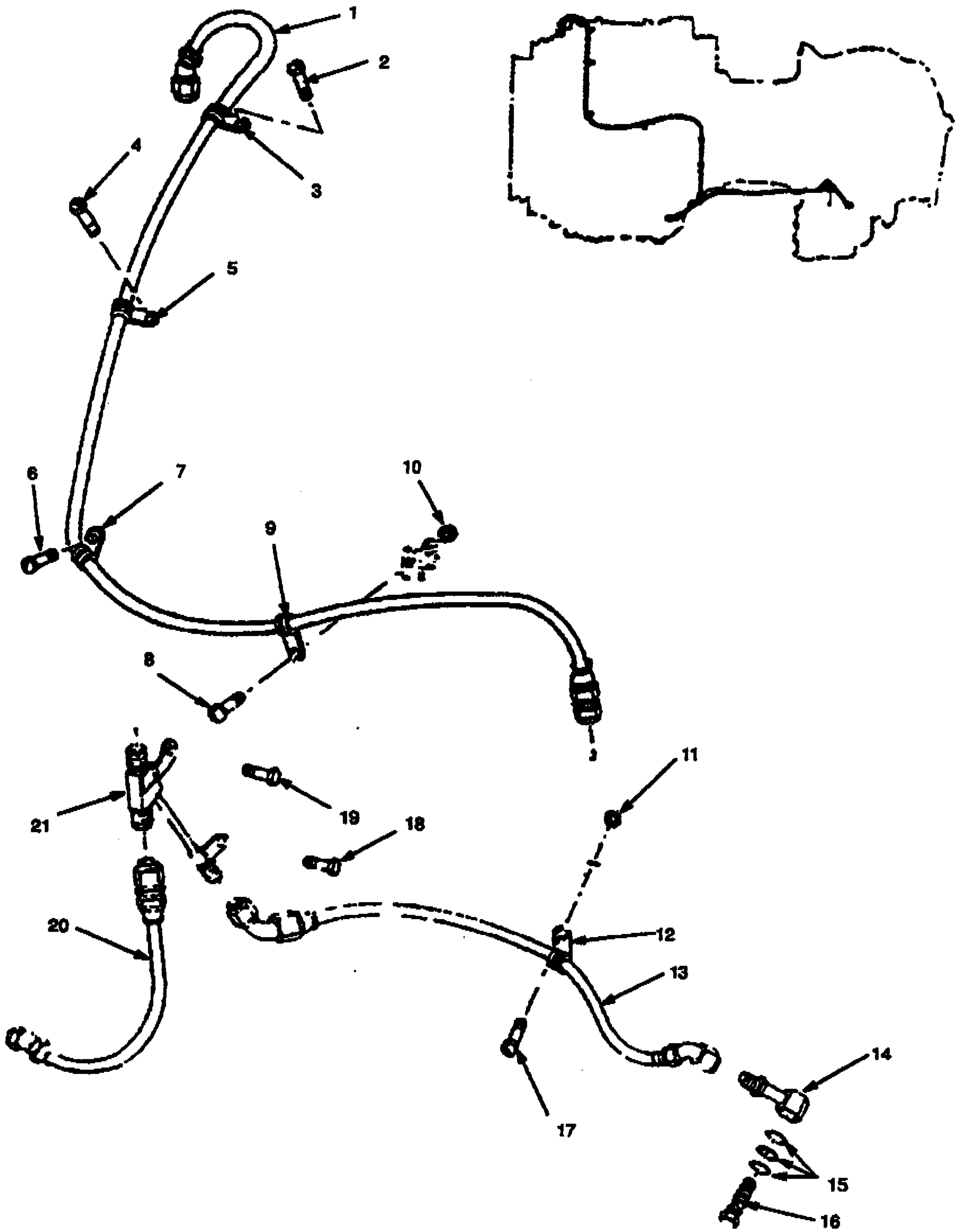


Figure 4-8. Lubrication Pressure Manifold, Hose Assemblies and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-8	No Number	LUBRICATION HOSE and TURBINE (NHA 1-170-330-13 and 1-170-330-21)	Ref	A,B
-1	95713	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-121-01)	1	A,B
	M666302-1	. HOSE ASSEMBLY, Nonmetallic (70128) (Alternate) (Lycoming Source Cont Dwg 1-300-121-02)	1	A,B
	R25734	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-121-03)	1	A,B
-2	AN501A10-4	. SCREW, Machine	1	A,B
-3	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	A,B
-4	AN501A10-4	. SCREW, Machine	1	A,B
-5	8016S5	. CLAMP Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	A,B
-6	AN501A10-4	. SCREW, Machine	1	A,B
-7	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	A,B
-8	AN501-10-8	. SCREW, Machine	1	A,B
-9	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	A,B
-10	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-11	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-12	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	A,B
-13	666304-23	. HOSE ASSEMBLY, Nonmetallic (00624) (Lycoming Source Cont Dwg 1-300-225-01)	1	A,B
	94543	. HOSE ASSEMBLY, Nonmetallic (78570) (Alternate) (Lycoming Source Cont Dwg 1-300-225-02)	1	A,B
	TF191	. HOSE ASSEMBLY, Nonmetallic (78510) (Alternate) (Lycoming Source Cont Dwg 1-300-225-03)	1	A,B
	R25156	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-225-04)	1	A,B
-14	1-160-560-01	. ADAPTER, Oil line, inlet housing	1	A,B
-15	NAS617-5	. PACKING	3	A,B
-16	1-160-469-01	. CONNECTOR, Oil line	1	A,B
-17	AN501-10-8	. SCREW, Machine	1	A,B
-18	AN103809	. BOLT, Drilled hex head	1	A,B
-19	MS9530-13	. BOLT, Drilled hex head	1	A,B

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-8-20	M666300-9	. HOSE ASSEMBLY, Nonmetallic (70128) (Lycoming Source Cont Dwg 1-300-054-01)	1	A,B
	94819	. HOSE ASSEMBLY, Nonmetallic (78570) (Alternate) (Lycoming Source Cont Dwg 1-300-054-02)	1	A,B
	TE246	. HOSE ASSEMBLY, Nonmetallic (70510) (Alternate) (Lycoming Source Cont Dwg 1-300-054-03)	1	A,B
	R25120	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-054-04)	1	A,B
-21	1-170-410-02	. MANIFOLD, Lubrication Pressure	1	A,B

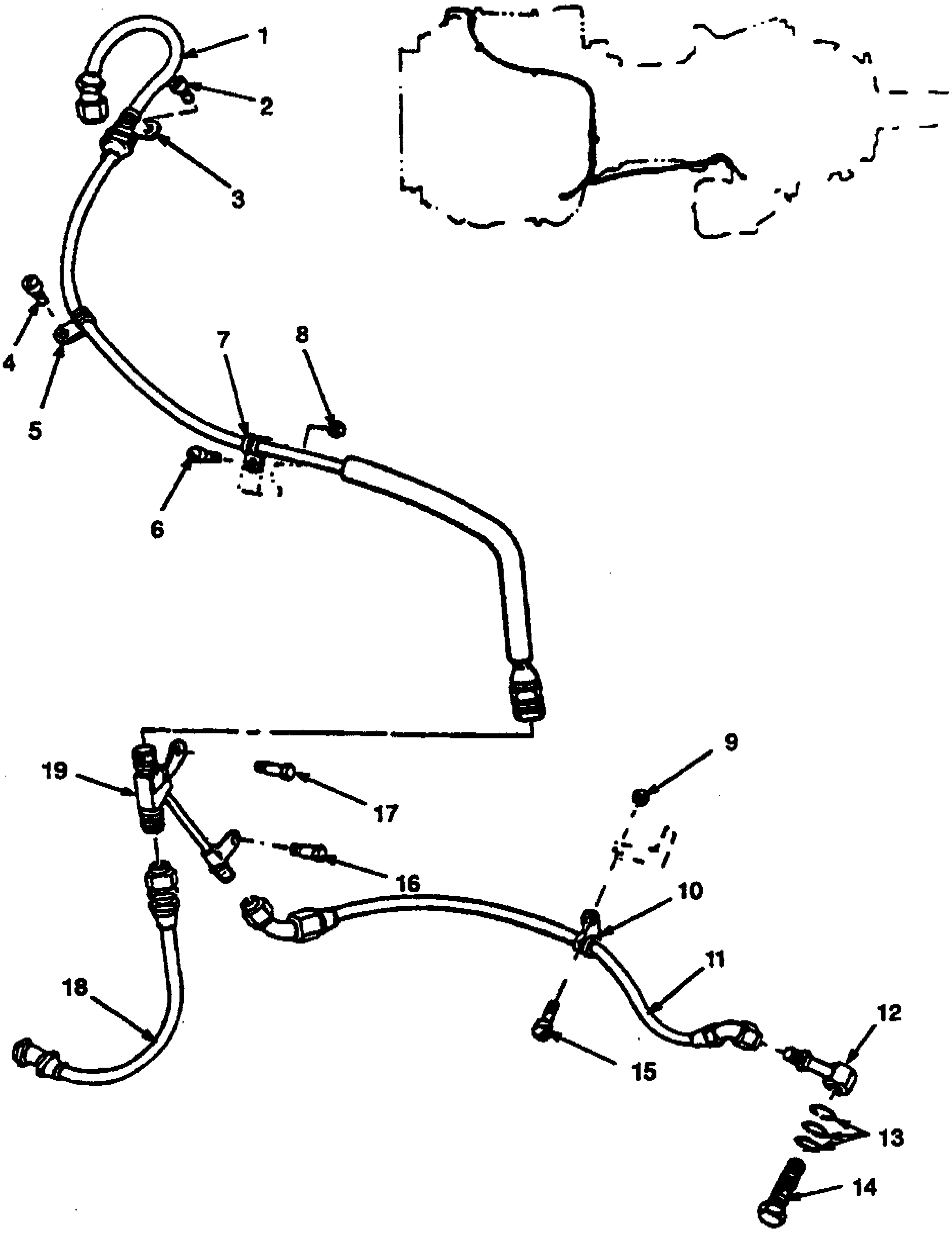


Figure 4-9. Lubrication Pressure Manifold, Hose Assemblies and Attaching Parts (T53-L-15, -701, -701A) (Sheet 1 of 2).

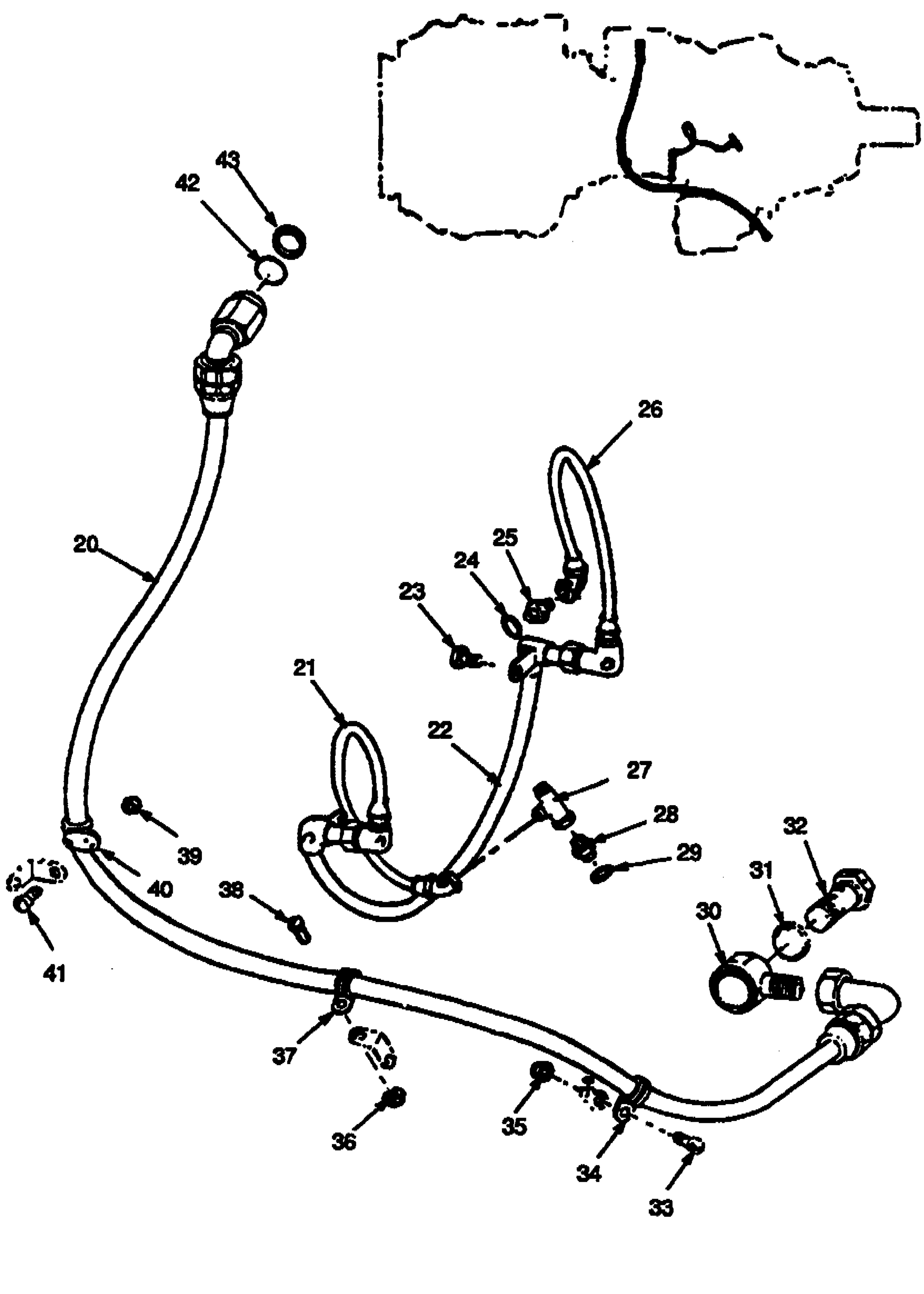


Figure 4-9. Lubrication Pressure Manifold, Hose Assemblies and Attaching Parts (T53-L-15, -701, -701A) (Sheet 2 of 2).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-9	No Number	LUBRICATION PRESSURE MANIFOLD AND HOSE ASSEMBLIES (NHA 1-170-330-06 and 1-170-330-09)	Ref	C,D
-1	95950	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-164-01)	1	C,D,E
	AE702314-1	. HOSE ASSEMBLY, Nonmetallic (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-164-02)	1	C,D,E
	R11838	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-164-03)	1	C,D,E
-2	AN501A10-4	. SCREW, Machine	1	C
	MS35266-59	. SCREW, Machine	1	D,E
-3	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	3	C,D,E
-4	AN501A10-4	. SCREW, Machine	1	C
	MS35266-59	. SCREW, Machine	1	D,E
-5	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	3	C,D,E
-6	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D,E
-7	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	3	C,D,E
-8	MS21042-3	. NUT, Self-locking	1	C,D,E
-9	MS21042-3	. NUT, Self-locking	1	C,D,E
-10	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	C,D,E
-11	666304-23	. HOSE ASSEMBLY, Nonmetallic (70128) (Lycoming Source Cont Dwg 1-300-225-01)	1	C,D,E
	94543	. HOSE ASSEMBLY, Nonmetallic (70570) (Alternate) (Lycoming Source Cont Dwg 1-300-225-02)	1	C,D,E
	TF191	. HOSE ASSEMBLY, Nonmetallic (70510) (Alternate) (Lycoming Source Cont Dwg 1-300-225-03)	1	C,D,E
	R25156	. HOSE ASSEMBLY, Nonmetallic (70570) (Alternate) (Lycoming Source Cont Dwg 1-300-225-02)	1	C,D,E
-12	1-160-560-01	. ADAPTER, Oil line, inlet housing	1	C,D,E
-13	NAS617-5	. PACKING	3	C,D,E
-14	1-160-469-01	. CONNECTOR, Oil line	1	C,D,E
-15	AN501A10-4	. SCREW, Machine	1	C
	MS535266-59	. SCREW, Machine	1	D,E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-9-16	AN103809	. BOLT, Drilled hex head	1	C,D,E
-17	AN103813	. BOLT, Drilled hex head	1	C,D,E
-18	M666300-9	. HOSE ASSEMBLY, Nonmetallic (70128) (Lycoming Source Cont Dwg 1-300-054-01)	1	C,D,E
	94819	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-054-02)	1	C,D,E
	TE246	. HOSE ASSEMBLY, Nonmetallic (70510) (Alternate) (Lycoming Source Cont Dwg 1-130-054-03)	1	C,D,E
	R25120	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-130-054-04)	1	C,D,E
-19	1-170-410-02	. MANIFOLD, Lubrication pressure	1	C,D,E
-20	95947	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-130-159-01)	1	C,D,E
-21	96019	. HOSE ASSEMBLY, Pressure torque limiter, right side (78570) (Lycoming Source Cont Dwg 1-130-372-01)	1	C
	M666303-37	. HOSE ASSEMBLY, Pressure torque limiter, right side (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-372-02)	1	C
	R26231	. HOSE ASSEMBLY, Pressure torque limiter, right side (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-372-03)	1	C
-22	1-170-470-01	. MANIFOLD ASSEMBLY, Torque limiter	1	C
-23	AN101127	. BOLT	1	C
-24	NAS617-3	. PACKING	1	C
-25	AN815-3D	. UNION, Tube	1	C
-26	96020	. HOSE ASSEMBLY, Pressure torque limiter, left side (78570) (Lycoming Source Cont Dwg 1-300-373-01)	1	C
	M666301-65	. HOSE ASSEMBLY, Pressure torque limiter, left side (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-373-02)	1	C
	R26232	. HOSE ASSEMBLY, Pressure torque limiter, (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-373-03)	1	C
-27	4661046	. MANIFOLD TEE (92003) (Lycoming Source Cont Dwg 1-300-379-01) (Replace with 4680028)	1	C
	4680028	. MANIFOLD TEE (92003) (Lycoming Source Cont Dwg 1-300-379-02)	1	C
-28	MS24392J4	. UNION, Tube	1	C
-29	M83248/1-904	. PACKING	1	C
-30	AN776-10D	. ELBOW	1	C,D,E
-31	AN901-10A	. GASKET	2	C,D,E
-32	1-160-317-01	. BOLT, Universal fitting	1	C,D,E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-9-33	AN501A10-6	. SCREW, Machine	1	C
	MS35266-61	. SCREW, Machine	4	D,E
-34	8016S10	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-09)	1	C,D,E
-35	MS21042-3	. NUT, Self-locking	1	C,D,E
-36	MS21042-3	. NUT, Self-locking	1	C,D,E
-37	8016S10	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-09)	1	C,D,E
-38	AN501A10-6	. SCREW, Machine	1	C
	MS35266-61	. SCREW, Machine	1	DE
-39	MS21042-3	. NUT, Self-locking	1	C,D,E
-40	8016S10	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-09)	1	C,D,E
-41	AN501A10-6	. SCREW, Machine	1	C
	MS35266-61	. SCREW, Machine	1	D,E
-42	NAS617-10	. PACKING	1	C,D,E
-43	AN901-10A	. GASKET	1	C,D,E

f. Remove connector (14), packings (13), and adapter (12) from inlet housing. Discard packings.

g. Remove bolts (16 and 17) that secure lubrication pressure manifold (19) to engine. Remove manifold.

h. Remove screws (23, 38, and 41) and nuts (35, 36, and 39) from clamps (34, 37, and 40).

i. Disconnect hose assembly (20) from oil heat exchanger on fuel heater assembly and power-driven rotary (oil) pump. Remove hose assembly, packing (42), and gasket (43). Discard packing.

j. Remove elbow (30), bolt (32), and gasket (31) from power-driven rotary (oil) pump.

NOTE

The following steps (k through n) apply to T53-L-15 engines only.

k. Disconnect hose assembly (26) from fuel control torque limiter.

l. Remove bolts (23) and remove hose assemblies (26 and 21) and manifold assembly (22).

m. Remove manifold tee (27), union (28), and packing (29) from inlet housing. Discard packing.

n. Remove union (25) and packing (24) from torque limiter.

4-12. REMOVAL OF STARTING FUEL HOSE ASSEMBLIES, CHECK-FILTER VALVE, AND STARTING FUEL SOLENOID ASSEMBLY (T53-L-13B, -703). Proceed as follows:

a. Disconnect hose assembly (1, figure 4-10) from fuel control and from union (23). Remove hose assembly.

b. Remove screw (5) and nut (19) from clamp (6).

c. Remove screw (14) and nut (18) from clamp (17).

d. Remove screw (15) from clamp (16).

e. Disconnect hose assembly (4) from solenoid valve assembly (20) and check-filter valve (10) and starting fuel manifold. Remove hose assembly.

f. Remove bolt (12) and gaskets (13) from boss on combustor housing. Discard gaskets.

g. Disconnect tube assembly (11) from check-filter valve (10). Remove tube assembly.

h. Loosen screw (9) and nut (7) on bracket and clamp assembly (8) that secures check-filter valve. Remove check-filter valve. Remove screw, nut, and bracket and clamp assembly.

i. Disconnect electrical harness plug from solenoid valve assembly connector. Remove bolt (3) that secures bracket (2) to compressor housing. Remove valve assembly and bracket.

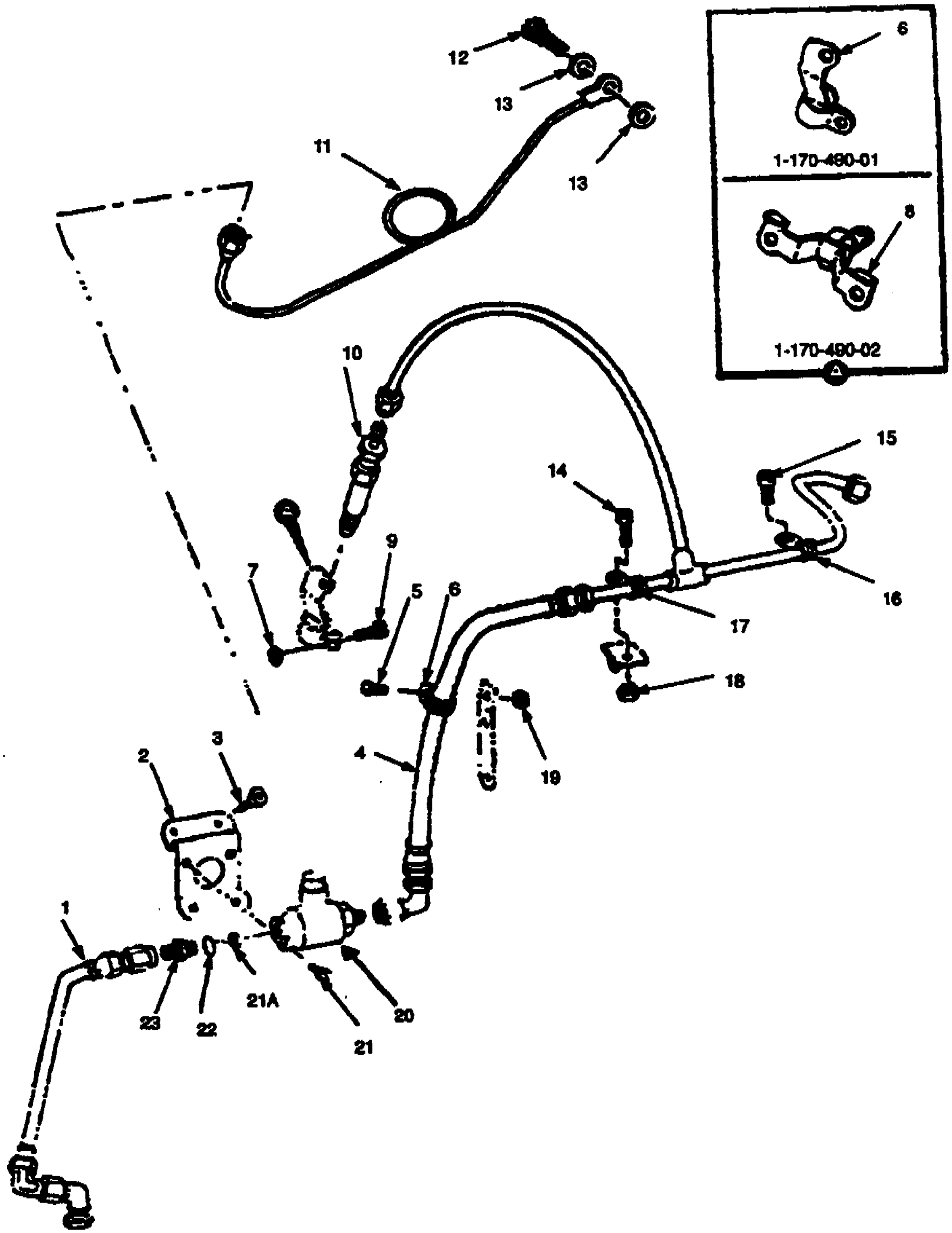


Figure 4-10. Starting Fuel Hose Assemblies, Check-Filter Valve, Solenoid Valve Assembly, and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-10	No Number	STARTING FUEL HOSES AND SOLENOID VALVE AND RELATED PARTS (NHA 1-170-330-13 AND 1-170-330-21)	REF	A,B
-1	666301-21	. HOSE ASSEMBLY, Nonmetallic (70128) (Lycoming Source Cont Dwg 1-300-244-01)	1	A,B
	94127	. HOSE ASSEMBLY, Nonmetallic (78570) (Alternate) (Lycoming Source Cont Dwg 1-300-244-02)	1	A,B
	TF197	. HOSE ASSEMBLY, Nonmetallic (70510) (Alternate) (Lycoming Source Cont Dwg 1-300-244-03)	1	A,B
	R25157	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-244-04)	1	A,B
-2	1-160-890-01	. BRACKET, Primer valve	1	A,B
-3	AN103707	. BOLT, Drilled hexhead	4	A,B
-4	96076	. HOSE ASSEMBLY, Starting fuel (78570) (Lycoming Source Cont Dwg 1-300-403-01)	1	A,B
	R11949	. HOSE ASSEMBLY, Starting fuel (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-403-02)	1	A,B
	AE702641-1	. HOSE ASSEMBLY, Starting fuel (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-403-03)	1	A,B
-5	AN501-10-8	. SCREW, Machine	1	A,B
-6	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	A,B
-7	MS21043-3	. NUT	1	A,B
-8	1-170-490-01	. BRACKET AND CLAMP ASSEMBLY (Replace with 1-170-490-02)	1	A,B
	1-170-490-02	. BRACKET AND CLAMP ASSEMBLY	1	A,B
-9	MS35276-261	. SCREW	1	A,B
-10	2670065	. VALVE, Check filter (92003) (Lycoming Source Cont Dwg 1-300-398-01)	1	A,B
	145-1001	. VALVE, Check-filter (12439) (Alternate) (Lycoming Source Cont Dwg 1-300-398-02)	1	A,B
-11	1-170-500-01	. TUBE ASSEMBLY, Metal	1	A,B
-12	1-130-268-01	. BOLT, Purge system	1	A,B
-13	STD3027C6	. GASKET (Replace with STD3027C4)	2	A,B
	STD3027C4	. GASKET (Replace with STD3027C5)	2	A,B
	STD3027C5	. GASKET	2	A,B
-14	AN501-10-8	. SCREW, Machine	1	A,B
-15	AN501A10-4	. SCREW, Machine	1	A,B
-16	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	A,B
-17	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	A,B

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-10-18	N363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-19	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-20	AF56C39A	. VALVE, Solenoid, starting fuel (98568) (Lycoming Source Cont Dwg 1-300-191-02)	1	A,B
	AV1F1144	. VALVE, Solenoid, starting fuel (73760) (Alternate) (Lycoming Source Cont Dwg 1-300-191-03) (Replace with AV1F1144-1)	1	A,B
	AV1F1144-1	. VALVE, Solenoid, starting fuel (73760) (Alternate) (Lycoming Source Cont Dwg 1-300-191-05)	1	A,B
-21	AN501A10-8	. SCREW, Machine	2	A,B
-21A	T103-78	. STRAINER	1	A,B
-22	MS29512-04	. PACKING, Fuel resistant (Replace with M83248/1-904	1	A,B,
	M83248/1-904	. PACKING	1	A,B
-23	AN815-4D	. UNION, Flared Tube (Replace with MS24392J4)	1	A,B
	MS24392-D4	. UNION, (Alternate) (Replace with MS24392J4)	1	A,B
	MS24392J4	. TUBE, Nipple	1	A,B

4-13. REMOVAL OF STARTING FUEL HOSE ASSEMBLIES, CHECK-FILTER VALVE, AND STARTING FUEL SOLENOID VALVE ASSEMBLY (T53-L-15, -701, -701A). Proceed as follows:

a. Disconnect hose assembly (17, figure 4-11) from elbow on fuel control and elbow (14).

b. Remove screw (21) from clamp (20) and nut (18) from screw (2). Remove screw from clamp (20).

c. Disconnect hose assembly (1) from solenoid valve assembly (10) and check-filter valve (3). Remove hose assembly.

d. Remove bolt (8) and gasket (9) from boss on combustor housing. Discard gaskets.

e. Disconnect tube assembly (7) from check-filter valve (3). Remove tube assembly.

f. Loosen screw (6), and nut (4) on bracket and clamp assembly (5) that secures check-filter valve. Remove check-filter valve. Remove screw, nut, and bracket and clamp assembly.

g. Remove screws (11) and remove solenoid valve assembly (10) from bracket (15).

h. Remove elbow (14), nut (13), and packing (12) from solenoid valve assembly (10). Discard packing.

i. Remove bolts (16) that secure bracket (15) to compressor housing.

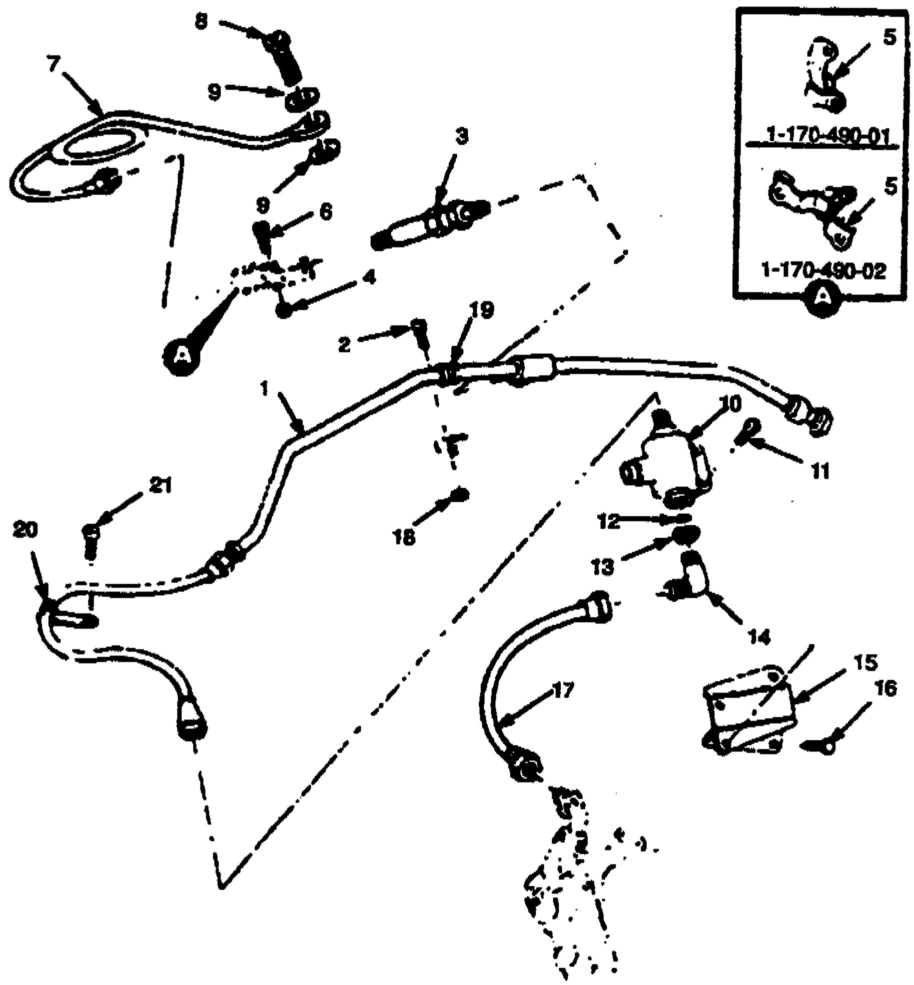


Figure 4-11. Starting Fuel Hose Assemblies, Check-Filter Valve, Solenoid Valve Assembly, and Attaching Parts (T53-L-15, -701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-11	No Number	STARTING AND MAIN FUEL HOSE ASSEMBLIES (NHA 1-170-330-06 and 1-170-330-09)	Ref	C, D, E
	No Number	. Starting Fuel Solenoid Valve and Related Parts (NHA 1-170-330-06 and 1-170-330-09)	Ref	C, D, E
-1	96075	. HOSE ASSEMBLY, Primer valve (78570) (Lycoming Source Cont Dwg 1-300-396-01)	1	C, D, E
	R11948	. HOSE ASSEMBLY, Primer valve (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-396-03)	1	C, D, E
-2	AN501-10-8	. SCREW, Machine	1	C
	MS35226-63	. SCREW, Machine	1	D, E
-3	2670065	. VALVE, Check-filter (92003) (Lycoming Source Cont Dwg 1-300-398-01)	1	C, D, E
	145-1001	. VALVE, Check-filter (12439) (Alternate) (Lycoming Source Cont Dwg 1-300-398-02)	1	C, D, E
-4	MS21043-3	. NUT, Self-locking	1	C, D, E
-5	1-170-490-01	. BRACKET AND CLAMP ASSEMBLY (Replace with 1-170-490-02)	1	C, D, E
	1-170-490-02	. BRACKET AND CLAMP ASSEMBLY	1	C, D, E
-6	MS35276-261	. SCREW	1	C, D, E
-7	1-170-500-01	. TUBE ASSEMBLY	1	C, D, E
-8	1-130-268-01	. BOLT, Purge system	1	C, D, E
-9	STD3027C6	. GASKET (Replace with STD 3027C4)	2	C, D, E
	STD3027C4	. GASKET (Replace with STD 3027C5)	2	C, D, E
	STD3027C5	. GASKET	2	C, D, E
-10	AF56C137	. VALVE, Solenoid, starting fuel (98568) (Alternate) (Lycoming Source Cont Dwg 1-300-191-01)	1	C, D, E
	AV1F1155-1	. VALVE, Solenoid, starting fuel (73760) (Alternate) (Lycoming Source Cont Dwg 1-300-191-06)	1	C, D, E
-11	AN501-10-8	. SCREW, Machine	2	C
	MS35266-63	. SCREW, Machine	2	D, E
-12	MS29512-04	. PACKING, Fuel resistant	1	C, D, E
-13	AN924-4C	. NUT, Flared tube	1	C, D, E
-14	AN833-4D	. ELBOW, Flared tube	1	C, D, E
-15	1-170-460-01	. BRACKET, Starting fuel solenoid valve	1	C, D, E
-16	AN103707	. BOLT, Drilled hexhead	2	C, D, E
-17	95745	. HOSE ASSEMBLY, Nonmetallic, high pressure (78570) (Lycoming Source Cont Dwg 1-300-142-01)	1	C, D, E
-18	MS21042-3	. NUT, Self-locking	1	C, D, E
-19	8016S-4	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-03)	1	C, D, E
-20	8016S5	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-04)	1	C, D, E
-21	AN501A10-6	. SCREW, Machine	1	C
	MS35266-61	. SCREW, Machine	2	D, E

4-14. REMOVAL OF MAIN FUEL HOSE ASSEMBLY (T53-L-13B, -703). Proceed as follows:

a. Remove screw (6, figure 4-12) and nut (1) from clamp (2).

b. Remove screw (5) from clamp (4).

c. Disconnect hose assembly (3) from fuel control and flow divider assembly. Remove hose assembly.

4-15. REMOVAL OF MAIN FUEL HOSE ASSEMBLY (T53-L-15, -701, -701A). Proceed as follows:

a. Disconnect main fuel hose (9, figure 4-13) from union (4) and flow divider.Remove nuts (12 and 15) and screws (6 and 11) that secure clamps (5 and 10) to brackets on combustor. Remove screw (8) that secures clamp (7) to engine and remove hose.

b. Disconnect main fuel hose (3) from union (4) and from main fuel control fitting and remove hose. Remove union (4).

c. Remove screw (14) and nut (16) from clamp (13) that secures main fuel hose (2) to bracket on ignition coil and lead assembly bracket. Disconnect hose from regulator assembly and from union on fuel filter assembly. Remove hose.

d. Disconnect main fuel hose (1) from tee on main fuel filter and from engine overspeed governor.Remove hose.

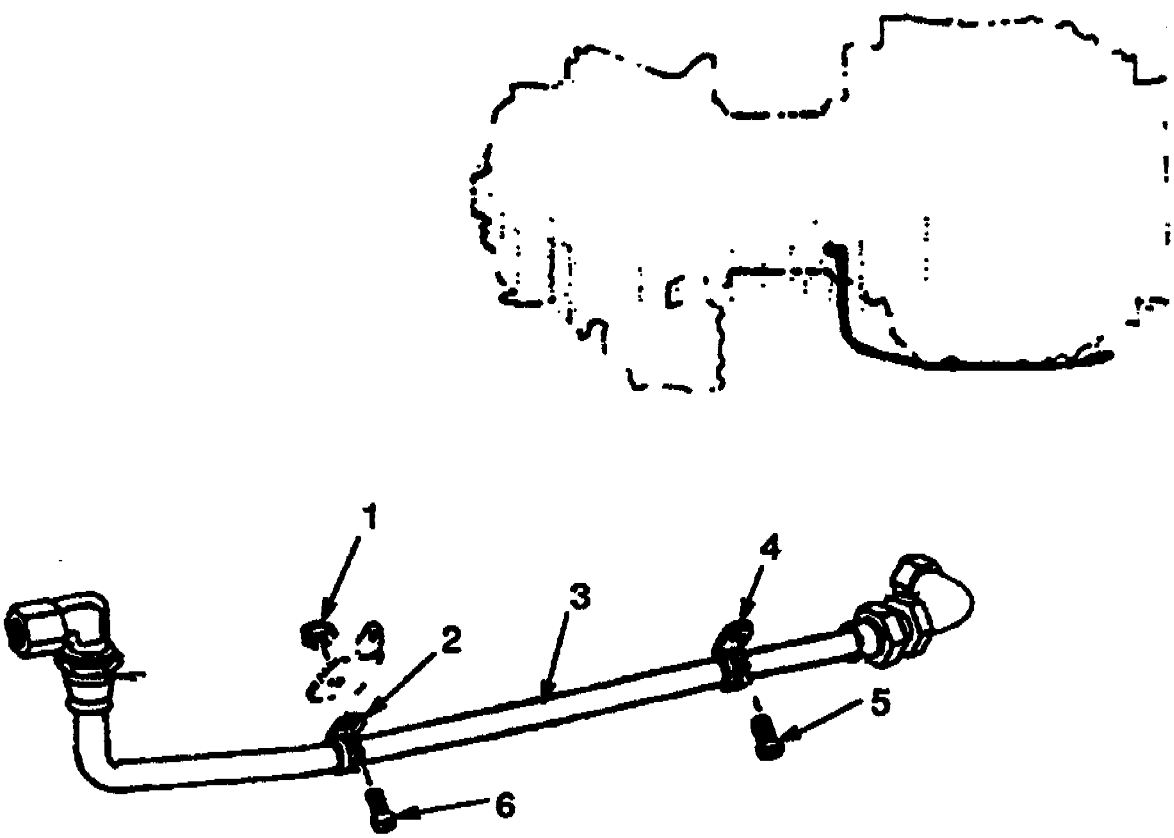


Figure 4-12. Main Fuel Hose Assembly and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-12	No Number	STARTING AND MAIN FUEL HOSES (NHA 1-170-330-13, 1-170-330-21)	Ref	A, B
-1	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A, B
	MS21042-3	. NUT, Self-locking	1	A, B
-2	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	1	A, B
-3	95743	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-139-01)	1	A, B
	M666304-36	. HOSE ASSEMBLY, Nonmetallic (70127) (Alternate) (Lycoming Source Cont Dwg 1-300-139-02)	1	A, B
	R25739	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-139-03)	1	A, B
-4	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	1	A, B
-5	AN501A10-4	. SCREW, Machine	1	A, B
-6	AN501-10-8	. SCREW, Machine	1	A, B

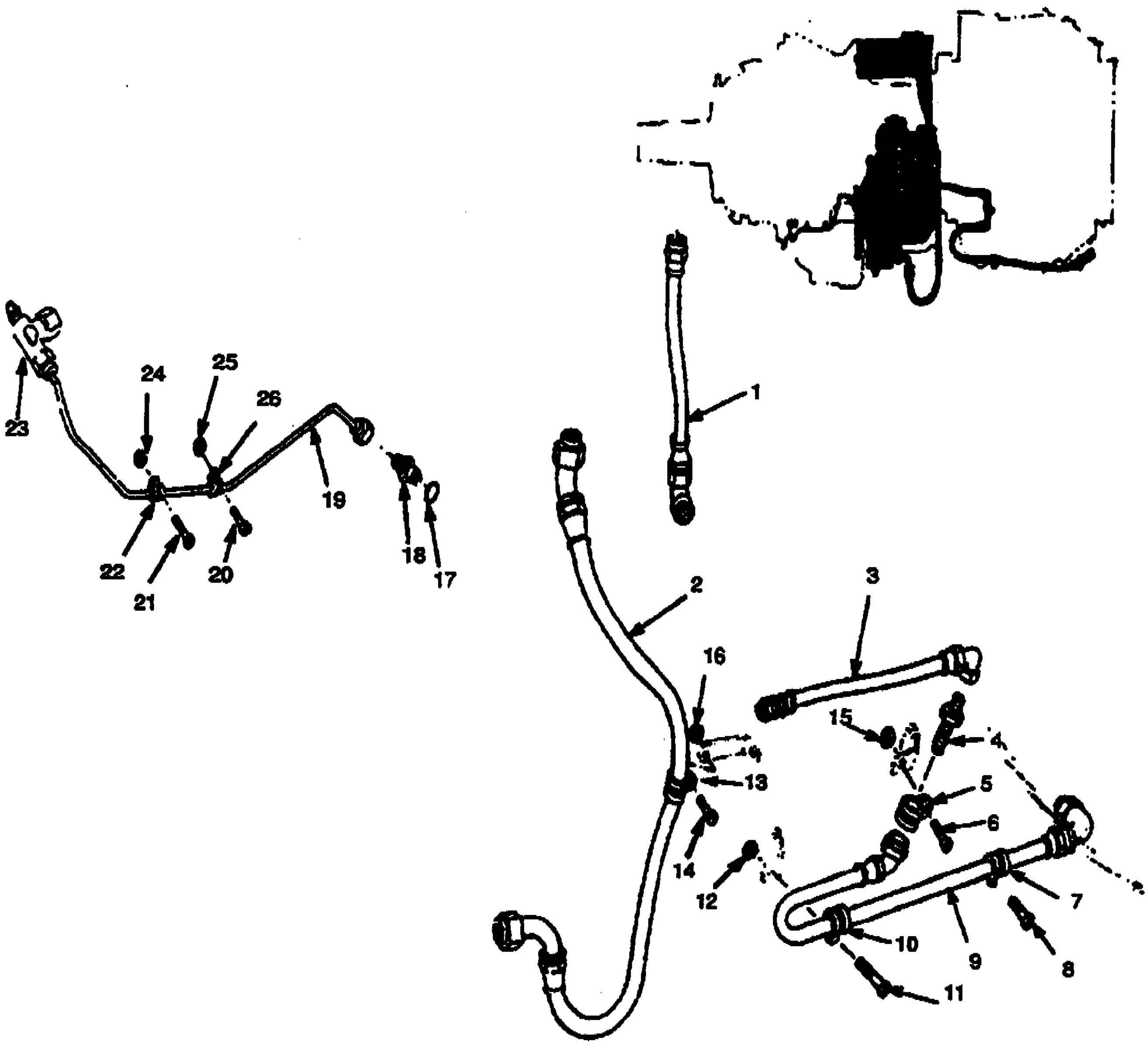


Figure 4-13. Main Fuel Hose and Torque Limiter Tube Assemblies and Attaching Parts (T53-L-15, -701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-13	No Number	STARTING AND MAIN FUEL HOSE ASSEMBLIES (NHA 1-170-330-06 and 1-170-330-09)	Ref	C, D, E
-1	M656214-7	. HOSE ASSEMBLY, Nonmetallic (70128) (Lycoming Source Cont Dwg 1-300-209-01)	1	C, D, E
	94536	. HOSE ASSEMBLY, Nonmetallic (78750) (Alternate) (Lycoming Source Cont Dwg 1-300-209-02)	1	C, D, E
	TF187	. HOSE ASSEMBLY, Nonmetallic (70510) (Alternate) (Lycoming Source Cont Dwg 1-300-209-03)	1	C, D, E
-2	95951	. HOSE ASSEMBLY, Fuel filter (78570) (Lycoming Source Cont Dwg 1-300-165-01) (Replace with M650448-1)	1	C
	M650448-1	. HOSE ASSEMBLY, Fuel filter (00624) (Lycoming Source Cont Dwg 1-300-312-01)	1	C, D, E
	94896	. HOSE ASSEMBLY, Fuel filter (78570) (Alternate) (Lycoming Source Cont Dwg 1-300-312-02)	1	C, D, E
	TE295	. HOSE ASSEMBLY, Fuel filter (70510) (Alternate) (Lycoming Source Cont Dwg 1-300-312-03)	1	C, D, E
-3	M656214-2	. HOSE ASSEMBLY, Nonmetallic (00624) (Lycoming Source Cont Dwg (1-300-048-01)	1	C, D, E
	94815	. HOSE ASSEMBLY, Nonmetallic (78570) (Alternate) (Lycoming Source Cont Dwg 1-300-048-02)	1	C, D, E
	TF205	. HOSE ASSEMBLY, Nonmetallic (70510) (Alternate) (Lycoming Source Cont Dwg 1-300-048-03)	1	C, D, E
-4	AN832-6C	. UNION, Flared tube	1	C, D, E
-5	8016S9	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-08)	1	C, D, E
-6	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D, E
-7	8016S7	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-06)	1	C, D, E
-8	AN501A10-4	. SCREW, Machine	1	C
	MS35266-59	. SCREW, Machine	1	D, E
-9	96056	. HOSE ASSEMBLY, Nonmetallic, mainfuel (78750) (Lycoming Source Cont Dwg 1-300-401-01) (Replace with 96317)	1	C
	96317	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-433-01)	1	C, D, E
	M666304-43	. HOSE ASSEMBLY, Nonmetallic (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-433-02)	1	C, D, E
	R26804	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-433-03)	1	C, D, E
-10	8016S7	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-06)	1	C, D, E
-11	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D, E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-13-12	MS21042-3	. NUT, Self-locking	1	C, D, E
-13	8016S10	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-09)	1	C, D, E
-14	AN501A10-5	. SCREW, Machine	1	C
	MS35266-60	. SCREW, Machine	1	D, E
-15	MS21042-3	. NUT, Self-locking	1	C, D, E
-16	MS21042-4	. NUT, Self-locking	1	C, D, E
-17	NAS617-2	. PACKING	1	C, D, E
-18	MS24392D2	. NIPPLE	1	C, D, E
-19	96026	. TUBE ASSEMBLY, Metal (78570) (Lycoming Source Cont Dwg 1-300-376-01)	1	C, D, E
-20	AN501-10-8	. SCREW, Machine	1	C, D, E
-21	AN501-10-8	. SCREW, Machine	1	C, D, E
-22	8016S3	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-02)	1	C, D, E
-23	1-300-378	. TEE	1	C, D, E
-24	MS21042-3	. NUT, Self-locking	1	C, D, E
-25	MS21042-3	. NUT, Self-locking	1	C, D, E
-26	8016S3	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-02)	1	C, D, E

NOTE

The following steps (e and f) apply to the T53-L-15 engine only.

e. Disconnect tube assembly (19) from fuel control torque limiter and from accessory drive gearbox assembly. Remove screws (20 and 21) and nuts (24 and 25) and clamps (22 and 26) that secure bleed line to inlet housing and oil temperature bulb connector lead clamp.

f. Remove nipple (18) and packing (17) from fuel control torque limiter. Remove tee (23) from tube assembly (19).

4-16. REMOVAL OF FLOW DIVIDER HOSE ASSEMBLIES. Proceed as follows:

CAUTION

Immediately after complying with each of the following steps, cap flow divider and fuel manifold ports or drain valve ports.

a. Disconnect hose assemblies (1 and 2, figure 4-14) from right-hand fuel manifold and from flow divider and dump valve assembly (10). Remove hose assemblies.

b. Disconnect hose assemblies (1 and 2) from left-hand fuel manifold and from flow divider and dump valve assembly. Remove hose assemblies.

c. Disconnect hose assembly (17) from flow divider and from combustion chamber drain valve assembly (16). Remove hose assembly.

4-17. REMOVAL OF FLOW DIVIDER AND DUMP VALVE ASSEMBLY. Proceed as follows:

a. Remove screws (7 and 9, figure 4-14) and secure retainers (6 and 8) and support (11) to exhaust diffuser support cone.

b. Using suitable tool, remove four pins (12).

c. Remove screws (3, 4, and 5) securing flow divider and dump valve to support (11). Remove flow divider and dump valve and spacer (13).

d. Reinstall support (11) on exhaust diffuser support cone with screws (7 and 9). Hand-tighten screws.

4-18. REMOVAL OF COMBUSTION CHAMBER DRAIN VALVE ASSEMBLY. Proceed as follows:

a. Remove bolts (15, figure 4-14) securing drain valve to combustion chamber housing.

b. Remove combustion chamber drain valve assembly (16) and gasket (14).

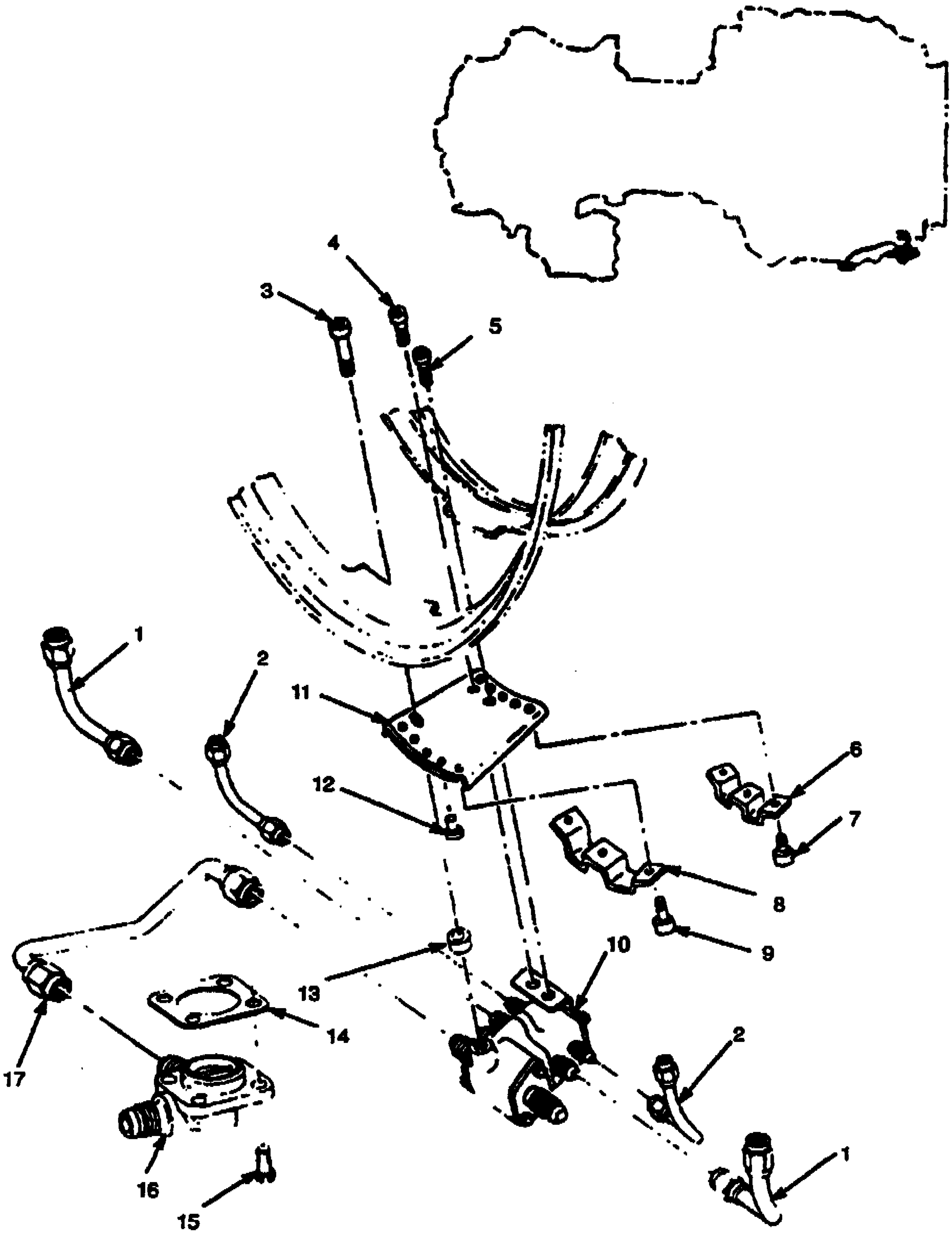


Figure 4-14. Flow Divider and Dump Valve Assembly, Combustion Chamber Drain Valve Assembly, and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-14	No Number	FLOW DIVIDER HOSE ASSEMBLIES (NHA 1-170-330-06,1-170-330-09, 1-170-330-13, and 1-170-330-21)	1	
-1	95745	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-142-01)	2	
	M666301-53	. HOSE ASSEMBLY, Nonmetallic (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-142-02)	2	
	R25741	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-142-03)	2	
-2	95744	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-141-01)	2	
	M666300-15	. HOSE ASSEMBLY, Nonmetallic (00624) (Alternate) (Lycoming Source Cont Dwg 1-300-141-02)	2	
	R25740	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-141-03)	2	
-3	MS24673-2	. SCREW, Cap	1	
-4	MS24673-1	. SCREW, Cap	1	
-5	MS24673-1	. SCREW, Cap	1	
-6	1-150-119-01	. PLATE, Retainer	6	
-7	MS24673-9	. SCREW, Machine	18	
-8	1-150-122-01	. PLATE, Retainer	6	
-9	MS24673-9	. SCREW, Machine	18	
-10	1-180-190-03	. VALVE, Linear	1	
-11	1-150-280-03	. SUPPORT ASSEMBLY	1	
-12	1-150-123-02	. PIN, Straight Headed	4	
-13	1-180-131-01	. SPACER, Sleeve	1	
-14	1-160-045-01	. GASKET	1	
-15	MS9500-04	. BOLT, Machine	4	
-16	1-160-220-03	. VALVE, Drain	1	
-17	95746	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-143-01)	1	
	M666300-13	. HOSE ASSEMBLY, Nonmetallic (00624) (Lycoming Source Cont Dwg 1-300-143-02)	1	
	R25742	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-143-03)	1	

SECTION III. IGNITION UNIT

4-19. REMOVAL OF IGNITION COIL AND LEAD ASSEMBLY. Proceed as follows:

a. Disconnect electrical leads at igniter plugs (13, figure 4-15) and ignition unit (37).

b. Remove all screws and nuts securing all clamps on ignition coil and lead assembly (32).

c. Remove bolts (33) securing ignition coil and lead assembly to engine.

d. Remove ignition coil and lead assembly from engine.

e. On T53-L-13B and -703 engines, remove bolts (33) and nuts (28) securing ignition coil and lead assembly (32) to bracket (29). Separate ignition coil and lead assembly from bracket.

f. On T53-L-15, -701, and -701A engines, remove bolts (33) and nuts (28) securing ignition coil and lead assembly (32) to brackets (30 and 31). Separate ignition coil and lead assembly from brackets.

4-20. REMOVAL OF IGNITION UNIT. Proceed as follows:

a. Disconnect electrical connectors from ignition unit (37), (figure 4-15).

b. Remove screws (43) and nuts (44) securing ends of loop clamps (38). Spread loop clamps until slots in clamps clear positioning lugs on both sides of ignition unit. Slide clamps toward each other, releasing ignition unit for removal.

c. Remove bolts (34 and 36) and bracket (35) from compressor housing assembly.

4-21. REMOVAL OF IGNITER PLUGS. Proceed as follows:

a. If necessary, disconnect ignition coil and lead assembly (32, figure 4-15) from igniter plugs (13).

b. Remove plugs (13) from igniter mounts. Remove spacers (12).

4-22. REMOVAL OF STARTING FUEL MANIFOLDS. Proceed as follows:

a. Remove screws (1,8,11, and 17, figure 4-16 securing clamps (2, 7, 10, and 16) to support cone.

b. Remove nut (3) and washer (4) securing tee (5) to support cone bracket.

c. Fully back off connector nuts holding manifolds (6 and 15) to starting fuel nozzles (13). Remove manifolds (6 and 15) and tee (5) as a unit. Remove washer (4). Immediately cap all openings.

d. Loosen connector nuts and separate left-hand starting fuel manifold (6) and right-hand starting fuel manifold (15) from tee (5).

4-23. REMOVAL OF FUEL HEATER (T53-L-15, -701, -701A). PROCEED AS FOLLOWS:

a. Remove bolts (8, figure 4-17), nut (1), and washers (2 and 7).

CAUTION

Cap or plug all openings in fuel heater to prevent contamination.

b. Pull fuel heater (3) away from fuel filter and bracket assembly until free of transfer tube coupling (5).

NOTE

Residual fuel and oil in fuel filter should be drained into a suitable container.

c. Remove transfer tube coupling (5) from fuel filter and bracket assembly.

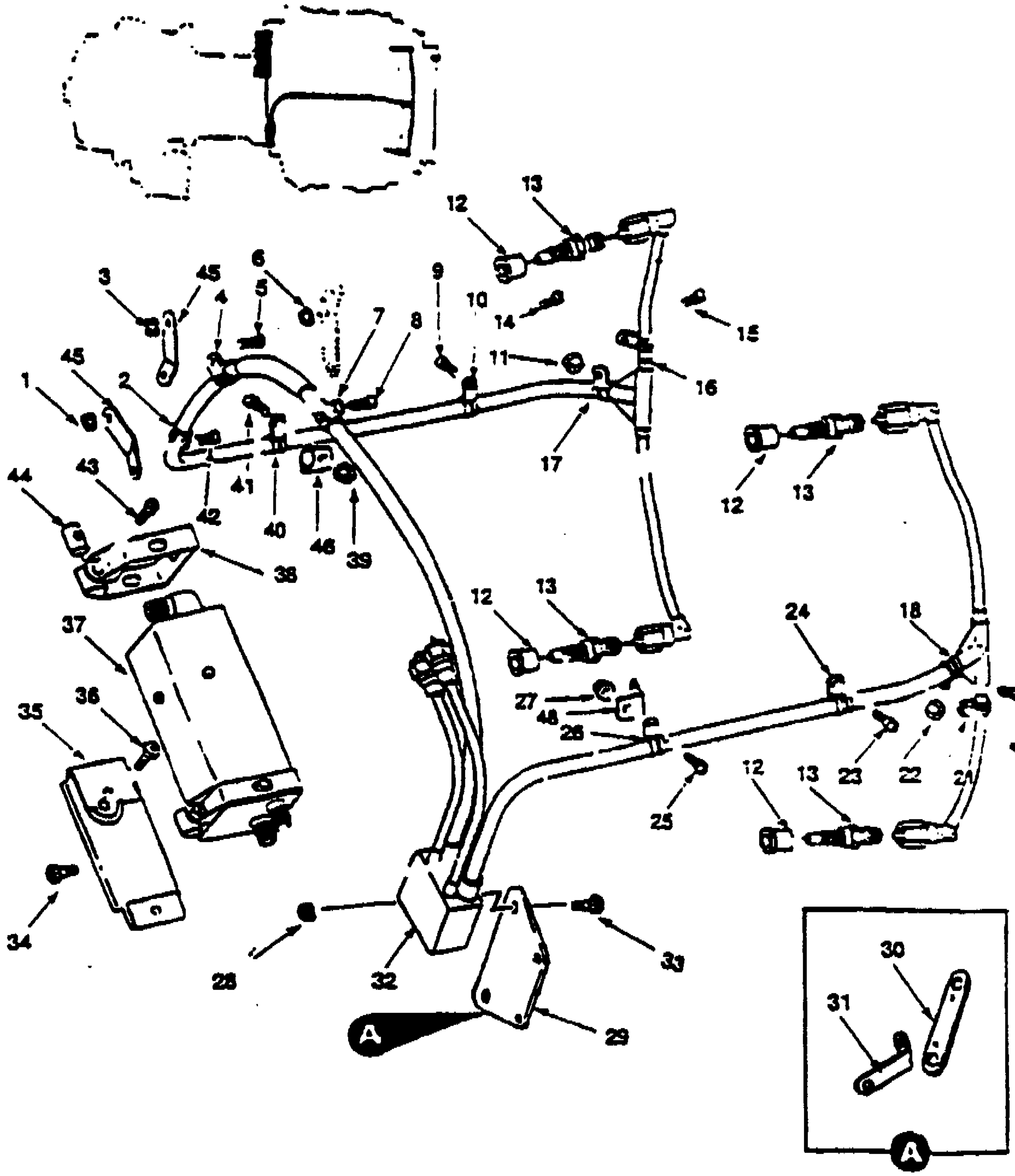


Figure 4-15. Ignition System and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-15	No Number	IGNITION COIL AND LEAD ASSEMBLY AND RELATED PARTS (NHA 1-070-330-06, 1-170-330-09, 1-170-330-13 and 1-170-330-21)	Ref	
-1	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	C
	MS20142-3	. NUT, Self-locking	1	
-2	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	1	
-3	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	C
	MS21042-3	. NUT, Self-locking	1	
-4	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	1	
-5	AN501-10-8	. SCREW, Machine	1	A,B,C
	MS35266-63	. SCREW, Machine	1	D,E
-6	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	C
	MS21042-3	. NUT, Self-locking	1	
-7	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	1	
-8	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D,E
-9	AN501A10-4	. SCREW, Machine	2	A,C
	MS35266-59	. SCREW, Machine	2	D,E
-10	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	2	
-11	MS21042-3	. NUT, Self-locking	2	
-12	1-150-126-01	. SPACER, Sleeve, igniter	4	
-13	5611304	. IGNITER PLUG (70040) (Lycoming Source Cont Dwg 1-300-348-01)	4	
	10-360840-1	. IGNITER PLUG (77820) (Alternate) (Lycoming Source Cont Dwg 1-300-348-02)	4	
	FH211-2	. IGNITER PLUG (11583) (Alternate) (Lycoming Source Cont Dwg 1-300-348-03)	4	
-14	AN501A10-4	. SCREW, Machine	2	A,B,C
	MS35266-59	. SCREW, Machine	2	D,E
-15	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D,E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-15-16	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	2	
-17	8016S7	. CLAMP, Loop (72785) (Lycoming Spec Cont Dwg 1-300-271-06)	2	C
	8016S8	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-07)	2	D,E
-18	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	2	C
	8016S8	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-07)	2	D,E
-19	AN501A10-4	. SCREW, Machine	2	A,B,C
	MS35266-59	. SCREW, Machine	2	D,E
-20	AN501-10-8	. SCREW, Machine	1	C
	MS35266-59	. SCREW, Machine	2	D,E
-21	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	2	
-22	MS21042-3	. NUT, Self-locking	2	
-23	AN501A10-4	. SCREW, Machine	2	C
	MS35266-59	. SCREW, Machine	2	D,E
-24	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	2	
-25	AN501-10-8	. SCREW, Machine	1	C
	MS35266-63	. SCREW, Machine	1	D,E
-26	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	5	
-27	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	5	C
	MS21042-3	. NUT, Self-locking	5	
-28	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	2	
	MS21042-3	. NUT, Self-locking	2	
-29	1-160-622-01	. BRACKET, Mounting ignition unit	1	A,B
-30	1-160-352-01	. BRACKET, Mounting ignition unit	1	C,D,E
-31	1-160-369-01	. BRACKET, Angle	1	C,D,E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-15-32	10-319813-1	. COIL AND LEAD ASSEMBLY, Special purpose (77820) (Lycoming Source Cont Dwg 1-300-124-01)	1	
	43113	. COIL AND LEAD ASSEMBLY, Special purpose (83311) (Alternate) (Lycoming Source Cont Dwg 1-300-124-03)	1	
	10-380053-1	. COIL AND LEAD ASSEMBLY, Special purpose (77820) (Alternate) (Lycoming Source Cont Dwg 1-300-124-03)	1	
	43338	. COIL AND LEAD ASSEMBLY, Special purpose (83311) (Alternate) (Lycoming Source Cont Dwg 1-300-124-04)	1	
-33	AN103707	. BOLT, Drilled hex-head	4	
-34	AN103809	. BOLT, Drilled hex-head	3	
-35	1-160-509-03	. BRACKET, Ignition unit	1	A,B
	1-160-509-04	. BRACKET, Ignition unit	1	C,D,E
-36	AN103706	. BOLT, Drilled hex head	1	
-37	10-371440-1	. IGNITION UNIT, Exciter type (77820) (Lycoming Source Cont Dwg 1-300-363-01)	1	
	42416	. IGNITION UNIT, Exciter type (83311) (Alternate) (Lycoming Source Cont Dwg 1-300-363-02)	1	
	10-383225-1	. IGNITION UNIT, Exciter type (77820) (Alternate) (Lycoming Source Cont Dwg 1-300-363-03)	1	
	43326	. IGNITION UNIT, Exciter type (83311) (Alternate) (Lycoming Source Cont Dwg 1-300-363-04)	1	
-38	1-160-870-02	. CLAMP, Loop	2	
-39	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	5	C
	MS21042-3	. NUT, Self-locking	5	
-40	8016S7	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-06)	5	
-41	AN501-10-8	. SCREW, Machine	1	A,B,C
	MS35266-63	. SCREW, Machine	1	D,E
-42	AN501-10-8	. SCREW, Machine	1	A,B,C
	MS35266-63	. SCREW, Machine	1	D,E
-43	AN501A10-18	. SCREW, Machine	2	
	MS35266-68	. SCREW, Machine	2	D,E
-44	1-160-258-02	. NUT, Plain, barrel	2	
-45	1-160-623-01	. BRACKET, Angle	2	
-46	1-160-135-01	. BRACKET, Angle	1	
-47	1-300-271-01	. CLAMP, Loop	1	
-48	1-160-136-01	. BRACKET, Clamp	1	

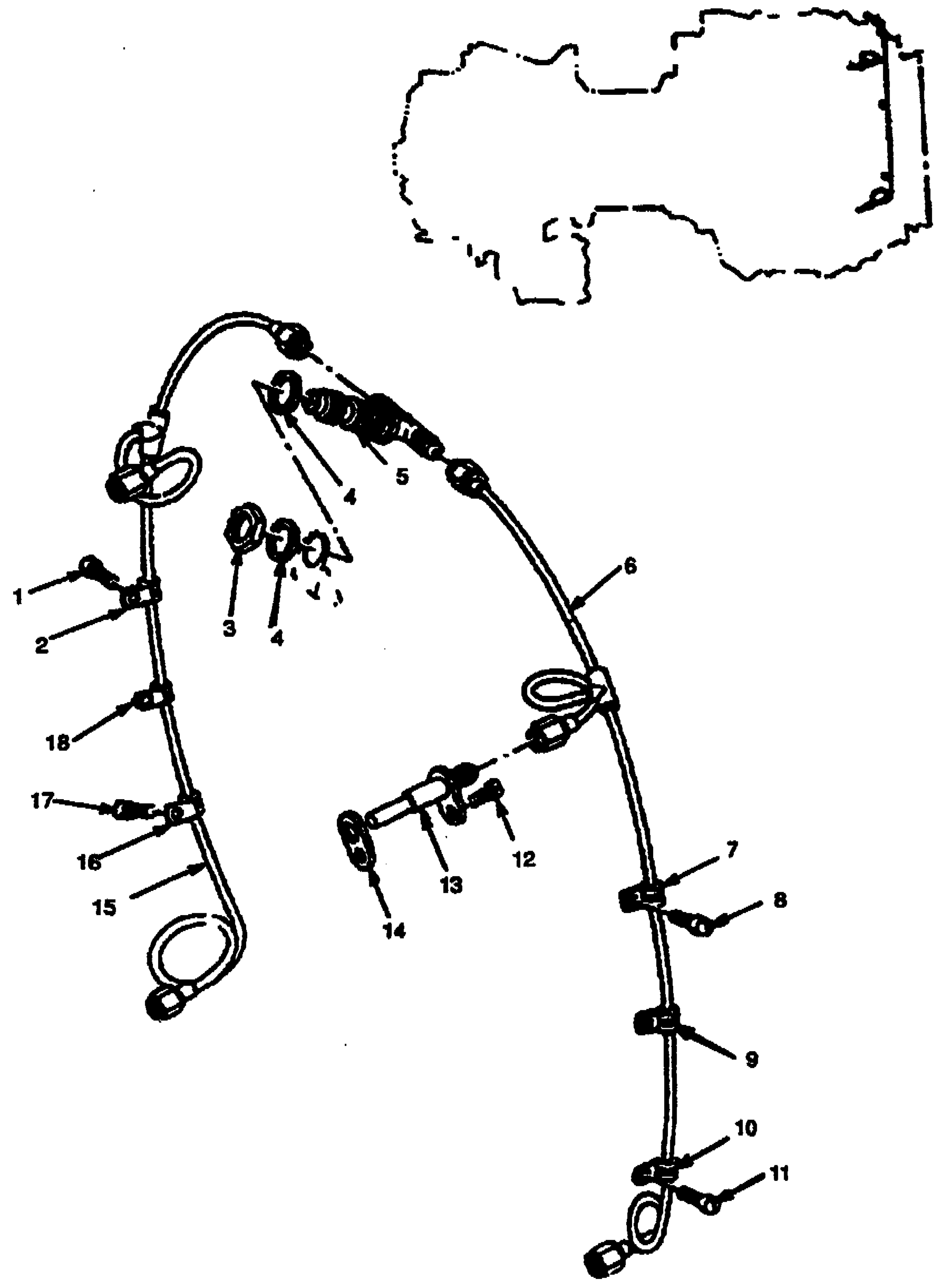


Figure 4-16. Starting Fuel Manifolds, Starting Fuel Nozzles, and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-16	No Number	STARTING FUEL MANIFOLD AND RELATED PARTS (NHA 1-170-330-06, 1-170-330-09,1-170-330-13,1-17 0-330-21)	Ref	
-1	AN501A10-4	. SCREW, Machine	1	A,B,C,E
	MS35266-59	. SCREW, Machine	1	D
-2	8016S2	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-01)	1	
-3	AN924-4C	. NUT	1	
-4	AN96C716	. WASHER, Flat	2	
-5	1-160-322-01	. TEE, Tube	1	
-6	1-170-420-01	. MANIFOLD, Fueling, right-hand	1	
-7	8016S2	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-01)	1	
-8	AN501A10-4	. SCREW, Machine	1	A,B,C,E
	MS35266-59	. SCREW, Machine	1	D
-9	8016S2	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-01)	1	
-10	8016S2	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-01)	1	
-11	AN501A10-4	. SCREW, Machine	1	A,B,C,E
	MS35266-59	. SCREW, Machine	1	D
-12	MS35266-61	. SCREW, Machine	4	
-13	1-300-405-02	. NOZZLE, Fuel	4	
-14	1-160-362-03	. GASKET	4	
-15	1-170-430-01	. MANIFOLD, Fueling, left-hand	1	
-16	8016S2	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-01)	1	
-17	AN501A10-4	. SCREW; Machine	1	A,B,C,E
	MS35266-59	. SCREW, Machine	1	D
-18	8016S2	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-01)	1	

NOTE

Transfer tube assemblyshall remain with fuel heater.

d. Remove packings(4) from nipple (6). Discard packings.

4-24. REMOVAL OF FUEL FILTER AND BRACKET ASSEMBLY (T53-L-15, -701, -701A). Proceed as follows:

a. Disconnect wiring harness connector (D, figure 4-23) from fuel filter pressure switch.

b. Remove bolts (7, figure 4-18), nuts (3), and washers (4 and 6).

CAUTION

After complying with following step c, cap or plug all openings in filter assembly to prevent contamination.

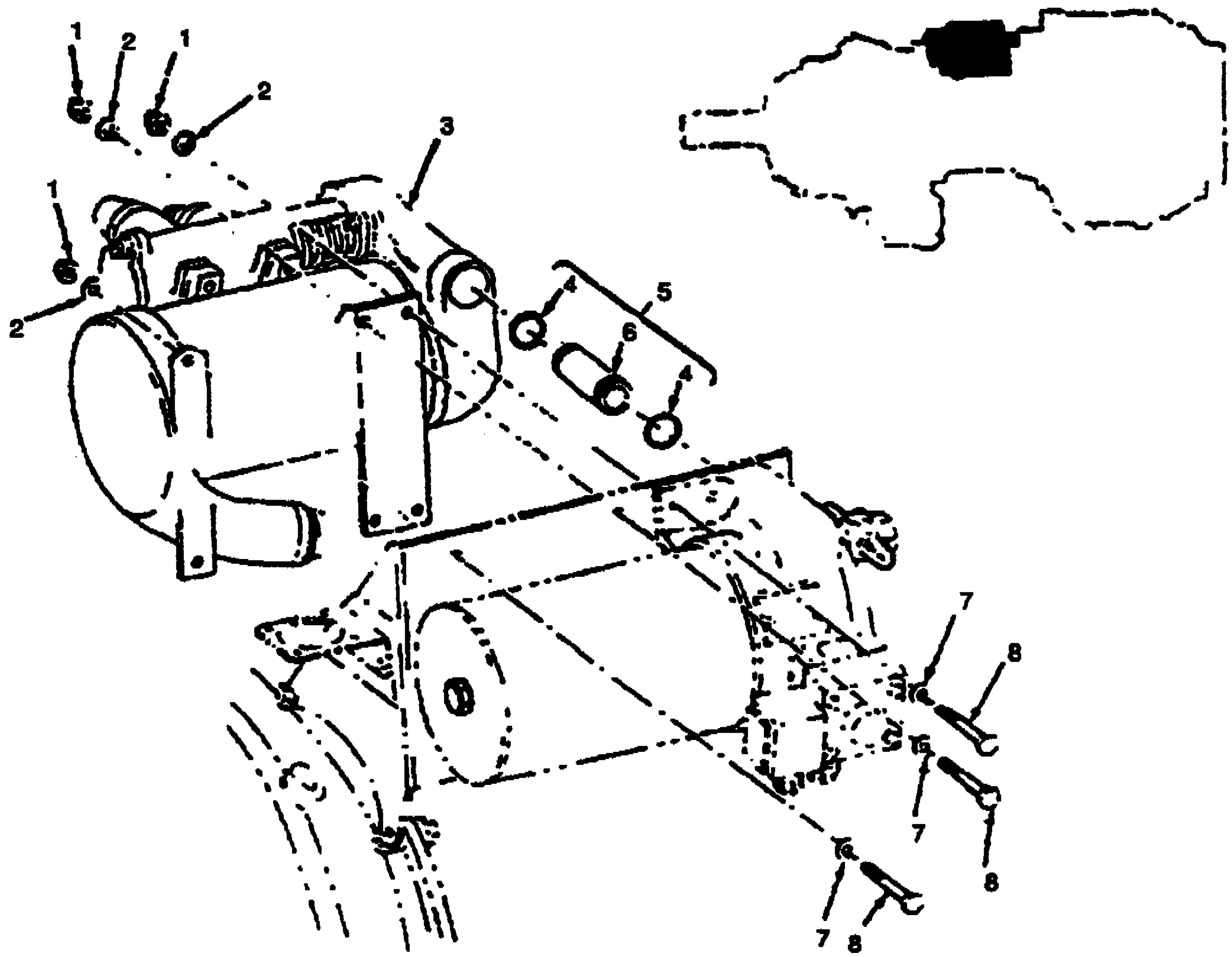


Figure 4-17. Fuel Heater and Attaching Parts (T53-L-15, -701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-17	No Number	. FUEL HEATER AND ATTACHING PARTS (NHA 1-170-330-06 and 1-170-339-09)	Ref	C,D,E
-1	MS21042-4	. NUT, Self-locking	3	C,D,E
-2	AN960-416L	. WASHER, Flat	6	C,D,E
-3	1-300-251-02	. HEATER ASSEMBLY	1	C,D,E
-4	MS29513-113	. PACKING	2	C,D,E
-5	1-160-577-07	. COUPLING, Tube	1	C,D,E
-6	MS24392D10	. NIPPLE, Tube	1	C,D,E
-7	AN960-416L	. WASHER, Flat	6	D,E
-8	AN101116	. BOLT, Hex head	3	C
	MS9519-13	. BOLT, Hex head	3	D,E

c. Remove fuel filter assembly (8) from bracket (2).

NOTE

Residual fuel in fuel filter assembly should be drained into a suitable container.

d. Remove screws (1) and nuts (15) that secure wiring harness main receptacle (16) to bracket (2).

e. Remove bolts (11), shims (12), washers (13), and nuts (14).

f. Remove bolts (10), washers (9), and clips (5).

g. Remove bracket (2) from engine.

4-25. REMOVAL OF STARTING FUEL NOZZLES. Proceed as follows:

a. Remove screws (12, figure 4-16) and withdraw starting fuel nozzles (13)from combustion chamber.

b. Remove sealing gaskets (14) and discard.

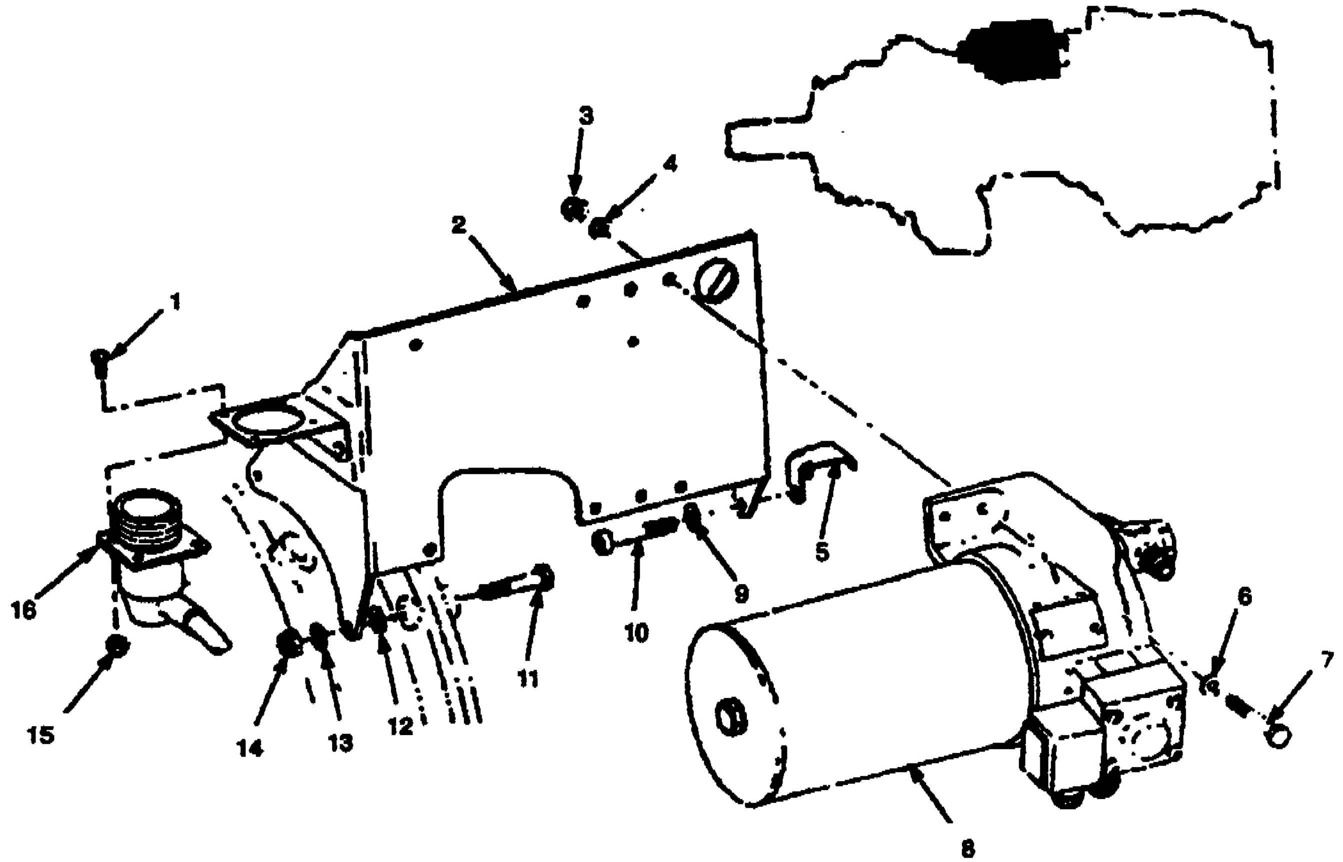


Figure 4-18. Fuel Filter and Bracket Assembly and Attaching Parts (T53-L-15, -701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-18	1-300-252	FUEL FILTER AND BRACKET ASSY AND ATTACHING PARTS	REF	
-1	AN116905	. SCREW, oval Phillips head	4	C
	MS35265-29	. SCREW, oval Phillips head	4	D,E
-2	1-170-190-02	. BRACKET ASSEMBLY, Fuel filter	1	C
-3	AN363-428	. NUT, Self-locking	2	C
	S21042-4	. NUT, Self-locking	2	D,E
-4	AN960-416L	. WASHER, Flat	1	C,D,E
-5	1-160-253-01	. CUP, Band retaining, interstage bleed	2	C
-6	AN960-416L	. WASHER, Flat	1	C,D,E
-7	AN101116	. BOLT, Hex head	2	C
	MS9519-13	. BOLT, Hex head	2	D,E
-8	123992	. BODY ASSEMBLY (73370)	1	C,D,E
-9	AN960-416L	. WASHER, Flat	2	C
-10	AN148679	. BOLT, Drilled socket head	2	C
	MS9089-28	. BOLT, Drilled socket head	2	D,E
-11	AN102910	. BOLT, Drilled hex head	2	C
	MS9519-26	. BOLT, Hex head	2	D,E
-12	1-160-588-01	. SHIM, Bracket	AR	C
	1-160-588-02	. SHIM, Bracket	AR	D,E
-13	AN960-416L	. WASHER, Flat	2	
-14	AN363-428	. NUT, Self-locking	2	C
	MS21042-4	. NUT, Self-locking	2	D,E
-15	MS20365-440	. NUT, Self-locking	4	C
	S21042-06	. NUT, Self-locking	4	D,E
-16	1-300-427-01	. WIRING, Harness	1	C,D,E

SECTION IV. ELECTRICAL CABLES

4-26. REMOVAL OF ELECTRICAL CABLE AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-13B, -703) Proceed as follows:

a. Remove all screws (1, 7, 10, 14, 15, and 19, figure 4-19) and nuts (3, 5, 12, 17, and 18) securing electrical cable assembly clamps (2, 8, 11, 13, 16, and 20) to engine.

NOTE

Index each connector to facilitate reassembly.

b. Disconnect electrical cable assembly at each of the following remaining connectors: compressor rotor (N_1), tachometer generator (A), hot-air solenoid valve (B), ignition unit (C), starting fuel solenoid valve (D), power turbine (N_2) tachometer generator (E), transfer solenoid valve (G), and oil temperature bulb (H).

c. Remove screws (4) and nuts (9) securing airframe main connector (F) to bracket.

d. Remove electrical cable assembly from engine.

NOTE

The following two steps (e and f) apply to T53-L-13B engines only.

CAUTION

In the following step e, loosen each nut one turn, then progress to the next nut. Do not attempt to remove the harness until all nuts are loose.

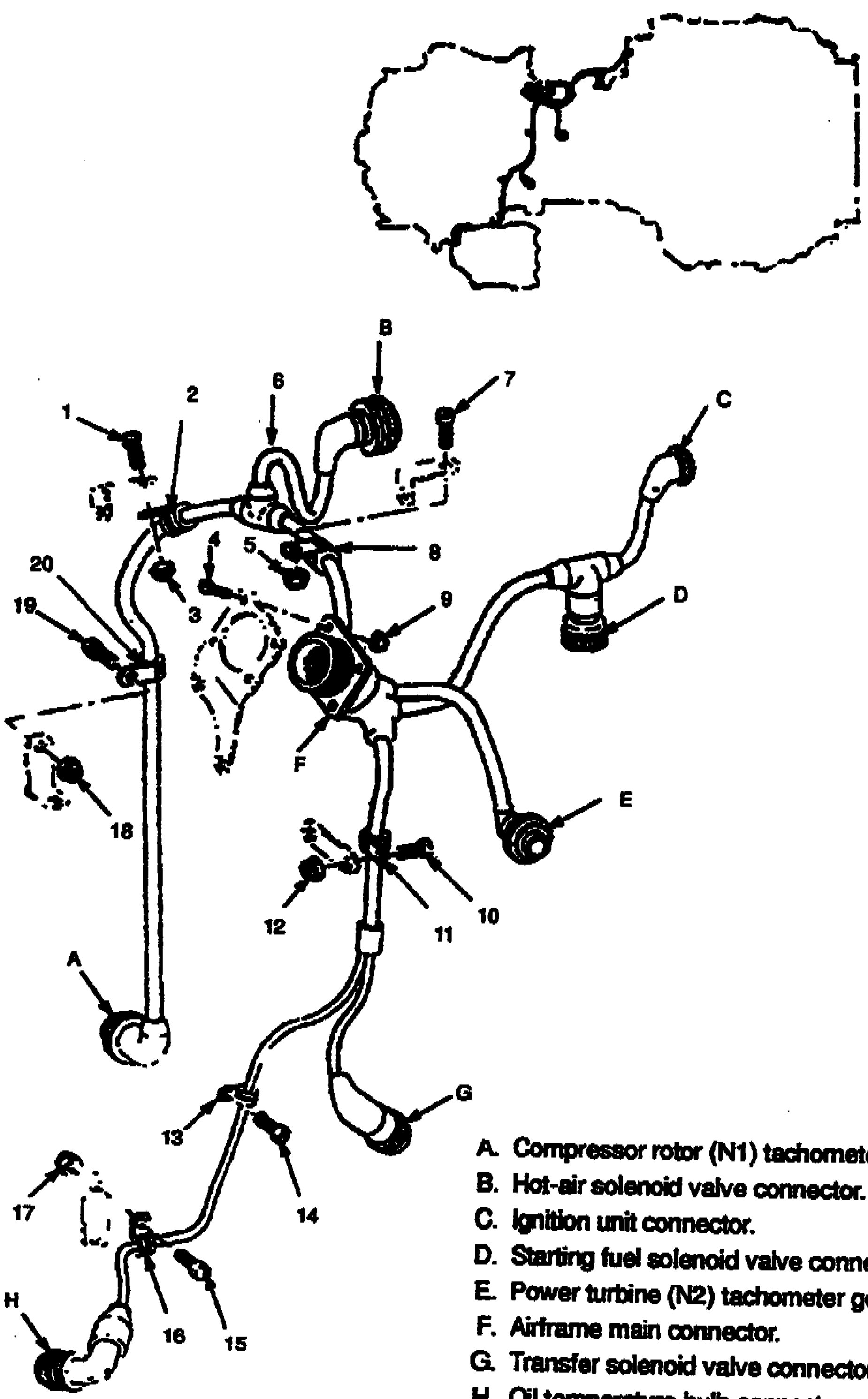
e. Using a 5/16 inch combination wrench, P/N GOE X100, or equivalent, with box end modified (by grinding) to 3/32-inch maximum thickness for a length of approximately one inch, remove nuts (3, figure 4-20) that retain exhaust thermocouple assembly (1) to exhaust diffuser.

CAUTION

In following step f, when removing exhaust the thermocouple assembly from exhaust diffuser, do not damage thermocouple ends. Flex or bend exhaust thermocouple assembly only as necessary to remove.

f. Remove exhaust thermocouple harness from studs.

g. On T53-L-703 engines, disconnect the thermocouple lead assembly (2) from connector housing on exhaust diffuser support cone.



A. Compressor rotor (N1) tachometer generator connector.
B. Hot-air solenoid valve connector.
C. Ignition unit connector.
D. Starting fuel solenoid valve connector.
E. Power turbine (N2) tachometer generator connector.
F. Airframe main connector.
G. Transfer solenoid valve connector.
H. Oil temperature bulb connector.

Figure 4-19. Electrical Cable Assembly and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-19	No Number	ELECTRICAL CABLE AND EXHAUST THERMO-COUPLE ASSEMBLIE SAND RELATED PARTS (NHA 1-170-330-13 and 1-170-300-21)	Ref	A,B
-1	AN501-10-8	. SCREW, Machine	1	A,B
-2	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 300-271-03)	1	A,B
-3	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-4	AN116905	. SCREW, Machine	4	A,B
-5	AN363-1032	. NUT, Self-locking (Replace with (MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-6	59359	. CABLE ASSEMBLY, Special purpose (77820) (Lycoming Source Cont Dwg 1-300-242-02)	1	A,B
	10-321720-1	. CABLE ASSEMBLY, Special purpose (77820) (Alternate) (Lycoming Source Cont Dwg 1-300-242-03)	1	A,B
-7	AN501-10-8	. SCREW, Machine	1	A,B
-8	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	A,B
-9	MS20365-440	. NUT, Self-locking	4	A,B
-10	AN501-10-8	. SCREW, Machine	1	A,B
-11	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	2	A,B
-12	AN363-1032	. NUT, Self-locking (Replace with (MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-13	8016S3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	A,B
-14	AN501A10-5	. SCREW, Machine	1	A,B
-15	AN501-10-8	. SCREW, Machine	1	A,B
-16	8016S3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	A,B
-17	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-18	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-19	AN501-10-8	. SCREW, Machine	1	A,B
-20	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	A,B

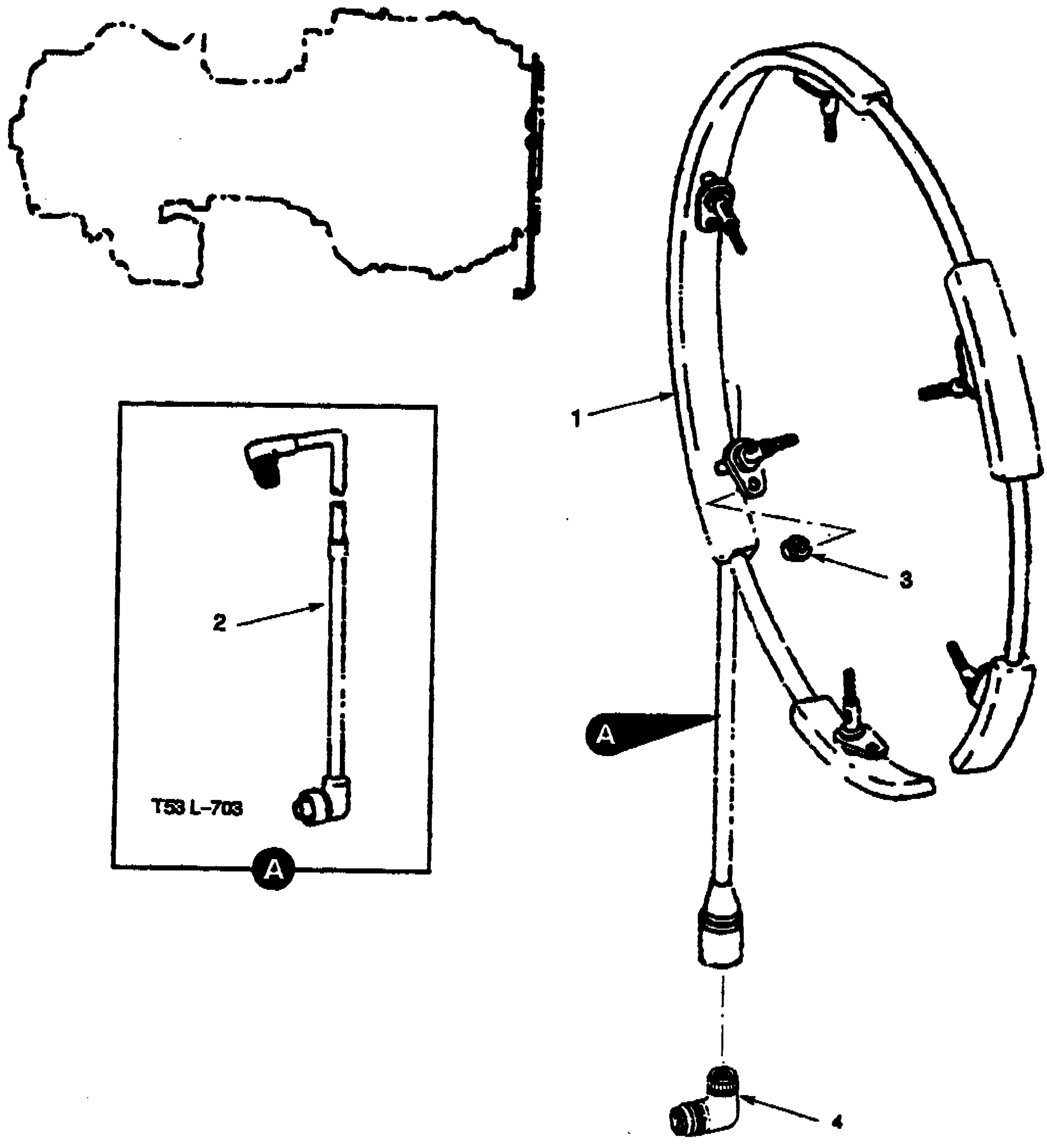


Figure 4-20. Exhaust Thermocouple Assembly, Thermocouple Lead Assembly, and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-20	No Number	ELECTRICAL CABLE AND EXHAUST THERMO COUPLE ASSEMBLIES AND RELATED PARTS (NHA 1-170-330-13 and 1-170-330-21)	Ref	A,B
-1	TH38583	. THERMOCOUPLE ASSEMBLY, Exhaust (50625) (Lycoming Source Cont Dwg 1-300-177-01) (Replace by 1-300-177-02)	1	A
	6006	. THERMOCOUPLE ASSEMBLY, Exhaust (83311) (Lycoming Source Cont Dwg 1-300-177-02)	1	A
	TH41310	. THERMOCOUPLE ASSEMBLY, Exhaust (50625) (Alternate) (Lycoming Source Cont Dwg 1-300-177-03)	1	A
	1-300-177-AV	. THERMOCOUPLE ASSEMBLY, EXHAUST (24735)	1	A
	1-300-177-04	. THERMOCOUPLE ASSEMBLY, EXHAUST	1	A
-2	1-300-599-01	. LEAD ASSEMBLY	1	B
-3	MS21043-4	. NUT, Self-locking	6	
-4	1-300-178-01	. . ADAPTER, CONNECTOR	1	A

4-27. REMOVAL OF ELECTRICAL CABLE AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-15). Proceed as follows:.

a. Remove screws (1, 4, 6, 9, 17, and 20, figure 4-21) and nuts (10, 12, 14, 15, and 16) that secure electrical cable assembly clamps (2, 5, 7, 8, 18, and 19) to engine.

NOTE

Index each connector to facilitate reassembly.

b. Disconnect electrical plug at airframe main connector (A).

c. Disconnect electrical cable assembly (21) at each of the following connectors: oil temperature bulb (G), starting fuel solenoid valve (C), fuel filter pressure switch (D), power turbine (N2) tachometer generator (E), hot-air solenoid valve (J), compressor rotor (H1) tachometer generator (H), chip detector (1), and ignition unit input (B).

NOTE

Connector (F) is not used.

d. Remove screws (3) and nuts (13) that secure airframe main connector (A) to bracket.

e. Remove electrical cable assembly from engine.

f. Remove nuts (2, figure 4-22) that retain exhaust thermocouple assembly (1) to exhaust diffuser.

CAUTION

When complying with following step g, excessive flexing of thermocouple assembly harness, specifically at probe locations, can lead to internal breakage and shorting. Use extreme caution when removing harness from exhaust diffuser. Always remove end probes first. Never use pliers or other sharp objects to pry probes or adjacent harness loose from exhaust diffuser.

g. Remove exhaust thermocouple harness from studs.

4-28. REMOVAL OF ELECTRICAL CABLE AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-701, -701A). Proceed as follows:

a. Remove all screws (1, 4, 6, 9, 17, and 20, figure 4-23) and nuts (10, 12, 14, 15, and 16) that secure electrical cable assembly clamps (2, 5, 7, 8, 18, and 19) to engine.

NOTE

Index each connector to facilitate reassembly.

b. Disconnect electrical plug at airframe main connector (A).

c. Disconnect electrical cable assembly (21) at each of the following connectors: oil temperature bulb (G), starting fuel solenoid valve (C), fuel filter pressure switch (D), power turbine (N_2) tachometer generator (E), electric torquemeter (K); hot-air solenoid valve (J), compressor rotor (N1) tachometer generator (H), chip detector (I), and ignition unit input (B).

NOTE

Connector (F) is not used.

d. Remove screws (3) and nuts (13) that secure airframe main connector (A) to bracket.

A. Airframe main connector.
B. Ignition unit input.
C. Starting fuel solenoid valve.
D. Fuel filter pressure switch.
E. Power turbine (N2) tachometer generator.
F. Connector (not used).
G. Oil temperature bulb.
H. Compressor rotor (N1) tachometer generator.
I. Chip detector.
J. Hot-air solenoid valve.

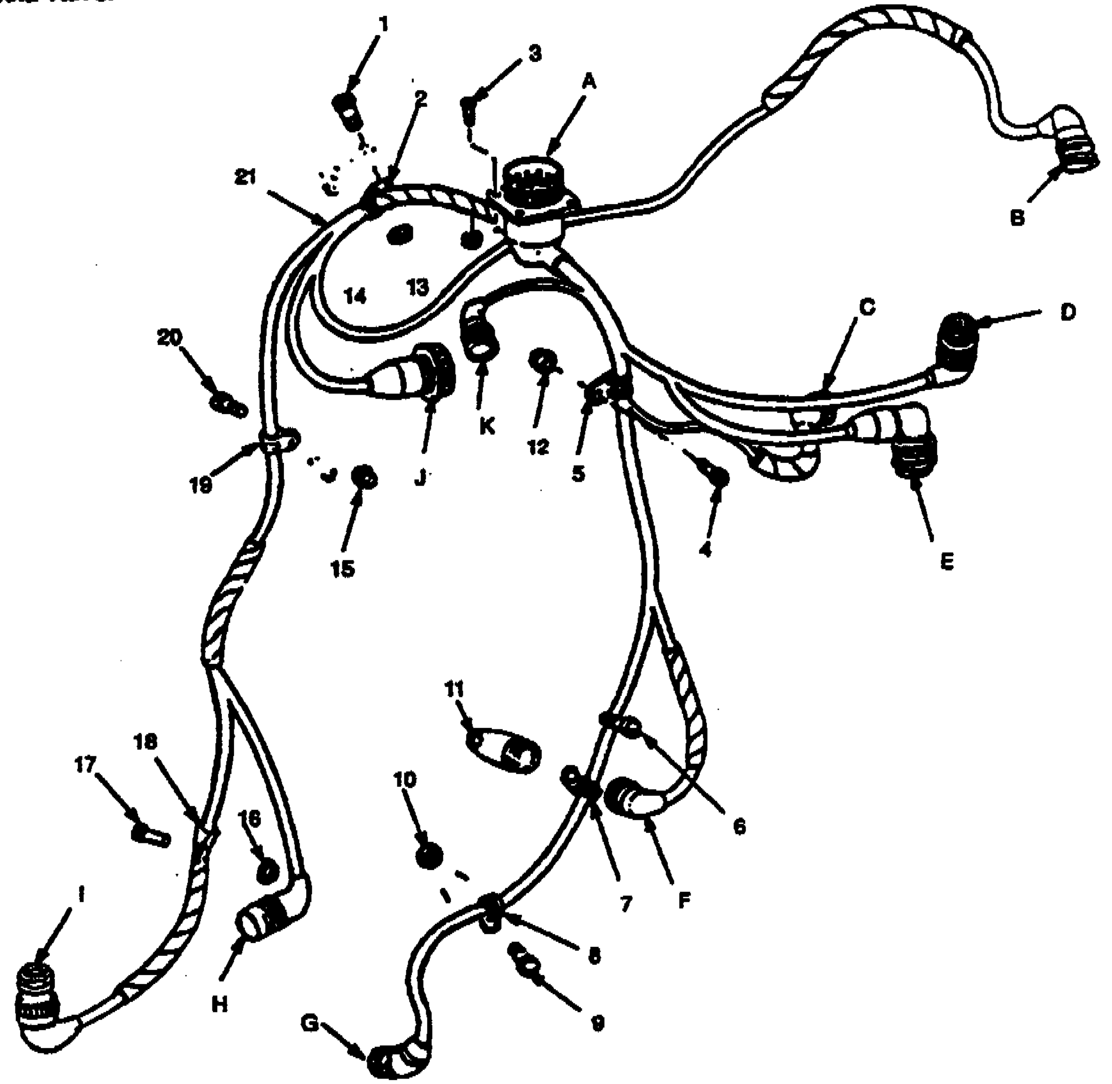


Figure 4-21. Electrical Cable Assembly and Attaching Parts (T53-L-15).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-21	No Number	ELECTRICAL CABLE AND EXHAUST THERMO-COUPLE ASSEMBLIES AND RELATED PARTS (NHA 1-170-330-06)	Ref	C
-1	AN502-10-8	. SCREW, Machine	1	C
-2	EAB7005	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	C
-3	AM116916	. SCREW, Oval Phillips head	4	C
-4	AN502-10-8	. SCREW, Machine	1	C
-5	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	C
-6	AN501A10-5	. SCREW, Machine	1	C
-7	EAB700-3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	C
-8	EAB700-3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	C
-9	AN502-10-8	. SCREW, Machine	1	C
-10	MS21042-3	. NUT, Self-locking	1	C
-11	1-160-482-0 2	. CONNECTING LINK, Rigid	1	C
-12	MS21042-3	. NUT, Self-locking	1	C
-13	MS21044N04	. NUT, Self-locking	4	C
-14	MS21042-3	. NUT, Self-locking	1	C
-15	MS21042-3	. NUT, Self-locking	1	C
-16	MS21042-3	. NUT, Self-locking	1	C
-17	AN502-10-8	. SCREW, Machine	1	C
-18	EAB700-3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	C
-19	EAB700-3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	C
-20	AN502-10-8	. SCREW, Machine	1	C
-21	59357	. CABLE ASSEMBLY, Special purpose, electrical branched (81482) (Lycoming Source Cont Dwg 1-300-196-03)	1	C
	10-321725-1	. CABLE ASSEMBLY, Special purpose, electrical branched (77820) (Alternate) (Lycoming Source Cont Dwg 1-300-196-04)	1	C

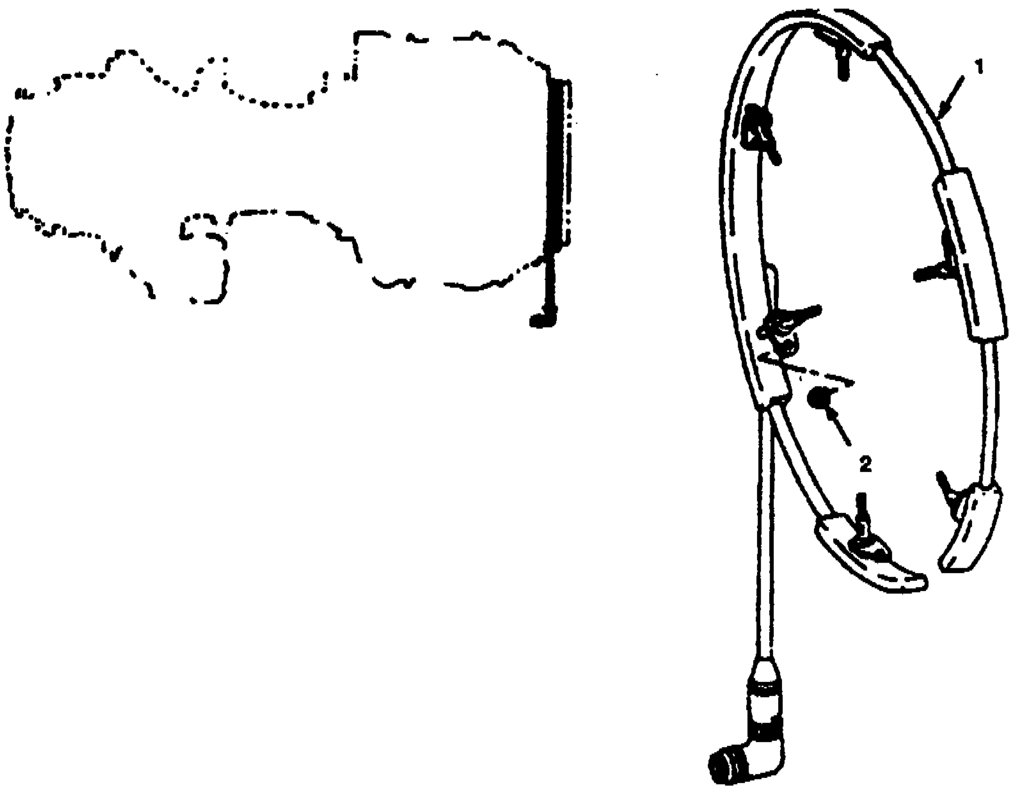


Figure 4-22. Exhaust Thermocouple Assembly and Attaching Parts (T53-L-15, -701,-701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-22	No Number	ELECTRICAL CABLE AND EXHAUST THERMO COUPLE ASSEMBLIES AND RELATED PARTS (NHA 1-170-330-06 AND 1-170-330-09)	Ref	C,D,E
-1	TH38583	. THERMOCOUPLE ASSEMBLY, Exhaust (50625) (Lycoming Source Cont Dwg 1-300-177-01) (Replaced by 1-300-177-02)	1	C,D,E
	6006	. THERMOCOUPLE ASSEMBLY, Exhaust (83311) (Lycoming Source Cont Dwg 1-300-177-02)	1	C,D,E
	TH41310	. THERMOCOUPLE ASSEMBLY, Exhaust (50625) (Alternate) (Lycoming Source Cont Dwg 1-300-177-03)	1	C,D,E
	1-300-177-AV	. THERMOCOUPLE ASSEMBLY (24735)	1	C,D,E
	1-300-177-04	. THERMOCOUPLE ASSEMBLY, EXHAUST	1	C,D,E
-2	MS21043-4	. NUT, Self-locking	6	C,D,E

A. Airframe main connector.
B. Ignition unit input.
C. Starting fuel solenoid valve.
D. Fuel filter pressure switch.
E. Power turbine (N2) tachometer generator.
F. Connector (not used).
G. Oil temperature bulb.
H. Compressor rotor (N1) tachometer generator.
I. Chip detector.
J. Hot-air solenoid valve.
K. Electric torquemeter.

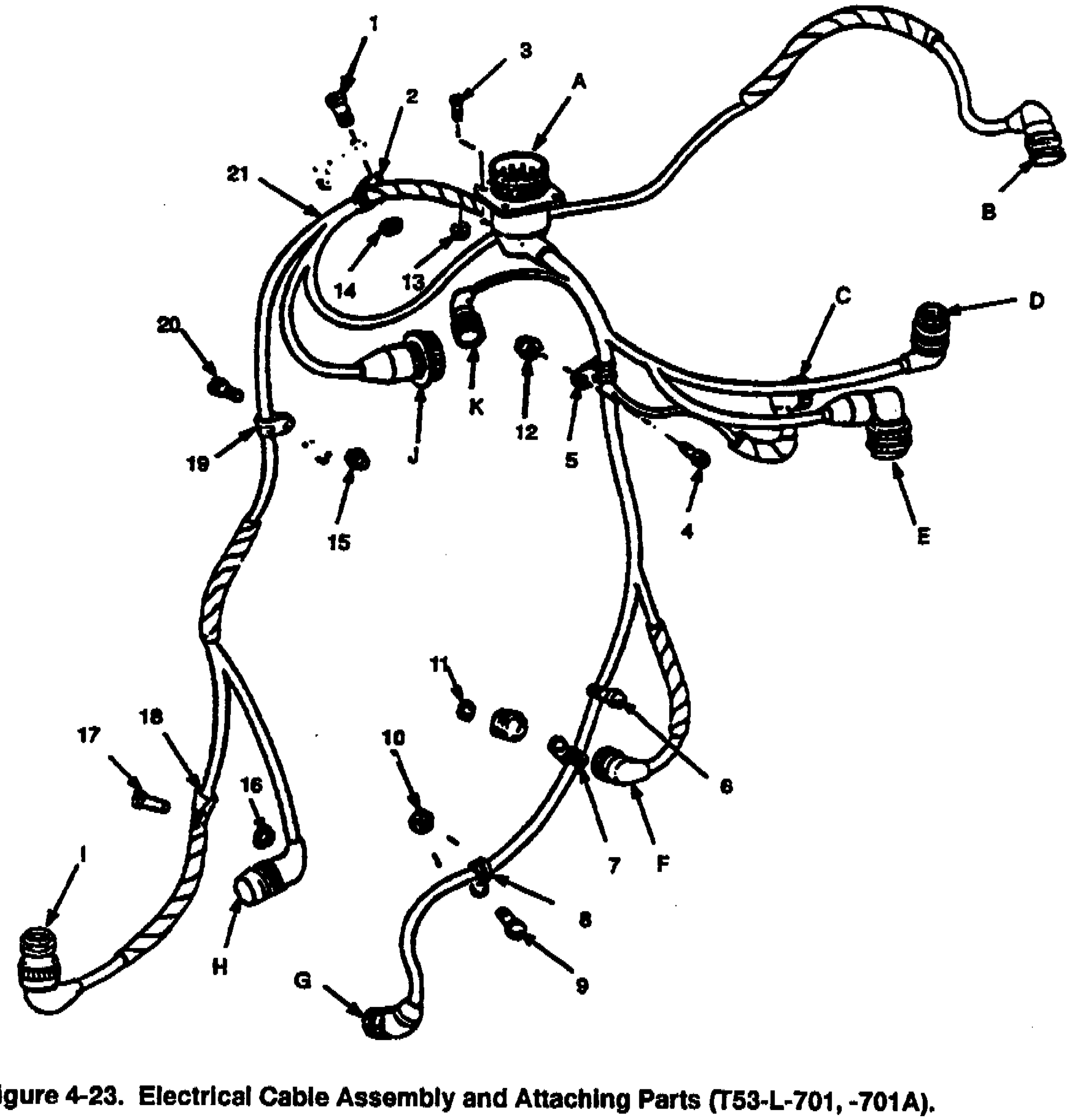


Figure 4-23. Electrical Cable Assembly and Attaching Parts (T53-L-701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-23	No Number	ELECTRICAL CABLE AND EXHAUST THERMO COUPLE ASSEMBLIES AND RELATED PARTS (NHA 1-170-330-09)	Ref	D,E
-1	MS35266-63	. SCREW, Machine	1	D,E
-2	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	1	D,E
-3	MS35265-29	. SCREW, Oval Phillips head	4	D,E
-4	MS35266-63	. SCREW, Machine	1	D,E
-5	8016S5	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-04)	1	D,E
-6	MS35266-60	. SCREW, Machine	1	D,E
-7	8016S3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	D,E
-8	8016S3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	D,E
-9	MS35266-63	. SCREW, Machine	1	D,E
-10	MS21042-3	. NUT, Self-locking	1	D,E
-11	1-160-482-02	. CONNECTOR LINK, Rigid	1	D,E
-12	MS21042-3	. NUT, Self-locking	1	D,E
-13	MS21042-06	. NUT, Self-locking	4	D,E
-14	MS21042-3	. NUT, Self-locking	1	D,E
-15	MS21042-3	. NUT, Self-locking	1	D,E
-16	MS21042-3	. NUT, Self-locking	1	D,E
-17	MS35266-63	. SCREW, Machine	1	D,E
-18	8016S3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	D,E
-19	8016S3	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-02)	1	D,E
-20	MS35266-63	. SCREW, Machine	1	D,E
-21	64545	. WIRING HARNESS, Branched (81482) (Lycoming Source Cont Dwg 1-300-427-01)	1	D,E

e. Remove electrical cable assembly from engine.

f. Remove nut (2, figure 4-22) that retains exhaust thermocouple assembly (1) to exhaust diffuser.

CAUTION

When complying with following step g excessive flexing of thermocouple assembly harness, specifically at probe locations, can lead to internal breakage and shorting. Use extreme caution when removing harness from exhaust diffuser. Always remove end probes first. Never use pliers or other sharp objects to pry probes or adjacent harness loose from exhaust diffuser.

g. Remove exhaust thermocouple harness from studs.

4-29. REMOVAL OF HOT-AIR SOLENOID VALVE AND AIR REGULATOR TUBE. Proceed as follows:

a. Expand retaining ring (5, figure 4-24) at forward end of air regulator tube (4). Slide ring towards rear of tube.

b. Remove tube from valve by twisting and sliding it toward front of engine.

c. Remove bolts (7) that secure flange of solenoid valve to impeller flange on T53-L-13B,-15,-701,-701A engines, or bleed air adapter assembly on T53-L-703 engines.

d. Remove hot air solenoid valve (2) and gasket (1). Discard gasket. Remove packing (3) from valve. Discard packing.

e. Remove tube and packing (6) from inlet housing. Remove retaining ring (5) from air regulator tube (4).

f. Cover opening in inlet housing where tube was removed.

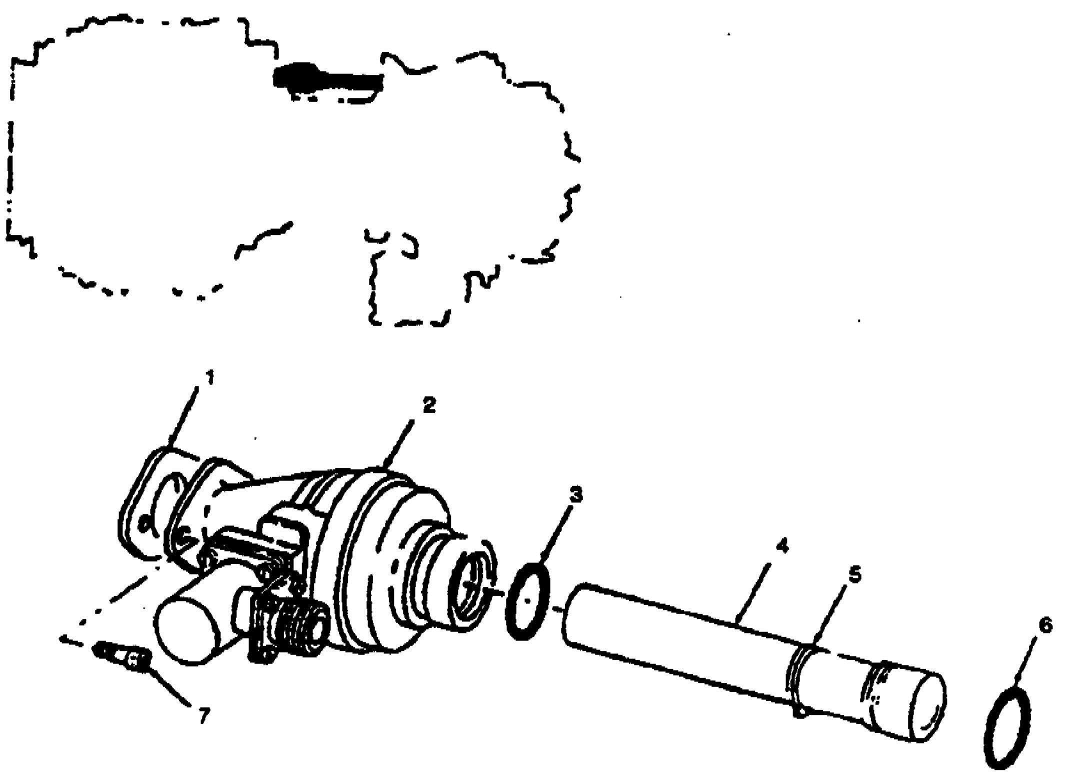


Figure 4-24. Hot-Air Solenoid Valve, Air Regulator Tube, and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-24	No Number	HOT AIR SOLENOID VALVE, AIR REGULATOR TUBE, AND RELATED PARTS (NHA 1-170-330-06, 1-170-330-09, 1-170-330-13, and 1-170-330-21)	Ref	
-1	1-160-047-02	. GASKET, Valve, anti-icing	1	
-2	26230027	. VALVE, Solenoid, hot air (80234) (Lycoming Source Cont Dwg 1-300-194-02)	1	
	26330053	. VALVE, Solenoid, hot air (80234) (Alternate) (Lycoming Source Cont Dwg 1-300-194-03)	1	
	28040	. VALVE, Solenoid, hot air (99643) (Alternate) (Lycoming Source Cont Dwg 1-300-194-04)	1	
-3	STD3000B19	. PACKING	1	
-4	1-100-334-05	. TUBE, Air regulator	1	
-5	MS16624-1106	. RING, Retaining	1	
-6	STD3000B20	. PACKING	1	
-7	MS9924-08	. BOLT	2	

SECTION V. FUEL CONTROL

4-30. REMOVAL OF FUEL CONTROL (T53-L-13B, -703). Proceed as follows:

a. Remove screws (6, figure 4-25) and nuts (4) that secure clamps (5) to brackets on overspeed governor and tachometer drive assembly and compressor housing flange.

b. Remove tube assembly with rod end bearings per paragraph 4-32 a.

CAUTION

Cap all openings immediately.

c. Disconnect air pressure-sensing hose assembly (7) from inlet housing and from fuel control. Remove hose assembly.

d. Remove nut (2), elbow (3), and packing (1) from inlet housing and union (8) and packing (9) from fuel regulator. Discard packing.

e. Disconnect and tag all remaining fuel, air, and mechanical connections. Cap all open ports.

f. Remove screw (20) and nut (27) that secures clamp (21) to bracket.

g. Remove bolts (19) and washers (18) that secure upper housing (17) and lower housing (16) to inlet housing. Remove housings and gaskets (15).

CAUTION

In following step h, exercise extreme care in removing and handling the lower and upper housings (16 and 17) which contain the temperature-sensing element. Nicks, dents, or sharp bends may destroy the capillary action of the tube.

h. Support fuel control assembly and remove nuts (23) and washers (24).

i. Withdraw fuel control, keeping it as level as possible to prevent damage or distortion to shaft (11). Remove gasket (26), packing (12), and seal (25). Discard packing.

j. Withdraw tube (14) with attached snap rings (13), and packing (12) from regulator (22). Discard packing.

k. Remove shaft (11) and nuts (10).

l. If fuel control is to be removed for more than 48 hours, preserve it as follows:

(1) Thoroughly clean fuel controls shaft, mounting flange, overspeed governor drive shaft port, and all threaded areas with dry cleaning solvent (item 134, table C–1). Blow out all crevices with dry, filtered compressed air. Air dry or wipe with a clean lint-free cloth.

(2) Remove servo supply filter and pump discharge strainer. Allow fuel to drain from fuel control.

(3) Install high-pressure caps on main and starting fuel outlet and inlet fittings and on pump discharge ports.

(4) Pour lubricating oil (item 189, table C–1)into fuel control, through pump discharge retainer port, and install cap.

(5) Rotate fuel control drive shaft by hand.

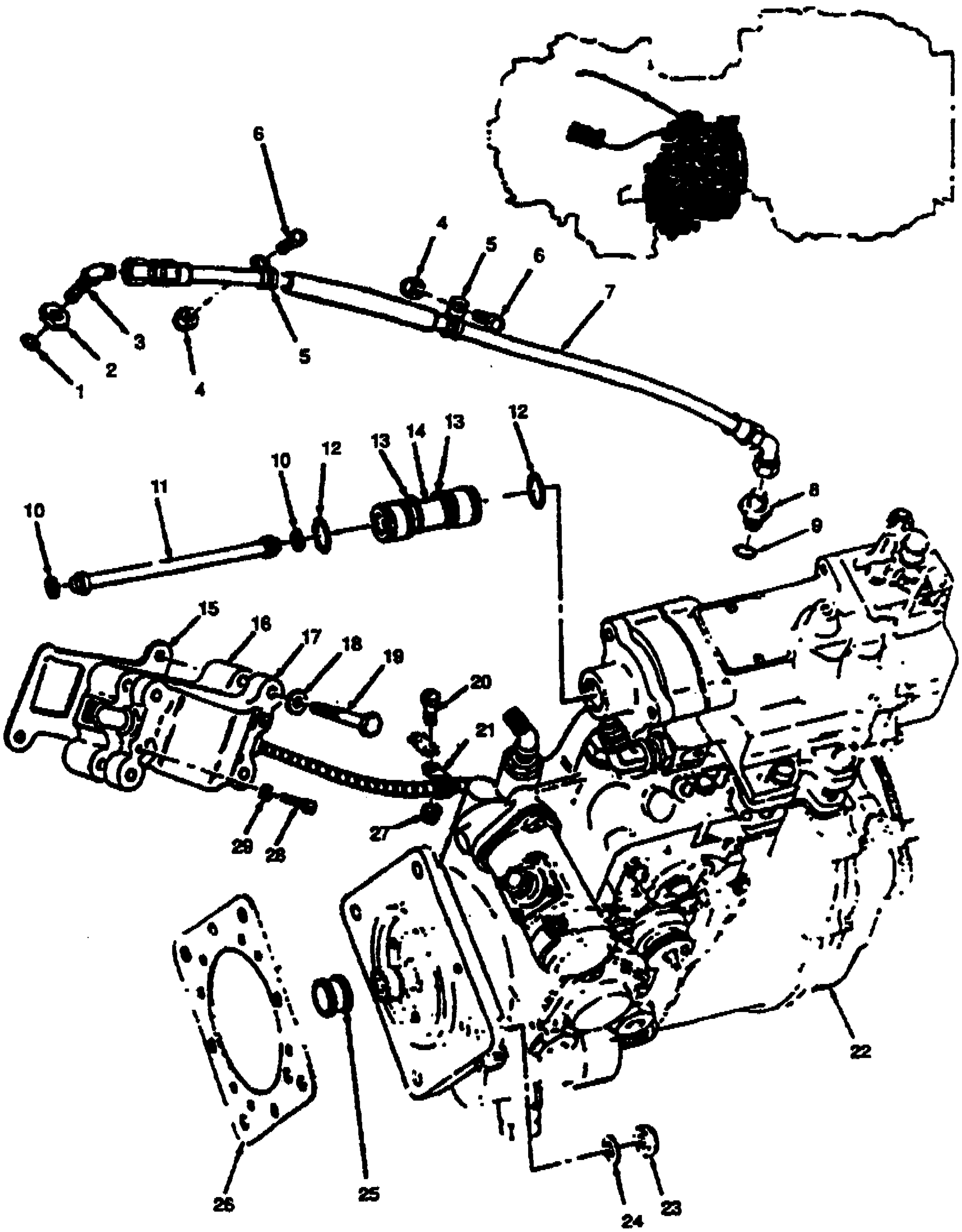


Figure 4-25. Fuel Control and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-25	No Number	FUEL CONTROL AND RELATED PARTS (NHA 1-170-330-13 and 1-170-330-21)	Ref	A,B
-1	STD3017E4	. PACKING	1	A,B
-2	AN924-4D	. NUT, Flared tube	1	A,B
-3	AN833-4D	. ELBOW, Flared tube	1	A,B
-4	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	2	A,B
	MS21042-3	. NUT, Self-locking	2	A,B
-5	8016S4	. CLAMP, Loop (72285) (Lycoming Spec Cont Dwg 1-300-271-03)	2	A,B
-6	AN501-10-8	. SCREW, Machine	2	A,B
-7	95739	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-135-01)	1	A,B
	M666300-17	. HOSE ASSEMBLY Nonmetallic (70128) (Alternate) (Lycoming Source Cont Dwg 1-300-135-02)	1	A,B
	R25735	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-135-03)	1	A,B
-8	AN815-4D	. UNION, Flared Tube (Replace with MS24392J4)	1	A,B
	MS24392J4	. TUBE, Nipple	1	A,B
-9	STD3017E4	. PACKING (Replace with M83248/1-904)	1	A,B
	M83248/1-904	. PACKING	1	A,B
-10	1-160-589-02	. NUT, Plain, spline	AR	
-11	1-160-444-01	. SHAFT, Shouldered	1	A,B
-12	MS29561-113	. PACKING	2	A,B
-13	STD3033C15	. RING, Snap	2	A,B
-14	1-160-464-01	. TUBE, Govenor shaft	1	A,B
-15	1-160-454-01	. GASKET, Temperature-sensing element	1	A,B
-16	1-170-120-01	. HOUSING, Lower	1	A,B
-17	1-160-446-03	. HOUSING, Upper	1	A,B
-18	AN960-10L	. WASHER, Flat	4	A,B
-19	AN 103722	. BOLT, Drilled hex head	4	A,B
-20	AN5-1-10-8	. SCREW, Machine	1	A,B
-21	MS9024-03	. CLAMP, Loop	1	A,B

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-25-22	84200A1	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A2)	1	A,B
	84200A2	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A3)	1	A,B
	84200A3	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A4)	1	A,B
	84200A4	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A5)	1	A,B
	84200A5	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A6)	1	A,B
	84200A6	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A7)	1	A,B
	84200A7	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-47)	1	A,B
	100770A4	. REGULATOR, Main (11599)	1	A,B
	106500A1	. REGULATOR, Main (11599)	1	A,B
-23	AN363-524	. NUT, Self-locking (Replace with MS21042-5)	4	A,B
	MS21042-5	. NUT, Self-locking	4	A,B
-24	AN960-516L	. WASHER, Flat	4	A,B
-25	101003	. SEAL, Special (07060) (Lycoming Source Cont Dwg 1-300-368-01) (Use with 84200A3, 84200A4, 84200A5, 84200A6, and 84200A7)	1	A,B
-26	1-080-025-02	. GASKET, Cover	1	A,B
-27	AN363-1032	. NUT, Self-locking (Replace with MS21042-3)	1	A,B
	MS21042-3	. NUT, Self-locking	1	A,B
-28	AN503-8-10	. SCREW, Machine	2	A,B
-29	AN960C8	. WASHER, Flat	2	A,B

(6) Turn fuel control over several times to allow lubricating oil to penetrate to all sections. Remove caps and add oil, if necessary. Recap.

(7) Reinstall servo supply filter and pump discharge strainer.

(8) Enclose fuel control in a plastic envelope and store in a clean dry area.

m. Remove screws (28) and washers (29) that secure upper housing (17) to lower housing (16) and separate housings. Retain housings for installation of fuel control.

4-31. REMOVAL OF FUEL CONTROL (T53-L-15, -701, -701A). Proceed as follows:

a. Remove screws (6, figure 4-26) and nuts (4) that secure clamps (5) to brackets on overspeed governor and tachometer drive assembly and compressor housing flange.

CAUTION

Cap all openings immediately.

b. Disconnect air pressure-sensing hose assembly (7) from inlet housing and from fuel control. Remove hose assembly.

c. Remove nut (2), elbow (3), and packing (1) from inlet housing and union (8) and packing (9) from fuel control. Discard packing.

d. Disconnect and tag remaining fuel, air, and mechanical connections. Cap all open ports.

e. Remove screw (28) and nut (26) that secure clamp (27) to bracket.

CAUTION

In following step f, when handling the temperature-sensing element housing assembly (21), exercise extreme care in removing and handling the lower and upper housings (22 and 23) which contain the temperature-sensing element. Nicks, dents, or sharp bends may destroy the capillary action of the tube.

f. Remove bolts (29) and washers (30) that secure upper housing (23) and lower housing (22) to inlet housing. Remove housings and gasket (31).

g. Slide snap ring (13) aft toward center of tube (14) and push tube forward into overspeed governor and tachometer drive housing.

h. Support fuel control assembly and remove nuts (16) and washers (17).

i. Withdraw fuel control, keeping it as level as possible to prevent damage or distortion to topping governor drive shaft (11). Remove gasket (20), seal (19), and packing (12). Discard packing.

j. Remove topping governor drive shaft (11) and nuts (10).

k. If fuel control is to be removed for more than 48 hours, preserve it in accordance with instructions in paragraph 4-30, step k.

l. Remove screws (25) and washers (24) that secure upper housing (23) to lower housing (22) and separate housings. Retain housings for installation of fuel control.

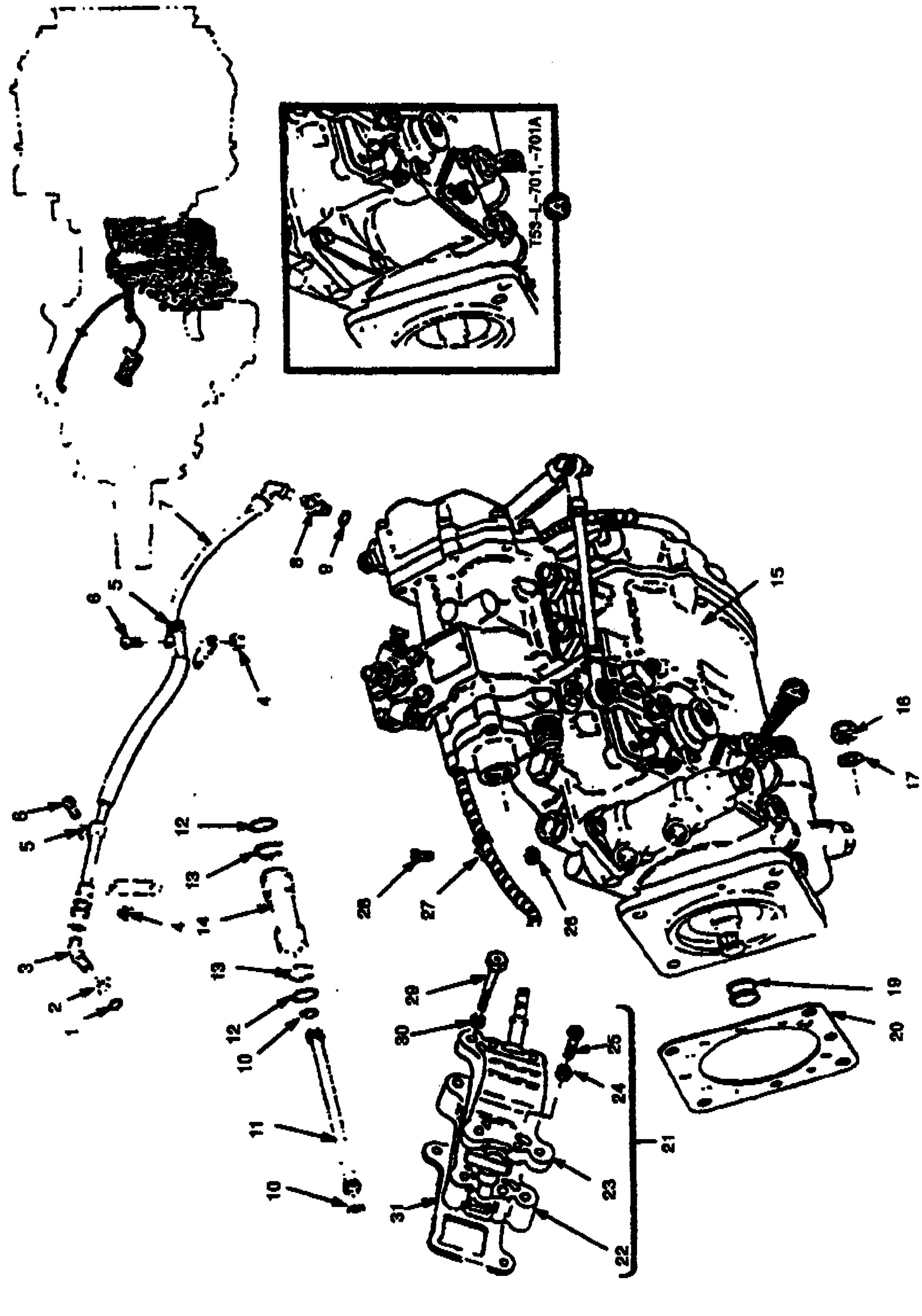


Figure 4-26. Fuel Control and Attaching Parts (T53-15, -701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-26	No Number	FUEL CONTROL AND RELATED PARTS (NHA 1-170-330-06 and 1-170-330-09)	REF	C,D,E
-1	STD3017E4	. PACKING	1	C,D,E
-2	AN924-4D	. NUT, Flared tube	1	C,D,E
-3	AN833-4D	. ELBOW, Flared tube	1	C,D,E
-4	MS21042-3	. NUT, Self-locking	1	C
	MS21042-3	. NUT, Self-locking	2	D,E
-5	8016S5	. CLAMP, Loop (72285) (Lycoming Source Cont Dwg 1-300-271-04)	1	C,D,E
-6	AN501-10-8	. SCREW, Machine	2	C
	MS35266-63	. SCREW, Machine	2	D,E
-7	95739	. HOSE ASSEMBLY, Nonmetallic (78570) (Lycoming Source Cont Dwg 1-300-135-01)	1	C,D,E
	M666300-17	. HOSE ASSEMBLY, Nonmetallic (70128) (Alternate) (Lycoming Source Cont Dwg 1-300-135-02)	1	C,D,E
	R25735	. HOSE ASSEMBLY, Nonmetallic (50599) (Alternate) (Lycoming Source Cont Dwg 1-300-135-03)	1	C,D,E
-8	MS24392J4	. UNION, Flared tube	1	C,D,E
-9	M83248/1-904	. PACKING	1	C,D,E
-10	1-160-589-02	. NUT, Plain, splined	AR	C,D,E
-11	1-160-444-01	. SHAFT, Shouldered	1	C,D,E
-12	MS29561-113	. PACKING	2	C,D,E
-13	STD3033C15	. RING, Snap	2	C,D,E
-14	1-160-464-01	. TUBE, Governor shaft	1	C,D,E
-15	92700-A1	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-17) (Replace with 92700-A2)	1	C
	92700-A2	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-25) (Replace with 92700-A3)	1	C
	92700-A3	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-25) (Replace with 92700-A5)	1	C
	92700-A5	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-48)	1	C
	98500-A1	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-25) (Replace with 98500-A2)	1	D,E
	98500-A2	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-49)	1	D,E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-26-15	105900A1	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-88)	1	C,D,E
	107100A1	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-88)	1	C,D,E
	106000A1	. REGULATOR, Main fuel (11599) (Lycoming Part No. 1-170-240-88)	1	C,D,E
-16	MS21042-5	. NUT, Self-locking	4	C,D,E
-17	AN960-516L	. WASHER, Flat	4	C,D,E
-18	BLANK			
-19	101003	. SEAL, Special (07060) (Lycoming Source Cont Dwg 1-300-368-01)	1	C,D,E
-20	1-080-025-01	. GASKET, Cover	1	C,D,E
-21	1-160-040-03	. HOUSING ASSEMBLY, Temperature-sensing element	1	C,D,E
-22	1-170-120-01	. . HOUSING, Lower	1	C,D,E
-23	1-160-446-03	. . HOUSING, Upper	1	C,D,E
-24	AN960C8	. . WASHER, Flat	2	C,D,E
-25	AN503-8-10	. SCREW, Machine	2	C,D,E
-26	MS21042-3	. NUT, Self-locking	1	C,D,E
-27	MS9024-03	. CLAMP, Loop	1	C,D,E
-28	AN501-10-8	. SCREW, Machine	1	C
-29	AN103722	. BOLT, Drilled hex head	4	C,D,E
-30	AN960-10L	. WASHER, Flat	4	C,D,E
-31	1-160-454-01	. GASKET, Temperature-sensing element	1	C,D,E

SECTION VI. AIR INLET HOUSING

4-32. REMOVAL OF AIR INLET GUIDE VANE ACTUATOR ASSEMBLY. Proceed as follows:

a. Remove cotter pins (15, figure 4-27), nut (13), nut (16), bolts (9 and 18), washers (10), washer (12), and washer (17). Remove tube assembly (19) with rod end bearings (11).

b. Remove two rod end bearings (11) from tube assembly (19).

c. Cut lockwire and loosen nut (5). Unscrew bearing (6) from connector.

d. Remove three nuts (7), bolts (1 and 20), washers (2 and 21), support (3), and spacer (4).

e. Carefully remove inlet guide vane actuator assembly (8) from engine.

4-33. REMOVAL OF ELBOW, TUBE, AND BLEED AIR ADAPTER ASSEMBLY. Proceed as follows:

a. Remove three bolts (16, figure 4-28) that secure bleed air adapter elbow (1) to diffuser housing.

b. Using twisting motion, remove elbow and bleed air crossover tube (3) from bleed air adapter assembly (9). Separate elbow and tube and remove one packing (2) from elbow. Discard packing.

c. Remove remaining packing (2) from flange of adapter assembly (9). Discard packing.

NOTE

Perform steps d and e or f and g as required.

d. Remove two bolts (13) and washers (14) that secure adapter assembly (9) to impeller housing.

e. Remove adapter assembly and gasket (15) from impeller housing.

f. Remove bolts (6 and 8), washers (5), and clip (7) that secure bleed air adapter assembly (4) to air diffuser and compressor housing assembly.

g. Remove four bolts (12), cover (11), and gasket (10) from adapter assembly.

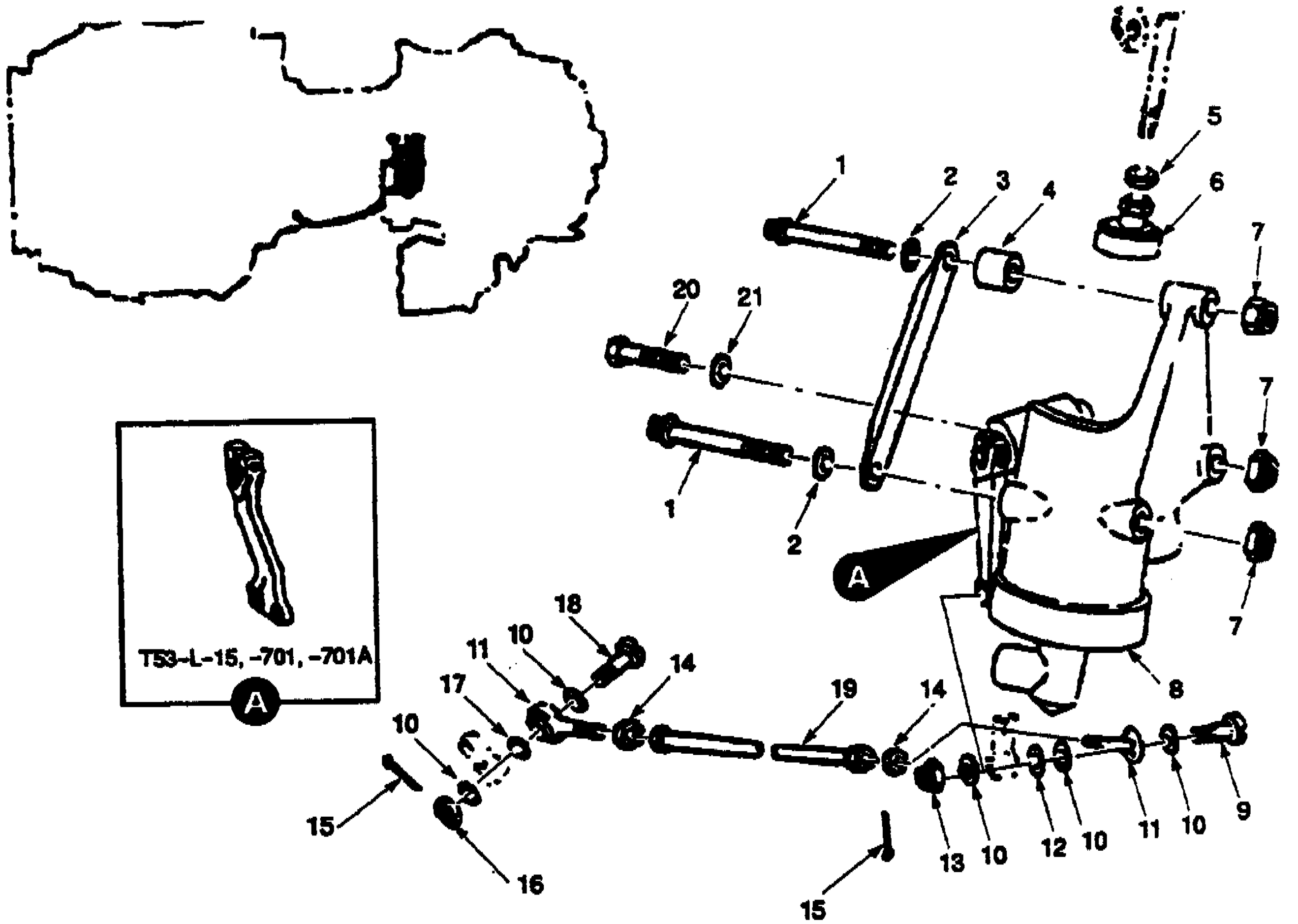


Figure 4-27. Air Inlet Guide Vane Actuator Assembly and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-27	No Number	INLET GUIDE VANE ACTUATOR ASSEMBLY AND RELATED PARTS (NHA 1-170-330-06,1-170-330-09, 1-170-330-13, AND 1-170-330-21)	Ref	
-1	MS9147-35	. BOLT, Machine	2	
-2	AN960C416	. WASHER	AR	
-3	1-180-210-01	. SUPPORT, Actuator Housing	1	
-4	1-160-607-02	. SPACER, Sleeve	1	
-5	2-161-055-01	. NUT, Hex drilled	1	
-6	TB3SP10	. BEARING, Plain, self-aligning (15860) (Lycoming Source Control Dwg 1-300-345-02)	1	
	S452	. BEARING, Plain, self-aligning (78118) (Alternate) (Lycoming Source Control Dwg 1-300-345-02)	1	
-7	AN363-428	. NUT, Self-locking (Replace with MS21042-4)	3	
	MS21042-4	. NUT, Self-locking	3	
-8	1-180-106-01	. HOUSING, Actuator	1	
-9	AN101916	. BOLT, Hex head	1	
-10	AN960-10L	. WASHER, Flat	AR	
-11	HMVVJ3	. BEARING, Plain, rod end (73134) (Lycoming Source Cont Dwg 1-300-341-01) (Replace with HMVVJ3A)	2	
	HMVVJ3A	. BEARING, Plain, rod end (73134) (Lycoming Source Cont Dwg 1-300-341-01)	2	
-12	AN960-10L	. WASHER, Flat	2	
-13	MS17826-3	. NUT, Self-locking	1	
-14	2-161-055-01	. NUT, Hex drilled	2	
-15	MS24665-151	. PIN, Cotter	2	
-16	AN150432	. NUT-HEX, Shear, slotted (Replace with MS17826-3)	AR	C,D,E
	MS17826-3	. NUT, Self-locking	1	C,D,E
-17	AN960-10L	. WASHER, Flat	4	
-18	AN101914	. BOLT, Hex head	1	
-19	1-180-160-01	. TUBE ASSEMBLY, Feedback linkage	1	
-20	AN101130	. BOLT, Hex head	1	A,B
	MS9519-24	. BOLT, Hex head	1	C,D,E
-21	AN960-416L	. WASHER, Flat	1	

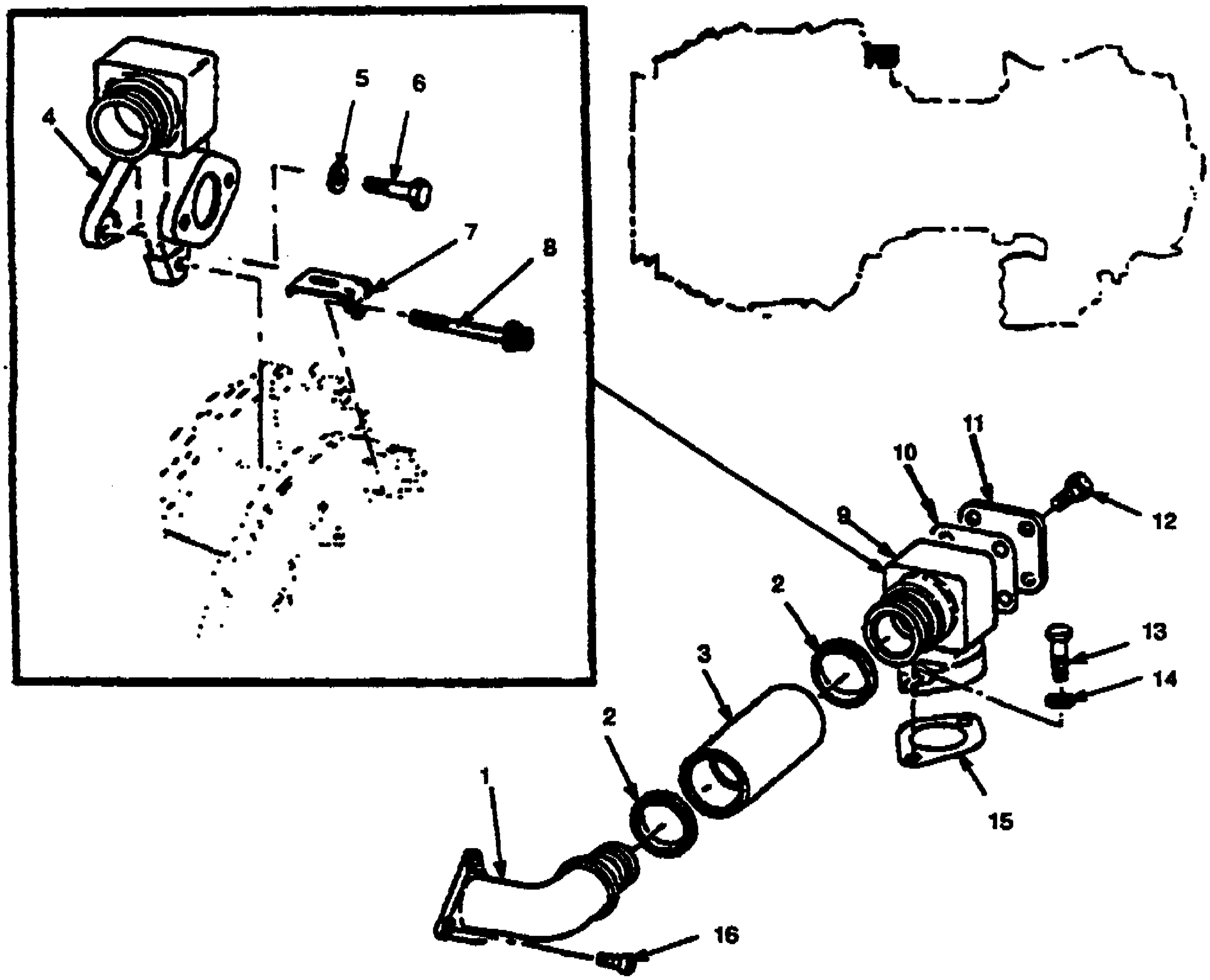


Figure 4-28. Elbow, Tube, and Bleed Air Adapter Assembly and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-28	No Number	BLEED AIR ADAPTER AND RELATED PARTS (NHA 1-170-330-06, 1-170-330-09,1-170-330-13 and 1-170-330-21)	Ref	
-1	1-160-033-01	. ELBOW, Bleed air adapter	1	
-2	STD8019E122	. PACKING (Replace with CEC2089)	2	
	CEC2089	. PACKING (07060) (Lycoming Source Cont Dwg 1-300-182-01)	2	
	E1057	. PACKING (15211) (Alternate) (Lycoming Source Cont Dwg 1-300-182-02)	2	
-3	1-160-619-01	. TUBE, Crossover, air bleed	1	
-4	1-170-710-02	. ADAPTER ASSEMBLY(Use with P/N 1-101-370-03)	1	
-5	AN960-416L	. WASHER, Flat (Use with P/N 1-170-710-02)	2	
-6	MS9530-13	. BOLT, Machine (Use with P/N 1-170-710-02)	2	
-7	1-160-253-01	. CLIP (Use with P/N 1-170-710-02)	1	
-8	MS9924-25	. BOLT, Machine (Use with P/N 1-170-710-02)	1	
-9	1-170-220-01	. ADAPTER ASSEMBLY, Bleed air	1	A,C,D,E
-10	1-160-299-02	. GASKET, Flange, bleed air	1	
-11	1-160-304-01	. COVER, Port, bleed air	1	
-12	AN107406	. BOLT, Drilled hex head	4	
	MS9584-06	. BOLT, Drilled hex head	4	
-13	AN4H5A	. BOLT, Drilled hex head	1	
-14	AN960-416L	. WASHER, Flat	2	
-15	1-160-047-02	. GASKET, Valve, anti-icing	1	
-16	AN148656	. BOLT, Socket head (Replaced with MS9089-06)	3	
	MS9089-06	. BOLT, Socket head	3	

SECTION VII. OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY AND POWER-DRIVEN ROTARY PUMP

4-34. REMOVAL OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY AND POWER-DRIVEN ROTARY (BOOSTER) PUMP. (T53-L-13B, -15, -703). Proceed as follows:

a. Remove bolts (13, figure 4-29) and washers (12) from overspeed governor and tachometer drive assembly (6). Remove power-driven rotary (booster) pump (14) and packing (11). Discard packing.

b. Remove six bolts (5, 7, and 9), five washers (8 and 10), and bracket (4) from inlet housing. Remove overspeed governor and tachometer drive assembly (6). Remove packings (2 and 3). Discard packings.

c. Withdraw shaft (1) from inlet housing.

4-35. REMOVAL OF ELECTRIC TORQUEMETER JUNCTION BOX ASSEMBLY. (T53-L-701, -701A). Proceed as follows:

a. Cut lockwire and remove four screws (30, figure 4-30) and four washers (2) from overspeed governor mounting flange.

b. Remove electric torquemeter junction box (1).

c. Disconnect electric cabling at connector (4).

4-36. REMOVAL OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-701, 701A). Proceed as follows:

a. Cut lockwire and remove six bolts (12, figure 4-31), washers (13), bolt (10), and bracket (9) from inlet housing. Remove overspeed governor and tachometer drive assembly (11). Remove packings (7 and 8). Discard packings.

b. Withdraw shaft (6) from inlet housing.

c. Remove packing (1) from top of plate (2). Discard packings.

d. Remove screws (4) and flat washers (3). Remove torquemeter lockplates (5) and plate (2).

e. Remove packing(1) from underside of plate. Discard packings.

4-37. REMOVAL OF POWER-DRIVEN ROTARY (OIL) PUMP. Proceed as follows:

a. Support power-driven rotary (oil) pump, (6, figure 4-32). Remove bolts (1 and 7) and washers (2).

b. Hold pump in position against mounting pad. Slowly pull pump directly from mounting pad. Use care not to damage drive shaft assembly.

c. Remove oil pump drive shaft assembly (3) from accessory drive gearbox assembly. Remove packings (4 and 5).

d. Remove scavenge filter assembly (8) from oil pump.

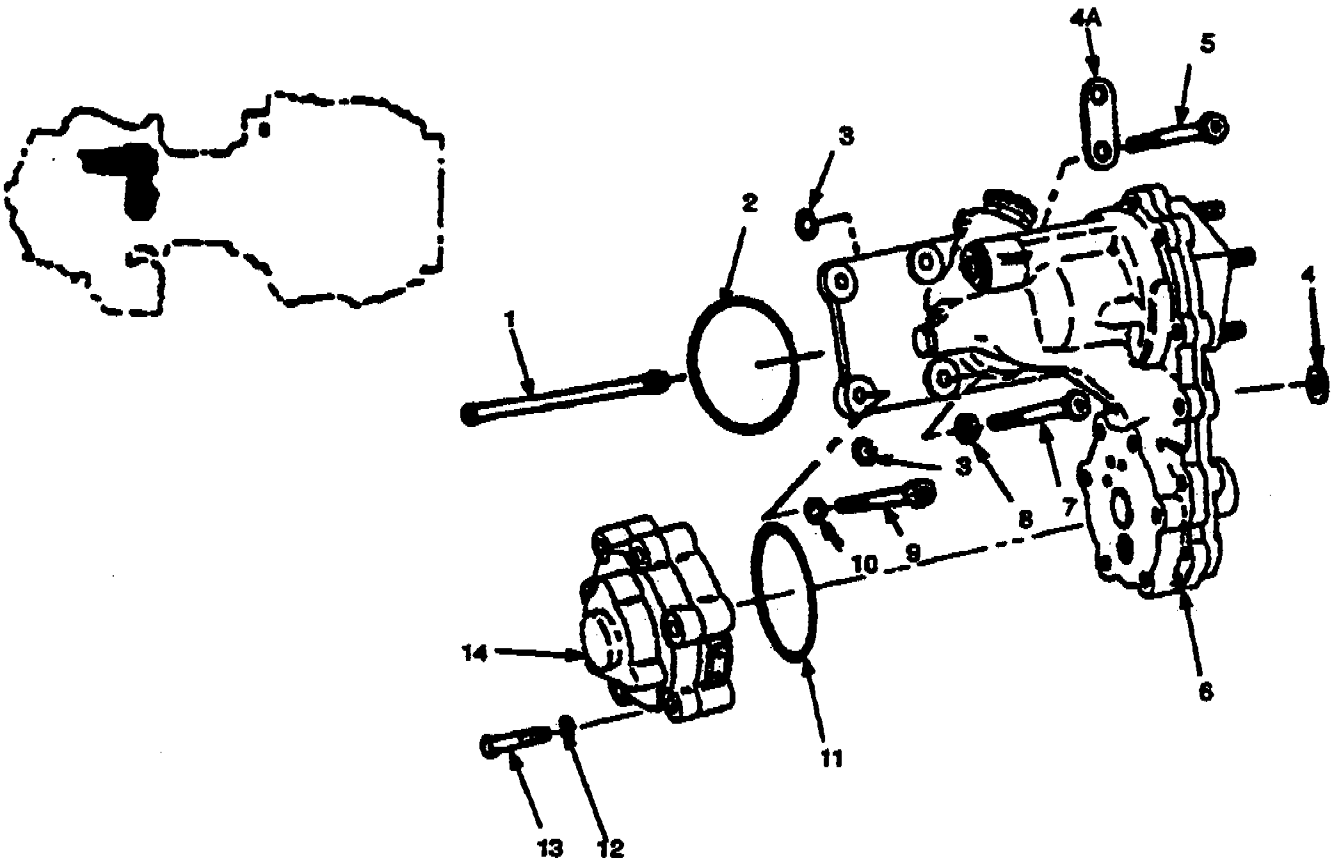


Figure 4-29. Overspeed Governor and Tachometer Drive Assembly, Torquemeter Booster Pump and Attaching Parts (T53-L-13B, -15, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-29	No Number	OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY AND RELATED PARTS (NHA 1-000-060-10, 1-000-060-22, 1-000-100-01, 1-000-060-23, 1-170-330-06, 1-170-330-13, and 1-170-330-21)	Ref	A,B,C
-1	1-160-411-01	. SHAFT, Spline	1	A,B,C
-2	MS29561-144	. PACKING	1	A,B,C
-3	MS29561-012	. PACKING	2	A,B,C
-4	1-160-566-01	. WASHER, Flat	1	A,B,C
-4a	1-160-309-01	. BRACKET	1	A,B,C
-5	MS9089-14	. BOLT	2	A,B,C
-6	1-160-500-04	. DRIVE ASSEMBLY, Overspeed governor and tachometer	1	A,B,C
-7	MS9530-18	. BOLT	2	A,B,C
-8	AN960-416L	. WASHER, Flat	2	A,B,C
-9	MS9530-13	. BOLT	2	A,B,C
-10	AN960-416L	. WASHER, Flat	2	A,B,C
-11	MS29561-230	. PACKING	1	A,B,C
-12	AN960-10L	. WASHER, Flat	6	A,B,C
-13	AN103721	. BOLT, Machine	6	A,B,C
-14	1-300-221-04	. PUMP, Rotary	1	A,B,C

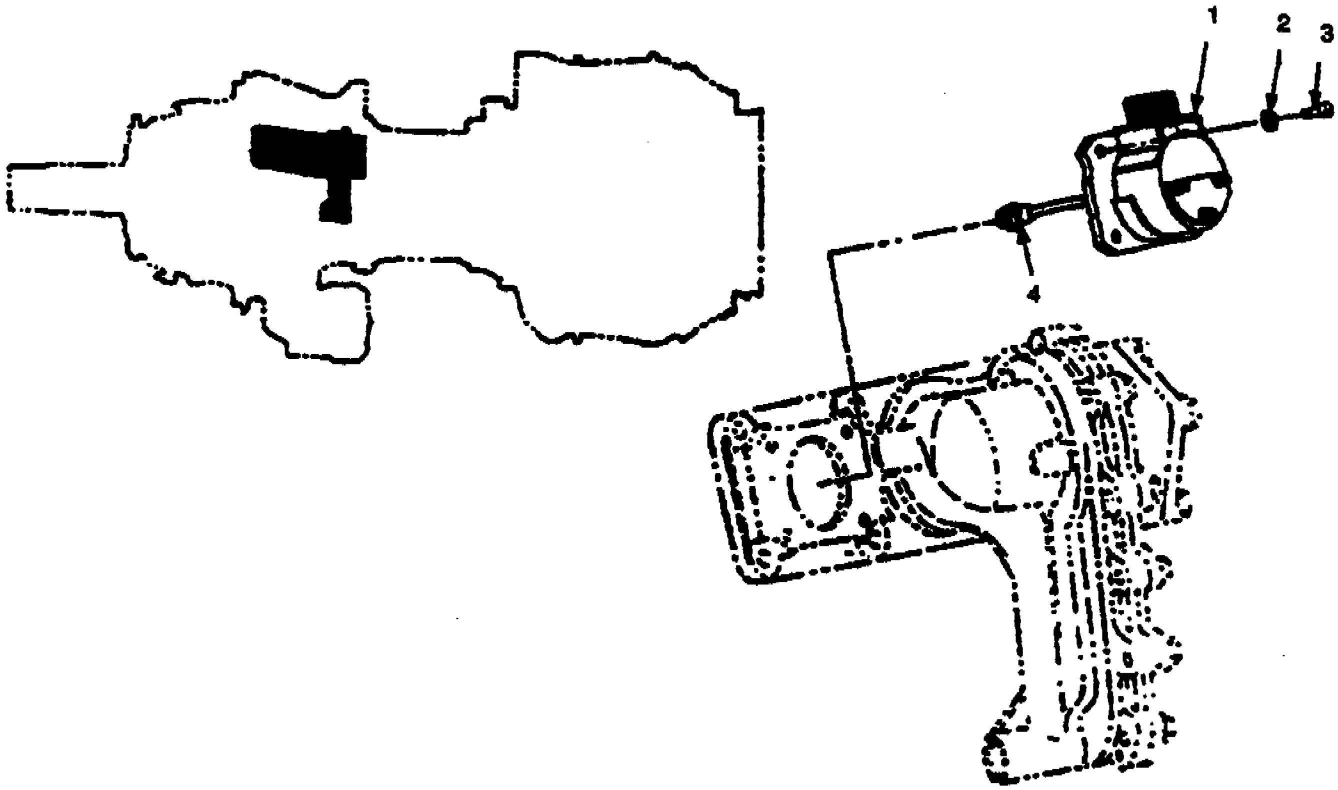


Figure 4-30. Electric Torquemeter Junction Box Assembly and Attaching Parts (T53-L-701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-30	No Number	ELECTRICAL TORQUEMETER JUNCTION BOX ASSEMBLY (NHA 1-000-110-01, and 1-170-330-09)	Ref	D,E
-1	1-020-400-01	. JUNCTION BOX, Electrical torquemeter	1	D,E
	1-020-400-02	. JUNCTION BOX, Electrical torquemeter (Alternate)	1	D,E
-2	AN960C4L	. WASHER, Flat	4	D,E
-3	MS35275-214	. SCREW, Machine	4	D,E
-4	1-300-421-01	. CONNECTOR, Plug	1	D,E

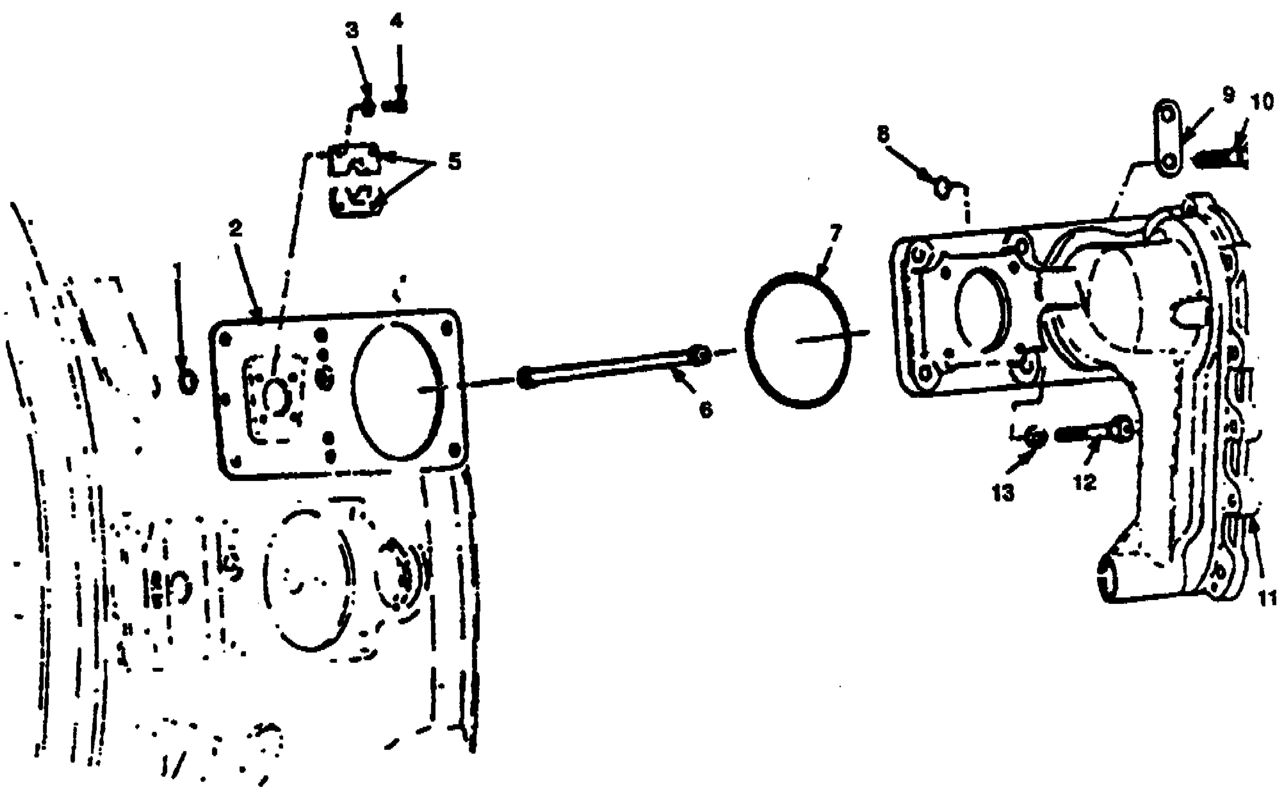


Figure 4-31. Overspeed Governor and Tachometer Drive Assembly and Attaching Parts (T53-L-701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-31	No Number	OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY AND RELATED PARTS (NHA 1-000-110-01 and 1-170-330-09)	Ref	D,E
-1	MS29561-012	. PACKING	1	D,E
-2	1-160-637-01	. PLATE, Mounting, overspeed governor and tachometer drive	1	D,E
-3	AN960C6L	. WASHER, Flat	4	D,E
-4	MS35275-226	. SCREW, Machine slotted	4	D,E
-5	1-160-638-01	. LOCKPLATE, Torquemeter	2	D,E
-6	1-160-411-01	. SHAFT, Spline	1	D,E
-7	MS29561-144	. PACKING	1	D,E
-8	MS29561-012	. PACKING	1	D,E
-9	1-160-309-01	. BRACKET, Flexible tube clamping	1	D,E
-10	AN103813	. BOLT, Drilled hex head	1	D,E
-11	1-170-530-01	. DRIVE ASSEMBLY, Overspeed governor and tachometer	1	D,E
-12	MS9530-16	. BOLT, Drilled, hex head	6	D,E
-13	AN960-416L	. WASHER, Flat	5	D,E

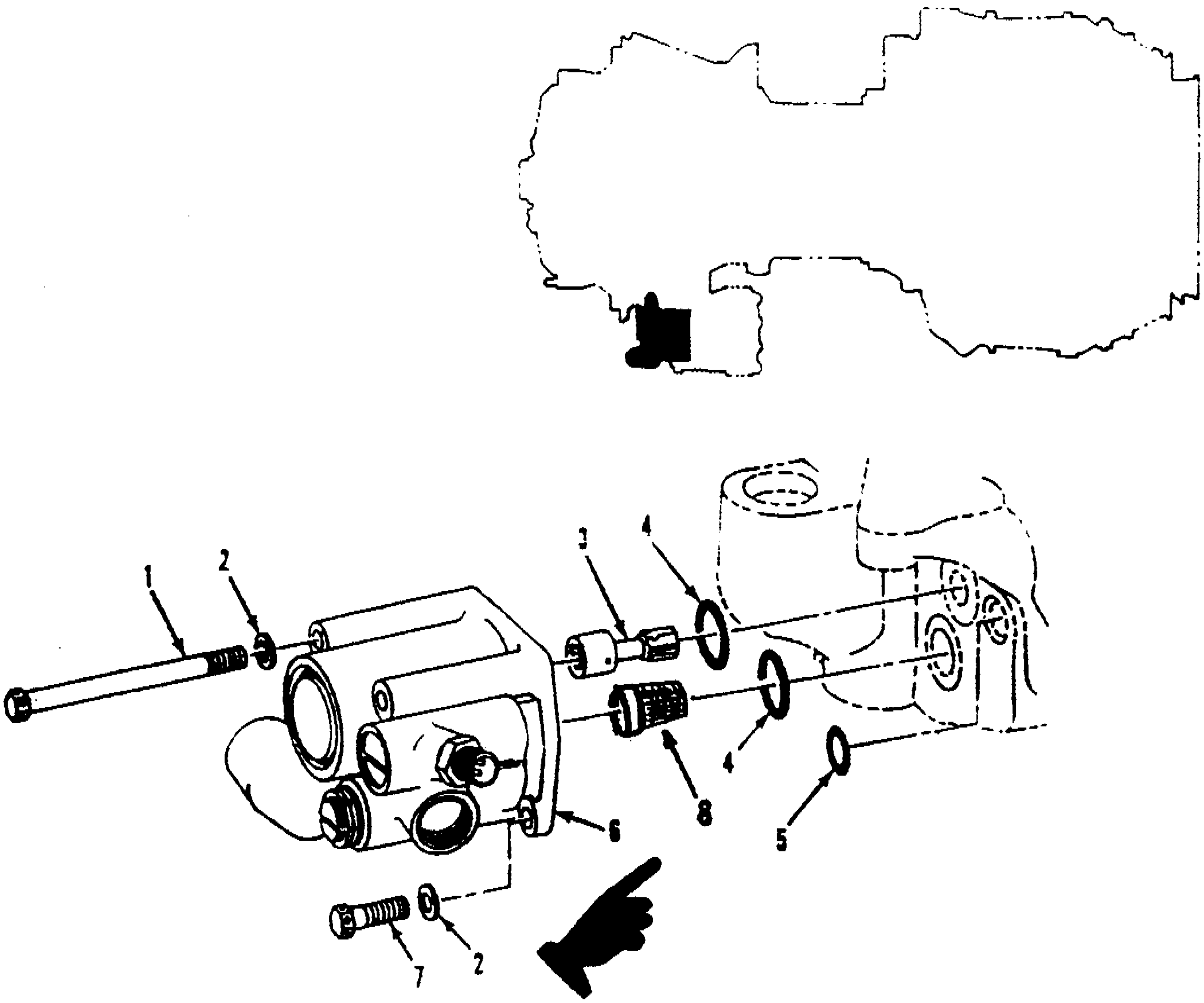


Figure 4-32. Power-Driven Rotary (Oil) Pump and Attacing Parts.

FGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-32	No Number	POWER DRIVEN ROTARY (OIL) PUMP AND RELATED PARTS (NHA 1-170-330-06, 1-170-330-09, 1-170-330-13, 1-170-330-21, and 1-080-250-16)	Ref	
-1	AN10340	.BOLT, Drilled hex head	2	
	MS9147-35	.BOLT, Drilled hex head	2	
-2	AN960-416L	.WASHER, Flat	4	
-3	1-080-350-04	.SHAFT ASSEMBLY, Oil pump drive	1	
-4	MS29561-122	.PACKING	2	
-5	MS29561-115	.PACKING	1	
-6	RG17350	.PUMP, Rotary, power driven (Lycoming Source Cont Dwg 1-300-212-01)	1	
	RG17350D	.PUMP, Rotary, power driven (Lycoming Source Cont Dwg 1-300-212-04)	1	
-7	AN103811	.BOLT, Drilled hex head	2	
-8	1-300-659-01	...SCAVENGE, filter assembly (After incorporation of ECP LY-GT-53-273)	1	

4-38. REMOVAL OF TEMPERATURE BULB. Proceed as follows:

a. Unscrew and remove temperature bulb (3, figure 4-33) from power-driven rotary (oil) pump (1)

b. Remove packing (2).

4-39. REMOVAL OF LUBE OIL FILTER ASSEMBLY. Proceed as follows:

a. Straighten two tabwashers (4, figure 4-34) under two bolts (5).

b. Support lube oil filter assembly (8) and remove two bolts (5), two tabwashers (4), rigid connecting link (3), two bolts (7), and two washers (6).

c. Remove lube oil filter assembly (8) and packings (1 and 2). Discard packings.

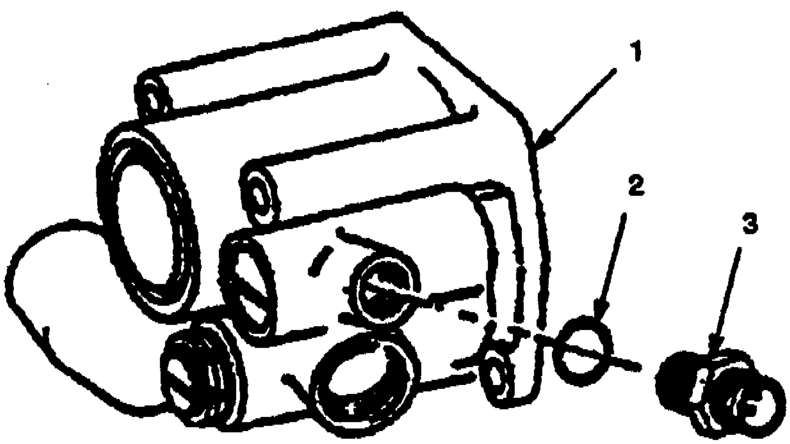


Figure 4-33. Temperature Bulb and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-33				
-1	RG17350D	PUMP, Rotary, power driven (Lycoming Source Cont Dwg 1-300-212-04)	1	
	RG17350	PUMP, Rotary, power driven (Lycoming Source Cont Dwg 1-300-212-01)	1	
-2	NAS617-4	PACKING	1	
-3	MS28034-3	BULB, Temperature	1	

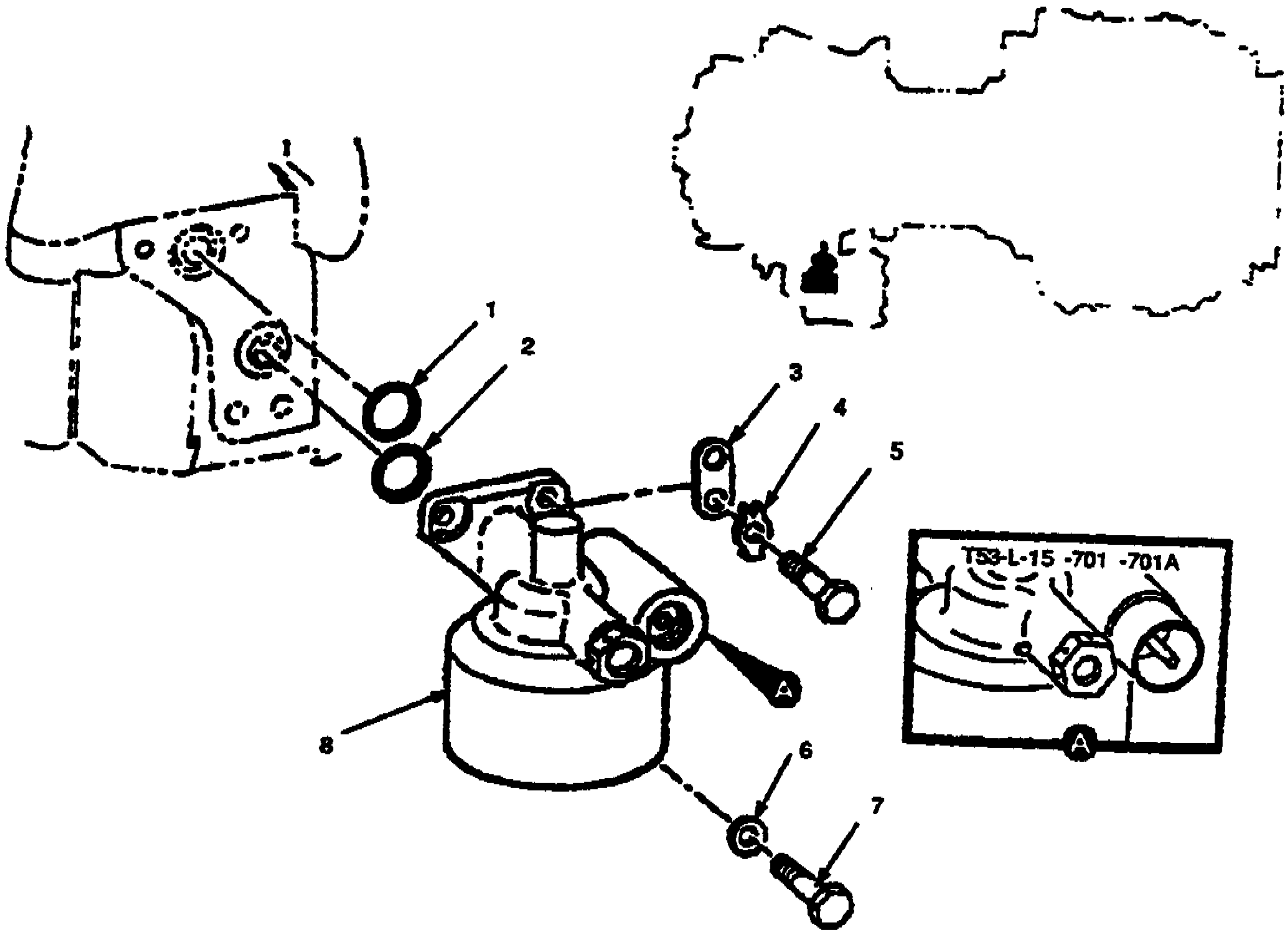


Figure 4-34. Lube Oil Filter Assembly and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-34	No Number	LUBE OIL FILTER ASSEMBLY AND RELATED PARTS (NHA 1-170-330-06, 1-170-330-09, 1-170-330-13, and 1-170-330-21)	Ref	
-1	MS29561-114	. PACKING	1	
-2	MS29561-115	. PACKING	1	
-3	1-160-482-02	. CONNECTING LINK, Rigid	1	
-4	STD3018R11	. TABWASHER	2	A,B,C
	STD3023K2	. TABWASHER	2	D,E
-5	AN102910	. BOLT, Drilled hex head	2	
-6	AN960-416L	. WASHER, Flat	2	
-7	AN102910	. BOLT, Drilled hex head	2	
-8	1-300-241-01	. FILTER ASSEMBLY, Lubricating oil (94592) (Lycoming Source Cont Dwg 1-080-460-01)	1	A,B,C
	1-080-460-02	. FILTER ASSEMBLY, Lubricating oil (94592) (Lycoming Source Cont Dwg 1-080-460-01)	1	
	1-300-166-01	. FILTER ASSEMBLY, Lubricating oil (94592) (Lycoming Source Cont Dwg 1-080-460-01)	1	DE

SECTION VIII. ACCESSORY DRIVE GEARBOX

4-40. REMOVAL OF ACCESSORY DRIVE GEARBOX. Proceed as follows:

a. Remove three bolts (1, figure 4-35), washers (2) and bracket (2A) from rear flange of inlet housing assembly.

b. Support accessory drive gearbox and remove shouldered bolt (5), bolt (6), two bolts (7) and washers (4 and 8). Remove accessory drive gearbox (3) and accessory drive shaft (11).

c. Remove packings (12 and 13) and strainer assembly (10). Remove packings (9) from strainer assembly. Discard packings.

SECTION IX. COMBUSTOR TURBINE ASSEMBLY

4-41. REMOVAL OF COMBUSTOR TURBINE ASSEMBLY. Proceed as follows:

a. Remove bolt (12, figure 4-36) and washer (11) that secure cover (10) to cover (8). Remove cover (10).

b. Remove bolts (9) that secure cover (8) to exhaust diffuser.

CAUTION

To avoid damage to cover (8) in following step c, do not use threaded hole to pull cover.

c. Install three 1/4-28 puller screws in cover (8) at approximately 1-, 4-, and 9-o'clock positions. Tighten puller screws evenly, and remove cover (8) and seal (7). Discard seal (7).

d. Straighten deformed rim of nut (6) at all places.

e. Install torque adjustment fixture (LTCT962) into rear of combustor turbine assembly and engage tangs of torque adjustment fixture with slots in nut (6). Secure plate assembly (LTCT963, detail of LTCT962) with three bolts.

f. Using wrench (LTCT505), remove nut (6).

g. Using wrench (LTCT506), remove power shaft through bolt (5) and shims (4).

NOTE

Record shim thickness and attach shims to bolt.

h. Remove locking plate assembly (LTCT962).

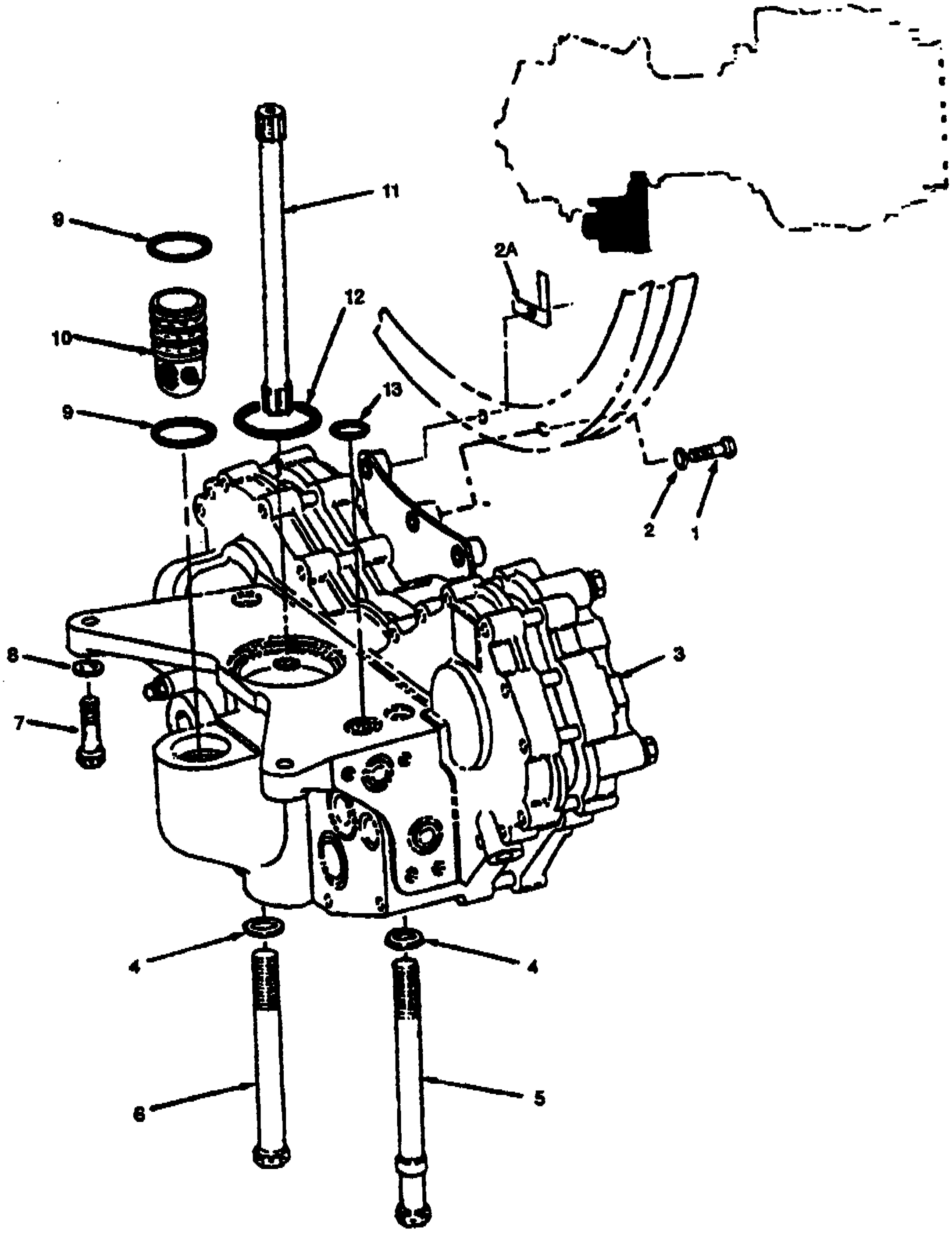


Figure 4-35. Accessory Drive Gear Box and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-35	No Number	ACCESSORY DRIVE GEARBOX AND RELATED PARTS (NHA 1-000-060-10, 1-000-060-22, 1-000-060-23, 1-000-100-01, 1-000-110-01, 1-170-330-06, 1-170-330-09, 1-170-330-13, and 1-170-330-21)	Ref	
-1	1-080-185-01	. BOLT, Machine	3	
-2	1-080-186-01	. WASHER, Flat	2	
-2a	1-160-468-01	. BRACKET	1	
-3	1-080-250-16	. GEARBOX ASSEMBLY, Accessory drive	1	
-4	1-080-051-01	. WASHER, Special	2	
-5	1-080-081-01	. BOLT, Shouldered	1	
-6	AN104146	. BOLT, Drilled hex head (Replace with MS9533-42)	1	
	MS9533-42	. BOLT, Drilled hex head	1	
-7	AN104016	. BOLT, Drilled hex head (Replace with MS9532-14)	2	
	MS9532-14	. BOLT, Drilled hex head	2	
-8	1-080-051-02	. WASHER, Special	2	
-9	MS29561-122	. PACKING	2	
-10	1-080-430-1	. STRAINER ASSEMBLY, Oil	1	
-11	1-080-282-01	. SHAFT, Accessory drive	1	
-12	MS29561-131	. PACKING	1	
-13	MS29561-114	. PACKING	1	

i. Position combustor hoisting adapter (LTCT3665) around flange of diffuser support cone. (See figure 4-37).

j. Attach suitable hoist to lifting eye of adapter.

k. Using wrench (LTCT393), remove bolts (2, figure 4-36) and nuts (1) that secure combustor turbine assembly (3) to diffuser housing.

l. Remove combustor turbine assembly and place on suitable work surface.

4-42. REMOVAL OF SECOND STAGE GAS PRODUCER ROTOR ASSEMBLY. Proceed as follows:

a. Straighten rim of lockring (54, figure 4-38). Engage tangs of socket wrench (LTCT13456, detail of LTCT13175) or socket wrench (LTCT4181) with nut (53)to prevent compressor rotor shaft from turning.

b. On T53-L-13B, -15, -701, -701A engines, straighten tabwashers (46) and remove nuts (47) and tabwashers (46) that secure second stage gas producer rotor assembly (45) to spacer (42).

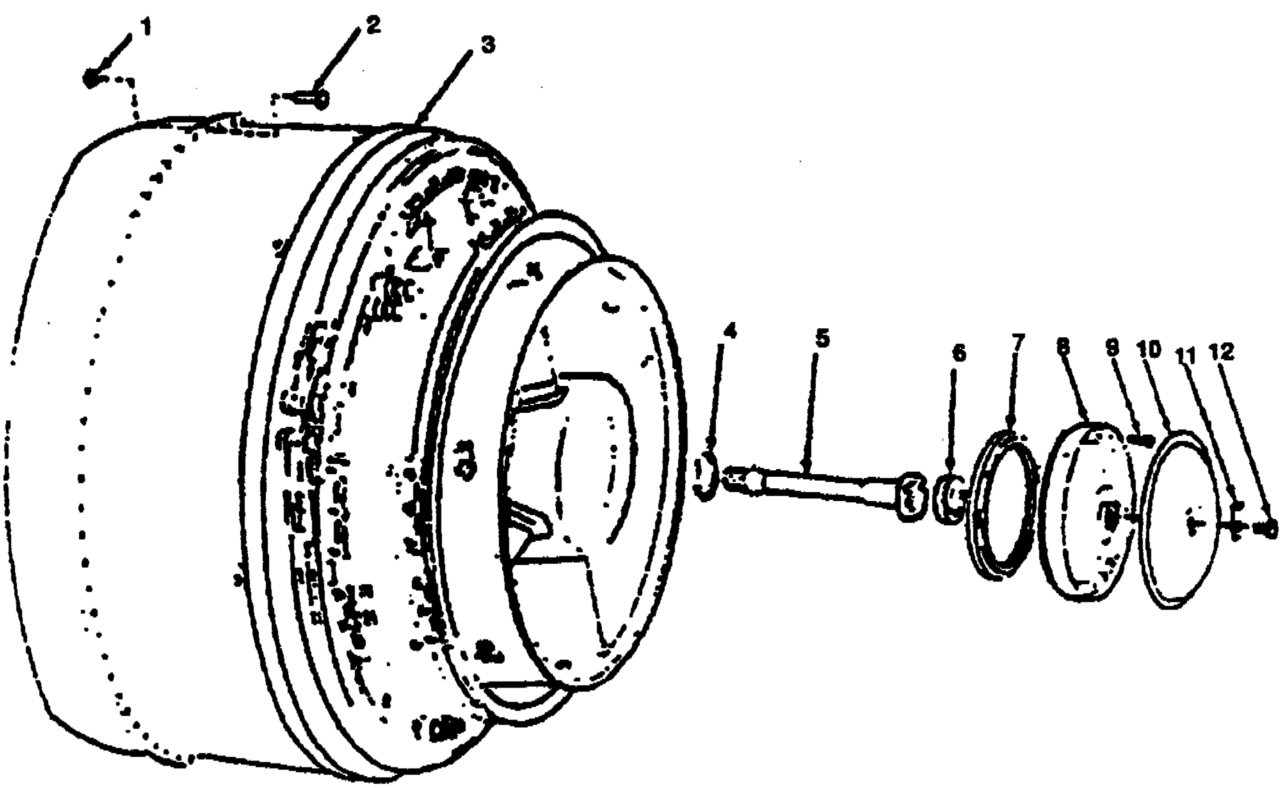
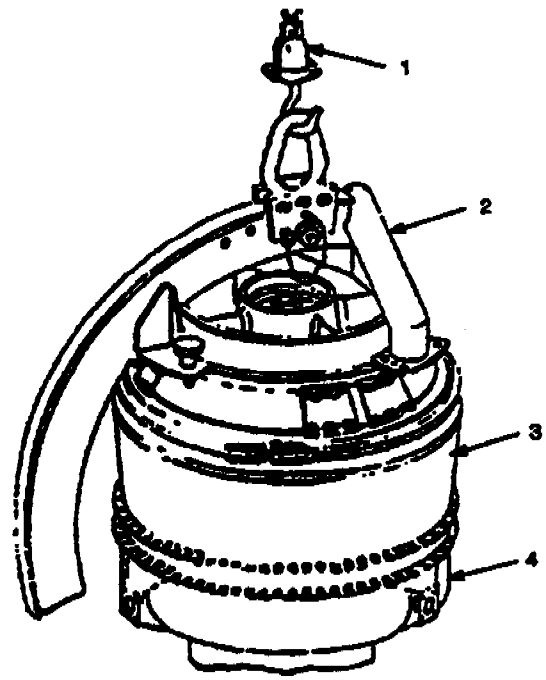


Figure 4-36. Combustor Turbine Assembly and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-36	No Number	COMBUSTOR TURBINE ASSEMBLY AND RELATED PARTS (NHA 1-000-100-01, 1-000-110-01, 1-000-060-10, 1-000-060-22, 1-000-060-23, 1-130-630-08, and 1-170-330-06, 1-170-330-09, 1-170-330-13, and 1-170-330-21)	Ref	
-1	MS21042-3	. NUT, Self-locking	72	
-2	MS9518-08	. BOLT, Hex head	72	
-3	1-130-630-08	. COMBUSTOR TURBINE ASSEMBLY	1	A,C,D, E
	1-130-630-19	. COMBUSTOR TURBINE ASSEMBLY	1	B
-4	1-140-217-01	. SHIM, Power shaft retainer, 0.015 inch thick	AR	
	1-140-217-02	. SHIM, Power shaft retainer, 0.035 inch thick	AR	
	1-140-217-03	. SHIM, Power shaft retainer, 0.060 inch thick	AR	
	1-140-217-04	. SHIM, Power shaft retainer, 0.125 inch thick	AR	
-5	1-140-067-14	. BOLT, Power shaft	1	
-6	1-140-233-02	. NUT, Internal wrenching	1	
-7	AR 100260	. SEAL, Plain encased (70128) (Lycoming Source Cont Dwg 1-300-462-01)	1	
	A01071	. SEAL, Plain encased (05939) (Alternate) (Lycoming Source Cont Dwg 1-300-462-02)		
-8	1-140-640-03	. COVER, Turbine, rear bearing	1	
-9	STD3061-08	. BOLT, Internal wrenching	10	
-10	1-140-182-01	. COVER, Exhaust diffuser	1	
-11	1-160-635-01	. WASHER, Special	1	
-12	1-150-059-01	. BOLT	1	



1. Hoist
2. Adapter
3. Combustor turbine assembly
4. Diffuser housing assembly

Figure 4-37. Lifting Combustor Turbine Assembly with Adapter.

c. On T53-L-703 engines, straighten tabwashers (46) and remove nuts (47) and tabwashers (46) that secure second stage gas producer rotor assembly (45) to sealing disc (57), and spacer (56). Using a suitable marker, mark bolts (27) across threaded end face, with a line perpendicular to axis of power shaft.

NOTE

In following steps d and e, spacer may be removed with rotor assembly or may remain in engine.

d. On T53-L-13B, -15, -701, -701A engines, using puller (LTCT691), carefully remove second stage gas producer rotor assembly (45) and spacer (42).

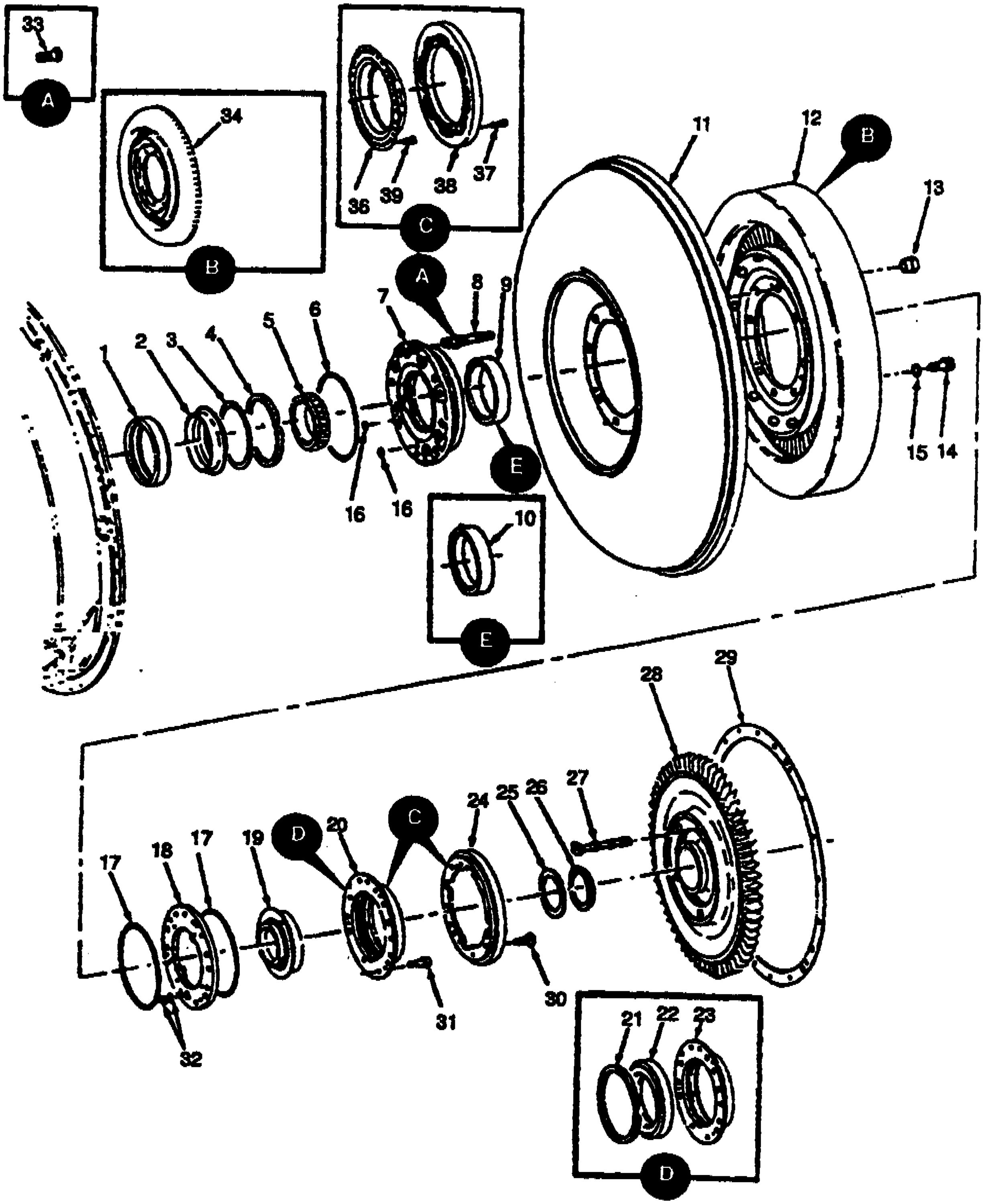


Figure 4-38. Gas Producer Rotor, Nozzle, and Combustion Chamber Deflector Assemblies and Attaching Parts (Sheet 1 of 2).

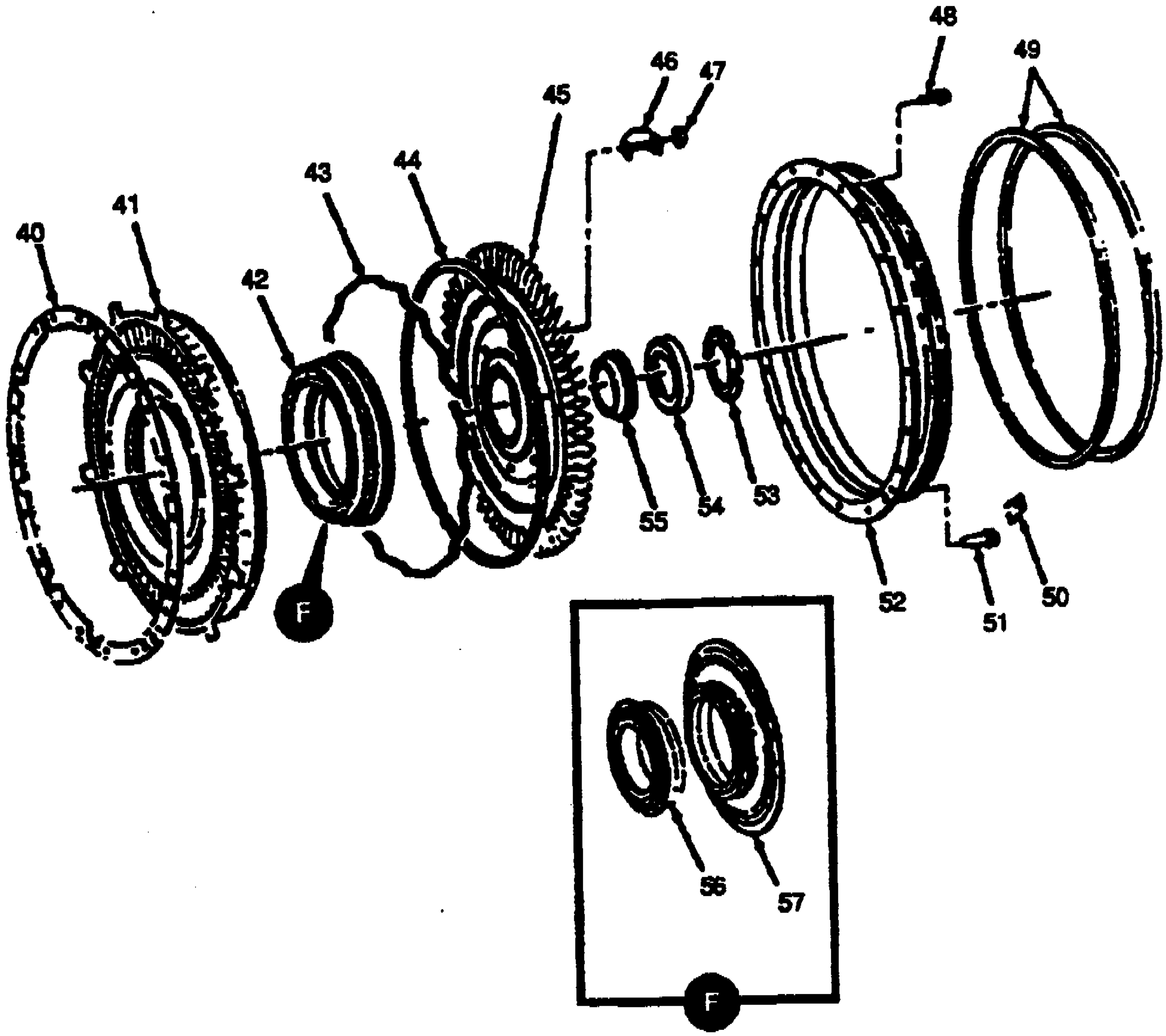


Figure 4-38. Gas Producer Rotor, Nozzle, and Combustion Chamber Deflector Assemblies and Attaching Parts (Sheet 2 of 2).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-38	No Number	DIFFUSER HOUSING ASSEMBLY AND REAR BEARING ASSEMBLY (NHA 1-000-100-01, 1-000-060-10, 1-000-060-22, 1-000-110-01, and 1-000-060-23)	Ref	
-1	C108005	. SEAL, Plain encased (71840) (Lycoming Cont Dwg 1-300-173-01) (Replace with C108439)	1	
	C108439	. SEAL, Plain encased (71840) (Lycoming Source Cont Dwg 1-300-173-01)	1	
	830-805548	. SEAL, Plain encased (24981) (Alternate) (Lycoming Source Cont Dwg 1-300-173-03)	1	
-2	1-100-146-04	. RING, Oil, forward (Replace with 1-100-146-04)	1	
-3	1-110-211-01	. SPACER, Ring	1	
-4	RR368S	. RING, Retaining (80756) (Lycoming Source Cont Dwg 1-300-358-01)	1	
-5	462642	. BEARING, Roller, cylindrical (52676) (Lycoming Source Cont Dwg 1-300-176-03) Replace with P/N 1-300-665	Ref	A,C,D,E
-6	E4420C	. SEAL, Ring metal (97968) (Lycoming Source Cont Dwg 1-300-249-01)	1	A,C,D,E
-7	1-110-470-13	. HOUSING ASSEMBLY, Second bearing	1	A,B,E
	1-110-590-02	. HOUSING ASSEMBLY, Second bearing	1	A,C,D,E
-8	1-110-131-04	. STUD, Bearing housing (use with bearing housing 1-110-590-02)	2	A,C,D,E
-9	462642	. BEARING, Roller, cylindrical (52676) (Lycoming Source Cont Dwg 1-300-176-03) Replace with P/N 1-300-665	1	A,C,D,E
	H01011EAR5728	. BEARING, Roller, cylindrical (51600) (Alternate) (Lycoming Source Cont Dwg 1-300-176-04) Replace with P/N 1-300-665	1	A,C,D,E
-10	1-300-584-01/02	. BEARING, Roller (use with bearing housing 1-110-470-13) Replace with P/N 1-300-665	1	A,B,E
	1-300-665	. BEARING, ROLLER (Use with bearing housing 1-110-470-13)	1	A,B,E
	No Number	COMBUSTION CHAMBER DEFLECTOR, FIRST STAGE GAS PRODUCER NOZZLE ASSEMBLY-AND SUPPORT PLATE (NHA 1-000-060-10, 1-000-100-01, 1-000-110-01 and 1-000-060-23)	Ref	
-11	1-110-500-03	. DEFLECTOR, Combustion chamber	1	
-12	1-110-520-14	. NOZZLE, Turbine, first stage (Replace with 1-110-520-19)	1	C,D,E
	1-110-520-21	. NOZZLE, Turbine, first stage (for overhaul and field replacement) (Replace with 1-110-520-19)	1	D,E
	1-110-520-19	. NOZZLE, Turbine first stage		A,C,D,E
-13	1-110-134-01	. NUT, Special bearing housing (use with bearing housing 1-110-590-02)	2	A,C,D,E
-14	MS9171-10	. BOLT, Machine (6 bolts required on 1-110-590-02)	8	
-15	AN960-516L	. WASHER, Flat (use on 1-110-520-14/21)	6	C,D,E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-38-16	MS9373-017	. GASKET (use on 1-110-590-02)	1	
	No Number	REAR COMPRESSOR BEARING OIL SEAL RETAINER, OIL SEAL RETAINING PLATE SEAL AND RETAINER ASSEMBLY, AND RELATED PARTS (NHA 1-000-100-01, 1-100-060-10, 1-000-110-01, and 1-000-060-23)	Ref	
-17	U2212-04625SEN	. GASKET, Metal O-ring (78943) (Lycoming Source Cont Dwg 1-300-315-01)	2	
-18	1-110-181-06	. PLATE, Retaining	1	A,C,D,E
	1-110-181-10	. PLATE, Retaining (mandatory with 1-110-470-13)	1	A,B,E
-19	1-100-147-02	. RING, Oil, rear compressor bearing	1	
-20	1-110-600-05	. SEAL AND RETAINER ASSEMBLY	1	A,C,D,E
	1-110-720-02	. SEAL AND RETAINER ASSEMBLY, (use with bearing housing 1-110-470-13)	1	A,B,E
-21	RR387S	. . RING, Retaining (71840) (Lycoming Source Cont Dwg 1-300-359-01)	1	
-22	830-805549	. . SEAL, Plain encased (24981) (Alternate) (This is part of 1-110-600-05) (Lycoming Source Cont Dwg 1-300-174-03)	1	A,C,D,E
	1-300-616-01	. . SEAL, Plain (use with bearing housings 1-110-470-13) This is part of 1-110-720-02	1	A,B,E
-23	1-110-194-04	. . RETAINER, Oil seal This is part of 1-110-600-05	1	A,C,D,E
	No Number	FIRST STAGE GAS PRODUCER TURBINE ROTOR AND RELATED PARTS (NHA 1-000-100-01, 1-000-060-10, 1-000-111-01, and 1-000-060-23)	Ref	
-24	1-110-161-03	. SEALING RING, Outer first gas producer	1	A,C,D,E
	1-110-398-01	. SEALING RING, Outer first gas producer (use with bearing housing 1-110-470-13)	1	A,E
-25	1-100-289-01	. SHIM, Turbine wheel, gas producer	AR	
-25	1-100-289-02	. SHIM, Turbine wheel, gas producer	AR	
	1-100-289-03	. SHIM, Turbine wheel, gas producer	AR	
-26	1-110-132-01	. CONE, Forward	1	
-27	1-100-292-02	. BOLT, Externally, relieved body, gas producer	6	
-28	1-100-880-12	. TURBINE ROTOR, First stage gas producer	1	A,C,D,E
	1-101-530-01	. TURBINE ROTOR, First Stage Gas producer	1	A,C,D,E
	1-101-100-08	. TURBINE ROTOR, First Stage Gas producer	1	B
-29	1-120-029-01	. SPACER, Gas producer turbine (0.022 to 0.028 inch)	AR	
	1-120-029-02	. SPACER, Gas producer turbine (0.010 to 0.016 inch)	AR	
	1-120-029-03	. SPACER, Gas producer turbine (0.078 to 0.084 inch)	AR	

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-38-30	1-110-137-01	.BOLT, Machined hex head	8	
-31	1-140-157-02	.BOLT, Machine	3	
-32	MS9371-07	.PACKING	2	
-33	AN115408	.SCREW, Machine (use with bearing housing 1-110-470-13)	2	A,B,E
-34	1-110-710-06	.NOZZLE, Turbine	1	B
-35	DELETED			
-36	1-110-252-03	.RETAINER (use with bearing housing 1-110-470-13)	1	A,B,E
-37	STD3061-08	.BOLT, Machine	8	B
-38	1-110-376-08	.RING, Gas producer	1	B
-39	AN115410	.SCREW, Machine (This is part of 1-110-720-02)	3	A,B,E
	No Number	.SECOND GAS PRODUCER ROTOR ASSEMBLY, NOZZLE ASSEMBLY, CYLINDER ASSEMBLY, AND RELATED PARTS (NHA 1-000-060-10,1-000-110-01,1-000-100-0 and 1-100-060-23)	REF	
-40	1-120-031-01	.RING, Mounting	1	
-41	1-120-000-14	.NOZZLE, Turbine, second stage	1	A,C,D,E
	1-120-050-03	.NOZZLE, Turbine, second stage	1	B
-42	1-100-294-03	.SPACER, Ring	1	A,C,D,E
-43	1-120-038-02	.SPRING, Flat	1	
-44	1-120-035-02	.RING, Sealing	1	
-45	1-100-820-08	.TURBINE ROTOR, Second stage gas producer (Replaced by 1-101-360-04)	1	A,C,D,E
	1-101-360-04	.TURBINE, Rotor	1	B
-46	1-100-131-01	.TABWASHER, Gas producer	3	
-47	1-100-293-01	.NUT, Special, gas producer	6	
-48	MS9705-11	.BOLT, Machine	20	B
	1-110-262-01	.BOLT, Machine	20	A,C,D,E
-49	55767	.SEAL RING, Metal (90183) (Lycoming Source Cont Dwg 1-300-487-01)	2	B
	8001	.SEAL RING, Metal (06320) (Alternate) (Lycoming Source Cont Dwg 1-300-487-02)	2	A,C,D,E
-49	URS3487	.SEAL RING, metal (53080) (Alternate) (Lycoming Source Cont Dwg 1-300-847-03)	2	
-50	1-120-034-01	.PLATE, Pin retaining	3	
-51	1-120-033-01	.PIN, Straight, headed	3	
-52	1-120-032-01	.CYLINDER, Second stage gas producer	1	
-53	1-100-034-01	.NUT, Plain, round	1	
-54	1-100-423-01	.LOCK RING, Rear bearing	1	
-55	1-110-141-02	.CONE, Rear compressor turbine	1	
-56	1-100-546-01	.SPACER, Turbine rotor	1	B
	1-100-546-02	.SPACER, Turbine rotor	1	B
-57	1-100-544-03	.DISK, Turbine rotor	1	B

e. On T53-L-703 engines, using puller (LTCT691), carefully remove second stage gas producer rotor assembly (45), sealing disk (57), and spacer (56).

NOTE

In following steps f and g, use thumbscrews to position arms into spacer. When arms are in position, firmly lock them with knurled cup and back off thumbscrews at least one-half turn to allow puller to operate freely and prevent binding of thumbscrews.

f. On T53-L-13B, -15, -701, -701A engines, using mechanical puller (LTCT4842), remove spacer (42) from second stage gas producer rotor assembly (45).

g. On T53-L-703 engines, using mechanical puller (LTCT4842), remove spacer (56) from sealing disc (57).

4-43. REMOVAL OF SECOND STAGE GAS PRODUCER NOZZLE ASSEMBLY AND SECOND STAGE GAS PRODUCER CYLINDER. Proceed as follows:

a. Remove two seal rings (49, figure 4-38) from outside diameter of second stage gas producer cylinder (52).

b. Remove and discard 20 bolts (48) that secure second stage gas producer cylinder (52) to first stage gas producer nozzle assembly (12 or 34). Remove three retaining plates (50).

c. Using pin removal tool (LTCT4692), remove pins (51). Remove cylinder (52).

d. Remove seal ring (44) and expanders (43) from outside diameter of second stage gas producer nozzle assembly (41). Remove second stage gas producer nozzle assembly (41), ring (40), and spacer (29).

e. Record thickness of spacer (29) for reassembly.

4-44. REMOVAL OF FIRST STAGE GAS PRODUCER ROTOR ASSEMBLY. Proceed as follows:

NOTE

In following step a, ensure that bolts are drawn completely through fixture.

a. Install hub and adapter assembly (LTCT3076, detail of LTCT4676) over studs of first stage gas producer rotor assembly (28), and secure with nuts (47).

b. Position and secure holding fixture (LTCT4533) to diffuser housing.

c. Using wrench (LTCT584, detail of LTCT4676), engage tangs of wrench with slots in nut (53). Remove nut (53) and lockring (54).

d. Using removal tool (LTCT4677, detail of LTCT4676), remove rear cone (55).

e. Remove holding fixture and adapter.

f. Remove first stage gas producer rotor assembly (28). Remove bolts (27) from rotor assembly.

NOTE

An alternate method to preceding steps a through f is given in following steps g, through j. In following step g, ensure that bolts (27) are drawn through fixture.

g. Install torque fixture (LTCT13175) over bolts (27) of first stage gas producer rotor assembly (28), engaging tangs of socket wrench (LTCT13456, detail of LTCT13175) with slots in nut (53). Secure fixture with nuts (47).

h. Using torque wrench, P/N PD2501, remove nut (53) and lockring (54).

i. Using rear cone removal tool (LTCT6465), remove rear cone (55) and first stage gas producer rotor assembly (28). Remove bolts (27) from rotor assembly.

j. Remove torque wrench and torque fixture.

4-45. REMOVAL OF FIRST STAGE GAS PRODUCER NOZZLE ASSEMBLY, COMBUSTION DEFLECTOR, BEARING AFT SEAL, HOUSING, BEARING, OIL RINGS, AND BEARING FORWARD SEAL. Proceed as follows:

a. On T53-L-13B, -15, -701, -701A engines, remove eight bolts (30, figure 4-38) securing sealing ring (24). Remove sealing ring (24).

b. On T53-L-703 engines, remove eight bolts (37) securing sealing ring (38). Remove sealing ring (38).

c. On T53-L-13B, -15, -701, -701A engines, remove three bolts (31) or three screws (39) securing seal and retainer assembly (20). Remove seal and retainer assembly (20).

d. On T53-L-703 engines, remove three screws (39) securing oil seal retainer (36). Remove oil seal retainer (36)

e. Remove retaining ring (21) from oil seal retainer (23 or 36).

f. Using arbor press and suitable sleeve, press seal (22) from oil seal retainer (23 or 36).

g. Using adapter and guide (LTCT3685) and puller (LTCT2121), remove forward cone (26), shim (25), and aft oil ring (19).

h. Remove metal gaskets (17), retaining plate (18), and gaskets (32).

NOTE

Perform steps i or j as applicable.

i. Remove two bearing housing nuts (13), six bolts (14), and washers (15) securing first stage gas producer nozzle assembly (12) and combustion chamber deflector (11) to rear bearing housing assembly (7).

j. Remove bolts (14) and washers (15) securing first stage gas producer nozzle assembly (34) and combustion chamber deflector (11) to rear bearing housing assembly (7).

k. Remove first stage gas producer nozzle assembly (34 or 12) and combustion chamber deflector (11).

l. On T53-L-13B, -15, -701, -701A engines, remove two bearing housing studs (8). Remove rear bearing housing assembly (7), packing (16) and seal (6). Bearing outer race (9) will remain in rear bearing housing assembly (7).

m. On T53-L-703 engines, remove two screws (33). Remove rear bearing housing assembly (7), packings (16), and seal (6). Bearing outer race (10) will remain in rear bearing housing assembly (7).

n. Using sleeve bushing (LTCT3659), remove bearing outer race (9) from rear bearing housing assembly (7).

o. Using mechanical puller (LTCT4809) and split plate (LTCT6296), remove bearing inner race and rollers (5) from compressor rear shaft.

p. Remove retaining ring (4) and spacer (3).

q. Using puller (LTCT4846), remove forward oil ring (2).

r. Using forward seal puller (LTCT4568) with arbor (LTCT4571), remove forward seal (1).

SECTION X. OUTPUT REDUCTION CARRIER AND GEAR ASSEMBLY

4-46. REMOVAL OF OUTPUT REDUCTION CARRIER AND GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-13B, -703). Proceed as follows:

a. Rotate engine to a horizontal position.

b. Straighten tabwashers (2, figure 4-39) and remove bolts (1) and tabwashers from each oil transfer tube (3).

c. Insert bolt with1/4-28 thread into one of oil transfer tubes (3), and pull oil transfer tube from output reduction carrier and gear assembly (9). Remove two remaining oil transfer tubes. Remove packings (4 and 5) from each oil transfer tube.

d. Remove 24 nuts (6), washers (7), and spacers (8).

e. Insert pin (part of LTCT4182) into gear shaft (51, figure 5-333).

f. Install three 1/4-20 thread puller screws near edge of housing and tighten screws evenly.

g. Using overhead hoist attached to lifting fixture (LTCT4182), remove output reduction carrier and gear assembly (9, figure 4-39). Remove packing (10) and seal rings (11 and 12).

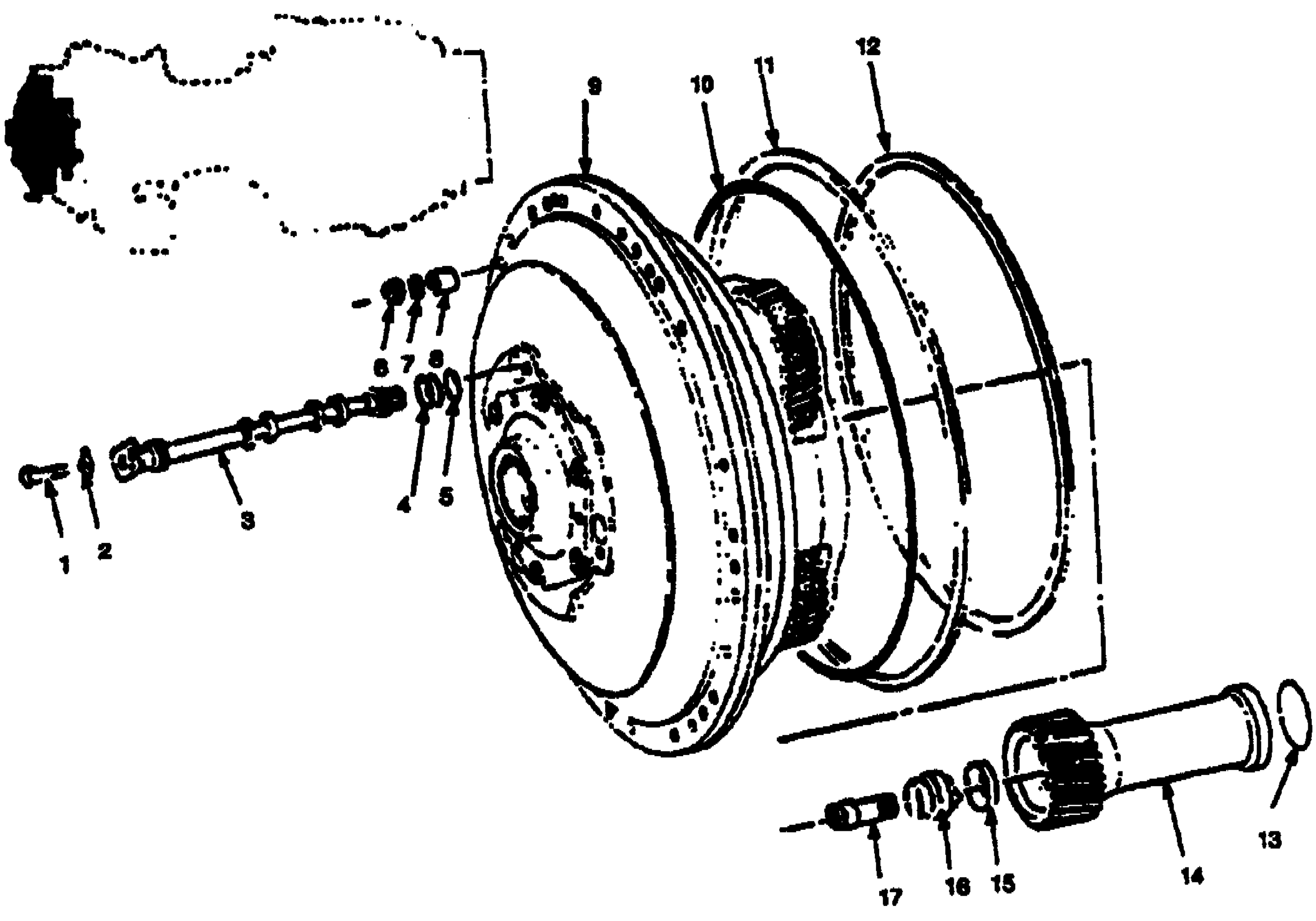


Figure 4-39. Output Reduction Carrier and Gear Assembly and Sun Gearshaft and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-39	No Number	OUTPUT REDUCTION CARRIER AND GEAR ASSEMBLY AND RELATED PARTS (NHA 1-000-060-10, 1-000-060-22 AND 1-000-060-23)	Ref	
-1	MS9490-08	. BOLT, Hex head	3	A,B
-2	STD3023K2	. TABWASHER	3	A,B
-3	1-030-330-03	. TUBE, Oil transfer	3	A,B
-4	MS29561-014	. PACKING	6	A,B
-5	MS29561-013	. PACKING	3	A,B
-6	MS21042-4	. NUT, Self-locking	24	A,B
-7	AN960-416	. WASHER, Flat	24	A,B
-8	1-030-069-01	. SPACER, Sleeve	24	A,B
-9	1-030-350-08	. CARRIER AND GEAR ASSEMBLY, Output reduction (Replace with 1-030-350-12)	1	A,B
	1-030-350-12	. CARRIER AND GEAR ASSEMBLY, Output reduction (Replace with 1-030-350-18)	1	A,B
	1-030-350-18	. CARRIER AND GEAR ASSEMBLY, Output reduction (Replaces 1-030-350-12 until 1-030-350-19 is available)	1	A,B
	1-030-350-19	. CARRIER AND GEAR ASSEMBLY, Output reduction (Replaces 1-030-350-18, when available)	1	A,B
-10	1-020-017-01	. PACKING, Front bearing support	1	A,B
-11	1-020-154-01	. . SEAL RING, Metal, front torquemeter	2	A,B
	1-020-154-02	. . SEAL RING, Metal, front torquemeter (Alternate)	2	A,B
	1-020-154-03	. . SEAL RING, Metal, front torquemeter (Alternate)	2	A,B
	1-020-154-04	. . SEAL RING, Metal, front torquemeter (Alternate)	2	A,B
-12	1-020-155-01	. . SEAL RING, Metal, front torquemeter (Alternate)	2	A,B
	1-020-155-02	. . SEAL RING, Metal, rear torquemeter (Alternate)	2	A,B
	1-020-155-03	. . SEAL RING, Metal, rear torquemeter (Alternate)	2	A,B
	1-020-155-04	. . SEAL RING, Metal, rear torquemeter (Alternate)	2	A,B
	1-020-155-05	. . SEAL RING, Metal, rear torquemeter (Alternate)	2	A,B
-13	MS29561-128	. PACKING	1	A,B
-14	1-030-192-04	. GEARSHAFT, Helical, sun	1	A,B
-15	1-030-138-04	. WASHER, Convex	1	A,B
-16	1-030-141-02	. RETAINER, Bolt, sun gear	1	A,B
-17	1-030-139-02	. BOLT, Internally relieved body	1	A,B

h. Remove lifting fixture and three puller screws.

i. Position sun gear holding fixture (LTCT2075) on studs of inlet housing with splines meshed with sun gearshaft (14).

j. Using tool set (LTCT509), hand-tighten tool center rod into engine sun gear bolt; back off one-quarter turn, insert allen wrench in center rod, and hold. Align and engage tool tabs in slot in bolt, and turn handle clockwise to straighten tabs of bolt retainer (16).

k. Install driver wrench (LTCT258).

l. Use wrench to remove bolt (17), bolt retainer (16), and washer (15).

NOTE

When removing wrench, the bolt and retainer will be attached.

m. Hold sun gearshaft (14), and remove sun gear holding fixture from inlet housing.

n. Remove sun gearshaft and packing (13).

4-47. REMOVAL OF OIL TRANSFER SUPPORT ASSEMBLY (T53-L-13B, -703). Proceed as follows:

a. Remove 12 bolts (5, figure 4-40) and washers (4).

b. Install three 1/4-20 puller screws, 3 inches long, into oil transfer support assembly (1) and tighten screws evenly.

c. Remove oil transfer support assembly (1) and packings (2 and 3).

d. Remove puller screws.

4-48. REMOVAL OF REDUCTION GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-15). Proceed as follows:

a. Rotate engine to a horizontal position.

b. Install socket, P/N SWE8673L; anchor plate, P/N SWE8473W, and power wrench, P/N SWE8100; on propeller shaft. (See figure 4-41.)

c. Loosen round plain nut (1, figure 4-42); then remove power wrench, anchor plate, and socket.

NOTE

Do not remove nut at this time.

d. Remove nuts (2) and washers (3).

e. Install hoisting adapter (LTCT181) on propeller shaft and attach suitable hoist to clamp eye. (See figure 4-43.) Support weight with hoist.

CAUTION

In following step f, puller holes are located between raised bosses.

f. Install three 1/40-20 puller screws in reduction gear assembly (4, figure 4-42) at approximately 1-, 4-, and 8-o'clock positions.

CAUTION

In following step g, to prevent damage to inlet housing studs, keep reduction gear horizontal by applying downward force on handle of hoisting adapter while sliding reduction gear assembly free of inlet housing.

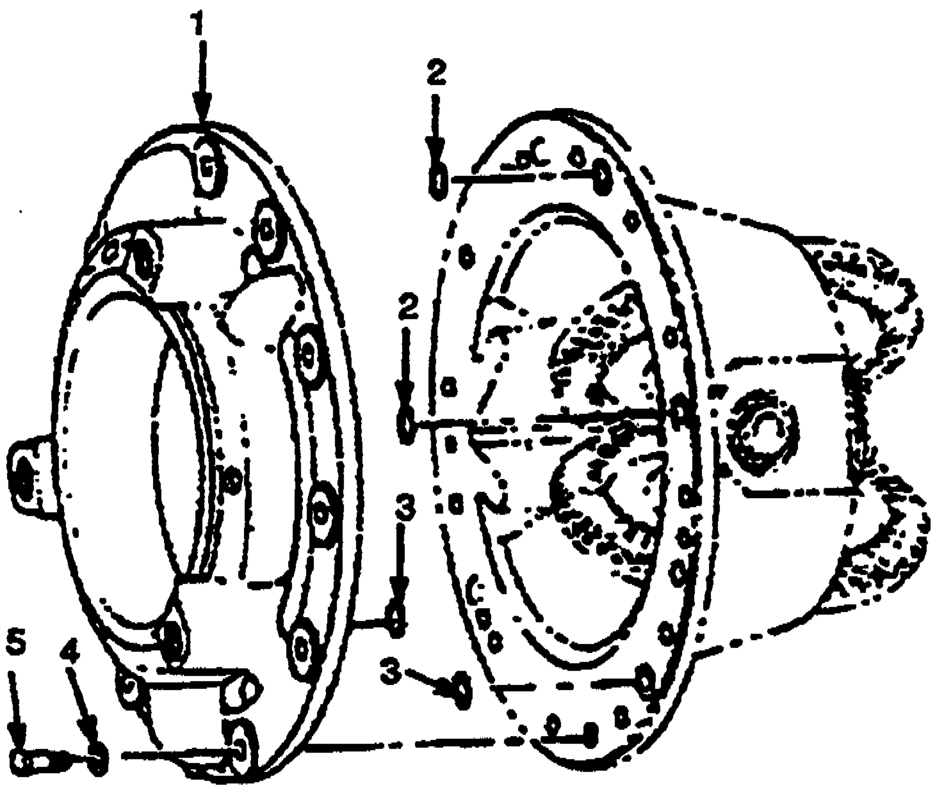


Figure 4-40. Oil Transfer Support Assembly and Attaching Parts (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-40	No Number	OIL TRANSFER SUPPORT ASSEMBLY AND RELATED PARTS (NHA 1-000-060-10, 1-000-060-22 and 1-000-060-23)	Ref	A,B
-1	1-030-400-01	. SUPPORT ASSEMBLY, Oil transfer	1	A,B
-2	MS29561-013	. PACKING	2	A,B
-3	MS29561-015	. PACKING	2	A,B
-4	AN960C416	. WASHER, Flat	12	A,B
-5	MS9584-19	. BOLT, Drilled hex head	12	A,B

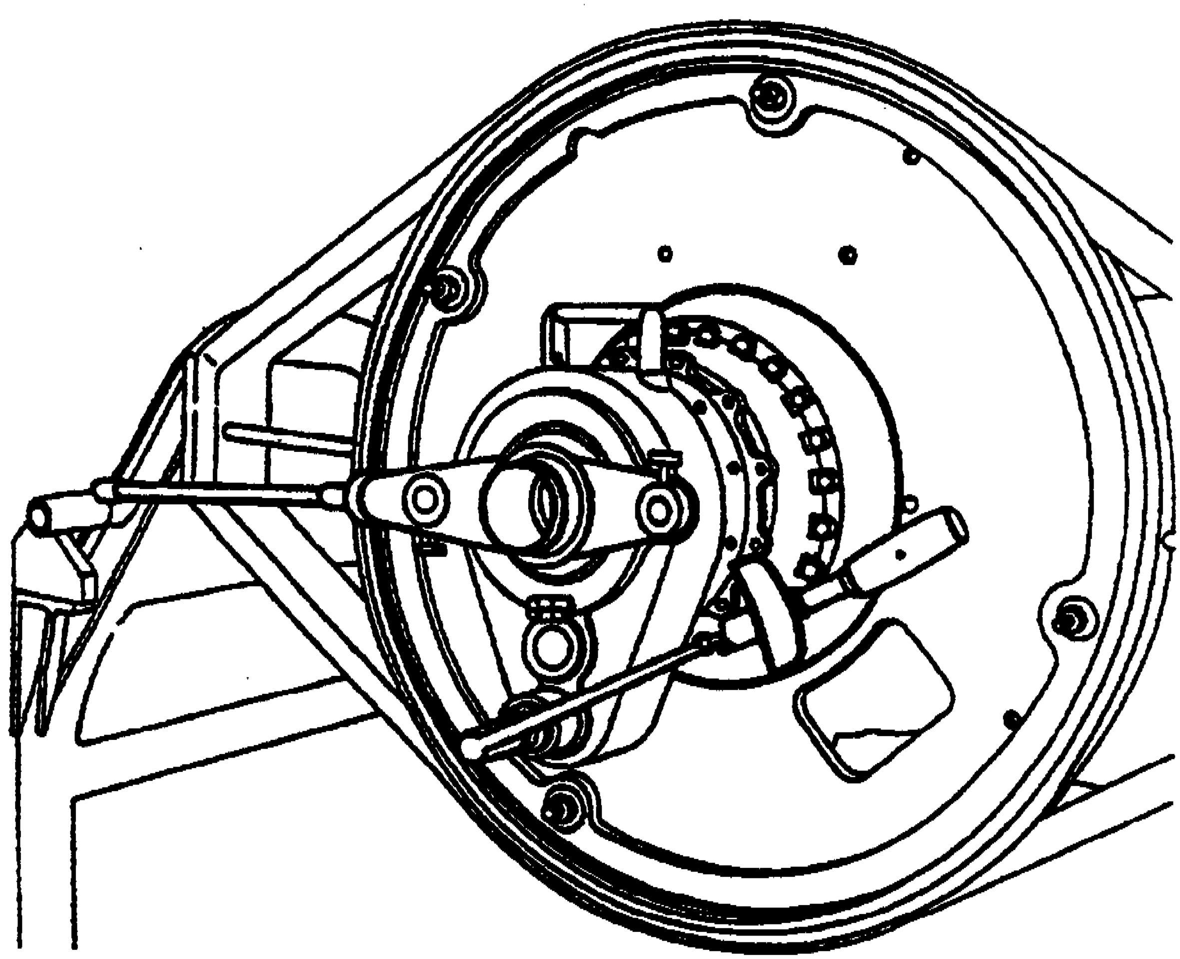


Figure 4-41. Loosening Thrust Nut (T53-L-15, -701, -701A).

g. Tighten puller screws evenly and withdraw reduction gear assembly.

NOTE

Provide a suitable container to catch oil when reduction gear assembly is separated from inlet housing.

h. Remove and discard packing (5).

i. Position holding fixture (LTCT6985) on studs of inlet housing. Ensure that sun gearshaft (9) is fully engaged with teeth of holding fixture.

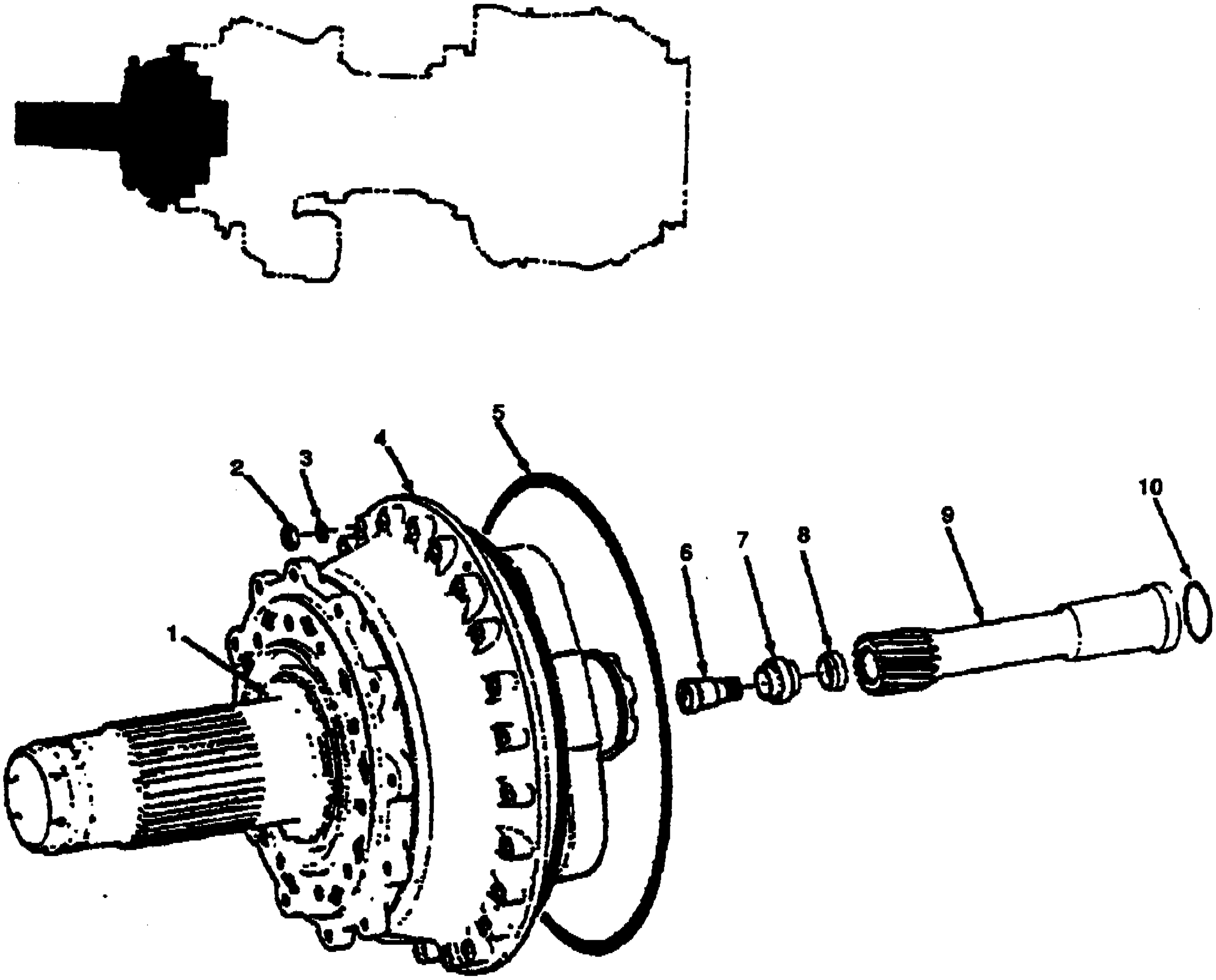


Figure 4-42. Reduction Gear Assembly and Sun Gearshaft and Attaching Parts (T53-L-15).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-42	No Number	REDUCTION GEAR ASSEMBLY AND SUN SHAFT GEAR AND RELATED PARTS (NHA 1-000-100-01)	Ref	C
-1	1-020-006-01	. NUT, Plain round	1	C
-2	MS21042-4	. NUT, Self-locking	24	C
-3	AN960-416L	. WASHER, Flat	24	C
-4	1-020-200-02	. GEAR ASSEMBLY, Reduction	1	C
-5	1-020-017-01	. PACKING, front bearing support	1	C
-6	1-030-139-02	. BOLT, Internally relieved body, sun gear	1	C
-7	1-030-141-03	. RETAINER, Bolt, sun gear	1	C
-8	1-030-138-04	. WASHER, Convex	1	C
-9	1-020-158-04	. GEARSHAFT, Helical, sun	1	C
-10	MS29561-128	. PACKING	1	C

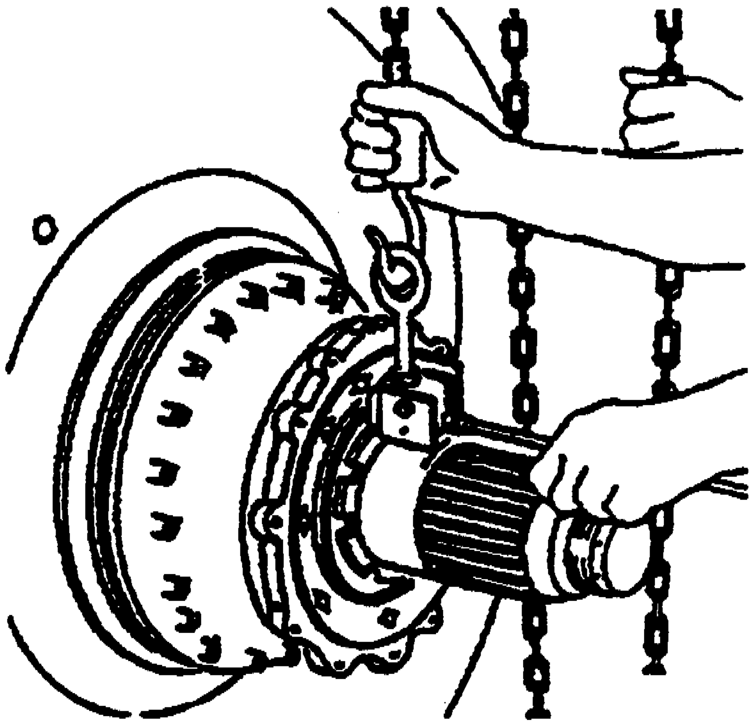


Figure 4-43. Removal of Reduction Gear Assembly (T53-L-15, -701, -701A).

j. Using tool set (LTCT509), hand-tighten tool center rod into engine sun gear bolt; back off one-quarter turn, insert allen wrench in center rod, and hold. Align and engage tool tabs in slot in bolt, and turn handle clockwise to straighten tabs of bolt retainer (7). (See figure 4-44.)

k. Using driver wrench (LTCT258), remove bolt (6), bolt retainer (7), and washer (8).

l. Remove holding fixture, sun gearshaft (9), and packing (10).

4-49. REMOVAL OF REDUCTION GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-701, -701A). Proceed as follows:

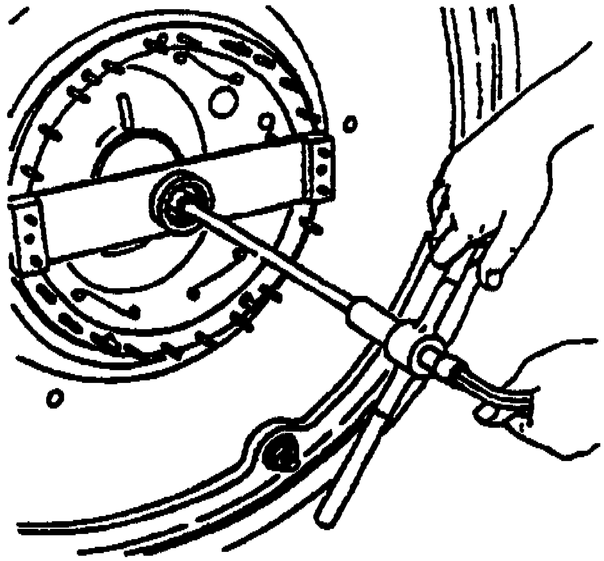
a. Rotate engine to a horizontal position.

b. Install socket, P/N SWE8673L; anchor plate, P/N SWE8473W; and power wrench, P/N SWE8100; on propeller shaft. (See figure 4-41.)

c. Loosen nut (1, figure 4-45); then remove power wrench, anchor plate, and socket.

NOTE

Do not remove nut at this time.


STRAIGHTENING RETAINER

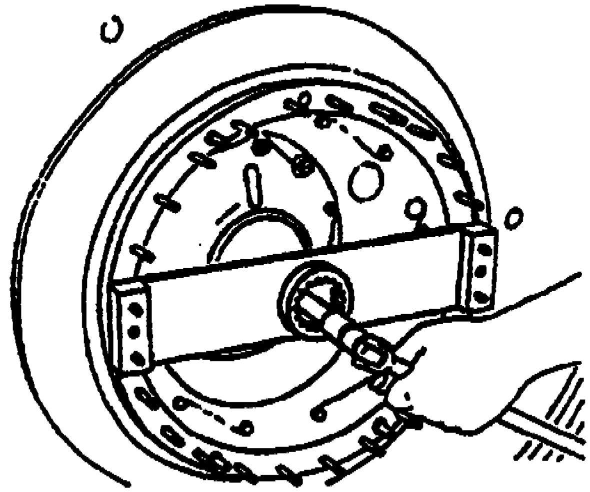

REMOVING BOLT

Figure 4-44. Straightening Retainer and Removing Bolt From Sun Gearshaft (T53-L-15).

d. Remove nuts (2) and washers (3)

e. Install hoisting adapter (LTCT181) as follows:

(1) Align adapter so pins can be inserted in front of shaft.

(2) Tighten thumbscrew to engage rear of shaft.

(3) Attach suitable hoist to clamp eye and take sufficient strain on hoist to support reduction gear assembly weight.

f. Thread three T-handle bolts (LTCT1429) into reduction gear assembly at approximately the 1-, 4-, and 8-o'clock positions.

CAUTION

The reduction gear weighs approximately 190 pounds (86.3 kg). In following step g, to prevent damage to inlet housing studs, keep reduction gear horizontal by applying downward force on hoisting adapter handle while sliding reduction gear assembly free of inlet housing.

NOTE

Bolt holes are positioned between raised bosses.

g. Thread bolts evenly into threaded holes and withdraw reduction gear assembly away from inlet housing. Set assembly on bench.

NOTE

Provide suitable container to catch oil at assembly separation.

h. Remove oil transfer tubes (9). Remove and discard tube packings (10).

i. Remove and discard packing (8).

j. Remove hoisting adapter assembly from reduction gear assembly and install thread protector on end of propeller shaft.

k. Attach sling (LTCT13340) to rear of reduction gear assembly. Attach slingto suitable hoist.

l. Using hoist, install reduction gear assembly, shaft down, in holding fixture (LTCT247). Remove sling (LTCT13340).

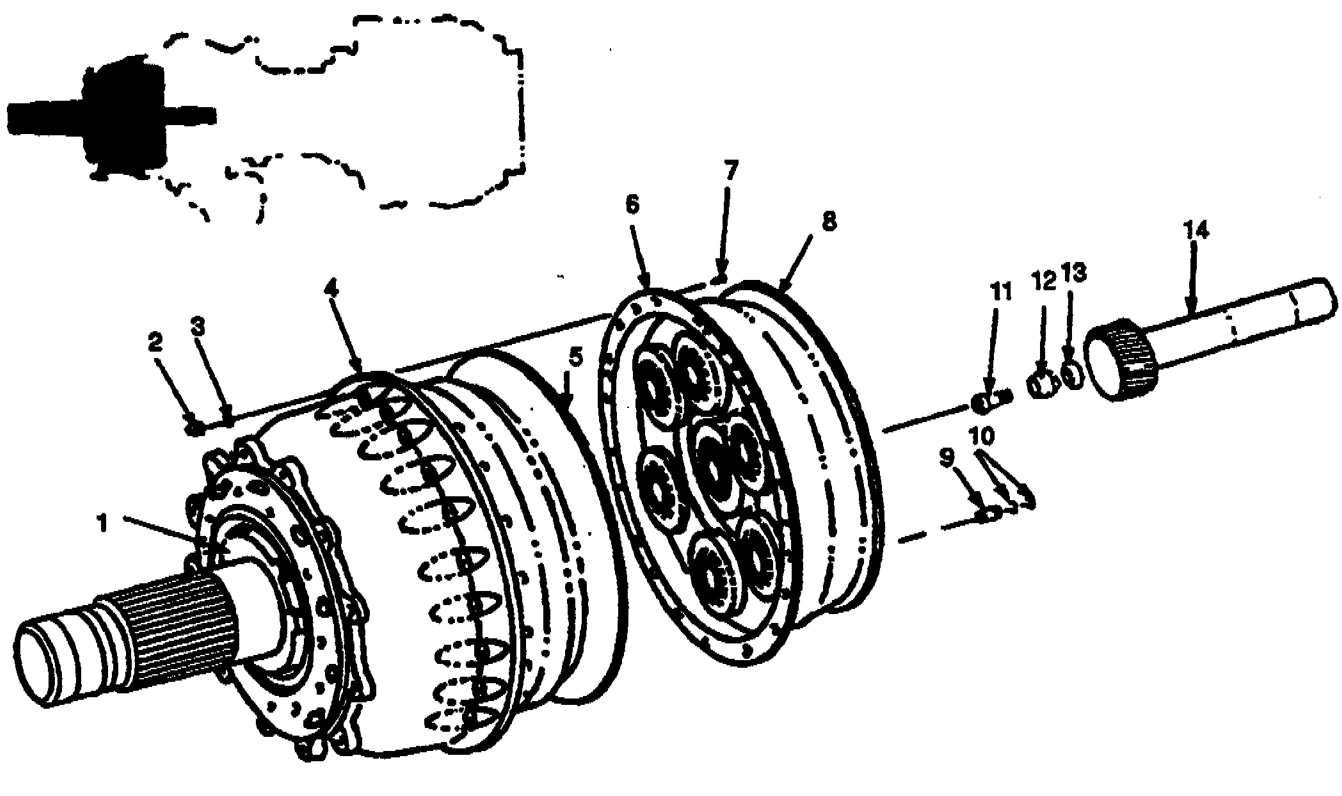


Figure 4-45. Reduction Gear Assembly, Sun Gear Assembly, and Attaching Parts (T53-L-701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-45	No Number	REDUCTION GEAR ASSEMBLY AND SUN SHAFT-GEAR AND RELATED PARTS (NHA 1-000-110-01)	Ref	D,E
-1	1-020-006-01	. NUT, Plain, round	1	D,E
4-45-2	MS21042-5	. NUT, Self-locking	24	D,E
-3	AN960-516L	. WASHER, Flat	24	D,E
-4	1-020-300-01	. GEAR ASSEMBLY, Reduction primary	1	D,E
-5	1-020-205-01	. PACKING	1	D,E
-6	1-020-310-01	. CARRIER ASSEMBLY, Secondary	1	D,E
-7	MS24693C270	. SCREW, Machine	3	D,E
-8	1-020-205-01	. PACKING	1	D,E
-9	1-020-197-01	. TUBE, Oil transfer	2	D,E
-10	MS29561-011	. PACKING	4	D,E
-11	1-030-139-02	. BOLT, Internally relieved body, retainer sun gear	1	D,E
-12	1-030-141-03	. RETAINER, Bolt, sun gear	1	D,E
-13	1-030-138-04	. WASHER, Convex	1	D,E
-14	1-020-320-01	. GEAR ASSEMBLY, Primary sun	1	D,E

m. Remove three flat head screws (7) securing secondary carrier assembly (6) to primary reduction gear assembly (4).

n. Thread two T-handle bolts (LTCT1428) into threaded holes in secondary carrier assembly at about the 3- and 9-o'clock positions.

o. Using jackscrews as handles, lift secondary carrier assembly (6) from primary reduction gear assembly (4) and place on bench. Remove and discard packing (5).

p. Install holding fixture (LTCT6985) on studs of inlet housing. Ensure the sun gear assembly (14) teeth are fully engaged in holding fixture.(See figure 4-44.)

q. Using tool set (LTCT509), hand-tighten tool center rod into engine sun gear bolt; back off one-quarter turn, insert allen wrench in center rod, and hold. Align and engage tool tabs in slot in bolt, and turn handle clockwise to straighten tabs of bolt retainer (12, figure 4-45).

r. Using driver wrench (LTCT258), remove bolt (11), bolt retainer (12), and washer (13).

CAUTION

In following step s, use extreme care when withdrawing or handling sun gear-shaft.Careless handling may result in damage to torquemeter components.

s. Remove holding fixture and carefully withdraw sun gear assembly (14).

NOTE

Torquemeter components are provided in calibrated sets. Replacement of one item mandates replacement of the other two.

4-50. REMOVAL OF PROPELLER SHAFT REAR BEARING SUPPORT ASSEMBLY (T53-L-15). Proceed as follows:

a. Remove 12 bolts (5, figure 4-46) and washers (4).

b. Install three 1/4-20 puller screws at approximately 3-, 7-, and 11-o'clock positions.

c. Tighten puller screws evenly; then remove propeller shaft rear bearing support (1, figure 4-46).

d. Remove puller screws. Remove packings (2 and 3).

4-51. REMOVAL OF ACCESSORY DRIVE CARRIER ASSEMBLY(T53-L-13B, -15, -703). Proceed as follows:

a. Install three bolts (LTCT1429) in face of accessory drive carrier assembly (1, figure 4-47). Tighten machine bolts evenly and remove accessory drive carrier assembly.

b. Remove machine bolts.

c. Remove oil transfer tube (2) and packings (3).

d. Remove packings (4 and 5).

4-52. REMOVAL OF REAR BEARING SUPPORT ASSEMBLY, MAIN SUN GEAR SUPPORT, ELECTRIC TORQUEMETER HEAD ASSEMBLY, TORQUEMETER HEAD SUPPORT ASSEMBLY, AND ACCESSORY DRIVE CARRIER ASSEMBLY (T53-L-701, -701A). Proceed as follows:

a. Remove bolts (1, figure 4-48) and washers (2) that retain rear bearing support assembly (3), torquemeter head support assembly (15), and accessory drive carrier assembly (19).

b. Withdraw rear bearing support assembly. Remove and discard packings (4 and 5).

c. Remove bolts (6) and withdraw main sun gear support (7).

d. Remove screws (8) and retaining strap (9).

e. Straighten tabs of tabwashers (11). Remove bolts (10) and tabwashers and permit electric torquemeter head assembly (12) to hang aside.

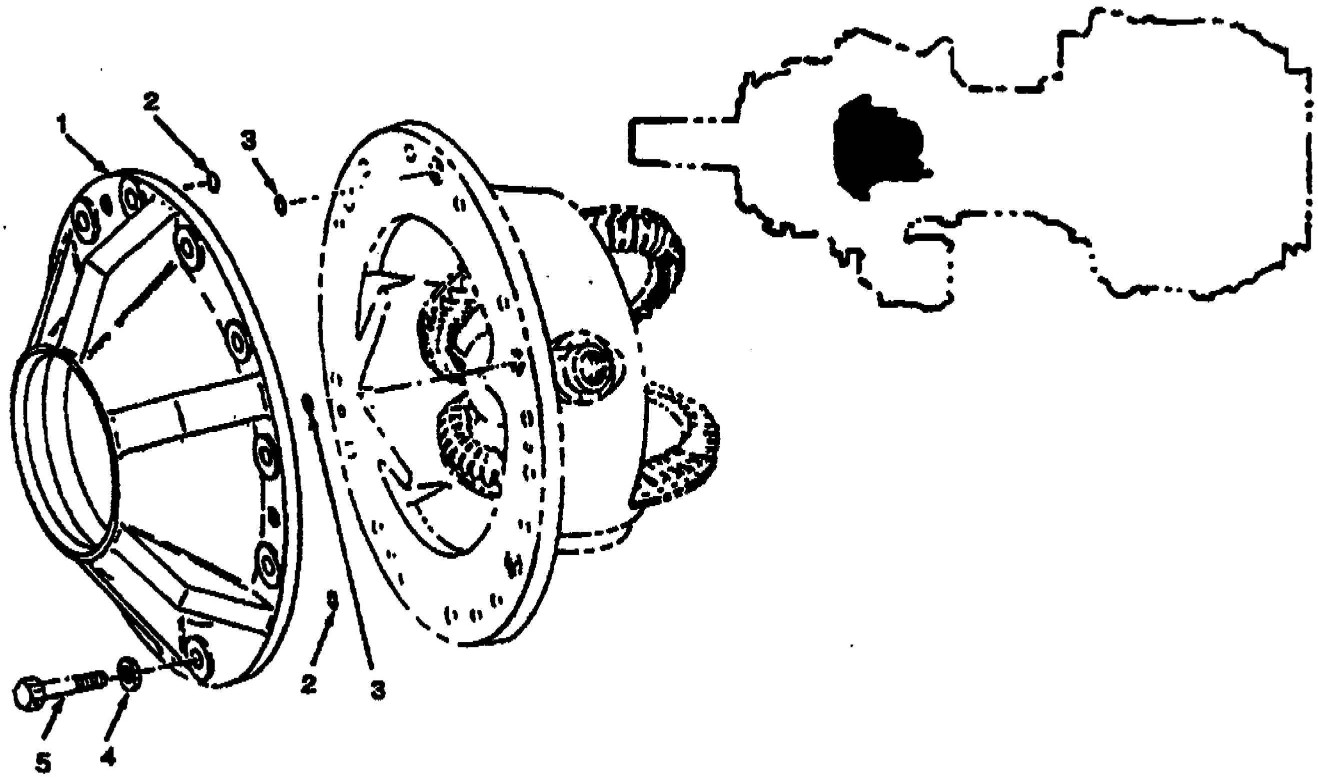


Figure 4-46. Propeller Shaft Rear Bearing Support and Attaching Parts (T-53-L-15).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-46	No Number	PROPELLER SHAFT REAR BEARING SUPPORT AND RELATED PARTS (NHA 1-000-100-01)	Ref	C
-1	1-020-270-04	. SUPPORT ASSEMBLY, Rear bearing	1	C
-2	MS29561-013	. PACKING	2	C
-3	MS29561-015	. PACKING	2	C
-4	AN960-416L	. WASHER, Flat	12	C
-5	MS9584-19	. BOLT, Drilled hex head	12	C

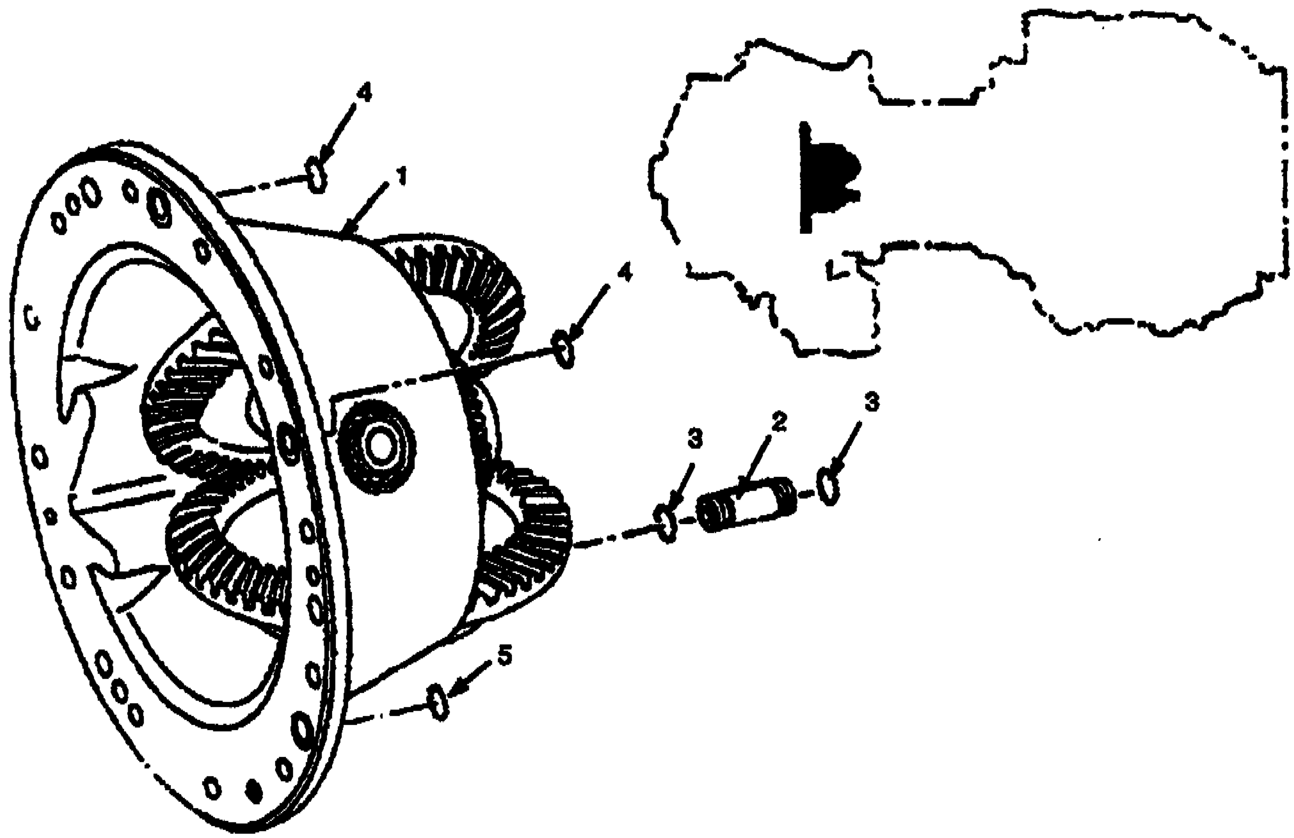


Figure 4-47. Accessory Drive Carrier Assembly and Attaching Parts (T53-L-13B, -15, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-47	No Number	ACCESSORY DRIVE CARRIER ASSEMBLY AND RELATED PARTS (NHA 1-000-100-01, 1-000-060-10, 1-000-060-22, 1-000-110-01, 1-100-110-03, 1-100-110-07, AND 1-000-060-23)	Ref	
-1	1-070-220-03	. CARRIER ASSEMBLY, Accessory drive (Replaced by 1-070-220-10)	1	A,B,C
	1-070-220-13	. CARRIER ASSEMBLY, Accessory drive (Replaced by 1-070-220-10)	1	A,B
	1-070-220-14	. CARRIER ASSEMBLY, Accessory drive (Replaced by 1-070-220-10)	1	A,B
	1-070-240-01	. CARRIER ASSEMBLY, Accessory drive	1	D,E
	1-070-220-10	. CARRIER ASSEMBLY, Accessory drive	1	A,B
-2	1-060-128-01	. TUBE, Oil transfer	1	
-3	MS29561-008	. PACKING	2	
-4	MS29561-015	. PACKING	2	
-5	MS29561-014	. PACKING	1	

f. Remove three flat-head screws (14) and carefully remove torquemeter head support assembly (15). Remove and discard packing (16).

g. Using puller (LTCT2021), remove spur gear (3, figure 4-49).

h. Remove packing (2) from gear (3).

i. Remove retaining ring (4).

j. While holding torquemeter head aside, withdraw accessory drive carrier assembly (19, figure 4-48). Remove and discard packings (17 and 18).

k. Remove oil transfer tube (22). Remove and discard packings (23).

l. While supporting torquemeter head, push connector-sleeve assembly into inlet housing cavity, retrieve from inside, and remove entire assembly from inlet housing. Remove and discard packings (13).

m. Remove and discard packings (20 and 21) from grooves in accessory drive carrier assembly mounting face of inlet housing.

4-53. REMOVAL OF POWER SHAFT BEARING RETAINER. Proceed as follows:

a. On T53-L-13B, -15, and -703 engines, using puller (LTCT2021), remove spur gear (1, figure 4-49).

b. Remove retaining ring (4).

c. Remove bolts (5 and 10) and tabwashers (9); then remove power shaft bearing retainer (6) using puller (LTCT2021).

d. Use socket wrench (LTCT4002), support assembly (LTCT911), and pinion gear holder (LTCT2048) to break torque on nut and seal assembly (7) as follows:

(1) Open lockringto disengage nut.

(2) Position pinion gear holder (LTCT2048) in inlet housing, and align prongs of gear holder with accessory drive pinion gear.

(3) Secure pinion gear holder to inlet housing with a minimum of four bolts (5 and 10).

(4) Use socket wrench (LTCT4002) to loosen nut and seal assembly (7).

NOTE

Do not remove nut and seal assembly (7) at this time.

e. Return engine to vertical position , and remove bolts (5 and 10) and pinion gear holder.

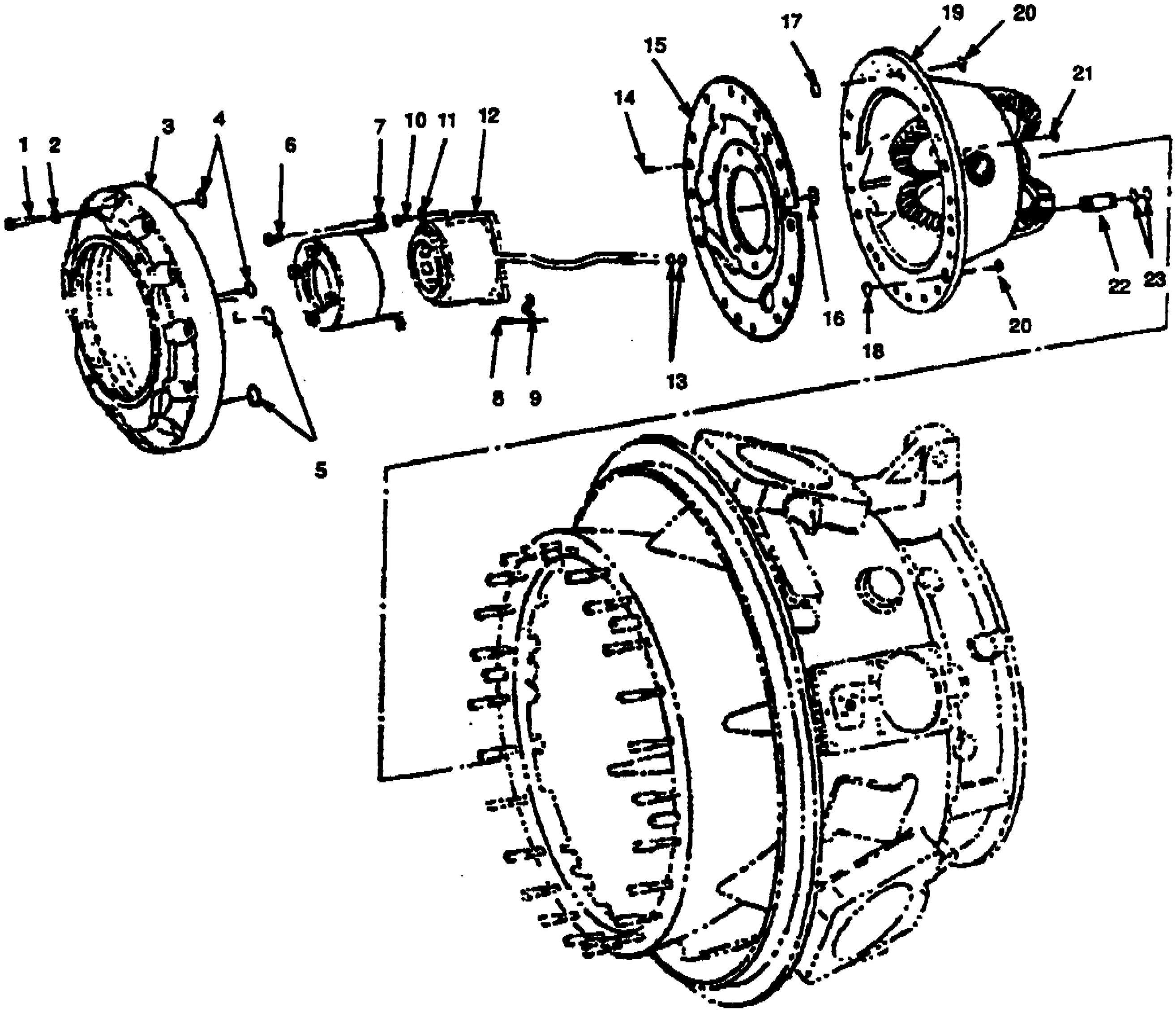


Figure 4-48. Rear Bearing Support Assembly, Main Sun Gear Support, Electric Torquemeter Head Assembly, Torquemeter Head Support Assembly, Accessory Drive Carrier Assembly, and Attaching Parts (T53-L-701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-48	No Number	ACCESSORY DRIVE CARRIER ASSEMBLY AND RELATED PARTS (NHA 1-000-110-01, 1-000-110-03, AND 1-000-110-07)	Ref	
-1	MS9584-27	. BOLT, Drilled hex head	12	D,E
-2	AN960-416L	. WASHER, Flat	12	
-3	1-020-330-01	. SUPPORT ASSEMBLY, Rear Bearing	1	D,E
-4	MS29561-013	. PACKING	2	D,E
-5	MS29561-015	. PACKING	2	D,E
-6	MS9583-04	. BOLT, Hex head	2	D,E
-7	1-020-450-01	. SUPPORT, Main sun gear assembly	1	D,E
-8	MS35275-259	. SCREW, Machine	2	D,E
-9	1-020-212-01	. STRAP, Retaining	1	D,E
-10	MS9490-07	. BOLT, Hex head	4	D,E
-11	STD3023K2	. TABWASHER	4	D,E
-12	1-020-390-01	. BEAD ASSEMBLY, Torquemeter	1	D,E
-13	MS29561-012	. PACKING	2	D,E
-14	MS24693C270	. SCREW, Machine	3	D,E
-15	1-020-410-01	. SUPPORT ASSEMBLY, Torquemeter head	1	D,E
-16	MS29561-013	. PACKING	2	D,E
-17	MS29561-013	. PACKING	2	D,E
-18	MS29561-015	. PACKING	2	D,E
-19	1-070-240-01	. CARRIER ASSEMBLY, Accessory drive	1	D,E
-20	MS29561-015	. PACKING	2	D,E
-21	MS29561-014	. PACKING	1	D,E
-22	1-060-128-01	. TUBE, Oil transfer	1	D,E
-23	MS29561-008	. PACKING	2	D,E

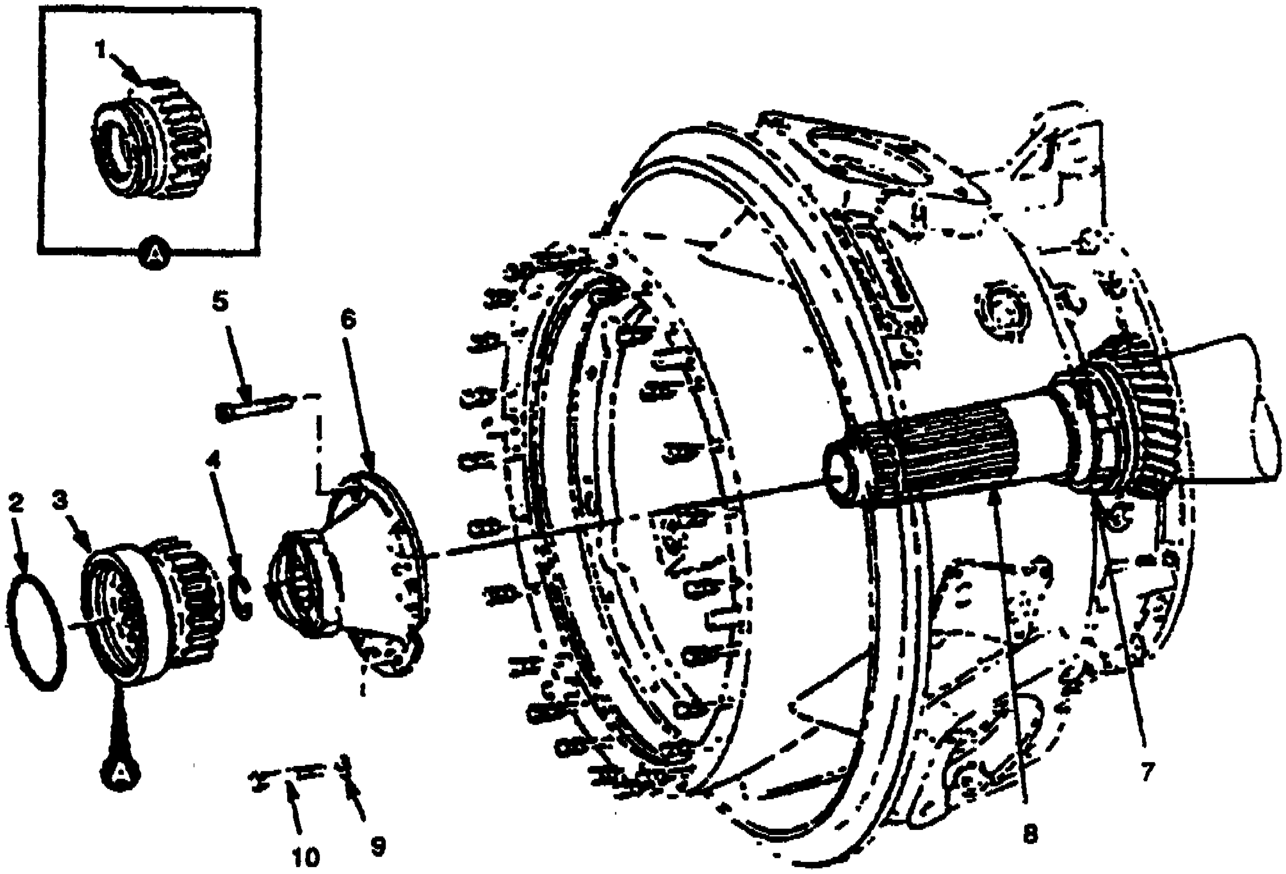


Figure 4-49. Power Shaft Bearing Retainer and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-49	No Number	POWER SHAFT BEARING RETAINER AND RELATED PARTS (NHA 1-000-100-01, 1-000-060-10, 1-000-060-22, 1-000-110-01, 1-000-110-03, 1-000-110-07, and 1-000-060-23)	Ref	
-1	1-070-072-03	. GEAR, Spur	1	A,B,C
-2	STD3019E33	. PACKING,	1	
-3	1-070-072-04	. GEAR, Spur	1	D,E
-4	1-100-346-02	. RING, Retaining	1	
-5	STD3022-123	. BOLT, Drilled socket head	4	
-6	1-060-090-03	. RETAINER ASSEMBLY, Bearing, power shaft	1	
-7	1-300-077	. NUT AND SEAL ASSY	1	
-8	1-100-800-04	. SHAFT	1	
-9	STD3018K11	. TABWASHER	2	
-10	MS9490-28	. BOLT, Hex head	2	

SECTION XI. DIFFUSER HOUSING ASSEMBLY

4-54. REMOVAL OF DIFFUSER HOUSING ASSEMBLY. Proceed as follows:

a. Remove bolts (2, figure 4-50) and brackets (3).

NOTE

Identify and mark all bolt holes at which clamp brackets are secured.

b. On T53-L-15 and -703 engines, remove bolts (6) and washers (7).

c. On T53-L-13B, -701, and -701A engines, remove bolts (6), washers (7), bolts (4), and bushings (5).

d. Position sling (LTCT2096) on diffuser housing.

e. Remove diffuser housing (1) by carefully lifting it off compressor rotor shaft.

SECTION XII. COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES

4-55. REMOVAL OF COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES. Proceed as follows:

CAUTION

When complying with following steps a and b, to prevent damage to housings, do not apply heat to threaded taper pins or housings.

NOTE

Following steps a through c apply to housings with hollow dowels.

a. On magnesium impeller housings remove nuts (4, figure 4-51), washers (3) and bolts (1) in flange of compressor and impeller housings.

b. Remove bolts (17, figure 4-51), washer (19) and nuts (20) from flange of impeller housing.

c. Using mechanical puller (LTCT1218) and slide hammer adapter (LTCT6740), remove dowels (2 or 18).

d. Remove bolts (5 and 8), washer (6), brackets (9), and nuts (7) that join upper and lower compressor and impeller housing sections.

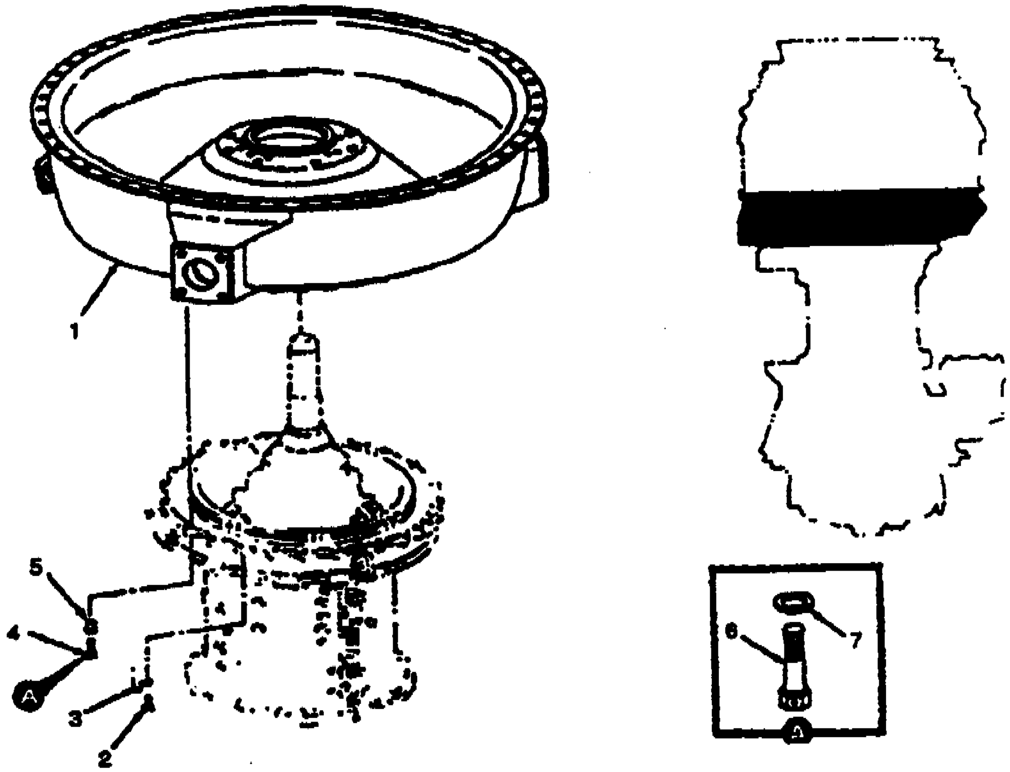


Figure 4-50. Diffuser Housing Assembly and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-50	No Number	DIFFUSER HOUSING ASSEMBLY AND ATTACHING PARTS	Ref	
-1	1-110-230-08	. DIFFUSER HOUSING	1	A,C,D,E
	1-110-230-15	. DIFFUSER HOUSING	1	A,B,E
-2	MS9089-28	. BOLT - W/MAG, IMP HSNG	4	A,C,D,E
	MS9924-25	. BOLT - W/S/STEEL, IMP HSNG	4	A,B,E
-3	1-160-306-01	. BRACKET	4	A,D,E
-4	1-100-527-01	. BOLT, W/MAG, IMP HSNG	12	A,D,E
-5	1-100-526-01	. BUSHING, W/MAG, IMP HSNG	12	A,D,E
-6	MS9958-09	. BOLT, W/S/STEEL, IMP HSNG	22	A,B,E
	MS9530-09	. BOLT W/MAG, IMP HSNG	12	A,C,D,E
-7	AN960-416	. WASHER, W/MAG, IMP HSNG	12	A,C,D,E
	AN960-416	. WASHER, W/S/STL, IMP HSNG	22	A,B,E

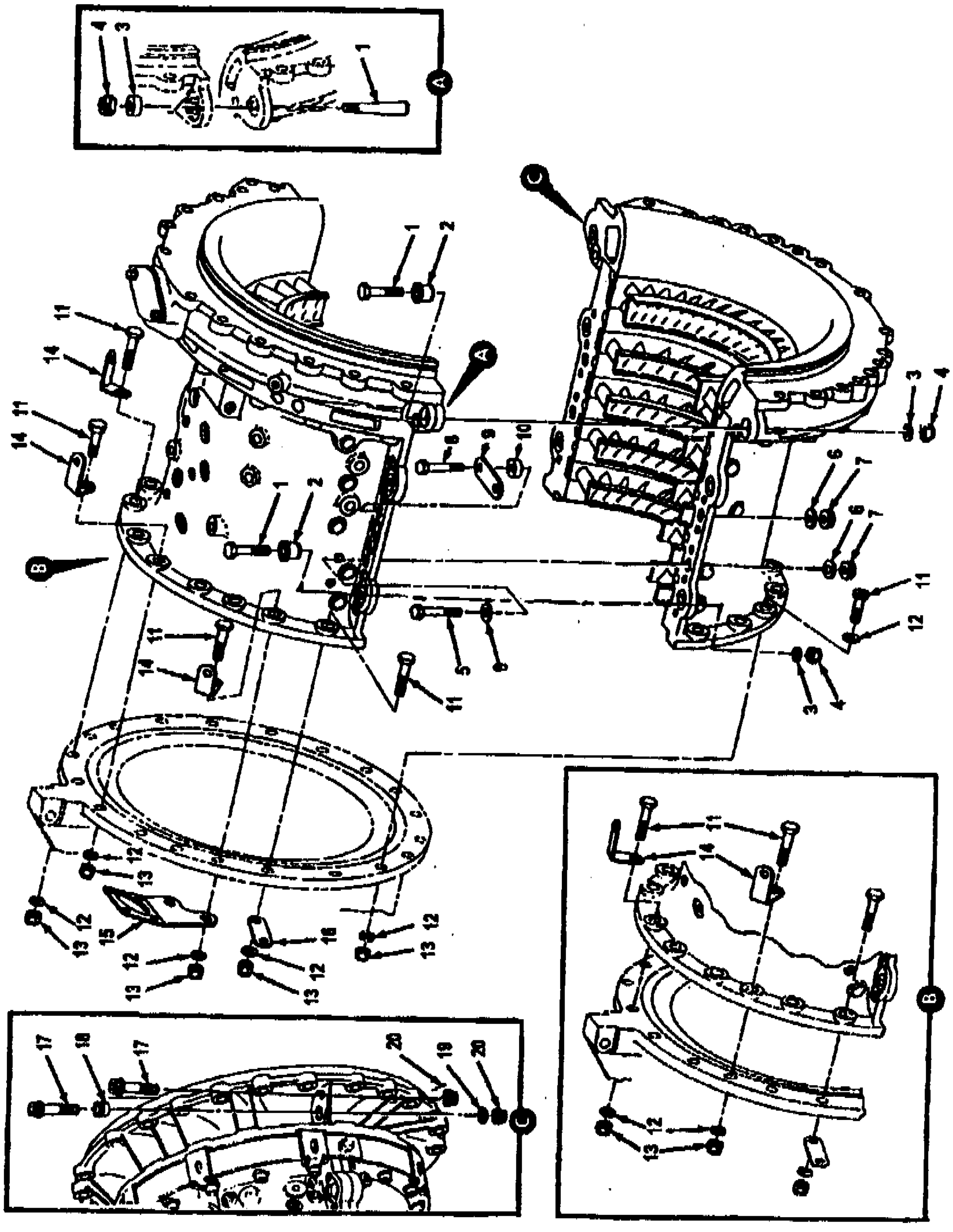


Figure 4-51. Compressor and Impeller Housing Assemblies and Attaching Parts.

FGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-51	No Number	COMPRESSOR AND IMPELLER HOUSING AND RELATED PARTS (NHA 1-000-060-10, 1-000-060-22, 1,000-100-01, 1-000-110-01, 1-000-110-03, 1-000-110-07, AND 1-000-060-23)	Ref	
-1	MS9519-17	.BOLT, Hex head	6	C,D,E
	MS519-17	.BOLT, Hex head	4	A,B
	AN386-2-6A	.PIN	2	C,D,E
-2	1-100-186-01	.DOWEL, Hollow	6	C,D,E
-3	AN975-3	.WASHER, Recessed	3	C,D,E
	MS15795-810	.WASHER, Flat	4	A,B
	MS15795-810	.WASHER, Flat	6	C,D,E
-4	MS21042-4	.NUT, Self-locking	6	C,D,E
	MS21042-4	.NUT, Self-locking	4	A,B
-5	MS9519-15	.BOLT, Hex head	12	
-6	AN960-416L	.WASHER, Flat	30	
-7	MS21042-4	.NUT, Self-locking	16	
-8	AN101120	.BOLT, Hex head	2	
-9	1-160-309-01	.BRACKET	1	
-10	1-160-607-01	.SPACER, Sleeve	2	
-11	MS9519-22	.BOLT, Hex head	15	
-12	AN960-416L	.WASHER, Flat	Ref	
-13	MS21042-4	.NUT, Self-locking	17	
-14	1-160-468-01	.BRACKET, Angle, electrical harness	3	
-15	1-160-457-02	.BRACKET, Angle, electrical receptacle	1	A,B
-16	1-160-309-01	.BRACKET, Flexible tube clamping	1	
-17	MS9915-11	.BOLT, Machine	4	
-18	1-100-538-01	.INSERT	2	
-19	AN960-C416	.WASHER, Flat	2	
-20	STD3064-4	.NUT, Self-locking	4	
	H22-4	..NUT, Self-locking (Alternate)	4	A,B

NOTE

On T53-L-13B, and -703 engines, remove spacers (10).

e. Remove bolts (11), washers (12), bracket (14), brackets(15 or 16), and nuts (13) that secure compressor housing to inlet housing.

f. Install four 1/4-28 jackscrews, two in each mating flange of upper compressor housing, to separate upper and lower sections of compressor and impeller housings.

g. Tighten jackscrews evenly until compressor and impeller housings can be removed.

h. Remove compressor and impeller housing sections straight out until rotor blades are cleared.

SECTION XIII. COMPRESSOR ROTOR ASSEMBLY

4-56. REMOVAL OF COMPRESSOR ASSEMBLY. Proceed as follows:

a. Position adapter (1, figure 4-52) (LTCT4558) and suitable lifting hoist on compressor rotor (2).

CAUTION

In following step b, to avoid damage to blades, extreme care shall be used when removing the compressor rotor.

b. Remove compressor rotor from inlet housing (3).

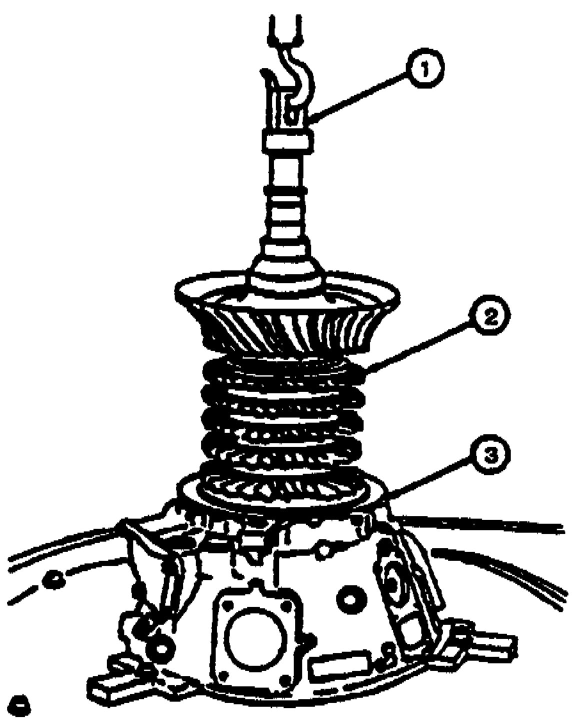
c. Place compressor rotor (1, figure 4-53) in holding fixture (LTCT13001 or LTCT55).

d. Remove washer (3) and shim (4) from inlet housing (8).

e. Using 1/4-28 machine bolts as pullers, withdraw sleeve (5) from inlet housing.

f. Remove shim (6) and packing (7) from inlet housing (8).

g. Using a sharp-pointed instrument, remove packing (2) from ID of inlet housing inner fairing ring. Discard packing.



1. Adapter
2. Compressor rotor
3. Inlet housing

Figure 4-52. Lifting Compressor Rotor Assembly.

4-57. REMOVAL OF VARIABLE INLET GUIDE VANE ASSEMBLY. Proceed as follows:

a. Remove bolt (1, figure 4-54) before attempting to remove air inlet vane assembly (7).

b. Remove outer rear fairing ring (8).

c. Remove screw (3) and plate (4).

d. Remove connector (6) and guides (5).

e. Using puller (LTCT4007), remove air inlet guide vane assembly. (See figure 4-55).

f. Remove packing (2, figure 4-54.)

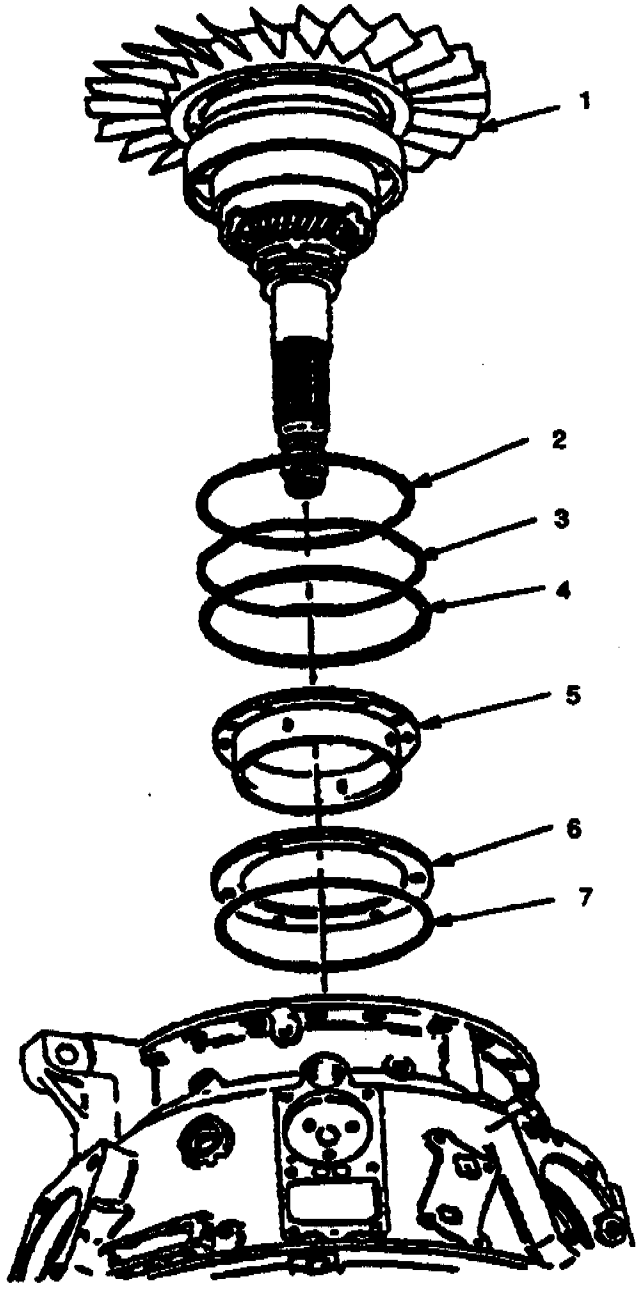


Figure 4-53. Compressor Rotor Assembly Removal and Installation.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-53	No Number	COMPRESSOR ROTOR ASSEMBLY (NHA1-000-060-22, AND 1-000-060-23 AND 1-000-110-07)	Ref	A,B,E
-1	1-100-720-47	COMPRESSOR ROTOR ASSEMBLY	1	A,E
	1-101-510-04	COMPRESSOR ROTOR ASSEMBLY	1	A,B,E
-2	STD3019B72	. PACKING	1	
-3	1-060-139-01	. WASHER, Spring tension	1	
-4	1-060-141-01	. SPACER, Inlet guide vane 0.020 - 0.022	AR	
	1-060-141-02	. SPACER, Inlet guide vane 0.028 - 0.030	AR	
	1-060-141-03	. SPACER, Inlet guide vane 0.036 - 0.038	AR	
	1-060-141-04	. SPACER, Inlet guide vane 0.044 - 0.046	AR	
	1-060-141-05	. SPACER, Inlet guide vane 0.052 - 0.054	AR	
	1-060-141-06	. SPACER, Inlet guide vane 0.060 - 0.062	AR	
	1-060-141-07	. SPACER, Inlet guide vane 0.068 - 0.070	AR	
	1-060-141-08	. SPACER, Inlet guide vane 0.076 - 0.078	AR	
	1-060-141-09	. SPACER, Inlet guide vane 0.084 - 0.086	AR	
	1-060-141-10	. SPACER, Inlet guide vane 0.092 - 0.094	AR	
-5	1-060-122-01	. SLEEVE, Compressor front bearing	1	
-6	1-060-124-01	. SHIM, Compressor front bearing, 0.020 - 0.022 inch thick	AR	
	1-060-124-02	. SHIM, Compressor front bearing, 0.028 - 0.030 inch thick	AR	
	1-060-124-03	. SHIM, Compressor front bearing, 0.036 - 0.038 inch thick	AR	
	1-060-124-04	. SHIM, Compressor front bearing, 0.044 - 0.046 inch thick	AR	
	1-060-124-05	. SHIM, Compressor front bearing, 0.052 - 0.054 inch thick	AR	
	1-060-124-06	. SHIM, Compressor front bearing, 0.060 - 0.062 inch thick	AR	
	1-060-124-07	. SHIM, Compressor front bearing, 0.068 - 0.070 inch thick	AR	
	1-060-124-08	. SHIM, Compressor front bearing, 0.076 - 0.078 inch thick	AR	
	1-060-124-09	. SHIM, Compressor front bearing, 0.084 - 0.086 inch thick	AR	
	1-060-124-10	. SHIM, Compressor front bearing, 0.092 - 0.094 inch thick	AR	
-7	M83248-1-159	. PACKING	1	

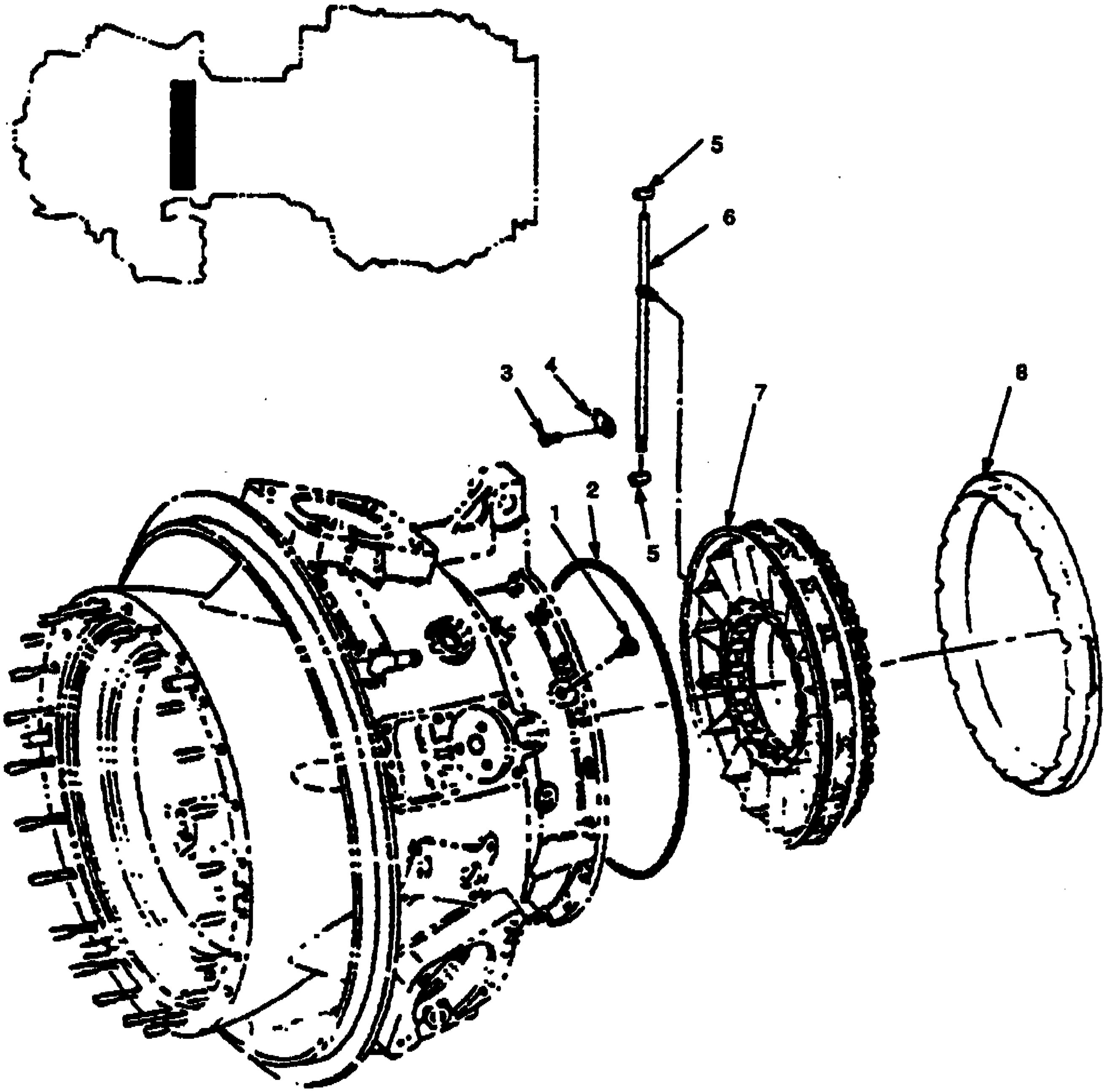


Figure 4-54. Variable Air Inlet Guide Vane Assembly and Attaching Parts.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
4-54	No Number	VARIABLE INLET GUIDE VANE ASSEMBLY AND RELATED PARTS (NHA 1-000-100-01, 1-000-110-01, 1-000-060-10, 1-000-060-22, AND 1-000-060-23)	Ref	
-1	1-060-142-01	. BOLT, Machine	1	
-2	1-060-003-01	. PACKING	1	
-3	AN507C1032-5	. SCREW	1	
-4	1-060-151-01	. PLATE, Setting, vane	1	
-5	1-060-135-02	. GUIDE, Actuator rod	2	
-6	1-060-300-03	. CONNECTOR, Variable inlet guide vane	1	
-7	1-060-270-05	. VANE ASSEMBLY, Variable inlet guide	1	
-8	1-060-310-01	. FAIRING ASSEMBLY	1	

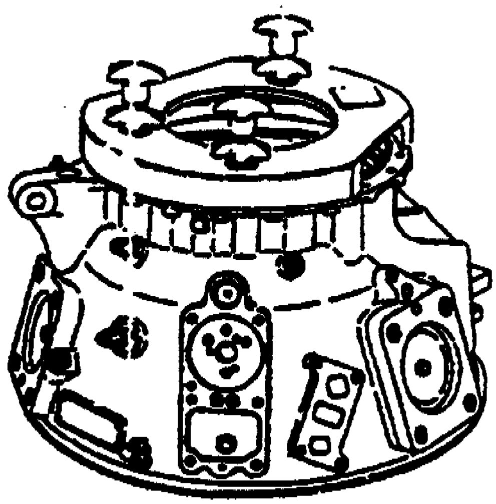
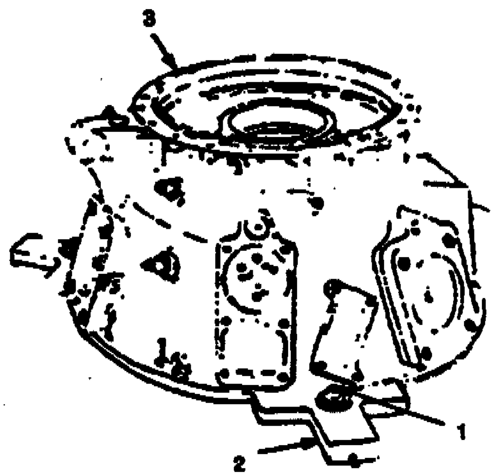


Figure 4-55. Variable Air Inlet Guide Vane Assembly Removed.

4-58. **REMOVAL OF INLET HOUSING ASSEMBLY.** Proceed as follows:

a. Loosen bolts (1, figure 4-56) and slide clamps (2) away from inlet housing (3).

b. Lift inlet housing straight out of stand until it clears working surface.



1. Bolt
2. Clamp
3. Inlet Housing

Figure 4-56. Inlet Housing Assembly on Stand.

CHAPTER 5
DISASSEMBLY

SECTION I. GENERAL

5-1. **GENERAL.** This chapter contains maintenance overhaul and repair procedures for all accessories and components of the T53-L-13B, -15, -701, -701A, and -703 engines. Disassembly performed shall be based on the results of preshop analysis, including through visual and mechanical inspection, and shall not be limited to the removal and separation of mechanical items, such as cover plates and gears.

5-2. **DISASSEMBLY.** Not Applicable.

5-3. **INSPECTION.** Conduct all inspections under a bright light using a 5X to 7X magnifying glass. Visually check all threaded parts for crossed or damaged threads. Replace parts having threads damaged beyond repair. Check the security of all parts not removed during disassembly.

5-4. **BEARINGS.** Clean and inspect all bearings in accordance with TM 55-1500-322-24.

SECTION II. LUBRICATION AND FUEL HOSE ASSEMBLIES

5-5. **GENERAL HOSE AND TUBE FITTING USAGE.** With the exceptions listed below, hose and tube rings shall be reused in manufacturing and repair if they pass inspection by shop personnel, in accordance with TM 55-1500-204-23 (Series).

CAUTION

Do not reuse aluminum sockets on high pressure hose fittings.

NOTE

Military Specification MIL-F-8789 states that MS28760, MS28761, MS28780 and MS28781 fittings for MIL-H-8788 hose should not be reused.

5-6. **OIL SCAVENGE HOSE ASSEMBLIES.**

5-7. **DISASSEMBLY.** Disassembly is not required.

5-8. **CLEANING.** Clean lines as required per SP No. 3002 in Appendix E.

5-9. **INSPECTION.** Perform specific inspections listed in table 5-1.

5-10. **REPAIR.** (See figures 4-2 and 4-3). Proceed as follows:

a. Remove scratches and nicks on tubing by burnishing with hand tools.

b. Repair minor chafing, fraying, and cuts using teflon spiral chafing sleeve or equivalent. (Refer to table 5-2).

c. Replace hose assembly if chafing, fraying, or cuts are other than minor, or if leakage is noted.

5-11. **REASSEMBLY.** Reassembly is not required.

5-12. **FUNCTIONAL TEST.** (See figures 4-2 and 4-3.) Proceed as follows:

NOTE

Functional-test hose assemblies, using calibrating fluid (item 68 or 69, table C–1) at ambient temperature.

a. Install suitableplug in one end of hose being tested. Do not tighten plug at this time.

b. Connect opposite end of hose to OUTLET NO. 3 BYPASS port of test stand (LTCT314 or equivalent).

c. Close STATIC BYPASS valve.

Table 5-1. Inspection of Oil Scavenge Hose Assemblies.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-2 3 and 8 and 4-3, 1 and 6	Hose Assembly	Visual	Chafing, fraying, or cuts	Repair or replace. (Refer to paragraph 5-10.)
			Cracks or grooves in flared end fittings	Not allowed. Replace
			Crossed or stripped threads on fittings	Not allowed. Replace
			Kinks	Not allowed. Replace
			Clogging or foreign material in hose assembly ID	Clean. (Refer to paragraph 5-8)
4-2 1, 9, 12, and 14 and 4-3, 8, 11, and 13	Clamps	Visual	Worn or damaged cushion	Not allowed. Replace

d. Use hand pump on test stand, bleed air from hose by simultaneously applying hydraulic pressure and loosening plug installed in preceding step a. After all air has been bled, tighten plug securely.

e. Using hand pump, increase pressure until GAGE NO. 1 STATIC PRESSURE gage indicates 2,900 to 3,100 psi (203.9 to 217.9 kg sq/cm).

f. While maintaining this hydraulic pressure for a minimum of 30 seconds, and a maximum of 5 minutes, flex hose through all positions and observe for leakage through braze joints and through braided casing.

g. If leakage is noted, reject hose.

h. Decrease hydraulic pressure to zero; then remove hose from test stand.

i. Remove plug installed in preceding step and drain hose.

Table 5-2. Chafing Sleeve Sizes.

HOSE SIZE	SPIRAL CONSTANT	CHAFING SLEEVE PART NO.
-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 approximate sleeve length is the product of these two (6 x 1.8 = 10.8 inches). Use the P/N 94835-1 sleeve.

5-13. AIR INLET GUIDE VANE ACTUATOR ASSEMBLIES.

5-14. DISASSEMBLY. Disassembly is not required.

5-15. CLEANING. Clean lines as required per SP No. 3002 in Appendix E.

5-16. INSPECTION. Perform specific instructions listed in table 5-3.

5-17. REPAIR. (See figures 4-4 and 4-5). Proceed as follows:

a. Repair minor chafing, fraying, or cuts in braided area using teflon spiral chafing sleeve or equivalent. (Refer to table 5-2).

b. Replace hose assembly if chafing, fraying, or cuts are other than minor, or if leakage is noted.

5-18. REASSEMBLY. Reassembly is not required.

5-19. FUNCTIONAL TEST. (See figures 4-4 and 4-5). Functional test hose assemblies as outlined in paragraph 5-12, steps a through i.

5-20. INTERSTAGE BLEED ACTUATOR HOSE ASSEMBLIES INTERSTAGE BLEED ACTUATOR ASSEMBLY AND BLEED BAND.

5-21. DISASSEMBLY.

a. Interstage Bleed Actuator Hose Assemblies (see figure 4-5). Disassembly is not required.

b. Interstage Bleed Actuator Assembly. Proceed as follows:

CAUTION

Upon disassembly of air-bleed 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 along with springseat that is found shall be removed and discarded.

Boot material can deteriorate and cause operational and mechanical difficulties.

(1) Remove union (1, figure 5-1), and packing (2).

(2) On T53-L-13B and -703 engines, remove bolts (6), washers (7) and bracket (8).

(3) On T53-L-15, -701 and -701A engines, remove bolts (6), washers (7) and brackets (8) and (9).

(4) Separate housing assembly (10) from cover (36).

(5) Remove nut (3) that secures rod (4) to pin (5). Remove rod end and remaining nut (3).

(6) Remove piston and seal assembly (11), spring (15), and seat (16) from housing assembly (10). Remove packing (13) and seal (12) from piston (14).

(7) Remove packing (17) from cover (36).

(8) Remove, nuts (18), and washers (19), and springs (20) and washers (19).

(9) Remove screws (21 and 22) and washers (23) from cover (36).

(10) Lift off cap (24), remove nut (25), bolt (31), washer (30), diaphragm (29), washer (28), and spacer (27). Shake seat (26) out of oblong hole in cover (36). Discard diaphragm (29).

(11) Remove reducer (32), packing (33), strainer element (34), and spring (35) from cover (36).

c. Interstage Bleed Band (see figure 4-7). Disassembly is not required.

5-22. CLEANING. Proceed as follows:

a. Clean all repairable parts, using dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

b. Using dry cleaning solvent (item 134, table C–1), pressure-flush strainer element (34, figure 5-1).

Table 5-3. Inspection of Air Inlet Guide Vane Actuator Hose Assemblies.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-4				
3, 12, and 26	Hose Assembly	Visual	Chafing, fraying, or cuts	Repair or replace (Refer to paragraph 5-17).
4-5				
3, 16 and 23			Cracks or grooves in flared end fittings	Not allowed. Replace.
			Crossed or stripped threads on fittings	Not allowed. Replace.
			Kinks	Not allowed. Replace.
			Clogging or foreign material to in hose assembly ID	Clean (Refer to paragraph 5-8).
4-4				
6,9,14,15, 18, 22, and 24	Clamps	Visual	Worn or damaged cushion	Not allowed. Replace.
4-5				
7,9,14, and 19				

5-23. INSPECTION. Inspect as follows:

a. Interstage Bleed Actuator Hose Assembly as listed in table 5-4.

b. Interstage Bleed Actuator Assembly as listed in table 5-5.

c. Interstage Bleed Band as listed in table 5-7.

5-24. REPAIR.

a. Interstage Bleed Actuator Hose Assemblies. (See figure 4-6). Proceed as follows:

(1) Repair minor chafing, fraying, or cuts in braided area using teflon spiral chafing sleeve or equivalent (Refer to table 5-2).

(2) Replace hoses if chafing, cuts, or fraying are other than minor, or if cracks or leakage are observed.

(3) Hose and Tube Fitting Usage. With the exceptions listed below, hose and tube fittings shall be reused in manufacturing and repair if they pass inspection by shop personnel, in accordance with TM 55-1500-204-23 (Series). Do not reuse aluminum sockets on high pressure hose fittings.

NOTE

Military Specification MIL-F-8789 states that MS28760, MS28761, MS28780 and MS28781 fittings for MIL-H-8788 hose should not be reused.

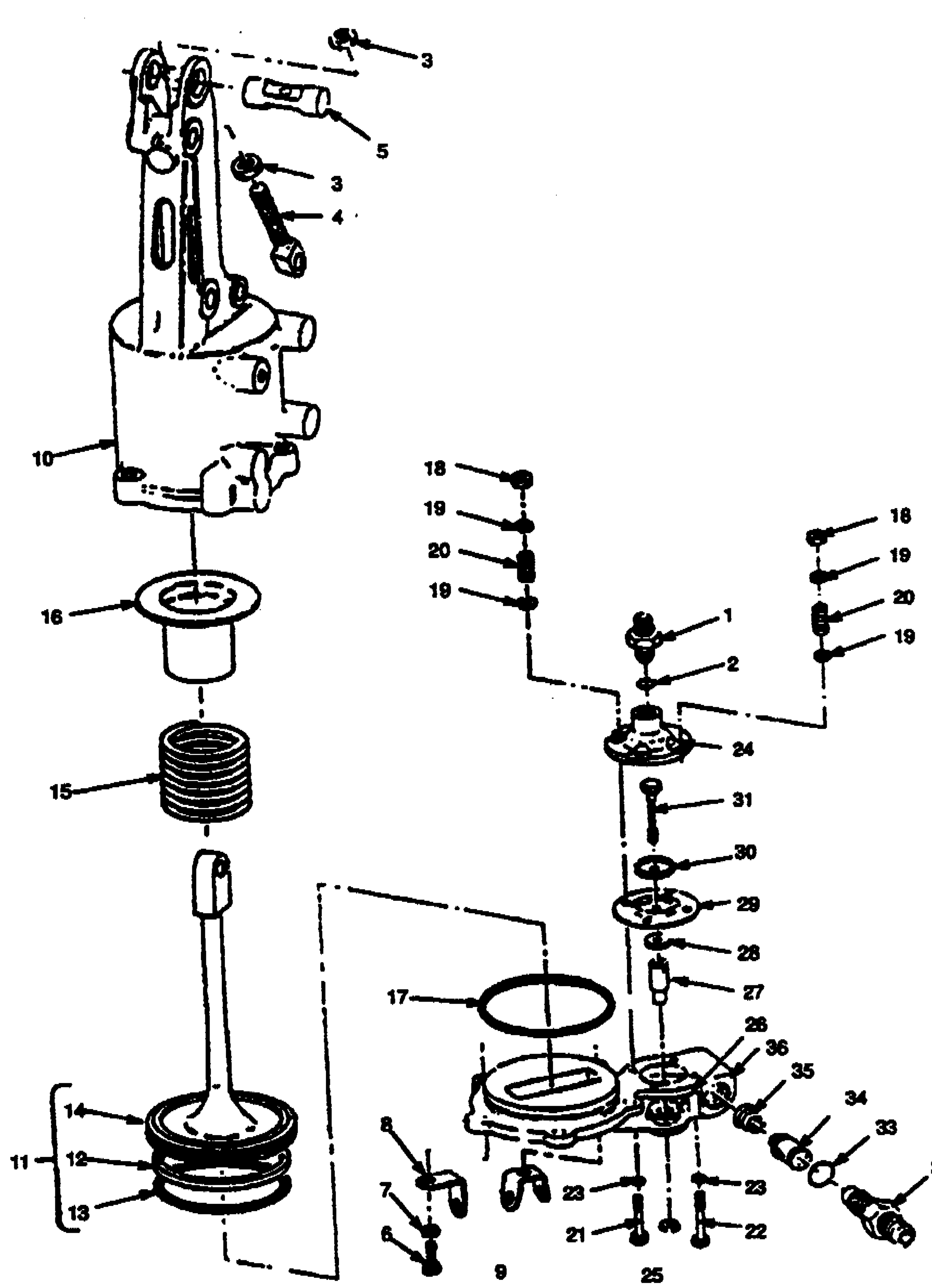


Figure 5-1. Interstage Bleed Actuator Assembly.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-1	No Number	INTERSTAGE BLEED ACTUATOR (NHA 1-100-640-06,1-170-330-06, 1-170-330-09, 1-170-330-13 and 1-170-330-21)	Ref	
-1	MS24392D4	. UNION, Flared tube (Replace with MS24392J4)	1	
	MS24392J4	. TUBE, Nipple	1	
-2	STD3017E4	. PACKING (Replace with M83248/1-904)	1	
	M83248/1-904	. PACKING	1	
-3	1-160-272-01	. NUT, Plain, hexagon, drilled	2	
-4	1-160-920-01	. ROD END, Externally threaded	1	
-5	1-160-254-01	. PIN, Grooved, headless	1	
	1-170-050-08	. ACTUATOR ASSEMBLY, Interstage bleed	1	
	1-170-050-12	. ACTUATOR ASSEMBLY, Interstage bleed	1	
-6	AN103809	. . BOLT, Drilled hex head	5	
-7	AN960-416L	. . WASHER, Flat	5	
-8	1-160-468-01	. . BRACKETS, Angle, electrical harness	1	A,B
	1-160-625-01	. . BRACKET ANGLE	1	C,D,E
-9	1-160-366-01	. . BRACKET, Mounting (Replace with 1-160-366-02)	1	C,D,E
	1-160-366-02	. . BRACKET, Mounting	1	C,D,E
-10	1-160-760-04	. . HOUSING ASSEMBLY, Actuator	1	
-11	No Number	. . PISTON AND SEAL ASSEMBLY (NHA 1-170-050-08)	Ref	
-12	KEX6232	. . SEAL (07322) (Lycoming Spec Cont Dwg 1-300-237-01)	1	
-13	STD3000D37	. . PACKING	1	
-14	1-160-342-01	. . PISTON, Actuator	1	
-15	1-160-268-02	. . SPRING, Piston	1	
-16	1-160-341-01	. . SEAT, Helical compression spring	1	
-17	STD3019E149	. . PACKING	1	
-18	MS21042L3	. . NUT, Self-locking	4	
-19	AN960-10	. . WASHER, Flat	8	
-20	1-180-049-01	. . SPRING, Compression	4	
-21	AN501-10-32	. . SCREW, Machine	2	
-22	AN501-10-20	. . SCREW, Machine	2	
-23	1-160-605-01	. . WASHER, Flat	4	
-24	1-160-592-03	. . CAP, Relay valve	1	

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-1-25	1-160-597-01	. . NUT, Plain hex	1	
-26	1-160-596-03	. . SEAT, Valve	1	
-27	1-160-617-02	. . SPACER, Valve	1	
-28	1-180-004-01	. . WASHER, Flat	1	
-29	1-160-595-01	. . DIAPHRAGM, Relay (Replace with AGC-2611)	1	
	AGC-2611	. . DIAPHRAGM, Relay (98500) (Lycoming Source Cont Dwg 1-300-611-01) (Replace with AGC-2836)	1	
	AGC-2836	. . DIAPHRAGM, Relay (98500) (Lycoming Source Cont Dwg 1-300-582-01)	1	
	JP20078	. . DIAPHRAGM, Relay (00986) (Alternate) (Lycoming Source Cont Dwg 1-300-611-02)	1	
	JL78-28-4	. . DIAPHRAGM, Relay (48287) (Alternate) (Lycoming Source Cont Dwg 1-300-611-03)	1	
-30	1-180-017-01	. . WASHER, Recessed	1	
-31	1-160-593-01	. . BOLT, Shoulder	1	
-32	MS24399D12	. . REDUCER, Flared tube	1	
-33	STD3017E8	. . PACKING	1	
-34	2-160-500-01	. . STRAINER ELEMENT	1	
	102800	. . STRAINER ELEMENT, Sediment (05160) (Alternate) (Lycoming Spec Cont Dwg 2-300-361-01)	1	
-35	2-160-267-01	. . SPRING, Helical, comp.	1	
-36	1-160-591-03	. . COVER, Actuator	1	

b. Repair of Interstage Bleed Actuator Assembly. (See figure 4-6). Proceed as follows:

(1) Replate spring (15, figure 5-1) as follows:

(a) Clean spring as required per SP No. 3002 in Appendix E.

(b) Strip cadmium plate by immersing part in solution of ammonium nitrate (item 44, table C–1) and water (13 ounces of ammonium nitrate per gallon of water) at room temperature until cadmium plating is removed.

(c) Rinse part in cold, then hot water.

(d) Blow dry with compressed air at 25 psig, (1757.7 grm sq cm).

(e) Cadmium-plate as outlined in SP No. 6015 in Appendix E.

(f) Stress-relieve at 440° to 460°F (227° to 238°C) for 2 hours after plating.

NOTE

Plate thickness shall be 0.0002 to 0.0005 inch (0.0005 to 0.0013 cm).

(2) Remove scoring from cylinder wall of housing assembly (10, figure 5-1) as follows:

(a) Machine cylinder bore of housing to a minimum depth of 2.245, to remove score marks. Polish using suitablemandrel on 320 grit aluminum oxide cloth to remove tool marks.

CAUTION

Do not exceed an inside diameter of 3.009 inches (7.643 cm) or out of round of 0.002 inch (0.005 cm).

(b) Light scoring shall be acceptable in areas noted in figure 5-4, if a maximum diameter has been reached, this applies to housing P/N 1-160-760-04 ONLY.

(c) Pitting due to casting porosity shall be disregarded providing the assembled unit meets functional test requirements.

(d) Anodize reworked areas.

(3) If actuator housing assembly (10, figure 5-1) cannot be made serviceable by the procedures in paragraph 5-24b(2), repair as follows:

(a) Machine the bore of cylinder to a depth of 2.245 to 2.255 inches (5.702 to 5.728 cm) deep, and 3.060 to 3.061 inches (7.772 to 7.775 cm) in diameter. Surface finish must be 64 rms or better. Maintain diameter round within 0.002 inches (0.005 cm).

(b) Manufacture cylindrical bushing 2.250 to 2.255 inches (5.715 to 5.728 cm) long, 3.062 to 3.063 inches (7.777 to 7.780 cm) outside diameter and 2.985 to 2.990 inches (7.582 to 7.595 cm) inside diameter from 6061T6 aluminum stock. Surface finish should be 64 rms or better on outside diameter.

(c) Penetrant inspect bushing and housing. No cracks are allowed.

(d) Anodize bushing and machined portion of housing as outlined in SP No. 6017 in Appendix E.

(e) Heat housing to 300°F (149°C) and insert bushing.

(f) Machine cylindrical bushing flush with open end of housing. Machine inside of bushing 3.000 to 3.002 inches (7.620 to 7.625 cm) diameter. Machine a 30° X 3.09 inch diameter chamfer on end of bushing to blend with existing chamfer on housing. Surface finish on inside surfaces should be 32 rms or better and 64 rms or better on end of housing.

Table 5-4. Inspection of Interstage Bleed Actuator Hose Assemblies.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-6				
-1 and -4	Hose Assembly	Visual	Chafing, fraying, or cuts	Repair or replace (Refer to paragraph 5-24).
			Cracks or grooves in flared end fittings	Not allowed. Replace.
			Damaged threads on fittings	Not allowed. Replace.
			Kinks	Not allowed. Replace.
			Clogging or foreign material in hose assembly ID	Clean. (Refer to paragrap 5-8.)
-5 and -9	Clamps	Visual	Worn or damaged cushion	Not allowed. Replace.

c. Interstage Bleed Band. (See figure 4-7). Blend-repair nicks and surface defects on bleed band as outlined in SP No. 5000 in Appendix E.

d. Interstage Bleed Band Screws. (See figure 5-2).

(1) Some screws may have a deeper head than allowed on figure 5-2, which may cause a bleed air leak. Screw heads may be ground to meet head dimension.

(2) Apply cadmium plate to screw head where plating has been removed using brush method in accordance with QQ-P-416

5-25. REASSEMBLY.

a. Interstage Bleed Actuator Hose Assembly. Reassembly is not required.

b. Interstage Bleed Actuator Assembly. Proceed as follows:

(1) Insert spring (35, figure 5-1) and strainer element (34) into cover (36). Install packing (33) on reducer (32) and install reducer into cover (36).

(2) Install seat (26) through oblong hole in cover (36) and position seat with recessed surface facing outward. Seat must be pressure-tight when seated. Lap seat as follows:

(a) Using lapping compound (item 178, table C–1), lap seat into housing.

(b) Remove excess lapping compound from lapped areas with cotton swab or cheese cloth saturated with water. Continue until cleaning cloth shows no evidence of lapping compound.

(c) Wipe with acetone (item 13, table C–1).

(d) Air dry for a minimum of 10 minutes.

(e) Using a brush, apply chemical film to lapped seat area of cover (36) as outlined in MIL-C-5541.

(3) Install spacer (27), cross-hole end upward, through top of cover and into recess of seat (26).

(4) Position washer (28), a new diaphragm (29), washer (30), and bolt (31) in cover (36). Align screw holes in diaphragm with holes in cover.

(5) Thread nut (25) onto bolt (31). Tighten nut to 10 to 12 pound-inches (1786 to 2143.2 gm cm) torque and lockwire, using lockwire (item 181, table C–1).

CAUTION

Adequately support cover (36).

(6) Secure cap (24) to cover (36) with washers (19 and 23), springs (20), nuts (18), and screws (22 and 21). Tighten screws 1-1/2 to 1-3/4 turns after engaging springs. Coat packings (2 and 17) with grease (item 166, table C–1). Install packings (2) on union (1). Install union in cap (24). Install packing (17) on cover (36).

(7) Coat packing (13) with grease (item 166, table C–1). Position packing on piston (14).

(8) Using ring compressor (RC40C or LTCT4718), position and compress seal (12) and piston (14).

(9) Install spring (15) on seat (16) and install spring and seat on piston (14), with flared end of seat away from piston head.

(10) Insert piston (14), with seat (16) and spring (15) installed, into housing assembly (10).

CAUTION

In following step (11), do not damage packing (17) during installation of cover (36).

(11) Secure cover (36) to housing assembly (10) with bracket (8), washers (7), and bolts (6). On T53-L-15, -701, -701A engines, position bracket (9) on cover and secure with bolt (6). Lockwire bolts.

NOTE

In following step (12), pins with head may be installed in lieu of headless pins without rework

(12) Install pin (5) into actuator housing assembly.

(13) Thread one nut (3) on rod end (4). Insert rod end through hole in pin (5), and thread remaining nut (3) onto rod end (4). Do not tighten nuts; rod end will be adjusted during installation of interstage bleed actuator.

(14) After overhaul, change P/N 1-170-050-08 to P/N 1-170-050-12.

c. Interstage Bleed Band. Reassembly is not required.

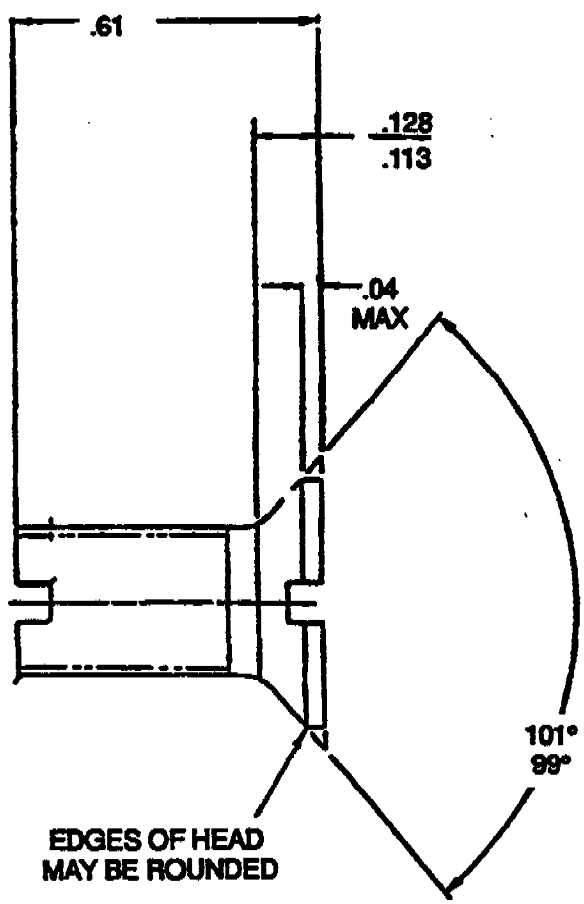


Figure 5-2. Bleed Band Screw, P/N 1-160-265-01.

Table 5-5. Inspection of Interstage Bleed Air Actuator Assembly.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-1				
-4	Rod End	Visual	Cracks	Not Allowed. Replace.
-10	Housing Assembly	Visual	Nicks, burrs, dents or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
			Damaged threads	Repair or replace. (Refer to SP No. 5007 in Appendix E)
		Visual and SIE	Scoring of cylinder wall	Repair. (Refer to paragraph 5-24)
		Visual and Fluores-cent Penetrant.	Cracks	Not allowed. Replace.
		Dimen-sional	Wear. (Refer to table 5-6)	Replace if limits are not met.
-12	Seal	Visual	Cuts and scoring	Not allowed. Replace.
-14	Piston	Visual	Nicks, burrs, or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
		Visual and Fluores-cent Penetrant.	Cracks	Not allowed.
		Dimen-sional	Wear. (Refer to table 5-6)	Replace if limits are not met.
-15	Spring	Visual	Nicks or burrs scratches	Repair. (Refer to SP No. 5000 in Appendix E)
			Pitting, worn, or dam-aged plating	Repair (refer to paragraph 5-24)
	Spring		Cracks	Not allowed. Replace
		SIE	*Requires less than 12.44 or more than 18.44 pounds (5.648 to 8.372 kg) to com-press spring to 2.7 inches (6.86 cm)	Replace if limits are not met
			*Requires less than 49.44 or more than 61.44 pounds (22.446 to 27.894 kg) to com-press spring to 1.7 inches (4.32 cm)	Replace if limits are not met
-16	Seat	Visual	Nicks, buffs, dents, or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
			Cracks	Not allowed. Replace

Table 5-5. Inspection of Interstage Bleed Air Actuator Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-1-20	Springs	Visual	Nicks or burrs	Repair. (Refer to SP No. 5000 in Appendix E)
			Damage or loss of tension	Not allowed. Replace
-24	Cap	Visual and Fluores-cent Penetrant	Cracks	Not allowed. Replace
-26	Seat	Visual	Cracks	Not allowed. Replace
-27	Spacer	Visual	Nicks or burrs	Not allowed. Replace
			Elongated or damaged hole	Not allowed. Replace
-34	Strainer element	Visual	Cut or tears	Not allowed. Replace
			Foreign material on strainer	Clean. (Refer to paragraph 5-22)
-35	Spring	Visual	Nicks and burrs	Repair. (Refer to SP No. 5000 in Appendix E)
-36	Cover	Visual	Nicks and burrs or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
			Damaged threads	Repair or replace. (Refer to SP No. 5007 in appendix E)
			Cracks	Not allowed. Replace
		Dimen-sional	Wear. (Refer to table 5-6)	Replace if limits are not met

* Inspect only if visual inspection indicates an unusual condition such as elongation or distortion.

Table 5-6. Dimensional Inspection of Interstage Bleed Actuator Assembly.

NOMENCLATURE	FIG. & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-1								5–2
PISTON	14*	OD	2.986	2.988	2.984	2.988			A
			(7.584)	(7.590)	(7.580)	(7.590)			
HOUSING ASSEMBLY	10*	ID	3.000	3.002			0.001L	0.005L	B
TO			(7.620)	(7.625)			(0.002)	(0.012)	
COVER	36*	OD	2.998	2.999	2.997	2.999			C
			(7.614)	(7.617)	(7.612)	(7.617)			

NOTE: DIMENSIONS IN ( ) ARE CENTIMETER

*Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion or wear.

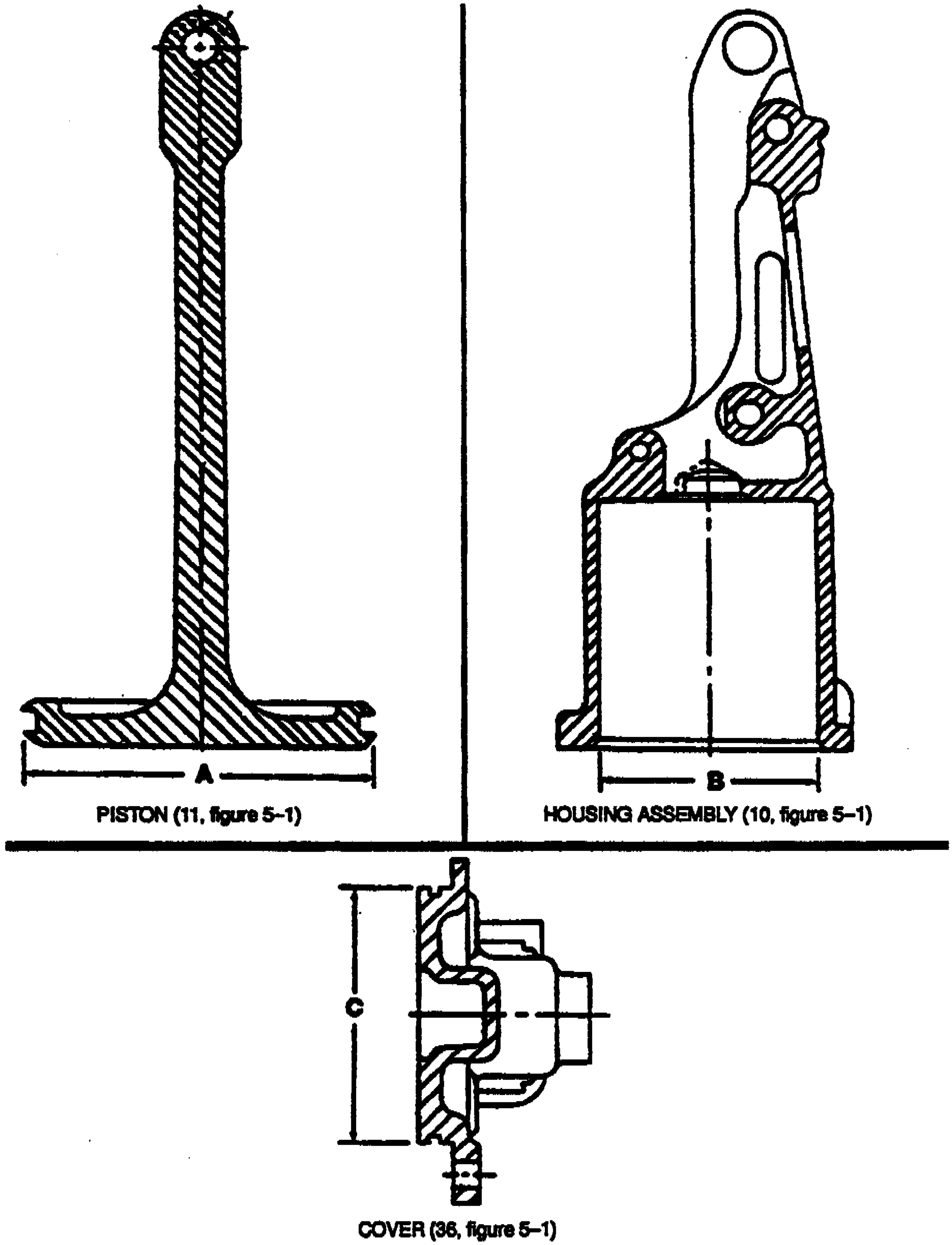


Figure 5-3. Interstage Bleed Actuator Assembly Dimensional Inspection Locations.

Table 5-7. Inspection of Interstage Bleed Band

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-7 2 and 5	Upper and Lower Bands	Visual	Nicks, dents, or burrs	Repair. (Refer to SP No. 5000 in Appendix E)
		Visual and Fluorescent Penetrant	Cracks in band or spot welds	Not allowed. Replace

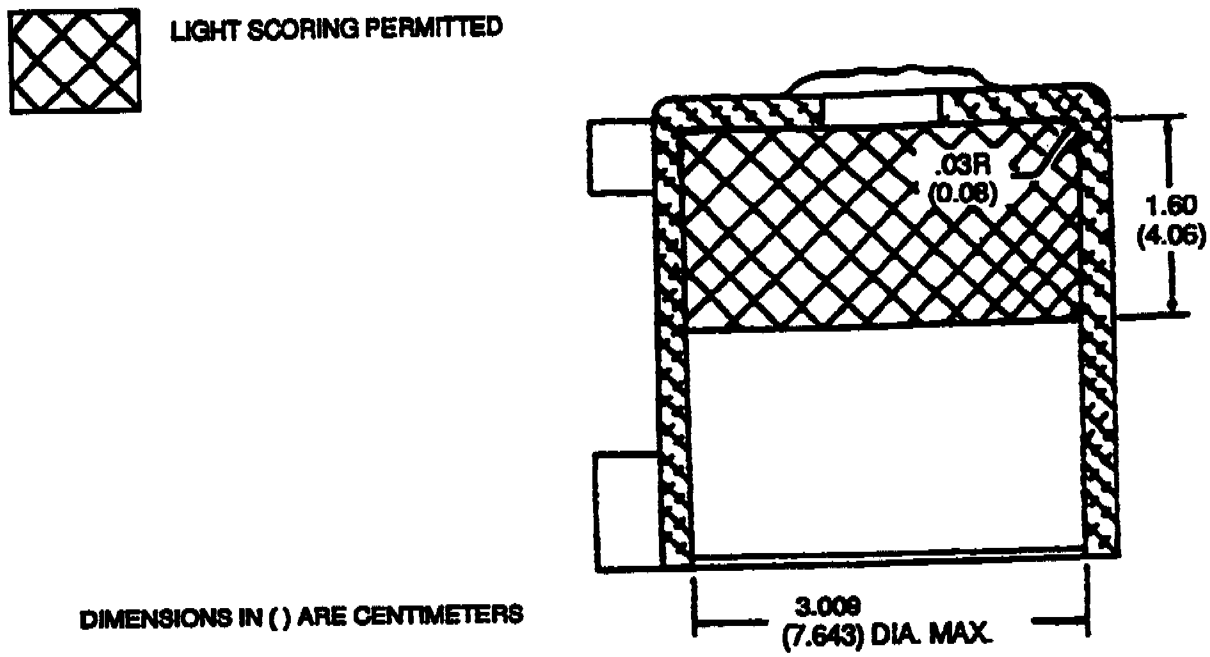


Figure 5-4. Acceptable Scoring of P/N 1-160-760-04.

5-26. FUNCTIONAL TEST.

a. Interstage Bleed Actuator Hose Assemblies. (See figure 4-6.). Functional-test hose assemblies as outlined in paragraph 5-12, steps a through i.

WARNING

FLIGHT SAFETY PARTS

Verification that part passes functional test is flight safety critical.

b. Interstage Bleed Actuator Assembly. Proceed as follows:

(1) Place test fixture assembly (LTCT10440-01) on compressor bleed valve test stand (LTCT421). (See figure 5-5).

(2) Secure actuator to test fixture assembly (LTCT10440-01) with screws (1), washers (2), and nuts (3).

(3) Connect No. 6 (3/8 inch diameter) hose to L-2 OUTLET on test stand, and install tee AN824-6, in opposite end of hose.

(4) Connect No. 6 hose from one leg of the tee to actuator inlet reducer (32, figure 5-1).

(5) Install reducer, AN919-6, in remaining leg of tee and connect No. 4 (1/4 inch diameter) hose from reducer to L-2 GAGE port on test stand.

(6) Connect tee (4, figure 5-5) to micrometer (5).

(7) Connect No. 4 hose from union (1, figure 5-1) to tee of test fixture.

(8) Connect No. 4 hose from tee to L-4 Gage port on test stand.

(9) Close L-4 (PSIG) (Signal Pressure) and L-2 (Supply Pressure) indicator shutoff valve.

(10) Turn on test stand. Turn L-2 selector valve to PRESSURE.

(11) Open L-2 PRESSURE CONTROL regulator valve until L-4 gage and L-2 gage indicate pressure of 50 to 70 inches Hg absolute pressure (10 to 20 psi) (703 to 1406 gm sq cm).

(12) Open and close vernier control valve several times and observe actuator piston.

NOTE

Piston should move to the extended position when vernier control valve is closed, and move to the retracted position when the valve is open.

(13) If sticking or erratic action occurs when performing preceding step (12), stop test, disassemble unit, and replace defective parts.

(14) Build L-2 gage pressure to 150 inches Hg absolute (60 psi); then close vernier control valve. Maintain this pressure for 3 minutes and observe that pressure, as indicated on L-4 gage, is not less than 147 inches Hg absolute (58.8 psi). Check actuator for leaks.

NOTE

Leakage is determined by pressure indication of L-4 gage. If gage indicates less than 147 inches Hg absolute (58.8 psi), actuator is leaking.

(15) If leakage is indicated from performing preceding step(14), replace defective parts, as necessary, to stop leakage.

(16) Set L-2 pressure at 90 inches Hg absolute (30 psig), open vernier control valve until piston retracts. Record L-2 and L-4 gage reading.

NOTE

Vernier opening on test fixture (LTCT10440-01) must be within 0.010 to 0.014 inch (0.025 to 0.035 cm).

(17) Set L-2 pressure at 90 inches Hg absolute (30 psig), close vernier valve until piston extends. Record L-2 and L-4 gage readings.

NOTE

Closing pressure on L-4 gage must exceed opening pressure by a minimum of 3 inches Hg absolute (1.5 psig).

(18) If limits cannot be met, repair or replace actuator assembly.

c. Interstage Bleed Band.Functional test of the interstage bleed band is not required.

5-27. PRESSURE MANIFOLD AND HOSE ASSEMBLIES.

5-28. DISASSEMBLY. Disassembly is not required.

5-29. CLEANING. Clean lines as required per SP No. 3002 in Appendix E.)

5-30. INSPECTION. Perform specific inspections listed in table 5-8.

5-31. REPAIR. (See figures 4-8 and 4-9.) Proceed as follows:

a. Remove scratches and nicks on tubing by burnishing with hand tools.

b. Repair minor chafing, fraying and cuts in hoses, using teflon spiral chafing sleeve (Titeflex Co., Inc.), or equivalent. (Refer to table 5-2.)

c. Replace hoses if chafing, cuts, and fraying is other than minor, or if leakage is observed.

d. Replace manifold (21, figure 4-8, or 19, figure 4-9) if cracks are apparent.

5-32. REASSEMBLY. Reassembly is not required.

5-33. FUNCTIONAL TEST. (See figures 4-8 and 4-9.) Proceed as follows:

a. Functional-test lubrication pressure manifold; (21, figure 4-8 and 19, figure 4-9) using calibrating fluid (item 69 or 68, table C–1) heated to 60° to 120°F (16° to 49°C) as follows:

(1) Install plugs in two of three manifold ports. Do not tighten one of the two plugs at this time.

(2) Connect 1/4-inch diameter hose from OUTLET NO. 3 STATIC BYPASS port of test stand (LTCT314 or equivalent) to remaining port of manifold.

(3) Close STATIC BYPASS valve.

(4) Using hand pump on test stand, bleed air from manifold by simultaneously applying hydraulic pressure and loosening untightened plug installed in step (1). After all air has been bled, tighten plug securely.

(5) Using hand pump, increase pressure until GAGE NO. 1 STATIC PRESSURE gage indicates 500 to 525 psi (35154 to 36911 gm sq cm).

(6) Maintain this pressure for a minimum of one minute and observe for leakage.

(7) If leakage is noted, reject manifold.

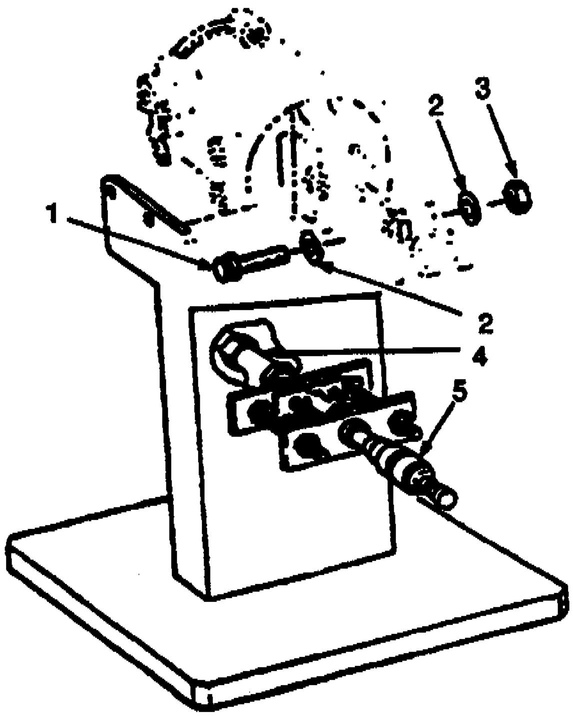
(8) Decrease hydraulic pressure to zero; then remove manifold from test stand.

(9) Remove plug installed in preceding step (1) and drain manifold.

b. Functional-test hose assemblies as outlined in paragraph 5-12, steps a through i.

Table 5-8. Inspection of Lubrication Pressure Manifolds and Hose Assemblies

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-8 1,13, and 20	Hose Assembly	Visual	Nicks and scratches	Repair. (Refer to paragraph 5-31)
			Chafing, or cuts	Not allowed. Replace
4-9 1,11, 18, 20, 21, and 26			Cracks or grooves in flared end fittings	Not allowed. Replace
			Crossed or stripped threads on fittings	Not allowed. Replace
			Kinks	Not allowed. Replace
			Clogging or foreign material in hose assembly ID	Clean. (Refer to paragraph 5-29)
4-8 3, 5, 7, 10, and 12	Clamps	Visual	Worn or damaged cushion	Not allowed. Replace
4-9 3, 5, 7, 10, 34, 37, and 40				
4-8 14	Adapter	Visual	Damaged threads or dents	Not allowed. Replace
4-9 12	Adapter	Visual and Fluorescent Penetrant.	Cracks	Not allowed. Replace
4-8 16	Connector	Visual	Cracks or dents	Not allowed. Replace
4-9 14			Damaged threads	Not allowed. Replace
4-8 21	Lubrication Pressure Manifold	Visual and Fluorescent Penetrant	Cracks	Not allowed. Replace
4-9 19				
4-9 22	Manifold Assembly (T53-L-15)	Visual and Fluorescent Penetrant	Cracks	Not allowed. Replace



1. Screw
2. Washer
3. Nut
4. Tee
5. Micrometer

Figure 5-5. Interstage Bleed Actuator Assembly Installed In Test Stand.

5-34. **STARTING FUEL HOSE ASSEMBLIES.**

5-35. **DISASSEMBLY.** Disassembly is not required.

5-36. **CLEANING.** Clean lines as required per SP No. 3002 in Appendix E).

5-37. **INSPECTION.** Perform specific inspections listed in table 5-9.

Table 5-9. Inspection of Starting Fuel Hose Assemblies

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-10 1 and 4 4-11 1 and 17	Hose Assembly	Visual	Chafing, fraying, or cuts	Repair or replace. (Refer to paragraph 5-38)
			Cracks or grooves in flared end fittings	Not allowed. Replace
			Crossed or stripped threads on fittings.	Not allowed. Replace
			Kinks	Not allowed. Replace
			Clogged or foreign material in hose assembly ID	Clean. (Refer to paragraph 5-36)
4-10 8 4-11 5	Bracket and Clamp Assembly	Visual and Dye-Penetrant	Cracks in and adjacent to welded joints	Repair. (Refer to paragraph 5-59)
4-10 11 4-11 7	Tube Assembly	Visual	Cracks	Not allowed. Replace
			Cracks or grooves in flared end fittings	Not allowed. Replace
			Clogging or foreign material in tube assembly ID	Clean. (Refer to paragraph 5-36)
4-10 6, 16, and 17 4-11 19 and 20	Clamps	Visual	Worn or damaged cushion	Not allowed. Replace

5-38. REPAIR. (See figures 4-10 and 4-11.) Proceed as follows:

a. Repair minor chafing, fraying, and cuts in braided area using teflon spiral chafing sleeve (Titeflex Co., Inc.) or equivalent. (Refer to table 5-2).

b. Replace hoses if chafing, cuts, and fraying is other than minor, or if leakage is observed.

5-39. REASSEMBLY. Reassembly is not required.

5-40. FUNCTIONAL TEST. (See figures 4-10 and 4-11.) Functional-test hose assemblies as outlined in paragraph 5-12, steps a through i.

5-41. CHECK FILTER VALVE ASSEMBLY.

5-42. DISASSEMBLY. Proceed as follows:

a. Remove lockwire from valve body (9, figure 5-6) and end cap (1).

NOTE

In following step b, use care when removing end cap (1). Spring retainer (2) and spring (3) are free to drop from valve body.

b. Using two open end wrenches, remove end cap (1).

c. Remove spring retainer (2) and spring (3).

d. Remove popper (4), poppet seat (5), filter (8), and spacer (7).

e. Remove and discard copper gasket (6).

5-43. CLEANING. Clean all parts by dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

5-44. INSPECTION. Perform specific inspections listed in table 5-10.

5-45. REPAIR. (See figures 4-10, 4-11, and 5-6.) Proceed as follows:

Table 5-10. Inspection of Check-Filter Valve Assembly

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-6				
-1	End Cap	Visual	Damaged threads	Repair or replace. (Refer to SP No. 5007 in Appendix E)
-3	Spring	Visual	Loss of tension	Not allowed. Replace
-4	Poppet	Visual	Nicks, burrs, or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
-5	Poppet Seat	Visual	Nicks, burrs, or scratches on internal surface	Repair. (Refer to paragraph 5-45)
-8	Filter	Visual	Foreign material on filter	Clean. (Refer to paragraph 5-43)
-9	Valve Body	Visual	Damaged threads	Repair or replace. (Refer to SP No. 5007 in Appendix E)
			Dents	Not allowed. Replace

a. Remove nicks, burrs, and scratches from internal surface of poppet seat (5, figure 5-6) as follows:

b. Using lapping compound (item 177, table C–1), and fabricated tool, polish poppet seat internal surface to remove imperfections.

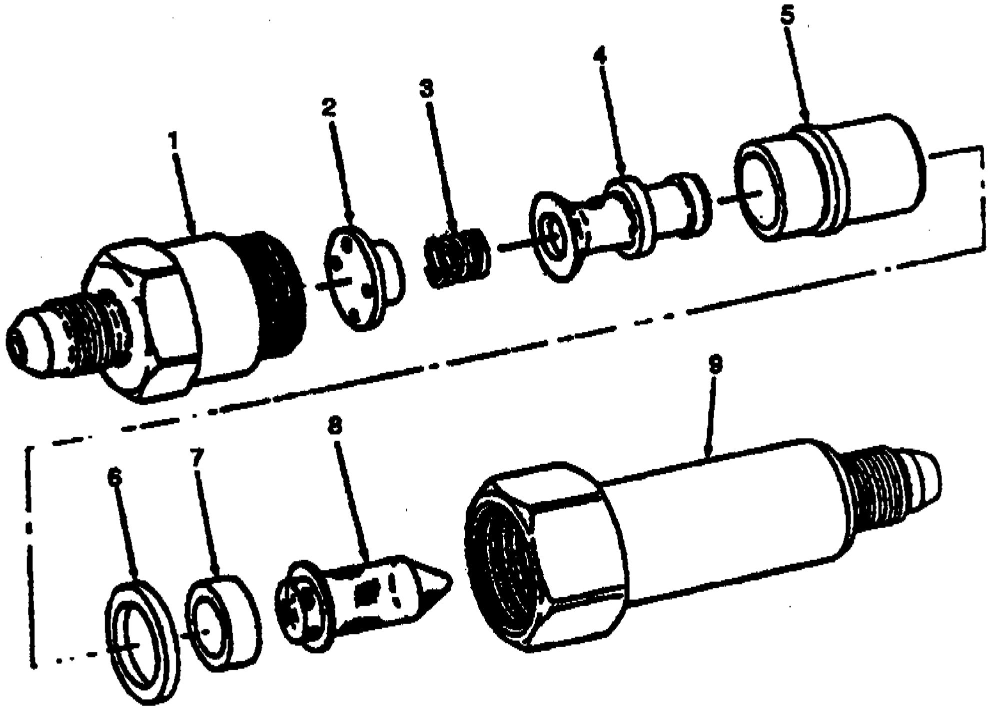
c. Repair cracks in bracket and clamp assembly (8, figure 4-10 and 5, figure 4-11) in and adjacent to welded joints as outlined in following steps c through g.

d. Route out cracks using a minimum diameter and thickness cuffing wheel to ensure removal of least amount of metal. Restrain assembly securely while routing.

e. Using dry-cleaning solvent (item 134, table C–1), clean assembly.

f. Using welding wire (item 347, table C–1) weld cracks as outlined in SP No. 5001 in Appendix E. Back up metal with copper while welding. (See figure 5-7.)

g. Blend weld repair. (Refer to SP No. 5000 in Appendix E.)



1. **End Cap**
2. **Spring retainer**
3. **Spring**
4. **Poppet**
5. **Poppet seat**
6. **Copper gasket**
7. **Spacer**
8. **Filter**
9. **Valve body**

Figure 5-6. Check Filter Valve Assembly.

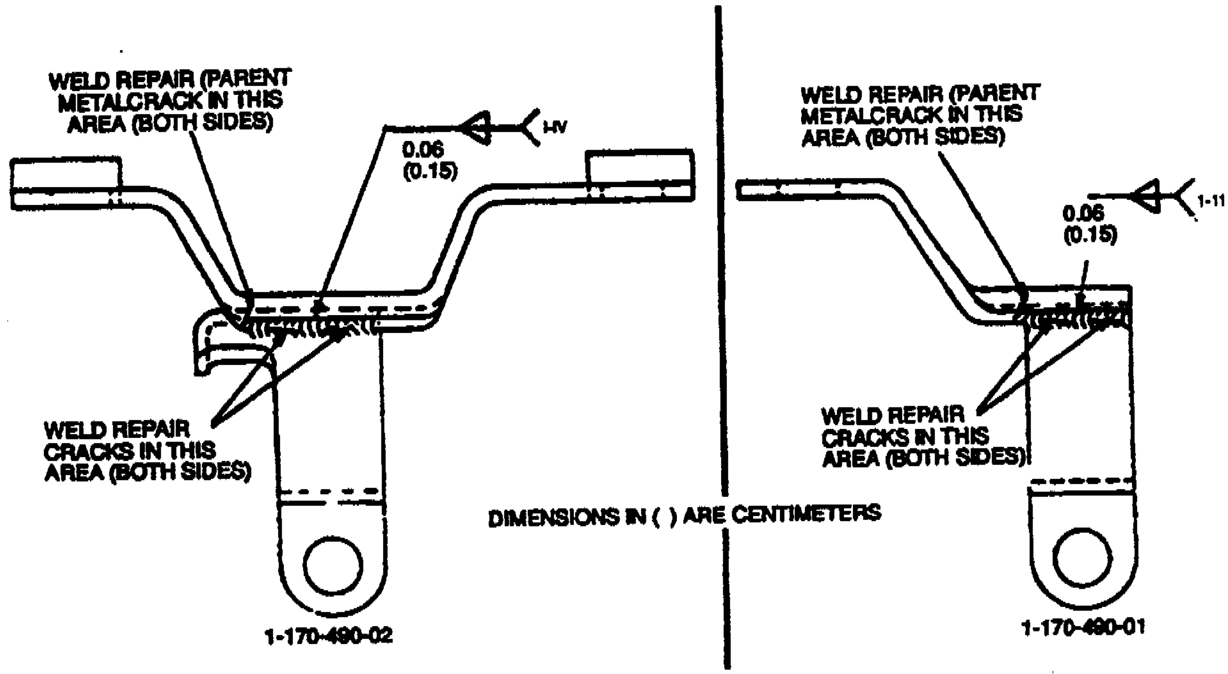


Figure 5-7. Bracket and Clamp Assembly - Weld Repair.

h. Perform a visual and dye-penetrant inspection of assembly. Cracks are not acceptable.

i. Replace all other damaged parts.

5-46. **REASSEMBLY.** Proceed as follows:

a. Position new copper gasket (6, figure 5-6) on poppet seat (5).

b. Install spacer (7), filter (8), poppet seat (5), and poppet (4) in valve body (9).

c. Install spring (3) and spring retainer (2).

d. Install end cap (1) on valve body (9). Tighten end cap to 250 to 350 pound-inches (44650 to 62510 gm cm) torque and lockwire.

5-47. **FUNCTIONAL TEST.** (See figures 4-10 and 4-11.) Proceed as follows:

a. Using a suitable air supply, check cracking pressure of valve. Valve should crack at a pressure of 0.5 to 1.0 psid.

b. Using calibrating fluid (item 68 or 69, table C–1), heated to a temperature of 50° to 90°F (10° to 32°C), apply a pressure of 95 to 105 psig (6679 to 7382 gm sq cm) in the opposite direction of flow.

(1) Internal leakage shall not exceed 6 cc per minute.

(2) External leakage is not allowed.

c. Reject check-filter valve assembly if assembly does not pass preceding test.

5-48. **STARTING FUEL SOLENOID VALVE ASSEMBLY.**

5-49. **DISASSEMBLY.** Disassembly is not required.

5-50. CLEANING. Proceed as follows:

a. Mask electrical terminal ends and threads, as well as inlet and outlet ports of the starting fuel solenoid valve assembly (10), figure 4-11. Clean using dry cleaning solvent method (refer to SP No. 3002 in Appendix E). If corrosion (in the form of rust) is present, clean the solenoid valve assembly with dry cleaning solvent (item 134, table C–1) and repair as per paragraph 5-52.

b. Clean lines as required per SP No. 3002 in Appendix E.

5-51. INSPECTION. Perform specific inspections listed in table 5-11.

5-52. REPAIR. (See figures 4-10 and 4-11.) Proceed as follows:

a. Treat corroded solenoid valve assembly as follows:

(1) Blast with glass bead abrasive (item 4, table C–1) to remove corroded area. Do not exceed a blasting pressure of 60 psi. Remove glass bead residue with clean, dry, compressed air.

(2) Apply rust remover and metal conditioner (item 260, table C–1) to the pitted areas and all of the remaining surface to remove any residual rust in the pits not removed by glass bead blasting and to provide an excellent paint base for protective coatings. Leave rust remover or surface for about 30 seconds and remove with a clean wet rag followed by a clean dry rag.

(3) Apply two (2) coats of primer (item 253, table C–1) to the treated surface followed by two (2) coats of paint (item 107, table C–1).

b. If valve cannot be identified due to missing or mutilated data plate, proceed as follows:

(1) Determine proper identification and flow direction (See figure 5-8).

(2) Using a vibropeen etching tool, identify valve (See figure 5-8).

NOTE

Depth of marking shall be within 0.001 to 0.006 inch (0.002 to 0.015 cm).

(3) Using a vibropeen etching tool, etch an arrow to indicate flow direction (See figure 5-8).

(4) Loss of serial number does not constitute cause for rejection. New serial number is not required.

c. Replace screen (21A, figure 4-2) if damaged.

NOTE

Use rubber end of pencil to insert new screen.

d. Replace gasket if valve leaks.

5-53. REASSEMBLY. Reassembly is not required.

5-54. FUNCTIONAL TEST. (See figures 4-10 and 4-11) Proceed as follows:

a. Connect No. 4 (1/4-inch diameter) hose from OUTLET NO. 1 HIGH PRESSURE port on test stand (LTCT314), or equivalent to inlet port of starting fuel solenoid valve. (See figure 5-9.)

b. Position DC PUMP switch to OFF.

c. Connect electrical lead from DC OUTLET receptacle to starting fuel solenoid valve receptacle.

d. Position DC POWER switch to ON. Set DC CONTROL knob until DC VOLTMETER indicates 14 to 30 vdc.

e. Press MAIN POWER ON button.

f. Open HIGH PRESSURE CONTROL valve and observe GAGE NO. 4 HIGH PRESSURE gage for rise in pressure.

Table 5-11. Inspection of Starting Fuel Solenoid Valve Assembly

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-10				
-20	Solenoid Valve Assembly	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
4-11				
-10			Bent or broken pins on connector	None allowed. Replace
			Corroded connector	Repair. (Refer to paragraph 5-52)
			Missing or mutilated data plate	Replace. (Refer to paragraph 5-52)
			Foreign material in fuel inlet screen	Replace. (Refer to paragraph 5-52)
4-10				
-23	Union	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
-2	Bracket	Visual	Cracks	Not allowed. Replace
		Visual	Loss of protective finish	Repair by Cadmium Plate. (Refer to SP No. 6015 in Appendix E) or Electroless Nickel Plate per MIL-C-26074
4-11				
-14	Elbow	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
-15	Bracket	Visual	Cracks	Not allowed. Replace

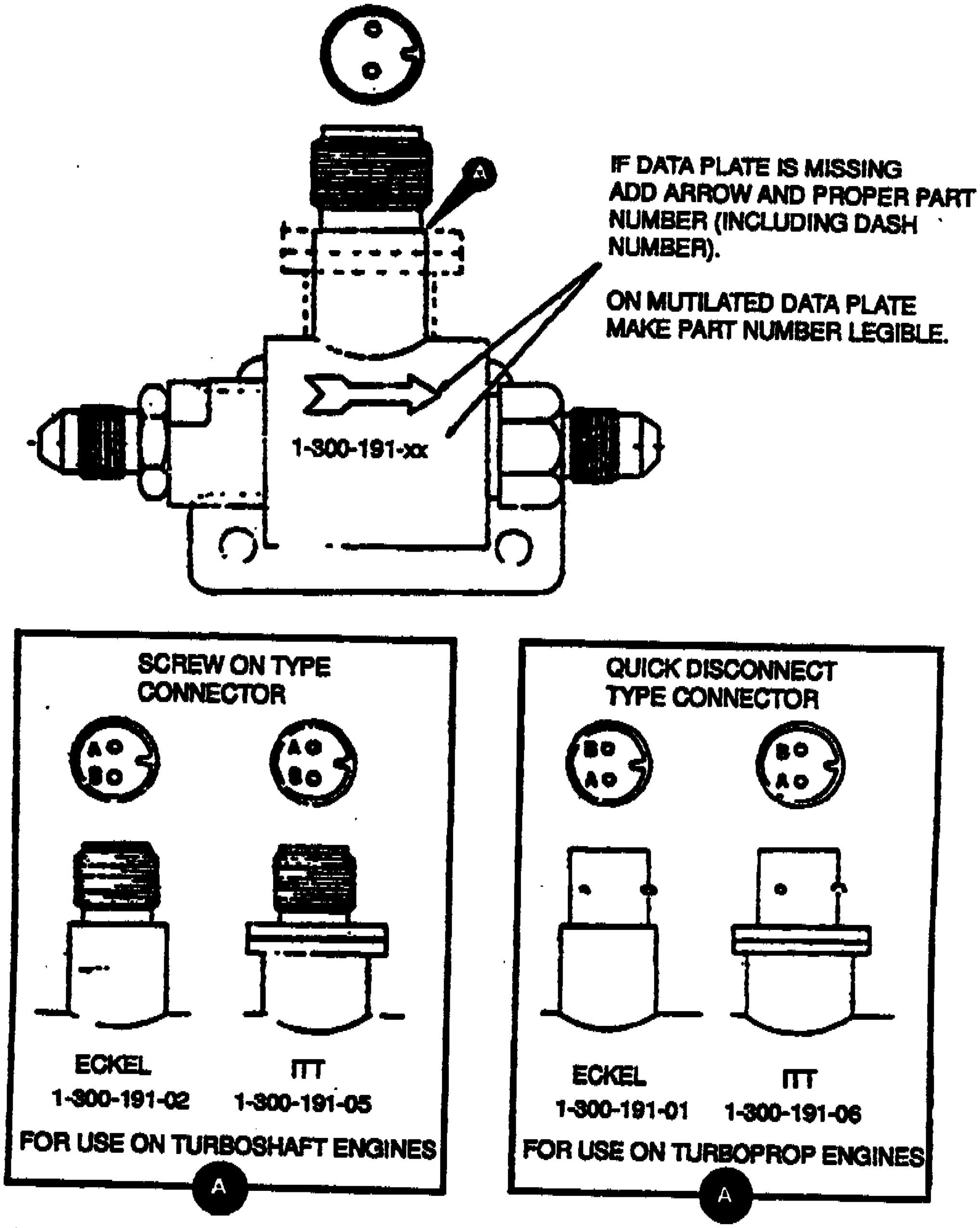


Figure 5-8. Identification of Starting Fuel Solenoid Valve.

g. With a flow rate of 25 phr, actuate DC POWER switch on and off five times. Solenoid valve shall open and close each time.

h. Repeat preceding step g with a flow rate of 50 phr.

i. Turn BYPASS valve until GAGE NO. 4 HIGH PRESSURE gage indicates 495 to 505 psi (34802 to 35505 gm cm sq).

NOTE

Place solenoid valve in a suitable container or cover solenoid valve to avoid splashing of fluid.

j. Actuate DC POWER switch off and on five times. Starting fuel solenoid valve shall open and close each time at 14 to 30 vdc.

k. Check solenoid valve for evidence of leakage. Leakage shall not exceed one drop per minute. Press MAIN PUMP ON button off.

l. Turn BYPASS valve until GAGE NO. 4 HIGH PRESSURE gage indicates zero psi.

m. Position DC POWER switch to OFF.

n. Disconnect hose from OUTLET NO. 1 HIGH PRESSURE port and connect to OUTLET NO. 3 STATIC PRESSURE port on test stand. Cap outlet port.

o. Position DC POWER switch to ON.

p. Turn STATIC BYPASS knob to closed position.

q. Using test stand hand pump, increase hydraulic pressure to 1500 psig (105.5 kg sq cm). Read pressure on GAGE NO. 1 STATIC PRESSURE gage. Check solenoid valve for leakage. No leakage is allowed.

r. Decrease hydraulic pressure to zero.

s. Position DC POWER switch to OFF.

t. Reject valve if it fails to meet any of the preceding requirements.

u. Remove valve from test stand.

5-55. MAIN FUEL HOSE ASSEMBLY.

5-56. DISASSEMBLY. Disassembly is not required.

5-57. CLEANING. Clean lines as required (per to SP No. 3002 in Appendix E).

5-58. INSPECTION. Perform specific inspections listed in table 5-12.

5-59. REPAIR. (See figures 4-12 and 4-13.) Proceed as follows:

a. Repair minor chafing, fraying, and cuts in braided area using teflon spiral chafing sleeve or equivalent. (Refer to table 5-2.)

b. Replace hose assemblies if chafing, cuts, and fraying is other than minor, or of leakage is observed.

5-60. REASSEMBLY. Reassembly is not required.

5-61. FUNCTIONAL TEST. (See figures 4-12 and 4-13) Functional-test hose and tube assemblies as outlined in paragraph 5-12, steps a through i.

5-62. FLOW DIVIDER HOSE ASSEMBLIES.

5-63. DISASSEMBLY. Disassembly is not required.

5-64. CLEANING. Clean lines as required per to SP No. 3002 in Appendix E.

5-65. INSPECTION. Perform specific inspections listed in table 5-13.

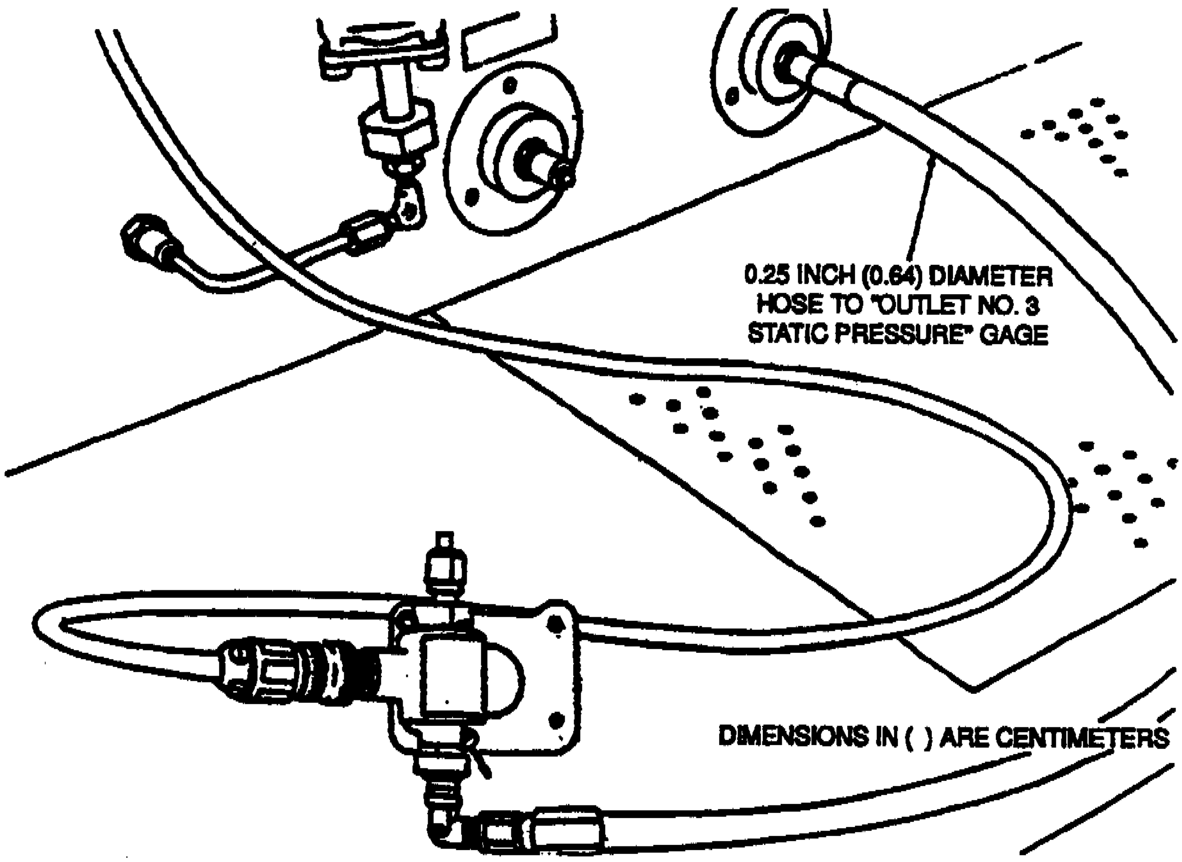


Figure 5-9. Starting Fuel Solenoid Valve Assembly Test Connections (Typical).

5-66. REPAIR. (See figure 4-14.) Proceed as follows:

a. Repair minor chafing, fraying, and cuts in braided area using teflon spiral chafing sleeve, or equivalent. (Refer to table 5-2.)

b. Replace hose assemblies if chafing, cuts, and fraying is other than minor, or if leakage is observed.

5-67. REASSEMBLY. Reassembly is not required.

5-68. FUNCTIONAL TEST. (See figure 4-14) Functional-test hose assemblies as outlined in paragraph 5-12, steps a through i.

5-69. FLOW DIVIDER AND DUMP VALVE ASSEMBLY.

5-70. DISASSEMBLY. Proceed as follows:

CAUTION

In following step a, use care when removing bracket (11, figure 5-10). Cap (12) beneath bracket is under spring tension.

Table 5-12. Inspection of Main Fuel Hose Assemblies

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-12 -3	Hose Assemblies	Visual	Chafing, fraying, or cuts	Repair, or replace. (Refer to paragraph 5-59)
4-13 -1,-2, -3, and -9			Cracks or grooves in flared end fittings	Not allowed. Replace
			Crossed or stripped threads on fittings	Not allowed. Replace
			Kinks	Not allowed. Replace
			Clogged or foreign material in hose assembly ID	Clean. (Refer to paragraph 5-57)
4-13 -19	Tube Assembly	Visual	Cracks	Not allowed. Replace
			Cracks or grooves in flared end fittings	Not allowed. Replace
			Clogged or foreign material in tube assembly ID	Clean. (Refer to paragraph 5-57)
4-12 -2 and -4	Clamps	Visual	Worn or damaged cushions	Not allowed. Replace
4-13 -5, -7,-10, -13, -22 and -26				

NOTE

In following step a, to ensure proper reassembly, note position of bracket (11).

a. Remove screws (10) that secure bracket (11) and upper housing (17) to lower housing (20).

b. Remove bracket (11), cap (12), packing (13), and spring (14). Separate upper housing (17) from lower housing (20).

c. Shake shim (15) out of plunger (16) and remove plunger from upper housing (17).

d. Remove packings (19 and 18) from lower housing (20).

CAUTION

In following step e, use care when removing screws (1). Union halves are under spring tension.

Table 5-13. Inspection of Flow Divider Hose Assemblies

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-14 -1,-2, and 17	Hose Assemblies	Visual	Chafing, fraying, or cuts	Repair or replace. (Refer to paragraph 5-66)
			Cracks or grooves in flared end fittings	Not allowed. Replace
			Damaged threads on fittings	Not allowed. Replace
			Kinks	Not allowed. Replace
			Clogging or foreign material in hose assembly ID	Clean. (Refer to paragraph 5-64)

e. Remove screws (1) that secure union halves (2 and 7) to lower housing (20).

f. Remove union halves (2 and 7). Remove packings (8, and 4 or 5) and seal (6) from lower housing (20).

g. Remove spring (3) and plunger (9) from lower housing (20).

5-71. CLEANING. Proceed as follows:

a. Clean flow divider and dump valve assembly (10, figure 4-14) by dry cleaning solvent method (refer to SP No. 3002 in Appendix E).

b. If corrosion (in the form of rust) is present on assembled flow divider and dump valve assemblies, clean as follows:

(1) Cap all openings with stainless steel caps.

(2) Clean the assembly per SP No. 3002 in Appendix E).

(3) Immerse the capped assembly in a rust remover solution (item 321, table C–1) for a minimum time of 30 minutes. Remove from the bath. Rinse with hot water and air dry.

5-72. INSPECTION. Perform specific inspections listed in table 5-14.

5-73. REPAIR. (See figure 4-14). Silver solder-repair fittings on upper housing (17, figure 5-10) where external leakage is evident.

5-74. REASSEMBLY. Proceed as follows:

a. Install packing (8, figure 5-10) on union half (7), and install union into lower housing (20).

b. Install plunger (9), blind end in, through drain side of lower housing (20). Insert spring (3) into open end of plunger.

c. Install seal (6) and packing (4 or 5) on union half (2). Rest union half (7) on flat surface and hold lower housing (20) while compressing spring (3) with drain union half (2). Align holes in union halves (2 and 7) and lower housing (20), and secure unions to housing with screws (1). Tighten screws, as required.

d. Install packing (19) on lower housing (20).

e. Install packing (18) on upper housing (17) and position upper housing on lower housing (20).

f. Install plunger (16), blind end in, into upper housing (17). Position shim (15) into bottom of plunger and insert spring (14) into open end of plunger.

g. Install packing (13) on cap (12), and position stepped end of cap on spring.

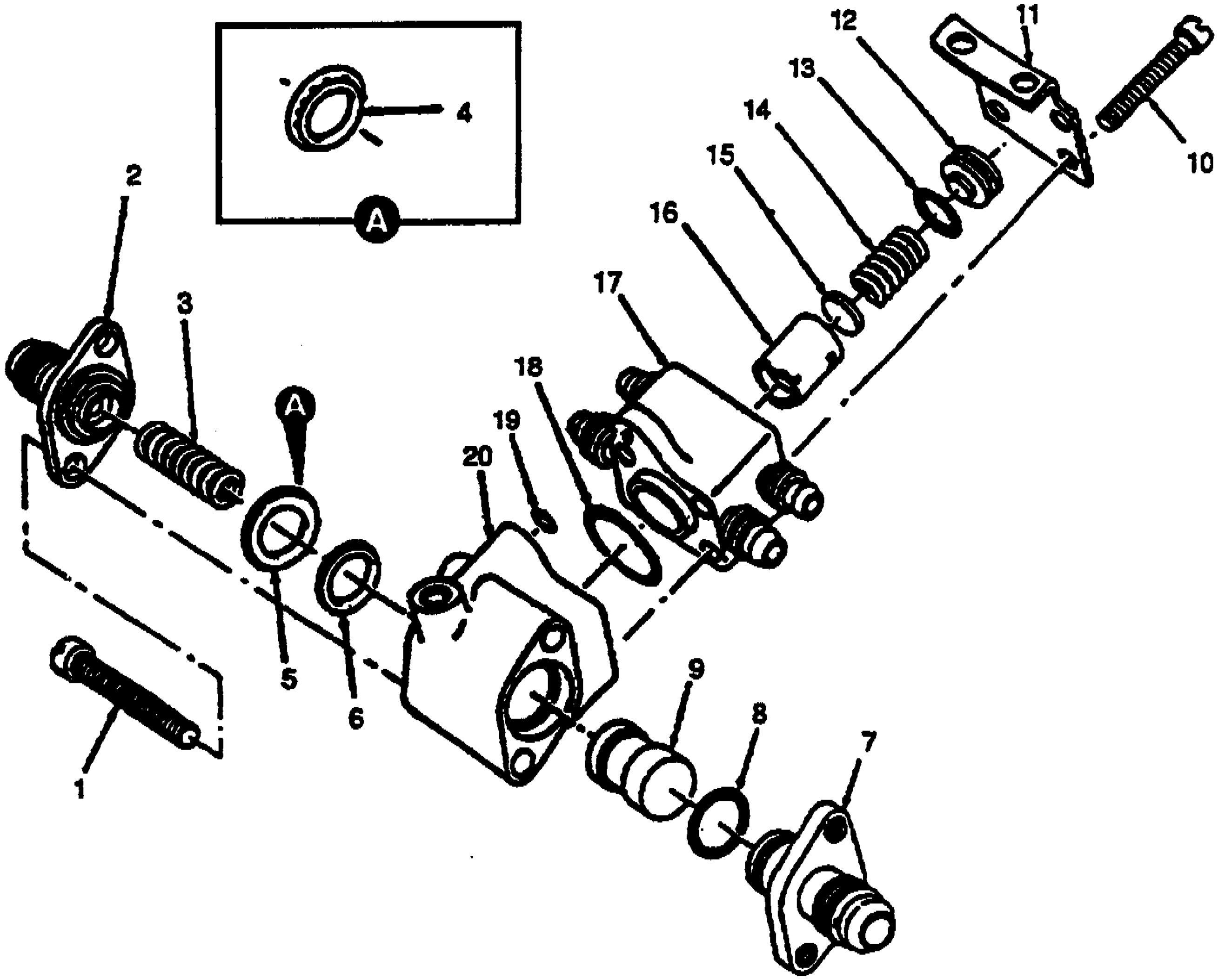


Figure 5-10. Flow Divider and Dump Valve Assembly.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-10	1-180-190-01	FLOW DIVIDER AND DUMP VALVE ASSEMBLY (Replace with 1-180-190-03)	1	
	1-180-190-03	FLOW DIVIDER AND DUMP VALVE ASSEMBLY	1	
-1	AN502-10-26	. SCREW, Machine	2	
-2	1-180-122-01	. UNION HALF, Flanged (Use on 1-180-190-03)	1	
	1-180-122-03	. UNION HALF, Flanged	1	
-3	1-180-126-01	. SPRING, Helical, compression	1	
-4	1-180-220-01	. SEAL ASSEMBLY (Use on 1-180-190-01)	1	
-5	MS29513-016	. PACKING (Use on 1-180-190-03)	1	
-6	650-430-1/2	. SEAL, Plain encased (07060) (Lycoming Spec Cont Dwg 1-300-190-03) (Replace with CEC405)	1	
	CEC405	. SEAL, Plain encased (07060) (Lycoming Spec Cont Dwg 1-300-167-01) (Use on 1-180-190-03)	1	
-7	1-180-121-01	. UNION HALF, Flanged	1	
-8	MS29513-014	. PACKING,	1	
-9	1-180-125-01	. PLUNGER, Detent	1	
-10	1-180-134-01	. SCREW, Machine, Phillips head	4	
-11	1-180-200-01	. BRACKET, Cover	1	
-12	1-180-119-03	. CAP, Spring retainer	1	
-13	MS29513-014	. PACKING,	1	
-14	1-180-127-01	. SPRING, Helical, compression	1	
-15	1-180-128-01	. SHIM	AR	
-16	1-180-180-01	. PLUNGER, Flow divider	1	
-17	1-180-170-01	. HOUSING, Upper	1	
-18	MS29513-017	. PACKING,	1	
-19	MS29513-006	. PACKING,	1	
-20	1-180-115-01	. HOUSING, Lower	1	

Table 5-14. Inspection of Flow Divider and Dump Valve Assembly

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-10 2 and 7	Union Half	Visual	Cracks	Not allowed. Replace
			Damaged threads	Not allowed. Replace
3 and 14	Springs	Visual	Broken springs	Not allowed. Replace
			Cracks	Not allowed. Replace
20 and 17	Upper and Lower Housings	Visual	Nicks, burrs, or scratches on housing bore	Repair. (Refer to SP No. 5000 in Appendix E)
			Cracks	Not allowed. Replace
			Evidence of leakage through cracks in upper housing fittings	Not allowed. (Repair as outlined in paragraph 5-73)
			Damaged threads	None allowed. Replace
16	Plunger	Visual	Cracks	Not allowed. Replace
11	Bracket	Visual	Cracks	Not allowed. Replace
9	Plunger	Visual	Nicks, burrs, or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
			Cracks	Not allowed. Replace

h. Compress spring with cap until top of cap is flush with surface of upper housing. Place bracket (11) on upper housing (17), in same position from which it was removed, and secure with screws (10). Tighten screws to 26 to 36 pound-inches (4644 to 6429 gm cm) torque and lockwire.

WARNING

FLIGHT SAFETY PARTS

Verification that part passes functional test is flight safety critical.

5-75. FUNCTIONAL TEST. (See figure 5-10.) Proceed as follows:

NOTE

Perform following test, using calibrating fluid (item 68 or 69, table C–1) heated to 70° to 90°F (21° to 32°C):

a. The flow divider and dump valve is tested, using test stand (LTCT314), or equivalent.

b. Install plugs in outlet ports and drain port.

c. Apply pressure of 1,400 to 1,600 psi (98430 to 112491 gm sq cm) to inlet port of flow divider and dump valve assembly. Maintain pressure for 2 minutes.

d. While pressure is being applied, inspect flow divider and dump valve assembly for evidence of leakage and distortion. No external leakage or distortion is allowed. Decrease hydraulic pressure to zero.

e. If external leakage is evident, repair as outlined in paragraph 5-73.

f. Remove plugs from drain port.

g. Remove plugs from primary and secondary ports of flow divider and dump valve assembly. Prepare valve assembly for the flow scheduling versus pressure drop test as follows:

(1) Connect fuel inlet hose to a 0 to 1,000 phr rotometer on test stand.

(2) Connect hoses to primary and secondary ports of valve.

(3) Install nozzle simulators (adjustable orifices) in outlet ends of primary and secondary hoses.

(4) Install a 0 to 1,000 phr rotometer in outlet end of secondary hoses.

(5) Set primary and secondary nozzle simulators for an inlet pressure of 100 psig. Adjust primary nozzle simulator for flow of 123 to 127 phr and secondary nozzle simulator for a flow of 415 to 425 phr.

NOTE

Fuel inlet temperature, when setting simulators, shall be 65° to 75°F (18° to 24°C).

(6) Increase total flow to 400 phr and add or remove shim (15, figure 5-10) to obtain a secondary flow of 250 to 270 phr.

NOTE

This point is merely a guide, and should not be cause for rejection on reflow if flow requirements in table 5-15 are met.

Decreasing shim thickness will increase flow; increasing shim thickness will decrease flow.

h. Apply pressure of 50 psi (3515 gm sq cm) to inlet port. Slowly decrease this pressure and observe flow divider and dump valve assembly for fluid flow from drain port. Fluid shall start to flow from drain port at 22 to 32 psi (1547 to 2250 gm sq cm). Decrease hydraulic pressure to zero.

i. Disconnect hoses from secondary ports of valve.

j. Gradually increase the flow from 0 to 50 phr. Leakage shall not exceed 10 cc per minute.

k. Reconnect hoses to secondary ports of valve.

l. Perform test of flow divider and dump valve assembly, using values given in table 5-15.

m. After completion of test noted in preceding step l, decrease hydraulic pressure to zero.

n. Apply pressure of 50 psi (3515 gm sq cm) and increase to 370 to 430 psi (26014 to 30232 gm sq cm) to inlet port. Place beaker under flow divider and dump valve assembly at drain port. Leakage at drain port shall not exceed 0.5 cubic centimeter per minute. Decrease hydraulic pressure to zero.

o. Remove flow divider and dump valve assembly from stand.

p. If valve assembly fails to pass tests in steps j and l, replace packing (5, figure 5-10) and seal (6) and/or plunger (9) and retest.

q. Reject flow divider and dump valve assembly if assembly does not pass preceding tests.

Table 5-15. Flow-Divider Test Values

Total Flow Phr	Valve Inlet Pressure Psi		Secondary Flow Phr	
	Min.	Max.	Min.	Max.
100	54	80	0	8
*300	160	190	140	175
500	175	205	335	375
*700	207	247	518	578
900	290	362	695	745

NOTE

For test points marked with an asterisk, data will also be recorded in the decreasing flow direction.

5-76. COMBUSTION CHAMBER DRAIN VALVE ASSEMBLY.

5-77. DISASSEMBLY. Proceed as follows:

a. Using a suitable punch, drive pins (4, figure 5-11) from body (3).

b. Remove plate (1) and spring (2).

5-78. CLEANING. Clean combustion chamber drain valve assembly (16, figure 4-14) by dry cleaning solvent method (SP No. 3002 in Appendix E). An alternate procedure is dry blasting at 40 psi maximum air pressure with glass bead abrasive (item 4, table C–1).

5-79. INSPECTION. Perform specific inspections listed in table 5-16.

5-80. REPAIR. (See figure 4-14.) Repair of combustion chamber drain valve assembly is not required.

5-81. REASSEMBLY. Proceed as follows:

a. Insert spring (2, figure 4-10) and plate (1) into body (3).

b. Depress plate (1) and insert pins (4).

c. Stake pins (4) as shown in figure 5-12 to retain in place; ensure that staked ends of pins do not extend more than 0.020 inch (0.050 cm) beyond circumference of valve body. If necessary, file end of pins to maintain 0.020 (0.050 cm) dimension.

5-82. FUNCTIONAL TEST. (See figure 5-11.) Proceed as follows:

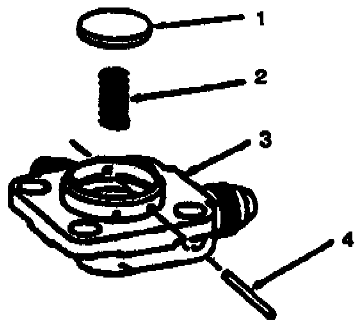
NOTE

Perform the following tests using calibrating fluid (item 68 or 69, table C–1) heated to 60° to 120°F (16° to 49°C).

a. Install combustion chamber drain valve assembly in holding fixture (LTCT859). (See figure 5-13.)

b. Connect No. 4 (1/4-inch diameter) hose from OUTLET NO. 2 LOW PRESSURE port of test stand (LTCT314), or equivalent, to connector on fixture.

c. Open LOW PRESSURE SHUTOFF valve.



1. **Plate**
2. **Spring**
3. **Body**
4. **Pin**

Figure 5-11. Inspection of Combustion Chamber Drain Valve Assembly

Table 5-16. Inspection of Combustion Chamber Drain Valve Assembly

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-11				
2	Spring	Visual	Broken spring	Not allowed. Replace
			Cracks	Not allowed. Replace
3	Body	Visual	Worn seat	Not allowed. Replace
			Damaged Threads	Repair or Replace. (Refer to SP No. 5007 in Appendix E)
			Cracks	Not allowed. Replace

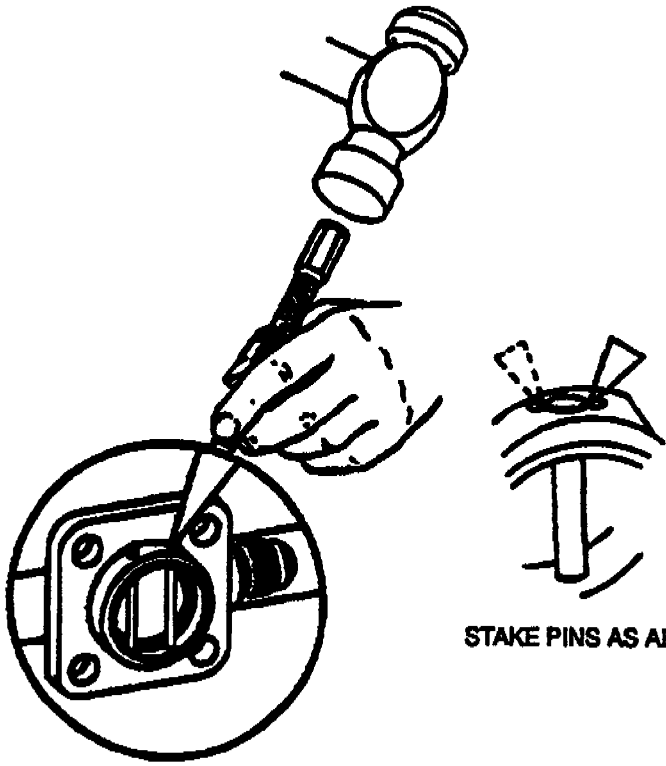


Figure 5-12. Staking Drain Valve Assembly Pins.

NOTE

Hose length shall be as short as practical.

This combustion chamber drain valve assembly is normally open: therefore, under a nonpressure condition and depending upon spring tension, valve will remain open up to a maximum of 3 psig (210.9 gm sq cm).

d. Observe that combustion chamber drain valve assembly closes at differential pressure of 0.6 to 3 psig (42.18 to 210.9 gm sq cm).

e. Adjust LOW PRESSURE SHUTOFF valve to obtain pressure of 9 to 11 psig (632.8 to 773.4 gm sq cm). If leakage is observed, position calibrated measuring cup at combustion chamber drain valve assembly port and allow combustion chamber drain valve to drain for one minute.

f. Check that fluid level in measuring cup does not exceed 10 cc. If fluid exceeds given limit, lap or polish the valve and valve seat to remove any scratches or pits which may be the cause of the excessive leakage. The use of either lapping compound (item 177, table C–1) or crocus cloth (item 125, table C–1) is acceptable. If leakage rate still exceeds given limit, reject combustion chamber drain valve assembly.

g. Slowly release pressure and observe that drain valve reopens at a maximum of 3 psig (210.9 gm sq cm).

h. Return test stand to pretest conditions and remove combustion chamber drain valve assembly.

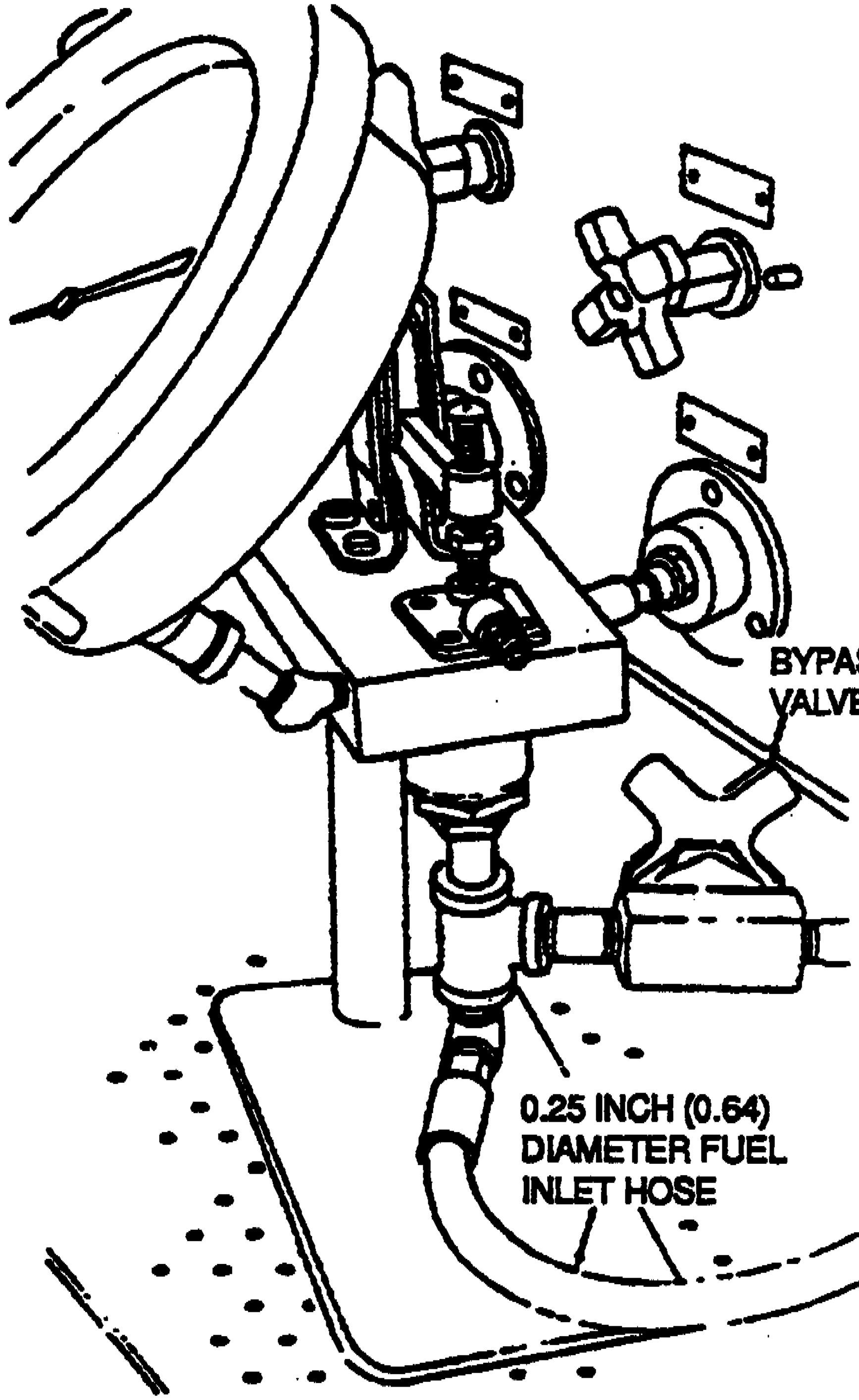


Figure 5-13. Combustion Chamber Drain Valve Assembly Test Setup.

SECTION III. IGNITION UNIT

5-83. IGNITION COIL AND LEAD ASSEMBLY.

5-84. DISASSEMBLY. Disassembly is not required.

5-85. CLEANING. Clean ignition coil and lead assembly (32, figure 4-15) with a lint-free cloth moistened in dry cleaning solvent (item 134, table C–1).

5-86. INSPECTION. Perform specific inspections listed in table 5-17.

5-87. REPAIR. (See figure 4-15.) Proceed as follows:

a. Repair minor fraying or chafing of braiding in localized areas by wrapping affected area with teflon chafing sleeve or equivalent (Refer to table 5-2.)

b. Replace cracked nuts which exceed limits as follows:

(1) Machine off defective nuts.

(2) Place new nut, P/N 10-319878, or equivalent, in a 3-jaw lathe chuck.

NOTE

Do not tighten excessively or nut will be deformed.

(3) Clamp cable ferrule in a suitable fixture to hold and align coaxially with nut, and position ferrule and nut in assembled configuration.

(4) Place balance of coil and lead assembly in a suitable restraining device to prevent possible injury.

(5) Set up a suitable roll tool in tool post of lathe.

(6) Spin a 10-degree shoulder on nut with a 0.014 inch (0.036 cm) diametral clearance between nut and ferrule.

NOTE

The nut shall turn freely on ferrule after installation when seated against shoulder.

(7) Perform a visual inspection of the spun area of nut.

c. Repair damaged or pulled out lockwire holes in nuts as follows:

(1) Blend-repair sharp edges and protrusions.

(2) Drill a 0. 045 inch (0.114 cm) diameter hole approximately 1/4-inch (0.635 cm) aft of original hole.

NOTE

Restrain nut while drilling.

(3) Remove any burrs from pulled out hole.

Table 5-17. Inspection of Ignition Coil and Lead Assembly

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-15				
2,4,7, 10,16, 17,18, 21,24, 26, and 40	Clamps	Visual	Worn or damaged cushions	Not allowed. Replace
29,30 and 31	Brackets	Visual	Cracks	Not allowed. Replace
32	Ignition Coil and Lead Assembly	Visual	Chafing, fraying, or kinks	Not allowed. Replace
			Chafing or fraying or braiding	Repair. (Refer to paragraph 5-87)
			Cracks in nuts. (Refer to table 5-18 for limits)	Repair or replace (Refer to paragraph 5-87)
			Damaged or pulled out lockwire holes in nuts. (Refer to table 5-18)	Repair. (Refer to paragraph 5-87)
			Broken or cracked insulators	Repair. (Refer to paragraph 5-87)
			Damaged braided shielding (PN 10-319813-1 only)	Repair. (Refer to paragraph 5-87)
			Damaged metal identification band	Repair. (Refer to paragraph 5-87)

Table 5-18. Ignition Coil and Lead Assembly Inspection Limits

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Ignition and Lead Assembly for Cracks in Nuts		a. Clearance between nut and base of ferrule up to 0.032 inch (0.0813 cm) is acceptable. b. One crack per nut up to 3/32 inch (0.238 cm) in length is acceptable. c. If more than one crack per nut is observed or if crack length exceeds 3/32 inch (0.238 cm) replace nuts. (Refer to paragraph 5-87). d. If lockwire holes are pulled out, repair as outlined in paragraph 5-87).

d. Replace defective insulator on electrical connector plug as follows:

(1) Remove retaining ring from electrical plug, slide out insulator, and replace with a new insulator from kit, P/N 10-88584-10. Reinstall retaining ring.

NOTE

Ensure that the new insulator is clean and dry prior to installation.

(2) Perform a functional test on the lead and coil assembly. (Refer to paragraph 5-89).

e. Repair damaged braided shielding of coil and lead assembly, (32, figure 4-15), by soldering, as follows:

(1) Inspection. Inspect braided shielding, for damage.

(2) Limits. Soldering limits are as follows:

(a) Area where no bend will occur during installation - maximum of one (1) inch (2.54 cm) in length by one quarter (1/4) inch (0.635 cm) (see figure 5-14 view A.)

(b) Area where bending will occur during installation - maximum of three-eighths (3/8) inch (0.953 cm) by 360° circumference (see figure 5-14 view B).

(3) Repair. Repair as follows:

(a) Point all ends of frayed shielding away from insulation.

(b) Seal frayed shielding by soldering with solder (item 286, table C–1).

NOTE

Do not attempt repair if insulation or conductors are damaged.

f. If ignition coil and lead assembly cannot be identified due to damaged or missing lettering, proceed as follows:

(1) Determine proper identification. (See figure 5-15.)

(2) Install metal band, with Lycoming part number stamped on it, around cable as shown in figure 5-15.

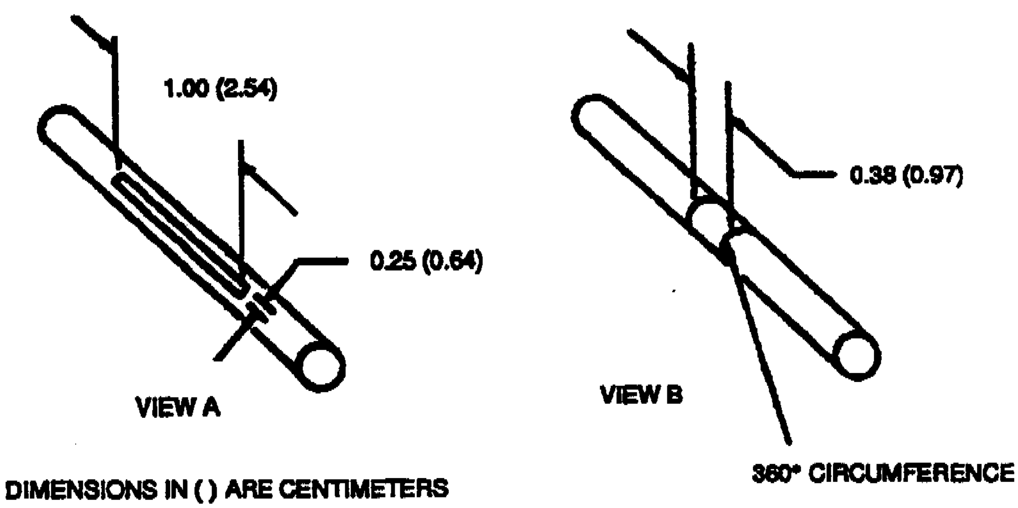


Figure 5-14. Coil and Cable Repair.

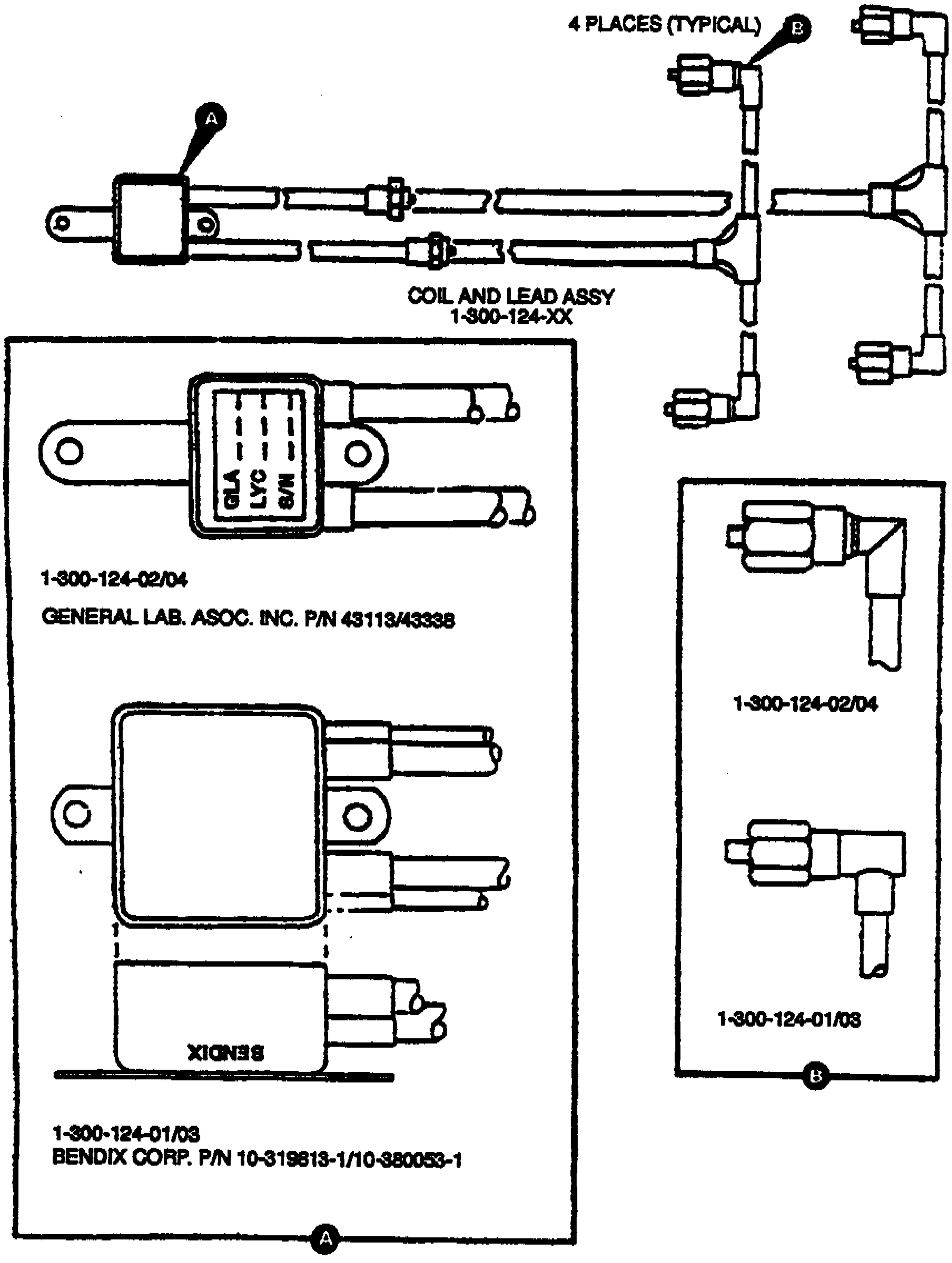


Figure 5-15. Identification of Coil and Lead Assembly.

NOTE

If Allied Signal and vendor part numbers are missing, then the part shall be identified to the lowest dash number for that particular vendor.

Loss of serial number does not constitute cause for rejection. New serial number is not required.

g. Replace if damage is other than minor.

5-88. **REASSEMBLY.** Reassembly is not required.

5-89. **FUNCTIONAL TEST.** (See figure 4-15). Proceed as follows:

a. Place POWER switch on test stand (11-4700-1) or equivalent, to ON. Observe that red indicator lamp lights.

b. Position CONTINUITY switch to ON. Observe that red indicator lamp lights.

c. Connect test leads to CONTINUITY jack.

NOTE

In following step d, red indicator lamp should light and warning buzzer should sound.

d. Momentarily short leads together.

e. Connect one lead to input lead of separator.

NOTE

In following step f, red indicator lamp should light and warning buzzer should sound.

f. Touch remaining test lead to tips of igniter plug connectors.

g. Check shielding for continuity (electrical leakage) by tracing shielding with test lead used in preceding step f. If indicator lamp lights or warning buzzer sounds, reject coil and lead assembly.

h. Connect ground lead from jack to lead and coil assembly. (See figure 5-16.)

i. Connect lead (11-4700-01), to L. V. OUTPUT jack. (See figure 5-16.)

j. Turn VOLTAGE SELECTOR to H. V. TEST.

k. Turn METER SELECTOR to 5 ADC.

l. Press 60 CYCLE AC button, and observe that red indicator lamp lights.

m. Position TEST SELECTOR switch to 2 KV.

n. Press FILAMENT switch on. Wait 15 seconds, then press PLATE switch on.

o. Connect remaining end of lead (11-4700-01), to input lead of lead and coil assembly.

p. Advance VARIAC knob until a 2000-volt indication is obtained on kilovoltmeter, M-8.

NOTE

In following step q, leakage is not allowed.

q. Check indicator M-9 for evidence of leakage.

r. If electrical leakage is noted, reject coil and lead assembly.

s. Turn VARIAC knob to zero, and observe kilovoltmeter, M-8. As voltage indication passes through 1,000 volts, touch lead, P/N 11-6082 to ground to discharge remaining voltage.

t. Return test set to pretest conditions.

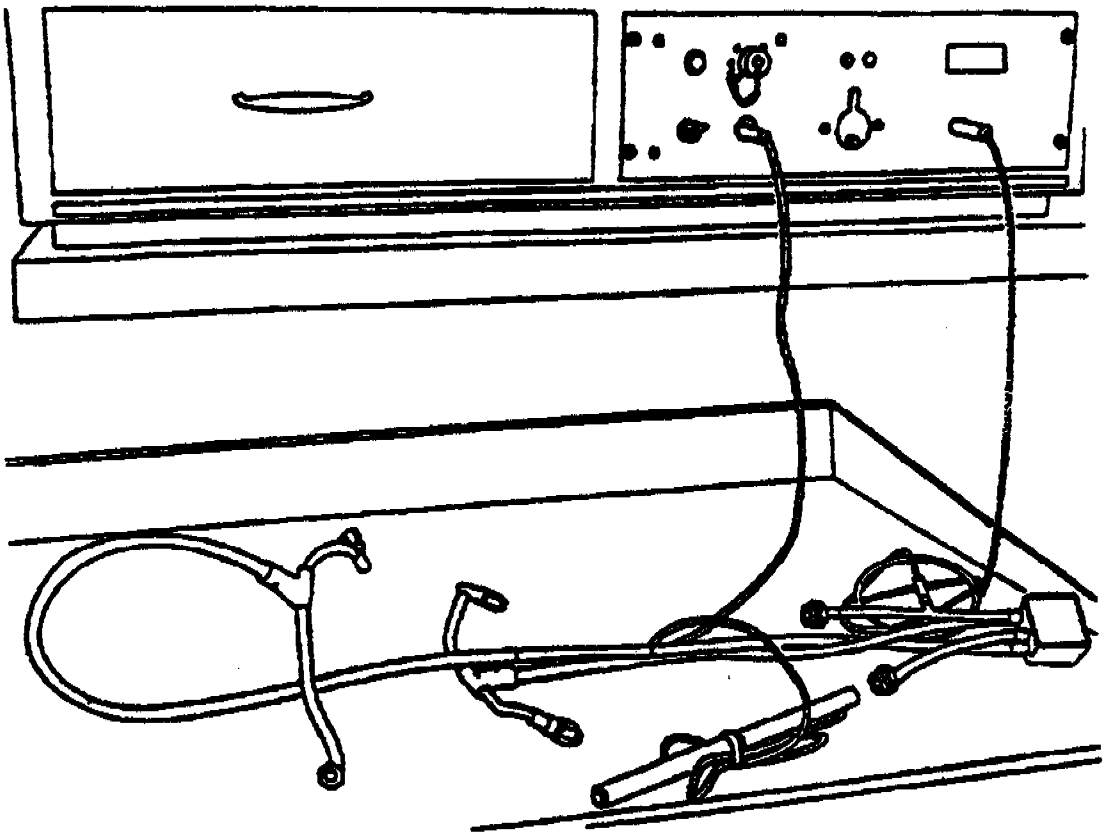


Figure 5-16. Checking Ignition Coil and Lead Assembly for Electrical Leakage.

5-90. IGNITION UNIT.

5-91. DISASSEMBLY. Disassembly is not required.

5-92. CLEANING. Proceed as follows:
Clean ignition unit (37, figure 4-15) with a lint-free cloth moistened in dry cleaning solvent (item 134, table C–1).

5-93. INSPECTION. Perform specific inspections listed in table 5-19.

5-94. REPAIR. (See figure 4-15). Proceed as follows:

a. Weld-repair cracks in bracket (35).

(1) Remove crack(s) from damaged bracket by grinding or machining.

(2) Clean area to be welded with acetone (item 13, table C–1). Brush with a stainless steel brush to remove all foreign matter, oil, grease, scale, and metal chips.

(3) Weld the damaged area using the tungsten-inert gas (TIG) arc method as per MIL-W-8611.

(4) Use filler rod per MIL-R-5632, class 1 (item 153, table C–1).

(5) Weld beads shall be reasonably smooth and free from irregularities in accordance with good aircraft quality welding practice. The weld bead shall blend into the adjacent parent metal in gradual smooth curves.

(6) After welding, clean weld area with solvent (item 13 or item 102, table C–1) and penetrant inspect part per MIL–STD–6866, Type I to assure that weld crack(s) is sound.

CAUTION

When removing rust, mask holes and decals to prevent damage and contamination.

b. Remove rust from casing of ignition unit (37) by one of the following methods:

(1) Remove rust by wire-brushing.

(2) Remove rust by abrasive-blasting as follows:

(a) Mask all fittings and decals.

(b) Abrasive-blast with 220-grit aluminum oxide powder (item 36, table C–1).

(c) Remove masking.

(3) Remove rust by glass bead blasting as follows:

(a) Mask all fittings and decals.

(b) Abrasive blast with glass beads, size 10 or smaller, per MIL-G-9954. Use minimum pressure required to remove rust.

(c) Remove masking.

c. Repair after rust removal by either of two following methods:

(1) Cadmium Plating.

(a) Remove rust by one of the mechanical methods cited in paragraph 5-94b.

(b) Cadmium plate per QQ-P-416, Class 1 to obtain a final plating thickness of 0.0003 to 0.0005 inches (0.3 to 0.5 mils) (0.0009 to 0.0012 cm).

(2) Paint Repair.

(a) If paint stripping is required, remove paint using plastic media blasting as outlined in SP No. 3003 in Appendix E.

(b) Remove rust by one of the mechanical methods cited in paragraph 5-94b.

(c) Prepare surfaces to be painted by applying a suitable rust removing and metal conditioning compound such as MIL-C-10578, Type 1. Preparation and procedure for applying this compound are as follows:

1 Add 1 part concentrated MIL-C-10578, Type 1 material to 3 parts of water by volume. Use acid resisting steel, earthenware crocks, or other suitable mixing tanks for storage of this diluted material.

2 Apply the diluted material by spraying, dipping, or by brushing rusted surfaces. Allow material to remain on rusted surfaces from 2 to 10 minutes depending on the degree of rusting. Rinse surface with water, preferably hot water. Allow rinsed surfaces to thoroughly dry prior to application of paint.

3 Mask connectors, decals and other areas that were not originally painted.

4 Apply one coat (0.0006 to 0.0009 inch dry film thickness) of epoxy primer (item 253, table C–1). Air dry at least one hour.

5 Apply two coats (0.0017 inch minimum total, dry film thickness) of epoxy coating (item 107, table C–1).

6 Remove masking.

d. If ignition unit (37) cannot be identified due to missing or mutilated data plate, proceed as follows:

(1) Determine proper identification. (See figure 5-18.)

(2) Using vibropeen etching tool, identify ignition unit. (See figure 5-18.)

NOTE

Depth of marking shall be within 0.001 to 0.006 inch (0.003 to 0.015 cm).

Table 5-19. Inspection of Ignition Unit

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-15				
35	Bracket	Visual	Cracks	Repair. (Refer to paragraph 5-94) (See figure 5-17).
			Loss of protective finish	Repair by cadmium plate (SP No. 6015 in Appendix E) or electroless nickel plate per MIL-C-26074. **NOTE** Plate thickness shall be within 0.0003 to 0.0005 inch (0.0007 to 0.0012 cm)
37	Ignition Unit	Visual	Arc holes or burn through on casing	Not allowed. Replace.
			Cracks or tears	Repair. (Refer to paragraph 5-94).
		Visual and SIE	Dents on casing exceeding 0.12 inch (0.304 cm)	Replace if limits are exceeded. Dents not exceeding 0.12 inch (0.030 cm) are acceptable.
			Rust on casing exceeding 2 square inches cumulative	Replace if limits are exceeded. (Repair rust areas not exceeding limits as outlined in paragraph 5-94).
			Damaged metal identification plate	Repair. (Refer to paragraph 5-94).
			Loss of protective finish	Repair. (Refer to SP No. 6015 in Appendix E). **NOTE** Plate thickness shall be within 0.0003 to 0.0005 inch (0.0007 to 0.0012 cm)
		Visual	Missing or broken lockwire lug	Remove lug if broken. No repair necessary
	Ignition Unit (P/N 1-300-363-02/03 only)		Dents	Dents outside case not allowed.
-38	Loop Clamp	Visual	Cracks	Not allowed. Replace.

Figure 5-17. Ignition Exciter Unit Bracket Showing Repairable Cracks.

(3) Loss of serial number does not constitute cause for rejection. New serial number is not required.

e. Repair tears or cracks that less than 1 inch in length and 1/4 inch width as follows:

(1) Buff and clean area to be repaired.

(2) Apply patch over area using sealing strip (item 116, table C–1).

(3) Solder per MIL-STD-2000.

(4) Remove solder and sealing screw next to connectors.

(5) Evacuate as follows: Heat to 155° to 165°F (68° to 74°C) for one hour in inert oven at 2 inch Hg pressure to evacuate.

(6) Immediately replace sealing screw. Resolder per MIL-STD-2000.

(7) Visually inspect for acceptability of solder.

5-95. REASSEMBLY. Reassembly is not required.

5-96. FUNCTIONAL TEST. (See figure 4-15.) Proceed as follows:

a. Before test, adjust compensator setting to read 310 on test stand (11-4700-1), or equivalent.

b. Connect cable assembly (11-4700-1) to CONN 1 Panel 1) of test stand (11-4700-1), or equivalent.

c. Connect adapter(11-4700-1) between cable assembly (11-4700-1) and inlet receptacle of ignition unit.

d. Connect two adapters, P/N 11-6532, to outlet receptacles of ignition unit.

NOTE

Adapter, P/N 11-6277, is equivalent to P/N 11-6532 and may be used interchangeably.

e. Connect two leads between adapter, P/N 11-6532, and CONN 3 and CONN 4 receptacles (Panel 5).

f. Connect ground lead from GROUND JACK on test stand to case of ignition unit.

g. Turn POWER switch to ON, VOLTAGE SELECT to DC VOLTS, and METER SEL to 5 ADC. Press red DC selector switch on panel 2. Observe that red indicator lamps light.

h. Position power switch on counter panel to ON, and turn counter dial to XI.

i. Turn on external power supply.

j. Turn TEST SELECTOR knob to 2 KV and POLARITY SELECTOR from A to B or B to A, as required, to produce a reading on the unit under test.

k. Turn OUTPUT RANGE switch to A.

l. Turn OUTPUT SELECTOR to LOW TENSION.

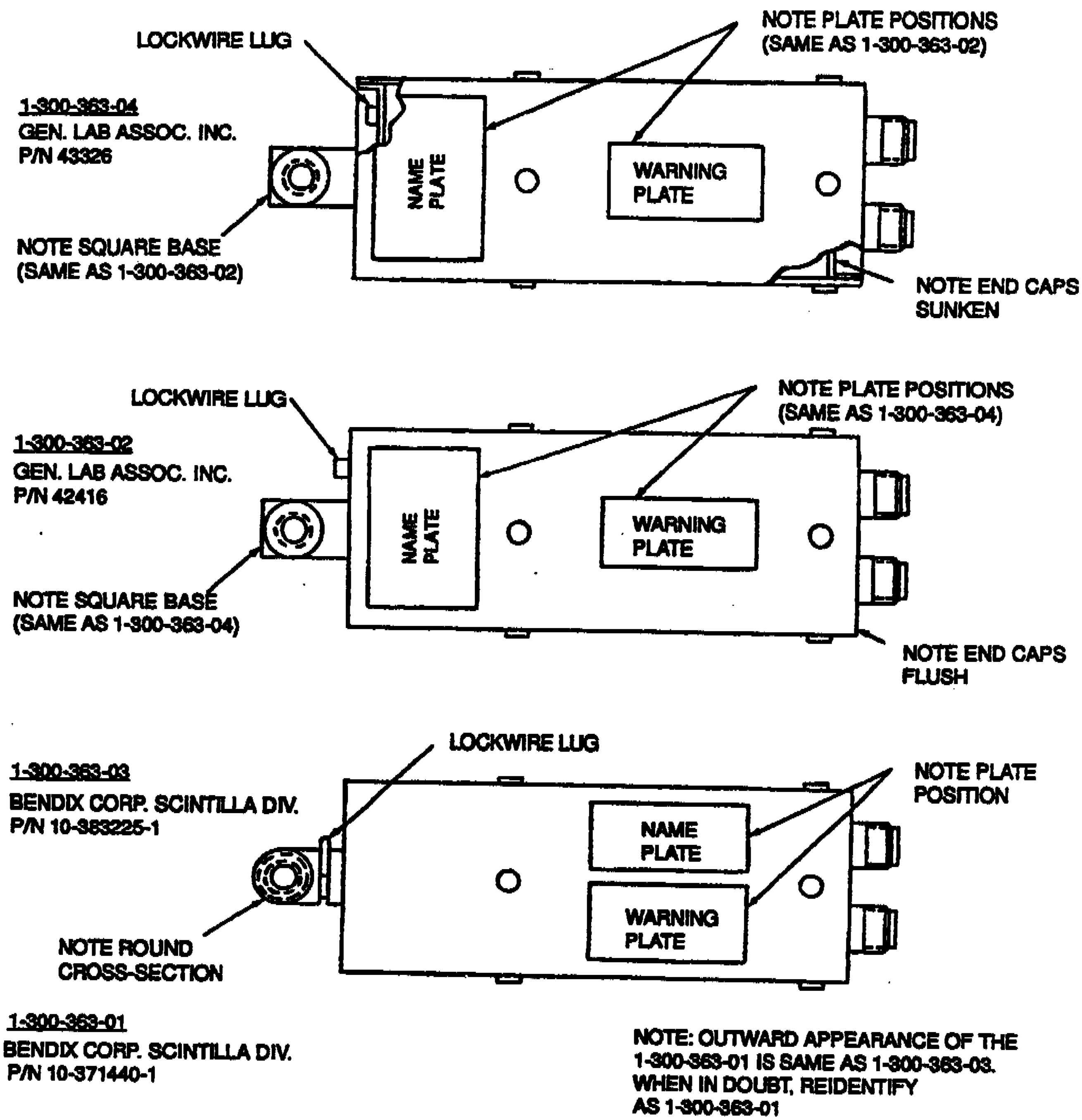


Figure 5-18. Identification of Ignition Unit.

NOTE

In step m, spark rate shall be 1.5 sparks per second minimum.

m. Using POWER STAT, bring voltage up to 14 as indicated on gage, M-7. Check spark per second on a gage M-1. Gages M-1 and M-2 will be used for dual outlet ignition units. Turn POWER OUTPUT switch on panel 2 to ON position.

NOTE

In following step n, output voltage shall not be less than 2,400 volts at 14 to 29 volts.

n. Turn OUTPUT SELECTOR to OUTPUT 1, and read output voltage on gage M-10.

o. Turn OUTPUT SELECTOR to OUTPUT 2, and DISCHARGE CALIBRATE switch to DISCHARGE position.

NOTE

In following step p, spark rate shall be 2.5 sparks per second minimum.

p. Allow ignition unit to cool approximately one minute; then bring unit up to 24 vdc and check for sparks per second on gage, M-1. Gages M-1 and M-2 will be used for dual outlet ignition units.

q. Check ignition unit for spark emission. Operate ignition unit at each specified voltage input for approximately one minute. When testing ignition unit (1-300-363-01), observe that spark emission is regular and that no skips are apparent. When testing ignition unit (1-300-363-02), irregularities are not reason enough for rejection. (See figure 5-18.)

r. If specified requirements cannot be met, replace ignition unit.

5-97. IGNITER PLUGS.

5-98. DISASSEMBLY. Disassembly is not required.

5-99. CLEANING. Proceed as follows:

a. Place igniter plugs (13, figure 4-15) in perforated or wire mesh corrosion-resistant steel container.

WARNING

In following step b, to prevent inhaling fumes, provide adequate ventilation around bath. If inhaled deeply, the solution may be injurious to the lungs. Wear rubber gloves to protect hands from chemicals, as skin will be harmed by prolonged contact.

b. Lower basket into a corrosion-resistant steel cleaning tank containing a solution of four parts Magnus 61C by volume (item 289, table C–1), or equivalent; one part Magnus 751 (item 290, table C–1), or equivalent; four parts rust stripper (item 321, table C–1), or equivalent; and 14 parts water, until basket is completely immersed in solvent solution.

WARNING

In following step c, do not permit copper, bronze, brass, or aluminum objects to contact solution. Do not apply heat to this solution as mixture will result in a solution temperature of approximately 180°F (82°C) when first mixed. Use solution only once.

c. Soak igniter plugs in cleaning solution for 30 to 60 minutes, depending upon accumulation of gum, carbon, or other contaminants.

d. Remove igniter plugs from solution and spray-rinse with clean, cool water.

e. Rinse igniter plugs in acetone (item 13, table C–1).

f. An alternate method of cleaning igniter plugs is as follows:

(1) Clean plugs using dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

(2) Clean plugs using glass bead blast.

5-100. INSPECTION. Perform specific inspections listed in table 5-20.

5-101. REPAIR. Repair of igniter plugs (13, figure 4-15) is not allowed.

5-102. REASSEMBLY. Reassembly is not required.

5-103. FUNCTIONAL TEST. (See figure 4-15.) Proceed as follows:

a. Install igniter plugs in holding fixture (11-4700-1). (See figure 5-21.)

b. Attach ground lead from GROUND jacks on test stand (11-4700-1), or equivalent, to bolt on holding fixture.

c. Connect test lead between CONN 2 receptacle and igniter plug.

d. Turn POWER switch to ON. Observe that red indicator lamp lights.

e. Turn VOLTAGE SELECTOR switch to H. V. TEST.

f. Turn METER SELECTOR switch to 5 ADC.

g. Press 60 CYCLE AC button.

h. Turn TEST SELECTOR switch to L. T. PLUG.

Table 5-20. Inspection of Igniter Plugs

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-15				
13	Igniter Plug	Visual	Damaged threads	Not allowed. Replace
			Erosion or wear on semi-conductor and electrode. (Refer to table 5-21)	Replace if limits are not met
			Cracked semi-conductor. (Refer to table 5-21)	Replace if limits are not met
			Burned or cracked electrodes	Not allowed. Replace
			Cracked or damaged insulator	Not allowed. Replace
			Dents and nicks on plug housing	Not allowed. Replace
		Visual and SIE	Chafing or grooving on housing area beyond 0.020 inch (0.050 cm) depth. (Refer to figure 5-20)	Replace if limits are not met

Table 5-21. Igniter Plug Inspection Limits

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Erosion or Wear on Semiconductor and Electrode	5-19	Erosion or wear on semiconductor and electrode are acceptable, provided depth of erosion on semiconductor does not exceed 1/16 inch as viewed from top of outer housing and noted undercutting of electrode is not apparent
Cracked Semiconductor		Tight-lipped cracks and chipping of semiconductor is acceptable **NOTE** Final acceptance criteria for igniter plug, if all other limits are met, shall be the functional test. (Refer to paragraph 5-101)

i. Press FILAMENT switch ON. Wait 15 seconds, then press PLATE switch ON. Observe that red indicator lamps light.

j. Turn POTENTIOMETER knob until igniter plug fires. Plug shall fire five consecutive times without skipping.

NOTE

In following step k, firing voltage must not exceed 1,000 vdc, for new igniter plugs, or 1,800 vdc, for used igniter plugs.

k. Press PUSH TO READ switch, and check igniter plug firing voltage on gage, M-8.

l. If limits cannot be met, replace igniter plug.

m. Return test unit to pretest condition, and remove igniter plug from holding fixture.

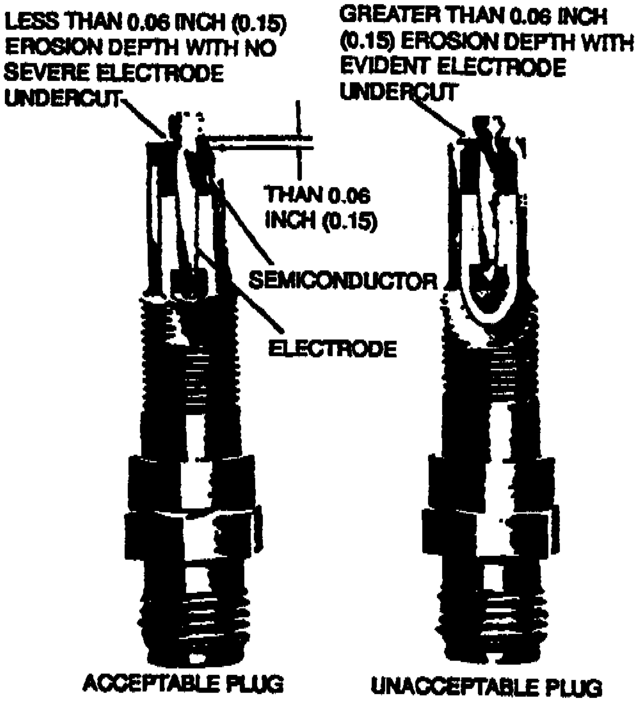


Figure 5-19. Igniter Plug - Inspection Limits.

5-104. STARTING FUEL MANIFOLDS.

5-105. DISASSEMBLY. Disassembly is not required.

5-106. CLEANING. Pressure flush starting fuel manifolds (6 and 15, figure 4-16) using dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.).

5-107. INSPECTION. Perform specific inspections listed in table 5-22.

5-108. REPAIR. (See figure 4-16.) Proceed as follows:

a. Repair conical seat of tee (5) as follows:

(1) Blend-repair all raised metal. (Refer to SP No. 5000 in Appendix E.)

(2) If defects specified in figure 5-22 are noted, remachine a new 37-degree conical seat.

NOTE

Machining data is shown in figure 5-22.

b. Repair cracked or defective tubing in parts of starting fuel manifold (6 or 15, figure 4-16) as follows:

(1) Heat and separate old joints, and remove defective tubing. Remove excess braze from fittings.

(2) Using corrosion-resistant steel tubing (item 314, table C–1) 0.120 to 0.130 inch (0.305 to 0.330 cm) OD by 0.017 to 0.023 inch (0.043 to 0.058 cm) wall thickness, fabricate new tube to original dimensions.

(3) Swage OD of tube to provide 0.001 to 0.003 inch (0.003 to 0.008 cm) joint clearance on both ends for the distance the tube is to be inserted into mating fittings.

CAUTION

In following step (4), do not permit excess braze to block passages in tubing.

(4) Install tube, and, using suitable brazing fixture, hold manifold in alignment; then torch-braze joints, using brazing alloy (item 58, table C–1) as specified in SP No. 5003 in Appendix E.

(5) Inspect and test manifolds. (Refer to paragraph 5-110.)

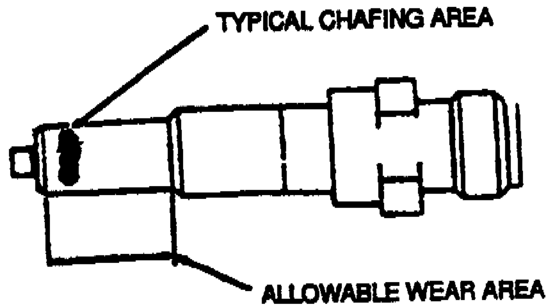


Figure 5-20. Igniter Plug Inspection.

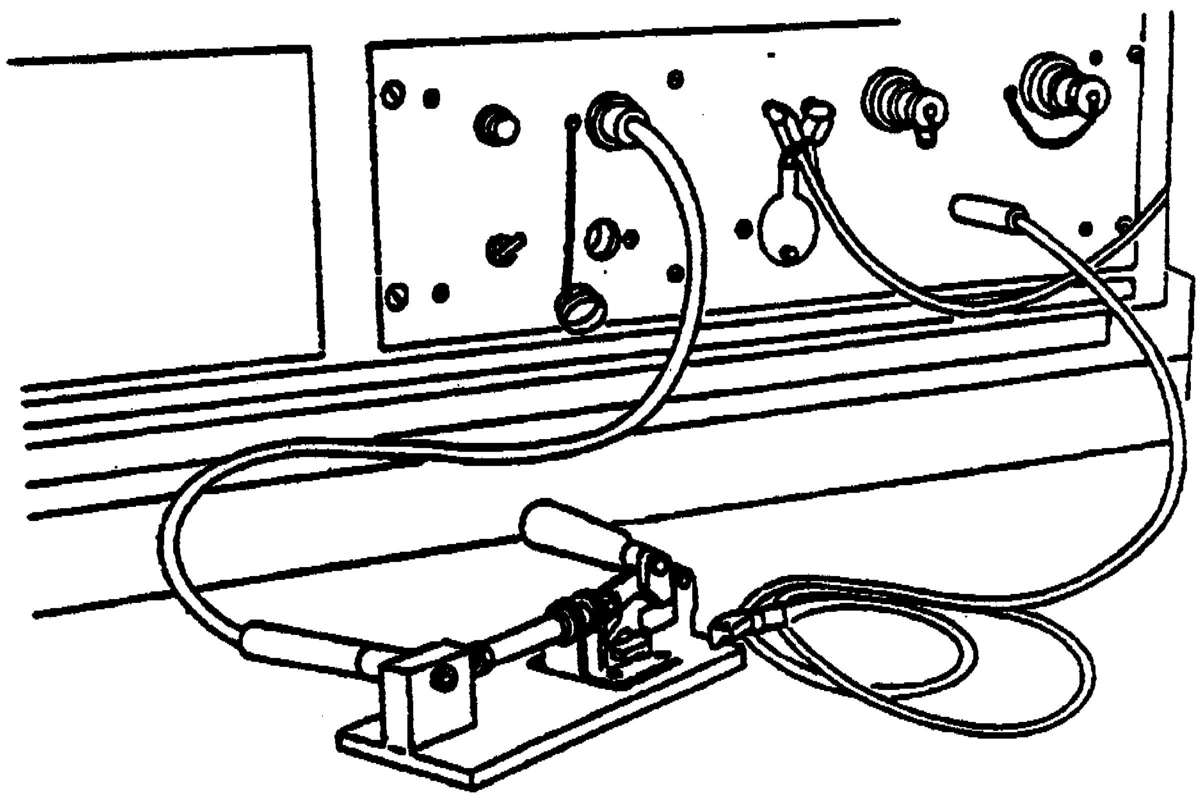


Figure 5-21. Igniter Plug Setup for Test.

Table 5-22. Inspection of Starting Fuel Manifolds

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-16				
2,7,9, 10,16, and 18	Clamps	Visual	Worn or damaged cushions	Not allowed. Replace
5	Tee	Visual	Damaged threads	Not allowed. Replace
			Cracks	Not allowed. Replace
			Damaged conical seat. (Refer to figure 5-22)	Repair. (Refer to paragraph 5-108)
6 and 15	Right-and Left-Hand Starting Fuel Manifolds	Visual	Damaged threads	Not allowed. Replace
			Cracks	Repair. (Refer to paragraph 5-108)

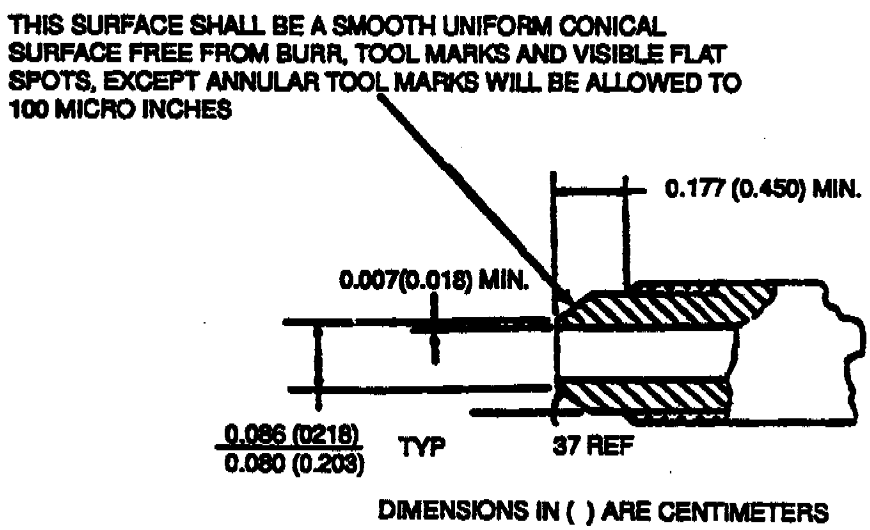


Figure 5-22. Tee Inspection and Repair Limits.

5-109. REASSEMBLY. Reassembly is not required.

5-110. FUNCTIONAL TEST. (See figure 4-16.) Proceed as follows:

NOTE

The following tests are performed using hand pump on test stand (LTCT314), or equivalent, and calibrating fluid (item 68 or 69, table C–1) heated to 60° to 120°F (16° to 49°C).

a. Install suitable union in end port of manifold half.

b. Using suitable plugs, plug two nozzle ports of manifold half.

c. Apply 800 to 850 psig (56246 to 59761 gm sq cm) pressure to manifold half, and observe for leakage.

d. If leakage is noted, reject manifold half and repeat procedure for second half of manifold.

5-111. FUEL HEATER ASSEMBLY (T53-L-15, -701, -701A).

5-112. DISASSEMBLY. Proceed as follows:

NOTE

If overhaul of fuel heater is required, further disassembly is given in TM 55-2840-217-40.

a. Remove union (2, figure 5-25) from fuel heater (3).

b. Remove packing (1).

5-113. CLEANING. Cleaning of fuel heater (figure 4-17) is outlined in TM 55-2840-217-40.

5-114. INSPECTION. Perform specific inspections listed in table 5-23.

5-115. REPAIR. (See figure 4-17.) Proceed as follows: Repair of the fuel heater assembly is specified in TM 55-2840-217-40.

5-116. REASSEMBLY. Proceed as follows:

NOTE

Lubricate threads of union with lubricating oil (item 187, table C–1).

a. Install packing (1, figure 5-25) on union (2).

b. Install union with packing into fuel heater (3).

Table 5-23. Inspection of Fuel Heater Assembly (T53-L-15, -701, -701A).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-6 3	Fuel Heater	Visual	Severe damage on external surface **NOTE** In the event overhaul of the fuel heater was found to be necessary, further inspection requirements are given in TM 55-2840-217-40.	Not allowed. Replace.

5-117. **FUNCTIONAL TEST.** (See figure 5-25.) Proceed as follows:

NOTE

Refer to TM 55-2840-217-40 for overhaul instructions of fuel heater assembly. If fuel heater assembly does not require overhaul, perform the following procedures.

The following tests are performed using lubricating case oil (item 189 or 190, table C–1) and calibrating fluid (item 68 or 69, table C–1) heated from 60° to 120°F (16° to 49°C), unless other wise specified.

a. Perform fuel circuit pressure-test as follows: (See figure 5-23.)

(1) Install reducer, AN919-10, in FUEL IN port.

(2) Install plugging fixture (LTCT2160) in FUEL OUT port and secure with nut.

(3) Connect a No. 4 (1/4 inch diameter) hose from reducer at FUEL IN port of fuel heater to STATIC PRESSURE PORT FUEL port of test stand (LTCT1414).

(4) Loosen cap on fixture, and using fuel hand pump on right side of test stand, supply calibrating, fluid (item 68, table C–1) to fuel heater fuel chamber until fuel begins to discharge from FUEL OUT port. Tighten cap.

(5) Ensure that oil side of fuel heater is vented to atmosphere.

(6) Using fuel hand pump on right side of test stand, build up pressure in heater fuel chamber at a rate of 100 psi (7031 gm sq cm) per minute until STATIC TEST PRESSURE FUEL gage indicates 200 psi (14061 gm sq cm).

(7) Maintain applied pressure for 5 minutes. After 5 minutes have elapsed, fuel heater shall show no evidence of failure, malfunction, distortion, or leakage.

(8) Bleed off 200 psi (14061 gm sq cm) pressure to zero.

(9) Remove reducer from FUEL IN port and cap from fixture at FUEL OUT port.

b. Perform an oil circuit pressure-test as follows:

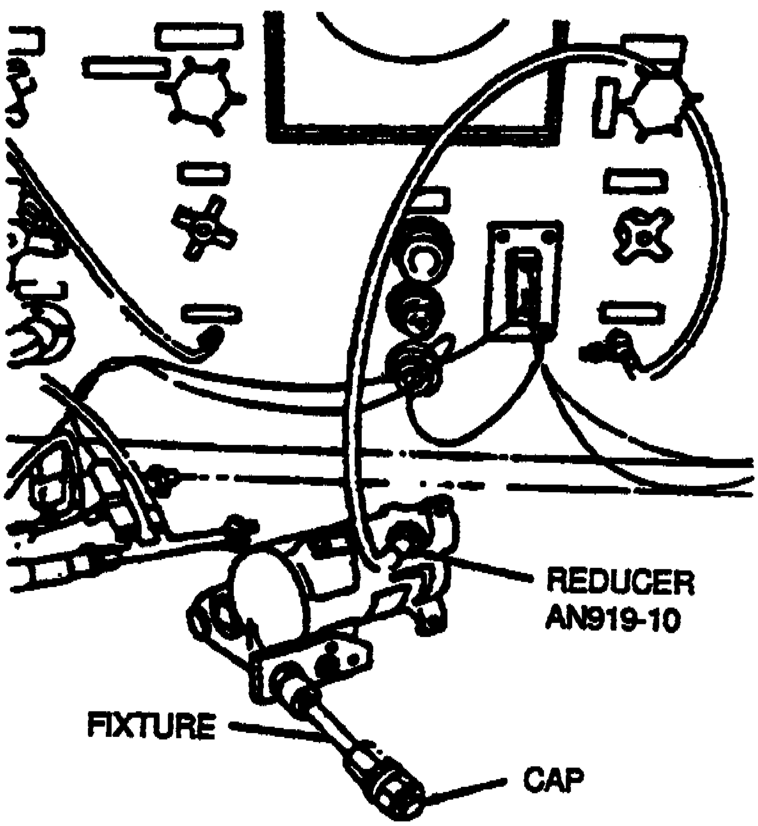


Figure 5-23. Fuel Heater Pressure Test Connections.

(1) Install reducers, MS24399-10, in OIL IN and OIL OUT ports.

(2) Connect a No. 4 (1/4-inch diameter) hose from reducer at OIL IN port of fuel heater to STATIC PRESSURE PORT OIL port of test stand.

(3) Using oil hand pump on left side of test stand, supply test oil to fuel heater oil chamber until oil begins to discharge from OIL OUT port.

(4) Install number 4 cap on adapter in OIL OUT port.

(5) Ensure that fuel side of fuel heater is vented to atmosphere.

(6) Using oil hand pump on left side of test stand, build up pressure in heater oil chamber at a rate of 100 psi (7031 gm sq cm) per minute until STATIC TEST PRESSURE OIL gage indicates 300 psi (21092 gm sq cm).

(7) Maintain applied pressure for 5 minutes. After 5 minutes have elapsed, fuel heater shall show no evidence of failure, malfunction, distortion or leakage.

(8) Reduce pressure to zero psi; then remove hose from fuel heater.

(9) Remove reducer from OIL IN and OIL OUT ports.

c. Perform an alternate pressure-test as follows:

(1) Cap fuel ports with suitable fittings. Attach small diameter tube to one of these fittings. The small tube is attached to fitting to prevent flooding the interior and at the same time, if there is an internal leak, allowing air to escape.

(2) Apply 300 psig (21092 gm sq cm) air to the oil side and immerse heater in water. Check exterior of heater for external leaks, and check tube end for emission of air bubbles indicating an internal leak.

(3) Test pressure must be held for 5 minutes minimum during which there shall be no leakage or permanent deformation.

(4) Cap oil ports with suitable fittings. Attach small diameter tube to one of these fittings.

(5) Apply 200 psig (14061 gm sq cm) to fuel side and immerse heater in water. Check exterior of heater for external leaks, and check tube for emission of air bubbles indicating internal leaks.

(6) Test pressure must be held for 5 minutes minimum during which there shall be no leakage or permanent deformation.

d. For flow test, make following connections: (See figure 5-24.)

(1) Connect hose (5) to RETURN PORT OIL port on test stand; then install union (16) to opposite end of hose.

(2) Connect adapter (11) to union (16); then connect opposite end of adapter to OIL OUT port of fuel heater.

(3) Connect hose (14) from oil out adapter to OUTLET PRESSURE port on test stand.

(4) Connect hose (3) to PRESSURE PORT OIL port of test stand; then install union (13) to opposite end of hose.

(5) Connect adapter (8) to union (13), then connect adapter to OIL IN port of fuel heater.

(6) Connect hose (6) to adapter to OIL IN port; then connect hose (2) from adapter to INLET PRESSURE PORT of test stand.

(7) Connect hose (22) to RETURN PORT FUEL port of test stand; then install union (39) in opposite end of hose.

(8) Connect adapter (38) to union (39), then connect adapter to FUEL OUT port of heater.

(9) Connect hose (37) to adapter pressure port; then install tee (34) in opposite end of hose. Connect hose (26) from tee to OUTLET PRESSURE port on test stand. Connect hose (30) from remaining leg of tee to low-pressure port on water gage (range 0-10 inches H20) (Barton Instrument Co.), or equivalent.

(10) Connect hose (27) to PRESSURE FUEL port of test stand; then install union (31) to opposite end of hose.

(11) Connect adapter (8) to union (31); then connect opposite end of adapter to fuel in port heater.

(12) Connect a No. 4 (1/4-inch diameter) hose from adapter (8) to high-pressure port of water gage (range 0-10 inches H20) (29).

e. Perform fuel circuit check as follows:

(1) Press STAND POWER and FUEL PUMP on buttons.

(2) Set TEMPERATURE CONTROL FUEL gage to obtain a fuel inlet temperature of 70° to 80°F (21° to 27°C).

(3) Turn BYPASS FUEL and BACK PRESSURE CONTROL-FUEL valves until FLOWMETER FUEL gage indicates 380 to 420 phr, and ΔP FUEL SIDE HEAT EX. gage indicates 10 to 15 psi (7031 to 1054.6 gm sq cm).

(4) Maximum permissible differential pressure, as indicated on water gage, shall be 3.0 inch water.

f. Perform valve stabilization test as follows:

(1) Turn TEMPERATURE CONTROL OIL knob to obtain 245° to 255°F (118° to 124°C) on TEMPERATURE CONTROL OIL temperature readout. Observe that oil reaches operating temperature.

(2) Turn BYPASS OIL and BACK PRESSURE CONTROL-OIL valves until FLOWMETER OIL indicates 2,550 to 2,650 phr at inlet pressure of 60 psi (4218 gm sq cm) or below.

(3) Adjust fuel flow to obtain 750 to 850 at 60° to 80°F (16° to 27°C), and at a pressure of 5 to 15 psig (351.5 to 1054.6 gm sq cm). After a stabilization period of 4 to 6 minutes, the difference between fuel inlet and fuel outlet temperatures shall not exceed 5°F (3°C). Read temperatures on TEMPERATURE INDICATOR gage.

g. Perform oil circuit check as follows:

(1) Reverse lines to FUEL IN and FUEL OUT ports of heater.

(2) Bring inlet temperature of fuel down to 30°F (-1°C) or lower, and inlet oil temperature to 75° to 85°F (24° to 30°C).

(3) Turn BYPASS FUEL and BACK PRESSURE CONTROL FUEL valves until FLOWMETER FUEL gage indicates 380 to 420 phr.

(4) Check ΔP FUEL SIDE HEAT EX. gage for a pressure of 10 to 15 psi (703.1 to 1054.6 gm sq cm).

(5) Turn BYPASS OIL and BACK PRESSURE CONTROL oil valves until FLOWMETER OIL gage indicates 1,750 to 1,850 phr.

(6) Check OIL SIDE HEAT EX. gage for an inlet pressure of 60 psi (4218 gm sq cm) or below.

(7) Check ΔP gage and subtract black needle reading from red needle reading. Differential pressure shall not exceed 3.8 psi (267.2 gm sq cm).

h. If test requirements cannot be met, reject fuel heater.

5-118. FUEL FILTER ASSEMBLY.

5-119. DISASSEMBLY. Proceed as follows:

NOTE

During the following procedures, provide a suitable container to receive drained fuel.

a. Remove plug and bleeder (18, figure 5-26) and packing (19) and allow fuel to drain. Discard packing.

b. Remove bolt (4) and seal (5). Remove seal from bolt.

c. Remove body assembly (6), element assembly (8), and packings (7). Discard packings.

d. Remove screws (9) that secure valve retainer (10) to base assembly (20). Remove gasket (11), packing (12), valve assembly (13), and spring (14). Discard packing.

e. Remove screws (15) that secure pressure switch (16) to base assembly (20). Remove pressure switch and packings (16 and 17). Discard packings.

f. Remove bolt (1) that secures tee (3) to base assembly (20). Remove tee and gaskets (2).

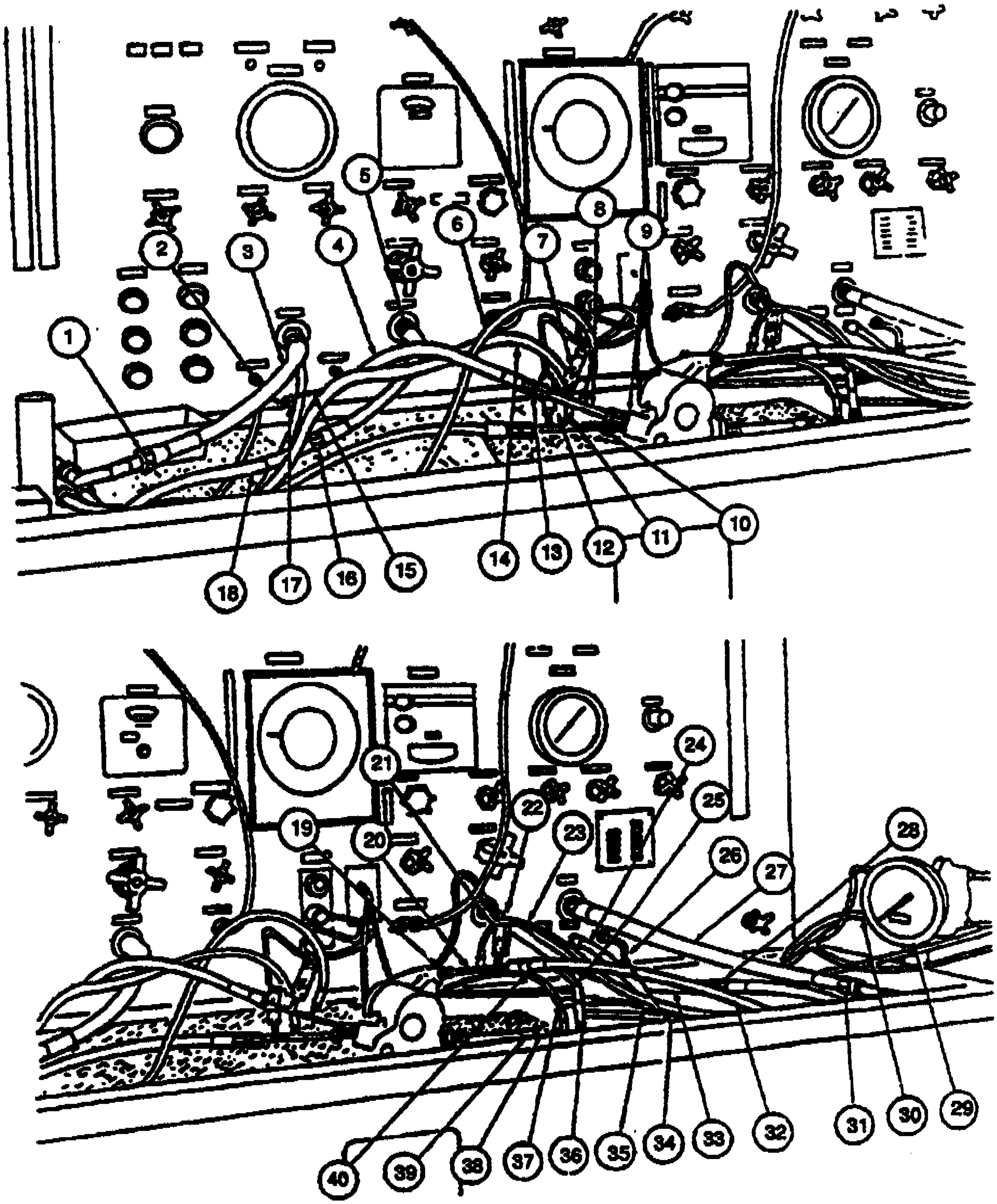


Figure 5-24. Fuel Heater Flow-Test Connections (Sheet 1 of 2).

1. Reducer MS24399D18
2. No. 4 hose (1/4inch diameter)
3. No. 10 hose (5/8 inch diameter)
4. No. 6 hose (3/8 inch diameter)
5. No. 10 hose (5/8 inch diameter)
6. No. 4 hose (1/4 inch diameter)
7. No. 3 thermocouple plug
8. Adapter (5/8 inch diameter)
9. Reducer MS24399D12
10. Reducer MS24399D12
11. Adapter (5/8 inch diameter)
12. No. 4 thermocouple plug
13. Union MS24392-10
14. No. 4 hose (1/4 inch diameter)
15. Tube (1/4 inch diameter)
16. Union MS24392-10
17. Tee MS24402D4
18. No. 6 hose (3/8 inch diameter)
19. Reducer MS24399D11
20. Adapter (1/4 inch diameter)
21. No. 2 thermocouple plug
22. No. 10 hose (5/8 inch diameter)
23. No. 4 hose (1/4 inch diameter)
24. No. 4 hose (1/4 inch diameter)
25. Flexible hose (1/4 inch diameter)
26. Hose (1/4 inch diameter)
27. No. 10 hose (5/8 inch diameter)
28. Reducer MS24399D18
29. Water gage
30. No. 4 hose (1/4 inch diameter)
31. Union MS24392-10
32. No. 6 hose (3/8 inch diameter)
33. No. 6 hose (3/8 inch diameter)
34. Tee MS24402D4
35. Tee MS24402D4
36. No. 1 thermocouple plug
37. No. 4 hose (1/4 inch diameter)
38. Adapter (5/8 inch diameter)
39. Union MS24392-10
40. Reducer MS24399D7

Legend for Figure 5-24

Figure 5-24. Fuel Heater Flow-Test Connections (Sheet 2 of 2).

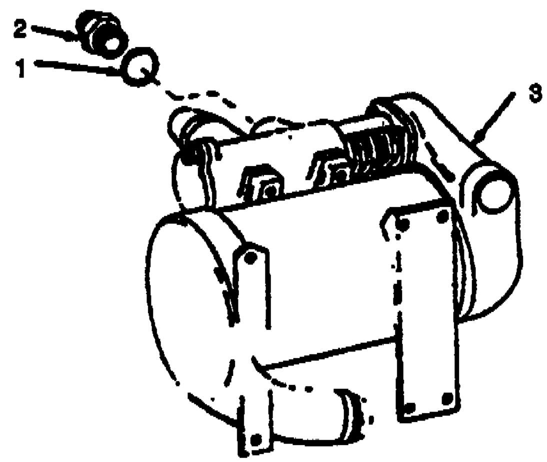


Figure 5-25. Fuel Heater Assembly (T53-L-15, -701, -701A)

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-25	No Number	FUEL HEATER ASSEMBLY AND RELATED PARTS (NHA 170-330-06 AND 1-170-330-09)	Ref	C,D,E
-1	MS29512-10	. PACKING	1	C,E
	NAS617-10	. PACKING	1	D
-2	MS24392-10	. UNION, Flared tube	1	C,D,E
-3	5A470-001	. HEATER, Fuel (78493) (Lycoming Source Cont Dwg 1-300-251-02)	1	C,D,E
	US526758-6	. HEATER, Fuel (78493) (Alternate) (Lycoming Source Cont Dwg 1-300-251-03)	1	C,D,E

5-120. CLEANING. Proceed as follows:

a. Immerse fuel filter assembly (8, figure 4-18) in tank containing dry cleaning solvent (item 134, table C–1). Remove filter from tank and pressure flush with dry cleaning solvent at 25 psig (1757.7 gm sq cm) maximum.

b. Clean all other parts by dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

5-121. INSPECTION. Perform specific inspections listed in table 5-24.

5-122. REPAIR. (See figure 4-18.) Proceed as follows:

a. Blend-repair nicks, and dents. (Refer to SP No. 5000 in Appendix E.)

b. Repair damaged surface coating. (Refer to SP No. 6005 in Appendix E.)

5-123. REASSEMBLY. Proceed as follows:

a. Position tee (3, figure 5-26) and gaskets (2) on base assembly (20). Secure tee with bolt (1). Tighten, as required, and lockwire.

b. Install packings (17 and 19) into base assembly (20). Position pressure switch (16) on base assembly and secure with four screws (15). Lockwire screws.

NOTE

In following step c, ensure that gasket (11) and valve retainer (10) are properly aligned with screw holes in base assembly.

c. Install spring (14), valve assembly (13), packing (12), and gasket (11) into base assembly. Install valve retainer (10) and secure with screws (9).

CAUTION

In following step d, extreme care must be taken to ensure that packings are not pinched or cut during assembly.

d. Position packings (7) on element assembly (8) and insert into body assembly (19). Position body assembly into base and install seal (5) and bolt (4).

e. Tighten bolt (4) to 50 pound-inches (8930 gm cm) torque and lockwire.

NOTE

Lubricate threads of plug with lubricating oil (item 187, table C–1).

f. Install plug and bleeder (18) and packing (19) into base assembly.

5-124. FUNCTIONAL TEST. (See figure 5-26.) Proceed as follows:

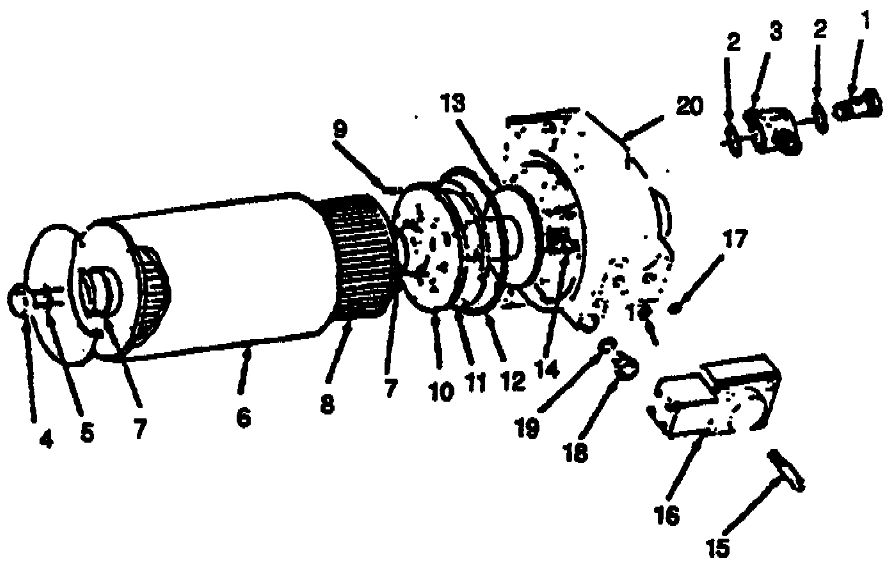


Figure 5-26. Fuel Filter Assembly (T53-L-15, -701, -701A).

NOTE

The following test is performed, using calibrating fluid (item 68, table C–1) at 70°F (21°C).

a. Break lockwire and remove bolt, seal, and body assembly. Remove filter element assembly.

b. Reinstall body assembly, seal, and bolt. Tighten bolt to 45 to 55 pound-inches (8037 to 9823 gm cm) torque.

c. Pressure-test fuel filter as follows:

(1) Install reducer, MS24399-10, in FUEL IN port. Install suitable high-pressure cap on FUEL OUTLET port.

(2) Connect No. 4 (1/4-inch diameter) hose from reducer to STATIC PRESSURE PORT FUEL port of test stand (LTCT1414).

(3) Close STATIC PRESSURE BYPASS FUEL valve.

(4) Using hand pump on right side of test stand, slowly increase pressure until STATIC TEST PRESSURE FUEL gage indicates 100 psi (7030.7 gm sq cm). Maintain this pressure for 2 minutes, plus or minus 30 seconds. After specified time has elapsed, check that there is no evidence of failure, distortion, or leakage.

(5) If requirements cannot be met, reject fuel filter.

(6) Reduce pressure to zero, then disconnect hose from filter.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-26	No Number	FUEL FILTER AND BRACKET ASSEMBLY AND RELATED PARTS (NHA 1-170-330-06, 1-170-330-09 and 1-100-640-06)	Ref	C,D,E
-1	1-160-319-01	. BOLT, Universal fitting	1	C,D,E
-2	AN901-4A	. GASKET, Metal tube connection seal	2	C,D,E
-3	1-160-321-01	. TEE, Universal fitting	1	C,D,E
-	No Number	. FUEL FILTER AND BRACKET ASSEMBLY (NHA 1-170-330-06,1-170-330-09)	1	C,D,E
	123998	. . FILTER, Fluid pressure (73370) (Lycoming Source Cont Dwg 1-300-252-02)	1	C,D,E
	045468	. . FILTER, Fluid pressure (90005) (Alternate) (Lycoming Source Cont Dwg 1-300-252-03)	1	C,D,E
-4	123994	. . . BOLT (73370)	1	C,D,E
-5	123915	. . . SEAL (73370)	1	C,D,E
-6	123992	. . . BODY ASSEMBLY (73370)	1	C,D,E
-7	MS29513-24	. . . PACKING	2	C,D,E
-8	123993	. . . ELEMENT ASSEMBLY	1	C,D,E
-9	126031	. . . SCREW (73370)	8	C,D,E
-10	126033	. . . VALVE RETAINER (73370)	1	C,D,E
-11	126041	. . . GASKET (73370)	1	C,D,E
-12	MS29513-237	. . . PACKING	1	C,D,E
-13	126035	. . . VALVE ASSEMBLY (73370)	1	C,D,E
-14	126032	. . . SPRING (73370)	1	C,D,E
-15	126221	. . . SCREW (73370)	4	C,D,E
-16	126222	. . . SWITCH, Pressure (73370)	1	C,D,E
-17	MS29513-6	. . . PACKING	1	C,D,E
-18	AN814-4DL	. . . PLUG AND BLEEDER, Screw thread	1	C,D,E
-19	MS29512-04	. . . PACKING	1	C,D,E
-20	126144	. . . BASE ASSEMBLY(73370)	1	C,D,E

Table 5-24. Inspection of Fuel Filter Assembly (T53-L-15, -701, -701A)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-26				
20	Base Assembly	Visual	Nicks or dents	Repair. (Refer to SP No. 5000 in Appendix E)
			Cracks	Not allowed. Replace
			Damaged surface coating	Repair. (Refer to SP No.6005 in Appendix E)
6	Body Assembly	Visual	Nicks or dents	Repair. (Refer to SP No. 5000 in Appendix E)
			Cracks	Not allowed. Replace
			Damaged surface coating	Repair. (Refer to SP No. 5000 in Appendix E)
8	Element Assembly	Visual	Cuts, holes or foreign material in filter element	Replace if damaged. Remove foreign material. (Refer to paragraph 5-120.)

d. Perform pressure-switch operation as follows:

(1) Remove bolt, seal, body assembly.

(2) Install dummy element assembly in body assembly; then reinstall body assembly, seal, and bolt. Tighten bolt to 45 to 55 pound-inches (8037 to 9823 gm cm) torque.

(3) Connect power and light source to receptacle on pressure switch housing.

(4) Connect No. 12 (3/4-inch diameter) hose to PRESSURE FUEL PORT of test stand; then install reducer, MS24399-18, to opposite end of hose.

(5) Connect No. 6 (3/8-inch diameter) hose to reducer; then install another reducer, MS24399-7, to opposite end of hose. Connect a 1/4-inch diameter adapter to reducer, then connect adapter to FUEL IN port of fuel filter.

(6) Connect No. 4 (1/4-inch diameter) hose to adapter pressure port; then install tee MS24402-4, to opposite end of hose.

(7) Connect 1/4-inch diameter flexible hose from tee to GAUGE PORT FUEL 22 port of test stand. Connect 1/4-inch diameter adapter from remaining leg of tee; then install another tee, MS24402-4, in adapter. Connect No. 4 (1/4-inch diameter) hose from leg of tee to GAUGE PORT 25 port of test stand. Connect No. 4 (1/4-inch diameter) hose from remaining leg of tee to water gage (0 to 75 inches H20) (part of LTCT1414), or equivalent.

(8) Press STAND POWER and FUEL PUMP on buttons.

(9) Turn BYPASS FUEL and BACK PRESSURE CONTROL-FUEL valves until water gage indicates 20 to 25 inches water pressure. Observe light to ensure that switch is actuated at this pressure.

(10) If requirements cannot be met and if switch, P/N 126222, does not actuate at desired pressure it may be reworked as follows:

(a) Drill to remove epoxy.

(b) Caution should be exercised so as not to damage set screw, insert or switch housing.

(c) Switch may be adjusted to obtain values specified in applicable technical data.

(d) After adjustment has been satisfactorily made, fill cavity with Devcon F epoxy putty.

(e) Retest as per paragraph d above. If unsatisfactory reject pressure switch.

e. Perform bypass valve operation as follows:

(1) Turn BYPASS FUEL and BACK PRESSURE CONTROL-FUEL valves in small increments until leakage rate through bypass valve is 8 cc minimum. This leakage rate is cracking pressure of valve and shall occur at 27 to 40 inches water pressure as indicated on water gage.

(2) If requirements cannot be met, reject fuel filter.

(3) Turn BYPASS FUEL and BACK PRESSURE CONTROL-FUEL valves until pressure returns to zero inches water. Disconnect hose from fuel filter and remove reducer.

f. Remove bolt, seal, and body assembly. Remove dummy element assembly from body assembly.

g. Install element assembly in body assembly; then reinstall body assembly, seal, and bolt. Tighten bolt to 45 to 55 pound-inches (8037 to 9823 gm cm) torque. Lockwire bolt to body assembly.

5-125. STARTING FUEL NOZZLES.

5-126. DISASSEMBLY. Disassembly is not required.

5-127. CLEANING. Proceed as follows:

WARNING

In following step a, avoid direct contact of solution with skin or eyes. This solution is a strong caustic and protective garments shall be worn when handling. Ensure that tank is exhausted to outside atmosphere.

CAUTION

The following procedure should be a continuous process in order to prevent corrosive attack on nozzles. If it should be necessary to delay the procedure, an adequate flow rinse should be accomplished to remove any pockets of solvent.

a. Fill a corrosion-resistant steel cleaning tank with nondiluted Magnus Magnustrip (item 318, table C–1) heated to a temperature of 220° to 260°F (104° to 127°C) or a solution in the ration of 3 pounds of Turco compound (item 337, table C–1) per gallon of water heated to a temperature of 220° to 225°F (104° to 107°C).

b. Place starting fuel nozzles (13, figure 4-16) in stainless steel baskets constructed to prevent contact between nozzles.

NOTE

In the following step c, use of vertical agitation will accelerate carbon removal from nozzles.

c. Suspend the baskets containing the nozzles in the solution. Soak for a period of 90 minutes if using Magnustrip solution and 45 minutes if using Turco compound solution.

d. Remove nozzles from solution and spray-rinse with cold water for one minute to dislodge particles from orifices.

e. Water-rinse nozzles for 5 minutes, using overflow method.

f. Rinse nozzles again in an ultrasonic water-rinse heated to a temperature of 180°F (82°C) for a period of 3 to 5 minutes.

g. Place nozzles in a dip tank containing a solution in the ratio of 2 to 2 1/2 pounds Turco alkaline permanganate (item 241, table C–1) per gallon of water heated to a temperature of 190° to 200°F (88° to 93°C), and soak for 30 to 40 minutes.

h. After soaking, remove nozzles from solution and spray-rinse using overflow method.

i. Water-rinse nozzles in clean, cold water for 2 to 7 minutes, using overflow method.

j. Rinse nozzles in an ultrasonic water-rinse for 3 to 5 minutes.

k. Soak nozzles in a solution of nondiluted Magnus Magnustrip (item 318, table C–1) at a temperature of 200° to 260°F (93° to 127°C) or a solution in the ratio of 3 pounds of Turco Compound (item 337, table C–1) per gallon of water heated to a temperature of 220° to 225°F (104° to 107°C) for a period of 10 to 15 minutes.

l. After soaking, remove nozzles from solution and spray-rinse with cold water for one minute.

m. Rinse in an ultrasonic water-rinse for 5 to 10 minutes.

n. Dry nozzles with a low pressure air blast.

o. Functional-test nozzles. (Refer to paragraph 5-308).

p. Reclean if necessary.

5-128. INSPECTION. Perform specific inspections listed in table 5-25.

5-129. REPAIR. (See figure 4-16). After functional test and inspection, reform nozzle flanges to noted concavity, as required, to provide improved sealing and prevent possible gasket blowout as follows:

a. Place nozzle (13) in a suitably mounted block (see figure 5-27) mounted over a 0.050 inch (0.127 cm) step or appropriate shim stock.

NOTE

Shim stock should be perpendicular to nozzle flange centerline as shown in figure 5-28.

b. Screw nozzle into block using the nozzle/manifold assembly screw (12, figure 4-16), AN501A10-6, or machine screw, MS35266-61.

CAUTION

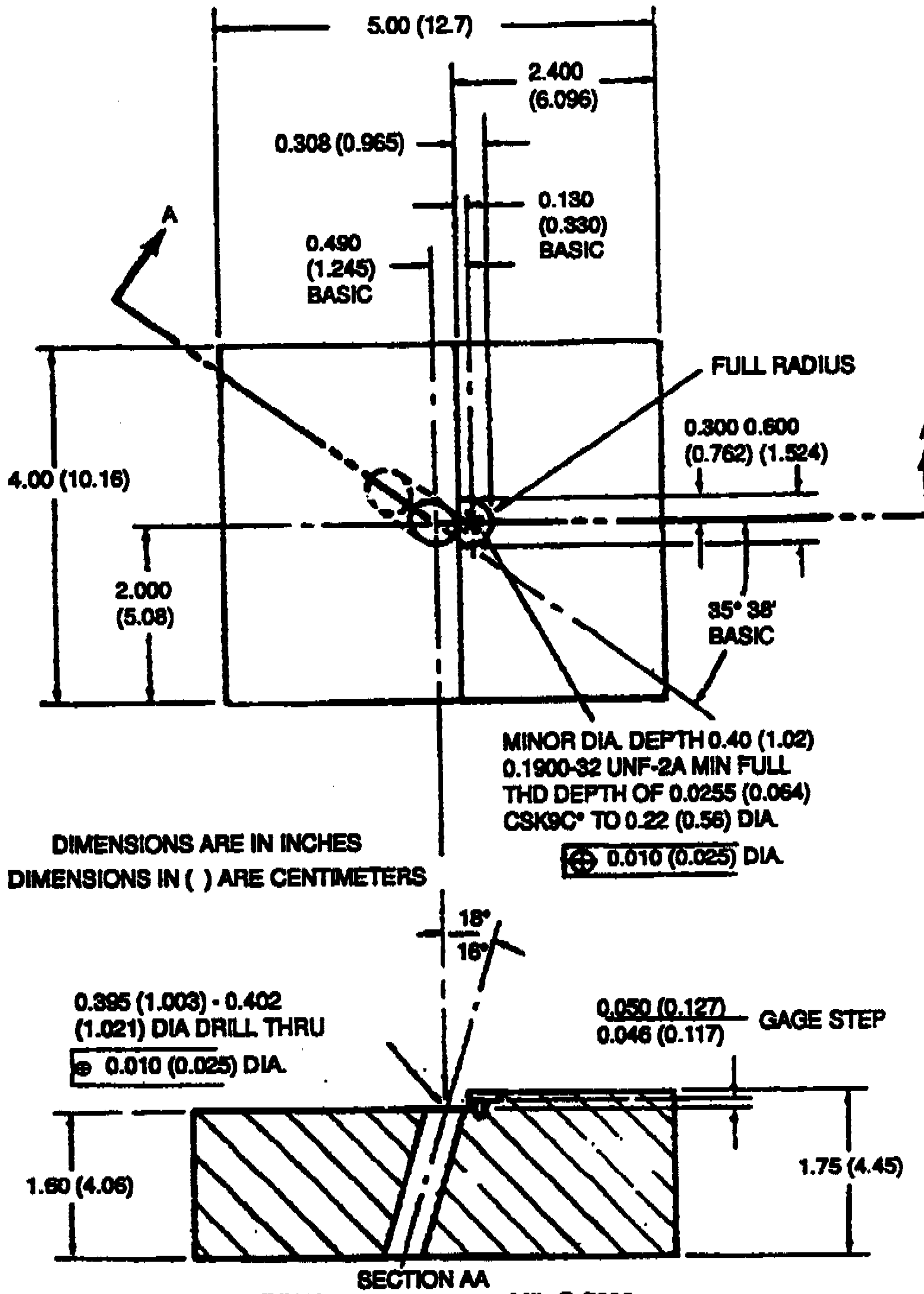
In following step c, ensure that force is applied only at centerline location; otherwise, flange will twist, resulting in leakage.

c. Using a drift or other suitable force, apply pressure to point shown in figure 5-28 to obtain desired 0.008 to 0.015 inch (0.020 to 0.038 cm) concavity. Additional shims may be placed under flange end to be formed, as desired.

d. After force is released, measure with feeler gages according to requirements of figure 5-28 to ensure that concavity at nozzle end is within 0.008 to 0.015 inch (0.020 to 0.038 cm) requirements.

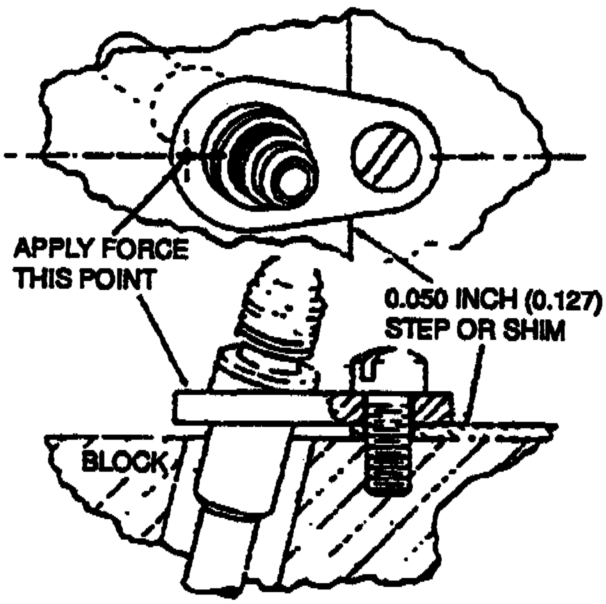
Table 5-25. Inspection of Starting Fuel Nozzles

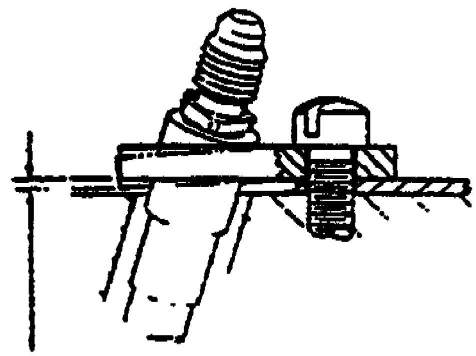
FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-16				
13	Starting Fuel Nozzles	Visual	Nicks or scratches	Not allowed. Replace
			Damaged threads	Not allowed. Replace
			Evidence of leakage	Repair. (Refer to paragraph 5-129)
			Chafing, fretting, or nicks and dents on air shroud due to combustor liner seal guide adapter interference	Repair or replace. (Refer to table 5-26 for limits)



1. MATERIAL MIL-S-5000
2. HARDNESS: RC 37-42
3. HEAT TREAT: MIL-H-6875
4. SURFACE TREAT: MIL-C-13924CL1 (BLACK OXIDE)

Figure 5-27. Holder for Nozzle.





0.008 TO 0.015 (0.020 TO 0.038) CONCAVITY IN DIRECTION SHOWN. MAXIMUM CONCAVITY SHALL APPLY AT THE EXTREME END OF THE FLANGE ONLY AFTER REFORMING. MEASURE CLEARANCE AT THE END OF FLANGE WITH 0.035 INCH (0.089) AND 0.042 INCH (0.107) FEELER GAGES.

A. IF 0.035 INCH (0.089) FEELER GAGE CAN BE INSERTED, FLANGE CONCAVITY IS NOT IN EXCESS OF 0.015 INCH (0.038).

B. IF 0.042 (0.107) INCH FEELER GAGE CAN BE INSERTED WITH CLEARANCE, FLANGE HAS NOT BEEN DEFORMED TO REQUIRED CONCAVITY.

DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-28. Reforming of Nozzle Flange.

Table 5-26. Starting Fuel Nozzle Inspection Limits

DEFECT	FIGURE REFERENCE	INSPECTIONS LIMITS
Nozzle for Chafing, Fretting, or Nicks and Dents on Air Shroud	5-29	Minor chafing, fretting, or nicks and dents on air shroud up to 0.005 inch (0.013 cm) maximum depth are acceptable. Burnishing or shroud discoloration is acceptable. Crushing or breakthrough is unacceptable.

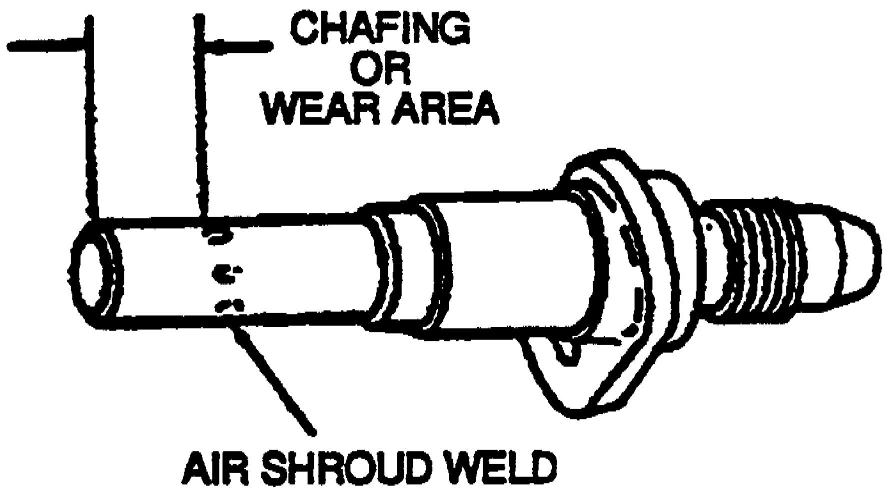


Figure 5-29. Starting Fuel Nozzle Inspection Area.

5-130. REASSEMBLY. Reassembly is not required.

5-131. FUNCTIONAL TEST. (See figure 4-16.) Proceed as follows:

NOTE

Perform following test using calibrating fluid (item 68, table C–1) heated to 78° to 82°F (27° to 28°C).

a. Connect a 1/4-inch diameter hose, with a 1/8 inch diameter adapter, from FUEL OUTLET TO NOZZLE port of test stand (LTCT314), or equivalent; connect adapter of hose to starting fuel nozzle.

b. Turn FUEL BYPASS VALVE Knob until INLET PRESS TO NOZZLE gage indicates 99 to 101 psi (6960 to 7101 gm sq cm).

c. Spray cone angle shall cover a spray area of 75 to 85 degrees, and cone flow shall be 5.70 to 6.30 phr. (See figures 5-30 and 5-31.) Shutdown test stand.

d. If limits cannot be met, reject starting fuel nozzle.

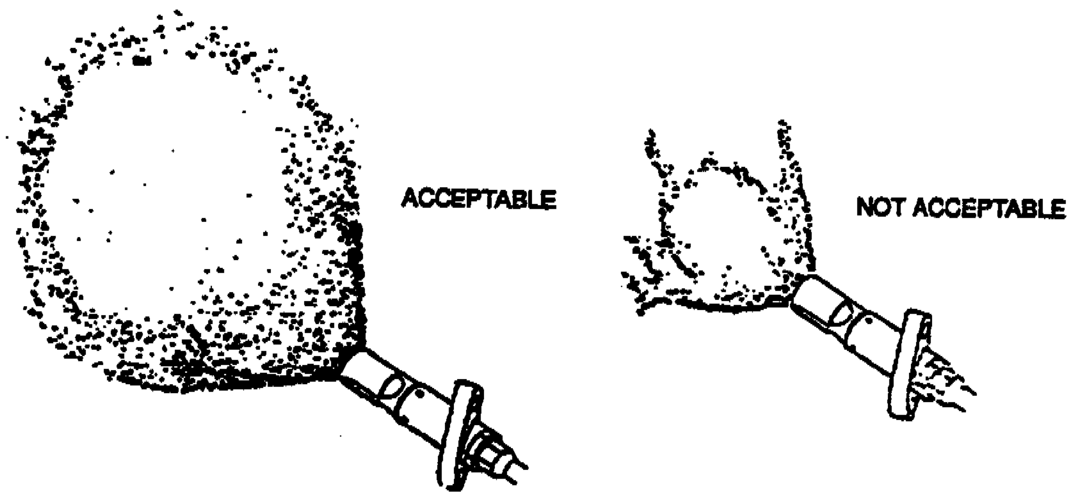


Figure 5-30. Starting Fuel Nozzle Spray Cone.

Figure 5-31. Starting Fuel Nozzle Spray Angle.

SECTION IV. ELECTRICAL CABLE ASSEMBLIES AND HARNESS ASSEMBLY

5-132. ELECTRICAL CABLE ASSEMBLY.

5-133. DISASSEMBLY. Disassembly is not required.

5-134. CLEANING. Proceed as follows:

a. Clean electrical cable assembly, by wiping with a clean lint free cloth slightly dampened with isopropyl alcohol (item 25, table C–1).

b. After cleaning, wipe electrical cable assembly, with a clean, dry lint-free cloth to remove all residual solvent. Allow to air-dry.

5-135. INSPECTION. Perform inspections as follows:

a. Inspection of Electrical Cable Assembly. (T53-L-13B, -703.) Perform specific inspections listed in table 5-29.

b. Inspection of Electrical Cable Assembly. (T53-L-15, -701, -701A.) Perform specific inspections listed in table 5-28.

5-136. REPAIR. (See figures 4-19, 4-21, and 4-23) Proceed as follows:

a. Remove corrosion from cable assembly and thermocouple assembly as follows:

(1) Remove corrosion from plugs and threads by lightly rubbing corroded area with wire brush or crocus cloth (item 125, table C–1).

(2) Remove corrosion from pin sockets and terminals with dry cleaning solvent (item 134, table C–1).

CAUTION

To prevent possibility of short circuits, connectors shall be dried completely.

b. Repair cracks in molding compound of cable assembly, adjacent to main connector; as follows: (See figure 5-32.)

(1) Clean entire molded area adjacent to main connector, using isopropyl alcohol (item 25, table C–1). Allow to air dry for 10 to 15 minutes.

(2) File a V-notch, 1/8-inch wide and 1/8 inch deep, in molding compound along the line of crack. File surface of compound adjacent to V-notch to remove surface film from each side of V-notch.

(3) Using clean brush, remove loose particles from notched area.

(4) Prepare sealing compound (item 147, table C–1) as follows:

WARNING

The following material is toxic; avoid prolonged contact with skin. Keep containers closed, except when mixing and transferring material.

(a) Carefully stir Catalyst No. 15 (item 82, table C–1) into a creamy paste.

(b) To 100 parts of basic resin (item 147, table C–1) add 100 parts of Catalyst No. 15. Mix thoroughly, avoiding entrapped air in compound during this mixing.

Table 5-27. Inspection of Electrical Cable Assembly (T53-L-13B, -703)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-19				
6	Electrical Cable Assembly	Visual	Burned insulation	Not allowed. Repair or replace. (Refer to paragraph 5-136)
4-21				
21			Damaged threads, broken pins, or cracks in insulation	Not allowed. Repair or replace. (Refer to paragraph 5-136)
			Corrosion on connector plugs and security of connections	Repair. (Refer to paragraph 5-136)
			Cracks in molding compound in area adjacent to main connector	Repair. (Refer to paragraph 5-136)
			Cracks or chips in polyurethane molding of cable	Repair. (Refer to paragraph5-136)
			Tears, fraying, or worn spots on cable sleeve	Repair. (Refer to paragraph 5-136)
			Missing cable clamp rubber sleeving	Repair. (Refer to paragraph5-136)
4-19				
6	Electrical Cable Assembly		Damaged lockwire hole on connector	Repair. (Refer to paragraph 5-136)
			Missing spiral chafing sleeve at oil temperature bulb connector end	Repair. (Refer to paragraph 5-136)
			Missing or mutilated part number	Repair. (Refer to paragraph 5-136)
4-19				
2,8,11,13, 16, and 20	Clamps	Visual	Worn or damaged cushion	Not allowed. Replace

Table 5-28. Inspection of Electrical Cable Assembly (T53-L-15, -701, -701A)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-23				
21	Electrical Cable Assembly	Visual	Burned insulation or broken wires.	Not allowed. Repair or replace. (Refer to paragraph 5-136)
			Damaged threads, broken pins, or cracked insulation	Not allowed. Repair or replace. (Refer to paragraph 5-136)
			Corrosion on connector plugs and security of connections	Not allowed. (Refer to paragraph 5-136)
			Cracks in molding compound in area adjacent to main connector	Repair. (Refer to paragraph 5-136)
			Cracks or chips in polyurethane molding of cable	Repair, (Refer to paragraph5-136)
			Tears, fraying, or worn spots on cable sleeve	Repair. (Refer to paragraph 5-136)
			Missing cable clamp rubber sleeving	Replace. (Refer to paragraph 5-136
2,5,7,8,18 , and 19	Clamps	Visual	Worn or damaged cushions	Not allowed. (Refer to paragraph 5-136)

NOTE

The mixed material has a pot life of approximately 90 minutes at 75° to 79°F (24° to 26°C) and 45 to 55 percent relative humidity. The useful life of mixed material maybe extended up to 36 hours by storing at temperatures of 0° to -20°F (-18° to -29°C). Pot life is inversely proportional to temperature and humidity.

(5) Fill V-notch with prepared compound. Round compound up above adjacent surface.

(6) Cure compound at room temperature for 24 hours.

c. Repair cracks or chips in moldings of cable assembly as follows:

(1) File V-notch in molding along line of crack or chip.

(2) Using a clean brush, remove loose particles from notched area.

(3) Clean area with isopropyl alcohol (item 25, table C–1), and air dry for 15 minutes.

(4) Prepare molding compound mixture as follows:

(a) Mix thoroughly 100 parts by weight of Stycast 2741 resin (item 147, table C–1) and 100 parts of Catalyst No. 15 (item 82, table C–1).

(b) Stir until compounds are well mixed.

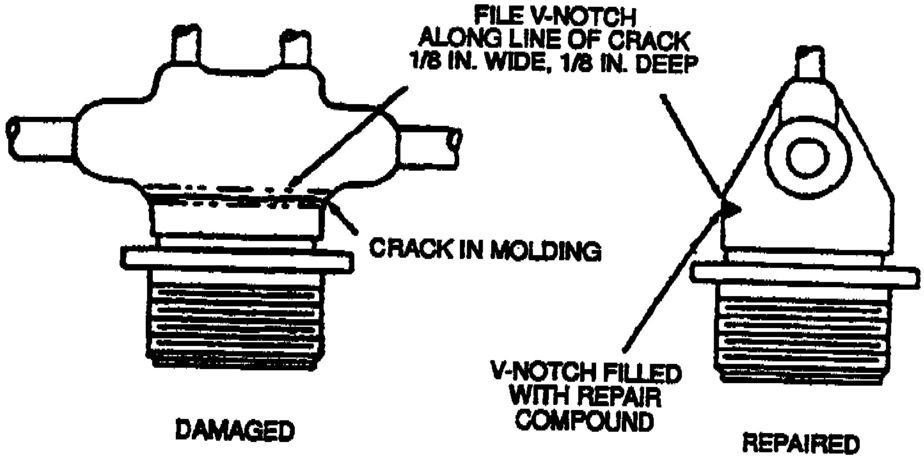


Figure 5-32. Electrical Main Connector - Repair.

NOTE

The mixed material has a pot life of approximately 2 hours at room temperature. For best results, use immediately.

(5) Fill V-notch with prepared compound. Round compound up above adjacent surface.

NOTE

To repair chipped ends of molding, adapt a potting boot to proper size of mold.

(6) Cure compound at room temperature for 24 hours.

(7) After curing, file off excess compound.

d. Repair torn, worn, or frayed cable clamp rubber sleeving of cable assembly as follows:

(1) Remove dirt and loose particles from damaged area, using moisture-free compressed air or a clean, soft brush.

(2) Cover damaged area with electrical tape (item 139, table C–1).

NOTE

Start electrical tape approximately one inch from damaged area and wrap two turns with 100-percent overlap. Proceed to wrap, at an angle, with a 50-percent overlap to approximately one inch beyond damaged area, then terminate tape by wrapping two turns with 100-percent overlap.

(3) Using a small brush, coat entire wrapped area of tape with electrical coating (item 136, table C–1) and allow to dry.

e. Repair damaged lockwire hole of connectors on cable assembly, by drilling a new 0.045 inch (0.1143 cm) diameter minimum hole adjacent to the damaged hole. (See figure 5-33.)

f. If spiral chafing sleeve is missing at the oil temperature bulb connector end (see figure 5-34), install sleeve, P/N 94835-1, or equivalent, cut to a length of 4.12 to 4.38 inches (10.46 to 11.13 cm).

g. Replace electrical cable assembly if it cannot be repaired or if it fails to meet functional test requirements.

h. If electrical cable on T53-L-13B, -15, or -703 engines cannot be identified due to missing or mutilated part number, proceed as follows:

(1) Determine proper identification. (See figure 5-35.)

(2) Install metal band, with Lycoming part number stamped on it around cable as shown in figure 5-35.

NOTE

Loss of serial number does not constitute cause for rejection. New serial number is not required

i. Rework bottom of cap as shown in figure 5-36.

(1) Touch up rework area using Alodine (MIL-C-5541).

(2) Upon installation use screw P/N MS24694-S48 in lieu of MS35266-63 or AN502-10-8.

j. Replace missing cable clamp rubber sleeving using insulation tape, MIL-I-46852, Type 2. Wrap a minimum 1-1/2 times to obtain required thickness.

k. Repair damaged cable or replace damaged connectors by splice repair. Serviceable connectors may be obtained from irreparable electrical cable assemblies.

(1) Splice per MIL-S-47093 ensuring original length is retained. Use splice kit MIL-S-81824.

(2) Clip excess harness cover and insulation. Seal spliced area with heat shrink tubing per MIL-I-23053 (tubing is to be slid onto cable prior to splicing). Tubing is to overlap existing cover material by one inch.

5-137. REASSEMBLY. Reassembly is not required.

5-138. FUNCTIONAL TEST. (See figures 4-19, 4-21, and 4-23.) Proceed as follows:

a. Connect electrical cable assembly to test board of test unit (LTCT-23746-01) or equivalent. (See figure 5-37.)

b. Connect test board electrical connector to receptacle 1 of test unit.

c. Connect test unit to a 110-vac external power supply.

d. Position AC power switch to ON.

e. Turn TEST SELECTION knob to LO-VOLTAGE.

f. Turn METER SELECTION knob to AUTO TEST.

NOTE

The automatic sequence of testing should begin. Amber SHORT and OPEN indicator lamps should flicker and red circuit indicator lamps should flash as analyzer moves through test cycle. If a circuit is defective, the amber OPEN or SHORT (whichever is applicable) will remain glowing and the automatic sequence will stop. The red indicator lamp will glow, identifying defective circuit.

g. Reject cable if defective.

h. Press RESET switch to advance analyzer to next circuit.

i. Turn TEST SELECTION knob to HI-VOLTAGE; then repeat preceding steps f and g.

j. Position AC POWER switch to OFF, disconnect power source, and remove cable from test board.

5-139. EXHAUST THERMOCOUPLE ASSEMBLY AND HARNESS ASSEMBLY.

5-140. DISASSEMBLY. Disassembly is not required.

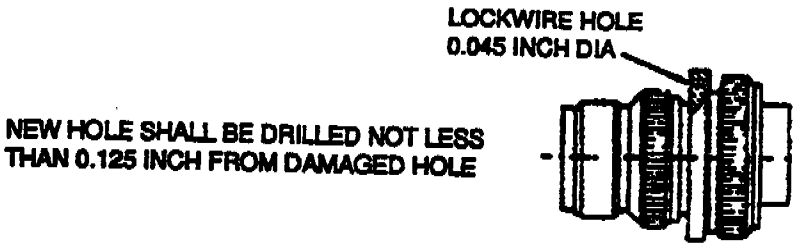


Figure 5-33. Connector Lockwire Drill Hole - Repair.

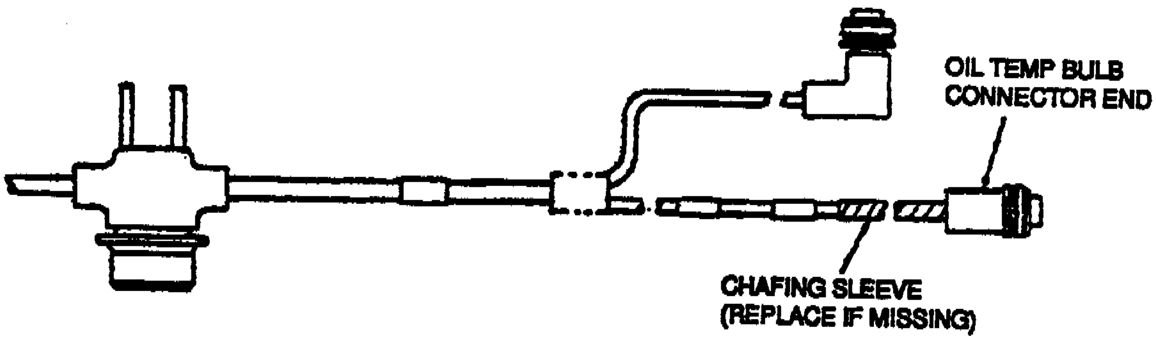


Figure 5-34. Chafing Sleeve - Installed.

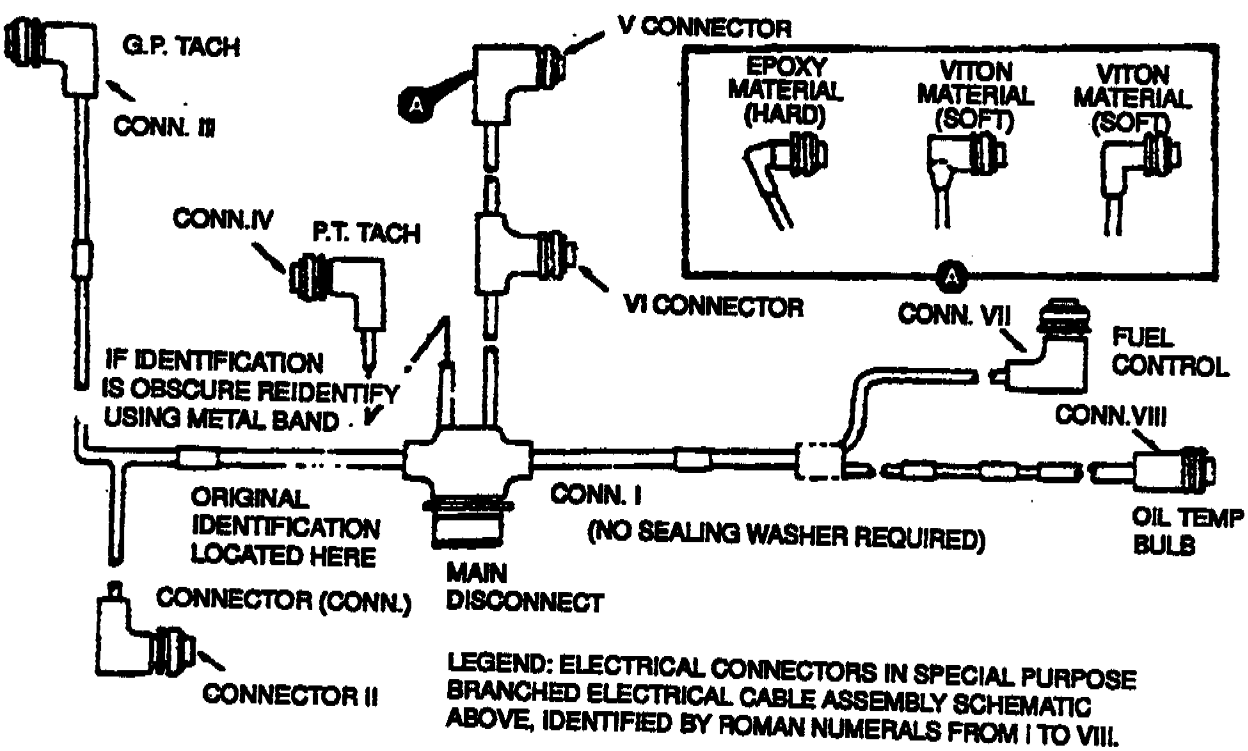


Figure 5-35. Identification of Electrical Cables (Sheet 1 of 2).

LYCOMING P/N	VENDOR P/N	
1-300-242-01	BENDIX 10-166280-4	Connector I does not require a sealing washer. Connector II, III, IV and VIII require sealing, washer P/N 10-35957-101; 1 washer per connector Connectors V, VI, and VII require sealing washer P/N 10-35957-81; 1 washer per connector. **NOTE** Sealing washer material synthetic rubber AMS 3209
1-300-242-02	COOPERATIVE INDUSTRIES 59359	Connector I does not require a sealing washer. Connectors II, III, IV and VIII require Teflon sealing washer P/N 50109; 1 washer per connector. Connectors V, VI and VII require Teflon sealing washer P/N 50107; 1 washer per connector.
1-300-242-03	BENDIX 10-321720-1	Connector I does not require a sealing washer. Connectors II, III, IV and VIII require sealing washer P/N 10-229957-101; 1 washer per connector. Connectors, V, VI and VII require sealing washer P/N 10-229957-81; 1 washer per connector. **NOTE** Seating washer material DuPont Viton or equivalent.

Figure 5-35. Identification of Electrical Cables (Sheet 2 of 2).

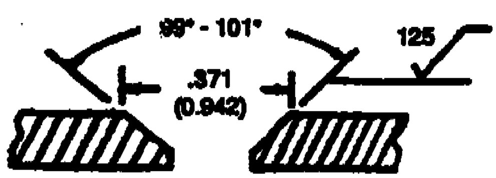


Figure 5-36. Electrical Dust Cap Rework (P/N 1-160-301-01).

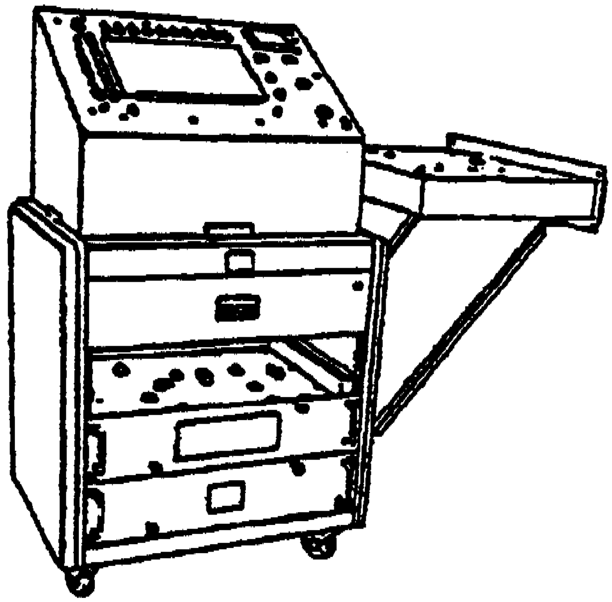


Figure 5-37. Electrical Cable Test Unit (LTCT23746-01).

5-141. CLEANING OF EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-13B, -15, -701, -701A), AND THERMOCOUPLE HARNESS ASSEMBLY (T53-L-703).

CAUTION

Do not immerse thermocouple assemblies in solvent. Solvent may cause malfunction of thermocouple probes and deterioration of electrical cable and thermocouple internal wiring.

Excessive flexing of thermocouple harness, specifically at probe locations, can lead to external breakage and shorting. Use extreme caution when handling harness. Never use pliers or other sharp objects.

a. Clean exhaust thermocouple assembly, or thermocouple harness assembly by wiping with a clean lint-free cloth slightly dampened with dry cleaning solvent (item 134, table C–1).

b. After cleaning, wipe exhaust thermocouple assembly, or thermocouple harness assembly with a clean, dry lint-free cloth to remove all residual solvent. Allow to air-dry.

5-142. INSPECTION. Perform specific inspections listed in tables 5-29 and 5-84.

5-143. REPAIR. (See figures 4-20, 4-22 and 5-135.) Proceed as follows:

a. Remove corrosion from thermocouple assembly using following procedure:

(1) Remove corrosion from plugs and threads by lightly rubbing corroded area with wire brush or crocus cloth (item 125, table C–1).

(2) Remove corrosion from pin sockets and terminals with dry cleaning solvent (item 134, table C–1).

Table 5-29. Inspection of Exhaust Thermocouple Assembly (T53-L-13B, -15, -701, -701A)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-20 -1	Exhaust Thermocouple Assembly	Visual	Cracks, chafing, fraying, or dents in probes or cables	Not allowed. Replace
4-22 -1			Damaged threads, broken pins, or cracks in insulator	Not allowed. Replace
			Corrosion on connector plugs and security of connector	Repair. (Refer to paragraph 5-143)
			Cable braid for fraying or chafing (figure 4-22, item 1). Refer to table 5-30 for limits	Repair or replace. (Refer to paragraph 5-143)
		Visual	Loose sensors or probe saddle damage (1-300-177-01 only). (Refer to figure 5-39 for limits)	Not allowed. Replace. (Refer to paragraph 5-143)
		Visual	Sensors or probes pulled out of attaching out band (1-300-177-02/03 only)	Not allowed. Replace
			Defective band between adapter body and connector	Repair. (Refer to paragraph 5-143)
		Visual	Loss or erosion of insulating material around the probe tip and through wires at the midspan junction area. (Refer to table 5-30 for limits)	Replace if limits are not met

Table 5-30. Exhaust Thermocouple Assembly Inspection Limits

DEFECT	FIGURE REFERENCE	INSPECTIONS LIMITS
Fraying or Chafing on Exhaust Thermocouple Assembly Cable Braid (figure 4-22, item 1). Refer to table 5-30 for limits	5-38	Fraying or chafing is acceptable for repair, provided that discrepant area is within limits shown in figure 5-38 and that thermocouple assembly passes functional test requirements. Repair as outlined in paragraph 5-143. If limits are exceeded, replace thermocouple assembly.
Loss or erosion of insulating material in the probe midspan junction		Thru wires may be visible. Loss of some insulating material around the individual probe thru wires is acceptable. Material loss may not exceed 3/8 inch of length per wire. Material loss may not exceed half of the circumference at any location on the probe thru wires. Thermocouple harness must pass functional test.

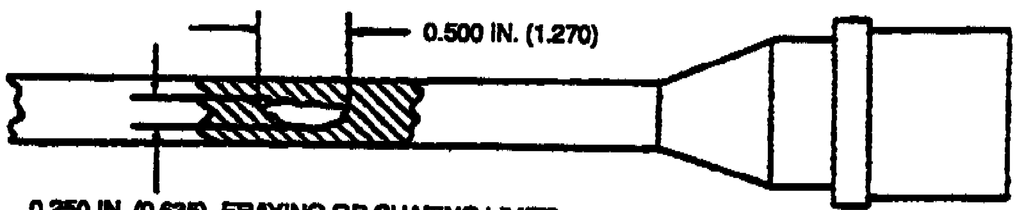


Figure 5-38. Exhaust Thermocouple Assembly Inspection.

CAUTION

To prevent possibility of short circuits, connectors shall be dried completely.

b. Repair frayed or chafed cable braid as follows:

(1) Remove projecting wire strands of braid at discrepant area.

(2) Wind lockwire (item 181 or 182, table C–1) around braid, extending wrap 3/8-inch beyond both ends of braid defect as shown in figure 5-40. Wrap to dimension noted in figure 5-40.

(3) Finish wrap with whip-finish technique by inserting wire end A through loop B. Hold end A taut while pulling end C to close loop. Release end A, and carefully pull end C until end A is anchored beneath wrapping. Remove excess wire ends. (See figure 5-40).

NOTE

Use care when pulling end C. Pull only far enough to firmly anchor end A beneath several wraps of the wire.

(4) Functional-test exhaust thermocouple assembly in accordance with paragraph 5-145.

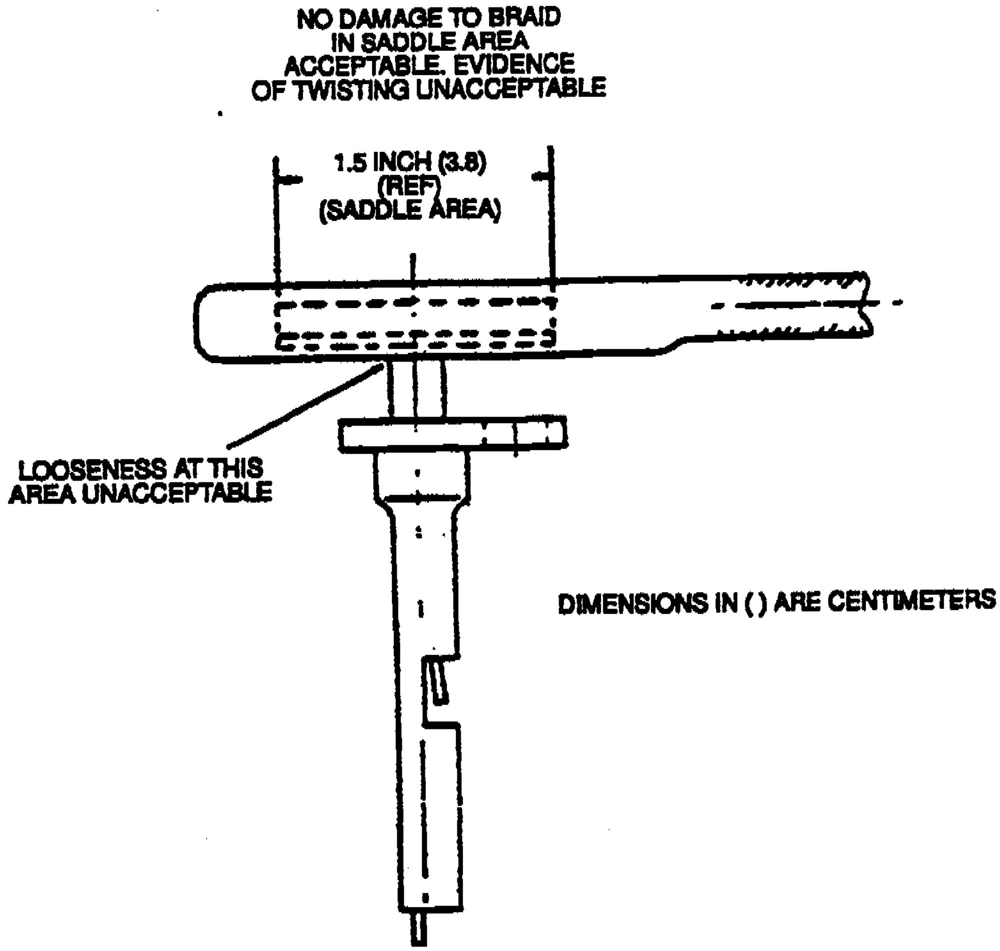


Figure 5-39. Exhaust Thermocouple Assembly Inspection Area.

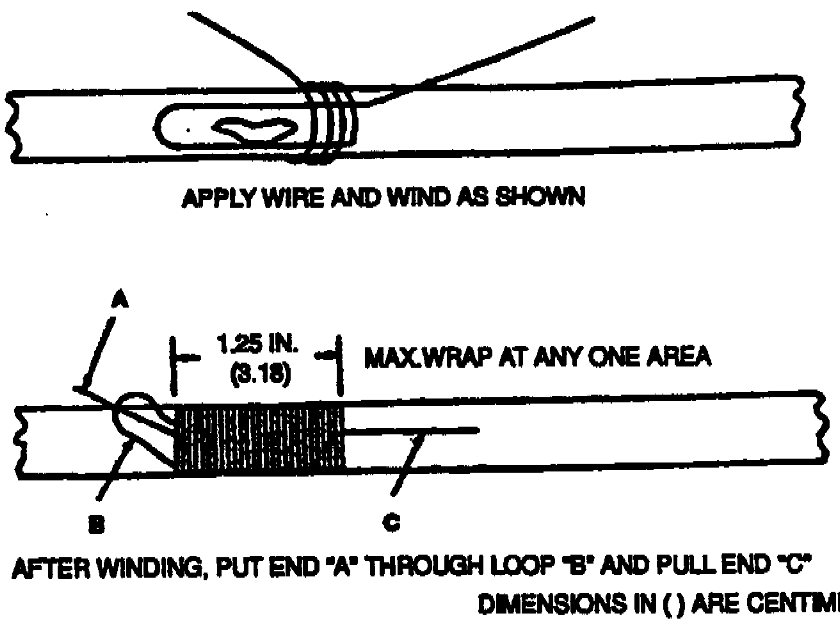


Figure 5-40. Exhaust Thermocouple Assembly Repair.

c. Repair loose sensors on exhaust thermocouple assembly (1-300-177-01) as follows:

(1) Thoroughly clean areas to be welded.

(2) Position loose sensors in original position.

(3) Using welding wire (item 347, table C–1), tack weld in accordance with SP No. 5001 in Appendix E.

(4) Perform a visual and fluorescent-penetrant inspection. Cracks are not acceptable.

(5) Functional-test thermocouple assembly in accordance with paragraphs 5-145 and 5-146.

d. Repair thermocouple adapter, that has defective bond between adapter body and connector, as follows:

(1) Using isopropyl alcohol (item 25, table C–1), remove loose film or particles around the areas to be repaired and air-dry for approximately 15 minutes.

(2) Fabricate a suitable fixture to hold connector in approximate alignment (90 degrees), not to exceed ±1/8 degree.

(3) Prepare a filling compound consisting of 60 parts of base resin compound (item 52, table C–1) to 40 parts of catalyst compound (item 81, table C–1) by weight.

(4) Pull connector to one side, and work filling compound around the connector and into the defective bond area between the molded adapter body and the connector.

(5) Place the fixture, fabricated in preceding step (2), in place and finish coating 360 degrees around the connector, layering the filling compound out onto the adapter body to reinforce the area of repair.

NOTE

A mold release compound or other suitable measures must be used to prevent the filling compound from adhering to the connector nuts.

(6) Cure adapter by baking in an oven at 240° to 260°F (116° to 127°C) for one hour or by baking with a heat lamp at 190° to 210°F (88° to 99°C) for 4 hours.

(7) Remove the fixture and inspect to be certain that the connector nuts are free and can be rotated.

e. Replace exhaust thermocouple assembly if it cannot be repaired or if it fails to meet functional test requirements.

f. Repair cuts, gouges, nicked rubber of connector (figure 5-41) by removing loose material.

(1) Feather the edges of the rubber material to the underlying metal. Clean repair area with isopropyl alcohol (item 25, table C–1) and allow 15 minutes to air-dry.

(2) Prepare epoxy casting by mixing by weight: 100 parts Stycast No. 2741 or Insulcast 174 (item 147, table C–1) 80 parts Catalyst No. 15 or Insulcure 22 (item 82, table C–1). Carefully stir epoxy casting compound and catalyst or curing agent, mixing thoroughly. Avoid entrapped air in compound.

(3) Casting compound may be slightly above or flush with adjacent surface when applied to the connector cover.

(4) Allow epoxy casting compound to cure for 24 hours.

5-144. REASSEMBLY. Reassembly is not required.

5-145. FUNCTIONAL TEST OF EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-13B, -15, -701, -701A). (See figures 4-20 and 4-22.) Proceed as follows:

CAUTION

Excessive flexing of thermocouple assembly harness, specifically at probe locations, can lead to external breakage and shorting. Use extreme caution when handling harness. Never use pliers or other sharp objects.

a. Set up exhaust thermocouple harness, for functional test as follows:

(1) If console tester (BH112JB53), or equivalent, is to be used, connect heater probe element, P/N B11734L-40, to console tester.

(2) If Jetcal analyzer, P/N BH112JB53, is to be used, connect heater probe element, P/N BH734L-40, to junctior box, P/N BH361-8. Connect junction box to Jetcal analyzer.

b. Functional-test exhaust thermocouple as follows:

(1) Connect test cable between exhaust thermocouple assembly connector and P-2 receptacle of test set. (See figure 5-42.)

(2) Connect test set to an external 110-vac, 60-cycle power source.

NOTE

Test set has no ON-OFF switch.

(3) Set SW-1 switch to RANGE position.

(4) Set SW-2 switch to EXTERNAL T/C position.

(5) Set HEATER PROBE switches 1, 2, 3, 4, 5, and 6 to on. Potentiometer window should illuminate.

(6) Set SW-1 switch to MECH. ZERO position.

(7) Adjust POTENTIOMETER knob until pointer indicates zero.

(8) Set SW-1 switch to ELEC. ZERO position.

(9) Adjust R-1 switch until pointer indicates zero.

(10) Set SW-1 switch to RANGE position.

(11) Turn TEMPERATURE REGULATOR controls 1, 2, 3, 4, 5, and 6 to 80 for warm-up.

(12) Adjust temperature control until pointer is visible.

(13) Touch EGT heater probe element No. 1 to each thermocouple individually. Galvanometer pointer should move to right on scale.

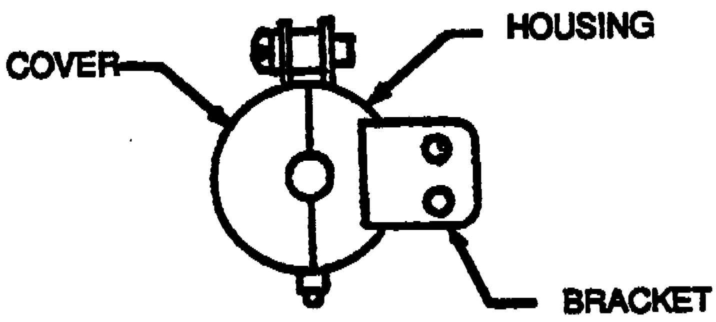


Figure 5-41. T53-L-703 Thermocouple Connector.

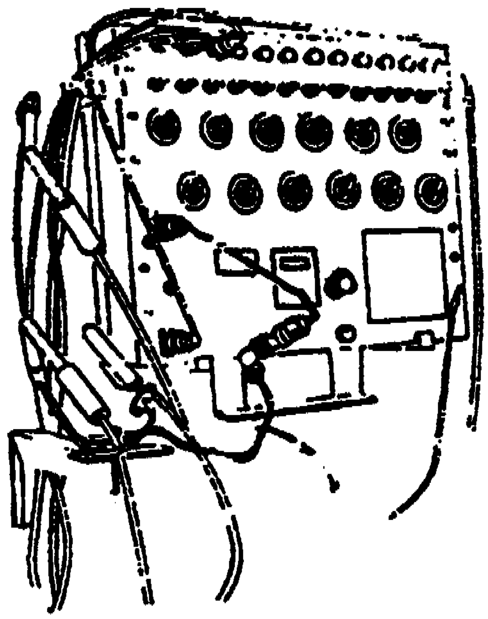


Figure 5-42. Thermocouple Analog Console Tester Heaters Attached to Thermocouple Probes.

(14) Reject exhaust thermocouple if no movement or movement to left on scale is noted.

(15) Set SW-2 switch to HEATER PROBE T/C position.

(16) Install heater probes on thermocouples.

(17) Adjust temperature recorder control for 1,094° to 1,130°F (590° to 610°C) indication in recorder window.

NOTE

After short warm-up period, pointer should become visible in illuminated potentiometer window.

(18) Set TEMPERATURE REGULATOR controls 1, 2, 3, 4, 5, and 6 and permit pointer to stabilize at temperatures obtained in preceding step (17).

(19) Adjust temperature recorder control until pointer indicates zero. Record setting of temperature recorder control.

NOTE

In following step (20), SW-2 switch is spring-loaded and must be held in desired position.

(20) Set SW-2 switch EXTERNAL T/C position. Permit pointer to stabilize.

(21) Adjust temperature recorder control until pointer indicates zero.

(22) Record setting of temperature recorder control.

NOTE

The difference between recorded settings obtained in preceding steps (19) and (22) must not exceed plus or minus 18°F (10°C).

(23) Allow exhaust thermocouple to cool to ambient temperature and connect exhaust thermocouple to test unit (LTCT317).

(24) Set MULTIPLE CIRCUIT SELECTOR switch to NORMAL position.

(25) Set TEST SELECTION switch to LO RES position.

(26) Set METER SELECTION switch to SHORT VOLTAGE position.

(27) Set METER RANGE switch to RX 100 position.

(28) Zero ohmmeter.

(29) Record resistance readings on ohmmeter.

(30) If resistance reading is below 400 ohms, indicating an internal short, one such short as detected by extremely cautious flexing of the harness probe areas is acceptable. If more than one harness area exhibits a short condition, reject exhaust thermocouple.

(31) Check 1-300-177 exhaust thermocouple assembly for continuity, using Multimeter, P/N AN/PSM6B. Resistance shall be 1.4±0.14 ohms at 68°F soak temperature (except for 1-300-177-02 which shall be as shown in figure 5-43). For other ambient temperatures, see figure 5-43. If resistance is not within limits, replace thermocouple assembly.

5-146. FUNCTIONAL TEST OF 12-PROBE THERMOCOUPLE HARNESS ASSEMBLY (T53-L-703). Proceed as follows:

a. Temperature check of thermocouple harness assembly.

(1) Connect test connector (1-300-564-01) to test unit; then install lead of thermocouple harness (21, figure 5-135) in connector and secure with two screws.

(2) Turn on test unit and connect A and B heaters, Jetcal BII7454, to 12 harness lead probes.

(3) Check accuracy of thermouples at 1,094° to 1,130°F (590° to 610°C).

NOTE

Difference between recorded settings obtained must not exceed plus or minus 11°F (6°C) for new harness or plus or minus 18°F (10°C) for used harness.

b. Insulation resistance check of thermocouple harness assembly.

(1) Using a megohmmeter and applying a 50-vdc potential, check insulation resistance between each of the four circuits and the braiding and each of the four circuits and the connectors.

(2) Minimum recorded resistance shall be 25,000 ohms when assembly is dry.

NOTE

Assembly may be oven-dried if necessary.

c. Resistance check of thermocouple harness assembly.

(1) With temperature stabilized at 65° to 75°F (18° to 24°C), use an ohmmeter to check resistance between alumel and chromel circuits (A, B, and C).

(2) Resistance through each circuit shall be 2.10 to 2.40 ohms.

d. Individual thermocouple heat check.

(1) Connect suitable millivolt readout to appropriate output connections.

(2) Heat individual probes and check millivolt readout for indicator movement.

NOTE

All heated probes should affect readout of indicator.

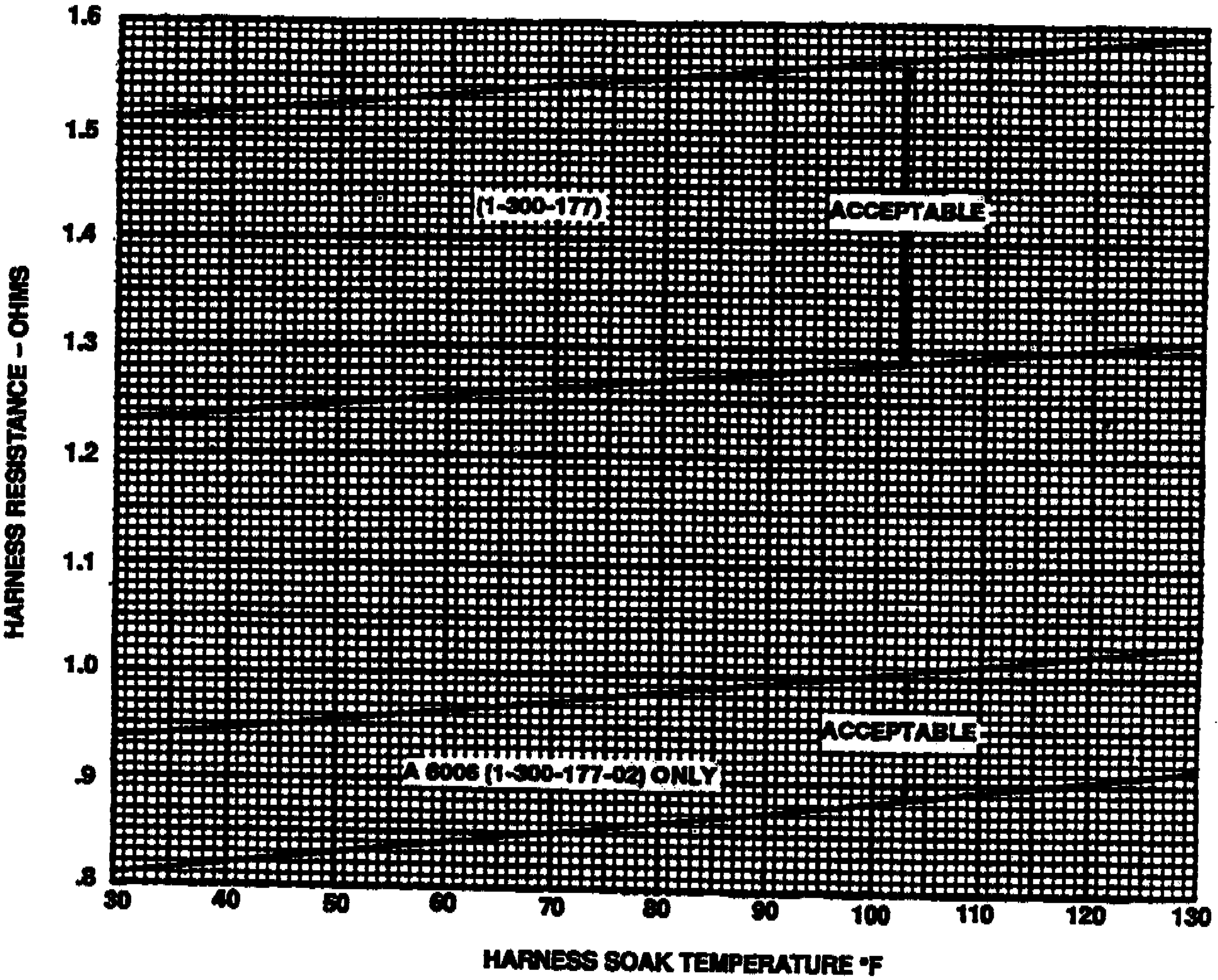


Figure 5-43. Harness Soak Temperature Versus Resistance.

e. Resistance check of connector.

(1) Using a megohmmeter and applying a 50-vdc potential, check connector insulation resistance between contacts (V-shaped alumel) A to B; then A to C.

(2) Repeat resistance check between contacts B and C.

(3) Minimum recorded resistance shall be 25,000 ohms when connector is dry.

NOTE

Connector may be oven-dried if necessary.

f. Continuity check of connector.

(1) Using a volt ohmmeter, check continuity between connector receptacle pin D to chromel V-shaped contact A.

(2) Repeat preceding step (1) between connector receptacle pin A to alumel V-shaped contact A; pin E to chromel V-shaped contact B; pin B to alumel V-shaped contact B; pin F to chromel V-shaped contact C: Pin C to alumel V-shaped contact C.

g. Resistance check of thermocouple lead assembly.

(1) Connect a short length of wire across output connector sockets.

(2) Using a digital readout, check resistance between input connector circuit A and DEF; B and DEF, and C and DEF.

(3) Resistance shall be 0.70 to 0.80 ohms at 65° to 75°F (18° to 24°C).

h. Insulation resistance check of thermocouple lead assembly.

(1) Apply 50-vdc potential between the chromel and alumel contacts.

(2) Using a megohmmeter, check that minimum recorded resistance is 25,000 ohms when lead assembly is dry.

NOTE

Lead assembly may be oven-dried if necessary.

i. If limits given cannot be met, replace affected unit.

5-147. HOT AIR SOLENOID VALVE.

5-148. DISASSEMBLY. If functional test indicates overhaul is required, disassemble the hot-air solenoid valve as outlined in DMWR 55-2840-223.

5-149. CLEANING. Proceed as follows:

a. Mask electrical terminal ends as well as inlet and outlet ports of the hot-air solenoid valve assembly (2, figure 4-24).

(1) Clean solenoid valve by wiping with a clean cloth dampened with dry cleaning solvent (item 134, table C–1). Use a clean dry cloth to remove residual solvent. Allow to air dry.

(2) If corrosion (in the form of rust) is present, clean as follows:

(a) Clean solenoid valve by dry cleaning solvent method (Refer to SP No. 3002 in Appendix E).

(b) Remove solenoid from hot-air solenoid valve assembly.

(c) Mask all valve openings.

(d) Dry blast valve with glass bead abrasive (item 4, table C–1) with a maximum air pressure of 40 psi. Remove all residue.

CAUTION

Do not soak the solenoid in the rust remover solution as this will damage the electrical components.

(e) Immerse the valve in a rust remover solution (item 321, table C–1) for a minimum time of 30 minutes. Remove from the bath. Rinse with hot water and air dry.

b. Clean air regulator tube (4) by dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

5-150. INSPECTION OF HOT-AIR SOLENOID VALVE AND AIR REGULATOR TUBE. Perform specific inspections listed in table 5-31.

5-151. REPAIR OF HOT-AIR SOLENOID VALVE AND AIR REGULATOR TUBE. (See figure 4-24.) Proceed as follows:

a. For repair procedures, refer to DMWR 55-2840-223.

b. If valve cannot be identified due to missing or mutilated data plate, proceed as follows:

(1) Determine proper identification and flow direction. (See figure 5-44).

(2) Using vibropeen etching tool, identify valve. (See figure 5-44).

NOTE

Depth of marking shall be within 0.001 to 0.006 inch (0.003 to 0.015 cm).

(3) Using vibropeen etching tool, etch an arrow to indicate flow direction. (See figure 5-44.)

NOTE

Depth of marking shall be 0.001 to 0.006 inch (0.003 to 0.015 cm). Loss of serial number does not constitute cause for rejection. New serial number not required.

c. Repair air regulator tube as follows:

(1) Minor scratches of anodized surface may be treated with chemical film (item 85, table C–1).

(2) Repair greater damage over extensive area of the part (by scratching or corrosion) by stripping, reanodizing, and sealing per Military Specification MIL-A-8625, Type I.

NOTE

Painting of tube is not required.

5-152. REASSEMBLY OF HOT-AIR SOLENOID VALVE AND AIR REGULATOR TUBE. Reassemble hot-air solenoid valve as outlined in DMWR 55-2840-223.

5-153. FUNCTIONAL TEST OF HOT-AIR SOLENOID VALVE. (See figure 4-24.) Proceed as follows:

a. Mount and secure hot-air solenoid valve in piping of test stand (LTCT316), or equivalent. (See figure 5-45.)

b. Connect electrical plug from HOT AIR VALVE receptacle on test stand to electrical receptacle on hot-air solenoid valve and adjust voltage selector knob on test stand to 24 volts dc at ambient temperature.

c. Turn TEST VALVE SYSTEM PRESSURE REGULATOR valve until TEST VALVE SYSTEM PRESSURE gage indicates 55 to 65 psi (3866. 9 to 4569.9 gm sq cm).

Table 5-31. Inspection of Hot-Air Solenoid Valve and Air Regulator Tube.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-24				
-2	Hot-Air Solenoid Valve	Visual	Cracks in valve housing or mounting flange	Repair. (Refer to DMWR 55-2840-223)
			Damaged threads	Repair. (Refer to DMWR 55-2840-223)
			Bent or broken pins in connector	Repair. (Refer to DMWR 55-2840-223)
			Cracked or damaged insulation connector	Repair. (Refer to DMWR 55-2840-223)
			Missing or mutilated data plate	Repair. (Refer to paragraph 5-151)
-4	Air Regulator Tube	Visual	Cracks or dents in tube	Not allowed. Replace
			Scratches through coating or evidence of corrosion of parent metal through coating	Minor scratches or evidence of corrosion may be repaired as outlined in paragraph 5-151

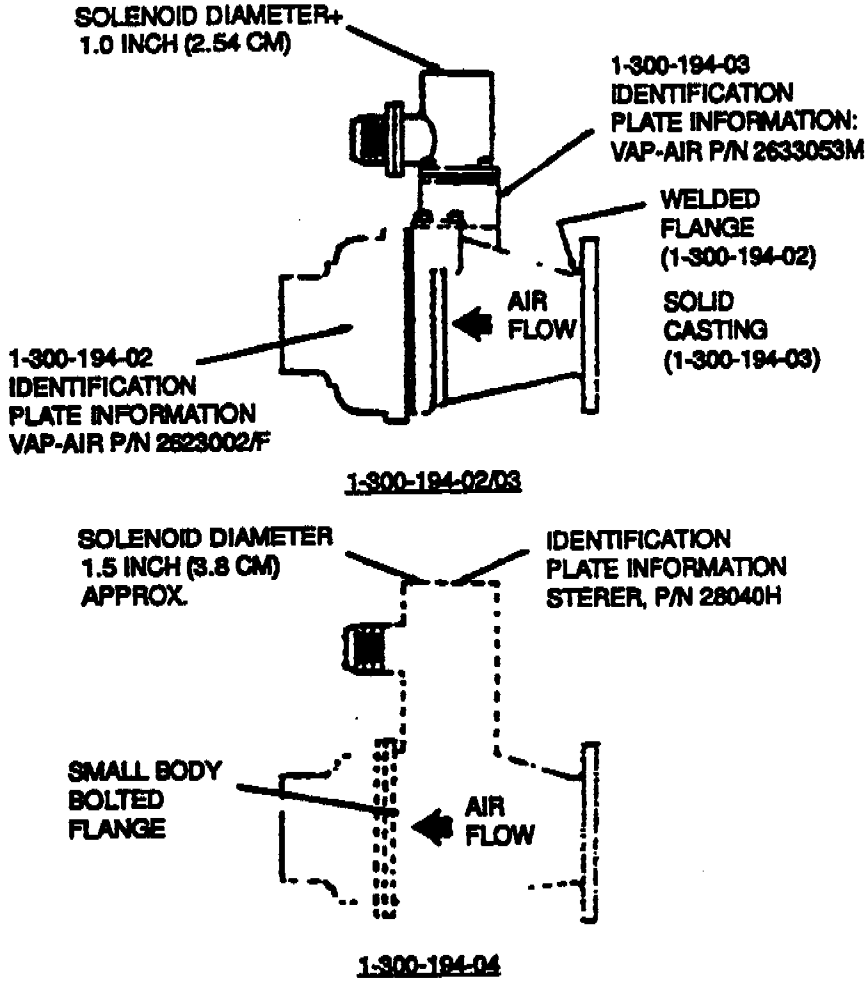


Figure 5-44. Hot-Air Solenoid Valve Identification.

d. Turn TEST VALVE INLET CONTROL valve until TEST VALVE INLET PRESSURE gage indicates 4 psi (281. 2 gm sq cm).

e. Actuate HOT AIR VALVE switch four times, each time checking amperage on AMMETER DETECTOR/HOT AIR VALVE gage. Amperage readings shall not exceed one ampere.

f. Turn TEST VALVE INLET CONTROL valve until TEST VALVE INLET PRESSURE gage indicates 9. 5 to 10.5 psi (667.9 to 738.2 gm sq cm). Check that TEST VALVE OUTLET PRESSURE gage indicates 5.5 psi (386.7 gm sq cm) minimum.

g. Check that air flow is 0.13 pound per second minimum. Read air flow on ORIFICE DIFFERENTIAL PRESSURE gage.

h. Actuate HOT AIR VALVE switch once, and observe that amperage on AM-METER DETECTOR/HOT AIR VALVE gage does not exceed one ampere.

i. Turn TEST VALVE INLET CONTROL valve until TEST VALVE INLET PRESSURE gage indicates 19.5 to 20.5 psi (1371.0 to 1441.3 gm sq cm). Check that TEST VALVE OUTLET PRESSURE gage indicates 13.5 psi (949.1 gm sq cm) minimum.

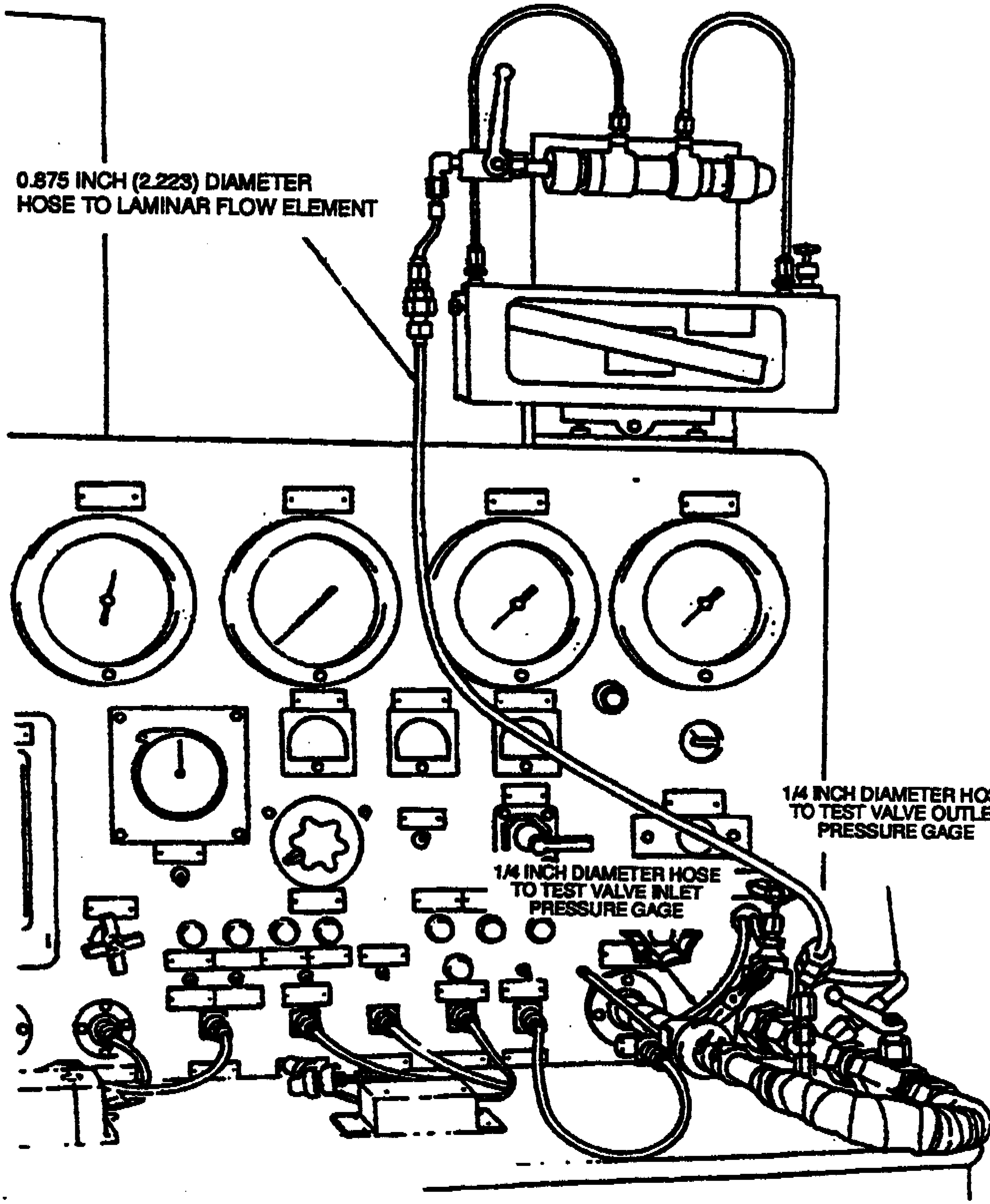


Figure 5-45. Hot-Air Solenoid Valve Test Connections.

j. Check that airflow is 0.21 pound per second minimum. Read air flow on ORIFICE DIFFERENTIAL PRESSURE gage.

k. Actuate HOT AIR VALVE switch once and observe that amperage on AMMETER DETECTOR/HOT AIR VALVE gage does not exceed one ampere.

l. If limits cannot be met, reject hot-air solenoid valve.

SECTION V. FUEL CONTROL

5-154. FUEL CONTROL. Disassemble as follows:

a. Disassembly of Fuel Control (T53-L-13B, -703). Proceed as follows:

(1) Loosen nut (2, figure 5-46) and remove elbow (1) and packing (3) from fuel control (6).

(2) Remove unions (4), packing (5), and packings (3).

NOTE

Do not remove the packings from the temperature-sensing element.

(3) If functional test indicates overhaul is required, further disassembly of the fuel control is given in DMWR 55-2915-335.

b. Disassembly of Fuel Control (T53-L-15, -701, -701A). Proceed as follows:

(1) Loosen nut (4, figure 5-47) and remove elbow (3) and packing (5) from fuel control (8).

(2) Remove reducer (1) and packing (2).

(3) Remove unions (6), packing (5), and packing (7).

NOTE

Do not remove the packings from the temperature-sensing element.

(4) If required, further disassembly and complete overhaul of fuel control is given in DMWR 55-2915-322.

5-155. CLEANING. Inspect all surfaces of the fuel control to determine which of the following cleaning methods is applicable.

a. For routine cleaning, proceed as follows:

(1) Cap or plug all open ports and cover all other openings with suitable closures to prevent any dirt, grime, or other foreign material from getting inside the fuel control.

(2) Thoroughly clean exterior surfaces of the fuel control with dry cleaning solvent (item 134, table C-1), using a soft brush or cotton wiping rag as necessary to ensure thorough cleanliness.

(3) Allow the fuel control to air dry. Remove all closures.

b. For a heavy accumulation of rust preventive compound or grease, clean with an emulsified mixture followed by steam cleaning, as follows:

(1) Cap, plug and seal all openings.

CAUTION

Make sure all openings in the fuel control components are sealed to prevent steam compound/water mixture from entering the interior of these components during the steam cleaning operation. To obtain the best seals, use common AN fitting connectors with preformed packings and caps.

(2) Mix the emulsified mixture by combining two parts of cleaning compound (item 97, table C-1) and one part of dry cleaning solvent (item 134, table C-1).

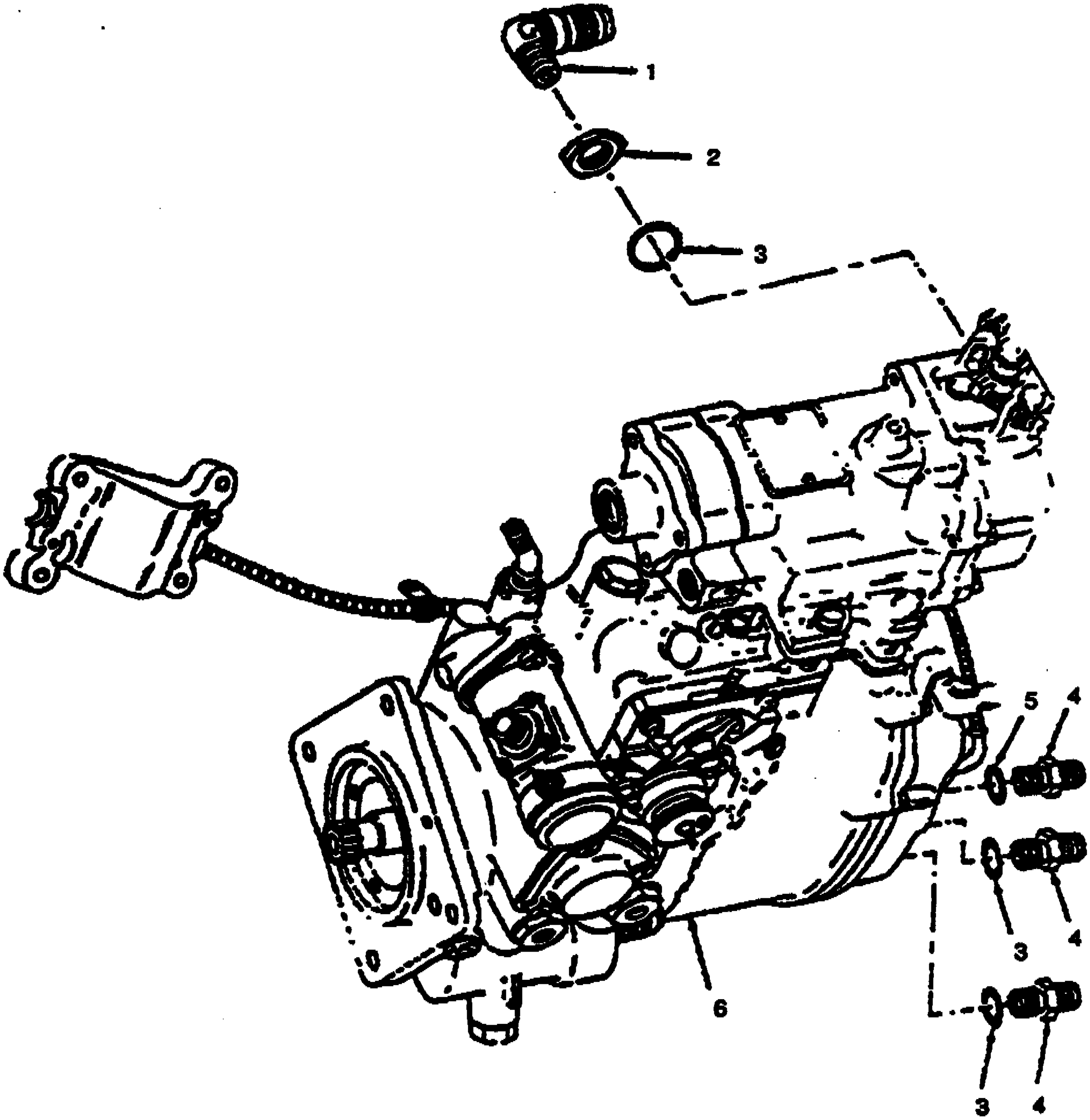


Figure 5-46. Fuel Control (T53-L-13B, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-46	No Number	FUEL CONTROL AND RELATED PARTS (NHA 1-170-330-13 and 1-170-330-21)	Ref	A, B
-1	AN833-4C	. ELBOW, Flared tube	1	A, B
-2	AN924-4C	. NUT, Flared tube	1	A, B
-3	MS29512-04	. PACKING, fuel resistant (Replace with M83248/1-904	2	A, B
	M83248/1-904	. PACKING	2	A,B
-4	AN815-4D	. UNION, Flared tube (Replace with MS24392J4)	1	A, B
	MS24392J4	. TUBE, Nipple	3	A, B
-5	STD3017E4	. PACKING (Replace with M83248/1-904)	1	A, B
	M83248/1-904	. PACKING	1	A,B
-6	84200A1	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A2)	1	A, B
	84200A2	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A3)	1	A, B
	84200A3	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A4)	1	A, B
	84200A4	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A5)	1	A, B
	84200A5	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A6)	1	A, B
	84200A6	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-12) (Replace with 84200A7)	1	C
	84200A7	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-47) (Replace with 100770A4)	1	A, B
	100770A4	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-60) (Replace with 106500A1)	1	A, B
	106500A1	. REGULATOR, Main (11599) (Lycoming Part No. 1-170-240-91)	1	A, B

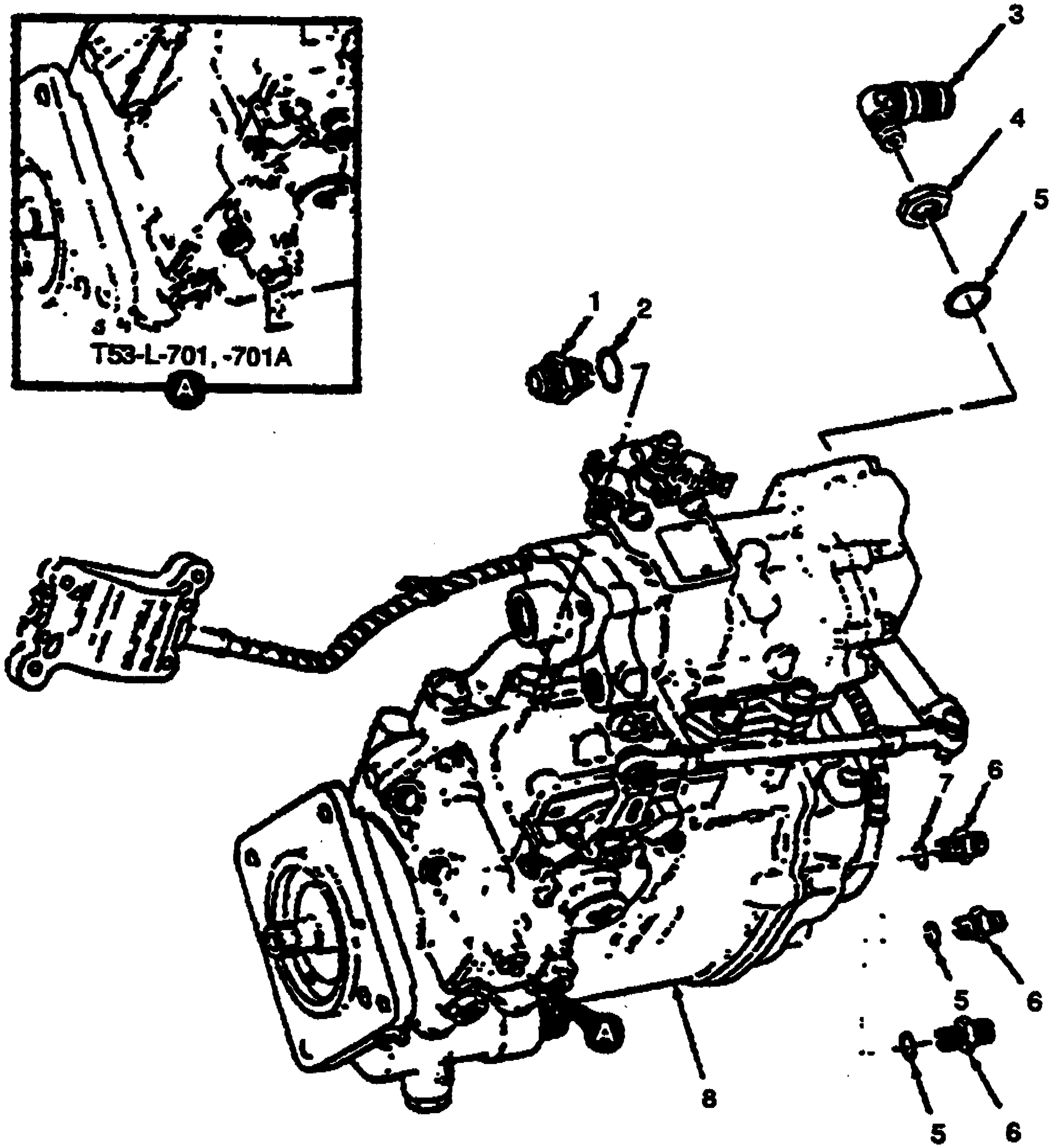


Figure 5-47. Fuel Control (T53-L-15, -701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-47	No Number	FUEL CONTROL AND RELATED PARTS (NHA 1-170-330-06)	Ref	C
		FUEL CONTROL AND RELATED PARTS (NHA 1-170-330-09)	Ref	D,E
-1	AN919-2C	. REDUCER	1	C,D,E
-2	MS29512-3	. PACKING	1	C,D,E
-3	AN833-4C	. ELBOW, Flared tube	1	C,D,E
-4	AN924-4C	. NUT, Flared tube	1	C,D,E
-5	M83248/1-904	. PACKING, fuel-resistant	2	C,D,E
-6	MS24392J4	. UNION, Flared tube	1	C,D,E
-7	M83248/1-904	. PACKING	1	C,D,E
-8	98500-A1	. REGULATOR, Main fuel (11599)(Lycoming Part No. 1-170-240-30)(Replace with 98500-A2)	1	D,E
	98500-A2	. REGULATOR, Main fuel (11599)(Lycoming Part No. 1-170-240-49)	1	D,E
	92700-A1	. REGULATOR, Main fuel (11599)(Lycoming Part No. 1-170-240-17)(Replace with 92700-A2)	1	C
	92700-A2	. REGULATOR, Main fuel (11599)(Lycoming Part No. 1-170-240-25)(Replace with 92700-A3)	1	C
	92700-A3	. REGULATOR, Main fuel (11599)(Lycoming Part No. 1-170-240-25)(Replace with 92700-A5)	1	C
	92700-A4	. REGULATOR, Main fuel (11599)(Lycoming Part No. 1-170-240-48)	1	C
	92700-A5	. REGULATOR, Main fuel (11599)	1	C
	106000A1	. REGULATOR, Main fuel (11599)(Lycoming Part No. 1-170-240-88)	1	D,E

(3) Apply the emulsified mixture to all external surfaces of the fuel control. Leave the mixture on the surfaces for 15 minutes. Wipe off the mixture.

(4) Mix one and one-half quarts of steam cleaning compound (item 115, table C–1) with fifty gallons of water (a mixing ratio of 0.75 per cent by volume). Adjust the concentrate metering device to obtain the desired results.

(5) Using 40 to 50 PSI of steam pressure, maintain a steam temperature of 220° to 240°F. With a steam gun, direct the steam mixture to all external surfaces of the fuel control. Using clean compressed air, dry the fuel control, making sure that all moisture is removed from around fittings or from recessed areas. Remove all closures.

5-156. INSPECTION. Perform specific inspections listed in table 5-32.

5-157. REPAIR. (See figures 4-25 and 4-26.) Proceed as follows:

a. For repair procedures for fuel control, refer to DMWR 55-2915-322 and DMWR 55-2915-335 and following steps b and c.

b. Repair nut (10) as follows:

(1) Blend-repair nicks, burns, and scratches as outlined in SP No. 5000 in Appendix E. If, during repair, surface coating has been disturbed, repair as outlined in SP No. 6003 in Appendix E.

(2) Repair damaged threads as outlined in SP No. 5007 in Appendix E.

(3) Repair damaged surface coating as outlined in SP No. 6003 in Appendix E.

c. Replace all other defective parts.

5-158. TIME CODING OF MAIN BELLOWS ASSEMBLY. Main bellows (P/N 74865) shall be time coded as follows: on new bellows, vibropeen "M-Date of Installation" and on used bellows, mark "X-Date of Installation" as shown on figure 5-48.

5-159. REASSEMBLY. Reassembly as follows:

a. Reassembly of Fuel Control (T53-L-13B, -703). Proceed as follows:

CAUTION

In following step (1), position temperature-sensing element in housing so that the bend in the forward vanes is toward the bottom of lower housing (16, figure 4-25) and away from fuel regulator (22). Fuel control will not operate properly if installation is incorrect.

NOTE

Reassemble fuel control in accordance with DMWR 55-2915-335 and as follows:

(1) Position upper housing (17) and lower housing (16) together and secure with screws (28) and washers (29). Ensure that temperature-sensing element packings are properly positioned in housings (16 and 17).

(2) Position packing (5, figure 5-46) on union (4) and packings (3) on two unions (4). Thread unions into fuel control.

(3) Install packing (3), nut (2), and elbow (1) on fuel regulator (1, figure 4-25).

Figure 5-48. Time Coding of Main Bellows.

Table 5-32. Inspection of Fuel Control

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-25 and 4-26				
-5	Clamps	Visual	Worn or damaged cushion	Not allowed. Replace
-7	Air Pressure-Sensing Hose Assembly	Visual	Chafing or fraying	Not allowed. Replace
			Cracks or grooves on flared end fittings	Not allowed. Replace
			Crossed on stripped threads on fittings	Not allowed. Replace
			Kinks	Not allowed. Replace
			Clogged or foreign material in hose ID	Pressure-flush hose assembly with dry cleaning solvent (item 134, table C–1)
4-25 and 4-26	Main Bellows Assembly P/N 74865	Visual	Missing fin	One-half (1/2) of a fin may be missing, a total of two (2) missing half fins is acceptable
		Visual	Dents, holes, corrosion, pitting, handling damage	No damage allowed. Replace
			Exceeding time code	If "X" date is surpassed by two years, or M date is surpassed by four years, bellows is not acceptable for use. Refer to paragraph 5-158
-10	Nut	Visual	Nicks, burrs, scratches, damaged threads, or damaged surface coating	Repair. (Refer to paragraph 5-157)
			Cracks	Not allowed. Replace
-11	Shaft	Visual	Damaged surface coating	Repair (Refer to SP No. 6003 in Appendix E)
		SIE and Visual	Worn or Damaged Splines	Replace if limits are exceeded (Refer to SP No 3009 in Appendix E)
		Visual and Magnetic-Particle. (Refer to table 5-33)	Cracks	Not allowed. Replace
-14	Tube	Visual	Cracks, dents, or distortion	Not allowed

Table 5-32. Inspection of Fuel Control. (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-25 -16 4-26 -22	Lower Housing	Visual	Cracks	Refer to table 5-34
4-25 -17 4-26 -23	Upper Housing	Visual	Cracks	Refer to table 5-34
5-46 -6	Fuel Control	Visual and Test Stand	Possible overhaul	Determine if fuel control requires overhaul. If it is not indicated, perform functional check as out-lined in paragraph 5-160 or in accordance with instructions in DMWR 55-2915-322 and DMWR 55-2915-331 for T53-L-15, -701, 701A, and DMWR 55-2915-335 and DMWR 55-2915-331for T53-L-703 and -13B If functional check fails, replace

Table 5-33. Magnetic-Partical Inspection of Fuel Control.

Figure & Index No.	Nomenclature	Method of Magnetization
4-25 and 4-26 -11	Shaft	Circular, use direct contact at 800 amperes. Longitudinal at 4000 ampere-turns.

Table 5-34. Fuel Control and Related Parts Inspection Limits.

DEFECT	FIGURE REFERENCE	INSPECTIONS LIMITS
Cracks in Lower housing P/N 1-170-120-01	5-49	a. Cracks in insert area (see figure 5-49) (1) Two cracks per insert area (2) Cracks shall not be on same side (3) Total of four cracks per housing b. Reject housing if above limits are exceeded
Cracks in Upper housing P/N 1-160-446-03	5-49	a. Cracks as shown in figure 5-49 (1) One crack per end (2) Total of two cracks per housing b. Reject housing if above limits are exceeded

b. Reassembly of Fuel Control (T53-L-15, -701, -701A). Proceed as follows:

CAUTION

In following step (1), position temperature-sensing element in housing so that the bend in the forward vanes is toward the bottom of lower housing (22, figure 4-26) and away from fuel regulator. Fuel control will not operate properly if installation is incorrect.

NOTE

Reassemble fuel control in accordance with DMWR 55-2915-322 and as follows:

(1) Position upper housing (23) and lower housing (22) together and secure with screws (25) and washers (24). Ensure that temperature-sensing element packings are properly positioned in housings (22 and 23).

(2) Position packing (7, figure 5-47) on union (6), packings (5), and nuts (4) on unions (6). Thread unions into fuel control.

(3) Retaining nuts P/N AN320C3, shall be installed finger-tight on clevis attaching bolts, P/N AN23-12 and -13. Do not tighten against clevis. After tightening nut finger-tight, back off to nearest alignment for installation of cotter pin. Bolt shall be free to turn. Slight end play is permitted. (See figure 5-50.)

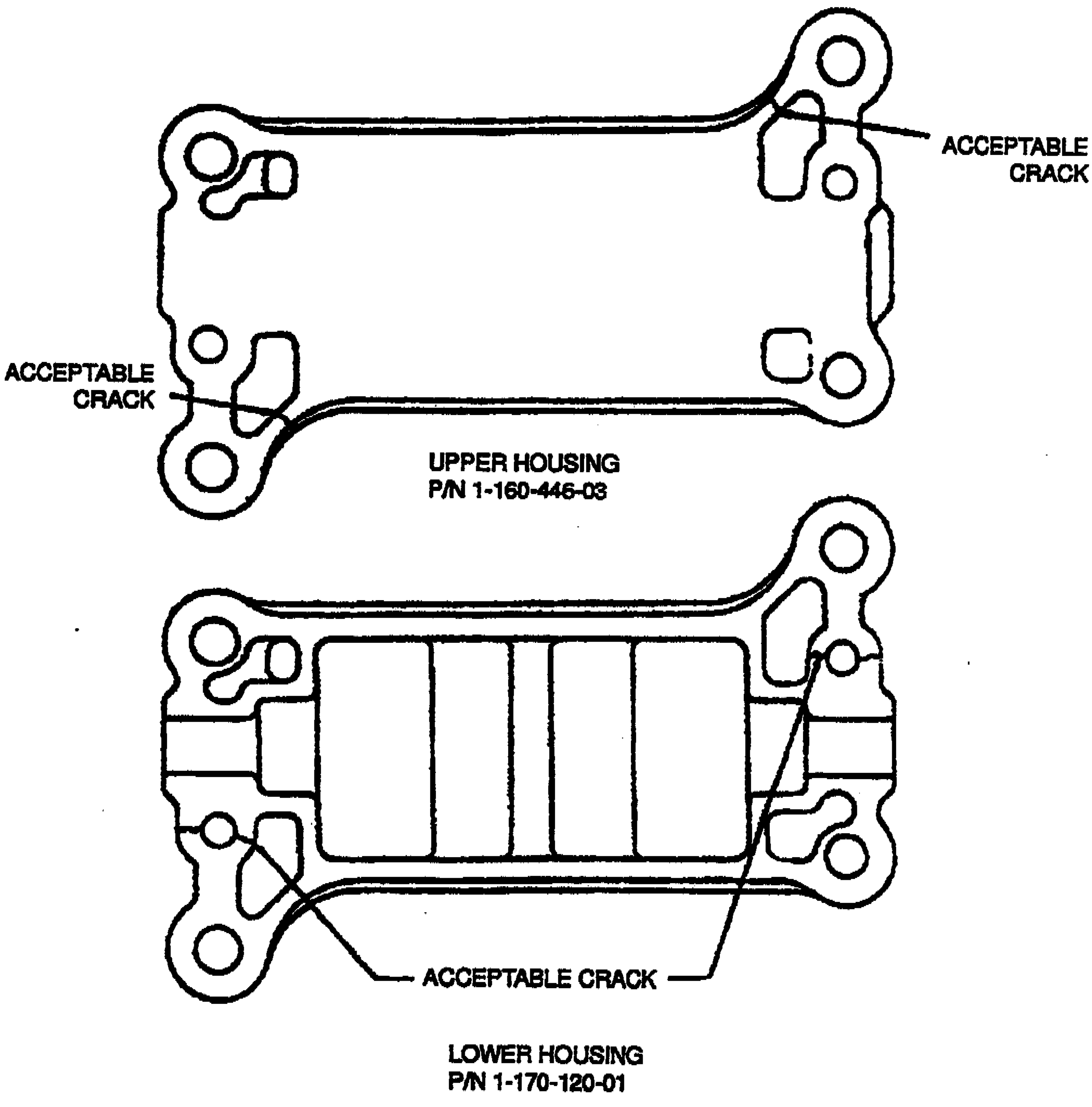


Figure 5-49. Crack Limits.

WARNING

FLIGHT SAFETY PART

Functional test is flight safety critical.

5-160. FUNCTIONAL TEST. (See figures 4-25 and 4-26.) Proceed as follows:

a. Perform functional test on T53-L-701 and -701A fuel control as follows:

NOTE

In the following test procedures, approach all speeds in the increasing direction, except during the deceleration test, N_1 and N_2 speed droop tests, and during the hysteresis checks. Utilize all tolerances given before attempting to adjust the fuel control. If adjustments are to be made, the original readings and the adjustment and readings after adjustments must be recorded.

(1) Remove fuel control from its shipping container.

(2) Cut lockwire and remove screw and washer located adjacent to N_1 lever stop.

(3) Install and secure spacer (LTCT407-3) and spline quadrant (LTCT407-7) to N_1 power lever hub. Using a 3/16-inch allen wrench, secure quadrant to N_1 power lever hub.

NOTE

Set quadrant by locating power lever pointer in dwell, which is at 38 degrees. Adjust quadrant, as necessary.

(4) Using screw (LTCT407-4), secure quadrant to spacer.

(5) Remove shipping caps and plugs from the following fuel control (or fuel regulator) ports: No. 1 and 2 pump, N_1 face seal drain, air-bleed, fuel inlet pressure, and overspeed governor bleed.

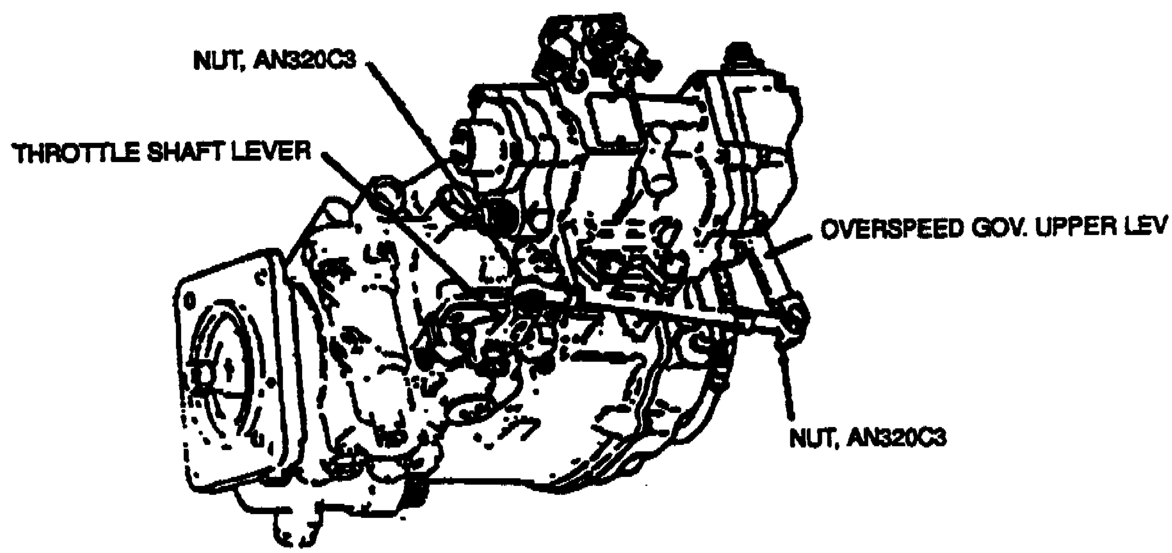


Figure 5-50. Overspeed Governor to Throttle Shaft Lever Installation.

(6) Install unions, MS24392-4, in the following ports; No. 1 and 2 pump, N_1 face seal drain, air-bleed, fuel inlet pressure, variable inlet guide vane pressure, and P_1.

(7) Install elbow, MS24401-4, in overspeed governor bleed port.

(8) Install reducer, AN912-2, in overspeed governor and seal drain port.

(9) Using plastic cap, cap fuel inlet port.

(10) Remove four nuts and washers that secure fuel control to mounting board. Remove fuel control.

(11) Install fuel control on mounting pads of test stand (LTCT319) and secure with four nuts and washers.

NOTE

To prevent damage, care shall be taken to mesh splines of test stand drive with splines of fuel control.

(12) Connect hoses from test stand to fuel control as follows:

NOTE

Hose length shall be as short as practical.

(a) Connect a No. 10 (5/8-inch diameter) hose from PB (FLOW) port on test stand to fuel port of fuel control.

(b) Connect the No. 6 (3/8-inch diameter) hose from PN (FLOW) port on test stand to tee.

(c) Connect No. 4 (1/4-inch diameter) hose from tee to 91 port on stand.

(d) Connect No. 6 (3/8-inch diameter) hose from tee to control discharge port of fuel control.

(e) Connect the No. 4 (1/4-inch diameter) hose from IGN. (FLOW) port on test stand to IGN. discharge port of fuel control.

(f) Connect No. 4 (1/4-inch diameter) hose from 64 PB port on test stand to inlet pressure tap port of fuel control.

(g) Connect No. 4 (1/4-inch diameter) hose from PFE port of test stand to No. 1 pump of fuel control.

(h) Connect No. 4 (1/4-inch diameter) hose from PF port on test stand on No. 2 pump port of fuel control.

(i) Connect 1/4-inch diameter plastic hose from 17 P_1 port on test stand to P_1 AIR port on fuel control.

(j) Connect No. 4 (1/4-inch diameter) hose to overboard bleed (overspeed governor bleed) port on fuel control.

(k) Connect No. 6 (3/8-inch diameter) hose from 74 PUMP BYPASS port on test stand to bypass fuel filter.

(l) Turn heating and refrigeration unit on. Install T_1 temperature-sensing bellows in heating and refrigeration unit of test stand.

(m) Press STAND POWER, N_1, N_2, MG start buttons.

(n) Maintain T_1 inlet temperature at 59°F (15°C) by adjusting temperature knobs on heating and refrigeration unit, and fuel temperature at 75°F (24°C) by turning TEMP. CONT. FUEL knob to desired temperatures. Check temperature of fuel and T_1 by pressing button on temperature readout instrument.

NOTE

Check fuel and T_1 temperature periodically during test.

(o) Press BOOST PUMP start button and check that fuel drains from overspeed governor bleed port. Press VAC. PUMP START button.

(p) Turn PB REG. knob until FUEL INLET PRESSURE gage indicates 4 psi (281.2 gm sq cm).

(q) Check atmospheric pressure. If atmospheric pressure differs from the standard sea level pressure (29.92 inches Hg), compensate for the difference as follows:

NOTE

Check barometric pressure every 2 hours and compensate for difference.

1 Subtract actual pressure (if less than standard pressure) from standard pressure or subtract standard pressure (if less than actual pressure) from actual pressure.

2 If actual barometric pressure was less than standard barometric pressure, turn P_1 PR. REG. knob so that result in preceding step 1 is indicated on plus side of P_1 pressure gage zero mark. If actual barometric pressure is greater than standard barometric pressure, turn P_1 PR. REG. knob so the result obtained in step 1 is indicated on minus side of P_1 pressure gage zero mark.

(r) Press N_1 DRIVE start button; then turn N_1 SPEED CONTROL knob at any speed to allow fluid to flow, thereby bleeding the system.

(s) Turn N_1 SPEED CONTROL knob until 600 phr fuel flow is indicated on MAIN FUEL DISCHARGE gage, and adjust valve at PN (FLOW) port on test stand until No.2 CONTROL DISCHARGE PRESS gage indicates 180 to 200 psi (12655.3 to 15467.5 gm sq cm).

(t) For all calibration and cycling tests, the following fixed variable shall be maintained unless otherwise specified.

1 Position the emergency switch over valve in the automatic position.

2 Fuel inlet temperature shall range from 65° to 85°F (18° to 29°C).

3 Fuel pressure at fuel control (or fuel regulator) inlet shall range from 2 to 6 psig (140.6 to 421.8 gm sq cm).

4 Fuel discharge pressure shall be set to provide 180 to 200 psi (12655.3 to 15467.5 gm sq cm) at flow rate of 600 phr.

5 Igniter line shall be closed.

6 P_1 air pressure shall be set at 29.82 to 30.02 inches Hg absolute.

7 T_1 bath temperature shall be within 56° to 62°F (13° to 17°C).

8 N_2 drive shall not be running.

9 Quadrant tolerance shall be plus or minus 0.5 degrees.

10 Temperature tolerance shall be plus or minus 3 degrees.

11 Condition lever shall be set at 20 to 90 degrees.

12 N_1 tolerance shall be plus or minus 4 rpm.

13 Controls may be tested with or without N_2 overspeed governor installed.

14 Minimum inlet guide vane lever position shall be set at 49 to 51 degrees.

(u) For all calibration tests, the following data shall be recorded unless otherwise specified:

1 N_1 speed in rpm.

2 Fuel flow rate at discharge.

3 Data of last calibration and serial number of test stand.

4 All unusual behavior or instability.

(13) High-pressure relief valve test of fuel control.

(a) Set N_1 power lever at 100 degrees, plus or minus 0.5 degrees.

(b) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,500 plus or minus 20 rpm.

(c) Slowly close valve at PN (FLOW) port on test stand until fuel flow drops approximately 25 phr. Read fuel flow on MAIN FUEL DISCHARGE gage. Record 1 and 2 PUMP DISCHARGE gage readings. Readings shall be 800 to 900 psi (56245.6 to 63276.3 gm sq cm).

(d) If relief valve pressure is too high, remove necessary amount of shims from high-pressure relief valve. If relief valve pressure is too low, add necessary amount of shims in high-pressure relief valve.

(e) Reset test stand as outlined in step (12) (s).

(14) Stopcock leakage test.

(a) Turn N_1 SPEED CONTROL knob until speed indicator readout indicates zero rpm.

(b) Move N_1 power lever to 100 plus or minus 0.5 degrees position and set condition lever to 0 to 3 degrees.

(c) Disconnect hose from control discharge port of fuel control (or fuel regulator) and observe for leakage from port. Leakage shall not exceed two drops per minute.

(d) Turn PB REG, knob until FUEL INLET PRESS. gage indicates 5 to 15 psi (351.5 to 1054.6 gm sq cm). Record leakage noted from control discharge port of fuel control.

(e) Repeat preceding step (d) with FUEL INLET PRESS. gage indicating 50 psi (3515.4 gm sq cm).

(f) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 2,000 rpm.

(g) Repeat preceding step (d).

(h) If excessive leakage is noted in preceding steps (d), (e), or (g), adjust condition lever low stop, as necessary. Recheck condition lever travel and reset high stop, as necessary.

(i) Reconnect hose to control discharge port of fuel control.

(j) Position condition lever at 20 to 21 degrees to allow fuel to flow and bleed system.

(k) Reset fuel inlet pressure as outlined in step (12) (p).

(15) Steady state test of fuel control.

(a) Set N_1 power lever at 0, plus or minus 2 degrees.

(b) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 784 to 816 phr. Record actual fuel flow obtained and rpm indicated on the SPEED INDICATOR readout. The N_1 speed shall be 4,241 to 4,299 rpm.

(c) Set N_1 power lever at 13 degrees, plus or minus 0.5 degrees.

(d) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 171 to 179 rpm. Record actual fuel flow obtained and rpm indicated on the SPEED INDICATOR readout The N_1 speed shall be 2,485 to 2,635 rpm.

(e) Set N_1 power lever at 23 degrees, plus or minus 0.5 degrees.

(f) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 137 to 143 phr. Record actual fuel flow obtained and rpm indicated on SPEED INDICATOR readout. The N_1 speed shall be 2,180 to 2,260 rpm.

(g) Set N_1 power lever at 26 degrees, plus or minus 0.5 degrees, and repeat preceding step (f).

NOTE

Actual N_1 speed recorded at the 23-degree quadrant setting and the actual N_1 speed recorded at the 26-degree quadrant setting shall be within 30 rpm.

(h) Set N_1 power lever at 38 degrees, plus or minus 0.5 degrees.

(i) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 206 to 214 phr. Record actual fuel flow obtained and rpm indicated on SPEED INDICATOR readout. The N_1 speed shall be 2,890 to 2,970 rpm.

(j) Set N_1 power lever at 42 degrees, plus or minus 0.5 degrees and repeat preceding step (i).

NOTE

Actual N_1 speed recorded at the 38-degree quadrant setting and the actual N_1 speed recorded at the 42-degree quadrant setting shall be within 30 rpm.

(k) Set N_1 power lever at 100 degrees plus or minus 0.5 degrees.

(l) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 784 to 816 phr Record actual fuel flow obtained and rpm indicated on SPEED INDICATOR readout. The N_1 speed shall be 4,241 to 4,299 rpm.

(m) Subtract 22.5 inches Hg from compensated barometric pressure reading obtained in step (12)(q). Turn P_1 PR. REG. knob so that P_1 pressure gage reflects the new pressure within plus or minus 0.10 inch Hg on vacuum or negative side of gage.

(n) With quadrant set at 100 degrees, turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 578 to 602 phr. Record actual fuel flow obtained and rpm indicated on SPEED INDICATOR readout. The N_1 speed shall be 4,240 to 4,300 rpm.

(o) If limits cannot be met, reset trims and repeat preceding steps (a) through (n).

(p) Readjust P_1 pressure gage to compensated pressure obtained in step (12) (q).

(16) 59°F (15°C) T_1 temperature acceleration test.

NOTE

Position the power lever at maximum stop 100 degrees, plus or minus 0.5 degrees.

(a) Turn N_1 SPEED CONTROL knob until the SPEED INDICATOR readout indicates 550 rpm, plus or minus 4 rpm. Check actual fuel flow on FUEL DISCHARGE gage. Flow shall be 55 to 71 phr. Record flow.

(b) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 850 rpm, plus or minus 4 rpm.

(c) Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 71 to 87 phr. Record flow.

(d) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 1,700 rpm, plus or minus 4 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 164 to 182 phr. Record actual fuel flow.

(e) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 2,100 rpm, plus or minus 4 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 207 to 229 phr. Record actual fuel flow.

(f) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,700 rpm, plus or minus 4 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 723 to 767 phr. Record actual fuel flow.

(g) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 4,075 rpm, plus or minus 4 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 880 to 920 phr. Record actual fuel flow. If maximum fuel flow cannot be obtained, reset maximum flow stop.

(h) Hysteresis check. Turn N_1 SPEED CONTROL knob until SPEED INDICATOR indicates 2,100 rpm, plus or minus 4 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within plus or minus 2 percent of that obtained in preceding step (f). Record actual fuel flow.

(i) Subtract 15 inches Hg from compensated pressure obtained in step (12) (q). Turn P_1 PR. REG. knob so that P_1 pressure gage reflects new pressure on vacuum or negative side of gage.

(j) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,700 rpm, plus or minus 4 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 354 to 388 phr. Record actual fuel flow.

(k) Subtract 11 inches Hg from compensated pressure reading obtained in step (12) (q). Turn P_1 PR. REG. knob so that P_1 pressure gage reflects new pressure on vacuum or negative side of gage.

(l) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,700 rpm, plus or minus 4 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 264 to 290 phr.

(m) Hysteresis check. Turn N_1 SPEED CONTROL knob until speed increases approximately 100 rpm. Decrease N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,700 rpm, plus or minus 4 rpm. Fuel flow shall be within 0 to 4 percent of that obtained in preceding step (l).

(n) If fuel flows obtained are too rich or too lean, reset main pressure regulating valve. After adjustment, main pressure regulating valve must be at least three turns from either end.

NOTE

If main pressure regulating valve is adjusted, the entire test must be rechecked.

(o) Turn P_1 PR. REG. knob to readjust P_1 pressure gage to pressure obtained in step (12)(q).

(17) N_1 droop test.

(a) Set N_1 power lever at 100 degrees, plus or minus 0.5 degrees.

(b) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 686 to 714 phr. Check actual N_1 rpm as indicated on SPEED INDICATOR readout. Speed shall be within 4,286 to 4,344 rpm. Record actual fuel flow and rpm.

(c) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 4. 426 to 4.520 rpm. Check fuel flow on FUEL DISCHARGE gage. Fuel flow shall be 392 to 408 phr. Record actual rpm and fuel flow.

(d) If limits cannot be met, reset trims.

(e) Hysteresis check. Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates same fuel flow as obtained in preceding step (b). Check actual rpm on SPEED INDICATOR readout. Speed shall be plus or minus 18 rpm of speed recorded in step (b). If limits cannot be met, reject fuel regulator.

(18) Deceleration schedule test.

(a) Set N_1 power lever at 24.5 degrees plus or minus 0.5 degrees.

(b) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 4,190 to 4,210 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 241 to 267 phr. Record actual fuel flow.

(c) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 2,290 to 2,310 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Flow shall be 101 to 113 phr. Record actual fuel flow.

(d) Subtract 15 inches Hg from the compensated pressure reading obtained in step (12)(q). Turn P_1 PR. REG. knob so that P_1 pressure reflects new pressure on vacuum or negative side of gage.

(e) With N_1 speed remaining at 2,290 to 2,310 rpm, check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 52 to 62 phr. Record fuel flow.

(f) If limits cannot be met, reject fuel control.

(g) Turn P_1 PR. REG. knob to set P_1 pressure gage to the pressure obtained in step (12)(q).

(19) Acceleration and face can schedule test.

(a) Test No. 1 (97° to 103°F (36° to 39°C)).

NOTE

Position the N_1 power lever at maximum stop 100 degrees, plus or minus 0.5 degrees.

1 Adjust knob in refrigeration or heating unit to bring T_1 temperature down to 97° to 103°F (36° to 39°C). Read temperature on the T_1 temperature readout instrument.

2 Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 1,200 rpm, plus or minus 4 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 92 to 108 phr.

3 Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 2,900 rpm, plus or minus 4 rpm.

4 Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 315 to 337 phr. Record actual fuel flow.

5 Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates an N_1 speed of 3,700 rpm, plus or minus 4 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 648 to 706 phr. Record actual fuel flow.

6 Subtract 22.5 inches Hg from compensated pressure reading obtained in step (12)(q). Turn P_1 PR. REG,. knob so that P_1 pressure gage reflects pressure on vacuum or negative side of gage.

7 Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 500 to 520 phr. Check N_1 speed on the SPEED INDICATOR readout. The N_1 speed shall be 4,231 to 4,289 rpm. Record actual N_1 speed. If N_1 speed is not within limits, check military trim and adjust, if necessary. If trims are reset, steady state and N_1 droop schedules must be rechecked.

8 If limits cannot be met, reject fuel control.

9 Turn P_1 PR. REG. knob to readjust P_1 pressure gage to pressure obtained in step (12)(q).

(b) Test No. 2 (-33° to -27°F (-36° to -33°C).

NOTE

Position the N_1 power lever at maximum stop 100 degrees, plus or minus 0.5 degrees.

1 Adjust knob in refrigeration and or heating unit to bring T_1 temperature within -33° to -27°F (-36° to -33°C). Read temperature on the T_1 temperature readout instrument.

2 Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,900 rpm, plus or minus 4 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 389 to 439 phr. Record actual fuel flow.

3 Subtract 22.5 inches Hg from the compensated pressure reading obtained in step (12)(q). Turn P_1 PR. REG. knob so that P_1 pressure gage reflects the new pressure on the vacuum or negative side of gage.

4 Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 745 to 775 phr. Check N_1 speed on the SPEED INDICATOR readout. The N_1 speed shall be 4,202 to 4,282 rpm. Record actual N_1 speed. If N_1 speed is not within limits, check military trim and adjust if necessary. If trims are rest, steady state, N_1 droop schedules, and preceding step (a)6 and (a)7 must be rechecked.

5 If limits still cannot be met, reject fuel control.

6 Turn P_1 PR. REG. knob to readjust P_1 pressure gage to pressure obtained in step (12)(q).

(20) Face cam schedule.

NOTE

Position the N_1 power lever at maximum stop 100 degrees, plus or minus 0.5 degrees.

(a) Adjust temperature control knob on heating and refrigeration unit until T_1 temperature readout instrument indicates that a T_1 temperature of 15°F (-9°C) has been reached.

(b) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 4,240 to 4,300 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 666 to 694 phr. Record actual fuel flow.

(c) Adjust temperature condition knob on heating and refrigeration unit until T_1 temperature readout instrument indicates that a T_1 temperature of 160°F (71°C) has been reached.

(d) Subtract 22. 5 inches Hg from compensated pressure reading obtained in step (12)(q). Turn P_1 PR. REG. knob so P_1 pressure gage reflects new pressure on vacuum or negative side of gage.

(e) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 377 to 393 phr. Check N_1 speed on the SPEED INDICATOR readout. The N_1 speed shall be 4,110 to 4,196 rpm. Record actual N_1 speed.

(f) If fuel flow specified in preceding step (e) cannot be obtained, recheck trims and repeat preceding step (d). If trims are reset, steady state and N_1 droop schedules must be rechecked.

(g) After final trim adjustment is made, tighten trim lockscrew to 26 to 30 pound-inches (4643.6 to 5358.0 gm cm) torque.

(h) If limits still cannot be met, reject fuel control.

(21) Variable inlet guide vane schedule.

NOTE

Position feedback lever at 4,010 to 4,020 rpm and at -0.5 to +0.5 degree quadrant position with servo nulled. Record position of lever.

Position the N_1 power lever at maximum stop 100 degrees, plus or minus 0.5 degrees.

(a) With standshut down, connect two No. 4 (1/4-inch diameter) hoses from the variable inlet guide vane pressure ports to two pressure gages on test stand.

(b) Turn N_1 SPEED CONTROL knob until 600 phr fuel flow is indicated on MAIN FUEL DISCHARGE gage and CONTROL DISCHARGE PRESS. Gage indicates 50 psi (3515 gm sq cm).

(c) Set the T_1 temperature at 57° to 61°F (14° to 16°). Increase N_1 SPEED CONTROL until 3,455 to 3,465 rpm is obtained.

(d) Move the inlet guide vane lever until inlet guide vane gages are nulled. Quadrant setting should be between 45 to 50 degrees.

NOTE

Servo is nulled when inlet guide vane gages are within 20 psi (1406.1 gm sq cm).

(e) Increase N_1 SPEED CONTROL until 3,987 to 3,997 rpm is obtained. Move inlet guide vane lever until inlet guide vane gages are nulled. Quadrant should read 0 to 5 degrees.

(f) If limits are exceeded, loosen quadrant plate hold down screws and set quadrant plate to zero degrees, with fuel control set as in preceding step (b). Repeat test.

(g) Reset stand as indicated in step (r).

(22) Air-bleed trigger test.

NOTE

Perform air-bleed trigger line test by using either a calibrated interstage bleed actuator P/N 1-170-050-08/12 or fixture STD 62532. Refer to DMWR 55-2915-322 or DMWR 55-2915-335 for instructions when using fixture STD 62532.

(a) Install union on P_3 port of actuator (See figures 5-51 and 5-52).

(b) Install tee in P (Sig) port of actuator.

(c) Connect 1/4-inch hoses as follows: from air-pressure gage-console regulator to union on actuator; from signal pressure gage on console to tee installed in actuator; and from other port on tee to P_3 port on fuel control.

(d) Install a suitable trigger line setting fixture on the control with the bottom of the indicator resting on the cam follower. Set the dial indicator to any convenient reference zero. The positioning of the button is extremely critical. Since the follower travels in an arc, care must be taken to ensure not only that contact between the indicator button and the cam follower is complete through the total travel, but also that no part of the fixture interferes with operation of the control.

(e) Mount N_2 simulator STD62526 (Colt Industries, Inc.), or equivalent, on the control. Adjust the linkage so that the cam follower rise is 0.0365 to 0.0375 inch (0.0927 to 0.0953 cm) for a change in fuel flow from 600 phr to 300 phr. Shorten the linkage to reduce the travel. Conversely, lengthen the linkage to lengthen the travel.

NOTE

Linkage end bearings have been engaged an equal amount into adjusting nuts at assembly. Any adjusting of the linkage at this test must be done by moving only the nut and not by moving the relative positions of the bearings. The setting of this schedule is extremely critical and requires great care in all phases of test.

(f) Turn regulator valve until P3 gage on right side of console indicates 40 psi (2812.2 gm sq cm).

NOTE

This pressure must be maintained throughout the test.

(g) Turn N_1 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates fuel flow above 816 phr.

(h) Turn N_2 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates 784 to 816 phr. Adjust N_1 speed until actuator closes. Record actual fuel flow and N_1 speed. Actuator should close at (33.4) psig with N_1 speed within 3,865 to 3,955 rpm.

(i) Turn N_1 SPEED SELECTOR knob until actuator opens. Record actual fuel flow and N_1 speed. Actuator should open at (31.6) psig with N_1 speed within 3,811 to 3,885 rpm.

(j) Turn N_2 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates 392 to 408 phr. Adjust N_1 speed until actuator closes. Record actual fuel flow and N_1 speed. Actuator should close at (33.4) psig with N_1 speed within 3,329 to 3,459 rpm.

(k) Turn N_1 SPEED SELECTOR knob until actuator opens. Record actual fuel flow and N_1 speed. Actuator should open at (31.6) psig with N_1 speed within 3,308 to 3,378 rpm.

(l) Turn N_2 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates 270 to 280 phr. Adjust N_1 speed until actuator closes. Record actual fuel flow and N_1 speed. Actuator should close at (33.4) psig with N_1 speed within 3,252 to 3,392 rpm.

(m) Turn N_1 SPEED SELECTOR knob until actuator opens. Record actual fuel flow and N_1 speed. Actuator should open at (31.6) psig with N_1 speed within 3,223 to 3,323 rpm.

(n) Turn regulator valve on console until P_3 gage on right side of console indicates 85 psi (5976.1 gm sq cm). Adjust N_1 speed until actuator closes. Reference gage on left side of console should indicate 84 psi (5905.8 gm sq cm) minimum.

(o) Turn regulator valve until P_3 gage indicates 0 psi. Disconnect hose from P_3 port on fuel control.

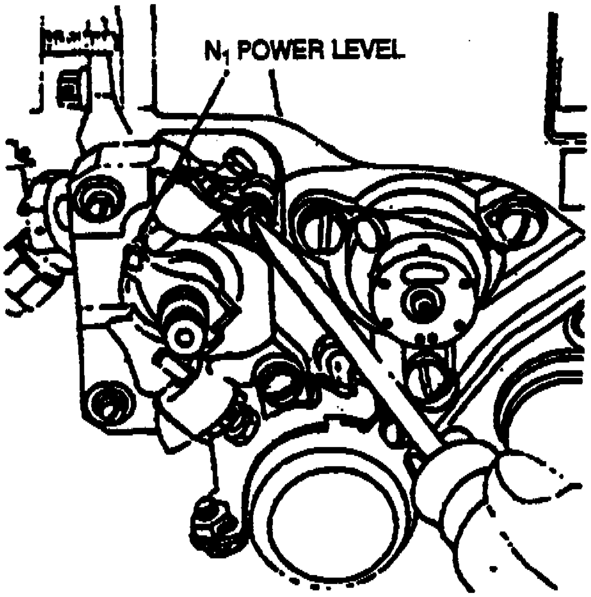


Figure 5-51. Removing Screw and Washer Prior to Installing Quadrant Spacer.

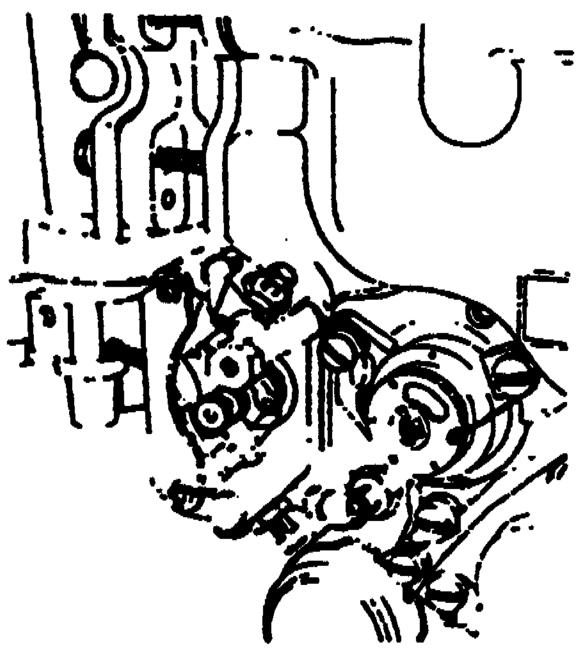


Figure 5-52. Quadrant Spacer Installed.

(23) N_2 governor droop schedule test

NOTE

T_1 bath temperature shall be within 49° to 69°F (9° to 21°C).

(a) Place N_2 power lever in the low cam (reverse) position.

(b) Place N_1 power lever in the maximum stop position (100 degrees, plus or minus 0.5 degrees).

(c) Set N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,980 to 4,020 rpm.

(d) Press N_2 DRIVE START button and place TACH. SEL. SWITCH to N_2 position

(e) Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 686 to 714 phr. Check speed on SPEED INDICATOR readout. Speed shall be 4,191 to 4,247 rpm. Record actual fuel flow and N_2 rpm.

(f) Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 392 to 408 phr. Check speed on SPEED INDICATOR readout. Speed shall be 4,286 to 4,360 rpm.

(g) Reset TACH. SEL. SWITCH to the N_1 position.

(h) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 1,980 to 2,020 rpm.

(i) Set TACH. SEL. SWITCH to the N_2 position.

(j) Turn N_2 SPEED CONTROL knob until speed on SPEED INDICATOR readout indicates 4,597 to 4,603 rpm and MAIN FUEL DISCHARGE gage indicates 130 to 155 phr. Record actual fuel flow and N_2 rpm.

(k) If proper speeds cannot be obtained, reset cam as follows:

1 Loosen screws securing cam sufficiently to allow cam to rotate.

2 Rotate cam, as required; toward quadrant to increase fuel flow, away from quadrant to decrease fuel flow.

3 Retighten screws, lockwire, and seal.

4 Recheck preceding steps (a)through (j).

(l) Hysteresis check.

1 Set TACH. SEL. SWITCH in the N_1 position.

2 Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,980 to 4,020 rpm.

3 Set TACH. SEL. SWITCH to the N_2 position.

4 Turn N_2 SPEED CONTROL knob until the MAIN FUEL DISCHARGE gage indicates same fuel flow as obtained in preceding step (e). Check speed on SPEED INDICATOR readout. Speed shall be within 18 rpm of N_2 speed recorded in step (c).

(m) Place N_2 power lever in the high cam (takeoff position).

(n) Place N_1 power lever in the maximum stop position (100 degrees, plus or minus 0.5 degrees).

(o) Set N_1 SPEED control knob until SPEED INDICATOR readout indicates 3,980 to 4,020 rpm.

(p) Press N_2 DRIVE START button and place TACH. SEL. SWITCH to N_2 position.

(q) Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 686 to 714 phr. Check speed on SPEED INDICATOR readout. Speed shall be 4,587 to 4,687 rpm. Record actual fuel flow and N_2 rpm.

(r) Reset TACH. SEL. SWITCH to the N_1 position.

(s) Shut down N_2 drive and press N_2 drive off button.

(24) Leakage test. This test to be performed only when leakage is noted.

(a) Turn N_1 and N_2 SPEED CONTROL knobs until the SPEED INDICATOR readout indicates that N_1 and N_2 speed are at zero rpm.

NOTE

Read N_2 speed on SPEED INDICATOR readout by placing TACH. SEL. SWITCH in the N_2 position.

(b) Turn PB REG. knob until 45 to 50 spi (3163.8 to 3515.4 gm sq cm) is indicated on FUEL INLET PRESS. gage.

(c) Check for leakage through the N_1 and N_2 drive seals, using a suitable graduated beaker. Combined leakage through seals shall not exceed one cc per minute. There shall be no other external leakage.

(d) Repeat preceding step (a) until 4,300 N_1 rpm and 4,600 N_2 rpm have been obtained.

(e) Turn PB REG. knob until FUEL INLET PRESS. gage indicates 2 psi (140.6 gm sq cm).

(f) Turn PN (FLOW) valve until CONTROL DISCHARGE PRESS. gage indicates 610 psi (42887 gm sq cm).

(g) Using a suitable graduated beaker, check that the combined leakage through the N_1 and N_2 drive seals does not exceed one cc per minute. There shall be no other external leakage.

(h) Repeat preceding step (a) until 4,300 N_1 rpm and 4,600 N_2 rpm have been obtained.

(i) Turn PB REG. knob until FUEL INLET PRESS. gage indicates 45 to 50 psi (3163.8 to 3515.4 gm sq cm).

(j) Turn PN (FLOW) valve until CONTROL DISCHARGE PRESS. gage indicates 610 psi (42887 gm sq cm).

(k) Using a suitable graduated beaker, check that combined leakage through the N_1 and N_2 drive seals does not exceed one cc per minute. There shall be no external leakage.

(l) If leakage exceeds maximum given, check torque on seal screws. If excess leakage is still noted, replace seals and repeat test.

(25) Military cold weather stop setting.

(a) Set fuel regulator throttle against the maximum stop (100 degrees). Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 800 phr. Check N_1 rpm as indicated on SPEED INDICATOR readout. Record the rpm.

(b) Install stop assembly (LTCT6763) on maximum stop adjustment screw. Make certain fixture is bottomed on screw.

(c) With N_1 throttle against stop assembly (LTCT6763), turn N_1 SPEED CONTROL until MAIN FUEL DISCHARGE gage indicates 540 phr. Check N_1 rpm as indicated on SPEED INDICATOR readout. Record rpm.

(d) Obtain ΔN_1 percent to the nearest 0.1 percent as follows:

1 Subtract N_1 speed recorded in preceding step (c) from N_1 speed recorded in preceding step (a) to obtain ΔN_1.

2 Calculate ΔN_1 percent by substituting in the following formula:

$$\Delta N_1 \text{ percent} = \frac{\Delta N_1 \times 100}{4{,}270}$$

(e) Using 1/16-inch steel stamps, stamp the ΔN_1 percent obtained on name plate. Using yellow opaque ink (item 234, table C–1), fill in the stamp impressions.

(26) Full reverse cold weather STOP.

(a) Set fuel regulator throttle against the reverse stop (0 degrees). Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 800 phr. Check N_1 rpm as indicated on SPEED INDICATOR readout. Record the rpm.

(b) Install stop assembly (LTCT6241) on reverse stop adjustment screw. Make certain fixture is bottomed against adjusting screw.

(c) With N_1 throttle against stop assembly (LTCT6241), turn N_1 SPEED CONTROL until MAIN FUEL DISCHARGE gage indicates 540 phr. Check N_1 rpm as indicated on SPEED INDICATOR readout. Record the rpm.

(d) Obtain ΔN_1 percent to the nearest 0.1 percent as follows:

1 Subtract N_1 speed recorded in preceding step (c) from N_1 speed recorded in preceding step (a) to obtain ΔN_1.

2 Calculate ΔN_1 percent by substituting in the following formula:

$$\Delta N_1 \text{ percent} = \frac{\Delta N_1 \times 100}{4{,}270}$$

(e) Using 1/16-inch steel stamps, stamp the ΔN_1 obtained on name plate. Using yellow opaque ink (item 234, table C–1) fill in stamp impressions.

(27) Position rigging hole 79.5 degrees from takeoff stop.

(28) Maximum flow stop reset

(a) Set T_1 temperature at 57° to 61°F (14° to 16°C).

(b) Set P_1 pressure at 29.92 inches Hg by adjusting P_1 PR. REG. valve.

(c) Using N_1 SPEED CONTROL knob, increase N_1 speed until 4,000 rpm is obtained on speed indicator gage; MAIN FUEL DISCHARGE gage should be indicating a fuel flow of approximately 900 phr

(d) Adjust maximum flow stop (figure 5-53) until MAIN FUEL DISCHARGE gage indicates 860 to 880 phr.

(29) Preserve fuel control as outlined in Chapter 10.

(30) Perform pressure-test of hose assembly (7, figure 4-26) as outlined in paragraph 5-12.

b. Perform the following functional test on T53-L-703 and -13B fuel controls as follows:

NOTE

In the following test procedures, approach all speeds in the increasing direction, except during the deceleration schedule test and during hysteresis checks. Use all tolerances given before attempting to adjust fuel control. If adjustments are to be made, original readings and adjustment and readings after adjustments must be recorded.

(1) Prepare fuel control for functional test as follows:

(a) Remove fuel control from its shipping container.

(b) Cut lockwire; then remove screw and washer located adjacent to N_1 power lever stop. (See figure 5-51.)

(c) Install and secure spacer (LTCT407-3), or equivalent, (figure 5-52), then spline quadrant (LTCT407-7), or equivalent, to N_1 power lever. Using a 3/16-inch allen wrench, secure quadrant to N_1 power lever and, using screw (LTCT407-4), or equivalent, secure quadrant to spacer. (See figure 5-53.)

NOTE

Set quadrant by locating power lever pointer in dwell, which is at 38 degrees. Adjust quadrant, as necessary.

(d) Remove all shipping caps and plugs from fuel control orifices.

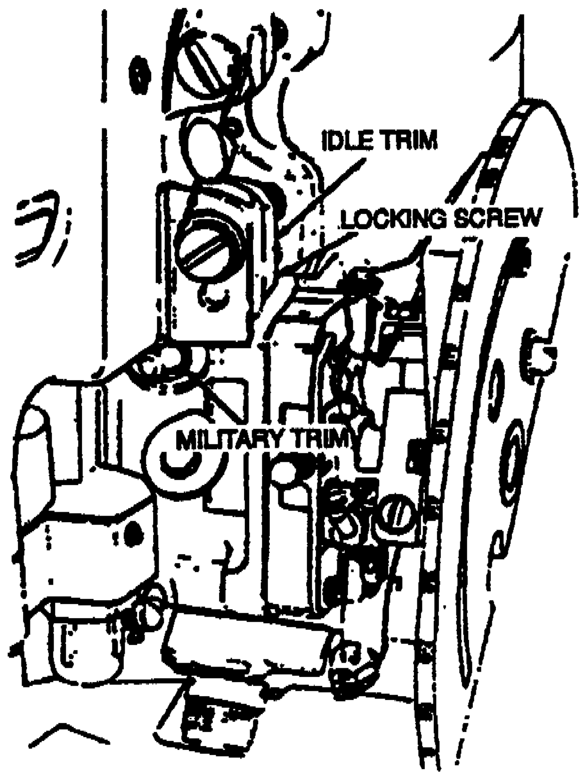


Figure 5-53. Quadrant Assembly Installed and Trim Locations.

(e) Install fittings, MS24392-4, in the following ports: number 1 pump (figure 5-54); number 2 pump (2); fuel inlet pressure (3); air-bleed (4); P_1 (5); N_1 face seal drain (6); and overspeed governor bleed (7); and two inlet guide vanes (9).

(f) Install fitting, AN919-2, in overspeed governor seal drain port (8).

(g) Using plastic cap, cap fuel inlet port.

(h) Remove four nuts and washers that secure fuel control to mounting board. Remove fuel control.

CAUTION

In following step (i), to prevent damage to fuel control, care shall be taken to mesh splines of test stand drive with splines of fuel control properly.

(i) Install fuel control on mounting pads of test stand (LTCT319); or equivalent, and secure with four nuts and washers. (See figure 5-55.)

(j) Connect hoses from test stand to fuel control as follows: (See figure 5-55.)

1 Connect hose (1) from PB (FLOW) port on test stand to fuel inlet port of fuel control.

2 Connect hose (2) from PN (FLOW) port on test stand to shutoff valve (3), tee (4) to shutoff valve, hose (5) from tee to 94 port on test stand, and hose (6) from tee to control discharge port of fuel control.

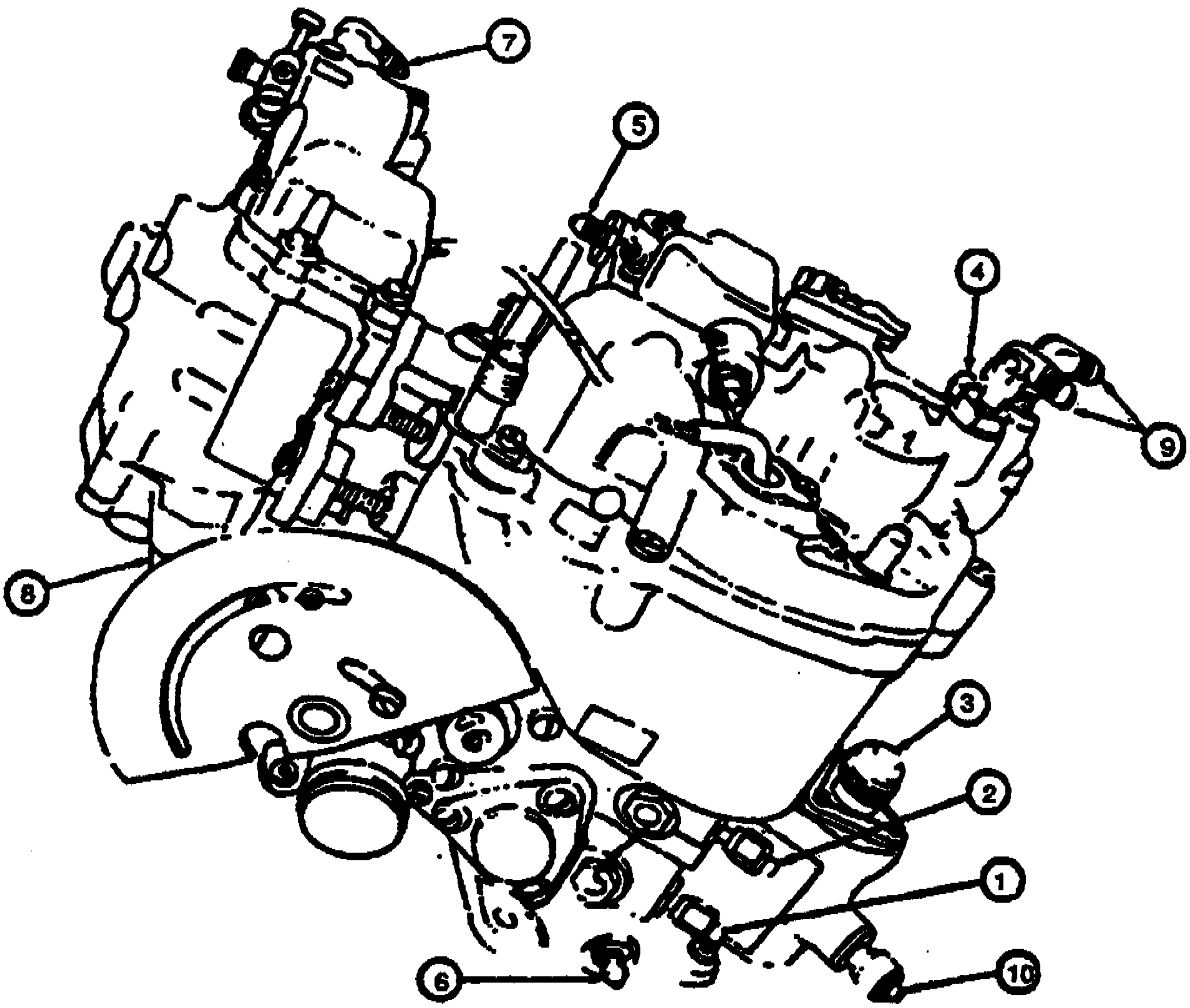
3 Connect hose (7) from IGN. DISCHARGE port on test stand to igniter discharge port of fuel control.

4 Connect hose (8) from 64P port on test stand to fuel inlet pressure tap port of fuel control.

5 Connect hose (9) from PF port of test stand to the No. 1 pump port of fuel control and hose (10) from PFE port on test stand to the No. 2 pump port on fuel control.

6 Connect a clear plastic hose (11) from 17 P_1 port on test stand to air pressure port on fuel control.

7 Connect a suitable hose (12) to overboard bleed (overspeed governor bleed) port on fuel control.



1. No. 1 pump port
2. No. 2 pump port
3. Fuel inlet pressure port
4. Air-bleed port
5. P_1 Port
6. N_1 face seal drain port
7. Overspeed governor bleed port
8. Overspeed governor seal drain port
9. Inlet guide vane ports
10. Fuel inlet pressure port

Figure 5-54. Location of Test Fittings and Adjustment Points.

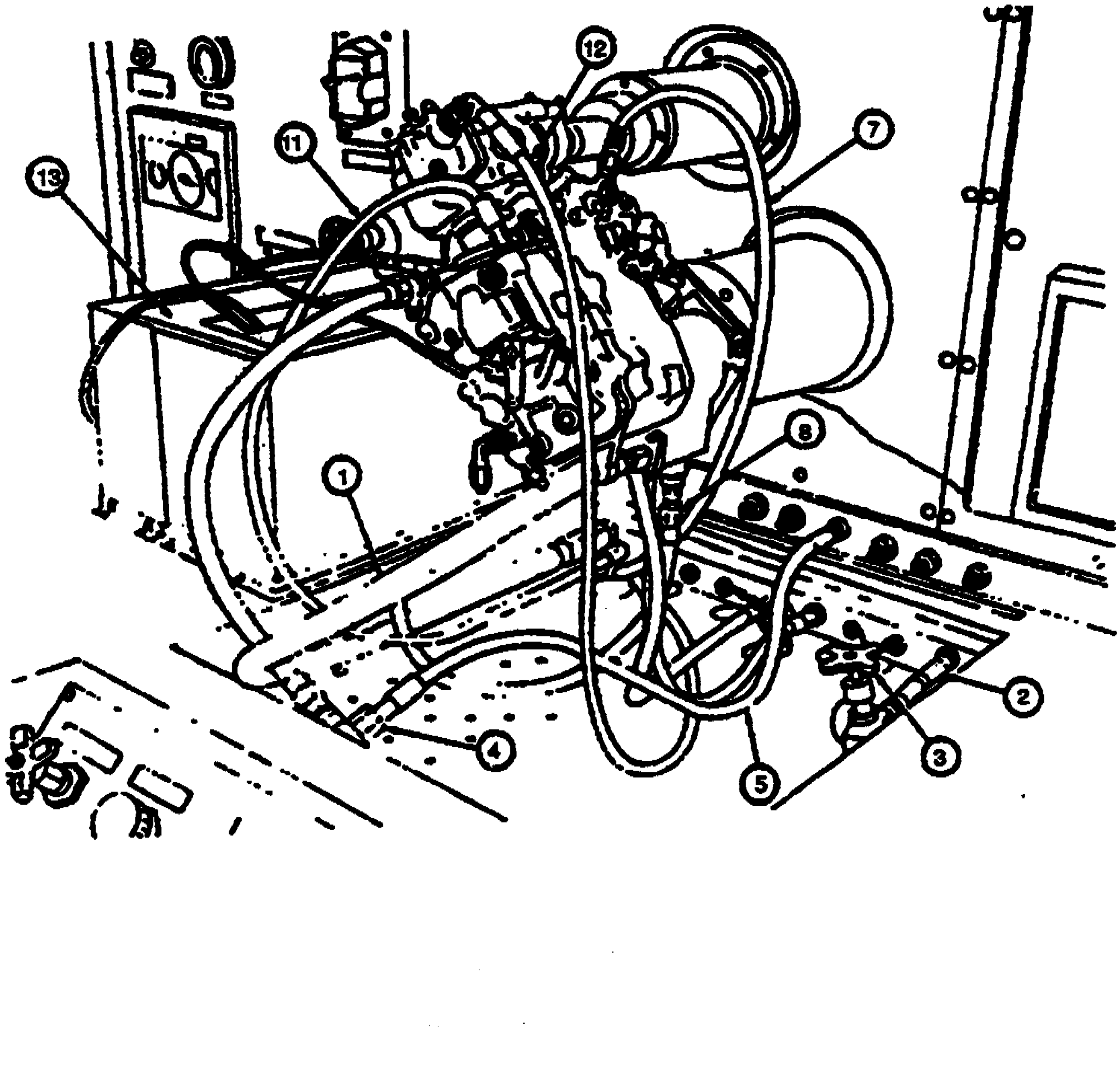
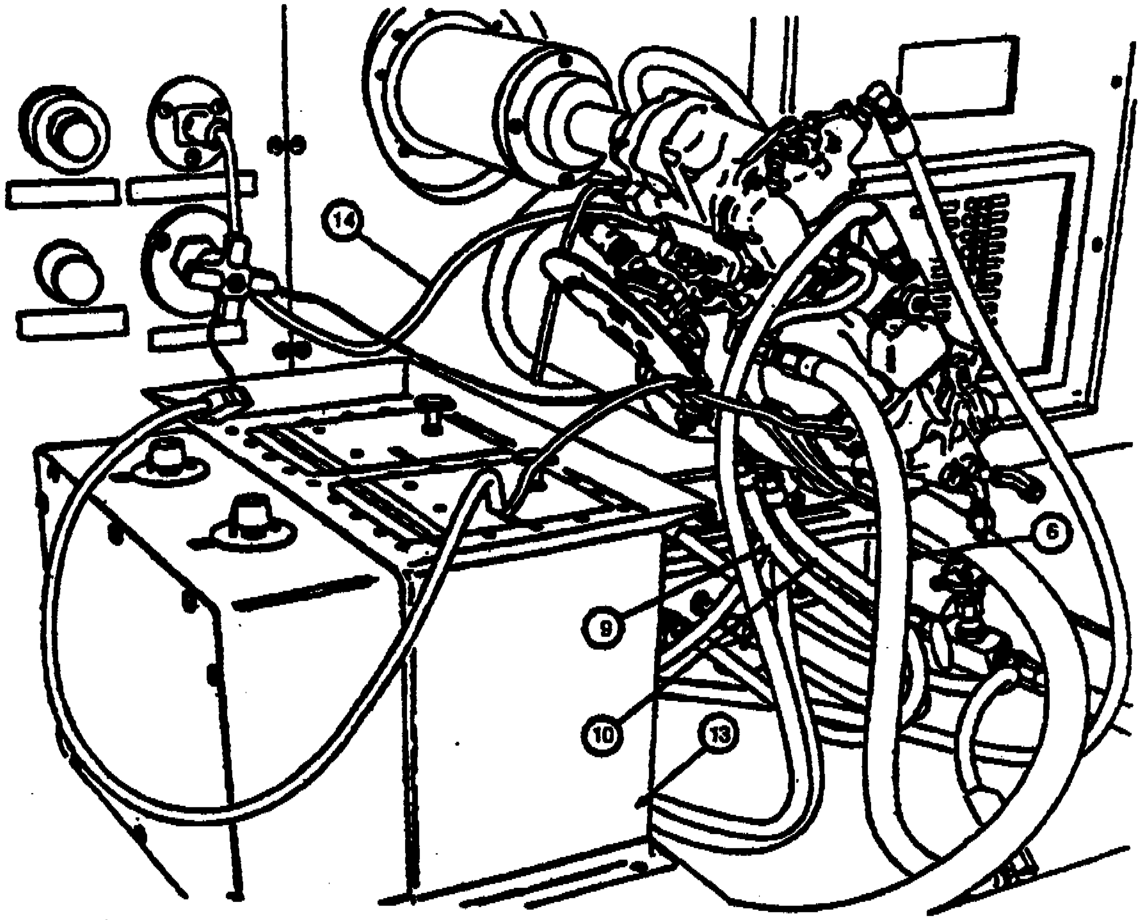


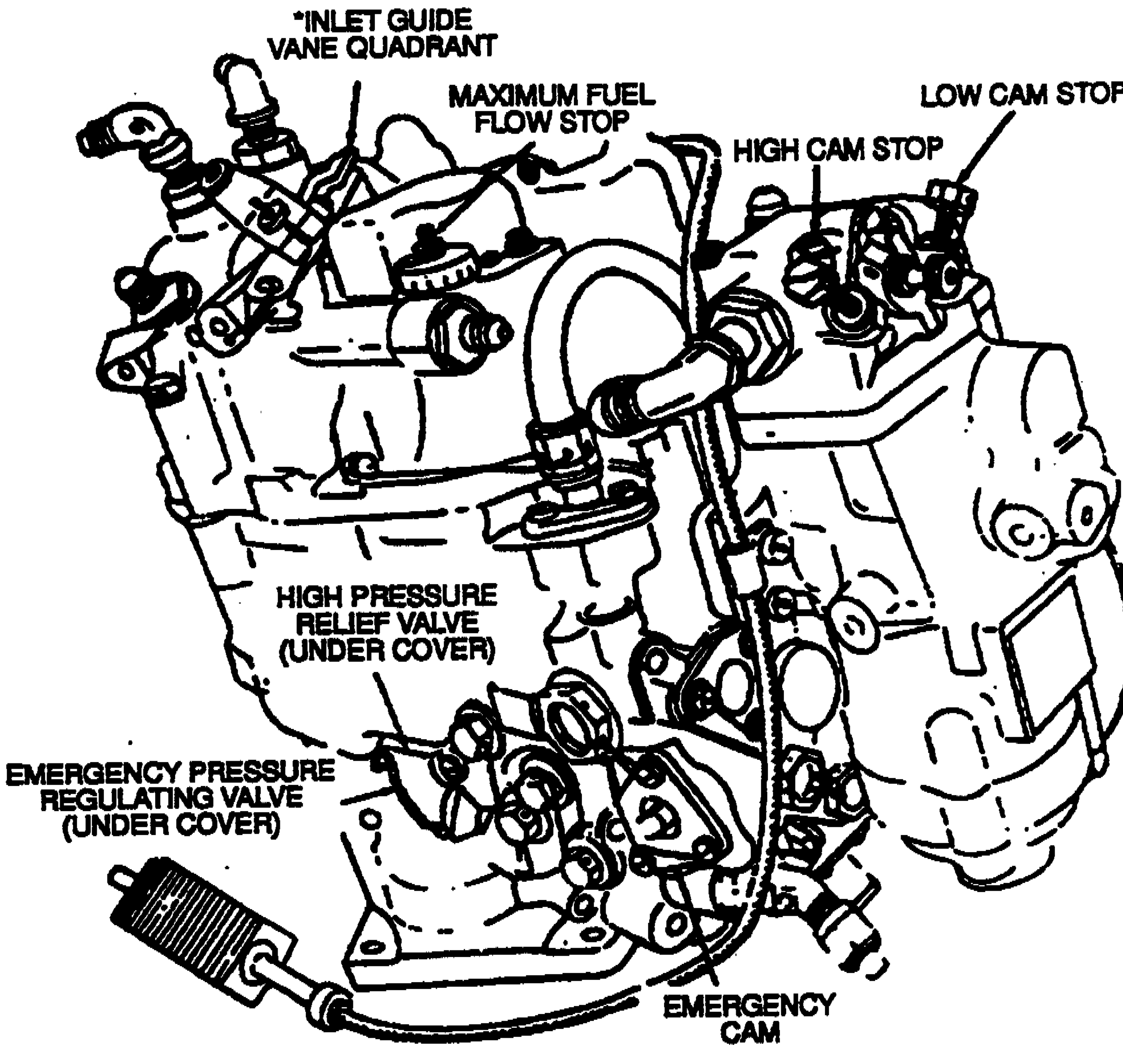
Figure 5-55. Fuel Control Mounted on Test Stand (Right Side) (Sheet 1 of 2).



LEGEND

1. No. 10 hose (5/8 inch diameter) to fuel inlet port
2. No. 6 hose (3/8 inch diameter)
3. Shutoff valve (10,000 gwm 150°F)
4. Tee, P/N MS24402-6
5. No. 4 hose (1/4 inch diameter)
6. No. 6 hose (3/8 inch diameter) from fuel control discharge port
7. No. 4 hose (1/4 inch diameter) from igniter discharge port
8. No. 4 hose (1/4 inch diameter) to fuel inlet pressure tap port
9. No. 4 hose (1/4 inch diameter) to No. 1 pump port
10. No. 4 hose (1/4 inch diameter) to No. 2 pump port
11. No. 4 hose (1/4 inch diameter) to air pressure port
12. Hose (no specific size) from overboard bleed port
13. Heating and refrigeration unit
14. Power line (electrical lead)

Figure 5-55. Fuel Control Mounted on Test Stand (Left Side) (Sheet 2 of 2).



*NOT APPLICABLE TO FUEL CONTROL (1 -170-240-58)

Figure 5-56. Fuel Control Adjustment Locations (Sheet 1 of 2).

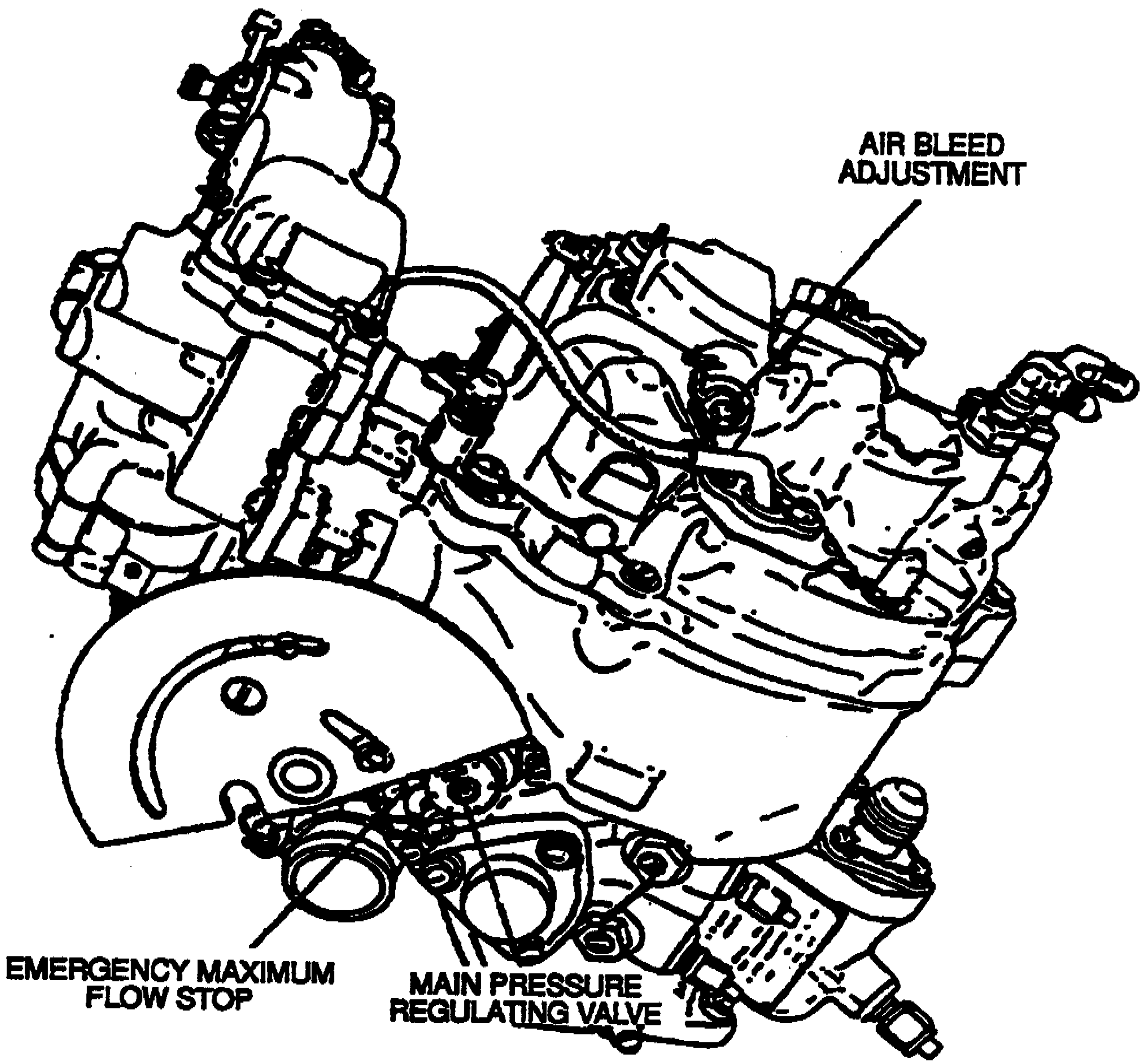


Figure 5-56. Fuel Control Adjustment Locations (Sheet 2 of 2).

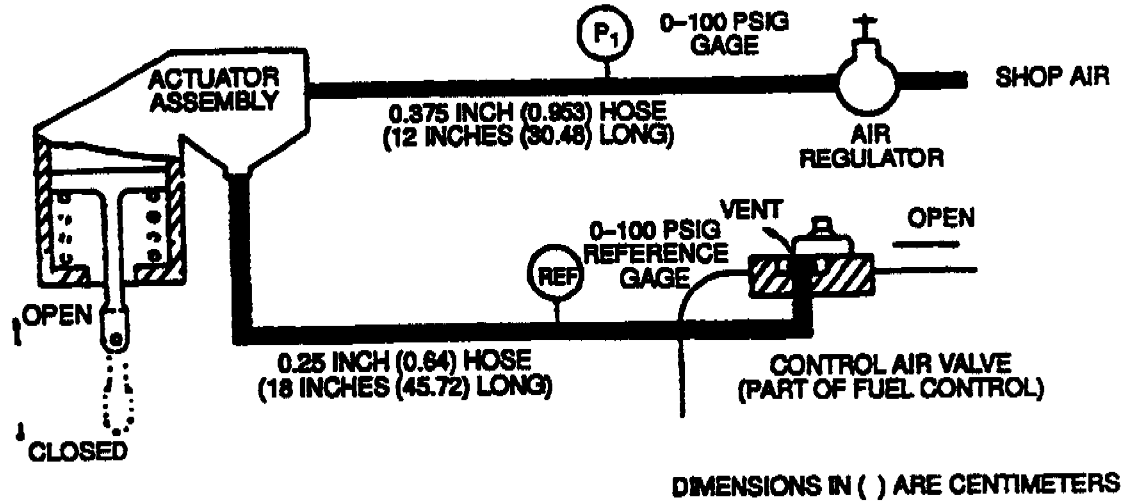


Figure 5-57. Air-Bleed Trigger Line Test Setup Schematic.

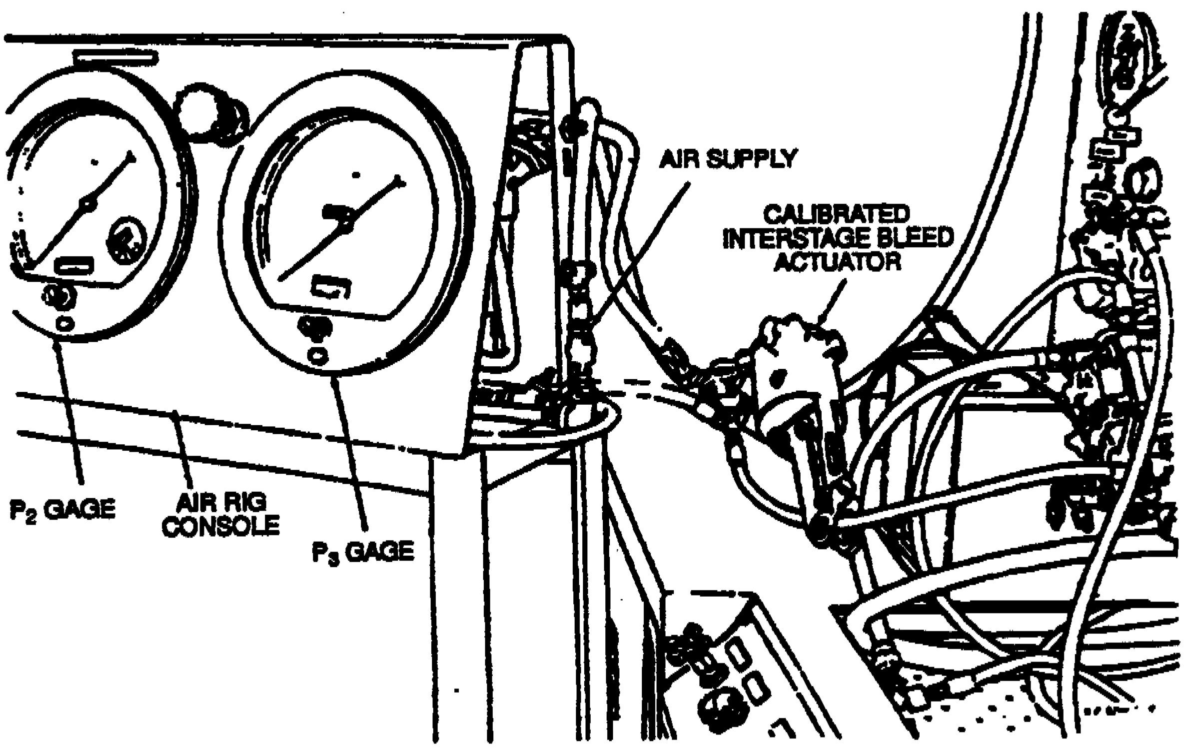


Figure 5-58. Rig Console Test Setup.

(k) Install T_1 temperature-sensing bellows in heating and refrigeration unit (13) on test stand.

(l) Maintain T_1 (inlet) temperature at 56° to 62°F (13° to 17°C) by adjusting temperature knobs on heating and refrigeration unit, and fuel temperature at 65° to 85°F (18° to 29°C) by turning TEMP. CONT. FUEL knob to desired temperatures. Check temperature of fuel and T_1 by pressing buttons on the temperature readout indicator.

NOTE

Check fuel and T_1 temperature periodically during test.

(m) Connect an electrical lead (14) from DC POWER OUTLET receptacle on test stand to receptacle on fuel control.

(n) Press BOOST pump START buttons, and check that fuel drains from overspeed governor bleed port. Press VAC. PUMP START button.

(o) Check atmospheric pressure. If atmospheric pressure differs from standard sea level pressure (29.92 inches Hg), compensate for difference as follows:

NOTE

Check barometric pressure every 2 hours and compensate for difference.

1 Subtract actual pressure (if less than standard pressure) from standard pressure or subtract standard pressure (if less than actual pressure) from actual pressure.

2 If actual barometric pressure was less than standard barometric pressure, turn P_1 PR.REG. knob so that result in preceding step 1 is indicated on plus side of P_1 pressure gage zero mark. If actual barometric pressure is greater than standard barometric pressure, turn P_1 PR.REG. knob so the result obtained in step 1 is indicated on minus side of P_1 pressure gage zero mark.

(p) Press N_1 DRIVE START button; then turn N_1 SPEED CONTROL knob at any speed to allow fluid to flow, thereby bleeding the system.

(q) Turn N_1 SPEED CONTROL knob until 900 phr fuel flow is indicated on MAIN FUEL DISCHARGE gage; then adjust valve at PN (FLOW) port on test stand until 300 psi (14061 gm sq cm) is indicated on No. 2 CONTROL DISCHARGE PRESS. gage.

(r) Turn PB REG. knob until FUEL INLET PRESSURE gage indicates 2 to 6 psi (140.6 to 421.8 gm sq cm).

(2) High-pressure relief valve test.

(a) Set N_1 power lever at 99.5 to 100.5 degrees.

(b) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,480 to 3,520 rpm.

(c) Slowly close valve at PN (FLOW) port on test stand until fuel flow drops approximately 25 phr. Read fuel flow on MAIN FUEL DISCHARGE gage. Record No. 1 and No. 2 PUMP DISCHARGE gage readings. Readings shall be 800 to 900 psig (56245.6 to 63276.3 gm sq cm)

NOTE

Discharge pressure differential between the pumps shall not exceed 50 psig (3515.4 gm sq cm.)

(d) If relief valve pressure is too high, remove necessary amount of shims from high-pressure relief valve (figure 5-56). If relief valve pressure is too low, add necessary amount of shims in high-pressure relief valve (figure 5-56).

(e) Reset test stand. (Refer to step (1)(q)).

(3) Stopcock leakage test.

(a) Turn N_1 SPEED CONTROL knob until speed indicator readout indicates zero rpm.

(b) Move N_1 power lever to 0±0.5 degree position.

(c) Disconnect hose from control discharge port of fuel control and observe for leakage from port. Leakage shall not exceed 2 drops per minute.

(d) Turn PB REG. knob until FUEL INLET PRESS. gage indicates 10 psi (703.07 gm sq cm). Record leakage noted from control discharge port of fuel control.

(e) If excessive leakage is noted in step (d), check position of shutoff stop and/or remove shims from stopcock adjustment.

(f) Reconnect hose to control discharge port of fuel control.

(g) Position N_1 power lever at 99.5 to 100.5 degrees to allow fuel to flow and bleed system.

(4) Steady state test.

(a) Set N_1 power lever at 22.5 to 23.5 degrees.

(b) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 150 to 156 phr. Record actual fuel flow obtained and rpm indicated on SPEED INDICATOR readout. The N_1 speed shall be within 2,167 to 2,247 rpm.

(c) Set N_1 power lever at 25.5 to 26.5 degrees and repeat preceding step (b).

NOTE

Actual N_1 speed recorded at the 22.5 and 23.5 degree quadrant setting and the actual N_1 speed recorded at the 25.5 to 26.5 degree quadrant setting shall be within 30 rpm.

(d) Set N_1 power lever at 37.5 to 38.5 degrees.

(e) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 256 to 264 phr. Record actual fuel flow obtained and rpm indicated on SPEED INDICATOR readout. The N_1 speed shall be within 2,960 to 3,040 rpm.

(f) Set N_1 power lever at 41.5 to 42.5 degrees and repeat step (e).

NOTE

Actual N_1 speed recorded at the 37.5 to 38.5 degree quadrant setting and actual N_1 speed recorded at the 41.5 to 42.5 degree quadrant setting shall be within 30 rpm.

(g) Set N_1 power lever at 99.5 to 100.5 degrees.

(h) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 834 to 866 phr. Record actual fuel flow obtained and rpm indicated on SPEED INDICATOR readout. The N_1 speed shall be within 4,566 to 4,624 rpm.

(i) Set P_1 gage to 22. 5 inches Hg.

(j) With quadrant set at 99.5 to 100.5 degrees, turn N_1 SPEED CONTROL knob until FUEL DISCHARGE gage indicates 748 to 778 phr. Record actual fuel flow obtained and rpm indicated on SPEED INDICATOR readout. The N_1 speed shall be within 4,453 to 4,511 rpm.

(k) Hysteresis check.

1 Readjust P_1 pressure gage to compensated pressure obtained in step b(1)(o).

2 Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates flow recorded in step (h). The N_1 speed shall be within plus or minus 18 rpm of speed recorded in preceding step (h).

3 Set N_1 power lever at 41.5 to 42.5 degrees.

4 Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates flow recorded in preceding step(f). The N_1 speed shall be within plus or minus 18 rpm of speed recorded in step (f).

5 Set N_1 power lever at 37.5 to 38.5 degrees.

6 Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates flow recorded in preceding step(e). The N_1 speed shall be within plus or minus 18 rpm of the speed recorded in step (e).

7 Set N_1 power lever at 25.5 to 26.5 degrees.

8 Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates flow recorded in preceding step (c). The N_1 speed shall be within plus or minus 18 rpm of the speed recorded in step (c).

9 Set N_1 power lever at 22.5 to 23.5 degrees.

10 Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates flow recorded in preceding step(b). The N_1 speed shall be within plus or minus 18 rpm of the speed recorded in step (b).

(l) If the limits given cannot be met, reset trims and repeat preceding steps (a) through (j).

(5) 59°F (15°C) T_1 temperature acceleration test.

(a) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates between 546 and 554 rpm.

(b) Record fuel flow indicated on MAIN FUEL DISCHARGE gage. Main fuel flow shall be within 59 to 75 phr.

(c) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates between 1,696 to 1,704 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 165 to 183 phr. Record actual fuel flow.

(d) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates between 2,096 to 2,104 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 204 to 226 phr. Record actual fuel flow.

(e) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates between 3,696 to 3,704 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 716 to 760 phr. Record actual fuel flow.

(f) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates between 4,196 to 4,204 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 910 to 950 phr. Record actual fuel flow.

(g) Hysteresis check. Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 2,096 to 2,104 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within plus or minus 2 percent of that obtained in preceding step (d). Record actual fuel flow. If the difference between fuel flows exceed 2 percent, reject fuel control.

(h) Set P_1 gage at 15 inches Hg.

(i) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates between 3,696 to 3,704 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 353 to 387 phr. Record actual fuel flow.

(j) Set P_1 gage at 11 inches Hg.

(k) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates between 3,696 to 3,704 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 259 to 285 phr. Record actual fuel flow.

(l) Hysteresis check. Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,696 to 3,704 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within plus or minus 2 percent of that recorded in preceding step (i). Record actual fuel flow. If difference between fuel flows exceeds 2 percent, reject fuel control.

NOTE

Attempt to maintain adjustment at least three turns from either end. However, fuel control is acceptable if some adjustment remains and all schedule requirements are met.

(m) If fuel flows obtained are too rich, reset main pressure regulating valve; if too lean, reset main pressure regulating valve (figure 5-56) and repeat preceding steps (a) through(l). If fuel flows are still too rich or too lean, adjust P_1 multimeter spring adjusting nut as follows:

1 Remove fuel regulator cover assembly. (Refer to DMWR 55-2915-335.)

2 Break lockwire securing P_1 multiplier spring adjusting nuts, and remove lockwire from fuel regulator.

3 Loosen hex nut, and adjust sleeve nut on adjusting screw assembly. (Increasing spring tension will decrease fuel flow; decreasing spring tension will increase fuel flow.)

NOTE

Maximum adjustment of sleeve nut is one and one-half turns clockwise or counter-clockwise from original setting.

4 Tighten adjusting nuts to 8 to 12 pound-inches (1428.8 to 2143.2 gm cm) torque. If fuel flow is within limits, lockwire hex nut to sleeve nut using lockwire (item 181, table C–1).

5 Install cover assembly on fuel regulator and repeat preceding steps (a) through (m).

NOTE

If problem cannot be corrected with main pressure regulating valve adjustment or adjustment to P_1 multiplier spring adjusting nut, reject fuel control.

(n) Turn P_1 PR. REG. knob to readjust P_1 pressure gage to pressure obtained in step b(1)(o).

(6) N_1 droop test.

(a) Set N_1 power lever at 99.5 to 100.5 degrees.

(b) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 890 to 910 phr. Check actual N_1 rpm as indicated on SPEED INDICATOR readout. Speed shall be within 4,531 to 4,589 rpm. Record actual fuel flow and rpm.

(c) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 834 to 866 phr. Check actual N_1 rpm as indicated on SPEED INDICATOR readout. Speed shall be within 4,566 to 4,624 rpm. Record actual fuel flow and rpm.

(d) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 890 to 910 phr. Check actual rpm as indicated on SPEED INDICATOR readout. Speed shall be within plus or minus 18 rpm of speed recorded in preceding step (b).

(e) If limits cannot be met, reset trims and repeat preceding steps b(4)(a) through b(4)(j) and b(6)(a) through b(6)(d).

(7) Deceleration schedule test.

(a) Set N_1 power lever at 24 to 25 degrees.

(b) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 4,190 to 4,210 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 262 to 288 phr. Record actual fuel flow.

(c) Turn N_2 SPEED CONTROL knob until SPEED INDICATOR readout indicates 2,780 to 2,810 rpm. Check actual fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 127 to 141 phr. Record actual fuel flow.

(d) Set P_1 gage at 15 inches Hg.

(e) With N_1 speed remaining at 2,340 to 2,360 rpm, check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 60 to 74 phr. Record fuel flow.

(f) If limits cannot be met, reject fuel control.

(g) Turn P_1 PR. REG. knob to set P_1 pressure gage to pressure obtained in step b(1)(o).

(8) Emergency schedule test.

(a) Set N_1 Power lever at 20. 5 to 21.5 degrees.

(b) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 1,790 to 1,810 rpm.

(c) Place DC POWER SUPPLY switch to ON; then place OPERATION SEL. SWITCH in EMERGENCY position.

(d) Place DC POWER SUPPLY switch to OFF.

(e) Check fuel flow on main fuel discharge gage. Fuel flow shall be within 107 to 126 phr. Record actual fuel flow.

(f) Set N_1 power lever at 54.5 to 55.5 degrees.

(g) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 2,590 to 2,610 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 186 to 226 phr. Record actual fuel flow. If flow cannot be obtained, check shims under emergency pressure regulating valve (figure 5-56); add shims to increase fuel flow, remove shims to decrease fuel flow.

(h) Set N_1 power lever at 99.5 to 100.5 degrees.

(i) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 4,090 to 4,110 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 675 to 725 phr. Record actual fuel flow. If maximum flow cannot be obtained, reset emergency maximum flow stop (figure 5-56) counterclockwise to increase fuel flow, clockwise to decrease fuel flow.

(j) Repeat preceding steps (f) and (g).

(k) Set N_1 power lever at 40.5 to 41.5 degrees.

(l) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 990 to 1,010 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be 107 phr minimum. Record actual fuel flow.

(m) If limit cannot be met, check shims under emergency pressure regulating valve; add shims to increase fuel flow, remove shims to decrease fuel flow and repeat preceding steps (a) through (l).

(n) Place DC POWER SUPPLY switch to ON and OPERATION SEL. SWITCH to AUTO position.

(o) Place DC POWER SUPPLY switch to OFF; then reset N_1 power lever to 99.5 to 100.5 degrees.

(9) N_2 governor droop schedule test.

(a) Procedure for low cam setting is as follows:

1 Set N_1 POWER LEVER at 99.5 to 100.5 degrees.

2 Set N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,980 to 4,020 rpm.

3 Press N_2 DRIVE START button; then place TACH. SEL. SWITCH to N_2 position.

4 Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 392 to 408 phr. Check speed on SPEED INDICATOR readout. Speed shall be within 3,255 to 3,285 rpm. Record actual fuel flow and N_2 rpm.

5 If proper speed cannot be obtained, reset lower N_2 speed within required limits and reset stop; turning screw in will provide more fuel flow, turning screw out will provide less fuel flow. Repeat preceding step 4.

6 Reset N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 1,980 to 2,020 rpm.

7 Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 125 to 155 phr. Check speed on SPEED INDICATOR readout. Speed shall be within 3,740 to 3,760 rpm. Record actual fuel flow and N_2 rpm.

8 Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 392 to 408 phr. Check actual rpm on SPEED INDICATOR readout. Speed shall be within plus or minus 18 rpm of speed recorded in preceding step 4.

(b) Procedure for high cam setting is given as follows:

1 Set N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,980 to 4,020 rpm.

2 Place N_2 power lever in high cam position.

3 Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 735 to 765 phr. Check N_2 speed on SPEED INDICATOR readout. The N_2 speed shall be within 4,230 to 4,296 rpm. Record actual fuel flow and N_2 speed.

4 Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 392 to 408 phr. Check N_2 speed on SPEED INDICATOR readout. The N_2 speed shall be within 4,435 to 4,465 rpm. Record actual fuel flow and N_2 speed.

5 Turn N_2 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 392 to 408 phr. Check actual rpm on SPEED INDICATOR readout. Speed shall be within plus or minus 18 rpm of speed recorded in preceding step 3.

6 If limits cannot be met, reset N_2 speed within required limits and reset high cam stop (figure 5-56); turning screw in will provide less fuel flow, turning screw out will provide more fuel flow. Repeat preceding step 2.

7 Turn N_2 SPEED CONTROL knob until N_2 speed is zero rpm. Check speed on SPEED INDICATOR readout.

8 Install quadrant (LTCT407), or equivalent, on N_2 power lever. Check that total travel of N_2 power is 56 to 64 degrees. Record actual total power lever travel. Remove quadrant.

(c) Reset TACH. SEL. SWITCH to the N_1 position.

(10) Air-bleed trigger line test (P/N 100770A4).

NOTE

Perform air-bleed trigger line test by using either a calibrated interstage bleed actuator P/N 1-170-050-08/12 or fixture STD 62532. Refer to DMWR 55-2915-335 for instructions when using fixture STD 62532.

(a) Install union in P_3 port of actuator.

(b) Install tee in P (Sig) port of actuator. (See figures 5-57 and 5-58).

(c) Connect 1/4-inch hoses as follows: from air-pressure gage-console regulator to union on actuator, from signal pressure gage on console to tee installed in actuator, and from other port on tee to P_3 port on fuel control.

(d) Turn regulator valve until P_3 gage on right side of console indicates 40 psi (2812.3 gm sq cm).

NOTE

This pressure must be maintained throughout the test.

(e) Turn N_1 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates fuel flow above 816 phr.

(f) Turn N_2 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates 784 to 816 phr. Adjust N_1 speed until actuator closes. Record actual fuel flow and N_1 speed. Actuator should close with N_1 speed within 3,970 to 4,050 rpm.

(g) Turn N_1 SPEED SELECTOR knob until actuator opens. Record actual fuel flow and N_1 speed. Actuator should open with N_1 speed within 3,907 to 3,973 rpm.

(h) Turn N_2 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates 392 to 408 phr. Adjust N_1 speed until actuator closes. Record actual fuel flow and N_1 speed. Actuator should open with N_1 speed within 3,372 to 3,452.

(i) Turn N_1 SPEED SELECTOR knob until actuator opens. Record actual fuel flow and N_1 speed. Actuator should open with N_1 speed within 3,320 to 3,380 rpm.

(j) Turn N_2 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates 220 to 230 phr. Adjust N_1 speed until actuator closes. Record actual fuel flow and N_1 speed. Actuator should close with N_1 speed within 3,175 to 3,225 rpm.

(k) Turn N_1 SPEED SELECTOR knob until actuator opens. Record actual fuel flow and N_1 speed. Actuator should open with N_1 speed within 3,132 to 3,192 rpm.

(l) Turn regulator valve on console until P_3 gage on right side of console indicates 85 psi (5976.1 gm sq cm). Adjust N_1 speed until actuator closes. Reference gage on left side of console should indicate 84 psi (5905.8 gm sq cm) minimum.

(m) Turn regulator valve until P_3 gage indicates 0 psi. Disconnect hose from P_3 port on fuel control.

(11) Leakage test.

(a) Turn N_1 and N_2 SPEED CONTROL knobs until SPEED INDICATOR readout indicates that N_1 and N_2 speeds are at zero rpm.

NOTE

Read N_2 speed on SPEED INDICATOR readout by placing TACH. SEL. SWITCH in the N_2 position.

(b) Turn PB REG. knob until 45 to 50 psi (3163.8 to 3515.4 gm sq cm) is indicated on FUEL INLET PRESS. gage.

(c) Using suitable graduated beakers, check for leakage through N_1 and N_2 drive seals. Leakage through N_1 drive seal shall not exceed 0.6 cc per minute (12 drops per minute). Leakage through N_2 drive seal shall not exceed 0.4 cc per minute (8 drops per minute.) There shall be no other external leakage.

(d) Repeat preceding step (a) until 4,250 to 4,350 N_1 rpm and 4,580 to 4,620 N_2 rpm has been obtained.

(e) Turn PN (FLOW) valve until CONTROL DISCHARGE PRESS. gage indicates 600 to 620 psi (42184 to 43390 gm sq cm).

(f) Using suitable graduated beakers, check for leakage through N_1 and N_2 drive seals. Leakage through N_1 drive seal shall not exceed 0.6 cc per minute (12 drops per minute). Leakage through N_2 drive seal shall not exceed 0.4 cc per minute (8 drops per minute). There shall be no other external leakage.

(12) 100°F (37.8°C) acceleration and face cam schedule test.

(a) Adjust knob in refrigeration and heating unit to bring T_1 temperature to 100°F (37.8°C). Read temperature on T_1 temperature readout indicator.

(b) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 1,194 to 1,204 rpm.

(c) Check fuel flow on MAIN FUEL DISCHARGE gage. fuel flow shall be within 94 to 112 phr. Record actual fuel flow.

(d) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 2,896 to 2,904 rpm.

(e) Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 318 to 350 phr. Record actual fuel flow.

(f) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates an N_1 speed of 3,696 to 3,704 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 643 to 701 phr. Record actual fuel flow.

(g) Set P_1 gage at 22. 5 inches Hg.

(h) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 652 to 678 phr. Check N_1 speed on SPEED INDICATOR readout. The N_1 speed shall be within 4,425 to 4,489 rpm. Record actual N_1 speed. If N_1 speed is not within limits, check military trim and adjust, if necessary. Repeat steady state, droop schedule, and face cam tests.

NOTE

If trims are adjusted, repeat steady state test (preceding step (4) and N_1 droop test (preceding step (6)).

(i) If limits still cannot be met, reject fuel control.

(j) Turn P_1 PR. REG. knob to readjust P_1 pressure gage to pressure obtained in Step b(1)(o).

(13) -30°F (-34°C) acceleration and face cam schedule test.

(a) Adjust temperature control knob on heating and refrigeration unit until T_1 temperature readout instrument indicator indicates a T_1 temperature of -27° to -33°F (-33° to -36°C) has been reached.

(b) Set P_1 gage at 11 inches Hg.

(c) Turn N_1 SPEED CONTROL knob until SPEED INDICATOR readout indicates 3,896 to 3,904 rpm. Check fuel flow on MAIN FUEL DISCHARGE gage. Fuel flow shall be within 391 to 441 phr. Record actual fuel flow.

(d) Set P_1 gage at 22. 5 inches Hg.

(e) Turn N_1 SPEED CONTROL knob until MAIN FUEL DISCHARGE gage indicates 842 to 874 phr. Check N_1 speed on SPEED INDICATOR readout. The N_1 speed shall be within 4,356 to 4,463 rpm. Record actual N_1 speed.

NOTE

If limits cannot be met, reset trims and repeat preceding step (4), step (6), step (12) (h) and (i), and face cam test.

(f) After final trim adjustment is made, tighten trim lockscrew to 26 to 30 pound-inches (4644 to 5358 gm cm) torque.

(g) If limits cannot be met, reject fuel control.

(h) Turn P_1 PR REG. knob to readjust P_1 pressure gage to pressure obtained in preceding step b(1).

(14) N_1 power lever torque check (control not running).

(a) Remove quadrant assembly from N_1 power lever.

(b) Using torquemeter, TQ-4AL, or equivalent, splined to N_1 power lever, check torque from 0 to 100 degrees; torque shall be 15 pound-inches (2,679 gm cm) maximum. Check torque from 100 to 0 degrees; torque shall be 25 pound-inches (4,465 gm cm) maximum.

(c) If torque exceeds limits, reject fuel control.

(15) Inlet guide vane test.

(a) Remove caps from two inlet guide vane ports on fuel control.

(b) Connect two 1/4-inch hoses from inlet guide vane ports to two suitable pressure gages.

(c) Turn N_1 SPEED SELECTOR knob until MAIN FUEL DISCHARGE gage indicates 600 phr.

(d) Turn valve provided on control discharge line until CONTROL DISCHARGE PRESSURE gage indicates 50 psi (3515.4 gm sq cm).

(e) Turn N_1 SPEED SELECTOR knob until SPEED INDICATOR readout indicates 3,988 to 3,996 rpm.

(f) Move IGV lever until gage readings are within 20 psi (1,406 gm sq cm) of each other.

(16) Preserve fuel control as outlined in Chapter 8.

5-161. MODIFICATION OF FUEL REGULATOR. Modification will be performed IAW DMWR 55-2915-322.

5-162. MODIFICATION OF MAIN FUEL REGULATOR. Modification will be performed IAW DMWR 55-2915-335.

SECTION VI. ACCESSORIES

5-163. AIR INLET GUIDE VANE ACTUATOR.

5-164. DISASSEMBLY. Proceed as follows:

a. Remove screw (16, figure 5-59), flat washers (17), ring retainer (18), and internal retaining ring (19). Remove actuator housing (20) from actuator housing (28). Remove packing (21) from housing (20).

b. Straighten bolt retainer (14) to permit removal of screw (13). Using a 3/8-inch wrench on hex end of actuator piston (22), prevent piston from turning while removing screw (13). Remove bolt retainer (14), bearing connector (15), and pin (10).

c. Remove piston (22) from housing (28). Remove packing (25 and 26) from piston.

d. Using etching tool, etch a match mark on face of feedback control lever (8 or 9) from lever (11) to ensure proper assembly.

e. Remove nut (7), flat washers (6), and bolt (5). Separate lever (8 or 9) from lever (11). Remove lever (11) from sleeve bearings (12).

f. Remove packings (23 and 24) from housing (28).

g. Remove union (3) and reducer (1). Remove packings (2 and 4).

5-165. CLEANING. Clean assembled air inlet guide vane actuator as follows:

a. Clean assembly using the dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E).

CAUTION

Do not exceed 170°F as Titanium alloy parts of this assembly will be attacked by the cleaning solution.

b. Prepare cleaning solution (8 oz. of TURCO Compound, item 337, table C–1 or equivalent with 1 gal. of water) and heat to a temperature of 160° to 170°F. Maintain this temperature range.

CAUTION

Do not exceed 30 minutes. Beyond this maximum time limit, Titanium alloys parts will be attacked by this cleaning solution.

c. Immerse assembly in above cleaning solution for a period of 15 to 30 minutes.

d. Remove assembly from cleaning solution and pressure rinse in clear water.

e. Dry parts with clean, dry compressed air, then coat assembly with lubricating oil (item 192, table C–1.)

5-166. INSPECTION. Perform specific inspections listed in table 5-35.

5-167. REPAIR. (See figure 4-27.) Proceed as follows:

a. Repair bent tube assembly (19) as follows:

(1) Cold-straighten tube assembly manually while restrained in a vise. Check for alignment by measuring for deflection.

(2) Perform a dye-penetrant inspection of straightened tube assembly. Cracks are not acceptable.

b. Chrome-plate 0. 497 to 0.499 inch (1.262 to 1.267 cm) diameter on actuator piston (22, figure 5-59) as follows:

(1) Chrome-plate as outlined in SP No. 6014 in Appendix E, to obtain 0.002 to 0.010 inch (0.0050 to 0.025 cm) maximum thickness after final grind.

(2) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(3) Machine to dimension shown in figure 5-61.

c. Replace damaged linkage bearings (11, figure 4-27), as follows:

CAUTION

In following step (1), do not damage housing bore.

(1) Using suitable drift and mallet, drive bearings from housing.

(2) Using soft-faced mallet, tap new bearing into housing.

d. Repair 1. 874 to 1.877 (4.760 to 4.768 cm) cylinder ID on actuator housing, (28, figure 5-59), (P/N 1-180-106-01 only) as follows:

(1) Machine (only as necessary) to remove score/wear marks and polish to remove tool marks. Surface finish of 16 RMS is required. Do not exceed a maximum ID of 1.877 (4.768 cm) or an out of round of 0.002 inch (0.005 cm).

(2) Anodize reworked area.

5-168. REASSEMBLY. Proceed as follows:

a. Install sleeve bearings (12, figure 5-59) on actuator lever (11). Insert lever (11) into actuator housing (28). Install feedback control lever (8 or 9) on lever (11) so that matchmarks on levers are aligned. Secure lever (8 or 9) to lever (11) with flat washers (6), bolt (5), and nut (7).

b. Install packings (23 and 24) into housing (28). Install packings (25 and 26) on piston (22).

c. Insert piston (22) into housing (28). Insert pin (10) into lever (11) and engage connector (15) with pin. Lower connector onto piston (22).

d. Install retainer (14) and secure with screw (13). Using 3/8-inch wrench on hex end of piston, tighten screw (13) to 50 to 55 pound-inches (8930 to 9823 gm cm) torque.

NOTE

In following step, several screws may have to be tried to obtain proper alignment.

e. Check for proper alignment of screw slots and connector (15). (See figure 5-62.) If proper alignment is obtained, stake retainer in four places as shown in figure 5-62.

NOTE

In following step f, the seal drain is the port which is at a 45-degree angle to the housing.

f. Using wrench on hex end of actuator piston (22, figure 5-59), turn piston so that output in spherical bearing connector (15) is facing toward seal drain port.

g. Install packing (21) on housing (20). Place housing (20) into housing (28). Ensure drain port faces lever (8 or 9). Install retaining ring (19). Insert retainer (18) into housing (28) and align retainer with housing to allow installation of washers (17). Rotate housing to align screw holes in housing with screw holes in retainer (18). Install washers (17) and screws (16). Tighten screws and lockwire.

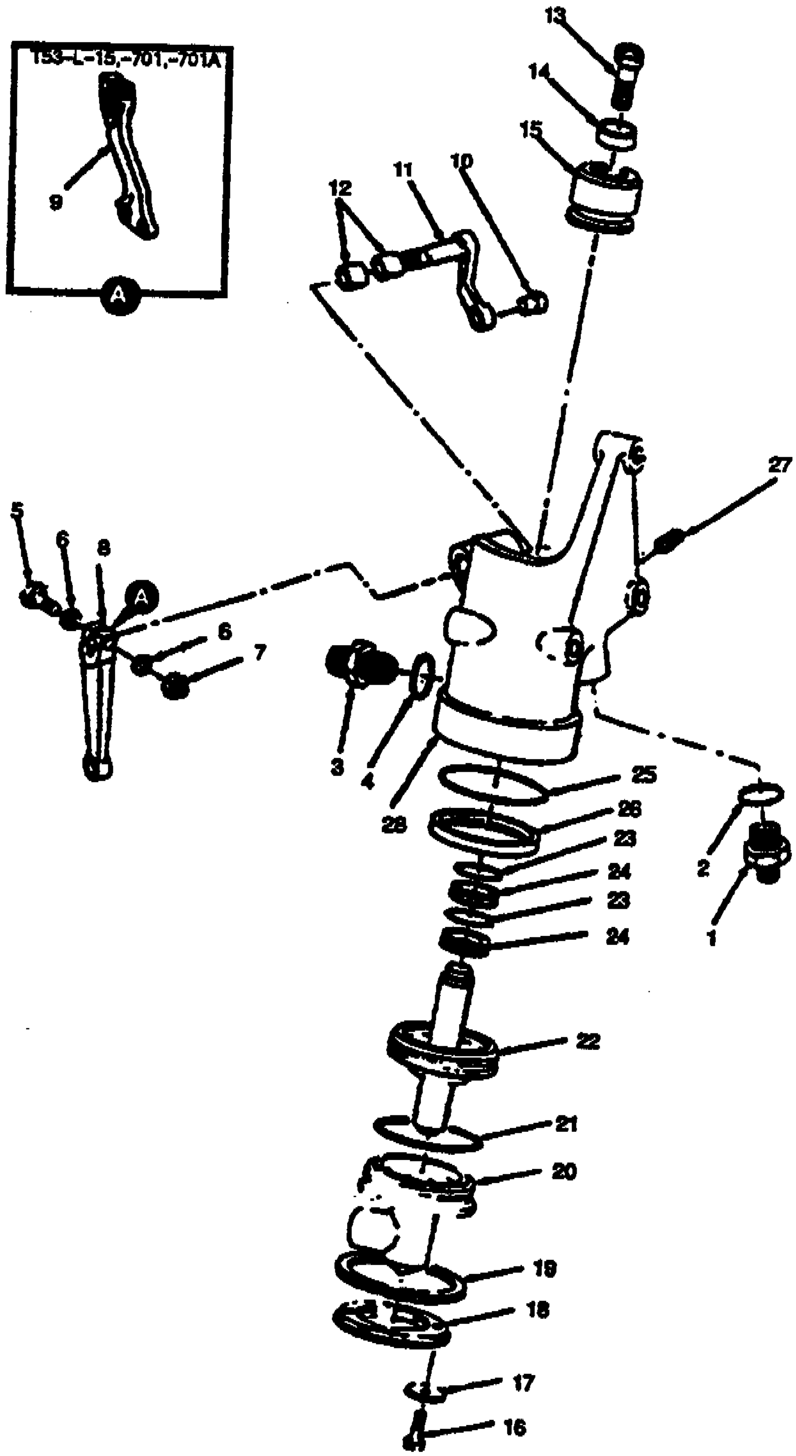


Figure 5-59. Air Inlet Guide Vane Actuator Assembly.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-59	No Number	INLET GUIDE VANE ACTUATOR ASSEMBLY AND RELATED PARTS (NHA 1-000-060-10, 1-000-060-22, 1-000-100-01, 1-000-110-01, 1-000-110-03, 1-000-110-07, 1-000-060-23, 1-170-330-06, 1-170-330-09, 1-170-330-13, AND 1-170-330-21)	Ref	
-1	MS24399D3	. REDUCER, Flared tube	1	
-2	M83248/1-904	. PACKING, Fuel resistant	1	
-3	AN815-4D	. UNION, Flared tube (Replace with MS24392J4)	1	
-	MS24392J4	. TUBE, Nipple	2	
-4	MS29512-04	. PACKING, Fuel resistant (Replace with M83248/1-904)	1	
-	M83248/1-904	. PACKING	2	
-	1-180-150-01	. ACTUATOR ASSEMBLY, Inlet guide vane	1	A,B
-	1-180-150-02	. ACTUATOR ASSEMBLY, Inlet guide vane	1	C,D,E
-5	AN101016	. . BOLT, Hex head	1	
-6	AN960-10L	. . WASHER, Flat	2	
-7	MS21042-3	. . NUT, Self-locking	1	
-8	1-180-105-02	. . LEVER, Feedback control	1	A,B
-9	1-180-105-04	. . LEVER, Feedback control	1	C,D,E
-10	1-180-104-01	. . PIN, Straight, headed	1	
-11	1-180-103-03	. . LEVER, Actuator	1	
-12	4-6L8D	. . BEARING, Sleeve (96881) (Lycoming Spec Cont Dwg 1-300-339-01)	2	
-13	AN501C416-8	. . SCREW, Machine (Replace with 1-180-135-01)	1	
	1-180-135-01	. . SCREW, Cross slotted (Make from AN501C416-8)	1	
-14	1-180-109-02	. . RETAINER, Bolt	1	
-15	1-180-101-01	. . CONNECTOR, Spherical bearing	1	
-16	AN500AD5-5	. . SCREW, Machine	2	
-17	1-180-114-01	. . WASHER, Flat	2	
-18	1-180-111-01	. . RETAINER, Ring	1	
-19	RRN200CJ	. . RING, Retaining, internal (80756) (Lycoming Spec Cont Dwg 1-300-344-01)	1	
-20	1-180-107-01	. . HOUSING, Actuator	1	
-21	MS9021-030	. . PACKING	1	
-22	1-180-108-01	. . PISTON, Actuator	1	
-23	MS9021-014	. . PACKING	2	

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-59 -24	S12604-014	. . PACKING (09257) (Lycoming Source Cont Dwg 1-300-355-01)	2	
	EIER-014	. . PACKING, (15211) (Alternate) (Lycoming Source Cont Dwg 1-300-355-02)	2	
-25	MS29513-223	. . PACKING	1	
-26	KEX6223	. . PACKING (07322) (Lycoming Source Cont Dwg 1-300-354-01)	1	
-27	156101	. . PLUG ASSEMBLY, Actuator (92555) (Lycoming Spec Cont Dwg 1-300-346-01)	1	
-28	1-180-106-01	. . HOUSING, Actuator	1	

Table 5-35. Inspection of Air Inlet Guide Vane Actuator Assembly

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-27				
-3	Support	Visual	Cracks	Not allowed. Replace
-11	Rod End Bearings	Visual	Damaged threads	Not allowed. Replace
			Excessive bearing wear, incorrect bearing movement, and binds	Not allowed. Replace. (Refer to paragraph 5-167)
-19	Tube Assembly	Visual	Cracks	Not allowed. Replace
		SIE and Visual	Bent tube	(Refer to Table 5-36)
5-59				
-12	Sleeve Bearings	Visual	Damage	Not allowed. Replace. (Refer to paragraph 5-167)
-11	Actuator Lever	Visual	Bending or distortion	Not allowed. Replace
			Stripped or worn serrations on lever	Not allowed. Replace
			Worn or damaged guide pin	Not allowed. Replace
		Visual	Cracks in areas adjacent to bolt holes	Not allowed. Replace
-10	Pin	Visual	Cracks	Not allowed. Replace
-15	Spherical Bearing Connector	Visual	Wear, scoring, or cracks	Not allowed. Replace
-22	Actuator Piston	SIE and Visual	Wear or scoring on piston OD. (Refer to table 5-37 for dimensional limits)	Not allowed. Replace
			Cracks	Not allowed. Replace
			Damage to chrome-plated areas	Repair. (Refer to paragraph 5-167)
-20	Actuator Housing	Visual	Cracks	Not allowed. Replace
			Scoring and damaged threads	Not allowed. Replace
		SIE and Visual	Dimensions for acceptable limits. (Refer to table 5-37)	Repair or replace, as required. (Refer to paragraph 5-167)
			Nicks, burrs, and scratches	Repair. (Refer to SP No. 5000 in Appendix E)

Table 5-35. Inspection of Air Inlet Guide Vane Actuator Assembly

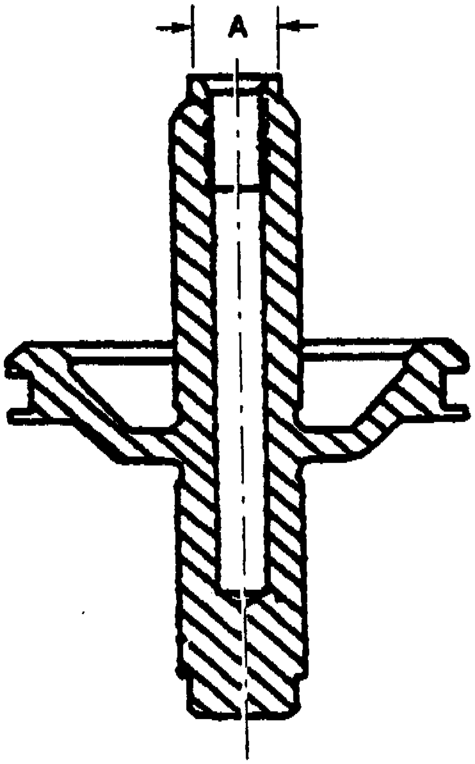
FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-27 -28	Actuator Housing (Cont)	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
			Cracks	Not allowed. Replace
			Wear or scoring on cylinder ID	Repair (Refer to paragraph 5-167)
			Worn or damaged linkage bearings	Replace. (Refer to paragraph 5-167)
		SIE and Visual	Dimensions for acceptable limits, (refer to table 5-37)	Replace if limits are not met
			Nicks, burrs, and scratches	Repair. (Refer to SP No. 5000 in Appendix E)
-8 or 9	Feedback Control Lever	Visual	Bends or distortion. Stripped or worn serrations on lever	Not allowed. Replace
			Elongated or deformed bolt holes	Not allowed. Replace
			Distortion or galling on splines	Not allowed. Replace
			Cracks in areas adjacent to bolt holes	Not allowed. Replace
			Cracks	Not allowed. Replace
		SIE and Visual	Excessive play between lever and housing	0.010 inch (0.025 cm) max, repair or replace if beyond above limits
			Excessive play in circumferential direction	0.030 inch (0.076 cm) max, repair or replace if beyond above limits
			Bending or distortion	Measure from tip of housing bottom to center line for bolt hole in lever, distance may be 3-5/8 (9.208 cm) to 4-1/8 inch (10.795 cm)

Table 5-36. Inlet Guide Vane Actuator Assembly Inspection Limits

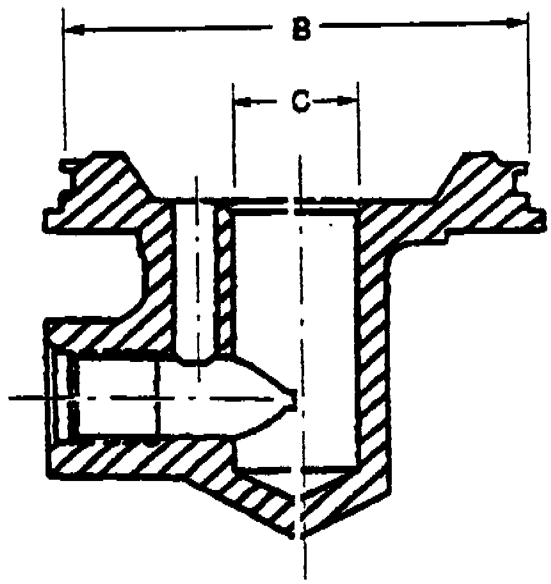
DEFECT	FIGURE REFERENCE	INSPECTIONS LIMITS
Bent Tube Assembly		Lay tube assembly on a flat surface and dimensionally inspect for bending a. Bending up to 1/4 inch (0.635 cm) along entire length is acceptable for repair. (Refer to paragraph 5-167) b. Replace twisted, cracked, or distorted tubes and tubes which exceed above limit

Table 5-37. Dimensional Inspection of Air Inlet Guide Vane Actuator Assembly

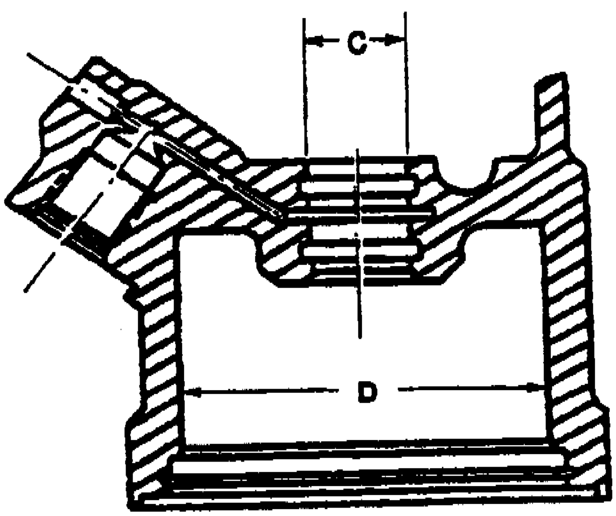
NOMENCLATURE	FIG. & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-59								5-60
Actuator Piston	22	OD	0.497 (1.262)	0.499 (1.267)	0.496 (1.260)	0.499 (1.267)			A
Actuator Housing	20	OD	1.871 (4.752)	1.872 (4.755)	1.870 (4.750)	1.872 (4.755)			B
		ID	0.500 (1.27)	0.502 (1.275)	0.500 (1.27)	0.505 (1.283)			C
Actuator Housing	28	ID	1.874 (4.760)	1.876 (4.765)	1.874 (4.760)	1.877 (4.768)			D
		ID	0.500 (1.27)	0.502 (1.275)	0.500 (1.27)	0.505 (1.283)			C



ACTUATOR PISTON (22, Figure 5-59)



ACTUATOR HOUSING (20, Figure 5-59)



ACTUATOR HOUSING (28, Figure 5-59)

Figure 5-60. Air Inlet Guide Vane Actuator Assembly Dimensional Inspection Locations.

NOTE

On T53-L-701A measure from run hole on lever 9.

h. Measure from tip of housing bottom to center line for bolt hole in lever (9), distance may be 3-5/8 (9.208 cm) to 4-1/8-inch (10.795 cm).

NOTE

The following washers may be used in lieu of flat washer P/N AN 96010L, flat washer P/N 1-160-605-01 (NSN 5310-00-088-8008), flat washer P/N P24532 (NSN 5310-00-530-4114).

i. Install packings (2), reducer (1), and union (3) into housing (28).

j. If removed, install plug assembly (27).

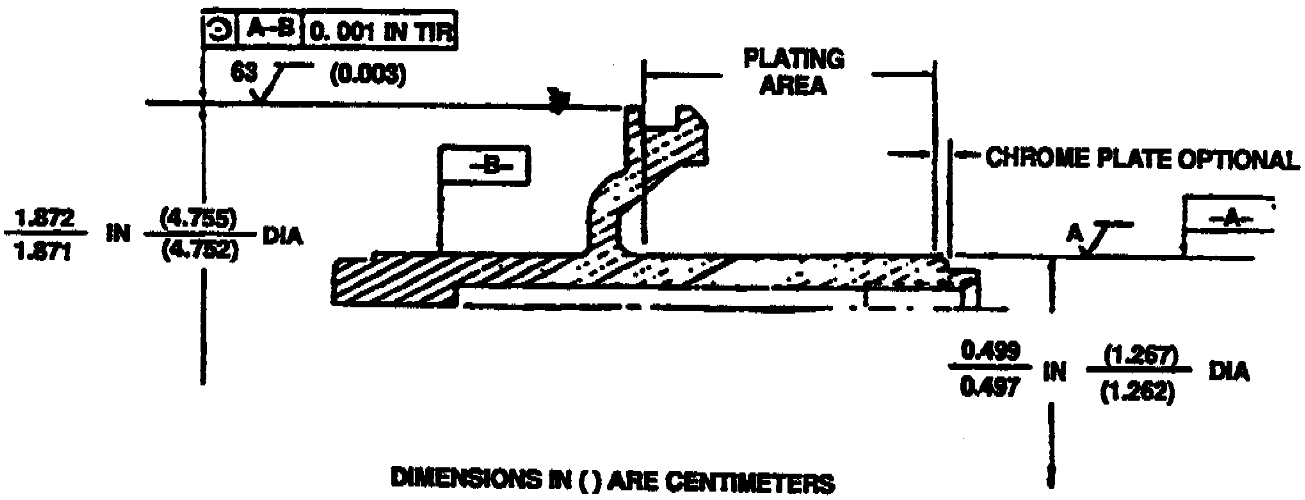


Figure 5-61. Air Inlet Guide Vane Actuator Piston Plating Areas.

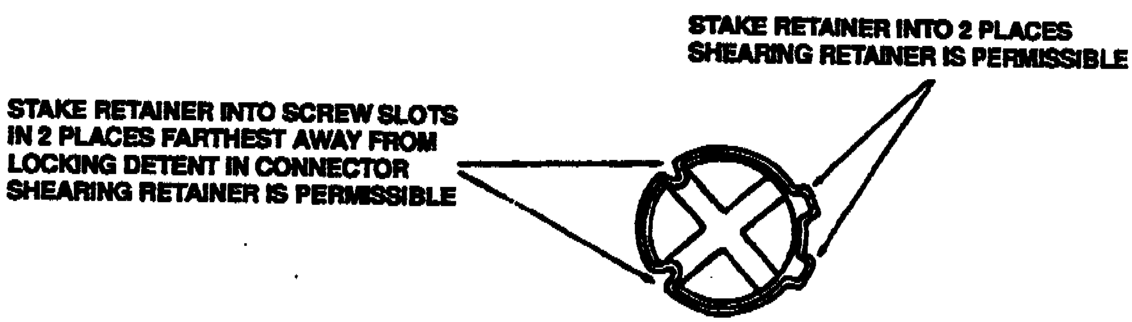


Figure 5-62. Staking of Retainer.

WARNING

FLIGHT SAFETY PARTS

Verification that part passes functional test is flight safety critical.

5-169. FUNCTIONAL TEST. (See figure 5-59.) Proceed as follows:

NOTE

Perform the following test using calibrating fluid (item 68 or 69, table C–1 heated to 70° to 90°F (21° to 32°C).

a. Connect hose from OUTLET NO. 1 HIGH PRESSURE port of test stand (LTCT314), or equivalent, to seal drain port on air inlet guide vane actuator.

b. Apply pressure to seal drain port until GAGE NO. 1 HIGH PRESSURE gage indicates 500 psi (35154 gm sq cm).

c. With pressure applied to seal drain port, visually inspect plug, located adjacent to drain port, for leakage. No leakage is allowed.

d. Decrease pressure at seal drain port to zero. Remove hose.

e. Connect hose from the OUTLET NO. 1 HIGH PRESSURE port to cylinder port number two.

f. Position two 25-cubic-centimeter beakers under actuator seal drain port and port number one.

g. Apply pressure to port number two until GAGE NO. 1 HIGH PRESSURE gage indicates 500 psi (35154 gm sq cm). Maintain pressure for 1 minute.

h. Inspect actuator for leakage. Leakage through seal drain port shall not exceed one cubic centimeter per minute. Leakage through cylinder port number one shall not exceed 10 cubic centimeters per minute.

i. Decrease pressure at cylinder port number two to zero. Remove hose.

j. Install suitable indicator on actuator and check pressure required to move actuator piston in either direction by applying pressure to port number one and then to port number two. Pressure required to move piston shall not exceed 10 psig (703.1 gm sq cm).

k. Reject all actuators that do not meet above requirements.

5-170. BLEED AIR ADAPTER ASSEMBLY.

5-171. DISASSEMBLY. Disassembly is not required.

5-172. CLEANING. Clean all parts of bleed air adapter assembly using dry solvent method. (Refer to SP No. 3002 in Appendix E.)

5-173. INSPECTION. Perform specific inspections listed in table 5-38.

Table 5-38. Inspection of Bleed Air Adapter Assembly.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-28				
-1	Bleed Air Adapter Elbow	Visual	Nicks, dents, or burrs	Blend-repair. (Refer to SP No. 5000 in Appendix E)
		Visual and Fluorescent Penetrant	Cracks	Not allowed. Repair
-3	Bleed Air Crossover Tube	Visual	Cracks	Not allowed. Replace
			Nicks, dents, or burrs	Blend-repair. (Refer to SP No. 5000 in Appendix E)
			Loss or protective finish (anodize)	Repair. (Refer to SP No. 6016 in Appendix E)
-4 or -9	Bleed Air Adapter Assembly	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
		Visual	Corrosion	Repair. (P/N 1-170-220-01, refer to SP No. 6026 in Appendix E.) (P/N 1-170-710-02, refer to SP No. 6011 in Appendix E).

5-174. REPAIR. (See figure 4-28.) Proceed as follows:

a. Blend-repair nicks, dents or burrs on bleed air adapter elbow (1) and bleed air crossover tube(3) as outlined in SP No. 5000 in Appendix E.

b. Repair damaged threads on bleed air adapter assembly (9) as outlined in SP No. 5007 in Appendix E.

c. Repair loss of protective finish on bleed air crossover tube (3) as outlined in SP No. 6016 in Appendix E.

d. Replace all other defective parts.

5-175. REASSEMBLY. Reassembly is not required.

5-176. FUNCTIONAL TEST. Functional test is not required.

5-177. POWER DRIVEN ROTARY (BOOSTER) PUMP.

5-178. DISASSEMBLY. Proceed as follows:

NOTE

The following procedure applies to pump, P/N RG17670 and RG17670A.

a. Remove three screws, AN505-10R15, from drive end housing (1, figure 5-63); then separate drive end housing from housing assembly (2). Discard preformed packing (3).

NOTE

In following step b, take care when removing drive shaft (12) to prevent loss of pins (7). Retaining ring (8) need not be removed.

b. Remove scavenge gerotors (10 and 11), pins (7), thrust plate (9), drive shaft (12), and pressure gerotors (4 and 5) from housings.

NOTE

The following procedure applies to pump, P/N GC1608.

c. Remove screws (11, figure 5-65) and separate housing assembly (1) from head, bearing, and inserts assembly (1). Discard packings (2).

d. Remove scavenge gerotors (8 and 9), pilot plate (7), drive shaft (4) with key (3), and pressure gerotors (5 and 6) from housings.

NOTE

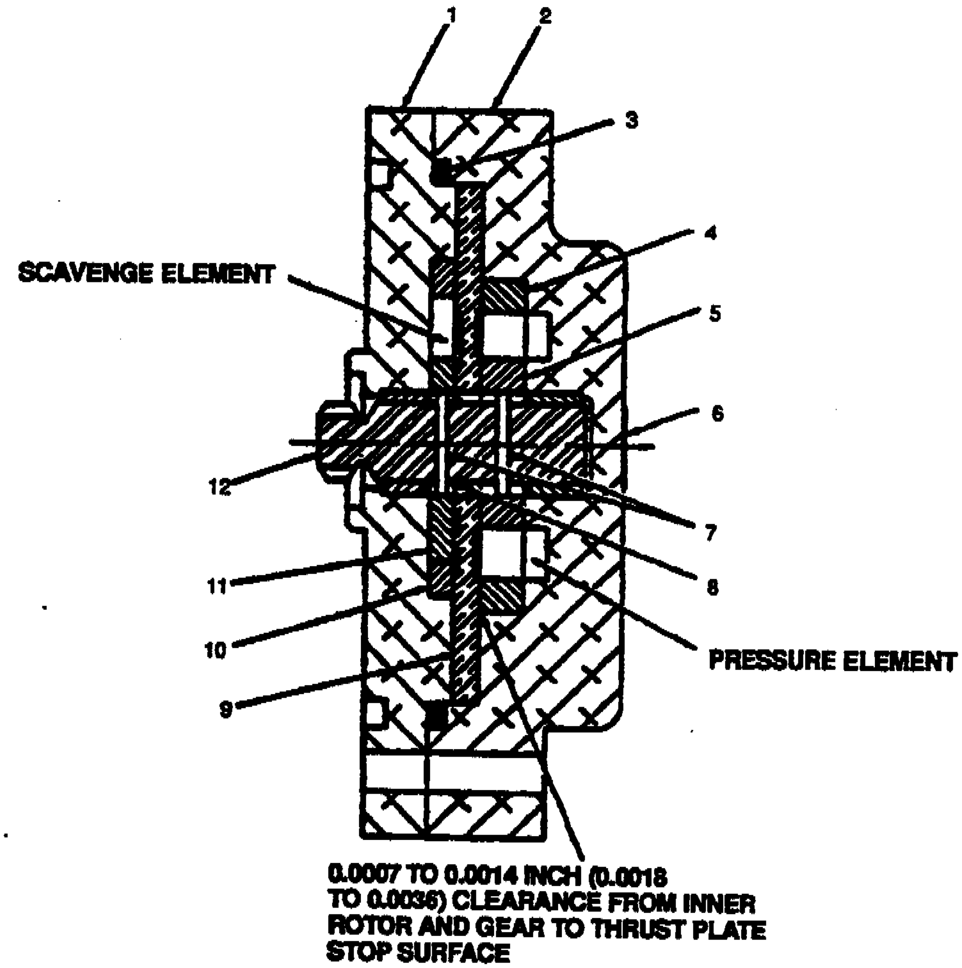
Take care when removing drive shaft (4) to prevent loss of key (3).

5-179. CLEANING. Clean all parts of pump using dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

5-180. INSPECTION. Perform specific inspections listed in table 5-39.

Table 5-39. Inspection of Power-Driven Rotary (Booster) Pump.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-63 5-65	Power-Driven Rotary (Boost) Pump (RG17670, RG17670A) and GC1608	Visual	Damaged or excessive wear. (All parts)	None allowed. Replace
			Missing or mutilated data plate	Repair. (Refer to paragraph 5-181).



DIMENSIONS IN ( ) ARE CENTIMETERS.

1. Drive end housing (RG17671)
2. Housing Assembly (RD17672)
3. Performed packing (MS29561-146)
4. Pressure gerotor (outer) (RS26057-8G)
5. Pressure geroter (inner) (RS26058-8-TG)
6. Identification plate (RB17676)
7. Headless pin (RA17789)
8. Retaining ring (RB13005-6B)
9. Thrust plate (RD17674)
10. Scavenge gerotor (outer) (RS26057-2G)
11. Scavenge gerotor (inner) (RS26058-2-TG)
12. Drive shaft (RD17675)

Figure 5-63. Power-Driven Rotary (Booster) Pump, P/N RB17670 and RG17670A.

5-181. REPAIR. Repair missing or mutilated data plate as follows:

a. Determine proper identification. (See figure 5-64.)

b. Using vibropeen etching tool, identify pump. (See figure 5-64.)

NOTE

Depth of marking shall be within 0.001 to 0.006 inch (0.003 to 0.015 cm).

c. Loss of serial number does not constitute cause for rejection. New serial number is not required.

5-182. REASSEMBLY. Proceed as follows:

a. Reassembly power-driven rotary (booster) pump P/N RG17670 and RG17670A, as follows:

(1) Install pressure gerotors (4 and 5, figure 5-63) in housing assembly (2).

(2) Insert drive shaft (12) through pressure gerotors (4 and 5) and into housing assembly (2).

NOTE

Take care to prevent loss of headless pins (7) when installing drive shaft (12).

(3) Install thrust plate (9) over drive shaft and into housing assembly (2).

NOTE

Maintain required clearance between inner gerotor (5) and gear to thrust plate stop surface.

(4) Install scavenge gerotors (10 and 11) over drive shaft.

(5) Install new packings (3), and secure drive end housing (1) to housing assembly (2) with three screws, AN505-10R15, MS51959-67, or equivalent.

(6) Tighten screws evenly to 20 to 25 pound-inches (3572 to 4465 gm cm) torque.

NOTE

Ensure screw heads are flush with mounting surface.

b. Reassembly power-driven rotary (booster) pump, P/N GC1608, as follows:

CAUTION

In following step (1), take care when installing drive shaft (4) to prevent loss of key (3).

(1) Install key (3, figure 5-65) on drive shaft (4); then install gerotors (5 and 6), drive shaft with key, pilot plate assembly (7), and gerotors (8 and 9) in head, bearing, and inserts assembly (1) and housing assembly (10).

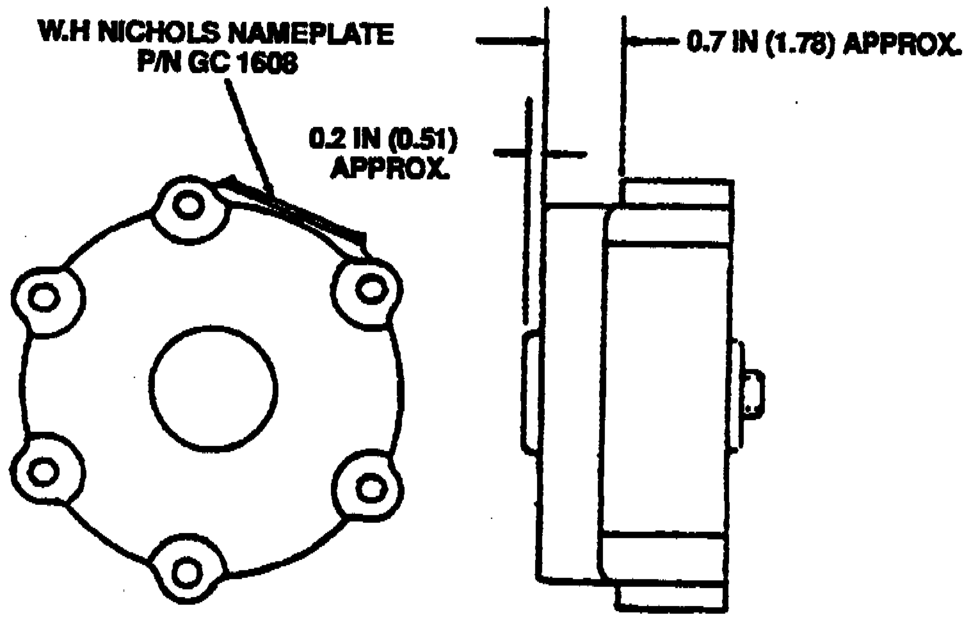
(2) Install packings (2) on head, bearing, and insert assembly (1) and housing assembly (10); then mate assemblies. Secure assemblies with screws (11). Tighten screws evenly to 20 to 25 pound-inches (3572 to 4465 gm cm) torque.

5-183. FUNCTIONAL TEST. (See figures 5-63 and 5-65.) Proceed as follows:

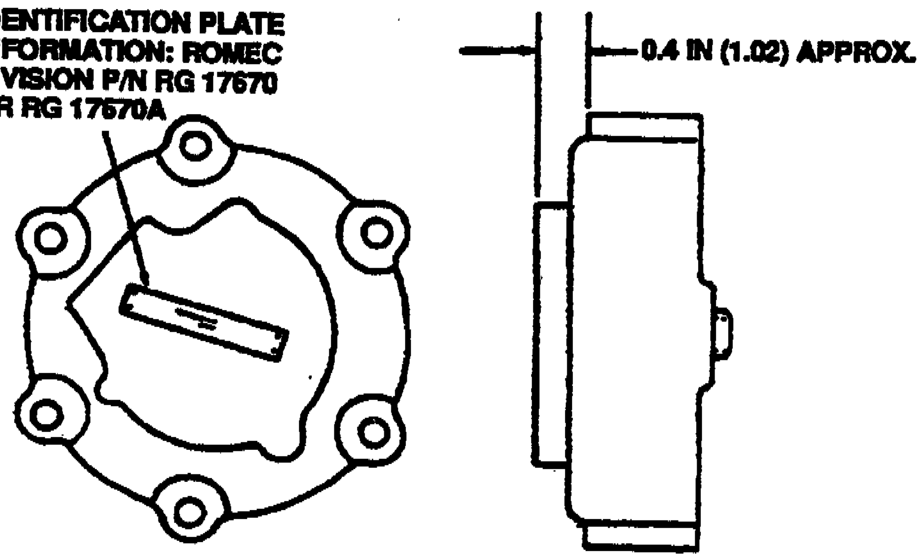
NOTE

Check rear of torquemeter oil pump test stand (LTCT422), or equivalent, for proper internal connections (figure 5-66) before performing the following test. Perform test, using lubricating oil (item 189 or 190, table C–1).

a. Using four bolts, secure pump to drive fixture of test stand. Tighten bolts, as necessary.



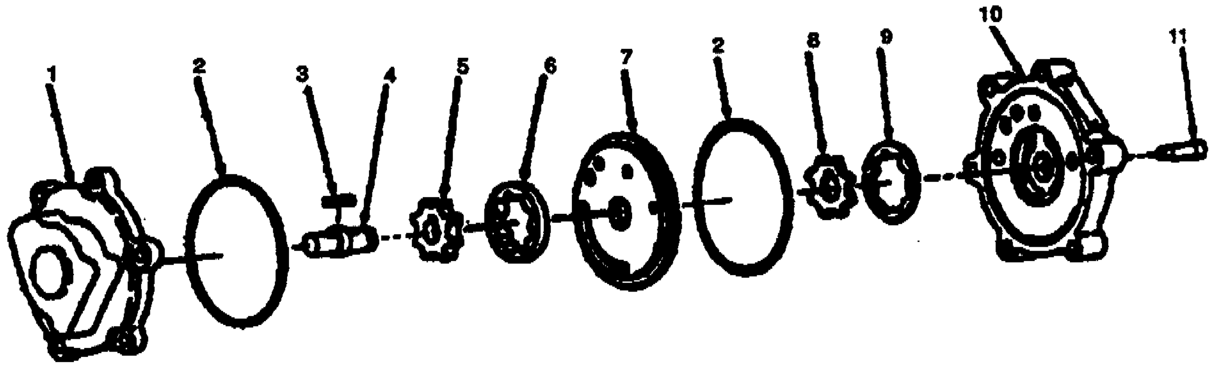
1-300-221-01 BOOSTER PUMP



1-300-221-02 BOOSTER PUMP

DIMENSIONS IN ( ) ARE IN CENTIMETERS

Figure 5-64. Booster Pump Identification.



1. Head, bearing, and inserts assembly (GA6046)
2. Packings (MS29561-230)
3. Key (GA6050)
4. Drive shaft (GB2446)
5. Inner gerotor (GA6048)
6. Outer gerotor (GA6049)
7. Pilot plate (GB2447)
8. Inner gerotor (GA4442)
9. Outer gerotor (GA4443)
10. Housing assembly (GA4437)
11. Screw (NAS608-632-12)

Figure 5-65. Power-Driven Rotary (Booster) Pump, P/N GC1608.

b. Connect all hoses as follows. (See figure 5-67.)

(1) Connect No. 6 (3/8-inch diameter) hose from MAIN ELEMENT INLET port of test stand to drive fixture.

(2) Connect No. 4 (1/4-inch diameter) hose from SCAVENGE ELEMENT DISCHARGE port on test stand drive fixture.

(3) Connect No. 4 (1/4-inch diameter) hose from SCAVENGE ELEMENT INLET port of test stand to drive fixture.

(4) Connect No. 8 (1/2-inch diameter) hose to MAIN ELEMENT DISCHARGE port of test stand; then install reducer, MS24399-12, in open end of hose. Connect No. 6 (3/8-inch diameter) hose from reducer to drive fixture.

c. Press STAND POWER, MOTOR GENERATOR, BOOST CIRCUIT PUMP, and DC DRIVE MOTOR switches on and observe that red indicator lamps light.

NOTE

All indicator lamps should light.

d. Turn DRIVE ROTATION SELECTOR knob to CCW.

e. Advance SPEED CONTROL knob until DRIVE SPEED indicator indicates 1,500 rpm.

f. Set HEATER switch to ON.

g. Permit test stand lubricating oil to attain operating temperature of 185° to 195°F (85° to 91°C). Read temperature on BOOST PUMP FUEL TEMPERATURE INDICATOR.

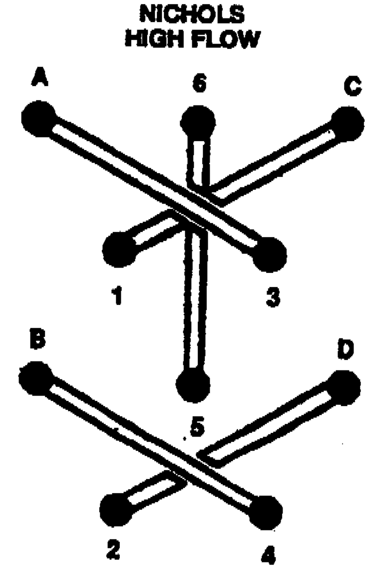


Figure 5-66. Internal Connections of Test Stand When Testing Booster Pump.

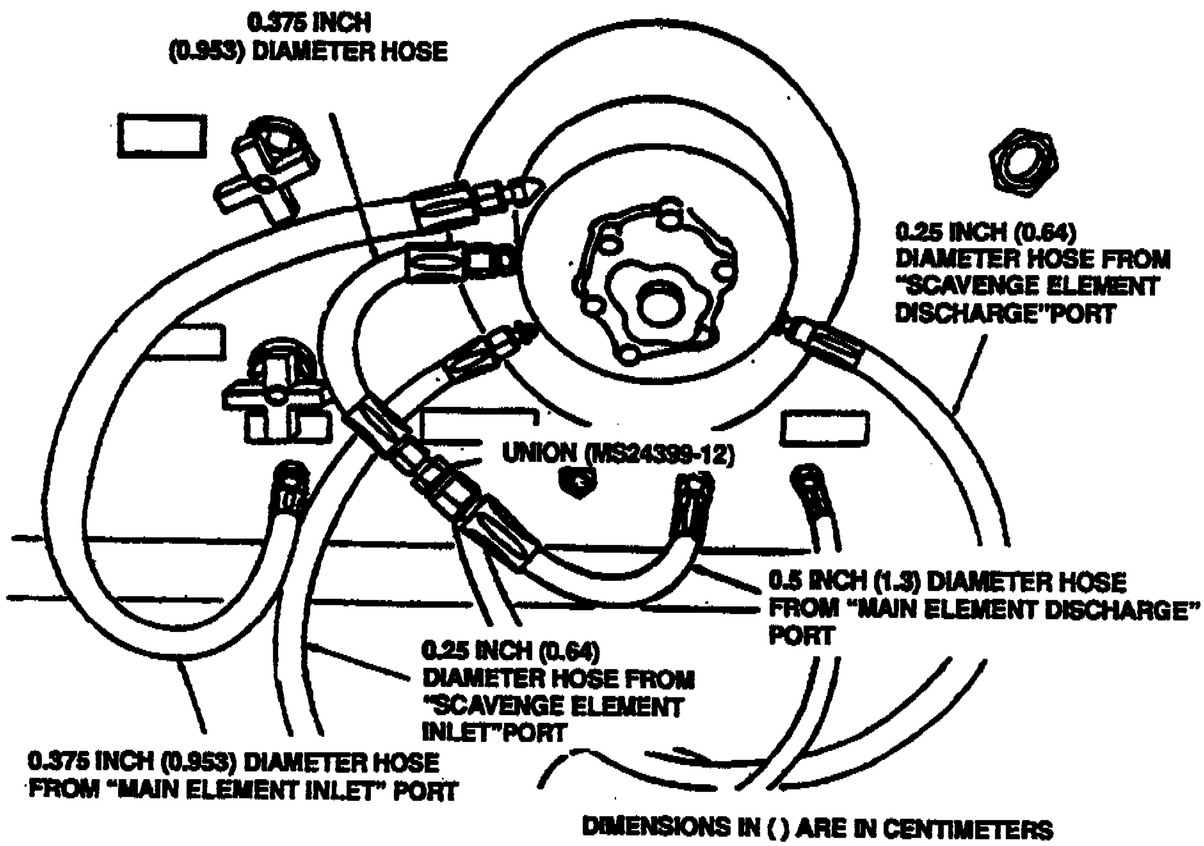


Figure 5-67. Booster Pump Installed on Test Stand.

h. Observe MAIN ELEMENT FLOW rotometer for indication of fluid flow.

NOTE

Float should rise partially in tube of rotometer to indicate that pump is primed and circulating fluid.

i. Open MAIN ELEMENT INLET THROTTLE, PUMP BYPASS, MAIN ELEMENT DISCHARGE PRESSURE, MAIN ELEMENT INLET PRESSURE, SCAVENGE ELEMENT DISCHARGE PRESSURE, SCAVENGE ELEMENT DISCHARGE THROTTLE, and MAIN ELEMENT DISCHARGE THROTTLE valves.

j. Adjust SCAVENGE INLET PRESSURE valve to maintain zero psi indication on SCAVENGE INLET PRESSURE indicator as SPEED CONTROL knob is advanced to obtain 4,200, plus or minus 50 rpm, indication on DRIVE SPEED indicator. Observe all remaining indicators and adjust accordingly.

k. Adjust SCAVENGE ELEMENT DISCHARGE THROTTLE valve until SCAVENGE ELEMENT DISCHARGE PRESSURE indicator indicates 50, plus or minus one psi (3515±70 gm sq cm) for GC1608 pump, or 60, plus or minus one psi (4128±70 gm sq cm) for RG17670 or RG17670A pumps.

l. Observes that fluid flow indicated on SCAVENGE ELEMENT FLOW rotometer exceed 260 phr, if lubricating oil (item 190, table C–1) is used, or 270 phr, if lubricating oil (item 189, table C–1) is used. If requirements cannot be met, reject pump.

m. Adjust MAIN ELEMENT DISCHARGE THROTTLE valve until MAIN ELEMENT DISCHARGE PRESSURE indicates discharge pressure 200, plus or minus one psi.

n. Adjust PUMP BYPASS valve until MAIN ELEMENT INLET PRESSURE indicator indicates 70, plus or minus one psi (4921±70 gm sq cm).

o. Observe that fluid flow, as indicated on MAIN ELEMENT FLOW rotometer, exceeds 520 phr, if lubricating oil (item 190, table C–1) is used, or 540 phr, if lubricating oil (item 189, table C–1) is used. If requirement cannot be met, reject pump.

p. Carefully perform the following simultaneously:

(1) Turn PUMP BYPASS valve to bring reading indicated on MAIN ELEMENT INLET PRESSURE gage to zero.

(2) Turn SPEED CONTROL knob to zero.

(3) Maintain zero reading on SCAVENGE INLET PUMP gage by turning SCAVENGE ELEMENT INLET THROTTLE valve.

q. When preceding step p has been accomplished, press CIRCUIT PUMP OFF button, this will also shut off DC DRIVE MOTOR system.

r. Remove bolts that secure pump to fixture. Remove pump.

s. Manually rotate pump to ensure freedom of movement in both directions. The maximum torque required to rotate pump shaft shall not exceed 24 ounce-inches (.17 N-m). If any binding is noted, reject pump.

SECTION VII. OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY

5-184. OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY.

5-185. DISASSEMBLY OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-13B, -703, -15). Proceed as follows:

a. Remove plug (1, figure 5-68) and packing (2).

b. If installed, remove filter plug (45 or 43) with packing (46); then remove packing from plug. Remove filter (44), filter assembly (47), if installed, and packing (49).

c. Straighten tabs on key washer (4). Using wrench (LTCT215), remove spanner nut (3) and key washer. Remove relief valve assembly (5).

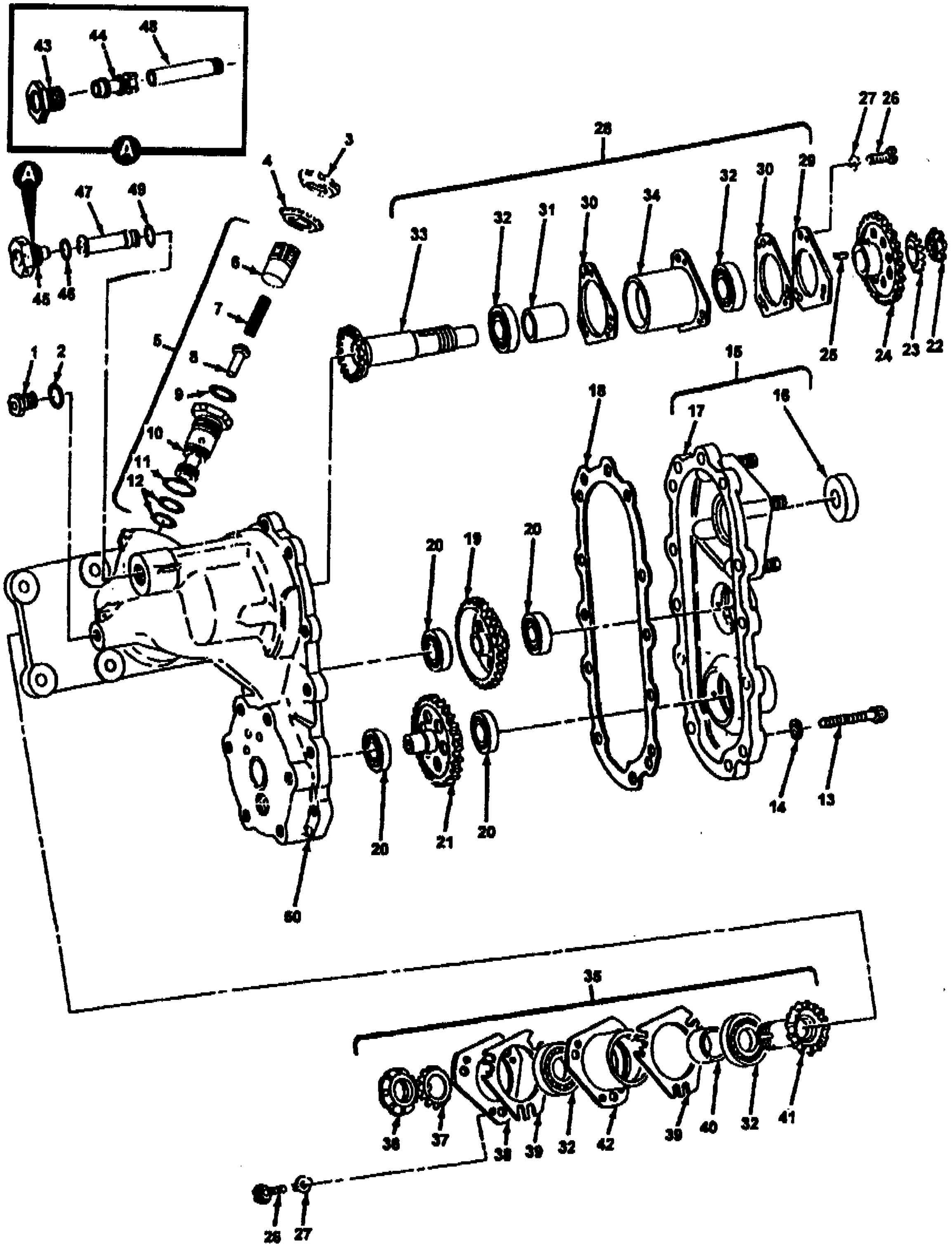


Figure 5-68. Overspeed Governor and Tachometer Drive Assembly (T53-L-13B, -15, -703).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-68	No Number	OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLE AND RELATED PARTS (NHA 1-000-060-10, 1-000-060-22, 1-000-100-01, 1-000-060-23, 1-170-330-06, 1-170-330-13 AND 1-170-330-21	Ref	A,B,C
	1-160-500-04	. DRIVE ASSEMBLY. Overspeed governor and tachometer	1	A,B,C
-1	STD3021-02	. . PLUG, straight thread	1	A,B,C
-2	NAS617-2	. . PACKING	1	A,B,C
	1-160-420-01	. . VALVE ASSEMBLY, Relief, torquemeter	1	A,B,C
-3	MS172322	. . . NUT, Spanner	1	A,B,C
-4	MS172272	. . . WASHER Key	1	A,B,C
-5	No Number	. . . VALVE ASSEMBLY, (Relief 1-160-500-04 and 1-160-420-01)	1	A,B,C
-6	1-160-425-01	. . . . SCREW, Adjusting	1	A,B,C
-7	1-160-452-01	. . . . SPRING, Relief valve	1	A,B,C
-8	1-160-427-01	. . . . PLUNGER Relief valve	1	A,B,C
-9	MS29561-014	. . . . PACKING	1	A,B,C
-10	1-160-424-01	. . . . Body, Relief valve	1	A,B,C
-11	NAS617-8	. . . . PACKING	1	A,B,C
-12	MS29561-014	. . PACKING	2	A,B,C
-13	AN103712	. . BOLT, Drilled hex head	12	A,B,C
-14	AN960-10L	. . WASHER, Flat	12	A,B,C
-15	No Number	. . COVER AND SEAL ASSEMBLY (NHA 1-160-500-04)	1	A,B,C
-16	4239-1	. . . SEAL, Plain encased (91251) (Lycoming Source Cont Dwg 1-300-235-02)	1	A,B,C
	514246	. . . SEAL, Plain, encased (24981) (ALTERNATE) (Lycoming Source Cont Dwg 1-300-235-03)	1	A,B,C
-17	1-160-450-01	. . . COVER ASSEMBLY	1	A,B,C
-18	1-160-443-01	. . . GASKET, Housing	1	A,B,C
-19	1-160-422-02	. . GEAR, Spur, intermediate	1	A,B,C

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-68-20	1902S301	. . BEARING, Ball (38433) (Lycoming Source Cont Dwg 1-300-003-01)	4	A,B,C
	PM9302KMBRE8 211	. . BEARING, Ball (21335) (Lycoming Source Cont Dwg 1-300-003-03)	4	A,B,C
	P9302KE8959	. . BEARING, Ball (21335) (Lycoming Source Cont Dwg 1-300-003-03)	4	A,B,C
-21	1-160-423-02	. . GEARSHAFT, Spur	1	A,B,C
-22	MS172238	. . NUT, Spanner	1	A,B,C
-23	MS172203	. . WASHER, Key	1	A,B,C
-24	1-160-419-02	. . GEAR, Spur	1	A,B,C
-25	STD3057-2	. . KEY Square	1	A,B,C
-26	1-160-451-01	. . SCREW, Machine, slotted	6	A,B,C
-27	STD3023K1	. . TABWASHER	6	A,B,C
-28	No Number	. . BEARING AND LINER ASSEMBLY (NHA 1-160-500-04)	1	A,B,C
-29	1-160-448-01	. . . PLATE Retainer, bearing	1	A,B,C
-30	1-160-439-01	. . . SHIM, Liner	AR	A,B,C
-31	1-160-418-01	. . . SPACER Sleeve	1	A,B,C
-32	1903S301	. . . BEARING Ball (38443) (Lycoming Source Cont Dwg 1-300-004-01)	4	A,B,C
	6903 VAC	. . . BEARING Ball (52676) (Alternate) (Lycoming Source Cont Dwg 1-300-004-02)	4	A,B,C
	3LL03K	. . . BEARING Ball (43334) (Alternate) (Lycoming Source Cont Dwg 1-300-004-03)	4	A,B,C
	1903S303	. . . BEARING Ball (38443) (Alternate) (Lycoming Source Cont Dwg 1-300-004-04)	4	A,B,C
-33	1-160-490-01	. . . GEARSHAFT ASSEMBLY, Tachometer drive	1	A,B,C
-34	1-160-421-01	. . . LINER, Bearing	1	A,B,C
-35	No Number	. . BEARING AND LINER ASSEMBLY (NHA 1-160-500-04)	1	A,B,C
-36	1-160-404-01	. . . NUT Plane, round	1	A,B,C
-37	1-160-403-01	. . . WASHER, Key	1	A,B,C
-38	1-160-415-01	. . . PLATE, Retaining, bearing	1	A,B,C
-39	1-160-416-02	. . . SHIM, Liner, bearing	AR	A,B,C
-40	1-160-418-02	. . . SPACER, Sleeve	1	A,B,C

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-68-41	1-160-480-01	. . . GEARSHAFT ASSEMBLY, Lower driver	1	A,B,C
-42	1-160-414-02	. . . LINER, Bearing, shaft gear	1	A,B,C
	1-160-410-04	. . HOUSING FILTER AND THROTTLE ASSEMBLY (Replace with 1-160-410-05)	1	A,B,C
	1-160-410-05	. . HOUSING FILTER AND THROTTLE ASSEMBLY	1	A,B,C
	1-160-413-01	. . . FILTER ASSEMBLY (NHA 1-160-410-04)	1	A,B,C
-43	1-160-432-01	. . . . PLUG, Filter	1	A,B,C
-44	1-160-431-01	. . . . FILTER, Overspeed governor and tachometer drive	1	A,B,C
-45	1-160-432-02	. . . PLUG, Filter (NHA 1-160-410-05)	1	A,B,C
46	NAS617-5	. . . PACKING	1	A,B,C
-47	21074	. . . FILTER ASSEMBLY (10989) (Lycoming Source Cont Dwg 1-300-425-01) (NHA 1-160-410-05)	1	A,B,C
-48	1-160-440-01	. . . THROTTLE ASSEMBLY (NHA 1-160-410-04)	1	A,B,C
-49	MS29561-010	. . . PACKING	1	A,B,C
-50	1-160-510-05	. . . HOUSING AND LINER-ASSEMBLY, Overspeed governor and tachometer drive	1	A,B,C

d. Unscrew and remove adjusting screw (6). Remove spring (7), plunger (8), and packings (9, 11, and 12) from relief valve body (10).

e. Remove bolts (13), flat washer (14), cover and seal assembly (15), and gasket (18). Press seal (16) out of cover assembly (17), using arbor press and sleeve bushing (LTCT3640).

f. Remove spur gear (19), with ball bearings (20) installed.

g. Using bearing puller (LTCT675), remove bearings (20) from gear (19).

h. Remove spur gearshaft (21) with bearings (20) installed.

i. Using bearing puller (LTCT916 or LTCT97), remove bearings (20) from gearshaft (21).

j. Install holding device (LTCT2044 or LTCT278), engaging adapter of holding device with the female taper of gearshaft assembly (41), and secure to housing and liner assembly (50) with bolts (5 and 9, figure 4-29) and washers (5). Straighten key washer (23, figure 5-68) and, using wrench (LTCT1109 or LTCT214), remove spanner nut (22). Remove key washer, spur gear (24), and key (25). Remove holding device.

k. Straighten tabwasher (27), and remove screws (26) and tabwashers that secure bearing and liner assembly (28) to housing and liner assembly (50). Withdraw assembly and remove retainer plate (29) and shims (30).

NOTE

To facilitate reassembly, record the thickness of each shim and the side of the bearing retainer from which it was removed

l. Using arbor press and suitable adapter, press gearshaft assembly (33), with ball bearing (32) and sleeve spacer (31) installed, out of bearing liner (34).

m. Remove spacer (31) and, using suitable bearing puller, remove bearing (32) from gearshaft assembly (33). Using bearing removal tool (LTCT231), remove bearing (32) from liner (34).

n. Using 3/4-28 bolt, threaded into throttle, pull throttle assembly (48), if installed, out of housing and liner assembly (50) and remove packing (49).

o. Straighten tabwashers (27), and remove screws (26) and tabwashers that secure the bearing and liner assembly (35) to the housing and liner assembly (50). Withdraw bearing and liner assembly from housing and liner assembly and remove retaining plate (38) and shims (39).

NOTE

To facilitate reassembly, record the thickness of each shim and the side of the bearing retainer from which it was removed

p. Place gearshaft assembly (41) in gear holding assembly (LTCT2037or LTCT277). Straighten key washer (37) and, using socket wrench (LTCT2161 or LTCT213), remove nut (36) and key washer.

q. Using arbor press and suitable adapter, push gearshaft assembly (41), with bearing (32) and spacer (40) installed, out of liner (42). Remove spacer (40) and, using bearing puller (LTCT675), remove bearing (32) from gearshaft assembly (41). Using bearing removal tool (LTCT231) and an arbor press, remove bearing (32) from liner (42).

5-186. DISASSEMBLY OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-701, -701A). Proceed as follows:

a. Remove plug (1, figure 5-69) and packing (2) from cover assembly (7).

b. Remove filter plug (34) with packing (35) from housing (33) and remove packing from plug. Remove filter assembly (36) and packing (37).

c. Remove bolts (3), washers (4), cover and seal assembly (5), and gasket (8). Press seal (6) out of cover assembly (7), using arbor press and sleeve bushing (LTCT3640).

d. Remove spur gear (9) with ball bearings (10) installed.

e. Using bearing puller (LTCT675), remove bearings (10) from shaft of gear (9).

f. Remove spur gearshaft (11) with bearings (10) installed.

g. Using bearing puller (LTCT916 or LTCT97), remove bearings (10) from gearshaft (11).

h. Install holding device (LTCT2044 or LTCT278), meshing splines of holding device with internal splines of gearshaft assembly (31), and secure to filter assembly housing (33) with bolts (10, figure 4-31), bolts (12), and washers (13). Straighten key washer (13, figure 5-69) and, using wrench (LTCT1109 or LTCT214), remove spanner nut (12). Remove key washer, spur gear (14), and square key (15). Remove holding device.

i. Straighten tabwashers (17), and remove screws (16) and tabwashers that secure bearing and liner assembly (18) to filter assembly housing (33). Withdraw assembly and remove retainer plate (19) and shims (20).

NOTE

To facilitate reassembly, record the thickness of each shim and the side of the bearing retainer from which it was removed

j. Using arbor press and suitable adapter, press gearshaft assembly (23), with ball bearing (22) and sleeve spacer (21) installed, out of bearing liner (24).

k. Remove spacer (21) and, using (bearing puller LTCT916 or LTCT197), remove bearing (22) from gearshaft assembly (23). Using bearing removal tool (LTCT231), remove bearing (22) from liner (24).

l. Straighten tabwashers (17) and remove screws (16) and tabwashers that secure the bearing and liner assembly (25) to the filter assembly housing (33). Withdraw bearing and liner assembly from filter assembly housing and remove retaining plate (28) and bearing liner shims (29).

NOTE

To facilitate reassembly, record the thickness of each shim and the side of the bearing retainer from which it was removed

m. Place gearshaft assembly (31), in holding assembly (LTCT2037 or LTCT277). Straighten key washer (27) and, using socket wrench (LTCT2161 or LTCT213), remove nut (26) and key washer.

n. Using arbor press and suitable adapter, push gearshaft assembly (31), with bearing (22) and sleeve spacer (30) installed, out of bearing liner (32). Remove spacer (30) and, using bearing puller (LTCT675), remove bearing (22) from gearshaft assembly (31). Using bearing removal tool (LTCT231) and an arbor press, remove bearing (22) from liner (32).

5-187. CLEANING OF TACHOMETER DRIVE ASSEMBLY. Proceed as follows:

a. Immerse filter plug (45, figure 5-68) or filter assembly (36, figure 5-69) in a tank containing dry cleaning solvent (item 134, table C–1) and clean with a soft bristle brush. Remove filter plug or filter assembly from tank and pressure-flush with dry cleaning solvent.

b. Clean seal (16, figure 5-68, or 6, figure 5-69) using dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

c. On T53-L-13B, -703 engines, clean all parts of throttle assembly (48, figure 5-68), using a small mesh steel screen; then basket in ultrasonic cleaning unit, Model DR500AH, or equivalent, with dry cleaning solvent (item 134, table C–1) as a cleaning agent.

d. Clean all gears and splined parts as outlined in SP No. 3009 in Appendix E.

e. Clean all bearings as outlined in SP No. 3010 in Appendix E.

f. Clean all other parts by dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

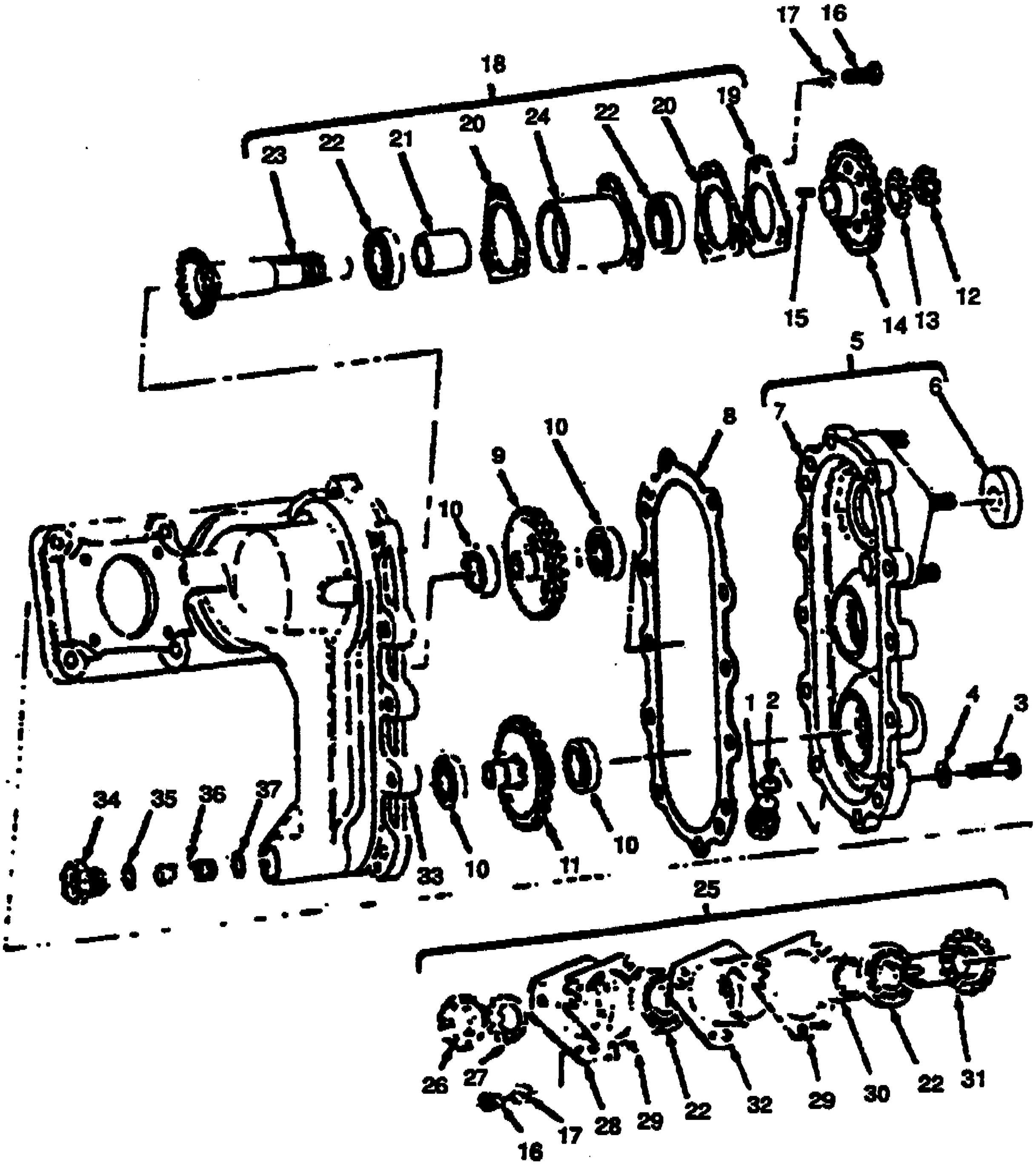


Figure 5-69. Overspeed Governor and Tachometer Drive Assembly (T53-L-701, 701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-69	No Number	OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY AND RELATED PARTS (NHA 1-000-110-01, 1-000-110-03, 1-000-110-07 and 1-170-330-09)	Ref	D,E
	1-170-530-01	. Drive Assembly, Overspeed Governor and Tachometer	1	D,E
-1	MS9015-03	. PLUG, Straight thread	1	D,E
-2	NAS617-3	. . PACKING	1	D,E
-3	AN103710	. . BOLT, Drilled hex head	12	D,E
-4	AN960	. . WASHER, Flat	12	D,E
-5	No Number	. . COVER AND SEAL ASSEMBLY (NHA 1-170-530-01)	1	D,E
-6	4239-1	. . . SEAL, Plain, encased (91251) (Lycoming Source Cont Dwg 1-300-235-02)	1	D,E
	514246	. . . SEAL Plain, encased (24981) (Alternate) (Lycoming Source Cont Dwg 1-300-235-03)	1	D,E
-7	1-160-450-03	. . . COVER ASSEMBLY	1	D,E
-8	1-160-443-02	. . GASKET, Housing	1	D,E
-9	1-160-636-01	. . GEAR, Spur, intermediate	1	D,E
-10	1902S301	. . BEARING, Ball (38433) (Lycoming Source Cont Dwg 1-300-003-01)	4	D,E
	821102KMBRE	. . BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 1-300-003-02)	4	D,E
	P9302KE8959	. . BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 1-300-003-03)	4	D,E
-11	1-170-520-01	. . GEARSHAFT, Spur	1	D,E
-12	MS172238	. . NUT Spanner	1	D,E
-13	MS172203	. . WASHER Key	1	D,E
-14	1-160-419-02	. . GEAR, Spur	1	D,E
-15	STD3057-2	. . KEY, Square	1	D,E
-16	1-160-451-01	. . SCREW, Machine, slotted	6	D,E
-17	STD3023K1	. . TABWASHER	6	D,E
-18	No Number	. . BEARING AND LINER ASSEMBLY (NHA 1-170-530-01)	1	D,E
-19	1-160-448-01	. . . PLATE, Retainer, bearing	1	D,E
-20	1-160-439-01	. . . SHIM, Liner	AR	D,E
-21	1-160-418-01	. . . SPACER, Sleeve	1	D,E

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
-22	1903S301	. . BEARING, Ball (38443) (Alternate) (Lycoming Source Cont Dwg 1-300-004-01)	4	D,E
	6903VAC	. . . BEARING, Ball (52676) (Alternate) (Lycoming Source Cont Dwg 1-300-004-02)	4	D,E
	3LL03K	. . . BEARING, Ball (43334) (Alternate) (Lycoming Source Cont Dwg 1-300-004-03)	4	D,E
	1903S303	. . . BEARING, Ball (38443) (Alternate) (Lycoming Source Cont Dwg 1-300-004-04)	4	D,E
-23	1-160-490-01	. . . GEARSHAFT ASSEMBLY, Tachometer Drive	1	D,E
-24	1-160-421-01	. . . LINER, Bearing	1	D,E
-25	No Number	. . BEARING AND LINER ASSEMBLY (NHA 1-170-530-01)	1	D,E
-26	1-160-404-01	. . . NUT, Plain, round	1	D,E
-27	1-160-403-01	. . . WASHER, Key	1	D,E
-28	1-160-415-01	. . . PLATE, Retaining, bearing	1	D,E
-29	1-160-416-02	. . . SHIM, Liner, bearing	AR	D,E
-30	1-160-418-02	. . . SPACER, Sleeve	1	D,E
-31	1-160-480-01	. . . GEARSHAFT ASSEMBLY, Lower drive	1	D,E
-32	1-160-414-02	. . . LINER, Bearing shaft gear	1	D,E
-33	1-160-510-07	. . HOUSING, Filter assembly, over-speed governor and tachometer drive	1	D,E
-34	1-160-432-02	. . . PLUG, Filter, overspeed governor and tachometer drive	1	D,E
-35	NAS617-5	. . . PACKING	1	D,E
-36	21074	. . . FILTER ASSEMBLY (10989) (Lycoming Source Cont Dwg 1-300-425-01)	1	D,E
-37	MS29561-010	. . . PACKING	1	D,E

5-188. INSPECTION OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-13B, -703, -15) Perform specific inspections listed in table 5-40.

5-189. INSPECTION OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-701, 701A). Perform specific inspections listed in table 5-44.

5-190. REPAIR OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-13B, -703, -15). (See figure 4-29.) Proceed as follows:

a. Blend-repair nicks, burrs, or scratches as outlined in SP No. 5000 in Appendix E.

b. Repair journals of tachometer drive gearshaft assembly (33, figure 5-68)as follows: (See figure 5-72.)

(1) Nickel or chrome-plate the 0.5904 to 0.5909 inch (1.4996 to 1.5009 cm) diameter, depending upon thickness required, as follows:

(a) Nickel-plate to a maximum thickness of 0.0010 inch (0.0025 cm) after final grind as outlined in SP No. 6018 in Appendix E.

(b) Chrome-plate the 0. 495 to 0.501 and 0.5904 to 0.5909 inch diameter journals as follows:

1 Machine as necessary to obtain 0.002 to 0.010 inch plate thickness after final machining.

2 Shotpeen area to be plated in accordance with MIL-S-13165 using shot (cast) size No. 110 (nominal diameter 0.011 inches). Peening intensity to be 5-8A with minimum coverage of 150 percent.

3 Chrome-plate as outlined in SP No. 6014 in Appendix E.

4 Bake at 255° to 275°F (124° to 135°C) for 5 hours.

(2) Machine to dimensions shown in figure 5-72.

c. Repair damaged surface coating or corrosion on cover assembly (17, figure 5-68) or housing and liner assembly (50) as outlined in SP No. 6026 in Appendix E.

d. Replace bearing liners in cover assembly (17) and housing and liner assembly (50) as follows:

(1) Mount cover assembly or housing and liner assembly in a suitable lathe.

CAUTION

When performing following step (2), do not nick or score bore of cover or housing.

(2) Machine bearing liner until wall is thin enough to buckle and peel away from cover or housing.

(3) Remove bearing liner from cover or housing.

(4) Grind the two lockpins flush with bore.

(5) Remove cover or housing from lathe and place on bench.

(6) Using yellow Colorbrite pencil (item 239, table C–1, or other approved marker, mark positions of lockpins on face of cover or housing.

Table 5-40. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-13B, -15, -703).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-29				
1	Shaft	Visual and Magnetic-Particle. (Refer to table 5-41)	Cracks	Not allowed. Replace
		SIE and Visual.	Worn or damaged splines	Replace if limits are exceeded. (Refer to SP No. 3009 in Appendix E)
		Visual	Damaged surface coating	Repair. (Refer to SP No. 6003 in Appendix E)
5-68				
6	Adjusting Screw	Visual	Cracks	Not allowed. Replace.
			Damaged threads	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
7	Spring	Visual	Nicks or burrs	Not allowed. Replace.
8	Plunger	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. Refer to SP No. 5000 in Appendix E
10	Relief Valve Body	Visual	Cracks	Not allowed. Replace.
			Damaged or crossed threads	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. Refer to SP No. 5000 in Appendix E
17	Cover Assembly	Visual	Cracks	Not allowed. Replace.
			Damaged or crossed threads	Repair (Refer to SP No. 5007 in Appendix E) or replace (Refer to SP No. 5008 in Appendix E)
			Nicks, scores, burrs, dents, or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
			Damaged surface coating or corrosion	Repair. (Refer to SP No. 6026 in Appendix E)
		SIE and Visual	Dimensions within acceptable limits (Refer to table 5-42)	Repair. (Refer to paragraph 5-190)

Table 5-40. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-13B, -15, -703).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
		WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**		
5-68 19	Intermediate Spur Gear	Visual and Magnetic-Particle (Refer to table 5-41)	Cracks	Not allowed. Replace.
		Visual	Worn or damaged gear teeth.	If limits are exceeded replace. (Refer to SP No. 3009 in Appendix E)
		SIE and Visual	Dimensions within acceptable limits (Refer to table 5-42)	Replace if limits cannot be met.
		WARNING **FLIGHT SAFETY PART** **Verification of a bore diameter of the following parts is flight safety critical.**		
20 and 32	Ball Bearings	SIE and Visual	Wear or damage	Not allowed. Replace.
		SIE and Visual	Dimensions for acceptable limits (Refer to table 5-43)	Replace ball bearing
		WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**		
21	Spur Gearshaft	Visual and Magnetic Particle. (Refer to table 5-41)	Cracks	Not allowed. Replace.
		Visual	Worn or damaged splines.	Replace if limits are exceeded. (Refer to SP No. 3009 in Appendix E)
		Visual	Nicks, scores, burrs, dents, or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
		SIE and Visual	Step wear on internal spline greater than 0.010 inch (0.025 cm)	Replace if wear is greater than 0.010 inch (0.025 cm)
			Dimensions within acceptable limits (Refer to table 5-42)	Replace if limits cannot be met

Table 5-40. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-13B, -15, -703).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-68				
WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**				
24	Spur Gear	Visual and Magnetic Particle. (Refer to table 5-41)	Cracks	Replace
		Visual	Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		SIE and Visual	Dimensions for acceptable limits (Refer to table 5-42)	Replace if limits cannot be met
			Worn or damaged gear teeth	Replace if limits are exceeded. (Refer to SP No. 3009 in Appendix E)
29	Retainer Plate	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
31	Sleeve Spacer	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**				
33	Tachometer Drive Gearshaft Assembly	Visual and Magnetic-Particle. (Refer to table 5-41)	Cracks	Not allowed. Replace.
		SIE	Square end wear	Not to exceed 0.020 in. (See table 5-42)
		Visual	Damaged threads	Repair or replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		Visual and SIE	Worn or damaged gear teeth	Replace if limits are exceeded. (Refer to SP No. 3009 in Appendix E)
		Visual and SIE	Wear and fits. (Refer to table 5-42)	Repair or replace as required. (Refer to paragraph 5-190)

Table 5-40. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-13B, -15, -703).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-68				
34	Bearing Liner	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		SIE and Visual	Dimension for acceptable limits (Refer to table 5-42)	Repair or replace. (Refer to paragraph 5-190)
36	nut	Visual	Cracks	Not allowed. Replace.
			Damaged or crossed threads	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
38	Retaining Plate	Visual	Cracks	Not allowed. Replace.
			Nicks, burrs, scores, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
40	Sleeve Spacer	Visual	Cracks	Repair or replace
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
WARNING FLIGHT SAFETY PART Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.				
4	Lower Drive Gear-shaft Assembly	Visual and Magnetic Particle (Refer to table 5-41)	Cracks	Not allowed. Replace.
		Visual	Damaged or crossed threads	Repair or replace
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		SIE and Visual	Worn or damaged gear teeth.	Replace if limits are exceeded. (Refer to SP No. 3009 in Appendix E)
			Dimensions within acceptable limits. (Refer to table 5-42)	Replace if limits are exceeded.

Table 5-40. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-13B, -15, -703).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-68				
42	Bearing Liner	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		SIE	Dimensions within acceptable limits	Repair or replace. (Refer to table 5-42)
44	Filter	Visual	Damaged, or foreign material	Replace if damaged. Remove foreign material by cleaning in dry cleaning solvent (item 134, table C–1)
			Nicks, scores, burrs, dents, or scratches	Blend-repair. (Refer to SP No. 5000 in Appendix E)
50	Housing	Visual	Cracks	Not allowed. Replace.
			Damaged or crossed threads	Repair. (Refer to SP No. 5007 in Appendix E)
			Nicks, scores, burrs, dents, or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
		Visual	Damaged surface coating or corrosion	Repair. (Refer to paragraph 5-190)
		SIE and Visual	Dimensions within acceptable limits (Refer to table 5-42)	Repair. (Refer to paragraph 5-190)

Table 5-41. Magnetic-Particle Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-13B, -15, -703).

Figure and Index No.	Nomenclature	Method of Magnetization
4-29, 1	Shaft	Circular, use direct contact at 600 amperes. Longitudinal at 4000 ampere-turns
5-68, 19	Intermediate Spur Gear	Circular, use central conductor at 1000 amperes
5-68, 21	Spur Gearshaft	Longitudinal at 5000 ampere-turns
5-68, 24	Spur Gear	Circular, use central conductor at 1000 amperes
5-68, 33	Tachometer Drive Gearshaft Assembly	Circular, use direct contact at 800 amperes. Longitudinal at 5000 ampere-turns
5-68, 41	Lower Driver Gear-shaft Assembly	Circular, use direct contact at 800 amperes. Longitudinal at 5000 ampere-turns

Table 5-42. Dimensional Inspection of Overspeed Governor and Tachometer Drive Assembly (T-53-L-13B, -15, -703).

NOMENCLATURE	FIG. & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-68								5-70
Tachometer Drive Gearshaft Assembly	33*	OD	0.6692 (1.6998)	0.6695 (1.7005)					A
Seal Journal	33*	OD	0.495 (1.2673)	0.501 (1.2573)					B1
Tachometer Drive Gearshaft Assembly	33*	OD	0.5904 (1.4996)	0.5909 (1.5009)	0.5904 (1.4996)	0.5909 (1.5009)			B
to							0.0001L (0.0003)	0.0013L (0.0033)	
Spur Gear	24*	ID	0.5910 (1.5011)	0.5915 (1.5024)	0.5910 (1.5011)	0.5917 (1.5029)			C
Bearing Liner	34*	ID	1.1811 (3.0000)	1.1816 (3.0013)	1.1811 (3.0000)	1.1818 (3.0018)			D
Bearing Liner	34*	OD	1.4005 (3.5573)	1.4010 (3.5515)	1.4005 (3.5573)	1.4010 (3.5585)			E
to							0.0010L (0.0026)	0.0035L (0.0089)	
Housing and Liner Assembly	50*	ID	1.4020 (3.5611)	1.4030 (3.5636)	1.4020 (3.5611)	1.4040 (3.5662)			F
Cover Assembly	17*	ID	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1031 (2.8019)			G,H

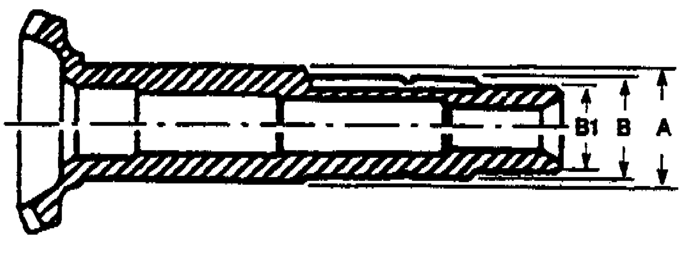
* **Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.**

NOTE: WEAR TO THE INTERNAL SQUARE DRIVE OF THE TACHOMETER DRIVE GEARSHAFT ASSEMBLY SHALL NOT EXCEED 0.020 INCHES.

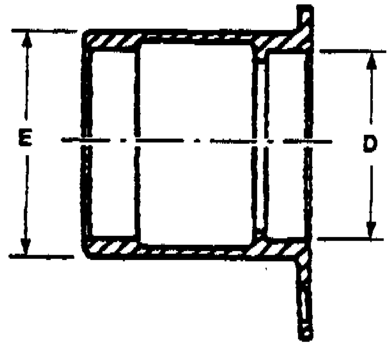
Table 5-42. Dimensional Inspection of Overspeed Governor and Tachometer Drive Assembly (T-53-L-13B, -15, -703).

NOMENCLATURE	FIG. & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-68								5-70
Cover Assembly	17*	ID	1.1230 (2.8524)	1.1250 (2.8575)	1.1230 (2.8524)	1.1255 (2.8588)			I
Intermediate Spur Gear	19*	OD	0.5905 (1.4999)	0.5908 (1.5006)	0.5901 (1.4989)	0.5908 (1.5006)			J
Housing and Liner Assembly	50*	ID	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1031 (2.8019)			K,L
Intermediate Spur Gear	19*	OD	0.5905 (1.4999)	0.5908 (1.5006)	0.5901 (1.4989)	0.5908 (1.5006)			J
Housing and Liner Assembly	50*	ID	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1031 (2.8019)			K,L
Housing and Liner Assembly	50*	OD	2.7050 (6.8707)	2.7060 (6.8732)	2.7035 (6.8669)	2.7060 (6.8732)			M
Housing and Liner Assembly	50*	ID	1.3500 (3.429)	1.3510 (3.4315)	1.3500 (3.429)	1.3520 (3.4341)			N
to							0.0010L (0.0025)	0.0035L (0.0089)	
Bearing Liner	42*	OD	1.3485 (3.4252)	1.3490 (3.4265)	1.3485 (3.4252)	1.3490 (3.4265)			O
Spur Gearshaft	21*	OD	0.5905 (1.4999)	0.5908 (1.5006)	0.5901 (1.4989)	0.5908 (1.5006)			P
Lower Driver Gearshaft Assembly	41*	OD	0.6692 (1.6998)	0.6695 (1.7005)	0.6688 (1.6987)	0.6695 (1.7005)			Q
Bearing Liner	42*	ID	1.1811 (3.0000)	1.1816 (3.0013)	1.1811 (3.0000)	1.1818 (3.0018)			R

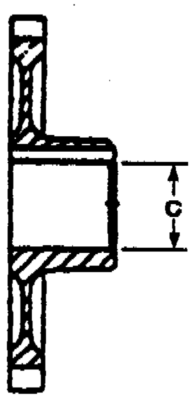
* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.



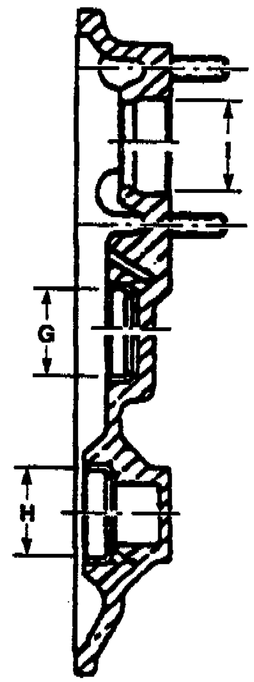
TACHOMETER DRIVE GEARSHAFT ASSEMBLY
(33 Figure 5-68)



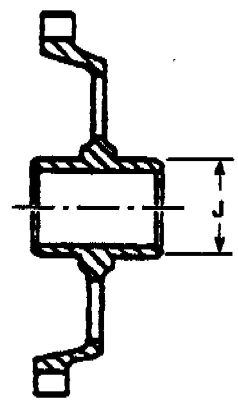
BEARING LINER (34 Figure 5-68)



SPUR GEAR
(24 Figure 5-68)

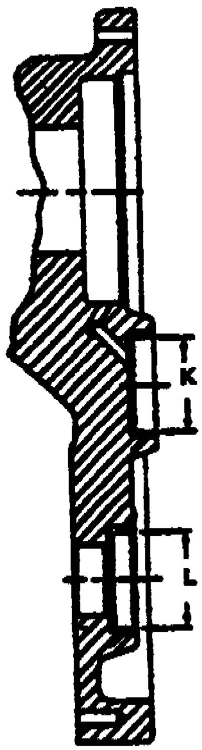


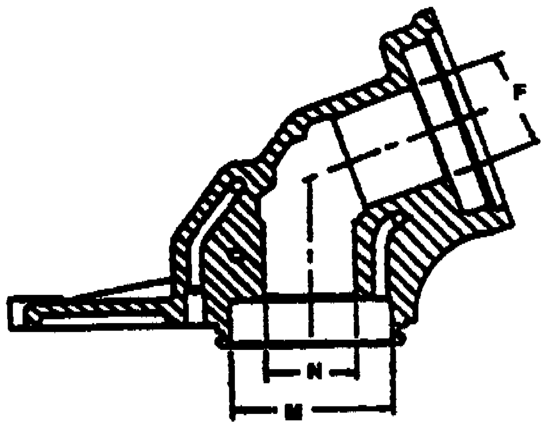
COVER ASSEMBLY
(17 Figure 5-68)



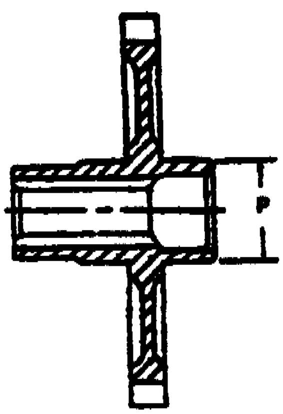
INTERMEDIATE SPUR GEAR
(19 Figure 5-68)

Figure 5-70. Overspeed Governor and Tachometer Drive Assembly Dimensional Inspection Locations (T53-L-13B, -15, -703) (Sheet 1 of 2).

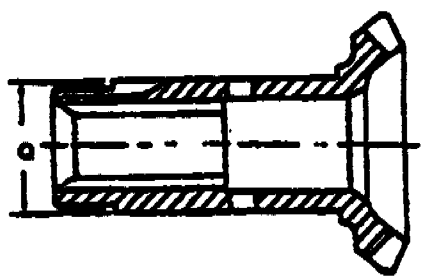




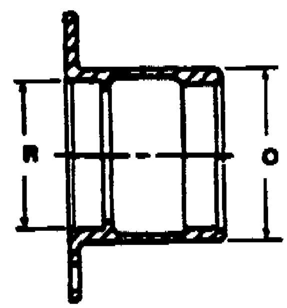
HOUSING AND LINER ASSEMBLY (50 Figure 5-68)



SPUR GEARSHAFT
(21 Figure 5-68)



LOWER DRIVE GEARSHAFT ASSEMBLY
(41 Figure 5-68)



BEARING LINER
(42 Figure 5-68)

Figure 5-70. Overspeed Governor and Tachometer Drive Assembly Dimensional Inspection Locations (T53-L-13B, -15, -703) (Sheet 2 of 2).

Table 5-43. Dimensional Inspection of Overspeed Governor and Tachometer Drive Assembly Bearings (T53-L-13B, -15, -703).

BEARING TYPE & PART NO.	FIG. & INDEX	DIM MEAS	BLUEPRINT DIMENSIONS MIN	BLUEPRINT DIMENSIONS MAX	INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
	5-68		**WARNING FLIGHT SAFETY PART** **Verification of the 0.6690 - 0.6693 bore diameter is Flight Safety Critical.**						
Ball	32	ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003 (0.0007)	0.0035 (0.0089)	58 to 62	N/A	1-300-004-01
1903S301		OD	1.1807 (2.9980)	1.1811 (3.0000)	0.0009* (0.0023)				
or									
6903VAC		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0004 (0.0010)	0.006 (0.015)	58 to 61	N/A	1-300-004-02
		OD	1.1807 (2.9980)	1.1811 (3.0000)	0.0010 (0.0025)				
or									
3LL03K		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003 (0.0007)	0.0055 (0.0140)	58 to 62	N/A	1-300-004-03
		OD	1.1807 (2.9980)	1.1811 (3.0000)	0.0009* (0.0023)	**			
or									
1903S303		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003 (0.0007)	0.005 (0.013)	58 to 62	N/A	1-300-004-04
		OD	0.1807 (2.9980)	1.1811 (3.0000)	0.0009 (0.0023)	0.005 (0.013)			

* Under 5.5 pound gage load

** Under 3.0 pound gage load

Table 5-43. Dimensional Inspection of Overspeed Governor and Tachometer Drive Assembly Bearings (T53-L-13B, -15, -703).

BEARING TYPE & PART NO.	FIG. & INDEX	DIM MEAS	BLUEPRINT DIMENSIONS MIN	BLUEPRINT DIMENSIONS MAX	INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
			WARNING **FLIGHT SAFETY PART** **Verification of the 0.5903/0.5904 - 0.5906 diameter is Flight Safety Critical.**						
Ball	-20	ID	0.5903 (1.4994)	0.5906 (1.5001)	0.0003 (0.0023)		58 to 62	N/A	1-300-003-01
1902S301		OD	1.1020 (2.7991)	1.5001 (1.4994)	1.1024 (2.8001)	0.0050* (0.0127)			
or									
PM9302KMBRE		ID	0.5904 (1.4996)	0.5906 (1.5001)	0.0005 (0.0013)	0.006* (0.015)	58 MIN.	N/A	1-300-003-02
8211		OD	1.1021 (2.7993)	1.1024 (2.8001)	0.0009* (0.0023)				
or									
P9302KE8959		ID	0.5903 (1.4991)	0.5906 (1.5001)	0.0004 (0.0010)	0.004* (0.010)	58 to 62	N/A	1-300-003-03
		OD	1.1020 (2.7991)	1.1024 (2.8001)	0.0010 (0.0025)				

* Under 5.5 pound gage load

** Under 3.0 pound gage load

Table 5-44. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-701, -701A).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-31				
6	Shaft	Visual and Magnetic-Particle. (Refer to table 5-45)	Cracks	Not allowed. Replace.
		SIE and Visual	Worn or damaged splines	Replace if limits are exceeded
		Visual	Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
5-69				
	WARNING FLIGHT SAFETY PART Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.			
23	Tachometer Drive Gearshaft Assembly	Visual and Magnetic-Particle. (Refer to table 5-45)	Cracks	Not allowed. Replace.
		Visual	Damaged or crossed threads	Not allowed. Repair or replace, as required
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		Visual and SIE	Worn or damaged splines	
			Wear and fits (Refer to table 5-46)	Replace if limits cannot be met
	WARNING FLIGHT SAFETY PART Verification of the bore diameter of the following part is Flight Safety Critical.			
22 and 10	Ball Bearings		Wear (Refer to table 5-47)	Replace if limits cannot be met
21	Sleeve Spacer	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
24	Bearing Liner	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents, or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
19	Retainer Plate	Visual	Cracks	Not Allowed. Replace.

Table 5-44. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-701, -701A). (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
	WARNING FLIGHT SAFETY PART Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.			
5-69				
14	Spur Gear	Visual and Magnetic Particle. (Refer to table 5-45)	Cracks	Not allowed. Replace.
		SIE and Visual.	Worn or damaged splines	Not allowed. Replace.
		Visual	Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		SIE and Visual	Wear and fits (Refer to table 5-46)	Replace if limits cannot be met
7	Cover Assembly	Visual	Damaged threads	Repair or replace. (Refer to SP No. 5007 or 5008 in Appendix E)
			Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
			Damaged surface coating or corrosion	Repair. (Refer to paragraph 5-191)
		SIE and Visual	Wear and fits (Refer to table 5-46)	Repair or replace. (Refer to paragraph 5-191)
	WARNING FLIGHT SAFETY PART Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.			
9	Intermediate Spur Gear	Visual Magnetic Particle. (Refer to table 5-45)	Cracks	Not allowed. Replace.
		Visual	Worn or damaged splines	Replace if limits are not met
		SIE and Visual	Wear and fits. (Refer to table 5-46)	Replace if limits cannot be met

Table 5-44. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-701, -701A). (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-64				
36	Filter Assembly	Visual	Damaged, or foreign material	Replace if damaged. Remove foreign material by cleaning in dry cleaning solvent (item 134, table C–1)
			Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
			Damaged surface coating, or corrosion	Repair. (Refer to SP No. 6026 in Appendix E)
33	Overspeed Governor and Tachometer Drive Filter Assembly Housing	Visual	Cracks	Not allowed. Replace.
			Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
			Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
			Damaged surface coating or corrosion	Repair. (Refer to paragraph 5-191)
		SIE and Visual	Wear. (Refer to table 5-46)	Replace if limits cannot be met
	WARNING FLIGHT SAFETY PART **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**			
11	Spur Gearshaft	Visual	Nicks, scores, burrs, dents or scratches	Repair. (Refer to SP No. 5000 in Appendix E)
		Visual and Magnetic-Particle. (Refer to table 5-45)	Cracks	Not allowed. Replace.
		SIE and Visual	Worn or damaged splines	Replace if limits are exceeded.
		SIE and Visual	Step wear on internal spline exceeding 0.010 inch (0.025 cm)	Not allowed. Replace.
		SIE and Visual	Wear and fits. (Refer to table 5-46)	Replace if limits cannot be met

Table 5-44. Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-701, -701A). (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
	WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**			
5-69				
31	Lower Driver Gear-shaft Assembly	Visual	Damaged threads	Not allowed. Replace.
			Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		Visual and Magnetic-Particle. (Refer to table 5-45)	Cracks	Not allowed. Replace.
		SIE and Visual	Worn or damaged splines	Not allowed. Replace
		SIE and Visual	Wear and fits. (Refer to table 5-46)	Replace if limits can not be meet
30	Sleeve Spacer	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
32	Bearing Liner	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
		SIE and Visual	Wear and fits. (Refer to table 5-46)	Replace if limits can not be meet
28	Retaining Plate	Visual	Cracks	Not allowed. Replace.
			Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)
26	Nut	Visual	Cracks	Not allowed. Replace.
			Damaged threads	Not allowed. Replace.
			Nicks, scores, burrs, dents or scratches	Repair or replace. (Refer to SP No. 5000 in Appendix E)

Table 5-45. Magnetic-Particle Inspection of Overspeed Governor and Tachometer Drive Assembly (T53-L-701, -701A).

Figure and Index No.	Nomenclature	Method of Magnetization
4-31, 6	Shaft	Circular, use direct contact at 600 amperes. Longitudinal at 4000 ampere-turns
5-69, 9	Intermediate Spur Gear	Circular, use central conductor at 1000 amperes
5-69, 11	Spur Gearshaft	Longitudinal at 5000 ampere-turns
5-69, 14	Spur Gear	Circular, use central conductor at 1000 amperes
5-69, 23	Tachometer Drive Gearshaft and Assembly	Circular, use direct contact at 800 amperes. Longitudinal at 5000 ampere-turns
5-69, 31	Lower Driver Gear-shaft Assembly	Circular, use direct contact at 800 amperes. Longitudinal at 5000 ampere-turns.

Table 5-46. Dimensional Inspection of Overspeed Governor and Tachometer Drive Assembly (T-53-L-701, -701A).

NOMENCLATURE	FIG. & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	.MAX	
	5-69								5-71
Tachometer Drive Gearshaft Assembly	23*	OD	0.6692 (1.6998)	0.6695 (1.7005)	0.6690 (1.6993)	0.6695 (1.7005)			A
Seal Journal	23*	OD	0.495 (1.2573)	0.501 (1.2725)					D1
Bearing Liner	24*	ID	1.1811 (3.0000)	1.1816 (3.0013)	1.1811 (3.0000)	1.1818 (3.0018)			B
Spur Gear	14*	ID	0.5910 (1.5011)	0.5915 (1.5024)	0.5910 (1.5011)	0.5917 (1.5029)			C
to							0.0001L (0.0002)	0.0013L (0.0033)	
Tachometer Drive Gearshaft Assembly	23*	OD	0.5904 (1.4996)	0.5909 (1.5009)	0.5904 (1.4996)	0.5909 (1.5009)			D
Cover Assembly	7*	ID	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1031 (2.8019)			E,F,G
		ID	1.1230 (2.8524)	1.1250 (2.8575)	1.1230 (2.8524)	1.1255 (2.8588)			
Intermediate Spur Gear	9*	OD	0.5905 (1.4999)	0.5909 (1.5009)					H
Housing	33*	ID	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1031 (2.8019)			I,J,K
		OD	2.7050 (6.8707)	2.7060 (6.8732)	2.7035 (6.8669)	2.7060 (6.8732)			

* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.

NOTE: WEAR TO THE INTERNAL DRIVE SQUARE DRIVE OF THE TACHOMETER DRIVE GEARSHAFT ASSEMBLY SHALL NOT EXCEED 0.020 INCHES.

Table 5-46. Dimensional Inspection of Overspeed Governor and Tachometer Drive Assembly (T-53-L-701,-701A) (Continued)

NOMENCLATURE	FIG. & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-69								5-71
Housing	33*	ID	1.4020 (3.5611)	1.4030 (3.5636)	1.4020 (3.5611)	1.4040 (3.5662)			L
to							0.0010L (0.0025)	0.0035L (0.0089)	M
Bearing Liner	24*	OD	1.4005 (3.5573)	1.4010 (3.5585)	1.4005 (3.5573)	1.4010 (3.5585)			
Spur Gearshaft	11*	OD	0.5905 (1.4999)	0.5908 (1.5006)	0.5903 (1.4994)	0.5908 (1.5006)			N
Lower Drive Gearshaft Assembly	31*	OD	0.6692 (1.6998)	0.6695 (1.7005)	0.6690 (1.6993)	0.6695 (1.7005)			O
Bearing Liner	32*	ID	1.1811 (3.0000)	1.1816 (3.0013)	1.1811 (3.0000)	1.1818 (3.0018)			P
Bearing Liner	32*	OD	1.3485 (3.4252)	1.3490 (3.4265)	1.3485 (3.4252)	1.3490 (3.4265)			Q
to						0.0010L (0.0025)	0.0035L (0.0089)		
Housing	33*	ID	1.3500 (3.429)	1.3510 (3.4315)	1.3500 (3.429)	1.3520 (3.4341)			R

* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.

Table 5-47. Dimensional Inspection of Overspeed Governor and Tachometer Drive Assembly Bearings (T53-L-701,-701A).

BEARING TYPE & PART NO.	FIG. & INDEX	DIM MEAS	BLUEPRINT DIMENSIONS		INTERNAL CLEAR-ANCE	END PLAY	HARDNESS RC	CON-TACT ANGLE	LYCOMING PART NUMBER
			MIN	MAX					
	5-69								
			WARNING FLIGHT SAFETY PART Verification of the 0.6690 - 0.6693 bore diameter is Flight Safety Critical.						
Ball 1903S301	22	ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003 (0.0008)	0.0035 (0.0089)	58 to 62	N/A	1-300-004-01
		OD	1.1807 (2.9980)	1.1811 (3.000)	0.0009* (0.0023)				
6903VAC		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0004- (0.0010)	0.006 (0.015) **	58 to 61	N/A	1-300-004-02
		OD	1.1807 (2.9980)	1.1811 (3.000)	0.0010 (0.0025)				
3LL03K		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003- (0.0008)	0.0055 (0.0130)	58 to 62	N/A	1-300-004-03
		OD	1.1807 (2.9980)	1.1811 (3.000)	0.0009* (0.0023)				
1903S303		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003- (0.0008)	0.005 (0.013)	58 to 62	N/A	1-300-004-04
		OD	1.1807 (2.9980)	1.1811 (3.000)	0.0009* (0.0023)				

* Under 5.5 pound gage load
** Under 3.0 pound gage load

Table 5-47. Dimensional Inspection of Overspeed Governor and Tachometer Drive Assembly Bearings (T53-L-701, -701A) - (Continued)

BEARING TYPE & PART NO.	FIG. & INDEX	DIM MEAS	BLUEPRINT DIMENSIONS		INTERNAL CLEAR-ANCE	END PLAY	HARDNESS RC	CON-TACT ANGLE	LYCOMING PART NUMBER
			MIN	MAX					
	5-69								
			WARNING **FLIGHT SAFETY PART** **Verification of the 0.5903/0.5904 - 0.5906 diameter is Flight Safety Critical.**						
Ball 1902S301	-10	ID	0.5903 (1.4994)	0.5906 (1.5001)	0.0003 (0.0008)	0.0050* (0.0127)	58 to 62	N/A	1-300-003-01
		OD	1.1020 (2.799)	1.1024 (2.8001)	0.0009* (0.0023)				
PM9302KM BRE		ID	0.5904 (1.4996)	0.5906 (1.5001)	0.0005- (0.0013)	0.006* (0.015)	58 min	N/A	1-300-003-02
		OD	1.1021 (2.7993)	1.1024 (2.8001)	0.0009* (0.0023)				
P9302KE8 959		ID	0.5903 (1.4994)	0.5906 (1.5001)	0.0004- (0.0010)	0.004* (0.010)	58 to 62	N/A	1-300-003-02
P9302KE8 959		OD	1.1020 (2.7991)	1.1024 (2.8001)	0.0010 (0.0025)				

* Under 5.5 pound gage load
** Under 3.0 pound gage load

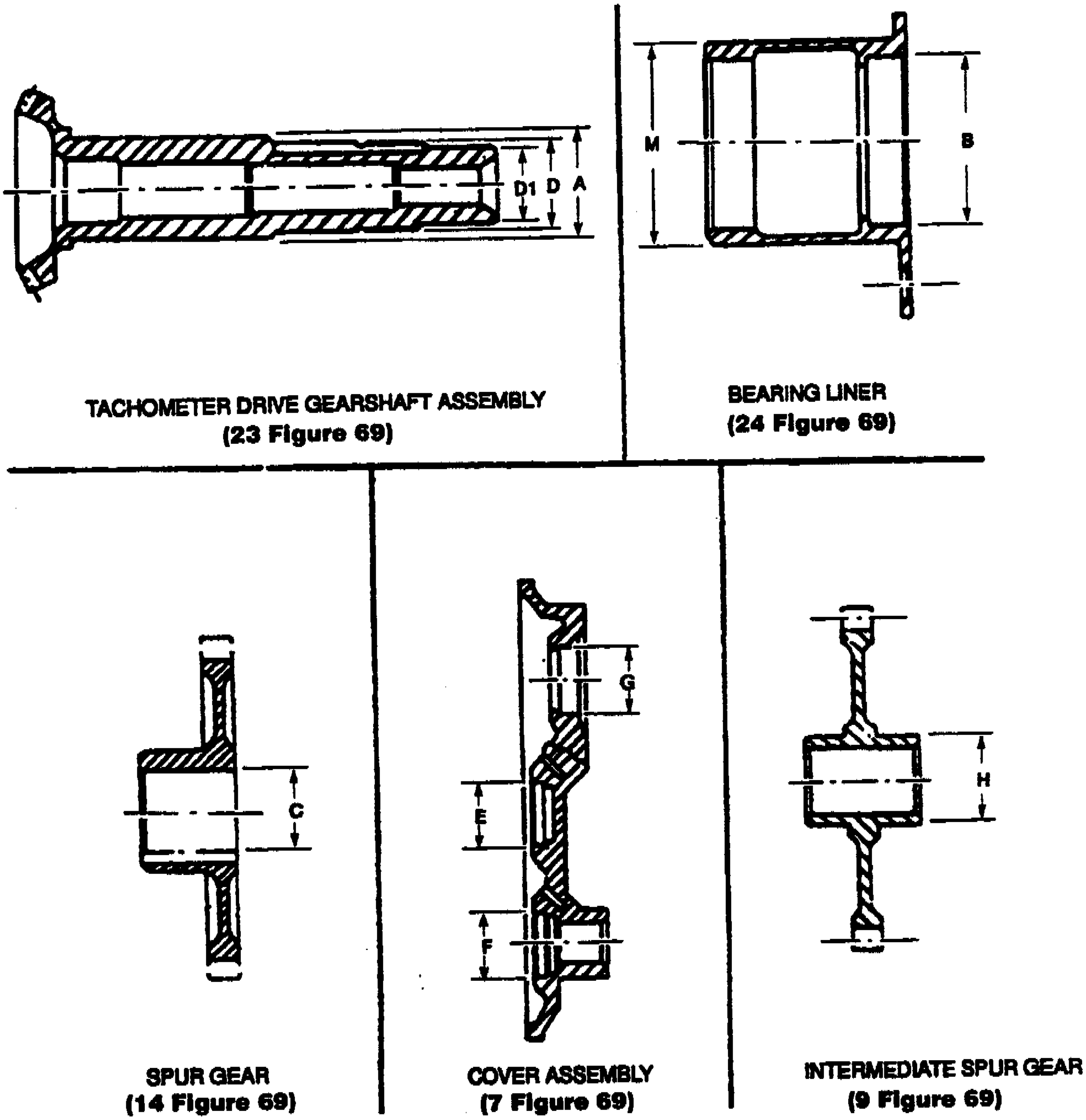
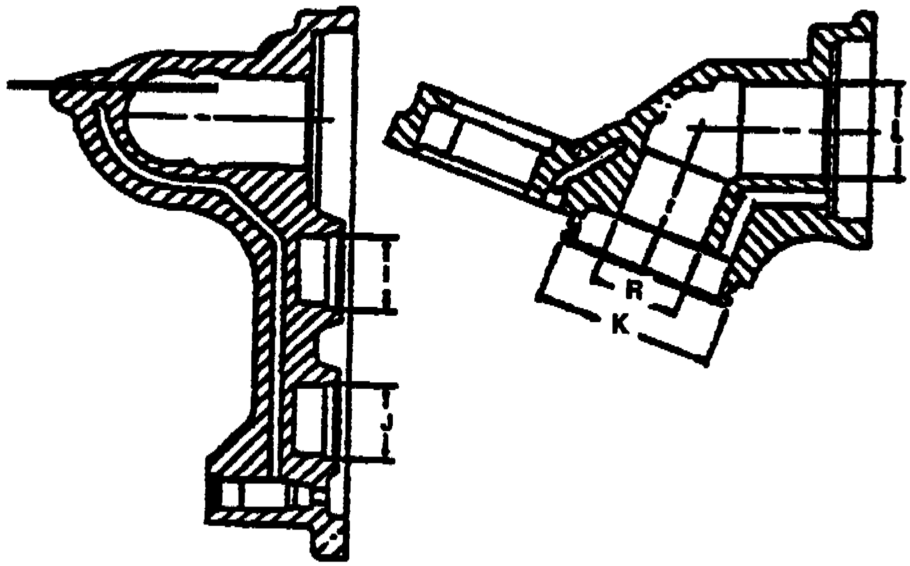
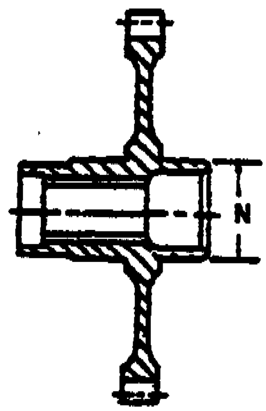


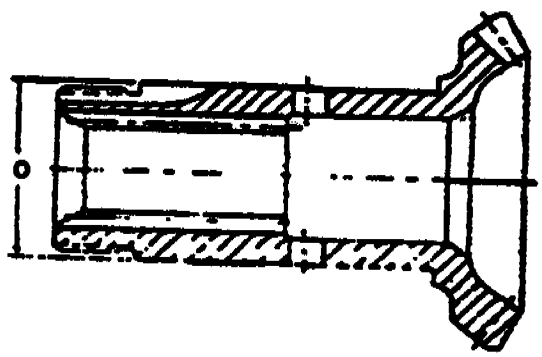
Figure 5-71. Overspeed Governor and Tachometer Drive Assembly Dimensional Inspection Locations (T53-L-701, -701A) (Sheet 1 of 2).



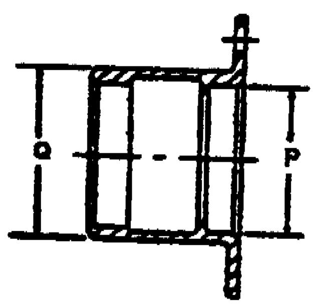
OVERSPEED GOVERNOR AND TACHOMETER
DRIVE FILTER ASSEMBLY HOUSING (33 Figure 69)



SPUR GEARSHAFT
(11 Figure 69)



LOWER DRIVER GEARSHAFT ASSEMBLY
(31 Figure 69)



BEARING LINER (24 Figure 69)

Figure 5-71. Overspeed Governor and Tachometer Drive Assembly Dimensional Inspection Locations (T53-L-701, -701A) (Sheet 2 of 2).

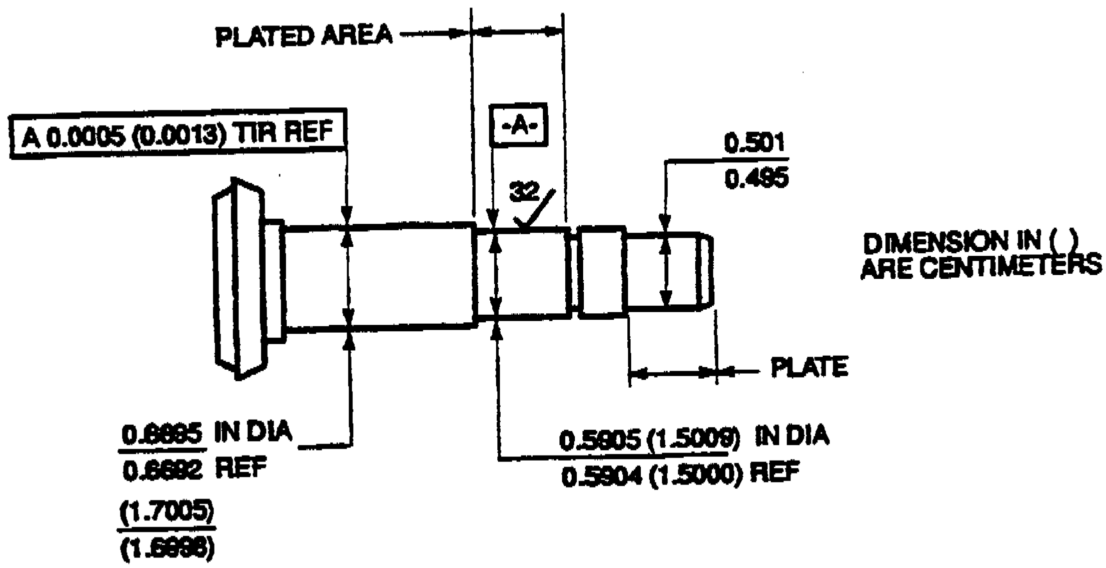


Figure 5-72. Tachometer Drive Gearshaft Assembly Repair Area.

(7) Place new liner (1-160-429-01) into a mixture of dry ice (item 135, table C–1) and alcohol (item 25, table C–1) for 30 minutes.

(8) Clean cover or housing bore with chromic acid (item 86, table C–1), and apply a thin coat of primer (item 253, table C–1) to bore before installing liner.

CAUTION

When complying with following step (9), prevent damage during pressing operation by ensuring that cover or housing is properly supported from below.

(9) Remove bearing liner from the alcohol and dry ice mixture and quickly insert liner, chamfered face first, into bore. Using suitable adapter and an arbor press, press liner into cover of housing until it bottoms.

(10) Using a number-53 drill, drill two holes through liner into the cover or housing to a depth of 0.300 inch (0.762 cm) at the angle shown in figure 5-73.

NOTE

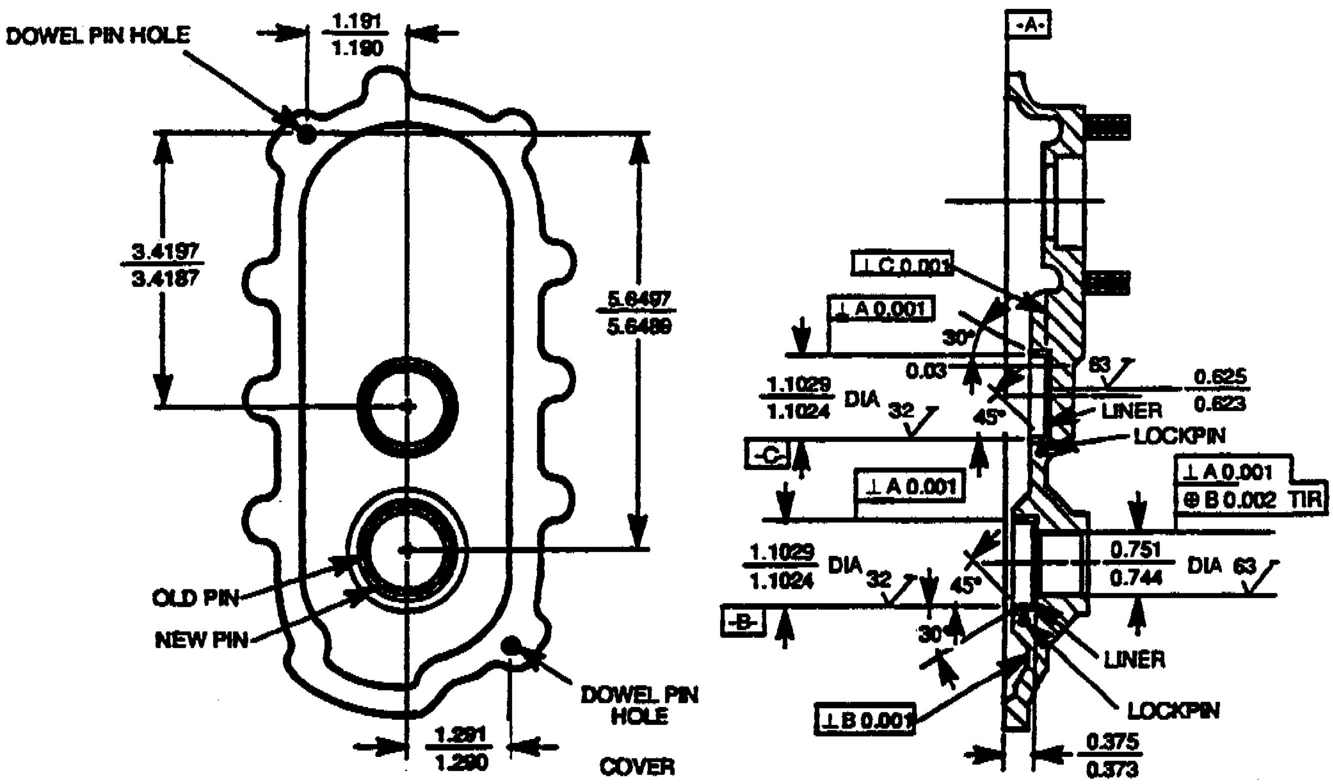
Up to this point, the procedure is the same for both the cover and housing, except for lockpin hole locations. For the cover, drill the lockpin holes 180 degrees apart and 45 degrees from the original holes. In the housing, drill the lockpin holes 180 degrees apart and 90 degrees from the original holes. (See figure 5-73.)

(11) Ream lockpin holes to 0.0610 to 0.0615 inch (0.1540 to 0.1562 cm) diameter, 0.280 inch (0.711 cm) deep. Using compressed air, blow chips from the holes.

CAUTION

When complying the following step (12), prevent damage to bearing liner by using extreme care when driving lockpins.

(12) Apply a thin coat of primer (item 253, table C–1) to the lockpins, MS9486-03, and, using suitable drift, drive the pins flush with ID of the liner.



NOTE: ALL DIMENSIONS ARE IN INCHES

Figure 5-73. Overspeed Governor and Tachometer Drive Assembly Bearing Liner Repair (English) (Sheet 1 of 2).

(13) Finish-grind and chamfer liner to dimensions shown in figure 5-73.

NOTE

Locate bearing bores from dowel pin or dowel pin holes as shown in figure 5-73.

(14) After finish-grinding, clean cover assembly or housing and liner assembly with dry cleaning solvent (item 134, table C-1).

(15) Inspect repaired cover assembly and housing and liner assembly. (See figure 5-73.)

e. Flow-check throttle assembly (48, figure 5-68) as follows:

(1) Install throttle assembly into handle.

(2) Install packing (MS29561-013, detail of LTCT216), on short side of union, and install union into handle.

(3) Connect union and handle to oil flow check stand (LTCT313), or equivalent, with a short hose.

(4) Supply lubricating oil (item 189 or 190, table C-1) at 95° to 100°F (35° to 38°C) and 68 to 72 psig (4781 to 5062 gm sq cm).

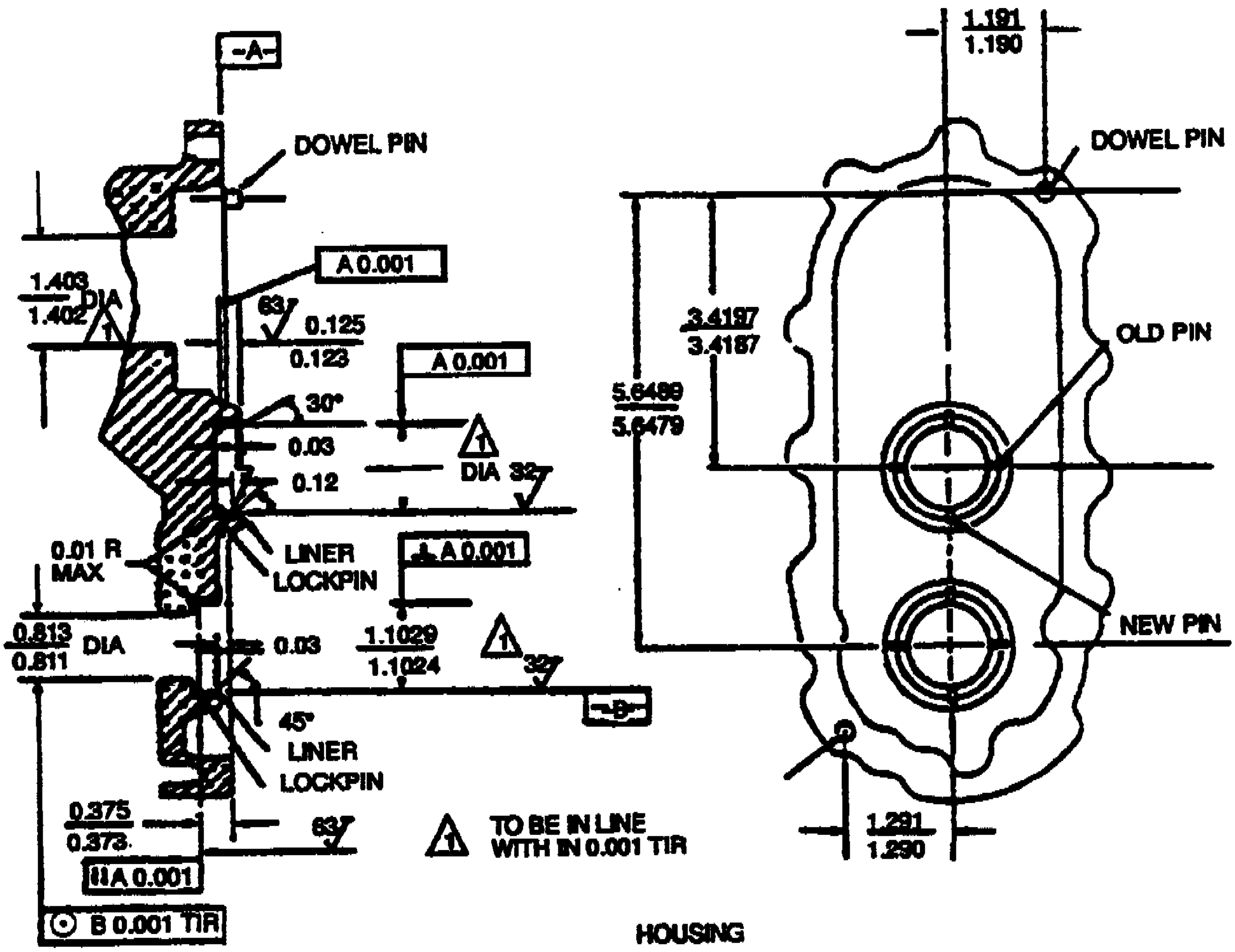
(5) Flow shall be 125 to 175 cubic centimeters per minute if lubricating oil (item 190, table C-1) is used or 119 to 166 cubic centimeters per minutes if lubricating oil (item 189, table C-1) is used.

(6) If flow requirements cannot be met, reject throttle assembly.

f. Replace all defective parts.

NOTE

A hairline cracked Rosan Lockring KR5A15 installed with insert 335-7-5A is acceptable provided assembly is tight and free of corrosion.



HOUSING

NOTE

All dimensions are in inches.

Figure 5-73. Overspeed Governor and Tachometer Drive Assembly Bearing Liner Repair (English) (Sheet 2 of 2).

5-191. REPAIR OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-701A). Proceed as follows:

a. Blend-repair nicks, burrs, scores, dents, or scratches as outlined in SP No. 5000 in Appendix E.

b. Repair damaged threads as outlined in SP No. 5007 in Appendix E.

c. Repair damaged surface coating or corrosion on cover assembly (7, figure 5-69) and filter assembly housing (33) as outlined in SP No. 6026 in Appendix E.

5-192. REASSEMBLY OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-13B, -15, -703). Proceed as follows:

a. Lubricate packing (2, figure 5-68) with petrolatum (item 197, table C–1), and place on plug (1). Install plug into housing and liner assembly (50). Tighten plug to 70 to 80 pound-inches (12502 to 15181 gm cm) torque and lockwire.

NOTE

When installing filter (44) and throttle assembly (48), refer to step b, when installing filter assembly (47), refer to step c.

b. Install packing (49) on throttle assembly (48) and packing (46) on filter plug (43). Lubricate throttle assembly with petrolatum (item 197, table C–1)and insert throttle assembly, filter (44), and plug (43) into housing and liner assembly. Tighten plug to 70 to 85 pound-inches (12502 to 15181 gm cm) torque.

c. Install packing (49) on filter assembly (47) and packing (46) on plug (45 or 43). Insert filter assembly and plug into housing and liner assembly. Tighten plug to 70 to 85 pound-inches (12502 to 15181 gm cm) torque.

d. Using soft-faced mallet, gently tap one ball bearing (32) into bearing liner (42). Using a depth micrometer, measure distance from top of bearing to surface of liner flange and select a shim (39) to obtain 0.002 to 0.004 inch (0.005 to 0.010 cm) pinch fit on bearing.

e. Using arbor press and sleeve bushing (LTCT3640), press second ball bearing (32), onto lower driver gearshaft assembly (41). Install sleeve spacer (40) and using arbor press liner (42) with one bearing (32) install onto lower driver gearshaft assembly (41). Check for rotational freedom on gearshaft within liner. If necessary, gently tap gearshaft with soft-faced mallet to eliminate sticking.

f. Place gearshaft and liner assembly in gear assembly holder (LTCT2037 or LTCT277). Install shim (39) and retaining plate (38). Install key washer (37) and nut (36). Using socket wrench (LTCT2161 or LTCT213), tighten nut to 80 to 100 pound-inches (14288 to 17860 gm cm) torque. Bend tabs on key washer.

g. Coat teeth of gearshaft assembly (41) with marking compound (item 160, table C–1).

h. Install shim (39) on underside of liner (42).

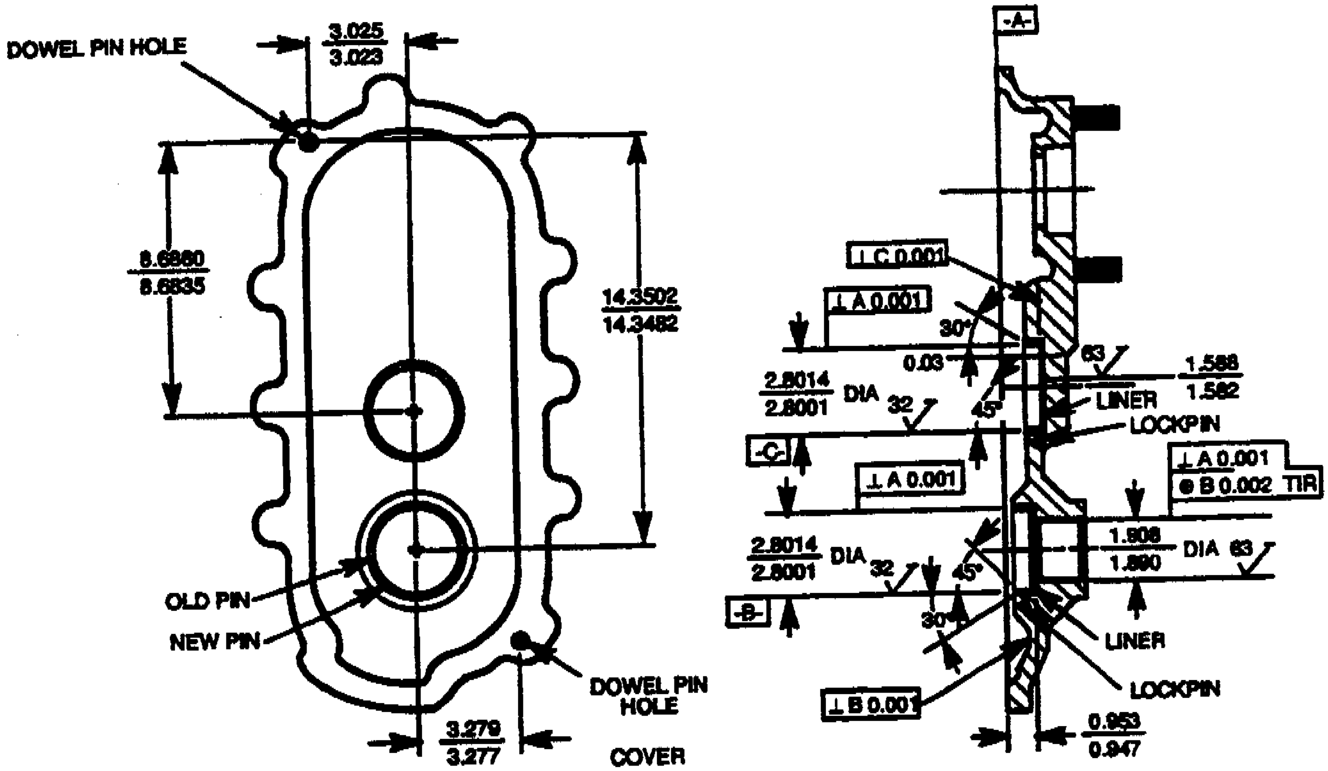
NOTE

Shim shall correspond in thickness to shim removed during disassembly.

i. Insert bearing and liner assembly (35) into housing and liner assembly (50). Using a soft-faced mallet, gently tap liner assembly to ensure proper seating. Install tabwashers (27) and screws (26), and tighten screws to 30 to 33 pound-inches (5358 to 6787 gm cm) torque. Do not bend tabs on tab-washers until backlash and gear pattern have been checked.

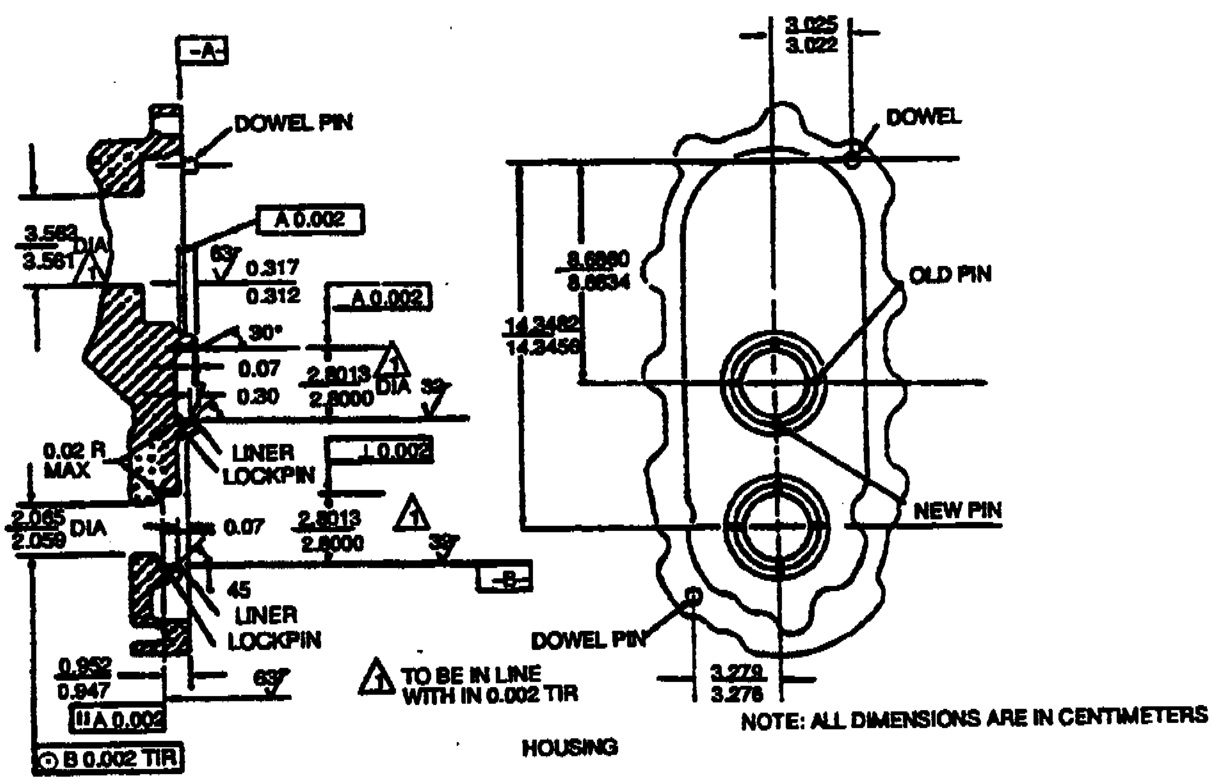
j. Install holding device (LTCT2044 or LTCT278) on gearshaft assembly (41), and secure to housing and liner assembly (50) with bolts (5 and 7, figure 4-29), washers (8), and bracket (4).

k. Using soft-faced mallet, gently tap one ball bearing (32, figure 5-68) into liner (34). Using depth micrometer, measure distance from top of bearing to surface of liner flange and select shim (30) to obtain 0.002 to 0.004 inch (0.005 to 0.010 cm) pinch fit on bearing.



NOTE: ALL DIMENSIONS ARE IN CENTIMETERS

Figure 5-74. Overspeed Governor and Tachometer Drive Assembly Bearing Liner Repair (Metric). (Sheet 1 of 2).



NOTE: ALL DIMENSIONS ARE IN CENTIMETERS

Figure 5-74 Overspeed Governor and Tachometer Drive Assembly Bearing Liner Repair (Metric). (Sheet 2 of 2).

l. Using arbor press and sleeve bushing (LTCT3640), press two bearings (32) onto tachometer drive gearshaft assembly (33). Install spacer (31) in liner (34), with bearing (32) installed. Check for rotational freedom of gearshaft assembly within liner. If necessary, gently tap gearshaft assembly with a soft-faced mallet to eliminate sticking.

m. Coat teeth of gearshaft assembly (33) with iron-blue pigment (item 172, table C–1).

n. Install shim (30) on underside of liner (34).

NOTE

Shim shall correspond in thickness to shim removed during disassembly.

o. Insert shims (30), bearing and liner assembly (28), and plate (29) into housing and liner assembly (50), carefully meshing with gearshaft assembly (41). Install tabwashers (27) and screws (26), and tighten screws to 30 to 38 pound-inches (5358 to 6787 gm cm) torque.

p. Insert key (25) and, mating key with keyway in spur gear (24), install gear. Install key washer (23) and spanner nut (22). Using socket wrench (LTCT1109 or LTCT214), tighten nut to 80 to 100 pound-inches (14288 to 17860 gm cm) torque.

q. Using backlash gage (LTCT3486), with contact point of dial indicator touching scribed line on flag of gage, check for 0.004 to 0.008 inch (0.010 to 0.020 cm) backlash between gearshaft assemblies (33 and 41).

r. Remove holding device (LTCT2044 or LTCT278) and rotate gears to obtain tooth pattern. Remove both bearing and liner assemblies (28 and 35) and check tooth pattern.

s. Correct backlash and pattern by adjusting shims (30 and 39). Reassemble and recheck backlash and pattern until correct.

t. When correct backlash and pattern are established, remove bearing (28) and liner assembly (35) wash gears with dry cleaning solvent (item 134, table C–1), and reinstall bearings, and liner assemblies, (28 and 35). Tighten all nuts and screws to proper torque and bend tabs on all tabwashers.

CAUTION

When installing overspeed governor drive shaft gear (21) ensure that long portion of splined shaft is inserted inboard to housing (50).

u. Using arbor press and sleeve bushing (LTCT3640) press bearing (20) onto spur gear (19) and (21). Lubricate bearing liners in housing with shortening compound (item 270, table C–1). Insert intermediate spur gear (19) with ball bearings (20) installed. Insert spur gearshaft (21) with bearings (20) installed. Hold gear (19) stationary and, using tapered feeler gage, check for 0.006 to 0.012 inch (0.015 to 0.030 cm) backlash between gear and each gearshaft.

v. Position gasket (18) on housing and liner assembly (50).

w. Lubricate lip of seal (16) with lubricating oil (item 189 or 190, table C–1) and, using seal installation tool (LTCT501), press seal into cover assembly (17).

x. Position cover and seal assembly (15) on housing and liner assembly (50) and, using soft-faced mallet, gently tap cover and seal assembly down until firmly seated. Secure with bolts (13) and flat washers (14). Tighten bolts to 38 to 40 pound-inches (6787 to 7144 gm cm) torque.

y. Lubricate packings (11 and 12) with shortening compound (item 270, table C–1), and place on relief valve body (10). Lubricate inside of relief valve body with shortening compound (item 270, table C–1), and insert packing (9), plunger (8), spring (7), and adjusting screw (6) into body. Install relief valve assembly (5) into housing and liner assembly (50). Tighten valve assembly to 80 to 100 pound-inches (14288 to 17860 gm cm) torque. Install key washer (4) and spanner nut (3), and tighten fingertight.

NOTE

Do not tighten and lock nut (3) until after torquemeter oil pressure has been checked and adjusted.

z. After engine test, tighten nut (3) to 70 to 80 pound-inches (12502 to 14288 gm cm) torque, and bend washer against relief valve body (10) and into nut (3).

5-193. REASSEMBLY OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-701, -701A). Proceed as follows:

a. Lubricate packing (2, figure 5-69) with petrolatum (item 197, table C–1), and place on plug (1). Install plug into cover assembly (7). Tighten plug to 70 to 80 pound-inches (12502 to 14288 gm cm) torque and lockwire.

b. Install packing (37) on filter assembly (36) and packing (35) on plug (34). Insert filter assembly and plug into housing and liner assembly. Tighten plug to 70 to 85 pound-inches (12502 to 15181 gm cm) torque.

c. Using soft-faced mallet, gently tap ball bearing (22) into bearing liner (32). Using a depth micrometer, measure distance from top of bearing to surface of liner flange and select a shim (29) to obtain 0.002 to 0.004 inch (0.005 to 0.10 cm) pinch fit on bearing.

d. Using arbor press and sleeve bushing (LTCT3640), press bearing (22) onto gearshaft assembly (31). Install spacer (30), and using arbor press, press liner (32) with bearing (22) installed, onto gearshaft assembly (31). Check for rotational freedom of gearshaft within liner. If necessary, gently tap gearshaft with soft-faced mallet to eliminate sticking.

e. Place gearshaft and liner assembly in gear assembly holder (LTCT2037or LTCT277). Install key washer (27) and nut (26). Using socket wrench(LTCT2161or LTCT213), tighten nut to 80 to 100 pound-inches (14288 to 17860 gm cm) torque. Do not bend tabs on key washer until backlash and gear pattern have been checked.

f. Coat teeth of gearshaft assembly (31) with marking compound (item 160, table C–1).

g. Install shim (29) on underside of liner (32).

NOTE

Shim shall correspond in thickness to shim removed during disassembly.

h. Insert shims (29), bearing and liner assembly (25), and plate (28) into filter assembly housing (33). Using a soft-faced mallet, gently tap liner assembly to ensure proper seating. Install tabwashers (17) and screws (16), and tighten screws to 30 to 38 pound-inches (5358 to 6787 gm cm) torque. Do not bend tabs on tabwashers until backlash and gear pattern have been checked.

i. Install holding device (LTCT2044 or LTCT278), meshing splines of device with internal splines of gearshaft assembly (31), and secure to filter assembly housing (33) with bolts (10 and 11, figure 4-31), washers (13) and bracket (9).

j. Using soft-faced mallet, gently tap bearing (22, figure 5-69) into liner (24). Using depth micrometer, measure distance from top of bearing to surface of liner flange and select shim (20) to obtain 0.002 to 0.004 inch (0.005 to 0.010 cm) pinch fit on bearing.

k. Using arbor press and sleeve bushing (LTCT3640), press bearings (22), onto gearshaft assembly (23) spacer (21), using arbor press, press liner (24), with bearing (22) installed, onto gearshaft assembly (23). Check for rotational freedom of gearshaft assembly within liner. If necessary, gently tap gearshaft assembly with a soft-faced mallet to eliminate sticking.

l. Coat teeth of gearshaft assembly (23) with iron-blue pigment (item 172, table C–1).

m. Install shim (20) on underside of liner (24).

NOTE

Shim shall correspond in thickness to shim removed during disassembly.

n. Insert shims (20), bearing and liner assembly (18), and plate (19) into filter assembly housing (33), carefully meshing with gearshaft assembly (31).Install tabwashers (17) and screws (16) and tighten screws to 30 to 39 pound-inches (5358 to 6965 gm cm) torque.

o. Insert key (15) and, mating key with keyway in gear (14), install gear. Install keywasher (13) and nut (12). Using socket wrench (LTCT1109 or LTCT214), tighten nut 80 to 100 pound-inches (14288 to 17860 gm cm) torque.

p. Using backlash gage (LTCT3486), with contact point of dial indicator touching scribed line on flag of gage, check for 0.004 to 0.008 inch (0.010 to 0.020 cm) backlash between gearshaft assemblies(23 and 31).

q. Remove holding device (LTCT2044 or LTCT278) and rotate gears to obtain tooth pattern. Remove both bearing and liner assemblies (18 and 25) and check tooth pattern.

r. Correct backlash and pattern by adjusting shims (20 and 29). Reassemble and recheck backlash and pattern until correct.

s. When correct backlash and pattern are established, remove bearing and liner assembly (18 and 25).Wash gears with dry cleaning solvent (item 134, table C–1) and reinstall bearing and liner assembly. Tighten all nuts and screws to proper torque and bend tabs on all tabwashers.

CAUTION

When installing overspeed governor drive shaft gear (11) ensure that long portion of splined shaft is inserted inboard to housing (33).

t. Using arbor press and sleeve bushing (LTCT3640), press bearings (10) onto spacer gears (9 and 11). Lubricate bearing liners in housing with shortening compound (item 270, table C–1). Insert gear (9) with ball bearings (10) installed. Insert gearshaft (11) with bearings (10) installed. Hold gear (9) stationary and, using tapered feeler gage, check for 0.006 to 0.012 inch (0.015 to 0.030 cm) backlash between gear and each gearshaft.

u. Position gasket (8) on filter assembly housing (33).

v. Lubricate lip of seal (6) with lubricating oil (item 189 or 190, table C–1) and, using seal installation tool (LTCT501), press seal into cover assembly (7).

w. Position cover and seal assembly (5) on filter assembly housing (33) and, using soft-faced mallet, gently tap cover and seal assembly down until firmly seated. Secure with bolts (3) and washers (4). Tighten bolts to 38 to 40 pound-inches (6787 to 7144 gm cm) torque.

5-194. FUNCTIONAL TEST OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53L-701, -701A). (See figure 5-69.) Proceed as follows:

a. Remove plug (1) and packing (2), and install suitable line fitting into housing and liner assembly.

b. Install holding device (LTCT2044) onto overspeed governor and tachometer drive assembly, and secure with suitable bolts, washers, and nuts.

c. Install suitable plug into overspeed governor drive port.

d. Connect clean, dry air supply to line fitting. Air supply shall be equipped with regulator to limit pressure to 8 to 12 psig (562.5 to 843.7 gm cq cm).

e. Apply lubricating oil (item 189 or 190, table C–1), or leak test compound (item 179, table C–1), to all seals and mating surfaces.

f. Check for leakage. If leakage is apparent, repair by lapping mating surface of cover assembly (7) and by replacing seals.

g. After completing pressure-test, remove holding fixture, line fitting, plug, and pump.

h. Place packing (2) on plug (1) and install plug in cover assembly (7). Tighten plug to 70 to 85 pound-inches (12502 to 15181 gm cm) torque, and lockwire.

5-195. FUNCTIONAL TEST OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-13B, -15, -703). (See figure 5-68). Proceed as follows:

a. Install power-driven rotary (booster) pump (14, figure 4-29) onto overspeed governor and tachometer drive assembly.

b. Remove plug (1, figure 5-68) and packing (2) and install suitable line fitting.

c. Install holding device (LTCT2044 or LTCT278) onto overspeed governor and tachometer drive assembly, and secure with bolts (5 and 7, figure 4-29) and washers (8).

d. Install plug into overspeed governor drive port.

e. Connect regulated source of air at 8 to 12 psi (562.5 to 843.7 gm sq cm) to line fitting.

f. Immerse overspeed governor and tachometer drive assembly into an oil bath or dry cleaning solvent (item 134, table C–1)until completely submerged.

g. Check for leakage; if leakage is apparent, repair by lapping surfaces.

h. After completing air-check, remove fixtures, reinstall plug and packing, and lockwire plugs and bolts.

i. Remove booster pump.

5-196. ELECTRICAL TORQUEMETER JUNCTION BOX ASSEMBLY (T53-L-701, -701A).

5-197. DISASSEMBLY. Proceed as follows:

a. Remove three screws (1, figure 5-75) and washers (2) from cover (3).

b. Remove cover (3) and gasket (4) from electric torquemeter junction box (5).

5-198. CLEANING. Proceed as follows:

a. Clean electric torquemeter junction box (1, figure 4-30) by wiping with a clean cloth or soft bristle brush dampened with dry cleaning solvent (item 134, table C–1). After cleaning, wipe junction box assembly with clean, dry cloth to remove all residual solvent.

b. Clean all other parts using dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

5-199. INSPECTION. Perform specific inspections listed in table 5-48.

5-200. REPAIR. (See figure 5-75.) Proceed as follows:

a. Blend-repair nicks, burrs, or scratches on cover (3) as outlined in SP No. 5000 in Appendix E.

b. Replace all other defective parts.

5-201. REASSEMBLY. Proceed as follows:

a. Install gasket (4, figure 5-75) and cover (3) on junction box (5).

b. Secure with three screws (1) and flat washers (2). Lockwire screws.

5-202. FUNCTIONAL TEST. (See figure 5-75.) Proceed as follows:

NOTE

Functional-test torquemeter junction box, using procedures given in following steps a through c. Functional-test head assembly as given in following step d. Functional-test torquemeter junction box, head assembly, and power output shaft using procedures outlined in following step e.

Functional-test torquemeter junction box, using torquemeter test set (LTCT6943).

a. Perform inverter (power supply) self-check as follows:

(1) Position DVM range switch to MV and functional switch to 100.

(2) Set the console FUNCTION switch to position 24.

(3) Position AC POWER switch to ON.

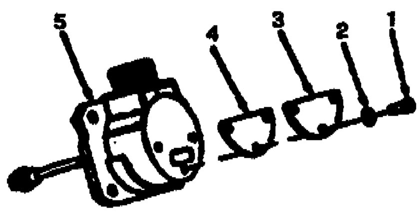


Figure 5-75. Electrical Torquemeter Junction Box Assembly (T53-L-701, -701A).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-75	No Number	ELECTRICAL TORQUEMETER Junction Box Assembly (NHA 1-000-110-01, 1-000-110-03, 1-000-110-07, 1-170-330-09 and 1-200-080-01)	Ref	D,E
-1	MS35275-202	. SCREW, Machine	3	D,E
-2	AN960-2	. WASHER, Flat	3	D,E
-3	2-060-291-2	. COVER, Electric torquemeter junction box	1	D,E
-4	2-060-295-02	. GASKET, Cover, electric torquemeter junction box	1	D,E
-5	1-020-400-01	. JUNCTION BOX, Electrical Torquemeter (alternate)	1	D,E
	1-020-400-02	. JUNCTION BOX, Electrical torquemeter	1	D,E
	1-020-400-04	. JUNCTION BOX, Electrical torquemeter	1	D,E

(4) Position digital voltmeter (DVM) (LTCT9835) power ON.

NOTE

If test set has not been used, allow test set to warm up for at least 15 minutes.

(5) Zero digital voltmeter by shorting across signal input probes on face of DVM. Final adjust with ZERO CONTROL screw on face of DVM until display reads 000.00.

(6) Remove shorting wires.

(7) Position DVM range switch to AUTO and DVM FUNCTION switch to AC.

(8) Turn test set FUNCTION switch to position 1.

(9) Position inverter checkout switch (55) to ON.

(10) Position SELF TEST switch to position 1. Digital voltmeter must read 0.555 to 0.559 volts AC.

(11) Repeat preceding step (10) for remaining positions of SELF TEST switch 2, 3, and 4. If digital voltmeter does not display the voltage given in preceding step (10), replace inverter (power supply).

NOTE

Repeat preceding steps (10) and (11) if there is any question as to the accuracy of the readings when first obtained.

(12) Position AC power switch to OFF.

(13) Position inverter checkout switch (55) to OFF.

b. Perform resistance test as follows: (See figures 5-76, 5-77, and 5-78.)

(1) Remove three screws (1, figure 5-75), three flat washers (2), cover (3), and gasket (4).

(2) Scrape away potting to gain access to SENS and BAL screws.

(3) Install torquemeter junction box (5) on calibrating rig bracket.

(4) Connect cable assembly to test set; then connect cable connector P2 to cable assembly and attach other end of jumper cable and cable connector P3 to torquemeter junction box.

(5) Position AC POWER switch to ON.

(6) On digital voltmeter, position RANGE switch to AUTO, FUNCTION switch to K, and POWER switch to ON.

(7) Turn test set FUNCTION switch to position 2. The digital voltmeter shall display less than ohm. If voltmeter display is one ohm or more, reject torquemeter junction box.

(8) Repeat preceding step (7) with FUNCTION switch in positions 3, 4 and 5.

(9) Turn test set FUNCTION switch to position 6 and refer to table for test particulars. If voltmeter display values are not within the limits specified in table 5-49 or table 5-50, reject torquemeter junction box.

(10) Repeat preceding step (9) with FUNCTION switch in position 7.

c. Perform bridge test on junction box as follows:

(1) On digital voltmeter, position FUNCTION switch to DC.

(2) Position BRIDGE TEST switch to ON.

(3) Turn test set FUNCTION switch to position 8. Digital voltmeter shall display 125±15 vdc. If digital display is not within limits given, reject torquemeter junction box.

(4) Repeat step (3) with FUNCTION SWITCH in position 9.

(5) Position BRIDGE TEST switch to OFF.

(6) Disconnect cable assembly and jumper cable from torquemeter junction box.

Table 5-48. Inspection of Electrical Torquemeter Junction Box Assembly.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-75				
5	Electrical Torquemeter Junction Box	Visual	Damaged connector or connector threads	Not allowed. Replace. Repair threads (Refer to SP No. 5000 in Appendix E)
			External mutilation	Not allowed. Replace.
		Visual	Cracks on teflon tubing	Acceptable
4	Gasket	Visual	Damage	Not allowed. Replace.
3	Cover	Visual	Warping	Not allowed. Replace.
			Cracks	Not allowed. Replace.
			Nicks, burrs or scratches	Blend-repair. (Refer to SP No. 5000 in Appendix E)

CAUTION

Ensure AC POWER switch is in OFF position before attempting to disconnect cable assembly.

d. Perform functional test of torquemeter head assembly, using torquemeter test set (LTCT6943), as follows:

(1) Connect interface cable assembly to test set.

(2) Connect interface cable assembly lead (P4) and to cable assembly.

(3) Install head assembly on centering shaft (LTCT13511, detail of LTCT6943) and cone. Install second cone on centering shaft and head assembly.

(4) Position AC POWER switch to ON. Allow test set to warm up for 15 minutes to stabilize inverter output.

(5) On digital voltmeter, position RANGE switch to AUTO, and FUNCTION switch to AC.

(6) Turn test set FUNCTION switch to position 10. Digital voltmeter shall display 0.557±0.002 vrms. If display is not within limits, reject head assembly.

(7) Turn TEST FUNCTION switch to position 11. Digital voltmeter shall display between 1.10 vrms and 1.39 vrms. If display is not within limits, reject head assembly.

(8) Repeat step (7) with FUNCTION switch in position 12.

(9) To obtain a voltage differential between positions 11 and 12, turn test set FUNCTION switch to position 13. Digital voltmeter shall display a differential voltage of less than 0.08 vrms. If display is not within limits, reject head assembly.

NOTE

To check result obtained in step (9), mathematically subtract result obtained in step (8) from result in step (9).

(10) Position AC POWER switch to OFF, and remove head assembly from centering shaft.

(a) Torquemeter head assemblies which have passed the inspection criteria specified (refer to table 5-54, index number 12 and table 5-55) but which fail the functional electrical tests specified in paragraph 5-202d(1) through (10)shall be evaluated as follows:

1 Open circuits: check resistance between pin connectors as shown in table 5-51. If maximum limit is exceeded, an open circuit exists which may be isolated as follows:

a Remove teflon sheave from wire bundle, leaving at least one inch of teflon sheave on each end of wire bundle.

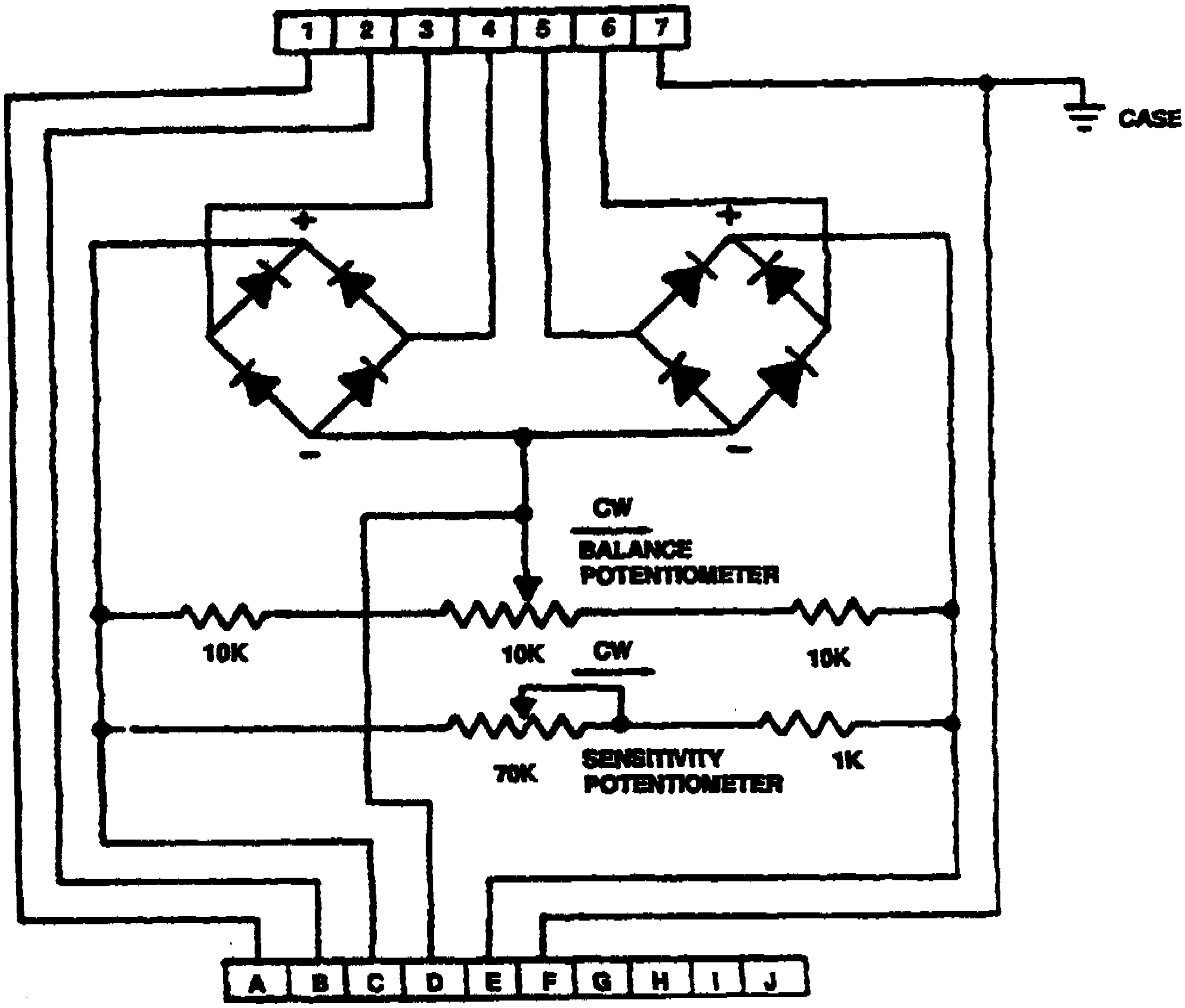


Figure 5-76. Wiring Diagram for Electrical Torquemeter Junction Box (1-020-400-01, -04).

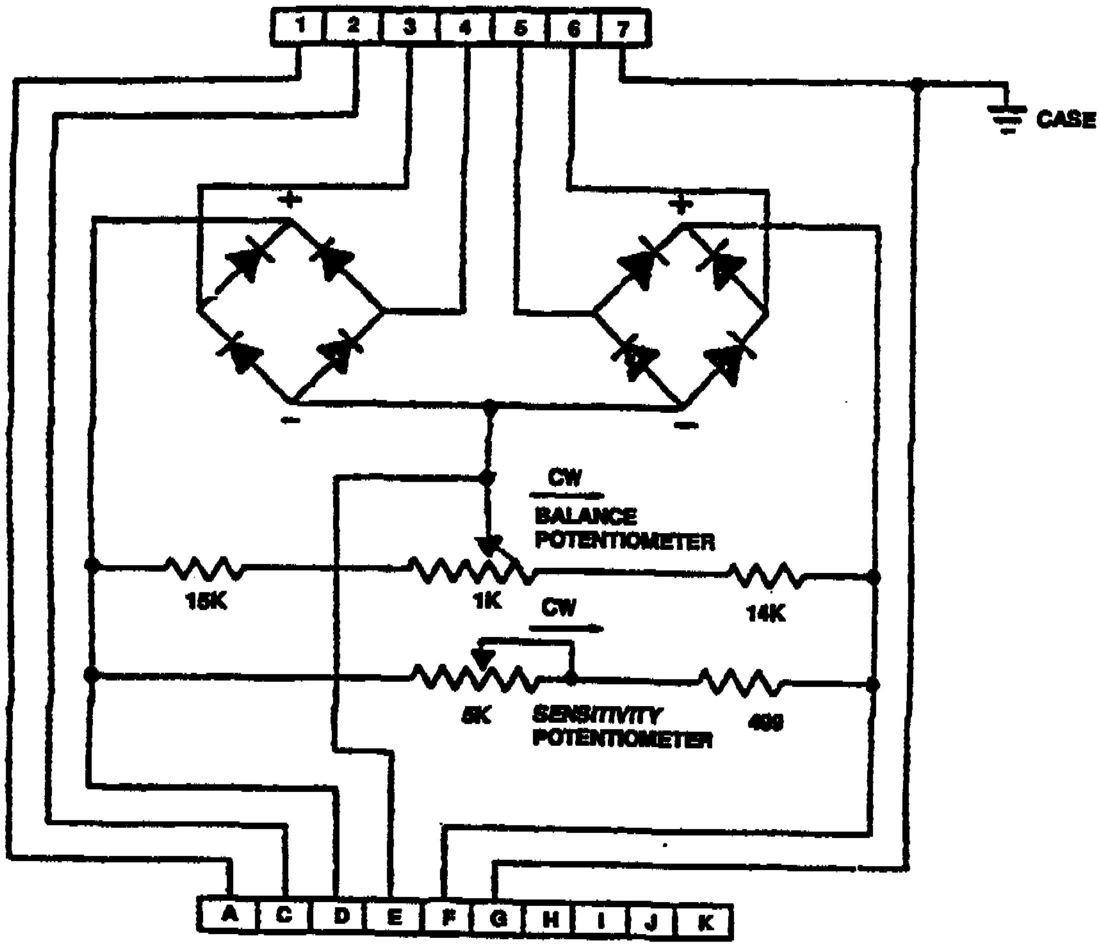


Figure 5-77. Wiring Diagram for Electric Torquemeter Junction Box (1-020-400-02).

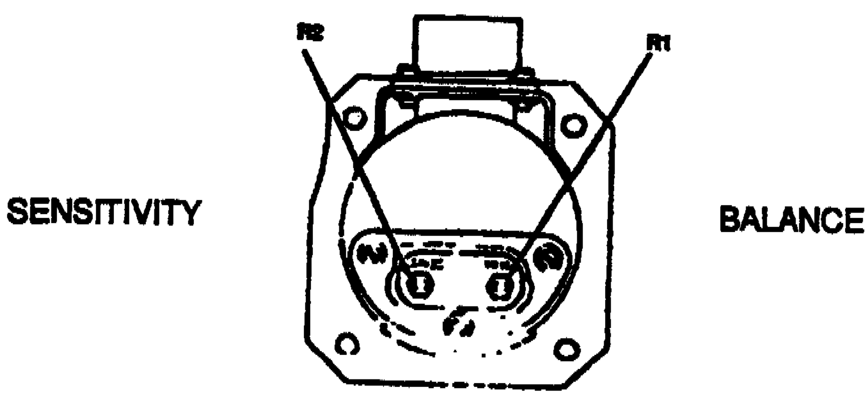


Figure 5-78. Electric Torquemeter Junction Box Calibration Points.

Table 5-49. Torquemeter Junction Box (1-020-400-01, -04) Resistance Checks.

Sensitivity* Adjustment (See fig 5-78)	Balance Adjustment (See fig 5-78)	Resistance in Ohms
	Function Switch In Position 6	
Max. C.C.W.	Max. C.C.W.	6,950 max to 6,600 min
Max C.W.	Max. C.C.W.	8,250 max to 7,850 min
Max C.W.	Max C.W.	12,450 max to 11,800 min
Max C.C.W.	Max C.W.	7,280 max to 6,920 min
	Function Switch In Position 7	
Max. C.C.W.	Max. C.C.W.	7,280 max to 6,920 min
Max C.W.	Max. C.C.W.	12,450 max to 11,800 min
Max C.W.	Max C.W.	8,250 max to 7,850 min
Max. C.C.W.	Max C.W.	6,950 max to 6,600 min

* Maximum C.C.W. or C.W. is obtained when digital voltmeter reading is constant regardless of number of turns on adjustment screw.

Table 5-50. Torquemeter Junction Box (1-020-400-02) Resistance Checks.

Sensitivity* Adjustment (See fig 5-78)	Balance Adjustment (See fig 5-78)	Resistance in Ohms
	Function Switch In Position 6	
Max. C.C.W.	Max. C.C.W.	7,709 max to 7,537 min
Max C.W.	Max. C.C.W.	8,791 max to 8,568 min
Max C.W.	Max C.W.	8,929 max to 8,648 min
Max C.C.W.	Max C.W.	7,742 max to 7,521 min
	Function Switch In Position 7	
Max. C.C.W.	Max. C.C.W.	7,741 max to 7,536 min
Max C.W.	Max. C.C.W.	8,797 max to 8,526 min
Max C.W.	Max C.W.	8,600 max to 8,356 min
Max. C.C.W.	Max C.W.	7,658 max to 7,489 min

* Maximum C.C.W. or C.W. is obtained when digital voltmeter reading is constant regardless of number of turns on adjustment screw.

b Using needle (or equivalent device) to penetrate insulation on wires, check resistance between wires per table 5-51 and continuity between pin connectors and wires per table 5-52. If the resistance between wires exceeds 50,000 ohms, an open circuit exists in the head. Scrap head, but salvage the metal sleeve (tube) for a spare part. If pin connectors and wires lack continuity an open circuit exists in the plug. Replace plug as per paragraph 5-207a.

2 Shorts: Check resistance between pin connectors as shown in table 5-51. If resistance is less than the minimum limit as shown in table 5-51, a short exists. The short may be isolated as follows:

a Remove teflon sheath, plug, and metal sleeve as per paragraphs 5-207c(1) through 5-207c(3). Separate wire pins as per table 5-52. This removes any possibility of a short in the plug or cable assembly.

b Check the resistance of the wire pairs after connector plug and metal tube (sleeve) have been removed. If resistance is less than the minimum limit shown in table 5-51, a short still exists in the torquemeter head assembly. Scrap the head but salvage the metal tube for a spare part.

(11) Perform functional test for electric torquemeter kit. (Refer to following step e.)

e. Perform functional test of torquemeter junction box, head assembly, and power output shaft as follows:

(1) Install head assembly on support of calibrator rig. (See figure 5-79.)

(2) Install head assembly and support, as a unit, on forward face of holding block. Secure with two screws (MS16998-41, detail of LTCT6943) through slots in support flange. Do not tighten screws at this time.

(3) Connect torquemeter junction box electrical lead to head assembly electrical lead.

(4) Remove three shoulder screws and end plate from calibrator rig.

(5) Remove adapters, if installed.

(6) Install adapter in arm assembly hub and secure with shim and stop.

(7) Install torquemeter shaft assembly in adapter assembly and secure with thumbscrew.

(8) Install assembly in calibrator rig and through head assembly.

(9) Spline torquemeter shaft to adapter in arm hub.

(10) Reinstall end plate and secure with three shoulder screws.

(11) Connect shorting cable jumper to torquemeter junction box; then connect cable assembly to shorting jumper (plug P3) and test set (plug P1).

(12) Turn console function switch to position 14.

(13) Turn DVM range switch to AUTO.

(14) Turn DVM function switch to MV.

(15) Turn AC power switch to ON.

NOTE

Inverter self-check, DMV zero check, (refer to preceding step (a) and warmup must be provided if test set has not been in previous use.

(16) Turn R1 impedance potentiometer until DVM reads 0.00±0.02 MV DC.

(17) Disconnect shorting cable.

(18) Establish electrical and mechanical balance of torque system.

(a) Connect connector P3 of cable assembly to torquemeter junction box.

(b) Turn torquemeter junction box SENS screw (R2) clockwise a minimum of 17 full turns for maximum sensitivity.

(c) Install bearing housing and spacer over end of torquemeter shaft adapter assembly and secure with bracket and screws (MS16997-60, detail of LTCT6943). (See figure 5-80.)

Table 5-51. Resistance Test for Open Circuits and Shorts.

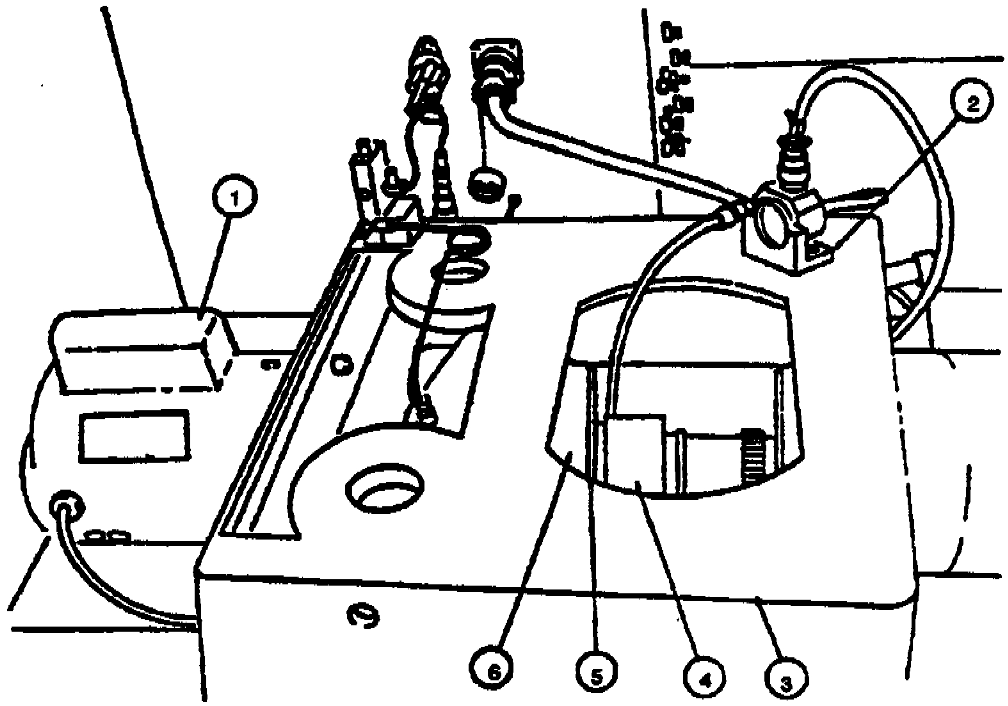
PIN CONNECTORS	WIRES	NORMAL (OHMS)	LIMIT (OHMS)	
			(MAX)	(MIN)
A AND B	BLACK AND BROWN	2.2 TO 3.0	4.5	2.0
C AND D	RED AND ORANGE	500 TO 650*	50,000*	450
E AND F	YELLOW AND GREEN	500 TO 650*	50,000*	450

* THE DIFFERENCE IN RESISTANCE BETWEEN C-D AND E-F MUST NOT EXCEED 50,000 OHMS

NOTE: IF RESISTANCE EXCEEDS MAX. ON PIN CONNECTORS, CLEAN PIN CONNECTORS WITH ISOPROPYL ALCOHOL (ITEM 25, TABLE C-1) (USE DRILL BIT TO REMOVE COMPACTED DIRT) AND RETEST.

Table 5-52. Continuity (One Ohm Maximum).

PIN CONNECTORS	WIRE COLOR	WIRE SETS
A	BLACK	I
B	BROWN	
C	RED	II
D	ORANGE	
E	YELLOW	III
F	GREEN	



1. Motor
2. Calibrating ring bracket
3. Calibrating ring
4. Head assembly
5. Support
6. Holding Block

Figure 5-79. Torquemeter Junction Box, Head Assembly, and Power Output Shaft - Function Test.

(d) Remove cover from over calibrator rig arm assembly.

(e) Remove shoulder screws from calibrating rig arm assembly.

(f) Position AC POWER switch to ON and energize MOTOR switch for torquemeter shaft rotation.

(g) Turn junction box BAL screw, as required, to obtained 0±0.2 mv display on digital voltmeter.

(h) De-energize MOTOR switch. Allow motor to stop; then reinstall shoulder screws in arm assembly to lock shaft in place.

NOTE

It may be necessary to rotate torquemeter shaft to pick up bolt holes.

(i) Remove holding parts installed in preceding step (c).

(j) Loosen head assembly and rotate clockwise or counterclockwise, as required, to return digital voltmeter reading to 0±0.2 mv. Secure head assembly, as required.

NOTE

Alternately tighten screws in small increments until head assembly is secured.

(19) There are two possible methods which can be used to determine if system is within acceptable load condition requirements. They are detailed in following steps (a) and (b).

(a) The individual points may be determined corresponding to the millivolt and torque values given in table 5-53. In order to obtain these values relative to each other, a given torque will be applied through the powerdyne unit and the corresponding millivolt reading read from the digital voltmeter. Proceed to following step (52)(a) through (52) (d)prior to using table 5-53.

(b) The X-Y plotter may be used to obtain a trace of the millivolt versus torque relationship.

NOTE

It is recommended that the X-Y plotter be used only with a new shaft. If the values of table 5-53 cannot be met, it shall be necessary to remove preload by application of reverse torque as outlined in step e (53) (g)1 and then perform preload procedures as outlined in step e (53)(f).

(20) Obtain a blank sheet of graph paper and, where indicated on graph paper, write in serial number of torquemeter shaft, torquemeter junction box, and head assembly.

(21) Turn test set AC POWER switch to ON.

(22) Position X-Y recorder controls as follows:

(a) CHART switch to RELEASE.

(b) PEN switch to UP.

(c) POWER/SERVO switch to ON/OFF.

(d) Y RANGE switch to 10V/IN.

(e) X RANGE switch to 1V/IN.

(23) Install graph paper on X-Y recorder and align lower and left edges of sheet with corresponding paper guides.

(24) Turn CHART switch of recorder to HOLD. Smooth paper, if necessary.

(25) Position test set FUNCTION switch to 15.

(26) Manually position point of pen over any horizontal line on graph paper.

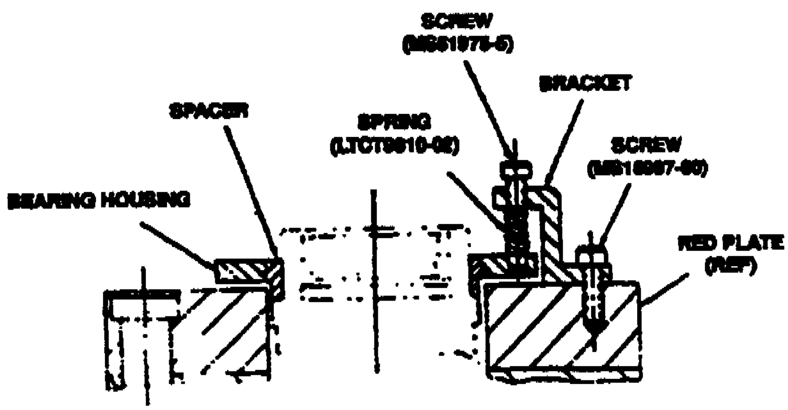


Figure 5-80. Shaft Holding Equipment Installed.

(27) Manually move carriage arm across graph paper to ensure that the paper is aligned horizontally. (Pen should track along horizontal line set up in preceding (20).

(28) Position recorder POWER/SERVO switch to ON/ON.

(29) Unlock X-AXIS ZERO control by turning LOCK control in a counterclockwise direction.

(30) Using X-AXIS ZERO control, position recorder pen to a point approximately 3 inches from left side of graph paper.

(31) Position PEN switch to DOWN.

(32) Using X-AXIS ZERO control, position recorder pen exactly 3 inches from the left of the graph paper.

(33) Lock X-AXIS ZERO control by turning LOCK control in a clockwise direction.

(34) Position PEN switch to UP.

(35) Unlock Y-AXIS ZERO control by turning LOCK control in a counterclockwise direction.

(36) Using Y-AXIS ZERO control, position recorder pen approximately one inch from bottom of graph paper.

(37) Position PEN switch to DOWN.

(38) Lock Y-AXIS ZERO control by turning LOCK control in a clockwise direction.

(39) Position PEN switch to UP.

(40) Position test set FUNCTION switch to 16.

(41) Adjust R15 (front to test set) to displace recorder pen approximately 7 inches, (28 millivolts) upward on Y-AXIS.

(42) Position PEN switch to DOWN.

(43) Adjust R15 for exactly 7 inches (28 millivolts) displacement.

(44) Position PEN switch to UP.

(45) Position test set FUNCTION switch to 17.

(46) Check for a pen displacement of 7 inches along the X-AXIS (left to right).

(47) Position test set FUNCTION switch to position 18.

(48) Check for a pen displacement of approximately 7 inches on both the X and Y axis.

(49) Set Y-RANGE switch to IV/IN.

Table 5-53. Individual Data Points for Acceptable Load Conditions.

Torque Load (ft. lbs)	Millivolt Display
40	2.25 to 3.04
80	5.00 to 5.83
120	7.88 to 8.68
160	10.73 to 11.58
200	13.62 to 14.48
240	16.58 to 17.49
280	19.55 to 20.47
320	22.58 to 23.48
360	25.65 to 26.49
390	27.91 to 28.82

(50) Position test set FUNCTION switch to 19.

(51) Position AC POWER switch to OFF.

(52) Perform load application check as follows:

(a) Position FUNCTION switch to position 19.

(b) Using power torque wrench, P/N PD2501, apply 390 pound-feet (580 kgm) torque to torquemeter shaft.

(c) At the 390 pound-foot (580 kgm) torque limit, check digital voltmeter display. Display shall be 28.35 mv. If voltmeter does not display 28.35 mv, turn torquemeter junction box SENS screw (R2), until voltmeter displays 28.35±0.5 mv dc.

NOTE

If the value in preceding step (c) cannot be met, the shaft is either over preloaded or under preloaded and the shaft shall be handled as detailed in following step (53)(c).

(d) Decrease torque load and compare to millivolt limits in table 5-53.

(e) If required, adjust junction box potentiometer (bal) and repeat steps (c) and (d).

(53) Perform load application check as follows:

(a) Position POWER/SERVO switch to ON/ON, and PEN switch to DOWN.

(b) Apply up to 390 pound-feet (580 kgm) torque to torquemeter shaft and plot the output.

(c) Set PEN switch to UP, position POWER/SERVO to ON/OFF, and remove powerdyne load.

(d) Compare plotted curve with overlay template. (See figure 5-81.) If the curve fits the overlay, proceed to following step(h).

NOTE

The plotted curve must lie within the overlay limits. First 40 percent of comparison curve will indicate whether shaft is over or under preload.

(e) If the plotted curve lies below the limits of overlay, the shaft is under preload and must be corrected as outlined in following step (f)1. If the plotted curve lies below the limits of overlay, the shaft is over preloaded and must be corrected as outlined in following step (f)3.

(f) Preload shaft as follows:

1 Apply 1,000 pound-foot (1488 kgm) torque load to torquemeter shaft assembly. Maintain torque for 5 minutes. After 5 minutes have elapsed, remove applied torque.

2 Repeat preceding steps (53) (a) through (d) or recheck to table 5-53.

3 If shaft is under preload condition, continue increasing torque load in 100 pound-feet (149 kgm) increments until a desired plot is obtained.

CAUTION

The maximum torque that may be applied to torquemeter shaft is 1,600 pound-feet (2381 kgm). If the torquemeter shaft does not conform to the transparent overlay after a 1,600 pound-feet (2381 kgm) preload, reject shaft and calibrate a new shaft.

(g) Decrease preload on torquemeter shaft as follows:

1 Remove preload on torquemeter shaft by applying a reverse torque equal to the existing torque load. Read torque value from power-dyne gauge, not from console gauge.

2 Repeat steps (52) and (53)or recheck to table 5-53.

3 If shaft is still out of limits, reject shaft and calibrate a new shaft.

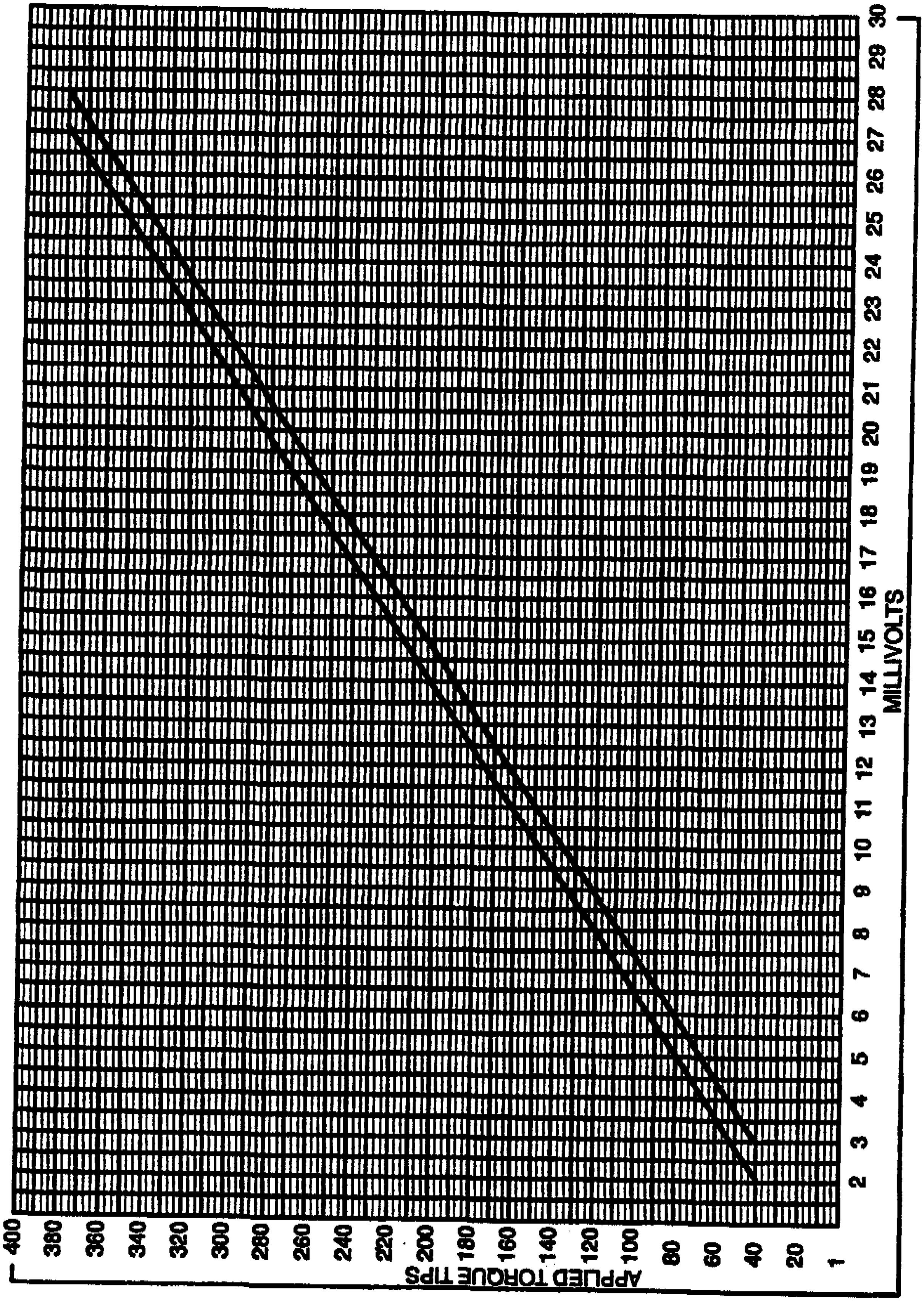


Figure 5-81. Overlay Template (LTCT13947) - Reference Curve.

(h) Installation of electric torquemeter identification plate when replacement is required on the T53-L-701/701A torquemeter junction box.

1 Materials.

a Red Metal Label, P/N 8001 (aluminum foil with modified acrylic adhesive backing).

b 300 grit sand paper or 400-420 grit aluminum oxide.

c Acetone (item 13, table C–1)

2 Fabrication and Installation.

a Fabricate the new metal ID plate by superimposing a picture of the original electric torquemeter junction box ID plate on and side of the Red Metal Label material which has no adhesive backing.

b Abrade to roughen surface of junction box where ID plate is to be attached. Use either 300 grit sand paper or 400 to 420 grit aluminum oxide.

c Clean abraded area with acetone (item 13, table C–1) and then make sure all contaminates and loose particles have been removed.

d Let surface dry for about 5 minutes.

e Strip the barrier material from the adhesive side of the Red Metal Label material (paragraph (h)1a above) and attach to the junction box by pressing the adhesive firmly to the junction box surface.

5-203. ELECTRICAL TORQUEMETER HEAD ASSEMBLY (T53-L-701, -701A).

5-204. DISASSEMBLY. Disassembly is not required.

5-205. CLEANING. Clean electric torquemeter head assembly (12, figure 4-48) by wiping with a clean cloth or soft bristle brush dampened with dry cleaning solvent (item 134, table C–1). After cleaning, wipe torquemeter head assembly with clean; dry cloth to remove all residual solvent.

5-206. INSPECTION. Perform specific inspection listed in table 5-54.

5-207. REPAIR OF ELECTRICAL TORQUEMETER HEAD ASSEMBLY AND SUPPORT (T53-L701A). Repair damaged electrical torquemeter head assembly support in accordance with the repair procedure referenced in table 5-54. If electrical torquemeter- head assembly is replaced, it shall be calibrated as a set with electrical torquemeter junction box torquemeter head assembly parts as follows:

a. Replacing Defective Connector Plug:

(1) Remove teflon sheave form wire bundle leaving one piece of teflon sheave on each end of the wire bundle. Be careful not to cut or nick insulation on wires in the bundle.

(2) Remove connector plug from metal sleeve by pulling, crushing, or chiseling to expose and separate pins from the plug body. Be careful not to damage sleeve, as it will be reused.

(3) Slide back small pieces of wire tubing to expose solder joints. Unsolder the wires from the connector pins one at a time and pull the wires back through the aluminum sleeve.

NOTE

Bundle of wires are encased in teflon sleeve located inside the aluminum sleeve. Once the wires are unsoldered from the connector pins, it is very easy to pull the wires through the aluminum sleeve.

When all the wires have been removed from the aluminum sleeve, grasp the piece of teflon at back of metal sleeve with a pair of pliers (or similar tool) and remove it from the inside of the aluminum sleeve. Save this piece of teflon for reuse.

(4) Carefully remove blue potting compound from the aluminum sleeve using a 11/32-inch drill bit in a drill press(or similar tool). Drill or rout out inside of connector end of sleeve to a depth of 7/16 (1.111 cm).

CAUTION

Do not drill into aluminum sleeve near the larger end of this sleeve.

(5) Remove the remainder of blue potting compound bonded to inside of the aluminum tube with a small drill bit (about 1/4 inch (0.635 cm) diameter), drilling from both ends as necessary and being careful not to drill into the metal during this removal operation.

(6) Wrap aluminum sleeve with small cloth and hold it with locking pliers.

(7) Slide aluminum sleeve over the wiring harness and push it against the body of the torquemeter head assembly. Be sure and install the aluminum sleeve with the slot end forward facing away from the torquemeter, i.e. the end of the sleeve which is attached to the connector plug. Don't install backwards. See figure 5-83.

(8) Take the piece of teflon sleeve (removed from the aluminum sleeve) and drill a hole through one end. Split end of tubing at right angle (where hole were drilled) to form two ears containing the two holes. Slide this teflon sleeve over the wiring harness assembly and inside the aluminum sleeve making sure that the split end of this sleeve is facing away from the torquemeter head.

NOTE

The split end of this teflon sleeve will be butted against the new connector plug.

(9) Take a new connector plug (item 137, table C–1and solder (item 287, table C–1) the six colored wires listed in table 5-52 to the connector pins. Solder in accordance with MIL-STD-454, requirement 5 (MPS25).

(10) Brush solder connections with isopropyl alcohol (item 25, table C–1) to remove residual solder resin and air dry. Slide small pieces of teflon tubing (located on each wire) over the solder connections.

(11) Coat the first four (4) inches (10.16 cm) of wiring harness behind the connector plug with 1/8-inch (0.318 cm) thick layer of adhesive (item 15, table C–1). Slide the aluminum sleeve toward connector, grasp the end of the teflon sleeve located inside the metal sleeve) and slide over the potted wiring harness against the bottom of the connector and seat the connector firmly in place inside the metal sleeve. Remove excess potting compound.

(12) Place torquemeter head on a bench top (or equivalent holding device) in the position shown in figure 5-82. Starting at the top of the aluminum sleeve completely fill the tube with additional potting compound up to the level where the bundle of wires emerge from the top of the aluminum sleeve hole as shown in figure 5-82. Allow potting compound to cure for at least 24 hours in this position.

b. Splice Repair:

(1) A replacement plug may be removed from a scrapped torquemeter head assembly to replace a damaged plug on a repairable torquemeter head assembly.

(2) Remove teflon sheave from wire bundles leaving one inch of sheave at end attached to part.

(3) Cut wires to required length and remove 1-3/4 inch of insulation at ends. Total length of repaired wire bundle and plug is to be 7.44 to 7.53 inch.

(4) Splice (preferably staggered) wiring harness to join torquemeter head assembly and plug, per QQ-S-571 (item 287, table C–1).

c. Sheath Repair:

(1) Carefully remove teflon sheath from wiring harness assembly, leaving a one inch piece of teflon sheath on each end of the wiring harness assembly (or wire bundle).

NOTE

If a plug repair has been made prior to this repair the teflon sheath has already been removed.

(2) Clean all of teflon coated, colored wires and remaining pieces of teflon sheath with cleaning solvent (item 100, table C–1) to remove MIL-L-23699 turbine engine oil. Do not contaminate cleaned surfaces with finger prints.

Table 5-54. Inspection of Electric Torquemeter Head Assembly and Support (T53-L-701, -701A).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-48				
12	Electric Torquemeter Head Assembly	Visual	Distortion	Not allowed. Replace.
			Cracks, in potting compound (refer to table 5-55)	Replace if limit exceeded, but salvage connector plugand metal sleeve for spare parts.
			Cracks or chips in connector	Cracks or separation between metal sleeve and connector not acceptable. Replace connector as per paragraph 5-207a.
				Chips or cracks that extend into threads of connector plug not acceptable. Replace connector as per paragraph 5-207a.
			Loose, bent, or missing connector pins	Pins in connector not securely fixed, or missing not acceptable. replace connector as per paragraph 5-207a.
			Cracks, tears, pin holes, or turbine engine oil inside sheath	No longitudinal, circumferential cracks, tears, or pin holes acceptable. Replace sheath and repair as per paragraph 5-207c.
			Cut or broken wires in cable wiring harness assembly	Scrap part, but salvage metal sleeve and connector plug for spare parts.

Table 5-55. Electric Torquemeter Head Assembly Limits.

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Cracks, or Chips on Potting Compound Surfaces		a. Replace head assembly if separation between cracks is less than 0.150 inch (0.381 cm) but salvage metal sleeve and connector plug of head assembly for square parts. b. Replace head assembly if cracks exceed 0.007 inch (0.018 cm) but salvage metal sleeve and connector plug for spare parts. If cracks less than 0.007 inch (0.018 cm), head assembly satisfactory for use provided functional electrical testing does not reveal an open circuit in torquemeter. If open circuit is found, replace torquemeter head, but salvage metal sleeve and connector plug spare parts. If short is found, replace torqueme- ter head assembly but salvage metal sleeve and connector plug for spare parts. c. Replace torquemeter head assembly but salvage metal sleeve and connector plug if more than three cracks extending the complete axial length of the torquemeter head are found. If three or less cracks extending the complete axial length of the torquemeter are found, the torquemeter head is satisfactory for use provided functional electrical tag does not reveal an open circuit or short. d. Replace torquemeter head assembly, but salvage metal sleeve and connector plug, for spare parts if three or more cracks converge or intersect, or if a crack extended will intersect, or converge with other cracks to form an enclosed area (island) isolating itself from the main body of the potting compound.

(3) Roughen metal surface about 1/2-inch (2.27 cm) radius around the hole where the bundle of wires emerge from the base of the torquemeter head and also roughen around the hole where this same bundle of wires enter the bottom of the metal sleeve (see figure 5-83). Metal surfaces mentioned should be roughened with a Scotch Brite pad (item 10, table C–1) or equivalent.

(4) Clean these aforementioned roughened metal surfaces with acetone, (item 13, table C–1) and apply silicone primer (item 277, table C–1), to these cleaned metal surfaces. Allow primer to dry for 30 minutes.

(5) Apply fluorosilicone sealant (item 266, table C–1) to the remaining pieces of teflon sheath on each end of the wiring harness assembly by forcing the sealant under two pieces of sheath material, thus forming a plug on each end of the wiring harness assembly.

(6) Remove several pieces of heat shrink silicone tubing (item 275, table C–1) from the tubing container and cut to 3 1/2 inch (8.890 cm) lengths. Return any unused tubing to the container.

(7) Apply technical petrolatum (item 329, table C–1) to the mechanical expansion tool 79SPL-12757-A-0031-2 and inside the heat shrink tubing, and insert the connector plug in this tool. Starting from the bullet shaped end of the tool slide the heat shrink tubing over the connector plug, the aluminum metal sleeve, and over the teflon sheath plugs on each end of the wiring harness assembly. Apply a heat gun to half the length of the heat shrink tubing, beginning at the junction where the electric cable assembly emerges from the base of the housing and shrink down this part of the tubing. Apply silicone sealant (item 266, table C–1) to the prime coated surfaces prepared in paragraphs 5-207c (3) and 5-207c(4) and around the circumferences of the end of the shrink tubing butted against the torquemeter head. Starting at the end of this tubing 1/4 to 1/2 inch (0.635 to 0.127 cm) in length. Then using additional sealant form a truncated, conical shaped, connective bridge between the aforementioned metal surfaces and the cylindrical sealant plug as shown in figure 5-83. Finally apply a heat gun to the remaining half of the tubing and shrink it down.

(8) Also apply a bead of sealant to the primed metal surfaces around the hole where, the bundle of wires in cable assembly enter the bottom of aluminum sleeve.) Apply a bead of sealant (item 267, table C–1) on top of a first bead; then place cable installation tool 79SPL-12757-A-0032 around the end of the shrink tubing butted against this bottom of this aluminum sleeve, and clamp down squeezing the sealant around the end of the shrink tubing to form a cylindrical plug (see figure 5-82). Set torquemeter head assembly aside to allow sealant to cure.

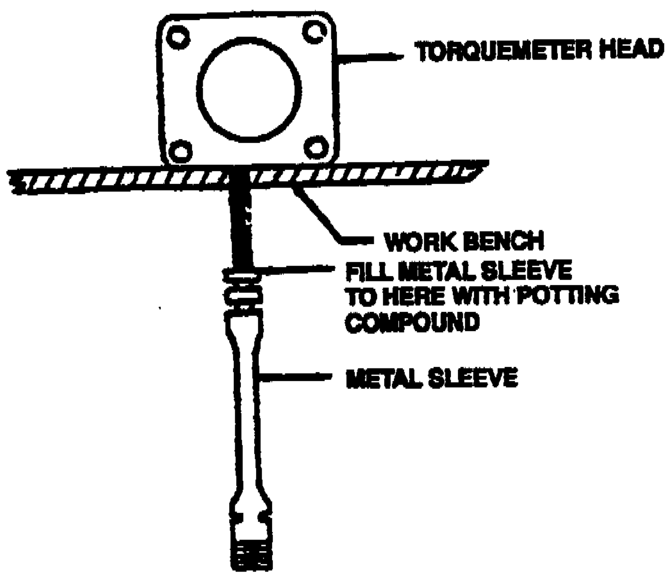


Figure 5-82. Position of Metal Sleeve During Potting.

1. 0.375 INCH (1.313) HEAT SHRINK TUBING (SILICONE RUBBER)
2. WIRES
3. SEALANT AND CONNECTIVE SEALANT BRIDGE
4. ALUMINUM TUBING (SLEEVE)
5. CONNECTOR PLUG
6. ONE (1) INCH (2.54) LONG ORIGINAL TEFLON SHEAVE PLUGGED WITH RTV730 SEALANT AND COVERED WITH 0.375 INCH (0.952) HEAT SHRINK SILICONE TUBING
7. SLOTS

DIMENSIONS IN () ARE CENTIMETERS

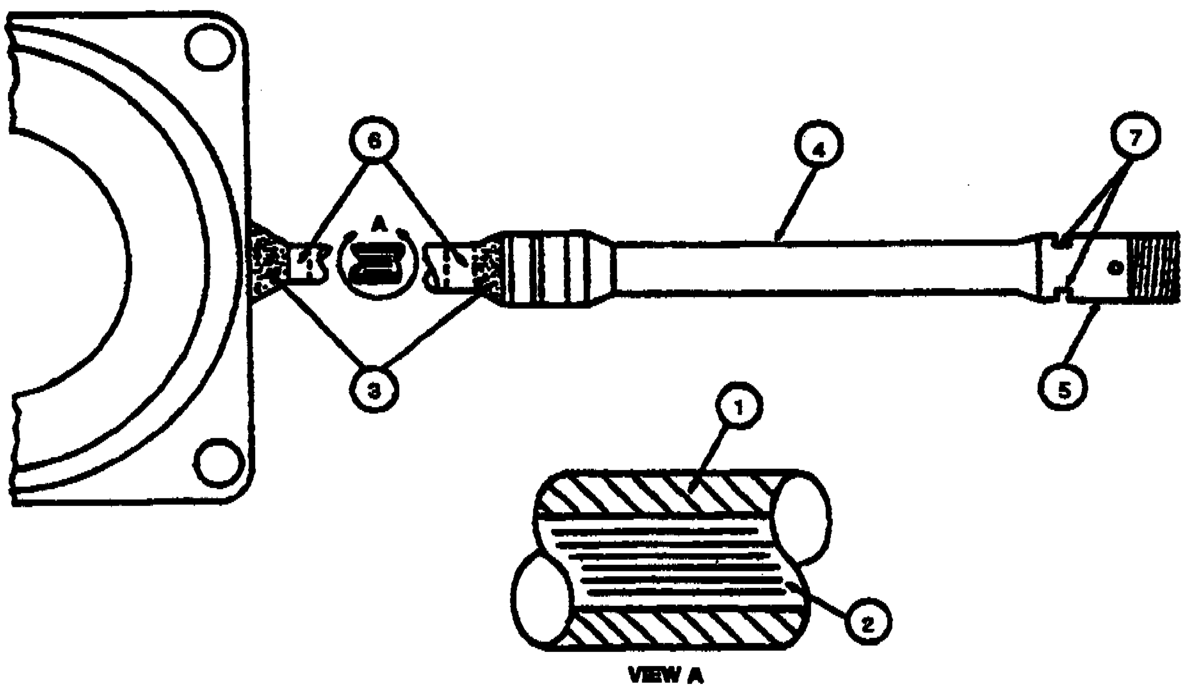


Figure 5-83. Air Shrink Tubing, Repair and End Sealing of T53-L-701,-701A, TQM Head Assembly.

NOTE

Time required to develop a full cure for silicone sealant (item 267, table C–1) is normally seven (7) days at room temperature. If an accelerated cure of this sealant is required, place a wet rag over the uncured sealant overnight. This sealant cures at a faster rate at high humidities. Heat will not accelerate the cure of this sealant!

d. Marking of Reworked Part: After the sheath repair of the torquemeter harness assembly has been completed, the torquemeter head shall be marked with the letter "-S-" using a vibropeen marking tool. The location of this letter shall be in the general area where the part number and seal number for this part is printed. Depth of the mark should be within 0.001 inch to 0.006 inch (0.002 to 0.015 cm).

5-208. REASSEMBLY. - Reassembly is not required.

5-209. FUNCTIONAL TEST. - Refer to paragraph 5-202.

5-210. POWER-DRIVEN ROTARY (OIL) PUMP.

5-211. DISASSEMBLY. Proceed as follows:

NOTE

Perform following steps a through b only if damage is evident.

a. Remove snap ring (1, figure 5-84) from splines of oil pump drive shaft assembly.

b. Drill off one end of lock pin (2); then remove pin.

c. Using suitable arbor press, press splined coupling (3) from coupling shaft (4).

d. If functional test indicates overhaul is required, further disassembly procedures for rotary pump are given in TM 55-2840-216-40.

5-212. CLEANING. Proceed as follows:

a. Clean all parts, except pump, by dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

b. Clean power-driven rotary (oil) pump as outlined in TM 55-2840-216-40.

5-213. INSPECTION. Perform specific inspections listed in table 5-56.

5-214. REPAIR. The pump is not repairable.

5-215. REASSEMBLY. Proceed as follows:

a. Reassemble shaft assembly as follows:

(1) Mark coupling shaft (4, figure 5-84) to drill hole for lockpin 90 degrees away from existing hole.

(2) Heat coupling (3) to 350°F (177°C).

(3) Install coupling on shaft. Bottom shaft in coupling.

(4) Drill completely through coupling and shaft at a distance of 0.160 inch (0.406 cm) from end of coupling.

(5) Ream hole to 0.1245 inch (0.3162 cm) and countersink both ends to 0.150 (0.381 cm) diameter with 90-degree countersink.

(6) Install lock pin (2), selected for 0.003 to 0.004 inch (0.008 to 0.010 cm) interface fit, through coupling and shaft. Stake both ends.

(7) Install snapring (1) in groove on splines of shaft.

b. Install shaft assembly in pump.

WARNING

FLIGHT SAFETY PART

Functional test of the oil pump is flight safety critical.

5-216. FUNCTIONAL TEST. (See figure 5-84.) Proceed as follows:

NOTE

Perform the following tests, using lubricating oil (item 189 or 190, table C–1).

a. Using torque wrench TQ-1, check that torque on oil pump drive shaft assembly (3, figure 4-32) does not exceed 3 pound-inches (536 gm cm).

b. Fill inlet port with oil; then connect a regulated supply of air to lube inlet port of pump.

c. Fill oil outlet port on mounting face of pump with oil.

d. While observing oil outlet port, gradually increase air pressure to 4 inches Hg. No leakage allowed during a 3-minute period.

NOTE

Leakage may be caused by improper static seating or sticking of the pressure regulating valve or check valve.

e. Mount power-driven rotary (oil) pump on test fixture adapter (LTCT423) and secure with four screws. (See figure 5-85.)

f. Connect all hoses as follows:

(1) Connect No. 12 (3/4-inch diameter) hose from LUBE INLET port of test stand (LTCT340), or equivalent, to 1/2-inch diameter adapter connected to oil-in port of pump.

(2) Connect No. 4 (1/4-inch diameter) hose from 3 GAGE PORT on test stand to fitting in 1/2-inch diameter adapter.

(3) Connect No. 16 (one-inch diameter) hose from SCAVENGE OUTLET port of test stand to one-inch diameter adapter connected to oil-out port of pump.

(4) Connect No. 4 (1/4-inch diameter) hose from 11 GAGE PORT on test stand to tee fitting in one-inch diameter adapter.

(5) Connect No. 16 (one-inch diameter) hose from SCAVENGE INLET port on test stand to scavenge in adapter of fixture.

(6) Connect No. 4 (1/4-inch diameter) hose from 10 GAGE PORT on test stand to scavenge in adapter of fixture.

(7) Connect No. 12 (3/4 inch diameter) hose from LUBE OUTLET port on test stand to LUBE OUT adapter of fixture.

(8) Connect No. 4 (1/4-inch diameter) hose from 4 GAGE PORT on test stand to lube out adapter of fixture.

g. Press STAND POWER, VACUUM PUMP, CIRCULATING PUMP and MOTOR GENERATOR SET on buttons. Observe that indicator lamps light.

h. Loosen hose connected to lube inlet adapter of test fixture adapter (LTCT423). Bleed air from system by turning RESERVOIR AIR VACUUM SELECTOR lever to AIR. As soon as oil flow is observed, place RESERVOIR AIR VACUUM SELECTOR lever in center position and retighten hose.

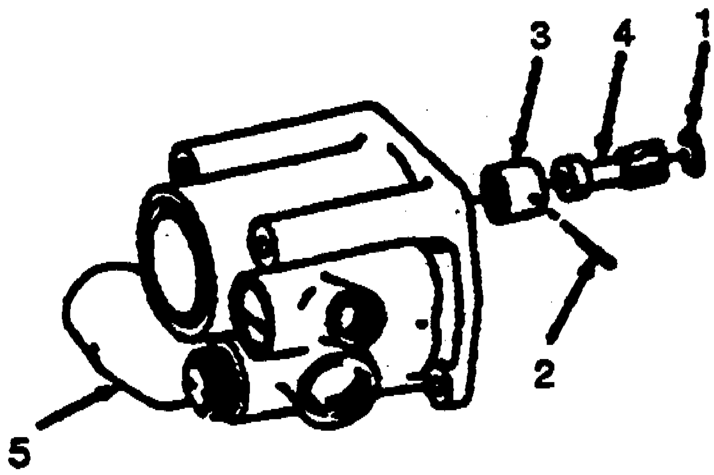


Figure 5-84. Power-Driven Relay (Oil) Pump.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-84	No Number	POWER DRIVEN ROTARY (OILS) PUMP AND RELATED PARTS (1-170-330-96, 1-170-330-09, 1-170-330-13, 1-170-330-21, 1-080-250-14 and 1-080-150-16)	Ref	
4-32-3	1-080-350-0 4	. SHAFT ASSEMBLY, Oil pump drive	1	
5-84 -1	STD3033B7	. . RING, Snap	1	
-2	MS9105-59	. . PIN, Lock	1	
-3	1-080-279-0 2	. . COUPLING, Splined, oil pump drive	1	
-4	1-080-276-0 3	. . SHAFT, Coupling, oil pump drive	1	
-5	RG17350	. PUMP, Rotary, power driven (Lycoming Source Cont Dwg 1-300-212-01)	1	
	RG17350D	. PUMP, Rotary, power driven (Lycoming Source Cont Dwg 1-300-212-04)	1	

Table 5-56. Inspection of Power-Driven Rotary (Oil) Pump

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-32				
-3	Oil Pump Drive Shaft Assembly	Visual and Magnetic-Particle (Refer to table 5-57)	Cracks	Not allowed, Replace.
5-84 -3	Oil Pump Drive Splined Coupling	Visual and Magnetic-Particle (Refer to table 5-57)	Cracks	Not allowed. Replace.
-4	Coupling Shaft	SIE and Visual	Spline wear in excess of 0.010 inch (0.025 cm)	If spline wear is exceeded, replace. If splines wear is within limits, refinish splines, (Refer to SP No. 6012 in Appendix E)
		Visual and Magnetic-Particle (Refer to table 5-57)	Cracks	Not allowed. Replace.
-2	Lock Pin	Visual	Sheared or broken pin	Replace
-5	Power-Driven Rotary Pump	Visual	Cracks	Not allowed. Replace.
			Need for overhaul	Determine if pump requires overhaul. If overhaul is not indicated, perform functional check as outlined in paragraph 5-216
		Manually Rotate	Freedom of movement in either direction	If binding reject pump
-8	Scavenge filter assembly	Visual	Enlarged holes, dents, tears or clogging	Not allowed. Replace.

Table 5-57. Magnetic-Particle Inspection of Power-Driven Rotary (Oil) Pump.

Figure and Index No.	Nomenclature	Method of Magnetization
5-84,3	Oil Pump Drive Splined Coupling	Circular, use central conductor at 600 amperes.
5-84,4	Coupling Shaft	Circular, use direct contact at 600 amperes. Longitudinal at 4000 ampere-turn

i. Turn RESERVOIR AIR VACUUM SELECTOR lever to VACUUM and hold until LUBE INLET PRESSURE gage indicates 5 inches Hg vacuum.

j. Press DC DRIVE MOTOR on button. Observe that indicator lamp lights.

k. Turn SPEED CONTROL COURSE knob until DRIVE SPEED gage indicates 400 to 600 rpm. Check LUBE FLOW rotometer to ensure that there is oil flow within maximum of 20 seconds.

l. Operate test stand until lubricating oil heats to 180° to 200°F (82° to 93°C). Observe temperature on TEMPERATURE INDICATOR.

m. Open pump pressure relief valve until needle on LUBE OUTLET PRESSURE gage begins to fluctuate; this indicates that valve is open.

n. Turn pump pressure relief valve clockwise until LUBE INLET PRESSURE gage indicates -0.5 to 0.5 psi (-35.2 to 35.2 gm sq cm); LUBE OUTLET PRESSURE gage indicates 100 to 120 psi (7031 to 8437 gm sq cm); and LUBE FLOW rotometer indicates 3,380 phr minimum, if lubricating oil (item 190, table C–1) is used, or 3,500 phr minimum, if lubricating oil (item 189, table C–1) is used. Adjust fluid flow by turning LUBE BACK PRESSURE valve knob.

o. Turn SPEED CONTROL COURSE knob until DRIVE SPEED gage indicates 4,200 to 4,300 rpm.

p. Turn RESERVOIR AIR VACUUM SELECTOR lever to VACUUM and hold until SCAVENGE INLET PRESSURE gage indicates -0.5 to 0.5 inches Hg vacuum.

q. Turn SCAVENGE BACK PRESSURE VALVE knob until SCAVENGE OUTLET PRESSURE gage indicates 55 to 65 psi (3867 to 4570 gm sq cm). Check SCAVENGE FLOW rotometer for oil flow of 6,720 phr minimum, if lubricating oil (item 190, table C–1) is used, or 6,950 phr minimum, if lubricating oil (item 189, table C–1) is used.

r. Turn RESERVOIR AIR VACUUM SELECTOR lever to VACUUM and hold until LUBE INLET PRESSURE gage indicates 17. 5 to 18.5 inches Hg vacuum. Record pressure indicated on LUBE OUTLET PRESSURE gage. LUBE FLOW rotometer shall indicate oil flow of 2,830 phr minimum, if lubricating oil (item 190, table C–1) is used, or 2,900 phr minimum, if lubricating oil (item 189, table C–1) is used. Record oil flow.

s. Turn RESERVOIR AIR VACUUM SELECTOR lever to VACUUM and hold until LUBE INLET PRESSURE gage indicates 22. 5 to 23.5 inches Hg vacuum. Record pressure indicated on LUBE OUTLET PRESSURE gage. LUBE FLOW rotometer shall indicate 2,140 phr minimum, if lubricating oil (item 190, table C–1) is used, or 2,200 phr minimum, if lubricating oil (item 189, table C–1) is used. Record oil flow.

t. Turn RESERVOIR AIR VACUUM SELECTOR lever to VACUUM and hold until SCAVENGE INLET PRESSURE gage indicates 17. 5 to 18.5 inches Hg vacuum. Record pressure indicated on SCAVENGE OUTLET PRESSURE gage. LUBE FLOW rotometer shall indicate 5,720 phr minimum, if lubricating oil (item 190, table C–1) is used, or 5,900 phr minimum, if lubricating oil (item 189, table C–1) is used. Record oil flow.

u. Turn RESERVOIR AIR VACUUM SELECTOR lever to VACUUM and hold until SCAVENGE INLET PRESSURE gage indicates 22. 5 to 23.5 inches Hg vacuum. Record pressure indicated on SCAVENGE OUTLET PRESSURE gage. LUBE FLOW rotometer shall indicate 4,180 phr minimum, if lubricating oil (item 190, table C–1) is used, or 4,300 phr minimum, if lubricating oil (item 189, table C–1) is used. Record oil flow.

v. Bottom the pump relief valve.

w. Turn LUBE BACK PRESSURE VALVE until LUBE FLOW rotometer indicates 3,610 phr minimum, if lubricating oil (item 190, table C–1) is used, or 3,700 phr minimum, if lubricating oil (item 189, table C–1) is used.

NOTE

Outlet pressure indication on LUBE OUTLET PRESSURE gage must be 100 to 120 psi (7031 to 8437 gm sq cm). Inlet pressure indication on LUBE INLET PRESSURE gage must be -0.5 to 0.5 inches Hg vacuum.

x. If limits cannot be met, disassemble relief valve and check valve; refer to TM 55-2840-216-40.

NOTE

Due to the design of the pump, both valves must be reworked to eliminate leaks.

y. Braze a scrapped relief-valve poppet and a scrapped check-valve ball on the end of a rod.

z. Using rod and lapping compound (item 177, table C–1), lap valve seat to remove imperfections.

aa. Test spring rate of spring as follows:

(1) Relief valve spring - replace spring if load is less than 30.4 pounds (13.8 kg) at 1.926 inches (4.892 cm) or less than 12.25 pounds (5.56 kg) at 2.200 inches (5.588 cm).

(2) Check valve spring - replace spring if load is less than 0.36 pounds (0.16 kg) at 0.550 inches (1.397 cm) or less than 0.72 pounds (0.33 kg) at 0.280 inches (0.711 cm).

ab. Assemble relief valve and check valve; refer to TM 55-2840-216-40.

ac. Repeat leak test.

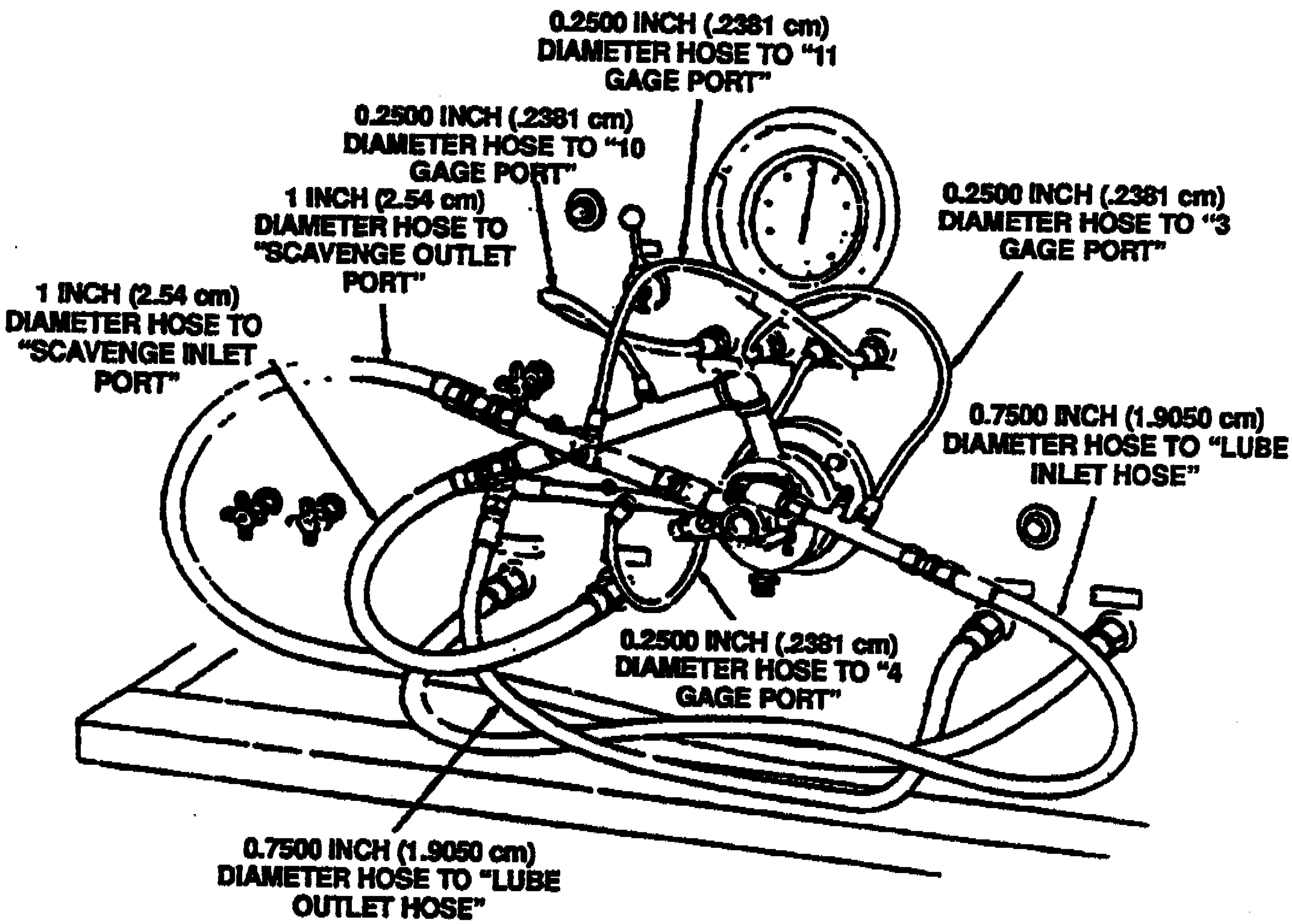


Figure 5-85. Power-Driven Rotary (Oil) Pump Installed on Test Stand.

ad. If all limits have been met, provide zero inch Hg at inlet pressure port, 110 psig (7734 gm sq cm) at lube discharge port, and adjust relief valve for flow of 3,450 phr. Secure relief valve adjustment.

ae. Turn SPEED CONTROL COURSE knob until DRIVE SPEED gage indicates zero rpm.

af. Turn RESERVOIR AIR VACUUM SELECTOR lever to AIR; then turn lever to VACUUM side until LUBE and SCAVENGE OUTLET PRESSURE gages indicate zero.

ag. Push DRIVE MOTOR off buttons.

ah. Push remaining off buttons.

ai. Remove power-driven rotary (oil) pump from test stand.

5-217. TEMPERATURE BULB.

5-218. DISASSEMBLY. Disassembly is not required.

5-219. CLEANING. Clean temperature bulb (3, figure 4-33) and housing with a lint-free cloth moistened in dry cleaning solvent (item 134, table C–1).

5-220. INSPECTION. Perform specific inspections listed in table 5-58.

5-221. REPAIR. Repair is not required.

5-222. REASSEMBLY. Reassembly is not required.

5-223. FUNCTIONAL TEST. (See figure 4-33.) Proceed as follows:

a. Install reference thermometer in test unit (LTCT1452), or equivalent, filled with lubricating oil (items 189 or 190, table C–1). (See figure 5-86.)

b. Heat oilto temperature of 140° to 200°F (60° to 93°C).

c. Connect two test leads to POSITIVE and NEGATIVE jacks located on external power supply of test stand (LTCT315), or equivalent.

NOTE

The two test leads connect internally to the OIL TEMP gage.

d. Connect test stand lead to temperature bulb.

e. Submerge probe of bulb in heated oil.

f. Observe temperature indications of OIL TEMP indicator and reference thermometer. Reading on OIL TEMP indicator shall be within plus or minus 10°F (5.5°C) of reading in reference thermometer. If requirements cannot be met, reject bulb.

5-224. LUBE OIL FILTER ASSEMBLY.

NOTE

A filter assembly with a threaded type differential pressure indicator may be identified as P/N 1-080-460-01. This filter assembly without the filter element is identified as filter housing P/N 1-300-648-01. An older filter assembly P/N 1-300-166-01 with a clip in differential pressure indicator may also be identified as P/N 1-080-460-01. It may also be identified as P/N 1-300-166-01 or have both part numbers. This filter assembly without the filter element is identified as filter housing P/N 1-300-648-02. ECP LY-GT-53-243 cancels P/N 1-080-460-01 and replaces it with P/N 1-080-460-02. The respective housings are now identified as P/N 1-300-656-01 and P/N 1-300-656-02 which do not include the filter element or differential pressure indicators. The housing, filter elements, and differential pressure indicators can now be ordered separately.

5-225. DISASSEMBLY. Proceed as follows:

a. Loosen bolt (2, figures 5-87 and 5-88) that secures filter cover assembly to filter housing (11). Withdraw cover assembly.

b. Remove packing (7). Remove retaining ring (10) and end plate (9).

c. Carefully lift filter element(s) (8) from filter cover (5). Discard seven wafer filter elements. Save single cleanable stainless steel element.

d. Using suitable wrenches, loosen nut (6) and turn bolt (2) until it is free of nut.

e. Remove bolt (2), flat washer (3), packing (4), and nut (6). Discard packing (4).

f. Remove plug and bleeder (22) with packing (23). Discard packing (23).

NOTE

Steps g through i apply to filter assembly (1-300-241-01), figure 5-87.

g. Remove retaining ring (12).

h. Insert 1/4-28 screw into threaded end of relief valve plug (13). Pull plug from housing (11). Remove packing (14) and discard.

i. Carefully remove spring (15) and relief valve (16).

NOTE

Step j applies to filter assembly 1-300-166-01 and filter assembly 1-080-460-02 with housing 1-300-656-02, figure 5-87.

j. Remove retaining ring (12), pressure indicator (21) with packings (14 and 20), spring seat (19), spring (18) and relief valve (17). Discard packings (14 and 20). Pressure indicator (21) does not need to be disassembled unless it fails to test within limits.

NOTE

Following steps k and l apply to filter assembly, 1-080-460-02, with housing 1-300-656-01, figure 5-88.

k. Remove pressure indicator (12) and discard packings (19 and 20). Pressure indicator (12) does not have to be disassembled unless it fails to test within limits.

l. Remove retaining ring (26), relief valve (24) and packing (25). Discard packing (25).

Table 5-58. Inspection of Temperature Bulb.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-33				
-3	Temperature Bulb	Visual	Cracked or bent probe	Not allowed. Replace.
			Damaged threads	Not allowed. Replace.
			Bent, broken, or loose pins in electrical receptacle	Not allowed. Replace.

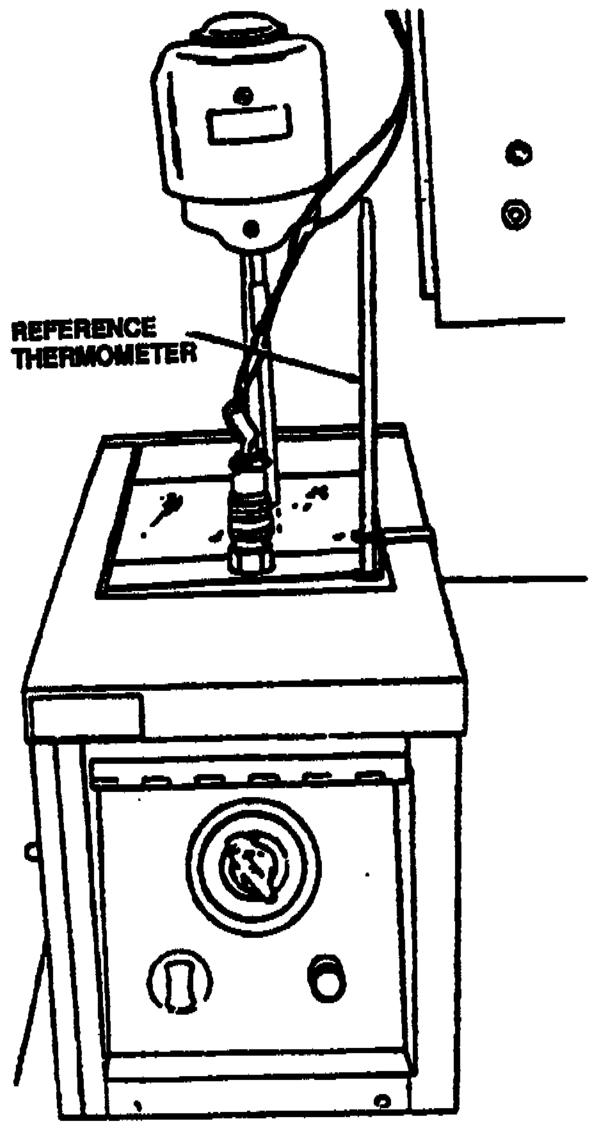


Figure 5-86. Temperature Bulb Test Setup.

5-226. CLEANING. Proceed as follows:

a. Immerse all parts except the filter elements (8, figures 5-87 and 5-88) in dry cleaning solvent (items 134, table C-1). If necessary, use a fiber brush to clean part thoroughly. Dry with compressed air.

b. Wafer filter elements (1-300-649-01) should not be cleaned and reused.

CAUTION

If the filter element has a large quantity of metal particles or is damaged, do not clean or reuse.

c. Clean stainless steel, one piece, filter element (8, figures 5-87 and 5-88) (1-300-647-01) as follows:

(1) Locally design a hollow shaft with the same diameter as the filter element orifice. The shaft should have four 1/4 inch diameter holes at 90 degree intervals around shaft for each element. The shaft can be designed to hold from one to five elements with sealing gaskets between each element. The shaft should be sealed on one end, have a quick

disconnect air coupling on the other end and have a nut or clamp to secure the elements together on the shaft. This allows air to be blown from the inside out during the cleaning process.

(2) Install the element(s) on the shaft with gaskets to ensure no contaminates enter the inner portion of the filters.

(3) Connect air line to the shaft and immerse into an agitating bath of dry cleaning solvent (item 134, table C–1).

CAUTION

Perform cleaning operation in a well ventilated area.

(4) Blow air through the filter elements at 50 psi for five minutes. Stop the cleaning and rotate the filter elements at 50 psi for five minutes. Stop the cleaning and rotate the filter elements(s) on the shaft 1/8th of a turn (45 degrees). Continue blowing air through the shalt and filter element(s) while submerged in the cleaning bath for five more minutes. Remove the filter element(s) from the cleaning bath.

(5) Blow air through the shaft and filter element(s) at 100 psi for two minutes to dry. Rotate the filter element(s) on the shaft 1/8th of a turn (45 degrees). Continue blowing air through the shaft and filter element(s) at 100 psi for another two minutes.

(6) Remove the filter elements and inspect visually for cleanliness.

5-227. INSPECTION. Perform specific inspections listed in table 5-59.

5-228. REPAIR. (See figure 4-34.) Proceed as follows:

a. If indicator on filter assembly (1-300-166-01) actuates above 13 psi (914 gm sq cm), proceed as follows:

(1) Remove retaining ring (12, figure 5-87), and gently pull indicator from oil filter housing.

(2) Using a small screwdriver, remove spirolox retaining ring (4, figure 5-89)

(3) Remove washer (5) and pressure sensing spring (6) from indicator body.

NOTE

Spring will come out as soon as washer is removed.

(4) Tap indicator on a soft surface, and manually remove magnet assembly (3).

(5) Remove fluorosilicone packing (7) from magnet, and discard packing.

CAUTION

In following step (6), do not use sharp tools or metallic objects in magnetic bore area.

(6) Clean magnet and magnet bore by immersing in dry cleaning solvent (item 134, table C–1), and allow to air-dry.

(7) Lubricate new fluorosilicone packing, magnet, and magnet bore with clean lubricating oil (item 189, table C–1) and install packing on magnet.

(8) Reassemble indicator assembly and install into oil filter.

(9) Functional-test indicator assembly as outlined in paragraph 5-230.

CAUTION

In following step (10), do not touch or disturb the thermal lockout bimetallic strip (2).

NOTE

In some cases, actuation of indicator above 13 psi (914 gm sq cm) may be caused by contamination on the indicator pin assembly. This condition is generally accompanied by a damaged plastic cover. To correct this condition, proceed with following steps (10) through (13).

(10) Remove cap assembly retaining ring (1) and remove cap assembly (11) from indicator body. Indicator pin assembly (9) will come out with the cap assembly.

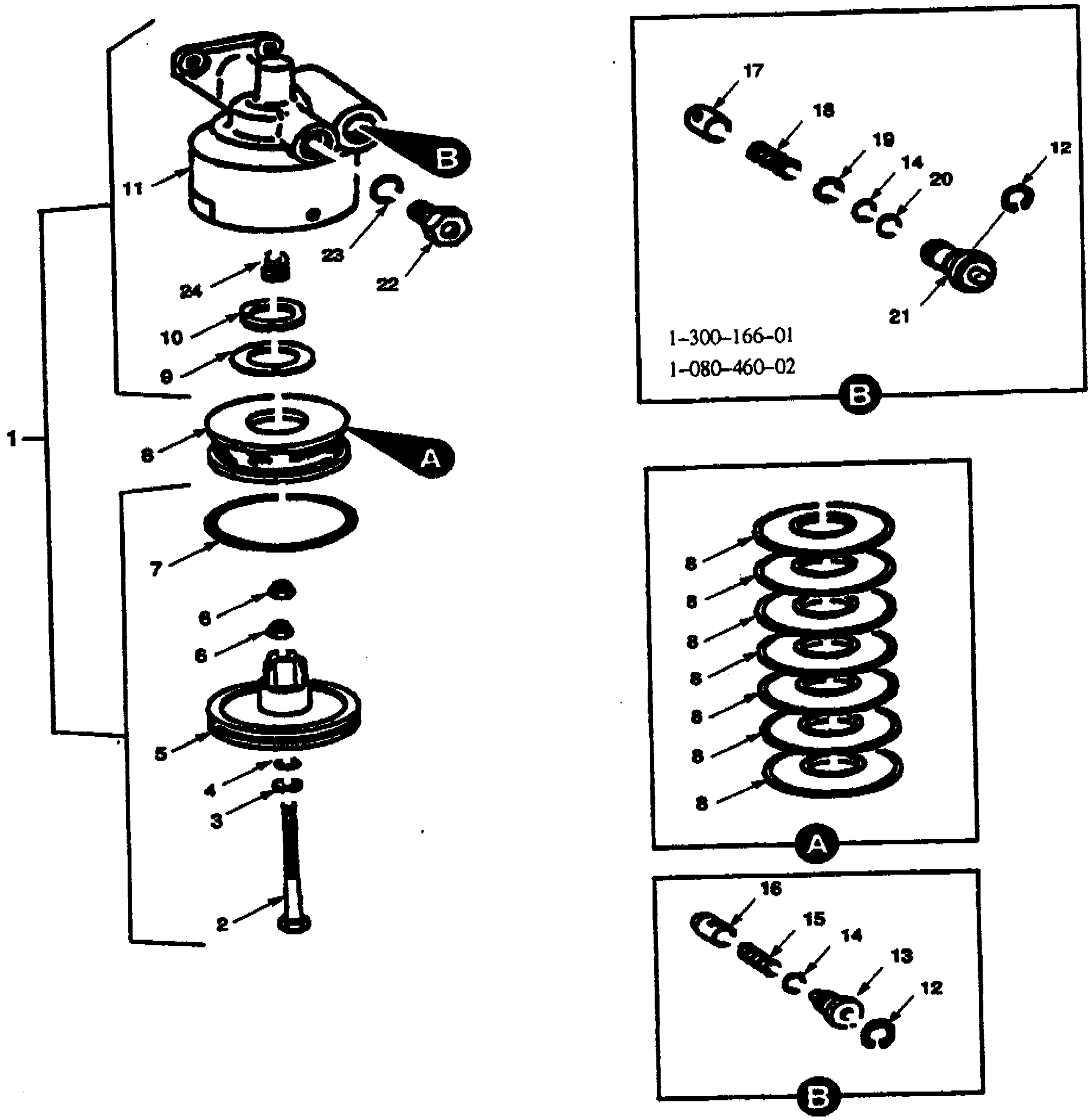


Figure 5-87. Lube Oil Filter Assembly, P/N 1-300-241-01, 1-300-166-01, 1-080-460-02.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-87	1-300-241-01	LUBE OIL FILTER ASSEMBLY	1	A,B
	1-300-166-01	LUBE OIL FILTER ASSEMBLY	1	
	1-080-460-02	LUBE OIL FILTER ASSEMBLY	1	
-1	1-300-656-02	. FILTER HOUSING	1	
-2	SP806	. . BOLT	1	
-3	SP805	. . WASHER, Flat	1	
-4	MS29561-010	. . PACKING	1	
-5	SP803	. . COVER, Filter	1	
-6	MS9361-10	. . NUT, Self-Locking	2	
-7	MS29561-146	. . PACKING	1	
-8	1-300-647-01	. FILTER ELEMENT	1	
-8	1-300-649-01	. FILTER ELEMENT (Alternate)	7	
-9	SP809	. . PLATE, End	1	
-10	SP801	. . RING, Retaining	1	
-11	SP1976	. . HOUSING, Filter	1	
-12	MS16625-1062	. . RING, Retaining	1	
-13	SP796	. . PLUG, Relief Valve	1	
-14	MS29561-013	. . PACKING	1	
-15	SP795	. . SPRING, Helical	1	
-16	SP794	. . VALVE, Relief	1	
-17	4630-4000	. . VALVE, Relief	1	
-18	5830-4007	. . SPRING, Relief Valve	1	
-19	5320-4001	. . SEAT, Spring	1	
-20	MS29561-014	. . PACKING	1	
-21	9040-4008	. INDICATOR, Differential Pressure	1	
-22	AN814-4DL	. . PLUG AND BLEEDER	1	
-23	NAS617-4	. . PACKING	1	
-24	MS124736	. . INSERT	1	

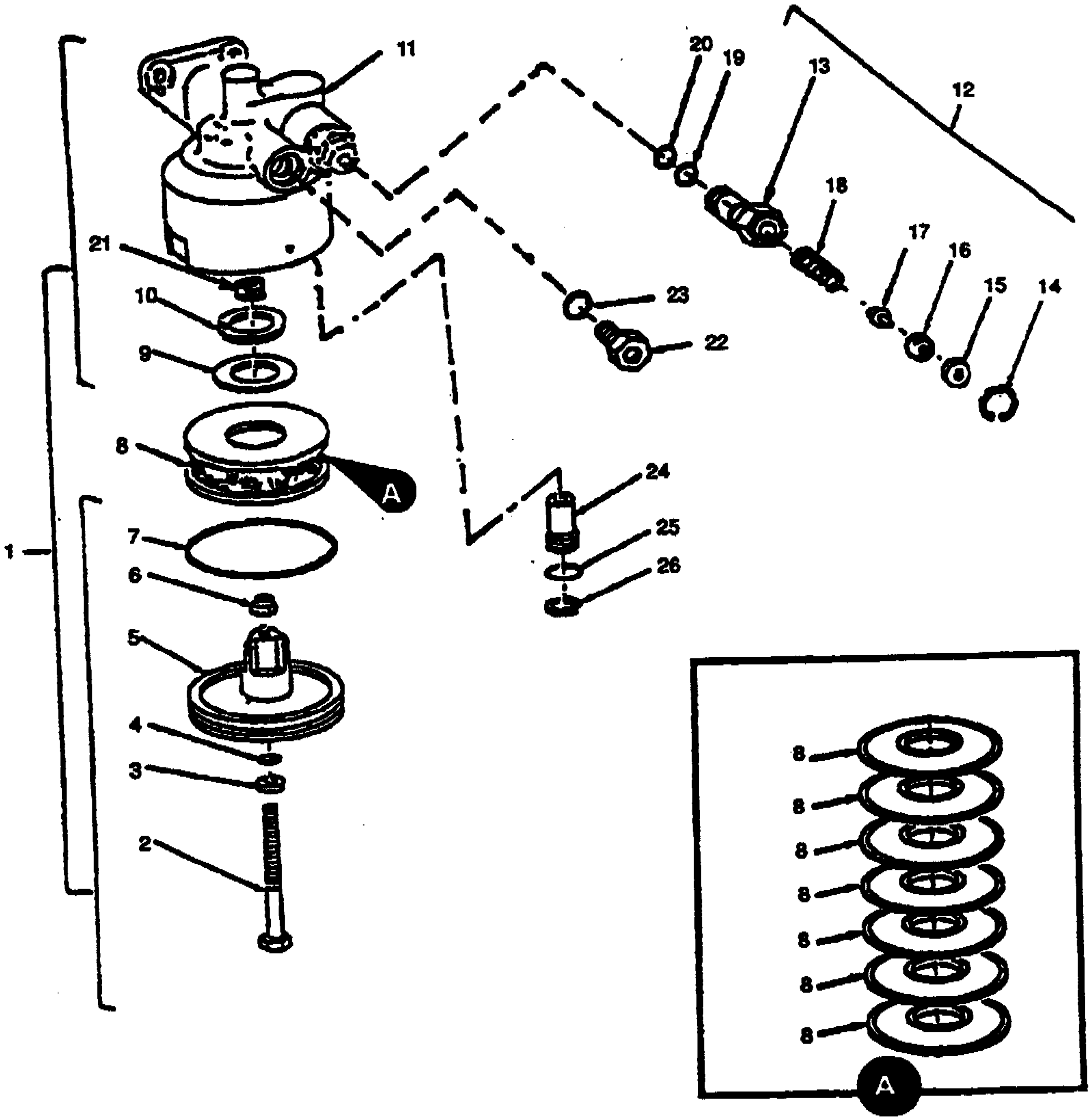


Figure 5-88. Lube Oil Filter Assembly, P/N 1-080-460-02.

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-88	1-080-460-02	LUBE OIL FILTER ASSEMBLY	1	A,B,C, D,E
-1	1-300-656-01	. FILTER HOUSING	1	
-2	AA-9500-D823	. . BOLT-MODIFIED	1	
-3	AN960XC416	. . WASHER	1	
-4	M83248/1-010	. . PACKING	1	
-5	AC-A926-402	. . COVER	1	
-6	MS21044C4	. . NUT, Self-Locking	1	
-7	M83248/1-146	. . PACKING	1	
-8	1-300-647-01	. FILTER ELEMENT	1	
-9	AA-A926-47	. . SPACER	1	
-10	SPIRO-LOXRSN-100	. . RETAINING RING	1	
-11	AA-A9264-DIA	. . HOUSING	1	
-12	1-300-655-01	. DIFFERENTIAL PRESSURE INDICATOR	1	
-13	08RC77800002	. . PLUG	1	
-14	AA-9500-D330	. . RETAINING RING	1	
-15	60RA878UL080	. . NAMEPLATE	1	
-16	69RB55100000	. . BIMETAL ASSEMBLY	1	
-17	19RA551Z0000	. . INDICATOR BUTTON ASSEMBLY	1	
-18	AA-2100-3D5	. . MAGNET ACTUATION SPRING	1	
-19	M83248/1-016	. . PACKING	1	
-20	M83248/1-014	. . PACKING	1	
-21	MS124736	. . INSERT	1	
-22	AN814-4DL	. . PLUG AND BLEEDER	1	
-23	NAS617-4	. . PACKING	1	
-24	AB-A034-6RX4JXXNX	. . RELIEF VALVE ASSEMBLY	1	
-25	M83248/1-014	. . PACKING	1	
-26	RR-65	. . RETAINING RING	1	

Table 5-59. Inspection of Lube Oil Filter Assembly.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-87				
-2	Bolt	Visual	Cracks or evidence of cracks	Not allowed. Replace.
-11	Filter Housing	Visual	Damaged threads	Not allowed. Replace.
			Cracks	Not allowed. Replace.
-21	Differential Pressure Indicator	Visual	Proper actuation of filter impending bypass indicator (9 to 13 psi) (633 to 914 gm sq cm)	Repair. (Refer to paragraph 5-228)
-8	Element	Measure	Overhaul thickness of elementat inner ring	

(11) Remove and discard packing (8), and install new packing, in its place.

(12) Using dry cleaning solvent (item 134, table C–1), clean indicator pin assembly and allow to air-dry.

CAUTION

Whenever cap assembly is removed for any reason, indicator pin assembly must be cleaned using dry cleaning solvent (item 134, table C–1).

NOTE

If plastic cover is damaged or clouded, replace cap assembly.

(13) Reinstall indicator pin assembly (9) and cap assembly (11).

(14) Functional-test indicator assembly is outlined in paragraph 5-230. If indicator still actuates above 13 psi (914 gm sq cm), repeat preceding steps (1) through (9). If indicator still is above range, replace indicator assembly.

b. If indicator on filter assembly (1-300-166-01) actuates below 9 psi (633 gm sq cm), proceed as follows:

(1) Replace packing (8) as outlined in preceding steps a(10) through (13).

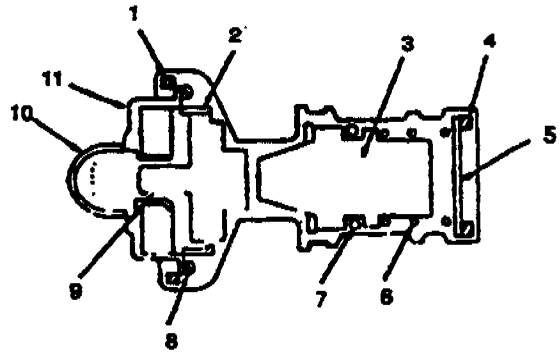
(2) Repeat functional test of indicator assembly as outlined in paragraph 5-230. If indicator still actuates below 9 psi (633 gm sq cm), replace indicator assembly.

c. If indicator (12) on filter housing 1-300-656-01, figure 5-88 actuates above 13 psi (914 gm sq cm), clean as follows:

NOTE

P/N 1-300-655-01 (item 12, figure 5-88) is a matched assembly. Parts may not be purchased separately and may not be interchangeable.

(1) Remove retaining ring (14) and nameplate (15).



1. Cap assembly retaining ring
2. Thermal lockout bimetallic strip
3. Magnet assembly
4. Spiralox retaining ring
5. Washer
6. Pressure sensing spring
7. Fluorosilicone packing (SP4150-4023)
8. Packing (SP4152-7017)
9. Indicator pin assembly
10. Plastic cover
11. Cap assembly

Figure 5-89. Indicator Assembly.

NOTE

Bimetal assembly (16) does not need to be removed.

(2) Using a probe, gently move tab of bimetal assembly (16) to remove indicator button (17) and spring (18) from indicator assembly (12).

NOTE

Aft portion of indicator can not be disassembled.

(3) Clean components by immersing in dry cleaning solvent (item 134, table C–1) and allow to air dry.

(4) Reassemble indicator (12) by installing spring (18) and indicator button (17). Using a probe, gently move tab of bimetal assembly (16) to seat indicator button (17).

(5) Install nameplate (15) and retaining ring (14).

(6) Functional test indicator assembly as outlined in paragraph 5-230.

d. Replace any other defective parts of oil filter.

5-229. REASSEMBLY. Proceed as follows:

a. On filter assembly 1-300-241-101 (figure 5-87), carefully install relief valve (16) and spring (15) into filter housing (11).

b. Install packing (14) on relief valve plug (13). Install plug into housing (11). Secure plug with retaining ring (12).

c. On filter assembly 1-300-166-01 and filter assembly 1-080-460-02 with housing 1-300-656-02, figure 5-87, carefully install relief valve (17), spring (18), and spring seat (19), into housing (11).

d. Install packings (14 and 20) on differential pressure indicator (21). Install indicator into housing. Secure indicator with retaining ring (12).

NOTE

Rubber boot not required on 1-300-655-01 differential pressure indicator (12, figure 5-88).

e. On filter assembly, 1-080-460-02, (figure 5-88), with housing, 1-300-656-01, install packings (19 and 20) on differential pressure indicator (12). Install indicator (12) into housing (11). Tighten until pressure indicator bottoms out. Torque 10 to 20 inch-pounds. Install packing (25) on relief valve (24). Install relief valve in housing (11). Valve cage must not restrict outlet port. Secure with retaining ring (26).

NOTE

Paragraphs f through i apply to all oil filters.

f. Install packing (4) in groove within base of filter cover (5). Install packing (7) in groove of filter cover OD.

g. Install bolt (2) and flat washer (3) through cover (5). Thread jam nuts (6) on bolt until they bottom, and then torque them against each other.

h. Carefully slide filter elements (8) and end plate (9) on cover. Secure filter elements and plate with retaining ring (10).

i. Install filter cover assembly (1) into housing (11). Using suitable wrench, tighten bolt (2) to 20 to 35 pound-inches (3572 to 6251 gm cm) torque. Lockwire bolt (2) when installing lube oil filter assembly in Chapter 6.

j. Install packing (23) on plug and bleeder (22). Install plug into housing (11).

5-230. FUNCTIONAL TEST. (See figure 5-87.) Proceed as follows:

NOTE

Check rear of test stand (LTCT422), or equivalent, for proper internal connections (figure 5-90) before performing the following test. Perform test, using lubricating oil (item 189 or 190, table C–1). Temperature of oil shall be as delivered.

a. Position oil filter mounting stand (LTCT865), or equivalent, on test stand and secure with two nuts. (See figure 5-91.)

b. Connect all hoses and lines as follows:

(1) Connect No. 10 (5/8-inch diameter) hose between valve to FILTER INLET port on test stand and holding fixture.

(2) Connect No. 10 (5/8-inch diameter) hose between valve to FILTER OUTLET port on test stand and hold fixture.

(3) Connect No. 4 (1/4-inch diameter) hose from the fitting in FILTER INLET line to CALIBRATION PORT just below INLET PRESSURE indicator.

(4) Connect No. 4 (1/4-inch diameter) hose from tee fitting in FILTER OUTLET line to valve and adapter at OUTLET PRESSURE indicator.

(5) Connect No. 4 (1/4-inch diameter) hose from HAND PUMP OUTLET port to tee fitting in FILTER INLET line.

c. Check filter pressure differential as follows:

(1) Press STAND POWER switch. Observe that red indicator lamp lights.

(2) Press FILTER CIRCUIT PUMP switch. Observe that red indicator lamp lights.

(3) Allow oil temperature to stabilize at 190 to 210 degree fahrenheit (88 to 99 degree celsius).

(4) Open FILTER OUTLET valve until INLET PRESSURE gage indicates 13 to 17 psi.

(5) Open FILTER INLET valve.

(6) Observe OUTPUT PRESSURE on outlet pressure gage; outlet pressure shall not be more than 5 psi below the pressure obtained in preceding step (4). If requirements can not be met reject oil filter.

(7) Press FILTER CIRCUIT PUMP switch to OFF.

(8) Open FILTER INLET valve, and bleed off all pressure.

NOTE

Pressure indications should drop to zero.

d. Loosen bolt (2, figures 5-87 and 5-88). Remove filter cover assembly (1) from filter housing (11).

e. Install gasket and test plug in housing.

f. Open FILTER OUTLET valve.

g. Press FILTER CIRCUIT PUMP switch to ON. Observe that red indicator lamp lights.

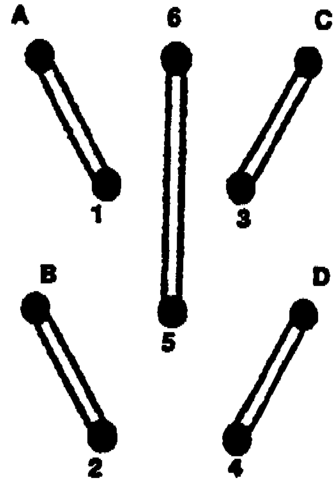


Figure 5-90. Internal Connections of Test Stand When Testing Lube Oil Filter.

h. When testing filter assemblies 1-080-460-02 with differential pressure indicator 1-300-655-01, allow oil temperature to stabilize at 190° to 210°F (88° to 99° C)

NOTE

Bimetal spring on differential pressure indicator 1-300-655-01 prevents actuation of button if oil temperature is below 135°F (57°C). It permits actuation above 165°F (74°C).

i. On 1-300-166-01, and 1-080-460-02 filter assemblies, slowly open FILTER INLET valve and observe INLET PRESSURE indicator and OUTLET PRESSURE indicator. Bypass indicator button shall actuate at 9 to 13 psig (633 to 914 gm sq cm). If limits are [exceeded either below 9 psig (633 gm/sq cm) or above 13 psig (914 gm sq cm)], repair as outlined in paragraph 5-228.

j. On all filter assemblies, slowly open FILTER INLET valve and observe OUTLET PRESSURE indicator. Stop opening valve at first indication of pointer movements.

k. Observe pressure indication on MAIN ELEMENT DISCHARGE PRESSURE indicator.

l. Subtract pressure indication of OUTLET PRESSURE indicator (preceding step j) from indication on MAIN ELEMENT DISCHARGE PRESSURE indicator (step k). Differences between the two readings shall be within 15 to 20 psi (1055 to 1406 gm sq cm). If requirement cannot be met, reject housing. Close FILTER INLET valve.

m. Press FILTER CIRCUIT PUMP Switch to OFF.

n. Open FILTER INLET valve and bleed off all pressure.

NOTE

Pressure indications should drop to zero.

o. Remove test plug and gasket installed in preceding step e.

NOTE

Filter cover assembly (1, figures 5-87 and 5-88) shall be lockwired after final test of engine.

p. Install cover assembly (1) in filter housing (11) and secure with bolt (2). Tighten bolt 25 to 35 pound-inches (4465 to 6251 gm cm) torque.

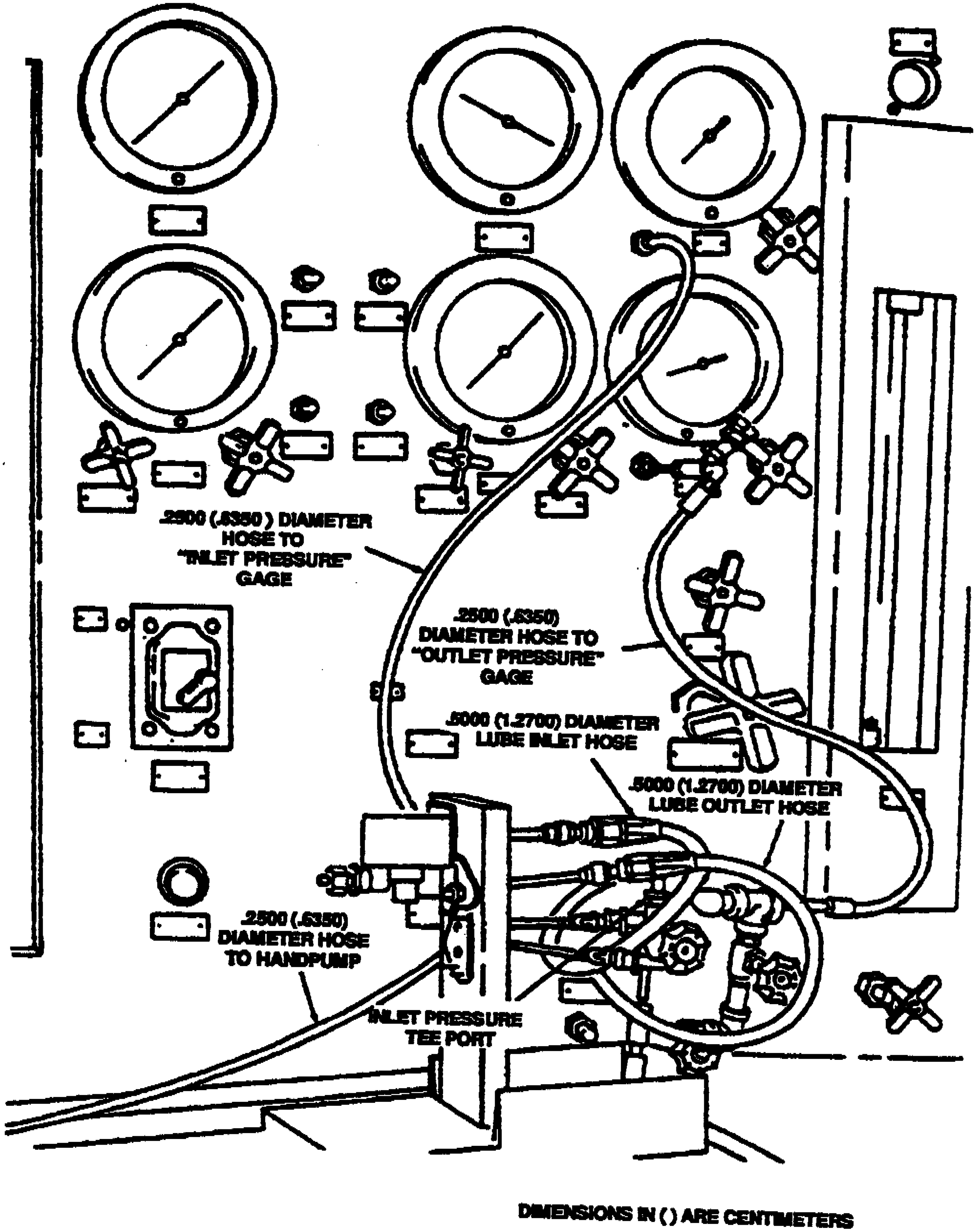


Figure 5-91. Lube Oil Filter Installed on Test Stand.

q. Close valve located in OUTLET PRESSURE gage adapter.

r. Close FILTER INLET and FILTER OUTPUT valves.

s. Open HAND PUMP SHUT-OFF valve.

t. Using hand pump handle on test stand, build up hydraulic pressure to 225 to 235 psi (15819 to 16522 gm sq cm) on filter assembly, 1-300-241-01 and 200 to 210 psi (14062 to 14765 gm sq cm) on all other filter assemblies. Read pressure on MAIN ELEMENT DISCHARGE PRESSURE indicator.

u. Visually inspect lube oil filter assembly for evidence of leakage. If leakage is noted, reject lube oil filter assembly. If no leakage is evident, proceed to following steps.

v. Observe MAIN ELEMENT DISCHARGE PRESSURE indicator while opening FILTER INLET valve to ensure that pressure is bled to zero.

w. Disconnect all flexible hose and line connections and remove lube oil filter assembly from holding fixture.

5-231. MODIFICATION OF LUBE AND SCAVENGE PUMP. Rework pump P/N 1-300-212-01 (RG17350) to 1-300-212-04 (RG17350D) as follows:

a. Add a new oil bleed hole in bearing, P/N RB17357, as shown in figure 5-92. Deburr hole and clean bearing. Reidentify bearing with electroetch as P/N RB17357-1.

NOTE

New bearings procured under P/N RB17357-1 will incorporate the new oil bleed hole only. The original hole will not be machined in new parts.

b. At reassembly, substitute packing RB25112 for packing RS26173-21333 or packing RA17359.

c. Using metal stamp, modify pump identification plate as follows: Reidentify unit as Model RG17350D by adding suffix letter "D" to the part number. Reidentify Lycoming, part number to 1-300-212-04 by obliterating the -01 and adding -04 to existing number.

d. Functional test of modified pump in accordance with paragraph 5-216.

SECTION VIII. ACCESSORY DRIVE GEARBOX

5-232. ACCESSORY DRIVE GEARBOX.

5-233. DISASSEMBLY. Proceed as follows:

a. Remove chip detector (1, figure 5-93) and packing (2).

b. On T53-L-15 engines, remove manifold tee (4), bolt (6), and bracket (7). On T53-L-701 and -701A engines, remove plug (3), packing (5), bolt (6), and bracket (7). If disassembling gearbox assembly (48), P/N 1-080-340-05, remove bolts (7a) that secure housing (7b) to accessory gearbox assembly. Remove housing (7b) and packing (7c). Discard packing.

c. Remove pinion gear shaft and bearing assembly (8) and packing (9) using (LTCT2099).

d. Install gearshaft holder assembly (LTCT3833) in vise. Position pinion gearshaft and bearing assembly in holding fixture.

e. Straighten tabs of key washer (16) and, using spanner wrench (LTCT107), remove nut (17) and washer (16). Remove pinion gearshaft and bearing assembly from holding fixture.

f. Using puller (LTCT675), remove ball bearing (10) from outer pinion gearshaft assembly (11).

g. Using long brass drift and arbor press, press outer pinion gearshaft assembly (11) free of liner (15).

h. Remove and record thickness of shim (12).

i. Remove retaining ring (13), and, using arbor press and bushing from bushing set (LTCT3664), press bearing (14) from liner (15).

j. Remove nuts (79) and washers (78). Remove cover (77), gasket (63), support (62), and gasket (63).

k. Remove bolts (76) that secure seal and housing assembly (71) to accessory gearbox cover assembly (26).

l. Using two 10-32 puller screws, remove seal and housing assembly (71). Turn screws clockwise until seal and housing assembly separates from accessory gearbox cover assembly.

NOTE

To prevent the seal and housing assembly from jamming in the accessory gearbox cover assembly, thread both puller screws evenly.

m. Remove packing (74) from seal housing (75).

n. Using removal tool (LTCT3648) and arbor press, press seal (72) from housing (75). Remove packing (73) from housing.

o. Straighten rim of lock cup (69). Position holding device (LTCT115) on mounting pad studs. Ensure that tangs of holding device engage slots of spanner nut (70).

p. Insert splined tool (part of holding device) and engage internal splines of accessory gear assembly (37). Use suitable wrench to turn splined tool clockwise to remove spanner nut (70). Remove holding device (LTCT115).

q. Remove nut (70) and lock cup (69).

r. Remove nuts (38) and flat washer (39) that secure cover (51) to accessory gearbox cover assembly (26).

s. Remove cover (51) and gasket (52).

CAUTION

In following step t, to prevent the tachometer drive flange and seal assembly from jamming in accessory gearbox cover assembly, thread both puller screws evenly.

t. Using two 10-32 puller screws, remove tachometer drive flange and seal assembly (58).

u. Remove packing (60) from tachometer drive flange and seal assembly.

v. Using seal installation tool (LTCT501) and arbor press, remove seal (59) from bearing retainer (61).

w. Remove bolts (57) that secure seal and liner assembly (53) to accessory gearbox cover assembly (26).

CAUTION

In following step x, to prevent the seal and liner assembly from jamming in the accessory gearbox cover assembly, thread both puller screws evenly.

x. Using two 10-32 puller screws, remove seal and liner assembly.

y. Remove packing (55) from seal and liner assembly.

z. Using sleeve bushing (LTCT3654) and arbor press, remove seal (54) from liner (56).

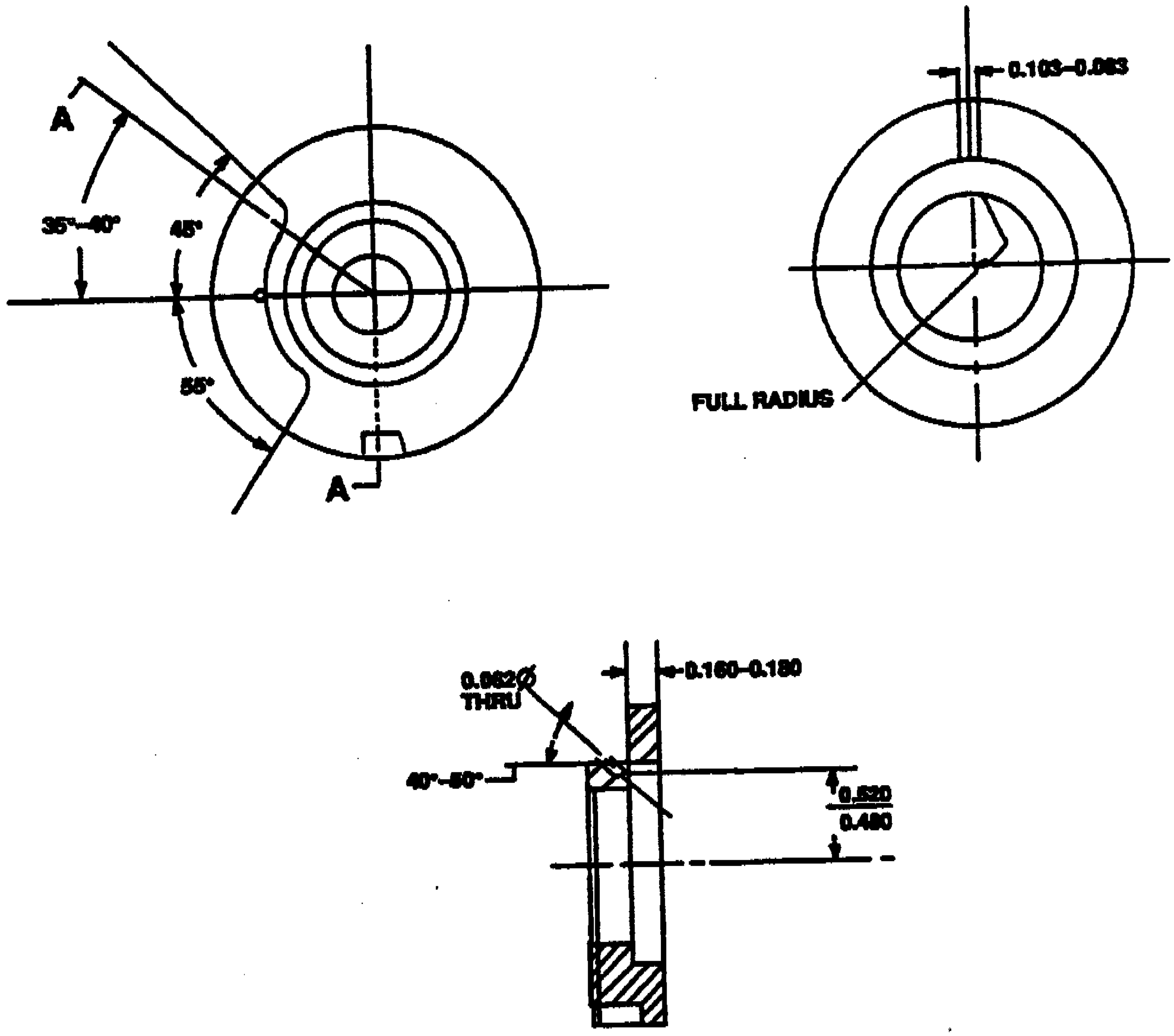
aa. Remove plug (23) and packing (24).

ab. Remove nuts (38) and flat washer (39) that secure gearbox cover assembly (25) to accessory gearbox housing assembly (48).

ac. Secure mechanical puller (LTCT142) to studs located at 3- and 9-o'clock positions on gearbox cover assembly. Turn handle slowly until cover separates from housing.

NOTE

If one side of the cover sticks, tap the high side with a soft-face mallet. When a gap 1/2 inch between the cover and housing is obtained, check to ensure the oil-air separator drive gearshaft is clear.



SECTION AA

Figure 5-92. Rework of Bearing RB17357.

ad. Lift gearbox cover assembly from accessory gearbox housing assembly, and remove puller. Remove spacer (68) and packing (67). Remove cover gasket (31).

ae. Straighten tabs of tabwasher (65), and remove bolts (64) and tabwashers that secure retaining plate (66) to accessory gearbox cover assembly (26).

af. Remove plate (66) and shim (28). Record thickness of shim, and secure it to plate.

ag. Turn accessory gearbox cover assembly over and, using soft-faced mallet, tap liner assembly (27) from cover.

ah. Remove and record the thickness of shim (28).

ai. Using sleeve bushing (LTCT3654) and arbor press, remove ball bearing (14) from liner (29).

aj. Carefully lift gearshaft and bearing assembly (19) from accessory gearbox housing assembly (48).

ak. Using puller (LTCT2067), remove seal (18) from housing assembly (48).

al. Using bearing puller (LTCT675), remove ball bearing (20) from tachometer drive-gearshaft assembly (21).

am. Using bearing puller (LTCT675), remove ball bearing (22) from tachometer drive-gearshaft assembly (21).

an. Remove oil-air separator drive gearshaft assembly (30) with bearings (22) installed.

ao. Using bearing puller (LTCT675), remove bearings (22) from oil-air separator drive gearshaft assembly (30).

ap. Remove the fuel control drive gearshaft assembly (50) with ball bearings (49) installed.

aq. Using bearing puller (LTCT675), remove bearings (49) from fuel control drive gearshaft assembly (50).

ar. Remove oil pump drive gearshaft assembly (47) with ball bearings (43and 44) installed.

as. Using bearing puller (LTCT675), remove bearings (43 and 44) from the oil pump drive gearshaft assembly (47).

at. Remove accessory gear assembly (37).

NOTE

When removing accessory gear assembly, outer race of roller bearing, (36) will remain in accessory gearbox housing assembly (48). Outer race must be extracted and kept with inner race as a matched set.

au. Using puller (LTCT916), remove inner race of bearing (36) from accessory gear assembly (37). Using brass drift and hammer, tap out outer race of bearing (36) from accessory gearbox housing assembly.

av. Cut lockwire to release screws (45 and 35). Remove screws, packing (46), bolt (34), and sleeve spacer (32) securing baffle (33) to accessory gearbox housing assembly (48).

aw. Remove baffle (33). Remove remaining lockwire.

ax. Remove three plugs and two lubrication unions from cover assembly (26).

ay. Remove capscrews (42), connector (41), and packing (40) from cover assembly (26).

5-234. CLEANING. Proceed as follows:

a. Clean all gears and splined parts as outlined in SP No. 3009 in Appendix E.

b. Clean all bearings as outlined in SP No. 3010 in Appendix E.

c. Clean cover assembly (26, figure 5-93), support (62) and housing assembly (48) by the dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

d. Clean all other parts by the dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

5-235. INSPECTION. Perform specific inspections listed in table 5-60.

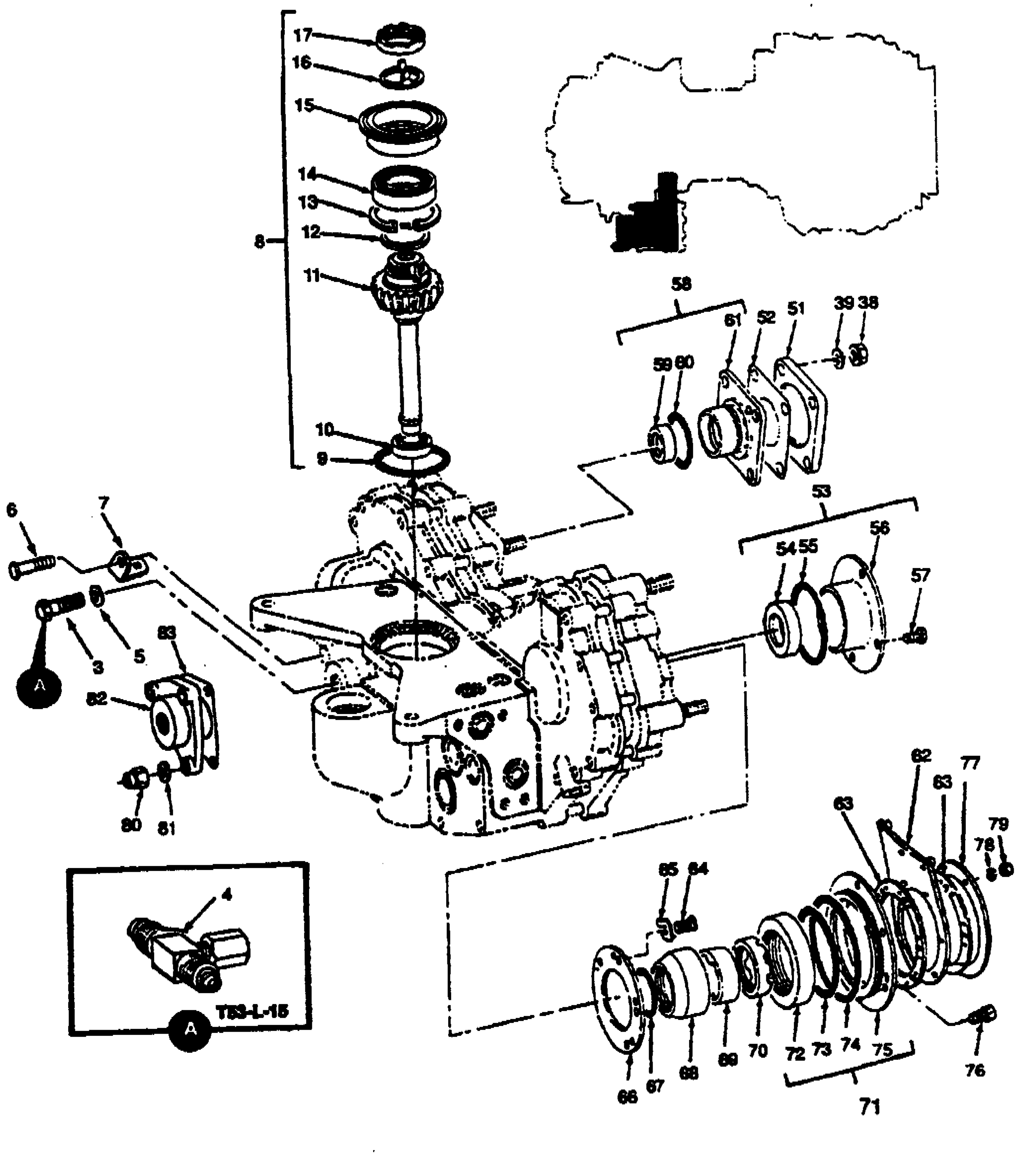


Figure 5-93. Accessory Drive Gearbox (Sheet 1 of 2).

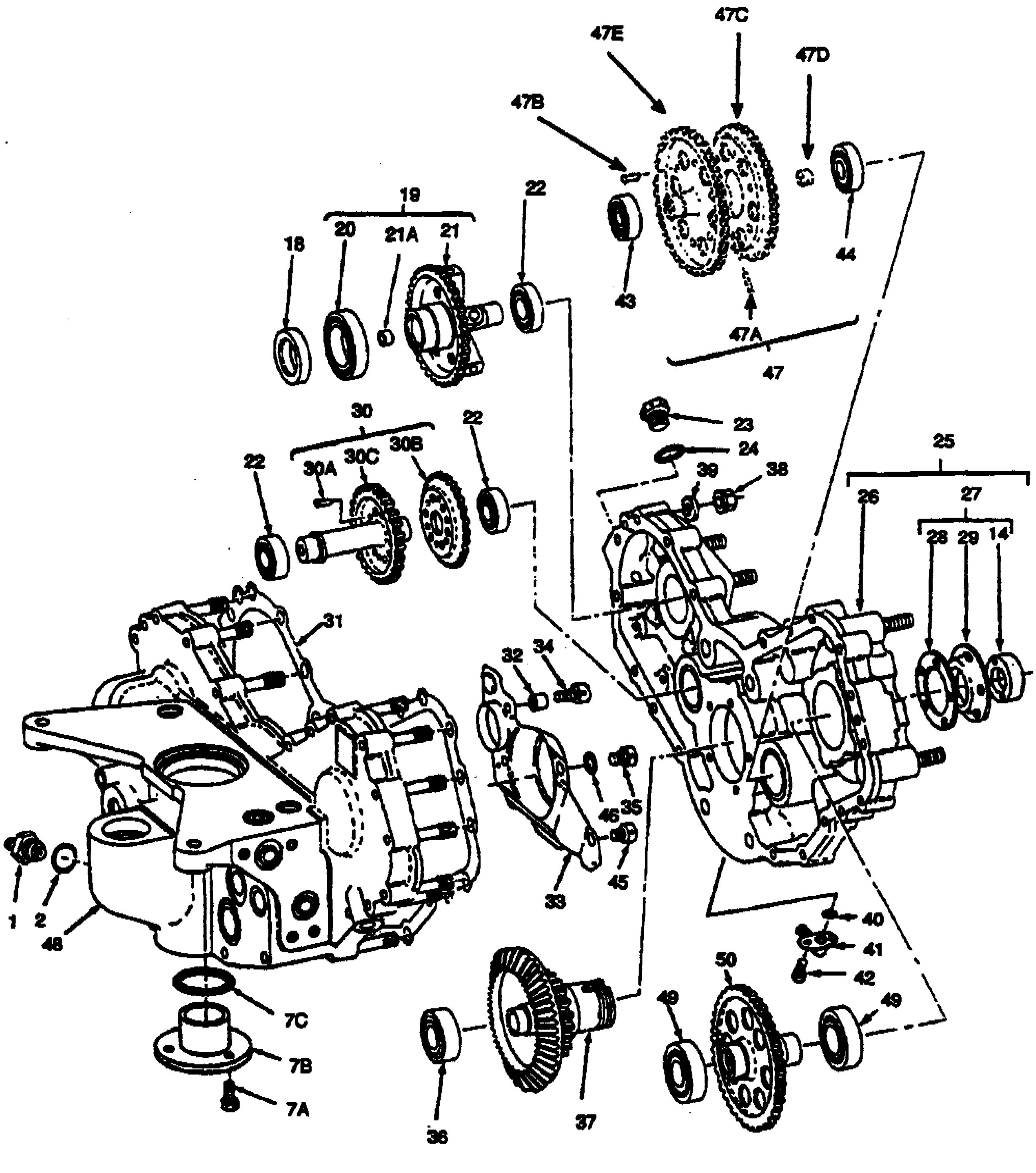


Figure 5-93. Accessory Drive Gearbox (Sheet 2 of 2).

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-93	No Number	ACCESSORY DRIVE GEARBOX AND RELATED PARTS (NHA 1-000-060-10, 1-000-100-10, 1-000-110-01, 1-000-060-23, 1-170-330-06, 1-170-330-09, 1-170-330-13, and 1-170-330-21)	Ref	
-1	CD20M	. DETECTOR, Chip (36540) (Lycoming Source Cont Dwg 1-300-243-01)	1	A,B
	A53F	. DETECTOR, Chip (97484) (Alternate) (Lycoming Source Cont Dwg 1-300-243-02)	1	A,B
	CD20R	. DETECTOR, Chip (36540) (Lycoming Source Cont Dwg 1-300-219-01)	1	C,D,E
	A53FW	. DETECTOR, Chip (97484) (Alternate) (Lycoming Source Cont Dwg 1-300-219-02)	1	C,D,E
-2	NAS617-6	. PACKING	1	
-3	MS9404-04	. PLUG, Machine thread	1	A,B,D,E
-4	4661047	. MANIFOLD TEE, Reducer, flared tube (92003) (Lycoming Source Cont Dwg 1-300-378-01)	1	C
	1-300-378-02	. MANIFOLD TEE, Reducer, flared tube	1	C
-5	NAS617-4	. PACKING	1	D,E
-6	AN103706	. BOLT, Drilled hex head	1	C,D,E
-7	1-160-306-01	. BRACKET, Angle flexible tube	1	C
	1-160-468-01	. BRACKET, Angle, electrical harness	1	D,E
-7A	AN103806	. BOLT (use on housing assembly with radial bearing)	3	
-7B	1-080-262-01	. HOUSING, Radial Bearing (use on housing assembly with radial bearing)	1	
-7C	MS29561-123	. PACKING, (use on housing assembly with radial bearing)	1	
-	1-080-250-13	. GEARBOX ASSEMBLY, Accessory drive (Replace with 1-080-250-14)	1	
-	1-080-250-14	. GEARBOX ASSEMBLY, Accessory drive (Replace with 1-080-250-16)	1	
-	1-080-250-16	. GEARBOX ASSEMBLY, Accessory drive	1	
-	1-080-250-24	. GEARBOX ASSEMBLY, Accessory drive	1	
-	1-080-250-25	. GEARBOX ASSEMBLY, Accessory drive	1	
-8	No Number	. . PINION GEARSHAFT AND BEARING ASSEMBLY (NHA 1-080-250-13,-16, -24, and -25)	1	
-9	MS29561-138	. . . PACKING	1	
-10	1901S300	. . . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-002-01)	1	
-11	1-080-320-01	. . . GEARSHAFT ASSEMBLY, Pinion, outer	1	
-12	1-080-014-01	. . . SHIM, Pinion	1	
-13	MS16625-3185	. . . RING, Retaining	1	

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-93				
-14	1906S300	. . . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-006-01)	2	
	454886	. . . BEARING, Ball (52676) (Alternate) (Lycoming Source Cont Dwg 1-300-006-02)	2	
-15	1-080-261-01	. . . LINER, Pinion, outer	1	
-16	1-080-267-01	. . . WASHER, Key, bearing	1	
-17	1-080-259-01	. . . NUT, Plain, round	1	
-18	504917	. . SEAL, Plain encased (24981) (Lycoming Source Cont Dwg 1-300-233-01)	1	
-19	No Number	. . GEARSHAFT AND BEARING ASSEMBLY (NHA1-080-250-13, -16, -24, and -25)	1	
-20	1905S304	. . . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-005-01)	1	
	6905VAD	. . . BEARING, Ball (52676) (Alternate) (Lycoming Source Cont Dwg 1-300-005-02)	1	
	2-300-933-01	. . . BEARING, Ball (91547)	1	
	2-300-933-02	. . . BEARING, Ball (91547)	1	
	2-300-933-03	. . . BEARING, Ball (91547)	1	
-21	1-080-370-01	. . . GEARSHAFT, ASSEMBLY, Tachometer drive	1	
-21A	1-080-037-01	. . . . PLUG, Gearshaft	1	
-22	1902S301	. . . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-003-01)	3	
	PM9302KMBRE 8211	. . . BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 1-300-003-02)	3	
	P9302KE8959	. . . BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 1-300-003-02)	3	
-23	STD3021-06	. . PLUG, Straight thread	1	
	MS9902-06	. . PLUG, Straight thread	1	
-24	NAS617-5	. . PACKING (Replace with NAS617-6)	1	
	NAS617-6	. . PACKING	1	
-25	No Number	. . COVER ASSEMBLY, Gearbox (NHA 1-080-250-13, -16, -24 and -25)	1	
-26	1-080-330-07	. . . COVER ASSEMBLY, Accessory gearbox	1	
-27	No Number	. . . LINER ASSEMBLY, Thrust bearing (NHA 1-080-250-13, -16, -24 and -25)	1	
-28	1-080-271-01	. . . . SHIM, Thrust bearing	2	
-29	1-080-268-01	. . . . LINER, Thrust bearing	1	
-30	1-080-280-02	. GEARSHAFT ASSEMBLY, Oil-air separator drive	1	
	1-080-280-01	. GEARSHAFT ASSEMBLY, Oil-air separator drive	1	
	1-080-280-03	. GEARSHAFT ASSEMBLY, Oil-air separator drive	1	

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-93				
-30A	STD3036-32	. . . RIVET, Solid	6	
-30B	1-080-253-01	. . . GEAR, Spur	1	
-30C	1-080-154-04	. . . GEARSHAFT, Spur	1	
-31	1-080-273-01	. . GASKET,Cover	1	
-32	1-080-297-01	. . SPACER, Sleeve	2	
-33	1-080-296-01	. . BAFFLE, Accessory gearbox	1	
-34	STD3053-49	. . BOLT, Drilled socket head	2	
-35	1-080-298-01	. . SCREW, Externally relieved body	1	
-36	R202D300	. . BEARING, Roller (38443) (Lycoming Source Cont Dwg 1-300-012-01)	1	
	452534	. . BEARING, Roller (52676) (Alternate) (Lycoming Source Cont Dwg 1-300-012-02)	1	
-37	1-080-310-01	. . GEARSHAFT ASSEMBLY, Accessory drive	1	
-38	MS21042-4	. . NUT, Self-locking	23	
-39	AN960-416L	. . WASHER, Flat	23	
-40	MS29561-010	. . PACKING, Preformed	1	
-41	1-160-626-01	. . CONNECTOR, Fuel overflow	1	
-42	MS24673-9	. . SCREW, Cap, socket head	2	
-43	1902S301	. . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-003-01)	1	
	PM9302KMBRE 8211	. . BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 1-300-003-02)	1	
	P9302KE8959	. . BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 1-300-003-03)	1	
-43	2-300-941-01	. BEARING, Ball, (Alternate)	1	
-44	1903S301	. . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-004-01)	1	
	6903VAC	. . BEARING, Ball (52676) (Alternate) (Lycoming Source Cont Dwg 1-300-004-04)	1	
-45	1-080-299-01	. . SCREW, Cap	1	
-46	MS29561-008	. . PACKING	1	
-47	1-080-260-01	. . GEARSHAFT ASSEMBLY, Oil pump drive	1	
	1-080-260-03	. . GEARSHAFT ASSEMBLY, Oil pump drive	1	
-47A	MS171499	. . . PIN	1	
-47B	STD3036-32	. . . RIVET, Solid	6	
-47C	1-080-251-01	. . . GEAR	1	
-47D	1-080-046-01	. . . CUP, RETAINING, Oil	1	

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-93				
-47E	1-080-044-03	. . . GEAR, Spur	1	
-48	1-080-340-05	. . HOUSING ASSEMBLY, Accessory gearbox	1	A, C, D, E
	1-080-340-08	. . HOUSING ASSEMBLY, Accessory gearbox	1	
-49	1905S304	. . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-005-01)	2	
	6905VAD	. . . BEARING, Ball (52676) (Alternate) (Lycoming Source Cont Dwg 1-300-005-02)	2	
	2-300-933-01	. . BEARING, Ball (91547)	1	
	2-300-933-02	. . BEARING, Ball (91547)	1	
	2-300-933-03	. . BEARING, Ball (91547)	1	
-50	1-080-270-04	. . GEARSHAFT ASSEMBLY, Fuel control drive	1	
-51	AN100043	. . COVER, Engine accessory drive	1	
	1-010-093-XX	. . COVER, Shipping (Alternate)	1	
-52	AN4045-1	. . GASKET, Engine accessory drive	1	
-53	No Number	. . SEAL AND LINER ASSEMBLY (NHA 1-080-250-13, -16, -24 and -25)	1	
-54	506604	. . . SEAL, Plain encased (24981) (Lycoming Source Cont Dwg 1-300-231-01)	1	
-55	MS29561-135	. . . PACKING	1	
-56	1-080-266-01	. . LINER, Fuel control drive	1	
-57	AN103706	. . BOLT, Drilled hex head	4	
-58	No Number	. . . FLANGE AND SEAL ASSEMBLY, drive (NHA 1-080-250-13 and 1-080-250-16)	1	
-59	4238-1	. . . SEAL, Plain encased (91251) (Lycoming Source Cont Dwg 1-300-234-02)	1	
-60	MS29561-024	. . . PACKING	1	
-61	1-080-256-01	. . . RETAINER, Bearing, tachometer drive	1	
-62	1-080-100-03	. SUPPORT, Accessory gearbox	1	
-63	1-080-026-01	. . GASKET, Starter pad	2	
-64	STD3053-3	. . BOLT, Hex head	5	
-65	STD3023K1	. . TABWASHER	5	
-66	1-080-269-01	. . PLATE, Retaining, thrust bearing	1	
-67	MS29561-025	. . PACKING	1	
-68	1-080-275-02	. . SPACER, Seal	1	
-69	1-080-083-02	. . CUP, Lock	1	
-70	1-080-084-01	. . NUT, Spanner	1	
-71	No Number	. . SEAL AND HOUSING ASSEMBLY (1-080-250-13, -16, -24, and -25)	1	

FIGURE & INDEX NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6 7	QTY PER ASSY	USABLE ON CODE
5-93				
-72	507822	. . . SEAL, plain encased (24981) (Lycoming Source Cont Dwg 1-300-232-01)	1	
-73	STD3019C46	. . . PACKING	1	
-74	STD3019C52	. . . PACKING	1	
-75	1-080-274-01	. . . HOUSING, Oil seal	1	
-76	AN148555	. . BOLT, Socket head	6	
	MS9923-04	. . BOLT, (Alternate)	6	
-77	AN100041	. COVER, Engine accessory drive	1	
-78	AN960-616L	. WASHER, Flat	6	
-79	MS20365-624	. NUT, Self-locking	6	
-80	MS21042-4	. NUT, Self-locking	3	A, B
-81	AN960-416L	. WASHER, Flat	3	A, B
-82	1-080-021-01	. COVER, PAD, ACCESSORY	1	A, B
-83	1-080-022-01	. GASKET	1	A, B

Table 5-60. Inspection of Accessory Drive Gearbox

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-35				
-1	Bolt	Visual	Cracks	Not allowed. Replace.
			Loss of cadmium plating	Repair. (Refer to SP No. 6015 in Appendix E).
			Damaged threads	Not allowed. Replace.
-2	Washer	Visual	Cracks	Not allowed. Replace.
-5	Shouldered Bolt	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E).
			Cracks	Not allowed. Replace.
-6	Bolt	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E).
			Cracks	Not allowed. Replace.
-10	Screen and Transfer Tube	Visual	Enlarged holes, dents, tears, or clogging	Not allowed. Replace.
-11	Accessory Drive Shaft	SIE and 4-power Magnifying Glass	Worn or damage splines	Replace if limits are exceeded. (Refer to SP No. 3009 in Appendix E).
		Visual and Magnetic-Particle . (Refer to table 5-61)	Cracks	Not allowed. Replace.
		Visual	Damaged surface coating	Repair (Ref to SP No. 6003 in Appendix E).
5-93				
-1	Chip Detector	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
		Visual	Metal chips or foreign material	Submit chips or foreign material for analysis. Remove chips or foreign material with dry cleaning solvent (item 134, table C–1)
		4-Power Magnifying Glass	Cracks or separations (T53-L- 13B, -703	Refer to table 5-62
	WARNING FLIGHT SAFETY PART Verification of the bore diameter of the following part is Flight Safety Critical.			
-10, -14, -20, -22, -43, -44 -49	Ball Bearings	SIE and Visual	Wear or damage	Not allowed. Replace.
		SIE and Visual	Wear. (Refer to table 5-63)	Replace if limits cannot be met

Table 5-60. Inspection of Accessory Drive Gearbox (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-93	**WARNING** **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**			
-11	Outer Pinion Gear-shaft Assembly	SIE and 4-power Mag-nifying Glass	Worn or damaged splines	Replace if limits cannot be met. (Refer to SP No. 3009 in Appendix E)
		Visual and Magnetic -Particle. (Refer to table 5-61)	Cracks	Not allowed. Replace.
		SIE and Visual	Wear.(Refer to table 5-64)	Repair 0.4723 to 0.4726 inch (1.1996 to 1.2004 cm) diame-ter. (Refer to paragraph 5-236.) Replace if other dimensions cannot be met
-7b	Housing, Radial Bear-ing	Visual	Wear or damage	Not allowed. Replace.
		Cracks	Visual	Replace
		Damaged Surface Coat-ing or Corrosion	Visual	Repair. (Refer to paragraph 5-236)
-15	Outer Pinion Liner	Visual	Cracks	Not allowed. Replace
			Loss of protective sur-face finish (black oxide)	Repair. (Refer to SP No. 6002 in Appendix E)
		SIE and Visual	Scoring or wear of 1.8504 to 1.8507 inch (4.7000 to 4.7008 cm) diameter. (Refer to table 5-64)	Repair. (Refer to paragraph 5-236)
			Damaged plating	Repair. (Refer to paragraph 5-236)
-17	Nut	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
			Cracks	Not allowed. Replace

Table 5-60. Inspection of Accessory Drive Gearbox (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-93				
	WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**			
-21	Tachometer Drive Gearshaft Assembly	Visual	Plug	Replace if leaking, damaged or missing. (Refer to paragraph 5-236)
		SIE and Visual	Wear to internal square drive	Not to exceed 0.020 inch
		Visual and Magnetic Particle (Refer to table 5-61)	Cracks	Not allowed. Replace.
-26	Accessory Gearbox Cover Assembly	Visual	Damaged threads	Repair. (Refer to SP No. 5007 in Appendix E)
			Loose fuel control mounting studs	Repair. (Refer to paragraph 5-236)
			Corrosion	Repair. (Refer to paragraph 5-236)
			Damaged drain hole threads	Repair. (Refer to paragraph 5-236)
		Visual and fluorescent penetrant	Cracks	Not allowed. Replace.
		Visual	Damaged surface coating or corrosion	Repair. (Refer to paragraph 5-236)
			Broken studs	Repair. (Refer to paragraph 5-236)
		SIE and Visual	Wear and fits. (Refer to table 5-64)	Replace if limits cannot be met
			Scored, worn, or damaged bearing liners	Repair. (Refer to paragraph 5-236)
		SIE and Visual	Damaged or stripped threads in oil scavenge ports	Repair. (Refer to paragraph 5-236)
			Damaged starter pad lip at 4.125 to 4.127 inch (10.478 to 10.483 cm) ID	Repair. (Refer to paragraph 5-236)
-29	Liner	Visual	Cracks	Not allowed. Replace.
		SIE and Visual	Wear and fits (Refer to table 5-64)	Repair or replace, as required. (Refer to paragraph 5-236)

Table 5-60. Inspection of Accessory Drive Gearbox (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-93	**WARNING** **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**			
-30	Oil-Air-Separator Drive Assembly	Visual	Cracks in rivet heads. (See figure 5-94)	Replace. (Refer to paragraph 5-236)
			Loose or missing rivets (1-080-280-03)	Replace rivets. (Refer to paragraph 5-236)
			Loose or missing rivets on elongated holes. (1-080-280-01 /02)	Modify to 1-080-280-03. (Refer to paragraph 5-236)
		SIE and 4-Power Magnifying Glass	Worn or damaged splines and gear teeth	Replace if limits cannot be met. (Refer to SP No. 3009 in Appendix E).
		SIE and Visual	Wear. (Refer to table 5-64)	Replace if limits cannot be met
		Visual and Magnetic particle. (Refer to table 5-61)	Cracks	Not allowed. Replace
	WARNING **FLIGHT SAFETY PART** **Verification of the bore diameter of the following part is Flight Safety Critical.**			
	Roller bearing	SIE and Visual	Wear. (Refer to table 5-63)	Replace if limits cannot be met.
	WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**			
-37	Accessory Drive Gearshaft Assembly	Spline Wear Gage (LTCT 9896)	Splines worn in excess of 0.012 inch (0.030 cm) and damaged or cracked splines	Repair. (Refer to paragraph 5-236)
		Visual	Damaged threads	Repair. (Refer to paragraph 5-236)
		SIE and Visual	Wear. (Refer to table 5-64)	Repair or replace, as required. (Refer to paragraph 5-236)

Table 5-60. Inspection of Accessory Drive Gearbox (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-93				
-37 (Cont)	Accessory Drive Gearshaft Assembly (Cont)	Visual and Magnetic Particle. (Refer to table 5-61)	Cracks	Not allowed. Replace
-41	Fuel Overflow Connector	Visual	Cracks	Not allowed. Replace
	WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**			
-47	Oil Pump Drive Gearshaft Assembly	SIE and 4-Power Magnifying Glass	Worn or damaged splines and gear teeth	Refer to table 5-63. Repair. (Refer to paragraph 5-236 and SP No. 3009 in Appendix E)
		Visual	Cracks in rivet heads	Replace in accordance with figure 5-95. (Refer to paragraph 5-236)
			Loose or missing rivets or elongated holes	Replace rivets. (Refer to paragraph 5-236)
			(1-180-260-03) Loose or missing rivets or elongated holes	Modify to 1-080-260-03. (Refer to paragraph 5-236)
			(1-180-260-01) Damaged plating	Repair. (Refer to paragraph 5-236)
		Visual and magnetic particle . (Refer to table 5-61)	Cracks	Not allowed. Replace
		SIE and Visual	Wear. (Refer to table 5-64)	If limits cannot be met, replace
	WARNING **FLIGHT SAFETY PART** **Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.**			
-48	Accessory Gearbox Housing Assembly	Visual	Damaged, unseated, crossed, or stripped screw thread inserts (helical-coil)	Repair. (Refer to paragraph 5-236)
			Damage to pressure port tapped hole	Repair. (Refer to paragraph 5-236)
			Damage to baffle mounting tapped hole	Repair. (Refer to paragraph 5-236)
			Damaged surface coating or corrosion	Repair. (Refer to paragraph 5-236)

Table 5-60. Inspection of Accessory Drive Gearbox (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-93 -48 (Cont)	Accessory Gearbox Housing Assembly	Visual and Fluorescent Penetrant	Cracks	Not allowed. Replace
		Visual	Nicks or burrs	Repair. (Refer to paragraph 5-236)
		SIE and visual	Scored, worn, or damaged bearing liners	Repair or replace. (Refer to paragraph 5-236)
			Scored, worn, or damaged mounting flange holes	Repair. (Refer to paragraph 5-236)
		SIE and Visual	Insufficient oil hole opening in housing at base of bearing liner in housings which incorporate continuous lubrication of fuel control drive spline	Refer to table 5-62
			Wear and fits. (Refer to table 5-64	Replace if limits cannot be met
		WARNING **FLIGHT SAFETY PART** **Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.**		
-50	Fuel Control Gear-shaft Assembly	SIE and 4-power Magnifying Glass	Worn or damaged splines and gear-teeth	Not allowed. Replace (Refer to SP No. 3009 in Appendix E)
		Visual and magnetic particle (Refer to table 5-61)	Cracks	Not allowed. Replace
		SIE and Visual	Worn or damaged OD seal journal	Not allowed. Replace (Refer to SP No. 5013 in Appendix E)
		SIE and Visual	Damaged plating on 0.875 to 0.877 inch (0.223 to 0.228 cm) diameter	Repair. (Refer to paragraph 5-236)
			Wear. (Refer to table 5-64)	Replace if limits cannot be met
		SIE and Visual	Worn or damaged ID seal journal	Defect to 0.005 may be removed by burnishing

Table 5-60. Inspection of Accessory Drive Gearbox. (Continued)

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-93				
-56	Liner	Visual	Cracks	Not allowed. Replace
			Loss of protective surface finish (black oxide)	Repair. (Refer to paragraph 5-236)
		SIE and Visual	Scoring of 1.6535 to 1.6541 inch (4.1999 to 4.2014 cm) diameter	Repair. (Refer to paragraph 5-236)
		SIE and Visual	Wear and fits. (Refer to table 5-64)	Replace if limits cannot be met
-61	Bearing Retainer	Visual	Cracks	Not allowed. Replace.
			Loss of protective surface finish (black oxide)	Repair. (Refer to paragraph 5-236)
		SIE and Visual	Scoring on 1.1024 to 1.1029 inch (2.8001 to 2.8014 cm)	Repair. (Refer to paragraph 5-236)
			Worn 1.1024 to 1.1029 inch (2.8001 to 2.8014 cm)	Repair. (Refer to paragraph 5-236)
			Worn 1.500 to 1.502 inch (3.810 to 3.815 cm) diameter	Repair. (Refer to paragraph 5-236)
			Wear and fits. (Refer to table 5-64)	Repair or replace as required. (Refer to paragraph 5-236)
-62	Support	Visual	Cracks	Not allowed. Replace
			Damaged surface coating or corrosion	Repair. (Refer to SP No. 6000 or 6001 in Appendix E).
			Damaged threads	Not allowed. Replace
-66	Retaining Plate	Visual	Cracks	Not allowed. Replace
-68	Spacer	Visual	Scoring of 1.811 to 1.813 inch (4.600 to 4.605 cm) OD	Repair. (Refer to paragraph 5-236)
		Visual and Magnetic-Particle. (Refer to table 5-61)	Cracks	Not allowed. Replace
-70	Spanner Nut	Visual	Damaged threads	Not allowed. Replace
			Cracks	Not allowed. Replace
-75	Seal Housing	Visual	Cracks	Not allowed. Replace
		SIE and Visual	Wear and fits. (Refer to table 5-64)	Replace if limits cannot be met
-82	Pad Cover	Visual	Cracks	Not allowed. Replace
			Loss of Protective Surface Finish.	Repair (Refer to para 5-236)

Table 5-61. Magnetic-Particle Inspection of Accessory Drive Gearbox.

Figure and Index No.	Nomenclature	Method of Magnetization
4-35, 11	Accessory Drive Shaft	Circular, use direct contact at 1000 amperes. Longitudinal at 5000 ampere turns
5-93, 11	Gearshaft Assembly Pinion, Outer	Circular, use direct contact at 800 amperes. Longitudinal at 4000 ampere-turns
5-93, 21	Gearshaft Assembly Tachometer Drive	Circular, use direct contact at 1000 amperes
5-93, 30	Gearshaft Assembly, Oil-air separator	Circular, use central conductor at 1200 amperes. Longitudinal at 6000 ampere-turns
5-93, 37	Gearshaft Assembly, Accessory drive	Circular, use direct contact at 1500 amperes Longitudinal at 7500 ampere-turns
5-93, 47	Gearshaft Assembly, Oil pump drive	Circular, use direct contact across teeth at 1200 amperes. Turn 90° for second shot
5-93, 50	Gearshaft Assembly, Fuel control drive	Circular, use central conductor at 1500 amperes
5-93, 68	Spacer	Circular, use central conductor at 800 amperes

Table 5-62. Accessory Drive Gearbox Inspection Limits.

DEFECT	FIGURE REFERENCE	INSPECTIONS LIMITS
Wear on Oil Pump Drive Gearshaft Assembly Spline		Using paddle gage (LTCT6917), perform the following inspection: a. If gage can be inserted into the gearshaft spline it is an indication that wear is in excess of the 0.005 inch (0.013 cm) limit. Replace gearshaft assembly. b. If gage cannot be inserted into the gear-shaft spline, it is an indication that wear is within the 0.005 inch (0.013 cm) limit. Gear-shaft is acceptable provided that all other overhaul requirements are met. **NOTE** Check paddle gage (LTCT6917) periodically for wear. (The use of a master gearshaft assembly which is known to have 0.005 inch (0.013 cm) wear would be a suitable fixture for determining paddle gage acceptability.)
Insufficient Oil Hole Opening in Housing at Base of Liner Bearing		Using a 0.035 inch (0.089 cm) wire gage, perform the following inspection: a. If gage can be inserted into oil hole opening at base of bearing liner, opening is large enough to permit sufficient oil passage. Part is acceptable. b. If gage cannot be inserted, oil hole opening is insufficient. Repair as outlined in paragraph 5-236.
Cracks or Separations on Chip Detector (1-300-243-01 and 1-300-243-02 Only)		a. Using 4-power magnifying glass, visually inspect for cracks in the magnetic material surrounding the electrode. If cracks are observed, replace chip detector. b. Using a 4-power magnifying glass, visually inspect for separation between the electrode and the magnetic material. If any separation is observed replace chip detector. c. Using a suitable tool, apply a torque of 15 pound-inches (2679 gm cm) in a clockwise direction to the 0.1640-32NC-3A screw. If the nut turns in the potting material or if the potting material turns in the chip detector housing, replace chip detector.
Corrosion under screw thread inserts (helical-coil) of accessory drive gearbox housing assembly oil pump mount		a. Check torque of screw thread inserts (helical-coil) at 100±5 pound-inches. If any coils pull, remove and repair as outlined in paragraph 5-236 **NOTE** This requirement is applicable for spare accessory drive gearboxes.

Table 5-63. Dimensional Inspection of Accessory Drive Gearbox Bearings.

BEARING TYPE & PART NUMBER	FIG & INDEX	DIM. MEAS	BLUEPRINT DIMENSIONS MIN.	BLUEPRINT DIMENSIONS MAX	INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
	5-93								
			WARNING **FLIGHT SAFETY PART** **Verification of the 0.4721/0.4722 - 0.4724 diameter is Flight Safety Critical.**						
Ball 1903S3011	10	ID	0.4721 (1.1991)	0.4724 (1.9999)	0.0003 (0.0008)	0.005 (0.013)	58 to 65	N/A	1-300-002 -01
		OD	0.9445 (2.3990)	0.9449 (2.4000)	0.0009** (0.0023)				
PM9301KMRE 8211		ID	0.4722 (1.1994)	0.4724 (1.1999)	0.0005 (0.0013)	0.006** (0.015)	59 to 63	N/A	1-300-002 -02
		OD	0.9446 (2.3993)	0.9449 (2.4000)	0.0009* (0.0023)				
			WARNING **FLIGHT SAFETY PART** **Verification of the 1.1809-1.1811 diameter is Flight Safety Critical.**						
Ball 1906S300	14	ID	1.1809 (2.9995)	1.1811 (3.0000)	0.003 (0.008)	0.0035 (0.0089)	58 to 61	N/A	1-300-006 -01
		OD	1.8501 (4.6993)	1.8504 (4.7000)	0.0009 (0.0023)				
		ID	1.1809 (2.9995)	1.1811 (3.0000)	0.0005 (0.0013)	0.008 (0.020)	58 to 61	N/A	1-300-006 -02
454886		OD	1.8501 (4.6993)	1.8504 (4.7000)					

* Under an 11.0 pound gage load.
** Under a 5.5 pound gage load.
*** Under a 3.0 pound gage load.

Table 5-63. Dimensional Inspection of Accessory Drive Gearbox Bearings (Continued)

BEARING TYPE & PART NUMBER	FIG & INDEX	DIM. MEAS	BLUEPRINT DIMENSIONS MIN.	BLUEPRINT DIMENSIONS MAX	INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
	5-93								
			WARNING **FLIGHT SAFETY PART** **Verification of the 0.9839 - 0.9843 diameter is Flight Safety Critical.**						
Ball 190S5304	20 49	ID	0.9839 (2.4991)	0.9843 (2.5001)	0.0003 (0.0008)	0.0035 (0.0089)	58 to 62	N/A	1-300-005-01
		OD	1.6530 (4.1986)	1.6535 (4.1999)	0.0009* (0.0023)				
6905 VAD	20 49	ID	0.9839 (2,4991)	0.9843 (2.5001)	0.0005 (0.0013)	0.006 (0.015)	58 to 61	N/A	1-300-005-02
		OD	1 6530 (4.1986)	1.6535 (4.1999)	0.0011 (0.0028)				
6905 VAD		ID	0.9839 (2,4991)	0.9843 (2.5001)	0.0005 (0.0013)	0.006 (0.015)	58 to 61	N/A	2-300-933-01
		OD	1.6530 (4.1986)	1.6535 (4.1999)	0.0011* (0.0028)				
1905-S-308		ID	0.9839 (2.4991)	0.9843 (2.5001)	0.0005 (0.0013)	0.006 (0.015)	58 to 61	N/A	2-300-933-02
		OD	1.6530 (4.1986)	1.6535 (4.1999)	0.0011* (0.0028)				

* Under an 11.0 pound gage load.
** Under a 5.5 pound gage load.
*** Under a 3.0 pound gage load.

Table 5-63. Dimensional Inspection of Accessory Drive Gearbox Bearings (Continued)

BEARING TYPE & PART NUMBER	FIG & INDEX	DIM. MEAS	BLUEPRINT DIMENSIONS MIN.	BLUEPRINT DIMENSIONS MAX	INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
	5-93								
			WARNING **FLIGHT SAFETY PART** **Verification of the 0.5903/0.5904 diameter is Flight Safety Critical.**						
Ball 1902S301	-22 and -43	ID	0.5903 (1.4994)	0.5906 (1.5001)	0.0003 (0.0008)	0.0050** (0.0127)	58 to 62	N/A	1-300-003-01
		OD	1.1020 (2.7991)	1.1024 (2.8001)	0.0009** (0.0023)				
PM9302KMBRE 8211		ID	0.5904 (1.4996)	0.5906 (1.5001)	0.0005 (0.0013)	0.006** (0.015)	58 to 62	N/A	1-300-003-02
		OD	1.1021 (2.7993)	1.1024 (2.8001)	0.0009** (0.0023)				
P9032KE8959		ID	0.5903 (1.4994)	0.5906 (1.5001)	0.0004 (0.0010)	0.004 (0.010) ***	58 to 62	N/A	1-300-003-03
		OD	1.1020 (2.7991)	1.1024 (2.8001)	0.0010* (0.0025)				
PM9302KMBRA 3897		ID	0.5904 (1.4996)	0.5906 (1.5001)	0.0005** (0.0013)	0.006 (0.015)	58 MIN	N/A	2-300-941-01
		OD	1.1021 (2.7993)	1.1024 (2.8001)	0.0009 (0.0023)				
			WARNING **FLIGHT SAFETY PART** **Verification of the 0.5903/0.5904 - 0.5906 diameter is Flight Safety Critical.**						
Roller R202D300	-36	ID	0.5903 (1.4994)	0.5906 (1.5001)	0.0007 (0.0018)	N/A	58 to 61	N/A	1-300-012-01
		OD	1.3775 (3.4989)	1.3780 (3.5001)	0.0017* (0.0043)				
45234		ID	0.5904 (1.4996)	0.5906 (1.5001)	0.0008 (0.0020)	N/A	58 to 61	N/A	1-300-012-02
		OD	1.3777 (3.4994)	1.3780 (3.5001)	0.0016 (0.0041)				

* Under an 11.0 pound gage load.
** Under a 5.5 pound gage load.
*** Under a 3.0 pound gage load.

Table 5-63. Dimensional Inspection of Accessory Drive Gearbox Bearings (Continued)

BEARING TYPE & PART NUMBER	FIG & INDEX	DIM. MEAS	BLUEPRINT DIMENSIONS MIN.	BLUEPRINT DIMENSIONS MAX	INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
	5-93								
			WARNING **FLIGHT SAFETY PART** **Verification of the 0.6690 - 0.6693 bore diameter is Flight Safety Critical.**						
Ball 1903S301	-44	ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003 (0.0008)	0.0035 (0.0089)	58 to 62	N/A	1-300-004-01
		OD	1.1807 (2.9980)	1.1811 (3.0000)	0.0009** (0.0023)				
6903VAD		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0004 (0.0010)	0.006 (0.015)	58 to 61	N/A	1-300-004-02
		OD	1.1807 (2.9980)	1.1811 (3.0000)	0.0010 (0.0025)				
3LL03K		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003 (0.0008)	0.0055 (0.0130)	58 to 62	N/A	1-300-004-03
		OD	1.1807 (2.9980)	1.1811 (3.0000)	0.0009** (0.0023)	*** 0.013			
19003S303		ID	0.6690 (1.6993)	0.6693 (1.7000)	0.0003 (0.0008)	0.005	58 to 62	N/A	1-300-004-04
		OD	1.1807 (2.9980)	1.1811 (3.0000)	0.0009** (0.0023)				

* Under an 11.0 pound gage load.
** Under a 5.5 pound gage load.
*** Under a 3.0 pound gage load.

Table 5-64. Dimensional Inspection of Accessory Drive Gearbox.

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-93								5-95
Outer Pinion Gear-shaft Assembly	-11	OD*	0.4723 (1.1996)	0.4726 (1.2004)	0.4721 (1.1991)	0.4726 (1.2004)			A
		OD*	1.1811 (3.0000)	1.1815 (3.0010)	1.1810 (3.0008)	1.1815 (3.0010)			B
Outer Pinion Liner	-15	ID*	1.8504 (4.7000)	1.8507 (4.7008)	1.8504 (4.7000)	1.8510 (4.7015)			C
Tachometer Drive Gearshaft Assembly	-21	OD*	0.9844 (2.5004)	0.9848 (2.5014)	0.9842 (2.4999)	0.9848 (2.5014)			E
		OD*	0.5905 (1.4999)	0.5908 (1.5006)	0.5903 (1.4994)	0.5908 (1.5006)			D
		OD*	0.4950 (1.2573)	0.5020 (1.2751)	0.4950 (1.2573)	0.5020 (1.2751)			D1
		OD*	0.9640 (2.4486)	0.9710 (2.4663)	0.9640 (2.4486)	0.9710 (2.4663)			E1
Accessory Gearbox Cover Assembly	-26	ID*	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1031 (2.8019)			F
		ID*	1.1811 (3.0000)	1.1816 (3.0013)	1.1811 (3.0000)	1.1818 (3.0018)			G
		ID*	4.125 (10.478)	4.127 (10.4831)	4.125 (10.478)	4.128 (10.485)			H
		ID*	3.250 (8.255)	3.251 (8.258)	3.250 (8.255)	3.252 (8.260)			I

* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion or wear

Table 5-64. Dimensional Inspection of Accessory Drive Gearbox (Continued)

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-93								5-95
Liner to	-29	OD*	1.998 (5.075)	1.999 (5.077)	1.9975 (5.0737)	1.9990 (5.0775)			L
							0.001L (0.003)	0.0045 1 (0.014)	K
Accessory Gear box Assembly	-26	ID*	2.000 (5.08)	2.001 (5.083)	2.0000 (5.08)	2.0020 (5.0851)			
Liner	-29	ID*	1.8504 (4.7000)	1.8510 (4.7015)	1.8504 (4.700)	1.8512 (4.702)			J
Oil-Air Separator Drive Gearshaft Assembly	-30	OD*	0.5905 (1.4999)	0.5909 (1.5009)	0.5903 (1.4994)	0.5909 (1.5009)			M
Accessory Gear Assembly	-37	OD*	1.1812 (3.0002)	1.1815 (3.0010)	1.1810 (2.9997)	1.1815 (3.0010)			N
		OD*	0.5906 (1.5001)	0.5910 (1.5011)	0.5904 (1.4996)	0.5910 (1.5011)			O
Oil Pump Drive Gearshaft Assembly	-47	OD*	0.6692 (1.6992)	0.6695 (1.1005)	0.6690 (1.6993)	0.6695 (1.7005)			P
		OD*	0.5905 (1.4999)	0.5908 (1.5006)	0.5903 (1.4994)	0.5908 (1.5001)			Q
Accessory Gearbox Gearbox Housing	-48	ID*	1.6535 (4.1999)	1.6541 (4.2014)	1.6535 (4.1999)	1.6543 (4.2019)			R
		ID*	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1031 (2.8019)			S

* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion or wear

Table 5-64. Dimensional Inspection of Accessory Drive Gearbox (Continued)

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-93								5-95
Accessory Gearbox Housing Assembly	-48 (Cont)	ID*	1.3778 (3.4996)	1.3781 (3.5004)	1.3778 (3.4996)	1.3783 (3.5004)			T
		ID*	0.9449 (2.4000)	0.9454 (2.4013)	0.9449 (2.4000)	0.9456 (2.4018)			U.1
Accessory Gearbox Housing Assembly to	-48	ID*	2.0000 (5.08)	2.0010 (5.083)	2.0000 (5.08)	2.0017 (5,0843)	0.0005 L (0.0013)	0.0003 2L (0.0081)	U
Outer Pinion Liner	-15	OD*	1.9985 (5.0762)	1.9995 (5.0787)	1.9985 (5.0762)	1.9995 (5.0787)			V
Fuel Control Drive Gearshaft Assembly to	-50	OD*	0.9844 (2.5004)	0.9847 (2.5011)	0.9842 (2.4999)	0.9847 (2.5011)			W
Liner	-56	ID*	1.6535 (4.1999)	1.6541 (4.2014)	1.6535 (4.1999)	1 .6543 (4.2019)			X
Liner to	-56	OD*	1.811 (4.600)	1.812 (4.602)	1.811 (4.600)	1.812 (4.602)			Y
							0.001L (0.003)	0.004L (0.010)	
Accessory Gearbox Cover Assembly	26	ID*	1.813 (4.605)	1.814 (4.608)	1.813 (4.605)	1.815 (4.610)			Z
Bearing	61	OD*	1.2480 (3.1699)	1.2490 (3.1725)	1.2480 (3.1699)	1.2490 (3.1725)			AA
Retainer to		ID	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1031 (2.8019)			AB
							0.001L (0.003)	0.004L (0.010)	

* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion or wear

Table 5-64. Dimensional Inspection of Accessory Drive Gearbox (Continued)

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-93								5-95
Accessory Gearbox Cover Assembly	26	ID*	1.2500 (3.175)	1.2510 (3.1775)	1.2500 (3.175)	1.2520 (3.1801)			AC
Seal Housing	75	OD	2.9970 (7.6124)	2.9990 (7.6175)	2.9965 (7.6111)	2.9990 (7.6175)			AD
to		ID	2.4960 (6.3398)	2.4980 (6.3449)	2.496 (6.340)	2.500 (6.35)	0.001L (0.003)	0.0065 L (0.0165)	AE
Accessory Gearbox Cover Assembly	26	ID	3.0000 (7.62)	3.0010 (7.6225)	3.0000 (7.62)	3.0030 (7.6276)			AF

* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion or wear

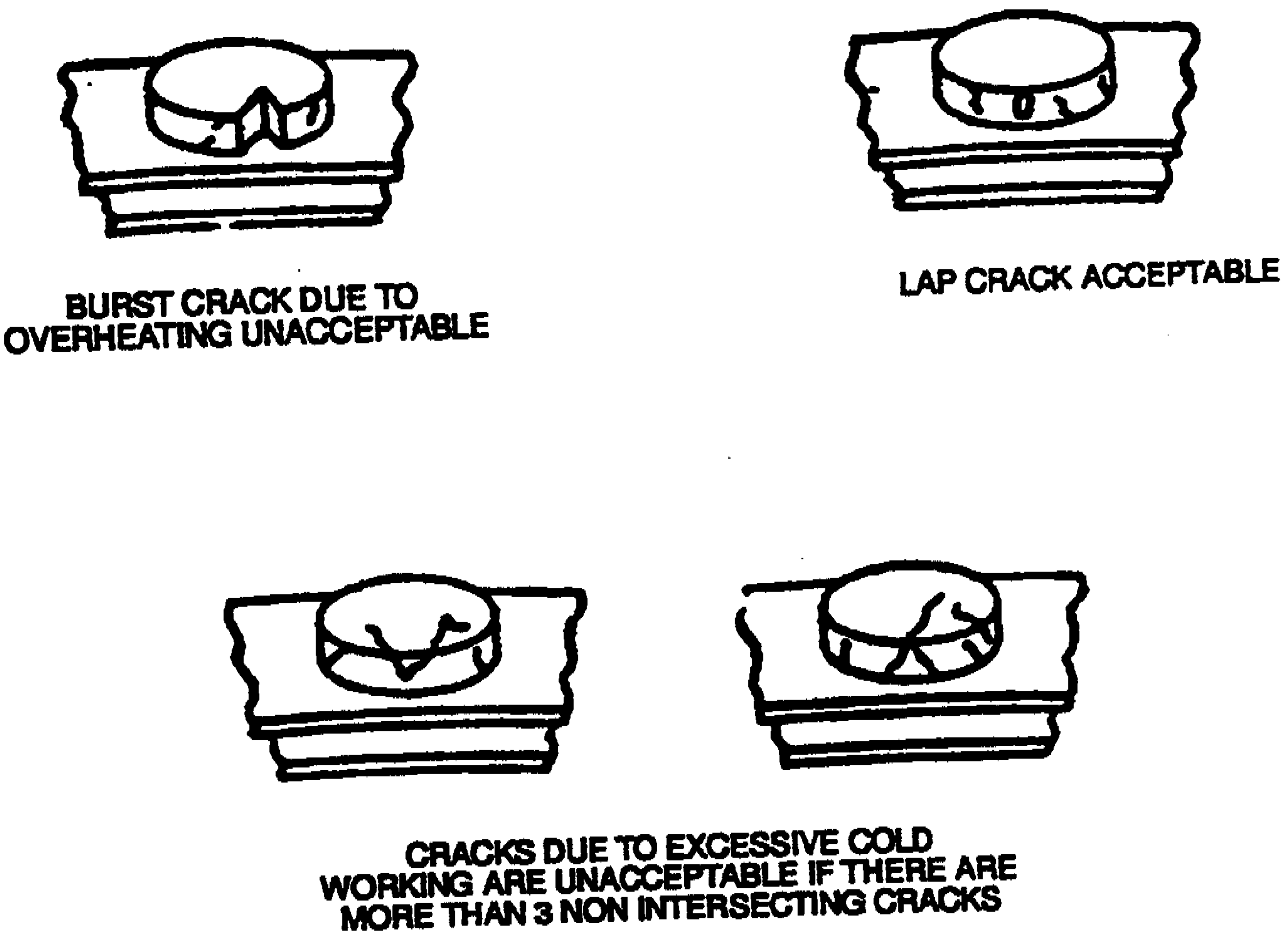
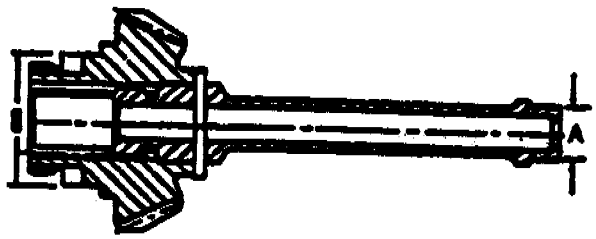
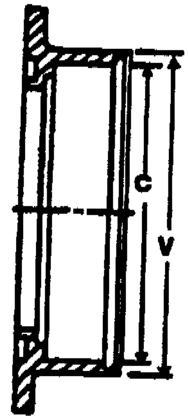


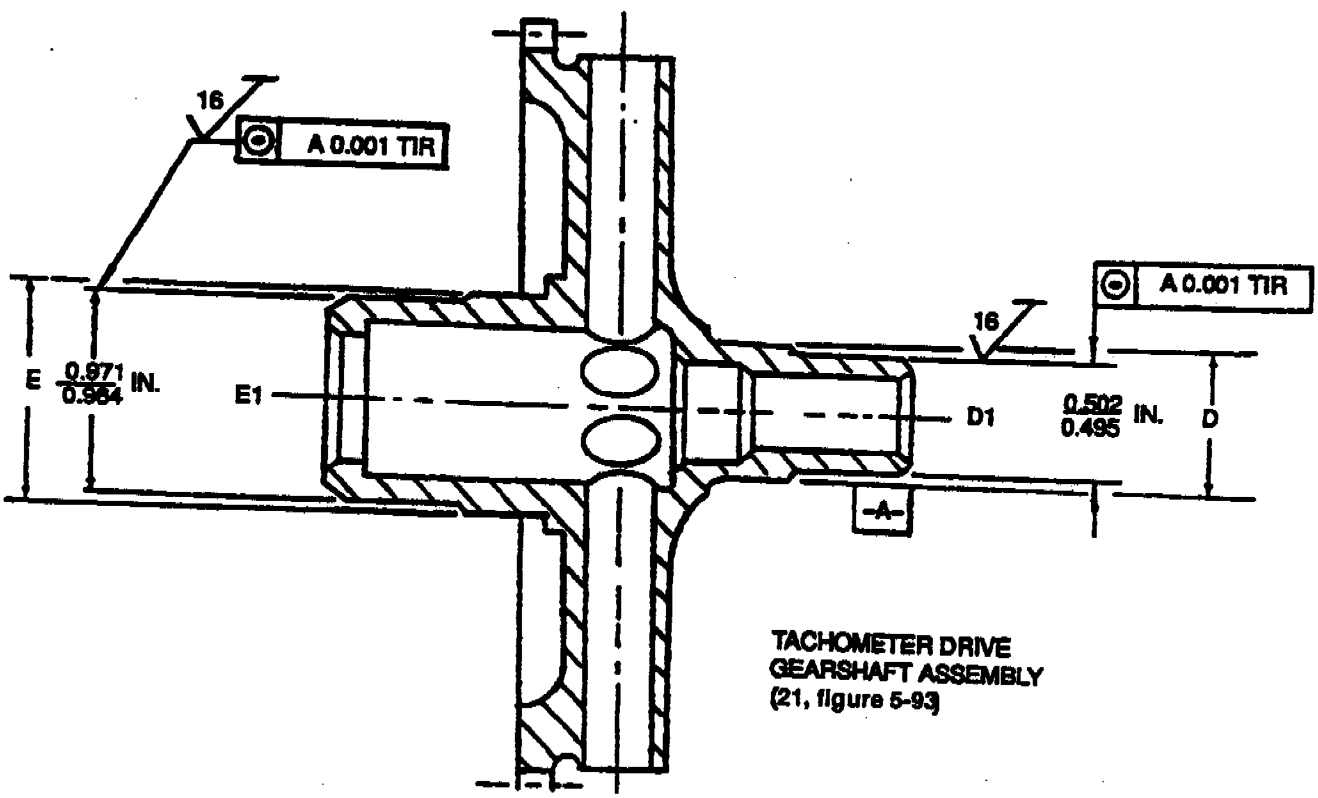
Figure 5-94. Rivet Head - Crack Limits.



OUTER PINION GEARSHAFT (11, figure 5-93)



OUTER PINION LINER (15, figure 5-93)



TACHOMETER DRIVE GEARSHAFT ASSEMBLY (21, figure 5-93)

Figure 5-95. Accessory Drive Gearbox Dimensional Inspection Locations (Sheet 1 of 4).

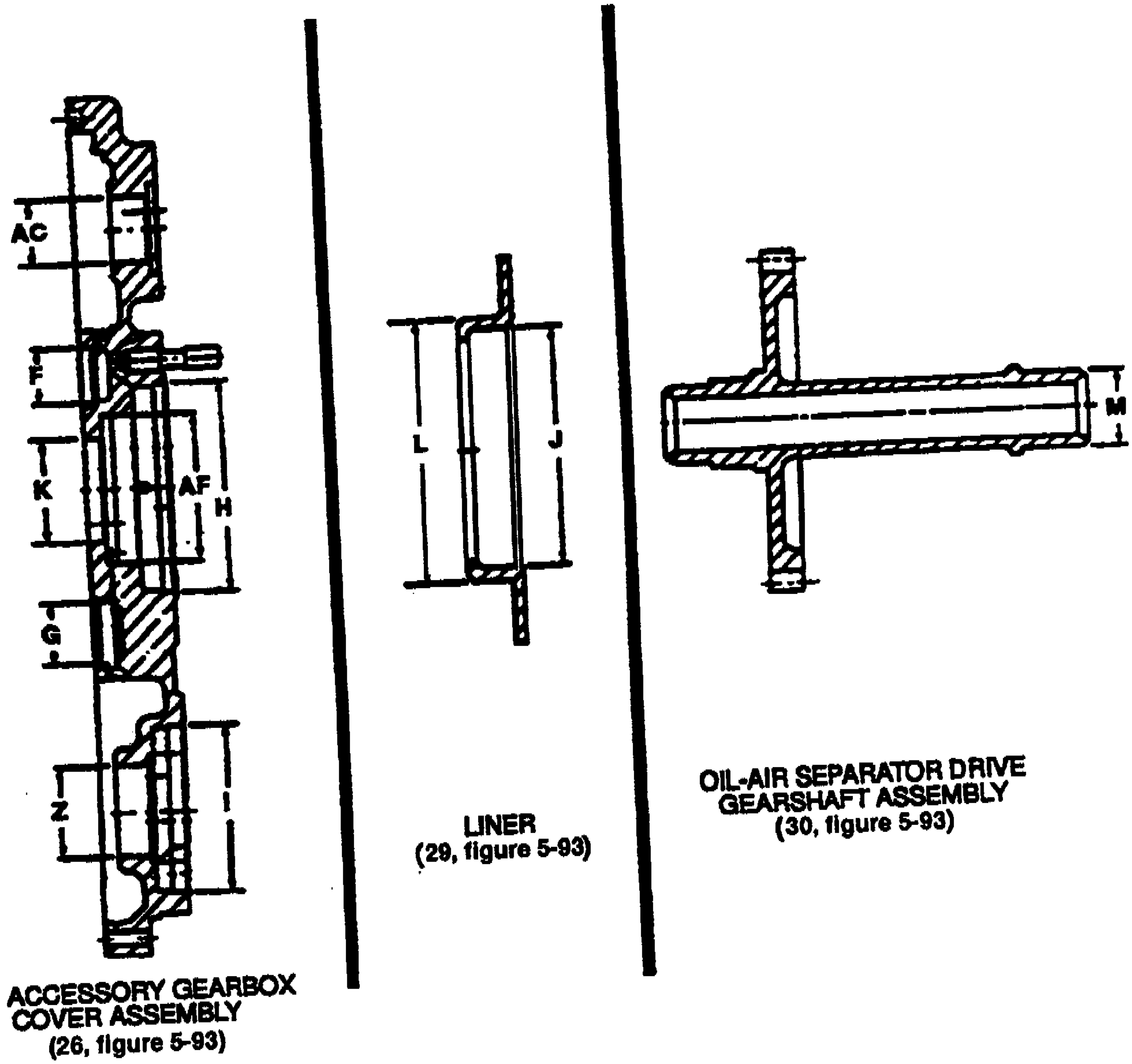
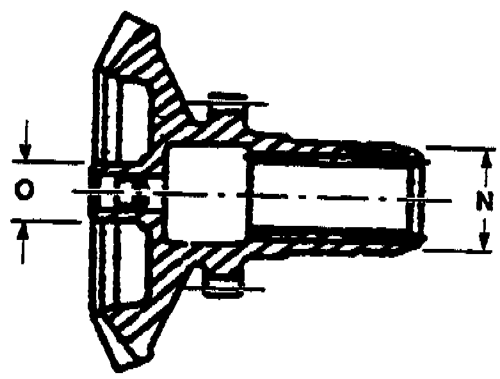
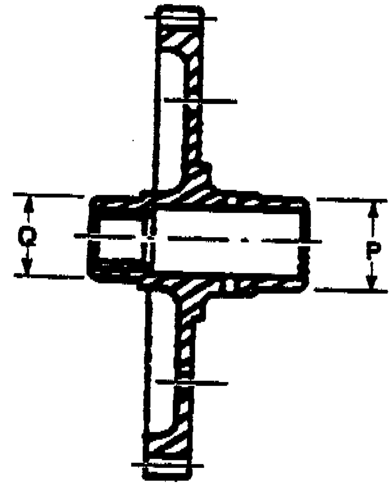


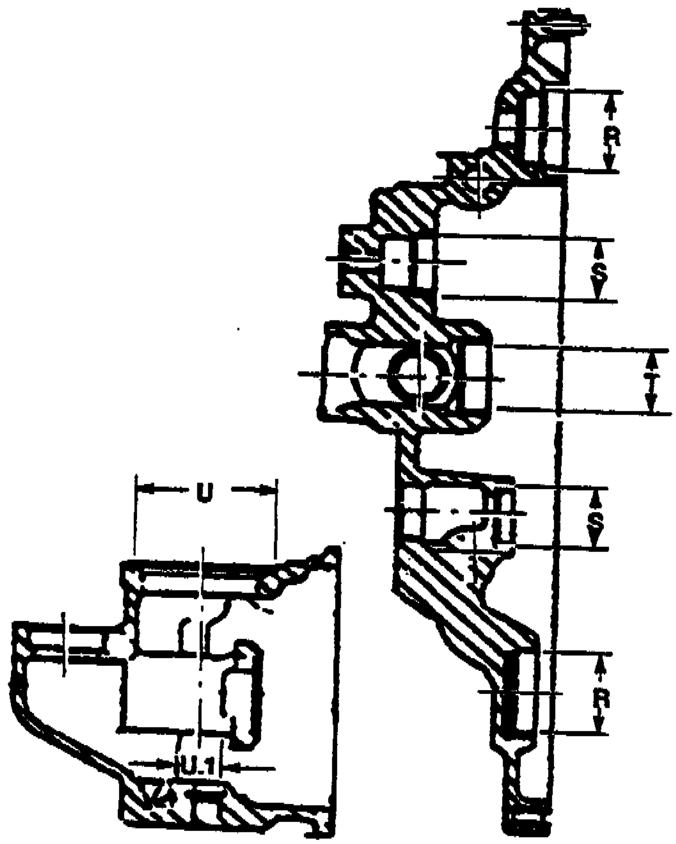
Figure 5-95. Accessory Drive Gearbox Dimensional Inspection Locations (Sheet 2 of 4).



ACCESSORY GEAR ASSEMBLY (37, figure 5-93)

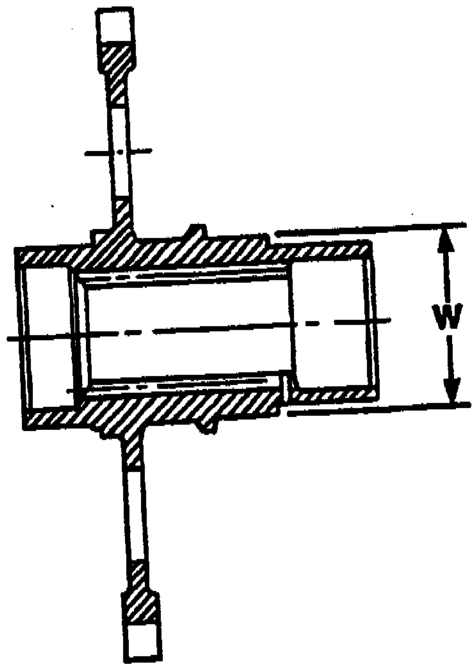


OIL PUMP DRIVE GEARSHAFT ASSEMBLY (47, figure 5-93)

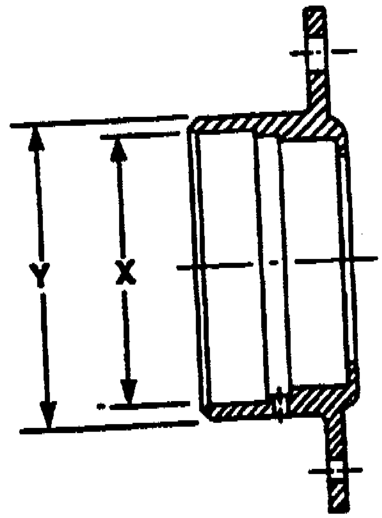


ACCESSORY GEARBOX HOUSING ASSEMBLY (48, figure 5-93)

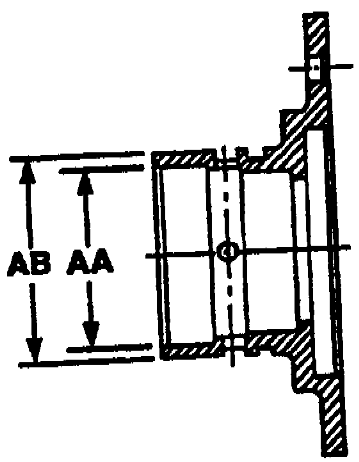
Figure 5-95. Accessory Drive Gearbox Dimensional Inspection Locations (Sheet 3 of 4).



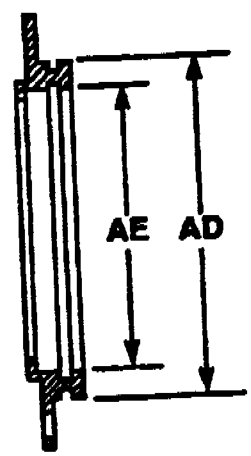
FUEL CONTROL DRIVE GEARSHAFT ASSEMBLY (50, figure 5-93)



LINER (56, figure 5-93)



BEARING RETAINER (61, figure 5-93)



SEAL HOUSING (75, figure 5-93)

Figure 5-95. Accessory Drive Gearbox Dimensional Inspection Locations (Sheet 4 of 4).

5-236. REPAIR OF ACCESSORY DRIVE GEARBOX. (See figures 4-35 and 5-93.) Proceed as follows:

a. Blend-repair nicks, burrs, or scratches as outlined in SP No. 5000 in Appendix E.

b. Replace accessory drive gearbox housing oil pump mount screw thread insert (helical-coil) with slimsert insert 1/4-28, SRW258 (NSN 5340-00-407-9261) or equivalent. If slimsert is removed, it shall be replaced with an insert 1/4-28 MS51830-202 (NSN 5340-00-085-0219) or equivalent.

NOTE

Repair all other damaged screw thread inserts as outlined in SP No. 5007 in Appendix E.

c. Repair scored area on 1.8504 to 1.8507 inch (4.7000 to 4.7008 cm) diameter of outer pinion liner (15, figure 5-93) if scoring depth exceeds 0.010 inch (0.025 cm) as follows:

(1) Using crocus cloth (item 125, table C–1), remove sharp edges of scored area.

(2) Refinish repaired area with black oxide coating as outlined in SP No. 6002 in Appendix E.

d. Repair worn 1.8504 to 1.8507 inch (4.7000 to 4.7008 cm) diameter on outer pinion liner (15), where 0.003 to 0.015 inch (0.008 to 0.038 cm) buildup is required, by plasma flame spray as follows:

(1) Machine ID, if necessary, to obtain a 0.003 to 0.015 inch (0.008 to 0.038 cm) buildup thickness after final machining.

(2) Plasma flame-spray liner. (Refer to SP No. 5006 in Appendix E.)

(3) Touch up reworked area with black oxide coating. (Refer to SP No. 6002 in Appendix E.)

e. Repair plating on outer pinion gearshaft assembly (11) as follows: (See figure 5-96.)

(1) Nickel- or chrome-plate 0.4723 to 0.4726 inch (1.1996 to 1.2004 cm) diameter, depending upon thickness required.

(a) If plating thickness after final grind is to be 0.001 inch (0.003 cm) or less, nickel-plate as outlined in SP No. 6018 in Appendix E.

(b) If plating thickness after final grind is to be 0.002 to 0.010 inch (0.005 to 0.025 cm) chrome-plate as outlined in SP No. 6014 in Appendix E.

(2) Bake at 255° to 275°F (124° to 135°C) for 5 hours.

(3) Machine to given dimensions.

f. Press plug (item 21A) into tachometer gearshaft (21).

g. Repair damaged fuel control tapped stud hole as follows: (See figure 5-97.)

(1) Remove stud.

(2) Use 0. 4459 to 0.4537 inch (1.1326 to 1.1524 cm) diameter drill to drill stud hole 0.900 inch (2.286 cm) deep.

(3) Use 0. 500-20 UNF-3B tap to tap stud hole 0.880 inch (2.235 cm) deep.

(4) Using magnesium alloy (item 201, table C–1) 0.625 inch (1.588 cm) diameter hex stock, fabricate plug 0.880 inch (2.235 cm) long.

NOTE

Machine thread size to obtain 0.0005 to 0.0010 inch (0.0013 to 0.0025 cm) tight fit in tapped hole.

(5) Undercut plug shank at end of 0.880 inch (2.235 cm) thread length, 0.072 inch (0.183 cm) wide to 0.422 to 0.426 inch (1.072 to 1.082 cm) diameter.

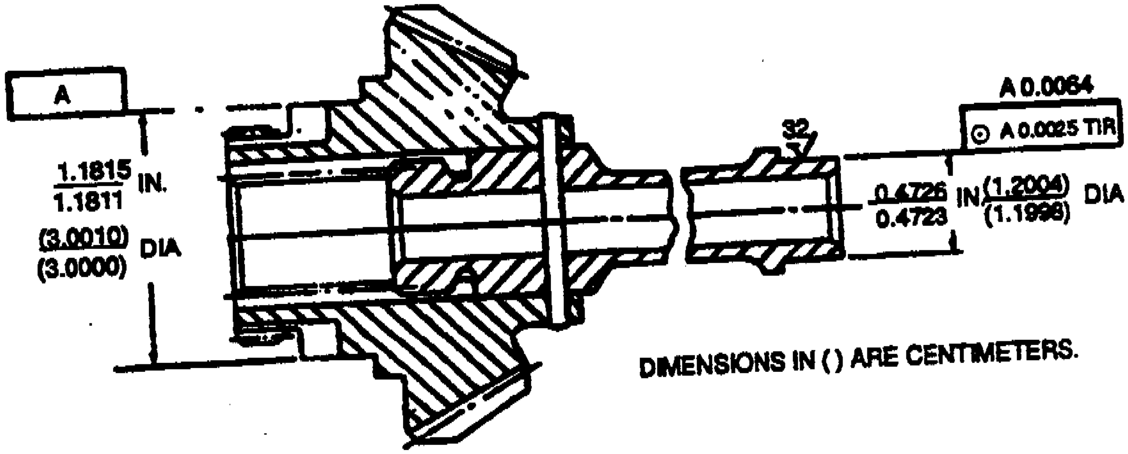


Figure 5-96. Accessory Drive Gearshaft Repair Area.

(6) Coat tapped hole and plug with primer (item 253, table C–1).

(7) Install plug; machine flush with surface.

(8) Using a 0.1232 to 0.1242 inch (0.3120 to 0.3155 cm) diameter drill, drill a 0.210 inch (0.533 cm) deep lockpin hole.

NOTE

When drilling lockpin hole, half of hole shall extend into parent metal and the other half shall extend into plug.

(9) Using magnesium alloy (item 201, table C–1) 0.1250±0.0005 inch (0.3175±0.0013 cm) diameter round stock, fabricate lockpin to length of 0.188 inch (0.478 cm).

(10) Install pin flush with surface, and stake securely.

(11) Using a 0.311 to 0.318 inch (0.780 to 0.808 cm) diameter drill, drill at stud hole in plug 1.10 to 1.15 inch (2.79 to 2.92 cm) deep.

(12) Countersink hole 90 degrees.

(13) Using a 0.3750-16NC-3B tap, tap stud hole 0.880 inch (2.235 cm) deep.

(14) Install new stud of same type as one removed.

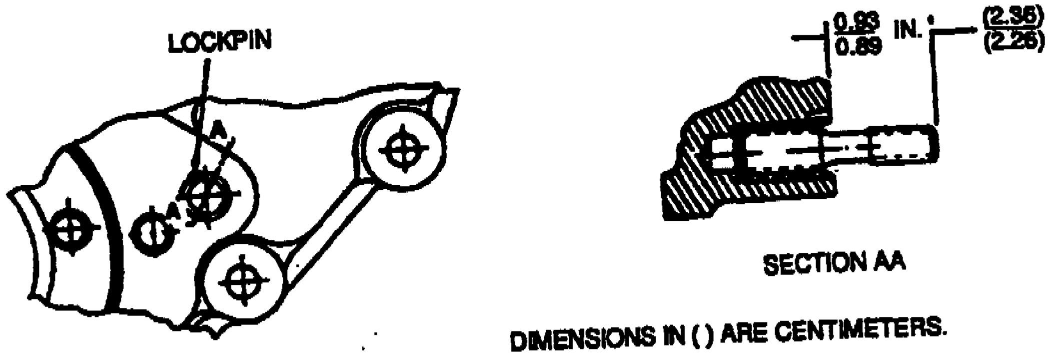


Figure 5-97. Fuel Control Stud Hole Repair.

(15) Touch up reworked area. (Refer to SP Nos. 6023 and 6028 in Appendix E.)

(16) Repair seal surfaces at tachometer drive gearshaft (21, figure 5-93) as follows:

(a) Grind seal surface dimension E1 or D1. Remove material only as required to clean up surface defects and to allow a plating thickness of 0.002 to 0.010 inch (0.005 to 0.025 cm) after grinding.

(b) Steel shotpeen ground area per MIL-S-13165 using shot (cast) size No. 110 (nominal diameter 0.011 inches). Peening intensity to be 5-8A with minimum coverage of 150 percent.

(c) Mask all areas except seal surfaces.

(d) Chrome plate per SP No. 6014 in Appendix E.

(e) Bake plating at 275°F (135°C) for 5 hours (within 2 hours after plating).

(f) Finish machine to the dimensions in table 5-68.

h. Repair drain hole in cover assembly (26, figure 5-93) as follows:

(1) Drill out old holes to a diameter of 0.6823 to 0.6908 inch (1.7330 to 1.7546 cm) and to a depth of 0.55 inch (1.30 cm).

(2) Use a 0.750-16 UNF-3B tap to tap hole to a depth of 0.53 inch (1.35 cm).

(3) Manufacture plug as shown in figure 5-98.

NOTE

Cut threads 0.0005 to 0.001 inch (0.0013 to 0.003 cm) tight to hole.

(4) Manufacture lockpin as shown in figure 5-99.

(5) Apply Loctite "C" or equivalent (item 264, table C–1) to threads of hole.

(6) Install plug into hole 0.0005 to 0.0010 inch (0.0013 to 0.0025 cm) tight on threads.

(7) Machine plug flush with surface of cover.

(8) Remove excess Loctite from cover using acetone (item 13, table C–1).

(9) Drill lockpin hole 0.0607 to 0.0617 inch (0.1542 to 0.1567 cm) diameter and to a depth of 0.210 inch (0.533 cm) as shown in figure 5-100.

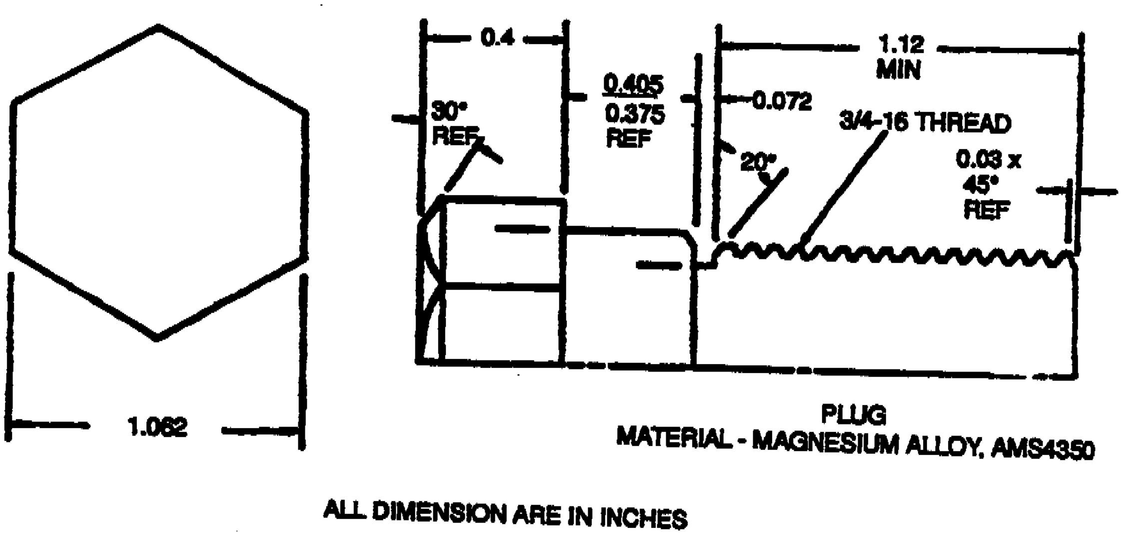


Figure 5-98. Manufacturing of Plug for Cover Drain Hole.

NOTE

Half the hole shall be in parent metal and other half shall be in the plug.

(10) Apply primer (item 253, table C–1) to lockpin, press lockpin below surface of cover, and stake securely.

(11) Drill plug to 0.3838 to 0.3906 inch (0.9749 to 0.9921 cm) diameter to a depth of 0.550 inch (1.397 cm) as shown in figure 5-101.

(12) Counterdrill to 0.450 to 0.455 inch (1.143 to 1.156 cm) diameter to a depth of 0.075 to 0.090 inch (0.191 to 0.229 cm). Maintain centerline distance as shown in figure 5-101.

(13) Countersink 120 degrees to 0.562 to 0.577 inch (1.427 to 1.466 cm) diameter.

(14) Using 0.4375-20NF-3 tap, tap to a depth of 0.550 inch (1.397 cm).

(15) Touch up cover as outlined in SP No. 6005 in Appendix E.

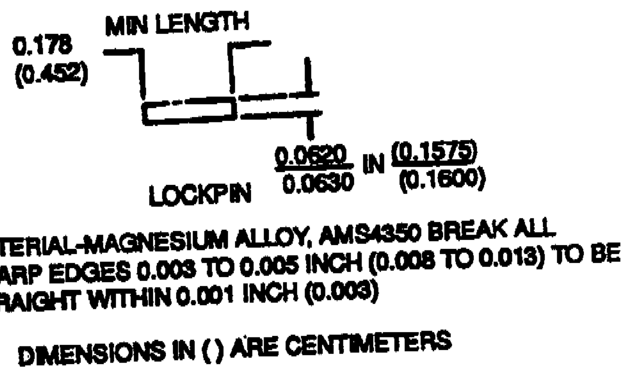


Figure 5-99. Manufacturing of Lockpin for Cover Drain Hole.

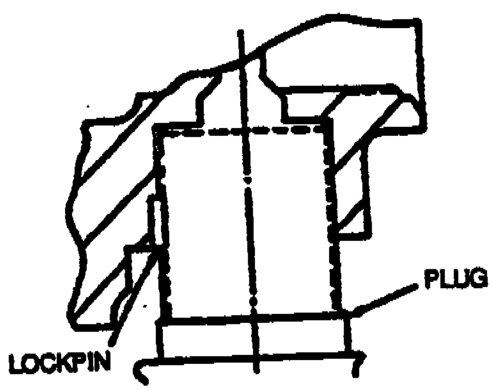
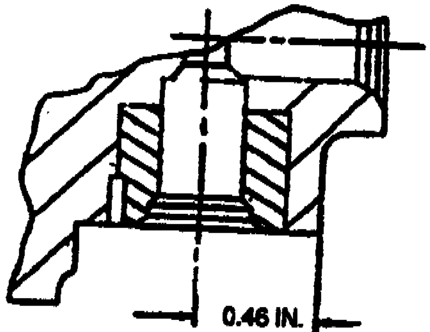


Figure 5-100. Drilling Lockpin Hole.



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-101. Drilling Plug in Drain Hole.

i. Corrosion pitting of less than one square inch inside surface area in the fuel control mount pad and starter mount pad inside diameters may be repaired as follows:

(1) Clean area with a rotary file or by sand blasting to remove all corrosion. Treat area in accordance with Military Specification MIL-M-3171, Type VI.

(2) Using epoxy putty (item 149, table C–1), fill cleaned area and allow to cure at ambient temperature for 12 to 16 hours.

(3) Finish the putty to original contour.

j. Repair defective studs in cover assembly (26, figure 5-93) or housing assembly (48) as follows:

(1) If stud is broken off below surface of flange, it will be necessary to drill out damaged stud using 3/16-inch drill. This will allow sufficient wall thickness to prevent damage to cover or housing but will permit use of a bolt extractor.

CAUTION

When installing or removing studs, grip only flat surface of stud to prevent damage.

NOTE

An electric discharge machine, Type HRP 103, or equivalent, may be used instead of a drill. An electrode, corresponding to a 3/16-inch drill, must then be fabricated.

(2) If stud is broken off 1/2 inch or more above flange remove, using suitable tool.

(3) Clear hole, using clean dry air.

(4) Coat threads of new stud (tables 5-65 or 5-66) with primer (item 253, table C–1).

NOTE

The studs are listed by their standard number and by an oversized letter designation.

(5) Drive stud into cover or housing approximately 1/2 inch (1.27 cm). Check torque. Torque shall be 150 to 165 pound-inches (26790 to 29469 gm cm).

k. Repair defective bearing liners in cover assembly (26, figure 5-93) as follows: (See figure 5-102.)

(1) The following repair applies to liners 1-080-031-01, with 1.1024 to 1.1029 inch (2.8001 to 2.8014 cm) ID, and 1-080-032-01, with 1.1811 to 1.1816 inch (3.000 to 3.0013 cm) ID.

NOTE

All lockpins are part numbered 1-080-086-01.

(a) Machine bearing liner wall to thickness of 0.012 to 0.014 inch (0.030 to 0.036 cm) or until thin enough to buckle and peel away from cover.

(b) Grind two lockpins flush with bore.

(c) Mark position of lockpins on face of cover assembly, using yellow Colorbrite pencil (item 239, table C–1).

(d) Place cover into a temperature-controlled oven at 132°F (56°C) for 30 minutes.

(e) Place new liner into mixture of dry ice and alcohol for 30 minutes.

(f) Apply thin coat of primer (item 253, table C–1) to cover bore on surface that will mate with liner.

CAUTION

When performing following step (g), prevent damage by ensuring that cover is supported below the bore prior to pressing operation.

(g) Place liner (chamfered end down) into position over bore. Using suitable adapter and arbor press, press liner into cover until it bottoms.

(h) Using No. 43 drill, drill two holes through liner, 180 degrees apart and 90 degrees from original holes.

(i) Drill holes to depth of 0.36 (0.91 cm). Ream holes to 0.091 to 0.092 inch (0.231 to 0.234 cm) diameter and 0.33 inch (0.84 cm) depth. Blow chips from holes, using dry compressed air.

CAUTION

In following step (j), use extreme care when driving pins so as not to damage the liner.

(j) Apply thin coat of primer (item 253, table C–1) to lockpins and, using a suitable drift, drive pins flush with ID of liner.

(k) Finish-grind the liner to dimensions shown in 5-102.

NOTE

The 1.1024 to 1.1029 inch (2.8001 to 2.8014 cm) and the 1.1811 to 1.1816 inch (3.0000 to 3.0013 cm) diameters must be square with the "X" surface within 0.0003 inch (0.0008 cm).

(2) The following repair applies to liners 1-080-031-01, with 1.1024 to 1.1029 inch (2.8001 to 2.8014 cm) ID; 1-080-034-01, with 1.3778 to 1.3781 inch (3.4996 to 3.5004 cm) ID; and 1-080-077-01, with 1.6535 to 1.6541 inch (4.1999 to 4.2014 cm).

NOTE

All lockpins are part numbered 1-080-086-01.

Table 5-65. Accessory Drive Gearbox Housing Stud Replacement.

Accessory Gearbox Cover Pad Stud	Accessory Gearbox Housing Stud	Accessory Gearbox Housing Stud
STD3001B8	STD3001B15	1-080-284-01
STD3001B83	STD3001B153	1-080-284-01N
STD3001B87	STD3001B157	1-080-284-01P

"3" indicates 0.003 inch (0.008 cm) oversize diameter
"7" indicates 0.007 inch (0.018 cm) oversize diameter

Table 5-66. Accessory Drive Gearbox Cover Assembly Stud Replacement.

Fuel Control Mounting Stud	Accessory Gearbox Cover Stud	Accessory Gearbox Tachometer Drive Stud
STD3007B8	1-080-283-01	1-080-285-01
STD3007B83	1-080-283-01N	1-080-284-01N
STD3007B87	1-080-283-01P	1-080-285-01P
		1-080-285-01R

"3" indicates 0.003 inch (0.008 cm) oversize diameter
"7" indicates 0.007 inch (0.018 cm) oversize diameter
"R" indicates 0.012 inch (0.030 cm) oversize diameter

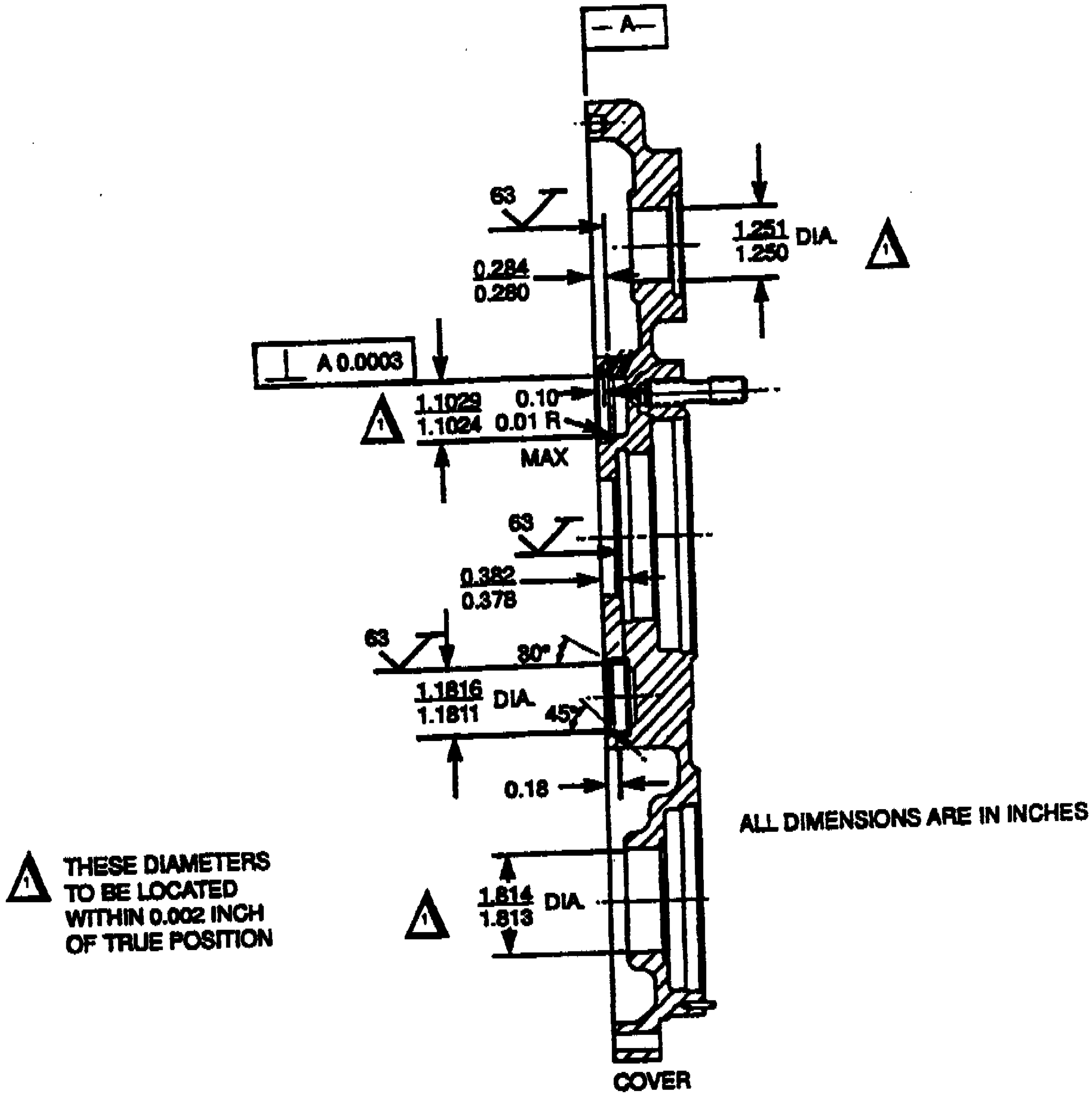


Figure 5-102. Accessory Drive Gearbox Bearing Liner Repair (English) (Sheet 1 of 2).

CAUTION

In following step (a), do not nick or score bore of cover or housing and liner assemblies.

(a) Machine bearing liner wall to a thickness of 0.012 to 0.014 inch (0.030 to 0.036 cm) or until thin enough to buckle and peel away from cover or housing.

(b) Grind two lockpins flush with bore.

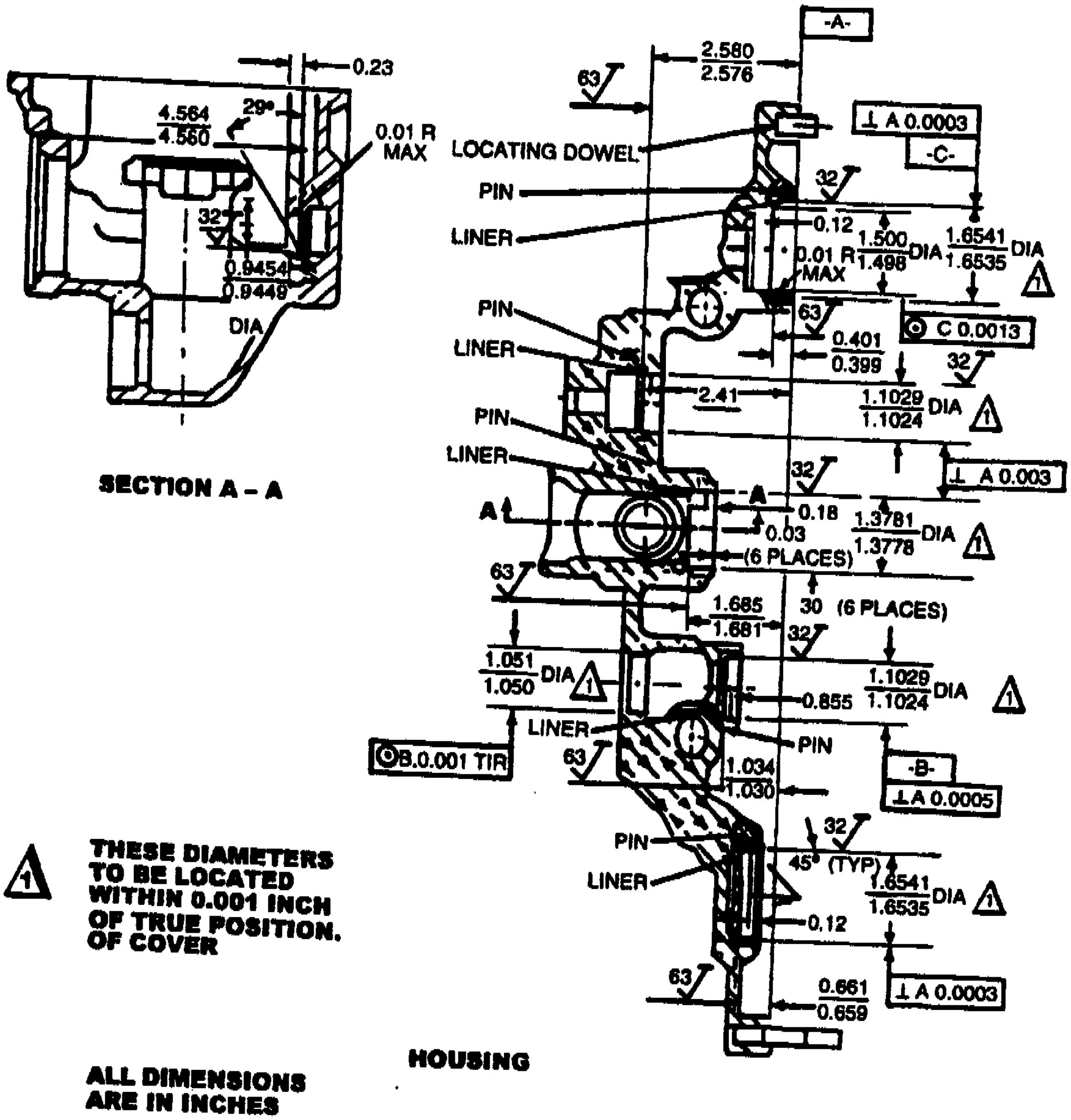


Figure 5-102. Accessory Drive Gearbox Bearing Liner Repair (English) (Sheet 2 of 2).

(c) Mark position on lockpins on face of cover or housing assemblies with Colorbrite pencil (item 239, table C–1).

(d) If it is found that a bearing liner bore is oversize by no more than 0.002 inch (0.005 cm) nickel-plate OD of liner as follows:

1 Nickel-plate, as required, to obtain a plate thickness of no more than 0.001 inch (0.003 cm). (Refer to SP No. 6018 in Appendix E.)

2 Bake at 365° to 385°F (185° to 196°C) for 3 hours.

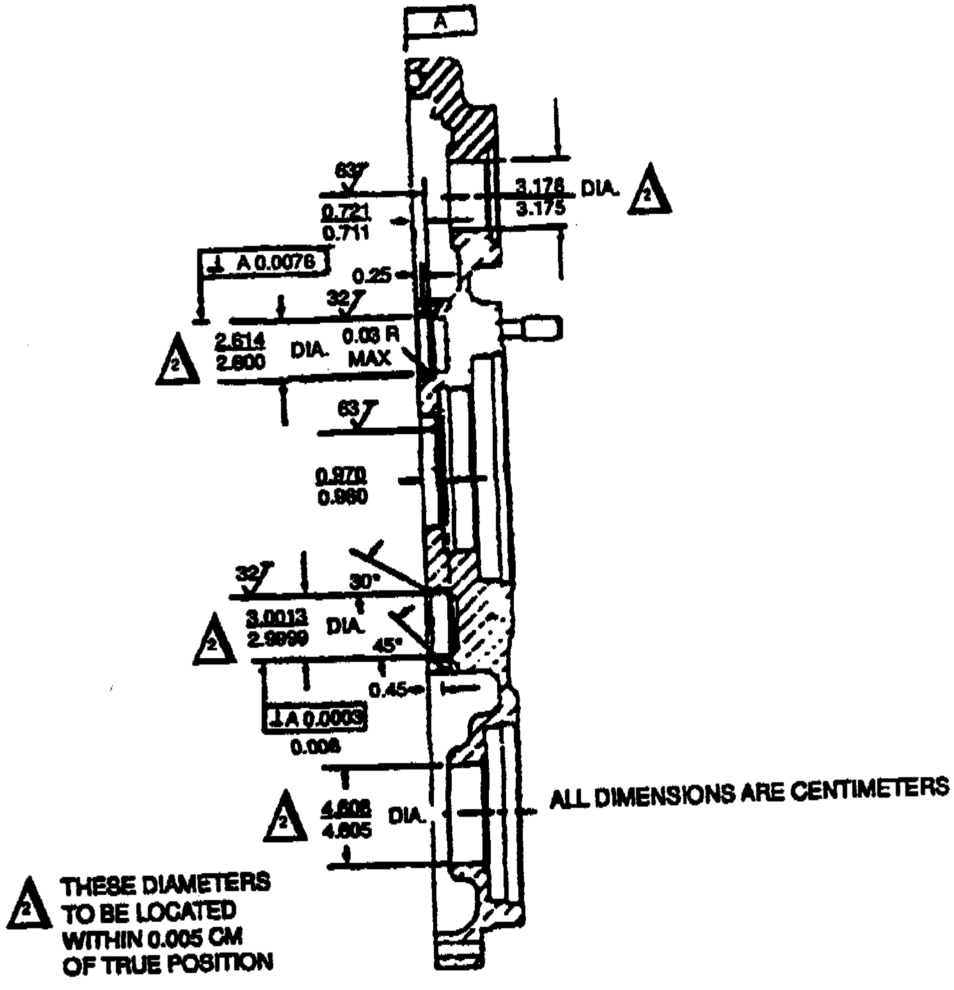


Figure 5-103. Accessory Drive Gearbox Bearing Liner Repair (Metric) (Sheet 1 of 2).

(e) Place cover or housing assembly into a temperature-controlled oven at 132°F (56°C) for 30 minutes.

(f) Place new liner into a mixture of dry ice and alcohol for 30 minutes.

(g) Clean casting bore with chromic acid (item 86, table C–1) and apply a thin coat of primer (item 253, table C–1) to bore on surface that will mate with liner.

CAUTION

When performing following step (h), prevent damage by ensuring that cover is properly supported.

(h) Place liner, chamfered end down, into position over bore. Using suitable adapter and arbor press, press liner into cover or housing assembly until it bottoms.

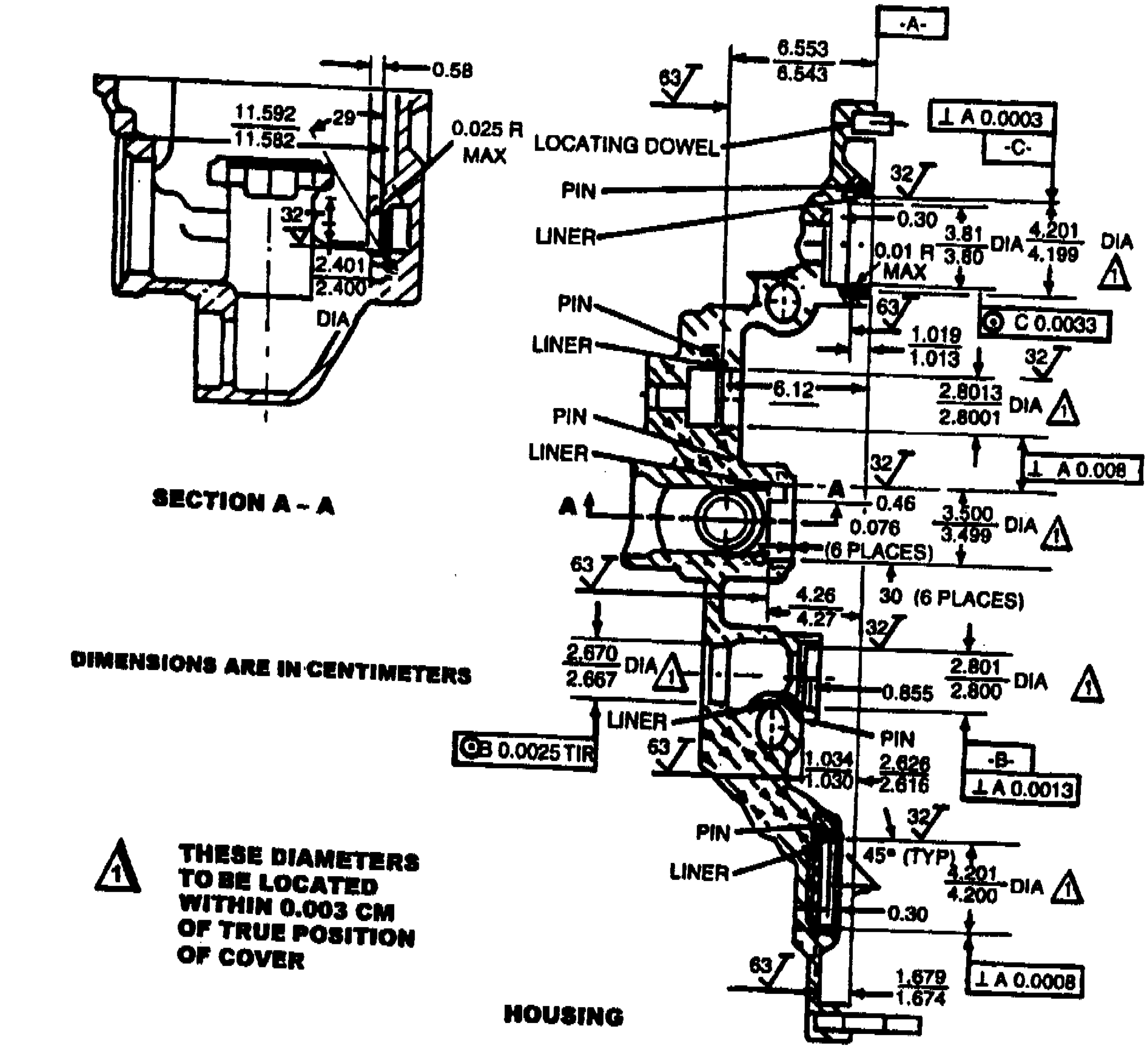


Figure 5-103. Accessory Drive Gearbox Bearing Liner Repair (Metric) (Sheet 2 of 2).

(i) Using No. 43 drill, drill two holes through liner, a minimum of 120 degrees apart and at least 20 degrees from original holes

NOTE

Locate lockpin holes in heavy section of wall.

(j) Drill holes to a depth of 0.360 inch (0.914 cm). Ream holes to 0.091 to 0.092 inch (0.231 to 0.234 cm) diameter, 0.330 inch (0.838 cm) deep. Blow chips from holes, using dry compressed air.

CAUTION

In following step (k), when driving pins, use extreme care to prevent damage to the liner.

(k) Apply a thin coat of primer (item 253, table C–1) to lockpins. Using suitable drift, drive pins flush with ID of liner.

(3) Finish-grind liner to dimensions shown in figure 5-102.

(4) The following repair applies to liner 1-080-087-01.

(a) Machine 0.84 inch (2.13 cm) diameter and 1 .0585 - 1.0595 inch (2.6886 - 2.6911 cm) diameter to 1.0763-1.0810 inch (2.7338 - 2.7457 cm) diameter and a depth of 4.96 inch (12.50 cm) from reference datum line (see figure 5-104).

(b) Treat bore per MIL-M-3171, Type VI.

WARNING

FLIGHT SAFETY PART

Fluorescent penetrant inspection is flight safety critical.

(c) Fluorescent penetrant inspect reworked areas.

(d) Fabricate bushing to OD dimension determined by minimum clean up of hole in gearbox housing. Maintain a 0.0005 inch (0.0013 cm) to 0.0015 inch (0.0038 cm) pinch fit (see figure 5-105).

(e) Install bushing, drill for pinning (see figure 5-106) and pin bushing with pin P/N 1-080-086-01.

(f) Locate slanted hole and drill through installed bushing.

(g) Finish rework per figure 5-106.

l. Repair damaged bearing oil scavenge port as follows: (See figure 5-107.)

(1) Use 0.5649 to 0.5730 inch (1.4348 to 1.4554 cm) diameter drill to drill oil scavenge port 0.460 inch (1.168 cm) deep.

(2) Use 0.625-18 UNF-3B tap to tap oil port 0.460 inch (1.168 cm).

(3) Counterbore hole 0.634 to 0.636 inch (1.610 to 1.615 cm) and 0.120 inch (0.305 cm) deep.

(4) Use a 0.460 inch (1.168 cm) long magnesium alloy (item 201, table C–1) plug with 0.625-18 thread and with shoulder diameter, 0.634 to 0.636 inch (1.610 to 1.615 cm) by 3/8 inch long.

NOTE

Machine plug, to obtain 0.0005 to 0.0010 inch (0.0013 to 0.0025 cm) tight fit at shoulder diameter of port, and to seat against counterbore face.

(5) Undercut plug shank, at end of 3/8 inch shoulder length, 0.072 inch (0.183 cm) wide to a 0.541 to 0.545 inch (1.374 to 1.384 cm) diameter.

(6) Coat tapped hole and plug with primer (item 253, table C–1).

(7) Install plug, machine flush with surface, and stake securely.

(8) Use 0.3299 to 0.3372 inch (0.8379 to 0.8565 cm) diameter drill to drill hole, 0.460 inch (1.168 cm) deep, in plug.

(9) Use 0.3750-24NF-3B tap to tap hole 0.460 inch (1.168 cm) deep.

(10) Machine plug shoulder to dimension shown in figure 5-107.

(11) Touch up reworked areas.

m. Repair damaged starter pad lip of accessory gearbox cover assembly (26, figure 5-93), at 4.125 to 4.127 inch (10.478 to 10.483 cm) ID by blending if less than 25% of lip is damaged. If more than 25% of lip is damaged, or ID is damaged, install liner as follows:

(1) Bore 4.340 to 4.360 inch (11.024 to 11.074 cm) diameter, with a 0.030 inch (0.076 cm) corner radius, to a depth of 0.250 inch (0.635 cm) as shown in figure 5-108.

(2) Using magnesium alloy (item 201, table C–1), fabricate a special magnesium sleeve as shown in figure 5-108.

NOTE

Diameter A, figure 5-108, shall be 0.004 to 0.006 inch (0.010 to 0.015 cm) tight fit with 4.340 to 4.360 inch (11.024 to 11.074 cm) bore diameter.

(3) Apply Loctite A or equivalent (item 263, table C–1) to sleeve, and install sleeve.

(4) Machine to given dimensions.

(5) Touch up reworked areas in accordance with SP No. 6027 in Appendix E.

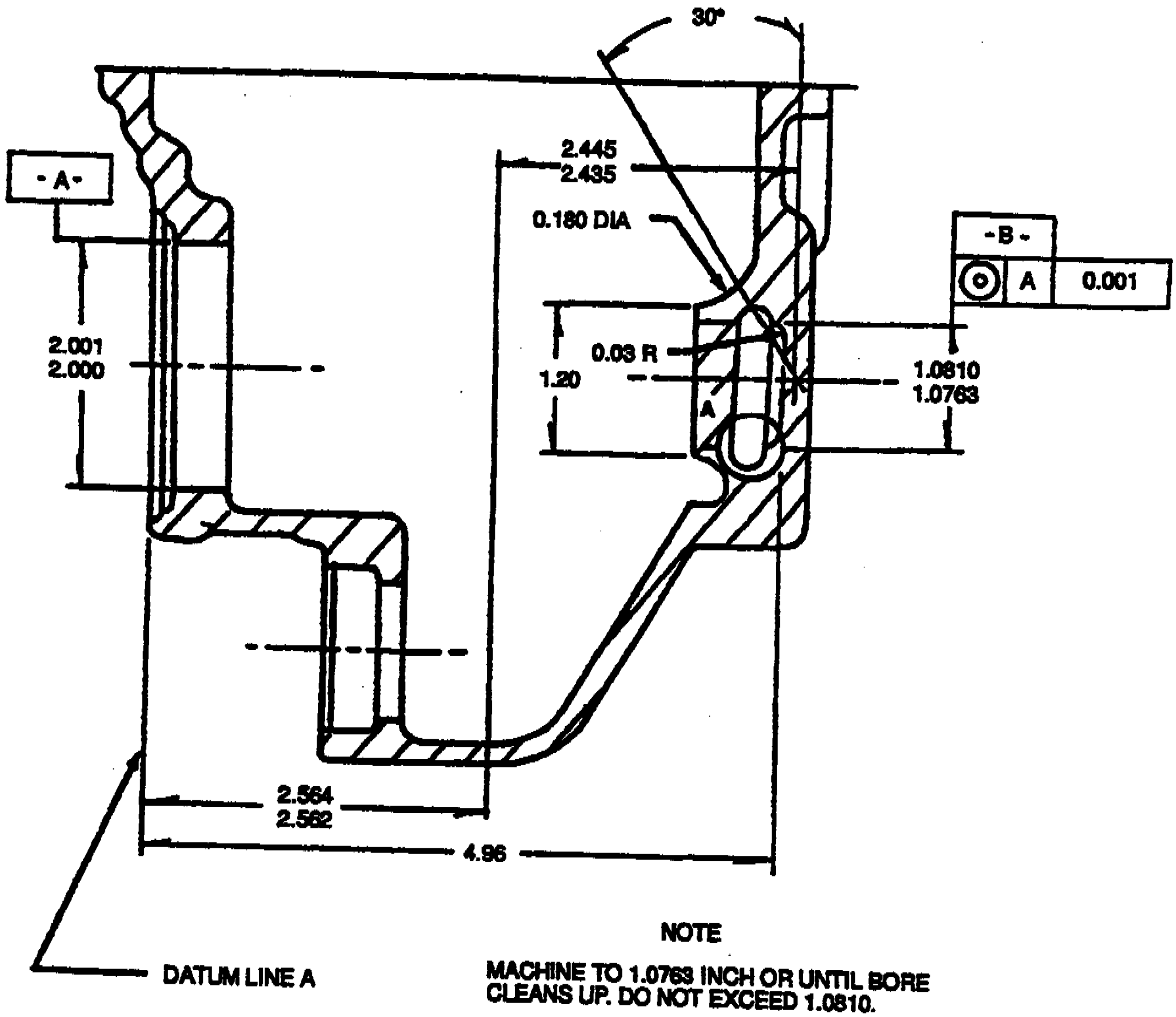


Figure 5-104. Radial Bearing Bore Area.

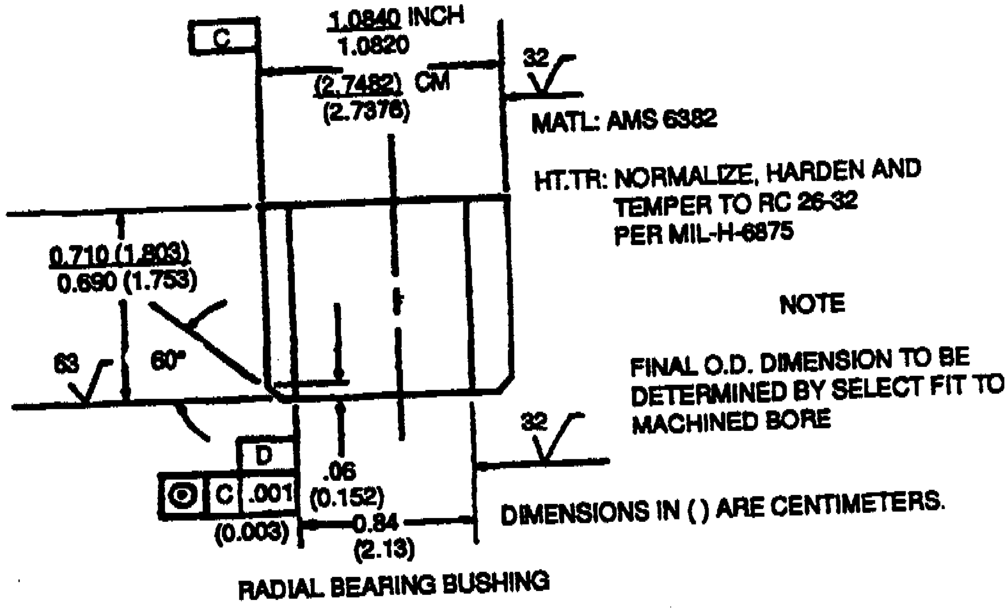


Figure 5-105. Radial Bearing Bushing.

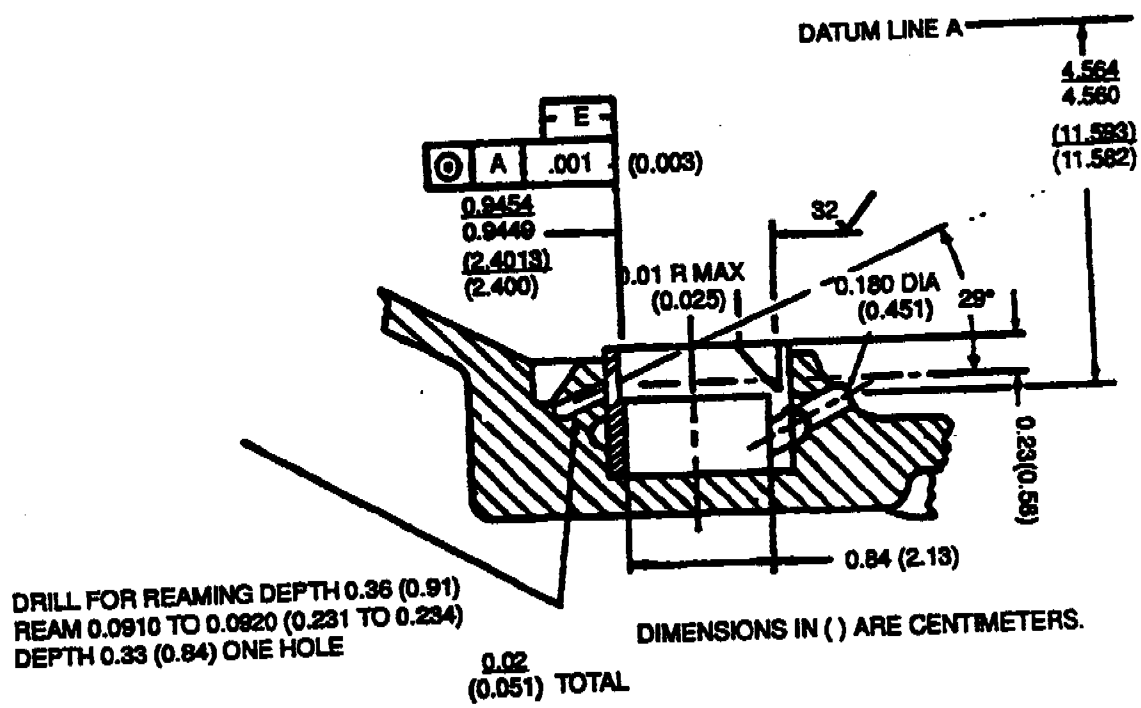


Figure 5-106. Bushing Installation.

n. Repair defective rivets, shaft gear, or gear on oil-air separator drive gearshaft assembly (30, figure 5-93) as follows: (See detail B, figure 5-109.)

(1) Using 0.125 inch (0.318 cm) drill, drill out six rivets (1)

(2) Carefully separate gear (3) from shaftgear (2).

(3) Replace defective component.

CAUTION

In following step (4), do not damage surface of gears when peening rivets.

NOTE

Angular relationship between teeth of gear (3) and spline of shaftgear (2) may vary freely.

(4) Align rivet holes of gear and shaftgear. Using new rivets (1), assemble oil-air separator drive gearshaft assembly. Back up rivet with suitable tool, and form head by peening.

NOTE

Elongation of any rivet hole in gears greater than original 0.128 inch diameter is unacceptable.

(5) Ensure that rivet manufactured head interfaces only with chamfered holes in shaft gears.

(6) A 0.0015 inch feeler gage shall not be allowed to pass under any portion of manufactured head. Replace rivet if discrepant.

(7) Upset head height shall be between 0.062 to 0.087 inch. Minimum upset head diameter is 0.165 inch.

o. Repair worn surfaces on 0.5906 to 0.5910 inch diameter or 1.1812 to 1.1815 inch diameter of accessory gear assembly (37, figure 5-93) where up to 0.005 inch maximum plate thickness is required. (Refer to figure 5-110.)

(1) Machine, if necessary, to obtain a 0.002 inch (0.005 cm) minimum plate thickness after final machining.

(2) Chrome-plate as outlined in SP No. 6014 in Appendix E.

(3) Bake at 255° to 275°F (124° to 135°C) for 5 hours.

(4) Machine to dimensions given.

p. Repair damaged splines or splines worn in excess of 0.012 inch (0.030 cm) on accessory gear assembly (37, figure 5-93) as follows:

(1) Remove plug (1-180-159-01) from gear assembly and retain for reinstallation after repair.

(2) Remove worn splines of gear assembly by machining as shown in figure 5-111. The diameter 1.0800-1.0795 inch is minimum diameter. Remove only material required to clean up this surface. Maximum diameter after machining shall not exceed 1.0960 inch.

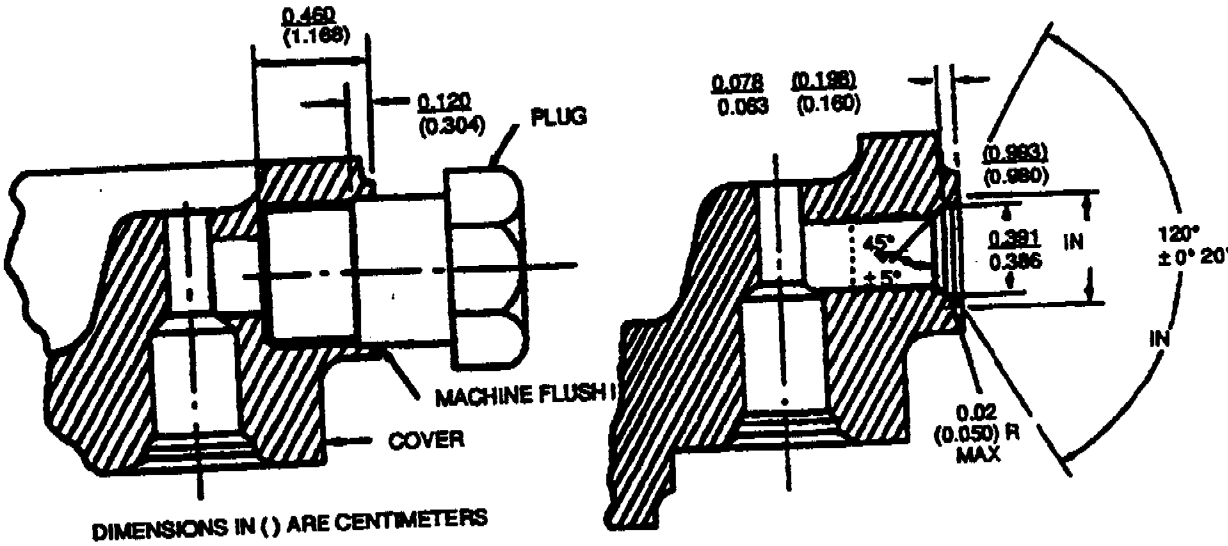
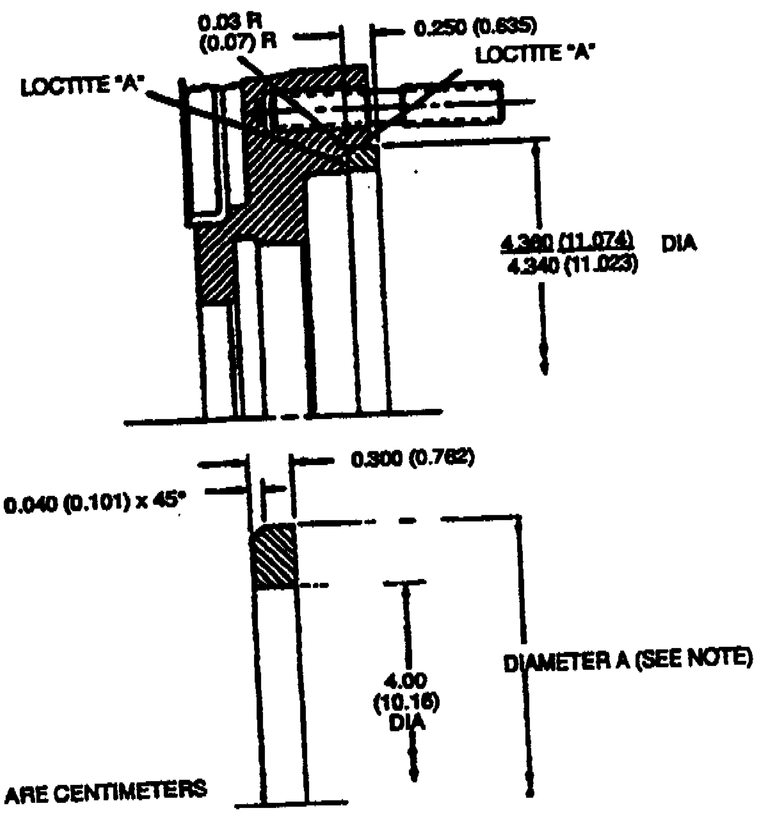
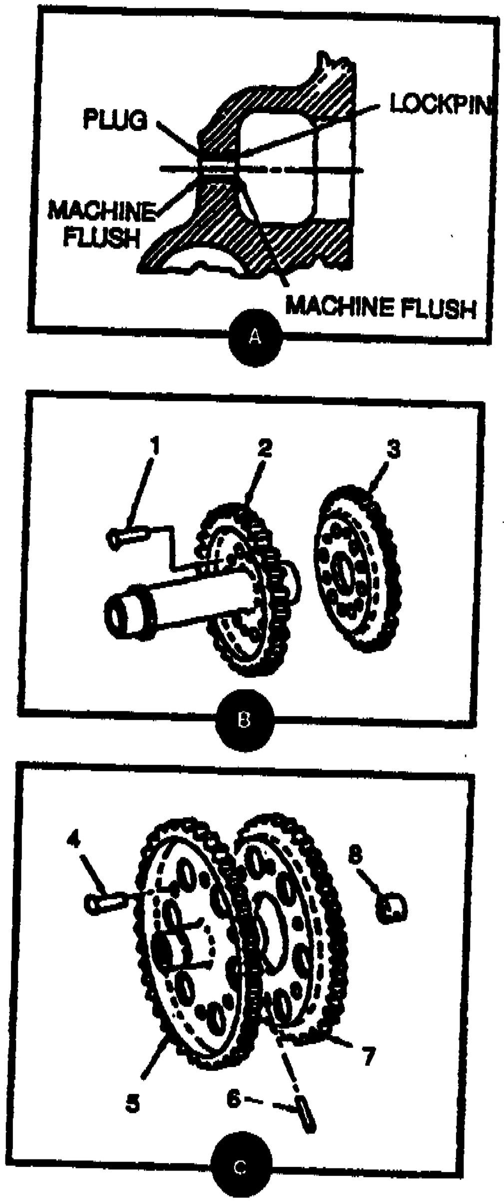


Figure 5-107. Repair of Bearing Oil Scavenge Ports.



NOTE: DIAMETER A SHALL BE 0.004 TO 0.006 INCH (0.010 TO 0.015) TIGHT FIT WITH 4.30 TO 4.360 INCH (11.023 TO 11.074) BORE DIAMETER

Figure 5-108. Accessory Gearbox Cover Assembly Starter Pad Lip Repair.



1. RIVET (STD3036-32)
2. SHAFTGEAR (1-080-154-04)
3. GEAR (1-080-253-01)
4. RIVET (STD3036-32)
5. SHAFTGEAR (1-080-044-03)
6. PIN (MS 171499)
7. GEAR (1-080-251-01)
8. CUP (1-080-046-01)

Figure 5-109. Baffle Mounting Tapped Hole and Gear Repair Areas.

NOTE

The 1.06 inch reference length is non-critical and when machining a previously welded spline this length may be reduced to 1.04 inch.

WARNING

FLIGHT SAFETY PART

Magnetic particle inspection is flight safety critical.

(3) Perform magnetic-particle inspection on machined area. If cracks or crack like indications are evident, do not attempt to repair.

(4) Machine replacement spline blank of steel (item 305, table C–1) shown in figure 5-112. Ensure that material used has been heat-treated as follows:

NOTE

The 0.020 inch (0.050 cm) radius (notch) aft of the external spline may be machined subsequent to welding and joint inspection.

(a) Normalize at 1,725° to 1,775°F (941° to 968°C) for one hour and allow to air cool.

(b) Temper at 975° to 1,025°F (523° to 550°C) for 2 hours and allow to air cool.

(c) Check for hardness of Rockwell C24 to C32.

NOTE

Do not final-grind large diameter, short hub, or weld fraying surface until it is matched to the gear.

(5) Copper-plate all areas except those to be carburized in accordance with AMS2418. (See figure 5-112.)

(6) Gas-carburize areas shown in figure 5-112 to a depth of 0.023 to 0.031 inch (0.058 to 0.079 cm) case depth. (Refer to SP No. 6029 in Appendix E.)

NOTE

A test piece of the same material should be included with the spline blank for determining case depth.

(7) Strip copper plating in accordance with AMS2418.

(8) Copper-plate entire spline blank in accordance with AMS2418.

(9) Harden spline blank at 1,475° to 1,500°F (800° to 814°C) for 30 minutes and oil quench.

(10) Degrease spline blank. (Refer to SP No. 3002 in Appendix E.)

(11) Cool spline blank to -65°F (-54°C) for one hour; then allow to warm to room temperature.

(12) Strip copper plating in accordance with AMS2418.

(13) Temper spline blank at 250° to 275°F (120° to 135°C) for 2 hours; then allow to air-cool to room temperature.

(14) Check spline blank hardness as follows:

(a) Case hardness for Rockwell 30N-75.5 to 80.0.

(b) Core hardness for Rockwell A-66.5 to 70.5.

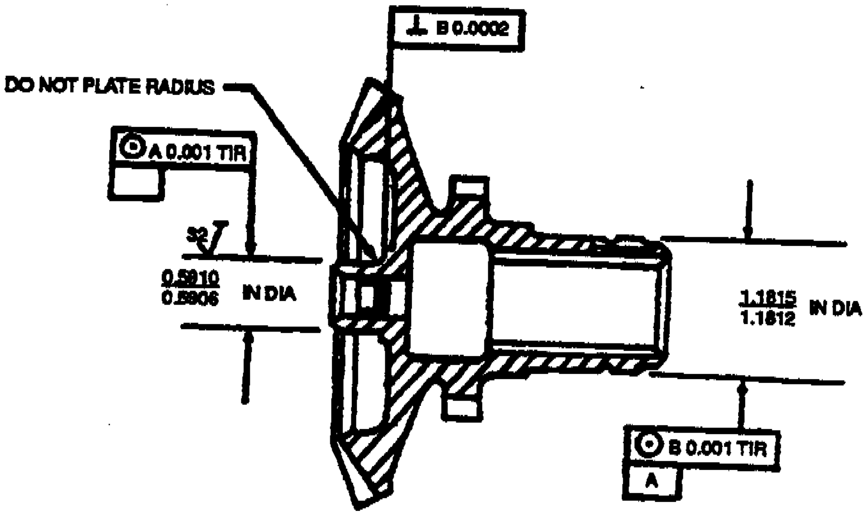


Figure 5-110. Gear Assembly - Repair Area.

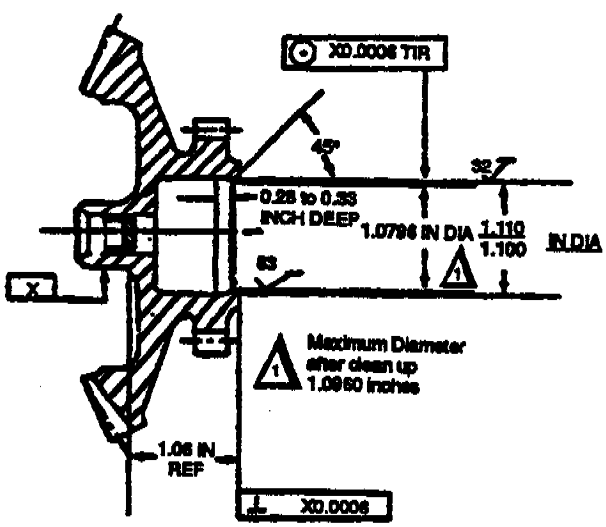
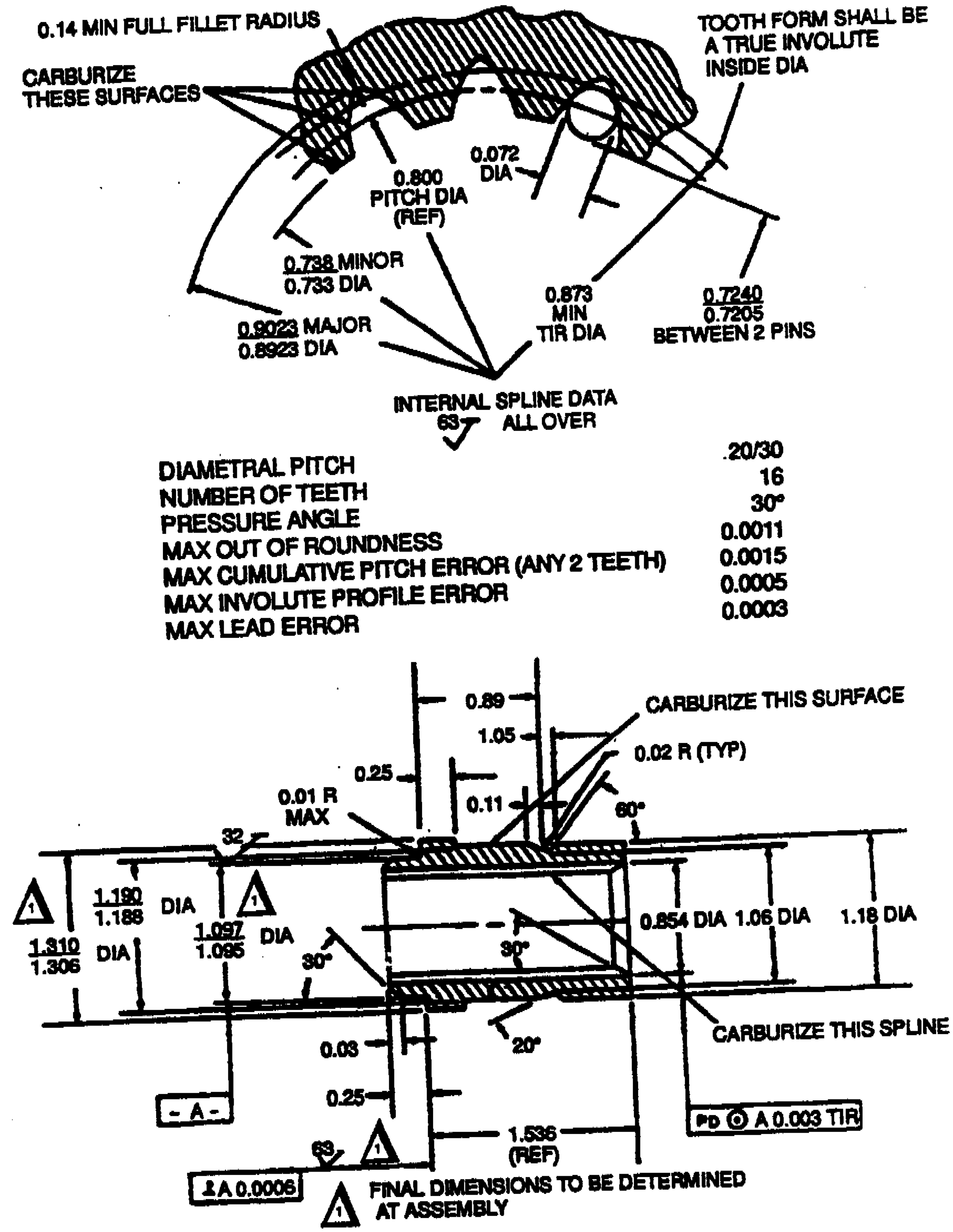


Figure 5-111. Removal of Worn Spline.



ALL DIMENSIONS ARE IN INCHES

Figure 5-112. Replacement of Spline Blank (English).

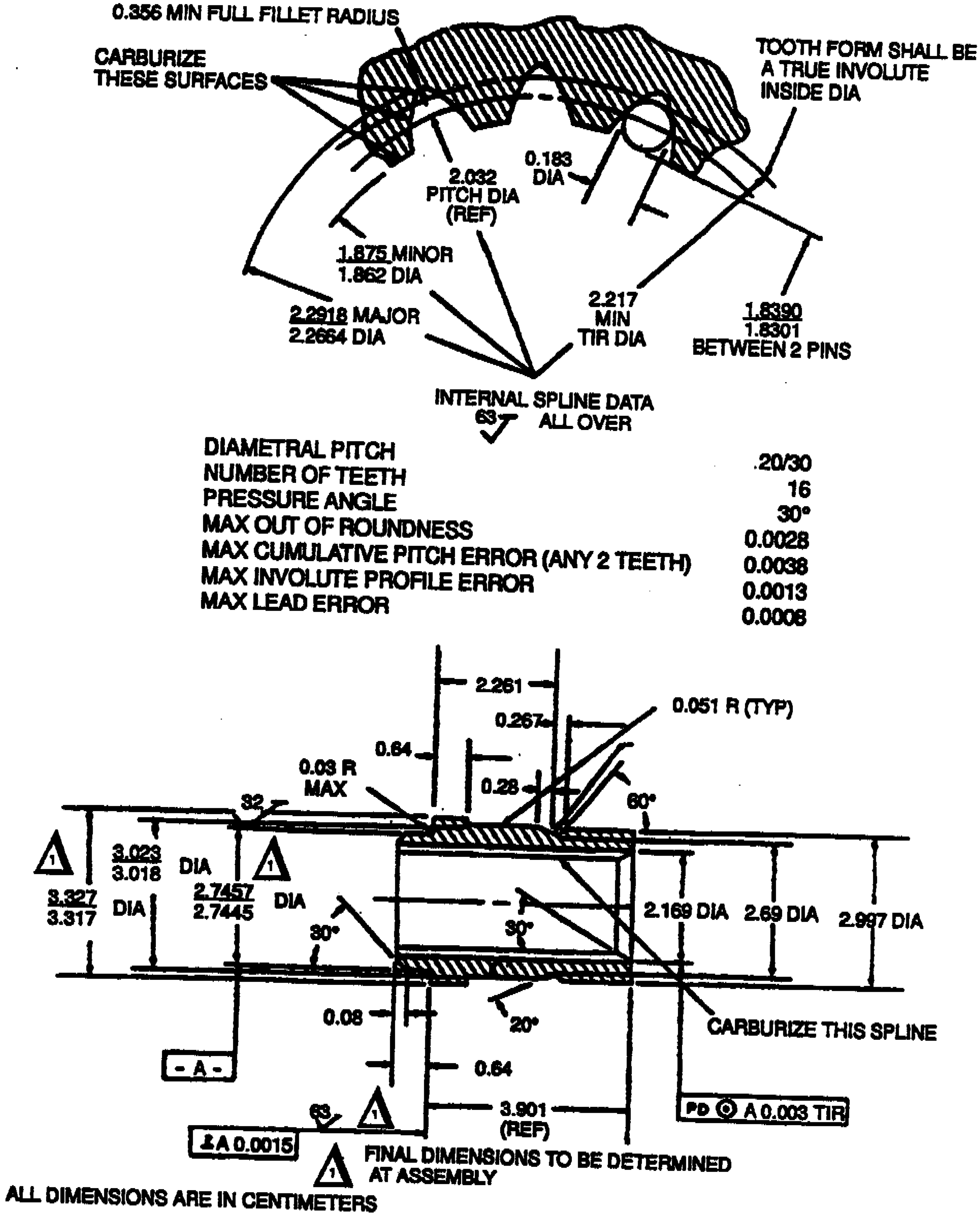


Figure 5-113. Replacement of Spline Blank (Metric).

(15) Lap spline teeth as shown in figure 5-111.

(16) Final-grind large diameter, short hub, and weld fraying surface as shown in figure 5-112 so that a 0.0005 to 0.0010 inch press fit exists between spline blank and the previously machined gear.

(17) Clean gear and replacement spline using acetone (item 13, table C–1.)

CAUTION

Do not freeze the spline in an attempt to facilitate assembly. Freezing could cause condensation and subsequent contamination of the joint interface.

(18) Heat gear to 265°F (130°C) for 20 minutes.

(19) Remove gear from heat source and, while hot, insert and press in mating end of spline until it seats, using tool shown in figure 5-114 and arbor press.

(20) Prepare gear assembly for electron-beam welding as outlined in SP No. 5005 in Appendix E.

(21) Secure gear assembly on rotary fixture so that impact point of electron-beam weld tracks along joint circumference.

(22) Electron-beam tack-weld gear assembly joint with approximately 0.25 inch (0.64 cm) long tacks, four places around circumference, at 12-, 6-, 9-, and 3-o'clock positions (in that sequence), as follows

(a) Tack-weld with settings developed in SP No. 5005, step a (3)., in Appendix E, except with milliamperage reduced to about 50 percent, and speed increased to about twice that selected for joint.

(b) End each tack with milliamperage decay, rotating part until decay is complete.

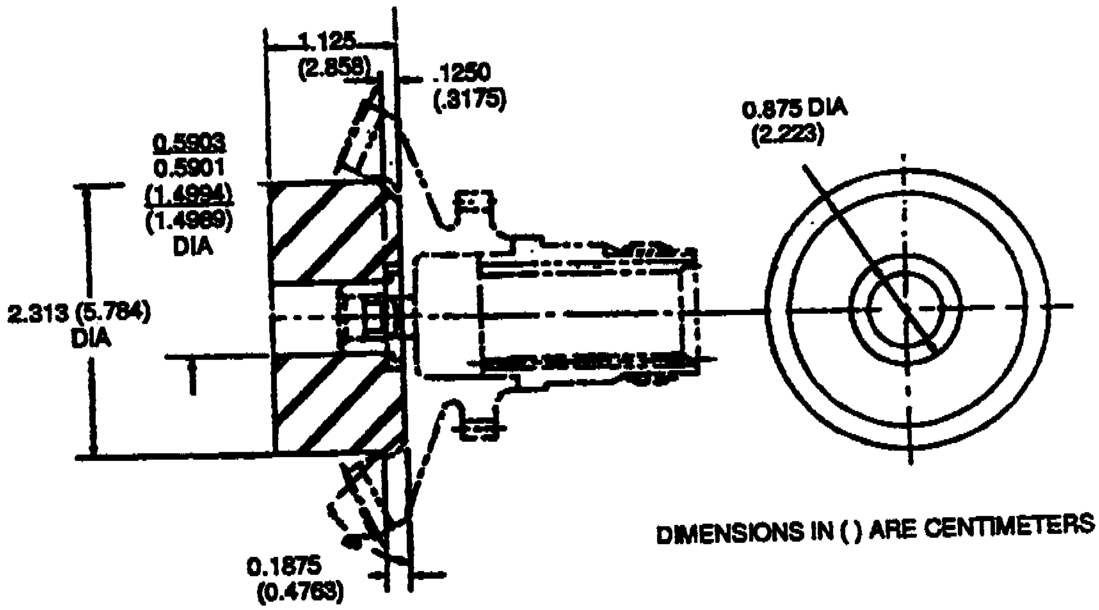


Figure 5-114. Gear Assembly Tool.

(23) Electron-beam weld entire joint, starting and ending weld at location of second tack-weld made in proceeding step (22)as follows:

(a) Weld with settings developed in SP No. 5005, step a(3) in Appendix E, except with milliamperage reduced to about 50 percent and speed increased to about twice that selected for joint.

(b) End weld with milliamperage decay, rotating part until decay is complete.

(24) Electron-beam weld entire joint with optimum setting. (Refer to SP No. 5005 in Appendix E.) End weld with milliamperage decay, rotating part until decay is complete.

WARNING

FLIGHT SAFETY PART

Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.

(25) Machine gear assembly as shown in figure 5-115 and reinspect, by magnetic-particle method, for cracks and crack like indications. Crack and crack like indications are not acceptable.

(26) Apply Loctite A or equivalent (item 263, table C–1) to threads of plug and reinstall plug (1-080-159-01) removed in step (1).

NOTE

Ensure adequate cleaning, before Loctite application, and adequate curing in accordance with Loctite application instructions.

q. Replace defective rivets, pin, and cup on oil pump drive gearshaft assembly (47, figure 5-93) as follows: (See detail C, figure 5-109.)

(1) Using 0.125 inch (0.318 cm) drill, drill out six rivets (4).

(2) Carefully separate gear (7) from shaftgear (5).

(3) Remove cup (8) by driving out pin (6), using a suitable drift and mallet.

(4) Insert new cup and install new pin. Stake both sides of pin.

CAUTION

In following step (5), do not damage surface of gears when peening rivet.

(5) Align rivet holes of gear and shaftgear and, using new rivets, assemble oil pump drive gearshaft assembly. Back up rivet with suitable tool and head over by peening.

NOTE

Angular relationship between teeth of gear (7) and spline of shaftgear (5) may vary freely.

NOTE

Elongation of any rivet hole in gears greater than original 0.128 inch diameter is unacceptable.

(6) Ensure that rivet manufactured head interfaces only with chamfered holes in shaftgears.

(7) A 0.0015 inch feeler gage shall not be allowed to pass under any portion of manufactured head. Replace rivet if discrepant.

(8) Upset head height shall be between 0.062 and 0.087 inch. Minimum upset head diameter is 0.165 inch.

r. Repair damaged plating on oil pump drive gearshaft assembly (47, figure 5-93)as follows: (See figure 5-117).

(1) Depending on plate thickness required, nickel- or chrome- plate 0.5905 to 0.5908 inch (1.4999 to 1.5006 cm) OD. (See figure 5-117.) If thickness required after final grind is 0.001 inch (0.025 cm) or less, nickel-plate as outlined in SP No.6018 in Appendix E. If thickness required after final grind is 0.002 to 0.010 inch (0.005 to 0.025 cm), chromeplate as outlined in SP No.6014 in Appendix E. Bake at 225° to 275°F (107° to 135°C) for 5 hours. Machine to dimensions given.

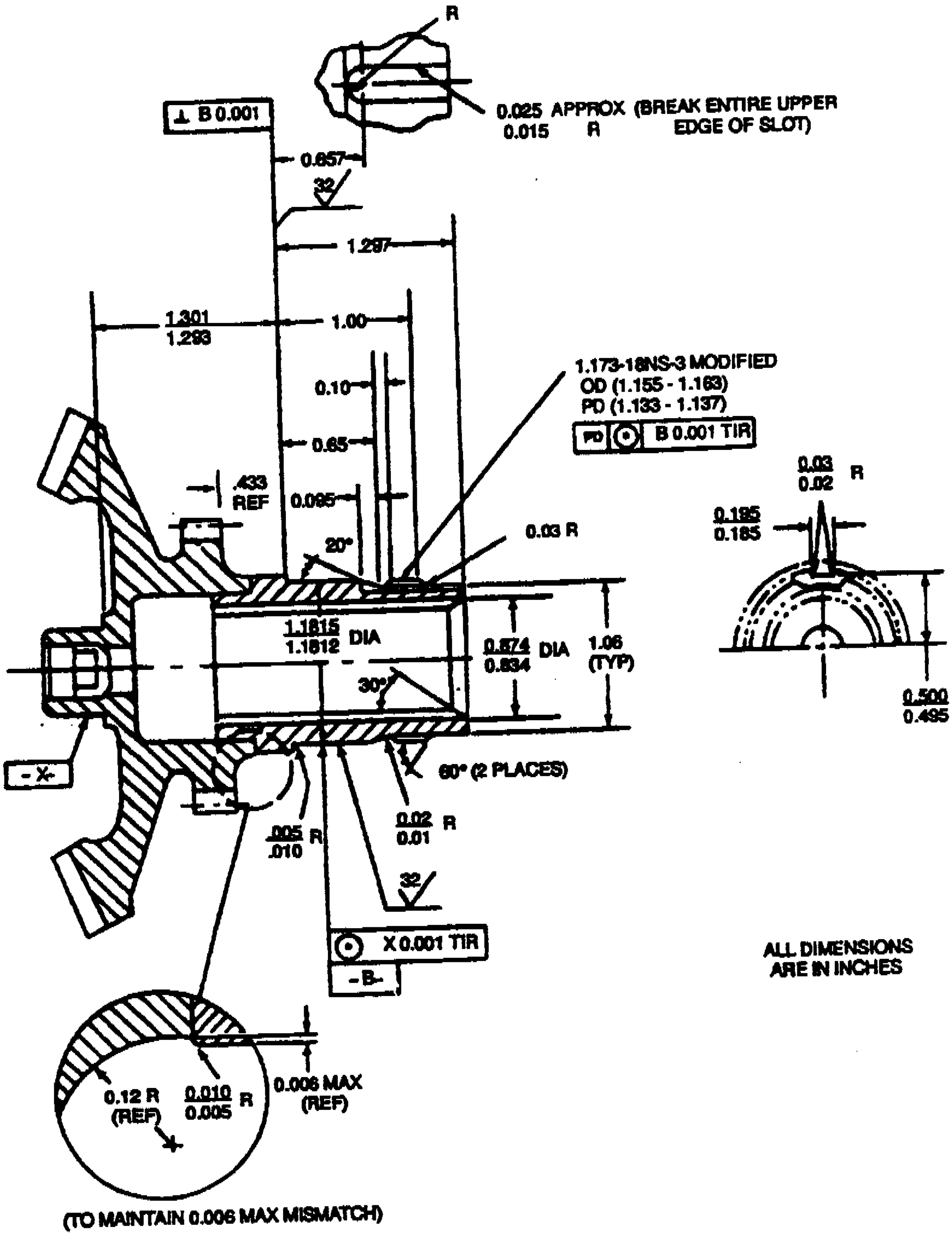


Figure 5-115. Assembly and Finish Machine of Gear. (English)

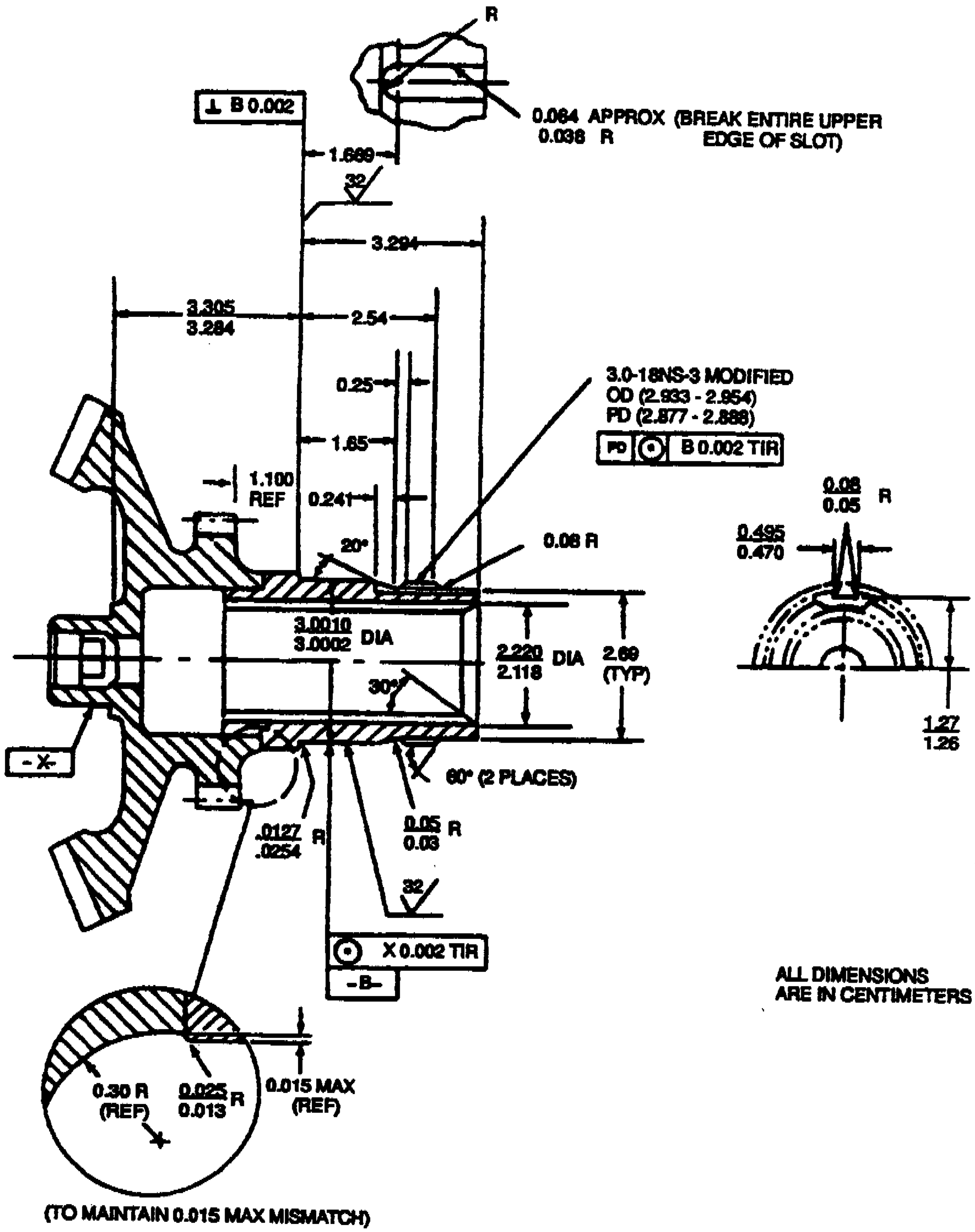


Figure 5-116. Assembly and Finish Machine of Gear (Metric).

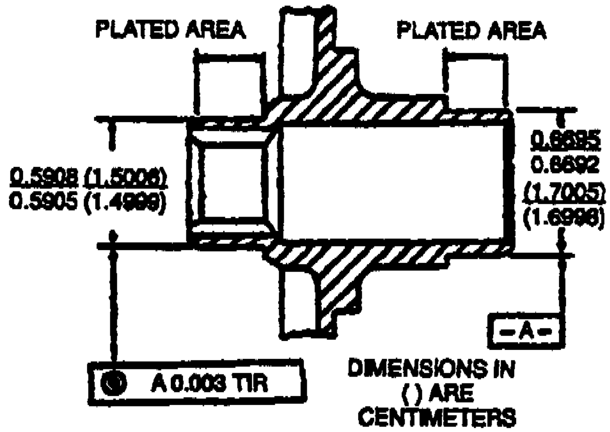


Figure 5-117. Oil Pump Drive Gearshaft Assembly - Plating Area.

(2) Depending on plate thickness required, nickel- or chrome- plate 0.6692 to 0.6695 inch (1.6998 to 1.7005 cm) OD. (See figure 5-117.) If thickness required after final grind is 0.001 inch (0.003 cm) or less, nickel-plate as outlined in SP No. 6018 in Appendix E. If thickness after final grind is 0.002 to 0.010 inch (0.005 to 0.025 cm) chrome-plate as outlined in SP No. 6014 in Appendix E. Bake at 225° to 275° F (107° to 135° C) for 5 hours. Machine to dimensions given.

s. Repair damaged pressure port tapped hole in housing assembly (48, figure 5-93) as follows: (See figure 5-118)

(1) Using a 0.6823 to 0.6908 inch (1.7330 to 1.7546 cm) diameter drill, drill pressure port hole through material.

(2) Using a 0.750-16UNF-3B tap, tap pressure port hole through material.

(3) Using magnesium alloy (item 201, table C–1) 1.062 inch (2.697 cm) diameter hex stock, fabricate a plug with 0.750-16 thread 1.12 inch (2.84 cm) long.

NOTE

Machine thread size to obtain 0.0005 to 0.0010 inch (0.0013 to 0.0025 cm) tight fit in tapped hole.

(4) Undercut plug shank at end of 1.12 inch (2.84 cm) thread length, 0.072 inch (0.183 cm) wide to 0.657 to 0.661 inch (1.669 to 1.679 cm) diameter.

(5) Apply Loctite A (item 263, table C–1) to threads of hole.

(6) Install plug, machine flush at both surfaces.

(7) Using a 0.0607 to 0.0617 inch (0.1542 to 0.1567 cm) diameter drill, drill a lockpin hole 0.21 inch (0.53 cm) deep.

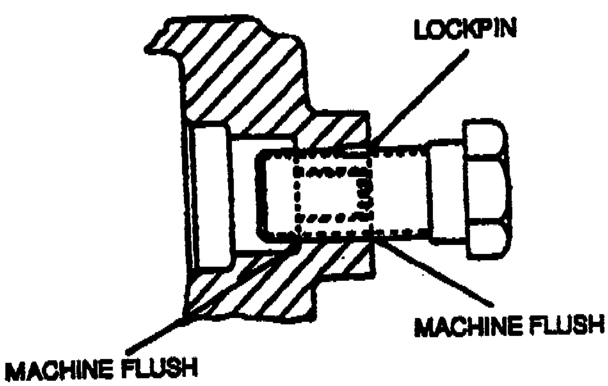


Figure 5-118. Pressure Port Tapped Hole Repair Area.

NOTE

When drilling lockpin hole, half of hole shall extend into parent metal and the other half shall extend into plug.

(8) Using magnesium alloy (item 201, table C–1) 0.0620 to 0.0630 inch (0.1575 to 0.1600 cm) diameter round stock, fabricate a lockpin to a length of 0.188 inch (0.478 cm).

(9) Install pin flush with or below surface, and stake securely.

(10) Using a 0.3838 to 0.3906 inch (0.9749 to 0.9921 cm) diameter drill, drill pressure port hole in plug through material.

(11) Using a 0.450 to 0.455 inch (1.143 to 1.156 cm) diameter drill, counterdrill to 0.075 to 0.090 inch (0.191 to 0.229 cm) deep.

(12) Countersink 120 degrees to 0.562 to 0.577 inch (1.427 to 1.466 cm) diameter.

(13) Using a 0.4375-20NF-3 tap, tap pressure port hole through material.

(14) Touch up reworked area as outlined in SP No. 6027 in Appendix E.

(15) Apply 70 psig (4921 gm sq cm) of air pressure to housing, and check for leaks. Leakage is not acceptable.

t. Repair damaged baffle mounting tapped hole in housing assembly (48, figure 5-93) as follows: (See detail A, figure 5-109.)

(1) Using a 0.3299 to 0.3372 inch (0.8379 to 0.8565 cm) diameter drill, drill baffle mounting hole through material.

(2) Using a 0.375-24UNF tap, tap baffle mounting hole through material.

(3) Using magnesium alloy (item 201, table C–1) 0.625 inch (1.588 cm) diameter hex stock, fabricate a plug with 0.375-24 thread, 0.750 inch (1.905 cm) long.

NOTE

Machine thread size to obtain 0.0005 to 0.0010 inch (0.0013 to 0.0025 cm) tight fit in tapped hole.

(4) Coat tapped hole and plug with primer (item 253, table C–1).

(5) Install plug; machine flush at both surfaces.

(6) Using 0.0607 to 0.0617 inch (0.1542 to 0.1567 cm) diameter drill, drill lockpin hole, 0.100 inch (0.254 cm) deep.

NOTE

Use of a 0.0620 to 0.0630 inch (0.1575 to 0.1600 cm) diameter drill is permissible if more readily available. When drilling lockpin hole, half of hole shall extend into parent metal and other half shall extend into plug.

(7) Using magnesium alloy (item 201, table C–1) 0.0620 to 0.0630 inch (0.1575 to 0.1600 cm) diameter round stock, fabricate lockpin to length of 0.125 inch (0.318 cm).

(8) Install pin flush with surface, and stake securely.

(9) Use 0.2113 to 0.2190 inch (0.5367 to 0.5563 cm) diameter drill to drill baffle mounting hole in plug through material.

(10) Countersink hole 90°.

(11) Use 0.250-28UNF-3B tap to tap baffle mounting hole through material.

(12) Touch up reworked area as outlined in SP No. 6027 in Appendix E.

u. Repair damaged threads of chip detector port in accessory gearbox housing assembly (48, figure 5-93) as follows:

(1) Using a 0.687 inch (1.745 cm) diameter drill, drill chip detector hole through material.

(2) Counterbore hole 0.875 to 0.878 inch (2.223 to 2.230 cm) diameter to a depth of 0.279 to 0.289 inch (0.709 to 0.734 cm) using counterbore tool, P/N RCA 56-687, or equivalent.

(3) Using a 0.750-16NC-3 tap, tap hole through material.

(4) Install insert, P/N R1711SX-9 or equivalent, and packing, NAS1594-115.

(5) Install lock ring, P/N RLRR56SU-8, or equivalent. Position lock ring serrations in area of most parent material.

WARNING

FLIGHT SAFETY PART

Fluorescent penetrant inspection is flight safety critical.

(6) Perform a visual and fluorescent-penetrant inspection of reworked area. Cracks are not acceptable.

v. Repair damaged mounting flange holes on the accessory gearbox housing assembly (48, figure 5-93) as follows:

(1) If any of the surfaces indicated by an "X" (see figure 5-119) are worn in excess of 0.030 inch, which can be caused by washer depressions, all four of the spot faced mounting surfaces must be inspected.

(2) If either of the two counterbored mounting pads measures less than 3.100 inch thick, as shown in figure 5-119 (sections A-A and B-B) or the two thin pads measure less than 0.514 inches (section C-C), then the accessory gearbox housing is not usable.

CAUTION

The minimum material thickness of the mounting areas must be maintained.

(3) If more than one quarter of the surface area of any one mounting surface is damaged, corroded or worn beyond 0.030 inch, spotface or counterbore as shown in figure 5-119 to clean up the discrepant surface(s). Do not exceed minimum dimensions.

(4) If the internal diameter surfaces indicated by Sections A-A and B-B in figure 5-119 are pitted in excess of 0.125 inch depth, then the accessory gearbox housing is not usable.

(5) Touch up all reworked areas as outlined in SP No. 6030, Appendix E.

w. Repair insufficient oil hole opening at base of bearing liner in housing assembly (48, figure 5-93) as follows: (See figure 5-120).

(1) Determine size of reamer or drill required to open oil hole to provide a minimum dimension of 0.035 inch (0.089 cm) from inner wall of liner.

(2) Ream or drill oil hole to obtain a minimum opening of 0.035 inch (0.089 cm) from inner wall of liner.

(3) Reinspect oil hole for 0.035 inch (0.089 cm) minimum opening.

x. Repair damaged plating on 0.875 to 0.877 inch (2.223 to 2.228 cm) diameter of fuel control drive gearshaft assembly (50, figure 5-93) where 0.002 to 0.010 inch (0.005 to 0.025 cm) plate thickness is required by chrome-plating as follows: (See figure 5-121.)

(1) Machine, if necessary, to obtain a 0.002 inch (0.005 cm) minimum plate thickness after final machining.

(2) Chrome-plate as outlined in SP No. 6014 in Appendix E.

(3) Bake at 255° to 275°F (124° to 135°C) for 5 hours.

(4) Machine to dimensions given.

y. Repair damaged coating on liners (15 and 56, figure 5-93) and bearing retainer (61) with black oxide coating (Refer to SP No. 6002 in Appendix E).

z. Repair scored area of 1.6535 to 1.6541 inch (4.1999 to 4.2014 cm) inside diameter of liner (56, figure 5-93) if scoring depth exceeds 0.010 inch (0.025 cm). Proceed as follows: (See figure 5-122.)

CAUTION

In following step (1), do not rework below depth of scoring.

(1) Using crocus cloth (item 125, table C–1), rework sharp edges of scored area.

(2) Refinish repaired area with black oxide coating. (Refer to SP No. 6002 in Appendix E.)

aa. Repair worn 1.6535 to 1.6541 inch (4.1999 to 4.2014 cm) diameter on liner (56, figure 5-93) where up to 0.005 inch (0.013 cm) maximum buildup is required, by chrome-plating as follows:

(1) Machine ID, if necessary, to obtain 0.002 inch (0.005 cm) minimum buildup thickness after final machining.

(2) Chrome-plate as outlined in SP No. 6014 in Appendix E.

(3) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(4) Machine to dimensions given.

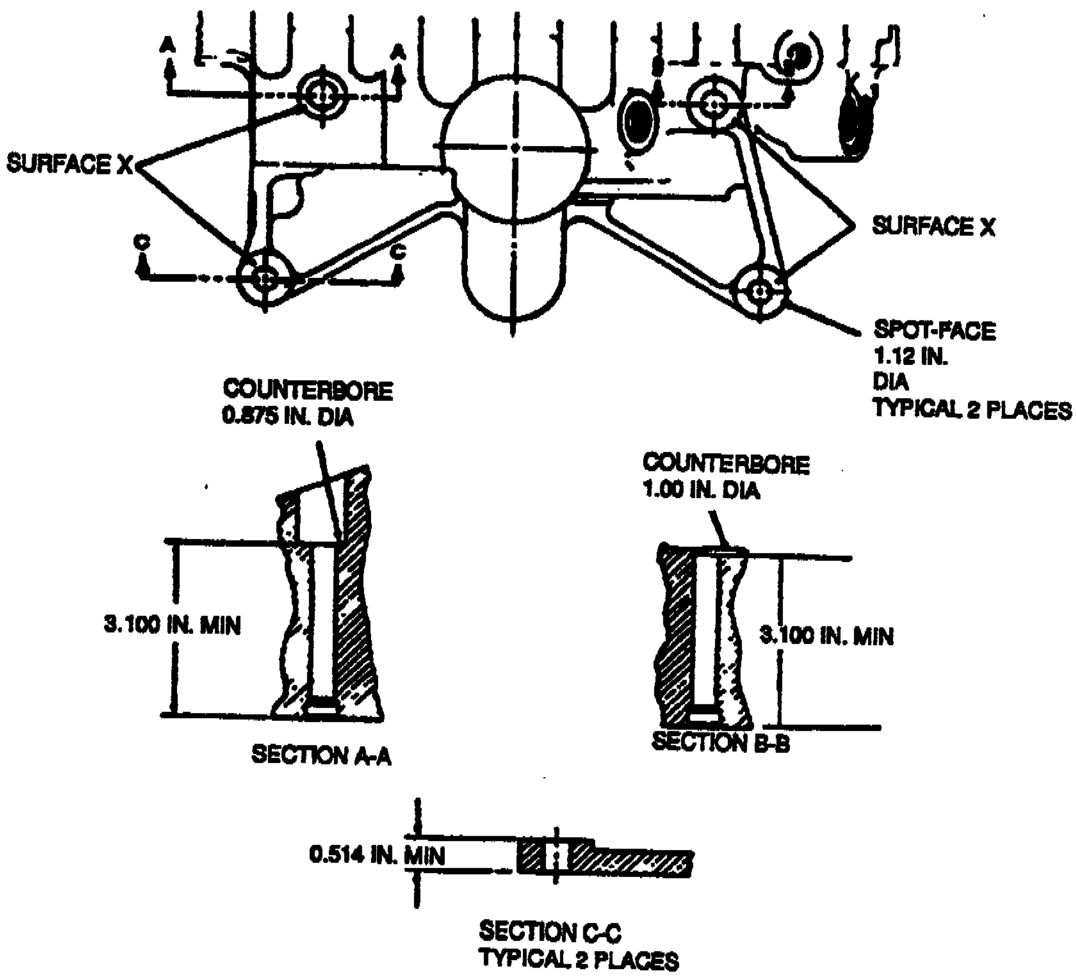


Figure 5-119. Repair of Mounting Flange Holes.

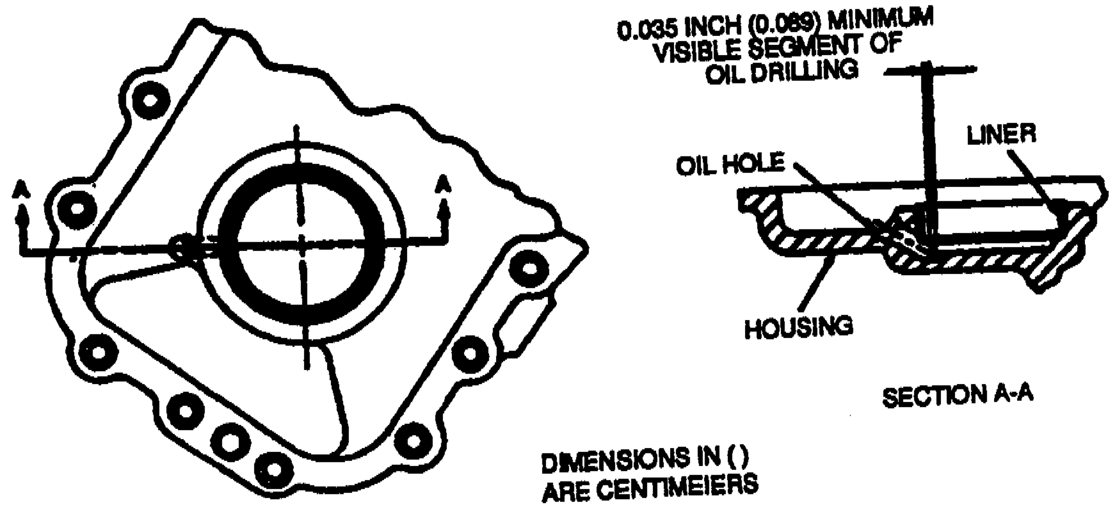


Figure 5-120. Rework of Oil Hole in Accessory Drive Gearbox Housing.

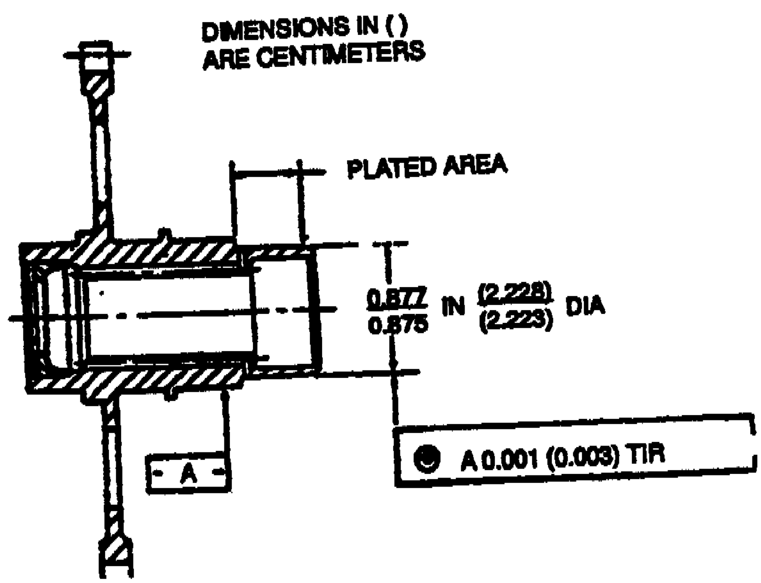


Figure 5-121. Fuel Control Drive Gearshaft Assembly - Plating Area.

ab. Repair scored area on 1.1024 to 1.1029 inch (2.8001 to 2.8014 cm) diameter of bearing retainer (61, figure 5-93) if scoring exceeds depth of 0.010 inch (0.025 cm).

CAUTION

In following step (1), do not rework below depth of scoring.

(1) Using crocus cloth (item 125, table C–1), rework sharp edges of scored area.

(2) Refinish repaired area with black oxide coating. (Refer to SP No. 6002 in Appendix E.)

ac. Repair worn 1.1024 to 1.1029 inch (2.8001 to 2.8014 cm) diameter bearing retainer (61, figure 5-93) where up to 0.001 inch (0.003 cm) maximum plate thickness is required, by nickel-plating; or where 0.002 to 0.010 inch (0.005 to 0.025 cm) plate thickness is required, by chrome-plating; or where 0.003 to 0.015 inch (0.008 to 0.038 cm) buildup is required, by plasma flame-spraying. (See figure 5-123.)

(1) Repair retainer by nickel-plating as follows:

(a) Machine ID, if necessary, to obtain up to 0.001 inch (0.003 cm) maximum-plate as outlined in SP No. 6018 in Appendix E.

(b) Nickel-plate as outlined in SP No. 6018 in Appendix E.

(c) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(d) Machine to dimensions given.

(2) Repair retainer by chrome-plating as follows:

(a) Machine ID, if necessary, to obtain up to 0.002 to 0.010 inch (0.005 to 0.025 cm) plate thickness after final machining.

(b) Chrome-plate as outlined in SP No. 6014 in Appendix E.

(c) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(d) Machine to dimensions given.

(3) Repair retainer by plasma flame spraying as follows:

(a) Machine ID, if necessary, to ensure a 0.003 to 0.015 inch (0.008 to 0.038 cm) buildup thickness is obtained after final machining.

(b) Plasma flame-spray retainer. (Refer to SP No. 5006 in Appendix E.)

(c) Machine to dimensions given.

NOTE

Part must be coated within one-half hour after final cleaning.

(d) Touch up reworked area with black oxide coating as outline in SP No. 6002 in Appendix E.

ad. Repair worn 1.500 to 1.502 inch (3.810 to 3.815 cm) diameter on bearing retainer (61, figure 5-93), where 0.002 to 0.010 inch (0.005 to 0.025 cm) plate thickness is required, by chrome plating; or where 0.003 to 0.015 inch (0.008 to 0.038 cm) buildup is required, by plasma flame spraying. (See figure 5-123.)

(1) Repair retainer by chrome plating as follows:

(a) Machine ID, if necessary, to obtain 0.002 to 0.010 inch (0.005 to 0.025 cm) plate thickness after final machining.

(b) Chrome-plate as outlined in SP No. 6014 in Appendix E.

(c) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(d) Machine to dimensions given.

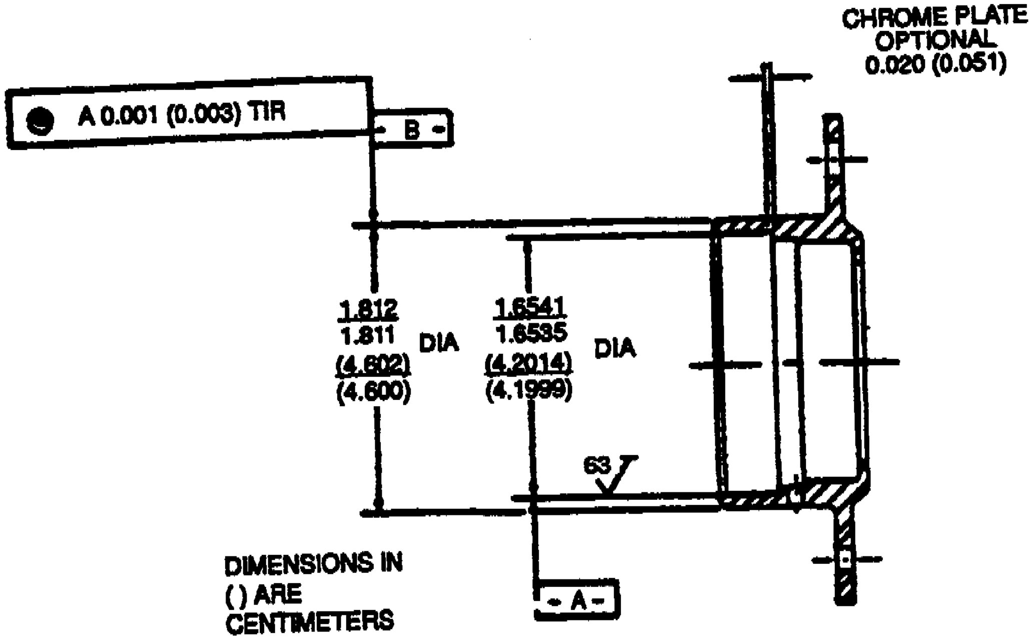


Figure 5-122. Fuel Control Drive Liner - Repair Area.

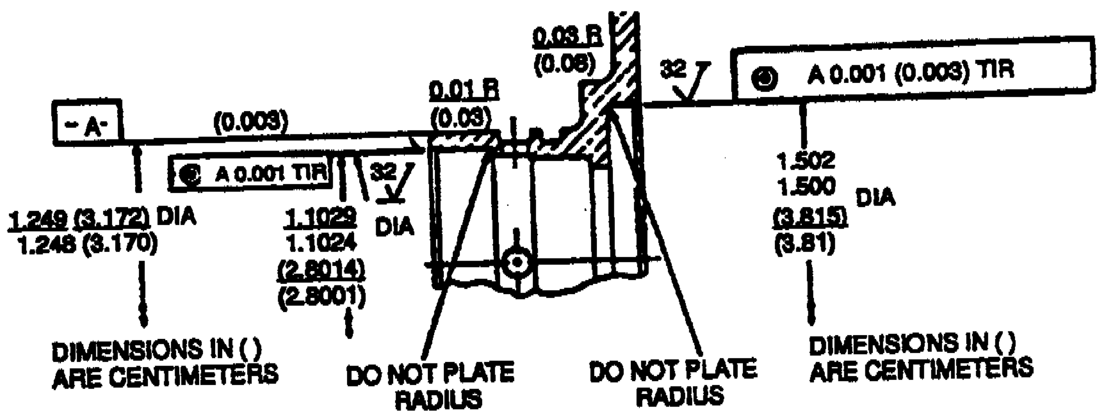


Figure 5-123. Bearing Retainer - Repair Area.

(2) Repair retainer by plasma flame spraying as follows:

(a) Machine ID, if necessary, to ensure a 0.003 to 0.015 inch (0.008 to 0.038 cm) buildup thickness is obtained after final machining.

(b) Plasma flame-spray retainer, using molybdenum powder (item 219, table C–1). (Refer to SP No. 5006 in Appendix E)

(c) Touch up reworked area with black oxide coating according to procedure outlined in SP No. 6002 in Appendix E.

ae. Remove scoring on 1.811 to 1.813 inch (4.600 to 4.605 cm) diameter of spacer (68, figure 5-93) as follows: (See figure 5-124.)

(1) Chrome-plate. (Refer to SP No. 6014 in Appendix E.) Repair diameter to 1.811 to 1.813 (OD) inches (4.600 to 4.605 cm). Bake at 375°F (191°C) for 3 hours. Finish-grind to dimensions shown. Required plate thickness is 0.002 to 0.010 inch (0.005 to 0.025 cm).

(2) Refinish with black oxide coating. (Refer to SP No. 6002 in Appendix E.)

af. Repair radial bearing housing (7B, figure 5-93) as follows:

(1) Remove corrosion using hot alkali soak No. 2. (Refer to SP No. 3005 in Appendix E.)

(2) Repair or replace black oxide coating. (Refer to SP No. 6002 or 6003 in Appendix E.)

ag. Replace surface coating on gearbox covers (26, figure 5-93) and housing (48) with extensive coating damage by stripping and replacing finish as follows:

(1) Degrease parts. (Refer to SP No. 3002 in Appendix E.)

NOTE

Chemical paint strippers should only be used when other methods will not strip adequately. Use chemical paint stripper in accordance with local, state and federal regulations and guidelines.

(2) Strip paint by any of the following methods:

(a) Dry media blasting including plastic media (item 2, table C–1), sodium bicarbonate (baking soda), or other media that will not remove or damage the substrate material.

(b) Hand sanding using 400 grit or finer abrasive paper (item 274, table C–1).

(c) Chemical paint stripper (item 236, table C–1) only if any of the above methods do not strip adequately.

(3) Remove any remaining paint and minor surface corrosion using plastic media blasting.(Refer to SP No. 3003.1 in Appendix E.)

(4) Alkaline clean parts using hot alkali soak procedures. (Refer to SP No. 3004 in Appendix E.)

(5) Treat parts with Type III Dichromate treatment in accordance with MIL-M-3171 or Dow 7.

(6) Paint is required on all external surfaces. Mask all machined mating surfaces on front and back of parts. Mask fastener bosses. Mask all inside surfaces from edge to edge.

(7) Prime parts with epoxy polymide primer, MIL-P-23377, Type 2 (item 152, table C–1). Apply to a thickness 0.0005 to 0.0015 inch. Mix and apply in accordance with manufacturer's instructions. Air dry.

(8) Apply topcoat of engine gray epoxy coating, MIL-C-22750 (item 148, table C–1). Color shall meet the requirements of FED-STD-595, table VIII, Gloss 16081. Mix and apply in accordance with manufacturer's instructions.

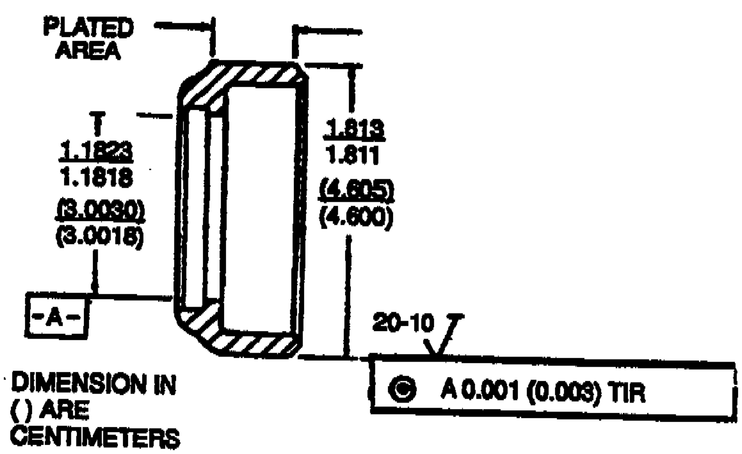


Figure 5-124. Plating Area - Starter Generator Drive Seal Spacer.

5-237. REASSEMBLY. Proceed as follows:

a. Install baffle (33, figure 5-93) and secure with screw and capscrew (35 and 45), sleeve spacer (32), packing (46), and bolt (34). Tighten, as required, and lockwire.

NOTE

To facilitate lockwiring, insert precut strands of lockwire into applicable holes in baffle before installation.

b. Using arbor press and sleeve bushing (LTCT3640), press outer race of bearing (36) into accessory gearbox housing assembly (48).

c. Using drift and hammer tap outer race of bearing (36) onto journal of accessory gear assembly (37).

d. Coat teeth of accessory gear assembly with red marking compound (item 160, table C–1).

e. Using arbor press and sleeve bushing (LTCT3636), press bearing (10) onto outer pinion gearshaft assembly (11).

f. Using sleeve bushing (LTCT3654), press ball bearing (14) into outer pinion liner (15).

g. Using snapring pliers, insert and seat retaining ring (13) in groove of liner. Install packing (9).

h. Install shim (12) on outer pinion gearshaft assembly (11).

NOTE

Shim shall correspond in thickness to shim removed during disassembly.

i. Using arbor press and sleeve bushing (LTCT3654), press assembled liner onto journal of outer pinion gearshaft assembly. Install nut (17).

j. Install gearshaft holder assembly (LTCT3833) in a bench vise. Position outer pinion gearshaft assembly in holding tool. Using spanner wrench (LTCT107), tighten nut to 300 to 360 pound-inches (53580 to 64296 gm cm) torque. Remove outer pinion gearshaft assembly from holding tool.

NOTE

Key washer (16) is not installed at this time. This will be accomplished after correct gear pattern and backlash have been established.

k. If assembling gearbox housing assembly (48), P/N 1-080-340-05, install packing (7c) on housing (7b). Insert housing (7b) into housing assembly (48) and secure with bolts (7a). Tighten bolts and lockwire.

l. Coat teeth of gear with iron-blue pigment (item 172, table C–1) and install pinion gearshaft and bearing assembly (8)into accessory gearbox housing assembly (48). Tap gently with soft-faced mallet until properly seated. Using test fixture (LTCT207), secure pinion gear and liner in position.

m. Carefully install accessory gear assembly (37) and inner race of bearing (36) into outer race.

NOTE

Ensure that driven gear meshes with accessory drive gear.

n. Measure bore depth of liner (29). Measure width of outer race of bearing (14). Subtract bore depth from bearing width, and select shim (28) to obtain a bearing pinch of 0.002 to 0.004 inch (0.005 to 0.010 cm).

NOTE

For gasket (31) a thickness up to .022-inch may be installed on the accessory gear box housing assembly provided the proper backlash can be obtained.

o. Install shim (28) and liner (29) on accessory gearbox cover assembly. Install cover gasket (31) on accessory gearbox housing assembly (48).Position gearbox cover assembly (25) onto accessory gearbox housing assembly (48) and journal of accessory gear assembly (37). Secure with washers (39) and nuts (38).

p. Install bearing (14), using mechanical puller (LTCT142). Install shim (28) and retaining plate (66) and secure with tabwashers (65) and bolts (64).

q. Install spacer (68), lock cup (69), and spanner nut (70).

r. Position holding device (LTCT115) on gearbox cover assembly (25). Ensure that tangs of device engage slots of nut (70).

s. Insert splined tool (part of holding device) and tighten nut to 420 to 450 pound-inches (75012 to 80370 gm cm) torque.

NOTE

Do not deform locking cup at this time.

t. Remove holding device (LTCT115) and rotate gear several times.

u. Install holding fixture (LTCT4904 or LTCT44) on gearbox cover assembly, and in spline of accessory gear assembly (37).

v. Install backlash gage (LTCT2099, LTCT311, or LTCT205) in outer pinion gearshaft assembly (11).

w. Using dial indicator, check backlash of outer pinion gearshaft accessory (11) and accessory gear assembly (37). Backlash must be 0.006 to 0.012 inch (0.015 to 0.030 cm). If backlash exceeds limits, remove and disassemble pinion gearshaft and bearing assembly (8) and/or liner assembly (27), and select a suitable shim (12) and/or shim (28). Reassemble pinion gearshaft and bearing assembly and/or liner assembly, install, and repeat backlash check until limits are obtained.

x. When acceptable backlash is established, remove holding fixture (LTCT4904 or LTCT44) and test fixture (LTCT207). Remove pinion gearshaft and bearing assembly (8) from gearbox housing, and examine tooth pattern on outer pinion gearshaft assembly (11) and accessory gear assembly (37).

y. When correct backlash and gear pattern is established, proceed as follows:

(1) Position holding device (LTCT115) on cover mounting pad studs, check tangs of holding device, and engage slots of nut (70).

(2) Insert splined tool into holding device and into splines of accessory gear assembly (37).

(3) Using suitable wrench, turn splined tool clockwise to remove nut (70). Remove holding device.

(4) Remove nut, cup (69), and spacer (68). Remove nuts (38) and washers (39).

(5) Secure mechanical puller (LTCT142) to gearbox cover assembly. Turn handle to separate cover from housing. Remove puller. Remove gearbox cover assembly.

(6) Remove accessory gear assembly (37).

(7) Clean gears in dry cleaning solvent (item 134, table C–1).

(8) Remove nut (17) and install key washer (16) on outer pinion gearshaft assembly (11). Install nut (17), and using spanner wrench (LTCT107), tighten nut to 300 to 360 pound-inches (53580 to 64296 gm cm) torque. Look key washer (16).

z. Install pinion gearshaft and bearing assembly (8) into accessory gearbox housing assembly. Tap gently with soft-faced mallet until properly seated.

aa. Install accessory gear assembly (37) and inner race of bearing (36) into outer race.

NOTE

Ensure that the gear assembly meshes with the accessory drive gear.

ab. Using sleeve bushing (LTCT3640) and arbor press, install bearings (22) on oil-air separator drive gearshaft assembly (30).

ac. Install oil-air separator drive gearshaft assembly (30), with bearings installed, into accessory gearbox housing assembly (48), and carefully mesh teeth of gear with teeth of accessory drive gear assembly spur gear.

ad. Using sleeve bushing (LTCT3640) and arbor press, install ball bearing (43 and 44) on oil pump drive gearshaf assembly (47).

ae. Install oil pump drive gearshaft assembly (47), with bearings installed, into accessory gearbox housing assembly (48), and carefully mesh teeth of gear with teeth of accessory drive gear assembly spur gear.

af. Dip seal (18) in lubricating oil (item 189 or 190, table C–1), and install seal in accessory gearbox housing assembly (48), using sleeve bushing (LTCT100).

ag. Using sleeve bushing (LTCT3637) and arbor press, install bearing (20) on tachometer drive gearshaft assembly (21).

ah. Using sleeve bushing (LTCT3640), and arbor press, install bearing (22) on tachometer drive gearshaft assembly (21).

ai. Install tachometer drive gearshaft assembly (21), with bearings installed gear side first, carefully meshing teeth of gear with teeth of oil-air separator drive gearshaft assembly (30). Gently tap to ensure proper seating.

aj. Using sleeve bushing (LTCT3637) and arbor press, press ball bearings (49) on fuel control drive gearshaft assembly (50).

ak. Install fuel control drive gearshaft assembly (50), with bearings installed short hub first, carefully meshing teeth of gear with teeth of oil pump drive gearshaft assembly (47). Gently tap to ensure proper seating.

al. Position gearbox cover assembly (25) on accessory gearbox housing assembly (48), taking care to align bearings property.

NOTE

Ensure that gasket (31) is installed on housing assembly (48).

am. Using mechanical puller (LTCT142), press gearbox cover assembly onto accessory gearbox housing assembly, bearing, and drive gear. Secure brackets (24, figure 4-5) with washers (39, figure 5-93) and nuts (38). Lock washer (65).

an. Install spacer (68, figure 5-93) packing (67), cup (69), and nut (70).

ao. Position holding device (LTCT115) on gearbox cover assembly. Ensure that tangs of the device engage slots of nut.

ap. Insert splined tool (part of holding device) into driven gear. Turn counterclockwise and tighten nut to 420 to 450 pound-inches (75012 to 80370 gm cm) torque. Remove holding device.

aq. Deform locking cup onto nut in three places.

ar. Install packing (73) into seal housing (75).

as. Using seal installer (LTCT270) and arbor press, press seal (72) into housing.

NOTE

Seal must be installed with solid side of seal case (side with part number) facing housing (75).

at. Install packing (74) on hub of housing (75). Using seal installer (LTCT511) as a guide, tap seal and housing assembly (71) into gearbox cover assembly, and secure with bolts (76). Tighten bolts, as required.

au. Using arbor press and installation tool (LTCT501), press seal (59) into bearing retainer (61). Install packing (60) on retainer (61).

av. Install tachometer drive flange and seal assembly (58), gasket (52), and cover (51) over studs of gearbox cover assembly, and secure with flat washers (39) and nuts (38). Tighten nuts, as required.

aw. Using sleeve bushing (LTCT3654 or LTCT100) and an arbor press, press seal (54) into liner (56). Install packing (55) in recess in gearbox cover assembly.

ax. Install seal and liner assembly (53) over studs and into gearbox cover assembly. Secure with bolts (57).

ay. Install plug (23) and packing (24) into gearbox cover assembly.

az. Install packing (40), fuel overflow connector (41), and capscrews (42) into gearbox cover assembly. Tighten screws, as required, and lockwire.

ba. Install gasket (83) and cover (82) on studs of accessory gearbox housing assembly, and secure with washers (81) and nuts (80).

NOTE

Do not accomplish preceding step az when cover (82) is part of housing assembly (48).

bb. Test chip detector (1) as follows:

(1) Heat chip detector to 350°F (177°C) in an oven. Check insulation between shell and core of chip detector. The resistance shall be a minimum of 200,000 ohms.

(2) Short magnet to shell. There shall be continuity between the magnet and shell.

(3) If above requirements cannot be met, reject chip detector.

bc. Install packing (2) on chip detector (1) and install in the accessory gearbox housing assembly. Tighten chip detector to 90 to 100 pound-inches (16074 to 17860 gm cm) torque.

NOTE

If threads on chip detector port have been repaired as outlined in paragraph 5-236, install new packing, AN6227-10, in place of packing (2).

bd. On T53-L-15 engines, position bracket (7) (1-160-306-01) on accessory drive gearbox housing and secure with bolt (6). Install manifold tee (4). On T53-L-701 and -701A engines, position bracket (7) (1-160-468-01) and secure with bolt (6). Position packing (5) on plug (3) and install in gearbox housing.

be. Do not install shims (63). support (62), cover (77), and nuts (79) until completion of pressure-test.

bf. Prepare accessory drive gearbox assembly for pressure-testing as follows: (See figure 5-125).

(1) Install packings (8 and 9) into accessory drive gearbox assembly (3).

(2) Install packings (6 and 7) into accessory drive gearbox assembly.

(3) Install metal blankoff plates (4 and 10) on accessory drive gearbox assembly, and secure with bolts (5).

(4) Install packing (2).

(5) Install suitable fitting in air pressure port.

(6) Install test fixture (1) (LTCT207).

bg. Pressure-test as follows:

(1) Connect regulated shop air to the line fitting. Apply 8 to 12 psig air pressure to the accessory drive gearbox.

(2) Use soap and water to pressure check the mating surfaces (split lines) of the engine accessory drive gear box for leaks, immersion of this part to perform this pressure check is not required. Oil (item 189 or 190, table C–1) is used for pressure checking the seals of the accessory drive gear box for leaks, immersion of this part in engine oil to perform this pressure check is not required.

(3) Visually inspect for air leakage around seals and around gasket between the cover and housing assemblies.

(4) If leakage is noted, disassembly gearbox assembly and check for defective packings, seals, and plugs in gearshaft. Replace defective parts. Repeat pressure-test after reassembly.

(5) Remove test fixture (LTCT207).

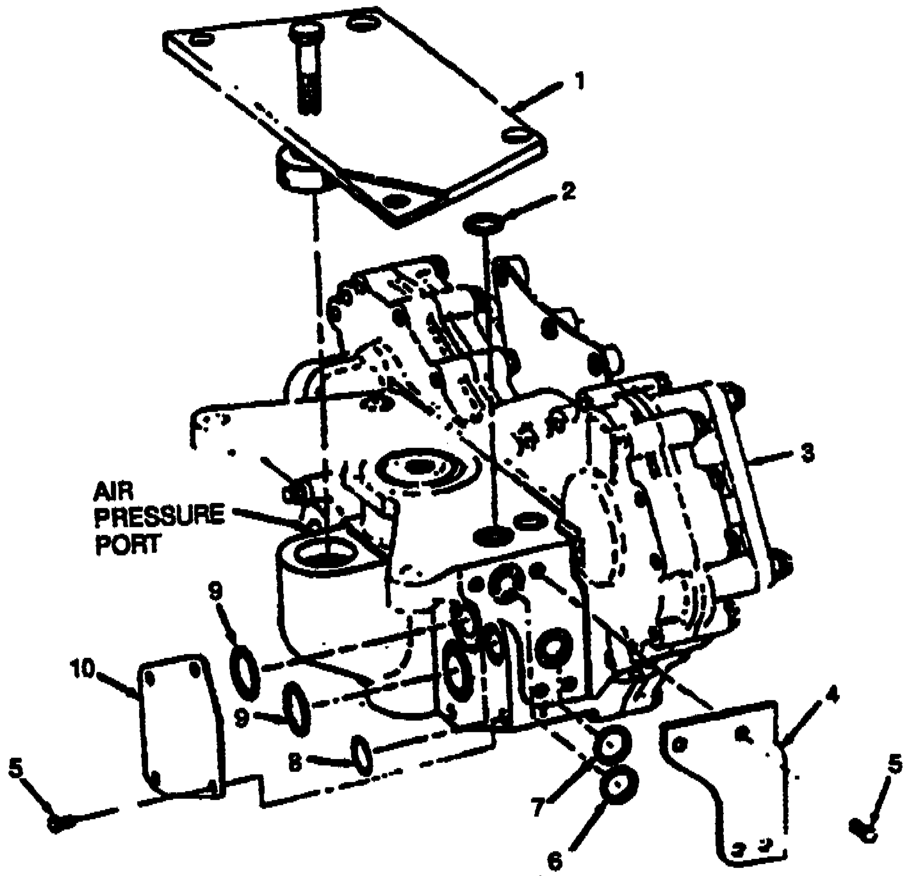
(6) Remove bolts (5) and metal blankoff plates (4 and 10).

(7) Remove packings (6 and 7) from accessory drive gearbox assembly (3).

(8) Remove packings (8 and 9) from accessory drive gearbox assembly.

(9) Remove packing (2).

(10) Remove fitting from air pressure port.



1. Test fixture
2. Packing (MS29561-114)
3. Accessory drive gearbox assembly
4. Blankoff plate
5. Bolt
6. Packing (MS29561-115)
7. Packing (MS29561-114)
8. Packing (MS29561-115)
9. Packing (MS29561-122)
10. Blankoff plate

Figure 5-125. Test Preparation of Accessory Drive Gearbox Assembly (Typical) bh. After completion of pressure-test, install shims (63, figures 5-93 and 5-238), support (62), cover (77), washers (78), and nuts (79).

bi. Install gasket (52), and cover (51) with flat washers (39) and nuts (38).

bj. Lockwire bolts (57 and 76).

5-238. FUNCTIONAL TEST. Functional test is not required.

5-239. MODIFICATION OF ACCESSORY DRIVE GEARBOX ASSEMBLY. Rework accessory drive gearbox assembly 1-080-250-13 to 1-080-250-16 configuration as follows:

a. Rework cover assembly (1-080-330-09) as follows:

(1) Enlarge oil-return hole as shown in figure 5-126

(2) Touch up reworked areas as outlined in following steps (6) and (7).

(3) Machine flat on cover assembly as shown in figure 5-127.

(4) Drill 0.125 diameter hole in cover assembly as shown in figure 5-127.

(5) Clean drilled hole with acetone (item 13, table C–1) (99.9% pure).

WARNING

Both liquid nitric acid (item 229, table C–1) and its vapors are a personnel hazard. Avoid contact with skin, eyes, or clothing. Avoid inhalation of vapors. In case of contact, immediately flush skin or eyes with water for at least 15 minutes; get medical attention.

NOTE

In following step (6), solution shall be composed of 1.5 pounds sodium dichromate (item 282, table C–1) and 1.5 pints nitric acid (item 229, table C–1) (specific gravity 1.42) per gallon of water prepared at ambient temperature.

(6) Using a cotton swab, apply chrome-pickle solution, in accordance with Military Specification MIL-M-3171, Type VI, to area being treated.

(7) Allow chrome-pickle solution to remain on surface for 2 to 5 minutes. Then rinse well with cold water and air-dry.

(8) Incorporate two mounting holes at 0.125 inch (0.318 cm) diameter hole location as follows: (See figure 5-127).

(a) Drill 0.257 to 0.264 inch (0.653 to 0.671 cm) diameter holes to a depth of 0.58 to 0.62 inch (1.47 to 1.57 cm) at location shown in figure 5-127.

(b) Countersink 120 degrees to 0.31 inch (0.79 cm) diameter.

(c) Tap 0.440 inch minimum deep for 0.250-28 UNF-3B Helicoil insert, per MS33537.

(d) Apply primer (item 253, table C–1) to the two holes, and air-dry for 30 minutes.

(e) Assembly two inserts, MS124696, 1 to 1-1/2 turns below surface.

(f) Using vibropeen etching tool, reidentify cover assembly to 1-080-330-07.

NOTE

Depth of marking shall be 0.001 to 0.006 inch (0.025 to 0.152 cm).

b. Using a vibropeen etching tool, reidentify accessory drive gearbox assembly to 1-080-250-16.

NOTE

Depth of marking shall be 0.004 to 0.010 inch (0.010 to 0.025 cm).

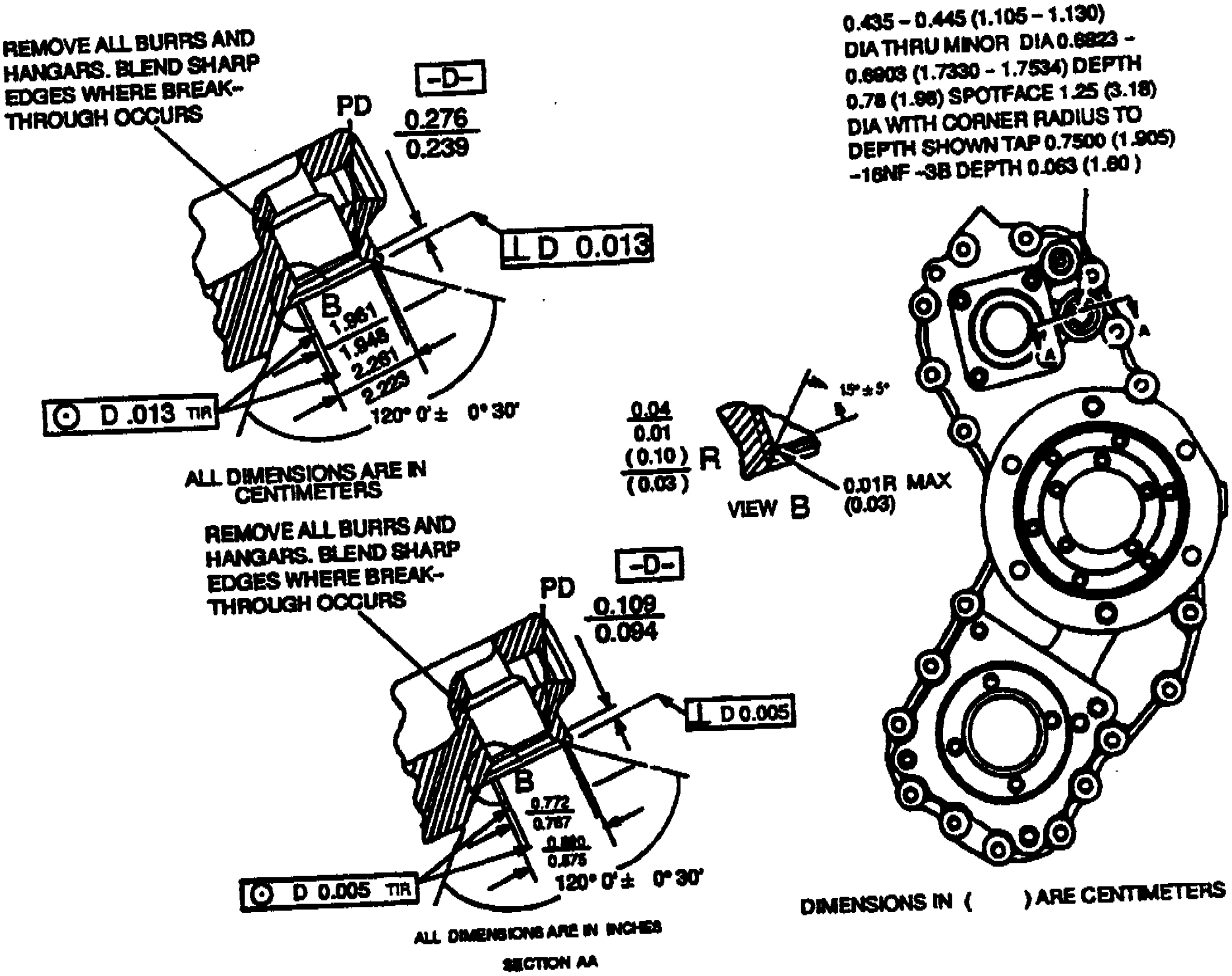


Figure 5-126. Enlarging Oil - Return Hole in Cover Assembly.

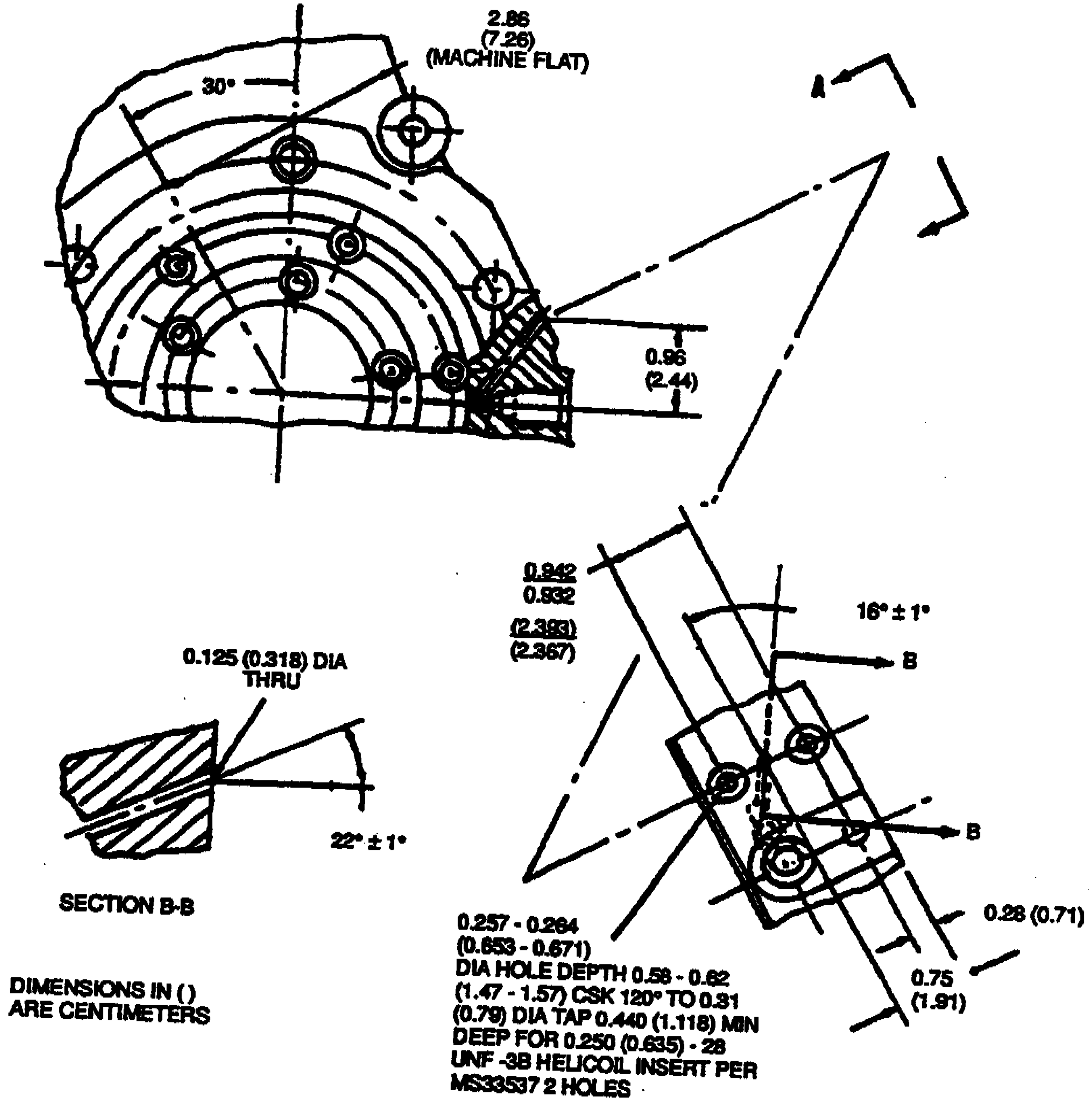


Figure 5-127. Machining of Cover Assembly.

5-240. MODIFICATION OF ACCESSORY GEARBOX HOUSING ASSEMBLY. The purpose of this modification is to provide improved lubrication to the main oil pump drive spline.

a. Inspect oil pump drive gear boss in accessory gearbox housing for tube holes. If boss has only one hole, rework housing as follows:

(1) Remove stud (see figure 5-128) to allow alignment of drill bit and drill bushing.

(2) Secure accessory gearbox drill fixture to housing.

(3) Using a 0.250 inch diameter drill, insert drill into drill bushing and drill through one wall of boss. (See figure 5-129).

CAUTION

To prevent damage, ensure drill does not contact bottom of housing.

(4) Remove fixture from housing and reinstall stud.

(5) Touch up reworked area. (Refer to SP No. 6028 in Appendix E.)

b. Repair insufficient oil hole opening per paragraph 5-236 w. Using vibropeen etching tool, reidentify housing cover assembly 1-080-340-05 to 1-080-340-08.

c. Reassemble accessory drive gearbox. (Refer to paragraph 5-237).

5-241. MODIFICATION OF ACCESSORY DRIVE GEARBOX OIL-AIR SEPARATOR DRIVE GEARSHAFT ASSEMBLY (1-080-280-01/02 TO 1-080-280-03) AND OIL PUMP DRIVE GEARSHAFT ASSEMBLY (1-080-260-01 TO 1-080-260-03). The purpose of this modification is to incorporate longer rivets which will have larger upset heads to enhance positive retention and prevent loosening of rivets.

NOTE

In the following steps remove and replace one rivet at a time.

a. Center punch manufactured rivet head.

b. Using 0.125 inch drill, drill out existing rivets in each shaftgear assembly.

NOTE

Elongation of any rivet hole in gears greater than original 0.128 inch diameter is unacceptable.

c. Install six new rivets STD3036-32 in each shaftgear assembly, ensuring that rivet manufactured head interfaces only with chamfered holes in shaftgears.

d. Inspect rivets as follows:

(1) A 0.0015 inch feeler gage shall not be allowed to pass under any portion of manufactured head. Replace rivet if discrepant.

(2) Upset head height shall be between 0.062 and 0.087 inch.

(3) Minimum upset head diameter is 0.165 inch.

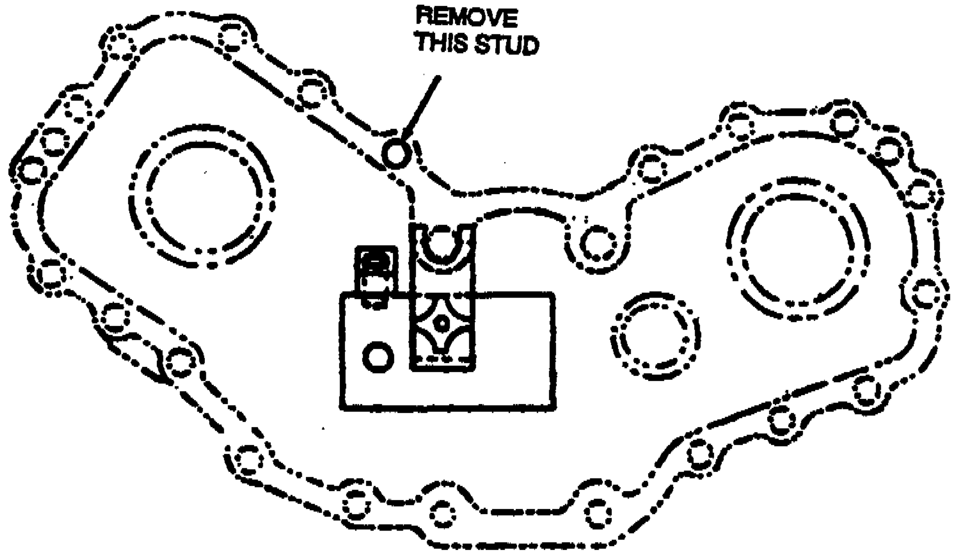


Figure 5-128. Accessory Gearbox Drill Fixture.

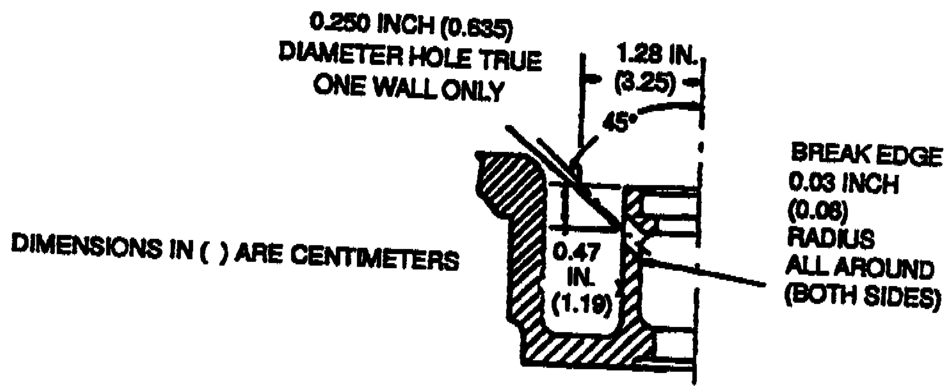


Figure 5-129. Accessory Gearbox Housing- Repair Area.

WARNING

FLIGHT SAFETY PART

Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.

e. Perform magnaflux or dye penetrant inspection on riveted shaftgear assemblies.

f. Using vibropeen etch method, reidentify shaftgear assembly 1-080-260-01 to 1-080-260-03 and shaftgear assemblies 1-080-280-01/02 to 1-080-280-03.

g. Using vibropeen etch method, reidentify accessory drive gearbox assemblies 1-080-250-13 to 1-080-250-24 or 1080-250-16 to 1-080-250-25.

5-242. MODIFICATION OF ACCESSORY DRIVE CARRIER ASSEMBLY (1-070-220-03). The purpose of this modification is to eliminate the possibility of overspeed drive spur gear disengagement due to improper seating of snapring.

a. Replace tachometer drive spur gear (1-070-062-03) with tachometer drive spur gear (1-070-062-04), as required.

b. Measure snapring groove area as shown in figure 5-130.

c. If diameter is not within 0.976 to 0.980 inch (2.479 to 2.489 cm) or radii are more than 0.005 inch (0.013 cm), machine as shown in figure 5-130, detail A.

d. Inspect parts as indicated in table 5-177.

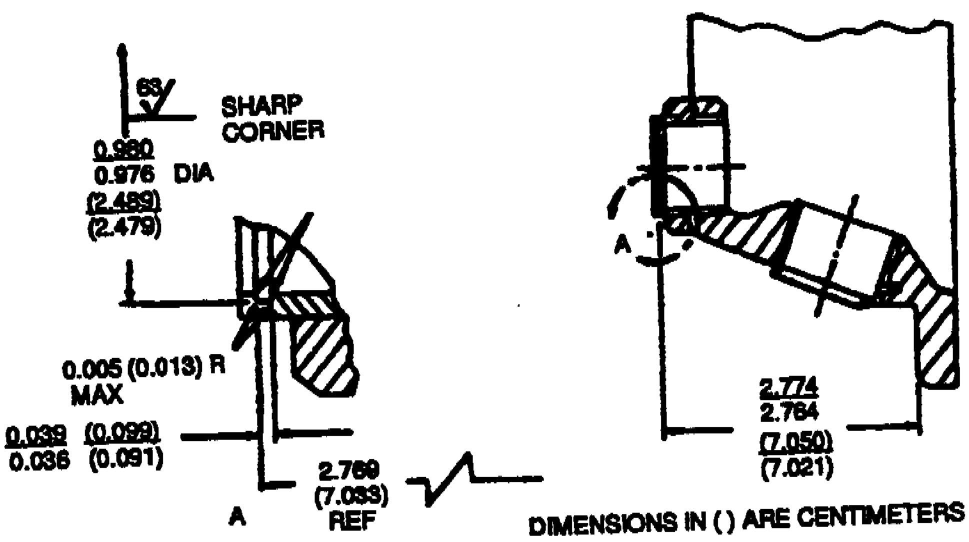


Figure 5-130. Rework of Carrier and Cap Assembly.

5-243. MODIFICATION OF ACCESSORY DRIVE CARRIER AND CAP ASSEMBLY (1-070-210-01) AND STRAINER RETAINING COVER (1-070-016-02). The purpose of this modification is to eliminate interference with the inlet housing.

NOTE

This modification applies when interference is encountered at engine assembly.

a. Eliminate interference by reworking accessory drive carrier and cap assembly (1-070-210-01) and strainer retaining cover (1-070-016-02) as follows:

(1) Rework accessory drive carrier and cap assembly to dimensions shown in figure 5-131.

(2) Touch up reworked area by dichromate method. (Refer to SP No. 6026 in Appendix E.)

(3) Rework strainer retaining cover to dimensions shown in figure 5-132.

NOTE

No touch up or reidentification is required.

b. Prefabrication of plugs for the carrier and cap assembly P/N 1-070-120-05/1-070-210-01.

(1) Repair damaged oil transfer tube seat in carrier and cap assembly 1-070-120-05.

(2) Counterbore transfer tube hole 0.413 to 0.414 inch (1.049 to 1.052 cm) diameter ("Z reamer") to a depth of 0.35 to 0.36 inch (0.89 to 0.91 cm).

(3) Treat exposed metal in accordance with MIL-M-3171, Type VI.

(4) Fabricate a plug 0.4145 to 0.4150 (1.0528 to 1.0541 cm) diameter, from aluminum alloy, (item 31, table C–1) and install with Locktite "C" (item 264, table C–1).

(5) Pin plug with 1/16 inch aluminum pin in area of maximum web thickness.

(6) Machine-bore plug 0.2344 inch diameter to a depth of 0.35 to 0.36 inch (0.89 to 0.91 cm).

(7) Counterbore plug 0.311 to 0.313 inch (0.790 to 0.795 cm) diameter to a depth of 0.243 to 0.247 inch (0.617 to 0.627 cm).

(8) Countersink plug 60 degrees to a 0.370 to 0.380 inch (0.940 to 0.965 cm) diameter.

(9) Drill 0.0995 inch diameter hole at 37 to 37.5 degrees through plug to meet with existing oil passage.

c. Inspect parts as indicated in table 5-177.

5-244. MODIFICATION OF ACCESSORY DRIVE CARRIER ASSEMBLY. Rework carrier and cap assembly 1-070-210-01 to 1-070-230-01 configuration as follows:

a. Drill through carrier flange at three locations as shown in figure 5-133.

b. Tap holes for Heli-coil inserts.

c. Install inserts, MS21208-F1-15, as outlined in SP No.5007 in Appendix E.

d. Cut access slot in carrier flange as shown in figure 5-133.

e. Machine carrier overspeed drive spur gear snapring surface, if necessary, as shown in figure 5-133.

f. Using vibropeen etching tool, reidentify carrier and cap assembly from 1-070-210-01 to 1-070-230-01.

WARNING

FLIGHT SAFETY PART

Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.

g. Perform fluorescent-penetrant inspection of carrier and cap assembly.

h. Clean and resurface carrier and cap assembly, using dichromate method. (Refer to SP No. 6026 in Appendix E.)

i. After dichromate treatment, reinspect Heli-coil thread diameters.

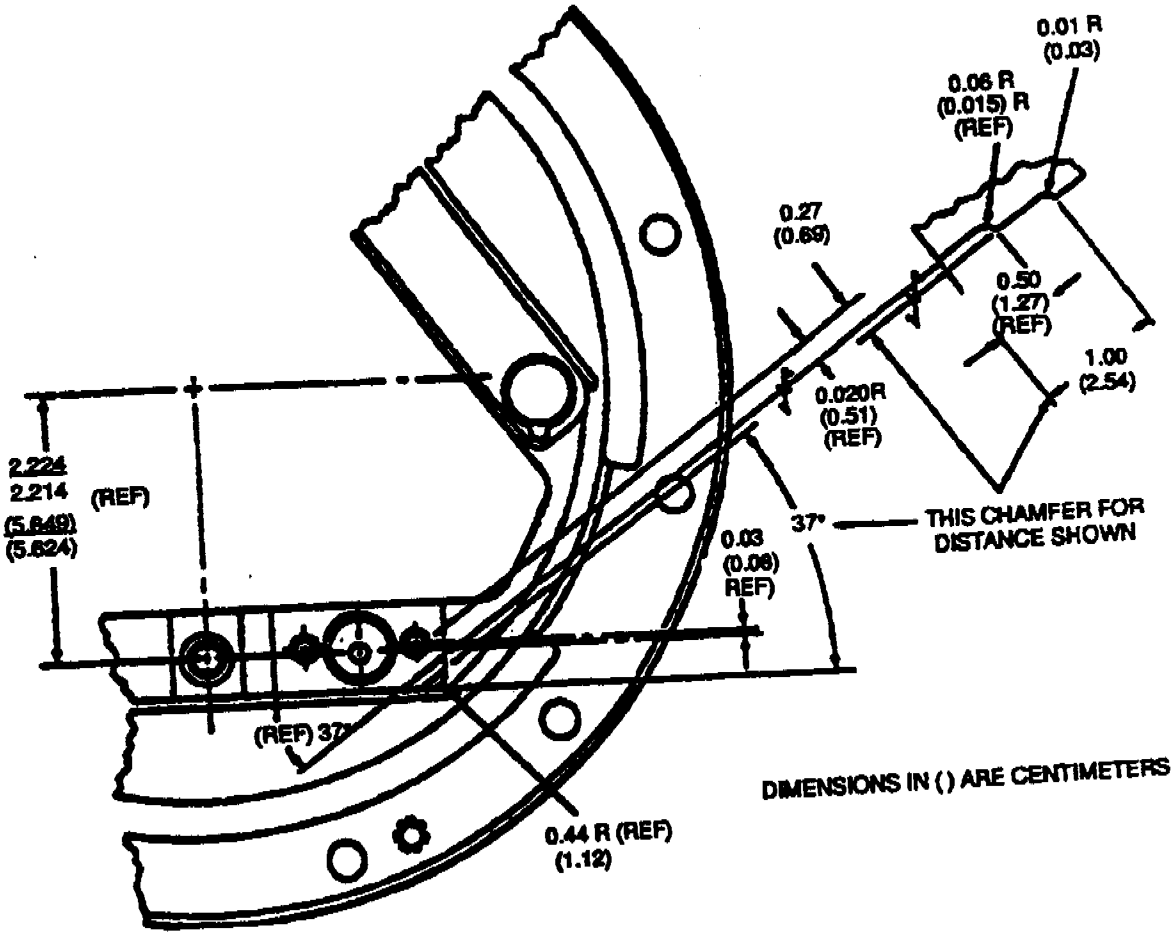


Figure 5-131. Rework of Accessory Drive Carrier and Cap Assembly.

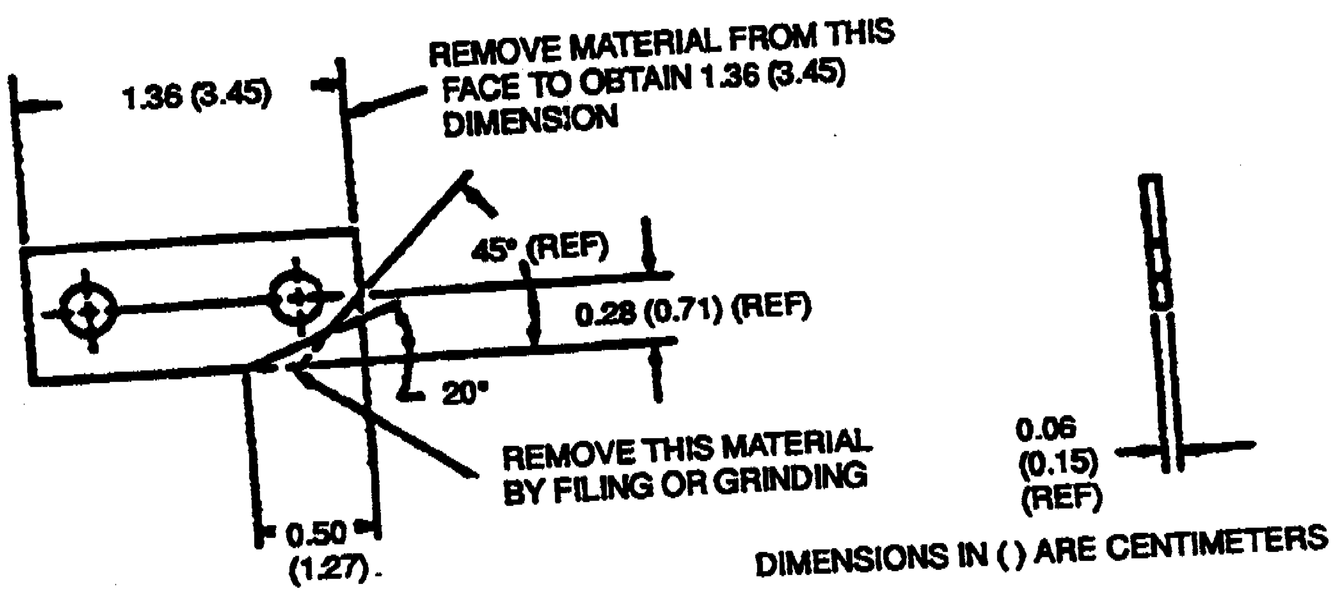
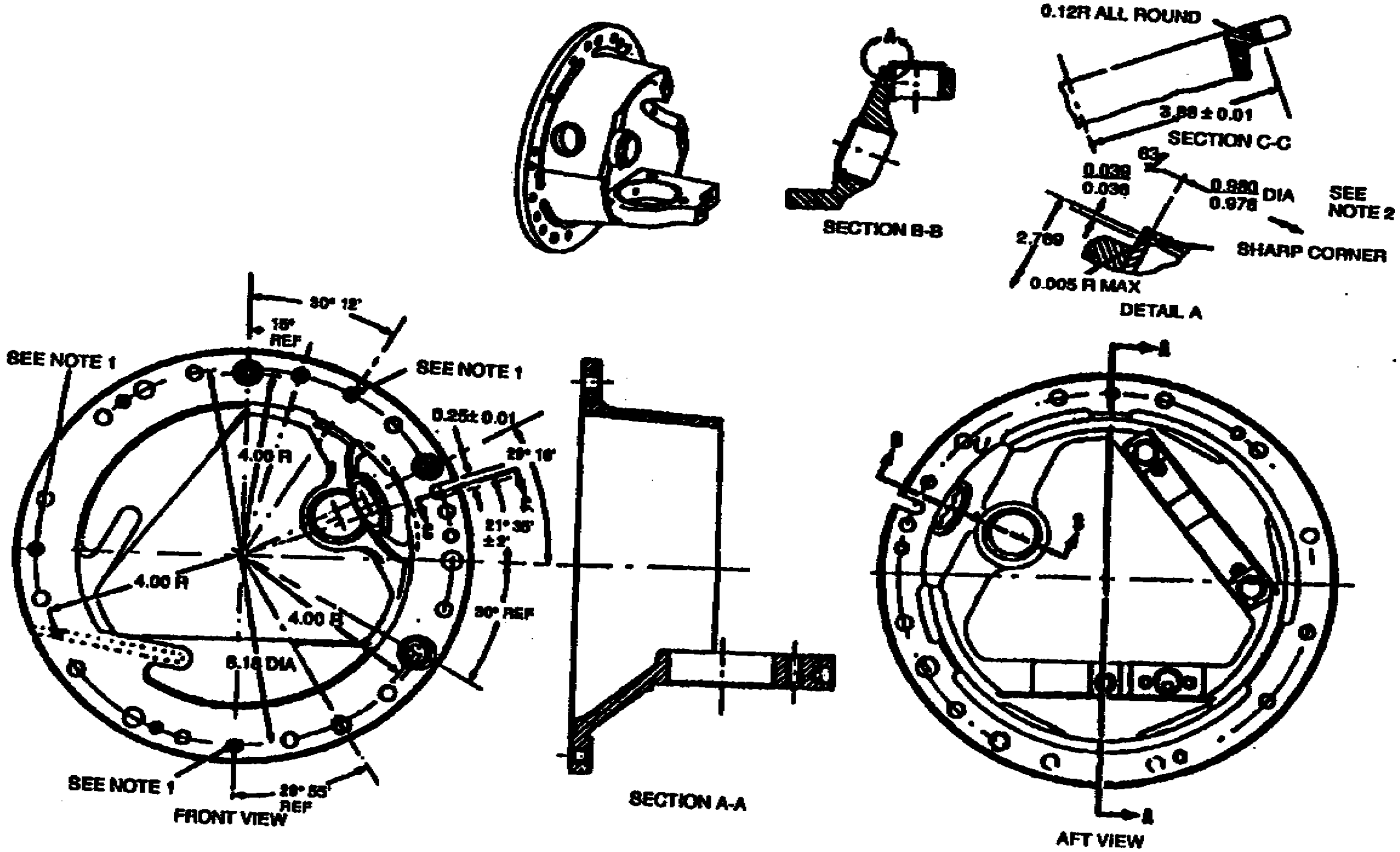


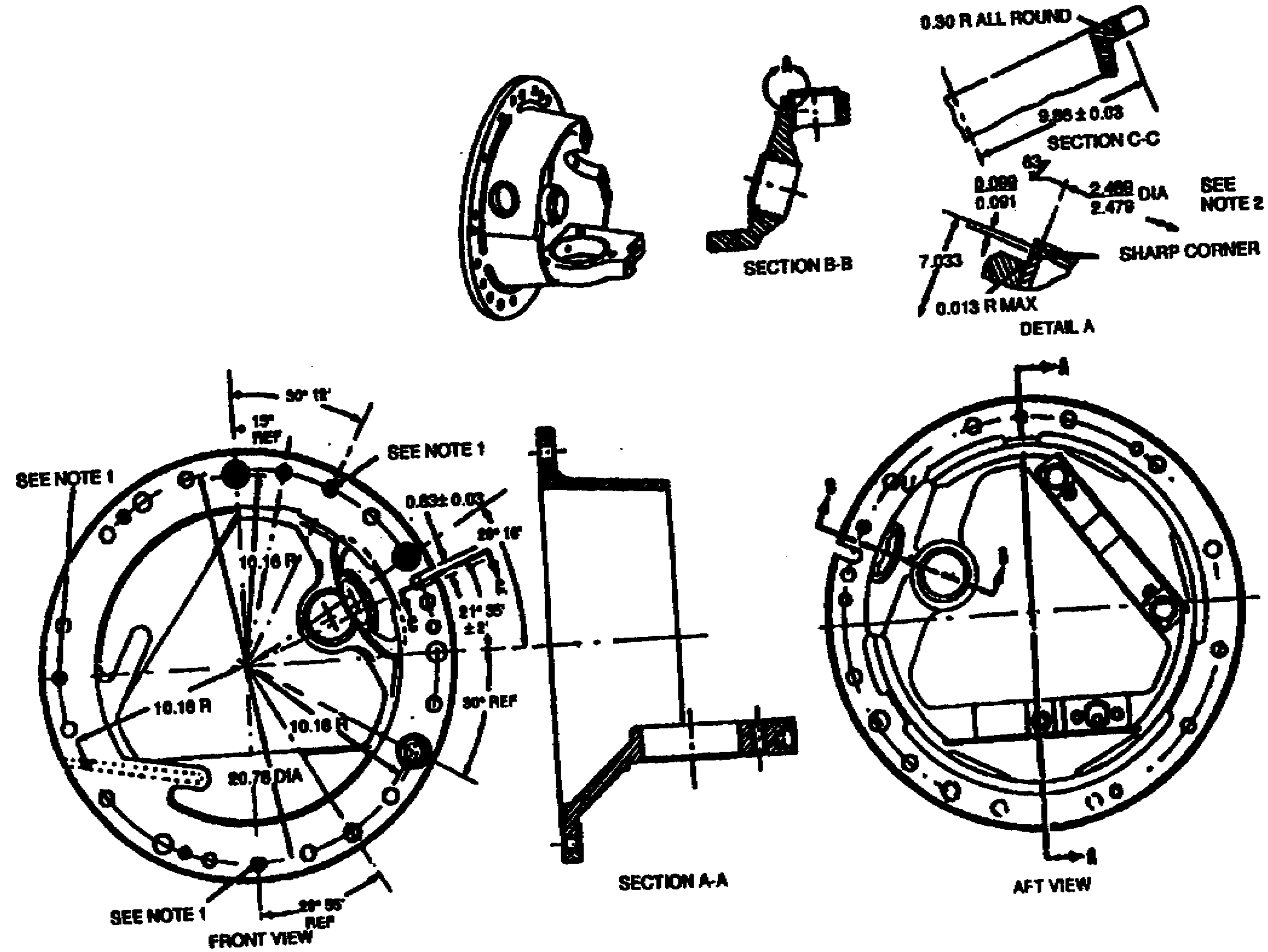
Figure 5-132. Rework of Strainer Retaining Cover.



NOTES

1. 0.200 to 0.205 diameter thru countersink 120° ± 55 for 0.22 to 0.26 diameter. Tap for 0.1900-3B UNF - 32 helicoil insert per MS33646 at three holes. Use insert MS21208-F1-15.
2. Inspect for 0.976 to 0.980 diameter. If diameter is 0.972 to 0.978 machine as necessary to 0.976 to 0.980 diameter.
3. All demensions are in inches.

Figure 5-133. Rework of Carrier and Cap Assembly (English).



NOTES

1. 0.508 to 0.523 diameter thru countersink 120° $\pm$ 5° for 0.56 to 0.66 diameter. Tap for 0.4826-32 UNF - 3B helicoil insert per MS33646 at three holes. Use insert MS21208-F1-15.
2. Inspect for 2.479 to 2.489 diameter. If diameter is 2.469 to 2.489 machine as necessary to 2.479 to 2.489 diameter.
3. All dimensions are in centimeters.

Figure 5-134. Rework of Carrier and Cap Assembly (Metric).

FOR THE COMMANDER:

CLIFTON J. BRODERICK
Colonel, OD
Chief of Staff

Official:

Richard E. Turner

RICHARD E. TURNER
Director
Logistics Support Directorate
Integrated Materiel Management Center

REQUEST FOR DEPOT ENGINEERING SUPPORT	CONTRACT NO.	PRIORITY OF REQUEST ☐ URGENT ☐ ROUTINE	DATE OF REQUEST

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PAGE NO.	PARA-GRAPH	FIGURE NO	TABLE NO.

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT

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TITLE	SIGNATURE	DATE

RECOMMENDED SOLUTIONS OR DISPOSITIONS

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AMSAT-M FORM 1379 16 SEP 93 EDITION OF 1 JUN 93 OBSOLETE

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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.

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To: ls–lp@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:*** DMWR
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.

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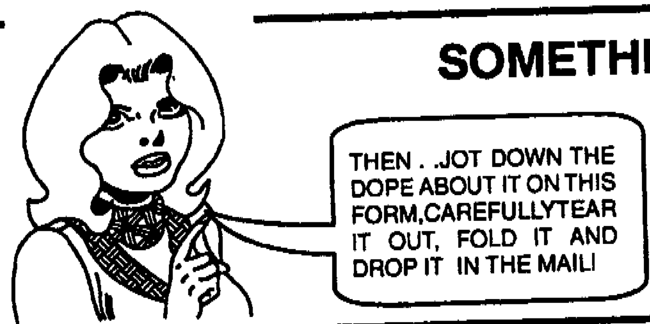

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)
PFC John DOE
CO A 3rd Engineer Bn
Ft. Leonardwood, MO 63108

DATE SENT 22 August 1992

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 1-1520-250-10	15 June 1992	Operator's manual MH60K Helicopter

BE EXACT PIN-POINT WHERE IT IS				IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO	
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.
81		4-3		Callout 16 on figure 4-3 is pointed at a bolt. In key to figure 4-3, item 16 is calle a shim. Please correct one or the other

EXAMPLE

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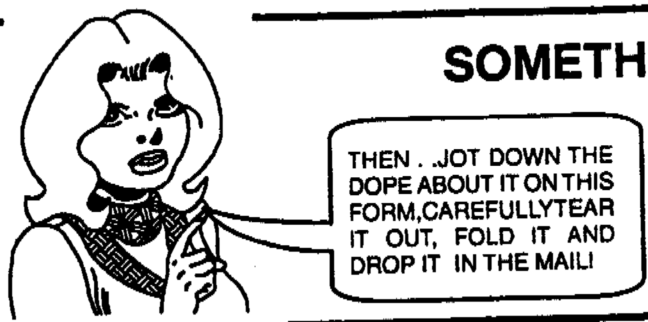

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DMWR 1-2840-113-1	15 JANUARY 1999	DMWR FOR TURBO-PROP AND TURBOSHAFT AIRCRAFT ENGINES

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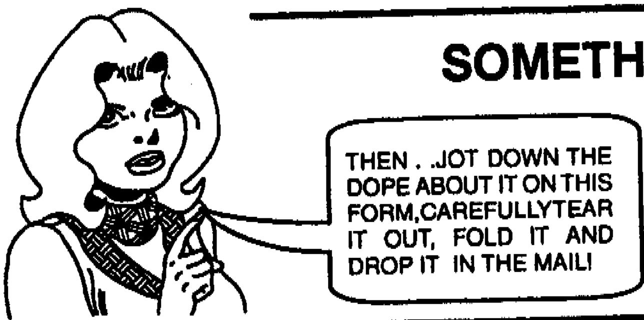

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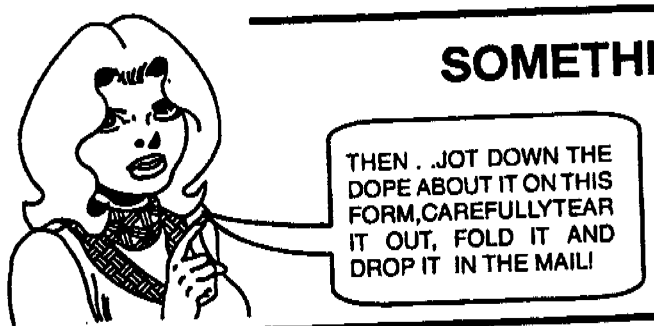

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

U-UP

*DMWR 1-2840-113-2

DEPOT MAINTENANCE WORK REQUIREMENT

for

ENGINE, AIRCRAFT, TURBO–PROP

MODEL	PART NUMBER	NATIONAL STOCK NUMBER
T53–L–15	1–000–100–01	2840–00–957–2853
T53–L–701	1–000–110–01	2840–00–116–7134
T53–L–701A	1–000–110–03/07	2840–00–176–9132

and

ENGINE, AIRCRAFT, TURBO–SHAFT

MODEL	PART NUMBER	NATIONAL STOCK NUMBER
T53–L–13B	1–000–060–22	2840–00–134–4803
T53–L–703	1–000–060–23	2840–00–621–1860

This publication is a reprint of DMWR 1-2840-113-2, dated 15 January 1999, including change 1.

* This manual supersedes DMWR 1-2840-113-2 dated 30 September 1994, including all changes.

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US ARMY AVIATION AND
MISSILE COMMAND
15 JANUARY 1999