

**DEPOT MAINTENANCE  
WORK REQUIREMENT**

**for**

**ENGINE, AIRCRAFT, TURBO-PROP**

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

**and**

**ENGINE, AIRCRAFT, TURBO-SHAFT**

<b>MODEL</b>	<b>PART NUMBER</b>	<b>NATIONAL STOCK NUMBER</b>
<b>T53-L-13B</b>	<b>1-000-060-22</b>	<b>2840-00-134-4803</b>
<b>T53-L-703</b>	<b>1-000-060-23</b>	<b>2840-00-621-1860</b>

This publication is a reprint of DMWR1-2840-113-3, dated 15 January 1999, including change 1.

\* This manual supersedes DMWR 1-2840-113-3, dated 30 September 1994, including all changes.

This publication is not available through U.S. Army Publication Distribution Centers. It must be obtained from U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5230.

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

---

CHQSOFTWARE.COM

CHQSOFTWARE.COM

**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 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****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.

CHQSOFTWARE.COM

**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 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.



CHQSOFTWARE.COM

**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.

CHQSOFTWARE.COM

**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.

CHANGE

NO. 1

CHQSOFTWARE.COM

DMWR 1-2840-113-3

C1

U.S. ARMY AVIATION AND  
MISSILE COMMAND

REDSTONE ARSENAL, AL 35898-5230

26 MAY 2000

# 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

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

DMWR 1-2840-113-3, dated 15 January 1999, is changed as follows:

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

### Remove Pages

A/(B blank)  
III and IV  
IX and X  
XIII and XIV  
5-1253 through 5-1258  
-----  
5-1259 through 5-1270  
-----  
5-1271 through 5-1278  
-----  
5-1287 and 5-1288

### Insert Pages

A/(B blank)  
III and IV  
IX and X  
XIII and XIV  
5-1253 through 5-1258  
5-1258.1 and 5-1258.2  
5-1259 through 5-1270  
5-1270.1/(5-1270.2 blank)  
5-1271 through 5-1278  
5-1278.1 and 5-1278.2  
5-1287 and 5-1288

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

CHQSOFTWARE.COM

**FOR THE COMMANDER:**

**HERBERT M. CARR**  
*Colonel, AD*  
*Chief of Staff*

**OFFICIAL:**



**RICHARD E. TURNER**

*Director*

*Logistics Support Directorate*

*Integrated Materiel Management Center*



CHQSOFTWARE.COM

DEPOT MAINTENANCE  
WORK REQUIREMENT  
NO. 1-2840-113-3

CHQSOFTWARE.COM

US ARMY AVIATION  
AND MISSILE COMMAND  
15 JANUARY 1999

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

**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) or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5230. You may also submit your recommended changes by E-Mail directly to ls-lp@redstone.army.mil or by fax 256-842-6546/DSN 788-6546. A reply will be furnished directly to you. Instruction for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

**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.

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

**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 1-2840-113-3, dated 30 September 1994, including all changes.

# CHQ SOFTWARE.COM TABLE OF CONTENTS

SECTION/PARAGRAPH	TITLE	PAGE
SECTION XII. COMPRESSOR .....		5-992
5-409.	COMPRESSOR AND IMPELLER HOUSINGS .....	5-992
5-410.	DISASSEMBLY .....	5-992
5-411.	CLEANING .....	5-996
5-412.	INSPECTION .....	5-996
5-413.	REPAIR OF COMPRESSOR AND IMPELLER HOUSING .....	5-996
5-414.	REASSEMBLY .....	5-1040
5-415.	FUNCTIONAL TEST .....	5-1041
5-416.	REAR COMPRESSOR BEARING OIL SEAL .....	5-1041
5-417.	CLEANING OF REAR COMPRESSOR BEARING OIL SEAL RETAINER, OIL SEAL, AND RETAINING PLATE .....	5-1041
5-418.	INSPECTION OF REAR COMPRESSOR BEARING OIL SEAL RETAINER, OIL SEAL, AND RETAINING PLATE .....	5-1041
5-419.	REPAIR OF REAR COMPRESSOR BEARING OIL SEAL RETAINER, OIL SEAL, AND RETAINING PLATE .....	5-1041
5-420.	REASSEMBLY OF REAR COMPRESSOR BEARING OIL SEAL RETAINER .	5-1045
5-421.	FUNCTIONAL TEST .....	5-1057
5-422.	COMPRESSOR ROTOR ASSEMBLY (T53-L-15, -701) .....	5-1057
5-423.	DISASSEMBLY .....	5-1057
5-424.	CLEANING .....	5-1060
5-425.	INSPECTION .....	5-1061
5-426.	REPAIR .....	5-1061
5-427.	REPLACEMENT OF COMPRESSOR ROTOR BLADES .....	5-1133
5-428.	INITIAL REASSEMBLY OF COMPRESSOR ROTOR ASSEMBLY (T53-L-15, -701) .....	5-1138
5-429.	COMPRESSOR ROTOR COMPRESSION CHECK (T53-L-15, -701) .....	5-1140
5-430.	COMPRESSOR ROTOR CONCENTRICITY CHECK (T53-L-15, -701) .....	5-1144
5-431.	COMPRESSOR ROTOR BALANCING (T53-L-15, -701) .....	5-1144
5-432.	FINAL REASSEMBLY OF COMPRESSOR ROTOR ASSEMBLY (T53-L-15, -701) .....	5-1147
5-433.	FUNCTIONAL TEST .....	5-1148
5-434.	COMPRESSOR ROTOR ASSEMBLY (T53-L-13B, -701A, -703) .....	5-1148
5-435.	DISASSEMBLY .....	5-1148
5-436.	CLEANING .....	5-1155
5-437.	INSPECTION .....	5-1155
5-438.	REPAIR .....	5-1155
5-439.	REPLACEMENT OF COMPRESSOR ROTOR BLADES (T53-L-13B, -701A, -703) .....	5-1197
5-440.	REPLACEMENT OF WELDED COMPRESSOR ROTOR DISKS (T53-L-13B, -701A, -703) .....	5-1199
5-441.	INITIAL REASSEMBLY .....	5-1223
5-442.	COMPRESSOR ROTOR CONCENTRICITY CHECK (T53-L-13B, -701A, -703) .....	5-1226
5-443.	COMPRESSOR ROTOR BALANCING (T53-L-13B, -701A, -703) .....	5-1227
5-444.	FINAL REASSEMBLY .....	5-1229
5-445.	FUNCTIONAL TEST .....	5-1230
5-446.	MODIFICATION .....	5-1230
5-447.	MODIFICATION OF COMPRESSOR AND IMPELLER HOUSING ASSEMBLY .	5-1243



## TABLE OF CONTENTS (Continued)

SECTION/PARAGRAPH	TITLE	PAGE
5-448.	MODIFICATION OF COMPRESSOR HOUSING ASSEMBLY .....	5-1247
5-449.	MODIFICATION OF THICK FORWARD FLANGE AXIAL COMPRESSOR HOUSINGS (1-100-980-03), REV. E AND SUBSEQUENT THAT INCORPORATE THE FIRST LAND STEEL INSERT .....	5-1247
5-450.	REPLACEMENT OF IMPELLER HOUSING ASSEMBLY .....	5-1251
5-451.	MODIFICATION OF COMPRESSOR ROTOR FRONT SHAFT FOR INCORPORATION OF A FACE SEAL AND FACEPLATE FOR NO. 1 BEARING .....	5-1251
SECTION XIII. ACCESSORY DRIVE CARRIER ASSEMBLY .....		5-1254
5-452.	ACCESSORY DRIVE CARRIER ASSEMBLY .....	5-1254
5-453.	DISASSEMBLY .....	5-1254
5-454.	CLEANING .....	5-1261
5-455.	INSPECTION .....	5-1261
5-456.	REPAIR OF ACCESSORY DRIVE CARRIER ASSEMBLY .....	5-1261
5-457.	REASSEMBLY OF ACCESSORY DRIVE CARRIER ASSEMBLY .....	5-1275
5-458.	FUNCTIONAL TEST .....	5-1278.2
5-459.	POWER SHAFT BEARING RETAINER .....	5-1278.2
5-460.	DISASSEMBLY .....	5-1278.2
5-461.	CLEANING .....	5-1278.2
5-462.	INSPECTION .....	5-1278.2
5-463.	REPAIR .....	5-1278.2
5-464.	COATING AND CORROSION (RUST) REPAIR OF POWER SHAFT .....	5-1284
5-465.	BALANCING POWER SHAFT .....	5-1285
5-466.	REASSEMBLY .....	5-1287
5-467.	FUNCTIONAL TEST .....	5-1288
5-467A.	MODIFICATION OF ACCESSORY DRIVE ASSEMBLY (1-070-220-03/-13/-14 TO 1-070-220-10) .....	5-1288
SECTION XIV. INLET HOUSING .....		5-1288
5-468.	INLET HOUSING .....	5-1288
5-469.	DISASSEMBLY .....	5-1288
5-470.	CLEANING .....	5-1289
5-471.	INSPECTION .....	5-1289
5-472.	REPAIR .....	5-1289
5-473.	REASSEMBLY .....	5-1340
5-474.	FUNCTIONAL TEST .....	5-1341
5-475.	VARIABLE AIR INLET GUIDE VANE ASSEMBLY .....	5-1342
5-476.	DISASSEMBLY .....	5-1342
5-477.	INSPECTION .....	5-1353
5-478.	REPAIR .....	5-1353
5-479.	REASSEMBLY .....	5-1361
5-480.	FUNCTIONAL TEST .....	5-1361
5-481.	MODIFICATION OF INLET HOUSING ASSEMBLY .....	5-1361
CHAPTER 6 FINAL ASSEMBLY .....		6-1
6-1.	GENERAL .....	6-1
6-2.	INSTALLATION OF INLET HOUSING ASSEMBLY .....	6-1
6-3.	INSTALLATION OF VARIABLE AIR INLET GUIDE VANE ASSEMBLY .....	6-1
6-4.	INSTALLATION OF COMPRESSOR ROTOR ASSEMBLY .....	6-3
6-5.	INSTALLATION OF COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES .....	6-4

## TABLE OF CONTENTS (Continued)

SECTION/PARAGRAPH	TITLE	PAGE
6-6.	INSTALLATION OF DIFFUSER HOUSING ASSEMBLY .....	6-5
6-7.	COMPRESSOR ROTOR CLEARANCES .....	6-6
6-8.	INSTALLATION OF FIRST STAGE GAS PRODUCER NOZZLE ASSEMBLY, COMBUSTION CHAMBER DEFLECTOR, BEARING AFT SEAL, HOUSING, BEARING, OIL RINGS, AND BEARING FORWARD SEAL ..	6-14
6-9.	INSTALLATION OF FIRST STAGE GAS PRODUCER TURBINE ROTOR ASSEMBLY .....	6-20
6-10.	INSTALLATION OF SECOND STAGE GAS PRODUCER NOZZLE ASSEMBLY AND CYLINDER .....	6-22
6-11.	INSTALLATION OF SECOND STAGE GAS PRODUCER ROTOR ASSEMBLY ..	6-24
6-12.	ACCESSORY DRIVE CARRIER GEAR PATTERN AND BACKLASH CHECK ..	6-26
6-13.	DETERMINING MEAN POSITION OF POWER SHAFT .....	6-28
6-14.	INSTALLATION OF POWER SHAFT BEARING RETAINER .....	6-29
6-15.	INSTALLATION OF COMBUSTOR TURBINE ASSEMBLY .....	6-30
6-16.	INSTALLATION OF REAR BEARING SUPPORT ASSEMBLY, MAIN SUN GEAR SUPPORT, ELECTRIC TORQUEMETER HEAD SUPPORT ASSEMBLY, AND ACCESSORY DRIVE CARRIER ASSEMBLY (T53-L-701, -701A) .....	6-36
6-17.	INSTALLATION OF ACCESSORY DRIVE CARRIER ASSEMBLY (T53-L-13B, -703, -15) .....	6-37
6-18.	INSTALLATION OF OIL TRANSFER SUPPORT ASSEMBLY (T53-L-13B, -703) .....	6-38
6-19.	POWER SHAFT FORWARD BEARING OIL IMPINGEMENT CHECK (T53-L-13B, -703) .....	6-38
6-20.	INSTALLATION OF PROPELLER SHAFT REAR BEARING SUPPORT (T53-L-15) .....	6-38
6-21.	POWER SHAFT FORWARD BEARING OIL IMPINGEMENT CHECK (T53-L-15, -701, -701A) .....	6-39
6-22.	INSTALLATION OF OUTPUT REDUCTION CARRIER AND GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-13B, -703) .....	6-39
6-23.	INSTALLATION OF REDUCTION GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-15) .....	6-40
6-24.	INSTALLATION OF REDUCTION GEAR ASSEMBLY AND SUN GEAR ASSEMBLY (T53-L-701, -701A) .....	6-41
6-25.	INSTALLATION OF ACCESSORY DRIVE GEARBOX .....	6-42
6-26.	INSTALLATION OF LUBE OIL FILTER ASSEMBLY .....	6-42
6-27.	INSTALLATION OF TEMPERATURE BULB .....	6-42
6-28.	INSTALLATION OF POWER-DRIVEN ROTARY (OIL) PUMP .....	6-42
6-29.	INSTALLATION OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY AND POWER-DRIVEN ROTARY (BOOSTER) PUMP (T53-L-13B, -15, -703) .....	6-42
6-30.	INSTALLATION OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-701, -701A) .....	6-43
6-31.	INSTALLATION OF TORQUEMETER JUNCTION BOX ASSEMBLY (T53-L-701, -701A) .....	6-43
6-32.	INSTALLATION OF ELBOW TUBE, AND BLEED AIR ADAPTER ASSEMBLY ..	6-43
6-33.	INSTALLATION OF AIR INLET GUIDE VANE ACTUATOR ASSEMBLY .....	6-43
6-34.	INSTALLATION OF INTERSTAGE BLEED ACTUATOR ASSEMBLY AND BLEED BANDS .....	6-44
6-35.	ADJUSTMENT OF BLEED BANDS .....	6-45
6-36.	INSTALLATION OF INTERSTAGE BLEED ACTUATOR HOSE ASSEMBLIES ..	6-46
6-37.	INSTALLATION OF IGNITION SYSTEM .....	6-47
6-38.	INSTALLATION OF FUEL CONTROL (T53-L-13B, -703) .....	6-48
6-39.	INSTALLATION OF FUEL CONTROL (T53-L-15, -701, -701A) .....	6-51

## TABLE OF CONTENTS (Continued)

SECTION/PARAGRAPH	TITLE	PAGE
6-40.	INSTALLATION OF AIR INLET GUIDE VANE ACTUATOR HOSE ASSEMBLIES (T53-L-13B, -703) .....	6-54
6-41.	INSTALLATION OF AIR INLET GUIDE VANE ACTUATOR HOSE ASSEMBLIES (T53-L-15, -701, -701A) .....	6-55
6-42.	INSTALLATION OF HOT-AIR SOLENOID VALVE AND AIR REGULATOR TUBE .....	6-55
6-43.	INSTALLATION OF STARTING FUEL SOLENOID VALVE ASSEMBLY (T53-L-13B, -703) .....	6-56
6-44.	INSTALLATION OF STARTING FUEL SOLENOID VALVE ASSEMBLY (T53-L-15, -701, -701A) .....	6-56
6-45.	INSTALLATION OF FLOW DIVIDER AND DUMP VALVE ASSEMBLY .....	6-56
6-46.	INSTALLATION OF COMBUSTION CHAMBER DRAIN VALVE ASSEMBLY ....	6-56
6-47.	INSTALLATION OF ELECTRICAL CABLE ASSEMBLY AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-13B) .....	6-56
6-48.	INSTALLATION OF ELECTRICAL CABLE ASSEMBLY (T53-L-703) .....	6-57
6-49.	INSTALLATION OF THERMOCOUPLE LEAD ASSEMBLY (T53-L-703) .....	6-57
6-50.	INSTALLATION OF ELECTRICAL CABLE ASSEMBLY AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-15) .....	6-57
6-51.	INSTALLATION OF ELECTRICAL CABLE ASSEMBLY AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-701, -701A) .....	6-57
6-52.	INSTALLATION OF FUEL FILTER AND BRACKET ASSEMBLY (T53-L-15, -701, -701A) .....	6-59
6-53.	INSTALLATION OF FUEL HEATER (T53-L-15, -701, -701A) .....	6-59
6-54.	INSTALLATION OF STARTING FUEL MANIFOLDS .....	6-59
6-55.	INSTALLATION OF STARTING FUEL HOSE ASSEMBLIES AND CHECK-FILTER VALVE (T53-L-13B, -703) ....	6-60
6-56.	INSTALLATION OF STARTING FUEL HOSE ASSEMBLIES AND CHECK-FILTER VALVE (T53-L-15, -701, -701A) .....	6-60
6-57.	INSTALLATION OF MAIN FUEL HOSE ASSEMBLY (T53-L-13B, -703) .....	6-60
6-58.	INSTALLATION OF MAIN FUEL HOSE ASSEMBLY (T53-L-15, -701, -701A) ...	6-61
6-59.	INSTALLATION OF LUBRICATION PRESSURE MANIFOLD AND HOSE ASSEMBLIES, AND OIL SCAVENGE HOSE ASSEMBLIES (T53-L-13B, -703) .	6-61
6-60.	INSTALLATION OF LUBRICATION PRESSURE MANIFOLD, PRESSURE HOSES, AND SCAVENGE HOSES (T53-L-15, -701, -701A) .....	6-62

## LIST OF ILLUSTRATIONS

Figure	Title	Page
5-501.	Compressor and Impeller Housing .....	5-993
5-502.	Vane Inner Shroud Sealing Area - Inspection Limits (Typical) .....	5-1008
5-503.	Impeller Housing Inspection Area .....	5-1008
5-504.	Compressor Housing Crack Limits .....	5-1008
5-505.	Compressor Housing Inspection Limit (Minimum Distance Between Adjacent Opposite Defects) .....	5-1009
5-506.	Compressor Housing Corrosion Inspection Areas .....	5-1009
5-507.	Overhaul Length Dimension of Housing (Sheet 1 of 2) .....	5-1010
5-507.	Overhaul Length Dimension of Housing (Sheet 2 of 2) .....	5-1011
5-508.	Compressor and Impeller Housing Assemblies Dimensional Inspection Locations .....	5-1012
5-509.	Compressor Housing Bolt Retainer Slot Machining and Replacement Plug .....	5-1013
5-510.	Fabrication of Expendable Runoff Tab .....	5-1013
5-511.	Compressor Housing Bolt Retainer Slot Rework .....	5-1014
5-512.	Compressor Housing Crack Repair .....	5-1017
5-513.	Fabrication of Ring Blank .....	5-1021
5-514.	Fabrication of Inserts .....	5-1023
5-515.	Compressor Stator Vane - Repair Limits .....	5-1026
5-516.	Cross Section of Centrifugal Compressor Housing .....	5-1028
5-517.	Aluminum Shims to Reposition Housing .....	5-1031

## LIST OF ILLUSTRATIONS (Continued)

Figure	Title	Page
5-518.	Location of Shim Bonding .....	5-1032
5-519.	Centrifugal Impeller Housing Cross Sectional Area .....	5-1032
5-520.	Centrifugal Impeller Housing - Repair Area .....	5-1033
5-521.	Metal Spray Repair of 9.823-9.828 Diameter .....	5-1036
5-522.	Metal Spray Repair of 13.372-13.375 Diameter .....	5-1037
5-523.	Metal Spray Repair of Stainless Steel Impeller Housing Contoured Surface .....	5-1039
5-524.	Retaining Plate - Plating Area .....	5-1045
5-525.	Aft Oil Ring - Plating Area .....	5-1046
5-526.	Retaining Plate, Retaining Ring, and Oil Seal Retainer Dimensional Inspection Locations .....	5-1047
5-527.	Compressor Rotor Assembly (T53-L-15, -701) .....	5-1058
5-528.	Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-15, -701) (Sheet 1 of 4) .....	5-1096
5-528.	Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-15, -701) (Sheet 2 of 4) .....	5-1097
5-528.	Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-15, -701) (Sheet 3 of 4) .....	5-1098
5-528.	Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-15, -701) (Sheet 4 of 4) .....	5-1099
5-529.	Compressor Rotor Blade Tip Inspection Limits .....	5-1100
5-530.	First Stage Compressor Rotor Blade - Measuring Chordal Width .....	5-1102
5-531.	Compressor Rotor Disk - Repair Area (English) .....	5-1103
5-532.	Compressor Rotor Disk - Repair Area (Metric) .....	5-1104
5-533.	Compressor Front Rotor Shaft - Wear .....	5-1105
5-534.	Compressor Rotor Disk Pilot Diameter - Inspection and Repair (T53-L-15, -701) .....	5-1106
5-535.	Centrifugal Compressor Impeller Blade Inspection and Repair (Sheet 1 of 2) .....	5-1106
5-535.	Centrifugal Compressor Impeller Blade Inspection and Repair (Sheet 2 of 2) .....	5-1107
5-536.	Chrome Plating - Fifth Stage Compressor Rotor Spacer (T53-L-15, -701) .....	5-1108
5-537.	Power Shaft Shoulder Area - Wear .....	5-1108
5-538.	Compressor Rotor Blade Damage Before and After Repair .....	5-1109
5-539.	Nut and Seal Assembly - Seal Replacement .....	5-1110
5-540.	Rework of Front Seal Housing on Seal Assembly (1-300-077-02) .....	5-1111
5-541.	Compressor Front Bearing Housing - Plating Area .....	5-1112
5-542.	Seal Housing - Plating Area .....	5-1113
5-543.	First Stage Compressor Rotor Blade - Repair .....	5-1114
5-544.	Shaft and Disk Pin Hole - Repair .....	5-1116
5-545.	Pin Hole - Drilling .....	5-1117
5-546.	Compressor Front Rotor Shaft - Plating Area .....	5-1117
5-547.	Second, Third, and Fourth Stage Compressor Disks - Repair Areas .....	5-1118
5-548.	Compressor Rotor Runouts - Typical .....	5-1119
5-549.	Fifth Stage Compressor Disk - Repair Area .....	5-1120
5-550.	Fifth Stage Compressor Rotor Spacer - Parallelism Repair .....	5-1121

## LIST OF ILLUSTRATIONS (Continued)

Figure	Title	Page
5-551.	First, Second, Third, and Fourth Stage Compressor Rotor Spacers - Plating Area .....	5-1123
5-552.	Forward Bearing and Seal Repair Areas .....	5-1124
5-553.	Removal of Spline End .....	5-1127
5-554.	Replacement of Spline End (English) .....	5-1128
5-555.	Replacement of Spline End (Metric) .....	5-1129
5-556.	Finish Machining (English) .....	5-1130
5-557.	Finish Machining (Metric) .....	5-1131
5-558.	Power Shaft Repair Area .....	5-1132
5-559.	Rear Compressor Shaft - Repair Area .....	5-1132
5-560.	Masking Airfoil Surfaces in Preparation for Vapor-Blasting of Blade Roots .....	5-1135
5-561.	Masking Shield Preparation Prior to Spraying Blade Roots .....	5-1135
5-562.	Coating of Blade Roots .....	5-1135
5-563.	First Stage Disk Blade Arrangements .....	5-1137
5-564.	Compressor Rotor Blade Grinding .....	5-1139
5-565.	Compressor Rotor Assembly and Adapters Positioned on Hydraulic Press .....	5-1142
5-566.	Screw Sequence and Torque Requirements .....	5-1143
5-567.	Compressor Rotor Length Dimension and Stock Removal Areas .....	5-1146
5-568.	Installing Forward Seal .....	5-1147
5-569.	Compressor Rotor Assembly (T53-L-13B, -701A, -703) .....	5-1149
5-570.	Index Mark Locations on Compressor Rotor .....	5-1154
5-571.	Compressor Rotor Assembly Dimensional. Inspection Locations (T53-L-13B, -701A, -703) (Sheet 1 of 2) .....	5-1174
5-571.	Compressor Rotor Assembly Dimensional. Inspection Locations (T53-L-13B, -701A, -703) (Sheet 2 of 2) .....	5-1175
5-572.	Faceplate Inspection .....	5-1176
5-573.	Centrifugal Compressor Impeller Blade Inspection and Repair .....	5-1177
5-574.	Front Bearing Housing- Plating Area .....	5-1179
5-575.	Mainshaft Seal Face Plate Metal Spray Repair .....	5-1181
5-576.	Seal Housing - Plating Area .....	5-1182
5-577.	Installing Forward Face Seal .....	5-1183
5-578.	First Stage Compressor Rotor Blade - Sand and Dust Inspection .....	5-1184
5-579.	Front Compressor Shaft- Repair Area .....	5-1186
5-580.	Disk Pin Hole - Repair .....	5-1188
5-581.	Pin Hole Drilling .....	5-1188
5-582.	Centrifugal Compressor Impeller Blade Inspection and Repair .....	5-1190
5-583.	Rear Compressor Shaft Repair Area .....	5-1193
5-584.	Compressor Rotor Blade Grinding (English) .....	5-1200
5-585.	Compressor Rotor Blade Grinding (Metric) .....	5-1201
5-586.	Removal of Damaged Compressor Rotor Stages (English) (Sheet 1 of 2) .....	5-1203
5-586.	Removal of Damaged Compressor Rotor Stages (English) (Sheet 2 of 2) .....	5-1204
5-587.	Removal of Damaged Compressor Rotor Stages (Metric) (Sheet 1 of 2) .....	5-1205



## LIST OF ILLUSTRATIONS (Continued)

Figure	Title	Page
5-587.	Removal of Damaged Compressor Rotor Stages (Metric) (Sheet 2 of 2) .....	5-1206
5-588.	Machining of Replacement Compressor Rotor Disks (English) (Sheet 1 of 2) .....	5-1207
5-588.	Machining of Replacement Compressor Rotor Disks (English) (Sheet 2 of 2) .....	5-1208
5-589.	Machining of Replacement Compressor Rotor Disks (Metric) (Sheet 1 of 2) .....	5-1209
5-589.	Machining of Replacement Compressor Rotor Disks (Metric) (Sheet 2 of 2) .....	5-1210
5-590.	Installation of Replacement Compressor Rotor Disk (English) (Sheet 1 of 4) .....	5-1211
5-590.	Installation of Replacement Compressor Rotor Disk (English) (Sheet 2 of 4) .....	5-1212
5-590.	Installation of Replacement Compressor Rotor Disk (English) (Sheet 3 of 4) .....	5-1213
5-590.	Installation of Replacement Compressor Rotor Disk (English) (Sheet 4 of 4) .....	5-1214
5-591.	Installation of Replacement Compressor Rotor Disk (Metric) (Sheet 1 of 4) .....	5-1215
5-591.	Installation of Replacement Compressor Rotor Disk (Metric) (Sheet 2 of 4) .....	5-1216
5-591.	Installation of Replacement Compressor Rotor Disk (Metric) (Sheet 3 of 4) .....	5-1217
5-591.	Installation of Replacement Compressor Rotor Disk (Metric) (Sheet 4 of 4) .....	5-1218
5-592.	Compressor Rotor Set Up for Electron Beam Welding (Typical) .....	5-1221
5-593.	Relative Starting Positions for Electron Beam Welded Joints .....	5-1221
5-594.	Dimensional Limits, Stock Removal Areas, and Staking Procedure for Compressor Rotor Subassembly .....	5-1225
5-595.	Lockcup Washer Centering Ring Fabrication .....	5-1226
5-596.	Dimensional Limits for Material Removal and Radial Runout of Impeller .....	5-1229
5-597.	Compressor Housing Dimensional Inspection .....	5-1231
5-598.	Compressor Housing Machining (English) .....	5-1232
5-599.	Compressor Housing Machining (Metric) .....	5-1233
5-600.	Compressor Housing Machining .....	5-1234
5-601.	Compressor Housing Machining (Section AH-AH) .....	5-1235
5-602.	Compressor Housing Machining (Section AJ-AJ) .....	5-1236
5-603.	Compressor Housing Machining (Section AK-AK) .....	5-1236
5-604.	Compressor Housing Machining (Section AL-AL) .....	5-1237
5-605.	Compressor Housing Machining (Section EE) .....	5-1238
5-606.	Compressor Housing Coating Requirements .....	5-1240
5-607.	Installing Plates to Housing Halves .....	5-1241
5-608.	Axial Compressor Housing Machining Final (English) .....	5-1244
5-609.	Axial Compressor Housing Machining Final (Metric) .....	5-1245
5-610.	Compressor Housing Spacer Fabrication .....	5-1246
5-611.	Rework of Compressor Housing Assembly Forward Flange .....	5-1248
5-612.	Comparison of Axial Compressor Housing Flanges .....	5-1249
5-613.	Rework of Thick Flange Housing (1-100-980-03), Revision E and Subsequent .....	5-1250
5-614.	Rework of Compressor Rotor Front Shaft .....	5-1252
5-615.	Installation of Seal Ring onto Front Shaft .....	5-1252
5-616.	Fabrication of Sealing Ring .....	5-1253
5-617.	Accessory Drive Carrier Assembly (Sheet 1 of 2) .....	5-1255
5-617.	Accessory Drive Carrier Assembly (Sheet 2 of 2) .....	5-1256
5-618.	Spur Gear (1-070-062-04/-06) Inspection .....	5-1270.1

# LIST OF ILLUSTRATIONS (Continued)

CHQSOFTWARE.COM

Figure	Title	Page
5-619.	Accessory Drive Carrier Dimensional Inspection Locations .....	5-1271
5-620.	Bearing Liner - Plating Area .....	5-1272
5-621.	Gearshaft - Repair Area .....	5-1272
5-622.	Accessory Drive Carrier - Bearing Liner Replacement (English) (1-070-210-01/ 1-070-230-01) .....	5-1273
5-622A.	Accessory Drive Carrier - Bearing Liner Replacement (English) (1-070-210-07) .....	5-1274
5-623.	Accessory Drive Gear Carrier - Bearing Liner Replacement (Metric) (1-070-210-01/ 1-070-230-01) .....	5-1274
5-623A.	Accessory Drive Gear Carrier - Bearing Liner Replacement (Metric) (1-070-210-07) .....	5-1275
5-624.	Correct Assembly of Gearshaft and Bearing Assembly (Typical) .....	5-1277
5-625.	Power Shaft Bearing Retainer Assembly .....	5-1279
5-626.	Power Shaft Bearing Retainer Assembly Dimensional Inspection Locations .....	5-1283
5-627.	Repair of Power Shaft Bearing Retainer .....	5-1283
5-628.	Power Shaft Supporting and Stock Removal Areas for Balancing .....	5-1286
5-629.	Internal Connections for Test Stand .....	5-1287
5-630.	Inlet Housing Assembly .....	5-1290
5-631.	Repair of Inlet Housing Mounting Pad Holes .....	5-1301
5-632.	Inlet Housing Internal Corrosion Inspection Criteria .....	5-1301
5-633.	Inlet Housing Assembly Dimensional Inspection Locations (Typical) .....	5-1302
5-634.	Inlet Housing Weldable Area .....	5-1303
5-635.	Machining/Plating Requirements .....	5-1305
5-636.	Fabrication of Hollow Dowel .....	5-1307
5-637.	Inlet Housing Core Plug Corrosion Cleanup Limits .....	5-1309
5-638.	Inlet Housing Bearing Bore Repair (Sheet 1 of 2) .....	5-1312
5-638.	Inlet Housing Bearing Bore Repair (Sheet 2 of 2) .....	5-1313
5-639.	Inlet Housing VIGV Area Plasma Spray and Machining Dimensions .....	5-1316
5-640.	Machining of Weld Repaired Inlet Housing V-Band Area .....	5-1318
5-641.	Inlet Housing Repair Areas .....	5-1319
5-642.	Repair of Inlet Housing (English) (Sheet 1 of 4) .....	5-1324
5-642.	Repair of Inlet Housing (English) (Sheet 2 of 4) .....	5-1325
5-642.	Repair of Inlet Housing (English) (Sheet 3 of 4) .....	5-1326
5-642.	Repair of Inlet Housing (English) (Sheet 4 of 4) .....	5-1327
5-643.	Repair of Inlet Housing (Metric) (Sheet 1 of 4) .....	5-1328
5-643.	Repair of Inlet Housing (Metric) (Sheet 2 of 4) .....	5-1329
5-643.	Repair of Inlet Housing (Metric) (Sheet 3 of 4) .....	5-1330
5-643.	Repair of Inlet Housing (Metric) (Sheet 4 of 4) .....	5-1331
5-644.	Repair of Inlet Housing Mount Pad .....	5-1335
5-645.	Repair of Oil Port Hole .....	5-1336
5-646.	Air Bleed Vent Hole Relocation .....	5-1337
5-647.	Air Bleed Vent Hole Relocation Pin Installation .....	5-1338
5-648.	Air Bleed Vent Hole Relocation Machining Dimensions .....	5-1339
5-649.	Setting Torquemeter Valve Clearance .....	5-1342
5-650.	Variable Inlet Guide Vane Assembly .....	5-1344
5-651.	Variable Inlet Guide Vane Assembly Dimensional Inspection Locations .....	5-1352



## LIST OF ILLUSTRATIONS (Continued)

Figure	Title	Page
5-652.	Air Inlet Vane Repair Limits .....	5-1353
5-653.	Stacking of Unison Ring Bearing .....	5-1354
5-654.	Stacking of Unison Ring Rollers .....	5-1354
5-655.	Repair of Inner Rear and Forward Fairings .....	5-1356
5-656.	Final Drilling and Machining of Inner Rear and Forward Fairings .....	5-1357
5-657.	Inner Rear and Forward Fairing Bushing Repair .....	5-1358
5-658.	Outward Forward Fairing Bushing Repair .....	5-1359
5-659.	Inlet Housing Assembly - Rework (English) (Sheet 1 of 4) .....	5-1363
5-659.	Inlet Housing Assembly - Rework (English) (Sheet 2 of 4) .....	5-1364
5-659.	Inlet Housing Assembly - Rework (English) (Sheet 3 of 4) .....	5-1365
5-659.	Inlet Housing Assembly - Rework (English) (Sheet 4 of 4) .....	5-1366
5-660.	Inlet Housing Assembly - Rework (Metric) (Sheet 1 of 4) .....	5-1367
5-660.	Inlet Housing Assembly - Rework (Metric) (Sheet 2 of 4) .....	5-1368
5-660.	Inlet Housing Assembly - Rework (Metric) (Sheet 3 of 4) .....	5-1369
5-660.	Inlet Housing Assembly - Rework (Metric) (Sheet 4 of 4) .....	5-1370
6-1.	Protractor (LTCT4750) Installed .....	6-2
6-2.	Modification of Protractor Finger Assembly (LTCT4751, Detail of Protractor LTCT4750) .....	6-2
6-3.	Variable Air Inlet Guide Vane Connector .....	6-3
6-4.	Mounting Bracket Locations (T53-L-13B, -703) .....	6-6
6-5.	Mounting Bracket Locations (T53-L-15, -701, -701A) .....	6-7
6-6.	Impeller Housing Bolt Locations (Magnesium) (1-100-090-13) (Sheet 1 of 2) .....	6-8
6-6.	Impeller Housing Bolt Locations (Stainless Steel) (1-101-370-03) (Sheet 2 of 2) .....	6-9
6-7.	Compressor Rotor Clearance Locations .....	6-9
6-8.	Forward Seal - Installation .....	6-15
6-9.	Rear Bearing Housing Studs, Nuts, and Bolts - Lockwire Procedure (P/N 1-110-590-02) .....	6-17
6-10.	Rear Bearing Housing Bolt Lockwiring Procedures (P/N 1-110-470-13) .....	6-17
6-11.	Determining Clearance Between First Stage Gas Producer Nozzle Assembly and Rotor Assembly .....	6-19
6-12.	Rework of Rear Cone (1-110-141-01 to 1-110-141-02) Configuration .....	6-21
6-13.	Checking Positions - Tip Clearance .....	6-22
6-14.	Determining Clearance Between First Stage Gas Producer Rotor and Second Stage Gas Producer Nozzle .....	6-23
6-15.	Spacer Thickness .....	6-25
6-16.	Checking Runout on Second Stage Gas Producer Rotor .....	6-27
6-17.	Checking Hub Runout on Second Stage Gas Producer Rotor .....	6-27
6-18.	Checking Backlash of Accessory Drive Carrier Assembly Gear .....	6-28
6-19.	Gear to Power Shaft - Installation Dimension (T53-L-13B, -15, -703) .....	6-30
6-20.	Determining Clearance Between Combustor Turbine Assembly and Second Stage Gas Producer Rotor Assembly (Typical) .....	6-31
6-21.	Combustor Turbine Bracket Locations (T53-L-13B, -703) .....	6-34

**LIST OF ILLUSTRATIONS (Continued)**

<b>Figure</b>	<b>Title</b>	<b>Page</b>
6-22.	Combustor Turbine Bracket Locations (T53-L-15, -701A) .....	6-35
6-23.	Measurement from Forward Face of Power Shaft to Forward Face of Gear (T53-L-701, -701A) .....	6-37
6-24.	Determining Rod Travel .....	6-45
6-25.	Ignition Unit Retaining Bracket .....	6-48
6-26.	End Float Adjustment of Overspeed Governor Drive Shaft .....	6-48
6-27.	Filler Assembly .....	6-50
6-28.	Fabrication of Mounting Bracket .....	6-58

# LIST OF TABLES

Table	Title	Page
5-153.	Inspection of Compressor and Impeller Housing .....	5-997
5-154.	Compressor and Impeller Housing Inspection Limits .....	5-1002
5-155.	Dimensional Inspection of Compressor and Impeller Housing Assemblies .....	5-1006
5-156.	Drill and Dimensions Chart, Fabrication of Inserts .....	5-1024
5-157.	Compressor Stator Vanes - Braze Instructions .....	5-1027
5-158.	Inspection of Rear Compressor Bearing Oil Seal Retainer, Oil Seal, and Retaining Plate .....	5-1042
5-159.	Retaining Plate Inspection Limits .....	5-1043
5-160.	Magnetic-Particle Inspection of Rear Compressor Bearing Oil Seal Retainer and Retaining Plate .....	5-1043
5-161.	Dimensional Inspection of Retaining Plate, Retaining Ring, and Oil Retainer .....	5-1044
5-162.	Inspection of Compressor Rotor Assembly (T53-L-15, -701) .....	5-1062
5-163.	Magnetic-Particle Inspection of Compressor Rotor Assembly (T53-L-15, -701) .....	5-1072
5-164.	Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) .....	5-1073
5-165.	Compressor Rotor Assembly - Inspection Limits (T53-L-15, -701) .....	5-1089
5-167.	Dimensional Inspection of Compressor Rotor Assembly Seal (T53-L-15, -701) .....	5-1095
5-166.	Dimensional Inspection of Compressor Rotor Assembly Bearings (T53-L-15, -701) .....	5-1095
5-168.	Compressor Rotor Blade Installation Fixtures .....	5-1137
5-169.	Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) .....	5-1156
5-170.	Magnetic Particle Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) .....	5-1163
5-171.	Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) .....	5-1164
5-172.	Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) .....	5-1169
5-173.	Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) .....	5-1169
5-174.	Compressor Rotor Assembly - Inspection Limits (T53-L-13B, -701A, -703) .....	5-1170
5-175.	Visual, Fluorescent-Penetrant, and Radiographic Acceptance Limits for Reworked Compressor Rotor .....	5-1222
5-176.	Ultrasonic Inspection Acceptance Limits for Reworked Compressor Rotor .....	5-1222
5-177.	Inspection of Accessory Drive Carrier Assembly .....	5-1262
5-178.	Accessory Drive Carrier Inspection Limits .....	5-1266
5-179.	Dimensional Inspection of Accessory Drive Carrier Assembly .....	5-1267
5-180.	Magnetic Particle Inspection of Rear Accessory Drive Carrier Assembly .....	5-1268
5-181.	Dimensional Inspection of Accessory Drive Carrier Assembly Bearings .....	5-1269
5-182.	Tachometer Drive Bearing Spacer/Shim Sizes .....	5-1278
5-183.	Inspection of Power Shaft Bearing Retainer Assembly .....	5-1280
5-184.	Power Shaft Bearing Retainer Assembly Units .....	5-1281
5-185.	Magnetic Particle Inspection of Power Shaft Bearing Retainer .....	5-1281
5-186.	Dimensional Inspection of Power Shaft Bearing Retainer Assembly .....	5-1281
5-187.	Dimensional Inspection of Power Shaft Front Bearing .....	5-1282
5-188.	Inspection of Inlet Housing Assembly .....	5-1293
5-189.	Inlet Housing Assembly - Inspection Limits .....	5-1296

## LIST OF TABLES (Continued)

<b>Table</b>	<b>Title</b>	<b>Page</b>
5-190.	Magnetic Particle Inspection of Inlet Housing Assembly .....	5-1298
5-191.	Dimensional Inspection of Inlet Housing Assembly .....	5-1299
5-192.	Parts Required for Reassembly of Inlet Housing (T53-L-13B, -15, -703) .....	5-1323
5-193.	Inspection of Variable Inlet Guide Vane Assembly .....	5-1346
5-194.	Dimensional Inspection of Variable Inlet Guide Vane and Fairing Assemblies .....	5-1349
5-195.	Variable Inlet Guide Vane Assembly - Inspection Limits .....	5-1350
6-1.	Compressor Rotor Clearances .....	6-11
6-2.	Shim Thickness .....	6-20
6-3.	Chafing Sleeve Sizes .....	6-47

## SECTION XII. COMPRESSOR

### 5-409. COMPRESSOR AND IMPELLER HOUSINGS.

### 5-410. DISASSEMBLY. Proceed as follows:

#### NOTE

If during disassembly of compressor housing assembly, it becomes necessary to remove the steel inserts, identify inserts by compressor housing serial number. Use temporary method of identification such as tagging.

- a. Remove bolts (1, figure 5-501) and washers (2) that secure the impeller housing assembly (5) to the compressor housing assembly. Remove bracket (3) and clips (4).
- b. Remove screws (6) and washers (7) that secure first stage vane assembly (8), second stage vane assembly (9), third stage compressor vane (10), and fourth stage compressor vane (11) to compressor housing subassembly. Remove the vane assemblies and place in a suitable container, keeping both halves of the vane assemblies together.

#### CAUTION

In following step c, care must be taken to ensure that retainer (15) does not score housing during removal.

- c. Straighten retainer (15), using suitable drift. Remove bolts (12), screws (14), retainers (15), and washers (13) that secure exit guide vane (23) to compressor housing halves. Remove the exit guide vane assembly and place in suitable container.

#### NOTE

Compressor housing halves are not interchangeable and must be tagged as a matched set.

If inserts 19, 20, 21, and 22 are removed, note and record serial numbers of inserts, by position in compressor housing, and note serial number of compressor housing. Compressor housing and inserts are a matched set and parts should not be mixed during reassembly.

CHQSOFTWARE.COM

CHQSOFTWARE.COM

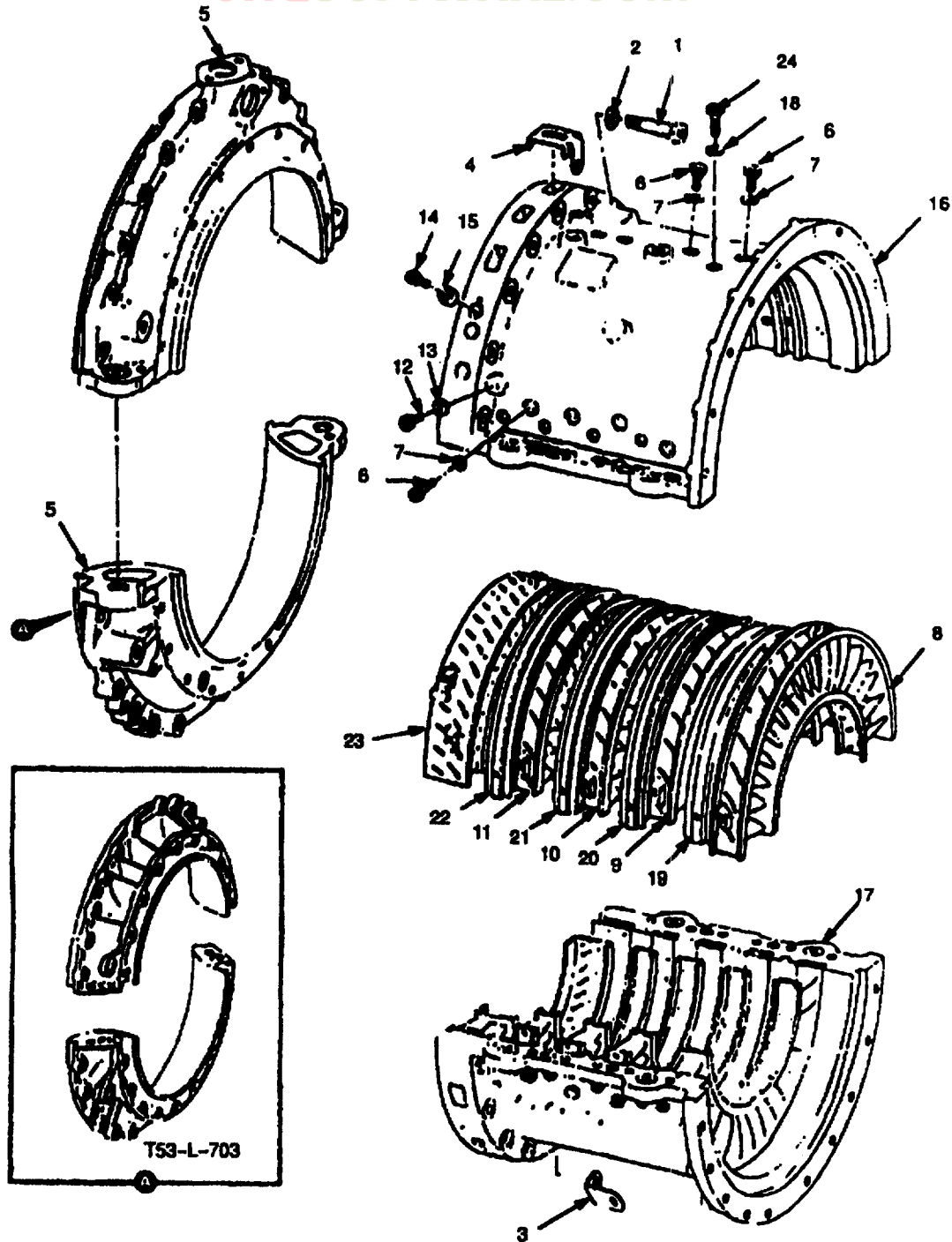


Figure 5-501. Compressor and Impeller Housing.

Figure & Index Number	Part Number	CHQSOFTWARE.COM	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7			
5-501	No Number		Housing, Compressor and Impeller (NHA 1-000-060-03, 1-000-060-08, 1-170-330-13, 1-170-330-04, 1-100-640-05, and 1-100-640-06)	1	
-1	AN148675		. BOLT, Socket Head (Replace with MS9089-28)	18	
	MS9089-28		. BOLT Machine	18	
-2	AN960-416		. WASHER, Flat	18	
-3	1-160-306-01		. BRACKET, Angle	1	
-4	1-160-253-01		. CLIP, Band retaining	7	
-5	1-101-370-03		. HOUSING ASSEMBLY, Impeller	1	
	1-100-090-13		. HOUSING ASSEMBLY, Impeller (Magnesium) (Replaced by 1-101-370-03)	1	
-6	1-100-002-01		.. SCREW, Cap	21	
-7	AN960C10L		.. WASHER, Flat	24	
-8	1-101-110-07		.. VANE ASSEMBLY, First stage (Make from 1-101-110-08)	1	
-9	1-101-120-03		.. VANE ASSEMBLY Second stage (Make from 1-101-120-04)		
-10	1-101-020-01		.. VANE, Compressor, third stage	1	
	1-101-020-06		.. STATOR, Compressor, interstage bleed, third stage (Alternate)	1	
	1-101-020-07		.. STATOR, Compressor, interstage bleed, third stage (Alternate)	1	
-11	1-101-030-01		.. VANE, Compressor, fourth stage	1	
	1-101-350-06		.. STATOR, Compressor interstage bleed, fourth stage (Alternate)	1	
	1-101-350-07		.. STATOR, Compressor, interstage bleed, fourth stage (Alternate)	1	
-12	AN103710		.. BOLT, Drilled hex head	6	
-13	AN960C10L		.. WASHER, Flat	6	
-14	1-100-210-01		.. SCREW, Cap, socket head (Replace with 1-100-214-03)		
	1-100-214-03		.. SCREW, Cap, socket head	4	
-15	1-080-028-03		.. RETAINER, Bolt	4	
-16	1-100-980-01		.. HOUSING SUBASSEMBLY, Compressor (NHA 1-100-140-05)	1	A
-17	1-101-210-01		.. HOUSING SUBASSEMBLY, Compressor (NHA 1-100-140-06)	1	
	1-101-210-02		.. HOUSING SUBASSEMBLY, Compressor (NHA 1-100-140-07)	1	
	1-101-210-04		.. HOUSING SUBASSEMBLY, Compressor (Alternate) (NHA 1-100-140-09)	1	B, C, D, E



Figure & Index Number	Part Number	Description 1 2 3 4 5 6 7	Qty Per Assy	Usable on Code
5-501-18	1-100-463-01	... WASHER, Flat	50	
-19	1-100-454-06	... INSERT Compressor housing, second-stage	1	
-20	1-100-454-07	... INSERT, Compressor housing, third stage	1	
-21	1-100-454-08	... INSERT, Compressor housing, fourth stage	1	
-22	1-100-454-09	... INSERT, Compressor housing, fifth stage	1	
-23	1-101-040-01	.. EXIT GUIDE VANE	1	
	1-100-310-08	.. EXIT GUIDE VANE, Compressor interstage bleed (Alternate)	1	
	1-100-310-10	.. EXIT GUIDE VANE, Compressor interstage bleed (Alternate)	1	
-24	1-100-462-01	... SCREW CAP, Socket head drilled head	40	

**5-411. CLEANING.** Proceed as follows:

a. Clean compressor vanes by the dry cleaning solvent method (Refer to SP No. 3002 in Appendix E). Stainless steel impeller housing (P/N 1-101-370-03) may be cleaned by plastic media blasting (SP No. 3003.1). Individual vane assemblies (P/N 1-101-020-01, 1-101-030-01, 1-101-040-01, 1-101-110-07, 1-101-120-03) may be cleaned by plastic media blasting (SP No. 3003.1).

b. Clean all other parts by dry cleaning solvent method (Refer to SP No. 3002 in Appendix E.)

**5-412. INSPECTION.** Perform specific inspections listed in table 5-153.**5-413. REPAIR OF COMPRESSOR AND IMPELLER HOUSING.** (See figure 5-501.) Proceed as follows:

a. Repair upper and lower compressor housings (16 and 17) and impeller housing assembly (5) as follows:

**CAUTION**

To prevent damage to parts, do not use power tools to blend-repair.

(1) Blend-repair nicks, burrs, and scratches on all parts as follows:

(a) Repair, using small diesinker-type files and India or Carborundum stones. Use crocus cloth (item 125, table C-1).

(b) Blend all repairs and finish smoothly.

(c) Lines, scratches, or sharp edges that might cause concentration of stress are not permitted.

(2) Repair worn aft flange bolt retainer slots as follows: (see figures 5-509, 5-510, and 5-511.)

(a) Vapor-blast area of repair, using vapor-blast compound (item 340, table C-1). Rinse in clean cold water, and then hot water, to remove all traces of vapor-blast compound.

(b) Bore out hole to diameter of 0.800 inch (2.032 cm) and depth of 0.150 inch (0.381 cm) to remove worn retainer slot as shown in figure 5-509.

(c) Using magnesium alloy (item 202, table C-1), machine round plug 0.8005 to 0.8010 inch (2.0333 to 2.0345 cm) diameter and 0.160 to 0.170 inch (0.406 to 0.432 cm) thick as shown in figure 5-509.

(d) Using magnesium alloy (item 202, table C-1), fabricate runoff tab as shown in figure 5-510.

(e) Clean area of compressor housing, plug, and runoff tab to be repaired with acetone (item 13, table C-1). Wipe dry with clean, lint-free cloth prior to welding.

(f) Press plug into hole until it bottoms.

(g) Position runoff tab so that it covers one-half of the joint circumference.

(h) Develop electron-beam welding parameters as follows:

1 Obtain scrap magnesium alloy (item 202, table C-1). An aft flange from a scrapped compressor housing is ideal.

2 Set this material on the table of electron-beam welding unit along with suitable target (tungsten). The focal distance between gun and work piece must be identical with that to be used for welding actual part.

**Table 5-153. Inspection of Compressor and Impeller Housing.**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-501 16 and 17	Upper and Lower Compressor Housings	Visual	<p>Damaged or crossed threads.</p> <p>Nicks, pits, dents, or burrs on ID and OD. (Refer to table 5-154.)</p> <p>Wear on aft flange bolt retaining slots.</p> <p>Scoring on lands.</p> <p>Corrosion on land adjacent to stainless steel inserts. (Refer to table 5-154.)</p> <p>Displacement of inserts.</p> <p>Corrosion on aft mounting flange. (Refer to figure 5-506 and table 5-154.)</p> <p>Loss of protective surface finish.</p> <p>Corrosion around stator vane bolt holes. (Refer to table 5-154.)</p>	<p>Repair. (Refer to SP No. 5007 in Appendix E.)</p> <p>Repair or replace if limits are not met. (Refer to paragraph 5-413a.)</p> <p>Repair. (Refer to paragraph 5-413a.)</p> <p>Repair. (Refer to paragraph 5-413a.)</p> <p>Repair. (Refer to paragraph 5-413a.)</p> <p>Refer to table 5-154.</p> <p>Repair. (Refer to paragraph 5-413a.)</p> <p>Repair. (Refer to paragraph 5-413a.)</p> <p>Repair. (Refer to SP No. 6028 in Appendix E.)</p>

Table 5-153. Inspection of Compressor and Impeller Housing (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-501 16 and 17 (Cont)	Upper and Lower Compressor Housings (Cont)	Visual and SIE	Corrosive pitting in stator vane seating areas. (Refer to table 5-154.)	Repair. (Refer to paragraph 5-413a.)
			Sand and dust erosion on lands ID. (Refer to table 5-154.)	Repair if limits are not met. (Refer to paragraph 5-413a.)
			Guide pin hole hairline cracks emanating from guide pin hole to outer lodge of housing.	Replace if more than one hairline crack per hole is present. (Refer to paragraph 5-413a.)
			Damaged jackscrew hole threads in housing. (Refer to table 5-154.)	Repair. (Refer to paragraph 5-413a.)
		Visual and Fluorescent-Penetrant.	Cracks	Repair. (Refer to paragraph 5-413a.)
8, 9, 10, 11 and 23	First Stage Vane Assembly, Second Stage Vane Assembly, Third Stage Compressor Vane, Fourth Stage Compressor Vane, and Exit Guide Vane	Visual and Fluorescent-Penetrant.	Cracks in jackscrew hole area of housing upper half.	Refer to table 5-154.
		Dimensional	Wear and fits. (Refer to table 5-155.)	Repair or replace if limits cannot be met. (Refer to paragraph 5-413a.)
		<b>WARNING</b> <b>FLIGHT SAFETY PARTS</b> Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.		
		Visual	Nicks, dents, or burrs	Repair. (Refer to paragraph 5-413d.)
		Visual SIE	Bending and minor distortion of inner shroud sealing areas. (Refer to table 5-154.)	Repair or replace if limits are not met. (Refer to paragraph 5-413d.)
			Eroded vane width less than 5/8 inch on first through fourth stage vanes, and 7/16 inch on exit guide vane.	Replace if limits are not met.

**Table 5-153. Inspection of Compressor and Impeller Housing (Continued).**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-501 8, 9, 10, 11 and 23 (Cont)  5	First Stage Vane Assembly, Second Stage Vane Assembly, Third Stage Compressor Vane, Fourth Stage Compressor Vane, and Exit Guide Vane (Cont)	Visual and Fluorescent- Penetrant	Cracks in brazed joints.	Repair. (Refer to paragraph 5-413d.)
			Cracks in inner/outer shroud of parent metal	Not allowed. Replace
	Impeller Housing Assembly (Magnesium)	Visual	Damaged or crossed threads	Repair. (Refer to SP No. 5007 in Appendix E.)
			Nicks, pits, dents, and burrs on OD. (Refer to table 5-154.)	Repair or replace if limits are not met. (Re- fer to paragraph 5-413.)
			Loss of protective surface finish	Repair. (Refer to paragraph 5-413.)
			Grooves in ID. (Refer to table 5-154.)	Repair if limits are not met. (Refer to paragraph 5-413.)
		Visual	Evidence of rubbing or scoring on ID (Refer to table 5-154.)	Repair if limits are not met. (Refer to paragraph 5-413.)
		Visual and SIE	Worn 13.373 to 13.375 (33.967 to 33.973 cm) or 9.825 to 9.828 inch (24.956 to 24.963 cm) diameter	Repair. (Refer to paragraph 5-413.)
		Contour Gage (LTCT3653)	Erosion on ID not within limits. (Refer to table 5-154.)	Repair. (Refer to paragraph 5-413.)
		Visual and Fluor- escent-Pene- trant.	Cracks	Repair. (Refer to paragraph 5-413.)
		Dimensional	Wear on housing (refer to table 5-155.)	Replace if limits are not met.

Table 5-153. Inspection of Compressor and Impeller Housing (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-501	<p style="text-align: center;"><b>WARNING</b>  <b>FLIGHT SAFETY PARTS</b>  <b>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</b></p>			
5 (Cont)	Impeller Housing Assembly (Stainless Steel)	Visual	Nicks, Burrs, or scratches	Repair. (Refer to SP No. 5000 in Appendix E.)
			Damaged or crossed threads	Repair. (Refer to SP No. 5007 in Appendix E.)
		Contour Gage (To be determined)	Erosion on ID not within limits. (Refer to table 5-154.)	Hold for future repair.
		Visual and Fluorescent-Penetrant	Cracks	Not allowed. Replace.
		Dimensional	Wear on housing. (Refer to table 5-155.)	Replace if limits are not met.

**Table 5-153. Inspection of Compressor and Impeller Housing (Continued).**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5 (Cont)	Impeller Housing Assembly (Stainless Steel)(Cont)	Dimensional	<p>Nicks, dents, and gouges on ID contour of impeller housing.</p> <p>Rub damage on ID contour of impeller housing.</p>	<p>Nicks, dents, gouges, and pits are acceptable for repair on ID of housing provided said defects do not exceed 0.010 inch (0.025 cm) in depth. If within these limits blend repair as per paragraph 5-413g(1). If beyond these limits plasma spray repair as per paragraph 5-413g(2).</p> <p>Rub damage is acceptable for repair on ID of housing provided this damage does not deviate at any measured location more than 0.010 inch (0.025 cm) from the master contour. If damage is within these limits, blend repair as paragraph 5-413g(1). If damage exceed this limit; machine surface to true up same not to exceed 0.020 inch (0.051 cm) above the maximum Blue Print dimension shown in figure 5-523 and metal spray repair per paragraph 5-413g(2).</p>

Table 5-153. Inspection of Compressor and Impeller Housing (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-501 5 (Cont)	Impeller Housing Assembly (Stainless Steel) (Cont)		Foreign object damage on ID contour of impeller housing  Inspect housings for corrosion in cavities at the 6 o'clock position on both sides of compressor housing mounting bosses.	Same limits and repairs as for rub damage above.  Repair per paragraph 5-413g.
3	Impeller Housing Assembly P/N 1-101-370-03	Visual	G after P/N	Rework. (Refer to paragraph 5-413f.)
4	Bracket	Visual	Cracks	Not Allowed. Replace.
4-51	Clip	Visual	Cracks	Not Allowed. Replace.
9,14,15 and 16	Bracket	Visual	Cracks	Not Allowed. Replace.

Table 5-154. Compressor and Impeller Housing Inspection Limits.

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Bending and Minor Distortion of Vane Inner Shroud Sealing Areas	5-502	Bending and minor distortion is acceptable for repair, provided deflection from unaffected area does not exceed 1/16 inch. If within limits, rework vane assembly as outlined in paragraph 5-413. If beyond limits, replace vane assembly.
Erosion on Impeller Housing ID (1-100-090-only)		Using contour gage (LTCT3653), measure housing contour at the No. 3 gage point in four places (two places on each half.) The maximum permissible deviation at any measured location is 0.010 inch (0.025 cm) from master contour. If contour deviation exceeds 0.010 inch (0.025 cm) at any location, repair magnesium housing as outlined in paragraph. If coating has been removed by erosion or other causes, repair as outlined in paragraph 5-413.
Grooves on Impeller Housing ID	5-503	<p><b>NOTE</b></p> <p>Eroded housings will show as scalloping of inlet side. Any degree of scalloping is acceptable, provided contour limits are met.</p> <p>One groove is acceptable, provided that it does not exceed 0.004 inch (0.010 cm) in depth and 0.0625 inch (0.1588 cm) in width. Disregard length of groove. If limits are exceeded, repair as outlined in paragraph 5-413.</p>



**Table 5-154. Compressor and Impeller Housing Inspection Limits (Continued).**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
<p>Evidence of Rubbing or Scoring on ID Contour of Impeller Housing (Magnesium)</p> <p>Nicks, Pits, Dents, and Burrs on OD of Impeller Housing.</p> <p>Sand and Dust Erosion on Land ID's (Inserts)</p> <p>Corrosion on aft mounting flange of compressor housing assembly.</p> <p>Corrosion Pitting in Stator, Vane Seating Areas of Compressor Housing Assembly</p> <p>Corrosion under Helicoil (Magnesium Housing)</p> <p>Corrosion on Aft Mounting Flange of Compressor Housing Assembly</p> <p>Cracks in Jackscrew Hole Area in Compressor Housing Upper Half</p>	5-504	<p>If HAE coating is still intact the housing will not be considered to be rubbed or scored on housings that show rubbing or scoring repair as outlined in paragraph 5-413.</p> <p>Nicks, pits, dents, and burrs are acceptable for repair on OD of housing, provided they are not opposite similar conditions on ID of housing, do not protrude into mating surfaces, and no associated cracks are evident. If within limits, repair as outlined in paragraph 5-413. If beyond limits, replace housing.</p> <p>Any deviation from blueprint dimensions (refer to table 5-155) caused by sand and dust erosion is acceptable, provided tip clearance between lands and compressor rotor blades can be maintained within limits shown in tables 5-155 and 6-1. (Refer to paragraph 6-7.) If limits are exceeded, repair in accordance with paragraph 5-413.</p> <p>Corrosion up to 0.200 inches (0.508 cm) deep after cleanup may be repaired provided the total cumulative corroded areas do not exceed 30% of mounting surface of compressor half. Repair as outlined in paragraph 5-413.</p> <p>Pitting is acceptable in the stator vane seating area to a depth not exceeding 0.070 inch (0.178 cm).</p> <p>Check torque of screw thread inserts (helical-coil) on impeller housing mating surface with compressor housing at 100 +5 lb. inches. If a helical coil is pulled due to corrosion replace with insert 1/4-28 MS124696 or equivalent per SP No. 5008.</p> <p>Corrosion up to 0.200 inches (0.508 cm) deep after clean up may be repaired provided the total cumulative corroded area does not exceed 30% of mounting surface of compressor half. Repair as outlined in paragraph 5-413.</p> <p>a. Longitudinal cracks running from jackscrew holes are unacceptable.</p> <p>b. Cracks emanating from jackscrew holes and progressing to edge of housing are acceptable, provided no more than one per hole is evident.</p> <p>c. If limits are exceeded, repair as outlined in paragraph 5-413.</p>

Table 5-154. Compressor and Impeller Housing Inspection Limits (Continued).

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Nicks, Pits, Dents, and Burrs on ID and OD of Compressor Housing	5-505	Nicks, pits dents, and burrs, up to 0.070 inch (0.178 cm) in depth, are acceptable, provided they do not protrude into mating surfaces and are not opposite each other with reference to ID and OD of housing (0.25 inch (0.64 cm) shall be the minimum distance between adjacent opposite defects). (See figure 5-505.) These defects are not allowed within 0.25 inch (0.64 cm) of any hole or port. Associated cracks shall not be evident. If within limits, blend-repair as outlined in paragraph 5-413. If beyond limits, replace housing.
Cracked Threaded Jackscrew Holes Compressor Housing		Cracks to outside flange are acceptable if original threads are tight fitting and in good condition. Repair threaded jackscrew holes, not having serviceable original threads, as outlined in paragraph 5-413.
Corrosion on Land Adjacent to Stainless Steel Inserts	5-506	<p>If corrosion displaces the stainless steel inserts denoted by excessive gaps between steel inserts (see figure 5-506), displaced inserts and magnesium lands must be removed (refer to paragraph 5-413) and the exposed lands and groves inspected for corrosion pitting as follows:</p> <ol style="list-style-type: none"> <li>Pitting, caused by corrosion at bottom of groves, is acceptable up to 0.080 inch (0.216 cm) in depth, except within 0.375 inch (0.953 cm) of hole centers.</li> <li>Pitting, in groove sides and top of lands, is acceptable up to 0.040 inch (0.102 cm) in depth.</li> <li>Corrosion pitting around stator vane bolt or housing holes shall not exceed 0.052 inch (0.132 cm) in depth.</li> </ol> <p style="text-align: center;"><b>NOTE</b></p> <p>Concentrated pitting that interferes with proper reseating and torquing of bolts is unacceptable.</p> <ol style="list-style-type: none"> <li>Repair all corrosion as outlined in paragraph 5-413.</li> <li>Epoxy repair (refer to paragraph 5-413) for heavy corrosion in the steel insert and stator vane seating areas within the following limits. <ol style="list-style-type: none"> <li>Corrosion pits or a single corroded area up to 0.100 inch deep after removal of corrosion.</li> </ol> </li> </ol>



Table 5-155. Dimensional Inspection of Compressor and Impeller Housing Assemblies.

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
Upper and Lower Compressor Housing to Impeller Housing Assembly	5-501 16 or 17	ID	9.825 (24.950)	9.828 (24.963)	Either part may vary (Use overhaul service fit)		0.003T (0.008)	0.005L (0.013)	5-508 A
	5	OD	9.823 (24.950)	9.828 (24.963)					B
	5	OD	13.372 (33.965)	13.375 (33.973)	Either part may vary (Use overhaul service fit)				C
Impeller Housing Assembly to Diffuser Housing Assembly	5-501 1	ID (Ref)	13.375 (33.973)	13.376 (33.975)			0.000	0.015L (0.038)	
Upper and Lower Compressor Housing First Land Forward Diameter	5-501 16 or 17		9.745 (24.752)	9.427 (23.945)	9.758 (24.785)			0.005 (0.013)	D

\* Measured from forward face of housing.

\*\* Measured at land edge.

\*\*\* Indicated dimensions are average diameters and an out-of-roundness of 0.010 inch (0.025 cm) total is permissible. All requirements apply when part is clamped at split line.

Table 5-155. Dimensional Inspection of Compressor and Impeller Housing Assemblies (Continued).

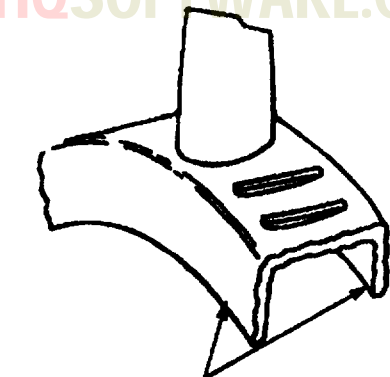
NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
Second Land Forward Diameter at Gage Point 2.243*		ID	9.418 (23.922)	9.424 (23.937)		9.432 (23.958)			E
Third Land Rear Diameter at at Gage Point 4.438*		ID	9.236 (23.460)	9.332 (23.703)		9.340 (23.724)			F
Fourth Land Diameter		ID	9.299 (23.619)	9.305 (23.635)		9.313 (23.655)			G
Fifth Land Diameter		ID	9.291 (23.599)	9.297 (23.614)		9.305 (23.635)			H
Upper and Lower Compressor Housing Forward ID	16 or 17	ID	10.874 (27.620)	10.877 (27.628)					I
Upper and Lower Compressor Housing (Forward Face Parallel to Rear Face)	16 or 17	TIR	0.001 (0.003)	0.001 (0.003)	0.002 (0.005)	0.002 (0.005)			J

\* Measured from forward face of housing.

\*\* Measured at land edge.

\*\*\* Indicated dimensions are average diameters and an out-of roundness of 0.010 inch (0.025 cm) total is permissible. All requirements apply when part is clamped at split line.

CHQSOFTWARE.COM



BENDS UP TO 1/16 INCH  
AXIALLY IN EITHER DIRECTION  
FROM ORIGINAL CONTOUR ARE  
ACCEPTABLE FOR REPAIR

Figure 5-502. Vane Inner Shroud Sealing Area - Inspection Limits (Typical).

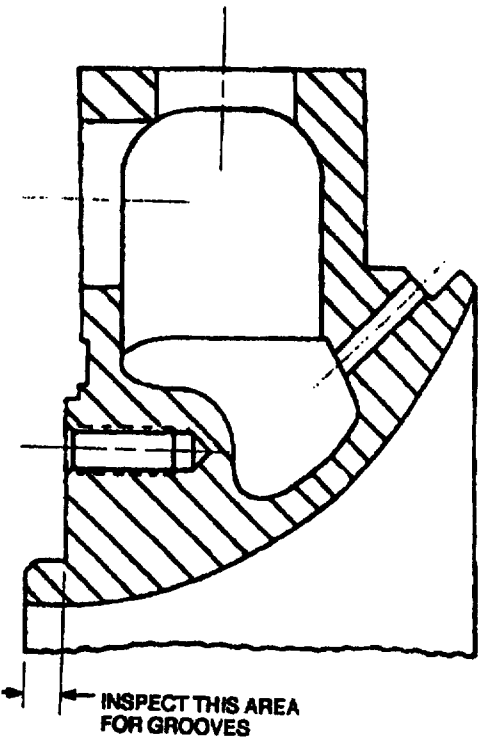


Figure 5-503. Impeller Housing Inspection Area.

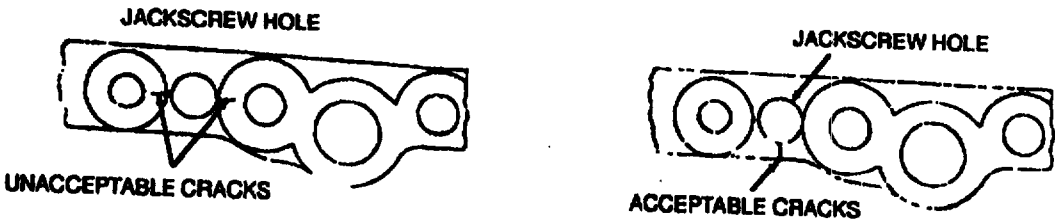
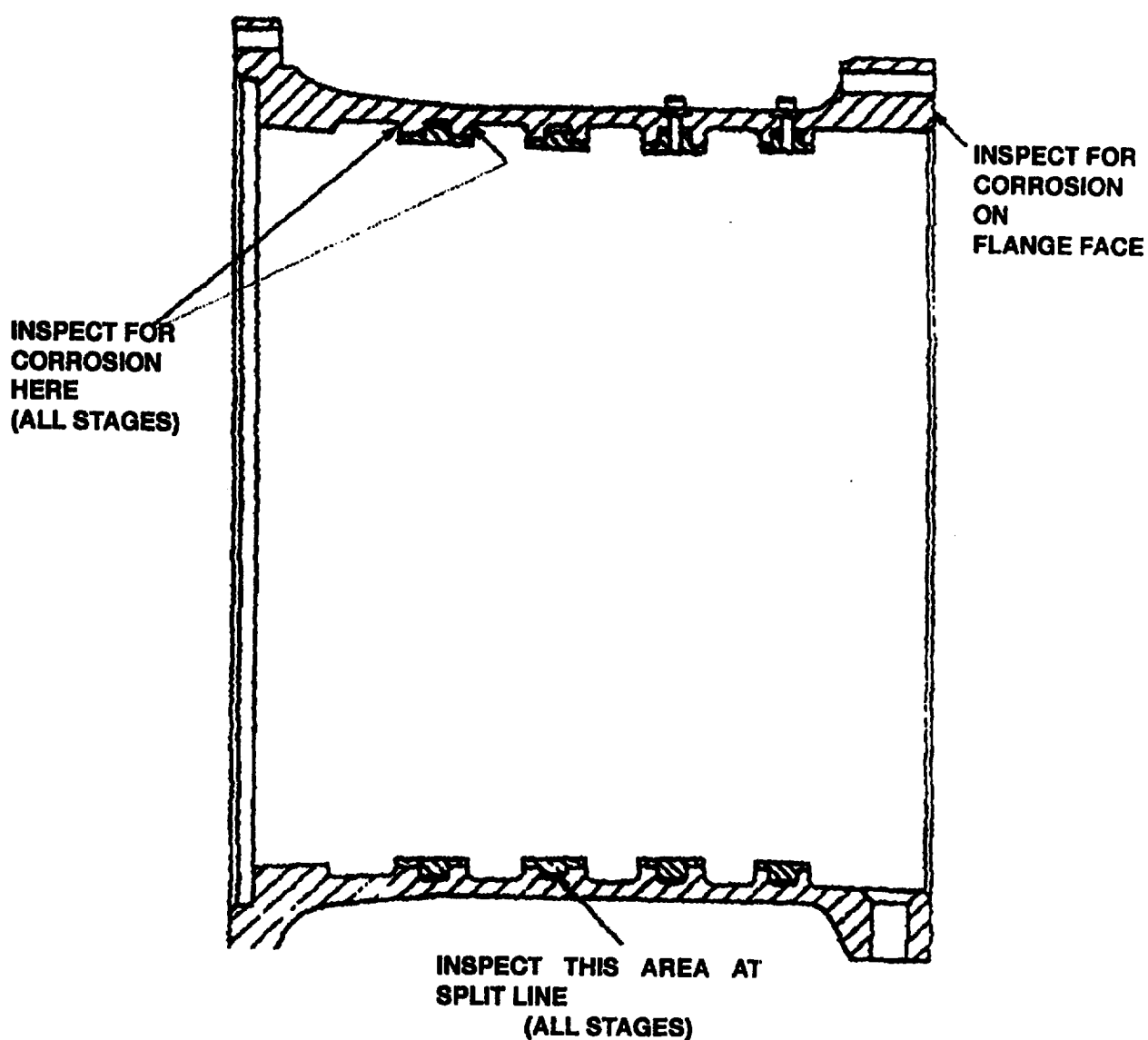


Figure 5-504. Compressor Housing Crack Limits.



**Figure 5-505. Compressor Housing Inspection Limit  
(Minimum Distance Between Adjacent Opposite Defects).**



**Figure 5-506. Compressor Housing Corrosion Inspection Areas.**

CHQSOFTWARE.COM

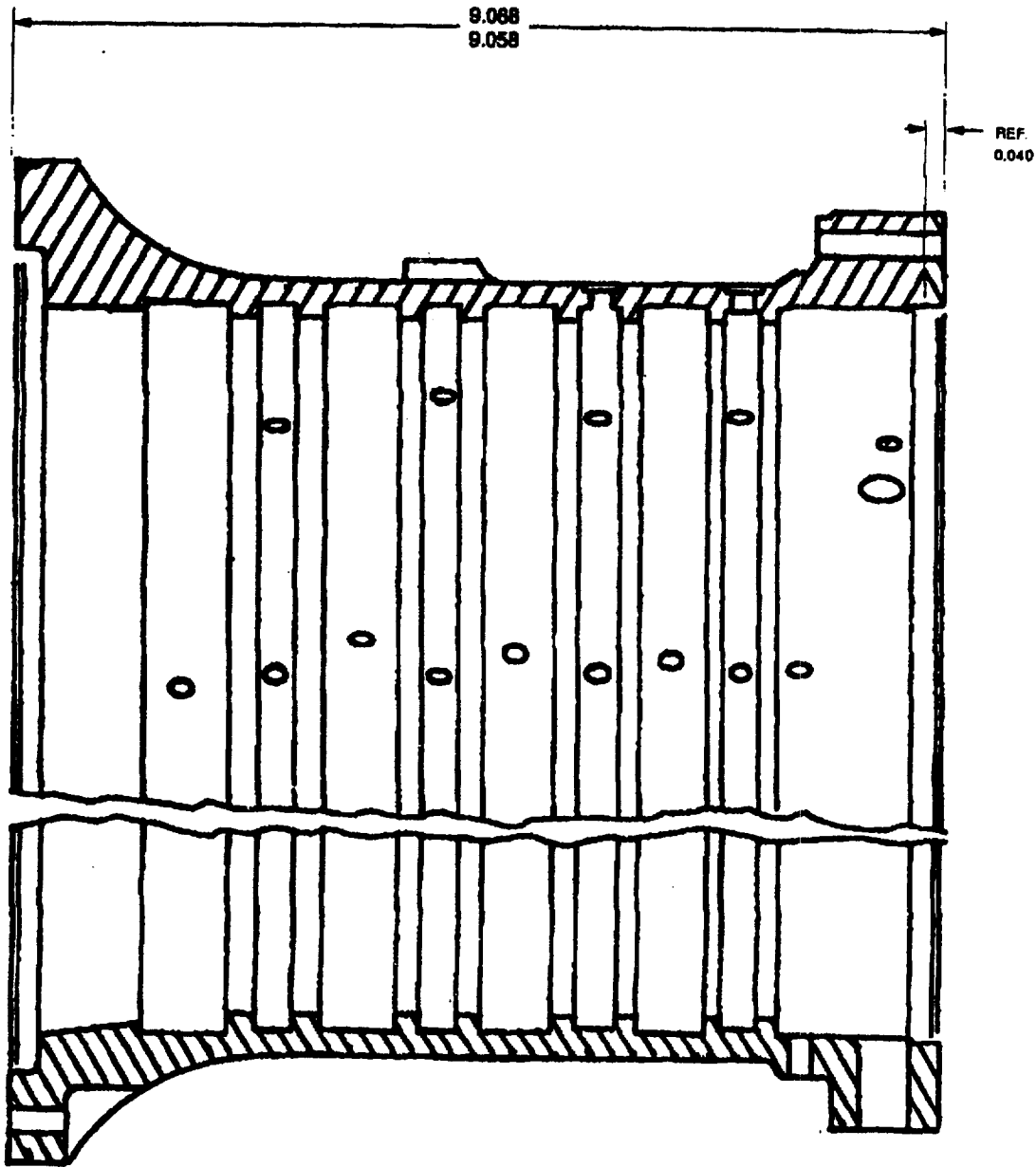


Figure 5-507. Overhaul Length Dimension of Housing (Sheet 1 of 2).



CHQSOFTWARE.COM

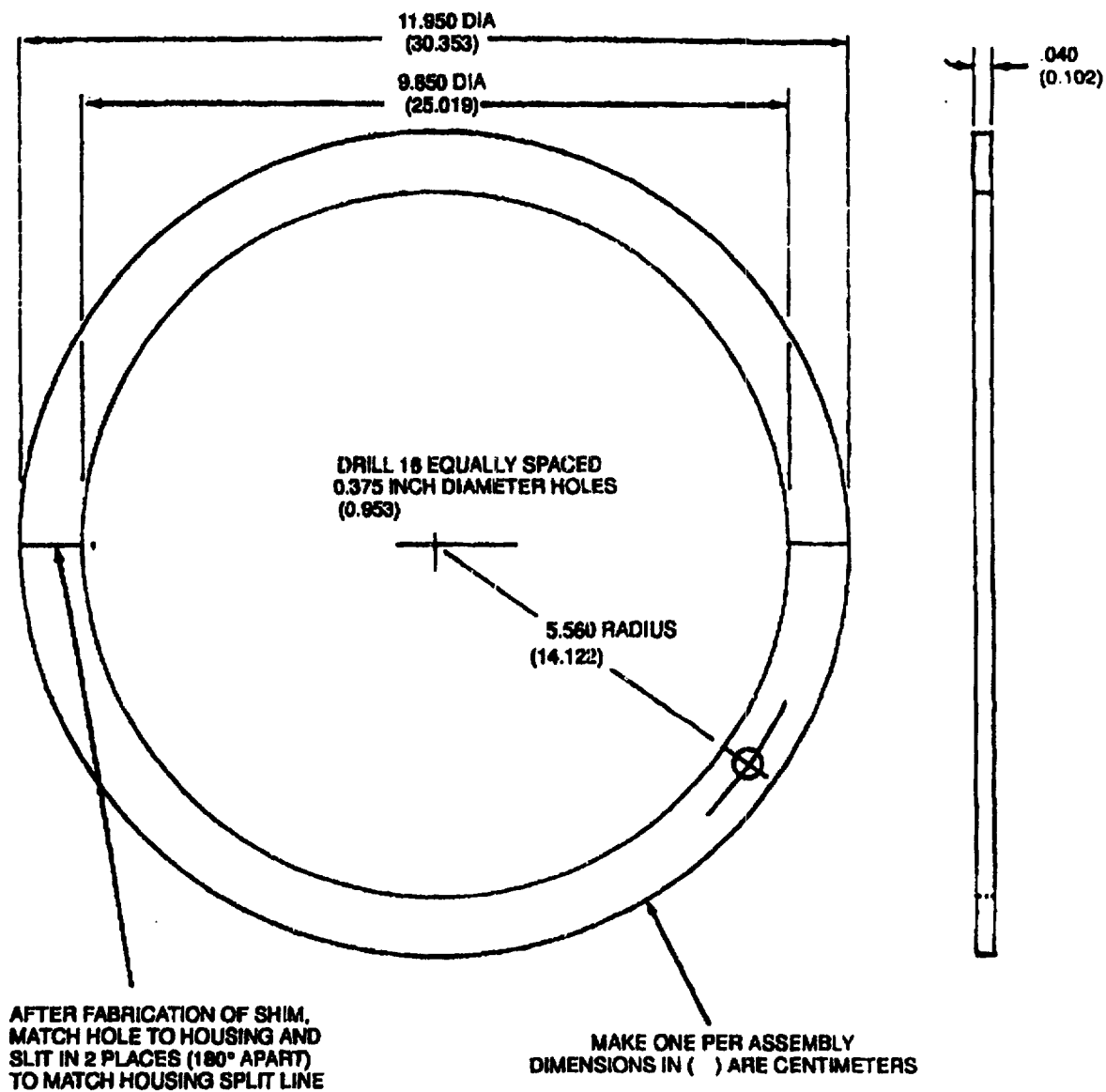
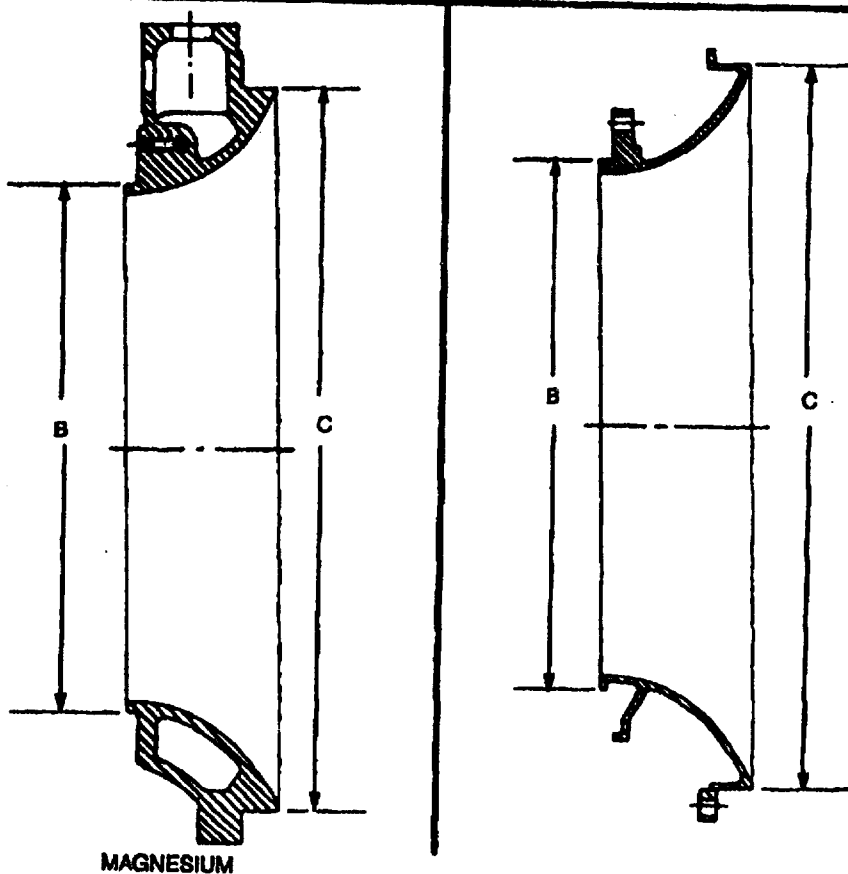
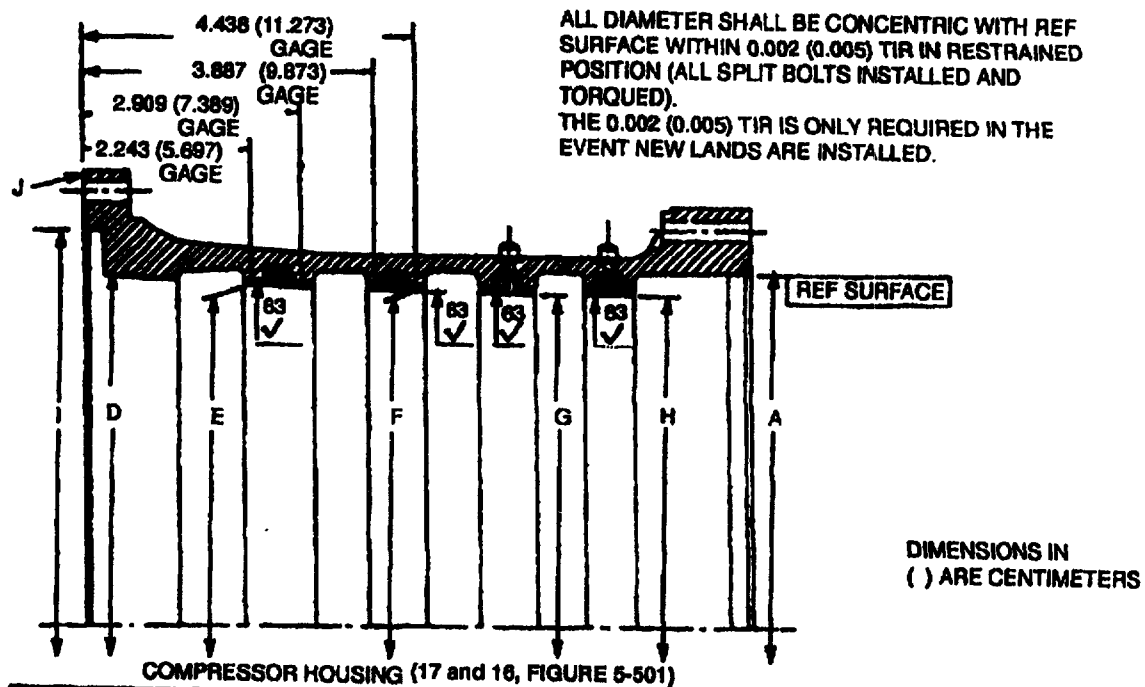


Figure 5-507. Overhaul Length Dimension of Housing (Sheet 2 of 2).

CHQSOFTWARE.COM



IMPELLER HOUSING ASSEMBLY (5, FIGURE 5-501)

Figure 5-508. Compressor and Impeller Housing Assemblies Dimensional Inspection Locations.

CHQSOFTWARE.COM

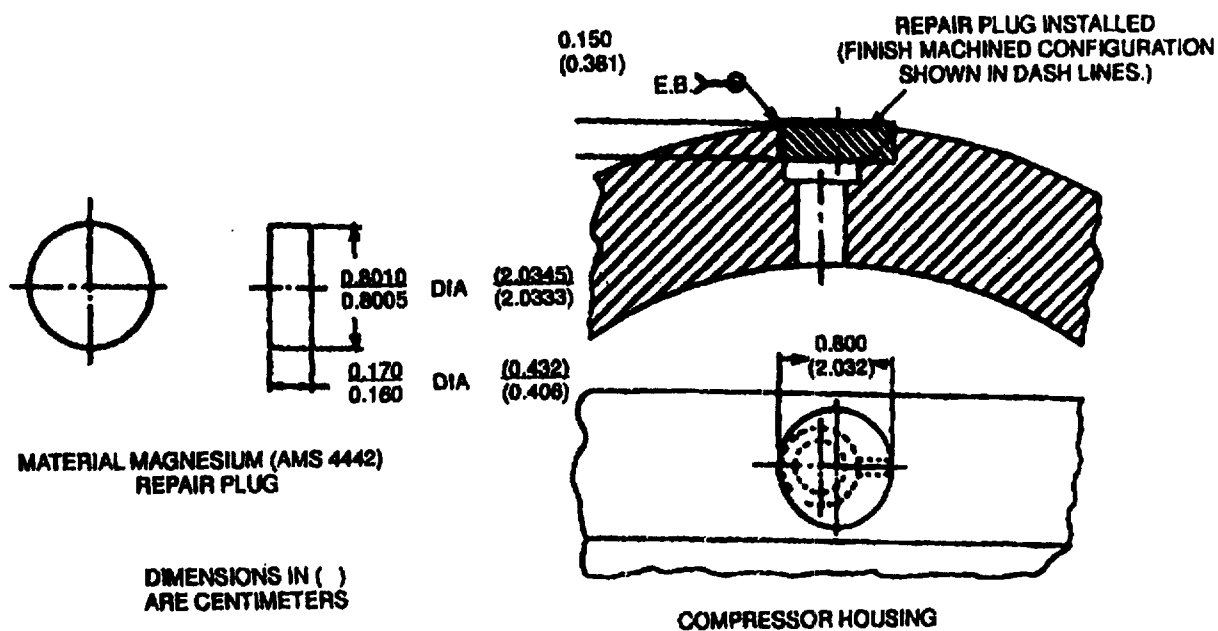


Figure 5-509. Compressor Housing Bolt Retainer Slot Machining and Replacement Plug.

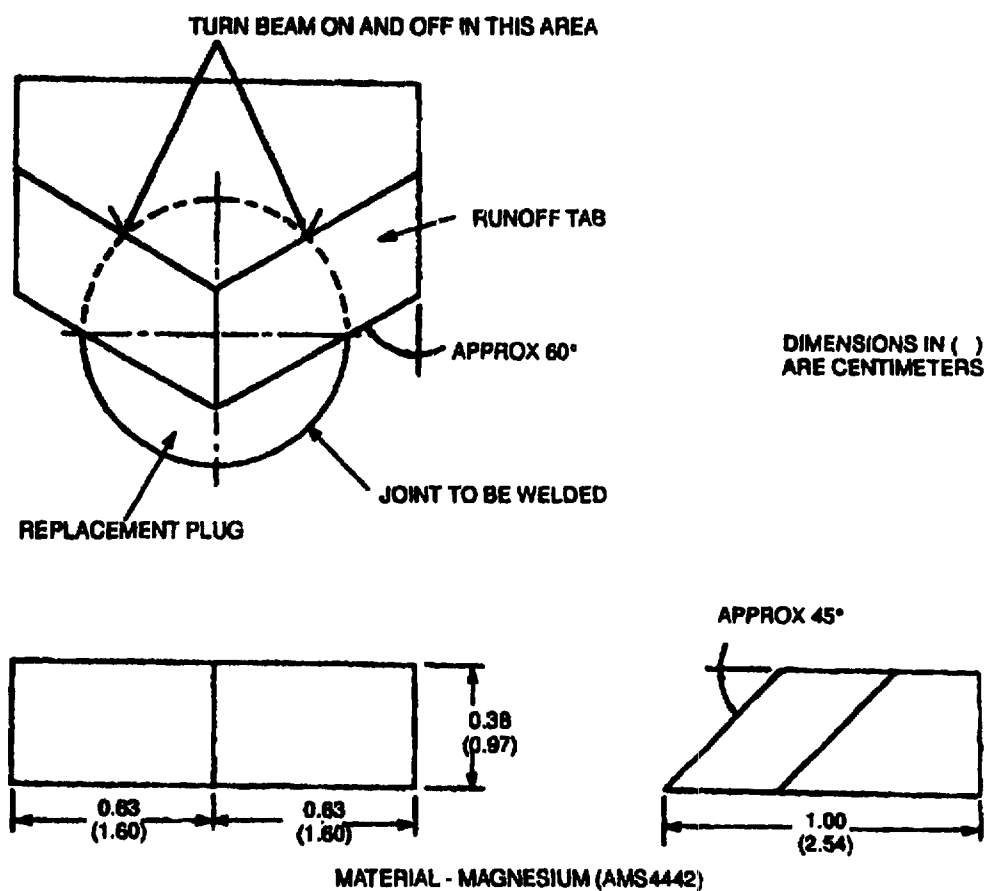
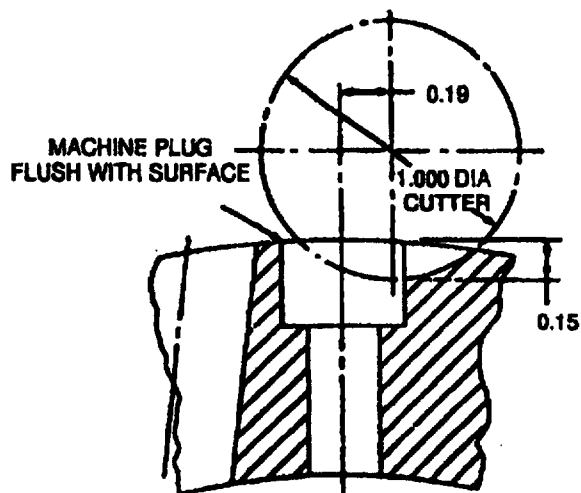


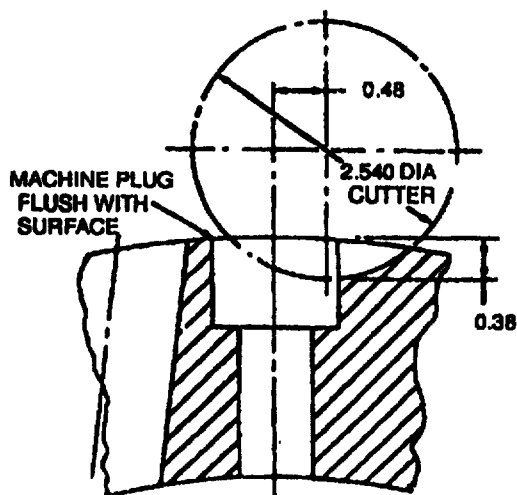
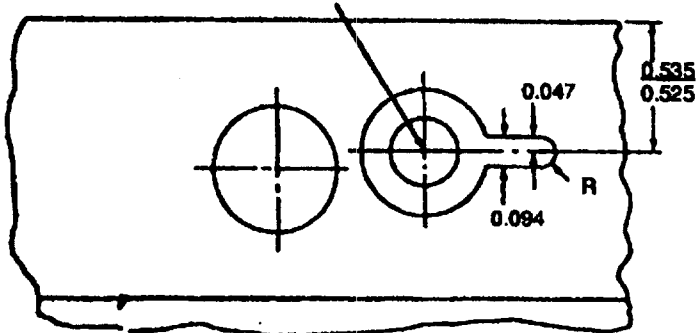
Figure 5-510. Fabrication of Expendable Runoff Tab.

CHQSOFTWARE.COM



ALL DIMENSIONS ARE IN INCHES

0.25 DIA THRU TO COINCIDE WITH EXISTING HOLE  
 C-BORE 0.50 DIA DEPTH 0.35 WITH 0.005-0.015  
 CORNER RADIUS. LOCATE WITHIN 0.005  
 OF PREVIOUS POSITION



ALL DIMENSIONS ARE IN CENTIMETERS

.634 DIA THRU TO COINCIDE WITH EXISTING HOLE  
 C-BORE 1.27 DIA DEPTH 0.89 WITH 0.013-0.038  
 CORNER RADIUS. LOCATE WITHIN 0.013 OF PREVIOUS  
 POSITION

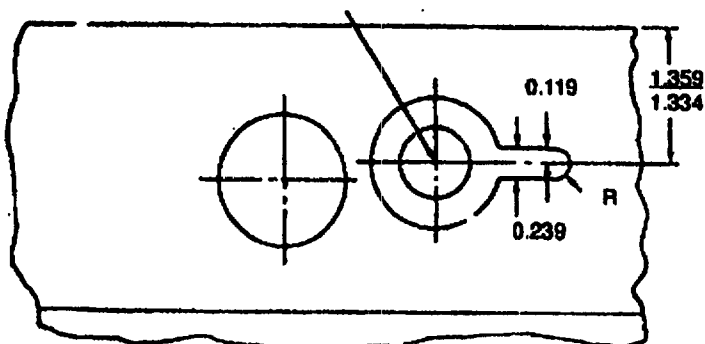


Figure 5-511. Compressor Housing Bolt Retainer Slot Rework.

**NOTE**

Run no more than one trial weld on a block of material in any pump-down of the vacuum chamber because the preheating effect on the subsequent passes will render them useless for evaluation purposes.

- 3 Try various combinations of weld settings until sample weld, meeting requirements of step (2)(h)5 is obtained. The following settings are recommended.
- a Highest voltage setting, 150 kv.
  - b Milliamperage in the range of 3 to 7 ma. This will vary for given penetration according to the travel speed selected.
  - c Travel speed in the range 30 to 60 inches (76.2 to 152.4 cm) per minute.

**NOTE**

If the speed is too fast, extremely high top beads and excessive root porosity will result; If the speed is too slow, excessive undercutting and cracking may occur.

- d Focus at or slightly above the part surface. Do not use AC deflections.
- 4 Section trial welds under suitable optical equipment.
- 5 Examine trial welds under suitable optical equipment.
- a The depth of penetration should be the same as, or 1/16 inch greater than, the depth of the joint.
  - b No cracking is acceptable.
- (i) Set up housing on rotary or eccentric table so that the joint is aligned throughout its travel to within 0.001 inch (0.003 cm) of beam impact point.
  - (j) Employ optimum settings as determined in step (2)(h).
  - (k) Start rotary motion at optimum travel speed determined in step (2)(h).
  - (l) Turn on beam as impact point passes over runoff tab. (See figure 5-510).
  - (m) Allow beam to travel over exposed joint circumference.
  - (n) Turn off beam when it is again on runoff tab. (See figure 5-510).
  - (o) Vent chamber and remove runoff tab from part.

**NOTE**

The thin edge of the runoff tab may be fused to the joint because of beam penetration. The tab can be easily removed by bending it gently back and forth while gripped with pliers.

- (p) Remove any projecting fused material from bottom of runoff tab with clean fine file.
- (q) Reposition runoff tab so that unwelded portion of joint circumference is exposed and welded portion is covered by runoff tab.
- (r) Pump down chamber and repeat preceding steps (i) through (o).
- (s) Machine repaired area as shown in figure 5-511.

- (t) Perform fluorescent-penetrant inspection on repaired area including the following limits:
- 1 No cracks are allowed.
  - 2 Individual surface porosity up to 0.020 inch (0.051 cm) diameter is acceptable.
  - 3 Linear porosity is not acceptable.

**NOTE**

Linear porosity is defined as three or more voids in a line wherein the spacing between the voids is less than the diameter of the largest void.

- (u) Clean area to be treated with acetone (item 13, table C-1). Wipe dry with clean, lint-free cloth.
- (v) Using cotton swab, apply chrome pickle solution to machined area.

**NOTE**

Solution should 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 room temperature.

- (w) Allow chrome pickle solution to remain on surface for 2 to 5 minute. Rinse with cold water and air-dry.

(3) Repair damaged upper and lower housings (16 and 17, figure 5-501) in areas where less than 25% of total surface shows missing coating/evidence of corrosion. Repair damaged magnesium impeller housing assembly (5) when ID surface coating has been worn away, but surface is within acceptable dimensional limits or dimensions can be restored by coating application up to 0.008 inch (0.020 cm) maximum coating thickness, as follows:

**WARNING**

Avoid prolonged inhaling of fumes. Perform cleaning operation in a well-ventilated area.

- (a) Clean damaged areas with acetone (item 13, table C-1).
- (b) After cleaning, inspect for corrosion. Corrosion is indicated by pitting or flaking on surface of metal.
- (c) To remove corrosion, use rotary stainless steel brush or brush chromic acid (item 86, table C-1) (24 ounces per gallon of water).
- (d) Using cotton swab, apply chrome pickle solution (in accordance with Military Specification MIL-M-3171) to areas being treated.

**NOTE**

Solution should 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 room temperature.

- (e) Allow chrome pickle solution to remain on surface for 2 to 5 minutes. Wipe with clean, dry cloth.
- (f) Dry-treat areas for 5 to 10 minutes, using 500 watt heat lamps.
- (g) Touch up treated areas by applying a sealant coat of synthetessine with a brush or by spraying. (Refer to SP No. 6023 in Appendix E.)

**NOTE**

Scored areas on lands shall be additionally brush-coated with graphite-impregnated synthetessine. (Refer to SP No. 6023 in Appendix E.)

- (4) For compressor housings with 25% of total area requiring recoating, strip and recoat as follows:
- (a) Clean housing using the dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E).
  - (b) Immerse housing in magnesium cleaner (item 94, table C-1) for 5 minutes and rinse in hot water.

- (1) Machine or grind lines enclosing shot blast area as shown in figure 5-651.
- (2) Do not exceed 0.005 inch depth.
- k. Repair loose, missing, or damaged alignment pin in rear fairing ring (8, figure 4-54).
  - (1) Retighten loose pin by re-peening.
  - (2) Replace missing or damaged pin.

**5-479. REASSEMBLY.** Proceed as follows:

- a. Place inner forward fairing (13, figure 5-650) in fixture assembly (LTCT3038).

**NOTE**

Ensure the 0.250 inch (0.635 cm) slot on forward rim face is located over flattened pin in fixture.

- b. Install outer forward fairing (1) in assembly fixture with packing ring groove facing down.

**NOTE**

To locate radially, install a 1-060-142-01 bolt through counterbored hole in wall of fixture and into 0.375 inch (0.953 cm) diameter hole in raised boss on periphery of outer forward fairing (1).

- c. Install vane (10) into inner and outer forward fairing rings.
- d. Install unison ring (2).

**CAUTION**

Ensure that guide levers are aligned with their respective slots in unison ring.

**NOTE**

Position unison ring so that bearing (3) is in the approximate center of the actuator rod slot of the fixture.

- e. Position inner rear fairing (12) over inner forward fairing (13) and vane spindles. Align dowel hole in inner forward fairing (13).
- f. Install rear fairing ring (8, figure 4-55) and place dampening rings in position on fixture and clamp.

**CAUTION**

Freedom of movement must be maintained on all vanes.

- g. Secure inner forward fairing (13, figure 5-650) to inner rear fairing (12) with four screws (9).
- h. Release clamps and remove guide vane assembly from fixture.
- i. Using installing and removal tool (LTCT4698), install new spring pins (11) through unison ring and guide vane levers. Pins must not protrude after assembly.
- j. Install remaining screws (9). Tighten screws to 6 to 7 pound-inches (1071.6 to 12.50 gm cm) torque and lockwire.

**5-480. FUNCTIONAL TEST.** Functional test is not required.

**5-481. MODIFICATION OF INLET HOUSING ASSEMBLY.** Rework inlet housing assembly 1-060-100-07 to the 1-060-220-03 configuration as follows:

- a. Remove and scrap inlet guide vane antirotation bolt insert, MS124657. (See Section C-C, figure 5-659 sheet 4.)
- b. Mask all internal openings within the inlet housing.

- c. Mount housing in a suitable machine.
- d. Machine housing to dimensions shown in figure 5-659.
- e. Drill hole as shown in figure 5-659, sheet 1, for inlet guide vane antirotation pin.
- f. Enlarge inlet guide vane antirotation bolt hole as shown in Section C-C, figure 5-659, sheet 4.
- g. Touch up reworked areas as outlined in SP No. 6028 in Appendix E.
- h. Install pin (1-060-098-02). (See figure 5-659, sheet 2.)
- i. Remove plug, AN932-D3, at the rear of the 8-o'clock position engine mount pad. Install metering plug with loctite pipe sealant HVV or equivalent (Item 265, table C-1).
- j. Install insert, MS124965. (See Section CR-CR, figure 5-659, sheet 3.)
- k. Install Insert (1-060-143-01). (See Section C-C, figure 5-659, sheet 4.)
- l. Replace three locks (1-060-119-01) with three locks (1-060-119-02).
- m. Using a carbide burr, obliterate part number of Inlet housing and Inlet housing assembly.
- n. Using vibropeen etching tool, reidentify Inlet housing from 1-060-101-01 to 1-060-102-03.
- o. Reassemble Inlet housing. (Refer to paragraph 5-473)
- p. Using vibropeen etching tool, reidentify inlet housing assembly from 1-060-100-07 to 1-060-220-03.

**NOTE**

Depth of marking shall be 0.004 to 0.010 inch (0.010 to 0.025 cm).



CHQSOFTWARE.COM

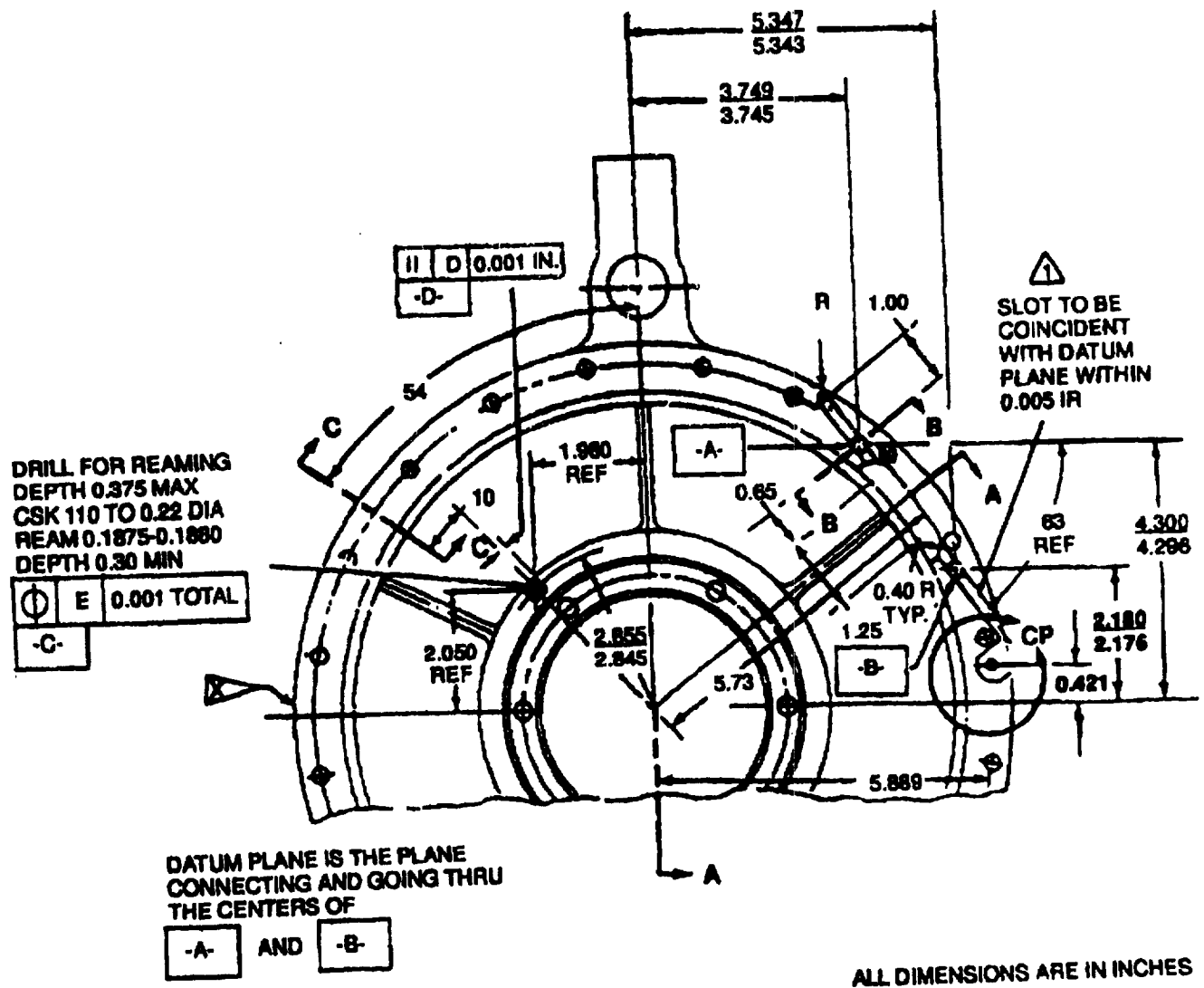
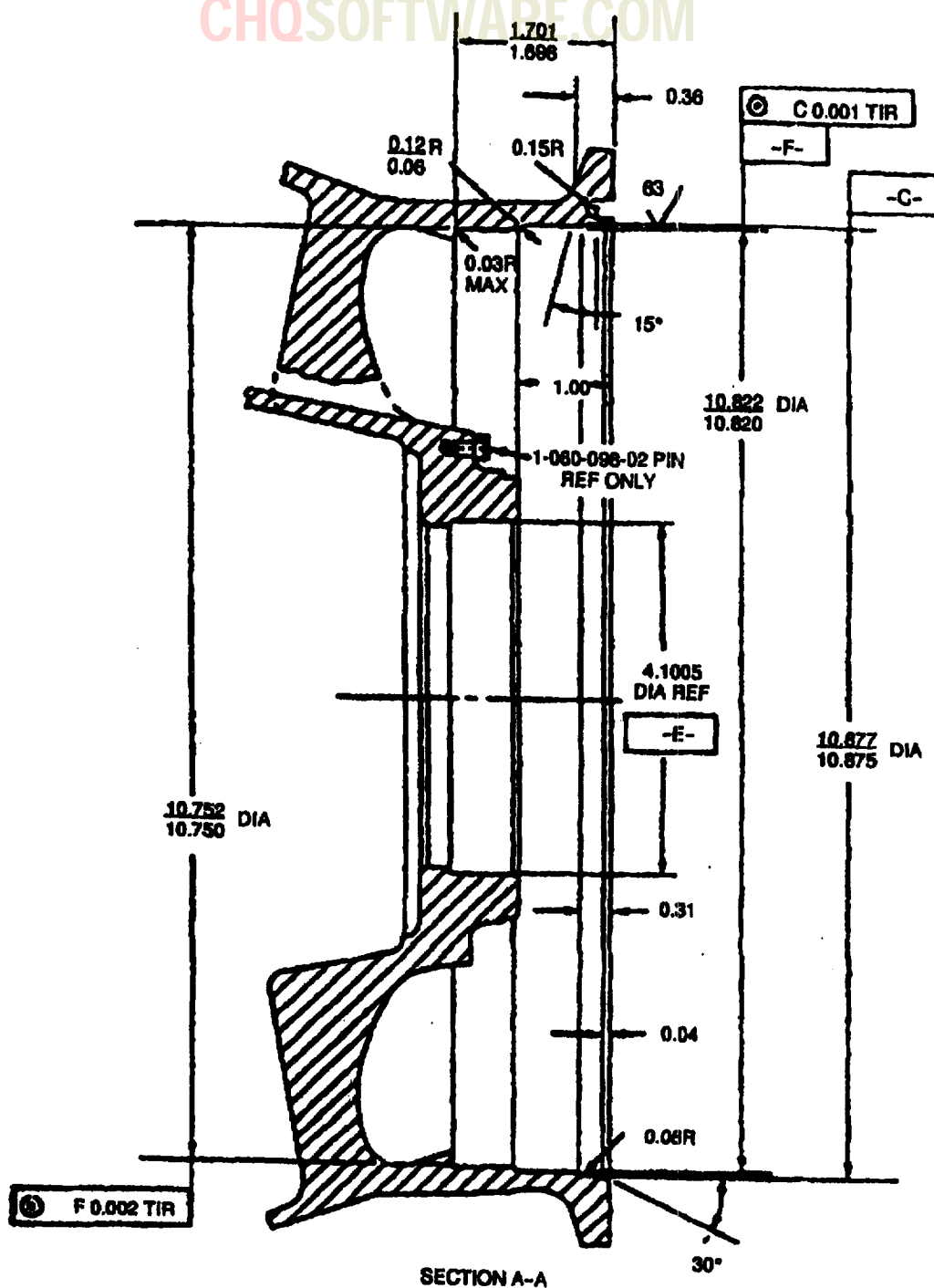


Figure 5-659. Inlet Housing Assembly - Rework (English) (Sheet 1 of 4).



ALL DIMENSIONS ARE IN INCHES

#### NOTE

100 percent clean-up of 10.750 to 10.752 inch diameter is not required.

Figure 5-859. Inlet Housing Assembly - Rework (English) (Sheet 2 of 4).

CHQSOFTWARE.COM

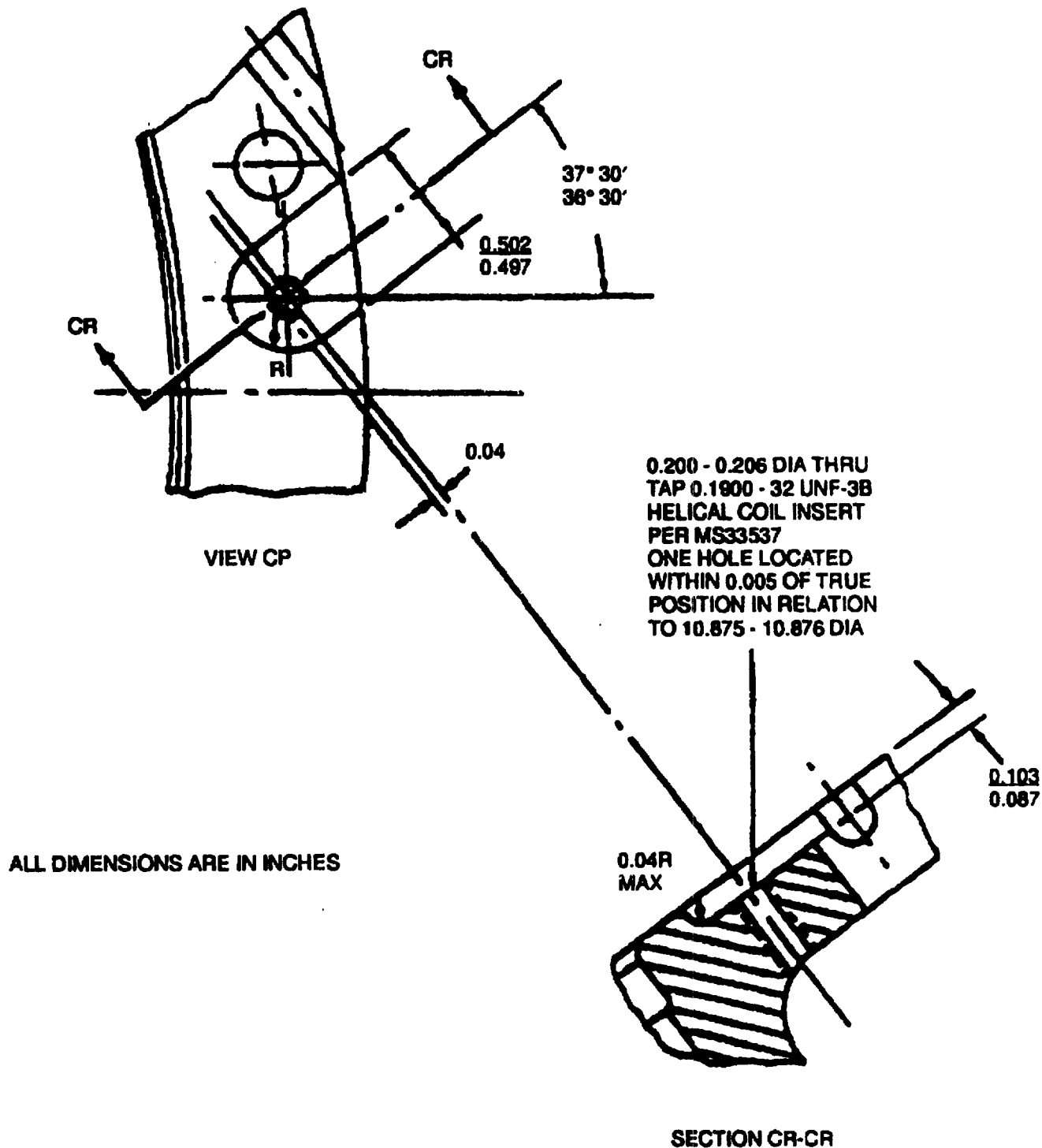
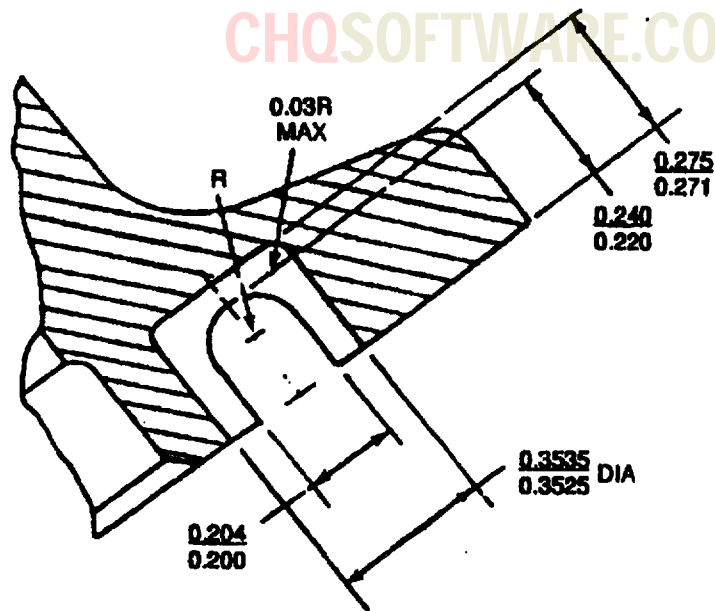


Figure 5-659. Inlet Housing Assembly - Rework (English) (Sheet 3 of 4).



SECTION B-B

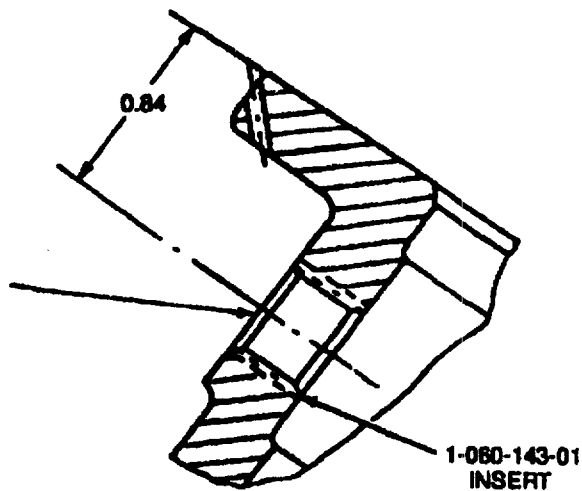
TYPICAL 2 HOLES -A- AND -B-

ALL DIMENSIONS ARE IN INCHES

0.453 - 0.461 DIA. THRU TAP  
THRU FOR 0.4375-20 UNF-3B  
HELICAL INSERT PER MS33537

$\oplus$  G 0.005 TOTAL

ASSEMBLE INSERT 0.25 TO 0.50  
PITCH BELOW SURFACE 0.295  
MIN. LENGTH OF INSERT.  
BREAK TANG  $\triangle$

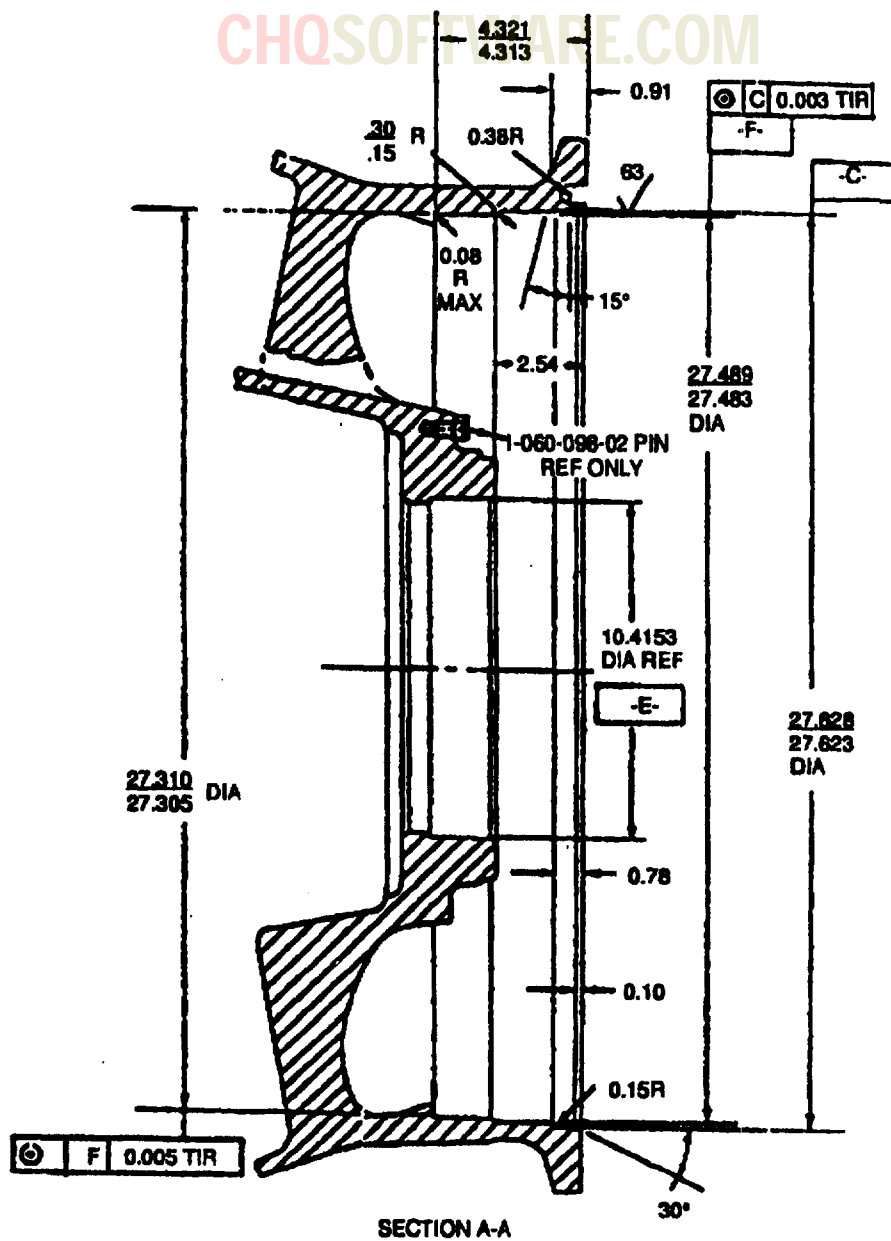


SECTION C-C

$\triangle$  REMOVE PRESENT INSERT

Figure 5-659. Inlet Housing Assembly - Rework (English) (Sheet 4 of 4).





ALL DIMENSIONS ARE IN CENTIMETERS

#### NOTE

100 percent clean-up of 27.305 to 27.310 centimeter diameter is not required.

Figure 5-660. Inlet housing Assembly - Rework (Metric) (Sheet 2 of 4).

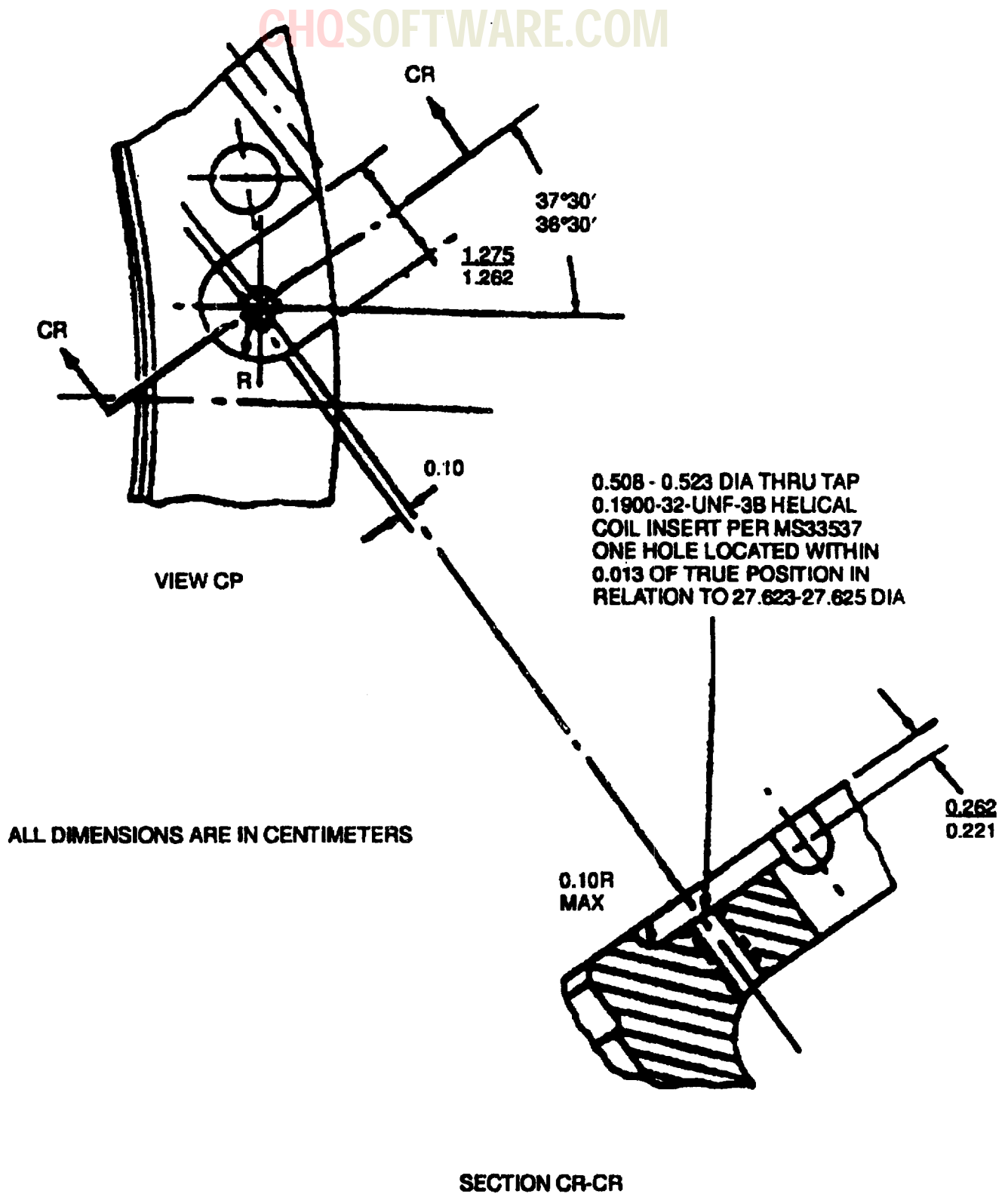
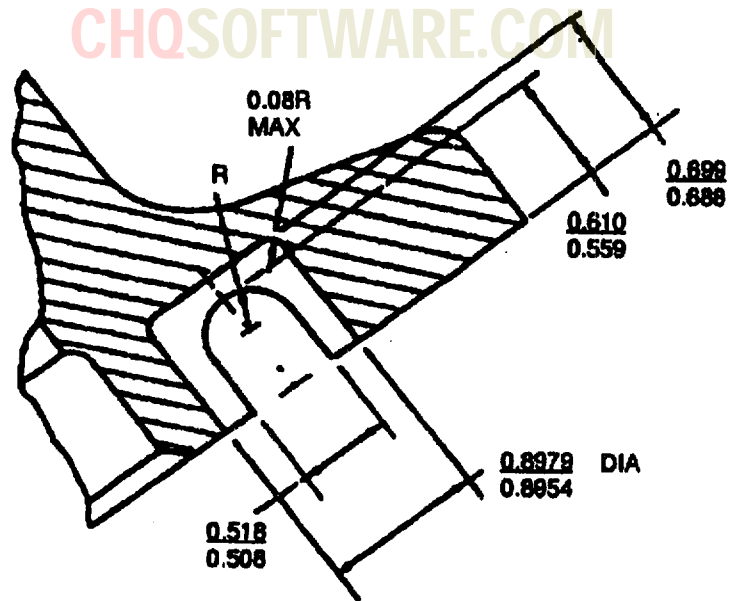


Figure 5-660. Inlet housing Assembly - Rework (Metric) (Sheet 3 of 4).



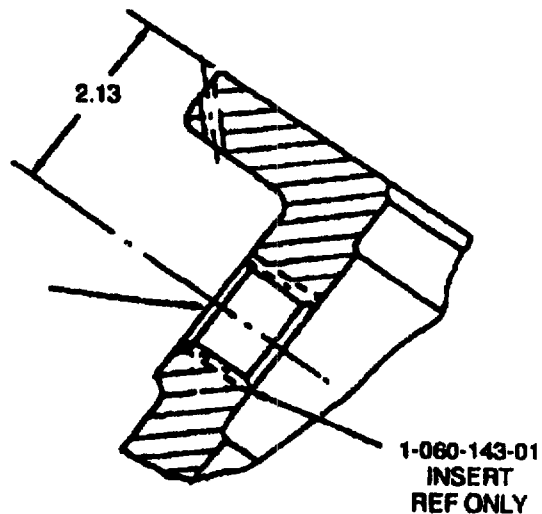
SECTION B-B  
TYPICAL 2 HOLES **-A-** AND **-B-**

ALL DIMENSIONS ARE IN CENTIMETERS

1.151-1.171 DIA THRU  
TAP THRU FOR 0.4375-20 UNF-3B  
HELICAL INSERT PER MS33537

**⊕ G 0.013 TOTAL**

ASSEMBLE INSERT 0.64 TO 1.27  
PITCH BELOW SURFACE 0.749 MIN  
LENGTH OF INSERT BREAK TANG



SECTION C-C



REMOVE PRESENT INSERT

Figure 5-660. Inlet housing Assembly - Rework (Metric) (Sheet 4 of 4).



## CHAPTER 6 FINAL ASSEMBLY

**6-1. GENERAL.** This section contains instructions for final engine assembly.

**6-2. INSTALLATION OF INLET HOUSING ASSEMBLY.** Proceed as follows:

- a. Position engine stand 42M76 or equivalent, with adapter plate, in horizontal position.

### CAUTION

In following step b, to prevent damage to inlet housing struts, use care when installing inlet housing into adapter.

- b. Loosen bolts (1, figure 4-56) that secure clamps (2) and slide clamps toward outside diameter of adapter plate ring. Secure each clamp in place.

- c. Position inlet housing forward flange flush against surface of adapter plate ring.

- d. Position clamps (2) over inlet housing flange and tighten bolts (1) to secure inlet housing (3) to stand.

**6-3. INSTALLATION OF VARIABLE AIR INLET GUIDE VANE ASSEMBLY.** Proceed as follows:

- a. Install packing (2, figure 4-54) on air inlet vane assembly (7).

- b. Install air inlet vane assembly, aligning key on inlet housing with keyway in air inlet vane assembly.

### NOTE

The inlet guide vane assembly should be installed with pressure by hand only. If some difficulty is encountered, use a suitable drift and hammer and lightly tap inner fairing ring until air inlet vane assembly is seated in inlet housing.

- c. Install connector (6) into inlet housing by carefully inserting pin of connecting rod into ball socket of inlet guide vane.

- d. Slide tow guides (5) on connector rod and position in inlet housing, with chamfer end down.

- e. Install new plate (4) and screw (3). Tighten, as necessary.

- f. Initially adjust variable inlet guide vane assembly as follows:

- (1) Set protractor (LTCT4750) at 6-1/2 degrees and install on inlet housing (See figure 6-1.)

### NOTE

Guide vanes must be in open position before adjustment is to be made.

- (2) Slide indicator on tool until vane is flush with arm of protractor.

### NOTE

When adjusting guide vanes, use protractor (LTCT4750) that has been modified as shown in figure 6-2. If protractor arm contacts vane deformations, place a 0.002 inch (0.005 cm) shim stock between protractor arm and vane leading and trailing edges. Shim is only required on those vanes that exhibit deformation.

- (3) Scribe a line on index plate located in flange of inlet housing.

### NOTE

Scribe mark should be lined up within 0.02 inch (0.051 cm) with end of shot-blast area (figure 6-3) on connector rod.

Further adjustment of variable inlet guide vane connector will be performed in paragraph 6-33.

- g. Install rear fairing ring (8, figure 4-54).

### NOTE

Ensure that vanes move freely through full travel. Filter vanes, as required.

- h. Install bolt (1). Tighten bolt to 60 to 80 pound-inches (10716 to 14288 gm cm) torque and lockwire.

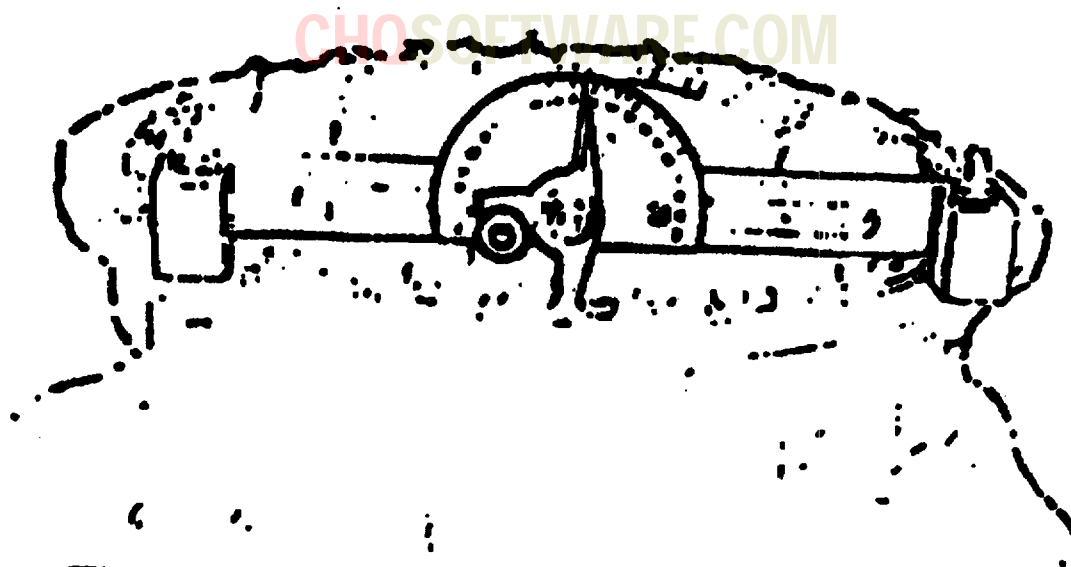


Figure 6-1. Protractor (LTCT4750) Installed.

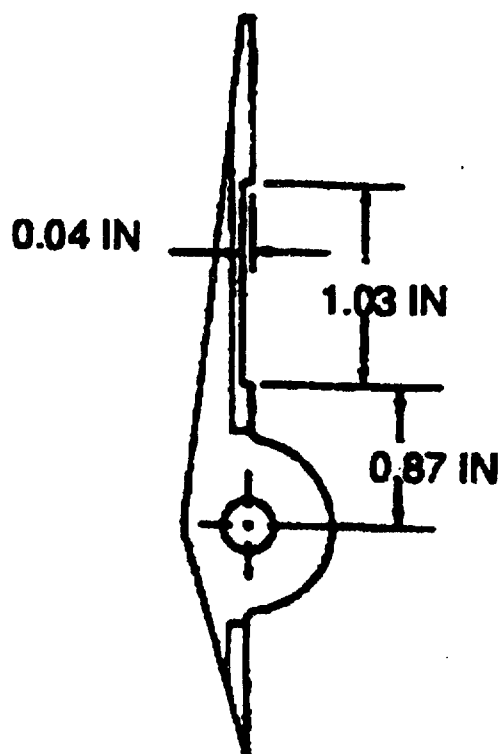
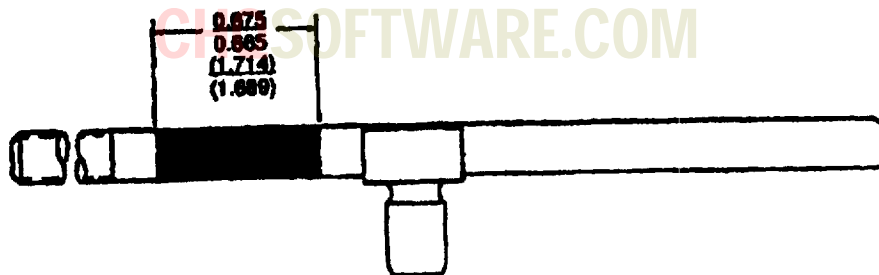


Figure 6-2. Modification of Protractor Finger Assembly (LTCT4751, Detail of Protractor LTCT4750).



DIMENSIONS IN ( ) ARE CENTIMETERS

**Figure 6-3. Variable Air Inlet Guide Vane Connector.**

**6-4. INSTALLATION OF COMPRESSOR ROTOR ASSEMBLY.** Proceed as follows:

**CAUTION**

In following step a, ensure that packing (2, figure 4-53) is installed without kinking or twisting.

- a. Lubricate and install new packing (2) in groove of inner fairing ring.

**NOTE**

In following step b, shim thickness will be needed for reference when axial clearance is checked during engine buildup.

- b. Select shim (6) and record thickness. Refer to shim thickness recorded during removal.

**CAUTION**

In following step c, ensure that packing (7) is installed without kinking or twisting.

- c. Install packing (7) in inlet housing (8). Place shim (6) and sleeve (5) on inlet housing and line up bolt holes.

**NOTE**

In following step d, size of shim (4) will be determined by thickness of shim (6) within plus or minus 0.002 inch (0.005 cm).

- d. Place shim (4) on inner fairing ring.
- e. Place spring-loaded washer (3) on shim (4).
- f. Install two guide pins (LTCT387) in seal housing (13, figure 5-569).
- g. Install adapter (LTCT4558) (1, figure 4-52) on compressor rear shaft. Attach suitable hoist to lifting eye.
- h. Lower compressor rotor into inlet housing (3).
- i. Remove guide pins, and install six slave bolts in seal housing (13, figure 5-569).
- j. Draw compressor rotor into position with slave bolts until it is properly seated. Tighten bolts to 70 to 75 pound-inches (12502 to 13395 gm cm) torque.
- k. Remove six slave bolts and install pinion gear holder (LTCT2048) on accessory drive gear. Secure to inlet housing with six bolts.

**6-5. INSTALLATION OF COMPRESSOR AND IMPELLER HOUSING ASSEMBLIES.** Proceed as follows:**CAUTION**

If a shimmed (impeller housing-to-compressor housing mating surface) housing is being reinstalled, ensure shims were retained for air-bleed actuator mounting bosses. If actuator shims were not retained, fabricate two new shims 0.040 inch (0.102 cm) thick, 1.00 inch (2.54 cm) OD, with 0.500 inch (1.27 cm) hole from aluminum alloy (item 27, table C-1) and retain with impeller housing for use during actuator installation. (Not applicable to T53-L-703 engines.)

**NOTE**

On T53-L-15, -701, 701A engines, when impeller housing 1-100-090-09 is not available for use, housings 1-100-090-06 or 1-100-090-07, which are new or in excellent condition (not shimmed or recontoured), may be used. Shimmed and recontoured impeller housings 1-100-090-06 and 1-100-090-07 may be used on T53-L-13B engines. When impeller housing 1-100-090-06 or 1-100-090-07 is used, the axially threaded hole in the lower housing located at the 8-o'clock position, as viewed from the front face, must be plugged with self-locking setscrew MS180-63-14, installed flush.

Compressor housing subassembly 1-100-210-01 and impeller housings 1-100-090-06 and 1-100-090-08, which require taper pin installation, may be used on T53-L-13B engines.

- a. Separate compressor and impeller housing sections. Do not separate impeller housing from compressor housing.

**CAUTION**

The compressor rotor must not be rotated during installation of compressor and impeller housings. Rotation of compressor rotor may result in damage to the centrifugal compressor housing or to the centrifugal compressor blades.

In following steps b and c, to prevent damage to rotor blades or compressor vanes, guide compressor and impeller onto inlet housing in as straight a line as possible.

- b. Position lower section of compressor and impeller housings on inlet housing. Align match marks on inlet housing and compressor housing.
- c. Position upper section of compressor and impeller housings on inlet housing.
- d. Align upper and lower housing sections on inlet housing.

**NOTE**

In following step e, do not lubricate bolts.

- e. Secure upper and lower sections of compressor and impeller housings with dowels (2, figure 4-51), washers (3), nuts (4), and bolts (1) or bolts (17), hollow dowel (18), washers (19), and nuts (20). Tighten nuts to 40 to 45 pound-inches (7144 to 8037 gm cm) torque.
- f. Secure upper and lower section of compressor and impeller housings with bolts (5 and 8), brackets (9), and nuts (7).

**NOTE**

On T53-L-13B and -703 engines, install spacers (10) under bracket (9).

- g. Install bracket (14), brackets (15 or 16), and secure compressor housing to inlet housing with bolts (11), washers (12), and nuts (13). Tighten nuts to 70 to 95 pound-inches (12502 to 16967 gm cm) torque.

**NOTE**

Three bolt positions are left open to secure accessory drive gearbox support.

**6-6. INSTALLATION OF DIFFUSER HOUSING ASSEMBLY.** Proceed as follows:

- a. Using diffuser sling (LTCT2096) and hoist, lower diffuser housing over compressor rotor to impeller housing. Ensure oil drain port is at 6-o'clock position.

**NOTE**

Alignment pads on air diffuser and inlet housings are symmetrical; therefore, locators on fixture (LTCT526) may be engaged in any two sets of pads to effect alignment during final assembly.

- b. Install alignment fixture (LTCT526) by aligning fixture pads with any two inlet housing mounting pads and securing with lock bushings (LTCT2654, detail of LTCT526).

**NOTE**

Use of bolts in mounting pad holes is not necessary.

- c. Align corresponding diffuser pads within fixture and engage locators (LTCT2653, detail of LTCT526). Shift diffuser until locators rotate freely.

- d. On T53-L-13B and -703 engines, secure diffuser housing (1, figure 4-50) to impeller housing as follows:

- (1) Install 12 bolts (6) and washers (7). (See figure 6-6)
- (2) Use 10 bolts for lower section of impeller housing, skipping bracket locations. (See figures 6-4 and 6-5 for mounting bracket locations.) Do not lubricate bolts.

- e. On T53-L-15B, -701, -701A engines, secure diffuser housing (1, figure 4-50) to impeller housing as follows:

- (1) Install seven bolts (6) and washers (7) and five bolts (4) and bushings (5). (See figure 6-6)
- (2) Use five bolts (6, figure 4-50) and five bolts (4) for lower section of impeller housing, skipping bracket locations. (See figure 6-4 or 6-5 for mounting bracket locations.) Do not lubricate bolts.

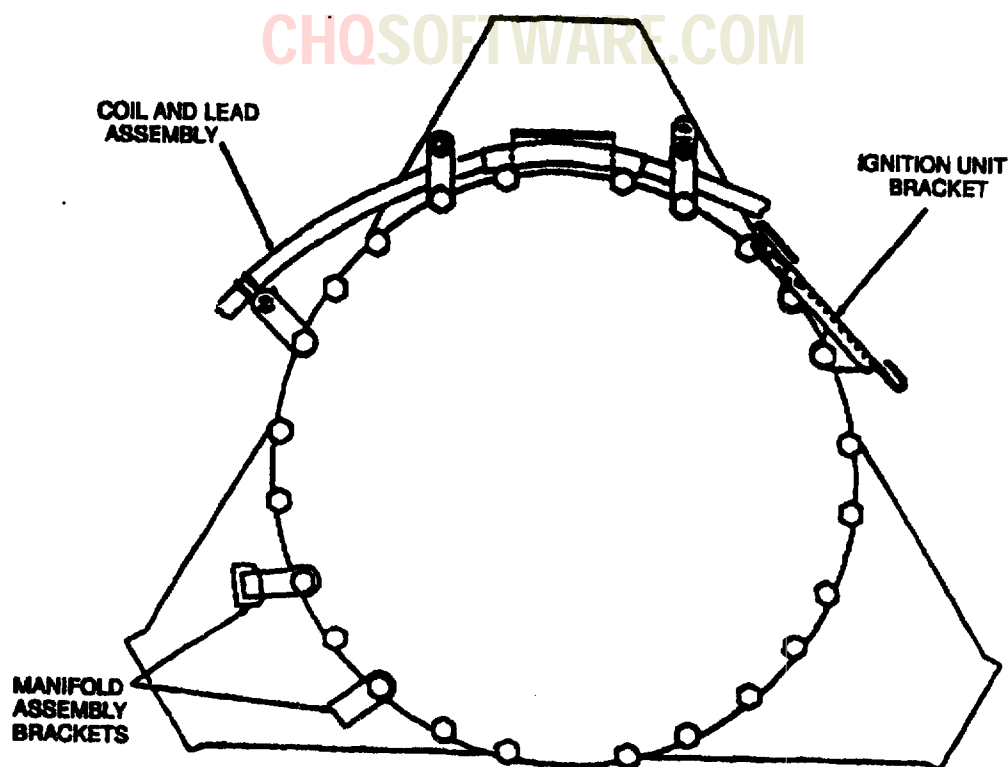


Figure 6-4. Mounting Bracket Locations (T53-L-13B, -703).

1. With engine in vertical position, use feeler gage to measure clearance between sleeve (5, figure 4-53) and front bearing housing (6, figure 5-569). Measure at three places, 120 degrees apart. Average clearance must be 0.0043 to 0.0047 inch (0.0109 to 0.0119 cm). Minimum clearance at any one point is 0.0030 inch (0.0076 cm). Maximum clearance at any one point is 0.0060 inch (0.0152 cm).

**6-7. COMPRESSOR ROTOR CLEARANCES.** (See figure 6-7 and table 6-1) Proceed as follows:

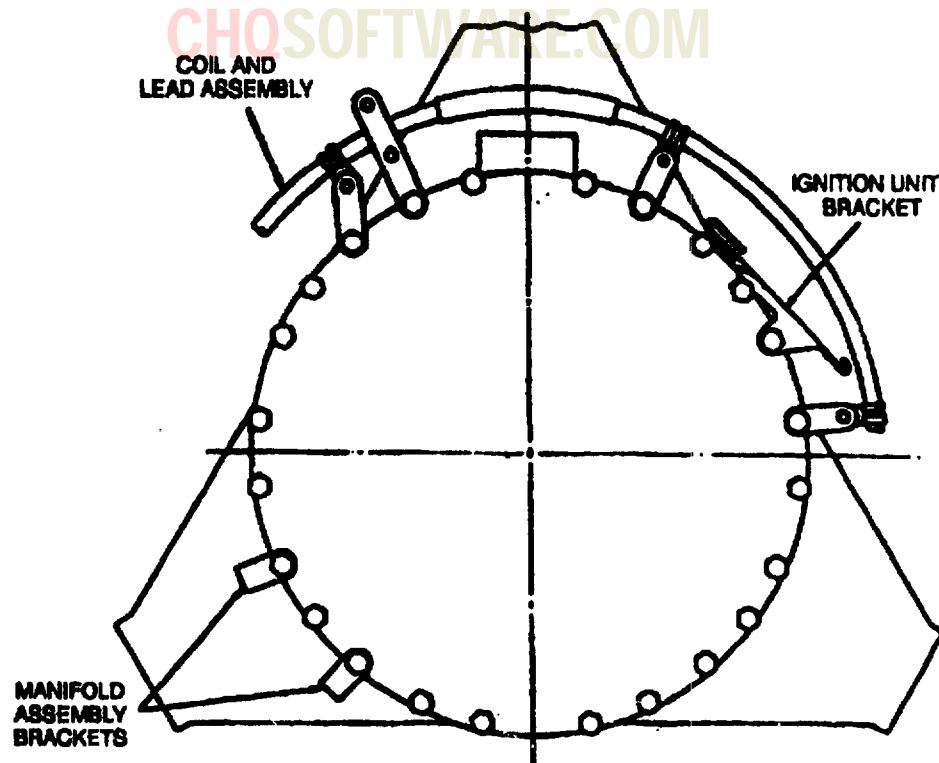
**NOTE**

Forward seal, spacer (if required), forward oil ring, bearing inner race and rollers, bearing outer race, and bearing housing must be installed prior to clearance check. (Refer to paragraph 6-8.)

- a. Using support assembly (LTCT911) and socket wrench (LTCT4002), tighten nut and seal assembly (7, figure 4-49) on compressor rotor to 320 pound-feet (476 kg m) torque.
- b. Remove pinion gear holder or locking plate, then reinstall six bolts installed in paragraph 6-4, step k.
- c. With engine in vertical position, remove dowels or hollow dowels, bolts, washers, and nuts that secure upper and lower sections of compressor and impeller housings together.

**NOTE**

Remove dowels or hollow dowels, using mechanical puller (LTCT1218) and slide hammer adapter (LTCT6740).



**Figure 6-5. Mounting Bracket Locations (T53-I-15, -701, -701A).**

- d. Remove bolts, washers and nuts that secure upper section of compressor housing to inlet housing.
- e. Remove bolts and washers that secure upper section of compressor housing to impeller housing.
- f. Remove upper section of compressor housing, straight out, until rotor blades are cleared.
- g. Remove bolts and washers that secure upper impeller housing to air diffuser.
- h. Remove upper impeller housing by lowering impeller housing until free of air diffuser.
- i. Using feeler gage, check radial and axial clearances between compressor rotor and housing (refer to table 6-1). When the compressor housing, stainless steel insert and blades/impeller are all new, radial clearance shall be per blueprint. When the impeller and impeller housing are new, radial clearances will be per blueprint. Otherwise, overhaul clearances will be used. Check points 7, 8, and 9 must be located at the correct diameter. Point 8, when using impeller housing P/N 1-100-090-13, is 10.721 inch (27.231 cm) diameter and when using P/N 1-101-370-03G it is 10.380 inch (26.365 cm) diameter.

INSTALL BOLT (1-100-527-01)  
AND BUSHING (1-100-528-01) IN  
12 LOCATIONS AS MARKED ▲

BOLT (MS9958-09) AND WASHER  
(AN960-416) INSTALLED IN REMAINING  
LOCATIONS

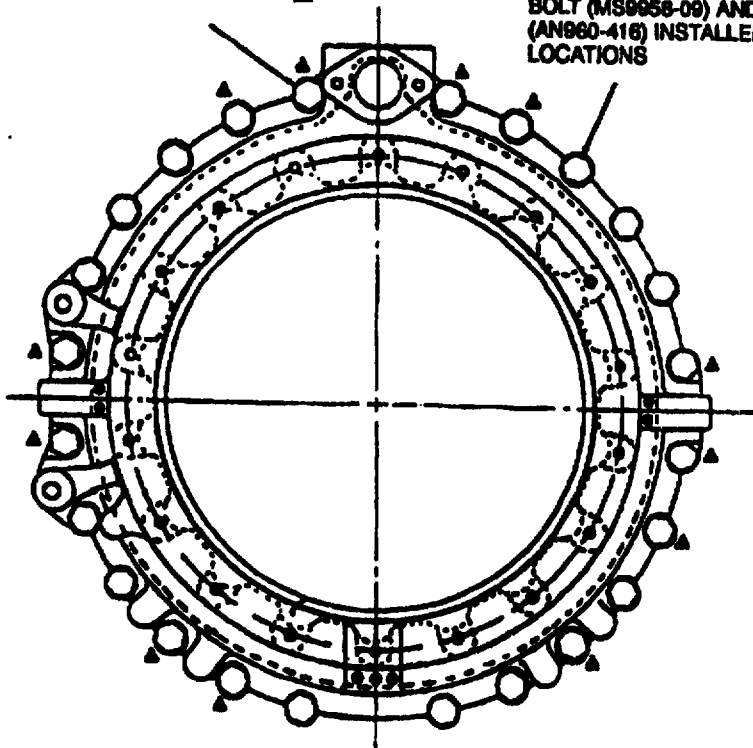


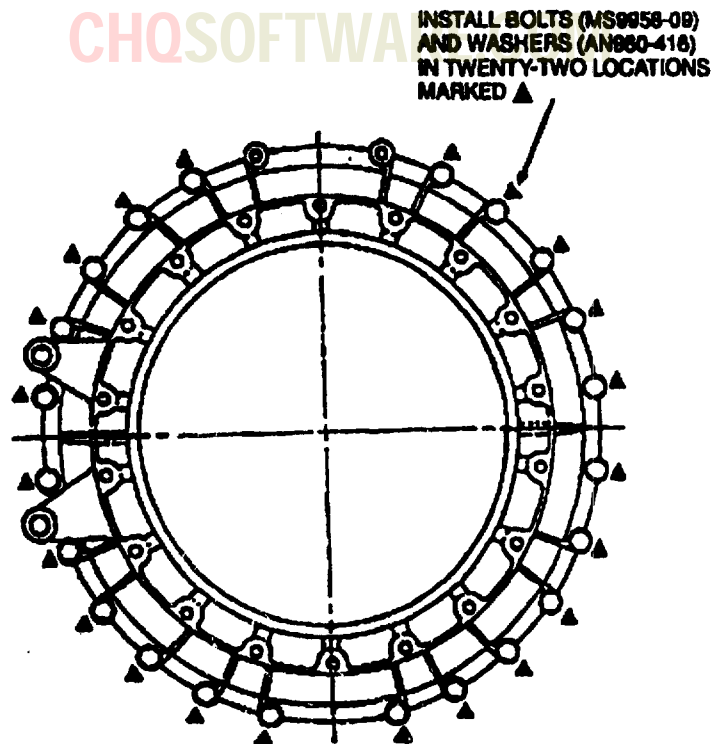
Figure 6-6. Impeller Housing Bolt Locations (Magnesium) (1-100-090-13) (Sheet 1 of 2).

**CAUTION**

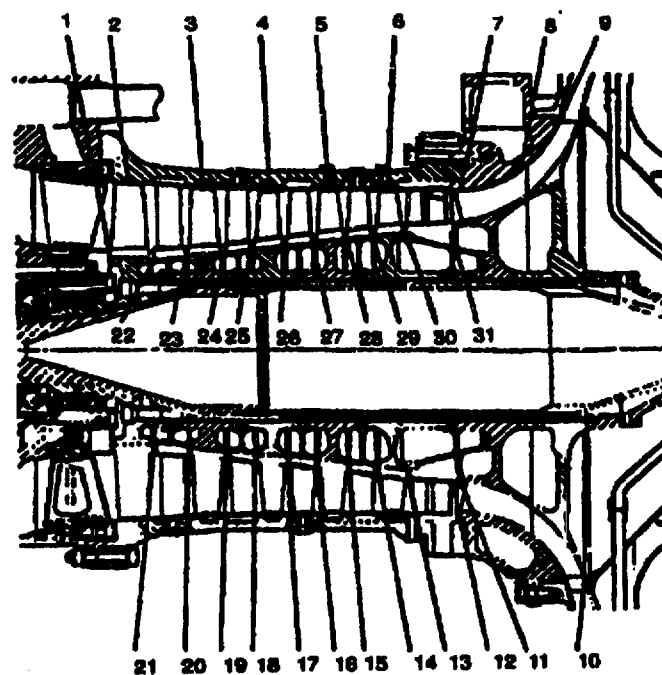
In following step j, if clearance differ from those listed in table 6-1, buildup of engine shall be stopped and the situation remedied. These clearances depend on thickness of shim (6, figure 4-53). The engine must be disassembled to that stage of assembly immediately before compressor rotor installation, and shim must be modified. If clearance shows that compressor assembly is resting too far rearward, shim thickness must be reduced. If clearance shows compressor assembly is resting too far forward, thickness of shim must be increased.

- j. On T53-L-13B, -703 engines, when clearances have been established, install upper section of impeller housing into air diffuser with bolts (2 and 6, figure 4-50) and washers (7). (See figure 6-6 for bolt locations).
- k. On T53-L-15B, -701, 701A engines, when clearances have been established, install upper section of impeller housing into air diffuser with bolts (2 and 6, figure 4-5), washers (7) and bushings (5). (See figure 6-6 for bolt locations).





**Figure 6-6. Impeller Housing Bolt Locations (Stainless Steel) (1-101-370-03) (Sheet 2 of 2).**



**Figure 6-7. Compressor Rotor Clearance Locations.**

**NOTE**

Do not torque bolts (2, 4 and 6, figure 4-50) until bolts (1 or 17, figure 4-51), which secure dowels (2) or hollow dowels (18), have been installed and torqued.

- l.** Install dowels (2 or 18) on compressor housing. Secure upper compressor housing with washers (3), nuts (4), and bolts (1). Tighten nuts to 40 to 45 pound-inches (7144 to 8037 gm cm) torque.

**NOTE**

Do not lubricate bolts that secure compressor sections together and to inlet housing.

- m.** Additionally secure upper and lower sections of compressor and impeller housing together with bolts (5 and 8), washers (6), spacers (10), brackets (9), and nuts (7).

- n.** Secure compressor housing to inlet housing with bolts (11), washers (12) brackets (14 and 15), and nuts (13).

**NOTE**

Three bolt positions are left open to secure accessory drive gearbox support.

Table 6-1. Compressor Rotor Clearances.

Tip Clearances	Dir Meas	Blueprint Clearances		Overhaul Clearances		See Fig 6-7 Index
		Min	Max	Min	Max	
First disc blade to compressor housing	Radial	*0.023 (0.058)	0.037 (0.094)	0.023 (0.058)	0.041 (0.104)	2
		**0.024 (0.061)	0.037 (0.094)	0.018 (0.046)	0.041 (0.104)	
Second disc blade to compressor housing	Radial	*0.026 (0.066)	0.036 (0.091)	0.026 (0.066)	0.038 (0.099)	3
		**0.024 (0.061)	0.033 (0.084)	0.018 (0.046)	0.035 (0.089)	
Third disc blade to compressor housing	Radial	*0.025 (0.064)	0.035 (0.089)	0.025 (0.064)	0.036 (0.091)	4
		**0.024 (0.061)	0.033 (0.084)	0.024 (0.061)	0.034 (0.087)	
Fourth disc blade to compressor housing	Radial	*0.025 (0.064)	0.040 (0.102)	0.025 (0.064)	0.041 (0.104)	5
		**0.024 (0.061)	0.032 (0.081)	0.024 (0.061)	0.033 (0.084)	
				0.020 (0.051)	(when using compressor housing 1-101-070-04, -05 only)	
Fifth disc blade to compressor housing	Radial	*0.025 (0.064)	0.040 (0.102)	0.025 (0.064)	0.040 (0.102)	6
		**0.024 (0.061)	0.032 (0.081)	0.024 (0.061)	0.032 (0.081)	
Impeller to centrifugal housing front	Radial	*0.017 (0.043)	0.024 (0.061)	0.017 (0.043)	0.032 (0.081)	7
		***0.023 (0.058)	0.032 (0.081)	0.023 (0.058)	0.039 (0.099)	
Impeller to centrifugal housing midpoint	Radial/Axial	*0.023 (0.058)	0.033 (0.084)	0.023 (0.058)	0.033 (0.084)	8
		**0.041 (0.104)	0.051 (0.130)	0.041 (0.104)	0.051 (0.130)	
		***0.047 (0.119)	0.057 (0.145)	0.047 (0.119)	0.057 (0.145)	
Impeller to centrifugal housing rear	Axial	*0.040 (0.102)	0.044 (0.112)	0.040 (0.102)	0.048 (0.122)	9
		**0.062 (0.157)	0.066 (0.168)	0.062 (0.157)	0.070 (0.178)	
Impeller to diffuser	Radial	0.036 (0.091)	0.056 (0.142)	0.036 (0.091)	0.062 (0.157)	10

\*T53-L-15, -701

\*\*T53-L-13B, -701A, -703

\*\*\*All Engines with P/N 1-101-370-03G impeller housing installed.

Table 6-1. Compressor Rotor Clearances (Continued).

Tip Clearances	Dir Meas	Blueprint Clearances		Overhaul Clearances		See Fig. 6-7 Index
		Min	Max	Min	Max	
First disc to inlet vane shroud	Axial	*0.086 (0.218)	0.160 (0.406)	0.086 (0.218)	0.160 (0.406)	1
First disc to first vane	Axial	**0.040 (0.102)	0.151 (0.384)	0.040 (0.102)	0.151 (0.384)	21
First vane to second disc	Axial	*0.038 (0.097)	0.102 (0.259)	0.038 (0.097)	0.102 (0.259)	20
Second disc to second vane	Axial	**0.040 (0.102)	0.106 (0.269)	0.040 (0.102)	0.106 (0.269)	19
Second vane to third disc	Axial	*0.029 (0.074)	0.099 (0.251)	0.029 (0.074)	0.099 (0.251)	18
Third disc to third vane	Axial	*0.036 (0.091)	0.112 (0.284)	0.036 (0.091)	0.112 (0.284)	17
Third vane to fourth disc	Axial	**0.040 (0.102)	0.098 (0.249)	0.040 (0.102)	0.098 (0.249)	16
Fourth disc to fourth vane	Axial	*0.032 (0.081)	0.096 (0.244)	0.032 (0.081)	0.096 (0.244)	15
Fourth vane to fifth disc	Axial	**0.040 (0.102)	0.098 (0.249)	0.040 (0.102)	0.098 (0.249)	14
		*0.034 (0.086)	0.094 (0.239)	0.034 (0.086)	0.094 (0.239)	
		**0.040 (0.102)	0.097 (0.246)	0.040 (0.102)	0.097 (0.246)	
		*0.040 (0.102)	0.108 (0.274)	0.040 (0.102)	0.108 (0.274)	
		**0.040 (0.1029)	0.105 (0.267)	0.040 (0.102)	0.105 (0.267)	

\*T53-L-15, -701

\*\*T53-L-13B, -701A, -703

\*\*\*All Engines with P/N 1-101-370-03G impeller housing installed.

**Table 6-1. Compressor Rotor Clearances (Continued).**

Tip Clearances	Dir Meas	Blueprint Clearances		Overhaul Clearances		See Fig. 6-7 Index
		Min	Max	Min	Max	
Fifth disc to fifth vane	Axial	*0.029 (0.074)	0.095 (0.241)	0.029 (0.074)	0.095 (0.241)	13
		**0.040 (0.102)	0.101 (0.257)	0.040 (0.102)	0.101 (0.257)	
Fifth vane to impeller	Axial	*0.048 (0.122)	0.142 (0.361)	0.048 (0.122)	0.142 (0.361)	11
		**0.063 (0.160)	0.159 (0.404)	0.063 (0.160)	0.159 (0.404)	
Centrifugal housing to fifth vane	Axial	0.000 (0.000)	0.034 (0.086)	0.000 (0.000)	0.062 (0.157)	12
First spacer land to first vane - front	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		22
First spacer land to first vane- rear	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		23
Second spacer land to second vane - front	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		24
Second spacer land to second vane - rear	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		25
Third spacer land to third vane- front	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		26
Third spacer land to third vane - rear	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		27
Fourth spacer land to fourth vane - front	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		28
Fourth spacer land to fourth vane - rear	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		29
Fifth spacer land to fifth vane- front	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		30
Fifth spacer land to fifth vane - rear	Radial	0.022 (0.056)	0.038 (0.096)	0.022 (0.056)		31

\*T53-L-15, -701

\*\*T53-L-13B, -701A, -703

\*\*\*All Engines with P/N 1-101-370-03G Impeller housing installed.

o. If compressor housing has been installed, check for proper sealing of compressor housing at the splitline using a 0.002 inch (0.005 cm) feeler gage. Partial penetration of the housing shall not be cause for rejection. If the feeler gage penetrates the full depth of splitline, reject the housing.

p. After rotor clearances have been established, a lubrication check should be made of compressor rotor rear bearing. Proceed as follows:

(1) Prepare oil flow check stand (LTCT313), or equivalent, to provide lubricating oil (item 190 or 189, table C-1) at a temperature of 90° to 110° F (32° to 43° C).

(2) Connect oil pressure hose from check stand to strainer on air diffuser.

(3) Remove cap from oil scavenge port.

(4) Adjust pressure regulating valve for 68 to 72 psig (4780 to 5062 gm sq cm), and start oil flow from check stand. When oil starts to flow from scavenge hoses, check flowmeter for 279 to 378 phr indication, if lubricating oil (item 190, table C-1) is used or 266 to 360 phr, if lubricating oil (item 189, table C-1) is used.

(5) Immediately shut down check stand and allow oil to drain into container.

(6) Disconnect oil line from check stand.

q. Connect scavenge line and pressure line to air diffuser, and return engine for further reassembly.

**6-8. INSTALLATION OF FIRST STAGE GAS PRODUCER NOZZLE ASSEMBLY, COMBUSTION CHAMBER DEFLECTOR, BEARING AFT SEAL, HOUSING, BEARING, OIL RINGS, AND BEARING FORWARD SEAL.** Proceed as follows:

#### NOTE

Aft seal 1-300-174-02 and -03 are manufactured with a fracture at one of the slot locations on air side carbon element. The fracture is not a defect and is not considered cause for seal replacement. Forward seals (1-300-173-02 or -03) and aft seals (1-300-174-02 and -03) are manufactured with three splits, 120 degrees apart, on oil side carbon element. Aft seal 1-300-616-01 is manufactured with three splits, 120 degrees apart on the carbon element. These splits are not defects and are not considered cause for seal replacement.

a. Carefully position forward seal (1, figure 4-38) on forward oil ring (2) and, using installing tool (LTCT13070), install seal and ring as a unit on rear compressor shaft. Ensure top marking on seal is located at 12-o'clock position. (See figure 6-8 for proper seal installation.)

#### NOTE

For ease of installation, a heater may be applied, if necessary, to the air diffuser during installation of the forward seal and forward oil ring onto the rear compressor shaft and into the air diffuser. To prevent tool rotation during installation, engage tangs of installing tool (LTCT13070) with cutouts in seal.

b. Install spacer (3, figure 4-38) and retaining ring (4).

c. Using installing tool (LTCT791), install bearing inner race and rollers (5) on rear compressor shaft.

#### CAUTION

In following step d, ensure oil holes in bearing outer race (9) line up with oil passage in rear bearing housing assembly (7), with oil holes forward.

d. With rear bearing housing 1-110-590-02, use arbor press and sleeve bushing (LTCT3492) to press bearing outer race (9) into rear bearing housing assembly (7).

#### NOTE

If bearing is pinched, ensure that pin in outer race of bearing engages slot of bearing housing.

e. With rear bearing housing 1-110-470-13, using arbor press and suitable sleeve, press bearing outer race (10) into rear bearing housing assembly (7).

- f. Install seal (6) and gaskets (16) in grooves of diffuser housing assembly.
- g. With rear bearing housing 1-110-590-02, position rear bearing housing assembly (7) over rear compressor shaft. Install bolts (14) and tighten bolts to 120 to 165 pound-inches (21432 to 29469 gm cm) torque.

**CAUTION**

In following step h, do not apply torque to hex end of stud. Hex end is utilized only during disassembly, to hold stud stationary when breaking nut loose.

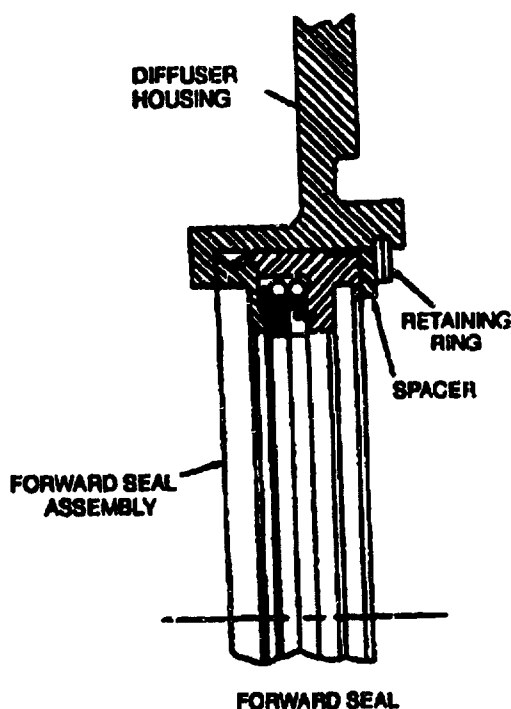
- h. With rear bearing housing 1-110-590-02, install two bearing housing studs (8) at the 12- and 6-o'clock positions. Using a special wrench (LTCT6940) on the large four flats on stud, tighten studs to 70 to 90 pound-inches (12502 to 16074 gm cm) torque. Do not lockwire at this time.

**NOTE**

Prior to stud installation, apply antiseize (item 47, table C-1) or Molykote antiseize thread compound (item 221, table C-1) to threads.

- i. With rear bearing housing 1-110-470-13, position rear bearing housing assembly (7) over rear compressor shaft. Apply Molykote antiseize compound (item 221, table C-1) to threads of screws (33); then install screws two counterbored holes at the 10- 4-o'clock positions on bearing housing. Tighten, as required.

- j. With rear bearing housing 1-110-590-02, remove bolts (14).



**Figure 6-8. Forward Seal - Installation.**

- k. Position combustion chamber deflector (11) and first stage gas producer nozzle assembly (12 or 34) on rear bearing housing assembly (7) and into diffuser housing assembly.

**CAUTION**

On T53-L-13B, -15, -701, -701A engines, the combustion chamber liner forward inside dimples must contact the first stage gas producer nozzle deflector. This may be accomplished by selection of parts or by carefully bending tabs on liner inward. Check contact throughout 360 degrees with feeler gage.

**NOTE**

Prior to nut installation, apply antiseize thread compound (item 221, table C-1) to threads.



l. With rear bearing housing 1-110-470-13, secure first stage gas producer nozzle and deflector with bolts (14). Tighten bolts to 120 to 165 pound-inches (21432 to 29469 gm cm) torque.

m. With rear bearing housing 1-110-590-02, secure first stage gas producer nozzle and deflector with two bearing housing nuts (13) at 12- and 6-o'clock positions and bolts (14). Tighten nuts to 60 to 90 pound-inches (10716 to 16074 gm cm) torque and bolt to 120 to 165 pound-inches (21432 to 29469 gm cm) torque.

**NOTE**

Prior to bolt installation, apply antiseize thread compound (item 221, table C-1) to threads.

n. With rear bearing housing 1-110-590-02, lockwire bolts (14), bearing housing nuts (13), and bearing housing studs (8) as shown in figure 6-9. With rear bearing housing 1-110-470-13, lockwire bolts (14) as shown in figure 6-10.

o. Install metal gasket (17, figure 4-38) in groove of rear bearing housing assembly (7). Install gasket (32) in groove of retaining plate (18). Install retaining plate (18), taking care not to disturb gasket (17) and gasket (32).

p. Using adapter and guide (LTCT3685), install aft oil ring (19). Do not remove adapter and guide (LTCT3685) from aft oil ring at this time.

q. Install metal gasket (17) in groove of retaining plate (18).

**CAUTION**

In following step t, exercise care during installation to prevent damage to carbon sealing elements. Carefully guide seal and retainer assembly (20) over adapter and guide (LTCT3685) and onto aft oil ring.

r. Using an arbor press and a suitable sleeve, press seal (22) into oil seal retainer (23 or 36).

s. Install retaining ring (21) into oil seal retainer (23 or 36).

**NOTE**

Prior to installation of bolts (31), apply molybdenum disulfide (item 48, table C-1) to threads.

t. With seal retainer assembly 1-110-600-05, position seal and retainer assembly (20) against retaining plate (18), taking care not to disturb gasket (17). Secure with three bolts (31). Tighten bolts to 40 to 45 pound-inches (7144 to 8037 gm cm) torque. Remove adapter and guide installed in preceding step p.

u. With seal retainer assembly 1-110-720-02, position oil seal retainer (36) against retaining plate (18) taking care not to disturb gasket (17). Secure with three screws (37). Tighten screws to 18 to 25 pound-inches (3214 to 4465 gm cm) torque. Remove adapter and guide installed in preceding step p.

**CAUTION**

In following step v, ensure lockwire is positioned around bolt heads.

v. On T53-L-13B, -15, -701, and -701A engines, position sealing ring (24) on aft face of seal and retainer assembly (20), align bolt holes, and secure with eight bolts (30). Tighten bolts to 85 to 95 pound-inches (15181 to 16967 gm cm) torque. Tighten bolts (31) to 40 to 45 pound-inches (7144 to 8037 gm cm) torque. After 5 minutes, release torque on bolts (30); then retighten bolts to 95 to 105 pound-inches (16967 to 18753 gm cm) torque. Lockwire bolts together.

**CAUTION**

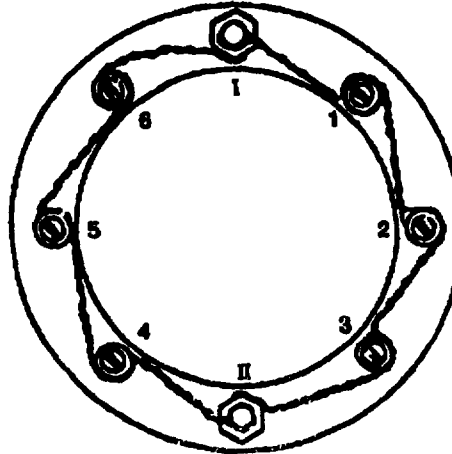
In following step w, ensure lockwire is positioned around bolt heads.

w. On T53-L-703 engines, position sealing ring (38), with two-slot louver section at 2-o'clock, on aft face of oil seal retainer (36), align bolt holes, and secure with eight bolts (39). Tighten bolts to 95 to 105 pound-inches (16967 to 18753 gm cm) torque. Lockwire bolts together in pairs using the method shown in figure 6-10.

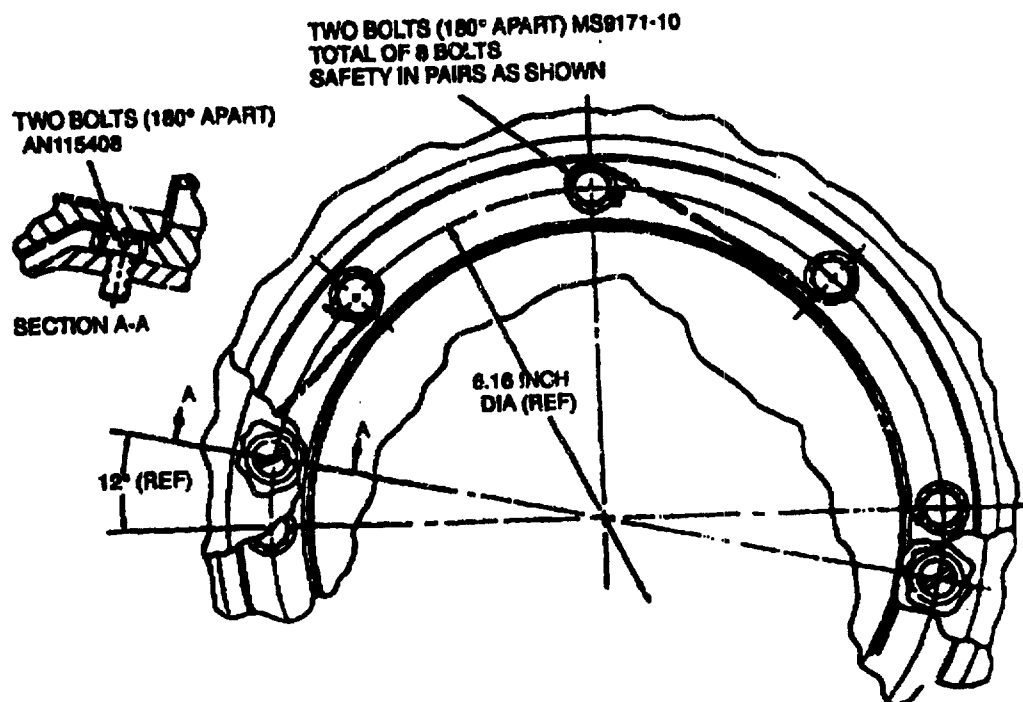
x. Using installing tool (LTCT4013), install shim (25) and forward cone (26). Ensure parts bottom against aft oil ring (19).



- LOCKWIRING PROCEDURE**
- (1) NUT ON STUD I TO BOLT 6 TO BOLT 5
  - (2) NUT ON STUD II TO BOLT 3 TO BOLT 2
  - (3) STUD I TO BOLT 1 TO BOLT 2
  - (4) STUD II TO BOLT 4 TO BOLT 5



**Figure 6-9. Rear Bearing Housing Studs, Nuts, and Bolts - Lockwire Procedure (P/N 1-110-590-02).**



**Figure 6-10. Rear Bearing Housing Bolt Lockwiring Procedures (P/N 1-110-470-13).**

**NOTE**

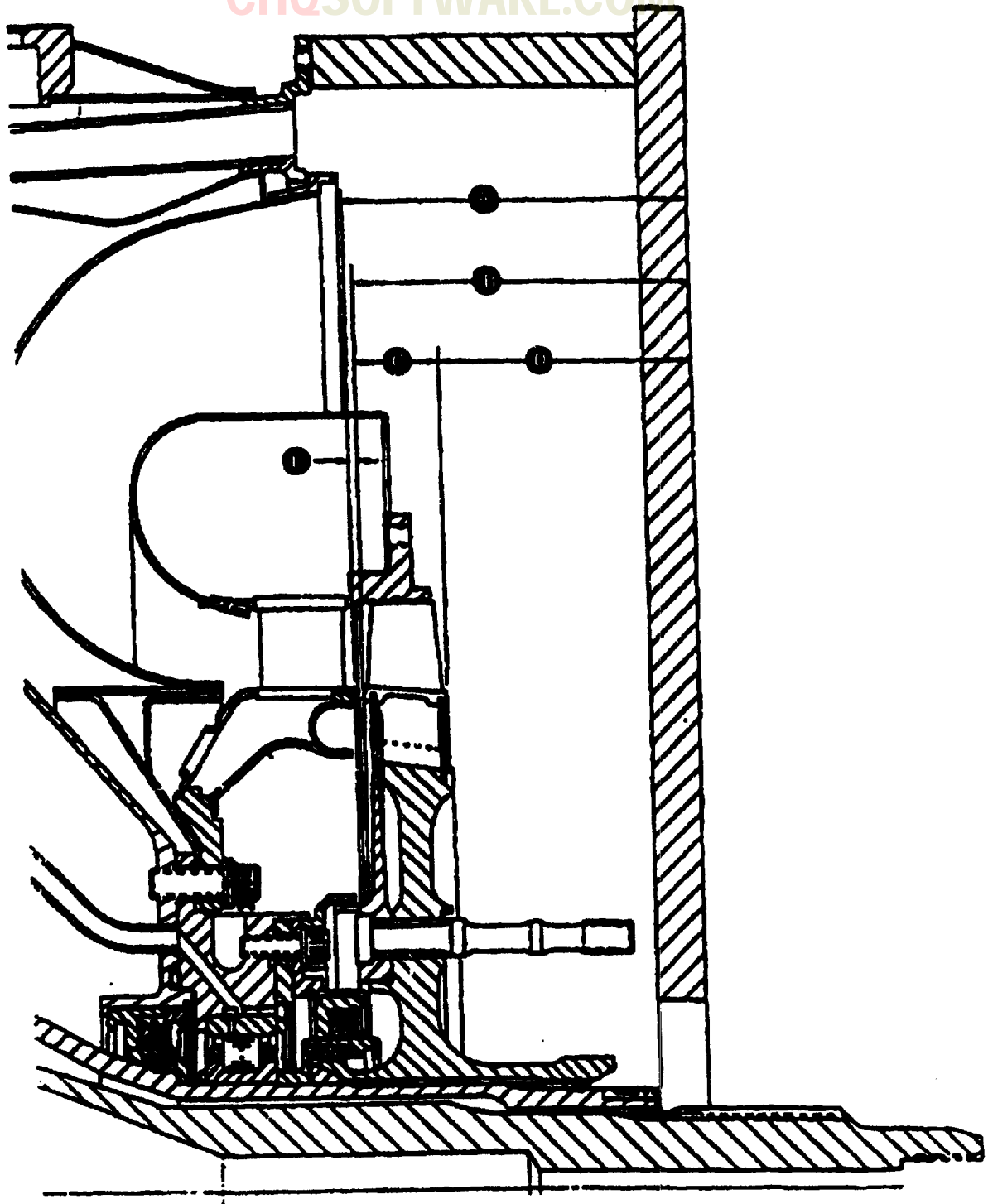
Determine size of shim (25) required to effect proper clearance between first stage gas producer nozzle assembly (12 or 34) and first stage gas producer rotor assembly (28). (Refer to following step y.) Replace shim (25), if required, with shim of proper thickness.

- y. Establish clearance E between first stage gas producer nozzle assembly and first stage gas producer turbine rotor assembly by using a go-no-go type gage or as follows (See figure 6-11):

**NOTE**

If go-no-go gage is used, ensure measurement is obtained at high points of blade platforms, do not measure in blade cutout areas. Clearance E must be within 0.070 inch (0.178 cm) minimum to 0.120 inch (0.305 cm) maximum for T53-L-15 and -701 engines. Clearance E must be within 0.095 inch (0.241 cm) minimum to 0.120 inch (0.305 cm) maximum for T53-L-13B and -701A engines and 0.095 inch (0.241 cm) minimum to 0.120 inch (0.305 cm) maximum for T53-L-703 engine. If desired clearance is not obtained, select shim (25, figure 4-38) of correct thickness. (Refer to table 6-2.) As clearance increases, the number of threads engaged by nut (53, figure 4-38) decreases.

- (1) Place two gage blocks of equal thickness on diffuser housing flange. Place locating bar (LTCT153) on gage blocks.
- (2) Using depth micrometer, measure from bar to inner shroud A in four locations. Record dimension from highest point on inner shroud.
- (3) Using micrometer, measure thickness of rotor assembly (dimension C) at thickest portion of blade platform of highest blade (from forward face). Do not measure from cutout area. Using suitable marker, mark rear side of blade.
- (4) Install turbine rotor assembly over compressor shaft splines, and temporarily secure with rear cone (55), lockring (54), and nut (53). Tighten nut to 320 to 350 pound-feet (476 to 521 kg m) torque.
- (5) Using depth micrometer, measure from bar to first stage gas producer turbine blade platform of highest blade (D, figure 6-11).
- (6) Add dimension C and D. Result will be dimension B.
- (7) Subtract dimension B from dimension A. Result will be clearance E.
- (8) Remove nut (53), lockring (54), rear cone (55), and first stage gas producer rotor assembly (28).



**Figure 6-11. Determining Clearance Between First Stage Gas Producer Nozzle Assembly and Rotor Assembly.**

Table 6-2. Shim Thickness.

Part Number	Thickness
1-100-289-01	0.020 to 0.025 inch (0.051 to 0.064 cm)
1-100-289-02	0.030 to 0.035 inch (0.076 to 0.089 cm)
1-100-289-03	0.040 to 0.045 inch (0.102 to 0.114 cm)

**6-9. INSTALLATION OF FIRST STAGE GAS PRODUCER TURBINE ROTOR ASSEMBLY.** (See figure 4-38.) When the assembly contains either a new cylinder or new blades, the minimum tip clearance for the first or second stage gas producer rotor is .030 inch (0.076 cm). When both new blades and a new cylinder are installed, the tip clearance shall be .034 to .043 inch (0.086 to 0.109 cm). When used blades and used cylinder are installed, DMWR limit applies. Proceed as follows:

- a. Install bolts (27) through first stage gas producer rotor assembly from forward side.
- b. Install first stage gas producer rotor assembly (28) over rear compressor shaft splines, locating heavy point 180 degrees from heavy point on rear shaft of compressor rotor assembly.
- c. Lubricate threads of nut (53) with molybdenum disulfide (item 48, table C-1).
- d. Install rear cone (55), lockring (54), and nut (53).

**NOTE**

Nut (53) may be reused, provided that general condition is good and threads are not worn or damaged. To facilitate reassembly, if rear cone 1-110-141-02 is not available, then rear cone 1-110-141-01 may be reworked to 1-110-141-02 configuration. (See figure 6-12).

e. Rotate gas producer rotor components and listen for audible rubbing between outer sealing ring of first stage gas producer rotor assembly and sealing ring (24, figure 4-38). If no rubbing is evident, proceed with installation procedure. If rubbing is evident, remove gas producer rotor components, and rework rotor outer sealing ring to obtain a minimum clearance of 0.010 inch (0.025 cm).

f. Install hub and adapter assembly (LTCT3076, detail of LTCT4676) over bolts (27) of first stage gas producer rotor assembly, and secure with tabwashers (46) and nuts (47).

**NOTE**

Ensure that bolts are drawn completely through adapter.

- g. Position and secure holding fixture (LTCT576) to diffuser housing.
- h. Using socket wrench (LTCT584, detail of LTCT4676) engage tangs of wrench with slots in nut (53). Tighten nut to 320 to 350 pound-feet (476 to 521 k gm) torque. Remove holding fixture and hub and adapter assembly.

**NOTE**

An alternate method to preceding steps f through h is shown in following steps i and j.

i. Install torque fixture (LTCT13175) over bolts (27) of first stage gas producer rotor assembly, engaging tangs of socket wrench (LTCT13456, detail of LTCT13175) with slots in nut (53), and secure fixture with nuts (47).

**NOTE**

Ensure that bolts are drawn completely through fixture.

j. Using torque wrench, P/N PD2501 or equivalent, tighten nut (53) to 320 to 350 pound-feet (476 to 521 kgm) torque. Remove torque wrench and torque fixture.

**NOTE**

Nut (53) shall not extend more than 0.060 inch (0.152 cm) beyond aft face of compressor rotor rear stub shaft.

- k. Check first stage gas producer rotor for minimum tip clearances as follows:

**NOTE**

Tip clearance shall be 0.025 inch (0.064 cm) minimum to 0.050 inch (0.127 cm) maximum if parts are reused. If new parts are used, tip clearance shall be 0.034 inch (0.086 cm) minimum to 0.043 inch (0.112 cm) maximum.

- (1) Insert feeler gage between first stage gage producer rotor assembly (28) and first stage gas producer nozzle assembly (12 or 34) at the 12-o'clock position.

**CAUTION**

In following step (2), do not use lead pencil to mark blade.

- (2) Rotate turbine rotor and check and record minimum tip clearance (longest blade). Mark longest blade with Colorbrite pencil (item 239, table C-1).

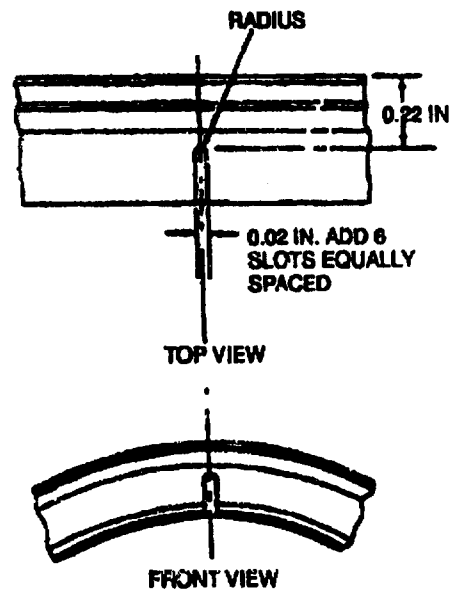


Figure 6-12. Rework of Rear Cone (1-110-141-01 to 1-110-141-02) Configuration.

**NOTE**

Exercise care when taking tip clearance so that coating on tips of blades is not damaged.

- (3) Check clearance between tip of longest blade and flange at seven additional positions (See figure 6-13.) Hold feeler gage stationary at each position and turn rotor one full turn. If tip clearance at any position is less than 0.025 inch (0.064 cm) with used parts, or 0.034 inch (0.086 cm) with new parts, flange must be reworked. (Refer to paragraph 5-251, step t) If flange is not to be reworked, proceed to following step 1.

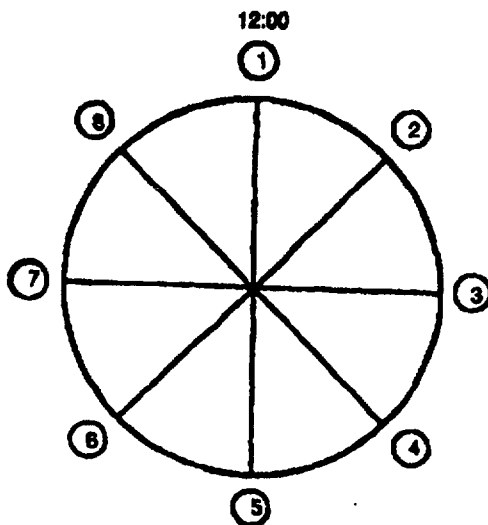
**NOTE**

Minimum acceptable tip clearance at inspection is 0.025 inch (0.064 cm) with used parts, or 0.034 inch (0.086 cm) with new parts. However, when rework is to be accomplished, the minimum tip clearance after rework is 0.034 inch (0.086 cm).

If repair to flange is of a minor nature, maintenance kit (LTCT2020) may be used to repair flange. Repair shall be accomplished as outlined in paragraph 5-251, step t.

- (4) Locate areas to be reworked as follows:
- Insert 0.034 inch (0.086 cm) feeler gage between tip of longest blade and first stage gas producer nozzle cylinder, as near as possible to area of least tip clearance.
  - Rotate turbine wheel and feeler gage together until stopped by an area of less clearance.
  - At stopping point, mark edge of cylinder flange with Colorbrite pencil (item 239, table C-1).
  - Remove feeler gage and turn rotor until long blade is past high point far enough to allow 0.034 inch (0.086 cm) feeler gage to be inserted.
  - Reinsert feeler gage between long blade and cylinder flange.

- (f) Rotate turbine wheel and feeler gage together, in reverse direction, until stopped by an area of less clearance.
- (g) Mark cylinder flange as before and connect the two marks to show area to be reworked.
- (h) Repeat preceding steps (a) through (g) until all areas that must be reworked have been located.



**Figure 6-13. Checking Positions - Tip Clearance.**

- I. Mount bracket (LTCT3955) on flange of air diffuser.

**NOTE**

Bracket is used as a base for dial indicator while taking runouts. Prior to performing steps m and n, position engine at approximately 45 degrees, nose down, and apply forward pressure to compensate for bearing internal clearance.

- m. Position dial indicator against point just inboard of first stage gas producer turbine blade roots. Rotate gas producer turbine rotor assembly, and record runout. Runout shall be within 0.004 inch (0.010 cm).
- n. Position dial indicator on rear flange of gas producer turbine rotor assembly. Rotate gas producer turbine rotor assembly and record runout. Runout shall be within 0.003 inch (0.008 cm).

**NOTE**

Sum of the runouts determined in preceding steps m and n shall not exceed 0.006 inch (0.015 cm).

- o. If runouts are not within limits, remove first stage gas producer rotor assembly and reposition at 180 degrees from removed position. Repeat preceding step j. If limits are still exceeded, try 90 degrees or 270 degrees from original position. If limits are still exceeded, replace forward cone (26, figure 4-38) and/or rear cone (55) and recheck. Record information in engine log.

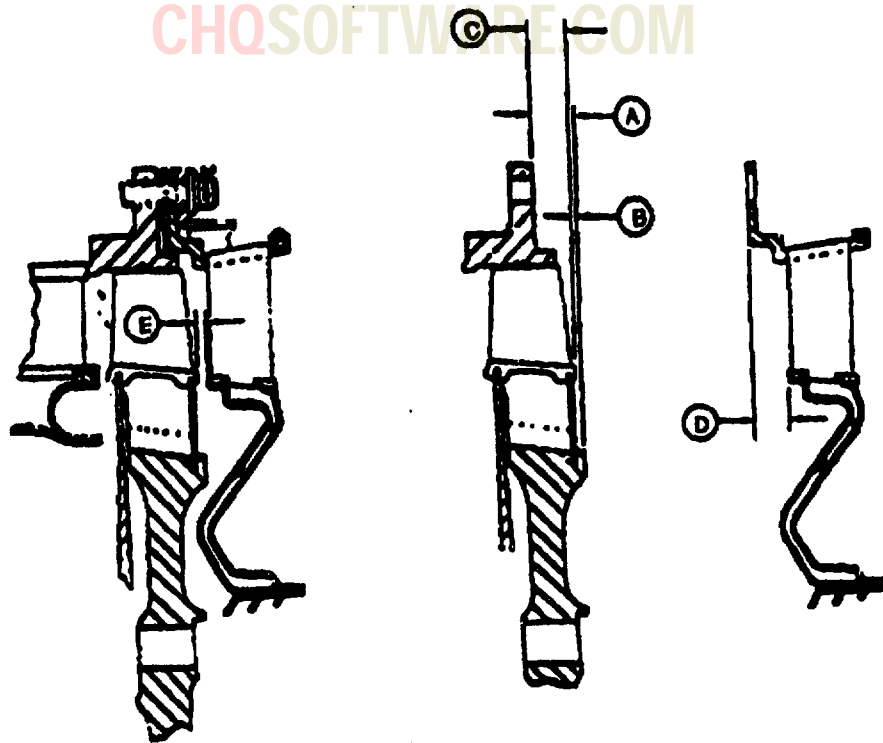
- p. Bend lockring (54) into slots of nuts (53) in two places, 180 degrees apart. Do not shear lockring.

**6-10. INSTALLATION OF SECOND STAGE GAS PRODUCER NOZZLE ASSEMBLY AND CYLINDER.** (See figure 4-38.) Proceed as follows:

- a. Establish clearance between first stage gas producer rotor assembly and second stage gas producer nozzle, using a go-no-go gage, or as follows:

(1) Using vernier depth gage, measure from locating bar to first stage gas producer nozzle in four locations. (See dimension A, figure 6-14.)

(2) Using vernier depth gage, measure from locating bar to base shroud of highest first stage gas producer blade. (See dimension B.)



**Figure 6-14. Determining Clearance Between First Stage Gas Producer Rotor and Second Stage Gas Producer Nozzle.**

- (3) Subtract dimension obtained in step (2) from largest dimension obtained in step (1). Result is dimension C.
- (4) Place second stage gas producer nozzle, forward face up, on a bench. Place locating bar across tangs on forward face of nozzle.
- (5) Using vernier depth gage, measure from bar to lip on inner shroud of nozzle in four locations and subtract thickness of bar from smallest dimension. Result is dimension D.
- (6) Subtract dimension C obtained in step (3) from dimension D in step (5). Result is dimension E.
- (7) Clearance must be within 0.074 inch (0.188 cm) minimum to 0.100 inch (0.254 cm) maximum, for T53-L-15 and -701 engines, and within 0.080 inch (0.203 cm) minimum to 0.105 inch (0.267 cm) maximum for T53-L-13B, -701A, and -703 engines. If desired clearance is not obtained, install spacer (29, figure 4-38), as required.

**NOTE**

A minimum of one spacer 1-120-029-01 or 1-120-029-03 is to be used. Additional spacers 1-120-029-01, 1-120-029-02 or 1-120-029-03 may be used, as required; however, spacer 1-120-029-01 or 1-120-029-03 shall always be installed against the second stage gas producer nozzle flange.

- b. Install second stage gas producer nozzle assembly (41) and ring (40).

**NOTE**

When installing seal ring (44), ensure that pinching or binding does not exist in the seal ring groove of second stage gas producer nozzle.

- c. Using compressor (LTCT4155), install one expander (43) and seal ring (44) into groove on OD of second stage gas producer nozzle, and carefully install second stage gas producer cylinder (52). Remove compressor (LTCT4155), align bolt holes, and install pins (51).



**CAUTION**

In following step d, do not apply lubricant to underside of bolt head, since this may lead to over-torquing. Excessive torque may cause fracture of the bolt. Do not reuse old bolts.

- d. Lubricate threads of new bolts (48) with molybdenum disulfide (item 48, table C-1).
- e. Install bolts and position three retaining plates (50) on pins. Tighten bolts to 35 to 40 pound-inch (6251 to 7144 gm cm) torque in 180 degree opposite pairs; then reduce torque to zero, one bolt at a time, and retighten to 15 to 20 pound-inch (2679 to 3572 gm cm).
- f. Install two seal rings (49) into grooves on OD of second stage gas producer cylinder.
- g. On T53-L-13B, -15, -701, and -701A engines, align match marks and position spacer (42) on bolts (27), and secure with spacer to compensate for thickness of second stage gas producer rotor assembly (45) and nuts (47).
- h. On T53-L-703 engines, align match marks and install spacer (56) into sealing disc (57). Position spacer (56) and sealing disc (57) on first stage gas producer turbine bolts. Tap with rawhide mallet until spacer and disc are seated.
- i. On T53-L-13B, -15, -701, and -701A engines, rotate gas producer rotor components, and listen for audible rubbing between seal flanges of second stage gas producer nozzle assembly (41) and spacer (42). If rubbing is evident, remove gas producer components, and rework nozzle seal flange using a half-round file to obtain minimum clearances of 0.016 inch (0.041 cm) at the forward flange, 0.017 inch (0.043 cm) at the middle flange, and 0.017 inch (0.043 cm) at the aft flange.

**NOTE**

If rework is required due to rubbing of nozzle assembly seals to spacer, make certain that 0.020 inch (0.051 cm) out-of-roundness, or less, is maintained on seal lands in order to ensure maximum clearance is not exceeded. (Maximum clearance need not be measured.)

- j. On T53-L-703 engines, rotate gas producer rotor assemblies and check for rubbing between second stage gas producer nozzle assembly (41) and sealing disc (57). A light intermittent rub is acceptable. If heavy rub exists, recheck and inspect for distortion.

**6-11. INSTALLATION OF SECOND STAGE GAS PRODUCER ROTOR ASSEMBLY.** (See figure 4-38.) When the assembly contains either a new cylinder or new blades, the minimum tip clearance for the second stage gas producer rotor is 0.030 inch (0.076 cm). When both new blades and a new cylinder are installed, the tip clearance shall be 0.034 to 0.043 inch (0.086 to 0.109 cm). When used blades and used cylinder are installed, DMWR limit applies. When new blades and/or new cylinder are installed, and a second test cell run is required, tip clearance for final build shall be 0.024 inch (0.061 cm) minimum.

- a. Determine clearance between second stage gas producer nozzle and the second stage gas producer rotor assembly.

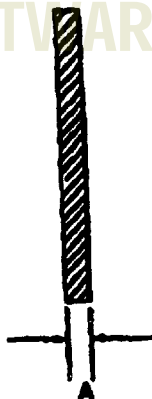
**CAUTION**

In the following step b, ensure forward face of rotor is toward front of engine.

- b. Temporarily install second stage gas producer assembly (45). Tighten nut in opposite pairs to 170 to 180 pound-inches (30362 to 32148 gm cm) torque.
- c. On T53-L-13B, -15, -701, and -701A engines, using suitable diameter wire gage, check clearance between second stage gas producer nozzle and second stage gas producer rotor assembly. Clearance shall be within 0.120 inch (0.305 cm) minimum to 0.190 inch (0.483 cm) maximum, for T53-L-13B and -701A engines and within 0.125 inch (0.318 cm) minimum to 0.210 inch (0.533 cm) maximum for T53-L-15 and -701 engines. If desired clearance is not obtained, select a spacer (29) of correct thickness. (See figure 6-15).
- d. On T53-L-703 engines, using a 0.051-inch (0.130 cm) wire gage, check clearance between second stage gas producer nozzle and second stage gas producer rotor assembly. Clearance shall be within 0.051 inch (0.130 cm) minimum to 0.128 inch (0.325 cm) maximum. If desired clearance is not obtained, select a spacer (29, figure 4-38) of correct thickness. (See figure 6-15).



CHQSOFTWARE.COM



PART NO.	A DIM
1-120-029-01	0.022 0.028
1-120-029-02	0.010 0.016
1-120-029-03	0.078 0.084

Figure 6-15. Spacer Thickness.

**NOTE**

A minimum of one spacer 1-120-029-01 or 1-120-029-03 is to be used. Additional spacers 1-120-029-01, 1-120-029-02 or 1-120-029-03 may be used, as required; however, spacer 1-120-029-01 or 1-120-029-03 shall always be installed against the second stage gas producer nozzle flange.

- e. Check second stage gas producer rotor for minimum tip clearance as follows:

**NOTE**

Tip clearances shall be 0.024 inch (0.061 cm) minimum to 0.050 inch (0.127 cm) maximum if parts are reused. If new parts are used, tip clearances shall be 0.034 inch (0.086 cm) minimum to 0.043 inch (0.109 cm) maximum.

- (1) Insert feeler gage between second stage gas producer rotor assembly (45, figure 4-38) and second stage gas producer cylinder (52) at 12-o'clock position.

**CAUTION**

In following step (2), do not use lead pencil to mark blade.

- (2) Rotate turbine rotor and check and record minimum tip clearance (longest blade). Mark longest blade with Colorbrite pencil (item 239, table C-1).

**NOTE**

Exercise care when taking tip clearance so that coating on tips of blades is not damaged.

- (3) Check clearance between tip of longest blade and flange at seven additional positions. Hold feeler gage stationary at each position and turn rotor one full turn. If tip clearance at any position is less than 0.024 inch (0.061 cm) with used parts, or 0.034 inch (0.086 cm) with new parts, cylinder flange must be reworked using maintenance kit (LTCT2020) and adapter kit (LTCT4172). (Refer to paragraph 5-251.) If flange is not to be reworked, proceed to following step f.

**NOTE**

Minimum acceptable tip clearance at inspection is 0.024 inch (0.061 cm) with used parts, or 0.034 inch (0.086 cm) with new parts. However, when rework is to be accomplished, the minimum tip clearance after rework is 0.034 inch (0.086 cm).

- (4) Locate areas to be reworked as follows:

- (a) Insert 0.034 inch (0.086 cm) feeler gage between tip of longest blade and second stage gas producer cylinder, as near as possible to area of least tip clearance.
- (b) Rotate turbine wheel and feeler gage together until stopped by an area of less clearance.
- (c) At stopping point, mark edge of cylinder flange with Colorbrite pencil (item 239, table C-1).
- (d) Remove feeler gage and turn rotor until long blade is past high point, far enough to allow 0.034 inch (0.086 cm) feeler gage to be inserted.
- (e) Reinsert feeler gage between long blade and cylinder flange.
- (f) Rotate turbine wheel and feeler gage together, in the reverse direction, until stopped by an area of less clearance.
- (g) Mark cylinder flange, as before, and connect the two marks to show the area to be reworked.
- (h) Repeat preceding steps (a) through (g) until all areas that must be reworked have been located.

**NOTE**

Six 4-40 x 3/4 inch long capscrews may be installed in bolts (27, figure 4-38) to facilitate alignment and nut installation while securing second stage gas producer rotor.

- f. Lubricate threads of bolts (27) with molybdenum disulfide (item 48, table C-1).
- g. Secure rotor with tabwashers (46) and nuts (47). Engage tangs of socket wrench (LTCT13456, detail of LTCT13175) and torque wrench (PD2501) or socket wrench (LTCT4181) with nut (53) to prevent compressor rotor shaft from turning. Tighten nuts (47) evenly to 170 to 180 pound-inch (30362 to 32148 gm cm) torque.

**NOTE**

Nuts (47) have a machined washer surface. This surface must be positioned towards the rotor assembly. Do not bend tabwashers at this time.

Prior to performing following steps h and i, position engine at approximately 45 degrees, nose down, and apply forward pressure to compensate for bearing internal clearance.

- h. Position dial indicator against point just inboard of second stage gas producer turbine blade roots. (See figure 6-16) Rotate gas producer turbine rotor assembly and record runout. Runout shall be within 0.004 TIR.

**NOTE**

The sum of the runouts recorded in steps h and i shall not exceed 0.006 TIR.

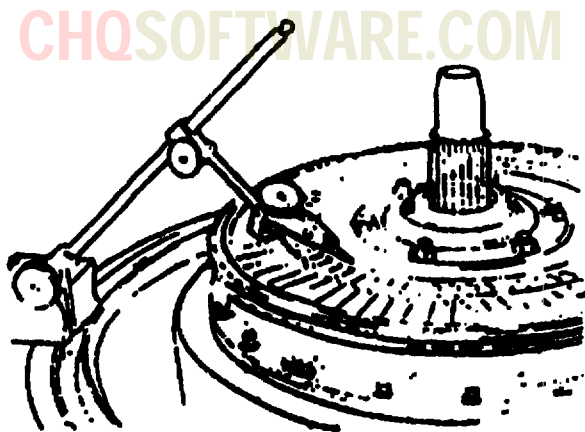
- i. Position dial indicator on step inboard of bolt circle. (See figure 6-17) Rotate gas producer turbine rotor assembly and record runout. Runout shall be within 0.003 TIR.
- j. If runouts are not within limits loosen and retorquing nuts (47, figure 4-38).

**6-12. ACCESSORY DRIVE CARRIER GEAR PATTERN AND BACKLASH CHECK.** Proceed as follows:

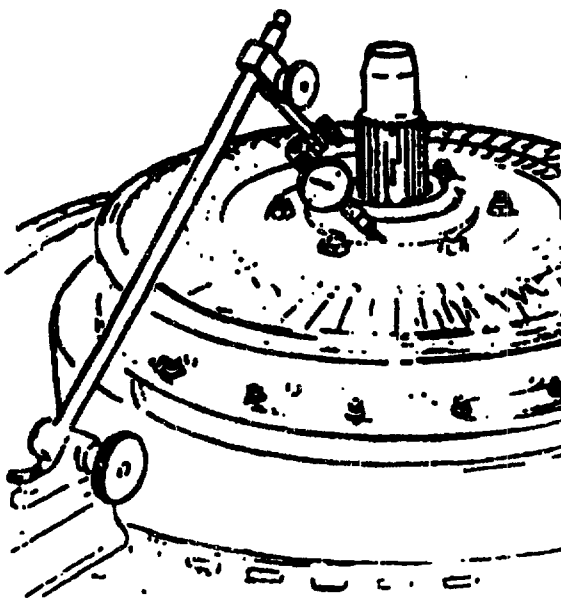
- a. Coat accessory drive driven gear with red gear marking compound (item 160, table C-1). Coat accessory drive pinion gear on compressor rotor with iron-blue pigment (item 172, table C-1).

**NOTE**

The accessory drive carrier assembly is installed temporarily to establish gear pattern and backlash.



**Figure 6-16. Checking Runout on Second Stage Gas Producer Rotor.**



**Figure 6-17. Checking Hub Runout on Second Stage Gas Producer Rotor.**

- b. Install accessory drive carrier assembly in inlet housing and temporarily secure with three bolts (5, figure 4-40) and suitable spacers. Mesh accessory drive driven gear with accessory drive pinion gear.
- c. Turn engine to vertical position.
- d. Rotate gas producer section several turns in each direction to obtain gear pattern of accessory drive pinion gear and accessory drive driven gear.
- e. Install backlash gage (LTCT2099) into accessory drive driven gear through shaft opening of inlet housing. Set up dial indicator with magnetic base to contact flag of backlash gage. (See figure 6-18).
- f. With backlash gage flag set a minimum end of backlash stroke, position dial indicator to zero. Using fingers, rotate flag back and forth; amount of flag travel indicated on dial indicator is backlash between gears. A backlash of 0.006 to 0.012 inch (0.015 to 0.030 cm) is required.

**NOTE**

Ensure that gear has been loaded to operating (outboard) position.

- g. Turn engine to horizontal position.
- h. Remove accessory drive carrier assembly from inlet housing and inspect gear pattern. (Refer to SP 5016 in Appendix E.) Use puller screws, if necessary.

**NOTE**

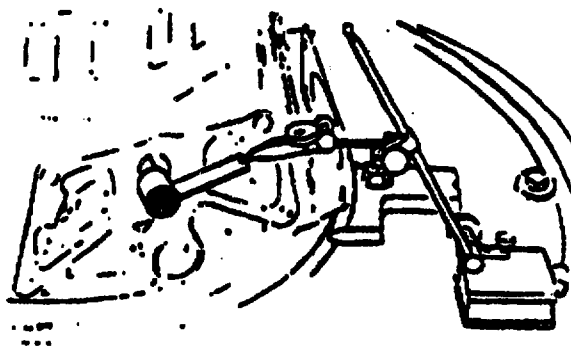
The gear pattern for the accessory drive pinion gear and driven gear is governed by the shim behind the pinion gear. If gear pattern is unsatisfactory, it may be necessary to modify this shim.

- i. Remove six slave bolts and install locking plate (LTCT217) or pinion gear holder (LTCT2048) on accessory drive pinion gear. Secure locking plate with six bolts.

(1) If pattern shows accessory drive pinion gear is too far from driven gear (tooth bearing pattern low and toe on convex side and tooth bearing pattern low and heel on concave side of pinion gear), remove nut and gear and increase thickness of shim (4, figure 5-569).

(2) If pattern shows accessory drive pinion gear is too close to driven gear (tooth bearing pattern high and heel on convex side and tooth bearing pattern high and toe on concave side of pinion gear), remove nut and gear and decrease thickness of shim (4, figure 5-569).

(3) If torque on nut and seal assembly was released in preceding step (1) or (2), tighten to 320 pound-feet (476 kgm) torque using socket wrench (LTCT4002) and support assembly (LTCT911).



**Figure 6-18. Checking Backlash of Accessory Drive Carrier Assembly Gear.**

- j. Remove pinion gear holder (LTCT2048) and reinstall six slave bolts.
- k. If proper backlash is not obtained, remove and disassemble accessory drive carrier assembly and adjust shims, as necessary.
- l. Reassemble accessory drive carrier assembly and reinstall into inlet housing.
- m. Repeat gear pattern and backlash checks.
- n. Remove starter and pump pad cover (3, figure 5-630) and repeat preceding steps a through m for diagonally positioned accessory drive driven gear on the T53-L-701A engines.
- o. Remove accessory drive carrier assembly from inlet housing. Use puller screws if necessary.
- p. Wash coloring from gears.
- q. Check for 300 pound-inch (53580 gm cm) torque on accessory drive driven gear spanner nut(s) and bend key washer(s). Lockwire bolts on accessory drive carrier assembly and bend tab washers.

### **6-13. DETERMINING MEAN POSITION OF POWER SHAFT.** Proceed as follows:

- a. Install locating bar (LTCT153) across forward face of inlet housing.

- b. Pull power shaft forward.
- c. Using depth gage, measure distance from locating bar to end of power shaft. Record dimension.
- d. Push power shaft toward rear of engine. Repeat preceding step c.
- e. Add two dimensions obtained; then divide by two to obtain mean position.
- f. Record actual dimension in engine final assembly record.

**NOTE**

The mean position dimension is used during engine assembly to locate the power shaft 0.020 to 0.025 inch (0.051 to 0.064 cm) forward of the mean position.

- g. Remove locating bar.

#### 6-14. INSTALLATION OF POWER SHAFT BEARING RETAINER. (See figure 4-49.) Proceed as follows:

**NOTE**

Prior to installation of power shaft bearing retainer, ensure that gear pattern and amount of backlash has been established. (Refer to paragraph 6-12.)

- a. Stake locking into nut and seal assembly at two places, 180 degrees apart. Do not shear locking.
- b. Remove six slave bolts.
- c. Slide power shaft bearing retainer (6, figure 4-49) onto power shaft (8), and position in inlet housing with cutouts for accessory drive driven gears in correct position.
- d. Install four bolts (10) and two tabwashers (9) with two bolts (5). Tighten bolts to 70 to 95 pound-inches (12502 to 16967 gm cm) torque.

**NOTE**

Do not lubricate bolts.

**NOTE**

The four socket head bolts (5, figure 4-49), P/N STD 3022-123, required when installing the power shaft bearing retainer, may be replaced with either drilled hexagon head bolt P/N MS9584-27 or P/N AN107427.

- e. Lock tabwashers on two bolts. Lockwire four bolts.
- f. On T53-L-13B, -15, and -703 engines, install retaining ring (4) in groove on power shaft.

**WARNING**

In following step g, to prevent injury to operator, asbestos gloves must be worn when removing gear from oven.

- g. On T53-L-13B, -15, and -703 engines, use spur gear installation tool (LTCT4576). Heat spur gear (1) in oven for 30 minutes at 300° to 400° F (149° to 204° C). Remove gear from oven and quickly install on power shaft spline, seating it firmly over retaining ring.

**CAUTION**

Power shaft must be pressed forward from aft end of engine.

- h. After installation of spur gear (1), measure from forward face of power shaft (8) to forward face of spur gear (1). Dimension shall be 2.020 to 2.040 inches (5.131 to 5.182 cm). (See figure 6-19.)

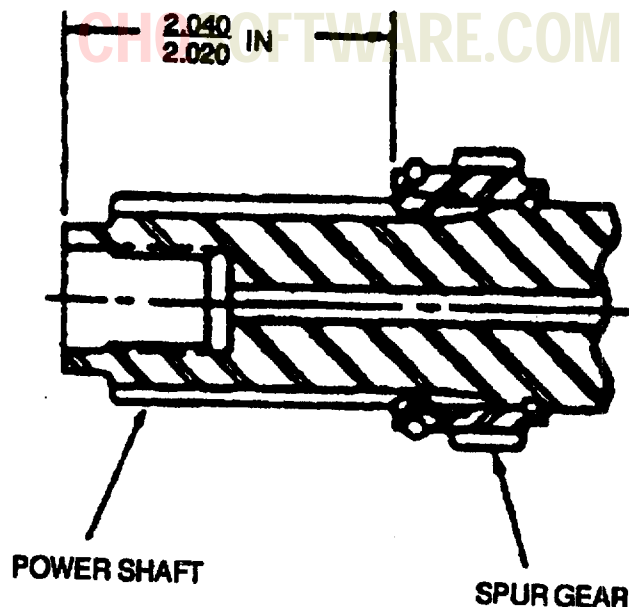


Figure 6-19. Gear to Power Shaft - Installation Dimension (T53-L-13B, -15, -703).

**6-15. INSTALLATION OF COMBUSTOR TURBINE ASSEMBLY.** (Refer to figure 4-36.) Proceed as follows:

**NOTE**

In order to save assembly time, the instructions in this paragraph may be accomplished in sequence after paragraph 6-21, if it is positively determined that tachometer drive spur gear (1-070-062-04 or later) is installed in the accessory drive carrier assembly and that overspeed governor and tachometer drive spur gear (1-070-072-03 Rev F) or later (1-070-072-04 Rev D) or later (which have a 45 degree chamfer on rear tooth end faces) is installed on the power shaft. Cautions requiring that the combustor turbine assembly be installed prior to accomplishing certain steps in other assembly paragraphs do not apply if this determination is made.

- a. Install power shaft through bolt (5) into power shaft, finger-tight, to check cleanliness and condition of threads. If any tightness or failure of shoulder to bottom on power shaft exists, clean or repair threads. (Refer to SP No. 5007 in Appendix E.)

**NOTE**

Lubrication of power shaft through bolt and installation of shims is not necessary at this time.

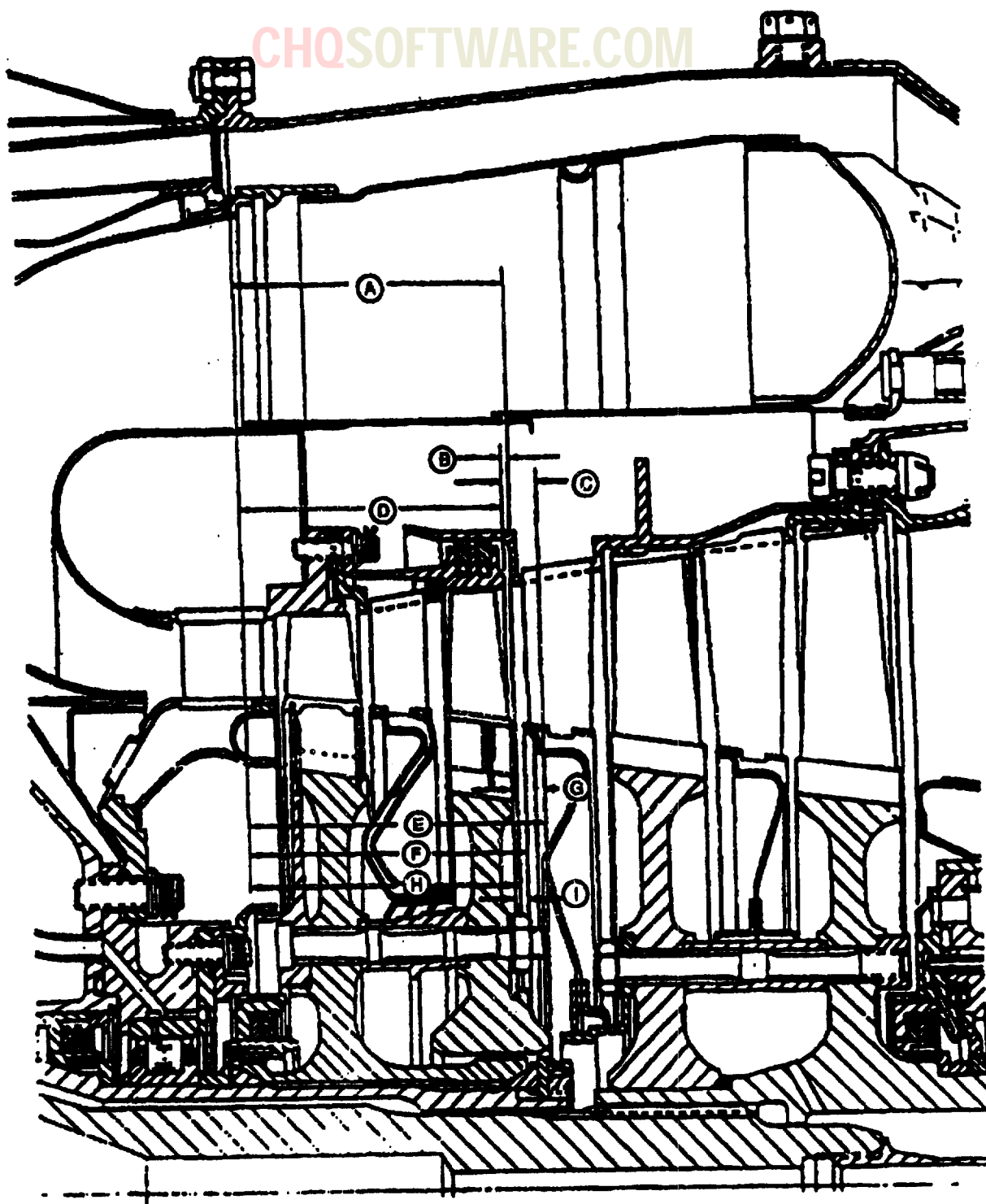
- b. Rotate engine to a vertical position.
- c. Establish clearance between second stage gas producer cylinder and first stage power turbine nozzle (dimension B, figure 6-20) as follows:

- (1) Position locating bar (LTCT153) over combustion chamber housing flange.

**NOTE**

On T53-L-703 engines, position a piece of 0.750 inch (1.905 cm) ground stock or parallel bar on combustion chamber bolt hole flange, under each end of locating bar, to prevent bar from contacting inner lip of combustion chamber liner.

- (2) Using depth vernier, measure from bar to step at outer shroud of first stage power turbine nozzle. Subtract dimension from top of bar to flange. Result is dimension A from contacting inner lip of combustion chamber liner.
- (3) Position locating bar (LTCT153) over second stage gas producer turbine rotor hub.
- (4) Using depth vernier, measure from bar to flange of diffuser housing (dimension E).



**Figure 6-20. Determining Clearance Between Combustor Turbine Assembly and Second Stage Gas Producer Rotor Assembly (Typical).**



- (5) Using depth micrometer, measure from bar to second stage gas producer cylinder (dimension C).
- (6) Subtract dimension C from dimension E; result will be dimension D.
- (7) Subtract dimension D from dimension A; result will be dimension B.
- (8) Dimension B shall be within 0.020 inch (0.051 cm) minimum to 0.258 inch (0.655 cm) maximum for T53-L-15 and -701 engines. Dimension B shall be within 0.015 inch (0.038 cm) minimum to 0.238 inch (0.605 cm) maximum for T53-L-13B, -701A, -703 engines.

d. Establish clearance between second stage gas producer rotor and first stage power turbine nozzle (dimension I, figure 6-20) as follows:

- (1) Place locating bar (LTCT153) over combustion chamber housing flange.

**NOTE**

On T53-L-703 engines, position a piece of 0.750 inch (1.905 cm) ground stock or parallel bar on combustion chamber bolt hole flange, under each end of locating bar, to prevent bar from contacting inner lip of combustion chamber liner.

- (2) Using depth vernier, measure from bar to first stage power turbine nozzle (dimension F).
- (3) Position locating bar (LTCT153) over second stage gas producer rotor hub.
- (4) Using depth micrometer, measure from bar to flange of diffuser housing (dimension E).
- (5) Using depth vernier, measure from bar to second stage gas producer rotor (dimension G).
- (6) Subtract dimension G from dimension E; result will be dimension H.
- (7) Subtract dimension H from dimension F; result will be dimension I.
- (8) Dimension I shall be within 0.080 inch (0.203 cm) minimum to 0.250 inch (0.635 cm) maximum for T53-L-15, -701 engines. Dimension I shall be within 0.064 inch (0.163 cm) minimum to 0.255 inch (0.572 cm) maximum for T53-L-13B, -701A engines. Dimension I shall be 0.134 inch (0.340 cm) minimum to 0.279 inch (0.709 cm) maximum for T53-L-703 engines.

- e. Bend tangs of tabwasher against flats of nuts (47, figure 4-38).
- f. Remove bracket (LTCT3955 or LTCT910) from air diffuser.
- g. Lockwire bolt (item 48, figure 4-38). Both the head and the shank require safety wire on all engines except for T53-L-703 engine. Only the head must be safety wired on T53-L-703 engines.

**NOTE**

The threaded end of the bolt has provisions for safety wire. If the shanks require safety wire, a single strand of wire will be run from shank to shank of the bolts.

- h. Position combustor hoisting adapter (LTCT3665) around flange of diffuser support cone. (See figure 4-37.)

**WARNING**

**FLIGHT SAFETY PARTS  
ASSEMBLY CHARACTERISTIC**

**The following assembly procedure is flight safety critical.**

i. Before installation of hot section, inspect as follows: Dimples on ID of combustion chamber liner must contact OD of first stage gas producer nozzle deflector. Apply iron-blue pigment (item 172, Appendix C) to the liner dimples and mate the nozzle and liner to simulate hot end installation. If contact is not evident through 360 degrees, carefully bend liner tab(s) inward as required.

j. Attach suitable hoist to lifting eye of adapter, to insure contact and install combustor turbine assembly on diffuser housing assembly, with combustion chamber drain valve located in the 6-o'clock position.

**NOTE**

Prior to mating, visually inspect to ensure power shaft aft splines and power turbine wheel internal splines are clean and free of foreign material.

Ensure that red or white ink mark on power shaft is installed 180 degrees from red or white ink mark on power turbine shaft.



k. Lubricate bolts (2, figure 4-36) with molybdenum disulfide (item 48, table C-1). Using wrench (LTCT393), install bolts (2) and nuts (1) that secure combustor turbine assembly (3) to diffuser housing. Install bracket and clamp assembly. (See figure 6-21 or 6-22 as applicable.) Remove combustor hoisting adapter.

#### NOTE

Reinstall all other brackets at areas where indicated during removal. (See figure 6-21 or 6-22 as applicable.)

l. Apply light coating of antiseize compound (item 47, table C-1) to threads of power shaft through bolt (5, figure 4-36).

m. Install torque adjustment fixture (LTCT962) into rear of combustor turbine assembly and engage tangs of locking plate assembly with slots in bearing retainer nut. Secure plate assembly with three bolts.

#### CAUTION

The number of shims installed shall not exceed three. The use of an excessive number of shims can result in a cocked bolt and cause high power turbine vibration.

n. (Refer to para 6-13 to determine mean position of power shaft.) Install shims (4), as required, on power shaft through bolt (5) so that power shaft is positioned 0.020 to 0.025 inch forward of its mean position within compressor rotor assembly. Record shim thickness in engine final assembly record. Install power shaft through bolt into rear of turbine rotor and into power shaft. Using wrench (LTCT506), tighten bolt to 195 to 200 pound-inch torque.

o. Apply light coating of antiseize compound (item 47, table C-1) or Molykote antiseize thread compound (item 221, table C-1) to the threads of nut (6, figure 4-36).

p. Using wrench (LTCT505), install nut (6). Tighten nut to 100 pound-feet torque. Loosen and remove nut. Retighten power shaft through bolt (5) to 195-200 pound-inch torque. Install nut (6) and tighten to 50 pound-feet torque. Remove torque adjustment fixture (LTCT962).

q. With the engine in the horizontal position, install locating bar (LTCT153) across forward face of inlet housing. Push power shaft toward rear of engine.

r. Using vernier depth gage, check for proper axial positioning of power shaft. Lower shaft should be 0.020 to 0.025 inch forward of mean position.

s. If power shaft is not in the required position, re-check mean position (refer to para 6-13) and repeat paragraphs n through r.

t. Deform nut (6) into shaft in three places, 120 degrees apart, or in two places, 180 degrees apart if there are only two slots in shaft. DO NOT SHEAR NUT.

u. Using end of suitable rounded punch, or the side of tapered drift punch, deform collar of nut (6) in three places, 120 degrees apart, or in two places, 180 degrees apart if there are only two slots in shaft. Do not shear nut.

v. Visually inspect nut for cracks that may have occurred as a result of the deformation. If nut is cracked, it must be replaced.

w. Install new seal (7) in groove of cover (8) and install cover. Apply light coating of antiseize compound (item 47, table C-1) to threads of bolts (9). Install bolts (9) and tighten, as required. Lockwire bolts using lockwire (item 181, table C-1).

#### NOTE

Ensure groove in cover (8) is clean. Coat groove of cover with shortening compound (item 270, table C-1) to facilitate holding seal in groove during assembly.

CHQSOFTWARE.COM

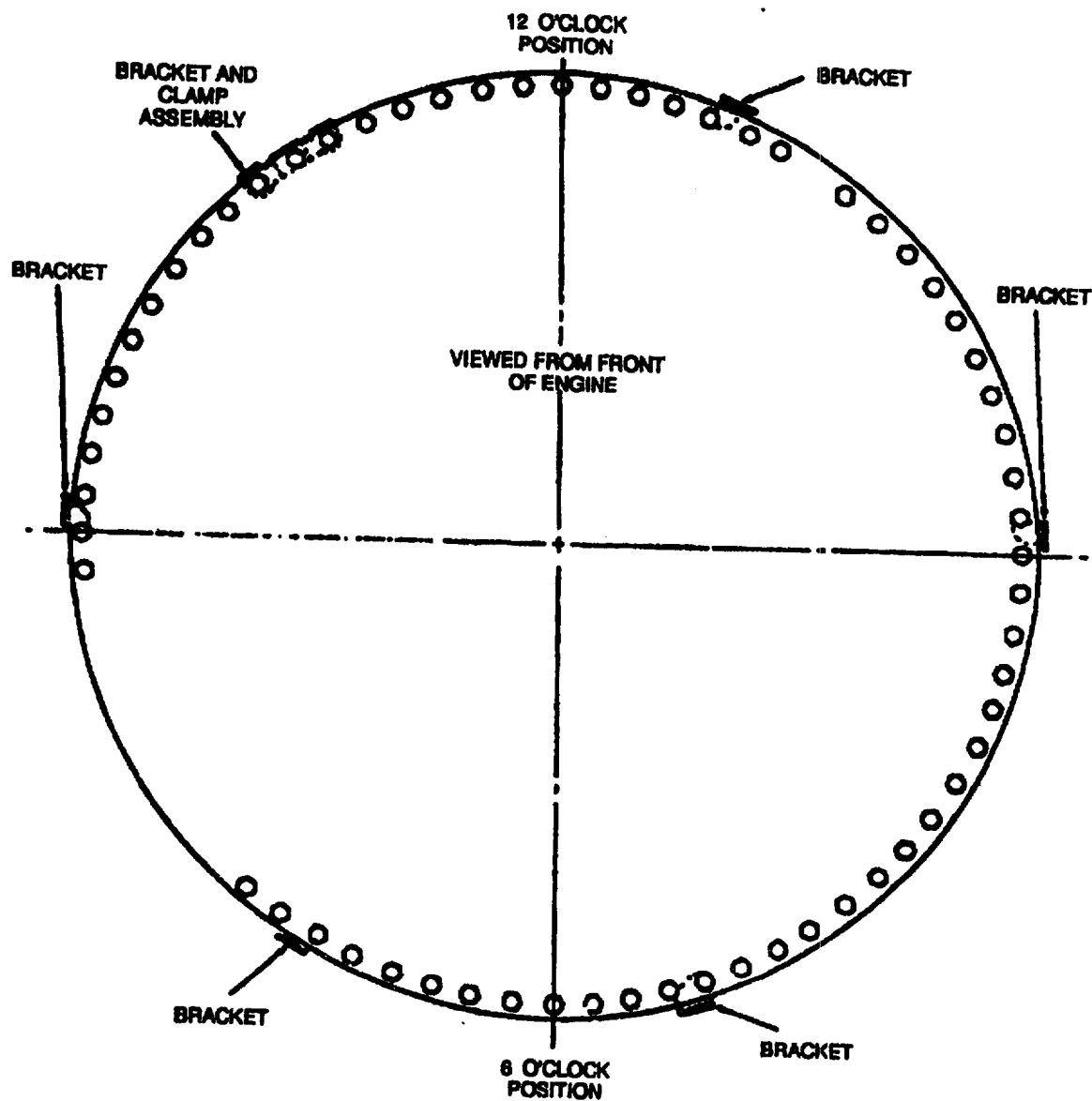


Figure 6-21. Combustor Turbine Bracket Locations (T53-L-13B, -703).

CHQSOFTWARE.COM

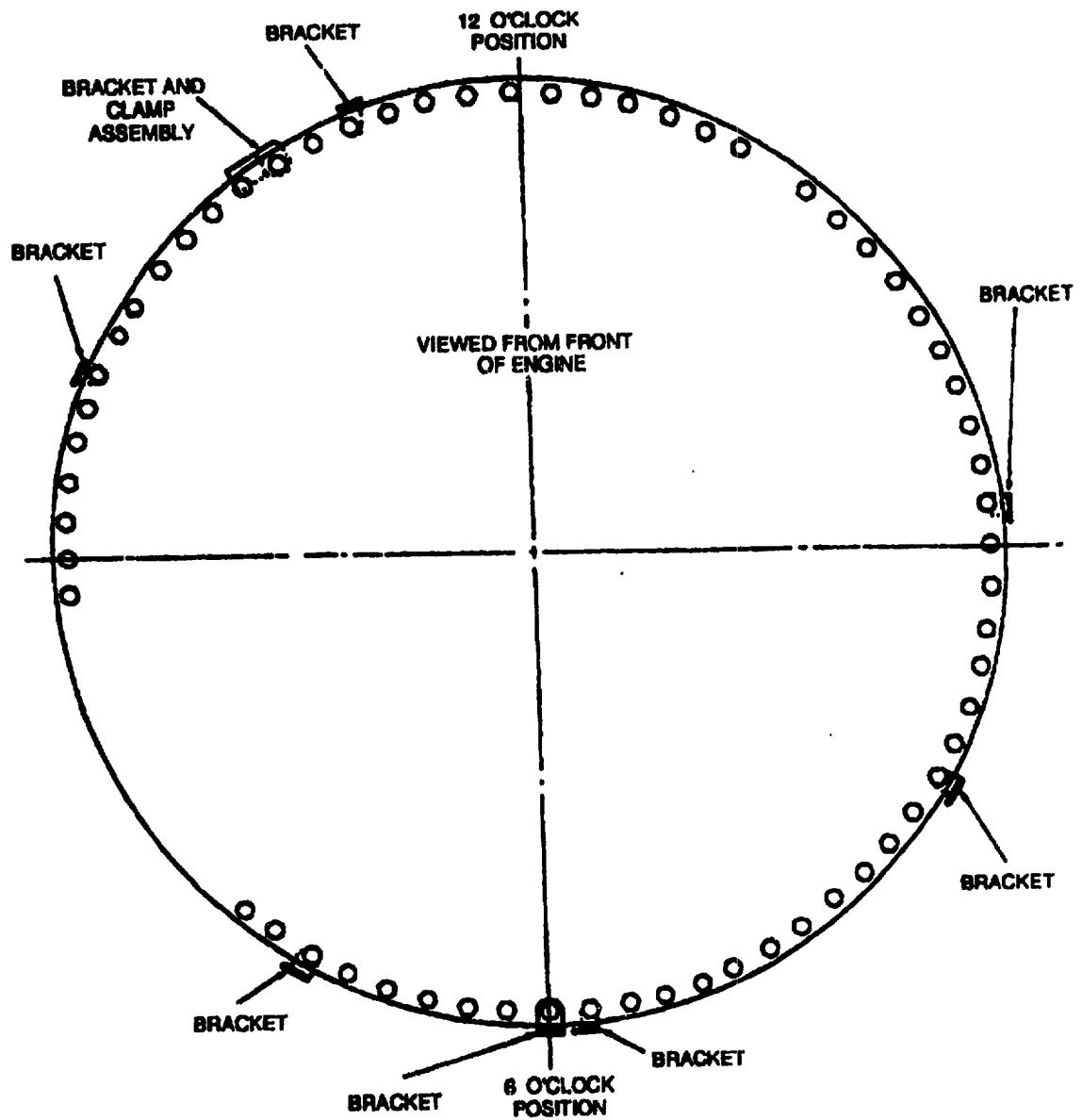


Figure 6-22. Combustor Turbine Bracket Locations (T53-L-15, -701A).

- x. Position cover (10) over cover (8), aligning slots in both covers.
- y. Install tabwasher, special (11) (1-160-635-01) into slots of cover. If tab does not fit into slots, file cover (10) to obtain a snug fit.

**CAUTION**

In following step z, after tightening bolt, inspect tablock to ensure proper engagement in slots of covers (8 and 10).

**NOTE**

Tab with lockwire hole must face outward.

- z. Install bolt (12) while holding tablock in alignment. Tighten bolt to 70 to 75 pound-inch (12502 to 13395 gm cm) torque. Lockwire tablock to bolt.

**6-16. INSTALLATION OF REAR BEARING SUPPORT ASSEMBLY, MAIN SUN GEAR SUPPORT, ELECTRIC TORQUEMETER HEAD SUPPORT ASSEMBLY, AND ACCESSORY DRIVE CARRIER ASSEMBLY (T53-L-701, -701A).** (See figure 4-48.) Proceed as follows:

- a. Install two packings (13) on connector sleeve of electric torquemeter head assembly (12).
- b. While supporting torquemeter head assembly, insert connector sleeve into its opening in inlet housing. Ensure connector is inserted far enough to expose lockplate grooves at outer opening.

**NOTE**

Establish gear pattern and amount of backlash of accessory drive gears before installation of accessory drive carrier assembly. (Refer to paragraph 6-12).

- c. Install two packings (20) and one packing (21) in accessory drive carrier assembly mating mounting face of inlet housing.
- d. Install two packings (23) on oil transfer tube (22) and insert tube in opening in rear of accessory drive carrier assembly (19).
- e. Install two alignment dowels, approximately 180 degrees apart, in accessory drive gear carrier mounting bolt holes in inlet housing.

**NOTE**

Dowels may be made from 1/4-28 bolts of sufficient length to provide dowel engagement before oil transfer tube contacts power shaft bearing retainer.

- f. While holding the torquemeter head aside, carefully position the accessory drive carrier assembly in inlet housing and over the dowels, and push into position, using care to assure oil transfer tube alignment and proper meshing of spur gear (3, figure 4-49) and its mating tachometer drive spur gear (39, figure 5-617).

**CAUTION**

The combustor turbine assembly must be installed prior to installing accessory drive carrier assembly. During installation of the accessory drive gear carrier assembly, ensure that spur gear (3 figure 4-49) and tachometer drive gear (39, figure 5-617) are meshed properly during installation. Damage to either gear can cause serious engine malfunction.

**NOTE**

If accessory drive carrier assembly meets sudden resistance, do not force installation; remove carrier, inspect oil transfer tube for damage, replace packing, and repeat preceding step f.

Accessory drive carrier assembly should slide easily into inlet housing. If pilot interference is encountered, dimensionally measure diameters and rework, if necessary.

- g. After installation, use an inspection mirror and light and check that spur gears are properly meshed and that tachometer drive gear is in proper axial relationship with spur gear.
- h. Install retaining ring (4, figure 4-49) in groove on power shaft.

**WARNING**

In the following step i, to prevent injury to operator, asbestos gloves must be worn when removing gear from oven.

- i. Place spur gear (3) into installation tool (LTCT13102). Heat gear in oven for 30 minutes at 300° to 400° F (149° to 204° C). Remove gear from oven, and quickly install on power shaft spline, seating it firmly over retaining ring.

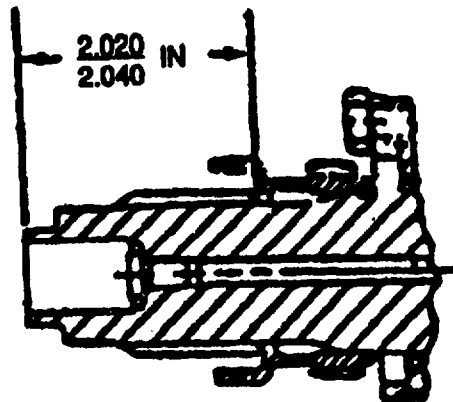


Figure 6-23. Measurement from Forward Face of Power Shaft to Forward Face of Gear (T53-L-701, -701A).

- j. Install new packing (2) into internal groove of spur gear (3).
- k. After installation of spur gear (3), measure from forward face of power shaft (8) to forward face of gear. Dimension shall be 2.020 to 2.040 inches (5.131 to 5.182 cm). (See figure 6-23).
- l. Perform a check to ensure there is some backlash between the tachometer drive gear (39, figure 5-617) and the spur gear (3, figure 4-49). This check should be accomplished at three (3) locations, 120 degrees apart on the powershaft axis. The backlash at each of the three (3) positions should be approximately the same.
- m. Install two packings, (17, figure 4-48) and one packing (18) in grooves of accessory drive carrier face.
- n. Install packing (16) in groove in rear face of torquemeter head support assembly (15).
- o. Position torquemeter head support assembly (15) against accessory drive carrier assembly. Insert and tighten three flathead screws (14).
- p. Position electric torquemeter head assembly (12) on torquemeter head support and secure with four bolts (10) and four tabwashers (11). Bend tabs of tabwashers.
- q. Position retaining strap (9) over torquemeter head cable sleeve, and secure to torquemeter head support with two screws (8). Lockwire screws.
- r. Carefully position main sun gear support (7) over torquemeter head and secure tabs to torquemeter head support with two bolts (6). Lockwire bolts (6) and bolts (10) in two groups of three.
- s. Install two packings (4) and two packings (5) in grooves in rear face of rear bearing support assembly (3).
- t. Position rear bearing support, with 5/16 inch (.7938 cm) drain hole at 6-o'clock position, and fit into seat in inlet housing.
- u. After ensuring holes are aligned, secure with 12 bolts (1) and washers (2).

**6-17. INSTALLATION OF ACCESSORY DRIVE CARRIER ASSEMBLY (T53-L-13B, -703, -15).** (See figure 4-47.)  
Proceed as follows:

**CAUTION**

The combustor turbine assembly must be installed prior to installing accessory drive carrier assembly. During installation of the accessory drive carrier assembly, ensure that spur gear (1, figure 4-49) and tachometer drive spur gear (39, figure 5-618) are meshed properly during installation. Damage to either gear can cause serious engine malfunction.

**NOTE**

Establish gear pattern and amount of backlash of accessory drive gears before installation of accessory drive carrier assembly. (Refer to paragraph 6-12).

- a. Install two packings (4, figure 4-47) and one packing (5) in grooves on mounting face of inlet housing.
- b. Install two packings (3) on oil transfer tube (2) and install tube in accessory drive carrier assembly (1).
- c. Install two alignment dowels, approximately 180 degrees apart, in accessory drive carrier mounting bolt holes in inlet housing.

**NOTE**

Dowels may be made from 1/4-28 bolts of sufficient length to provide dowel engagement before oil transfer tube contacts power shaft bearing retainer.

d. Position accessory drive carrier assembly (1) in inlet housing and over the dowels, and push into position, using care to assure oil transfer tube alignment and proper meshing of spur gear (1, figure 4-49) and its mating tachometer drive spur gear (39, figure 5-617).

e. Using an inspection mirror and light, ensure that spur gear (1, figure 4-49) and tachometer drive spur gear (39, figure 5-617) are properly meshed and that the tachometer drive spur gear is in proper axial relationship with the spur gear.

**NOTE**

If accessory drive carrier assembly meets sudden resistance, do not force installation; remove carrier, inspect oil transfer tube for damage, replace packing, and repeat preceding step d.

Accessory drive carrier assembly should slide easily into inlet housing. If pilot interference is encountered, dimensionally measure diameters and rework, if necessary.

f. After installation use an inspection mirror and light and check that spur gears are properly meshed and that tachometer drive gear is in proper axial relationship with spur gear.

g. Perform a check to ensure there is some backlash between the tachometer drive gear (39, figure 5-617) and the spur gear (1, figure 4-49). This check should be accomplished at three (3) location, 120° apart on the powershaft axis. The backlash at each of the three (3) positions should be approximately the same.

**6-18. INSTALLATION OF OIL TRANSFER SUPPORT ASSEMBLY (T53-L-13B, -703).** (See figure 4-40.) Proceed as follows:

- a. Install packings (2 and 3) on rim of accessory drive carrier assembly and on rim of oil transfer support assembly (1).

**NOTE**

Do not lubricate bolts.

- b. Position oil transfer support assembly (1) on flange of accessory drive carrier assembly and secure with 12 bolts (5) and washers (4). Tighten bolts to 75 pound-inches (13395 gm cm) torque and lockwire.

**6-19. POWER SHAFT FORWARD BEARING OIL IMPINGEMENT CHECK (T53-L-13B, -703).** Proceed as follows:

- a. Using oil flow test fixture (LTCT912), plug oil holes in oil transfer support assembly.
- b. Close off two oil ports in mounting pad of overspeed governor and tachometer drive assembly on inlet housing.

**NOTE**

An automotive-type brake bleeder may be used as an oil supply. Ensure that lubricating oil (item 189 or 190, table C-1) is used.

c. Supply oil at 25 to 30 psi (1758 to 2109 gm sq cm) to fitting on fixture from brake pressure bleeder. Observe impingement of oil stream on rollers of power shaft bearing.

- d. Bleed off pressure and disconnect equipment.

**6-20. INSTALLATION OF PROPELLER SHAFT REAR BEARING SUPPORT (T53-L-15).** (See figure 4-46.) Proceed as follows:

a. Lubricate packings (3) with shortening compound (item 270, table C-1) and install in two counterbores on forward face of accessory drive carrier assembly. Lubricate and install packings (2) in two counterbores on rear face of propeller shaft rear bearing support (1).

b. Install propeller shaft rear bearing support and secure with 12 bolts (5) and washers (4). Tighten bolts to 75 pound-inches (13395 gm cm) torque and lockwire.



**6-21. POWER SHAFT FORWARD BEARING OIL IMPINGEMENT CHECK (T53-L-15, -701, -701A).** Proceed as follows:

- a. Close off two oil ports in mounting pad of overspeed governor and tachometer drive assembly on inlet housing.
- b. Supply oil to support assembly with squirt oil can. Observe impingement of oil stream on rollers of power shaft bearing.

**6-22. INSTALLATION OF OUTPUT REDUCTION CARRIER AND GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-13B, -703).** (See figure 4-39.) Proceed as follows:

- a. Rotate engine to a horizontal position.
- b. Install packing (13) on OD of spur gear on power shaft.
- c. Place sun gearshaft (14) carefully over power shaft, and press end of sun gearshaft over packing (13).

**CAUTION**

In following step d, ensure that the tangs of the bolt retainer engage the slots in the power shaft.

**NOTE**

Ensure that washer 1-030-138-04 is installed. Do not lubricate bolt.

- d. Install washer (15) on bolt retainer (16), with beveled side of washer facing toward bolt retainer. Using guide (LTCT4602), install bolt retainer and washer through sun gearshaft onto power shaft. Secure bolt retainer (16) and washer (15) to power shaft with bolt (17).
- e. Position sun gear holding fixture (LTCT2075) on studs of inlet housing, with splines meshed with sun gearshaft teeth. Secure with four nuts.
- f. Using driver wrench (LTCT258), tighten bolt (17) to 50 to 60 pound-feet (74 to 89 kgm) torque. Do not lock bolt at this time.
- g. Apply forward load on rear side of power turbine assembly (through exhaust diffuser) to overcome end float of support bearings.

**NOTE**

In following step h, if end play exceeds established limits, recheck tang engagement or install a new bolt retainer or washer. Racheck end play.

- h. Using dial indicator, check end play between sun gearshaft and power shaft assembly. End play shall be 0.020 to 0.046 inch (0.051 to 0.117 cm).

**CAUTION**

In following step i, do not shear bolt retainer.

- i. 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 deform tabs of bolt retainer (16).
- j. Remove sun gear holding fixture from inlet housing.
- k. Check for 0.004 inch (0.010 cm) minimum end gap on seal rings (11 and 12) in the installed position. Gap between periphery of rings and torquemeter cylinder shall not be greater than 0.003 inches at any point.
- l. Install packing (10) on output reduction carrier and gear assembly (9) and seal rings (11 and 12).

**CAUTION**

In following step m, to prevent damage to gear teeth, mesh gears carefully.

- m. Attach overhead hoist to lifting fixture (LTCT4182) and position output reduction carrier and gear assembly (9) onto inlet housing.
- n. Secure output reduction carrier and gear assembly with 12 spacers (8), washers (7), and nuts (6). Tighten nuts to 70 to 80 pound-inches (12502 to 14288 gm cm) torque. (See figure 7-35 for specific location.)

**NOTE**

Do not lubricate nuts or studs. Position end of spacer with chamfered ID against housing.

- o. Remove installation tool.
- p. Install packings (4 and 5) on each oil transfer tube (3) and install tubes into output reduction carrier and gear assembly (9). Secure each oil transfer tube with tabwasher (2) and bolts (1). Tighten bolts, as required, and secure by bending one tab against flat of bolt and one tab into hole provided in oil transfer tube.

**6-23. INSTALLATION OF REDUCTION GEAR ASSEMBLY AND SUN GEARSHAFT (T53-L-15).** (See figure 4-42.)  
Proceed as follows:

- a. Rotate engine to a horizontal position.
- b. Install packing (10) on OD of spur gear (1, figure 4-49) on power shaft (8).
- c. Place sun gearshaft carefully over power shaft and press end of sun gearshaft over packing (10, figure 4-42).

**CAUTION**

In following step d, ensure that the tangs of the bolt retainer engage the slots in the power shaft.

- d. Install washer (8) on bolt retainer (7) with beveled side of washer facing toward bolt retainer. Using guide (LTCT4602), install bolt retainer and washer through sun gearshaft onto power shaft. Secure bolt retainer (7) and washer (8) to power shaft with bolt (6).

**NOTE**

Ensure that washer 1-030-138-04 is installed. Do not lubricate bolt.

- e. Position holding fixture (LTCT570) on studs of inlet housing with splines meshed with sun gearshaft teeth. Secure with four nuts.
- f. Using driver wrench (LTCT258), tighten bolt (6) to 50 to 60 pound-feet (74 to 89 kgm) torque. Do not lock bolt at this time.
- g. Apply forward load on rear side of power turbine assembly (through exhaust diffuser) to overcome end float of support bearings.

**NOTE**

In following step h, if end play exceeds established limits, recheck tang engagement or install a new bolt retainer or washer. Recheck end play.

- h. Using dial indicator, check end play between sun gearshaft and power shaft assembly. End play shall be 0.020 to 0.046 inch (0.051 to 0.117 cm).

**CAUTION**

In following step i, do not shear bolt retainer.

- i. 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 deform tabs of bolt retainer (7).
- j. Install packing (5).

**NOTE**

All corners of sealing rings must be sharp and free from burrs.

- k. Attach hoisting adapter (LTCT181) and suitable hoist to reduction gear assembly (See figure 4-43.)

**CAUTION**

In following step l, do not damage threads of inlet housing studs. Apply downward pressure on bar of sling clamp to maintain horizontal position. Ensure that the zero shaftgear and accessory driver carrier shaftgears are properly engaged.

- l. Carefully guide reduction gear assembly over inlet housing studs and into inlet housing.



I. Repair worn 3.9990 to 4.0005 (10.1575 to 10.1613 cm) and 4.100 to 4.101 (10.414 to 10.417 cm) inch diameter bores that are 0.006 inch or more oversize, and torquemeter cylinder mounting pad areas that are not repairable by machining as follows:

(1) Premachine to obtain 0.017 inch minimum plasma spray thickness after final machining and painting. Up to 0.050 inch maximum thickness is permissible. Treat machined surface with chromic acid (item 86, table C-1). Clean surfaces to be metal sprayed with acetone (item 13, table C-1), isopropyl alcohol (item 25, table C-1), or denatured alcohol (item 24, table C-1). Metal spray within 90 minutes after surface preparation.

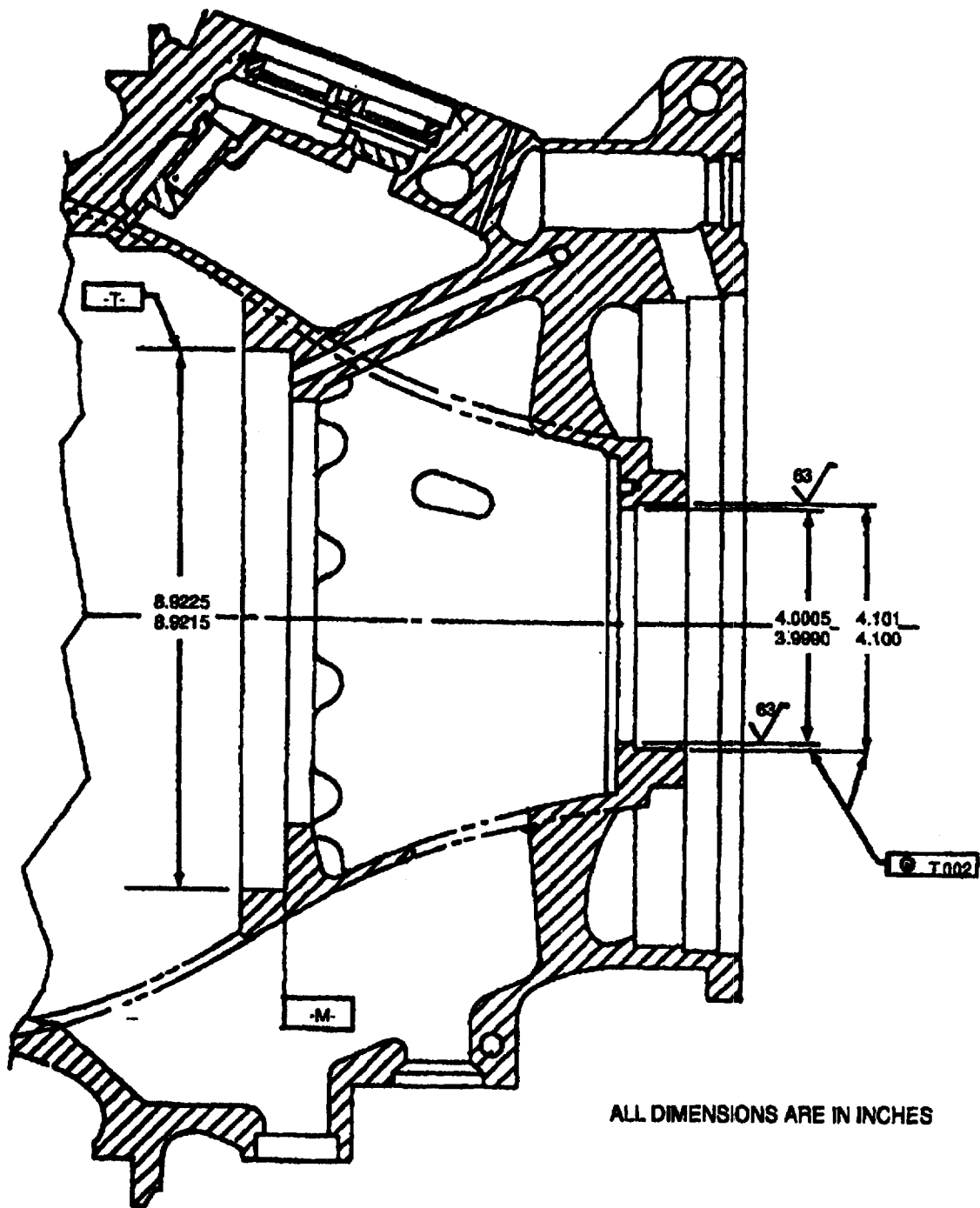
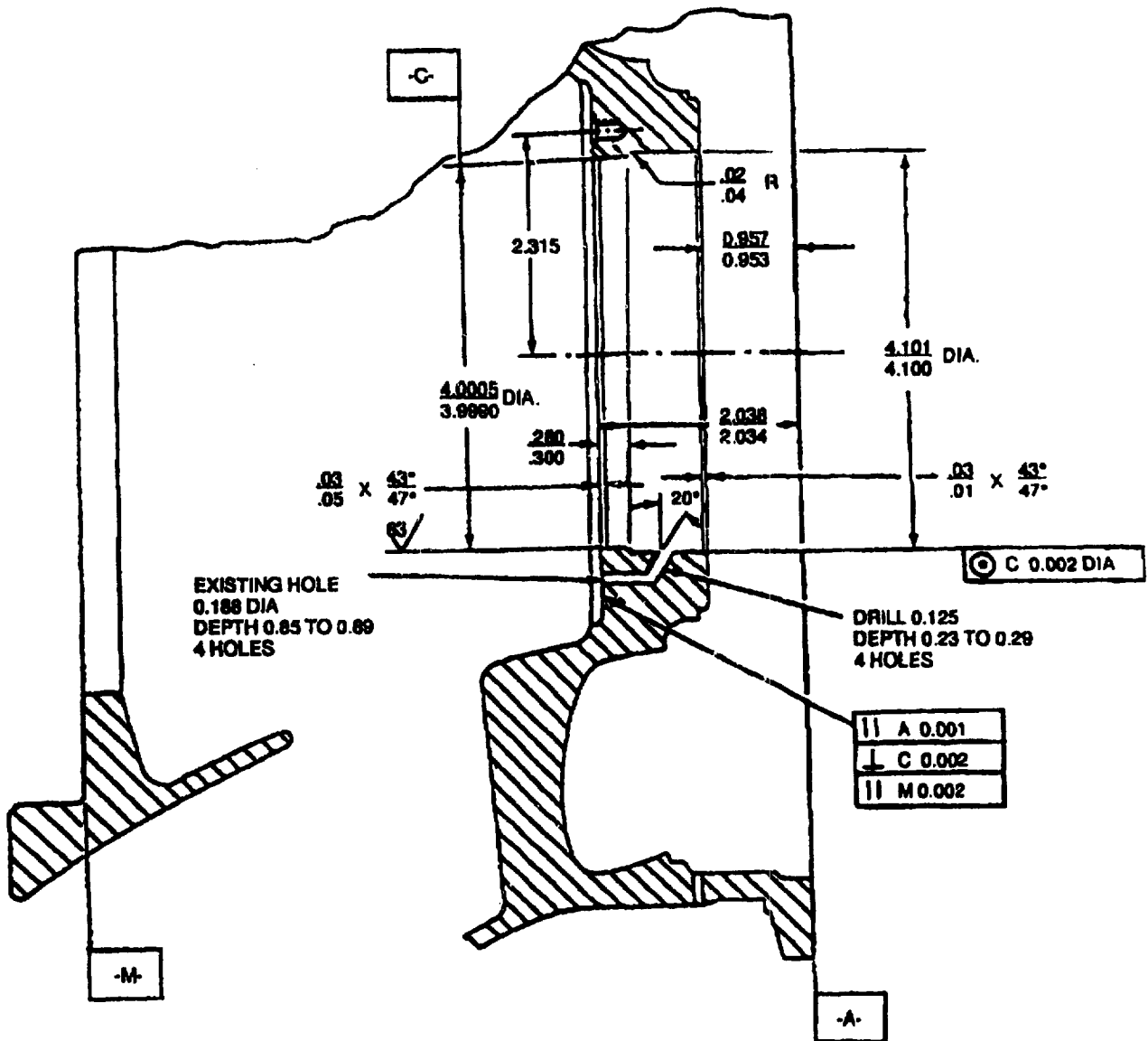


Figure 5-638. Inlet Housing Bearing Bore Repair (Sheet 1 of 2).

CHQSOFTWARE.COM



ALL DIMENSIONS ARE IN INCHES

Figure 5-638. Inlet Housing Bearing Bore Repair (Sheet 2 of 2).

(2) Grit blast areas requiring material addition with aluminum oxide abrasive grit (item 7, table C-1). Remove all the residual grit from the housing using clean, dry air.

(3) Protect the areas not requiring metal spray by masking, liquid (item 210, table C-1) or tape (item 328, table C-1) or protective covers. Holes in the metal spray area are to be plugged with aluminum plug or liquid maskant.

### CAUTION

During plasma spraying of inlet housing, it is required that base material temperature be kept under 300°F (149°C).

(4) Place housing in a suitable fixture in plasma spray area. Position plasma spray gun (type 3MB) with Metco nozzle type GH, powder port and insulator perpendicular to the housing surface. Set spray distance from the gun to surface at 5 inches  $\pm$  1 inch. Set the following parameters for the application of Metco 450 bond coat:

- (a) Arc amps - 500  $\pm$  10
- (b) Arc volts - 67  $\pm$  1
- (c) Meter wheel Type S
- (d) Turntable speed to 100 RPM
- (e) Primary (Argon) gas pressure 100 psi
- (f) Primary flow 80
- (g) Secondary (Hydrogen) gas pressure 50 psi
- (h) Spray rate at 9 pounds per hour  $\pm$  1

(5) Plasma spray areas requiring material addition with bond coat Metco 450 (item 225, table C-1) at a deposition rate of 0.004 to 0.006 inch per pass to a final thickness of 0.050 inch maximum.

(6) Remove aluminum plug, liquid maskant, and anti-bond, if used. File excess plasma spray material from housing and ream through holes. Remove excess particles with clean, dry compressed air.

(7) Seal plasma spray area with coricone sealer (item ~~NO TAG~~ table C-1). Finish machine to dimensions shown in figure 5-639.

121A (newly added item)

(8) Clean and check all oil passages to insure they are free of grit and machine chips. Apply coating per paragraph h above.

j. Repair worn 4.100 to 4.101 inch (0.414 to 0.417 cm) diameter of inlet housing, where up to 0.015 inch (0.038 cm) maximum epoxy patching compound, (item 150, table C-1) is required, as follows (see figure 5-638):

- (1) Remove all surface treatment from surface to be repaired.
- (2) Machine to obtain 0.002 to 0.015 inch (0.005 to 0.038 cm) buildup thickness after final machining.
- (3) Using a stiff bristle brush, scrub area using pumice (item 254, table C-1) and water to provide a water-break free surface.
- (4) Rinse thoroughly in clean, cold water.
- (5) Dry; then apply coating touchup chromic acid (item 114, table C-1) to prepared surface.
- (6) Rinse in clean, cold, running water.
- (7) Dry at room temperature for 12 to 16 hours, then place in curing oven and bake for 1 hour at 140°F to 160°F (60° to 71°C).
- (8) Cool at ambient temperature.
- (9) Apply epoxy patching compound (item 150, table C-1) to diameter; ensure all surfaces are covered.

- (10) Cure for 2 hours at 200°F (93°C).
- (11) Cool to 100°F (38°C) then remove from oven.
- (12) Machine to given dimensions.

k. Repair minor corrosion pitting on strut area, inlet guidance area, and external portions of inlet housing as follows:

#### NOTE

This repair shall not apply to the area immediately adjacent to engine mount bolt holes.

- (1) Clean area with a rotary file, bead blasting or by sand blasting, to remove corrosion pitting.
- (2) Using epoxy putty, (Item 149, table C-1), fill cleaned area and allow to cure at ambient temperature for 12 to 16 hours. Place in curing oven and bake for 1 hour at 140° to 160°F (60° to 71°C).
- (3) Finish the putty to original contour of housing.
- (4) Using a brush, apply chromic acid solution in accordance with Military Specifications MIL-M-3171, Type VI, to all exposed metal.
- (5) Using epoxy putty (Item 149, table C-1), fill corrosion pits in the No. 1 bearing bore "O" ring seat and reduction gear "O" ring seat. Machine to given dimensions.

l. Inlet housing VIGV area corrosion shall be repaired by plasma spray as follows (see figure 5-639):

- (1) Machine the discrepant surface(s) removing the smallest amount of parent material possible, or any of the discrepant epoxy putty, so as not to reduce the parent metal thickness excessively. Small localized areas of corrosion may be hand routed to a depth of 0.025 inch from the blueprint dimension diameter. Pre-machine to obtain a minimum of 0.003 inch and maximum of 0.025 inch of the plasma material buildup. (See figure 5-639).
- (2) Mask those areas not to be plasma sprayed.
- (3) Grit blast 200% coverage on the areas to be sprayed.

#### NOTE

The surfaces being repaired must be plasma sprayed within 2 hours of being cleaned and grit blasted.

- (4) Plasma spray the discrepant surface(s) using Metco 450 (Item 218, table C-1).

#### NOTE

No plasma spray allowed in the radii.

#### NOTE

Chamfer required on all plasma sprayed edges.

- (5) Final machine the surfaces to the requirements of figure 5-639.

CHQSOFTWARE.COM

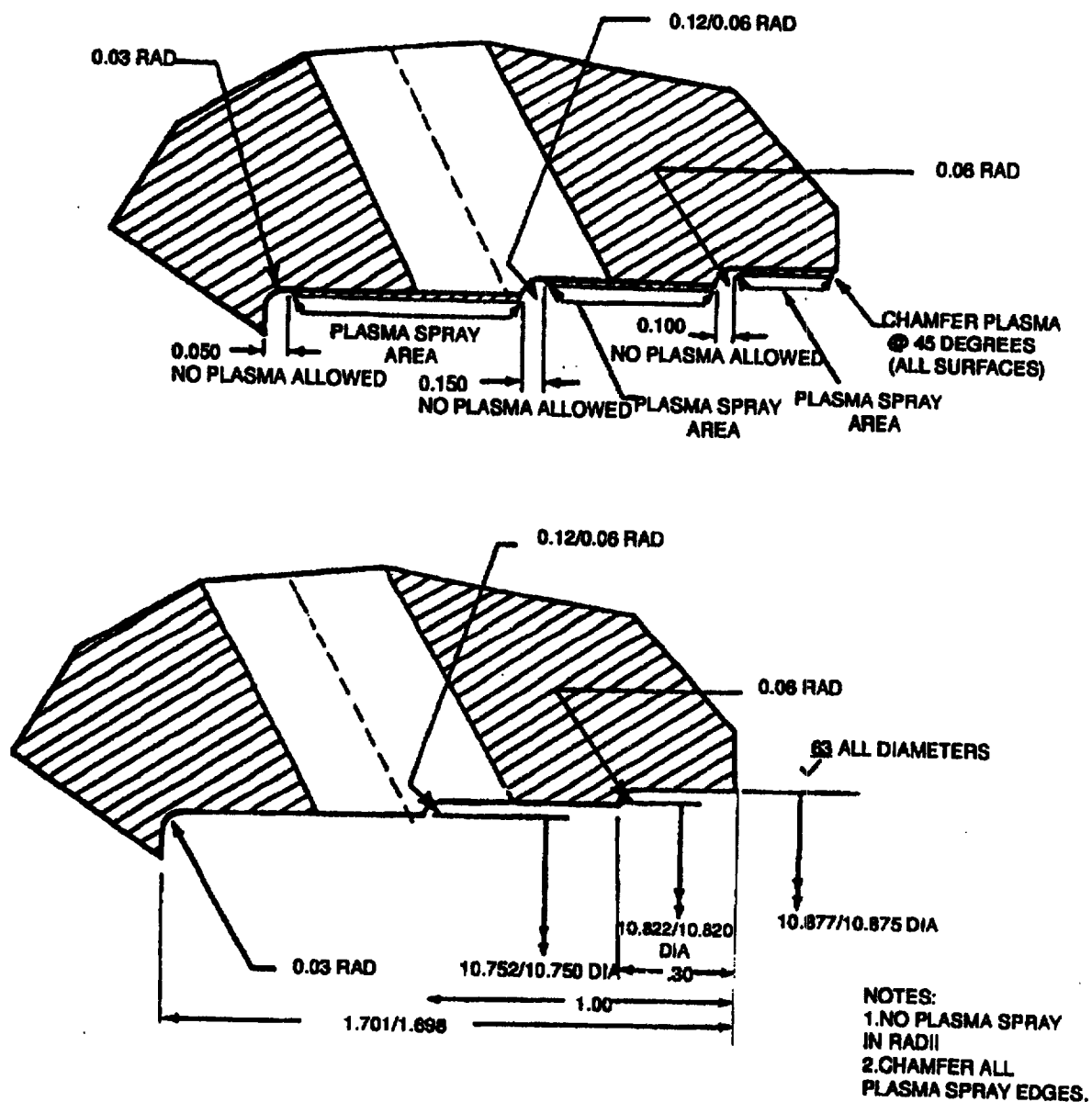


Figure 5-639. Inlet Housing VIGV Area Plasma Spray and Machining Dimensions.

m. Repair corrosion pitting in nonseal area of inlet housing mounting pad holes (3.375 to 3.377) inch (8.573 to 8.578 cm) diameter as follows:

- (1) Clean area thoroughly by sand blasting or bead blasting to remove products of corrosion.
- (2) Treat area in accordance with Military Specification MIL-M-3171, Type VI.
- (3) Apply clear synthetic (item 104, table C-1) to reworked area.

(4) Touch up reworked area as outlined in SP No. 6023 in Appendix E.

n. Inlet housing V-Band corrosion areas, to be repaired by using epoxy putty; shall be repaired as follows:

(1) Heavy sand blast or bead blast corrosion areas.

(2) Apply epoxy putty (item 149, table C-1) to these areas and allow to cure at ambient temperature for 12 to 16 hours. Place in curing oven and bake for 1 hour at 140° to 160°F (60° to 71°C).

(3) Machine to original contour or to match undamaged portion of V-Band periphery;

(4) Treat exposed bare metal in accordance with Military Specification MIL-M-3171, Type VI.

o. Inlet housing V-Band corrosion areas to be blend-repaired shall be repaired as follows:

(1) Using rotary files or sanding drums, V-Band areas shall be smoothed to remove irregularities and corrosion.

(2) Treat V-Band areas in accordance with Military Specification MIL-M-3171, Type VI.

p. Inlet housing V-Band corrosion areas to be welded shall be repaired as follows:

(1) Preheat inlet housing to 300°F.

(2) Using the gas tungsten arc welding process and filler metal (welding rod, item 344, table C-1) per SP No. 5001, Appendix E, apply sufficient material to conform to original contour. Ensure the final weld has a smooth surface.

(3) Fluorescent penetrant inspect the reworked area per MIL-STD-6866. No cracks or linear indications allowed.

(4) Machine welded area per figure 5-640.

(5) Stress relieve at 350°F for 12 hours.

(6) Dimensional inspect.

(7) Touchup reworked area using dichromate and engine gray enamel per SP No. 6026 and SP No. 6027, Appendix E.

q. Repair material fallout or cracking to VIGV rod slot thin wall areas as follows:

(1) For material fallout at ID of inlet housing (to VIGV rod slot) remove coating and TIG weld to build up material using AMS4396C rod. Allow cooling time after each pass or buildup. Machine to dimensions per figure 5-659. Penetrate inspect. No cracks allowed. Stress relieve at 350°F for 12 hours.

(2) For cracks between flange bolt hole and VIGV rod slot, blend to remove crack. Depth of VIGV slot and length shall not exceed 0.15.

(3) Touch up reworked areas using dichromate and engine gray SP Nos. 6026 and 6027.

r. Repair wear in seal area of 3.375 to 3.377 inch (8.572 to 8.577 cm) diameter mounting pad holes as follows:

(1) Counterbore a 3.690 inch (9.373 cm) diameter hole, 0.695 to 0.705 inch (1.765 to 1.791 cm) deep, in defective bore (See figure 5-631).

(2) Using magnesium alloy (item 204 or 203, table C-1) fabricate a magnesium sleeve (See figure 5-631). Corrosion protection treatment in accordance with Military Specification MIL-M-3171, Type VI, shall be applied after machining. OD of sleeve shall be such as to provide 0.002 to 0.004 inch (0.005 to 0.010 cm) tight fit with housing bore. Thickness and ID shall be sufficient to allow machining after installation.

(3) Coat OD of sleeve and end of sleeve with sealing, locking, and retaining compound (item 269, table C-1), and install sleeve into housing while sealing, locking, and retaining compound is still wet.

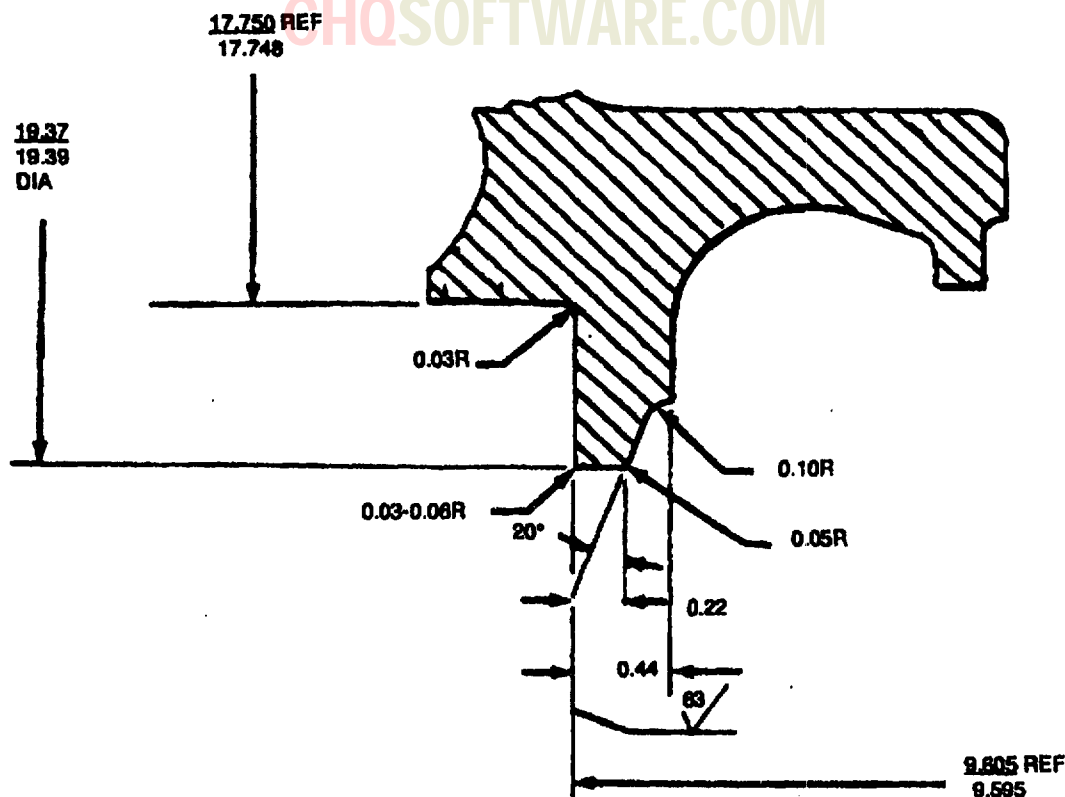


Figure 5-640. Machining of Weld Repaired Inlet Housing V-Band Area.

- (4) Machine sleeve flush with housing, and machine diameter to dimensions given.
- (5) After final machining, surface treat in accordance with MIL-M-3171, Type VI.
- (6) Apply clean synthetic (Item 104, table C-1) to reworked area.
- (7) Touch up reworked area, as outlined in SP No. 6023 in Appendix E.
- s. Inspect inlet housing torque-meter pad surface for flatness. If surface deviated more than 0.002, repair as follows:
  - (1) Machine surface the minimum amount necessary to obtain 0.001 flatness. Do not exceed 1.535 inch distance from flange. Refer to figure 5-641.
  - (2) If surface is not repairable by this method, metal spray using instructions given in paragraph h.
  - (3) If inspection limits are not met, machine the inside diameter 10.893 to 10.894 inches.
- t. Rework procedures for mounting pad hole and torque-meter valve seal port.
  - (1) Visually inspect the 3.375 to 3.377 inch (8.573 to 8.578 cm) diameter mount pad holes for corrosion pitting.
  - (2) Visually inspect the torque-meter valve port seal area for corrosion pitting.
  - (3) Visually inspect mount pad bolt holes for excessive helicoil thread depth.

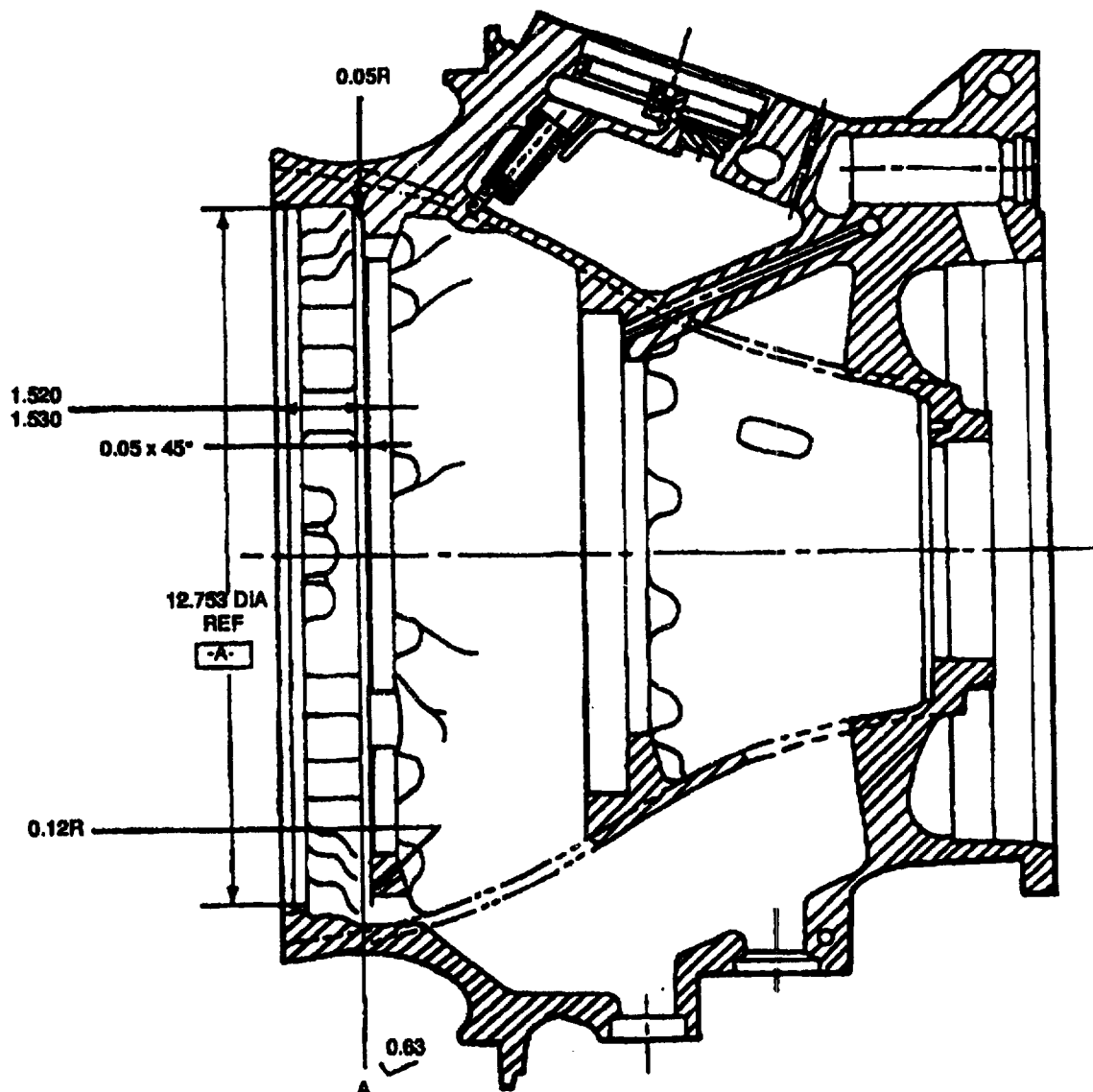
#### NOTE

Helicoil inserts in mount pad holes should not be installed at a depth exceeding 0.150 inch (0.381 cm) below the surface of the pad.

- (4) Corrosion pitting in mount pad hole up to 1/4 inch in depth may be repaired in accordance with paragraph (6) through (14).
- (5) Corrosion pitting up to 1/32 inch in depth in the torque-meter valve port seal and/or inlet housings rejected for leaking torque-meter valves may be repaired per paragraph (6) through (14).



- (6) Plug torque-meter valve port.
- (7) Thoroughly clean area(s) by sand blasting or bead blasting, or equivalent to remove all products of corrosion or roughen surface.
- (8) Fill void(s) with epoxy putty (Devcon F or equivalent); allow to cure 12 hours minimum.
- (9) Finish mount pad holes to original contour of part.
- (10) Finish torque-meter valve seal port to manufacturer's drawing specifications. Replace screw thread inserts (helicoils) with inserts 1/4-28, MS51830-202 (NSN 5340-00-085-0219), or equivalent
- (11) Remove plug from torque-meter valve port.
- (12) Treat exposed metal with MIL-M-3171, Type VI solution.
- (13) Apply two (2) coats No. 4840 epoxy, dark gray, to mount pad rework area.
- (14) Check and test operation of torque-meter valve after installation.



ALL DIMENSIONS ARE IN INCHES

Figure 5-841. Inlet Housing Repair Areas.

- u. Repair loss of epoxy resin sealant on inlet housing front flange, lifting eye, and mounting pads as follows:

**WARNING**

To prevent inhaling fumes, perform cleaning operation in well-ventilated area.

- (1) Clean mounting pads with acetone (item 13, table C-1).
- (2) After cleaning, inspect mounting pad for corrosion indicated by pitting or flaking on surface of metal.
- (3) To remove corrosion, brush chromic acid (item 86, table C-1) (24 ounces per gallon of water) over corroded area until corrosion is removed.

**WARNING**

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 body contact, immediately flush skin or eyes with water for at least 15 minutes; then seek medical attention.

- (4) Using cotton swab, apply chrome-pickle solution in accordance with Military Specification MIL-M-3171 to areas being treated.

**NOTE**

Solution should 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 room temperature.

- (5) Allow chrome-pickle solution to remain on surface for 2 to 5 minutes; then wipe dry with a clean dry cloth.
- (6) Using heat lamps (500 watt), dry treated areas for 5 to 10 minutes.
- (7) Prepare mixture of clear epoxy resin sealant or a mixture of pigmented epoxy sealant as an alternate.

**CAUTION**

To prevent possible damage to magnesium parts, temperature must not exceed 315°F (157°C).

**NOTE**

Clear epoxy resin sealant shall be made up of one part clear synthetic (item 104, table C-1) to one part thinner (item 331, table C-1). Stir for 3 minutes.

Pigmented epoxy sealant shall be made up of one part pigmented epoxy sealant, component A (item 245, table C-1) to one part pigmented epoxy sealant, component B (item 246, table C-1). Mix thoroughly, and allow to stand for 1/2 hour. Restir before using.

- (8) Spray coat of sealant over exposed area and cure in a temperature-controlled oven at 300° to 315°F (149° to 157°C) for 15 minutes.

- v. Touch up areas with lack of sealant on inlet housing mounting pads as follows:

- (1) Install suitable bolts in mounting pad bolt holes, finger-tight, to prevent epoxy from entering bolt holes.

**WARNING**

To prevent inhaling fumes, perform cleaning operation in well-ventilated area.

- (2) Clean mounting pads with acetone (item 13, table C-1).
- (3) After cleaning, inspect mounting pad for corrosion. Corrosion is indicated by pitting or flaking on surface of metals.

(4) To remove corrosion, brush chromic acid (item 86, table C-1) (24 ounces per gallon of water) over corroded area until corrosion is removed.

(5) Using cotton swab, apply chrome-pickle solution, in accordance with Military Specification MIL-M-3171 to areas being treated.

### WARNING

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 body contact, immediately flush skin or eyes with water for at least 15 minutes; then seek medical attention.

### NOTE

Solution should 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 room temperature.

- (6) Allow chrome-pickle solution to remain on surface for 2 to 5 minutes; then wipe dry with a clean dry cloth.
- (7) Using heat lamps (500 watt), dry treated areas for 5 to 10 minutes.
- (8) Prepare mixture of clear epoxy resin sealant or a mixture of pigmented epoxy sealant as an alternate.

### NOTE

Clear epoxy resin sealant shall be composed of 10 grams adhesive (item 14, table C-1) and 1.5 grams triethylene tetramine (item 79, table C-1). Stir for 3 minutes. Pot life of mixture is approximately 30 minutes.

Pigmented epoxy sealant shall be made up of one part pigmented epoxy sealant, component A (item 245, table C-1) to one part pigmented epoxy sealant, component B (item 246, table C-1). Mix thoroughly, and allow to stand for 1/2 hour. Restir before using.

- (9) Using brush, apply thin coat of epoxy mixture to mounting pads immediately after exposed metal is dry. Wipe off excessive mixture with rubber squeegee.
- (10) Remove bolts installed in preceding step (1).
- (11) Using heat lamps, cure sealant on mounting pads.
- (12) After mounting pads have been cured, perform continuity check.

### NOTE

If continuity check indicates that further touch up is required, repeat preceding steps (1) through (12).

(13) Use suitable gage to check holes in mounting pad. Gage shall seat evenly without any noticeable tightness. If it is difficult to install or remove gage, too thick a coating of epoxy resin sealant has been applied. If too thick a coating was applied, scrape off sealant and apply thinner coating.

w. Repair corroded interior air passages of inlet housing as follows:

(1) If corroded areas are accessible, corrosion may be removed using a rotary stainless steel brush or bead blasting, instead of stripping. Touch up using cotton swab. Apply chrome-pickle solution in accordance with MIL-M-3171. Apply HAE coating and epoxy resin sealant per SP No. 6028. Touch up synthetic coating (area A of figure 5-642) per SP No. 6023 in Appendix E.

(2) If corrosion is extensive and/or inaccessible, strip and recoat as follows:

(3) Install inlet housing in suitable holding fixture. Mask or protect related hardware as necessary during stripping and coating, or remove as follows (see list of parts, table 5-192).

(a) Remove 24 studs, STD3001-B-121 (See figure 5-642, sheet 1 of 4).

(b) Remove three alignment studs (1-060-037-01) (See figure 5-642, sheet 1 of 4).

(c) Drill out three locking pins, AN122684, using holding fixture (LTCT11397) (See figure 5-642, sheet 1 of 4).

(d) Remove three bushings (1-060-115-01) (See figure 5-642, sheet 1 of 4).

(e) Remove one insert, MS124660 (See figure 5-642, sheet 1 of 4).

(f) Remove 30 inserts, MS124736 (See figure 5-642, sheet 1 of 4 and 2 of 4).

(g) Remove two inserts, MS124739, and two dowel pins (1-060-013-01) from rear pad at 6-o'clock position (See figure 5-642, sheet 2 of 4).

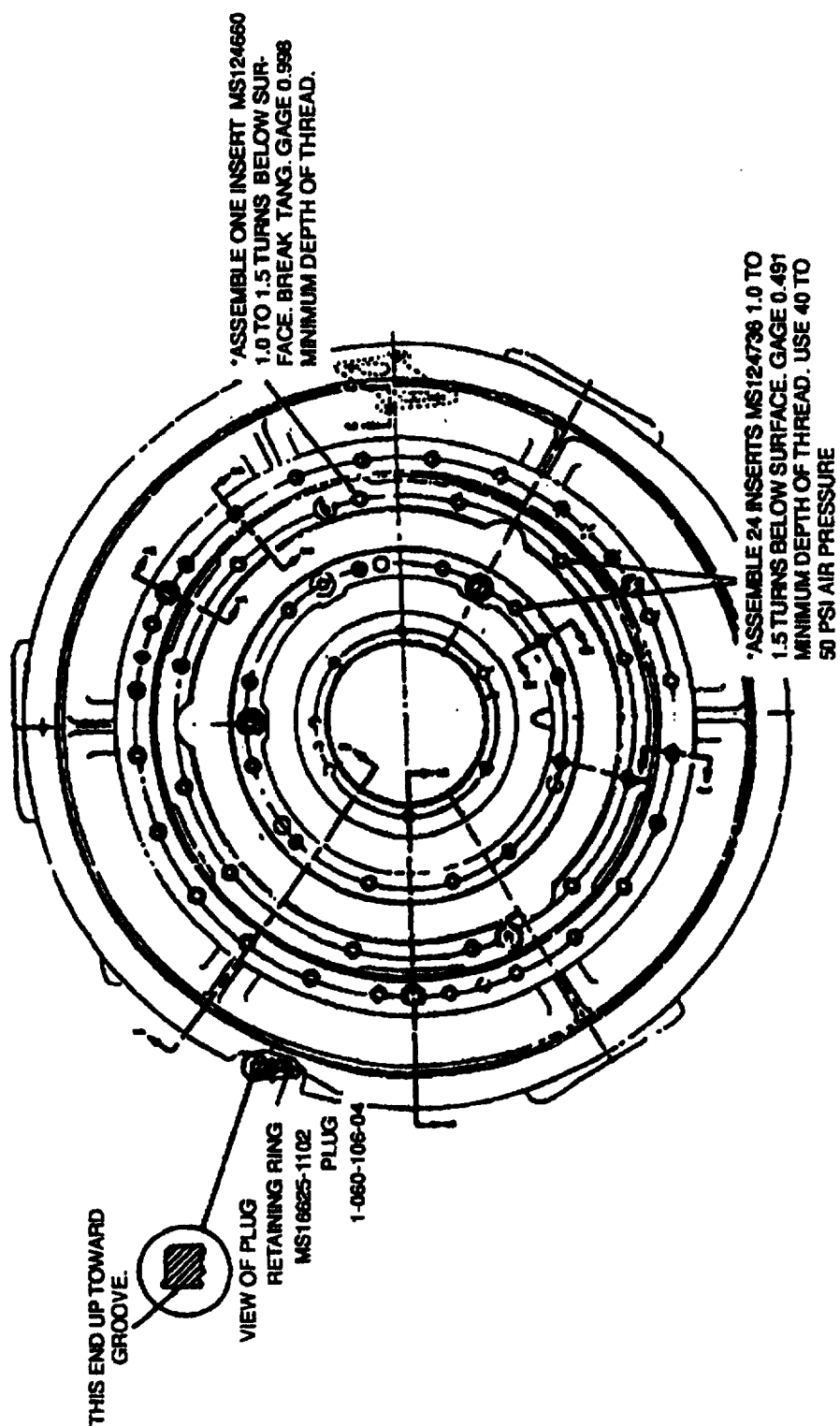
(h) Remove two inserts, MS124698, from front pad at the 6-o'clock position and four inserts from upper right pad (See figure 5-642, sheet 2 of 4).

(i) Remove 12 inserts, MS124740, four from pad at 12-o'clock position, four from lower left pad, and four from lower right pad (See figure 5-642, sheet 2 of 4).

**Table 5-192. Parts Required for Reassembly of Inlet Housing (T53-L-13B, -15, -703).**

Nomenclature	Part Number	Quantity
Pipe Plug	AN932-D1	1
Pipe Plug	AN932-D2	1
Pipe Plug	AN932-D3	1
Pin	AN122684	3
Pin	AN122705	1
Pin	AN122730	1
Insert	MS 124655	1
Insert	MS124660	1
Insert	MS 124695	6
Insert	MS 124698	6
Insert	MS 124736	30
Insert	MS124739	2
Insert	MS 124740	12
Retaining Ring	MS16625-1102	10
Retaining Ring	MS16625-3068	1
Packing	MS29561-020	1
Stud (oversize 0.003 inch) (0.008 cm)	STD3001-B-121N	24
Stud	1-060-037-01	3
Pin	1-060-013-01	2
Pin	1-060-098-02	1
Plug	1-060-106-03	1
Plug	1-060-106-04	9
Tube	1-060-107-01	1
Bushing	1-060-115-01	3
Insert	1-060-143-01	1
Metering Plug	1-060-154-01	1

CHQSOFTWARE.COM



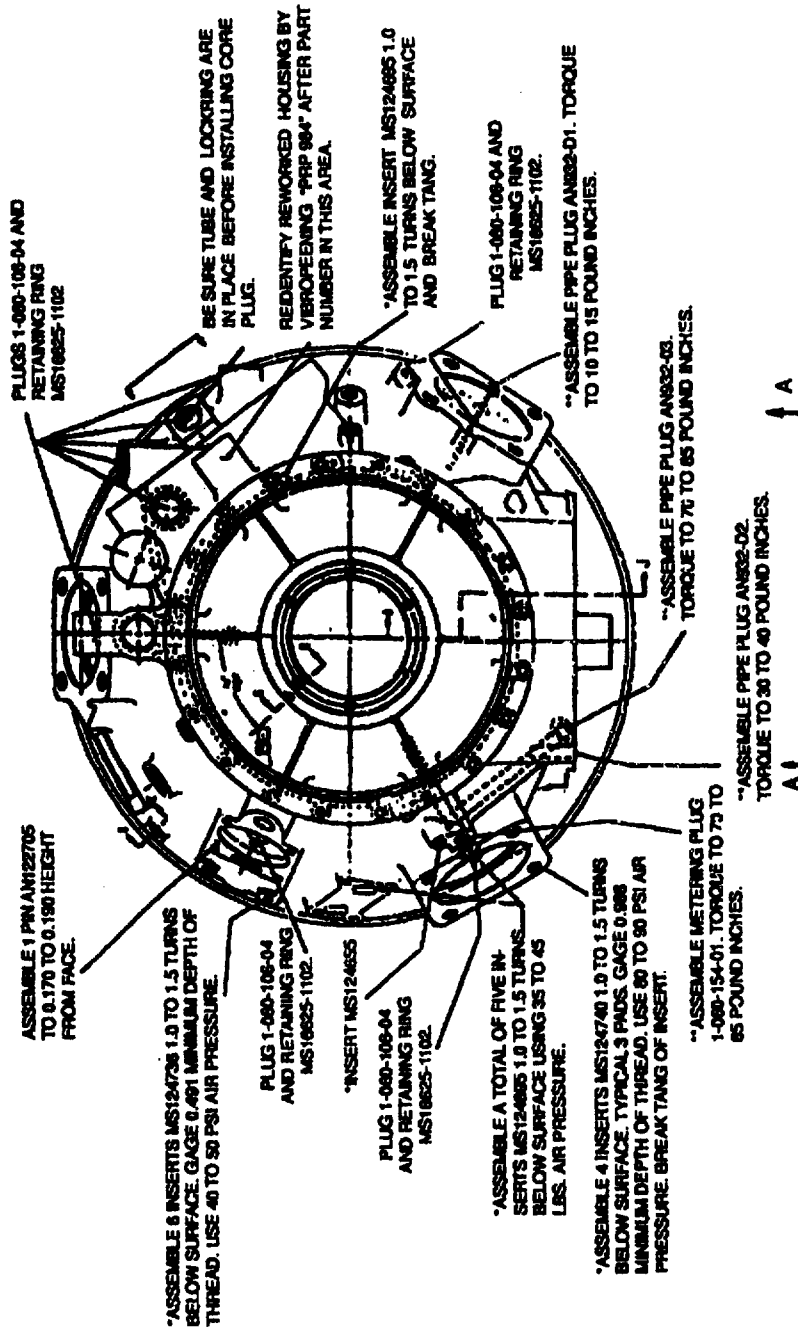
## NOTE

All dimensions are in inches.

- Prior to installation, apply Primer (item 253, table C-1) to inserts. After installation, remove excess primer.
- \*\* Prior to installation, apply Anti Seize Compound (item 47, table C-1) to plugs. After installation, remove excess compound.

Figure 5-642. Repair of Inlet Housing (English) (Sheet 1 of 4).

CHQSOFTWARE.COM

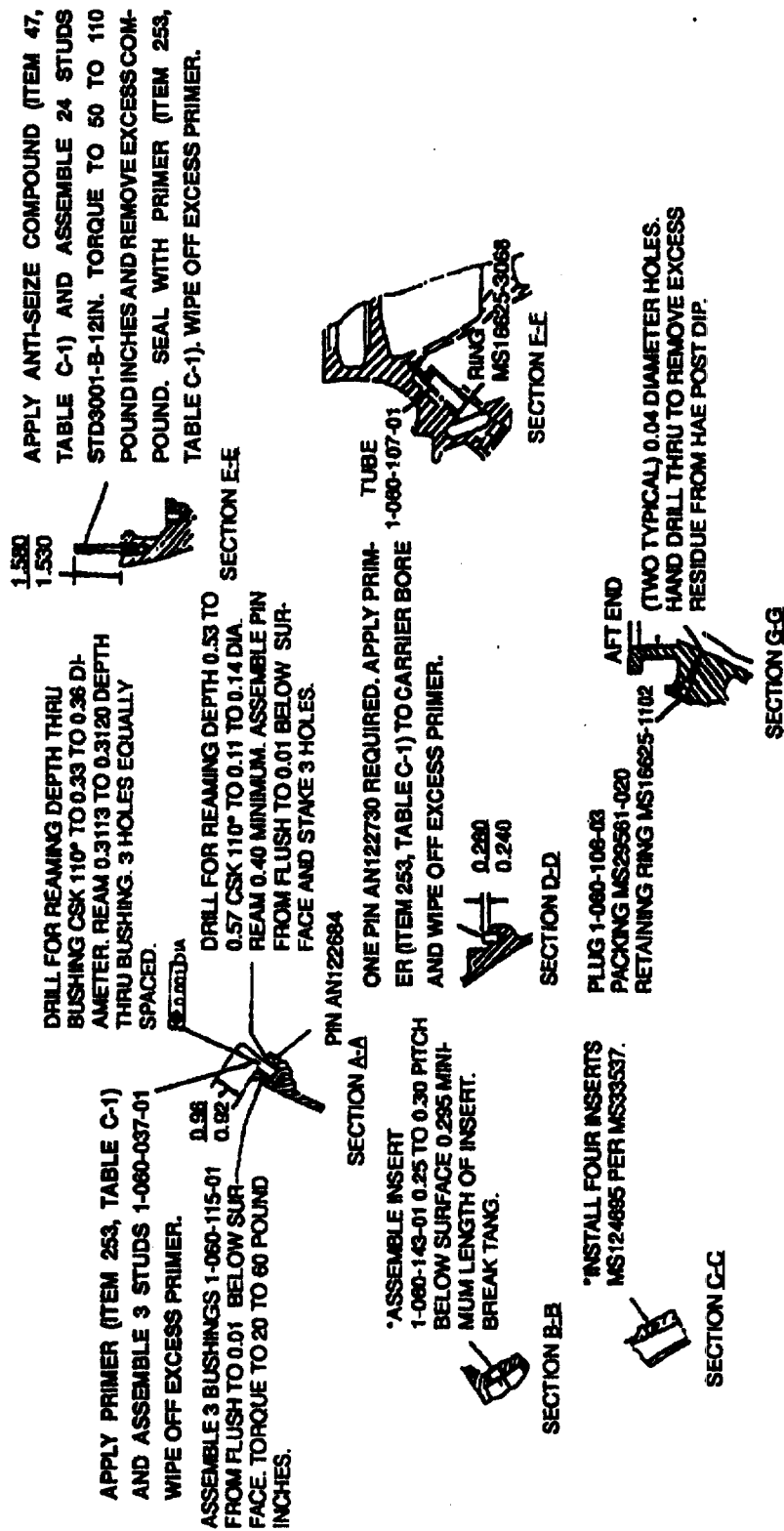


## NOTE

All dimensions are in inches.

- Prior to installation, apply Primer (item 253, table C-1) to inserts. After installation, remove excess primer.
- \*\* Prior to installation, apply Loctite (item 264, table C-1) to plugs. After installation, remove excess compound.

Figure 5-642. Repair of Inlet Housing (English) (Sheet 2 of 4).

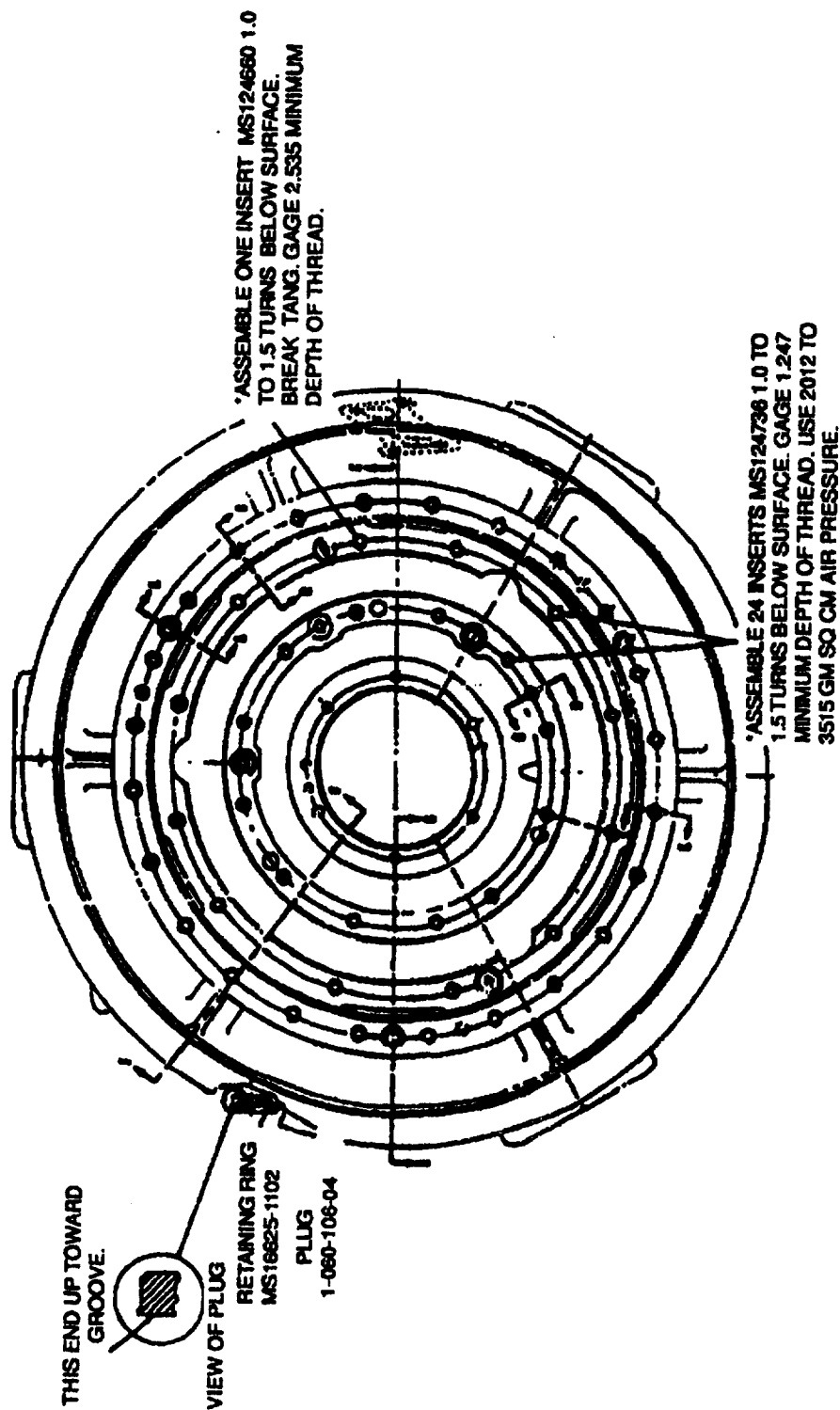


**Figure 5-642. Repair of Inlet Housing (English) (Sheet 3 of 4).**





CHQSOFTWARE.COM



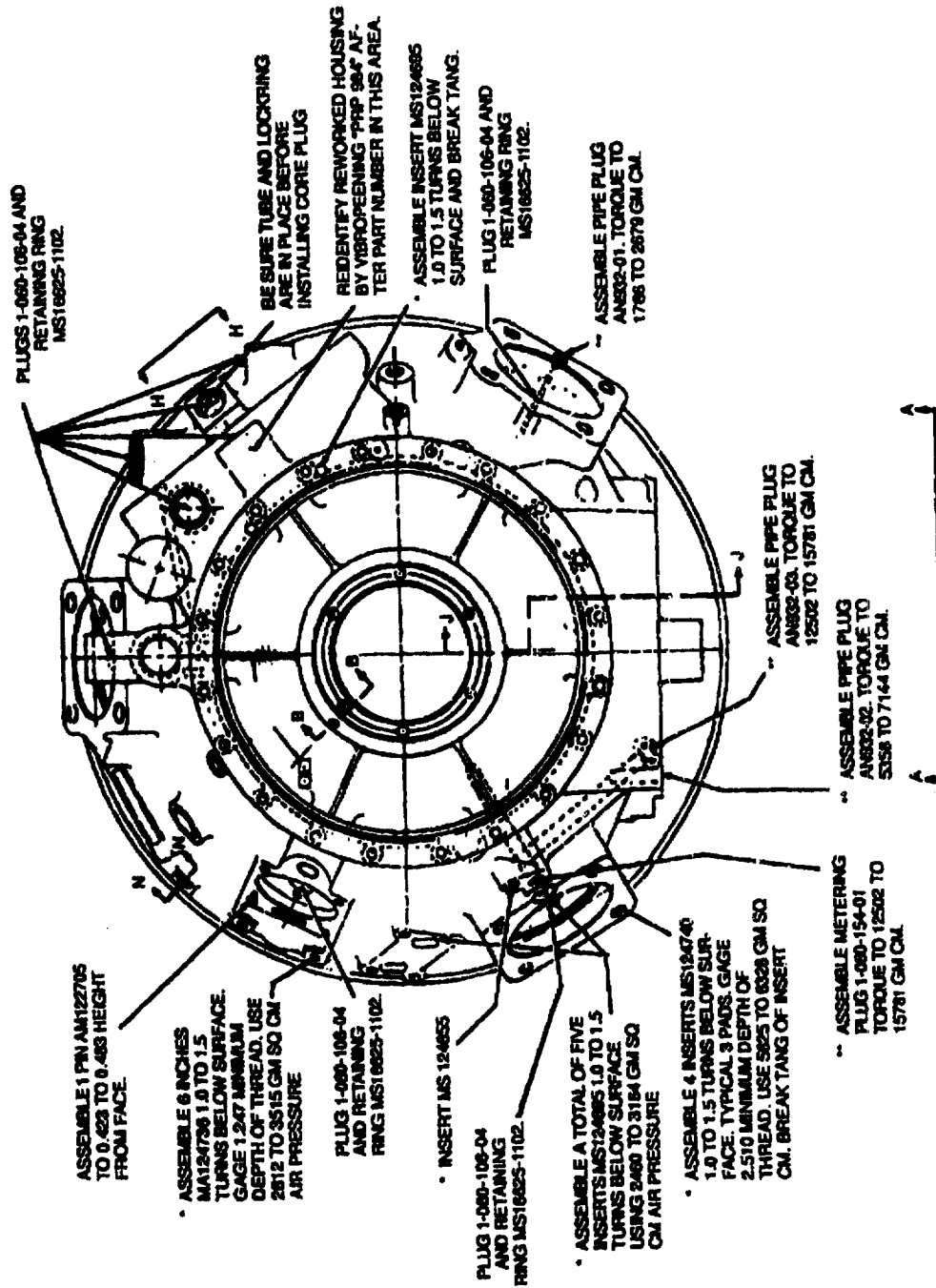
## NOTE

All dimensions are in inches.

- \* Prior to installation, apply Primer (item 253, table C-1) to inserts. After installation, remove excess primer.
- \*\* Prior to installation, apply Anti Seize Compound (item 47, table C-1) to plugs. After installation, remove excess compound.

Figure 5-643. Repair of Inlet Housing (Metric) (Sheet 1 of 4).

CHQSOFTWARE.COM



## NOTE

All dimensions are in centimeters.

- Prior to installation apply Primer (item 253, table C-1) to inserts. After installation, remove excess primer.
- Prior to installation apply Loctite (item 264, table C-1) to plugs. After installation, remove excess compound.

Figure 5-643. Repair of Inlet Housing (Metric) (Sheet 2 of 4).

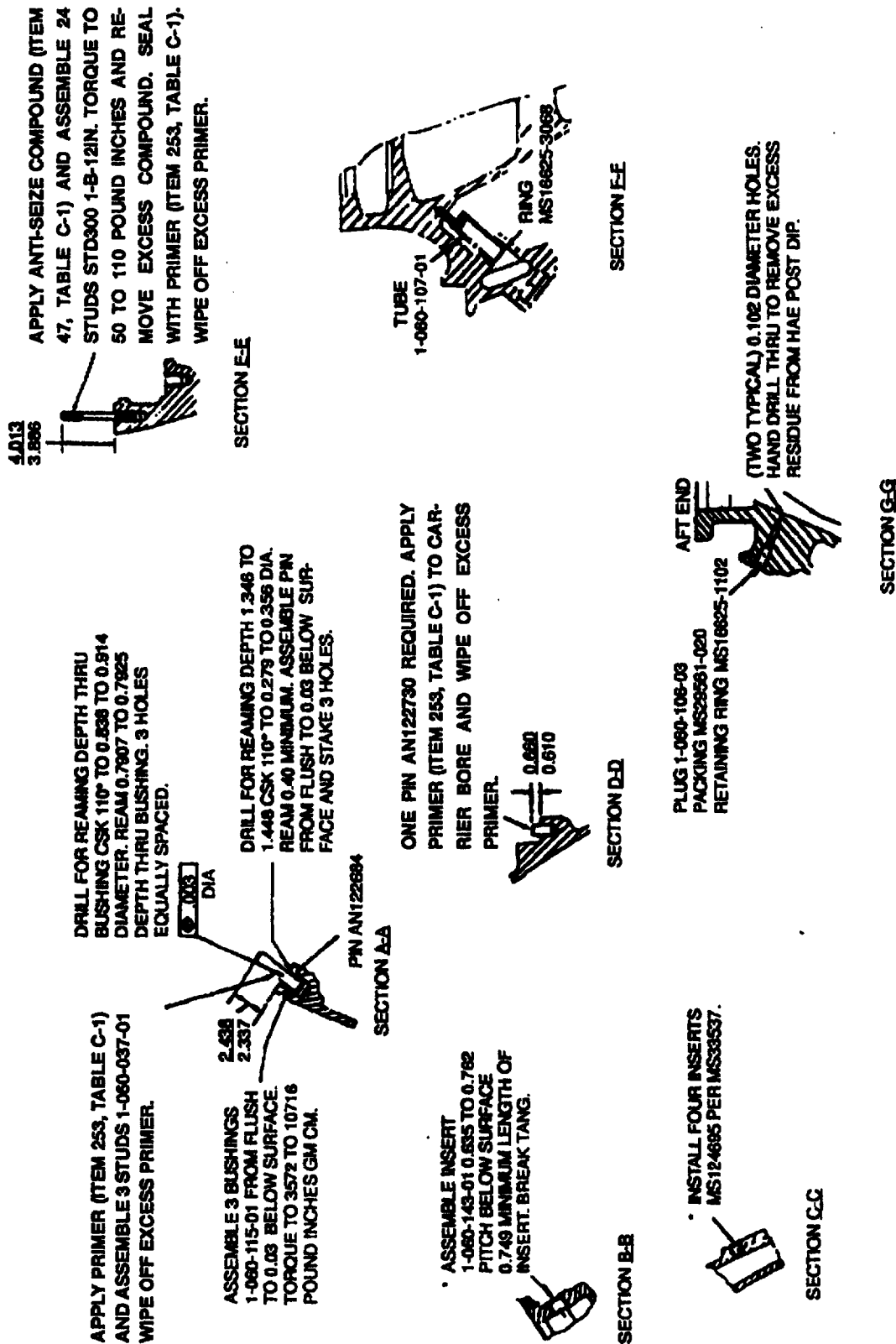
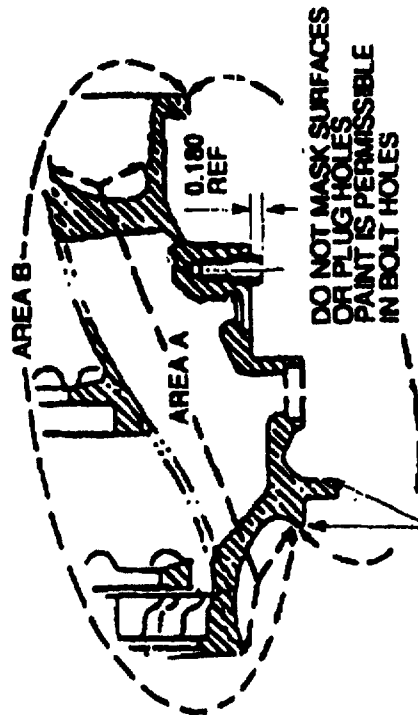
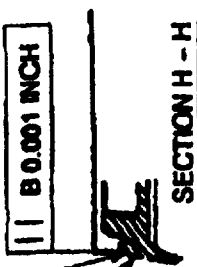


Figure 5-643. Repair of Inlet Housing (Metric) (Sheet 3 of 4).

CHQSOFTWARE.COM

APPLY PRIMER (ITEM 253, TABLE C-1) TO PIN 1-060-098-02 AND ASSEMBLE PIN TO SEAT.

RADIUS END OF PIN OUT



DO NOT MASK FLANGE OD

SECTION J - J

SPECIAL MASKING PLUG LOCATION



FINGER-TIGHTEN THE BOSS ASSEMBLY ONLY



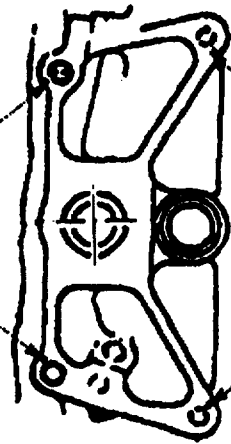
MASK BORE AND HOLES ON PAD FACE (TYPICAL)

STEP 1

ASSEMBLE 2 INSERTS MS124739 1.0 TO 1.5 TURNS BELOW TOP THREAD. GAGE THREAD 0.863 MINIMUM.

STEP 2

ASSEMBLE 2 DOWELS 1-060-013-01



VIEW A - A

ASSEMBLE TWO INSERTS MS124698 1.0 TO 1.5 TURNS BELOW SURFACE GAGE 0.552 MINIMUM THREAD DEPTH. USE 60 TO 70 PSI AIR PRESSURE.



VIEW B - B

ASSEMBLE TWO INSERTS MS124698 1.0 TO 1.5 TURNS BELOW SURFACE GAGE 0.552 MINIMUM THREAD DEPTH. USE 60 TO 70 PSI AIR PRESSURE.

Figure 5-643. Repair of Inlet Housing (Metric) (Sheet 4 of 4).

- (j) Remove pin, AN122705, from tachometer drive pad (See figure 5-642, sheet 2 of 4).
- (k) Remove one insert, MS124655, and four inserts, MS124695 (See figure 5-642, sheet 2 of 4).
- (l) Remove metering plug (1-060-154-01) from lower left mounting pad (See figure 5-642, sheet 2 of 4).
- (m) Remove pipe plugs, AN932-D2 and AN932-D3, from accessory gearbox pad area and pipe plug, AN932-D1, from lower right mounting pad (See figure 5-642).
- (n) Remove nine retaining rings, MS16625-1102, and nine plugs (1-060-106-04) (See figure 5-642, sheet 2 of 4).
- (o) Remove retaining ring, MS16625-1102; plug (1-060-106-03); and packing MS29561-020 (See figure 5-642, sheet 1 of 4).
- (p) Remove pin, AN122730 (See figure 5-642, sheet 1 of 4).
- (q) Remove two inserts, MS124695 (See figure 5-642, sheet 2 of 4).
- (r) Remove tube (1-060-107-01), retaining ring, MS16625-3068, and pin (1-060-098-02) (See figure 5-642, sheets 1 of 4 and 2 of 4).
- (s) Remove insert (1-060-143-01) (See figure 5-642, sheet 1 of 4).
- (4) Machine epoxy from all plug holes and retaining ring grooves, if necessary.
- (5) Clean metal chips from housing, using an air nozzle, followed by reverse-flush.
- (6) Clean housing by dry cleaning solvent method (Refer to SP No. 3002 in Appendix E).
- (7) Cover original datum T and M, figure 5-638, with suitable fixture and teflon lining such that it is undisturbed through paint stripping, corrosion treating, HAE treating, and repainting processes. This datum is used for machining after repainting.
- (8) Immerse housing in magnesium cleaner (item 94, table C-1) for 5 minutes and rinse in hot water.

#### NOTE

Chemical paint stripper 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.

- (9) 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.
- (10) Immerse housing in chromic acid (item 86, table C-1) (24 ounces per gallon), maintained at 180°F (82°C) minimum for approximately 20 minutes, and rinse in hot water.
- (11) Turn housing over and repeat step (10).

#### CAUTION

Removal of metal must be kept to a minimum, especially in pilot diameters.

- (12) Using an air pressure of 50 psi (3515 gm sq cm) (maximum), light abrasive blast exterior of casting to remove any remainder of paint.
- (13) Mask threaded holes with teflon screws.
- (14) Using suitable masking, mask all critical dimensions prior to heavy HAE treatment.
- (15) Heavy HAE-treat housing as outlined in SP No. 6022 in Appendix E.
- (16) Remove masking and special teflon screws from housing.
- (17) Clean threaded holes with aluminum wool (item 42, table C-1).
- (18) Light HAE treat threaded holes as outlined in SP No. 6022 in Appendix E.

- (19) Hand-drill through to remove excess residue from HAE postdip (See figure 5-642, sheet 1 of 4).
- (20) After curing, plug all threaded holes with teflon screws and oil passage holes with corks (See figure 5-642, sheet 1 of 4, for special plug location).
- (21) Prepare clear epoxy resin sealant as follows:
  - (a) Mix one part clear synthetic (item 104, table C-1) to two parts thinner (item 335, table C-1).
  - (b) Add 1/4-fluid ounce of Troy antifoat (item 324, table C-1) to each gallon of sealant.
- (22) Apply clear epoxy resin sealant by dip application to all surfaces of housing including air passages. Change the dip position 180 degrees to ensure total application.
- (23) Remove all teflon screws and corks from housing.
- (24) Cure in oven at 240° to 260°F (116° to 127°C) for 10 to 15 minutes.
- (25) Apply friction reducing coating to housing as outlined in SP No. 6031 in Appendix E.
- (26) Mask all machined and cast areas not included in Area A of figure 5-642, sheet 2 of 4.

**NOTE**

Area A of figure 5-642, sheet 2 of 4, includes air passages and side of struts which will receive machinable friction reducing coating.

- (27) Install special masking plus (See figure 5-642, sheet 1 of 4).
- (28) Apply machinable friction reducing coating, as outlined in SP No. 6031 in Appendix E, to Area A shown in figure 5-642, sheet 2 of 4).
- (29) Mask area included by Area B and all machined areas on OD of casting (See figure 5-642 sheet 4 of 4).
- (30) Apply coating for exposed finished parts, as outlined in SP No. 6031 in Appendix E, to housing as shown in Area C of figure 5-642, sheet 4 of 4).
- (31) Remove cover over datum T and M (reference figure 5-638). Where edge of cover resided, touch up any unpainted surfaces per SP No. 6023, Appendix E.
- (32) Dimensionally inspect inlet housing as outlined in table 5-188.

**NOTE**

Isolated uneven paint buildup is permitted in non-dimensional, non-functional surfaces to a maximum thickness of 0.012 inch (0.030 cm).

- (33) Install nine core plugs (1-060-106-04) in inlet housing as follows: (See figure 5-642, sheet 2 of 4), for plug locations.

**CAUTION**

To prevent contamination of the surfaces to be bonded, wear white cotton gloves with rubber gloves worn over the cotton gloves. In case epoxy compound comes in contact with hands, wash hand in cleaning solvent (item 102, table C-1).

- (a) Using clean absorbent gauze, clean inlet housing core plug holes and plugs with cleaning solvent (item 102, table C-1). Continue wiping, changing gauge frequently, until gauze remains clean.
- (b) Air-dry for 15 minutes.

**NOTE**

The following adhesive mixture must be used as soon as possible because the mixture solidifies in about 1-1/2 hours.

- (c) Mix 100 grams of adhesive (item 16, table C-1) to 23 grams of adhesive curing agent (item 17, table C-1). Continue mixing, about 5 minutes, until both parts of mixture are thoroughly mixed.
- (d) Spread out the mixture on a clean piece of metal or cardboard.



- (e) Coat both surfaces to be bonded with a layer of adhesive mixture.
- (f) Push core plugs into housing, making certain plug is well seated.
- (g) Install retaining rings, MS16625-1102.
- (h) Wipe off excessive mixture and air-dry 1-1/2 to 2 hours.
- (i) Cure housing in oven at 200°F (92.2°C) for 1 hour.
- (j) Reinstall remaining hardware that was removed in step w (3)(a) through w (3)(s) by following special instructions on referenced figures.
- (k) Pressure-test oil lines at 100 psi (7031 gm sq cm).
- (l) Pressure-test tachometer to 200 psi (4061 gm sq cm).

(34) Inspect mounting pad holes for corrosion pitting in sealing area on internal passage way. Remove all traces of corrosion and treat. If corrosion pitting exceeds sleeve repair limits; repair per paragraph (a).

(a) Repair.

1 Counterbore a 3.690 inch (9.373 cm) diameter hole 0.870 to 0.880 (2.210 to 2.235 cm) as shown in figure 5-644.

2 Fabricate a sleeve of magnesium alloy (item 204 or 203, table C-1) allowing for a 0.002 to 0.004 inch (0.005 to 0.010 cm) tight fit with housing bore. Corrosion treat per MIL-M-3171, Type VI. Thickness and ID shall be sufficient to allow finish machining after installation.

3 Coat OD and end of sleeve with sealing, locking, and retaining compound (item 269, table C-1) and install sleeve into housing while sealing, locking, and retaining compound is still wet.

4 Finish machine sleeve per figure 5-644.

5 Apply clear synthetic (item 104, table C-1) to reworked area.

6 Touch up reworked area, as outlined in SP No. 6023 in Appendix E.

7 When the four o'clock mount pad is repaired, leakage may be prevented by one of the following two methods:

a Install tube in oil port hole:

(1) Ream oil port hole to 0.2502 inch x 2.0 inches deep (refer to figure 5-645).

(2) Fabricate a 0.250 inch OD x 2.0 inch long x 0.187 inch ID aluminum tube (item 32, table C-1).

**CAUTION**

Prevent excess material from intersecting passages or restricting the repaired hole.

(3) Using epoxy patching compound (item 149, table C-1), install and secure the tube into the oil port hole.

b Fill oil port hole and redrill hole:

(1) If tube is already installed in oil port hole, remove.

(2) Fill hole with epoxy patching compound (item 149, table C-1).

(3) Ream hole to 0.187 inch diameter.

8 Leak test housing per paragraph 5-474.

x. Relocate air bleed vent hole in order to prevent water accumulation and corrosion.

(1) Remove cover (3), packings (4 and 5), air transfer tube (11), and retaining ring (10).

(2) Locate the air bleed hole (upper side of accessory drive pad), and clean to ensure no foreign material exists on the hole ID. Clean both ends of the hole. Use either a pipe plug or a manufactured pin to plug the hole.

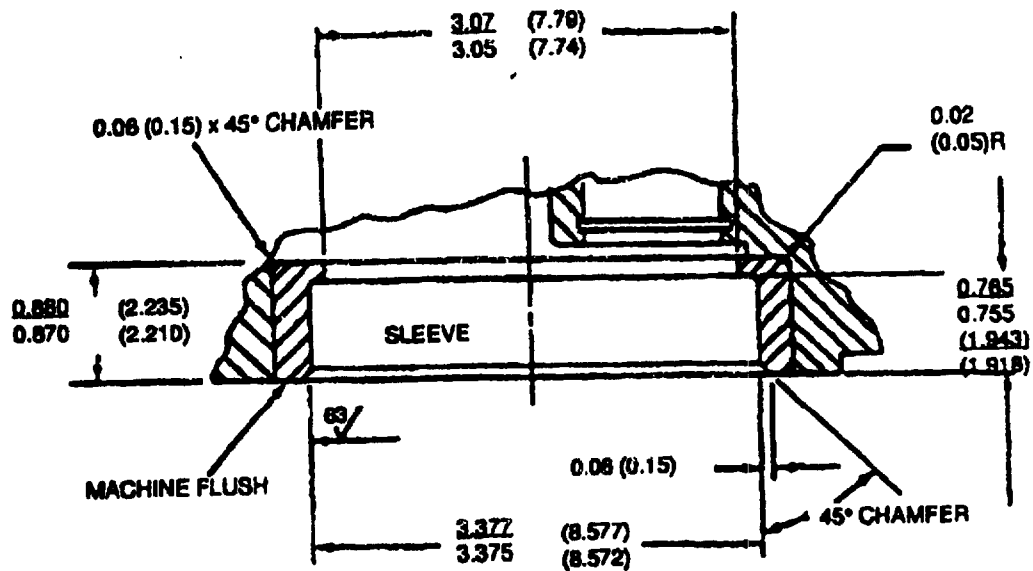
(3) If a pipe plug is to be installed in the old air bleed vent hole, perform the following steps:

(a) Drill the vent hole to 0.250 inch diameter and 0.300 inch minimum depth.

(b) Tap the hole for 1/16 NPT.

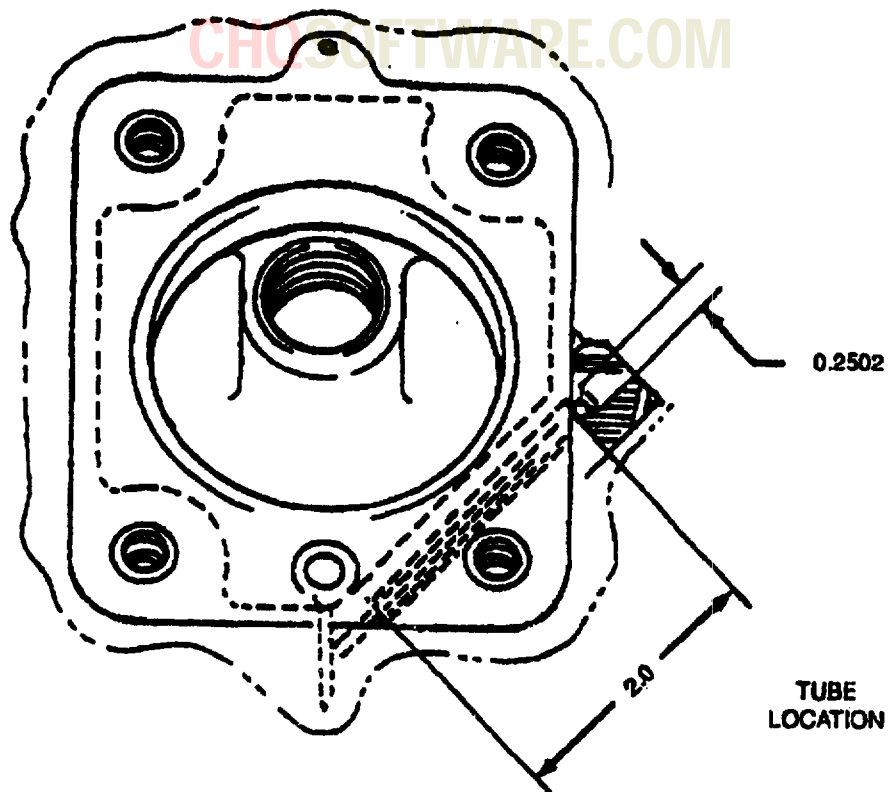


- (c) Install pipe plug P/N MS27769D1. See figure 5-646.
- (4) If a pin is to be installed in the old air bleed vent hole, perform the following steps:
- Ream the vent hole to 0.130 inch diameter and 0.600 inch minimum depth.
  - Manufacture a magnesium (AMS4396) pin of 0.1305/0.1315 inch diameter and 0.500 inch long. Pin is to be press fit into hole.



DIMENSIONS IN ( ) ARE IN CENTIMETERS

Figure 5-644. Repair of Inlet Housing Mount Pad.



**Figure 5-645. Repair of Oil Port Hole.**

- (c) Treat any bare metal inside of hole with chrome pickle solution.
- (d) Cool pin to facilitate installation.
- (e) Press pin into vent hole. Pin is to be flush to 0.1 below bottom of the counterbore. See figure 5-648.
- (5) Fill the inside end and the plug/pin end with epoxy (item 149, table C-1). Ensure that no moisture trapping cavity is present in the plug/pin end.
- (6) Remove excess epoxy from the original contour.
- (7) Machine the alternate air bleed vent hole on the underside of the accessory drive pad. See figure 5-648.
- (8) Treat all bare magnesium in accordance with MIL-M-3171, Type VI. Touch-up reworked areas as outlined in SP No. 6023 in Appendix E.

CHQSOFTWARE.COM

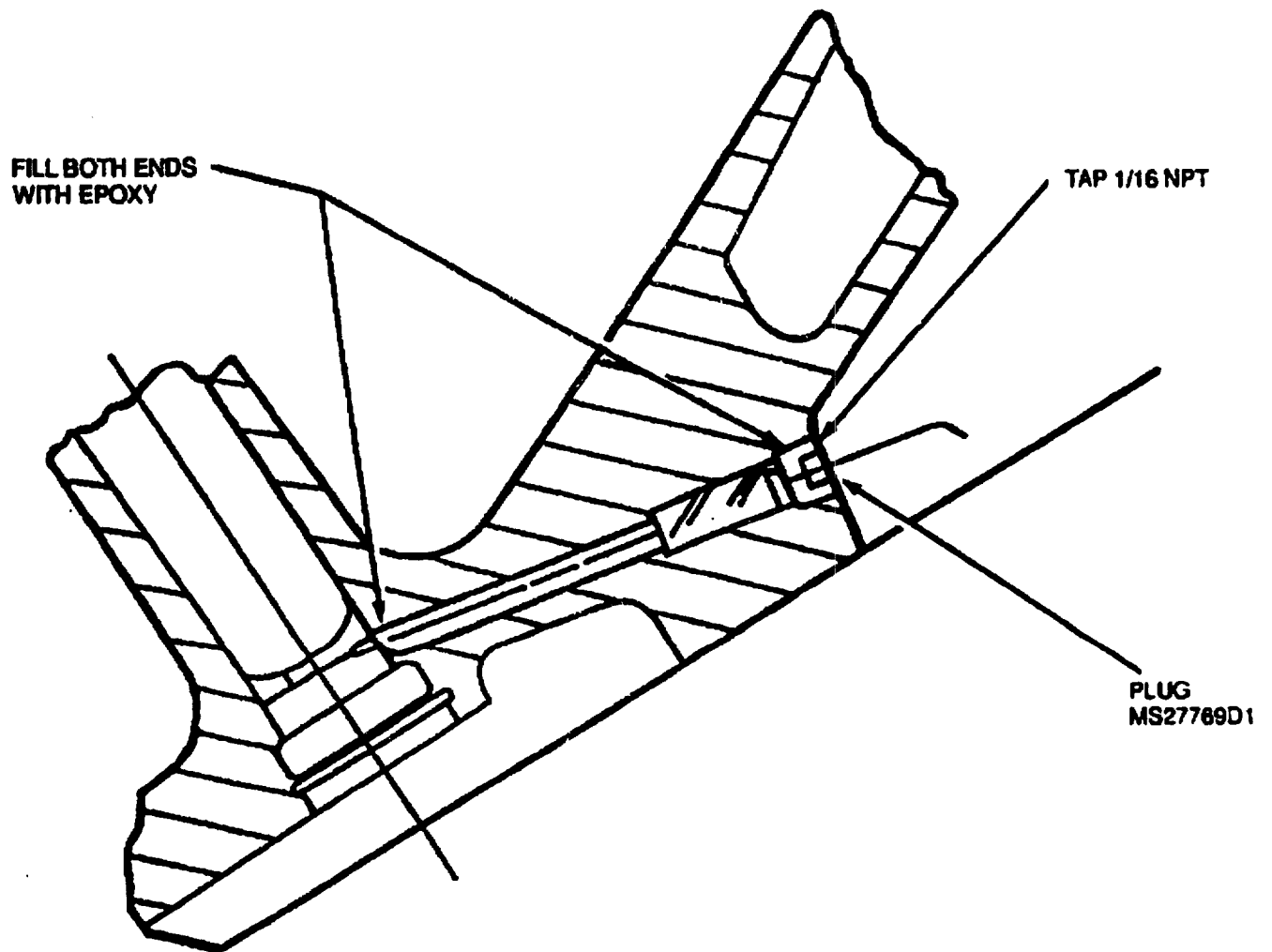


Figure 5-646. Air Bleed Vent Hole Relocation.

CHQSOFTWARE.COM

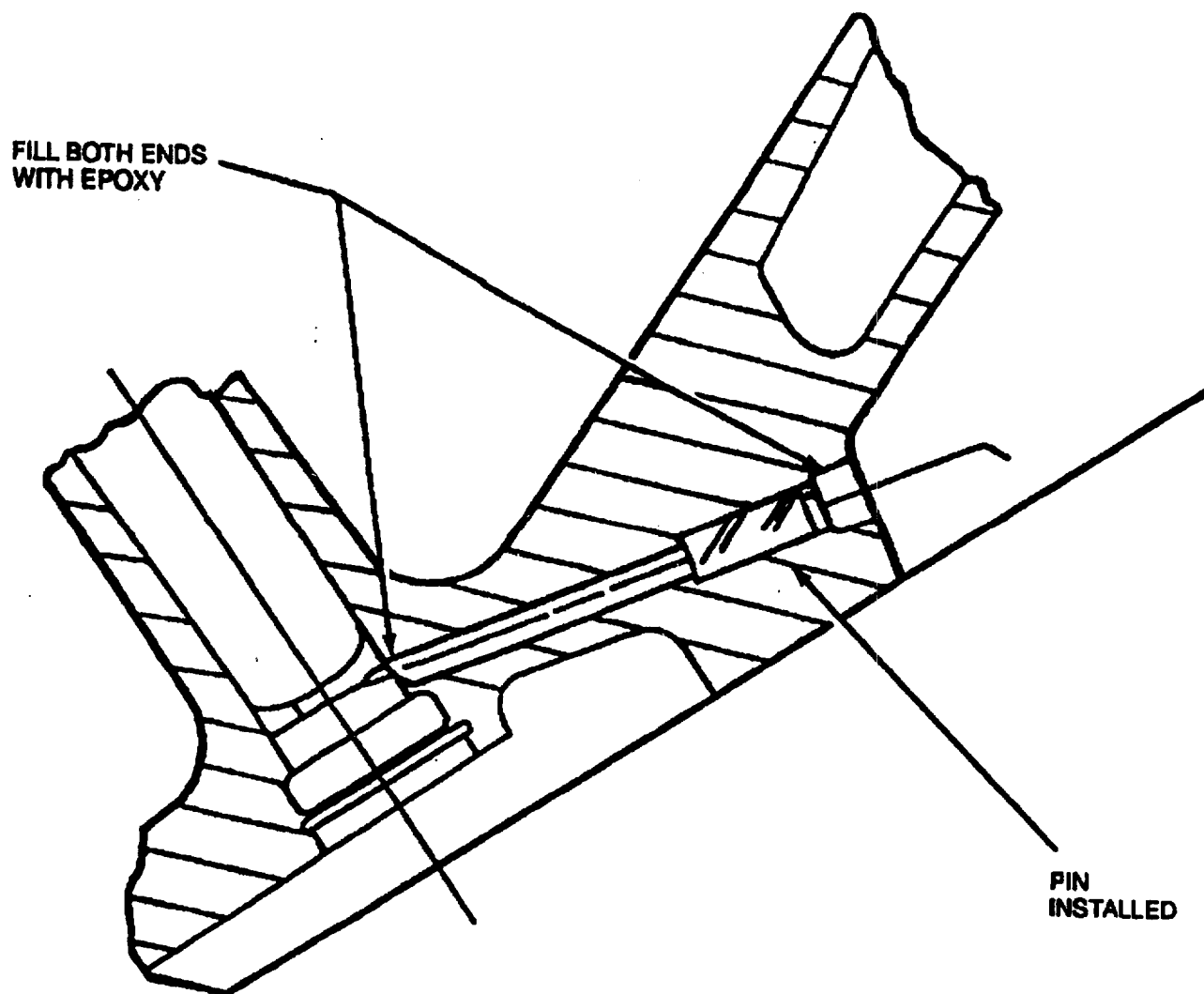
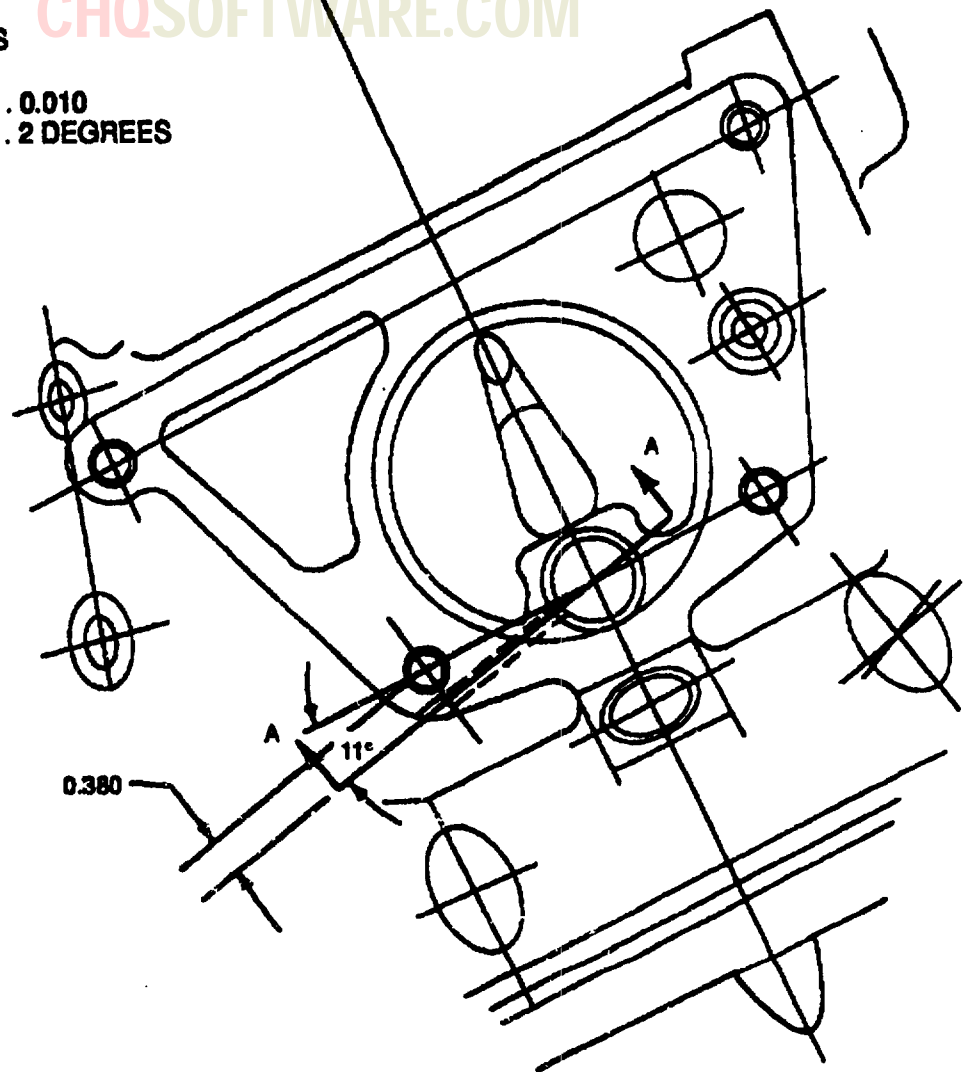


Figure 5-647. Air Bleed Vent Hole Relocation Pin Installation.

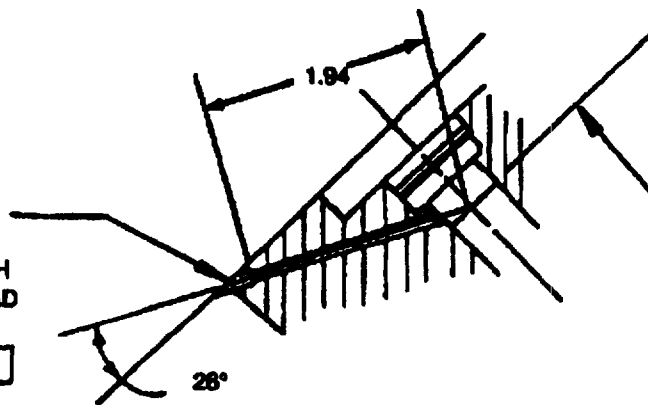
## TOLERANCES

DIMENSIONS.....0.010  
 ANGLES.....2 DEGREES



0.124-0.129 DIA  
 DEPTH THRU  
 CBORE 0.25 WITH  
 0.03 CORNER RAD  
 DEPTH SHOWN

0.04 TOTAL



7.04 INCHES TO  
 CENTER LINE  
 OF ENGINE

SECTION A-A

Figure 5-648. Air Bleed Vent Hole Relocation Machining Dimensions.

**5-473. REASSEMBLY.** Proceed as follows:

- a. Position packing (30, figure 5-630) on plug (29), and install plug into inlet housing assembly. Tighten plug as required.
- b. Install metering plug (31) with loctite pipe sealant HVV (8 Item 265, table C-1) or equivalent into inlet housing assembly.

**NOTE**

The oil supply power takeoff nozzle assembly (12) is required for turbo-prop engines (T53-L-701/701A). Do not install nozzle assembly in T53-L-13B/703 engines.

- c. Using holding fixture (LTCT413), install disk (15) and setscrew (16) into oil supply filter (14). Tighten screw to 30 to 50 pound-inches (2109 to 3615 gm sq cm) torque.

**CAUTION**

In following step d, do not slide allen wrench into setscrew on filter when tightening setscrew (17).

- d. Install setscrew (17) into filter and tighten to 30 to 50 pound-inches (2109 to 3515 gm sq cm) torque.
- e. Flow-test power takeoff oil supply nozzle assembly as follows:
  - (1) Using test fixture (LTCT216), flow-check power takeoff oil supply nozzle assembly from slotted end. Attach oil pressure line from oil flow check stand (LTCT313), or equivalent, to adapter assembly.
  - (2) Turn oil pressure valve knob until SUPPLY PRESSURE gage indicates 28 to 32 psi (1969 to 2250 gm sq cm) at temperature range of 95° to 100°F (35° to 38°C).
  - (3) Place graduated beaker under power takeoff oil supply nozzle assembly and obtain quantity of oil for 1 minute. This quantity shall be 480 to 530 cc, if lubricating oil (item 189, table C-1) is used, or 456 to 503 cc, if lubricating oil (item 190, table C-1) is used.
  - (4) If desired quantity cannot be obtained, disassemble oil supply nozzle and replace disk (15).

**NOTE**

Step f below applies to T53-L-15, -701 engines only.

- f. Place packing (13) on outside of oil supply filter (14) and insert oil supply power takeoff nozzle assembly (12) into inlet housing, and secure with retaining ring (18).
- g. Place packings (4 and 5) in starter pad and secure cover (3) of inlet housing with bolts (1) and washers (2). Tighten bolt, as required, and lockwire.
- h. If removed, install plug (36) as follows:
  - (1) Degrease plug and inlet housing port with acetone (item 13, table C-1).
  - (2) Install packing (37) on plug (36).
  - (3) Apply epoxy compound (item 149, table C-1) to mounting surface face and end surface face of plug (36).
  - (4) Install plug (36) into inlet housing with washers (35) and bolts (34).
  - (5) Tighten bolts (34) as required and lockwire.
  - (6) Remove excess epoxy compound.
- i. Install packing (32) on plug (33) and install plug into air transfer plug assembly. Tighten plug, as required.

**NOTE**

Following steps j through l apply to T53-L-13B, -15, -703 engines only.

- j. Install packing (38). Place torquemeter cylinder (27) within inlet housing, and align holes for torquemeter valve and shim assembly (20). Secure cylinder to inlet housing with bolts (19). Tighten bolts, as required, and lockwire.

**NOTE**

Do not use lubricants on bolts.

k. Install plunger (25), spring (24), and disk (23) into body (26). Secure with retaining ring (22).

l. Pressure-test torquemeter valve assembly as follows:

(1) Using a suitable fixture, connect a pressure line from standard flow-test fixture to torquemeter valve assembly.

(2) Using lubricating oil (189, table C-1) heated to 75° to 150°F (24° to 66°C), pressure-test at a pressure of 40 psig (2812 gm sq cm). Hold for 1 minute. Maximum allowable leakage rate is 8 cubic centimeters per minute.

(3) Depress plunger momentarily, and observe capability to reseal itself.

(4) Reject units that do not meet test requirements.

m. Install torquemeter valve and shim assembly (20) into inlet housing, and torque to 150 to 200 pound-inches (2679 to 3568 gm cm).

n. Establish torquemeter valve clearance as follows:

(1) Using depth micrometer, measure distance between inlet housing flange face and torquemeter cylinder inner lip. Record dimension (See B, figure 5-649).

(2) Using depth micrometer, measure distance between inlet housing flange face and tip of plunger. Record dimension (See A, figure 5-649).

(3) Subtract dimension obtained in preceding step (2) from that obtained in preceding step (1) (See C, figure 5-649).

(4) Subtract results of preceding step (3) from 0.034 inch (0.086 cm). Select shim (21, figure 5-630) equal in thickness to resultant dimension.

(5) Using valve remover and installer (LTCT519), or 6-point socket wrench, remove torquemeter valve assembly. Install shim (21) and replace torquemeter valve assembly. Tighten torquemeter valve assembly to 150 to 200 pound-inches (2679 to 3568 gm cm) torque.

(6) Repeat preceding steps (1) through (4). Dimension must be within 0.030 to 0.034 inch (0.076 to 0.086 cm) for the T53-L-13B and T53-L-703 engines or 0.026 to 0.030 inch (0.066 to 0.076 cm) for the T53-L-15 engines. Lockwire valve.

**5-474. FUNCTIONAL TEST.** (See figure 5-630). Proceed as follows:

a. Using standard flow test stand with fixture (LTCT4875 or LTCT524), pressure-test all oil passages with 45 psig (3164 gm sq cm) pressure.

b. On T53-L-13B, -15 and -703 engines, pressure-test torquemeter oil passages with 45 psig (3164 gm sq cm) pressure.

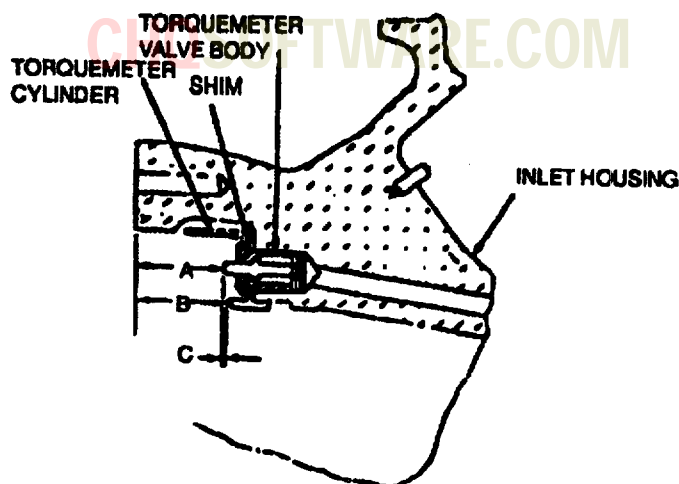
c. Test inlet housing for leaks as follows:

(1) Insert plug (LTCT4085, detail of LTCT4084) in mounting pad bleed hole.

(2) Attach test plug (LTCT4088, detail of LTCT4084) to ring assembly (LTCT4599, detail of LTCT4084) using spacer (LTCT4086, detail of LTCT4084) and bar (LTCT4087, detail of LTCT4084). Adjust air supply to deliver 20 psig (1406 gm sq cm) pressure.

(3) Connect air hose to transfer tube port. Grasp plug and apply air pressure. Inspect core plugs for leaks. If leaks are detected, repair as outlined in paragraph 5-472.

(4) Turn air pressure off and remove hose from transfer tube port.



**Figure 5-649. Setting Torquemeter Valve Clearance.**

- (5) Install air transfer tube (11, figure 5-630), retaining ring (10), mounting pad lock (9), packing (8), engine mounting pad plug (7), and bolts (6). Tighten bolts to 25 to 35 pound-inches (3465 to 6251 gm cm) torque, and lockwire.
- (6) Remove anti-icing plug. Insert rubber plug in anti-icing plug port.
- (7) Position ring assembly (LTCT4599), with two packings, in inlet housing, and secure with bolt and washer.
- (8) Position dummy gasket and cover in tachometer drive mount pad. Secure cover to housing with six bolts. Tighten bolts.
- (9) Install cover (LTCT4089, detail of LTCT4084) and gasket (LTCT4090, detail of LTCT4084) on fuel control sensing bulb mount pad and secure with two setscrews, AN565A524H6.
- (10) Position cover (LTCT4091, detail of LTCT4084) on power takeoff port in inlet housing and secure with four bolts, AN104011.

#### NOTE

During overhaul the pressure test for air chambers in subject housings shall be made with air at 45 psig.

- (11) Connect air hose to standard fitting on power takeoff plate. Apply 45 psig (3164 gm cm) pressure and check for leaks at five core plugs located in inlet housing front flange.
- (12) With inlet housing still under pressure, submerge entire assembly in water and check for leaks.
- (13) Remove inlet housing assembly from water and repair any leaks. Submerge inlet housing to check repairs. Remove from water.
- (14) Turn air pressure off and remove test equipment, plugs, and fittings.
- (15) Completely dry housing with compressed air.
- (16) Remove all test components from inlet housing.
- (17) Install all plugs and fittings removed for pressure test.

#### 5-475. VARIABLE AIR INLET GUIDE VANE ASSEMBLY.

#### 5-476. DISASSEMBLY. Refer to figure 5-650 and proceed as follows:

- a. Clean assembled variable air inlet guide vane as follows:
  - (1) Clean assembly by 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.



(2) Prepare cleaning solution 8 oz of TURCO compound, (Item 337, table C-1 or equivalent with 1 gallon of water) and heat to a temperature of 160° to 170°F. Maintain this temperature range.

**CAUTION**

Do not exceed 30 minutes. Beyond this medium time limit, Titanium alloy parts will be attacked by this cleaning solution.

- (3) Immerse assembly in above cleaning solution for a period of 15 to 30 minutes.
- (4) Remove assembly from cleaning solution and pressure rinse in clear water.
- (5) Dry parts with clean, dry compressed air, then coat assembly with lubricating oil (item 192, table C-1).

**CAUTION**

In following step b, to prevent contamination of rotating components, clean fluorescent-penetrant should be used.

**NOTE**

The following procedures outlined in steps b. through e. reduce the requirement for disassembly of the variable inlet guide vane assembly for inspection purposes.

b. Inspect vane assembly using visual, fluorescent-penetrant (optional), and standard inspection equipment methods.

- (1) Prior to disassembly, inspect all accessible areas in accordance with table 5-193.

**NOTE**

The following wear check shall also be performed whenever vanes are removed for rework or replacement.

(2) Check for excessive play in inner and outer fairing holes and unison ring pin holes by moving individual vanes. In event excessive play is noted, disassemble vane assembly in accordance with step e, and measure the 0.2500 to 0.2506 inch (0.6350 to 0.6365 cm) diameter holes for wear. A maximum of eight of the 0.2500 to 0.2506 (0.6350 to 0.6365 cm) diameter holes are allowed to be worn (elongated) a maximum of 0.010 inch (0.025 cm), providing the wear on the 0.005 inch (0.013 cm) wear is measured, replace inner rear and inner forward fairings. If visual inspection reveals excessive wear, replace outer fairing.

c. Repair defects in accordance with paragraph 5-478.

d. Reclean variable inlet guide vane assembly in accordance with preceding step a to remove penetrant from contact surfaces of rotating parts.

e. Disassemble variable inlet guide vane assembly as follows:

- (1) Using installation and removal tool (LTCT4698), remove and discard all spring pins (11, figure 5-650) from unison ring (2).
- (2) Withdraw unison ring (2), taking care not to damage guide vane levers.
- (3) Disassemble for further inspection or repair only those assemblies which do not pass inspection in accordance with preceding step b.
- (4) Remove screws (9) and lift off inner forward fairing (13).

CHQSOFTWARE.COM

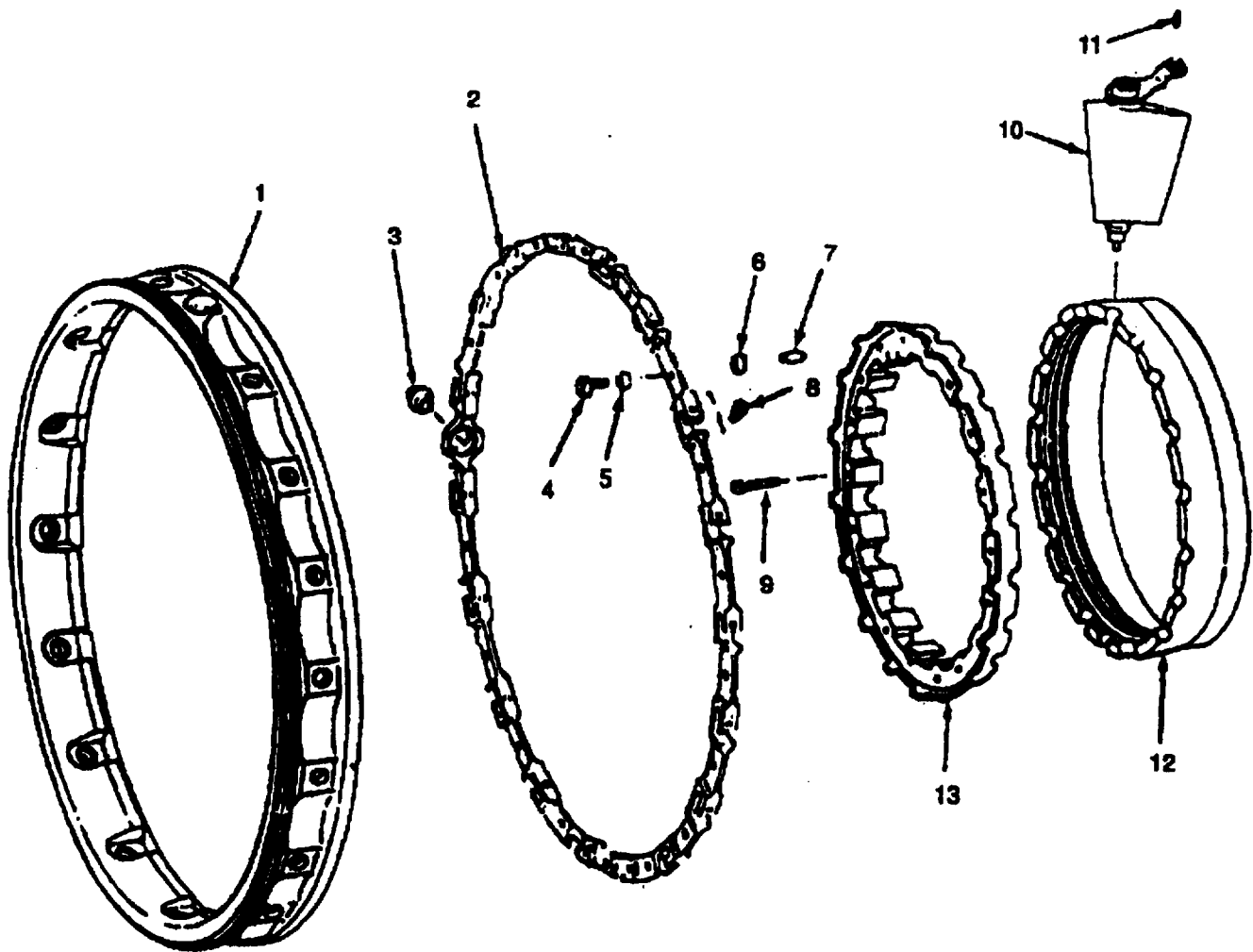


Figure 5-650. Variable Inlet Guide Vane Assembly.

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code	
5-850	No Number	VARIABLE INLET GUIDE VANE ASSEMBLY AND RELATED PARTS (NHA1-000-060-03, 1-000-100-01, 1-000-110-01, 1-000-060-08, and 1-000-060-10)	Ref		
	1-060-270-05	VANE ASSEMBLY, STATOR, VARIABLE INLET GUIDE	1		
	<b>WARNING</b>				
	<b>FLIGHT SAFETY PARTS</b>				
	<b>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</b>				
	1	1-060-088-03	. FAIRING, Outer Forward		1
	2	1-060-340-01	. UNISON RING, Assembly Variable inlet guide vane		1
		1-060-093-03	. UNISON RING, Variable inlet guide vane		1
	3	LHSS4R	.. BEARING, Plain, self-aligning (73134) (Lycoming Source Cont Dwg 1-300-116-01)		1
		CB10-4	.. BEARING, Plain, self-aligning (78118) (Alternate) (Lycoming Source Cont Dwg 1-300-116-02)		1
	4	1-060-095-01	.. SCREW, Shoulder		17
	5	1-060-096-02	.. ROLLER, Unison ring		17
	6	1-060-097-01	.. NUT, Plain, round		17
		1-060-250-03	. FAIRING ASSEMBLY, Inner (Includes items -7, 9, 12, & 13)		1
	7	1-060-099-02	.. PIN, Straight, headless dowel		3
	8	1-060-142-01	.. BOLT, Machine		
	9	AN500AD5-8	.. SCREW, Machine		15
	10	1-060-260-07	. VANE, Variable inlet guide		18
	11	STD3059-062	.. PIN, Spring		18
12	1-060-092-03	.. FAIRING, Inner rear	1		
13	1-060-091-04	.. FAIRING, Inner forward	1		

**Table 5-193. Inspection of Variable Inlet Guide Vane Assembly**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-54				
5	Guides	Visual	Galling and scoring in internal guide passage	Not allowed. Replace.
6	Connector	Visual	Bent shaft Stripped threads Damaged threads	Not allowed. Replace Not allowed. Replace Repair. (Refer to SP No. 5007 in Appendix E)
		Visual and Fluorescent Penetrant	Cracks in connector and brazed joint.	Not allowed. Replace.
		Dimensional	Wear. (Refer to table 5-194). Inspect connector for reference lines enclosing former shot blast area. (Refer to figure 5-651).	Replace if limits are not met. Add reference lines if not on connector. (Refer to paragraph 5-478).
7	Air Inlet Assembly Vane	Dimensional	Wear. (Refer to table 5-194).	Replace if limits are not met.
8	Rear Fairing-Ring	Dimensional	Wear. (Refer to table 5-194). Cracks Loose, missing, or damaged alignment pin.	Replace if limits are not met. Not allowed. Replace. Repair. (Refer to paragraph 5-478).
<b>WARNING</b>				
<b>FLIGHT SAFETY PARTS</b>				
<b>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</b>				
5-650		Visual and SIE	Nicks, dents, burrs and rub wear.	Repair. (Refer to paragraph 5-478).
1	Outer Forward Fairing	Visual and SIE	Damaged 0.3750 to 0.3756 inch (0.9525 to 0.9540 cm) diameter holes.  0.3750 to 0.3756 inch (0.9525 to 0.9540 cm) diameter holes exceeding maximum allowable diameter of 0.3806 inch (0.9667 cm).  Nicks, dents, or burrs	Repair. (Refer to paragraph 5-478).  Repair. (Refer to paragraph 5-478).  Repair. (Refer to paragraph 5-478).

Table 5-193. Inspection of Variable Inlet Guide Vane Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-650 (Cont) 1 (Cont)		Visual and Fluorescent-Penetrant.	Cracks	Not allowed. Replace.
<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</p>				
2	Unison Ring	Visual Visual and Fluorescent-Penetrant. SIE	Bent or distorted ring. Cracks  Wear of unison ring pin holes, using a 0.096 inch (0.244 cm) pin gage on both sides of hole.	Not allowed. Replace Not allowed. Replace  Reject unison ring if pin gage passes through either side of hole under light pressure.
3	Bearing	Visual	Wear or damage. Improperly staked bearing.	Not allowed. Replace. Repair. (Refer to paragraph 5-478).
4	Screw	Visual and Fluorescent-Penetrant.	Cracks	Not allowed. Replace.
5	Unison Ring Roller	Visual	Wear and damage.  Improperly staked unison.	Not allowed. Replace  Refer to paragraph 5-478.
6	Nut	Visual and Fluorescent-Penetrant	Cracks	Not allowed. Replace.
<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p>Fluorescent penetrant inspection of the following part (to ensure that cracks are within limits) is flight safety critical.</p>				
10	Vane	Visual	Bulging of concave side of airfoil.	Not allowed. Replace

Table 5-193. Inspection of Variable Inlet Guide Vane Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-650 (Cont) 10 (Cont)	Vane (Cont)	Visual and SIE	Nicks, dents, and tears, or foreign object damage (FOD) on leading and trailing edges or airfoil surfaces. (Refer to table 5-195).  Worn or damaged lever bearing.	Repair or replace if limits cannot be met. (Refer to paragraph 5-478).  Not allowed. Replace
		Visual and SIE	Bending or distortion of leading and trailing edges and corners of vane. (Refer to table 5-195).	Replace if limits are not met.
		Visual and SIE	Bent lever arms	Repair. (Refer to paragraph 5-478).
		Visual and Fluorescent-Penetrant	Cracks in lever to vane weld.	Repair. (Refer to paragraph 5-478).
			Cracks in vane.	Not allowed. Replace
			Cracks and voids in vane cap brazements. Refer to table 5-195.	Repair if limits are not met. (Refer to paragraph 5-478).
			Cracks along leading edge and trailing edge seam weld.	Repair. (Refer to paragraph 5-478).
<b>WARNING</b>				
<b>FLIGHT SAFETY PARTS</b>				
<b>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</b>				
12 and 13	Inner Rear and Forward Fairings	Visual and SIE	Worn or elongated 0.2500 to 0.2506 inch (0.6350 to 0.6365 cm) diameter holes.	Repair if limits cannot be met (Refer to table 5-195).
			Worn or elongated 0.3750 to 0.3756 inch (0.925 to 0.9540 cm) diameter holes.	Repair. (Refer to paragraph 5-478.)
			Nicks, dents, or burrs	Repair. (Refer to SP No. 5000 in Appendix E.)
		Visual and Fluorescent-Penetrant.	Cracks	Not allowed. Replace.

Table 5-194. Dimensional Inspection of Variable Inlet Guide Vane and Fairing Assemblies.

NOMEN- CLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
Connector	4-54 6	OD	0.2481 (0.6302)	0.2491 (0.6327)					5-651
Air Inlet Vane	7	*OD (FWD)	10.738 (27.275)	10.742 (27.285)	10.736 (27.269)	10.742 (27.285)			A
		*OD (AFT)	10.818 (24.478)	10.8190 (27.4803)	10.8175 (27.4765)	10.8190 (27.4803)			B
Rear Fairing Ring	8	*OD (AFT)	10.873 (27.617)	10.874 (27.620)	10.872 (27.615)	10.874 (27.620)			C
									D

\* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.

**Table 5-195. Variable Inlet Guide Vane Assembly - Inspection Limits.**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Nicks, Dents, Tears, and Other Foreign Objects Damage on Leading Edges or Airfoil - Surface Vanes	5-652	<p>a. Isolated nicks, burrs, and dents on leading and trailing edges of vanes are acceptable up to 0.0625 inch (0.1588 cm) in depth, provided skin is not penetrated. Blend- repair as outlined in paragraph 5-478. Blend-repair only nicks and dents with projections affecting flow path.</p> <p>b. Isolated nicks and dents on airfoil surfaces are acceptable as follows:</p> <p>(1) Nicks and dents up to 0.125 inch (0.318 cm) in diameter, not exceeding 0.010 inch (0.025 cm) in depth without skin penetration, may be blend-repaired as outlined in paragraph 5-478. Blend-repair only nicks with projections affecting flow path</p> <p>(2) Nicks and dents up to 0.125 inch (0.318 cm) in diameter, not exceeding 0.025 inch (0.064 cm) depth without skin penetration, may be braze repaired as outlined in paragraph 5-478.</p> <p>(3) One nick or dent per vane up to 0.250 inch diameter, not exceeding 0.040 inch depth, without skin penetration and no protrusion on the opposite side may be braze-repaired as outlined in paragraph 5-478.</p> <p>c. Tears in leading and trailing edges with resultant loss of material are not acceptable. Replace vane.</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Acceptable defects shall be limited to the maximums:</p> <p>Leading edge - three</p> <p>Trailing edge - three</p> <p>Airfoil - five</p> <p>Replace vanes if limits are exceeded</p> <p>Bending and distortion in vanes less than 0.125 inch (0.318 cm) may be cold-straightened as outlined in paragraph 5-478. Replace vanes that exceed limits</p>
Bending and Distortion on Vane Leading and Trailing Edge and Corners		

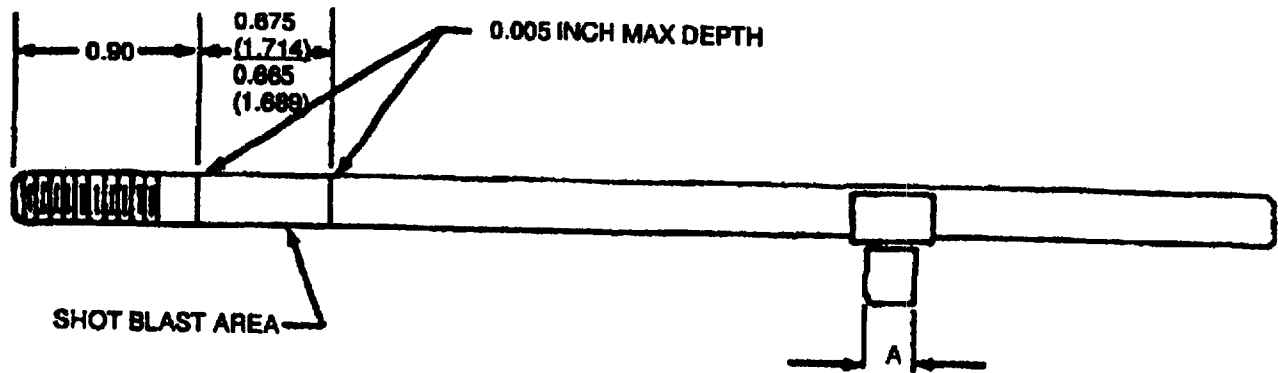


**Table 5-195. Variable Inlet Guide Vane Assembly - Inspection Limits (Continued).**

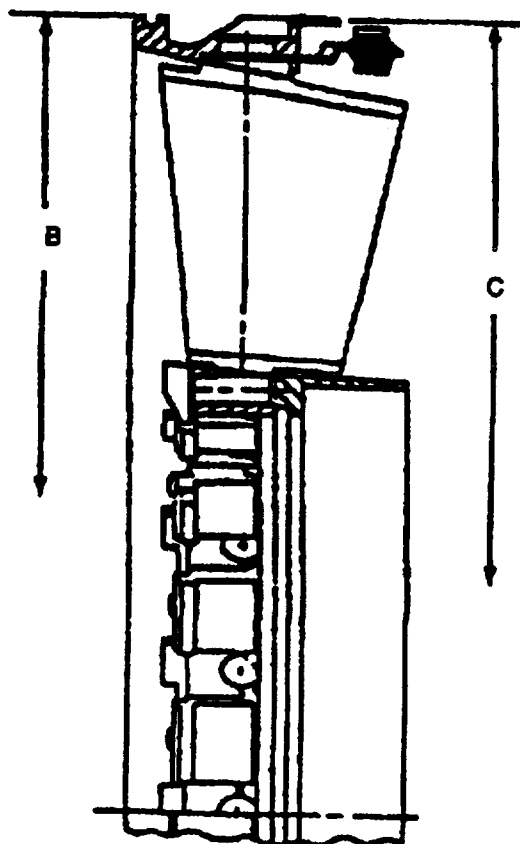
DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Missing Material in Trailing Edge Corners of Vanes	5-652	Vaness with missing material in trailing edge corner, not exceeding a maximum of 0.0625 inch (0.1588 cm) and 0.1875 inch (0.4763 cm) in depth (see figure 5-652) without skin penetration, may be braze-repaired as out lined in paragraph 5-478.
Vane Cap Brazement Cracks and Voids	5-652	Inspect the areas where the end caps join the airfoil halves for cracks, voids, and crack-like indication. These conditions are not acceptable. Repair as outlined in paragraph 5-478.
Inner Fairing Worn or Elongated Holes	5-655	If more than eight of the holes are worn more than 0.010 inches, repair as outlined in paragraph 5-478.

CHQSOFTWARE.COM

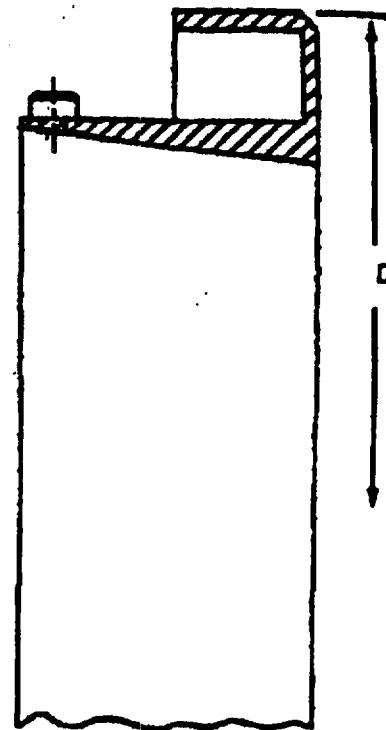
DIMENSIONS IN ( ) ARE CENTIMETERS



CONNECTOR (6, FIGURE 4-54)



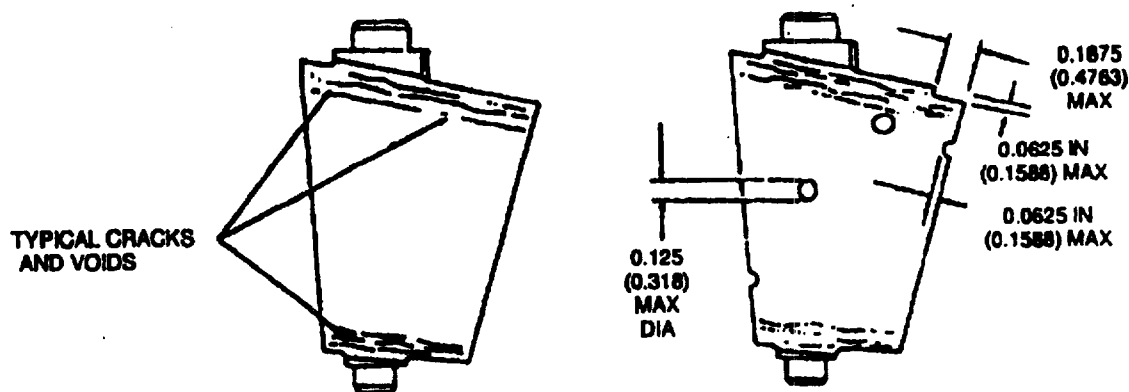
AIR INLET VANE ASSEMBLY (7, FIGURE 4-54)



REAR FAIRING RING (8, FIGURE 4-54)

Figure 5-651. Variable Inlet Guide Vane Assembly Dimensional Inspection Locations.

DIMENSIONS IN ( ) ARE CENTIMETERS



VANE CAP BRAZEMENT CRACKS AND VOIDS TYPICAL ALLOWABLE NICKS AND DENTS

**Figure 5-652. Air Inlet Vane Repair Limits.**

(5) Turn fairing assembly over and remove inner rear fairing (12) and vanes (10).

(6) Remove unison ring rollers (5), if damaged or to facilitate cleaning, by removing screws (4) and nuts (6).

**5-477. INSPECTION.** Inspect as per table 5-193.

**5-478. REPAIR.** Proceed as follows:

- a. Repair dents, nicks, pits, rub wear and other foreign object damage as follows:

**CAUTION**

To prevent damage to parts, do not use power tools to blend-repair.

- (1) Blend-repair, using India or carborundum stones, only to extent of removing projections affecting flow path.
- (2) Blend all repairs and finish smoothly. Use crocus cloth (item 125, table C-1) for final polishing.
- (3) Finish strokes of repair work shall be parallel to longitudinal axis of vane. Finish strokes on fairings shall be parallel to flow of air.

**NOTE**

If vane has been damaged to the extent of vane core penetration or if vanes are cracked in parent metal, replace vane.

- b. Repair improperly staked unison ring bearing (3, figure 5-650) as shown in figure 5-653.
- c. Replace worn or damaged unison ring rollers (5, figure 5-650). Tighten nuts to 10 to 15 pound-inches (1786 to 2679 gm sq cm) torque and stake as shown in figure 5-654.
- d. Using suitable tool, straighten bent lever arms of vanes (10, figure 5-650.)
- e. Repair cracks in lever-to-vane weld, cracks and voids in vane cap brazements and cracks along leading and trailing edge of seam welds as follows:
  - (1) Clean part as required per SP No. 3002 in Appendix E.
  - (2) Vapor-blast area to be repaired. (Refer to SP No. 3003 in Appendix E.)
  - (3) Using brazing alloy (item 58, table C-1), flux (item 158, table C-1), and braze torch tip, type 0 to 00, silver-braze damaged area as outlined in SP No. 5003 in Appendix E.
  - (4) Smooth braze repair to contour of vane.

(5) Using fluorescent-penetrant method, inspect vane. Cracks are not permitted.

f. Repair worn or elongated holes 0.2500 to 0.2506 inch (0.635 to 0.6365 cm) diameter on inner rear and forward fairings (12 and 13) as follows:

(1) Clean surfaces to be metal sprayed with acetone (item 13, table C-1), isopropyl alcohol (item 25, table C-1) or denatured alcohol (item 24, table C-1).

#### NOTE

The holes drilled in the following step must be drilled on original center lines. (See figure 5-655.)

(2) Using a jig grinder or other suitable equipment, drill worn or elongated holes 0.2500 to 0.2506 inch (0.6350 to 0.6365 cm) diameter to 0.2640 to 0.2660 inch (0.6706 to 0.6756 cm) diameter. Deburr holes, as necessary.

(3) Separate housing halves and plug counterbores.

(4) Using Metco (item 215, table C-1), plasma flame-spray over-sized holes as outlined in SP No. 5006 in Appendix E, to the following criteria:

(a) Spray each half separately.

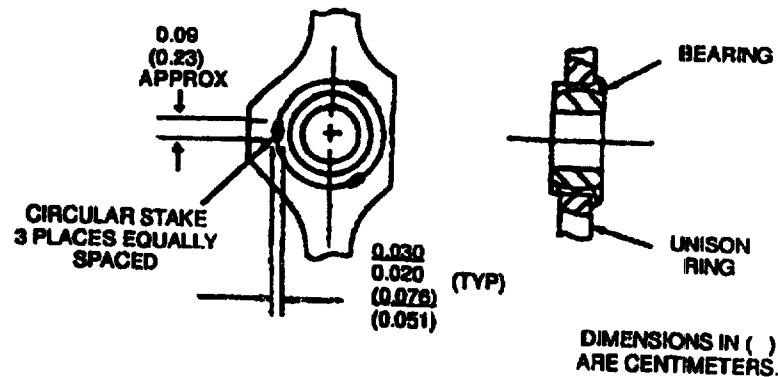


Figure 5-653. Stacking of Unison Ring Bearing.

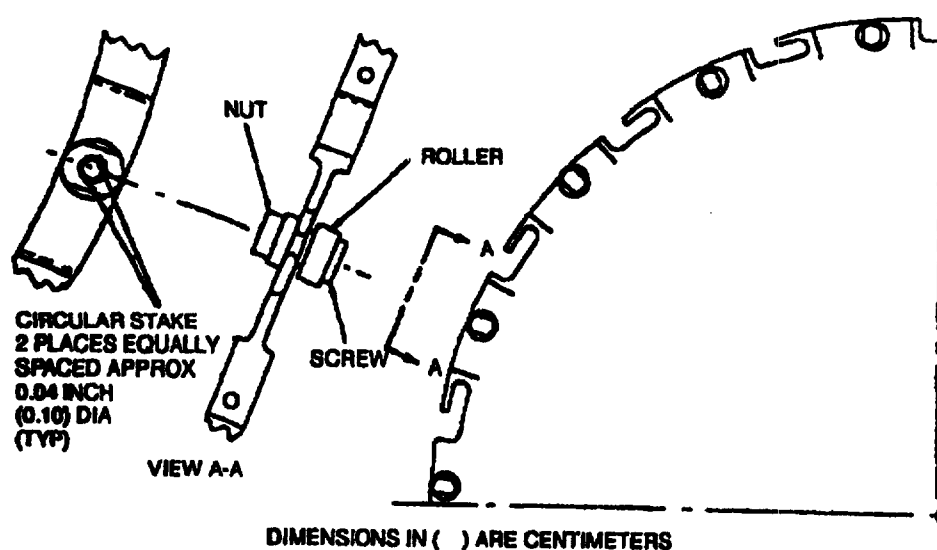


Figure 5-654. Stacking of Unison Ring Rollers.

(b) Build up the minimum amount necessary to restore holes to 0.2500 to 0.2506 inch (0.6350 to 0.6365 cm) diameter.

(c) Elongated areas over 0.2650 inch (0.6731 cm) shall be filled in during this operation

(5) Reassemble fairing halves and, using carbide-tipped drill, drill holes through. Machine holes as shown in figures 5-655 and 5-656.

(6) Dimensionally inspect variable air inlet guide vane as outlined in table 5-194.

g. Cold-straighten bent or distorted vanes (10, figure 5-650) as follows:

(1) Place vane between two wooden forming blocks, contoured to vane airfoil, and apply pressure, using a C-clamp or vise.

(2) Using fluorescent-penetrant method, inspect straightened vanes for cracks. Cracks are not permitted.

h. Repair for parts damaged in excess of work requirement limits.

(1) Cold Working.

(a) Vanes having dents in excess of previous limits but not exceeding 1.0 longest dimension and 3/16 inch depth may be straightened by cold working. Any number of vanes may be straightened providing the dimensional integrity of frame is maintained or can be repaired per paragraph (1)(a). Repair vanes as follows:

1 Clean assembly inside and out to eliminate any foreign particles that could damage the vanes when hammered.

2 Place concave side of vanes on contoured dolly with radius slightly smaller than vane. Dolly surface finish to be polished. Any projected areas extending out from concave side may be driven back by bumping frame downward with rubber mallet. This causes dolly to exert impact pressure on concave surface.

3 Dents on convex surface may be raised by forcing various shaped knives and blade shaped instruments of soft stainless steel into hollow vane. These tools are also to have polished surface finish to prevent marring of blade metal. Final working of vane will be to insert appropriate blade inside vane, place vane concave side on dolly, and hammering on convex side with small polished face hammer. The vane can be ironed out very effectively in this manner; this will prevent the blade inside the vane from collapsing. Templates should be made for final contour check. These can be hand ground from sheet metal using new vane assembly for standard.

4 Any areas that have punctures, leaks or suspect fatigued areas from working should be brazed per paragraph (2).

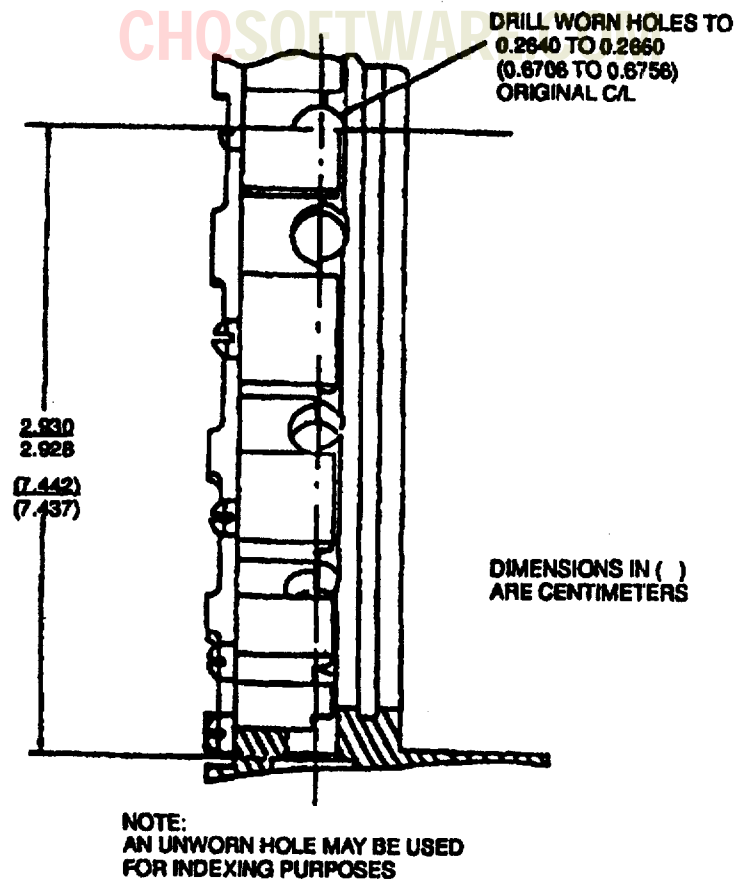
(b) Inlet guide vane assemblies having slight warpage may be cold formed as follows:

1 Place inlet guide vane in suitable fixture and tighten top plate against inlet guide vane with sufficient force to pull vane assembly flat against bottom surface.

#### NOTE

Fixture surfaces must be flat and smooth to prevent damage to inlet guide vane assembly.

2 Release fixture and check inlet guide vane for flat surface within 0.010 inch (0.025 cm).



**Figure 5-655. Repair of Inner Rear and Forward Fairings.**

3 If vane assembly is not flat within 0.010 inch (0.025 cm) reinstall in fixture per above paragraph (b)1 and tap top of fixture plate with a rubber mallet.

4 Recheck for flatness.

(2) Brazing. Dents in excess of DMWR limits but not exceeding 1/8 inch depth, 1/2 inch width, and 3/4 inch length or punctures not exceeding 1/8 inch diameter may be repaired as follows:

**NOTE**

No more than 5 repairs per side of individual vane is allowed in excess of DMWR limits.

(a) Preparation.

1 Clean surfaces to be brazed with acetone (Item 13, table C-1), isopropyl alcohol (Item 25, table C-1) or denatured alcohol (Item 24, table C-1).

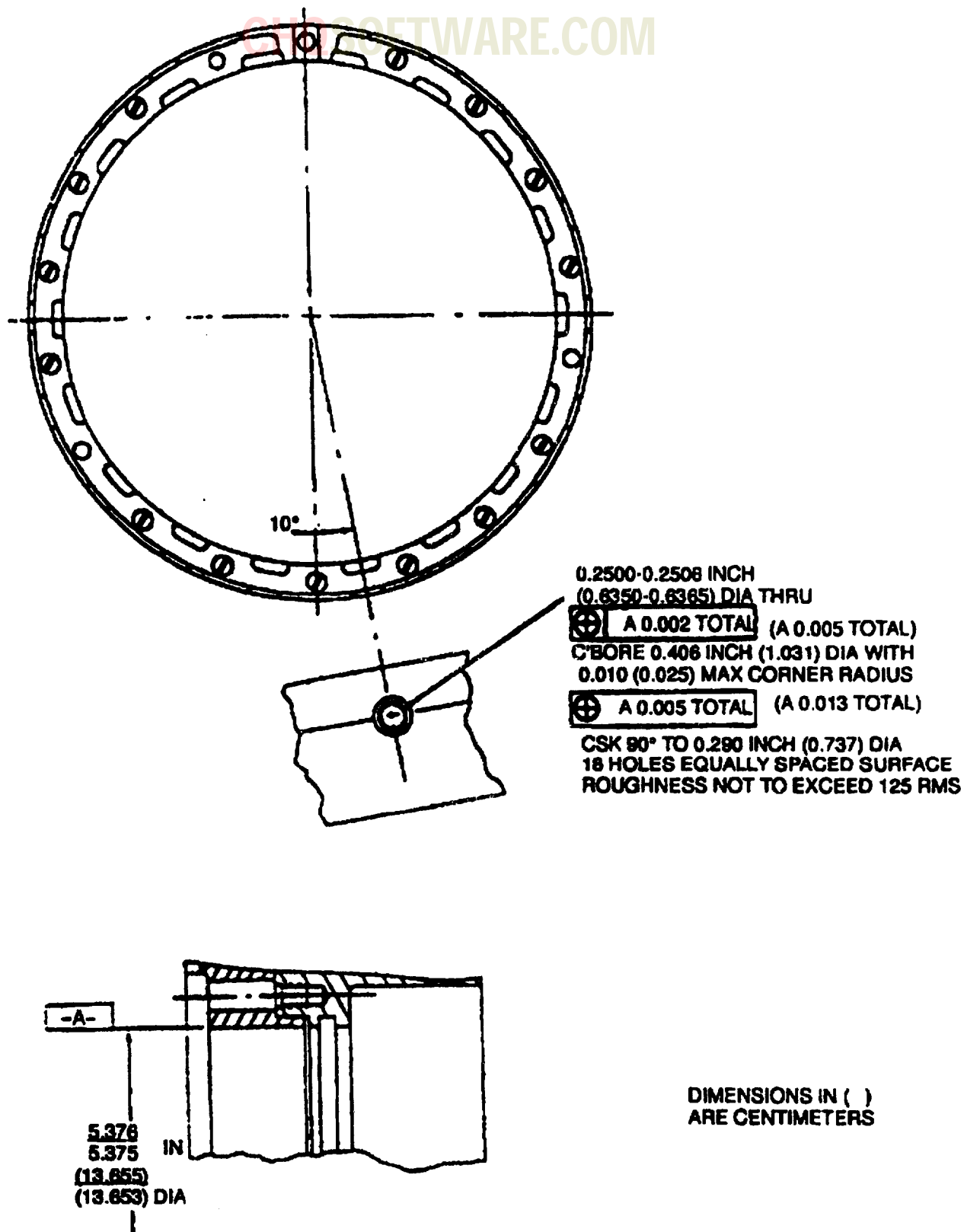


Figure 5-656. Final Drilling and Machining of Inner Rear and Forward Fairings.

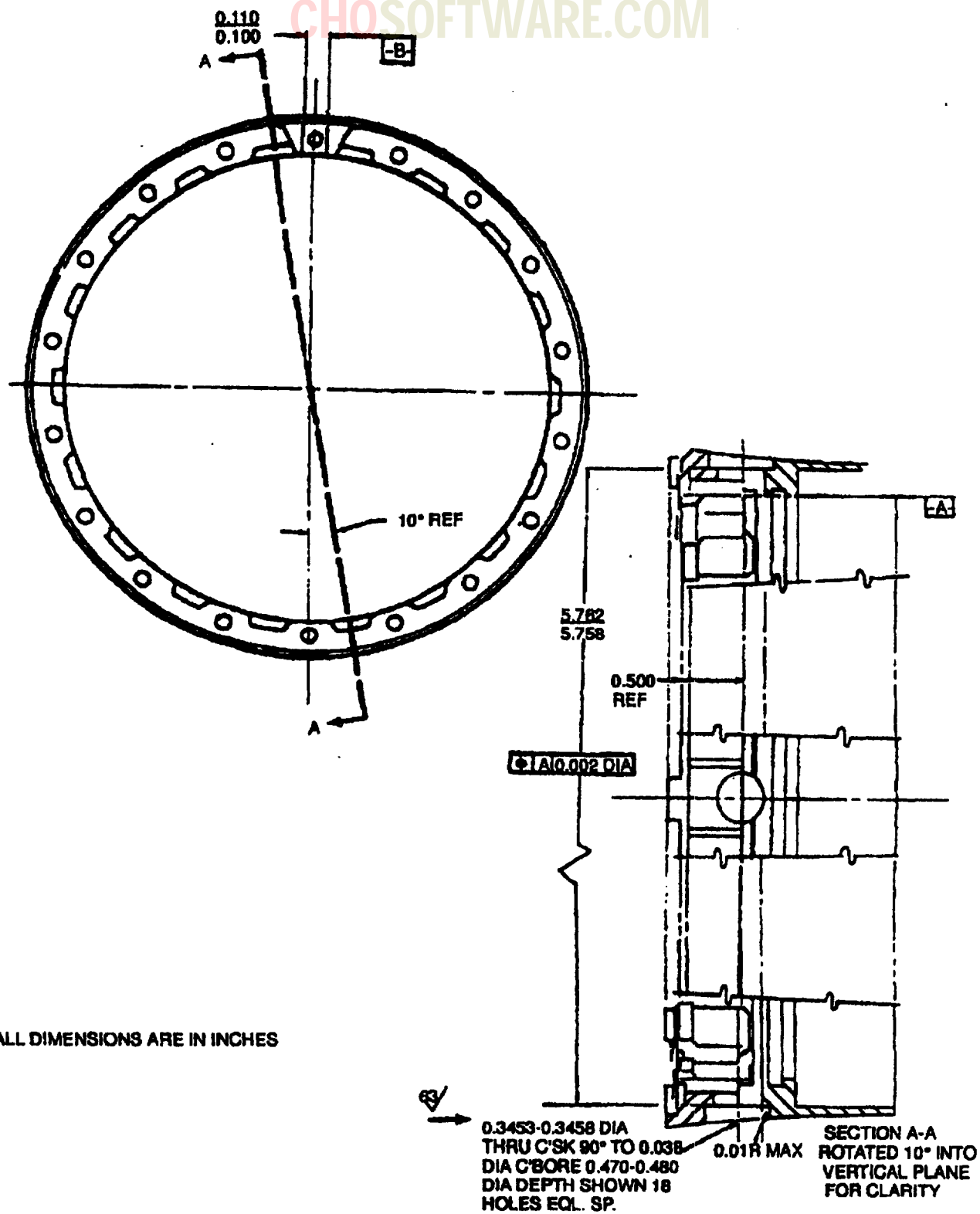


Figure 5-657. Inner Rear and Forward Fairing Bushing Repair.



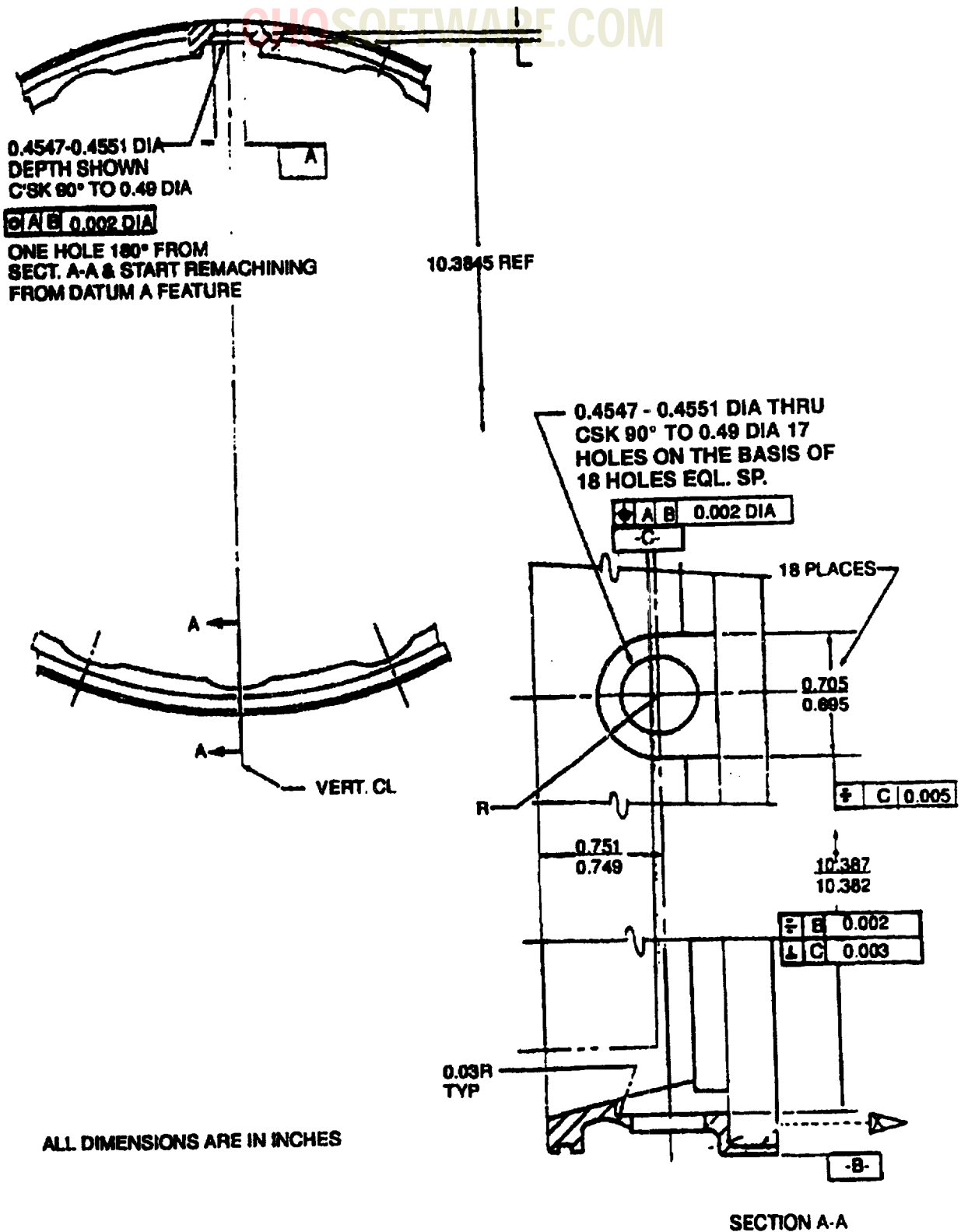


Figure 5-658. Outward Forward Fairing Bushing Repair.

- 2 Vapor blast the surface to be brazed.

**CAUTION**

Parts shall not be cleaned for brazing until such time as the brazing operation can follow immediately.

(b) Repair.

- 1 Torch braze dents per MIL-B-7883 using QQ-S-561, Class 5, or MIL-B-15395, Grade V silver braze alloy.
- 2 Rinse brazed assembly in hot water (180° to 212° F) (86.6° to 100° C) to remove all trace of brazing flux.
- 3 Dry, using air blast.
- 4 Blend brazed area to parent metal. Repaired area must be finished smooth and parent metal shall not be undercut.

**NOTE**

Dents which do not exceed the DMWR limit do not require brazing.

(3) Puller Screw Holes, Repair. If factory installed set screws are present, remove set screws and clean puller holes. Plug screw holes with silver braze per MIL-B-7883, Type I, using QQ-S-561, Class 5, brazing rod.

- I. Repair of worn or elongated holes in inner and outer forward fairing as follows:

**NOTE**

All holes must be repaired when any are worn and repaired in accordance with this procedure.

- (1) Clean VIGV fairing per paragraph 5-476.
- (2) Inspect inner and outer forward fairings per table 5-193.
- (3) With rear and forward fairing assembled on a jig borer, machine worn 0.2500-0.2506 diameter holes to 0.3453-0.3458 diameter. Refer to figure 5-657. Machine worn 0.3750-0.3756 holes to 0.4547-0.4551 diameter. Refer to figure 5-658.

**WARNING**

**FLIGHT SAFETY PARTS**

**Fluorescent penetrant inspection is flight safety critical.**

- (4) Using fluorescent-penetrant inspection method, inspect machined holes for cracks. Cracks are not permitted.
- (5) Install bushing P/N 1-060-167-02 IGV from the outboard side of inner fairing assembly. Install bushing P/N 1-060-167-01 IGV from the inboard side of the outer forward fairing.
- (6) Identify inner and outer forward fairings by vibropeen etching PRP 1200 0.001-0.006 inch deep adjacent to part and serial numbers. Assemble VIGV assembly per paragraph 5-479 and check assembly for freedom of movement at bench level.

**NOTE**

If binding is observed, isolate affected vanes, disassemble and remove noted outer forward fairing bushings. Lay affected P/N 1-060-167-01 bushings flat side down (large O/D) on a flat surface with a crocus cloth. Up to a maximum of 0.010 (0.30 minimum flange thickness) is allowed to be removed to eliminate binds.

- J. Scribe lines on connector rod (6, figure 4-54) as follows:

Table 5-177. Inspection of Accessory Drive Carrier Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-617 42 (Cont)		Fluorescent-Penetrant	Cracks	Not allowed. Replace.
		Visual and SIE	Security of liners and correct pin installation	Feel for looseness of liners and visually inspect pin. The pin should be barely visible, flush with liner. Half-moon voids less than 25% of the pin surface are acceptable. If any discrepancies are noted, replace liner. (Refer to paragraph 5-456.)
42A	Carrier (1-070-210-07)	Visual and SIE	Scoring or wear on 1.1024 to 1.1029 inches (2.8001 to 2.8014 cm) diameters of bearing liner	Repair. (Refer to paragraph 5-456.)
		Fluorescent-Penetrant	Cracks	Not allowed. Replace.
		Visual and SIE	Security of liner and correct pin installation	Feel for looseness of liner and visually inspect pin. The pin should be barely visible, flush with liner. Half-moon voids less than 25% of the pin surface are acceptable. If any discrepancies are noted, replace liner. (Refer to paragraph 5-456.)
<b>WARNING</b>				
<b>FLIGHT SAFETY PARTS</b>				
<b>Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.</b>				
46	Gear, Bevel-Driven Tachometer Drive	Visual and SIE	Wear or damage on gear teeth. (Refer to table 5-178)	Repair or replace if limits are not met. (Refer to SP No. 3009.)
		Magnetic-Particle. (Refer to table 5-180)	Cracks	None allowed. Replace.
<b>WARNING</b>				
<b>FLIGHT SAFETY PARTS</b>				
<b>Verification of the bore diameter of the following part is flight safety critical.</b>				
47	Ball Bearing	Visual and SIE	Damaged bearing	
		Dimensional	Wear. (Refer to table 5-181)	Repair or replace.

Table 5-177. Inspection of Accessory Drive Carrier Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-617 50	Shaft, Tachometer Drive Gear	Visual and SIE Visual and Dimensional Magnetic-Particle. (Refer to table 5-180)	Wear or damage on gear teeth Wear. (Refer to table 5-179) Cracks	Repair or replace. (Refer to SP No. 3009.) Repair or replace. None allowed. Replace.

Table 5-178. Accessory Drive Carrier Inspection Limits.

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Tachometer Drive Bevel-Driven Gear Wear Indications (1-070-064-04)		<p>Non-uniform scratches, slight cuts, or slight frosting on gear teeth, that cannot be felt with 0.010 inch (0.025 cm) probe, are acceptable. Excessive wear, spalling, pitting, other conditions of frosting, or cracks are not acceptable.</p> <p><b>NOTE</b></p> <p>Small groove-like defects parallel to the pitch line and running off end of tooth towards center of gear are acceptable provided they are on the unloaded face of the gear tooth.</p>
<p align="center"><b>WARNING</b></p> <p align="center"><b>FLIGHT SAFETY PARTS</b></p> <p align="center"><b>Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.</b></p>		
Tachometer Drive Spur Gear Damage (1-070-062-04/-06)	5-618	<p>a. Perform magnetic-particle inspection of uncoated areas.</p> <p>b. Inspect both forward and rear gear faces for indenting or gouging.</p> <p>(1) Any tooth face damage or severe end gear face gouging caused by forced mesh of gear is cause for rejection. (Refer to figure 5-618.)</p> <p>(2) Small indentation or dent on gear face, that cannot be felt with a 0.020 inch (0.050 cm) probe, are acceptable.</p>
Tachometer Drive Spur Gear Coating Damage (1-070-062-06)		<p>Radial cracks in coating are not allowed. Circumferential cracks and/or missing coating within 0.1 x 0.1 inch or 0.01 square-inch at O.D. or I.D. edges of the coating are acceptable. Replace spur gear if coating is blistered, chipped, cracked, or delaminated in any other areas except O.D. or I.D. edges or if damage to coating exceeds specified limits. Hand finish to blend edges of chipped or missing coating smooth to adjacent surfaces. Acceptable cracks in the coating must be hand finished to parent metal and blended to adjacent surfaces.</p>

Table 5-179. Dimensional Inspection of Accessory Drive Carrier Assembly.

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Liner	5-617 6 and 29	ID	1.8504 (4.7000)	1.8508 (4.7010)	1.8504 (4.7000)	1.8511 (4.7018)			5-619 A
		*OD	2.060 (5.232)	2.061 (5.235)	2.059 (5.230)	2.061 (5.235)			B
Gear	11 and 19	*OD	0.9844 (2.5004)	0.9848 (2.5014)	0.9842 (2.4999)	0.9848 (2.5014)			C
Gearshaft	34	*OD	0.4723 (1.1996)	0.4726 (1.2004)	0.4721 (1.1991)	0.4726 (1.2004)			D
Carrier (1-070-210-01 and 1-070-230-01)	42	*OD	8.9195 (22.6555)	8.9205 (22.6581)	8.9193 (22.6550)	8.9205 (22.6581)			E
		*ID	2.0620 (5.2375)	2.0630 (5.2400)	2.0620 (5.2375)	2.0632 (5.2405)			F
Carrier (1-070-210-07)	42A	ID	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1030 (2.8016)			G
		ID	0.9449 (2.4000)	0.9454 (2.4013)	0.9449 (2.4000)	0.9456 (2.4018)			H
		*OD	8.9195 (22.6555)	8.9205 (22.6581)	8.9193 (22.6550)	8.9205 (22.6581)			E
		*ID	2.0620 (5.2375)	2.0630 (5.2400)	2.0620 (5.2375)	2.0632 (5.2405)			F
Shaft	50	ID	1.1024 (2.8001)	1.1029 (2.8014)	1.1024 (2.8001)	1.1030 (2.8016)			G
		ID	0.9460 (2.403)	0.9470 (2.405)	0.9460 (2.403)	0.947 (2.405)			H
		*OD	0.5905 (1.4999)	0.5908 (1.5006)	0.5903 (1.4994)	0.5908 (1.5006)			I

\* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.

Table 5-180. Magnetic Particle Inspection of Rear Accessory Drive Carrier Assembly.

FIGURE AND INDEX NO.	NOMENCLATURE	METHOD OF MAGNETIZATION
5-617		
11 and 19	Gear	Circular. Use direct current at 1200 amperes. Rotate 90° for a second shot. Longitudinal at 6000 ampere turns.
34	Gearshaft	Longitudinal at 5000 ampere-turns.
39	Gear	Circular. Use central conductor at 1000 amperes. Longitudinal at 5000 ampere-turns.
46	Gear	Circular. Use central conductor 1000 amperes. Longitudinal at 5000 ampere-turns.
50	Shaft	Longitudinal at 4000 ampere-turns.

Table 5-181. Dimensional Inspection of Accessory Drive Carrier Assembly Bearings.

Table 3-101. Dimensional Inspection of Bearings, Etc.										
BEARING TYPE & PART NO.	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	ALLIED SIGNAL PART NUMBER	
			MIN	MAX						
Ball, 105KS300	5-617	8 and 20	WARNING FLIGHT SAFETY PARTS Verification of the 0.9839 - 0.9843 bore diameter is flight safety critical.							1-300-001-01
			ID	0.9839 (2.4991)	0.9843 (2.5001)	0.0003 (0.0008)	0.006** (0.015)	N/A		
			OD	1.8499 (4.6987)	1.8504 (4.7000)	0.0009** (0.0023)				
			ID	0.9839 (2.4991)	0.9843 (2.5001)	0.0002 (0.0005)	N/A		60 min	
			OD	1.8499 (4.6987)	1.8504 (4.7000)	0.0008 (0.0020)				
			ID	0.9839 (2.4991)	0.9843 (2.5001)	0.0005 (0.0013)				
			OD	1.8499 (4.6987)	1.8504 (4.7000)	0.0011* (0.0028)	N/A		58 to 62	
			ID	0.9839 (2.4991)	0.9843 (2.5001)	0.0006 to 0.001 (0.0015 to 0.0025)				
			OD	2.060 (5.2324)	2.061 (5.2349)	0.0025 to 0.0037 ** (0.0063 to 0.0094)				
			Duplex, 5205J2300	20A	8 and 20	WARNING FLIGHT SAFETY PARTS Verification of the 0.4721 - 0.4724 bore diameter is flight safety critical.				
ID	0.4721 (1.1991)	0.4724 (1.1999)				0.0003 (0.0008)	0.005** (0.013)	N/A		
OD	0.9445 (2.3990)	0.9449 (2.4000)				0.0009** (0.0023)				
ID	0.4721 (1.1991)	0.4724 (1.1999)				0.0003 (0.0008)	N/A		58 to 65	
OD	1.8499 (4.6987)	1.8504 (4.7000)				0.0009** (0.0023)				
ID	0.9839 (2.4991)	0.9843 (2.5001)				0.0005 (0.0013)				
OD	1.8499 (4.6987)	1.8504 (4.7000)				0.0011* (0.0028)	N/A		58 to 62	
ID	0.9839 (2.4991)	0.9843 (2.5001)				0.0006 to 0.001 (0.0015 to 0.0025)				
OD	2.060 (5.2324)	2.061 (5.2349)				0.0025 to 0.0037 ** (0.0063 to 0.0094)				
Ball, 1901S300	36	8 and 20				WARNING FLIGHT SAFETY PARTS Verification of the 0.4721 - 0.4724 bore diameter is flight safety critical.				
			ID	0.4721 (1.1991)	0.4724 (1.1999)	0.0003 (0.0008)	0.005** (0.013)	N/A	58 to 65	
OD	0.9445 (2.3990)	0.9449 (2.4000)	0.0009** (0.0023)							

Table 5-181. Dimensional Inspection of Accessory Drive Carrier Assembly Bearings (Continued).

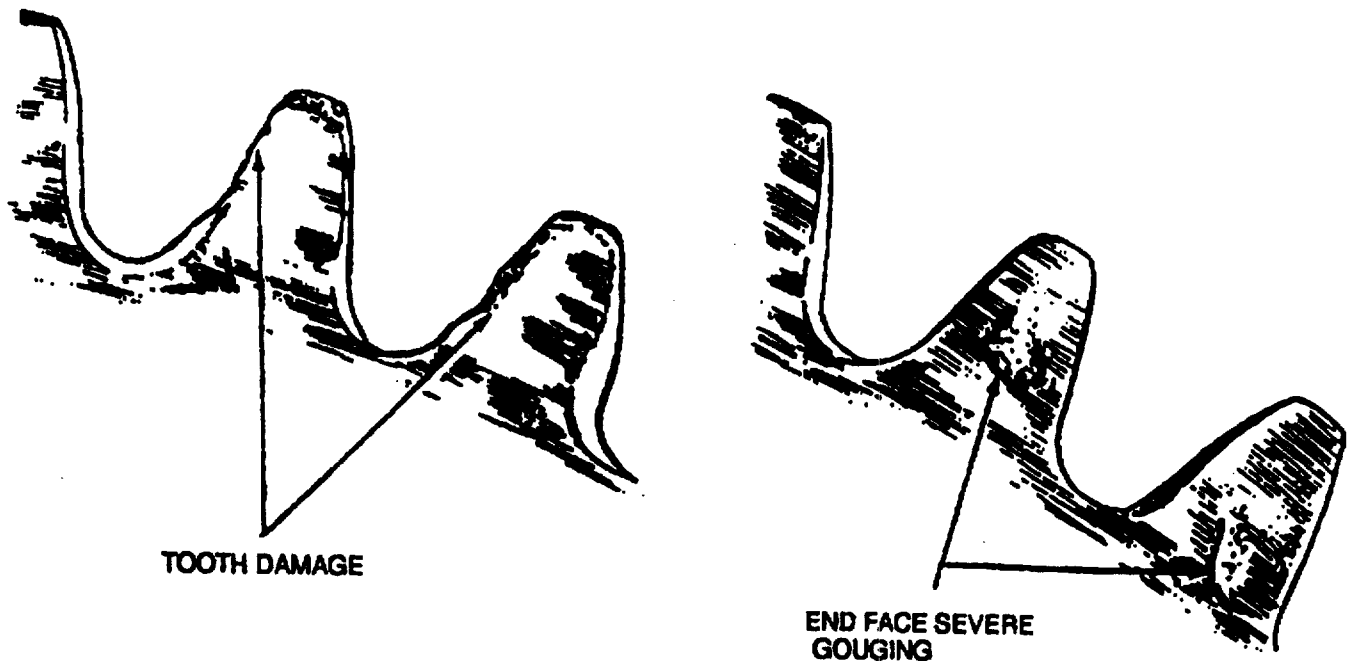
BEARING TYPE & PART NO.	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	ALLIED SIGNAL PART NUMBER
			MIN	MAX					
Ball, UMERF-1901SD 600DBAMXA3	36C	ID	0.4722 (1.1994)	0.4724 (1.1999)	0.0003 (0.0008)	0.005** (0.013)	58 to 62	N/A	1-300-672-01
		OD	0.945 (2.4003)	0.946 (2.4028)	0.0005 to 0.0011** (0.0013 to 0.0028)	0.0021** (0.0053)			
WARNING FLIGHT SAFETY PARTS Verification of the 0.5903 - 0.5906 bore diameter is flight safety critical.									
Ball, 1902S301	47	ID	0.5903 (1.4994)	0.5906 (1.5001)	0.0003 (0.0008)	0.0050** (0.0127)	58 min	N/A	1-300-003-01
		OD	1.1020 (2.7990)	1.1024 (2.8001)	0.0009** (0.0023)				
Ball, P9302KE8959		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)				
Ball, 554155A		ID	0.5904 (1.4996)	0.5906 (1.5001)	0.0005 to 0.0009 (0.0013 to 0.0023)	0.006** (0.0150)	58 to 62	N/A	2-300-941-01
		OD	1.1021 (2.7993)	1.1024 (2.8001)	0.0010** (0.0025)				

\*Under an 11.0 pound gage load.

\*\*Under a 5.5 pound gage load.



CHQSOFTWARE.COM



**Figure 5-618. Spur Gear (1-070-062-04/-06) Inspection.**

- (2) Plasma flame spray where 0.003 to 0.015 inch (0.008 to 0.038 cm) buildup is required.
  - (a) Machine ID, if necessary, to obtain a 0.003 to 0.015 inch (0.008 to 0.038 cm) buildup thickness after final machining.
  - (b) Plasma flame spray liner 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. (Refer to SP No. 6003 in Appendix E.)
- c. Repair the 2.060 to 2.061 inches (5.232 to 5.235 cm) diameter on liner (6 or 29, figure 5-617) by plasma flame spray. (See figure 5-620.)
  - (1) Machine OD, 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 using molybdenum powder (item 219, table C-1). (Refer to SP No. 5006 in Appendix E.)
  - (3) Touch up reworked area with black oxide coating. (Refer to SP No. 6003 in Appendix E.)
- d. Repair scoring on 1.8504 to 1.8508 inches (4.700 to 4.701 cm) diameter of liner (6 or 29, figure 5-617), if scoring depth exceeds 0.010 inch. Proceed as follows:

CHQSOFTWARE.COM

CHQSOFTWARE.COM

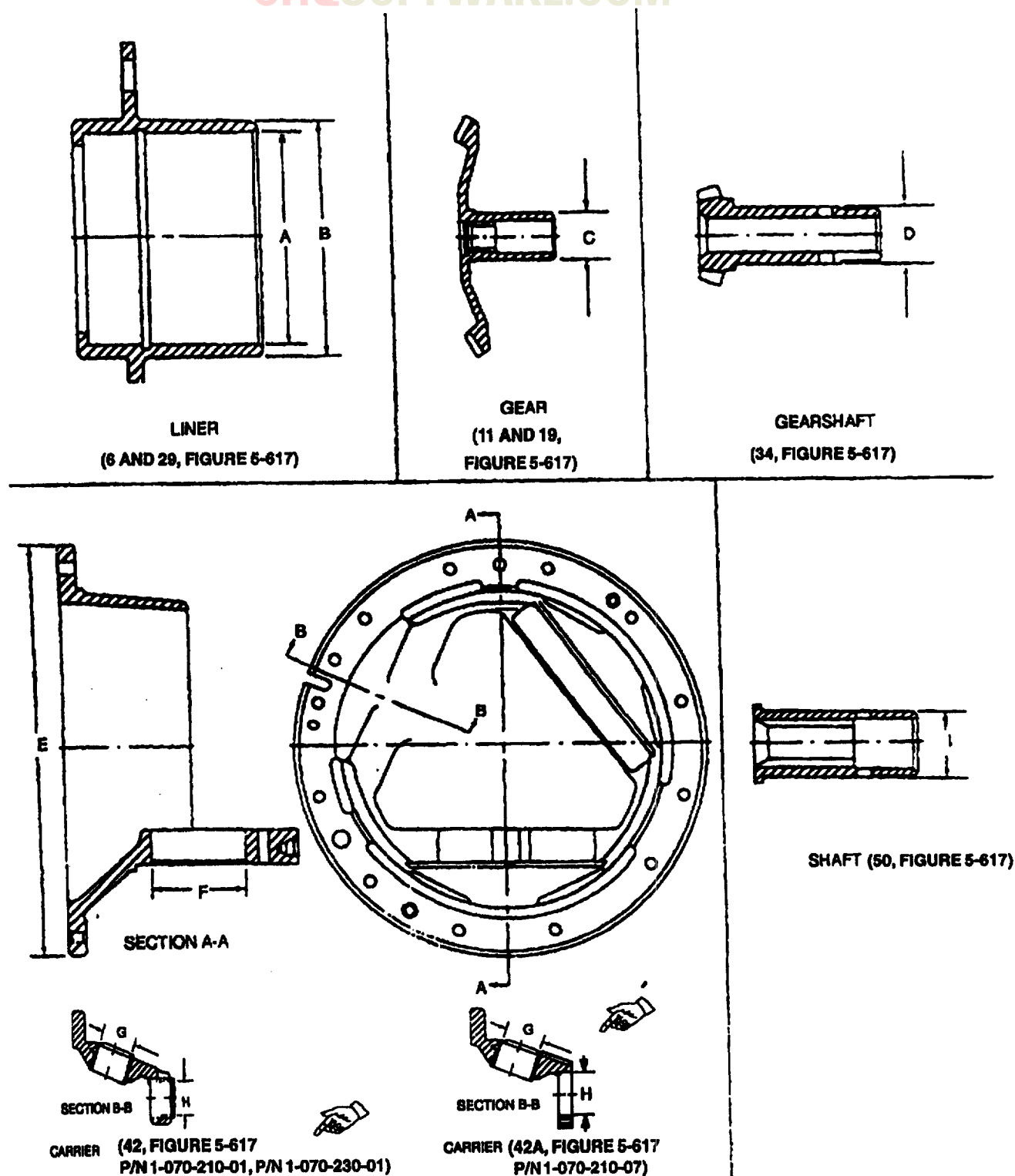


Figure 5-619. Accessory Drive Carrier Dimensional Inspection Locations.

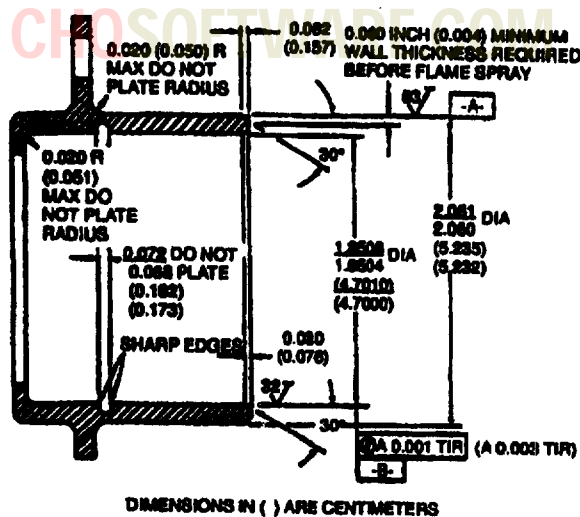


Figure 5-620. Bearing Liner - Plating Area.

- (1) Using crocus cloth (item 125, table C-1), remove sharp edges from scored areas.

**CAUTION**

Do not rework below depth of scoring.

- (2) Refinish repaired area with black oxide coating. (Refer to SP No. 6003 in Appendix E.)
- e. Repair worn surfaces on 0.4723 to 0.4726 inch (1.9996 to 1.2004 cm) diameter of gearshaft (34) where up to 0.005 inch (0.013 cm) maximum plate thickness is required. (See figure 5-621.)
  - (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 (125° to 135° C) for 5 hours.
  - (4) Machine to dimensions given.

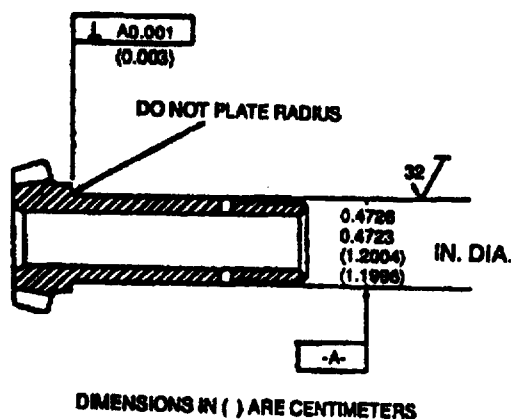


Figure 5-621. Gearshaft - Repair Area.

- f. Repair scoring or wear on the 0.9449 to 0.9454 inch (2.4000 to 2.4013 cm) and 1.1024 to 1.1029 inch (2.8001 to 2.8014 cm) diameters of accessory drive gear carrier bearing liners (1-070-056-01 and/or 1-070-058-01), by replacing liners as follows:

- (1) Mount accessory drive gear carrier in a suitable lathe.
- (2) 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 carrier.

CAUTION

**Do not nick or score carrier.**

- (3) Grind lockpin flush with bore.
- (4) Using a yellow Colorbrite marking pencil (item 239, table C-1), mark position of lockpin on face of carrier.
- (5) Dimensional inspect the OD of replacement Liner Part No. 1-070-058-01 and ID of carrier hole. Fit of liner must be 0.0010 to 0.0025 tight. Compute the average diameter of the hole to determine the size replacement liner necessary to obtain the required fit. An out-of-roundness up to 0.0025 inch is acceptable without reworking housing. Liner may be manufactured oversized in order to meet fit requirements. If an oversized liner is used, the average wall thickness must be at least 0.140 inch. (Take the average of two measurements at thinnest point, one at forward end and one at aft end.)
- (6) Place new liner into a mixture of dry ice and alcohol (item 23, table C-1) for 30 minutes.
- (7) Clean carrier bore with chromic acid (item 86, table C-1).

### NOTE

**Carrier may be heated to 300°F (150°C) for shrink fitting of liners.**

- (8) Remove liner from alcohol and dry ice mixture and quickly position liner over carrier bore. Apply loctite 620 (Item 186, table C-1) and press into bore using a suitable bushing and press. (See figure 5-622 or 5-622A.)

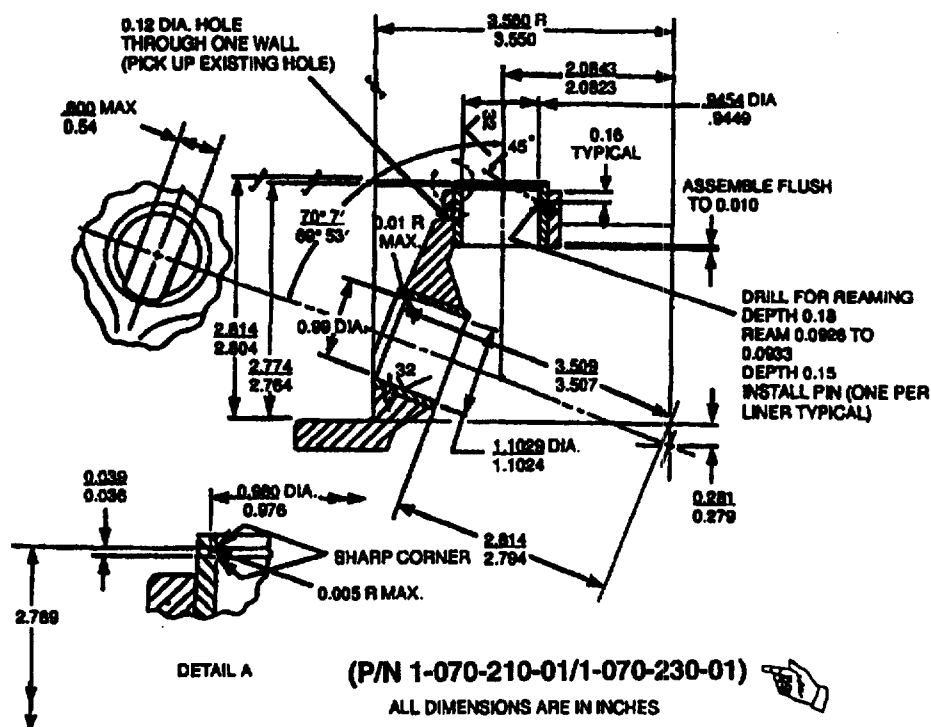
## WARNING

## FLIGHT SAFETY PARTS

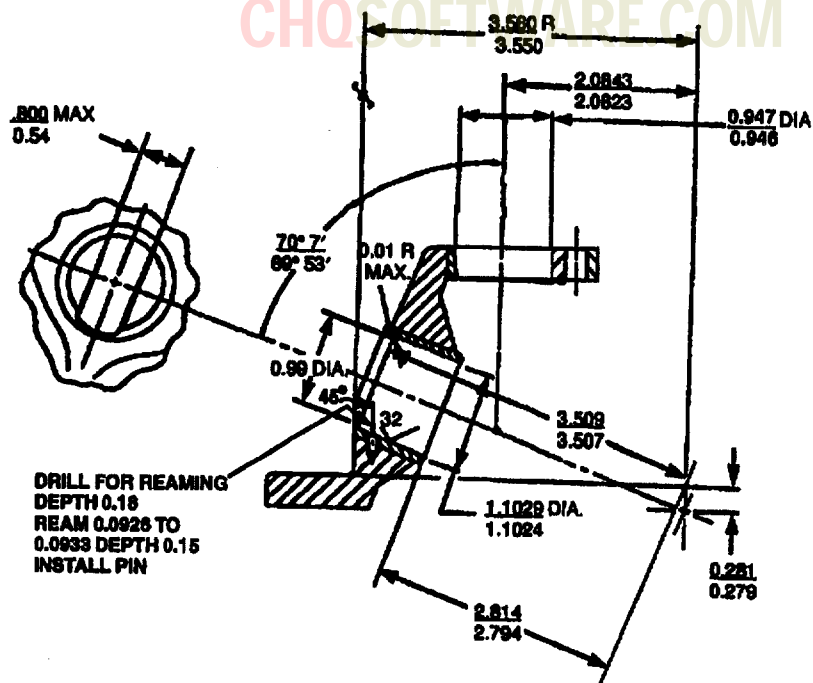
**Alignment of top bore (2.0823 - 2.0843) of P/N 1-070-210-01/1-070-230-01 is flight safety critical.**

**CAUTION**

**To prevent damage to carrier during pressing operation, ensure that carrier is properly supported below the bore.**

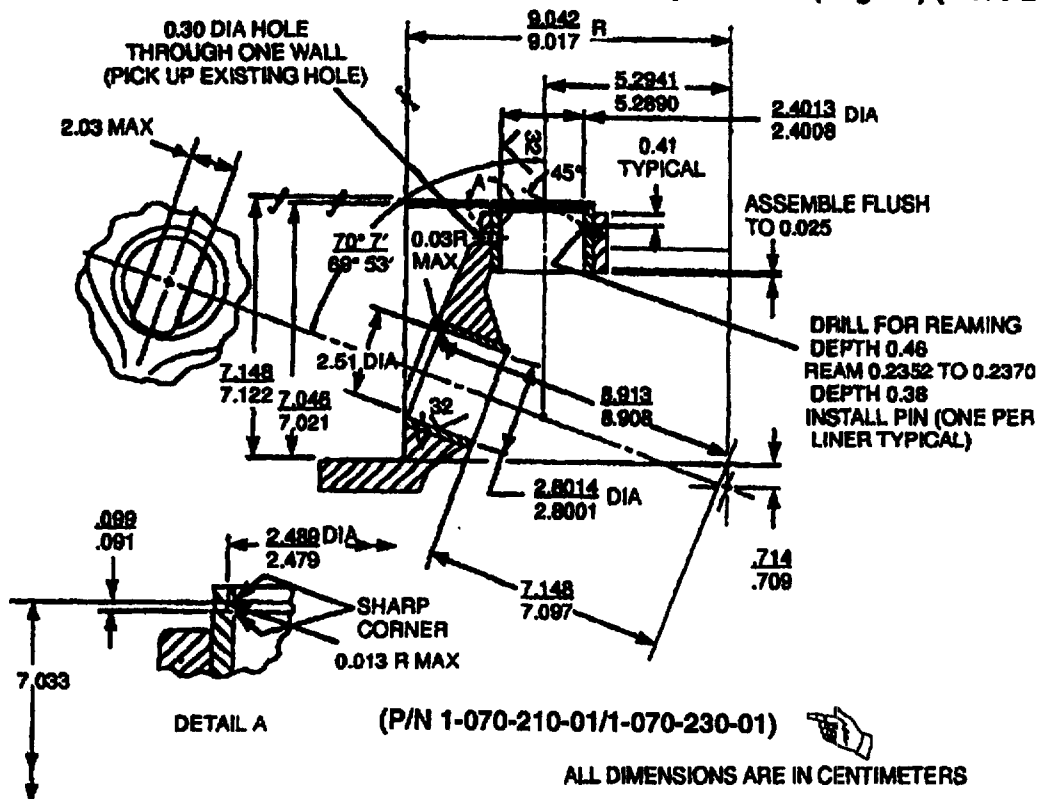


**Figure 5-622. Accessory Drive Carrier - Bearing Liner Replacement (English) (1-070-210-01/1-070-230-01).**



(P/N 1-070-210-07)  
ALL DIMENSIONS ARE IN INCHES

Figure 5-622A. Accessory Drive Carrier - Bearing Liner Replacement (English) (1-070-210-07).



(P/N 1-070-210-01/1-070-230-01)

ALL DIMENSIONS ARE IN CENTIMETERS

Figure 5-623. Accessory Drive Gear Carrier - Bearing Liner Replacement (Metric) (1-070-210-01/1-070-230-01).

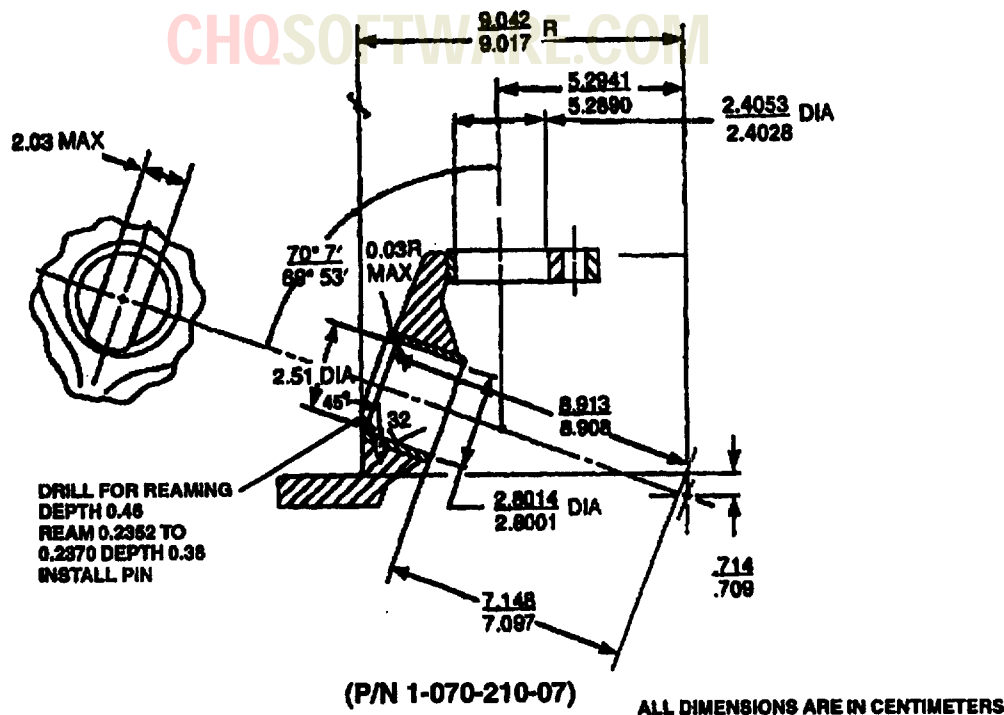


Figure 5-623A. Accessory Drive Gear Carrier - Bearing Liner Replacement (Metric) (1-070-210-07).

**WARNING**

**FLIGHT SAFETY PART**

Alignment of top bore (5.2890-5.2941) is flight safety critical.

- (9) Drill new pin hole 90 degrees from original location. (See figure 5-622 or 5-622A.)
- (10) Apply a thin coat of primer (item 253, table C-1) to new Pin Part No. AN122683 and install pin as shown in figure 5-622 or 5-622A.
- (11) Using No. 31 drill, drill oil hole through one wall of liner. (See figure 5-622 or 5-622A.)
- (12) Finish grind to dimensions given in figure 5-622 or 5-622A.

**5-457. REASSEMBLY OF ACCESSORY DRIVE CARRIER ASSEMBLY.** Proceed as follows:

**NOTE**

Throughout the following procedures, lubricate using engine oil (item 189 or 190, Appendix C) where step is identified by asterisk (\*).

- a. \*Using arbor press and sleeve bushing (LTCT3640), press bearing (47, figure 5-617) onto tachometer drive gear shaft (50) using lubricant. Press spacer (48), of same length as recorded during disassembly, and second bearing (47) onto shaft.
- b. Install lockpin (49) into shaft.
- c. Install gear (46) onto shaft, aligning slot in gear with pin in shaft.

**NOTE**

Position gear with gear teeth facing nut.

- d. \*Lubricate threads of shaft with oil. \*Lubricate and install retainer (45) and nut (44) onto tachometer drive gearshaft (50).

**NOTE**

Do not deform retainer at this time.

e. Position splined end of shaft and bearing assembly (43) onto spline of holding fixture (LTCT3040). Using wrench (LTCT1109 or LTCT214), tighten lubricated nut (44) to 130 to 150 pound-inches (23218 to 26790 gm cm) torque.

**CAUTION**

When installing items 36 or 36C with arbor press, ensure sleeve bushing engages only inner race of bearing.

f. \*(1-070-220-03/-13/-14 and 1-070-240-01) Lubricate all pressed parts. Using arbor press and sleeve bushing (LTCT3636), press bearing (36) onto gearshaft (34). Press ring spacer (37), of same length as recorded during disassembly, onto gearshaft (34). Press bearing (36) onto gearshaft (34).

**CAUTION**

When installing items 36 or 36C with arbor press, ensure sleeve bushing engages only inner race of bearing.

f1. \*(1-070-220-10) Lubricate all pressed parts. Using arbor press and sleeve bushing (LTCT3636), press bearing (36C) onto gearshaft (34).

g. Using fiber drift, install shaft and bearing assembly (43) into carrier (42 or 42A).

h. (1-070-220-03/-13/-14 and 1-070-240-01) Install lubricated gearshaft and bearing assembly (33) into carrier. Take care to mesh gear teeth carefully.

h1. (1-070-220-10) Install lubricated gearshaft and bearing (33) into carrier as follows:

(1) Place shim (37A) of the same thickness as recorded during disassembly onto flange of bearing (36C).

(2) Install lubricated gearshaft and bearing assembly (33) into carrier. Take care to mesh gear teeth carefully.

(3) Install bolts (36A) and washers through the flange of carrier (42) and shims (37A) and into flange of bearing (36C). Torque bolts (36A) to 40 to 45 pound-inches.

i. (1-070-220-03/-13/-14 and 1-070-240-01) Install lockpin (35) into gearshaft (34). Lockpin (35) must be installed with one end flush to the gearshaft (34). (See figure 5-624.) Secure gearshaft (34, figure 5-617) and bearing assembly (33) with retaining ring (38).

i1. (1-070-220-10) Install lockpin (35) into gearshaft (34). Lockpin (35) must be installed with one end flush to the gearshaft (34). (See figure 5-624.)

j. Install gear (39, figure 5-617) (1-070-062-04/-06) onto gearshaft (34) aligning slot in gear (39) with lockpin (35) in gearshaft (34).

**CAUTION**

If the gearshaft threads are recessed below the nut by more than one complete thread, disassemble the gear and reassemble as outlined in steps j through k.

**NOTE**

If interference exist between pin and slot in gear, remove and install new pin, or rework pin to 0.562 inch minimum length.

k. \*Lubricate threads of gearshaft (34). Install \*lubricated retainer (40) and nut (41) onto gearshaft (34) and tighten nut (41) fingertight. Threads of the gearshaft (34) can be recessed up to one thread below the nut (41). If threaded portion is below limit, the lockpin (35) is not properly installed (refer to preceding step i and i1).

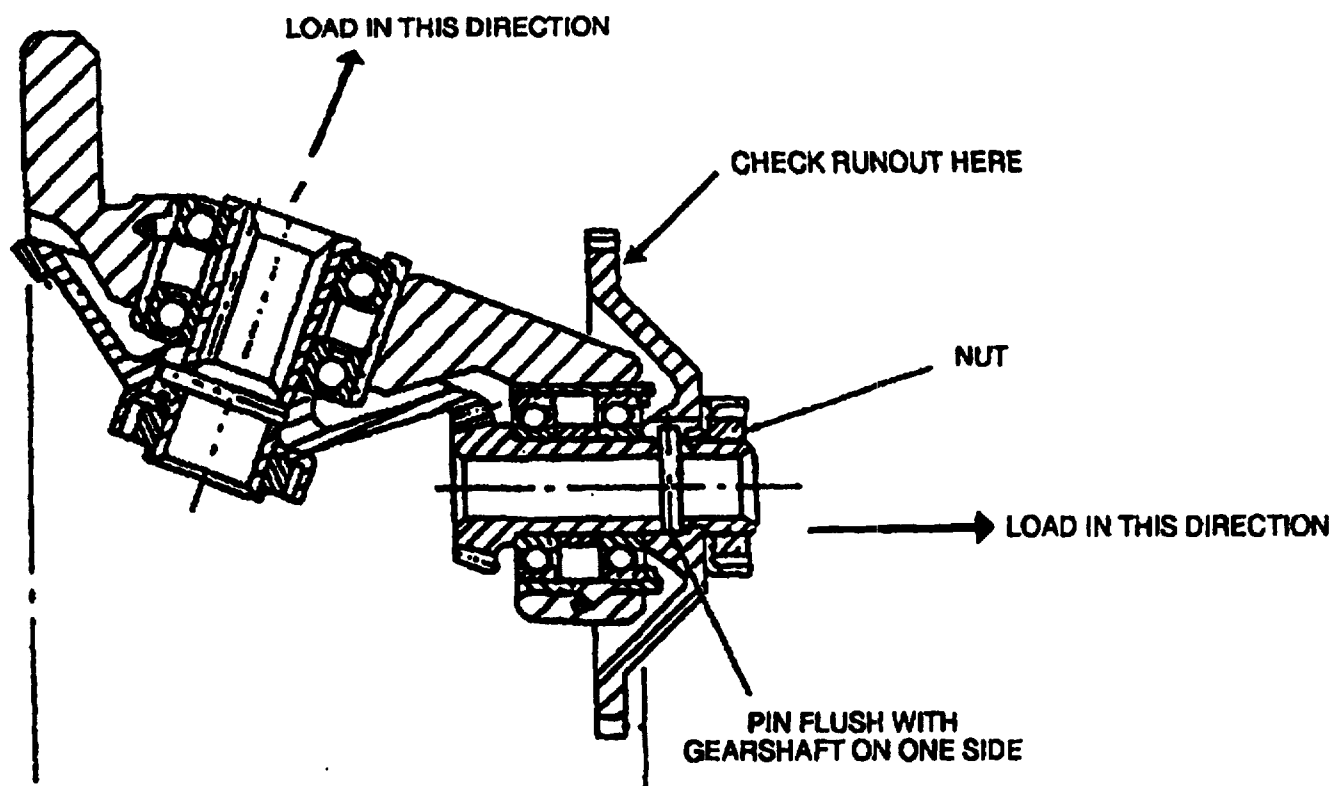
l. (1-070-220-03/-13/-14 and 1-070-240-01) To determine if the outer race of bearing (36) is too loose in the accessory drive carrier assembly, perform the following:

(1) Hold the accessory drive carrier assembly with spur gear (39) pointed down. This will put the accessory drive carrier assembly so you can view bevel gearshaft (34) and aft bearing (36).

(2) Place index finger of your hand not holding the accessory drive carrier assembly onto the teeth of the spur gear (39).



CHQSOFTWARE.COM



**Figure 5-624. Correct Assembly of Gearshaft and Bearing Assembly (Typical).**

(3) With a pulling motion, spin the gearshaft assembly. While the gearshaft assembly is spinning, watch the outer race of bearing (36). There cannot be any holding of the gearshaft assembly while the gearshaft assembly is moving.

(4) If there is no turning movement of the race, or if turns intermittently with a skipping motion, the accessory drive carrier assembly is acceptable.

(5) If the outer race moves (in a continuous motion) with gear rotation for at least 1/2 of the circumference of the liner, the accessory drive carrier assembly is unacceptable.

m. Install accessory drive carrier assembly into holding fixture (LTCT3040) and secure gear.

n. Using wrench (LTCT4020), tighten \*lubricated nut (41) to 275 to 300 pound-inches (49115 to 53580 gm cm) torque. Release gear.

**CAUTION**

If face runout of gear (39) exceeds 0.005 inch and/or the gearshaft threads are recessed below the nut by more than one thread, disassemble the gear and re-assemble as outlined in preceding steps k. through n.

o. Visually check side face runout on the face of gear (39) by placing dial indicator probe on gear (39), just below teeth pitch diameter (see figure 5-624 for location). With this gear (39, figure 5-617) loaded in backlash position, the maximum runout shall not exceed 0.005 inch.

**NOTE**

Do not deform retainer at this time.

- p. Secure gear (39). Install backlash flag (LTCT4564) into tachometer drive gearshaft (50).

**NOTE**

Lift up firmly on gear (39) and out on backlash flag in gear (50) before performing backlash check and pattern check. (See figure 5-624.)

- q. Position dial indicator pointer onto backlash gage at scribed line on flag. Set backlash flag to extreme position and dial indicator to zero. Rotate backlash flag to other extreme and read backlash on dial indicator. Backlash shall be within 0.002 to 0.005 inch (0.005 to 0.013 cm).

- r. Release holding device on gear. Coat teeth of shaft and bearing assembly (43) with iron-blue pigment (item 172, table C-1). Rotate gears to obtain tooth pattern. Inspect to establish correct tooth pattern (see SP No. 5016).

- s. (1-070-220-03/-13/-14 and 1-070-240-01) Correct backlash and pattern by replacing ring spacers (37, 48). (Refer to table 5-182 for spacer length and part numbers.) \*Lubricate, reassemble, and recheck backlash and pattern until correct.

- s1. (1-070-220-10) Correct backlash and pattern by replacing ring shims (37A, 48). (Refer to table 5-182 for spacer length and part numbers.) \*Lubricate, reassemble, and recheck backlash and pattern until correct.

**NOTE**

Replace spacer (48) for backlash and ring spacer (37) for pattern correction. \*Lubricate all threads, lockups and nuts. Use bearing puller (LTCT675) whenever removing bearings (36 or 47) from shafts.

**Table 5-182. Tachometer Drive Bearing Spacer/Shim Sizes.**

Part Number	Size
1-070-059-01	0.160 to 0.164 inch (0.406 to 0.417 cm) long
1-070-059-02	0.165 to 0.169 inch (0.419 to 0.429 cm) long
1-070-059-03	0.170 to 0.174 inch (0.432 to 0.442 cm) long
1-070-059-04	0.175 to 0.179 inch (0.445 to 0.455 cm) long
1-070-059-05	0.180 to 0.184 inch (0.457 to 0.467 cm) long
1-070-061-01	0.200 to 0.204 inch (0.508 to 0.518 cm) long
1-070-125-01	0.020 to 0.024 inch (0.508 to 0.518 cm) thick
1-070-061-02	0.205 to 0.209 inch (0.520 to 0.531 cm) long
1-070-125-02	0.025 to 0.029 inch (0.508 to 0.518 cm) thick
1-070-061-03	0.210 to 0.214 inch (0.533 to 0.544 cm) long
1-070-125-03	0.030 to 0.034 inch (0.508 to 0.518 cm) thick
1-070-061-04	0.215 to 0.219 inch (0.546 to 0.556 cm) long
1-070-125-04	0.035 to 0.039 inch (0.508 to 0.518 cm) thick
1-070-061-05	0.220 to 0.224 inch (0.558 to 0.569 cm) long
1-070-125-05	0.040 to 0.044 inch (0.508 to 0.518 cm) thick
1-070-061-06	0.225 to 0.227 inch (0.572 to 0.577 cm) long
1-070-125-06	0.045 to 0.049 inch (0.508 to 0.518 cm) thick
1-070-061-07	0.228 to 0.232 inch (0.579 to 0.589 cm) long
1-070-125-07	0.050 to 0.052 inch (0.508 to 0.518 cm) thick

t. When correct backlash and pattern has been established, wash gears with dry cleaning solvent (item 134, table C-1). \*Lubricate all gears, lockups, and nuts. Tighten all nuts to proper torque and deform retainers (40, 45) in two places 180 degrees apart. Do not shear retainers when deforming. Recheck side face runout step m.

**NOTE**

Do not shear retainers when deforming.

u. Remove carrier from holding fixture.

**NOTE**

Do not reidentify the Accessory Drive Assembly Part No. 1-070-220-10.

v. Using a vibropeen etching tool, reidentify Accessory Drive Assembly Part No. 1-070-220-03 to 1-070-220-13. Depth of marking shall be 0.006 inch (0.0025 to 0.0152 cm). Treat remarked area with chrome pickle solution per MIL-M-3171.

w. Install stop (18) into gear (19) and secure with retaining ring (17).

**CAUTION**

When installing bearing (20), press on inner race in order to prevent damage to bearing (20).

**NOTE**

The following steps x through aa are not applicable to Accessory Drive Carrier Assembly Part No. 1-070-220-10. If utilizing Part No. 1-070-220-10, proceed to step ab.

x. Using arbor press and installation tool (LTCT3646), press bearing (20) onto journal of gear (19). Press spacer (26) onto gearshaft.

y. Using installation tool (LTCT3646), press bearing (20) into liner (29) and secure with retaining ring (27).

z. Using shim (28), of same thickness as recorded during disassembly, install bearing and liner assembly (25) into carrier (42) and secure with bolts (32). Tighten bolts (32), as required.

aa. Align bearing (20) and gear (19) squarely with liner (29). Using installation tool (LTCT108), press assembled gear (19) and bearings (20) into liner (29).

ab. (1-070-220-10) Using shim (28) of same thickness, as recorded during disassembly, align duplex bearing (20A) and gear (19) into carrier (42A). Support duplex bearing (20A) with three slave bolts or guide pins.

**CAUTION**

Do not use powered tool when using installation tools (LTCT30741). Continuously monitor alignment of duplex bearing (20A) and gear (19) during assembly. Realign as necessary.

ac. (1-070-220-10) Using installation tool (LTCT30741), press assembled gears (19) into duplex bearing (20A). Remove slave bolts or guide pins and installation tool (LTCT30741). Secure with bolts (32). Tighten bolts (32) to 70 to 95 pound-inches.

ad. Deleted.

ae. Install washer (30) and nut (31). Mount carrier in holding fixture (LTCT4996). Using wrench (LTCT2133), tighten nut (31) to 275 to 300 pound-inches (49115 to 53580 gm cm) torque and lock washer (30). Remove carrier from holding fixture (LTCT4996).

**NOTE**

Steps af through am are to be installed only on the T53-L-701A engine.

af. Install stop (12) into gear (11) and secure with retaining ring (13).

ag. Using arbor press and installation tool (LTCT3646), press bearing (8) onto journal of gear (11). Press spacer (10) onto gear (11).

ah. Using installation tool (LTCT3646), press second bearing (8) into liner (6) and secure with retaining ring (9).

ai. Place shim (7), of same thickness as recorded during disassembly, on bearing and liner assembly (5).

aj. Mount gear assembly on arbor press. With short sleeve positioned on liner (6), press bearing and liner assembly (5) onto gear assembly.

ak. Install gear and bearing assembly (2) in holding fixture (LTCT2045 or LTCT4996). Install washer (4) and nut (3). Tighten nut (3) to 275 to 300 pound-inches (49115 to 53580 gm cm) torque using wrench (LTCT2133 or LTCT69). Remove gear and bearing assembly (2) from holding fixture.

al. Position gear and bearing assembly (2) on carrier (42). Align holes in liner (6) and shim (7) with tapped holes in carrier. Install pins (54) and cap (14). Secure with tabwashers (15) and bolts (16). Tighten bolts (16), as required, and lock with tabwasher (15).

am. Secure gear and bearing assembly (2) to carrier (42) with bolts (1). Tighten bolts (1), as required, and lockwire.

an. Install strainer (24) and packing (23) into carrier. Secure cover (22) with screws (21). Tighten screws (21), as required, using lockwire (Item 183, table C-1).

**5-458. FUNCTIONAL TEST.** Functional test not required.

**5-459. POWER SHAFT BEARING RETAINER.**

**5-460. DISASSEMBLY.** Proceed as follows:

- a. Remove bolts (1, figure 5-625) that secure clamping plate (2) to retainer assembly (4). Remove clamping plate (4).
- b. Using a suitable sleeve and arbor press, press roller bearing (3) from retainer assembly (4).

**5-461. CLEANING.** Proceed as follows:

- a. Clean gear (1 or 3, figure 4-49) as outlined in SP No. 3009 in Appendix E.
- b. Clean roller bearing (3, figure 5-625) as outlined in SP No. 3010 in Appendix E.
- c. Clean all other parts by dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.)

**5-462. INSPECTION.** Perform specific inspections listed in table 5-183.

**5-463. REPAIR.** (See figures 4-49 and 5-625.) Proceed as follows:

- a. Blend repair nicks, burrs, and scratches as outlined in SP No. 5000 in Appendix E.
- b. Touch up retainer assembly (4, figure 5-625) repaired areas with black oxide coating. (Refer to SP No. 6002 in Appendix E.)
- c. Repair damaged 0.041 to 0.044 inch (0.104 to 0.112 cm) diameter holes in retainer assembly (4) as follows:
  - (1) Remove and discard pins as shown in figure 5-627.
  - (2) Clean area of holes.
  - (3) Preheat part to 600 to 700°F (316 to 371°C).
  - (4) Using welding wire (Item 354, table C-1), plug weld holes. (Refer to SP No. 5001 in Appendix E.)
  - (5) Postheat part at 600 to 700°F (316 to 371°C) for 15 minutes.
  - (6) Blend weld flush and shot-peen part per AMS2430.

CHQSOFTWARE.COM

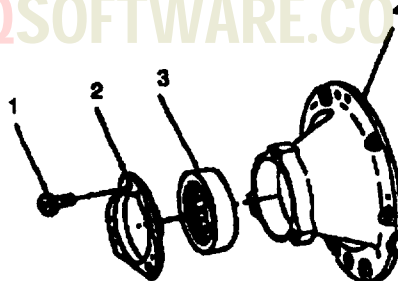


Figure 5-625. Power Shaft Bearing Retainer Assembly.

Figure & Index Number	Part Number	Description	Qty Per Assy	Useable on Code
5-625	No Number	1 2 3 4 5 6 7 POWER SHAFT BEARING RETAINER AND RELATED PARTS (NHA 1-000-060-03, 1-000-100-01, 1-000-060-08, 1-000-060-10, and 1-000-110-10)	Ref	
	-1 AN107406	. BOLT, Drilled hex head	3	
	MS9584-06	. BOLT, Drilled hex head	3	
	-2 1-060-082-01	. PLATE, Clamping, bearing, 0.1137 - 0.1149 inch thick	1	
	1-060-082-02	. PLATE, Clamping, bearing, 0.1150 - 0.1163 inch thick	1	
	1-060-082-03	. PLATE, Clamping, bearing, 0.1164 - 0.1176 inch thick	1	
	1-060-082-04	. PLATE, Clamping, bearing, 0.1177 - 0.1190 inch thick	1	
	1-060-082-05	. PLATE, Clamping, bearing, 0.1190 - 0.1203 inch thick	1	
	-3 R106KEX302	BEARING, Roller (38443) (Lycoming Source Cont Dwg 1-300-082-1)	1	
	SKF463724	BEARING, Roller (51600) (Lycoming Source Cont Dwg 1-300-082-03)	1	
5-625	1205-WHAR5506	BEARING, Roller (51600) (Lycoming Source Cont Dwg 1-300-082-02) (Replace with 1-300-082-03)	1	
	-4 1-060-090-03	RETAINER ASSEMBLY, Bearing, Power Shaft	1	

Table 5-183. Inspection of Power Shaft Bearing Retainer Assembly.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-49				
<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p><b>Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.</b></p>				
1 and 3	Spur Gear	Visual	Heat discoloration on teeth. (Refer to table 5-184)	Replace if limits are not met
			Wear or damage on gear teeth or splined areas	Not allowed. Replace
		Visual and Magnetic-Particle. (Refer to table 5-185)	Cracks	Not allowed. Replace
5-625				
2	Clamping Plate	Visual	Cracks	Not allowed. Replace
			Loss of protective surface finish	Repair. (Refer to SP No. 6003 in Appendix E)
		Dimensional	Wear. (Refer to table 5-186)	Replace if limits are not met
<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p><b>Verification of the bore diameter of the following part is flight safety critical.</b></p>				
3	Roller Bearing	Visual and SIE	Damaged bearing.	Replace if limits are not met
		Dimensional	Wear. (Refer to table 5-187.)	Replace if limits are not met
		Visual	Part Number	Replace 1-300-082-01 and -02 bearing with 1-300-082-03
4	Retainer Assembly	Visual	Nicks, burrs or scores on bearing mating surface	Repair. (Refer to paragraph 5-463)
			Clogged or foreign material in oil passages	Clean. (Refer to paragraph 5-461)
			Loss of protective surface finish	Repair (Refer to SP No. 6003 in Appendix E)
		Visual and SIE	Damaged 0.041 to 0.044 inch (0.104 to 0.112 cm) diameter holes	Repair (Refer to paragraph 5-463)
		Visual and Magnetic-Particle. (Refer to table 5-185)	Cracks	Not allowed. Replace
		Dimensional	Wear. (Refer to table 5-186)	Replace if limits are not met

Table 5-184. Power Shaft Bearing Retainer Assembly Units.

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS	
		FIGURE REFERENCE	INSPECTION LIMITS
Spur Gear Teeth for Heat Discoloration	4-49 1 and 3		If discoloration is evident, a hardness inspection shall be taken on the center of the lands of three teeth, 120 degrees apart. Hardness shall be within R30N77.5 to 80.0 (Rc 60 to 63). If limit is exceeded, replace spur gear.

Table 5-185. Magnetic Particle Inspection of Power Shaft Bearing Retainer.

FIGURE AND INDEX NO.		NOMENCLATURE	METHOD OF MAGNETIZATION
4-49	1 and 3	Spur Gear	Circular. Use central conductor at 500 amperes.
5-625	4	Retainer Assembly	Circular. Use central conductor at 1200 amperes.

Table 5-186. Dimensional Inspection of Power Shaft Bearing Retainer Assembly.

NOMENCLATURE	FIG & IN-DEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
Clamping Plate	5-625 2	*OD	2.1620 (5.4915)	2.1630 (5.4940)	2.1612 (5.4894)	2.1630 (5.4950)	0.0015L (0.0038)	0.0042L (0.0107)	5-626 A
	4	*ID	2.1645 (5.4978)	2.1652 (5.4996)	2.1645 (5.4978)	2.1654 (5.5001)			B
Retainer Assembly		*OD	3.9980 (10.1549)	3.9985 (10.1562)	3.9979 (10.1547)	3.9985 (10.1562)			C

\* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.



Table 5-187. Dimensional Inspection of Power Shaft Front Bearing.

BEARING TYPE & PART NUMBER	FIG & INDEX	DIR MEAS	BLUE PRINT DIMENSIONS		INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
			MIN	MAX					
*Roller SKF463724	5-625	3	<b>WARNING</b> <b>FLIGHT SAFETY PARTS</b> <b>Verification of the 1.4232 - 1.4235 and 2.1651 - 2.1654 bore diameter is flight safety critical.</b>						
			ID	1.4232 (3.6149)	1.4235 (3.6157)	0.0010 (0.0025)	N/A	58 to 61	1-300-082-03
			OD	2.1651 (5.4994)	2.1654 (5.5001)	0.0018 -(0.0046)			

\*This bearing does not have an inner race.

NOTE: Check ID by verifying that internal radial clearance is 0.0012 - 0.0015 when measured with a 1.4220 diameter shaft as shown in TM55-1500-322-24, para 8-71.



CHQSOFTWARE.COM

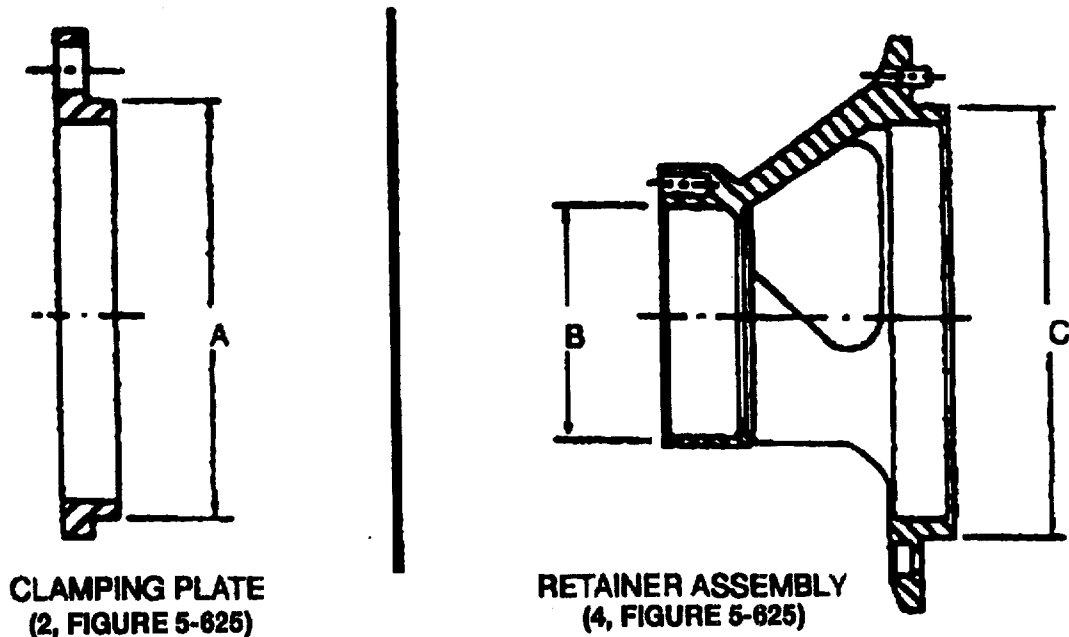
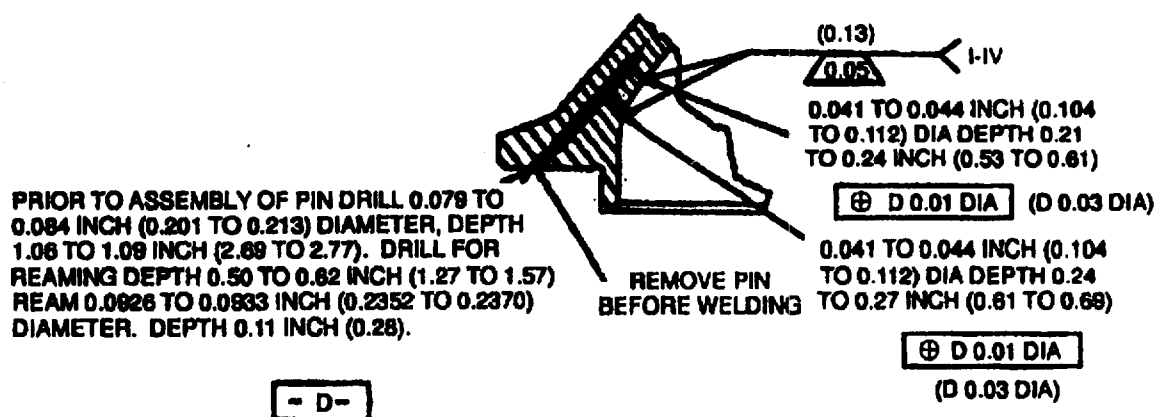


Figure 5-626. Power Shaft Bearing Retainer Assembly Dimensional Inspection Locations.



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-627. Repair of Power Shaft Bearing Retainer.

- (7) Drill holes to dimensions shown in figure 5-627.
- (8) Perform a visual and fluorescent-penetrant inspection of welded area.
- (9) Install pin same as AN150229. Pin must be of a diameter to obtain a 0.0005 to 0.0010 inch (0.0013 to 0.0025 cm) tight fit with the 0.0926 to 0.0933 inch (0.2352 to 0.2370 cm) reamed holes.
- (10) Stake pin securely in two places.

#### 5-464. COATING AND CORROSION (RUST) REPAIR OF POWER SHAFT.

a. If less than 20% of total surface area is corroded. Touch-up repair procedure may be used. If more than 20% of total surface area is corroded use coating repair procedure.

b. Touch-up Repair.

- (1) Remove heavy rust on external surfaces with a wire brush. Remove any grease with a suitable grease solvent, before applying the rust removing compound.

#### NOTE

Mix and store this solution in an acid resistant steel, glass or earthenware container.

- (2) Mix one (1) part metal conditioner and rust removing compound (item 211, table C-1) with three (3) parts of water. Apply this diluted solution to the rusted areas on the power shaft external surfaces with a brush, rag or sponge.

(3) Allow diluted solution to remain on the rusted areas for about thirty (30) seconds. Wipe off residue first with damp rags, and then with dry rags, no more than a light film of gray-white coating should remain on the treated areas. Remove any loose powdery deposits with a brush or a rag.

- (4) Touch-up treated areas with black oxide coating compound (item 106, table C-1). If needed, temporarily preserve by applying corrosion preventative compound (item 121, table C-1).

c. Coating Repair

#### CAUTION

Do not phosphate coat the plated and carburized forward end (first 4.59 inches) of power shaft.

#### NOTE

This repair should be performed after all other power shaft repairs

- (1) Remove heavy rust on external surfaces with a wire brush. Remove any grease with a suitable grease solvent, before applying the rust removing compound.

#### NOTE

Mix and store this solution in an acid resistant steel, glass or earthenware container.

- (2) Mix one (1) part metal conditioner and rust removing compound (item 211, table C-1) with three (3) parts of water. Apply this diluted solution to the rusted areas on the power shaft external surfaces with a brush, rag or sponge.
- (3) Allow diluted solution to remain on the rusted areas for about thirty (30) seconds. Wipe off residue first with damp rags, and then with dry rags. No more than a light film of gray-white coating should remain on the treated areas. Remove any loose powdery deposits with a brush or a rag.
- (4) Plug all openings and mask all other areas that are not to be coated.
- (5) Phosphate coat external surfaces as per SP No. 6012 in Appendix E.

**CAUTION**

To prevent case tempering of carburized parts, do not bake above 275°F (135°C).

- (6) Remove all plugs and masking.

**CAUTION**

To prevent case tempering of carburized parts, do not exceed 275° F (135° C) when baking power shaft.

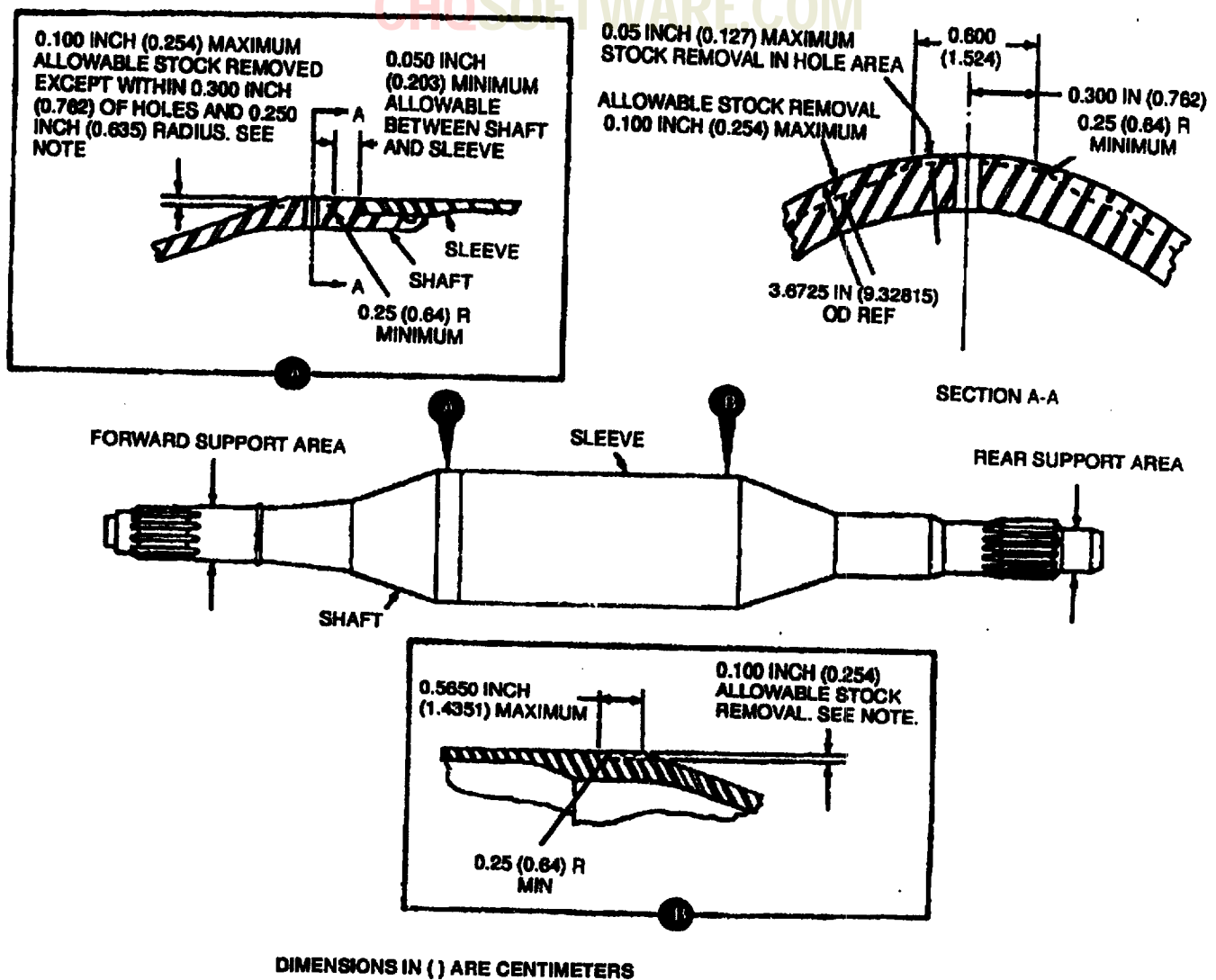
- (7) Bake power shaft for 5 hours at 275° F (135° C).

**5-465. BALANCING POWER SHAFT.** Proceed as follows:

- a. Using sleeve bearings (LTCT2712-40 and LTCT2712-42 and bearing holders LTCT4029), support power shaft on diameter shown in figure 5-628, and use spline adapters.
- b. Dynamically balance power shaft on balancing machine.

**NOTE**

To ensure sufficient balancing accuracy, rotate the compressor rotor between 1,000 and 2,000 rpm.

**WARNING****FLIGHT SAFETY PART**

**Metal removal limits are flight safety critical.**

**NOTE**

For balancing purposes, 0.100 max dimension may be increased to 0.110 max for a total circumferential length of 2.00 max, additionally the 0.25 R dimensions may be reduced to 0.10 R min. in the 2.00 max circumferential region.

**Figure 5-628. Power Shaft Supporting and Stock Removal Areas for Balancing.**

c. Correct unbalance to within 0.5 gram-inch in each plane by removing material from power shaft within limits shown in figure 5-628.

d. Mark heavy point on power shaft with red opaque ink (item 232, table C-1) or white marking ink (item 209, table C-1) or marks-a-lot (item 238, table C-1).

e. After removing material to correct the unbalance condition, hole must be rounded and polished (See figure 5-628.)

f. Coat or touch-up material removal areas per paragraph 5-464

**5-466. REASSEMBLY.** Proceed as follows:

a. Check oil impingement of retainer assembly (4, figure 5-625) as follows:

(1) Check rear of test stand (LTCT422), or equivalent, for proper internal test connections. (See figure 5-629.) Perform the following test, using lubricating oil (item 189 or 190, table C-1).

(2) Attach retainer assembly (4, figure 5-625) to test fixture (LTCT4900) and set on test stand (LTCT422), or equivalent.

(3) Connect hose between/main element inlet port on test stand and nipple on test fixture.

(4) Close all valves on scavenge side of test stand.

(5) Press STAND POWER and BOOST CIRCUIT PUMP switches on.

(6) Open MAIN ELEMENT INLET THROTTLE valve and observe that a pressure indication appears on MAIN ELEMENT DISCHARGE PRESSURE gage.

(7) Adjust PUMP BYPASS valve until MAIN ELEMENT DISCHARGE PRESSURE gage indicates 25 psi. (1757.7 gm sq cm).

(8) Run test stand to bring temperature of lubricating oil to 95° to 100° F (35° to 38° C).

(9) Observe oil impingement on test fixture. If jets do not strike within the target area of the fixture, clean retainer assembly as follows:

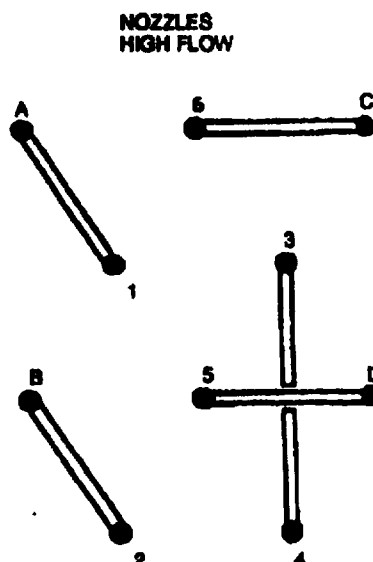
(a) Soak parts in carbon removing compound (item 70, table C-1) for 2 to 3 hours.

(b) Clean passage by pressure flushing with dry cleaning solvent (item 134, table C-1) under 80 to 100 psig (170 to 170.31 gm sq cm) pressure.

(10) Repeat oil impingement check in accordance with preceding steps (1) through (9).

(11) Reject retainers that do not meet oil impingement requirements after cleaning.

(12) Readjust PUMP BYPASS valve until MAIN ELEMENT DISCHARGE PRESSURE gage indicates 45 psi (7864 gm sq cm). Repeat preceding steps (8) and (9).



**Figure 5-629. Internal Connections for Test Stand.**

(13) Flow check bearing retainer assembly as follows:

(a) Adjust PUMP BYPASS valve until MAIN ELEMENT DISCHARGE PRESSURE gage indicates 70 psi (11921 gm sq cm).

(b) Run test stand to bring temperature of lubricating oil to 95 to 100°F (35 to 38°C).

(c) Check flowmeter for 350 to 475 phr, if lubricating oil (item 190, table C-1) is used, or 332 to 451 phr, if lubricating oil (item 189, table C-1) is used.

(14) Secure test stand and remove bearing retainer from test fixture.

b. Place retainer assembly (4) on a bench, large end down.

c. Press roller bearing (3) into retainer assembly (4) and set it firmly.

d. Measure from edge of retainer assembly (4) down to bearing race and record depth measurement.

e. Select clamping plate (2) with hub height that will provide 0.0010 to 0.0035 inch (0.025 to 0.0089 cm) pinch on bearing.

f. Install plate and secure with three bolts (1). Tighten bolts (1) 40 to 45 pound-inches (7144 to 8037 gm cm) torque and lockwire (item 183, table C-1).

**5-467. FUNCTIONAL TEST.** Functional test is not required.

**5-467A. MODIFICATION OF ACCESSORY DRIVE ASSEMBLY (1-070-220-03/-13/-14 TO 1-070-220-10).** Conversion procedure from Part No. 1-070-220-03/-13/-14 to 1-070-220-10 configuration is as follows:

a. Remove Accessory Drive Assembly Part No. 1-070-220-03/-13/-14 per paragraph 4-51.

b. Install Accessory Drive Assembly Part No. 1-070-220-10 per paragraph 6-17.

#### NOTE

After completion of modification, Accessory Drive Assembly Part No. 1-070-220-03/-13/-14 shall be disposed of by standard de-mil procedures. No parts shall be salvaged from the Accessory Drive Assembly Part No. 1-070-220-03/-13/-14 for reuse.

## SECTION XIV. INLET HOUSING

**5-468. INLET HOUSING.**

**5-469. DISASSEMBLY.** Proceed as follows:

#### NOTE

Steps a through e apply to T53-L-13B, -15, and -703 engines only.

a. Using valve installer and remover (LTCT519) or 6-point socket wrench, remove torquemeter valve and shim assembly (20, figure 5-630).

b. Remove shim (21) from torquemeter valve assembly.

c. Remove retaining ring (22) from body (26).

d. Invert valve and remove disk (23), spring (24), and plunger (25) from body (26).

e. Remove bolts (19) that secure cylinder (27) within inlet housing and remove cylinder. Remove packing (38).

#### WARNING

Sharp outer edge may exist on torquemeter cylinder (27). Handle with care when removing, cleaning, inspecting, repairing, transporting, or installing torquemeter cylinder (27).

- f. Remove plug (33) and packing (32) from inlet housing.
- g. If installed, remove bolts (34), washers (35), plug (36) and packings (37).
- h. Remove bolt (1), washer (2), cover (3), and packings (4 and 5) from inlet housing (28).
- i. Remove retaining ring (18). Remove oil supply power takeoff nozzle assembly (12) by inserting a 3/16-24 screw into oil supply filter (14), and withdrawing power takeoff oil supply nozzle assembly from inlet housing assembly.

#### NOTE

The oil supply nozzle assembly is not installed in T53-L-13B/703 series engine.

- j. Remove setscrews (16 and 17) and disk (15) from oil supply filter (14).
- k. Remove packing (13) from filter.
- l. Remove plug (29) and packing (30) from inlet housing.
- m. Remove metering plug (31) from inlet housing.
- n. Remove bolts (6) from engine mounting pad. Using puller (LTCT518), remove engine mounting pad plug (7) and packing (8). Remove mounting pad lock (9).
- o. Remove retaining ring (10) and air transfer tube (11).

#### 5-470. CLEANING. Proceed as follows:

- a. Clean air transfer tube by pressure-flushing with dry cleaning solvent (item 134, table C-1).
- b. Clean oil supply filter (14), figure 5-630 as follows:
  - (1) Immerse filter in tank containing dry cleaning solvent (item 134, table C-1), and clean, using soft-bristle brush.
  - (2) Remove from tank and pressure-flush using dry cleaning solvent.
- c. Clean all other parts by dry cleaning method. (Refer to SP No. 3002 in Appendix E.)

#### 5-471. INSPECTION. Inspect as per table 5-188.

#### 5-472. REPAIR. Proceed as follows:

- a. Repair inlet housings and data plate mount fastener holes as follows:
  - (1) On T53-L-13B,-15, and -703 engines, repair all inlet housings that fail the pressure test due to minor casting leaks as follows: (See figure 5-634.)

#### NOTE

Minor holes up to 1/8 inch (0.318 cm) in diameter may be plug-welded. The following repairs shall be performed while the housings are stripped of all surface coatings.

- (a) Rout out defect area so hole can be filled with weld metal. Chemically etch area to remove any flowed area.
- (b) Dye-check the defect area to ensure no porosity.

CHQSOFTWARE.COM

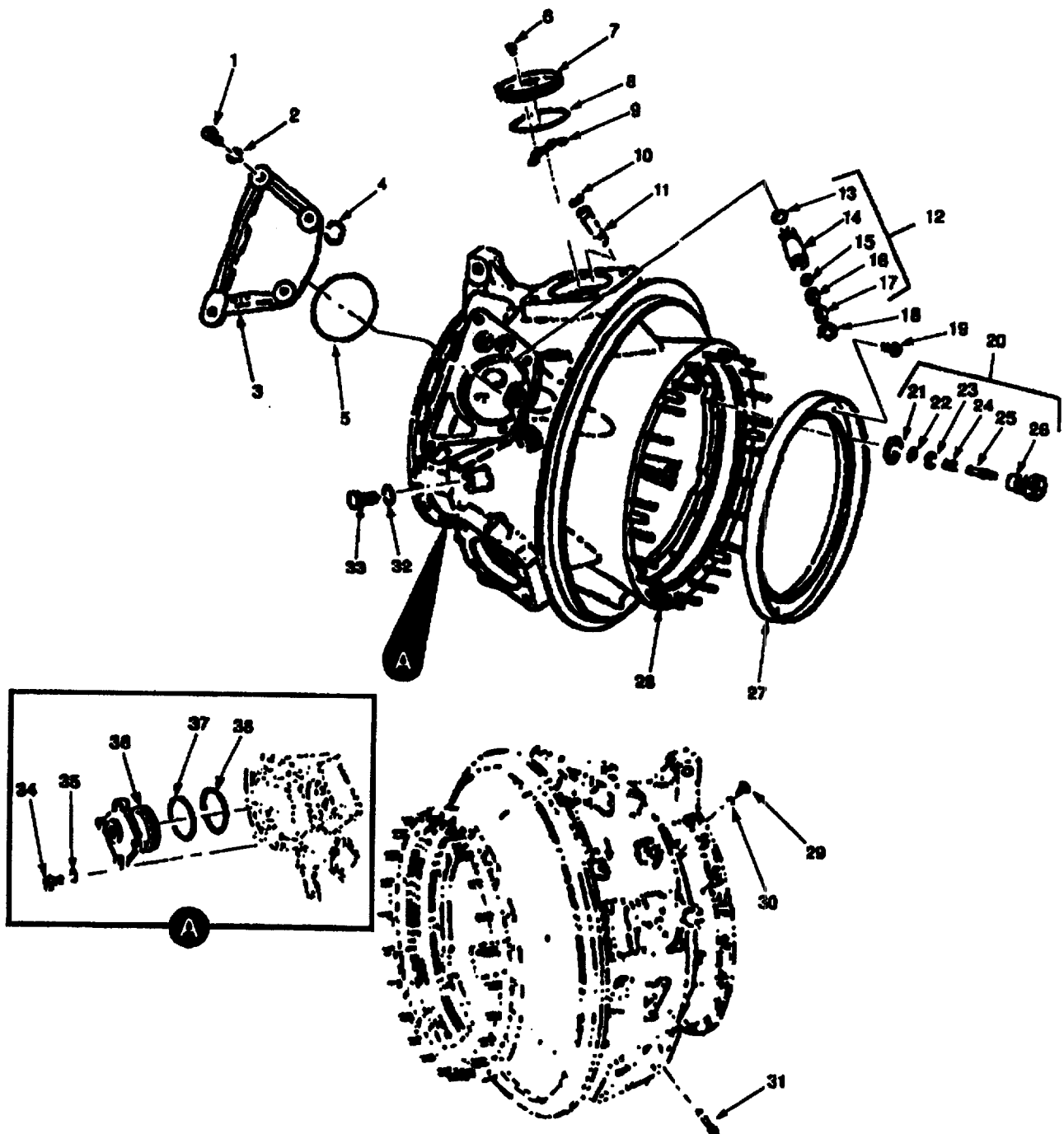


Figure 5-630. Inlet Housing Assembly.



Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-630	No Number	INLET HOUSING ASSEMBLY AND RELATED PARTS (NHA 1-000-060-03, 1-000-100-01, 1-000-060-08, 1-000-06-10, 1-000-110-01, 1-170-330-04, 1-170-330-06, 1-170-330-13, and 1-170-330-09)	Ref	
-1	AN104011	. BOLT, Drilled hex head	4	
-2	AN960-616L	. WASHER, Flat	4	
-3	1-060-112-03	. COVER, Starter and pump pad	1	
-4	MS29561-017	. PACKING	1	
-5	MS29561-237	. PACKING	1	
-6	1-060-118-01	. BOLT, Machine	6	
-7	1-060-109-03	. PLUG, Engine mounting pad	3	
-8	MS29561-235	. PACKING	3	
-9	1-060-119-01	. LOCK, Mounting pad (Replace with 1-060-119-02)	3	A,B,C
	1-060-119-02	. LOCK, Mounting pad	3	
-10	MS16625-010	. RING, Retaining	5	
-11	1-060-107-01	. TUBE, Air transfer	5	
-12	1-060-060-01	. NOZZLE ASSEMBLY Oil supply power take off	1	
-13	MS29561-010	.. PACKING	1	
-14	1-060-034-01	.. FILTER, Oil supply	1	
-15	1-060-436-02	.. DISK, metering, throttle	1	
-16	1-160-434-01	.. SETSCREW; Disk retaining	1	
-17	1-160-435-01	.. SETSCREW Jam	1	
-18	MS16625-3037	. RING, Retaining	1	
-19	MS9584-06	. BOLT Drilled hex head	12	A,B,C
-20	No Number	. TORQUE METER VALVE AND SHIM ASSEMBLY (NHA 1-000-060-03, 1-000-100-01, and 1-000-060-08)	1	A,B,C
-21	1-030-073-01	.. SHIM, Torquemeter valve	AR	A,B,C
	1-030-040-08	.. VALVE ASSEMBLY, Torquemeter	1	A,B,C
-22	1-030-063-01	.. RING, Retaining	1	A,B,C
-23	1-030-062-03	... DISK, Torquemeter valve	1	A,B,C
-24	1-030-065-02	... SPRING, Helical compression	1	A,B,C
-25	1-030-064-04	... PLUNGER, Torquemeter valve	1	A,B,C
-26	1-030-066-07	... BODY, Torquemeter valve	1	A,B,C
-27	1-060-121-03	. CYLINDER, Torquemeter	1	A,B,C
-28	No number	. INLET HOUSING AND STUD ASSEMBLY (NHA 1-060-220-03, 1-060-220-04, and 1-060-350-01)	1	

Figure & Index Number	Part Number	Description						Qty Per Assy	Usable on Code
		1	2	3	4	5	6 7		
-29	MS9015-02	. PLUG, Machine thread						2	A,B,C
-30	MS29512-2	. PACKING, fuel resistant						2	
	1-060-220-03	. HOUSING Assembly, Inlet						1	
	1-060-220-04	. HOUSING Assembly, Inlet						1	
	1-060-350-01	. HOUSING Assembly, Inlet						1	
-31	1-060-154-01	. . PLUG, Metering						1	A,B,E
-32	AN6290-4	. . PACKING (Replace with MS29512-04)						1	
	MS29512-04	. . PACKING						1	
-33	MS9015-04	. . PLUG, Machine thread						1	
-34	AN103809	. . BOLT (Use on 1-060-220-04)						4	A,B
-35	AN960-416L	. . WASHER (Use on 1-060-220-04)						4	A,B
-36	1-060-170-01	. . PLUG ASSEMBLY (Use on 1-060-220-04)						1	A,B
-37	MS29561-133	. . PACKING (Use on 1-060-220-04)						2	A,B
-38	M83248/1-014	. PACKING						1	A,B,C

Table 5-188. Inspection of Inlet Housing Assembly.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-630				
3	Cover	Visual	Cracks	Not allowed. Replace
7	Engine Mounting Pad Plug	Visual	Crossed, stripped, or damaged threads	Not allowed. Replace
			Nicks or dents	Not allowed. Replace
			Distortion	Not allowed. Replace
9	Mounting Pad Lock	Visual	Crossed, stripped, or damaged threads	Not allowed. Replace
			Distortion	Not allowed. Replace
11	Air Transfer Tube	Visual	Clogging	Not allowed. Replace
14	Oil Supply Filter	Visual	Nicks, burrs, or wear	Clean. (Refer to SP No. 5000 in Appendix E)
			Crossed, stripped, or damaged threads	Repair (Refer to SP No. 5007 in Appendix E)
15	Disk	Visual	Nicks, burrs, or wear	Repair (Refer to SP No. 5000 in Appendix E)
16 and 17	Setscrews	Visual	Crossed, stripped, or damaged threads	Replace
24	Spring (T53-L-13B, -15, -703)	Visual	Nicks, burrs, or wear	Repair (Refer to SP No. 5000 in Appendix E)
			Damage	Not allowed. Replace
25	Plunger (T53-L-13B, -15, -703)	Visual	Nicks, burrs, or wear	Repair (Refer to SP No. 5000 in Appendix E)
			Cracks	Not allowed. Replace
26	Body (T53-L-13B, -15, -703)	Visual	Nicks, burrs, or wear	Repair (Refer to SP No. 5000 in Appendix E)
		Visual	Cracks	Not allowed. Replace
27	Cylinder (T53-L-13B, 15, -703)	Visual and SIE	Nicks, burrs, or wear	Repair (Refer to SP No. 5000 in Appendix E)
		Visual and Magnetic-Particle. (Refer to table 5-190)	Scoring, scratches, or ring steps on 10.771 to 10.773 (27.358 to 27.363 cm) and 12.509 to 12.511 inch (31.773 to 31.778 cm). Refer to table 5-189	Repair or replace if limits are not met. (Refer to paragraph 5-472)
			Cracks in parent metal or plated area	Not allowed. Replace

Table 5-188. Inspection of Inlet Housing Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-630 28	Inlet Housing	Visual	Evidence of leaking around core plugs	Repair (Refer to paragraph 5-472)
		Visual	Broken out lock-wire holes	Repair. (Refer to paragraph 5-472)
			Corrosion inside of inlet housing casting in accessory pad area. (Refer to table 5-189)	Repair if limits are not met. (Refer to paragraph 5-472)
			Damaged or loose accessory drive gearbox locating hollow dowel pin	Repair. (Refer to paragraph 5-472)
			Bent, broken, or defective studs on forward flange	Repair. (Refer to paragraph 5-472)
			Corrosion around core plug seating lip, (Refer to table 5-189)	Repair. (Refer to paragraph 5-472)
		Visual and SIE	Worn 3.9990 to 4.0005 inch (10.1575 to 10.1613 cm) and 4.100 to 4.101 inch (10.414 to 10.417 cm) diameters	Repair. (Refer to paragraph 5-472)
			Erosion pitting on strut area and external portions of housing. (Refer to table 5-189)	Repair if limits are not met. (Refer to paragraph 5-472)
			Uneven surface on torque-meter cylinder area	Repair if limits are not met. (Refer to paragraph 5-472)
			Corrosion pitting on 3.375 to 3.377 inch (8.573 to 8.578 cm) diameter mounting pad holes. (Refer to table 5-189)	Repair if limits are not met. (Refer to paragraph 5-472)
			Corrosion in V-band area (Refer to table 5-189)	Repair (Refer to paragraph 5-472)
		Visual and Ohmmeter	Wear in seal area of 3.375 to 3.377 inch (8.573 to 8.578 cm) diameter mounting pad holes.	Repair (Refer to paragraph 5-472)
			Loss of epoxy resin sealant from front flange, and lifting eye	Repair (Refer to paragraph 5-472)
			Loss of epoxy resin sealant from mounting pad	Repair. (Refer to paragraph 5-472)

Table 5-188. Inspection of Inlet Housing Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
28 (Cont)	Inlet Housing (Cont)	Dimensional	Wear and flts. (Refer to table 5-191)	Repair if limits are not met
		Boroscope (flexible fiber-scope) or radiographic (X-Ray)	Internal corrosion in inlet housing. (Refer to table 5-189)	Repair or replace. (Refer to paragraph 5-472)
		Visual	Worn or oversize data plate mount pad fastener holes	Repair (Refer to paragraph 5-472)
		Visual	Material fallout or crack at thin wall areas of VIGV rod slot	Repair (Refer to paragraph 5-472)
36	Plug Assembly	Visual and/or air pressure check	Inspect torquemeter head assembly electrical outlet seating area (2 o-rings on plug) using special tool. Check for wear and/or corrosion.	Repair or replace. (Refer to paragraph 5-472)
		Visual	Nicks, burrs, or scratches.	Repair. (Refer to SP No. 5000 in Appendix E.)
		Visual and fluorescent penetrant	Crossed, stripped or damaged threads.  Cracks	Repair. (Refer to SP No. 5007 in Appendix E.)  Not allowed. Replace.

Table 5-189. Inlet Housing Assembly - Inspection Limits.

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS												
Scoring, scratches, or Ringsteps on 10.771 to 10.773 inches (27.358 to 27.363 cm) and 12.509 to 12.511 inch (31.773 to 31.778 cm) Diameters of Torquemeter Cylinder		<p>a. If minor scratches or ringsteps can not be detected with a 0.050 inch (0.127 cm) probe, polish cylinder diameters. (Refer to paragraph 5-472)</p> <p>b. If scoring, scratches, or ringsteps can be detected with a 0.050 inch (0.127 cm) probe, grind cylinder diameters. (Refer to paragraph 5-472)</p> <table> <tr> <th>Blueprint</th><th>Dimensions</th><th>Maximum Oversize Before Plating</th></tr> <tr> <td><u>Min</u></td><td><u>Max</u></td><td></td></tr> <tr> <td>10.771 (27.358)</td><td>10.773 (27.363)</td><td>10.783 (27.389)</td></tr> <tr> <td>12.509 (31.773)</td><td>12.511 (31.778)</td><td>12.521 (31.803)</td></tr> </table> <p>c. If above oversize limits are exceeded, chrome plate. (Refer to paragraph 5-472)</p> <p><b>NOTE</b></p> <p>Grinding for plate build-ups shall not exceed 0.015 inch (0.038 cm) depth above 0.010 inch (0.025 cm) maximum oversize diameter. If scoring or other damage exceeds these limits, replace cylinder.</p>	Blueprint	Dimensions	Maximum Oversize Before Plating	<u>Min</u>	<u>Max</u>		10.771 (27.358)	10.773 (27.363)	10.783 (27.389)	12.509 (31.773)	12.511 (31.778)	12.521 (31.803)
Blueprint	Dimensions	Maximum Oversize Before Plating												
<u>Min</u>	<u>Max</u>													
10.771 (27.358)	10.773 (27.363)	10.783 (27.389)												
12.509 (31.773)	12.511 (31.778)	12.521 (31.803)												
Oversize Bolt Holes		<p>Inspect inlet housing to compressor housing mounting bolt holes for oversize due to corrosion or wear. Remove all corrosion and protective treat per paragraph 5-472.</p> <p>Housing is acceptable provided bolt holes have not exceeded 0.381 (0.968 cm) diameter, and holes are still able to facilitate alignment of housing.</p>												
Corrosion Inside of Inlet Housing Casting in Accessory Pad Area		<p>Remove one access plug and inspect inside of housing for corrosion. If corrosion is found, remove any other plugs that give access to corroded area and repair. (Refer to paragraph 5-472.) If no corrosion is noted, replace plug.</p> <p><b>NOTE</b></p> <p>Removed plug may be replaced with plug 1-060-106-03 when available. If reference plug is not available, plug 1-060-106-04 may be used.</p>												

Table 5-189. Inlet Housing Assembly - Inspection Limits (Continued).

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Corrosion Around Core Plug Area	5-631	<p>a. No corrosion is permitted in core plug sealing walls (bores).</p> <p>b. Core plug seating lip may have 75 per cent missing up to sealing wall due to heavy corrosion. Under cutting of sealing wall in lip area is permissible provided undercuts are at least 0.5 inch (1.3 cm) apart and do not extend circumferentially for more than 0.75 inch (1.91 cm)</p> <p>c. Local internal surface may have light to heavy corrosion provided break through of walls does not occur.</p> <p>d. Corrosion type is defined as follows:</p> <p>Light Corrosion - Initial corrosion attack. No visual detectable pitting. Oxide powder visible</p> <p>Moderate Corrosion - Pitting present but contour of part intact.</p> <p>Heavy Corrosion - Pitting to extent of changing contour.</p>
Corrosion Pitting on Strut Area, Inlet Guidance Area, and External Portions of Inlet Housing		<p>Areas of corrosion less than one square inch in area, and greater than 1/16 inch (0.158 cm) but less than 1/8 inch (0.318 cm) in depth, shall be repaired as outlined in paragraph 5-472.</p>
Corrosion Pitting one 3.375 to 3.377 inch (8.573 to 8.578 cm) Diameter Mounting Pad Holes of Inlet Housing		<p>a. Areas of corrosion less than one square inch in area and greater than 0.0625 inch (0.158 cm) but less than 0.125 inch (0.318 cm) in depth, shall be repaired with epoxy putty as outlined in paragraph 5-472.</p> <p>b. On inlet guide vane area, corrosion pitting less than 0.020 inch shall be repaired by plasma spray per paragraph 5-472.</p>
Corrosion in V-Band Area of Inlet Housing		<p>a. Repaired V-Band area must meet the following criteria: Individual repairs must be separated by a minimum of 2 inches of sound metal; the total repair area must not exceed 50% of circumference.</p> <p>b. Areas of V-Band periphery less than 1-1/2 inches (3.81 cm) in length and 3/16 inch (0.476 cm) in depth may be blend repaired and treated with dichromate treatment. (Refer to paragraph 5-472).</p>

**Table 5-189. Inlet Housing Assembly - Inspection Limits (Continued).**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Internal Corrosion In Inlet Housing	5-632	<p>c. Areas of V-Band periphery up to 11 inches (27.94 cm) in length and 1/8 inch (0.318 cm) in depth may be repaired using epoxy putty (item 149, table C-1).</p> <p>d. Areas of V-Band periphery exceeding 0.060 inches in depth but less than 6 inches in length may be weld repaired.</p> <p>a. Housings showing evidence of heavy corrosion shall be replaced.</p> <p>b. Housing showing evidence of medium and light corrosion shall be repaired in accordance with paragraph 5-472.</p>

**Table 5-190. Magnetic Particle Inspection of Inlet Housing Assembly.**

FIGURE AND INDEX NO.	NOMENCLATURE	METHOD OF MAGNETIZATION
5-630 27	Cylinder	Circular. Use central conductor at 1500 amperes.



Table 5-191. Dimensional Inspection of Inlet Housing Assembly.

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
Inlet Housing (Fwd) to	5-630 28	*ID	10.750 (27.305)	10.752 (27.310)	10.750 (27.305)	10.754 (27.315)	0.008L (0.20)	0.018L (0.046)	5-633 A
Air Inlet Vane Assembly	4-55 7	*OD (Ref)	10.738 (27.275)	10.742 (27.285)	10.736 (27.269)	10.742 (27.285)			
Inlet Housing (Aft) to	5-630 28	*ID	10.820 (27.483)	10.822 (27.488)	10.820 (27.483)	10.823 (27.490)	0.0010L (0.0025)	0.0055L (0.0140)	B
Air Inlet Vane Assembly	4-55 7	*OD (Ref)	10.8180 (27.4777)	10.8190 (27.4803)	10.8175 (27.4765)	10.8190 (27.4803)			
Inlet Housing to	5-630 28	*ID	10.875 (27.623)	10.877 (27.628)	10.875 (27.623)	10.878 (27.630)	0.0010L (0.0025)	0.004L (0.010)	C
Rear Fairing	4-55 8	OD (Ref)	10.873 (27.617)	10.874 (27.620)	10.872 (27.615)	10.874 (27.630)	0.0010L (0.0025)	0.004L (0.010)	
Inlet Housing to	5-630 28	*ID	8.9215 (22.6606)	8.9225 (22.6632)	8.9215 (22.6606)	8.9229 (22.6642)	0.0015L (0.0038)	0.0053L (0.0135)	D

• Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.

•• Overhaul service dimensions 10.783 and 12.521 (27.389 to 31.803 cm) are acceptable provided that no score marks, scratches, or ring ups are evident. Rework if exceeded.

Table 5-191. Dimensional Inspection of Inlet Housing Assembly (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
Support	5-353 3	*OD (Ref)	8.9180 (22.6517)	8.9200 (22.6568)	8.9170 (22.6492)	8.9200 (22.6568)			5-633
Inlet Housing to	5-630 28	*ID	8.9215 (22.6606)	8.9225 (22.6632)	8.9215 (22.6606)	8.9229 (22.6642)	0.0015L (0.0038)	0.00361 (0.0091)	D
Carrier	5-617 42	*OD (Ref)	8.9195 (22.6555)	8.9205 (22.6581)	8.9193 (22.6550)	8.9205 (22.6581)			
Inlet Housing to	5-630 28	*ID	3.9990 (10.1575)	4.005 (10.1613)	3.9990 (10.1575)	4.006 (10.1615)	0.0005L (0.0013)	0.0027L (0.0069)	E
Retainer Assembly to	5-625 4	*OD (Ref)	3.9980 (10.1575)	3.9985 (10.1562)	3.9979 (10.1547)	3.9985 (10.1562)			
Cylinder (T53-I-13B, -15, -703)	5-630 27	*ID	12.509 (31.773)	12.511 (31.778)	12.509 (31.773)	12.521** (31.803)			F
		*ID	10.771 (27.358)	10.773 (27.363)	10.771 (27.358)	10.783** (27.389)			G
		*OD	10.891 (27.663)	10.893 (27.668)	10.890 (27.661)	10.893 (27.668)			H
		*ID	12.752 (32.390)	12.754 (32.395)	12.752 (32.390)	12.757 (32.4028)			I
		ID	10.893 (27.668)	10.894 (27.671)	10.892 (27.666)	10.895 (27.673)			J
Inlet Housing	28	*ID	4.100 (10.414)	4.101 (10.417)	4.1000 (10.4140)	4.1015 (10.4178)			K

\* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.

\*\* Overhaul service dimensions 10.783 and 12.521 (27.389 to 31.803 cm) are acceptable provided that no score marks, scratches, or ring ups are evident. Rework if exceeded.

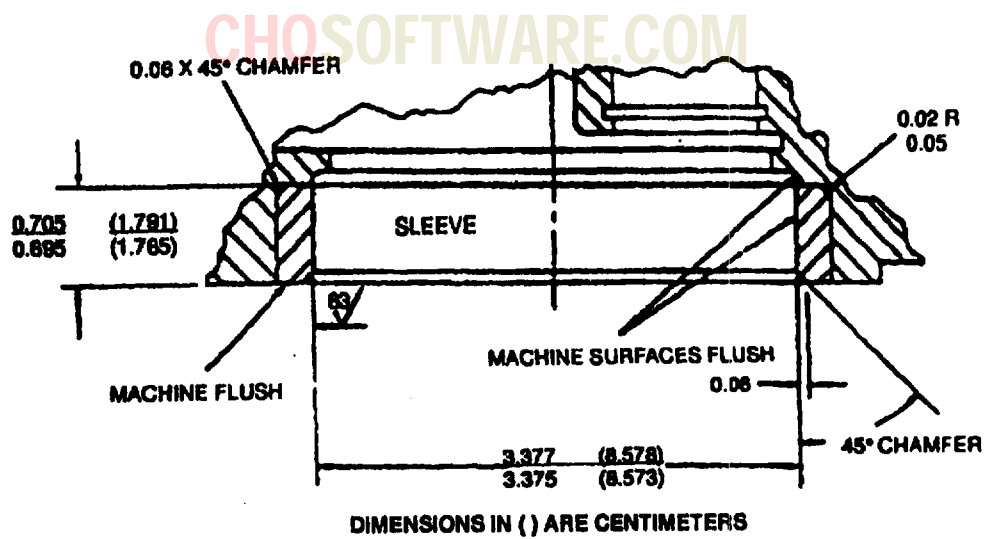
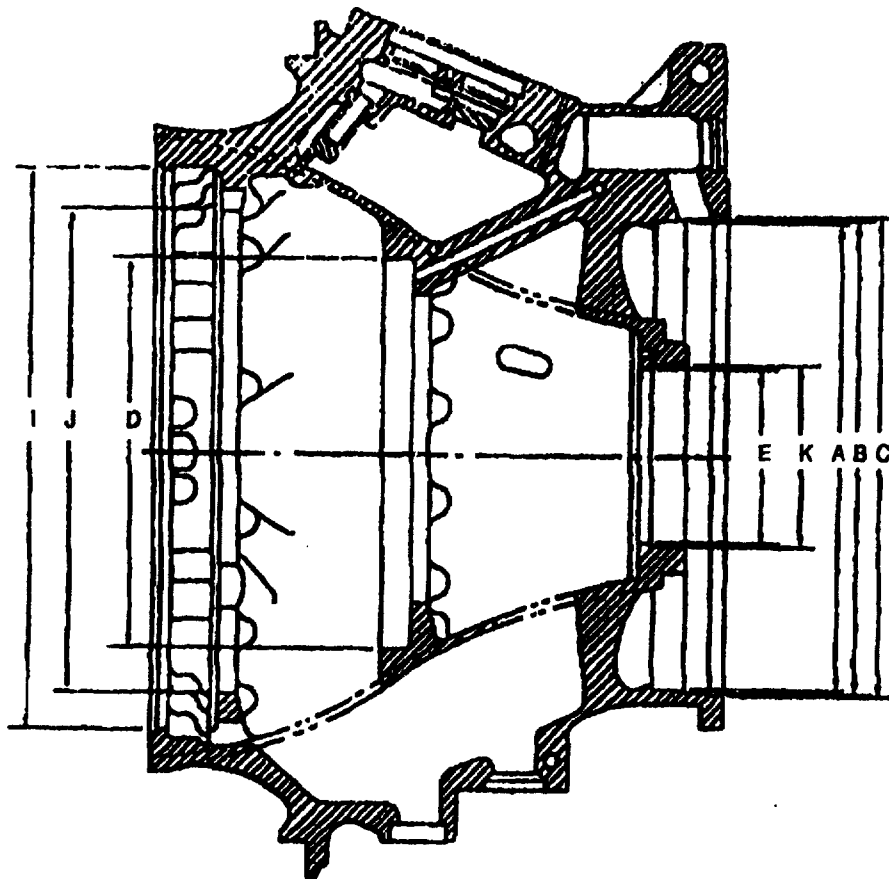


Figure 5-631. Repair of Inlet Housing Mounting Pad Holes.

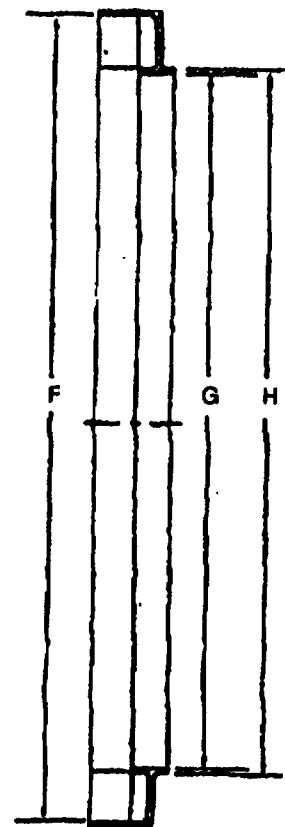


Figure 5-632. Inlet Housing Internal Corrosion Inspection Criteria.

CHQSOFTWARE.COM



INLET HOUSING - TYPICAL (28, FIGURE 5-630)



CYLINDER (27, FIGURE 5-630)

Figure 5-633. Inlet Housing Assembly Dimensional Inspection Locations (Typical).

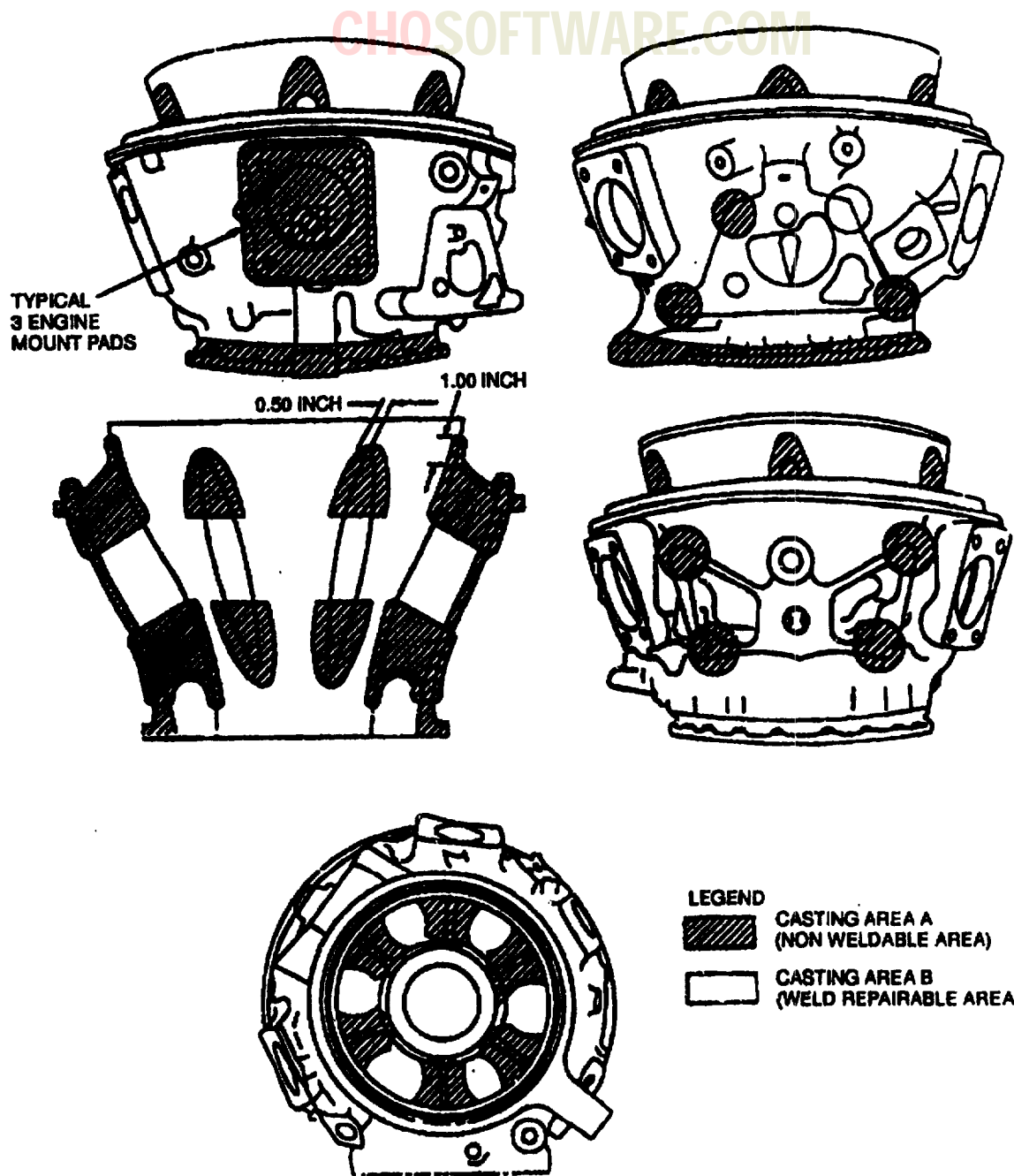


Figure 5-634. Inlet Housing Weldable Area.

- (c) Clean area with acetone (item 13, table C-1)
  - (d) Preheat to 300°F (149°C) maximum.
  - (e) Fill the defect in with welding rod (item 344, table C-1), using fusion-weld repair (Refer to SP No. 5001 in Appendix E).
  - (f) Hand-blend or machine-weld area smooth to original contour.
  - (g) Visually inspect the welded area.
  - (h) Fluorescent-penetrant inspect the welded area.
  - (i) Stress relieve at 300°F (149°C) for one hour.
- (2) Repair worn or oversize data plate mount pad fastener holes on the inlet housing assembly.
- (a) Weld repair discrepant holes with welding rod (item 344, table C-1) by fusion welding Refer to SP No. 5001 in Appendix E).
  - (b) Hand-blend or machine repair area to original contour.
  - (c) Using a suitable template, drill fastener holes 0.086 inch (0.218 cm) diameter, 0.240 to 0.280 inch (0.610 to 0.711 cm) deep.
  - (d) Treat bare metal surfaces (Refer to SP No. 6023 in Appendix E).
- b. Repair scoring, scratches, or ringsteps on 10.771 to 10.773 (27.358 to 27.363 cm) and 12.509 to 12.511 inch (31.773 to 31.778 cm) diameters of the cylinder (27, figure 5-630) as follows: (See figure 5-635).
- (1) Repair minor scratches or ringsteps as follows:
    - (a) Polish cylinder diameters to a 32 RMS finish.
    - (b) Refinish with black oxide coating (Refer to SP No. 6002 in Appendix E).
  - (2) Repair scoring, scratches, or ringsteps, detected with a 0.050 inch (0.127 cm) probe, as follows:
    - (a) Grind cylinder diameters up to a maximum of 0.010 inch (reference 10.783 inch (27.389 cm) maximum and 12.521 inch (31.803 cm) maximum, including machining to meet concentricity, surface finish, and edge radius/thickness per figure 5-635.
    - (b) Refinish with black oxide coating (Refer to SP No. 6002 in Appendix E).
  - (3) If above limits are exceeded, chrome plate cylinder diameters as follows:
    - (a) Grinding for plate buildup shall not exceed 0.015 inch depth above the 0.010 maximum over size diameter. If scoring or other damage exceeds these limits, replace cylinder.
    - (b) Chrome plate as outlined in SP No. 6014 in Appendix E, to obtain a 0.002 to 0.015 inch (0.005 to 0.038 cm) plate thickness after final grind.
    - (c) Bake at 365° to 385°F (185° to 196°C) for 3 hours.
    - (d) Machine diameters to 10.771 to 10.783 and/or 12.509 to 12.521 including required machining to meet concentricity, surface finish, and edge radius/thickness per figure 5-635.
- c. Repair evidence of leakage around core plugs on inlet housing (28, figure 5-630) as follows:
- (1) Remove snapping. Remove all defective inlet housing plugs, using plug remover (LTCT3911).

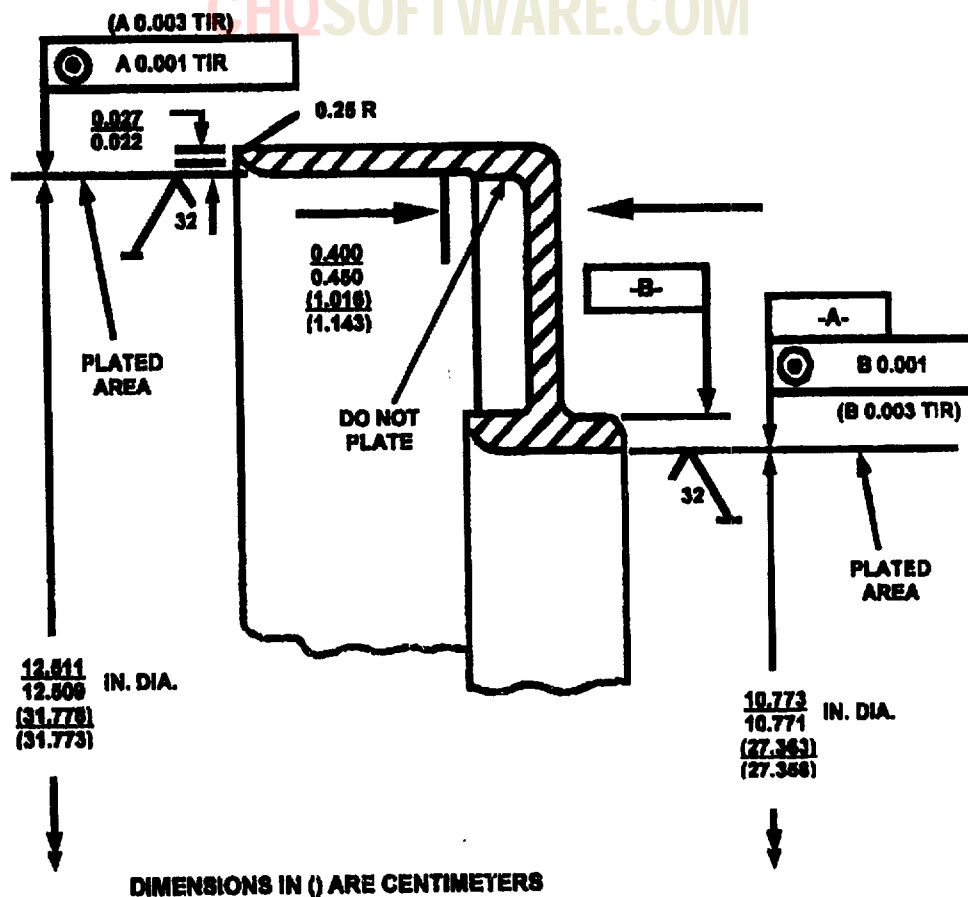


Figure 5-635. Machining/Plating Requirements.

(2) This repair applies to all T53 engine inlet housing core plugs requiring removal from inlet housing for the purpose of cleaning and removing accumulated corrosion products from the internal surfaces of these housings. This repair also applies to the reinstallation of these removed core plugs.

- Degrease all core plugs (to be adhesive bounded) with cleaning solvent (item 102, table C-1).
- Using clean absorbent gauze wipe all corresponding core plug hole surfaces with cleaning solvent (item 102, table C-1). Continue wiping, changing gauze frequently, until gauze remains clean.
- Prior to bonding, bake parts for four hours at 225° to 250°F (107.2° to 121.1°C) to dry absorbed moisture and/or remove the water of crystallization.
- Mix by weight in a container 100 parts of EC 2216, Part A (NSN 8040-00-145-0432) and 140 parts of EC 2216 Accelerator, Part B (same NSN as Part A), or mix by volume 100 parts of EC 2216, Part A and 150 parts of EC 2216 Accelerator, Part B. Stir this mixture thoroughly until a uniform gray color with no streakings obtained. Use this adhesive mixture within one (1) hour after mixing.
- Apply the above adhesive mixture to both surfaces of the cleaned core plugs, and to the surfaces of the inlet housing core plug holes to be bonded. Thickness of adhesive layer applied should be between .005 to .010 inch (.013 to .025 cm).
- Press core plug into plug seat. Secure in inlet housing with snap ring, MS11625-1102.

#### NOTE

Whenever possible, use minimum number of small aluminum spacers to maintain 0.004 to 0.006 inch (0.010 to 0.015 cm) cured bond line between mating surface.

- (g) Using any available means, apply external compression load to core plug being bonded, but do not exert extreme pressure on the core plug. Nominal pressure of 10 psi (703.07 gm sq cm) is sufficient.
- (h) Remove excess adhesive coming from bonded joint, and air dry 1-1/2 to 2 hours.
- (i) Cure adhesive mixture until it is completely firm. This may be accomplished by allowing the housing to stand overnight at 60°F (15.6°C) or above, or curing of adhesive may be speeded up by placing the housing in an oven at 300°F (148.9°C) for 1 hour.

#### NOTE

Completely firm means the cured adhesive will resist fingernail penetration.

- (j) After curing, pressure test repaired core plugs as follows:

- 1 Coat surface area of plug with liquid soap.

#### NOTE

During overhaul the pressure test for air chambers in subject housings shall be made with air at 45 psig.

- 2 Pressure-test as outlined in paragraph 5-474, except that air pressure of 15 to 45 psig (1055 to 3164 gm sq cm) is applied internally.

- 3 If lockwire holes of inlet housing assembly are broken out, repair by drilling new lockwire holes adjacent to old holes as follows:

- a Smooth rough edges of breakout area.
- b Using hand-held drill, drill 0.060 inch (0.152 cm) hole in area adjacent to previous lockwire hole. Do not drill less than 0.125 inch (0.318 cm) from any edge.

- c Touch up bare metal as outlined in SP No. 6027 in Appendix E.

- d. Remove corrosion from inside of inlet housing in accessory pad area as follows:

- (1) With plugs removed, use a suitable rotary brush or bead blasting to remove all products of corrosion from inner surface.

- (2) After cleaning area of corrosion, surface treat in accordance with MIL-M-3171, Type VI. Allow solution to wet surface for 3 minutes minimum; then dry surface with clean, dry compressed air.

- (3) Reinstall removed plugs.

#### NOTE

Removed plugs may be replaced with plug (1-160-106-03) when available. If referenced plug is not available, plug (1-060-106-04) may be used.

- e. Repair damaged or loose accessory drive gearbox locating dowel as follows:

- (1) Remove defective hollow dowel.

- (2) Using steel alloy (item 302, table C-1), fabricate a new hollow dowel to the dimensions shown in figure 5-636. Dimension A will be determined by oversize and allowing for 0.0005 to 0.0020 inch (0.0014 to 0.0051 cm) tight fit when installed.

- (3) Install hollow dowel in inlet housing.

- f. Replace bent, broken, or defective studs on forward flange as follows:





## CAUTION

(1) If stud is broken below surface of flange, drill out damaged stud, using 3/16-inch drill. This will allow sufficient wall thickness to permit use of bolt extractor.

## CAUTION

### NOTE

- (2) If stud is broken 1/2 inch or more above flange, remove with vise grips.
- (3) Remove metal particles from stud hole, using moisture-free compressed air.
- (4) Coat threads of new stud with primer (Item 253, table C-1).
- (5) Thread stud into housing approximately 1/2 inch. Tighten stud to 50 to 110 pounds-inches (8930 to 1965 gm sq cm) torque.
- (6) If required torque cannot be obtained, use first oversized stud, STD3001B121N. If required torque still cannot be obtained, use a second oversized stud, STD3001B121P
- (7) After stud has been properly tightened, distance from housing flange to stud shall be 1.530 to 1.580 inches (3.886 to 4.013 cm).

**g. Repair corroded core-plug seating lip as follows:**

CHQSCRE.COM

**WARNING**

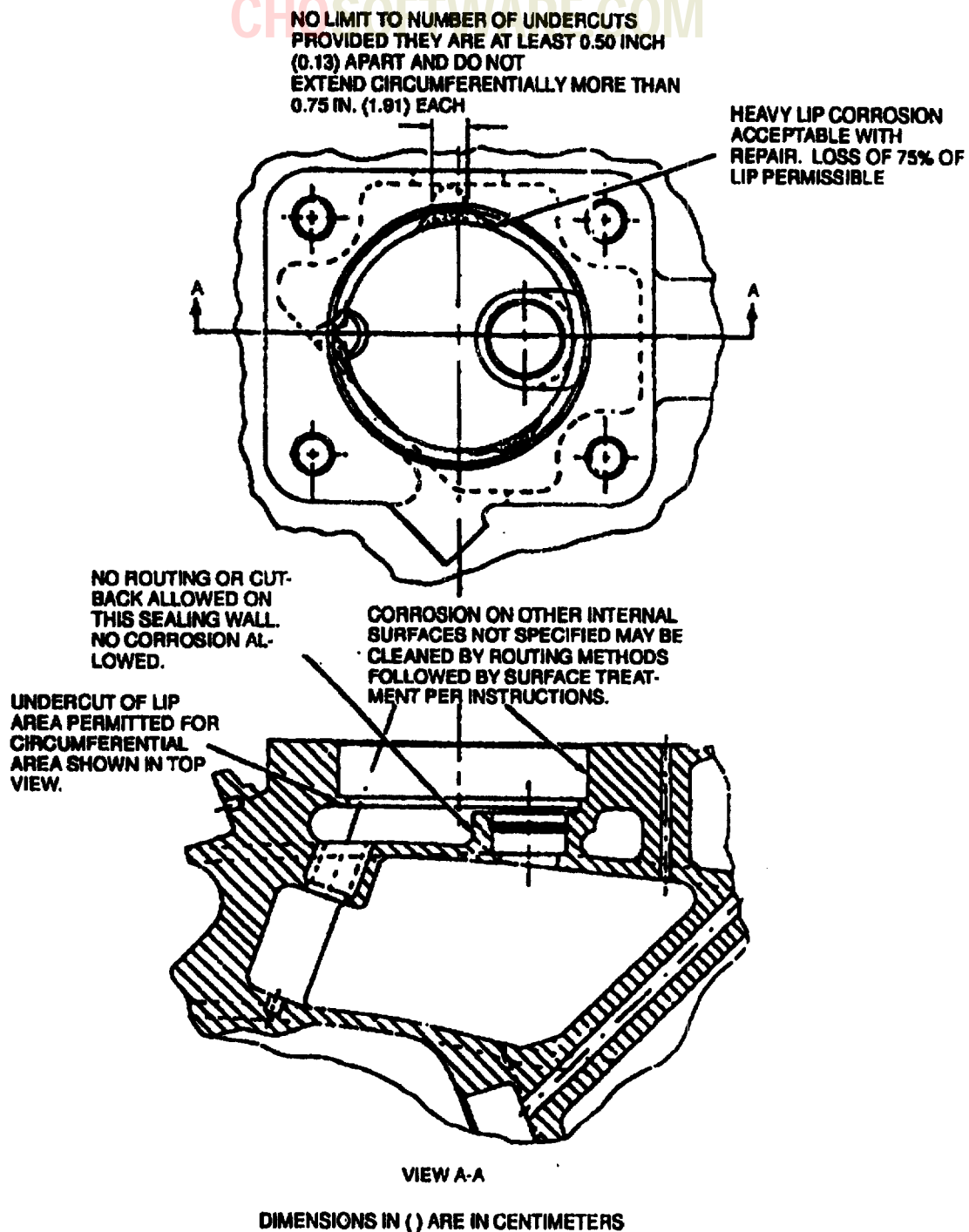
To avoid inhaling acetone fumes, perform following cleaning operation in a well-ventilated area. Avoid prolonged inhalation of fumes.

- (1) Clean areas that require touchup using acetone (item 13, table C-1).
- (2) After cleaning, inspect area for corrosion. Corrosion is indicated by pitting or flaking on surface of metal.
- (3) Remove corrosion by routing out with a hand grinder, observing limits of figure 5-637.

**WARNING**

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 body contact, immediately flush skin or eyes with water for at least 15 minutes; then seek medical attention.

- (4) Using a cotton swab, apply chrome-pickle solution consisting of 1.5 pounds of sodium dichromate (item 282, table C-1) and 1.5 pints of nitric acid (item 229, table C-1) per gallon of water, to areas being treated.
- (5) Allow chrome-pickle solution to remain on surface for 2 to 5 minutes and rinse in cold water.
- (6) Dry with a heat lamp for 10 to 15 minutes.
- (7) Using a brush apply epoxy adhesive (item 21, table C-1).



**Figure 5-637. Inlet Housing Core Plug Corrosion Cleanup Limits.**

- (8) Cure epoxy at room temperature for 24 hours or for 1 hour at 300°F (149°C), should an accelerated cure be required.
- (9) Push core plugs into their respective core plug holes in each inlet housing, insuring that each plug is well seated.
- (10) Install retaining rings, MS-11625-1102.
- (11) Wipe off excess adhesive mixture and air dry for 1 1/2 to 2 hours.

## NOTE

Completely firm means the cured adhesive will resist fingernail penetration.

h. Repair worn 3.9990 to 4.0005 inch (10.1575 to 10.1613 cm) diameter and 4.100 to 4.101 inch (10.414 to 10.417 cm) diameter of inlet housing, where up to 0.006 inch (0.015 cm) maximum synthetessine thickness is required, as follows: (See figure 5-638).

(1) **Painting Procedure:** The following procedure will be used to apply synthetessine paint for the purpose of build-up in the number 1 main bearing and seal bore areas of the inlet housing.

(a) **Preparation.** Preclean the repair surface per SP No. 6005 in Appendix E.

(b) **Application of coating.**

1 Apply one coat of either one of the following types of synthetessine coatings to the aforementioned areas to be painted:

a Synthetessine 200, Epoxy/Phenolic pigmented, formula number S-3612-H (item 151, table C-1).

b Synthetessine 200, Epoxy/Phenolic engine gray XW-108 (item 144, table C-1).

2 The coat applied should have a viscosity of 16 to 18 seconds at 80°F (37°C) using a Number 2 Zahn Cup. This viscosity can be achieved by diluting the paint with thinner (item 330, table C-1 or equivalent).

3 The thickness of the applied coat should be 0.0002 to 0.0003 inch (0.0005 to 0.0008 cm).

## NOTE

Areas which have serviceable paint on them do not require a coat.

4 Cure the coating at 340°F to 360°F (171.1° to 182.2°C) for 2 1/2 to 3 hours.

(c) **Application of Build-up Coating.**

1 The build-up coat shall consist of one of the synthetessine coating referenced in paragraph h(1)(b)1. combined with flake graphite in the following proportions:

a Mix one (1) part of volume of either pigmented enamel number S-3612-H or epoxy/phenolic engine gray XW-108 (1) part by volume thinner (item 330, table C-1 or equivalent) to give viscosity of 17 to 19 seconds at room temperature using a Number 2 Zahn Cup.

b Mix 200 parts by weight of the "thinned" synthetessine paint with three (3) parts by weight of flake graphite (item 165, table C-1 or equivalent) to give a viscosity of 17 to 19 seconds at 80°F (27.4°C) using a Number 2 Zahn Cup.

2 Apply sufficient number of 0.002 (0.005cm) (maximum thickness) coats to achieve finish thickness requirements. Each 0.002 (0.005cm) must be cured at 340°F to 360°F (171.1°C to 182°C) for 2 1/2 to 3 hours and the final 0.002 (0.005 cm) coat must be cured at 340°F to 360°F (171.1°C to 182.1°C) for 3 hours.

(2) **Machining of Synthetessine Coating.** The coating must be finish machined to figure 5-638. Machinability of the coating is strongly dependent upon its degree of cure.

(a) **Paint peeling during machining** Indicates that paint is not completely cured.

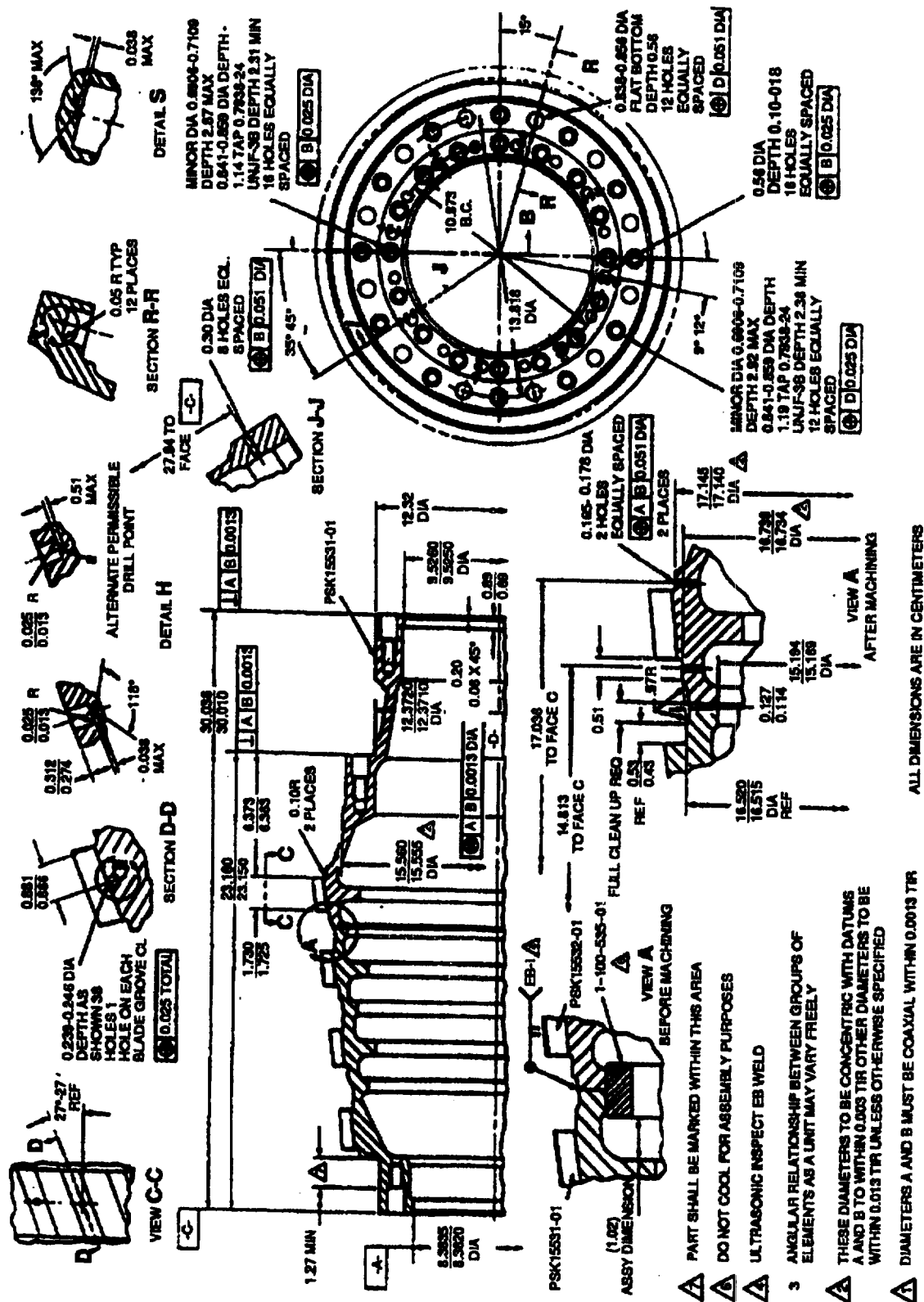
1 The engine gray (XW-108) synthetessine does not undergo sufficient color change to indicate degree of cure. However, "fluid resistance" and "tape adhesion" test may be used to determine if paint is fully cured.

(b) **Paint chipping during machining** Indicates that paint is charred from over curing. Over curing will char entire coating system on housing and requires complete stripping and recoating.

1 Synthetessine S-3612-H starts "yellowing" and becomes increasingly darker as it is over cured, and will ultimately achieve a blackish brown color.

2 The engine gray (XW-108) synthetessine does not undergo sufficient color change to indicate degree of cure. However, "fluid resistance" and "tape adhesion" test may be used to determine if paint is charred.





**Figure 5-591. Installation of Replacement Compressor Rotor Disk (Metric) (Sheet 4 of 4).**

## NOTE

Use solution at room temperature.

(b) Areas of parts to be welded shall be etched for 1 or 2 minutes in a solution consisting of 32 to 36 percent by volume concentrated nitric acid (item 229, table C-1) (42° Baume), 2 to 4 percent by volume concentrated hydrofluoric acid (70 percent) (item 170, table C-1), and water to make one gallon.

### CAUTION

Concentration of chlorides present in water shall not exceed 17 ppm.

(c) Rinse parts in clean running water then dry with a clean, filtered air blast.

### CAUTION

Extreme caution shall be exercised to prevent any contamination occurring to joint areas after cleaning.

(d) Clean surfaces to be welded by manually wiping with a disposable wipe (item 356, table C-1) soaked in acetone (item 13, table C-1).

(4) Install replacement rotor disk and rotor subassembly on welding fixture.

## NOTE

Welding fixture shall smoothly rotate assembly at approximately three revolutions per minute. Fixture shall rotate assembly in such a manner that runout of joints shall be within plus or minus 0.002 inch (0.005 cm). There shall be no gaps at weld joint interfaces.

(5) Position disposable spatter shield, fabricated from steel alloy (item 301, table C-1) inside rotor assembly. (See figure 5-592.)

(6) Suitably mask blade slot areas to protect them from metal spatter.

## NOTE

Masking material shall not be detrimental to part or interfere with welding process.

(7) Install copper targets level with OD of joint to be welded and at least 8 inches from rotor assembly, unless rotor assembly is protected by spatter shield.

(8) Electron-beam weld as outlined in SP No. 5005 in Appendix E as follows:

(a) Set operator panel beam deflection selector switch to OFF. Leave in OFF position while welding.

(b) Move 20-power oculars to locate impact point on reticles.

(c) Install heat shield 6 to 12 inches from part to be welded.

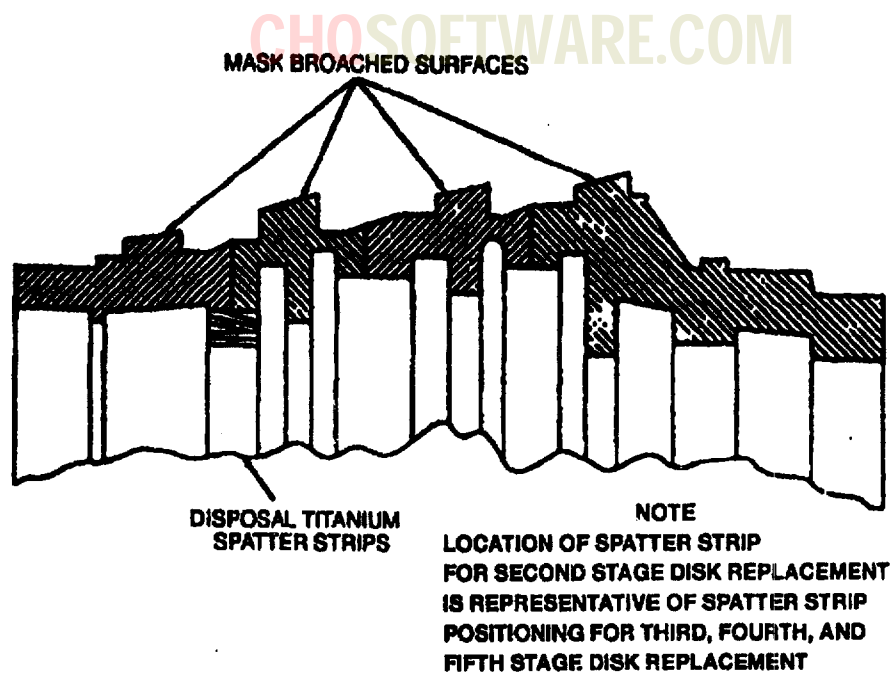
(d) Eight 1/2- to 3/4-inch- (1.27- to 1.91 cm-) long tack welds shall be made at 45-degree intervals (0°, 180°, 90°, 270°, 135°, 315°, 225°, and 45°)

## NOTE

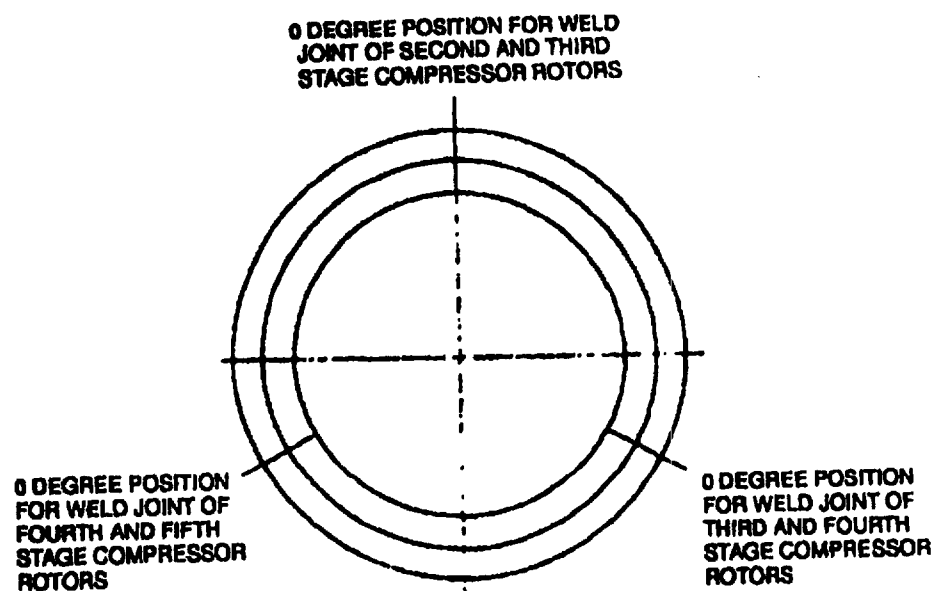
The 0-degree point shall be shifted 120-degrees clockwise from weld joint between second and third stage disk to the weld joint between third and fourth stage disk. Similar 120-degree rotation shall be made between third and fourth stage weld joint and the weld joint between fourth and fifth stage disk weld joint. (See figure 5-593.)

- (e) Starting at second tack weld (180°), weld joint in a single pass.
- (f) Inspect weld joints visually, radiographically, ultrasonically, and by fluorescent-penetrant method. (Refer to tables 5-175 and 5-176.)
  - 1 Porosity indications on welded joints shall be removed by the use of small die grinder or carbide wheel (Atrax P-1 or K-1, medium grade or, equivalent) or hand routing, using an emery cloth (320 grit or finer) and/or an India stone (medium grade or finer).
  - 2 After rework, the blend limits shall be as follows:
    - a Length: 2.000 inch (5.080 cm) maximum.
    - b Depth: A minimum wall thickness of 0.200 inch (0.508 cm) at weld.
    - c Width: Outside Diameter Blends: 0.120 inch (0.305 cm) when centered on the weld joint. Inside Diameter Blend: Equal to width of weld land.
    - d Blend Frequency: Only one ID blend and one OD blend shall be permitted on a weld joint. When both inside and outside blends occur on the same joint, the blends shall be separated by at least one inch in a circumferential direction.
    - e Blended areas must be inspected to insure conformity to requirements of table 5-175.





**Figure 5-592. Compressor Rotor Set Up for Electron Beam Welding (Typical).**



**Figure 5-593. Relative Starting Positions for Electron Beam Welded Joints.**

**Table 5-175. Visual, Fluorescent-Penetrant, and Radiographic Acceptance Limits for Reworked Compressor Rotor.**

Defect	Visual	Fluorescent-Penetrant	Radiographic
Crack and Crack-like Indications	Unacceptable	Unacceptable	Unacceptable
Incomplete Penetration and Fusion	Unacceptable	Unacceptable	Unacceptable
Porosity Maximum Dimension	0.010 Inch (0.025 cm)	0.010 inch (0.025 cm)	0.060 inch (0.152 cm)
Maximum Cumulative Length	Three indications per weld joint	Three indications per weld joint	Two indications of maximum size per linear inch or an equivalent length of smaller indications
Minimum Distance Between Indications	1.0 inch (2.5 cm)	1.0 inch (2.5 cm)	Two times the maximum dimensions of the smaller indication. (See Note)

**NOTE:** When the distance between porosity indications is less than 2 times the major dimension of the smaller indication, the following shall apply:

The porosity indications (2 or more) shall be evaluated as single porosity.

The porosity clusters which cannot be encompassed by a 0.060 inch (0.152 cm) diameter circle shall be subject to assembly rejection

**Table 5-176. Ultrasonic Inspection Acceptance Limits for Reworked Compressor Rotor.**

Scan Angle	Max. Size of Indication	Max. Number of Indications Per Inch	Max. Cumulative Amount
60 Degrees	0.024 Inch (0.061 cm) Diameter	Four indications of maximum size or equivalent size of smaller indication	Two one inch areas with maximum indications separated by a minimum of two inches, or equivalent length of small indication
45 Degrees	0.060 Inch (0.152 cm) Diameter	Four indications of maximum size or equivalent size of smaller indication	Two one inch areas with maximum indications separated by a maximum of two inches, or equivalent length of small indication

- (g) Stress-relieve rotor assembly as follows:

**NOTE**

Stress-relieve operation shall be performed in a vacuum furnace maintained at a vacuum of one micron or less.

- 1 Heat rotor assembly in a vacuum furnace at 885° to 915° F (474° to 491° C).
  - 2 Hold at heat for 4 hours.
  - 3 Cool-stress relieved part at ambient conditions.
- (9) After welding, machine rotor disks as shown in figure 5-590.

**NOTE**

Deburr all tenon corners.

- (10) Surface-treat replacement compressor rotor stage as follows:

- (a) Clean part as required per SP No. 3002 in Appendix E.
  - (b) Soak compressor rotor in alkaline solution for one minute to loosen and remove soils not removable in preceding step (a). (Refer to SP No. 3004 in Appendix E.)
  - (c) Remove part from solution and rinse thoroughly in hot, then cold water.
  - (d) Areas of parts that are welded shall be picked for 3 seconds in a solution consisting of 1-1/2 pints per gallon nitric acid (item 229, table C-1) and 3 fluid ounces per gallon hydrofluoric acid (item 170, table C-1); then rinsed off rapidly and thoroughly in cold running water.
  - (e) Inspect welded joints visually, radiographically, ultrasonically, and by fluorescent-penetrant method. (Refer to tables 5-175 and 5-176.)
- c. Reblade compressor rotor assembly (Refer to paragraph 5-439.)
  - d. Using vibro etcher etch PRP 528 on all replacement compressor disks as shown in figures 5-588 through 5-592.

**5-441. INITIAL REASSEMBLY. Proceed as follows:**

- a. If power shaft plug (37, figure 5-569) was removed, install as follows:
  - (1) Using approved method, chill new power shaft plug and install in forward end of balanced power shaft (38).
  - (2) Test plug for tightness by tapping with brass rod inserted in opposite end of power shaft.
- b. Assemble compressor rotor subassembly as follows:

**NOTE**

Ensure that all indexed parts and hardware are properly aligned during reassembly.

- (1) Position compressor rotor subassembly (24) in holding fixture (LTCT13001).
- (2) Install two guide pins (LTCT13003), 180 degrees apart, into front bolt holes on compressor rotor subassembly (24).
- (3) Position front shaft assembly (19) on compressor rotor subassembly (24) and install three bolt retainers (35) and three screws (36), 120 degrees apart.

**NOTE**

Lubricate threads and under screw heads with antiseize compound (item 47, table C-1).

- (4) Draw down front shaft assembly (19) by tightening screws installed in preceding step (3).
- (5) Remove guide pins installed in preceding step (2) and install seven remaining bolt retainers (35) and seven remaining screws (36). Place compressor rotor assembly, front stub shaft down in holding fixture (LTCT6641).

**NOTE**

Lubricate threads and under screw heads with antiseize compound (item 47, table C-1).

- (6) Install prebalanced power shaft (38). Ensure that plug (37) is installed in power shaft.
- (7) Install two guide pins (LTCT13003) in rear shaft bolt holes of compressor rotor subassembly (24).
- (8) Freeze rear compressor shaft (39); align index marks then position shaft on compressor rotor subassembly (24) and install three lock cup washers (32) and three bolts (33), approximately 120 degrees apart.

**NOTE**

Bolts (33) must be identified with the letters SPS, letters VS, letters VSI, two dots, part number 1-100-502-02, part number 2-07-5029G, or manufacturer's code number 92215 on the bolt heads. The letters may be followed by a lot number. Lubricate under bolts heads with antiseize compound (item 47, table C-1).

- (9) Draw down rear compressor shaft (39) by tightening bolts installed in preceding step (8).
- (10) Remove guide pins installed in preceding step (7) and install remaining 13 lock cup washers (32) and 13 bolts (33).
- (11) Position compressor rotor assembly, rear stub down, in wrench and base assembly (LTCT2147).
- (12) Tighten 10 screws (36) as follows:
  - (a) Cross-tighten to 120 to 130 pound-inches (21432 to 23218 gm cm) torque and release.
  - (b) Cross-tighten to 130 to 140 pound-inches (23218 to 25004 gm cm) torque and release.
  - (c) Cross-tighten to 120 to 130 pound-inches (21432 to 23218 gm cm) torque.
- (13) Stake bolt retainers as shown in figure 5-594, using locking tools (LTCT2151 and LTCT2152) and staking tool (LTCT4051).

**NOTE**

Shearing of locking cup into slots in disk is permissible in order to ensure locking of mating bolt, provided resulting tang is still firmly attached along resulting bend line. If cracks result from shearing, only vertical cracks are allowed.

- (14) Position compressor rotor assembly, front shaft down, in holding fixture (LTCT6641).
- (15) Fabricate a ring to dimensions shown in figure 5-595 of low-alloy heat-resistant steel, black-oxide coated, in accordance with SP No. 6002 in Appendix E.
- (16) Install fabricated ring over shoulder of stub shaft to ensure centering of lockcup washers around bolt heads. Washers shall be held outward by the OD of the ring a minimum of 0.080 inch (0.203 cm) from the OD of the stub shaft.

CHQSOFTWARE.COM

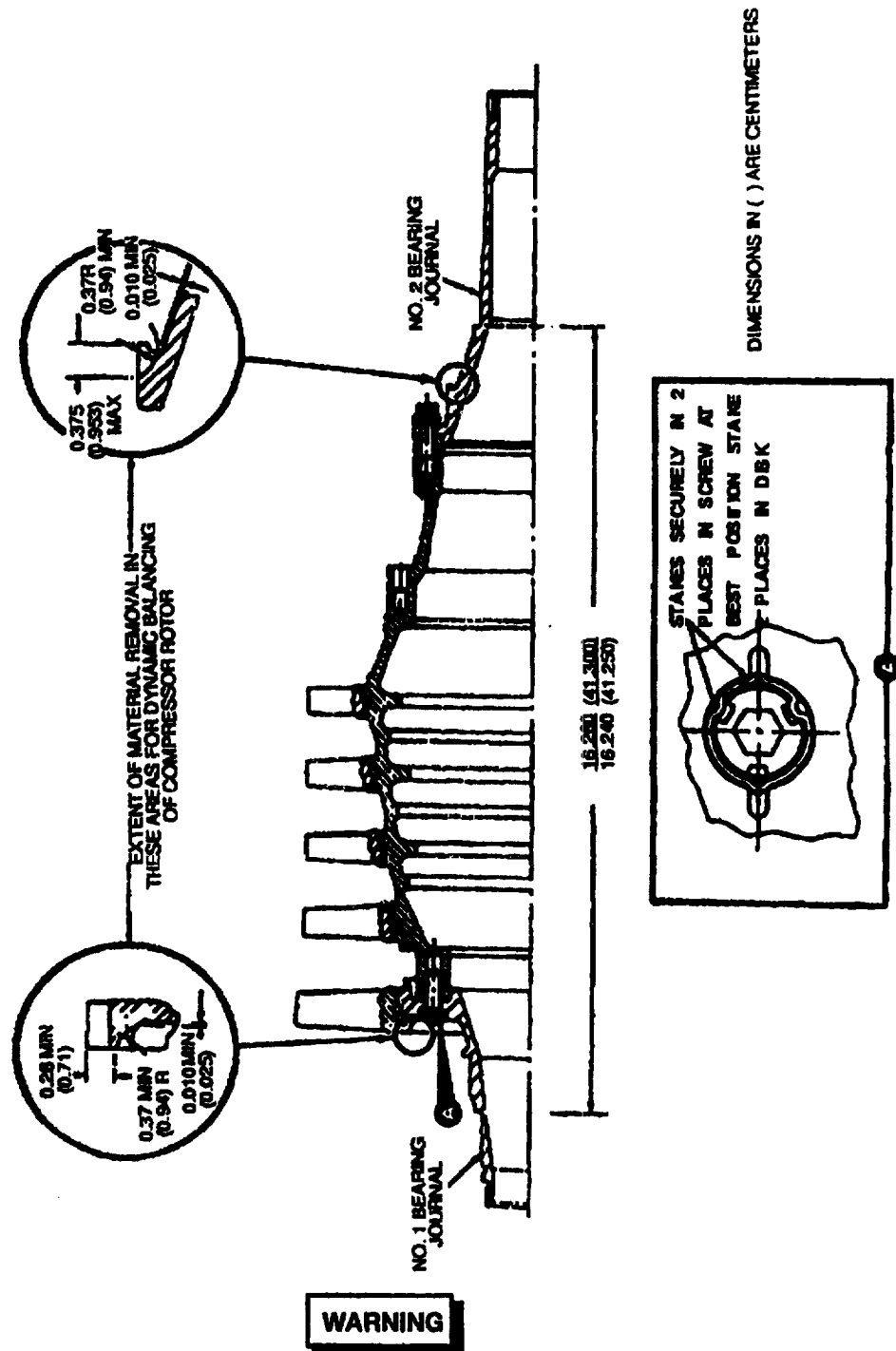
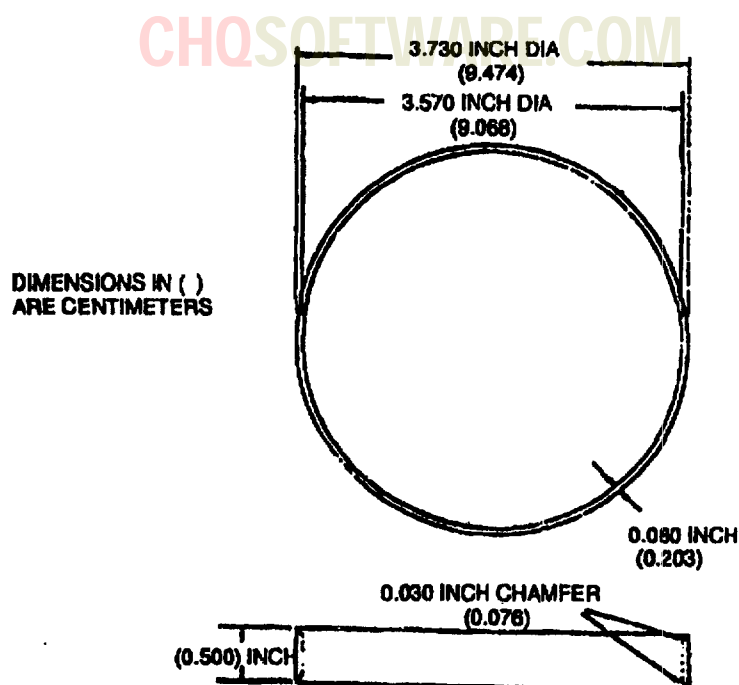


Figure 5-594. Dimensional Limits, Stock Removal Areas, and Staking Procedure for Compressor Rotor Subassembly.



**Figure 5-595. Lockup Washer Centering Ring Fabrication.**

(17) Do not deform lockup washers. Tighten 16 bolts (33, figure 5-569) as follows:

- (a) Cross-tighten to 190 to 200 pound-inches (33934 to 35720 gm cm) torque and release.
- (b) Cross-tighten to 190 to 200 pound-inches (33934 to 35720 gm cm) torque and release.
- (c) Cross-tighten to 190 to 200 pound-inches (33934 to 35720 gm cm) torque.

(18) Remove lockup washer centering ring.

**5-442. COMPRESSOR ROTOR CONCENTRICITY CHECK (T53-L-13B, -701A, -703).** Proceed as follows:

- a. Position compressor rotor subassembly in concentricity and length rotor assembly gaging fixture (LTCT4719).
- b. Measure distance from No. 1 bearing journal shoulder to No. 2 bearing ring shoulder. (See figure 5-594.) Distance shall be 16.240 to 16.260 inches (41.250 to 41.300 cm).
- c. Using height gage and dial indicator, check concentricity of first, second, third, fourth, and fifth stage compressor rotor blade tips, seal journals, and rear cone pilot of rear compressor shaft.
  - (1) Maximum allowable runout of first, second, third, fourth, and fifth stage blade tips is 0.003 inch TIR.
  - (2) Maximum allowable runout on seal journal or seal runner and rear cone pilot of rear compressor shaft is 0.002 inch TIR.
- d. If runout is not within limits, compressor rotor subassembly shall be disassembled and front shaft assembly (19, figure 5-569) and/or rear compressor shaft (39) repositioned, as necessary; to bring runout within limits.
- e. Take end float of power shaft. Record measurement with power shaft in full aft position. Move power shaft to full forward position and record measurement. End float of power shaft shall be 0.390 to 0.600 inch (0.991 to 1.524 cm). If power shaft end float is not within limits, disassemble compressor rotor and investigate.

**5-443. COMPRESSOR ROTOR BALANCING (T53-L-13B, -701A, -703).** Proceed as follows:**NOTE**

If extensive repairs have been made to the compressor, balance rotor subassembly and impeller separately. (Refer to following steps h and i).

- a. Position compressor rotor subassembly in holding fixture (LTCT6641) and install two guide pins (LTCT13003) in rear outer bolt holes.
- b. Position balanced impeller (34) on compressor rotor subassembly and install three lockcup washers (32) and three bolts (33), approximately 120 degrees apart.

**NOTE**

Bolts (33) must be identified with the letters SPS, letters VS, letters VSI, two dots, part number 1-100-502-02, part number 2-07-5029G, or manufacturer's code number 92215 on the bolt heads. The letters may be followed by a lot number. Lubricate under bolts heads with antiseize compound (item 47, table C-1).

Lubricate under bolt heads with antiseize compound (item 47, table C-1).

- c. Draw down impeller (34) by tightening bolts installed in preceding step b.
- d. Remove guide pins installed in preceding step a and install nine remaining lockcup washers (32) and nine bolts (33).
- e. Do not deform lockcup washers. Tighten 12 bolts (33) as follows:
  - (1) Cross-tighten to 150 to 160 pound-inches (26790 to 28576 gm cm) torque and release.
  - (2) Cross-tighten to 150 to 160 pound-inches (26790 to 28576 gm cm) torque and release.
  - (3) Cross-tighten to 150 to 160 pound-inches (26790 to 28576 gm cm) torque.
- f. Using concentricity and length rotor assembly gaging fixture (LTCT4719), check for radial runout of compressor rotor assembly. Maximum allowable runout of impeller trailing edges shall not exceed 0.003 inch TIR.

**WARNING****FLIGHT SAFETY PARTS**

**Material removal limits for balancing are flight safety critical**

- g. Balance complete compressor rotor assembly as follows:
  - (1) Using suitable slave bearings (1-300-C15 and 1-300-176), support compressor rotor assembly in holding fixture (LTCT4078), and support power shaft with holding fixture (LTCT251). Check balance of complete compressor rotor assembly, using Model 3S balancing machine (Gisholt Machine Co.), or equivalent.

**NOTE**

To ensure sufficient balancing accuracy, rotate the compressor rotor between 1,000 and 2,000 rpm.

- (2) Residual unbalance shall not exceed 2.0 inch-gram on each plane. Record the measured unbalance on permanent sheets, noting both the amount of residual unbalance and its location.
- (3) Should unbalance exceed 2.0 inch-gram on each plane, remove material from front shaft and from compressor impeller to bring rotor into balance.

- (4) If compressor rotor assembly cannot be balanced, or if too much material has to be removed for balancing, balance compressor impeller and then compressor rotor subassemblies separately; then as a complete assembly.

**NOTE**

After balancing, the end of compressor rear shaft may be marked by vibropeen mark in lieu of paint or ink marking. The vibropeen mark should be a single radial line on end face of shaft. At next overhaul the old balance mark may be "slashed thru" with another vibropeened line or blended out with crocus cloth.

- (5) Mark heavy point on compressor power shaft with red opaque (Item 232, table C-1) or white marking ink (item 209, table C-1).

**WARNING**

**FLIGHT SAFETY PARTS**

**Material removal limits for balancing are flight safety critical**

- h. Balance compressor rotor subassembly as follows:

(1) Using suitable sleeve bearings, support compressor subassembly in holding fixture (LTCT4078), and support power shaft with holding fixture (LTCT251). Dynamically balance rotor on a Model 3S balancing machine (Gisholt Machine Co.), or equivalent.

**NOTE**

To ensure sufficient balancing accuracy, rotate the compressor rotor between 1,000 and 2,000 rpm.

(2) Correct unbalance by removing material from front shaft assembly disk and the material from the rear compressor shaft (see figure 5-594).

(3) The remaining unbalance on each plane must not exceed 1.0 inch-gram.

(4) If protective finish is removed, clean area with a suitable degreasing agent or solvent and refinish.

(5) After balancing, mark all parts with a straight line running from the front to the rear of the assembly with a colored ink or paint.

- i. Balance impeller as follows:

(1) Using sleeve bearing (LTCT2712-03) and bearing holders (LTCT4028), position impeller (34, figure 5-569) on balancing arbor (LTCT6722). Radial runout shall not exceed 0.002 inch TIR. (See figure 5-596.)

(2) Dynamically balance impeller on Model 3S balancing machine (Gisholt Machine Co.), or equivalent.

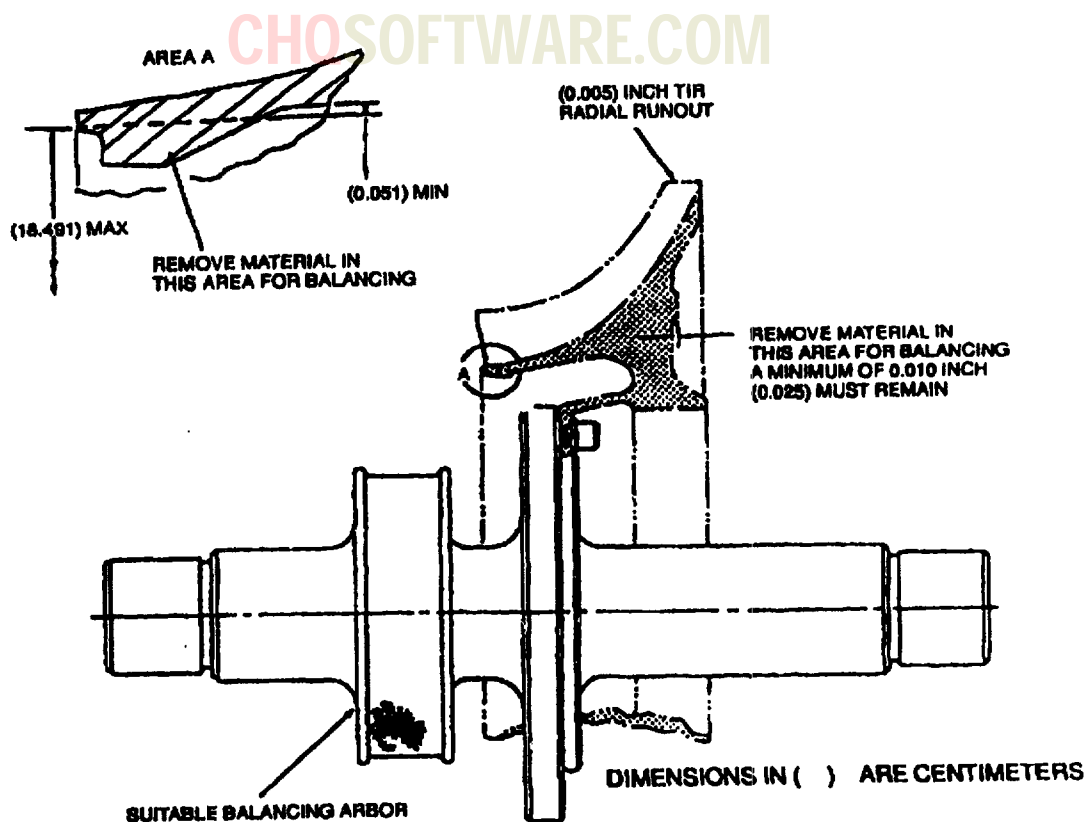
**NOTE**

To ensure sufficient balancing accuracy, rotate the compressor rotor between 1,000 and 2,000 rpm.

(3) Correct unbalance by removing material from areas designated in figure 5-596.

(4) Remaining unbalance in each plane shall not exceed 0.5 inch-gram.





**Figure 5-596. Dimensional Limits for Material Removal and Radial Runout of Impeller.**

**WARNING**

**FLIGHT SAFETY PARTS**

**Material removal limits for balancing are flight safety critical**

**CAUTION**

In following step k, do not attempt to lock tabs by striking them from the side as it could damage or move bolt heads

j. After complying with preceding steps h and i, reassemble impeller to compressor rotor subassembly and repeat balancing procedure given in preceding step g.

k. After balancing, deform 28 lockcup washers (32, figure 5-569) in two places using staking tool (LTCT14514).

**5-444. FINAL REASSEMBLY.** Proceed as follows:

- Using suitable sleeve and arbor press, press seal (15, figure 5-569) into housing (13).
- Position seal housing assembly (12) onto front shaft assembly (19), and install faceplate (10). Lubricate with oil (item 189 or 190, table C-1).
- Install front bearing housing (6) in holding fixture (LTCT4713).
- Using suitable drift or arbor press, press bearing (7) into bearing housing.
- Install front bearing locking cup (8) and nut (9) into bearing housing.
- Tighten nut to 75 to 125 pound-feet (111.6 to 186.0 kg m) torque, using wrench (LTCT487). Locate slots in nut with slots in cup and lock nut by deforming cup into slots, 180 degrees apart. Do not shear cup. Install two guide pins into seal housing (13) and, using suitable installing tool, press bearing housing assembly (5) onto seal housing.

## CHOSOFTWARE.COM

### NOTE

As an alternate procedure, bearing package (assembled in previous steps) may be installed on front shaft of compressor rotor at final assembly of engine.

- g. Install shim (4) of same thickness as the one removed during disassembly. (Refer to paragraph 5-435.)
- h. Install pinion gear (3) on front shaft assembly.
- i. Vacuum-test nut and seal assembly as follows:
  - (1) Install nut and seal assembly (1) hand-tight on base of seal leakage test fixture (LTCT11365).
  - (2) Connect vacuum line from seal leakage tester (LTCT13606) to fitting on seal testing fixture hand-tight.
  - (3) Actuate vacuum pump until vacuum gage readings stabilized and hold for 15 seconds minimum.
  - (4) If vacuum gage readings are lower than 18 inches Hg, remove nut and seal assembly from test fixture and clean using acetone (Item 13, table C-1), and repeat preceding steps (2) through (3). If, after cleaning, vacuum gage readings remain lower than 18 inches Hg, replace nut and seal assembly.
  - (5) If vacuum gage readings are 18 inches Hg or higher, remove nut and seal assembly from test fixture and proceed with following step j.
- j. Install locking cup (2) and nut and seal assembly (1) hand tight.

### NOTE

Do not torque and lock the seal assembly at this time. This operation will be performed during final engine reassembly, after gear pattern and backlash have been established.

**5-445. FUNCTIONAL TEST.** Functional test is not required.

**5-446. MODIFICATION.** Axial compressor Housing Modification of P/N 1-100-070-04/05 to the P/N 1-101-210-01/02 configuration.

**a. Inspection.**

- (1) To facilitate inspection, clean using the dry cleaning solvent method (Refer to SP No. 3002 in Appendix E).
- (2) Inspect housing per DMWR. If compressor lands exhibit erosive wear, dimensionally inspect housing as per Figure 5-597. If any dimension shown in figure 5-597 is exceeded this part cannot be repaired as per this DMWR.

### NOTE

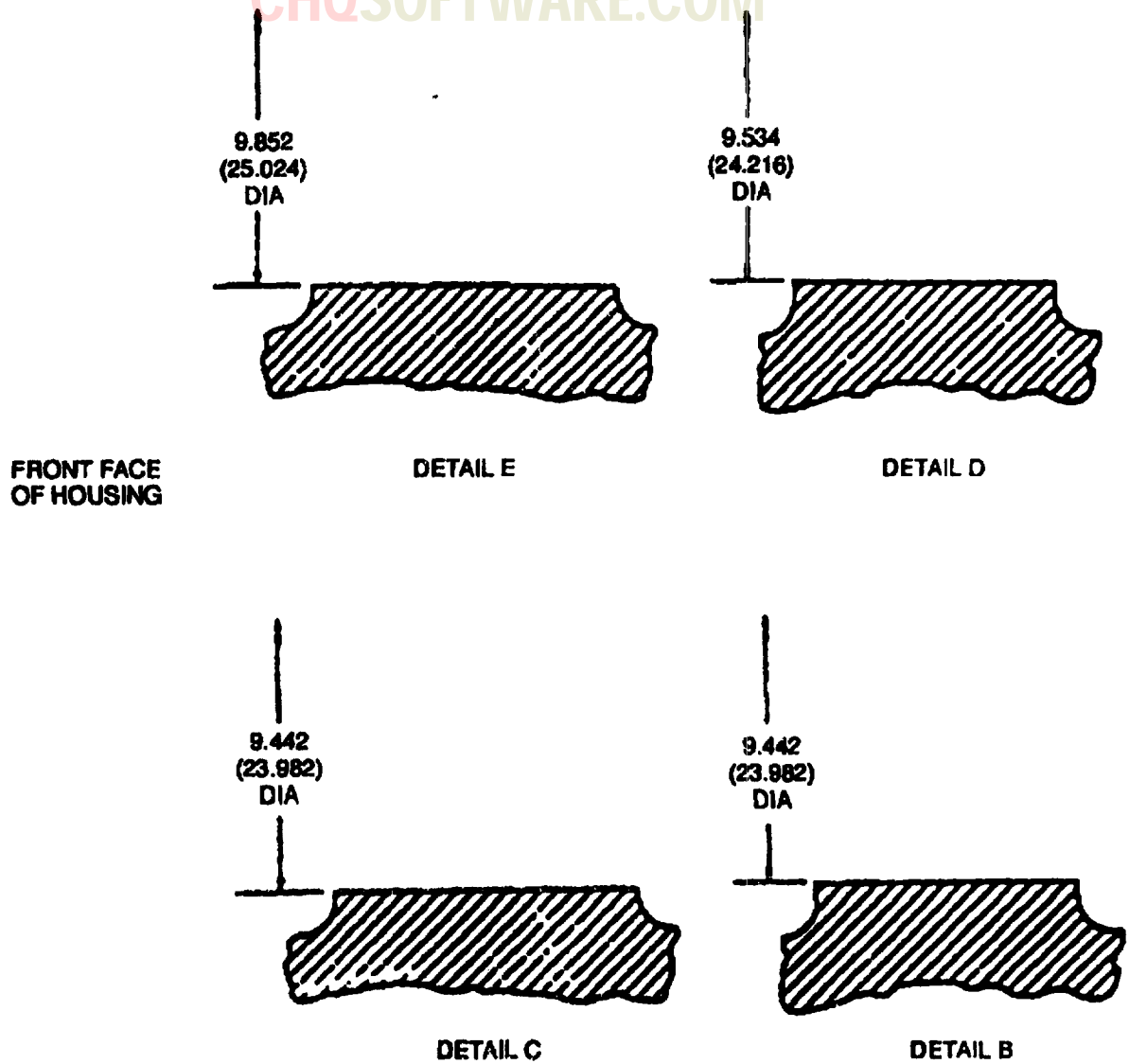
Prior to any inspections or repair the stators shall be removed from the housing details and the housing reassembled with original bolting hardware and tapered pins. Torque bolts to assembly torque value requirements.

- (3) Inspect housing visually and by tape test as per DMWR to determine whether the epoxy/phenolic coating (per paragraph c(1)(a), and (b), and (c), and exposed HAE is serviceable. If exposed HAE coating is not serviceable, strip the epoxy/phenolic and HAE coating from the housing and repair as per paragraph c(2)(b). If exposed HAE coating is serviceable, repair as per paragraph c(2)(c).

**b. Machining and Reidentification:**

- (1) Reassemble the housing with original bolting hardware and tapered pins. Torque bolts to assembly torque requirements.
- (2) Position assembled housing onto fixtures LTCT4153 or equivalent for machining the ID of lands.
- (3) Machine lands, through holes and spot face holes of housing per figure 5-598, 5-600, 5-601, 5-602, 5-603, 5-604, 5-605.

CHQSOFTWARE.COM



DIMENSIONS IN ( ) ARE CENTIMETERS

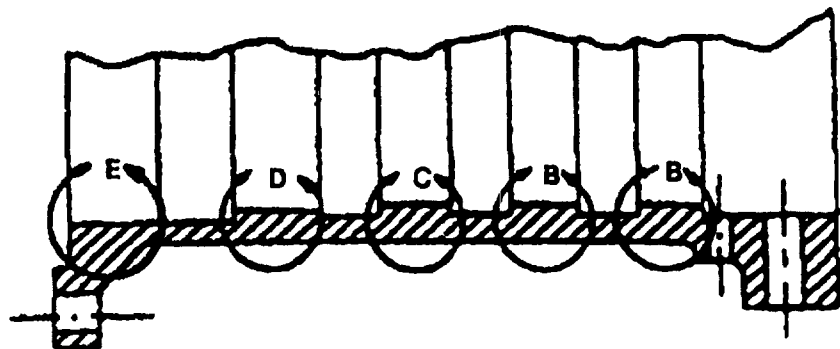


Figure 5-597. Compressor Housing Dimensional Inspection.

CHQSOFTWARE.COM

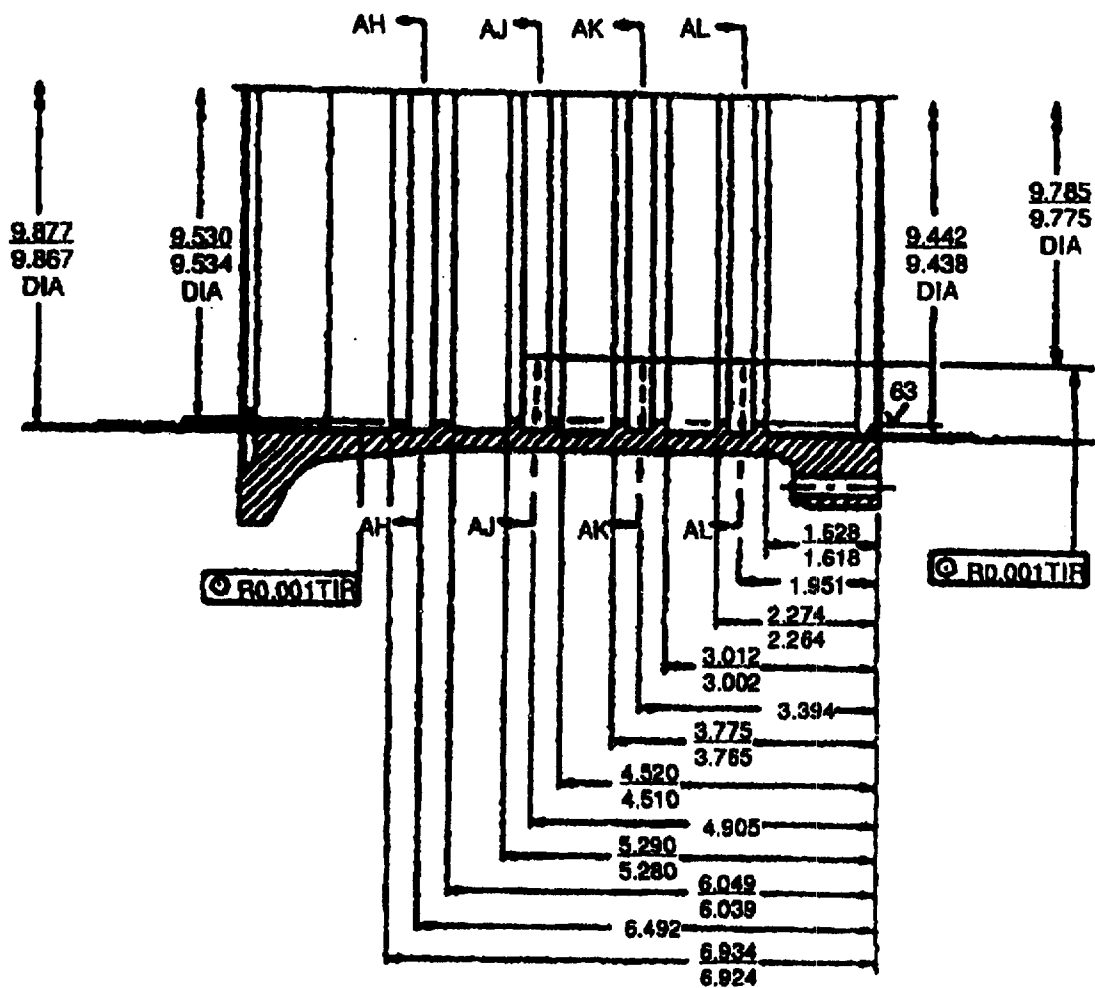
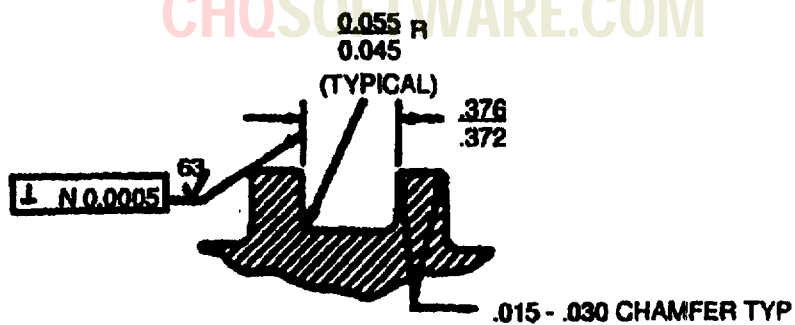


Figure 5-598. Compressor Housing Machining (English).

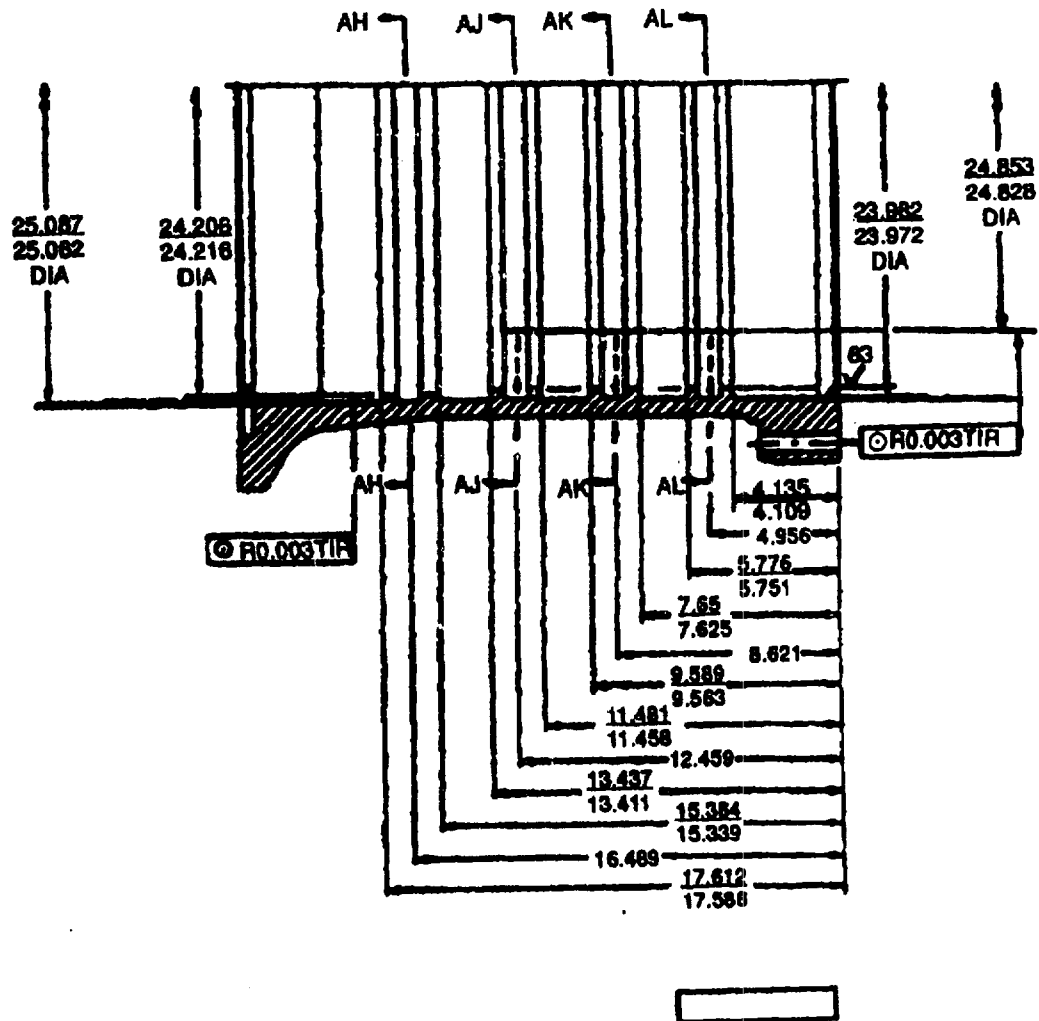
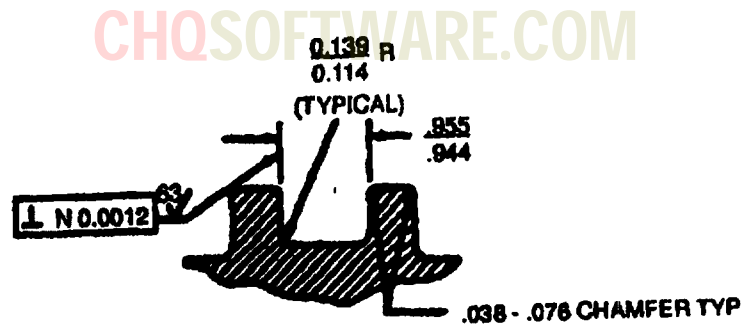
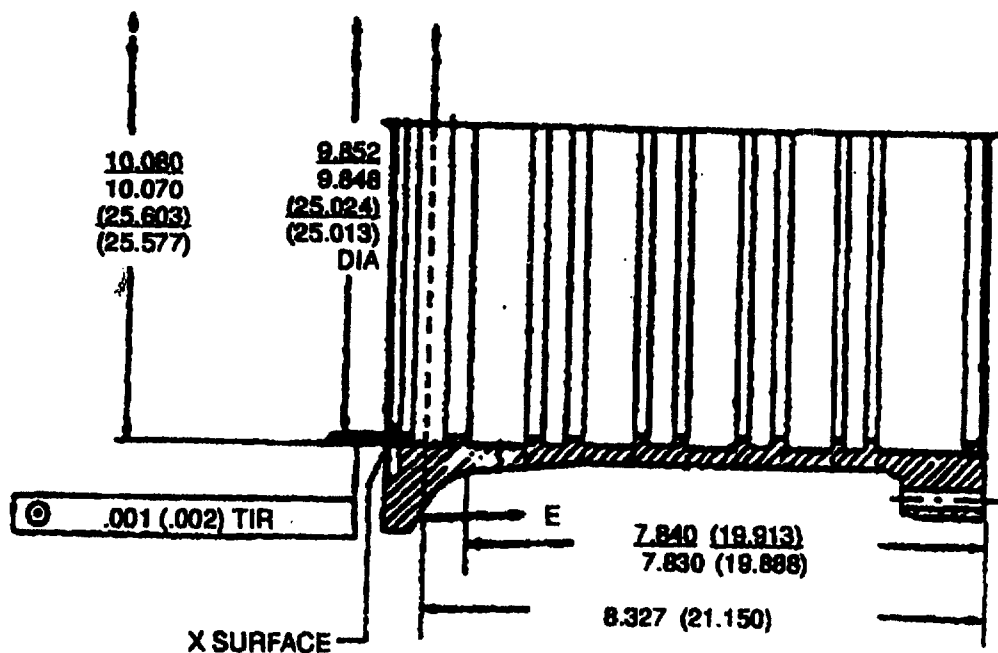
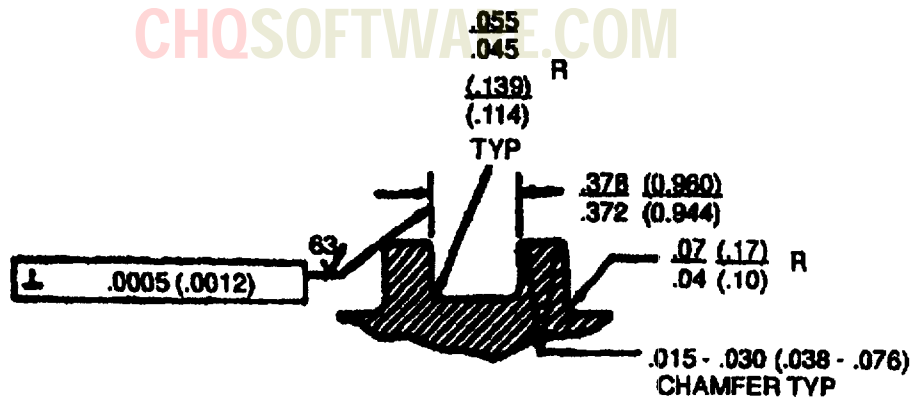


Figure 5-599. Compressor Housing Machining (Metric).

CHQSOFTWARE.COM



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-600. Compressor Housing Machining.

CHQSOFTWARE.COM

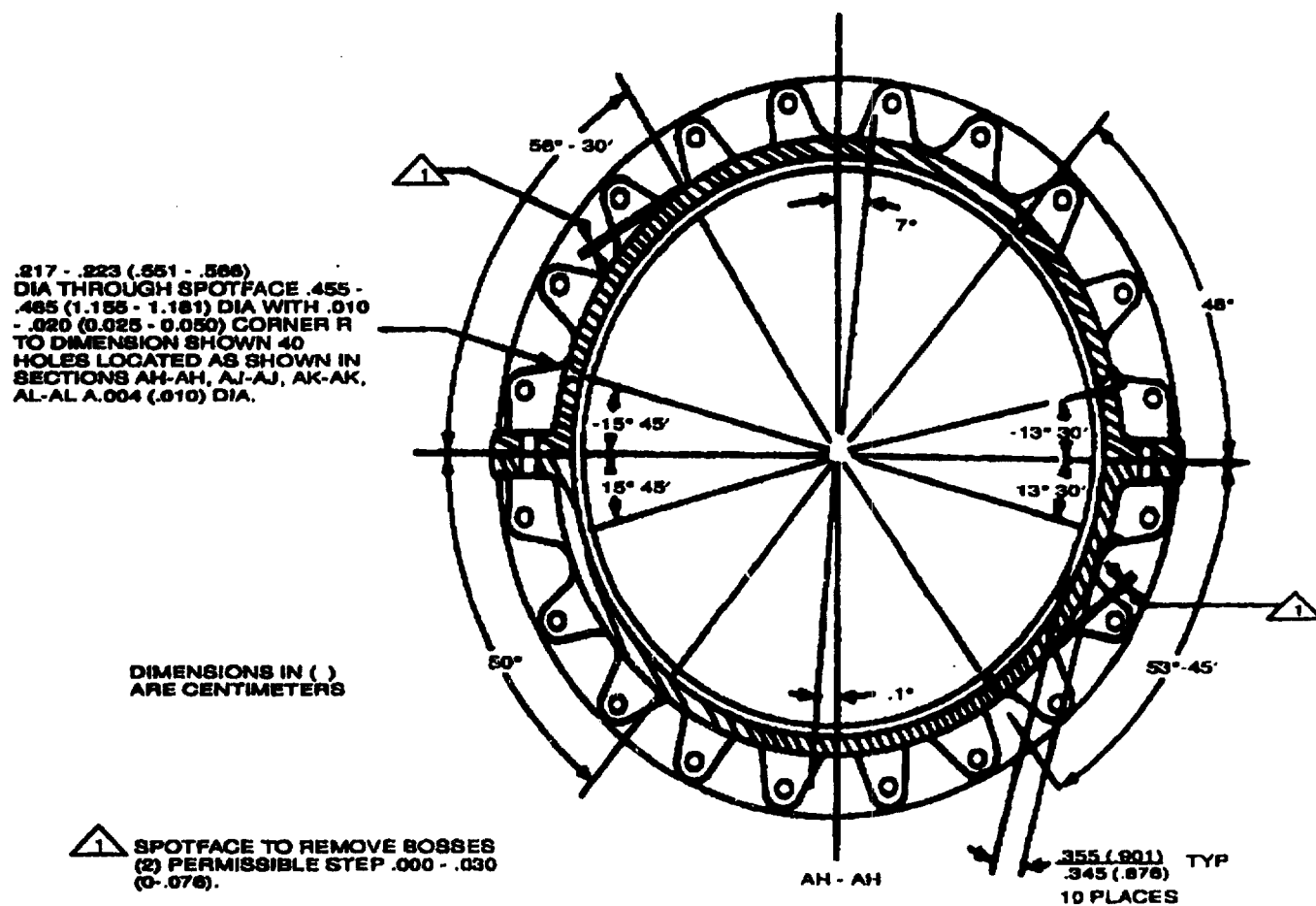
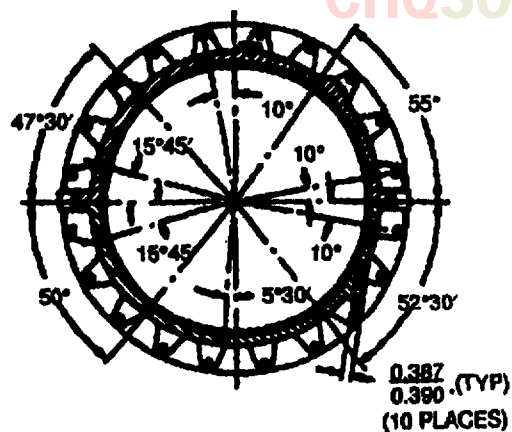
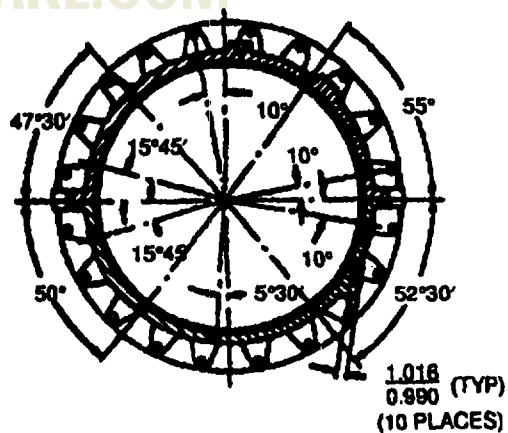


Figure 5-601. Compressor Housing Machining (Section AH-AH).

CHQSOFTWARE.COM



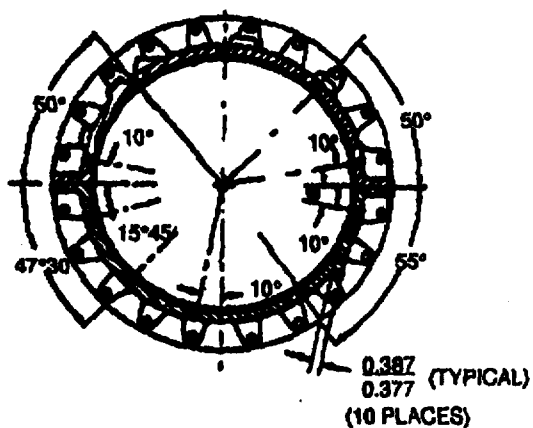
AJ - AJ



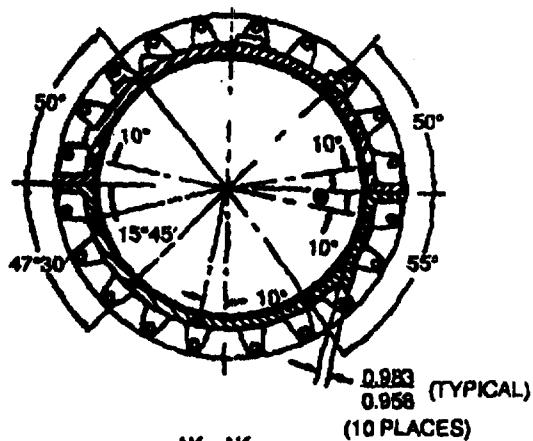
AJ - AJ

(METRIC)

Figure 5-602. Compressor Housing Machining (Section AJ-AJ).



AK - AK



AK - AK

(METRIC)

Figure 5-603. Compressor Housing Machining (Section AK-AK).



CHQSOFTWARE.COM

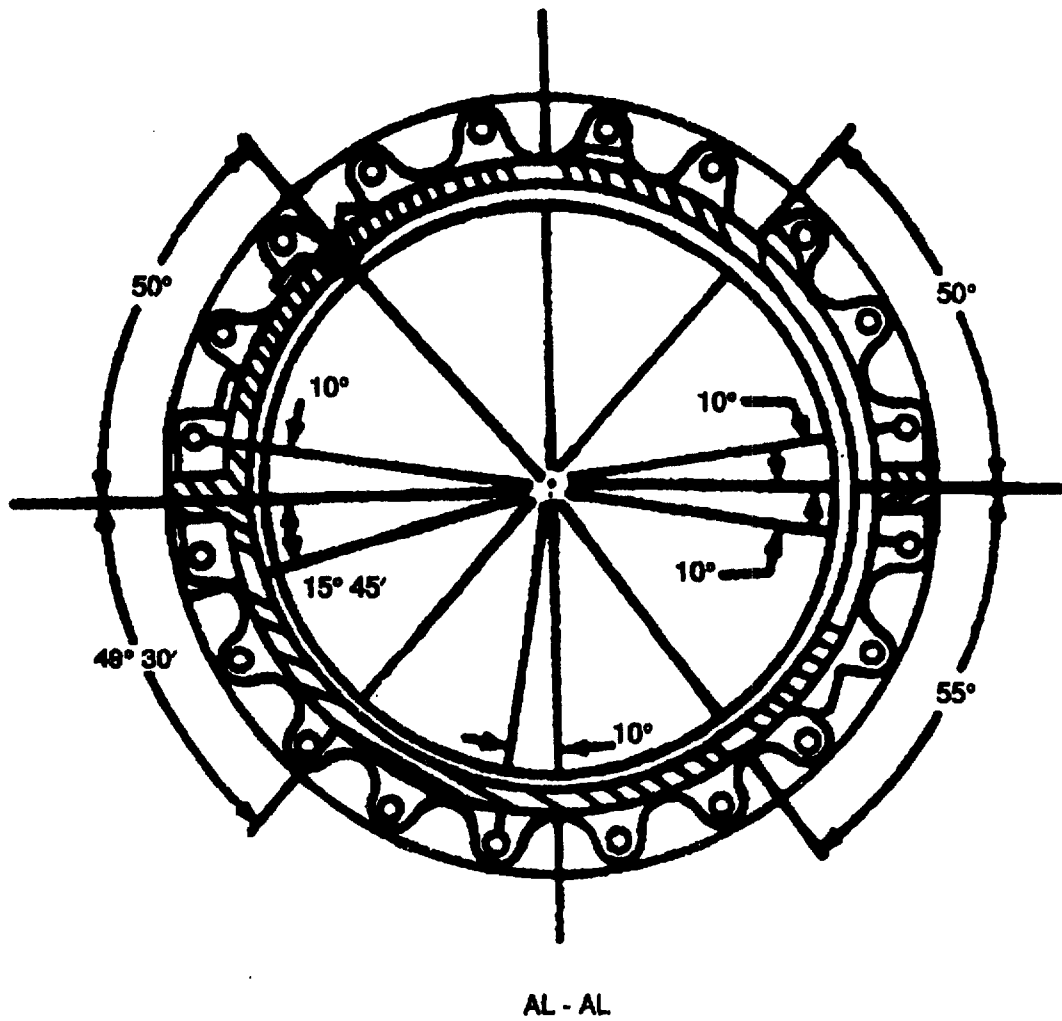
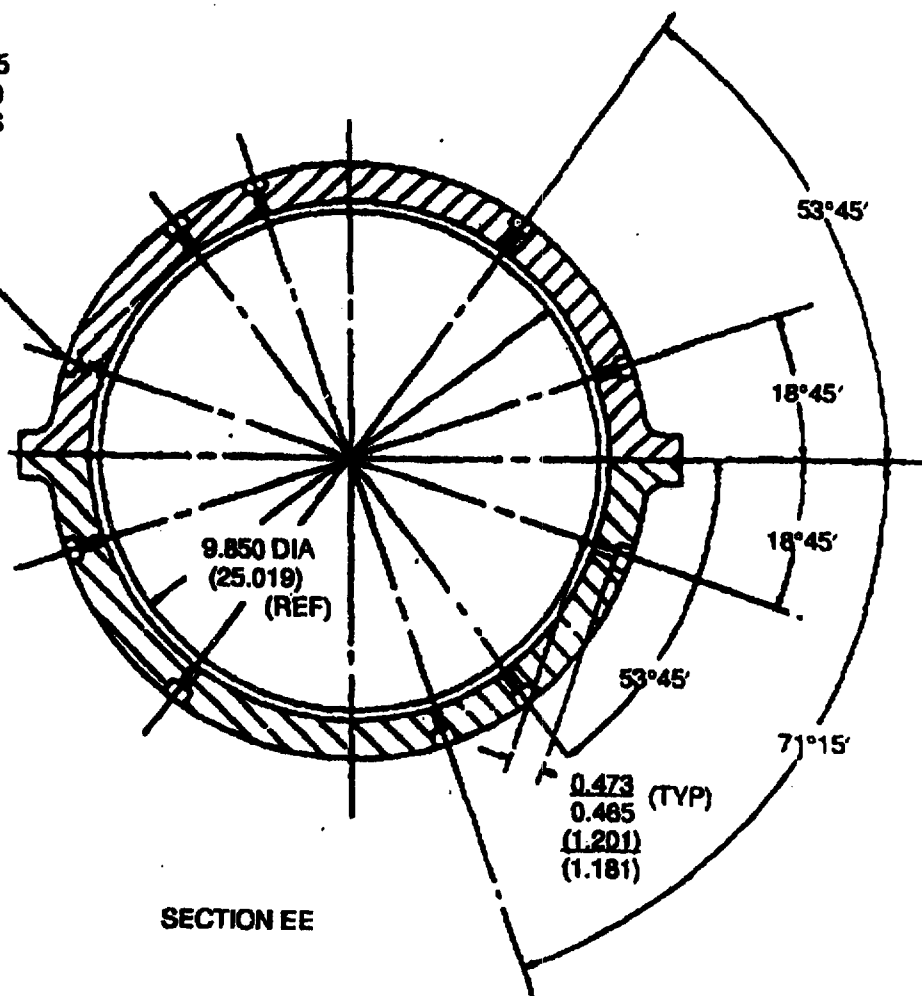


Figure 5-604. Compressor Housing Machining (Section AL-AL).

CHQSOFTWARE.COM

.217 - .223 (.551 - .568)  
 DIA THROUGH C BORE .439 -  
 .441 (1.115 - 1.120) DIA WITH .045  
 - .050 (.114 - .127) CORNER R TO  
 DIMENSIONS SHOWN 10 HOLES

⊕ A .004 (0.010) DIA



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-605. Compressor Housing Machining (Section EE).

## CHQSOFTWARE.COM

### NOTE

Remove bosses from housing per Figure 5-601 prior to drilling operation.

(4) Disassemble the housing. Axial compressor housing inducted for overhaul which have been repaired by installation of stainless steel inserts of 2nd through 5th stages, and compressor housings which have been previously modified shall be reidentified as follows: P/N 1-100-070-04 to P/N 1-101-210-01 and P/N 1-100-070-05 to P/N 1-101-210-02. Reidentify these aforementioned parts by vibropeening applicable part number adjacent to existing part number. Line out the old part number.

### NOTE

Installation of 1st stage insert is considered a repair and would not be cause for reidentification of housing.

If HAE recoating is required, reidentification of housing should be accomplished prior to the application of this coating.

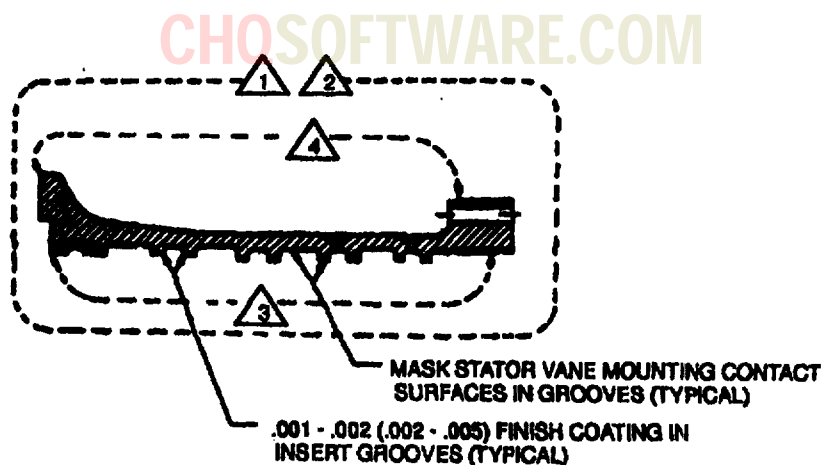
#### c. Coating of Housing.

##### (1) Materials.

- (a) Sythetisine 200 Epoxy/Phenolic pigmented enamel, formula number NR S-3612-808 (item 143, table C-1).
- (b) Synthestine 200 Epoxy/Phenolic engine gray xw-108 (item 144, table C-1).
- (c) Flake Graphite No. 635 (item 165, table C-1).
- (d) Thinner, TT-T-266 (item 330, table C-1).
- (e) Retardant-butyl Cellosolve (2-butoxy ethanol) commercial grade (item 66, table C-1).

##### (2) Procedure.

- (a) Clean surfaces with acetone (item 13, table C-1) or cleaning solvent (item 101, table C-1)
- (b) If compressor housing has been completely stripped of HAE and epoxy/phenolic coatings, reapply HAE coating as per SP No. 6220 in Appendix E and epoxy/phenolic coatings specified in figure 5-606.
- (c) If housing has not been completely stripped of HAE and the epoxy/phenolic coatings, treat machined areas and other bare metal areas with MIL-M-3171, Type III treatment and recoat machine areas with the epoxy/phenolic coatings to meet the requirements specified in figure 5-606.



- △ HAE COATING PER CCAD PROCESS STANDARD E.05 (ANODIC TREATMENT TYPE II CLASS A, GRADE 3)
- △ PRIMER COAT .0002 - .0003 (.0005 - .0007) THICKNESS
- △ FINISH COAT .0035 - .0055 (.0088 - .0139) THICKNESS EXCEPT IN AREAS SHOWN
- △ ENGINE GRAY FINISH COAT .001 - .002 (.002 - .005) THICKNESS EXCEPT IN AREAS SHOWN

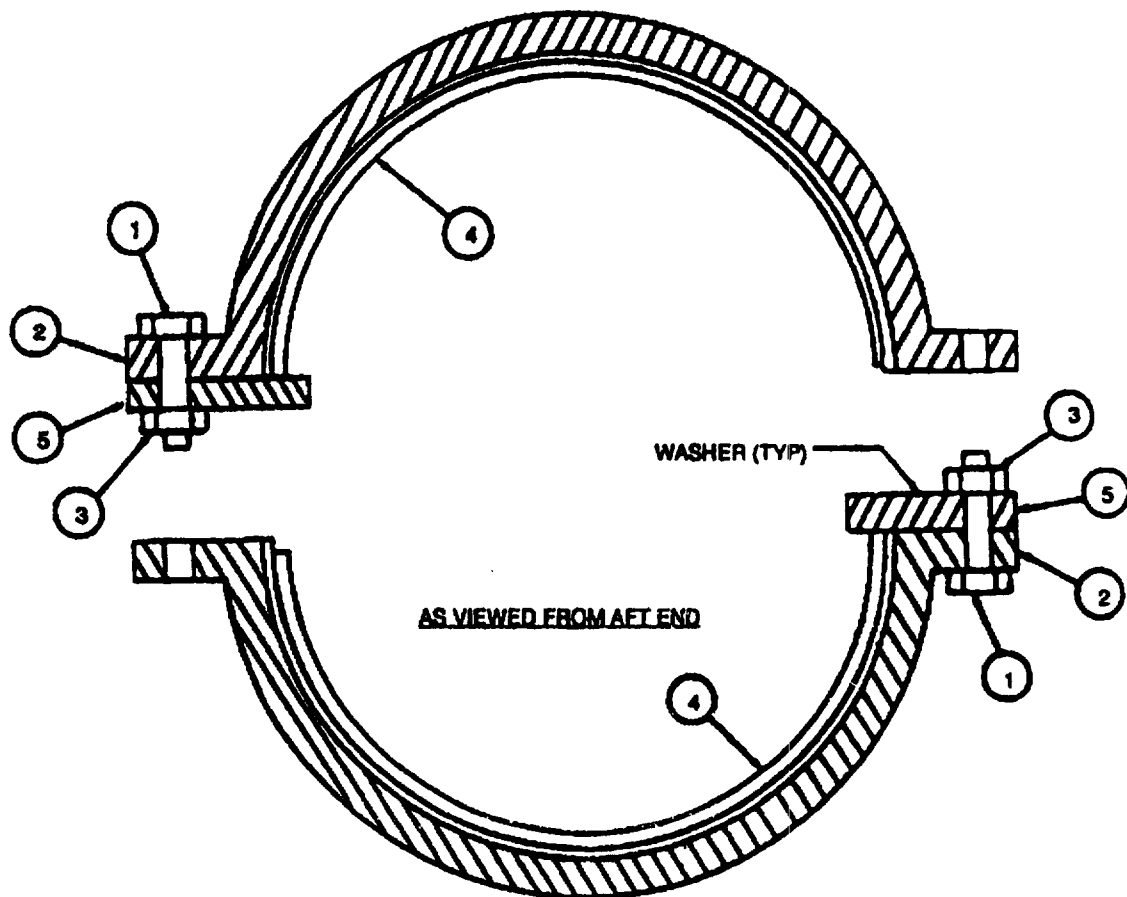
**Figure 5-606. Compressor Housing Coating Requirements.**

(d) Mask and paint housing as follows:

1 Primer Coating: Mix Synthetessine 200, Epoxy/Phenolic pigmented enamel NR. S-3612-808 (paragraph c(1)(a) with thinner TT-T-266 to give a viscosity of 12-14 seconds at 80° F using a Zahn Nr. 2 cup. Apply primer coating to areas of housing shown in Figure 5-606.0002-0.003 inch (0.0005-0.0008 cm) thick. Air dry coating, precure at 350° ± 10° F for 30-35 minutes, and then cure for 3 hours at 350° ± 10° F.

2 Engine Gray Finish Coating: Mix on (1) part by volume of Synthetessine 200, Epoxy/Phenolic engine gray XW-108 (paragraph c(1)(b) with one (1) part thinner TT-T-266 (paragraph c(1)(d) to give a 15 to 17 second viscosity at 80° F (27° C) using a Zahn Nr. 2 Cup. Apply this finish coating to areas of the housing and to the thickness shown in figure 5-606.

CHQSOFTWARE.COM

**NOTE**

Torque Item 1 and 3 to 28-34 Inch lbs. Use (5001-6072 GM CM) washers under head and nut.

ITEM	NOUN	P/N	QTY.
1	1/4-28 BOLT	AN-101116	6
2	AXIAL HOUSING	1-100-070-04	1
3	1/4-28 PLAIN NUT	AN 363-428	6
4	INSERT		5 FT
5	PLATE	67-SPL12757-0209	2

**Figure 5-607. Installing Plates to Housing Halves.**

**NOTE**

During hot weather when either Synthetoline 200 Epoxy/Phenolic resin requires a retardant for proper application modify the TT-T-266 thinner by mixing three (3) parts thinner to one (1) part butyl cellosolve. Use this mixture in the same manner as the plain TT-T-266 thinner to reduce either Synthetoline 200 Epoxy/Phenolic resin to the required spraying viscosity.

**d. Procedures for Fitting and Installation of Inserts.****(1) Fitting and Installation of Inserts:**

- (a) Install plates (2) P/N 67-SPL12757-0102 to housing halves as shown in figure 5-607.

**NOTE**

The part numbered end of insert must be installed against the plate.

- (b) Install first screw and washer. Adjust to plate No. 67-SPL12757-0102.
- (c) Torque middle screw to 22-24 inch-lbs. All other screw torque to 12-14 inch-lbs.
- (d) Dimensionally check free end of insert to determine the amount of stock removal required to adjust to 0.002-0.035 inches (0.005-0.089 cm) below split flange as shown in figure 5-608.
- (e) Remove insert and machine as required. Reinstall insert and check.
- (f) Proceed to install other inserts by repeating steps d(1)(a) thru d(1)(e).
- (g) When all five (5) inserts have been installed in 1st half of axial housing per figure 5-608 select the split flange 180 degrees from the previous split line where plate No. 67-SPL-12757-0102 was installed per figure 5-608 and step d(1)(a) and repeat steps d(1)(a) thru d(1)(e) until all 5 inserts are installed in opposite half of axial housing.

**(2) Alternate Procedures for Fitting and installation of Inserts.**

- (a) Install and center inserts in housing halves.

**NOTE**

The part number end of inserts must be installed on counterclockwise end of inserts as viewed from aft end.

- (b) Torque middle screw to 22-24 inch-lbs. All other screws torque to 12-14 inch-lbs.
- (c) Dimensionally check free ends of inserts to determine the amount of stock removal required to adjust gaps to 0.001 to 0.017 inches (0.003 to 0.043) below split flanges.
- (d) Remove inserts and rework as required. Reinstall inserts and center between split flanges. Recheck gaps.

**e. Finish Machining:**

- (1) Finish machine the inside diameters per figure 5-608.

**NOTE**

Insert retaining screws shall be retorqued prior to finish machine cut.

**1. Final Assembly.**

(1) Remove screws, one at a time, and place heavy coat of primer (item 253, table C-1) between the washer and the axial housing and retorqued middle screw to 12-14 inch-lbs (2143 to 2500 gm cm) all others shall be torqued 12-14 inch-lbs (2143 to 2500 gm cm).

**NOTE**

Assemble washers and screws to housing before primer dries.

(2) Screws will be safety wired using 0.026 inch (0.066 cm) diameter wire (stainless).

**NOTE**

Install screws, P/N AN163706 and washer, P/N AN960C10L, in all unused tapped holes on exterior of housing and torque not to exceed 44 inch-pounds (7858.4 gm cm), safety wire in groups of 3 each, as applicable.

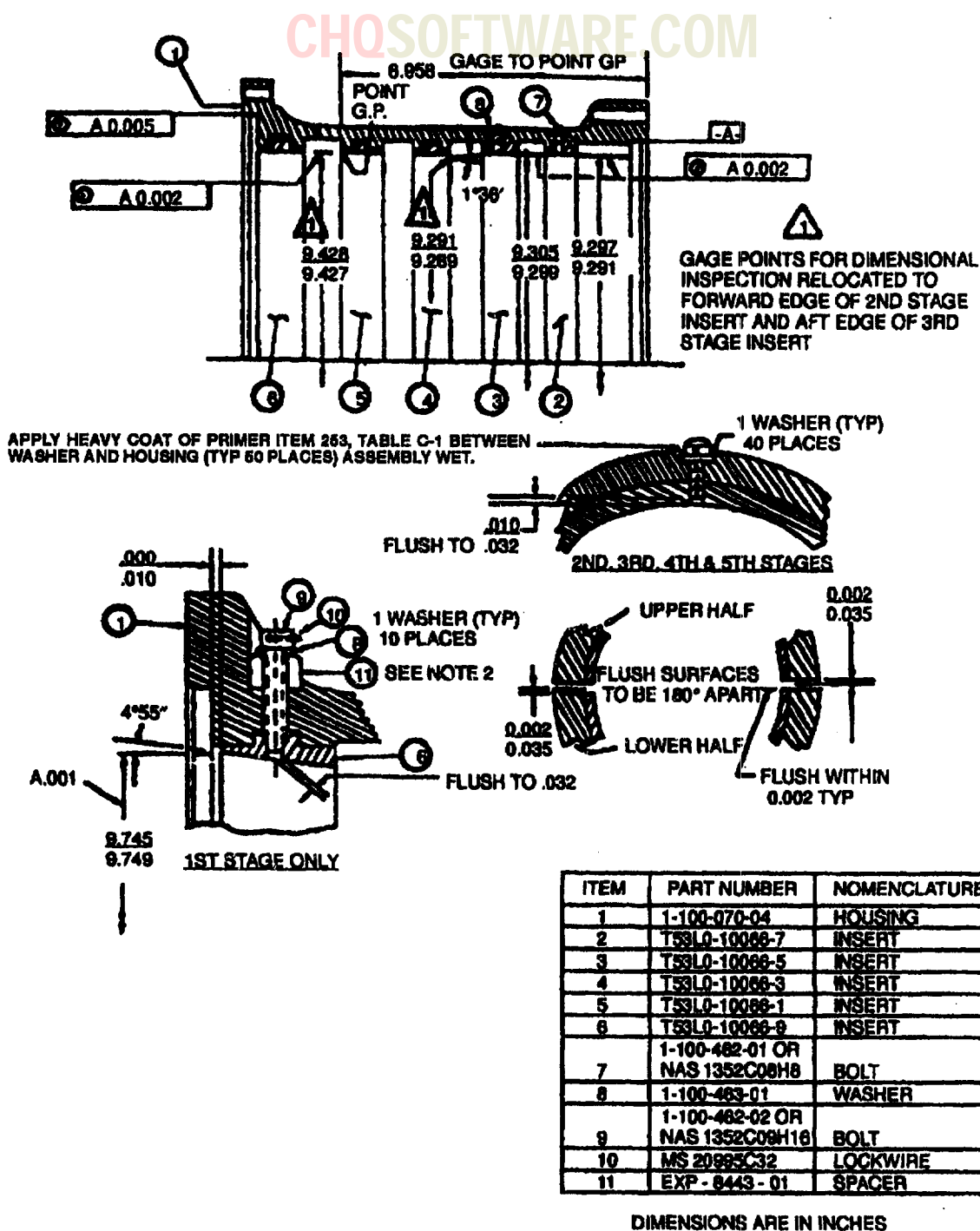
**NOTE**

All safety wiring shall be accomplished after installation of stator vanes. If any insert retaining screw is moved after the primer dries, the screw must be removed and recoated with fresh primer.

**5-447. MODIFICATION OF COMPRESSOR AND IMPELLER HOUSING ASSEMBLY.** Rework compressor and impeller housing 1-100-630-13 to 1-100-640-06 configuration as follows:

**a.** Rework interstage bleed actuator 1-170-050-13 to 1-170-050-08 as follows:

(1) Disassemble, clean inspect, and repair as outlined in paragraphs 5-410, 5-411, 5-412, and 5-413.

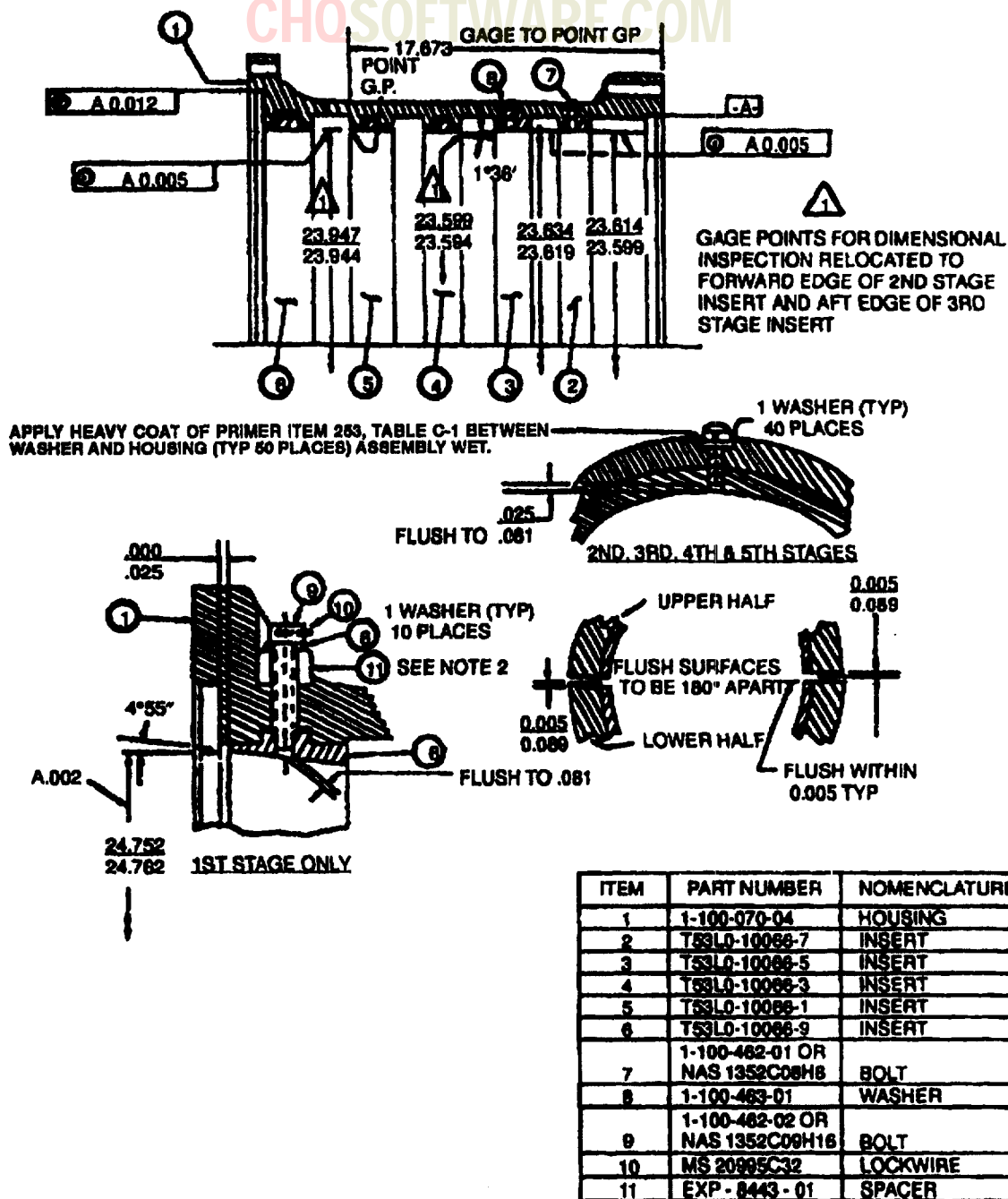


## NOTE

1. Gage points for dimensional inspection relocated to forward edge of 2nd stage insert and aft edge of 3rd stage insert.
2. See Figure 5-610 for fabrication of spacer.
3. Surface finish of lands after machining diameters shall be 125 RMS maximum

Figure 5-608. Axial Compressor Housing Machining Final (English).





**DIMENSIONS ARE IN CENTIMETERS**

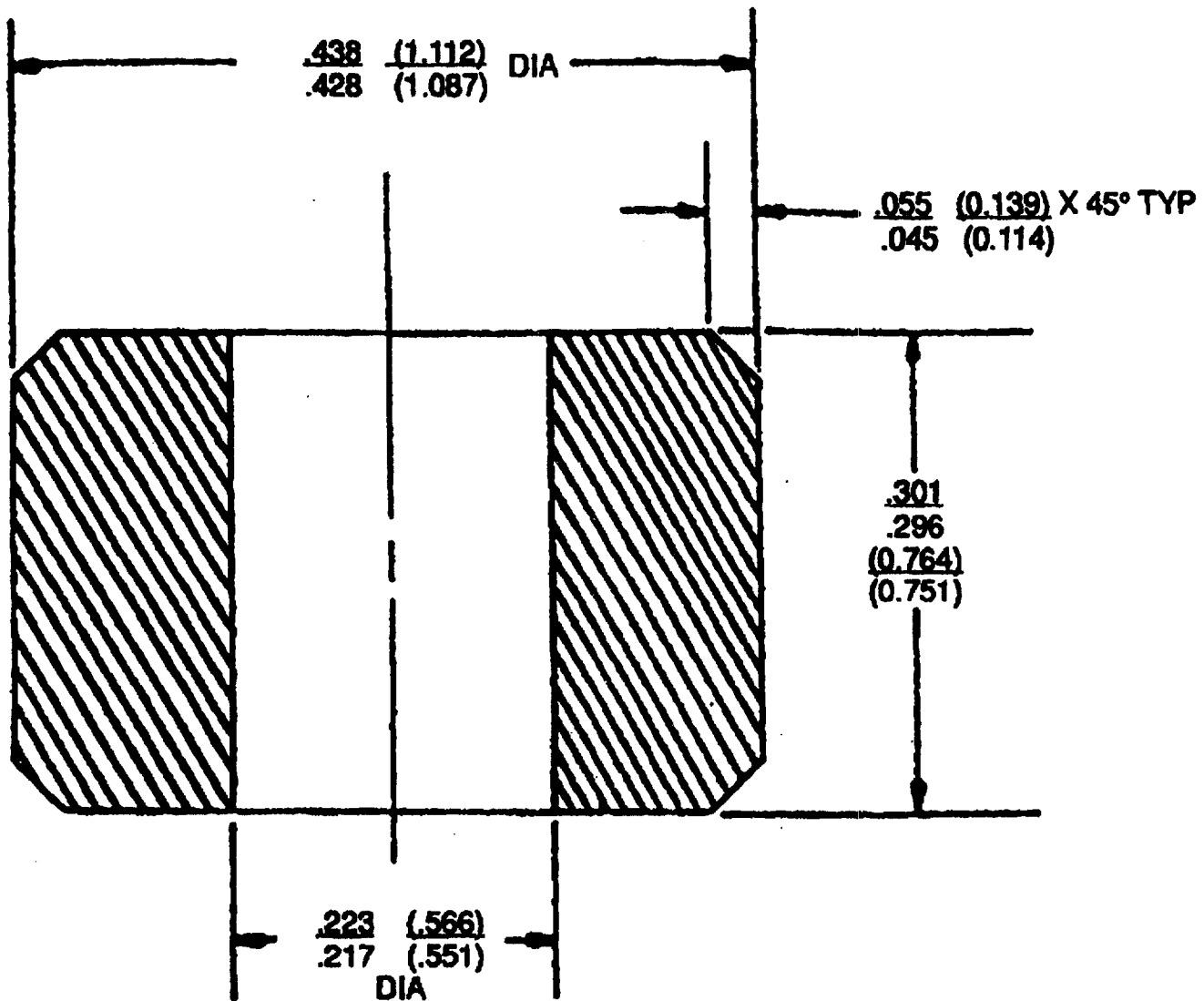
### NOTE

1. Gage points for dimensional inspection relocated to forward edge of 2nd stage insert and aft aft edge of 3rd stage insert.
2. See Figure 5-610 for fabrication of spacer.
3. Surface finish of lands after machining diameters shall be 125 RMS maximum

**Figure 5-609. Axial Compressor Housing Machining Final (Metric).**

CHOSOFTWARE.COM

DIMENSIONS IN ( ) ARE CENTIMETERS



MATERIAL ALUM. AMS 4114  
HARDNESS Bhn. 42 MAX.  
SURF. TREAT. AMS 24 TO  
EXP 8443-01

Figure 5-610. Compressor Housing Spacer Fabrication.

- (2) Replace sleeve spacer (1-160-598-01) with sleeve spacer (1-160-617-02).
- (3) Replace valve seal (1-160-596-01) with valve seal (1-160-596-03).
- (4) Replace actuator cover (1-160-591-03) with actuator cover (1-160-591-07).
- (5) Remove washer (1-160-605-01).
- (6) Change screws, MS35266-71 and MS35266-68 to screws, AN 501-10-32 and AN5-1-10-20.
- (7) Change bolt, MS9958-01, to bolt, AN103809.
- (8) Reassemble interstage bleed actuator. (Refer to paragraph 5-25.)
- (9) Using a vibropeen etching tool, reidentify actuator assembly from 1-170-050-08.

**NOTE**

Depth of marking shall be 0.001 to 0.006 inch (0.0025 to 0.0152 cm).

- (10) Functional-test interstage bleed actuator as outlined in paragraph 5-26.
  - b. Replace first stage stator (1-101-000-01) with first stage stator (1-101-110-07).
  - c. Replace second stage stator (101-110-01) with second stage stator (1-100-120-03).
  - d. Using a vibropeen etching tool, reidentify compressor and impeller housing assembly from 1-100-630-13 to 1-100-080-06 to 1-100-140-07.

**NOTE**

Depth of marking shall be 0.001 to 0.006 inch (0.0025 to 0.0152 cm).

**5-448. MODIFICATION OF COMPRESSOR HOUSING ASSEMBLY.** The purpose of this modification is to rework the compressor housing assembly whenever interference is encountered between the forward flange of the compressor housing and the fuel control housing.

**NOTE**

The following rework procedure may be required to facilitate installation of the fuel control unit on the accessory drive gearbox assembly during engine buildup.

- a. Using a rotary hand grinder and carbide burr, grind chamfer on forward flange of compressor housing assembly to requirements of figure 5-611.
- b. Touch up reworked area as outlined in SP No. 6030 in Appendix E.

**5-449. MODIFICATION OF THICK FORWARD FLANGE AXIAL COMPRESSOR HOUSINGS (1-100-980-03), REV. E AND SUBSEQUENT THAT INCORPORATE THE FIRST LAND STEEL INSERT.** Purpose of this modification is to alleviate a lockwiring problem by increasing the counterbore diameter. (See figure 5-612, Detail "C".)

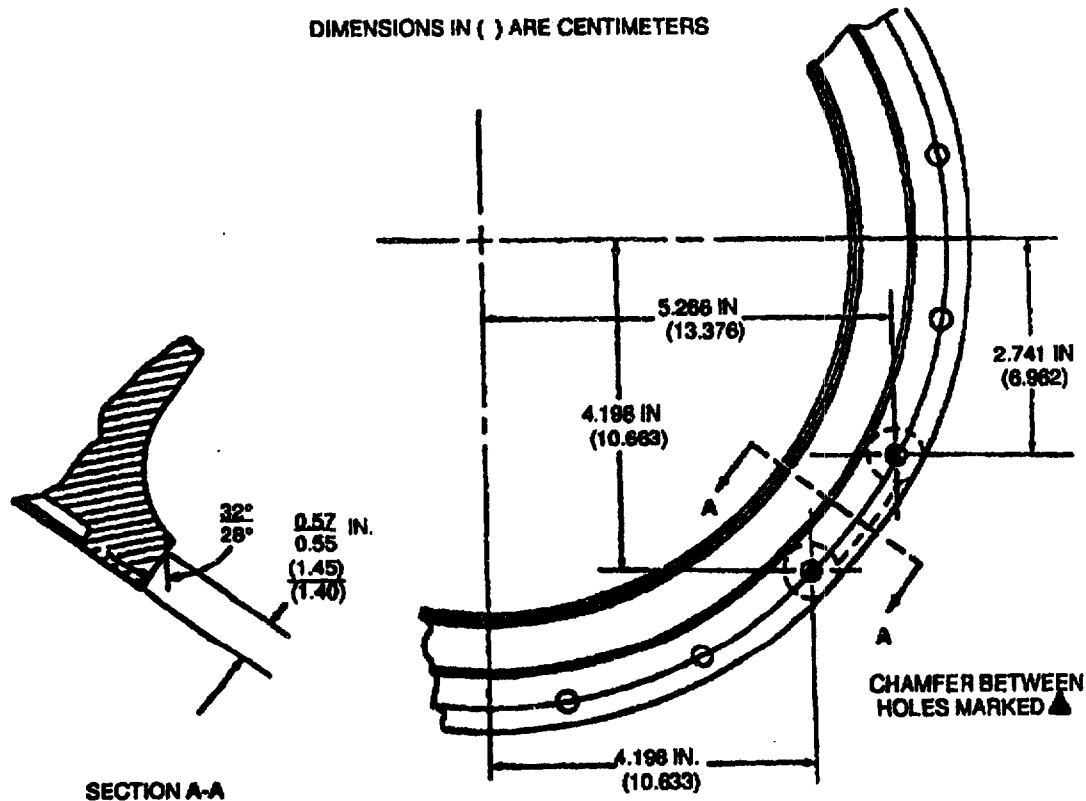
**NOTE**

Thick flange housings that already incorporate the thin flange rework may be modified by enlarging the counterbore diameter down to the top of the spacer as indicated in the instructions. (See figure 5-612, Detail "B".)

An optional machining step may be added to eliminate the counterbore outer lip if interference is encountered. (See figure 5-613, View AN-AN.)

- a. At ten 0.217 to 0.223 inch (0.551 to 0.566 cm) diameter holes (shown in figure 5-613), counterbore 0.500 to 0.510 inch (1.27 to 1.295 cm) diameter to a depth shown leaving 0.03 inch (0.076 cm) corner radius at bottom.

CHQSOFTWARE.COM



**Figure 5-611. Rework of Compressor Housing Assembly Forward Flange.**

#### NOTE

Thick wall flanges that have previously been reworked using thin flange procedure can be reworked to include the enlarged 0.500 to 0.510 inch (1.27 to 1.295 cm) diameter counterbore restricted to a depth corresponding to the top of an installed spacer. (See figure 5-612, Detail "B".)

- b. Optional rework - Mill outer lip of counterbore wall off as shown in figure 5-613, view AN-AN (Optional). Also see figure 5-612, Detail B and Detail C.
- c. Clean area to be reworked thoroughly with acetone (Item 13, table C-1).

CHQSOFTWARE.COM

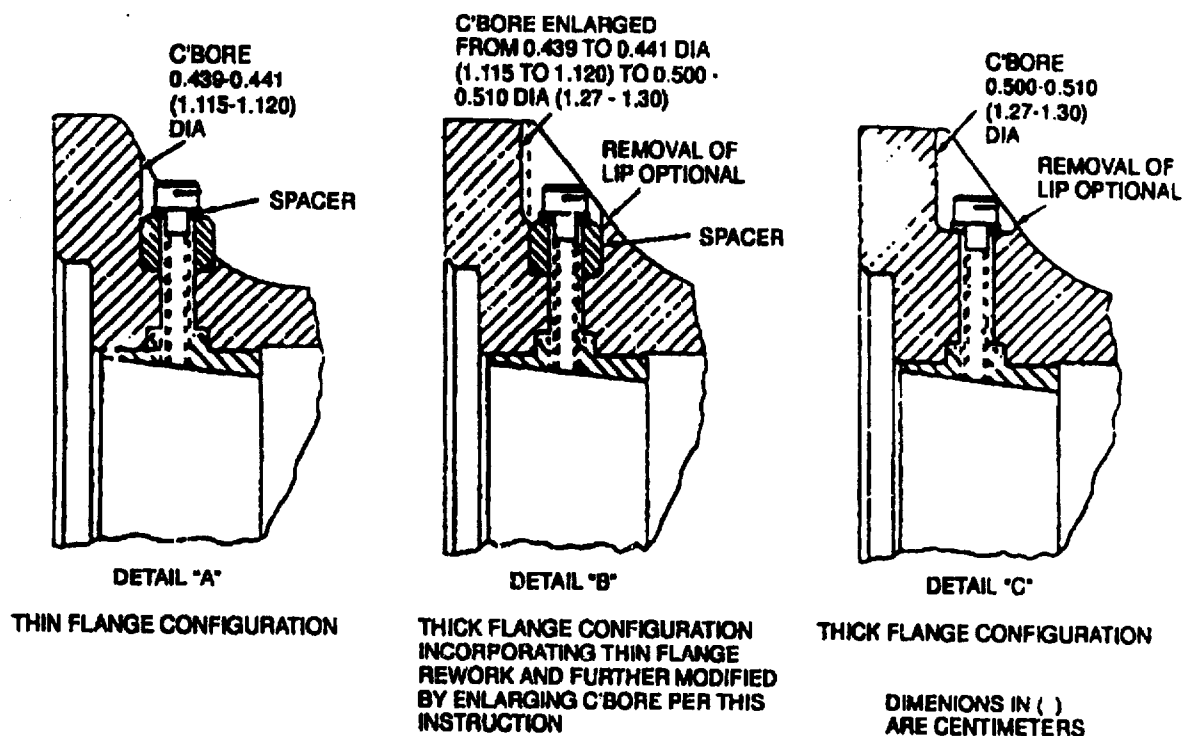


Figure 5-612. Comparison of Axial Compressor Housing Flanges.

**WARNING**

Both 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 d, 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 water prepared at ambient temperature.

- d. Using a cotton swab, apply chrome-pickle solution, in accordance with Military Specification MIL-M-3171, to areas being treated.
- e. Allow chrome-pickle solution to remain on surface for 2 to 5 minutes. Then rinse well with cold water.

CHQSOFTWARE.COM

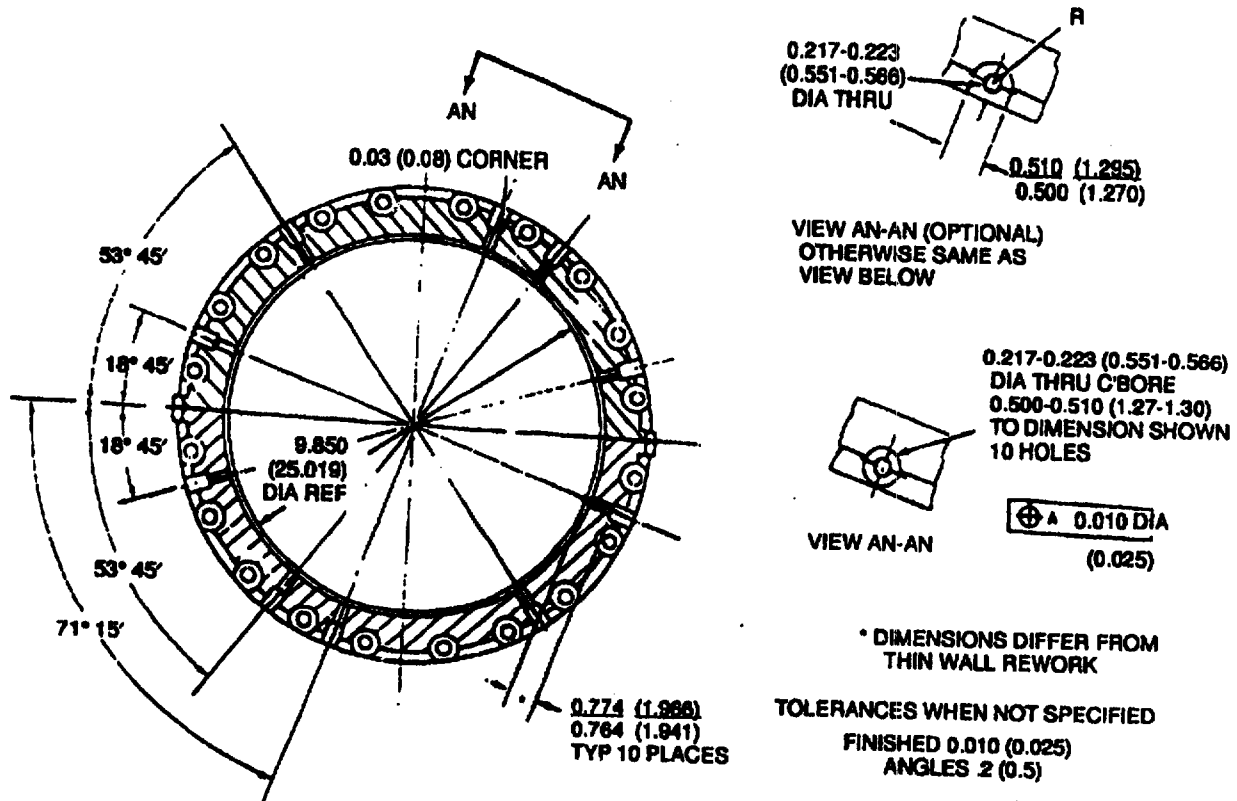


Figure 5-613. Rework of Thick Flange Housing (1-100-980-03), Revision E and Subsequent.

- f. Using heat lamps (500 watts), dry treated areas for 5 to 10 minutes.
- g. Prepare a mixture of clear epoxy resin sealant.

#### NOTE

Mixture shall be composed of one part epoxy coating (item 110, table C-1) and one part thinner (item 331, table C-1).

- h. Brush or spray one coat of sealant over the exposed areas.
- i. After touchup, cure part in an oven at 300° to 315° F (149° to 167° C) for 15 minutes.
- j. Brush or spray one of coat of engine gray enamel (item 143, table C-1) over the exposed areas.
- k. Bake in an oven at 275° to 300° F (135° to 149° C) for 30 minutes.

**5-450. REPLACEMENT OF IMPELLER HOUSING ASSEMBLY.** Replace impeller housing assembly (1-100-090-13) with new stainless steel impeller housing (1-101-370-03) and new auxiliary air housing adapter (1-170-710-02), and remove or add parts as follows:

- a. Add four new bolts, MS9915-11; four new nuts, STD 3064-4; and two dowels (1-100-538-01), to be used to bolt the impeller housing halves together. Two washers, MS 15795-810, will be used opposite the dowels during assembly.
- b. Discard one of the bolts, MS9924-25, which secured the axial housing to the centrifugal housing, and replace with one bolt, MS9924-32; this bolt is longer than the original bolt so it can pass through the impeller housing flange and screw into the new auxiliary air housing.
- c. Discard 12 bolts (1-100-527-01) and 12 spacers (1-100-526-01), used to secure the impeller housing to the air diffuser. Replace these bolts with ten bolts, MS9530-09, (with 12 original MS9530-09 bolts, this makes a total of 22), and two bolts, MS9530-13. The two MS9530-13 bolts are longer and pass through the auxiliary air housing adapter prior to screwing into air diffuser.
- d. Add two new bolts, MS9944-27, and two new nuts, STD3064-6, to be used to mount the air-bleed actuator to the impeller housing. Discard the two AN104206 bolts previously used. The AN960-616L washers are reusable.

**5-451. MODIFICATION OF COMPRESSOR ROTOR FRONT SHAFT FOR INCORPORATION OF A FACE SEAL AND FACEPLATE FOR NO. 1 BEARING.** Instructions for the rework and incorporation of a face seal and faceplate for the No. 1 bearing is given as follows:

- a. Machine seal journal to dimensions shown in figure 5-614.
- b. Inspect reworked area in accordance with standard magnetic-particle inspection procedures, or florescent penetrant method.
- c. Install seal ring (1-100-561-02) onto the front shaft. (See figure 5-615 for procedure.)

#### NOTE

The seal ring, P/N 1-100-561-02, shall be locally manufactured per figure 5-616. The seal ring may be painted prior to installation on front shaft providing care is exercised during installation to avoid damaging the paint, a clearance may exist between the aft end of the sealing ring and the machined step on the shaft, which is acceptable.

- d. Reidentify compressor rotor front shaft from 1-100-495-03 to 1-100-495-07. Reidentify 1-100-287-04 by adding ECP-213 after the part number using a vibropeen marking tool. Depth of mark 0.001 to 0.006 inch (0.0025 to 0.0152 cm).

CHQSOFTWARE.COM

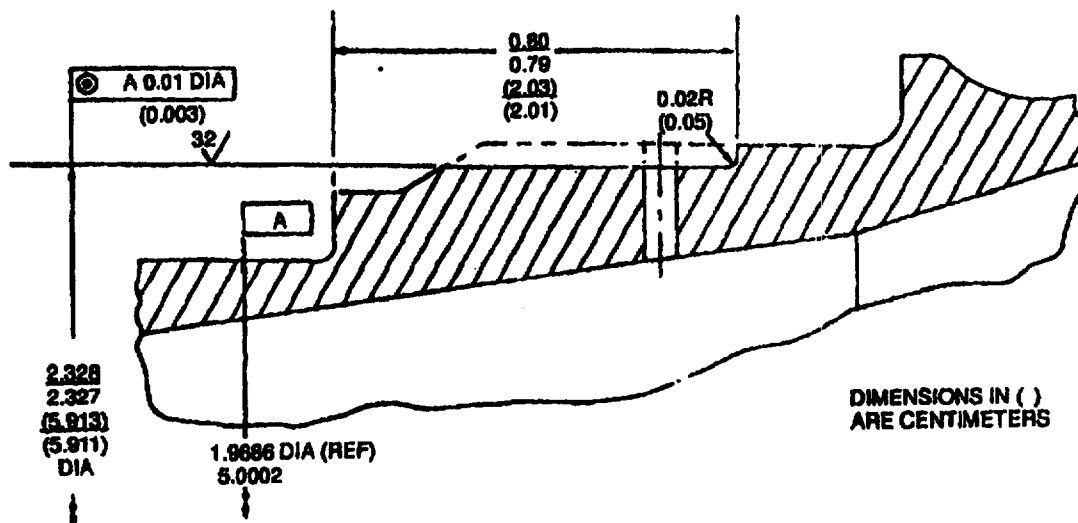
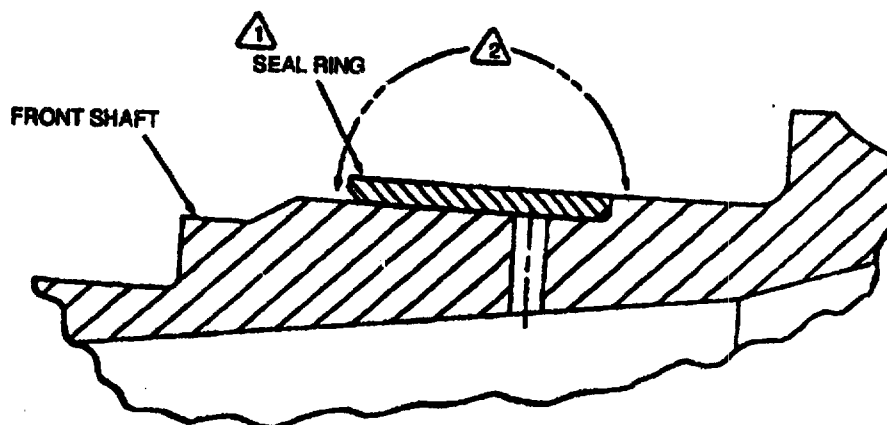


Figure 5-614. Rework of Compressor Rotor Front Shaft.

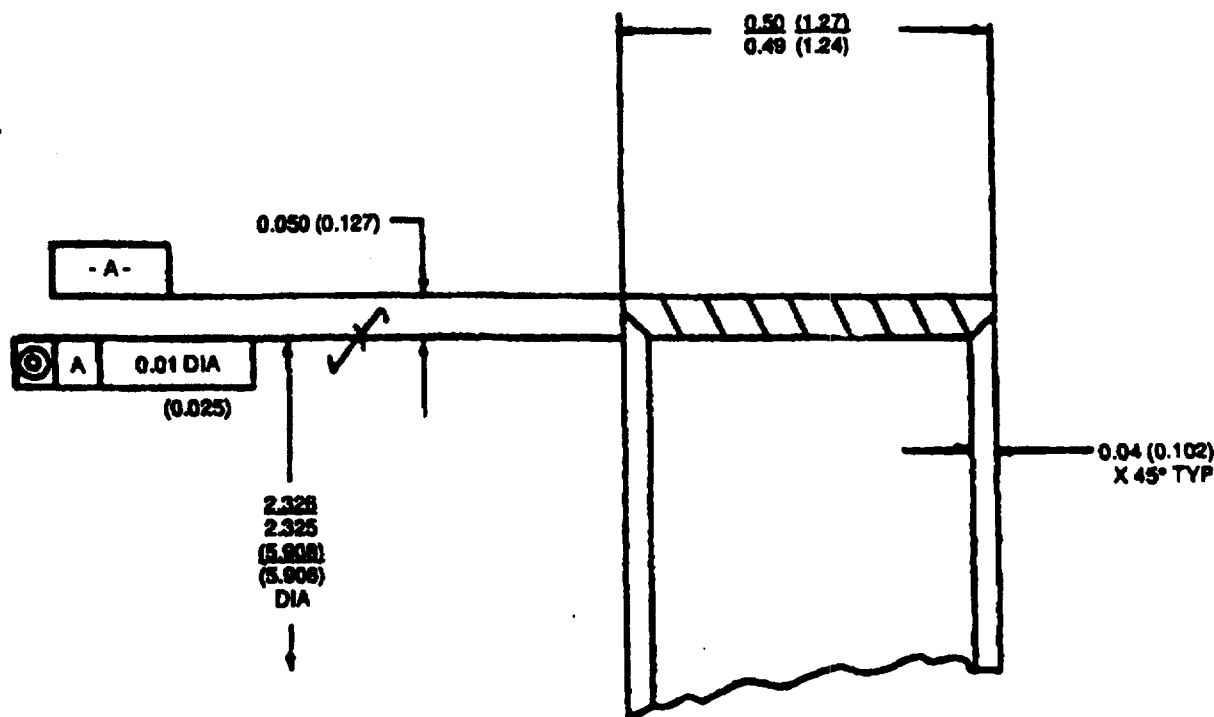


- ⚠ RING IS SHRINK FIT ON SHAFT HEAT RING TO 400° TO 600° F (204 TO 316° C)
- ⚠ SURFACE TREATMENT. REFER TO SP NO. 6000.

Figure 5-615. Installation of Seal Ring onto Front Shaft.



CHQSOFTWARE.COM



DIMENSIONS IN ( ) ARE CENTIMETERS

MATL SPEC ..... AMS 6381  
 HARDNESS ..... Rc 26-32  
 SURF TREAT .... AMS 2481 (DO NOT OIL)  
 INSPECTION .... MAGNETIC PARTICLE  
 SURFACE ROUGHNESS .. 32/

Figure 5-616. Fabrication of Sealing Ring.

e. Reidentify compressor rotor front shaft assembly from 1-101-080-01 to 1-101-080-04. Reidentify 1-100-700-05 same as above:

f. On compressor rotor assembly 1-100-720-40 only, reidentify compressor rotor subassembly from 1-101-260-02 to 1-101-260-08 and compressor rotor from 1-100-720-40 to 1-100-720-45. Reidentify 1-100-720-23 to 1-100-720-23 Δ. Reidentify 1-100-721-21 same as d above.

g. Divert the following unused parts for use in unmodified engines.

(1) Impeller	1-100-413-12	(Qty 1)
(2) Packing	STD3019E54	(Qty 1)
(3) Seal	1-300-214-01/02/03	(Qty 1)

**h. Parts required:**

- (1) Face Seal, 1-300-585-01 (1 Required) NSN 5330-01-008-8243.
- (2) Seal Face Plate, 1-300-588-01 (1 Required) NSN 2840-01-008-1373.
- (3) Shim, 1-060-162-01 (A/R) NSN 5365-01-006-1148
- |              |                            |
|--------------|----------------------------|
| 1-060-162-02 | (A/R) NSN 5365-01-006-1149 |
| 1-060-162-03 | (A/R) NSN 5365-01-007-1066 |
| 1-060-162-04 | (A/R) NSN 5365-01-006-1150 |
| 1-060-162-05 | (A/R) NSN 5365-01-004-8091 |
| 1-060-162-06 | (A/R) NSN 5365-01-004-8091 |

- (4) Seal Ring, 1-100-561-02 (1 Required - Locally manufactured).

**i. Assemble engine then reidentify engine as follows:**

- (1) From Model T53-L-13B to T53-L-13B S/N Suffix "B" P/N 1-000-060-22.
- (2) From Model T53-L-15 to T53-L-15 S/N Suffix "AB" P/N 1-000-100-01.
- (3) From Model T53-L-701A to T53-L-701A P/N 1-000-110-07.
- (4) From Model T53-L-701AB to T53-L-701AB P/N 1-000-110-07.

**NOTE**

Engines already identified S/N suffix "X" shall be reidentified S/N suffix "BX" for the T53-L-13B and S/N suffix "AX" for the T53-L-701A. These engines carry the same part number as the basic engine.

## **SECTION XIII. ACCESSORY DRIVE CARRIER ASSEMBLY**

### **5-452. ACCESSORY DRIVE CARRIER ASSEMBLY.**

#### **5-453. DISASSEMBLY.** Proceed as follows:

- a.** Remove screws (21) that secure cover (22) to carrier (42 or 42A). Remove cover (22). Thread one screw (21) to serve as a puller to remove strainer (24) and packing (23). Remove and discard packing (23).

**CAUTION**

If items 1 through 16 are not used, ensure that pin (54) is removed.

**NOTE**

Items 1 through 16 may not be installed on the T53-L-13B and -703 engines.

CHQSOFTWARE.COM

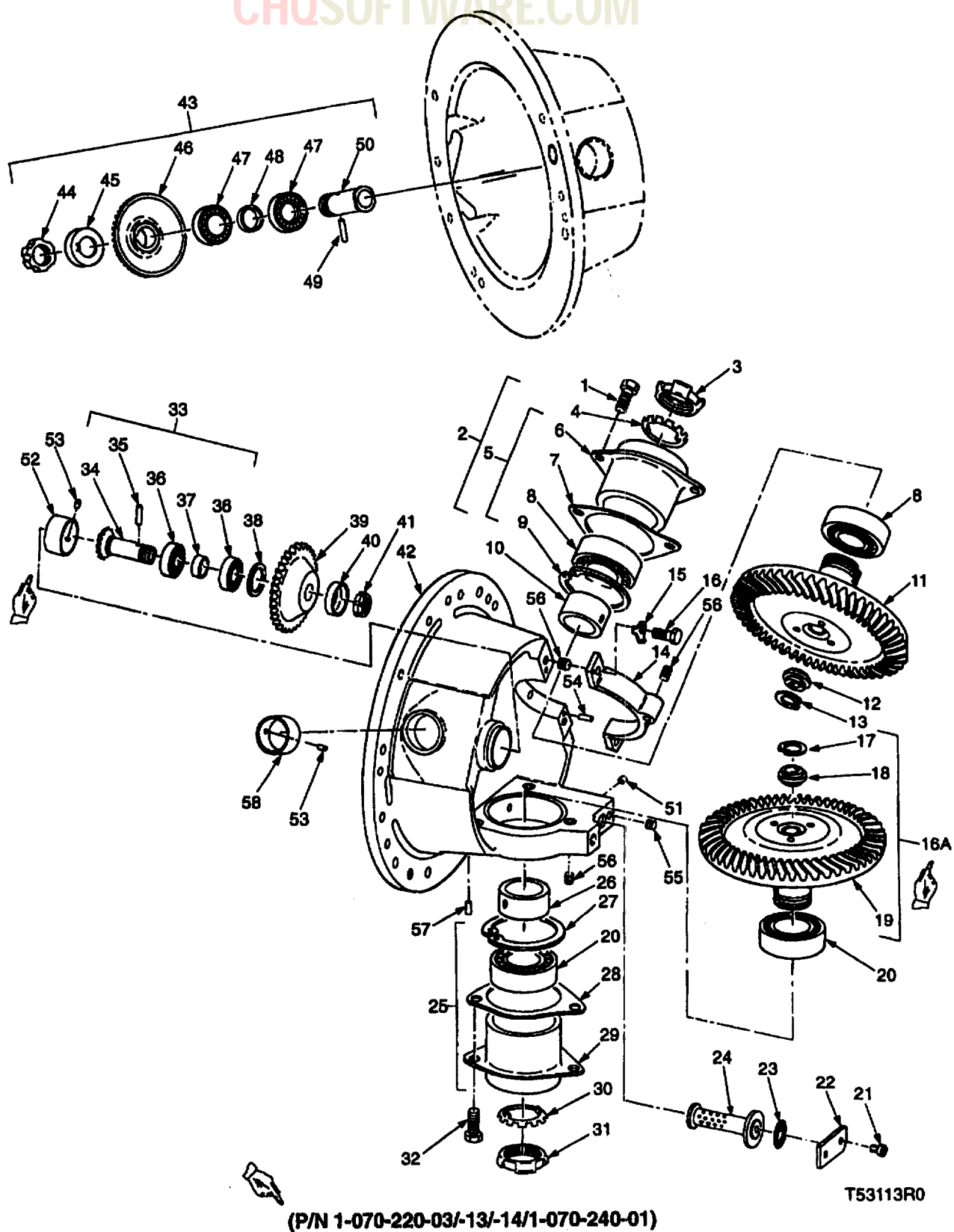
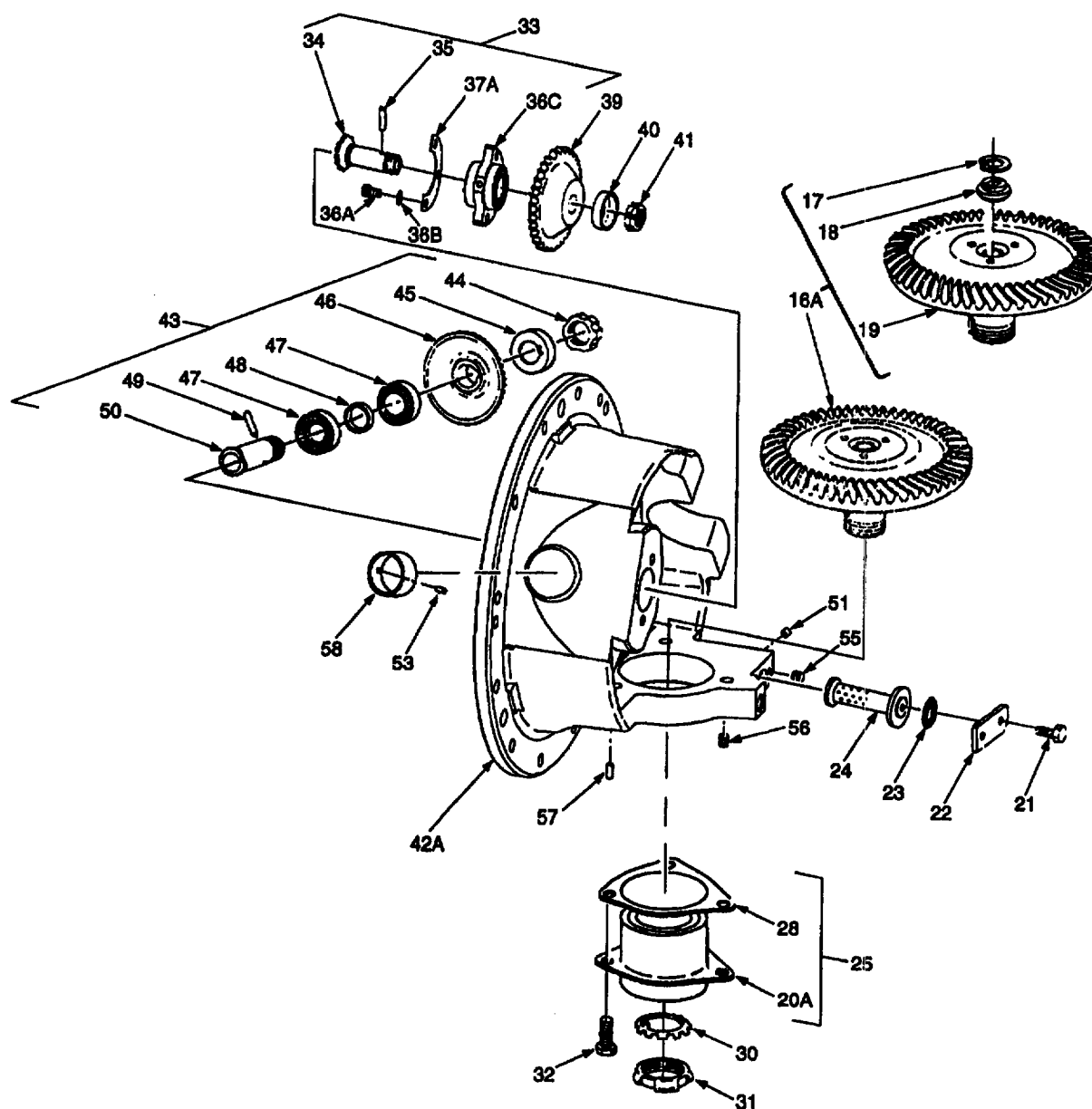


Figure 5-617. Accessory Drive Carrier Assembly (Sheet 1 of 2).

CHQSOFTWARE.COM



T53112R1

(P/N 1-070-220-10)

Figure 5-617. Accessory Drive Carrier Assembly (Sheet 2 of 2).

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-617	No Number	ACCESSORY DRIVE CARRIER ASSEMBLY AND RELATED PARTS (NHA 1-000-060-03, 1-000-100-01, 1-000-060-10, 1-000-060-22, 1-000-060-23, and 1-000-110-01)	Ref	
	1-070-220-03	CARRIER ASSEMBLY, Accessory drive (Replace with 1-070-220-10) (See sheet 1)	1	A,B,C,E
	1-070-220-13	CARRIER ASSEMBLY, Accessory drive (Replace with 1-070-220-10) (See sheet 1)	1	A,B
	1-070-220-14	CARRIER ASSEMBLY, Accessory drive (Replace with 1-070-220-10) (See sheet 1)	1	A,B
	1-070-240-01	CARRIER ASSEMBLY, Accessory drive (See sheet 1)	1	D
	1-070-220-10	CARRIER ASSEMBLY, Accessory drive (See sheet 2)	1	A,B
-1	STD3053-25	. BOLT, Drilled hex head	3	E
-2	No Number	. GEAR AND BEARING ASSEMBLY	1	E
-3	1-070-007-01	. NUT, Spanner, bearing retaining	1	E
-4	1-070-006-01	. . WASHER, Key	1	E
-5	No Number	. . BEARING AND LINER ASSEMBLY	1	E
-6	1-070-103-01	. . . LINER, Bearing	1	E
-7	1-070-002-01	. . . SHIM, Bearing liner	AR	E
-8	105KS300	. . . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-001-01)	1	E
	Q3L05XR1	. . . BEARING, Ball (06008) (Alternate) (Lycoming Source Cont Dwg 2-300-023-01)	1	E
	P9105KE8211	. . . BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 2-300-023-02)	1	E
-9	MS16625-3181	. . . RING, Retaining	1	E
-10	1-070-102-01	. . SPACER, Sleeve	1	E
	1-070-140-01	. GEAR ASSEMBLY, Accessory drive	1	E
-11	1-070-101-01	. . GEAR, Bevel driven, accessory drive	1	E
-12	1-070-011-01	. . STOP, Shaft, accessory drive gear	1	E
-13	MS16625-3068	. . RING, Retaining	1	E
-14	1-070-057-01	. CAP, Pillow block (NHA 1-070-210-01 and 1-070-230-01)	1	E
-15	STD3018K11	. TABWASHER (NHA 1-070-210-01 and 1-070-230-01)	2	E
-16	STD3053-11	. BOLT, Hex head (NHA 1-070-210-01 and 1-070-230-01)	2	E
-16A	1-070-140-01	. GEAR ASSEMBLY, Accessory drive	1	
-17	MS16625-3068	. . RING, Retaining	1	
-18	1-070-011-01	. . STOP, Shaft, accessory drive gear	1	
-19	1-070-101-01	. . GEAR, Bevel driven, accessory drive	1	

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
5-617-20	105KS300	. BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-001-01)	2	
	Q3L05XR1	. BEARING, Ball (06008) (Alternate) (Lycoming Source Cont Dwg 2-300-023-01)	2	
	P9105KE8211	. BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 2-300-023-02)	2	
-20A	5205J2300	. BEARING, Duplex, thrust (38843) (AlliedSignal Source Cont Dwg 1-300-658-01)	1	A,B
-21	1-070-073-01	. SCREW, Cap, socket head	2	
-22	1-070-016-02	. COVER, Strainer retaining	1	
-23	MS29561-012	. PACKING	1	
-24	1-070-021-01	. STRAINER, Oil	1	
-25	No Number	. BEARING AND LINER ASSEMBLY	1	
-26	1-070-102-01	. . SPACER, Sleeve (NHA 1-070-220-03/-13/-14/1-070-240-01)	1	
-27	MS16625-3181	. . RING, Retaining (NHA 1-070-220-03/-13/-14/1-070-240-01)	1	
-28	1-070-002-01	. . SHIM, Bearing liner	AR	
-29	1-070-103-01	. . LINER, Bearing	1	
-30	1-070-006-01	. WASHER, Key	1	
-31	1-070-007-01	. NUT, Spanner, bearing retaining	1	
-32	STD3053-25	. BOLT, Drilled hex head	3	
-33		. GEARSHAFT AND BEARING ASSEMBLY (NHA 1-070-220-XX)	1	
-34	1-070-063-02	. . GEARSHAFT, Bevel tachometer drive	1	
-35	MS9105-58	. . PIN, Lock	1	
-36	1901S300	. . BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-002-01)	2	
-36A	MS9565-08	. . BOLT, Drilled hex head	3	A,B
-36B	AN960C10L	. . WASHER	3	A,B
-36C	UMERF-1901SD 600DBAMX3	. . BEARING, Ball (83086) (AlliedSignal Source Cont Dwg 1-300-672-01)	1	A,B
-37	1-070-061-01	. . SPACER, Ring, tachometer drive bearing, 0.200 - 0.204 inch thick (NHA 1-070-220-03/-13/-14/1-070-240-01)	1	
	1-070-061-02	. . SPACER, Ring, tachometer drive bearing, 0.205 - 0.209 inch thick (NHA 1-070-220-03/-13/-14/1-070-240-01)	1	
	1-070-061-03	. . SPACER, Ring, tachometer drive bearing, 0.210 - 0.214 inch thick (NHA 1-070-220-03/-13/-14/1-070-240-01)	1	
	1-070-061-04	. . SPACER, Ring, tachometer drive bearing, 0.215 - 0.219 inch thick (NHA 1-070-220-03/-13/-14/1-070-240-01)	1	

Figure & Index Number	Part Number	Description						Qty Per Assy	Usable on Code
		1	2	3	4	5	6		
5-617-37	1-070-061-05	.. SPACER, Ring, tachometer drive bearing, 0.220 - 0.224 inch thick (NHA 1-070-220-03/-13/-14/1-070-240-01)						1	
	1-070-061-06	.. SPACER, Ring, tachometer drive bearing, 0.225 - 0.227 inch thick (NHA 1-070-220-03/-13/-14/1-070-240-01)						1	
	1-070-061-07	.. SPACER, Ring, tachometer drive bearing, 0.228 - 0.232 inch thick (NHA 1-070-220-03/-13/-14/1-070-240-01)						1	
-37A	1-070-125-01	.. SHIM, Accessory drive pinion location, 0.020 - 0.024 inch thick (NHA 1-070-220-10)						1	A,B
	1-070-125-02	.. SHIM, Accessory drive pinion location, 0.025 - 0.029 inch thick (NHA 1-070-220-10)						1	A,B
	1-070-125-03	.. SHIM, Accessory drive pinion location, 0.030 - 0.034 inch thick (NHA 1-070-220-10)						1	A,B
	1-070-125-04	.. SHIM, Accessory drive pinion location, 0.035 - 0.039 inch thick (NHA 1-070-220-10)						1	A,B
	1-070-125-05	.. SHIM, Accessory drive pinion location, 0.040 - 0.044 inch thick (NHA 1-070-220-10)						1	A,B
	1-070-125-06	.. SHIM, Accessory drive pinion location, 0.045 - 0.049 inch thick (NHA 1-070-220-10)						1	A,B
	1-070-125-07	.. SHIM, Accessory drive pinion location, 0.050 - 0.052 inch thick (NHA 1-070-220-10)						1	A,B
-38	RR93L	. RING, Retaining (80756) (Lycoming Spec Cont Dwg 1-300-046-01) (Not a component of 1-070-220-10)						1	
-39	1-070-062-03	.. GEAR, Spur, tachometer drive (Replace with 1-070-062-06)						1	
	1-070-062-04	.. GEAR, Spur, tachometer drive (Replace with 1-070-062-06)						1	
	1-070-062-06	.. GEAR, Spur, tachometer drive						1	
-40	1-070-066-03	. RETAINER, Nut and bolt						1	
-41	MS172237	.. NUT, Spanner						1	
-42	1-070-210-01	. CARRIER AND CAP ASSEMBLY (NHA 1-070-220-03/-13/-14)						1	A,B,C,E
	1-070-230-01	. CARRIER AND CAP ASSEMBLY (NHA 1-070-240-01)						1	D
-42A	1-070-210-07	. CARRIER AND CAP ASSEMBLY (NHA 1-070-220-10)						1	A,B
-43	No Number	. SHAFT AND BEARING ASSEMBLY (NHA 1-070-220-XX and 1-070-240-01)						1	
-44	MS172238	.. NUT, Spanner						1	
-45	1-070-065-01	.. RETAINER, Nut and bolt, bearing retaining						1	
-46	1-070-064-04	.. GEAR, Bevel-driven, tachometer drive						1	
-47	1902S301	.. BEARING, Ball (38443) (Lycoming Source Cont Dwg 1-300-003-01)						2	
	P9302KE8959	.. BEARING, Ball (21335) (Alternate) (Lycoming Source Cont Dwg 1-300-003-03)						2	
	554155A	.. BEARING, Ball (91547) (Alternate) (AlliedSignal Source Cont Dwg 2-300-941-01)						2	

Figure & Index Number	Part Number	Description 1 2 3 4 5 6 7	Qty Per Assy	Usable on Code
5-617-48	1-070-059-01	. . SPACER, Ring, tachometer drive bearing, 0.160 - 0.164 inch thick	1	
	1-070-059-02	. . SPACER, Ring, tachometer drive bearing, 0.165 - 0.169 inch thick	1	
	1-070-059-03	. . SPACER, Ring, tachometer drive bearing, 0.170 - 0.174 inch thick	1	
	1-070-059-04	. . SPACER, Ring, tachometer drive bearing, 0.175 - 0.179 inch thick	1	
	1-070-059-05	. . SPACER, Ring, tachometer drive bearing, 0.180 - 0.184 inch thick	1	
-49	MS9105-60	. . PIN, Lock	1	C-E
-50	1-070-067-01	. SHAFT, Tachometer drive gear	1	
-51	1-070-023-01	. PLUG, Machine thread	1	
-52	1-070-058-01	. BUSHING, Sleeve	1	
-53	AN122683	. PIN, Straight (NHA 1-070-220-10)	2	
	AN122683	. PIN, Straight (NHA 1-070-220-14)	1	E
-54	AN122692	. PIN, Straight	2	
-55	MS124695	. INSERT Screw thread	2	
-56	MS124736	. INSERT Screw thread	8	
-57	MS9105-77	. PIN, Straight	1	
-58	1-070-056-01	. BUSHING, Sleeve	1	



- b. Remove bolts (1) that secure gear and bearing assembly (2) to carrier (42).
- c. Straighten tabwashers (15). Remove bolts (16) and tabwashers that secure cap (14) to carrier. Discard tabwashers (15).

**NOTE**

Mark gear (11) to ensure that it is reassembled in the same position from which it was removed.

- d. Remove cap (14) gear and bearing assembly (2) from carrier (42) and place in holding fixture (LTCT2045 or LTCT4996).
- e. Straighten washer (4). Using wrench (LTCT2133), remove nut (3) and washer (4). Discard washer (4).
- f. Install puller (LTCT2028) on gear (11). Turn handle of puller and remove bearing and liner assembly (5). Remove puller.
- g. Remove and record thickness of shim (7).
- h. Using snapping pliers, remove retaining ring (9) from liner (6).
- i. Support liner. Using fiber drift and soft-faced mallet, press out bearing (8) from liner (6).
- j. Using base (LTCT2966) and driver (LTCT4012), remove spacer (10) and bearing (8) from gear (11).
- k. Remove retaining ring (13) and stop (12) from gear (11).
- l. Position carrier (42 or 42A), with remaining gear installed, in holding fixture (LTCT4996).
- m. Straighten washer (30). Using wrench (LTCT2133), remove nut (31) and washer (30). Discard washer (30). Remove carrier (42 or 42A) from fixture.

**NOTE**

The following steps n through s are not applicable to Accessory Drive Carrier Assembly Part No. 1-070-220-10. If utilizing Accessory Drive Carrier Assembly Part No. 1-070-220-10, proceed to step t.

- n. Remove bolts (32) that secure bearing and liner assembly (25) to the carrier.

**NOTE**

Mark gear (19) to ensure that it is reassembled in the same position from which it was removed.

- o. Install puller (LTCT2028) on gear (19). Turn handle of puller and remove gear (19). Using a soft-faced mallet, tap bearing and liner assembly from carrier.
- p. Remove and record thickness of shim (28).
- q. Using snapping pliers, remove retaining ring (27) from liner (29).
- r. Support liner. Using a fiber drift and soft-faced mallet, press out bearing (20) from liner (29).
- s. Using base (LTCT2966) and driver (LTCT4012), remove spacer (26) and bearing (20) from gear (19).
- t. (1-070-220-10) Install carrier (42A) into holding fixture (LTCT3040) and secure gear (39).
- u. (1-070-220-10) Straighten retainer (40) and using wrench (LTCT4020), remove nut (41) and retainer (40). Discard retainer (40). Release and remove gear (39) from gearshaft (34). Remove carrier (42A) from holding fixture.
- v. (1-070-220-10) Remove pin (35).
- w. (1-070-220-10) Remove bolts (36A) and washers (36B). Remove assembled bearing (36C), shim (37A), and gearshaft (34) from carrier (42A).
- x. (1-070-220-10) Remove bolts (32) that secure duplex bearing (20A) to the carrier.

CHQS **CAUTION** ARE.COM

Fabricate non-metallic cushion to be used between gear and housing to prevent damage while removing flanged bearing assembly.

Do not use powered tool when using installation tools (LTCT30741). Continuously monitor alignment of duplex bearing (20A) and gear (19) during disassembly. Re-align as necessary.

- y. (1-070-220-10) Using puller (LTCT30741), remove duplex bearing (20A) from gear (19). Remove and record thickness of shim (28).
- z. Remove retaining ring (17) and stop (18) from gear (19).
- aa. (1-070-220-03/-13/-14 and 1-070-240-01) Install carrier (42) into holding fixture (LTCT3040) and secure gear (39).

**CAUTION**

Care must be exercised to prevent damage to gear (39) during removal from gearshaft (34). Use of pry-type hand tools is not permitted; damage or cracking of gear teeth may result.

- ab. (1-070-220-03/-13/-14 and 1-070-240-01) Straighten retainer (40) and using wrench (LTCT4020), remove nut (41) and retainer. Discard retainer (40). Release and remove gear (39) from gearshaft (34). Remove carrier (42) from holding fixture.
- ac. (1-070-220-03/-13/-14 and 1-070-240-01) Remove retaining ring (38). Using fiber drift, drive gearshaft and bearing assembly (33) from carrier.
- ad. (1-070-220-03/-13/-14 and 1-070-240-01) Remove pin (35).

**CAUTION**

Ensure puller engages inner race of bearing (36 or 36C) to prevent damage to bearing during disassembly.

- ae. (1-070-220-03/-13/-14 and 1-070-240-01) Using puller (LTCT675), remove bearings (36) and spacer (37) from gearshaft (34). Measure length of spacer and record for reference during reassembly.

**CAUTION**

Bearing (36C) and gearshaft (34) assembly must be fully seated into disassembly tool (LTCT30719) to prevent damage to gearshaft teeth

- af. (1-070-220-10) Using disassembly tool (LTCT30719) and arbor press, remove bearing (36C) from gearshaft (34). Measure thickness of shim (37A) and record for reference during reassembly.
- ag. Using fiber drift, remove shaft and bearing assembly (43) from carrier.
- ah. Install shaft and bearing assembly (43) onto spline of holding fixture (LTCT3040) with nut (44) up.
- ai. Straighten retainer (45) and using wrench (LTCT1109 or LTCT696), remove nut (44) and retainer (45). Discard retainer (45). Remove gear (46) from shaft (50).
- aj. Remove pin (49).

**CAUTION**

Ensure puller engages inner race of bearing (47) to prevent damage to bearing during disassembly.

- ak. Using puller (LTCT675), remove bearings (47) and spacer (48) from shaft (50). Measure length of spacer and record for reference during reassembly.

**5-454. 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 strainer (24, figure 5-617) as follows:
  - (1) Immerse strainer in a tank that contains dry cleaning solvent (item 134, table C-1) and clean, using a soft bristle brush.
  - (2) Remove from tank and pressure-flush, using dry cleaning solvent (item 134, table C-1).
- d. Remove any foreign material clogging No. 1 bearing oil transfer tube (2, figure 4-47 or 22, figure 4-48) and oil passages in carrier (42 or 42A, figure 5-617) by pressure-flushing using dry cleaning solvent (item 134, table C-1).

**5-455. INSPECTION.** Perform specific inspections listed in table 5-177.**5-456. REPAIR OF ACCESSORY DRIVE CARRIER ASSEMBLY.** (See figures 4-47, 4-48, and 5-617). Proceed as follows:

- a. Repair damaged oil transfer tube seat in carrier and cap assembly (1-070-120-05).
  - (1) Counterbore transfer tube hole 0.4375 (7/16) inch (1.1112 cm) diameter to a depth of 0.35 to 0.36 inch (0.89 to 0.91 cm).
  - (2) Treat exposed metal in accordance with MIL-M-3171, Type VI.
  - (3) Fabricate a press-fit plug 0.4380 to 0.4390 inch (1.1125 to 1.1151 cm) diameter from aluminum alloy (item 31, table C-1) and install with sealant, Loctite "C" (item 264, table C-1).
  - (4) Pin plug with 1/16-inch aluminum pin in area of maximum web thickness.
  - (5) Machine bore plug 0.2344 inch (0.5954 cm) diameter to a depth of 0.35 to 0.36 inch (0.89 to 0.91 cm).
  - (6) 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).
  - (7) Countersink plug 60 degrees to a 0.370 to 0.380 inch (0.940 to 0.965 cm) diameter.
  - (8) Drill 0.0995 inch (0.2527 cm) diameter hold at 37 to 37.5 degrees through plug to meet with existing oil passage.
  - (9) Scavenge and pressure oil tube seal ring grooves may be dimensionally repaired by welding and re-machining. Welding should be accomplished prior to metal spraying adjacent support surface. TIG weld as outlined in MIL-W-8611 using welding wire AMS5774 (item 345, table C-1). Finish machine as follows:
    - (a) Scavenge oil tube seal ring groove:
      - 1 Locate on centerline of oil tube.
      - 2 Counterbore around scavenge oil tube: 0.572/0.570 diameter; 0.050/0.045 depth; 0.02R (max.) at bottom of counterbore; seal ring surface to be parallel to support surface within 0.001; break sharp edges.
    - (b) Pressure oil tube seal ring groove:
      - 1 Locate on centerline of oil tube.
      - 2 Counterbore around pressure oil tube: 0.572/0.570 diameter; 0.050/0.045 depth; 0.02R (max.) at bottom of counterbore; seal ring surface to be parallel to support surface within 0.001; break sharp edges.
- b. Repair the 1.8504 to 1.8508 inch (4.7000 to 4.7010 cm) diameter of liner (6 or 29, figure 5-617) by nickel plate, chrome plate, or plasma flame spray. (Refer to figure 5-620.)
  - (1) Nickel plate or chrome plate, 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.
    - (c) Bake at 365 to 385°F (185 to 196°C) for 3 hours.
    - (d) Machine to dimensions given.

Table 5-177. Inspection of Accessory Drive Carrier Assembly.

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-47 2	Oil Transfer Tube	Visual	Clogged Tube	Clean. (Refer to paragraph 5-454)
4-48 22	Oil Transfer Tube	Visual	Clogged tube	Clean. (Refer to paragraph 5-454)
5-617	Accessory Drive Carrier Assembly	Visual and SIE	Crossed, stripped, or worn threaded parts	Repair or replace. (Refer to SP No. 5007 in Appendix E)
			Damaged oil transfer tube seat in carrier and cap assembly 1-070-210-01	Repair. (Refer to paragraph 5-456)
		Visual	Loss of protective surface finish on carrier and cap assembly (dichromate)	Repair. (Refer to SP No. 6026 in Appendix E)
			Loss of protective surface finish on liners and spacers (black oxide)	Repair. (Refer to SP No. 6003 in Appendix E)
		Visual with 4-power magnifying glass	Worn or damaged gears or splined parts. (Refer to table 5-178)	Replace if limits are not met
		Dimensional	Wear. (Refer to table 5-179)	Replace if limits are not met and parts are not repairable. (Refer to paragraph 5-456)
		Visual and Magnetic-Particle. (Refer to table 5-180)	Cracks	Replace defective parts if limits are not met (SP No. 3009)
6	Liner Bearing	Visual	Nicks, burrs, scoring, or wear on bearing liner protective finish	Repair. (Refer to paragraph 5-456)
		Dimensional	Wear (Refer to table 5-179)	Replace or repair (Refer to paragraph 5-456)
<b>WARNING</b>				
<b>FLIGHT SAFETY PARTS</b>				
<b>Verification of the bore diameter of the following part is flight safety critical.</b>				
8	Ball Bearing	Visual and Dimensional	Damaged bearing wear (Refer to table 5-181.)	Replace if limits are not met.

Table 5-177. Inspection of Accessory Drive Carrier Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-617	<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p><b>Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.</b></p>			
11 and 19	Gear, Bevel Driven Accessory Drive	Visual and SIE	Wear or damage on gear teeth	Repair or replace (SP No. 3009).
		Visual and Dimensional	Wear. (Refer to table 5-179)	Repair or replace if limits are not met.
		Magnetic-Particle. (Refer to table 5-180)	Cracks	None allowed. Replace.
14	Cap	Visual and Florescent-Penetrant	Cracks	Not allowed. Replace.
<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p><b>Verification of the bore diameter of the following part is flight safety critical.</b></p>				
20	Ball Bearing	Visual and SIE	Damaged bearing	
		Dimensional	Wear. (Refer to table 5-181)	Replace if limits are not met.
20A	Duplex Bearing	Visual and SIE	Damaged bearing	
		Dimensional	Wear. (Refer to table 5-181)	Replace if limits are not met.
22	Strainer Retainer Cover	Visual	Distorted and elongated holes	Replace.
24	Strainer	Visual	Foreign material, cuts, or dents in strainer	Clean strainer of foreign material. (Refer to paragraph 5-454.) Replace if strainer is cut or dented.
29	Liner Bearing	Visual	Nicks, burrs, scoring, or wear on bearing liner protective finish	Repair. (Refer to paragraph 5-456.)
		Dimensional	Wear. (Refer to table 5-179)	Replace or repair. (Refer to paragraph 5-456.)

Table 5-177. Inspection of Accessory Drive Carrier Assembly (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-617	<p align="center"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p><b>Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.</b></p>			
34	Gearshaft Bevel Tachometer Drive	Visual and SIE	Wear on 0.4723 to 0.4726 inch (1.1996 to 1.2004 cm) diameter	Repair. (Refer to paragraph 5-456 and SP No. 3009.)
		Visual and Magnetic-Particle. (Refer to table 5-180)	Cracks	Not allowed. Replace.
36, 36C	Ball Bearing	Visual and SIE	Damaged bearing	
		Dimensional	Wear. (Refer to table 5-181)	Replace if limits are not met.
37	Spacer	Visual	Cracks	None allowed. Replace.
37A	Shim, Accessory Drive Pinion Location	Visual	Cracks	None allowed. Replace.
<p align="center"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p><b>Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.</b></p>				
39	Gear, Spur, Tachometer Drive (1-070-062-04/-06)	Visual and SIE	Wear or damage on gear teeth. (Refer to table 5-178)	Repair or replace (SP No. 3009).
	(1-070-062-06)	Visual	Coating for cracks, chips, blistering, and missing coating using 10X magnification. (Refer to table 5-178)	Replace if limits are not met.
		Magnetic-Particle. (Refer to table 5-180)	Cracks in non-coated areas	None allowed. Replace.
<p align="center"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p><b>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</b></p>				
42	Carrier (1-070-210-01 and 1-070-230-01)	Visual and SIE	Scoring or wear on 0.9449 to 0.9454 inch (2.4000 to 2.4013 cm) and 1.1024 to 1.1029 inches (2.8001 to 2.8014 cm) diameters of bearing liner	Repair. (Refer to paragraph 5-456.)

**Table 5-171. Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).**

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.	
			MIN	MAX	MIN	MAX	MIN	MAX		
	5-569								5-571	
			<b>WARNING</b>							
			<b>FLIGHT SAFETY PARTS</b>							
			The following dimensional inspection is flight safety critical.							
Rear Compressor Shaft	39	OD	3.7524 (9.5311)	3.7530 (9.5326)	3.7524 (9.5311)	3.7530 (9.5326)			O	
Front Bearing Housing	6	Axial	1.299 (3.299)	1.302 (3.307)	1.299 (3.299)	1.302 (3.307)			P	
Sleeve	4-53	OD	4.099 (10.411)	4.100 (10.414)	4.0985 (10.4102)	4.1000 (10.4140)			Q	
Seal Housing	5*	ID	3.249 (8.252)	3.250 (8.255)	3.249 (8.252)	3.250 (8.255)			R	
	13									
			<b>WARNING</b>							
			<b>FLIGHT SAFETY PARTS</b>							
			The following dimensional inspection is flight safety critical.							
Front Shaft Assembly	19	OD	1.9685 (5.0000)	1.9687 (5.0005)	1.9683 (4.9995)	1.9687 (5.0005)			S	
		OD	2.4290 (6.1697)	2.4310 (6.1747)	2.4290 (6.1697)	2.4310 (6.1747)			T	
			<b>WARNING</b>							
			<b>FLIGHT SAFETY PARTS</b>							
			The following dimensional inspection is flight safety critical.							
Power Shaft	38	OD	1.4217 (3.6111)	1.4222 (3.6124)	1.4217 (3.6111)	1.4222 (3.6124)			U	
		OD	1.1815 (3.0010)	1.1830 (3.0048)	1.1805 (2.9985)	1.1830 (3.0048)			V	

\*\*\* See Notes on last page of table.



Table 5-171. Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
	5-569								5-571
<p style="text-align: center;"><b>WARNING</b></p> <p style="text-align: center;"><b>FLIGHT SAFETY PARTS</b></p> <p style="text-align: center;">Verification of the 2.1655-2.1658, 2.1544-2.1551 and 1.9779-1.9786 dimensions are flight safety critical.</p>									
Rear Compressor Shaft	39	OD	2.1655 (5.5004)	2.1658 (5.5011)	2.1654 (5.5001)	2.1658 (5.5011)			W
		OD	2.1544 (5.4723)	2.1551 (5.4740)	2.1541 (5.4714)	2.1551 (5.4740)			X
		OD	1.9779 (5.0239)	1.9786 (5.0256)	1.9776 (5.0231)	1.9786 (5.0256)			Y
Front Bearing Housing Squareness**	6	TIR		0.001		0.0015			Z
Front Bearing Housing Concentricity**	6	TIR		0.001		0.0025			AA
Front Shaft Assembly-Rear Hub Runout**	19	TIR		0.001		0.0015			AB
Power Shaft-Seal Journal Runout***	38	TIR		0.0005		0.0010			AC
									AD

\*\*\*\* See Notes on last page of table.

## \*\*\*\*NOTES

\*Dimension inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear

\*\*Measure taken to REF SURFACE indicated in figure 5-571.

\*\*\*Provided bumper clearance between compressor front bearing housing and sleeve is maintained at assembly.



Table 5-172. Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703).

BEARING TYPE & PART NUMBER	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
			MIN	MAX					
Ball V3210RSS470 or MM210VM25MBRE 7730	5-569								
	<b>WARNING</b> <b>FLIGHT SAFETY PARTS</b> Verification of the 1.9683-1.9685 bore diameter is flight safety critical.								
	7***	ID	1.9683 (4.9995)	1.9685 (5.0000)	0.0020 (0.0051)	0.008 (0.020)	58 to 62	N/A	1-300-015-02
		OD	3.5430 (8.9992)	3.5433 (9.0000)	0.0024 (0.0061)	0.012** (0.030)			
		ID	1.9683 (4.9995)	1.9685 (5.0000)	0.0037 (0.0094)	0.016* (0.041)	58 to 62	N/A	1-300-015-04
		OD	3.5430 (8.9992)	3.5433 (9.0000)	0.0043 (0.0109)	MAX			

\*Under 11.0 pound gage load.

\*\*Under 13.0 to 17.0 pound gage load

\*\*\*Scribe match lines (V mark) across the bearing bore must be aligned.

Table 5-173. Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703).

SEAL TYPE AND PART NUMBER	FIG & INDEX	OUTSIDE DIAMETER		INSIDE DIAMETER		WIDTH (AXIAL)	
		MIN	MAX	MIN	MAX	MIN	MAX
Face Seal (1-300-585-01/-02)	5-569 15	3.252 (8.260)	3.253 (8.263)	N/A	N/A	0.788 (2.002)	0.792 (2.012)

Table 5-174. Compressor Rotor Assembly - Inspection Limits (T53-L-13B, -701A, -703).

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Sand and Dust Erosion on Front Shaft Assembly Blades		<p>a. Inspect leading edge of blades for undercutting and metal rolled-over effect as follows:</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Rolled-over can be detected by running a finger-nail along airfoil on convex side until leading edge is contacted. Erosion roughness is acceptable.</p> <p>Rolled-over effect is acceptable, provided requirements in step b are met. Repair as outlined in paragraph 5-438.</p>
Grooves on 1.481 to 1.483 inch (3.762 to 3.767 cm) ID of Front Compressor Rotor Shaft	5-533	<p>b. Measure chordal width at the midpoint of blade as shown on figure 5-530. Blade is acceptable for use if chordal width is 0.965 inch or greater. Inspect the under cut as shown in figure 5-529. Blade is acceptable for use if under cut is 0.0156 inch or less. Repair as outlined in paragraph 5-439.</p> <p>Inspect the 1.481 to 1.483 inch (3.762 to 3.767 cm) ID at the front of the shaft underneath the thread runout for grooves caused by contact with the 0.05 to 0.09 inch (0.13 to 0.23 cm) shoulder of the power shaft. Wear up to 0.090 inch (0.229 cm) wide and to a depth of 0.015 inch (0.038 cm) is acceptable provided the wall thickness in the two 0.265 to 0.270 inch (0.673 to 0.686 cm) slot areas is not less than 0.045 inch (0.114 cm). (See figure 5-533.) Remove sharp edges and protrusions in wear area by blend-repairing. (Refer to SP No. 5000 in Appendix E.)</p>
Erosion on Blades (Second Through Fifth Stages)	5-529	<p style="text-align: center;"><b>NOTE</b></p> <p>Blades may remain in the disk for this inspection.</p> <p>a. Inspect second stage blades for erosion wear as shown in figure 5-529. Blades measuring less than 0.885 inch chordal width at tips shall be rejected. Measure blades as far outboard as possible, using a suitable outside micrometer.</p> <p>b. Inspect third through fifth stage blades for erosion wear as shown in figure 5-529. Blades measuring less than 0.652 inch chordal width at tips shall be rejected. Measure blades as far outboard on tips as possible using a suitable outside micrometer. Any rounding tip corners which may inhibit measuring is cause for blade rejection without the need for measurement.</p>

Table 5-174. Compressor Rotor Assembly - Inspection Limits (T53-L-13B, -701A, -703) (Continued).

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Cracks, Nicks, Dents, and Rubs in Disk and Spacer Area of Compressor Rotor Subassembly	5-529 (cont)	<p><b>NOTE</b></p> <p>Pay particular attention to blade retention areas.</p> <p>a. Cracks are not allowed in any area.</p> <p>b. Minor, random (well-spaced) nicks and dents are acceptable. Blend nicks only to the extent of removing sharp protrusions.</p> <p>c. Surface rubs to a maximum depth of 0.030 inch (0.076 cm) are acceptable where rotor has rubbed stationary components, except in disk tenon face areas; deep rubs resulting in obvious mutilation of rotor are not allowed in any area. Blend repair only to extent of removing surface projections. If depth of rubs exceed 0.030 inch (0.076 cm) repair as outlined in paragraph 5-440.</p> <p>Bolts (33) must be identified with the letters SPS, letters VS, letters VSI, two dots, part number 1-100-502-02, part number 2-07-5029G, or manufacturer's code number 92215 on the bolt heads. The letters may be followed by a lot number.</p> <p>If bolts are properly identified, they must be inspected by magnetic-particle method for cracks prior to being reused. If cracks are noted, replace.</p> <p>Any degree of rubbing is acceptable provided the accompanying discoloration on the sides (airfoil) of the vane is limited only to faint straw color. A deep gold or blue color. On the vane sides shall be cause for impeller assembly replacement. Blend-repair tips to a smooth radius. (Refer to paragraph 5-438).</p>
Rear Compressor Shaft and Impeller Bolts for Proper Identification		
Evidence of Rubbing on Impeller Blade Tips		
Nicks, Dents, and Burrs on Impeller Vanes	5-573	<p>Critical Area: No nicks allowed. Smooth dents are permitted, provided they do not exceed 0.04 inch (0.10 cm) diameter and 0.01 inch (0.03 cm) depth. No repair allowed in critical area. (Refer to paragraph 5-438)</p>
	5-573	<p>Leading Edge:</p> <p>a. Dents: Dents are acceptable on each vane leading edge up to 0.08 inch (0.20 cm) depth. No repair required.</p> <p>b. Nicks: Each vane leading edge may have three nicks up to 0.06 inch (0.15 cm) depth, provided the vane is blend-repaired. (Refer to paragraph 5-438).</p> <p>Trailing Edge: 0.05 inch (0.13 cm) maximum repair depth. Distance between repaired area must be equal to or greater than the length of the shortest repair.</p> <p>Tips: 0.05 inch (0.13 cm) maximum repair depth. Distance between repaired areas must be at least 1/4 inch (0.635 cm).</p>

**Table 5-174. Compressor Rotor Assembly - Inspection Limits (T53-L-13B, -701A, -703) (Continued).**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
	5-573 (cont)	<p>Airfoil (sides): Inducer Area (Forward of theoretical split line).</p> <p>a. Dents up to 0.06 inch (0.15 cm) in diameter are permitted without repair, provided a minimum of 0.025 inch (0.064 cm) vane thickness remains.</p> <p>b. Nicks after blend repair shall not exceed the dent limits given above. Distance between defects must be at least 1/4 inch (0.635 cm).</p> <p>Impeller Area (Aft of theoretical splitline).</p> <p>a. No repair allowed other than blending of burrs, except on trailing edge and tip.</p> <p>b. Dents and nicks to 0.06 inch (0.15 cm) in diameter are permitted without repair, provided a minimum of 0.025 inch (0.064 cm) vane thickness remains. Distance between defects must be at least 1/4 inch (0.064 cm).</p>
Erosion on Impeller	5-573	<p>Position a straight edge across the forward lip of the centrifugal impeller (refer to figure 5-573). The maximum gap between straight edge and closest point on impeller blade (erosion wear) shall not exceed 0.08 inch (0.20 cm).</p>
Corrosion Discoloration on Power Shaft Bearing Journals		Corrosion discoloration is acceptable and can be effectively removed by standard cleaning methods.
Discoloration, Staining and Varnishing on Power Shaft Bearing Journals		Discoloration, staining and varnishing are acceptable if heavy varnish films can be removed by standard cleaning and staining is not caused by acid etch as observed after standard cleaning. If limits are exceeded, replace power shaft.
Wear on 0.05 to 0.09 inch (0.13 to 0.23 cm) Shoulder of Power Shaft Caused by Contact with ID of Front Compressor Shaft		Wear is acceptable up to flush with the 1.425 to 1.435 inch (3.620 to 3.645 cm) diameter. (See figure 5-537.) Remove sharp edges and protrusions in rear area by blend-repairing.
Scoring or damage in blade base area	5-573	Scoring or damage in blade base area resulting in a depression or loss of material less than 0.010 inch deep is acceptable after blending per SP No. 5000 to remove burrs and sharp edges.
Frosting on Power Shaft Bearing Journals		Frosting is acceptable, provided it cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If within limits, blend repair as outlined in SP No. 5000 in Appendix E. If limit is exceeded, replace power shaft.
Nicks, (Isolated) on Power Shaft Bearing Journals		Nicks, (isolated) with no projections are acceptable, provided they cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If within limits, blend-repair as outlined in SP No. 5000 in Appendix E. If limits is exceeded, replace power shaft

**Table 5-174. Compressor Rotor Assembly- Inspection Limits (T53-L-13B, -701A, -703) (Continued).**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Scoring (Axial) on Power Shaft Bearing Journals	5-573 (cont)	Scoring (axial) is acceptable provided it cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If within limits, blend-repair as outlined in SP No. 5000 in Appendix E. If limit is exceeded, replace power shaft
Scuffs and Scratches on Power Shaft Bearing Journals		Scuffs and scratches are acceptable provided they cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If within limits, blend-repair as outlined in SP No. 5000 in Appendix E. If limit is exceeded, replace power shaft
Pilot Diameter Concentricity for Helicoil Repair to Aft End of Power Shaft		Pilot diameter must be concentric with A and B surfaces of power shaft within 0.002 inch (0.005 cm) TIR
Indenting of Corrosion Pitting on Power Shaft Bearing Journal		a. Indenting is acceptable if it cannot be detected with a 0.040 inch (0.102 cm) radius scribe. If limit is exceeded, replace power shaft. b. Corrosion pitting is acceptable if it cannot be detected with a 0.040 inch (0.102 cm) radius scribe. If limit is exceeded, replace power shaft.
Circumferential Marks on Power Shaft 1.1815 to 1.1830 inch (3.0010 to 3.0048 cm) Diameter		Circumferential marks caused by contact between the power shaft OD and second stage power turbine rotor sealing flange ID are acceptable, provided depth of defect does not exceed 0.003 inch (0.008 cm). If limit is exceeded, repair power shaft. (Refer to paragraph 5-438).
Blade Protrusion on Compressor Rotor Subassembly	5-571	Blade protrusion is allowable up to 0.015 inch maximum on forward and aft of disk faces. Axial movement of loose blades is acceptable provided axial clearance requirements are met.
Scoring (Axial) Scratches and Scuffs on Bearing and Cone Journals. (Dimensions W, X and Y)		Scoring (Axial), scratches and scuffs are acceptable provided they cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If within limits, blend repair. (Refer to SP No. 5000 in Appendix E). If limits are exceeded, repair journals (paragraph 5-438).
Discoloration and Stains on Bearing and Cone Journals. (Dimensions W, X and Y)		Discoloration and stains are acceptable after standard cleaning.

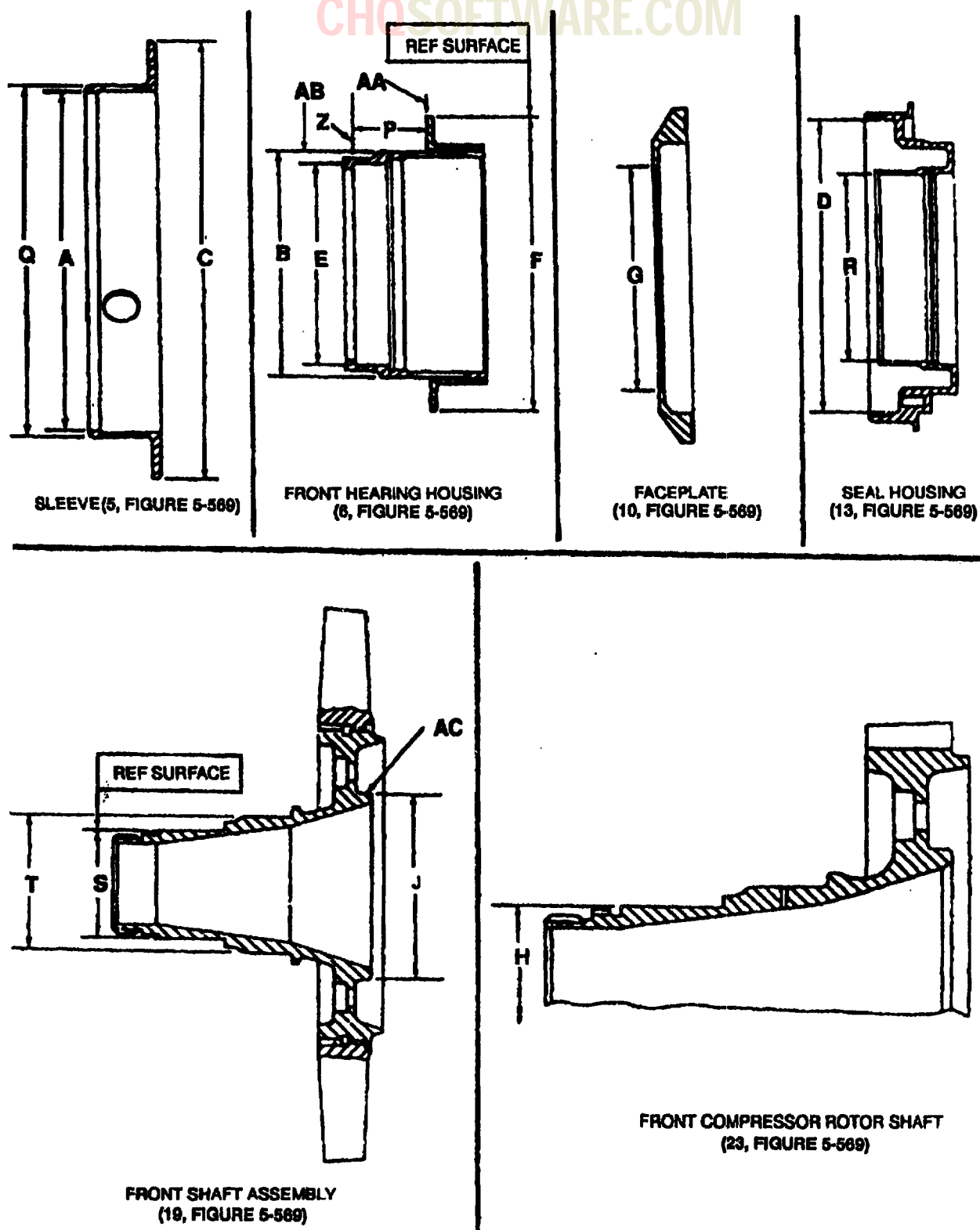


Figure 5-571. Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-13B, -701A, -703)  
(Sheet 1 of 2).

CHQSOFTWARE.COM

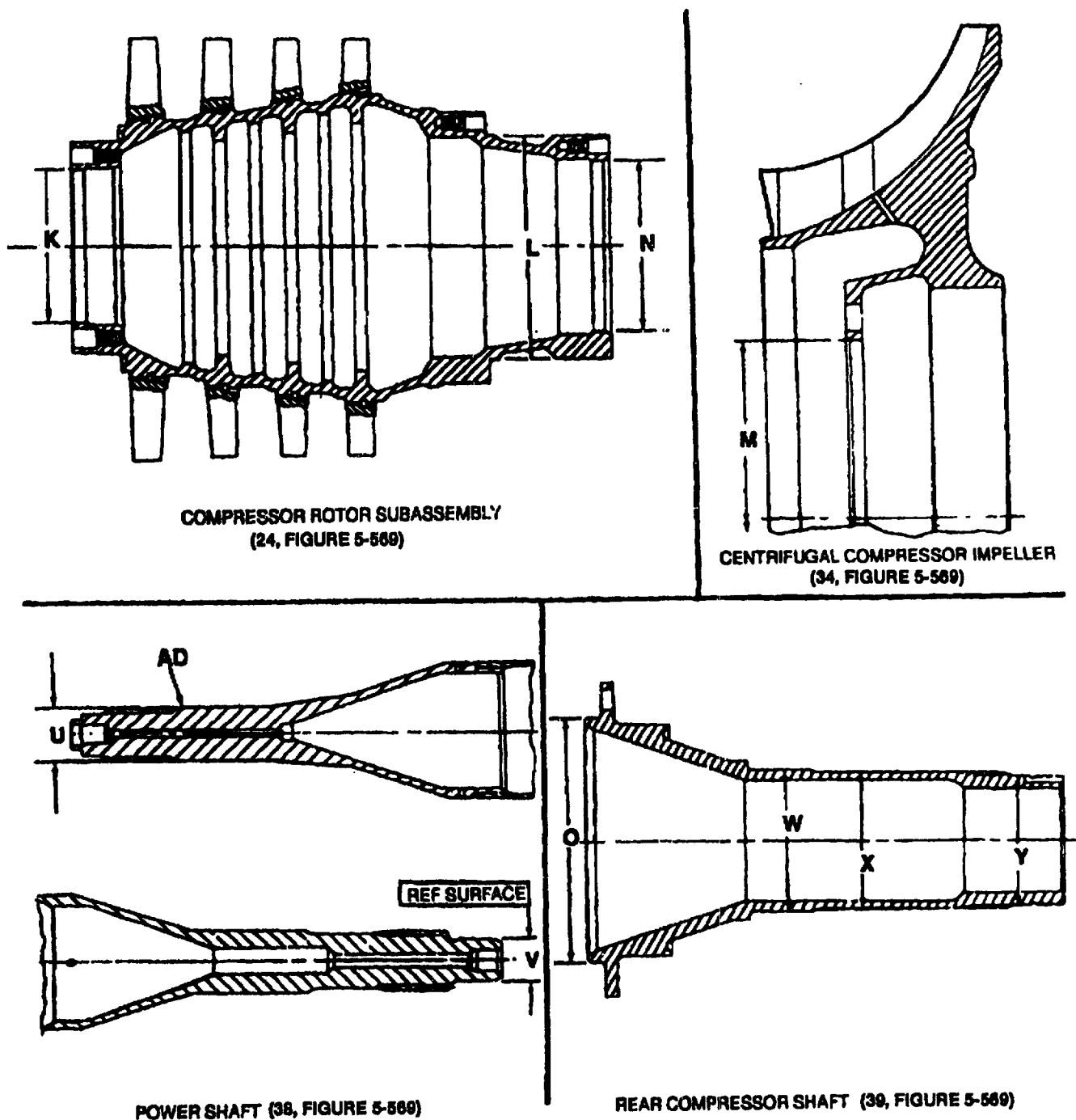
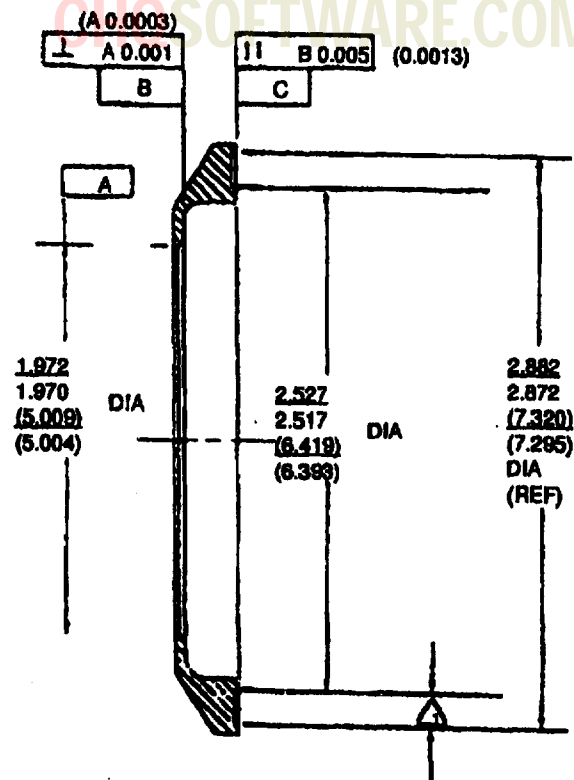


Figure 5-571. Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-13B, -701A, -703)  
(Sheet 2 of 2).



**THIS SURFACE TO BE FLAT WITHIN  
THREE HELIUM LIGHT BANDS  
DIMENSIONS IN ( ) ARE IN CENTIMETERS**

**Figure 5-572. Faceplate Inspection.**

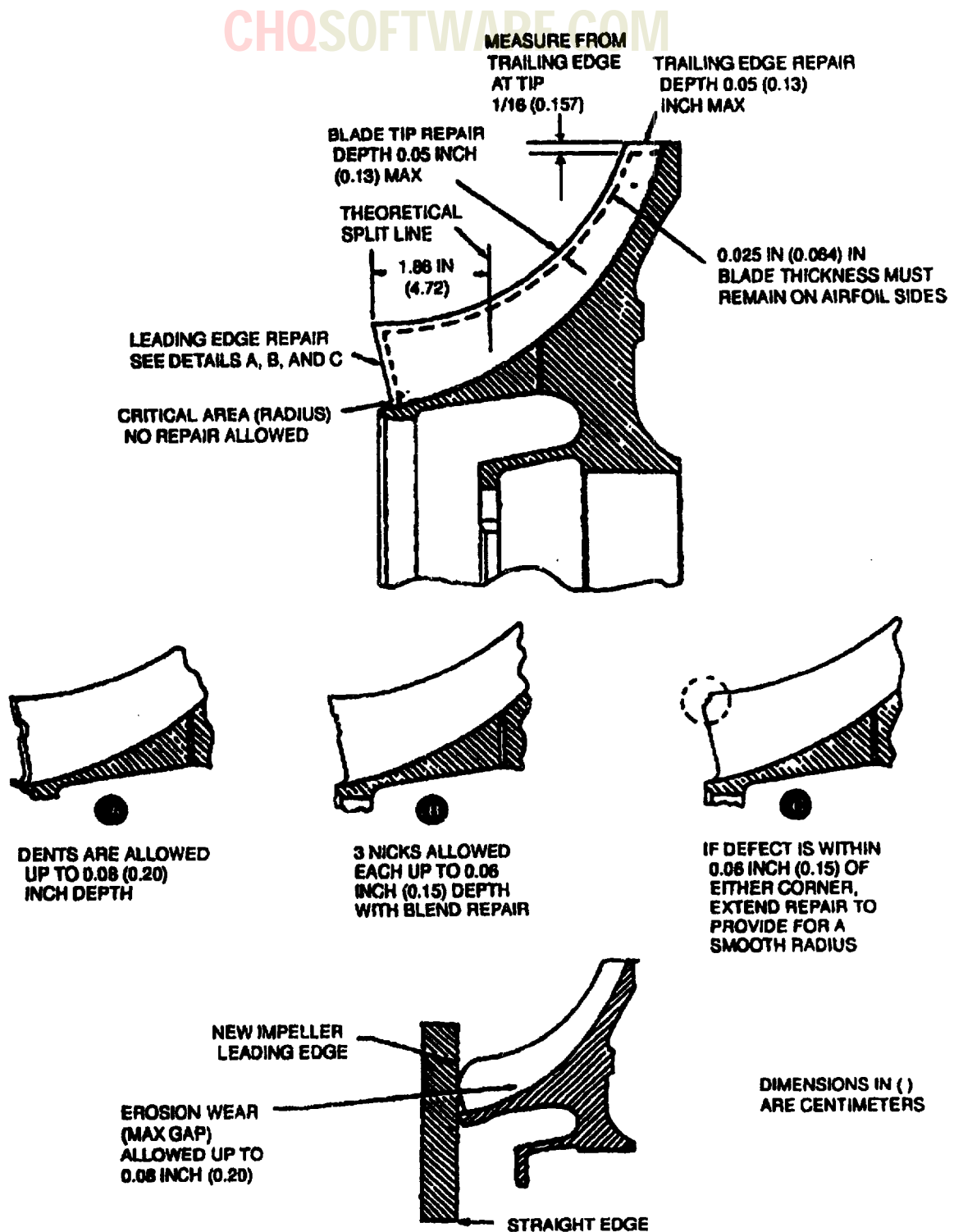
- (6) Rework front seal housing on seal assembly (1-300-077-02) only by machining tang detents in three places, 120 degrees apart, as shown in figure 5-540.
- (7) Perform a visual and magnetic particle inspection of the reworked area.
- (8) Phosphate-treat reworked area as outlined in SP No. 6012 in Appendix E.

**CAUTION**

Ensure vendor detail components are used in applicable vendor assemblies. Do not mix vendor parts in reassembly.

- (9) Reassemble seal, lining up front seal housing slots with three previously unbent tangs, when using seal assembly (1-300-077-01), and lining up front seal housing machined detents with three previously unbent tangs, when using seal assembly (1-300-077-02).





**Figure 5-573. Centrifugal Compressor Impeller Blade Inspection and Repair.**

- (10) Roll over tangs to retain front seal cover (three tangs on 1-300-077-01 seal, six tangs on 1-300-077-02 seal).
- (11) Ensure that carbon ring floats freely with only slight finger pressure.

**WARNING**

**FLIGHT SAFETY PARTS**

**Dimensional inspection after the following repair is flight safety critical.**

**b. Repair worn 3.5432 to 3.5436 inch (8.9997 to 9.0007 cm) diameter on front bearing housing (6, figure 5-569), where up to 0.005 inch (0.013 cm) maximum plate thickness is required, as follows: (See figure 5-574.)**

- (1) Machine, if necessary, to obtain a 0.002 to 0.005 inch (0.005 to 0.013 cm) plate 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.

**c. Repair worn 5.1882 to 5.1885 inch (13.1780 to 13.1788 cm) diameter on front bearing housing (6, figure 5-569), where up to 0.005 inch (0.013 cm) maximum plate thickness is required, as follows: (See figure 5-574.)**

- (1) Machine, if necessary, to obtain a 0.002 to 0.005 inch (0.005 to 0.013 cm) plate 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.

**d. Repair worn 1.299 to 1.302 inch (3.299 to 3.307 cm) dimension on front bearing housing (6, figure 5-569), where up to 0.010 inch (0.025 cm) maximum plate thickness is required, as follows: (See figure 5-574.)**

- (1) Machine, if necessary, to obtain a 0.002 to 0.010 inch (0.005 to 0.025 cm) plate 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.



(4) Seal face plates that are rejected because of excessive damage to the chrome oxide coated surface shall be repaired as follows:

**5-1179**

(a) Remove chrome oxide by grinding seal surface and producing a process dimension of 0.238/0.235 at -A- dimensions. If this dimension is minimum (0.235) and the surface is still discrepant, reject the faceplate. Refer to figure 5-575.

(b) Plasma spray a base coat of Metco 443 (M3956 or equivalent) (item 215, Appendix C-1) 0.016/0.017 thick to the seal face, increasing process dimension to 0.255/0.251.

(c) Immediately plasma spray a top coat of chrome oxide Metco 106 N.S. or equivalent (item 212, table C-1) 0.017/0.020 thick, increasing the process dimension to 0.268/0.275.

(d) Grind the seal face producing process dimension 0.261/0.265V 15.RMS.

(e) Lap seal face to  $\leq 3$  He Light bands surface flatness, and blueprint dimension -A- 0.260/0.265.

(f) Inspect new seal face for chips on the inner and outer edges, the contact area must be free from imperfections. Chips that do not progress more than 0.025 into the seal face from the inner or outer edges are permissible.

g. Repair worn diameter 3.249 to 3.250 inch (8.252 to 8.255 cm), diameter 5.1881 to 5.1886 inch (13.1778 to 13.1790 cm), and 0.002 to 0.004 inch (0.005 to 0.010 cm) dimensions on seal housing (13, figure 5-569), where up to 0.010 inch (0.025 cm) plate thickness is required, by chrome-plating or plasma spray as follows: (See figure 5-576)

(1) Chrome-plate as follows:

(a) Machine if necessary; to obtain a 0.002 to 0.010 inch (0.005 to 0.025 cm) plate thickness after final machining.

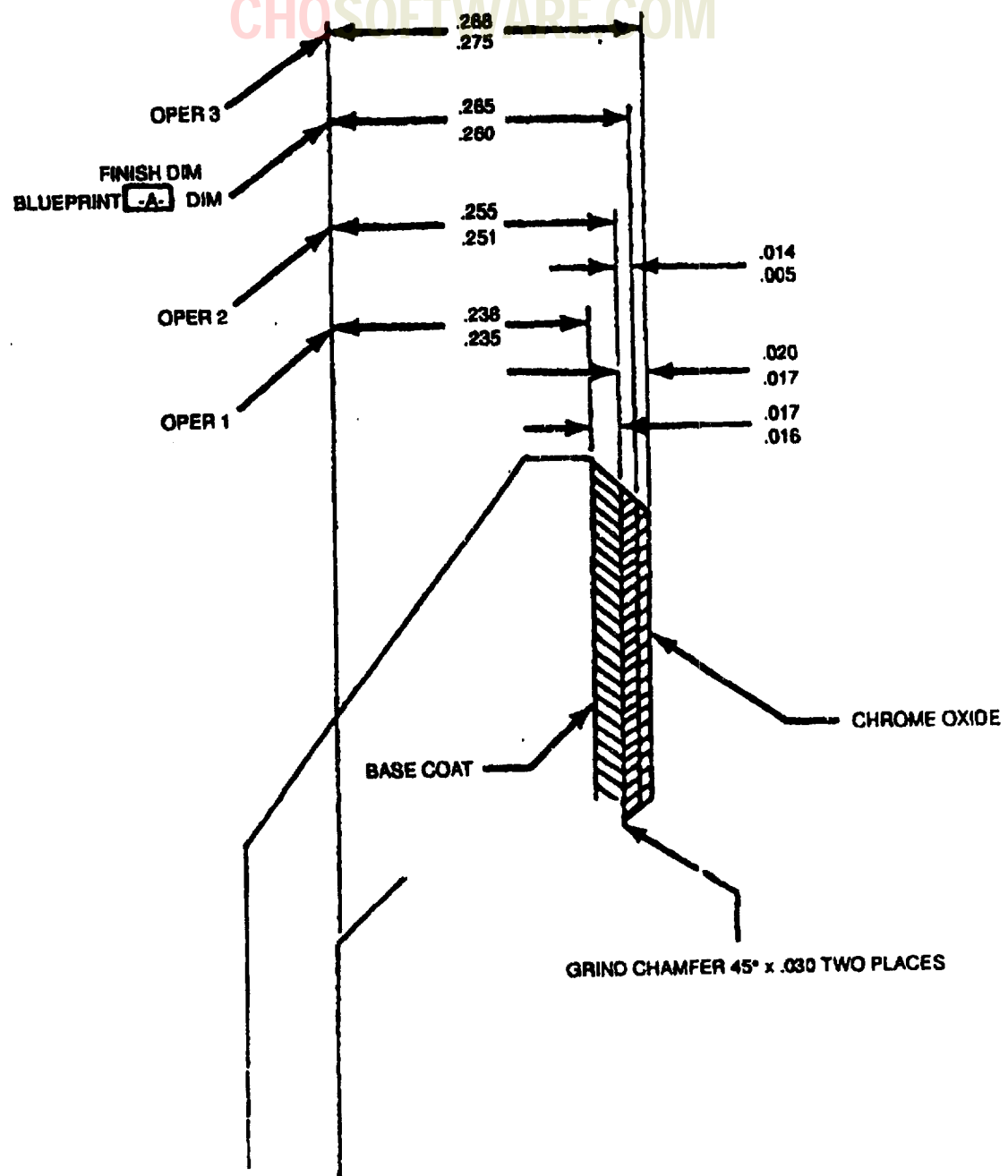
(b) Chrome-plate as outlined in SP No. 6014 in Appendix E.

(c) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(d) Machine to dimensions given.

(2) Plasma spray as follows:

(a) Machine or grind as required to obtain a 0.003 to 0.010 inch (0.008 to 0.025 cm) plate thickness after final machining.



**Figure 5-575. Mainshaft Seal Face Plate Metal Spray Repair.**

- C-1).
- (b) Plasma spray as outlined in SP No. 5006 in Appendix E using thermal spray powder (item 224, table
  - (c) Machine the surfaces to the requirements of figure 5-542.
  - (d) Chamfer the coating edges.

h. Replace defective face seal (15, figure 5-569) as follows:

- (1) Remove retaining ring (18) from seal housing (13). Remove one shim (14) from rear end of seal housing.

#### NOTE

When removing seal in following step (2), ensure adapter contacts seal housing and not the carbon element.

- (2) Using suitable adapter and arbor press, press seal out of housing. Remove remaining shim (14).
- (3) Reinstall retaining ring (18) into seal housing.
- (4) Measure Dimension A, figure 5-577.
- (5) Measure thickness of replacement seal, Dimension B, figure 5-577.
- (6) Subtract Dimension B from Dimension A.
- (7) Select two shims (14, figure 5-569) of equal thickness to obtain 0.000 to 0.006 inch (0.000 to 0.015 cm) loose fit as shown in figure 5-577.
- (8) Remove retaining ring from seal housing.
- (9) Install one shim, of thickness determined in preceding steps (4) through (7), in forward end of seal housing.
- (10) Using suitable sleeve and arbor press, press face seal (15) into seal housing.
- (11) Install remaining shim, same thickness as the one installed in preceding step (9), behind seal in seal housing.
- (12) Install retaining ring (18) in seal housing.

i. Repair eroded blades of front compressor rotor shaft (23, figure 5-569) as follows: (See figure 5-543.)

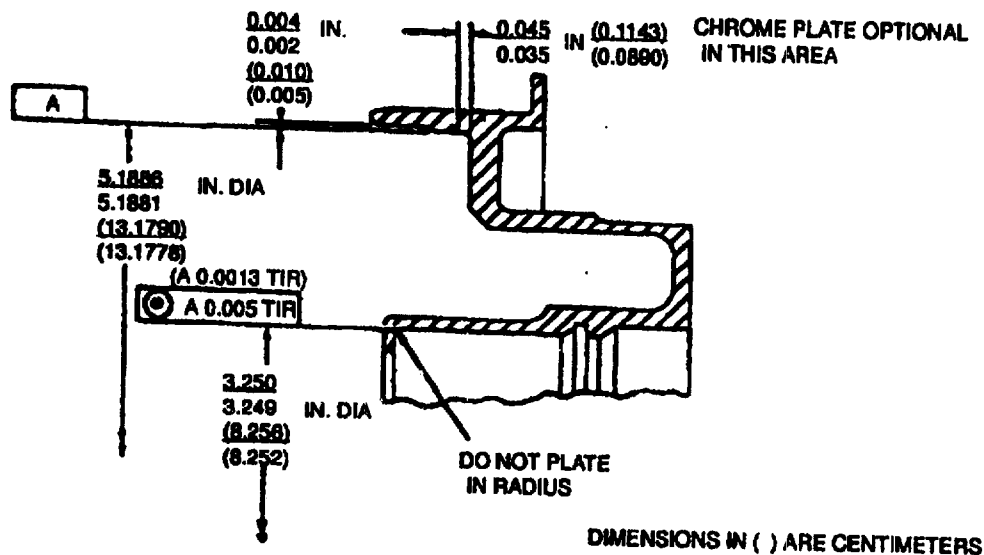
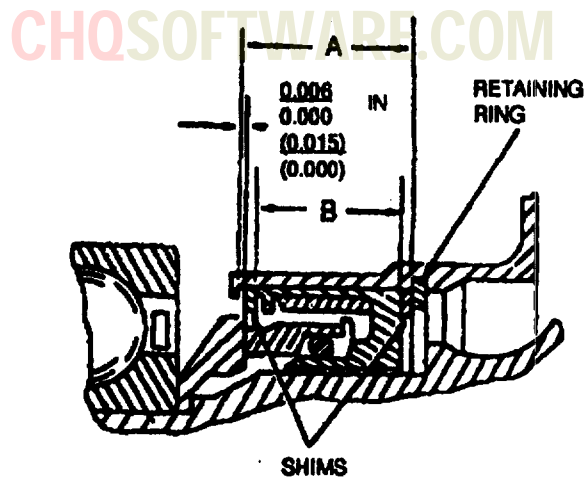


Figure 5-576. Seal Housing - Plating Area.



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-577. Installing Forward Face Seal.

- (1) Blend-repair. (Refer to SP No. 5000 in Appendix E.)
- (2) Stone blades on leading edge only (from blade tip to platform radius) to remove sharp projections and roll-over burrs. Strokes shall be parallel to leading step.

#### NOTE

Stoning shall be accomplished in such manner as to eliminate sharp edges (roll-over) as shown in figure 5-578.

- (3) Stoning of airfoil, tip, or trailing edge is not required except as indicated in foreign object damage repair in step j.
- (4) If, after stoning of leading edge, nicks remain, repair as indicated in foreign object damage repair in step j.
- j. Repair nicks, burrs, pits, dents, and other foreign object damage on compressor rotor blades. (See figure 5-538.)

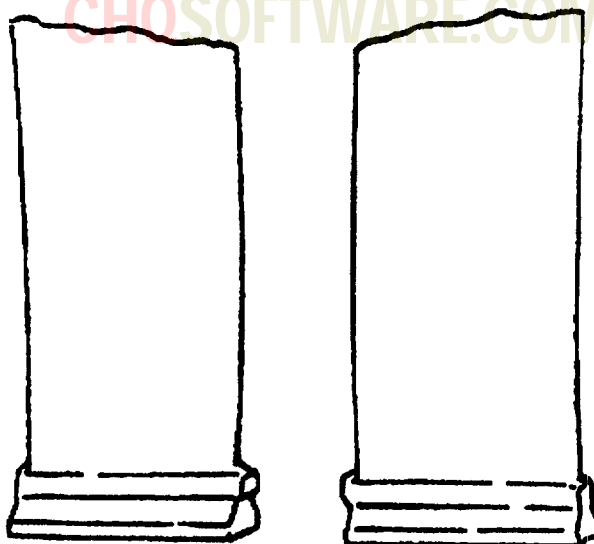
#### WARNING

Critical area on blades is flight safety critical.

#### NOTE

All defects in noncritical areas shall be reworked within the exception of smooth dents where burrs are not evident.

- (1) Blend-repair. (Refer to SP No. 5000 in Appendix E.)
- (2) Make finished strokes of all repair work parallel to the length of the blade.
- (3) Blend the leading and trailing edges with a smooth radius as part of the repair.



**Figure 5-578. First Stage Compressor Rotor Blade - Sand and Dust Inspection.**

**CAUTION**

To prevent damage to parts, do not use power tools to blend-repair.

(4) No blend repairs or damage allowed within 1/2 inch (1.27 cm) of blade span as measured from blade root on any area on first or second stage transonic blades. Polishing is acceptable on the leading edge of the critical area per paragraph i. Damage in radius is not acceptable.

(5) No repairs on leading or trailing edge are allowed within 1/4 inch (0.64 cm) of blade root in any area of the third, fourth and fifth stage blades. Smooth dents, not exceeding 1/32 inch (0.079 cm) on longest side and 0.010 inch (0.025 cm) deep, are acceptable without rework.

(6) Maximum allowable repair depth on leading or trailing edge shall be 3/32 inch (0.238 cm).

(7) Repairs to damage on leading or trailing edge within 1/8 inch (0.317 cm) of blade tip shall be continued to tip. (See figure 5-538.)

(8) If distance between two damaged areas on leading or trailing edge is less than 3/32 inch (0.238 cm), make one blend repair. If distance is greater than 3/32 inch, (0.238 cm) make separate repairs.

(9) Maximum allowable repair depth on blade tip edge is 3/32 inch (0.238 cm).

(10) Length of repair on blade tip edge shall be at least three times repair depth.

(11) If damage is closer to blade tip edge than 1/16 inch, (0.159 cm) blend-repair to the leading or trailing edge, whichever applies.

**NOTE**

A minimum of one-half blade tip chordal width must remain after blend repairs.

(12) Minimum airfoil thickness shall be 75 percent original thickness.



- (13) If distance between two damaged areas on blade airfoil surface is less than 3/32 inch (0.238 cm), make one blend repair. If distance is greater than 3/32 inch (0.238 cm), make separate repairs.
- (14) Maximum allowable repair length on blade airfoil surfaces shall be 13/32 inch (1.032 cm).
- (15) Remove scratches or lines in airfoil areas to within repair limits.
- (16) No more than 20 percent of total blade material may be removed during repairs.

#### NOTE

If any of the preceding repair limits are exceeded, replace blades. (Refer to paragraph 5-439.)

k. Repair front shaft assembly (19, figure 5-569) blades, protruding more than 0.015 inch (0.038 cm) from front or rear face of disk, as follows:

- (1) Remove blade, as outlined in paragraph 5-439, and inspect pin.
- (2) Reinstall blade, using plate of proper thickness. (Refer to paragraph 5-439.)

#### WARNING

#### FLIGHT SAFETY PARTS

The 1.9687 to 1.9685 and 3.3017 to 3.3010 dimensions are flight safety part critical.

l. Repair worn, crazed, or scored 2.4310 to 2.4290 inch (6.1747 to 6.1697 cm); and 1.9687 to 1.9685 inch (5.0005 to 4.9999 cm) diameters by use of 0.002 to 0.010 inch of chrome or 0.003 to 0.010 inch plasma. Repair of 3.3017 to 3.3010 inch (8.3863 to 8.3845 cm) diameter by use of 0.002 maximum thickness of nickel plate, 0.002 to 0.010 inch chrome, or 0.003 to 0.025 inch plasma is allowed.

(1) Chrome Plate Repair.

(a) Machine, if necessary, to obtain a 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 690° to 710°F (366° to 377°C) for 2 hours or 350° to 400°F (177° to 204°C) for three hours.

(d) Machine to dimensions in figure 5-579.

(2) Nickel Plate Repair. (This repair is limited to 3.3010 to 3.3017 inch diameter).

(a) Machine, if necessary; to obtain a 0.002 inch (0.005 cm) maximum plate thickness after final machining.

(b) Nickel plate as outlined in SP No. 6018 in Appendix E.

(c) Bake at 690° to 710°F (366° to 377°C) for two hours or 350° to 400°F (177° to 204°C) for three hours.

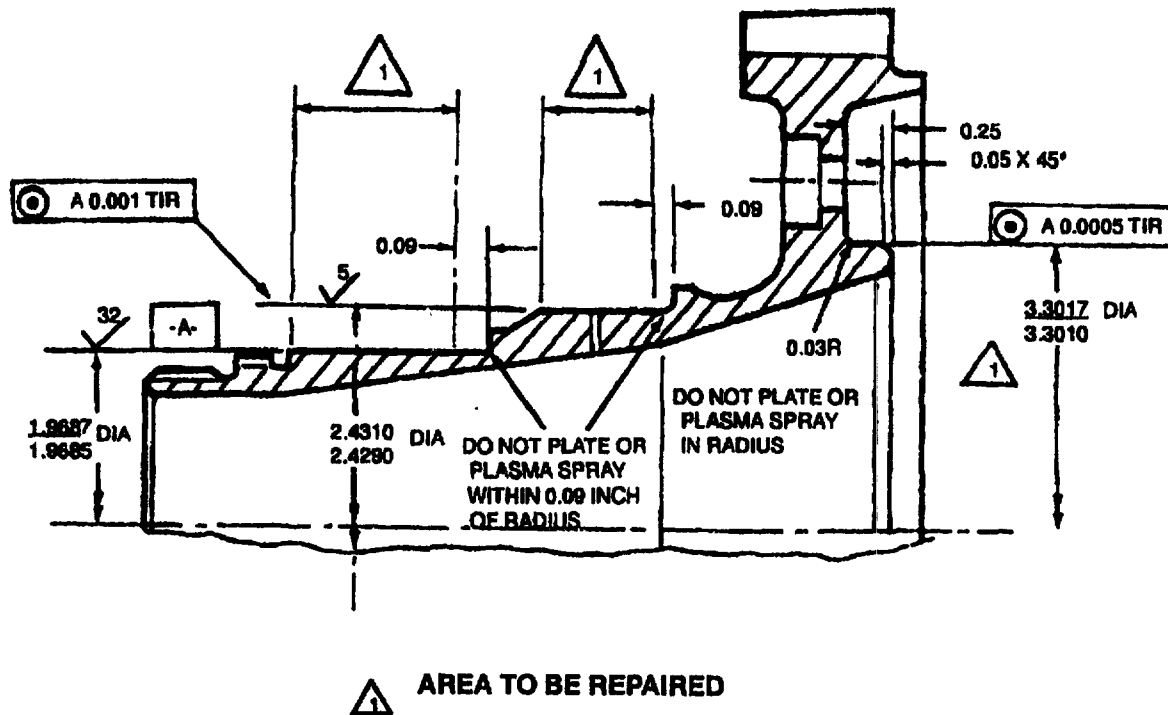


Figure 5-579. Front Compressor Shaft - Repair Area.

- (d) Machine to dimensions in figure 5-579.
- (3) Plasma Repair.

**NOTE**

A maximum coating thickness of 0.025 inches will be allowed on the 3.3010/3.3017 inch diameter.

- (a) Machine, if necessary, to obtain a 0.003 to 0.010 inch (0.0076 to 0.025 cm) deposit buildup after final machining.
- (b) Clean surfaces to be metal sprayed with acetone (item 13, table C-1), isopropyl alcohol (item 25, table C-1) or denatured alcohol (item 24, table C-1).
- (c) Mask and grit blast per SP No. 5006 in Appendix E, using silicon carbide grit at 40 psi.

**CAUTION**

Parts shall be fixtured using mechanized equipment so the torch to work distance and angle of spray remains fixed during the coating operation.

- (d) Immediately plasma spray per Standard Practice No. 5006 in Appendix E, using Powder Metco 450-NS (item 225, table C-1), or equivalent.
- (e) Machine to dimensions in figure 5-579.

m. Repair compressor rotor subassembly (24, figure 5-569) pilot diameters (refer to figure 5-571, diameters K, L and N) as follows:

- (1) Machine pilot diameters, as necessary, to obtain a 0.003 to 0.010 inch (0.008 to 0.025 cm) material build-up after final machining.
- (2) Clean. Mask around machined area and grit blast.
- (3) Clean the abraded area with clean dry air. Remove masking material.

#### NOTE

Abraded surface must be kept clean and should be sprayed within 2 hours of grit blasting. Surfaces not sprayed within 2 hours shall be reprocessed.

- (4) Mask as required.
  - (5) Plasma flame spray with nickel aluminide powder or equivalent (item 225, table C-1).
  - (6) Machine rotor subassembly as shown in figure 5-590.
- n. Repair worn 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter pin holes in disks of compressor rotor assembly (28, figure 5-569) or front compressor rotor shaft (23) as follows:
- (1) Using proper diameter reamer, ream hole to dimensions shown in figure 5-580.

#### CAUTION

Do not cut sides of dovetail lands.

- (2) Using steel alloy (item 301, table C-1), fabricate a bushing to fit 0.0004 to 0.0010 inch (0.0010 to 0.0025 cm) tight in reamed hole. (Refer to figure 5-580.)
- (3) Install bushing flush to 0.005 inch (0.013 cm) below surface, and stake securely.
- (4) Using a 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter drill, drill hole to dimensions shown in figure 5-581.

#### NOTE

As an optional method, bushing may be predrilled prior to installing.

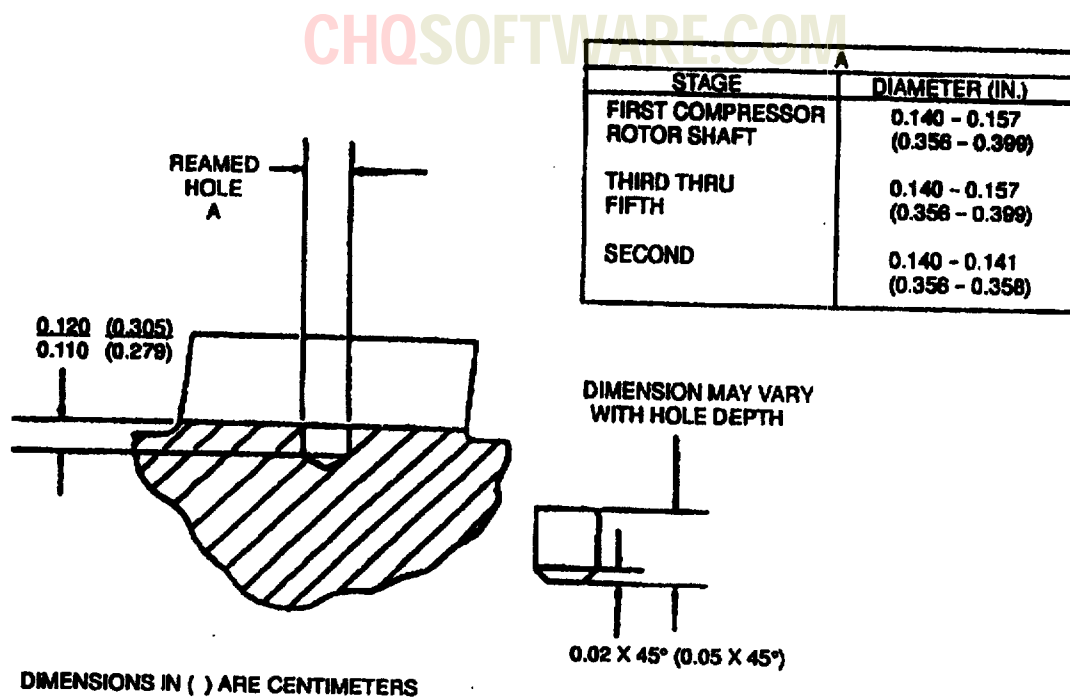


Figure 5-580. Disk Pin Hole - Repair.

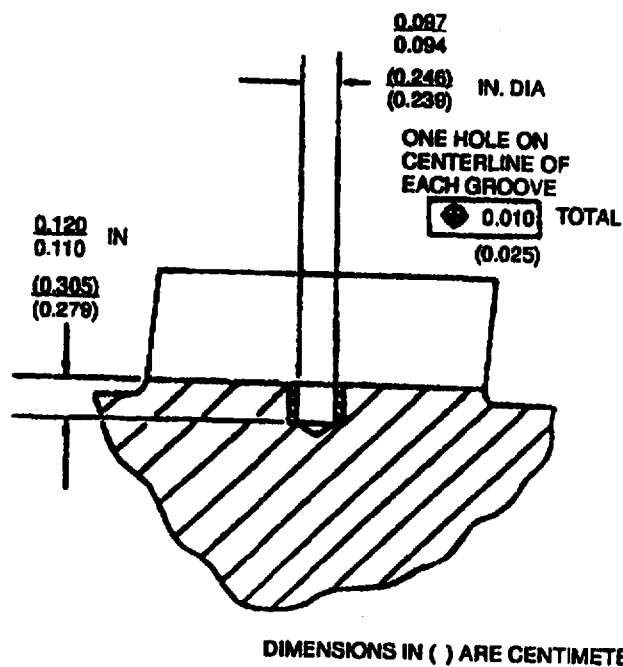


Figure 5-581. Pin Hole Drilling.

**o. Repair blade tips of impeller (34, figure 5-569) that show evidence of rubbing as follows:**

(1) Blend-repair tips to a smooth radius, as outlined in SP No. 5000 in Appendix E. Moderate to heavy rub damage may be polished using a low RPM rotary drill with a sandpaper spool. Remove only the minimum material required to restore blade tip profile. Polish reworked area using a crocus cloth (item 125, table C-1).

(2) Perform a fluorescent-penetrant inspection of the repaired areas. Cracks are not acceptable.

**CAUTION**

Impellers that show any evidence of tip rub must also pass the centrifugal impeller housing clearance limits.

(3) Magnesium build-up on impeller vanes shall be removed.

(a) immerse part in 20% solution of sulfuric acid for 10 minutes.

(b) Remove part and check for any damage to the titanium anodized coating. If any damage is found reapply the coating per SP No. 6025.

**p. Blend-repair nicks, dents, and burrs on impeller blades as outlined in SP No. 5000 in Appendix E and as follows: (See figure 5-582.)**

**NOTE**

Rework in critical areas is not allowed. Finish strokes of all repair work shall be parallel to blade tip edge. When a blade is repaired on leading or trailing edges, bend with a smooth radius as part of repair.

(1) Remove only as much materials as necessary to provide a smooth repair.

(2) Repairs made within 0.06 inch (0.152 cm) of either corner shall be blended to a smooth radius.

**CAUTION**

No repairs may be made in impeller airfoil area except on trailing edge and tip as shown in figure 5-582.

**q. Remove broken power shaft through bolt (5, figure 4-36) using one of the following methods (depending upon degree of seizure):**

(1) Method 1. Soak bolt in penetrating oil (item 197, table C-1) for 1 to 7 hours. Remove defective bolt by tapping out with punch.

(2) Method 2. Using bolt extractor, break torque on bolt.

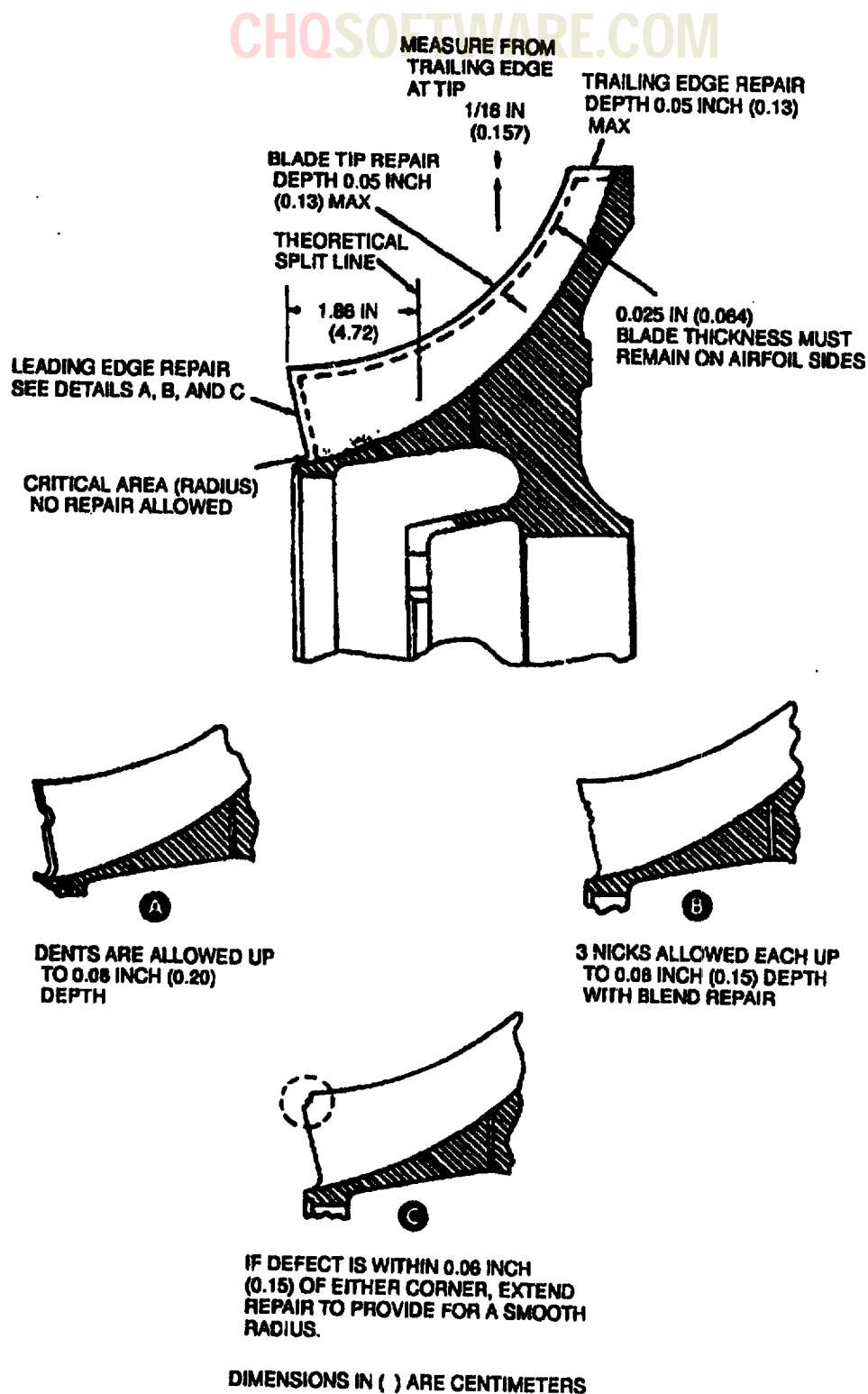


Figure 5-582. Centrifugal Compressor Impeller Blade Inspection and Repair.

CHQSOFT **CAUTION** E.COM

Use caution not to distort the threads on the bolt of power shaft.

Extreme care must be exercised to avoid damaging the threads of the power shaft when a drill or electric discharge machine is used.

(3) Method 3. For bolts that are extremely difficult to remove, drill out bolt, using 17/32 inch drill. This will allow sufficient wall thickness to prevent damage to power shaft threads. Remove bolt using bolt extractor. An electric discharge machine, Type HRP-103. (Elox Corp.), or equivalent, may be utilized instead of a drill. An electrode corresponding to 17/32 inch drill must be fabricated.

r. Repair worn or damaged forward spline end of power shaft (38, figure 5-569) as follows:

(1) Remove forward spline end of power shaft by machining as shown in figure 5-553.

(2) Machine a replacement spline end as shown in figure 5-554.

(3) Inertia-weld replacement spline end to power shaft as follows:

(a) Clean surfaces to be welded by manually wiping with a disposable wipe (Item 356, table C-1) soaked in acetone (item 13, table C-1).

#### NOTE

All surfaces shall be clean and free from film or other foreign material that may be detrimental to weld. Other approved cleaning solvents may be used provided they leave a film-free surface.

(b) Using suitable inertia-welding equipment, weld replacement spline end to power shaft. (See figure 5-556.)

#### NOTE

Inertia-welding equipment shall have the following controllable functions: rotational speed, fly-wheel movement of inertia, axial force (ram and upset pressures), and part-holding devices.

(c) Remove power shaft from welding equipment, and check for total weld upset; total weld upset length shall be 0.043 to 0.053 inch (0.109 to 0.135 cm). (See figure 5-556.)

(d) Immediately after welding, stress-relieve welded shaft at 250° to 275°F (121° to 135°C) for 2 hours minimum.

(4) Machine spline end as shown in figure 5-556.

#### WARNING

#### FLIGHT SAFETY PARTS

**Magnetic particle inspection is flight safety critical.**

(5) Inspect welded area visually and by magnetic-particle method.

#### NOTE

Finish-machined weld area shall be devoid of all indications of imperfections, such as cracking, porosity, and lack of bond; surface imperfections may be blended, provided limits shown in figure 5-556 are maintained.

(6) Balance power shaft. (Refer to paragraph 5-465).

(7) Using vibropeen etching tool, identify repaired power shaft by adding PRP 784 after part number.

#### NOTE

Depth of marking shall be 0.001 to 0.006 inch (0.0025 to 0.0152 cm).

s. Repair circumferential marks on power shaft (38, figure 5-569) 1.1815 to 1.1830 inch (3.0010 to 3.0048 cm) diameter as follows: (See figure 5-558.)

(1) Machine dimension, if necessary, to obtain a 0.002 to 0.010 inch (0.005 to 0.025 cm) 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.

t. Repair cracks in plated area of journal on power shaft (38, figure 5-569) as follows: (See figure 5-552.)

(1) Set up power shaft in grinder. Center part within 0.002 inch TIR. Grind shaft, as required.



CHQSOFTWARE.COM

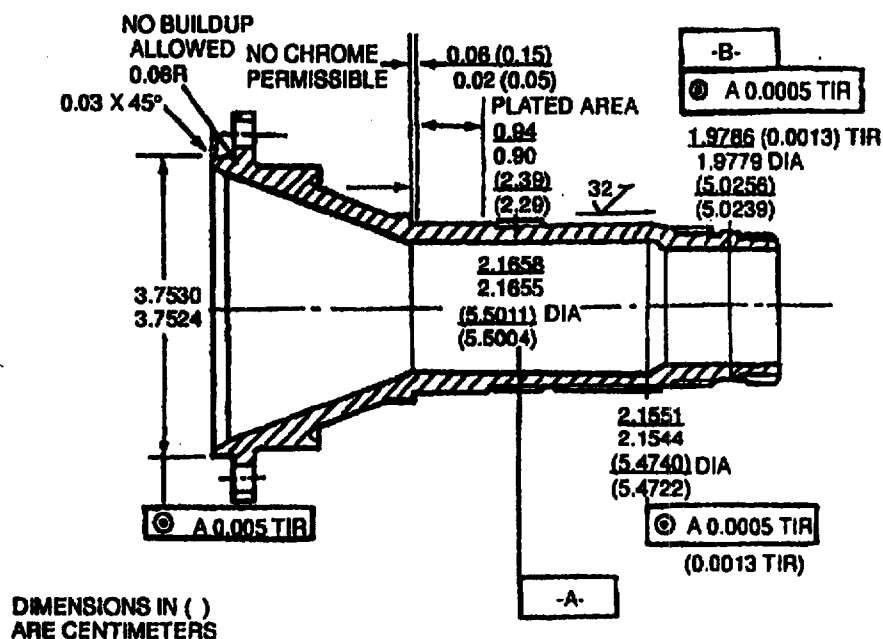


Figure 5-583. Rear Compressor Shaft Repair Area.

**WARNING****FLIGHT SAFETY PARTS**

Diameters and surface finish are flight safety critical

**NOTE**

Use grinding wheel with corners dressed to a radius equal to required plate thickness.

(2) Measure ground surface for amount of stock removed or pre-plate dimension, for proper blend radius, and for out-of-roundness.

**NOTE**

Ensure that the surface to be plated is smooth and substantially free from blemishes, tool marks, and other irregularities.

**WARNING****FLIGHT SAFETY PARTS**

Magnetic particle inspection is flight safety critical.

- (3) Inspect basic metal, using magnetic-particle method. Replace power shaft if cracks are found.
- (4) If no cracks are found, chrome-plate power shaft as outlined in SP No. 6014 in Appendix E.
- (5) Bake at 255° to 275°F (124° to 135°C) for 5 hours. Machine to dimensions shown in figure 5-552.

CHQSOFTWARE.COM

**WARNING****FLIGHT SAFETY PARTS**

**Dimensional inspection after the following repair is flight safety critical.**

**NOTE**

Plate thickness after finish machining shall be within 0.002 to 0.010 inch (0.005 to 0.025 cm).

u. Repair scoring, crazing, or plating on 2.1655 to 2.1658 inch (5.5004 to 5.5011 cm) diameter on rear compressor shaft (39, figure 5-569), 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. (See figure 5-583.)

(1) Repair rear compressor shaft by nickel plating as follows:

(a) Machine, if necessary; to obtain up to 0.001 inch (0.003 cm) maximum plate thickness after final machining.

(b) Nickel-plate as outlined in SP No. 6018 in Appendix E.

(c) Bake at 350° to 400°F (177° to 204°C) for 3 hours or at 690° to 710°F (366° to 377°C) for 2 hours within 30 minutes after plating.

(d) Machine to dimensions given.

(2) Repair rear compressor shaft by chrome plating as follows:

(a) Machine, if necessary, to obtain a 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 350° to 400°F (177° to 204°C) for 3 hours or at 690° to 710°F (366° to 377°C) for 2 hours within 30 minutes after plating.

(d) Machine to dimensions given in figure 5-583.

**WARNING****FLIGHT SAFETY PARTS**

**Dimensional inspection after the following repair is flight safety critical.**

(3) INSPECTION.

(a) Inspect shaft P/N 1-100-501-01 to determine if pilot diameter is 3.7524 to 3.7530 inches. (Dimension "O" in figure 5-571, item 39.)

(b) All shafts prior to Revision E, except those identified by EMI 166 adjacent to part number will require modification.

(c) The diameter to be repaired shall be machined undersize in order to allow material build up, after finish machining, of 0.003 inch (0.008 cm) minimum to 0.010 inch (0.025 cm) maximum, coating shall be completely removed on parts previously coated.

(d) Thermo flame spray or plasma flame spray rear compressor shaft using nickel aluminide powder (item 217, table C-1) (Refer to SP No. 5006 in Appendix E), observing the following special instruction:

1 Using the flame from the spray gun, pre-heat surface to be sprayed evenly to 180° to 220°F (82° to 104°C).

CHQSOFTWARE.COM

**CAUTION**

During repair cycle, temperature of shaft shall not exceed 350°F (177°C) as indicated by a suitable contact pyrometer.

**NOTE**

The carrier gas shall be argon, set at 100 psi (7031 gm sq cm) and 80 units flow and hydrogen, set at 50 psi (3515 gm sq cm) and 15 units flow.

- 2 Use a standard meter wheel on the powder feed unit set at 35 RPM. Set the feed at 85, and use a feed rate reading of 65. The carrier gas flow shall be 37.
- 3 With the spray gun held four (4) to six (6) inches from the surface to be coated and the shaft rotating at 200 RPM, apply spray to a thickness of 0.040 inch (0.102 cm) using nickel aluminide powder, (Item 217, table C-1).
- 4 Use an air nozzle to flow shop air on the shaft 180 degrees from the spray gun in order to keep temperature within limits.
- (e) Machine 3.7524 to 3.7530 inch (9.5311 to 9.5326 cm) diameter as shown in figure 5-583.
- (f) Using etcher, vibropeen EMI 166 following part number. Depth of marking shall be within 0.001 to 0.006 inch (0.003 to 0.015 cm).

**WARNING****FLIGHT SAFETY PARTS**

**Dimensional inspection after the following repair is flight safety critical.**

v. Repair worn 2.1544 to 2.1551 inch (5.4722 to 5.4740 cm) and 1.9779 to 1.9786 inch (5.0239 to 5.0256 cm) diameters on rear compressor shaft (39, figure 5-569), 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. (See figure 5-583.)

- (1) Repair rear compressor shaft by nickel plating as follows:
  - (a) Machine dimension, if necessary, to obtain up to 0.001 inch (0.003 cm) maximum plate thickness after final machining.
  - (b) Nickel-plate as outlined in SP No. 6018 in Appendix E.
  - (c) Bake at 350° to 400°F (177° to 204°C) for 3 hours or at 690° to 710°F (366° to 377°C) for 2 hours within 30 minutes after plating.
  - (d) Machine to dimensions given.
- (2) Repair rear compressor shaft by chrome plating as follows:
  - (a) Machine dimensions, if necessary, to obtain a 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 350° to 400°F (177° to 204°C) for 3 hours or at 690° to 710°F (366° to 377°C) for 2 hours within 30 minutes after plating.
  - (d) Machine to dimensions given.

**WARNING****FLIGHT SAFETY PARTS**

**Replacement of pins is flight safety critical.**

w. To correct problem of compressor rotor blade retaining pin failure by changing to new material, pin P/N 1-300-268-02.

**(1) MODIFICATION PROCEDURE:**

- (a) Remove front shaft assembly, impeller, rear shaft, and power shaft.
- (b) Mark blades for proper installation into the same rotor and remove all blades.
- (c) Deburr all blade retention slots.
- (d) Remove pins in front shaft assembly (1st stage) using pin puller, LTCT14647 in conjunction with puller, LTCT1218. Pins can also be removed by EDM method utilizing fixture LTCT11404-01.

**NOTE**

Suitable modified pliers are allowed to be used as an alternate pin removal method. This applies to the front shaft assembly and the rotor subassembly.

(e) Remove all pins from the compressor rotor subassembly using the sulfuric acid anodize process for titanium as follows:

- 1 Clean part as required per SP No. 3002 Appendix E or using cleaning solvent (item 100, table C-1).
- 2 Anodize part at approximately 12 volts DC using lead cathodes.

**NOTE**

Use titanium racking. Solution shall be 20% by volume of sulfuric acid (specific gravity 1.18-1.28). Record initial leaching time for fresh sulfuric acid solution. As solution becomes contaminated, leaching time will increase. When leaching time increases by 50% replace solution.

- 3 Cool solution using lead cooling oil to maintain 100°F to 140°F (38°C to 60°C) solution temperature.

**NOTE**

Part shall enter and leave solution with the current ON.

(f) When all steel pins are dissolved, (approximately 60 minutes) the amperage will be at a low steady level.

(g) Visually inspect to insure complete removal of all pins.

(h) Rinse thoroughly in cold, then hot water.

1 Immerse parts in the titanium scale conditioner (item 334, table C-1). Part Immersion shall be for five (5) seconds.

2 Abrasive clean exterior surface of part with either MIL-G-5544, Size 10 glass beads (item 4, table C-1) or MIL-G-5634, Type III walnut nut shell abrasive grain (item 5, table C-1). Blasting pressure should be a minimum of 20 psi (1406 gm sq cm) and a maximum of 60 psi (4218 gm sq cm). Lowest blast pressure that will clean part but minimize metal loss should be used.

(i) Caustic anodize part to remove all residual acid as follows:

1 Rack parts and immerse in caustic anodize solution consisting of 6.7 oz (190 gm) commercial grade sodium hydroxide in water to make one (1) gallon (3.78 liter). Solution to be used at a temperature of 198° to 203°F (91° to 95°C).

2 Anodize parts by applying current for approximately 10 to 20 minutes at 12 to 15 volts DC.

3 Rinse in hot running water followed by a rinse in cold running water: air dry

(j) Fluorescent penetrant inspect all blades and disks. This can be performed individually or as assemblies.

(k) Install new pins, P/N 1-300-268-02 using installer, LTCT256.

(l) Reinstall serviceable blades in the same rotor from which they were removed. Install new blades as required.

(m) Reidentify T53-L-703 as follows:

- 1 Rotor Assembly - Compressor as 1-101-510-04.

- 2 Shaft Assembly - Front as 1-101-080-06.
- 3 Rotor Subassembly as 1-101-090-06 (for spool 1-101-250-03) or 1-101-090-07 (for spool 1-101-250-04).
- (n) Reidentify T53-L-13B/701A as follows:
  - 1 Rotor Assembly - Compressor 1-100-720-45 to 1-100-720-47.
  - 2 Rotor Assembly - Compressor 1-101-260-08 to 1-101-260-11.
  - 3 Shaft Assembly - Front 1-101-080-04 to 1-101-080-06.
  - 4 Rotor Subassembly as 1-101-090-06 (for spool 1-101-250-03) or 1-101-090-07 (for spool 1-101-250-04).
  - 5 Rotor Assembly - Compressor 1-100-720-23  $\Delta$  to 1-100-720-23  $\Delta$  ECP 226.
- (o) Assemble power shaft, front shaft, impeller and rear shaft to rotor.
- (p) Tip grind to rotor as required.
- (q) Balance the compressor rotor.

**5-439. REPLACEMENT OF COMPRESSOR ROTOR BLADES (T53-L-13B, -701A, -703).** The first stage compressor rotor blades are removed and installed from the rear face of the disk. The second through fifth stage compressor rotor blades are removed and installed from the forward face of each disk. When installing a complete set of blades, the first stage compressor rotor blades are installed counterclockwise (when facing the rear face of the disk), and the second through fifth stage compressor rotor blades are installed counterclockwise (when facing the forward face of each disk).

#### NOTE

If concentricities are not within limits, remove material from tips of high blades, using a fine cup file, to match readings of adjacent blades that are within limits.

#### NOTE

The following steps pertain to the complete reblading of the front shaft assembly or compressor rotor subassembly. To remove only those compressor rotor blades that are defective, follow the procedures that deal only with the blade removal and installation, and disregard the instructions for arranging blades in the order of ascending weights. When installing a new compressor blade, ensure that the blade is of the same weight as the one being replaced. Replace blades in pairs, 180 degrees apart.

- a. Place front shaft assembly, forward face up, in suitable holding fixture. Place compressor rotor subassembly, forward face down, in suitable holding fixture.

#### CAUTION

To avoid damaging edge of blade, tap blade gently.

- b. Using drift assembly (LTCT1644) and soft-faced mallet, remove blade from first stage compressor rotor disk assembly. Tabs of locking plate will straighten as blade moves out.
- c. Using drift assembly (LTCT1644) and soft-faced mallet, remove blades from compressor rotor subassembly. Tab of locking plate will straighten as blade moves out.
- d. Remove and discard locking plate. Remove and discard pin only if pin is damaged.
- e. Remove front shaft assembly from fixture.
- f. The front shaft assembly has a complement of 31 blades and requires a special assembly and replacement procedure. The following steps must be performed for blade replacement of the first stage compressor disk only.

#### NOTE

Blade weight to the nearest 0.1 gram is stamped on the convex side of each blade. Two blades marked with equal weights are a set and are to be kept together.

- (1) Blade sets are to be arranged in a row according to ascending weights.

**SET I - EXAMPLE**

Set 1-2-3-4-5-6-7-8\*-9-10-11-12-13-14-15

Gram 16.6 16.8—17.6 17.8

**NOTE**

\*One blade must be added to set No. 8 to make this a set of three equal weight blades.

- (2) Starting with set No. 2 remove every other set and with these sets make a second row keeping sets in order of descending weights

**STEP II - EXAMPLE**

Row I 1-3-5-7-9-11-13-15

Row II 14-12-10-8\*-6-4-2

**NOTE**

\*Set No. 8 has three blades of equal weight.

- (3) Reposition row II to the right of row I to form a single row of blade sets that are in assembly order.

**SET III - EXAMPLE**

Final Row 1-3-5-7-9-11-13-15-14-12-10-8\*-6-4-2

**NOTE**

\*Set No. 8 has three blades of equal weight.

- g. Assemble blades into disk so that each blade is in sequence. (See figure 5-563.)

**CAUTION**

If, for any reason, a blade must be replaced, the replacement must be accomplished by using a matched set; using one blade of a set to replace the damaged blade and the other blade of the set to replace a blade one place farther, in the direction of rotation from the theoretical 180-degree opposite blade.

- h. Perform the following step for blade replacement of the second through fifth stages of the compressor rotor subassembly.

**CAUTION**

If, for any reason, a blade must be replaced, this replacement must be accomplished using matched blade sets.

**NOTE**

Blade sets for each stage are to be selected from random order. No systematic grouping is required.

- i. Assemble blade sets for each stage into proper disk so that each blade in a set is 180 degrees from its mate.
- j. Place front shaft assembly, forward face down; or compressor rotor subassembly, forward face up, on ring of suitable fixture.
- k. Using pin installer (LTCT256), install new pins, if required.
- l. Install locking plate on pin in root of disk.

CHQSOFTWARE.COM

**CAUTION**

Do not use metallic tools for blade assembly. Nylon rods are suggested for blade assembly and/or for bending blade locking plate tabs.

When installing blades, press against blade root to avoid damaging edge of blade. Ensure blade is seated against pin. Assembly forces must not result in displacement (lean) of pin.

- m. Install replacement blades by hand, with light tapping permitted, using a hide mallet weighing not more than 8 ounces.
- n. Using a soft-faced mallet and suitable nylon drift, bend tab of locking plate against blade root.
- o. Remove front shaft assembly or compressor rotor subassembly from fixture.
- p. Measure diameters at gage points of first, second, and third stage blades. (See figure 5-584.) Using a suitable grinding fixture, grind first stage blade tips to required angle. (See figure 5-584.)
- q. Place compressor rotor subassembly in Norton grinder or equivalent. Ensure runout on appropriate diameters is in accordance with figure 5-584.
- r. Fit dampening rings or other suitable dampening material, as required, between disk stages. (See figure 5-584.)
- s. Grind second and third stage blade tips (similar angles), and grind fourth and fifth stage blade tips (no angle). (See figure 5-584). Using a 320-grit cloth, break edges at tips 0.003 inch (0.008 cm) maximum all around. (Sharp edges are desirable.)

**NOTE**

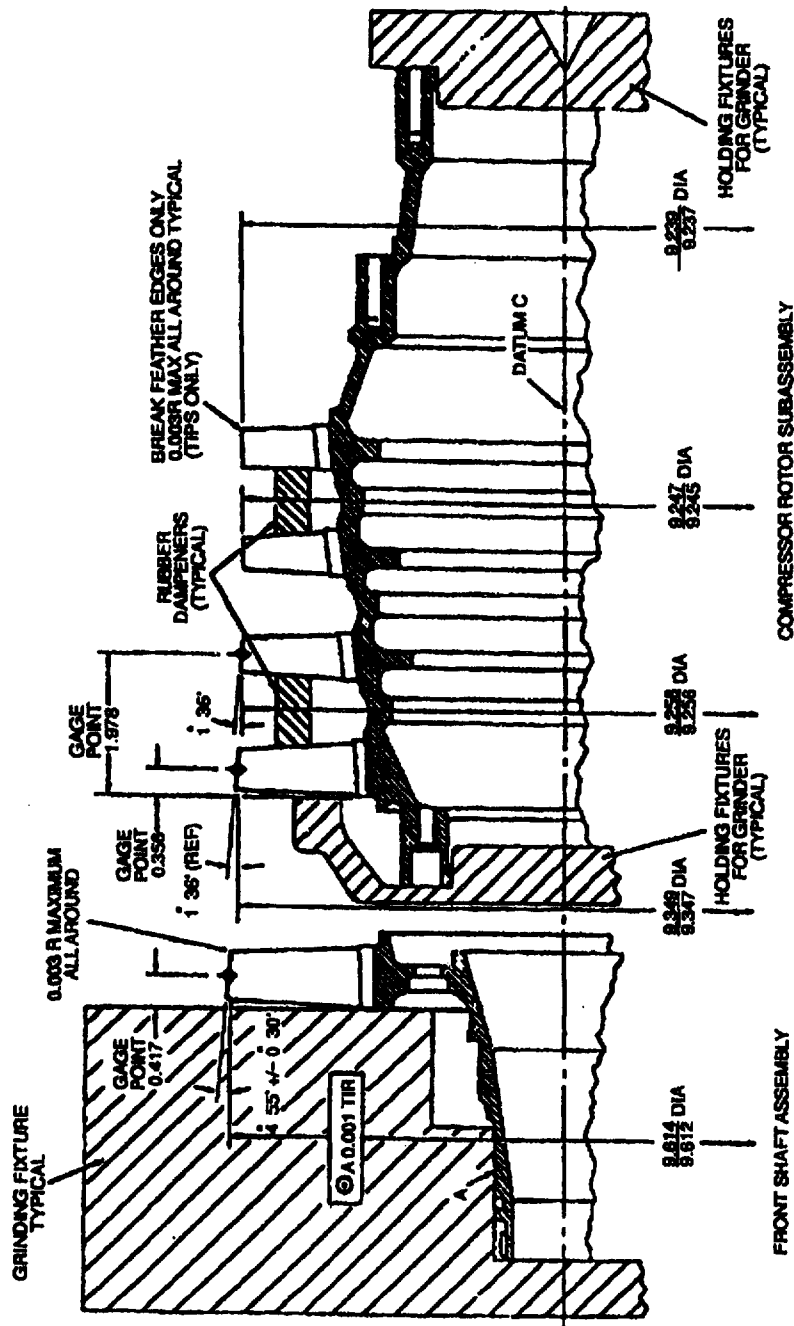
Compressor rotors that have been ground undersize are acceptable, providing final assembly tip clearances are maintained. (Tip diameter undersize should not exceed 0.010 inches.) (Refer to figure 5-584.)

- t. Inspect diameters at gage points in accordance with figure 5-584.
- u. Remove compressor rotor subassembly from grinder.

**5-440. REPLACEMENT OF WELDED COMPRESSOR ROTOR DISKS (T53-L-13B, -701A, -703).** Proceed as follows:

- a. Completely deblade compressor rotor assembly. (Refer to paragraph 5-439.)





## NOTE

**All dimensions are in inches.**

**All diameters are to be concentric to datum C within 0.001 inch TIR.**

**Figure 5-584. Compressor Rotor Blade Grinding (English).**





**All dimensions are in centimeters.**

**All diameters are to be concentric to datum C within 0.003 TIR.**

**Figure 5-585. Compressor Rotor Blade Grinding (Metric).**

b. Replace damaged disk section as follows:

- (1) Remove defective compressor disk from rotor subassembly by machining. (See figure 5-586.)

**CAUTION**

Dimensions for replacement disk are based upon a weld shrinkage of 0.002 inch (0.005 cm) per joint. If the weld parameters developed for an individual welding machine indicate a greater or lesser weld shrinkage, dimensional adjustments shall be made to compensate for this differing weld shrinkage during machining. (See figures 5-588 and 5-590.)

- (2) Obtain replacement compressor disk and machine as shown in figure 5-588.
- (3) Clean all rotor subassembly details (figure 5-590) as follows:

**CAUTION**

Cleaning shall be performed immediately before assembling and welding of detail parts. Detail parts shall be protected by clean plastic bags while in transit or storage, between cleaning and assembly operation, and between assembly and loading into vacuum chamber. Parts not to be welded within 24 hours after cleaning shall be disassembled and recleaned, unless stored under vacuum. Before welding, detail parts and subassembly shall only be handled with clean lint-free gloves during and after cleaning.

- (a) Immerse part in acetone (item 13, table C-1) and wipe until all surface dirt, grease, oils, and other contaminants are removed. Wipe part dry with a clean disposable wipe (item 356, table C-1).

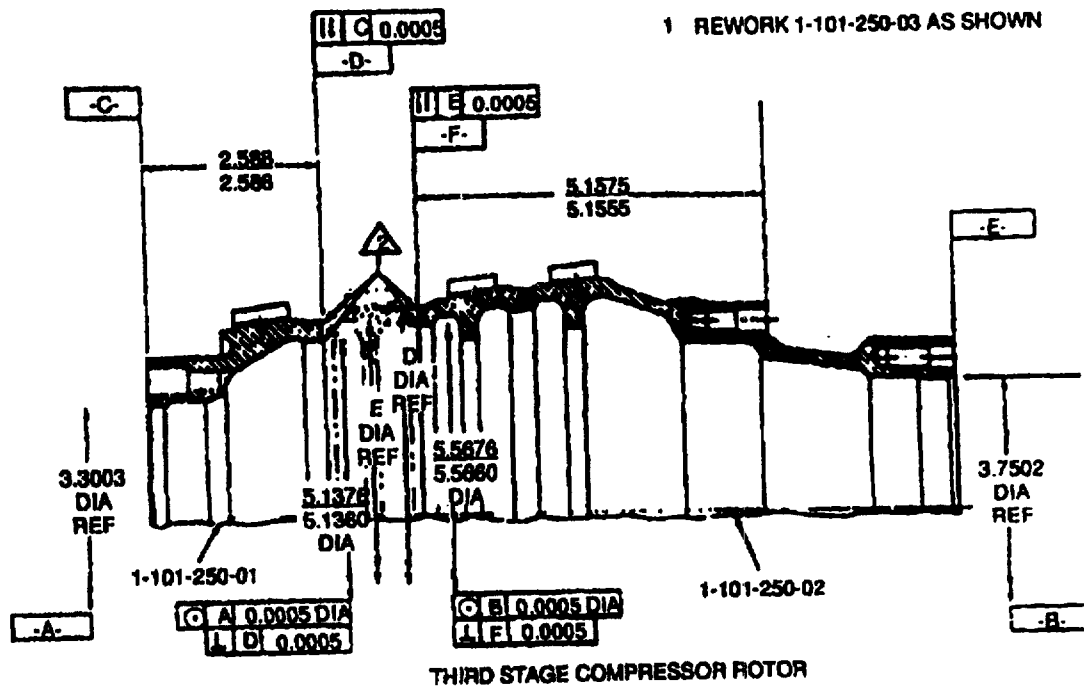
**CAUTION**

Do not allow etching solution to get on blade root area. Concentration of chlorides present in water shall not exceed 17 parts per million (ppm). Weight of suspended solids shall not exceed 8 grams per liter (gm/l).

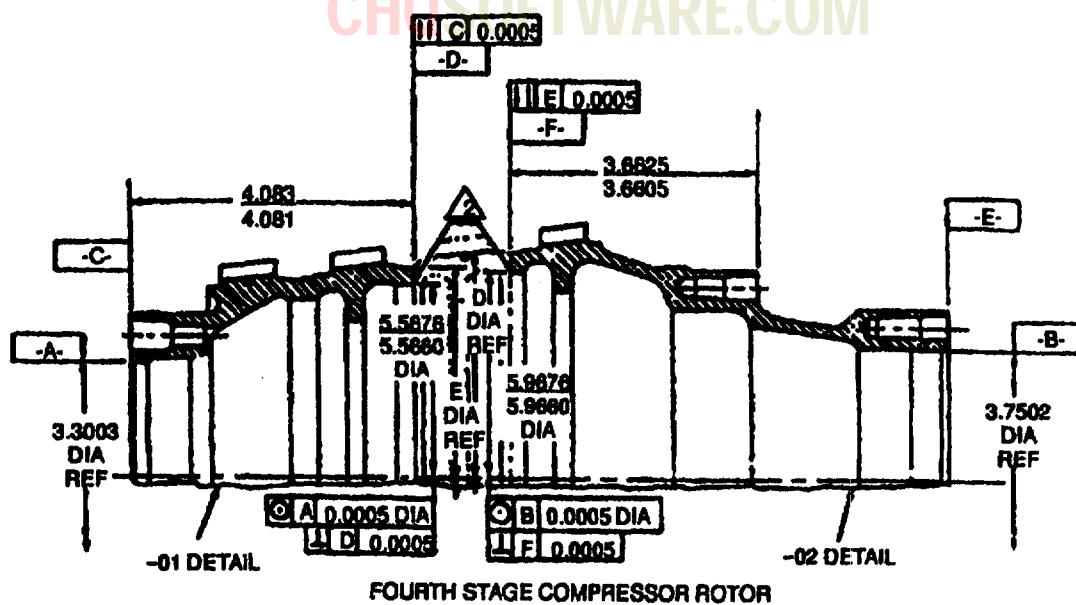


**DO NOT BREAK EDGE**

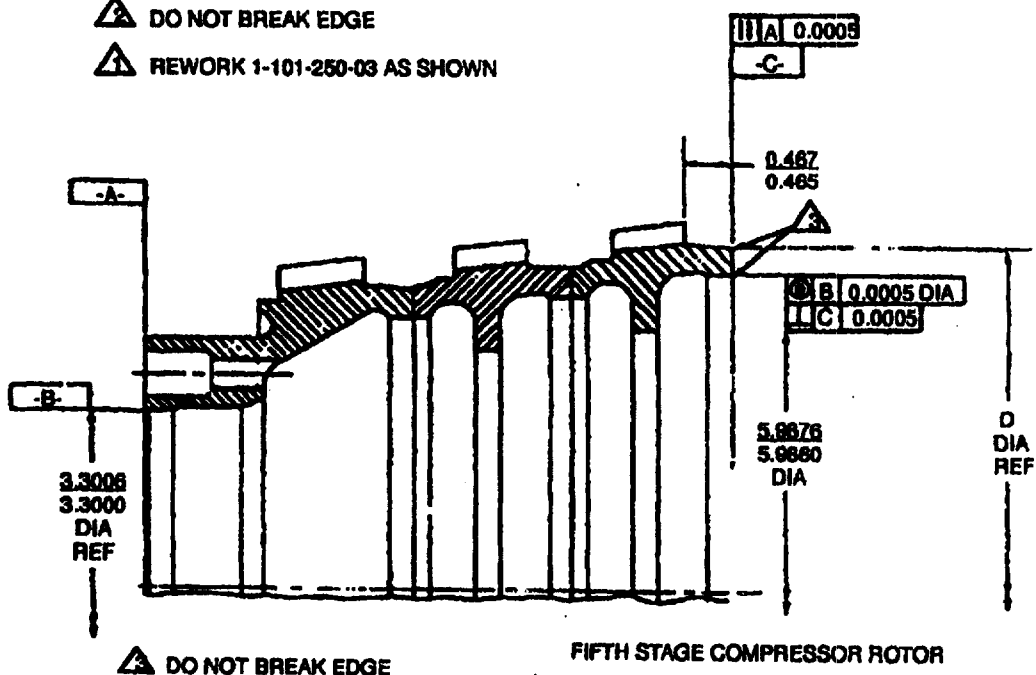
1 REWORK 1-101-250-03 AS SHOWN



**5-1203**



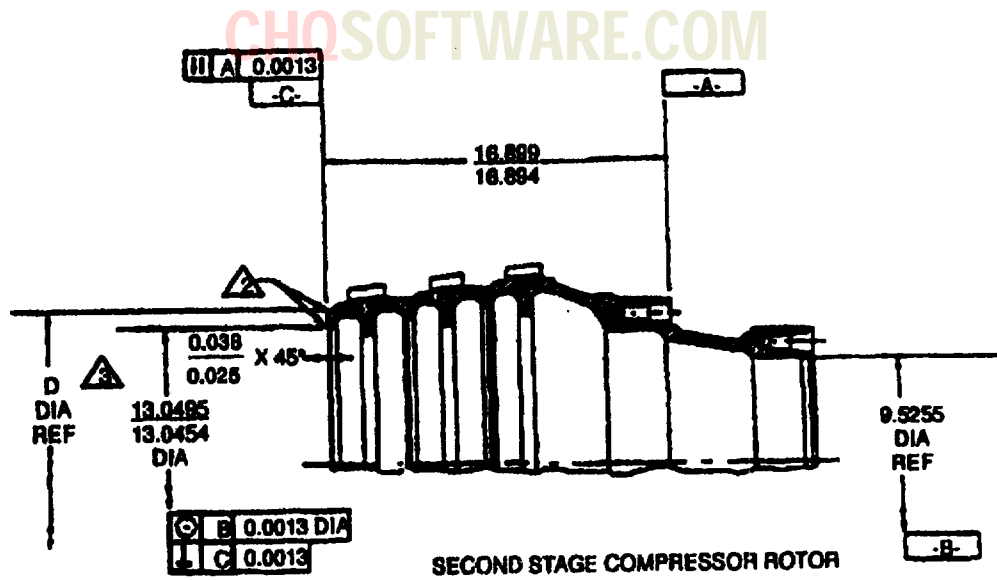
- DO NOT BREAK EDGE
- REWORK 1-101-250-03 AS SHOWN



- DO NOT BREAK EDGE
- 2 AFTER REWORK ALL DIAMETERS MARKED ON 1-101-250-03 TO BE CONCENTRIC WITH DATUMS A AND B TO WITHIN 0.002 TIR
- REWORK 1-101-250-03 REV "B" AS SHOWN

ALL DIMENSIONS ARE IN INCHES

Figure 5-586. Removal of Damaged Compressor Rotor Stages (English) (Sheet 2 of 2).



ALL DIMENSIONS ARE IN CENTIMETERS

3 REFER TO FIGURE 5-401 NOTE 4

2 DO NOT BREAK EDGE

1 REWORK 1-101-250-03 AS SHOWN

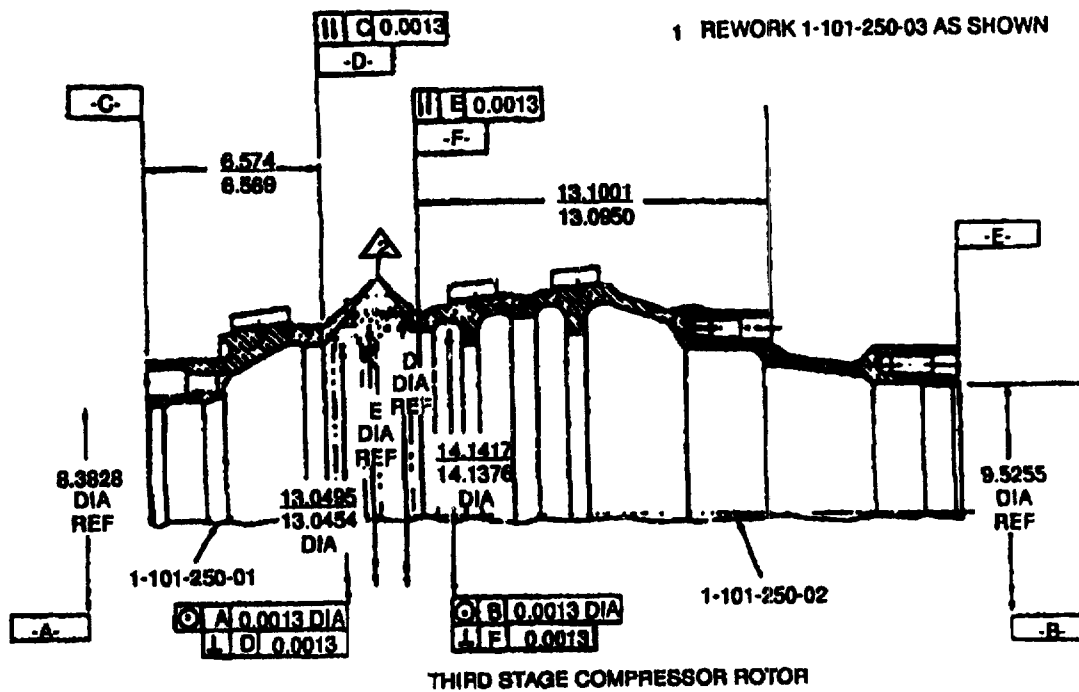
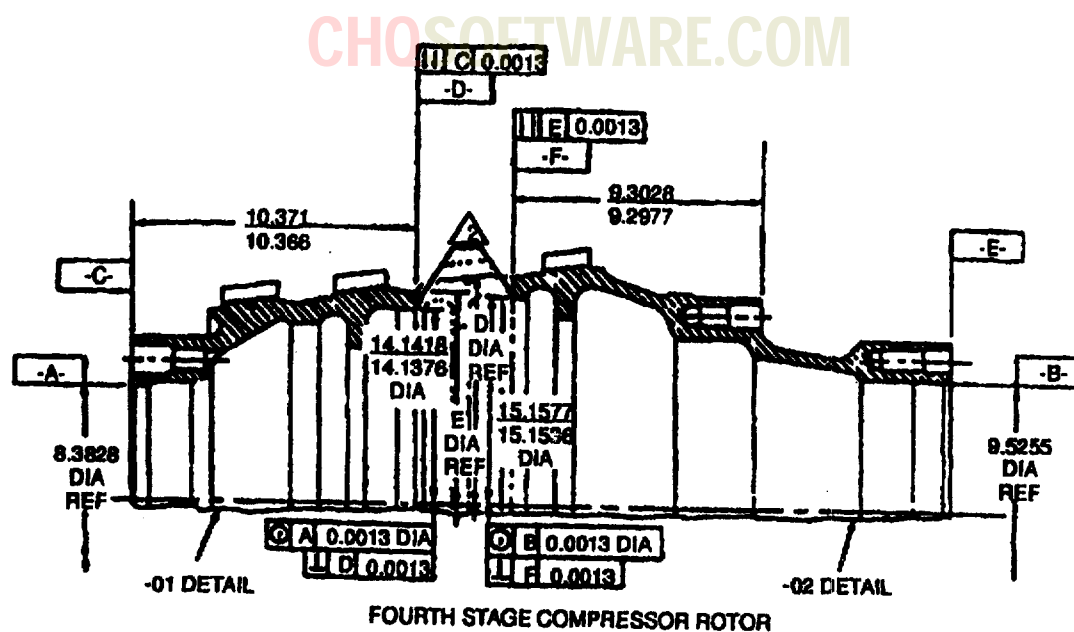
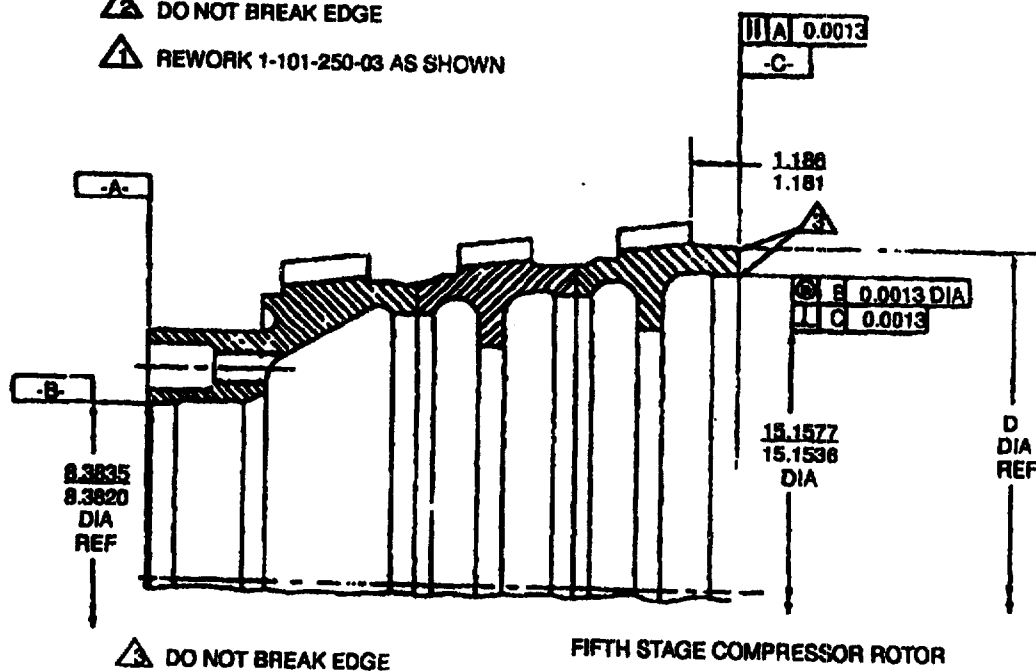


Figure 5-587 Removal of Damaged Compressor Rotor Stages (Metric) (Sheet 1 of 2).



- △ DO NOT BREAK EDGE
- △ REWORK 1-101-250-03 AS SHOWN



- △ DO NOT BREAK EDGE
- 2 AFTER REWORK ALL DIAMETERS MARKED ON 1-101-250-03 TO BE CONCENTRIC WITH DATUMS A AND B TO WITHIN 0.002 TIR
- △ REWORK 1-101-250-03 REV "B" AS SHOWN

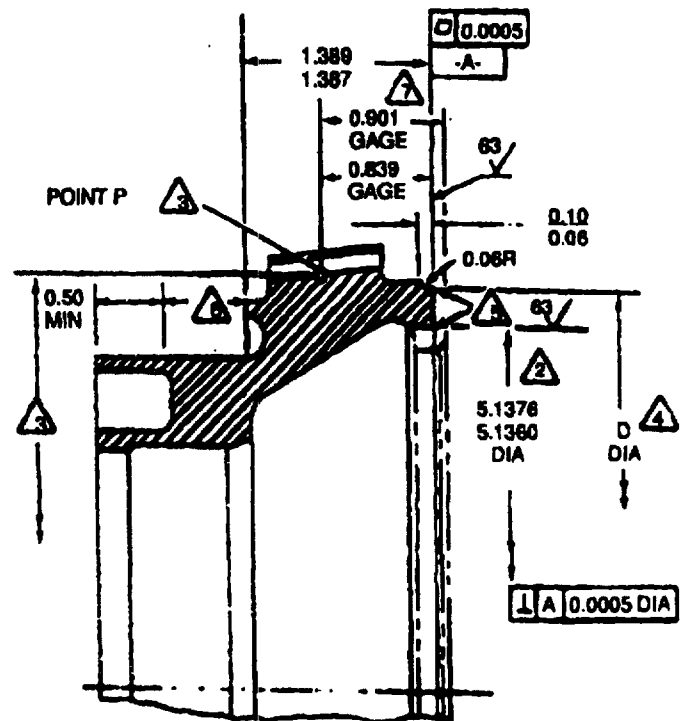
ALL DIMENSIONS  
ARE IN CENTIMETERS

Figure 5-587. Removal of Damaged Compressor Rotor Stages (Metric) (Sheet 2 of 2).

CHQSOFTWARE.COM

- 7 THIS DIM ESTABLISHES PLANE OF POINTS "P" REFERENCED FROM 1-100-498-03
- 6 PART SHALL BE MARKED WITHIN THIS AREA
- 5 DO NOT BREAK EDGE
- 4 DIA D TO BE MACHINED FLUSH TO 0.010 LARGER THAN DIA D OF MATING PART PSK 16482-01
- 3 BEFORE REWORKING 1-100-498-03 AN AVERAGE CENTER OF POINT "P" ON 34 GROOVES MUST BE ESTABLISHED
- 2 THIS DIA MUST BE CONCENTRIC TO THE AVERAGE CENTER OF POINTS "P" WITHIN 0.001 DIA
- 1 REWORK 1-100-498-03 AS SHOWN

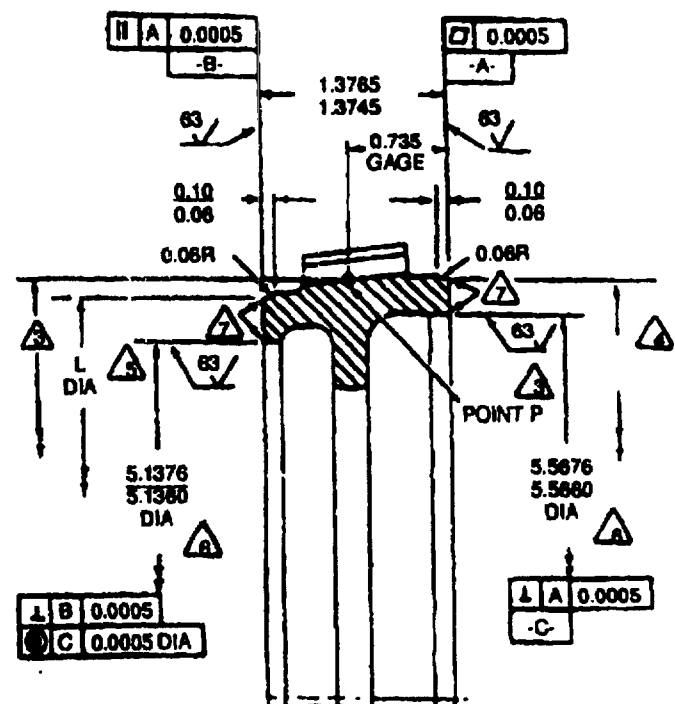
ALL DIMENSIONS ARE IN INCHES



SECOND STAGE COMPRESSOR ROTOR DISC

ALL DIMENSIONS ARE IN INCHES

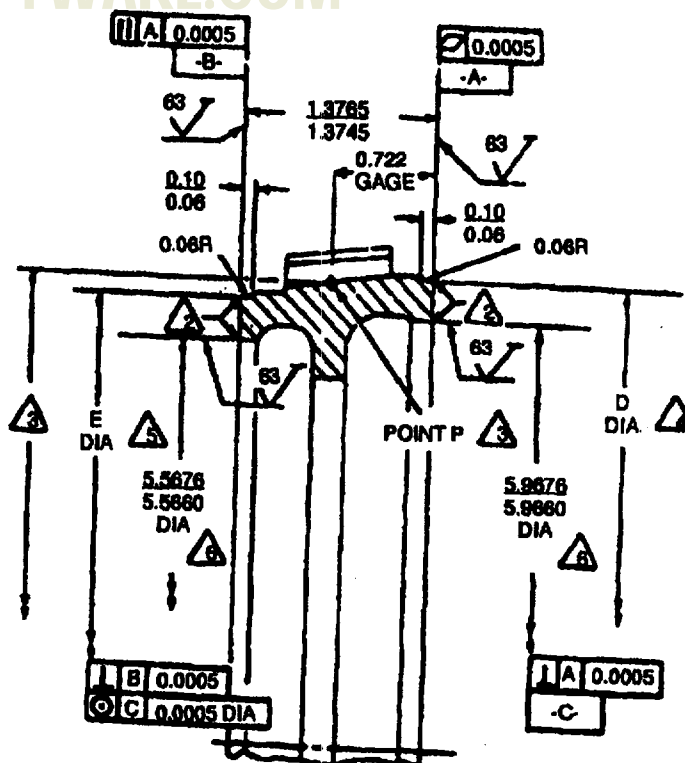
- 6 THESE DIA MUST BE CONCENTRIC TO THE AVERAGE CENTER OF POINTS "P" WITHIN 0.001 DIA
- 5 DIA E TO BE MACHINED FLUSH TO 0.010 LARGER THAN DIA E OF MATING PART PSK 15884-01
- 4 DIA D TO BE MACHINED FLUSH TO 0.025 LARGER THAN DIA D OF MATING PART PSK 15884-02
- 3 BEFORE REWORKING 1-100-497-01 AN AVERAGE CENTER OF POINT "P" ON 34 GROOVES MUST BE ESTABLISHED
- 2 DO NOT BREAK EDGE
- 1 REWORK 1-100-497-01 SHOWN



THIRD STAGE COMPRESSOR ROTOR DISC

Figure 5-588. Machining of Replacement Compressor Rotor Disks (English) (Sheet 1 of 2).

- 6** THESE DIA MUST BE CONCENTRIC TO THE AVERAGE CENTER OF POINTS "P" WITHIN 0.001 DIA
- 5** DIA E TO BE MACHINED FLUSH TO 0.010 LARGER THAN DIA E OF MATING PART PSK 15687-01
- 4** DIA D TO BE MACHINED FLUSH TO 0.010 LARGER THAN DIA D OF MATING PART PSK 16487-02
- 3** BEFORE REWORKING 1-100-498-01 AN AVERAGE CENTER OF POINT "P" ON 34 GROOVES MUST BE ESTABLISHED
- 2** DO NOT BREAK EDGE
- 1** REWORK 1-100-498-01 AS SHOWN



**FOURTH STAGE COMPRESSOR ROTOR DISC**

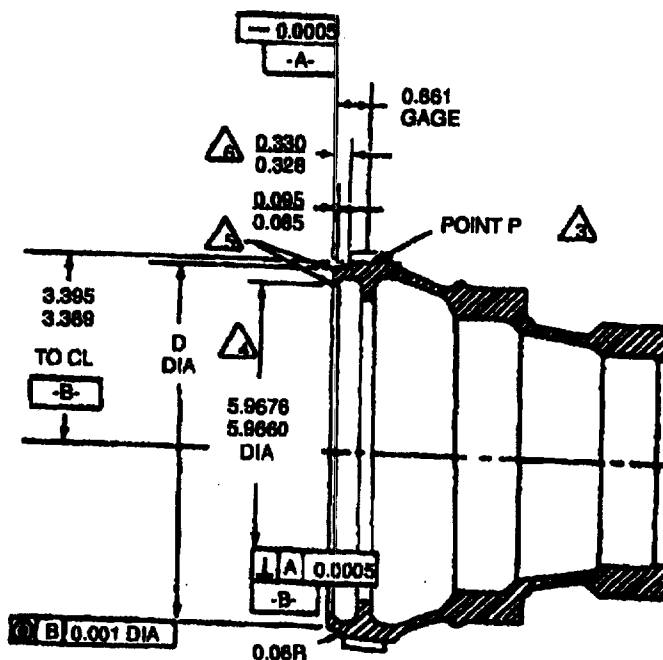
**ALL DIMENSIONS  
ARE IN INCHES**

- 6** BEFORE MACHINING DIMENSION OF  
0.3905-0.3915 PER PRE-PRODUCTION  
PROCESS SHEETS
- 5** DO NOT BREAK EDGE
- 4** DIA D TO BE MACHINED FLUSH TO  
0.010 LARGER THAN DIA D OF MATING  
PART PSK 15531-01
- 3** POINT "P" MAY VARY FROM DISC TO  
DISC WITHIN TOTAL SHOWN BUT MUST  
NOT VARY MORE THAN 0.003 ON ANY  
ONE DISC
- 2** AFTER REWORK ALL SURFACES  

$\perp$	B	0.006
---------	---	-------

 AND ALL DIA 

$\perp$	B	0.006 DIA
---------	---	-----------
- 1** REWORK 1-100-499-03 REV "A" AS SHOWN



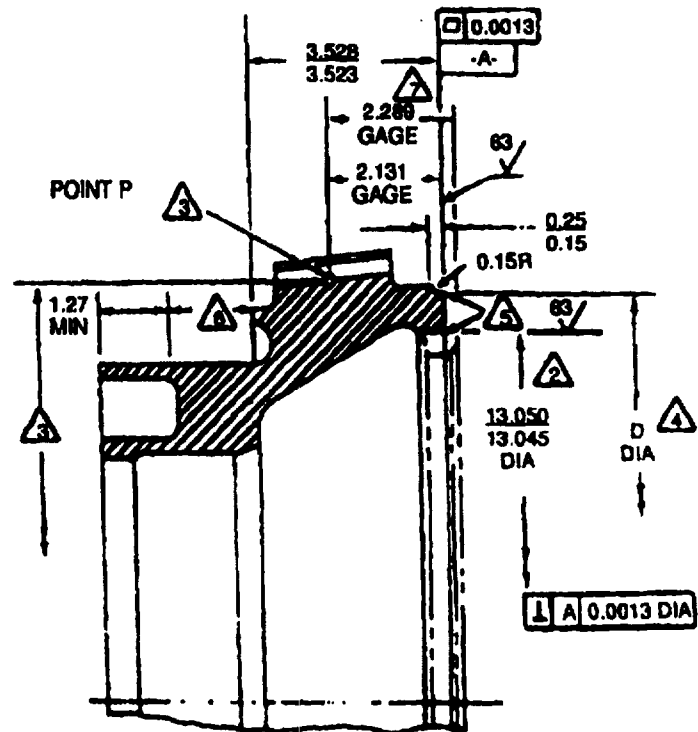
**FIFTH STAGE COMPRESSOR ROTOR DISC**

**Figure 5-588. Machining of Replacement Compressor Rotor Disks (English) (Sheet 2 of 2).**



CHQSOFTWARE.COM

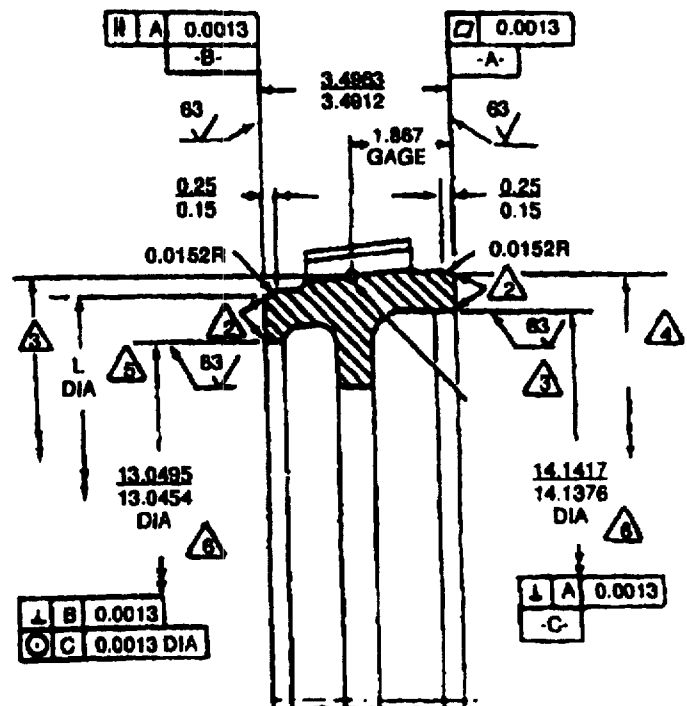
- 7 THIS DIM ESTABLISHES PLANE OF POINTS "P" REFERENCED FROM 1-100-496-03
- 6 PART SHALL BE MARKED WITHIN THIS AREA
- 5 DO NOT BREAK EDGE
- 4 DIA D TO BE MACHINED FLUSH TO 0.025 LARGER THAN DIA D OF MATING PART PSK 16482-01
- 3 BEFORE REWORKING 1-100-496-03 AN AVERAGE CENTER OF POINT "P" ON 34 GROOVES MUST BE ESTABLISHED
- 2 THIS DIA MUST BE CONCENTRIC TO THE AVERAGE CENTER OF POINTS "P" WITHIN 0.003 DIA
- 1 REWORK 1-100-496-01 AS SHOWN



SECOND STAGE COMPRESSOR ROTOR DISC

ALL DIMENSIONS ARE IN CENTIMETERS

- 6 THESE DIA MUST BE CONCENTRIC TO THE AVERAGE CENTER OF POINTS "P" WITH 0.003 DIA
- 5 DIA E TO BE MACHINED FLUSH TO 0.025 LARGER THAN DIA E OF MATING PART PSK 15684-01
- 4 DIA D TO BE MACHINED FLUSH TO 0.010 LARGER THAN DIA D OF MATING PART PSK 16484-02
- 3 BEFORE REWORKING 1-100-497-01 AN AVERAGE CENTER OF POINT "P" ON 34 GROOVES MUST BE ESTABLISHED
- 2 DO NOT BREAK EDGE
- 1 REWORK 1-100-497-01 AS SHOWN

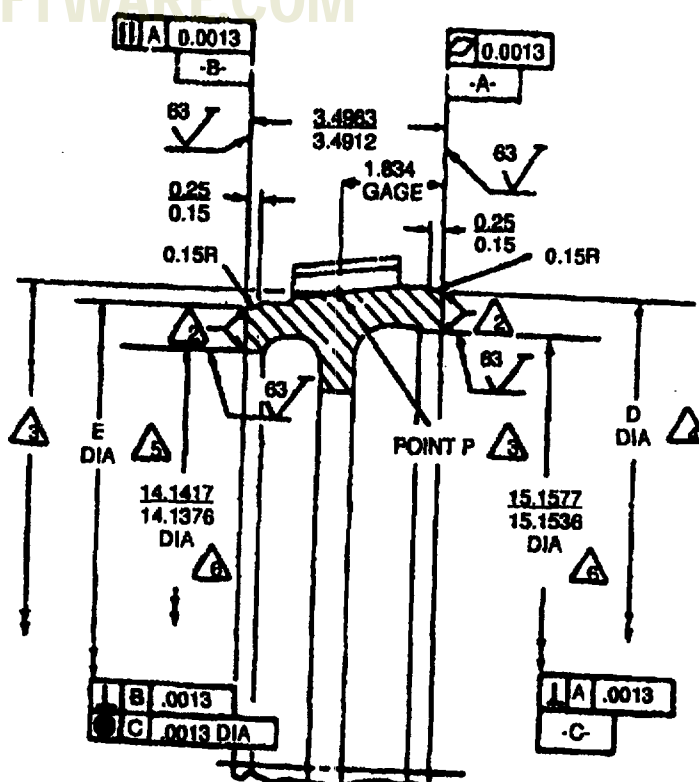


THIRD STAGE COMPRESSOR ROTOR DISC

Figure 5-589. Machining of Replacement Compressor Rotor Disks (Metric) (Sheet 1 of 2).

CHQSOFTWARE.COM

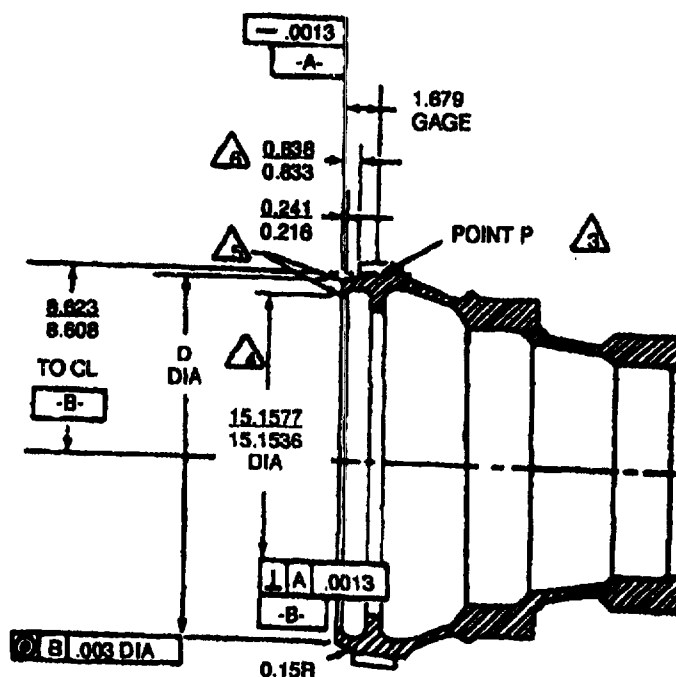
- 6 THESE DIA MUST BE CONCENTRIC TO THE AVERAGE CENTER OF POINTS "P" WITHIN 0.003 DIA
- 5 DIA E TO BE MACHINED FLUSH TO 0.025 LARGER THAN DIA E OF MATING PART PSK 15887-01
- 4 DIA D TO BE MACHINED FLUSH TO 0.025 LARGER THAN DIA D OF MATING PART PSK 16487-02
- 3 BEFORE REWORKING 1-100-498-01 AN AVERAGE CENTER OF POINT "P" ON 34 GROOVES MUST BE ESTABLISHED
- 2 DO NOT BREAK EDGE
- 1 REWORK 1-100-498-01 AS SHOWN



FOURTH STAGE COMPRESSOR ROTOR DISC

ALL DIMENSIONS ARE IN CENTIMETERS

- 6 BEFORE MACHINING DIMENSION OF 0.8819-0.8844 PER PRE-PRODUCTION PROCESS SHEETS
- 5 DO NOT BREAK EDGE
- 4 DIA D TO BE MACHINED FLUSH TO 0.025 LARGER THAN DIA D OF MATING PART PSK 15531-01
- 3 POINT "P" MAY VARY FROM DISC TO DISC WITHIN TOTAL SHOWN BUT MUST NOT VARY MORE THAN 0.008 ON ANY ONE DISC
- 2 AFTER REWORK ALL SURFACES  $\perp$  B 0.015 AND ALL DIA  $\perp$  B 0.015 DIA
- 1 REWORK 1-100-499-03 REV "A" AS SHOWN

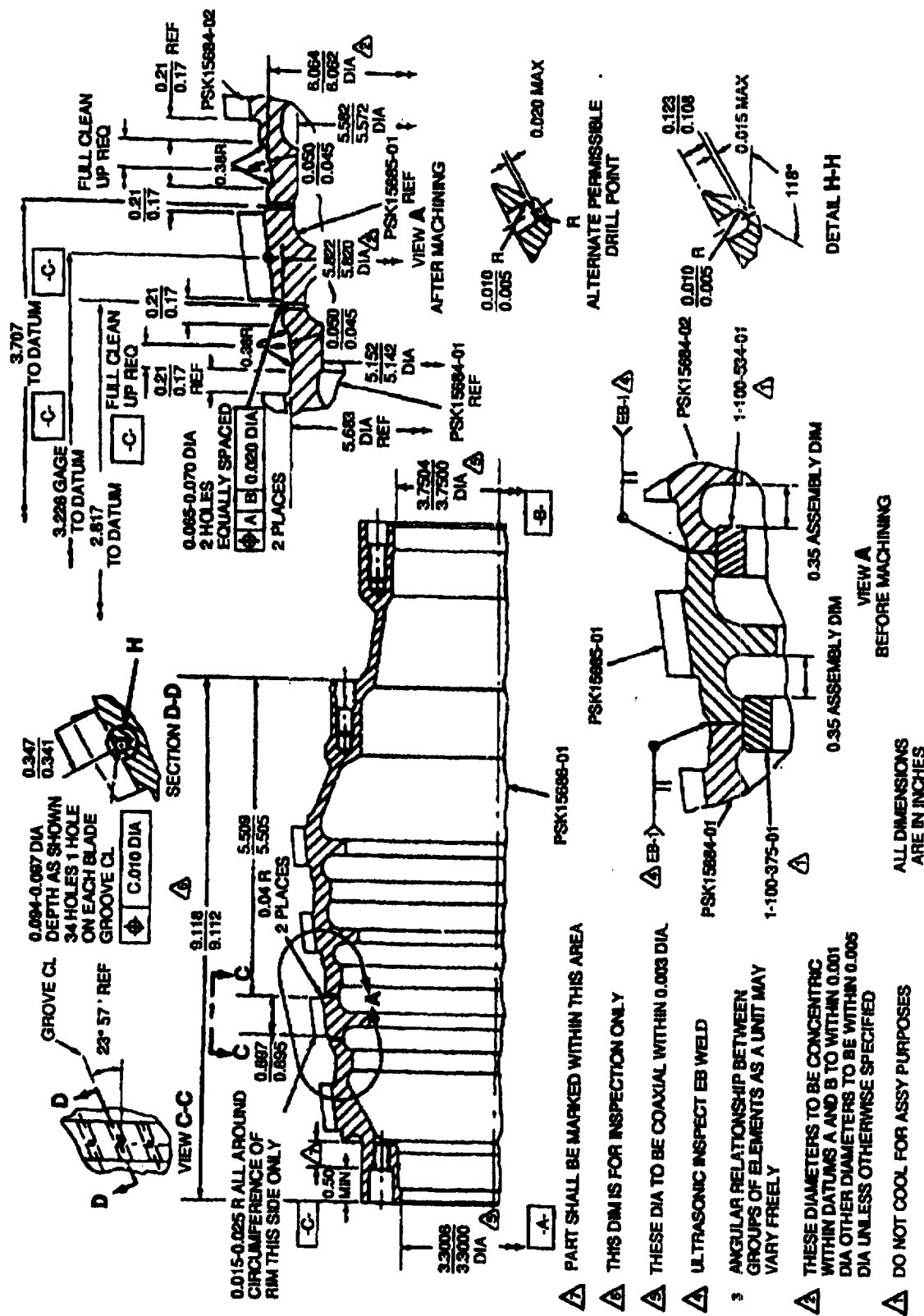


FIFTH STAGE COMPRESSOR ROTOR DISC

Figure 5-589. Machining of Replacement Compressor Rotor Disks (Metric) (Sheet 2 of 2).

[illegible]

**Figure 5-590. Installation of Replacement Compressor Rotor Disk (English) (Sheet 1 of 4).**



**Figure 5-590. Installation of Replacement Compressor Rotor Disk (English) (Sheet 2 of 4).**

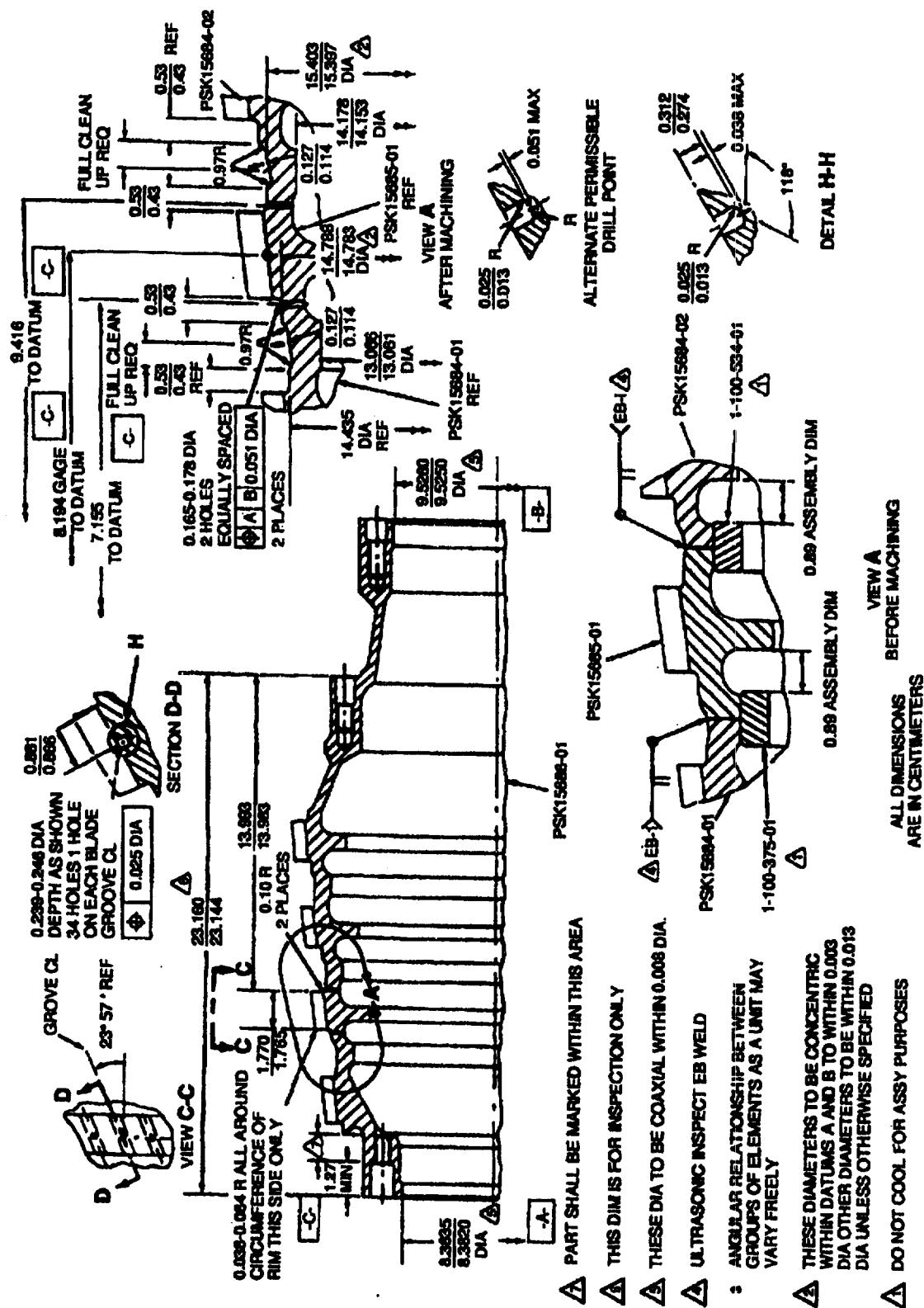




- ⚠ PART SHALL BE MARKED WITHIN THIS AREA
- ⚠ DO NOT COOL FOR ASSEMBLY PURPOSES
- ⚠ THIS DIM IS FOR INSPECTION ONLY
- ⚠ INSPECT EB WELD
- 3 ANGULAR RELATIONSHIP BETWEEN GROUPS OF ELEMENTS AS A UNIT MAY VARY FREELY
- ⚠ THESE DIAMETERS TO BE CONCENTRIC WITH DATUMS "A" AND "B" TO WITHIN 0.003 DIA. OTHER DIAMETERS TO BE WITHIN 0.013 DIA UNLESS OTHERWISE SPECIFIED
- ⚠ THESE DIAMETERS TO BE COAXIAL WITHIN 0.003 DIA

**5-1215**





**Figure 5-591. Installation of Replacement Compressor Rotor Disk (Metric) (Sheet 2 of 4).**



CHQSOFTWARE.COM

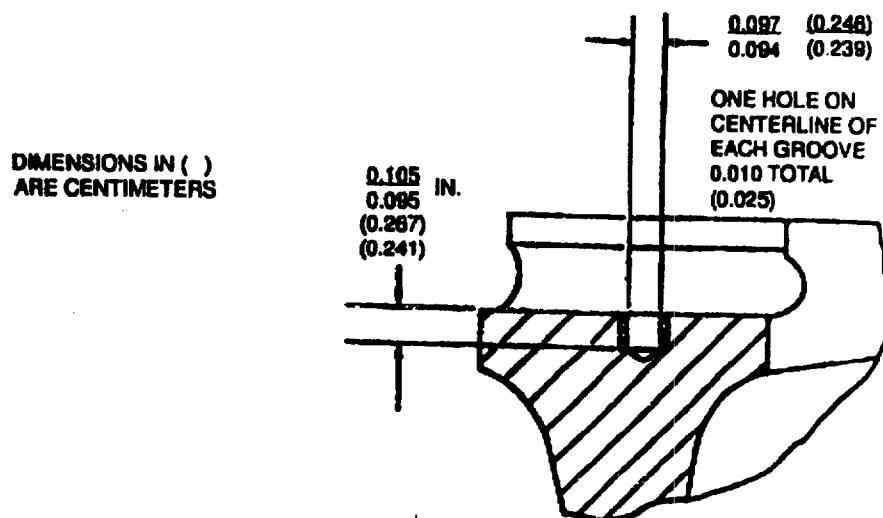


Figure 5-545. Pin Hole - Drilling.

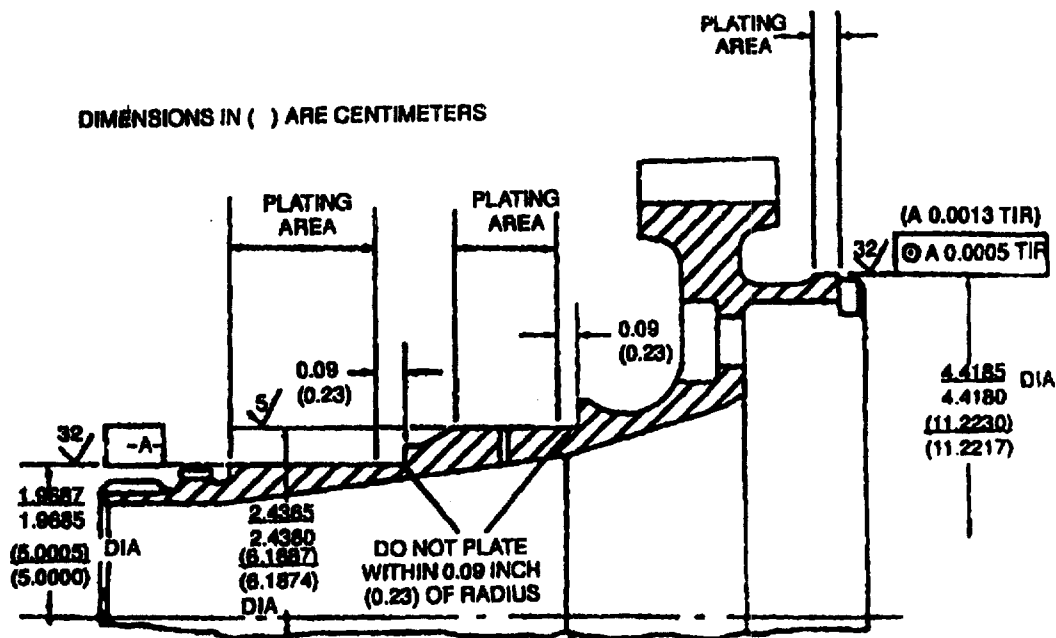
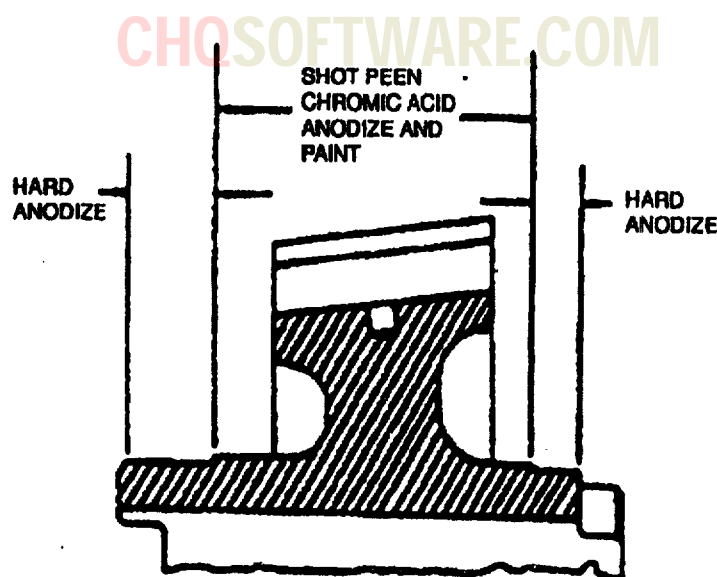


Figure 5-546. Compressor Front Rotor Shaft - Plating Area.



**Figure 5-547. Second, Third, and Fourth Stage Compressor Disks - Repair Areas.**

- (6) Reanodize disk as outlined in SP No. 6017 in Appendix E.

**NOTE**

Anodized surface shall have a dull mate, gray appearance, which is slightly iridescent. A highly iridescent appearance shall be cause for rejection.

- (7) Spray-paint area shown in figure 5-547 to obtain a thickness of 0.0004 to 0.0008 (0.0010 to 0.0020 cm). No excessive buildup or runs are allowed. Paint shall consist of one part clear synthetic (item 81, table C-1) to one part thinner (item 331, table C-1).

**NOTE**

Paint shall be cured, between each coating application, for 15 minutes at 305° to 325°F (152° to 163°C). Final coat shall be cured for a minimum of 30 minutes at 305° to 325°F (152° to 163°C).

- (8) Painted surface shall have a continuous glossy appearance. Any evidence of broken paint film or lack of coverage shall be cause for rejection. Painted surface showing lack of coverage shall be repainted and cured.

**p.** Rework second, third, and fourth stage compressor rotor disks (22, 27, and 32, figure 5-527) (hub runout) (See figures 5-531 and 5-548).

- (1) Remove disk from between centers, remove all blades from disk, and mount disk in an arbor between centers on X surface.

- (2) If A and B surfaces are concentric with X surface, but the forward and rear faces are out-of-squareness with X surface and out-of-parallel with each other, proceed as follows:

- (a) Machine forward and rear faces as shown in figure 5-531.
- (b) Surface-treat reworked area as outlined in SP No. 6016 in Appendix E.

- (3) Dimensionally inspect fifth stage compressor rotor disk as shown in figure 5-531.

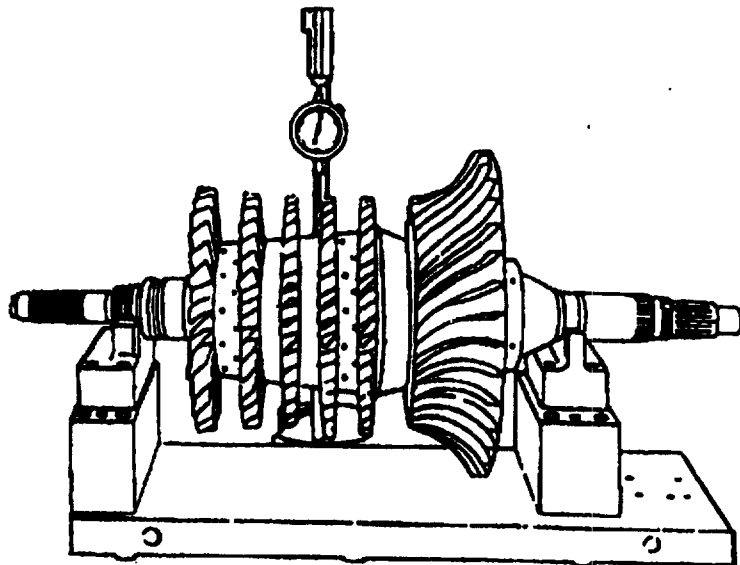
- (4) If A and B surfaces are out of concentricity with X surface, but the forward and rear faces are square with X surface and parallel with each other, proceed as follows:

- (a) Machine A and B surfaces until they are concentric with X surface.
- (b) Reinspect to ensure that A and B surfaces are within specified diameters. (Refer to table 5-164.)
- (5) If the X surface is out of concentricity with the A and B surfaces, out-of-squareness with the forward and rear faces, and the forward and rear faces are not parallel with each other, proceed as follows:
  - (a) Remove disk from arbor. Bore out X surface until it is square with either forward or rear and, if possible, concentric with either A or B surface.
  - (b) Surface-treat machined areas as outlined in SP No. 6012 in Appendix E.
  - (c) Install disk in suitable arbor on X surface and reinspect as outlined in table 5-164.
- q. Repair fifth stage compressor rotor disk (37, figure 5-527) by anodizing. Anodize 4.4210 to 4.4220 inch (11.2293 to 11.2319 cm), OD (forward) and 4.4180 to 4.4190 inch (11.2217 to 11.2243 cm) OD (rear) as follows: (See figure 5-549.)
  - (1) Clean part as required per SP No. 3002 in Appendix E.
  - (2) Alkaline soak for one minute or electrolytic clean (cathodic 5 seconds and anodic 10 seconds) in a solution of rust removing compound (Item 259, table C-1).
  - (3) Pickle part for 3 seconds in solution consisting of the following:

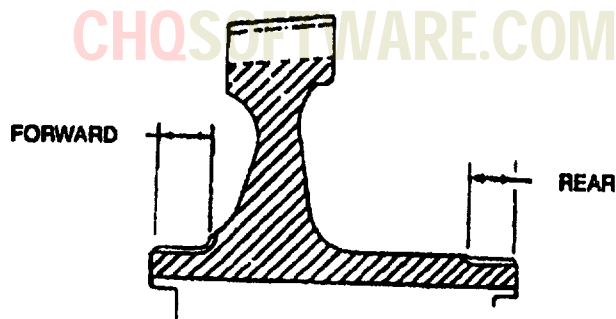
**WARNING**

Both 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.

- (a) 1.5 pints of nitric acid (item 229, table C-1.)
- (b) 3 fluid ounces of hydrofluoric acid (item 170, table C-1).
- (c) One gallon of water.



**Figure 5-548. Compressor Rotor Runouts - Typical.**



**Figure 5-549. Fifth Stage Compressor Disk - Repair Area.**

- (4) Prepare a solution consisting of the following:
  - (a) 6.7 ounces of sodium hydroxide (item 283, table C-1).
  - (b) One gallon of water.

**NOTE**

Maintain solution temperature at 203° to 205°F (95° to 96°C).

- (5) Fasten racked part to anode bar and immerse in solution for 20 minutes at a current density of 50 amps per square foot and a voltage of 0 to 18 volts dc.
- (6) Rinse part in cold, then hot water, and dry with clean, dry air.
- (7) Inspect part for a sparkling gray durable anodic coating. Iridescence is permissible.

**NOTE**

The coatings shall be continuous and uniform in appearance, except that the anodic coating racking of contact marks may remain uncoated, and shall be in a noncritical location. Minor dustiness of the coating can be removed by wiping with a clean cloth.

- r. Repair pilot diameter of fifth stage compressor rotor disk (37, figure 5-527) as follows:
  - (1) Machine pilot diameter to minimum dimension shown in figure 5-534.
  - (2) Clean surfaces to be metal sprayed with acetone (item 13, table C-1), isopropyl alcohol (item 25, table C-1) or denatured alcohol (item 24, table C-1).

**NOTE**

Do not direct cooling air against surface of pilot diameter or into spray path.

- (3) Plasma flame-spray disk pilot, using nickel aluminide powder (item 217, table C-1).
- (4) Position part in a suitable grinder utilizing a medium-grit A1203 grinding wheel, Metco 46 (item 168, table C-1), and grind pilot diameter to dimensions shown in figure 5-534.
- (5) Inspect pilot diameter for conformance to dimensions shown in figure 5-534.
- (6) Repair compressor rotor sub-assemblies that have either the front shaft pilot, rear shaft pilot and/or the centrifugal impeller assembly pilot out of limits as follows:
  - (a) Clean rotor sub-assembly with acetone (item 13, table C-1).
  - (b) Machine pilot diameters (refer to figure 5-490) such that 0.003 to 0.010 material buildup will remain after final machining.
  - (c) Clean, mask around machined area and grit blast.
  - (d) Remove all silicon carbide particles.
  - (e) Immediately plasma flame spray using nickel aluminide powder or equivalent (item 218, table C-1).

- (f) Machine to drawing limits.
- s. Repair centrifugal compressor impeller assembly (41, figure 5-527) as follows:
- (1) Blend-repair nicks, burrs, pits, and dents as outlined in SP No. 5000 in Appendix E. (See figure 5-527.)

**NOTE**

Rework in critical areas is not allowed. Finish strokes of all repair work shall be parallel to blade tip edge. When a blade is repaired on leading or trailing edges, bend with a smooth radius as part of repair.

- (a) Remove only as much material as necessary to provide a smooth repair.
- (b) Repairs made within 0.06 inch (0.15 cm) of either corner shall be blended to a smooth radius.

**CAUTION**

No repairs may be made in impeller airfoil area (aft of splitline) except on trailing edge tip as shown in figure 5-535.

- (2) Grind nicks on leading edge as follows: (See figure 5-535.)
- (a) Using air gun (20,000 rpm) and a 60-grit cartridge, grind back leading edge to depth of deepest nick (not exceeding 0.13 inch (0.33 cm)). (See detail D, figure 5-535.)
- (b) Using medium grit carborundum stone, add finish strokes to radius on leading edge and tip corner.
- (3) Repair centrifugal impeller vane tips that show evidence of rubbing as follows:
- (a) Blend-repair blade tips to a smooth radius, as outlined in SP No. 5000 in Appendix E.
- (b) Perform a fluorescent-penetrant inspection of the repaired areas. Cracks are not acceptable.

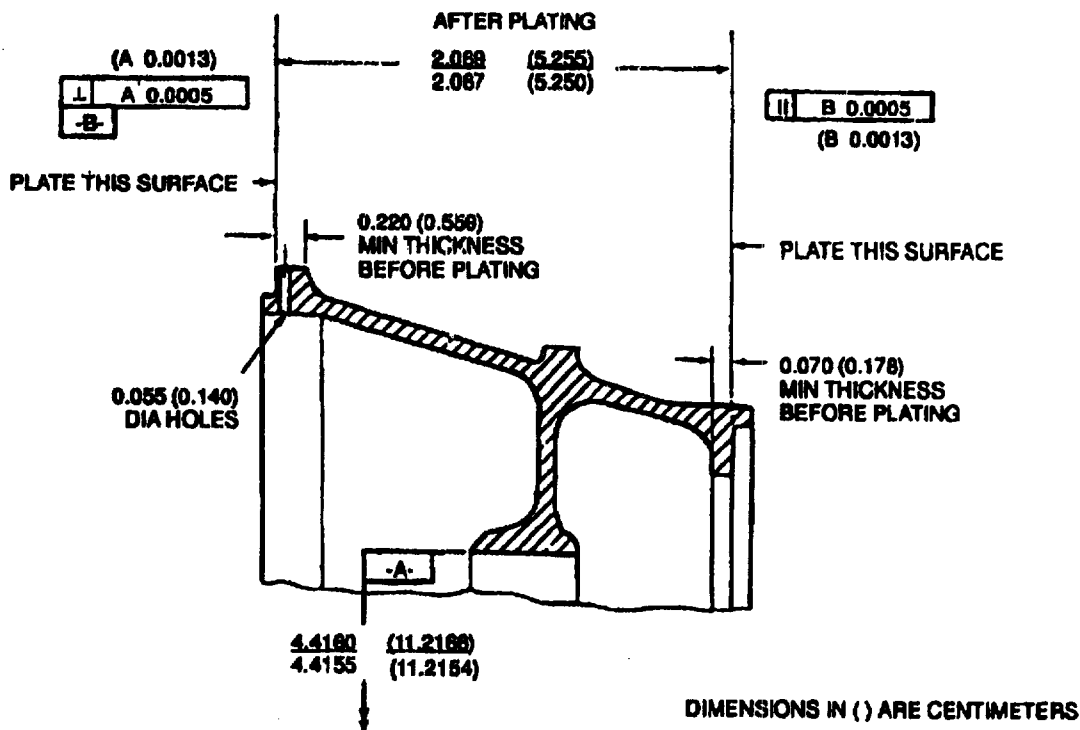


Figure 5-550. Fifth Stage Compressor Rotor Spacer - Parallelism Repair.

CHQSO **CAUTION** RE.COM

Impellers that show any evidence of tip rub must also pass the centrifugal impeller housing clearance limits.

t. Rework scored surface of fifth stage compressor rotor spacer (46, figure 5-527) OD and over maximum ID. (See figure 5-536.)

- (1) Set up spacer in grinder and center within 0.002 TIR. Grind spacer, as required.

#### NOTE

Use grinding wheel with corners dressed to a radius equal to required plate thickness.

(2) Measure ground surface for amount of stock removal of preplate dimension, for proper blend radius, and for out-of-roundness.

(3) Ensure that surface to be plated is smooth and substantially free from blemishes, tool marks, and other irregularities.

(4) Chrome-plate spacer as outlined in SP No. 6014 in Appendix E to obtain a thickness of 0.002 to 0.010 inch (0.005 to 0.025 cm) after final grind.

(5) Bake at 375°F (191°C) for 3 hours.

(6) Machine spacer to dimensions shown in figure 5-536.

u. Repair fifth stage compressor-rotor spacer (46, figure 5-527) to restore parallelism. (See figure 5-550.)

(1) Remove surface defects by grinding.

(2) Nickel- or chrome-plate areas, depending on thickness required.

(a) If plating thickness after final grind is to be 0.002 inch (0.005 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.

(3) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(4) Finish-grind to given dimensions.

#### NOTE

Do not obstruct 0.055 inch (0.140 cm) diameter holes with plating.

v. Cadmium-plate first, second, third, and fourth stage compressor rotor spacer (47, through 50, figure 5-527) when plating is damaged or spacer is reworked. (See figure 5-551.)

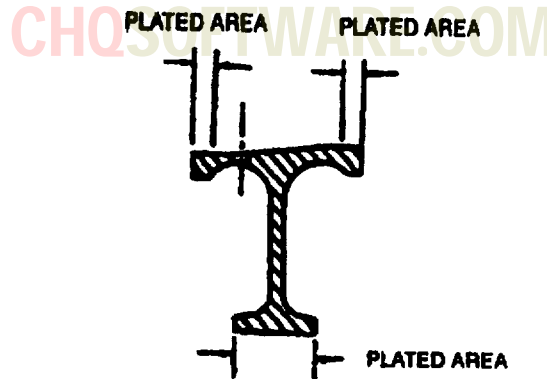
(1) Mask ID and forward and rear faces of spacer. Mask land surfaces when chrome-plating has been used as a repair procedure.

(2) Cadmium-plate to a thickness of 0.0003 to 0.0005 inch (0.0008 to 0.0013 cm) as outlined in SP No. 6015 in Appendix E.

w. Remove broken power shaft through bolt (5, figure 4-36) from power shaft (55, figure 5-527) using one of the following methods (depending upon degree of seizure).

(1) Method 1. Soak bolt in penetrating oil (item 190, table C-1) for 1 to 7 hours. Remove defective bolt by tapping out with punch.

(2) Method 2. Using bolt extractor, break torque on the bolt.



**Figure 5-551. First, Second, Third and Fourth Stage Compressor Rotor Spacers - Plating Area.**

**CAUTION**

Use caution not to distort the threads on the power shaft.

(3) Method 3. For bolts that are extremely difficult to remove, drill out the bolt, using 17/32 inch drill. This will allow sufficient wall thickness to prevent damage to power shaft threads. Remove bolt, using bolt extractor. An electrical discharge machine, Type HRP 103 (Elox Corp.), or equivalent, may be utilized instead of a drill. An electrode corresponding to 17/32 inch drill must be fabricated.

**CAUTION**

Extreme care must be exercised to avoid damaging the threads of the power shaft when a drill or electric discharge machine is used.

x. Repair cracks in plated area of journal on power shaft (55, figure 5-527.) (See figure 5-552.)

(1) Set up power shaft in grinder. Center part within 0.001 inch (0.0025 cm) TIR. Grind shaft, as required.

(2) Measure ground surface for amount of stock removed or preplate dimension for proper blend radius and for out-of-roundness.

**NOTE**

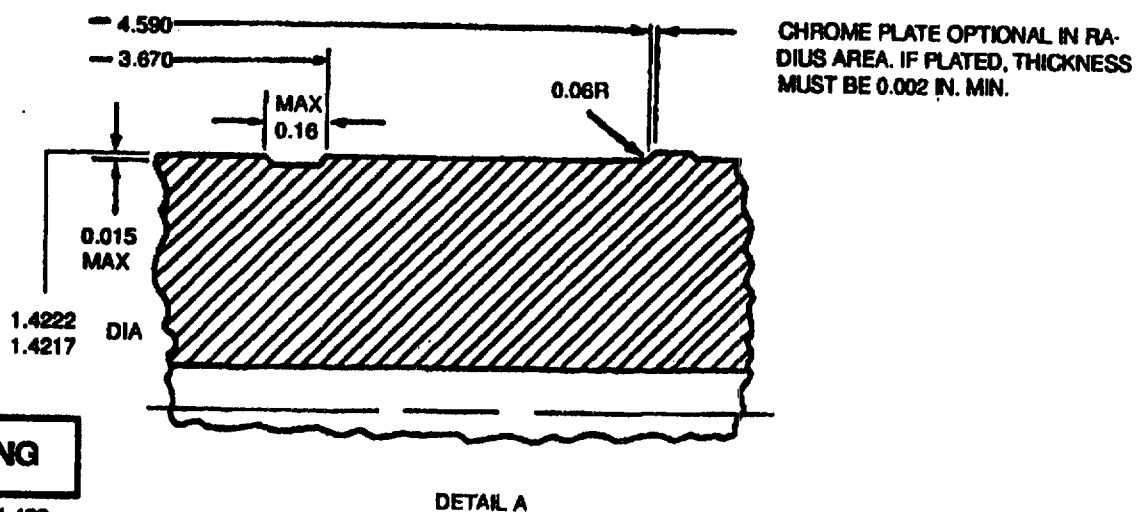
Ensure that surface to be plated is smooth and substantially free from blemishes, tool marks, and other irregularities.

**NOTE**

Use grinding wheel with corners dressed to a radius equal to required plate thickness.

(3) Inspect basic metal, using magnetic-particle method. Replace power shaft if cracks are found.

CHQSOFTWARE.COM

**WARNING**

THE 1.4217 - 1.422  
DIMENSION IS  
FLIGHT SAFETY  
CRITICAL

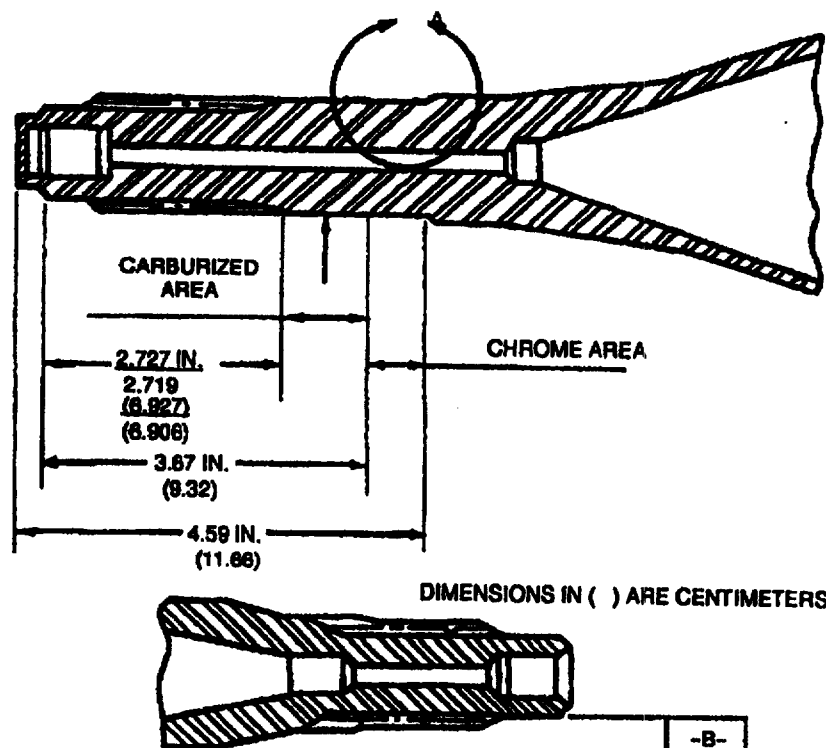


Figure 5-552. Forward Bearing and Seal Repair Areas.



**y. Coating and Corrosion Repair of Power Shaft.**

(1) **INSPECTION:** Inspect outside surfaces of power shaft for rust. If rust exceeds 20% of surface area repair per paragraph (3), if less than 20% repair per paragraph (2).

**(2) TOUCH-UP REPAIR:**

(a) Remove heavy rust by wire brush and heavy grease with a suitable grease solvent before applying rust removing compound.

(b) Mix 1 part concentrated MIL-C-10578, Type II metal conditioner and rust removing compound with 3 parts of water and apply this diluted solution to the rusted areas on power shaft outside surfaces. This diluted solution may be applied by brush, rag, or sponge.

**NOTE**

Mix and store this solution in acid resistant steel, glass, or earthenware containers.

(c) Allow diluted solution to remain on the rusted areas of the power shaft for about one-half (1/2) minute. Wipe off residue first with damp rags and then the rusted treated areas. Remove any loose powdery deposits which may still be on the surface with a brush or rag.

(d) After the chemical treatment of the rusted areas, apply immediately a QPL-16173, Grade 3 preservative oil to these same rusted areas and the remaining outside surfaces of the power shaft.

**(3) COATING REPAIR:**

(a) After all repair procedures specified above have been complied with, chrome-plating, phosphate coating, or both chrome-plating or phosphate coating may be required for coating repair of subject part.

(b) Before chrome-plating or phosphate coating repair is undertaken, remove rust from outside surfaces of subject part, using MIL-C-10578, Type II compound. Use same procedure specified in paragraph (2) for applying this compound except omit procedural step in paragraph (2)(d).

(c) If chrome-plating only is required for the repair area, plug all openings and mask all other areas not to be plated, then proceed as follows:

- 1 Chrome plate part as described in SP No. 6014 in Appendix E.
- 2 Remove masking and bake part for 4 hours at 275°F (135°C).

**NOTE**

Carburized parts should not be baked above 275°F (135°C), or else case tempering may result.

(d) If both chrome plating and phosphate coating are required for repair areas, proceed as follows:

- 1 Mask-off all areas to be phosphate coated and chrome plated.
- 2 Chrome plate appropriate areas of part as cited in paragraph (c)1 above.
- 3 Mask-off chrome plated area.
- 4 Phosphate coat outside surfaces of subject part in accordance SP No. 6012 in Appendix E.
- 5 Remove all masking and bake part for 4 hours at 275°F (135°C).

CHQSO **CAUTION** RE.COM

To prevent case tempering of carburized parts, do not bake above 275°F (135°C).

(e) If phosphate coating only is required, mask all areas not to be phosphate coated, then proceed as follows:

- 1 Phosphate coat outside surfaces of subject part in accordance SP No. 6012 in Appendix E.
- 2 Remove all masking and bake part for 4 hours at 275°F.

**CAUTION**

Do not exceed 275°F (135°C) for carburized parts.

(f) After balancing operations, touch up areas of metal removal with MIL-C-13924, Type I coating followed by an application of MIL-G-1617-3, Grade 3 preservative oil to these touched up areas, and the remaining outside surfaces of the power shaft.

- (4) Bake at 255° to 275°F (124° to 135°C) for 5 hours. Machine to dimensions shown in figure 5-552.

**NOTE**

Plate thickness after finish machining shall be within 0.002 to 0.010 inch (0.005 to 0.025 cm).

z. Repair worn or damaged forward spline end of power shaft (55, figure 5-527) as follows:

- (1) Remove forward spline end of power shaft by machining as shown in figure 5-553.
- (2) Machine a replacement spline end as shown in figure 5-554.
- (3) Inertia-weld replacement spline end to power shaft as follows:

**NOTE**

All surfaces shall be clean and free from film or other foreign material that may be detrimental to weld. Other approved cleaning solvents may be used provided they leave a film-free surface.

- (a) Clean surfaces to be welded by manually wiping with a disposable wipe (item 356, table C-1) soaked in acetone (item 13, table C-1).

**NOTE**

Inertia-welding equipment shall have the following controllable functions: rotational speed, fly-wheel movement of inertia, axial force (ram and upset pressures), and part-holding devices.

- (b) Using suitable inertia-welding equipment, weld replacement spline end to power shaft. (See figure 5-556.)

(c) Remove power shaft from welding equipment, and check for total weld upset: total weld upset length shall be 0.043 to 0.053 inch (0.109 to 0.135 cm). (See figure 5-556.)

- (d) Immediately after welding stress-relieve welded shaft at 250° to 275°F (121° to 135°C) for 2 hours minimum.

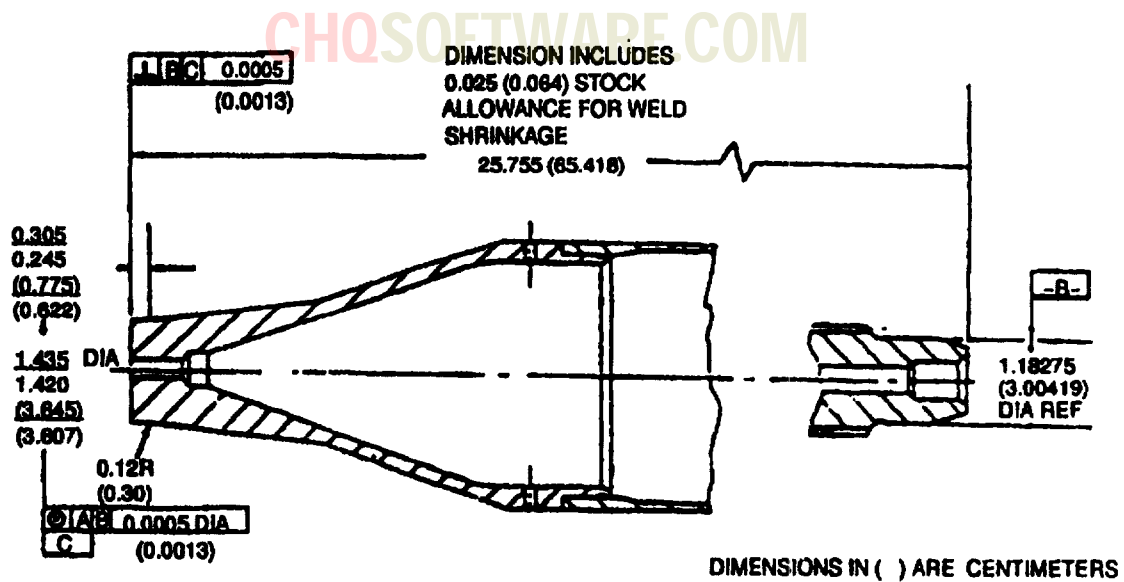


Figure 5-553. Removal of Spline End.

- (4) Machine spline end as shown in figure 5-556.
- (5) Inspect welded area visually and by magnetic-particle method.

**NOTE**

Finish-machined weld area shall be devoid of all indications of imperfections, such as cracking, porosity, and lack of bond; surface imperfections may be blended, provided limits shown in figure 5-556 are maintained.

- (6) Balance power shaft. (Refer to paragraph 5-465.)
- (7) Using vibropeen etching tool, identify repaired power shaft by adding PRP 784 after part number.

**NOTE**

Depth of marking shall be 0.001 to 0.006 inch (0.003 to 0.015 cm).

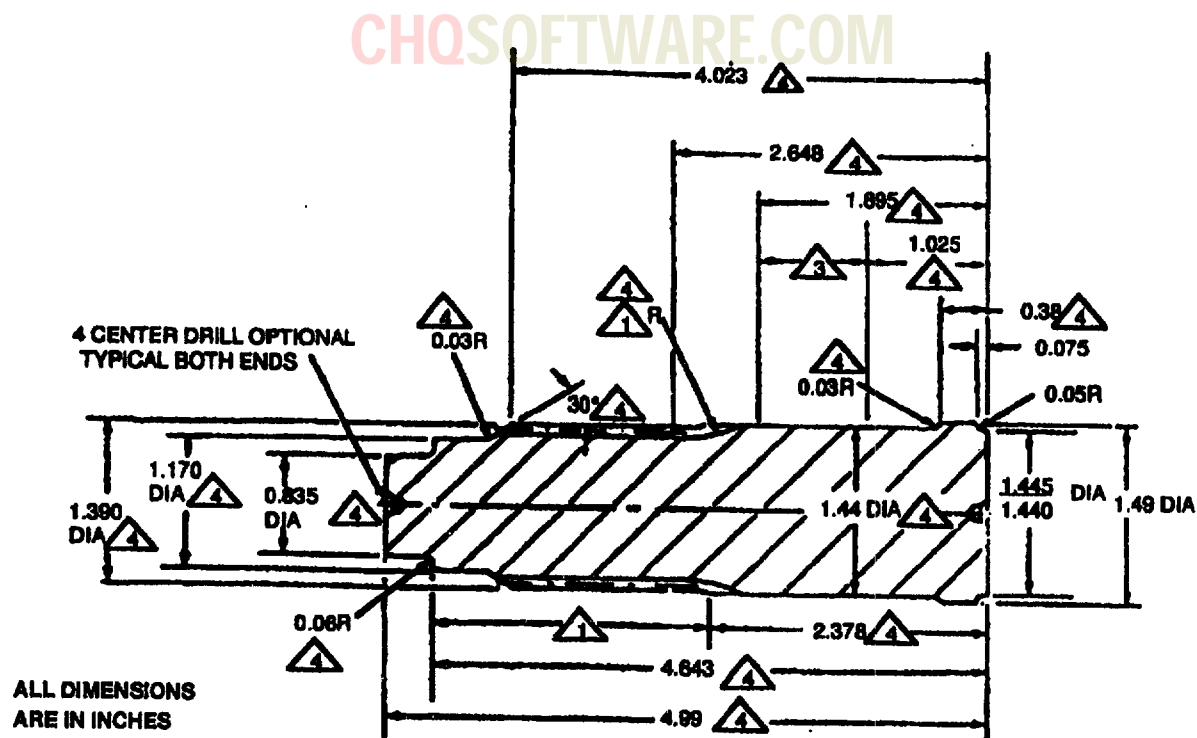
aa. Repair grooving on 1.1815 to 1.1830 inch (3.0010 to 3.0048 cm) diameter of power shaft (55, figure 5-527) as follows: (See figure 5-558).

- (1) Machine dimension, if necessary; to obtain a 0.002 to 0.010 inch (0.005 to 0.025 cm) 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.

ab. Repair scoring, crazing, or plating on 2.1655 to 2.1658 inch (5.5004 to 5.5011 cm) diameter on rear compressor shaft (56, figure 5-527) 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. (See figure 5-559.)

**NOTE**

Nicks, scoring, scuffs, and scratches in power shaft carburized bearing journal that are beyond DMWR limits may be repaired by lapping, provided the O.D. of bearing journal is not reduced below drawing minimum requirements. The repaired surface does not have to "clean up", merely meet DMWR inspection criteria.



NON MANDATORY DIM MAY BE VARIED FOR PROCESS AND MANUFACTURING PURPOSES BUT MUST FINALLY MEET THE REQUIREMENTS OF END PRODUCT



CARBURIZE THIS SURFACE EFFECTIVE CASE DEPTH 0.045-0.065 HARDEN TO OBTAIN 77.5-80.0 ROCKWELL 30N (EQUIV 60-63 Rc) REMAINDER TO BE 66.5-70.5 Ra (EQUIV 32-40 Rc)

CASE DEPTH OF CARBURIZED AREA AS DEFINED BY NOTES



1 AND 3 SHALL BE MET AT NEXT ASSY MAX STOCK ALLOWANCE AS SPECIFIED IN P6030 MUST NOT BE EXCEEDED BETWEEN CARBURIZING AND FINAL ASSY GRIND.



CARBURIZE THESE SURFACES EFFECTIVE CASE DEPTH 0.014-.020 HARDEN TO OBTAIN 75.5-80.0 ROCKWELL 30 N (EQUIV 58-63 Rc) REMAINDER TO BE 66.5-70.5 Ra (EQUIV 32-40 Rc)

### SEMI FINISH EXTERNAL SPLINE DATA

FULL FILLET SIDE BEARING FIT

NUMBER OF TEETH

21

DIAMETRAL PITCH

16/32

PRESSURE ANGLE

30°

MACHINE CIRCULAR TOOTH THICKNESS MAX

0.1022

MACHINE CIRCULAR TOOTH THICKNESS MIN

0.1009

OUTSIDE DIAMETER

1.3775

PITCH DIAMETER

1.3125 BASIC

ROOT DIAMETER

1.183

ROOT FILLET RADIUS CURVATURE MIN

0.015

MEASURING WIRE DIAMETER

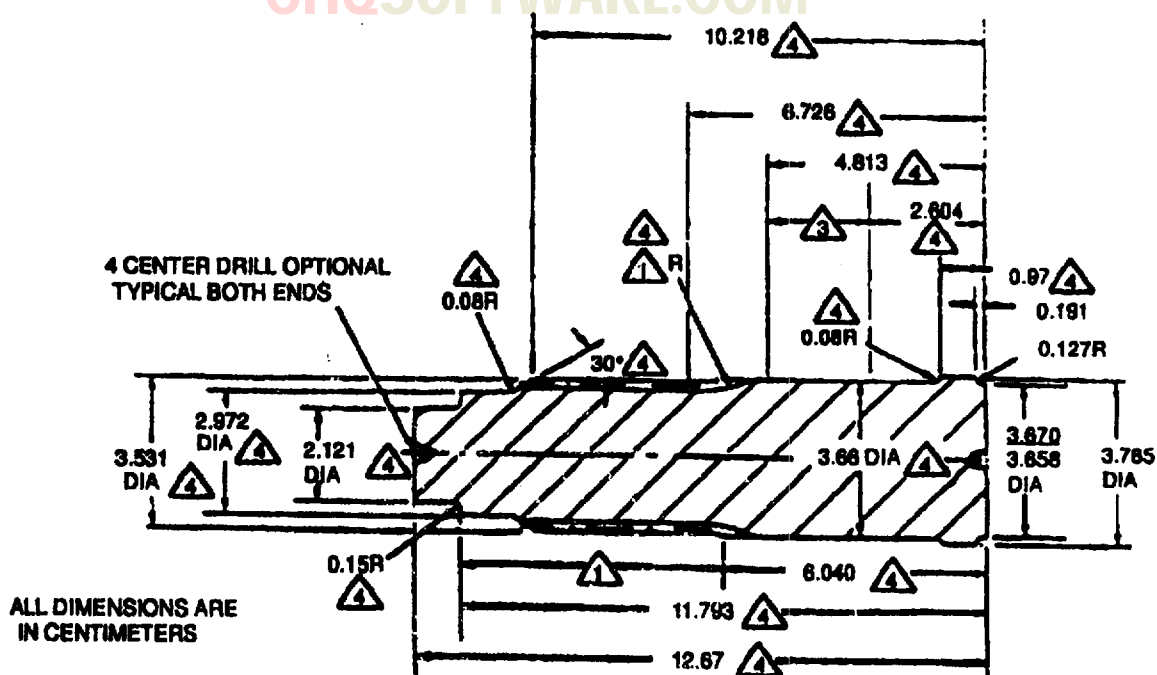
0.1200 REF

MEASUREMENT OVER TWO WIRES

1.4992

Figure 5-554. Replacement of Spline End (English).

CHQSOFTWARE.COM



NON MANDATORY DIM MAY BE VARIED FOR PROCESS AND MANUFACTURING PURPOSES BUT MUST FINALLY MEET THE REQUIREMENTS OF END PRODUCT



CARBURIZE THIS SURFACE EFFECTIVE CASE DEPTH 0.114-0.185 HARDEN TO OBTAIN 77.5-80.0 ROCKWELL 30N (EQUIV 60-63 Rc) REMAINDER TO BE 66.5-70.5 Ra (EQUIV 32-40 Rc)



CASE DEPTH OF CARBURIZED AREA AS DEFINED BY NOTES



1 AND 3 SHALL BE MET AT NEXT ASSY. MAX STOCK ALLOWANCE AS SPECIFIED IN P8030 MUST NOT BE EXCEEDED BETWEEN CARBURIZING AND FINAL ASSY GRIND.



CARBURIZE THESE SURFACES EFFECTIVE CASE DEPTH 0.036-0.051 HARDEN TO OBTAIN 75.5-80.0 ROCKWELL 30 N (EQUIV 58-63 Rc) REMAINDER TO BE 66.5-70.5 Ra (EQUIV 32-40 Rc)

### SEMI FINISH EXTERNAL SPLINE DATA

FULL FILLET SIDE BEARING FIT

NUMBER OF TEETH

21

DIAMETRAL PITCH

1.27

PRESSURE ANGLE

30°

MACHINE CIRCULAR TOOTH THICKNESS MAX

0.2596

MACHINE CIRCULAR TOOTH THICKNESS MIN

0.2563

OUTSIDE DIAMETER

3.4989

PITCH DIAMETER

3.3338

ROOT DIAMETER

BASIC

ROOT FILLET RADIUS CURVATURE MIN

3.0048

0.038

MEASURING WIRE DIAMETER

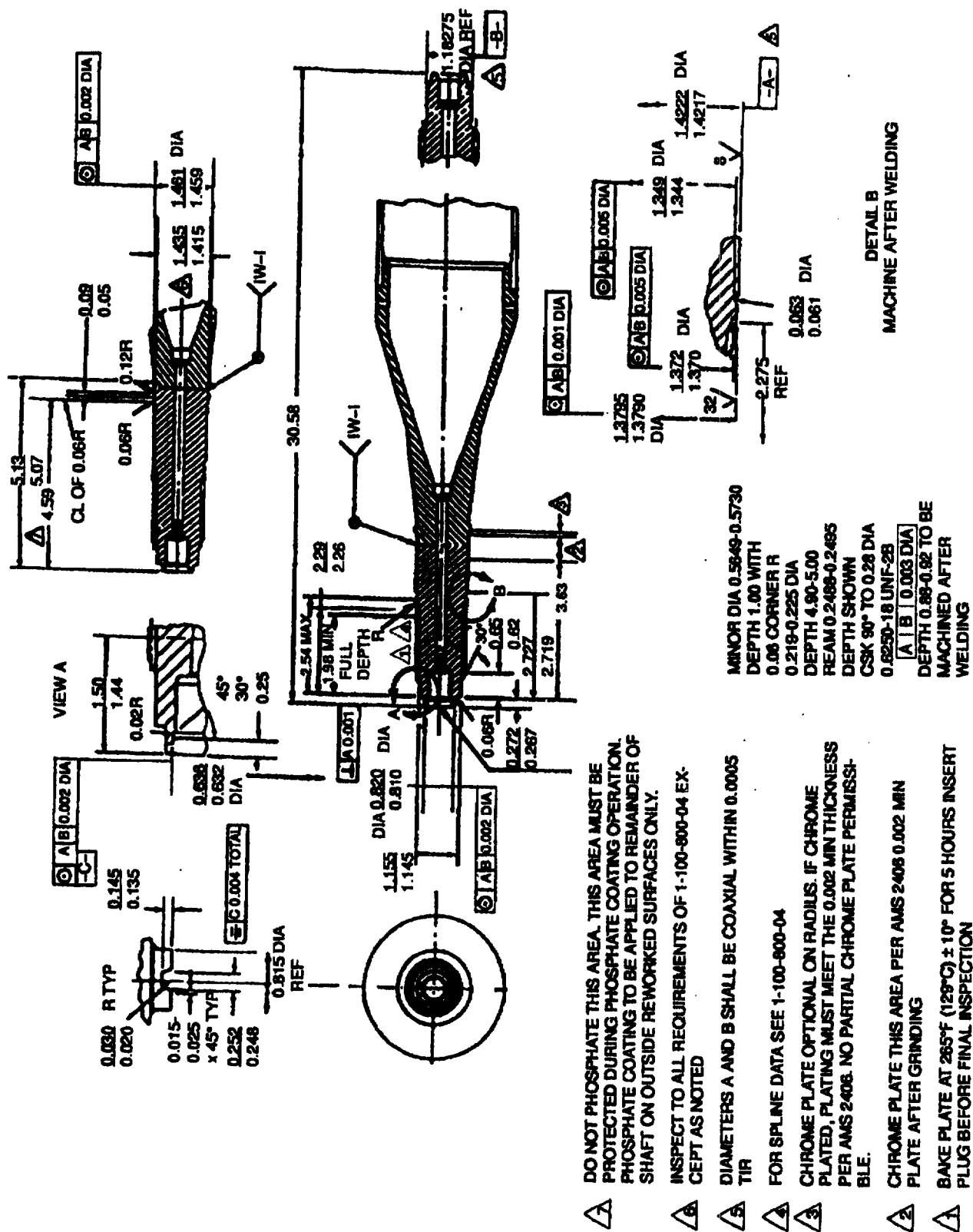
0.3048

MEASUREMENT OVER TWO WIRES

REF

3.8080

Figure 5-555. Replacement of Spline End (Metric).



**Figure 5-556. Finlsh "machining (English)".**

CHQSOFTWARE.COM

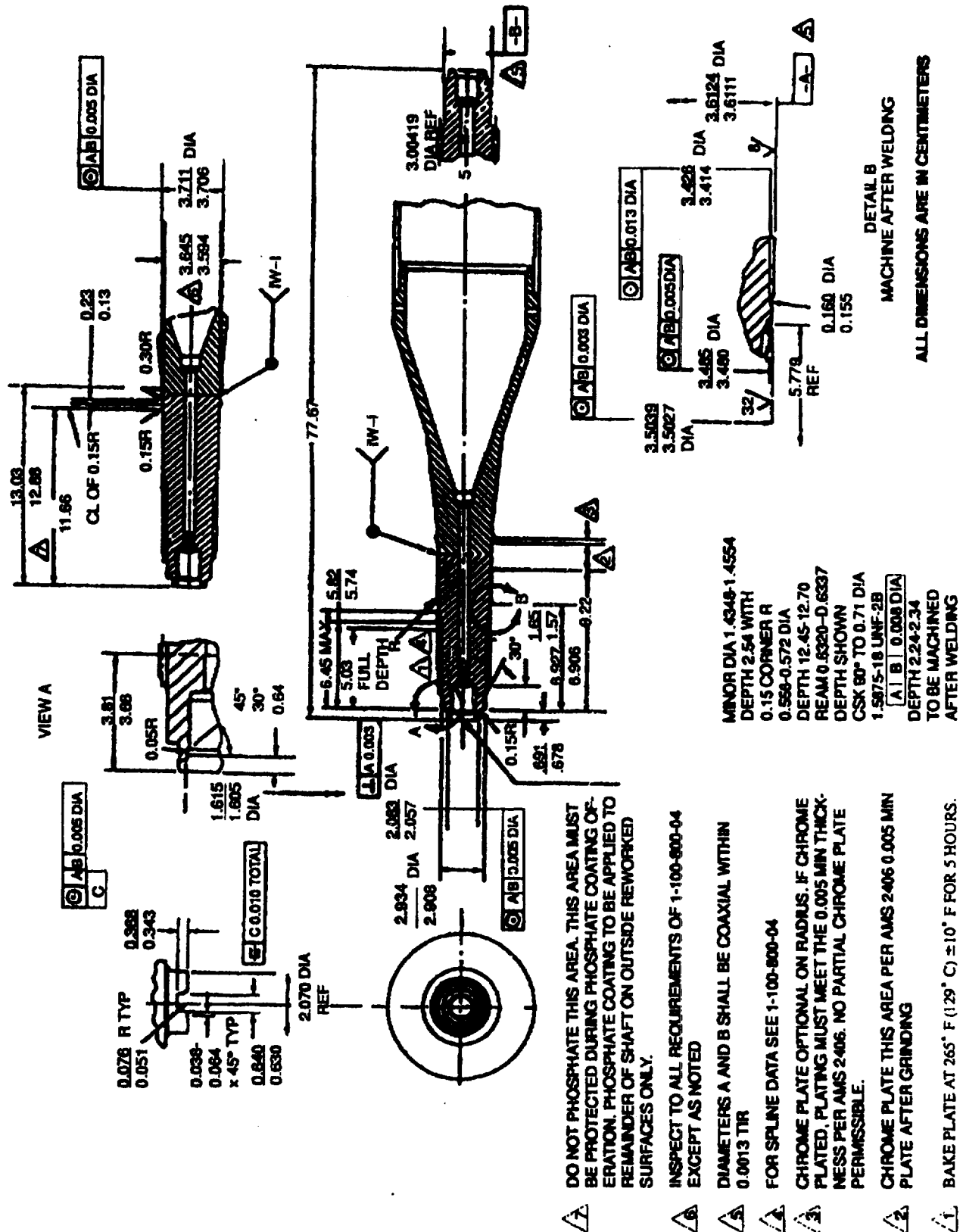


Figure 5-557. Finish Machining (Metric).



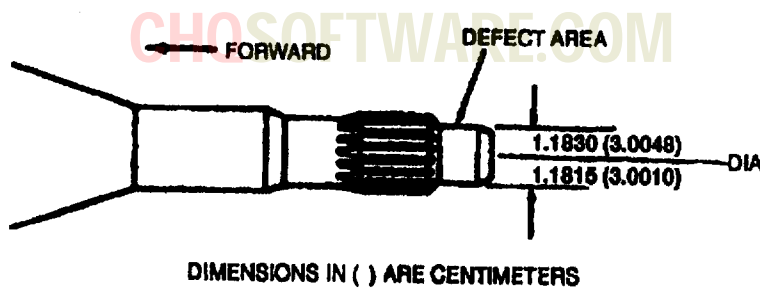


Figure 5-558. Power Shaft Repair Area.

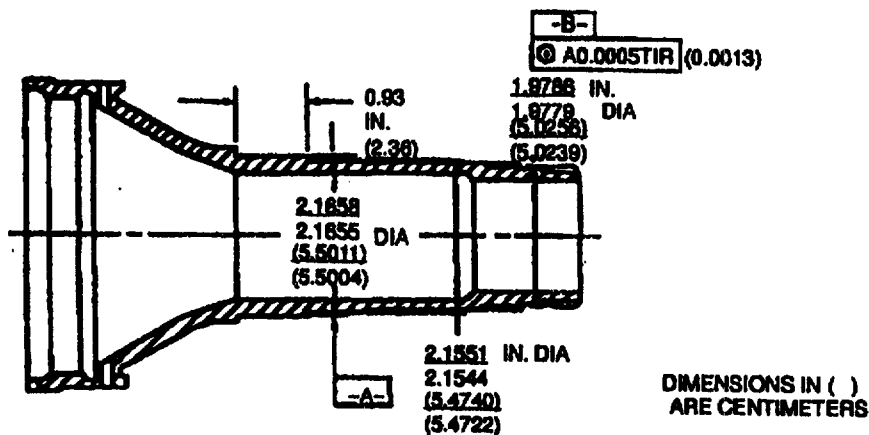


Figure 5-559. Rear Compressor Shaft - Repair Area.

- (1) Repair rear compressor shaft by nickel plating as follows:
  - (a) Machine, if necessary; to obtain up to 0.001 inch (0.003 cm) maximum plate thickness after final machining.
  - (b) Nickel-plate as outlined in SP No. 6018 in Appendix E.
  - (c) Bake at 350° to 400°F (177° to 204°C) for 3 hours within 30 minutes after plating.
  - (d) Machine to dimensions given.
- (2) Repair rear compressor shaft by chrome plating as follows:
  - (a) Machine, if necessary, to obtain a 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 350° to 400°F (177° to 204°C) for 3 hours within 30 minutes after plating.
  - (d) Machine to dimensions given.

ac. Repair worn 2.1544 to 2.1551 inch (5.4722 to 5.4740 cm) and 1.9779 to 1.9786 inch (5.0239 to 5.0256 cm) diameters on rear compressor shaft (56, figure 5-527), 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. (See figure 5-559.)

- (1) Repair rear compressor shaft by nickel plating as follows:
  - (a) Machine dimension, if necessary; to obtain up to 0.001 inch (0.003 cm) maximum plate thickness after final machining.



- (b) Nickel-plate as outlined in SP No. 6018 in Appendix E.
  - (c) Bake at 690° to 710°F (367° to 377°C) for 2 hours within 30 minutes after plating.
  - (d) Machine to dimensions given.
- (2) Repair rear compressor shaft by chrome plating as follows:
- (a) Machine dimensions, if necessary; to obtain a 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 350° to 400°F (177° to 204°C) for 3 hours within 30 minutes after plating.
  - (d) Machine to dimensions given.
- ad. Rework other scored areas of rear compressor shaft (56, figure 5-527) as follows:
- (1) Set up shaft in grinder and center within 0.002 TIR. Grind shaft, as required.

#### NOTE

Use grinding wheel with corners dressed to a radius equal to required plate thickness.

- (2) Measure ground surface for amount of stock removal or pre-plate dimension, for proper blend radius, and for out-of-roundness.
  - (3) Recoat phosphate surface as outlined in SP No. 6012 in Appendix E.
- ae. Repair of damage to splines on the front compressor shaft resulting from disassembly or improper handling which does not exceed 0.050 inch (0.127 cm) of the spline tooth length is as follows:
- (1) Blend damage smoothly into undamaged tooth area. No raised material allowed after rework.
  - (2) Accessory gear must slide freely on shaft after rework without binding on splines.
  - (3) Scoring on the tooth face is acceptable.
  - (4) Raised material at ends of spline teeth shall be repaired. (See paragraph 5-426ab(1) above.)

**5-427. REPLACEMENT OF COMPRESSOR ROTOR BLADES.** The first stage compressor rotor blades are removed and installed from the rear face of the disk. The second through fifth stage compressor rotor blades are removed and installed from the forward face of each disk. When installing a complete set of blades, the first stage compressor rotor blades are installed counterclockwise (when facing the rear face of the disk), and the second through fifth stage compressor rotor blade are installed counterclockwise (when facing the forward face of each disk).

#### NOTE

The following steps pertain to the complete reblading of the rotor disk assembly. To remove only those compressor blades that are defective, follow the procedures that deal only with blade removal and installation, and disregard the instructions for arranging blades in the order of ascending weights. When installing a new compressor blade, ensure that the blade is of the same weight as the one being replaced. Replace blades in pairs, 180 degrees apart.

- a. Place first stage compressor rotor disk assembly, forward face up, in holding fixture (LTCT360). Place second, third, fourth, or fifth stage compressor rotor disk assembly, forward face down, in fixture.
- b. Using drift assembly (LTCT1643) and soft-faced mallet, remove blade from first stage compressor rotor disk assembly. Tab of locking plate will straighten as blade moves out.

CHQSOARE.COM

**CAUTION**

To avoid damaging edge of blade, tap blade gently.

**CAUTION**

Do not use metallic rods for blade assembly other than brass. Use brass or nylon rods only for blade assembly and/or for bending blade locking plate tabs.

c. Using drift assembly (LTCT1644) and soft-faced mallet. A brass or nylon rod 5/16 diameter may be used for removing and/or installing blades and locking plates tabs. Remove blades from second through fifth stage compressor rotor disk assembly. Tab of locking plate will straighten as blade moves out.

d. Remove and discard locking plate. Remove and discard pin only if pin is damaged.

e. Remove compressor rotor disk assembly from fixture.

1. The first stage compressor disk assembly has a complement of 31 blades and requires a special assembly and replacement procedure. The following steps must be performed for the 31-blade disk only:

(1) Weight blades to the nearest 0.10 gram. Using white opaque ink (Item 233, table C-1) or marks-a-lot (Item 238, table C-1), mark weight on blade.

**NOTE**

Two blades marked with equal weight are to be kept together and considered a set.

(2) Blade sets are to be arranged in a row according to ascending weights.

**SET I - EXAMPLE**

Set 1-2-3-4-5-6-7-8\*-9-10-11-12-13-14-15  
Grams 16.6 16.8 ... 17.6 17.8

**NOTE**

\*One blade must be added to set No. 8 to make this a set of three equal weight blades.

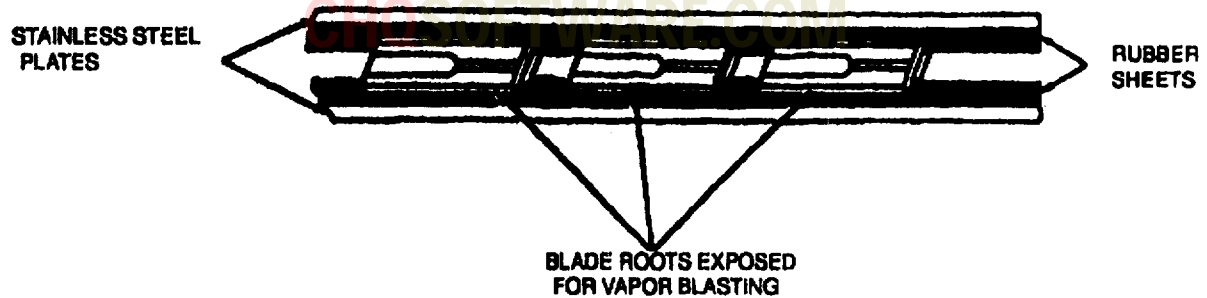
(3) Starting with set No. 2, remove every other set and with these sets make a second row keeping sets in order of descending weights.

**SET II - EXAMPLE**

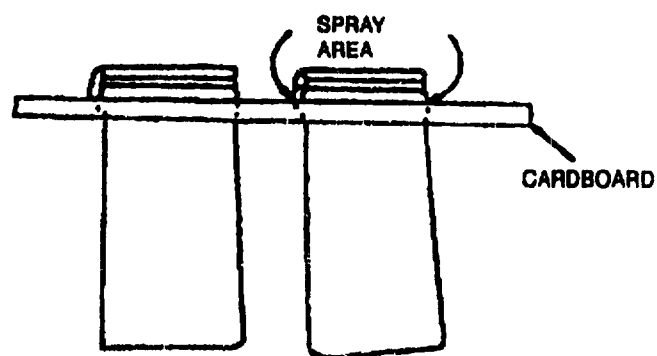
Row 1 1-3-5-7-9-11-13-15  
Row 2 14-12-10-8\*-6-4-2

**NOTE**

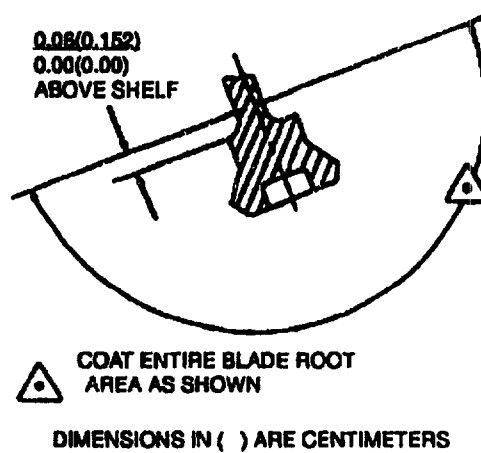
\*Set No. 8 has three blades of equal weight.



**Figure 5-560. Masking Airfoil Surfaces in Preparation for Vapor-Blasting of Blade Roots.**



**Figure 5-561. Masking Shield Preparation Prior to Spraying Blade Roots.**



**Figure 5-562. Coating of Blade Roots.**

- (4) Reposition row 2 to the right of row 1 to form a single row of blade sets that are in assembly order.

STEP III - EXAMPLE

Final Row 1-3-5-7-9-11-13-15- 14-12-10-8\*-6-4-2

**NOTE**

\*Set No. 8 has three blades of equal weight.

- g. Assemble blades into disk so that each blade is in sequence. (See figure 5-563.)

**CAUTION**

If, for any reason, a blade must be replaced, the replacement must be accomplished by using a matched set; using one blade of a set to replace the damaged blade and the other blade of the set to replace a blade one place farther, in the direction of rotation from the theoretical 180-degree opposite blade.

- h. Perform the following steps for blade replacement for the second through the fifth stage compressor disk assemblies:

- (1) Weigh blades to the nearest 0.10 gram. Using white opaque ink (item 233, table C-1) mark weight on blades.

**NOTE**

Two blades marked with equal weight are to be kept together and considered a set.

- (2) Select blade sets at random. No systematic grouping is required.  
(3) Assemble blade sets into disk so that each blade in a set is 180 degrees from the other blade of the set.

**CAUTION**

If, for any reason, a blade must be replaced, this replacement must be accomplished using matched blade sets.

- I. Place first stage compressor rotor disk assembly, forward face down; or second, third, fourth, or fifth stage compressor rotor disk assembly, forward face up, on ring of applicable fixture listed in table 5-168.  
J. Using pin installer (LTCT256), install new pins, if required.

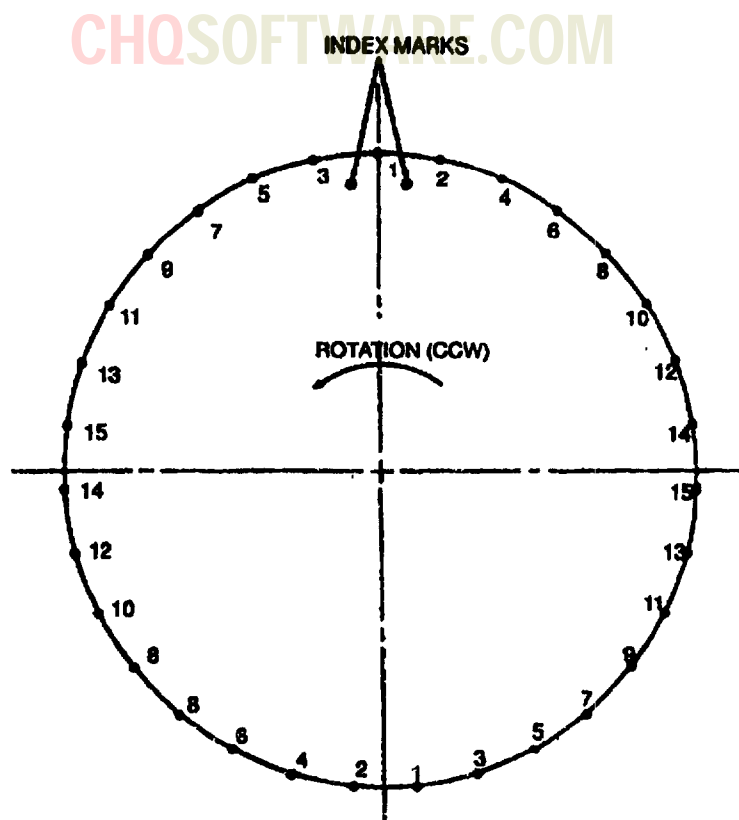


Figure 5-563. First Stage Disk Blade Arrangements.

**NOTE**

Visually inspect to ensure that pins are fully installed and are not deformed or otherwise damaged.

**Table 5-168. Compressor Rotor Blade Installation Fixtures.**

First Stage	Second Stage	Third Stage	Fourth Stage	Fifth Stage
LTCT6253	LTCT6254	LTCT6256	LTCT6300	LTCT6304

k. Install 1/2 inch drive direct reading torque wrench, 0 to 100 pound-feet (0 to 149 kg m) capacity, onto arm of fixture.

l. Select locking plate of suitable thickness to require a force of 80 to 180 pounds for blade installation, and install on pin in root of disk. (Start with mid-range plate thickness.)

**CAUTION**

When installing blades, press against blade root to avoid damaging edge of blade.

m. Manually install replacement blades in disk assembly. Each blade should fit snugly about halfway in the slot.

n. Align blade root with setscrew on arm of fixture and fully seat the blade (note reading on torque wrench). Installation force must be 80 to 180 pounds (40 to 90 pound-feet reading on torque wrench). If torque wrench, reading is not within these limits, remove blade and select next thicker or thinner locking plate, as required.

- o. Repeat preceding steps m and n until torque wrench reading is within limits.

**NOTE**

Normally only one locking plate size will be required for all blades of a particular disk assembly

- p. Using a soft-faced mallet and brass drift, bend tab of locking plate against blade root.
- q. Remove disk assembly from fixture.

**NOTE**

The distance between the table end and the blade recess shoulder should be no more than 3/32 inch. A greater distance indicates that the tab hole has been elongated and the locking plate must be replaced.

- r. Measure diameters at gage points of first, second, and third stage compressor disk assemblies. (See figure 5-564.) Using a cylindrical grinder, grind to the required angle. Grind fourth and fifth stage compressor disk assemblies to a zero-degree angle. Break all sharp edges to a maximum of 0.003 inch (0.008 cm) radius.

**NOTE**

Diameter should be maintained concentric to center within 0.0005 inch (0.0013 cm) TIR, for first; and second stage compressor rotor disk assemblies, and 0.001 inch (0.003 cm) TIR, for third, fourth, and fifth stage compressor rotor disk assemblies.

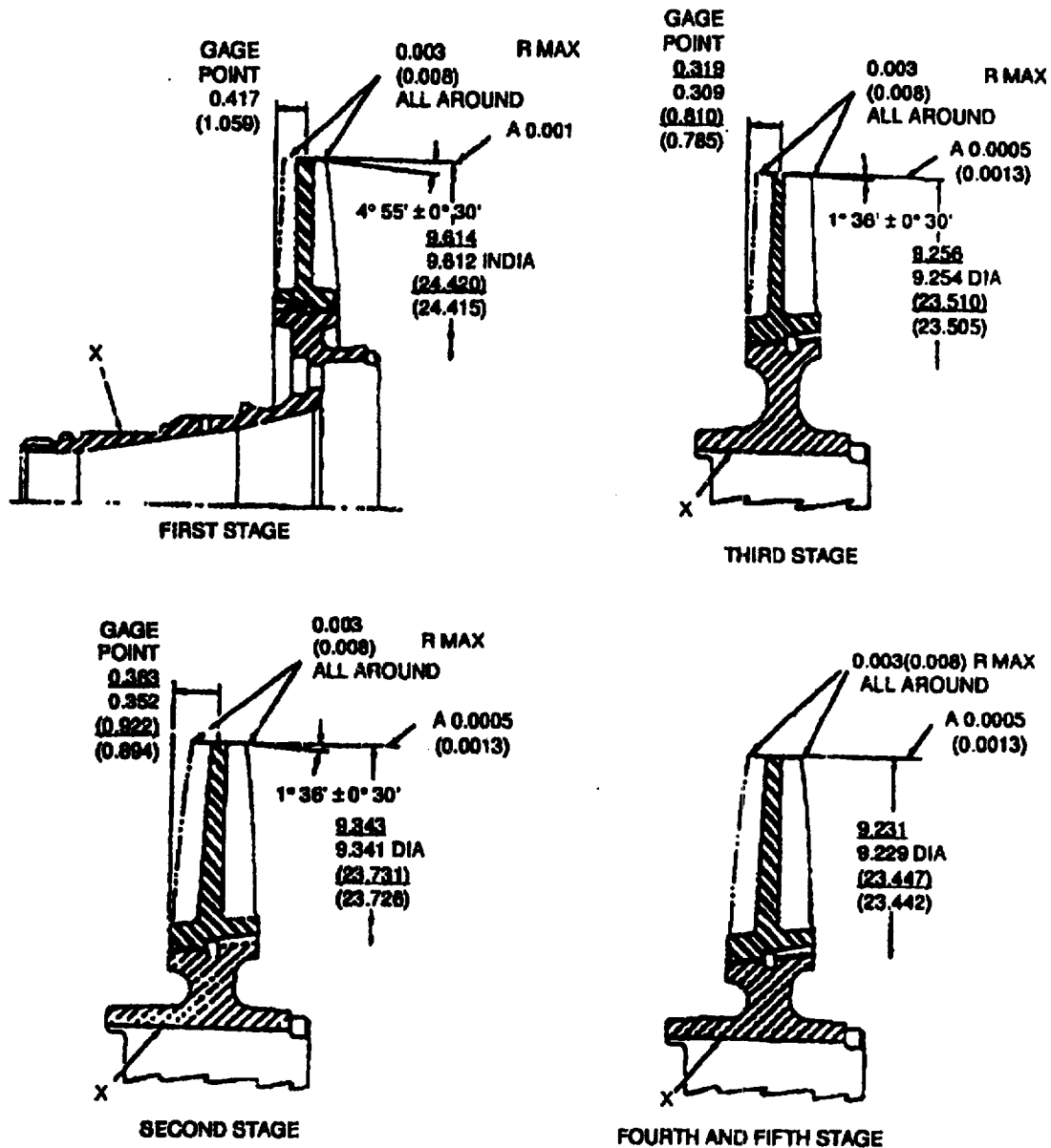
**5-428. INITIAL REASSEMBLY OF COMPRESSOR ROTOR ASSEMBLY (T53-L-15, -701). Proceed as follows:**

**NOTE**

Prior to installation of disk assemblies (16, 21, 26, 31, and 36, figure 5-527), ensure the requirements of Form DD829-1, Historical Records, are compiled with.

- a. Install blades in first stage compressor disk. (Refer to paragraph 5-427.)
- b. If power shaft plug (54) was removed, install as follows:
  - (1) Using approved method, chill new power shaft plug and install in forward end of balanced power shaft (55).
  - (2) Test plug for tightness by tapping with brass rod inserted in opposite end of power shaft.
- c. Place five compressor rotor spacers (46, 47, 48, 49, and 50) in drying oven. Heat for 30 minutes at 350° to 425° F (177° to 218°C).
- d. Install rear compressor shaft (56) into compressor rotor fixture (LTCT55). Check that matchmarks, on forward and rear section impellers (43 and 44) and on compressor coupling (42), are properly aligned. Place impeller and coupling on rear compressor shaft.
- e. Insert balanced power shaft (55) into impeller.
- f. Position compressor rotor sleeve (53) over power shaft. Insert two guide pins in tapped holes of sleeve and thread sleeve in until it bottoms in rear of compressor shaft (56). Back off sleeve one-quarter to one-half turn to obtain alignment with holes in first stage compressor disk assembly.
- g. Set disk assemblies (16, 21, 31, and 36) on sleeve (53), aligning the tangs and slots of each assembly.

CHQSOFTWARE.COM



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-584. Compressor Rotor Blade Grinding.

**NOTE**

It may be necessary to rotate the first stage compressor disk assembly (16) in order to obtain alignment. Rotate sleeve (53), as necessary, to align guide pins with holes in disk assembly.

- h. Using an ink pencil (item 238, table C-1), mark an impeller blade and a rotor blade on each disk to serve as an alignment index.
- i. Remove compressor rotor disk assemblies from sleeve.
- j. Using installation tool (LTCT4705), press seal (45) into impeller.
- k. Remove fifth stage compressor rotor spacer (46) from oven, and using an arbor press, install spacer on fifth stage compressor disk assembly (36). Install fifth stage compressor disk assembly and spacer on impeller assembly.

**NOTE**

Ensure that alignment marks on the fifth stage rotor disk matches that on impeller, and the alignment mark on each subsequent rotor disk matches that on the disk before.

- l. Install fourth stage compressor rotor spacer (47), fourth stage compressor disk assembly (31), third stage compressor rotor spacer (48), third stage compressor disk assembly (26), second stage compressor rotor spacer (49), second stage compressor disk assembly (21), first stage compressor rotor spacer (50), and first stage compressor rotor disk assembly (16) on fifth stage compressor disk assembly (36).
- m. Remove guide pins and install 10 bolt retainers (51) and screws.

**NOTE**

Apply molybdenum disulfide (item 48, table C-1) to the threads of the screws before installing. Tighten screws to 10 pound-inches torque. Do not stake retainers at this time.

- n. Allow compressor rotor to cool to room temperature.

**5-429. COMPRESSOR ROTOR COMPRESSION CHECK (T53-L-15, -701). Process as follows:**

- a. Install sleeve adapter (LTCT2959, detail of LTCT590) on rear compressor shaft.
- b. Position compressor rotor and adapter, rear compressor shaft downward, on plate assembly (LTCT2961, detail of LTCT590). (See figure 5-565.)
- c. Position adapter (LTCT2958, detail of LTCT590) over first stage compressor disk assembly (16, figure 5-527).
- d. Install straight allen wrench in each of 10 screws (52).
- e. Using an ink pencil (item 238, table C-1), number holes in flange of forward adapter (LTCT2958, detail of LTCT590) in clockwise sequence, 1 through 10.
- f. Insert stacking adapter (LTCT772, detail of LTCT590) between load cell and adapter (LTCT2958, detail of LTCT590).
- g. Gradually apply load until 65,000 pounds is reached; then reduce load to 3,000 pounds.
- h. Repeat preceding step g until a total of three loading and unloading cycles has been accomplished.
- i. Increase load from final 3,000 pounds to 38,000 pounds.
- j. Maintaining 38,000 pound load, measure rotor length dimension A, figure 5-565, at three places, 120 degrees apart, using vernier height gage with attached indicator (graduated in 0.0001 inch (0.0003 cm) increments. Measurement must be accurate within 0.0005 inch (0.0013 cm).
- k. Increase load to 50,000 - 52,000 pounds.
- l. Using a torque wrench, tighten screws in the following sequence: 1-6, 3-8, 5-10, 4-9, 2-7, to 150 pound-inches torque (2679 gm cm) in 10 pound-inch (1786 gm cm) increments. (See figure 5-566.)



CHQSOFT **CAUTION** E.COM

To avoid cocking of the compressor rotor, ensure screws are tightened, in increments of 10 pound-inches (1786 gm cm) torque, to 150 pound-inches (2679 gm cm) torque. Repeat the last torque as many times as necessary; at least three times, to ensure that all screws are tightened to the same torque.

To prevent damage to the rotor assembly, do not exceed 150 pounds-inches (2679 gm cm) torque. Final torque on all screws must be the same.

m. Gradually decrease the pressed load to zero. Measure rotor length, dimension A, figure 5-565, at the same three locations as in preceding step j. Record each measurement. Measured length of rotor must be within plus or minus 0.002 inch (0.005 cm) of those measured in step j.

n. Surface irregularities in screws and mating parts can effect required torque. If preceding step m, cannot be accomplished within 150 pound-inch torque (2679 gm cm) limit, proceed as follows:

- (1) Increase compression load to 50,000 - 52,000 pounds and break torque on screws.

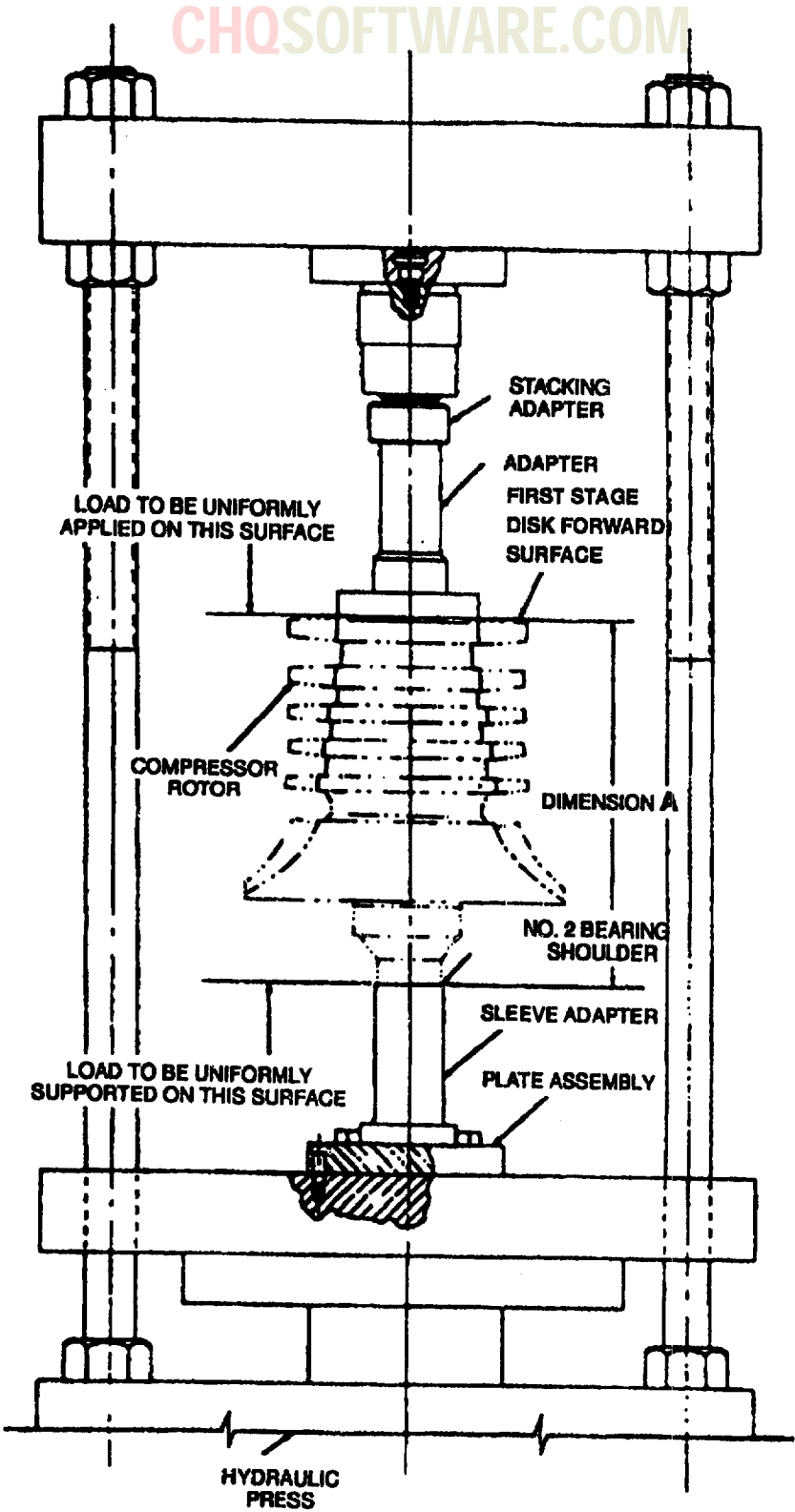
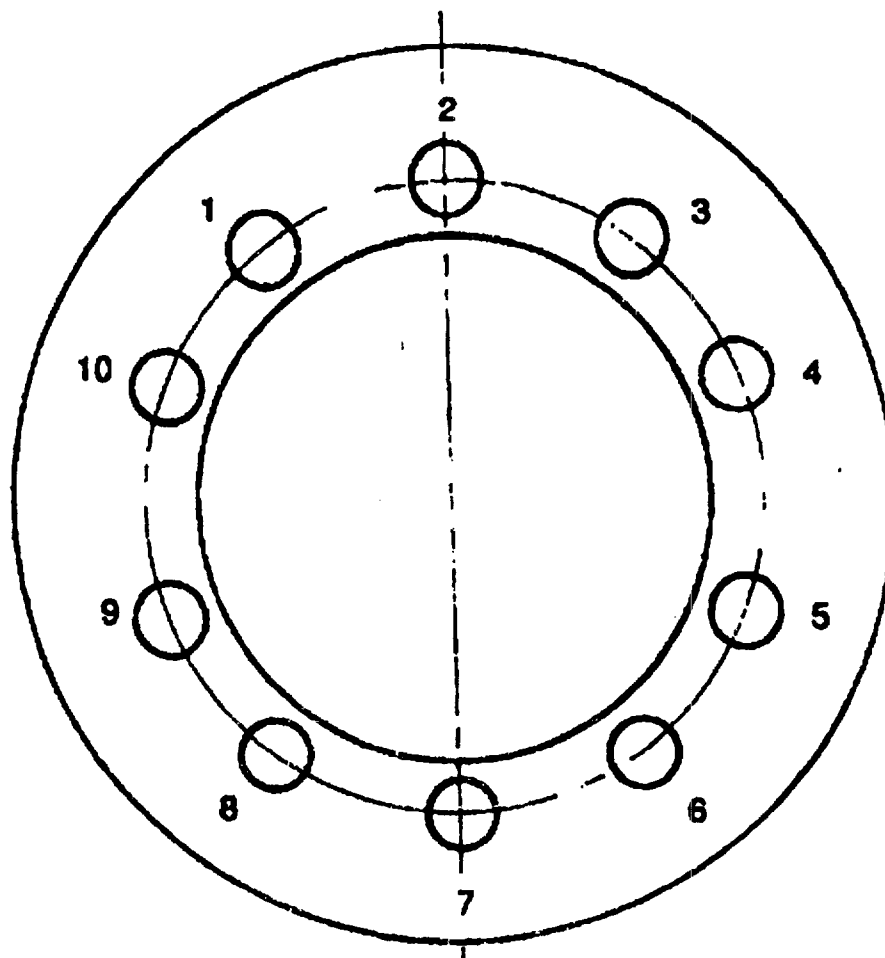


Figure 5-565. Compressor Rotor Assembly and Adapters Positioned on Hydraulic Press.

CHQSOFTWARE.COM

**SCREW TORQUING SEQUENCE WITH SCREWS NUMBERED 1 THROUGH 10 AS SHOWN (STARTING POINT OPTIONAL) TORQUE 1-6, 3-8, 5-10, 4-9, 2-7.**



**Figure 5-566. Screw Sequence and Torque Requirements.**

**NOTE**

Full torque on screws is to be achieved in increasing increments of 10 pounds inches (1786 GMSQCM) per screw per sequence specified above. Do not apply full torque immediately to any screw.

- (2) Reduce load to zero and remove screws.
- (3) Inspect screws and mating parts for irregularities. Replace any parts that are questionable.
- (4) Repress compressor rotor assembly starting with preceding step g.
- o. Check to ensure that assembled rotor length is 16.209 to 16.273 inches (41.171 to 41.333 cm) measured from bearing shoulder of first stage compressor disk assembly to bearing shoulder of rear compressor shaft. (See figure 5-567.)

- p. Remove compressor rotor assembly from press. Remove adapters from compressor rotor.

**5-430. COMPRESSOR ROTOR CONCENTRICITY CHECK (T53-L-15, -701).** Proceed as follows:

- a. Position compressor rotor in gaging fixture (LTCT4719). Lubricate bearing journals with lubricating oil (item 189 or 190, table C-1).
- b. Mark rear face of rear section impeller (43, figure 5-527) at four points, equally spaced.
- c. Using height gage and dial indicator, check concentricity of first, second, third, fourth, and fifth stage compressor rotor spacer lands, OD of centrifugal compressor impeller assembly, seal journals, and rear cone area of rear compressor shaft.
  - (1) Maximum allowable runout of all spacer lands is 0.003 TIR, except that any two spacers may have a runout of up to 0.0033 TIR
  - (2) Maximum allowable runout of centrifugal compressor impeller assembly OD is 0.0035 TIR.
  - (3) Maximum allowable runout on seal journals and rear cone area of rear compressor shaft is 0.002 TIR.
- d. If runout is not within limits, compressor rotor shall be disassembled and reoriented, or parts replace as necessary; to bring runout within limits.

**NOTE**

If concentricities are not within limits, remove material from tips of high blades, using a fine cup file, to match readings of adjacent blades that are within limits.

- e. Mark line with yellow paint from rear stub shaft locking cup slot along length of compressor rotor. Remove all other previous paint markings.
  1. Take end float of power shaft. Record measurement with power shaft in full aft position. Move power shaft to full forward position and record measurement. End float of power shaft shall be 0.370 to 0.620 inch (0.940 to 1.575 cm). If power shaft end float is not within limits, disassemble compressor rotor and investigate.
- g. Using locking tools (LTCT2151, LTCT2152, and LTCT4051), securely stake retainers in two places in bolt and two places in disk. (See view A, figure 5-567.)

**NOTE**

Shearing of locking cup into slots in disk is permissible in order to ensure locking of mating bolt, provided resulting tang is still firmly attached along resulting bend line. If cracks result from shearing, only vertical cracks are allowed.

**5-431. COMPRESSOR ROTOR BALANCING (T53-L-15, -701).** Proceed as follows:

- a. Prepare compressor rotor for balancing as follows:
  - (1) Position compressor rotor in holding fixture (LTCT13001 or LTCT202).
  - (2) Install retaining ring (15, figure 5-527) on rear compressor shaft (56).
  - (3) Lubricate shaft bearing journal with grease (item 166, table C-1). Press rear bearing inner race onto rear compressor shaft, using installing tool (LTCT791).
  - (4) Install impeller on disk assembly (16). Align yellow line on impeller with yellow line on compressor rotor. If there is no yellow line on impeller, mark one.
  - (5) Lubricate shaft bearing journal with shortning compound (item 270, table C-1). Using bearing driver (LTCT3706 or LTCT2137), press bearing (7) onto first stage compressor disk assembly.

**NOTE**

Ensure scribe match lines (V-mark) across the bearing bore are aligned.

- b. Position holding fixture (LTCT4078) and holding fixture (LTCT251) in balancing machine, Model 3S (Gisholt Machine Co.), or equivalent.
- c. Place compressor rotor in cradle and position power shaft so that it rests in holding fixture (LTCT251).

**NOTE**

Be certain that shaft is centered correctly to prevent any unnecessary rubbing.

- d. Close shields of machine. Adjust speed and proceed with balancing.

**NOTE**

To ensure sufficient balancing accuracy, rotate the compressor rotor between 1,000 and 2,000 rpm.

- e. Mark unbalance areas on forward and aft planes, using approved marker.

**NOTE**

The forward (A) plane shall be balanced until angle indication is lost. The aft (B) plane shall be balanced to a maximum of 0.7 inch-gram.

- f. Remove compressor rotor from cradle and place in holding fixture (LTCT13001 or LTCT202).
- g. Remove material, as necessary, from forward radius on rear compressor shaft and inner forward rim of first compressor disk. (See figure 5-567.)

**NOTE**

Do not grind radius of front first stage compressor disk assembly closer than 0.062 inch (0.157 cm) to inner face of blade root channel with a radius of 0.280 inches (0.711 cm) minimum. Do not grind aft into face of disk. Maintain original surface finish (125 rms) and remove all tool marks.

- h. Remove material, as necessary, from rear outside corner of rear compressor shaft (56, figure 5-527).

MATERIAL MAY BE REMOVED TO THIS DIMENSION FOR DYNAMIC BALANCE OF COMPRESSOR ROTOR.

MATERIAL MAY BE REMOVED TO THIS DIMENSION FOR DYNAMIC BALANCE OF COMPRESSOR ROTOR.

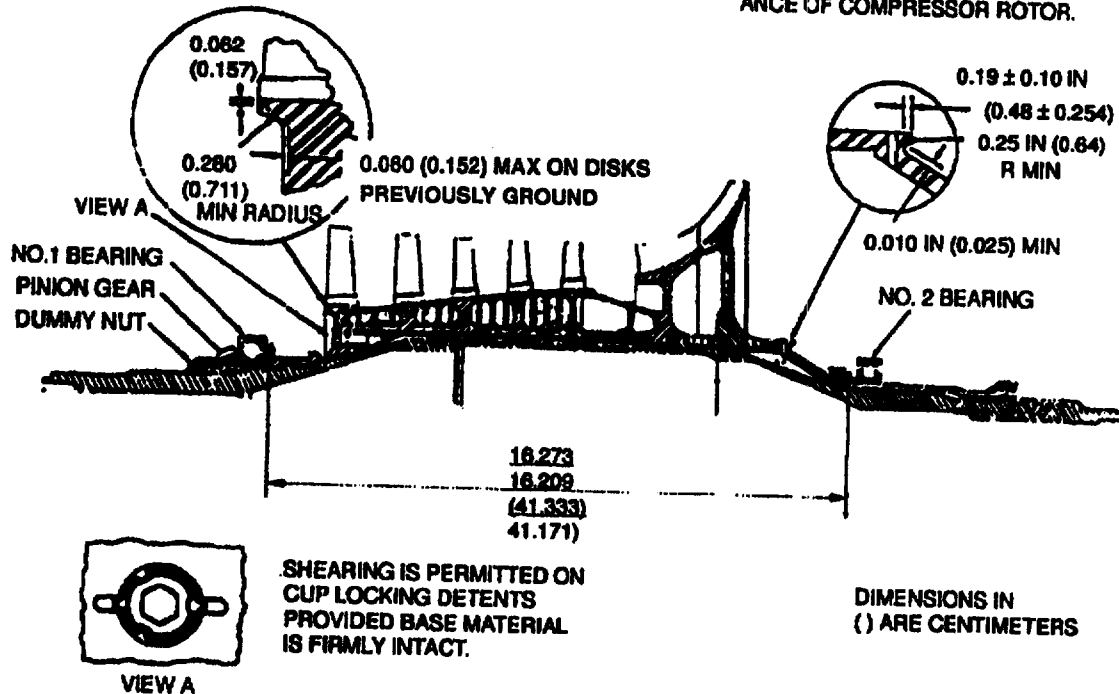


Figure 5-567. Compressor Rotor Length Dimension and Stock Removal Areas.

- I. Position compressor rotor in balancing machine.
- J. Repeat compressor rotor balance check.

#### NOTE

If compressor rotor is still unbalanced, follow procedures outlined in preceding steps c through h.

- k. After balancing, mark all parts to indicate heavy point (with straight line running from front to rear of compressor rotor) with colored ink or paint, except in areas that are contacting surfaces for seals.

#### NOTE

After balancing, the end of compressor rear shaft may be marked by vibropeen mark in lieu of paint or ink marking. The vibropeen mark should be a single radial line on end face of shaft. At next overhaul the old balance mark may be "slashed thru" with another vibropeened line or blended out with crocus cloth.

CHQSOFTWARE.COM

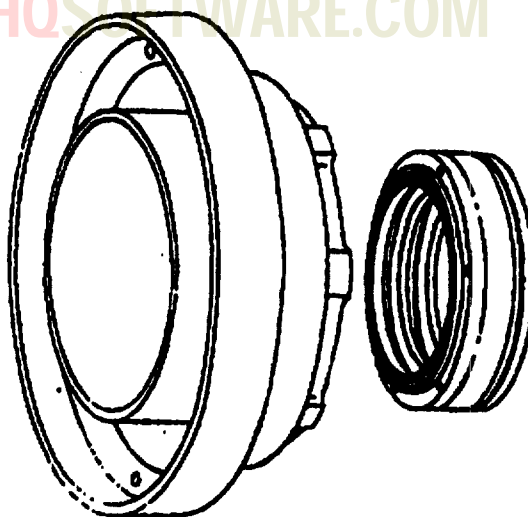


Figure 5-568. Installing Forward Seal.

- l. Remove compressor rotor from balancing machine and place in holding fixture (LTCT2049 or LTCT56).

**NOTE**

Where protective finish is removed, clean the area with dry cleaning solvent (Item 134, table C-1) and spot-paint as outlined in SP No. 6001 in Appendix E.

- m. Using wrench (LTCT4002), break torque on forward nut
- n. Remove compressor rotor from fixture. Remove rear bearing outer race and place compressor rotor in holding fixture (LTCT55), with first stage compressor disk assembly up.
- o. Using puller (LTCT483), remove bearing (7). Remove impeller from first stage compressor disk assembly.
- p. Remove compressor rotor from fixture and invert.

**CAUTION**

In following step q, to prevent damage to bearing, do not pull on bearing cage. Rotate cage while pulling bearing in order to assure complete freedom.

- q. Install puller (LTCT4809) on rear bearing. Remove bearing from rear compressor shaft.
  - r. Remove forward bearing impeller from rear compressor shaft.
  - s. Wash bearing with lubricating oil (Item 189 or 190, table C-1) and wrap with protective covering.
- 5-432. FINAL REASSEMBLY OF COMPRESSOR ROTOR ASSEMBLY (T53-L-15, -701).** Proceed as follows:
- a. Install packing (14, figure 5-527) on OD of seal (13). Heat seal housing (12) to 250°F (121°C) and using suitable sleeve and arbor press, press seal and packing into housing (12).

**CAUTION**

In following step b, to prevent possible axial seal movement, ensure that retaining ring (15) is seated properly.

**NOTE**

Install seal so that grooved face and screws are toward the front of the engine, and the seal part number is toward the rear. (See figure 5-568.)

- b. Secure seal with retaining ring (15, figure 5-527).
- c. Position seal housing assembly (11) onto disk assembly (16) and install impeller (10).
- d. Install front bearing housing (6) in holding fixture (LTCT4713).
- e. Using suitable drift and arbor press, press bearing (7) into bearing housing.

**NOTE**

Ensure scribe match lines (V-mark) across the bearing bore are aligned.

- f. Install front bearing locking cup (8) and nut (9) into bearing housing.
- g. Tighten nut to 75 to 125 pound-feet (111.615 to 186.02 kg m) torque, using wrench (LTCT487). Locate slots in nut with slots in cup and lock nut by deforming cup into slots, 180 degrees apart. Do not shear cup. Install two guide pins into housing (12) and, using suitable installing tool, press bearing housing assembly (5) onto seal housing.
- h. Install shim (4) of same thickness as the one removed during disassembly. (Refer to paragraph 5-423.)
- i. Install pinion gear (3) on first stage compressor disk assembly (16).
- j. Vacuum-test nut and seal assembly (1) as follows:
  - (1) Install nut and seal assembly (1), hand-tight, on base of seal leakage test fixture (LTCT11365).
  - (2) Connect vacuum line, from seal leakage tester (LTCT13606) to fitting on seal testing fixture, hand-tight.
  - (3) Activate vacuum pump until vacuum gage readings stabilize, and hold for 15 seconds minimum.
  - (4) If vacuum gage readings are lower than 18 inches Hg, remove nut and seal assembly from test fixture and clean using acetone (item 13, table C-1), and repeat preceding steps (1) through (3). If, after cleaning, vacuum gage readings remain lower than 18 inches Hg, replace nut and seal assembly.
  - (5) If vacuum gage readings are 18 inches Hg or higher, remove nut and seal assembly from test fixture and proceed with step k.
- k. Install locking cup (2) and nut and seal assembly (1). Using socket wrench (LTCT4002) and support assembly (LTCT911), tighten nut and seal assembly to 320 pound-feet torque.

**NOTE**

During final engine reassembly, shim (4) behind pinion gear (3) may have to be changed to correct the gear pattern.

**5-433. FUNCTIONAL TEST.** Functional test is not required.

**5-434. COMPRESSOR ROTOR ASSEMBLY (T53-L-13B, -701A, -703).**

**5-435. DISASSEMBLY.** Proceed as follows:

- a. Position compressor rotor assembly in holding fixture (LTCT13001).

**CAUTION**

To prevent damage, handle power shaft carefully during disassembly of compressor rotor assembly.

- b. Using socket wrench (LTCT4002), remove seal assembly (1, figure 5-569) and cup (2).
- c. Using puller (LTCT2027), remove gear (3).
- d. Remove shim (4) and record thickness.
- e. Use puller (LTCT14716) to remove bearing housing assembly (5) and seal housing assembly (12) as follows:
  - (1) Engage legs of puller with flange of seal housing assembly (12).
  - (2) Remove bearing housing assembly (5) and seal housing assembly (12).
  - (3) Remove puller.
- f. Using jackscrew, separate bearing housing assembly (5) from seal housing assembly (12). Remove faceplate (10).



CHQSOFTWARE.COM

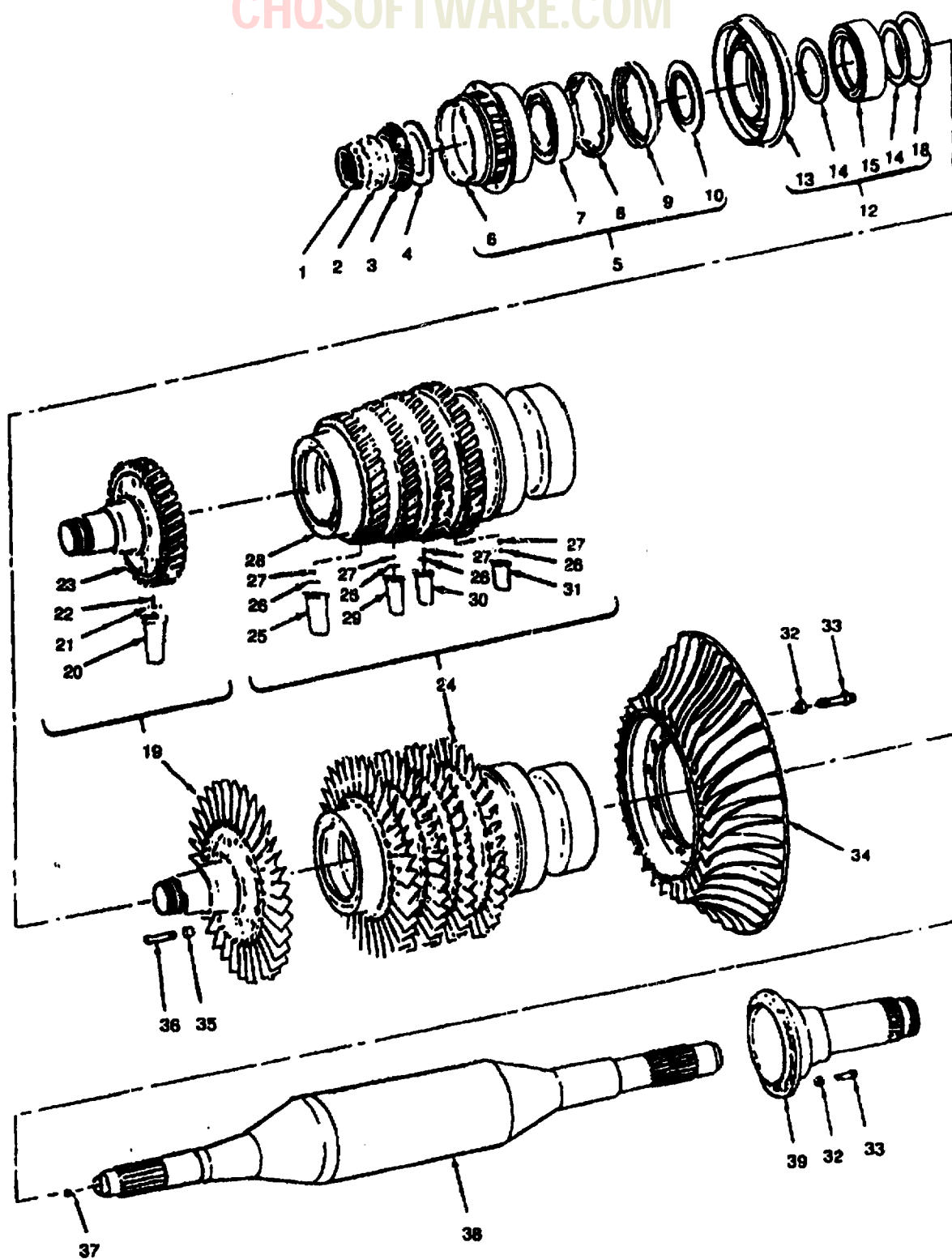


Figure 5-569. Compressor Rotor Assembly (T53-L-13B, -701A, -703).

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-569	No Number	* COMPRESSOR ROTOR ASSEMBLY (NHA 1-000-060-10, 1-000-060-22, 1-000-060-23, 1-000-110-03, and 1-000-110-07)	Ref	A,B,E
-1	B30-800956	. SEAL ASSEMBLY (24981) (Lycoming Source Cont Dwg 1-300-077-01)	1	A,B,E
	C107800	. SEAL ASSEMBLY (71840) (Alternate) (Lycoming Source Cont Dwg 1-300-077-02)	1	A,B,E
-2	1-100-276-01	. CUP, Locking	1	A,B,E
-3	1-100-212-01	. GEAR, Pinion, accessory drive	1	A,B,E
-4	1-100-213-02	. SHIM, Accessory drive gear, 0.0230-0.0259 inch thick	AR	A,B,E
	1-100-213-03	. SHIM, Accessory drive gear, 0.0260-0.0289 inch thick	AR	A,B,E
	1-100-213-04	. SHIM, Accessory drive gear, 0.0290-0.0319 inch thick	AR	A,B,E
	1-100-213-05	. SHIM, Accessory drive gear, 0.0320-0.0349 inch thick	AR	A,B,E
	1-100-213-06	. SHIM, Accessory drive gear, 0.0350-0.0379 inch thick	AR	A,B,E
	1-100-213-07	. SHIM, Accessory drive gear, 0.0380-0.0409 inch thick	AR	A,B,E
	1-100-213-08	. SHIM, Accessory drive gear, 0.0410-0.0439 inch thick	AR	A,B,E
	1-100-213-09	. SHIM, Accessory drive gear, 0.0440-0.0469 inch thick	AR	A,B,E
	1-100-213-10	. SHIM, Accessory drive gear, 0.0470-0.0499 inch thick	AR	A,B,E
	1-100-213-11	. SHIM, Accessory drive gear, 0.0500-0.0529 inch thick	AR	A,B,E
	1-100-213-12	. SHIM, Accessory drive gear, 0.0530-0.0559 inch thick	AR	A,B,E
	1-100-213-13	. SHIM, Accessory drive gear, 0.0560-0.0589 inch thick	AR	A,B,E

\* Compressor rotor assembly, P/N 1-101-510-04, is usable on T53-L-13B, -701A and -703 engines.  
Compressor rotor assembly, P/N 1-100-720-47 (without the gas producer rotors), is usable on the T53-L-703 engine.

Figure & Index Number	Part Number	Description 1 2 3 4 5 6 7	Qty Per Assy	Usable on Code
5-569-4 (cont)	1-100-213-14	. SHIM, Accessory drive gear, 0.590-0.0619 inch thick	AR	A,B,E
	1-100-213-15	. SHIM, Accessory drive gear, 0.0620-0.0649 inch thick	AR	A,B,E
	1-100-213-16	. SHIM, Accessory drive gear 0.0200-0.0229 inch thick	AR	A,B,E
	1-100-213-17	. SHIM, Accessory drive gear, 0.0170-0.0199 inch thick	AR	A,B,E
	1-100-213-18	. SHIM, Accessory drive gear, 0.0140-0.0169 inch thick	AR	A,B,E
	1-100-213-19	. SHIM, Accessory drive gear, 0.0110-0.0139 inch thick	AR	A,B,E
	1-100-213-20	. SHIM, Accessory drive gear, 0.0650-0.0679 inch thick	AR	A,B,E
	1-100-213-21	. SHIM, Accessory drive gear, 0.0680-0.0709 inch thick	AR	A,B,E
	-5 No Number	. BEARING HOUSING ASSEMBLY (NHA 1-000-060-10, 1-100-720-23, and 1-100-720-40)	1	A,B,E
	-6 1-060-190-01	. . HOUSING, Compressor, front bearing	1	A,B,E
	-7 MM210VM25MBR E7730	. . BEARING, Ball (21335) (Lycoming Source Cont Dwg 1-300-015-04)	1	A,B,E
	V3210RS5470	. . BEARING, Ball (43334) (Alternate) (Lycoming Source Cont Dwg 1-300-015-02)	1	A,B,E
	-8 1-060-125-01	. . CUP, Locking, front bearing	1	A,B,E
	-9 1-060-126-01	. . NUT, Spanner, front bearing	1	A,B,E
	-10 1-300-588-01	. . FACE PLATE	1	A,B,E
	-11 Deleted			
	-12 No Number	. SEAL HOUSING ASSEMBLY (NHA 1-100-060-10)	1	A,B,E
	-13 1-060-127-04	. . HOUSING SEAL	1	A,B,E
	-14 No Number	. . SHIM,	1	A,B,E
	-15 1-300-585-01/02	. . FACE SEAL	1	A,B,E
	-16 Deleted			
	-17 Deleted			
	-18 RR325L	. . RING, Retaining (80756) (Lycoming Spec Cont Dwg 1-300-047-01)	1	A,B,E
	-19 1-101-080-01	. . SHAFT ASSEMBLY, Front (Replace with 1-101-080-06)	1	A,B,E

Figure & Index Number	Part Number	Description						Qty Per Assy	Usable on Code
		1	2	3	4	5	6		
5-569-19 (cont)	1-101-080-04	.. SHAFT ASSEMBLY Front (Replace with 1-101-080-06)						1	A,B,E
	1-101-080-05	.. SHAFT ASSEMBLY, Front (Replace with 1-101-080-06)						1	A,B,E
	1-101-080-06	.. SHAFT ASSEMBLY Front						1	A,B,E
-20	1-100-361-06	... BLADE, Transonic Compressor, first stage						31	A,B,E
	1-100-361-05	... BLADE SET, Spare compressor first stage (Make from 1-100-361-06) (For field replacement) 6						AR	A,B,E
-21	1-100-505-02	... PLATE, Locking, compressor rotor blade						AR	A,B,E
-22	1-300-268-01	... PIN, Spring (Replace with 1-300-268-02)						31	A,B,E
	1-300-268-02	... PIN, Spring						31	A,B,E
-23	1-100-495-03	... SHAFT, Front (Replace with 1-100-495-07)						1	A,B,E
	1-100-495-07	... SHAFT Front						1	A,B,E
-24	1-101-090-01	.. ROTOR SUB-ASSEMBLY Compressor (Replace with 1-101-090-06/07)						1	A,B,E
	1-101-090-06	.. ROTOR SUB-ASSEMBLY Compressor						1	A,B,E
	1-101-090-07	.. ROTOR SUB-ASSEMBLY Compressor						1	A,B,E
-25	1-100-286-09	... BLADE, Transonic compressor, second stage						34	A,B,E
	1-100-286-08	... BLADE SET Spare, compressor, second stage (Make from 1-100-286-09) (For field replacement) 9						AR	A,B,E
-26	1-100-505-02	... PLATE, Locking, compressor rotor blade						AR	A,B,E
-27	1-300-268-01	... PIN, Spring (Replace with 1-300-268-02)						142	A,B,E
	1-300-268-02	... PIN, Spring						142	A,B,E
-28	1-101-250-03	... ROTOR, Compressor assembly						1	A,B,E
	1-101-250-04	... ROTOR, Compressor assembly						1	A,B,E
-29	1-100-383-05	... BLADE, Compressor rotor third stage						34	A,B,E
	1-100-383-04	... BLADE Set, Spare, Compressor rotor third stage (Make from 1-100-383-05) (For field replacement)						AR	A,B,E
-30	1-100-384-05	... BLADE, Compressor rotor, fourth stage						36	A,B,E
	1-100-384-04	... BLADE Set, Spare, Compressor rotor, fourth stage (Make from 1-100-384-05) (For field replacement)						AR	A,B,E
-31	1-100-385-05	... BLADE, Compressor rotor, fifth stage						38	A,B,E
	1-100-385-04	... BLADE Set, Spare, Compressor rotor, fifth stage (Make from 1-100-385-05) (For field replacement)						AR	A,B,E
-32	1-100-148-01	... WASHER, Cup, lock						28	A,B,E

Figure & Index Number	Part Number	Description 1 2 3 4 5 6 7	Qty Per Assy	Usable on Code
5-569-33 (cont)	1-100-502-02	. . . BOLT Double hexagon, extended washer head	28	A,B,E
-34	1-100-078-03	. IMPELLER, Centrifugal compressor, Interstage bleed (Replace with 1-100-078-09)	1	A,B,E
	1-100-078-09	. IMPELLER, Centrifugal compressor, Interstage bleed (Replace with 1-100-078-07)	1	A,B,E
	1-100-078-07	. IMPELLER, Centrifugal compressor, Interstage bleed	1	A,B,E
-35	1-080-028-02	. RETAINER, Bolt	10	A,B,E
-36	1-100-506-02	. . SCREW, Cap, socket head	10	A,B,E
-37	1-100-344-01	. . PLUG, Power shaft	1	A,B,E
-38	1-100-800-04	. . SHAFT, Power	1	A,B,E
-39	1-100-501-01	. . SHAFT, Rear compressor	1	A,B,E

g. Secure bearing housing assembly in holding fixture (LTCT4713), forward end down. Straighten cup (8) and, using wrench (LTCT487), remove nut (9) and cup.

h. Using suitable drift and mallet, gently tap bearing (7) from front bearing housing (6).

i. Remove retaining ring (18) from seal housing (13).

j. Use a suitable adapter and arbor press to press out face seal (15) and shims (14) from seal housing (13). Remove compressor rotor assembly from holding fixture (LTCT13001).

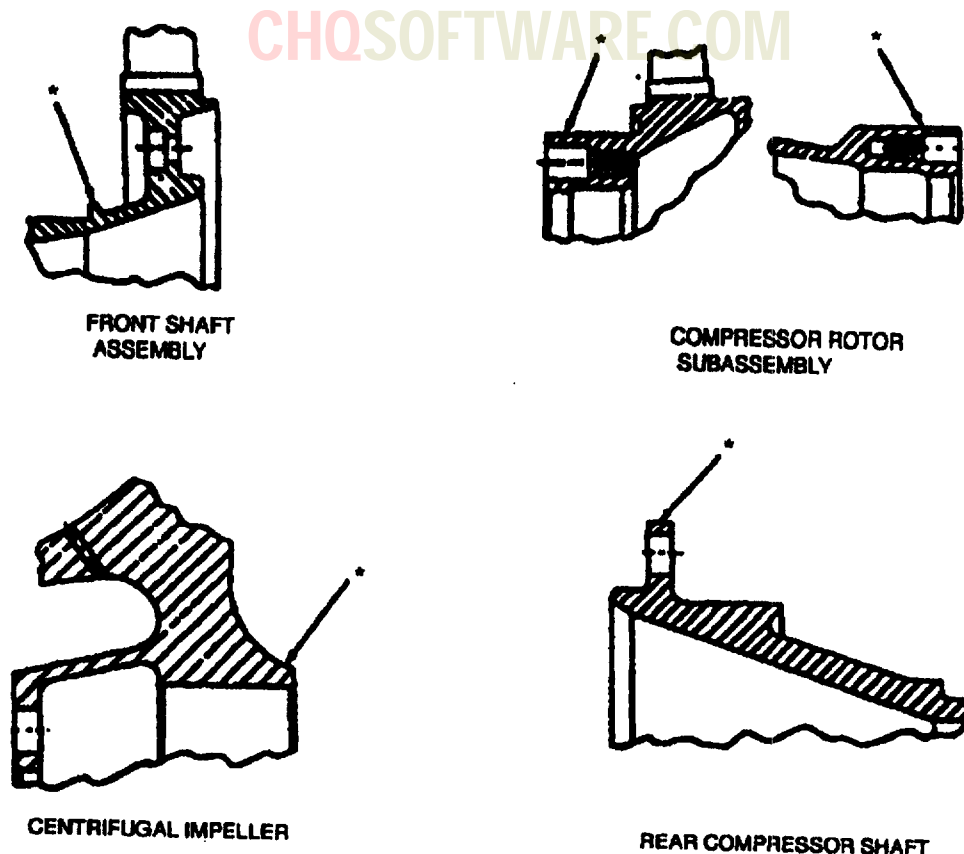
k. Position compressor rotor assembly, rear stub shaft down, in wrench base assembly (LTCT2147).

l. Using punch, break tabs on bolt retainers (35).

m. Index component parts of compressor rotor assembly by vibropeening the letter "O" axially aligned in areas indicated in figure 5-570.

#### NOTE

When necessary to reposition the front shaft, rear shaft, or impeller to correct unbalance and/or runout, obliterate the letter "O" by vibropeening an "X" over it and reindexing as outlined in step m.



\*VIBROPEEN THE LETTER "O" IN THIS AREA

**Figure 5-570. Index Mark Locations on Compressor Rotor.**

- n. Loosen but do not remove screws (36).
- o. Position compressor rotor assembly, front stub shaft down, in holding fixture (LTCT6641).
- p. Remove bolts (33) and washers (32), and remove rear compressor shaft (39) using jackscrews.
- q. Slide power shaft (38) aft out of compressor rotor subassembly (24).

#### NOTE

Do not remove plug (37) unless necessary; If it is necessary to remove plug, use a suitable brass rod from opposite end of power shaft and drive plug out.

- r. Remove bolts (33) and washers (32), and remove impeller (34) using jackscrews.
- s. Remove compressor rotor assembly from holding fixture (LTCT6641) and install into holding fixture (LTCT13001). Remove eight screws (36) and bolt retainers (35) and slacken two remaining screws enough to allow separating front shaft assembly (19) from compressor rotor subassembly (24).

#### NOTE

The two slack screws prevent front shaft assembly from falling.

- t. Using two separator tools (LTCT197), separate front shaft assembly (19) from compressor rotor subassembly (24).
- u. Remove two screws (36), two bolt retainer (35), and front shaft assembly.

**5-436. CLEANING.** Refer to paragraph 5-424 for cleaning.

**5-437. INSPECTION.** Inspect as per table 5-169.

**5-438. REPAIR.** Proceed as follows:

a. Replace defective carbon ring in seal assembly (1, figure 5-569) as follows: (See figure 5-539.)

(1) Bend back retaining tags on seal housing.

**NOTE**

It may be necessary to slightly bend back other tangs to assist in removal of the front seal housing.

(2) Remove front seal housing, taking care not to score or in any way mark the rear face of the front seal housing or forward face of the nut component.

(3) Remove defective carbon seal and replace with new seal, P/N 980956, for seal assembly (1-300-077-01), or new seal, P/N 107800-2, or seal assembly (1-300-077-02).

(4) Clean nut and seal metal components using acetone (item 13, table C-1),

(5) Inspect rear face of front seal housing. Face must be entirely free of nicks, scratches, and tool marks and present a smooth flat surface.

Table 5-169. Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-53 5	Sleeve	Visual	Loss of protective surface finish (black oxide)	Repair. (Refer to SP No. 6003 in Appendix E).
		Visual and Magnetic-Particle. (Refer to table 5-170)	Cracks	Not allowed. Replace.
		Dimensional	Wear (Refer to table 5-171)	Replace if limits are not met.
6	Shim	Visual	Damaged surface coating (black oxide)	Repair (Refer to SP No. 6003 in Appendix E).
5-569 1	Seal Assembly	Visual	Cracks	Not allowed. Replace.
<b>WARNING</b> <b>FLIGHT SAFETY PARTS</b> Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.				
3	Gear	Visual and Magnetic-Particle. (Refer to table 5-170)	Cracks	Not allowed. Replace.
<b>WARNING</b> <b>FLIGHT SAFETY PARTS</b> Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.				
<b>WARNING</b> <b>FLIGHT SAFETY PARTS</b> The following dimensional inspection is flight safety critical.				
6	Front Bearing Housing	Visual and SIE	Worn 3.5432 to 3.5436 inch (8.9997 to 9.0007 cm) diameter	Repair (Refer to paragraph 5-438).
			Worn 5.1882 to 5.1885 inch (13.1780 to 13.1788 cm) diameter	Repair (Refer to paragraph 5-438).
			Worn 1.299 to 1.302 inch (3.299 to 3.307 cm) diameter	Repair (Refer to paragraph 5-438).
			Worn 3.9696 to 3.9700 inch (10.0828 to 10.0838 cm) diameter	Repair (Refer to paragraph 5-438).



**Table 5-169. Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
6 (cont)	Front Bearing Housing (cont)	Visual  Visual and Magnetic-Particle. (Refer to table 5-170) Dimensional	Nicks, burrs, or scratches  Damaged threads  Cracks  Wear. (Refer to table 5-171)	Repair (Refer to SP No. 5000 in Appendix E).  Repair or replace. (Refer to SP No. 5007 in Appendix E). Not allowed. Replace.  Repair or replace. (Refer to paragraph 5-438).
<b>WARNING</b> <b>FLIGHT SAFETY PARTS</b>				
<b>Verification of the bore diameter of the following part is flight safety critical.</b>				
7	Bearing	Visual Dimensional	Damaged bearing. Wear. (Refer to table 5-172)	Not allowed. Replace. Replace if limits are not met.
10	Faceplate	Visual  Visual and Magnetic-Particle. (Refer to table 5-170) Visual and SIE	Nicks and scratches on face C of figure 5-572 Parallelism and squareness of surfaces of figure 5-572. Cracks  Wear. (Refer to table 5-171)	Repair (Refer to paragraph 5-438). Replace if limits are not met. Not allowed. Replace.  Replace if limits cannot be met.
13	Seal Housing	Visual  Visual and SIE  Visual and Magnetic-Particle. (Refer to table 5-170) Dimensional	Loss of protective surface finish (black oxide)  Worn 3.249 to 3.250 inch (8.252 to 8.255 cm) diameter, 5.1886 inch (13.1778 cm) diameter, and 0.002 to 0.004 inch (0.005 to 0.010 cm) dimension Cracks  Wear and fits. (Refer to table 5-171)	Repair. (Refer to SP No. 6003 in Appendix E). Repair (Refer to paragraph 5-438).  Not allowed. Replace.  Replace if limits are not met.


**Table 5-169. Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-569 15	Seal	Visual Dimensional	Cracks Wear and fit. (Refer to table 5-173)	Not allowed. Replace Replace if limits are not met. (Refer to paragraph 5-438).
<p style="text-align: center;"><b>WARNING</b></p> <p style="text-align: center;"><b>FLIGHT SAFETY PARTS</b></p> <p><b>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</b></p>				
19	Front Shaft Assembly	Visual  Visual and 7-power magnifying glass  Visual and SIE   Visual and Fluorescent-Penetrant. Dimensional	Seal tracking coke, varnish, and carbon deposits on seal journal. (T53-L-701A)  Eroded front shaft assembly blades Nicks, burrs, pits, dents, and other foreign object damage on blades Blades protruding more than 0.015 inch (0.038 cm) from front or rear face of disk Sand and dust erosion on blades. (Refer to table 5-174) Cracks in blades or disk shaft Wear and fits. (Refer to table 5-171)	Repairs (Refer to paragraph 5-438).  Repair. (Refer to paragraph 5-438). Repair. (Refer to paragraph 5-438). Repair. (Refer to paragraph 5-438). Replace of limits cannot be met. Not allowed. Replace. (Refer to paragraphs 5-439 and/or 5-440). Replace if limits cannot be met.
<p style="text-align: center;"><b>WARNING</b></p> <p style="text-align: center;"><b>FLIGHT SAFETY PARTS</b></p> <p><b>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</b></p>				
23	Front Compressor Rotor Shaft	Visual and SIE	Grooves on 1.481 to 1.483 inch (3.762 to 3.767 cm) ID. (Refer to table 5-174)  Worn, crazed, or scored 2.4360 to 2.4365 inch (6.1874 to 6.1887 cm) diameter seal area on shaft 1-101-080-01 and 1.9685 to 1.9687 inch (5.0000 to 5.0005 cm) diameter bearing journal	Replace if limits cannot be met.  Repair. (Refer to paragraph 5-438).

**Table 5-169. Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-569  23 (cont)			<p>Worn 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter pin hole (T53-L-701A)</p> <p>Runout beyond acceptable limits. (Refer to table 5-165) (T53-L-701A)</p> <p>Worn or damaged chrome surface in seal area (2.4360 to 2.4265 inch (6.1874 to 6.1887 cm) and bearing journal (1.9687 to 1.9685 inch (5.0005 to 5.0000 cm)). (See figure 5-534.) (T53-L-701A)</p> <p>Below minimum dimension (4.4180 inch (11.2217 cm) on spacer seating area. (See figure 5-534.) (T53-L-701A)</p> <p>Damage to splines resulting from disassembly or improper handling which does not exceed 0.050 inch (0.127 cm) of the spline tooth length are acceptable after repair. Scoring on tooth face is acceptable. Raised material at ends of spline teeth shall be repaired</p> <p>Cracks.</p>	<p>Repair (Refer to paragraph 5-438).</p> <p>Refer to table 5-164 reference 5-527-17.</p> <p>Refer to table 5-164 reference 5-527-17.</p> <p>Refer to table 5-164 reference 5-527-17.</p> <p>Repair (Refer to paragraph 5-426ae).</p> <p>None allowed. Replace.</p>
24		<p>Visual and SIE</p> <p>Visual and Fluorescent-Penetrant</p>		
<p style="text-align: center;"><b>WARNING</b></p> <p style="text-align: center;"><b>FLIGHT SAFETY PARTS</b></p> <p><b>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</b></p>				
	Compressor Rotor Subassembly	Visual	Erosion on third, fourth, and fifth stage (Refer to table 5-174)	Replace if limits are not met. (Refer to paragraphs 5-438 and 5-439).
		Visual and 7 - power magnifying glass	Nicks, burrs, pits, dents, and other foreign objects damage on blades.	Repair or replace if limits are not met. (Refer to paragraphs 5-438 or 5-439.)

Table 5-169. Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-569 24 (cont)		Dimensional  Visual and Fluorescent-Penetrant Visual	Wear and fits. (Refer to table 5-171).  Cracks on blades.  Fourth and fifth stage blades marked  signifying modification.	Repair or replace. (Refer to paragraphs 5-438 or 5-440).  None allowed. Replace.  Replace Blades and pins. (Refer to paragraph 5-439.)
<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</p>				
28	Compressor Rotor Assembly	Visual and SIE	Worn 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter pin holes.	Repair. (Refer to paragraph 5-438)
<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p>Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.</p>				
33	Bolt	Magnetic Particle	Cracks.	None allowed. Replace.
34				
<p style="text-align: center;"><b>WARNING</b> <b>FLIGHT SAFETY PARTS</b></p> <p>Fluorescent penetrant inspection to ensure that the following part is crack-free is flight safety critical.</p>				
	Impeller	Visual	Evidence of rubbing on vane tips. (Refer to table 5-174).	Repair or replace if limits cannot be met. (Refer to paragraph 5-438)
		Visual and SIE	Nicks, dents, burrs on impeller vanes. (Refer to table 5-174). Scoring or damage in blade base area. (Refer to table 5-174).	Repair if limits are not met. (Refer to paragraph 5-438). Repair or replace if limits cannot be met. (Refer to paragraph 5-438)
		Visual and Fluorescent-Penetrant	Erosion on vanes. (Refer to table 5-174). Cracks	Replace if limits are not met. Not allowed. Replace
		Dimensional	Wear and fits. (Refer to table 5-171)	Replace if limits are not met.

**Table 5-169. Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-589				
	<b>WARNING</b> <b>FLIGHT SAFETY PART</b> <b>Visual inspect to ensure that the following part is crack-free is flight safety critical.</b>			
36	Screw	Visual	Cracks	Not allowed. Replace
	<b>WARNING</b> <b>FLIGHT SAFETY PARTS</b> <b>Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.</b>			
38	Power Shaft	Visual	Corrosion discoloration on bearing journals.	Refer to table 5-174
			Discoloration, staining, and varnishing on bearing journals.	Refer to table 5-174
			Galling on bearing journals	Not allowed. Replace
			Grooving on bearing journals	Not allowed. Replace
			Broken power shaft bolt remaining in power shaft	Repair. (Refer to paragraph 5-438)
			Fatigue pitting on bearing journals	Not allowed. Replace
		Visual	Plug on forward end. Plug should be seated for a minimum 0.82 inches below shaft opening.	Replace missing or defective plug.
			Cracks in plated area of journal	Repair (Refer to paragraph 5-438).
		Visual and SIE	Wear or damage in splined areas	Repair or replace. (Refer to SP No. 3009 and paragraph 5-438)
			Wear on 0.05 to 0.09 inch (0.13 to 0.23 cm) shoulder	Refer to table 5-174.
			Frosting on bearing journals	Refer to table 5-174.
			Nicks (isolated) on bearing journals	Refer to table 5-174.
			Scoring (axial) on bearing journals	Refer to table 5-174.
			Scruffs and scratches on bearing journals	Refer to table 5-174.
			Concentricity of pilot diameter if helicoll insert repair has been made in aft end of power shaft	Refer to table 5-174.

Table 5-169. Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-569 38 (Cont)	Power Shaft (Cont)	Model 3S Balancing Machine or Equivalent Visual and Magnetic-Particle (Refer to table 5-170) Dimensional  Visual	Indenting or corrosion pitting on journals	Refer to table 5-174.
			Circumferential marks on power shaft 1.1815 to 1.1830 inch (3.0010 to 3.0048 cm) diameter	Repair (Refer to table 5-174)
			Power shaft out of balance	Repair (Refer to paragraph 5-465)
			Cracks	Not allowed. Replace
			Wear. (Refer to table 5-171)	Repair or replace if limits cannot be met (Refer to paragraph 5-438).
			Corrosion (rust) or missing coating on external surfaces	Repair (Refer to paragraph 5-464).

**WARNING****FLIGHT SAFETY PARTS**

Magnetic particle inspection to ensure that the following part is crack-free is flight safety critical.

39	Rear Compressor Shaft	Visual	Damage to threads	Not allowed. Replace
			Scoring (axial), scratches and scuffs on bearing and cone journals. (Dimensions W, X and Y of figure 5-571).	Refer to table 5-174.
			Discoloration and stains on bearing and cone journals. (Dimensions W, X and Y of figure 5-571).	Refer to table 5-174.
			Scoring, crazing, or damage to chrome on 2.1655 to 2.1658 inch (5.5004 to 5.5011 cm) OD	Repair (Refer to paragraph 5-438)
		Visual SIE	Worn 2.1544 to 2.1551 inch (5.4722 to 5.4740 cm) diameter	Repair (Refer to paragraph 5-438)
			Worn 1.9779 to 1.9786 inch (5.0239 to 5.0256 cm) diameter	Repair (Refer to paragraph 5-438)
		Dimensional	Wear and fits. (Refer to table 5-171)	Replace if limits not met
		Visual and Magnetic-Particle. (Refer to table 5-170)	Cracks	Not allowed. Replace

**Table 5-170. Magnetic Particle Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703).**

FIGURE AND INDEX NO.	NOMENCLATURE	METHOD OF MAGNETIZATION
4-53		
5	Sleeve	Circular, use central conductor at 600 amperes
5-569		
3	Gear	Circular, use central conductor at 800 amperes.
6	Front Bearing Housing	Circular, use central conductor at 800 amperes.
10	Faceplate	Circular, use central conductor at 600 amperes.
13	Seal Housing	Circular, use central conductor at 1000 amperes.
33	Bolt	Longitudinal at 5000 ampere - turns.
38	Power Shaft	Circular, use direct contact at 1500 amperes. Longitudinal at 7500 ampere-turns.
39	Rear Compressor Shaft	Circular, use central conductor at 1200 amperes.

Table 5-171. Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.
			MIN	MAX	MIN	MAX	MIN	MAX	
Sleeve	4-53	ID	3.9786 (10.1056)	3.9790 (10.1067)	3.9786 (10.1056)	3.9792 (10.1072)	0.0086L (0.0218)	0.0096L (0.0244)	5-571 A
to									
Front Bearing Housing	6	OD	3.9696 (10.0828)	3.9700 (10.0838)	3.9696 (10.0828)	3.9700 (10.0838)			B
Sleeve	5	OD	5.1882 (13.1780)	5.1885 (13.1778)	5.1881 (13.1778)	5.1885 (13.1788)			C
to									
Seal Housing	5-569	ID	5.1881 (13.1778)	5.1886 (13.1790)	5.1881 (13.1778)	5.1887 (13.1793)	0.0004T (0.0010)	0.0006L (0.0015)	D
<b>WARNING</b>									
<b>FLIGHT SAFETY PARTS</b>									
Verification of the 3.5432-3.5436 blueprint (3.5432-3.5438 overhaul) dimensions is flight safety critical.									
Front Bearing Housing	6	ID	3.5432 (8.9997)	3.5436 (9.0007)	3.5432 (8.9997)	3.5438 (9.0013)			E
to									
Bearing	7	OD	3.5430 (8.9992)	3.5433 (9.0000)	3.5430 (8.9992)	3.5433 (9.0000)			
to									
Front Bearing Housing	5-569	OD	5.1882 (13.1780)	5.1885 (13.1788)	5.1881 (13.1778)	5.1885 (13.1788)	0.0001T (0.0003)	0.0008L (0.0020)	5-571 F
to									
Seal Housing	13	ID	5.1881 (13.1778)	5.1886 (13.1790)	5.1881 (13.1778)	5.1887 (13.1793)	0.0004T (0.0010)	0.0006L (0.0015)	D

\*\*\*\* See Notes on last page of table.



Table 5-171. Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.	
			MIN	MAX	MIN	MAX	MIN	MAX		
Faceplate  to	5-569 10	ID	1.970 (5.004)	1.972 (5.009)	1.970 (5.004)	1.972 (5.009)	0.0013L (0.0033)	0.0035L (0.0089)	5-571 G	
			<div>WARNING</div> <div>FLIGHT SAFETY PARTS</div> <div>The following dimensional inspection is flight safety critical.</div> <div>OD 1.9685 1.9687 1.9683 1.9687 (5.0000) (5.0005) (4.9995) (5.0005)</div>							
Front Compressor Rotor Shaft (T53-L-13B, -703)	23	OD	<div>WARNING</div> <div>FLIGHT SAFETY PARTS</div> <div>The following dimensional inspection is flight safety critical.</div>							H
Front Shaft Assem- bly (T53-L-701A)	19	OD	1.9685 (5.0000)	1.9687 (5.0005)	1.9683 (4.9995)	1.9687 (5.0005)	0.0003L (0.0008)	0.0015L (0.0038)	S	
			<div>WARNING</div> <div>FLIGHT SAFETY PARTS</div> <div>The following dimensional inspection is flight safety critical.</div>							

\*\*\*\* See Notes on last page of table.

Table 5-171. Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).

Dimensional Inspection of Compressor Rotor Assembly (T53-L-13B, -701A, -703) (Continued).										
NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG & DIM.	
	5-569		MIN	MAX	MIN	MAX	MIN	MAX	5-571	
Front Shaft Assembly to	19	OD	WARNING							J
			FLIGHT SAFETY PARTS							
			The following dimensional inspection is flight safety critical.							
			3.3010 (8.3845)	3.3017 (8.3863)	3.3010 (8.3845)	3.3017 (8.3863)	0.0015T (0.0038)	0.0005T (0.0013)		
Compressor Rotor Subassembly	24	ID	WARNING							K
			FLIGHT SAFETY PARTS							
			Verification of the 3.3000-3.3006 blueprint (3.3000-3.3006 overhaul) dimension is flight safety critical.							
			3.3000 (8.3820)	3.3006 (8.3835)	3.3000 (8.3820)	3.3006 (8.3835)				
Compressor Rotor Sub-assembly to	24	OD	WARNING							L
			FLIGHT SAFETY PARTS							
			Verification of the 4.8694-4.8700 dimension is flight safety critical.							
			4.8705 (12.3711)	4.8709 (12.3721)	4.8705 (12.3711)	4.8709 (12.3721)	0.0005T (0.0013)	0.0015T (0.0038)		
Impeller	34	ID	WARNING							M
			FLIGHT SAFETY PARTS							
			Verification of the 4.8694-4.8700 dimension is flight safety critical.							
			4.8694 (12.3683)	4.8700 (12.3698)	4.8694 (12.3683)	4.8700 (12.3698)				
Compressor Rotor Subassembly to	24	ID	WARNING							N
			FLIGHT SAFETY PARTS							
			Verification of the 3.7500-3.7504 dimension is flight safety critical.							
			3.7500 (9.5250)	3.7504 (9.5260)	3.7500 (9.5250)	3.7504 (9.5260)	0.003T (0.008)	0.002T (0.005)		

\*\*\*\* See Notes on last page of table.

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527 -31 (cont)          36	Disk Assembly (Fourth Stage Compressor Rotor (cont)	Visual	Loss of protective surface finish.	Repair. (Refer to paragraph 5-426)
		Visual and SIE	Worn 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter pin hole in disk.	Repair. (Refer to paragraph 5-426)
			Hub runouts beyond acceptable limits. (Refer to table 5-165)	Repair. (Refer to paragraph 5-426)
			Blade tip shake.	Not allowed. Replace locking plates or blades. (Refer to paragraph 5-427)
			Blades protruding more than 0.015 inch (0.038 cm) from front or rear face of disk.	Repair. (Refer to paragraph 5-426)
	Disk Assembly (Fifth Stage Compressor Rotor)	SIE and 7 - power magnifying glass	Nicks, burrs, pits, dents, and other foreign objects damage on blades. (See figure 5-538)	Repair or replace blades if limits are not met. (Refer to paragraph 5-426)
		Visual and Fluorescent-Penetrant.	Cracks in disks of blades.	Not allowed. Replace.
		Dimensional	Wear and fits. (Refer to table 5-164)	Replace if limits cannot be met.
		Visual	Erosion on blades. (Refer to table 5-165)	Replace blades if limits are not met. (Refer to paragraph 5-426)
		Visual and SIE	Hub runout beyond acceptable limits. (Refer to table 5-165)	Repair. (Refer to paragraph 5-426)
			Blades tip shake.	Not allowed. Replace blades. (Refer to paragraph 5-427)
			Blades protruding more than 0.015 inch (0.038 cm) from front or rear face of disk.	Repair. (Refer to paragraph 5-426)
		SIE and 7 - power magnifying glass	Nicks, burrs, pits, dents, and other foreign objects damage on blades. (See figure 5-538)	Repair or replace blades if limits are not met. (Refer to paragraph 5-426)

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527				
36 (cont)	Disk Assembly (Fifth Stage Compressor Rotor)	Visual and Fluorescent-Penetrant	Cracks in disks or blades.	Not allowed. Replace.
		Dimensional	Wear and fits. (Refer to table 5-164)	Replace if limits cannot be met.
37	Disk (Fifth Stage Compressor Rotor)	Visual	Loss of protective surface finish.	Repair. (Refer to paragraph 5-426)
		Visual and SIE	Defective pilot diameter. (Refer to table 5-165)	Repair or replace if limits cannot be met. (Refer to paragraph 5-426)
41	Centrifugal Compressor Impeller Assembly	Visual	Evidence of rubbing on vane tips. (Refer to table 5-165)	Repair or replace if limits cannot be met. (Refer to paragraph 5-426)
		Visual and SIE	Nicks, dents, and burrs. (Refer to table 5-165)	Repair or replace if limits cannot be met. (Refer to paragraph 5-426)
			Erosion on vanes. (Refer to table 5-165)	Replace if limits cannot be met.
		Dimensional	Wear and fits. (Refer to table 5-164)	Replace if limits cannot be met.
43	Rear Section Impeller	Visual and Fluorescent-Penetrant	Cracks.	Not allowed. Replace.
44	Forward Section Impeller	Visual and Fluorescent-Penetrant Seal	Cracks.	Not allowed. Replace.
45	Seal	Visual	Rubs of damaged lands	Not allowed. Replace
46	Fifth Stage Compressor Rotor Spacer	Visual	Plated areas scored beyond 0.004 inch (0.010 cm)	Repair. (Refer to paragraph 5-426)
		Visual and SIE	Wear or damage to parallelism.	Repair. (Refer to paragraph 5-426)
		Visual and Fluorescent-Penetrant	Cracks.	Not allowed. Replace.
		Dimensional	Wear and fits. (Refer to table 5-164 and table 5-165)	Repair or replace if limits cannot be met. (Refer to paragraph 5-426)
47, 48, 49, and 50	First Through Fourth Stage Compressor Rotor Spacers	Visual	Loss of protective surface finish.	Repair. (Refer to paragraph 5-426)
		Visual and SIE	Scoring on lands exceeding 0.004 inch (0.010 cm) in depth.	Repair. (Refer to SP No. 6014 in Appendix E)

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527	First Through Fourth Stage Compressor Rotor Spacers (cont)	Visual and Magnetic-Particle	Cracks.	Not allowed. Replace.
47, 48, 49, and 50 (cont)		Dimensional	Wear and fits. (Refer to table 5-164)	Replace if limits are not met.
52	Screw	Visual	Cracks	Not allowed. Replace.
53	Compressor Rotor Sleeve	Visual	Loss of protective surface finish (phosphate).	Repair. (Refer to SP No. 6012 in Appendix E)
		Visual and SIE	Crossed, stripped, or worn threads.	Repair. (Refer to SP No. 5007 in Appendix E)
		Visual and Magnetic-Particle.	Cracks.	Not allowed. Replace.
		Dimensional	Wear and fits. (Refer to table 5-164)	Replace if limits are not met.
55	Power Shaft	Visual	Broken power shaft bolt remaining in power shaft.	Repair. (Refer to paragraph 5-426)
			Discoloration, staining, and varnishing on bearing journals. (Refer to table 5-165)	Replace if limits are not met.
			Galling or bearing journals.	Not allowed. Replace.
			Grooving on bearing journals.	Not allowed. Replace.
			Fatigue pitting on bearing journals.	Not allowed. Replace.
			Cracks in plated area of journal.	Repair. (Refer to paragraph 5-426)
			Banding on bearing journals.	Acceptable.
			Corrosion discoloration on bearing journals. (Refer to table 5-165)	Clean. (Refer to paragraph 5-426)
			Wear or damage in splines areas.	Repair. (Refer to paragraph 5-426)
			Wear on 0.05 to 0.09 inch (0.13 to 0.23 cm) shoulder. (Refer to table 5-165)	Replace if limits cannot be met.
		Visual and SIE		

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527 55 (cont)	Power Shaft (cont)	Visual and SIE	Frosting on bearing journals. (Refer to table 5-165)	Replace if limits are not met.
			Nicks (isolated) on bearing journals (Refer to table 5-165)	Replace if limits are not met.
			Scoring (axial) on bearing journals (Refer to table 5-165)	Replace if limits are not met.
			Scuffs and scratches on bearing journals. (Refer to table 5-165)	Replace if limits are not met.
			Corrosion (rust) on external surfaces.	If rust exceeds 20% of total surface area, repair as per paragraph 5-426 y(3). If less than 20%, repair as per paragraph 5-426y(2).
		Visual and SIE	Concentricity of pilot diameter if helicoil insert repair has been made in aft end of power shaft. (Refer to table 5-165)	Replace if limits are not met.
			Indenting or corrosion pitting on bearing journals. (Refer to table 5-165)	Replace if limits are not met.
			Circumferential marks or grooving on power shaft 1.1825 to 1.1830 inch (3.0036 to 3.0048 cm) diameter. (Refer to table 5-165)	Repair. (Refer to paragraph 5-426)
		Visual and Magnetic-Particle Dimensional	Cracks.	Not allowed. Replace.
			Wear and (Refer to table 5-164)	Repair or replace if limits cannot be met. (Refer to paragraph 5-426)
		Balancing Machine, Model 3S, or equivalent	Out of balance.	Replace if limits cannot be met. (Refer to paragraph 5-465)

**Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527 56	Rear Compressor Shaft	Visual	Damaged threads.	Repair or replace. (Refer to SP No. 5007 in Appendix E)
			Scoring, crazing, or damage to chrome on 2.1655 to 2.1658 inch (5.5004 to 5.5011 cm) OD.	Repair. (Refer to paragraph 5-426)
		Visual and SIE	Worn 2.1544 to 2.1551 inch (5.4722 to 5.4740 cm) diameter.	Repair. (Refer to paragraph 5-426)
			Worn 1.9779 to 1.9786 inch (5.0239 to 5.0256 cm) diameter.	Repair. (Refer to paragraph 5-426)
		Visual and Magnetic Particle	Cracks.	Not allowed. Replace.
		Dimensional	Wear. (Refer to table 5-164)	Replace if limits are not met.

**Table 5-163. Magnetic-Particle Inspection of Compressor Rotor Assembly (T53-L-15, -701).**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD OF MAGNETIZATION
4-53 5	Compressor Front Sleeve	Circular, use central conductor at 600 amperes
5-527 3	Gear	Circular, use central conductor at 800 amperes
5-527 6	Front Bearing Housing	Circular, use central conductor at 800 amperes
5-527 10	Impeller	Circular, use central conductor at 600 amperes
5-527 12	Housing	Circular, use central conductor at 1000 amperes
5-527 17	Compressor Front Rotor Shaft	Circular, use central conductor at 800 amperes for shaft area and 2000 for blade grooves
5-527 47, 48, 49 and 50	First through Fourth Compressor Rotor Spacers	Circular, use central conductor at 800 amperes.
5-527 53	Compressor Rotor Sleeve	Circular, use central conductor at 1000 amperes
5-527 55	Power Shaft	Circular, use direct contact at 1500 amperes. Longitudinal at 7500 ampere-turns
5-527 56	Rear Compressor Shaft	Circular, use central conductor at 1200 amperes



Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Compressor Front Bearing Sleeve to Front Bearing Housing	4-54	ID	3.9786 (10.1056)	3.9790 (10.1067)	3.9786 (10.1056)	3.9792 (10.1072)			5-528 A
	5								
Compressor Front Bearing Sleeve to Housing	5-527	OD	3.9696 (10.0828)	3.9700 (10.0838)	3.9696 (10.0828)	3.9700 (10.0838)	0.0086L (0.0218)	0.0096L (0.0244)	B
	6								
Compressor Front Bearing Sleeve to Housing	4-54	OD	5.1882 (13.1780)	5.1885 (13.1788)	5.1881 (13.1778)	5.1888 (13.1796)			C
	5								
Front Bearing Housing to Bearing	5-527	ID	5.1881 (13.1778)	5.1886 (13.1790)	5.1881 (13.1778)	5.1888 (13.1796)			D
	12								
Front Bearing Housing to Bearing	6	ID	3.5432 (8.9997)	3.5436 (9.0007)	3.5432 (8.9997)	3.5438 (9.0013)			E
Front Bearing Housing to Housing	7	OD	3.5430 (8.9992)	3.5433 (9.0000)	3.5430 (8.9992)	3.5433 (9.0000)			F
	5-527								
Front Bearing Housing to Housing	6	OD	5.1882 (13.1780)	5.1885 (13.1788)	5.1881 (13.1778)	5.1885 (13.1788)			
							0.0004T (0.0010)	0.0007L (0.0018)	
							0.0001T (0.0003)	0.0008L (0.0020)	
							0.0004T (0.0000)	0.0007L (0.0018)	

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Impeller to Compressor Front Rotor Shaft	5-527								5-528
	12	ID	5.1881 (13.1778)	5.1886 (13.1790)	5.1881 (13.1778)	5.1888 (13.1796)			D
Disk Assembly (First Stage Compressor Rotor) Rear to First Stage Compressor Rotor Spacer Front	10	ID	1.9690 (5.0013)	1.9700 (5.0038)	1.9690 (5.0013)	1.9700 (5.0038)			G
	17	OD	1.9685 (5.0000)	1.9687 (5.0005)	1.9685 (5.0000)	1.9687 (5.0005)	0.0003L (0.0008)	0.0015L (0.0038)	H
Disk Assembly (First Stage Compressor Rotor) to Compressor Rotor Sleeve	16	OD	4.4180 (11.2217)	4.4185 (11.2230)	4.4173 (11.2199)	4.4185 (11.2230)			I
	50	ID	4.4163 (11.2174)	4.4168 (11.2187)	4.4163 (11.2174)	4.4169 (11.2189)	0.0022T (0.0056)	0.0004T (0.0010)	J
Disk Assembly (First Stage Compressor Rotor) to Compressor Rotor Sleeve	16	ID	4.0620 (10.3175)	4.0630 (10.3200)	4.0620 (10.3175)	4.0630 (10.3200)			K
	53	OD	4.0595 (10.3111)	4.0600 (10.3124)	4.0590 (10.3099)	4.0600 (10.3124)	0.0020L (0.0051)	0.0040L (0.0102)	L

CHQSOFTWARE.COM

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Disk Assembly (Second Stage Compressor Rotor) Front to First Stage Compressor Rotor Spacer Rear	5-527								5-528
	21	OD	4.4190 (11.2243)	4.4200 (11.2268)	4.4182 (11.2222)	4.4200 (11.2268)	0.0037T (0.0094)	0.0012T (0.0030)	M
First Stage Compressor Rotor Spacer Rear to Disk Assembly (Second Stage Compressor Rotor) Rear	50	ID	4.4163 (11.2174)	4.4168 (11.2187)	4.4163 (11.2174)	4.4170 (11.2192)			N
	21	OD	4.4190 (11.2243)	4.4200 (11.2268)	4.4182 (11.2222)	4.4200 (11.2268)	0.0037T (0.0094)	0.0012T (0.0030)	O
Spacer (Second Stage Compressor Rotor) - Front to Disk Assembly (Third Stage Compressor Rotor)	49 ***	ID	4.4163 (11.2174)	4.4168 (11.2187)	4.4163 (11.2174)	4.4170 (11.2192)			P
	26 ***	OD	4.4190 (11.2243)	4.4200 (11.2268)	4.4182 (11.2222)	4.4200 (11.2268)			Q
Spacer (Second Stage Compressor Rotor) - Rear	49 ***	ID	4.4163 (11.2174)	4.4168 (11.2187)	4.4163 (11.2174)	4.4170 (11.2192)	0.0037T (0.0094)	0.0012T (0.0033)	R

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Disk Assembly (Third Stage Compressor Rotor Rear to Spacer (Third Stage Compressor Rotor) Front	5-527 26	OD	4.4190 (11.2243)	4.4200 (11.2268)	4.4183 (11.2225)	4.4200 (11.2268)	0.0037T (0.0094)	0.0013T (0.0033)	5-528 S
Disk Assembly (Fourth Stage Compressor Rotor Front to Spacer (Third Stage Compressor Rotor) Rear	48 31	ID OD	4.4163 (11.2174)	4.4168 (11.2187)	4.4163 (11.2174)	4.4170 (11.2192)	0.0037T (0.0094)	0.0013T (0.0033)	T U
Disk Assembly (Fourth Stage Compressor Rotor Rear to Spacer (Fourth Stage Compressor Rotor) Front	48 31	ID OD	4.4163 (11.2174)	4.4168 (11.2187)	4.4163 (11.2174)	4.4170 (11.2192)	0.0037T (0.0094)	0.0013T (0.0033)	V W

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
5-527									5-528
Disk Assembly (Fifth Stage Compressor Rotor) Front	36	OD	4.4210 (11.2293)	4.4220 (11.2319)	4.4203 (11.2276)	4.4220 (11.2319)			X
to									
Spacer (Fourth Stage Compressor Rotor) - Rear	47	ID	4.4163 (11.2174)	4.4168 (11.2187)	4.4163 (11.2174)	4.4170 (11.2192)	0.0057T (0.0145)	0.0033T (0.0084)	Y
Disk Assembly (Fifth Stage Compressor Rotor) Rear	36	OD	4.4180 (11.2217)	4.4190 (11.2243)	4.4180 (11.2217)	4.4190 (11.2243)			Z
to									
Fifth Stage Compressor Rotor Spacer - Front	46 ---	ID	4.4155 (11.2154)	4.4160 (11.2166)	4.4155 (11.2154)	4.4162 (11.2171)	0.0035T (0.0089)	0.0018T (0.0046)	AA
Centrifugal Compressor Impeller Assembly Front	41	OD	4.4180 (11.2217)	4.4190 (11.2243)	4.4180 (11.2217)	4.4190 (11.2243)			AB
to									
Spacer (Fifth Stage Compressor Rotor) Rear	46 ---	ID	4.4155 (11.2154)	4.4160 (11.2166)	4.4155 (11.2154)	4.4162 (11.2171)	0.0035T (0.0089)	0.0018T (0.0046)	AA
Front Bearing Housing	6	Axial	1.299 (3.299)	1.302 (3.307)	1.299 (3.299)	1.302 (3.307)			AC

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
5-527									5-528
Spacer (Fifth Stage Compressor Rotor) Width	46 ***	Axial	2.067 (5.250)	2.069 (5.255)	2.066 (5.248)	2.069 (5.255)			AD
Spacer (Fourth Stage Compressor Rotor) Width	47	Axial	0.812 (2.062)	0.814 (2.068)	0.811 (2.060)	0.814 (2.068)			AE
Spacer (Third Stage Compressor Rotor) Width	48 ***	Axial	0.820 (2.083)	0.822 (2.088)	0.819 (2.080)	0.822 (2.088)			AF
Spacer (Second Stage Compressor Rotor) Width	49 ***	Axial	0.832 (2.113)	0.834 (2.118)	0.831 (2.111)	0.834 (2.118)			AG
First Stage Compressor Rotor Spacer - Width	50	Axial	0.982 (2.494)	0.984 (2.4994)	0.980 (2.489)	0.984 (2.499)			AH
Sleeve (Compressor Front Bearing)	4-54 5 ***	OD	4.099 (10.411)	4.100 (10.414)	4.0985 (10.4102)	4.1000 (10.4140)			AI
Housing (Seal)	5-527 12	ID	3.249 (8.252)	3.250 (8.255)	3.249 (8.252)	3.2505 (8.2563)			AJ
Disk Assembly (First Stage Compressor Rotor)	16	OD	1.9685 (5.0000)	1.9687 (5.0005)	1.9683 (4.9995)	1.9687 (5.0005)			AK

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Compressor Front Rotor Shaft	5-527 17	OD	2.4360 (6.1874)	2.4365 (6.1887)	2.4360 (6.1874)	2.4365 (6.1887)			AL
Centrifugal Compressor Impeller Assembly	41	ID	4.0585 (10.3086)	4.0590 (10.3099)	4.0585 (10.3086)	4.0590 (10.3099)			AM
Fifth Stage Compressor Rotor Spacer Front Land	46 ---	OD	6.748 (17.140)	6.750 (17.145)	6.746 (17.135)	6.750 (17.145)			AN
Fifth Stage Compressor Rotor Spacer Rear Land	46 ---	OD	6.124 (15.555)	6.126 (15.560)	6.122 (15.550)	6.126 (15.560)			AO
Spacer (Fourth Stage Compressor Rotor) Front Land	47	OD	6.502 (16.151)	6.504 (16.520)	6.500 (16.510)	6.504 (16.520)			AP
Spacer (Fourth Stage Compressor Rotor) Rear Land	47	OD	6.588 (16.734)	6.590 (16.739)	6.586 (16.728)	6.590 (16.739)			AQ
Spacer (Third Stage Compressor Rotor) Front Land	48 ---	OD	6.062 (15.397)	6.064 (15.403)	6.060 (15.392)	6.064 (15.403)			AR
Spacer (Third Stage Compressor Rotor) Rear Land	48 ---	OD	6.194 (15.733)	6.196 (15.738)	6.192 (15.728)	6.196 (15.738)			AS
Spacer (Second Stage Compressor Rotor) Front Land	49 ---	OD	5.682 (14.432)	5.684 (14.437)	5.680 (14.427)	5.684 (14.437)			AT

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Spacer (Second Stage Compressor Rotor)-Rear Land	5-527	OD	5.820 (14.783)	5.882 (14.788)	5.818 (14.778)	5.822 (14.788)			5-528
	49 ***								AU
	50		5.250 (13.335)	5.252 (13.340)	5.248 (13.330)	5.252 (13.340)			AV
	50		5.338 (13.685)	5.390 (13.691)	5.386 (13.680)	5.390 (13.691)			AW
	53		4.0585 (10.3086)	4.0590 (10.3099)	4.0585 (10.3086)	4.0590 (10.3099)			AX
Compressor Rotor Sleeve-Rear	55	OD	1.4217 (3.6111)	1.4222 (3.6124)	1.4217 (3.6111)	1.4222 (3.6124)			AY
			1.1815 (3.0012)	1.1830 (3.0048)	1.1805 (2.9985)	1.1830 (3.0048)			AZ
			2.1655 (5.5004)	2.1658 (5.5011)	2.1654 (5.5001)	2.1658 (5.5011)			BA
			2.1544 (5.4722)	2.1551 (5.4740)	2.1541 (5.4714)	2.1551 (5.4740)			BB
			1.9779 (5.0239)	1.9786 (5.0256)	1.9776 (5.0231)	1.9786 (5.0256)			BC
Rear Compressor Shaft	56	OD							BD
									BE
Front Bearing Housing Squareness *	6	TIR							

\*\*\*\* See Notes on Last page of table.



Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
5-527									5-528
Front Bearing Housing Concentricity*	6	TIR	0.001 (0.003)			0.0015** (0.0038**)			BF
Disk Assembly (First Stage Compressor Rotor) - Rear Hub Runout*	16	TIR	0.002 (0.005)			0.003 (0.008)			BG
Disk Assembly (First Stage Compressor Rotor) Rear	16	TIR	0.002 (0.005)			0.003 (0.008)			BH
First Stage Compressor Rotor Spacer Face Runout*	50								
Disk Assembly (Second Stage Compressor Rotor) - Front Hub Runout*	21	TIR	0.002 (0.005)			0.003 (0.008)			BI
Disk Assembly (Second Stage Compressor Rotor) - Front	21	TIR	0.002 (0.0050)			0.003 (0.008)			BJ
First Stage Compressor Rotor Spacer - Face Runout*	50								

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
5-527									5-528
Disk Assembly (Second Stage Compressor Rotor) Rear	21	TIR		0.002 (0.005)		0.003 (0.008)			BK
Spacer (Second Stage Compressor Rotor) - Face Runout*	49								
Disk Assembly (Second Stage Compressor Rotor) - Rear Hub Runout*	21	TIR		0.002 (0.005)		0.003 (0.008)			BL
Disk Assembly Third Stage Compressor Rotor) - Front Hub Runout*	26	TIR		0.002 (0.005)		0.003 (0.008)			BM
Disk Assembly Third Stage Compressor Rotor) Front	26	TIR		0.002 (0.005)		0.003 (0.008)			BN
Spacer (Second Stage Compressor Rotor) Face Runout*	49								
Disk Assembly (Third Stage Compressor Rotor) Rear	26	TIR		0.002 (0.005)		0.003 (0.008)			BO

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
5-527									5-528
Disk Assembly (Third Stage Compressor Rotor) - Front Hub Runout*	26	TIR	0.002 (0.005)	0.003 (0.008)					BP
Disk Assembly (Fourth Stage Compressor Rotor) - Front Hub Runout*	31	TIR	0.002 (0.005)	0.003 (0.008)					BQ
Disk Assembly (Fourth Stage Compressor Rotor) - Front	31	TIR	0.002 (0.005)	0.003 (0.008)					BR
Spacer (Third Stage Compressor Rotor) - Face Runout*	48								
Disk Assembly (Fourth Stage Compressor Rotor) - Rear	31	TIR	0.002 (0.005)	0.003 (0.008)					BS
Spacer (Fourth Stage Compressor Rotor) Runout*	47								
Disk Assembly (Fourth Stage Compressor Rotor) - Rear Hub Runout*	31	TIR	0.002 (0.005)	0.003 (0.008)					BT
Spacer (Third Stage Compressor Rotor) - Face Runout*	48								

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
5-527									5-528
Disk Assembly (Fifth Stage Compressor) Front Hub Runout*	36	TIR		0.002 (0.005)		0.003 (0.008)			BU
Disk Assembly (Fifth Stage Compressor Rotor) Front	36	TIR		0.002 (0.005)		0.003 (0.008)			BY
Spacer (Fourth Stage Compressor Rotor) Face Runout*	47								
Disk Assembly (Fifth Stage Compressor Rotor) Rear	36	TIR		0.002 (0.005)		0.003 (0.008)			BW
Fifth Stage Compressor Rotor Spacer - Face Runout	46								
Disk Assembly (Fifth Stage Compressor Rotor) - Rear Hub Runout*	36	TIR		0.002 (0.005)		0.003 (0.008)			BX
Centrifugal Compressor Impeller Assembly - Front Hub Runout*	41	TIR		0.002 (0.005)		0.003 (0.008)			BY

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
5-527									5-528
Forward Section Impeller - Rear	44	TIR		0.002 (0.005)		0.003 (0.008)			BZ
Fifth Stage Compressor Rotor Spacer - Face Runout*	46***								
Fifth Stage Compressor Rotor Spacer Front Land Concentricity*	46***	TIR		0.001 (0.003)		0.002 (0.005)			CA
Fifth Stage Compressor Rotor Spacer Front Face Square*	46***	TIR		0.0005 (0.0013)		0.002 (0.005)			CB
Fifth Stage Compressor Rotor Spacer Rear Face Spacer*	46***	TIR		0.0005 (0.0013)		0.002 (0.005)			CC
Fifth Stage Compressor Rotor Spacer - Rear Land Concentricity*	46***	TIR		0.001 (0.003)		0.002 (0.005)			CD
Spacer (Fourth Stage Compressor Rotor) - Front Land Concentricity	47	TIR		0.001 (0.003)		0.002 (0.005)			CE

\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
5-527									5-528
Spacer (Fourth Stage Compressor Rotor Front Face Square	47	TIR		0.0005 (0.0013)		0.002 (0.005)			CF
Spacer (Fourth Stage Compressor Rotor) - Rear Face Square	47	TIR		0.0005 (0.0013)		0.002 (0.005)			CG
Spacer (Fourth Stage Compressor Rotor) - Rear Land Concentricity	47	TIR		0.001 (0.003)		0.002 (0.005)			CH
Spacer (Third Stage Compressor Rotor) Front Land Concentricity	48****	TIR		0.0015 (0.0038)		0.002 (0.005)			CI
Spacer (Third Stage Compressor Rotor) Front Face Square*	48****	TIR		0.0005 (0.0013)		0.002 (0.005)			CJ
Spacer (Third Stage Compressor Rotor) Rear Face Square*	48****	TIR		0.0005 (0.0013)		0.001 (0.003)			CK
Spacer (Third Stage Compressor Rotor) Rear Land Concentricity*	48****	TIR		0.0015 (0.0038)		0.002 (0.005)			CL

\*\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Spacer (Second Stage Compressor Rotor) Front Land Concentricity*	5-527 49***	TIR		0.0015 (0.0038)		0.002 (0.005)			5-528 CM
Spacer (Second Stage Compressor Rotor) Front Face Square*	49***	TIR		0.0005 (0.0013)		0.001 (0.003)			CN
Spacer (Second Stage Compressor Rotor) Rear Face Square*	49***	TIR		0.0005 (0.0013)		0.001 (0.003)			CO
Spacer (Second Stage Compressor Rotor) - Rear Land Concentricity*	49***	TIR		0.0015 (0.0038)		0.002 (0.005)			CP
Spacer (First Stage Compressor Rotor) - Front Land Concentricity*	50	TIR		0.001 (0.003)		0.002 (0.005)			CQ
Spacer (First Stage Compressor Rotor) - Front Face Square*	50	TIR		0.0005 (0.0013)		0.001 (0.003)			CR

\*\*\* See Notes on Last page of table.

Table 5-164. Dimensional Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued) .

NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Spacer (First Stage Compressor Rotor) - Rear Face Square*	5-527 50	TIR		0.0005 (0.0013)					5-528 CS
First Stage Compressor Rotor) Spacer Rear Land Concentricity*	50	TIR		0.001 (0.003)					CT
Power Shaft Seal Journal *	55	TIR		0.0005 (0.0013)					CU

## NOTE

- \* Measurement taken to REF SURFACE Indicated in figure 5-528.
- \*\* Provided bumper clearance between compressor front bearing housing and sleeve is maintained as assembly.
- \*\*\* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.



**Table 5-185. Compressor Rotor Assembly - Inspection Limits (T53-L-15, -701).**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Seal Assembly		<p>a. Inspect carbon rings in seal assembly for the following.</p> <p>(1) Carbon ring must float freely with only slight finger pressure.</p> <p>(2) Carbon rings must be free of all chipping, nicks, cracks, and score marks.</p> <p>(3) Carbon ring ID must not exceed 1.4247 inch (3.6187 cm). This ID shall be measured in at least three locations, using a suitable dial bore gage.</p> <p style="text-align: center;"><b>CAUTION</b></p> <p>Do not use a bore gage with high spring tension as distortion of the carbon element could result.</p> <p>(4) If above limits are exceeded, replace carbon ring as outlined in paragraph 5-426.</p> <p>b. Inspect nut thread condition. Minor thread damage is acceptable if it can be cleaned up with a file. If threads are heavily damaged, replace seal assembly.</p>
Sand and Dust Erosion on First Stage Compressor Rotor Blades	5-529 5-530	<p>a. Inspect leading edge of blades for undercutting, and slight rolled-over effect, as follows:</p> <p style="text-align: center;"><b>NOTE</b></p> <p>Rolled-over effect can be detected by running a finger nail along airfoil on convex side until leading edge is contacted. Repair as outlined in paragraph 5-426.</p> <p>b. Measure chordal width at midpoint of blade. Blade acceptable for further use if chordal width is 0.962 inch (2.443 cm) or greater. (See figure 5-530) If limit cannot be met, replace as outlined in paragraph 5-427.</p>
Erosion on Second Through Fifth Stage Compressor Rotor Blades	5-529	<p style="text-align: center;"><b>NOTE</b></p> <p>Blades may remain in the disk for this inspection.</p> <p>a. Inspect second stage blades for erosion wear as shown in figure 5-529. Blades measuring less than 0.878 inch chordal width at tips shall be rejected. Measure blades as far outboard as possible using a suitable outside micrometer.</p>

**Table 5-165. Compressor Rotor Assembly - Inspection Limits (T53-L-15, -701) (Continued).**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Erosion on Second Through Fifth Stage Compressor Rotor Blades(cont)	5-529 (cont)	b. Inspect third through fifth stage blades for erosion wear as shown in figure 5-529. Blades measuring less 0.642 inch chordal width at tips shall be rejected. Measure blades as far outboard on tips as possible using a suitable outside micrometer.
Runout on Compressor Front Rotor Shaft	5-531	Any rounding of tip corners which may inhibit measuring is cause for blade rejection without the need for measurement. a. Mount shaft between true centers (mandrel or equivalent).
Grooves on 1.481 to 1.483 Inch (3.762 to 3.767 CM) ID of Compressor Front Rotor Shaft	5-533	b. Maximum runout on surfaces A and B is 0.001 inch TIR. If runout is exceeded, surfaces may be ground as necessary to obtain 0.0005 inch TIR runout. Refer to paragraph 5-426. c. Check runout on bearing shoulder (surface C). Runout must be within 0.001 inch TIR. If runout is exceeded, machine surfaces C and/or D as necessary to obtain runout. Refer to paragraph 5-426.
Grooves on 1.481 to 1.483 Inch (3.762 to 3.767 CM) ID of Compressor Front Rotor Shaft (cont)		Inspect the 1.481 to 1.483 inch (3.762 to 3.767 cm) ID at the front of the shaft underneath the thread runout for grooves caused by contact with the 0.05 to 0.09 inch (0.127 to 0.23 cm) shoulder of the power shaft. Wear up to 0.090 inch (0.229 cm) wide and to a depth of 0.015 inch (0.038 cm) is acceptable provided the wall thickness in the two 0.265 to 0.270 inch (0.673 to 0.686 cm) slot areas is not less than 0.045 inch. (See figure 5-533.) Remove sharp edges and protrusions in wear area by blending-repairing.
<p style="text-align: center;"><b>NOTE</b></p> <p>Blades shall remain in disk for this inspection.</p> <p>a. All pits in tenon face are allowed provided they cannot be felt with a 0.020 inch (0.051 cm) radius scribe. If a maximum of two are felt with the 0.020 inch (0.051 cm) scribe, reinspect using 0.040 inch (0.102 cm) radius scribe; if those two pits cannot be felt, disk is acceptable.</p> <p>b. On other disk areas, pits are acceptable provided they cannot be felt with a 0.040 inch (0.102 cm) radius scribe and their density is not greater than three per square inch.</p>		

Table 5-165. Compressor Rotor Assembly - Inspection Limits (T53-L-16, -701) (Continued).

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Hub Runout on Compressor Rotor Disk (Second through Fifth Stages)	5-533 (cont)	<p>c. If blades are removed for any reason, inspect the blade slots for pitting. Pits are acceptable provide they cannot be felt with a 0.020 inch (0.051 cm) radius scribe. Lightly stone acceptable pitting in blade slot radius.</p> <p><b>NOTE</b></p> <p>Blades shall not be removed for sole purpose of inspecting blade slots.</p> <p>d. If above limits are exceeded, replace disk</p>
	5-531	<p>a. Measure A and B diameters in four equally spaced locations. (See figure 5-531) If the limits are not as specified, repair as outlined in paragraph 5-426.</p> <p>b. Inspect surface X to ensure that it is free of scratches and other defects.</p> <p>c. Mount disk between true centers (mandrel or equivalent).</p> <p>d. Check concentricity of surfaces A and B with respect to surface X. Maximum concentricity shall be 0.002 inch (0.005 cm). Record reading.</p> <p>e. Check squareness of forward and rear faces with X surface. Maximum out-of-squareness shall be 0.002 inch TIR. Record reading.</p> <p><b>NOTE</b></p> <p>With blades removed from disk, runout must be within 0.005 inch (0.0013 cm) TIR.</p> <p>f. Check forward and rear faces for parallelism. Parallel shall be within 0.0005 inch TIR. Record reading.</p> <p>g. If either of the readings recorded in steps e and f is not within limits specified, repair as outlined in paragraph 5-426.</p> <p><b>NOTE</b></p> <p>Inspection of disk tenon shall be performed by personnel possessing normal or corrected to normal vision.</p> <p>a. Inspect disk tenon for cracks. If cracking is suspected, a 7-power to 10-power magnifying glass may be used for further inspection.</p> <p>b. If tenon cracks are found, remove blades and reinstall blades in a serviceable disk. (Refer to paragraph 5-427).</p>
Cracks in Second Stage Disk Tenon		

Table 5-165. Compressor Rotor Assembly - Inspection Limits (T53-L-15, -701) (Continued).

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Defective Pilot Diameter	5-534	Fifth stage compressor rotor disk having defective pilot diameter will be reworked provided diameter can be machined to minimum the dimension shown in figure 5-531. (Refer to paragraph 5-426.) If limits cannot be met, replace disk.
Evidence of Rubbing on Impeller Blade Tips		Any degree of rubbing is acceptable provided the accompanying discoloration on the sides (airfoil) of the vane is limited only to faint straw color. A deep gold or blue color on the vane sides shall be cause for impeller assembly replacement. Blend-repair tips to a smooth radius. (Refer to paragraph 5-426).
Nicks and Dents on Impeller Vanes	5-535	<p>Critical Area: No nicks allowed. Smooth dents are permitted provided they do not exceed 0.04 inch (0.10 cm) diameter and 0.01 inch (0.03 cm) depth. No repair allowed in critical area. (Refer to paragraph 5-426).</p> <p>Leading Edge:</p> <ul style="list-style-type: none"> <li>a. Dents: Dents are acceptable on each vane leading edge up to 0.08 inch (0.20 cm) depth. No repair required.</li> <li>b. Nicks: Each vane leading edge may have three nicks up to 0.06 inch (0.15 cm) depth provided the vane is blend-repaired. (Refer to paragraph 5-426).</li> <li>c. If leading edge have more than three nicks or depth of nick exceeds 0.06 inch (0.15 cm) and is less than 0.13 inch (0.33 cm) grind back leading edge. (Refer to paragraph 5-426).</li> </ul> <p style="text-align: center;"><b>NOTE</b></p> <p>Nine vanes (four of which may be adjacent) may be ground back. If limit is exceeded, replace impeller assembly.</p> <p>Trailing Edge: 0.05 inch (0.13 cm) maximum repair depth. Distance between repaired areas must be equal to or greater than the length of the shortest repairs.</p> <p>Tip: 0.05 inch (0.13 cm) maximum repair depth. Distance between repaired areas must be at least 1/4 inch.</p> <p>Airfoil (sides):</p> <p>Inducer Area (Forward of split line)</p> <ul style="list-style-type: none"> <li>a. Dents up to 0.06 inch (0.15 cm) in diameter are permitted without repair provided a minimum of 0.025 inch (0.064 cm) vane thickness remains.</li> <li>b. Nicks after blend-repair shall not exceed the dent limits given above. Distance between defects must be at least 1/4 inch (0.64 cm).</li> </ul>

**Table 5-165. Compressor Rotor Assembly - Inspection Limits (T53-L-15, -701) (Continued).**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Nicks and Dents on Impeller Vanes (cont)	5-535 (cont)	Impeller Area (Aft of split line)  a. No repair allowed other than blending of burrs, except on trailing edge and tip.  b. Dents and nicks to 0.06 inch (0.15 cm) in diameter are permitted without repair provided a minimum of 0.025 inch (0.064 cm) vane thickness remains. Distance between defects must be at least 1/4 inch. (0.64 cm).
Erosion on Centrifugal Compressor Impeller Assembly	5-535	Visually inspect all vanes for erosion. Using blades erosion gage (LTCT6881) or dial caliper 599-57B, or equivalent, measure a minimum of five vanes showing thinnest area at vane tip. (See figure 5-535) Replace impeller if any one vane is less than 0.035 inch (0.089 cm) thick as measured at vane tip approximately 1/16 inch (0.10 cm) from trailing edge.
Damaged Surfaces on Fifth Stage Compressor Rotor Spacer	5-536	a. Dimensionally inspect 4.4155 to 4.4160 inch (11.2154 to 11.2166 cm) diameter for an over maximum ID. If ID is over maximum, rework as specified in paragraph 5-426.  b. Inspect 6.124 to 6.126 inch (15.555 to 15.560 cm) diameter for scoring. If scoring is evident, refer to paragraph 5-426.  c. Inspect 6.748 to 6.750 inch (17.140 to 17.145 cm) diameter for scoring. If scoring is evident, refer to paragraph 5-426.
Discoloration, Staining, and Varnishing on Power Shaft Bearing Journals		Discoloration, staining, and varnishing are acceptable if heavy varnish films can be removed by standard cleaning and staining is not caused by acid etch as observed after standard cleaning. If limits are exceeded, replace power shaft.
Corrosion Discoloration on Power Shaft Bearing Journals		Corrosion discoloration is acceptable and can be effectively removed by standard cleaning methods.
Wear on 0.05 to 0.09 Inch (0.13 to 0.23 cm) Shoulder of Power Shaft Caused by Contact with ID of Front Compressor Rotor Shaft	5-537	Wear is acceptable up to flush with the 1.425 to 1.435 inch (3.620 to 3.645 cm) diameter. (See figure 5-537.) Remove sharp edges and protrusions in wear area by blend-repairing.
Frosting on Power Shaft Bearing Journals		Frosting is acceptable provided it cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If limit is exceeded, replace power shaft.
Nicks (Isolated) on Power Shaft Bearing Journals		Nicks (Isolated) with no projections are acceptable provided they cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If limit is exceeded, replace power shaft.

**Table 5-165. Compressor Rotor Assembly - Inspection Limits (T53-L-15, -701) (Continued).**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Scoring (Axial) on Power Shaft Bearing Journals	5-529	Scoring (axial) is acceptable provided it cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If limit is exceeded, replace power shaft.
Scuffs and Scratches on Power Shaft Bearing Journals		Scuffs and scratches are acceptable provided they cannot be felt with a 0.040 inch (0.102 cm) radius bearing probe. If limit is exceeded, replace power shaft.
Pilot Diameter Concentricity for Helicoll Repair to Aft End of Power Shaft		Pilot diameter must be concentric with A and B surfaces of power shaft within 0.002 inch (0.005 cm) TIR.
Indenting or Corrosion Pitting on Power Shaft Bearing Journals		a. Indenting is acceptable if it cannot be detected with a 0.040 inch (0.102 cm) radius scribe. If limit is exceeded, replace power shaft.  b. Corrosion pitting is acceptable if it cannot be detected with a 0.040 inch (0.102 cm) radius scribe. If limit is exceeded, replace power shafts.
Circumferential Marks on Power Shaft 1.1825 to 1.1830 Inch (3.004 to 3.005 cm) Diameter		Circumferential marks caused by contact between the power shaft OD and second stage power turbine rotor sealing flange ID is acceptable, provided depth of defect does not exceed 0.003 inch (0.008 cm). If limit is exceeded, repair power shaft. (Refer to paragraph 5-426).

Table 5-166. Dimensional Inspection of Compressor Rotor Assembly Bearings (T53-L-15, -701).

BEARING TYPE & PART NO.	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		INTERNAL CLEARANCE	END PLAY	HARDNESS RC	CONTACT ANGLE	LYCOMING PART NUMBER
			MIN	MAX					
Ball V3210RS5470  or MM210VM2SMBRE 7730	5-527 7***	ID	1.9683 (4.9995)	1.9685 (5.0000)	0.0020- (0.0051)	0.008 (0.020)	58 to 62	N/A	1-300-015-02
		OD	3.5430 (8.9992)	3.5433 (9.0000)	0.0024 (0.0061)	0.012** (0.030)**			
			1.9683 (4.9995)	1.9685 (5.0000)	0.0037- (0.0094)	0.016* (0.041)	58 to 62	N/A	1-300-015 -04
		OD	3.5430 (8.9992)	3.5433 (9.0000)	MAX 0.0043* (0.0109)				

\* Under 11.0 pound gage load

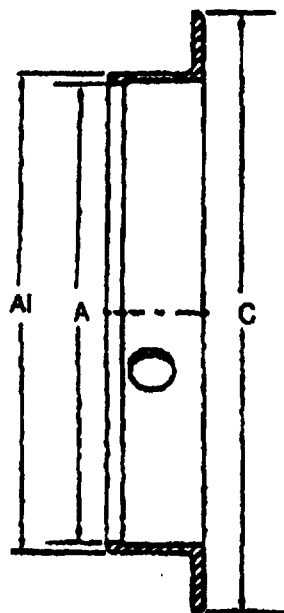
\*\* Under 13.0 to 17.0 pound gage load

\*\*\* Scribe match lines (V mark) across the bearing bore must be aligned

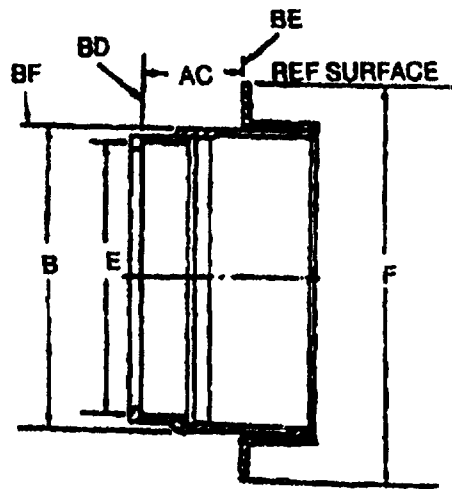
Table 5-167. Dimensional Inspection of Compressor Rotor Assembly Seal (T53-L-15, -701).

SEAL TYPE AND PART NUMBER	FIG & INDEX	OUTSIDE DIAMETER		INSIDE DIAMETER		WIDTH (AXIAL)	
		MIN	MAX	MIN	MAX	MIN	MAX
Seal (Positive Contact) (1-300-214-01)	5-527						
	13	3.251 (8.258)	3.252 (8.260)	N/A	N/A	0.838 (2.129)	0.842 (2.139)

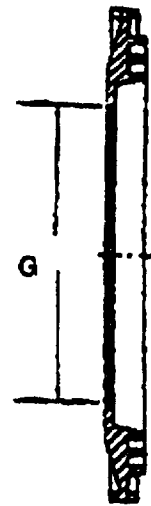
CHQSOFTWARE.COM



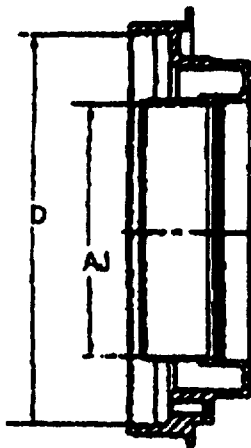
SLEEVE (5, FIGURE 5-527)



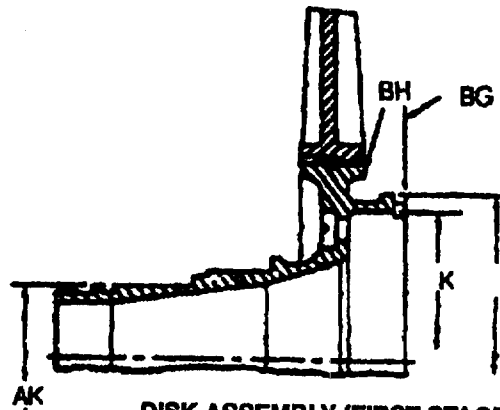
FRONT BEARING HOUSING  
(6, FIGURE 5-527)



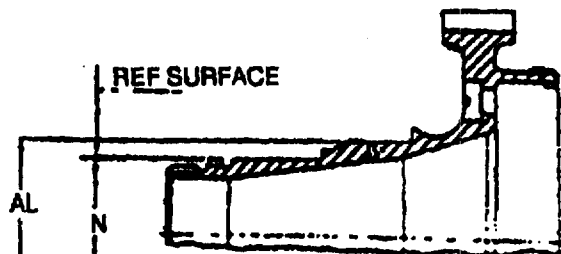
IMPELLER  
(10, FIGURE 5-527)



HOUSING  
(12, FIGURE 5-527)



DISK ASSEMBLY (FIRST STAGE COMPRESSOR  
ROTOR) (16, FIGURE 5-527)



COMPRESSOR FRONT ROTOR SHAFT  
(17, FIGURE 5-527)

Figure 5-528. Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-15, -701)  
(Sheet 1 of 4).



CHQSOFTWARE.COM

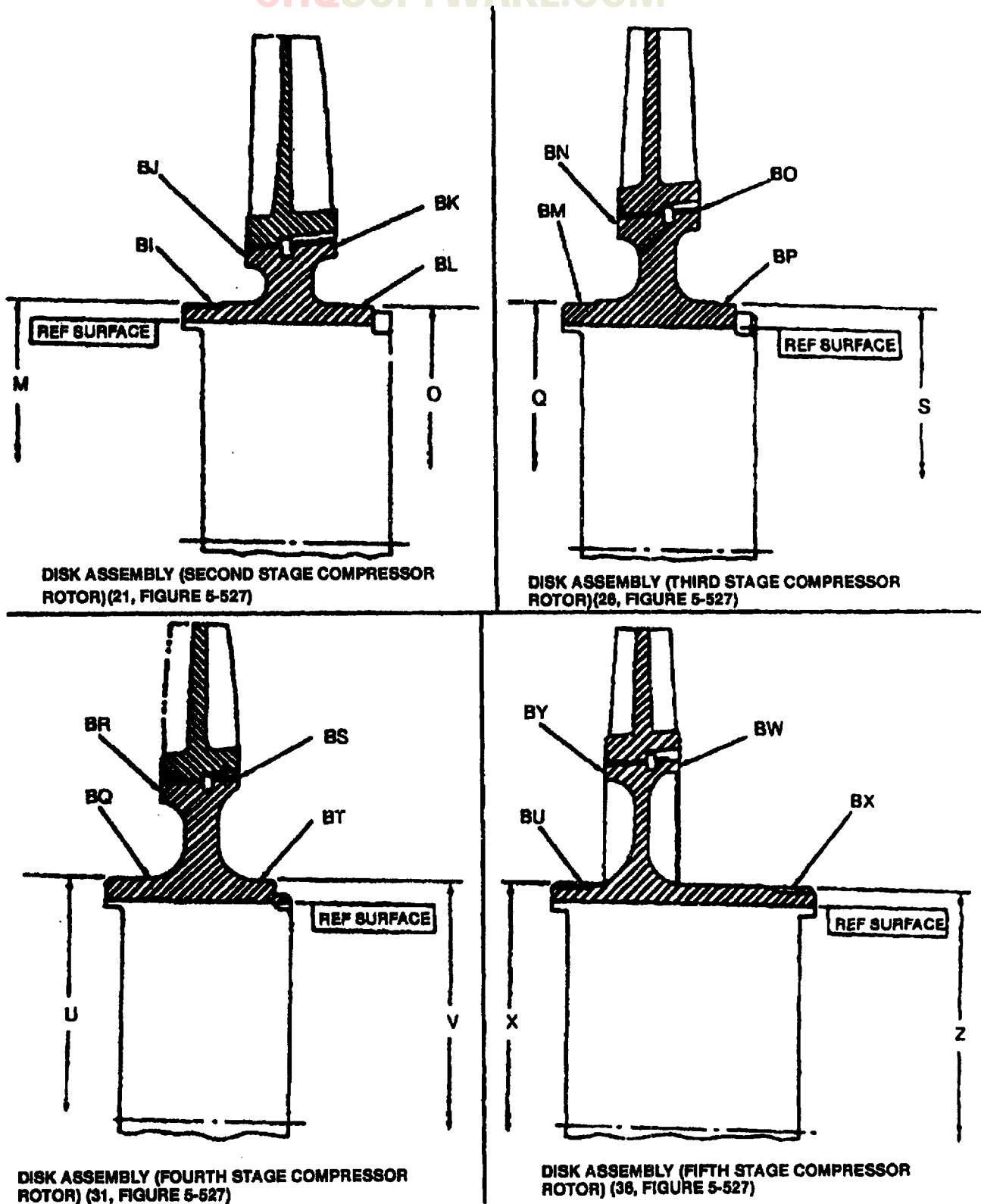


Figure 5-528. Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-15, -701)  
(Sheet 2 of 4).

CHQSOFTWARE.COM

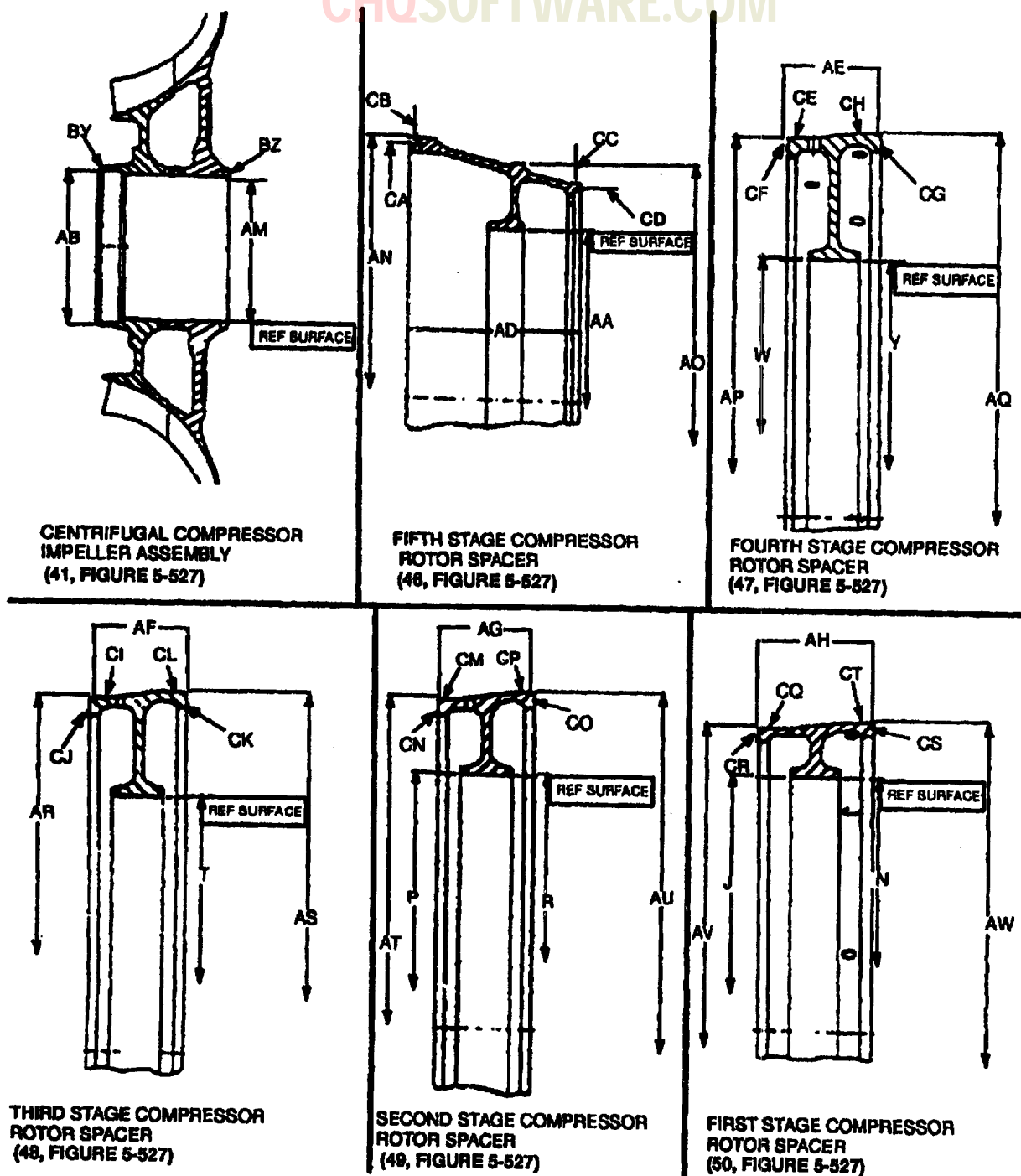
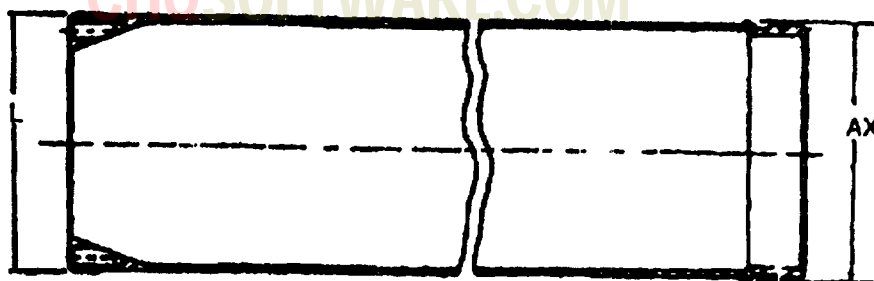
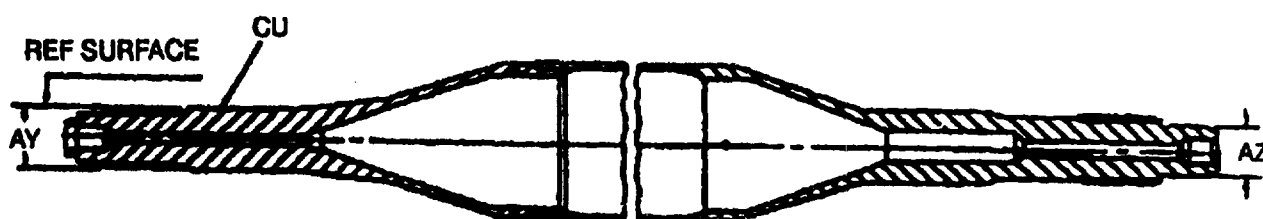


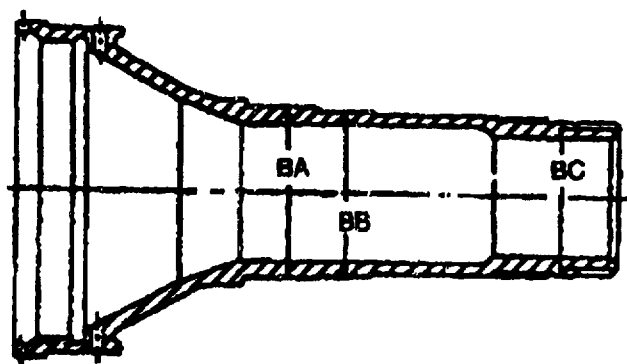
Figure 5-528. Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-15, -701)  
(Sheet 3 of 4).



COMPRESSOR ROTOR SLEEVE (53, FIGURE 5-527)



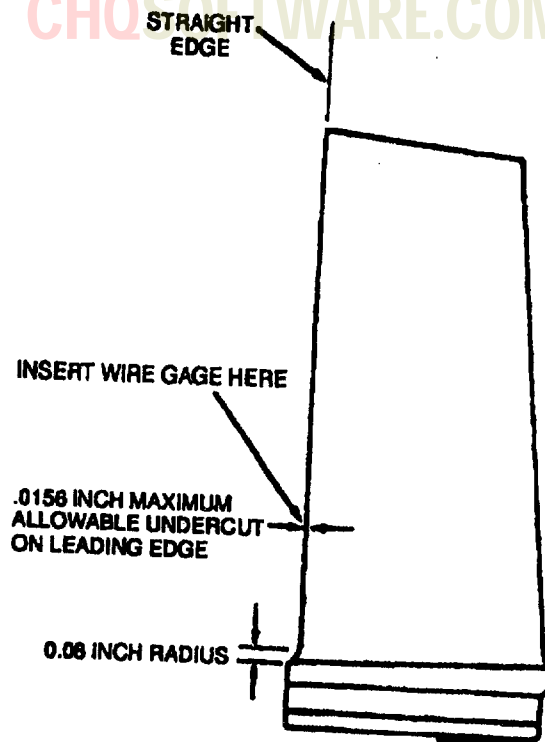
POWER SHAFT (55, FIGURE 5-527)



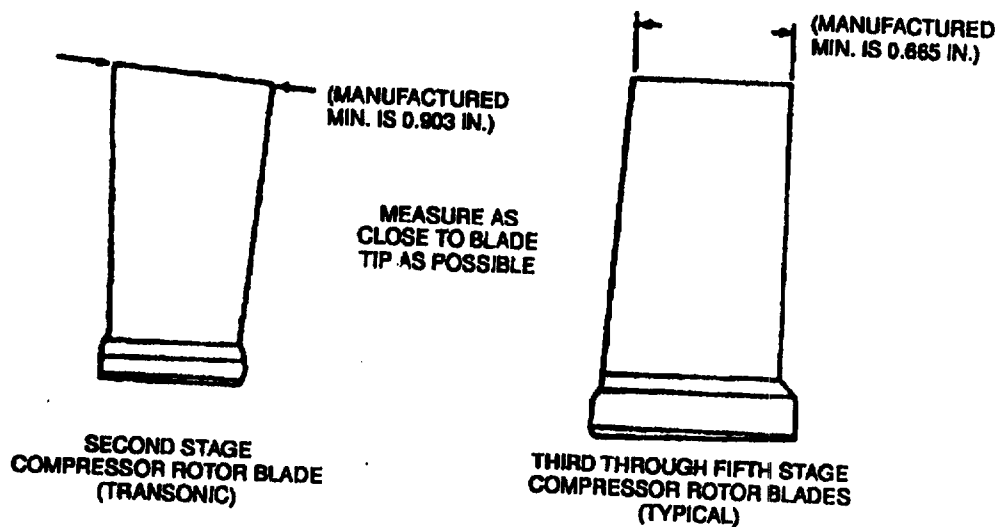
REAR COMPRESSOR SHAFT (56, FIGURE 5-527)

Figure 5-528. Compressor Rotor Assembly Dimensional Inspection Locations (T53-L-15, -701)  
(Sheet 4 of 4).

CHQSOFTWARE.COM



FIRST STAGE COMPRESSOR ROTOR BLADE-MEASURING EROSION UNDERCUTTING



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-529. Compressor Rotor Blade Tip Inspection Limits.

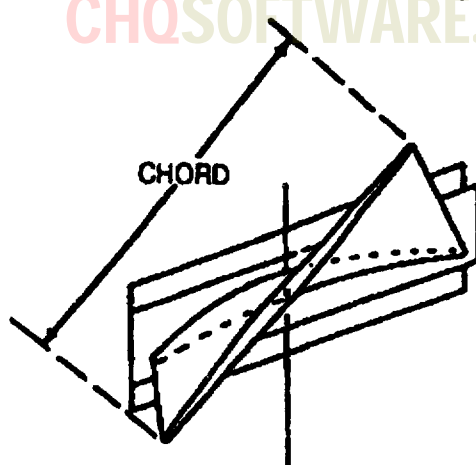
- (7) Perform a visual and fluorescent-penetrant inspection of the reworked area.
- (8) Phosphate-treat reworked area as outlined in SP No. 6012 in Appendix E.

**CAUTION**

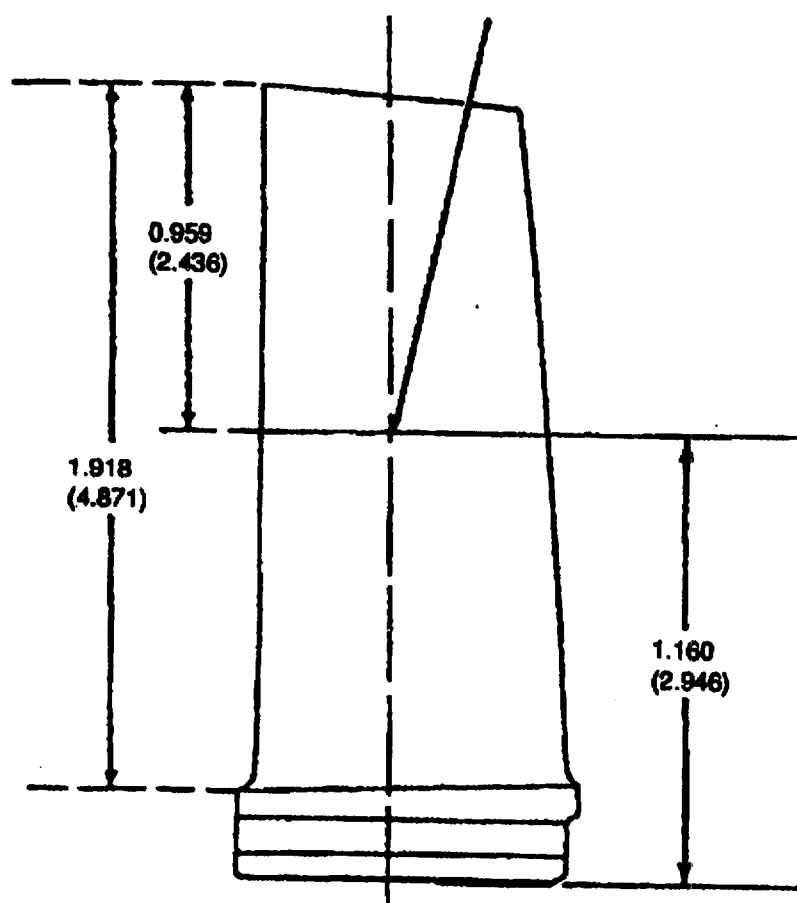
Ensure vendor detail components are used in applicable vendor assemblies. Do not mix vendor parts in reassembly.

- (9) Reassemble seal, lining up front seal housing slots with three previously unbent tangs, when using seal assembly (1-300-077-01), and lining up front seal housing machined detents with three previously unbent tangs, when using seal assembly (1-300-077-02).
- (10) Roll over tangs to retain front seal cover (three tangs on 1-300-007-01 seal, six tangs on 1-300-077-02 seal).
- (11) Ensure that carbon ring floats freely with only slight finger pressure.
- b. Repair worn 3.5432 to 3.5436 inch (8.9997 to 9.0007 cm) diameter on compressor front bearing housing (6, figure 5-527), where up to 0.005 inch (0.013 cm) maximum plate thickness is required, as follows: (See figure 5-541.)
  - (1) Machine, if necessary to obtain a 0.002 to 0.005 inch (0.005 to 0.013 cm) plate 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.
- c. Repair worn 5.1882 to 5.1885 inch (13.1780 to 13.1788 cm) diameter on front bearing housing (6, figure 5-527), where up to 0.005 inch (0.013 cm) maximum plate thickness is required, as follows: (See figure 5-541.)
  - (1) Machine, if necessary; to obtain a 0.002 to 0.005 inch (0.005 to 0.013 cm) plate 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.

CHQSOFTWARE.COM



MEASURE CHORDAL WIDTH HERE  
AT BLADE MIDPOINT



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-530. First Stage Compressor Rotor Blade - Measuring Chordal Width.

CHQSOFTWARE.COM

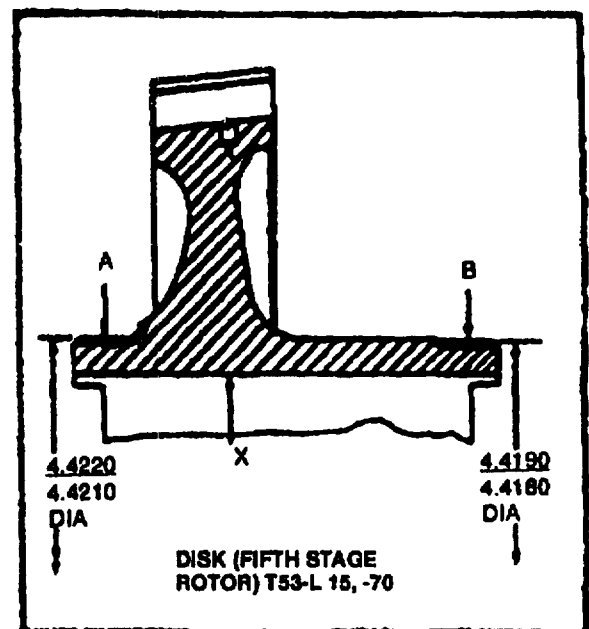
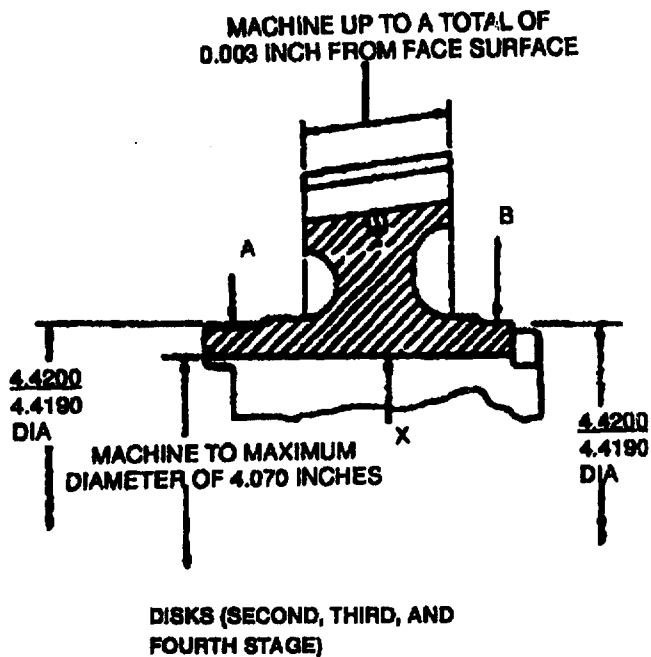
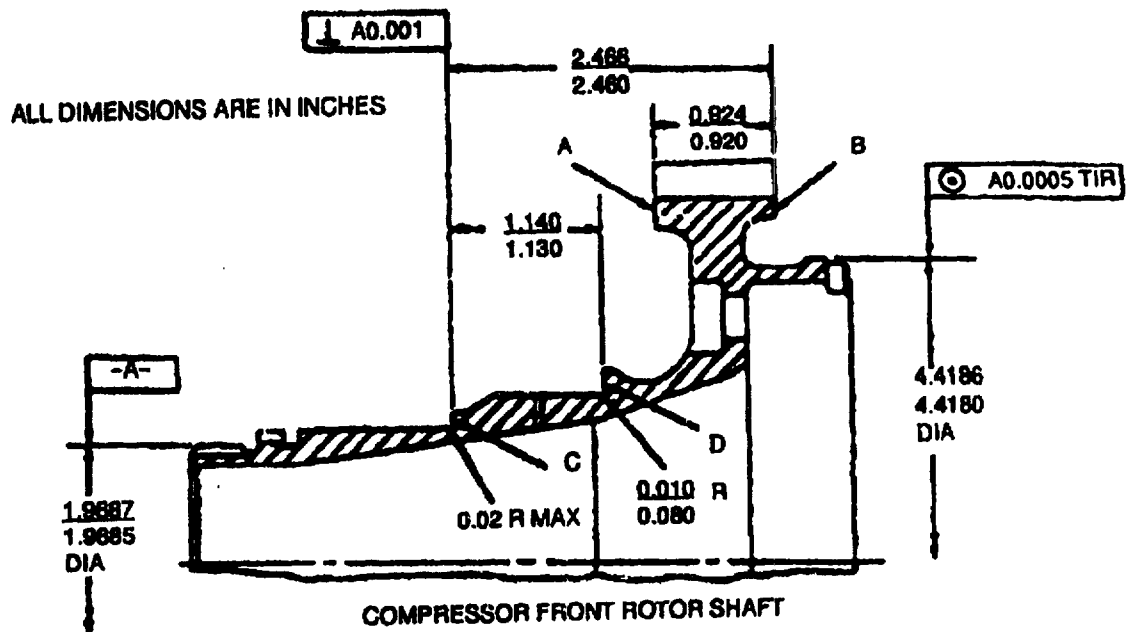
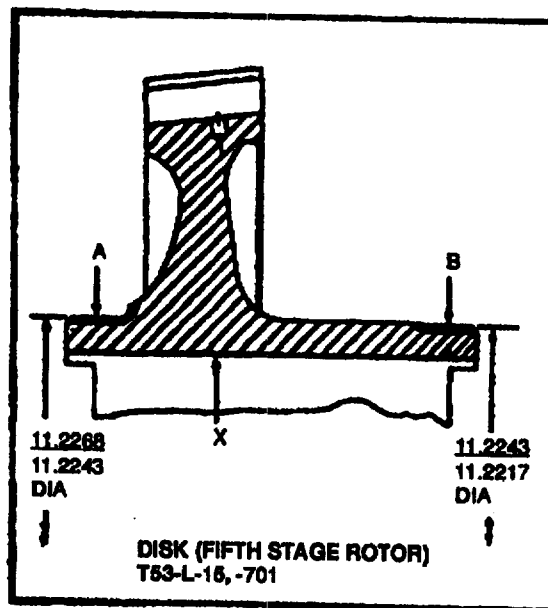
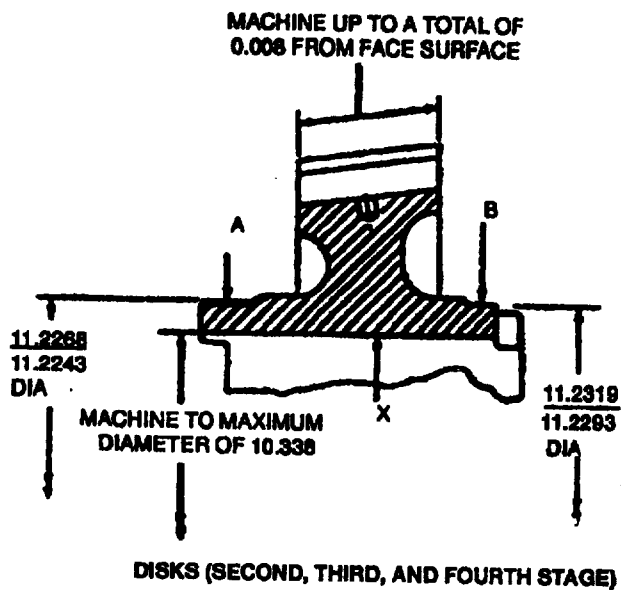
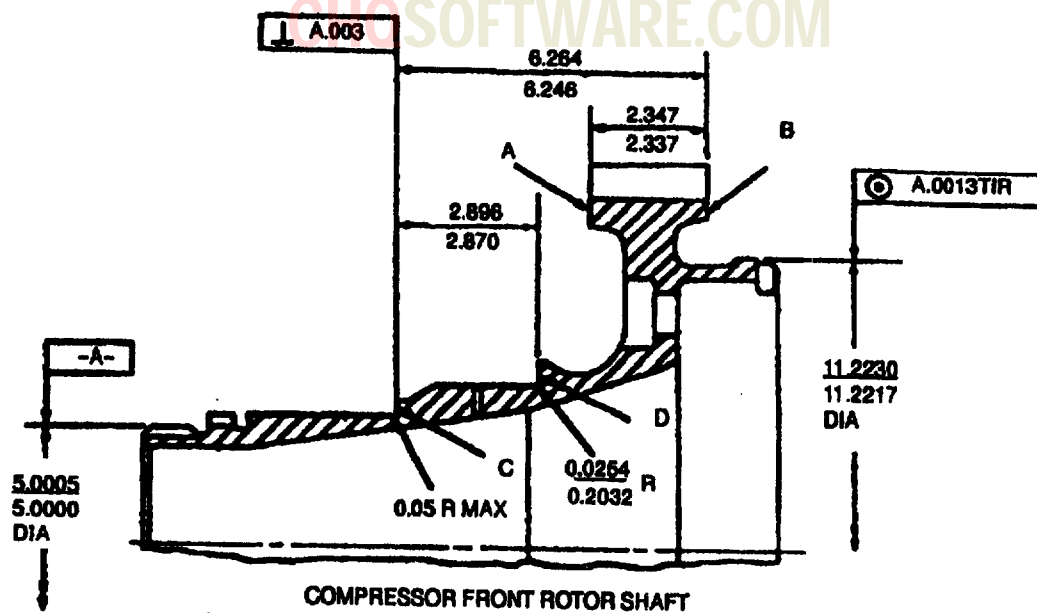


Figure 5-531. Compressor Rotor Disk - Repair Area (English).



DIMENSIONS ARE CENTIMETERS

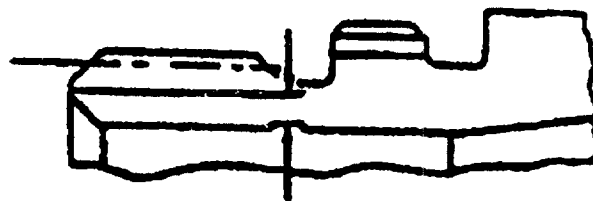
Figure 5-532. Compressor Rotor Disk - Repair Area (Metric).



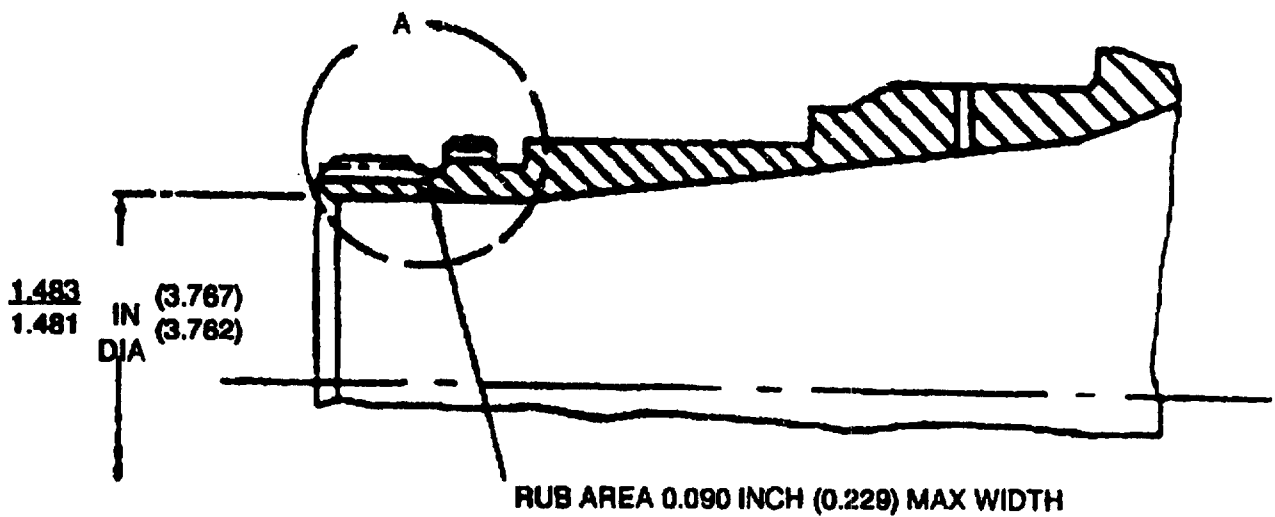
TYPICAL 2 SLOTS  
EQUALLY SPACED

0.270(0.685)  
0.265(0.673)  
IN

VIEW A  
(SLOT AREAS)

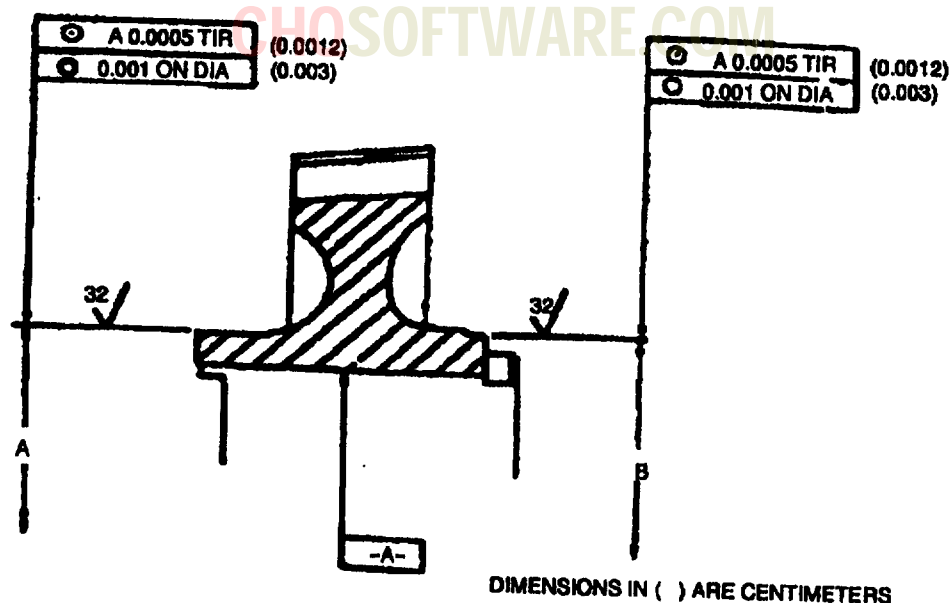


0.045 INCH (0.114)  
MIN IN SLOT AREAS



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-533. Compressor Front Rotor Shaft - Wear.



COMPRESSOR ROTOR DISK	BLUEPRINT DIMENSION A	MINIMUM MACHINING DIMENSION PRIOR TO REPAIR	BLUEPRINT DIMENSION B	MINIMUM MACHINING DIMENSION PRIOR TO REPAIR
FIFTH STAGE (TITANIUM)	4.421 TO 4.422 (11.229 TO 11.232)	4.411 (11.204)	4.418 TO 4.419 (11.222 TO 11.224)	4.408 (11.196)

Figure 5-534. Compressor Rotor Disk Pilot Diameter - Inspection and Repair (T53-L-15, -701).

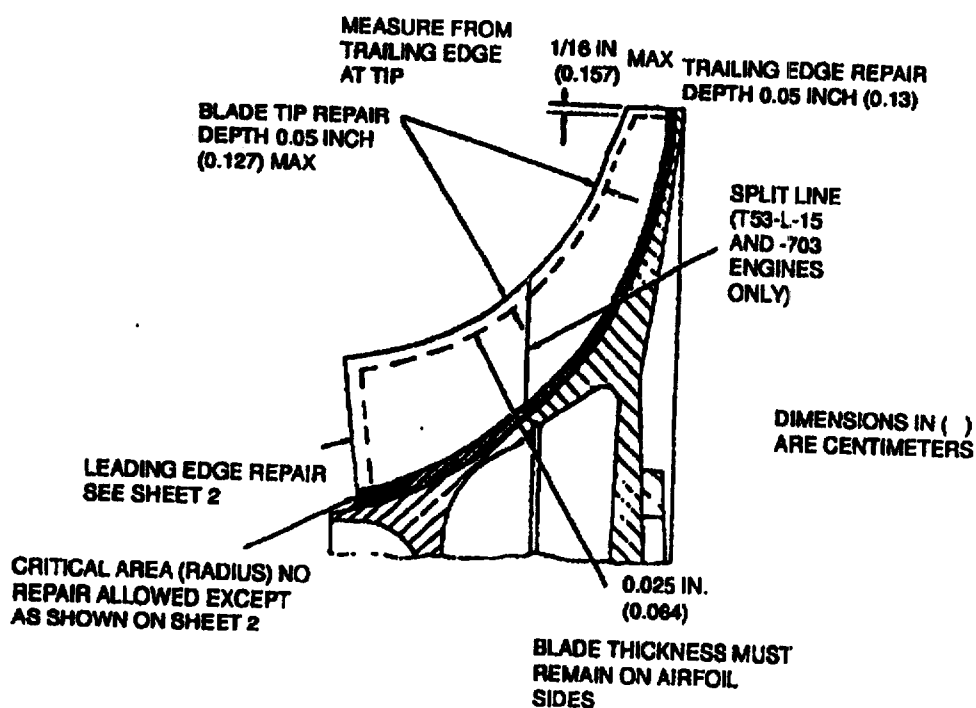
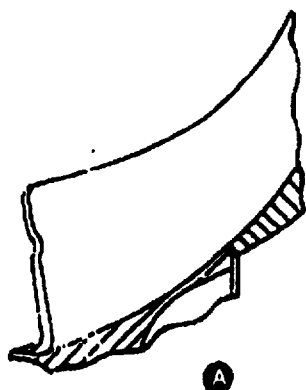
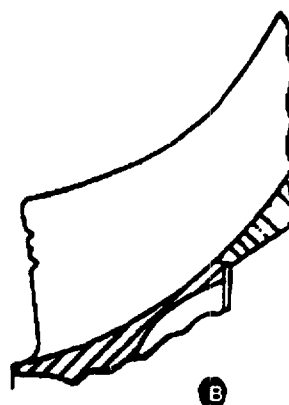


Figure 5-535. Centrifugal Compressor Impeller Blade Inspection and Repair (Sheet 1 of 2).

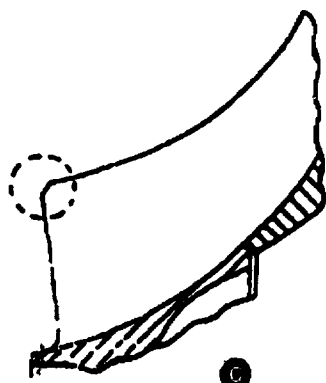
CHQSOFTWARE.COM



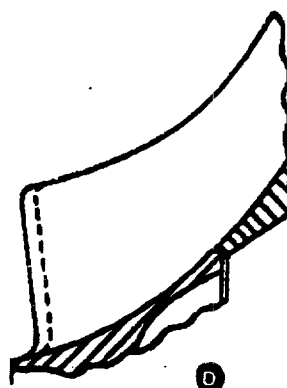
DENTS ARE ALLOWED UP TO  
0.08 INCH (0.20) DEPTH



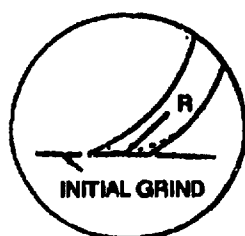
3 NICKS ALLOWED EACH UP TO 0.06 INCH (0.15)  
DEPTH WITH BLEND REPAIR  
IF OVER 3 NICKS, GRIND BACK TO DEPTH OF  
DEEPEST NICK. DO NOT EXCEED 0.13 INCH  
(0.33). IF ANY SINGLE NICK EXCEEDS 0.06 INCH  
(0.15) GRIND BACK TO DEPTH OF DEEPEST NICK.  
DO NOT EXCEED 0.13 INCH (0.33).



IF DEFECT IS WITHIN 0.06 INCH (0.15) OF  
EITHER CORNER, EXTEND REPAIR TO  
PROVIDE FOR A SMOOTH RADIUS



WHEN GRINDING BACK LEADING EDGE, PROFILE  
TO CLOSELY RESEMBLE AN UNAFFECTED VANE.  
REMOVAL OF METAL FROM AIRFOIL SHALL BE  
MADE ONLY TO FORM RADIUS AS SHOWN



DOTTED LINE INDICATES BLENDING  
BLEED SURFACE SIMILAR TO UNAF-  
FECTED VANE

DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-535. Centrifugal Compressor Impeller Blade Inspection and Repair (Sheet 2 of 2).

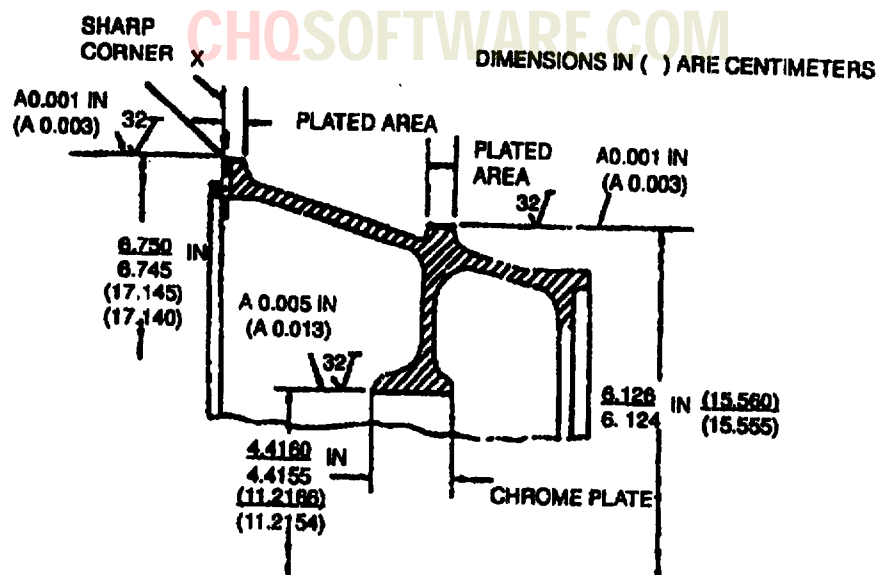


Figure 5-536. Chrome Plating - Fifth Stage Compressor Rotor Spacer (T53-L-15, -701).

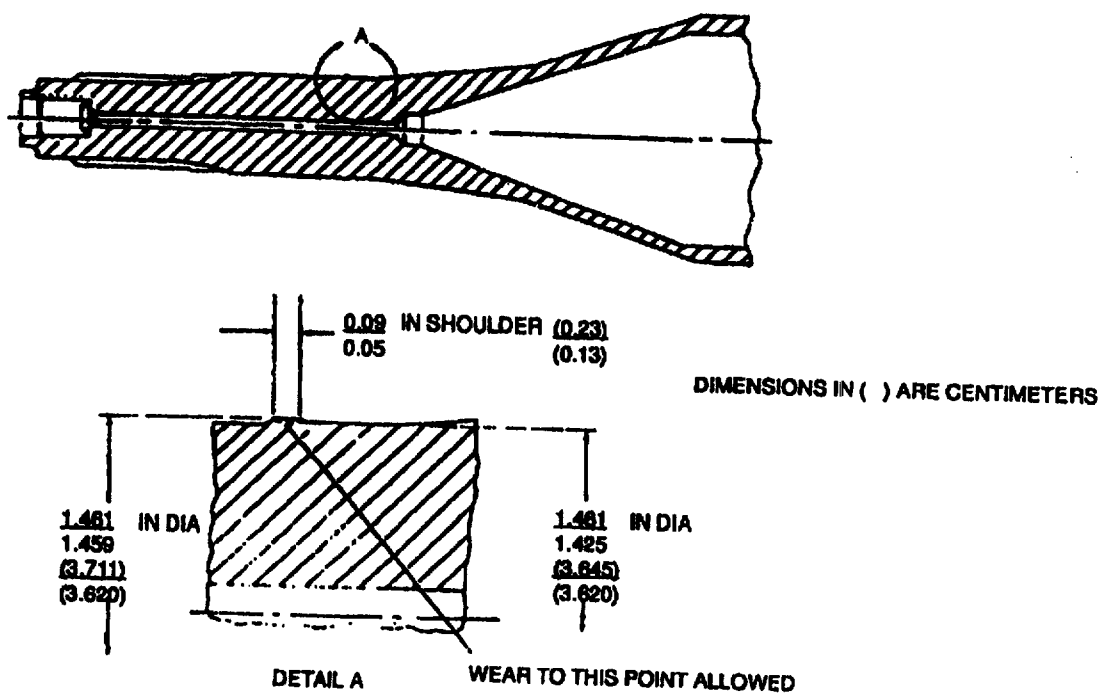
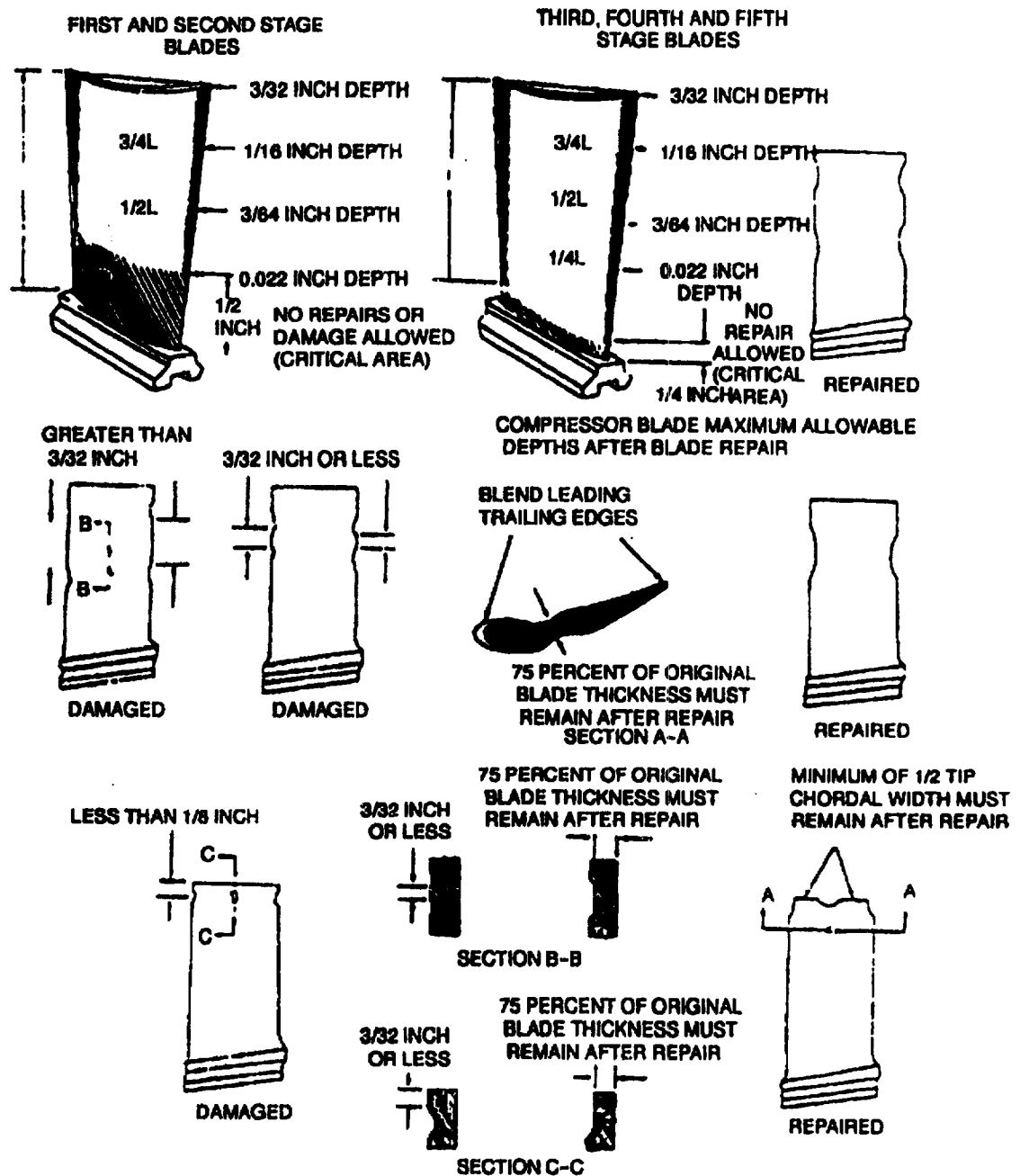


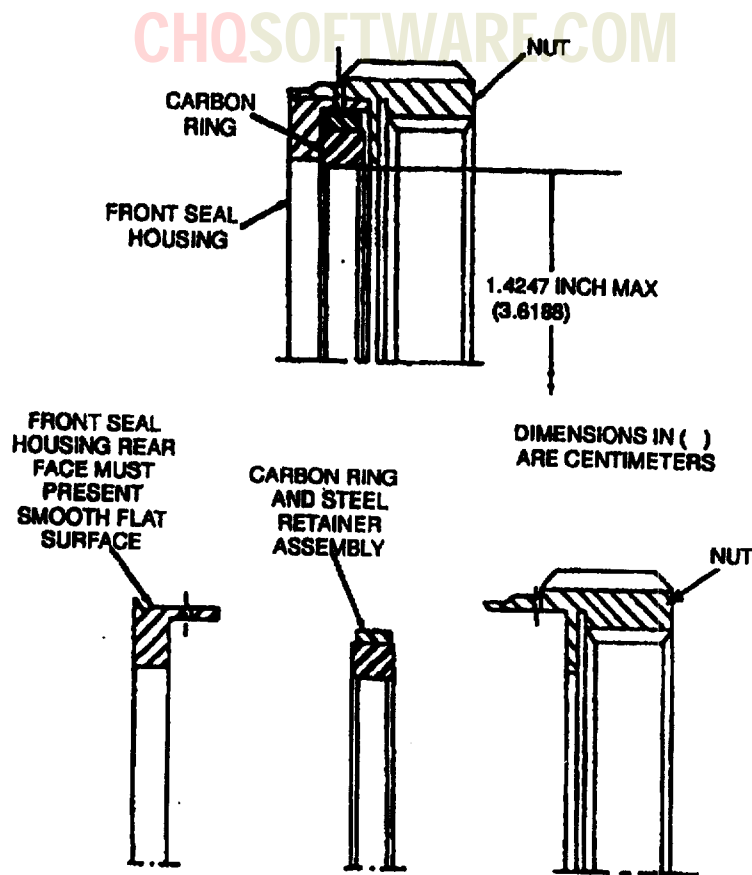
Figure 5-537. Power Shaft Shoulder Area - Wear.

CHQSOFTWARE.COM

**WARNING****FLIGHT SAFETY PARTS**

Critical area on blades is flight safety critical.

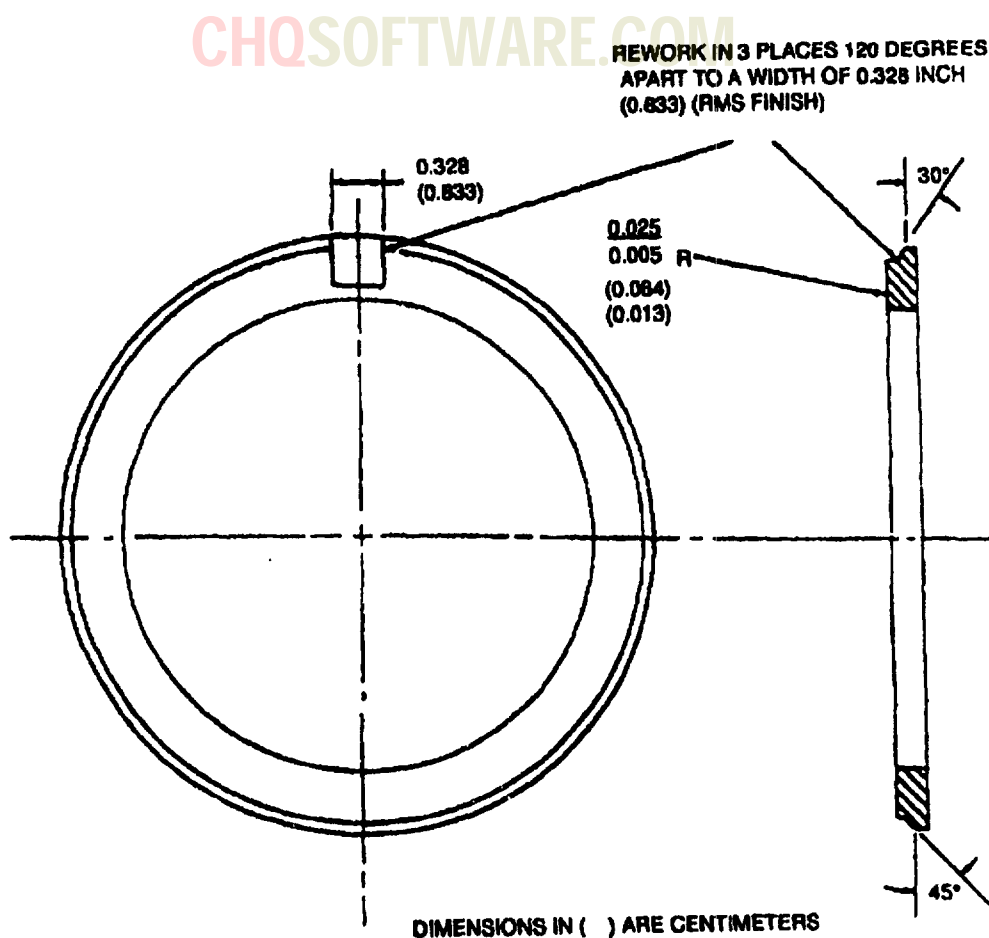
Figure 5-538. Compressor Rotor Blade Damage Before and After Repair.



**Figure 5-539. Nut and Seal Assembly - Seal Replacement.**

d. Repair worn 1.299 to 1.302 Inch (3.299 to 3.307 cm) dimensions on front bearing housing (6, figure 5-527), where up to 0.010 inch (0.025 cm) maximum plate thickness is required; as follows: (See figure 5-541.)

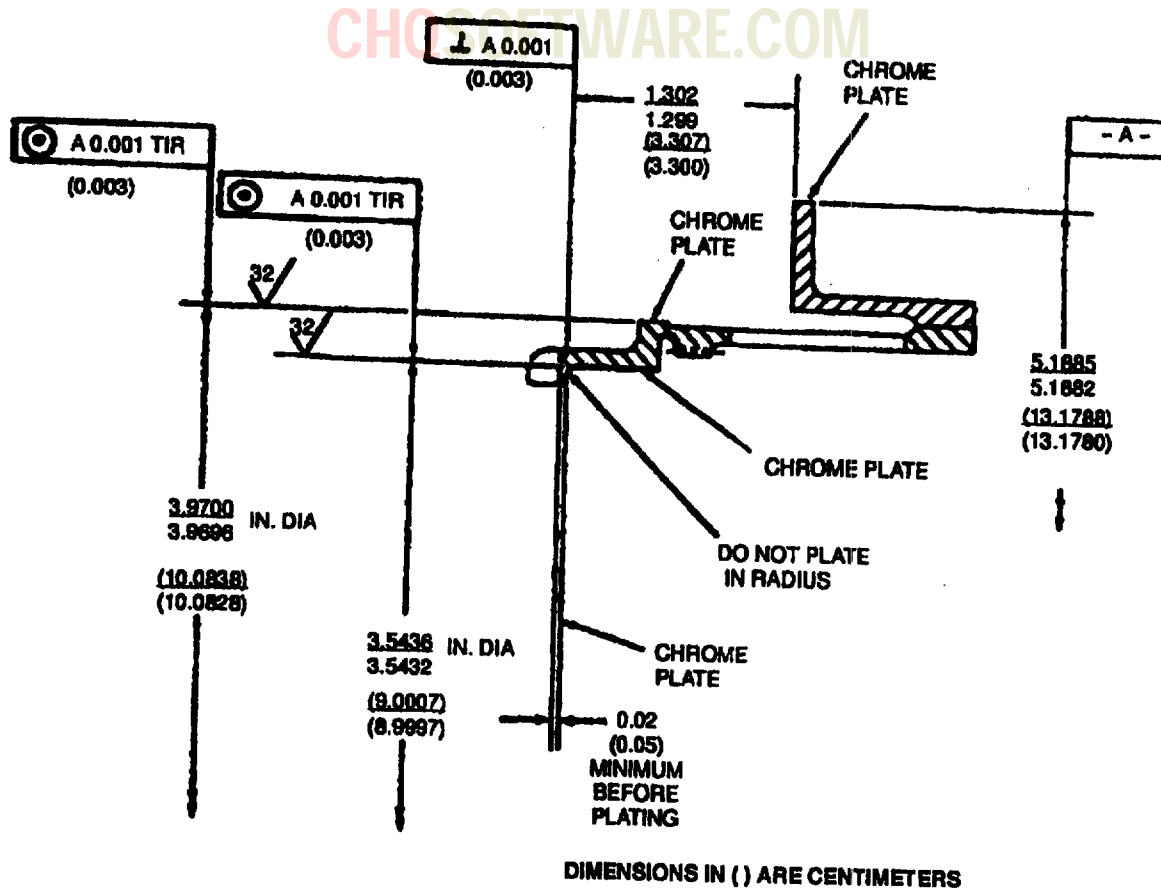
- (1) Machine, if necessary, to obtain a 0.002 to 0.010 Inch (0.005 to 0.025 cm) plate thickness after final machining.
- (2) Chrome-plate as outlined in SP No. 6014 in Appendix E.
- (3) Bake at 365° to 385° F (185° to 196° C) for 3 hours.
- (4) Machine to dimensions given.



**Figure 5-540. Rework of Front Seal Housing on Seal Assembly (1-300-077-02).**

e. Repair worn 3.9696 to 3.9700 inch (10.0828 to 10.0839 cm) diameter on front bearing housing (6, figure 5-527), where up to 0.005 inch (0.013 cm) maximum plate thickness is required as follows: (see figure 5-541.)

- (1) Machine, if necessary, to obtain a 0.002 to 0.005 inch (0.005 to 0.013 cm) plate 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 5-541. Compressor Front Bearing Housing - Plating Area.**

- f. Repair worn diameter 3.249 to 3.250 inch (8.252 to 8.255 cm), diameter 5.1881 to 5.1886 inch (13.1778 to 13.1790 cm diameter), and 0.002 to 0.004 inch (0.005 to 0.010 cm) dimension on housing (12, figure 5-527), where up to 0.010 inch (0.025 cm) plate thickness is required, by chrome-plating or plasma spray as follows: (See figure 5-542).
- (1) Chrome-plate as follows:
    - (a) Machine, if necessary, to obtain a 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.
  - (2) Plasma spray as follows:
    - (a) Machine or grind as required to obtain a 0.003 to 0.010 inch (0.008 to 0.025 cm) plate thickness after final machining.
    - (b) Plasma spray as outlined in SP No. 5006 in Appendix E using thermal spray powder (Item 224, table C-1).
    - (c) Machine the surfaces to the requirements of figure 5-542.
    - (d) Chamfer the coating edges.



g. On test stage disk, remove positive contact seal tracking and residual deposits of coke, varnish, and carbon, that project above journal surface, by lightly polishing the journal with crocus cloth (item 125, table C-1).

#### NOTE

It is not necessary to remove carbon deposits that are embedded below journal surface.

All polishing shall be accomplished in a circumferential direction.

h. Repair eroded first stage compressor rotor blades (20, figure 5-527) as follows: (See figure 5-543.)

(1) Blend repair. (Refer to SP No. 5000 in Appendix E.)

(2) Stone blades on leading edge only (from blade tip to platform radius) to remove sharp projections and roll-over burrs. Strokes shall be parallel to leading edge.

#### NOTE

Stoning shall be accomplished in such a manner as to eliminate sharp edges (roll-over).

(3) Stoning of airfoil, tip, or trailing edge is not required except as indicated in foreign object damage repair in following step j.

(4) If, after stoning of leading edge, nicks remain, repair as indicated in foreign object damage repair in following step j.

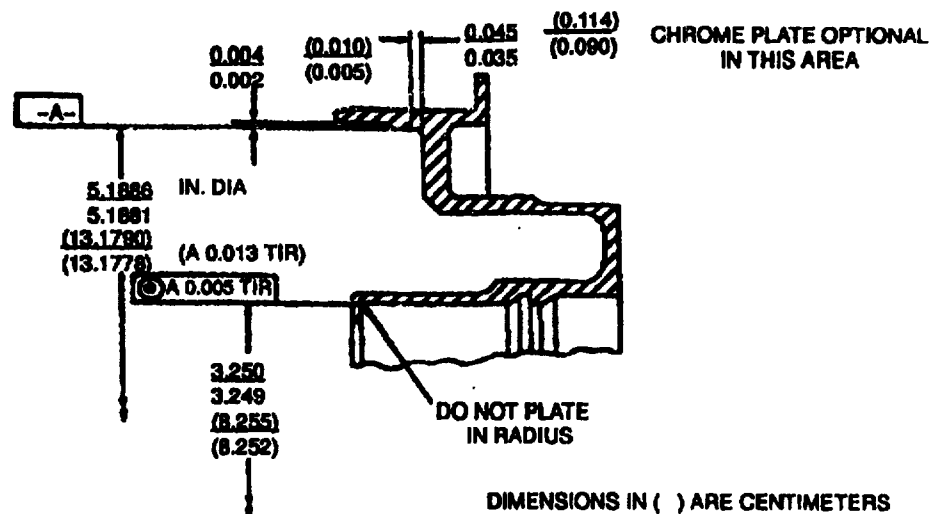
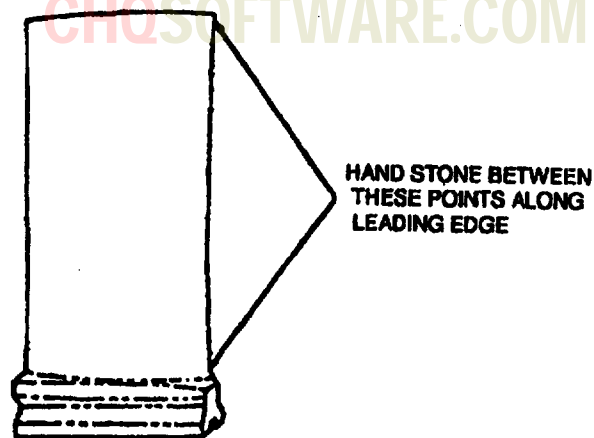


Figure 5-542. Seal Housing - Plating Area.



**Figure 5-543. First Stage Compressor Rotor Blade - Repair.**

- I. Repair first through fifth stage compressor rotor disk assemblies (16, 21, 26, 31, and 36, figure 5-527), which have blades protruding more than 0.015 inch (0.038 cm) from front or rear face of disk, as follows:
  - (1) Remove blade as outlined in paragraph 5-427, and inspect pin.
  - (2) Reinstall blade using plate of proper thickness. (Refer to paragraph 5-427.)
- J. Repair nicks, burrs, pits, dents, and other foreign object damage on compressor rotor blades. (See figure 5-538.)

**NOTE**

All defects in noncritical areas shall be reworked with the exception of smooth dents where burrs are not evident.

- (1) Blend repair. (Refer to SP No. 5000 in Appendix E.)
- (2) Make finished strokes of all repair work parallel to the length of the blade.
- (3) Blend the leading and trailing edges with a smooth radius as part of the repair.

**CAUTION**

To prevent damage to parts, do not use power tools to blend-repair.

- (4) No repairs or damage allowed within 1/2 inch of blade span, as measured from blade root in any area. Smooth dents, not exceeding 1/32 inch on longest side and 0.010 inch (0.025 cm) deep, are acceptable without rework.
- (5) No repairs on leading or trailing edges are allowed within 1/4 inch of blade root in any area. Smooth dents, not exceeding 1/32 inch on longest side and 0.010 inch (0.025 cm) deep, are acceptable without rework.
- (6) Maximum allowable repair depth on leading or trailing edge shall be 3/32 inch.
- (7) Repairs to damage on leading or trailing edge within 1/8 inch of blade tip shall be continued on tip. (See figure 5-538.)
- (8) If distance between two damaged areas on leading or trailing edge is less than 3/32 inch, make one blend-repair. If distance is greater than 3/32 inch, make separate repairs.

- (9) Maximum allowable repair depth on blade tip edge is 3/32 inch.
- (10) Length of repair on blade tip edge shall be at least three times repair depth.
- (11) If damage is closer to blade tip edge than 1/16 inch, blend-repair to the leading or trailing edge, whichever applies.
- (12) Minimum airfoil thickness shall be 75 percent original thickness.
- (13) If distance between two damaged areas on blade airfoil surface is less than 3/32 inch, make one blend-repair. If distance is greater than 3/32 inch, make separate repairs.
- (14) Maximum allowable repair length on blade airfoil surfaces shall be 13/32 inch.
- (15) Remove scratches or lines in airfoil areas to within repair limits.
- (16) No more than 20 percent of total blade material may be removed during repairs.

#### NOTE

If any of the above listed repair limits are exceeded, replace blades.

k. Repair worn 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter pin hole in compressor front rotor shaft (17, figure 5-527) and second through fourth stage disk assemblies (21, 26, and 31) as follows:

(1) Using a 0.156 to 0.157 inch (0.396 to 0.399 cm) diameter ream, ream hole to dimensions shown in figure 5-544.

(2) Using steel alloy (item 301, table C-1) for shaft and aluminum alloy (item 30, table C-1) for disks, fabricate a pin to fit 0.0004 to 0.0010 inch (0.0010 to 0.0025 cm) tight in reamed hole. (See figure 5-544.)

(3) Install pin and stake securely.

(4) Using a 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter drill, drill hole to dimensions in figure 5-545).

l. Rework compressor front rotor shaft (17, figure 5-527) to obtain runout as follows: (See figure 5-531.)

(1) If runout on surfaces A and B, figure 5-531 exceeds 0.001 inch (0.003 cm) TIR, surfaces may be ground, as necessary, to obtain 0.0005 inch (0.0013 cm) TIR. Do not exceed minimum dimension of 0.920 inch (2.337 cm).

(2) If runout on bearing shoulder (surface C, figure 5-531) is not within 0.001 inch (0.003 cm) TIR, machine surfaces C and/or D as necessary to obtain runout. Do not exceed 2.459 to 2.466 inches (6.246 to 6.264 cm) or 1.130 to 1.140 inches (2.870 to 2.896 cm) dimensions.

m. Repair worn spacer seating area (4.180 to 4.185 inches (10.617 to 10.630 cm) diameter), seal area (2.4360 to 2.4365 inches (6.1874 to 6.1887 cm) diameter), and bearing journal (1.9685 to 1.9687 inches (5.0000 to 5.0005 cm) diameter) of compressor front rotor shaft (17, figure 5-527), where up to 0.010 inch (0.025 cm) maximum plate thickness is required, by chrome plating as follows: (See figure 5-546.)

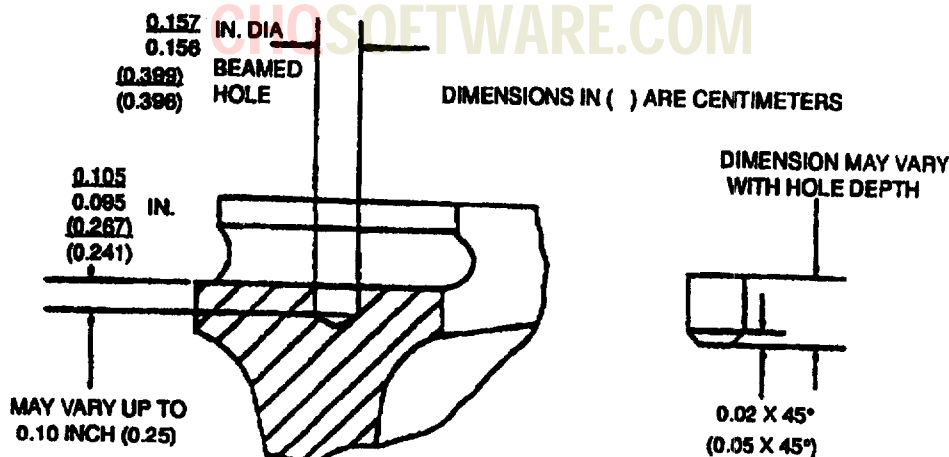


Figure 5-544. Shaft and Disk Pin Hole - Repair.

- (1) Machine, if necessary, to obtain a 0.002 to 0.010 inch (0.005 to 0.025 cm) plate thickness after final machining.
- (2) Chrome-plate as outlined in SP No. 6014 in Appendix E.
- (3) Bake at 350° to 400°F (177° to 204°C) for 3 hours.

#### NOTE

Do not plate within 0.09 inch (0.23 cm) of radius.

n. Repair second, third, and fourth state of compressor disk (22, 27, and 32, figure 5-527) by hard-anodizing as outlined in SP No. 6016 in Appendix E. Anodize 4.4200 inches (11.2243 to 11.2268 cm) OD (forward and rear) to a maximum thickness of 0.0020 inch (0.0051 cm.) (See figure 5-547.)

o. Second through fourth stage compressor disk (22, 27, and 32, figure 5-527), that have been stripped of epoxy and anodic coating, shall be glass-bead shot-peened in area shown in figure 5-551.

- (1) Peening intensity of 14-16N<sub>2</sub> (as determined by AMS2430) shall be maintained.
- (2) Bead diameter shall be 0.0083 to 0.0117 (0.0211 to 0.0297 cm) (D glass).
- (3) Slurry shall be maintained at 35 to 45 percent glass by volume.
- (4) Glass-bead shot-peened surfaces shall show complete coverage when examined visually at 7X magnification. Complete coverage is defined as a uniform and complete denting or obliteration of the original surface finish.
- (5) Surfaces showing lack of coverage shall be repeened, blending with surrounding peened areas.

# CHQSOFTWARE.COM

## 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.

(c) Strip paint by any of the following methods:

1 Dry media blasting including plastic media (Item 2, table C-1), bicarbonate (baking soda), or other media that will not remove or damage the substrate material.

2 Hand sanding using 400 grit or finer abrasive paper (Item 274, table C-1).

3 Chemical paint stripper (Item 236) only if any of the above methods do not strip adequately.

(d) Immerse housing in chromic acid (Item 86, table C-1)(24 ounces per gallon), maintained at 180°F (82°C) minimum for approximately 20 minutes, and rinse in hot water.

(e) Coat housing per paragraph 5-446c.

(5) Repair unacceptable cracks in jackscrew hole area of compressor housing upper half as follows:

(a) Remove helical insert.

(b) Using a 3/4-inch diameter counterbore, piloted in the discrepant jackscrew hole (1/4 inch pilot approximate), counterbore cracked portion to a depth not to exceed flush with adjacent counterbored areas. (See figure 5-512.)

(c) Perform visual and fluorescent-penetrant inspection of machined area to ensure that all crack indications are removed.

(d) Retap threads, if necessary. Tap through for 1/4-inch (0.250-28 UNF-3B) helical insert, MS33537.

(e) Touch up reworked area in accordance with SP No. 6021 in Appendix E.

(f) Install helical insert in accordance with SP No. 5007 in Appendix E.

(6) Repair corrosive pitting in stator vane seating areas of compressor housing assembly as follows:

(a) Clean areas with dry-cleaning solvent (Item 134, table C-1).

(b) Blend-repair areas. (Refer to SP No. 5000 in Appendix E.)

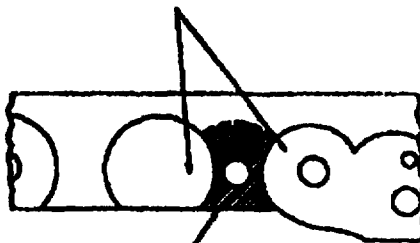
(c) Restore protective surface finish. (Refer to SP No. 6022 in Appendix E.)

(d) Repair heavy corrosion in steel insert and stator vane seating area using epoxy (Item 149, table C-1) as follows:

1 Remove corrosion and treat as outlined in paragraph (3)(a) through (f).

2 Fill area with epoxy (Item 149, table C-1) and cure at room temperature for 24 hours.

**CRACKS EXTENDING INTO PREVIOUSLY  
COUNTERBORED AREAS ARE NOT REPAIRABLE**



**COUNTERBORE SHADED AREA TO REMOVE CRACKS**

**Figure 5-512. Compressor Housing Crack Repair.**

3 Finish machine housing ID to blueprint dimensions.

4 Coat repaired areas with clear epoxy resin sealant as outlined in SP No. 6028, steps g through i, in Appendix E.

(7) Repair cracked threaded jackscrew holes in compressor housing as follows:

(a) Drill and tap through 3/8-24 thread.

(b) Touch up area in accordance with Military Specification MIL-M-3171, Type VI.

(c) Insert threaded stainless steel plug using sealant (item 263, table C-1).

(d) Pin plug with tight-fitting 1/16 inch stainless steel pin, located in threaded area 90 degrees from crack.

(e) Drill and tap through plug 1/4-28 thread.

(8) Repair cracks in compressor, and on magnesium impeller housing as follows:

(a) Rout or blend out minor surface cracks.

(b) Etch reworked areas as follows:

1 Swab areas with 5 percent solution of sulphuric acid (item 323, table C-1). Allow solution to remain on surface for 10 to 20 seconds, or until foaming stops, then swab with solution of sodium hydroxide (ten grams sodium hydroxide (item 283, table C-1) to 100 milliliters of water).

2 Allow solution to remain on surface 1 to 2 minutes; then wipe dry with clean, lint-free cloth.

3 Swab areas with a solution of 18 grams chromic acid (item 86, table C-1) to 100 milliliters of water. Allow solution to remain on surface for 20 to 30 seconds; then wipe with cloth saturated with water to remove chromic acid stains. Wipe area dry with a clean, lint-free cloth.

(9) Corrosion up to 0.080 inches (0.203 cm) deep on the mounting flange may be repaired in accordance with subparagraph (a) by installing an aluminum shim. Individual corrosion pockets must not exceed 0.10 inches (0.25 cm) in diameter after machining 0.040 inches (0.102 cm) off the aft flange for a shim, corrosion not exceeding 0.200 inches (0.508 cm) deep after cleanup may be repaired by welding in accordance with subparagraph (b). The cumulative corroded area must not exceed 30% of mounting flange surface after routing for welding.

(a) Repair mounting flange corrosion by installing an aluminum shim as follows:

### CAUTION

After installation of the shim, the housing must meet the overhaul length dimension shown in figure 5-507.

1 Mill 0.040 inch (0.102 cm) of magnesium from the compressor housing aft flange surface which mates with the impeller housing surface.

2 Remove any remaining corrosion, by hand sanding, using sandpaper (item 262, table C-1) or light grit blast.

3 Individual remaining corrosion pockets shall not exceed 0.040 inches (0.102 cm) deep or 0.10 inches (0.25 cm) diameter after machining and corrosion removal.

4 Treat surface with chromate acid brush on MIL-M-2171, Type VI.

5 Fabricate shim from 0.040 inch (0.102 cm) thick 2024-T3 aluminum sheet (item 28 or 29, table C-1) per figure 5-507, sheet 2 of 2. Hard anodize shim per MIL-A-8625, Type II, Class 1.

6 Clean the housing and shim in accordance with SP No. 3001 in Appendix E to remove all surface contamination or vapor blast in accordance with SP No. 3003 in Appendix E. Clean the milled surface of the compressor housing with cleaning solvent (item 102, table C-1) to insure a clean surface for adhesive bonding of the shim.

7 Assemble compressor housing with alignment pins and bolts.

8 Adhesive bond the shim to the repair surface using EA934NA epoxy adhesive (item 145, table C-1). Apply a thin even adhesive coating 0.002 to 0.005 inches (0.005 to 0.013 cm) thick.

#### NOTE

When applying adhesive use polyethylene gloves to prevent contamination of repair surfaces.

9 Position shim halves on housing and apply hand pressure to remove excessive adhesive. Wipe off excessive adhesive with cleaning solvent (item 102, table C-1).

10 Secure the shim in place with a dummy plate or use bolts torqued to 70-90 inch pounds.

11 Cure adhesive at 190-210°F (88-100°C) or one hour.

12 Verify the housing meets the overhaul length dimensions in accordance with figure 5-507.

13 Apply one coat of Syntheteline 200 (item 144, table C-1). Bake at 340° to 360°F (171° to 182°C) for 2 hours.

(b) Repair mounting flange by welding as follows:

1 Clean area to be welded with acetone (item 13, table C-1).

2 Corroded areas equal or less than 0.040 inches (0.102 cm) deep may be filled with epoxy (item 149, table C-1) instead of welding.

3 Using carbide burr, rout corrosion to expose clean, sound base metal.

4 Preheat to 300°F (149°C) maximum.

5 Build up corroded areas using gas tungsten arc welding in accordance with SP No. 5001, Appendix E, using welding rod (item 344, table C-1).

6 Stress relieve at 345° - 355°F (174° - 179°C) for 12 hours.

7 Machine welded surface to blueprint dimensions, surface finish and specifications.

8 Verify housing meets the length dimensions in accordance with figure 5-507. A short housing may be repaired by installing a shim in accordance with paragraph 5-413a(9)(a).

9 Perform visual and fluorescent penetrant inspection of repaired area. No cracks allowed.

10 Clean part with acetone (item 13, table C-1) or cleaning solvent (item 101, table C-1).

11 Apply dichromate treatment to repaired surface in accordance with MIL-M-3171, Type III.

12 Apply one coat of Syntheteline 200 (item 144, table C-1). Bake at 340° to 360°F (171° to 182°C) for 2 hours.

(c) Individual remaining corrosion pockets shall not exceed 0.040 inches deep or 0.10 inches diameter after machining and corrosion removal.



- (d) Using an acid brush, treat surface with chromate acid, MIL-M-3171, type VI.
- (e) Fabricate shim from 0.040 inch (0.102 cm) thick aluminum sheet (item 27 or 29, table C-1) per figure 5-507, sheet 2 of 2. Hard anodize shim per MIL-A-8625, Type III, Class 1.
- (f) Clean the housing and shim in accordance with SP No. 3001 in Appendix E to remove all surface contamination or vapor blast in accordance with SP No. 3003 in Appendix E. Clean the milled surface of the compressor housing with cleaning solvent (item 102, table C-1) to insure a clean surface for adhesive bonding of the shim.
- (g) Assemble compressor housing with alignment pins and bolts.
- (h) Adhesive bond the shim to the repair surface using EA934NA Epoxy Adhesive. Apply a thin even adhesive coating 0.002 to 0.005 inches (0.005 to 0.013 cm) thick.

#### NOTE

When applying adhesive use polyethylene gloves to prevent contamination of repair surfaces.

- (i) Position shim halves on housing and apply hand pressure to remove excessive adhesive. Wipe off excessive adhesive with cleaning solvent (item 102, table C-1).
- (j) Secure the shim in place with a dummy plate or use bolts torqued to 70-90 inch pounds.
- (k) Cure adhesive at 190°-210°F for one hour.
- (l) Verify the housing meets the overhaul length dimensions in accordance with figure 5-507.
- (m) Refinish or touch-up surface finish of housing as required.

b. If inside diameter dimensional requirements (figure 5-508) can not be met because of distortion or undersize, machine inserts as required to establish minimum dimensions. If insert is oversize, metal spray repair as follows:

- (1) If removed, install inserts in original housing and pre-machine ID only if required to true up.
- (2) Clean inserts using acetone (item 13, table C-1).
- (3) Mask as required and grit-blast insert ID using aluminum oxide powder No. 220 grit (item 36, Appendix C).
- (4) Plasma spray ID using plasma spray powder (item 225, Appendix C) as required to 0.015 inch build up.

#### NOTE

No minimum thickness of spray is required.

- (5) Finish machine inserts to dimensions shown in figure 5-508.

c. Remove damaged inserts. Inserts may be removed to allow for corrosion treatment. Mark reusable inserts and install in the same location after corrosion treatment and repair.

- (1) Fabrication of inserts is as follows:

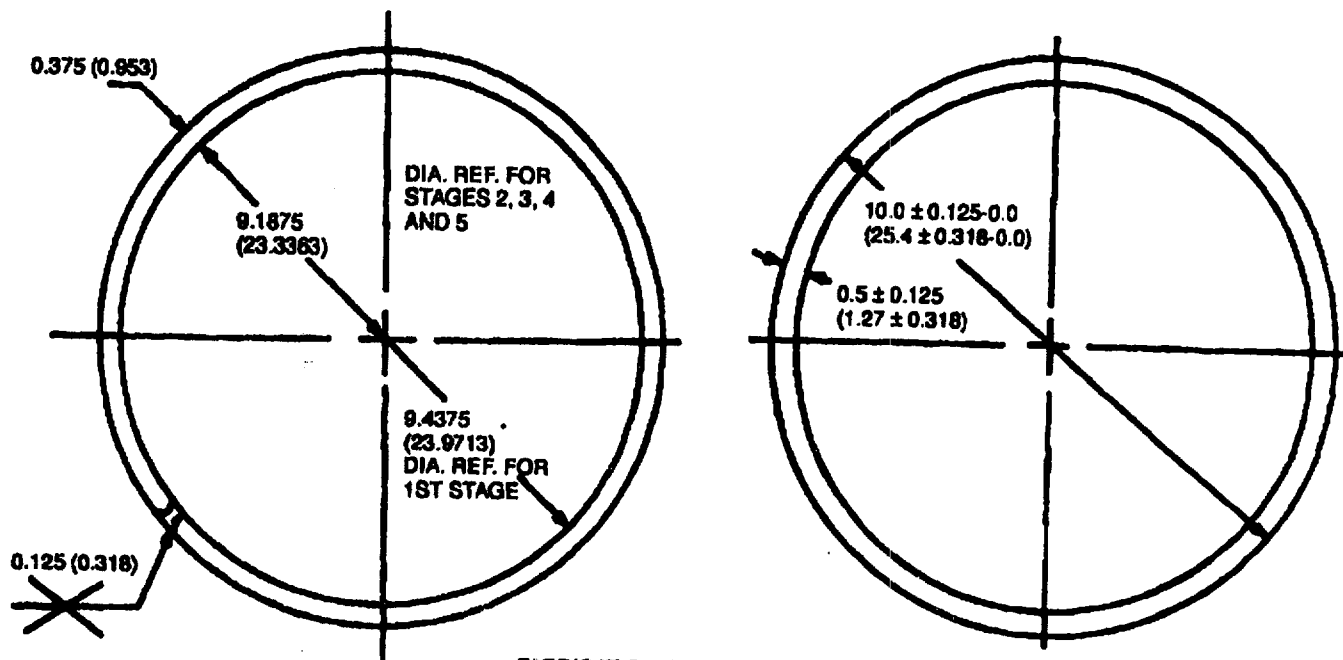
- (a) Fabrication of ring blank: Ring blank may be fabricated or tubing may be used as shown in figure 5-513.
- (b) Fabrication of Inserts:
  - 1 Machine inserts from ring blank to dimensions shown in figure 5-514, table 5-156.
  - 2 Mark part numbers and cut rings in locations shown.

#### NOTE

It is not required that inserts halves be kept together as a matched set.



CHQSOFTWARE.COM



FABRICATION OF BLANK FOR INSERTS

DIMENSIONS IN ( ) ARE CENTIMETERS

**ROLLED WELDMENT (SHEET)  
(PREFERRED)****MATERIAL SPECIFICATION:**  
MIL-S-6721 (TYPE 321)**WELD SPECIFICATION:**  
MIL-W-8811 (T.I.G. METHOD)**ROD SPECIFICATION:**  
MIL-R-5031  
CLASS 5A (TYPE 347)  
ANNEAL PER  
MIL-H-8875**TUBING****1ST ALTERNATE  
MATERIAL SPECIFICATION:**  
MIL-T-8806

NO HEAT TREATMENT NEEDED.

**NOTE**

Other manufacturing methods such as forging, extrusion and casting, but not limited to these shall be acceptable provided the finished product meets all requirements of this DMWR.

Figure 5-513. Fabrication of Ring Blank.

- 5-156. 3 Drill holes using drill fixture 67AMXAC-D-0246 or equivalent, in locations shown in figure 5-514, table

**CAUTION**

Inserts must be split prior to drilling and tapping bolt holes. Inserts must be restrained during the drilling operation in such a manner that the O.D. of the inserts are held to a dimension compatible to the axial compressor housing in which they are to be installed. Fixture P/N 67AMXAC-D-0246 complies with this requirement. Tapped holes must be located from the part numbered end of the insert.

(c) Packaging and Preservation: This paragraph applies when parts are to be packaged for shipment or stored for extended periods.

Method - MIL-P-116, Method 1.

Preservation - P-6, MIL-C-11796, Class 3.

Wrap - MIL-B-121, Grade A.

Cushioning - As required.

Container - PPP-B-636

Unit - One Insert, Consisting of One Each "A" Half and "B" Half

(d) Tapped holes which are mislocated during manufacture may be repaired as follows:

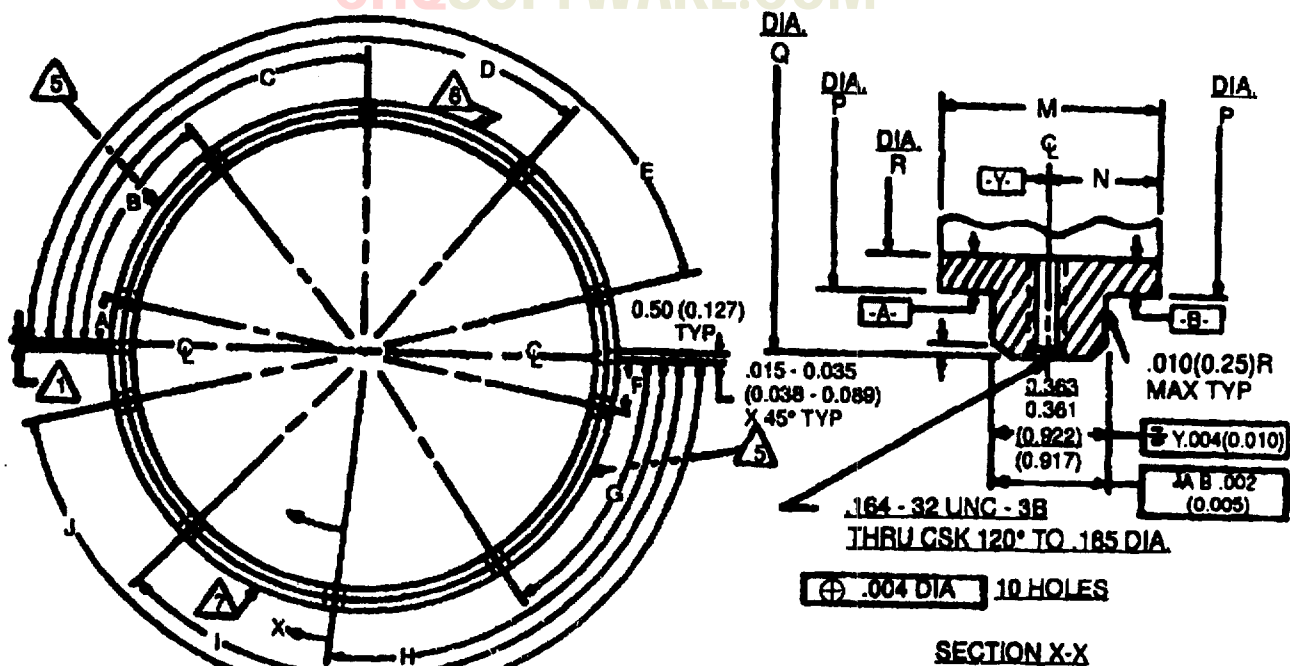
1 Weld repair holes in inserts by TIG method per MIL-W-8611, using filler metal conforming to MIL-R-5031, Type 7A (AISI347). Use necessary heat sink(s) to reduce or eliminate warpage during welding.

2 Blend weld bead smooth to parent metal.

3 After welding, clean weld area with acetone (item 13, table C-1) or cleaning solvents (item 101 or 102, table C-1) followed by Isopropyl alcohol (item 25, table C-1), and penetrant inspect part per MIL-STD-6866 Type I to assure that welded crack(s) is sound.

4 Drill and tap in accordance with figure 5-514, and table 5-156. All other inspection requirements per figure 5-514, and table 5-156 must be maintained.

(2) Inspect lands and insert groove for evidence of corrosion (Refer to table 5-154). Treat corrosion as outlined in SP No. 5000 and SP No. 6022 in Appendix E.



DIMENSIONS IN ( ) ARE CENTIMETERS

- 1 ALL FINISH REQUIREMENTS TO BE 125 RMS (MAX.) UNLESS OTHERWISE SPECIFIED.
- 2 ALL DIMENSIONS SHOWN EXCEPT LOCATION OF BOLT HOLES ARE OBTAINED BEFORE SPLITTING INSERT RINGS INTO SEMI-CIRCLES.
- 3 THICKNESSES **-A-** AND **-B-** MUST MEASURE THE SAME WITHIN .005(0.013) TOTAL AT ANY GIVEN POINT.
- 4 AFTER FINISH MACHINING, INSERTS ARE TO BE SPLIT AS SHOWN (.050 (0.127) MAX. WIDTH OF CUT). END FACES OF INSERTS SHALL BE PARALLEL TO CENTER LINE WITHIN .003 T.I.R. DE-BURR SHARP EDGES ON END FACE OF INSERTS.

#### CAUTION

WHEN RING BLAND IS FABRICATED FROM ROLLED WELDMENT OR WELDED AND DRAWN TUBING (TYPE II) RINGS SHALL BE SPLIT THRU THE WELD JOINT. NECESSARY STEPS SHOULD BE TAKEN DURING THE ENTIRE MFG. PROCESS TO INSURE LOCATION OF WELD JOINT FOR SPLITTING.

- 5 VIBROPEEN PART NUMBER TWO (2) PLACES AS SHOWN. LOCATE TAPPED HOLES FROM PART NUMBERED, END OF INSERT.
- 6 VIBROPEEN LETTER "A" IN LOCATION SHOWN TO IDENTIFY TOP HALF OF INSERT.
- 7 VIBROPEEN LETTER "B" IN LOCATION SHOWN TO IDENTIFY BOTTOM HALF OF INSERT.
- 8 ALL VIBROPEEN MARKINGS SHALL BE ACCOMPLISHED USING APPROX. 0.125 (0.318) CHARACTERS.

Figure 5-514. Fabrication of Inserts.

**Table 5-156. Drill and Dimensions Chart, Fabrication of Inserts.**

CODE	FIRST STAGE	SECOND STAGE	THIRD STAGE	FOURTH STAGE	FIFTH STAGE
A°	18°45'	15°45'	15°45'	10°	10°
B°	53°45'	56°30'	47°30'	50°	50°
C°	108°45'	97°	80°	90°	90°
D°	126°15'	13°	125°	130°	130°
E°	161°15'	166°30'	170°	170°	170°
F°	18°45'	13°30'	10°	10°	10°
G°	53°45'	53°45'	52°30'	55°	55°
H°	108°45'	94°	95°30'	100°	100°
I°	126°15'	130°	130°	132°30'	132°30'
J°	161°15'	164°15'	164°15'	164°45'	164°15'
Width M	.976 - .971	.918 - .913	.803 - .798	.796 - .791	.680 - .675
Dim. N	.488 - .485	.459 - .456	.402-.399	.398 - .395	.340 - .337
Dia. Q	10.000 - 10.080	9.692 - 9.841	9.600 - 9.749	Same	Same
Dia. P	9.885 - 9.905	9.567 - 9.587	9.476 - 9.496	Same	Same*
Dia. R	9.595 - 9.615	9.349 - 9.369	9.272 - 9.292	Same	Same
P/N	T53L0-I0066-9	T53L0-I0066-1	T53L0-I0066-3	T53L0-I0066-5	T53L0-I0066-7

\* See Note  FIGURE 5-514.

(3) Install new inserts as follows:

- (a) Loosely assemble inserts to housing with bolts (12) and washers (13).
- (b) Position inserts so that one end of lower insert is flush with housing splitline, on one side, and one end of upper insert is flush with housing splitline, on the opposite side, 180° away.

**NOTE**

Inserts may be centered in housing halves as an alternate assembly procedure.

- (c) Tighten two centermost bolts to 22 to 24 pound-inches (3929.2 to 4286.4 gm cm) torque.
  - (d) Clamp or bolt housing halves together and tighten outside insert bolts to 12 to 14 pound-inches (2143.2 to 2500.4 gm cm) torque.
  - (e) Inspect bolts for projection into airflow path. Bolts are to be flush to 0.032 inch (0.081 cm) below surface of inserts.
  - (f) Measure inside diameter of inserts as shown in figure 5-508. If dimensions cannot be met, machine inserts as necessary. Holding fixture (LTCT4153) should be used to mount compressor housing in lathe.
  - (g) Using a feeler gage, check both ends of inserts for an end gap of 0.002 to 0.035 inch (0.005 to 0.089 cm).
- d. Repair of vanes (8, 9, 10, 11, and 23, figure 5-501).

**NOTE**

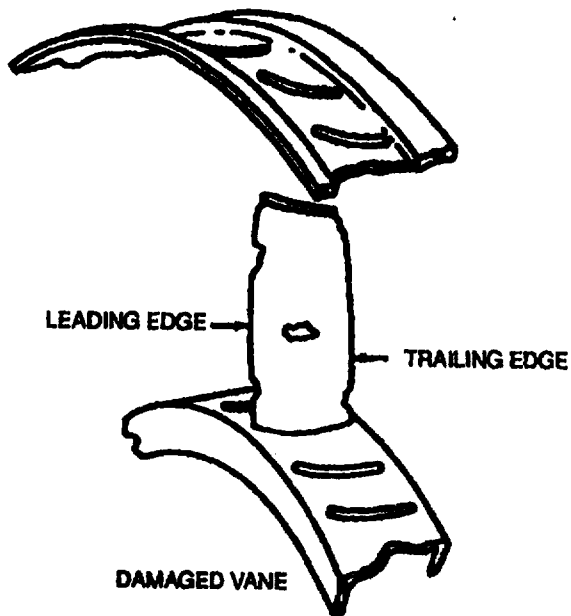
Stator vane halves remaining after the other halves have been rejected can be re-matched with another serviceable half.

- (1) Blend-repair nicks, burrs, pits, and dents. (See figure 5-515.)

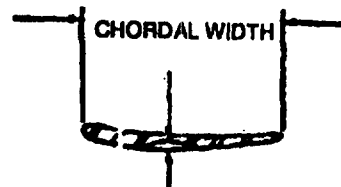
**NOTE**

Length of blend-repaired areas shall be four times the depth. Maintain longest radius possible within limits of length and depth. The maximum permissible area of blend repairs on airfoil surfaces is 0.020 inch (0.051 cm) in depth and 0.025 inch (0.064 cm) in length. Maintain largest radius possible within limits of length and depth.

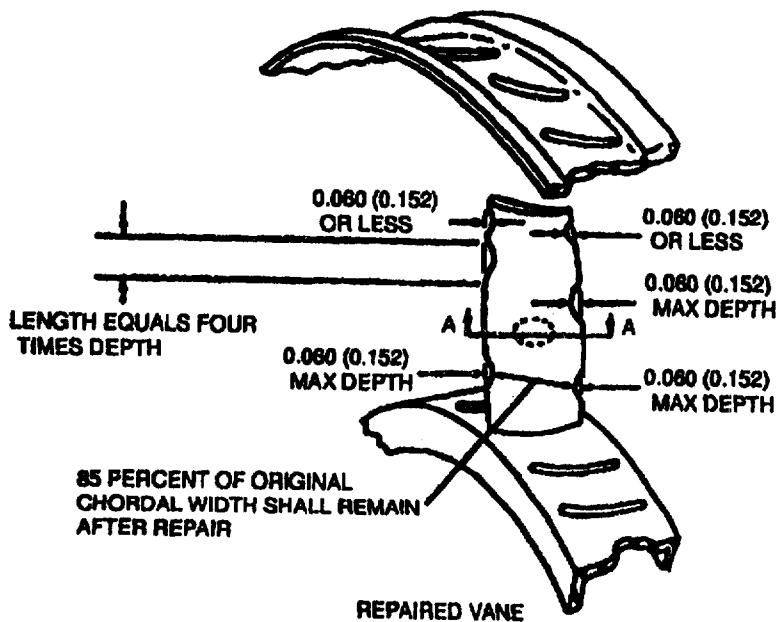
CHQSOFTWARE.COM



ROUND BOTTOMED DEFECTS UP TO 0.20 INCH MAXIMUM DIAMETER ARE ALLOWED ON AIRFOIL SURFACES PROVIDED THEY DO NOT EXTEND INTO LEADING OR TRAILING EDGE AREAS AND CRACKS ARE NOT GENERATED. OPPOSITE SIDE PROTRUSIONS CAUSED BY THESE DEFECTS ARE ALLOWED PROVIDED THE VANE THICKNESS IS WITHIN LIMITS. DO NOT BLEND REPAIR OPPOSITE SIDE DEFECTS AS THIS FURTHER REDUCES VANE THICKNESS.



SECTION A-A



DIMENSIONS IN ( ) ARE CENTIMETERS

Figure 5-515. Compressor Stator Vane - Repair Limits.

- (a) Repair, using small diesinker-type file and India or carborundum stone.
- (b) Use abrasive crocus cloth (item 125, table C-1) for final polishing.
- (c) Blend all repairs and finish smoothly.
- (d) The finish strokes of all repair work shall be parallel to the longitudinal axis of the vane. (See figure 5-515, for repair limits)

**WARNING****FLIGHT SAFETY PARTS**

**Fluorescent penetrant inspection is flight safety critical.**

**CAUTION**

Power tools may be used for blend repair of compressor stators, provided care is taken to prevent damage to adjacent areas.

- (2) Repair bending and minor distortion of inner shroud sealing areas on vanes as follows:
  - (a) Using a soft-face mallet and wooden forming blocks, reform damaged areas to conform to original shroud contour.
  - (b) Perform a visual and fluorescent-penetrant inspection on repaired areas. Cracks are not acceptable.
- (3) Straighten bent vanes, using pliers, having friction-taped jaws. If straightening generates crack in vane, the assembly half shall be replaced.
- (4) Torch-braze repair as outlined in table 5-157.
- e. Repair of impeller housing assembly (Magnesium) (5, figure 5-501).
  - (1) Repair erosion, rubbing, scoring, or grooves on impeller housing assembly by use of shims as follows:

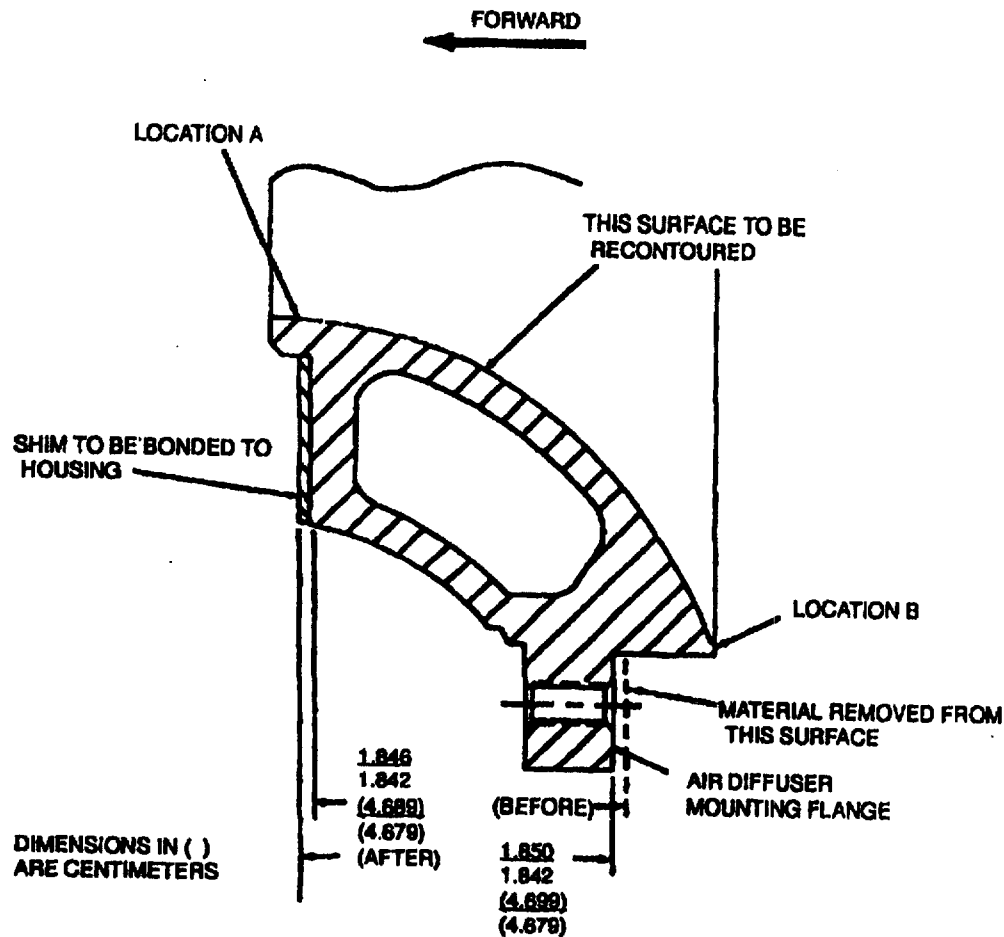
**CAUTION**

Repair may be accomplished only once per housing due to the structural weakening caused by machining mounting flange.

**Table 5-157. Compressor Stator Vanes - Braze Instructions.**

Rework	Process	Pre-Heat	Pre-Heat	Material	Inspection	Pressure Test
Repair of Cracks in Braze Joints	Torch-Braze	-	-	Brazing Alloy (item 58, table C-1)	Visual and Fluorescent Penetrant.	

CHQSOFTWARE.COM



**Figure 5-516. Cross Section of Centrifugal Compressor Housing.**

(a) Inspect impeller housing assembly for conformance with contour gage LTCT3653. If contour does not conform to limits, the housing shall be repaired.

**CAUTION**

Housing halves must be identified to assure reassembly as matched pairs.

**NOTE**

All other necessary repairs shall be accomplished prior to reworking the contoured surface of the impeller housing assembly.

(b) Place impeller housing assembly in locating fixture (LTCT11176) and center on a vertical turret lathe.



(c) Machine 0.040 inch (0.102 cm) from the aft face of air diffuser mounting flange, changing the 1.842 to 1.846 inch (4.679 to 4.689 cm) dimension to 1.802 to 1.806 inch (4.577 to 4.587 cm). (See figure 5-516.)

(d) Position contour template (LTCT11175) in the trace section of a vertical turret lathe.

(e) Set the turret lathe cutting tool at 9.2890 to 9.2912 inch (23.5941 to 23.5996 cm) diameter at Location A (see figure 5-516) on impeller housing assembly. Bring the tracer stylus into contact with template at corresponding position and set tracer section at 0.

Location "A" area of repair surface does not have to completely "clean up" provided "A" clearance (specified below) can be obtained during assembly.

#### NOTE

Due to erosion, the cutting tool may not contact the impeller housing assembly surface during setup.

(f) Bring the cutting tool into contact with impeller housing assembly at Location B (see figure 5-516) and bring the tracer stylus into contact with template at corresponding location. Raise tracer 0.040 inch (0.102 cm) and set tracer section at 0.

#### NOTE

Setting will serve to position lathe to cut a new contour which is 0.040 inch (0.102 cm) lower than the original. It does not move contour out radically in the impeller housing assembly.

(g) Machine new contour.

(h) Remove impeller housing assembly from machining fixture.

(i) Using threaded teflon plugs and silicone rubber (item 278, table C-1), mask all tapped holes and holes containing helicoils.

(j) Using machined magnesium plugs and silicone rubber (item 278, table C-1), mask all dissimilar metals.

(k) Apply heavy HAE coating or MIL-M-3171, type III coating to all machined surfaces. (Refer to SP No. 6022 in Appendix E.)

(l) Apply epoxy phenolic paint as a sealant. (Refer to SP No 6023 in Appendix E.)

(m) Apply epoxy phenolic paint with graphite to inside diameter surfaces. (Refer to SP No 6023 in Appendix E.)

(n) Mask part and apply enamel to exterior surfaces. (Refer to SP No 6023 in Appendix E.)

(o) Repaint the impeller housing assembly. (Refer to SP No. 6021 in Appendix E.)

(p) Fabricate shims from 0.25 inch (0.64 cm) thick steel alloy (item 304, table C-1). (See figure 5-517.)

(q) Adhesive bonding (item 66, table C-1) of shims to recontoured impeller housings shall be accomplished as follows:

1 **Preparation of Adhesive:** EC-2186 (item 20, Appendix E) is one part, high temperature curing adhesive. The catalyst is incorporated in the one part formulation hence no mixing of resin and catalyst is required. This adhesive may be applied directly from the container to the part to be bonded using a spatula, knife coat, notched trowel, or by extruding into place.

**CAUTION**

This adhesive may cause skin irritation. Use polyethylene (or equivalent) gloves for protection of hands.

**NOTE**

For optimum storage (shelf) life refrigerate adhesive at 40°F (4.4°C) and below. Allow adhesive to warm to room temperature before opening container to prevent moisture condensation on the adhesive surface.

2 **Bonding of Shims:** Bond aluminum shims to recontoured impeller housing using EC-2186 (item 18, Appendix E) adhesive as follows:

- a Assemble housing halves with alignment pins and bolts.
- b Apply a thin, even coating of adhesive to the clean, dry, aluminum shims; coating thickness should be between 0.002 to 0.005 inch (0.005 to 0.013 cm).

**NOTE**

When applying adhesive use polyethylene gloves to prevent contamination of repair surfaces.

- c Position adhesive coated shim on impeller housing as shown in figure 5-518. Apply hand pressure to shims and remove excess adhesive. A one piece (flat) steel plate should be used to position and secure shims while adhesive is curing.

CHQSOFTWARE.COM

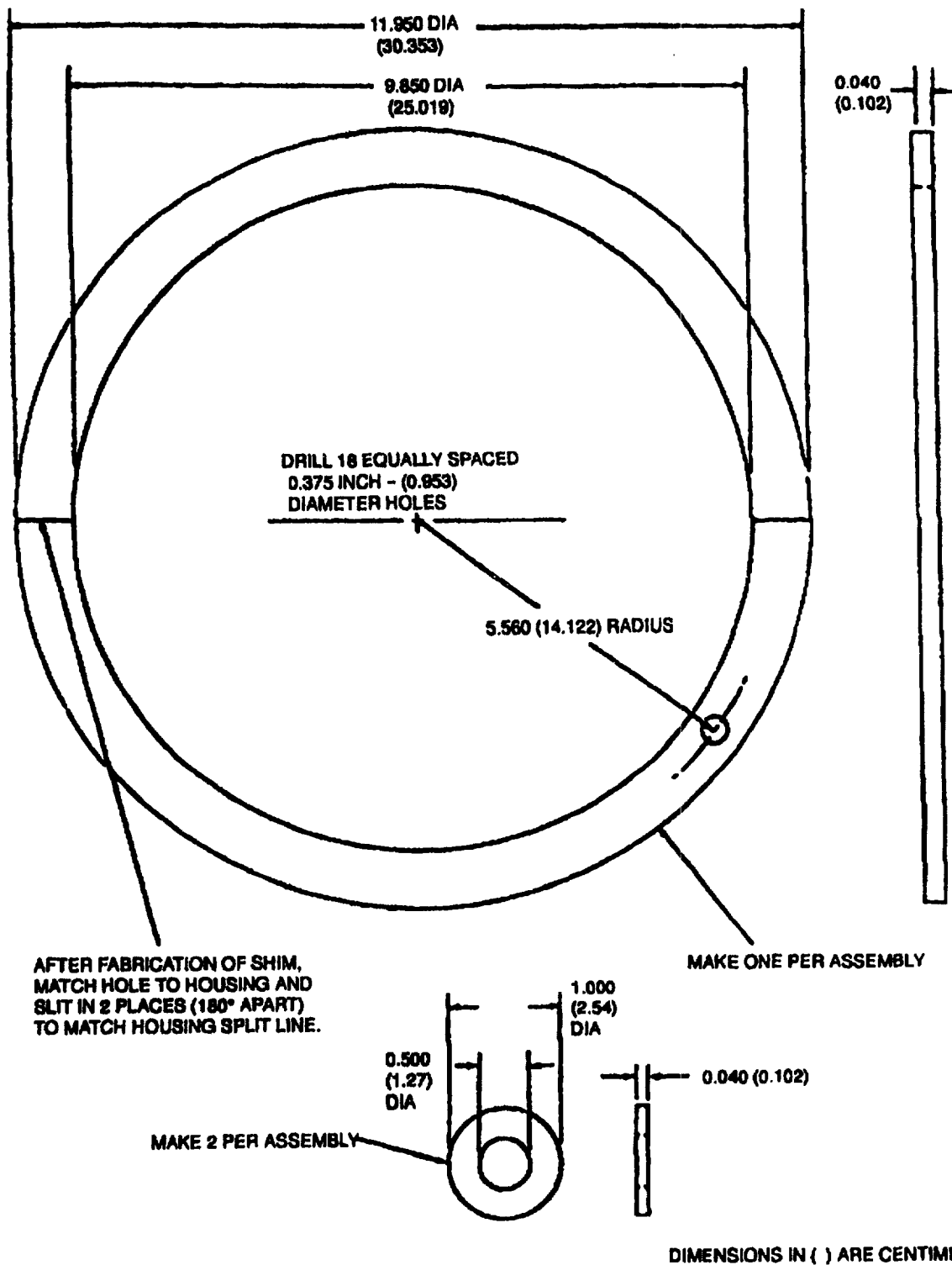


Figure 5-517. Aluminum Shims to Reposition Housing.

CHQSOFTWARE.COM

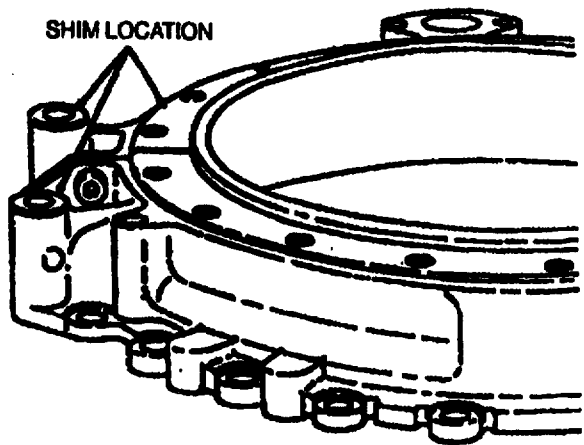
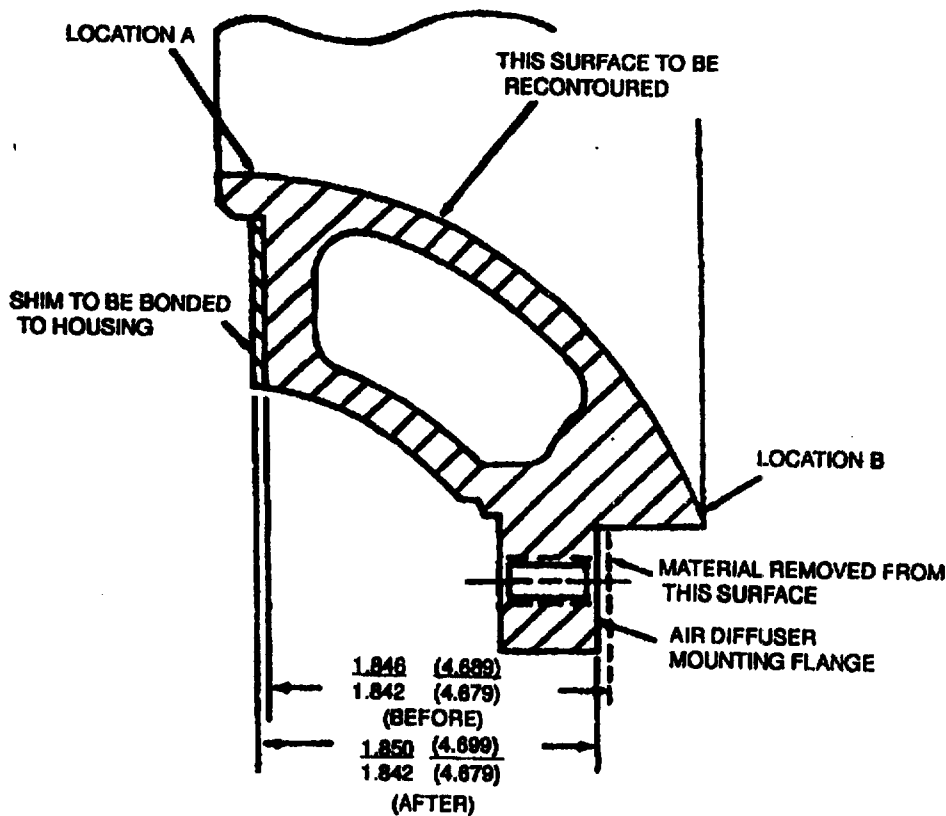


Figure 5-518. Location of Shim Bonding.



DIMENSIONS IN ( ) ARE IN CENTIMETERS.

Figure 5-519. Centrifugal Impeller Housing Cross Sectional Area.

## NOTE

The flat steel plate must be uniformly loaded to insure shim flatness. Suggest use of bolts, with 70 to 90 pound-inch (4921 to 6328 gm sq cm) torque, to fasten plate to housing.

d Cure adhesive in oven at  $350^{\circ} \pm 10^{\circ}\text{F}$  ( $176.6^{\circ} \pm 5.6^{\circ}\text{C}$ ) for 40 to 60 minutes or at  $375^{\circ} \pm 10^{\circ}\text{F}$  ( $190.6^{\circ} \pm 5.5^{\circ}\text{C}$ ) for 20 to 30 minutes.

e Inspect for 1.850/1.842 (4.699/4.679 cm) dimension shown in figure 5-519. If necessary, machine shims to obtain this dimension.

(r) Clearance at final assembly.

1 Repair worn or warped split line surface by applying synthetessine paint. Sand paint repaired surfaces (if necessary), using surface plate with 220 grit abrasive paper, to obtain required flatness. The finished thickness of synthetessine paint shall not exceed 0.010 inch (0.025 cm) on each repaired surface.

2 The maximum clearance between the 5th stage stator vane and centrifugal impeller housing which have been recontoured and shimmed is 0.048 (0.122 cm).

(s) Reidentify impeller housing assembly by adding OHRS-GT-261 after part number.

(t) Ink stamp P/N T53-10009-1 on the 11.950 inch (30.353 cm) diameter shim and P/N T53-10009-2 on the 1.000 inch (2.540 cm) diameter shim.

(2) Repair worn 13.372 to 13.375 inch diameter centrifugal impeller housing, where up to 0.010 inch (0.025 cm) maximum synthetessine thickness is required, as follows: (See figure 5-520.)

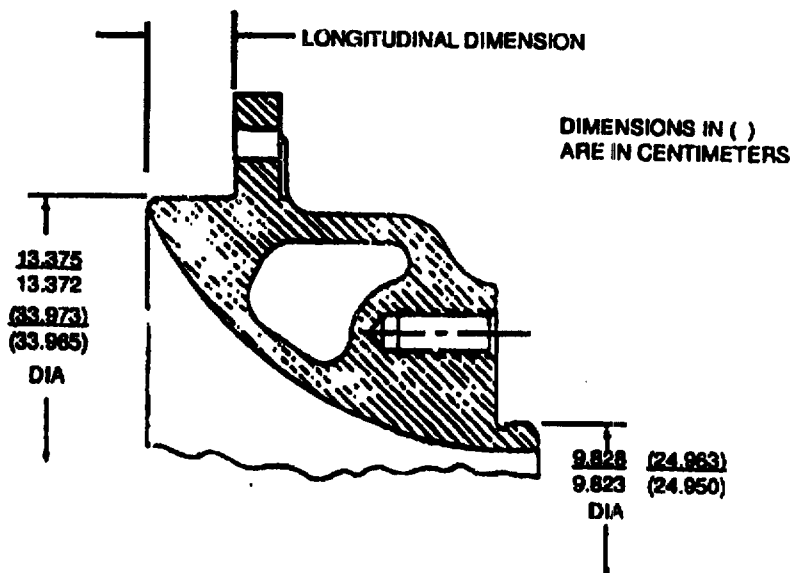


Figure 5-520. Centrifugal Impeller Housing - Repair Area.

(a) When the diameter is damaged beyond economical DMWR repair through paint buildup, the following repair procedures may be utilized.

- 1 Clean part as required per SP No. 3002 in Appendix E.
- 2 Make required repairs to areas other than the damaged.
- 3 Inspect cleaned paint visually and by tape test to determine whether paint on part is serviceable. If paint is found nonserviceable, strip part with (item 70, table C-1), mix this stripper per manufacturer instructions. Remove part from stripping bath and finish removing residual paint by means of blasting with MIL-G-5634, Type III, walnut shell abrasive grain (item 5, table C-1) using a blast pressure not to exceed 40 psi (2813 gm sq cm).
- 4 HAE coat the stripped part as per SP No. 6022, Method C.
- 5 If paint is serviceable and applicable technical data does not require the part to be HAE coated, machine the diameter of part to 0.015 inch (0.038 cm) below minimum tolerance or until the surface "cleans up", provided the diameter dimension is not reduced below 13.325 inch (33.846 cm). Remove minimum amount of metal from the surface to be metal sprayed.

#### NOTE

"Clean up" means all surface coatings have been removed except in the surface pits.

- 6 Cut 4 to 5 grooves into the circumferential surfaces to be metal sprayed. Grooves shall be 1/64 to 1/32 inch in depth and 1/32 inch in width with an 0.060 radius.
- 7 Clean surfaces to be metal sprayed with acetone (item 13, table C-1), isopropyl alcohol (item 25, table C-1) or denatured alcohol (item 24, table C-1)
- 8 Mask surfaces (item 213, table C-1) not to be metal sprayed and blast clean surfaces to be metal sprayed with aluminum oxide (item 1, table C-1), using a pressure not to exceed 40 psig (2812 gm sq cm).
- 9 Apply a bond coat of nickel aluminide wire (item 218, table C-1) not to exceed 0.004 inch (0.010 cm) using the process specified in SP No. 5006.
- 10 After applying nickel aluminum wire bond coat, maintain sprayed part at temperature between 100° and 150°F (38° and 65°C) and apply a top coat of Metco SF Aluminum wire (item 217, table C-1) per manufacturer's instructions, and to a thickness between 0.009 to 0.015 inch (0.023 to 0.038 cm).
- 11 Preserve and seal metal spray coating with Coricone 1700 or equivalent (item 246, table C-1).
- 12 Finish machine to an average diameter of 13.3708 to 13.3698 inches (33.9618 to 33.9593 cm). An out of roundness of 0.006 inch (0.015 cm) total in diameter is permissible.

#### NOTE

All requirements apply when the part is clamped at the split line with all four bolts. In cases of doubt, dimensions while mounted on the machine chuck or engine mounting fixture will govern.

- 13 Clean surfaces with acetone (item 13, table C-1) or cleaning solvent (item 101, table C-1). Apply a thin coat of Coricone 1700 to finish machined aluminum metal spray surface. Touch up exposed magnesium surface as follows:

a Touch up minor scratches or a combined area of less than 2% of the bare magnesium surface with MIL-M-3171, Type VI Brush treatment.

b Treat combined bare magnesium surface area exceeding 2% of the part area with MIL-M-3171, Type III treatment.

14 To the metal sprayed area and adjacent on fit areas, apply primer coat to Synthetessine 200 to a thickness of 0.002 to 0.003 inch (0.005 to 0.008 cm) thick. Bake the primer coat at  $350^{\circ}\text{F} \pm 10^{\circ}$  ( $177^{\circ} \pm 5^{\circ}\text{C}$ ) for 30-35 minutes.

#### NOTE

The Synthetessine 200 will be thinned with Thinner No. T-336 (Item 330, table C-1) to give a viscosity of 10 to 12 sec at  $80^{\circ}\text{F}$  ( $27^{\circ}\text{C}$ ) using a No. 4 Ford Cup (12 to 14 sec using a No. 2 Zahn Cup).

15 To all areas that will be inside the engine and all fit areas painted with the primer coat, apply a finish coat (0.0015 to 0.0020 inch (0.0038 to 0.0051 cm) thick) of Synthetessine 200 mixed with flake graphite (item 165, table C-1). Air dry coat and then bake at  $350^{\circ}\text{F} \pm 10^{\circ}$  ( $176.5^{\circ}\text{C} \pm 5^{\circ}$ ) for three (3) hours.

#### NOTE

Mix 200 parts of thinned Synthetessine 200 (item 139, table C-1) with 3.3 parts by weight Flake Graphite No. 635 (item 165, table C-1) or equivalent.

The Synthetessine 200-graphite coating system may be used to touch up the entire housing, provided it is engine gray in color.

Adjust the viscosity of the thinned Synthetessine 200-flake graphite mixture with Thinner No. T-336 (item 330, table C-1) to 10 to 14 sec at  $80^{\circ}\text{F}$  ( $27^{\circ}\text{C}$ ) using a No. 4 Ford Cup (12 to 17 sec using a No. 2 Zahn Cup).

(b) Final inspection will assure conformance to all dimensional requirements and other specifications in the applicable technical data.

(c) Chipping at split line is acceptable provided the length of coating removed does not exceed one inch. (This limit allows a maximum accumulated coating removal of four inches on the housing.) Chipped areas must be touched up as follows:

- 1 Apply chrome pickle (MIL-M-3171, Type IV) to bare magnesium surface.

#### CAUTION

Chrome pickle can attack the substrate between metal spray and base metal causing loss of bond. Carefully touch up area adjacent to metal spray coating using a minimum of solution. Do not allow chrome pickle solution to soak into metal spray coating.

2 Seal chipped metal spray coating (or coating edges) and paint repair area per paragraph 5-413e(2)(a) through (c).

(3) Repair worn 9.823 to 9.828 inch (24.950 to 24.963 cm) diameter of centrifugal impeller housing, where up to 0.006 inch (0.015 cm) maximum synthetessine thickness is required, as follows: (See figure 5-520.)

- (a) Build up worn diameter. (Refer to SP No. 6022 in Appendix E.)

#### NOTE

Total synthetessine buildup shall not exceed 0.006 inch (0.015 cm) per side.

(b) Machine to given dimensions.

f. Rework impeller housing assembly P/N 1-101-370-03 to the G configuration.

(1) Machine the 9.295 to 9.299 inch (23.609 - 23.619 cm) ID to 9.303 to 9.307 inch (23.640-23-038 cm.) ID.

(2) Reidentify housing assembly from P/N 1-101-370-03 to P/N 1-101-370-03G.

g. Repair of stainless steel impeller housing assembly.

(1) Blend repair of I.D. contour where defects do not exceed 0.010 inch (0.025 cm) in depth, blend repair, nicks, burrs, pits, dents, and local rubs as follows:

(a) Repair using small diesinker type file.

(b) Use crocus cloth for final polishing.

(c) Blend all repairs and finish smoothly.

#### NOTE

Defects listed above exceeding 0.010 inches (0.025 cm) in depth shall be repaired by the plasma spray method.

(2) Plasma spray repair.

(a) Repair of 9.823 - 9.828 inch (24.950- 24.963 cm) diameter (see figure 5-521).

1 Premachine housing as necessary to obtain a minimum finished coating thickness of 0.003 inch (0.008 cm). After final machining the maximum allowable finish coating is 0.020 inch.

2 Clean surfaces to be metal sprayed with acetone (item 13, table C-1), isopropyl alcohol (item 25, table C-1) or denatured alcohol (item 24, table C-1)

3 Mask surfaces other than the repair area using tape (item 328, table C-1) to protect against over spray.

4 Grit blast surface to be repaired, using METCOLITE C aluminum oxide grit or equivalent (item 8, table C-1). Use an airline pressure of 85 to 95 PSI (586.0544 to 655.0019 kPa) for blasting and a grit size between 12 to 35 mesh.

5 Remove masking tape and purge the abraded area with clean dry compressed air or dry nitrogen.

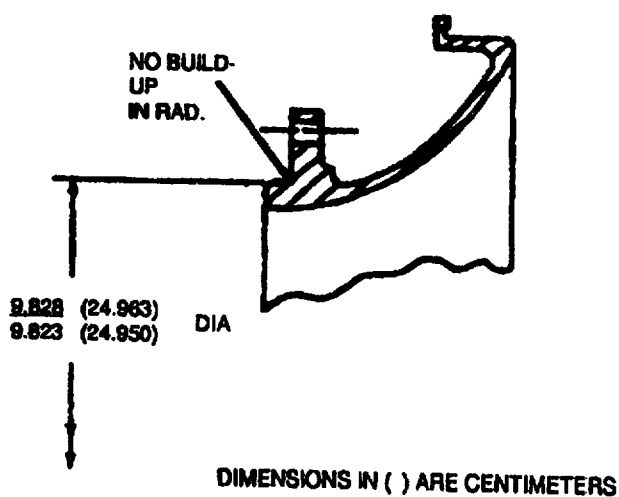


Figure 5-521. Metal Spray Repair of 9.823-9.828 Diameter.



CHQSOFTTIME.COM

**CAUTION**

The abraded surface should be protected, kept free of finger prints prior to spraying. If part must be cleaned after grit blasting, wipe the part with a clean, lint free cloth, moistened with acetone (item 13, table C-1). Allow approximately 15 minutes for drying.

- 6 Apply METCO anti-bond to areas adjacent to the surface to be sprayed.
- 7 Mask all areas not to be plasma sprayed with metal tape or other suitable material.
- 8 Position the housing on a turntable in a metal spray booth.

**NOTE**

The housing may be rotated vertically or horizontally depending on the equipment available. Spray gun must be held normal (perpendicular) to the surface being coated.

9 Plasma spray the diameter of housing using Metco 450 nickel aluminide powder (item 225, table C-1) or equivalent, in accordance with SP No. 5006 in Appendix E. Remove tape.

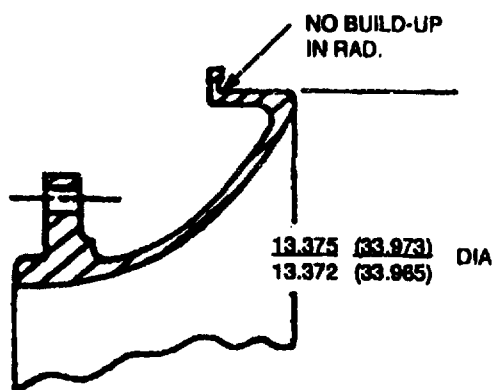
10 Machine diameter to dimensions shown in figure 5-521.

(b) Repair of 13.375 - 13.372 inch (33.973 - 33.965 cm) diameter. (See figure 5-522).

1 Premachine as necessary to obtain a minimum finished coating thickness of 0.003 inch (0.008 cm). The maximum allowable buildup coating thickness after final machining is 0.010 inch (0.025 cm).

2 Perform steps cited in paragraphs Perform steps cited in paragraphs g(2)(a)1 through 9 above.

3 Machine diameter to dimension shown in figure 5-522.



DIMENSIONS IN ( ) ARE CENTIMETERS

**Figure 5-522. Metal Spray Repair of 13.372-13.375 Diameter.**

CHQSO **CAUTION** RE.COM

Minimum parent metal wall thickness at repaired diameter is 0.060 inch (0.152 cm).

(c) Repair of discrepant contour surface (see figure 5-523).

- 1 Place impeller housing in a suitable locating fixture and center on a tracer lathe.
- 2 Premachine contour as necessary to obtain a 0.003 inch (0.008 cm) minimum plasma buildup thickness after final machining.

**NOTE**

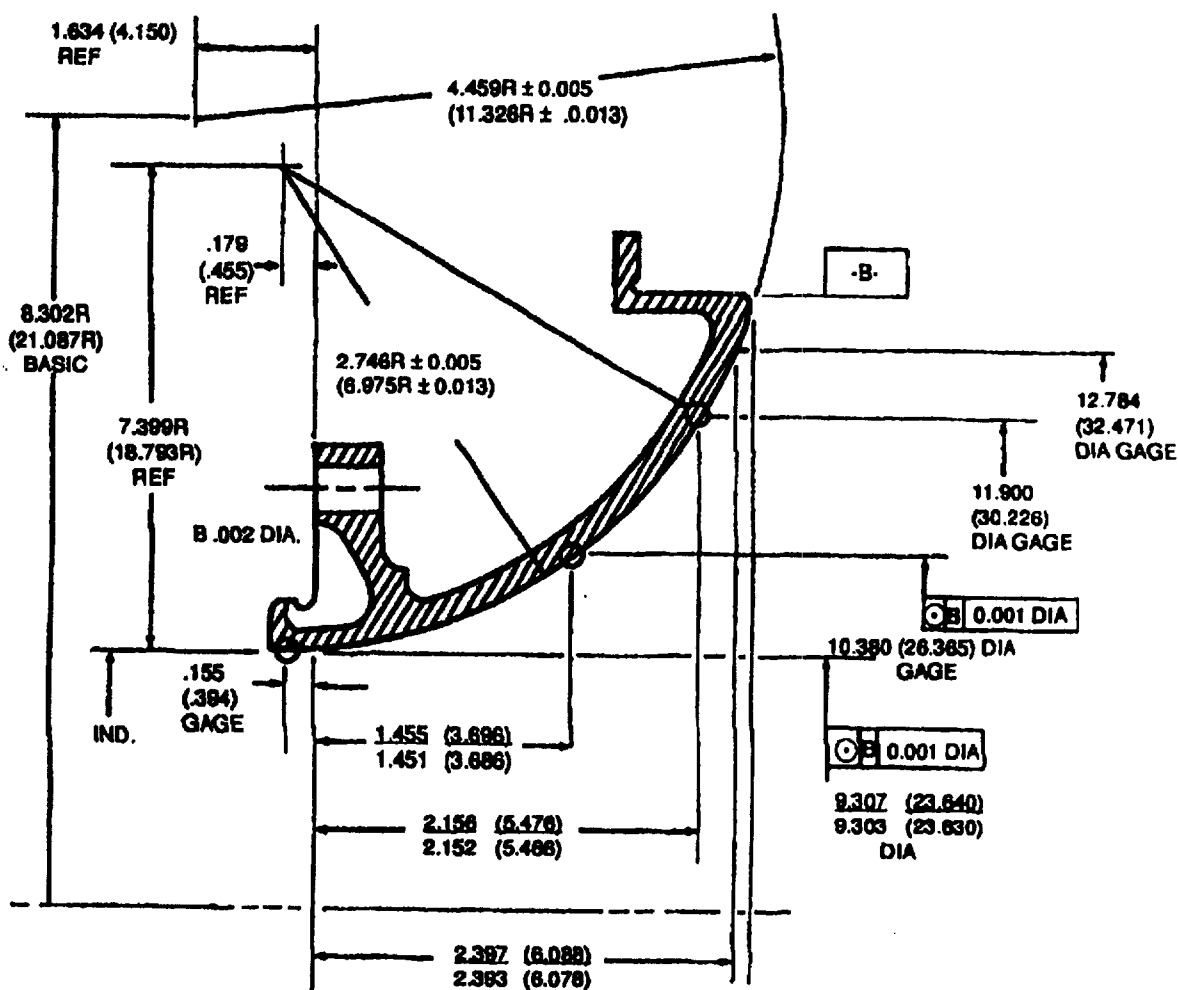
Minimum parent metal wall thickness at repaired diameter is 0.060 inch (0.152 cm).

- 3 Perform steps cited in paragraph g(2)(a)2 through 7.
- 4 Install shim stock P/N 67SPL-12757-0115-3 between split flanges of this part. Shim is made from 0.064 to 0.080 inch (0.163 - 0.203 cm) thick Teflon or equivalent material recessed approximately 0.0625 inch (0.1588 cm) below machined surface.

**NOTE**

The purpose of the shim is to allow easy separation of impeller housing halves after plasma spray.

CHQ SOFTWARE.COM  
DIMENSIONS IN ( ) ARE CENTIMETERS



**Figure 5-523. Metal Spray Repair of Stainless Steel Impeller Housing Contoured Surface.**

- 5 Mount the housing on a turntable and rotate at 85 to 95 rpm.
- 6 Plasma spray the contoured repair surface of housing with Metco 450 nickel aluminide powder (item 218, table C-1) or equivalent, in accordance with SP No. 5006.
- 7 Direct plasma gun at an angle of 90 degrees to the repair surface at all times during the plasma spray operation.
- 8 In order to ensure proper distance, traverse speed, and angle of attack, using mechanical traversing system (81SDSCC-D-005) to keep gun fixed at an angle of 90 degrees to repair surface.

9 Remove bolts and pull out shim stock; using air gun with cut off wheel (or equivalent), cut lightly to separate housing halves.

10 Check to ensure against metal spray interference at the split flange. If necessary, use a hand file and file end face of metal spray at split flange to eliminate any interference.

11 Machine plasma sprayed contour to manufacturer's drawing dimensions, shown in figure 5-523 and to a surface finish of 125 rms.

h. Repair of stainless steel impeller housing for corrosion in cavities between compressor housing mounting bosses.

(1) Remove all traces of corrosion in cavities using a small rotary file, or grit blast at 85 to 95 psi with 12 to 34 mesh aluminum oxide. DO NOT EXCEED A MINIMUM WALL THICKNESS OF 0.050 INCH.

(2) Passivate housing as outlined in SP No. 6024 in Appendix E.

**5-414. REASSEMBLY.** Proceed as follows:

#### NOTE

If either compressor housing half must be replaced, replace both halves with a matched set.

If the vane is bent or distorted and cannot be placed into the compressor housing subassembly, replace the vane. Rematched vane assemblies shall meet all assembly requirements. Halves of rematched vanes shall have the same degree of foreign object damage or erosion wear within established limits (an eroded vane half shall not be rematched with a noneroded half).

a. Insert first and second stage vane assemblies (8 and 9, figure 5-501), third and fourth stage compressor vanes (10 and 11), and exit guide vane (23) into each compressor housing half in their appropriate slots.

#### CAUTION

In the following steps, bolt ends shall be flushed to below inner surface of outer shroud assembly of vane assembly. If necessary, vary number of washers on bolt.

b. Ensure one end of vane is flush with compressor housing mating surface. Secure vanes with screws (6) and washers (7); exit guide vane assembly with retainer (15), bolts (12), screws (14), and washers (13).

c. Tighten screws (14) to 30 to 40 pound-inches (5358 to 7144 gm sq cm) torque.

d. Tighten center bolt (12) and screw (6) to 44 pound-inches (7858 to 8216 gm sq cm) torque and outer bolts (12) and screws (6) to 14 to 16 pound-inches (2500 to 2858 gm sq cm) torque. Do not lockwire bolts or bend retainer at this time.

e. Visually inspect exit guide vane assembly to ensure outer shroud is firmly seated on compressor land. If exit guide vane assembly is not seated, proceed with following step f; otherwise, proceed to step g.

f. Loosen bolts securing exit guide vane assembly to compressor housing assembly. With soft-faced mallet, tap inner shroud gently until vane is firmly seated. Use care not to bring mallet into contact with vanes. Tighten bolts as outlined in preceding step d.

CHQSOFT **CAUTION** E.COM

On magnesium housing, if recontoured and shimmed impeller housing is installed, ensure shims are installed on air-bleed actuator boss.

g. Position clips (4), brackets (3), and secure impeller housing assembly (5) to compressor housing assembly with bolts (1) and washers (2). Torque bolts to 45 to 50 inch pounds (8037 to 8930 gm sq cm).

#### NOTE

The bolts and washers (2 and 1, figure 5-501) used to secure the impeller housing to the compressor housing may be replaced with MS9089-28 bolts and AN960-416 washers.

h. On engines with magnesium impeller housing, assemble both halves of the compressor housing, using six threaded taper pins (1, figure 4-51), washers (3), and nuts (4), hollow dowels (2), bolts (5), washers (6), and nuts (7).

i. On engine with stainless steel impeller housing, assemble both halves of the compressor housing, using bolts (17), inserts (18), washers (19), nuts (20), bolts (5), washers (6), nuts (7), bolts and pins (1), dowels (2), washers (3) and nuts (4).

j. Using 0.003 inch feeler gage, check gap at both ends of stator inner shrouds. The minimum gap shall be 0.003 inch.

k. If shifting of stator vanes is required to obtain proper clearance, loosen screws on an individual vane half. Move stator and retighten screws to proper torque as outlined in preceding step d.

l. If stators required grinding to meet requirements, remove compressor housing assembly (paragraph 4-55). Grind one end of the vane, using flat carborundum stone. Reassemble and repeat inspection.

**5-415. FUNCTIONAL TEST.** Functional Test is not required.

**5-416. REAR COMPRESSOR BEARING OIL SEAL.** Disassembly of rear compressor bearing oil seal retainer has been accomplished during removal (paragraph 4-45).

**5-417. CLEANING OF REAR COMPRESSOR BEARING OIL SEAL RETAINER, OIL SEAL, AND RETAINING PLATE.** Clean all parts by the dry cleaning solvent method (after to SP No. 3002 in Appendix E). Use an alkaline cleaner to remove superficial rust from rear compressor bearing oil seal retainer if necessary for repair.

**5-418. INSPECTION OF REAR COMPRESSOR BEARING OIL SEAL RETAINER, OIL SEAL, AND RETAINING PLATE.** Perform specific inspections listed in table 5-158.

**5-419. REPAIR OF REAR COMPRESSOR BEARING OIL SEAL RETAINER, OIL SEAL, AND RETAINING PLATE.** (See figure 4-38.) Proceed as follows:

a. Refinish plating on retaining plate (18, figure 4-38). (See figure 5-524.)

**Table 5-158. Inspection of Rear Compressor Bearing Oil Seal Retainer, Oil Seal, and Retaining Plate.**

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-38 18	Retaining Plate	Visual	Nicks and blisters in chrome plating Restricted oil passages	Repair. (Refer to paragraph 5-419) Repair. (Refer to paragraph 5-419)
		Visual and SIE	Fretting on chrome plate. (Refer to table 5-159 for limits)	Repair. (Refer to paragraph 5-419)
		Visual and Magnetic-Particle. (Refer to table 5-160)	Cracks	Not allowed. Replace
		Dimensional	Wear and fits. (Refer to table 5-161 for limits)	Check crush ring seating areas (2), depth must be 0.026-0.028 inches and surface finish 32. Repair if limits are exceeded. (Refer to paragraph 5-419)
19	Aft Oil Ring	Visual	Wear or scoring beyond 10 RMS finish	Repair. (Refer to paragraph 5-419)
		Visual and Magnetic-Particle	Cracks	Not allowed. Replace
21	Retaining Ring	Visual	Cracks	Not allowed. Replace
		Dimensional	Wear. (Refer to table 5-161 for limits)	Replace if limits are not met.
22	Seal	Visual	Damage and wear	Replace
23 and 36	Oil Seal Retainer	Visual	Nicks, burrs, scratches, and dents	Repair. (Refer to SP No. 5000 in Appendix E).
		Visual and SIE	Damaged threads	Repair or replace (Refer to SP No. 5007 in Appendix E).
		Visual and Magnetic-Particle. (Refer to table 5-160)	Cracks	Not allowed. Replace.
		Dimensional	Wear and fits. (Refer to table 5-161 for limits)	Replace if limits are not met.
		Visual	Black oxide coating damage	Repair. (Refer to SP No. 6002 and 6003 in Appendix E).

**Table 5-159. Retaining Plate Inspection Limits.**

DEFECT	FIGURE REFERENCE	INSPECTION LIMITS
Fretting in Chrome Plate on Retaining Plate		Light, scattered fretting is acceptable, provided no more than 25 percent of total bearing seat area is fretted. Light fretting shall not exceed 0.001 inch (0.003 cm) depth, as inspected with a standard dial indicator having a 0.031 to 0.035 inch (0.079 to 0.089 cm) diameter contact ball point. If limits are exceeded, chrome plate as outlined in paragraph 5-419.

**Table 5-160. Magnetic-Particle Inspection of Rear Compressor Bearing Oil Seal Retainer and Retaining Plate.**

FIGURE AND INDEX NO.	METHOD OF NOMENCLATURE	MAGNETIZATION
4-38		
18	Retaining plate	Circular. Use central conductor at 800 amperes.
23 and 26	Oil Seal Retainer	Circular. Use central conductor at 600 amperes.

E. (1) Chrome-plate for a 0.002 to 0.010 inch (0.005 to 0.025 cm) thickness as outlined in SP No. 6014 in Appendix E.

(2) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(3) Machine to dimension given in figure 5-524.

b. Clear restricted oil passages in retaining plate (18, figure 4-38), using a suitable drill rod.

c. Refinish plating on aft oil ring (19) as follows:

(1) Chrome-plate 3.0575 to 3.0580 inch (7.7661 to 7.7673 cm) diameter to obtain a 0.002 to 0.010 inch (0.005 to 0.025 cm) thickness after final grind outlined in SP No. 6014 in Appendix E. (See figure 5-525.)

(2) Bake at 680° to 720°F (360° to 382°C) for 3 hours.

(3) Machine to dimensions given in figure 5-525.

d. Repair surface finish of crush ring seating areas by grinding. Surface finish to be 32 microfinish or better. If maximum depth of 0.028 inches is exceeded repair by chrome plating.

(1) Chrome-plate for a 0.002 to 0.010 inch thickness as outlined in SP No. 6014 in Appendix E.

(2) Bake at 365° to 385°F (185° to 196°C) for 3 hours.

(3) Machine to a depth of 0.026 to 0.028 inches.

CHQSOFTWARE.COM

Table 5-161. Dimensional Inspection of Retaining Plate, Retaining Ring, and Oil Retainer.

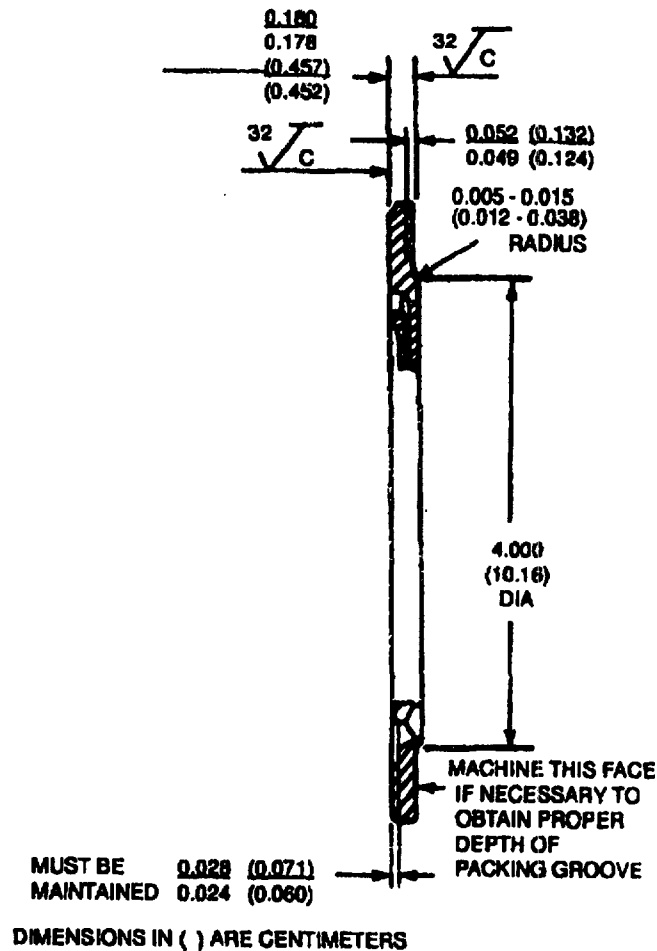
NOMENCLATURE	FIG & INDEX	DIR MEAS	BLUEPRINT DIMENSIONS		OVERHAUL SERVICE DIMENSIONS		OVERHAUL SERVICE FITS		REFER TO FIG. & DIM
			MIN	MAX	MIN	MAX	MIN	MAX	
Retaining Plate to Rear Bearing Housing Assembly	4-38 18	OD	5.398 (13.711)	5.399 (13.713)	5.397 (13.708)	5.399 (13.713)			5-526 A
	7	ID	5.400 (13.7160)	5.4020 (13.7211)	5.4000 (13.7160)	5.4023 (13.7218)	0.001L (0.003)	0.0053L (0.0135)	A
Retaining Ring	21*	OD	4.025 (10.224)	4.055 (10.300)					5-526 B
Oil Seal Retainer to Rear Bearing Housing Assembly	23 and 36 7	OD ID	5.398 (13.711) 5.4000 (13.7160)	5.399 (13.713) 5.4020 (13.7211)	5.397 (13.708) 5.4000 (13.7160)	5.399 (13.713) 5.4023 (13.7218)		0.001L (0.003) 0.0053L (0.0135)	C A

\* Dimensional inspection not required unless visual inspection indicates obvious damage, fretting, corrosion, or wear.



**5-420. REASSEMBLY OF REAR COMPRESSOR BEARING OIL SEAL RETAINER.** Proceed as follows:**NOTE**

Aft seal 1-300-174-02 and -03 are manufactured with a fracture at one of the slot locations on air side carbon element. The fracture, is not a defect and is not considered cause for seal replacement. Aft seals (1-300-174-02 and -03) are manufactured with three splits, 120 degrees apart, on oil side carbon element. Aft seal 1-300-616-01 is manufactured with three splits, 120 degrees apart on the carbon element. These splits are not defects and are not considered cause for seal replacement.

**NOTE**

A 0.174 (0.441) minimum overhaul width is permitted, provided .002 (.005) minimum chrome plate thickness is maintained.

**Figure 5-524. Retaining Plate - Plating Area.**

- a. Install seal (22, figure 4-38) onto base (LTCT3826, detail of LTCT3825) and secure with clamp (LTCT3875 detail of LTCT3825). Place seal with base and clamp in arbor press.
- b. Heat oil seal retainer (23 or 36) to 300° to 380°F (149° to 193°C) for 20 to 30 minutes.
- c. Remove retainer from oven and place onto seal (22). Position anvil (LTCT3827, detail LTCT3825) onto retainer and seat firmly with arbor press.

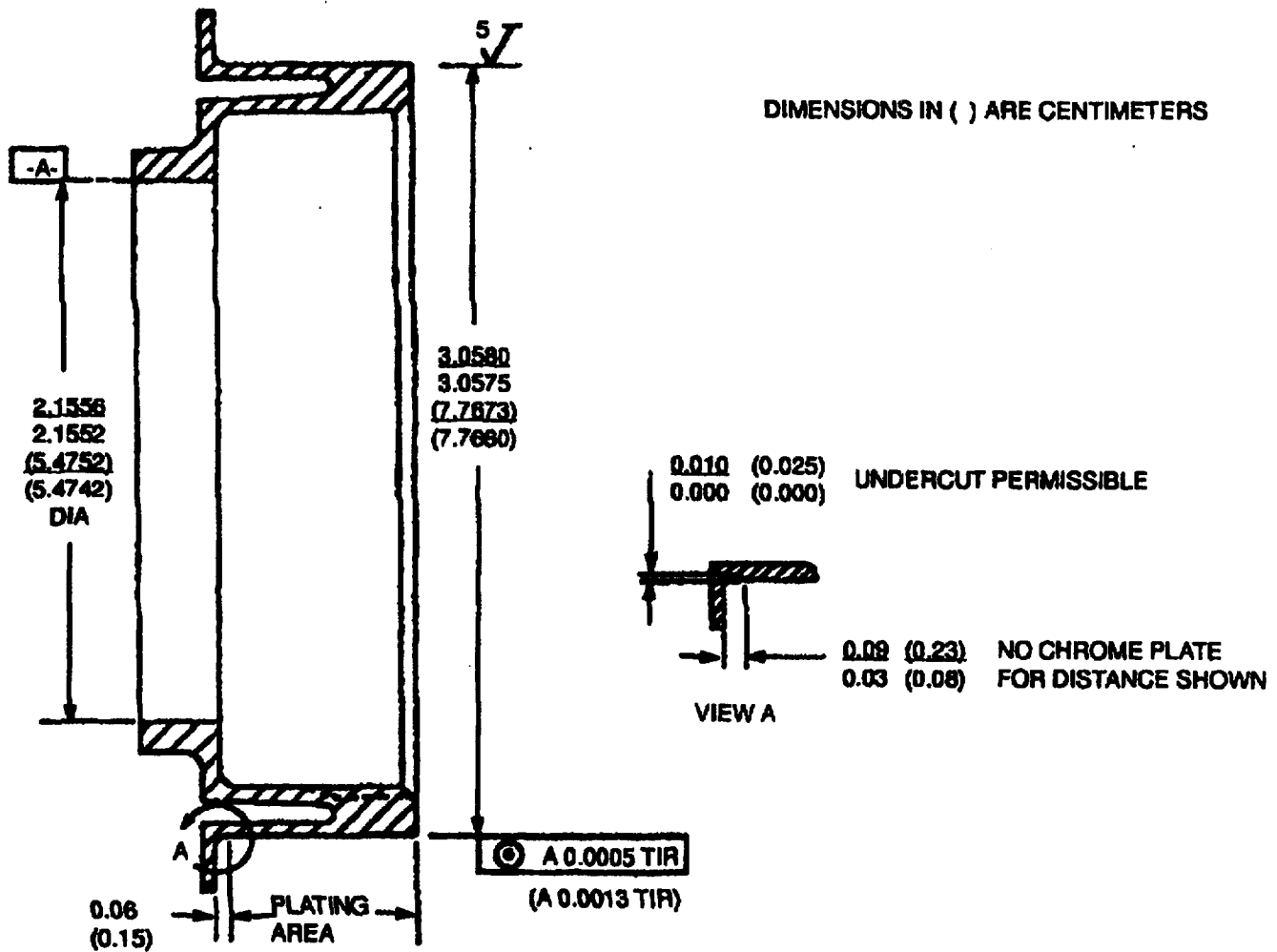
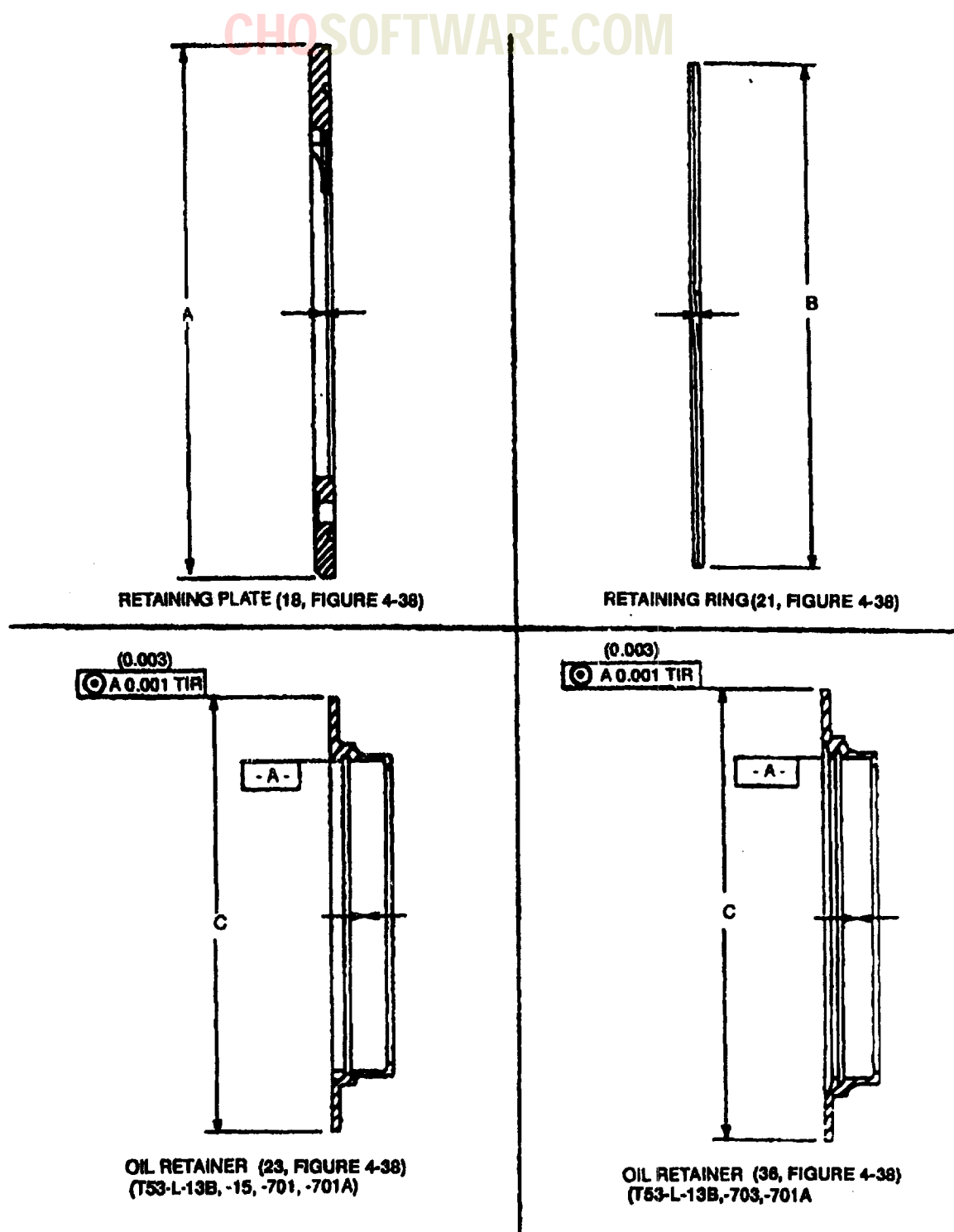


Figure 5-525. Aft Oil Ring - Plating Area.



**Figure 5-526. Retaining Plate, Retaining Ring, and Oil Seal Retainer Dimensional Inspection Locations.**

Figure & Index Number	Part Number	Description 1 2 3 4 5 6 7	Qty Per Assy	Usable on Code
5-527	No Number	COMPRESSOR ROTOR ASSEMBLY (NHA 1-000-060-03, 1-000-100-01, 1-000-060-08, 1-000-110-01, 1-100-720-13, 1-100-720-14, 1-100-720-15, 1-100-720-18, 1-100-720-21, and 1-100-720-33)	Ref	C,D
-1	B30-800956	. SEAL, ASSEMBLY (24981) (Lycoming Source Cont Dwg 1-300-077-01)	1	C,D
	C107800	. SEAL, ASSEMBLY (71840) (Alternate) (Lycoming Source Cont Dwg 1-300-077-02)	1	C,D
-2	1-100-276-01	. CUP Locking	1	C,D
-3	1-100-212-01	. GEAR, Pinion, accessory drive	1	C,D
-4	1-100-213-02	. SHIM, Accessory drive gear, 0.023 - 0.0259 inch thick	AR	C,D
	1-100-213-03	. SHIM, Accessory drive gear, 0.026 - 0.0289 inch thick	AR	C,D
	1-100-213-04	. SHIM, Accessory drive gear, 0.029 - 0.0319 inch thick	AR	C,D
	1-100-213-05	. SHIM, Accessory drive gear, 0.032 - 0.0349 inch thick	AR	C,D
	1-100-213-06	. SHIM, Accessory drive gear, 0.035 - 0.0379 inch thick	AR	C,D
	1-100-213-07	. SHIM, Accessory drive gear, 0.038 - 0.0409 inch thick	AR	C,D
	1-100-213-08	. SHIM, Accessory drive gear, 0.041 - 0.0439 inch thick	AR	C,D
	1-100-213-09	. SHIM, Accessory drive gear, 0.044 - 0.0469 inch thick	AR	C,D
	1-100-213-10	. SHIM, Accessory drive gear, 0.047 - 0.0499 inch thick	AR	C,D
	1-100-213-11	. SHIM, Accessory drive gear, 0.050 - 0.0529 inch thick	AR	C,D
	1-100-213-12	. SHIM, Accessory drive gear, 0.053 - 0.0559 inch thick	AR	C,D
	1-100-213-13	. SHIM, Accessory drive gear, 0.056 - 0.0589 inch thick	AR	C,D
	1-100-213-14	. SHIM, Accessory drive gear, 0.059 - 0.0619 inch thick	AR	C,D
	1-100-213-15	. SHIM, Accessory drive gear, 0.062 - 0.0649 inch thick	AR	C,D
	1-100-213-16	. SHIM, Accessory drive gear, 0.0200 - 0.0229 inch thick	AR	C,D

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-527-4	1-100-213-17	. SHIM, Accessory drive gear, 0.017 - 0.0199 inch thick	AR	C,D
	1-100-213-18	. SHIM, Accessory drive gear, 0.014 - 0.0169 inch thick	AR	C,D
	1-100-213-19	. SHIM, Accessory drive gear, 0.011 - 0.0139 inch thick	AR	C,D
	1-100-213-20	. SHIM, Accessory drive gear, 0.065 - 0.0679 inch thick	AR	C,D
	1-100-213-21	. SHIM, Accessory drive gear, 0.068 - 0.0709 inch thick	AR	C,D
-5	No Number	. BEARING HOUSING ASSEMBLY (NHA 1-000-060-03, 1-000-100-01, 1-000-060-08, 1-000-110-01, 1-100-720-13, 1-1000-720-14, 1-100-720-15, 1-100-720-18, 1-100-720-21, and 1-100-629-33)	1	C,D
-6	1-060-190-01	. . HOUSING, Compressor, front bearing	1	C,D
-7	MM210VM2SMB RE7730	. . BEARING, Ball (21335) (Lycoming Source Cont Dwg 1-300-015-04)	1	C,D
	V3210RS5470	. . BEARING, Ball, annular (43334) (Alternate) (Lycoming Source Cont Dwg 1-300-015-02)	1	C,D
-8	1-060-125-01	. . CUP, Locking, front bearing	1	C,D
-9	1-060-126-01	. . NUT Spanner, front bearing	1	C,D
-10	1-100-413-12	. . IMPELLER, Oil front compressor	1	C,D
-11	No Number	. . SEAL HOUSING ASSEMBLY (NHA 1-000-060-03, 1-000-110-01, 1-000-110-01 and 1-000-060-08)	1	C,D
-12	1-060-127-04	. . HOUSING, Seal	1	C,D
-13	C107209	. . SEAL, Plain encased (71840) (Lycoming Source Cont Dwg 1-300-214-01)	1	C,D
	B30-800053	. . SEAL, Plain encased (24981) (Alternate) (Lycoming Source Cont Dwg 1-300-214-02)	1	C,D
	B30-80-5552	. . SEAL, Plain encased (24981) (Alternate) (Lycoming Source Cont Dwg 1-300-214-03)	1	C,D
-14	STD3019E54	. . PACKING	1	C,D
-15	RR325L	. . RING Retaining (80756) (Lycoming Spec Cont Dwg 1-300-047-01)	1	C,D
-16	1-100-700-05	. DISK ASSEMBLY, Compressor rotor, first stage	1	C,D
-17	1-100-287-04	. . SHAFT Compressor front rotor	1	C,D

Figure & Index Number	Part Number	Description						Qty Per Assy	Usable on Code
		1	2	3	4	5	6		
5-527-18	1-100-237-01	.. PLATE, Locking, compressor rotor blade 0.0180						AR	C,D
	1-100-237-02	.. PLATE, Locking, compressor rotor blade 0.0190						AR	C,D
	1-100-237-03	.. PLATE, Locking, compressor rotor blade 0.0200						AR	C,D
	1-100-237-04	.. PLATE, Locking, compressor rotor blade 0.0210						AR	C,D
	1-100-237-05	.. PLATE, Locking, compressor rotor blade 0.0220						AR	C,D
	1-100-237-06	.. PLATE, Locking, compressor rotor blade 0.0230						AR	C,D
	1-100-237-07	.. PLATE, Locking, compressor rotor blade 0.0240						AR	C,D
	1-100-237-08	.. PLATE, Locking, compressor rotor blade 0.0250						AR	C,D
	1-100-237-09	.. PLATE, Locking, compressor rotor blade 0.0260						AR	C,D
	1-100-237-10	.. PLATE, Locking, compressor rotor blade 0.0270						AR	C,D
	1-100-237-11	.. PLATE, Locking, compressor rotor blade 0.0280						AR	C,D
	1-100-237-12	.. PLATE, Locking, compressor rotor blade 0.0290						AR	C,D
	1-100-237-13	.. PLATE, Locking, compressor rotor blade 0.0300						AR	C,D
-19	X31S094-0185	.. PIN, Spring (56878) (Lycoming Source Cont Dwg 1-300-268-01)						31	C,D
-20	1-100-361-01	.. BLADE, Thansonic compressor, first stage						1	C,D
	1-100-361-03	.. BLADE SET, Spare, compressor, first stage (Make from 1-100-361-01) (For field replacement)						AR	C,D
-21	1-100-710-04	. DISK ASSEMBLY, Compressor rotor, second stage (Replace with 1-100-710-08)						1	C,D
	1-100-710-08	. DISK ASSEMBLY Compressor rotor, second stage (Replace with 1-100-710-05)						1	C,D
	1-100-710-05	. DISK ASSEMBLY Compressor rotor, second stage (Replace with 1-100-710-09)						1	C,D
	1-100-710-09	. DISK ASSEMBLY Compressor rotor, second stage (Replace with 1-100-710-10)						1	C,D
	1-100-710-10	. DISK ASSEMBLY Compressor rotor, second stage						1	C,D
-22	1-100-288-03	.. DISK, Second rotor compressor (Replace with 1-100-288-06)						1	C,D

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-527-22          -23	1-100-288-06	.. DISK, Second rotor compressor	1	C,D
	1-100-288-04	.. DISK, Second rotor compressor (Use on 1-100-710-05) (Replace with 1-100-288-06)	1	C,D
	1-100-288-07	.. DISK, Second rotor compressor (Use on 1-100-710-10) (Replace with 1-100-288-08)	1	C,D
	1-100-288-08	.. DISK, Second rotor compressor (Use on 1-100-288-10)	1	C,D
	1-100-237-01	.. PLATE, Locking, compressor rotor blade 0.0180	AR	C,D
	1-100-296-01	.. PLATE, Locking, compressor rotor blade 0.0180 (Use on 1-100-710-05) (Replace with 1-100-299-01)	AR	C,D
	1-100-299-01	.. PLATE, Locking spring	AR	C,D
	1-100-237-02	.. PLATE, Locking, compressor rotor blade 0.0190	AR	C,D
	1-100-296-02	.. PLATE, Locking, compressor rotor blade 0.0190 (Use on 1-100-710-05) (Replace with 1-100-299-01)	AR	C,D
	1-100-299-01	.. PLATE, Locking spring	AR	C,D
	1-100-237-03	.. PLATE, Locking, compressor rotor blade 0.0200	AR	C,D
	1-100-296-03	.. PLATE, Locking, compressor rotor blade 0.0200 (Use on 1-100-710-05) (Replace with 1-100-299-01)	AR	C,D
	1-100-299-01	.. PLATE, Locking spring	AR	C,D
	1-100-237-04	.. PLATE, Locking, compressor rotor blade 0.0210	AR	C,D
	1-100-296-04	.. PLATE, Locking, compressor rotor blade 0.0210 (Use on 1-100-710-05) (Replace with 1-100-299-01)	AR	C,D
	1-100-299-01	.. PLATE, Locking spring	AR	C,D
	1-100-237-04	.. PLATE, Locking, compressor rotor blade 0.0210	AR	C,D
	1-100-296-04	.. PLATE, Locking, compressor rotor blade 0.0210 (Use on 1-100-710-05) (Replace with 1-100-299-01)	AR	C,D
	1-100-299-01	.. PLATE, Locking spring	AR	C,D
	1-100-237-05	.. PLATE, Locking, compressor rotor blade 0.0220	AR	C,D
	1-100-296-05	.. PLATE, Locking, compressor rotor blade 0.0220 (Use on 1-100-710-05) (Replace with 1-100-299-01)	AR	C,D

Figure & Index Number	Part Number	Description						Qty Per Assy	Usable on Code
		1	2	3	4	5	6		
5-527-23	1-100-299-01	..	PLATE, Locking spring					AR	C,D
	1-100-237-06	..	PLATE, Locking, compressor rotor blade 0.0230					AR	C,D
	1-100-296-06	..	PLATE, Locking, compressor rotor blade 0.0230 (Use on 1-100-710-05) (Replace with 1-100-299-01)					AR	C,D
	1-100-299-01	..	PLATE, Locking spring					AR	C,D
	1-100-237-07	..	PLATE, Locking, compressor rotor blade 0.0240					AR	C,D
	1-100-296-07	..	PLATE, Locking, compressor rotor blade 0.0240 (Use on 1-100-710-05) (Replace with 1-100-299-01)					AR	C,D
	1-100-299-01	..	PLATE, Locking spring					AR	C,D
	1-100-237-08	..	PLATE, Locking, compressor rotor blade 0.0250					AR	C,D
	1-100-296-08	..	PLATE, Locking, compressor rotor blade 0.0250 (Use on 1-100-710-05) (Replace with 1-100-299-01)					AR	C,D
	1-100-299-01	..	PLATE, Locking spring					AR	C,D
	1-100-237-09	..	PLATE, Locking, compressor rotor blade 0.0260					AR	C,D
	1-100-296-09	..	PLATE, Locking, compressor rotor blade 0.0260 (Use on 1-100-710-05) (Replace with 1-100-299-01)					AR	C,D
	1-100-299-01	..	PLATE, Locking spring					AR	C,D
	1-100-237-10	..	PLATE, Locking, compressor rotor blade 0.0270					AR	C,D
	1-100-296-10	..	PLATE, Locking, compressor rotor blade 0.0270 (Use on 1-100-710-05) (Replace with 1-100-299-01)					AR	C,D
	1-100-299-01	..	PLATE, Locking spring					AR	C,D
	1-100-237-11	..	PLATE, Locking, compressor rotor blade 0.0280					AR	C,D
	1-100-296-11	..	PLATE, Locking, compressor rotor blade 0.0280 (Use on 1-100-710-05) (Replace with 1-100-299-01)					AR	C,D
	1-100-299-01	..	PLATE, Locking spring					AR	C,D
	1-100-237-12	..	PLATE, Locking, compressor rotor blade 0.0290					AR	C,D
	1-100-296-12	..	PLATE, Locking, compressor rotor blade 0.0290 (Use on 1-100-710-05) (Replace with 1-100-299-01)					AR	C,D
	1-100-299-01	..	PLATE, Locking spring					AR	C,D



Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-527-23	1-100-237-13	.. PLATE, Locking, compressor rotor blade 0.0300	AR	C,D
	1-100-296-13	.. PLATE, Locking, compressor rotor blade 0.0300 (Use on 1-100-710-05) (Replace with 1-100-299-01)	AR	C,D
	1-100-299-01	.. PLATE, Locking spring	AR	C,D
-24	X31S094-0185	.. PIN, Spring (56878) (Lycoming Source Cont Dwg 1-300-268-01)	36	C,D
	X31S094-0185	.. PIN, Spring (56878) (Lycoming Source Cont Dwg 1-300-268-01) (Use on 1-100-710-05)	34	C,D
-25	1-100-286-01	.. BLADE, Transonic compressor, rotor, second stage (Use on 1-100-710-08)	36	C,D
	1-100-286-03	.. BLADE SET, Spare, Compressor second stage (Make from 1-100-286-01) (For field replacement)	AR	C,D
	1-100-286-05	.. BLADE, Transonic compressor, rotor, second stage (Make from 1-100-286-01) (Use on 1-100-710-05)	34	C,D
	1-100-286-06	.. BLADE SET, Spare, Compressor second stage (Make from 1-100-286-03) (For field replacement)	AR	C,D
-26	1-100-230-06	. DISK Assembly, Compressor rotor, third stage	1	C,D
	1-100-230-05	. DISK Assembly, Compressor rotor, third stage	1	C,D
	1-100-230-07	. DISK Assembly, Compressor rotor, third stage	1	C,D
-27	1-100-230-10	. DISK Assembly, Compressor rotor, third stage (Use to depletion)	1	C,D
	1-100-242-04	.. DISK, Compressor rotor, third stage (Use on 1-100-230-05)	1	C,D
	1-100-242-06	.. DISK, Compressor rotor, third stage (Replace with 1-100-242-09)	1	C,D
	1-100-242-09	.. DISK, Compressor rotor, third stage (Use on 1-100-230-07)	1	C,D
-28	1-100-237-01	.. PLATE, Locking, compressor rotor blade 0.0180	AR	C,D
	1-100-237-02	.. PLATE, Locking, compressor rotor blade 0.0190	AR	C,D
	1-100-237-03	.. PLATE, Locking, compressor rotor blade 0.0200	AR	C,D
	1-100-237-04	.. PLATE, Locking, compressor rotor blade 0.0210	AR	C,D

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-527-28	1-100-237-05	.. PLATE, Locking, compressor rotor blade 0.0220	AR	C,D
	1-100-237-06	.. PLATE, Locking, compressor rotor blade 0.0230	AR	C,D
	1-100-237-07	.. PLATE, Locking, compressor rotor blade 0.0240	AR	C,D
	1-100-237-08	.. PLATE, Locking, compressor rotor blade 0.0250	AR	C,D
	1-100-237-09	.. PLATE, Locking, compressor rotor blade 0.0260	AR	C,D
	1-100-237-10	.. PLATE, Locking, compressor rotor blade 0.0270	AR	C,D
	1-100-237-11	.. PLATE, Locking, compressor rotor blade 0.0280	AR	C,D
	1-100-237-12	.. PLATE, Locking, compressor rotor blade 0.0290	AR	C,D
	1-100-237-13	.. PLATE, Locking, compressor rotor blade 0.0300	AR	C,D
	-29 X31S094-0185	.. PIN, Spring (56878) (Lycoming Source Cont Dwg 1-300-268-01)	34	C,D
-30	1-100-383-01	.. BLADE, Compressor rotor, third stage (Use on 1-100-230-07)	34	C,D
	1-100-243-02	.. BLADE, Compressor rotor, third stage (Use on 1-100-230-07 and 1-100-230-10)	34	C,D
	1-100-383-02	.. BLADE, Set spare Compressor, third stage (Make from 1-100-383-01) (For Field replacement 1-100-230-10)	AR	
	1-100-243-15	.. BLADE SET Compressor third stage (Use on 1-100-230-10) (For field replacement)	AR	C,D
-31	1-100-240-08	.. DISK ASSEMBLY, Compressor rotor, fourth stage (Replace with 1-100-240-10)	1	C,D
	1-100-240-09	.. DISK ASSEMBLY, Compressor rotor, fourth stage (Replace with 1-100-240-10)	1	C,D
	1-100-240-10	.. DISK ASSEMBLY, Compressor rotor, fourth stage (Replace with 1-100-240-15)	1	C,D
	1-100-240-15	.. DISK ASSEMBLY, Compressor rotor, fourth stage	1	C,D
	1-100-240-13	.. DISK ASSEMBLY, Compressor rotor, fourth stage (Use to depletion)	1	C,D
-32	1-100-244-04	.. DISK, Compressor rotor, fourth stage (Use on 1-100-240-08 and 1-100-240-09)	1	C,D

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-527-32	1-100-244-06	.. DISK, Compressor rotor, fourth stage (Use on 1-100-240-10 and 1-100-240-13) (Replace with 1-100-240-08)	1	C,D
-32	11-100-244-08	.. DISK, Compressor rotor, fourth stage (Use on 1-100-240-10 and 1-100-240-15)	1	C,D
-33	1-100-237-01	.. PLATE, Locking, compressor rotor blade 0.0180	AR	C,D
-33	1-100-237-02	.. PLATE, Locking, compressor rotor blade 0.0190	AR	C,D
	1-100-237-03	.. PLATE, Locking, compressor rotor blade 0.0200	AR	C,D
	1-100-237-04	.. PLATE, Locking, compressor rotor blade 0.0210	AR	C,D
	1-100-237-05	.. PLATE, Locking, compressor rotor blade 0.0220	AR	C,D
	1-100-237-06	.. PLATE, Locking, compressor rotor blade 0.0230	AR	C,D
	1-100-237-07	.. PLATE, Locking, compressor rotor blade 0.0240	AR	C,D
	1-100-237-08	.. PLATE, Locking, compressor rotor blade 0.0250	AR	C,D
	1-100-237-09	.. PLATE, Locking, compressor rotor blade 0.0260	AR	C,D
	1-100-237-10	.. PLATE, Locking, compressor rotor blade 0.0270	AR	C,D
	1-100-237-11	.. PLATE, Locking, compressor rotor blade 0.0280	AR	C,D
	1-100-237-12	.. PLATE, Locking, compressor rotor blade 0.0290	AR	C,D
	1-100-237-13	.. PLATE, Locking, compressor rotor blade 0.0300	AR	C,D
-34	X31S094-0185	.. PIN, Spring (56878) (Lycoming Source Cont Dwg 1-300-268-01)	36	C,D
-35	1-100-384-01	.. BLADE, Compressor rotor; fourth stage (Use on 1-100-240-10)	36	C,D
	1-100-245-02	.. BLADE, Compressor rotor, fourth stage (Use on 1-100-240-09 and 1-100-240-13)	36	
	1-100-384-02	.. BLADE SET, Spare compressor, fourth stage (Make from 1-100-384-01) (For field replacement)	36	
-36	1-100-450-09	.. DISK ASSEMBLY, Compressor rotor, fifth stage	1	C,D

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-527-37	1-100-417-05	.. DISK, Compressor rotor, fifth stage	1	C,D
-38	1-100-237-01	.. PLATE, Locking, compressor rotor blade 0.0180	AR	C,D
	1-100-237-02	.. PLATE, Locking, compressor rotor blade 0.0190	AR	D
	1-100-237-03	.. PLATE, Locking, compressor rotor blade 0.0200	AR	C,D
	1-100-237-04	.. PLATE, Locking, compressor rotor blade 0.0210	AR	C,D
	1-100-237-05	.. PLATE, Locking, compressor rotor blade 0.0220	AR	C,D
	1-100-237-06	.. PLATE, Locking, compressor rotor blade 0.0230	AR	C,D
	1-100-237-07	.. PLATE, Locking, compressor rotor blade 0.0240	AR	C,D
	1-100-237-08	.. PLATE, Locking, compressor rotor blade 0.0250	AR	C,D
	1-100-237-09	.. PLATE, Locking, compressor rotor blade 0.0260	AR	C,D
	1-100-237-10	.. PLATE, Locking, compressor rotor blade 0.0270	AR	C,D
	1-100-237-11	.. PLATE, Locking, compressor rotor blade 0.0280	AR	C,D
	1-100-237-12	.. PLATE, Locking, compressor rotor blade 0.0290	AR	C,D
	1-100-237-13	.. PLATE, Locking, compressor rotor blade 0.0300	AR	C,D
-39	X31S094-0185	.. PIN, Spring (56878) (Lycoming Source Cont Dwg 1-300-268-01)	38	C,D
-40	1-100-385-01	.. BLADE, Compressor rotor, fifth stage	38	C,D
	1-100-385-02	.. BLADE SET Spare, compressor, fifth stage (Make from 1-100-385-01) (For field replacement)	AR	
-41	1-100-440-07	.. IMPELLER ASSEMBLY, Centrifugal compressor	1	C,D
-42	1-100-251-01	.. COUPLING, Compressor	1	C,D
-43	1-100-415-01	.. IMPELLER, Rear section	1	C,D
-44	1-100-414-04	.. IMPELLER, Forward section	1	C,D
-45	1-100-482-01	.. SEAL, Sleeve	1	C,D
-46	1-100-416-07	.. SPACER, Compressor rotor, fifth stage	1	C,D
-47	1-100-204-05	.. SPACER, Compressor rotor, fourth stage (Replace with 1-100-204-06)	1	C,D
-47	1-100-204-06	.. SPACER, Compressor rotor, fourth stage	1	C,D

Figure & Index Number	Part Number	Description	Qty Per Assy	Usable on Code
		1 2 3 4 5 6 7		
5-527-48	1-100-203-03	. SPACER, Compressor rotor, third stage	1	C,D
-49	1-100-202-03	. SPACER, Compressor rotor, second stage	1	C,D
-50	1-100-201-05	. SPACER, Compressor rotor, first stage	1	C,D
-51	1-080-028-02	. RETAINER, Bolt	10	C,D
-52	1-100-214-06	. SCREW Cap, socket head	10	C,D
-53	1-100-207-05	. SLEEVE, Compressor rotor	1	C,D
	1-100-800-04	. SHAFT, ASSEMBLY, Power	1	C,D
-54	1-100-344-01	. . PLUG, Power shaft	1	C,D
-55	No Number	. . SHAFT, Power	1	C,D
-56	1-100-137-04	. SHAFT Rear compressor	1	C,D

**CAUTION**

In following step d, prevent possible axial seal movement, ensure that retaining ring (21) is seated properly.

- d. Install retaining ring (21) into groove of retainer (23 or 36).

**5-421. FUNCTIONAL TEST.** Functional test is not required.

**5-422. COMPRESSOR ROTOR ASSEMBLY (T53-L-15, -701).**

**5-423. DISASSEMBLY.** Proceed as follows:

- a. Using socket wrench (LTCT4002), remove nut and seal assembly (1, figure 5-527) and cup (2).
- b. Using puller (LTCT2027), remove gear (3).
- c. Remove shim (4) and record thickness.
- d. Using puller (LTCT483), remove bearing housing assembly as follows:
  - (1) Slide seal housing assembly (11) aft.
  - (2) Insert puller legs through channels of bearing retainer assembly and position behind impeller (10).
  - (3) Remove bearing housing assembly (5).
- e. Remove the puller from the bearing housing assembly. Remove impeller (10).
- f. Secure bearing housing assembly in holding fixture (LTCT4713), forward end down. Straighten cup (8) and, using wrench (LTCT487), remove nut (9) and cup.
- g. Using suitable drift and mallet, gently tap bearing (7) from front bearing housing (6).
- h. Remove seal housing assembly (11) from the compressor rotor assembly.
- i. Remove retaining ring (15) from housing (12).

CHQSOFTWARE.COM

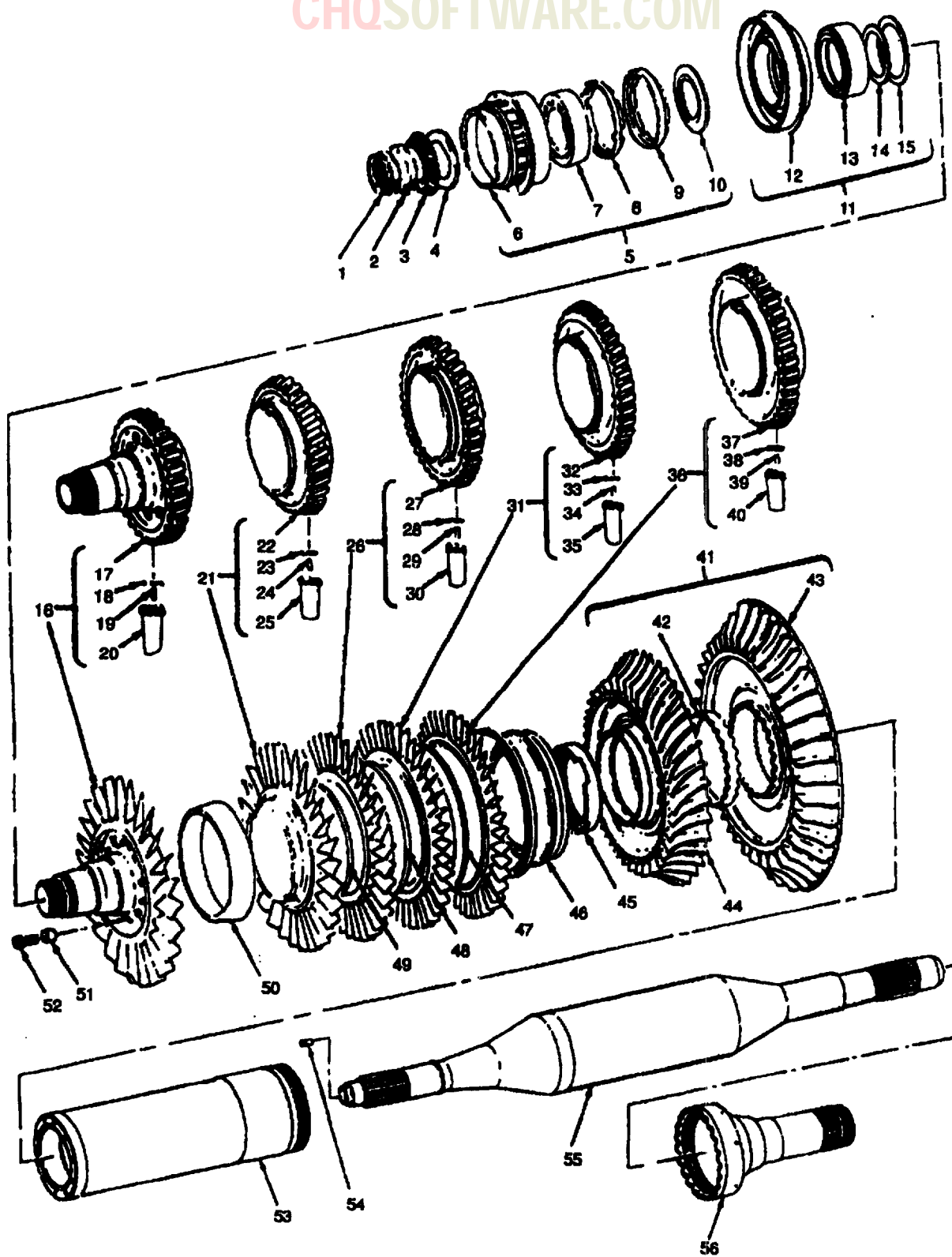


Figure 5-527. Compressor Rotor Assembly (T53-L-15, -701).

- j. Using suitable adapter and arbor press, press out seal (13), with packing (14) installed, from housing (12). Remove packing.
- k. Using punch, break tabs on bolt retainers (51).
- l. Insert the rear compressor shaft end of the compressor rotor into adapter (LTCT4815).
- m. Position compressor rotor with adapter into hydraulic press (LTCT590).
- n. Position adapter (LTCT2958, detail of LTCT590) over forward rotor shaft.
- o. Install suitable allen wrench into each of the 10 screws (52) so that wrenches protrude through the holes in adapter.
- p. Using approved marking pencil (item 238, table C-1) and proceeding clockwise, number the holes in the flange of the adapter in numerical sequence, 1 through 10.
- q. Energize hydraulic press (LTCT590) and apply a 50,000-pound load to the compressor rotor.
- r. Maintain pressure. Release torque on each screw (52) and immediately retighten to snug fit. After releasing torque, back off each screw one-quarter turn, following the same sequence in which torque was released.
- s. Release pressure and remove compressor rotor and adapters from hydraulic press.
- t. Remove adapters and place compressor rotor into holding fixture (LTCT55), or equivalent. Remove screws (52), and bolt retainers (51). Discard screws.
- u. Using separator tool (LTCT197), separate first stage compressor rotor spacer (50) from disk assembly (21).
- v. Using pullers (LTCT33), separate disk assembly (16) and first stage compressor rotor spacer (50).
- w. Using separator tool (LTCT197), remove disk assemblies (21, 26, 31, and 36) and spacer (47, 48, and 49).

**NOTE**

Upon removal of disk assemblies (26 and 31), inspect for serial numbers. If disks bear serial number C8D2018 through C8D2442 inclusive, C8C1900 through C8C2191 inclusive and C8C2785 through C8C2919 inclusive, remove disks from overhaul system.

- x. Separate fifth stage compressor rotor spacer (46) from impeller as follows:
  - (1) Place a bronze ring under outer lip of spacer.
  - (2) Position three separator tools (LTCT197), with one leg of each against bronze ring and the other against impeller, and separate spacer from impeller.

**NOTE**

If cocking of spacers occurs, use a soft-faced mallet to tap the high side.

- y. Using tool (LTCT4704), remove seal (45) from the impeller. Unscrew and remove rear compressor shaft (56) from compressor rotor sleeve (53).
- z. Slide power shaft (55) aft out of compressor rotor sleeve.
- aa. Remove rear section impeller (43) and compressor coupling (42) from compressor rotor sleeve.
- ab. Using an arbor press and a flat bar, press sleeve (53) forward out of forward section impeller (44).
- ac. Remove forward section impeller and seal (45) from sleeve.
- ad. On T53-L-15, -701 engines, remove blades from disk assembly (16) as follows:
  - (1) Place disk assembly, forward face up, in mounting fixture (LTCT360).

**CAUTION**

In following step (2), to avoid damaging edge of blade, tap blade gently.

- (2) Using drift assembly (LTCT1643) and soft-faced mallet, remove blade from disk assembly. Table of locking plate will straighten as blade moves out.



**NOTE**

Do not remove plug (37) unless necessary; If it is necessary to remove plug, use a suitable brass rod from opposite end of power shaft and drive plug out.

**5-424. CLEANING.** Proceed as follows:

a. Clean parts by dry cleaning solvent method. (Refer to SP No. 3002 in Appendix E.) If the power shaft (55, figure 5-527, or 38, figure 5-569) and front and rear shafts (17 and 56, figure 5-527, or 23 and 39, figure 5-569) require additional cleaning, clean by periodic-reverse method. (Refer to SP No. 3006 in Appendix E.) If the compressor rotor assembly (24, figure 5-569) rear shafts (56, figure 5-527 and 19, figure 5-569) front shaft assemblies (16, figure 5-527 and 19, figure 5-569, and power shafts (55, figure 5-527 and 39, figure 5-569) require additional cleaning, clean by plastic media blasting. (Refer to SP No. 3003.1 in Appendix E.) Clean seals by dry cleaning solvent method only. (Refer to SP No. 3002 in Appendix E.) If titanium parts (Impeller, index 34, and compressor rotor assembly, index 28, figure 5-569) require additional cleaning, use eldorado HTP-1160 (item 89, Appendix C) followed by warm water rinse.

**NOTE**

Titanium compressor rotor and impeller assemblies that have been cleaned with chlorinated solvents shall not be subjected to any heat-treat process unless they are first cleaned as outlined in following steps (1) through (5).

(1) Immerse part in acetone (item 13, table C-1) or cleaning solvent (item 101, table C-1). Remove and scour surfaces with disposable lint-free wipes (item 356, table C-1) soaked with acetone (item 13, table C-1) or cleaning solvent (item 101, table C-1) until all surface contamination is removed.

(2) Wipe dry with dry-disposable, lint-free wipes (item 356, table C-1).

**CAUTION**

When performing step (3), do not allow solution to contact tenon and blade slot area of rotor disks.

(3) Immerse the areas to be repaired, for 1 to 5 minutes, in etchant solution consisting of the following.

**WARNING**

Both 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.

(a) Nitric acid (item 229, table C-1) (40° Baume) 32 to 36 percent by volume.

(b) Hydrofluoric acid (item 170, table C-1) (70 percent) 2 to 4 percent by volume.

**CAUTION**

When including water to complete etchant solution, the concentration of chlorides present in water shall not exceed 17 parts per million.

(c) Water to make one gallon of solution.

(4) Rinse in clean, cold running water.

(5) Immerse part in acetone (item 13, table C-1) or cleaning solvent (item 101, table C-1); remove and wipe dry with dry, disposable, lint-free wipes (item 356, table C-1).

**NOTE**

Power shaft bearing journals shall be treated as bearings in regard to cleaning and preservation. (Refer to SP No. 3010 and 3008 in Appendix E.)

On T53-L-15, -701 engines, prior to performing corrosion pitting inspection of second through fourth stage compressor disk assemblies, epoxy and anodic coating must be stripped as outlined in following step b.



b. Strip epoxy and anodic coating from second through fourth stage compressor disk assemblies as follows:

- E.)
- (1) Clean assemblies as necessary using the dry cleaning solvent method. (Refer to SP No. 3002 in Appendix
  - (2) Remove blades and pins as outlined in paragraphs (5-439 or 5-427.)
  - (3) Immerse disk in chromic acid solution at 140° to 150°F (60° to 66° C) for a period of 1 to 3 hours (until resin is removed.)

#### NOTE

Chromic acid solution consists of 2 pounds chromic acid (item 86, table C-1) to one gallon of water.

- (4) Rinse disk in cold running water.
- (5) Immerse disk in boiling solution of chromic acid and phosphoric acid for a period of 10 minutes.

#### NOTE

Chromic acid and phosphoric acid solution consists of 75.7 grams of chromic acid (item 86, table C-1), 132.5 milliliters of phosphoric acid (item 243, table C-1), and enough water to make one gallon of solution.

- (6) Rinse disk in cold running water.
- (7) Anodic clean disk in phosphoric acid (item 243, table C-1) at ambient temperature for a period of 1 to 5 minutes, applying 10 volts.
- (8) Rinse disk in cold running water.
- (9) Rinse disk in hot water and air dry
- (10) Check for removal of anodic coating by testing for electrical conductivity using an ohmmeter set on X1000 resistance scale.

**5-425. INSPECTION.** Inspect as per table 5-162.

**5-426. REPAIR.** (See figures 4-53 and 5-527.) Proceed as follows:

- a. Replace defective carbon ring in nut and seal assembly (1, figure 5-527) as follows: (See figure 5-539.)
- (1) Bend back retaining tangs on seal housing.

#### NOTE

It may be necessary to slightly bend back other tangs to assist in removal of the front seal housing.

- (2) Remove front seal housing, taking care not to score or in any way mark the rear face of the front seal housing or forward face of the nut component.
- (3) Remove defective carbon seal, and replace with new seal, P/N 980956, for seal assembly (1-300-077-01) or new seal P/N 107800-2 for seal assembly (1-300-077-02).
- (4) Using acetone (item 13, table C-1), ultrasonically clean nut and seal metal components for up to 5 minutes.
- (5) Inspect rear face of front seal housing. Face must be entirely free of nicks, scratches, and tool marks and present a smooth flat surface.
- (6) Rework front seal housing, on seal assembly (1-300-077-02) only, by machining tang detents in three places, 120 degrees apart, as shown in figure 5-540.

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
4-53	Sleeve (Front Bearing)	Visual	Loss of protective surface finish.	Repair. (Refer to SP No. 6012 in Appendix E)
-5		Visual and Magnetic-Particle	Cracks.	Not allowed. Replace.
		Dimensional	Wear and fits. (Refer to table 5-164)	Replace if limits are not met.
-6	Shim (Front Bearing)	Visual	Damaged surface coating (black oxide).	Repair. (Refer to SP No. 6003 in Appendix E)
5-527	Nut and Seal Assembly	Visual	Cracks.	Not allowed. Replace.
-1			Freely floating carbon ring. (Refer to table 5-165)	Repair or replace if limits cannot be met. (Refer to paragraph 5-426)
			Nicks, chipping, cracks, and score marks on carbon ring. (Refer to table 5-165)	Replace if limits are not met.
			Damaged threads. (Refer to table 5-165)	Replace if limits are not met.
			Carbon ring ID not within limits. (Refer to table 5-165)	Replace if limits are not met.
-3	Gear	Visual and Magnetic-Particle (Refer to table 5-163)	Cracks.	Not allowed. Replace.
-6	Front Bearing Housing	Visual	Loss of protective surface finish (black oxide).	Repair. (Refer to SP No. 6003 in Appendix E)
		Visual and SIE	Damage to threads.	Repair or replace. (Refer to SP No. 5007 in Appendix E).
			Worn 3.5432 to 3.5436 inch (8.9997 to 9.0007 cm) diameter.	Repair. (Refer to paragraph 5-426)
			Worn 5.1882 to 5.1885 inch (13.1780 to 13.1788 cm) diameter.	Repair. (Refer to paragraph 5-426)
			Worn 1.299 to 1.300 inch (3.299 to 3.302 cm) diameter.	Repair. (Refer to paragraph 5-426)

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527		Visual and Magnetic-Particle	Cracks.	Not allowed. Replace.
		Dimensional	Wear. (Refer to table 5-167)	Replace if limits are not met.
-7	Bearing	Visual	Damage bearing.	Not allowed. Replace.
		Dimensional	Wear. (Refer to table 5-166)	Replace if limits are not met.
-10	Impeller	Visual	Nicks, burrs, or scratches.	Repair. (Refer to SP No. 5000 in Appendix E)
			Damaged surface coating (black oxide).	Repair. (Refer to SP No. 6003 in Appendix E)
		Visual and Magnetic-Particle	Cracks.	Not allowed. Replace.
-12	Housing (Seal)	Visual	Loss of protective surface finish (black oxide).	Repair. (Refer to SP No. 6003 in Appendix E)
		Visual and SIE	Worn 3.249 to 3.250 inch (8.252 to 8.255 cm) diameter, 5.1881 to 5.1886 inch (13.1778 to 13.1790 cm) diameter, and 0.002 to 0.004 inch (0.005 to 0.010 cm) dimension.	Repair. (Refer to paragraph 5-426)
		Visual and Magnetic-Particle	Cracks or dents.	Not allowed. Replace.
		Dimensional	Wear and flts. (Refer to table 5-167)	Replace if limits are not met.
-16	Disk Assembly (Front Stage Compressor Rotor)	Visual	Axial scoring, crazing, and damage chrome plate on seal journal.	Repair. (Refer to SP No. 6014 in Appendix E)
			Loss of protective surface finish (phosphate coating)	Repair. (Refer to SP No. 6012 in Appendix E)
		Visual and SIE	Sand and dust erosion on blades. (Refer to table 5-165)	Repair or replace if limits are not met.

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527 -16 (cont)	Compressor Front Rotor Shaft	Dimensional	Blade tip shake.	Not allowed. Replace locking plates or blades. (Refer to paragraph 5-427)
			Blades protruding more than 0.015 Inch (0.038 cm) from front or rear face of disk.	Repair. (Refer to paragraph 5-426)
			Wear and fits. (Refer to table 5-164)	Replace if limits cannot be met.
		Visual and Fluorescent Penetrant.	Seal tracking or deposits of coke, varnish and carbon on disk.	Repair. (Refer to paragraph 5-426)
			Cracks.	Not allowed. Replace.
-17		Visual and SIE	Worn 0.094 to 0.097 Inch (0.239 to 0.246 cm) diameter pin hole.	Repair. (Refer to paragraph 5-426)
			Runout beyond acceptable limits. (Refer to table 5-164)	Repair if limits are not met. (Refer to paragraph 5-426)
			Worn or damaged chrome surface in seal area. [2.4360 to 2.4365 Inch (6.1874 to 6.1887 cm)] and bearing journal [1.9685 to 1.9687 Inch (5.0000 to 5.0005 cm)]. (See figure 5-531)	Repair. (Refer to paragraph 5-426)
			Below minimum dimension [4.4180 Inch (11.222 cm)] on spacer seating area. (See figure 5-531)	Repair. (Refer to paragraph 5-426)
			Damage to splines resulting from disassembly or improper handling which does not exceed 0.050 inch (0.127 cm) of the spline tooth length are acceptable after repair. Scoring on tooth face is acceptable. Raised material at ends of spline teeth shall be repaired.	Repair. (Refer to paragraph 5-426)

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527 -17 (cont)  20  21	Compressor Front Rotor Shaft (Cont)	Visual and SIE	Grooves on 1.481 to 1.483 inch (3.762 to 3.767 cm) ID. (Refer to table 5-165)	Replace if limits are not met.
		Visual and Magnetic-Particle.	Cracks.	Not allowed. Replace.
	Blade (First Stage)	Visual and Fluorescent Penetrant	Cracks or crack-like indications.	Not allowed. Replace.
		Visual and SIE	Nicks, burrs pits, dents, and other foreign object damage. (See figure 5-538)	Repair or replace blades if limits are not met. (Refer to paragraph 5-426.)
	Disk Assembly (Second Stage Compressor Rotor)	Visual	Corrosion, pitting. (Refer to table 5-165)	Replace disk if limits are not met.
			Loss of protective surface finish.	Repair. (Refer to paragraph 5-426)
			Worn 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter pin hole in disk.	Repair. (Refer to paragraph 5-426)
			Hub runouts beyond acceptable limits. (Refer to table 5-165)	Repair. (Refer to paragraph 5-426)
			Blade tip shake. (All except 1-100-710-09 and 1-100-710-10).	Not allowed. Replace locking plates or blades. (Refer to paragraph 5-426)
			Blade tip shake in excess of 0.025 inch (0.064 cm) when measured 0.50 inch (1.27 cm) above blade root (1-100-710-09, -10).	Replace if limits are exceeded. (Refer to paragraph 5-427)
			Blade protruding more than 0.015 inch (0.038 cm) from front or rear face of disk.	Repair. (Refer to paragraph 5-426)
		SIE and 7-power magnifying glass	Nicks, burrs, pits, dents, and other foreign object damage on blades. (See figure 5-538)	Repair or replace blades if limits are not met. (Refer to paragraph 5-426)

Table 5-162. Inspection of Compressor Rotor Assembly (T53-L-15, -701) (Continued).

FIGURE & INDEX NO.	NOMENCLATURE	METHOD	INSPECT FOR	REQUIREMENTS
5-527 -21 (cont)	Disk Assembly (Second Stage Compressor Rotor) cont	Visual and Fluorescent- Penetrant	Cracks in disks or blades.	Not allowed. Replace.
26	Disk Assembly (Third Stage Compressor Rotor)	Dimensional	Cracks in disk tenon (1-100-710-05). (Refer to table 5-165)	Not allowed. Replace disk.
			Wear and fits. (Refer to table 5-164)	Replace if limits cannot be met.
		Visual	Erosion on blades. (Refer to table 5-165)	Replace blades if limits are not met.
			Corrosion pitting. (Refer to table 5-165)	Replace disk if limits are not met.
		Visual and SIE	Loss of protective surface finish.	Repair. (Refer to paragraph 5-426)
			Blades protruding more than 0.015 inch (0.038 cm) from front or rear face of disk.	Repair. (Refer to paragraph 5-426)
			Worn 0.094 to 0.097 inch (0.239 to 0.246 cm) diameter pin hole in disk.	Repair. (Refer to paragraph 5-426)
			Hub runouts beyond acceptable limits. (Refer to table 5-165)	Repair. (Refer to paragraph 5-426)
		SIE and 7 - power magnifying glass	Blades tip shake.	Not allowed. Replace blades. (Refer to paragraph 5-427)
			Nicks, burrs, pits, dents, and other foreign objects damage on blades. (See figure 5-538)	Repair or replace blade- if limits are not met. (Refer to paragraph 5-426)
31	Disk Assembly (Fourth Stage Compressor Rotor)	Visual and Fluorescent- Penetrant	Cracks in disks or blades.	Not allowed. Replace.
		Dimensional	Wear and fits. (Refer to table 5-164)	Replace if limits cannot be met.
		Visual	Erosion on blades. (Refer to table 5-165)	Replace blades if limits are not met. Refer to paragraph 5-427)

m. Secure reduction gear assembly with nuts (2, figure 4-42) and washers (3). Do not use lubricant on nuts (2). Tighten nuts to 70 to 75 pound-inches (12502 to 13395 gm cm) torque.

n. Using socket, P/N SWE8673L; anchor plate, P/N SWE8473-W; and power wrench, P/N SWE8100, or equivalent; tighten nut (1) to 630 to 680 pound-feet (938 to 1012 kgm) torque. (See figure 4-41.)

**6-24. INSTALLATION OF REDUCTION GEAR ASSEMBLY AND SUN GEAR ASSEMBLY (T53-L-701, -701A).**  
(See figure 4-45.) Proceed as follows:

- a. Rotate engine to a horizontal position.
- b. Carefully insert sun gear assembly (14, figure 4-45) through sun gear support assembly and torquemeter head. Continue careful insertion rotating sun gear to engage splines of power shaft pressing past packing against centerbore face in spur gear.

**CAUTION**

In following step c, ensure that the tangs of the bolt retainer engage the slots in the power shaft.

- c. Install washer (13) on bolt retainer (12), with beveled side of washer facing toward bolt retainer. Using guide (LTCT4602), install bolt retainer and washer through sun gearshaft onto power shaft. Secure bolt retainer (12) and washer (13) to power shaft with bolt (11).

**NOTE**

Ensure that washer 1-030-138-04 is installed. Do not lubricate bolt.

- d. Position sun gear holding fixture (LTCT6985) on studs of inlet housing, with splines meshed with sun gear teeth. Secure with four nuts.
- e. Using driver wrench (LTCT258), tighten bolt (11) to 50 to 60 pound-feet (74 to 89 kgm) torque. Do not lock bolt at this time.
- f. Apply forward load on rear side of power turbine assembly (through exhaust diffuser) to overcome end float of support bearings.

**NOTE**

If end play in following step g, exceeds established limits, recheck tang engagement or install a new bolt retainer or washer. Recheck end play.

- g. Using dial indicator, check end play between sun gearshaft and power shaft assembly. End play shall be 0.020 to 0.047 inch (0.051 to 0.119 cm).

**CAUTION**

In following step h, do not shear bolt retainer.

- h. 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 deform tabs of bolt retainer (12, figure 4-45).

- i. Attach hoisting adapter (LTCT181) and suitable hoist to reduction gear assembly. (See figure 4-43.)
- j. Lubricate and install packing (8, figure 4-45) on rear flange of reduction gear assembly.
- k. Lubricate and install four packings (10) on two oil transfer tubes and seat tubes in openings in rear of reduction gear assembly.

**CAUTION**

In following step l, use extreme care in installing reduction gear assembly. Apply downward pressure on sling clamp bar to maintain vertical alignment of reduction gear assembly. Align unit squarely and insert carefully. Pause after initial engagement of studs to ensure squareness of final entry stage.

- l. Carefully guide reduction gear assembly over sun gear, sun gear support assembly, and inlet housing studs into inlet housing.
- m. When assured unit is properly seated, secure reduction gear assembly with washers (3) and nuts (2). Tighten nuts to 70 to 75 pound-inches (12502 to 13395 gm cm) torque.



**NOTE**  
CHQSOFTWARE.COM

Do not lubricate nuts (2).

- n. Using socket, P/N SWE8673L; anchor plate, P/N SWE8473-W; and power wrench, P/N SWE8100, or equivalent; tighten nut (1). (See figure 4-41.) Apply 630 to 680 pound-feet (938 to 1012 kgm) torque.

**6-25. INSTALLATION OF ACCESSORY DRIVE GEARBOX.** (See figure 4-35.) Proceed as follows:

- a. Rotate engine into a vertical position.
- b. Place two packings (9) on screen and transfer tube (10), and install tube in accessory drive gearbox (3).
- c. Install packings (12 and 13) on mounting face of accessory drive gearbox.
- d. Install accessory drive shaft (11) through opening in inlet housing. Mesh splines carefully.
- e. Position accessory drive gearbox (3) on inlet housing. Carefully mesh accessory drive shaft with coupling in accessory drive gearbox.

**NOTE**

Make certain that accessory drive gearbox is supported against inlet housing before bolts are installed.

- f. Secure accessory drive gearbox with two bolts (7) and washers (8). Do not tighten bolts to full torque at this time.

**NOTE**

Do not lubricate bolts that secure accessory drive gearbox.

- g. Secure accessory drive gearbox with shouldered bolt (5), bolt (6), washers (4), and bracket (2A). Tighten bolts to 400 to 475 pound-inches (71440 to 84845 gm cm) torque. Tighten bolts (7) to 250 to 325 pound inches (44650 to 58045 gm cm) torque. Lockwire bolts.

- h. Secure accessory drive gearbox with three bolts (1) and washers (2). Tighten bolts to 70 to 95 pound-inches (12502 to 16967 gm cm) torque. Lockwire bolts.

**6-26. INSTALLATION OF LUBE OIL FILTER ASSEMBLY.** (See figure 4-34.) Proceed as follows:

- a. Install packings (1 and 2) into accessory drive gearbox assembly.
- b. Position lube oil filter assembly (8) against side of gearbox assembly.
- c. Secure with bolts (5 and 7), washers (6), tabwashers (4), and rigid connecting link (3).
- d. Tighten bolts, as required; lock bolts by bending tabs on tabwashers installed in top two bolts, and lockwire remaining two bolts.

**6-27. INSTALLATION OF TEMPERATURE BULB.** (See figure 4-33.) Proceed as follows:

- a. Position packing (2) onto temperature bulb (3).
- b. Install temperature bulb into power-driven rotary (oil) pump (1).

**6-28. INSTALLATION OF POWER-DRIVEN ROTARY (OIL) PUMP.** (See figure 4-32.) Proceed as follows:

- a. Install packings (4 and 5) into accessory drive gearbox assembly.
- b. Install oil pump drive shaft assembly (3) into gearbox, mating splined end of shaft with oil pump drive gearshaft assembly in the gearbox. Lock snapping.
- c. Position the power-driven rotary (oil) pump (6) on the forward pad of gearbox and engage exposed end of oil pump drive shaft assembly.
- d. Secure power-driven rotary pump to gearbox with bolts (1 and 7) and washers (2). Tighten bolts, as required, and lockwire.

**6-29. INSTALLATION OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY AND POWER-DRIVEN ROTARY (BOOSTER) PUMP (T53-L-13B, -15, -703).** (See figure 4-29.) Proceed as follows:

- a. Insert shaft (1) into inlet housing mounting pad hole.
- b. Install packings (2 and 3) and overspeed governor and tachometer drive assembly (6) on mounting pad of inlet housing. Ensure that splines of shaft (1) are properly engaged.



- c. Secure with bolts (5, 7, and 9), bracket (4A), and washers (8 and 10). Tighten bolts, as required, and lockwire.
- d. Install fuel control as outlined in paragraphs 6-38 or 6-39.
- e. Install packing (11) in power-driven rotary (booster) pump (14).
- f. Mount pump on overspeed governor and tachometer drive housing, mating its splined shaft within overspeed governor cover.
- g. Secure pump with washers (12) and bolts (13). Lockwire bolts.

**6-30. INSTALLATION OF OVERSPEED GOVERNOR AND TACHOMETER DRIVE ASSEMBLY (T53-L-701, -701A).** (See figure 4-31.) Proceed as follows:

- a. Install packing (1) and plate (2) on inlet housing pad and feed electric torquemeter head assembly lead through the smaller of the two openings. Install torquemeter lockplate (5) around lead assembly and secure with four screws (4) and flat washers (3).
- b. Insert shaft (6) into inlet housing mounting pad hole.
- c. Install packings (7 and 8) and overspeed governor and tachometer drive assembly (11) on inlet housing mounting pad.
- d. Secure with bolts (10 and 12), washers (13), and bracket (9). Tighten bolts, as required, and lockwire bolts.
- e. Install fuel control as outlined in paragraph 6-39.

**6-31. INSTALLATION OF TORQUEMETER JUNCTION BOX ASSEMBLY (T53-L-701, -701A).** (See figure 4-30.) Proceed as follows.

- a. Connect electrical cable at connector (4).
- b. Mount junction box (1) on flange of overspeed governor and tachometer drive assembly and secure with screws (3) and washers (2). Lockwire screws.

**6-32. INSTALLATION OF ELBOW TUBE, AND BLEED AIR ADAPTER ASSEMBLY.** (See figure 4-28.) Proceed as follows:

- a. Position gasket (10) and cover (11) on bleed air adapter assembly (4 or 9) and secure with bolts (12).
- b. Position bleed air adapter assembly (4) on compressor and diffuser housing assemblies and secure with bolts (6 and 8), washers (5), and clip (7).
- c. Position gasket (15) and bleed air adapter assembly (9) on impeller housing and secure with bolts (13) and washers (14).

**NOTE**

Position flanged port towards right side of engine.

- d. Position packing (2) on flanged port of adapter assembly.
- e. Position packing (2) on flange of elbow (1). Slide tube (3) over elbow (1).
- f. Slide tube (3) over flanged port of adapter assembly (4 or 9) and position flange of elbow (1) against diffuser housing mounting port.
- g. Secure elbow with bolts (16). Tighten bolts, as required, and lockwire.

**6-33. INSTALLATION OF AIR INLET GUIDE VANE ACTUATOR ASSEMBLY.** (See figure 4-27.) Proceed as follows:

- a. Position inlet guide vane actuator assembly (8) on rear flange of inlet housing.
- b. Secure actuator assembly with bolts (1), washer (2) support (3), spacer (4), bolt (20), washer (21), and nuts (7). Tighten nuts, as required. If installed, remove covers or liners from actuator fittings.

**NOTE**

Use washer (2), as required, to prevent threaded end of bolt from rubbing against inlet housing.

- c. Thread bearing (6) onto connector (6, figure 4-55). Hold actuator assembly full open (piston retracted, adjust bearing until upper end of blast-mark area on connector aligns with open scribe mark on rigging plate (located on inlet housing). Tighten nut (5, figure 4-27), as required, and secure with lockwire.

- d. Position tube assembly (19) under engine and connect to actuator assembly with bolt (9), washers (10 and 12), nut (13) and cotter pin (15).

**NOTE**

Use quantity of washers (10) under nut (13), as required, to obtain minimum clearance between pin (15) and nut (13).

- 6-34. INSTALLATION OF INTERSTAGE BLEED ACTUATOR ASSEMBLY AND BLEED BANDS.** (See figure 4-7.)  
Air bleed actuator P/N 1-170-050-08 may be used on T53-L-703 engines. Proceed as follows:

**NOTE**

Oil manifold must be installed prior to bleed band actuator. Refer to paragraphs 6-59a and 6-60b.

**NOTE**

In following step a, the clip is properly installed when legs are so positioned as not to cause bleed band binding. Check all legs and reposition or bend, as required. Check assembled bleed band in open and closed position.

- a. Install upper band (2) through clips (4, figure 5-501) on upper half of compressor housing and lower band (5, figure 4-7) through clips on lower half of compressor housing. Ensure clips are properly installed.

**CAUTION**

Ensure head of screw (6) is not below band ID.

- b. Place end of upper band (2) over end of lower band (5). Align screw holes and install screw (6) from inside the bands. Install washer (3) and nut (4) on screw. Hold the screw and tighten nut, as required.
- c. Support actuator assembly (14) and attach upper band (2) to rod end (1) with pin (7) and bearing (15). Attach lower band (5) to piston (10) with pin (7) and bearing (15).
- d. Position actuator assembly on mounting face of centrifugal case and secure with bolts (8 or 11) and washers (9 or 12) and nuts (13).
- e. Tighten bolts (8) or nuts (13), as required. Lockwire as required.

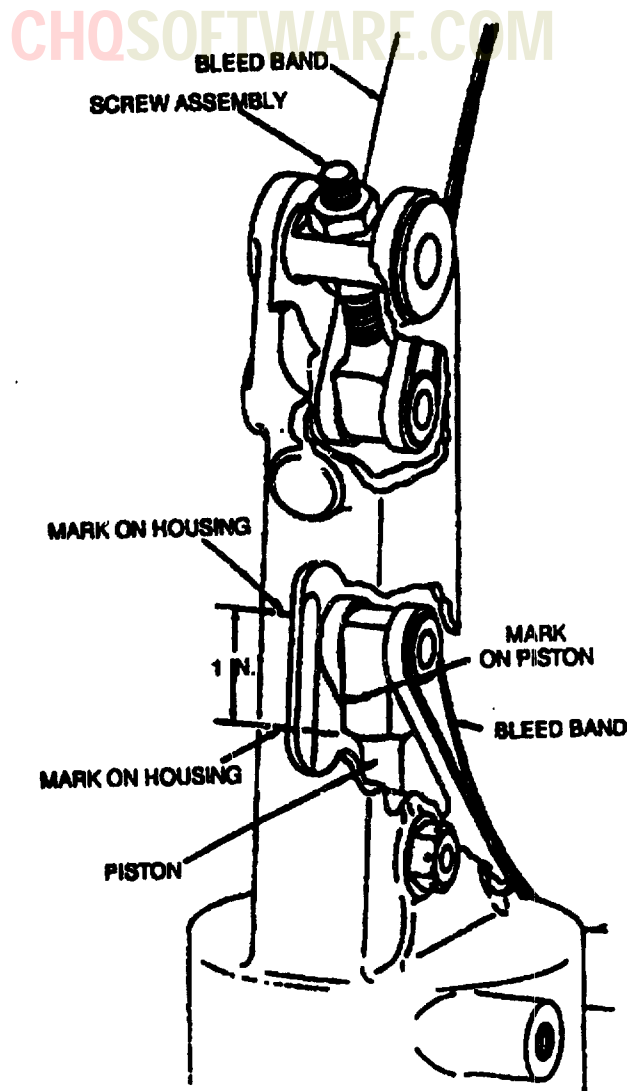


Figure 6-24. Determining Rod Travel.

- f. Adjust bleed bands. (Refer to paragraph 6-35).

**6-35. ADJUSTMENT OF BLEED BANDS.** The travel of the piston rod and tightness of the bleed band are adjusted as follows:

- a. With piston in retracted position, make mark on the piston rod. (See figure 6-24).
- b. Position mark on housing in line with mark on piston rod. Place another mark on housing exactly one inch (2.54 cm) above first mark. (See figure 6-24).
- c. Connect air supply to pressure port of actuator.
- d. Install cap assembly, AN929-4, on signal port of actuator.
- e. Cut lockwire that secure nut on each side of pin (5, figure 5-1). Back off nut (3) to end of rod end (4).

**NOTE**

At least one thread shall show beyond nut at all times.

- f. Close bleed bands by applying 60 psig (4218 gm sq cm) air pressure to actuator assembly.
- g. Measure travel (throw) of rod.

- h. Adjust nut (8) closest to rod and to obtain a piston travel of 1.0 to 1.2 inches (2.54 to 3.05 cm).
- i. Release pressure and tighten nut (8) farthest from rod end. Reapply pressure.
- j. Recheck rod travel. If rod travel is within limits, proceed to following step l.
- k. If rod travel cannot be accomplished by adjustment of nuts, replace band or actuator assembly, whichever is required, and repeat preceding steps a. through j.
- l. Apply 60 psig (4218 gm sq cm) air pressure to actuator assembly.
- m. Using feeler gage, check clearance between compressor housing and bleed band in all accessible bleed port areas. Clearance must not exceed 0.002 inch (0.005 cm) drag fit. If clearance is within limits, proceed with following step p.
- n. If clearance is not within limits, adjust nuts (8) to obtain required clearance by either of the following methods:
  - (1) Tighten band by loosening nut (8) farthest from rod end (10) and tightening second nut (8).
  - (2) Loosen band by loosening nut (8) closest to rod end (10) and tightening second nut (8).

**NOTE**

After adjustment of nuts (8), recheck for piston travel of 1.0 to 1.2 inches (2.54 to 3.05 cm). If not within limits, replace band or actuator assembly, whichever is required.

- o. Adjust bleed band under spot weld at 1-o'clock position as follows:
  - (1) Insert 0.032 inch (0.081 cm) shim (0.032 inch (0.081 cm) safety wire will suffice) between bleed band and compressor housing at 1-o'clock position.
  - (2) Using a small drift and a 3-ounce ball peen hammer, lightly tap bleed band until proper clearance is obtained. Clearance shall not exceed 0.002 inch (0.005 cm) drag fit.

**CAUTION**

Care shall be taken not to damage bleed band or compressor housing while making this adjustment.

- p. When proper clearance has been established, tighten nuts and lockwire both nuts together.
  - q. Disconnect air pressure supply and connect hose assemblies.
- 6-36. INSTALLATION OF INTERSTAGE BLEED ACTUATOR HOSE ASSEMBLIES.** (See figure 4-6.) Proceed as follows:

- a. Install union (3) and packing (2) into actuator assembly and tighten, as required.

**NOTE**

Prior to installation of hose assembly (4), ensure that chafing sleeve is installed and positioned to prevent rubbing on impeller housing, bleed band, or other hoses. (Refer to table 6-3).

- b. Connect hose assembly (4) to fuel control and interstage bleed actuator assembly. Tighten hose connectors to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.
- c. Secure clamp (5) to bracket on bottom rear flange of compressor housing with screw (7) and nut (6). Position nut (16) and washer (15) on tee tube (17) on T53-L-15/701-701A. Install tee tube on diffuser housing with female port pointing about 10 degrees from vertical up (toward C/L of engine) T53-L-15/701A. Install banjo fitting (10, 11, 12) on T53-L-13B/703 air diffuser housing.

**NOTE**

With engine in normal horizontal position, the multiple connector on banjo fitting shall point vertically downward and shall have cap, P/N AN929-A6 installed.

- d. Connect hose assembly (1) to interstage bleed actuator assembly and to the tee tube (17) (T53-L-15/701A) or fluid bolt (12) (T53-L-13B/703). Tighten hose connector from 100 to 150 pound inch torque.

**NOTE**

During engine test, the female port on tee tube must be plugged. Nipple (MS24392-6), packing (NAS1595-6) and cap (AN929-A6K) or any other suitable plug may be used. After test, the "plug" may be replaced with an aluminum male "dust cover".

- e. Secure clamp (9) to interstage bleed actuator assembly with screw (8).

**Table 6-3. Chafing Sleeve Sizes.**

Hose Size	Spiral Constant	Chafing Sleeve Part Number
-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	94835-3
-16	2.4	
-20	2.9	
-24	3.6	

**6-37. INSTALLATION OF IGNITION SYSTEM.** (See figure 4-15.) Proceed as follows:

- a. Apply anti-seize compound (item 47, table C-1) to threads of igniter plugs. Install spacers (12) on igniter plugs (13) and install plugs if not previously installed during hot section assembly. Tighten to 85 to 95 pound-inches (15181 to 16967 gm cm) torque.

- b. Position bracket (35) on compressor housing and secure with bolts (34 and 36). Tighten bolts, as required, and lockwire.

**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 ( $6 \times 1.8 = 10.8$  inches). Use the P/N 94835-1 sleeve.

- c. Place ignition unit (37) on bracket so that the "A" and "B" lead receptacles are parallel with the mount pad portion of the retainer bracket, as per figure 6-25. Position loop clamp (38) around unit so that lugs on unit fit into slots in loop clamps. Secure loop clamps and screws (43) and nuts (44). Tighten screws, as required, and lockwire.

- d. Connect all electrical connectors to ignition unit. Tighten connectors, as required, and lockwire.

- e. Secure bracket (29) (T53-L-13B,-703) or brackets (30 and 31) (T53-L-15, -701, -701A) to ignition coil and lead assembly (32) with bolts (33) and nuts (28). Bolt head must be on bracket side and nut on ignition coil and lead assembly side to provide clearance with air diffuser.

- f. Position ignition coil and lead assembly and installed bracket(s) on engine and secure with bolts (33). Tighten bolts, as required, and lockwire.

- g. Connect two short leads to ignition units (37). Tighten connectors, as required, and lockwire. Connect ignition leads to igniter plugs (13). Tighten connectors to 40 to 50 pound-inches (7144 to 8930 gm cm) torque and lockwire.

- h. Secure ignition coil and lead assembly clamps (2, 4, 7, 10, 17, 18, 24, 26, and 40) with screws (5, 8, 9, 14, 19, 25, 41, and 42) and nuts (1, 3, 6, 27, and 39).

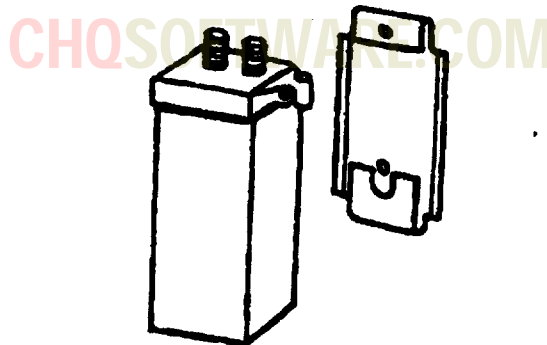


Figure 6-25. Ignition Unit Retaining Bracket.

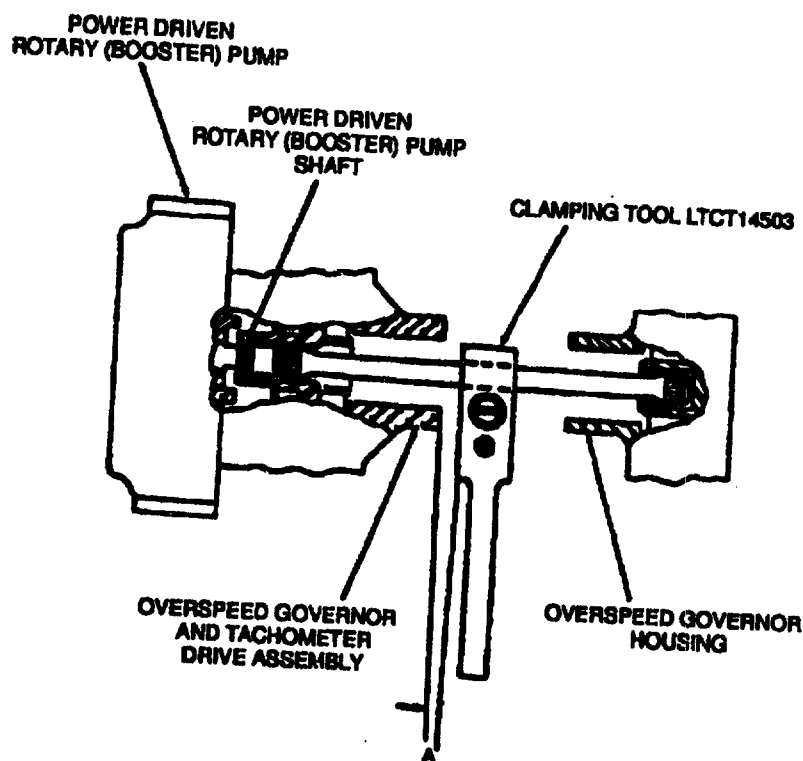


Figure 6-26. End Float Adjustment of Overspeed Governor Drive Shaft.

**NOTE**

Do not secure clamps (16 and 21) at this time. (Refer to paragraph 6-54).

**6-38. INSTALLATION OF FUEL CONTROL (T53-L-13B, -703).** (See figure 4-25.) Proceed as follows:

**CAUTION**

The capillary tube of the temperature-sensing assembly is connected to fuel control. Use extreme care to avoid damage to the tube. Do not separate tube from fuel control.

- a. Temporarily install fuel control on accessory drive gearbox, without snapping (13), packing (12), and tube (14), and perform end float check as follows:

- (1) Push overspeed governor drive shaft against rotary pump shaft and install clamping tool (LTCT14503 or C-Clamp) onto overspeed governor drive shaft so as to rest on mating face of the drive assembly housing.
- (2) With tool securely attached to shaft, push as far into overspeed governor housing as possible.
- (3) Measure and record distance between mating face of the drive assembly housing and the tool surface (A, figure 6-26).
- (4) If end float is less than 0.090 inch (0.229 cm) do not shim drive shaft.

**NOTE**

Minimum end float tolerance is not established; however, it is important that some end float exist to preclude jamming the overspeed governor drive shaft against the housing and power driven pump splined shaft.

- (5) If end float is between 0.090 inch (0.229 cm) and 0.280 inch (0.711 cm), one nut (10, figure 4-25) is to be installed at fuel control (aft) end of drive shaft.
- (6) If end float is more than 0.280 inch (0.711 cm) two nuts (10) are to be installed at each end of drive shaft.
- b. Install snaprings (13) and packings (12) in groove of tube (14).
- c. Insert tube (14) into overspeed governor and tachometer drive housing.
- d. Position gasket (26) on fuel control pad of accessory drive gearbox.
- e. Lubricate fuel control drive shaft splines with lubricating oil (item 189 or 190, table C-1) and install seal (25) over splines and into position on shaft.

**CAUTION**

When performing following step f, care shall be taken when installing fuel control to prevent damage to the drive shaft carbon seal.

- f. Place fuel control on accessory drive gearbox. Secure fuel control (22) with washers (24) and nuts (23). Tighten nuts to 125 to 140 pound-inches (22325 to 25004 gm cm) torque.

**NOTE**

To mesh the splines of the fuel regulator with drive gearshaft, use 1/4-inch drive extension and ratchet and turn N1 tachometer drive gear until fuel regulator drive gearshaft splines mesh with splines on fuel regulator.

Prior to installation of hose assembly (7), ensure chafing sleeve is positioned where hose may come in contact with overspeed governor and tachometer drive.

- g. Connect fuel control air pressure-sensing hose assembly (7) to inlet housing and fuel control. Secure with clamps (5), screws (6), and nuts (4).
- h. Add silicone oil (item 276, table C-1) to fuel regulator.
- (1) Material Required. Twelve cubic centimeters of silicone oil (100 centistrokes) P/N General Electric No. SF96-100 (CECO No. 107-P-35), or equivalent.

**(2) Equipment.**

- (a) Graduated beaker (20 cc)
- (b) Medicine dropper
- (c) Filler assembly (See figure 6-27.)

**(3) Silicone Oil Addition.**

- (a) Connect B nut of filler assembly to the pressure sense elbow or union (with valves A and B open).
- (b) Squeeze bulb and close valves A and B.
- (c) Pour 12 cc's of silicone oil from graduated beaker into tube A of filler assembly.

**NOTE**

Assembly must be in a vertical position.

- (d) Open valve A, then valve B, and close valve A as soon as silicone oil is below it.



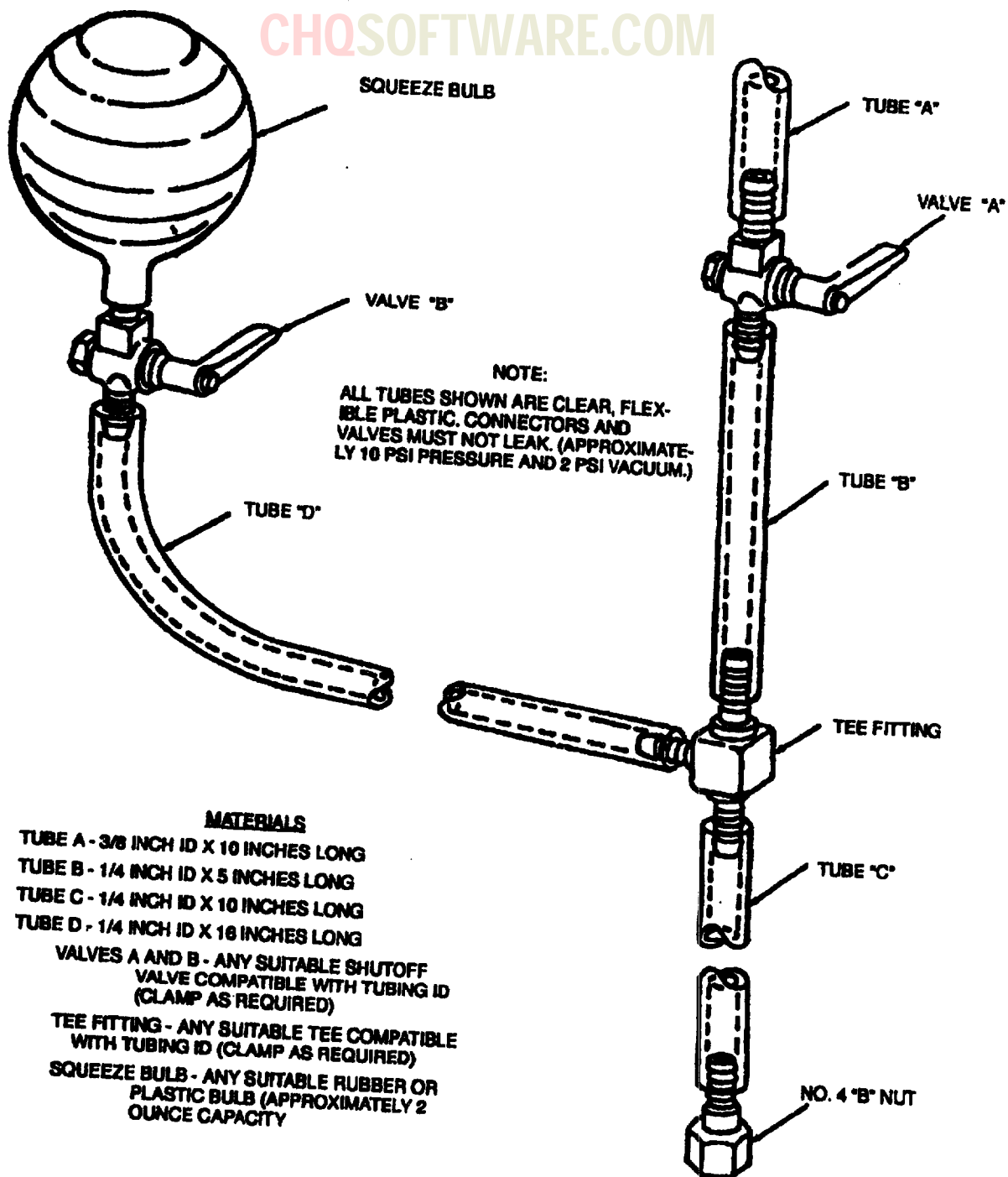


Figure 6-27. Filler Assembly.



- (e) Hold bulb and all tubes in a vertical position and intermittently squeeze and release bulb until P1, sense cavity is filled with oil.

**NOTE**

This may take 5 to 10 minutes, since oil must be forced into the cavity.

- (f) Ensure that at least 10 cc's of oil has entered cavity as follows:

- 1 Release bulb and open valve A.
- 2 Close valves A and B and disconnect filler "B" nut from the pressure sense elbow/union.
- 3 Hold "B" nut end of filler over graduated beaker and open valve A and valve B.
- 4 Squeeze bulb intermittently until remaining oil has drained into beaker. No more than 2 cc's should

remain.

- (g) If necessary, use medicine dropper to complete filling of cavity with oil.
- (h) Connect pressure sense hose or cap.

**CAUTION**

In following step i, do not damage packings on temperature-sensing element

- i. Assemble upper and lower housings (17 and 16) and secure with screws (28) and washers (29).

**NOTE**

Ensure that element is installed in the same position as when removed. The curved ends of the fins at forward end of tube should face inboard.

- j. Position lower and upper housings (16 and 17) and gasket (15) on inlet housing and secure with washers (18) and bolts (19). Tighten bolts to 18 to 22 pound-inches (3215 to 3929 gm cm) torque and lockwire.
- k. Secure clamp (21) to bracket with screw (20) and nut (27).
- l. Install IGV actuator as outlined in paragraph 6-33.
- m. Connect the loose end of tube assembly (19, figure 4-27) to fuel control lever using bolt (18) and washers (10 and 17). If necessary leave out washer (17) to eliminate chafing of tube assembly (19).

**NOTE**

Use quantity of washers (10), as required, to obtain minimum clearance between cotter pin (15) and washers (10).

- n. Hold actuator in full open position.
- o. Adjust rod end bearings (11) until indicator of fuel control lever aligns with 0 degrees position on fuel control indicator plate.
- p. Center tube assembly (19) and tighten nuts (14), as required, and lockwire.

### 6-39. INSTALLATION OF FUEL CONTROL (T53-L-15, -701, -701A). (See figure 4-26.) Proceed as follows:

**CAUTION**

The capillary tube of the temperature-sensing assembly is connected to fuel control. Use extreme care to avoid damage to the tube. Do not separate tube from fuel control.

**NOTE**

Refer to step a for installation of T53-L-15 fuel control and step c for installation of T53-L-701, -701A fuel control.

- a. Install T53-L-15 fuel control as follows:

- (1) Temporarily install fuel control on accessory drive gearbox without snapping (13), packing (12), and tube (14) and perform end float check as follows:
  - (a) Push overspeed governor drive shaft against rotary pump shaft and install clamping tool (LTCT14503 or C-Clamp) onto overspeed governor drive shaft, so as to rest on mating face of the drive assembly housing.
  - (b) With tool securely attached to shaft, push as far into overspeed governor housing as possible.

- (c) Measure and record distance between mating face of the drive assembly housing and the tool surface (A, figure 6-26).
- (d) If end float is less than 0.090 inch (0.229 cm), do not shim drive shaft.

**NOTE**

Minimum end float tolerance is not established; however, it is important that some end float exist to preclude jamming the overspeed governor drive shaft against the housing and power driven pump splined shaft.

- (e) If end float is between 0.090 inch (0.229 cm) and 0.280 inch (0.711 cm) one nut (10, figure 4-26) is to be installed at fuel control (aft) end of drive shaft.
- (f) If end float is more than 0.280 inch (0.711 cm), two nuts (10) are to be installed at each end of drive shaft.
- (2) Install packing (12) in groove of tube (14).
- (3) Insert tube (14) into overspeed governor and tachometer drive housing.
- (4) Lubricate fuel control drive shaft splines with lubricating oil (item 189 or 190, table C-1) and force seal (19) over splines and into position on the shaft.
- (5) Position gasket (20) on fuel control pad of accessory drive gearbox.

**CAUTION**

When performing following step (6), care shall be taken when installing fuel control to prevent damage to the drive shaft carbon seal.

- (6) Position fuel control on accessory drive gearbox.

**NOTE**

To mesh the splines of the fuel regulator with drive gearshaft, use 1/4-inch drive extension and ratchet and turn N1 tachometer drive gear until fuel regulator drive gearshaft splines mesh with splines on fuel regulator.

- (7) Secure fuel control with washers (17) and nuts (16). Tighten nuts to 125 to 140 pound-inches (22325 to 25004 gm cm) torque.
- (8) Add silicone oil (item 276, table C-1) to fuel regulator. (Refer to paragraph 6-38 (h)).

**NOTE**

Prior to installation of hose assembly (7), ensure chafing sleeve is positioned where hose may come in contact with overspeed governor and tachometer drive gearbox.

- (9) Install fuel control air pressure-sensing hose assembly (7) to inlet housing and fuel control. Secure with clamps (5), screws (6), and nuts (4).

**CAUTION**

In following step (10), do not damage packings on temperature-sensing element.

**NOTE**

Ensure that element is installed in the same position as when removed. The curved ends of the fins at forward end of tube should face inboard.

- (10) Assemble upper end lower housings (23 and 22) and secure with screws (25) and washers (24).
- (11) Position temperature-sensing element housing (21) and gasket (31) on inlet housing and secure with washers (30) and bolts (29). Tighten bolts to 18 to 22 pound-inches (3215 to 3929 gm cm) torque.
- (12) Secure clamp (27) to bracket with screws (28) and nuts (26).
- (13) Connect all fuel, air, oil, mechanical, and electrical connections.
- b. Connect loose end of tube assembly (19, figure 4-27) to fuel control lever arm as follows:
- (1) Install washer (10) on bolt (18) and insert bolt through rod end bearing (11).
- (2) Install two washers (10 and 17) on bolt (18) and insert bolt through hole in fuel control lever.

**NOTE**

Ensure that washers of the proper thickness are located on each side of the rod end bearing.

- (3) Install third washer (10) on bolt (18).

**NOTE**

Use quantity of washers (10), as required, to obtain minimum clearance between nut (16) and pin (15).

- (4) Install nut (16) on bolt (18) and tighten, as required.

**CAUTION**

Ensure that rod end bearing is not contacting the actuator arm.

- (5) Install cotter pin (15) in hole in bolt (18).

**NOTE**

Bolt (18) must be free to rotate about its axis.

- c. Install T53-L-701, -701A fuel control as follows:

(1) Install governor drive shaft (11, figure 4-26) into overspeed governor and tachometer drive assembly housing. Do not install tube (14) at this time.

(2) Temporarily install fuel control by positioning gasket (20) on fuel control mounting pad of accessory drive gearbox. Place fuel control assembly on accessory drive gearbox pad, inserting splined fuel control drive shaft (18) into accessory drive gearbox.

**NOTE**

To mesh the splines of the fuel control with the fuel control drive gearshaft, use 1/4-inch drive extension and ratchet and turn N1 tachometer drive gear until fuel regulator drive gearshaft splines mesh with splines on fuel regulator.

- (3) Secure fuel control assembly to studs on accessory drive gearbox with washers (17) and nuts (16).

(4) Push overspeed governor drive shaft against rotary pump shaft and install clamping tool (LTCT14503 or C Clamp) onto overspeed governor drive shaft so as to rest on mating face of the drive assembly housing.

(5) With tool securely attached to shaft, push as far into governor housing as possible.

(6) Measure and record distance between mating face of the drive assembly housing and the tool surface (A, figure 6-26).

- (7) If end float is less than 0.090 inch (0.229 cm), no nuts (10) are required on drive shaft.

**CAUTION**

Minimum end float tolerance is not established; however, it is important that some end float exist to preclude jamming of the governor drive shaft.

(8) If end float is between 0.090 (0.229 cm) and 0.280 inch (0.711 cm) one shim is required at fuel control (aft) end of topping governor drive shaft.

(9) If end float is more than 0.280 inch (0.711 cm) two shims are required at each end of topping governor drive shaft.

**NOTE**

Shim used during installation is 1-160-589-02. The number of shims required is either none, one, or four.

- (10) Remove dial indicator and C-clamp.

(11) Support fuel regulator and governor assembly and remove nuts (16) and washers (17).

(12) Withdraw the assembly, keeping it as level as possible to prevent damage or distortion to splined fuel control drive shaft (18) and topping governor drive shaft (11). Remove gasket (20).

(13) Remove governor drive shaft (11) and install required number of shims on shaft, as determined in preceding steps (4) through (9).

- (14) Install snaprings (13) and new packings (12) on tube (14), and insert tube and topping governor drive shaft (11) into overspeed governor and tachometer drive assembly housing.

**CAUTION**

When performing following step (15), do not damage packings or temperature-sensing element.

**NOTE**

Ensure that element is installed in the same position as when removed. The curved ends of the fins at forward end of tube should face inboard.

- (15) Assemble upper and lower housings (23 and 22) and secure with screws (25) and washers (24).  
(16) Install new gasket (20) on fuel control mounting pad of accessory drive gearbox.

**CAUTION**

In following step (17), care shall be taken when installing fuel control to prevent damage to the drive shaft carbon seal.

**NOTE**

To mesh the splines of the fuel control with the fuel control drive gearshaft, use 1/4-inch drive extension and ratchet and turn N1 tachometer drive gear until fuel regulator drive gearshaft splines mesh with splines on fuel regulator.

- (17) Lubricate fuel control drive shaft splines with lubricating oil (Item 189 or 190, table C-1). Install new seal (19). Place fuel control assembly on accessory drive gearbox pad, inserting splined fuel control drive shaft into accessory drive gearbox.

- (18) Secure fuel control with washers (17) and nuts (16). Tighten nuts to 125 to 140 pound-inches (22325 to 25004 gm cm) torque.

- (19) Position temperature-sensing element housing (21) and gasket (31) on inlet housing and secure with washers (30) and bolts (29). Tighten bolts to 18 to 22 pound-inches (3215 to 3929 gm cm) torque.

**NOTE**

Prior to installation of hose assembly (7), ensure chafing sleeve is positioned where hose may come in contact with overspeed governor and tachometer drive gearbox.

- (20) Add silicone oil (Item 276, table C-1) to fuel regulator. (Refer to paragraph 6-38 (h)).  
(21) Connect all fuel, oil, mechanical, and electrical connectors.  
(22) Secure clamp (27) to bracket with screw (28) and nut (26).  
d. Connect tube assembly (19, figure 4-27) to run portion of actuator arm as outlined in preceding step b.  
e. Hold actuator in full open position.  
f. Adjust rod end bearings until indicator of fuel control lever aligns with 0 degrees position on fuel control indicator plate.  
g. Center tube assembly and tighten nuts as required and lockwire.

**6-40. INSTALLATION OF AIR INLET GUIDE VANE ACTUATOR HOSE ASSEMBLIES (T53-L-13B, -703).** (See figure 4-5.) Proceed as follows:

- a. Install packings (18 and 22) on unions (17 and 21) and install unions into fuel control. Tighten unions, as required.  
b. Install packings (11 and 13) on unions (10 and 12) and install unions into inlet guide vane actuator assembly. Tighten unions, as required.

**NOTE**

Prior to installation of hose assemblies (16 and 23), ensure that chafing sleeves are positioned where hose may come in contact with airframe-supplied generator and other hoses.

- c. Connect hose assembly (16) to unions (12 and 17) and hose assembly (23) to unions (10 and 21). Tighten hose connections to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.

**NOTE**

Refer to identification tags installed at removal to ensure hose assemblies are connected to proper port.

- d. Secure clamps (14 and 19) to clamp (5, figure 4-6) with screw (15, figure 4-5) and nut (20).
- e. Install packing (1) on reducer (2) and install reducer into inlet guide vane actuator assembly. Tighten reducer as required.
- f. Connect hose assembly (3) to reducer (2) and accessory drive gearbox assembly. Tighten hose connectors to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.
- g. Secure clamp (9, figure 4-5) to bracket on accessory drive gearbox assembly with screw (8) and nut (4).
- h. Secure clamp (7) to second bracket on accessory drive gearbox assembly with screw (6) and nut (5).

**6-41. INSTALLATION OF AIR INLET GUIDE VANE ACTUATOR HOSE ASSEMBLIES (T53-L-15, -701, -701A).**  
(See figure 4-4.) Proceed as follows:

- a. Install packings (21 and 28) on unions (20 and 27) and install unions into fuel control. Tighten unions, as required.
- b. Position packings (10 and 31) on unions (11) and elbow (29) and install unions and elbow into inlet guide vane actuator assembly. Tighten union and nut (30) on elbow as required.

**NOTE**

Prior to installation of hose assemblies (12 and 26), ensure that chafing sleeves are positioned where hose may come in contact with airframe-supplied generator and other hoses.

- c. Connect hose assembly (12) to unions (11 and 20) and hose assembly (26) to union (27) and elbow (29). Tighten hose connections to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.

**NOTE**

Refer to identification tags installed at removal to ensure hose assemblies are connected to proper port.

- d. Secure clamp (14) to bracket (35, figure 5-1) with screw (13, figure 4-4) and nut (19).
- e. Secure clamps (15 and 22) to bracket (32, figure 5-1) with screw (16, figure 4-4) and nut (23).
- f. Secure clamps (18 and 24) to clamp (5, figure 4-6) with screw (17, figure 4-4) and nut (25).
- g. Position packing (1) on reducer (2) and install reducer into inlet guide vane actuator assembly. Tighten reducer, as required.
- h. Connect hose assembly (3) to reducer (2) and accessory drive gearbox assembly. Tighten hose connectors to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.
- i. Secure clamp (9, figure 4-4) to bracket on accessory drive gearbox assembly with screw (8) and nut (4).
- j. Secure clamp (6) to second bracket on accessory drive gearbox assembly with screw (7) and nut (5).

**6-42. INSTALLATION OF HOT-AIR SOLENOID VALVE AND AIR REGULATOR TUBE.** (See figure 4-24.) Proceed as follows:

- a. Slide retaining ring (5) on air regulator tube (4).
- b. Place packing (6) in recessed area within inlet housing.
- c. Insert tube into inlet housing to allow hot-air solenoid valve (2) to clear tube.
- d. Place packing (3) in recessed area of hot-air solenoid valve (2).
- e. Position gasket (1) and valve (2) on impeller housing with bolts (7).
- f. Slide tube rearward into valve and install retaining ring (5) firmly against inlet housing.
- g. Tighten bolts (7), as required, and lockwire.
- h. Attach connector from electrical cable assembly on valve connector. Tighten, as required, and lockwire.



**6-43. INSTALLATION OF STARTING FUEL SOLENOID VALVE ASSEMBLY (T53-L-13B, -703).** (See figure 4-10.) Proceed as follows:

- Install union (23) and packing (22) into inlet port of starting fuel solenoid valve assembly (20).
- Secure solenoid valve assembly to bracket (2) with screws (21). Tighten screws, as required, and lockwire.
- Secure solenoid valve assembly and bracket to compressor housing with bolts (3). Tighten bolts, as required, and lockwire.

**6-44. INSTALLATION OF STARTING FUEL SOLENOID VALVE ASSEMBLY (T53-L-15, -701, -701A).** (See figure 4-11.) Proceed as follows:

- Secure starting fuel solenoid valve assembly (10) to bracket (15), using screws (11).
- Secure valve assembly and bracket to compressor housing, using bolts (16). Tighten bolts, as required and lockwire.

**6-45. INSTALLATION OF FLOW DIVIDER AND DUMP VALVE ASSEMBLY.** (See figure 4-14.) Proceed as follows:

- Remove screws (7 and 9) that secure support (11) to exhaust diffuser support cone.
- Secure flow divider and dump valve assembly (10) and spacer (13) to support (11) with screws (3, 4, and 5). Tighten screws, as required, and lockwire.
- Position support (11) and flow divider and dump valve assembly on exhaust diffuser support cone and install four pins (12).
- Position retainers (6 and 8) over pins (12) and secure retainers and support (11) with screws (7 and 9). Tighten screws as required and lockwire.

**CAUTION**

In following step e, prevent damage while torquing hose connectors by installing plastic caps on adjacent flow divider fittings.

- Connect hose assemblies (1, 2, and 17) to flow divider and dump valve assembly (10). Tighten hose connectors to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.

**6-46. INSTALLATION OF COMBUSTION CHAMBER DRAIN VALVE ASSEMBLY.**

- Position combustion chamber drain valve assembly (16, figure 4-14) and gasket (14).
- Secure drain valve to combustion chamber housing with bolts (15). Tighten as required and lockwire.
- Connect hose (17) to drain valve assembly (16). Tighten hose connectors to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.

**6-47. INSTALLATION OF ELECTRICAL CABLE ASSEMBLY AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-13B).** (See figures 4-19 and 4-20.) Proceed as follows:

- Position electrical cable assembly on engine so that five connectors (C, D, E, G, and H, figure 4-19) are on left-hand side and two connectors (A and B) are on right-hand side of engine.
- Secure airframe main connector (F) to engine bracket with screws (4) and nuts (9). Tighten screws, as required.

**NOTE**

Compressor rotor (N1) tachometer generator (A) and power turbine (N2), tachometer generator (E) are not connected at this time, secure out of the way until required.

- Attach electrical cable assembly to components with each of following connectors: hot-air solenoid valve (B), ignition unit (C), starting fuel solenoid valve (D), transfer solenoid valve (G), and oil temperature bulb (H). Tighten all connectors, as required, and lockwire.

**NOTE**

If lockwire lug on ignition unit is missing, connector may be lockwired to the ignition connector base.

- Position clamps (2, 8, 11, 13, 16, and 20) and secure electrical cable assembly to engine with screws and nuts, as necessary. Tighten screws, as required, and lockwire.

**CAUTION**

In following steps e and f, excessive flexing of thermocouple assembly harness, specifically at probe locations, can lead to internal breakage and shorting. Use extreme caution when installing harness on exhaust diffuser. Never use pliers or other sharp objects.

e. Insert thermocouple probes into exhaust diffuser bosses at the 12-, 2-, 4-, 6-, 8-, and 10-o'clock positions with lead at 6-o'clock position.

f. Apply antiseize (item 47, table C-1) or Molykote antiseize thread compound (item 221, table C-1) to nuts (3, figure 4-20) and secure exhaust thermocouple assembly (1) to exhaust diffuser with nuts. Tighten nuts to 35 to 45 pound-inches (6251 to 8037 gm cm) torque.

**6-48. INSTALLATION OF ELECTRICAL CABLE ASSEMBLY (T53-L-703).** (See figure 4-19.) Refer to paragraph 6-47 steps a through d.

**6-49. INSTALLATION OF THERMOCOUPLE LEAD ASSEMBLY (T53-L-703).** (See figure 4-20.) Connect thermocouple lead assembly (2) to plug at top of connector (34, figure 5-135). Tighten connector, as required, and lockwire.

**NOTE**

If mounting bracket is missing, mounting bracket P/N T53-E0006-2 may be fabricated for installation purposes. Fabricate bracket as shown in figure 6-28. Vibropeen P/N T53-E0006-2 and rivet as shown in figure 6-28.

**6-50. INSTALLATION OF ELECTRICAL CABLE ASSEMBLY AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-15).** (See figures 4-21 and 4-22.) Proceed as follows:

a. Position electrical cable assembly (21) on engine so that six connectors (G, F, C, D, E, and B) are on left-hand side and three connectors (J, H, and I) are on right-hand side of engine.

**NOTE**

Ensure that cable assembly 1-300-196-03 or cable assembly 1-300-196-04 has had revision M accomplished. Cable assembly has been lengthened to measure 33 inches (84 cm) between the center lines of main connector, MS33678R 22-14P, and chip detector connector, MS33679R8S-1S.

b. Secure air frame main connector (A) to engine bracket with screws (3) and nuts (16). Tighten screws, as required.

c. Attach electrical cable assembly to components with 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 (N1) tachometer generator (H), chip detector (I), and ignition unit input (B). Tighten all connectors, as required, and lockwire.

d. Position clamps (2, 5, 7, 8, 18, and 19) and secure electrical cable assembly to engine with screws and nuts, as necessary. Tighten screws, as required, and lockwire.

e. Connect electrical plug at airframe main connector.

**CAUTION**

In following step f, excessive flexing of thermocouple assembly harness, specifically at probe locations, can lead to internal breakage and shorting. Use extreme caution when installing harness on exhaust diffuser. Never use pliers or other sharp objects.

f. Insert exhaust thermocouple assembly probes as outlined in paragraph 6-47, steps e and f.

**6-51. INSTALLATION OF ELECTRICAL CABLE ASSEMBLY AND EXHAUST THERMOCOUPLE ASSEMBLY (T53-L-701, -701A).** (See figures 4-22 and 4-23.) Proceed as follows:

**NOTE**

Prior to installation of electrical cable assembly (21, figure 4-23), ensure that chafing sleeves are installed and positioned as shown in figure 4-23 to prevent chafing on engine components.

a. Position electrical cable assembly (21) on engine so that seven connectors (G, F, C, D, E, K, and B) are on left-hand side and three connectors (J, H, and I) are on right-hand side of engine.





b. Secure airframe main connector (A) to engine bracket with screws (3) and nuts (16). Tighten screws, as required.

c. Attach electrical cable assembly to components with 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), electric torquemeter (K), hot-air solenoid valve (J), compressor rotor (N1) tachometer generator (H), chip detector (I), and ignition unit input (B). Tighten all connectors, as required, and lockwire.

**NOTE**

Connector (F) is not used.

d. Position clamps (2, 5, 7, 8, 18, and 19) and secure electrical cable assembly to engine with screws and nuts, as necessary. Tighten screws, as required, and lockwire.

e. Connect electrical plug at airframe main connector.

f. Install exhaust thermocouple assembly probes as outlined in paragraph 6-47, steps e and f.

**6-52. INSTALLATION OF FUEL FILTER AND BRACKET ASSEMBLY (T53-L-15, -701, -701A).** (See figure 4-18.) Proceed as follows:

a. Support bracket (2) and secure it to compressor housing rear flange with bolts (10), washers (9), and clips (5). Lockwire bolts.

b. Secure bracket to compressor housing forward flange with bolts (11), nuts (14), washer (13), and shim (12).

**NOTE**

Use original shims for installation when possible.

c. Secure wiring harness main receptacle (16) to bracket (2) with screws (1).

**CAUTION**

In following step d, ensure that locating pin in base assembly of filter is seated in hole in bracket. Failure to seal pin can cause leakage.

**NOTE**

Screws (1) shall extend completely through nuts (15).

d. Secure fuel filter assembly (8) to bracket and secure fuel filter assembly with bolts (7) nuts (3), and washers (4 and 6).

e. Secure wiring harness connector to fuel filter pressure switch and lockwire connector.

**6-53. INSTALLATION OF FUEL HEATER (T53-L-15, -701, -701A).** (See figure 4-17.) Proceed as follows:

a. Install packings (4) on either end of tube (6) and ensure that packings are seated in grooves.

**CAUTION**

In following step b, use extreme care when installing connection tube to ensure that packings are not cut or pinched and that tube is firmly in place.

b. Insert one end of tube into the fuel filter assembly.

c. Position fuel heater (3) to mate with end of connecting tube fuel-out port in the heater.

d. Push fuel heater onto tube.

e. Install bolts (8), nuts (1), and washers (2 and 7).

**6-54. INSTALLATION OF STARTING FUEL MANIFOLDS.** (See figure 4-16.) Proceed as follows:

a. Position left-hand starting fuel manifold (6) and right-hand starting fuel manifold (15) on tee (5). Loosely snug up connector nuts onto tee (5).

b. Install washer (4) on tee (5); then position tee in support cone bracket on engine.

c. Install washer (4) and nut (3). Do not tighten nut at this time.

- d. Connect starting fuel manifold fittings to starting fuel nozzles (13) and snug up by hand.
  - e. Install screws (1, 8, 11, and 17) securing clamps (2, 7, 9, and 16).
  - f. Connect clamps (9 and 18) to clamps (16 and 21, figure 4-15) on ignition coil and lead assembly. Secure with screws (15 and 20) and nuts (11 and 22).
  - g. Tighten starting fuel manifold connector nuts to starting fuel nozzles (13, figure 4-16); tighten nut (3) securing tee (5) in support cone bracket; and tighten starting fuel manifold connector nuts on tee (5).
- 6-55. INSTALLATION OF STARTING FUEL HOSE ASSEMBLIES AND CHECK-FILTER VALVE (T53-L-13B, -703).** (See figure 4-10.) Proceed as follows:

**CAUTION**

Proper installation of the check-filter valve is critical. Improper installation will result in start fuel being delivered outside the combustion chamber with resultant hot starts and damage to the combustor turbine components.

- a. Position tube assembly (11) on combustion chamber housing and secure with bolt (12) and gaskets (13). Do not tighten bolt at this time.
- b. Position check-filter valve (10) in bracket and clamp assembly (8) with arrow on top of valve and pointing away from tube assembly (11). Tighten screw (9) and nut (7) on bracket and clamp assembly lightly.

**NOTE**

A filter is located at the air "IN" side of check-filter valve.

- c. Connect tube assembly (11) to check-filter valve (10) and torque, as required.
- d. Connect hose assembly (4) to solenoid valve assembly (20), starting fuel manifold (5, figure 4-16) and check-filter valve (10, figure 4-10). Tighten connectors, as required.
- e. Tighten bolt (12) 90 to 120 pound-inches (16074 to 21432 gm cm) torque and lockwire.
- f. Tighten screw (9) that secures check-filter valve (10) in bracket and clamp assembly (8).

**6-56. INSTALLATION OF STARTING FUEL HOSE ASSEMBLIES AND CHECK-FILTER VALVE (T53-L-15, -701, -701A).** (See figure 4-11.) Proceed as follows:

**CAUTION**

Proper installation of the check-filter valve is critical. Improper installation will result in start fuel being delivered outside the combustion chamber with resultant hot starts and damage to the combustor turbine components.

- a. Position tube assembly (7) on combustion chamber housing and secure with bolt (8) and gasket (9). Do not tighten bolt at this time.
- b. Position check-filter valve (3) in bracket and clamp assembly (5) with arrow on top of valve and pointing away from tube assembly (7). Tighten screw and nut on bracket and clamp assembly (5) lightly.

**NOTE**

A filter is located at the air "IN" side of check-filter valve.

- c. Connect tube assembly (7) to check-filter valve and torque, as required.
- d. Connect hose assembly (1) to starting solenoid valve assembly (10), starting fuel manifold, and check-filter valve (3). Tighten connectors, as required.
- e. Tighten bolt (8) to 90 to 120 pound-inches (16074 to 21432 gm cm) torque and lockwire.
- f. Tighten screw that secures check-filter valve in bracket and clamp assembly.

**6-57. INSTALLATION OF MAIN FUEL HOSE ASSEMBLY (T53-L-13B, -703).** (See figure 4-12.) Proceed as follows:

- a. Connect hose assembly (3) to fuel control and fuel flow divider and dump valve assembly.

- b. Attach clamp (4) to combustor turbine assembly with screw (5).
- c. Attach clamp (2) to bracket with screw (6) and nut (1).

**6-58. INSTALLATION OF MAIN FUEL HOSE ASSEMBLY (T53-L-15, -701, -701A).** (See figure 4-13.) Proceed as follows:

- a. Connect main fuel hose (1) to tee on main fuel filter and to engine overspeed governor.
- b. Secure main fuel hose (2) and clamp (13) to bracket with screw (14). Connect hose to fuel control and main fuel filter.
- c. Connect main fuel hose (9) to union (4) and fuel flow divider and dump valve assembly. Secure clamps (10) to brackets with screws (8) and nut (15). Connect main fuel hose (3) to union (4) and main fuel control fitting.

**NOTE**

Perform following step d, for T53-L-15 engines only.

- d. Connect tube assembly (19) to fuel control torque limiter and to accessory drive gearbox assembly. Secure bleed line to inlet housing and oil temperature bulb connector with clamps (22 and 26), screws (20 and 21), and nuts (24 and 25).

**6-59. INSTALLATION OF LUBRICATION PRESSURE MANIFOLD AND HOSE ASSEMBLIES, AND OIL SCAVENGE HOSE ASSEMBLIES (T53-L-13B, -703).** (See figures 4-8 and 4-3.) Proceed as follows:

- a. Position lubrication pressure manifold (21, figure 4-8) on rear flange of impeller housing assembly and secure with bolts (18 and 19).
- b. Position packings (3 and 4, figure 4-3) onto unions (2 and 5) and install unions into accessory drive gearbox assembly. Tighten unions, as required.
- c. Connect hose assembly (1) to connector at bottom of diffuser housing assembly and to union (2) on accessory drive gearbox. Tighten hose connectors to 100 to 150 pound-inches (17860 and 26790 gm cm) torque.
- d. Position packing (42, figure 5-135) onto connector (41) and install connector into bottom of combustor turbine assembly. Tighten connector, as required, and lockwire.
- e. Connect hose assembly (6, figure 4-3) to connector (41, figure 5-135) and to union (5, figure 4-3) on accessory drive gearbox. Tighten hose connectors to 70 to 120 pound-inches (12502 and 21432 gm cm) torque.
- f. Position clamp (8) on each bracket located at bottom of inter-stage bleed actuator assembly, and secure with screws (9) and nut (7).
- g. Secure clamp (11) to bracket on forward flange of combustion chamber housing with screw (12) and nut (10). Secure clamp (13) with screw (14).
- h. Install packings (15, figure 4-8) onto connector (16). Secure adapter (14) to inlet housing with connector.

**NOTE**

Do not tighten connector until hose assembly (13) has been installed; repositioning of adapter may be necessary

- i. Connect hose assembly (13) to lubrication manifold (21) and to adapter (14). Tighten hose connectors to 70 to 120 pound-inches (12502 and 21432 gm cm) torque.
- j. Secure clamp (12) to bracket on compressor housing with screw (17) and nut (11).
- k. Connect hose assembly (20) to lubrication pressure manifold (21) and to No. 2 bearing oil pressure fitting on diffuser housing assembly. Tighten hose connectors to 70 to 120 pound-inches (12502 and 21432 gm cm) torque.
- l. Connect hose assembly (1) to lubrication pressure manifold (21) and to oil strainer housing adapter (30, figure 5-135) on top of combustion chamber assembly. Tighten hose connector on manifold to 70 to 120 pound-inches (12502 to 21432 gm cm) torque and connector on oil strainer housing adapter to 50 to 75 pound-inches (8930 to 13395 gm cm) torque.

**NOTE**

When tightening connector to 50 to 75 pound-inches (8930 to 13395 gm cm) torque on oil strainer housing adapter, use one wrench on adapter and one on connector to prevent adapter from turning.

- m. Secure hose assembly (1, figure 4-8) to bracket on forward flange of combustion chamber housing with screw (8) and nut (10).
- n. Secure clamps (3, 5, and 7) to combustion chamber housing with screws (2, 4, and 6).

**6-60. INSTALLATION OF LUBRICATION PRESSURE MANIFOLD, PRESSURE HOSES, AND SCAVENGE HOSES (T53-L-15, -701, -701A).** (See figures 4-2 and 4-9.) Proceed as follows:

- a. Position lubrication pressure manifold (19, figure 4-9) on rear flange of impeller housing assembly and secure with bolts, (16 and 17).
- b. Position gaskets (5 and 6, figure 4-2) onto unions (4 and 7) and install unions into accessory drive gearbox assembly. Tighten unions, as required.
- c. Connect hose assembly (3) to connector at bottom of diffuser housing assembly and to union (4) on accessory drive gearbox. Tighten hose connectors to 100 to 150 pound-inches (17860 to 26790 gm cm) torque.
- d. Position packings (42, figure 5-135) onto connector (41) and install connector into bottom of combustor turbine.
- e. Connect hose assembly (8, figure 4-2) to connector (41, figure 5-135) and to union (7, figure 4-2) on accessory drive gearbox. Tighten hose connectors to 70 to 120 pound-inches (12502 and 21432 gm cm) torque.
- f. Position clamp (9) on bracket located at bottom of interstage bleed actuator assembly, and secure with screw (10), clamp (1), and nut (2).

**NOTE**

Clamp (1) is not required if hose (3) is not long enough to facilitate clamping. Adjust hoses to prevent chafing.

- g. Secure clamp (12) to bracket on forward flange of combustion chamber housing with screw (13) and nut (11). Secure clamp (14) with screw (15).
- h. Position gasket (31, figure 4-9) on bolt (32) and install into elbow (30). Install assembly into power-driven rotary (oil) pump.
- i. Connect hose assembly (20) to the oil heat exchanger on the fuel heater assembly and to the power-driven rotary (oil) pump.
- j. Install clamps (34, 37, and 40) with screws (33, 38, and 41) and nuts (35, 36, and 39).
- k. Position packings (13) on connector (14) and position adapter (12) on inlet housing.

**NOTE**

Do not tighten connector until hose assembly (11) has been installed; repositioning of adapter may be necessary.

- l. Connect hose assembly (11) to lubrication pressure manifold (19) and to adapter (12). Tighten hose connectors to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.
- m. Secure clamp (10) to bracket on compressor housing with screw (15) and nut (9).

n. Connect hose assembly (18) to lubrication pressure manifold (19) and to No. 2 bearing oil-pressure fitting to diffuser housing assembly. Tighten hose connector to 70 to 120 pound-inches (12502 to 21432 gm cm) torque.

o. Connect hose assembly (1) to lubrication pressure manifold (19) and to oil strainer housing adapter on top of combustion chamber assembly. Tighten hose connector on manifold to 70 to 120 pound-inches (12502 to 21432 gm cm) torque and connector on oil strainer housing adapters to 50 to 75 pound-inches (8930 to 13395 gm cm) torque.

**NOTE**

When tightening connector to 50 to 75 pound-inches (8930 to 13395 gm cm) torque on strainer housing adapter, use one wrench on adapter and one on connector to prevent adapter from turning.

**NOTE**

Prior to installation of hose assembly (1), ensure that chafing sleeve is positioned where hose may come in contact with inlet diffuser.

p. Secure hose assembly (1) to bracket on forward flange of combustion chamber housing with screw (6) and nut (8).

q. Secure clamps (3 and 5) to combustion chamber housing with screws (2 and 4).

**NOTE**

Perform steps r through u for T53-L-15 engines only.

r. Install packing (24) and union (25) on fuel control torque limiter.

s. Install packing (29), union (28), and manifold tee (27) on inlet housing.

t. Position hose assemblies (26 and 21) and manifold assembly (22) and secure with bolts (23).

u. Connect hose assembly (26) to torque limiter.

v. Connect hose assembly (21) to manifold tee on inlet housing.

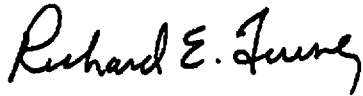
CHQSOFTWARE.COM

FOR THE COMMANDER:

CHQSOFTWARE.COM

CLIFTON J. BRODERICK  
Colonel, OD  
Chief of Staff

Official:



**RICHARD E. TURNER**  
Director  
Logistics Support Directorate  
Integrated Materiel Management Center

CHQSOFTWARE.COM



<b>REQUEST FOR DEPOT ENGINEERING SUPPORT</b>	<b>CONTRACT NO.</b>	<b>PRIORITY OF REQUEST</b>	<b>DATE OF REQUEST</b>
		<input type="checkbox"/> URGENT <input type="checkbox"/> ROUTINE	

<b>O:</b>  <b>IRU:</b>  <b>COPIES:</b>	<b>FROM :</b>		
	<b>POINT OF CONTACT :</b>		
	<b>PUBLICATION NO.</b>	<b>CHANGE NO.</b>	<b>PUBLICATION DATE.</b>
	<b>PUBLICATION TITLE</b>		

<b>AREA OF PUBLICATION WHERE PROBLEM EXISTS. BE EXACT. PIN-POINT WHERE IT IS.</b>				<b>IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT</b>
<b>PAGE NO.</b>	<b>PARA- GRAPH</b>	<b>FIGURE NO</b>	<b>TABLE NO.</b>	
				(USE CONTINUATION SHEET IF NECESSARY)

<b>TITLE</b>	<b>SIGNATURE</b>	<b>DATE</b>
--------------	------------------	-------------

<b>RECOMMENDED SOLUTIONS OR DISPOSITIONS</b>		

<b>TITLE</b>	<b>SIGNATURE</b>	<b>DATE</b>
--------------	------------------	-------------

CHQSOFTWARE.COM

## ***These are the instructions for sending an electronic 2028***

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" <whomever@avma27.army.mil>  
To: ls-lp@redstone.army.mil

Subject: DA Form 2028

55. **From:** Joe Smith

56. **Unit:** home

57. **Address:** 4300 Park

58. **City:** Hometown

59. **St:** MO

60. **Zip:** 77777

61. **Date Sent:** 19-OCT-93

62. **Pub no:** 55-2840-229-23

63. **Pub Title:** DMWR

64. **Publication Date:** 04-JUL-85

65. **Change Number:** 7

66. **Submitter Rank:** MSG

67. **Submitter FName:** Joe

68. **Submitter MName:** T

69. **Submitter LName:** Smith

70. **Submitter Phone:** 123-123-1234

71. **Problem:** 1

72. **Page:** 2

73. **Paragraph:** 3

74. **Line:** 4

75. **NSN:** 5

76. **Reference:** 6

77. **Figure:** 7

78. **Table:** 8

79. **Item:** 9

80. **Total:** 123

81. **Text:**

This is the text for the problem below line 27.

CHQSOFTWARE.COM



# SOMETHING WRONG

WITH THIS PUBLICATION?

THEN...NOT DOWN THE  
DOPE ABOUT IT ON THIS  
FORM, CAREFULLY TEAR  
IT OUT, FOLD IT AND  
DROP IT IN THE MAIL!

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

PFC John DOE  
CO 4 3rd Engineer Bn  
Fl. Leonardwood, MO 63108

DATE SENT

22 August 1992

PUBLICATION NUMBER

TM 1-1520-250-10

PUBLICATION DATE

15 June 1992

PUBLICATION TITLE

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		
B1		4-3	

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.

Callout 16 in figure 4-3 is  
pointed to a bolt. In key  
to figure 4-3, item 16 is calle  
a shim. Please correct  
one or the other

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

JOHN DOE, PFC (268) 317-7111

SIGN HERE

JOHN DOE

*John Doe*

DA FORM 2028-2  
1 JUL 79

PREVIOUS EDITIONS  
ARE OBSOLETE.  
DRSTS-M verprint2, 1 Nov 80

P.S. - IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR  
RECOMMENDATION, MAKE A CARBON COPY OF THIS  
AND GIVE TO YOUR HEADQUARTERS.

FILL IN YOUR  
UNITS ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER  
U.S. ARMY AVIATION AND MISSILE COMMAND  
ATTN: AMSAM-MMC-LS-LP  
REDSTONE ARSENAL, AL 35898-5230



THEN . . . JOT DOWN THE  
DOPE ABOUT IT ON THIS  
FORM, CAREFULLY TEAR  
IT OUT, FOLD IT AND  
DROP IT IN THE MAIL!

## SOMETHING WRONG WITH THIS PUBLICATION?

**FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)**

**DATE SENT**

**PUBLICATION NUMBER**  
**DMWR 1-2840-113-3**

**PUBLICATION DATE**  
**15 JANUARY 1999**

**PUBLICATION TITLE**  
**DMWR FOR TURBO-PROP AND TURBOSHAFT**  
**AIRCRAFT ENGINES**

**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**

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

**SIGN HERE**

**DA FORM 2028-2**  
1 JUL 79

PREVIOUS EDITIONS  
ARE OBSOLETE.

DRSTS-M verprint2, 1 Nov 80

P.S. - IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A CARBON COPY OF THIS AND GIVE TO YOUR HEADQUARTERS.

FILL IN YOUR  
UNITS ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER  
U.S. ARMY AVIATION AND MISSILE COMMAND  
ATTN: AMSAM-MMC-LS-LP  
REDSTONE ARSENAL, AL 35898-5230





THEN . JOT DOWN THE  
DOPE ABOUT IT ON THIS  
FORM, CAREFULLY TEAR  
IT OUT, FOLD IT AND  
DROP IT IN THE MAIL!

**SOMETHING WRONG WITH THIS PUBLICATION?**

**FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)**

DATE SENT

**PUBLICATION NUMBER**  
**DMWR 1-2840-113-3**

**PUBLICATION DATE**  
**15 JANUARY 1999**

**PUBLICATION TITLE**  
**DMWR FOR TURBO-PROP AND TURBOSHAFT**  
**AIRCRAFT ENGINES**

**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**

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

**SIGN HERE**

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS  
ARE OBSOLETE.

DRSTS-M.verprint2, 1 Nov 80

P.S. - IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A CARBON COPY OF THIS AND GIVE TO YOUR HEADQUARTERS.

FILL IN YOUR  
UNITS ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER  
U.S. ARMY AVIATION AND MISSILE COMMAND  
ATTN: AMSAM-MMC-LS-LP  
REDSTONE ARSENAL, AL 35898-5230



THEN . JOT DOWN THE  
DOPE ABOUT IT ON THIS  
FORM, CAREFULLY TEAR  
IT OUT, FOLD IT AND  
DROP IT IN THE MAIL!

**SOMETHING WRONG WITH THIS PUBLICATION?**

**FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)**

**DATE SENT**

**PUBLICATION NUMBER**  
**DMWR 1-2840-113-3**

**PUBLICATION DATE**  
**15 JANUARY 1999**

**PUBLICATION TITLE**  
**DMWR FOR TURBO-PROP AND TURBOSHAFT**  
**AIRCRAFT ENGINES**

**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**

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

**SIGN HERE**

**DA FORM 2028-2**  
1 JUL 79

PREVIOUS EDITIONS  
ARE OBSOLETE.

DRSTS-M verprint2, 1 Nov 80

P.S. - IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION, MAKE A CARBON COPY OF THIS AND GIVE TO YOUR HEADQUARTERS.

FILL IN YOUR  
UNITS ADDRESS



FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

COMMANDER  
U.S. ARMY AVIATION AND MISSILE COMMAND  
ATTN: AMSAM-MMC-LS-LP  
REDSTONE ARSENAL, AL 35898-5230

# 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	1.55
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
----	------------------------	----------------------------	---------------------	----

CHQSOFTWARE.COM