

SERVICE INSTRUCTION

ROBUST HIGH SPEED TURBINE INSPECTION AND REBUILD PROCEDURE



A12895-XX (SILVER SHAFT STYLE)

Equipment and Materials Required

Equipment and Materials Required:

1) 2/0 or finer abrasive paper or cloth 1 inch wide x 8-8 1/2 inch long strips (25mm wide x 200mm long) (included with kit A12951-00 and A12951-01)

Circular Donut 2/0 or finer abrasive disks .950 I.D. x 1.54 O.D. (24.1mm I.D. x 39.1mm O.D.) (included with kit A12951-00 and A12951-01)

2) Lint Free Tissue (included with kit A12951-00 and A12951-01)

3) Aerosol electrical contact cleaner with Nozzle Attachment

4) .0055 inch (0.140mm) Diameter Piano Wire (included with kit A12951-00 and A12951-01)

5) T-10 Star bit Wrench

6) Set of 90 degree "V" Blocks (Preferred Size 70mm x 90mm x 125mm) or A13268-00 Alignment Ring

7) Magnifier with Light – visual inspection

8) Master Bell Cup (12886-XX cup only) or equal

10) Safety Glasses

11) Latex Gloves

12) Isopropyl Alcohol

13) 3mm Hex Wrench

14) Light Duty Thread Retaining Com-

NOTE

Notes:

- **Flooded turbine motors** - prove to be difficult to repair if not addressed immediately after being flooded. It's difficult to impossible to flush the contaminated "hardened" fluid from the bearing air ports. If the unit cannot be cleaned up quickly, then the bearings and or housing must be replaced. Do not soak bearings in Ethylene-Glycol as it will destroy the bearing substrate and pressed in jets. The radial bearing may be soaked in a solvent compatible with the paint intrusion. A use of an Ultrasonic cleaner may aid in the loosening of material

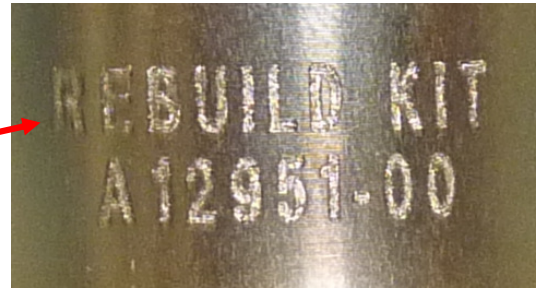
- During repair of multiple turbine motors **do not mix component parts** all rotor shafts are matched with their spacer ring to provide correct spacing for operation of the spindle.

****The spacers and the shafts are a matched set. The number on the shaft must correspond to the number on the spacer plate. See Fig. 1-26**

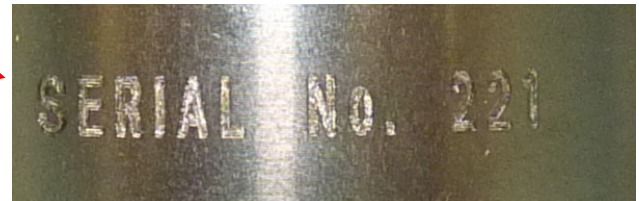
During tear down remove all O-rings and save in a safe place until new O-ring kit is installed

Final rinsing of component parts should be made by Isopropyl Alcohol

Important Numbers



REBUILD KIT NUMBER LOCATION



SPINDLE SERIAL NUMBER LOCATION

TEAR DOWN PROCEDURES & VISUAL INSPECTION OF PARTS

Step 1

Remove the rear cover screws with a T10 Star wrench from rear of the turbine motor and set aside.

CRITICAL AREAS THAT MUST BE DAMAGE FREE.

SEE FIGURE 1-2 FOR NON-REPAIRABLE CONDITION

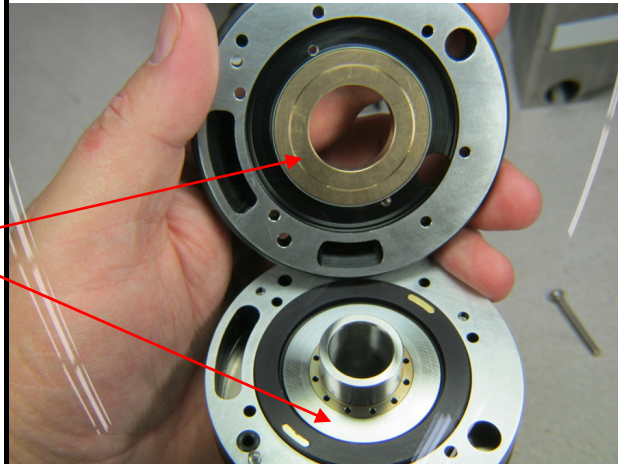


Figure 1-1 Rear Thrust Bearing and Shaft Thrust Area

Step 2

Carefully lift off the rear thrust plate and visually inspect the bronze bearing. If the bronze bearing is extremely discolored 360 degrees around the diameter this is an indication that the turbine cannot be rebuilt without replacement of rear thrust bearing (See Figure 1-2). If light damage such as less than 90 degrees damage proceed to clean up surface. See figure 1-1 for proper condition of the assembly. Set aside the rear cover until later rework process is covered.

AIR JET GALLERY GROOVE COMPLETELY WORN OFF. REPLACE SPINDLE MOTOR.

DAMAGED BEYOND REPAIR

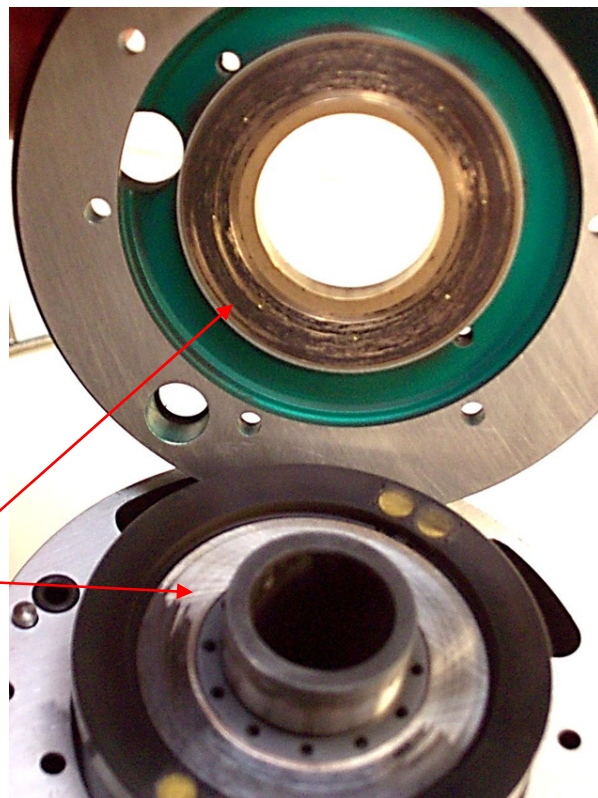


Figure 1-2 Illustration Non-Repairable Rear Plate

Step 3

Next, remove shaft rotor assembly from the turbine housing. Examine the shaft's outside diameter for contact marks. (See Figure 1-3 – shaft new condition) Typically contact marks can be found at the bottom of the shaft and at the top. The contact marks consist of a bronze material from the air bearings transferring onto the outside diameter of the shaft.

If contact area observed 360 degrees around the shaft diameter and it can be felt with your fingernail as a raised area, then the shaft has sustained too much damage to be cleaned up. Return entire turbine motor to Ransburg for an exchange rebuild unit. (See figure 1-3a – non-repairable shaft)

TYPICAL CONTACT AREA

NEW SHAFT CONDITION – PROVIDES OPTIMAL TURBINE MOTOR PERFOR-



Figure 1-3 New Shaft Appearance



Figure 1-3a 360 degree contact (non-repairable).

SHAFT DAMAGED BEYOND REPAIR DO NOT REPAIR



Excessive damage on front and rear thrust faces. Inspect thrust faces to determine if unit can be repaired.

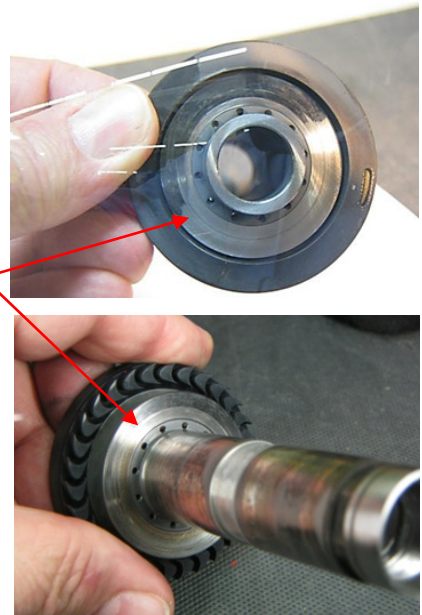


Figure 1-3b

Step 4

Inspect Shaft “Inside Diameter”

Visually inspect the inside diameter of shaft for paint in the threads and the undercut area. It will need to be cleaned up accordingly. **See Fig 1-4 - If circular wear marks are identified on the shafts taper it will need to be inspected to verify if taper is still good as shown in figure 1-4a.**

DIRTY ID SHAFT TAPER

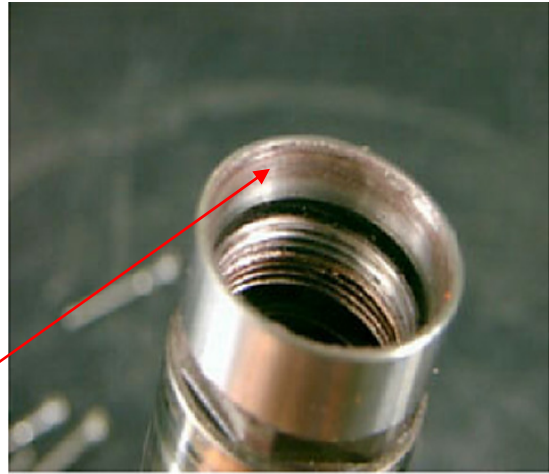


Figure 1-4

TAPER VERIFICATION

Apply Die Makers ink to taper of shaft and allow to dry (1-2 minutes). Install Master Bell Cup and tighten securely. Remove the bell cup and visually examine shaft taper. Metal to metal contact must be made on at least 80% of the diameter. If contact is less than that, shaft and spacer assembly must be replaced.

WITNESS MARK VISIBLE – TAPER ACCEPTABLE WITH 80% CONTACT ON THE DIAMETER



Figure 1-4A

Step 5

Pull off spacer plate from turbine assembly and set aside until later

Bearing Air O-Ring, retain do not lose.

“DO NOT REMOVE” FRONT THRUST BEARING – IT IS PRESET BY THE SUPPLIER. IT IS NOT FIELD REPLACEABLE

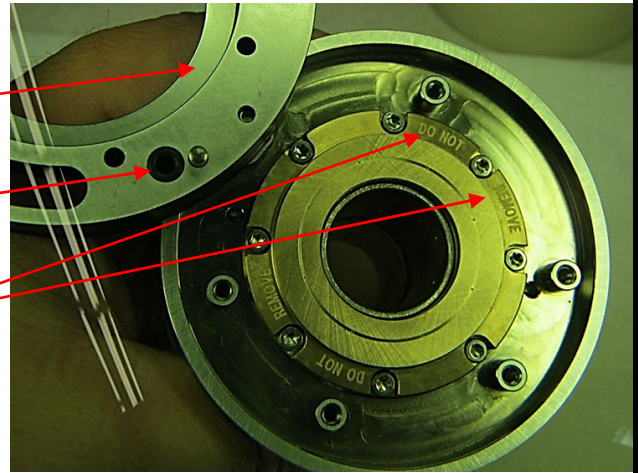


FIG. 1-5

Step 6

Inspect Front Thrust Bearing Mounted in the Bearing Housing

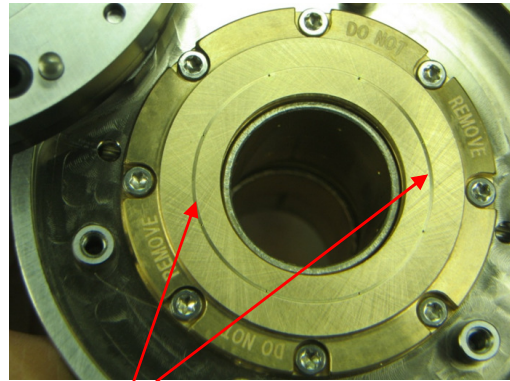
Inspect the rear bronze bearing in the turbine housing, if the bearing face is “discolored severely” the entire bearing housing must be replaced. The circular ring that connects air bearing jets must be intact to assure turbine motor will function at factory load specifications.

IMPORTANT NOTE: the circular ring connecting the bearing air holes on the front thrust bearing surface **if the ring is broken or completely worn down, the bronze bearing is no longer any good and the assembly needs to be replaced.**

VISUAL EXAMPLE OF: NON-REPAIRABLE FRONT THRUST BEARING.

AIR BEARING JETS AND CIRCULAR JET RING DAMAGED BEYOND REPAIR.

VISUAL APPEARANCE OF NEW FRONT THRUST BEARING.



CIRCULAR RING MUST BE PRESENT TO REPAIR!!!

Figure 1-6 Front thrust bearing in turbine housing.



Figure 1-6a

Step 7

Removal of Dual Bearings from Bearing Housing (Set Screw Extraction)

Set Screw Removal -Remove the two setscrews using 3mm hex wrench as shown in Figure 1-7

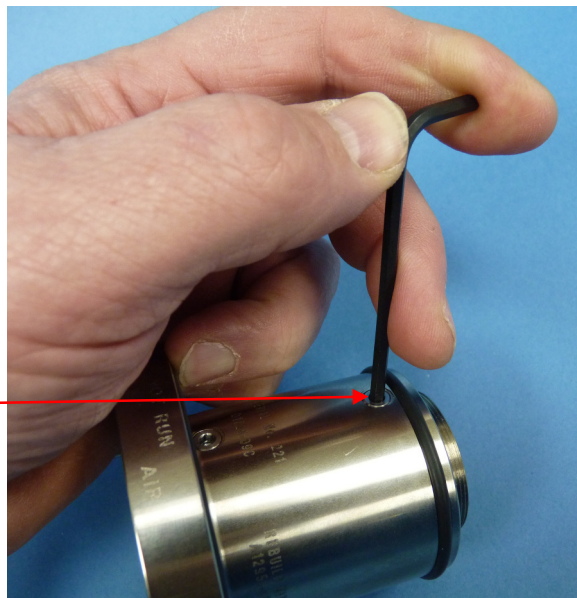


Figure 1-7

Step 8

Take note of the setscrew assembly – There should be (2) O-Rings and small spring that are removed from the two bearings. They will need to be reassembled in the same manner.

SPRING

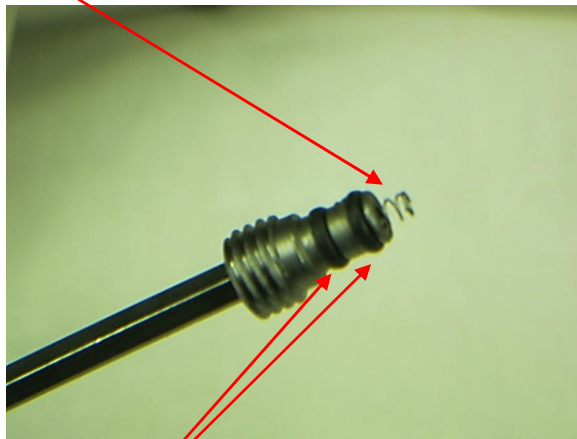


Figure 1-8

O-RINGS

Step 9

Removal of Dual Bearings from Bearing Housing (Bearing Removal)

Dual Bearing Removal - Use only non-metallic tool to extract bearing from housing. Bearings will remove with the slight pull of the forefinger as shown in Figure 1-9. Observe closely the position of the bearings assembled into housing.



Figure 1-9

Step 10

Use tool A13269-00 to push out radial bearings from the rear of the body assembly

Push bearings all the way thru body assembly as shown

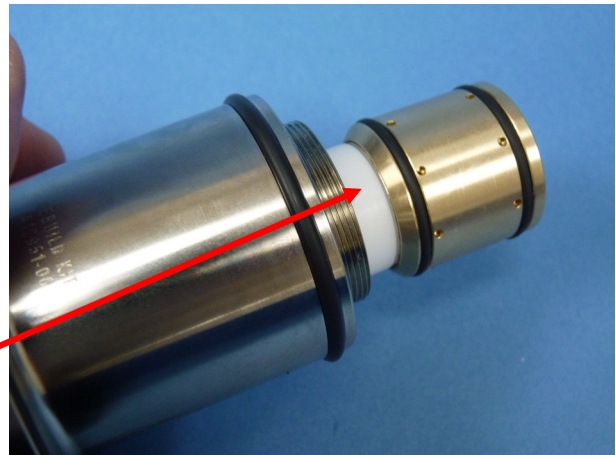
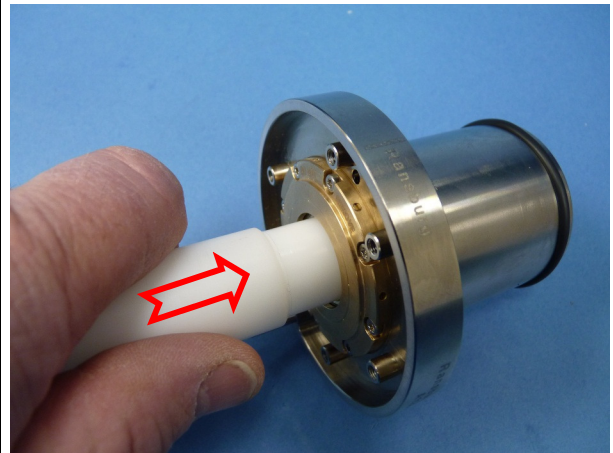


Figure 1-10

Step 10

Dual Bearing Inspection & Repair Process

Extract O-rings from bearing as shown in Figure 1-10.



Figure 1-10

Step 11

The radial bearings may be soaked in a solvent compatible with the paint debris intrusion. Use of an Ultrasonic cleaner may aid in loosening of the foreign material

Air Bearing Jet Inspection -
Using a 0.0055" (0.140MM) dia. Wire inspect all bearing air jet holes in both bearings making sure they are clean and free of debris. Blocked holes reduce the load capacities of the turbine motor allowing it to fail prematurely. If holes are blocked and cannot be cleared with wire replace with new bearings. **Do Not Change Bearing Jet Hole Size – Performance and motor life will be affected.**

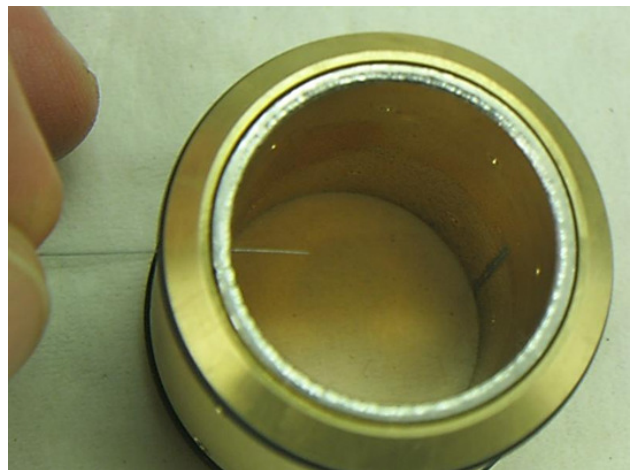


Figure 1-11

Step 12

Polish ID of Bearing – Dependent upon shaft contact to the ID of the bearing it may be necessary to polish the inside diameter of the bearing as shown in Figure 1-12. **Polish bearing in circular (rotation) motion not in linear direction use only abrasive paper/cloth 2/0.**

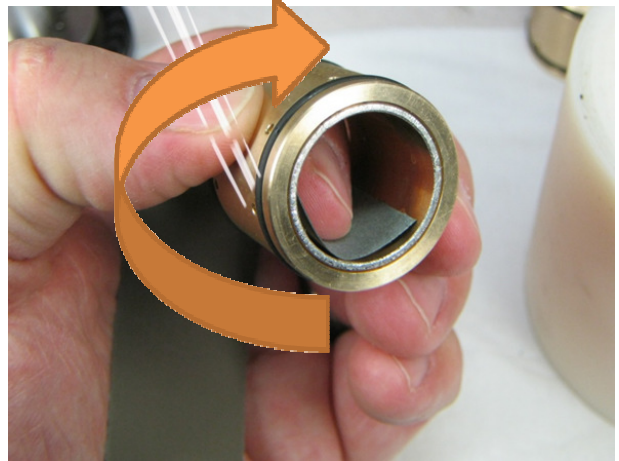


Figure 1-12

Step 13

Clean Air Bearing Jets After Polishing Operation - Using an approved compressed solvent with extension tube and face shield. Spray solvent through each air bearing jet to make sure they are clean and free of debris. Plugged holes will result in premature turbine motor failure.



Figure 1-13

Step 14

Rotor Shaft Polishing Process (Light Contact Marks Only)

Wrap the 2/0 sandpaper/cloth around shaft



Figure 1-14

Polish Shaft – Use a fine abrasive paper/cloth 2/0 paper to clean the outside diameter of the shaft as shown in figure 1-14A. Using the 2/0 abrasive paper/cloth, polish the shaft removing the deposition marks. **Polish by rotating the shaft by hand - Do not polish the shaft in a linear motion creating flat spots on the shaft.**

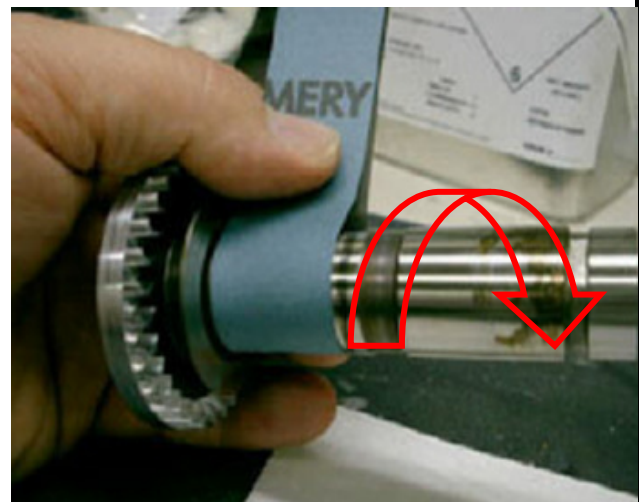


Figure 1-14A

Step 15

NOTE: After polishing is complete, the minimum shaft diameter allowed is .8828 (Inches) / 22.42 mm. Measure the entire shaft length with micrometers. If the diameter is under the measurement stated .8828 Inches / 22.42mm discard shaft return bearing housing assembly and rear cover for core credit towards an exchange rebuild unit.



Figure 1-15

Step 16

Sanding the Bearing Thrust Faces

Sanding Thrust Faces – using 2/0 abrasive paper/cloth – polish both sides front and rear thrust faces.



Figure 1-16

Step 17

Polish Thrust-face using Bearing face as Shown in Fig. 1-17 – Rotate shaft back and forth looking to see if discoloration has been removed. It may require additional 2/0 abrasive paper/cloth disc to achieve required finish. Reverse the abrasive paper/cloth and polish rear thrust bearing also. When polishing the rear thrust bearing final inspection with the 0.0055" (0.140mm) wire will be required to assure jets are open and clean.



Figure 1-17

Optional Tool A13270-00– Thrust plate sanding tool can be purchased and also used to polish the thrust plate on both sides of the shaft using the 2/0 abrasive sanding paper/cloth disc.

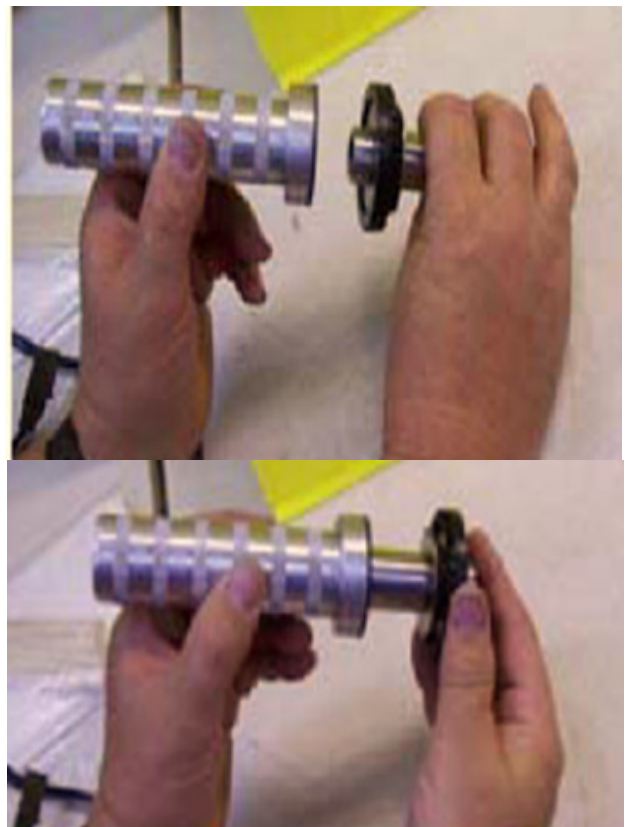


Figure 1-17 Optional

Clean Shaft - After polishing shaft thrust faces clean entire shaft with aerosol electronic contact cleaner, wear goggles; wipe down shaft with a lint free cloth.

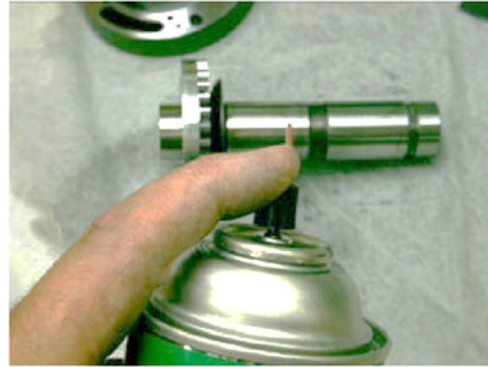


Figure 1-17a

Step 18

Inspect Bearing Air Jets in both thrust faces as shown in Figure 1-18

Inspect Bearing Air Jets - (8 total)
Insert a 0.0055" (0.140mm) wire into each bearing air jet making sure jet is open and clear of debris.

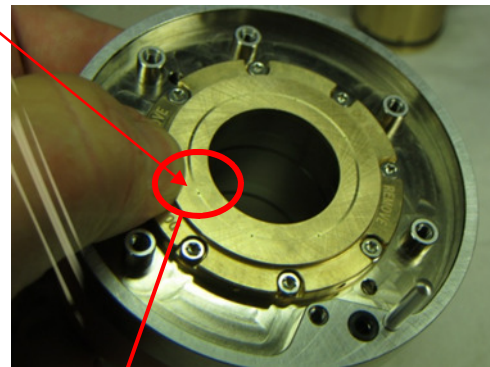
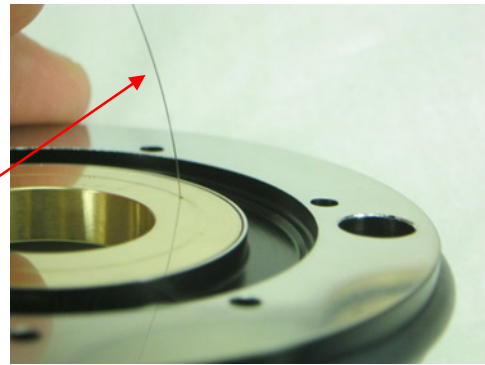


Figure 1-18

Step 19

USE SAFETY GLASSES DURING THIS PROCEDURE

Flush Bearing Air Jets with an aerosol electronic contact cleaner as shown in Figure 1-19

Solvent Flush Ports – Apply aerosol feed tube to bearing air port as shown. The hole on the opposite side need to be blocked. Use a small cloth or a piece of rubber. See Figure 1-19a on where Solvent should exit (bearing air ports).

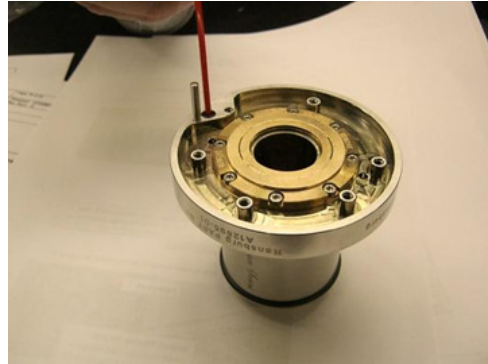


Figure 1-19a

USE SAFETY GLASSES DURING THIS PROCEDURE

Flush Bearing Air Jets - Using Safety Goggles – apply an aerosol electronic contact cleaner to bearing air-port and observe to see if solvent passes through all bearing air ports. See solvent stream shown in Figure 1-19b. Holes must free of debris to assure optimal performance.

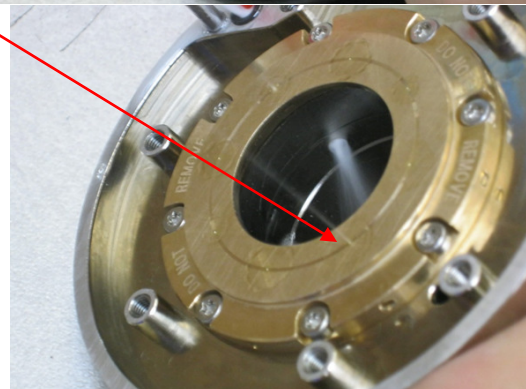
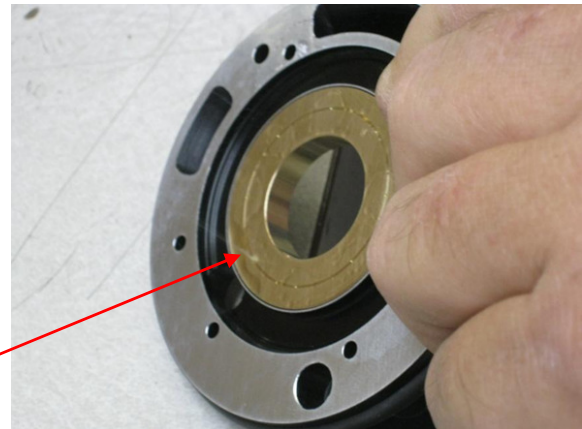


Figure 1-19b

Step 20

Note:

Prior to assembly go back and make sure that all component parts are clean. If not, wash them with 99% pure Isopropyl Alcohol and wipe with a lint free cloth. All parts must be very clean. **Use safety glasses and latex gloves during cleaning operation.** Do not apply solvents to O-Rings, swelling will occur, replace as needed with new kit.

Assemble Bearings back into Bearing Housing

Install new O-rings onto Bearings (Note: Radial Bearings are the Same Size and can be interchanged)

Install O-Rings – Locate O-rings from replacement kit and install onto bearing as shown in figure 1-20. **Please note new bearings may need to be installed if required.** New bearings are included with the rebuild kits.(A12951-01)

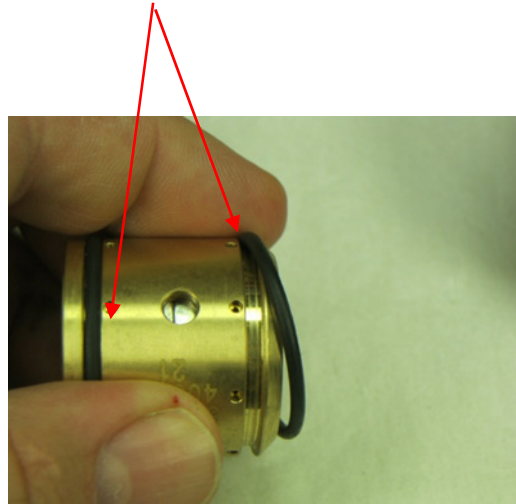


Figure 1-20

Step 21

Lay out bearings for installation

Position Assembled Bearings – Layout bearings for install as shown. Note the “taper end” goes inward towards the housing. Remember the set screw holes must align with bearing housing.

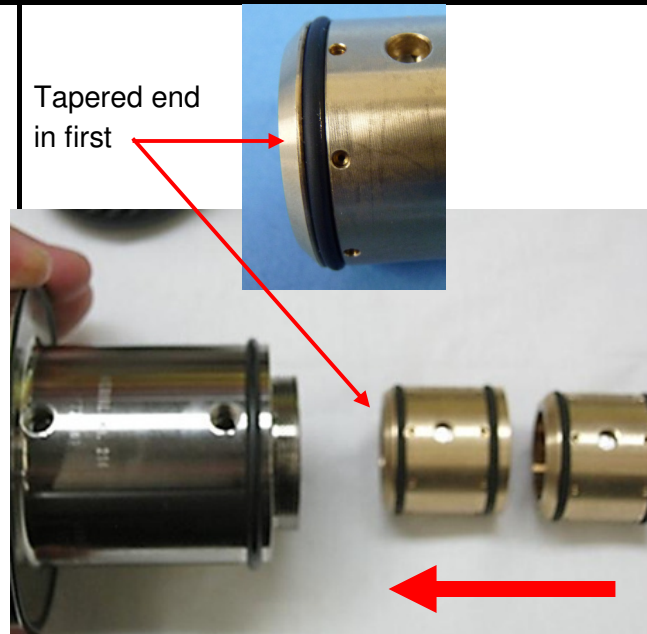


Figure 1-21

Step 22

Lightly lubricate bearing housing

Lubricate Bearing Housing – Use Ransburg A11545 **Use lubricant A11545 sparingly only enough (super thin film) to allow bearings to slide into position.**



Figure 1-22a



Figure 1-22b

Step 23

Slide Bearings into Position within the Housing

Slide Bearings into Housing – Notice position of the taper on bearings, they will be facing inwards during assembly

Set Screw Hole Alignment – Make sure to align both blind set screw holes to bearing housing during the insertion process.

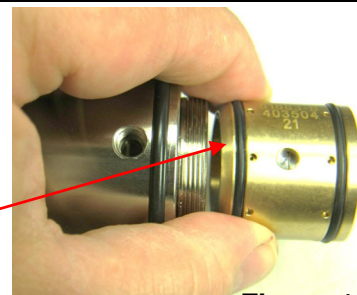


Figure 1-23a

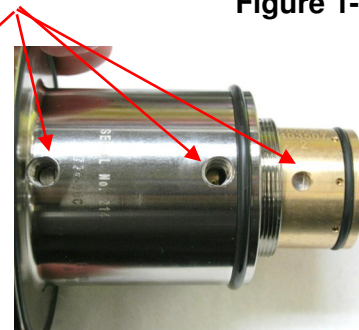


Figure 1-23b

Step 24

Install Set Screws into Bearings

Install New O-rings and spring – Install new O-rings and spring onto set screws as shown in Figure 1-24a.

Apply a drop of light duty thread retaining compound to first thread (7969-05)

Install Assembled Set Screws into bearing housing – Visually inspect to make sure blind holes in bearings are in alignment with housing. Once in alignment install both Set Screws and torque into place 15-20 lb.-in (1.3 -1.6 Nm) torque. **Reminder: It's critical to have proper alignment of set screws otherwise they will not fully seat allowing bearings to move yielding premature bearing failure.**

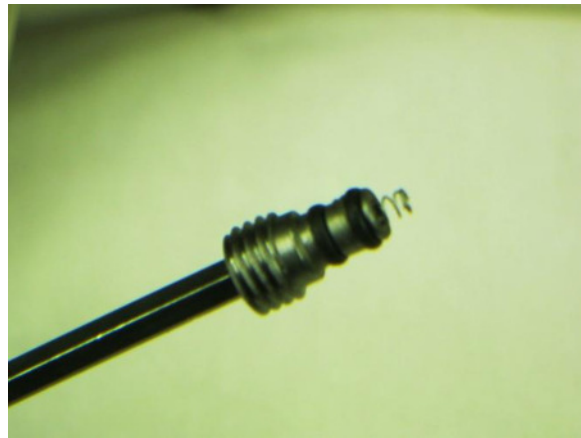


Figure 1-24a

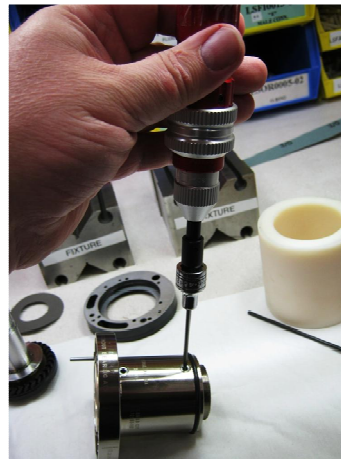


Figure 1-24b

Step 25

Assemble Turbine Motor Complete

1 Install Bearing Air O-ring

Insert Bearing Air O-Ring – Locate O-ring from kit and install into bearing housing as shown in Figure 1-25.

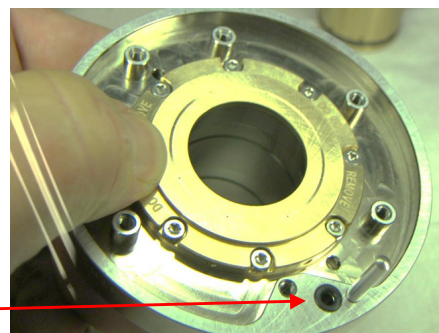


Figure 1-25

Step 26

Locate Spacer and Shaft

Important Assembly Note – Inspect spacer and shaft to make sure that they have corresponding serial numbers. They are a matched set. If numbers do not match locate ones that do match. Failure to do so will result in turbine motor failure.

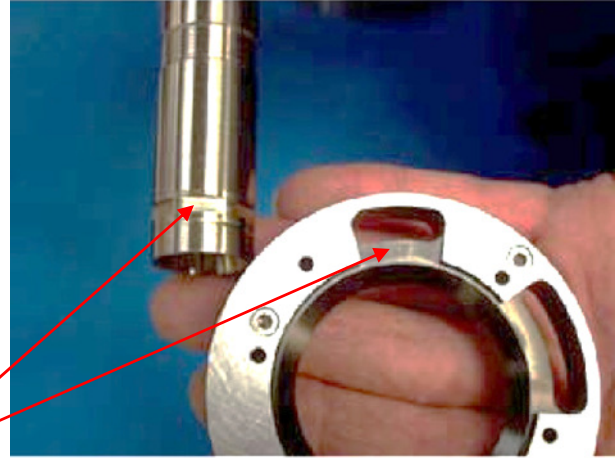


Figure 1-26

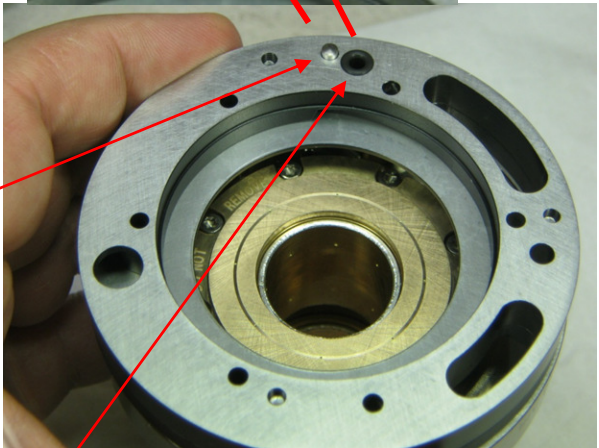
Step 27

Assemble Spacer Ring onto Bearing Housing

Assemble Spacer & Second O-Ring –

Align pin on body with hole near bearing air .

Align spacer before installing shaft



Bearing Air Hole

Figure 1-27

Step 28

Assemble Shaft into Bearing Housing

Assemble Shaft - Assemble shaft into bearing housing as shown in figure 1-28. Use care during installation.



Figure 1-28

Step 29

Assemble Rear Cover onto Bearing Housing

Assemble Rear Cover – Observe alignment pin during assembly. Make sure bearing air O-ring is in place. Assemble rear cover.

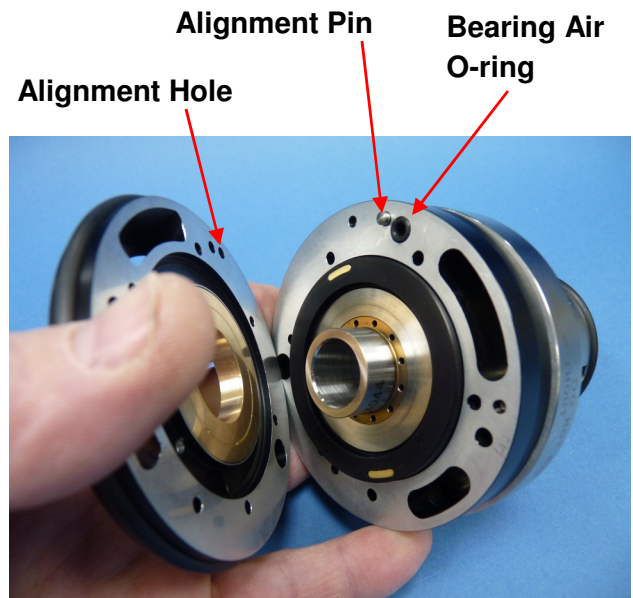


Figure 1-29

Step 30

Assemble Rear Cover onto Bearing Housing

Assemble Star screws - into rear cover of turbine motor. Do not tighten leave loose and proceed to next step.

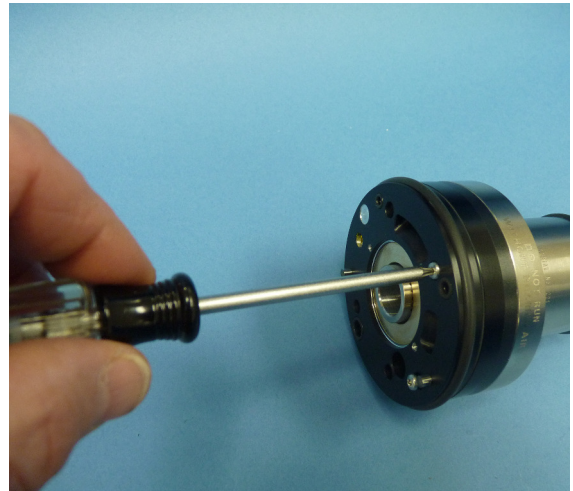


Figure 1-30

Step 31

Align housing, Spacer and Rear Cover in V-Block

Align Turbine Motor in V-Blocks - Carefully align turbine motor into V-block as shown in Fig. 1-31. Once aligned check shaft for free rotation by hand then proceed to tighten Star screws to 12-15 lbs.-in.(1.4-1.7 N-m) torque using an alternating pattern. The shaft should be free moving during the screw tightening process as well as after. If not spinning free, loosen screws and reposition unit in V-block then repeat process.

Remove exterior body O-Ring during assembly



Figure 1-31

Step 30A

Optional Alignment tool method

Assemble Rear Cover onto Bearing Housing

Assemble Star Head Screws - into rear cover of turbine motor. Do not tighten leave loose and proceed to next step.

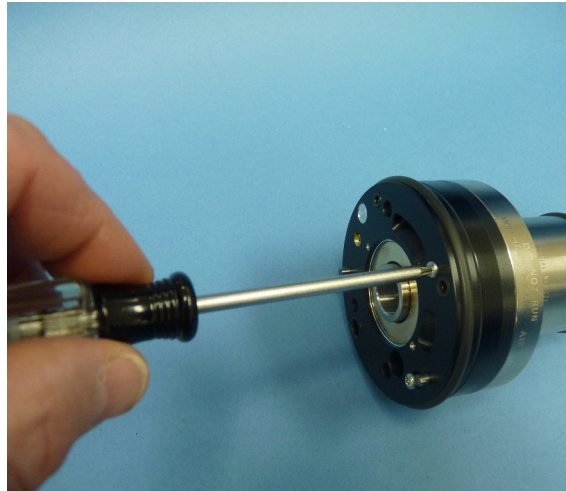


Figure 1-30A

Step 31A

Align housing, Spacer and Rear Cover in Alignment Ring

Align Turbine Motor in Alignment Ring

Carefully align turbine motor as shown in Fig. 1-31A. Once aligned check shaft for free rotation by hand then proceed to tighten #10 Star screws to 12-15 lbs.-in. (1.4-1.7 N-m) torque using an alternating pattern. The shaft should be free moving during the screw tightening process as well as after. If not spinning free, loosen screws and reposition unit in the alignment ring, then repeat process.

Remove large diameter rear O-Ring during assembly



A13268-00
Alignment Ring

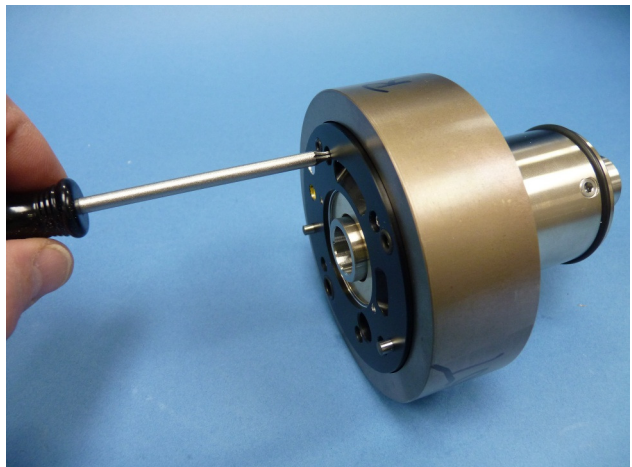


Figure 1-31A

Step 32

Install New O-Rings onto Turbine Motor



Figure 1-32a

Install New O-Rings – onto turbine motor as shown in Fig. 1-32a & b

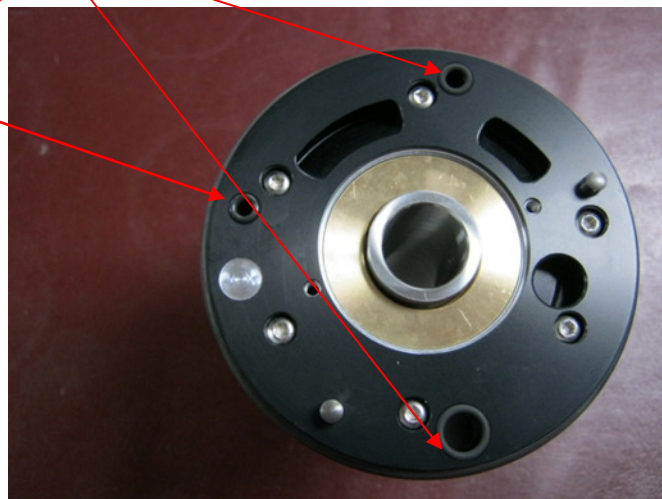
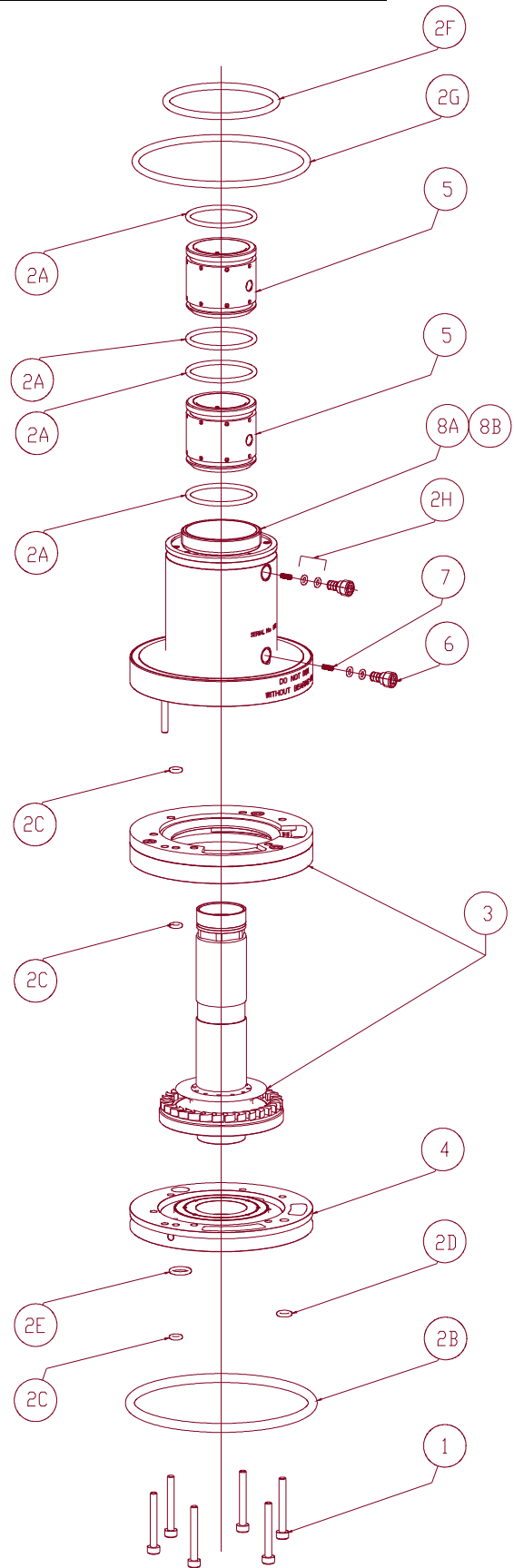


Figure 1-32b

SPINDLE REPLACEMENT PARTS

| | | A12908 O-RING KIT | |
|------|-------------|---|---|
| ITEM | PART NUMBER | DESCRIPTION | WHERE USED |
| 1 | A12907-00 | SCREW KIT (6 SCREWS) | |
| 2 | A12908-00 | O-RING KIT (16 O-RINGS) (SEE KIT BREAKDOWN FOR EACH O-RING) | RADIAL BEARINGS (4 REQ'D. PER ASS'Y.) |
| 3 | A12905-00 | SHAFT AND SPACER ASSEMBLY KIT | REAR COVER OUTSIDE DIAMETER |
| 4 | A12906-00 | REAR COVER ASSEMBLY W/ THRUST BEARING | BEARING AIR (3 REQ'D. PER ASS'Y.) |
| 5 | A12902-00 | RADIAL BEARING | BRAKE AIR, REAR COVER FACE |
| 6 | A12904-00 | RADIAL LOCATION PIN (2 PER ASSY REQ'D.) | TURBINE AIR, REAR COVER FACE |
| 7 | A12961-00 | SPRING (2 PER ASS'Y. REQ'D.) | |
| 8A | A12901-00 | BODY W/THRUST BEARING (WITH SHAPE AIR HOLES) | SPINDLE BODY, FRONT, OUTSIDE DIAMETER |
| 8B | A12901-01 | BODY W/THRUST BEARING (NO SHAPE AIR HOLES) | SPINDLE BODY, FRONT, LARGE DIAMETER |
| | | | RADIAL LOCATION PIN FOR BEARING LOCATOR (4 REQ'D. PER ASS'Y.) |



SERVICE KITS

SERVICE KIT A12951-00 (CLEANING AND BEARING)

| ITEM # | QTY. | PART NUMBER | DESCRIPTION |
|--------|------|-------------|-------------------------|
| 1 | 2 | RPM-63 | SANDPAPER STRIP |
| 2 | 1 | SSC-6001 | LINT FREE TISSUE |
| 3 | 2 | RPM-62-1 | SANDPAPER DISC |
| 4 | 2 | RPM-437 | WIRE, 6 $\frac{1}{4}$ " |
| 5 | 1 | A12907-00 | KIT, SCREW |
| 6 | 2 | A12902-00 | BEARING |
| 7 | 2 | A12961-00 | SPRING |
| 8 | 1 | A12908-00 | O-RING KIT |
| 9 | 1 | SI-12-02 | SERVICE INSTRUCTION |

SERVICE KIT A12951-01 (CLEANING)

| ITEM # | QTY. | PART NUMBER | DESCRIPTION |
|--------|------|-------------|-------------------------|
| 1 | 2 | RPM-63 | SANDPAPER STRIP |
| 2 | 1 | SSC-6001 | LINT FREE TISSUE |
| 3 | 2 | RPM-62-1 | SANDPAPER DISC |
| 4 | 2 | RPM-437 | WIRE, 6 $\frac{1}{4}$ " |
| 5 | 2 | A12961-00 | SPRING |
| 6 | 1 | A12908-00 | O-RING KIT |
| 7 | 1 | SI-12-02 | SERVICE INSTRUCTION |

TOOL OPTIONS



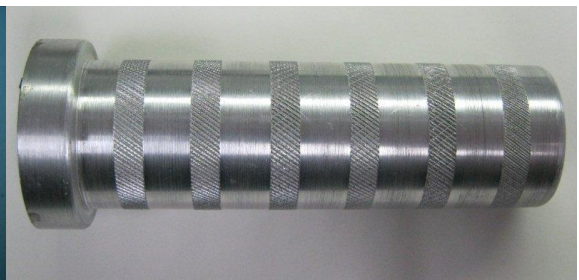
A13268-00

ALIGNMENT TOOL



A13269-00

BEARING TOOL



A13270-00

THRUST BEARING SANDING TOOL

Changes made to SI-12-02.1 Manual:

- Page 9 —Revised Tool Number from A13270-00 to A13269-00.
- Page 14— Added Optional Tool Number A13270-00.
- Page 27—Added Changes Made.

WARRANTY POLICIES

LIMITED WARRANTY

Ransburg will replace or repair without charge any part and/or equipment that falls within the specified time (see below) because of faulty workmanship or material, provided that the equipment has been used and maintained in accordance with Ransburg's written safety and operating instructions, and has been used under normal operating conditions. Normal wear items are excluded.

THE USE OF OTHER THAN RANSBURG APPROVED PARTS, VOID ALL WARRANTIES.

SPARE PARTS: One hundred and eighty (180) days from date of purchase, except for rebuilt parts (any part number ending in "R") for which the warranty period is ninety (90) days.

EQUIPMENT: When purchased as a complete unit, (i.e., guns, power supplies, control units, etc.), is one (1) year from date of purchase.

WRAPPING THE APPLICATOR, ASSOCIATED VALVES AND TUBING, AND SUPPORTING HARDWARE IN PLASTIC, SHRINK-WRAP, OR ANY OTHER NON-APPROVED COVERING, WILL VOID THIS WARRANTY.

RANSBURG'S ONLY OBLIGATION UNDER THIS WARRANTY IS TO REPLACE PARTS THAT HAVE FAILED BECAUSE OF FAULTY WORKMANSHIP OR MATERIALS. THERE ARE NO IMPLIED WARRANTIES NOR WARRANTIES OF EITHER MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. RANSBURG ASSUMES NO LIABILITY FOR INJURY, DAMAGE TO PROPERTY OR FOR CONSEQUENTIAL DAMAGES FOR LOSS OF GOODWILL OR PRODUCTION OR INCOME, WHICH RESULT FROM USE OR MISUSE OF THE EQUIPMENT BY PURCHASER OR OTHERS.

EXCLUSIONS:

If, in Ransburg's opinion the warranty item in question, or other items damaged by this part was improperly installed, operated or maintained, Ransburg will assume no responsibility for repair or replacement of the item or items. The purchaser, therefore will assume all responsibility for any cost of repair or replacement and service related costs if applicable.

Ransburg

Manufacturing

1910 North Wayne Street
Angola, Indiana 46703-9100
Telephone: 260-665-8800
Fax: 260-665-8516

Technical Service — Assistance

320 Philips Ave.
Toledo, Ohio 43612-1493
Telephone (toll free): 800-233-3366
Fax: 419-470-2233

Technical Support Representative will direct you to the appropriate telephone number for ordering Spare Parts.