Orbiting Plate Assembly (continued)

6. Using an arbor press, press against the orbiting spacer until it is flush with the open end of the J9104P bearing.

7. Immediately, while orbiting plate is still hot, insert the 7304WN SU bearing into the bore and against the orbiting spacer.

**WARNING** Assembly is hot; use heat resistant gloves.

**WARNING** Assembly is hot; use heat resistant gloves.

Observe Proper Orientation

Toward Bore
Orbiting Plate Assembly (continued)

8. Immediately, while the orbiting plate is still hot, place the orbiting plate onto the post of the orbiting plate fixture that has the larger bottom disk.

9. Place the large seal and the locking nut onto the post and tighten the entire assembly.

**WARNING** Assembly is hot, use heat resistant gloves.

10. Allow the orbiting plate to air cool completely.

11. Once it is cooled, remove the orbiting plate from the orbiting plate fixture.

12. Replace the seal and tighten the nut onto the orbiting plate fixture.

Install the Wave Washer and Shaft Seal

Tools required:
- Allen wrench
- Arbor press
- Seal installation tool
- Krytox GPL 224 grease
- Loctite 242

Locate the following parts:
① Wave washer - nested
② M5x5 set screw (6)
③ Shaft seal, 24x32x4, included in maintenance kit
Orbiting Plate Assembly (continued)

1. Apply a small amount of Loctite 242 to the lower threads of the six M5x5 screws, then install one screw into each threaded hole in the orbiting plate.

2. Tighten the screws until they are slightly below the surface.

3. Install the wave washer into the orbiting plate.
4. Apply a thin film of Loctite 242 to the outer edge of the shaft seal.

5. Place the shaft seal onto the shaft seal installation tool.

6. Using the shaft seal installation tool, press the shaft seal into the orbiting plate.

7. Apply Krytox GPL 224 to the inner diameter of the seal between the lips.
Orbiting Plate Assembly (continued)

Install the Needle Bearings

Tools required:
- Right angled snap ring pliers
- Krytox GPL 224 grease

Locate the following part in the photo on the left:
1. Orbiting plate

Locate the following parts in the photo on the left:
1. Snap rings (3)
2. O-rings, 0-016 (6), included in maintenance kit
3. Needle bearing (3), included in maintenance kit
4. Shaft seals, 8x15x3 (3), included in maintenance kit
1. Lightly grease the O-rings, then insert them into the two grooves in each of three sync crank bearing bores in the orbiting plate.

2. Push one needle bearing into each bearing bore.

3. Squeeze a 1/4" diameter dot of Krytox into each of the three needle bearings.

4. Smear grease over all the needles.
Orbiting Plate Assembly (continued)

5. Coat the lips of the three shaft seals with grease.
6. Insert one shaft seal into each bore against the needle bearing.

Observe Proper Orientation

7. Secure the sync crank by inserting the snap ring into the bearing bore groove.
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TriScroll 300 Assembly

TriScroll 300 Exploded View
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MK = Included in major maintenance kit

TSK = Included in tip seal kit

NSS = Not sold separately
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MK = Included in major maintenance kit
TSK = Included in tip seal kit
NSS = Not sold separately
# TriScroll 300 Dry Scroll Vacuum Pump

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</table>

MK = Included in major maintenance kit

TSK = Included in tip seal kit

NSS = Not sold separately
Final Assembly

Tools required:
- Allen wrench

Locate the following items:
1. Inboard housing assembly
2. Spider coupling
3. M6x16 screws (4)
Final Assembly (continued)

1. Insert the spider into the motor coupling.

2. Install the inboard assembly into the TriScroll frame, aligning the fingers on the fan assembly with the fingers on the coupling. Ensure that the dowel pins fit properly on the mating holes in frame.

   **NOTE**  Exhaust fitting located in the downward position.
3. Secure the inboard assembly to the frame with the four M6x16 screws.
Final Assembly (continued)

Install the Orbiting Plate

Tool required:
- Locking nut wrench
- Snap ring pliers
- Allen wrench
- Depth Gauge
- Krytox GPL 224 grease

Locate the following parts:
- Orbiting plate assembly

Locate the following parts:
① O-ring, large, 2-269, included in maintenance kit
② Orbiting cup
③ Locking nut
④ O-ring, small, 2-137, included in maintenance kit
⑤ Snap ring
⑥ Tip seals, included in maintenance kit
Final Assembly (continued)

1. Slide the orbiting plate assembly onto the crankshaft and into the inboard housing.

**NOTE**

The balance fin on the orbiting plate should be oriented in the downward position when sliding the orbiting plate onto the crankshaft and into the inboard housing.
Final Assembly (continued)

2. Remove the four M4x12 locking screws from the locking nut.
3. Secure the orbiting plate with the locking nut.
4. Tighten snugly with locking nut wrench.

**CAUTION**  Do not overtighten. Overtightening can cause bearing damage.

5. Measure the distance from the face of the locking nut to the crankshaft end using the depth gauge.
6. Note and record the distance.

Date  
Distance  

7. Disassemble the locking nut and orbiting plate assembly from the inboard assembly.
Final Assembly (continued)

8. Insert the tip seal into the scroll tip grooves on the inboard housing.

9. Cut to the correct length at the end of each groove.

10. Insert the tip seal into the scroll tip grooves on the inboard side of orbiting plate.

11. Cut to the correct length at the end of each groove.
12. Repeat steps 1 through 3 to reassemble the orbiting plate assembly and locking nut on the inboard assembly.

13. Using the locking nut wrench, tighten the locking nut until the distance from the face of the locking nut to the crankshaft end equals the distance noted in step 6 on page 74, plus 0.007 inch.

14. Secure the locking nut by installing the four M4x12 locking screws.

15. Use the locking nut wrench to maintain the locking nut position while tightening the locking screws.

**CAUTION**  Make sure that the locking nut does not rotate relative to the crankshaft.

16. Ensure that all four locking screws are tightened to at least 40 in-lb.

17. Insert tip seal in scroll tip grooves on orbiting plate.

18. Cut to length at the end of each groove.
Final Assembly (continued)

19. Lightly grease the O-ring and place it onto the orbiting cup.

20. Insert the orbiting cup into the center of the orbiting plate.

21. Push the orbiting cup into place and hold it securely while engaging the snap ring.

**CAUTION**

If the orbiting cup slips out prior to installing the snap ring, remove the orbiting cup, re-install the O-ring and re-insert the orbiting cup into the orbiting plate.

Use care not to shear the O-ring while pushing the orbiting cup into the orbiting plate.
Final Assembly (continued)

22. Lightly grease the large O-ring and install it around the lip of the inboard housing.

Install the Outboard Housing

Tools required:
- Snap ring pliers
- Allen wrench
- Krytox GPL 224 grease

Locate the following items shown in the photo to the left:
1. Intake fitting
2. M5x16 screws (2)
3. O-ring, 2-121, included in maintenance kit
4. Intake clamp
Final Assembly (continued)

Locate the following items shown in the photo to the left:

① Tip seal, included in maintenance kit
② M6x45 screws (6)
   Outboard housing (not shown in photo)

1. Lightly grease the O-ring and insert it in the groove on the intake fitting.
2. Place the intake fitting over the intake hole in the outboard housing.
3. Slide the intake clamp around the intake fitting.
4. Secure it with two M5x16 screws.
5. Tighten to 75 in-lb.

6. Insert the tip seals in the grooves on the outboard housing.
7. Cut to length at the end of grooves.
8. Install the outboard housing over the orbiting plate and against the inboard housing, engaging the dowel pins.

9. Secure the outboard housing to the inboard housing with the six M6x45 screws.

10. Tighten the screws sequentially in a diagonal pattern to 130 in-lb.
Final Assembly (continued)

Install the Sync Crank into the Outboard Housing

Tools required:
- Allen wrench
- Krytox GPL 224 grease

Locate the following parts shown in the photo at the left:
1. O-ring, 2-118 (3) included in maintenance kit
2. Sync crank cover (3)
3. M5x10 screws (6)
4. Sync crank assembly (3) included in maintenance kit

1. Insert one sync crank assembly into each of three bores in the outboard housing.
2. Ensure that the pin on the sync crank assembly end engages with the needle bearing in the orbiting plate.
Final Assembly (continued)

3. Lightly grease the three O-rings and insert them into the grooves on the three sync crank covers.

4. Install one sync crank cover over each sync crank bore.

5. Secure each cover with two M5x10 screws.

6. Tighten to 75 in-lb.
Replace the Cowling and Cover

Tools required:
- Allen wrench
- Krytox GPL 224 grease

Locate the following parts:
1. Cowling
2. Outboard cover
3. O-ring, 2-157, included in maintenance kit
4. M5x22 screws (6)
5. M5x16 screws (3)

1. Lightly grease the O-ring and insert it into the groove on the outboard cover.
2. Secure the outboard cover to the outboard housing with the six M5x22 screws.
Final Assembly (continued)

3. Install the cowling over the pump module.
4. Secure it with the three M5x16 screws.

This figure illustrates a fully reassembled TriScroll 300 pump.

Put the Pump Back into Service

The TriScroll 300 pump can be placed into service immediately after maintenance is complete. However, 24 hours of run time is required before base pressure of 10 mTorr can be achieved.

NOTE
The 24 hour run time does not have to be continuous. If your application requires a low base pressure, it is wise to run the pump for the 24-hour period for optimum performance.
1. Return authorization numbers (RA#) will not be issued for any product until this Certificate is completed and returned to a Varian, Inc. Customer Service Representative.

2. Pack goods appropriately and drain all oil from rotary vane and diffusion pumps (for exchanges please use the packing material from the replacement unit), making sure shipment documentation and package label clearly shows assigned Return Authorization Number (RA#). VVT cannot accept any return without such reference.

3. Return product(s) to the nearest location:

   - **North and South America**
     - Varian, Inc.
     - Vacuum Technologies
     - 121 Hartwell Ave.
     - Lexington, MA 02421
     - Fax: (781) 860-9252

   - **Europe and Middle East**
     - Varian S.p.A.
     - Via F.Ili Varian, 54
     - 10040 Leini (TO) – ITALY
     - Fax: (39) 011 997 9350

   - **Asia and ROW**
     - Varian Vacuum Technologies
     - Local Office

   For a complete list of phone/fax numbers see www.varianinc.com/vacuum

4. If a product is received at Varian, Inc. in a contaminated condition, the customer is held responsible for all costs incurred to ensure the safe handling of the product, and is liable for any harm or injury to Varian, Inc. employees occurring as a result of exposure to toxic or hazardous materials present in the product.

**CUSTOMER INFORMATION**

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<th>Contact person: Name:</th>
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**PRODUCT IDENTIFICATION**

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**TYPE OF RETURN** (check appropriate box)

- Paid Exchange
- Paid Repair
- Warranty Exchange
- Warranty Repair
- Loaner Return
- Credit
- Shipping Error
- Evaluation Return
- Calibration
- Other

**HEALTH AND SAFETY CERTIFICATION**

VACUUM TECHNOLOGIES CANNOT ACCEPT ANY BIOLOGICAL HAZARDS, RADIOACTIVE MATERIAL, ORGANIC METALS, OR MERCURY AT ITS FACILITY. CHECK ONE OF THE FOLLOWING:

- I confirm that the above product(s) has (have) NOT pumped or been exposed to any toxic or dangerous materials in a quantity harmful for human contact.

- I declare that the above product(s) has (have) pumped or been exposed to the following toxic or dangerous materials in a quantity harmful for human contact (Must be filled in):

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<th>Signature:</th>
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**PLEASE FILL IN THE FAILURE REPORT SECTION ON THE NEXT PAGE**

Do not write below this line

Notification (RA) #: Customer ID #: Equipment #:
**Request for Return**  
*Health and Safety Certification*

**FAILU RE REPORT**  
(Please describe in detail the nature of the malfunction to assist us in performing failure analysis):

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<td>□ Bellows leak</td>
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<td>□ Damaged sealing area</td>
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<td>□ Vacuum system unstable</td>
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Describe failure:

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<thead>
<tr>
<th>ALL OTHER VARIAN, INC.</th>
<th>DIFFUSION PUMPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Pump doesn’t start</td>
<td>□ Heater failure</td>
</tr>
<tr>
<td>□ Doesn’t reach vacuum</td>
<td>□ Electrical problem</td>
</tr>
<tr>
<td>□ Pump seized</td>
<td>□ Doesn’t reach vacuum</td>
</tr>
<tr>
<td></td>
<td>□ Cooling coil damage</td>
</tr>
</tbody>
</table>

Describe failure:

Customer application: