TriScroll 300 Disassembly (continued)

8. Push the crankshaft out of the inboard housing.
9. Remove the key from slot in the crankshaft.
10. Remove and discard the O-ring from the crankshaft.

11. Remove the two pipe plugs from the inboard housing.
12. Remove the snap ring that is holding the check valve plug in the inboard housing.

13. Remove the check valve plug by installing an M4 screw and then pulling out the plug.

14. Remove and discard the two O-rings.
15. Using the hemostat pliers, remove the two check valves, two small springs, one large spring, two plunger guides and one spacer from the port in the inboard housing.

16. Remove the snap ring that is holding the exhaust fitting in the inboard housing.
17. Remove the exhaust fitting.
18. Remove and discard the O-ring.

**NOTE**  The next step applies to all models except the 310.

19. Using the hemostat pliers, remove the large spring, plunger guide, small spring and check valve from the exhaust port in the inboard housing.
The parts removed from the exhaust are:

1. Large spring
2. Plunger guide
3. Small spring
4. Check valve

WARNING This step requires the use of heat resistant gloves. Do not proceed without them!

20. Heat the inboard housing for a minimum of 1 hour in a 350 °F oven.
21. Immediately after removing the inboard housing from oven, remove the two bearings, bearing spacer and wave washer from inboard housing.

22. Use the main bearing extractor tool to push bearings out if the bearings do not fall out.

The parts removed from the inboard housing are:

1. Bearing spacer
2. 7205W SU bearing, included in maintenance kit
3. 7305WN SU bearing, included in maintenance kit
4. Wave washer
23. Allow the inboard housing to air cool until it can be handled with bare hands.
24. Remove and discard the shaft seal from the inboard housing.

25. Carefully scrape with a chisel to loosen the tip seal dust from the orbiting plate, inboard and outboard housing. If seal debris is attached to the sides of the scroll walls, use a razor blade or Exacto knife to scrape this debris off.

26. Use dry compressed air to remove the tip seal debris.
27. Clean all the parts.

**NOTE**

The use of an industrial detergent and water is recommended.

28. Ensure that all parts are dry.
Crankshaft Assembly

Crankshaft Exploded View

<table>
<thead>
<tr>
<th>Callout</th>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
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<tbody>
<tr>
<td>➀</td>
<td>MK*</td>
<td>2-115 Viton® O-ring</td>
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</tr>
<tr>
<td>➁</td>
<td>MK*</td>
<td>7305WN SU Bearing</td>
<td>1</td>
</tr>
<tr>
<td>➂</td>
<td>S4770001</td>
<td>VDS4- Bearing Spacer</td>
<td>1</td>
</tr>
<tr>
<td>➃</td>
<td>S4769001</td>
<td>Wave Washer - Crank</td>
<td>1</td>
</tr>
<tr>
<td>➄</td>
<td>MK*</td>
<td>7205W SU Bearing</td>
<td>1</td>
</tr>
<tr>
<td>➅</td>
<td>S4711001</td>
<td>VDS4- Crankshaft</td>
<td>1</td>
</tr>
</tbody>
</table>

MK = Included in major maintenance kit

TSK = Included in tip seal kit

NSS = Not sold separately
Assemble the Crankshaft

Tools required:
- Allen wrench
- Bearing pre-load tool
- Arbor press
- Krytox GPL 224 grease, included in maintenance kit

Locate the following parts shown in the photo to the left:
1. Crankshaft
2. Bearing spacer
3. 7205W SU bearing, included in maintenance kit
4. Seal spacer
5. 7305WN SU bearing, included in maintenance kit
6. Wave washer-crank
7. O-ring, 2-115, included in maintenance kit

Locate the following parts in the photo to the left:
1. Bearing pre-load tool
2. Washer
3. M8x12 screw
4. 5x5x12 key

1. Install the wave washer onto the crankshaft.
Assemble the Crankshaft (continued)

2. Install 7205W SU bearing on crankshaft.
   
   Observe Proper Orientation

   Toward Wave Washer

3. Install bearing spacer on crankshaft.
   
   Observe Proper Orientation

4. Install 7305WN SU bearing on crankshaft.
   
   Observe Proper Orientation

   Toward Wave Washer
5. Lightly grease the O-ring and install it in the groove on the crankshaft.
6. Install the key in the slot.
7. Install the seal spacer over the O-ring.

8. Slide the bearing pre-load tool onto the crankshaft engaging key and secure it with the M8x12 screw and washer.
Inboard Housing Assembly

Inboard Housing Exploded View
<table>
<thead>
<tr>
<th>Callout</th>
<th>Part Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>①</td>
<td>NSS*</td>
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<td>②</td>
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<tr>
<td>③</td>
<td>MK*</td>
<td>O-ring, Viton 2-111</td>
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<tr>
<td>④</td>
<td>S4737001</td>
<td>VDS4- Check Valve Spacer</td>
<td>1</td>
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<td>⑤</td>
<td>S4723001</td>
<td>VDS4- Check Valve Assembly</td>
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<td>⑥</td>
<td>660285573</td>
<td>Spring, S/S, .18 OD x .75 L x .014 Wire OD</td>
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<tr>
<td>⑦</td>
<td>S4720001</td>
<td>VDS4- Plunger Guide</td>
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<tr>
<td>⑧</td>
<td>660285565</td>
<td>Spring, S/S, .60 OD x .50 L x .045 Wire OD</td>
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<tr>
<td>⑨</td>
<td>NSS*</td>
<td>VDS4- Inboard Housing</td>
<td>1</td>
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<tr>
<td>⑩</td>
<td>NSS*</td>
<td>Dowel Pin, Steel, M6x16</td>
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<td>⑪</td>
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<td>⑫</td>
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<td>VDS4- Exhaust Fitting</td>
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</table>

MK = Included in major maintenance kit

TSK = Included in tip seal kit

NSS = Not sold separately
<table>
<thead>
<tr>
<th>Callout</th>
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<th>Description</th>
<th>Quantity</th>
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<tr>
<td>14</td>
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<td>Shaft Seal, 32mm x 42mm x 4mm</td>
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<tr>
<td>16</td>
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<tr>
<td>17</td>
<td>S4727001</td>
<td>VDS4- Seal Spacer</td>
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<tr>
<td>18</td>
<td>MK*</td>
<td>O-ring, Viton 2-152</td>
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<td>19</td>
<td>S4712001</td>
<td>VDS4- Seal Housing</td>
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<td>20</td>
<td>NSS*</td>
<td>Screw, Socket Head Cap, M5x10, Black Steel</td>
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<tr>
<td>21</td>
<td>NSS*</td>
<td>VDS4- Fan Assembly</td>
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<td>22</td>
<td>NSS*</td>
<td>Washer, 11/32 x 3/4 x 1/8</td>
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<tr>
<td>23</td>
<td>NSS*</td>
<td>Screw, Socket Head Cap, M8x12, Black Steel</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>MK*</td>
<td>O-ring, Viton 2-140</td>
<td>1</td>
</tr>
</tbody>
</table>

MK = Included in major maintenance kit

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NSS = Not sold separately
Inboard Housing Assembly

Insert the Shaft Seal

Tools required:
- Arbor press
- Seal installation tool
- Krytox GPL 224 grease

Locate the following parts shown in the photos to the left:
1. Shaft seal, 32x42x4, included in maintenance kit
2. Inboard housing
1. Using Krytox GPL 224, grease the inner diameter of the shaft seal between its lips.

2. Using the seal insertion tool, press the shaft seal (32x42x4) into the bore of inboard housing from the fin side.

Observe Proper Orientation

Into Bore
Inboard Housing Assembly (continued)

Insert the Crankshaft

Tools required:
- Cooling stand
- Gloves

Locate the following items:
- Crankshaft assembly
- Inboard housing

WARNING
This step requires the use of heat resistant gloves. Do not proceed without them!

1. Heat the inboard housing for a minimum of 1 hour in a 350 °F oven.
Inboard Housing Assembly (continued)

2. Immediately after removing the inboard housing from oven, push the crankshaft assembly into the inboard housing, external threads first.

3. Place assembly in cooling stand and allow to air cool.

WARNING Assembly is hot. Use heat resistant gloves for this step.

CAUTION Be careful not to let crankshaft drop out.
Inboard Housing Assembly (continued)

Insert the Seal Housing

Tools required:
- Allen wrench
- Seal installation tool
- Krytox GPL 224 grease
- Locite® 242

Locate the following parts shown in the photo on the left:
1. Seal housing
2. Shaft seal, 32x42x4, included in maintenance kit
3. M5x10 screw (3)
4. O-ring, 2-152, included in maintenance kit
5. O-ring, 2-140, included in maintenance kit

1. Spread a thin film of Locite® 242 onto the outer surface of the shaft seal, (32x42x4).
2. Press the shaft seal into the seal housing. 

Observe Proper Orientation

3. Using Krytox GPL 224, grease the inner diameter of the shaft seal between lips.

4. Remove the screw, washer and bearing pre-load tool from crankshaft.

5. Lightly grease the 2-152 O-ring and insert it into the outer groove on the seal housing.

6. Lightly grease the 2-140 O-ring and insert it into the middle groove on the seal housing.
Inboard Housing Assembly (continued)

7. Secure the seal housing to the inboard housing with three M5x10 screws.
8. Tighten the screws to 75 in-lb.

CAUTION Avoid damage to the seal. Carefully rocking the seal housing onto the crankshaft will avoid damage to the seal during installation.

9. Place the key into the slot in the crankshaft.

10. Slide the fan assembly onto the crankshaft, engaging the key and against the seal spacer.
11. Secure with the M8x12 screw and washer previously removed (see page 22).
12. Tighten screws to 250 in-lb.
Install the Vents and Plugs

Tools required:
- 14 mm wrench
- Loctite PST 567 pipe sealant, included in maintenance kit

Locate the following parts:
1 Breather Vent, PTS03001UNIV and PTS03003UNIV, 1 required
2 1/4 NPT brass plug, PTS03001UNIV and PTS03003UNIV, 1 required
   PTS03101UNIV and PTS03103UNIV, 2 required

Inboard Housing Port Definition
Inboard Housing Assembly (continued)

**PTS03001UNIV and PTS03003UNIV only**

1. Apply a small amount of Loctite PST 567 pipe sealant to the first few threads of breather vent.
2. Insert and tighten the breather vent into the air ballast port.

**PTS03101UNIV and PTS03103UNIV only**

1. Apply a small amount of Loctite PST 567 pipe sealant to the first few threads of 1/4 NPT brass plug.
2. Insert the plug into the air ballast port and tighten.

**NOTE**

The photo shows a breather vent being installed into the air ballast port.

3. Apply a small amount of Loctite PST 567 pipe sealant to the first few threads of the second 1/4 NPT brass plug.
4. Insert the plug into the bearing purge port and tighten.
Inboard Housing Assembly (continued)

**Exhaust Port Reassembly**

**PTS03001UNIV and PTS03003UNIV only**

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

Locate the following parts:
1. Spring, large
2. Plunger guide
3. Spring, small
4. Check valve assembly
5. Exhaust fitting
6. O-ring, 2-205, included in maintenance kit
7. Snap ring

**PTS03001UNIV and PTS03003UNIV only**

1. Place the small spring onto the plunger guide.
2. Place the check valve onto the plunger guide.
3. Insert the check valve assembly, check valve first, into the exhaust port on the inboard housing.
4. Observe the proper orientation as shown in photo on the left.
Inboard Housing Assembly (continued)

PTS03001UNIV and PTS03003UNIV only

- Insert the larger spring into the exhaust port, pushing against the plunger guide.

PTS03101UNIV and PTS03103UNIV only

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

Locate the following parts:
- Exhaust fitting
- O-ring, 2-205, included in maintenance kit
- Snap ring

1. Lightly grease the O-ring, then install it in the groove on exhaust fitting.
2. Place the snap ring on the exhaust fitting. The snap ring must be bent slightly to fit around the exhaust fitting.
Inboard Housing Assembly (continued)

3. Push the exhaust fitting into the exhaust port and against the spring.
4. Secure it by inserting the snap ring into the groove in the exhaust port.

Bypass Port Reassembly

Tools required:
- Right angle snap ring pliers
- Bypass plug insertion tool
- Krytox GPL 224 grease

Locate the following parts:
1. Check valve spacer
2. Plunger guide (2)
3. Check valve assembly (2)
4. Spring, small (2)
5. Spring, large
6. O-rings, 2-111 (2), included in maintenance kit.
7. Check valve plug
   Snap ring (not shown)
5. Place the small spring onto the plunger guide.
6. Place the check valve onto the plunger guide.
7. Insert the check valve assembly, check valve first, into the exhaust port on the inboard housing.
8. Observe the proper orientation as shown in the photo on the left.

9. Insert the large spring into the bypass port, pushing against the plunger guide.

10. Place the small spring onto the plunger guide.
11. Place the check valve onto the plunger guide.
12. Insert the check valve assembly, plunger guide first, into the exhaust port on the inboard housing.
13. Observe the proper orientation as shown in the photo on the left.
14. Insert the check valve spacer into bypass port around the check valve assembly until it pushes against plunger guide.

15. Lightly grease the two O-rings and install them in the grooves on the check valve plug.

16. Insert the bypass plug insertion tool into the guide hole above the post.

**CAUTION** Be careful not to cut the O-ring on the 1/4” diameter cross-port in the bypass of the inboard housing. Use the bypass plug insertion tool.

17. Insert the check valve plug into bypass port against the check valve spacer.

18. Observe the proper orientation as shown in photo on the left.
19. Secure the check valve plug by inserting the snap ring into the bypass port groove.
Orbiting Plate Assembly

Orbiting Plate Exploded View
<table>
<thead>
<tr>
<th>Callout</th>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>①</td>
<td>MK*</td>
<td>7304WN SU Bearing</td>
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<tr>
<td>②</td>
<td>S4729001</td>
<td>VDS4- Orbiting Spacer</td>
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<tr>
<td>③</td>
<td>MK*</td>
<td>VDS4- Nylon Sleeve</td>
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<tr>
<td>④</td>
<td>MK*</td>
<td>J9104P x1527 Bearing</td>
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<tr>
<td>⑤</td>
<td>S4758001</td>
<td>Wave Washer - Nested</td>
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<tr>
<td>⑥</td>
<td>NSS*</td>
<td>VDS4- Center Orbiting Plate</td>
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<td>⑦</td>
<td>NSS*</td>
<td>DIN472-0150 Snap Ring</td>
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<tr>
<td>⑧</td>
<td>MK*</td>
<td>Shaft Seal, 8x15x3</td>
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</tr>
<tr>
<td>⑨</td>
<td>MK*</td>
<td>NK 8/12 Needle Bearing</td>
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<td>⑩</td>
<td>MK*</td>
<td>2-016 Viton O-ring</td>
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<td>NSS*</td>
<td>M5x5 Set Screw</td>
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</tbody>
</table>

MK = Included in major maintenance kit

TSK = Included in tip seal kit

NSSS = Not sold separately
Orbiting Plate Assembly

Install the Bearing Assembly

Tools required:
- Heat resistant gloves
- Orbiting plate fixture

Locate the following parts:
1. J9104P bearing, included in maintenance kit
2. Nylon sleeve, included in maintenance kit
3. Orbiting spacer
4. 7304WN SU bearing, included in maintenance kit
   Orbiting plate (not shown in photo)

**WARNING** This step requires the use of heat resistant gloves. Do not proceed without them!

1. Heat the orbiting plate for a minimum of 1 hour in 350 °F oven. While the orbiting plate is heating, prepare the bearing fixture. The posts of the orbiting plate bearing fixture have two different sized bottom disks. Use the end that has the larger of the bottom disks.

2. Remove the nut and the seal with the larger bottom disk from the fixture in preparation for sealing the assembly.
Orbiting Plate Assembly (continued)

3. Immediately after removing the orbiting plate from the oven, insert the J9104P bearing, sealed side toward the bore.

4. Immediately, and while the orbiting plate is still hot, drop the nylon sleeve into bore and around the J9104P bearing.

5. Drop the orbiting spacer on top of the nylon sleeve.

WARNING Assembly is hot, use heat resistant gloves.

WARNING Assembly is hot, use heat resistant gloves.