

OPERATOR'S MANUAL

67168

INCLUDING: OPERATION, INSTALLATION AND MAINTENANCE

67169, 67391
67390, 67392
67393

CYCLE COUNTER KITS (CLOSED ELECTRICAL CONTACT TYPE) FOR DIAPHRAGM PUMPS

RELEASED: 11-26-97
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(REV: J)



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING,
OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

CYCLE COUNTER KITS

| PRO Series Port Size | Metallic Fluid Section | | Non - Metallic Fluid Section and Center Body |
|----------------------|----------------------------|----------------------|--|
| | Non - Metallic Center Body | Metallic Center Body | |
| 1/2" | N/A | N/A | 67168 |
| 3/4" and 1" | 67169 | 67169 | N/A |
| 1-1/2" | 67169 | 67169 | N/A |
| 2" | 67169 | 67169 | N/A |

| EXP Series Port Size | Metallic Fluid Section | | Non - Metallic Fluid Section and Center Body |
|----------------------|----------------------------|----------------------|--|
| | Non - Metallic Center Body | Metallic Center Body | |
| 1" | 67390 | 67392 | 67390 |
| 1-1/2" | 67390 | 67392 | 67390 |
| 2" | 67391 | 67393 | 67391 |
| 3" | 67391 | 67393 | 67391 |

GENERAL DESCRIPTION

The ARO® diaphragm pump cycle counter kits provide a closed contact output each time the pump completes a cycle. This signal may be used to record cycles for maintenance purposes or batching if the discharge volume of each complete cycle is known.

Some parts of the pump must be replaced with those included in the kits to enable the activation of the switch.

OPERATION

Maximum Operating Voltage 200 VDC

Switching Current 0.5 Amps

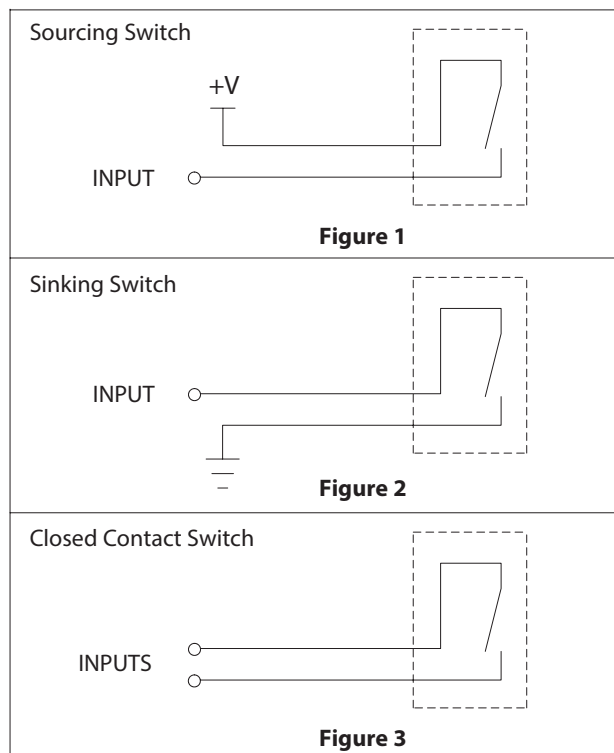
Once the kit is installed in the pump, it may be interfaced with a control device in the following ways:

Maximum sensor wire length is 25 ft (7.5 meters).

As a SOURCING switch (see figure 1) for use with PLC's.

As a SINKING switch (see figure 2) for use with PLC's.

As a closed contact switch (see figure 3) for use with meters.



67168 COUNTER INSTALLATION

1/2" DIAPHRAGM PUMP

| Kit | Models |
|-------|--|
| 67168 | 66605X-XXX, PD05P-XXX-XXX and PM05P-CSS-XXX-A02. |

Refer to figure 4. **NOTE:** Apply Lubriplate FML-2 grease 94276 to all "O" rings, "U" cups and mating parts.

1. Remove (134) bolts from the major valve and remove (135) valve block.
2. Remove (141) valve plate and (140) valve insert from the valve block.

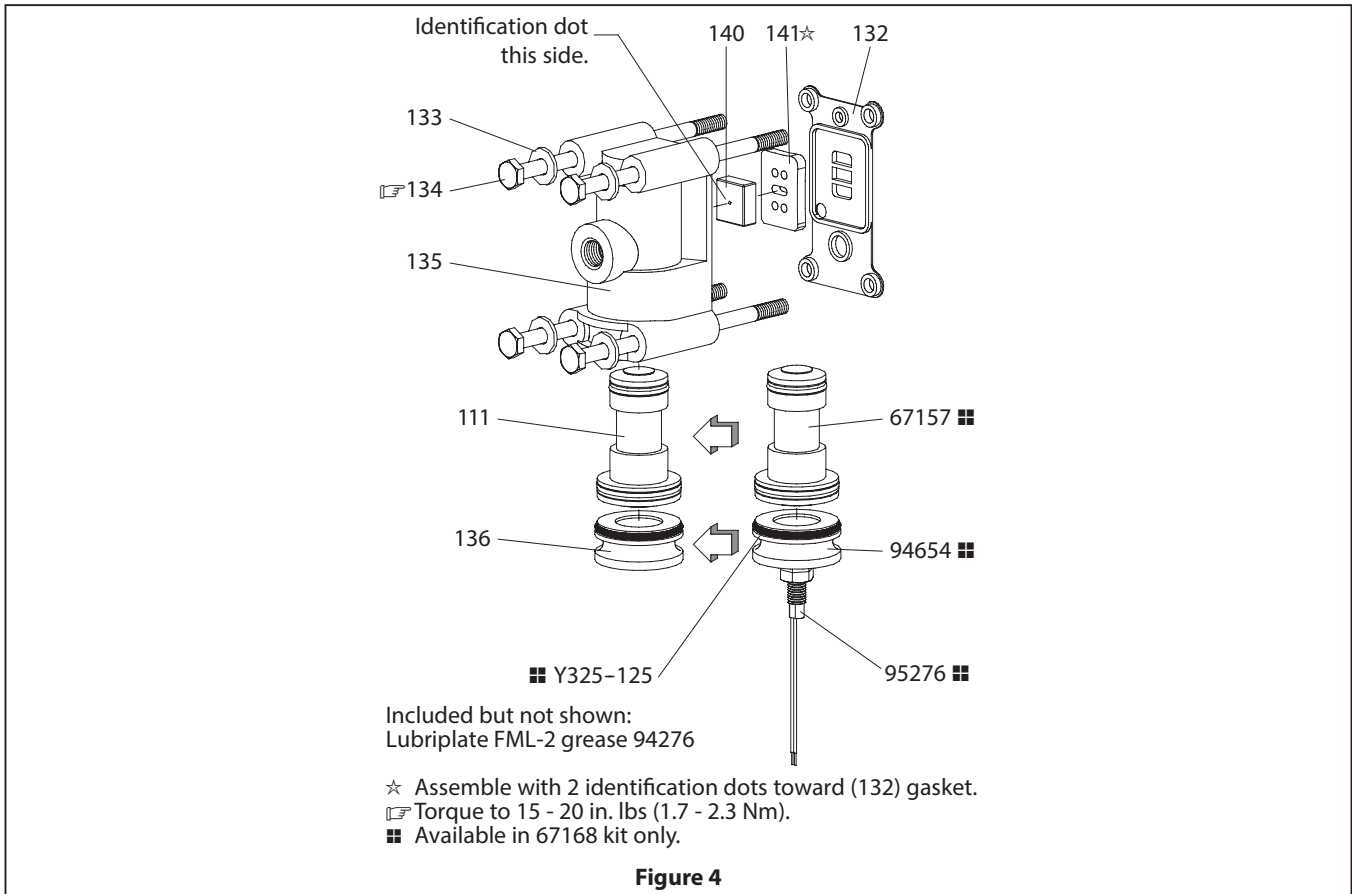
3. Remove (136) plug and (111) spool and replace with 67157 spool assembly and 67158 sensor assembly from kit as shown.

4. Replace (140) valve insert and (141) valve plate in valve block.

NOTE: Assemble (140) valve insert with "dished" side toward (141) valve plate.

5. Attach (135) valve block to (101) motor body, using (133) washers and (134) bolts.

NOTE: Torque to 15 - 20 in. lbs (1.7 - 2.3 Nm).



67169 COUNTER INSTALLATION

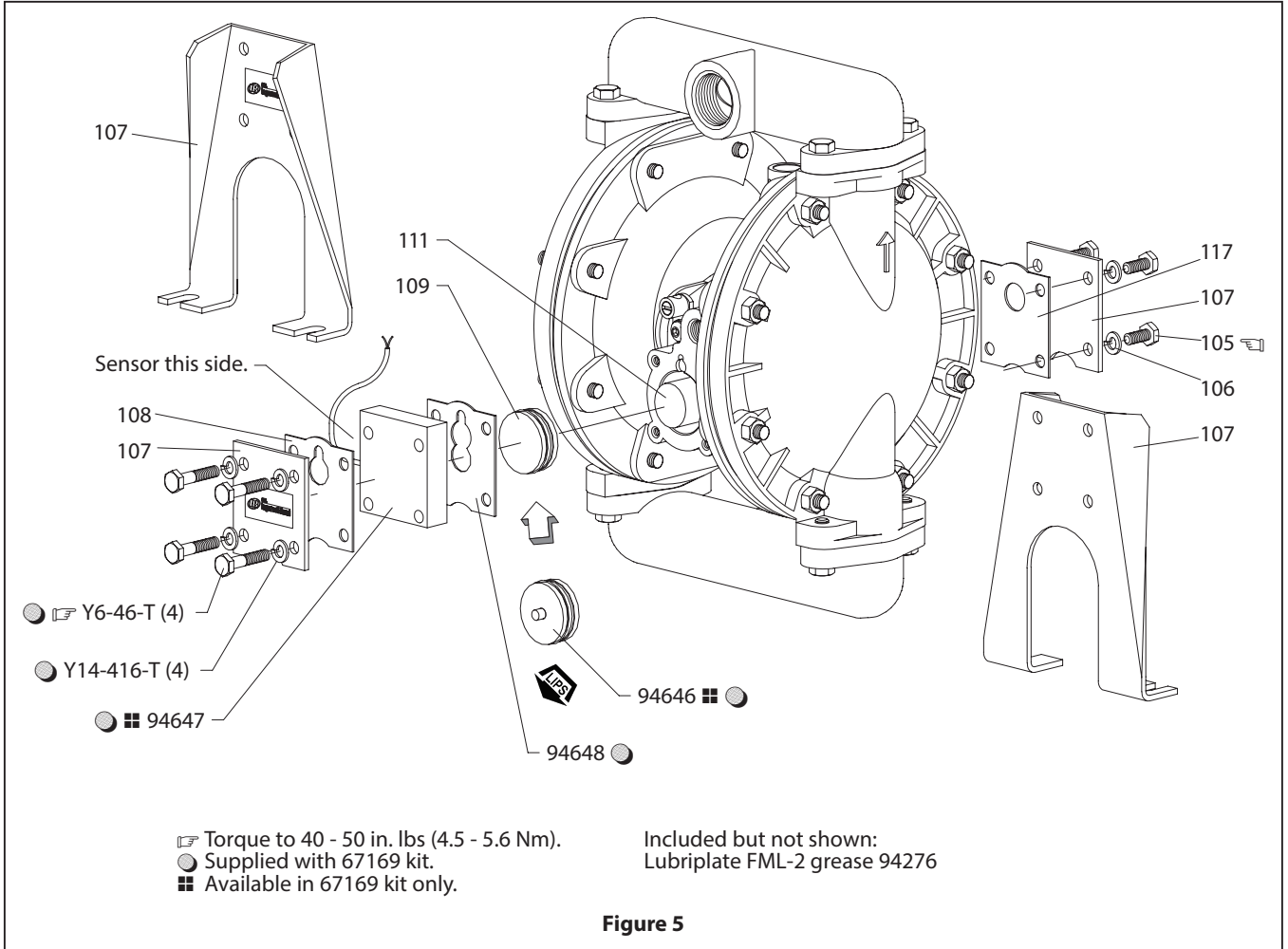
3/4", 1", 1-1/2" AND 2" (66607X-XXX-A, 66608X-XXX-A, 6661XX-XXX-C / 6662XX-XXX-C) DIAPHRAGM PUMPS

| Kit | Models |
|-------|--|
| 67169 | 66607X-XXX-A, 66608X-XXX-A, 6661XX-XXX-C and 6662XX-XXX-C. |

Refer to figure 5. **NOTE:** Lubriplate FML-2 grease 94276 to all "U" cups and mating parts.

1. Remove (105) bolts from both ends of (101) motor body and remove (107) legs / plates, (117) gasket and (108) gasket.
2. Apply force to (111) spool from the end opposite the air supply port to force (109) piston out.

3. Replace (109) piston with 94646 piston assembly from kit as shown.
4. Replace (117) gasket, (107) leg / plate and (105) bolts on the end opposite the air supply port. **NOTE:** Torque bolts to 40 - 50 in. lbs (4.5 - 5.6 Nm).
5. Install 94648 gasket from kit, 94647 sensor assembly from kit, (108) gasket, (107) leg / plate and Y6-46-T bolts with Y14-416-T washers from kit as shown. **NOTE:** Torque bolts to 40 - 50 in. lbs (4.5 - 5.6 Nm).



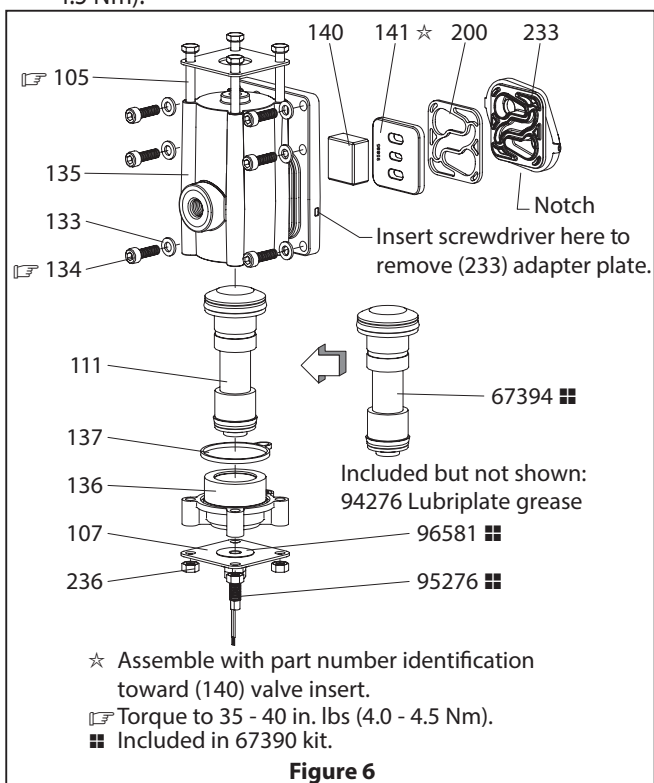
67390 COUNTER INSTALLATION

1" and 1-1/2" DIAPHRAGM PUMP WITH NON-METALLIC CENTER BODY

| Kit | Models |
|-------|--|
| 67390 | Non Metallic Models: PD10E-XXX-XXX, PD10P-XXX-XXX, PE10P-XXX-XXX, PD15E-XXX-XXX, PD15P-XXX-XXX and PE15P-XXX-XXX. |
| | Metallic Models: PD10R-XXX-XXX, PE10R-XXX-XXX, PM10R-CSS-XXX-A02, PD15R-XXX-XXX, PE15R-XXX-XXX and PM15R-CSS-XXX-A02. |

Refer to figure 6. **NOTE:** Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts upon assembly.

1. Remove (134) screws and remove (135) valve block.
2. Insert a small flat blade screwdriver into the notch in the side of (135) valve block and push in on tab to remove (233) adapter plate, releasing (140) valve insert, (141) valve plate and (200) gasket.
3. Remove (236) nuts from the major valve and remove (107) end plate.
4. Remove (136) end cap and (111) spool and replace with 67394 spool assembly as shown.
5. Place 95276 sensor and 96581 mounting plug thru hole in (107) end plate.
6. Install (137) gasket on (136) end cap and assemble end cap and (107) end plate to (135) valve block, securing (105) screws and (236) nuts. **NOTE:** Torque (105) screws to 35 - 40 in. lbs (4.0 - 4.5 Nm).
7. Install (140) valve insert and (141) valve plate in (135) valve block. **NOTE:** Assemble (140) valve insert with "dished" side toward (141) valve plate. Assemble (141) valve plate with part number identification toward (140) valve insert.
8. Assemble (200) gasket and (233) adapter plate to (135) valve block. **NOTE:** Assemble (233) adapter plate with notched side down.
9. Attach (135) valve block to (101) motor body, using (133) washers and (134) bolts. **NOTE:** Torque to 35 - 40 in. lbs (4.0 - 4.5 Nm).



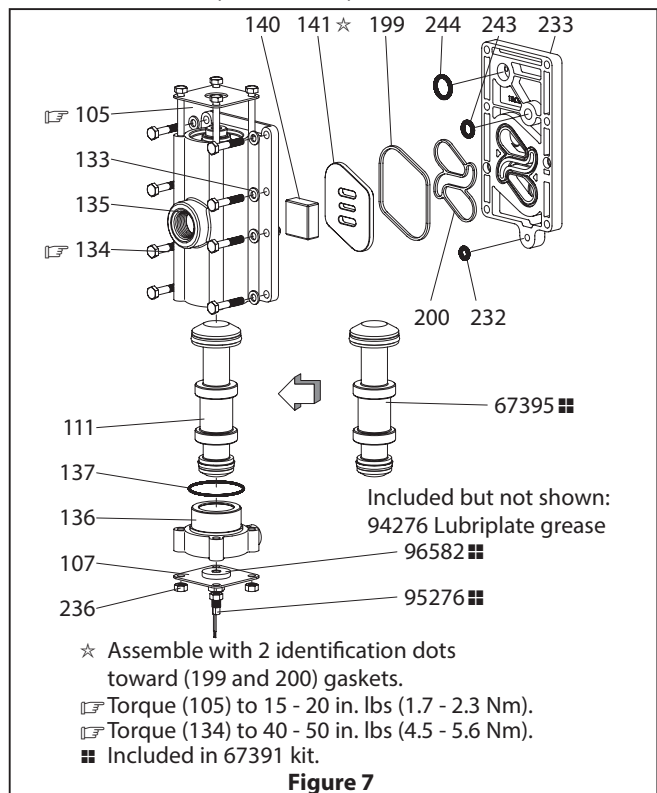
67391 COUNTER INSTALLATION

2" AND 3" DIAPHRAGM PUMP WITH NON-METALLIC CENTER BODY

| Kit | Models |
|-------|---|
| 67391 | Metallic Models: PD20R-XXX-XXX, PD20Y-XXX-XXX, PD20R-XXX-XXX-B, PE20R-XXX-XXX-B, PD20Y-XXX-XXX-B, PE20Y-XXX-XXX-B, PF20R-XXX-XXX, PF20Y-XXX-XXX, PF20R-XXX-XXX-B, PF20Y-XXX-XXX-B, PM20R-CSS-XXX-A02, PM20R-CSS-XXX-B02, PD30R-XXX-XXX-B, PD30R-XXX-XXX-C, PE30R-XXX-XXX-C, PM30R-CSS-XXX-B02 and PM30R-CSS-XXX-C02. |
| | Non Metallic Models: PD20E-XXX-XXX, PE20E-XXX-XXX, PD20P-XXX-XXX, PE20P-XXX-XXX, PD30P-XXX-XXX and PE30P-XXX-XXX. |

Refer to figure 7. **NOTE:** Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts upon assembly.

1. Remove (134) screws and remove (135) valve block.
2. Remove (233) adapter plate, releasing (140) valve insert, (141) valve plate and (200) gasket.
3. Remove (236) nuts from the major valve and remove (107) end plate.
4. Remove (136) end cap and (111) spool and replace with 67395 spool assembly as shown.
5. Place 95276 sensor and 96582 mounting plug thru hole in (107) end plate.
6. Install (137) "O" ring on (136) end cap and assemble end cap and (107) end plate to (135) valve block, securing with (105) screws and (236) nuts. **NOTE:** Torque (105) screws to 15 - 20 in. lbs (1.7 - 2.3 Nm).
7. Install (140) valve insert and (141) valve plate in (135) valve block. **NOTE:** Assemble (140) valve insert with "dished" side toward (141) valve plate. Assemble (141) valve plate with identification dots toward (199 and 200) gaskets.
8. Assemble (232, 243 and 244) "O" rings, (199 and 200) gaskets and (233) adapter plate to (135) valve block.
9. Attach (135) valve block and components to (101) motor body, using (133) washers and (134) bolts. **NOTE:** Torque to 40 - 50 in. lbs (4.5 - 5.6 Nm).



67392 COUNTER INSTALLATION

1" AND 1-1/2" DIAPHRAGM PUMP WITH METALLIC CENTER BODY

| Kit | Models |
|-------|--|
| 67392 | PD10A-XXX-XXX, PE10A-XXX-XXX, PD10S-XXX-XXX, PE10S-XXX-XXX, PM10A-XXX-XXX, PM10S-XXX-XXX, PP10A-XXX-XXX, PW10A-XXX-XXX, PD15A-XXX-XXX, PE15A-XXX-XXX, PD15S-XXX-XXX, PE15S-XXX-XXX, PM15A-XXX-XXX and PM15S-XXX-XXX. |

Refer to figure 8. **NOTE:** Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts upon assembly.

1. Remove (134) screws and remove (135) valve block.
2. Insert a small flat blade screwdriver into the notch in the side of (135) valve block and push in on tab to remove (233) adapter plate, releasing (140) valve insert, (141) valve plate and (200) gasket.
3. Remove (105) screws, releasing (136) end cap and (137) gasket.
4. Remove (111) spool and replace with 67398 spool assembly as shown.
5. Install (137) gasket on (136) end cap and assemble end cap, 96583 bracket and 95276 sensor to (135) valve block, securing with (105) screws. **NOTE:** Torque (105) screws to 40 - 50 in. lbs (4.5 - 5.6 Nm).
6. Install (140) valve insert and (141) valve plate in (135) valve block. **NOTE:** Assemble (140) valve insert with "dished" side toward (141) valve plate. Assemble (141) valve plate with part number identification toward (140) valve insert.
7. Assemble (200) gasket and (233) adapter plate to (135) valve block. **NOTE:** Assemble (233) adapter plate with notched side down.
8. Attach (135) valve block to (101) motor body, using (133) washers and (134) bolts. **NOTE:** Torque to 40 - 50 in. lbs (4.5 - 5.6 Nm).

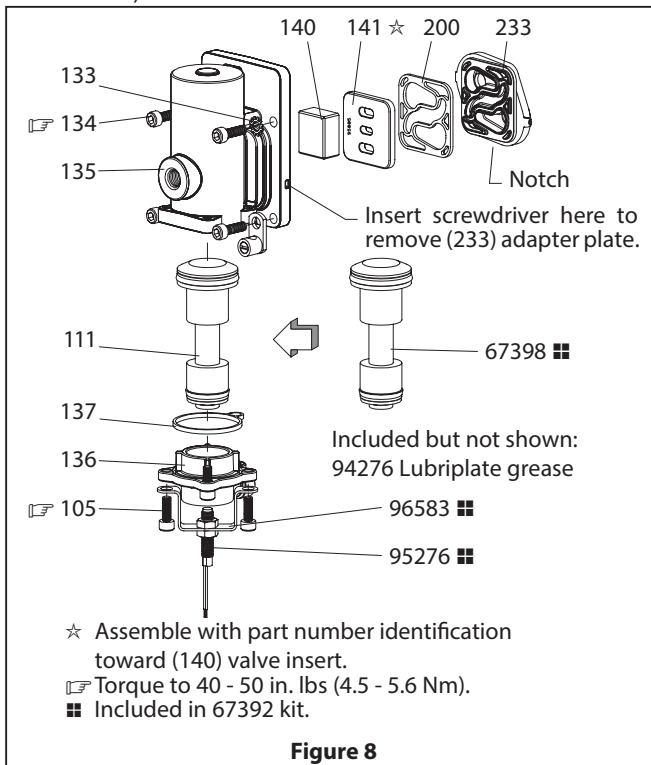


Figure 8

67393 COUNTER INSTALLATION

2" AND 3" DIAPHRAGM PUMP WITH METALLIC CENTER BODY

| Kit | Models |
|-------|---|
| 67393 | PD20A-XXX-XXX, PE20A-XXX-XXX, PD20S-XXX-XXX, PE20S-XXX-XXX, PM20A-XXX-XXX, PM20S-XXX-XXX, SD20S-XXX-XXX, PP20A-XXX-XXX, PF20A-XXX-XXX, PF20S-XXX-XXX, PD30A-XXX-XXX, PE30A-XXX-XXX, PD30S-XXX-XXX, PE30S-XXX-XXX, PM30A-XXX-XXX, and PM30S-XXX-XXX. |

Refer to figure 9. **NOTE:** Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts upon assembly.

1. Remove (134) screws and remove (135) valve block and components.
2. Remove (240) screws to remove (233) adapter plate, releasing (140) valve insert, (141) valve plate, (199, 200 and 241) gaskets and (243 and 244) "O" rings.
3. Remove (105) screws, releasing (136) end cap and (137 and 242) "O" rings.
4. Remove (111) spool and replace with 67395 spool assembly as shown.
5. Install (137 and 242) "O" rings on (136) end cap and assemble end cap, 96584 bracket and 95276 sensor to (135) valve block, securing with (105) screws. **NOTE:** Torque screws to 40 - 50 in. lbs (4.5 - 5.6 Nm).
6. Install (140) valve insert and (141) valve plate in (135) valve block. **NOTE:** Assemble (140) valve insert with "dished" side toward (141) valve plate. Assemble (141) valve plate with identification dots toward (199 and 200) gaskets.
7. Assemble (199, 200 and 241) gaskets, (243 and 244) "O" rings and (233) adapter plate to (135) valve block. **NOTE:** Assemble (233) adapter plate to (135) valve block, securing with (240) screws. **NOTE:** Torque screws to 40 - 50 in. lbs (4.5 - 5.6 Nm).
8. Attach (135) valve block to (101) motor body, using (133) washers and (134) bolts. **NOTE:** Torque to 40 - 50 in. lbs (4.5 - 5.6 Nm).

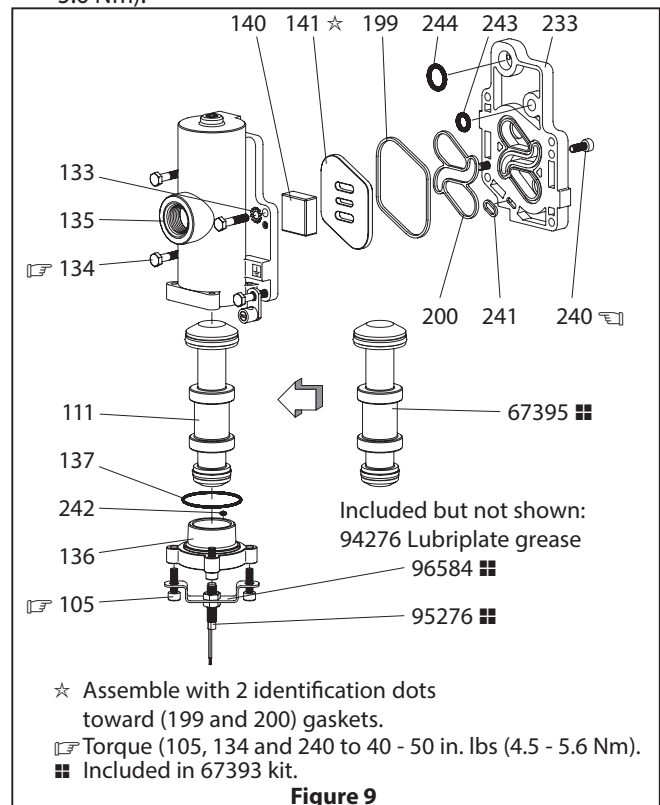


Figure 9

