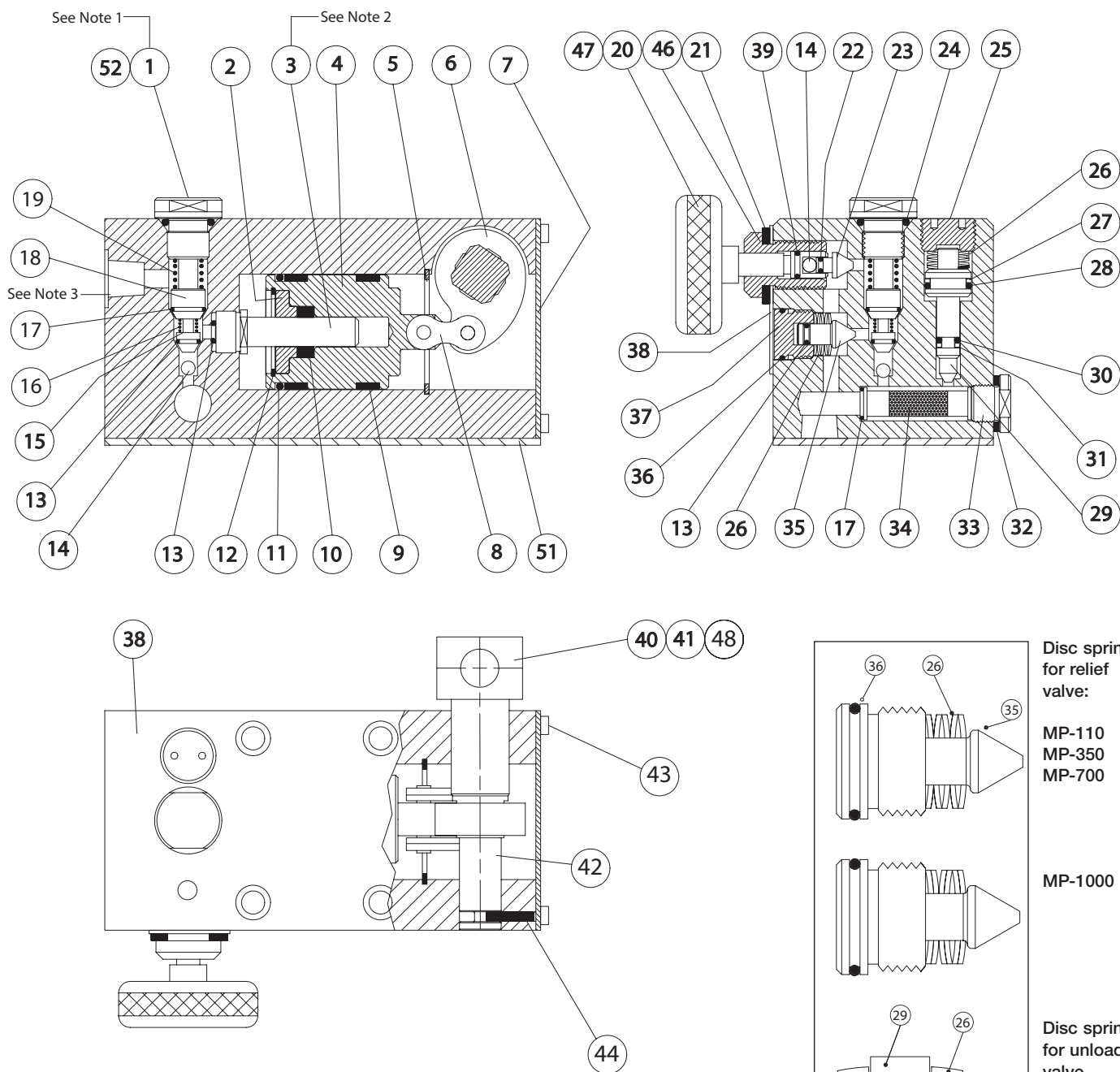




**IMPORTANT: TO AVOID ANY DANGER OR PERSONAL HARM THE CUSTOMER MUST SPECIFY WHICH FLUID HAS BEEN USED WITH THIS PUMP BEFORE SERVICE CAN BE OBTAINED.**

**TO PROTECT YOUR WARRANTY, FOLLOW THE INSTRUCTIONS AND ONLY USE FLUIDS RECOMMENDED BY ENERPAC.**



**NOTE 1:**  
Torque item nr. 1 with  
95-100 Nm [70-73 Ft.lbs]

**NOTE 2:**  
Torque item nr. 3 with  
40-45 Nm [30-33 Ft.lbs]

**NOTE 3:**  
Torque pressure fitting (Not Supplied) with  
54-81 Nm [40-60 Ft.lbs]

| Item Nr. | Part number | Description         | Quantity MP-110 | Quantity MP-350 | Quantity MP-700 | Quantity MP-1000 |
|----------|-------------|---------------------|-----------------|-----------------|-----------------|------------------|
| ▼ 1      | SY273006    | Pressure Plug       | 1x              | 1x              | 1x              | 1x               |
| 2        | SY817020    | Seal Gland MP-350   | –               | 1x              | –               | –                |
| 2        | DQ1692020   | Seal Gland MP-700   | –               | –               | 1x              | –                |
| 2        | DQ1682020   | Seal Gland MP-1000  | –               | –               | –               | 1x               |
| 3        | SY808040    | HP Plunger MP-110   | 1x              | –               | –               | –                |
| 3        | SY810040    | HP Plunger MP-350   | –               | 1x              | –               | –                |
| 3        | DQ1677040   | HP Plunger MP-700   | –               | –               | 1x              | –                |
| 3        | DQ1680040   | HP Plunger MP-1000  | –               | –               | –               | 1x               |
| 4        | DQ1684040   | LP Plunger MP-110   | 1x              | –               | –               | –                |
| 4        | DQ1685040   | LP Plunger MP-350   | –               | 1x              | –               | –                |
| 4        | DQ1678040   | LP Plunger MP-700   | –               | –               | 1x              | –                |
| 4        | DQ1681040   | LP Plunger MP-1000  | –               | –               | –               | 1x               |
| 5*       | DB964490    | Int. Circlip M50    | 1x              | 1x              | 1x              | 1x               |
| 6        | SY834157    | Tumbler             | 1x              | 1x              | 1x              | 1x               |
| 7        | DQ1703126   | Name Plate          | 1x              | 1x              | 1x              | 1x               |
| 8        | SY833061    | Chain Plate         | 2x              | 2x              | 2x              | 2x               |
| 8        | SY835062    | Chain Connect Link  | 1x              | 1x              | 1x              | 1x               |
| 9*       | DQ1689155   | Slydring            | 2x              | 2x              | 2x              | 2x               |
| 10*      | SY284041    | High Pressure Seal  | 1x              | 1x              | –               | –                |
| 10*      | DQ1687041   | High Pressure Seal  | –               | –               | 1x              | –                |
| 10*      | DQ1688041   | High Pressure Seal  | –               | –               | –               | 1x               |
| 11*      | DQ1704503   | O-Ring              | 1x              | 1x              | 1x              | 1x               |
| 12*      | DB9641900   | Int. Circlip M36    | –               | 1x              | 1x              | 1x               |
| ▼ 13*    | SY271903    | O-Ring              | 3x              | 3x              | 3x              | 3x               |
| † ◀ 14*  | SY278016    | 1/4" Ball           | 2x              | 2x              | 2x              | 2x               |
| ▼ 15     | SY271274    | Mid Delivery Cone   | 1x              | 1x              | 1x              | 1x               |
| ▼ 16*    | SY830110    | Spring              | 1x              | 1x              | 1x              | 1x               |
| ▼ 17*    | SY829903    | O-Ring              | 2x              | 2x              | 2x              | 2x               |
| ▼ 18     | SY272274    | Top Delivery Cone   | 1x              | 1x              | 1x              | 1x               |
| ▼ 19*    | SY831110    | Mid Delivery Spring | 1x              | 1x              | 1x              | 1x               |
| † 20     | SY832106    | Grip Nut            | 1x              | 1x              | 1x              | 1x               |
| † ◀ 21*  | SY276041    | Sealing washer 1/2" | 1x              | 1x              | 1x              | 1x               |

| Item Nr.           | Part number | Description                         | Quantity MP-110    | Quantity MP-350    | Quantity MP-700 | Quantity MP-1000 |
|--------------------|-------------|-------------------------------------|--------------------|--------------------|-----------------|------------------|
| † ◀ 22*            | SY274903    | O-Ring                              | 1x                 | 1x                 | 1x              | 1x               |
| † ◀ 23             | SY826274    | Release Valve Cone                  | 1x                 | 1x                 | 1x              | 1x               |
| 24*                | SY822006    | O-Ring                              | 1x                 | 1x                 | 1x              | 1x               |
| ▶ 25               | SY823006    | Unloader Valve Plug                 | 1x                 | 1x                 | 1x              | 1x               |
| ▶ 26               | SY109010    | Disc spring                         | 11x                | 11x                | 11x             | 12x              |
| ▶ 27*              | SY855564    | Back Up Washer                      | 1x                 | 1x                 | 1x              | 1x               |
| ▶ 28*              | SY852903    | O-Ring                              | 1x                 | 1x                 | 1x              | 1x               |
| ▶ 29               | SY825010    | Unloader Spindle                    | 1x                 | 1x                 | 1x              | 1x               |
| ▶ 30*              | SY853903    | O-Ring                              | 1x                 | 1x                 | 1x              | 1x               |
| ▶ 31*              | SY856569    | Back Up Washer                      | 1x                 | 1x                 | 1x              | 1x               |
| 32*                | SY278041    | Sealing washer 3/8"                 | 1x                 | 1x                 | 1x              | 1x               |
| 33                 | SY828006    | Filter Plug                         | 1x                 | 1x                 | 1x              | 1x               |
| 34                 | SY829018    | Filter Assembly                     | 1x                 | 1x                 | 1x              | 1x               |
| ▲ 35               | SY827274    | Relief Valve Cone                   | 1x                 | 1x                 | 1x              | 1x               |
| ▲ 36*              | SY277903    | O-Ring                              | 1x                 | 1x                 | 1x              | 1x               |
| ▲ 37               | SY824006    | Relief Valve Plug                   | 1x                 | 1x                 | 1x              | 1x               |
| 38                 | SY838101    | Cover Plate                         | 1x                 | 1x                 | 1x              | 1x               |
| † ◀ 39*            | SY832903    | O-Ring                              | 1x                 | 1x                 | 1x              | 1x               |
| ◁ 40               | DQ1686011   | Washer                              | 1x                 | 1x                 | 1x              | 1x               |
| ◁ 41               | DQ1699120   | Nut                                 | 1x                 | 1x                 | 1x              | 1x               |
| 42                 | DQ1676104   | Tumbler Shaft                       | 1x                 | 1x                 | 1x              | 1x               |
| 43                 | SY413028    | Screw                               | 4x                 | 4x                 | 4x              | 4x               |
| 44                 | DQ1690061   | Dowel Pin                           | 1x                 | 1x                 | 1x              | 1x               |
| ◁ 45               | DQ1679001   | Pump Body MP                        | 1x                 | 1x                 | 1x              | 1x               |
| † ◀ 46             | SY821044    | Release Valve Gland                 | 1x                 | 1x                 | 1x              | 1x               |
| † ◀ 47             | SY814028    | Release Valve Spindle               | 1x                 | 1x                 | 1x              | 1x               |
| ◁ 48               | DQ1675070   | Handle Tube                         | 1x                 | 1x                 | 1x              | 1x               |
| ◁ 49               | SY857290    | Relief Valve Seat                   | 1x                 | 1x                 | 1x              | 1x               |
| 50                 | SY850006    | Plug                                | 2x                 | 2x                 | 2x              | 2x               |
| 51*                | SY290001    | Gasket                              | 1x                 | 1x                 | 1x              | 1x               |
| <b>Repair Kit.</b> |             | <b>Contains parts marked with *</b> | <b>MP-110350K3</b> | <b>MP-110350K3</b> | <b>MP-700K3</b> | <b>MP-1000K3</b> |

#### Key to repair parts kits:

- ▼ Included in DD1798900 check assembly repair kit.
- ◀ Included in DD1795900 release valve repair kit.
- † Included in DQ1701900SR release valve spindle kit.
- ◁ Included in DD1796900 handle assembly repair kit.

- ▶ Included in DD1797900 unloader assembly repair kit.
- ▲ Included in DD1799900 relief valve repair kit.
- ◁ Included in DQ1700900 body assembly repair kit.



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## MULTI FLUID PUMP SERVICE INSTRUCTIONS

### 1. FAULT DIAGNOSES

Before stripping the pump try to establish where the fault lies within the unit. There are a few basic checks which can help to determine the faulty area as listed below:

- **The pump loses pressure and the pump handle rises.**  
This is caused by fluid from the system passing the pump outlet check cone (item 18) and pressurising the high pressure plunger chamber, this in turn forces the plunger backwards thus raising the handle. Check for damage to the top check valve seat, cone and O-ring seal (item 18).
- **The pump loses pressure but the handle does not rise.**  
There are two areas which can cause this problem apart from an external leak on a pump sealing plug, they are:
  1. The release valve is faulty, check the seat and cone for damage, if the seat is damaged a replacement seat kit is available.
  2. If the seat and cone appear to be in good condition check the condition of the unloader assembly, especially the plunger bore and seals.

- **Pump performance becomes erratic once the unloader setting has been reached (35 bar / 508 psi).**  
This is normally caused by a fault on the middle seat / cone (item 15) assembly. Check the seat, cone and O-ring seal allowing fluid from the high pressure pump plunger to flow back to the reservoir via the unloader piston once the unloader has opened.
- **The pump fails to make full pressure.**  
Normally this is caused by a fault within the relief valve assembly. Try adjusting the relief valve. It may have become loose or been tampered with. If this fails, strip and inspect the seat and cone for damage.

### 2. PUMP STRIPPING INSTRUCTIONS

Before stripping the pump ensure the pump plunger is fully forward. This will ensure the plunger cavities are empty before plunger removal.

#### Pump Plunger Assembly

1. Remove the 4 screws securing the pump identification plate to the rear of the pump (item 7) and remove the plate, being careful not to loosen the tumbler shaft retaining pin (item 44). When the plate is removed, turn the pump assembly vertically with the pump outlet port upwards. This should allow the tumbler shaft retaining pin to drop out. Some assistance may be required so either tap the body or move the tumbler shaft.
2. Before removing the tumbler shaft (item 42) rotate the shaft to move the pump plunger to its mid-position, now remove the tumbler shaft.

3. The tumbler (item 6) will now drop clear and allow access to the low pressure plunger retainer clip (item 5), this can now be removed with internal circlip pliers. With the circlip removed ease the plunger assembly out of the pump body.
4. Remove the tumbler link assembly (item 8) and check for wear on the pins and holes. The high pressure seal (item 10) is held in position by an internal circlip (item 12) and seal gland (item 2) once both are out the seal can be removed.
5. With the low pressure plunger removed access is now available to the high pressure plunger (item 3) a special service tool is required to remove this item. Contact Enerpac Technical Department for details. Using the service tool unscrew the plunger (counterclockwise).
6. When replacing the high pressure seal (item 10) note that the seal will be a reasonably snug fit on the threaded section of the plug. However, due to the under-cut at the bottom of the thread, the seal will seem loose. This is normal.
7. When installing, hold the seal in place while tightening the thread on the plunger.

#### Unloader Assembly

1. Unscrew the unloader adjusting plug (item 25), invert pump to allow the unloader spring washers to drop out.
2. With a pair of pliers gently pull the unloader plunger out (item 29) using a turning motion to help overcome seal friction.
3. Remove the O-rings and back-up washers taking care not to damage the seal grooves with sharp tools i.e. screw driver blades.

#### Check Valve Assembly

Unscrew the check valve plug (item 1), once removed this gives access to both check valve cones and cone springs and the suction ball. Invert pump to allow all items to drop out.

#### Release Valve Assembly

1. Unscrew the release valve gland nut located behind the release valve hand wheel and remove the complete release valve assembly.  
**Note:** The release valve knob, spindle and gland are non serviceable. If any of the components are damaged the whole assembly must be replaced.
2. Remove the cone (item 23) and ball (item 14). The O-ring on the cone is not intended as a seal. Its function is to secure the cone in the spindle.

#### Relief Valve Assembly

1. The relief valve is located under the cover plate (item 38) this plate will have been removed whilst removing the release valve assembly. Unscrew the adjusting plug (item 37), when removed the relief valve cone (item 35) and spring washers (items 26) should be attached.
2. Pull the relief valve cone out of the adjusting plug. The O-ring on the cone is not intended as a seal. Its function is to secure the cone in the spindle.
3. Remove the O-ring's (item 36) from the adjusting plug and (item 13) from the cone.

#### Filter Assembly

Unscrew the filter plug (item 33) this will allow access to the filter (item 34), invert the pump to allow the filter to drop out, O-ring (item 17) should also be removed.

#### Additional Notes

- The pump body has 3 threaded plugs (1/8" NPT ) inserted during manufacture. These should not be removed during servicing unless a leak is detected. If this is the case, remove and apply a suitable thread tape and refit.

### 3. ASSEMBLY PROCEDURE

Before re-assembly clean and inspect all components for visual wear or damage, paying particular attention to the main low pressure plunger bore of the pump body and all valve seats.

#### Unloader Valve Assembly

1. Assemble O-rings and back-up seals (items 27, 28, 30, 31) to the unloader piston (item 29) back-up washers fit on outside of both O-rings.

2. Lubricate piston assembly and insert into pump body.
3. Fit spring washers (items 26), see parts sheet for correct spring assembly.
4. Insert threaded plug (item 25), screw in until plug reaches spring assembly.

#### Relief Valve Assembly

1. Fit spring washers (items 26) onto relief valve cone (item 35), see parts sheet for correct spring assembly and fit O-ring (item 13) onto cone.
2. Fit O-ring (item 36) onto relief valve adjusting screw (item 37) and insert cone assembly into relief valve adjusting screw.
3. Screw complete assembly into pump body until plug begins to tighten onto springs, once this occurs turn adjuster one complete revolution (final setting will be made during relief valve setting procedure).

#### Release Valve Assembly

1. Fit sealing washer (item 21) onto the release valve gland nut.
2. Fit O-ring (item 22) to release valve cone (item 23).
3. Insert ball (item 14) and cone assembly into release valve spindle (do not apply any lubricant to this area).
4. Fit release valve nameplate (item 38) onto release valve gland nut and screw assembly into pump body, ensure release valve spindle remains free during tightening by rotating the release valve knob. Position nameplate to allow access to relief valve adjusting screw.

#### Filter Assembly

1. Insert O-ring (item 17) into pump body filter hole ensuring O-ring sits correctly at the bottom of the hole.
2. Insert clean filter (item 34) into pump body.
3. Fit bonded washer (item 32) to filter plug (item 33), screw plug into pump body and tighten.

#### Check Valve Assembly

**Note:** Middle valve seat cone and spring (items 17, 18) will not be installed at this stage.

1. Drop suction ball (item 14) into pump body check valve hole.
2. Fit new O-ring (item 17) to top valve seat cone (item 18) and drop assembly into pump body.
3. Fit check valve spring (item 19) onto top valve seat cone stem.
4. Fit O-ring (item 24) onto check valve plug (item 1), screw plug into pump body and tighten.

#### Plunger Assembly

1. Assemble tumbler linkage (items 8, 6) to low pressure piston (item 4) lubricating with a lithium based grease.
2. Fit both plastic bearings (items 9) to low pressure plunger and install O-ring (item 11) to front bearing groove.
3. Install high pressure seal (item 10) into low pressure plunger ensuring seal is the correct way round (widest seal lip faces inwards).
4. Fit high pressure seal gland (item 2) into low pressure plunger and install circlip (item 12) ensuring clip engages correctly into groove.
5. Fit O-ring (item 13) into the counter bore at the threaded end of the high pressure plunger (item 3).
6. Carefully screw high pressure plunger into the pump body using the appropriate special tool and tighten.
7. Lubricate the low pressure plunger assembly with a suitable lubricant (the lubricant must be compatible with the seals and fluid to be used with the pump after assembly) and carefully push the plunger assembly into the pump body. It may be necessary to gently hammer the plunger into the bore using a suitable drift (tumbler rocker must be positioned the correct way round). Insert plunger far enough to allow both the rocker to engage into the pump body tumbler shaft cavity and the low pressure plunger circlip to be inserted.
8. Insert the low pressure circlip (item 5) ensure correct engagement in groove.
9. Lubricate the tumbler shaft (item 42) with a Lithium based grease and insert shaft into body aligning the rocker as the shaft is inserted. With the shaft inserted, drop the shaft retaining pin (item 44) into the pump body and fit rear cover plate (item 7).

**Note:** The 110 bar pump unit (MP-110) has a different high pressure seal arrangement, the seal fits onto the high pressure plunger and not into the low pressure plunger as with all other units.

### Unloader Valve Setup Procedure

Fit the suction tube into the suction hole of the pump body and install the pump onto its reservoir which should be clean and filled with a suitable fluid. Fit a 0-100 bar gauge (0-1450 psi), hose and cylinder to the pump outlet port.

1. With the release valve open, pump the operating lever 6 complete strokes to prime the pump and expel all internal air.
2. Close the release valve and operate the pump handle, pressure may start to rise on the gauge. If no pressure is created, tighten the unloader valve adjusting screw (item 25) by a 1/4 of a revolution then re-operate the pump handle. Continue this procedure until the pressure gauge reaches  $35 \text{ bar} \pm 5 \text{ bar}$  ( $508 \text{ psi} \pm 72 \text{ psi}$ ) and continuous pumping will not allow gauge to rise above the set pressure.

**Note:** If the adjuster plug reaches the end of its travel before 35 bar is achieved the pump has a fault, check unit for correct assembly.

### Setting Main Relief Valve

Before the relief valve can be set the middle check valve cone must be installed as below:

1. Remove the check valve plug, top check valve cone and spring.
2. Fit O-ring (item 13) to middle check valve cone (item 15) and drop cone into pump, carefully fit the middle check valve spring (item 16) onto the cone stem.
3. Replace the top check valve cone, spring and check valve plug.

**Note:** Replace the 0-100 bar gauge with a suitable pressure gauge depending on the pump maximum pressure setting.

### Setting The Relief Valve

1. With the release valve open, pump the operating lever 6 complete strokes to prime the pump and expel all internal air.
2. Close the release valve and operate the pump handle. Pressure will rise on the gauge. To increase the pressure setting, tighten the relief valve adjusting screw (item 37). The adjustment is very sensitive so only turn a few degrees at a time. If the pressure raises too high release the pressure and back-off the adjusting screw, then try again.
3. When the correct pressure is achieved, release the pressure, loosen the release valve gland nut, rotate the relief valve cover plate into position and re-tighten the release valve gland nut.