




# **Installation, Operation, and Maintenance Manual**

## **Constant Pressure Crude Oil Container Model CPCCP IOM-016**

The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operations, and maintenance of the Welker® Constant Pressure Crude Oil Container (CPCCP). Correct operating and/or installation techniques, however, are the responsibility of the end user. Welker® reserves the right to make changes to this and all products to improve performance and reliability.


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# 1 General

## 1.1 Introduction

We appreciate your business and your choice of Welker® products. The installation, operations, and maintenance liability for this product becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operations, and Maintenance (IOM) Manual* prior to installation and operation of this equipment is required for a full understanding of its application and performance prior to use. If you have any questions, please call 1-800-776-7267 in the USA or (1) 281-491-2331.

The following procedures have been written for use with standard Welker® parts and equipment. Assemblies that have been modified may have additional requirements and specifications that are not listed in this manual. After unpacking the unit, check it for compliance or for any damage that may have occurred during shipment.



**NOTE**


Claims for damages caused during shipment must be initiated by the receiver and directed to the carrier. Welker® is not responsible for any damages caused from mishandling by the shipping company.

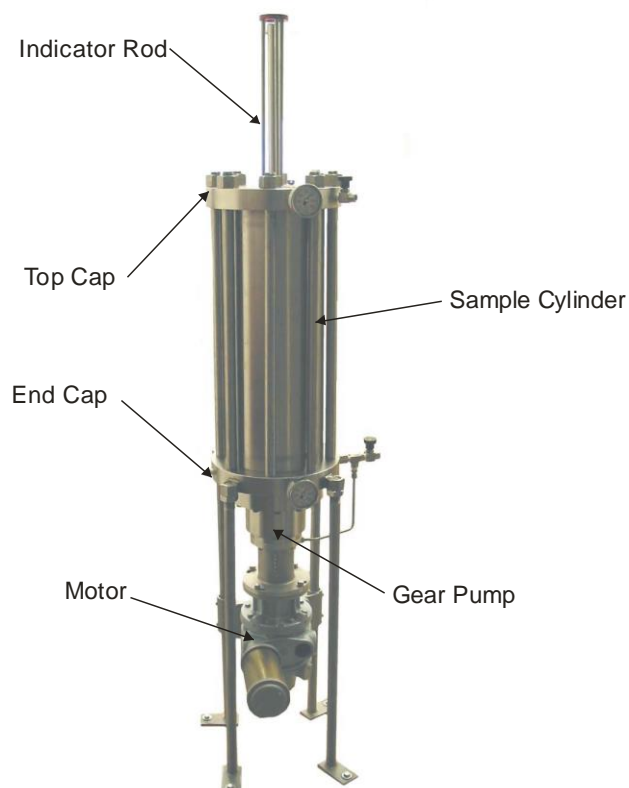
The Welker® Constant Pressure Crude Oil Container (CPCCP) is designed to allow the contents of the cylinder to thoroughly mix, while keeping the contents under line pressure. This process ensures a stabilized oil-water mixture for analysis.



**NOTE**

When sealing fittings with PTFE tape, refer to the proper sealing instructions for the tape used.

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**Figure 1**  
**CPCCP-31 Assembly**

## 1.2 Notes, Warnings, and Cautions




**NOTE**


Notes emphasize information or set it off from the surrounding text.




**CAUTION**

Caution messages appear before procedures that, if not observed, could result in loss of data or in damage to equipment.

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 **WARNING** Warnings alert users to a specific procedure or practice that, if not followed correctly, could cause personal injury or even death.

### 1.3 Specifications

 **NOTE** The specifications listed in this section are specialized for the Welker® Constant Pressure Crude Oil Container (CPCCP). If the specifications do not meet company stipulations, Welker® can modify the CPCCP so that it is specific to the company's requirements.

**Table 1 – CPCCP Specifications**

General	
Model number	CPCCP
Description	A self-contained CPCCP with motor mixing capabilities
Materials of construction	316 Stainless steel
Application	Can be used with all products that are compatible with the materials of construction and seal material.
Temperature range	0°F to 250°F (–17.8°C to 121°C); dependent upon pressure
Maximum working pressure	2,160 psig (149 barg)
Connections	1/4" NPT (product and inert gas connection) 1 1/2" NPT (air connection)

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## 2 Installation

### 2.1 Installing the CPCCP

To apply the CPCCP a pre-charge, complete the following steps:

1. Use 1/4" tubing or flex lines to connect the 1/4" NPT port on the top of the CPCCP to a pre-charge system.

**Caution** To apply a pre-charge, the system connected to the CPCCP must have a bottle supply capacity that is at least 50% greater in capacity than the pre-charge container.

2. Apply a pre-charge pressure greater than the sample line pressure to the valve on the container (50 to 100 psig or 3.4 to 6.9 barg).
3. Slowly open the valve on the container.
4. Connect the most convenient unused 1/4" NPT port to a sump.
5. Connect the sample line to the container.

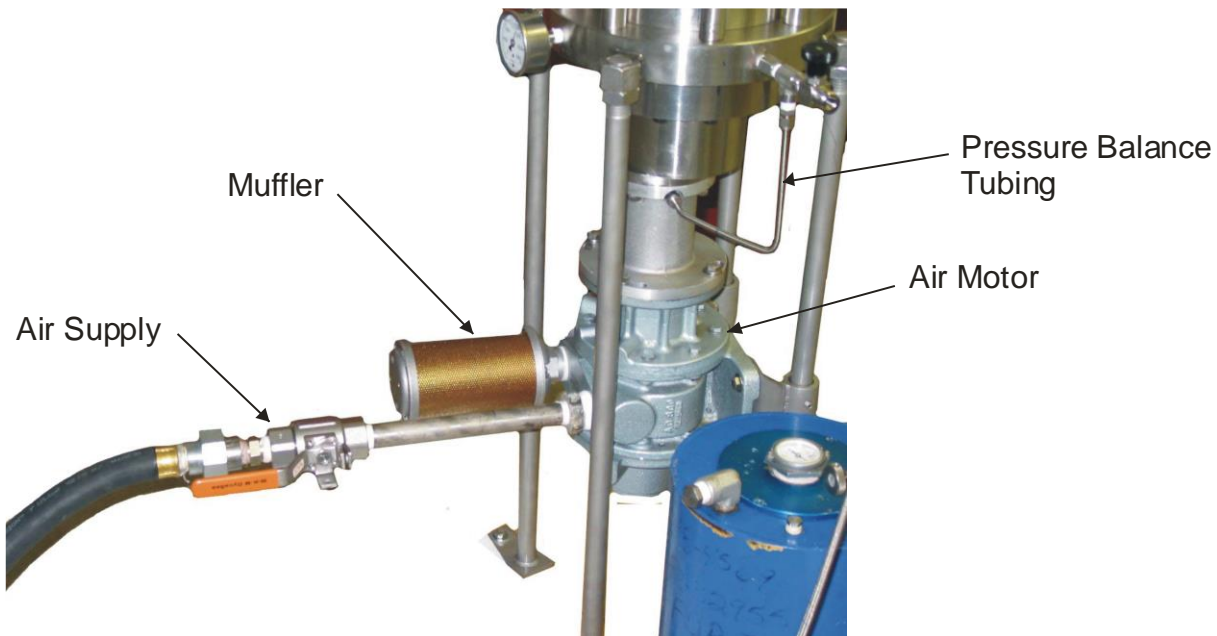


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## 2.2 Installing the Motor

### 2.2.1 Air Motor

To install the air supply system on the air motor (Figure 2), complete the following steps:




**Figure 2**  
***Air Supply Connected to Air Motor***

1. Use the 1 ½” NPT ports on the bottom of the CPCCP to connect the air supply system to the air motor.

**CAUTION** Do not run the air motor without an accompanying system to supply oil to the part, as this will cause the air motor to fail.

2. Ensure that the air supply system being used for the air motor is capable of supplying air pressure at approximately 130 psig, and has an unrestricted air flow from the air supply to the air motor.

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**NOTE**

When operating the system at maximum pressure, 130 psig (9.0 barg) of air pressure is necessary. When operating the system at lower pressures, a lower air supply pressure may be used.

3. Connect the isolation valve from the air supply to the air motor.

### 2.2.2 Electric Motor

Not Applicable Operation

## 2.3 Sampling to the CPCCP

To sample from the pipeline, complete the following steps:

1. Refer to the company procedures for obtaining a sample.


**CAUTION**


Do not exceed 80% of gas or liquid according to indicator rod. This can cause damage to the cylinder.

2. Stop sampling once desired amount of sample is obtained, up to 80% as shown on the indicator rod.

## 2.4 Retrieving a Sample

To mix the contents of the CPCCP and draw off a homogeneous mixture of the contents: complete the following steps:


1. Slowly open the valve to the air motor to begin mixing the sample.
2. Allow the contents of the container to mix according to API 8.2, ASTM-D4177, IP Section VI, ISO-3171 or as directed by your company performance-based testing specifications.
3. Place a container under the draw-off valve and open it to extract as much sample as necessary for testing.

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**NOTE**

Consult the company's policies and procedures for the correct amount of sample required for testing.


4. Close the draw-off valve.
5. Repeat Steps 2 through 4 if other samples are required.
6. Open the valve connected to the sump to drain the contents of the CPCCP.

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## 2.5 Cleaning the CPCCP

 **NOTE** It is necessary to use a pressurized system to properly clean and maintain the interior of the CPCCP.


1. Fill your solvent reservoir with approximately 1 gallon of solvent.

 **NOTE** Welker® recommends that a quick-evaporating solvent be used to clean the CPCCP. Consult your company for the correct type of quick-evaporating solvent to use. All of the elastomers within this system are Viton, unless specified otherwise. Any solvent used for cleaning this assembly must be compatible with the seals and the materials of construction.

2. Pressurize the solvent reservoir to a pressure above the pre-charge pressure.

 **NOTE** If you don't have high-pressure solvent reservoir, it is necessary to relieve the pre-charge pressure to below the solvent reservoir pressure.

3. Slowly open the valve to the air motor to start mixing the solvent in the CPCCP.
4. Allow the air motor to circulate the solvent for approximately 90 seconds.
5. Open the drain valve and allow the solvent to drain into the sump.
6. Close the drain valve.
7. Repeat Steps 1 through 6 until the solvent is clean when it is drained into the sump.

 **NOTE** If a non-vaporizing solvent is used, hook an inert gas supply to sample inlet valve and inject it into the CPCCP to dry the interior.

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## 3 Maintenance

### 3.1 Disassembly

#### 3.1.1 CPCCP

To properly maintain and repair the CPCCP, complete the following steps:


1. Isolate the air supply and disconnect the pre-charge system from the CPCCP.
2. Turn off the sampling system and isolate the pressure from the sample pump.
3. Open the draw-off valve to the sump and release pressure within the CPCCP.
4. Ensure that the indicator rod displays 0%, and the bottom process gauge shows 0 psig.
5. Open the valve on the top cap to release the pre-charge pressure.

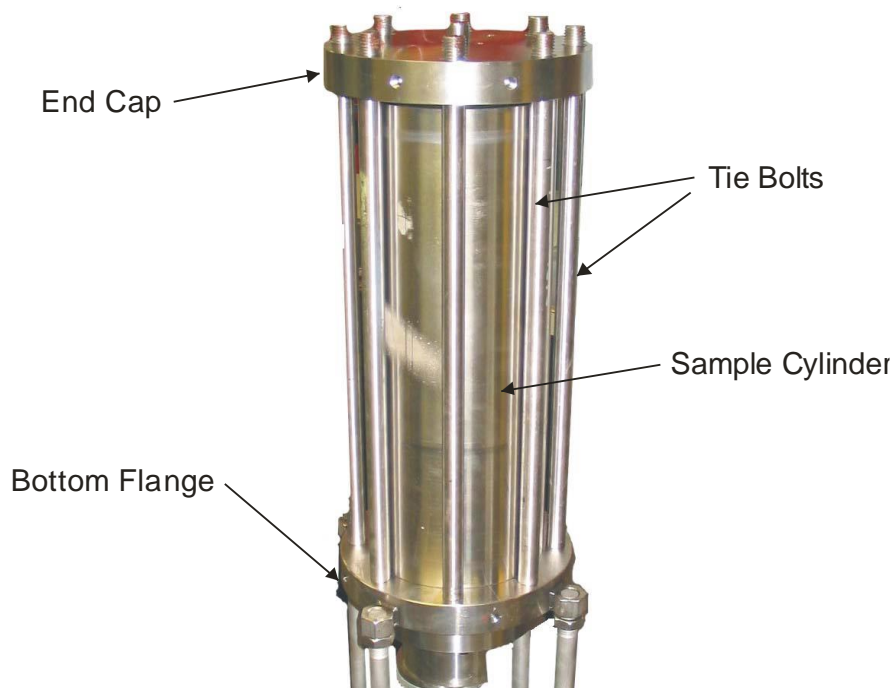


#### **WARNING**

**It is imperative that the system be de-pressurized before performing the following steps. Performing these steps on a sample pump under pressure can cause severe injury.**

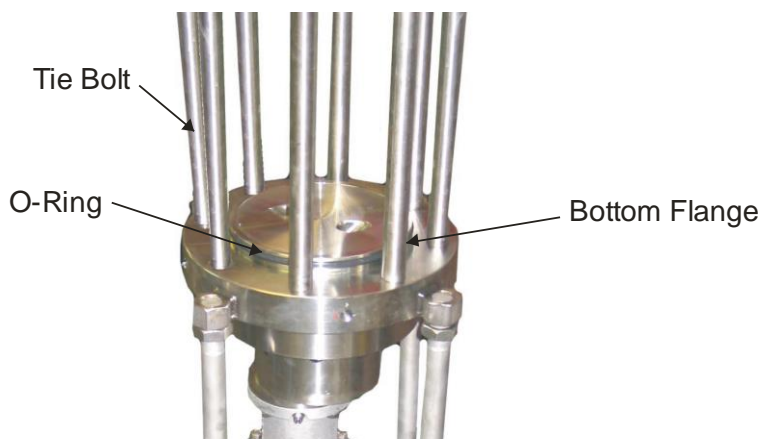
6. Use a 1<sup>5</sup>/<sub>8</sub>" crescent wrench to remove the six hex nuts on the top of the end cap (Figure 3).

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**Figure 3**  
**CPCCP with Hex Nuts Removed**

7. Remove the end cap from CPCCP.
8. Remove the O-ring in the O-ring groove on the outer diameter (OD) of the end cap.
9. Remove the O-ring and two backup rings in the O-ring grooves on the inner diameter (ID) of the end cap.
10. Remove the piston and cylinder from the bottom flange (Figure 4).



**Figure 4**  
**Remove the Cylinder from the Bottom Flange**

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11. Remove the O-ring in the O-ring groove on the OD of the bottom flange.
12. Place the cylinder in a horizontal position and use a block of wood (or equivalent) to push the piston out of the cylinder.
13. Remove the two O-rings, three backup rings, and three spiral backup rings in the O-ring grooves on the OD of the piston (Figure 5).




**Figure 5**  
**Piston O-Rings and Backup Rings**

14. Inspect the shaft for scratches or wear.
15. Replace the shaft, if necessary, as referenced in the following steps:
  - Use a  $\frac{3}{16}$ " Allen wrench to remove the lock collar by loosening the screws
  - Unscrew the piston shaft from the piston.

### **3.1.2 Air Motor**

The air motor provided by Fennerstone should be maintained as discussed in the manufacturer's specifications included in your order.

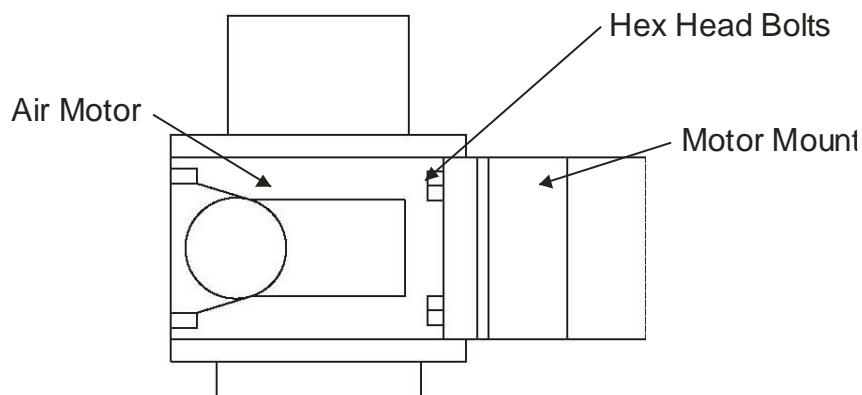


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### 3.1.3 Gear Pump

To disassemble and properly maintain the gear pump on the CPCCP, complete the following steps:

1. Remove the pressure balance tubing from the bottom flange and pump balance port.
2. Use a  $\frac{9}{16}$ " wrench to remove the hex head bolts securing the air motor in place.
3. Remove the air motor from the assembly.
4. Use a  $\frac{3}{16}$ " Allen wrench to lock the set screws on the motor mount to secure into place (Figure 6).



**Figure 6**  
**Hex Head Bolts on Air Motor**




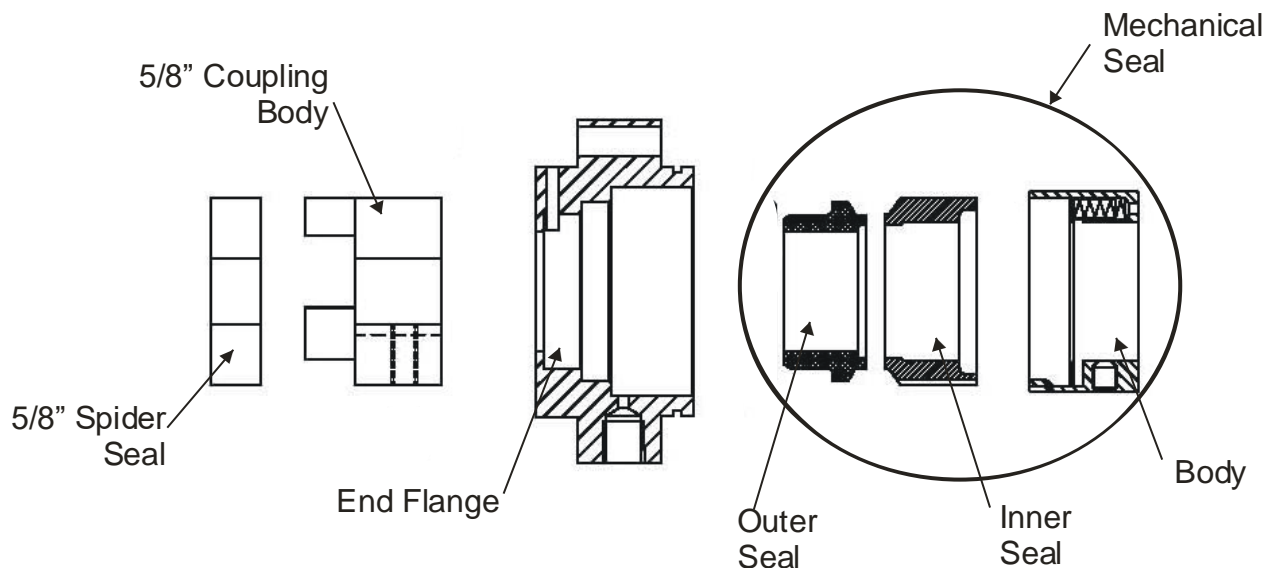
#### NOTE

The following steps should be completed after completely disassembling the CPCCP.

5. Position the assembly upside down on a workbench or the floor.
6. Remove the  $\frac{5}{8}$ " spider seal from the coupling body (Figure 7).



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**Figure 7**  
**Spider Seal, 5/8" Coupling Body, End Flange, and Mechanical Seal Assembly**

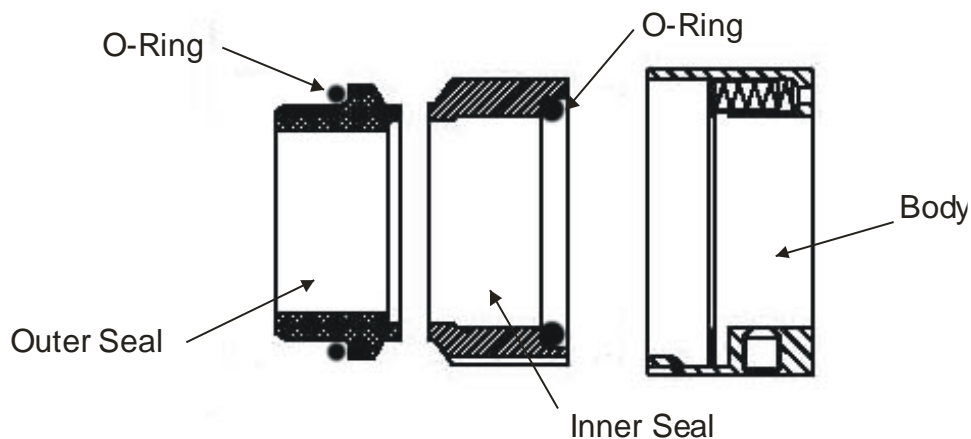
7. Use a  $\frac{1}{8}$ " Allen wrench to remove the set screw from the end flange.
8. Remove the coupling body and key from the end flange (Figure 7).
9. Use a  $\frac{3}{16}$ " Allen wrench to remove the 11 set screws from the end flange.
10. Remove the end flange from the mechanical seal (Figure 7).

**NOTE** The mechanical seal is made up of three parts: the body, the inner seal, and the outer seal.

11. Remove the inner and outer seals from the body of the mechanical seal, exposing the  $\frac{1}{4}$ " set screw (Figure 8).


**NOTE** The inner and outer seals within the mechanical seal are silica graphite and must be cleaned with lint free cloths and alcohol to ensure that they are dust free before being re-installed.

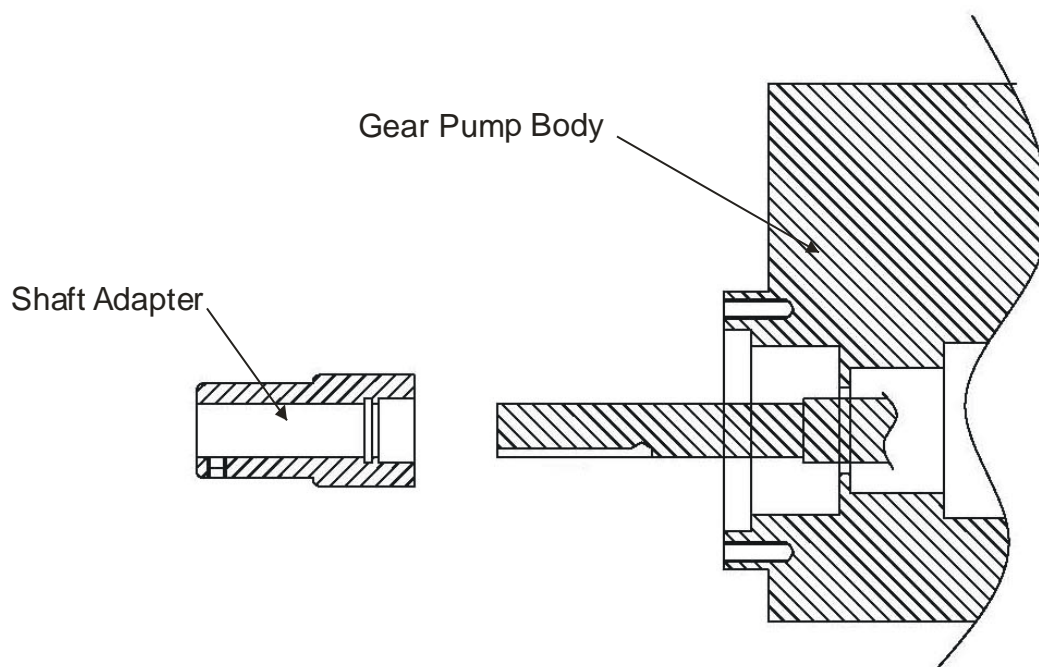
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**Figure 8**  
**Mechanical Seal Components**

12. Remove the O-rings on the OD of the inner and outer seals (Figure 8).
13. Use a 3 mm Allen wrench to remove the two set screws securing the body of the mechanical seal in place.
14. Remove the mechanical seal from the shaft adapter.
15. Use a  $\frac{1}{8}$ " Allen wrench to remove the  $\frac{1}{4}$ " set screw from the shaft adapter.
16. Remove the shaft adapter from the gear pump body (Figure 9).

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**Figure 9**  
**Shaft Adapter and Gear Pump Body**

17. Remove the O-ring in the O-ring groove in the ID of the shaft adapter.
18. Remove the O-ring on O-ring groove on the OD of the mechanical seal.

## 3.2 Re-Assembly

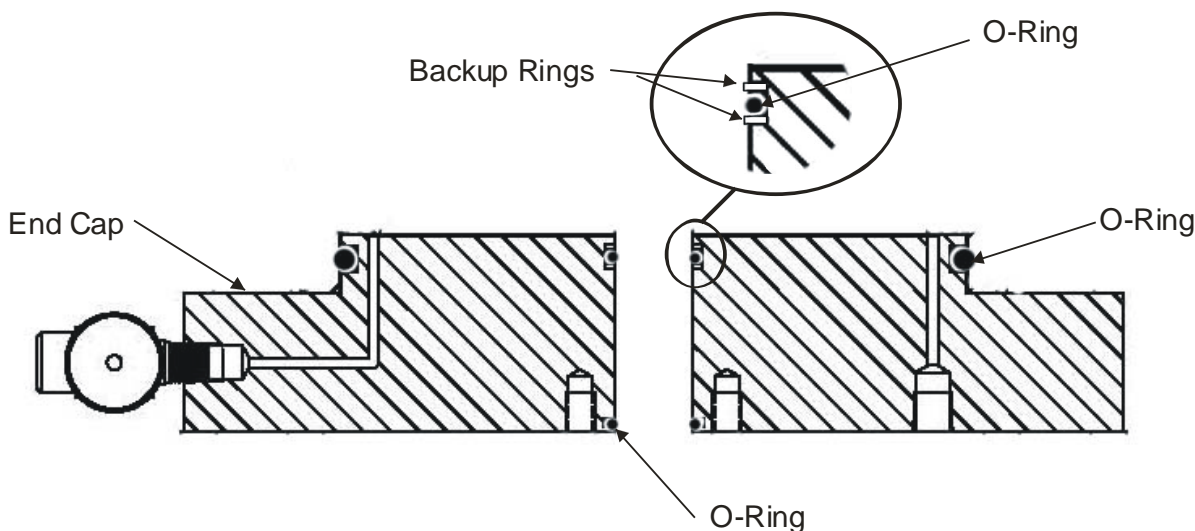
### 3.2.1 CPCCP

1. Install the alignment pin into the piston.
2. Seat the lock collar onto the piston so that it sits on the alignment pin.
3. Install the piston shaft into the piston through the lock collar.
4. Install the O-ring and three backup rings in the O-ring groove on the OD of the piston nearest the piston shaft.
5. Install the O-ring and three spiral backup rings in the O-ring groove on the OD of the piston farthest from the piston shaft.
6. Install the O-ring into the O-ring groove on the OD of the bottom flange.
7. Seat the piston on top of the bottom flange.

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**CAUTION** When assembling parts with O-rings, ensure that the O-rings are not pinched or nicked. Scratching the sealing surface can result in a leak.

8. Install the cylinder over the piston shaft and piston onto the bottom flange until it seats completely on the bottom flange.
9. Install the O-ring and two backup rings in the O-ring grooves on the ID of the end cap (Figure 10).
10. Install the O-ring in the O-ring groove on the top of the end cap (Figure 10).
11. Install the O-ring in the O-ring groove on the OD of the end cap (Figure 10).

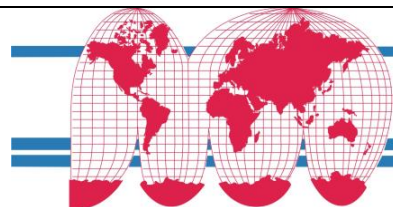


**Figure 10**  
**End Cap with O-Rings and Backup Rings**

12. Install the end cap onto the cylinder.
13. Apply Anti-Seize to the threads of the tie bolts.
14. Use a 1<sup>5</sup>/<sub>8</sub>" crescent wrench to install the six hex nuts on the top of the CPCCP and secure tightly.

### **3.2.2 Gear Pump Assembly**

To assemble the gear pump onto the CPCCP, complete the following steps:



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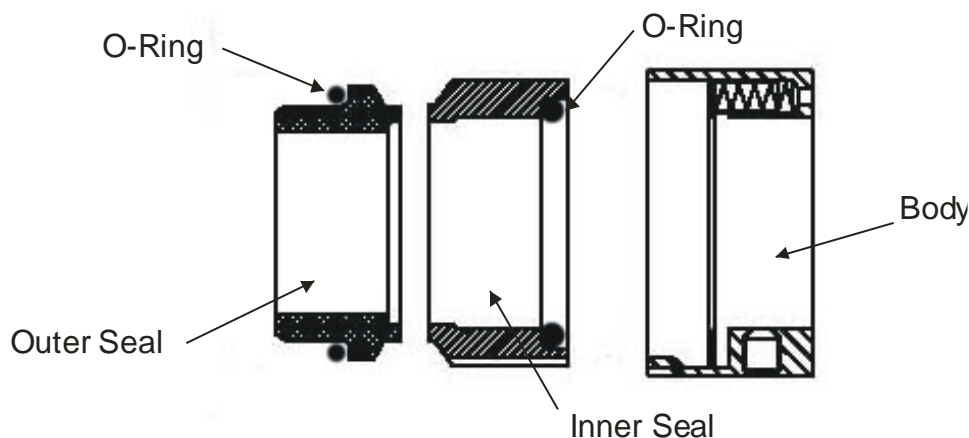
1. Install the O-ring in the O-ring groove in the ID of the shaft adapter.
2. Apply a small bead of Loctite 242 to the threads of the shaft adapter set screw.
3. Use a  $\frac{1}{8}$ " Allen wrench to install the set screw into the shaft adapter and secure the set screw in place.
4. Install the mechanical seal onto the shaft adapter.



**NOTE**

The two seals within the mechanical seal are silica graphite and must be cleaned with a lint-free cloth and alcohol to ensure that they are dust free before being re-installed. It is permissible to use Dow Corning 111 (DC 111) on the O-rings for these seals as long as none of the lubrication contacts the component parts.

5. Install the O-ring into O-ring groove on the OD of the inner seal (Figure 11).
6. Install the O-ring into O-ring groove on the OD of the outer seal.
7. Install the inner and outer seals into the mechanical seal body.




**Figure 11**  
**Mechanical Seal Body**



**CAUTION**

The mechanical seal must be installed on the shaft adapter so that there is a gap of 0.078" between the base of the shaft adapter and the mechanical seal.

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8. Apply a small bead of Loctite 242 to the threads of the two mechanical seal set screws.
9. Use a 3 mm Allen wrench to install the two set screws onto the shaft adapter.
10. Install an O-ring into the O-ring groove on the OD of the end flange.
11. Apply a small bead of Loctite 242 to the threads of 11 set screws for the end flange.
12. Use a  $\frac{3}{16}$ " Allen wrench to install 11 set screws into the end flange and gear pump body.
13. Install the key into the end flange so that it is flush with the coupling once it is installed.
14. Apply a small bead of Loctite 242 to the threads of the two coupling set screws.
15. Use a  $\frac{1}{8}$ " Allen wrench to install the set screws into coupling body to secure the coupling body to the end flange.
16. Install the  $\frac{5}{8}$ " spider seal onto the coupling body.
17. Use a  $\frac{9}{16}$ " wrench to install the hex head bolts into the gear pump housing, securing the air motor onto the assembly.
18. Use a  $\frac{3}{16}$ " Allen wrench to lock the air motor into place on the legs.
19. Reinstall the pressure balance tubing to the bottom flange and pump balance port.