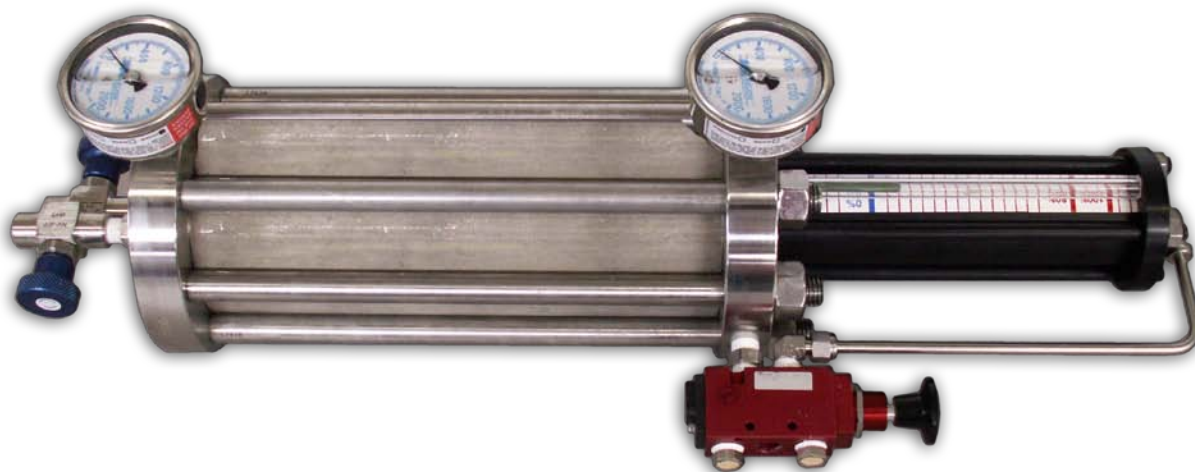




*Welker<sup>®</sup> Constant Pressure Sample  
Cylinder with Pneumatic Mixer  
Model  
CP-5 PM*



The information in this manual has been carefully checked for accuracy and is intended to be used as a guide for the installation, operation, and maintenance of the Welker equipment described above. 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 in order to improve performance and reliability.

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# SPECIFICATIONS

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## 1. GENERAL

### 1.1 INTRODUCTION

We appreciate your business and your choice of Welker products. The installation, operation, and maintenance liability for this product becomes that of the purchaser at the time of receipt. Reading the applicable *Installation, Operation, 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.

#### **Notes, Cautions, and Warnings**



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



**Caution** messages appear before procedures that, if not observed, could result in damage to equipment.



**Warnings** are alerts to a specific procedure or practice that, if not followed correctly, could cause personal injury.

\*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.\*

### 1.2 DESCRIPTION OF PRODUCT

The Welker Constant Pressure Sample Cylinder is designed for use in systems where it is necessary to extract and isolate accurate product samples by maintaining a steady pressure from the pipeline to the cylinder. The cylinders are equipped with a magnetic indicator and a graduated scale set to specify the capacity of the device. During continuous sampling, when the magnetic indicator reaches the 80% mark, all sampling should be stopped.



# SPECIFICATIONS

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## 1.2 DESCRIPTION OF PRODUCT (CONTINUED)

A pneumatic supply pre-charges the cylinder with pressure to correspond with pipeline pressure. Pre-charging allows the sample to be transferred to the cylinder without taking a pressure drop. An internal piston in the cylinder helps to purge out air and contaminants prior to taking the sample by displacement.

When a desired number of sample bites have been collected, the end user will activate the pneumatic solenoid mixer by pressing the mixer button, that will displace the air pressure to press down the tracking piston, causing the mixing plate to go down. Deselecting the button will cause the plate to move back up, thus repeatedly pressing and depressing the button will insure that the collective sample is thoroughly mixed.

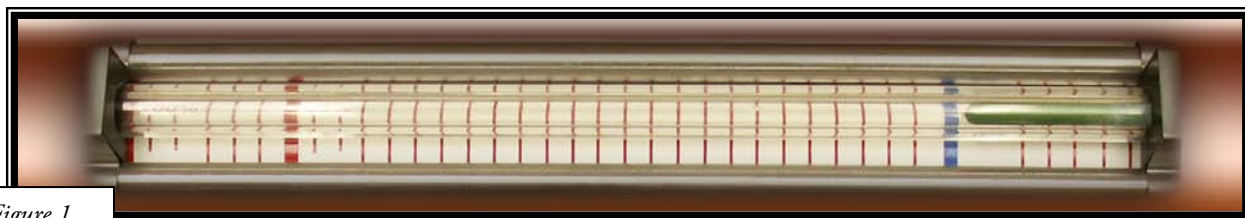


Figure 1

During the purge process, the piston is pushed to the end of the cylinder, also preventing any other possible contaminants from entering. Burst discs and gauges are also included on each end cap of the device. In the event that the cylinder is over pressurized, these discs will rupture, relieving excess pressure from the cylinder.

### **Adjustable relief valve (optional)**

The adjustable relief valve functions as a safety device for the unit. During continuous sampling of the cylinder, the relief valve assures that the device maintains a constant pressure and does not exceed maximum allowable pressure. The valve will relieve any pressure that exceeds the set pressure.

## 1.3 IMPORTANT INFORMATION



**Please read the following information in its entirety before using the Welker equipment described above. Failure to adhere to the recommendations could result in injury.**

- Never fill a cylinder completely full of hydrocarbon liquid or refrigerated gas. Always allow for at least 20% expansion.
- **Never transport this cylinder when pressurized.** It is not designed for transport. For D.O.T. approved cylinders, please contact the Welker sales department.
- Protect the cylinder at all times and handle with care. It is a precision instrument and may contain a flammable or hazardous product as well as a valuable representation of your company's product.

# SPECIFICATIONS

## 1.3 IMPORTANT INFORMATION (CONTINUED)

- When analysis is complete, the cylinder should be emptied safely and in a safe area by opening the product inlet valve, allowing the pre-charge pressure to push the piston to the product end cap, emptying the cylinder.
- Welker recommends cleaning and leak testing of the cylinders after each use.
- Because of the design of the cylinder and the incorporated seals, the process of emptying the cylinder will simultaneously wipe the walls of the device clean. The end cap will also be purged clean with the next use.

## 1.4 SPECIFICATIONS



The specifications listed in this section are generalized for this equipment. Welker can modify the equipment according to your company's needs. However, please note that **\*the specifications may vary depending on the customization of your product.**

**Table 1**

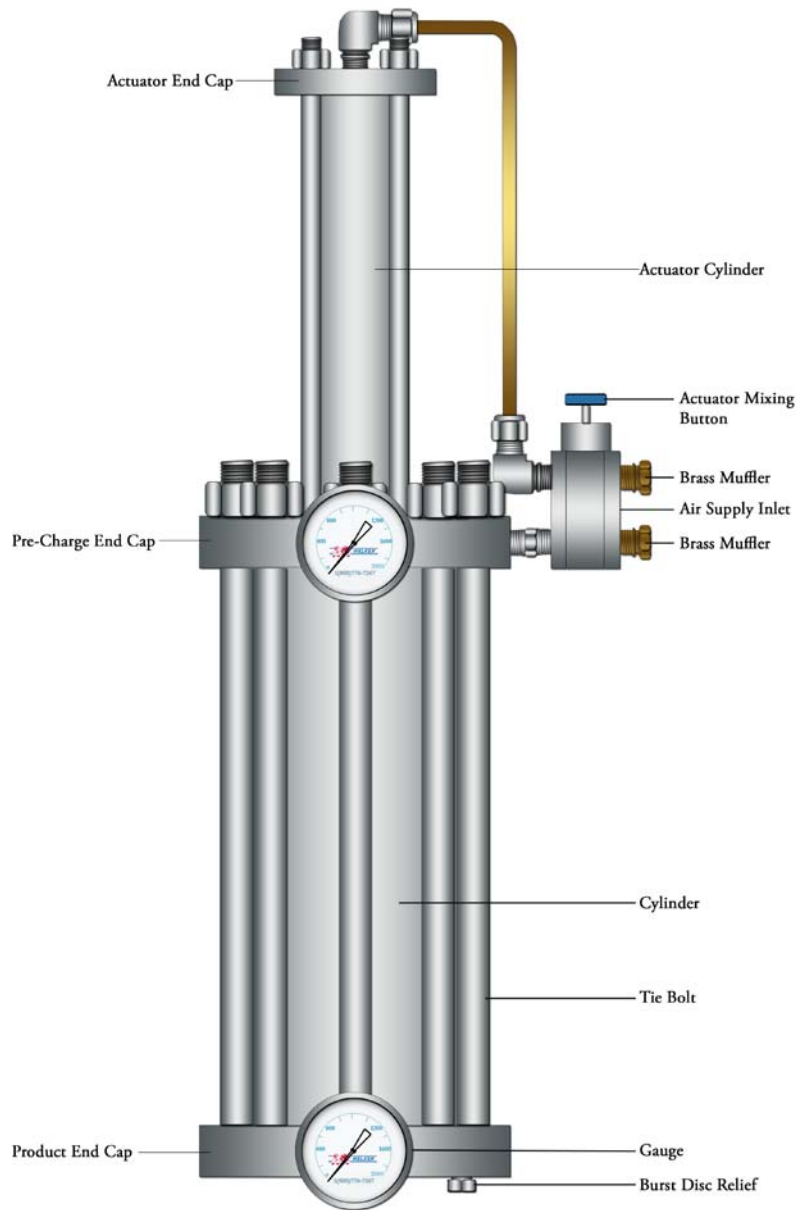
Specifications CP-5 PM	
<b>Products Sampled:</b>	Light liquid hydrocarbons, refined products, liquid petroleum gas, natural gas liquids, light crude and condensate
<b>Materials of Construction:</b>	316 stainless steel, aluminum, Viton, and PTFE; others available.
<b>Maximum Allowable Line Pressure**:</b>	2,160 psi (147 bar) Note: The mixing solenoid valve installed in this system will allow for mixing at 1,800 MAOP. For higher mixing pressure capabilities, please see factory for alternate mixing solenoid valves.
<b>Ports/Connections:</b>	1/4" NPT; others available
<b>Viscosity Range*:</b>	8 - 50° API gravity
<b>Temperature Range*:</b>	-20°F to 100°F (-28.9°C to 37.8°C)
<b>Area Classification*:</b>	Can be used in hazardous areas. Note: This cylinder does not carry the D.O.T. exemption. For D.O.T. approved cylinders, please contact the sales department at Welker.

# SPECIFICATIONS

## 1.5 PRODUCT COMPONENTS

**Table 2**

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Sample Collection Cylinder</li><li>• Internal Piston with Mixing Plate</li><li>• Tracking Piston</li><li>• Graduated Scale &amp; Magnetic Indicator</li></ul> | <ul style="list-style-type: none"><li>• Pressure Relief Valves</li><li>• Pressure Gauges</li><li>• Pneumatic Mixing Solenoid with Button</li><li>• Burst Disc Reliefs</li></ul> |
|---|---|



*Refer to above figure throughout manual.*

# INSTALLATION & OPERATIONS

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## 2. INSTALLATION & OPERATION INSTRUCTIONS

### 2.1 GENERAL

- After unpacking the unit, check it for compliance and for any damages that may have occurred during shipment.
- Claims for damages caused during shipping must be initiated by the receiver and directed to the shipping carrier. Welker is not responsible for any damages caused from mishandling by the shipping company.
- When sealing fittings with PTFE tape, refer to the proper sealing instructions for the tape used.
- A sample probe should be located in the least turbulent area available of the flowing stream; i.e., not in a header or blow-down stack and away from obstructions, elbows or partially closed valves. The sample probe should be installed reaching approximately into the center one-third of the pipeline.
- The sample cylinder should be located as close to the sample point as possible.

#### Recommended Tools

It would be advisable to have the following tools available for installation of the unit. However, tools used will vary depending on cylinder model.



- Flexible hose or tubing
- 6" adjustable wrench
- Tubing cutters
- Small diameter stainless steel tubing

### 2.2 PRE-CHARGING THE CYLINDER



The pre-charge gas being used must be compatible with the seals in the cylinder. The relief valves and gauges must also be adequate for the pressures used when pre-charging.

#### 1. Connecting the cylinder pre-charge valve to the pipeline (pressurized gas pipeline only):

- Use small diameter stainless steel tubing to connect from an available pipeline valve to the pre-charge inlet valve. If you have the premium purge model, connect from the pipeline valve to the pre-charge inlet port.
- Make sure all valves are closed on the sample cylinder.
- Open the pipeline isolation valve.
- Slowly open the pre-charge inlet valve.



# INSTALLATION & OPERATIONS

---

## 2.2 PRE-CHARGING THE CYLINDER (CONTINUED)

- Slowly open the product inlet valve to relieve any pressure buildup. The piston will begin to move.



Always open valves slowly to avoid slamming the piston from one end to the other.

- The pre-charge gauge should begin to read pressure and will eventually reach pipeline pressure.
- Once the piston has reached the end of the cylinder, close all valves and check for leaks.
- Disconnect the tubing from the cylinder and from the pipeline isolation valve.

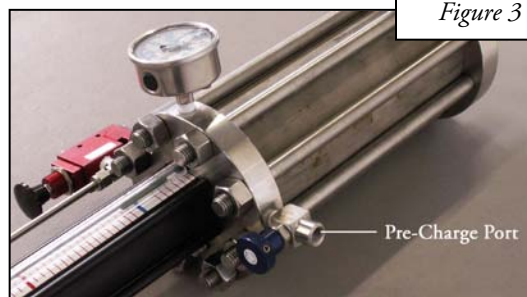


Figure 3

### 2. Connecting the pre-charge valve to the return port on a sampler probe (for continuous sampling of pressurized gas pipeline only):

- Install a valve into the return port of the sampler probe.
- Make sure all valves are closed on the sample cylinder.
- Use small diameter stainless steel tubing to connect from the cylinder's pre-charge inlet valve to the valve on the return port of the probe. If you have the premium purge model, connect from the sampler to the pre-charge inlet port.
- Open the valve on the return port of the sample probe.
- Slowly open the pre-charge inlet valve.
- Slowly open the product inlet valve to relieve any pressure buildup.
- The pre-charge gauge should begin to read pressure and will eventually read the pipeline pressure.
- Leave the pre-charge valve open during the sampling procedure.
- Leave the return port valve on the probe open during the sampling procedure.
- Check for leaks.

### 3. Using an auxiliary pre-charge gas:



When using an auxiliary gas, the pre-charge side of the cylinder should be pressurized with a regulated gas supply (i.e., nitrogen or helium) and set 50-100 psi above pipeline operating pressure, not to exceed the maximum allowable pressure of the device.

- Make sure all valves on the sample cylinder are closed.
- Use small diameter stainless steel tubing to connect the pre-charge valve to the regulated auxiliary gas supply. If you have the premium purge model, connect from the gas supply to the pre-charge inlet port (see Figure 3).
- Open the valve on the gas supply.



# INSTALLATION & OPERATIONS

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## 2.2 PRE-CHARGING THE CYLINDER (CONTINUED)

- Slowly open the pre-charge inlet valve.
- Slowly open the product inlet valve to relieve any pressure buildup. The piston will begin to move.
- The pre-charge gauge should begin to read pressure and will eventually read the designated pressure.
- Once the piston has reached the end of the cylinder, close all valves and check for leaks.
- Disconnect the tubing from the cylinder and from the pipeline isolation valve.

## 2.3 INSTALLATION



If steps 2.2 Section 1 or 2.2 Section 3 are used to pre-charge, or if the cylinder is being used for continuous sampling and the pre-charge is not connected to the pipeline, it will be necessary to install an adjustable, resetting relief valve in order to relieve pre-charge pressure while continuous sampling.

1. If your cylinder is equipped with an adjustable relief valve (see Figure 4), use an auxiliary gas supply to set the valve at least 50-100 psi above pipeline pressure, not to exceed the maximum allowable working pressure indicated in Table 1 on page 5 (refer to IO&M for relief valve).
2. If your cylinder is not equipped with a product purge valve, create a purge valve by tubing a T-fitting and valve inline between the sample point and the cylinder in order to provide a way to purge the system.



Purging the system of excess air is important to ensure the system is not contaminated from the previous sample.

3. Close the product inlet valve.
4. Connect the product inlet valve to the sample point (i.e., probe or sampler). If you have the premium purge model, connect the sample point to the product inlet port.

## 2.5 CONTINUOUS SAMPLING

1. Pre-charge the sample cylinder (see Section 2.2) and connect the product inlet end of the cylinder to the sampler outlet port. If you have the premium purge model, connect the sampler from the outlet port to the product inlet port.
2. Open the product purge valve to purge the system of any contaminants. Close the purge valve. Welker recommends plugging the purge valve when not in use.
3. Open the sampler outlet valve.
4. Slowly open the product valve on the product end cap. The piston will not yet move because pre-charge pressure is above pipeline pressure.



The automatic sampler will push product against the piston, causing the pre-charge pressure to relieve from the adjustable relief and/or to be pushed into the pipeline.

# INSTALLATION & OPERATIONS

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## 2.5 CONTINUOUS SAMPLING (CONTINUED)

5. Turn the sampler off when the cylinder is at 80% capacity. This allows a 20% margin for possible expansion due to temperature changes.
6. When the desired amount of sample is extracted, close all valves on the cylinder.
7. Close the sampler outlet valve.
8. Carefully disconnect the cylinder from the sampler, allowing the trapped product between the sampler outlet valve and the product inlet valve to vent.
9. Plug or cap all valves on the cylinder.
10. Record pressure, locations, etc., on the information tag according to company policy. Check all fittings for leaks.
11. The product is now ready for mixing and removal.

## 2.6 MIXING OF COMPOSITE SAMPLE

1. Attach air supply to the air supply inlet on the pneumatic mixer solenoid. The air supply pressure needed to assure proper mixing of the product will be determined by the pressure of the product inside the cylinder; consult the product pressure gauge to determine the psi then consult the chart below to determine the necessary air supply pressure.



It is important to use the appropriate air supply pressure to operate the pneumatic mixer, as too much air supply will cause the piston to slam back and forth and may damage the equipment, whereas too little air supply will not allow for proper mixing.

Approximate Product Pressure:	Air Supply Pressure Needed:
600 psi	Minimum 55 psi Best 80 psi
1,000 psi	Minimum 110 psi Best 130 psi
1,800 psi	150 psi
+1,800 psi	See note below



The mixing solenoid valve installed in this system has a MAOP of 150 psi, which will allow for mixing at 1,800 MAOP. For higher mixing pressure capabilities, please see factory for alternate mixing solenoid valves.

2. To actuate the mixer, alternately press and release the button on the mixing solenoid valve. The tracker tube magnet will move up and down as the mixing rod moves up and down. Ensure that with each press and depress of the mixing button the tracker magnet moves all the way to the top of the tracker tube and then all the way back to the bottom of the tracker tube. This will allow for thorough mixing.
3. Actuate the mixer at least 4 to 5 cycles.
4. When mixing is complete, disconnect the air supply.
5. The cylinder is now ready for product removal to analyzer or to a D.O.T. approved constant pressure cylinder for transport.

# MAINTENANCE

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## 3. MAINTENANCE

### 3.1 GENERAL

Prior to maintenance or disassembly of the unit, it is advisable to have a repair kit handy for the system in case of unexpected wear or faulty seals.



We recommend that the unit have annual maintenance under normal operating conditions. In the case of severe service, dirty conditions, excessive cycling usage, or other unique applications that may subject the equipment to unpredictable circumstances, a more frequent maintenance schedule may be appropriate.

#### Recommended Tools

It would be advisable to have the following tools available for installation of the unit. However, tools used will vary depending on cylinder model and connectors used.



- Small hex key set
- 6" adjustable wrench
- 10" adjustable wrench
- 10" channel lock pliers
- Fine-grit sandpaper
- Flat blade screwdriver
- Torque wrench
- O-Ring kit



New seals supplied in spare parts kits are not lubricated. They should be lightly coated with lubrication grease (silicone grease or other) before they are installed into the equipment. This helps in the installation of the seals while reducing the risk of damage when positioning them on the parts. After the seals are installed, some additional lubrication can be applied to shafts or cylinder inner diameters to allow smooth transition of parts. While lubrication should be thorough, only a minimal amount should be applied. Wipe excess lubrication from the seals, as it may have an adverse effect on sampling.



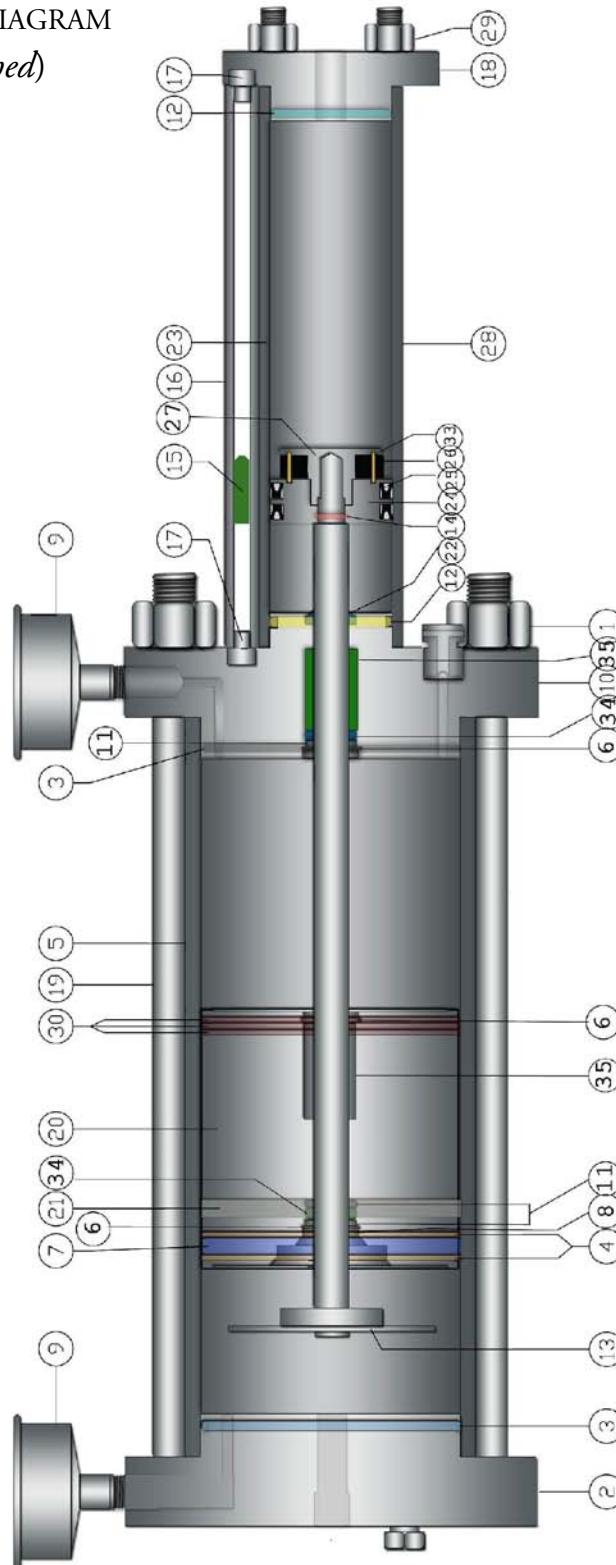
In the case of constant pressure cylinders, the lubrication grease should be applied sufficiently but lightly (Krytox® is preferred). When using lubrication other than Krytox, wipe excess lubrication from the seals as it may have an adverse effect on some analytical instrument results.



Do not dig into the metal surfaces of the parts when removing O-rings from the O-ring grooves. Scratching the sealing surface can result in a leak. If necessary, dig into the O-ring, and replace it during reassembly. If the sealing surface becomes damaged, use a 600-grit wet sand paper strip to smooth the surface, and then clean it. Check the ball bearing for any signs of wear or damage. Replace if necessary.

# MAINTENANCE

## 3.2 MAINTENANCE PARTS DIAGRAM (Also See AD741BB Rev J Attached)



# MAINTENANCE

## 3.3 DISASSEMBLY & MAINTENANCE

1. If necessary, disconnect the instrument air supply.
2. Make sure the unit is depressurized and empty prior to maintenance.
3. Disconnect the tubing and mixing solenoid from the unit, and set aside.
4. Remove the four nuts (Part 29) on the actuator end cap (Part 18).
5. Remove the four actuator tie bolts (Part 28) from the pre-charge end cap (Part 10) and the actuator end cap (Part 18).
6. Remove the tracker tube clips (Part 17) and tracker tube (Part 18). Be careful not to lose the tracker magnet (Part 15).
7. Remove the actuator end cap (Part 18) and replace the O-ring (Part 12).
8. Slowly slide the actuator cylinder (Part 23) up and off the pre-charge end cap (Part 10), and the actuator piston assembly (Part 24 & associated parts).
9. Remove the magnet retainer (Part 27), magnet (Part 26) and piston actuator (Part 24) from the mixing rod assembly (Part 13).
10. Remove and discard the two O-Rings (Part 33), the O-Ring (Part 14) and the two U-cups (Part 25) from the piston actuator assembly.
11. Clean the piston actuator and associated parts and dry thoroughly.
12. Replace the O-rings and U-cups in step 10, reassemble the piston actuator and associated parts, and set aside.
13. Remove the eight nuts (Part 1) on the pre-charge end cap (Part 10),
14. Lift the pre-charge end cap (Part 10) straight up and over the mixing rod assembly (Part 13) taking care not to scratch the rod.
15. Remove and discard all the O-Rings (Parts 3, 12, & 34), the wiper ring (Part 22), the backup ring (Part 11), and the snap ring (Part 6) from the pre-charge end cap (Part 10).
16. Remove and examine the bearing (Part 35). If it is smooth and free of nicks or scratches, clean it and set aside for reuse; if not, discard it.
17. Clean the pre-charge end cap (Part 10) and dry thoroughly.
18. When necessary, replace the burst disc (Part 32 & 31) in the end cap.



Burst discs should be replaced after 6-10 cylinder fillings or at least once a year. While the discs do help to maintain the product, they are designed as a safety device to prevent over pressurization of the cylinder.

- Insert the clear seal.
- Insert the rupture disc after the clear seal. The dome should face out.
- Torque the bursting relief caps to the proper specification (see Table 2).

Table 2

TORQUE SPECIFICATIONS FOR CYLINDER RUPTURE DISC CAPS			
Pressure Range (psi)	Torque Requirements		
	0-300	50 in-lbs	5.6 Nm
301-5000	20 ft-lbs	27 Nm	
5001-6000	24 ft-lbs	32 Nm	
6001-7000	29 ft-lbs	39 Nm	
7001-10,000	38 ft-lbs	52 Nm	

# MAINTENANCE

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## 3.3 DISASSEMBLY & MAINTENANCE (CONTINUED)

19. Replace all the seals listed in step 15 and the bearing if necessary, and set the pre-charge end cap aside.
20. If there is an adjustable relief valve on the pre-charge end cap, remove it and replace all seals within the part (*refer to IO&M for adjustable relief valve*).
21. Remove the eight tie bolts (Part 19) from the product (Part 2) and pre-charge end caps (Part 10).
22. Remove the product end cap (Part 2) from the other side of the cylinder (Part 5).
23. Push the mixing rod assembly (Part 13) and piston (Part 20) out of the cylinder (Part 5) from the product side of the cylinder.
24. Carefully slide the mixing rod assembly (Part 13) from the piston (Part 20), making sure not to bend the rod, and set the mixing rod assembly aside.
25. Remove and discard the O-Rings (Parts 7, & 34), the two solid backups (Part 11), and the two seats (Part 6) from the product end cap (Part 2).
26. Remove and examine the bearings (Parts 35 & 21) and the washer (Part 8). If they are smooth and free of nicks or scratches, clean them and set aside for reuse; if not, discard them.
27. Clean the product end cap (Part 2) and dry thoroughly.
28. See step 18 to replace the burst disc (Part 32 & 31) in the end cap when necessary.
29. Replace all the seals listed in step 24 and the bearings and washer if necessary, and set the product end cap aside.
30. Wipe down the inside of cylinder (Part 5) and dry carefully (*also see Section 3.5*).
31. Clean and dry the mixing rod assembly (Part 13).
32. Closely examine the honed surface of the cylinder. Scratches and pits will cause the seals to leak.



**The following are causes to return the device to the manufacturer:**

- Scratches or pitting that allow migration of gas from one side to the other.
- Any damage to the outside cylinder shell that may compromise the cylinder wall thickness.

## 3.4 REASSEMBLY INSTRUCTIONS

1. After all the seals have been changed and all the parts cleaned and dried thoroughly, reassemble the unit carefully following these instructions.
2. Reinsert the mixing rod assembly (Part 13) into the piston (Part 20) taking care not to bend or scratch the rod, and to place it in the proper orientation.
3. Carefully slide the mixing rod assembly (Part 13) and the piston (Part 20) into the cylinder (Part 5).
4. Reinstall the product end cap (part 2) on the end of the cylinder (Part 5) that the plate side of the mixing rod assembly (Part 13) is facing.

# MAINTENANCE

---

## 3.4 REASSEMBLY INSTRUCTIONS (CONTINUED)

5. Reinstall the pre-charge end cap (Part 10) onto the other end of the cylinder, taking care to slide the mixing rod (Part 13) through the end cap without bending it or scratching it.
6. Reinstall the eight tie bolts (Part 19) from the product (Part 2) and pre-charge end caps (Part 10) and secure them with the eight nuts (Part 1).
7. Tighten the actuator piston assembly (Part 24 & associated parts) back onto the end of the mixing rod assembly (Part 13).
8. Carefully place the actuator cylinder (Part 23) over the actuator piston assembly (Part 24 & associated parts) and set it back into the center ring of the pre-charge end cap (Part 10).
9. Reinstall the tracker tube clips (Part 17), tracker tube (Part 18), and the tracker magnet (Part 15).
10. Reinstall the four actuator tie bolts (Part 28) onto the pre-charge end cap (Part 10) and the actuator end cap (Part 18) and secure the actuator end cap with the four nuts (Part 29).
11. Reconnect the tubing and mixing solenoid onto the unit.
12. Pressure up cylinder at one end with an inert gas supply and test for leaks. Repeat the process from the opposite end. Pressurize slowly to avoid the slamming the piston from one end to the other.



Welker recommends using helium to test for leaks.

13. If there are leaks in any of the Welker valves, see IOM-105 for instructions on removal, maintenance, and reinstallation of the instrument valves.
14. The unit is now ready for reinstallation.



# MAINTENANCE

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## 3.5 CYLINDER CLEANING

Regular cleaning of the cylinder is essential for the proper functioning of the device. Solvent cleaning is normally done during scheduled maintenance; however, some companies require this before each cylinder is put into service. Any debris or residue that is not removed from the cylinder will contaminate the results of the next sample extracted from the cylinder. Welker recommends cleaning and leak testing of the cylinder after each use.

### **Cleaning a constant pressure sample cylinder can be done one of three ways:**

#### **1. Purging with helium**

- Fill and empty the cylinder with helium repeatedly.
- Take a sample of the helium to test for trace amounts of hydrocarbons.



If hydrocarbons are present in the analysis, the system has not been adequately cleaned, and further purging will be necessary. If hydrocarbons or contaminants remain present, a solvent cleaning may be required. (See Sections 3.3 & 3.4). After cleaning with solvent, purge with helium to remove the solvent and analyze the helium to verify the solvent and hydrocarbons have been removed.

- If no hydrocarbons are found, cleaning is complete.
- Repeat step 12 of Section 3.4.

#### **2. Purging with new product**

- Purge the cylinder using the product to be sampled. This can be accomplished each time the cylinder is put into service.
- Repeat step 12 of Section 3.4.



This method is acceptable only if the cylinder will be used in one location.

#### **3. Cleaning with solvent**

- Fill and empty the cylinder repeatedly with solvent.
- Use an inert gas to dry and purge the cylinder.
- Purge the cylinder of helium, following method 1 in this section, to verify the system is free of contaminants.
- Repeat step 12 of Section 3.4

# TROUBLESHOOTING

## 4. TROUBLESHOOTING GUIDE

The following is a troubleshooting table of issues most commonly associated with the Welker Constant Pressure Cylinder models. If you are having a problem that is not listed, or if the solution provided does not repair the problem, please call Welker for service options.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Gauge indicates a loss of pressure.	<ul style="list-style-type: none"> <li>• There is a leak from one of the fittings.</li> <li>• There is a leak from the burst discs.</li> <li>• The cylinder experienced a temperature drop.</li> <li>• There is a defective valve.</li> </ul>	<ul style="list-style-type: none"> <li>• Check all fittings for leaks with leak detector. Replace thread sealant.</li> <li>• Make sure the burst discs are torqued properly. If the problem persists, the discs may need replacement. <i>See Table 2.</i></li> <li>• Restore the temperature to pipeline temperature.</li> <li>• Repair or restore the defective valve.</li> </ul>
Pressure is leaking across the piston.	Seals in the piston are leaking.	Disassemble and clean the unit. Inspect cylinder for scratches. Replace seals in the piston and reassemble.  <i>See Sections 3.3-3.4.</i>
Pressure is leaking from the indicator rod.	Seals in the pre-charge end cap are leaking.	Disassemble the unit. Replace pre-charge end cap seals. Inspect the rod for scratches and reassemble.  <i>See Sections 3.3-3.4.</i>
The pre-charge or product end cap is leaking.	<ul style="list-style-type: none"> <li>• The burst disc is leaking.</li> <li>• There is a loose fitting.</li> <li>• The seat on purge valve is leaking.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace the burst disc. <i>See step 18 Section 3.3.</i></li> <li>• Tighten the fittings.</li> <li>• Replace the seat.</li> </ul>

# APPENDIX A

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## ATTACHMENTS:

1. ASSEMBLY DRAWING, AD741 BB REV B
2. WELKER INSTALLATION, OPERATION, AND MAINTENANCE MANUAL, IOM-105



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