

Syringe Pump O-rings

Syringe Pump Technical Bulletin TB29

Overview

O-rings are used when working with slurries, low pressures, and liquids with particulates. They can form a tighter seal than a standard lip seal in certain applications. This bulletin shows where and how the O-ring is installed on the piston, types of O-rings, maintenance, and troubleshooting.

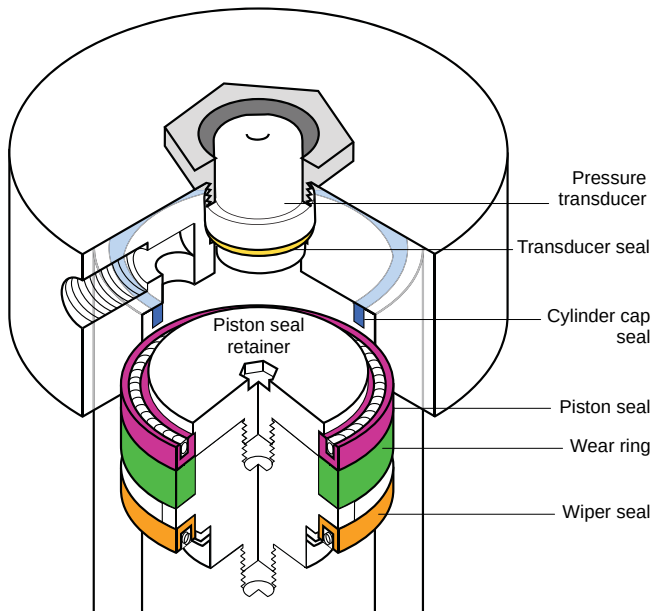


Figure 1: Cross-section of a piston with a piston lip seal (Standard)

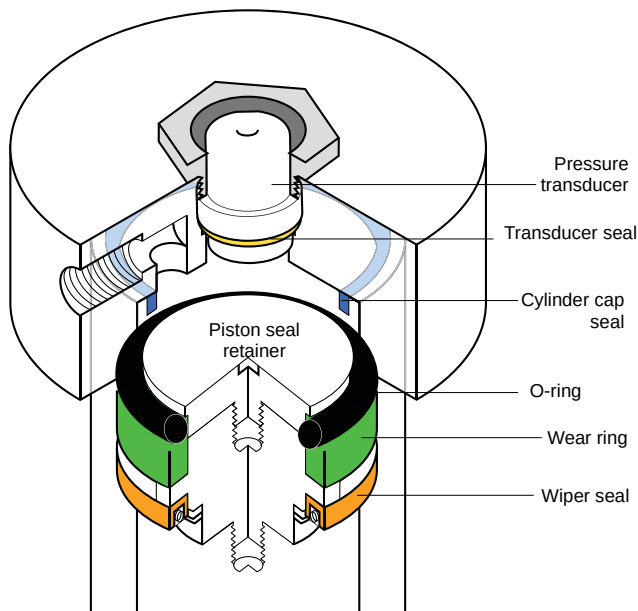


Figure 2: Cross-section of a piston with an O-ring (Wiper seal faces spring up in 1000D and 500D with wash gland)

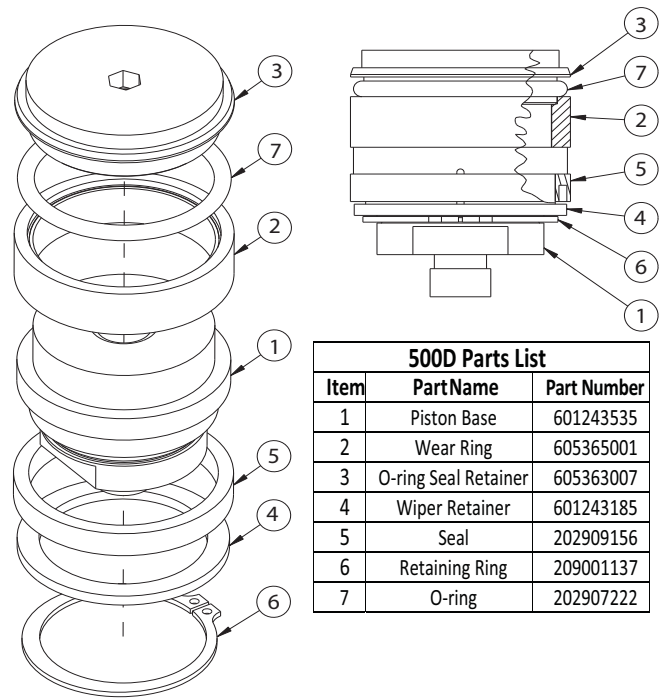


Figure 3: 500D Assembly with an O-ring

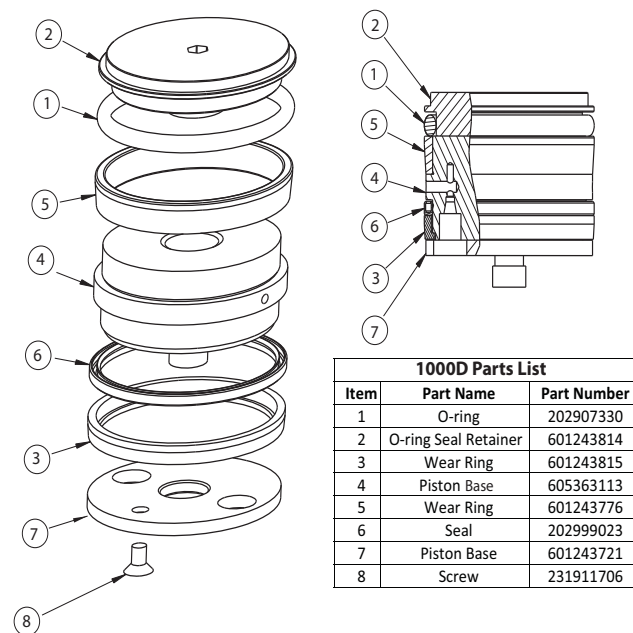


Figure 4: 1000D Assembly with an O-ring

Table 1: Specifications of ISCO Pumps with O-rings

Pump	Pressure Rating	O-ring Retainer Material	O-ring Material
500D	.6895 to 258.6 bar	Nitronic	Chemraz® or Simriz®
1000D	.06895 to 137.9 bar		

Installation

1. Run the pump until empty.
2. Remove the tubing from the inlet and outlet ports, then refill the pump with air until piston is at the lower limit.
3. Disconnect the power cord.
4. Disconnect the pump pressure transducer cable from the back of the pump.
5. Loosen the four cover screws on the sides of the tower.
6. Remove the front tower cover of the pump.
7. Loosen, but do not remove, the cylinder lock screw which is a 1/4-20 setscrew located at the top of the front side of the cylinder mounting block.
8. Unscrew the cylinder. If you need to use a wrench, we recommend using a strap wrench or the wrenches in the Teledyne ISCO wrench package (60-1247-067 for 65DM, 100DM, 100DX, and 260D; 60-1247-068 for 500D; 60-1247-093 for 1000D), which will not mar the cylinder's outer surface.
9. Once the cylinder has been unscrewed, lift it up and off the piston and the push tube.



CAUTION

Use care to pull the cylinder off straight to avoid damaging the cylinder bore with scratches.

10. Using the hex wrench, remove the seal retainer from the top of the piston. It is not necessary to remove the piston assembly. The seal will not be reused.
11. Remove the wear ring from the piston. It will also not be reused.
12. Put the new wear ring onto the piston with the stepped relief facing up.
13. Put the O-ring on the new retainer as shown in Figure 3 or 4.

14. Thread the retainer and O-ring assembly onto the piston and tighten to about 100in•lbs (11 N•m) using a wrench.
15. Carefully slide the cylinder onto the piston. Be especially careful to keep the cylinder straight with the pump to avoid scratching the cylinder bore.

Note

Wetting the O-ring with water or suitable lubricant will make installation easier.

16. Screw the cylinder into the cylinder mount until it bottoms. Use care not to force the cylinder beyond the stop.
17. Unscrew the cylinder slightly until the ports are approximately oriented to the side of the pump.



WARNING

Do not unscrew the cylinder more than one revolution from the stop.

18. Tighten the cylinder lock set screw on the front of the tower.
19. Position the front tower cover, aligning the top edge of the cover with the top surface of the press side plates.
20. Make sure the washers under the cover mounting screws are outside of the cover and tighten the cover screws.
21. Reattach the fluid connectors and check for leaks.
22. Reattach the transducer amplifier cable to the back of the pump.
23. Reconnect power and run pump until empty.

Maintenance

Leak Check

Perform the following steps to verify that the cylinder is in satisfactory condition.

1. Close the refill valve and pressurize the pump to the maximum pressure by pressing:

CONST PRESS () > PRESSURE ()
> MAX () > RUN ().

2. Allow the pump to stabilize for 15 minutes. Then record an initial reading of the remaining volume.
3. After a minimum run time of 30 minutes, record a second reading of the volume.

☑ Note

The cylinder temperature must remain constant throughout this test.

4. Calculate the flow rate using the following formula:

$$\text{FlowRate} = \frac{\text{Volume2} - \text{Volume1}}{\text{Time}}$$

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