



WELDED ALUMINUM ANGLE VALVE INSTRUCTION MANUAL FOR VALVES BUILT AUGUST 2002 & LATER

DISASSEMBLY

Disconnect all electrical and air service to the valve.

Remove the bolts from the Air Cylinder Flange and Seal Housing and lift the Cylinder and Seal Housing off of the valve.

The Seal Plate contains the main sealing O-Ring. Remove the O-Ring carefully so as not to scratch or damage the bottom of the O-Ring groove during removal.

Carefully inspect the O-Ring for wear, nicks, distortion, or imbedded particles, etc., and replacement if necessary. The Seal Plate should be extended from the Air cylinder to expose the split clamp which holds the sealing plate on the shaft.

Remove the Split Clamp bolts and the shaft will release the Seal Plate. The Seal Housing has O-Rings on its top and bottom sides and these should be inspected following the same procedure as the seal plate O-Ring.

When the Air Cylinder is removed, the Piston Cup Assembly (item 12) is exposed. Remove the Piston Hold Down Bolt (item 1) and pull the shaft out of the Seal Housing.

Clean the shaft and inspect for nicks or scratches which may damage the seal O-Rings. If nicks or scratches are present they should be removed by polishing with a 240 or finer emory paper.

To inspect the shaft seals remove Top Seal Retainer (item 14) from the Seal Housing (item 24). Remove the PolyPak High Pressure Seal (item 22) and inspect for nicks or wear, and replace if necessary.

Clean and inspect all O-Rings and seals for wear, distortion, nicks or imbedded particles and replace where necessary. Complete sets of O-Rings for any size valve are readily available and are the least expensive items to replace for continued dependable service. Grease all seals after cleaning with a good quality vacuum grease such as Apiezon M or Dow Corning silicone. Use only minimum amount of grease to prevent contamination, outgassing or shaft carry through.

Flange O-Rings are not greased when shipped with a valve to prevent dirt collection and contamination. Be sure to grease lightly when bolting mating flanges to the valve.

Make certain the mating flanges and piping are in line with the valve flanges and the correct distances apart to prevent undue strain on the valve body.

ASSEMBLY

Take the Cylinder and Seal Housing (item 24) and position it on the bonnet plate. Place the shaft through the hole in the Cylinder Mount and Seal Housing. Grease the parts, Actuating Shaft (item 13), Seal Housing O-Rings (items 7 & 8), and install as shown on the drawing. See "Shaft Seal Instructions" below.

WARNING

Be sure to slide the High Pressure Seal, Shaft Seals, and Spacers onto the shaft before re-assembling. Do not try to force the shaft through the seals as this will ruin the seals and cause a leak immediately. Refer to drawing for proper sequence of seals and spacers. Be sure that the High Pressure Seal is installed in position 22. See "Shaft Seal Instructions" below.

Place the Piston Cup Assembly (item 12) with magnet and retainer on the opposite end of the shaft and secure in position with the hold down bolt

Reconnect the seal plate to the shaft with Split Clamp & Bolts.

Align the cylinder flange and seal housing with the holes in the bonnet plate and fasten with Cylinder Retaining Screws (item 18) into the cover plate.

Assemble the solenoid valve as previously assembled and connect the air-lines to solenoid.

Check to be sure Seal Plate O-Ring has been cleaned, re-lubricated, or replaced and is in the seal plate O-Ring groove.

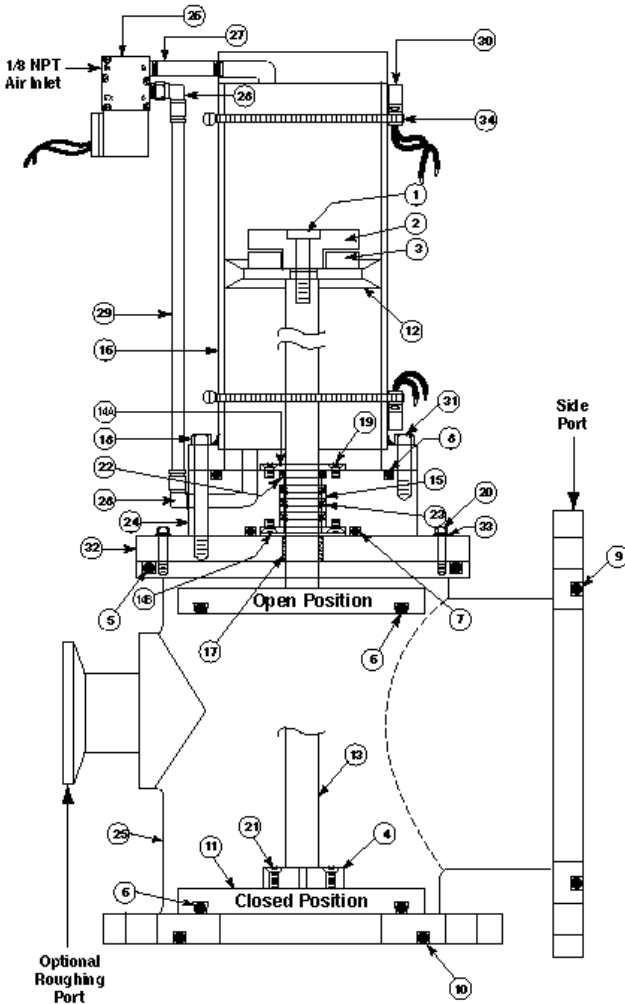
It is advisable to take the assembled valve and leak test it on a helium mass spectrometer leak detector in order to test for any possible leaks in the valve which may have resulted due to dirt particles, etc. during assembly.

Note: Air pressure should not exceed 75 psi (5 kg/cm²).

(Continued on Rear Cover)

SPARE PARTS FOR VRL STYLE WELDED ALUMINUM ANGLE VALVES

FOR VALVES BUILT AUGUST 2002 & LATER



Item	Description	2AV	3AV	4AV
		P/N	P/N	P/N
	Complete Kit of O-Rings, Shaft Seals & Piston. No Port Flange O-Rings	X810141 B \$43.00, V \$76.00	X810142 B \$43.00, V \$76.00	X810143 B \$52.00, V \$98.00
	Shaft Seal Kit With 3 Seal Rings and One Wiper Seal	X810543 B \$13.00, V \$38.00	X810543 B \$13.00, V \$38.00	X810543 B \$13.00, V \$38.00
1	Piston hold down bolt	X702221 \$.50	X702221 \$.50	X702210 \$.50
2	Magnet retainer	X700046 \$28.00	X700046 \$28.00	X700031 \$52.00
3	Magnet	X132003 \$16.00	X132003 \$16.00	X132002 \$16.00
4	Shaft retainer clamp	X700075 \$33.00	X700075 \$33.00	X700075 \$33.00
5	Bonnet plate O-ring (Add B or V Suffix)	X701239 B \$1.00, V \$4.00	X701155 B \$1.20, V \$8.00	X701356 B \$2.00, V \$10.00
6	Seal plate O-ring (Add B or V Suffix)	X701229 B \$2.25, V \$2.75	X701338 B \$2.25, V \$5.50	X701346 B \$2.25, V \$5.50
7	Seal housing to bonnet plate O-ring (B or V Suffix)	X701226 B \$.50, V \$2.10	X701226 B \$.50, V \$2.10	X701226 B \$.50, V \$2.10
8	Cylinder to seal housing O-ring (Add B or V Suffix)	X701229 B \$.50, V \$2.40	X701229 B \$.50, V \$2.40	X701235 B \$1.50, V \$3.00
9	Side port O-ring (Add B or V Suffix)	X701335 B \$1.25, V \$6.05	X701345 B \$1.50, V \$7.80	X701433 B \$2.00, V \$15.00
10	Bottom Port O-ring (Add B or V Suffix)	X701335 B 1.25, V \$6.05	X701345 B \$1.50, V \$7.80	X701433 B \$2.00, V \$15.00
11	Seal plate	X700373 \$75.00	X700088 \$92.00	X700122 \$100.00
12	Piston cup	X205002 (2.25") \$28.00	X205002 (2.25") \$28.00	X205004 (3") \$29.00
13	Shaft	X700375 \$85.00	X700185 \$97.00	X700121 \$114.00
14A	Top seal retainer	X700029 \$20.00	X700029 \$20.00	X700029 \$20.00
14B	Bottom seal retainer	X700029 \$20.00	X700029 \$20.00	X700029 \$20.00
15	Seal spacers 3 Required	X700028 \$4.00 EA.	X700028 \$4.00 EA.	X700028 \$4.00 EA.
16	Air cylinder weldment	X740034 \$140.00	X740075 \$165.00	X740009 \$177.00
17	Bonnet plate bushing	X702254 \$9.00	X702254 \$9.00	X702254 \$9.00
18	Cylinder retaining bolts 6 Required	X702048 (6) \$.25 EA	X702048 (6) \$.25 EA	X702219 (6) \$.40 EA
19	Seal retainer screws 4 required per retainer	X702055 \$.25 EA	X702055 \$.25 EA	X702055 \$.25 EA
20	Bonnet plate bolts	X702009 (4) \$.25 EA	X702016 (6) \$.25 EA	X702016 (6) \$.25 EA
21	Screws for shaft retainer clamp 4 required	X702003 \$.15 EA	X702044 \$.40 EA	X702044 \$.40 EA
22	High pressure seal (Add B or V Suffix)	X70112500625 B 5.00, V \$19.00	X70112500625 B 5.00, V \$19.00	X70112500625 B 5.00, V \$19.00
23	Vacuum shaft seals (Add B or V Suffix) 3 required	X701Q4208 B \$5.00, V \$6.50	X701Q4208 B \$5.00, V \$6.50	X701Q4208 B \$5.00, V \$6.50
24	Seal housing	X700073 \$111.00	X700073 \$111.00	X700084 \$111.00
25	Body with no roughing ports	P/N as required to indicate roughing ports and O-rings on flanges		
26	Solenoid (Select the voltage required)	115 VAC P/N X 703005, 24VDC P/N X 703031, 220 VAC P/N X 134010 \$81.00		
27	Nipple	X300009 \$1.80	X300009 \$1.80	X300009 \$1.80
28	Elbow 2 required	X702043 \$3.00 EA.	X702043 \$3.00 EA.	X702043 \$3.00 EA.
29	Hose	X701101 \$1.00	X701101 \$1.00	X701101 \$1.00
30	Position indicator switch	X703016 \$42.00	X703016 \$42.00	X703016 \$42.00
31	Cylinder seal housing bolts 6 required	N/A	N/A	N/A
32	Bonnet plate	X700374 \$70.00	X700183 \$90.00	X700098 \$111.00
33	Flat washer for bonnet plate bolts	X702250 (4) \$.10 EA	X702250 (6) \$.10 EA	X702250 (6) \$.10 EA
34	Clamp for position indicator	X703101 \$3.00	X703101 \$3.00	X703101 \$3.00

Note: Add a B for Buna or a V for Viton to the end of PN when ordering O-Rings or seals. (The seal plate O-Ring is always Viton as supplied by the factory.)

SPARE PARTS FOR VRL STYLE WELDED ALUMINUM ANGLE VALVES

FOR VALVES BUILT AUGUST 2002 & LATER

Item	Description	6AV		10AV		12AV		16AV	
		P/N		4.25 Inch Diameter Actuator Cylinder	6 Inch Diameter Actuator Cylinder	P/N		P/N	
	Complete Kit of O-Rings, Shaft Seals & Piston. No Port Flange O-Rings	X810144 B \$56.00, V \$92.00	X810145 B \$130.00, V \$212.00	X810487 B \$143.00, V \$228.00	X810486 B \$150.00, V \$250.00	X810488 B \$165.00, V \$279.00			
	Shaft Seal Kit With 3 Seal Rings and One Wiper Seal	X810543 B \$19.00, V \$38.00	X810544 B \$19.00, V \$63.00	X810544 B \$19.00, V \$63.00	X810544 B \$19.00, V \$63.00	X810544 B \$19.00, V \$63.00			
1	Piston hold down bolt	X702210 \$.50	X702231 \$.90	X702153 \$1.50	X702153 \$1.50	X702153 \$1.50			
2	Magnet retainer	X700031 \$52.00	X700031 \$52.00	X700304 \$54.00	X700304 \$54.00	X700304 \$54.00			
3	Magnet	X132002 \$16.00	X132002 \$16.00	X132004 \$28.00	X132004 \$28.00	X132004 \$28.00			
4	Shaft retainer clamp	X700075 \$33.00/Set	X700079 \$33.00/Set	X700079 \$33.00/Set	X700079 \$33.00/Set	X700079 \$33.00/Set			
5	Bonnet plate O-ring (Add B or V Suffix)	X701367 B \$2.50, V \$10.00	X701381 B \$5.00, V \$19.00	X701381 B \$5.00, V \$19.00	X701458 B \$8.00, V \$41.00	X701467 B \$17.00, V \$51.00			
6	Seal plate O-ring (Add B or V Suffix)	X701361 B \$2.50, V \$9.00	X701449 B \$4.00, V \$22.00	X701449 B \$4.00, V \$22.00	X701453 B \$7.00, V \$25.00	X701462 B \$13.00, V \$43.00			
7	Seal housing to bonnet plate O-ring (B or V Suffix)	X701226 B \$.50, V \$2.10	X701232 B \$.90, V \$4.25	X701335 B \$1.50, V \$7.50	X701335 B \$1.50, V \$7.50	X701335 B \$1.50, V \$7.50			
8	Cylinder to seal housing O-ring (Add B or V Suffix)	X701238 B \$1.50, V \$3.75	X701347 B \$1.50, V \$7.00	X701361 B \$2.00, V \$13.00	X701361 B \$2.00, V \$13.00	X701361 B \$2.00, V \$13.00			
9	Side port O-ring (Add B or V Suffix)	X701443 B \$3.25, V \$22.00	X701453 B \$7.00, V \$25.00	X701453 B \$7.00, V \$25.00	X701455 B \$7.50, V \$32.00	X701464 B \$8.00, V \$51.00			
10	Bottom Port O-ring (Add B or V Suffix)	X701443 B \$3.25, V \$22.00	X701453 B \$7.00, V \$25.00	X701453 B \$7.00, V \$25.00	X701455 B \$7.50, V \$32.00	X701464 B \$8.00, V \$51.00			
11	Seal plate	X700074 \$125.00	X700141 \$376.00	X700141 \$376.00	X700287 \$436.00	X700498 \$545.00			
12	Piston cup	X205001 (3.25") \$30.00	X205003 (4.25") \$103.00	X16119 (5.75") \$111.00	X16119 (5.75") \$111.00	X16119 (5.75") \$111.00			
13	Shaft	X700080 \$117.00	X700125 \$160.00	X700393 \$174.00	X700321 \$190.00	X700496 \$218.00			
14A	Top seal retainer	X700029 \$20.00	X700124 \$41.00	X700126 \$28.00	X700126 \$28.00	X700126 \$28.00			
14B	Bottom seal retainer	X700029 \$20.00	X700124 \$41.00	X700132 \$28.00	X700132 \$28.00	X700132 \$28.00			
15	Seal spacers 3 required	X700028 \$4.00 EA	X700130 \$18.00 EA	X700130 \$18.00 EA	X700130 \$18.00 EA	X700130 \$18.00 EA			
16	Air cylinder weldment	X740006 \$207.00	X740010 \$261.00	X740028 \$261.00	X740053 \$272.00	X740055 \$272.00			
17	Bonnet plate bushing	X702254 \$9.00	X702143 \$20.00	X702143 \$20.00	X702143 \$20.00	X702256 \$30.00			
18	Cylinder retaining bolts 6 required	X702219 (6) \$.40 EA	X702219 (6) \$.40 EA	X702181 (6) \$.50 EA	X702181 (6) \$.50 EA	X702261 (6) \$.50 EA			
19	Seal retainer screws 4 required per retainer	X702055 \$.25 EA	X702141 \$.25 EA	X702141 \$.25 EA	X702141 \$.25 EA	X702141 \$.25 EA			
20	Bonnet plate bolts	X702016 (8) \$.25 EA	X702212 (8) \$.25 EA	X702212 (8) \$.25 EA	X702212 (8) \$.25 EA	X702408 (12) \$.65 EA			
21	Screws for shaft retainer clamp 4 required	X702044 \$.40 EA	X702007 \$.40 EA	X702007 \$.40 EA	X702007 \$.40 EA	X702006 \$.40 EA			
22	High pressure seal (Add B or V Suffix)	X70112500625 B 5.00, V \$19.00	X70125001000 B 6.00, V 40.00	X70125001000 B 6.00, V 40.00	X70125001000 B 6.00, V 40.00	X70125001000 B 6.00, V \$40.00			
23	Vacuum shaft seals (Add B or V Suffix) 3 required	X701Q4208 B \$5.00, V \$6.50	X701Q4214 B \$6.00, V \$9.00	X701Q4214 B \$6.00, V \$9.00	X701Q4214 B \$6.00, V \$9.00	X701Q4214 B \$6.00, V \$9.00			
24	Seal housing	X700027 \$141.00	X700123 \$272.00	X700425 \$408.00	X700425 \$408.00	X700425 \$408.00			
25	Body with no roughing ports	P/N as required to indicate roughing ports and O-rings on flanges							
26	Solenoid (Select the voltage required)	115 VAC P/N X 703005, 24VDC P/N X 703031, 220 VAC P/N X 134010 \$81.00		X134012-115 VAC X134019-220 VAC-\$185. X134016-24 VDC-\$201.					
27	Nipple	X300009 \$1.80	X300009 \$1.80	X300011 \$2.75	X300011 \$2.75	X300011 \$2.75			
28	Elbow 2 required	X702043 \$3.00 EA.	X702043 \$3.00 EA.	X702152 \$6.50 EA.	X702152 \$6.50 EA.	X702152 \$6.50 EA.			
29	Hose	X701101 \$1.00	X701101 \$1.00	X701099 \$1.25/Ft.	X701099 \$1.25/Ft.	X701099 \$1.25/Ft.			
30	Position indicator switch	X703016 \$42.00	X703016 \$42.00	X703016 \$42.00	X703016 \$42.00	X703016 \$42.00			
31	Cylinder seal housing bolts 6 required	N/A	X702009 \$.50 EA	X702213 \$.50 EA	X702213 \$.50 EA	X702213 \$.50 EA			
32	Bonnet plate	X700081 \$207.00	X700142 \$430.00	X700364 \$430.00	X700299 \$463.00	X700497 \$545.00			
33	Flat washer for bonnet plate bolts	X702250 (8) \$.10 EA	X702226 (8) \$.10 EA	X702226 (8) \$.10 EA	X702226 (8) \$.10 EA	X702226 (12) \$.10 EA			
34	Clamp for position indicator	X703100 \$3.00	X703100 \$3.00	X703102 \$3.00	X703102 \$3.00	X703102 \$3.00			

Note: Add a B for Buna or a V for Viton to the end of PN when ordering O-Rings or seals. (The seal plate O-Ring is always Viton as supplied by the factory.)

SHAFT SEAL INSTALLATION

1. Disconnect all power sources (air and electric)
2. Remove all bolts from the Bonnet Plate and carefully lift off the entire assembly consisting of Air Cylinder, Bonnet Plate, and Seal Plate.
3. Place this assembly on a suitable work surface being very careful not to pinch or cut the Seal Plate or Bonnet Plate O- Rings.
4. Disconnect shaft from the seal plate.
5. Remove the bolts from the Cylinder Flange and lift off the Cylinder.
6. Remove the Upper and Lower Seal Retainers.
7. Remove the PolyPak Seal for high pressure.
8. Remove the three (3) Quad Rings and three (3) Seal Spacers.
9. Inspect all parts: Shaft, Seal Spacers, Shaft Seal End Cap. If the Shaft has scratches, remove them by polishing.
10. Be very careful to not scratch this shaft.
11. To reassemble apply a small amount of vacuum grease to the new Seal Rings and carefully slide them onto the shaft in the sequence shown in the drawing.

 WARNING
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Do NOT assemble the stem seal components and then try to force the shaft through. This will ruin the seal and it will leak immediately!
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12. Insert the Shaft with Shaft Seal Components into the Shaft Seal End Cap and reinstall the four (4) Shaft Seal Retainer Screws.
13. Check for easy movement of the Shaft through the Seal Kit.
14. Reassemble the remaining parts.

