OPERATION AND MAINTENANCE MANUAL

DIAPHRAGM
DESIGN
AIR OPERATED
VALVE

FOR
CL/CM/CH/OL/OM/OH
MODEL OPERATORS

10V
SW
10SM
20SM
30VM
40VM
60VM
100VM
SERIES VALVES

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ISO-9001 Certified

DIAPHRAGM DESIGN AIR OPERATED VALVE OPERATION & MAINTENANCE MANUAL

1.0 INSTALLATION

All valves are factory adjusted and tested at the pressure marked on the operator label.

Refer to Parker Autoclave Engineers' Valves, Fittings and Tubing Catalog (installation section) for proper tubing connection installation.

The air supply connection on the operator is 1/8" NPT. The recommended value for air pressure at the maximum valve operating pressures is shown on the operator label. The maximum allowable working pressure of the operator is 100 psi for OL, CL, OM and CM operators and 70 psi for OH and CH operators.

An extending stuffing box must be used at temperatures below-100°F. or above 800°F. Refer to Autoclave Engineers' Valves, Fittings and Tubing Catalog (Specialty Valves Section) for pressure ratings at various temperatures.

Use minimum required air pressure (CL, CM and CH operators) or minimum required spring precompression (OL, OM and OH operators) to increase stem and seat life. Refer to the Air Operator Sizing Data in the Valve Actuators Section of the VFT Catalog.

Applications which require extended cycle life should be considered on an individual basis.

!! CAUTION !!

! For proper operation of air operated valves, the pressure inlet to the valve should always be below the seat.

!! Rotating the operator with the valve in the closed position will damage the seat voiding the warranty.

SPRING ADJUSTMENT - OL, OM and OH VALVES ONLY

On some sizes of the OL, OM and OH operators, the spring limits the travel at the maximum pressures. This affects the flow capacity of the valve. See the Air Operator Sizing Data in the Valve Actuators Section of the VFT Catalog for actual system travel and flow coefficient.

If a longer stem travel is desired when the operating pressure is less than the maximum, then this should be requested at the time of order so that the valve will be properly adjusted at the factory. If a valve has already been set for a higher operating pressure and a longer stem travel is desired, the valve may have to be returned to the factory for stem and packing replacement and refinishing of the seat to assure an effective valve seat seal in the closed position.

3.0 PACKING ADJUSTMENT

When the valve packing starts to leak, follow the steps below to reseal the valve stem.

1. Relieve all pressure in the valve body.

2. CL, CM and CH Valves Only:
   Relieve all air pressure to the operator inlet.

   OL, OM and OH Valves Only:
   Apply and maintain air pressure to the operator inlet (so the stem is unseated).

3. Loosen the packing gland locking device.

4. While holding the valve body secure, use a torque wrench to tighten the packing gland to the value shown on the attached installation summary chart. If a torque wrench is not available, tighten the packing gland approximately 1/16 turn.

   NOTE: Do not attempt to tighten packing gland by grasping and turning the diaphragm operator housing.

5. Pressurize the valve and check for leaks.

6. If the packing still leaks, relieve all pressure in the valve and repeat steps 4 and 5. If the packing does not seal after several attempts, it probably needs replacement (refer to section 4.0).

7. Install the packing gland locking device.

8. OL, OM and OH Valves Only:
   Relieve air pressure to the operator.

4.0 PACKING OR STEM REPLACEMENT

To change packing or stem, follow the steps listed below.

1. Relieve all pressure from the valve and operator.

2. OL, OM and OH Valves Only:
   Loosen the jam nut on top of the spring housing, then loosen the screw until all spring compression is relieved. Apply air (approximately 20 psi) and maintain pressure to the operator (so the stem is unseated).

3. Loosen the packing gland locking device.

4. While holding the valve body secure, loosen the packing gland.

5. Completely loosen the packing gland and remove the valve body. The packing will stay on the stems that have a larger stem tip below the packing.

6. If the stem does not have a larger stem tip and only the packing is being replaced, go to Step #7.

   For stems that do have a larger stem tip or if the stem is being replaced, the operator must be disassembled so that the stem may be removed. Follow the instructions for disassembly of the operator in section 5.0 and remove the stem from the diaphragm head. Remove the packing gland and o-ring retainer (OL, OM and OH only) from the stem.

7. Remove the packing from the stem (stems with larger stem tip) or from the valve body (stems without this tip).

8. Place new packing and washers on the stem or in the valve body.

9. For stems with a larger stem tip, slide the stem through the packing gland and place the o-ring retainer (OL, OM and OH only) over the stem as shown in Figure 1. Follow the operator reassembly instructions in Section 5.0.

10 Place the packing gland locking device over the gland and install the gland into the valve body. OL, OM and OH only: apply and maintain air pressure to the operator (approximately 20 psi). While holding the valve body secure, tighten the packing gland to the value shown on the attached installation summary chart.

11. Secure the packing gland locking device.

12. OL, OM and OH Valves Only: Relieve air pressure to the operator and tighten the screw on top of the spring housing until the stem bottoms out on the seat. Back the screw off, then hand tighten. Tighten the screw the distance shown on the installation summary table. An equivalent amount of screw revolutions is also given. Once completed, tighten the jam nut securely in place.

5.0 SEAT REPLACEMENT (Replacement Seat Valves)

When the seat requires replacement, use the following procedure.

1. Relieve all pressure from the valve.

2. (OL, OM, and OH valves only)
   Loosen the jam nut on top of the spring housing then loosen the screw until all spring compression is relieved. Apply and maintain air (approximately 20 psi) to the operator to move the stem to the "open" position.

   (CL, CM and CH valves only)

   Relieve all pressure to the air operator.

3. While holding the valve body secure, remove the seat retainer or the seat.

4. Inspect the seat for signs of wear or damage. Replaceable seats may be reversed if only one side is worn. If both sides are worn, use a new seat.

5. Place the seat in the body and install the seat retainer. While holding the body secure, torque the seat retainer to the valve in the installation summary chart.

6. OL, OM, and OH valves only.
   Relieve all air pressure to the operator. Adjust the spring pre-compression per the specification sheets.

6.0 OL, OM, OH Operators (Refer to Figures 1, 4, 5, 6, 7, 8, and 9 for parts diagrams).

1. Disassemble the operator from the valve body as indicated in Section 4.0, Steps 1- 5.

2. Loosen the set screw (Item #14) in the lower housing (Item #2).

   NOTE: Some operators have a lock nut in lieu of a set screw. Loosen the lock nut prior to removal of the lower housing.

3. Unscrew the packing gland from the lower housing.

4. Loosen and remove the hex nuts (Item #12) around the perimeter of the housing. Remove the lock washers (Item #13) and hex head screws (Item #11) and remove the lower housing from the upper housing (Item #1).

5. Remove the diaphragm (Item #5) and diaphragm head (Item #6). If the stem does not have a larger stem tip, remove the o-ring retainer (Item #22) if the operator has one then go to Step #8. If the stem must be removed from the diaphragm head, follow Steps 6 and 7.

6. The stem may be attached to the diaphragm head in a number of different ways. Follow one of the below procedures and refer to the indicated illustration that applies to the operator being repaired.

   • **(Figure 4)** Loosen the hex socket set screw (Item #21) from the top of the diaphragm head and unscrew the stem.

   • **(Figure 5)** Remove the hex nut from the top of the diaphragm head and unscrew the stem.

7. Remove the diaphragm, o-ring retainer, and packing gland, packing and packing washers from the stem. Replace the packing if necessary.

   NOTE: If the stem does not have a larger tip, the packing and packing washers will remain in the body. Remove the packing and washers from the body and reinstall new packing.

8. Place the o-rings in the packing gland or the o-ring retainer if the operator has one. The o-rings may be installed in a number of different ways. Follow one of the below procedures and refer to the indicated illustration that applies to the operator being repaired.

   • **(Figure 6)** Place the o-rings in the o-ring retainer (P-0885, Unif. 112 and P-6002, Unif. 108) and make sure the o-ring retainer is placed around the stem on top of the packing gland before replacing in the lower housing. Reinstall retaining ring to secure o-ring retainer.

   • **(Figure 7)** Remove the sleeve from the packing gland bore. Replace the o-ring (P-0847 Unif. 107) in the bore. Replace the o-ring in the groove (P-0885, Unif. 112) on the outside of the packing gland and replace the sleeve.

   • **(Figure 8)** Remove the retaining ring and sleeve from the packing gland bore. Replace the o-ring (P-0847, Unif. 007) in the bore. Replace the o-ring in the groove (P-0885, Unif. 112) on the outside of the packing gland and replace the sleeve and retaining ring.

   • **(Figure 9)** Loosen the hex jam nut on the packing gland. Remove the insert from the packing gland. Replace the o-ring (P-0867, Unif. 110 or P-0848 Unif. 009) around the stem on top of the packing gland. Replace the insert and tighten the hex jam nut. It is necessary to have the stem pushed up through the packing gland at this time to be sure that the o-ring seals around it.

     For stems that have a larger stem tip, install the bottom washer, new packing and the packing washer on the stem.

9. Screw the packing gland into the lower housing and tighten the set screw or lock nut. If necessary, place the o-ring retainer above the packing gland, as shown in Figure 1.

10. Place a new diaphragm in the lower housing, making sure that it fits into the recess, as shown in Figure 1. Refer to the replacement parts list for the proper diaphragm part number.

11. Place the diaphragm head over the diaphragm, place the washer onto the stem, push the stem through the packing gland, o-ring retainer and diaphragm, and attach it into the diaphragm head. If necessary, replace the tighten the set screw or hex nut depending on which figure (4 or 5) is applicable to the stem attachment.

12. Place the spring (Item #8) over the diaphragm head and place the spring suppressor (Item #4) over the spring.

13. Place the upper housing on the lower housing, reinsert the hex head cap screws (Item #11), install the washers (Item #13) and nuts (Item #12) and gradually tighten the nuts around the perimeter of the housing.

14. Follow the instructions in Section 4.0, Steps 10-12 to install the operator to the body and adjust the spring.

6.1 CL, CM and CH Operators (refer to Figures 2 and 3 for parts diagrams).

1. Disassemble the operator from the valve body as indicated in Section 4.0, steps 1 - 5.

2. Loosen and remove the hex nuts (Item #9) around the perimeter of the housing. Re move the lock washers (Item #10) and hex head screws (Item #8) and remove the upper housing (Item #1) from the lower housing (Item #2).

CH only - remove the nut and stop from the top of the diaphragm head.

3. Remove the diaphragm (Item #4) and diaphragm head (Item #3).

4. If the stem has a larger tip below the packing and the packing or stem requires replacement, the stem must be removed from the diaphragm head. If not, proceed to Step 9.

5. Refer to Figure 3. Loosen the hex nut under the diaphragm head or the set screw above the diaphragm and unscrew the stem.

6. Remove the packing washer from the stem and replace the packing, if necessary.

NOTE: If the stem does not have a larger tip, the packing and packing washers will remain in the body. Remove the packing and washers from the body and replace the packing.

7. Slide the stem up through the packing gland and spring (Item #7).

8. Screw the stem into the diaphragm head and tighten the hex nut or hex socket set screw depending on how the stem is attached (Figure 3).

   CH only - Place stop onto stem above the diaphragm head then install and tighten nut.

9. Be sure that the spring (Item #7) is sitting on top of the packing gland and the diaphragm head sits on top of the spring, as shown in Figure 2.

10. Place a new diaphragm in the lower housing, making sure that it fits into the recess, as shown in Figure 2. Refer to the replacement parts list for the proper diaphragm part number.

> **NOTE:** Make sure that the diaphragm head is free of sharp edges before installing, as it may cause damage to the diaphragm.

11. Place the upper housing on the lower housing, insert the hex head cap screws (Item #8), install the washers (Item #10) and nuts (Item #9) and gradually tighten the nuts around the perimeter of the housing.

12. Follow the instructions in Section 4.0, Steps 10-12 to install the operator to the body.

7.0 SERVICE

For service, contact the Parker Autoclave Engineers Representative in your area, or FAX Parker Autoclave Engineers' Customer Support at 1-814-860-5811.

REPLACEMENT PARTS LISTS - Diaphragm Part Number

VALVE SERIES	OL	OM	OH	CL	CM	CH
10V2	3030-1414	105A-0226	-	3030-1414	102A-0326	-
10V4	3030-1414	103A-0326	-	3030-1414	102A-0326	-
10V6	3030-1414	103A-0326	-	3030-1414	102A-0326	-
10V8	-	103A-0326	-	-	102A-0326	-
SW4	-	105A-0326	-	-	102A-0326	-
SW6	-	105A-0326	-	-	102A-0326	-
SW8	-	105A-0326	-	-	102A-0326	-
10/20SM4	-	105A-0326	3100-2023	-	102A-0326	3100-2023
10/20SM6	-	105A-0326	3100-2023	-	102A-0326	3100-2023
10/20SM9	-	105A-0326	3100-2023	-	102A-0326	3100-2023
30VM4	3030-1414	103A-0326	3040-1897	3030-1414	102A-0326	3040-1897
30VM6	3030-1414	103A-0326	3040-1897	3030-1414	102A-0326	3040-1897
30VM9	3030-1414	103A-0326	3040-1897	3030-1414	102A-0326	3040-1897
60VM4	-	103A-0326	3040-1897	-	102A-0326	3040-1897
60VM6	-	103A-0326	3040-1897	-	102A-0326	3040-1897
60VM9	-	103A-0326	3040-1897	-	102A-0326	3040-1897

DIAPHRAGM AIR OPERATED VALVES - Installation Summary Chart - Air-to-Close

VALVE SERIES	Packing Gland Hex Size in (mm)	Packing Gland Torque ft-lbs (Nm)	Seat Retainer Torque ft-lbs (Nm)	Tube Gland Hex Size in (mm)	Tube Gland Torque ft-lbs (Nm)
10V2-CL	13/16 (20.6)	15 (20.4)	12 (16.3)	1/2 (12.7)	Note 4
10V2-CM	13/16 (20.6)	15 (20.4)	12 (16.3)	1/2 (12.7)	Note 4
10V4-CL	13/16 (20.6)	35 (47.4)	10 (13.6)	13/16 (20.6)	Note 4
10V4-CM	15/16 (23.8)	50 (67.8)	20 (27.1)	13/16 (20.6)	Note 4
10V6-CL	13/16 (20.6)	50 (67.8)	20 (27.1)	13/16 (20.6)	Note 4
10V6-CM	15/16 (23.8)	65 (88.4)	30 (40.8)	13/16 (20.6)	Note 4
10V8-CM	13/16 (20.6)	50 (67.8)	15 (20.3)	7/8 (22.2)	Note 4
SW4-CL	13/16 (20.6)	15 (20.3)	15 (20.3)	9/16 (14.3)	Note 4
SW4-CM	13/16 (20.6)	25 (47.3)	30 (40.8)	9/16 (14.3)	Note 4
SW6-CM	13/16 (20.6)	50 (67.8)	40 (54.4)	11/16 (17.5)	Note 4
SW8-CM	13/16 (20.6)	60 (81.6)	70 (95.2)	7/8 (22.2)	Note 4
SW8-CH	13/16 (20.6)	65 (88.4)	80 (108.8)	7/8 (22.2)	Note 4
20SM4-CM	13/16 (20.6)	40 (54.2)	35 (47.4)	1/2 (12.7)	20 (27.1)
20SM4-CH	13/16 (20.6)	40 (54.2)	35 (47.4)	1/2 (12.7)	20 (27.1)
20SM6-CM	13/16 (20.6)	60 (81.3)	40 (54.2)	5/8 (15.9)	30 (40.7)
20SM6-CH	13/16 (20.6)	60 (81.3)	40 (54.2)	5/8 (15.9)	30 (40.7)
10/20SM9-CM	13/16 (20.6)	25 (33.9)	55 (74.5)	7/8 (22.2)	30 (40.7)
10/20SM9-CH	13/16 (20.6)	60 (81.3)	35 (47.4)	7/8 (22.2)	40 (54.2)
10/20SM12-CM	15/16 (23.8)	Note 2	20 (27.1)	1-3/16 (30.2)	25 (33.8)
10/20SM12-CH	15/16 (23.8)	Note 2	35 (47.4)	1-3/16 (30.2)	45 (60.9)
10/20SM16-CM	15/16 (23.8)	Note 2	50 (67.8)	1-3/8 (34.9)	40 (54.2)
10/20SC16-CH	1-3/8 (34.9)	Note 2	65 (81.3)	1-3/8 (34.9)	50 (67.8)
30VM4-CL	13/16 (20.6)	25 (33.9)	15 (20.3)	5/8 (15.9)	10 (13.6)
30VM4-CM	13/16 (20.6)	40 (54)	35 (47.4)	5/8 (15.9)	15 (20.3)
30VM4-CH	13/16 (20.6)	40 (54)	35 (47.4)	5/8 (15.9)	15 (20.3)

DIAPHRAGM AIR OPERATED VALVES - Installation Summary Chart - Air-to-Close

VALVE SERIES	Packing Gland Hex Size in (mm)	Packing Gland Torque ft-lbs (Nm)[1]	Seat Retainer Torque ft-lbs (Nm)	Tube Gland Hex Size in (mm)	Tube Gland Torque ft-lbs (Nm)
30VM6-CL	13/16 (20.6)	35 (47.4)	15 (20.3)	13/16 (20.6)	10 (13.6)
30VM6-CM	13/16 (20.6)	40 (54)	35 (47.4)	13/16 (20.6)	25 (33.8)
30VM6-CH	13/16 (20.6)	40 (54)	35 (47.4)	13/16 (20.6)	25 (33.8)
30VM9-CL	13/16 (20.6)	35 (47.4)	15 (20.3)	1-3/16 (30.2)	10 (13.6)
30VM9-CM	13/16 (20.6)	40 (54)	35 (47.4)	1-3/16 (30.2)	55 (74.5)
30VM9-CH	13/16 (20.6)	40 (54)	35 (47.4)	1-3/16 (30.2)	55 (74.5)
60VM4-CM	13/16 (20.6)	60 (81.3)	45 (60.9)	5/8 (15.9)	25 (33.8)
60VM4-CH	13/16 (20.6)	60 (81.3)	45 (60.9)	5/8 (15.9)	25 (33.8)
60VM6-CM	13/16 (20.6)	60 (81.3)	45 (60.9)	13/16 (20.6)	50 (67.8)
60VM6-CH	13/16 (20.6)	60 (81.3)	45 (60.9)	13/16 (20.6)	50 (67.8)
60VM9-CM	13/16 (20.6)	60 (81.3)	45 (60.9)	1-3/16 (30.2)	110 (149.0)
60VM9-CH	13/16 (20.6)	60 (81.3)	45 (60.9)	1-3/16 (30.2)	110 (149.0)
100VM5-CH	15/16 (23.8)	60 (81.3)	70 (95.2)	11/16 (17.5)	110 (149.0)

Notes:

1. Torque may vary +/- 10%. Torque applies to PTFE or nylon/leather packings. Add 10% to above values for PTFE Glass and 25% to above values for graphite yarn.

2. Finger tight then 3/4 turn with wrench. (PTFE only).

3. Spring pre-compression required at the maximum working pressure of the valve.

4. Torque wrench not required for AE SpeedBite tube connections. Tighten the gland until the sleeve begins to grip the tubing, then 1-1/4 turns.

DIAPHRAGM AIR OPERATED VALVES - Installation Summary Chart - Air-to-Open

VALVE SERIES	Packing Gland Hex Size in (mm)	Packing Gland Torque ft-lbs (Nm)	Seat Retainer Torque ft-lbs (Nm)	Spring Pre-Compression in (mm)	Equiv-alent Turns	Tube Gland Hex Size in (mm)	Tube Gland Torque ft-lbs (Nm)
10V2-OL	13/16 (20.6)	10 (13.6)	10 (13.6)	0.38 (9.5)	7.6	1/2 (12.7)	Note 4
10V2-OM	13/16 (20.6)	15 (20.4)	12 (16.3)	0.25 (6.4)	3.25	1/2 (12.7)	Note 4
10V4-OL	15/16 (23.8)	35 (47.4)	10 (13.6)	0.38 (9.5)	7.6	13/16 (20.6)	Note 4
10V4-OM	13/16 (20.6)	50 (68.0)	20 (27.2)	0.38 (9.5)	5	13/16 (20.6)	Note 4
10V6-OL	15/16 (23.8)	35 (47.4)	10 (13.6)	0.38 (9.5)	7.6	13/16 (20.6)	Note 4
10V6-OM	13/16 (20.6)	50 (68.0)	20 (27.2)	0.22 (5.6)	2.9	13/16 (20.6)	Note 4
10V8-OM	13/16 (20.6)	50 (67.8)	15 (20.3)	0.44 (11.2)	5.7	7/8 (22.2)	Note 4
SW4-OM	13/16 (20.6)	35 (47.6)	30 (40.8)	0.46 (11.7)	5.7	9/16 (14.3)	Note 4
SW6-OM	13/16 (20.6)	40 (54.4)	50 (68.0)	0.56 (14.2)	7.4	11/16 (17.5)	Note 4
SW8-OM	13/16 (20.6)	50 (67.8)	50 (67.8)	0.56 (14.2)	7.4	7/8 (22.2)	Note 4
SW8-OH	13/16 (20.6)	65 (88.4)	80(108.8)	0.56 (14.2)	7.4	7/8 (22.2)	Note 4
20SM4-OM	13/16 (20.6)	60 (81.3)	35 (47.4)	0.56 (14.2)	7.3	1/2 (12.7)	20 (27.1)
20SM4-OH	13/16 (20.6)	60 (81.3)	40 (54.2)	0.69 (17.5)	9	1/2 (12.7)	20 (27.1)
20SM6-OM	13/16 (20.6)	40 (54.2)	35 (47.4)	0.56 (14.2)	7.3	5/8 (15.9)	30 (40.7)
20SM6-OH	13/16 (20.6)	60 (81.3)	40 (54.2)	0.56 (14.2)	7.3	5/8 (15.9)	30 (40.7)
10/20SM9-OM	13/16 (20.6)	25 (33.9)	55 (74.6)	0.44 (11.2)	5.7	7/8 (22.2)	30 (40.7)
10/20SM9-OH	13/16 (20.6)	65 (88.0)	55 (74.6)	0.56 (14.2)	7.3	7/8 (22.2)	40 (54.2)
10/20SM12-OH	15/16 (23.8)	Note 2	80 (108)	0.38 (9.5)	5	1-3/16 (30.2)	45 (60.9)
10/20SM16-OH	1-3/8 (34.9)	Note 2	65 (81.3)	0.69 (17.5)	9	1-3/8 (34.9)	50 (67.8)
30VM4-OL	13/16 (20.6)	25 (33.9)	15 (20.3)	0.69 (17.5)	13.8	5/8 (15.9)	10 (13.6)
30VM4-OM	13/16 (20.6)	40 (54)	35 (47.4)	0.312 (7.9)	4	5/8 (15.9)	15 (20.3)
30VM4-OH	13/16 (20.6)	40 (54)	35 (47.4)	0.44 (11.2)	5.7	5/8 (15.9)	15 (20.3)
30VM6-OM	13/16 (20.6)	40 (54)	35 (47.4)	0.50 (12.7)	6.5	13/16 (20.6)	25 (33.9)
30VM6-OH	13/16 (20.6)	40 (54)	35 (47.4)	0.38 (9.5)	4.8	13/16 (20.6)	25 (33.9)

DIAPHRAGM AIR OPERATED VALVES - Installation Summary Chart - Air-to-Open

VALVE SERIES	Packing Gland Hex Size in (mm)	Packing Gland Torque ft-lbs (Nm)	Seat Retainer Torque ft-lbs (Nm)	Spring Pre-Compression in (mm)	Equivalent Turns	Tube Gland Hex Size in (mm)	Tube Gland Torque ft-lbs (Nm)
30VM9-OM	13/16 (20.6)	40 (54)	35 (47.4)	0.5 (12.7)	6.5	1-3/16 (30.2)	55 (74.5)
30VM9-OH	13/16 (20.6)	40 (54)	35 (47.4)	0.38 (9.5)	4.8	1-3/16 (30.2)	55 (74.5)
60VM4-OM	13/16 (20.6)	60 (81.3)	45 (60.9)	0.38 (9.5)	4.8	5/8 (15.9)	25 (33.8)
60VM4-OH	13/16 (20.6)	60 (81.3)	45 (60.9)	0.5 (12.7)	6.5	5/8 (15.9)	25 (33.8)
60VM6-OM	13/16 (20.6)	60 (81.3)	45 (60.9)	0.38 (9.5)	4.8	13/16 (20.6)	50 (67.8)
60VM6-OH	13/16 (20.6)	60 (81.3)	45 (60.9)	0.5 (12.7)	6.5	13/16 (20.6)	50 (67.8)
60VM9-OM	13/16 (20.6)	60 (81.3)	45 (60.9)	0.56 (14.2)	7.3	1-3/16 (30.2)	110 (149.0)
60VM9-OH	13/16 (20.6)	60 (81.3)	45 (60.9)	0.69 (17.5)	13.8	1-3/16 (30.2)	110 (149.0)
100VM5-OH	15/16 (23.8)	45 (61.4)	70 (95.2)	0.56 (14.2)	7.3	11/16 (17.5)	110 (149.0)

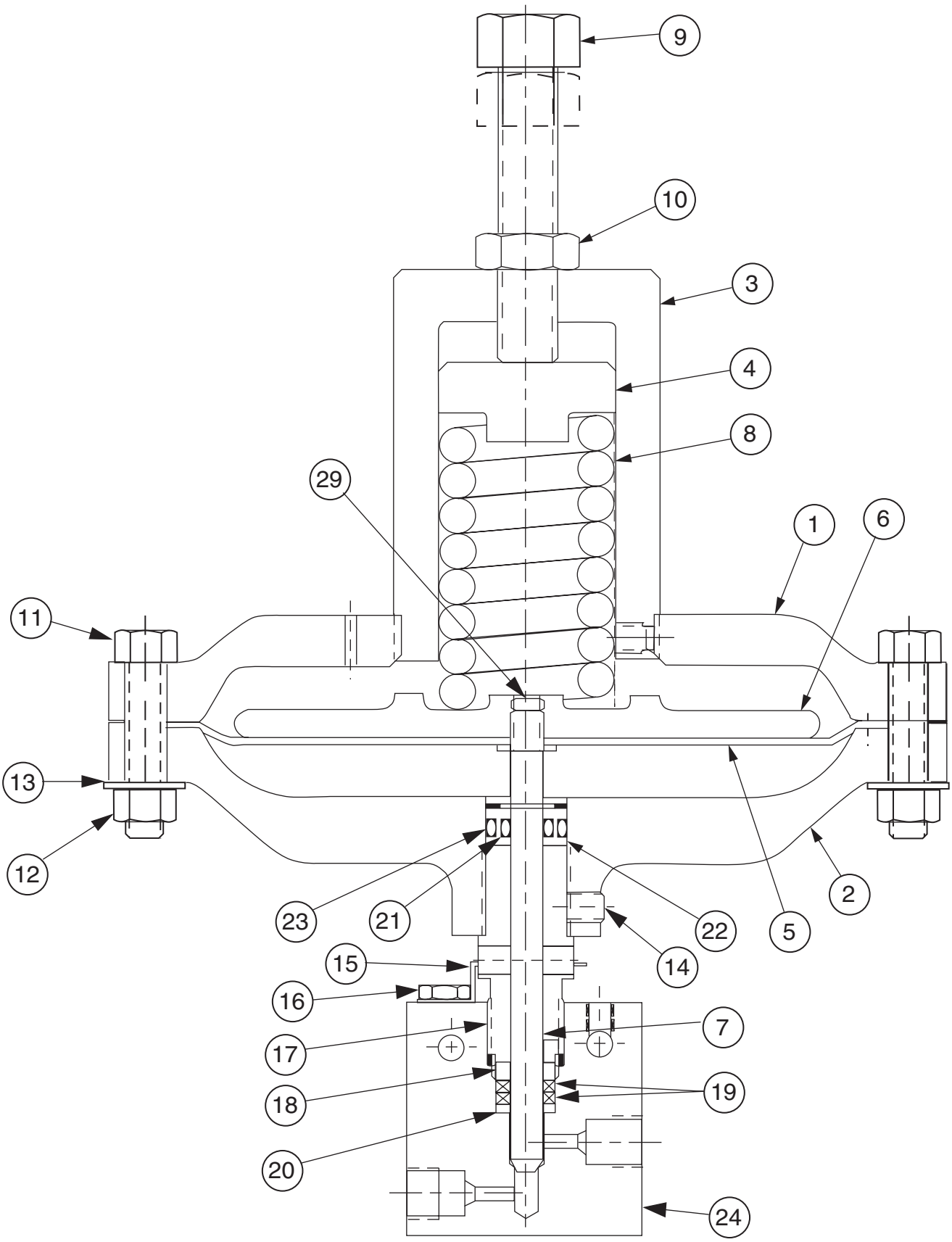
Notes:

1. Torque may vary +/- 10%. Torque applies to PTFE or nylon/leather packings. Add 10% to above values for PTFE Glass and 25% to above values for graphite yarn.

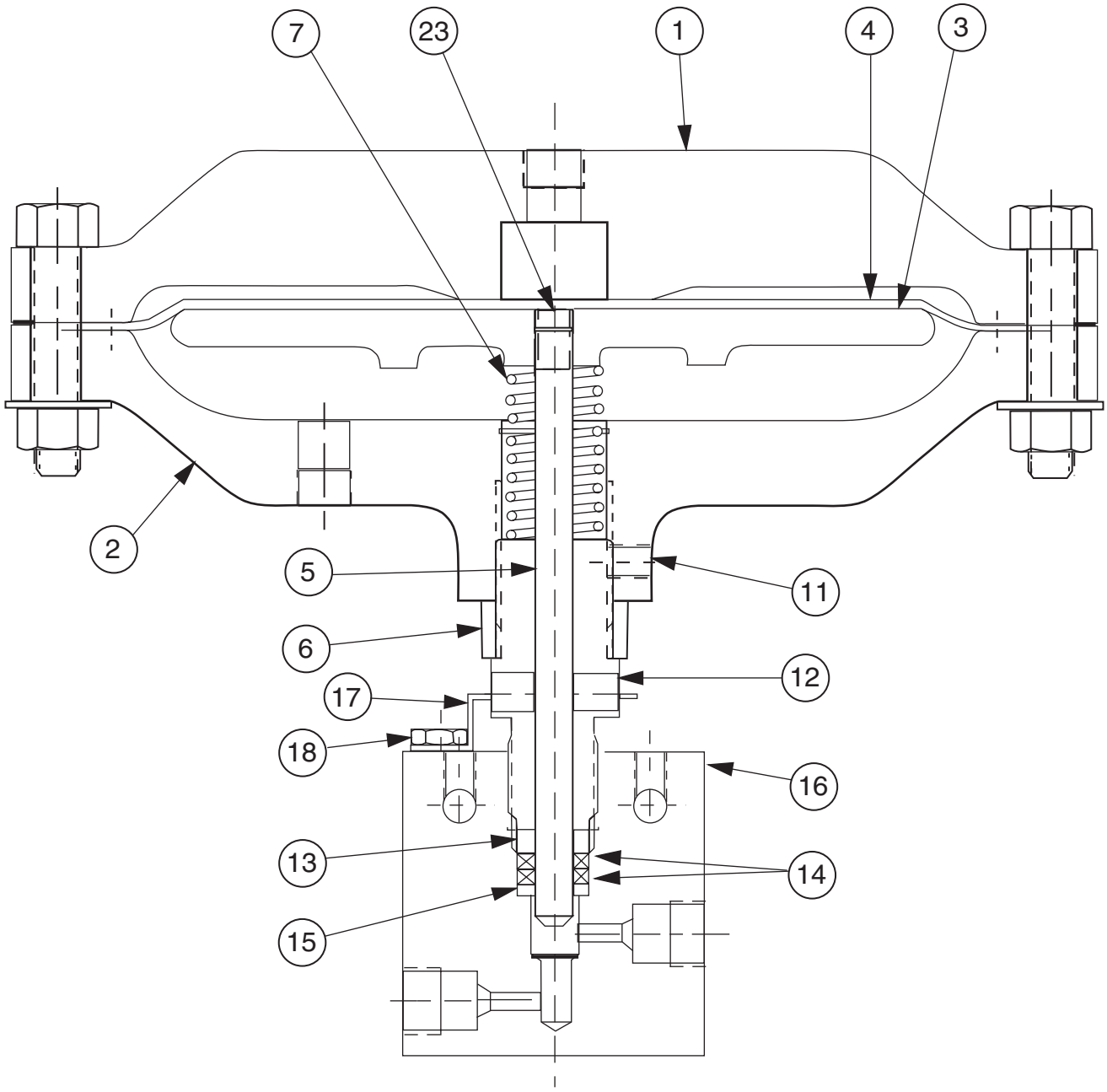
2. Finger tight then 3/4 turn with wrench. (PTFE only).

3. Spring pre-compression required at the maximum working pressure of the valve.

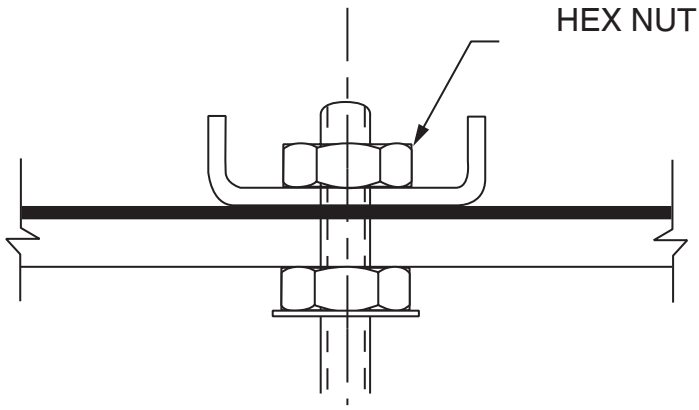
4. Torque wrench not required for AE SpeedBite tube connections. Tighten the gland until the sleeve begins to grip the tubing, then 1-1/4 turns.



-OM
figure #1



-CM
figure #2



-CH ONLY
figure #3

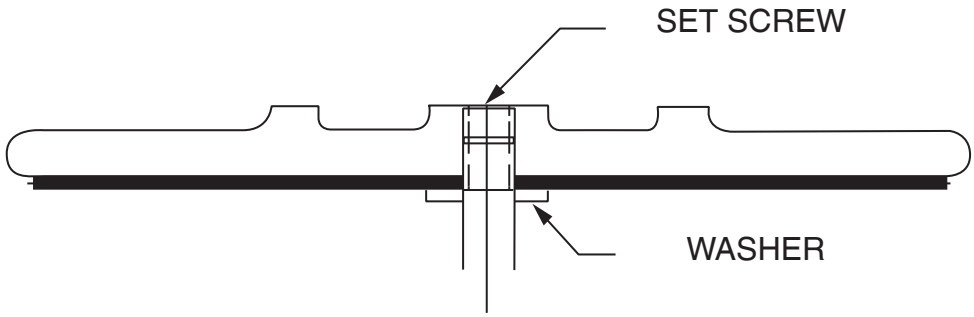


figure #4

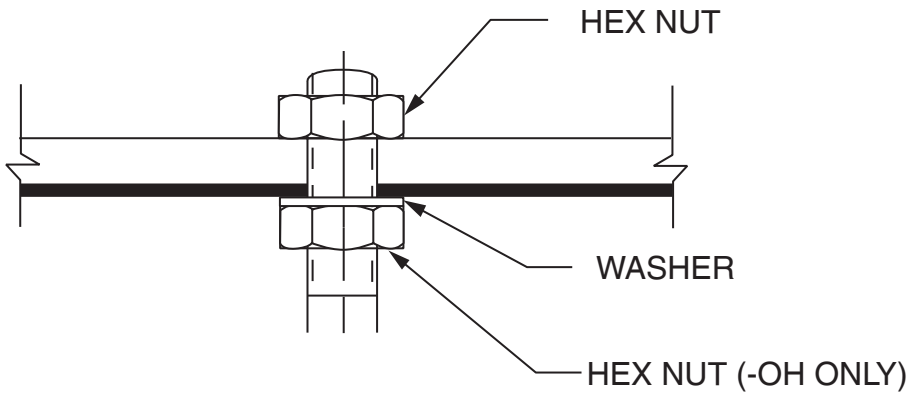


figure #5

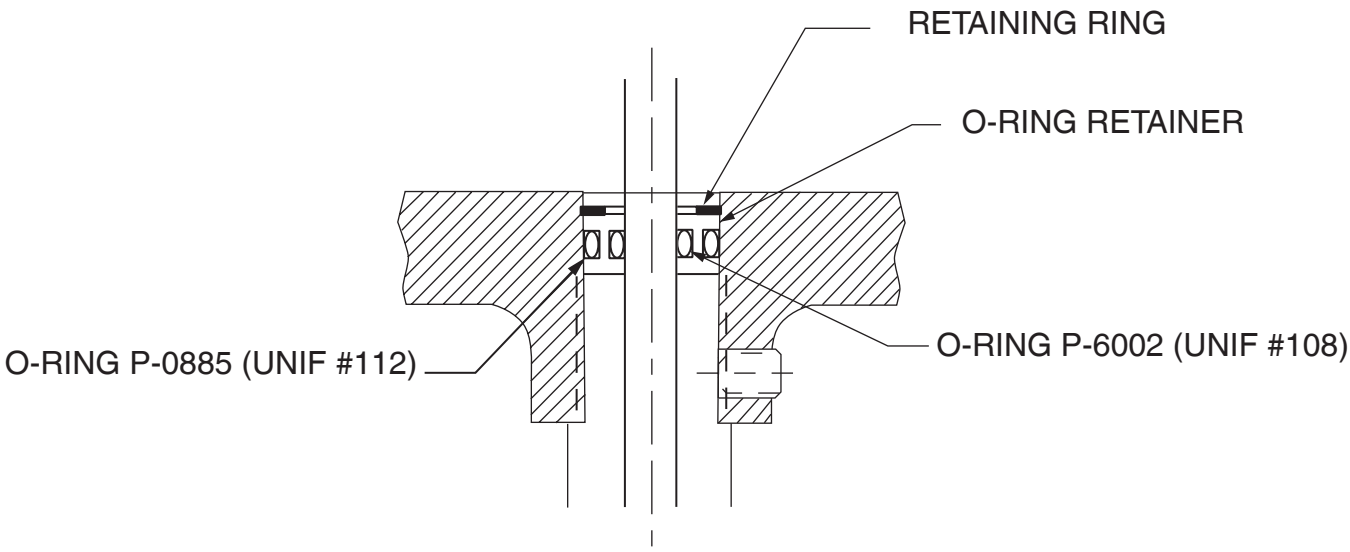


figure #6
OM OPERATOR 1/8” 1OV, ALL SW 8 20SM VALVES

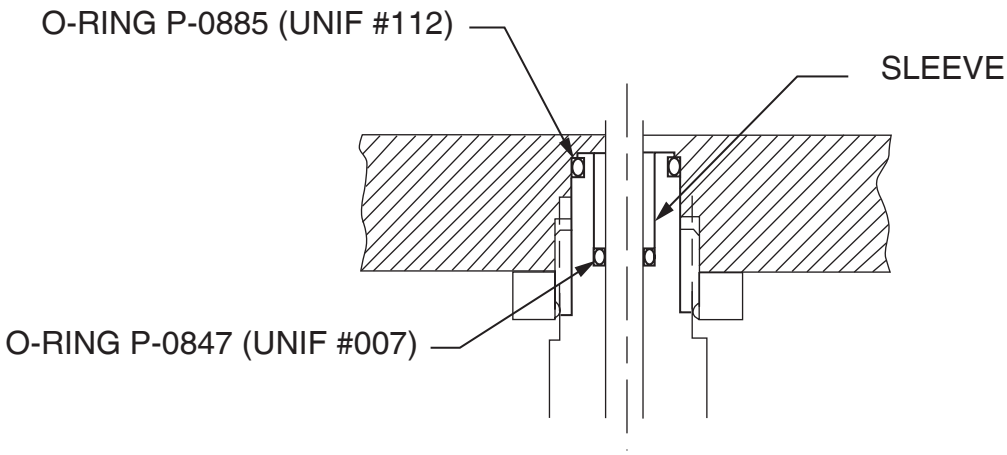


figure #7
OL OPERATORS

CAUTION: While testing has shown O-rings to provide satisfactory service life, both cyclic and shelf life may vary widely with differing service conditions, properties of reactants, pressure and temperature cycling and age of the O-ring, FREQUENT INSPECTIONS SHOULD BE MADE to detect any deterioration, and O-rings replaced as required.

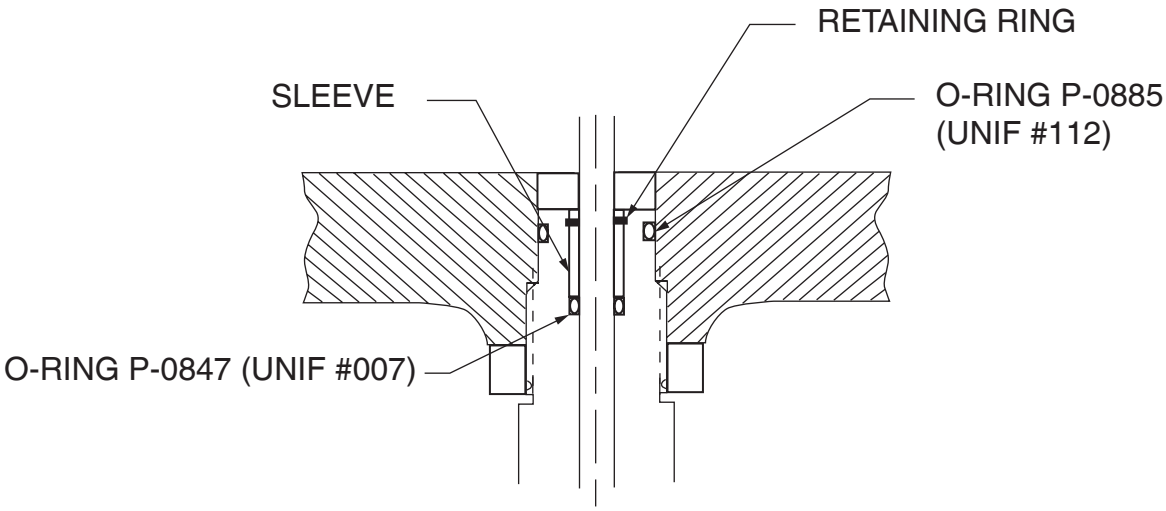


figure #8
OM OPERATOR 1/4, 3/8, 1/2 1OV & ALL 30VM & 60VM VALVES

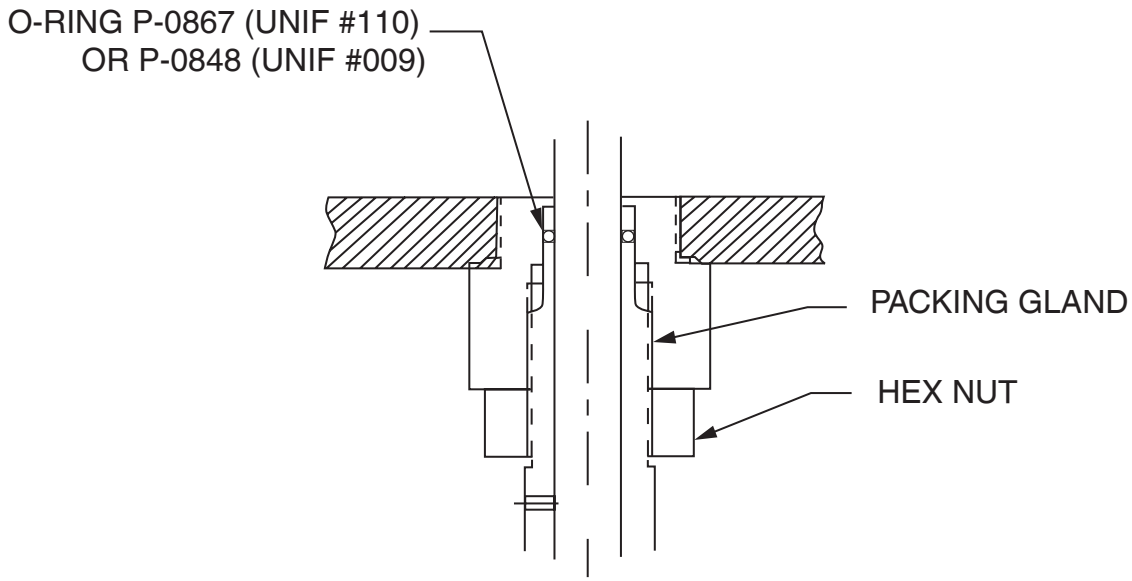


figure #9
OH OPERATORS

CAUTION: While testing has shown O-rings to provide satisfactory service life, both cyclic and shelf life may vary widely with differing service conditions, properties of reactants, pressure and temperature cycling and age of the O-ring, FREQUENT INSPECTIONS SHOULD BE MADE to detect any deterioration, and O-rings replaced as required.

Air-to-Close - Series 10V and SW Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)								Maximum Pressure psi (bar)*	Stem Travel in (mm)	Flow Coefficient**
			1-4 (6.89-27.57)	6 (41.37)	8 (55.16)	10 (68.95)	12 (82.74)	14 (96.53)	15 (103.42)				
10V2	Light Duty	Air Pressure psi (bar)	30 (2.07)	40 (2.76)	55 (3.79)	65 (4.48)	85 (5.86)	95 (6.55)	100 (6.89)		15,000 (1034.20)	0.16 (4.06)	0.12
	Medium Duty		25 (1.72)	25 (1.72)	25 (1.72)	25 (1.72)	25 (1.72)	25 (1.72)	30 (2.07)				
10V4	Light Duty		40 (2.76)	60 (4.13)	75 (5.17)	95 (6.55)					10,000 (689.46)	0.19 (4.83)	0.20
	Medium Duty		30 (2.07)	30 (2.07)	30 (2.07)	30 (2.07)	35 (2.41)	35 (2.41)	40 (2.76)		15,000 (1034.20)		
10V6	Light Duty		40 (2.76)	60 (4.13)	75 (5.17)	100 (6.89)					10,000 (689.46)	0.19 (4.83)	0.20
	Medium Duty		30 (2.07)	30 (2.07)	30 (2.07)	35 (2.41)	35 (2.41)	35 (2.41)	40 (2.76)		15,000 (1034.20)		
10V8	Medium Duty		50 (3.45)	50 (3.45)	55 (3.79)	65 (4.48)	75 (5.10)	85 (5.86)	90 (6.21)		10,000 (689.46)	0.31 (7.90)	0.086
SW4	Medium Duty		40 (2.76)	40 (2.76)	40 (2.76)	50 (3.45)	55 (3.79)	60 (4.13)	65 (4.48)		15,000 (1034.20)	0.25 (6.40)	0.065
SW6	Medium Duty		50 (3.45)	50 (3.45)	55 (3.79)	70 (4.83)	75 (5.17)	85 (5.86)	90 (6.21)		15,000 (1034.20)	0.25 (6.40)	0.095
	Heavy Duty		20 (1.38)	25 (1.72)	30 (2.07)	35 (2.41)	40 (2.76)	45 (3.10)	50 (3.45)		15,000 (1034.20)		
SW8	Medium Duty		65 (4.48)	70 (4.83)	100 (6.89)						8,500 (586.46)	0.38 (9.70)	1.90
	Heavy Duty		35 (2.41)	35 (2.41)	50 (3.45)	60 (4.13)					10,000 (698.46)		

Series 10SM

Valve Series	Operator Duty		System Pressure KSI (Mpa)											Maximum Pressure psi (bar)*	Stem Travel in (mm)	Flow Coefficient**
			1-3 (6.89-20.68)	4 (27.58)	6 (41.37)	8 (55.16)	10 (68.95)	12 (82.74)	14 (96.53)	16 (110.31)	18 (124.10)	20 (137.89)				
10SM9	Medium Duty	Air Pressure psi (bar)	65 (4.48)	65 (4.48)	75 (5.17)	100 (6.89)								8,600 (592.94)	0.38 (9.65)	1.75
	Heavy Duty		35 (2.41)	35 (2.41)	40 (2.76)	50 (3.45)	55 (3.79)							10,000 (689.46)		
10SM12	Medium Duty		90 (6.21)	100 (6.89)										4,800 (330.94)	0.44 (11.18)	2.80
	Heavy Duty		45 (3.10)	45 (3.10)	60 (4.13)	80 (5.52)	100 (6.89)							10,000 (689.46)		
10SM16	Medium Duty		100 (6.89)											2,800 (193.05)	0.56 (14.22)	5.20
	Heavy Duty		60 (4.13)	70 (4.83)	100 (6.89)									6,300 (434.36)		

NOTE: *Operator Suffix:* ***CL*** *- Light Duty* ***CM*** *- Medium Duty* ***CH*** *- Heavy Duty*

*** C_V data is for 2-way straight valves.*
For angle pattern, add approximately 50% to the C_V valve.

*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change.
For prompt service, Parker Autoclave stocks select products. Consult your local representative.

Air-to-Close - Series 20SM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)											Maximum Pressure psi (bar)*	Stem Travel in (mm)	Flow Coefficient**
			1-3 (6.89-20.68)	4 (27.58)	6 (41.37)	8 (55.16)	10 (68.95)	12 (82.74)	14 (96.53)	16 (110.31)	18 (124.10)	20 (137.89)				
20SM4	Medium Duty	Air Pressure psi (bar)	40 (2.76)	40 (2.76)	40 (2.76)	40 (2.76)	50 (3.45)	60 (4.13)	70 (4.83)	80 (5.52)	85 (5.86)	95 (6.55)		20,000 (1378.93)	0.25 (6.35)	0.31
	Heavy Duty		20 (1.38)	20 (1.38)	20 (1.38)	20 (1.38)	25 (1.72)	30 (2.07)	35 (2.41)	40 (2.76)	45 (3.10)	50 (3.45)				
20SM6	Medium Duty		45 (3.10)	45 (3.10)	45 (3.10)	45 (3.10)	55 (3.79)	65 (4.48)	75 (5.17)	85 (5.86)	95 (6.55)	100 (6.89)		19,000 (1309.98)	0.25 (6.35)	0.75
	Heavy Duty		25 (1.72)	25 (1.72)	25 (1.72)	25 (1.72)	30 (2.07)	35 (2.41)	40 (2.76)	45 (3.10)	50 (3.45)	55 (3.79)		20,000 (1378.93)		
20SM9	Medium Duty		60 (4.13)	60 (4.13)	65 (4.48)	80 (5.52)	100 (6.89)							10,700 (737.73)	0.38 (9.65)	1.30
	Heavy Duty		30 (2.07)	30 (2.07)	30 (2.07)	40 (2.76)	50 (3.45)	55 (3.79)	60 (4.13)	70 (4.83)	80 (5.52)	85 (5.86)		20,000 (1378.93)		
20SM12	Medium Duty		80 (5.44)	80 (5.44)	100 (6.80)									6,100 (420.57)	0.44 (11.18)	2.50
	Heavy Duty		40 (2.72)	40 (2.72)	50 (3.40)	60 (4.08)	75 (5.10)	90 (6.12)	100 (6.80)					13,600 (937.67)		
20SM16	Medium Duty		100 (6.89)	100 (6.89)										3,900 (268.89)	0.56 (14.22)	3.40
	Heavy Duty		50 (3.45)	50 (3.45)	70 (4.83)	100 (6.89)								8,800 (606.73)		

Series 30VM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)											Maximum Pressure psi (bar)*	Stem Travel in (mm)	Flow Coefficient**
			1-10 (6.89-68.94)	12 (82.74)	14 (96.53)	16 (110.31)	18 (124.10)	20 (137.89)	22 (151.68)	24 (165.47)	26 (179.26)	28 (193.05)	30 (206.84)			
30VM4	Medium Duty	Air Pressure psi (bar)	25 (1.72)	25 (1.72)	25 (1.72)	30 (2.07)	35 (2.41)	35 (2.41)	40 (2.76)	45 (3.10)	50 (3.45)	50 (3.45)	55 (3.79)	30,000 (2068.39)	0.19 (4.83)	0.12
	Heavy Duty		15 (1.03)	15 (1.03)	15 (1.03)	15 (1.03)	20 (1.38)	20 (1.38)	20 (1.38)	25 (1.72)	25 (1.72)	25 (1.72)	30 (2.07)			
30VM6 & 30VM9	Medium Duty		30 (2.07)	30 (2.07)	35 (2.41)	40 (2.76)	45 (3.10)	50 (3.45)	55 (3.79)	60 (4.13)	65 (4.48)	70 (4.83)	75 (5.17)	30,000 (2068.39)	0.19 (4.83)	0.23 (30VM6)
	Heavy Duty		15 (1.03)	15 (1.03)	20 (1.38)	20 (1.38)	25 (1.72)	25 (1.72)	30 (2.07)	30 (2.07)	35 (2.41)	35 (2.41)	40 (2.76)			0.33 (30VM9)

Series 40VM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)								Maximum Pressure psi (bar)*	Stem Travel in (mm)	Flow Coefficient**
			1-10 (6.89-68.94)	15 (103.42)	20 (137.89)	25 (172.37)	30 (206.84)	35 (241.31)	40 (275.79)				
40VM9	Medium Duty	Air Pressure psi (bar)	40 (2.76)	50 (3.45)	60 (4.13)	70 (4.83)	80 (5.52)	90 (6.21)	90 (6.21)		40,000 (2757.86)	0.25 (6.35)	0.28
	Heavy Duty		20 (1.38)	25 (1.70)	30 (2.07)	35 (2.41)	40 (2.76)	45 (3.10)	45 (3.10)				

NOTE: *Operator Suffix:* ***CL*** *- Light Duty* ***CM*** *- Medium Duty* ***CH*** *- Heavy Duty*

*** C_V data is for 2-way straight valves.*
For angle pattern, add approximately 50% to the C_V valve.

*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change.
For prompt service, Parker Autoclave stocks select products. Consult your local representative.

Air-to-Close - Series 60VM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)										Maximum Pressure psi (bar)*	Stem Travel in (mm)	Flow Coefficient**
			1-20 (6.89-137.89)	25 (172.37)	30 (206.84)	35 (241.31)	40 (275.79)	45 (310.26)	50 (344.73)	55 (379.21)	60 (413.68)				
60VM4 & 60VM6	Medium Duty	Air Pressure psi (bar)	30 (2.07)	30 (2.07)	35 (2.41)	45 (3.10)	50 (3.45)	55 (3.79)	60 (4.13)	70 (4.83)	75 (5.17)		60,000 (4136.79)	0.25 (6.35)	0.08 (60VM4)
	Heavy Duty		15 (1.03)	15 (1.03)	20 (1.38)	25 (1.72)	25 (1.72)	30 (2.07)	30 (2.07)	35 (2.41)	40 (2.76)				0.09 (60VM6)
60VM9	Medium Duty		35 (2.41)	40 (2.76)	50 (3.45)	55 (3.79)	65 (4.48)	70 (4.83)	75 (5.17)	85 (5.86)	90 (6.21)		60,000 (4136.79)	0.25 (6.35)	0.14
	Heavy Duty		20 (1.38)	20 (1.38)	25 (1.72)	30 (2.07)	35 (2.41)	35 (2.41)	40 (2.76)	45 (3.10)	45 (3.10)				

Series 100VM & 150V Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)									Maximum Pressure psi (bar)*	Stem Travel in (mm)	Flow Coefficient**
			1-40 (6.89-275.79)	50 (344.73)	60 (413.68)	70 (482.63)	80 (551.57)	90 (620.52)	100 (689.46)	150 1034.20)				
100VM4 100VM5 100VM6	Medium Duty	Air Pressure psi (bar)	50 (3.45)	55 (3.79)	65 (4.48)	75 (5.17)	85 (5.86)	95 (6.55)	100 (6.89)			100,000 (6894.65)	0.12 (3.05)	0.09
	Heavy Duty		30 (2.07)	30 (2.07)	35 (2.41)	40 (2.76)	40 (2.76)	45 (3.10)	50 (3.45)					

*** C_V data is for 2-way straight valves.*
For angle pattern, add approximately 50% to the C_V valve.

NOTE: *Operator Suffix:* ***CL*** *- Light Duty* ***CM*** *- Medium Duty* ***CH*** *- Heavy Duty*

*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change.
For prompt service, Autoclave stocks select products. Consult your local representative.

Air-to-Open - Series 10V Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)							Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-6 (6.89-41.37)	8 (110.31)	10 (124.10)	12 (82.74)	14 (96.53)	15 (103.42)			
10V2	Light Duty	Air Pressure: psi (bar)	60 **(4.13)**	60 **(4.13)**						8,200 **(565.36)**	0.12 to 0.09***
		Spring Pre-Compression: in. (mm)	0.31 **(7.87)**	0.38 **(9.65)**							
		Stem Travel in (mm)	0.12 **(3.05)**	0.06 **(1.52)**							
	Medium Duty	Air Pressure: psi (bar)	40 **(2.76)**	40 **(2.76)**	40 **(2.76)**	40 **(2.76)**	40 **(2.76)**	45 **(3.10)**		15,000 **(1034.20)**	0.12
		Spring Pre-Compression: in. (mm)	0.12 **(3.05)**	0.12 **(3.05)**	0.12 **(3.05)**	0.12 **(3.05)**	0.12 **(3.05)**	0.16 **(4.06)**			
		Stem Travel in (mm)	0.12 **(3.05)**	0.12 **(3.05)**	0.12 **(3.05)**	0.12 **(3.05)**	0.12 **(3.05)**	0.12 **(3.05)**			
10V4 10V6	Light Duty	Air Pressure: psi (bar)	60 **(4.13)**							5,600 **(386.46)**	0.02 to 0.17***
		Spring Pre-Compression: in. (mm)	0.38 **(9.65)**								
		Stem Travel in (mm)	0.06 **(1.52)**								
10V4	Medium Duty	Air Pressure: psi (bar)	45 **(3.10)**	45 **(3.10)**	50 **(3.45)**	55 **(3.79)**	60 **(4.14)**	65 **(4.48)**		15,000 **(1034.20)**	0.20
		Spring Pre-Compression: in. (mm)	0.12 **(3.05)**	0.12 **(3.05)**	0.14 **(3.65)**	0.18 **(4.75)**	0.20 **(5.08)**	0.22 **(5.59)**			
		Stem Travel in (mm)	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**			
10V6	Medium Duty	Air Pressure: psi (bar)	45 **(3.10)**	45 **(3.10)**	50 **(3.45)**	55 **(3.79)**	60 **(4.13)**	65 **(4.48)**		15,000 **(1034.20)**	0.20
		Spring Pre-Compression: in. (mm)	0.12 **(3.05)**	0.12 **(3.05)**	0.14 **(3.56)**	0.18 **(4.57)**	0.20 **(5.08)**	0.22 **(5.57)**			
		Stem Travel in (mm)	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**			
10V8	Medium Duty	Air Pressure: psi (bar)	75 **(5.17)**	85 **(5.86)**	95 **(6.55)**					10,000 **(689.46)**	0.86
		Spring Pre-Compression: in. (mm)	0.25 **(6.35)**	0.30 **(7.62)**	0.38 **(9.65)**						
		Stem Travel in (mm)	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**						
	Heavy Duty	Air Pressure: psi (bar)	50 **(3.45)**	55 **(3.79)**	60 **(4.13)**					10,000 **(689.46)**	0.86
		Spring Pre-Compression: in. (mm)	0.14 **(3.56)**	0.20 **(5.08)**	0.24 **(6.10)**						
		Stem Travel in (mm)	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**						

*** C_V data is for 2-way straight valves.*
For angle pattern, add approximately 50% to the C_V valve.

NOTE: *Operator Suffix:* ***OL*** *- Light Duty* ***OM*** *- Medium Duty* ***OH*** *- Heavy Duty*

**** C_V varies because of spring compression limitations. The flow coefficient range is given for the maximum stem travel (lowest system pressure) to minimum travel (highest system pressure).*

*Maximum pressure rating is based on the lowest rating of any component.
Actual working pressure may be determined by tubing pressure rating, if lower.

All dimensions for reference only and subject to change.
For prompt service, Parker Autoclave stocks select products. Consult your local representative.

Air-to-Open - Series SW Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)							Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-6 (6.89-41.37)	8 (55.16)	10 (68.95)	12 (82.74)	14 (96.53)	15 (103.41)			
SW4	Medium Duty	Air Pressure: psi (bar)	65 (4.48)	65 (4.48)	75 (5.17)	85 (5.52)	95 (6.55)	95 (6.55)		15,000 (1034.20)	0.065
		Spring Pre-Compression: in. (mm)	0.19 (4.83)	0.19 (4.83)	0.25 (6.35)	0.31 (7.87)	0.36 (9.14)	0.38 (9.14)			
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	025 (6.35)	025 (6.35)	025 (6.35)			
SW6	Medium Duty	Air Pressure: psi (bar)	75 (5.17)	75 (5.17)	95 (6.55)	95 (6.55)	95 (6.55)	100 (6.89)		13,500 (930.77)	0.62 to 0.95
		Spring Pre-Compression: in. (mm)	0.25 (6.35)	0.25 (6.35)	0.28 (7.11)	0.44 (11.17)	0.52 (13.21)	0.56 (14.22)			
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.19 (4.83)	0.10 (2.54)	0.06 (1.53)			
SW6	Heavy Duty	Air Pressure: psi (bar)	50 (3.45)	55 (3.79)	60 (4.13)	65 (4.48)	70 (4.83)	75 (5.17)		15,000 (1034.20)	0.95
		Spring Pre-Compression: in. (mm)	0.14 (3.56)	0.19 (4.83)	0.24 (6.10)	0.28 (7.11)	0.34 (8.64)	0.36 (9.14)			
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)			
SW8	Medium Duty	Air Pressure: psi (bar)	95 (6.55)	95 (6.55)						7,200 (469.41)	1.75
		Spring Pre-Compression: in. (mm)	0.38 (9.65)	0.56 (14.22)							
		Stem Travel in (mm)	0.25 (6.35)	0.05 (1.53)							
SW8	Heavy Duty	Air Pressure: psi (bar)	65 (4.48)	75 (5.17)	75 (5.17)					10,000 (689.46)	1.14
		Spring Pre-Compression: in. (mm)	0.28 (7.11)	0.38 (9.65)	0.44 (11.18)						
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.19 (4.83)						

*** C_V data is for 2-way straight valves.*
For angle pattern, add approximately 50% to the C_V valve.

NOTE: *Operator Suffix:* ***OL*** *- Light Duty* ***OM*** *- Medium Duty* ***OH*** *- Heavy Duty*

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Air-to-Open - Series 10SM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)										Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-4 (6.89-27.58)	6 (41.37)	8 (55.15)	10 (68.95)	12 (82.74)	14 (96.53)	16 (110.31)	18 (124.10)	20 (137.89)			
10SM9	Medium Duty	Air Pressure: psi (bar)	95 (6.55)	95 (6.55)	95 (6.55)								7,900 (544.68)	1.74 to 0.72***
		Spring Pre-Compression: in. (mm)	0.38 (9.65)	0.44 (11.18)	0.56 (14.22)									
		Stem Travel in (mm)	0.25 (6.35)	0.19 (4.83)	0.06 (1.52)									
	Heavy Duty	Air Pressure: psi (bar)	55 (3.79)	65 (4.48)	70 (4.83)	75 (5.17)							10,000 (689.46)	1.74 to 0.72***
		Spring Pre-Compression: in. (mm)	0.22 (5.59)	0.28 (7.11)	0.34 (8.64)	0.44 (11.18)								
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.19 (4.83)								
10SM12	Heavy Duty	Air Pressure: psi (bar)	70 (4.83)	75 (5.17)									7,000 (482.63)	2.23 to 0.78***
		Spring Pre-Compression: in. (mm)	0.24 (6.10)	0.56 (14.22)										
		Stem Travel in (mm)	0.25 (6.35)	0.06 (1.52)										
10SM16	Heavy Duty	Air Pressure: psi (bar)	75 (5.17)										4,300 (296.47)	0.79
		Spring Pre-Compression: in. (mm)	0.56 (14.22)											
		Stem Travel in (mm)	0.06 (1.52)											

Series 20SM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)										Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-4 (6.89-27.58)	6 (41.37)	8 (55.15)	10 (68.95)	12 (82.74)	14 (96.53)	16 (110.31)	18 (124.10)	20 (137.89)			
20SM4	Medium Duty	Air Pressure: psi (bar)	65 (4.48)	65 (4.48)	65 (4.48)	75 (5.17)	85 (5.86)	95 (6.55)	95 (6.55)	95 (6.55)	95 (6.55)		20,000 (1378.93)	0.31 to 0.22***
		Spring Pre-Compression: in. (mm)	0.19 (4.83)	0.19 (4.83)	0.19 (4.83)	0.25 (6.35)	0.31 (7.87)	0.38 (9.65)	0.44 (11.18)	0.50 (12.70)	0.56 (14.22)			
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.19 (4.83)	0.12 (3.05)	0.06 (1.52)			
	Heavy Duty	Air Pressure: psi (bar)	35 (2.41)	35 (2.41)	35 (2.41)	40 (2.76)	45 (3.10)	50 (3.45)	50 (3.45)	50 (3.45)	50 (3.45)			
20SM6	Medium Duty	Air Pressure: psi (bar)	65 (4.48)	65 (4.48)	75 (5.17)	85 (5.86)	95 (6.55)	95 (6.55)	95 (6.55)	95 (6.55)			18,250 (1258.27)	0.75 to 0.57***
		Spring Pre-Compression: in. (mm)	0.19 (4.83)	0.19 (4.83)	0.25 (6.35)	0.31 (7.87)	0.38 (9.65)	0.44 (11.18)	0.50 (12.70)	0.56 (14.22)				
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.19 (4.83)	0.12 (3.05)	0.06 (1.52)				
	Heavy Duty	Air Pressure: psi (bar)	35 (2.41)	35 (2.41)	40 (2.76)	45 (3.10)	50 (3.45)	50 (3.45)	50 (3.45)	50 (3.45)				
20SM9	Medium Duty	Air Pressure: psi (bar)	85 (5.86)	90 (6.21)	95 (6.55)	95 (6.55)							9,800 (675.68)	1.29 to 0.53***
		Spring Pre-Compression: in. (mm)	0.31 (7.87)	0.34 (8.64)	0.47 (11.94)	0.56 (14.22)								
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.15 (3.81)	0.06 (1.52)								
	Heavy Duty	Air Pressure: psi (bar)	50 (3.45)	55 (3.79)	65 (4.48)	70 (4.83)	75 (5.17)	75 (5.17)	75 (5.17)				15,700 (1082.46)	1.29 to 0.53***
		Spring Pre-Compression: in. (mm)	0.19 (4.83)	0.22 (5.59)	0.28 (7.11)	0.34 (8.64)	0.44 (11.18)	0.50 (12.70)	0.56 (14.22)					
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.19 (4.83)	0.12 (3.05)	0.06 (1.52)					

*** C_V data is for 2-way straight valves. For angle pattern, add approximately 50% to the C_V valve.*
**** C_V varies because of spring compression limitations. The flow coefficient range is given for the maximum stem travel (lowest system pressure) to minimum travel (highest system pressure).*

NOTE: *Operator Suffix:* ***OL*** *- Light Duty* ***OM*** *- Medium Duty* ***OH*** *- Heavy Duty*

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Air-to-Open - Series 20SM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)										Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-4 (6.89-27.58)	6 (41.37)	8 (55.15)	10 (68.95)	12 (82.74)	14 (96.53)	16 (110.31)	18 (124.10)	20 (137.89)			
20SM12	Heavy Duty	Air Pressure: psi (bar)	65 **(4.48)**	75 **(5.17)**	75 **(5.17)**								9,200 **(634.313)**	0.80 to 0.78***
		Spring Pre-Compression: in. (mm)	0.28 **(7.11)**	0.38 **(9.65)**	0.56 **(14.22)**									
		Stem Travel in (mm)	0.25 **(6.35)**	0.25 **(6.35)**	0.06 **(1.52)**									
20SM16	Heavy Duty	Air Pressure: psi (bar)	75 **(5.17)**	75 **(5.17)**									6,100 **(420.57)**	2.73 to .15***
		Spring Pre-Compression: in. (mm)	0.38 **(9.65)**	0.56 **(14.22)**										
		Stem Travel in (mm)	0.25 **(6.35)**	0.06 **(1.52)**										

Series 30VM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)											Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-10 (6.89-68.95)	12 (82.74)	14 (96.53)	16 (110.31)	18 (124.10)	20 (137.89)	22 (151.68)	24 (165.47)	26 (179.26)	28 (193.05)	30 (206.84)		
30VM4	Medium Duty	Air Pressure: psi (bar)	45 **(3.10)**	45 **(3.10)**	55 **(3.79)**	55 **(3.79)**	55 **(3.79)**	55 **(3.79)**	65 **(4.48)**	65 **(4.48)**	65 **(4.48)**	65 **(4.48)**	75 **(5.17)**	30,000 **(2068.39)**	0.12
		Spring Pre-Compression: in. (mm)	0.12 **(3.15)**	0.12 **(3.05)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**	0.31 **(7.87)**		
		Stem Travel in (mm)	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**		
	Heavy Duty	Air Pressure: psi (bar)	25 **(1.72)**	25 **(1.72)**	30 **(2.07)**	30 **(2.07)**	30 **(2.07)**	30 **(2.07)**	35 **(2.41)**	35 **(2.41)**	35 **(2.41)**	35 **(2.41)**	40 **(2.76)**		
30VM6 & 30VM9	Medium Duty	Air Pressure: psi (bar)	45 **(3.10)**	55 **(3.79)**	55 **(3.79)**	65 **(4.48)**	65 **(4.48)**	75 **(5.17)**	75 **(5.17)**	75 **(5.17)**	85 **(5.86)**	85 **(5.86)**	95 **(6.55)**	30,000 **(2068.39)**	0.33 **(30VM6)** 0.33 **(30VM9)**
		Spring Pre-Compression: in. (mm)	0.12 **(3.05)**	0.19 **(4.83)**	0.19 **(4.83)**	0.25 **(6.35)**	0.25 **(6.35)**	0.31 **(7.87)**	0.31 **(7.87)**	0.31 **(7.87)**	0.38 **(9.65)**	0.38 **(9.65)**	0.44 **(11.18)**		
		Stem Travel in (mm)	0.19 **(4.13)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**	0.19 **(4.83)**		
	Heavy Duty	Air Pressure: psi (bar)	25 **(1.72)**	30 **(2.07)**	30 **(2.07)**	35 **(2.41)**	35 **(2.41)**	40 **(2.76)**	40 **(2.76)**	40 **(2.76)**	45 **(3.10)**	45 **(3.10)**	50 **(3.45)**		

Series 40VM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)								Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-10 (6.89-68.95)	15 (103.42)	20 (137.89)	25 (172.37)	30 (206.84)	35 (241.31)	40 (275.79)			
40VM9	Medium Duty	Air Pressure: psi (bar)	60 **(4.13)**	70 **(4.83)**	75 **(5.17)**	85 **(5.86)**	95 **(6.55)**	100 **(6.89)**	100 **(6.89)**		40,000 **(2757.86)**	0.28
		Spring Pre-Compression: in (mm)	0.12 **(3.05)**	0.18 **(4.57)**	0.25 **(6.35)**	0.31 **(7.87)**	0.38 **(9.65)**	0.43 **(10.92)**	0.5 **(12.70)**			
		Stem Travel in (mm)	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**	0.25 **(6.35)**			
	Heavy Duty	Air Pressure: psi (bar)	30 **(2.07)**	35 **(2.41)**	40 **(2.76)**	45 **(3.10)**	50 **(3.45)**	50 **(3.45)**	55 **(3.79)**			

*** C_V data is for 2-way straight valves.*
For angle pattern, add approximately 50% to the C_V valve.

***NOTE:** Operator Suffix: **OL** - Light Duty **OM** - Medium Duty **OH** - Heavy Duty*

**** C_V varies because of spring compression limitations. The flow coefficient range is given for the maximum stem travel (lowest system pressure) to minimum travel (highest system pressure).*

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Air-to-Open - Series 60VM Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)											Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-15 (6.89-103.42)	20 (137.89)	25 (172.37)	30 (206.84)	35 (241.31)	40 (275.79)	45 (310.26)	50 (344.73)	55 (379.21)	60 (413.68)			
60VM4 & 60VM6	Medium Duty	Air Pressure: psi (bar)	55 (3.79)	65 (4.48)	65 (4.48)	65 (4.48)	75 (5.17)	75 (5.17)	85 (5.86)	85 (5.86)	85 (5.86)	95 (6.55)		60,000 (4136.79)	0.08 (60VM4)
		Spring Pre-Compression: in. (mm)	0.12 (3.05)	0.19 (4.83)	0.19 (4.83)	0.19 (4.83)	0.25 (6.35)	0.25 (6.35)	0.31 (7.87)	0.31 (7.87)	0.31 (7.87)	0.38 (9.65)			
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)			
	Heavy Duty	Air Pressure: psi (bar)	30 (2.07)	35 (2.41)	35 (2.41)	35 (2.41)	40 (2.76)	40 (2.76)	45 (3.10)	45 (3.10)	45 (3.10)	50 (3.45)			0.09 (60VM6)
60VM9	Medium Duty	Air Pressure: psi (bar)	55 (3.74)	65 (4.42)	65 (4.42)	75 (5.10)	75 (5.10)	85 (5.78)	95 (6.46)	95 (6.46)	95 (6.46)	95 (6.46)		60,000 (4136.79)	0.14
		Spring Pre-Compression: in. (mm)	0.12 (3.05)	0.19 (4.83)	0.19 (4.83)	0.25 (6.35)	0.25 (6.35)	0.31 (7.87)	0.38 (9.65)	0.38 (9.65)	0.44 (11.18)	0.50 (12.70)			
		Stem Travel in (mm)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.19 (4.83)	0.12 (3.05)			
	Heavy Duty	Air Pressure: psi (bar)	30 (2.07)	35 (2.41)	35 (2.41)	40 (2.76)	40 (2.76)	45 (3.10)	50 (3.45)	50 (3.45)	50 (3.45)	50 (3.45)			

Series 100VM and 150V Valves

Valve Series	Operator Duty		System Pressure KSI (Mpa)									Maximum Pressure psi (bar)*	Flow Coefficient Cv**
			1-20 (6.89-137.89)	40 (275.79)	60 (13.68)	80 (551.57)	90 (620.52)	100 (689.46)	125 (861.83)	150 (1034.20)			
100VM4 100VM5 100VM6	Heavy Duty	Air Pressure: psi (bar)	35 (2.41)	40 (2.76)	50 (3.45)	60 (4.14)	70 (4.83)	70 (4.83)				100,000 (6894.65)	0.09 to 0.07***
		Spring Pre-Compression: in. (mm)	0.12 (3.05)	0.19 (4.83)	0.25 (6.35)	0.31 (7.87)	0.38 (9.65)	0.38 (9.65)					
		Stem Travel in (mm)	0.12 (3.05)	0.12 (3.05)	0.12 (3.05)	0.12 (3.05)	0.12 (3.05)	0.12 (3.05)					

*** C_V data is for 2-way straight valves.*
For angle pattern, add approximately 50% to the C_V valve.

***NOTE:** Operator Suffix: **OL** - Light Duty **OM** - Medium Duty **OH** - Heavy Duty*

**** C_V varies because of spring compression limitations. The flow coefficient range is given for the maximum stem travel (lowest system pressure) to minimum travel (highest system pressure).*

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