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The Original Manual Seat Valve

SMO and SMO-R Sanitary Manual Valves

PD 60789 US7 2001-12

Application

The sanitary and flexible design of the SMO valve can be used in a wide range of applications, e.g. as a shut-off valve with two or three ports or as a divert valve with 3-5 ports. SMO-R is a regulating valve used for manual control of pressure and flow.

Working principle

The valves permit gradual opening and the few and simple moving parts result in very reliable valve easy to dismantle. Operating the SMO-R, the plug can be fixed in the adjusted position with a lock screw.

Standard design

SMO and SMO-R are manually operated versions of the pneumatic remote-controlled SRC valve. The SMO can easily be converted to an SRC valve by replacing the crank mechanism with an SRC actuator and bonnet assembly. The body and stem are identical. As an optional extra (except 1") the valves can be fitted with the same diaphragm stem seal as the ARC-valve thus forming an aseptic manually-operated valve, type AMO/AMO-R.

Control function - SMO-R

The Cv factor states the flow in GPM at a pressure drop of 1 psi. The plugs have linear characteristics. This means that a certain amount of stroke results in a proportional reduction of the flow if the pressure drop remains unchanged.

Materials

SMO/SMO-R

Product wetted steel parts:	AISI 316L
Other steel parts:	AISI 304
Plug stem:	AISI 316L with chromium plated surface
Product wetted seals:	EPDM
Other seals:	NBR and FPM
Finish:	32 m-inch Ra (std)
Connections:	Weld or Tri-Clamp®

Technical data

Max. product pressure:	145 psi (10 bar)
Min. product pressure:	Full vacuum
Temperature range:	15°F to +285°F (EPDM)

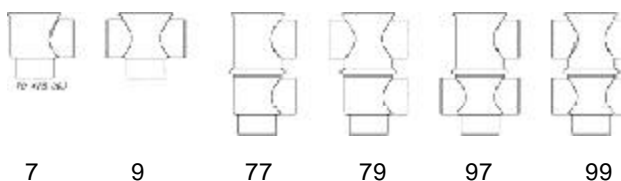


Fig.1. SMO and SMO-R stop valves.

Other valves in the same basic design:

- Aseptic manual valve, type AMO/AMO-R
- Micrometer valve, type 171-10M-90
- Manual compression valve, type D60

Valve body combination



Note! SMO-R is only available with either a 7 or 9 body.



Valve Sizing for SMO-R Throttling Valve

Flow Coefficients (Cv)

The following formula and flow coefficient values enable you to select the correct throttling valve for your application.

Formula for water and other products with a specific gravity equal to 1.0 is:

$$Cv = \frac{GPM}{\sqrt{\Delta P}}$$

Formula for products with a specific gravity other than 1.0 is:

$$Cv = \frac{GPM}{\sqrt{\Delta P / SG}}$$

Where:

GPM = Product flow rate in gallons per minute

SG = Specific gravity of product

ΔP = Pressure drop across valve in psi
(inlet pressure minus outlet pressure)

Example of Cv Calculation:

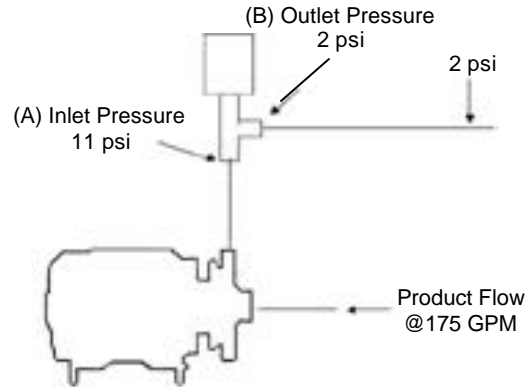
Determine the proper size valve for 175 GPM of water.

Inlet pressure of 11 psi
Outlet pressure of 2 psi

Solution: Inlet pressure (A) minus outlet pressure (B):

$$DP = 11 \text{ psi} - 2 \text{ psi} = 9 \text{ psi}$$

$$Cv = \frac{175}{\sqrt{9}} = \frac{175}{3} = 58.3$$



How to Use Data to Select Valve Size

After the Cv factor for a specific application has been calculated, locate the factor on the following chart. If the Cv factor resulting from your calculations is not shown in the charts, use the next closest factor. There are instances where a Cv factor may be listed in several columns. In situations of this type, select the size valve where the factor is closest to the optimum operating point (Optimum operating point is when valve is 50% open).

SMO-R Throttling Valve (Cv) Factor

% of Valve Stroke	1½" (38mm) (low flow)	1½" (38mm) (STD)	2" (51mm)	2½" (64mm)	3" (76mm)	4" (76mm)	% of Valve Stroke
10	2.0	5.1	8.5	13.5	18.3	18.9	10
20	4.0	10.1	17.0	26.9	36.6	37.8	20
30	6.0	15.2	25.5	40.4	54.9	56.5	30
40	8.0	20.3	34.0	53.3	73.2	75.5	40
50*	10.0	25.4	42.5	67.3	91.5	94.4	50*
60	12.1	30.4	51.0	80.7	109.7	113.3	60
70	14.1	35.5	59.5	94.2	128.0	132.2	70
80	16.1	40.6	68.0	107.6	146.3	151.0	80
90	18.1	45.6	76.5	121.1	164.6	169.9	90
100	20.1	50.7	85.0	134.5	182.9	188.8	100

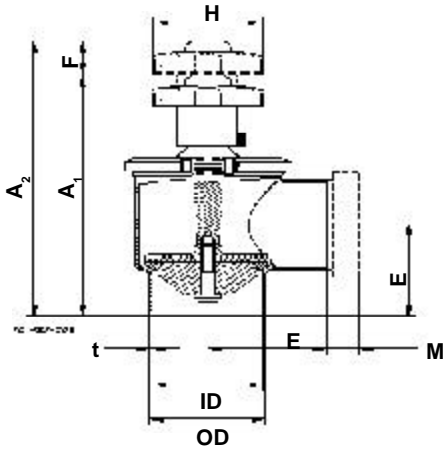
* Optimum operating point.



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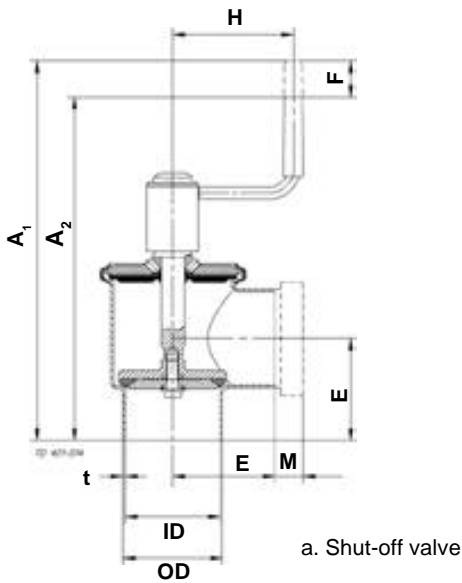
Dimensions (inches)
SMO-R



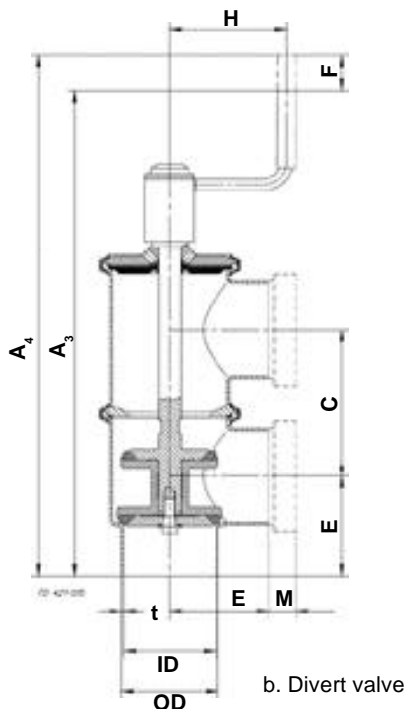
SMO-R Dimensions (inches)

Size	1½" (38mm)	2" (51mm)	2½" (64mm)	3" (76mm)	4" (76mm)
A ₁	6.69	7.17	8.54	9.13	11.96
A ₂	7.95	8.43	9.80	10.39	13.23
OD	1.50	2.00	2.50	3.00	4.00
ID	1.37	1.87	2.37	2.84	3.89
t	0.063	0.063	0.063	0.079	0.079
E	1.79	2.42	3.24	3.44	5.26
F	1.26	1.26	1.26	1.26	1.26
H	3.15	3.15	3.15	3.15	3.15
M/GC- Clamp	0.85	0.50	0.50	0.50	0.63
Weight (lbs.)	5.5	6.6	7.7	16.52	20.9

SMO



a. Shut-off valve



b. Divert valve

SMO Dimensions (inches)

Size	1½" (38mm)	2" (51mm)	2½" (64mm)	3" (76mm)	4" (76mm)
A ₁	10.55	10.94	12.28	12.95	15.79
A ₂	9.33	9.72	11.06	11.73	14.57
A ₃	13.66	14.65	16.73	18.03	22.20
A ₄	12.44	13.43	15.51	16.81	20.98
C	3.11	3.70	4.49	5.08	6.42
OD	1.50	2.00	2.50	3.00	4.00
ID	1.37	1.87	3.37	2.84	3.84
t	0.063	0.063	0.063	0.079	0.079
E	1.79	2.42	3.24	3.44	5.26
F	1.22	0.22	1.22	1.22	1.22
H	4.13	4.13	4.13	4.13	4.13
M/GC- Clamp	0.85	0.50	0.50	0.50	0.63
Weight (lbs.)					
Shut-Off	5.5	6.6	7.7	16.5	20.9
Divert	7.7	9.0	10.8	21.3	27.3



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Options

Equipment

- Other sanitary process connections
(weld or Tri-Clamp® standard)
- Replaceable lip seal kit

Material grades

- Product wetted seals and lip seal of Nitrile (NBR),
Fluorinated rubber (FPM) or PTFE
- Unpolished ID/OD

Ordering

Please state the following when ordering:

- Connections if not welding ends
- Size
- Valve body combination
- Options



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