

DESCRIPTION

The U.S. Model 9100 process control valve is a 2-way, high capacity globe available in 6 sizes, 1/2...2 in. (12.7...50.8 mm) with a B62 bronze body/bonnet. Comes with a field-reversible actuator and standard live loaded TFE packing.

BODY ASSEMBLY DESCRIPTION

Type	2-way high capacity globe, modulating
Size in. (mm)	1/2 (12.7), 3/4 (19.1), 1 (25.4), 1-1/4 (31.7), 1-1/2 (38.1), 2 (50.8)
Pressure Rating	ANSI CL 150: 300 psi @ 100° F (20.7 bar @ 37.8° C)
Body Material	Bronze ASTM B62
Bonnet Material	Bronze ASTM B62
Body Gasket Material	Copper
Innervalve Assembly	316L stainless steel
Seat Ring	316L stainless steel
Packing	PTFE "V" rings—live loaded
Packing	Optional Grafoil
Packing Spring	302 stainless steel
Packing Follower	PTFE-PFA
Packing Follower	Optional bronze (Grafoil)
Other Hardware	300 stainless steel

DESIGN CRITERIA

- Meets MSS SP-80 and ANSI B16.24
- Heavy duty high-capacity body
- Standard Characteristic: Equal percent
- Standard replaceable seat/innervalve
- Standard ANSI Class IV shutoff
- Standard live-loaded TFE packing
- Heavy duty post-guided innervalve
- Stem welded into innervalve guide
- Precision CNC cut NPT body threads

OPTIONS

- Linear characteristic or Quick open on-off
- Double packing, REK® fugitive emission packing
- Alarm/Purge port with double packing
- Stainless steel bonnet extensions for cryogenic service
- Positioners, Limit switches, Airset, and others
- Carbon steel "Lap-Joint Flange Kit," for conversion to CL150 flanges (meets ASME/ANSI face-to-face length)



ACTUATOR ASSEMBLY DESCRIPTION

Type	Pneumatic multi-spring and diaphragm actuator
Effective Area	35 in. ² (225 cm ²)
Stroke	3/4 in. (19.1 mm) or 1 in. (25.4 mm)
Spring (bench) Loading	Adjustable (some ranges)
Action	ATO or ATC (reversible without additional parts)
Accessory Mounting	IEC534 (Namur)
Rec. Max. Oper. Press.	60 psig @ 70° F (4 bar @ 21° C)
Max. Diaphragm Pressure	90 psig @ 70° F (6 bar @ 21° C)
Upper Ambient Temperature Limit	160° F @ 30 psig (71° C @ 2.07 bar)
Lower Ambient Temperature Limit	-20° F @ 30 psig (-29° C @ 2.07 bar)
Signal Range	Standard: 3...15 psig (0.2...1.03 bar) Others available
Pressure Cases and Yoke	Steel/epoxy coated
Diaphragm Material	Nitrile/polyester
Spring Material	17...7Ph stainless steel
Stem Seal	ELF Buna O-ring
Stem Guide Bushings	Filled composite bearing material
Hardware Material	300 stainless steel
Travel Indication	Adjustable, nylon safety pointer

SPECIFICATIONS

Innervolve Information, Equal Percent Characteristic

Valve Size in. (mm)	Orifice Dia. in. (mm)	Orif. area in. ² (mm ²)	Lift in. (mm)	Max. ΔP*	Cv vs Stem Travel *											
					100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	5%	2.5%
3/4 (19.1)	1.00 (25.4)	0.785 (506.5)	0.75 (19.1)	300	12.0	10.7	9.32	6.75	4.49	3.01	2.29	1.69	1.10	0.53	0.264	0.132
	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	8.0	5.3	3.56	2.37	1.58	1.05	0.70	0.47	0.31	0.15	0.076	0.038
3/4 (19.1), 1/2 (12.7)	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	6.0	4.0	2.67	1.78	0.09	0.79	0.53	0.35	0.23	0.11	0.057	0.029
	0.50 (12.7)	0.196 (126.5)	0.75 (19.1)	300	3.0	2.0	1.34	0.89	0.59	0.40	0.26	0.18	0.11	0.06	0.029	0.014
1 (25.4)	1.00 (25.4)	0.785 (506.5)	0.75 (19.1)	300	15.0	12.3	9.36	6.37	4.81	3.66	2.75	2.05	1.35	0.66	0.329	0.165
	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	10.0	6.7	4.44	2.97	1.98	1.32	0.88	0.59	0.38	0.19	0.096	0.048
	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	6.0	4.0	2.67	1.78	1.19	0.79	0.53	0.35	0.23	0.11	0.057	0.029
	0.50 (12.7)	0.196 (126.5)	0.75 (19.1)	300	3.0	2.0	1.33	0.89	0.59	0.40	0.26	0.18	0.11	0.06	0.029	0.014
1-1/4 (31.7)	1.63 (41.4)	2.074 (1338.1)	1 (25.4)	135	29.0	25.2	21.5	17.7	10.5	6.78	5.02	3.69	2.51	1.29	0.642	0.321
	1.25 (31.7)	1.227 (791.7)	1 (25.4)	225	20.0	13.3	8.90	5.92	3.95	2.63	1.76	1.17	0.76	0.38	0.189	0.095
	1.25 (31.7)	1.227 (791.7)	1 (25.4)	225	12.0	8.0	5.34	3.55	3.27	1.58	1.05	0.70	0.46	0.23	0.113	0.057
1-1/2 (38.1)	1.63 (41.4)	2.074 (1338.1)	1 (25.4)	135	35.0	31.0	26.8	20.7	14.4	10.0	6.74	4.49	2.95	1.54	0.766	0.383
	1.25 (31.7)	1.227 (791.7)	1 (25.4)	225	24.0	16.0	10.7	7.11	4.74	3.16	2.11	1.40	0.91	0.46	0.226	0.113
	1.25 (31.7)	1.227 (791.7)	1 (25.4)	225	15.0	10.0	6.67	4.45	2.96	1.98	1.32	0.88	0.57	0.29	0.142	0.071
2 (50.8)	2.00 (50.8)	3.142 (2027.1)	1 (25.4)	90	54.0	45.4	36.4	28.2	20.3	14.5	10.1	6.98	4.67	2.40	1.181	0.590
	1.75 (44.5)	2.405 (1551.6)	1 (25.4)	115	36.0	24.0	16.0	10.7	7.10	4.74	3.16	2.11	1.38	0.69	0.338	0.169
	1.75 (44.5)	2.405 (1551.6)	1 (25.4)	115	22.0	14.7	9.78	6.51	4.34	2.90	1.93	1.29	0.84	0.42	0.207	0.103

NOTE: Maximum Shutoff ΔP for Air-To-Open configuration, with 6 springs (280 pounds spring loading) and 0...23 psi air, may require a positioner to achieve full travel. Constantly high flowing ΔP, such as those listed in the Max. ΔP column can cause deterioration of the guide or innervolve material. Caution is advised when flowing ΔP is above 1/2 of the shutoff pressure listed.

*Data is for comparison only. Controlling in the 1...5% travel range is not usually recommended due to normal system and valve hysteresis. Precise signaling and positioning of the stem is critical and may require a positioner to achieve acceptable results.

Innervolve Information, Linear Characteristic

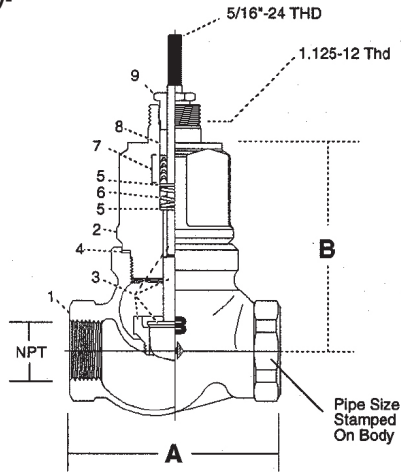
Valve Size in. (mm)	Orifice Dia. in. (mm)	Orif. area in. ² (mm ²)	Lift in. (mm)	Max. ΔP*	Cv vs Stem Travel *											
					100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	5%	2.5%
1/2 (12.7)	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	6	5.40	4.80	4.20	3.60	3.00	2.40	1.80	1.20	0.60	0.300	0.15
	0.50 (12.7)	0.196 (126.5)	0.75 (19.1)	300	3	2.70	2.40	2.10	1.80	1.50	1.20	0.90	0.60	0.30	0.15	0.08
3/4 (19.1)	1.00 (25.4)	0.785 (506.5)	0.75 (19.1)	300	12	10.80	9.60	8.40	7.20	6.00	4.80	3.60	2.40	1.20	0.60	0.30
	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	8	7.20	6.40	5.60	4.80	4.00	3.20	2.40	1.60	0.80	0.40	0.20
	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	6	5.40	4.80	4.20	3.60	3.00	2.40	1.80	1.20	0.60	0.30	0.15
	0.50 (12.7)	0.196 (126.5)	0.75 (19.1)	300	3	2.70	2.40	2.10	1.80	1.50	1.20	0.90	0.60	0.30	0.15	0.08
1 (25.4)	1.00 (25.4)	0.785 (506.5)	0.75 (19.1)	300	15	13.50	12.00	10.50	9.00	7.50	6.00	4.50	3.00	1.50	0.75	0.38
	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	10	9.00	8.00	7.00	6.00	5.00	4.00	3.00	2.00	1.00	0.50	0.25
	0.75 (19.1)	0.442 (285.2)	0.75 (19.1)	300	6	5.40	4.80	4.20	3.60	3.00	2.40	1.80	1.20	0.60	0.30	0.15
	0.50 (12.7)	0.196 (126.5)	0.75 (19.1)	300	3	2.70	2.40	2.10	1.80	1.50	1.20	0.90	0.60	0.30	0.15	0.08
1-1/4 (31.7)	1.63 (41.4)	2.074 (1338.1)	1 (25.4)	135	32	28.80	25.60	22.40	19.20	16.00	12.80	9.60	6.40	3.20	1.60	0.80
	1.25 (31.7)	1.227 (791.7)	1 (25.4)	225	20	18.00	16.00	14.00	12.00	10.00	8.00	6.00	4.00	2.00	1.00	0.50
	1.25 (31.7)	1.227 (791.7)	1 (25.4)	225	12	10.80	9.60	8.40	7.20	6.00	4.80	3.60	2.40	1.20	0.60	0.30
1-1/2 (38.1)	1.63 (41.4)	2.074 (1338.1)	1 (25.4)	135	37	33.30	29.60	25.90	22.20	18.50	14.80	11.10	7.40	3.70	1.85	0.93
	1 (25.4)	1.227 (791.7)	1 (25.4)	225	24	21.60	19.20	16.80	14.40	12.00	9.60	7.20	4.80	2.40	1.20	0.60
	1 (25.4)	1.227 (791.7)	1 (25.4)	225	15	13.50	12.00	10.50	9.00	7.50	6.00	4.50	3.00	1.50	0.75	0.38
2 (50.8)	2 (50.8)	3.142 (2027.1)	1 (25.4)	90	56	50.40	44.80	39.20	33.60	28.00	22.40	16.80	11.20	5.60	2.80	1.40
	1.75 (44.5)	2.405 (1551.6)	1 (25.4)	115	36	32.40	28.80	25.20	21.60	18.00	14.40	10.80	7.20	3.60	1.80	0.90
	1.75 (44.5)	2.405 (1551.6)	1 (25.4)	115	22	19.80	17.60	15.40	13.20	11.00	8.80	6.60	4.40	2.20	1.10	0.55

NOTE: Maximum Shutoff ΔP for Air-To-Open configuration, with 6 springs (280 pounds spring loading) and 0...23 psi air, may require a positioner to achieve full travel. Constantly high flowing ΔP, such as those listed in the Max. ΔP column can cause deterioration of the guide or innervolve material. Caution is advised when flowing ΔP is above 1/2 of the shutoff pressure listed.

*Data is for comparison only. Controlling in the 1...5% travel range is not usually recommended due to normal system and valve hysteresis. Precise signaling and positioning of the stem is critical and may require a positioner to achieve acceptable results.

DIMENSIONS

Valve Body-Bonnet Assembly



Body Pressure vs Temp

Temp. °F	Pressure in psi	Temp °C	Pressure in bar
-20...150	300	-29...66	20.67
200	270	93	18.6
250	240	121	16.54
300	210	149	14.47
350	180	177	12.4
400	—	204	—
406	150	207	10.33

Item Descriptions

NOTE: Detailed assembly drawings, with part numbers, can be obtained from the factory. Item numbers shown may not match prints. Part numbers listed are universal to all model 9100 valve sizes.

Item	Description	Part Number	Material
1	Body	Consult Factory	Bronze, B-62
2	Bonnet	Consult Factory	Bronze, B-62
3	Innervalve set	Consult Factory	316L stainless steel
4	Body gasket	Consult Factory	Copper
5	Washer (2)	430002-0115	316 stainless steel
6	Spring	510031-0158	302 stainless steel
7	Packing set (3 rings)	543242-0001	PTFE (std)
8	Follower	527241-0001	Teflon PFA
9	Packing gland	525950-0001	316 stainless steel

Items 5 through 8 are available as a kit: P.N. 544057-0001

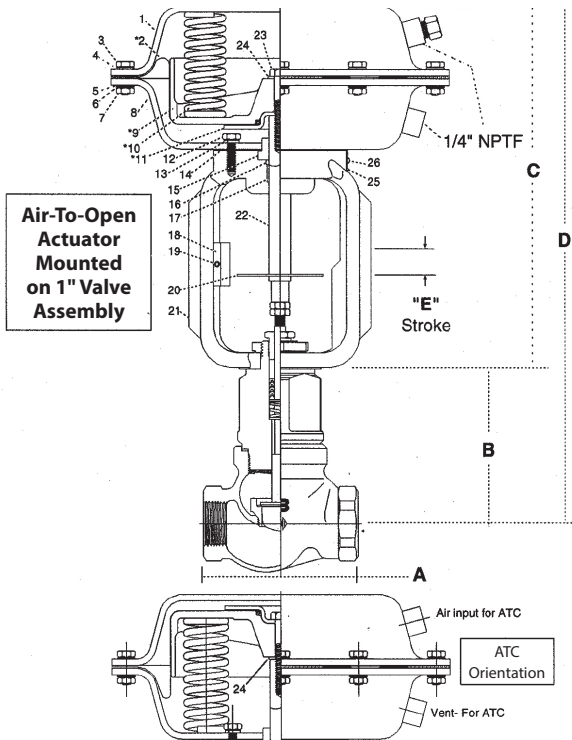
Weights

Valve Size	1/2 in., 3/4 in. and 1 in.	1-1/4 in. and 1-1/2 in.	2 in.
Pounds	29	36	44
Kilograms	13.2	16.3	20

Approx. average weight per size. Depends on options and accessories.

Dimensions

	1/2 in., 3/4 in. and 1 in.	1-1/4 in. and 1-1/2 in.	2 in.
A	4.5 in. (115 mm)	6.25 in. (159 mm)	7.0 in. (179 mm)
B	4.44 in. (113 mm)	5.22 in. (133 mm)	5.62 in. (143 mm)
C	10.5 in. (267 mm)	10.5 in. (267 mm)	10.5 in. (267 mm)
D	14.94 in. (380 mm)	15.72 in. (400 mm)	16.12 in. (410 mm)
E	3/4 in. (19.1 mm) Stroke	1 in. (25.4 mm) Stroke	1 in. (25.4 mm) Stroke



- Item**
- Description (Qty)**
- 1 Upper Housing (1)
- 2 *Diaphragm (1)
- 3 Hex Screw (12)
- 4 Flat Washer, top (12)
- 5 Flat Washer, bottom (12)
- 6 Lock Washer (12)
- 7 Hex Nut (12)
- 8 Lower Housing (1)
- 9 *Piston (1)
- 10 *Springs (3 or 6)
- 11 *Diaphragm Retainer (1)
- 12 Hex Screw, Gr 8 (6)
- 13 Lock Washer (6)
- 14 Gasket (1)
- 15 Upper Guide Bushing (1)
- 16 O-ring (1)
- 17 Lower Guide Bushing (1)
- 18 Travel Scale (1)
- 19 Set Screw (1)
- 20 Pointer, Nylon (1)
- 21 Yoke (1)
- 22 Stem (1)
- 23 Hex Screw, Gr 8 (1)
- 24 Thrust Washer (1)
- 25 Nameplate (1)
- 26 Nameplate Screw (2)

NOTE: Detailed assembly drawings, with part numbers, can be obtained from the factory. Item numbers shown may not match prints.

Reversing Actuator Action
The items indicated (*) should be re-oriented as shown to convert to ATC action. Details of this and other assemblies are available from the factory.

MODEL 9100 ORDERING MATRIX

The order number has 18 characters.

[1] - [2] - [3] - [4] - [5] - [6] - [7] - [8] - [9] - [10]
9106 - GC - N - BZ - SV - 1 - A - 54 - P - 36

[1] VALVE SIZE

9101 = 1/2 in.
 9102 = 3/4 in.
 9103 = 1 in.
 9104 = 1-1/4 in.
 9105 = 1-1/2 in.
 9106 = 2 in.

[2] BODY TYPE

GC = Globe case

[3] END CONNECTIONS

N = NPT

[4] BODY ASSEMBLY MATERIAL

BZ = BRONZE / ASTM B62

[5] BONNET AND PACKING TYPE

SV = Standard bonnet/Spring loaded TFE V-rings
 SG = Standard bonnet/Single Grafoil® packing
 DV* = Standard bonnet/Double TFE V-rings
 DG* = Standard bonnet/Double Grafoil packing
 PV* = Standard bonnet with 1/8 in. NPT purge port and double TFE V-rings
 PG* = Standard bonnet with 1/8 in. NPT purge port and double Grafoil packing
 ES* = Extended [4 in. SST] bonnet with spring loaded V-rings
 EL* = Extended [6 in. SST] bonnet with spring loaded V-rings

* **Optional:** Consult factory for price and delivery.

ABOUT THE MODEL NUMBER

When ordering by model number (required by the factory), please give a full description of the unit also. This will decrease the possibility of error. The model number will be shown on all acknowledgements, as well as the nameplate attached to the actuator. When inquiring about a valve in service, please give the serial number and the model number from the nameplate. An **X** in any location within the model number denotes a special item.

[6] ACTUATOR

1 = size 35, ATO, no positioner
 2 = size 35, ATO, with positioner *
 3 = size 35, ATC, no positioner
 4 = size 35, ATC, with positioner *
 * Side [yoke] mounted
 5 = size 58, ATO, no positioner
 6 = size 58, ATO, with positioner *
 7 = size 58, ATC, no positioner
 8 = size 58, ATC, with positioner *
 9 = Electric actuator
 * Side [yoke] mounted

[7] SIGNAL RANGE

A = 3...5 psig [adj. 3...4 psi]
 B = 6...30 psig [adj. 6...8 psi]
 C = 3...9 psig [positioner required]
 D = 9...15 psig [positioner required]
 E = 6...15 psig [3/4 in. stroke, fixed rate]
 F = 10...15 psig [3/4 in. stroke, fixed rate]
 H = 6...15 psig [1 in. stroke, fixed rate]
 J = 9...15 psig [1 in. stroke, fixed rate]
 K = 4...20 mA [incr. signal opens valve]
 L = 4...20 mA [incr. signal closes valve]
NOTE: K and L are for electric actuators only.
 O = 4.0...14.5 psig [1 in. stroke only]

[8] INNERVALVE SIZE

3/4 in. Valve Size
 Code Cv
 12 12.0 [3/4 in. only]
 08 8.0 [3/4 in. only]
 06 6.0 [1/2 in. or 3/4 in.]
 03 3.0 [1/2 in. or 3/4 in.]

1 in. Valve Size

Code Cv
 15 15.0
 10 10.0
 06 6.0
 03 3.0

1-1/4 in. Valve Size

Code Cv
 29 29.0
 20 20.0
 12 12.0

1-1/2 in. Valve Size

Code Cv
 35 35.0
 24 24.0
 15 15.0

2 in. Valve Size

Code Cv
 54 54.0 [= %]
 56 56.0 [Linear]
 36 36.0
 22 22.0

[9] INNERVALVE CHARACTERISTIC

P = Equal percent
 L = Linear
 Q = Quick open [special order]

[10] INNERVALVE MATERIAL

36 = 316L SST
 3T = 316L & TFE-PFA [special order]
 3S = Stellite 316L SST [special order]

NOTE: For other innervalve sized, characteristics and materials, consult the factory for price and delivery.

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DESCRIPTION

The ORION® Series 9100 bronze control valve is available with pre-assembled and tested ASTM carbon steel threaded flange adapters.

The adapters are factory installed with Loctite® PST 567® thread sealant and leak tested prior to shipment.

Standard sizes are 1 in. (25 mm), 1.5 in. (38 mm) and 2 in. (50 mm) CL 150.

The free-turning flanges simplify the alignment of mating the flange holes.

The nominal overall (face-to-face) length of the body is based on the standard length of a CL 150 steel valve.

NOTE: The nipple-to-body connection is NPT and should be considered accordingly regarding structural strength. When vibration, shock, excess side loading or abnormal stress is possible, the actuator should be bolted to a supporting structure. For this purpose, a rim-screw mounting bracket is available from the factory.

For valve information, see www.badgermeter.com.

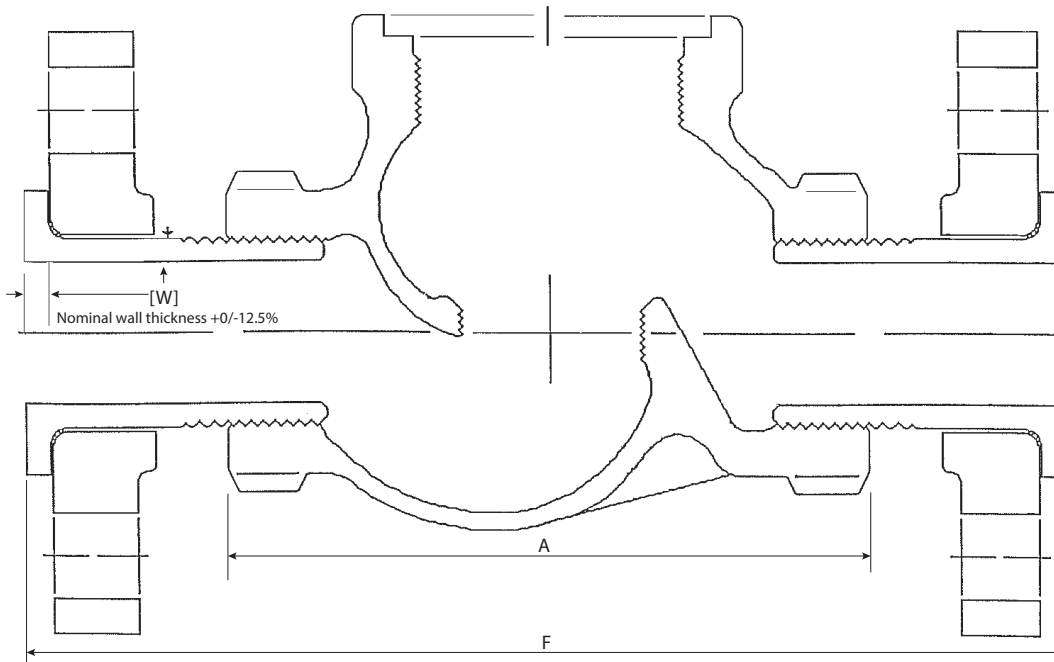
MATERIALS

Flange	Carbon Steel ASTM A-105
Adapter	Carbon Steel ASTM A-234
Coating	As received from vendor
Optional (at extra cost)	Painted

TEMPERATURE VS PRESSURE RATING

Temperature	Pressure
-20...100° F (-28.9...37.8° C)	285 psig (19.6 bar)
> 150° F (65.6° C)	270 psig (18.6 bar)
> 200° F (93.3° C)	260 psig (17.9 bar)
> 250° F (121.1° C)	240 psig (16.5 bar)
> 300° F (148.9° C)	210 psig (14.5 bar)
> 350° F (176.7° C)	180 psig (12.4 bar)
> 400° F (204.4° C)	150 psig (10.3 bar)

Final Assy. LeakTest: Per MSS SP-61



Typical 1 in. (25 mm) size body assembly, approximate actual size.

NOTE: The 1.5 in. (38 mm) and 2 in. (50 mm) valves have a close clearance between the inside of the flange and the body. Use the special hex nuts provided between the flange and the body.

Weight added to standard NPT valve:

- 1 in. (25 mm) + 4 lb
- 1.5 in. (38 mm) + 8 lb
- 2 in. (50 mm) + 12 lb

Size	A	F	W
1 in. (25.4 mm)	4.5 in. (114.3 mm)	7.25 in. (184.2 mm)	0.170 in. (4.3 mm)
1.5 in. (38.1 mm)	6.25 in. (158.8 mm)	8.75 in. (222.3 mm)	0.200 in. (5.1 mm)
2 in. (50.8 mm)	7.0 in. (177.8 mm)	10.00 in. (254 mm)	0.218 in. (5.5 mm)

Face-to-face length tolerance (L) Nominally ± 1/8 in. (3.2 mm)

DESCRIPTION

The Type NRMA Non-Rotating Manual Actuation design is used in applications where either our low-flow trims, cooling fins or bellows are needed and when applications demand human interaction. The manual actuator can be mounted on all RC series valves, including all "P" Trims and all Bonnets. Exchanging between electrical, pneumatic and manual actuators is therefore possible at any time with simple additions. The actuator is encapsulated and completely maintenance-free—designed for fine control.

APPLICATIONS

When you turn the hand wheel, the valve interior moves in a linear motion. This linear movement, from the hand wheel to the internal coupling, prevents damage to the trim and seat, distinguishing this design from conventional manual control valves.

FEATURES

- Hand drive, linear
- Suitable for Badger Meter® modular construction

MATERIALS

Case	1.4404 (316L)
Yoke	1.4404 (316L)
Hand Wheel	Duroplast

SPECIFICATIONS

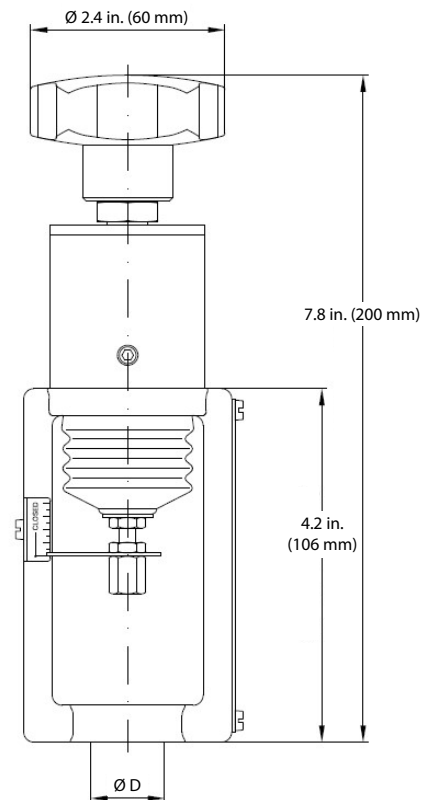
Weight	Approximately 3.3 lb (1.5 kg)
Temperature	-40...176° F (-40...80° C)
Valve Lift	0.04 in. (1 mm) / 360° turn

SIZES FOR RESEARCH CONTROL VALVES

Sizes	Ø Average	Stroke
1/4 in. standard	0.625 in.	11.1 mm
1/2 in., 3/4 in., 1 in. standard	0.875 in.	14.3 mm
1/2 in., 3/4 in., 1 in. heavy duty guiding	0.875 in.	14.3 mm



DIMENSIONS



RCV Valves		Trim Sizes Equal %															
% Lift	% Cv	6.0	5	4.5	4	3.5	A	B	C	D	E	F	G	H	I	J	% Lift
0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5%	1.0%	0.06	0.05	0.04	0.04	0.03	0.02	0.02	0.01	0.008	0.005	0.003	0.002	0.001	0.001	0.000	5%
10%	1.9%	0.11	0.10	0.09	0.08	0.07	0.05	0.04	0.02	0.015	0.010	0.006	0.004	0.002	0.002	0.001	10%
20%	3.8%	0.23	0.19	0.17	0.15	0.13	0.10	0.08	0.05	0.031	0.019	0.012	0.008	0.005	0.003	0.002	20%
25%	4.8%	0.29	0.24	0.22	0.19	0.17	0.12	0.10	0.06	0.038	0.024	0.015	0.010	0.006	0.004	0.002	25%
30%	5.9%	0.35	0.29	0.26	0.23	0.20	0.15	0.12	0.07	0.047	0.029	0.019	0.012	0.008	0.005	0.003	30%
40%	8.8%	0.53	0.44	0.40	0.35	0.31	0.22	0.18	0.11	0.070	0.044	0.028	0.018	0.011	0.007	0.004	40%
50%	13.2%	0.79	0.66	0.59	0.53	0.46	0.33	0.26	0.16	0.105	0.066	0.042	0.026	0.017	0.011	0.007	50%
60%	19.8%	1.19	0.99	0.89	0.79	0.69	0.49	0.40	0.25	0.158	0.099	0.063	0.040	0.026	0.016	0.010	60%
70%	29.6%	1.78	1.48	1.33	1.19	1.04	0.74	0.59	0.37	0.237	0.148	0.095	0.059	0.039	0.024	0.015	70%
75%	36.3%	2.18	1.81	1.63	1.45	1.27	0.91	0.73	0.45	0.290	0.181	0.116	0.073	0.047	0.029	0.018	75%
80%	44.4%	2.67	2.22	2.00	1.78	1.56	1.11	0.89	0.56	0.356	0.222	0.142	0.089	0.058	0.036	0.022	80%
90%	66.7%	4.00	3.33	3.00	2.67	2.33	1.67	1.33	0.83	0.533	0.333	0.213	0.133	0.087	0.053	0.033	90%
100%	100%	6.00	5.00	4.50	4.00	3.50	2.50	2.00	1.25	0.800	0.500	0.320	0.200	0.130	0.080	0.050	100%
Valve Sizes		1"	1"	1"	1", 3/4"	1", 3/4"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	

Trim Sizes O through P-18 are available only in linear characteristic. See Product Data Sheets for maximum Cvs.

RCV Valves		Trim Sizes Equal %															
% Lift	% Cv	6.0	5	4.5	4	3.5	A	B	C	D	E	F	G	H	I	J	% Lift
0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5%	1.0%	0.30	0.25	0.23	0.20	0.18	0.13	0.10	0.06	0.040	0.025	0.016	0.010	0.007	0.004	0.003	5%
10%	1.9%	0.60	0.50	0.45	0.40	0.35	0.25	0.20	0.13	0.080	0.050	0.032	0.020	0.013	0.008	0.005	10%
20%	3.8%	1.20	1.00	0.90	0.80	0.70	0.50	0.40	0.25	0.160	0.100	0.064	0.040	0.026	0.016	0.010	20%
25%	4.8%	1.50	1.25	1.13	1.00	0.88	0.63	0.50	0.31	0.200	0.125	0.080	0.050	0.033	0.020	0.013	25%
30%	5.9%	1.80	1.50	1.35	1.20	1.05	0.75	0.60	0.38	0.240	0.150	0.096	0.060	0.039	0.024	0.015	30%
40%	8.8%	2.40	2.00	1.80	1.60	1.40	1.00	0.80	0.50	0.320	0.200	0.128	0.080	0.052	0.032	0.020	40%
50%	13.2%	3.00	2.50	2.25	2.00	1.75	1.25	1.00	0.63	0.400	0.250	0.160	0.100	0.065	0.040	0.025	50%
60%	19.8%	3.60	3.00	2.70	2.40	2.10	1.50	1.20	0.75	0.480	0.300	0.192	0.120	0.078	0.048	0.030	60%
70%	29.6%	4.20	3.50	3.15	2.80	2.45	1.75	1.40	0.88	0.560	0.350	0.224	0.140	0.091	0.056	0.035	70%
75%	36.3%	4.50	3.75	3.38	3.00	2.63	1.88	1.50	0.94	0.600	0.375	0.240	0.150	0.098	0.060	0.038	75%
80%	44.4%	4.80	4.00	3.60	3.20	2.80	2.00	1.60	1.00	0.640	0.400	0.256	0.160	0.104	0.064	0.040	80%
90%	66.7%	5.40	4.50	4.05	3.60	3.15	2.25	1.80	1.13	0.720	0.450	0.288	0.180	0.117	0.072	0.045	90%
100%	100%	6.00	5.00	4.50	4.00	3.50	2.50	2.00	1.25	0.800	0.500	0.320	0.200	0.130	0.080	0.050	100%
Valve Sizes		1"	1"	1"	1", 3/4"	1", 3/4"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	

Numbers are for reference or comparison only.

% Lift	% Maximum Cv	
	Linear	Equal %
0%	0%	0%
5%	5%	1%
10%	10%	2%
20%	20%	4%
25%	25%	5%
30%	30%	6%
40%	40%	9%
50%	50%	13%
60%	60%	20%
70%	70%	30%
75%	75%	36%
80%	80%	44%
90%	90%	67%
100%	100%	100%

