RCV
Research Control® | ReCo® Valves

Small Control Valve

U.S. Type 808 (Includes Sub-BEL)

DESCRIPTION

The U.S. Type 808 bellows sealed globe control valve is especially suited to applications where the possibility of packing leakage cannot be tolerated. The bellows forms a flexible static seal that is virtually leak-free ,as long as the integrity of the bellows remains intact. The unit contains a set of backup packing that, in many cases, will allow the valve to continue in service until repairs can be made, should the bellows fail. The bellows is available in two pressure ranges:

- The low pressure bellows fits 1/4 in. (6.4 mm), 1/2 in. (12.7 mm), 3/4 in. (19.1 mm) or 1 in. (25.4 mm) valves and is available in four materials.
- The high pressure bellows fits 1/2 in. (12.7 mm) through 1 in. (25.4 mm) valves and is rated at 1500 psi for throttling applications.

NOTE: Consult the factory when using this bellows.

APPLICATIONS

The Type 808 valve is widely used in industrial applications, research, and process plants on liquids, gases or steam. The statically sealed bonnet makes it especially suited to applications where expensive concentrates are controlled and cannot be allowed to leak. Other applications arise when fugitive emissions must be prevented or when sensitive flow streams must be isolated from the ambient atmosphere. This type seal performs well in high vacuum service where standard packing is not desired.

MATERIALS

Body and Bonnet	
Standard	316 SST, carbon steel (WCB)
Optional	Alloy 20, Alloy C-276, Alloy B2 or ASTM equivalent, Ni-Cu Alloy 400
Bellows	
Low Pressure	DIN 1.4571 (316Ti SST), DIN 2.4360 (Ni-Cu Alloy 400) DIN 2.4819 (Alloy C-276) Ni Alloy 625 or 750
High Pressure	DIN 1.4571(316Ti SST)
Innervalve	
Standard	316 SST
Optional	Alloy 20, Alloy C-276, Alloy B2 or ASTM equivalent, Ni-Cu Alloy 400, Stellited SST
Packing	TFE CV rings, Graphite
Actuator	
Standard	Aluminum
Optional	316 SST on 1/2 in. (12.7 mm), 3/4 in. (19.1 mm) and 1 in. (25.4 mm)

ACTUATOR CHOICES

Standard	Air-to-open, Type 754 & 766 Air-to-close, Type 755 & 759
Standard Signals	3-15#, 6-30#
Optional Signals	With positioner, 3-9#, 9-15#
Accessories	Filter regulator, gauges, I/P, limit switches, handwheel on standard unit, solenoids

Shown with Type 754 Actuator

STANDARD FEATURES

- 1/4 in. (6.4 mm), 1/2 in. (12.7 mm), 3/4 in. (19.1 mm) and 1 in. (25.4 mm) models
- Interchangeable trim sets
- Bellows packing
- Trim characteristics: Linear, equal percent, quick open or double taper
- TFE CV ring backup packing
- TFE bellows gasket

OPTIONAL FEATURES

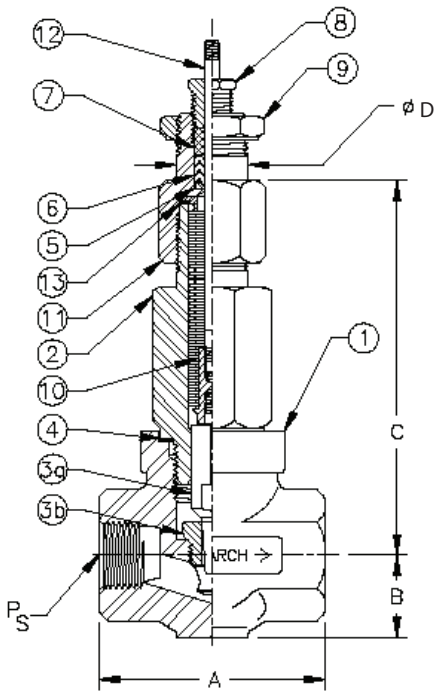
- Butt and socket weld ends, BSPP, tube connection and others
- Bonnet extensions for temperature extremes
- Angle pattern bodies
- Reduced Emissions Kalrez® (REK), graphite, spring-loaded chevron, and others
- Exotic alloys for complete valves or trims
- Stellited trims & soft seats (PTFE & Kel-F)
- TiN coating of innervalve stem and seat
- Purge or lead ports

Badger Meter

RCV-DS-00569-EN-05 (February 2021)

Product Data Sheet

DIMENSIONS



1. Valve Body
2. Bonnet-Bellows
3. Innervalve (trim) matched set
   3A: Plug Assembly
   3B: Seat
4. Body-Bonnet gasket
5. Packing Adaptor
6. Packing
7. Packing Adaptor
8. Packing-Gland
9. Yoke Locknut
10. Bellows
11. Bonnet Cap
12. Bellow Stem
13. Bellows Gasket

PS	1/4 in. (6.4 mm)	1/2 in. (12.7 mm)	3/4 in. (19.1 mm)	1 in. (25.4 mm)
A	2.12 in. (54 mm)	2.75 in. (70 mm)	3.37 in. (86 mm)	4.00 in. (102 mm)
B	0.68 in. (17 mm)	1 in. (25 mm)	1.18 in. (30 mm)	1.5 in. (38 mm)
C	4.15 in. (105 mm)	4.56 in. (116 mm)	4.76 in. (121 mm)	4.88 in. (124 mm)
D	0.625 in. (16 mm)	0.875 in. (22 mm)	0.875 in. (22 mm)	0.875 in. (22 mm)
Stroke	0.437 in. (11 mm)	0.562 in. (14 mm)	0.562 in. (14 mm)	0.562 in. (14 mm)

PRESSURE/TEMPERATURE RATING

Temp ° F (° C)	Low Pressure DIN 1.4571 psig (barg)	DIN 2.4360 psig (barg)	DIN 2.4819 psig (barg)	Ni Alloy 625 or 750 psig (barg)	High Pressure DIN 1.4571 psig (barg)
70 (21)	580 (40)	325 (22)	580 (40)	325 (22)	1500 (103)
200 (93)	525 (36)	290 (20)	550 (38)	280 (19)	1500 (103)
300 (149)	475 (32)	280 (19)	530 (36)	240 (16)	1500 (103)
400 (204)	445 (31)	270 (18)	520 (35)	210 (14)	1500 (103)
500 (260)	410 (28)	255 (17)	505 (35)	165 (11)	1500 (103)
600 (316)	385 (26)	240 (16)	480 (33)	125 (8)	1500 (103)
700 (371)	370 (25)	220 (15)	450 (31)	90 (6)	1500 (103)
800 (427)	345 (23)	—	420 (28)	50 (3)	1495 (103)

NOTE: The pressure ratings above are for valves constructed of 316, Alloy 20, Alloy C, Alloy B, and carbon steel. Consult factory about other materials.
The High Pressure DIN 1.451 bellows can be used up to 2500 psi in special applications. Consult factory for more information.

INNERVALVE CHART

Valve Size	Trim Size	Nominal Cv	Theoretical Turbulent Cv	Orifice Dia. in. (mm)	Orifice Area in.² (mm²)	Nominal Rangeability	
						Linear	Equal %
1 in. (25.4 mm)	6.0	6.0	6.0	0.6250 (15.9)	0.3068 (197.9)	50:1	60:1
	5.0	5.0	5.0	0.6250 (15.9)	0.3068 (197.9)	50:1	60:1
	4.5	4.5	4.5	0.5000 (12.7)	0.1963 (129.6)	50:1	60:1
3/4 in. (19.1 mm), 1 in. (25.4 mm)	4.0	4.0	4.0	0.4375 (11.1)	0.1503 (96.9)	50:1	60:1
	3.5	3.5	3.5	0.4375 (11.1)	0.1503 (96.9)	50:1	60:1
1/2 in. (12.7 mm), 3/4 in. (19.1 mm), 1 in. (25.4 mm)	A	2.5	2.5	0.3750 (9.5)	0.1104 (71.2)	40:1	50:1
	B	2.0	2.0	0.3750 (9.5)	0.1104 (71.2)	40:1	50:1
	C	1.25	1.25	0.2810 (7.1)	0.0620 (40.0)	40:1	50:1
	D	0.8	0.8	0.2500 (6.4)	0.0491 (31.7)	40:1	50:1
	E	0.5	0.5	0.2500 (6.4)	0.0491 (31.7)	40:1	50:1
1/4 in. (6.4 mm), 1/2 in. (12.7 mm), 3/4 in. (19.1 mm), 1 in. (25.4 mm)	F	0.32	0.32	0.1560 (3.9)	0.0191 (12.3)	30:1	40:1
	G	0.2	0.2	0.1560 (3.9)	0.0191 (12.3)	30:1	40:1
	H	0.13	0.13	0.1560 (3.9)	0.0191 (12.3)	30:1	40:1
	I	0.08	0.08	0.1560 (3.9)	0.0191 (12.3)	30:1	40:1
	J	0.05	0.05	0.1560 (3.9)	0.0191 (12.3)	30:1	40:1
	K	0.03	4.8E-02	0.0860 (2.2)	0.0058 (3.7)	25:1	—
	L	0.02	3.4E-02	0.0860 (2.2)	0.0058 (3.7)	25:1	—
	M	0.01	1.6E-02	0.0860 (2.2)	0.0058 (3.7)	25:1	—
	N	0.006	1.0E-02	0.0860 (2.2)	0.0058 (3.7)	25:1	—
	O	0.003	5.3E-03	0.0860 (2.2)	0.0058 (3.7)	25:1	—
1/4 in. (6.4 mm), 1/2 in. (12.7 mm)	P-1	0.002	3.6E-03	0.0625 (1.6)	0.0031 (2.0)	15:1	—
	P-2	0.0013	2.5E-03	0.0625 (1.6)	0.0031 (2.0)	15:1	—
	P-3	0.001	2.0E-03	0.0625 (1.6)	0.0031 (2.0)	15:1	—
	P-4	0.0006	1.4E-03	0.0625 (1.6)	0.0031 (2.0)	15:1	—
	P-5	0.0004	1.0E-03	0.0625 (1.6)	0.0031 (2.0)	15:1	—
	P-6	0.00027	8.3E-04	0.0625 (1.6)	0.0031 (2.0)	15:1	—
	P-7	0.00018	6.8E-04	0.0625 (1.6)	0.0031 (2.0)	15:1	—
	P-8	0.00012	5.6E-04	0.0625 (1.6)	0.0031 (2.0)	15:1	—
	P-9	0.00008	4.6E-04	0.0625 (1.6)	0.0031 (2.0)	15:1	—
1/4 in. (6.4 mm)	P-10	Consult the factory for these innervalve sizes.					
	P-11						
	P-12						
	P-13						
	P-14						
	P-15						
	P-16						
	P-17						
	P-18						

Control. Manage. Optimize.

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RCV
Research Control® | ReCo® Valves

Non-Rotating Manual Actuation

Type NRMA

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 coventional 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

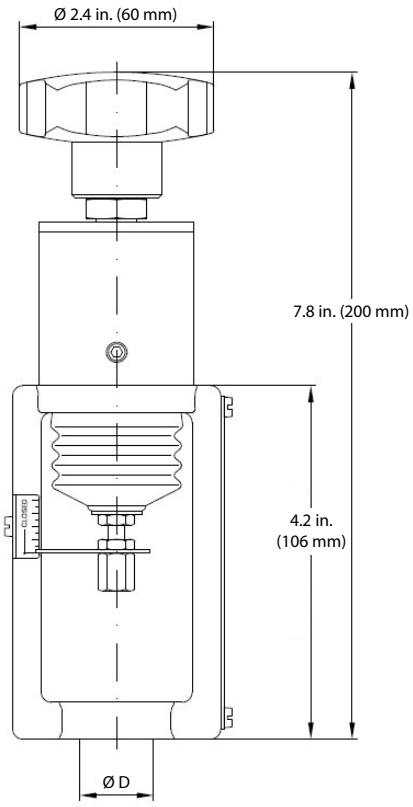
SPECIFICATIONS

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



Badger Meter

RCV-DS-03324-EN-01 (November 2020)

Product Data Sheet

RCV
Research Control® | ReCo® Valves

Research Control Valves

CV vs Lift Chart

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.

Badger Meter

Product Data Sheet

Research Control Valves

CV vs Lift Curve

	% Maximum Cv	
% Lift	**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%