

Small Control Valve

U.S. Type 1118 (Includes RC230)

DESCRIPTION

The U.S. Type 1118 three-way valve is available in either 3/4 in. (19.1 mm) or 1 in. (25.4 mm) sizes for modulating control of liquids, gases, or steam in either mixing or diverting applications. The unit features one common port and two non-common ports. When used in a diverting application, the common port is piped as the valve inlet with flow proportionally controlled through the two outlet ports. When used in a mixing application, the common port is piped as the outlet with incoming fluid entering the two non-common ports. In this application, the inlet pressure to the two inlets should be the same. Each innervalue within the unit is connected by a common stem and is stroked simultaneously by the actuator. This action causes one orifice to open as the other is closing. The Cv of each innervalue can be the same or of different value, depending on the requirements of the application.

APPLICATIONS

The Type 1118 three-way valve is used in mixing applications such as temperature control. By varying the position of the innervalue, the percentage of fluid passing through each port can be controlled as it exits the common port. The same concept can be applied to blending of various chemicals, dyes, additives, and other fluids or gases that must be proportionally mixed.

The Type 1118 valve is also well suited to diverting applications such as flow or pressure control in hydraulic systems. In a hydraulic system the fluid enters the common port of the valve with one of the non-common ports controlling the flow to a cylinder or a vessel. The unused fluid is re-circulated back to the sump through the other non-common port.

MATERIALS

Body, Bonnet	Standard	316 stainless steel, carbon steel
Innervalue	Standard	316 stainless steel
	Optional	Stellite, TFE or Kel-F soft seating on quick opening trims only
Packing	Standard	TFE chevron rings
	Optional	Graphite
Actuator	Standard	Die cast aluminum
	Optional	316L stainless steel on standard models



ACTUATOR CHOICES

Standard	Air-to-open, fail close Air-to-close, fail open
Optional	Integral top-mounted positioner
Standard Signals	3...15#, 3...27#, 6...30#
Optional Signals	3...9#, 9...15# with positioner
Accessories	Filter regulator, gauges, I/P converter, limit switches, handwheel, solenoids

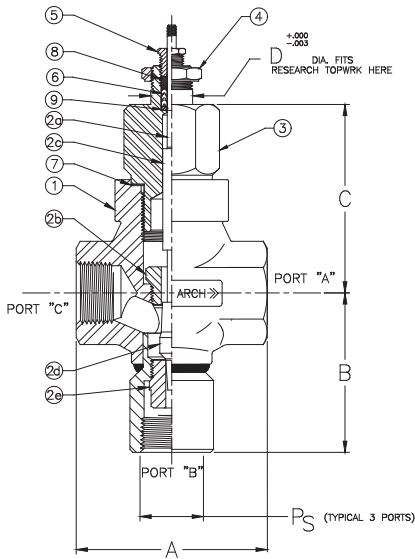
STANDARD FEATURES

- Wide range of interchangeable trim sets
- Threaded bonnet for quick disassembly
- Choice of linear or quick opening characteristics
- Choice of Cv and characteristic (linear or QO) on each port
- TFE chevron packing
- ANSI Class III shutoff

OPTIONAL FEATURES

- Flanges, socket weld, and butt-weld nipples
- Radiating fin bonnet for higher temperatures

DIMENSIONS



SPECIFICATIONS

3/4 in. (19.1 mm) and 1 in. (25.4 mm) Research Control Valve

Pressure vs Temperature Rating for Valve Superstructure
Excluding Packing or End Fittings.

Temp ° F (° C)	316 Stainless Steel		Carbon Steel	
	3/4 in. (19.1 mm) psig (barg)	1 in. (25.4 mm) psig (barg)	3/4 in. (19.1 mm) psig (barg)	1 in. (25.4 mm) psig (barg)
100 (37.8)	1500 (103)	1500 (103)	1500 (103)	1500 (103)
200 (93.3)	1450 (100)	1450 (100)	1350 (93)	1350 (93)
300 (148.9)	1325 (91)	1325 (91)	1325 (91)	1325 (91)
400 (204.4)	1175 (81)	1175 (81)	1275 (88)	1275 (88)
500 (260)	1100 (76)	1100 (76)	1200 (83)	1200 (83)
600 (315.6)	1050 (72)	675 (47)	1100 (76)	1100 (76)
700 (371.1)	840 (58)	250 (17)	1075 (74)	1075 (74)
800 (426.7)	575 (40)	—	—	—
3/4 in. (19.1 mm) Recommended bonnet torque = 290 ft-lb (393 Nm)				
1 in. (25.4 mm) Recommended bonnet torque = 345 ft-lb (468 Nm)				

NOTE: The pressure/temperature ratings listed above are based on material cross sections at the joint between the body and bonnet where a gasketed screwed type bonnet is utilized. When the proper torque levels are used, the valve should not experience rupture of the joint or the material. The above listed torque levels were used in hydrostatic tests at the factory at 70° F (21.1° C) at maximum body rating and were found to provide acceptable sealing. Other factors such as high or cyclic temperatures, light process gases, or poor gasket surfaces can dictate the ability of a seal to be made. Under such conditions, the only way to be assured of tight sealing is to perform a test under the actual process conditions.

Description of Items

- Valve Body
- Innervalve (trim set):
 - Upper stem: 3/16 in. (4.8 mm) Æ
 - Upper Seat: 3/4 in. (19.1 mm) = 3/4 in. (19.1 mm) hex;
1 in. (25.4 mm) = 15/16 in. (23.8 mm) hex
 - Lower Stem
 - Plug (throttling portion)
 - Lower Seat: 3/4 in. (19.1 mm) = 5/8 in. (15.9 mm) hex;
1 in. (25.4 mm) = 1-3/4 in. (44.5 mm) hex
- Bonnet: 3/4 in. (19.1 mm) = 1-1/2 in. (38.1 mm) hex;
1 in. (25.4 mm) = 1-3/4 in. (44.5 mm) hex
- Yoke lock nut: 1-1/8 in. (28.6 mm) hex
- Packing gland: 1/2 in. (12.7 mm) hex
- Packing
- Body-bonnet gasket
- Packing follower
- Packing adaptor

Dimensions					
PS in. (mm)	A in. (mm)	B in. (mm)	C in. (mm)	D in. (mm)	Stroke in. (mm)
3/4 (19.1)	3.37 (85.6)	2.94 (74.7)	3.90 (99.1)	0.875 (22.2)	0.562 (14.3)
1 (25.4)	4.00 (101.6)	3.34 (84.8)	3.95 (100.3)	0.875 (22.2)	0.562 (14.3)

INNERVALVE CHART

Valve Size	Trim Designation	Nominal CV	Orifice Dia in. (mm)	Orifice Area in. ² (mm ²)	Nominal Range-ability Linear	Max Pressure Drop
1 in. (25.4 mm)	5.0 Lwr Seat	5.0	0.625 (15.9)	0.307 (197.9)	50:1	100 psi
	5.0 Upr Seat	5.0	0.625 (15.9)	0.307 (197.9)	50:1	100 psi
	4.0 Lwr Seat	4.0	0.625 (15.9)	0.307 (197.9)	50:1	100 psi
	4.0 Upr Seat	4.0	0.625 (15.9)	0.307 (197.9)	50:1	100 psi
	3.5 Lwr Seat	3.5	0.500 (12.7)	0.1963 (126.6)	50:1	100 psi
3/4 in. (19.1 mm), 1 in. (25.4 mm)	3.5 Upr Seat	3.5	0.4375 (11.1)	0.1503 (97.3)	50:1	100 psi
	A Lwr Seat	2.5	0.3750 (9.5)	0.1104 (71.2)	40:1	100 psi
	A Upr Seat	2.5	0.4375 (11.1)	0.1503 (97.0)	40:1	100 psi
	B Lwr Seat	2.0	0.4375 (11.1)	0.1104 (71.2)	40:1	100 psi
	B Upr Seat	2.0	0.4375 (11.1)	0.1503 (97.0)	40:1	100 psi
	C Lwr Seat	1.5	0.2810 (7.1)	0.0620 (940.0)	40:1	100 psi
	C Upr Seat	1.5	0.4375 (11.1)	0.1503 (97.0)	40:1	100 psi
	D Lwr Seat	0.8	0.2500 (6.4)	0.0491 (31.7)	40:1	150 psi
	D Upr Seat	0.8	0.4375 (11.1)	0.1503 (97.0)	40:1	150 psi
	E Lwr Seat	0.5	0.2500 (6.4)	0.0491 (31.7)	40:1	150 psi
	E Upr Seat	0.5	0.4375 (11.1)	0.1503 (97.0)	40:1	150 psi
	F Lwr Seat	0.3	0.1560 (3.9)	0.0191 (12.3)	30:1	300 psi
	F Upr Seat	0.3	0.4375 (11.1)	0.1503 (97.0)	30:1	300 psi
	G Lwr Seat	0.2	0.1560 (3.9)	0.0191 (12.3)	30:1	300 psi
	G Upr Seat	0.2	0.4375 (11.1)	0.1503 (97.0)	30:1	300 psi
	H Lwr Seat	0.13	0.1560 (3.9)	0.0191 (12.3)	30:1	300 psi
	H Upr Seat	0.13	0.4375 (11.1)	0.1503 (97.0)	30:1	300 psi
	I Lwr Seat	0.08	0.1560 (3.9)	0.0191 (12.3)	30:1	300 psi
	I Upr Seat	0.08	0.4375 (11.1)	0.1503 (97.0)	30:1	300 psi
	J Lwr Seat	0.05	0.1560 (3.9)	0.0191 (12.3)	30:1	300 psi
J Upr Seat	0.05	0.4375 (11.1)	0.1503 (97.0)	30:1	300 psi	

Control. Manage. Optimize.

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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

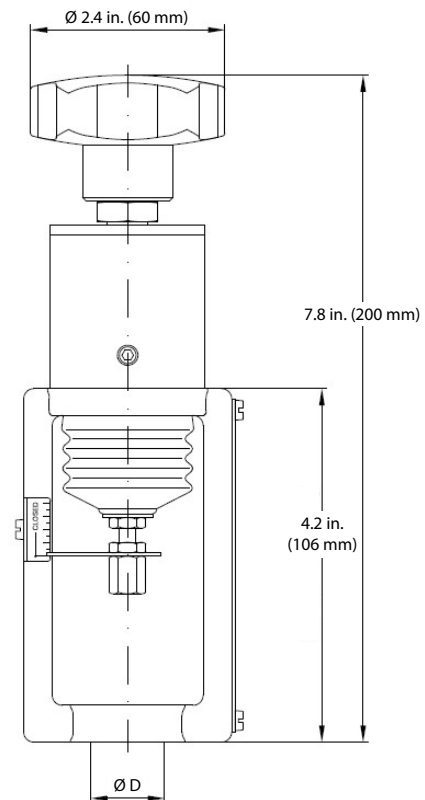
Weight	Approximately 3.3 lb (1.5 kg)
Temperature	-40...176° F (-40...80° C)
Valve Lift	0.04 in. (1 mm) / 360° turn

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.

Research Control Valves

CV vs Lift Curve

% 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%

