

# Small Control Valve

U.S. Type 807 and Type 752 (Includes RC200, RC220, RC250)

## DESCRIPTION

For more than 60 years, Type 807 and Type 752 valves have performed in some of the world's most demanding applications. If your application requires critical control of liquid, gas or steam, your choice of control valves is one of the most important decisions you will make.

When it comes to specifying a control valve, the variables are complicated and exacting. That is why Research Control® Valves are available in a broad range of options—so we can design a truly engineered solution that matches your requirements.

## APPLICATION

Processing plants, research facilities and government agencies worldwide rely on Research Control Valves for repeatable performance and durability. Built for applications 1 in. (25.4 mm) and under, our Types 807 and 752 control valve are integral components in systems ranging from petrochemical to pharmaceutical manufacturing. It is an ideal choice for additive injection or flow and pressure control.

## CONSTRUCTION

<b>Body – Bonnet</b>	
Standard	316/316L stainless steel, carbon steel (WCB)
Optional	Monel®, alloy 20, Hastelloy® C or ASTM equivalent, DIN 1.4581/1.4571. Other materials available upon request.
<b>Innervalue</b>	
Standard	316 stainless steel
Optional	Stellite®, Monel, alloy 20, Hastelloy C or B or ASTM equivalent
<b>Packing</b>	
Standard	TFE chevron rings
Optional	Graphite, Reduced Emissions Kalrez® (REK)
<b>Actuator</b>	
Standard	Die cast aluminum
Optional	316L stainless steel on 1/2", 3/4" and 1" models

## ACTUATOR CHOICES

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



Shown with Type 754 Actuator

## STANDARD FEATURES

- 1/4 in. (6.4 mm), 1/2 in. (12.7 mm), 3/4 (19.1 mm) and 1 in. (25.4 mm) models
- Interchangeable trim sets
- Threaded bonnet for quick disassembly
- Trim characteristics: Linear, equal percent, quick open or double taper
- TFE chevron packing
- ANSI Class IV shutoff (size O and larger)

## OPTIONAL FEATURES FOR 1/2 IN. (12.7 MM), 3/4 IN. (19.1 MM) AND 1 IN. (25.4 MM) MODELS

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

## PRESSURE VS TEMPERATURE RATINGS FOR VALVE SUPERSTRUCTURE

The pressure/temperature ratings listed here are based on material cross sections at the joint between the body and bonnet where a gasketed screw type bonnet is used. When the proper torque levels are used, the valve should not experience rupture of the joint or the material. The 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 seating. 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 sure of tight sealing is to perform a test under the actual process conditions.

These charts are not intended as an indication of functionality or suitability for control service. Other charts are available to assist in the choosing of valve type, bonnet type, trim type and actuator.

When flanges, fittings or other pressure containing elements are added to the valve, the pressure rating of the total valve assumes the rating of the weakest component.

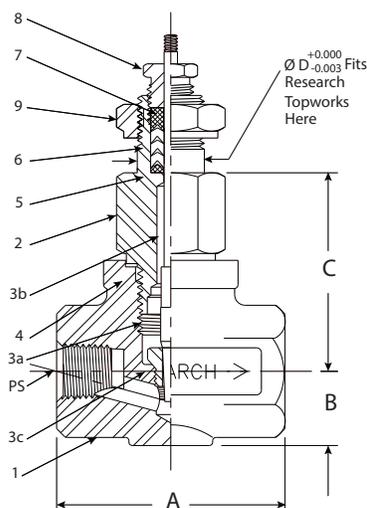
The following charts exclude packing or end fittings:

1/4 in. Research Control Valve						
Temp	316 S/S psi (bar)	Carbon Steel psi (bar)	Hastelloy B or = psi (bar)	Hastelloy C or = psi (bar)	Monel psi (bar)	Alloy 20 psi (bar)
100° F (37.8° C)	5000 (345)	4000 (276)	5000 (345)	5000 (345)	4000 (276)	5000 (345)
200° F (93.3° C)	5000 (345)	3700 (255)	5000 (345)	5000 (345)	4000 (276)	5000 (345)
300° F (148.9° C)	4750 (328)	3500 (241)	5000 (345)	5000 (345)	3880 (268)	4850 (334)
400° F (204.4° C)	4190 (289)	3200 (221)	5000 (345)	5000 (345)	3770 (260)	4700 (324)
500° F (260.0° C)	4000 (276)	2900 (200)	4900 (338)	4900 (338)	3740 (258)	4500 (310)
600° F (315.6° C)	3820 (263)	2600 (179)	4850 (334)	4850 (334)	3740 (258)	4200 (290)
700° F (371.1° C)	3640 (351)	2300 (159)	4800 (331)	4800 (331)	3640 (251)	3900 (269)
800° F (426.7° C)	3580 (247)	—	4750 (328)	4750 (328)	3580 (247)	3700 (255)
900° F (482.2° C)	2840 (196)	—	—	4500 (310)	2280 (157)	3000 (207)
1000° F (537.8° C)	1160 (80)	—	—	4000 (276)	940 (65)	1500 (103)
1100° F (593.3° C)	Consult factory for higher temperatures.			3500 (241)	—	—
1200° F (648.9° C)	Consult factory for higher temperatures.			3000 (207)	—	—
Recommended torque in ft-lb (Nm), +/- 2 ft-lb (2.71 Nm)						
	37 (50)	37 (50)	39 (53)	37 (50)	31 (42)	35 (47)

1/2 in. Research Control Valve						
Temp	316 S/S psi (bar)	Carbon Steel psi (bar)	Hastelloy B or = psi (bar)	Hastelloy C or = psi (bar)	Monel psi (bar)	Alloy 20 psi (bar)
100° F (37.8° C)	5000 (345)	4000 (276)	5000 (345)	5000 (345)	4000 (276)	5000 (345)
200° F (93.3° C)	4750 (328)	3800 (262)	5000 (345)	5000 (345)	3780 (261)	5000 (345)
300° F (148.9° C)	4310 (297)	3600 (248)	5000 (345)	5000 (345)	3520 (243)	4950 (341)
400° F (204.4° C)	3860 (266)	3300 (228)	5000 (345)	5000 (345)	3420 (236)	4850 (334)
500° F (260.0° C)	3640 (251)	3100 (214)	4900 (338)	4900 (338)	3390 (234)	4600 (317)
600° F (315.6° C)	3470 (239)	2900 (200)	4850 (334)	4870 (336)	3390 (234)	4300 (296)
700° F (371.1° C)	3310 (228)	2700 (186)	4800 (331)	4610 (318)	3310 (228)	4200 (290)
800° F (426.7° C)	3255 (224)	—	4750 (328)	4430 (305)	2090 (114)	4000 (276)
900° F (482.2° C)	3190 (220)	—	—	4200 (290)	2070 (143)	3000 (207)
1000° F (537.8° C)	1860 (128)	—	—	4000 (276)	850 (59)	1500 (103)
1100° F (593.3° C)	Consult factory for higher temperatures.			3400 (234)	—	—
1200° F (648.9° C)	Consult factory for higher temperatures.			3000 (207)	—	—
Recommended torque in ft-lb (Nm), +/- 2 ft-lb (2.71 Nm)						
	122 (165)	122 (165)	131 (178)	124 (168)	102 (138)	117 (159)

3/4 in. and 1 in. Research Control Valve				
Temp	316 S/S psi (bar)		Carbon Steel psi (bar)	
	3/4 in. (19.1 mm)	1 in. (25.4 mm)	3/4 in. (19.1 mm)	1 in. (25.4 mm)
100° F (37.8° C)	1500 (103)	1500 (103)	1500 (103)	1500 (103)
200° F (93.3° C)	1450 (100)	1450 (100)	1350 (93)	1350 (93)
300° F (148.9° C)	1325 (91)	1325 (91)	1325 (91)	1325 (91)
400° F (204.4° C)	1175 (81)	1175 (81)	1275 (88)	1275 (88)
500° F (260.0° C)	1100 (76)	1100 (76)	1200 (83)	1200 (83)
600° F (315.6° C)	1050 (72)	675 (46)	1100 (76)	1100 (76)
700° F (371.1° C)	840 (58)	250 (17)	1075 (74)	1075 (74)
800° F (426.7° C)	575 (40)	—	—	—
3/4 in. and 1 in. Torque = 290 ft-lb (393 Nm)				

**DIMENSIONS**



1. Valve Body
2. Valve Bonnet
3. Trim Set (innervalue)
4. Body Bonnet Gasket
5. Packing Adaptor
6. Packing (CV ring)
7. Packing Follower
8. Packing Gland
9. Yoke Lock Nut

PS	A	B	C	D	Stroke
0.25 in. (6.4 mm)	2.12 in. (53.8 mm)	0.68 in. (17.3 mm)	1.87 in. (47.5 mm)	0.625 in. (115.9 mm)	0.437 in. (11.1 mm)
0.50 in. (12.7 mm)	2.75 in. (69.9 mm)	1.00 in. (25.4 mm)	2.85 in. (72.4 mm)	0.875 in. (22.2 mm)	0.562 in. (14.3 mm)
0.75 in. (19.1 mm)	3.37 in. (85.6 mm)	1.18 in. (30.0 mm)	3.84 in. (97.5 mm)		
1 in. (25.4 mm)	4.00 in. (101.6 mm)	1.50 in. (38.1 mm)	3.95 in. (100.3 mm)		

**INNERVALVE CHART**

Valve Size	Trim Designation	Max. Cv	Theoretical Turbulent $Cv_t$	Orifice Dia.	Orifice Area	Nominal Rangeability Linear	Equal %
1 in. (25.4 mm)	6.0	6.0	6.0	0.6250 (15.9 mm)	0.3068 in. <sup>2</sup> (197.9 mm <sup>2</sup> )	50:1	60:1
	5.0	5.0	5.0	0.6250 (15.9 mm)	0.3068 in. <sup>2</sup> (197.9 mm <sup>2</sup> )	50:1	60:1
	4.5	4.5	4.5	0.5000 (12.7 mm)	0.1963 in. <sup>2</sup> (126.6 mm <sup>2</sup> )	50:1	60:1
3/4 in. (19.1 mm) and 1 in. (25.4 mm)	4.0	4.0	4.0	0.5000 (12.7 mm)	0.1963 in. <sup>2</sup> (126.6 mm <sup>2</sup> )	50:1	60:1
	3.5	3.5	3.5	0.5000 (12.7 mm)	0.1963 in. <sup>2</sup> (126.6 mm <sup>2</sup> )	50:1	60:1
1/2 in. (12.7 mm), 3/4 in. (19.1 mm) and 1 in. (25.4 mm)	A	2.5	2.5	0.3750 (9.5 mm)	0.1104 in. <sup>2</sup> (71.2 mm <sup>2</sup> )	40:1	50:1
	B	2.0	2.0	0.3750 (9.5 mm)	0.1104 in. <sup>2</sup> (71.2 mm <sup>2</sup> )	40:1	50:1
	C	1.25	1.25	0.2810 (7.1 mm)	0.0620 in. <sup>2</sup> (40.0 mm <sup>2</sup> )	40:1	50:1
	D	0.8	0.8	0.2500 (6.4 mm)	0.0491 in. <sup>2</sup> (31.7 mm <sup>2</sup> )	40:1	50:1
	E	0.5	0.5	0.2500 (6.4 mm)	0.0491 in. <sup>2</sup> (31.7 mm <sup>2</sup> )	40:1	50:1
1/4 in. (6.4 mm), 1/2 in. (12.7 mm), 3/4 in. (19.1 mm) and 1 in. (25.4 mm)	F	0.32	0.32	0.1560 (3.9 mm)	0.0191 in. <sup>2</sup> (12.3 mm <sup>2</sup> )	30:1	40:1
	G	0.2	0.2	0.1560 (3.9 mm)	0.0191 in. <sup>2</sup> (12.3 mm <sup>2</sup> )	30:1	40:1
	H	0.13	0.13	0.1560 (3.9 mm)	0.0191 in. <sup>2</sup> (12.3 mm <sup>2</sup> )	30:1	40:1
	I	0.08	0.08	0.1560 (3.9 mm)	0.0191 in. <sup>2</sup> (12.3 mm <sup>2</sup> )	30:1	40:1
	J	0.05	0.05	0.1560 (3.9 mm)	0.0191 in. <sup>2</sup> (12.3 mm <sup>2</sup> )	30:1	40:1
	K	0.03	4.8E-02	0.0860 (2.2 mm)	0.0058 in. <sup>2</sup> (3.7 mm <sup>2</sup> )	25:1	—
	L	0.02	3.4E-02	0.0860 (2.2 mm)	0.0058 in. <sup>2</sup> (3.7 mm <sup>2</sup> )	25:1	—
	M	0.01	1.6E-02	0.0860 (2.2 mm)	0.0058 in. <sup>2</sup> (3.7 mm <sup>2</sup> )	25:1	—
	N	0.006	1.0E-02	0.0860 (2.2 mm)	0.0058 in. <sup>2</sup> (3.7 mm <sup>2</sup> )	25:1	—
	O	0.003	5.3E-03	0.0860 (2.2 mm)	0.0058 in. <sup>2</sup> (3.7 mm <sup>2</sup> )	25:1	—
1/4 in. (6.4 mm) and 1/2 in. (12.7 mm)	P1	0.002	3.6E-03	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
	P2	0.0013	2.5E-03	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
	P3	0.001	2.0E-03	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
	P4	0.0006	1.4E-03	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
	P5	0.0004	1.0E-03	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
	P6	0.00027	8.3E-04	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
	P7	0.00018	6.8E-04	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
	P8	0.00012	5.6E-04	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
	P9	0.00008	4.6E-04	0.0625 (1.6 mm)	0.0031 in. <sup>2</sup> (2.0 mm <sup>2</sup> )	15:1	—
1/4 in. (6.4 mm)	P10	0.00005	1.9E-04	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—
	P11	0.000036	1.6E-04	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—
	P12	0.000024	1.3E-04	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—
	P13	0.000016	1.1E-04	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—
	P14	0.00001	8.4E-05	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—
	P15	0.000006	6.6E-05	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—
	P16	0.000004	5.3E-05	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—
	P17	0.0000027	4.4E-05	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—
	P18	0.0000018	3.6E-05	0.0420 (1.1 mm)	0.0014 in. <sup>2</sup> (0.9 mm <sup>2</sup> )	15:1	—

**Control. Manage. Optimize.**

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