

Type 564

1/4" and 1/2" 3-Way Valve Assembly RESEARCH® Control Valves

Technical Brief

DESCRIPTION

The Type 564 three-way valve is available in either 1/4" or 1/2" 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 innervalve 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, as well as the characteristic, of each innervalve can be the same or of different values, depending on the requirements of the application.

APPLICATIONS

The Type 564 valve is widely used in mixing applications such as temperature control; i.e., when a cold fluid enters one of the non-common ports of the body and a hot fluid enters the other. By varying the position of the innervalve, the percentage of fluid passing through each innervalve 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 unit is also suited to diverting applications such as flow or pressure control in hydraulic systems; i.e., the hydraulic fluid enters the common port of the valve with one of the non-common ports controlling the flow to a cylinder or vessel with the unused fluid recirculated back to the sump area through the other non-common port.

MATERIALS OF CONSTRUCTION

Body-Bonnet: (Barstock body material)

- Standard 316 s/s, carbon steel
- Optional Monel®, Hastelloy® B and C or ASTM equivalent, alloy 20

Innervalve:

- Standard 316 s/s
- Optional Monel, Hastelloy B and C or ASTM equivalent, alloy 20, TFE soft seated (Q.O. on-off trim only)

Packing:

- Standard TFE CV rings
- Optional Graphite

Actuator:

- Standard Epoxy-coated aluminum
- Optional 316L s/s (1/2" standard unit only)

STANDARD FEATURES

- Wide range of interchangeable trim sets
- Choice of Cv and characteristic on each port
- TFE chevron packing
- ANSI Class III shutoff



Shown with Type 755 actuator

OPTIONAL FEATURES

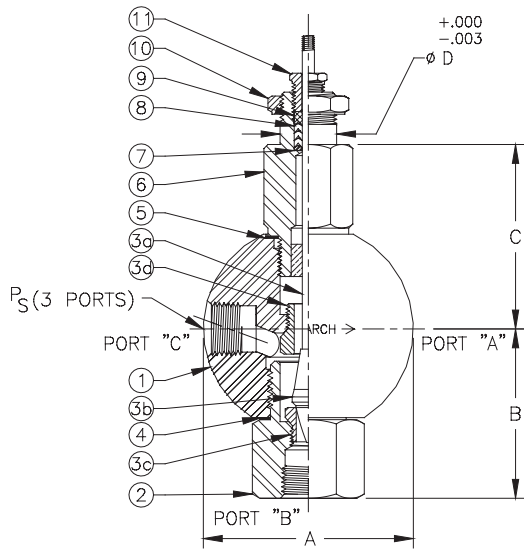
- Flanges – up to 1-1/2 " on 1/2" valve size, socket weld and butt weld nipples
- Radiating fin bonnet for higher temperatures
- Choice of linear or quick-opening characteristics

ACTUATOR CHOICES

- Standard Air to open, fail close
Air to close, fail open
- Optional Same function as above but with integral top-mounted positioner

- Standard Signal 3-15#, 6-30#, 3-27#
- Optional Signal 3-9#, 9-13#, (with positioner)

- Accessories Filter regulator, gauges, I/P accessories: converters limit switches, handwheel (non-override), solenoids.



DESCRIPTION OF ITEMS

1. Valve body (barstock, NPT ends standard)
2. Bottom body adaptor (1/4" valve = 1-1/4" hex; 1/2" valve = 1-1/2" hex)
3. Innervalve (trim set)
 - 3A: Plug (throttling portion)
 - 3B: Lower seat (1/4" valve = 3/8" hex; 1/2" valve = 5/8" hex)
 - 3C: Upper seat (1/4" valve = 5/8" hex; 1/2" valve = 3/4" hex)
 - 3D: Stem (1/4" valve = 1/8" dia.; 1/2" valve = 3/16" dia.)
4. Bottom port adaptor gasket (May not be supplied in exotic materials.)
5. Bonnet gasket (May not be supplied in exotic materials.)
6. Valve bonnet (1/4" valve = 7/8" hex; 1/2" valve = 1-1/4" hex. Some exotic materials may use round material.)
7. Packing adaptor (CV ring packing only)
8. Packing (CV Ring TFE)
9. Packing follower (CV ring packing only)
10. Yoke lock nut (1/4" valve = 7/8" hex; 1/2" valve = 1-1/8" hex)
11. Packing gland (1/4" valve = 7/16" hex; 1/2" valve = 1/2" hex)

DIMENSIONS (Inches)

PS	A	B	C	D	Stroke
1/4 Inch	2.75	2.00	2.12	.625	.437
1/2 Inch	3.25	2.62	2.86	.875	.562

1/4" Research Control Valve

Pressure vs. Temperature Rating for Valve Superstructure
Excluding Packing or End Fittings - See Note 1 below

Temp	316 S/S	Carbon Steel	Hast B or =	Hast C or =	Monel	Alloy 20
100°F	1500	1200	1500	1500	1200	1500
200°F	1500	1110	1400	1400	1100	1400
300°F	1425	1090	1300	1300	1000	1300
400°F	1250	990	1200	1200	900	1200
500°F	1190	890	1100	1100	800	1100
600°F	1130	790	1000	1000	700	1000
700°F	1070	625	900	900	600	900
800°F	1050	See Note 2	800	800	500	800
Recommended Torque in ft/lb, +/- 2 ft/lb:						
Bonnet	37	37	39	37	31	35
Bottom Adapt.	123	123	132	125	103	123

1/2" Research Control Valve

Pressure vs. Temperature Rating for Valve Superstructure
Excluding Packing or End Fittings - See Note 1 below

Temp	316 S/S	Carbon Steel	Hast B or =	Hast C or =	Monel	Alloy 20
100°F	1500	1200	1200	1200	1200	1200
200°F	1400	1100	1000	1000	1000	1000
300°F	1300	1000	800	800	800	800
400°F	1200	900	600	600	600	600
500°F	1100	800	400	400	400	
600°F	1000	700	200	200		200
700°F	900	600	100	100		100
800°F	800					
Recommended Torque in ft/lb, +/- 2ft/lb:						
Bonnet	122	122	131	124	102	117
Bottom Adapt.	200	200	308	293	241	244

Note 1. 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 degrees F. 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.

Note 2. Maximum recommended temperature for carbon steel is 750 deg. F. The pressure rating of the 1/4" valve at 750 degrees is 750 psi.

INNERVALVE CHART

While three-way valves can be used in mixing and diverting applications, the characteristics are based on mixing. Equal percentage trims are not recommended on three-way valves.

Valve Size	Trim Designation (1)	Max CV	Orifice Dia (in)	Orifice Area (sq in)	Nominal Rangeability Linear	Max Pressure Drop (2)
1/2"	A Lwr Seat	2.5	.375	.1105	40:1	50 psi
	A Upr Seat	2.5	.4375	.1504	40:1	50 psi
1/2"	B Lwr Seat	2.0	.375	.1105	40:1	50 psi
	B Upr Seat	2.0	.4375	.1504	40:1	50 psi
1/2"	C Lwr Seat	1.25	.281	.0621	40:1	100 psi
	C Upr Seat	1.25	.3125	.0767	40:1	100 psi
1/2"	D Lwr Seat	.80	.250	.0491	40:1	150 psi
	D Upr Seat	.80	.281	.0621	40:1	100 psi
1/2"	E Lwr Seat	.50	.250	.0491	40:1	150 psi
	E Upr Seat	.50	.281	.0621	40:1	150 psi
1/2"	F Lwr Seat	.32	.156	.0191	30:1	300 psi
	F Upr Seat	.32	.281	.0621	30:1	300 psi
1/2"	G Lwr Seat	.20	.156	.0191	30:1	300 psi
	G Upr Seat	.20	.281	.0621	30:1	300 psi
1/2"	H Lwr Seat	.13	.156	.0191	30:1	300 psi
	H Upr Seat	.13	.281	.0621	30:1	300 psi
1/2"	I Lwr Seat	.08	.156	.0191	30:1	300 psi
	I Upr Seat	.08	.281	.0621	30:1	300 psi
1/2"	J Lwr Seat	.05	.156	.0191	30:1	300 psi
	J Upr Seat	.05	.281	.0621	30:1	300 psi
1/4"	F Lwr Seat	.32	.156	.0191	30:1	200 psi
	F Upr Seat	.32	.250	.0491	30:1	200 psi
1/4"	G Lwr Seat	.20	.156	.0191	30:1	200 psi
	G Upr Seat	.20	.250	.0491	30:1	200 psi
1/4"	H Lwr Seat	.13	.156	.0191	30:1	200 psi
	H Upr Seat	.13	.250	.0491	30:1	200 psi
1/4"	I Lwr Seat	.08	.156	.0191	30:1	200 psi
	I Upr Seat	.08	.250	.0491	30:1	200 psi
1/4"	J Lwr Seat	.05	.156	.0191	30:1	200 psi
	J Upr Seat	.05	.250	.0491	30:1	200 psi

Note 1: Due to the area taken up by the stem, the orifice diameter of the upper seat is larger than that of the lower seat for the same size trim.

Note 2: The maximum pressure drop limit should not be exceeded without consulting the factory. In some cases, the use of special stem guides and materials can raise the pressure drop limit.

RESEARCH® is a registered trademark of Badger Meter, Inc.
Hastelloy® is a registered trademark of The Haynes Stellite Company
Monel® is a registered trademark of Inco Alloys International Inc.

Due to continuous research, product improvements and enhancements, Badger Meter reserves the right to change product or system specifications without notice, except to the extent an outstanding contractual obligation exists.

Please see our website at
www.badgermeter.com
for specific contacts.



BadgerMeter, Inc.

P.O. Box 581390, Tulsa, Oklahoma 74158
(918) 836-8411 / Fax: (918) 832-9962

www.badgermeter.com