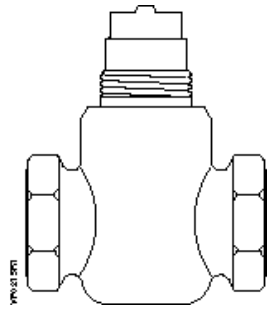
SIEMENS

Technical Instructions
Document No. 155-198P25
VF 599-7
December 29, 2009

Powermite 599 Series

MZ Series Zone Control Two-way Valves



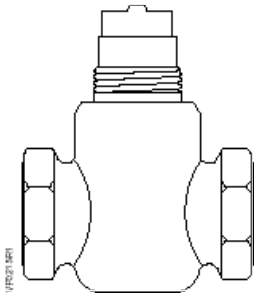
Description	The Powermite 599 Series ANSI Class 250 MZ Series two-way valves are designed to work with the MZ Series SSB actuator with a 7/32-inch (5.5 mm) stroke.	
Features	Direct coupled universal bonnet ANSI Leakage Class IV (0.01% of Cv)	
Application	A typical application for the Powermite two-way valve is the control of hot or chilled water for convectors, fan coil units, unit conditioners, and radiation, reheat coils, and similar terminal units requiring an actuator that delivers a minimum of 45 pounds force (200 N).	
Product Numbers	See Table 2.	
Ordering a Valve Plus Actuator Assembly	To order a complete valve plus actuator assembly from the factory, combine the actuator prefix code with the suffix of the valve assembly product number. See *Technical Bulletin (TB) 252* (155-307P25*)* for selection procedure and ordering codes. Valve assemblies can be ordered using the numbers in Table 2.	
Specifications	Line size	1/2 to 1 inch (15 to 25 mm)
	Capacity	See Tables 3 through 6 and Figure 1
	Body style	Globe
	Seat style	Metal-to-metal
	Action	Normally open/Normally closed
	Valve body rating	ANSI Class 250; See Table 1
	Stem travel (Stroke)	7/32-inch (5.5 mm)
Material	Body	UNS CA 844 bronze or Forged Brass C37700
	Body trim	Brass
	Stem	Stainless steel ASTM A582 Type 303
	Packing	Ethylene propylene O-ring

Specifications, continued

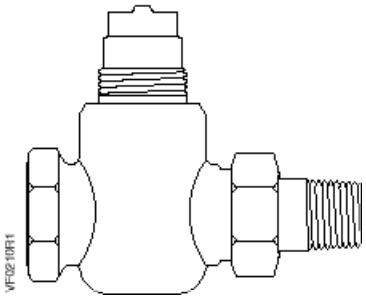
Operating	Controlled medium	Water or water-glycol solutions to 50%
	Medium temperature range	35°F to 250°F (2°C to 120°C)
	Maximum inlet pressure	See Table 1
	Maximum recommended differential pressure for modulating service	
	Liquid	25 psi (173 kPa)
	Rangeability	
	Cv <1	>50:1
	Cv >1	>100:1
	Close-off pressures	See Figure 1 and Table 5
	Close-off ratings	According to ANSI/FCI 70-2
	Leakage rate	Class IV (0.01% of Cv)
	Flow characteristics	Modified equal percentage
Miscellaneous	Canadian Registration Numbers	0H7645.5 0C0838.9
	Mounting location	NEMA 1 (interior only)
	Dimensions	See Tables 8 and 9 and Figure 4
	Valve weight	See Table 8
Service Kit	Sealing rings for union valves (package of 25)	
	1/2 inch (15 mm)	698-088
	3/4 inch (20 mm)	599-03394
	Union connection kit	
	1/2-inch (15 mm)	599-02941
	3/4-inch (20 mm)	599-02942
	Protective black knob to cover the bonnet and threads 	4 268 8895 0

Table 1. Body Temperature-Pressure Rating.

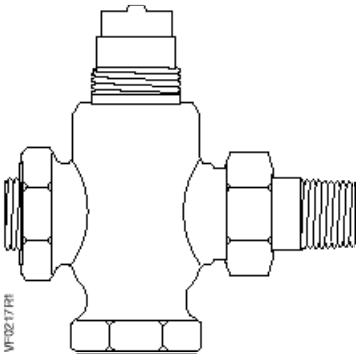
Valve Body	Temperature °F	°C	Pressure psig	(kPa)
			ANSI Class 250	
Bronze or Forged Brass	-20 to 150	(-30 to 66)	400	(2758)
	200	(93)	385	(2655)
	250	(121)	365	(2586)
	300	(149)	335	(2300)
	350	(177)	300	(2068)



Female NPT × Female NPT
F×F



Female NPT × Union Male
F×UM



Angle Female × Union Male
AF×UM

Table 2. Part Numbers.

Action	Flow Rate		Nominal Line Size		Connection		
	Cv	(Kvs)	inch	(mm)	F×F	F×UM	AF×UM
Normally Closed	0.4	(0.34)	1/2	(15)	599-01100	599-01101	—
	0.63	(0.54)	1/2	(15)	599-01102	599-01103	—
	1	(0.85)	1/2	(15)	599-01104	599-01105	—
	1.6	(1.37)	1/2	(15)	599-01106	599-01107	—
	2.5	(2.15)	1/2	(15)	599-01108	599-01109	—
	4	(3.44)	1/2	(15)	599-01110	599-01111	—
	6.3	(5.43)	3/4	(20)	599-01112	599-01113	—
	10	(8.6)	1	(25)	599-01114	—	—
Normally Open	0.4	(0.34)	1/2	(15)	599-01115	599-01116	—
	0.63	(0.54)	1/2	(15)	599-01117	599-01118	—
	1	(0.85)	1/2	(15)	599-01119	599-01120	—
	1.6	(1.37)	1/2	(15)	599-01121	599-01122	—
	2.5	(2.15)	1/2	(15)	599-01123	599-01124	599-01125
	4	(3.44)	1/2	(15)	599-01126	599-01127	599-01128
	6.3	(5.43)	3/4	(20)	599-01129	599-01130	—
	10	(8.6)	1	(25)	599-01131	—	—

Table 3. Maximum Water Capacity - U.S. Gallons per Minute.

Valve Size in inches	Pressure Differential - psi															
	Cv\1	2	3	4	5	6	8	10	15	20	25	30	40	50	60	75
1/2	0.4	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.5	1.8	2.0	2.2	2.5	2.8	3.1	3.5
	0.63	0.9	1.1	1.3	1.4	1.5	1.8	2.0	2.4	2.8	3.2	3.5	4.0	4.5	4.9	5.5
	1.0	1.4	1.7	2.0	2.2	2.5	2.8	3.2	3.9	4.5	5.0	5.5	6.3	7.1	7.8	8.7
	1.6	2.3	2.8	3.2	3.6	3.9	4.5	5.1	6.2	7.2	8.0	8.8	10.1	11.3	12.4	13.9
	2.5	3.5	4.3	5.0	5.6	6.1	7.1	7.9	9.7	11.2	12.5	13.7	15.8	17.7	19.4	22
	4	5.7	7	8.0	8.9	10	11.3	12.6	15.5	17.9	20.0	21.9	25	28	31	35
3/4	6.3	8.9	10.9	12.6	14.1	15.4	17.8	20	24	28	32	35	40	45	49	55
1	10	14.1	17.3	20	22	24	28	32	39	45	50	55	63	71	77	87

Table 4. Maximum Water Capacity - Cubic Meters per Hour (m^3/hr).

Valve Size in mm	Pressure Differential - kPa													
	1	10	20	30	40	50	60	80	Kvs/ 100	150	200	300	400	500
15	0.03	0.11	0.15	0.19	0.22	0.24	0.26	0.30	0.34	0.42	0.48	0.59	0.68	0.76
	0.05	0.17	0.24	0.30	0.34	0.38	0.42	0.48	0.54	0.66	0.76	0.94	1.08	1.21
	0.09	0.27	0.38	0.47	0.54	0.60	0.66	0.76	0.85	1.0	1.2	1.5	1.7	1.9
	0.14	0.43	0.61	0.75	0.87	0.97	1.06	1.23	1.37	1.7	1.9	2.4	2.7	3.1
	0.21	0.68	0.96	1.17	1.35	1.51	1.66	1.91	2.15	2.6	3.0	3.7	4.3	4.8
	0.34	1.1	1.5	1.9	2.2	2.4	2.7	3.1	3.4	4.2	4.9	6.0	6.9	7.7
20	0.54	1.7	2.4	3.0	3.4	3.8	4.2	4.9	5.4	6.7	7.7	9.4	10.9	12.1
25	0.86	2.7	3.8	4.7	5.4	6.1	6.7	7.7	8.6	10.5	12.2	14.9	17.2	19.2

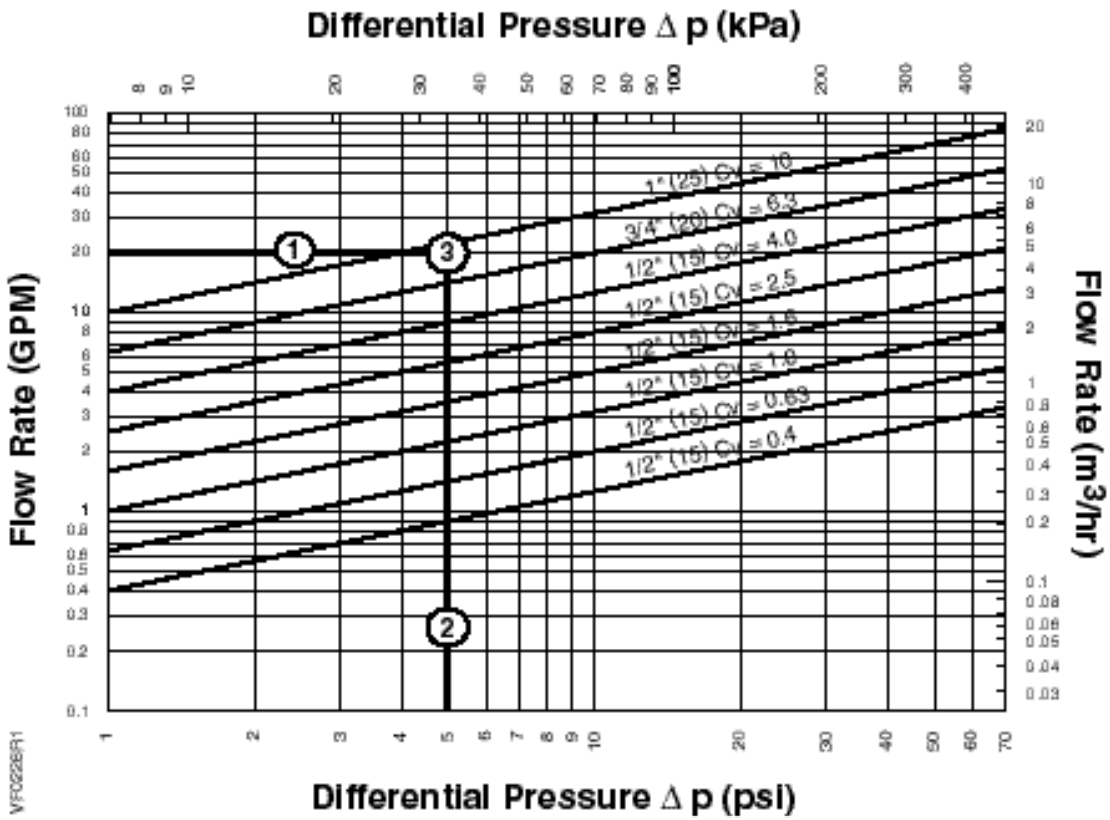


Figure 1. Water Capacity Graph.

Selection Example

Select a valve given:

See Figure 1.

① Required flow = 20 gpm.
② Desired pressure drop = 5 psi.
③ Choose a 1-inch (25-mm) valve, Cv 10.

Table 5. Close-off Pressures.

Action	Valve Size in. (mm)	SSB Actuator psi (kPa)
NC	1/2", 0.4< Cv <1.6 (15 mm, 0.34< Kvs <1.37)	70 (483)
	1/2", 2.5< Cv <4 (15 mm, 2.15< Kvs <3.44)	40 (276)
	3/4" and 1" (20 mm and 25 mm)	30 (207)
NO	1/2", 0.4< Cv <1.6 (15 mm, 0.34< Kvs <1.37)	60 (412)
	1/2", 2.5< Cv <4 (15 mm, 2.15< Kvs <3.44)	35 (241)
	3/4" and 1" (20 mm and 25 mm)	30 (207)

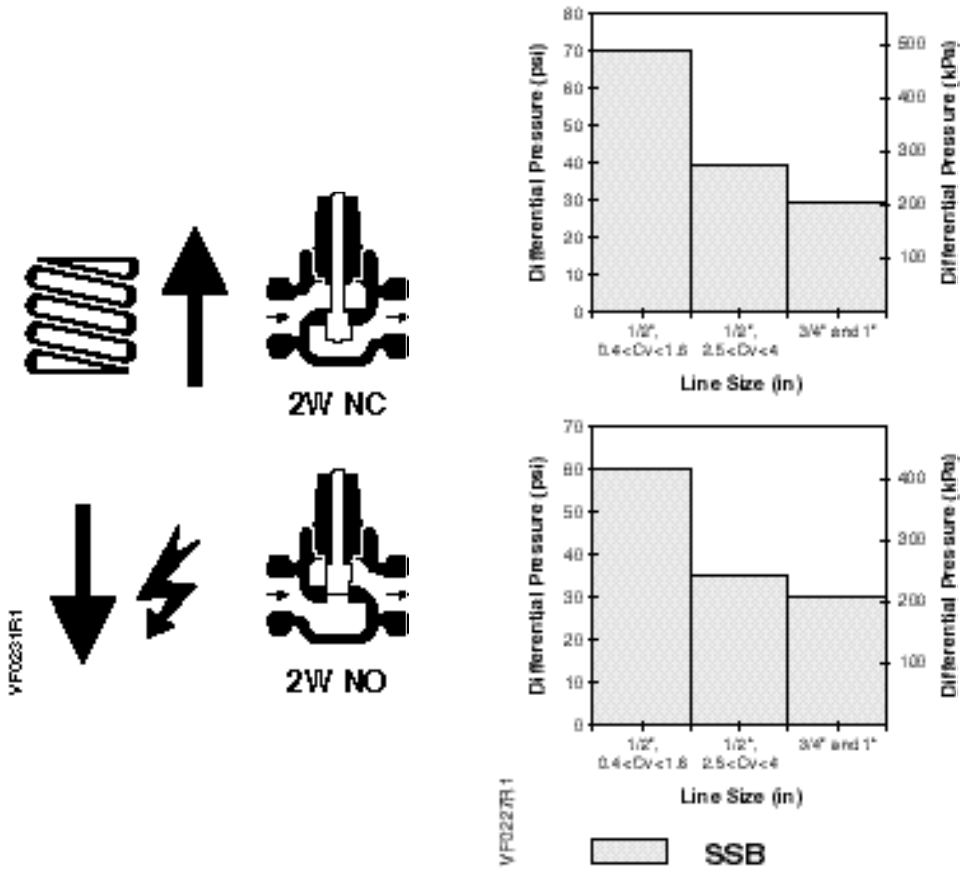


Figure 2. Close-off Pressures.

Operation

Figure 3 shows the normally open valve in the open or full flow position and the normally closed valve in the closed or zero flow position. The valve spring provides the necessary force to hold the stem in the raised or normal position.

In the event of power failure, a fail-safe actuator returns the valve to its normal position. Fail-in-place actuators will hold the last commanded position. See the Technical Instructions of the various actuators for additional information.

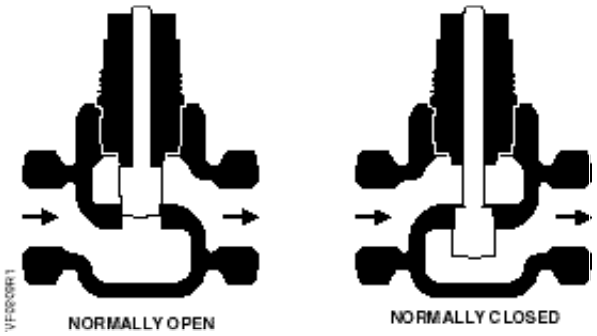


Figure 3.

Sizing

The sizing of a valve is important for correct system operation. An undersized valve will not have sufficient capacity at maximum load. An oversized valve can initiate cycling, and the seat and throttling plug can be damaged because of the restricted opening. Correct sizing of the control valve for actual expected conditions is considered essential for good control.

The following variables must be determined:

- The medium to be controlled: water, etc.
- The maximum inlet temperature and pressure of the medium at the valve.
- The pressure differential that will exist across the valve under maximum load demand.
- The maximum capacity the valve must deliver.
- The maximum line pressure differential the valve actuator must close against.

See *Application Bulletin (AB)-1 Control Valve Selection and Sizing (155-285)* for further recommendations.

See Tables 3 through 6 for valve capacities.

Mounting and Installation

Install the valve so that the flow follows the direction of the arrow indicated on the valve body.

For best performance, install the valve assembly with the actuator above the valve body. The valve and actuator can be installed in any position between vertical and horizontal. It is not recommended to install the valve assembly so that the actuator is below horizontal or upside down.

Mounting and Installation, Continued

Allow sufficient space for servicing the valve and actuator. See Table 8 for valve body dimensions. See Figure 4 and Table 9 for dimensions of the service envelope recommended around the actuator.

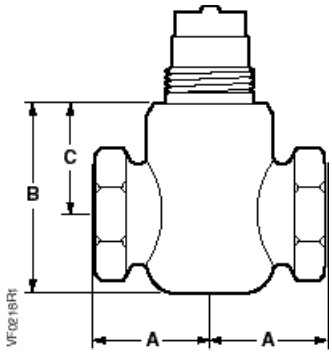
NOTE: Instructions for field mounting an actuator, wiring diagrams, and start-up are covered in the Technical Instructions and Installation Instructions for each actuator.

Service

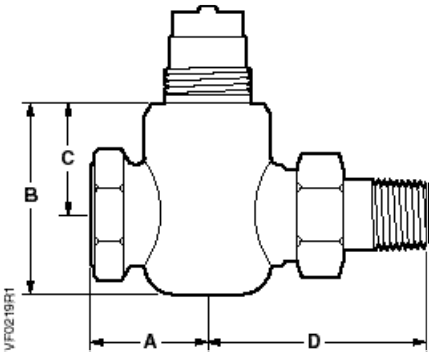
Replace the valve if inoperable.

Dimensions

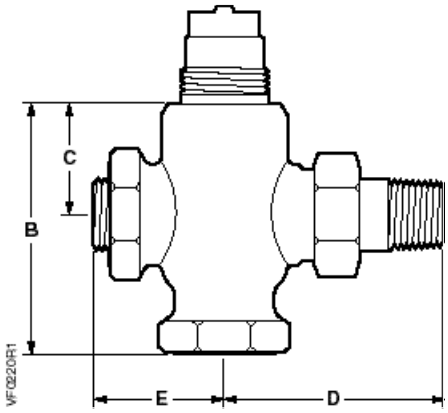
See Table 8 for valve body dimensions. The letters in Figure 4 refer to the valve centerline to top of the actuator, the width of the actuator, and service envelope dimensions in Table 9.



Female NPT × Female NPT
F×F



Female NPT × Union Male
F×UM



Angle Female × Union Male
AF×UM

Table 6. Two-way Valve Dimensions.

Valve Size inch (mm)	A	B		C	D	E	Weight lb (kg)		
		F×F & F×UM	AF×UM				F×F	F×UM	AF×UM
1/2 (15)	1-3/8 (35)	2-1/4 (57)	2-15/16 (74) NO Only	1-5/16 (33)	2-5/8 (67)	1-1/2 (38) NO only	.96 (.44)	1.14 (0.5)	1.4 (0.6)
3/4 (20)	1-5/8 (41)	2-3/8 (59)	–	1-5/16 (33)	3-1/8 (79)	–	1.13 (.51)	1.45 (.66)	–
1 (25)	1-15/16 (49)	2-3/4 (69)	–	1-9/16 (39)	–	–	1.7 (.77)	–	–

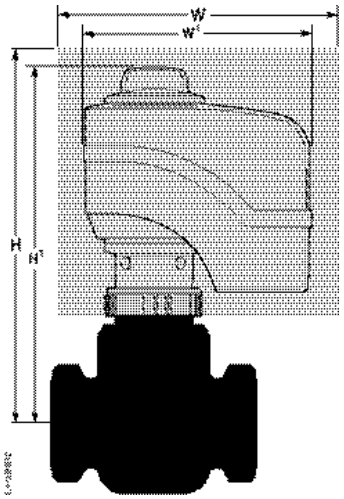
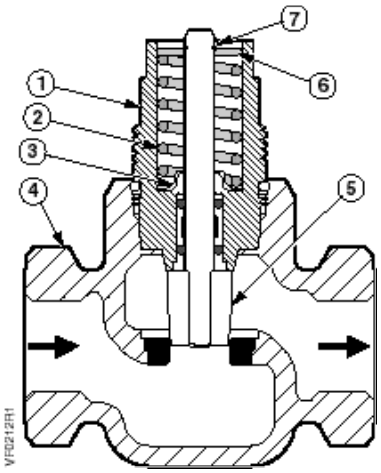


Figure 4.

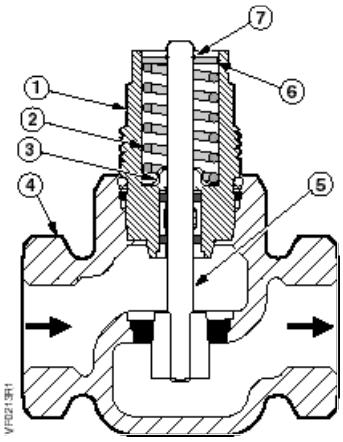
Table 7. Dimensions of the Actuator and Recommended Service Envelope. Dimensions in Inches (Millimeters).

Actuator	Actuator Prefix Code	Valve line size	Center line to Top of Actuator, H1	Service Height H	Actual width W1	Service Width W
SSB	254 255	1/2 (15)	4-7/8 (123)	13-1/8 (330)	3-1/4 (83)	11-1/4 (282)
		3/4 (20)	4-7/8 (123)	13-1/8 (330)	3-1/4 (83)	11-1/4 (282)
		1 (25)	5-1/8 (130)	13-1/8 (330)	3-1/4 (83)	11-1/4 (282)

Parts of the Valve



Normally Open



Normally Closed

Table 8. Two-way Bronze or Forged Brass Valves.

Item	Part Name	Qty	Material	Item	Part Name	Qty	Material
1	Bonnet assembly	1	—	5	Stem and plug assembly	1	Stainless steel or brass
2	Spring	1	Stainless steel	6	Upper guide disc	1	Brass
3	Wiper	1	Nylon	7	Retaining ring	1	Stainless steel
4	Valve body	1	Bronze or Forged Brass				

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