## **SIEMENS**

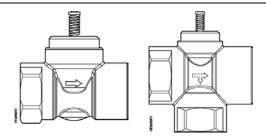
## **Technical Instructions**

Document No. 155-320P25 VE VV-1

February 6, 2006

# **599 Series Zone Valve Bodies:**

## **Two-Way and Three-Way**



Description	The 599 Series two-way and three-way Zone Valves with a 1/10-inch (2.5 mm) stroke.										
Features	Direct-coupled, u	Direct-coupled, universal bonnet									
Application	Control of hot or Zones with radia Floor heating by Fan coil units Induction units	tors	or: Cooling ceilings (zone valves) Wall-mounted boilers (zone valves VAV applications								
Ordering a Valve	To order a valve	To order a valve from the factory, use the product part numbers in Table 1.									
Specification s	Line size Capacity Body style Seat style Action  Valve body rating Stem travel (Stro		1/2 to 1-inch (15 to 25 mm)  See Tables 2 and 3 and Figure 2  Globe  Metal-to-metal  NO/NC determined by actuator  Diverting  Mixing (limited application)  ANSI Class 125  1/10-inch (2.5 mm)  Brass								
Material	Body trim Stem Packing		Brass Stainless steel ASTI Ethylene propylene	• • • • • • • • • • • • • • • • • • • •							
Operating	Controlled medium temperare Maximum inlet po Close off pressu (AB-A)	iture range ressure	Water, glycol solutions to 50% 34°F to 230°F (1°C to 110°C) 125 psig  Valve Size Inch (mm) Pressure Psi (I  1/2 (15) 44 (303) 3/4 (20) 44 (303) 1 (25) 22 (152)								

Operating, continued	Close-off ratings (AB-A)	According to ANSI/FCI 70-2
	Leakage rate	ANSI Class III (AB-A)
	Flow characteristics	Linear
Miscellaneous	Mounting location	NEMA 1 (interior only)
	Dimensions	See Table 4 and Figures 7 and 8
	Valve weight	See Table 4

### **Product Numbers**

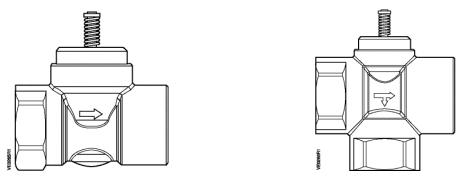


Figure 1. 2-Way and 3-Way Zone Valves.

Table 1. Part Numbers.

Valve		minal e Size	Flow	Rate	Connection			
^	Inch	Mm	Cv	(Kvs)	NPT	Sweat		
	0.5	15	1.0	(0.85)	599-00210	599-00510		
>	0.5	15	2.5	(2.15)	599-00211	599-00511		
2-Way	0.5	15	4.0	(3.4)	599-00214	599-00514		
6	0.75	20	4.1	(3.5)	599-00212	599-00512		
	1.00	25	7.0	(6.0)	599-00213	599-00513		
	0.5	15	1.0	(0.85)	599-00230	599-00530		
>	0.5	15	2.5	(2.15)	599-00231	599-00531		
3-Way	0.5	15	4.0	(3.4)	599-00234	599-00534		
က်	0.75	20	4.1	(3.5)	599-00232	599-00532		
	1.00	25	7.0	(6.0)	599-00233	599-00533		

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Table 2. Maximum Water Capacity - U.S. Gallons per Minute.

Valve Size		Pressure Differential - psi														
inches	Cv\1	2	3	4	5	6	8	10	15	20	25	30	40	50	60	75
0.5	1.0	1.4	1.7	2.0	2.2	2.4	2.8	3.2	3.9	4.4	5.0	5.5	6.3	4.1	7.7	8.7
0.5	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	21.7
0.5/0.75	4.1	5.8	7.1	8.2	9.2	10.0	11.6	13.0	15.9	18.3	20.5	22.5	25.9	29.0	31.8	35.5
1.00	7.0	9.9	12.1	14.0	15.7	17.1	19.8	22.1	27.1	31.3	35.0	38.3	44.3	49.5	54.2	60.6

Table 3. Maximum Water Capacity - Cubic Meters per Hour (m<sup>3</sup>/hr).

Valve		Pressure Differential - kPa												
Size mm	1	10	20	30	40	50	60	80	Kvs/ 100	150	200	300	400	500
15	0.9	0.27	0.38	0.47	0.54	0.60	0.66	0.76	0.85	1.04	1.20	1.47	1.70	1.90
15	0.21	0.68	0.96	1.17	1.35	1.51	1.66	1.91	2.15	2.60	3.00	3.70	4.30	4.80
15/20	0.35	1.12	1.59	1.94	2.24	2.51	2.75	3.17	3.50	4.34	5.01	6.14	7.09	7.93
25	0.60	1.91	2.71	3.32	3.83	4.28	4.69	5.41	6.00	7.41	8.56	10.48	12.11	13.54

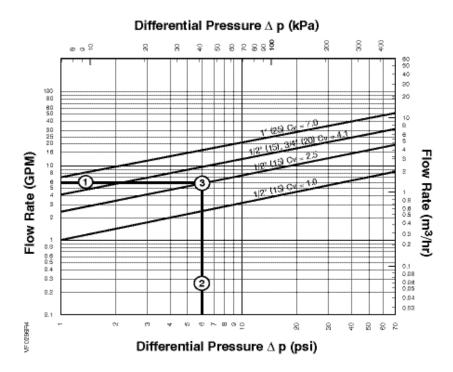


Figure 2. Water Capacity Graph.

## **Selection Example**

Select a valve given:

See Figure 2.

- ① Required flow = 6 gpm
- ② Desired pressure drop = 6 psi
- 3 Choose a 1/2-inch (15-mm) valve, Cv 2.5

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#### Operation

#### 2-Way

Figure 3 shows the zone valve in the open or full flow position. The valve spring provides the necessary force to hold the stem in the raised or NO position.

In the event of power failure, the actuator returns to its normal position; the actuator determines whether the valve will fail open or closed. See the actuator Technical Instructions for additional information.

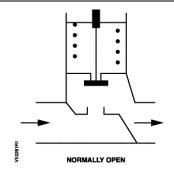


Figure 3.

#### 3-Way

#### Diverting

As the valve stem moves downward, the flow through the NO port (AB-A) decreases and the flow through the NC port (AB-B) increases. As the valve stem moves upward, the flow through the NO port (AB-A) increases and the flow through the NC (AB-B) port decreases.

In the event of power failure, the actuator returns the valve to its normal position; the actuator determines whether the valve fails with flow to port A or port B. See the actuator Technical Instructions for additional information.

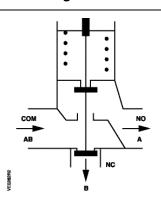


Figure 4.

#### Mixing

The 3-way zone valves are diverting valves. However, they may be used as mixing valves under the conditions shown in Figures 5 and 6.

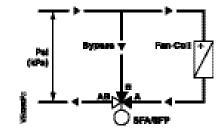


Figure 5. Mounting in the Return Flow.

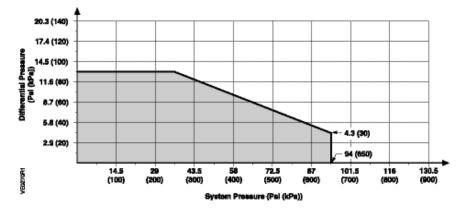


Figure 6. Allowable Differential Pressure in Relation to the System Pressure.

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#### 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 can damage the seat and throttling plug 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: hot or chilled water.

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 the Application Bulletin entitled *Control Valve Selection and Sizing* (140-0038) for further recommendations.

See Tables 2 and 3 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.

**NOTE:** It is not recommended to install the valve assembly so that the actuator is below horizontal or upside down.

Allow sufficient space for servicing the valve and actuator. See Table 4 for valve body dimensions.

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

Service Kit

599-00599 AL50 - Zone valve support rings - 10 pack

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#### **Dimensions**

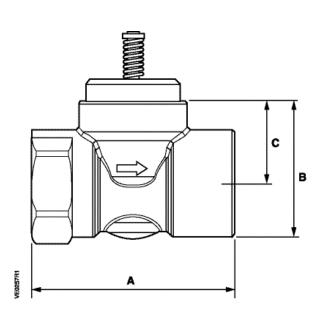


Figure 7. 2-Way Valve Body.

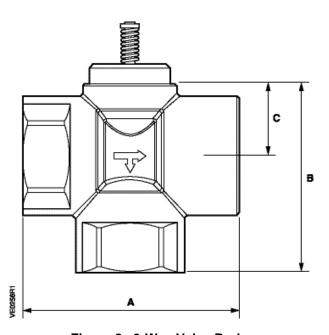


Figure 8. 3-Way Valve Body.

Table 4. Valve Dimensions.

	Valve		2-Wa	y Valve		3-Way Valve					
Connection Type	Size Inch (mm)	A	В	С	Weight Ib (kg)	A	В	С	Weight Ib (kg)		
	0.5	2.76	1.63	1.00	0.82	2.76	2.34	1.00	1.08		
	(15)	(70)	(41,5)	(25,4)	(0,37)	(70)	(59,5)	(25,4)	(0,49)		
NPT	0.75	2.76	1.77	1.00	.99	2.76	2.34	1.00	1.26		
NPI	(20)	(70)	(45)	(25,4)	(0,45)	(70)	(59,5)	(25,4)	(0,57)		
	1.0	3.50	2.10	1.00	1.68	3.50	2.85	1.00	2.14		
	(25)	(89)	(54)	(25,4)	(0,76)	(89)	(67,3)	(25,4)	(0,97)		
	0.5)	2.66	1.48	1.00	0.60	2.66	2.26	1.00	0.71		
	(15)	(66)	(38)	(25,4)	(0,27)	(68)	(57,5)	(25,4)	(0,32)		
Sweet	0.75	2.76	1.63	1.00	0.71	2.76	2.34	1.00	0.86		
Sweat	(20)	(70)	(41,5)	(25,4)	(0,32)	(0.70)	(59,5)	(25,4)	(0,39)		
	1.00	3.50	1.77	1.00	1.06	3.50	2.65	1.00	1.24		
	(25)	(89)	(45)	(25,4)	(0,48)	(89)	(67)	(25,4)	(0,56)		

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