SIEMENS

Technical Instructions

Document No. CM1N4845E-P25

Rev. 4, February, 2002

VVP45… and VXP45… Series

Two-port and Three-port Seat Valves
ANSI Class 250 Short-stroke Valves

Two-port Seat Valve
VVP45…

Three-port Seat Valve
VXP45…

Description	Two-port seat valves of the VVP45… range with two-port connection Three-port seat valves of the VXP45… range with three-port connection
Features	• Nominal pressure, ANSI Class 250 • Bronze valve body • 1/2-inch, 3/4-inch and 1-inch diameters • Externally threaded connections G 1/2-inch, G 3/4-inch and G 1-inch • Nominal stroke 5.5 mm • Manual adjusting knob • Can be fitted with SSB… or SSC… electric actuators
Application	• In ventilating and air conditioning applications to control, for water side, terminal units in closed circuits, such as induction and fan coil units, small unit heaters and small water-cooled units. For use in: – Two-pipe systems with one heat exchanger for heating and cooling – Four-pipe systems with two separate heat exchangers for heating and cooling • In heating applications to control heating zones in closed circuits, such as: – Self-contained heating systems – Apartments – Individual rooms
Product Numbers	See Table 1.

Fluids

Hot water: to maximum 230°F (110°C), short-term to maximum 248°F (120°C)

Chilled water: over 36°F (2°C)

Water-glycol solutions

Operating Pressure

Maximum 1600 kPa (16 bar) and ANSI Class 250

Table 1. Product Numbers.

Line Size mm (inch)	Connection ISO Thread	GPM Straight-through	VVP45… (2-port)	Δp_s (psi)	GPM Bypass	VXP45… (3-port)	Δp_{max} psi	Actuator Positioning Force	
								45lbf	67 lbf
10 (.394)	G 1/2-inch	1.1	**VVP45.10-0.25**	87	0.79	**VXP45.10-0.25**	29	SSB	SSC
		1.8	**VVP45.10-0.4**		1.23	**VXP45.10-0.4**			
		2.8	**VVP45.10-0.63**		1.90	**VXP45.10-0.63**			
		4.4	**VVP45.10-1**		3.08	**VXP45.10-1**			
		7.0	**VVP45.10-1.6**		4.93	**VXP45.10-1.6**			
15 (.5906)	G 3/4-inch	11.0	**VVP45.15-2.5**	58	7.71	**VXP45.15-2.5**			
20 (.7874)	G 1-inch	17.6	**VVP45.20-4**	58	12.33	**VXP45.20-4**			

Δp = >29 psi increases risk of noise and seat-plug erosion
Δp_s = Close-off pressure
Δp_{max} = Maximum permissible differential pressure across closed valve with actuator
Cv = Nominal flow at pressure drop of 1 psi

Ordering

When ordering, give quantity, product number and name of valve.

Example: 1 VXP45.10-1 three-port valve

Valves, actuators and screwed fittings are packed separately.

Equipment Combinations

Valves V…45.10-0.25 to V…45.25-6.3 are operated with SSB actuators (see data sheet CA1N4891.1E-P25 and CA1N4891.2E-P25) or SSC actuators. Valves V…P45.25-10, V…45.32-16 and V…P45.40-25 are only operated with SSC actuators.

Actuator	Operating Voltage	Control	Run Time (Seconds)	Positioning Force	GPM
SSB61...	24 Vac	0 to 10 Vdc	75	45 lbf	27.7
SSB81...		3-Point	150		
SSC61...		0 to 10 Vdc	30	67 lbf	110
SSC81...		3-Point	150		

Sizing

Water Sizing Equation:

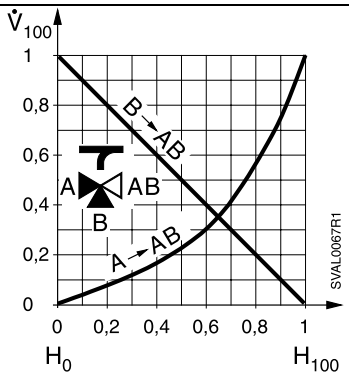
$$C_v = \frac{Q}{\sqrt{\Delta p}}$$

Where:
C_v = Flow Coefficient
Q = Volumetric flow rate (gpm)
Δp = Pressure drop, psi

Warning/Caution Notations

WARNING:		Personal injury, or loss of life may occur if you do not follow the procedures as specified.
CAUTION:		Equipment damage, or loss of data may occur if you do not follow the procedures as specified.

Control Characteristics



Legend:

V_{100}	= Volumetric flow rate
H_0	= Valve stroke 0% = Path A → AB closed, bypass B opened
H_{100}	= Valve stroke 100% = Path A → AB opened, bypass B closed
Tor AB	= Constant total flow from A and B → AB
Tor A	= Variable flow in straight-through path from A → AB
Tor B	= Variable flow in bypass-through port from B → AB

CAUTION:

The VXP45…can only be used as mixing valves.

Engineering Notes

Valves VVP45… and VXP45… are preferably installed in the return, as this provides lower temperatures on the seals.

Recommendation

Provide strainer upstream of the valve inlet.

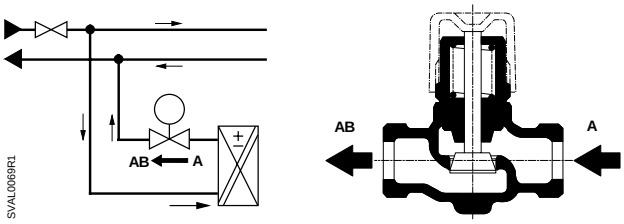


Figure 1. VVP45.

Two-port valves VVP45…
Flow permissible only in direction of arrow **from A → AB** arrow on valve body.

AB = Variable flow in straight-through port (outlet).

A = Variable flow in straight-through port (inlet).

Stem retracted: Path A → AB open.

Stem extended: Path A → AB closed.

Engineering Notes

Recommendation, Continued

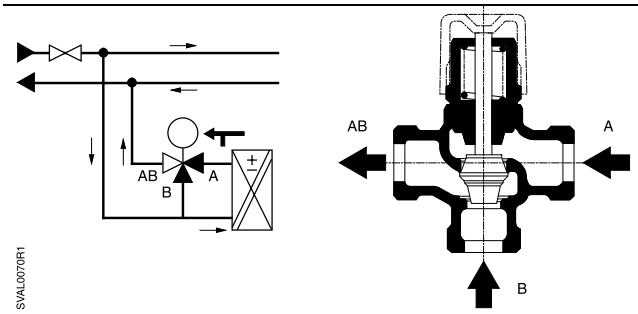


Figure 2. VXP45.

Three-port valves VXP45…
Use as mixing valves only.
Mixing: flow from A and B → AB.

AB = Constant total flow (outlet).
A = Variable flow A → AB (inlet A).
B = Variable flow B → AB in bypass (inlet B.)

Stem retracted: Path A → AB open, bypass B closed.
Stem extended: Path A → AB closed, bypass B open.

Also see *Mounting Notes* and *Commissioning Notes.*

Mounting Notes

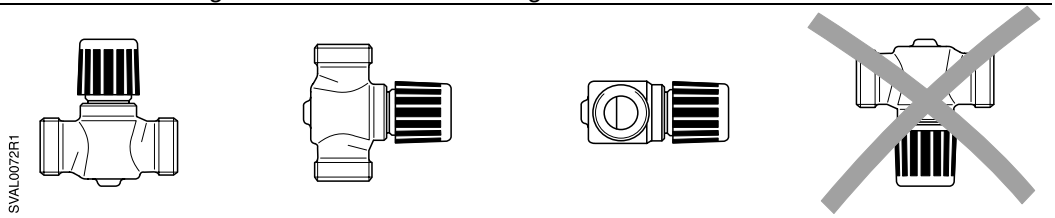


Figure 3. Mounting Positions.

See *Engineering Notes* for flow direction.
The valves are always supplied in a common package with installation instructions.

Commissioning Notes

Manual Adjustment

The valves are automatically closed by a return spring. The **straight-through port A → AB** of the valve is opened by adjusting the manual knob or actuator; with three-port valves, **bypass B** is throttled or closed. The manual adjusting knob only permits opening to 70% (bypass 30% open)

Two-port valves VVP45…
Spindle retracts: throughport from A → AB opens
Valve spindle extends: throughport from A → AB closes.

Three-port valves VXP45…
Spindle retracts: throughport A → AB opens, bypass B closes
Valve spindle extends: throughport A → AB closes, bypass B opens.

WARNING:

Before performing any service work on the valve and/or actuator, do the following:

1. Switch OFF pump and power supply.
2. Close the main shutoff valve of the piping system.
3. Release pressure and allow to cool down completely.
4. Disconnect electrical connections, if necessary, from terminals. Only commission the valve using the preset manual adjusting knob or with an actuator mounted in accordance with the relevant instructions.

Specifications **Characteristics**	Throughport A → AB Bypass B	n_{gl} = 2.2 (equal percentage, optimized for large controllable range) linear
Leakage rate	Throughport A → AB Bypass B	0 to 0.01% of Cv_s-value 0 to 0.01% of Cv_s-value
Rangeability		See *Product Numbers*
Threaded connections	Valve Fitting	ISO 228/1 ISO 7/1
Pressure class		ANSI Class 250
Nominal stroke		0.2 inch (5.5 mm)
Valve materials	Body Spindle Plug, seat, gland O-rings	Bronze Stainless steel Brass Special EPDM rubber
Weight		See *Dimensions*

Dimensions

All dimensions in inches (millimeters)

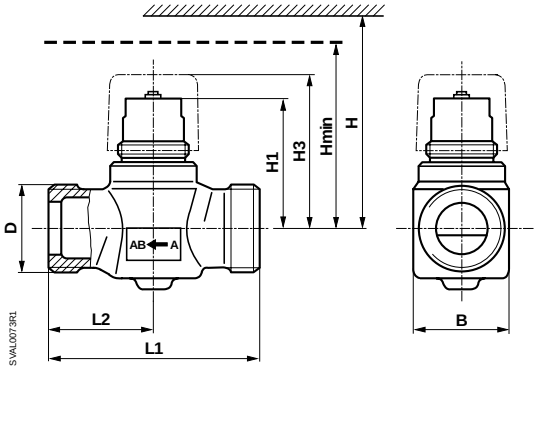


Figure 4. VVP45… (2-port).

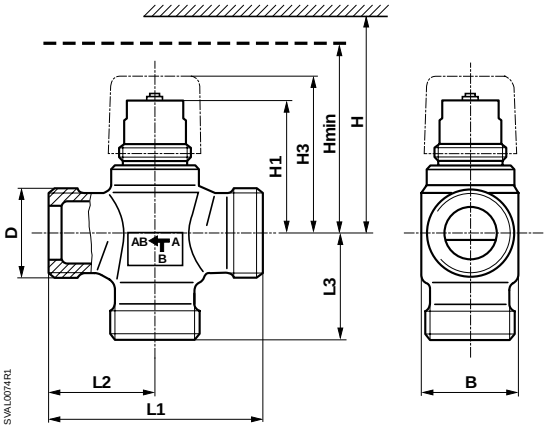


Figure 5. VXP45… (3-port).

Table 2.

D	Product Number	B	H	Hmin	H1	H3	L1	L2	L3
Two-port Seat Valves VVP45…									
G 1/2"	VVP45.10-0.25…1.6	1.14 (29)	8.07 (205)	4.92 (125)	1.77 (44.9)	≈ 2.13 (54)	2.36 (60)	1.18 (30)	—
G 3/4"	VVP45.15-2.5	1.22 (31)					2.56 (65)	1.28 (32.5)	
G 1"	VVP45.20-4	1.42 (36)	8.27 (210)	5.12 (130)	1.92 (48.9)	≈ 2.28 (58)	3.15 (80)	1.57 (40)	—
Three-port Seat Valves VXP45...									
G 1/2"	VXP45.10-0.25…1.6	1.14 (29)	8.07 (205)	4.92 (125)	1.77 (44.9)	≈ 2.13 (54)	2.36 (60)	1.18 (30)	1.18 (32.5)
G 3/4"	VXP45.15-2.5	1.22 (31)					2.56 (65)	1.28 (32.5)	1.28 (32.5)
G 1"	VXP45.20-4	1.42 (36)	8.27 (210)	5.12 (130)	1.92 (48.9)	≈ 2.28 (58)	3.15 (80)	1.57 (40)	1.57 (40)