VVI47…

VXI47…

ACVATIX™

2-port and 3-port seat valves, PN16

VVI47..
VXI47..

with internally threaded connections

- **Bronze valve body CC491K (Rg5)**
- **DN 15...50**
- **k_{vs} 2.5...40 m^3/h**
- **Internally threaded connections Rp.. as to ISO 7-1**
- **Can be equipped with SBX…- electromotoric**

Use

For use in heating, in ventilating and air conditioning systems as a control or safety shutoff valve. For open and closed circuits (mind Cavitation, refer to page 4).

Type summary

Product number		DN	k_{vs} [m^3/h]	S_v
2-port	**3-port**			
VVI47.15-2.5	**VXI47.15-2.5**	15	2.5	> 50
VVI47.15-4	**VXI47.15-4**	15	4.0	
VVI47.20-6.3	**VXI47.20-6.3**	20	6.3	> 100
VVI47.25-10	**VXI47.25-10**	25	10	
VVI47.32-16	**VXI47.32-16**	32	16	
VVI47.40-25	**VXI47.40-25**	40	25	
VVI47.50-40	**VXI47.50-40**	50	40	

DN = Nominal size
k_{vs} = Nominal flow rate of cold water (5…30 °C) through the fully open valve (H_{100}), by a differential pressure of 100 kPa (1 bar)
S_v = Rangeability k_{vs} / k_{vr} as per VDI 2173
k_{vr} = The lowest value for k_v at which the characteristic tolerance is still maintained, at a differential pressure of 100kPa (1 bar)

Ordering

Example:

Product number	*Stock number*	*Designation*	*Quantity*
VVI47.25-10	VVI47.25-10	2-port seat valve PN16 with internally threaded connection	1

Delivery

Valves, actuators and accessories are packed and supplied separately.

Equipment combinations

Valves		H_{100} [mm]	Actuators SBX.. Δp_{max} [kPa]	Δp_{max} [1)] [kPa]	Δp_s [2)] [kPa]
VVI47.15-2.5	**VXI47.15-2.5**	20	400	100	1600
VVI47.15-4	**VXI47.15-4**				
VVI47.20-6.3	**VXI47.20-6.3**				
VVI47.25-10	**VXI47.25-10**				1550
VVI47.32-16	**VXI47.32-16**				875
VVI47.40-25	**VXI47.40-25**				525
VVI47.50-40	**VXI47.50-40**		300		300

1) For 3-port valves in diverting function, max. 100 kPa is recommended. If noise is permitted, the same values apply as for mixing applications.

2) Valid for 2-port valves only

Δp_{max} = Maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve (maximum recommended operating differential pressure)

Δp_s = Maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close off pressure)

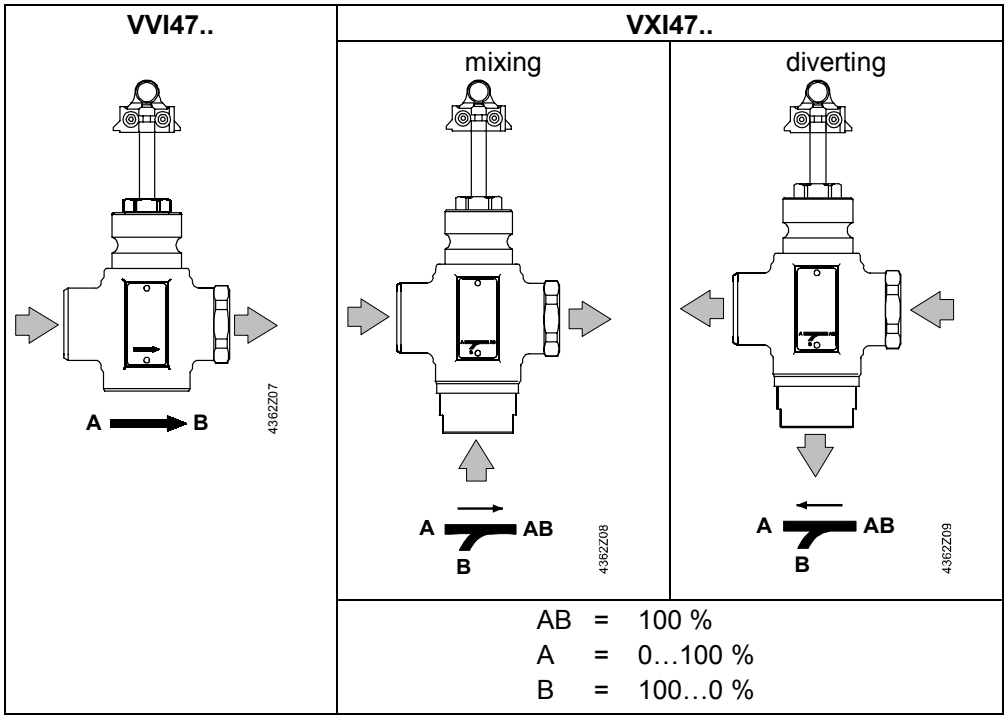
Actuator overview

Product number	Actuator type	Operating voltage	Positioning signal	Spring return function	Positioning time	Positioning force
SBX31	Electro-motoric	AC 230 V	3-position	-	120 s	700 N
SBX81		AC 24 V				
SBX61			DC 0…10 V [1)]			

1) or DC 4…20 mA with AZX420 function module

⚠ For VXI47.. the application is only possible if the valve is used as mixing valve.

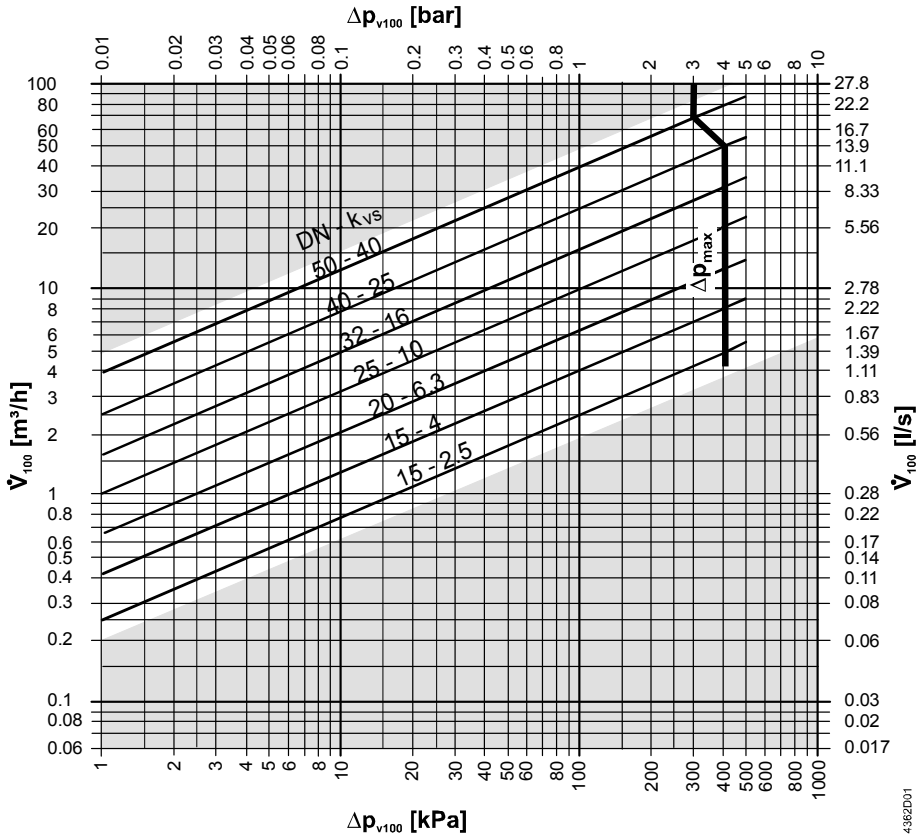
Technical design / Mechanical Design



⚠ **The 2-port seat valve does not become a 3-port valve by removing the blank fitting.**

Sizing

Flow diagram



Δp_{v100} = Differential pressure across the fully open valve and the valve's control path by a Volumetric flow $\dot{V}_{100}$

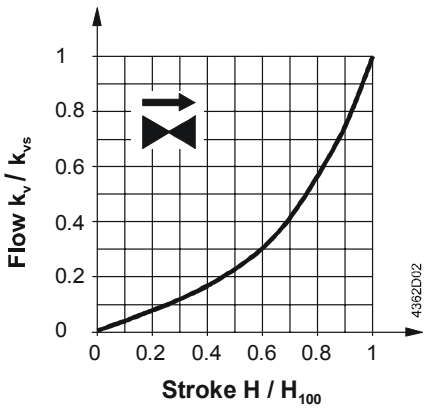
$\dot{V}_{100}$ = Volumetric flow through the fully open valve (H_{100})

100 kPa = 1 bar ≈ 10 mWG

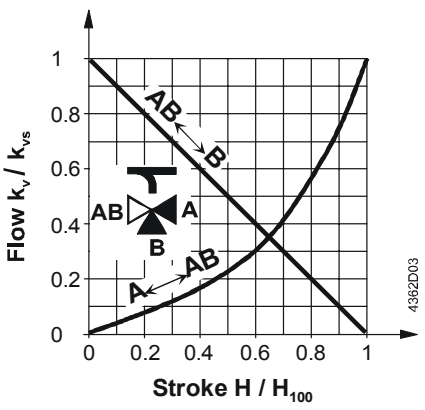
1 m^3/h = 0.278 l/s water at 20 °C

Valve flow characteristics

VVI47..



VXI47..

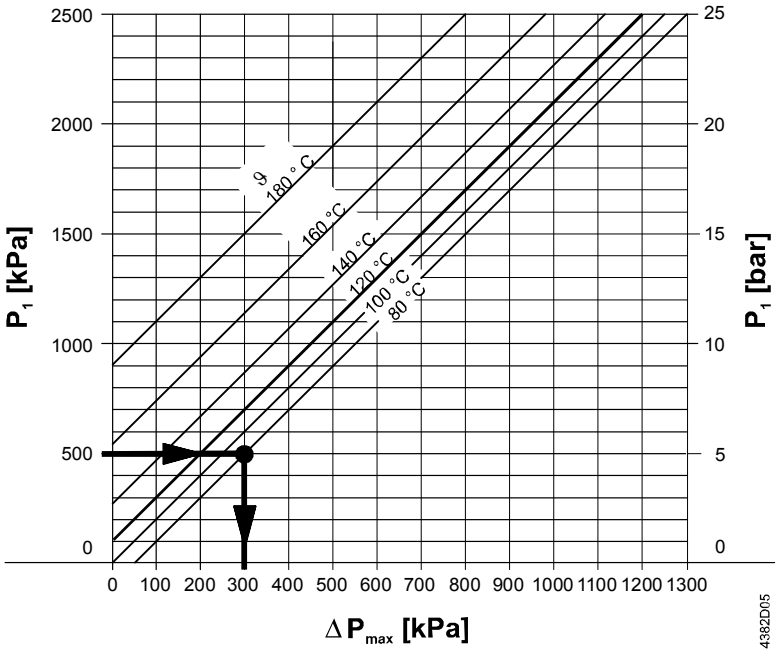


Cavitation

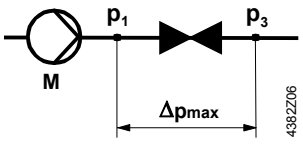
Cavitation accelerates wear on the valve plug and seat, and also results in undesirable noise. Cavitation can be avoided by not exceeding the differential pressure shown in the "Working pressure and medium temperature" on page 5, and by adhering to the static pressures shown below.

Note on chilled water

To avoid cavitation in chilled water circuits ensure sufficient counter pressure at valve outlet, e.g. by a throttling valve after the heat exchanger. Select the pressure drop across the valve at maximum according to the 80 °C curve in the flow.



Δp_{max} = Differential pressure with valve almost closed, at which cavitation can largely be avoided
p_1 = Static pressure at inlet
p_3 = Static pressure at outlet
M = Pump
ϑ = Water temperature



Hot water example:

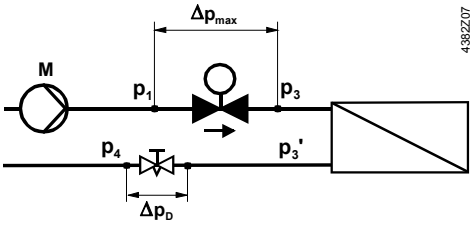
Pressure p_1 at valve inlet: 500 kPa (5 bar)
Water temperature: 80 °C

From the diagram above, it will be seen that with the valve almost closed, the maximum permissible differential pressure Δp_{max} is 300 kPa (3 bar).

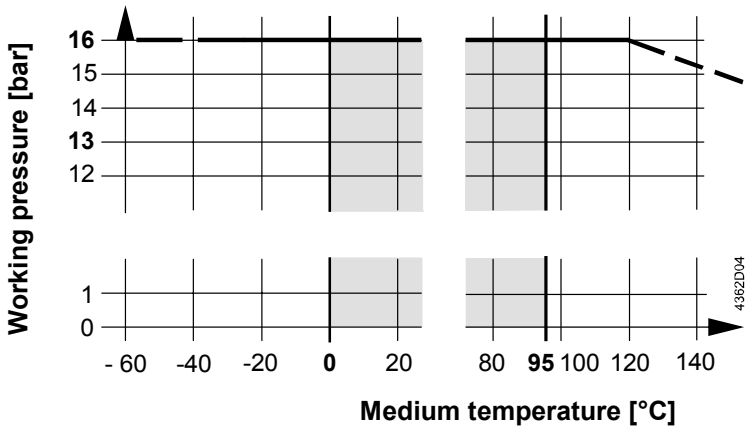
Chilled water example:

Spring water cooling as an example of avoiding cavitation:

Chilled water = 12 °C
p_1 = 500 kPa (5 bar)
p_4 = 100 kPa (1 bar) atmospheric pressure
Δp_{max} = 300 kPa (3 bar)
$\Delta p_{3-3'}$ = 20 kPa (0.2 bar)
Δp_D (throttle) = 80 kPa (0.8 bar)
p_3' = pressure after consumer in kPa



Working pressure and medium temperature



Working pressure and medium temperature staged as per ISO 7005.

Current local legislation must be observed.

Notes

Engineering

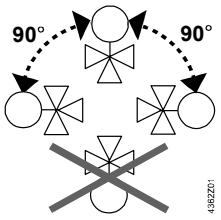
We recommend installation in the return pipe, as the temperatures in this pipe are lower for applications in heating systems, which in turn, extends the stem sealing gland's life.
Water quality requirements as per VDI 2035.

⚠ **We generally recommend to install a strainer to increase the valve's functional safety.**
Mainly use VXI47…as 3-port mixing valve.

Mounting

Both valve and actuator can easily be assembled at the mounting location. Neither special tools nor adjustments are required.
The valve is supplied with mounting instructions no. 7431909080

Mounting positions



Direction of flow

When mounting, pay attention to the valve's flow direction symbol →:

2-port	3-port mixing	3-port diverting
A → B	A → AB, B	A ← AB, B

Commissioning ⚠ Commission the valve only if the actuator has been mounted correctly.

Stem retracts:	Increasing flow	Through-port opens, bypass closes
Stem extends:	Decreasing flow	Through-port closes, bypass opens

Maintenance

⚠ For actuator service work: Turn off the pump and the operating voltage, close the shutoff valves, depressurize the pipes and allow them to cool down. Disconnect the electrical connections, where required, from the terminals. Re-commission the valve only if the actuator has been mounted correctly.

Disposal

The valve must be dismantled and separated into its various constituent materials before disposal.
Observe all local and applicable laws.

Warranty

The technical data supplied for these valves is valid only for valves used in conjunction with the actuators listed under "Equipment combinations".
Use with third-party actuators invalidates any warranty offered by Siemens Building Technologies / HVAC Products.

Technical data

Functional data	PN class	PN 16 to EN 1333
	Working pressure	to ISO 7005 within the permissible "Working pressure and medium temperature" range according to the diagram on page 5.
	Flow characteristic Through port 0…30 % Through port 30…100 % Bypass (VXI47..) 0…100 %	 Linear Equal percentage; n_{gl} = 3 to VDI / VDE 2173 Linear
	Leakage rate Through port Bypass (VXI47..)	 0…0.02 % of k_{vs} value to DIN EN 1349 0.5 … 2 % of k_{vs} value to DIN EN 1349
	Permissible media water brine	Cooling water, chilled water, low temperature hot water, high temperature hot water, water with anti-freeze; Recommendation: water treatment to VDI 2035
	Medium temperature	0…95 °C
	Rangeability S_v	DN 15: > 50 DN ≥ 20: > 100
	Nominal stroke	20 mm
Industry standards	Pressure Equipment Directive	PED 97/23/EC
	Pressure Accessories	as per article 1, section 2.1.4
	Fluid group 2	without CE-marking as per article 3, section 3 (sound engineering practice)

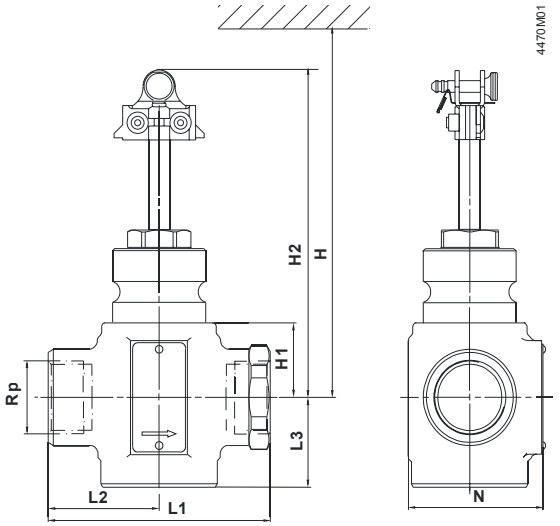
	Environmental compatibility	ISO 14001 (Environment) ISO 9001 (Quality) SN 36350 (Environmentally compatible products) RL 2002/95/EG (RoHS)
Materials	Valve body	Bronze CC491K (Rg5)
	Plug	Brass
	Stem	Stainless steel
	Sealing gland	Brass
	Gland materials	EPDM O rings, silicon-free
Dimensions / Weight	Dimensions	Refer to "Dimensions"
	Connections	Internally threaded, Rp… to ISO 7-1
	Weight	Refer to "Dimensions"

S_v = Rangeability k_{vs} / k_{vr} as per VDI 2173

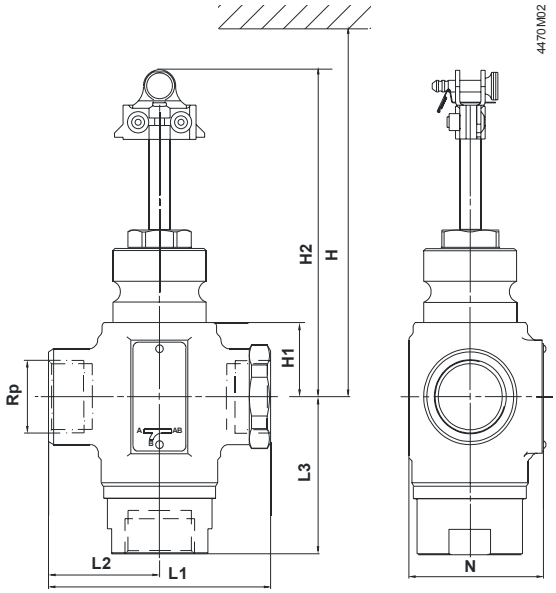
k_{vs} = Nominal flow rate of cold water (5...30 °C) through the fully open valve by a differential pressure of 100 kPa (1 bar)

k_{vr} = The lowest value for k_v at which the characteristic tolerance is still maintained, at a differential pressure of 100 kPa (1 bar)

Dimensions



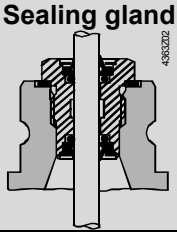
	DN	L1 [mm]	L2 [mm]	L3 [mm]	H1 [mm]	H2 [mm]	H + SBX [mm]	G [inches]	N [mm]	kg [kg]
VVI47.15 – 2.5	15	90	45	40	26	138.5	> 490	Rp½	60	1.34
VVI47.15 – 4	15	90	45	40	26	138.5		Rp½	60	1.34
VVI47.20 – 6.3	20	90	45	40	26	138.5		Rp¾	60	1.39
VVI47.25 – 10	25	105	52.5	41	34	146.5	> 500	Rp1	64	1.74
VVI47.32 – 16	32	115	57.5	41	34	146.5		Rp11/4	87	2.14
VVI47.40 – 25	40	130	65	46	46	158.5	> 510	Rp11/2	108	2.79
VVI47.50 – 40	50	150	75	56	46	158.5		Rp2	120	3.74



	DN	L1	L2	L3	H1	H2	H + SBX	G	N	kg
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[inches]	[mm]	[kg]
VXI47.15 – 2.5	15	90	45	68	26	138.5	> 490	Rp½	60	1.54
VXI47.15 – 4	15	90	45	68	26	138.5		Rp½	60	1.54
VXI47.20 – 6.3	20	90	45	69	26	138.5		Rp¾	60	1.64
VXI47.25 – 10	25	105	52.5	73.5	34	146.5	> 500	Rp1	64	2.14
VXI47.32 – 16	32	115	57.5	74	34	146.5		Rp11/4	87	2.34
VXI47.40 – 25	40	130	65	84	46	158.5	> 510	Rp11/2	108	3.14
VXI47.50 – 40	50	150	75	98	46	158.5		Rp2	120	4.14

Spare parts

Order numbers for spare parts

Product number		**DN**	**Sealing gland** 
VVI47.15-2.5	VXI47.15-2.5	15	4 284 8874 0
VVI47.15-4	VXI47.15-4	15	4 284 8874 0
VVI47.20-6.3	VXI47.20-6.3	20	4 284 8874 0
VVI47.25-10	VXI47.25-10	25	4 284 8874 0
VVI47.32-16	VXI47.32-16	32	4 284 8874 0
VVI47.40-25	VXI47.40-25	40	4 284 8874 0
VVI47.50-40	VXI47.50-40	50	4 284 8874 0

For these valves a plug replacement is not possible