SIEMENS

4320

2-Port Seat Valves with Flange, PN 10

VVF31...

- **Grey cast iron EN-GJL-250 valve body**
- **DN 15...150**
- **k_{vs} 2.5...315 m^3/h**
- **Can be equipped with SQX... electromotoric or SKD...-, SKB...- and SKC...-electrohydraulic actuators**

Use

For use in heating, ventilating, and air conditioning systems as a control or safety shutoff valve.
For closed circuits only (mind cavitation, refer to page 6).

Type summary

Type	DN	k_{vs} [m^3 / h]	S_v
VVF31.15-2.5	15	2,5	> 50
VVF31.15-4		4	
VVF31.24	25	5	
VVF31.25-6.3		6,3	
VVF31.25		7,5	
VVF31.25-10		10	
VVF31.39	40	12	
VVF31.40-16		16	
VVF31.40		19	
VVF31.40-25		25	
VVF31.50	50	31	> 100
VVF31.50-40		40	
VVF31.65	65	49	
VVF31.65-63		63	
VVF31.80	80	78	
VVF31.80-100		100	
VVF31.90	100	124	
VVF31.100-160		160	
VVF31.91	125	200	
VVF31.125-250		250	
VVF31.92	150	300	
VVF31.150-315		315	

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}
k_{vr} = Smallest k_v value, at which the flow characteristic tolerances can still be maintained, by a differential pressure of 100 kPa (1 bar)

Accessories

Type	Description
ASZ6.5	Electric stem heating element, AC 24 V / 30 W, required for media below 0 °C

Order

When ordering please give quantity, product name and type reference.

Example: 2 two-port valves VVF31.50-40

Delivery

Valves, actuators and accessories are packed and supplied separately.
The valves are supplied without counter-flanges and without flange gaskets.

Spare parts

See overview, section „Spare parts“, page 10

Equipment combinations

Valves		Actuators							
		SQX... [1]		SKD... [1]		SKB...		SKC...	
	H_{100}	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s
	[mm]	[kPa]							
VVF31.15-2.5	20	300	1000	300	1000	300	1000		
VVF31.15-4									
VVF31.24									
VVF31.25-6.3									
VVF31.25									
VVF31.25-10									
VVF31.39			525		775				
VVF31.40-16									
VVF31.40									
VVF31.40-25									
VVF31.50			325		475				
VVF31.50-40									
VVF31.65		175	175	275	275		750		
VVF31.65-63									
VVF31.80		100	100	175	175		500		
VVF31.80-100									
VVF31.90	40							200	300
VVF31.100-160									
VVF31.91								150	200
VVF31.125-250									
VVF31.92								100	125
VVF31.150-315									

[1] Usable up to maximum medium temperature of 150 °C

H_{100} = Nominal stroke
Δp_{max} = Maximum permissible differential pressure across valve's control path, valid for the entire actuating range of the motorized valve
Δp_s = Maximum permissible differential pressure at which the motorised valve will close securely against the pressure (close off pressure)

Actuator overview

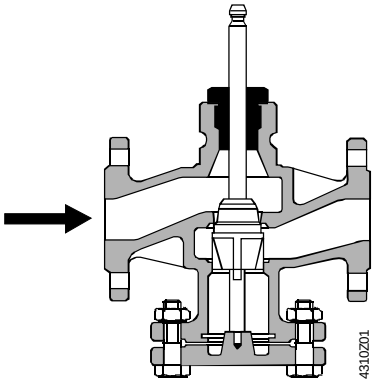
Type	Actuator type	Operating voltage	Positioning signal	Spring return	Positioning time	Positioning force	Data sheet
SQX32.00	Electro-motoric	AC 230 V	3- position	No	150 s	700 N	N4554
SQX32.03					35 s		
SQX82.00		AC 24 V			150 s		
SQX82.03					35 s		
SQX62			DC 0…10 V [1]				
SKD32.50	Electro-hydraulic	AC 230 V	3- position	No	120 s	1000 N	N4561
SKD32.21				Yes	30 s		
SKD32.51					120 s		
SKD82.50		AC 24 V		No			
SKD82.51				Yes			
SKD60			DC 0…10 V [1]	No	30 s		N4563
SKD62…				Yes			
SKB32.50	Electro-hydraulic	AC 230 V	3- position	No	120 s	2800 N	N4564
SKB32.51				Yes			
SKB82.50		AC 24 V		No			
SKB82.51				Yes			
SKB60			DC 0…10 V [1]	No			N4566
SKB62…				Yes			
SKC32.60	Electro-hydraulic	AC 230 V	3- position	No	120 s	2800 N	N4564
SKC32.61				Yes			
SKC82.60		AC 24 V		No			
SKC82.61				Yes			
SKC60			DC 0…10 V [1]	No			N4566
SKC62…				Yes			

[1] or DC 4…20 mA

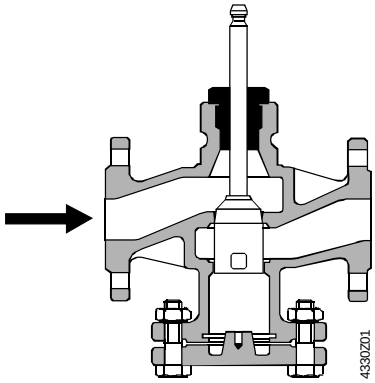
Pneumatic actuators Pneumatic actuators are available on request from your local office.

Technical design / mechanical design

Valve cross section



DN 15… 40
closes against pressure

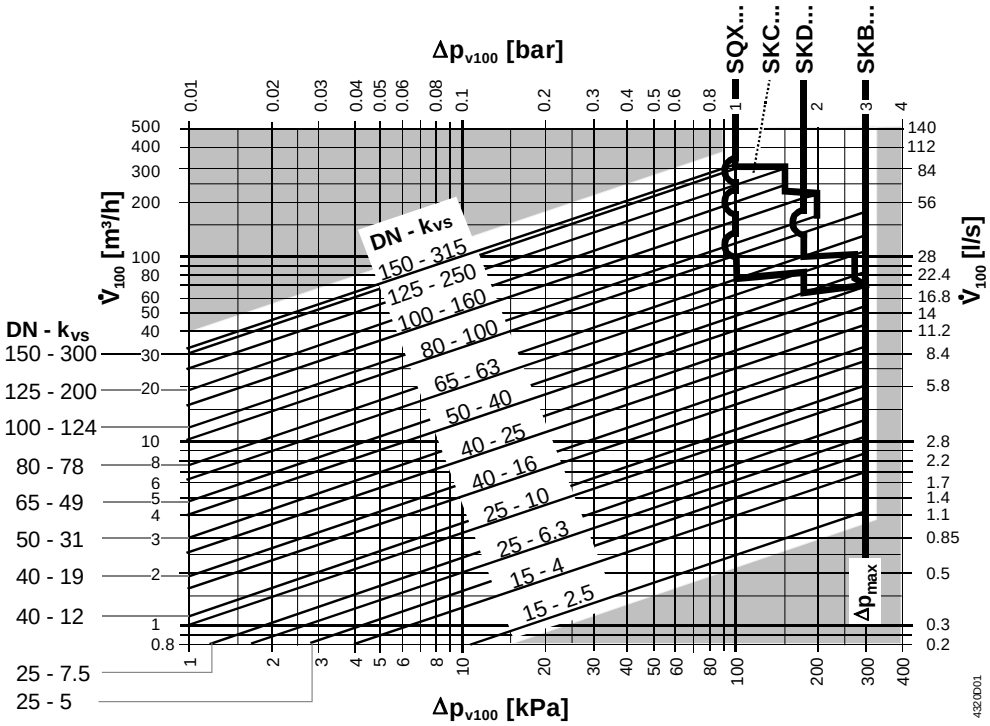


DN 50…150
closes against pressure

Guided plug which is integrated in the valve stem.
The seat is machined in the valve body.

⚠ **The two-port seat valve does not become a three-port valve by removing the blank flange!**

Flow diagram



Δp_{max} = Maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorised valve

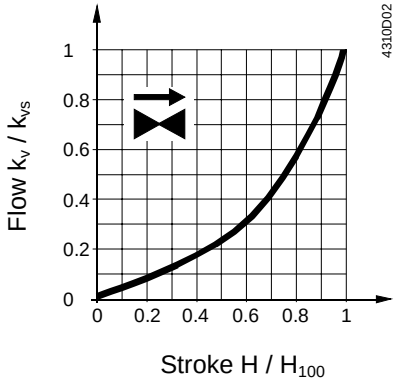
Δp_{v100} = Differential pressure across the fully open valve by a volume flow V_{100}

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

100 kPa = 1 bar ≈ 10 mWC

1 m^3/h = 0.278 l/s water at 20 °C

Valve flow characteristic



0…30 % → linear
30…100 % → equal percentage
n_{gl} = 3 as per VDI / VDE 2173

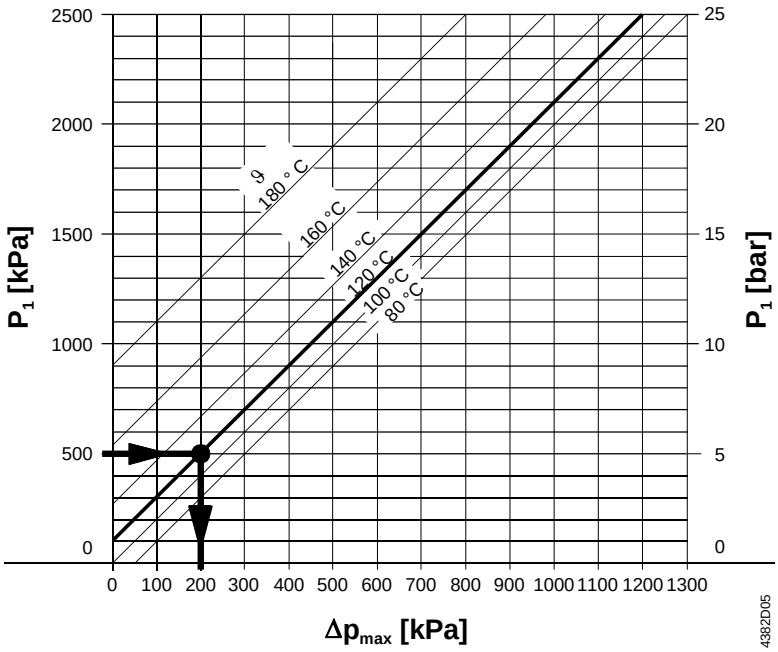
k_{vs}-values 100, 160, 250, 315 m^3/h:
0…30 % → linear
30…75 % → equal-percentage (n_{gl} = 3) as per VDI / VDE 2173
5…100 % → optimized for maximal flow k_{v100}

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 flow diagram 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 diagram below.



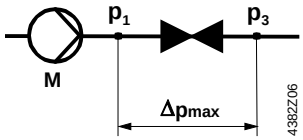
Δp_{max} = Differential pressure with valve almost closed, at which cavitation can largely be avoided

p_1 = Static pressure at inlet

p_3 = Static pressure at outlet

M = Pump

ϑ = Water temperature

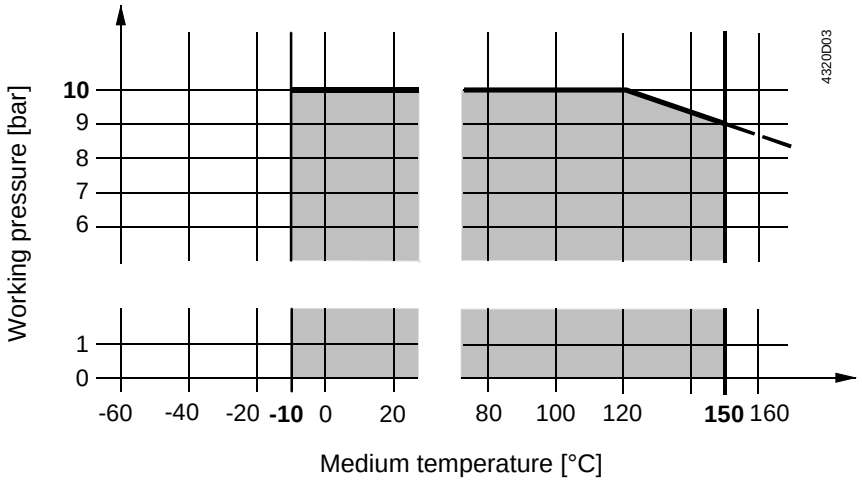


High temperature hot water example:

Pressure p_1 at valve inlet: 500 kPa (5 bar)
Water temperature: 120 °C

From the diagram above, it will be seen that with the valve almost closed, the maximum permissible differential pressure Δp_{max} is 200 kPa (2 bar).

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.

⚠ Always use a strainer upstream of the valve to increase the valve's functional safety.

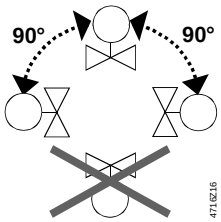
⚠ For media below 0 °C, use the electric ASZ6.5 stem heating element to prevent the valve stem from freezing in the sealing gland. For safety reasons, the stem heating element has been designed for AC 24 V / 30 W operating voltage.

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 74 319 0509 0.

Orientation



Direction of flow

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

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

Valve stem retracts: valve opens = increasing flow
Valve stem extends: valve closes = decreasing flow

Maintenance

VVF31... valves require no maintenance.

Warning ⚠ When doing service work on the valve / actuator:

- Deactivate the pump and turn off the power supply
- Close the shuttoff valves
- Fully reduce the pressure in the piping system and allow pipes to completely cool down

If necessary, disconnect the electrical wires.

Before putting the valve into operation again, make certain the actuator is correctly fitted.

Stem sealing gland

The glands can be exchanged without removing the valve, provided the pipes are depressurized and cooled off and the stem surface is unharmed.
If the stem is damaged in the gland range, replace the entire stem-plug-unit.
Contact your local office or branch.

Disposal

Before disposal the valve must be dismantled and separated into its various constituent materials.
Legislation may demand special handling of certain components, or it may be sensible from an ecological point of view.
Current local legislation must be observed.

Warranty

The technical data given for these applications is valid only in conjunction with the Siemens actuators as detailed under «Equipment combinations».
All terms of the warranty will be invalidated by the use of actuators from other manufacturers.

Technical data

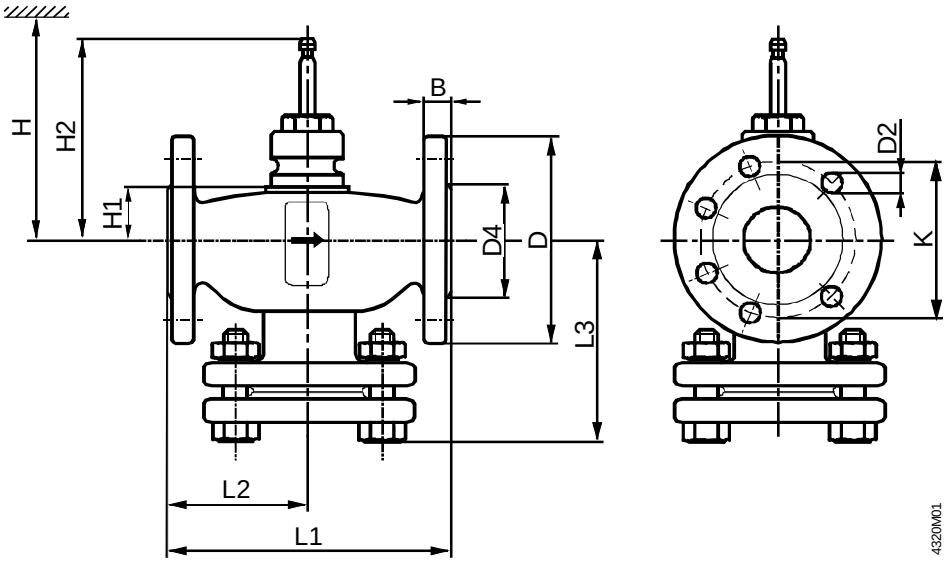
Functional data	PN class		PN 10 to ISO 7268
	Working pressure		to ISO 7005 within the permissible medium temperature range according to the diagram on page 7
	Flow characteristic	• 0…30 %	• linear
		• 30…100 %	• equal percentage; n_{gl} = 3 to VDI / VDE 2173 [1)]
	Leakage rate		0…0.02 % of k_{vs} value to DIN EN 1349
	Permissible media		chilled water, low temperature hot water, high temperature hot water, water with anti-freeze, brine; recommendation: water treatment to VDI 2035
	Medium temperature [2)]		-10…+150 °C
	Rangeability S_v		to DN 40: >50 DN 50…150: >100
	Nominal stroke		DN 15…80: 20 mm DN 100…150: 40 mm
Industry standards	Pressure Equipment Directive		PED 97/23/EC
	Pressure Accessories		as per article 1, section 2.1.4
	Fluid group 2:	• DN 15…100	• without CE-marking as per article 3, section 3 (sound engineering practice)
		• DN 125…150	• category I, with CE-marking
Materials	Valve body		grey cast iron EN-GJL-250
	Stem		stainless steel
	Plug		DN 15…40: brass DN 50…150: bronze
	Sealing gland		Brass, siliconfree
	Gland materials		EPDM O rings, siliconfree
Dimensions / Weight	Refer to «Dimensions»		
	Flange connections		to ISO 7005

[1)] k_{vs}-values 100, 160, 250, 315 m^3/h: flow characteristic is over 75 % stroke optimized for maximal flow k_{v100}, see page 5.

[2)] Electric stem heating element ASZ6.5 required for media below 0 °C.

Dimensions

Dimensions in mm



Valve	DN	B	D Ø	D2 Ø	D4 Ø	K	L1	L2	L3	H1	H2	H SQX…	H SKD…	H SKB…	H SKC…	kg [kg]
VVF31.15-2.5	15	14	95	14 (4x)	46	65	130	65	86	40,5	137	> 465	> 540	> 615		4,1
VVF31.15-4																
VVF31.24	25	16	115		65	85	160	80	104	34	130,5	> 459	> 534	> 609		6,3
VVF31.25-6.3																
VVF31.25																
VVF31.25-10																
VVF31.39	40	18	150	19 (4x)	84	110	200	100	126	39	135,5	> 464	> 539	> 614		10,4
VVF31.40-16																
VVF31.40																
VVF31.40-25																
VVF31.50	50	20	165		99	125	230	115	143							13,8
VVF31.50-40																
VVF31.65	65		185		118	145	290	145	173	60	156,5	> 485	> 560	> 635		18,5
VVF31.65-63																
VVF31.80	80	22	200	19 (8x)	132	160	310	155	185							24,1
VVF31.80-100																
VVF31.90	100	24	220		156	180	350	175	205	93	209,5				> 666	36,5
VVF31.100-160																
VVF31.91	125	26	250		184	210	400	200	232	104	220,5				> 677	50
VVF31.125-250																
VVF31.92	150		285	23 (8x)	211	240	480	240	275	120	236,5				> 693	70
VVF31.150-315																

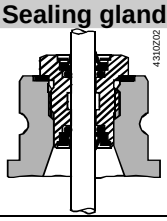
DN = Nominal size

H = Total actuator height plus minimum distance to the wall or the ceiling for mounting, connection, operation, maintenance etc.

H1 = Dimension from the pipe centre to install the actuator (upper edge)

H2 = Valve in the «Closed» position means that the stem is fully extended

Order numbers for spare parts

Valve	Sealing gland 	Set Plug with stem, circlip, sealing
VVF31.15-2.5	4 284 8806 0	74 676 0198 0
VVF31.15-4	4 284 8806 0	74 676 0199 0
VVF31.24	4 284 8806 0	74 676 0034 0
VVF31.25-6.3	4 284 8806 0	74 676 0200 0
VVF31.25	4 284 8806 0	74 676 0035 0
VVF31.25-10	4 284 8806 0	74 676 0201 0
VVF31.39	4 284 8806 0	74 676 0036 0
VVF31.40-16	4 284 8806 0	74 676 0202 0
VVF31.40	4 284 8806 0	74 676 0037 0
VVF31.40-25	4 284 8806 0	74 676 0203 0
VVF31.50	4 284 8806 0	74 676 0038 0
VVF31.50-40	4 284 8806 0	74 676 0204 0
VVF31.65	4 284 8806 0	74 676 0039 0
VVF31.65-63	4 284 8806 0	74 676 0205 0
VVF31.80	4 284 8806 0	74 676 0040 0
VVF31.80-100	4 284 8806 0	74 676 0206 0
VVF31.90	4 679 5629 0	74 676 0088 0
VVF31.100-160	4 679 5629 0	75 676 0207 0
VVF31.91	4 679 5629 0	74 676 0089 0
VVF31.125-250	4 679 5629 0	74 676 0208 0
VVF31.92	4 679 5629 0	74 676 0090 0
VVF31.150-315	4 679 5629 0	74 676 0090 0