



## 2-Port Seat Valves with Flange, PN 25

**VVF52...**

- Nodular cast iron EN-GJS-400-18-LT valve body
- DN 15...40
- $k_{vs}$  0.16...25 m<sup>3</sup>/h
- Can be equipped with SQX- electromotoric or SKD...- or SKB...- electrohydraulic actuators

### Use

For use in district heating, heating, ventilating, and air conditioning systems as a control or safety shutoff valve to DIN 32730.

For open and closed circuits (mind cavitation, refer to page 6).

Silicon-free valve versions with type suffix ...M available.

## Type summary

Type reference	DN	$k_{vs}$ [m <sup>3</sup> / h]	$S_v$
VVF52.15-0.16	15	0.16	50...100
VVF52.15-0.2		0.2	
VVF52.15-0.25		0.25	
VVF52.15-0.32		0.32	
VVF52.15-0.4		0.4	
VVF52.15-0.5		0.5	
VVF52.15-0.63		0.63	
VVF52.15-0.8		0.8	
VVF52.15-1		1	
VVF52.15-1.25		1.25	
VVF52.15-1.6		1.6	
VVF52.15-2		2	
VVF52.15-2.5		2.5	
VVF52.15-3.2		3.2	
VVF52.15-4		4	
VVF52.25-5	25	5	100...200
VVF52.25-6.3		6.3	
VVF52.25-8		8	
VVF52.25-10		10	
VVF52.40-12.5	40	12.5	
VVF52.40-16		16	
VVF52.40-20		20	
VVF52.40-25		25	

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)

## High performance versions

Type	Type suffix	Description	Examples
VVF52...A	A	Sealing gland with PTFE sleeve for temperatures up to 180 °C	VVF52.15-2.5A
VVF52...G	G	Sealing gland with PTFE sleeve for steam up to 180 °C, available for $k_{vs} \geq 1.25$ m <sup>3</sup> /h	VVF52.15-3.2G
VVF52...M	M	Sealing gland with PTFE sleeve, silicon-free version, for temperatures up to 180 °C	VVF52.25-6.3M

## Accessories

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

## Order

Example: 2 2-port valves VVF52.15-0.25

## 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 12

## Equipment combinations

Valves		Actuators					
		SQX... <sup>1)</sup>		SKD... <sup>1) 2) 3)</sup>		SKB... <sup>2) 3)</sup>	
		$\Delta p_{\max}$	$\Delta p_s$	$\Delta p_{\max}$	$\Delta p_s$	$\Delta p_{\max}$	$\Delta p_s$
	H <sub>100</sub> [mm]	[kPa]					
VVF52.15...	20	1600	2500	1600	2500	1600	2500
VVF52.25...		1200	1500		2250		
VVF52.40...		400	500	700	750		2000

<sup>1)</sup> Usable up to maximum medium temperature of 150 °C

<sup>2)</sup> Usable also in combination with special version G for saturated steam / super-heated steam

<sup>3)</sup> Together with actuators SKD... or SKB..., 2-port valves VVF52... are TÜV approved to DIN 32730 and can be used as safety shutoff valves for steam or high-temperature hot water should permissible temperature or pressure limits not be exceeded.

H<sub>100</sub> = Nominal stroke

$\Delta p_{\max}$  = Maximum permissible differential pressure across the valve, valid for the entire actuating range of the motorized valve

$\Delta p_s$  = 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 <sup>1)</sup>				
SKD32.50	Electro-hydraulic	AC 230 V	3-position	No	120 s	1000 N	N4561
SKD32.21				Yes	30 s		
SKD32.51				AC 24 V	No		
SKD82.50		Yes					
SKD82.51		DC 0...10 V <sup>1)</sup>			No		
SKD60			Yes				
SKD62...							
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 <sup>1)</sup>	No			
SKB62...		Yes					

<sup>1)</sup> or DC 4...20 mA

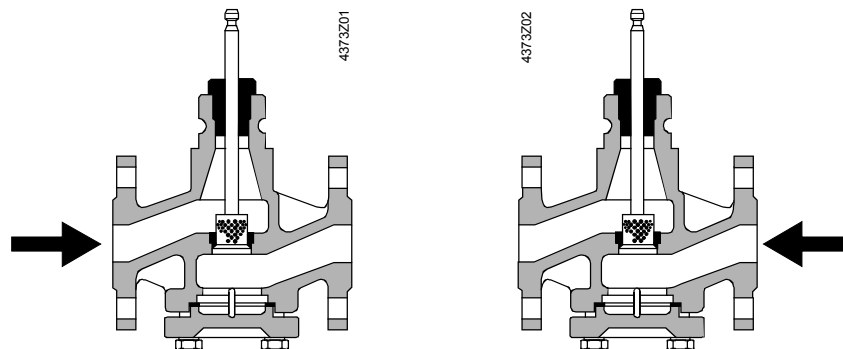
## Pneumatic actuators

Contact your local office or branch for more information.



**The VVF52...G valves (for saturated steam / super-heated steam) cannot be used with pneumatic actuators.**

Valve cross section



**Standard version VVF52...**

for chilled water, cooling water, low-  
temperature hot water, high-temperature  
hot water, water with anti-freeze  
-20...150 °C

**Special version VVF52...G**

for saturated steam, super-heated steam  
up to max. 600 kPa (6 bar) abs  
≤ 180 °C

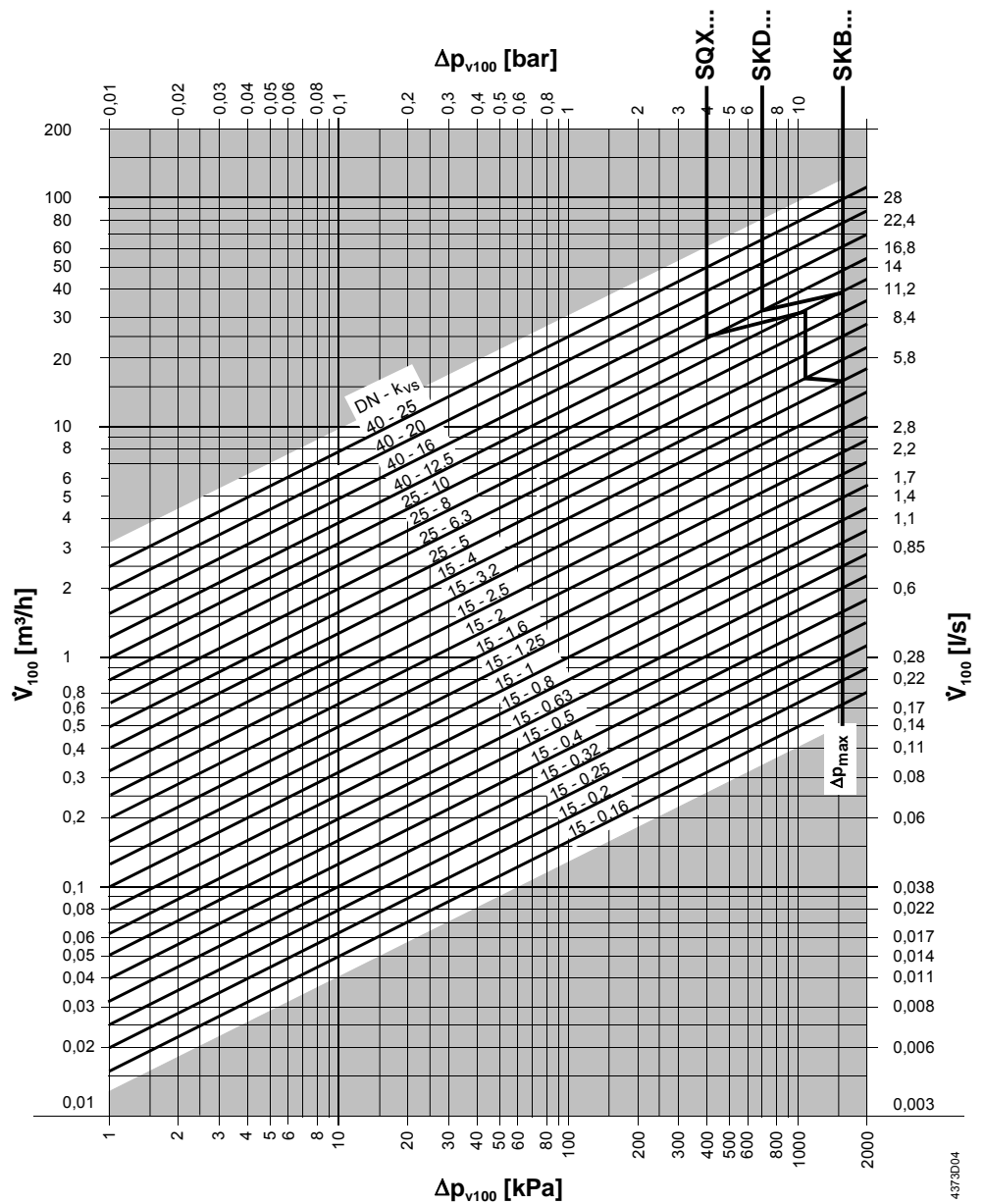
Depending on the nominal size, a guided parabolic, perforated or slot plug is used that is directly connected to the valve stem.

The seat is screwed to the valve body with the aid of special gland material.



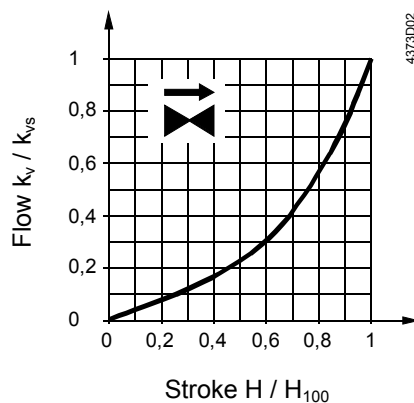
**The two-port seat valve does not become a three-port valve by removing the blank flange!**

## Flow diagram



- $\Delta p_{\text{max}}$  = Maximum permissible differential pressure across the valve, valid for the entire actuating range of the motorised valve  
 $\Delta p_{v100}$  = Differential pressure across the fully open valve and the valve's control path by a volume flow  $\dot{V}_{100}$   
 $\dot{V}_{100}$  = Volume flow through the fully open valve ( $H_{100}$ )  
 100 kPa = 1 bar  $\approx$  10 mWC  
 1  $\text{m}^3/\text{h}$  = 0.278 l/s water at 20 °C

## Valve flow characteristic



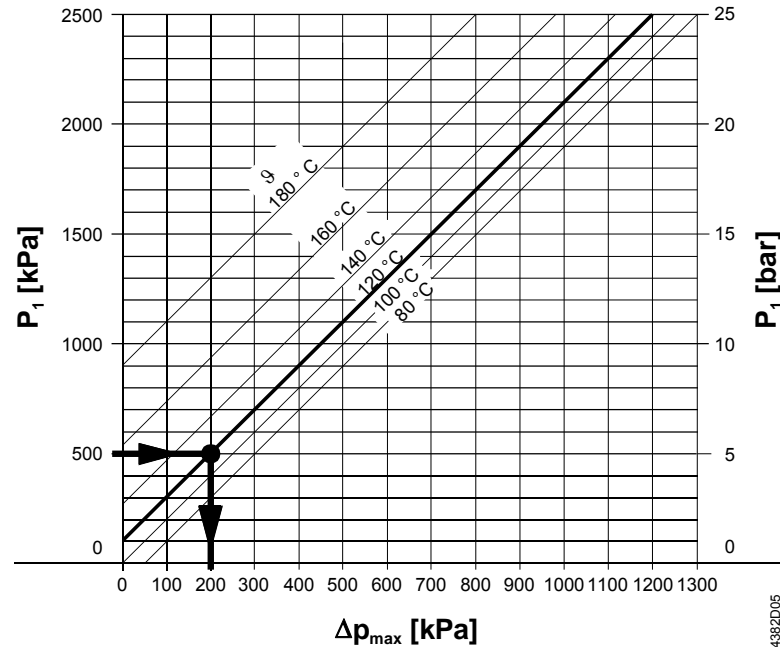
- 0...30 % → linear  
 30...100 % → equal percentage  
 $n_{gl} = 3$  as per VDI / VDE 2173

## 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.



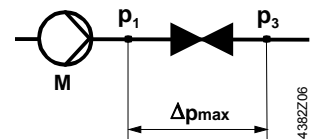
$\Delta p_{\max}$  = Differential pressure with valve almost closed, at which cavitation can largely be avoided

$p_1$  = Static pressure at inlet

$p_3$  = Static pressure at outlet

M = Pump

$\vartheta$  = 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  $\Delta p_{\max}$  is 200 kPa (2 bar).

Chilled water example:

Spring water cooling as an example of avoiding cavitation:

Chilled water = 12 °C

$p_1$  = 500 kPa (5 bar)

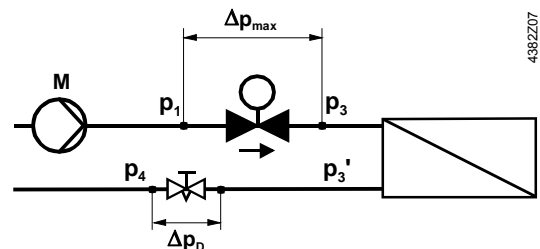
$p_4$  = 100 kPa (1 bar)  
(atmospheric pressure)

$\Delta p_{\max}$  = 300 kPa (3 bar)

$\Delta p_{3-3'}$  = 20 kPa (0,2 bar)

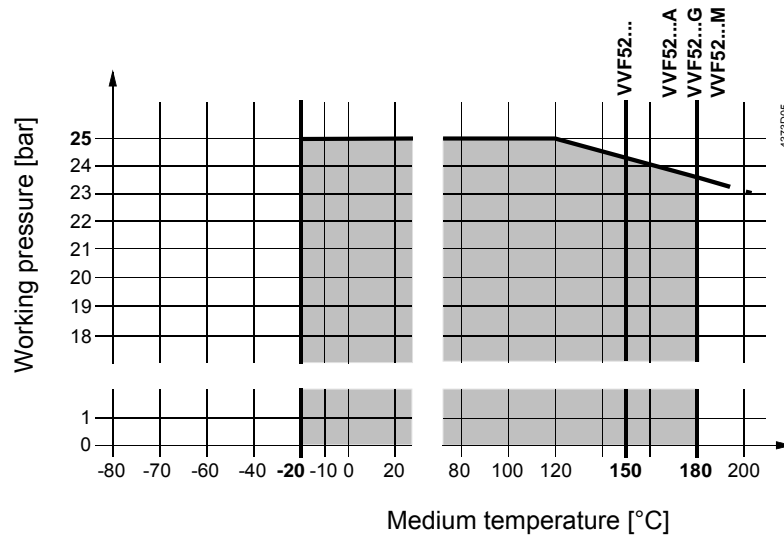
$\Delta p_D$  (throttle) = 80 kPa (0,8 bar)

$p_3'$  = pressure after consumer in kPa



## Working pressure and medium temperature

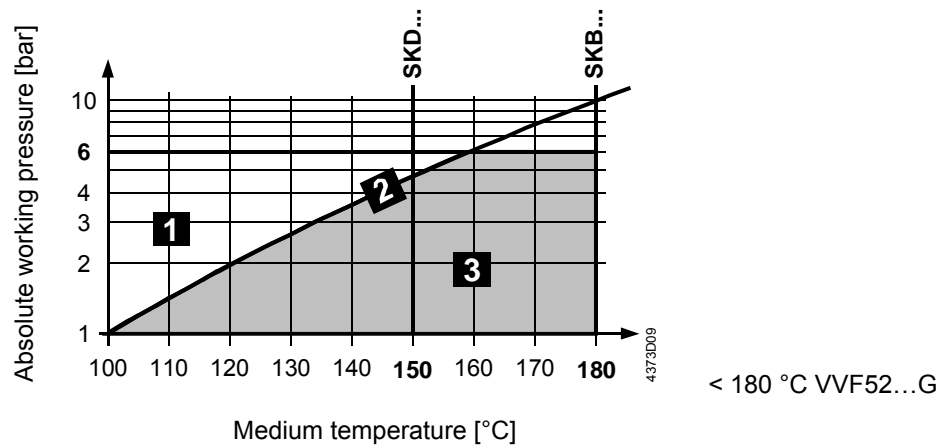
Fluids



## Working pressure and medium temperature staged as per ISO 7005

Current local legislation must be observed.

Saturated steam  
Superheated steam



<b>1</b>	wet steam	avoid
<b>2</b>	saturated steam	permissible range of use
<b>3</b>	superheated steam	

## Recommendation

For saturated steam and superheated steam the differential pressure  $\Delta p_{\max}$  across the valve should be close to the critical pressure ratio.

$$\text{Pressure ratio} = \frac{p_1 - p_3}{p_1} \cdot 100\%$$

$p_1$  = absolute pressure before valve in kPa  
 $p_3$  = absolute pressure after valve in kPa

## Calculation of the $k_{vs}$ value for steam

### Subcritical range

$$\frac{p_1 - p_3}{p_1} \cdot 100\% < 42\%$$

Pressure ratio < 42% subcritical

$$k_{vs} = 4.4 \cdot \frac{\dot{m}}{\sqrt{p_3 \cdot (p_1 - p_3)}} \cdot k$$

### Supercritical range

$$\frac{p_1 - p_3}{p_1} \cdot 100\% \geq 42\%$$

Pressure ratio  $\geq$  42% supercritical  
(not recommended)

$$k_{vs} = 8.8 \cdot \frac{\dot{m}}{p_1} \cdot k$$

$\dot{m}$  = steam quantity in kg/h

$k$  = factor for superheating of steam =  $1 + 0.0012 \cdot \Delta T$  ( $k = 1$  for saturated steam)

$\Delta T$  = temperature differential in K between saturated steam and superheated steam

### Example

given	saturated steam 151.8 °C $p_1 = 500 \text{ kPa (5 bar)}$ $\dot{m} = 460 \text{ kg/h}$ pressure ratio = 30 %	saturated steam 151.8 °C $p_1 = 500 \text{ kPa (5 bar)}$ $\dot{m} = 460 \text{ kg/h}$ pressure ratio = 42 % (supercritical permitted)
required	$k_{vs}$ , valve type	$k_{vs}$ , valve type
procedure	$p_3 = p_1 - \frac{30 \cdot p_1}{100}$ $p_3 = 500 - \frac{30 \cdot 500}{100} = 350 \text{ kPa (3.5bar)}$ $k_{vs} = 4.4 \cdot \frac{460}{\sqrt{350 \cdot (500 - 350)}} \cdot 1 = 8.83 \text{ m}^3/\text{h}$	$k_{vs} = 8.8 \cdot \frac{460}{500} \cdot 1 = 8.09 \text{ m}^3/\text{h}$
selected	$k_{vs} = 10 \text{ m}^3/\text{h} \Rightarrow \text{VVF52.25-10G}$	$k_{vs} = 8 \text{ m}^3/\text{h} \Rightarrow \text{VVF52.25-8G}$

### 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.

In open circuits the valve plug may seize as the result of scale deposits. In these applications, only the most powerful SKD... or SKB... actuators should be used. Further the valve should be exercised at regular intervals (two to three times per week). A strainer **MUST** be fitted at the valve inlet

Ensure cavitation free flow (refer to page 6).



To ensure the reliability of the valve, we recommend the fitting of a strainer at the valve inlet even in closed circuits.



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.

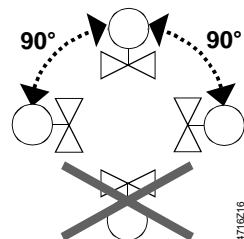
The use of these valves for steam is subject to specific parameters:  
Observe diagram for steam on page 7 and «Technical Data» on page 10!

#### 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 →.

VVF52... → Standard

Direction of action: closes against pressure

VVF52...G ← Steam

Direction of action: closes on pressure

## 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

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### Warning



VVF52... valves require no maintenance.

When doing service work on the valve / actuator:

- Deactivate the pump and turn off the power supply
- Close the shutoff 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

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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 25 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 % • 30...100 %	• linear • equal percentage; $n_{gl} = 3$ to VDI / VDE 2173
	Leakage rate	0...0.02 % of $k_{vs}$ value to DIN EN 1349	
	Permissible media: water	cooling water, chilled water, low temperature hot water, high temperature hot water, water with anti-freeze; recommendation: water treatment to VDI 2035	
	brine		
	steam	saturated steam, super-heated steam; dryness at inlet minimum 0.98	
	heat transfer oils	(use only valves with suffix A or M)	
	Medium temperature <sup>1)</sup>	max. 150 °C (180 °C)	
	water, brine <sup>2)</sup>	-20...150 °C (180 °C)	
	saturated steam	≤ 180 °C ≤ 600 kPa (6 bar)	
	super-heated steam	≤ 180 °C ≤ 600 kPa (6 bar)	
		permissible temperature and pressure range according to the diagram on page 7	
	heat transfer oils	≤ 180 °C (use only valves with suffix A or M)	
Industry standards	Rangeability $S_v$	DN 15: 50...100 DN 25...40: 100...200	
	Nominal stroke	20 mm	
	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)	
Materials	Valve body	nodular cast iron EN-GJS-400-18-LT	
	Stem	stainless steel	
	Plug, seat	stainless steel	
	Sealing gland <sup>3)</sup>	standard version:	brass, silicon-free
		special version:	stainless steel
	Gland materials <sup>3)</sup>	standard version:	EPDM O-ring, silicon-free
Dimensions / Weight		VVF52...A:	PTFE sleeve
		VVF52...G:	PTFE sleeve
		VVF52...M:	PTFE sleeve, silicon-free
Dimensions / Weight	Refer to «Dimensions»		
	Flange connections	to ISO 7005	

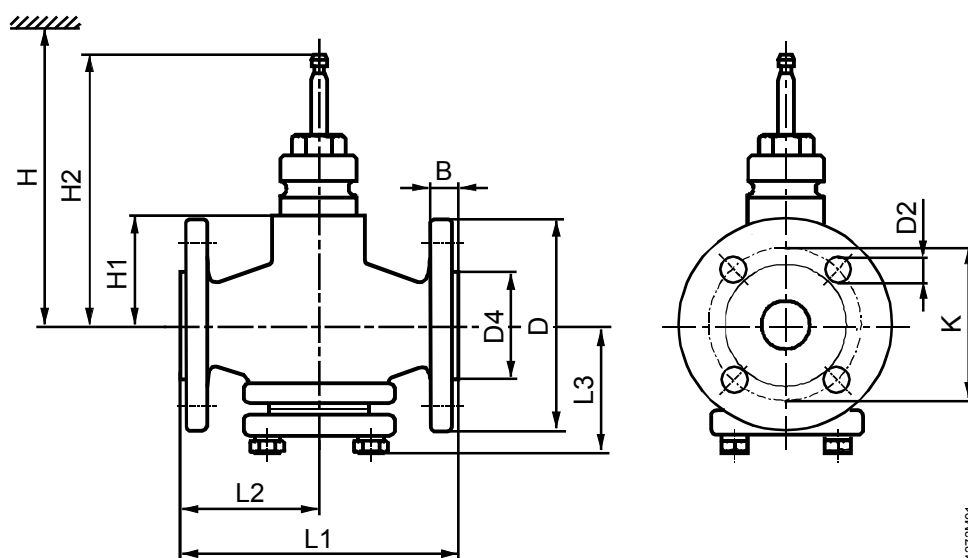
<sup>1)</sup> For 150...180 °C use special versions with type suffix A, G or M. Use electrohydraulic SKB... actuators.

<sup>2)</sup> Electric stem heating element ASZ6.5 required for media below 0 °C.

<sup>3)</sup> Silicon-free version to 180 °C with type suffix M.

## Dimensions

Dimensions in mm



4373M01

DN	B	D Ø	D2 Ø	D4 Ø	K	L1	L2	L3	H1	H2	H			kg [kg]
											SQX...	SKD...	SKB...	
15	16	95	14 (4x)	46	65	130	65	69	64	160.5	> 489	> 564	> 639	4.3
25	18	115		65	85	160	80	73						5.8
40	20	150	19 (4x)	84	110	200	100	97.5	57	153.5	> 482	> 557		8.9

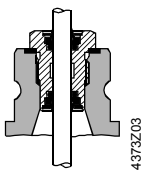
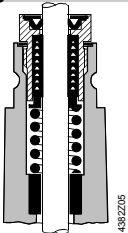
DN = Nominal size

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 valve stem is fully extended

## Order numbers for spare parts

	Sealing gland			Set
				Plug with stem, circlip, sealing
Valve	VVF52...	VVF52...A, VVF52...G	VVF52...M	VVF52..., VVF52...G, VVF52...M, VVF52...A
VVF52.15-0.16	4 284 8806 0	4 284 8829 0	4 284 9538 0	For these valves a plug replacement is not possible
VVF52.15-0.2	4 284 8806 0	4 284 8829 0	4 284 9538 0	
VVF52.15-0.25	4 284 8806 0	4 284 8829 0	4 284 9538 0	
VVF52.15-0.32	4 284 8806 0	4 284 8829 0	4 284 9538 0	
VVF52.15-0.4	4 284 8806 0	4 284 8829 0	4 284 9538 0	
VVF52.15-0.5	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0142 0
VVF52.15-0.63	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0143 0
VVF52.15-0.8	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0144 0
VVF52.15-1	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0145 0
VVF52.15-1.25	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0146 0
VVF52.15-1.6	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0147 0
VVF52.15-2	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0148 0
VVF52.15-2.5	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0149 0
VVF52.15-3.2	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0150 0
VVF52.15-4	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0151 0
VVF52.25-5	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0133 0
VVF52.25-6.3	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0138 0
VVF52.25-8	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0134 0
VVF52.25-10	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0139 0
VVF52.40-12.5	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0117 0
VVF52.40-16	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0131 0
VVF52.40-20	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0118 0
VVF52.40-25	4 284 8806 0	4 284 8829 0	4 284 9538 0	74 676 0132 0