SIEMENS

4463

Acvatix™

3-port seat valves with externally threaded connection, PN 16

VXG41..

- Bronze CuSn5Zn5Pb2 valve body
- DN 15…50
- k_{vs} 1.6…40 m^3/h
- Flat sealing connections with external thread G…B to ISO 228-1
- Sets of ALG..3 threaded fittings with threaded connection available from Siemens
- Can be equipped with SAX.. electromotoric or SKD.. and SKB.. electrohydraulic actuators
- VXG41..01 3-port seat valves are DVGW tested

Use

For use in heating, ventilating and air conditioning systems as a control valve for mixing and diverting functions. For closed and open circuits (mind «cavitation» on page 5).
VXG41..01 Three-port seat valves for distribution or supply of cold water to storage or heat exchanger for hot water treatment in the drinking water installation.

Type summary

Type / stock no.		DN	k_{vs} [m^3/h]	S_v
	VXG41.1301 [1]	15	1,6	> 50
	VXG41.1401 [1]		2,5	
VXG41.15	**VXG41.1501** [1]		4,0	
VXG41.20	**VXG41.2001** [1]	20	6,3	> 100
VXG41.25	**VXG41.2501** [1]	25	10	
VXG41.32	**VXG41.3201** [1]	32	16	
VXG41.40	**VXG41.4001** [1]	40	25	
VXG41.50	**VXG41.5001** [1]	50	40	

[1] These types, as a standard, are equipped with a tight bypass. DVGW verified, DVGW applications according to drinking water regulation 2001. For medium temperatures up to 90 °C

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	Stock No.	Description
ALG..3 [1]	**ALG..3**	Set of 3 threaded fittings for 3-port valves, consisting of - 3 union nuts, 3 discs and 3 flat seals ALG..3B are brass fittings, for media temperatures up to 100 °C.
ALG..3B [1]	**S55846-Z1..**	
ASZ6.6	**S55845-Z108**	Electric stem heating element, AC 24 V 30 W, required for media below 0 °C

[1] Applications requiring union fittings with DVGW approval must be delivered by thirds.

Order

When ordering please give type, stock no., designation and quantity.

Example:

Type	Stock no.	Designation	Quantity
VXG41.2501	VXG41.2501	Valve	2
ALG253B	S55846-Z105	Set of threaded fittings	2

Delivery

Valves, actuators and accessories are packed and supplied separately.

Spare parts, rev. no.

See overview, page 10.

Equipment combinations

Valves		Actuators						Fitting sets		
		SAX.. [4]		SKD.. [1]		SKB..		Malleable cast iron	Brass [5]	
		Mixing	Diverting	Mixing	Diverting	Mixing	Diverting			
		Δp_{max}						Type / stock no.	Type	Stock no.
	VXG41.1301 [3]	800	200 [2]	800	200 [2]	800	200 [2]	ALG153	ALG153B	S55846-Z101
	VXG41.1401 [3]									
VXG41.15	**VXG41.1501**									
VXG41.20	**VXG41.2001**							ALG203	ALG203B	S55846-Z103
VXG41.25	**VXG41.2501**							ALG253	ALG253B	S55846-Z105
VXG41.32	**VXG41.3201**							ALG323	ALG323B	S55846-Z107
VXG41.40	**VXG41.4001**	525	150 [2]	775	150 [2]		150 [2]	ALG403	ALG403B	S55846-Z109
VXG41.50	**VXG41.5001**	300	100 [2]	450	100 [2]		100 [2]	ALG503	ALG503B	S55846-Z111

[1] Usable up to maximum medium temperature of 150 °C
[2] If noise is permitted, the same values apply as for the mixing valve.
[3] Use the valves in conjunction with actuators SKD.. or SKB.. to ensure compliance with the bypass leakage rate.
[4] Series G / H: Usable up to maximum medium temperature of 130 °C
[5] Usable up to maximum medium temperature of 100 °C

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

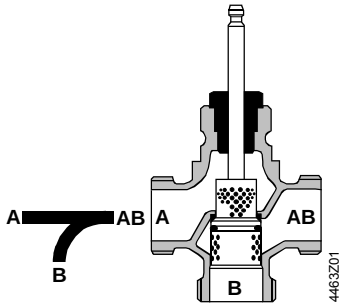
Actuator overview

Type	Actuator type	Operating voltage	Positioning signal	Spring return	Positioning time	Positioning force	Data sheet
SAX31.00	Electro-motoric	AC 230 V	3-position	No	120 s	800 N	N4501
SAX31.03					30 s		
SAX81.00		AC/DC 24 V			120 s		
SAX81.03					30 s		
SAX61.03			DC 0…10 V [1]				
SKD32.50	Electro-hydraulic	AC 230 V	3- position	No	120 s	1000 N	N4563
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		
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			
SKB62..				Yes			

Actuators SAX81.. and SAX61.. are UL listed
[1] or DC 4…20 mA or 0…1000 Ω

Technical design / mechanical design

Valve cross section

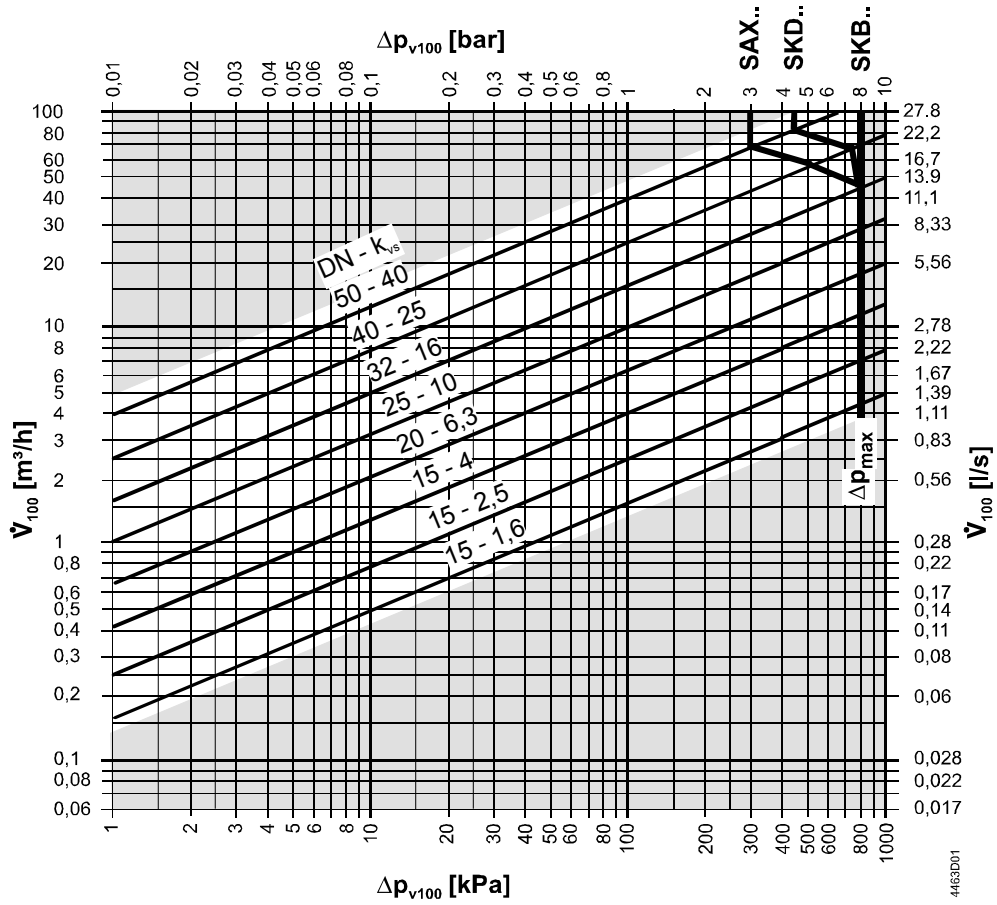


Guided perforated plug which is integrated in the valve stem.

A pressed-in stainless steel seat ring is used as seat A – AB.

Sizing

Flow diagram «Mixing»



Δp_{max} = Maximum permissible differential pressure across the valve (mixing: port A - AB, B - AB), valid for the entire actuating range of the motorized valve

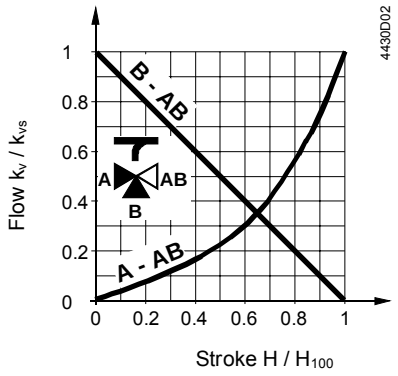
Δp_{v100} = Differential pressure across the fully open valve and the valve's control path A – AB, B - AB by a volume flow V_{100}

$\dot{V}_{100}$ = Volume 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



Throughport

0 ...30 %: linear

30 ...100 %: equal-percentage n_{gl} = 3 to VDI / VDE 2173

Bypass

0...100 %: linear

Mixing: flow from port A and port B to port AB

Diverting: flow from port AB to port A and port B

Port I = constant flow

Port II = variable flow

Port III = bypass (variable flow)

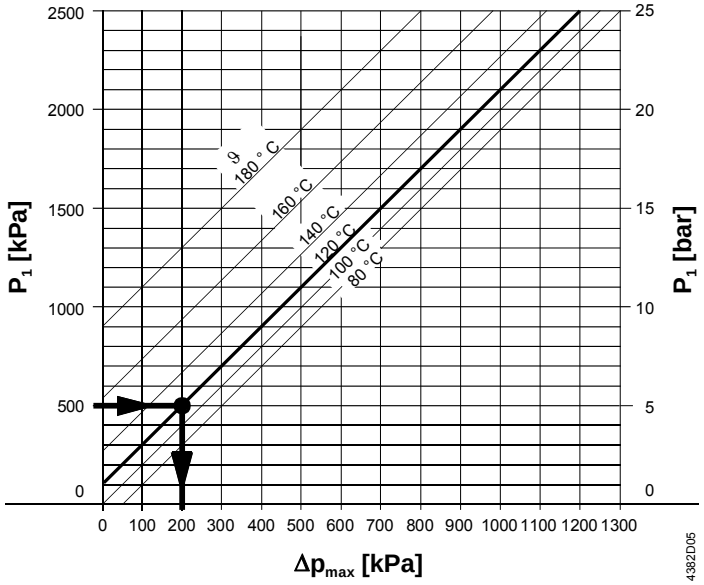
Use the 3-port valve primarily as a mixing valve.

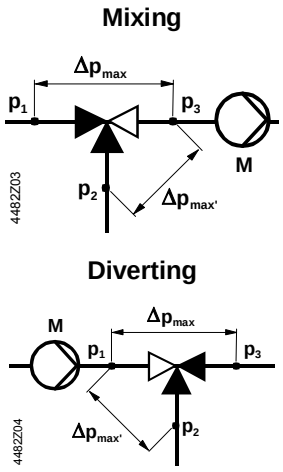
Cavitation

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 4, 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

…' Situation for bypass

p_1 = Static pressure at inlet

p_2 = Static pressure at outlet

M = Pump

ϑ = Water temperature

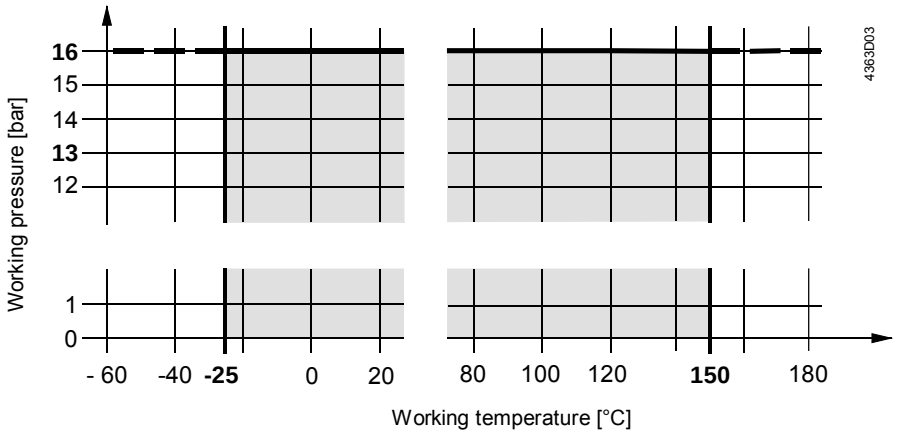
High temperature hot water example:

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 temperature



Working pressure and medium temperature staged as per ISO 7005

Current local legislation must be observed.

Notes

Engineering

⚠ In open circuits, there is a risk of valve plug seizing caused by scale deposits. Thus, use only the most powerful actuator SKB.. for these applications. Additionally, periodic actuation (twice or three times per week) must be planned.
With closed and open circuits always use a strainer upstream of the valve to increase the valve's functional safety.

Ensure cavitation-free flow, refer to page 5.

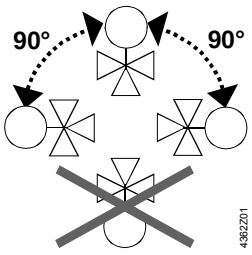
To ensure the reliability of the valve, we recommend the fitting of a strainer at the valve inlet in closed and open circuits.

⚠ For media below 0 °C, use the electric stem heating element to prevent the valve stem from freezing in the stem 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 4 319 9563 0.

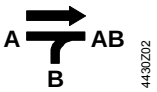
Orientation



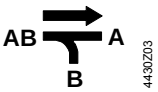
Direction of flow

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

Mixing from A / B to AB



Diverting from AB to A / B



Commissioning

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

Valve stem retracts: Throughport A – AB opens, bypass B closes
Valve stem extends: Throughport A – AB closes, bypass B opens

Maintenance

Valves are equipped with maintenance-free, continuously lubricated stem sealing glands. See page 10 for replacement stem sealing glands.

Warning ⚠

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, refer to «spare parts», page 10.
If the stem is damaged in the gland range, replace the entire valve.

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 a ecological point of view.
Current local legislation must be observed.

Warranty

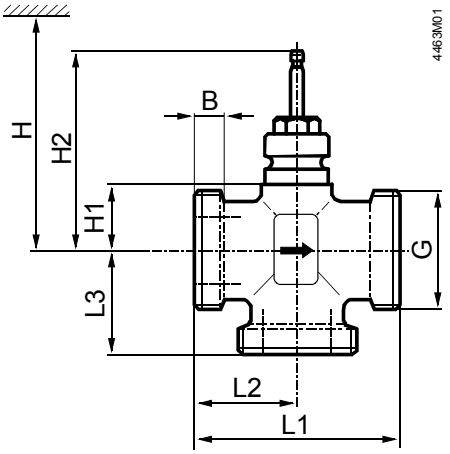
The technical data given for these applications is valid only in conjunction with the Siemens actuators as detailed under «Equipment combinations», page 3.
All terms of the warranty will be invalidated by the use of actuators from other manufacturers.

Technical data

Functional data	PN class	PN 16 to ISO 7268
	Operating pressure	to ISO 7005 within the permissible medium temperature range according to the diagram on page 6
	Flow characteristic	
	• Throughport 0…30 %	• linear
	• Throughport 30…100 %	• equal percentage; n_{gl} = 3 to VDI / VDE 2173
	• Bypass 0…100%	• linear
	Leakage rate • Throughport	0…0.02 % of k_{vs} value to DIN EN 1349
	• Bypass standard version	0.5…2% of k_{vs} value
	• Bypass VXG41..01	0…0.02% of k_{vs} value
	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
	drinking water	VXG41..01, < 90 °C
	Medium temperature [1]	-25...150 °C
	DVGW applications, VXG41..01, chilled- and low temperature hot water	max. 90 °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)
	DVGW approval No.	DW-6341BU0025
	Environmental compatibility	ISO 14001 (Environment) ISO 9001 (Quality) SN 36350 (Environmentally compatible products) RL 2002/95/EG (RoHS)
Materials	Valve body	bronze CuSn5Zn5Pb2
	Seat, plug, stem	stainless steel
	Stem sealing gland	dezincification-free brass EPDM O rings, silicon-free
Dimensions / Weight	Refer to «Dimensions»	
	External thread connections	G..B to ISO 228-1

[1] Media below 0 °C: Stem heating element required to prevent freezing of the valve stem in the stem sealing gland.
Applications requiring union fittings with DVGW approval must be delivered by thirds.

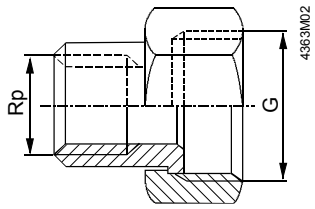
Dimensions



DN = Nominal size
H = Total actuator height plus minimum distance to the wall or the ceiling for mounting, connection, operation, service, 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

Type		DN	B	G	L1	L2	L3	H1	H2	H			kg
			[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	SAX..	SKD..	SKB..	[kg]
VXG41.1301		15	10	G1B	100	50	50	26	122.5	> 468	> 526	> 601	1.30
VXG41.1401													
VXG41.15	**VXG41.1501**												
VXG41.20	**VXG41.2001**	20		G1¼B									1.42
VXG41.25	**VXG41.2501**	25	14	G1½B	105	52.5	52.5	34	130.5	> 476	> 534	> 609	1.65
VXG41.32	**VXG41.3201**	32		G2B									2.10
VXG41.40	**VXG41.4001**	40	15	G2¼B	130	65	65	46	142.5	> 488	> 546	> 621	2.80
VXG41.50	**VXG41.5001**	50	16	G2¾B	150	75	75						3.90

Threaded fittings

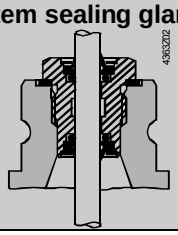


Malleable cast iron fittings	Brass fittings		for valve type	G	Rp
Type / Stock No.	**Type**	**Stock No.**		[inch]	[inch]
ALG153	**ALG153B**	**S55846-Z101**	VXG41.13…15	G 1	Rp ½
ALG203	**ALG203B**	**S55846-Z103**	VXG41.20..	G 1¼	Rp ¾
ALG253	**ALG253B**	**S55846-Z105**	VXG41.25..	G 1½	Rp 1
ALG323	**ALG323B**	**S55846-Z107**	VXG41.32..	G 2	Rp 1¼
ALG403	**ALG403B**	**S55846-Z109**	VXG41.40..	G 2¼	Rp 1½
ALG503	**ALG503B**	**S55846-Z111**	VXG41.50..	G 2¾	Rp 2

- On valve side: cylindrical thread to ISO 228-1
- On pipe side: with cylindrical thread to ISO 7-1
- For drinking water applications according to DVGW drinking water regulation 2001 threaded fittings must be obtained from local dealer.
- ALG..B for media temperatures up to 100 °C
- Applications requiring union fittings with DVGW approval must be delivered by thirds.

Spare parts

Order numbers for spare parts

Type	DN	Stem sealing gland 
VXG41.1301	15	74 284 0047 0
VXG41.1401	15	74 284 0047 0
VXG41.15	15	4 284 8874 0
VXG41.1501	15	74 284 0047 0
VXG41.20	20	4 284 8874 0
VXG41.2001	20	74 284 0047 0
VXG41.25	25	4 284 8874 0
VXG41.2501	25	74 284 0047 0
VXG41.32	32	4 284 8874 0
VXG41.3201	32	74 284 0047 0
VXG41.40	40	4 284 8874 0
VXG41.4001	40	74 284 0047 0
VXG41.50	50	4 284 8874 0
VXG41.5001	50	74 284 0047 0

Revision numbers

Type	Valid from rev. no.	Type	Valid from rev. no.	Type	Valid from rev. no.
VXG41.1301	..B	**VXG41.2001**	..B	**VXG41.40**	..A
VXG41.1401	..B	**VXG41.25**	..A	**VXG41.4001**	..B
VXG41.15	..A	**VXG41.2501**	..B	**VXG41.50**	..A
VXG41.1501	..B	**VXG41.32**	..A	**VXG41.5001**	..B
VXG41.20	..A	**VXG41.3201**	..B		

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Siemens Switzerland Ltd
Building Technologies Division
International Headquarters
Gubelstrasse 22
6301 Zug
Switzerland
Tel. +41 41-724 24 24
www.siemens.com/buildingtechnologies

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