



More
warranty
for you!



VALVES AND ACTUATORS

Do it right: **Acvatix**

Fast and easy planning, installation and commissioning
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SIEMENS



The right solution for every hydronic project



New: 5-year warranty on valves and actuators, damper actuators, and sensors.

Your benefits at a glance

- Products for any hydronic requirement
 - High level of investment protection, thanks to a long life and maximum reliability
 - Support and practical tools for every project phase
 - Easy and quick planning, installation, operation and commissioning
-

With Acvatix™ you choose a versatile range of valves and actuators for superior ease of use, maximum control accuracy and energy efficiency. All control and hydraulic requirements can be met quickly and easily with Acvatix, from the generation of heating and cooling to energy distribution and use. Siemens provides useful tools and extensive knowledge to assist you in every project phase.

Acvatix valves and actuators are improved continually based on Siemens' many years of experience in the field and rigorous testing in the in-house HVAC laboratory. For you, that means the highest quality and maximum reliability.

Your needs and requirements are the focus of our product development. We analyze not only the individual product, but also the entire HVAC system and the working processes behind it. This enables us to always remain one step ahead, while you benefit from optimally coordinated products that make your work easier from planning to service.

Acvatix hydronics.

Efficient all down the line



Product selection and engineering made easy

Tools from Siemens – such as the HIT Portal, the Acvatix slide ruler and the "Combi Valve Sizer" app – allow you to quickly find the right products. You can use the HIT Portal to design the entire HVAC application step by step while also accessing the specifications directly, complete with plant diagrams and lists of materials.



Installation in a few simple steps

Acvatix speeds up and simplifies installation thanks, for example, to color- and number-coded cables or a valve actuator coupling with just one screw or bayonet mount. If you lose the instructions for a product, simply use the "Scan to HIT" app from Siemens to scan the data matrix code on the product and receive complete product information.



Fast commissioning and optimized plant operation

Acvatix offers rapid commissioning and efficient plant control. Easy-to-see operating status and position indicators speed up commissioning, testing and maintenance of the plant and also help with any troubleshooting. Acvatix also features a robust design, outstanding reliability and minimal need for maintenance. Innovative products such as Intelligent Valves and PICVs save time and effort through automatic hydronic balancing – while also ensuring enhanced comfort and high energy efficiency. In addition, Intelligent Valves facilitate work through commissioning via WLAN with the "ABT Go" app or via cloud connection.



Understanding the language of buildings

Building Information Modeling (BIM) enables a significant productivity increase in the construction industry. BIM is a digitally supported process that changes the way we plan, build and operate buildings. Siemens provides a powerful, easy-to-use CAD browser that delivers BIM-compliant data that directly integrates into your BIM process, while also supporting more traditional CAD design workflows. Benefit from an easy transition to the future of construction with well over 4,000 products across all our global portfolio offerings:

[siemens.com/bim](https://www.siemens.com/bim)

Combi Valve Sizer/PICV app

App for easily selecting and sizing Acvatix PICVs and actuators. The app also calculates the maximum volumetric flow and presetting, checks the commissioning settings and provides access to all data sheets.



ABT Go

The mobile tool for commissioning and maintenance tasks of Siemens devices used in building automation and control systems e.g. the Intelligent Valves. Also suitable for fast and easy testing incl. test reports.



The right valve for every operating range

Valves are used in all parts of HVAC systems. We help you to find exactly the right valves for your application and for the particular purpose intended.



Intelligent Valves

Makes it a snap!

Intelligent Valves are self-optimizing dynamic valves with cloud connection used in heating groups and air handling units. They optimize consumption, increase energy efficiency and reduce operating costs.



PICVs

Hydronics made easy

PICVs (pressure-independent control valves) prevent the oversupply of consumers, as well as reciprocal hydronic interference. They reduce energy consumption and thus energy costs. Precise temperature control also improves the comfort and well-being of building users.



Globe valves

Plan and install in record time

Globe valves are used for flow shutoff, flow regulation or fluids mixing in a wide variety of applications. They are used in the majority of HVAC applications – whether in energy generation, distribution or consumption.



Control ball valves

An excellent choice for your business

Control ball valves are used in closed circuits. They are highly efficient thanks to continuous and precise control and leak-free operation.



Magnetic valves

Solid conditions through accurate control

Magnetic valves have a preinstalled magnetic actuator and are used for controlling and mixing fluids (water, water with antifreeze, heat transfer fluid, etc.) and steam in nearly all HVAC applications.



Rotary valves

Close off and mix reliably

Rotary valves are primarily used in energy generation and distribution. Typical applications are if an additional boiler needs to be connected, or for the switching over of storage tank charging.

	Energy consumption	Energy distribution	Energy generation
Intelligent Valves	–	Heating groups, air handling units	–
PICVs	Radiators, chilled ceilings, VAV, fan coil units, zone control	Heating groups, air handling units	District heating
Globe valves	Floor heating , radiators, chilled ceilings, VAV, fan coil units, zone control	Domestic hot water, heating groups , air handling units	District heating, boiler plants, chiller plants
Control ball valves	Chilled ceilings, heated and chilled ceilings , VAV, fan coil units, zone control	Domestic hot water, heating groups, air handling units	–
Magnetic valves	–	Domestic hot water , heating groups, air handling units	District heating, boiler plants, chiller plants
Rotary valves	–	Domestic hot water, heating groups	Boiler plants, chiller plants, cooling towers

Note the blue-highlighted recommendations from Siemens for maximum performance in every area of application.

Do it right:

Dynamic hydronic balancing

Experience the comfort of the right amount of energy in the right place at the right time. Enjoy the benefits of a perfectly balanced hydraulic system with our new 6-port PICVs.



Highlights:

- A constantly balanced system thanks to a fast reaction to fluctuations in pressure
- High control accuracy and perfect comfort thanks to a large control angle of 40° for both heating and cooling and the new actuator with high resolution
- Reduce pump's energy consumption thanks to high flow rates with minimal differential pressure
- No mixing of cooling and heating water thanks to a true close-off
- Protection against overpressures with an internal pressure equalization function
- Also available with Modbus actuator
- Fool-proof valve selection without complex pressure drop and valve authority calculations
- Only one data point to cost optimize your solution
- Error-free, time-saving installation without tools using the Siemens bayonet mount
- Protect your investment with a 5-year warranty

In combination with RDG thermostats from Siemens you get even more benefits:

- Time and cost savings through faster planning, installation and commissioning
- Drastic reduction of commissioning time on site

Enter the desired flow rates with the Siemens PCT-Go app on the RDG thermostat and send it via NFC technology to the PICV. Thermostat and PICV actuator automatically adjust the position.

Thanks to NFC, the thermostat can be easily programmed in the package without the need for a power supply.



More on
hydronic
balancing



Benefits of dynamic hydronic balancing with PICVs



- No need for complex hydronic calculations
- Fast and easy product selection
- Fewer components, less installation effort
- Effortless commissioning
- Automatic dynamic hydronic balancing
- High comfort
- Energy savings of up to 37 percent

										Recommended media									
		2-port valve	3-port valve	6-port valve	PN class	Type of connection	Silicone-free grease	Closed circuits	Open circuits	Permissible medium temperature [°C]	Chilled water	Cooling water ¹⁾	Drinking water	Low-temperature hot water	High-temperature hot water	Water glycol mixture	Saturated steam	Superheated steam	Heat transfer oil on basis of mineral oil
Int. Valves	EVG..	■			16	ET		■		1...120	■			■		■ ⁴⁾			
	EXG..		■		16	ET		■		1...120	■			■		■ ⁴⁾			
	EVF..	■			16	F		■		1...120	■			■		■ ⁴⁾			
	EXF..		■		16	F		■		1...120	■			■		■ ⁴⁾			
PICVs	VPD../VPE../VPU..	■			10	ET		■		2...95	■			■					
	VQI46../VQP46..	■			25	ET/IT		■		1...90	■			■					
	VPI46../VPP46..	■			25	ET/IT		■		1...120	■			■					
	VWPG51...			■	25	ET		■		0...90	■			■					
	VPF43../VPF44..	■			16	F	■	■		1...120	■			■					
	VPF53../VPF54..	■			25	F	■	■		1...120	■			■					
Globe valves	VDN../VEN../VUN..	■			10	ET		■		1...120	■			■					
	VD1..CLC	■			10	ET		■		1...110	■			■					
	VVP45..	■			16	ET		■		1...110	■			■					
	VXP45..		■		16	ET		■		1...110	■			■					
	VMP45..		■		16	ET		■		1...110	■			■					
	VVP47..	■			16	ET		■		1...110	■			■					
	VXP47..		■		16	ET		■		1...110	■			■					
	VMP47..		■		16	ET		■		1...110	■			■					
	VVG41..	■			16	ET	■	■	■	-25...150	■	■		■	■	■	■	■	■
	VXG41..		■		16	ET	■	■	■	-25...150	■	■		■	■	■			
	VXG41..01 ⁵⁾		■		16	ET	■	■	■	-25...150	■	■	■	■	■	■			
	VVG44..	■			16	ET	■	■		1...120	■			■					
	VXG44..		■		16	ET	■	■		1...120	■			■					
	VVG549..	■			25	ET		■		1...130	■	■		■	■	■			
	VVI46../J2	■			16	IT		■		1...110	■			■					
	VXI46../J2		■		16	IT		■		1...110	■			■					
	VVF22..	■			6	F	■	■		-10...130	■			■	■	■			
	VXF22..		■		6	F	■	■		-10...130	■			■	■	■			
	VVF32..	■			10	F	■	■		-10...150	■			■	■	■			
	VXF32..		■		10	F	■	■		-10...150	■			■	■	■			
	VVF42..	■			16	F	■	■		-10...150	■			■	■	■			
	VXF42..		■		16	F	■	■		-10...150	■			■	■	■			
	VVF43..	■			16	F	■	■	■	-20...220	■	■		■	■	■		■	■
	VXF43..		■		16	F	■	■	■	-20...220	■	■		■	■	■		■	■
VVF53..	■			25	F	■	■	■	-20...220	■	■		■	■	■		■	■	
VXF53..		■		25	F	■	■	■	-20...220	■	■		■	■	■		■	■	
VVF63..	■			40	F	■	■	■	-25...220	■	■		■	■	■		■	■	
VXF63..		■		40	F	■	■	■	-25...220	■	■		■	■	■		■	■	
Control ball valves	VAG61..	■			40	ET		■		-10...120	■			■					
	VBG61..		■		40	ET		■		-10...120	■			■					
	VAI61..	■			40	IT		■		-10...120	■			■					
	VBI61..		■		40	IT		■		-10...120	■			■					
	VWG41../VWG42..				16	ET/IT	■	■		1...90	■			■					
Magnetic valves	MXG461..	■	■		16	ET		■		1...130	■			■					
	MXG461..P	■	■		16	ET		■		1...130									■
	MXG461B..	■	■		16	ET		■	■	-20...130	■	■	■	■					
	MXG461S..	■	■		16	ET		■	■	1...130	■	■		■					
	MXG462S..	■	■		16	ET		■	■	-20...130	■	■		■					
	MXF461..	■	■		16	F		■		1...130	■			■					
	MXF461..P	■	■		16	F		■		1...130	■			■					■
	M3P..FY	■	■		16	F		■		1...120	■			■					
M3P..FYP	■	■		16	F		■		1...120	■			■					■	
MVF461H..	■	■		16	F		■		1...180	■			■				■	■	
Rotary valves	VBF21..		■		6	F		■		1...120				■	■				
	VFW41..	■			16	F		■		-20...120	■			■	■				
	VFL41..	■			16	F		■	■	-20...120	■	■		■					
	VAG60..	■			40	ET		■		-20...120	■			■	■				
	VBG60..		■		40	ET		■		-10...120	■			■	■				
	VAI60..	■			40	IT		■		-10...120	■			■	■				
	VBI60..		■		40	IT		■		-10...120	■			■	■				
Refrigerant valves	M2FP03GX				32	-		■		-40...100									
	M3FK..LX..		■		32	S		■		-40...120									
	M3FB..LX..		■		PS 43	S		■		-40...120									
	MVL661..	■			PS 45	S		■		-40...120									
	MVS661..N	■			63	W/S		■		-40...120									

Recommendation: water treatment according to VDI 2035

¹⁾ Open circuits; ²⁾ Not for drinking water circuit (open circuit); ³⁾ Variable air volume; ⁴⁾ Ethylene glycol-based anti-freezes (DN25 excepted);

⁵⁾ Sealed bypass; ⁶⁾ As zone valve for floor heating systems;

IT = internally threaded connection, ET = externally threaded connection, F = flanged connection, S = soldered connection, W = welded connection

			Generation				Distribution			Consumption / Use								
Media containing mineral oils	Refrigerants	Refrigerants (ammonia)	District heating	Boiler plants	Chiller plants	Cooling towers ¹⁾	Domestic hot water ²⁾	Heating groups	Air handling units	Floor heating	Radiators	Chilled ceilings	Heated and chilled ceilings	VAV ³⁾	Fan coil units	Zone control		
								■	■								EVG..	Int. Valves
								■	■								EXG..	
								■	■								EVF..	
								■	■								EXF..	
											■	■		■	■	■	VPD../VPE../VPU..	PICVs
									■ ⁶⁾		■			■	■	■	VQI46../VQP46..	
									■ ⁶⁾		■			■	■	■	VPI46../VPP46..	
			■					■	■				■		■		VWPG51...	Globe valves
			■					■	■								VPF43../VPF44..	
																	VPF53../VPF54..	
																	VDN../VEN../VUN..	
			■	■			■	■	■	■				■	■	■	VD1..CLC	
				■			■	■	■	■				■	■	■	VVP45..	
							■	■	■	■				■	■	■	VXP45..	
														■	■	■	VMP45..	
														■	■	■	VVP47..	
														■	■	■	VXP47..	
														■	■	■	VMP47..	
			■	■	■		■	■	■								VVG41..	
				■	■		■	■	■								VXG41..	
				■	■		■	■	■								VXG41..01 ⁵⁾	
				■	■		■	■	■								VVG44..	
				■	■		■	■	■								VXG44..	
										■				■	■	■	VVG549..	
										■		■		■	■	■	VVI46../J2	
										■		■		■	■	■	VXI46../J2	
				■	■		■	■	■								VVF22..	
				■	■		■	■	■								VXF22..	
				■	■		■	■	■								VVF32..	
				■	■		■	■	■								VXF32..	
				■	■		■	■	■								VVF42..	
				■	■		■	■	■								VXF42..	
				■	■		■	■	■								VVF43..	
				■	■		■	■	■								VXF43..	
				■	■		■	■	■								VVF53..	
				■	■		■	■	■								VXF53..	
				■	■		■	■	■								VVF63..	
				■	■		■	■	■								VXF63..	
							■	■	■					■	■	■	VAG61..	
							■	■	■					■	■	■	VBG61..	
							■	■	■					■	■	■	VAI61..	
							■	■	■					■	■	■	VBI61..	
													■				VWG41../VWG42..	
■					■		■	■	■								MXG461..	
							■	■	■								MXG461..P	
							■	■	■								MXG461B..	
							■	■	■								MXG461S..	
							■	■	■								MXG462S..	
							■	■	■								MXF461..	
■							■	■	■								MXF461..P	
■							■	■	■								M3P..FY	
							■	■	■								M3P..FYP	
							■	■	■								MVF461H..	
																	VBF21..	
																	VFW41..	
																	VFL41..	
																	VAG60..	
																	VBG60..	
																	VAI60..	
																	VBI60..	
	■																M2FP03GX	
	■																M3FK..LX..	
	■																M3FB..LX..	
	■	■															MVL661..	
																	MVS661..N	

6-port pressure independent control ball valves

Typical applications

- Heated and chilled ceilings
- Fan coil units

Actuators

GDB..9E..6..

Data sheet

A6V12986395

5 Nm



Operating voltage	Positioning signal	Positoning time [s]	Cable	
		GDB		
AC/DC 24 V	0/2...10 V	150	0.9 m	GDB161.9E/6W
	0/2...10 V	150	0.9 m	GDB161.9E/6P
	0/2...10 V	150	3 m	GDB161.9G/6W
	0/2...10 V	150	3 m	GDB161.9G/6P
	0/2...10 V	150	5 m	GDB161.9H/6W
	0/2...10 V	150	5 m	GDB161.9H/6P
	Modbus RTU	150	0.9 m	GDB161.9E/MO6P



PN 25	0...90 °C			DN	G [Inch]	\dot{V}_{min} [l/h]	\dot{V}_{100} [l/h]	Δp_{min} [kPa]	Δp_{max} [kPa]		
Data sheet		A6V11466366									
				VWPG51.15L0.9	VWPG51.15L0.9Q	15	3/4	35	820	18	400
				VWPG51.15F1.2	VWPG51.15F1.2Q	15	3/4	210	1200	23	400
				VWPG51.20F4.3	VWPG51.20F4.3Q	20	1	460	4250	38	400

Fittings for 6-port pressure independent control ball valves



Type	Connection		Description
	Valve	Coupling	
ALN14.152B	G 3/4 "	R 1/2 "	Fittings set made of DZR brass, consisting of: - 2x cap nuts - 2x cap nuts with sleeves and insert per ISO 228-1 - 2x flat seals
ALN14.202B	G 3/4 "	R 3/4 "	
ALN15.202B/1	G 1 "	R 3/4 "	
ALN15.252B	G 1 "	R 1 "	
ALP55	G 3/4 "	G 1/2 "A	Fittings set made of DZR brass, consisting of: - 1x cap nuts - 1x P/T coupling with sleeves and insert per ISO 228-1 - 1x flat seals
ALP56	G 3/4 "	G 3/4 "A	
ALP57	G 1 "	G 3/4 "A	
ALP58	G 1 "	G 1 "A	
ALP59	VWPG51.15..	-	Spare nipple P/T port for body valve
ALP60	VWPG51.20..	-	

Flanged PICVs

Typical applications	Actuators	Data sheet	20 mm 500 N	20 / 40 mm 1100 N	40 mm 1100 N					
– District heating – Heating groups – Air handling units	SAX..P..	N4509								
	SQV91P..	N4833								
	SAV..P..	N4510								
	Operating voltage	Positioning signal	Positioning time [s]			Spring return function [s]				
AC 230 V	3-position	SAX	30	–	120	–	SAX31P03	–	SAV31P00	
		SQV	–	40/80	–	30	–	SQV91P40 ¹⁾	–	–
		SAV	–	40/80	–	30	–	SQV91P30 ²⁾	–	–
AC/DC 24 V	3-position	SAX	30	–	120	–	SAX81P03	–	SAV81P00	
		SQV	–	40/80	–	30	–	SQV91P40 ¹⁾	–	–
		SAV	–	40/80	–	30	–	SQV91P30 ²⁾	–	–
	0...10 V, 4...20 mA	SAX	30	–	120	–	SAX61P03	–	SAV61P00	
	0...10 V, 4...20 mA	SQV	–	40/80	–	30	–	SQV91P40 ¹⁾	–	–
	0...10 V, 4...20 mA	SAV	–	40/80	–	30	–	SQV91P30 ²⁾	–	–
	Modbus RTU	SAX	30	–	120	–	SAX61P03/ MO	–	SAV61P00/ MO	



PN 16	1...120 °C	DN	\dot{V}_{min} [m ³ /h]	\dot{V}_{100} [m ³ /h]	Δp_{min} [kPa]	$\Delta p_s/\Delta p_{max}$ [kPa]	$\Delta p_s/\Delta p_{max}$ [kPa]	$\Delta p_s/\Delta p_{max}$ [kPa]
Data sheet	A6V12273951							
	VPF44.50F15 ³⁾	50	3.7	14.3	25	700/600	700/600	–
	VPF44.50F25 ³⁾	50	5.7	24.6	55	700/600	700/600	–
	VPF44.65F25 ³⁾	65	4.5	24.4	32	700/600	700/600	–
	VPF44.65F35 ³⁾	65	6.4	37.7	50	700/600	700/600	–
	VPF44.80F35 ³⁾	80	6.8	35.7	22	700/600	700/600	–
	VPF44.80F45 ³⁾	80	8.5	49	40	700/600	700/600	–
	VPF44.100F70	100	12.2	69.6	33	–	700/600	700/600
	VPF44.100F90	100	14.8	90.9	75	–	700/600	700/600
	VPF44.125F110	125	15	112	30	–	600	600
	VPF44.125F135	125	18	132	45	–	600	600
	VPF44.150F150	150	19	150	30	–	600	600
	VPF44.150F200	150	26	208	50	–	600	600
	VPF43.200F210 ⁴⁾	200	95	210	32	–	600	600
	VPF43.200F280 ⁴⁾	200	130	280	78	–	600	600
PN 25	1...120 °C	DN	\dot{V}_{min} [m ³ /h]	\dot{V}_{100} [m ³ /h]	Δp_{min} [kPa]	$\Delta p_s/\Delta p_{max}$ [kPa]	$\Delta p_s/\Delta p_{max}$ [kPa]	$\Delta p_s/\Delta p_{max}$ [kPa]
Data sheet	A6V12273951							
	VPF54.50F15	50	3.7	14.3	25	700/600	700/600	–
	VPF54.50F25	50	5.7	24.6	55	700/600	700/600	–
	VPF54.65F25	65	4.5	24.4	32	700/600	700/600	–
	VPF54.65F35	65	6.4	37.7	50	700/600	700/600	–
	VPF54.80F35	80	6.8	34.7	22	700/600	700/600	–
	VPF54.80F45	80	8.5	49.9	40	700/600	700/600	–
	VPF54.100F70	100	12.2	69.6	33	–	700/600	700/600
	VPF54.100F90	100	14.8	90.9	45	–	700/600	700/600
	VPF54.125F110	125	15	112	30	–	600	600
	VPF54.125F135	125	18	132	45	–	600	600
	VPF54.150F150	150	19	150	30	–	600	600
	VPF54.150F200	150	26	208	50	–	600	600
	VPF53.200F210 ⁴⁾	200	95	210	32	–	600	600
	VPF53.200F280 ⁴⁾	200	130	280	78	–	600	600

¹⁾ Fail-safe function: valve closed

²⁾ Fail-safe function: valve open

³⁾ Concerns valve type from series B

⁴⁾ Max. medium temperature 110 °C

Threaded globe valves

Typical applications	Actuators	Data sheet			
- Radiators	RTN..	N2111	RTN51/RTN51G	RTN71	RTN81
			4.0 mm 100 N		2.5 mm 100 N
					
Typical applications	Actuators	Data sheet			
- Radiators	STA.. SSA..31/61.. SSA..HF SSA118..	A6V14028280 A6V11858276 A6V11858278 A6V11858280			
Operating voltage	Positioning signal	Positioning time [s]			
AC 230 V	2-position	270	STA321.40L10	-	
	3-position	67.5	-	SSA331.00	
AC 24 V	3-position	67.5	-	SSA131.00	
	0...10 V	270 ¹⁾	STA161.40L10	-	
AC/DC 24 V	2-position/PDM	270	STA121.40L10	-	
	0...10 V	25	-	SSA161.05	
	4...20 mA	25	-	SSA151.05HF	
	0...10 V	25	-	SSA161.05HF	
	0...10 V	25	-	SSA161.05HF	
AC 24 V	KNX S-/LTE-Mode, KNX PL-Link	50	-	SSA118.09HKN	
Normally Open/Normally Closed (for radiator valves)			NC	-	



PN 10	1...120 °C	DIN	NF	DN	Rp/R [Inch]	k _v [m³/h]	Δp _{max} [kPa]	Δp _{max} [kPa]
Data sheet		N2105	N2106					
		VDN110	VDN210	10	Rp/R 3/8	0.09...0.63	60	60
		VDN115	VDN215	15	Rp/R 1/2	0.10...0.89	60	60
		VDN120	VDN220	20	Rp/R 3/4	0.31...1.41	60	60
		VEN110	VEN210	10	Rp/R 3/8	0.09...0.63	60	60
		VEN115	VEN215	15	Rp/R 1/2	0.10...0.89	60	60
		VEN120	VEN220	20	Rp/R 3/4	0.31...1.41	60	60
		-	VUN210	10	Rp/R 3/8	0.14...0.60	60	60
		-	VUN215	15	Rp/R 1/2	0.13...0.77	60	60

Presettings for radiator valves VEN.., VDN.., VUN..

k_v values [m³/h] at the different preadjusted positions (XP = 2K)

Control range with electromotoric and electrothermic actuators
SSA.../STA...



■ ■ ■ ■ ■ ■ ■ -

Control range with thermostatic head RTN..



■ ■ ■ ■ ■ ■ ■ ■

Reference numbers for preadjustment

	1	2	3	4	5	N	N (k _{vs})
VDN110/VDN210/VEN110/VEN210	0.072	0.17	0.24	0.28	0.37	0.43	0.63
VDN115/VDN215/VEN115/VEN215	0.07	0.17	0.28	0.36	0.45	0.50	0.89
VDN120/VDN220/VEN120/VEN220	0.22	0.35	0.44	0.52	0.60	0.71	1.41
VUN210	0.14	0.26	0.34	0.39	0.40	0.43	0.60
VUN215	0.13	0.22	0.30	0.39	0.45	0.50	0.77

Threaded globe valves

Typical applications	Actuators	Data sheet			
- Chilled ceilings	STA.. SSA..31/61.. SSA..HF SSA118..	A6V14028280 A6V11858276 A6V11858278 A6V11858280	4.0 mm 100 N		2.5 mm 100 N
					
Operating voltage	Positioning signal	Positioning time [s]			
AC 230 V	2-position	270	STA321.40L10	-	
	3-position	67.5	-	SSA331.00	
AC 24 V	3-position	67.5	-	SSA131.00	
	0...10 V	270 ¹⁾	STA161.40L10	-	
AC/DC 24 V	2-position/PDM	270	STA121.40L10	-	
	0...10 V	25	-	SSA161.05	
	4...20 mA	25	-	SSA151.05HF	
	0...10 V	25	-	SSA161.05HF	
	0...10 V	25	-	SSA161E.05HF	
AC 24 V	KNX S-/LTE-Mode, KNX PL-Link	50	-	SSA118.09HKN	
Normally Open/Normally Closed (for radiator valves)			NC	-	



PN 10	1...110 °C	DIN	Rp/R [Inch]	k _v [l/h]	Δp _{max} [kPa]	Δp _{max} [kPa]
Data sheet		N2103				
		VD115CLC	15	Rp/R 1/2	0.25...1.9	150
		VD120CLC	20	Rp/R 3/4	0.25...2.6	150
		VD125CLC	25	Rp/R 1	0.25...2.6	150

¹⁾ In control mode (warm-up time) min. running time approx. 30 s/mm

k_v = nominal flow rate of cold water (5...30 °C) through the valve at the respective stroke and a differential pressure of 100 kPa (1 bar)
The selected k_v values of the radiator valves can be easily and precisely set on the valve head in 5 steps + N (fully open).

Threaded globe valves

Typical applications		Actuators	Data sheet				5.5 mm			
<ul style="list-style-type: none"> – Floor heating – Chilled ceilings – VAV – Fan coil units – Zone control 		SSB..	N4891, A6V12681511							
		Operating voltage	Positioning signal	Positioning time [s]	Auxiliary switch					
		AC 230 V	3-position	150	✓	SSB31		SSB31.1		
		AC 24 V	3-position	150	✓	SSB81		SSB81.1		
		AC/DC 24 V	0...10 V	27.5	–	SSB161.05HF		–		
			0...10 V	27.5	–	SSB161.05UT		–		
PN 16	1...110 °C		DN	G [Inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	
Data sheet	N4845									
			VVP45.10-.. ¹⁾	10	G ½B	0.25 / 0.4 / 0.63 / 1 / 1.6	725	400	725	400
			VVP45.15-2.5	15	G ¾B	2.5	350	350	350	350
			VVP45.20-4	20	G 1B	4	350	350	350	350
			VVP45.25-6.3	25	G 1¼B	6.3	300	300	300	300
			VXP45.10-..	10	G ½B	0.25 / 0.4 / 0.63 / 1 / 1.6	–	400	–	400
			VXP45.15-2.5	15	G ¾B	2.5	–	350	–	350
			VXP45.20-4	20	G 1B	4	–	350	–	350
			VXP45.25-6.3	25	G 1¼B	6.3	–	300	–	300
			VMP45.10-..	10	G ½B	0.25 / 0.4 / 0.63 / 1	–	400	–	400
			VMP45.10-1.6	10	G ½B	1.6	–	400	–	400
			VMP45.15-2.5	15	G ¾B	2.5	–	350	–	350
			VMP45.20-4	20	G 1B	4	–	350	–	350
Typical applications		Actuators	Data sheet				6.5 mm		2.5 mm	
<ul style="list-style-type: none"> – Chilled ceilings – VAV – Fan coil units 		STP.. SFP.. SSP..., SSF..	A6V14028280 N4865 N4864, A6V12681511						  	
		Operating voltage	Positioning signal	Positioning time [s]	Spring return function [s]					
		AC 230 V	2-position	270	–	STP321.65L10		–		
			2-position	10	30...50	–		SFP21/18		
			3-position	150	–	–		SSP31		
		AC 24 V	2-position	10	30...50	–		SFP71/18		
			3-position	43	–	–		SSP81.04		
			3-position	150	–	–		SSP81		
			0...10 V	270 ²⁾	–	STP161.65L10		–		
		AC/DC 24 V	2-position/PDM	270	–	STP121.65L10		–		
			0...10 V	12.5	–	–		SSF161.05HF		
PN 16	1...110 °C		DN	G [Inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	
Data sheet	N4847									
			VVP47.10-.. ¹⁾	10	G ½B	0.25 / 0.4	700	400	1000	400
			VVP47.10-..	10	G ½B	0.63 / 1	250	250	500	400
			VVP47.10-1.6	10	G ½B	1.6	150	150	300	300
			VVP47.15-2.5	15	G ¾B	2.5	150	150	300	300
			VVP47.20-4	20	G 1B	4	100	100	175	175
			VXP47.10-..	10	G ½B	0.25 / 0.4	–	400	–	400
			VXP47.10-..	10	G ½B	0.63 / 1	–	250	–	400
			VXP47.10-1.6	10	G ½B	1.6	–	150	–	300
			VXP47.15-2.5	15	G ¾B	2.5	–	150	–	300
			VXP47.20-4	20	G 1B	4	–	100	–	175
			VMP47.10-..	10	G ½B	0.25 / 0.4	–	400	–	400
			VMP47.10-..	10	G ½B	0.63 / 1	–	250	–	400
			VMP47.10-1.6	10	G ½B	1.6	–	150	–	300
			VMP47.15-2.5	15	G ¾B	2.5	–	150	–	300

Union nuts for threaded valves

Union nuts for threaded valves See page 15

VVP45..N with Serto compression fittings, $k_{vs} = 2.5 / 4 / 6.3 \text{ m}^3/\text{h}$
VVP45..S, VMP45..S with Conex® compression fittings, $k_{vs} = 0.63 / 1 / 1.6 / 2.5 \text{ m}^3/\text{h}$
VVP47..S, VMP47..S with Conex® compression fittings, $k_{vs} = 0.63 / 1 / 1.6 / 2.5 \text{ m}^3/\text{h}$

¹⁾ .. = k_{vs} value

²⁾ In control mode (warm-up time) min. running time approx. 30 s/mm

Threaded globe valves

Typical applications	Actuators	Data sheet	2.5 mm		4.5 mm		2,5 mm					
			200 N	170 N	100 N	160 N						
– Floor heating – Fan coil units – Zone control	SFA..	N4863										
	SUA21/3	A6V10446174										
	STA..	A6V14028280										
	SSA31.04 ¹⁾	N4860										
Operating voltage	Positioning signal	Positioning time [s]	Spring return function [s]									
AC 230 V	2-position	10	30...50	SFA21/18	–	–	–	–				
	2-position	270	–	–	–	STA321.65L10	–	–				
	2-position/SPST ²⁾	10	–	–	SUA21/3	–	–	–				
	3-position/SPDT ²⁾	43	–	–	–	–	SSA31.04	–				
AC 24 V	2-position	10	30...50	SFA71/18	–	–	–	–				
	0...10 V	270 ³⁾	–	–	–	–	STA161.65L10	–				
AC/DC 24 V	2-position/PDM	270	–	–	–	STA121.65L10	–	–				
PN 16	1...110 °C											
Data sheet	A6V10421629	DN	Rp [Inch]	k _{vs} [m ³ /h]	Δp _s [kPa]	Δp _{max} [kPa]	Δp _s [kPa]	Δp _{max} [kPa]	Δp _s [kPa]	Δp _{max} [kPa]	Δp _s [kPa]	Δp _{max} [kPa]
	VVI46.15/2	15	Rp ½	2	300	300	400	400	200	200	300	300
	VVI46.20/2	20	Rp ¾	3.5	300	300	400	400	200	200	300	300
	VVI46.25/2	25	Rp 1	5	250	250	250	250	150	150	230	230
	VXI46.15/2 ⁴⁾	15	Rp ½	2	–	300	–	400	–	200	–	300
	VXI46.20/2 ⁴⁾	20	Rp ¾	3.5	–	300	–	400	–	200	–	300
	VXI46.25/2 ⁴⁾	25	Rp 1	5	–	250	–	250	–	150	–	230
	VXI46.25T/2	25	Rp 1	5	–	200	–	200	–	140	–	–

Thermal actuators and available cable lengths

For Actuators	PVC Cabel (Type)				Halogenfree Cabel (Type)		
	Cabel length				Cabel length		
	1 m	2 m	5 m	10 m	1 m	5 m	10 m
STA121.65/00							
STA321.65/00							
STP121.65/00	ASY21L10	ASY21L20	ASY21L50	ASY21L100	ASY21L10	ASY21L50	ASY21L100
STP321.65/00							
For Actuators	PVC Cabel, without Feedback signal (Type)				Halogenfree Cabel, without Feedback signal (Type)		
	Cabel length				Cabel length		
	1 m	2 m	5 m	10 m	1 m	5 m	10 m
STA161.65L10							
STA162.65L10							
STP161.65L10	ASY61L10	ASY61L20	ASY61L50	ASY61L100	ASY61L10H	ASY61L50H	ASY61L100H
STP162.65L10							
For Actuators	PVC Cabel, with Feedback signal (Type)				Halogenfree Cabel, with Feedback signal (Type)		
	Cabel length				Cabel length		
	1 m	2 m	5 m	10 m	1 m	5 m	10 m
STA161.65L10							
STA162.65L10							
STP161.65L10	ASY62L10	ASY62L20	ASY62L50	ASY62L100	ASY62L10H	ASY62L50H	ASY62L100H
STP162.65L10							

¹⁾ Not suited for radiator valves

²⁾ SPST = single-pole single-throw, SPDT = single-pole double-throw

³⁾ In control mode (warm-up time) min. running time approx. 30 s/mm

⁴⁾ 70% k_{vs} in bypass, leakage rate in bypass 2...5% of k_{vs} value

Threaded globe valves

Typical applications	Actuators	Data sheet	Spring return function [s]				800 N	20 mm 1000 N	2800 N	
<ul style="list-style-type: none"> - District heating - Boiler plants - Chiller plants - Domestic hot water - Heating groups - Air handling units 	SAX..	N4501								
	SKD..	N4561								
	SKB..	N4564								
	Operating voltage	Positioning signal	Positioning time [s]							
	AC 230 V	3-position	SAX	SKD	SKB	SKD	SKB	SAX31.00	SKD32.50	SKB32.50
		3-position	-	120	120	8	10	-	SKD32.51	SKB32.51
		3-position	30	-	-	-	-	SAX31.03	-	-
	AC 24 V ¹⁾	3-position	-	30	-	8	-	-	SKD32.21	-
		3-position	120	120	120	-	-	SAX81.00	SKD82.50	SKB82.50
		3-position	-	120	120	8	10	-	SKD82.51	SKB82.51
3-position		30	-	-	-	-	SAX81.03	-	-	
AC/DC 24 V	0...10 V, 4...20 mA	-	30	120	-	-	-	SKD60	SKB60	
	0...10 V, 4...20 mA	-	30	120	15	10	-	SKD62	SKB62	
	Modbus RTU	30	30	120	15	10	SAX61.03	-	-	
							SAX61.03/MO	SKD62/MO	SKB62/MO	



PN 16	-25...150 °C ²⁾	N4463		DN	G [Inch]	k _{vs} [m ³ /h]	Δp _s [kPa]	Δp _{max} [kPa]	Δp _s [kPa]	Δp _{max} [kPa]	Δp _s [kPa]	Δp _{max} [kPa]
Data sheet	N4363	N4463										
	VVG41.11..12		-	15	G 1B	0.63 / 1	1600	800	1600	800	1600	800
	VVG41.13		VXG41.1301 ³⁾	15	G 1B	1.6	1600	800	1600	800	1600	800
	VVG41.14		VXG41.1401 ³⁾	15	G 1B	2.5	1600	800	1600	800	1600	800
	VVG41.15		VXG41.1501 ³⁾	15	G 1B	4	1600	800	1600	800	1600	800
	VVG41.20		VXG41.2001 ³⁾	20	G 1¼B	6.3	1600	800	1600	800	1600	800
	VVG41.25		VXG41.2501 ³⁾	25	G 1½B	10	1550	800	1600	800	1600	800
	VVG41.32		VXG41.3201 ³⁾	32	G 2B	16	875	800	1275	800	1600	800
	VVG41.40		VXG41.4001 ³⁾	40	G 2¼B	25	525	525	775	775	1600	800
	VVG41.50		VXG41.5001 ³⁾	50	G 2¾B	40	300	300	450	450	1225	800

Union nuts for threaded valves ⁴⁾

Type	Set of 2		G [Inch]	R, Rp [Inch]	Material
	Set of 2	Set of 3			
ALG132	ALG132	ALG133	G ½B	R ¾ (External threading)	Brass
ALG142	ALG142	ALG143	G ¾B	R ½ (External threading)	Brass
ALG122	ALG122	ALG123	G ¾B	Rp ¾	Malleable cast iron
ALG152	ALG152	ALG153	G 1B	Rp ½	Malleable cast iron
ALG152B	ALG152B	ALG153B	G 1B	Rp ½	Brass
ALG202	ALG202	ALG203	G 1¼B	Rp ¾	Malleable cast iron
ALG202B	ALG202B	ALG203B	G 1¼B	Rp ¾	Brass
ALG252	ALG252	ALG253	G 1½B	Rp 1	Malleable cast iron
ALG252B	ALG252B	ALG253B	G 1½B	Rp 1	Brass
ALG322	ALG322	ALG323	G 2B	Rp 1¼	Malleable cast iron
ALG322B	ALG322B	ALG323B	G 2B	Rp 1¼	Brass
ALG402	ALG402	ALG403	G 2¼B	Rp 1½	Malleable cast iron
ALG402B	ALG402B	ALG403B	G 2¼B	Rp 1½	Brass
ALG502	ALG502	ALG503	G 2¾B	Rp 2	Malleable cast iron
ALG502B	ALG502B	ALG503B	G 2¾B	Rp 2	Brass
Type	Set of 2		G [Inch]	Ø d [mm]	Material
ALS152	ALS152	ALS153			
ALS202	ALS202	ALS203	G 1B	26.8	Steel, weldable
ALS252	ALS252	ALS253	G 1¼B	33.7	Steel, weldable

¹⁾ SAX81...: AC/DC 24 V

²⁾ SAX.. max. 130 °C

³⁾ Max. 90 °C

⁴⁾ Valve side: cylindrical thread G according to ISO 228-1, pipe side: ALG.. with cylindrical Rp- or tapered R-thread according to ISO 7-1, pipe side: ALS.. with welded connection

VXG41.. valves contain only materials in contact with drinking water that comply with the UBA Positive List dated April 23, 2013, Categories B+C

Threaded globe valves

Typical applications		Actuators	Data sheet				400 N	5.5 mm	400 N	400 N
<ul style="list-style-type: none"> – Boiler plants – Domestic hot water – Heating groups – Air handling units 		SAS..	N4581							
		Operating voltage	Positioning signal	Positioning time [s]	Spring return function [s]					
		AC 230 V	3-position	120	–	SAS31.00	–	–		
			3-position	30	–	SAS31.03	–	–		
			3-position	120	28	–	SAS31.50	–	–	
			3-position	30	14	–	SAS31.53	–	–	
		AC/DC 24 V	0...10 V,	30	–	SAS61.03	–	–		
			4...20 mA,	30	14	–	–	–	SAS61.33	
			0...1000 Ω	30	14	–	–	SAS61.53	–	
			3-position	120	–	SAS81.00	–	–	–	
			3-position	30	–	SAS81.03	–	–	–	
			3-position	30	14	–	–	–	SAS81.33	
			Modbus RTU	30	–	SAS61.03/MO	–	–	–	
			Modbus RTU	30	14	–	–	–	SAS61.33/MO	



PN 16	1...120°C			DN	G [Inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]
Data sheet	N4364		N4464									
	VVG44.15-.. ¹⁾		VXG44.15-..	15	G 1B	0.25 / 0.4 / 0.63	1600	400	1600	400	1600	400
	VVG44.15-..		VXG44.15-..	15	G 1B	1 / 1.6	725	400	725	400	725	400
	VVG44.15-..		VXG44.15-..	15	G 1B	2.5 / 4	400	400	400	400	400	400
	VVG44.20-6.3		VXG44.20-6.3	20	G 1¼B	6.3	750	400	750	400	750	400
	VVG44.25-10		VXG44.25-10	25	G 1½B	10	400	400	400	400	400	400
	VVG44.32-16		VXG44.32-16	32	G 2B	16	250	250	250	250	250	250
	VVG44.40-25		VXG44.40-25	40	G 2½B	25	125	125	125	125	125	125

Typical applications		Actuators	Data sheet				5.5 mm	300 N
<ul style="list-style-type: none"> – Boiler plants – Heating groups – Air handling units 		SSC..	N4895					
		Operating voltage	Positioning signal	Positioning time [s]				
		AC 230 V	3-position	150			SSC31	
		AC 24 V	3-position	150			SSC81	
		AC/DC 24 V	0...10 V	27.5			SSC161.05HF	
			0...10 V	27.5			SSC161.05UT	

PN 16	1...110°C			DN	G [Inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]
Data sheet	N4845		N4845					
	VVP45.20-4		VXP45.20-4	20	G 1B	4	350	350
	VVP45.25-6.3		VXP45.25-6.3	25	G 1¼B	6.3	300	300
	VVP45.25-10		VXP45.25-10	25	G 1½B	10	300	300
	VVP45.32-16		VXP45.32-16	32	G 2B	16	175	175
	VVP45.40-25		VXP45.40-25	40	G 2½B	25	75	75

Typical applications		Actuators	Data sheet				5.5 mm	300 N	300 N
<ul style="list-style-type: none"> – District heating – Boiler plants 		SAT..	N4584						
		Operating voltage	Positioning signal	Positioning time [s]	Spring return function [s]				
		AC 230 V	3-position	8	–	SAT31.008	–	–	
			3-position	15	8	–	SAT31.51	–	
		AC/DC 24 V	0...10 V,	8	–	SAT61.008	–	–	
			4...20 mA,	15	8	–	SAT61.51	–	
			0...1000 Ω			–	SAT61.008/MO	–	
			Modbus RTU	15	8	–	SAT61.51/MO	–	



PN 25	1...130°C			DN	G [Inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]
Data sheet	N4380									
	VVG549.15-.. ¹⁾			15	G ¾B	0.25 / 0.4 / 0.63	2500	1200	2500	1200
	VVG549.15-..			15	G 3¼B	1 / 1.6 / 2.5	2000	1200	2000	1200
	VVG549.20-4K			20	G 1B	4	1600	1200	1600	1200
	VVG549.25-6.3K			25	G 1¼B	6.3	1600	1200	1600	1200

Flanged globe valves

Typical applications	Actuators	Data sheet	Spring return function [s]	20 mm			40 mm			
				800 N	1000 N	2800 N	1600 N	2800 N		
– District heating – Boiler plants – Chiller plants – Domestic hot water – Heating groups – Air handling units	SAX..	N4501								
	SKD..	N4561								
	SKB..	N4564								
	SKC..	N4566								
	SAV..	N4503								
	Operating voltage	Positioning signal		Positioning time [s]						
	AC 230 V	3-position		SA.. SKD SKB/C	SKD SKB/C	SAX31.00	SKD32.50	SKB32.50	SAV31.00	SKC32.60
		3-position		– 120 120	8 10/18	–	SKD32.51	SKB32.51	–	SKC32.61
		3-position		30 – –	– –	SAX31.03	–	–	–	–
	AC 24 V	3-position		– 30 –	8 –	–	SKD32.21	–	–	–
3-position		120 120 120	– –	SAX81.00	SKD82.50	SKB82.50	SAV81.00	SKC82.60		
3-position		– 120 120	8 10/18	–	SKD82.51	SKB82.51	–	SKC82.61		
3-position		30 – –	– –	SAX81.03	–	–	–	–		
0...10 V, 4...20 mA		– 30 120	– –	–	SKD60	SKB60	–	SKC60		
AC/DC 24 V	0...10 V, 4...20 mA	– 30 120	15 10/20	–	SKD62	SKB62	–	SKC62		
	0...10 V, 4...20 mA	30 – –	– –	SAX61.03	–	–	–	–		
	0...10 V, 4...20 mA	120 – –	– –	–	–	–	SAV61.00	–		
	Modbus RTU	30 30 120	15 10/20	SAX61.03/MO	SKD62/MO ¹⁾	SKB62/MO ¹⁾	SAV61.00/MO	SKC62/MO		



PN 25	-20...220 °C ²⁾		DN	k _{vs} [m ³ /h]	Δp _s [kPa]	Δp _{max} [kPa]								
Data sheet	N4405	N4405												
	VVF53.15-... ³⁾		15	0.16/0.2/0.25/0.32/0.4/0.5/0.63	2500	1200	2500	1200	2500	1200	–	–	–	–
	VVF53.15-...		15	0.8/1/1.25/2/3.2	2500	1200	2500	1200	2500	1200	–	–	–	–
	VVF53.15-...		15	1.6/2.5/4	2500	1200	2500	1200	2500	1200	–	–	–	–
	VVF53.20-6.3		20	6.3	2500	1200	2500	1200	2500	1200	–	–	–	–
	VVF53.25-...		25	5/8	1600	1200	2100	1200	2500	1200	–	–	–	–
	VVF53.25-...		25	6.3/10	1600	1200	2100	1200	2500	1200	–	–	–	–
	VVF53.32-16		32	16	900	750	1200	1100	2500	1200	–	–	–	–
	VVF53.40-...		40	12.5/20	550	500	750	650	2000	1200	–	–	–	–
	VVF53.40-...		40	16/25	550	500	750	650	2000	1200	1250	1150	–	–
	VVF53.50-31.5		50	31.5	350	300	450	400	1200	1150	750	700	–	–
	VVF53.50-40		50	40	350	300	450	400	1200	1150	750	700	–	–
	VVF53.65-63		65	63	–	–	–	–	–	–	450	400	700	650
	VVF53.80-100		80	100	–	–	–	–	–	–	250	225	450	400
	VVF53.100-160		100	160	–	–	–	–	–	–	160	125	300	250
	VVF53.125-250		125	250	–	–	–	–	–	–	125	90	190	160
	VVF53.150-400		150	400	–	–	–	–	–	–	80	60	125	100
	VVF53.50-40K ⁴⁾		50	36	–	–	2500	1250	2500	1250	–	–	–	–
	VVF53.65-63K ⁴⁾		65	63	–	–	–	–	–	–	–	–	2500	1250
	VVF53.80-100K ⁴⁾		80	100	–	–	–	–	–	–	–	–	2500	1250
	VVF53.100-150K ⁴⁾		100	150	–	–	–	–	–	–	–	–	2500	1250
	VVF53.125-220K ⁴⁾		125	220	–	–	–	–	–	–	–	–	2500	1250
	VVF53.150-315K ⁴⁾		150	315	–	–	–	–	–	–	–	–	2500	1250
	VVF53.200-450K ⁴⁾		200	450	–	–	–	–	–	–	–	–	1200	800
	VVF53.250-630K ⁴⁾		250	630	–	–	–	–	–	–	–	–	1200	800

¹⁾ SK../MO = AC 24 V

²⁾ SAX.. max. 130 °C, SKD.. max. 150 °C

³⁾ .. = insert k_{vs} value

⁴⁾ Min. -5 °C

Flanged globe valves

Typical applications – District heating – Boiler plants – Chiller plants – Domestic hot water – Heating groups – Air handling units	Actuators	Data sheet					Spring return function [s]	20 mm			40 mm			
		Positioning signal	Positioning time [s]			SKD		SKB/C	1000 N	2800 N	2800 N	SKD32.50	SKB32.50	SKC32.60
			SKD	SKB/C	SAV									
	SKD..	N4561												
	SKB..	N4564												
	SAV..	N4503												
	SKC..	N4566												
	Operating voltage													
	AC 230 V	3-position	120	120	120	–	–							
		3-position	120	120	–	8	10/18							
		3-position	30	–	–	8	–							
	AC 24 V	3-position	120	120	120	–	–							
		3-position	120	120	–	8	10/18							
		0...10 V, 4...20 mA	30	120	120	–	–							
		0...10 V, 4...20 mA	30	120	–	15	10/20							
		Modbus RTU	30	120	120	15	10/20							



PN 40	-25...220 °C	DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	
Data sheet	A6V11459527									
		VVF63.15-0.2	15	0.2	4000	2000	4000	2000	–	–
		VVF63.15-0.32	15	0.32	4000	2000	4000	2000	–	–
		VVF63.15-0.5	15	0.5	4000	2000	4000	2000	–	–
		VVF63.15-0.8	15	0.8	4000	2000	4000	2000	–	–
		VVF63.15-1.25	15	1.25	4000	2000	4000	2000	–	–
		VVF63.15-2	15	2	4000	2000	4000	2000	–	–
		VVF63.15-3.2	15	3.2	4000	2000	4000	2000	–	–
		VVF63.20-6.3	20	5	3500	2000	4000	2000	–	–
		VVF63.25-5	25	5	2100	2000	4000	2000	–	–
		VVF63.25-8	25	8	2100	2000	4000	2000	–	–
		VVF63.32-16	32	16	1200	1100	3200	2000	–	–
		VVF63.40-12.5	40	12.5	750	650	2000	1800	–	–
		VVF63.40-20	40	20	750	650	2000	1800	–	–
		VVF63.50-31.5	50	31.5	450	400	1200	1150	–	–
		VVF63.65-50	65	50	–	–	–	–	700	650
		VVF63.80-80	80	80	–	–	–	–	450	400
		VVF63.100-125	100	125	–	–	–	–	300	250
		VVF63.125-200	125	200	–	–	–	–	175	160
		VVF63.150-315	150	315	–	–	–	–	125	100

PN 40	-5...220 °C	DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	
Data sheet	A6V11459527									
		VVF63.50-40K	50	36	–	1500	4000	2000	–	–
		VVF63.65-63K	65	63	–	–	–	–	4000	2000
		VVF63.80-100K	80	100	–	–	–	–	4000	2000
		VVF63.100-150K	100	150	–	–	–	–	4000	2000
		VVF63.125-220K	125	220	–	–	–	–	4000	2000
		VVF63.150-315K	150	315	–	–	–	–	4000	2000

PN 40	-25...220 °C	DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	
Data sheet	A6V11459527									
		VXF63.15-1.6	15	1.6	2000	200	2000	200	–	–
		VXF63.15-2.5	15	2.5	2000	200	2000	200	–	–
		VXF63.15-4	15	4	2000	200	2000	200	–	–
		VXF63.20-6.3	20	6.3	2000	200	2000	200	–	–
		VXF63.25-6.3	25	6.3	2000	200	2000	200	–	–
		VXF63.25-10	25	10	2000	200	2000	200	–	–
		VXF63.32-16	32	16	1100	200	2000	200	–	–
		VXF63.40-16	40	16	650	200	2000	200	–	–
		VXF63.40-25	40	25	650	200	2000	200	–	–
		VXF63.50-31.5	50	31.5	400	200	1150	200	–	–
		VXF63.65-50	65	50	–	–	–	–	650	200
		VXF63.80-80	80	80	–	–	–	–	400	200
		VXF63.100-125	100	125	–	–	–	–	250	150
		VXF63.125-200	125	200	–	–	–	–	160	100
		VXF63.150-315	150	315	–	–	–	–	100	70

Control ball valves

Typical applications	Actuators	Data sheet	Spring return function [s]	2 Nm	5 Nm	7 Nm	10 Nm GLB 8 Nm GLD								
<ul style="list-style-type: none"> – Domestic hot water – Heating groups – Air handling units – Chilled ceilings – VAV – Fan coil units – Zone control 	GQD..9A GSD..9A GDB..9E GDB111.9E/KN GMA..9E GLB..9E GLD..9E	N4659 A6V10636056 A6V10636150 A6V10725318 N4658 A6V10636203 A6V11171770													
Operating voltage	Positioning signal	Positioning time [s]													
		G..D	G..B						GMA						
AC 100...240 V	2/3-position	–	150						–	–	–	–	GDB341.9E	–	GLB341.9E
AC 24 V	KNX S-/LTE-Mode, KNX PL-Link	–	150						–	–	–	–	GDB111.9E/KN	–	GLB111.9E/KN
		Modbus RTU	–						150	–	–	–	GDB111.9E/MO	–	GLB111.9E/MO
AC/DC 24 V	3-position	30	–						90	15	GQD131.9A	–	GMA131.9E	–	–
	2/3-position	–	150						–	–	–	GDB141.9E	–	GLB141.9E	
	0...10 V	30	–						90	15	GQD161.9A	–	GMA161.9E	–	–
	0/2...10 V	30	150						–	–	GSD161.9A	–	GDB161.9E	–	GLB161.9E
	0/2...10 V	30	–	–	–	–	GDD161.9E	–	GLD161.9E						
	Modbus RTU	–	150	90	–	–	GDB161.9E/MO	GMA161.9E/MO	GLB161.9E/MO						



PN 40	-10...120°C			DN	G	k _{vs}	Δp _s	Δp _{max}						
Data sheet	N4211		N4211		[Inch]	[m ³ /h]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]
				15	G 1B	1,6/2,5/4/6,3	1400	350	1400	350	1400	350	1400	350
	VAG61.15-.. ¹⁾		VBG61.15-..	15	G 1B	1	1400	350	1400	350	1400	350	1400	350
	VAG61.15-..		–	15	G 1B	1	1400	350	1400	350	1400	350	1400	350
	VAG61.20-..		VBG61.20-..	20	G 1½B	4/6,3	1400	350	1400	350	1400	350	1400	350
	VAG61.20-10		–	20	G 1½B	10	1400	350	1400	350	1400	350	1400	350
	VAG61.25-10		VBG61.25-10	25	G 1½B	10	1400	350	1400	350	1400	350	1400	350
	VAG61.25-..		–	25	G 1½B	6,3/16	1400	350	1400	350	1400	350	1400	350
	VAG61.32-10		–	32	G 2B	10	–	–	–	–	1000	350	1000	350
	VAG61.32-16		VBG61.32-16	32	G 2B	16	–	–	–	–	1000	350	1000	350
	VAG61.32-25		–	32	G 2B	25	–	–	–	–	1000	350	1000	350
	VAG61.40-16		–	40	G 2½B	16	–	–	–	–	800	350	800	350
	VAG61.40-25		VBG61.40-25	40	G 2½B	25	–	–	–	–	800	350	800	350
	VAG61.40-40		–	40	G 2½B	40	–	–	–	–	800	350	800	350
	VAG61.50-25		–	50	G 2½B	25	–	–	–	–	600	350	600	350
	VAG61.50-40		VBG61.50-40	50	G 2½B	40	–	–	–	–	600	350	600	350
	VAG61.50-63		–	50	G 2½B	63	–	–	–	–	600	350	600	350

PN 40	-10...120°C			DN	Rp	k _{vs}	Δp _s	Δp _{max}						
Data sheet	N4211		N4211		[Inch]	[m ³ /h]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]
				15	Rp ½	0,25/0,4/0,6	1400	350	1400	350	600	350	1400	350
	VAI61.15-..		VBI61.15-..	15	Rp ½	1,6/2,5/4/6,3	1400	350	1400	350	1400	350	1400	350
	VAI61.15-.. ¹⁾		–	15	Rp ½	1/10	1400	350	1400	350	1400	350	1400	350
	VAI61.20-..		VBI61.20-..	20	Rp ¾	4/6,3	1400	350	1400	350	1400	350	1400	350
	VAI61.20-10		–	20	Rp ¾	10	1400	350	1400	350	1400	350	1400	350
	VAI61.25-10		VBI61.25-10	25	Rp 1	10	1400	350	1400	350	1400	350	1400	350
	VAI61.25-..		–	25	Rp 1	6,3/16	1400	350	1400	350	1400	350	1400	350
	VAI61.32-10		–	32	Rp 1¼	10	–	–	–	–	1000	350	1000	350
	VAI61.32-16		VBI61.32-16	32	Rp 1¼	16	–	–	–	–	1000	350	1000	350
	VAI61.32-25		–	32	Rp 1¼	25	–	–	–	–	1000	350	1000	350
	VAI61.40-16		–	40	Rp 1½	16	–	–	–	–	800	350	800	350
	VAI61.40-25		VBI61.40-25	40	Rp 1½	25	–	–	–	–	800	350	800	350
	VAI61.40-40		–	40	Rp 1½	40	–	–	–	–	800	350	800	350
	VAI61.50-25		–	50	Rp 2	25	–	–	–	–	600	350	600	350
	VAI61.50-40		VBI61.50-40	50	Rp 2	40	–	–	–	–	600	350	600	350
	VAI61.50-63		VBI61.50-63	50	Rp 2	63	–	–	–	–	600	350	600	350

¹⁾ .. = insert k_{vs} value; VBG61../VBI61..: For noiseless operation, the Δp_{max} value of 200 kPa should not be exceeded

6-port control ball valves

Typical applications	Actuators	Data sheet	2 Nm	5 Nm	5 Nm	5 Nm	
– Heated and chilled ceilings – Fan coil units	GSD..9A	A6V10636056					
	GDB..9E...	A6V10636150					
	GDB111.9E/KN	A6V10725318					
	Operating voltage	Positioning signal	Positioning time [s]				
			GSD	GDB			
	AC 100...240 V	2-position	–	150	–	GDB341.9E	–
	AC 230 V	2-position	30	–	GSD341.9A	–	–
	AC 24 V	KNX S-/LTE-Mode, KNX PL-Link	–	150	–	–	GDB111.9E/KN
	AC/DC 24 V	2-position	30	150	GSD141.9A	GDB141.9E	–
	0/2...10 V		30	150	–	–	–
	Modbus RTU		–	150	–	–	GDB161.9E/6W GDB161.9E/MO6P



PN 16	5...90°C	DN	k _{vs} left [m³/h]	k _{vs} right [m³/h]	Δp _s [kPa]	Δp _{max} [kPa]							
Data sheet	A6V10564480												
		VWG41.10-0.25-0.4	10	0.25	0.4	–	200	–	200	–	200	–	200
		VWG41.10-0.25-0.65	10	0.25	0.65	–	200	–	200	–	200	–	200
		VWG41.10-0.25-1.0	10	0.25	1	–	200	–	200	–	200	–	200
		VWG41.10-0.25-1.3	10	0.25	1.3	–	200	–	200	–	200	–	200
		VWG41.10-0.25-1.6	10	0.25	1.6	–	200	–	200	–	200	–	200
		VWG41.10-0.25-1.9	10	0.25	1.9	–	200	–	200	–	200	–	200
		VWG41.10-0.4-0.4	10	0.4	0.4	–	200	–	200	–	200	–	200
		VWG41.10-0.4-0.65	10	0.4	0.65	–	200	–	200	–	200	–	200
		VWG41.10-0.4-1.0	10	0.4	1	–	200	–	200	–	200	–	200
		VWG41.10-0.4-1.3	10	0.4	1.3	–	200	–	200	–	200	–	200
		VWG41.10-0.4-1.6	10	0.4	1.6	–	200	–	200	–	200	–	200
		VWG41.10-0.4-1.9	10	0.4	1.9	–	200	–	200	–	200	–	200
		VWG41.10-0.65-0.65	10	0.65	0.65	–	200	–	200	–	200	–	200
		VWG41.10-0.65-1.0	10	0.65	1	–	200	–	200	–	200	–	200
		VWG41.10-0.65-1.3	10	0.65	1.3	–	200	–	200	–	200	–	200
		VWG41.10-0.65-1.6	10	0.65	1.6	–	200	–	200	–	200	–	200
		VWG41.10-0.65-1.9	10	0.65	1.9	–	200	–	200	–	200	–	200
		VWG41.10-1.0-1.0	10	1	1	–	200	–	200	–	200	–	200
		VWG41.10-1.0-1.3	10	1	1.3	–	200	–	200	–	200	–	200
		VWG41.10-1.0-1.6	10	1	1.6	–	200	–	200	–	200	–	200
		VWG41.10-1.0-1.9	10	1	1.9	–	200	–	200	–	200	–	200
		VWG41.10-1.3-1.3	10	1.3	1.3	–	200	–	200	–	200	–	200
		VWG41.10-1.3-1.6	10	1.3	1.6	–	200	–	200	–	200	–	200
		VWG41.10-1.3-1.9	10	1.3	1.9	–	200	–	200	–	200	–	200
		VWG41.10-1.6-1.6	10	1.6	1.6	–	200	–	200	–	200	–	200
		VWG41.10-1.6-1.9	10	1.6	1.9	–	200	–	200	–	200	–	200
		VWG41.10-1.9-1.9	10	1.9	1.9	–	200	–	200	–	200	–	200
		VWG41.20-0.25-2.5	20	0.25	2.5	–	–	–	200	–	200	–	200
		VWG41.20-0.25-3.45	20	0.25	3.45	–	–	–	200	–	200	–	200
		VWG41.20-0.25-4.25	20	0.25	4.25	–	–	–	200	–	200	–	200
VWG41.20-0.4-2.5	20	0.4	2.5	–	–	–	200	–	200	–	200		
VWG41.20-0.4-3.45	20	0.4	3.45	–	–	–	200	–	200	–	200		
VWG41.20-0.4-4.25	20	0.4	4.25	–	–	–	200	–	200	–	200		
VWG41.20-0.65-2.5	20	0.65	2.5	–	–	–	200	–	200	–	200		
VWG41.20-0.65-3.45	20	0.65	3.45	–	–	–	200	–	200	–	200		
VWG41.20-0.65-4.25	20	0.65	4.25	–	–	–	200	–	200	–	200		
VWG41.20-1.0-2.5	20	1	2.5	–	–	–	200	–	200	–	200		
VWG41.20-1.0-3.45	20	1	3.45	–	–	–	200	–	200	–	200		
VWG41.20-1.0-4.25	20	1	4.25	–	–	–	200	–	200	–	200		
VWG41.20-1.3-2.5	20	1.3	2.5	–	–	–	200	–	200	–	200		
VWG41.20-1.3-3.45	20	1.3	3.45	–	–	–	200	–	200	–	200		
VWG41.20-1.3-4.25	20	1.3	4.25	–	–	–	200	–	200	–	200		
VWG41.20-1.6-2.5	20	1.6	2.5	–	–	–	200	–	200	–	200		
VWG41.20-1.6-3.45	20	1.6	3.45	–	–	–	200	–	200	–	200		
VWG41.20-1.6-4.25	20	1.6	4.25	–	–	–	200	–	200	–	200		
VWG41.20-2.5-2.5	20	2.5	2.5	–	–	–	200	–	200	–	200		
VWG41.20-2.5-3.45	20	2.5	3.45	–	–	–	200	–	200	–	200		
VWG41.20-2.5-4.25	20	2.5	4.25	–	–	–	200	–	200	–	200		
VWG41.20-3.45-3.45	20	3.45	3.45	–	–	–	200	–	200	–	200		
VWG41.20-4.25-4.25	20	4.25	4.25	–	–	–	200	–	200	–	200		

Fittings for 6-port control ball valves



Type	Description
ALN15.152B	Fittings set made of brass for media temperatures up to 90°C, consisting of 2x cap nuts, 2x inserts with external threading per ISO 228-1, 2x flat seals
ALG15.152B	Fittings set made of brass for media temperatures up to 90°C, consisting of 2x cap nuts with sleeves and insert per ISO 7-1, 2x flat seals
ALG15.202B	
ALG15.252B	

6-port compact control ball valves

Typical applications	Actuators	Data sheet	2 Nm	5 Nm	5 Nm	5 Nm		
– Heated and chilled ceilings – Fan coil units	GSD..9A GDB..9E... GDB111.9E/KN	A6V10636056 A6V10636150 A6V10725318						
	Operating voltage	Positioning signal	Positioning time [s]					
			GSD	GDB				
	AC 100...240 V	2-position	–	150	–	GDB341.9E	–	–
	AC 230 V	2-position	30	–	GSD341.9A	–	–	–
	AC 24 V	KNXS-/LTE-Mode, KNX-PL-Link	–	150	–	–	GDB111.9E/KN	–
	AC/DC 24 V	2-position	30	150	GSD141.9A	GDB141.9E	–	–
			0/2...10 V	30	150	–	–	–
		Modbus RTU	–	150	–	–	–	GDB161.9E/MO6P



PN 16	5...90 °C	DN	k _{vs} left [m³/h]	k _{vs} right [m³/h]	Δp _s [kPa]	Δp _{max} [kPa]							
Data sheet	A6V10564480												
		VWG42.10-0.25-0.25	10	0.25	0.25	–	200	–	200	–	200	–	200
		VWG42.10-0.25-0.4	10	0.25	0.4	–	200	–	200	–	200	–	200
		VWG42.10-0.25-0.65	10	0.25	0.65	–	200	–	200	–	200	–	200
		VWG42.10-0.25-1.0	10	0.25	1.0	–	200	–	200	–	200	–	200
		VWG42.10-0.25-1.6	10	0.25	1.6	–	200	–	200	–	200	–	200
		VWG42.10-0.25-1.95	10	0.25	1.95	–	200	–	200	–	200	–	200
		VWG42.10-0.4-0.4	10	0.4	0.4	–	200	–	200	–	200	–	200
		VWG42.10-0.4-0.65	10	0.4	0.65	–	200	–	200	–	200	–	200
		VWG42.10-0.4-1.0	10	0.4	1.0	–	200	–	200	–	200	–	200
		VWG42.10-0.4-1.3	10	0.4	1.3	–	200	–	200	–	200	–	200
		VWG42.10-0.4-1.6	10	0.4	1.6	–	200	–	200	–	200	–	200
		VWG42.10-0.4-1.95	10	0.4	1.95	–	200	–	200	–	200	–	200
		VWG42.10-0.65-0.65	10	0.65	0.65	–	200	–	200	–	200	–	200
		VWG42.10-0.65-1.0	10	0.65	1.0	–	200	–	200	–	200	–	200
		VWG42.10-0.65-1.3	10	0.65	1.3	–	200	–	200	–	200	–	200
		VWG42.10-0.65-1.6	10	0.65	1.6	–	200	–	200	–	200	–	200
		VWG42.10-0.65-1.95	10	0.65	1.95	–	200	–	200	–	200	–	200
		VWG42.10-1.0-1.0	10	1	1.0	–	200	–	200	–	200	–	200
		VWG42.10-1.0-1.3	10	1	1.3	–	200	–	200	–	200	–	200
		VWG42.10-1.0-1.6	10	1	1.6	–	200	–	200	–	200	–	200
		VWG42.10-1.0-1.95	10	1	1.9	–	200	–	200	–	200	–	200
		VWG42.10-1.3-1.3	10	1.3	1.3	–	200	–	200	–	200	–	200
		VWG42.10-1.3-1.6	10	1.3	1.6	–	200	–	200	–	200	–	200
		VWG42.10-1.3-1.95	10	1.3	1.95	–	200	–	200	–	200	–	200
		VWG42.10-1.6-1.6	10	1.6	1.6	–	200	–	200	–	200	–	200
		VWG42.10-1.6-1.95	10	1.6	1.95	–	200	–	200	–	200	–	200
		VWG42.10-1.9-1.95	10	1.95	1.95	–	200	–	200	–	200	–	200



Magnetic valves

Typical applications		Valve type	Operating voltage	Positioning signal		Type suffix	
– District heating		MXF461..	AC/DC 24 V	0...10 V, 2...10 V, 4...20 mA		p ¹⁾	
– Boiler plants		M3P..FY..	AC 24 V	0...10 V, 4...20 mA		p ¹⁾	
– Chiller plants		MVF461H..	AC/DC 24 V	0...10 V, 2...10 V, 0...20 mA, 4...20 mA		–	
– Domestic hot water		MXG461..	AC/DC 24 V	0...10 V, 2...10 V, 4...20 mA		p ¹⁾	
– Heating groups		MXG461B..	AC/DC 24 V	0...10 V, 2...10 V, 0...20 mA, 4...20 mA		–	
– Air handling units		MXG461S..	AC/DC 24 V	0...10 V, 2...10 V, 4...20 mA		–	
		MXG462S..	AC/DC 24 V	0...10 V, 2...10 V, 0...20 mA, 4...20 mA		–	
PN 16	1...130 °C						
Data sheet	N4455	DN	k _{vs} [m ³ /h]	Δp _s [kPa]	Δp _{max} [kPa]	Note	
 	MXF461.15-.. ²⁾	15	0.6 / 1.5 / 3	300	300	To be used as 2-port or mixing valves, not as diverting valves. Selectable valve characteristic: equal-percentage or linear.	
 	MXF461.20-5.0	20	5	300	300		
 	MXF461.25-8.0	25	8	300	300		
 	MXF461.32-12	32	12	300	300		
 	MXF461.40-20	40	20	300	300		
 	MXF461.50-30	50	30	300	300		
 	MXF461.65-50	65	50	300	300		
	1...120 °C						
Data sheet	N4454	DN	k _{vs} [m ³ /h]	Δp _s [kPa]	Δp _{max} [kPa]		
	M3P80FY	80	80	300	300		
	M3P100FY	100	130	200	200		
PN 16	1...180 °C						
Data sheet	N4361	DN	k _{vs} [m ³ /h]	Δp _s [kPa]	Δp _{max} [kPa]		
 	MVF461H15-.. ²⁾	15	0.6 / 1.5 / 3	1000	1000		
 	MVF461H20-5	20	5	1000	1000		
 	MVF461H25-8	25	8	1000	1000		
 	MVF461H32-12	32	12	1000	1000		
 	MVF461H40-20	40	20	1000	1000		
 	MVF461H50-30	50	30	1000	1000		
PN 16	1...130 °C						
Data sheet	N4455	DN	G [Inch]	k _{vs} [m ³ /h]	Δp _s [kPa]	Δp _{max} [kPa]	
 	MXG461.15-.. ²⁾	15	G 1B	0.6 / 1.5 / 3	300	300	
 	MXG461.20-5.0	20	G 1¼B	5	300	300	
 	MXG461.25-8.0	25	G 1½B	8	300	300	
 	MXG461.32-12	32	G 2B	12	300	300	
 	MXG461.40-20	40	G 2¼B	20	300	300	
 	MXG461.50-30	50	G 2¾B	30	300	300	
PN 16	-20...130 °C						
Data sheet	N4461	DN	G [Inch]	k _{vs} [m ³ /h]	Δp _s [kPa]	Δp _{max} [kPa]	
 	MXG461B15-.. ²⁾	15	G 1B	0.6 / 1.5 / 3	1000	1000	
 	MXG461B20-5	20	G 1¼B	5	800	800	
 	MXG461B25-8	25	G 1½B	8	700	700	
 	MXG461B32-12	32	G 2B	12	600	600	
 	MXG461B40-20	40	G 2¼B	20	600	600	
 	MXG461B50-30	50	G 2¾B	30	600	600	
PN 16	1...130 °C						
Data sheet	N4465						
 	MXG461S15-1.5					To be used as 2-port or mixing valves, not as diverting valves. Selectable valve characteristic: equal-percentage or linear. ³⁾	
 	MXG461S20-5.0						
 	MXG461S25-8.0						
 	MXG461S32-12						
 	MXG462S40-20	40	G 2¼B	20	600		600
 	MXG462S50-30	50	G 2¾B	30	600		600

¹⁾ P = media containing mineral oil ²⁾ .. = insert k_{vs} value ³⁾ Parts that are in contact with medium in stainless steel
 MXG461B.. valves contain only materials in contact with drinking water that comply with the UBA Positive List dated April 23, 2013, Categories B+C

Slipper valves

Typical applications	Actuators	Data sheet	10 Nm	10 Nm		
– Boiler plants – Heating groups	SAL..	N4502				
	Operating voltage	Positioning signal	Positioning time [s]			
	AC 230 V	3-position	120	SAL31.00T10		
		3-position	30	SAL31.03T10		
	AC/DC 24 V	3-position	120	SAL81.00T10		
		3-position	30	SAL81.03T10		
		0...10 V, 4...20 mA	120	SAL61.00T10		
		0...10 V, 4...20 mA	30	SAL61.03T10		
	Mounting set		ASK32N	ASK31N		
PN 6	1...120 °C	DN	k_{vs} [m³/h]	Δp_{max} [kPa]		
Data sheet	N4241				Δp_{max} [kPa]	
		VBF21.40	40	25	30	–
		VBF21.50	50	40	30	–
		VBF21.65	65	63	–	30
		VBF21.80	80	100	–	30
		VBF21.100	100	160	–	30
		VBF21.125	125	550	–	30
		VBF21.150	150	820	–	30

Butterfly valves

Typical applications	Actuators	Data sheet	Rotation angle 90°		
– Boiler plants – Chiller plants – Heating groups	SAL..	N4502	10 Nm 		
	Operating voltage	Positioning signal	Positioning time [s]		
	AC 230 V	3-position	30		
	AC/DC 24 V	3-position	30		
		0...10 V, 4...20 mA	30		
			SAL31.03T10/F05		
			SAL81.03T10/F05		
			SAL61.03T10/F05		
PN 6/10/16	-20...120 °C	DN	k_{vs} [m³/h]	Δp_s [kPa]	
Data sheet	A6V101029254				Δp_s [kPa]
		VFW41.40U	40	40	500
		VFW41.50U	50	100	500
		VFW41.65U	65	155	500
		VFW41.80U	80	260	500
		VFW41.100U	100	520	500
		VFW41.125U	125	820	300
		VFW41.150U	150	1600	250
		VFW41.200U	200	4000	125

Butterfly valves

Typical applications	Actuators	Data sheet	Rotation angle 90°							
			20 Nm	40 Nm	25 Nm	40 Nm	100 Nm	400 Nm	1200 Nm	
– Boiler plants – Chiller plants – Cooling towers – Domestic hot water – Heating groups	SAL..	N4502								
	SQL3...	A6V13343014								
	Operating voltage	Positioning signal	Positioning time [s]							
	AC 230 V	3-position	39	–	–	–	–	SQL341E100	–	–
		3-position	47	–	–	–	–	–	SQL341E400	SQL341E1200
		3-position	11	–	–	SQL341E25	–	–	–	–
		3-position	22	–	–	–	SQL341E40	–	–	–
		3-position	120	SAL31.00T20	SAL31.00T40	–	–	–	–	–
	AC/DC 24 V	3-position	120	SAL81.00T20	SAL81.00T40	–	–	–	–	–
		0...10 V, 4...20 mA	120	SAL61.00T20	SAL61.00T40	–	–	–	–	–
AC 230 V	0...10 V, 4...20 mA	11	–	–	SQL361E25	–	–	–	–	
	0...10 V, 4...20 mA	22	–	–	–	SQL361E40	–	–	–	
	0...10 V, 4...20 mA	39	–	–	–	–	SQL361E100	–	–	
	0...10 V, 4...20 mA	47	–	–	–	–	–	SQL361E400	SQL361E1200	

PN 16	-20...120°C	DN	k_{vs} [m³/h]	Δp_s [kPa]						
Data sheet	A6V12436917									
		VFW41.40	40	40	1600	–	1600	–	–	–
		VFW41.50	50	100	1600	–	1600	–	–	–
		VFW41.65	65	155	1600	–	1600	–	–	–
		VFW41.80	80	260	–	1600	–	1600	–	–
		VFW41.100	100	520	–	1200	–	1600	–	–
		VFW41.125	125	820	–	800	–	1000	–	–
		VFW41.150	150	1600	–	–	–	–	1600	–
		VFW41.200	200	4000	–	–	–	–	1000	–
		VFW41.250	250	4550	–	–	–	–	–	1000
		VFW41.300	300	7200	–	–	–	–	–	1000
		VFW41.350	350	10250	–	–	–	–	–	600
		VFW41.400	400	14100	–	–	–	–	–	300
		VFW41.450	450	18500	–	–	–	–	–	–
		VFW41.500	500	24000	–	–	–	–	–	300
		VFW41.600	600	31000	–	–	–	–	–	300

PN 16	-20...120°C	DN	k_{vs} [m³/h]	Δp_s [kPa]						
Data sheet	A6V12436917									
		VFL41.40	40	40	1600	–	1600	–	–	–
		VFL41.50	50	100	1600	–	1600	–	–	–
		VFL41.65	65	155	1600	–	1600	–	–	–
		VFL41.80	80	260	–	1600	–	1600	–	–
		VFL41.100	100	520	–	1200	–	1600	–	–
		VFL41.125	125	820	–	800	–	1000	–	–
		VFL41.150	150	1600	–	–	–	–	1600	–
		VFL41.200	200	4000	–	–	–	–	1000	–
		VFL41.250	250	4550	–	–	–	–	–	1000
		VFL41.300	300	7200	–	–	–	–	–	1000
		VFL41.350	350	10250	–	–	–	–	–	600
		VFL41.400	400	14100	–	–	–	–	–	300
		VFL41.450	450	18500	–	–	–	–	–	–
		VFL41.500	500	24000	–	–	–	–	–	300
		VFL41.600	600	31000	–	–	–	–	–	300

Hand-held adjuster (Type)

For VFW41../VFL41..

Type	DN40	DN50	DN65	DN80	DN100	DN125	DN150	DN200	DN250	DN300	DN350	DN400
ASK41NF04SP	■	■	■									
ASK41NF05SP				■	■	■						
ASK41NF07SP							■	■				
ASK41NF10SP									■	■	■	■



Recommended maximum flow velocity:
VFW41../VFL41..: 4.5 m/s for water

Changeover and open/close ball valves

Typical applications	Actuators	Data sheet					Spring return function [s]	2 Nm	5 Nm	7 Nm	10 Nm	
<ul style="list-style-type: none"> - Boiler plants - Chiller plants - Domestic hot water - Heating groups 	GQD..9A GSD..9A GMA..9E GLB..9E GDB..9E	N4659 N4655 N4658 A6V10636203 A6V10636150										
	Operating voltage	Positioning signal	Positioning time [s]									
			GQD/GSD	GMA	G..B							
	AC 230 V	2-position	30	90	-	15	GQD321.9A	-	GMA321.9E		-	-
		2-position	30	-	-	-	GSD341.9A	-	-		-	-
	AC 100...240 V	2/3-position	-	-	150	-	-	GDB341.9E		-	GLB341.9E	
	AC/DC 24 V	2-position	30	90	-	15	GQD121.9A	-	GMA121.9E		-	-
		2-position	30	-	-	-	GSD141.9A	-	-		-	-
		2/3-position	-	-	150	-	-	GDB141.9E		-	GLB141.9E	

PN 40	-10...120°C	DN	G [Inch]	k _{v5} [m³/h]	Δp _s [kPa]	Δp _{max} [kPa]						
Data sheet	N4214											
												
	VAG60.15-9	15	G 1B	9	1400	350	1400	350	1400	350	1400	350
	VAG60.20-17	20	G 1 ¼B	17	1400	350	1400	350	1400	350	1400	350
	VAG60.25-22	25	G 1 ½B	22	1400	350	1400	350	1400	350	1400	350
	VAG60.32-35	32	G 2B	35	-	-	-	-	1000	350	1000	350
	VAG60.40-68	40	G 2 ¼B	68	-	-	-	-	800	350	800	350
	VAG60.50-96	50	G 2 ¾B	96	-	-	-	-	600	350	600	350

PN 40	-10...120°C	DN	G [Inch]	k _{v5} [m³/h]	Δp _{max} [kPa]	Δp _{max} [kPa]	Δp _{max} [kPa]	Δp _{max} [kPa]
Data sheet	N4214							
								
	VBG60.15-8T	15	G 1B	8	350	350	350	350
	VBG60.20-13T	20	G 1 ¼B	13	350	350	350	350
	VBG60.25-13T	25	G 1 ½B	13	350	350	350	350
	VBG60.32-25T	32	G 2B	25	-	-	350	350
	VBG60.40-49T	40	G 2 ¼B	49	-	-	350	350
	VBG60.50-73T	50	G 2 ¾B	73	-	-	350	350

PN 40	-10...120°C	DN	G [Inch]	k _{v5} [m³/h]	Δp _{max} [kPa]	Δp _{max} [kPa]	Δp _{max} [kPa]	Δp _{max} [kPa]
Data sheet	N4214							
								
	VBG60.15-5 L	15	G 1B	5	350	350	350	350
	VBG60.20-8 L	20	G 1 ¼B	8	350	350	350	350
	VBG60.25-9 L	25	G 1 ½B	9	350	350	350	350
	VBG60.32-13 L	32	G 2B	13	-	-	350	350
	VBG60.40-25 L	40	G 2 ¼B	25	-	-	350	350
	VBG60.50-37 L	50	G 2 ¾B	37	-	-	350	350

PN 40	-10...120°C	DN	Rp [Inch]	k _{v5} [m³/h]	Δp _s [kPa]	Δp _{max} [kPa]						
Data sheet	N4214											
												
	VAI60.15-15	15	Rp ½	15	1400	350	1400	350	1400	350	1400	350
	VAI60.20-22	20	Rp ¾	22	1400	350	1400	350	1400	350	1400	350
	VAI60.25-22	25	Rp 1	22	1400	350	1400	350	1400	350	1400	350
	VAI60.32-35	32	Rp 1 ¼	35	-	-	-	-	1000	350	1000	350
	VAI60.40-68	40	Rp 1 ½	68	-	-	-	-	800	350	800	350
	VAI60.50-96	50	Rp 2	96	-	-	-	-	600	350	600	350

PN 40	-10...120°C	DN	Rp [Inch]	k _{v5} [m³/h]	Δp _{max} [kPa]	Δp _{max} [kPa]	Δp _{max} [kPa]	Δp _{max} [kPa]
Data sheet	N4214							
								
	VBI60.15-12T	15	Rp ½	12	350	350	350	350
	VBI60.20-16T	20	Rp ¾	16	350	350	350	350
	VBI60.25-16T	25	Rp 1	16	350	350	350	350
	VBI60.32-25T	32	Rp 1 ¼	25	-	-	350	350
	VBI60.40-49T	40	Rp 1 ½	49	-	-	350	350
	VBI60.50-73T	50	Rp 2	73	-	-	350	350

PN 40	-10...120°C	DN	Rp [Inch]	k _{v5} [m³/h]	Δp _{max} [kPa]	Δp _{max} [kPa]	Δp _{max} [kPa]	Δp _{max} [kPa]
Data sheet	N4214							
								
	VBI60.15-5L	15	Rp ½	5	350	350	350	350
	VBI60.20-9L	20	Rp ¾	9	350	350	350	350
	VBI60.25-9L	25	Rp 1	9	350	350	350	350
	VBI60.32-13L	32	Rp 1 ¼	13	-	-	350	350
	VBI60.40-25L	40	Rp 1 ½	25	-	-	350	350
	VBI60.50-37L	50	Rp 2	37	-	-	350	350

Refrigerant valves

Typical applications	Valve	Operating voltage	Positioning signal				Auxiliary functions		
– Chiller plants	M2FP03GX	AC 24 V	0...10 V, 4...20 mA, 0...20 Phs				–		
	MVL661..¹⁾	AC/DC 24 V	0...10 V, 2...10 V, 0...20 mA, 4...20 mA				Minimum stroke setting		
	MVS661..N¹⁾	AC/DC 24 V	0...10 V, 2...10 V, 0...20 mA, 4...20 mA				Minimum stroke setting		
	M3FB..LX..	AC 24 V	0...10 V, 4...20 mA, 0...20 Phs				–		
	M3FK..LX..	AC 24 V	0...10 V, 4...20 mA, 0...20 Phs				–		
PN 32	-40...100 °C						k_{vs}	Δp_{max}	
Data sheet	N4731						[m ³ /h]	[kPa]	
	M2FP03GX	Pilot valve						0.3	1800
PS 45	-40...120 °C		DN	Connection	Inner Ø [Inch]	k_{vs} [m ³ /h]	k_{vs} reduced [m ³ /h]	Δp_{max} [kPa]	
Data sheet	N4714								
	MVL661.15-0.4	15	Sleeve	5/8	0.4	0.25	2500		
	MVL661.15-1.0	15	Sleeve	5/8	1	0.63	2500		
	MVL661.20-2.5	20	Sleeve	7/8	2.5	1.6	2500		
	MVL661.25-6.3	25	Sleeve	1 1/8	6.3	4	2500		
	MVL661.32-10	32	Sleeve	1 3/8	10	6.3	1600		
	MVL661.32-12	32	Sleeve	1 3/8	12	7.6	200		
PN 63	-40...120 °C		DN	Connection	Inner Ø [mm]	Outer Ø [mm]	k_{vs} [m ³ /h]	k_{vs} reduced [m ³ /h]	Δp_{max} [kPa]
Data sheet	N4717								
	MVS661.25-016N	25	Weldable, solderable	22.4	33.7	0.16	0.1	2500	
	MVS661.25-0.4N	25	Weldable, solderable	22.4	33.7	0.4	0.25	2500	
	MVS661.25-1.0N	25	Weldable, solderable	22.4	33.7	1	0.63	2500	
	MVS661.25-2.5N	25	Weldable, solderable	22.4	33.7	2.5	1.6	2500	
	MVS661.25-6.3N	25	Weldable, solderable	22.4	33.7	6.3	4	2500	
PN 32	-40...120 °C		DN	Connection	Inner Ø [Inch]	k_{vs} [m ³ /h]	Liquid Δp_{max} [kPa]	Gas Δp_{max} [kPa]	
Data sheet	N4722								
	M3FK15LX06	15	Sleeve	5/8	0.6	200	800		
	M3FK15LX15	15	Sleeve	5/8	1.5	200	800		
	M3FK15LX	15	Sleeve	5/8	3	200	800		
	M3FK20LX	20	Sleeve	7/8	5	200	800		
	M3FK25LX	25	Sleeve	1 1/8	8	200	800		
	M3FK32LX	32	Sleeve	1 3/8	12	200	800		
	M3FK40LX	40	Sleeve	1 1/2	20	200	800		
	M3FK50LX	50	Sleeve	2 1/8	30	200	800		
PS 43	-40...120 °C		DN	Connection	Inner Ø [Inch]	k_{vs} [m ³ /h]	Δp_{max} [kPa]		
Data sheet	N4721								
	M3FB15LX06/A	15	Sleeve	5/8	0.6	2200			
	M3FB15LX15/A	15	Sleeve	5/8	1.5	2200			
	M3FB15LX/A	15	Sleeve	5/8	3	2200			
	M3FB20LX/A	20	Sleeve	7/8	5	1800			
	M3FB25LX/A	25	Sleeve	1 1/8	8	1200			
	M3FB32LX	32	Sleeve	1 3/8	12	800			

¹⁾ Also available as ATEX Zone 2

Symbols

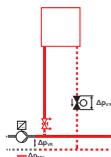
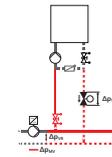
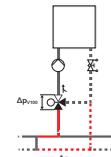
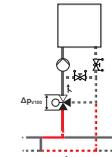
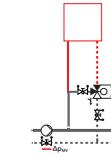
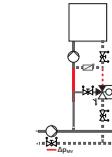
	3-port valve, control path with equal-percentage valve characteristic, bypass with linear valve characteristic.
	3-port valve, control path with equal-percentage valve characteristic, bypass with linear valve characteristic with 70% of the k_{VS} value. This compensates for the flow resistance of the heat exchanger, so that the total volumetric flow \dot{V}_{100} remains as constant as possible.
	2-port valve or 6-port control ball valve in the respective control path with equal-percentage valve characteristic.
	2-port valve or 6-port control ball valve in the respective control path with linear valve characteristic.
	3-port, control path and bypass with linear valve characteristic. Bypass with 70% of the k_{VS} value. This compensates for the flow resistance of the heat exchanger, so that the total flow amount \dot{V}_{100} remains as constant as possible.
	3-port valve, control path and bypass with linear valve characteristic.
	3-port valve, control path and bypass with equal-percentage valve characteristic.

Definitions

Abbr.	Term	Unit	Definition
Δp	Differential pressure	kPa	Pressure differential between plant sections.
Δp_{\max}	Maximum differential pressure	kPa	Maximum permissible differential pressure across the valve's control path (when mixing), valid for the entire actuating range of the motorized valve.
$\Delta p_{\max V}$	Maximum differential pressure	kPa	Maximum permissible differential pressure across the valve's control path (when distributing), valid for the entire actuating range of the motorized valve.
Δp_{\min}	Minimum differential pressure	kPa	Minimum differential pressure required, so that the differential pressure regulator works reliably with control valves (PICV). Δp_{\min} depends on presetting position, see data sheet for details.
Δp_{V0}		kPa	Maximum differential pressure across the valve's closed control path.
Δp_{V100}	Differential pressure at nominal flow rate	kPa	Differential pressure across the fully open valve and the valve's control path by a volumetric flow \dot{V}_{100} .
Δp_s	Closing pressure	kPa	For 2-port valves, maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close off pressure). Only valid for 2-port valves.
Δp_{MV}		kPa	Differential pressure across the variable flow path. Often Δp_{MV} is not known, in which case typical values can be used.
Δp_{VR}		kPa	Differential pressure between flow and return.
ΔT	Temperature spread	K	Temperature differential between flow and return.
DN	Nominal size		Characteristic for matching parts of the piping system.
H_0	Shutoff head	m	The head generated by a pump at closed valve, at a given speed and a given pump medium.
H_{100}	Valve fully open		Stroke of fully open valve.
kPa	Pressure	kPa	100 kPa = 1 bar = 10 mWS.
mWC	Meter water column	m	
k_V	Nominal flow	m ³ /h	Amount of cold water (5...30°C) passing through the valve at the respective stroke and at a differential pressure of 100 kPa (1 bar).
k_{VS}	Nominal flow rate	m ³ /h	Nominal flow rate of cold water (5...30°C) through the fully open valve (H_{100}) at a differential pressure of 100 kPa (1 bar).
	Spring return function		Shutoff in the event of a power failure.
PN	PN class		Characteristic relating to the combination of mechanical and dimensional properties of a component in the piping system.
PS	PS class		Maximum allowable pressure.
P_V	Valve authority		Ratio of differential pressure across fully open valve (H_{100}) and differential pressure across valve and variable flow path. To ensure control, a minimum valve authority of 0.25 is required. $P_V \geq 0.5$ is recommended for good controllability.
Q_{100}	Rated capacity	kW	Plant's design capacity.
\dot{V}_{100}	Volumetric flow	m ³ /h	Volumetric flow with valve fully open (H_{100}).
\dot{V}_{\min}	Minimum volumetric flow	m ³ /h	Smallest presettable volumetric flow through the fully open combi valve (H_{100}).
c	Specific heat capacity	kJ/kgK	
ρ	Specific density	kg/m ³	

Valve sizing and actuator selection

Basic hydronic circuit

1	Determine the type of hydronic circuit	Throttling circuit	Injection circuit with 2-port valve	Mixing circuit	Mixing circuit with fixed premixing	Diverting circuit	Injection circuit with 3-port valve
— For valve sizing relevant variable flow path							

HVAC plants and consumers

Heating

Surface/floor heating	—	■	—	■	—	outdated
Heating plant (primary)	—	■	■	■	—	outdated
Zone control, heating	—	■	—	—	—	outdated
Heating groups	—	■	■	■	—	—
Generation of heat energy	—	—	■	■	—	—
Heat exchanger water-water	■	uncommon	—	—	uncommon	uncommon

Ventilation and air conditioning plants

Air handling unit	■	■	■	—	—	outdated
Fan coil unit	■	—	—	—	—	outdated
Cooling coil	dehumidifying	■	—	—	—	uncommon
Reheating coil	■	■	uncommon	uncommon	—	outdated
Preheating coil	—	■	uncommon	uncommon	—	outdated
VAV	■	—	—	—	—	outdated
Zone control	■	—	—	—	—	outdated

Chiller plants

Surface/floor cooling	—	■	—	—	—	outdated
Generation of cooling energy	—	—	■	■	—	—
Cooling towers	■	—	—	—	—	outdated
Zone control, cooling	—	■	—	—	—	outdated

District heating and cooling

District heating, primary	■	uncommon	uncommon	uncommon	—	—
District heating, secondary	■	■	uncommon	uncommon	—	—
District cooling, primary	■	uncommon	uncommon	uncommon	—	—
District cooling, secondary	■	■	uncommon	uncommon	—	—

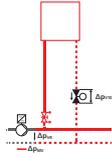
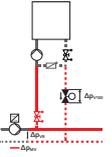
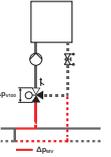
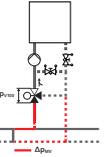
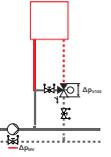
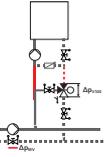
Hot water

Hot water directly	—	■	■	—	—	—
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Header

Differential pressure header	pressurized		pressureless		pressurized
Volumetric flow		variable			constant

Valve sizing and selection: k_{vs} valves and actuators

1 Determine the type of hydronic circuit	Throttling circuit	Injection circuit with 2-port valve	Mixing circuit	Mixing circuit with fixed pre-mixing	Diverting circuit	Injection circuit with 3-port valve
For valve sizing relevant variable flow path						

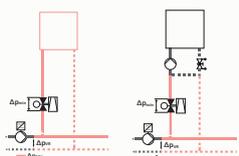
Determine volumetric flow \dot{V}

2	Δp_{VR} or Δp_{MV}	Δp_{VR}	Δp_{VR}	$3 \dots 12^1$ kPa	$3 \dots 12^1$ kPa	Δp_{MV}	$10 \dots 50$ kPa	$2 \dots 5$ kPa
	typical range	10...200 kPa	10...200 kPa	3...12 ¹⁾ kPa	3...12 ¹⁾ kPa	10...50 kPa	10...50 kPa	2...5 kPa
	typical value	Use effective Δp_{VR} value		3 kPa	3 kPa	eff. value Δp_{MV}	3 kPa	3 kPa
3	Determine Δp_{V100}	$\Delta p_{V100} \geq \frac{\Delta p_{VR}}{2} \quad (P_v \geq 0.5)$			$\Delta p_{V100} \geq \Delta p_{MV} \quad (P_v \geq 0.5)$			
4	Calculate \dot{V}_{100}	Water	$\dot{V}_{100} = \frac{\dot{Q}_{100}}{1.163 \cdot \Delta T}$		Water with anti-freeze	$\dot{V}_{100} = \frac{\dot{Q}_{100} \cdot 3600}{c \cdot \rho \cdot \Delta T}$		
5	Determine k_{vs} value	$k_v = \dot{V}_{100} \cdot \sqrt{\frac{100 \text{ kPa}}{\Delta p_{V100}}} \Rightarrow k_{vs} \geq 0.85 \cdot k_v \text{ value}$						
6	Check resulting Δp_{V100}	$\Delta p_{V100} = 100 \text{ kPa} \cdot \left(\frac{\dot{V}_{100}}{k_{vs}}\right)^2$						

Selection of valve and actuator

7	Select suitable valve series	1. Type of valve (2-port, 3-port, 3-port with bypass) 2. Connections (flanged, threaded, soldered)	3. PN class 4. Nominal size DN	5. Max. / min. medium temperature 6. Medium	
8	Check valve authority P_v	$P_v = \frac{\Delta p_{V100}}{\Delta p_{VR}} = 0.25 \dots 0.8$	$P_v = \frac{\Delta p_{V100}}{\Delta p_{V100} + \Delta p_{MV}} = 0.25 \dots 0.8$		
9	Select actuator	1. Operating voltage 2. Positioning signal 3. Positioning time 4. Spring return function 5. Auxiliary functions			
10	Check working range	1. Differential pressure $\Delta p_{max} > \Delta p_{V0}$ 2. Closing pressure $\Delta p_s > H_0$			
11	Selection	Valve and suitable actuator			

Valve sizing and selection: Intelligent Valves, PICVs and actuators

1	Determine the type of hydronic circuit	Throttling circuit or Injection circuit with 2-port valve (e.g. PICV)
		

Determine volumetric flow \dot{V}

2	Determine \dot{Q}_{100}	\dot{Q}_{100}			
3	Determine ΔT	ΔT			
4	Calculate \dot{V}	Water	$\dot{V}_{100} = \frac{\dot{Q}_{100}}{1.163 \cdot \Delta T}$	Water with anti-freeze	$\dot{V}_{100} = \frac{\dot{Q}_{100} \cdot 3600}{c \cdot \rho \cdot \Delta T}$

Select valve and actuator

5	Select suitable valve	1. Type of valve (with/without P/T plugs) 4. Connection (flanged, threaded)	2. PN class 5. Nominal size DN	3. Max. / min. medium temperature 6. Medium	
6	Determine presetting	Determine presetting using the volumetric flow/dial table in data sheet of the respective PICV			
7	Select actuator for PICV	1. Operating voltage 2. Positioning signal 3. Positioning time 4. Auxiliary functions			
8	Check working range	1. $\Delta p < \Delta p_{max}$ – maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve 2. $\Delta p > \Delta p_{min}$ – minimum differential pressure required across the valve's control path, so that the differential pressure regulator works reliably			

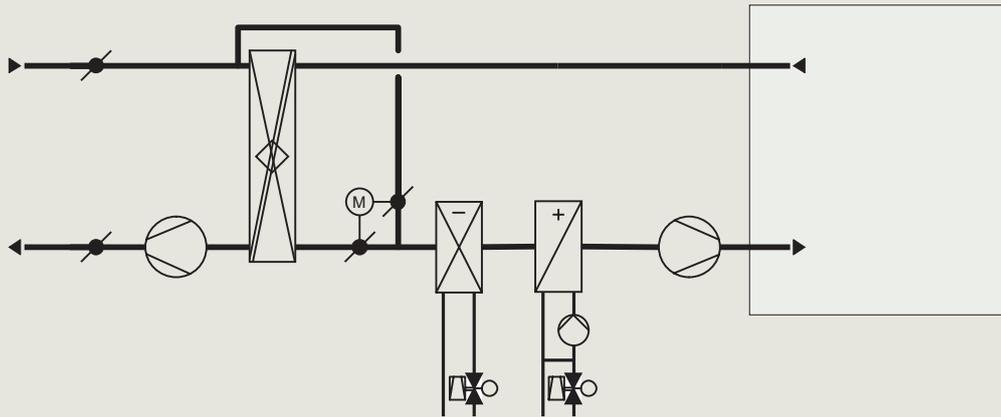
Or just use the Acvatix slide ruler, the online tool for simple valve sizing, to find the right valve with actuator.



Or just install the Combi Valve (PICV) Sizer on your smartphone to find the right PICV with actuator.



Air handling unit with cooling coil (cooling/de-humidification) and reheating coil, with PICVs



Plant data	Cooling coil	Heating coil
Cooling/heating power \dot{Q}_{100}	75 kW	65 kW
Supply temperature producer θ_{Producer}	6 °C	55 °C
Temperatures Supply/Return $\theta_{\text{Supply}} / \theta_{\text{Return}}$	6/12 °C	50/35 °C
Temperature difference	6 K	20 K
Medium	Water	Water
Differential pressure Δp_{MV} no balancing valve required	57 kPa	12 kPa
Shutoff head pump H_0 (resp. Δp_{v0})	18 mWC (180 kPa)	14 mWC (140 kPa)
Positioning signal	0...10 V	0...10 V

	Cooling coil	Reheating coil
1 Determine Volumetric flow \dot{V}_{100}		
$\dot{V}_{100} = \frac{\dot{Q}_{100}}{1.163 \cdot \Delta T}$ <p>decisive temperature difference</p> <p>Constant 1.163: with density $\rho = 1000 \text{ kg/m}^3$, 3600 s/h and specific heat capacity $c = 4.187 \text{ kJ/(kg}\cdot\text{K)}$</p>	$\dot{V}_{100} = \frac{75 \text{ kW}}{1.163 \cdot 6 \text{ K}} = 10.75 \text{ m}^3/\text{h}$ $\theta_{\text{Return cooling coil}} - \theta_{\text{Producer}} = (12 - 6) \text{ }^\circ\text{C} = 6 \text{ K}$	$\dot{V}_{100} = \frac{65 \text{ kW}}{1.163 \cdot 20 \text{ K}} = 2.79 \text{ m}^3/\text{h}$ $\theta_{\text{Producer}} - \theta_{\text{Return heating coil}} = (55 - 35) \text{ }^\circ\text{C} = 20 \text{ K}$
<p>Hydronic circuit</p> <p>— Δp_{MV} Differential pressure variable flow path</p> <p>$\Delta p_{VR} = \Delta p_{\min} + \Delta p_{MV}$</p>	<p>Throttling circuit</p>	<p>Injection circuit with 2-port valve</p>
Distribution setup	Pressurized with variable volumetric flow (primary pump controlled)	

	Cooling coil	Reheating coil
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2 Determine minimally required differential pressure Δp_{min} (from data sheet)		
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Cooling coil VPP44.50F15	VPP44.50F15																					
	15 m³/h nominal																					
	\dot{V} [m ³ /h]				3.7	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.2	10.0	11.0	11.9	12.6	13.2	13.5	13.8	14.1	14.3
	Dial	Min.	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	Max
Δp_{min} [kPa]				13	14	15	16	16	17	18	18	19	20	21	21	22	23	23	24	25	25	
Reheating coil VPP46.32F4Q	VPP46.32F4, VPP46.32F4Q, VPI46.32F4, VPI46.32F4Q																					
	4000 l/h nominal																					
	\dot{V} [l/h]				550	800	910	1110	1320	1520	1720	1930	2130	2330	2530	2740	2940	3140	3350	3550	3750	4001
	Dial	Min.	0.2	0.4	0.5	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8
Δp_{min} [kPa]				17.9	18	18.1	18.2	18.3	18.5	18.7	18.9	19.2	19.6	20.1	20.7	21.4	22.3	23.4	24.6	26	28	
Δp_{min}	$\Delta p_{min} = 21$ kPa										$\Delta p_{min} = 21$ kPa											
Presetting	Dial = 2.55										Dial = 2.85											
Total resistance Δp_{VR} for primary pump	$\Delta p_{VR} = \Delta p_{MV} + \Delta p_{min} = 57$ kPa + 21 kPa $\Delta p_{VR} = 78$ kPa (7.8 mWC)										$\Delta p_{VR} = \Delta p_{MV} + \Delta p_{min} = 12$ kPa + 21 kPa $\Delta p_{VR} = 33$ kPa (3.3 mWC)											

3 Select suitable valve type		
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Type of valve	PICV (with linear characteristic)	PICV (with linear characteristic)
Connection type	Flange	External thread
Nominal pressure level PN	PN 16	PN 16
Selected valve	VPP44.50F15 (with measuring points)/piping size DN 50	VPP46.32F4Q (with measuring points)/piping size DN 32

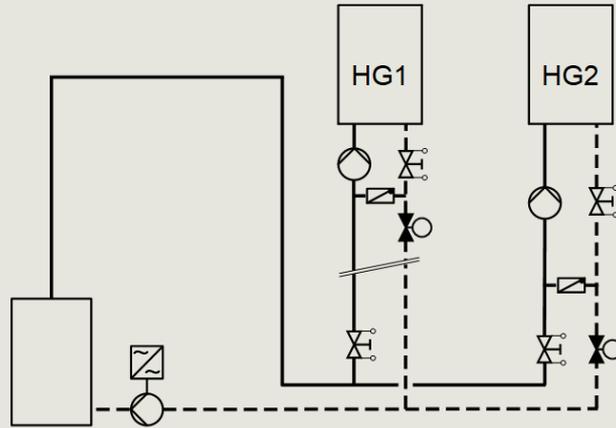
4 Select valve actuator		
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Actuator type	SAX.. with 20 mm stroke	SSA.. with 5.5 mm stroke
Operating voltage	AC 24 V	AC 24 V
Positioning signal	0...10 V	0...10 V
Positioning time	30 s	55 s
Spring return function	no	no
Additional functions	none	none
Selected actuator	SAX61P03, with selectable characteristic → equal percentage <i>fits well to cooling coil transfer characteristic</i>	SSA161E.05HF → with equal percentage characteristic <i>fits well to reheating coil transfer characteristic</i>
$\Delta p_{max} \geq \Delta p_{V0} (H_0)$	600 kPa \geq 180 kPa	600 kPa \geq 140 kPa

Selection		
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PICV	VPP44.50F15 (with measuring points)	VPP46.32F4Q (with measuring points)
Valve actuator	SAX61P03	SSA161E.05HF

Heating plant with pressurized distribution, with k_{VS} -valves (2-port)



Plant data	Heating group 1 (ventilation)	Heating group 2 (floor heating)
Heating group power \dot{Q}_{100}	55 kW	60 kW
Supply temperature producer θ_{Producer}	50 °C	50 °C
Temperatures Supply/Return $\theta_{\text{Supply}} / \theta_{\text{Return}}$	50/40 °C	35/28 °C
Temperature spread	see below	see below
Medium	Water	Water
Differential pressure Δp_{MV}	see below	see below
Shutoff head pump H_0 (resp. Δp_{V0})	4.5 mWC (45 kPa)	4.5 mWC (45 kPa)
Positioning signal	3-position	3-position

	Heating group 1 (ventilation)	Heating group 2 (floor heating)
1 Determine Volumetric flow \dot{V}_{100}		
$\dot{V}_{100} = \frac{\dot{Q}_{100}}{1.163 \cdot \Delta T}$ decisive temperature difference Constant 1.163: with density $\rho = 1000 \text{ kg/m}^3$, 3600 s/h and specific heat capacity $c = 4.187 \text{ kJ/(kg}\cdot\text{K)}$	$\dot{V}_{100} = \frac{55 \text{ kW}}{1.163 \cdot 10 \text{ K}} = 4.73 \text{ m}^3/\text{h}$ $\theta_{\text{Supply HG 1}} - \theta_{\text{Return HG 1}} = (50 - 40) \text{ °C} = 10 \text{ K}$	$\dot{V}_{100} = \frac{60 \text{ kW}}{1.163 \cdot 27 \text{ K}} = 1.91 \text{ m}^3/\text{h}$ $\theta_{\text{Producer}} - \theta_{\text{Return HG 2}} = (50 - 28) \text{ °C} = 22 \text{ K}$ Pre-mixing to 35 °C is also achieved by correct hydronic balancing with balancing valves.

	Heating group 1 (ventilation)	Heating group 2 (floor heating)
2 Determine Differential pressure Δp_{V100}		
Hydronic circuit Δp_{MV} Differential pressure across variable flow path $\Delta p_{VR} = \Delta p_{\text{min}} + \Delta p_{MV}$ Note on heating group 1 (ventilation): in case of long distance to the AHU, timely heating water supply must be ensured.	Injection circuit with 2-port valve 	Injection circuit with 2-port valve (with pre-mix to 35 °C)

Distribution setup	Pressurized with variable flow rate (primary pump controlled)	
Δp_{VR} typical range according to planner's specification	10...200 kPa ca. 20 kPa (for HG1, ventilation)	10...200 kPa 18.7 kPa (like $\Delta p_{VR \text{ HG1}}$)
Δp_{V100}	$\Delta p_{V100} \geq \Delta p_{VR}/2$ (resp. $P_V \geq 0.5$)	$\Delta p_{V100} = \Delta p_{VR \text{ HG1}} - \Delta p_{VR \text{ HG2}} = 18.7 \text{ kPa} - 5 \text{ kPa}$
Desired differential pressure	$\Delta p_{V100} \geq 10 \text{ kPa}$	$\Delta p_{V100} \geq 13.7 \text{ kPa}$

	Heating group 1 (ventilation)	Heating group 2 (floor heating)
3 Determine desired flow k_v		
$k_v = \dot{V}_{100} \cdot \sqrt{\frac{100 \text{ kPa}}{\Delta p_{V100}}}$	$k_v = 4.73 \text{ m}^3/\text{h} \cdot \sqrt{\frac{100 \text{ kPa}}{10 \text{ kPa}}} = 15.0 \text{ m}^3/\text{h}$	$k_v = 2.35 \text{ m}^3/\text{h} \cdot \sqrt{\frac{100 \text{ kPa}}{12.7 \text{ kPa}}} = 6.6 \text{ m}^3/\text{h}$
4 Select valve nominal flow rate k_{VS} and determine resulting differential pressure $\Delta p_{V100 \text{ res}}$		
$k_{VS} \geq 0.85 \cdot k_v\text{-value}$	$k_{VS} \geq 0.85 \cdot 15.0 \text{ m}^3/\text{h} = 12.8 \text{ m}^3/\text{h}$ selected: $k_{VS} = 16 \text{ m}^3/\text{h}$	$k_{VS} \geq 0.85 \cdot 6.6 \text{ m}^3/\text{h} = 5.6 \text{ m}^3/\text{h}$ selected: $k_{VS} = 6.3 \text{ m}^3/\text{h}$
resulting $\Delta p_{V100 \text{ res}}$		
$\Delta p_{V100 \text{ res}} = 100 \text{ kPa} \cdot \left(\frac{\dot{V}_{100}}{k_{VS}}\right)^2$	$\Delta p_{V100 \text{ res}} = 100 \text{ kPa} \cdot \left(\frac{4.73 \text{ m}^3/\text{h}}{16 \text{ m}^3/\text{h}}\right)^2$ $\Delta p_{V100 \text{ res}} = 8.7 \text{ kPa}$	$\Delta p_{V100 \text{ res}} = 100 \text{ kPa} \cdot \left(\frac{2.35 \text{ m}^3/\text{h}}{6.3 \text{ m}^3/\text{h}}\right)^2$ $\Delta p_{V100 \text{ res}} = 13.9 \text{ kPa}$
5 Check valve authority P_v (control stability)		
$P_v = \frac{\Delta p_{V100 \text{ res}}}{\Delta p_{V100 \text{ res}} + \Delta p_{MV}}$ and $0.25 < P_v < 0.8$	$P_v = \frac{8.7 \text{ kPa}}{8.7 \text{ kPa} + 10 \text{ kPa}}$ $P_v = 0.47$ (close to 0.5)	$P_v = \frac{13.9 \text{ kPa}}{13.9 \text{ kPa} + 5 \text{ kPa}}$ $P_v = 0.74$
6 Select suitable valve type		
Type of valve	2-port valve	2-port valve
Connection type	External thread	External thread
Nominal pressure level PN	PN 16	PN 16
Possible valve type(s)	VVG44.., VVG41..	VVG44.., VVG41..
Selected valve	VVG41.32-16 with $k_{VS} = 16 \text{ m}^3/\text{h}$ piping size DN 32, stroke = 20 mm with equal percentage/linear characteristic Fits well with reheat transfer behavior	VVG20-6.3 with $k_{VS} = 6.3 \text{ m}^3/\text{h}$ piping size DN 20, stroke = 5.5 mm with linear characteristic Fits well with the flow temperature control
7 Check valve working range		
Medium	VVG41 suitable for water	VVG44 suitable for water
Medium temperature	40 °C > -25 °C min. medium temperature 50 °C < 150 °C max. medium temperature	28 °C > 1 °C min. medium temperature 35 °C < 120 °C max. medium temperature
8 Select actuator		
	Controlled by the ventilation control	Controlled by the heating control
Actuator type	SAX.. with 20 mm stroke	SAS.. with 5.5 mm stroke
Operating voltage	AC 24 V	AC 230 V
Positioning signal	0...10 V	3-point (open – 0 – close)
Positioning time	30 s	120 s
Spring return function	No	No
Additional functions	None	None
Selected actuator	SAX61.03	SAS31.00
9 Check actuator working range		
Differential pressure $\Delta p_{\text{max}} \geq \Delta p_{V0} (H_0)$	$\Delta p_{\text{max}} = 800 \text{ kPa} \geq 18.7 \text{ kPa}$	$\Delta p_{\text{max}} = 400 \text{ kPa} \geq 18.7 \text{ kPa}$
Closing pressure $\Delta p_s \geq \Delta p_{V0} (H_0)$	$\Delta p_s = 875 \text{ kPa} \geq 18.7 \text{ kPa}$	$\Delta p_s = 750 \text{ kPa} \geq 18.7 \text{ kPa}$
Selected actuator	SAX61.03 (no spring return/additional functions)	SAS31.00 (no spring return/additional functions)
Selection		
Valve	VVG41.32-16 with $k_{VS} = 16 \text{ m}^3/\text{h}$	VVG44.20-6.3 with $k_{VS} = 6.3 \text{ m}^3/\text{h}$
Actuator	SAX61.03	SAS31.00

Smart Infrastructure combines the real and digital worlds across energy systems, buildings and industries, enhancing the way people live and work and significantly improving efficiency and sustainability.

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