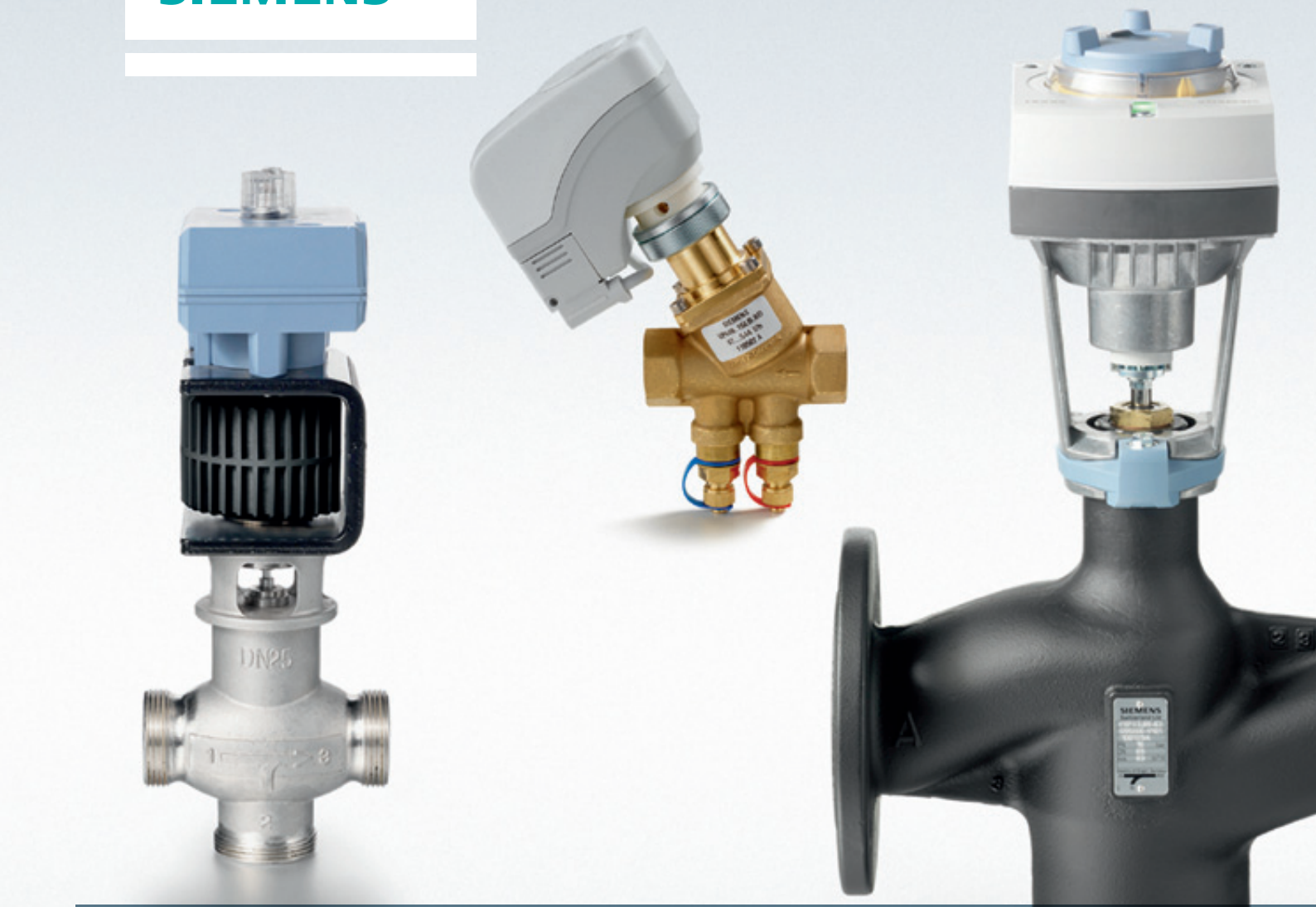
SIEMENS



Acvatix – the comprehensive range for greater energy efficiency

Reliable and economical valves and actuators for any type of application

iF product design award 2012: SAX and SAL

product design award 2012

Answers for infrastructure.

Acvatix – the crucial components for every economical and efficient HVAC plant

With Acvatix™, you decide for a comprehensive range of valves and actuators that stand for maximum control accuracy, energy efficiency and easy handling. Whether you select valves with electrohydraulic actuators, with magnetic actuators or combi valves, Acvatix significantly reduces energy consumption and thus operating costs. The reduced number of valve variants as well as new, optimized large-stroke valves facilitate product selection.

The extensive Acvatix product range offers you valves and actuators with a long service life that meet any control or hydraulic requirements when it comes to the generation, distribution and usage of heating or cooling energy. For you, this means that you are ideally prepared for any type of application with very small to very high volumetric flows or differential pressures.

Sophisticated valves and actuators – long-lasting, convenient and accurate

A safe investment thanks to high quality and backward compatibility

With Acvatix, you decide for a rugged design, high level of reliability and low maintenance. Thanks to the unique backward compatibility of more than 30 years, the range also offers you long-term investment protection. This means that you can exchange any installed valve actuator combination with a replacement product, thus saving both time and money. At the same time, you benefit from state-of-the-art technology – and increased energy efficiency.

Intelligent comfort for optimal plant operation

Acvatix enables quick commissioning and efficient plant control. For example, you can quickly and easily install and commission the actuators of the new generation thanks to their user-friendly handling. Clearly visible operating status and position indication speed up commissioning, testing and plant maintenance and support fault tracing.

Full support in every respect

Whether for planning, commissioning or service, Siemens offers you a variety of tools. For example, the HVAC Integrated Tool (HIT) supports you in selecting the appropriate products. It also provides all available documents like data sheets and mounting instructions for the respective product. Moreover, valve slide rules and product exchange tools make your daily work easier. Practice-oriented trainings bring you up-to-date. And the global sales and service network from Siemens supports you in every project phase – competently and reliably.

Best quality based on many years of experience

Acvatix valves and actuators come from Siemens' own development and production facilities. They are further developed based on the many years of field experience and tested intensively in Siemens' own HVAC laboratory. The result: For decades, Acvatix products have been used successfully millions of times worldwide. Therefore, you will receive the best quality and greatest reliability.

Highlights

- Comprehensive range with easy product selection, installation and commissioning
- Unique variety for the entire hydraulic circuit and all types of application (heating, cooling, chilling, refrigeration, drinking water and steam)
- High energy efficiency thanks to high control accuracy and speed
- Investment protection through rugged design, high level of reliability and backward compatibility
- Intelligent comfort thanks to easy handling and visible operating status and position indication
- Full support during planning, engineering and service
- High, tested quality based on many years of experience plus own development and production

										Recommended media																		
		2-port valve	3-port valve	4-port valve	PN class	Type of connection	Silicon-free grease	Closed circuits	Open circuits	Chilled water	Cooling water [2]	Drinking water	Low temperature hot water	High temperature hot water	Water with anti-freeze [3]	Brines	Saturated steam	Superheated steam	Heat transfer oil	Media containing mineral oils	Mineral oil SAE05 ... SAE50	Diesel fuels based on mineral oil	Safety refrigerants	R744 (CO_2)	R717 (ammonia)	Air
Central HVAC plants	M3P..FY	■	■		16	F		■		■			■		■												
	M3P..FYP	■	■		16	F		■											■	■	■	■					
	MXF461..	■	■		16	F		■		■			■		■												
	MXF461..M	■	■		16	F	■	■		■			■		■												
	MXF461..P	■	■		16	F		■											■	■	■	■					
	MXG461..	■	■		16	ET		■		■			■		■												
	MXG461B..	■	■		16	ET		■	■	■	■	■	■		■												
	MXG461..M	■	■		16	ET	■	■		■			■		■												
	MXG461..P	■	■		16	ET		■											■	■	■	■					
	MXG461S..	■	■		16	ET		■	■	■	■		■		■												
	MXG462S..	■	■		16	ET		■	■	■	■		■		■												
	MVF461H..	■			16	F		■		■			■	■	■		■	■									
	VAI61..	■			40	IT	■	■		■			■	■	■												
	VBF21..		■		6	F		■					■	■													
	VBG31..		■		10	ET		■					■	■													
	VBI31..		■		10	IT		■					■	■													
	VBI61..		■		40	IT	■	■		■			■	■	■												
	VCI31..			■	10	IT		■					■	■													
	VKF41..	■			16	F		■		■			■	■	■	■											
	VKF46..	■			16	F		■	■	■	■		■		■	■											■
	VVF21..	■			6	F	■	■		■			■	■	■	■											
	VVF31..	■			10	F	■	■		■			■	■	■	■											
	VVF40..	■			16	F	■	■		■			■	■	■	■											
	VVF43..	■			16	F	■	■	■	■	■		■	■	■	■	■	■	■								
	VVF53..	■			25	F	■	■	■	■	■		■	■	■	■	■	■	■								
	VVF61..	■			40	F		■	■	■	■		■	■	■	■	■	■	■								
	VVF61..2	■			40	F		■											■								
	VVF61..5	■			40	F	■	■	■	■	■		■	■	■	■	■	■	■								
	VVG41..	■			16	ET	■	■	■	■	■		■	■	■	■	■	■									
	VVG44..	■			16	ET	■	■		■			■		■												
	VVG55..	■			25	ET	■	■		■			■	■	■												
	VXF21..		■		6	F	■	■		■			■	■	■	■											
	VXF31..		■		10	F	■	■		■			■	■	■	■											
	VXF40..		■		16	F	■	■		■			■	■	■	■											
	VXF43..		■		16	F	■	■	■	■	■		■	■	■	■			■								
	VXF53..		■		25	F	■	■	■	■	■		■	■	■	■			■								
	VXF61..		■		40	F		■	■	■	■		■	■	■	■			■								
	VXF61..2		■		40	F		■											■								
	VXF61..5		■		40	F	■	■	■	■	■		■	■	■	■			■								
	VXG41..		■		16	ET	■	■	■	■	■		■	■	■	■											
	VXG41..01 [1]		■		16	ET	■	■	■	■	■	■	■	■	■	■											
	VXG44..		■		16	ET	■	■		■			■		■												
Room and zone applications	VD1..CLC	■			10	ET		■		■			■		■												
	VDN../VEN../VUN..	■			10	ET		■		■			■		■												
	VMP45..		■		16	ET		■		■			■		■												
	VMP47..		■		16	ET		■		■			■		■												
	VPD../VPE..	■			10	ET		■		■			■		■												
	VPI45.. [4]	■			25	IT		■		■			■		■												
	VPI46.. [4]	■			25	IT		■		■			■		■												
	VPP46.. [4]	■			25	ET		■		■			■		■												
	VVI46..	■			16	IT		■		■			■		■												
	VVP45..	■			16	ET		■		■			■		■												
	VVP47..	■			16	ET		■		■			■		■												
	VXI46..		■		16	IT		■		■			■		■												
	VXP45..		■		16	ET		■		■			■		■												
	VXP47..		■		16	ET		■		■			■		■												
Refrigera-tion systems	M2FP03GX				32	–		■															■		■	
	M3FB..LX..		■		PS 43	S		■															■			
	M3FK..LX..		■		32	S		■															■			
	MVL661..	■			PS 45	S		■															■	■		
	MVS661..N	■			PS 53	W		■															■	■	■	

Recommendation: Water treatment according to VDI 2035

[1] Sealed bypass

[2] Open circuits

[3] E.g. ethylene and propylene glycols

[4] As zone valve for floor heating systems

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

Permissible medium temperature [°C]																			Generation				Distribution			Consumption/Use								
-40	-25	-20	-10	0	1	...	90	100	110	120	130	150	180	220	350	Boiler plants	District heating	Chiller plants	Cooling towers [2]	Domestic hot water (DHW)	Heating groups	Air handling units	Floor heating	Radiators	Zone control	Fan coil units	Chilled ceilings	Variable air volume (VAV)		
																	■	■		■	■								M3P.. FY	Central HVAC plants
																					■								M3P.. FYP	
											■						■	■		■	■	■							MXF461..	
											■						■	■		■	■	■							MXF461..M	
																					■								MXF461..P	
																	■	■		■	■	■							MXG461..	
																		■		■	■								MXG461B..	
											■						■	■		■	■	■							MXG461..M	
																					■								MXG461..P	
																		■	■		■	■							MXG461S..	
																		■	■		■	■							MXG462S..	
											■	■				■	■	■		■	■	■							MVF461H..	
																■		■		■	■	■							VAI61..	
																■					■								VBF21..	
																■					■								VBG31..	
																■					■								VBI31..	
																■		■		■	■	■							VBI61..	
																■					■								VCI31..	
																■		■			■								VKF41..	
																■		■	■	■	■								VKF46..	
											■					■		■		■	■	■							VVF21..	
											■					■	■	■		■	■	■							VVF31..	
											■					■	■	■		■	■	■							VVF40..	
											■	■	■			■	■	■	■	■	■	■							VVF43..	
											■	■	■			■	■	■	■	■	■	■							VVF53..	
											■	■	■			■	■	■		■	■	■							VVF61..	
															■	■					■								VVF61..2	
											■	■	■			■	■	■	■	■	■	■							VVF61..5	
											■	■	■			■	■	■		■	■	■							VVG41..	
											■	■	■			■	■	■		■	■	■							VVG44..	
												■	■			■	■	■		■	■	■							VVG55..	
											■					■	■	■		■	■	■							VXF21..	
											■					■	■	■		■	■	■							VXF31..	
											■					■	■	■		■	■	■							VXF40..	
											■	■	■			■	■	■	■	■	■	■							VXF43..	
											■	■	■			■	■	■	■	■	■	■							VXF53..	
											■	■	■			■	■	■	■	■	■	■							VXF61..	
															■	■					■								VXF61..2	
											■	■	■			■	■	■	■	■	■	■							VXF61..5	
											■	■	■			■	■	■		■	■	■							VXG41..	
											■	■	■			■	■	■	■	■	■	■							VXG41..01 [1]	
											■		■			■	■	■		■	■	■							VXG44..	
																							■		■	■	■	■	VD1..CLC	Room and zone applications
																								■					VDN../VEN../VUN..	
																									■	■		■	VMP45..	
																									■	■		■	VMP47..	
																							■	■	■	■	■	■	VPD../VPE..	
																					■	■	■		■	■	■	■	VPI45.. [4]	
																							■		■	■	■	■	VPI46.. [4]	
																							■		■	■	■	■	VPP46.. [4]	
																							■		■	■	■	■	VVI46..	
																					■	■	■		■	■	■	■	VVP45..	
																							■		■	■	■	■	VVP47..	
																							■		■	■		■	VXI46..	
																					■	■	■		■	■		■	VXP45..	
																							■		■	■		■	VXP47..	
																		■											M2FP03GX	Refrigera-tion systems
																		■											M3FB..LX..	
																		■											M3FK..LX..	
																		■											MVL661..	
																		■											MVS661..N	

Flanged 2-port and 3-port valves with 20/40 mm actuators

Typical applications	Actuators	Data sheet
– Heating plants – Ventilation and air conditioning plants – Heat and cooling generation – Heat and cooling distribution	**SAX..**	N4501
	SKD..	N4561
	SKB..	N4564
	SKC..	N4566

Operating voltage	Positioning signal	Positioning time [s] SAX	SKD	SKB/SKC	Spring return function	20 mm 800 N	20 mm 1000 N	20 mm 2800 N	40 mm 2800 N
AC 230 V	3-position	120	120	120	–	**SAX31.00**	**SKD32.50**	**SKB32.50**	**SKC32.60**
	3-position	–	120	120	✓	**–**	**SKD32.51**	**SKB32.51**	**SKC32.61**
	3-position	30	–	–	–	**SAX31.03**	**–**	**–**	**–**
	3-position	–	30	–	✓	**–**	**SKD32.21**	**–**	**–**
AC 24 V [1]	3-position	120	120	120	–	**SAX81.00**	**SKD82.50**	**SKB82.50**	**SKC82.60**
	3-position	–	120	120	✓	**–**	**SKD82.51**	**SKB82.51**	**SKC82.61**
	3-position	30	–	–	–	**SAX81.03**	**–**	**–**	**–**
	0...10 V, 4...20 mA	–	30	120	–	**–**	**SKD60**	**SKB60**	**SKC60**
	0...10 V, 4...20 mA	–	30	120	✓	**–**	**SKD62**	**SKB62**	**SKC62**
AC/DC 24 V	0...10 V, 4...20 mA	30	–	–	–	**SAX61.03**	**–**	**–**	**–**

PN 6	-10...150 °C		DN	k_{vs}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}
Data sheet	N4310	N4410		[m³/h]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]
	VVF21.22..25 [2]	**VXF21.22..25** [2]	25	1.9 / 3 / 5 / 7.5	600	300	600	300	600	300	–	–
	VVF21.25-.. [3]	**VXF21.25-..** [3]	25	2.5 / 4 / 6.3 / 10	600	300	600	300	600	300	–	–
	VVF21.39..40 [2]	**VXF21.39..40** [2]	40	12 / 19	500	300	600	300	600	300	–	–
	VVF21.40-..	**VXF21.40-..**	40	16 / 25	500	300	600	300	600	300	–	–
	VVF21.50	**VXF21.50**	50	31	300	300	450	300	600	300	–	–
	VVF21.50-40	**VXF21.50-40**	50	40	300	300	450	300	600	300	–	–
	VVF21.65	**VXF21.65**	65	49	175	175	275	275	600	300	–	–
	VVF21.65-63	**VXF21.65-63**	65	63	175	175	275	275	600	300	–	–
	VVF21.80	**VXF21.80**	80	78	100	100	175	175	500	300	–	–
	VVF21.80-100	**VXF21.80-100**	80	100	100	100	175	175	500	300	–	–
	VVF21.90	**VXF21.90**	100	124	–	–	–	–	–	–	300	200
	VVF21.100-160	**VXF21.100-160**	100	160	–	–	–	–	–	–	300	200
PN 10	-10...150 °C		DN	k_{vs}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}
Data sheet	N4320	N4420		[m³/h]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]
	VVF31.15-.. [3]	**VXF31.15-..** [3]	15	2.5 / 4	1000	300	1000	300	1000	300	–	–
	VVF31.24..25 [2]	**VXF31.24..25** [2]	25	5 / 7.5	1000	300	1000	300	1000	300	–	–
	VVF31.25-..	**VXF31.25-..**	25	6.3 / 10	1000	300	1000	300	1000	300	–	–
	VVF31.39..40 [2]	**VXF31.39..40** [2]	40	12 / 19	525	300	775	300	1000	300	–	–
	VVF31.40-..	**VXF31.40-..**	40	16 / 25	525	300	775	300	1000	300	–	–
	VVF31.50	**VXF31.50**	50	31	325	300	475	300	1000	300	–	–
	VVF31.50-40	**VXF31.50-40**	50	40	325	300	475	300	1000	300	–	–
	VVF31.65	**VXF31.65**	65	49	175	175	275	275	750	300	–	–
	VVF31.65-63	**VXF31.65-63**	65	63	175	175	275	275	750	300	–	–
	VVF31.80	**VXF31.80**	80	78	100	100	175	175	500	300	–	–
	VVF31.80-100	**VXF31.80-100**	80	100	100	100	175	175	500	300	–	–
	VVF31.90	**VXF31.90**	100	124	–	–	–	–	–	–	300	200
	VVF31.100-160	**VXF31.100-160**	100	160	–	–	–	–	–	–	300	200
	VVF31.91	**VXF31.91**	125	200	–	–	–	–	–	–	200	150
	VVF31.125-250	**VXF31.125-250**	125	250	–	–	–	–	–	–	200	150
	VVF31.92	**VXF31.92**	150	300	–	–	–	–	–	–	125	100
	VVF31.150-315	**VXF31.150-315**	150	315	–	–	–	–	–	–	125	100
PN 16	-10...150 °C		DN	k_{vs}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}
Data sheet	N4330	N4430		[m³/h]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]
	VVF40.15-.. [3]	**VXF40.15-..** [3]	15	1.9 / 2.5 / 3 / 4	1600	300	1600	300	1600	300	–	–
	VVF40.25-..	**VXF40.25-..**	25	5 / 6.3 / 7.5 / 10	1550	300	1600	300	1600	300	–	–
	VVF40.40-..	**VXF40.40-..**	40	12 / 16 / 19 / 25	525	300	775	300	1600	300	–	–
	VVF40.50-..	**VXF40.50-..**	50	31 / 40	325	300	475	300	1300	300	–	–
	VVF40.65-..	**VXF40.65-..**	65	49 / 63	175	175	275	275	750	300	–	–
	VVF40.80-..	**VXF40.80-..**	80	78 / 100	100	100	175	175	500	300	–	–
	VVF40.100-..	**VXF40.100-..**	100	124 / 160	–	–	–	–	–	–	300	200
	VVF40.125-..	**VXF40.125-..**	125	200 / 250	–	–	–	–	–	–	200	150
	VVF40.150-..	**VXF40.150-..**	150	300 / 315	–	–	–	–	–	–	125	100
PN 16	-20...220 °C		DN	k_{vs}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}	Δp_s	Δp_{max}
Data sheet	N4404	N4404		[m³/h]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]	[kPa]
	VVF43.65-50	**–**	65	50	–	–	–	–	–	–	700	650
	VVF43.65-63	**VXF43.65-63**	65	63	–	–	–	–	–	–	700	650
	VVF43.80-80	**–**	80	80	–	–	–	–	–	–	450	400
	VVF43.80-100	**VXF43.80-100**	80	100	–	–	–	–	–	–	450	400
	VVF43.100-125	**–**	100	125	–	–	–	–	–	–	300	250
	VVF43.100-160	**VXF43.100-160**	100	160	–	–	–	–	–	–	300	250
	VVF43.125-200	**–**	125	200	–	–	–	–	–	–	175	160
	VVF43.125-250	**VXF43.125-250**	125	250	–	–	–	–	–	–	175	160
	VVF43.150-315	**–**	150	315	–	–	–	–	–	–	125	100
	VVF43.150-400	**VXF43.150-400**	150	400	–	–	–	–	–	–	125	100

[1] SAX81..: AC/DC 24 V

[2] For 22...25, 24...25, 39...40 = insert number in place of k_{vs} value

[3] .. = insert k_{vs} value

VVF43.., VXF43..: For DN 15...50 and k_{vs} value ≤ 40 m³/h see V..F53..

Flanged 2-port and 3-port valves with 20/40 mm actuators

Typical applications	Actuators	Data sheet
– Heating plants – Ventilation and air conditioning plants – Heat and cooling generation – Heat and cooling distribution	**SAX..**	N4501
	SKD..	N4561
	SKB..	N4564
	SKC..	N4566

Operating voltage	Positioning signal	Positioning time [s] SAX	SKD	SKB/SKC	Spring return function	20 mm 800 N	20 mm 1000 N	20 mm 2800 N	40 mm 2800 N
AC 230 V	3-position	120	120	120	–	**SAX31.00**	**SKD32.50**	**SKB32.50**	**SKC32.60**
	3-position	–	120	120	✓	–	**SKD32.51**	**SKB32.51**	**SKC32.61**
	3-position	30	–	–	–	**SAX31.03**	–	–	–
	3-position	–	30	–	✓	–	**SKD32.21**	–	–
AC 24 V [1]	3-position	120	120	120	–	**SAX81.00**	**SKD82.50**	**SKB82.50**	**SKC82.60**
	3-position	–	120	120	✓	–	**SKD82.51**	**SKB82.51**	**SKC82.61**
	3-position	30	–	–	–	**SAX81.03**	–	–	–
	0...10 V, 4...20 mA	–	30	120	–	–	**SKD60**	**SKB60**	**SKC60**
	0...10 V, 4...20 mA	–	30	120	✓	–	**SKD62**	**SKB62**	**SKC62**
AC/DC 24 V	0...10 V, 4...20 mA	30	–	–	–	**SAX61.03**	–	–	–

PN 25	-20...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]	Δp_s [kPa]	Δp_{max} [kPa]
Data sheet	N4405	N4405										
	VVF53.15-.. [2]	–	15	0.16 / 0.2 / 0.25	2500	1200	2500	1200	2500	1200	–	–
	VVF53.15-..	–	15	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-..	**VXF53.15-..** [2]	15	1.6 / 2.5 / 4	2500	1200	2500	1200	2500	1200	–	–
	VVF53.20-6.3	**VXF53.20-6.3**	20	6.3	2500	1200	2500	1200	2500	1200	–	–
	VVF53.25-..	–	25	5 / 8	1600	1200	2100	1200	2500	1200	–	–
	VVF53.25-..	**VXF53.25-..**	25	6.3 / 10	1600	1200	2100	1200	2500	1200	–	–
	VVF53.32-16	**VXF53.32-16**	32	16	900	750	1200	1100	2500	1200	–	–
	VVF53.40-..	–	40	12.5 / 20	550	500	750	650	2000	1200	–	–
	VVF53.40-..	**VXF53.40-..**	40	16 / 25	550	500	750	650	2000	1200	–	–
	VVF53.50-31.5	–	50	31.5	350	300	450	400	1200	1150	–	–
	VVF53.50-40	**VXF53.50-40**	50	40	350	300	450	400	1200	1150	–	–
	VVF53.65-63	**VXF53.65-63**	65	63	–	–	–	–	–	–	700	650
	VVF53.80-100	**VXF53.80-100**	80	100	–	–	–	–	–	–	450	400
	VVF53.100-160	**VXF53.100-160**	100	160	–	–	–	–	–	–	300	250
	VVF53.125-250	**VXF53.125-250**	125	250	–	–	–	–	–	–	175	160
	VVF53.150-400	**VXF53.150-400**	150	400	–	–	–	–	–	–	125	100

PN 40	-25...220 °C (350 °C)		DN	k_{vs} [m³/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]
Data sheet	N4382	N4482										
	VVF61.09..11 [3]	–	15	0.19 / 0.3 / 0.45	–	–	4000	1600	4000	1600	–	–
	VVF61.12..13 [3]	–	15	0.7 / 1.2	–	–	4000	1600	4000	1600	–	–
	VVF61.14..15 [3]	**VXF61.14..15** [3]	15	1.9 / 3	–	–	4000 –	1600 1200	4000 –	1600 1600	–	–
	VVF61.23..25 [3]	**VXF61.24..25** [3]	25	3 / 5 / 7.5 5 / 7.5	–	–	2250 –	1600 1200	4000 –	1600 1600		
	VVF61.39..40 [3]	**VXF61.39..40** [3]	40	12 / 19	–	–	–	–	4000 –	1600 1200	–	–
	VVF61.49..50 [3]	**VXF61.49..50** [3]	50	19 / 31	–	–	–	–	4000 –	1600 1000	–	–
	VVF61.65	**VXF61.65**	65	49	–	–	–	–	–	–	4000 –	1000 800
	VVF61.80	**VXF61.80**	80	78	–	–	–	–	–	–	4000 –	700 500
	VVF61.90	**VXF61.90**	100	124	–	–	–	–	–	–	4000 –	450 300
	VVF61.91	**VXF61.91**	125	200	–	–	–	–	–	–	4000 –	300 200
	VVF61.92	**VXF61.92**	150	300	–	–	–	–	–	–	4000 –	200 125

[1] SAX81..: AC/DC 24 V
[2] .. = insert k_{vs} value
[3] For 09...15, 14...15, 23...25, 24...25, 39...40, 49...50 = insert number in place of k_{vs} value

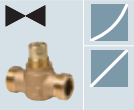
Threaded 2-port and 3-port valves with 5.5 mm actuators

Typical applications	Actuators	Data sheet					5.5 mm	
– Heating plants – District heating – Ventilation and air conditioning plants	SQS..	N4573					400 N	400 N
	Operating voltage	Positioning signal	Positioning time [s]		Spring return function			
	AC 230 V	3-position	150	150	✓	–	SQS35.50	SQS35.00
		3-position	35	35	✓	–	SQS35.53	SQS35.03
	AC 24 V	3-position	–	150	–	–	–	SQS85.00
		3-position	–	35	–	–	–	SQS85.03
		0...10 V	35	35	✓	–	SQS65.5	SQS65
		2...10 V	–	35	–	–	–	SQS65.2

PN 16	1...120 °C			DN	G [inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]
Data sheet	N4364		N4464					
	VVG44.15-..		VXG44.15-..	15	G 1B	0.25 / 0.4 / 0.63	1600	400
	VVG44.15-..		VXG44.15-..	15	G 1B	1 / 1.6	725	400
	VVG44.15-..		VXG44.15-..	15	G 1B	2.5 / 4	400	400
	VVG44.20-6.3		VXG44.20-6.3	20	G 1¼B	6.3	750	400
	VVG44.25-10		VXG44.25-10	25	G 1½B	10	400	400
	VVG44.32-16		VXG44.32-16	32	G 2B	16	250	250
	VVG44.40-25		VXG44.40-25	40	G 2¼B	25	125	125

PN 25	1...130 °C	DN	G [inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]
Data sheet	N4379					
	VVG55.15-..	15	G ¾B	0.25 / 0.4 / 0.63	2500	1200
	VVG55.15-..	15	G ¾B	1 / 1.6 / 2.5	2000	1200
	VVG55.20-4	20	G 1B	4	1000	1000
	VVG55.25-6.3	25	G 1¼B	6.3	800	800

Typical applications	Actuators	Data sheet				5.5 mm
– Heating plants – Ventilation plants	SSC..	N4895				300 N
	Operating voltage	Positioning signal	Positioning time [s]		Spring return function	
	AC 230 V	3-position	150	–	– –	SSC31 –
	AC 24 V	3-position	150	–	– –	SSC81 –
	AC/DC 24 V	0...10 V	30	30	– ✓	SSC61 SSC61.5

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 2¼B	25	75	75

Threaded 2-port and 3-port valves with 20 mm actuators

Typical applications	Actuators	Data sheet				Spring return function	20 mm		
– Heating plants – Ventilation and air conditioning plants – Heat generation – Heat distribution – District heating	SAX.. SKD.. SKB..	N4501 N4561 N4564					800 N	1000 N	2800 N
	Operating voltage	Positioning signal	Positioning time [s]						
			SAX	SKD	SKB				
	AC 230 V	3-position	120	120	120	–	SAX31.00	SKD32.50	SKB32.50
		3-position	–	120	120	✓	–	SKD32.51	SKB32.51
		3-position	30	–	–	–	SAX31.03	–	–
		3-position	–	30	–	✓	–	SKD32.21	–
	AC 24 V [1]	3-position	120	120	120	–	SAX81.00	SKD82.50	SKB82.50
		3-position	–	120	120	✓	–	SKD82.51	SKB82.51
		3-position	30	–	–	–	SAX81.03	–	–
		0...10 V, 4...20 mA	–	30	120	–	–	SKD60	SKB60
		0...10 V, 4...20 mA	–	30	120	✓	–	SKD62	SKB62
	AC/DC 24 V	0...10 V, 4...20 mA	30	–	–	–	SAX61.03	–	–

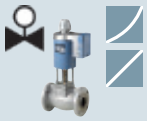
PN 16	-25...150 °C			DN	G [inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]
Data sheet	N4363		N4463									
	VVG41.11..12		–	–	15	G 1B	0.63 / 1	1600	800	1600	800	1600	800
	VVG41.13		–	VXG41.1301	15	G 1B	1.6	1600	800	1600	800	1600	800
	VVG41.14		–	VXG41.1401	15	G 1B	2.5	1600	800	1600	800	1600	800
	VVG41.15		VXG41.15	VXG41.1501	15	G 1B	4	1600	800	1600	800	1600	800
	VVG41.20		VXG41.20	VXG41.2001	20	G 1¼B	6.3	1600	800	1600	800	1600	800
	VVG41.25		VXG41.25	VXG41.2501	25	G 1½B	10	1550	800	1600	800	1600	800
	VVG41.32		VXG41.32	VXG41.3201	32	G 2B	16	875	800	1275	800	1600	800
	VVG41.40		VXG41.40	VXG41.4001	40	G 2¼B	25	525	525	775	775	1600	800
	VVG41.50		VXG41.50	VXG41.5001	50	G 2¾B	40	300	300	450	450	1225	800

.. = k_{vs} value

[1] SAX81..: AC/DC 24 V

2-port and 3-port valves fitted with magnetic actuator

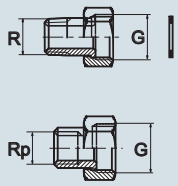
Typical applications	Valve type	Operating voltage	Positioning signal	Type suffix
– Supply air control with/without cascade – Fast-acting heat exchanger control – Domestic hot water mixing control – High-precision process control	**MXF461..**	AC 24 V	0...10 V, 2...10 V, 4...20 mA	P, M [1]
	M3P..FY..	AC 24 V	0...10 V, 4...20 mA	P [1]
	MVF461H..	AC/DC 24 V	0...10 V, 2...10 V, 0...20 mA, 4...20 mA	–
	MXG461..	AC 24 V	0...10 V, 2...10 V, 4...20 mA	P, M [1]
	MXG461B..	AC/DC 24 V	0...10 V, 2...10 V, 0...20 mA, 4...20 mA	–
	MXG461S..	AC 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	–

		DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Note
PN 16	1...130 °C					
Data sheet	N4455					
	MXF461.15-..	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					
	N4454					
	M3P80FY	80	80	300	300	
	M3P100FY	100	130	200	200	
PN 16	1...180 °C	DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	
Data sheet	N4361					
	**MVF461H15-..**	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	

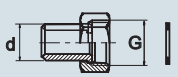
		DN	G [inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]
PN 16	1...130 °C					
Data sheet	N4455					
	MXG461.15-..	15	G 1B	0.6 / 1.5 / 3	300	300
	MXG461.20-5.0	20	G 1¼B	5	300	300
	MXG461.25-8.0	25	G 1½B	8	300	300
	MXG461.32-12	32	G 2B	12	300	300
	MXG461.40-20	40	G 2¼B	20	300	300
	MXG461.50-30	50	G 2¾B	30	300	300
PN 16	-20...130 °C	DN	G [inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]
Data sheet	N4461					
	MXG461B15-..	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

				DN	G [inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]	Note
PN 16	1...130 °C		-20...130 °C						
Data sheet	N4465		N4466						
	MXG461S15-1.5		–	15	G 1B	1.5	300	300	To be used as 2-port or mixing valves, not as diverting valves. Selectable valve characteristic: equal-percentage or linear. [2]
	MXG461S20-5.0		–	20	G 1¼B	5	300	300	
	MXG461S25-8.0		–	25	G 1½B	8	300	300	
	MXG461S32-12		–	32	G 2B	12	300	300	
	–		**MXG462S50-30**	50	G 2¾B	30	600	600	

Union nuts for threaded valves [3]



Type Set of 2	Type Set of 3	G [inch]	R, Rp [inch]	Material
ALG132	**ALG133**	G ½B	R ⅜ (externally threaded)	Brass
ALG142	**ALG143**	G ¾B	R ½ (externally threaded)	Brass
ALG122	**ALG123**	G ¾B	Rp ⅜	Malleable cast iron
ALG152	**ALG153**	G 1B	Rp ½	Malleable cast iron
ALG152B	**ALG153B**	G 1B	Rp ½	Brass
ALG202	**ALG203**	G 1¼B	Rp ¾	Malleable cast iron
ALG202B	**ALG203B**	G 1¼B	Rp ¾	Brass
ALG252	**ALG253**	G 1½B	Rp 1	Malleable cast iron
ALG252B	**ALG253B**	G 1½B	Rp 1	Brass
ALG322	**ALG323**	G 2B	Rp 1¼	Malleable cast iron
ALG322B	**ALG323B**	G 2B	Rp 1¼	Brass
ALG402	**ALG403**	G 2¼B	Rp 1½	Malleable cast iron
ALG402B	**ALG403B**	G 2¼B	Rp 1½	Brass
ALG502	**ALG503**	G 2¾B	Rp 2	Malleable cast iron
ALG502B	**ALG503B**	G 2¾B	Rp 2	Brass



Type Set of 2	G [inch]	Ø d [mm]	Material
ALS152	G ¾B	21.3	Steel, weldable
ALS202	G 1B	26.8	Steel, weldable
ALS252	G 1¼B	33.7	Steel, weldable

[1] P = media containing mineral oil, M = silicon-free version
[2] Parts that are in contact with medium in stainless steel
[3] 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

2-port and 3-port ball valves with rotary actuators

Typical applications	Actuators	Data sheet					Spring return function	2 Nm	5 Nm	7 Nm	10 Nm
– Heating plants – Ventilation and air conditioning plants – Heat and cooling generation – Heat and cooling distribution	**GQD..9A** **GDB..9E** **GMA..9E** **GLB..9E**	N4659 N4657 N4658 N4657									
	Operating voltage	**Positioning signal**	**Positioning time [s]** GQD	GDB	GMA	GLB					
	AC 230 V	3-position	–	150	–	150	–	–	**GDB331.9E**	–	**GLB331.9E**
	AC 24 V	3-position	–	150	–	150	–	–	**GDB131.9E**	–	**GLB131.9E**
		0...10 V	–	150	–	150	–	–	**GDB161.9E**	–	**GLB161.9E**
	AC/DC 24 V	3-position	30 / 15	–	90 / 15	–	✓	**GQD131.9A**	–	**GMA131.9E**	–
		0...10 V	30 / 15	–	90 / 15	–	✓	**GQD161.9A**	–	**GMA161.9E**	–

PN 40	1...120 °C		DN	Rp [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	N4211	N4211									
VAI61.15-..	**VBI61.15-..**	15	Rp ½	1.6 / 2.5 / 4 / 6.3	1400	350	1400	350	1400	350
VAI61.15-..	–	15	Rp ½	1 / 10	1400	350	1400	350	1400	350
VAI61.20-..	**VBI61.20-..**	20	Rp ¾	4 / 6.3	1400	350	1400	350	1400	350
VAI61.20-..	–	20	Rp ¾	10	1400	350	1400	350	1400	350
VAI61.25-..	**VBI61.25-..**	25	Rp 1	10	–	–	1400	350	1400	350
VAI61.25-..	–	25	Rp 1	6.3 / 16	–	–	1400	350	1400	350
VAI61.32-..	–	32	Rp 1¼	10	–	–	–	–	1000	350
VAI61.32-..	**VBI61.32-..**	32	Rp 1¼	16	–	–	–	–	1000	240
VAI61.32-..	–	32	Rp 1¼	25	–	–	–	–	1000	240
VAI61.40-..	–	40	Rp 1½	16	–	–	–	–	800	350
VAI61.40-..	**VBI61.40-..**	40	Rp 1½	25	–	–	–	–	800	240
VAI61.40-..	–	40	Rp 1½	40	–	–	–	–	800	240
VAI61.50-..	–	50	Rp 2	25	–	–	–	–	600	350
VAI61.50-..	**VBI61.50-..**	50	Rp 2	40	–	–	–	–	600	240
VAI61.50-..	–	50	Rp 2	63	–	–	–	–	600	240

3-port and 4-port slipper valves with rotary actuators

Typical applications	Actuators	Data sheet				5 Nm	5 Nm	10 Nm
– Small to medium-size heating plants	**SQK34../84..** **SQK33..** **SAL..**	N4508 N4506 N4502						
	Operating voltage	**Positioning signal**	**Positioning time [s]** SQK	SQK33	SAL			
	AC 230 V	3-position	135	125	120	**SQK34.00**	**SQK33.00**	**SAL31.00T10**
		3-position	–	–	30	–	–	**SAL31.03T10**
	AC 24 V	3-position	135	–	–	**SQK84.00**	–	–
	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 [1]					**direct**	**ASK32**	**ASK31N**

PN 6	1...120 °C	DN		k_{vs} [m³/h]	Δp_{max} [kPa]	Δp_{max} [kPa]	Δp_{max} [kPa]
Data sheet	N4241						
	VBF21.40	40		25	30	30	–
	VBF21.50	50		40	30	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
PN 10	1...120 °C	DN	G [inch]	k_{vs} [m³/h]	Δp_{max} [kPa]	Δp_{max} [kPa]	Δp_{max} [kPa]
Data sheet	N4233						
	VBG31.20	20	G 1¼B	6.3	30	30	–
	VBG31.25	25	G 1½B	10	30	30	–
	VBG31.32	32	G 2B	16	30	30	–
	VBG31.40	40	G 2¼B	25	30	30	–
PN 10	1...120 °C	DN	Rp [inch]	k_{vs} [m³/h]	Δp_{max} [kPa]	Δp_{max} [kPa]	Δp_{max} [kPa]
Data sheet	N4232						
	VBI31.20	20	Rp ¾	6.3	30	30	–
	VBI31.25	25	Rp 1	10	30	30	–
	VBI31.32	32	Rp 1¼	16	30	30	–
	VBI31.40	40	Rp 1½	25	30	30	–
PN 10	1...120 °C	DN	Rp [inch]	k_{vs} [m³/h]	Δp_{max} [kPa]	Δp_{max} [kPa]	Δp_{max} [kPa]
Data sheet	N4252						
	VCI31.20	20	Rp ¾	6.3	30	30	–
	VCI31.25	25	Rp 1	10	30	30	–
	VCI31.32	32	Rp 1¼	16	30	30	–
	VCI31.40	40	Rp 1½	25	30	30	–

VBI61..: For noiseless operation, the Δp_{max} value of 200 kPa should not be exceeded

[1] **Mounting sets ASK40, ASK41 for products of other manufacturers:** mounting sets for SQK33.. for 3-port and 4-port slipper valves from AXA, BUDERUS, CENTRA, ESBE/SHUNT AB, LOELL, MUEHLENBERG, ONDAMIX and VIESSMANN. For additional details, see data sheet N4291.

Butterfly valves with rotary actuators

Typical applications	Actuators	Data sheet	Rotation angle	90°	
			Torque	5 Nm	10 Nm
– Shutoff or control – For closed or open circuits	**SAL..** **SQK..**	N4502 N4506			
	Operating voltage	**Positioning signal**	**Positioning time [s]**		
	AC 230 V	3-position	120	**SQK33.00**	**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			**ASK33**	**ASK33N**

PN 16	-10...120 °C	DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_s [kPa]
Data sheet	N4131				
	VKF41.40	40	50	200	500
	VKF41.50	50	80	–	500
	VKF41.65	65	200	–	500
	VKF41.80	80	400	–	500
	VKF41.100	100	760	–	500
	VKF41.125	125	1000	–	300
	VKF41.150	150	2100	–	250
	VKF41.200	200	4000	–	125

Typical applications	Actuators	Data sheet	20 Nm	40 Nm		100 Nm	400 Nm	1200 Nm
– Shutoff or control – For closed or open circuits	**SQL35../85..** **SQL36..**	N4505 N4505						
	Operating voltage	**Positioning signal**	**time [s]**					
		3-position	6 [1]	–	–	**SQL36E65**	–	–
		3-position	12 [1]	–	–	–	**SQL36E110**	–
		3-position	24 [1]	–	–	–	–	**SQL36E160**
		3-position	25	–	**SQL36E50F04**	–	–	–
		3-position	125	**SQL35.00**	–	–	–	–
	AC 24 V	3-position	125	**SQL85.00**	–	–	–	–
	Mounting set			**ASK35**				
				.1	**.2**			

PN 16	-10...120 °C	DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]
Data sheet	N4136									
	VKF46.40	40	50	1600	–	1600	–	–	–	–
	VKF46.50	50	85	1600	–	1600	–	–	–	–
	VKF46.65	65	215	1600	–	1600	–	–	–	–
	VKF46.80	80	420	–	1600	–	1600	–	–	–
	VKF46.100	100	800	–	1600	–	1600	–	–	–
	VKF46.125	125	1010	–	1000	–	1000	–	–	–
	VKF46.150	150	2100	–	–	–	–	1600	–	–
	VKF46.200	200	4000	–	–	–	–	1000	–	–
	VKF46.250	250	6400	–	–	–	–	–	1000	–
	VKF46.300	300	8500	–	–	–	–	–	1000	–
	VKF46.350	350	11500	–	–	–	–	–	600	–
	VKF46.400	400	14500	–	–	–	–	–	300	–
	VKF46.450	450	20500	–	–	–	–	–	–	300
	VKF46.500	500	21000	–	–	–	–	–	–	300
	VKF46.600	600	29300	–	–	–	–	–	–	300
PN 16	-10...120 °C	DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]	Δp_s [kPa]
Data sheet	N4136									
	VKF46.350TS	350	11500	–	–	–	–	–	–	1000
	VKF46.400TS	400	14500	–	–	–	–	–	–	1000
	VKF46.450TS	450	20500	–	–	–	–	–	–	1000
	VKF46.500TS	500	21000	–	–	–	–	–	–	1000
	VKF46.600TS	600	29300	–	–	–	–	–	–	1000

[1] With auxiliary module SEZ31.1 variable positioning time: SQL36E65: 30...180 s, SQL36E110: 60...360 s, SQL36E160: 120...720 s

Recommended maximum flow velocity:

VKF41..: < 4 m/s for water, see data sheet for details

VKF46..: 4.5 m/s for water, 60 m/s for gas

Elite line

Typical applications	Actuators	Data sheet				5.5 mm	
– Terminal units – Induction units – Chilled ceilings	SSB..	N4891				200 N	200 N
	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	75	–	–	**SSB61**	–

PN 16 Data sheet	1…110 °C N4845	DN	G [inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]
	VVP45.10-..	10	G ½B	0.25 / 0.4 / 0.63	725	400
	VVP45.10-..	10	G ½B	1 / 1.6	725	400
	VVP45.15-..	15	G ¾B	2.5	350	350
	VVP45.20-..	20	G 1B	4	350	350
	VVP45.25-..	25	G 1¼B	6.3	300	300
	VXP45.10-..	10	G ½B	0.25 / 0.4 / 0.63	–	400
	VXP45.10-..	10	G ½B	1 / 1.6	–	400
	VXP45.15-..	15	G ¾B	2.5	–	350
	VXP45.20-..	20	G 1B	4	–	350
	VXP45.25-..	25	G 1¼B	6.3	–	300
	VMP45.10-..	10	G ½B	0.25 / 0.4	–	400
	VMP45.10-..	10	G ½B	0.63 / 1	–	400
	VMP45.10-..	10	G ½B	1.6	–	400
	VMP45.15-..	15	G ¾B	2.5	–	350
	VMP45.20-..	20	G 1B	4	–	350

Standard line

Typical applications	Actuators	Data sheet	Actuators	Data sheet	2.5 mm			
– Terminal units – Induction units – Chilled ceilings	**STP21../71..** **STP72E..** **SFP..**	N4878 N4876 N4865	**SSP..** **STS61..**	N4864 N4880	105 N	105 N	135 N	160 N
	Operating voltage	**Positioning signal**	**Positioning time [s]**					
	AC 230 V	2-position	180		**STP21**	–	–	–
		2-position	10		–	–	**SFP21/18**	–
		3-position	150		–	–	–	**SSP31**
	AC 24 V	2-position	10		–	–	**SFP71/18**	–
		3-position	43		–	–	–	**SSP81.04**
		3-position	150		–	–	–	**SSP81**
		0…10 V	< 150		–	**STS61**	–	–
	AC/DC 24 V	2-position/PDM	180		**STP71**	–	–	–
		2-position/PDM	180		**STP72E**	–	–	–
		0…10 V	34		–	–	–	**SSP61**

PN 16 Data sheet	1…110 °C N4847	DN	G [inch]	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kP a]	Δp_s [kPa]	Δp_{max} [kPa]
	VVP47.10-..	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-..	10	G ½B	1.6	150	150	300	300
	VVP47.15-..	15	G ¾B	2.5	150	150	300	300
	VVP47.20-..	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-..	10	G ½B	1.6	–	150	–	300
	VXP47.15-..	15	G ¾B	2.5	–	150	–	300
	VXP47.20-..	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-..	10	G ½B	1.6	–	150	–	300
	VMP47.15-..	15	G ¾B	2.5	–	150	–	300

Union nuts for threaded valves

Union nuts for threaded valves	See page 9

VVP45..S, VMP45..S with Conex® compression fittings, k_{vs} = 0.63 / 1 / 1.6 / 2.5 m³/h
.. = k_{vs} value

TRV line

Typical applications	Actuators	Data sheet
– Radiators	RTN..	N2111

RTN51/RTN51G

RTN71

RTN81

Typical applications	Actuators	Data sheet	Actuators	Data sheet	2.5 mm		
– Radiators	STA21../71..	N4877	STS61..	N4880	105 N	100 N	105 N
	STA72E..	N4875					
	SSA..	N4893					
	Operating voltage	**Positioning signal**	**Positioning time [s]**				
	AC 230 V	2-position	180		STA21	–	–
		3-position	150		–	SSA31	–
	AC 24 V	3-position	150		–	SSA81	–
		0...10 V	< 150		–	–	STS61
	AC/DC 24 V	2-position/PDM	180		STA71	–	–
		2-position/PDM	180		STA72E	–	–
		0...10 V	34		–	SSA61	–
	Normally open/normally closed (for radiator valves)				NC	–	NC/NO

PN 10 1...120 °C	DIN	NF	DN	Rp/R [inch]	k_v [m³/h]	Δp_{max} [kPa]
Data sheet	N2105	N2106				
	VDN110	VDN210	10	Rp/R ⅜	0.09...0.63	60
	VDN115	VDN215	15	Rp/R ½	0.10...0.89	60
	VDN120	VDN220	20	Rp/R ¾	0.31...1.41	60
	VEN110	VEN210	10	Rp/R ⅜	0.09...0.63	60
	VEN115	VEN215	15	Rp/R ½	0.10...0.89	60
	VEN120	VEN220	20	Rp/R ¾	0.31...1.41	60
	–	VUN210	10	Rp/R ⅜	0.14...0.60	60
	–	VUN215	15	Rp/R ½	0.13...0.77	60

PN 10 1...110 °C		DN	Rp/R [inch]	k_v [l/h]	Δp_{max} [kPa]
Data sheet	N2103				
	VD115CLC	15	Rp/R ½	0.25...1.9	150
	VD120CLC	20	Rp/R ¾	0.25...2.6	150
	VD125CLC	25	Rp/R 1	0.25...2.6	150

On/Off line

Typical applications	Actuators	Data sheet	Actuators	Data sheet	2.5 mm				
– Terminal units	SFA..	N4863	STA72E..	N4875	200 N	150 N	105 N	105 N	160 N
– Domestic hot water storage tank charging	SUA21/1	N4830	STS61..	N4880					
– Zone control	STA21../71..	N4877	SSA31.04 [1]	N4860					
	Operating voltage	**Positioning signal**	**Positioning time [s]**						
	AC 230 V	2-position	10		SFA21/18	–	–	–	–
		2-position	180		–	–	STA21	–	–
		2-position/SPST [2]	10		–	SUA21/1	–	–	–
		3-position/SPDT [2]	43		–	–	–	–	SSA31.04
	AC 24 V	2-position	10		SFA71/18	–	–	–	–
		0...10 V	< 150		–	–	–	STS61	–
	AC/DC 24 V	2-position/PDM	180		–	–	STA71	–	–
		2-position/PDM	180		–	–	STA72E	–	–

PN 16	1...110 °C	DN	Rp [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	N4842									
	VVI46.15	15	Rp ½	2	300	300	300	300	200	200
	VVI46.20	20	Rp ¾	3.5	300	300	300	300	200	200
	VVI46.25	25	Rp 1	5	300	300	250	250	200	200
	VXI46.15 [3]	15	Rp ½	2	–	300	–	300	–	200
	VXI46.20 [3]	20	Rp ¾	3.5	–	300	–	300	–	200
	VXI46.25 [3]	25	Rp 1	5	–	300	–	300	–	200
	VXI46.25T [4]	25	Rp 1	5	–	200	–	200	–	200

Accessories for radiator valves (for more accessories see data sheet N2100)

AV.. adapters for actuators from Siemens for TRV valves of other manufacturers	AV51	AV52	AV53	AV54	AV55	AV56	AV57	AV58	AV59	AV60	AV61
	Beulco [5]	Comap	Danfoss RA 2000	Danfoss RAVL	Danfoss RAV	Giacomini	Herz	Oventrop < 2002	Vaillant	TA < 2002	MMA Markaryd
Adapter thread	M30x1	M28x1.5	–	–	–	–	M28x1.5	M30x1	–	M28x1.5	M28x1.5

[1] Not suited for radiator valves; [2] SPST = single-pole single-throw, SPDT = single-pole double-throw; [3] 70% k_{vs} in bypass, leakage rate in bypass 2...5% of k_{vs} value; [4] 100% k_{vs} in bypass, leakage rate in bypass 0.05% of k_{vs} value. **For noiseless operation, the value of 100 kPa should not be exceeded.**
[5] Not to be used with RTN.. (distributor for underfloor heating systems), **connection (M30x1.5) to valves of other manufacturers, without adapter:** Heimeier, Cazzaniga, Junkers, Oventrop M30x1.5 (since 2001), Honeywell Braukmann, TA type TBV-C, MNG, Beulco

Combi valves with actuators

Typical applications	Actuators	Data sheet
– Radiators	**RTN..**	N2111
	STA21.. / STA71..	N4877
	STA72..	N4875
	SSA..	N4893
	STS61..	N4880

Operating voltage	Positioning signal	Positioning time [s]	Spring return function		2.5 mm 105 N	2.5 mm 100 N	2.5 mm 105 N
AC 230 V	2-position	180	✓	–	**STA21**	–	–
	3-position	150	–	–	–	**SSA31**	–
AC 24 V	3-position	150	–	–	–	**SSA81**	–
	0...10 V	< 150	✓	–	–	–	**STS61**
AC/DC 24 V	2-position / PDM	180	✓	–	**STA71**	–	–
	2-position / PDM	180	✓	–	**STA72E**	–	–
	0...10 V	34	–	–	–	**SSA61**	–
				RTN51	–	–	–
				RTN71	–	–	–
				RTN81	–	–	–

PN 10 1...90 °C	DIN	DN	Rp/R	V	V_{nom} [1]			Δp_{min}			Δp_{max}
Data sheet	N2185		[inch]	[l/h]	[l/h]			[kPa]			[kPa]
	VPD110A-..[1]	10	Rp/R ⅜	25...318	45	90	145	6 [2]	8 [2]	10 [2]	60
	VPD115A-..[1]	15	Rp/R ½	25...318	45	90	145	6 [2]	8 [2]	10 [2]	60
	VPD110B-200	10	Rp/R ⅜	95...483	200			20			60
	VPD115B-200	15	Rp/R ½	95...483	200			20			60
	VPE110A-..[1]	10	Rp/R ⅜	25...318	45	90	145	6 [2]	8 [2]	10 [2]	60
	VPE115A-..[1]	15	Rp/R ½	25...318	45	90	145	6 [2]	8 [2]	10 [2]	60
	VPE110B-200	10	Rp/R ⅜	95...483	200			20			60
	VPE115B-200	15	Rp/R ½	95...483	200			20			60

Typical applications	Actuators	Data sheet
– Terminal units	**SSA..**	N4893
– Air handling units	**STA..**	N4877
– Chilled ceilings	**STA72E..**	N4875
	STS61..	N4880
	SFA..	N4863
	SUA..	N4830

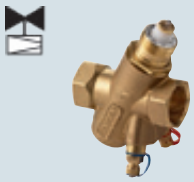
Operating voltage	Positioning signal	Positioning time [s]	Spring return function	2.5 mm 105 N	2.5 mm 105 N	2.5 mm 150 N	2.5 mm 200 N	2.5 / 5 mm 100 N
AC 230 V	3-position	150	–	–	–	–	–	**SSA31**
	2-position	180	✓	–	**STA21**	–	–	–
	2-position	10	✓	–	–	–	**SFA21/18**	–
	2-position/SPST [3]	10	–	–	–	**SUA21/1**	–	–
AC 24 V	2-position	10	✓	–	–	–	**SFA71/18**	–
	0...10 V	<150	✓	**STS61**	–	–	–	–
AC/DC 24 V	3-position	150	–	–	–	–	–	**SSA81**
	2-position/PDM	180	✓	–	**STA71**	–	–	–
	2-position/PDM	180	✓	–	**STA72E**	–	–	–
	0...10 V	75	–	–	–	–	–	**SSA61**

PN 25 1...110 °C	Without pressure testing points	With pressure testing points	DN	G [inch]	V_{min} [l/h]	V_{100} [l/h]	Δp_{min} [kPa]	Δp_{max} [kPa]	Δp_{min} [kPa]	Δp_{max} [kPa]
Data sheet	N4855									
	VPP46.10L0.2	**VPP46.10L0.2Q**	10	½	30	200	15	400	15	400
	VPP46.15L0.2	**VPP46.15L0.2Q**	15	¾	30	200	15	400	15	400
	VPP46.15L0.6	**VPP46.15L0.6Q**	15	¾	100	575	15	400	15	400
	VPP46.20F1.4	**VPP46.20F1.4Q**	20	1	220	1330	–	–	20	400

PN 25 1...110 °C	Without pressure testing points	With pressure testing points	DN	G [inch]	V_{min} [l/h]	V_{100} [l/h]	Δp_{min} [kPa]	Δp_{max} [kPa]	Δp_{min} [kPa]	Δp_{max} [kPa]
Data sheet	N4855									
	VPI46.15L0.2	**VPI46.15L0.2Q**	15	½	30	200	15	400	15	400
	VPI46.15L0.6	**VPI46.15L0.6Q**	15	½	100	575	15	400	15	400
	VPI46.20F1.4	**VPI46.20F1.4Q**	20	¾	220	1330	–	–	20	400

[1] .. = insert V_{nom}
V_{nom} = factory setting = volumetric flow at 0.5 mm stroke or setting mark 3 of the presetting
[2] Δp_{min} is valid for V_{nom} 45/90/145 l/h
[3] SPST = single-pole single-throw

Typical applications	Actuators	Data sheet					5.5 mm		6.5 mm	
– Terminal units – Air handling units – Chilled ceilings	**SSD..** **SQD..**	N4861 N4540					250 N		400 N	
	Operating voltage	**Positioning signal**	**Positioning time [s]**		**Spring return function**					
			SSD..	SQD..	SSD..	SQD..				
	AC 230 V	3-position	150	170	–	–	**SSD31**		**SQD35.00**	
	AC 24 V	3-position	150	43	–	–	**SSD81**		**SQD85.03**	
		0...10 V	–	43	–	–	**–**		**SQD65**	
	AC/DC 24 V	0...10 V	75	–	–	–	**SSD61**		**–**	
		0...10 V	75	–	–	–	**SSD61EP** [1]		**–**	
		2...10 V	75	–	–	–	**SSD61.2**		**–**	

PN 25 1...120 °C	Without pressure testing points	With pressure testing points	DN	Rp [inch]	V_{min} [l/h]	V_{100} [l/h]	Δp_{min} [kPa]	Δp_{max} [kPa]	Δp_{min} [kPa]	Δp_{max} [kPa]
Data sheet	N4853									
	**VPI45.15F0.5**	**VPI45.15F0.5Q**	15	Rp ½	90	620	16	400	–	–
	VPI45.15F1.5	**VPI45.15F1.5Q**	15	Rp ½	290	1730	18	400	–	–
	VPI45.20F0.9	**VPI45.20F0.9Q**	20	Rp ¾	160	1050	16	400	–	–
	VPI45.20F2	**VPI45.20F2Q**	20	Rp ¾	350	2040	22	400	–	–
	VPI45.25F1.5	**VPI45.25F1.5Q**	25	Rp 1	280	1720	16	400	–	–
	VPI45.25F2	**VPI45.25F2Q**	25	Rp 1	350	2040	22	400	–	–
	VPI45.32F3	**VPI45.32F3Q**	32	Rp 1 ¼	560	3050	18	400	–	–
	VPI45.40F7	**VPI45.40F7Q**	40	Rp 1 ½	2355	7105	–	–	26	400
	VPI45.50F8.5	**VPI45.50F8.5Q**	50	Rp 2	2664	8586	–	–	32	400

[1] For equal-percentage valve characteristic

Notes

Refrigerant valves

Typical applications	Valve	Operating voltage	Positioning signal	Auxiliary functions
– Expansion, direct/indirect hot-gas and hot-gas distribution applications – Suction gas applications – Condensate mixing – Brine plants	**M2FP03GX**	AC 24 V	0...10 V, 4...20 mA, 0...20 Phs	–
	MVL661..	AC/DC 24 V	0...10 V, 2...10 V, 0...20 mA, 4...20 mA	Minimum stroke setting
	MVS661..N	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} [m³/h]		Δp_{max} [kPa]	
Data sheet	N4731							
	M2FP03GX		Pilot valve		0.3		1800	
PS 45	-40...120 °C	DN	Connection	Inner ∅ [inch]	k_{vs} [m³/h]	k_{vs} reduced [m³/h]	Δp_{max} [kPa]	
Data sheet	N4714							
	MVL661.15-0.4	15	Sleeve	⅝	0.4	0.25	2500	
	MVL661.15-1.0	15	Sleeve	⅝	1	0.63	2500	
	MVL661.20-2.5	20	Sleeve	⅞	2.5	1.6	2500	
	MVL661.25-6.3	25	Sleeve	1⅛	6.3	4	2500	
	MVL661.32-12	32	Sleeve	1⅜	12	7.6	200	
PS 53	-40...120 °C	DN	Connection	Inner ∅ [mm]	Outer ∅ [mm]	k_{vs} [m³/h]	k_{vs} reduced [m³/h]	Δp_{max} [kPa]
Data sheet	N4717							
	MVS661.25-016N	25	Weldable	22.4	33.7	0.16	0.1	2500
	MVS661.25-0.4N	25	Weldable	22.4	33.7	0.4	0.25	2500
	MVS661.25-1.0N	25	Weldable	22.4	33.7	1	0.63	2500
	MVS661.25-2.5N	25	Weldable	22.4	33.7	2.5	1.6	2500
	MVS661.25-6.3N	25	Weldable	22.4	33.7	6.3	4	2500
PN 32	-40...120 °C	DN	Connection	Inner ∅ [inch]		k_{vs} [m³/h]		Liquid Δp_{max} [kPa] / Gas Δp_{max} [kPa]
Data sheet	N4722							
	M3FK15LX06	15	Sleeve	⅝		0.6		200 / 800
	M3FK15LX15	15	Sleeve	⅝		1.5		200 / 800
	M3FK15LX	15	Sleeve	⅝		3		200 / 800
	M3FK20LX	20	Sleeve	⅞		5		200 / 800
	M3FK25LX	25	Sleeve	1⅛		8		200 / 800
	M3FK32LX	32	Sleeve	1⅜		12		200 / 800
	M3FK40LX	40	Sleeve	1⅝		20		200 / 800
	M3FK50LX	50	Sleeve	2⅛		30		200 / 800
PS 43	-40...120 °C	DN	Connection	Inner ∅ [inch]		k_{vs} [m³/h]		Δp_{max} [kPa]
Data sheet	N4721							
	M3FB15LX06/A	15	Sleeve	⅝		0.6		2200
	M3FB15LX15/A	15	Sleeve	⅝		1.5		2200
	M3FB15LX/A	15	Sleeve	⅝		3		2200
	M3FB20LX/A	20	Sleeve	⅞		5		1800
	M3FB25LX/A	25	Sleeve	1⅛		8		1200
	M3FB32LX	32	Sleeve	1⅜		12		800

Definitions

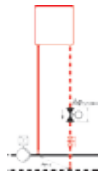
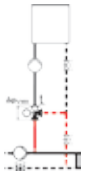
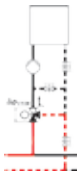
Abbr.	Term	Unit	Definition
Δp	Differential pressure	kPa	Pressure differential between plant sections.
Δp_{max}	Maximum differential pressure	kPa	Maximum permissible differential pressure across the valve's control path (when mixing), valid for the entire actuating range of the motorized valve.
Δp_{maxV}	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 combi valves. 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 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 value, at a given speed and a given pump medium.
kPa	Unit of pressure	kPa	100 kPa = 1 bar = 10 mWC
mWC	Meter water column	m	
k_V	Nominal flow	m³/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	m³/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.
Phs	Phase cut control signal	V	DC 0...20 V Phs
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 correct control, a minimum valve authority of 0.25 is required.
Q_{100}	Rated capacity	kW	Plant's design capacity.
V_{100}	Volumetric flow	m³/h	Volumetric flow with valve fully open (H_{100}).
V_{min}	Minimum volumetric flow	m³/h	Smallest presettable volumetric flow through the fully open combi valve (H_{100}).
υ	Kinematic viscosity	mm²/s	In the case of kinematic viscosities υ up to 10 mm²/s, no corrections are required. For the selection of actuating devices for kinematic viscosities υ above 10 mm²/s, please contact your local Siemens branch office.
c	Specific heat capacity	kJ/kgK	
ρ	Specific density	kg/m³	

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 exchange, so that the total volumetric flow V_{100} remains as constant as possible.
	2-port valve, control path with equal-percentage valve characteristic.
	2-port valve, 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 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.

Valve sizing and actuator selection

Basic hydraulic circuit

1	**Determine the type of hydraulic circuit**	Throttling circuit	Injection circuit with 2-port valve	Diverting circuit	Injection circuit with 3-port valve	Mixing circuit		Mixing circuit with fixed premixing	
—	For valve sizing relevant variable flow path					Primary pump ✓ 	Primary pump × 	Primary pump ✓ 	Primary pump × 

HVAC plants and consumers

Heating								
Surface/floor heating	–	■	–	outdated	–	–	■	■
Heating plant (primary)	–	■	■	outdated	■	■	■	■
Zone control, heating	–	■	–	outdated	–	–	–	–
Heating group	–	■	–	–	■	■	■	■
Generation of heat energy	–	–	–	–	–	■	–	■
Heat exchanger water-water	■	uncommon	uncommon	uncommon	uncommon	–	–	–
Ventilation and air conditioning plants								
Air handling unit (AHU)	■	■	■	outdated	■	■	–	–
Fan coil unit	■	–	■	outdated	–	–	–	–
Cooling coil	dehumidifying	–	dehumidifying	uncommon	–	–	–	–
Reheating coil	■	■	outdated	outdated	uncommon	uncommon	uncommon	uncommon
Preheating coil	–	■	–	outdated	uncommon	uncommon	uncommon	uncommon
VAV	■	–	■	outdated	–	–	–	–
Zone control	■	–	■	outdated	–	–	–	–
Chiller plants								
Surface/floor cooling	–	■	–	outdated	–	–	–	–
Generation of cooling energy	–	–	–	–	–	■	–	■
Cooling towers	■	–	■	uncommon	–	–	–	–
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
Domestic hot water (DHW)								
DHW	–	■	–	–	–	■	–	–

Header

Differential pressure header	pressurized					pressureless		
Volumetric flow	variable		constant			variable		

Determination of k_{vs} value

2	**Δp_{VR} or Δp_{MV}**	Δp_{VR}		Δp_{MV}					
	typical range	10...200 kPa	10...200 kPa	10...50 kPa	2...5 kPa	2...5 kPa	5...15 kPa	2...5 kPa	5...15 kPa
	typical value	Use effective Δp_{VR} value		35 kPa	3 kPa	3 kPa	8 kPa	3 kPa	8 kPa
3	**Determine Δp_{V100}**	$\Delta p_{V100} \geq \frac{\Delta p_{VR}}{2}$		$\Delta p_{V100} > \Delta p_{MV}$					
4	**Calculate V_{100}**	Water without anti-freeze $V_{100} = \frac{Q_{100}}{1.163 \cdot \Delta T}$				Water with anti-freeze $V_{100} = \frac{Q_{100} \cdot 3600}{c \cdot \rho \cdot \Delta T}$			
5	**Determine k_{vs} value**	$k_V = \frac{V_{100}}{\sqrt{\frac{\Delta p_{V100}}{100}}}$ => $k_{VS} \geq 0.85 \cdot k_V$ value							
6	**Check resulting Δp_{V100}**	$\Delta p_{V100} = 100 \cdot \left(\frac{V_{100}}{k_{VS}}\right)^2$							

Selection of valve and actuator

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

Size and select combi valves				
Determine volumetric flow V				
1	**Determine Q_{100}**	Q_{100}		
2	**Determine ΔT**	ΔT		
3	**Calculate V**	Water without anti-freeze $V_{100} = \frac{Q_{100}}{1.163 \cdot \Delta T}$	Water with anti-freeze $V_{100} = \frac{Q_{100} \cdot 3600}{c \cdot \rho \cdot \Delta T}$	
Select combi valve and actuator				
4	**Select suitable combi valve**	a) Type of valve (with/without P/T plugs)[1)] d) Connection (flanged, threaded)	b) PN class e) Nominal size DN	c) Max/min medium temperature f) Medium
5	**Determine presetting**	Determine presetting using the volumetric flow/dial table in data sheet of the respective combi valve		
6	**Select actuator**	a) Operating voltage b) Positioning signal c) Positioning time d) Auxiliary functions		
7	**Check working range**	a) $\Delta p < \Delta p_{max}$ – maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve b) $\Delta p > \Delta p_{min}$ – minimum differential pressure required across the valve's control path, so that the differential pressure regulator works reliably		
8	**Select actuator**	Combi valve and suitable actuator		

Notes

Siemens Switzerland Ltd
Infrastructure & Cities Sector
Building Technologies Division
International Headquarters
Gubelstrasse 22
6301 Zug
Switzerland
Tel +41 41 724 24 24

Siemens Building Technologies
Infrastructure & Cities Sector
Brunel House
Sir William Siemens Square, Frimley
Camberley
Surrey, GU16 8QD
United Kingdom
Tel +44 1276 696000

Siemens Ltd
Infrastructure & Cities Sector
Building Technologies Division
22/F, Two Landmark East
100 How Ming Street, Kwun Tong
Kowloon, Hong Kong
Tel +852 2870 7888

The information in this document contains general descriptions of technical options available, which do not always have to be present in individual cases. The required features should therefore be specified in each individual case at the time of closing the contract.

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