



SAX..., SAY..



SAV..



SAL..

Acvatix™

Actuators SAX..., SAY..., SAV..., SAL.. for valves **Basic Documentation**

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Contents

1	About this documentation.....	5
1.1	Navigation / Quick access	5
1.2	Revision history	6
1.3	Reference documents	6
1.4	Before you start	6
1.4.1	Trademarks	6
1.4.2	Copyright	7
1.4.3	Quality assurance	7
1.4.4	Document use / request to the reader	7
1.5	Scope of this documentation	7
2	Engineering.....	8
2.1	Product description	8
2.2	Use.....	9
2.3	Type summary	9
2.3.1	Stroke actuators.....	9
2.3.2	Stroke actuators – combi valves.....	10
2.3.3	Rotary actuators	10
2.4	Ordering	11
2.5	Equipment combinations.....	12
2.5.1	Stroke actuators – 3-port valves.....	12
2.5.2	Stroke actuators – 2-port valves.....	14
2.5.3	Stroke Actuators – combi valves	16
2.5.4	Rotary actuators – slipper and butterfly valves	16
2.6	Accessories	17
2.6.1	Electrical accessories	17
2.6.2	Mechanical accessories.....	17
2.7	Product replacements.....	18
2.7.1	Stroke actuators SQX.. to SAX.....	18
2.7.2	Rotary actuators SQL.. to SAL..	18
2.7.3	Electrical accessories	19
2.8	Spare parts.....	20
2.9	Sizing	20
2.9.1	Parallel operation of actuators.....	20
2.9.2	Permissible cable lengths and wire cross-sectional areas.....	21
2.10	Warranty.....	22
3	Handling.....	23
3.1	Mounting and installation	23
3.1.1	Mounting positions.....	23
3.1.2	Fitting stroke actuators to seat valves VVF.. / VXF.. or VVG.. / VVG.....	23
3.1.3	Avoid misalignment on V_G41 valves with fittings.....	24
3.1.4	Fitting rotary actuators to butterfly valves VKF41.....	25
3.1.5	Fitting rotary actuators to slipper valves VBF21.....	27
3.1.6	Fitting rotary actuators to butterfly valves VKF46.....	30
3.1.7	Fitting rotary actuators to butterfly valves VKF45.....	31
3.1.8	Fitting accessories.....	33
3.1.9	Wiring (installation)	40
3.2	Commissioning and operation.....	42
3.2.1	Function check and Calibration	42
3.2.2	Maintenance.....	44
3.2.3	Disposal	44

4	Functions and control	45
4.1	3-position control	45
4.1.1	Combination with RVD.. controller for direct domestic hot water distribution by heat exchanger	47
4.2	Modulating control	48
4.3	Function module AZX61.1	49
4.3.1	Sequence control (signal adaptation)	49
4.3.2	Changeover of acting direction	51
4.4	Positioning signal and flow characteristic selection	52
4.5	Acting direction and flow characteristic	53
4.6	Position Feedback U	53
4.7	Position control with ClosedPosition-Synchronisation	54
4.7.1	ClosedPosition-Synchronisation	54
4.8	Calibration	56
4.9	Signal priorities	56
4.10	Detection of valve seat	57
4.11	Detection of foreign bodies	57
4.12	Forced control Z	58
4.13	Technical and mechanical design	59
4.13.1	Transmission of power	59
4.13.2	Coupling	60
4.13.3	Manual adjuster	60
4.13.4	Indicators	61
4.13.5	Electrical accessories	62
4.13.6	Mechanical accessories	63
5	Technical data	64
6	Connection diagrams and dimensions	67
6.1	Internal diagrams	67
6.2	Connection terminals	68
6.2.1	Actuators	68
6.2.2	Electrical accessories	68
6.3	Connection diagrams	69
6.4	Dimensions	70
6.4.1	Stroke actuators	70
1)	SAX..U: 1.850 kg	70
6.4.2	Rotary actuators	71
7	Revision numbers	72
8	Glossary	73
8.1	Symbols	73
8.2	Terms	73

1 About this documentation

1.1 Navigation / Quick access

Information about a specific actuator is provided throughout the document. The structure of chapters 2 to 4 is as follows:

2 Engineering	device oriented
2.1 Product description	
2.2 Use	
3 Handling	handling oriented
3.1 Mounting and installation	
3.2 Commissioning and operation	
4 Functions and Control	assembly oriented
4.1 3-position control	
4.2 Modulating control	

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Quick access to important information including reference to pages:

Product no.	2 Engineering		3 Handling		4 Function and control		
	Equipment combinations	Accessories	Calibration	Accessories (mounting)	Control	Calibration	Accessories
SAX31.00	Page 12	Page 17	-	Page 33-39	Page 45-46	-	Page 62
SAX31.03							
SAX61.03 ¹⁾			Page 42		Page 48	Page 53	
SAV61.00U ¹⁾							
SAX81.00 ¹⁾			-		Page 45-46	-	
SAX81.03 ¹⁾							
SAX81.03U ¹⁾							
SAV31.00	Page 12	Page 17	-	Page 33-39	Page 45-46	-	Page 62
SAV61.00			Seite 42		Page 48	Page 53	
SAV61.00U							
SAV81.00			-		Page 45-46	-	
SAV81.00U							
SAL31.00T10	Page 12	Page 17	-	Page 33-39	Page 45-46	-	Page 62
SAL31.00T20							
SAL31.00T40							
SAL31.03T10			Page 42		Page 48	Page 53	
SAL61.00T10 ¹⁾							
SAL61.00T20 ¹⁾							
SAL61.00T40 ¹⁾							
SAL61.03T10 ¹⁾							
SAL81.00T10 ¹⁾			-		Page 45-46	-	
SAL81.00T20 ¹⁾							
SAL81.00T40 ¹⁾							
SAL81.03T10 ¹⁾							
SAY31P03	Page 12	Page 17	Page 42	Page 33-39	Page 45-46	Page 53	Page 62
SAY61P03							
SAY61.03U							
SAY81P03							
SAY81.03U							

¹⁾ These types of actuator are UL-listed versions

Note

Glossary and Index are arranged at the end of the document.

1.2 Revision history

Revision	Date	Changes	Chapter
First edition	16.07.2010	-	-
2.0	2010-12-12	Rotary actuator SAL..T10 integrated	
		Mounting and installation of butterfly valves and slipper valves corrected and expanded	3.1
		New chapter „Position feedback U“	4.6
		Technical data corrected	5
2.1	2011-09-14	V..F53.. valves added	2.5
		SAL.T20 rotary actuators added	1.1, 1.2, 2.3, 2.4, 2.5, 2.6, 3, 3.1, 4.12, 5, 7
3	2012-09-12	Corrections regarding SAX..Series „G“ “ VVF53.50-40K valve added	2.4, 4.1, 4.7, 4.13, 5, 6.4
3.1	2013-12-17	SAL..T40 is added	...
3.2	2014-11-20	Supplemented with new valves V..F22, V..F32.., V..F42..	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 3.1, 4.1, 4.3, 4.4 4.13, 5, 6.1, 6.4, 7
		Supplemented with actuators SAV..	1.1, 1.3, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 4.1, 4.4, 4.7, 4.13, 5, 6.4, 7
3.3	2015-10-26	Supplemented with actuators SAY..P..	Various
3.4	2016-10-04	Actualization of headings with SAY.., added SAY.. to information on content and accessories	Various

1.3 Reference documents

Type of document		SAX..	SAV..	SAY..	SAL..
Data Sheet		N4501, N4509, Q4501	N4503, N4510	A6V10628469	N4502
Mounting Instructions		-	-	-	ASK31N: M4502.1 ASK33N: M4502.2 ASK35N: M4502.3
		ASC...: M4040.1 ASZ7.5/...: M4040.2 AZX61...: M4040.3 ASK39...: M4040.3 ASZ6.6: M4501.1			-
CE Declaration of Conformity	AC 230 V	T4501X1	T4503X1	A5W00000333	T4502X1
	AC/DC 24 V	T4501X2	T4503X2	A5W00000333	T4502X2
Environmental Declaration		E4501	E4503	7173310559B	E4502

1.4 Before you start

1.4.1 Trademarks

The table below lists the third-party trademarks used in this document and their legal owners. The use of trademarks is subject to international and domestic provisions of the law.

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Acvatix™	Siemens Switzerland Ltd

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1.4.3 Quality assurance

These documents were prepared with great care.

- The contents of all documents are checked at regular intervals
- All necessary corrections are included in subsequent versions
- Anpassungen bzw. Documents are automatically amended as a consequence of modifications and corrections to the products described

Please make sure that you are aware of the latest document revision date.

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1.5 Scope of this documentation

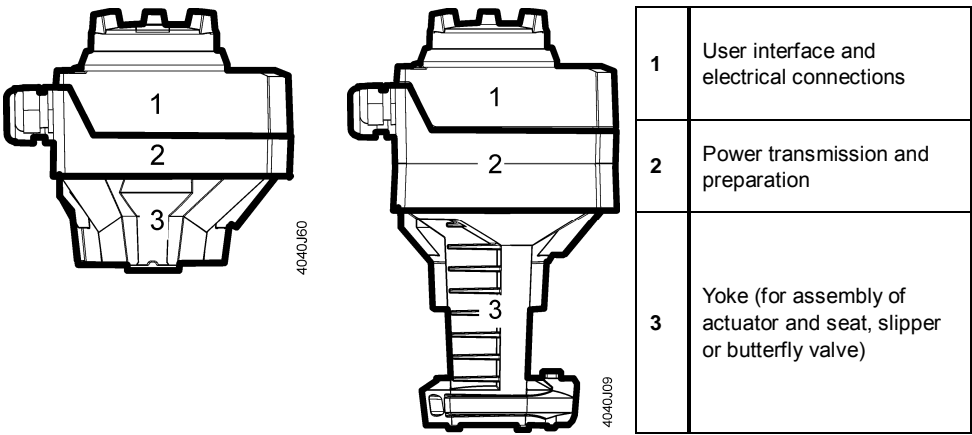
This document shall serve as a source of knowledge. In addition to basic information, it provides general technical information about the actuators used in HVAC plants. It is also targeted at engineering staff, HVAC electrical planners, system integrators and service engineers and provides all information required for planning work, correct installation, commissioning and service.

2 Engineering

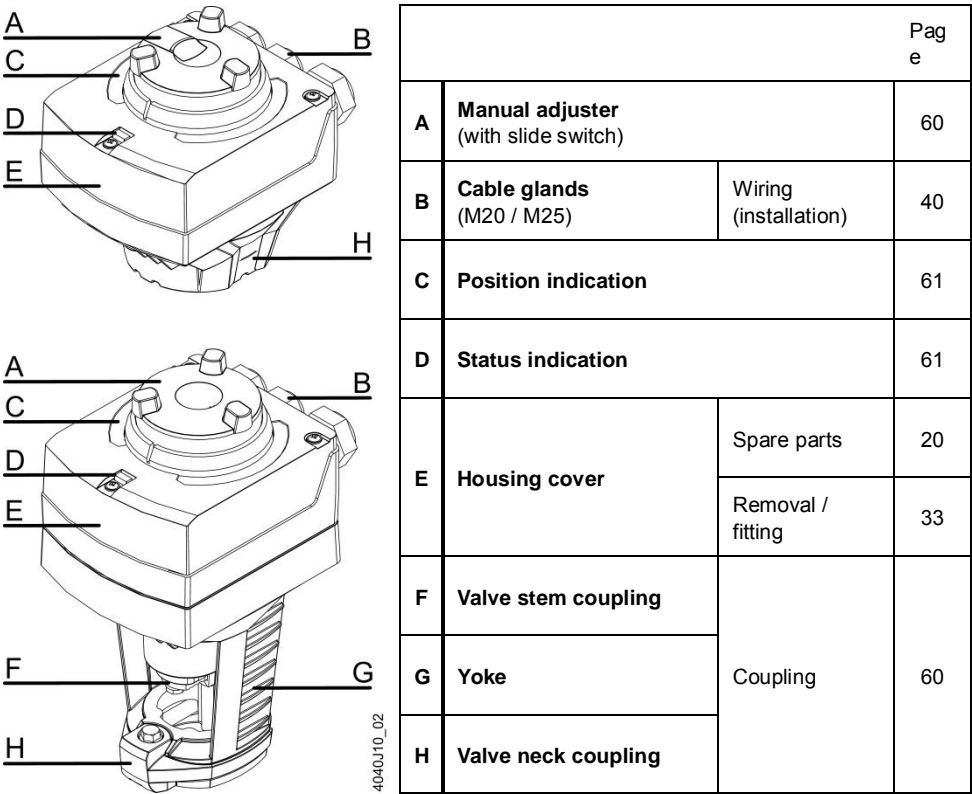
2.1 Product description

The line of large actuators is comprised of stroke actuators SAX..., SAY..., SAV... and rotary actuators SAL...

Mechanical design



Components



2.2 Use

SAX.., SAV..

For use in connection with Siemens 2-port or 3-port valves with 20/40 mm stroke, as control or shutoff valves for HVAC plants.

SAY..

For the operation of Siemens combi valves of type VPI46.40F9.5Q and VPI46.50F12Q with 15 mm stroke as control valves in ventilation, air conditioning, and district heating systems.

SAL..

For use in connection with Siemens butterfly or slipper valves, as control or shutoff valves for HVAC plants.

Note

When using the actuators outdoors, weather shield ASK39.1 must be fitted.

2.3 Type summary

2.3.1 Stroke actuators

Product no.	Stock no.	Stroke	Pos. force	Operating voltage	Positioning signal	Spr. ret. time	Pos. time	LED	Manual adjuster	Extra functions	
SAX31.00	S55150-A105	20 mm	800 N	AC 230 V	3-position	-	120 s	-	Press and fix	-	
SAX31.03	S55150-A106			AC 24 V /DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω		30 s	✓		Position feedback, forced control, change of characteristic	
SAX61.03 SAX61.03U	S55150-A100 S55150-A100-A100										
SAX81.00	S55150-A102						120 s	-			
SAX81.03 SAX81.03U	S55150-A103 S55150-A103-A100						30 s				-
SAV31.00	S55150-A112	40 mm	1600 N	AC 230 V	3-position	-	120 s	-	Press and fix	-	
SAV61.00 SAV61.00U	S55150-A110 S55150-A110-A100			AC 24 V /DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω			3-position		✓	Position feedback, forced control, change of characteristic
SAV81.00 SAV81.00U	S55150-A111 S55150-A111-A100										

SAV..: This product line of actuators might not be available in all countries. Please talk to your local contact or consult your local internet pages of www.buildingtechnologies.siemens.com.

2.3.2 Stroke actuators – combi valves

Product no.	Stock no.	Stroke	Pos. force	Operating voltage	Positioning signal	Spr. ret. time	Pos. time	LED	Manual adjuster	Extra functions		
SAY31P03	S55150-A132	15 mm	500 N	AC 230 V	3-Point	-	30 s	-	Press and fix	-		
SAY61P03	S55150-A133			AC 24 V /DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω			✓		Position feedback, forced control, change of characteristic		
SAY61.03U	S55150-A135				3-Point			-		-		
SAY81P03	S55150-A134							-		-		
SAY81.03U	S55150-A136											
SAX31P03	S55150-A118	20 mm	500 N	AC 230 V	3-position	-	30 s	-	Press and fix	-		
SAX61P03	S55150-A114			AC 24 V /DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω			✓		Position feedback, forced control, change of characteristic		
SAX81P03	S55150-A116				3-position			-		-		
SAV31P00	S55150-A121	40 mm	1100 N	AC 230 V	3-position	-	120 s	-	Press and fix	-		
SAV61P00	S55150-A119			AC 24 V /DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω			✓		Position feedback, forced control, change of characteristic		
SAV81P00	S55150-A120				3-position			-		-		

2.3.3 Rotary actuators

Product no.	Stock no.	Angular rotation	Torque	Operating voltage	Positioning signal	Spr. ret. time	Pos. time	LED	Manual adjuster	Extra functions
SAL31.00T10	S55162-A108	90°	10 Nm	AC 230 V	3-position	-	120 s	-	Press and fix	-
SAL31.00T20	S55162-A110		20 Nm							
SAL31.00T40	S55162-A111		40 Nm							
SAL31.03T10	S55162-A109		10 Nm	AC 24 V DC 24 V	DC 0...10 V DC 4...20 mA 0...1000 Ω		30 s	✓		-
SAL61.00T10	S55162-A100		10 Nm							
SAL61.00T20	S55162-A102		20 Nm							
SAL61.00T40	S55162-A103		40 Nm							
SAL61.03T10	S55162-A101		10 Nm		3- position		120 s	-		
SAL81.00T10	S55162-A104		10 Nm							
SAL81.00T20	S55162-A106		20 Nm							
SAL81.00T40	S55162-A107		40 Nm							
SAL81.03T10	S55162-A105		10 Nm				30 s			

2.4 Ordering


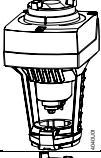
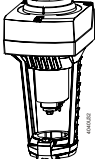
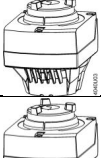
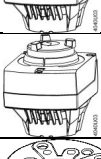


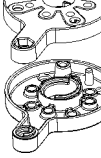


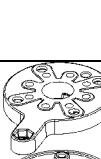




















































Example

Product no.	Stock no.	Description	Quantity
SAX81.03	S55150-A103	Actuator	1
ASZ7.5/1000	S55845-Z106	Potentiometer	1

Delivery

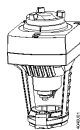
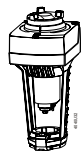






Actuators, valves and accessories are supplied in individual packs.

Scope of delivery

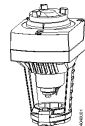
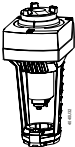









Type	Device	Screws	Waveinset
SAY..P..		-	-
SAX..		-	-
SAV..		-	-
SAL..T10		-	-
SAL..T20		2 pcs. M5 x 20 mm 	1 pc. 11 mm 
SAL..T40		2 pcs. M6 x 20 mm 	1 pc. 14 mm 
ASK31N		4 pcs. M6 x 16 mm 1 pc. M5 x 20 mm incl. nut             	1 pc. 12 mm  1 pc. 12 mm 
ASK33N		4 pcs. M6 x 16 mm 1 pc. M5 x 20 mm incl. nut             	1 pc. 12 mm  1 pc. 12 mm 
ASK35N		2 pcs. M8 x 50 mm 1 pc. M5 x 20 mm incl. nut             	1 pc. 12 mm 1 pc. 16 mm       

2.5 Equipment combinations

2.5.1 Stroke actuators – 3-port valves

Typical applications	Stroke actuators	Data Sheet	Stroke		20 mm	40 mm		
			Positioning force		800 N	1600 N		
<ul style="list-style-type: none">• Heating plants• Ventilation and air conditioning plants• Heat generation• Heat distribution• District heating plants	SAX.. SAV..	N4501 N4503						
					SAX.. $\Delta p_{\max}^{5)}$ [kPa] AB→A B	SAV.. $\Delta p_{\max}^{5)}$ [kPa] A→AB B		
Valves	Basic Doc. (P4030)							
Valves	Data Sheet	Valve type	DN	k_{vs} [m³/h]				
 -10...130 °C ⁴⁾	N4410	VXF21.22...25 ^{1) 7)}	25	1.9 / 3 / 5 / 7.5	100	300		
		VXF21.25... ^{2) 7)}	25	2.5 / 4 / 6.3 / 10				
		VXF21.39-40 ⁷⁾	40	12 / 19				
		VXF21.40... ^{2) 7)}	40	16 / 25				
		VXF21.50 ⁷⁾	50	31				
		VXF21.50-40 ⁷⁾	50	40	60	175		
		VXF21.65 ⁷⁾	65	49				
		VXF21.65-63 ⁷⁾	65	63				
		VXF21.80-78 ⁷⁾	80	78	40	100		
VXF21.80-100 ⁷⁾	80	100						
 -10...130 °C	N4401	VXF22.25... ²⁾	25	2.5 / 4 / 6.3 / 10	100	300	-	-
		VXF22.40... ²⁾	40	16 / 25				
		VXF22.50-40	50	40				
		VXF22.65-63	65	63	50	150	100	300
		VXF22.80-100	80	100		75		
		VXF22.100-160	100	160	-	-	50	225 125
 -10...130 °C ⁴⁾	N4420	VXF31.15... ^{2) 7)}	15	2.5 / 4	100	300	-	-
		VXF31.24...25 ^{1) 7)}	25	5 / 7.5				
		VXF31.25... ^{2) 7)}	25	6.3 / 10				
		VXF31.39...40 ^{1) 7)}	40	12 / 19				
		VXF31.40... ^{2) 7)}	40	16 / 25				
		VXF31.50 ⁷⁾	50	31	60	175		
		VXF31.50-40 ⁷⁾	50	40				
		VXF31.65 ⁷⁾	65	49				
		VXF31.65-63 ⁷⁾	65	63	40	100		
		VXF31.80 ⁷⁾	80	78				
 -10...130 °C ⁴⁾	N4402	VXF32.15... ²⁾	15	1.6 / 2.5	100	400	-	-
		VXF32.25... ²⁾	25	6.3 / 10				
		VXF32.40... ²⁾	40	16 / 25				
		VXF32.50-40	50	40	50	300	100	400
		VXF32.65-63	65	63		150		
		VXF32.80-100	80	100		75		
		VXF32.100-160	100	160	-	-	50	225 125 90 60
		VXF32.125-250	125	250				
		VXF32.150-400	150	400				
 -10...130 °C ⁴⁾	N4430	VXF40.15... ^{2) 7)}	15	1.9 / 2.5 / 3 / 4	100	300	-	-
		VXF40.25... ^{2) 7)}	20	5 / 6.3 / 7.5 / 10				
		VXF40.40... ^{2) 7)}	40	12 / 16 / 19 / 25				
		VXF40.50... ^{2) 7)}	50	31 / 40	60	175		
		VXF40.65... ^{2) 7)}	65	49 / 63				
		VXF40.80... ^{2) 7)}	80	78 / 100			40	100
 -10 130 °C ⁴⁾	N4440	VXF41.14...15 ^{1) 7)}	15	1.9 / 3	200	800	-	-
		VXF41.24...25 ^{1) 7)}	25	5 / 7.5				
		VXF41.39...40 ^{1) 7)}	40	12 / 19	150	500		
		VXF41.49...50 ^{1) 7)}	50	19 / 31	100	350		

SAV... This product line of actuators might not be available in all countries. Please talk to your local contact or consult your local internet pages of www.buildingtechnologies.siemens.com.


Typical applications		Stroke actuators	Data Sheet	Stroke	20 mm	40 mm							
				Positioning force	800 N	1600 N							
<ul style="list-style-type: none">• Heating plants• Ventilation and air conditioning plants• Heat generation• Heat distribution• District heating plants		SAX.. SAV.. N4501 N4503											
				SAX..		SAV..							
Valves	Basic Doc. (P4030)			$\Delta p_{\max}^{5)}$ [kPa] 	$\Delta p_{\max}^{5)}$ [kPa] 	$\Delta p_{\max}^{5)}$ [kPa] 	$\Delta p_{\max}^{5)}$ [kPa] 						
Valves	Data Sheet	Valve type	DN	k_{vs} [m ³ /h]									
 -10...130 °C ⁴⁾	N4403	VXF42.15-.. ²⁾	15	1.6 / 2.5 / 4	100	400	-	-					
		VXF42.20-6.3	20	6.3									
		VXF42.25-.. ²⁾	25	6.3 / 10									
		VXF42.40-.. ²⁾	40	16 / 25									
		VXF42.50-.. ²⁾	50	31.5 / 40	50	300	100	400					
		VXF42.65-.. ²⁾	65	50 / 63		150							
		VXF42.80-.. ²⁾	80	80 / 100		75							
		VXF42.100-.. ²⁾	100	125 / 160									
		VXF42.125-.. ²⁾	125	200 / 250	-	-	50	225					
VXF42.150-.. ²⁾	150	315 / 400			125								
 -20...130 °C ⁴⁾	N4404	VXF43.65-63	65	63	-	-	100	400					
		VXF43.80-100	80	100				225					
		VXF43.100-160	100	160			50	125					
		VXF43.125-250	125	250				90					
		VXF43.150-400	150	400				60					
 -20...130 °C ⁴⁾	N4405	VXF53.15-.. ²⁾	15	1.6 / 2.5 / 4	200	1200	-	-					
		VXF53.20-6.3	20	6.3									
		VXF53.25-.. ²⁾	25	6.3 / 10									
		VXF53.32-16	32	16									
		VXF53.40-.. ²⁾	40	16 / 25	100	500	200	1150					
		VXF53.50-40	50	40		300			700				
		VXF53.65-63	65	63									
		VXF53.80-100	80	100									
		VXF53.100-160	100	160	-	-	50	225					
		VXF53.125-250	125	250				125					
VXF53.150-400	150	400	90										
			75										
 -20...130 °C ⁴⁾	N4405	VXF53.65-63	65	63	-	-	100	400					
		VXF53.80-100	80	100				225					
		VXF53.100-160	100	160			50	125					
		VXF53.125-250	125	250				90					
		VXF53.150-400	150	400				75					
		 -25...130 °C ⁴⁾	N4463	-			VXG41.1301 ³⁾	15	1.6	-	800	-	-
				-			VXG41.1401 ³⁾	15	2.5				
				VXG41.15			VXG41.1501 ³⁾	15	4				
VXG41.20	VXG41.2001 ³⁾			20	6.3								
VXG41.25	VXG41.2501 ³⁾			25	10								
VXG41.32	VXG41.3201 ³⁾			32	16								
VXG41.40	VXG41.4001 ³⁾			40	25								
VXG41.50	VXG41.5001 ³⁾			50	40								

¹⁾ Insert running number instead of k_{vs} value

²⁾ .. = insert k_{vs} value

³⁾ With tight bypass; VXG41.1301 and VXG41.1401: use only SAX61.., SKD32.50 or SKD82.50.

⁴⁾ For media temperatures > 130 °C use electrohydraulic actuators SKD.. (N4561), SKB.. (N4564).

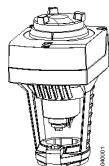
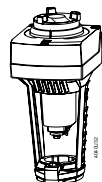




⁵⁾ Δp_{\max}  = max. permissible differential pressure in diverting mode

⁶⁾ DN 15...50: Flange dimensions for PN 16 and PN 25

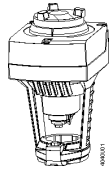
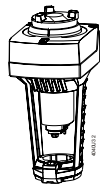




DN 65...150: Flange dimensions only for PN 25

⁷⁾ Valves no longer in the active sale

2.5.2 Stroke actuators – 2-port valves

Typical applications	Stroke actuators	Data Sheet	Stroke	20 mm		40° mm			
			Positioning force	800 N	1600 N				
<ul style="list-style-type: none">• Heating plants• Ventilation and air conditioning plants• Heat generation• Heat distribution• District heating plants	SAX.. SAV..	N4501 N4503							
			SAX..		SAV..				
			Valves	Basic Doc. (P4030)		Δp _s [kPa]	Δp _{max} [kPa]	Δp _s [kPa]	Δp _{max} [kPa]
Valves	Data Sheet		Valve type	DN	k _{vs} [m³/h]				
PN6  -10...130 °C ³⁾	N4310	VVF21.22...25 ^{1) 4)}	25	1.9 / 3 / 5 / 7,5	600	300	-	-	
		VVF21.25-... ^{2) 4)}	25	2.5 / 4 / 6.3 / 10					
		VVF21.39...-40 ^{1) 4)}	40	12 / 19					
		VVF21.40-... ^{2) 4)}	40	16 / 25	500				
		VVF21.50 ⁴⁾	50	31					
		VVF21.50-40 ⁴⁾	50	40	300				
		VVF21.65 ⁴⁾	65	49					
		VVF21.65-63 ⁴⁾	65	63	175				
		VVF21.80-78 ⁴⁾	80	78					
VVF21.80-100 ⁴⁾	80	100	100	100					
PN6 -10...130 °C	N4401	VVF22.25-... ²⁾	25	2.5 / 4 / 6.3 / 10	600	300	-	-	
		VVF22.40-... ²⁾	40	16 / 25	550		600	300	
		VVF22.50-40	50	40	350				
		VVF22.65-63	65	63	200	150			450
		VVF22.80-100 ¹⁾	80	100	125	75	250	225	
		VVF22.100-160 ¹⁾	100	160	-	-	160	160	
PN10  -10...130 °C ³⁾	N4320	VVF31.15-... ^{2) 4)}	15	2.5 / 4	1000	300	-	-	
		VVF31.24...25 ^{1) 4)}	25	5 / 7,5					
		VVF31.25-... ^{2) 4)}	25	6.3 / 10					
		VVF31.39...40 ^{1) 4)}	40	12 / 19	525				
		VVF31.40-... ^{2) 4)}	40	16 / 25					
		VVF31.50 ⁴⁾	50	31	325				
		VVF31.50-40 ⁴⁾	50	40					
		VVF31.65 ⁴⁾	65	49	175				
		VVF31.65-63 ⁴⁾	65	63					
		VVF31.80 ⁴⁾	80	78	100				
		VVF31.80-100 ⁴⁾	80	100					
		PN10 -10...130 °C ⁴⁾	N4402	VVF32.15-... ²⁾	15	1.6 / 2.5 / 4			1000
VVF32.25-... ²⁾	25			6.3 / 10					
VVF32.40-... ²⁾	40			16 / 25	550	1000	400		
VVF32.50-40	50			40	350				
VVF32.65-63	65			63	200			150	750
VVF32.80-100 ²⁾	80			100	125	75	250	225	
VVF32.100-160 ²⁾	100			160	-	-	160	125	
VVF32.125-250	125			250			125	90	
VVF32.150-400 ²⁾	150			400			80	80	
PN16  -10...130 °C ³⁾	N4330			VVF40.15-... ^{2) 4)}	15	1.9 / 2.5 / 3 / 4	1600	300	-
		VVF40.25-... ^{2) 4)}	20	5 / 6.3 / 7.5 / 10	1550				
		VVF40.40-... ^{2) 4)}	40	12 / 16 / 19 / 25	525				
		VVF40.50-... ^{2) 4)}	50	31 / 40	325				
		VVF40.65-... ^{2) 4)}	65	49 / 63	175	175			
		VVF40.80-... ^{2) 4)}	80	78 / 100	100	100			
PN16  -10...130 °C ³⁾	N4340	VVF41.49 ⁴⁾	50	19	350	300	-	-	
		VVF41.50 ⁴⁾	50	31					
		-	-	-	-	-			

SAV...: This product line of actuators might not be available in all countries. Please talk to your local contact or consult your local internet pages of www.buildingtechnologies.siemens.com.

Typical applications	Stroke actuators	Data Sheet	Stroke	20 mm	40°mm			
			Positioning force	800 N	1600 N			
<ul style="list-style-type: none">• Heating plants• Ventilation and air conditioning plants• Heat generation• Heat distribution• District heating plants	SAX.. SAV..	N4501 N4503						
			SAX..	SAV..				
Valves	Basic Doc. (P4030)			Δp _s [kPa]	Δp _{max} [kPa]	Δp _s [kPa]	Δp _{max} [kPa]	
Valves	Data Sheet							
PN16 N4403 -10...130 °C ³⁾	Valve type	DN	k _{vs} [m³/h]					
	VVF42.15-... ²⁾	15	1,6 / 2,5 / 4	1600	400	-	-	
	VVF42.20-6.3	20	6,3					
	VVF42.25-... ²⁾	25	6,3 / 10					
	VVF42.32-16	32	16					
	VVF42.40-... ²⁾	40	16 / 25	900	300	750	400	
	VVF42.50-... ²⁾	50	31,5 / 40	550				
	VVF42.65-... ²⁾	65	50 / 63	350				
	VVF42.80-... ²⁾	80	80 / 100	200				
	VVF42.100-... ²⁾	100	125 / 160	125				
	VVF42.125-... ²⁾	125	200 / 250	-	-	160	225	
	VVF42.150-... ²⁾	150	315 / 400	-	-	125	125	
						80	80	
	PN16  -10...130 °C ³⁾	N4403	VVF42.50-40K	50	40	1600	400	-
VVF42.65-63K		65	63					
VVF42.80-100K		80	100					
VVF42.100-160K		100	160	-	-	1600	400	
VVF42.125-250K		125	250			1400		
VVF42.150-360K		150	360					
PN16 N4404 20...130 °C ³⁾	N4404	VVF43.65-... ²⁾	65	50 / 63	-	-	450	400
	VVF43.80-... ²⁾	80	80 / 100	250			225	
	VVF43.100-... ²⁾	100	125 / 160	160			125	
	VVF43.125-... ²⁾	125	200 / 250	125			90	
	VVF43.150-... ²⁾	150	315 / 400	80			60	
PN25  -20...130 °C ³⁾	N4373	VVF52.15-... ^{2) 4)}	15	0.16 / 0.2 / 0.25 / 0.32 / 0.4 / 0.5 0.63 / 0.8 / 1 / 1.25 / 1.6 / 2 / 2.5 / 3.2 / 4	2500	1600	-	-
	VVF52.25-... ^{2) 4)}	25	5 / 6.3 / 8 / 10	1500	1200	-	-	
	VVF52.40-... ^{2) 4)}	40	12.5 / 16 / 20 / 25	500	400	-	-	
PN25/16  PN25 -20...130 °C ³⁾	N4405	VVF53.15-... ²⁾	15	0.16 / 0,2 / 0.25 / 0.32 / 0,4 / 0.5 / 0.63 / 0,8 / 1 / 1.25 / 1.6 / 2 / 2.5 / 3.2 / 4	2500	1200	-	-
	VVF53.20-6.3	20	6.3	1600	750			
	VVF53.25-... ²⁾	25	5 / 6.3 / 8 / 10					
	VVF53.32-16	32	16			900	750	1250
	VVF53.40-... ²⁾	40	12.5 / 16 / 20 / 25	550	500	750	700	
	VVF53.50-... ²⁾	50	31.5 / 40	350	300	450	400	
	VVF53.65-63 ³⁾	65	63	-	-	250	225	
	VVF53.80-100 ³⁾	80	100			160	125	
	VVF53.100-160	100	160			125	90	
	VVF53.125-250	125	250			80	60	
	VVF53.150-360	150	360					
PN16  -25...130 °C ³⁾	N4363	VVG41.11...12 ¹⁾	15	0.63 / 1	1600	800	-	-
	VVG41.13	15	1.6					
	VVG41.14	15	2.5					
	VVG41.15	15	4					
	VVG41.20	20	6.3					
	VVG41.25	25	10	1550	525			
	VVG41.32	32	16	875				
	VVG41.40	40	25	525				
	VVG41.50	50	40	300		300		

SAV.: This product line of actuators might not be available in all countries. Please talk to your local contact or consult your local internet pages of www.buildingtechnologies.siemens.com.

¹⁾ insert running number instead of k_{vs} value

²⁾ .. = insert k_{vs} value

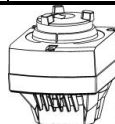

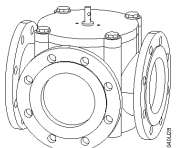

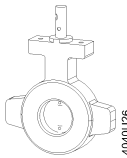

³⁾ For media temperatures > 130 °C use electrohydraulic actuators SKD.. (N4561), SKB.. (N4564).

⁴⁾ valves no longer in the active sale

2.5.3 Stroke Actuators – combi valves

	Valves				SAY..P.		Actuators SAX..P.		SAV..P.	
	Standard flow rate	High flow rate	DN	H ₁₀₀ [mm]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]	Δp_{max} [kPa]	Δp_s [kPa]
PN25 N4855	VPI46.40F9.5Q	-	40	15	400	400	-	-	-	-
	VPI46.50F12Q	-	50							
PN16 N4315	VPF43.50F16	VPF43.50F25	50	20	-	-	600	600	-	-
	VPF43.65F24	VPF43.65F35	65							
	VPF43.80F35	VPF43.80F45	80							
	VPF43.100F70	VPF43.100F90	100	40	-	-	-	-	600	600
	VPF43.125F110	VPF43.125F135	125							
	VPF43.150F160	VPF43.150F200	150							
PN25 N4315	VPF53.50F16	VPF53.50F25	50	20	-	-	600	600	-	-
	VPF53.65F24	VPF53.65F35	65							
	VPF53.80F35	VPF53.80F45	80							
	VPF53.100F70	VPF53.100F90	100	40	-	-	-	-	600	600
	VPF53.125F110	VPF53.125F135	125							
	VPF53.150F160	VPF53.150F200	150							

2.5.4 Rotary actuators – slipper and butterfly valves

Typical applications	Rotary actuators	Data Sheet	Angular rotation		90°			
			Torque		10 Nm	20 Nm	40 Nm	
<ul style="list-style-type: none">• Heating plants• Ventilation and air conditioning plants• Heat generation• Heat distribution• District heating plants	SAL..		N4502					
					SAL..T10	SAL..T20	SAL..T40	
Slipper valves	Data Sheet	Valve type	DN	k _{vs} [m³/h]	Mounting set	Δp _{max} [kPa]		
  1 °C...120 °C	N4241	VBF21.40	40	25	-	- ¹⁾	-	-
		VBF21.50	50	40	-	- ¹⁾		
		VBF21.65	65	63	ASK31N	30		
		VBF21.80	80	100	ASK31N			
		VBF21.100	100	160	ASK31N			
		VBF21.125	125	550	ASK31N			
		VBF21.150	150	820	ASK31N			
Butterfly valves						Δp _s [kPa]		
  -10 °C...120 °C	N4131	VKF41.40 ²⁾	40	50	ASK33N	500	-	-
		VKF41.50 ²⁾	50	80	ASK33N			
		VKF41.65 ²⁾	65	200	ASK33N			
		VKF41.80 ²⁾	80	400	ASK33N			
		VKF41.100 ²⁾	100	760	ASK33N			
		VKF41.125 ²⁾	125	1000	ASK33N	300		
		VKF41.150 ³⁾	150	2100	ASK33N	250	-	400
		VKF41.200 ³⁾	200	4000	ASK33N	125	-	300
 -10 °C...120 °C	N4136	VKF46.40 ⁴⁾	40	50	-	-	1600	-
		VKF46.50 ⁴⁾	50	85	-			
		VKF46.65 ⁴⁾	65	215	-			
		VKF46.80 ⁴⁾	80	420	-			
		VKF46.100 ⁴⁾	100	800	-	-	-	1600
		VKF46.125 ⁴⁾	125	1010	-			1200

¹⁾ SAL..T10 rotary actuators only fit on VBF21..., DN65... 150. For VBF21..., DN40/50 use SQK34..., SQK84.. or SQK33.00 rotary actuators.

²⁾ VKF41.. maximum flow speed with SAL.T10 actuator with water DN40.. DN125 = 4 m/

³⁾ VKF41.. maximum flow speed with SAL.T0 actuator with water DN150/200 = 2.5 m/s, with SAL.T40 actuator with water DN150/200 = 4 m/s

⁴⁾ VKF46.. maximum flow speed water = 4.5 m/s, air 40 m/s

2.6 Accessories

2.6.1 Electrical accessories

Product no.	Auxiliary switch ASC10.51	Potentiometer ASZ7.5/.. ¹⁾	Function module AZX61.1	Stem heating element ASZ6.6
Stock no.	S55845-Z103	S55845-Z104 (ASZ7.5/135) S55845-Z105 (ASZ7.5/200) S55845-Z106 (ASZ7.5/1000)	S55845-Z107	S55845-Z108
		Max. 2		Max. 1
SAX31..	Max. 2	Max. 1	-	Max. 1
SAX61..		-	Max. 1	
SAX81..		Max. 1	-	
SAX31P..	Max. 2	Max. 1	-	-
SAX61P..		-	Max. 1	
SAX81P..		Max. 1	-	
SAV31..	Max. 2	Max. 1	-	Max. 1
SAV61..		-	Max. 1	
SAV81..		Max. 1	-	
SAV31P..	Max. 2	Max. 1	-	-
SAV61P..		-	Max. 1	
SAV81P..		Max. 1	-	
SAL31..	Max. 2	Max. 1	-	-
SAL61..		-	Max. 1	
SAL81..		Max. 1	-	
SAY31P..	Max. 2	Max. 1	-	-
SAY61P..		-	Max. 1	
SAY81P..		Max. 1	-	

¹⁾ Available with 135 Ω, 200 Ω or 1000 Ω

2.6.2 Mechanical accessories

Product no.	Weather shield ASK39.1	Mounting set		
		ASK31N for VBF21..	ASK33N for VKF41..	ASK35N für VKF45.. ¹⁾
Stock no.	S55845-Z109	S55845-Z100	S55845-Z101	S55845-Z102
SAY..	Max. 1	-	-	-
SAX..		-	-	-
SAV..		-	-	-
SAL..		-	-	-
SAL..T10	Max. 1	✓	✓	-
SAL..T20		-	-	DN40...DN65
SAL..T40		-	DN150 / 200	DN80...DN200

¹⁾ In 2000 VKF45.. line was replaced by VKF46.. line.

2.7 Product replacements

Replacement of SQX.. / SQL.. actuators by SAX.. / SAL.. actuators.

Note

- When replacing actuators consider positioning force, torque and positioning times.
- Adjust in the controller the parameter "Running time" respectively "Positioning time", to ensure stable control.
- The replacement of accessory items needs to be taken into consideration also. In that case, compatibility is not necessarily ensured.

2.7.1 Stroke actuators SQX.. to SAX..

SQX..				SAX.. ¹⁾			VVF21../VXF21.. VVF31../VXF31.. VVF40../VXF40..	VVF41../VXF41.. VVG41../VVG41..	VVF51.. VVF52..
		Pos. time [s]	Pos. force [N]		Pos. time [s]	Pos. force [N]			
							DN15...80	DN15...50	DN15...40
SQX31.. ²⁾	SQX31.00	150	500	SAX31.00	120	800	✓	✓	✓
	SQX31.03	35	500	SAX31.03	30	800	✓	✓	✓
SQX61..	SQX61	35	500	SAX61.03	30	800	✓	✓	✓
	SQX61U	35	500	SAX61.03U	30	800	✓	✓	✓
SQX81..	SQX81.00	150	500	SAX81.00	120	800	✓	✓	✓
	SQX81.00U	150	500	SAX81.00U	120	800	✓	✓	✓
	SQX81.03	35	500	SAX81.03	30	800	✓	✓	✓
	SQX81.03U	35	500	SAX81.03U	30	800	✓	✓	✓
SQX32..	SQX32.00	150	700	SAX31.00	120	800	✓	✓	✓
	SQX32.03	35	700	SAX31.03	30	800	✓	✓	✓
SQX62..	SQX62	35	700	SAX61.03	30	800	✓	✓	✓
	SQX62U	35	700	SAX61.03U	30	800	✓	✓	✓
SQX82..	SQX82.00	150	700	SAX81.00	120	800	✓	✓	✓
	SQX82.00U	150	700	SAX81.00U	120	800	✓	✓	✓
	SQX82.03	35	700	SAX81.03	30	800	✓	✓	✓
	SQX82.03U	35	700	SAX81.03U	30	800	✓	✓	✓

¹⁾ SAX81.., SAX61.. are available as UL-listed versions.

²⁾ SQX31.06: Actuator for gas valves. Either replace complete valve-actuator combination or clarify required positioning time and replace only actuator. Consider if mounting set is required.

2.7.2 Rotary actuators SQL.. to SAL..

SQL..				SAL..		
		Pos. time [s]	Torque [Nm]		Pos. time [s]	Torque [Nm]
SQL31..	SQL31.10	120	12,5	SAL31.00T10	120	10
SQL32..	SQL32.10	125	12,5	SAL31.00T10	120	10
	SQL32.12	70	12,5	SAL31.00T10 or SAL31.03T10 ¹⁾	120 30	10 10
	SQL32.13	30	5	SAL31.03T10	30	10
SQL33..	SQL33.00	125	12,5	SAL31.00T10	120	10
	SQL33.03	30	10	SAL31.03T10	30	10
SQL83..	SQL83.00	125	12,5	SAL81.00T10	120	10
	SQL83.04	30	10	SAL81.03T10	30	10
SQL35..	SQL35.00	125	20	SAL31.00T20 ²⁾	120	20
	SQL35.00	125	20	SAL31.00T40 ²⁾	120	40
SQL85..	SQL85.00	125	20	SAL81.00T20 ²⁾	120	20
	SQL85.00	125	20	SAL81.00T40 ²⁾	120	40

¹⁾ SAL.. positioning time differs from that of SQL32.12 and SQL32.13 rotary actuators. Consider positioning time when replacing.

²⁾ use SAL.T20 on VKF46.40, VKF46.50 and VKF46.65
use SAL.T40 on VKF46.80, VKF46.100 and VKF46.125

Rotary actuators		SQL..				SAL..		
		SQL31..	SQL32..	SQL33.. SQL83..	SQL35.. SQL85..	SAL31.00T10 SAL31.03T10 SAL81.00T10 SAL81.03T10	SAL31.00T20 SAL81.00T20	SAL31.00T40 SAL81.00T40
VBF21..	DN 40 / DN 50 ¹⁾	-	-	ASK32	-	- ¹⁾	- ¹⁾	- ¹⁾
	DN 65...150	-	-	ASK31	-	ASK31N	-	-
VBF31..	DN 40 / DN 50 ²⁾	-	-	ASK32	-	- ²⁾	- ²⁾	- ²⁾
	DN 65...100	-	-	ASK31	-	ASK31N	-	-
B3f..	DN 40 / DN 50 ²⁾	Direct	ASK25	ASK31	-	-	-	-
	DN 65...150	Direct	ASK25	ASK31	-	ASK31N	-	-
C1f..	DN 40 / DN 50 ²⁾	Direct	-	ASK31	-	-	-	-
	DN 65...100	Direct	-	ASK31	-	ASK31N	-	-
K1i..	DN 20...32	Direct	ASK24	ASK33	-	ASK33N	-	-
K1f..	DN 40...200	Direct	ASK24	ASK33	-	ASK33N	-	-
VKF41..	DN 40...125	-	-	ASK33	-	ASK33N	-	-
	DN 150 / DN 200	-	-	ASK33	ASK35	ASK33N	-	ASK33N
VKF45..	DN40...65	-	-	-	ASK35	-	ASK35N	ASK35N
	DN80...200	-	-	-	-	-	-	ASK35N

¹⁾ Replace with rotary actuators SQK34.., SQK84.. (data sheet N4508) or SQK33.00 (data sheet N4506).

²⁾ Replace with rotary actuators SQK33.00 + ASK32

Note Rotary actuators SAL.. are not suited for mounting sets ASK24, ASK25, ASK31, ASK32, ASK33, ASK35, ASK40 and ASK41.

2.7.3 Electrical accessories

Notes

- If an auxiliary switch is required, its switching point should be indicated on the plant schematic.
- For media below 0 °C the stem heating element ASZ6.6 keeps the valve free from freezing.
- For this case, do not insulate the actuator bracket and the valve stem, as air circulation must be ensured!
- **Non-observance of the above may result in accidents and fires!**
- **Do not touch the hot parts without prior protective measures to avoid burns.**



Stroke actuators		SQX..				SAX..	
		SQX31..	SQX61..	SQX32..	SQX62..	SAX31..	SAX61..
		SQX81..	-	SQX82..	-	SAX81..	-
ASZ6.5	Stem heater	ASZ6.5	ASZ6.5	ASZ6.5	ASZ6.5	ASZ6.6	ASZ6.6
ASZ7.4	1 auxiliary switch, 1 potentiometer (1000 Ω)	ASZ7.4	-	ASZ7.4	-	ASC10.51 + ASZ7.5/1000	-
ASC9.4	Double auxiliary switch	ASC9.4	-	ASC9.4	-	2x ASC10.51	-
ASC9.5	Auxiliary switch	ASC9.5	-	ASC9.5	-	ASC10.51	-

Rotary actuators		SQL..				SAL..	
		SQL31..	SQL32..	SQL33.. SQL83..	-	SAL31..T10	-
		-	-	-	-	SAL81..T10	-
		-	-	-	SQL35.00	-	SAL31.00T20 / T40
		-	-	-	SQL85.00	-	SAL81.00T20 / T40
ASZ7.4	1 auxiliary switch, 1 potentiometer (1000 Ω)	-	-	ASZ7.4	ASZ7.4	ASC10.51 + ASZ7.5/1000	ASC10.51 + ASZ7.5/1000
ASC9.4	Double auxiliary switch	-	-	ASC9.4	ASC9.4	2x ASC10.51	2x ASC10.51
ASC9.5	Auxiliary switch	-	-	ASC9.5	ASC9.5	ASC10.51	ASC10.51
ASZ8.4	Potentiometer (220 Ω)	ASZ8.4	ASZ8.4	-	-	¹⁾	-
ASZ9.4	Potentiometer (2800 Ω)	ASZ9.4	ASZ9.4	-	-	¹⁾	-
ASC1.4	Auxiliary switch	ASC1.4	ASC1.4	-	-	ASC10.51	-

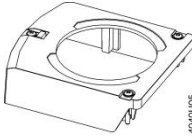
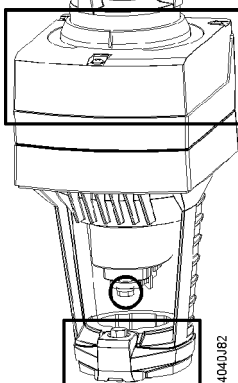

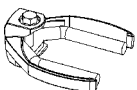
¹⁾ Used auxiliary switches or potentiometer (order accessories additionally were applicable):

- Check used functionality
- Check compatibility with controller

2.8 Spare parts

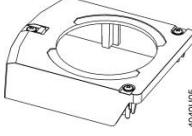
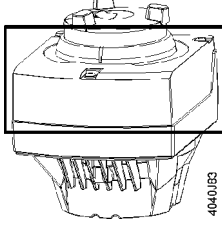


The following spare part sets are available:

SAY.., SAX.., SAV..

Stock number 8000060843	Housing cover  4040U05	 4040J82
	Screw (valve stem coupling)  4040J22	
	U-bracket  4040U04	

Single components from the spare part sets are not available.

SAL..

Stock number 8000060844	Housing cover  4040U05	 4040J83
	2 adapters  4040U06	
	4 screws  4040J20	
	1 pc. 14 mm 1 pc. 11 mm 2 pcs. M5 x 20 mm 2 pcs. M6 x 20 mm	

Single components from the spare part sets are not available.

2.9 Sizing

2.9.1 Parallel operation of actuators

SA..31.. and SA..81..

3-position actuators must have one specific controller each, refer to "Connection diagrams" (page 69).

SA..61..

Up to 10 actuators can drive in parallel on a controller output with a rating of 1 mA. Modulating actuators have an input impedance of 100 kΩ.

2.9.2 Permissible cable lengths and wire cross-sectional areas

Cable lengths and wire cross-sectional areas depend on the following criteria of the actuators:

- Current draw
- Permissible voltage drop across the power supply lines

The control accuracy of the modulating actuators can be improved by using 4-wire connections, thus ensuring that voltage drops on G0 will not distort the positioning signal.

Note

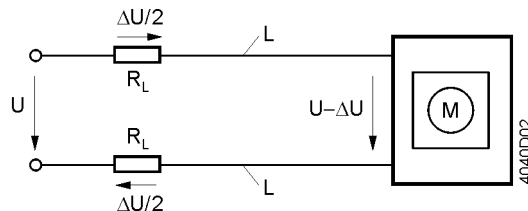
When determining the cable length and the wire cross-sectional area, adherence to the permissible operating voltage tolerance at the actuator is of importance, in addition to the permissible voltage drop across the operating voltage and signal lines (see table below).

Product no.	Operating voltage	Terminal	Max. permissible voltage drop
SA..31..	AC 230 V	N, Y1, Y2	2% each (total of 4%)
SA..61..	AC/DC 24 V	G0, G	4% each (total of 8%)
		G0, Y, U	1% each (at DC 0...10 V)
SA..81..		G, Y1, Y2	4% each (total of 8%)

The following criteria must be considered:

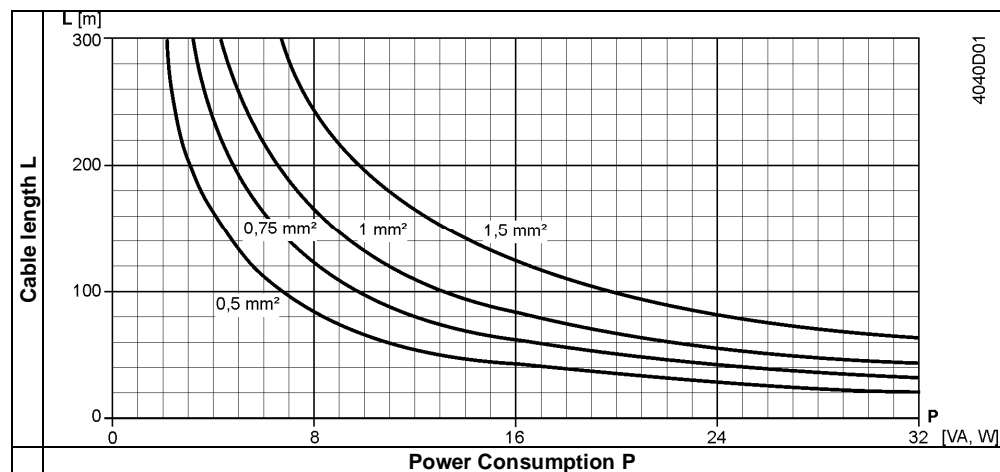
- With modulating control, the permissible positioning signal error must not exceed 1%, the reason being the voltage drop on the G0 wire.
- The voltage drop, caused by charging current peaks in the actuator's DC circuit, must not exceed 2 Vpp.
- If the G0 line is not correctly sized, load changes of the actuator due to changes of the DC voltage drop might lead to self-oscillations.
- The operating voltage drop at AC/DC 24 V may be a maximum of 8% (4% above the G0 wire).

Basic diagram – voltage drop across the power supply cables



The following diagram can be used to determine the cable lengths and wire cross-sectional areas.

L/P-diagram for AC/DC 24 V



Permissible cable length **L** as a function of power **P** and cross-sectional area of wire as a parameter

Note

P is the decisive power consumption of all actuators connected in parallel. When operating on AC 24 V, power consumption is in VA; when operating on DC 24 V, in W.

Formulas for wire lengths

Operating voltage	Permissible voltage drop / wire	Formula for wire length
AC 230 V	2% of AC 230 V	$L = 46 \cdot \frac{1313 \cdot A}{P}$ [m]
AC/DC 24 V	4% of AC 24 V	$L = \frac{1313 \cdot A}{P}$ [m]
	1% of DC 10 V	$L = \frac{5.47 \cdot A}{I(\text{DC})}$ [m]

A Cross-sectional area of wire in mm²
L Permissible wire length in m
P Power consumption in VA (AC) or W (DC) (see actuator's rating plate)
I(DC) DC current part (in A) on G0 wire

2.10 Warranty

The engineering data specified in chapter "Equipment combinations" (page 12) are only guaranteed in connection with the Siemens valves listed.

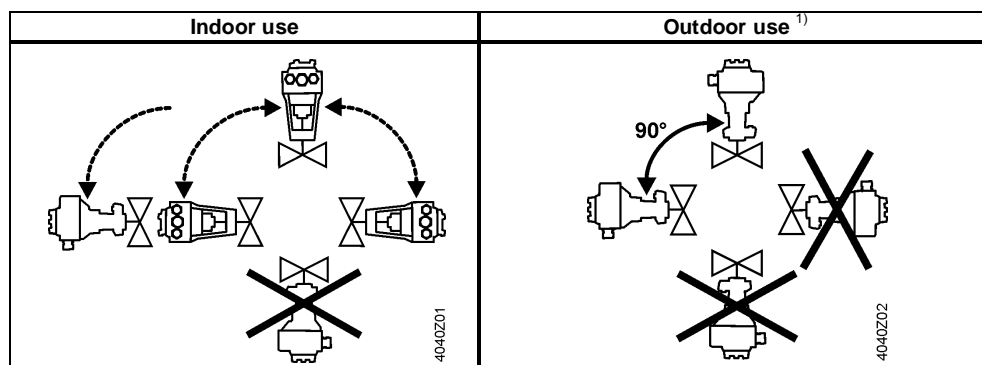
Note

When using the actuators in connection with valves of other manufacture, correct functioning must be ensured by the user, and Siemens will assume no responsibility.

3 Handling

3.1 Mounting and installation

3.1.1 Mounting positions

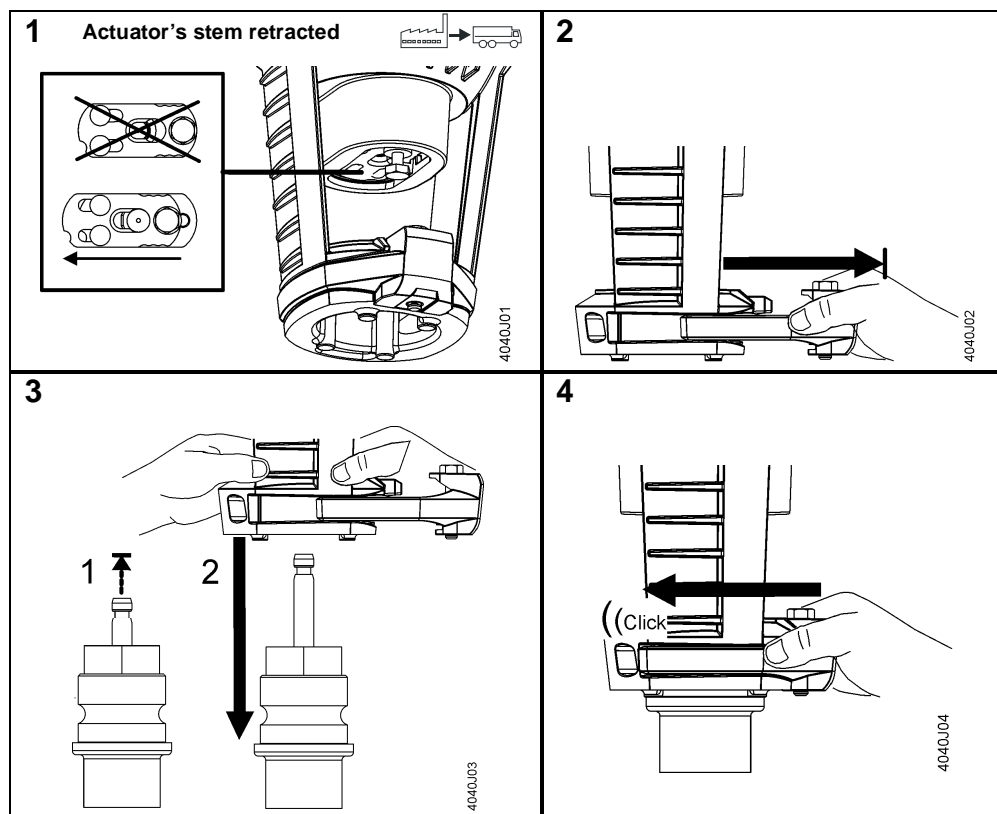


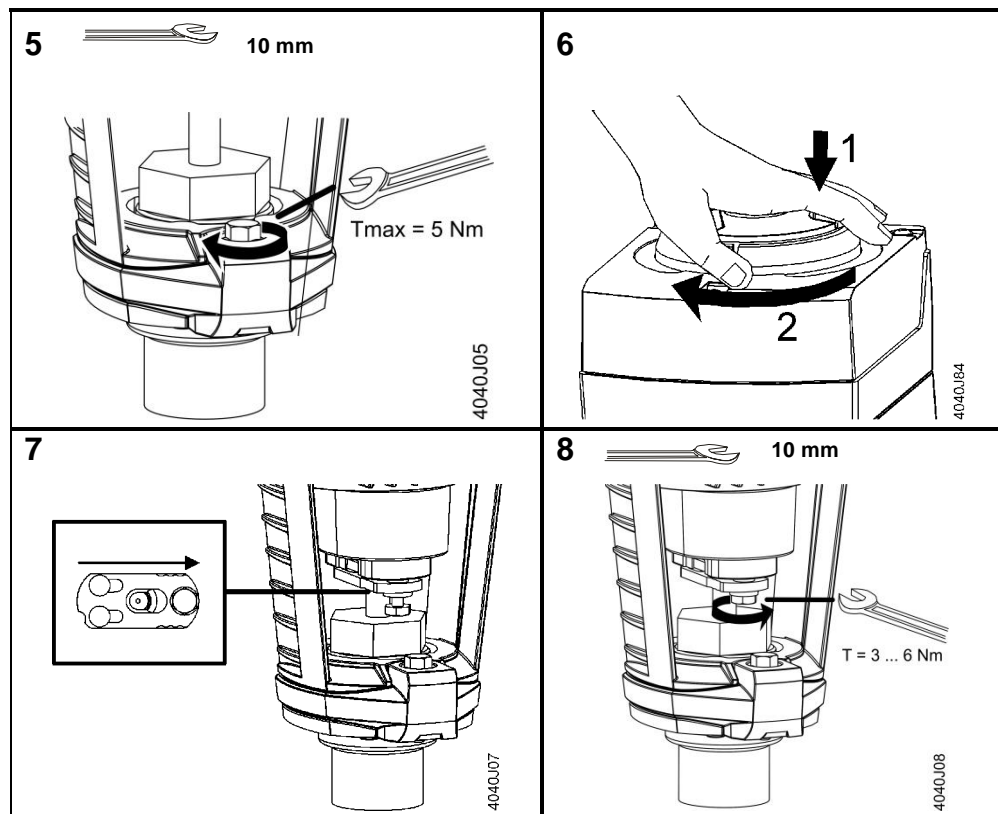
¹⁾ Only in connection with weather shield ASK39.1

3.1.2 Fitting stroke actuators to seat valves VVF.. / VXF.. or VVG.. / VVG..

First, observe "Mounting positions" (page 23).

	<p>Caution!</p> <p>Risk of burns from hot surfaces!</p> <p>If you touch heated parts, you will get burns as result.</p> <ul style="list-style-type: none"> • Allow to cool parts. • Wear protective gloves.
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3.1.3 Avoid missaligment on V_G41 valves with fittings

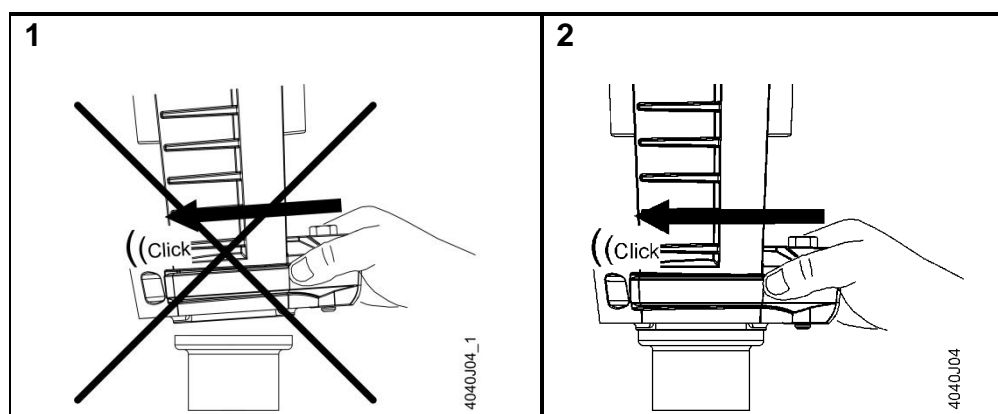


Caution!

Risk of burns from hot surfaces!

If you touch heated parts, you will get burns as result.

- Allow to cool parts.
- Wear protective gloves.

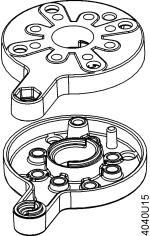
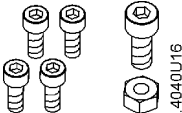

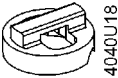


On threaded valves it's possible that the actuator is missaligned on the valve due to a collision with the fitting. If so, please take care for correct mounting, either by turning the actuator or by adjusting the fitting (e.g. use a second sealing to change fitting position).

3.1.4 Fitting rotary actuators to butterfly valves VKF41..


First, observe "Mounting positions" (page 23).

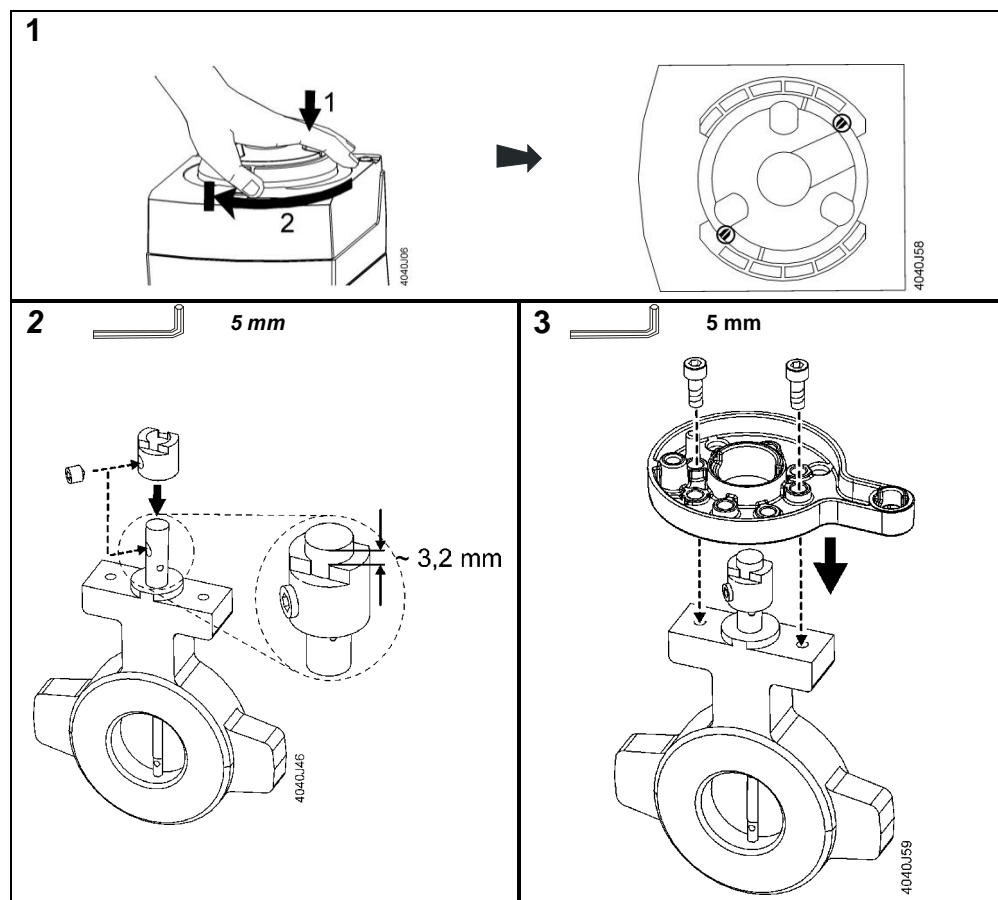
Mounting set ASK33N

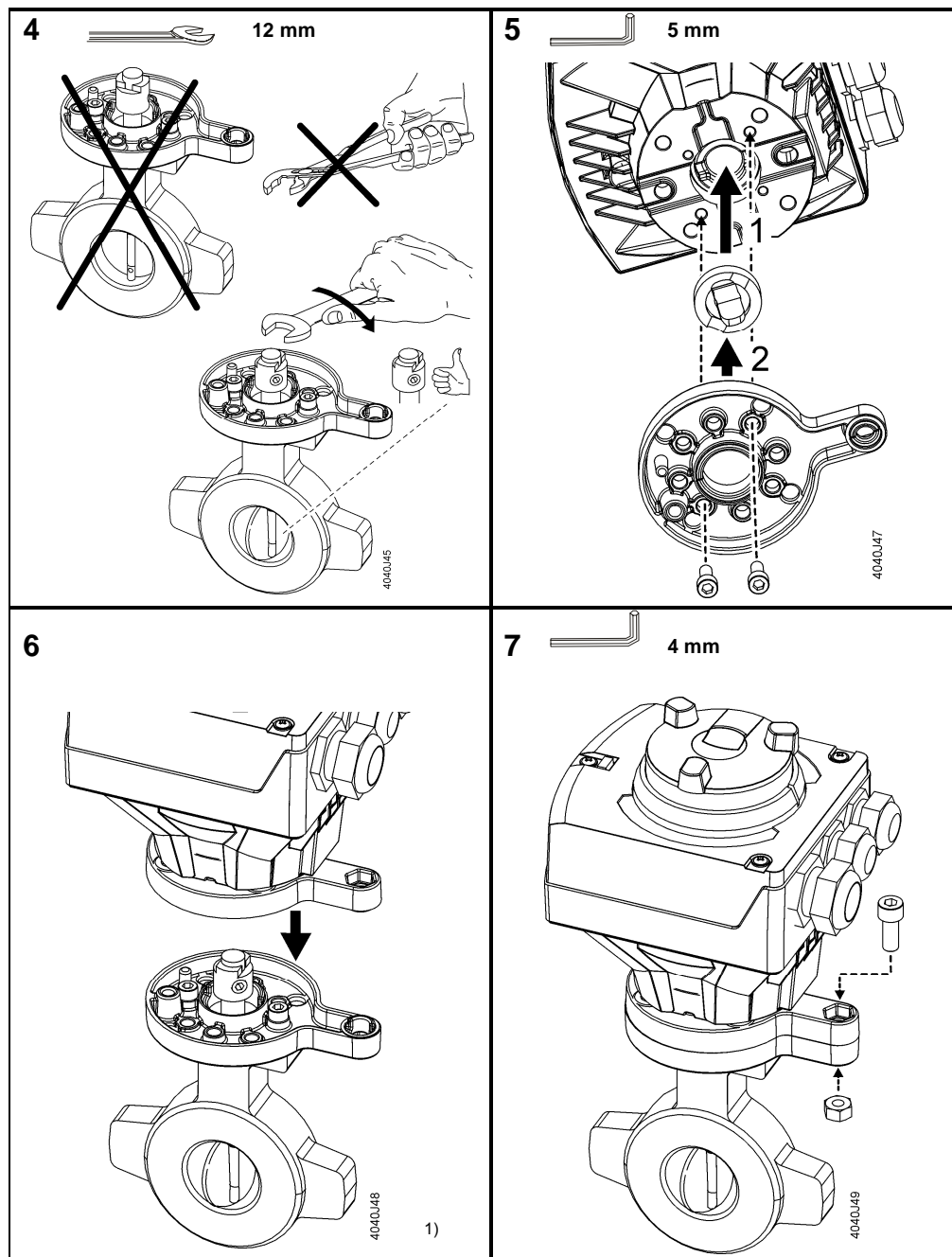
Scope of delivery			
Mounting set (2 parts)	5 screws	1 adapter inc. fixing screw	1 adapter
	4 pcs. M6 x 16 mm 1 pc. M5 x 20 incl. nut 		

Note

Actuators SAL.. are not compatible with mounting sets ASK31, ASK32, ASK33, ASK35, ASK40, and ASK41.

	Caution!
	Risk of burns from hot surfaces! If you touch heated parts, you will get burns as result. <ul style="list-style-type: none"> • Allow to cool parts. • Wear protective gloves.



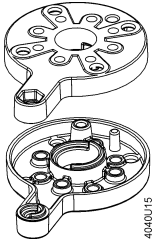
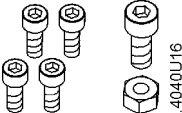

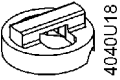


¹⁾ Angle position errors between actuator shaft and valve stem must be corrected via manual control (refer to "Manual adjuster" page 60).

3.1.5 Fitting rotary actuators to slipper valves VBF21..


First, observe "Mounting positions" (page 23).

Mounting set ASK31N

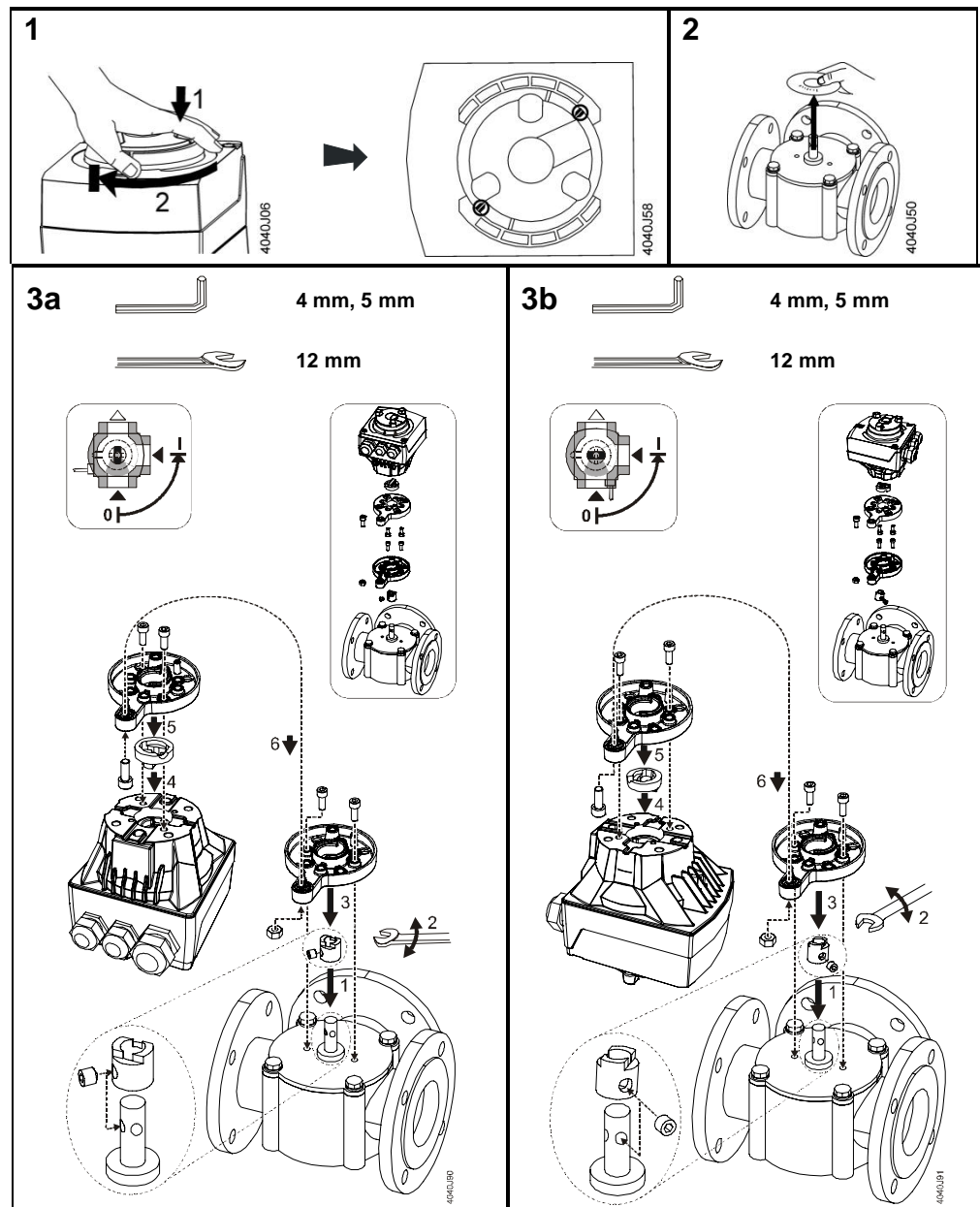
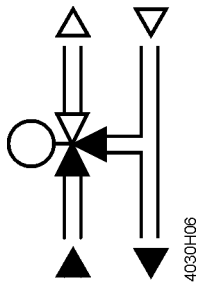
Scope of delivery			
Mounting set (2 parts)	5 screws	1 adapter inc. fixing screw	1 adapter
 4040U15	4 pcs. M6 x 16 mm 1 pc. M5 x 20 mm incl. nut  4040U16	 4040U17	 4040U18

SAL..T10 rotary actuators only fit on VBF21..., DN65...150. For VBF21..., DN40/50 use SQK34..., SQK84.. or SQK33.00 rotary actuators.

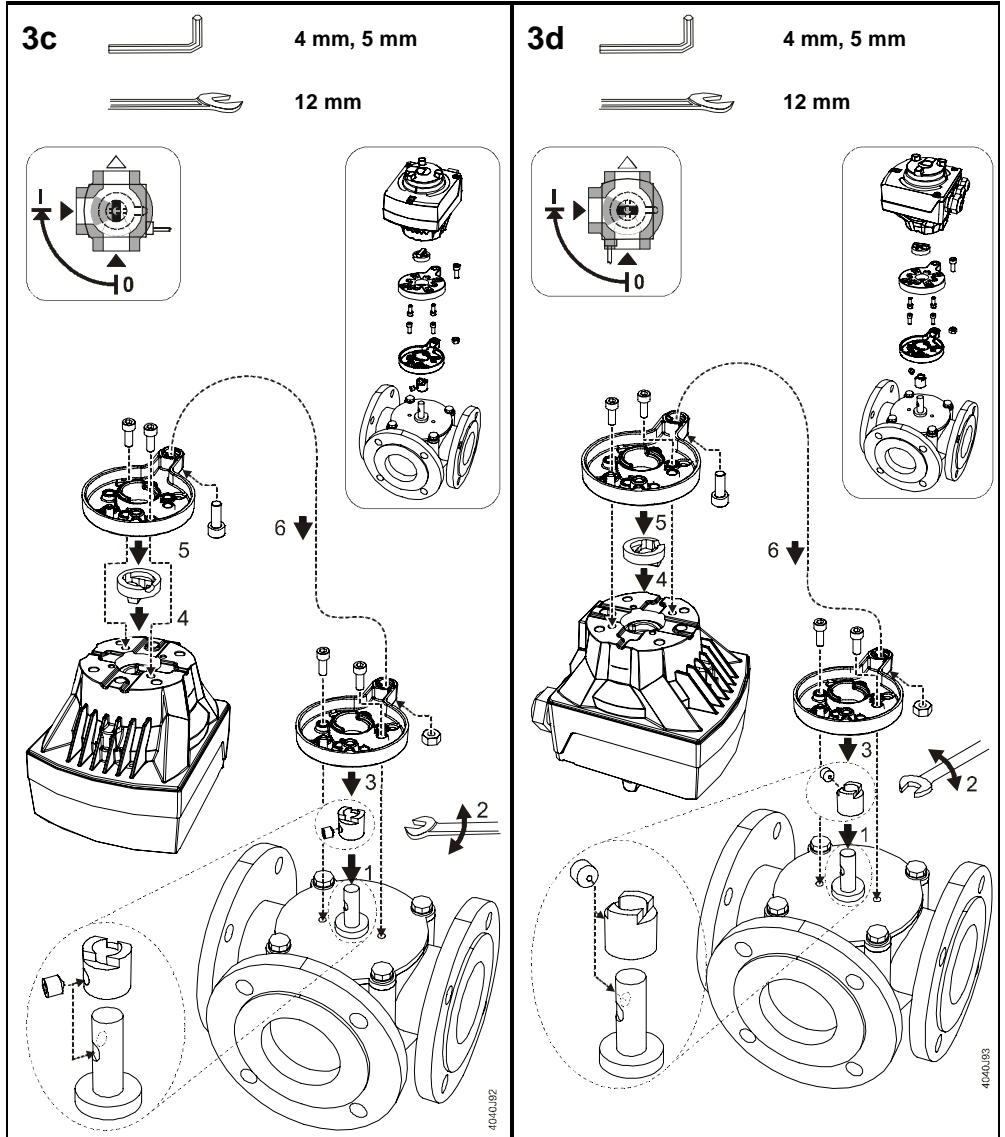
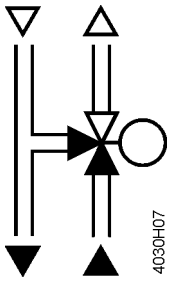
With VBF21.. (e.g. DN 125), the following steps must be performed prior to fitting the mounting set.

	Caution!
	Risk of burns from hot surfaces! If you touch heated parts, you will get burns as result. <ul style="list-style-type: none"> • Allow to cool parts. • Wear protective gloves.

Opening counterclockwise



Opening clockwise


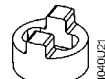


For further mounting positions of VBF 21.. and routing of the connection cables the rotary actuators and adapters must be mounted according to the sketches above.

3.1.6 Fitting rotary actuators to butterfly valves VKF46..

First, observe "Mounting positions" (page 23).

Standard scope of delivery
VKF46..

Product no.	Scope of delivery			
	2 screws		1 dapter	
SAL..T20	2 pcs. M5 x 20 mm		1 pc. 11 mm	
SAL..T40	2 pcs. M6 x 20 mm		1 pc. 14 mm	



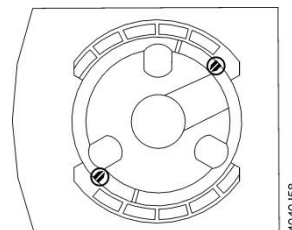
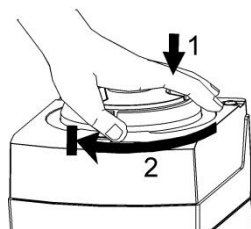
Caution!

Risk of burns from hot surfaces!

If you touch heated parts, you will get burns as result.

- Allow to cool parts.
- Wear protective gloves.

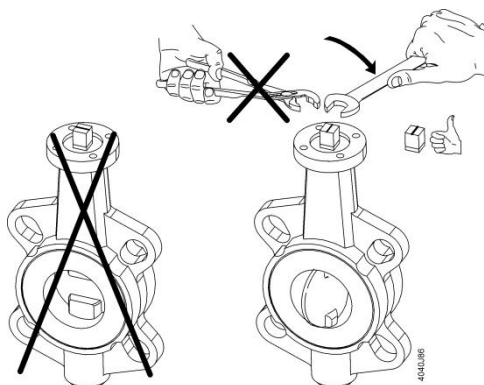
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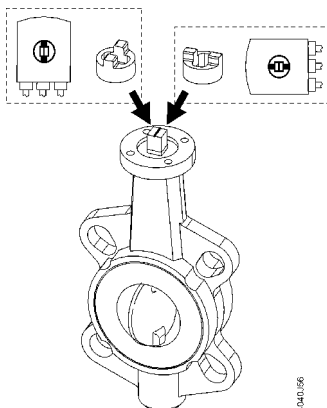
2



- 11 mm (DN 40...50)
- 14 mm (DN 80...125)



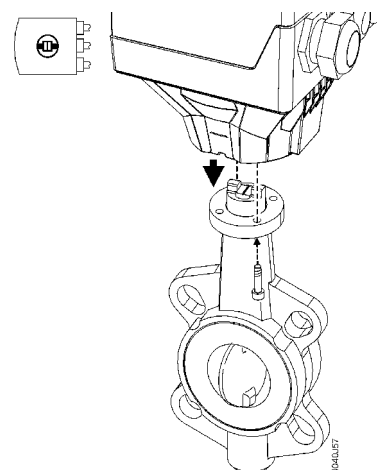
3



4



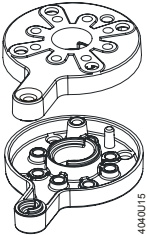
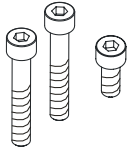
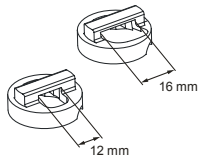
- 4 mm (DN 40...65)
- 5 mm (DN 80...125)



3.1.7 Fitting rotary actuators to butterfly valves VKF45..


First, observe "Mounting positions" (page 23).

Mounting set ASK35N For VKF45..

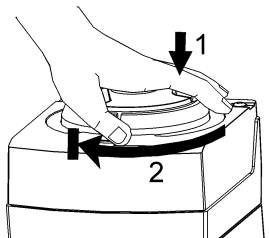
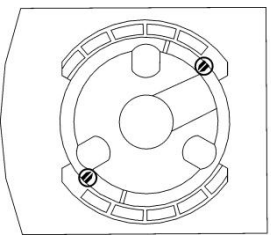
Scope of delivery		
Mounting set (2 parts)	5 screws	2 adapters
	2 pcs. M8 x 50 mm 1 pc. M5 x 20 mm incl. nut 	1 pc. 12 mm 1 pc. 16 mm
		

Note


Actuators SAL.. are not suited for use with mounting sets ASK31, ASK32, ASK33, ASK35, ASK40, and ASK41.

	Caution!
	Risk of burns from hot surfaces! If you touch heated parts, you will get burns as result. <ul style="list-style-type: none"> • Allow to cool parts. • Wear protective gloves.

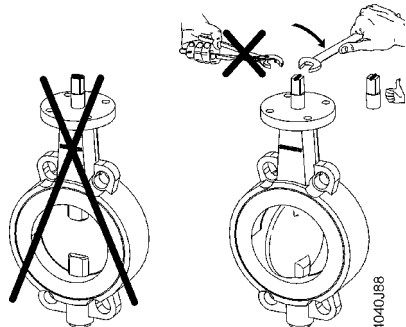
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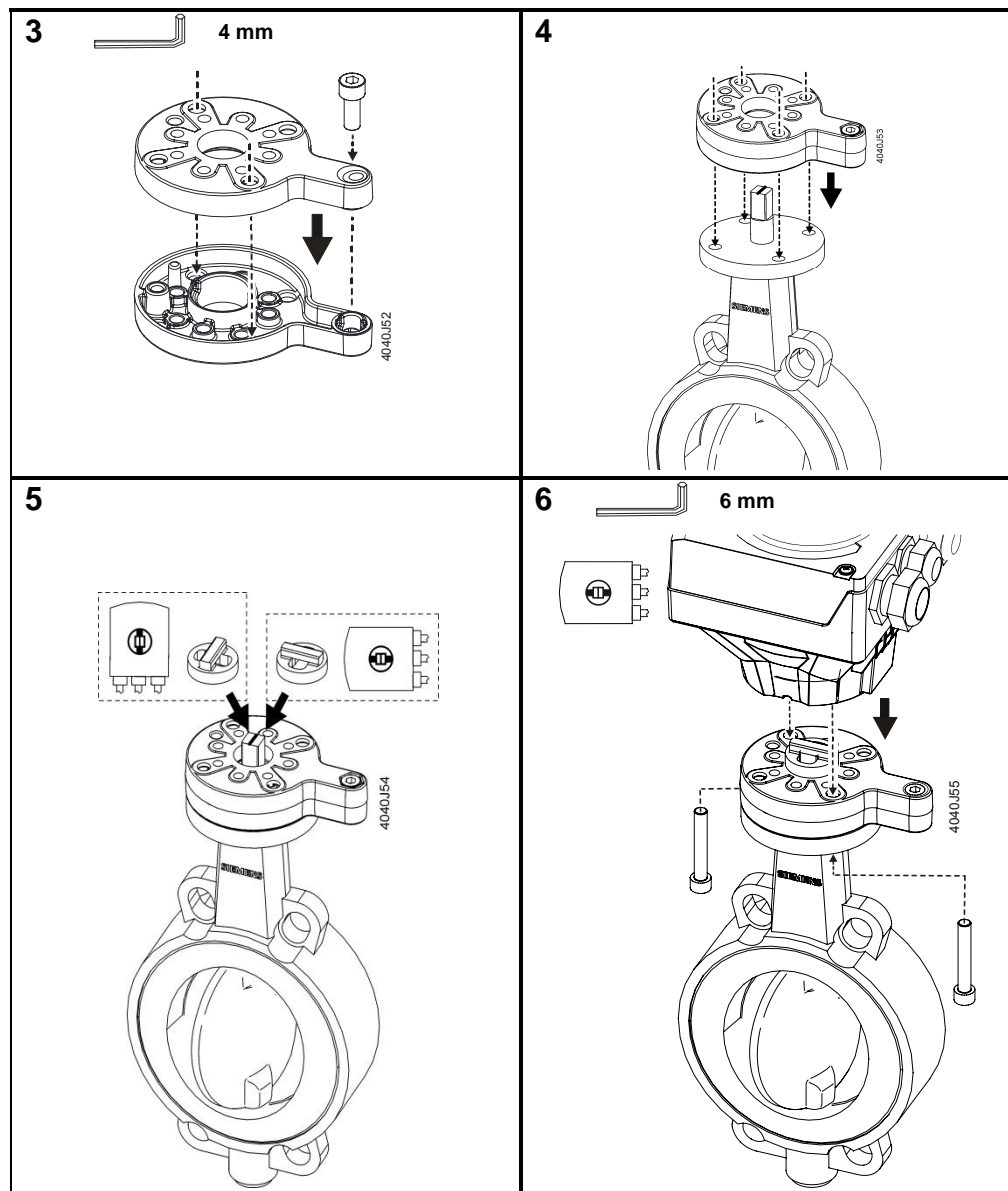



2



12 mm (DN 40...125)
16 mm (DN 150 / 200)





3.1.8 Fitting accessories

Special notes on mounting

SA..31..

Before fitting the accessory items shown below, the following steps must be performed:



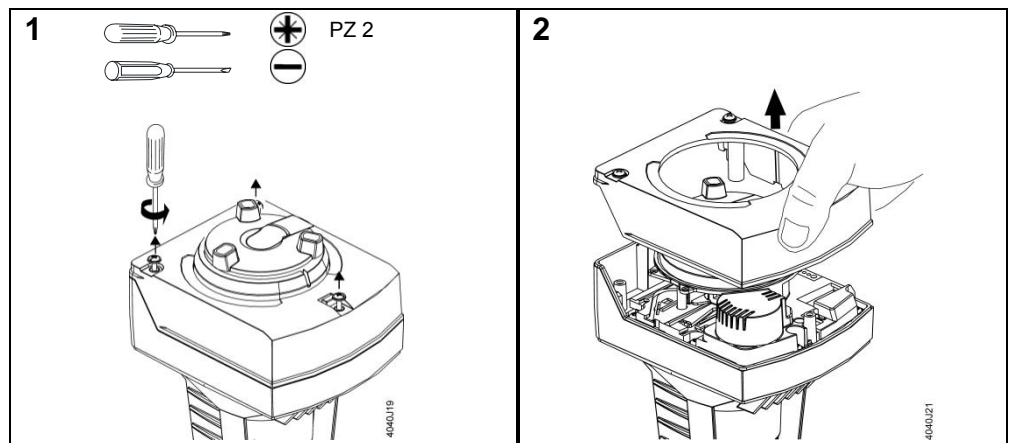
Danger!

Danger to life from electrical current!

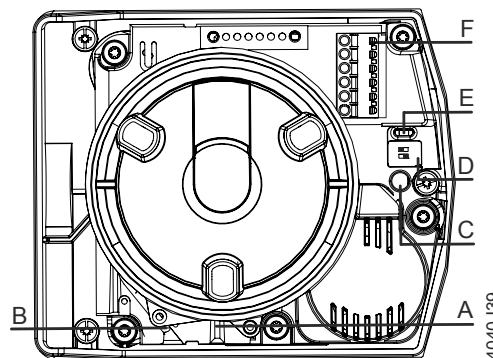
There is an immediate risk of fatal injury in case of contact with live parts of SA..31...

- Disconnect actuator from power.

1. Actuator is mechanically connected to a Siemens valve.
2. Observe compatibility and choice of combinations. Refer to "Accessories" (page 17).
3. Disconnect actuator from power.
4. Only required with actuators without fail safe function: Using the manual adjuster, drive the actuator's stem to the fully retracted position and fix the coupling. See "Manual operation" and "Fixing coupling" (page 45).
5. When mounting two different accessories watch out for correct plug-in space A or B (see below).
6. To fit an auxiliary switch, potentiometer or function module, the housing cover must be removed.



Interior view of setting elements and plug-in spaces



	Plug-in space for...
A	<ul style="list-style-type: none"> • Potentiometer ASZ7.5/..., or • Auxiliary switch ASC10.51
B	Plug-in space for... <ul style="list-style-type: none"> • Function module AZX61.1 , or • Auxiliary switch ASC10.51
C	LED
D	DIL switches
E	Calibration slot
F	Connection terminals

Potentiometer

ASZ7.5/..



Scope of delivery		
1 potentiometer ASZ7.5/..	1 screw	2 screw covers
4040U08	1 pc. 4040J28	4040U29



First, observe "Special notes on mounting" (page 33).



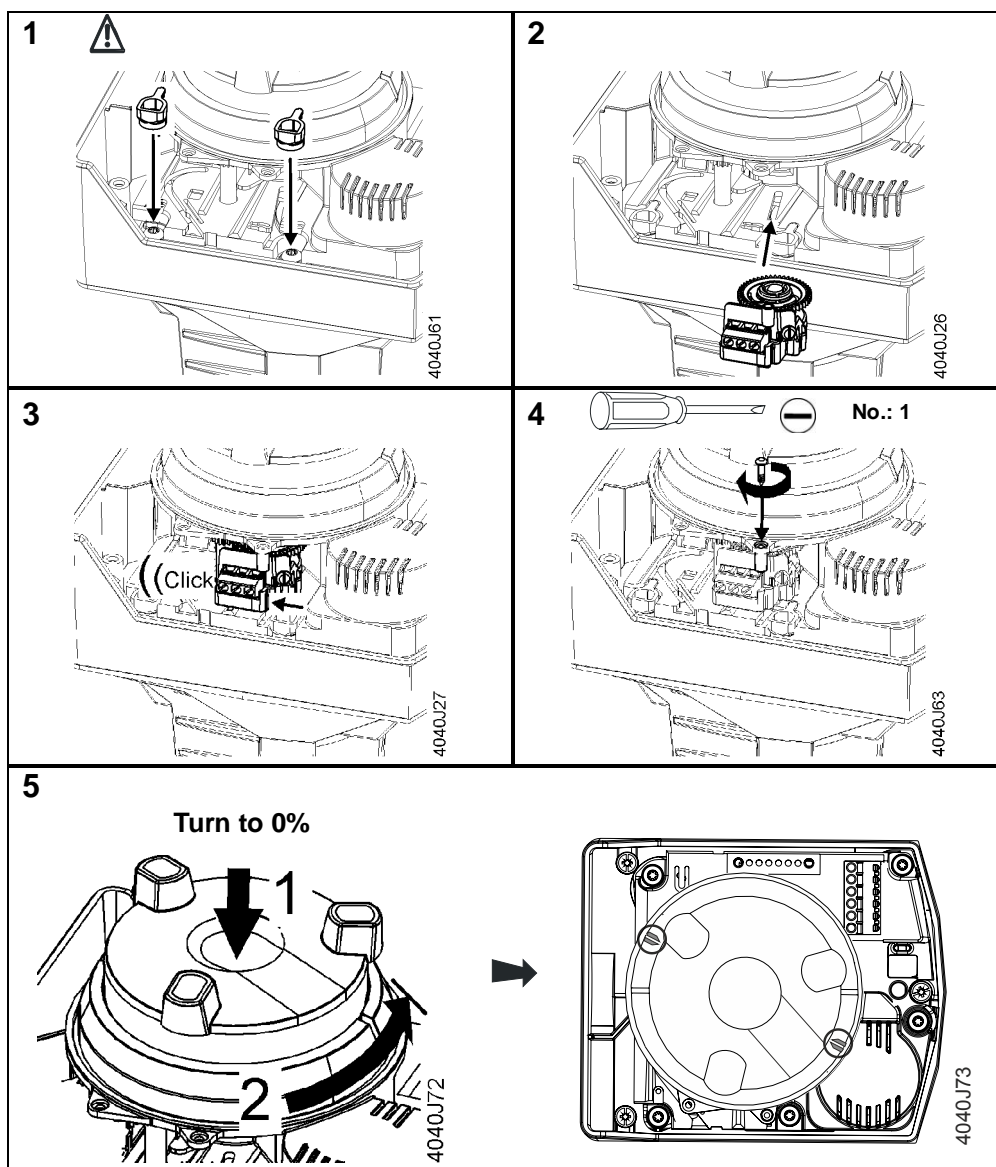
Danger!

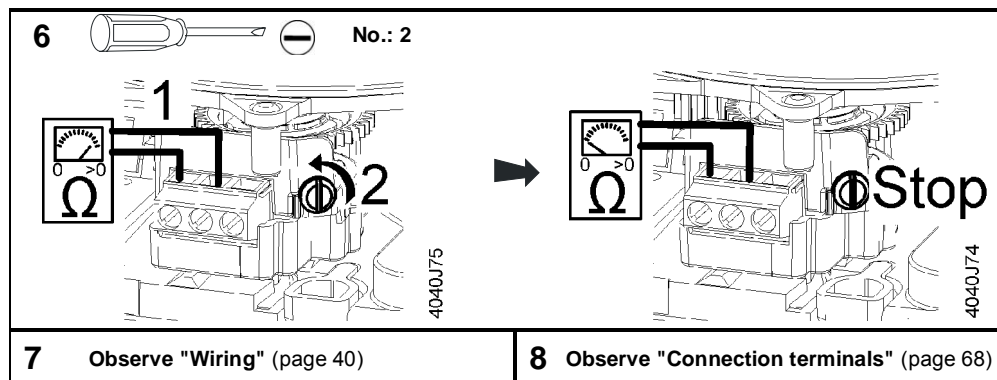
Danger to life from electrical current!

If a live wire gets in contact with the screws the whole actuator housing is a live.

- Fit the screw covers first.

Plug-in space A



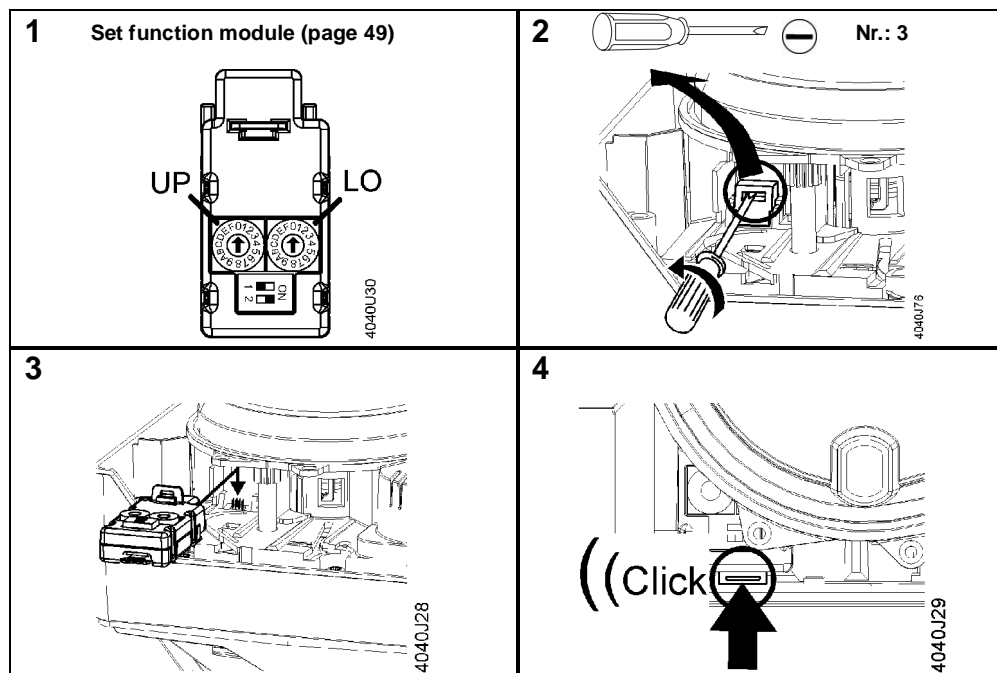


Function module AZX61.1



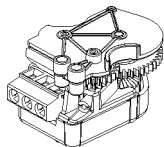

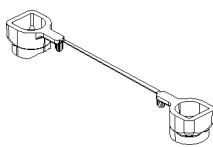
Plug-in space B

First, observe "Special notes on mounting" (page 33).



Auxiliary switch ASC10.51



Scope of delivery		
1 auxiliary switch ASC10.51	1 screw	2 screw covers
 4040U07	1 pc.  4040U28	 4040U29



First, observe "Special notes on mounting" (page 33).




Danger!

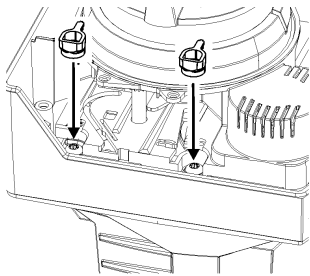
Danger to life from electrical current!

If a live wire gets in contact with the screws the whole actuator housing is a live.

- Fit the screw covers first.

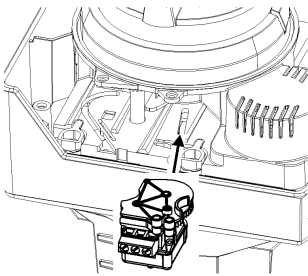
Plug-in space A

1 



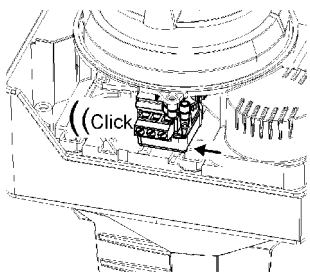
4040J61

2





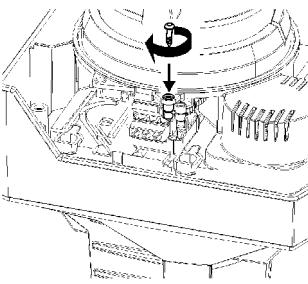
4040J22

3



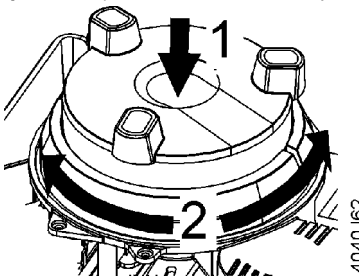
4040J23

4   No.: 1

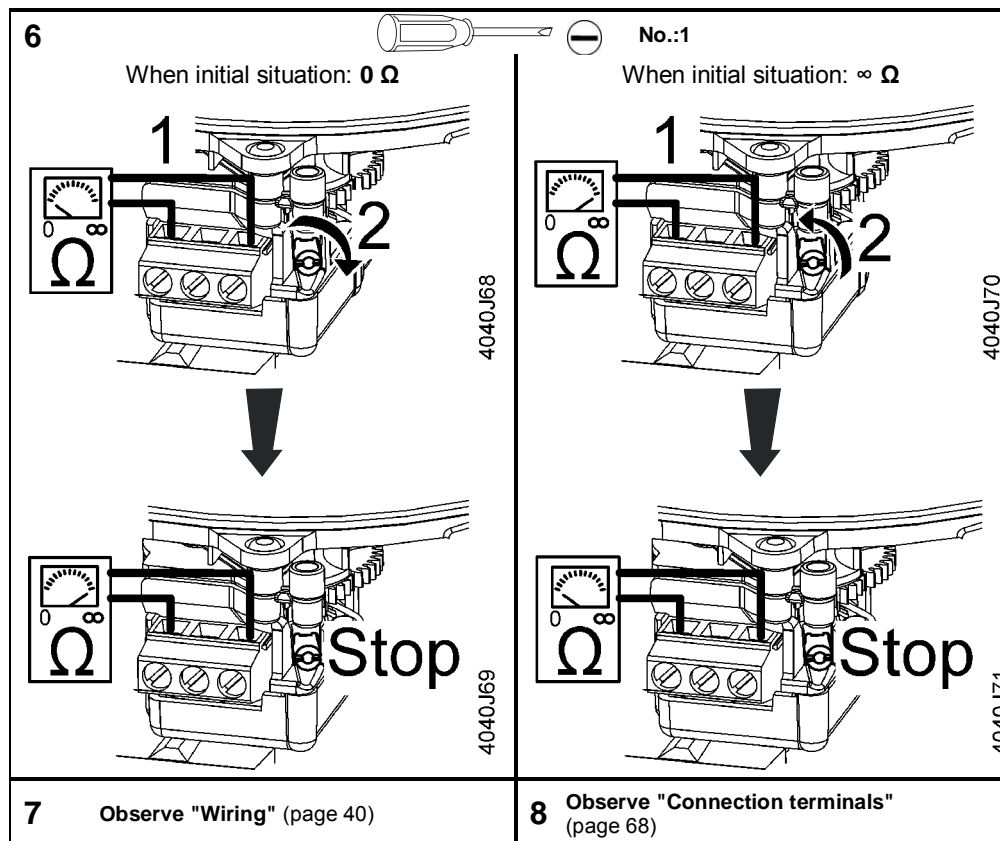


4040J65

5 **Adjust switch position** (refer also to "Manual operation" page 60)



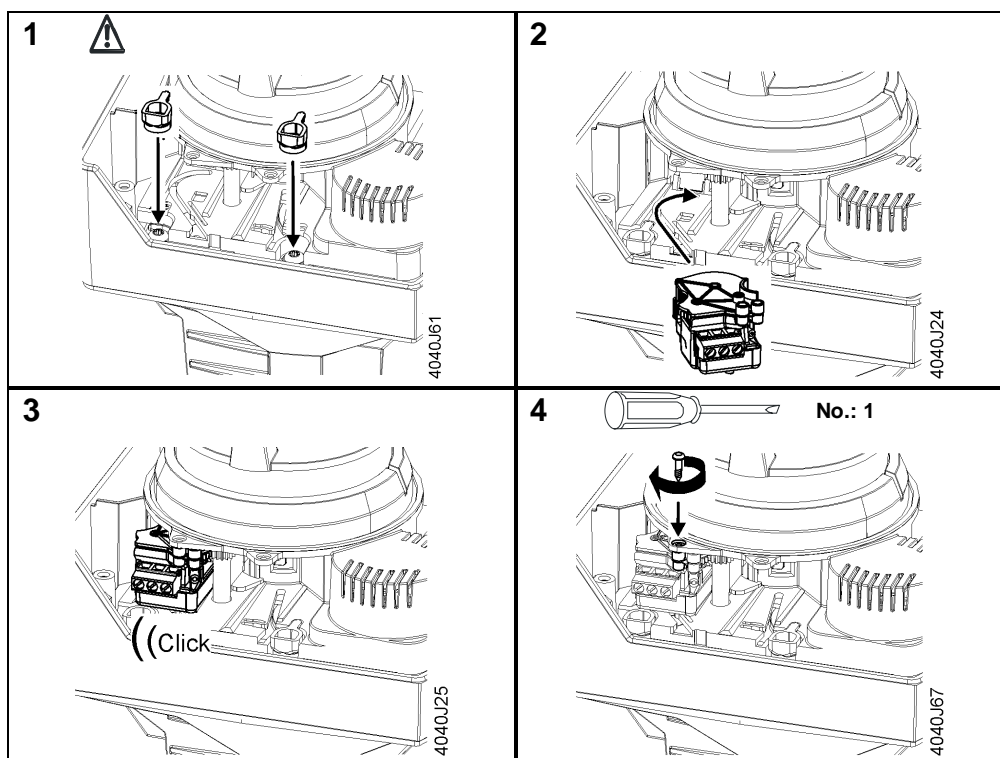
4040J62

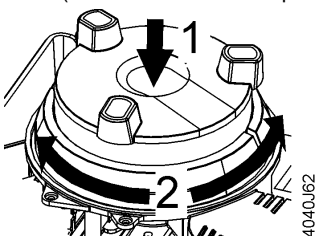
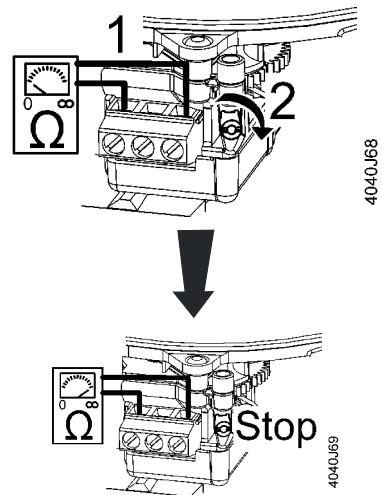
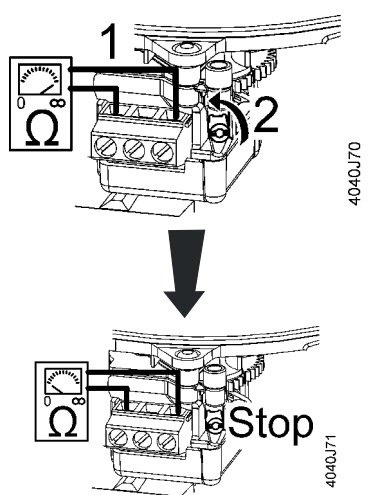


First, observe "Special notes on mounting" (page 33).

	<p>Danger!</p> <p>Danger to life from electrical current!</p> <p>If a live wire gets in contact with the screws the whole actuator housing is a live.</p> <ul style="list-style-type: none"> • Fit the screw covers first.
--	---

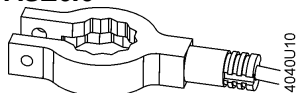
Plug-in space B

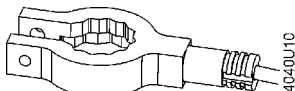
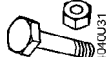


<p>5 Adjust switch position (refer also to "Manual operation" page 60)</p> 	
<p>6</p> <p>When initial situation: $0\ \Omega$</p> 	<p>No.: 1</p> <p>When initial situation: $\infty\ \Omega$</p> 
<p>7 Observe "Wiring" (page 40)</p>	<p>8 Observe "Connection terminals" (page 68)</p>

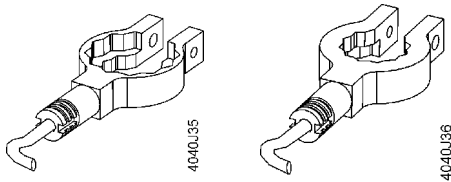
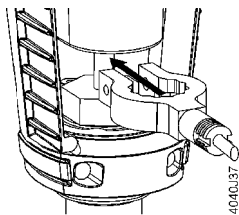
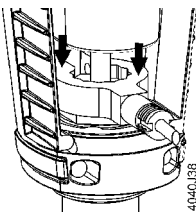
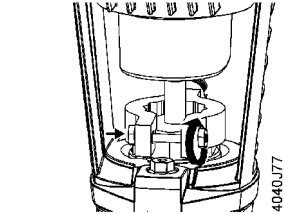
Stem heating element

ASZ6.6



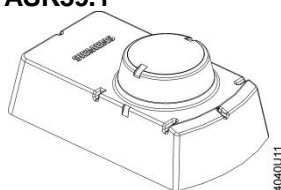
Scope of delivery	
1 stem heating element ASZ6.6	1 screw
	1 pc. M4 x 30 incl. nut 

When fitting the stem heating element, stroke actuator and valve must be assembled. The stem heating element is powered separately.
First, observe "Special notes on mounting" (page 33).

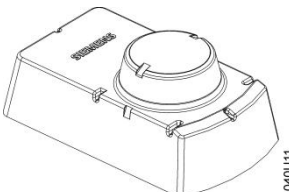
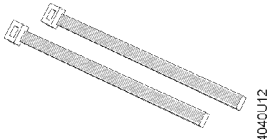
1 10 mm 14 mm 	2 
3 	4 8 mm 

Weather shield

ASK39.1

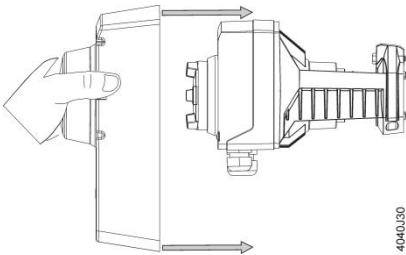
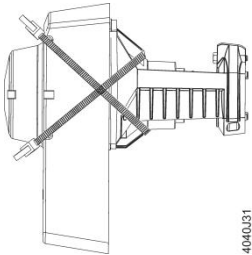


First, observe "Special notes on mounting" (page 33).

Scope of delivery	
Weather shield ASK39.1	2 UV-proof cable ties
	

Notes

- To protect the actuator when used outdoors, the weather shield must always be fitted.
- If fitted several times, 2 UV-proof cable ties (800 x 4 mm) must be used.
- The manual adjuster cannot be used when the weather shield is mounted.

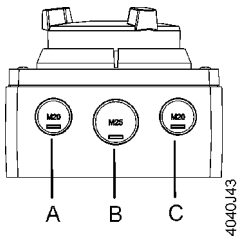
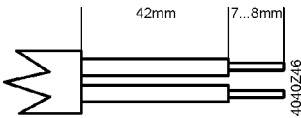
1 	2 
---	---

3.1.9 Wiring (installation)

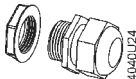
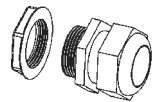

Conduct the electrical connections in accordance with local regulations on electrical installations as well as the "Connection diagrams" on page 68.

Preparation of wire endings

The cable endings must be prepared before as follows.




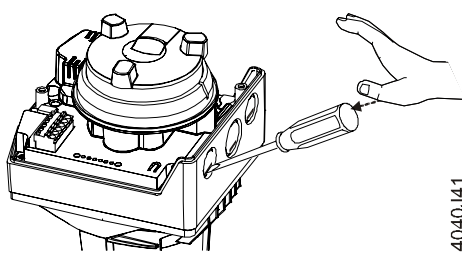
A	EU: M20 US: ½"	Standard	Connection actuator
B	EU: M25 US: ½"	Ground cable for outdoor installation	
C	EU: M20 US: ½"		Connection accessories

Cable glands (not contained in scope of delivery)		
Metric	Metric	Inch thread
M20	M25	½"
 4040U24	 4040U23	 4040U33

- Prior to installation, the following preconditions must be satisfied:
- Actuator is mechanically connected to a Siemens valve.
 - Housing cover is removed (step 6 "Special notes on mounting", page 33).

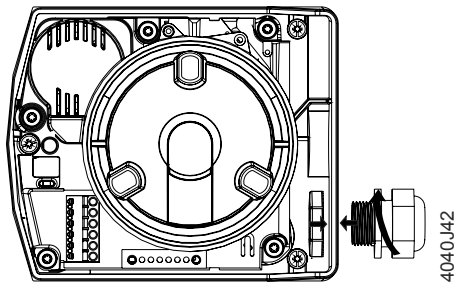
Actuator

1  No.: 4



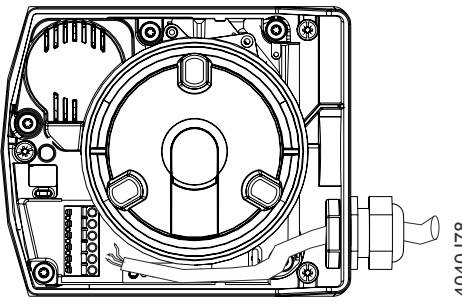
4040J41

2



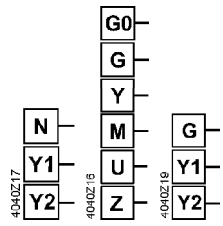
4040J42

3



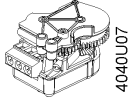
4040J78

4 Observe "Connection terminals" (page68)



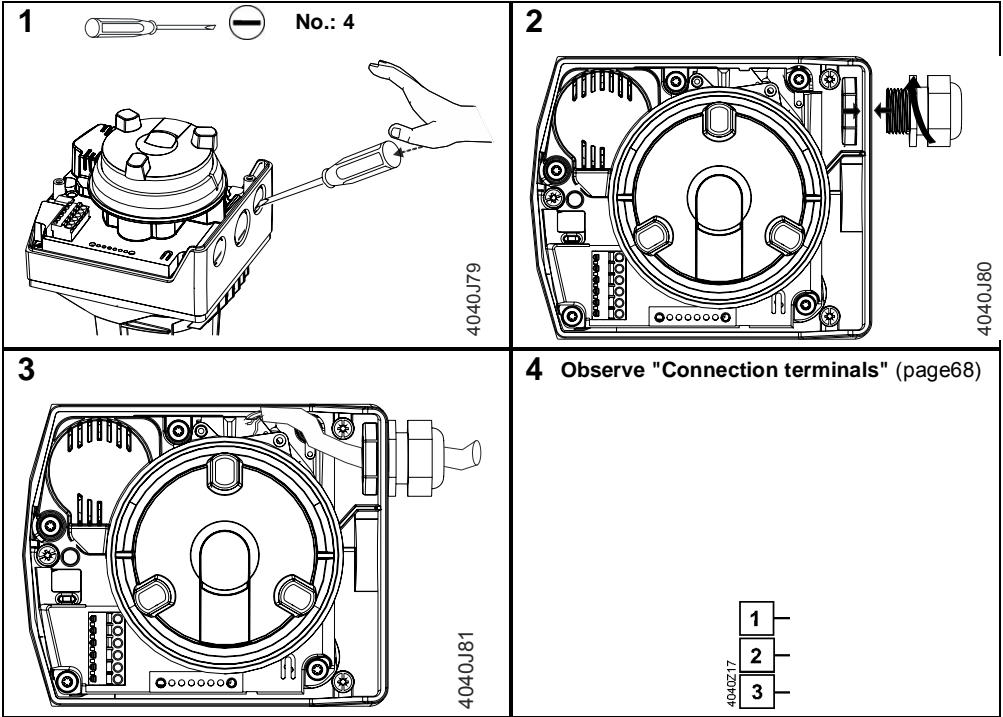
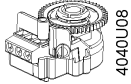
4040Z17 4040Z18 4040Z19

**Auxiliary switch
ASC10.51**



and

**Potentiometer
ASZ7.5/..**



3.2 Commissioning and operation

3.2.1 Function check and Calibration

Mechanically

Before making the function check, the following preconditions must be satisfied:

- Environmental conditions specified in chapter "Technical data" (page 64)
- Actuator is mechanically connected to a Siemens valve
- **Actuator is in "Manual operation" mode** (page 60).

The actuator can be operated with the help of the "Manual adjuster" (see page 60).

Manual adjuster	Stroke actuator	Rotary actuator	Control path valve A→AB	Bypass valve B → AB
Turning in clockwise direction	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing
Turning in counter-clockwise direction	Actuator's stem retracts	Actuator's spindle turns in counterclockwise direction	Closing	Opening

Notes

- Ensure that the actuator's and valve's stem, or actuator's and valve's spindle are securely connected in all positions.
- If the actuator is forced to travel beyond its end positions, overload protection responds.
- Observe information given in chapter "Acting direction and flow characteristic" on page 53.

Electrically

Before making the function check, the following preconditions must be satisfied:

- Environmental conditions specified in chapter "Technical data" (page 64).
- Actuator is mechanically connected to a Siemens valve.
- **Actuator is in "Automatic" mode** (page 60).
- Actuator and, if required, accessories are correctly fitted and connected. Also refer to "Connection terminals" (page 68).
- Power is applied.

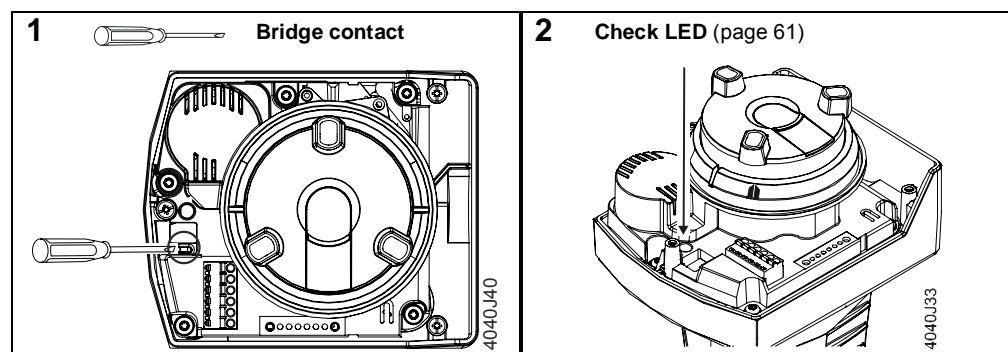
SA..61..

Calibration is required with modulating actuators and SA..61.. before the function check.

General notes on calibration

Before making the calibration, the following preconditions must be satisfied:

- A description of the calibration function is given in chapter "Calibration" (page 53).
- Housing cover is removed (step 6 "Special notes on mounting", page 33).



If required, calibration can be repeated any number of times.

Make the function check for modulating actuators after the calibration with a point test according to the following table:

Connection terminals	Stroke actuator	Rotary actuator	Control path valve A→AB	Bypass valve B → AB	Position feedback U
Y 6 V 13.6 mA	Actuator's stem extends (60%)	Actuator's spindle turns in clockwise direction (60 %)	Opening	Closing	6 V
Y 5 V 12 mA	Actuator's stem retracts (50%)	Actuator's spindle turns in counterclockwise direction (50 %)	Closing	Opening	5 V
"Z" connected to "G"	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing	10 V
"Z" connected to "G0"	Actuator's stem retracts	Actuator's spindle turns in counterclockwise direction	Closing	Opening	0 V

SA..31.. and SA..81..

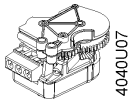
Make the function check for 3-position actuators according to the following table:

Connection terminals	Stroke actuator	Rotary actuator	Control path valve A→AB	Bypass valve B → AB
Voltage at Y1	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing
Voltage at Y2	Actuator's stem retracts	Actuator's spindle turns in counter-clockwise direction	Closing	Opening
No voltage at Y1 and Y2	Actuator's stem maintains the position	Actuator's spindle maintains the position	Maintains the position	

Notes

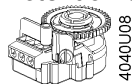
- If function module AZX61.1 is used, observe information given in chapter "Changeover of acting direction" (page 51).
- Observe information given in chapter "Acting direction and flow characteristic" on page 53.

Auxiliary switch
ASC10.51



Make the function check for mounted auxiliary switches according to the following table – example switching point at 25% position:

Connection terminals	Stroke actuator	Rotary actuator	Terminal S1 – S3	Terminal S1 – S2
Voltage at Y2	Y = 0 V Actuator's stem retracts (until end position is reached)	Actuator's spindle turns in counter-clockwise direction (until end position is reached)	-	-
No voltage at Y1 und Y2	Y = 0 V Actuator's stem maintains the position	Actuator's spindle maintains the position		
Voltage at Y1 for desired valve position % + 2% x positioning time Example: SAX31.00 = 27% x 120 sec = 32.5 sec	Valve position % + 2% Y = 2.7 V Actuator's stem extends to desired position (27%)	Actuator's spindle turns in clockwise direction to desired position (27%)		
Check switching point with voltmeter	Actuator's stem maintains the position	Actuator's spindle maintains the position	-	-



Make the function check for mounted potentiometer according to the following table
(Example values for ASZ7.5/1000):

Connection terminals	Stroke actuator	Rotary actuator	Terminal P1 – P2	Terminal P2 – P3
Voltage at Y2	Actuator's stem retracts (until end position is reached)	Actuator's spindle turns in counter-clockwise direction (until end position is reached)	-	-
No voltage at Y1 und Y2	Actuator's stem maintains the position	Actuator's spindle maintains the position	< 1 Ω	> 996 Ω
Voltage at Y1 for desired valve position % positioning time Example: SAX31.00 = 75% x 120 sec = 90 sec	Actuator's stem extends to desired position (75%)	Actuator's spindle turns in clockwise direction to desired position (75%)	-	-
Check position value with ohmmeter	Actuator's stem maintains the position	Actuator's spindle maintains the position	~ 560 Ω	~ 436 Ω
Voltage at Y2 for desired change of valve position % x positioning time Example: SAX31.00 = 10% x 120 sec = 12 sec	Actuator's stem retracts to desired position (65%)	Actuator's spindle turns in counter-clockwise to desired position (65%)	-	-
Check position value with ohmmeter	Actuator's stem maintains the position	Actuator's spindle maintains the position	~ 485 Ω	~ 511 Ω

3.2.2 Maintenance

The actuators are maintenance-free.

3.2.3 Disposal

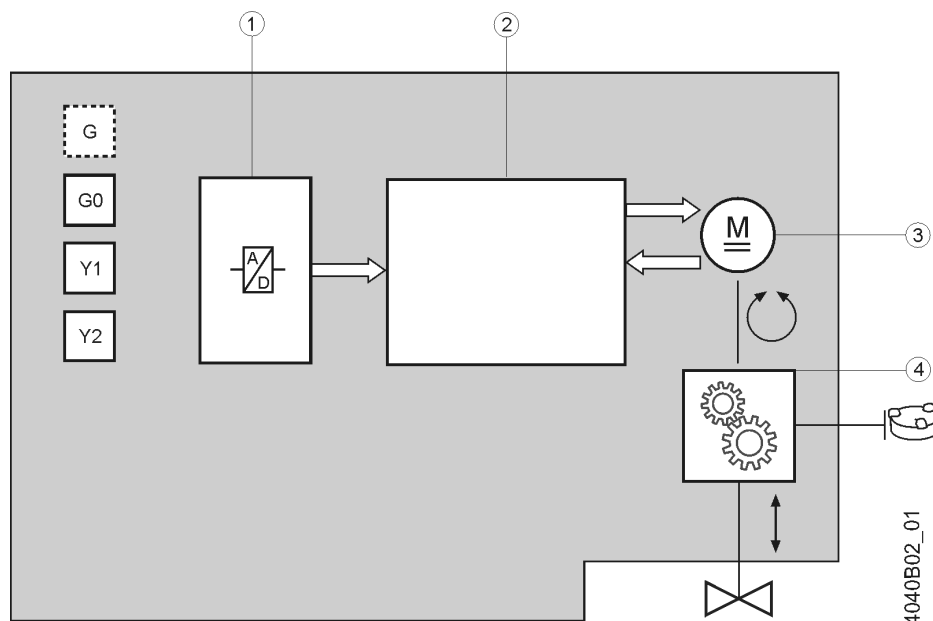


The device is considered an electronics device for disposal in terms of European Directive 2012/19/EU and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

4 Functions and control

4.1 3-position control



A 3-position signal drives the actuator via connection terminals Y1 or Y2. The required position is transferred to the valve.

1	A/D conversion	
2	Control functions	Identification of seat
		Control of direction
		Motor control
		Manual adjustment
3	Brushless DC motor	
4	Gear train	
5	Manual adjuster	

Positioning signal	Stroke actuator	Rotary actuator	Control path valve A → AB	Bypass valve B → AB
Voltage at Y1	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing
Voltage at Y2	Actuator's stem retracts	Actuator's spindle turns in counter-clockwise direction	Closing	Opening
No voltage at Y1 and Y2	Actuator's stem maintains the position	Actuator's spindle maintains the position	Maintains the position	

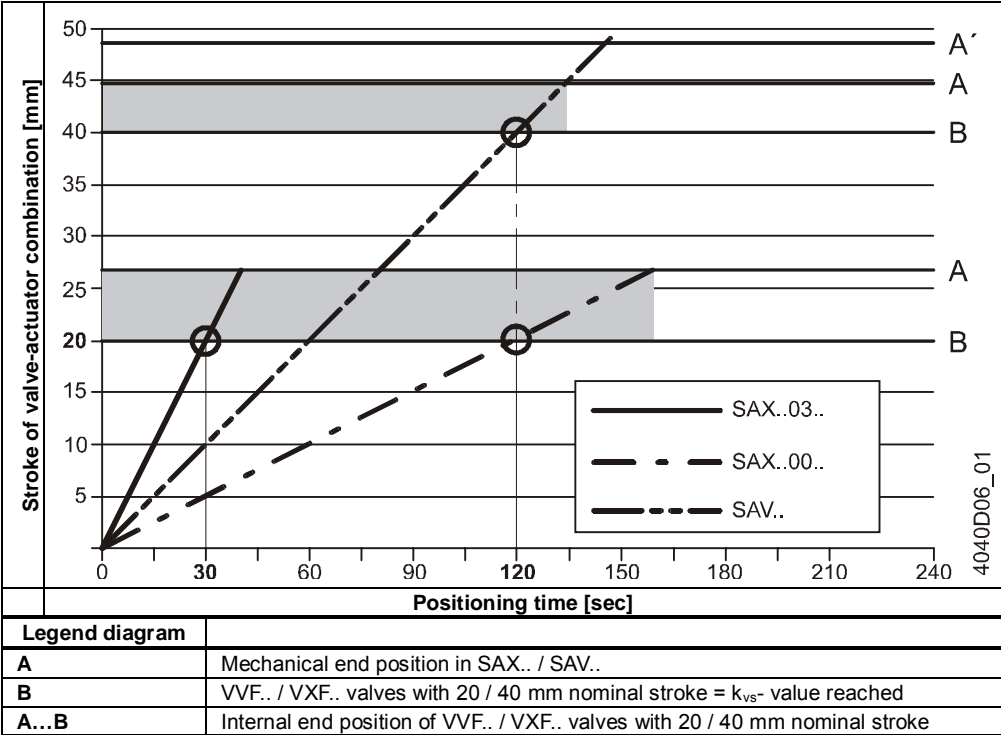
Note

Observe information given in chapter "Acting direction and flow characteristic" on page 53.

Internal control ensures very constant positioning times and determination of the actuator's position.

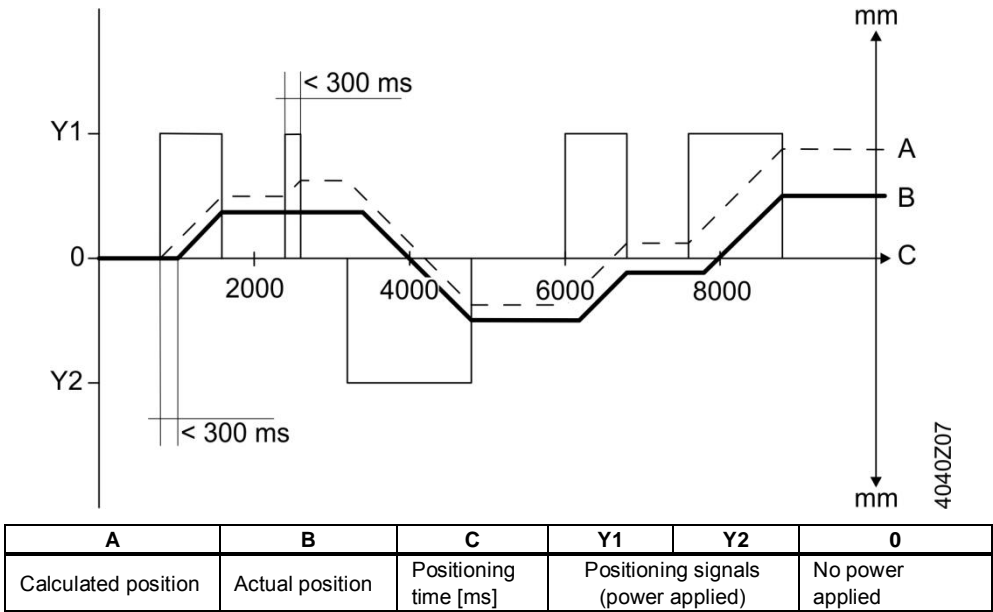
Positioning times stroke model

The specified positioning times refer to the respective nominal stroke / nominal angular rotation. Since the end positions of rotary actuators are inside the actuator, the following remarks refer to stroke actuators.
The resulting effective strokes vary, depending on the type of valve, resulting in shorter or longer actuator positioning times.



Notes

- Deviations occur...
- after several positioning signals Y1 and Y2 in the same direction since the stroke movement starts with a delay of 300 ms.
 - when positioning signals Y1 and Y2 are active for less than 300 ms since the stroke movement cannot be made in that case.



Accurate position feedback is made possible with the help of a potentiometer (page 62).

4.1.1 Combination with RVD.. controller for direct domestic hot water distribution by heat exchanger

The design based slow reaction on control signals of SAX31.., SAX81.., SAV31.. and SAV81.. actuators doesn't allow the actuator to react on very short control pulses. Only control pulses with a length greater than 400 ms allow a sufficient reaction.

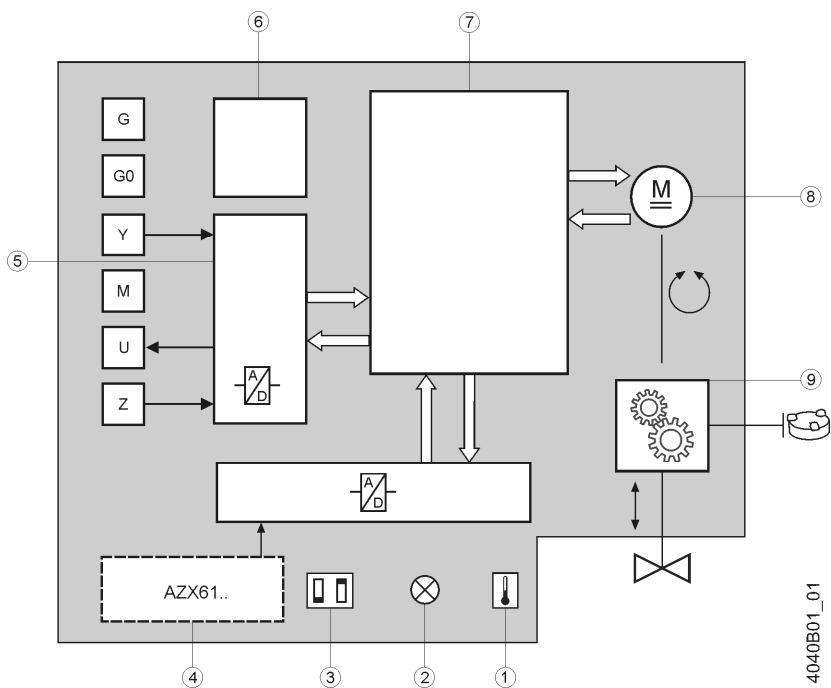
Especially the direct domestic hot water control does not allow such long control pulses. The specific optimized control loops – equipped with an SIGMAGYR RVD.. controller and Acvatix SQS359.05 actuator– work with pulses down to 40 ms.

SAX31.. and SAX81.. are not able to work with these short pulses.

The following table gives alternatives which actuators can be used within these control loops.

Controller	Plant type	Preferred actuator	Valve line	DN	kvs
RVD130 RVD135/109 RVD135/309 RVD140 RVD144/109 RVD145/109 RVD139	4 und 5	SQS35.03 SAS31.03	VVG55..	DN15 ..25	0.25 .. 6.3
		SQS359.05 SAT31.008	VVG549..	DN15 ..25	0.25 .. 6.3
		SQS359.54 SAT31.51	VVG549..	DN15 ..25	0.25 .. 6.3
		SKD32.21	VVG41.. VVF53..	DN15 ..50	0.63 .. 40 0.16 .. 40
		SKD32.21E		DN15 ..50	0.63 .. 40 0.16 .. 40
RVD230 RVD235/109 RVD250 RVD255/109 RVD240 RVD245/109 RVD260 RVD265/109	x- 4	SQS35.03 SAS31.03	VVG55..	DN15 ..25	0.25 .. 6.3
		SQS359.05 SAT31.008	VVG549..	DN15 ..25	0.25 .. 6.3
		SQS359.54 SAT31.51	VVG549..	DN15 ..25	0.25 .. 6.3
		SKD32.21	VVG41.. VVF53..	DN15 ..50	0.63 .. 40 0.16 .. 40
		SKD32.21E	VVG41.. VVF53..	DN15 ..50	0.63 .. 40 0.16 .. 40

4.2 Modulating control



The modulating positioning signal drives the actuator steplessly. The positioning signal range (DC 0...10 V / DC 4...20 mA, 0...1000 Ω) corresponds in a linear manner to the positioning range (fully closed...fully open, or 0...100 % stroke).

The actuator is driven via connection terminal Y or forced control Z (page 58). The required stroke / rotation is transferred to the valve's stem / spindle.

1	Calibration slot	
2	LED (2 colors)	
3	DIL switches	Changeover of characteristic
		Positioning signal
4	Function module	
5	A/D conversion	
6	Power supply	
7	Control functions	Identification of seat
		Position control
		Motor control
		Detection of foreign bodies
		Calibration
		Forced control
		Characteristics function
8	Brushless DC motor	
9	Gear train	
	Manual adjuster	

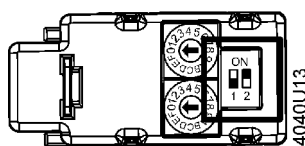
Positioning signal	Stroke actuator	Rotary actuator	Control path valve A → AB	Bypass valve B → AB
Signal Y, Z increasing	Actuator's stem extends	Actuator's spindle turns in clockwise direction	Opening	Closing
Signal Y, Z decreasing	Actuator's stem retracts	Actuator's spindle turns in counterclockwise direction	Closing	Opening
Signal Y, Z constant	Actuator's stem maintains the position	Actuator's spindle maintains the position	Maintains the position	





Notes

- If function module AZX61.1 is used, observe the information given in chapter "Changeover of acting direction" (page 51).
- Observe the information given in chapter "Acting direction and flow characteristic" on page 53.

4.3 Function module AZX61.1

DIL switches




	Acting direction	Sequence control
OFF ¹⁾	 Direct acting positioning signal Y or Z	 Sequence control not active
ON ¹⁾	 Reverse acting positioning signal Y or Z	 Sequence control (signal adaptation)

¹⁾ Factory setting: All switches set to OFF

4.3.1 Sequence control (signal adaptation)

DIL switches

	Sequence control
ON ¹⁾	 Sequence control (signal adaptation)

¹⁾ Factory setting: All switches set to OFF

HEX switches

Nr.: 1

4040U14

40-02208

Setting sequence control

Rotary switches LO and UP are used to set the starting point or working range of a sequence.

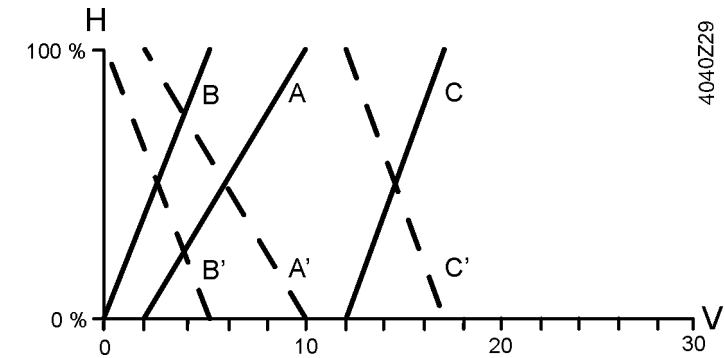
Position "LO"	Starting point	Position "UP"	Working range
0	0,3 V	0	9,4 V
1	1 V	1	3 V
2	2 V	2	4 V
3	3 V	3	5 V
4	4 V	4	6 V
5	5 V	5	7 V
6	6 V	6	8 V
7	7 V	7	9 V
8	8 V	8	10 V
9	9 V	9	12 V
A	10 V	A	14 V
B	11 V	B	16 V
C	12 V	C	18 V
D	13 V	D	20 V
E	14 V	E	25 V
F	15 V	F	30 V

Invalid HEX switches combinations

LO	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
UP		F	F	F	F	F	F	F	F	F	F	D	D	C	C	B
UP							E	E	E	E	E	E	E	D	D	C
UP												F	F	E	E	D
UP														F	F	E
UP																F

Notes

- Can only be used with voltage input.
- Maximum input voltage is DC 30 V. If the configuration is invalid, the actuator operates on DC 0...10 V.



Legend diagram	Positioning signal range	Position LO	Position UP	Position feedback U
A	DC 2...10 V	2	6	DC 0...10 V
B	DC 0...5 V	0	3	DC 0...10 V
C	DC 12...17 V	C	3	DC 0...10 V
H	Stroke or rotary angle			
— — — — —	Acting direction: Direct (A, B, C)			
- - - - -	Acting direction: Reverse (A', B', C')			

4.3.2 Changeover of acting direction

DIL switches

Acting direction			
OFF ¹⁾		Direct acting positioning signal Y or Z	ON ¹⁾
			Reverse acting positioning signal Y or Z

¹⁾ Factory setting: All switches set to OFF

Selecting the acting direction

- With valves whose stem is extended in the fully closed position, "direct acting" means that the valve is fully closed (0 %) when positioning signal Y = 0 V resp. Z = 0 Ω. This applies to all Siemens valves according to "Equipment combinations" (page 12).
- With valves whose stem is retracted in the fully closed position, "direct acting" means that the valve is fully open (100 %) when positioning signal Y = 0 V resp. Z = 0 Ω.

SAX61.03 SAV61.00

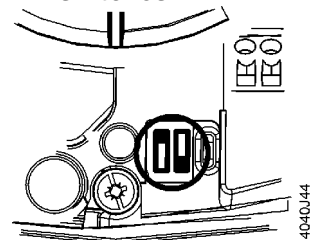
		Direct acting	Reverse acting
		Positioning signal Y: DC 0...10 V Positioning signal Z: 4...20 mA 0...1000 Ω	Positioning signal Y: DC 0...10 V Positioning signal Z: 4...20 mA 0...1000 Ω
Y, Z	Positioning signal		
V	Volumetric flow		
— — —	Acting direction: Direct		
— — —	Acting direction: Reverse		





SAY61P03 SAX61P03 SAV61P00

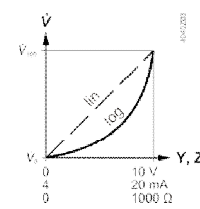
		Reverse acting	Direct acting
		Positioning signal Y: DC 0...10 V Positioning signal Z: 4...20 mA 0...1000 Ω	Positioning signal Y: DC 0...10 V Positioning signal Z: 4...20 mA 0...1000 Ω

4.4 Positioning signal and flow characteristic selection

DIL switches

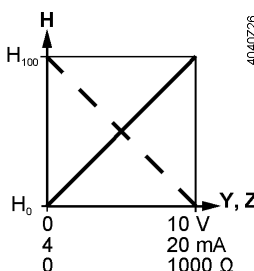
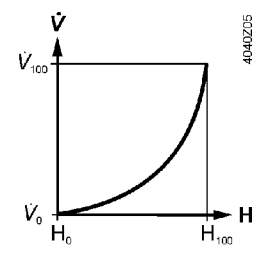
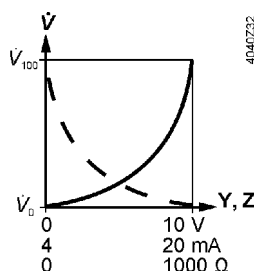
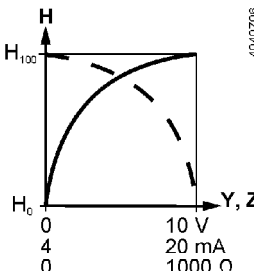
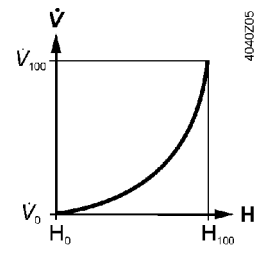
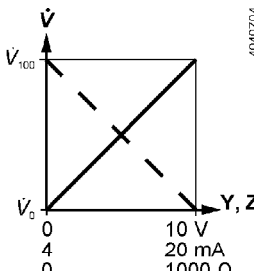


	Positioning signal "Y"	Position feedback "U"	Flow characteristic
OFF ¹⁾	 DC 0...10 V	DC 0...10 V	 log = equal-percentage
ON	 DC 4...20 mA	DC 0...10 V	 lin = linear

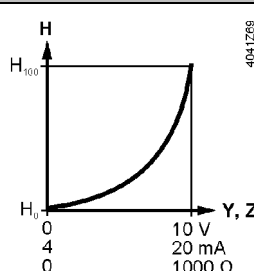
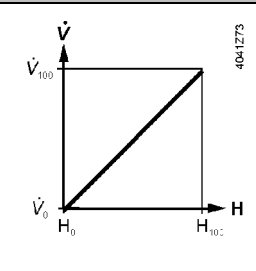
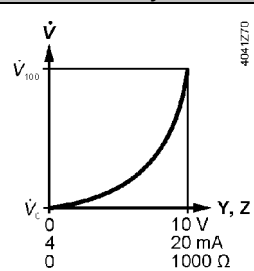
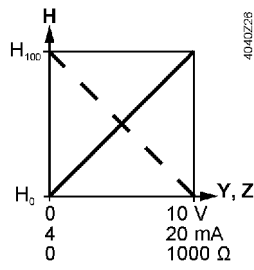
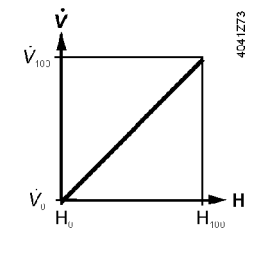
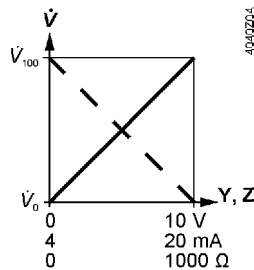


¹⁾ Factory setting: All DIL switches set to OFF

Flow characteristic
SAX61.03 / SAV61.00
with VVF..

	Actuator	Valve VVF.. / VVG41..	Totally
log			
lin			

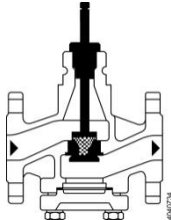
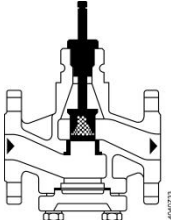




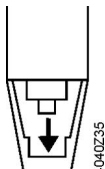
Flow characteristic
SAY61P03 / SAX61P03 /
SAV61P00 with VPF..

	Actuator	Combi-Valve VPF43/VPF53	Totally
log			
lin			
Y, Z	Positioning signal		
H	Stroke		
V	Volumetric flow		
— — —	Acting direction: Direct		
— — —	Acting direction: Reverse		

4.5 Acting direction and flow characteristic


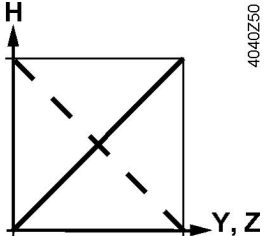
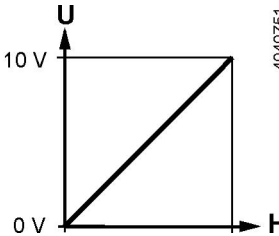

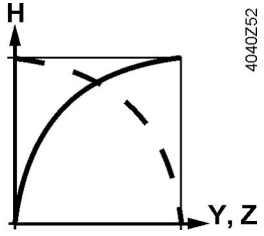
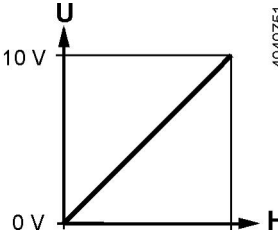
The selection of changeover of acting direction and characteristic with the DIL switches depends on the type of actuator (with or without fail safe function) and the associated type of valve (valve characteristic, push to open, pull to open).

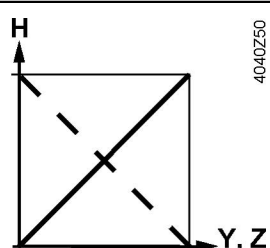
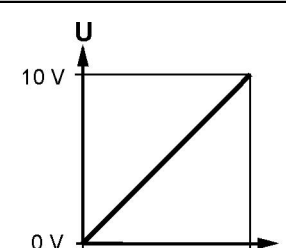
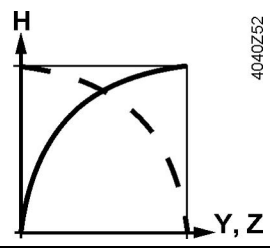
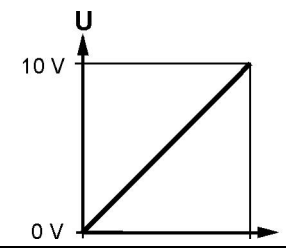
When the positioning signal increases (DC 0...10 V, DC 4...20 mA, 0...1000 Ω), the objective is to have the valve's volumetric flow V rising, but to fully open the valve, $V = 100\%$ (NO = normally open), or to fully close it, $V = 0\%$ (NC = normally closed) in the event of a power failure.

						
						
	DIL switches	Acting direction	Direct		Reverse	
		Flow characteristic	Linear	Equal-percentage	Linear	Equal-percentage
	Without fail safe function	No power applied	Maintains the position			

4.6 Position Feedback U

The position feedback U (DC 0...10 V) is always proportional to stroke H of the actuator's stem.

		Actuator Positioning signal Y, Z	Actuator Position feedback U
	log = equal-percentage		
	lin = linear		

	Actuator Positioning signal Y, Z	Actuator Position feedback U
Direct acting		
Reverse acting		
Y, Z	Positioning signal	
H	Stroke	
U	Position feedback	
—————	Acting direction: direct	
- - - - -	Acting direction: reverse	

4.7 Position control with ClosedPosition-Synchronisation

Within SAX/SAV/SAL61/SAY61.. actuators the position control works based on the HALL-sensor pulses from the brushless DC-motor calculating with an internal stroke model calculating the actual position. This kind of control is more accurate and wearless compared with a physical element for position measurement and grants a precise position control with high resolution.

During manual operation the motor is declutched from the gear train and the internal position control get's not sensor pulses. So real position will deviate from the internally calculated position. As a consequence the position feedback on terminal U is set to "0V" during manual operation.

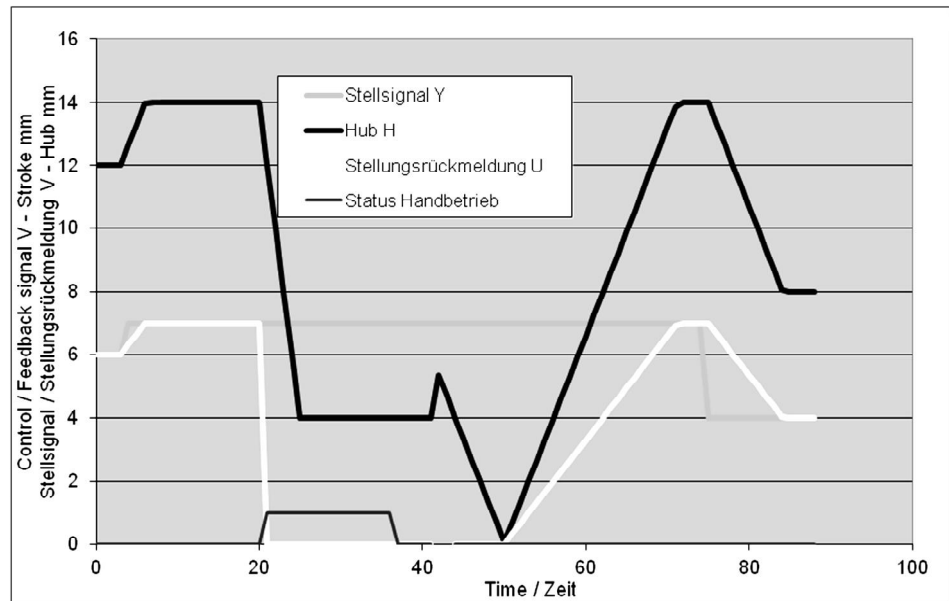
To grant – after manual operation – that real mechanical position and internal position control are matching all SA..61.. operate after manual operation an automatic ClosedPosition-Synchronisation.

4.7.1 ClosedPosition-Synchronisation

Returned into automatic operation the actuator runs for 0.5.. 2 s into opening direction to grant secure closed-position detection. Then the actuator runs into closed position (seat A-AB in the valve). Reaching the closed position the internal stroke model is synchronized. Positioning signal, position feedback and meachnical position now match perfectly again.

With this function it's granted that the position feedback U – which was zero during manual operation and synchronization - always represents the real mechanical position of the actuator.

After synchronization the actuator follows the control signal again.



4.7.1.1 Active forced position input on Z

If after return to automatic mode a signal on Z is active (GND, AC/DC 24 V or 0...1000 Ohm) the ClosedPosition-Synchronisation is deactivated as long as the signal on Z remains.

After Z is deactivated the ClosedPosition-Synchronisation will be performed.

Note

ClosedPosition-Synchronisation is only automatically activated after manual operation. A power failure does not activate this function automatically, to avoid that all actuators in a section close in parallel.

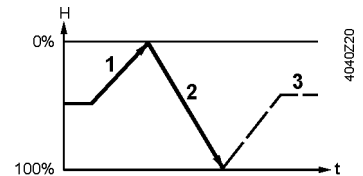
If the customer likes synchronization also after a power failure he should take care that the plant restarting routine drives the actuator automatically into an end position. This will also synchronise the internal position control and the real position.

4.8 Calibration

To match the actuator to production-related mechanical tolerances of the individual valves, accurate positioning and position feedback must be ensured, if calibration is performed when the plant is commissioned (page 42). During commissioning, the actuator detects the valve's end positions and files the exact stroke in its internal memory.

Calibration takes place in the following phases:

- Actuator drives to H_0 (1), valve closes. Detection of upper end position.
- Actuator drives to H_{100} (2), valve opens. Detection of lower end position.
- The detected values are stored (3). Then the actuator follows the positioning signal.




Note

- Observe status indication (LED) during and after calibration (page 61).
- If the actuator does not detect the second end position within an appropriate stroke range (max. 25 mm), the first end stop will be adopted and the actuator operates with a working range of 20 mm.

4.9 Signal priorities

The actuators are controlled via different interlinked positioning signal paths (positioning signal "Y", forced control input "Z", manual adjuster). The signal paths are assigned the following priorities:

Priority	Description	
1 (highest)	The manual adjuster always has priority 1, thus overriding all signals active at "Z" or "Y", independent of whether or not power is applied.	
2	Only SA..61...: As soon as a valid positioning signal is active at input "Z", the position is determined via positioning signal "Z" (forced control). Prerequisite: The manual adjuster is not used.	Z
3 (lowest)	The position is determined via positioning signal "Y". The manual adjuster is not used and on Z there is no active signal.	Y

Examples

Manual adjuster	Forced control (Z)	Positioning signal (Y)	Stroke actuator	Rotary actuator
Automatic mode	Not connected	5 V	Actuator's stem travels to position (50%)	Actuator's spindle travels to position (50%)
Automatic mode	G	3 V	Actuator's stem extends	Actuator's spindle turns in clockwise direction
Automatic mode	G0	3 V	Actuator's stem retracts	Actuator's spindle turns in counter-clockwise direction
Operated (30%) and engaged	G	8 V	Actuator's stem retracts manual (to 30%)	Actuator's spindle turns manual in counterclockwise direction (to 30%)

Bold printing = positioning signal currently active

4.10 Detection of valve seat

The actuators feature force-dependent valve seat detection. After calibration, the exact valve stroke is filed in the actuator's memory. When the actuator reaches the respective end of stroke, it does not hit the valve's seat at full speed, but stops for 5 seconds at about 1% before the stored position is reached. If the positioning signal stays at 0% or 100%, the actuator travels to the calculated end position at reduced positioning speed and builds up the required nominal force.

This function extends the actuator's service life since the dynamic forces are reduced when approaching the valve seat and there will be less strain on the gear train.

In addition, the actuator's oscillations in the case of instable control are suppressed.

If no force is built up in the calculated end position (e.g. in the event of temperature effects for instance), the actuator continues to operate at a reduced positioning speed until the nominal positioning force is restored. This ensures that the valve always fully closes.

After a power failure, valve seat identification is not active – the actuators define their stroke position on power resoration to be at 50%. From now on, the actuator follows the positioning signal.

When the valve plug reaches its seat for the first time, the actuator readjusts its stroke model.

Example

The supposed position is 50%, $Y = 2\text{ V}$, the actuator travels 30% of the stored valve stroke in the direction of "Actuator's stem retracted".

If the actuator reaches the seat within this 30% travel, it interprets the position as "Valve fully closed" and shifts the position of the valve's stroke accordingly without changing the extent of travel.

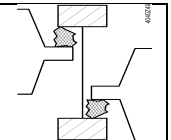
From now on, the actuator follows the changed valve stroke position.

This means: New position 0%, $Y = 2\text{ V}$, actuator travels 20% of the stored valve stroke in the direction "Actuator's stem extended".

4.11 Detection of foreign bodies

The actuator detects when the valve is clogged and adjusts its operational behavior accordingly to prevent damage to itself or the valve.

If the actuator hits an obstacle within the calibrated stroke and is not able to overcome it with its nominal positioning force, it stores the position at which the obstacle was hit. Depending on the direction of travel, as ...

• "Lower limit of valve clogging", if the clogging was detected when traveling in the direction of "Actuator's stem retracting".	
• "Upper limit of valve clogging", if the clogging was detected when traveling in the direction of "Actuator's stem extending".	

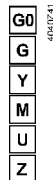
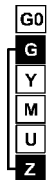
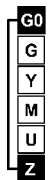
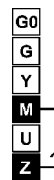
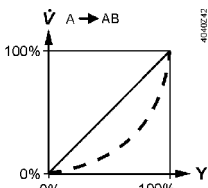
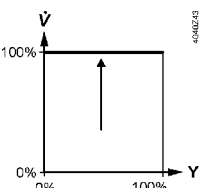
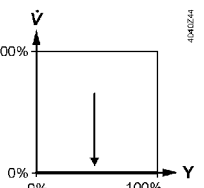
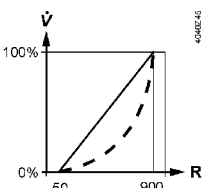
Now, the status LED blinks green and the actuator only follows the positioning signal between the positions "Actuator's stem retracted" and "Upper limit of valve clogging" or "Actuator's stem extended" and "Lower limit of valve clogging".

After detection of clogging, 3 attempts are made to overcome clogging by traveling about 15% in the opposite direction and then trying again to overcome the position of clogging. If the attempts made are unsuccessful, the actuator continues to follow the positioning signal within the restricted range only and the LED continues to blink green (refer to "Indicators" on page 61).

4.12 Forced control Z

SA..61.. only

Forced control is affected by changeover of acting direction. It uses the following operating modes:

		Z-mode			
		No function	Fully open	Fully closed	Overriding positioning signal "Y" by 0...1000 Ω
Connections					
Transmission					
	Equal-percentage or linear characteristic				Equal-percentage or linear characteristic
	Contact "Z" not connected, valve follows positioning signal "Y"	Contact "Z" is connected directly to "G", positioning signal "Y" has no impact	Contact "Z" is connected directly to "G0", positioning signal "Y" has no impact	Contact "Z" is connected to "M" via resistor "R", starting point at 50 Ω, end point at 900 Ω, positioning signal "Y" has no impact	

Note

The operating modes "Z" shown are based on factory setting "direct acting" and a "push to open" valve.

4.13 Technical and mechanical design

4.13.1 Transmission of power

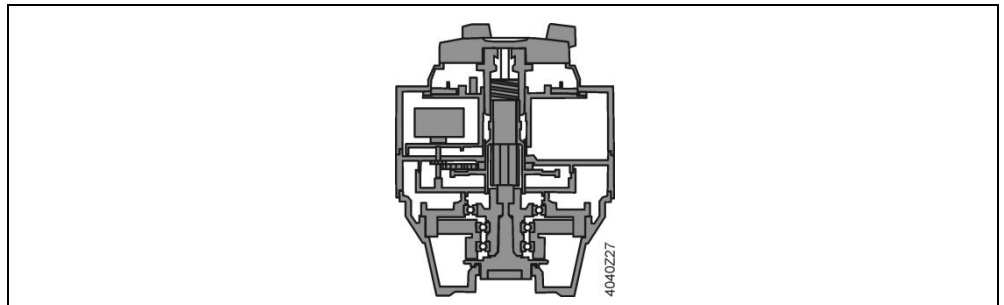
Function principle

Incoming positioning signals are translated to positioning commands for the motor.

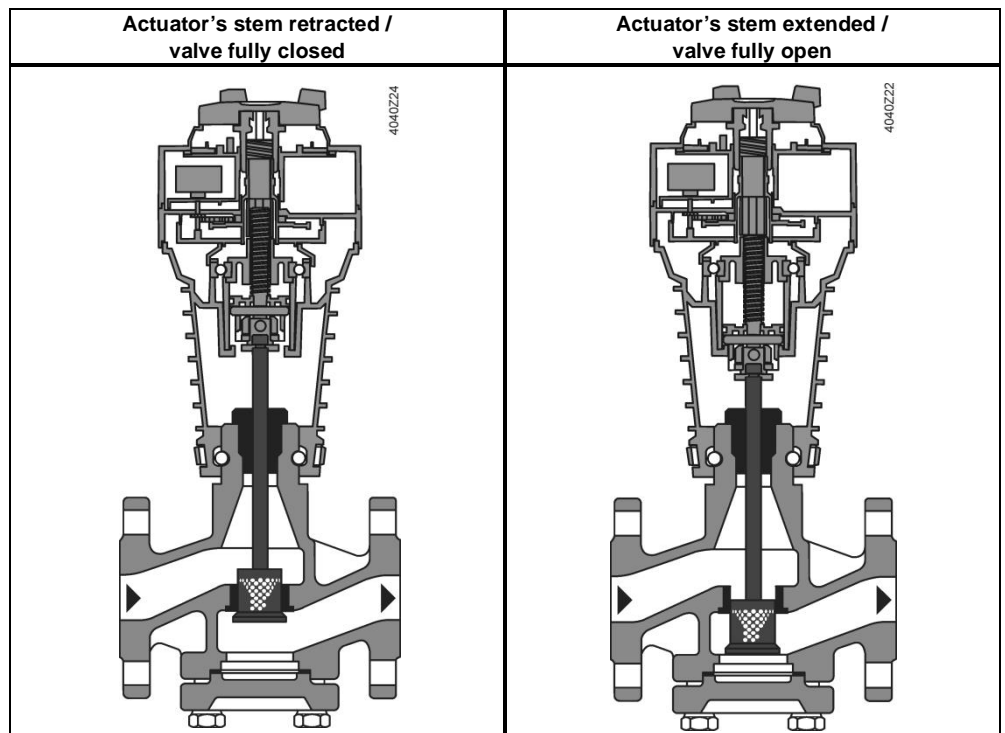
A gear train transmits the motor's positioning steps to the output stage (valve coupling). Attached to the gear train are the electrical and mechanical accessory items and the manual adjuster.

In the case of the rotary actuators, the adjustment to the required torque is made in the output stage. With the stroke actuators, the translation from rotary to stroke movement takes place in the output stage.

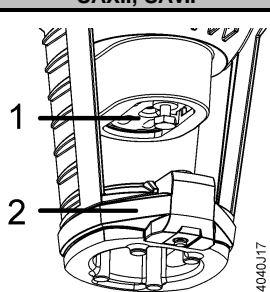
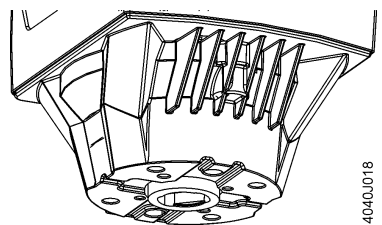
SAL..



SAX.., SAV..

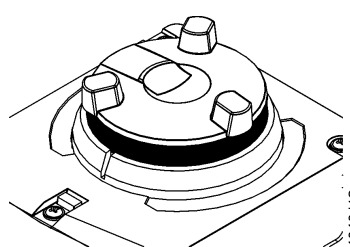


4.13.2 Coupling

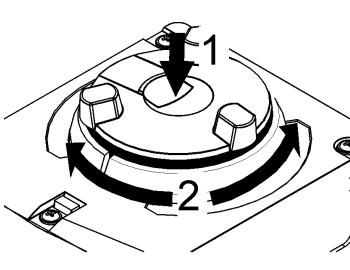
SAX.., SAV..	SAL..
	
<p>The stem coupling (1) and neck coupling (2) ensures full backward compatibility with all types of Siemens large-stroke valves produced since 1975.</p>	<p>Mounting sets are available for use with butterfly and slipper valves.</p>

4.13.3 Manual adjuster

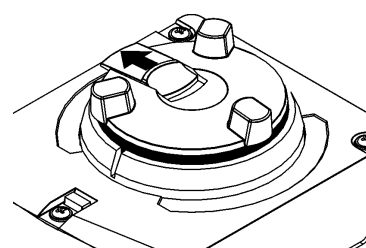
Automatic

	<p>When the motor drives the manual adjuster turns. Thus in automatic mode, the manual adjuster is used for indication of travel. If the manual adjuster is held firm in this mode, there is no transmission of power to the gear train.</p>
--	--

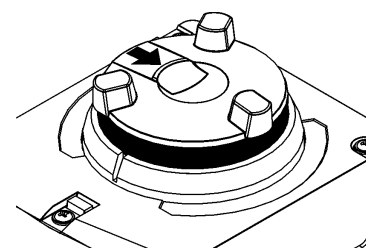
Manual operation

	<p>When pushing the manual adjuster down (1), it engages and the actuator can be manually operated.</p> <p>Stroke actuator: When turning the manual adjuster in clockwise / counterclockwise direction (2), the actuator's stem retracts / extends.</p> <p>Rotary actuator: The actuator spindle turns in the same direction.</p> <p>An overload protection prevents damage to the manual adjuster</p>
---	--

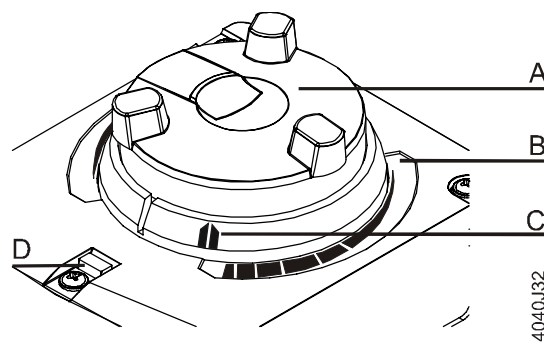
Fixing the position

	<p>Upon actuation and locking the slide switch, the manual adjuster remains engaged.</p> <p>When in this mode, do not turn the manual adjuster.</p>
---	---

Disengaging the fixing

	<p>When resetting the slide switch, the manual adjuster returns to automatic mode.</p> <p>->The modulating SA..61.. will automatically start a Zero Position Synchronisation</p>
---	---

4.13.4 Indicators



A	Indication of travel	
B	Scale	Position indication
C	Indicator	
D	LED Status indication	

Operational status indication

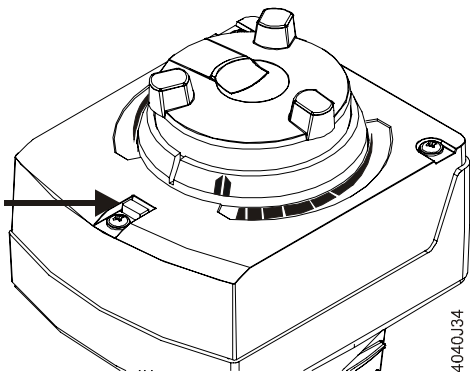
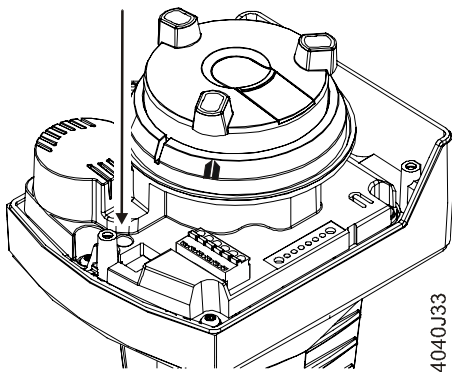
In Automatic mode, the manual adjuster serves for the indication of travel. See "Automatic" (page 60).

Position indication

Position indication is on 2 opposite sides. When turning the manual adjuster, the indicator moves in the same direction.

The scale indicates the stroke. When reaching the stops, the valve is either fully open or fully closed.

Status indication (LED)

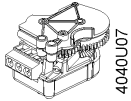
Housing cover fitted	Housing cover removed
	
When the housing cover is fitted, the LED can be viewed through a light conductor.	When the housing cover is removed, the LED can be viewed through a hole.

The status indication informs about the operational state of the actuator.

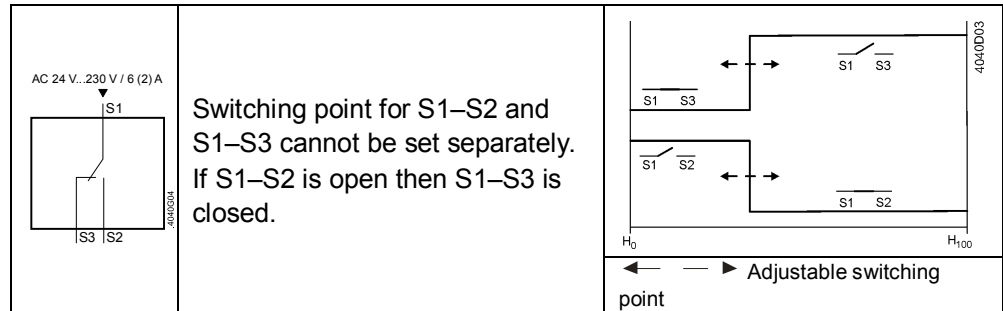
LED	Indication	Operating state	Remarks, troubleshooting
Green	On	Automatic mode	Normal operation
	Blinking	Calibration (page 42).	Wait until calibration is finished (then green or red light)
		In manual mode	Manual adjuster in MAN position
		Detection of foreign bodies (page 57)	Check valve / actuator
Red	On	Calibration error	Start calibration again (page 42)
	Blinking	Clogged valve	Check valve
Dark	Dark	No power or electronics faulty	Check operating voltage

4.13.5 Electrical accessories

Auxiliary switch ASC10.51



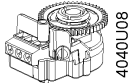
The auxiliary switch ASC10.51 switches on or off when a certain position is reached. The switching point can be set between 0...100%.



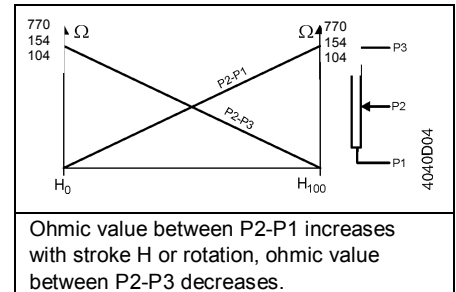
Application example:

When using an auxiliary switch, position feedback can trigger an automatic stop of the circulating pump in the end position "Fully closed".

Potentiometer ASZ7.5/..



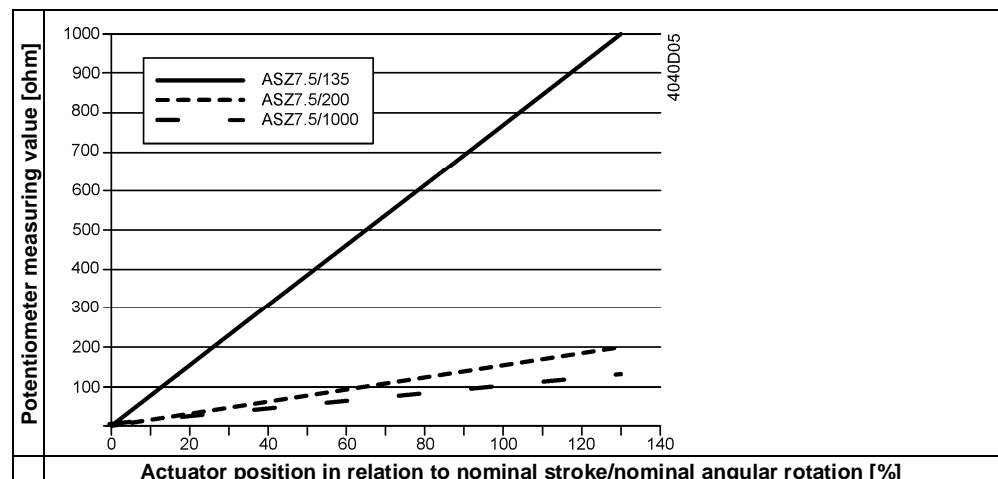
Potentiometer ASZ7.5/.. (1000 Ω, 200 Ω, 135 Ω) delivers an ohmic value to the controller giving the exact position of the actuator (continuous position feedback). A slip clutch prevents damage to the potentiometer in the mechanical end positions. This is also used for accurate balancing of the potentiometer in the fully closed position.



Flow characteristic

The end values of the potentiometers refer to the maximum stroke / maximum angular rotation of the actuators. For this reason, the resulting values in operation deviate, depending on the type of valve used in combination with the actuator. The potentiometer's starting point can be very accurately adjusted during installation (refer page 34).

	ASZ7.5/135	ASZ7.5/200	ASZ7.5/1000
	104 Ohm at nominal stroke/nominal angular rotation	154 Ohm at nominal stroke/nominal angular rotation	770 Ohm at nominal stroke/nominal angular rotation
	$R = 0 + 1.04 \text{ Ohm} \times \text{nominal stroke/nominal angular rotation (\%)}$	$R = 0 + 1.54 \text{ Ohm} \times \text{nominal stroke/nominal angular rotation (\%)}$	$R = 0 + 7.7 \text{ Ohm} \times \text{nominal stroke/nominal angular rotation (\%)}$
SAX..	$R = 0 + 5.2 \text{ Ohm} \times \text{stroke (mm)}$	$R = 0 + 7.71 \text{ Ohm} \times \text{stroke (mm)}$	$R = 0 + 38.5 \text{ Ohm} \times \text{stroke (mm)}$
SAV..	$R = 0 + 2.6 \text{ Ohm} \times \text{stroke (mm)}$	$R = 0 + 3.5 \text{ Ohm} \times \text{stroke (mm)}$	$R = 0 + 19.3 \text{ Ohm} \times \text{stroke (mm)}$
SAL..	$R = 0 + 1.15 \text{ Ohm} \times \text{rotary angle (°)}$	$R = 0 + 1.71 \text{ Ohm} \times \text{rotary angle (°)}$	$R = 0 + 8.55 \text{ Ohm} \times \text{rotary angle (°)}$



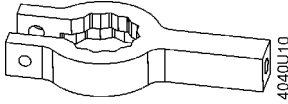
Function module AZX61.1



Function module AZX61.1 offers the following choices for changing control:

- Changeover of acting direction (page 51)
- Sequence control (page 49)

Stem heating element ASZ6.6



Stem heating element ASZ6.6 prevents the formation of ice on the stem when medium temperatures drop below 0 °C. It is suited for universal use with valves having a stem diameter of 10 or 14 mm.



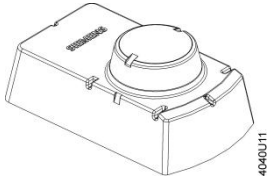
The stem heating element heats up to 120 °C.



This is a PTC element, which means it shows up with a low resistance at power up – inrush current may reach 13 A at low temperatures / high voltage level

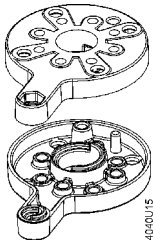
4.13.6 Mechanical accessories

Weather shield ASK39.1



Weather shield ASK39.1 protects the actuator when installed outdoors. This does not lead to a change of IP class (IP54).

Mounting sets ASK3..N



Mounting sets ASK31N, ASK33N and ASK35N enable the actuators to be fitted to slipper valves VBF21..., DN65...150 and butterfly valves VKF41.. and VKF45 (page 25-32).

5 Technical data

		SAY..	SAX..	SAV..	SAL..
Power supply	Operating voltage				
	SA..31..	AC 230 V ± 15 %			
	SA..61..	AC 24 V ± 20 % / DC 24 V + 20 % / -15 % (SELV)			
	SA..81..	AC 24 V ± 20 % / DC 24 V + 20 % / -15 % (SELV)			
	Frequenz	45...65Hz			
	External supply line protection (EU)	<ul style="list-style-type: none"> 6 A...10 A slow Circuit breaker max. 13 A Characteristic B, C, D according to EN 60898 Power source with current limitation of max. 10 A 			
	Power consumption at 50 Hz				
	SAX31.00 Stem retracts / extends		3.5 VA / 2 W		
	SAX31.03 Stem retracts / extends		6 VA / 3.5 W		
	SAX61.03.. Stem retracts / extends		8 VA / 3.75 W		
	Holding state		3.5 VA / 1.5 W	-	-
	SAX81.00.. Stem retracts / extends		3.5 VA / 2.25 W		
	SAX81.03.. Stem retracts / extends		5 VA / 3.75 W		
	SAV31.00.. Stem retracts / extends			6.5 VA / 4 W	
	SAV61.00.. Stem retracts / extends		-	9.5 VA / 4.5 W	-
	SAV81.00.. Stem retracts / extends			7 VA / 4.5 W	
	SAL31.00T10 Rotary actuator turns				3.5 VA / 2 W
	SAL31.00T20 Rotary actuator turns				4.5 VA / 2.75 W
	SAL31.00T40 Rotary actuator turns				7 VA / 4 W
	SAL31.03T10 Rotary actuator turns				5.5 VA / 3.25 W
	SAL61.00T10 Rotary actuator turns				5 VA / 2.5 W
	Holding state				3.5 VA / 1.5 W
	SAL61.00T20 Rotary actuator turns				6 VA / 2.75 W
	Holding state				3.5 VA / 1.5 W
	SAL61.00T40 Rotary actuator turns		-	-	9 VA / 4 W
	Holding state				3.5 VA / 1.5 W
	SAL61.03T10 Rotary actuator turns				7.5 VA / 3.5 W
	Holding state				3.5 VA / 1.5 W
	SAL81.00T10 Rotary actuator turns				3 VA / 2 W
	SAL81.00T20 Rotary actuator turns				4 VA / 2.75 W
	SAL81.00T40 Rotary actuator turns				6 VA / 3.75 W
	SAL81.03T10 Rotary actuator turns				5 VA / 3.5 W
	SAY31P03 Stem retracts / extends	6 VA / 3.5 W			
	SAY61P03 Stem retracts / extends	8 VA / 3.75 W			
	Holding state	3.5 VA / 1.5 W			
	SAY61.03U Stem retracts / extends	8 VA / 3.75 W	-	-	-
	Holding state	3.5 VA / 1.5 W			
	SAY81P03 Stem retracts / extends	5 VA / 3.75 W			
	SAY81.03U Stem retracts / extends	5 VA / 3.75 W			

		SAY..	SAX..	SAV..	SAL..
Function data	Positioning times with specified nominal stroke / nominal angular rotation				
	SAX..00, SAV.., SAL..00		120 s	120 s	120 s
	SAY..03, SAX..03, SAL..03	30 s	30 s	-	30 s
	Positioning force	200 N	800 N	1600 N	-
	Torque SAL..T10 SAL..T20 ⁴⁾ SAL..T40 ⁴⁾	-	-	-	10 Nm running 20 Nm running 40 Nm running
	Nominal stroke	15 mm	20 mm	40 mm	-
	Angular rotation	-	-	-	90°
Signal inputs	Positioning signal "Y" SA..31.., SA..81..	3- position			
	SA..31.. Voltage	AC 230 V ± 15 %			
	SA..81.. Voltage	AC 24 V ± 20 % / DC 24 V ± 20 % / -15%			
	SA..61.. (DC 0...10 V)	Current draw ≤ 0,1 mA			
	SA..61.. (DC 4...20 mA)	Input impedance ≥ 100 kΩ			
Parallel operation	SA..61..	≤ 10 (depending on controller output)			
Forced control	Positioning signal "Z"	R= 0...1000 Ω, G, G0			
	SA..61..	Stroke / rotation proportional to R			
	R = 0...1000 Ω	Max. stroke 100% ¹⁾			
	Z connected to G	Min. stroke 0% ¹⁾			
	Z connected to G0	Max. AC 24 V ± 20 %			
Position feedback	Voltage	Max. DC 24 V ± 20 % / -15%			
	Current draw	≤ 0,1 mA			
Connecting cable	Wire cross-sectional areas	0.13...1.5 mm ² , AWG 24...16 ²⁾			
	Cable entries SA..	EU: 2 entries Ø 20.5 mm (for M20)			
	SA..U	US: 1 entry Ø 25.5 mm (for M25)			
Degree of protection	Housing from vertical to horizontal	IP54 as per EN 60529 ³⁾			
	Insulation class	As per EN 60730			
	Actuators SA..31..	II			
	Actuators SA..61..	III			
	Actuators SA..81..	III			
Environmental conditions	Operation	IEC 60721-3-3			
	Climatic conditions	Class 3K5			
	Mounting location	Indoors (weather-protected)			
	Temperature General	-5...55 °C			
	Humidity (noncondensing)	5...95 % r.h.			
	Transport	IEC 60721-3-2			
	Climatic conditions	Class 2K3			
	Temperature	-25...70 °C			
	Humidity	<95 % r.h.			
	Storage	IEC 60721-3-1			
	Climatic conditions	Class 1K3			
	Temperature	-15...55 °C			
	Humidity	5...95 % r.h.			
	Max. media temperatur when mounted on valve	120 °C	130 °C	130 °C ⁵⁾	120 °C

- 1) Observe acting direction of DIL switches
- 2) AWG = American wire gauge
- 3) Also with weather shield ASK39.1
- 4) SAL.T20 / T40 have a minimum holding torque of 14 Nm
- 5) Up to 150 °C with horizontal mounting position

		SAY..	SAX..	SAV..	SAL..
Directives and Standards	Product standard	EN60730-x			
	Electromagnetic compatibility (Application)	For residential, commercial and industrial environments			
	EU Conformity (CE)	A5W00000333 ¹⁾	CE1T4501x1 ¹⁾ CE1T4501x2 ¹⁾	CE1T4503xx ¹⁾	CE1T4502X1 ¹⁾ CE1T4502X2 ¹⁾
	RCM Conformity AC 230 V	A5W00000334 ¹⁾	CE1T4515X4 ¹⁾	CM1T4503_C1 ¹⁾	-
	UL, cUL AC 230 V AC/DC 24 V	- UL 873 http://ul.com/database			
Environmental compatibility		The product environmental declarations contain data on environmentally compatible product designs and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal):			
		7173310559Ben ¹⁾	7173310559Ben ¹⁾	7173310522A ¹⁾	CE1E4502en ¹⁾
Dimensions		See "Dimensions" (page 70)			
Weight	Excl. packaging	See "Dimensions" (page 70)			
Accessories ²⁾	Potentiometer ASZ7.5/135	0...135 Ω ± 5 %			
	Voltage	DC 10 V (SELV)			
	Current rating	< 4 mA			
	Potentiometer ASZ7.5/200	0...200 Ω ± 5%			
	Voltage	DC 10 V (SELV)			
	Current rating	< 4 mA			
	Potentiometer ASZ7.5/1000	0...1000 Ω ± 5%			
	Voltage	DC 10 V (SELV)			
	Current rating	< 4 mA			
	Auxiliary switch ASC10.51	AC 24...230 V, 6 (2) A, floating			
	Switching capacity				
	External supply line protection	See section power supply			
	US installation, UL & cUL	AC 24 V class 2, 5 A general purpose			
	Stem heating element ASZ6.6	AC / DC 24 V			
	Power supply				
	Power consumption at 50 Hz	40 VA / 30 W			
	Inrush current (cold)	Max. 13 A			
	Function module AZX61.1 for SA..61..				
	Switching capacity	AC 24...230 V, 6 (2) A, floating			
	External supply line protection	See section power supply			
	US installation, UL & cUL	AC 24 V class 2, 5 A general purpose			

¹⁾ The documents can be downloaded from <http://siemens.com/bt/download>.

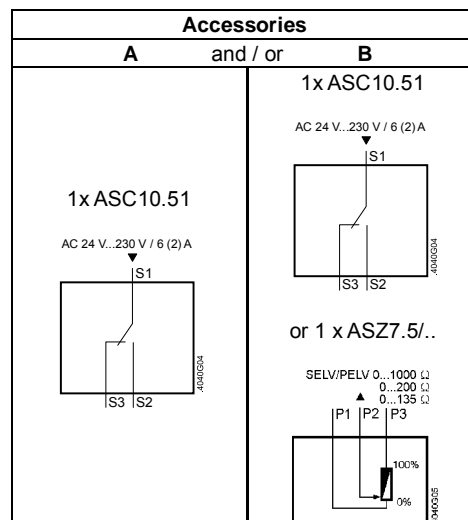
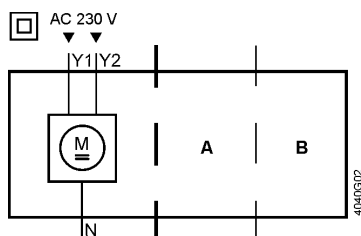
²⁾ UL recognized component



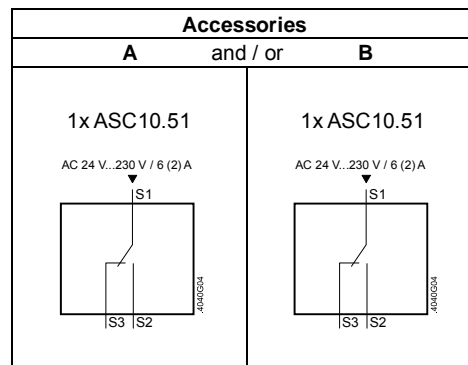
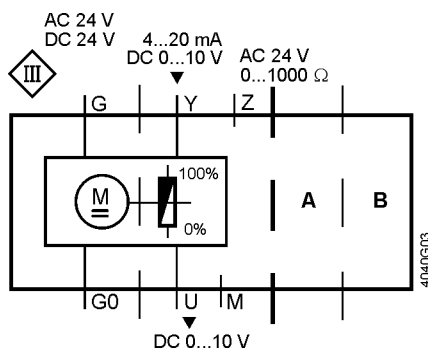
6 Connection diagrams and dimensions

6.1 Internal diagrams

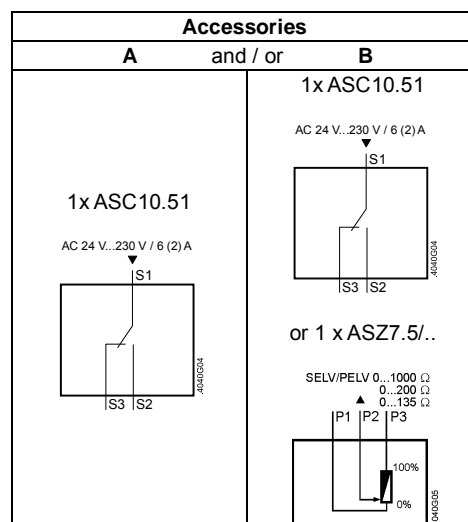
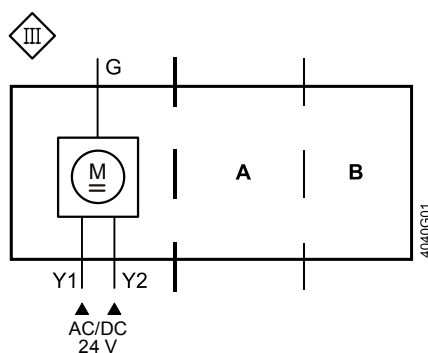
SA..31..



SA..61..



SA..81..



6.2 Connection terminals

6.2.1 Actuators

SA..31..

AC 230 V, 3-position

- | | |
|----|--|
| N | System neutral (SN) |
| Y1 | Positioning signal (actuator's stem extends / actuator's spindle turns clockwise) |
| Y2 | Positioning signal (actuator's stem retracts / actuator's spindle turns counter-clockwise) |

SA..61..

AC/DC 24 V, DC 0...10 V / 4...20 mA / 0...1000 Ω

- | | |
|----|--|
| G0 | System neutral (SN) |
| G | System potential (SP) |
| Y | Positioning signal for DC 0...10 V / 4...20 mA |
| M | Measuring neutral |
| U | Position feedback DC 0...10 V - (reference potential is M measuring neutral) |
| Z | Positioning signal forced control AC/DC ≤ 24 V, 0...1000 Ω |

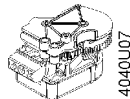
SA..81..

AC/DC 24 V, 3-position

- | | |
|----|--|
| G | System potential (SP) |
| Y1 | Positioning signal (actuator's stem extends / actuator's spindle turns clockwise) |
| Y2 | Positioning signal (actuator's stem retracts / actuator's spindle turns counter-clockwise) |

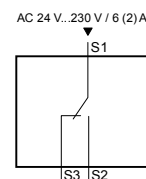
6.2.2 Electrical accessories

Auxiliary switch ASC10.51

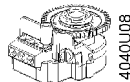


Adjustable switching points, AC 24...230 V

- | | |
|---|-----------------------|
| 1 | System potential (SP) |
| 2 | Closing Contact |
| 3 | Opening Contact |
- Switching state always related to extending actuator stem or clockwise turning actuator's spindle turns

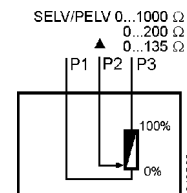


Potentiometer ASZ7.5/..

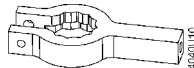


Adjustment of zero point, DC 10 V

- | | |
|---|-------------------|
| 1 | Measuring neutral |
| 2 | 0...x Ω |
| 3 | x...0 Ω |
- x = 135 Ω, 200 Ω; 1000 Ω



Stem heating element ASZ6.6

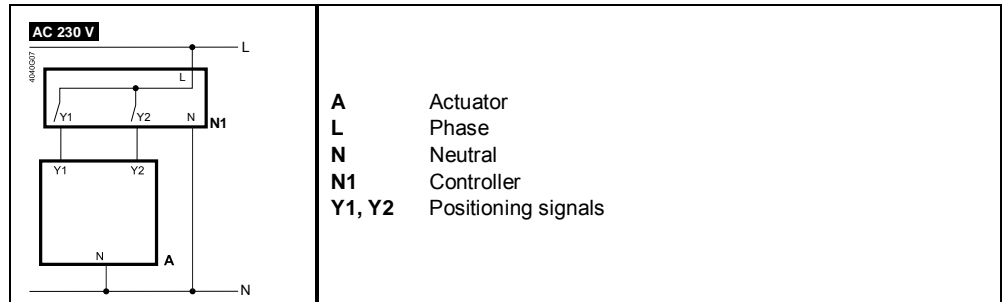


AC 24 V / 30 W / 40 VA / inrush current max. 13A

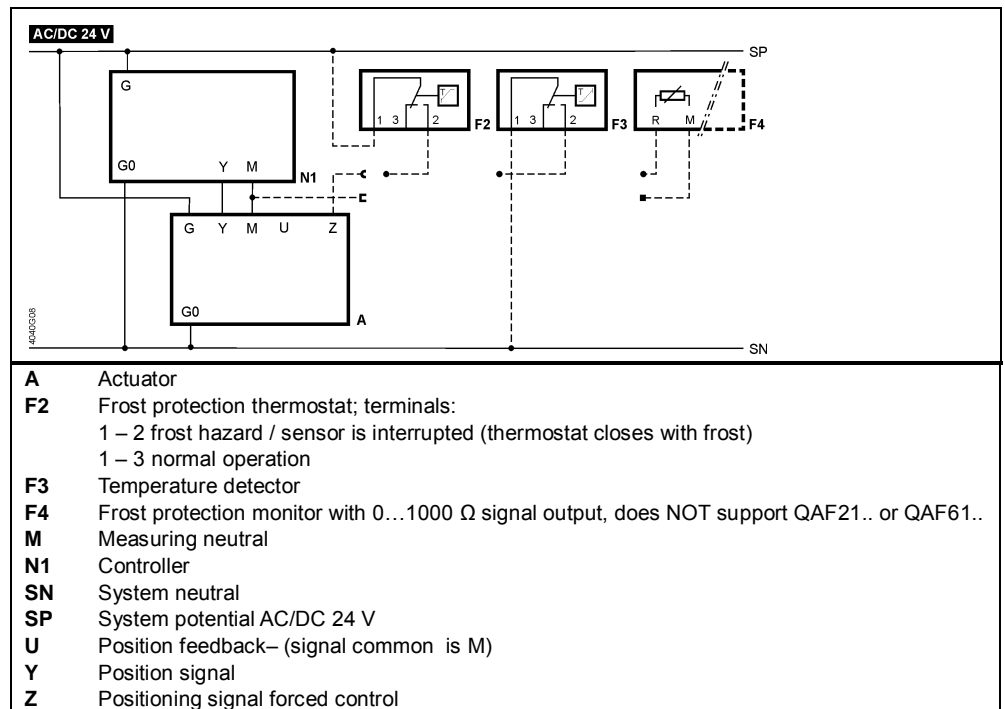
- | | |
|---|-------------------------------|
| 1 | System neutral (SN) (red) |
| 2 | System potential (SP) (black) |

6.3 Connection diagrams

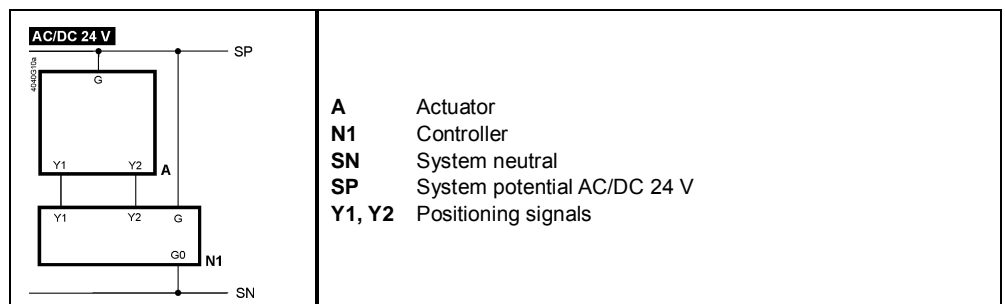
SA..31..



SA..61..



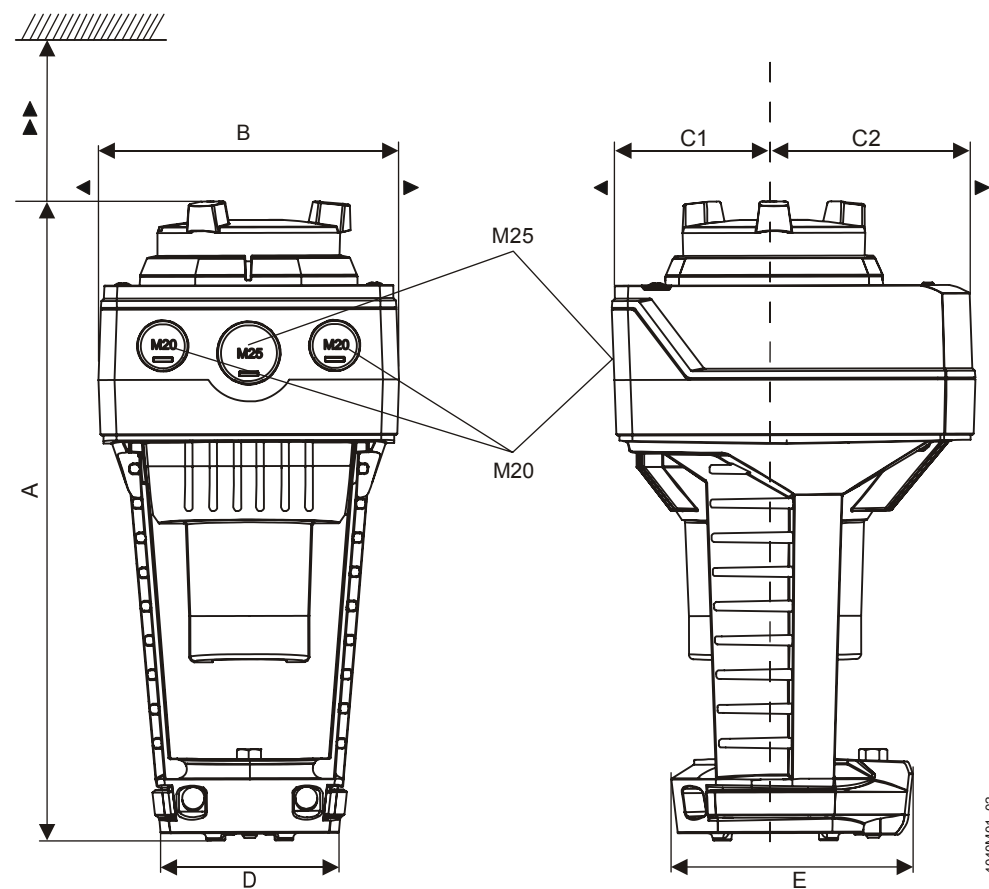
SA..81..



6.4 Dimensions

6.4.1 Stroke actuators

Dimensions in mm



- 1 SAX../SAV.: M25
SAX..U/SAV..U: ½" (Ø 21.5 mm)
2 SAX../SAV.: M20
SAX..U/SAV..U: ½" (Ø 21.5 mm)

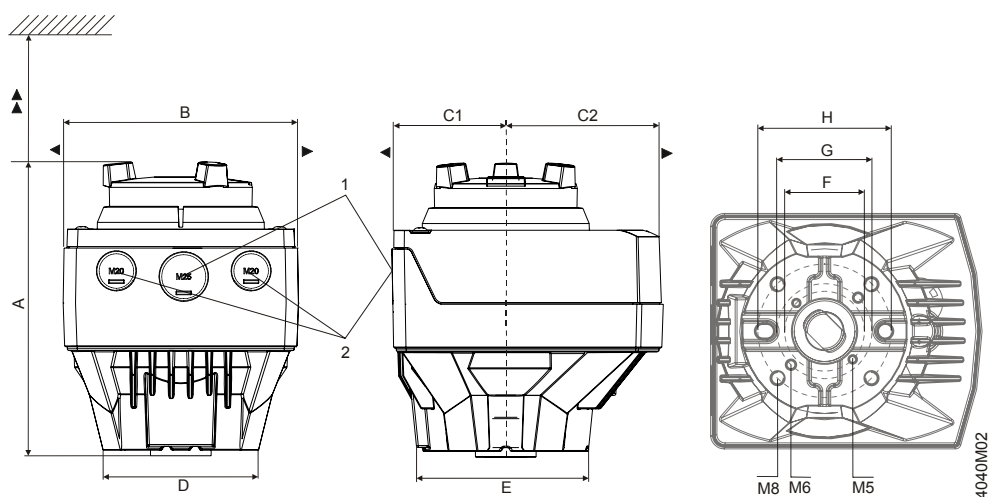
Type	A	B	C	C1	C2	D	E	▶	▶▶	kg
SAX.. (U ¹⁾)	242	124	150	68	82	80	100	100	200	1.780
Mit ASK39.1	+25	154	300	200	100	-	-	-	-	2.010
SAV.. (U ¹⁾)	265	124	150	68	82	80	100	100	200	1.920
Mit ASK39.1	+25	154	300	200	100	-	-	-	-	2.150
SAY.. (U ¹⁾)	242	124	150	68	82	80	100	100	200	1.780

¹⁾ SAX..U: 1.850 kg

²⁾ SAY..U: 1.850 kg

6.4.2 Rotary actuators

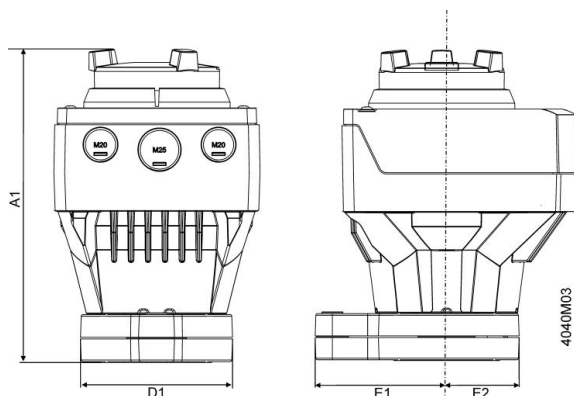
Dimensions in mm



- 1 SAL... M25
2 SAL... M20

Typ	A	B	C	C1	C2	D	E	F	G	H	▶	▶▶	kg		
													SAL..T10	SAL..T20	SAL..T40
SAL..	160	124	150	68	82	82	88	42	50	70	100	200	1.475	1.600	1.625
With ASK39.1	+25	154	300	200	100	-	-	-	-	-	-	-	1.710	1.835	1.860

With mounting set
ASK3..N



Type	A1	D1	E1	E2
SAL.. with ASK3..N	188	88	80	44
With ASK39.1	+25	-	-	-

7 Revision numbers

Product no.	Valid from rev. no.	Product no.	Valid from rev. no.
SAX31.00	..H	SAL31.00T10	..E
SAX31.03	..H	SAL31.00T20	..D
SAX31P03	..H	SAL31.00T40	..B
SAX81.00	..H	SAL31.03T10	..E
SAX81.03	..H	SAL61.00T10	..E
SAX81.03U	..H	SAL61.00T20	..D
SAX81P03	..H	SAL81.00T40	..B
SAX61.03	..H	SAL61.03T10	..E
SAX61.03U	..H	SAL81.00T10	..E
SAX61P03	..H	SAL81.00T20	..D
		SAL81.00T40	..B
SAV31.00	..B	SAL81.03T10	..E
SAV61.00	..B		
SAV61.00U	..B	SAY31P03	..A
SAV61P00	..B	SAY61P03	..A
SAV81.00	..B	SAY81P03	..A
SAV81.00U	..B		
SAV81P00	..B		

8 Glossary

8.1 Symbols



Caution, general danger – read the notes!



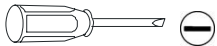
Caution, hot surface – read the notes!



Condition as supplied to customer



Crosstip screwdriver (Pozidriv)



Slotted screwdriver



Screw wrench



Allen key

8.2 Terms

DIL switches

A DIL switch shows the switching choices in the form of a place value system (dual in line) in relation to basis 2 (on and off).

DN

Nominal size: Characteristic for matching parts of the piping system.

Forced control

Forced control serves for overriding automatic mode and is implemented in the structure.

HEX switches

A HEX switch shows the switching choices in the form of a place value system (hexadecimal system) in relation to basis 16 (0...9 and A...F).

kPa

Unit of pressure: 100 kPa = 1 bar = 10 mWS.

k_{vs}

Nominal flow rate: 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).

LED

Light emitting diode.

PN

PN class: Characteristic relating to the combination of mechanical und dimensional properties of a component in the piping system.

Position feedback

Signal used to acquire the position, fed back via an input.

Spring return facility

Refer "fail safe function".

$\Delta p_{\max} / \Delta p_{\max V}$

Maximum permissible differential pressure across the valve's control path, valid for the entire actuating range of the motorized valve (V = diverting mode).

Δp_s

Maximum permissible differential pressure at which the motorized valve will close securely against the pressure (close off pressure).

slotted screwdriver

Index

3-position control	45	DN	12, 14, 16
A/D conversion	45, 48	Document use	7
About this documentation	5	Electrical accessories	62
Accessories	17, 66	Electrical planners	7
Electrical accessories	17	Engineering	8
Mechanical accessories	17	Environmental compatibility	66
Acting direction	51, 53	Environmental conditions	65
Angular rotation	10	Equipment combinations	12
Auxiliary switch ASC10.51	17, 33, 36, 41, 43, 62, 66, 67, 68	2-port valves	14
Before you start	6	3-port valves	12
Brushless DC motor	45, 48	combi valves	16
Cable entries	65	slipper and butterfly valves	16
Cable glands	8, 40	Extra functions	9, 10
cable lengths	21	Flow characteristic	52, 53, 62
Calibration	42, 48, 56	Equal-percentage	52, 53
Calibration slot	33, 48	Linear	52, 53
Changeover of acting direction	51	Flow characteristic selection	52
Changeover of characteristic	48	Force	12
Characteristics function	48	Forced control	9, 10, 48, 58, 65
Commissioning	42	Formulas for wire lengths	22
Connecting cable	65	Function check	42
Connection diagrams	67, 69	Function data	65
Connection terminals	33, 68	Function module AZX61.1	17, 33, 35, 48, 49, 63
3-position	68	Function principle	59
Actuators	68	Functions	45
Auxiliary switch ASC10.51	68	Gear train	45, 48
Electrical accessories	68	Glossary	73
Modulating	68	Handling	23
Potentiometer ASZ7.5	68	HEX switches	49
Stem heating element ASZ6.6	68	Housing cover	8
Contents	3	HVAC plants	7
Control	45	Identification of seat	45, 48
Control functions	45	Indicators	61
Control functions	48	LED	61
Control of direction	45	Operational status indication	61
Copyright	7	Position indication	61
Coupling	8, 60	Status indication	61
Cross-sectional area of wire	22	Indoor use	23
cross-sectional areas	21	Installation	8, 23, 40
Degree of protection	65	Interior view	33
Delivery	11	Internal diagrams	67
Detection of foreign bodies	48, 57	Kennlinienumschaltung	9
Detection of valve seat	57	k_{vs}	12, 14, 16
Deviations	46	L/P-diagram	22
DIL switches	33, 48, 49, 51	LED	9, 10, 33, 48, 61
Dimensions	66, 70	Maintenance	44
Rotary actuators	71	Manual adjuster	8, 9, 10, 45, 48, 60
Stroke actuators	70	Automatic	60
Direct acting	51, 53	Disengaging the fixing	60
Directives	66	Fixing the coupling	60
Disposal	44	Manual operation	60
		Manual adjustment	45, 48

Mechanical accessories	63	Stroke actuators SQX.. to SAX.....	18
Modulating control.....	48	Product replacements.....	18
Montagesatz ASK3..N.....	16	Quality assurance.....	7
Montagesatz ASK31N.....	27	Quick access.....	5
Montagesatz ASK35N.....	17	Reference documents	6
Motor control.....	45, 48	Request to the reader.....	7
Mounting.....	23	Reverse acting	51, 53
Accessories.....	33	Revision history.....	6
Auxiliary switch ASC10.51	36	Revision numbers.....	72
Fitting actuators to butterfly valves.....	25, 30, 31	Scope of this document	7
Fitting actuators to seat valves.....	23	Selecting the acting direction	51
Fitting actuators to slipper valves.....	27	Sequence control	49
Function module AZX61.1.....	35	Setting elements.....	33
Mounting positions.....	23	Signal adaptation.....	49
Potentiometer ASZ7.5.....	34	Signal error.....	21
Stem heating element ASZ6.6	39	Signal inputs.....	65
Weather shield ASK39.1	39	Signal priorities.....	56
Mounting set ASK3..N.....	63, 71	Sizing	20
Mounting set ASK31N.....	17	Spare parts.....	20
Mounting set ASK33N.....	17, 25	Spring return time.....	9, 10
Mounting set ASK35N.....	31	Standards	66
Navigation	5	Status indication.....	8
Operating voltage	22, 64	Stem heating element ASZ6.6	17, 39, 63, 66, 68
Operating voltage	9, 10	Stroke	9, 10
Ordering	11	Symbols	73
Outdoor use.....	23	Technical	59
Parallel operation.....	65	Technical data	64
Parallel operation of actuators.....	20	Terms	73
Permissible voltage drop.....	22	Torque.....	10, 16, 18
Permissible wire length	22	Trademarks	6
Plug-in space A.....	33, 34, 36	Transmission of power.....	59
Plug-in space B.....	33, 35, 37	Type summary.....	9
PN.....	12, 14, 16	Rotary actuators.....	10
Position control	48	Stroke actuators.....	9
Position feedback	9, 10, 52, 65	Use	9
Position indication.....	8	User interface.....	8
Positioning force	9, 10, 12, 14, 18	Valve neck coupling.....	8
Positioning signal.....	9, 10, 48	Valve stem coupling.....	8
Positioning signal (Z)	65	Voltage drop	21
Positioning signal selection	52	Volumetric flow	51, 52
Positioning time	9, 10, 18	Warranty.....	22
Positioning times stroke model.....	46	Weather shield ASK39.1	17, 39, 63
Potentiometer ASZ7.5.....	17, 33, 34, 41, 44, 62, 66, 67, 68	Weight.....	66
Power consumption	22	Wiring.....	40
Power supply	48, 64	Actuator	40
Power transmission.....	8	Auxiliary switch ASC10.51.....	41, 43
Product description	8	Potentiometer ASZ7.5.....	41
Product replacements		Preparation of wire endings.....	40
Electrical accessories	19	Yoke	8
Rotary actuators SQL.. to SAL.....	18	Δp_{\max}	12, 14, 16
		Δp_s	14, 16

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