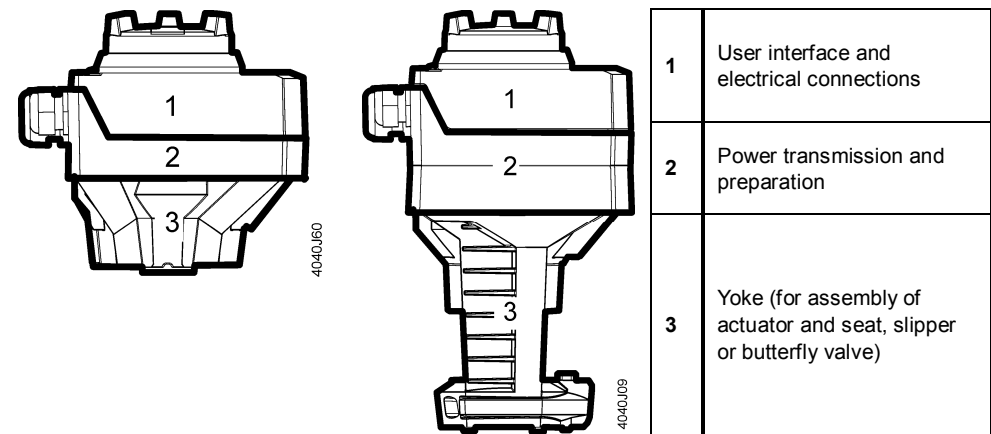


2 Engineering

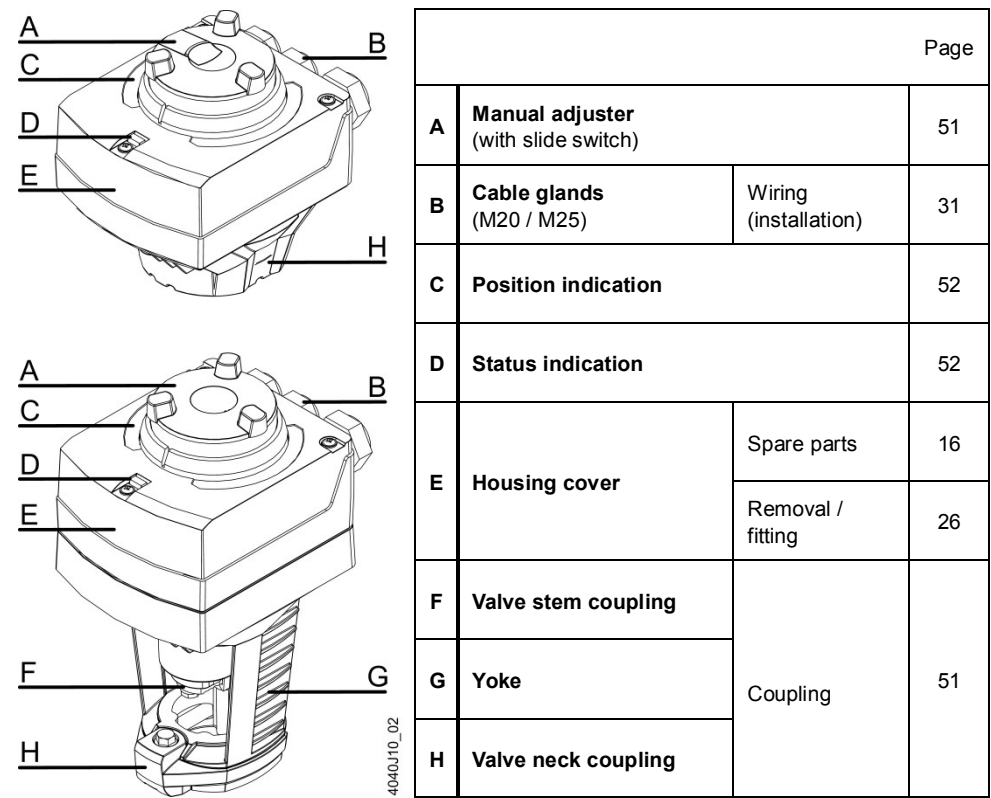
2.1 Product description

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

Mechanical design



Components



2.2 Use

SAX..

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

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	-	Push and fix	-
SAX31.03	S55150-A106			AC/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 SAX81.00U	S55150-A102 S55150-A102-A100				3-position		30 s			
SAX81.03 SAX81.03U	S55150-A103 S55150-A103-A100									

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
SAX31P03	S55150-A118	20 mm	500 N	AC 230 V	3-position	-	30 s	-	-	-
SAX61P03	S55150-A114			AC/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			-		-

2.3.3 Rotary actuators

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

2.4 Ordering

Example

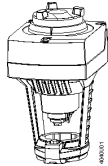






Product no.	Stock no.	Description	Quantity
SAX81.03	S55150-A103	Actuator	1
ASZ7.5/1000	S55845-Z106	Potentiometer	1

Delivery

Actuators, valves and accessories are supplied in individual packs.

2.5 Equipment combinations

2.5.1 Stroke actuators – 3-port valves

Typical applications	Stroke actuators	Data Sheet	Stroke	
			Positioning force	20 mm 800 N
<ul style="list-style-type: none"> • Heating plants • Ventilation and air conditioning plants • Heat generation • Heat distribution • District heating plants 	SAX..	N4501		
Valves	Basic Doc. (P4030)			
Valves	Data Sheet	Valve type	DN	k_{vs} [m³/h]
PN6  -10... 130 °C ⁴⁾	N4410	VXF21.22...25 ¹⁾	25	1,9 / 3 / 5 / 7,5
		VXF21.25... ²⁾	25	2,5 / 4 / 6,3 / 10
		VXF21.39-40	40	12 / 19
		VXF21.40-... ²⁾	40	16 / 25
		VXF21.50	50	31
		VXF21.50-40	50	40
		VXF21.65	65	49
		VXF21.65-63	65	63
		VXF21.80-78	80	78
		VXF21.80-100	80	100
PN10  -10... 130 °C ⁴⁾	N4420	VXF31.15-... ²⁾	15	2,5 / 4
		VXF31.24...25 ¹⁾	25	5 / 7,5
		VXF31.25-... ²⁾	25	6,3 / 10
		VXF31.39...40 ¹⁾	40	12 / 19
		VXF31.40-... ²⁾	40	16 / 25
		VXF31.50	50	31
		VXF31.50-40	50	40
		VXF31.65	65	49
		VXF31.65-63	65	63
		VXF31.80	80	78
PN16  -10... 130 °C ⁴⁾	N4430	VXF40.15-... ²⁾	15	1,9 / 2,5 / 3 / 4
		VXF40.25-... ²⁾	20	5 / 6,3 / 7,5 / 10
		VXF40.40-... ²⁾	40	12 / 16 / 19 / 25
		VXF40.50-... ²⁾	50	31 / 40
		VXF40.65-... ²⁾	65	49 / 63
PN16  -10... 130 °C ⁴⁾	N4440	VXF41.14...15 ¹⁾	15	1,9 / 3
		VXF41.24...25 ¹⁾	25	5 / 7,5
		VXF41.39...40 ¹⁾	40	12 / 19
		VXF41.49...50 ¹⁾	50	19 / 31
PN25/16  -20... 130 °C ⁴⁾	N4405	VXF53.15-... ²⁾	15	1,6 / 2,5 / 4
		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
PN16  -25... 130 °C ⁴⁾	N4463	-	VXG41.1301 ³⁾	15
		-	VXG41.1401 ³⁾	15
		VXG41.15	VXG41.1501 ³⁾	15
		VXG41.20	VXG41.2001 ³⁾	20
		VXG41.25	VXG41.2501 ³⁾	25
		VXG41.32	VXG41.3201 ³⁾	32
		VXG41.40	VXG41.4001 ³⁾	40
		VXG41.50	VXG41.5001 ³⁾	50

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

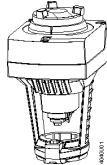







²⁾ .. = insert k_{vs} value

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_{maxV} = max. permissible differential pressure in diverting mode

2.5.2 Stroke actuators – 2-port valves

Typical applications	Stroke actuators	Data Sheet	Stroke		20 mm	
			Positioning force		800 N	
<ul style="list-style-type: none"> Heating plants Ventilation and air conditioning plants Heat generation Heat distribution District heating plants 	SAX..	N4501				
Valves	Basic Doc. (P4030)					
Valves	Data Sheet	Valve type	DN	k_{vs} [m³/h]	Δp_s [kPa]	Δp_{max} [kPa]
PN6 	N4310	VVF21.22...25 ¹⁾	25	1,9 / 3 / 5 / 7,5	600	300
		VVF21.25... ²⁾	25	2,5 / 4 / 6,3 / 10		
		VVF21.39-40	40	12 / 19	500	
		VVF21.40... ²⁾	40	16 / 25		
		VVF21.50	50	31	300	175
		VVF21.50-40	50	40		
		VVF21.65	65	49	175	
		VVF21.65-63	65	63		
		VVF21.80-78	80	78	100	100
		VVF21.80-100	80	100		
PN10 	N4320	VVF31.15... ²⁾	15	2,5 / 4	1'000	300
		VVF31.24...25 ¹⁾	25	5 / 7,5		
		VVF31.25... ²⁾	25	6,3 / 10	525	
		VVF31.39...40 ¹⁾	40	12 / 19		
		VVF31.40... ²⁾	40	16 / 25	325	175
		VVF31.50	50	31		
		VVF31.50-40	50	40	175	
		VVF31.65	65	49		
		VVF31.65-63	65	63	100	100
		VVF31.80	80	78		
PN16 	N4330	VVF40.15... ²⁾	15	1,9 / 2,5 / 3 / 4	1'600	300
		VVF40.25... ²⁾	20	5 / 6,3 / 7,5 / 10	1'550	
		VVF40.40... ²⁾	40	12 / 16 / 19 / 25	525	
		VVF40.50... ²⁾	50	31 / 40	325	
		VVF40.65... ²⁾	65	49 / 63	175	175
		VVF40.80... ²⁾	80	78 / 100	100	100
PN16 	N4340					
		VVF41.49	50	19		
		VVF41.50	50	31	350	300
PN25 	N4373	VVF52.15... ²⁾	15	0,16 / 0,2 / 0,25 / 0,32 / 0,4 / 0,5	2'500	1'600
		VVF52.15... ²⁾	15	0,63 / 0,8 / 1 / 1,25 / 1,6 / 2		
		VVF52.15... ²⁾	15	2,5 / 3,2 / 4	1'500	1'200
		VVF52.25... ²⁾	25	5 / 6,3 / 8 / 10	500	
		VVF52.40... ²⁾	40	12,5 / 16 / 20 / 25		
PN25/16 	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	2'500	1'200
		VVF53.20-6.3	20	6,3		
		VVF53.25... ²⁾	25	5 / 6,3 / 8 / 10	1'600	750
		VVF53.32-16	32	16	900	
		VVF53.40... ²⁾	40	12,5 / 16 / 20 / 25	550	
		VVF53.50... ²⁾	50	31,5 / 40	350	
		VVF53.50-40K ²⁾	50	40	2500	
						1250
PN16 	N4363	VVG41.11...12 ¹⁾	15	0,63 / 1	1'600	800
		VVG41.13	15	1,6		
		VVG41.14	15	2,5		
		VVG41.15	15	4		
		VVG41.20	20	6,3		525
		VVG41.25	25	10	1'550	
		VVG41.32	32	16	875	
		VVG41.40	40	25	525	
		VVG41.50	50	40	300	300

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

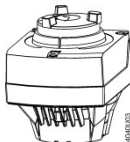

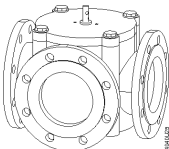

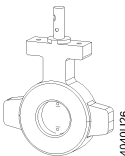

²⁾ .. = insert k_{vs} value

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

2.5.3 Stroke Actuators – combi valves

Valves				Actuators SAX..P..	
		DN	H ₁₀₀ [mm]	Δp _{max} [kPa]	Δp _s [kPa]
Standard flow rate	VPF43.50F16	50	20	600	600
	VPF43.65F24	65			
	VPF43.80F35	80			
	VPF53.50F16	50			
	VPF53.65F24	65			
	VPF53.80F35	80			
High flow rate	VPF43.50F25	50	20	600	600
	VPF43.65F35	65			
	VPF43.80F45	80			
	VPF53.50F25	50			
	VPF53.65F35	65			
	VPF53.80F45	80			

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	1'000	ASK33N	300	400	
		VKF41.150 ³⁾	150	2'100	ASK33N	250		
		VKF41.200 ³⁾	200	4'000	ASK33N	125		300
 -10 °C...120 °C	N4136	VKF46.40 ⁴⁾	40	50	-	-	1'600	-
		VKF46.50 ⁴⁾	50	85	-			
		VKF46.65 ⁴⁾	65	215	-			
		VKF46.80 ⁴⁾	80	420	-		-	1'600
		VKF46.100 ⁴⁾	100	800	-			1'200
		VKF46.125 ⁴⁾	125	1'010	-			800

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/s

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 AZX61.1	
SAX81..		Max. 1	-	
SAX31P..	Max. 2	Max. 1	-	-
SAX61P..		-		
SAX81P..		Max. 1		
SAL31..	Max. 2	Max. 1	-	-
SAL61..		-	Max. 1 AZX61.1	
SAL81..		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
SAX..	Max. 1	-	-	-
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 ¹⁾	-	-	ASK32	-	¹⁾	¹⁾	¹⁾
	DN 65...100	-	-	ASK31	-	ASK31N	-	-
B3f..	DN 40 / DN 50 ¹⁾	Direct	ASK25	ASK31	-	¹⁾	¹⁾	¹⁾
	DN 65...150	Direct	ASK25	ASK31	-	ASK31N	-	-
C1f..	DN 40 / DN 50 ¹⁾	Direct	-	ASK31	-	¹⁾	¹⁾	¹⁾
	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).

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 SQL85.00	-	SAL31.00T20 / T40 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	-

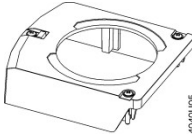
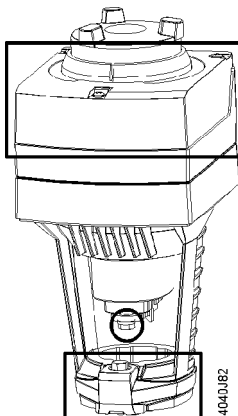

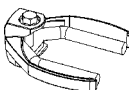
¹⁾ Used auxiliary switches or potentiometer (order accessories additionally were applicable):

- Check used functionality
- Check compatibility with controller

2.8 Spare parts

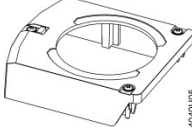
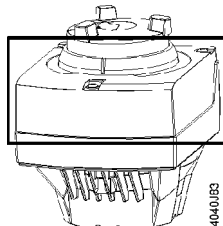


The following spare part sets are available:

SAX..

Stock number 8000060843	Housing cover  4040U05	 4040J82
	Screw (valve stem coupling)  4040U22	
	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  4040U20	
	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 59).

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

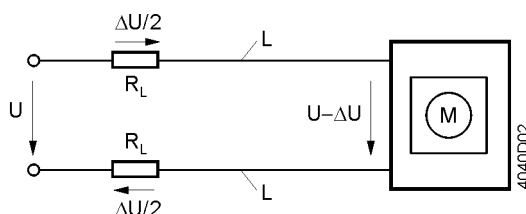
When determining the cable length and the wire cross-sectional area, adherence to the permissible operating voltage tolerance at the actuator is of importance, in addition to the permissible voltage drop across the operating voltage and signal lines (see table below).

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:

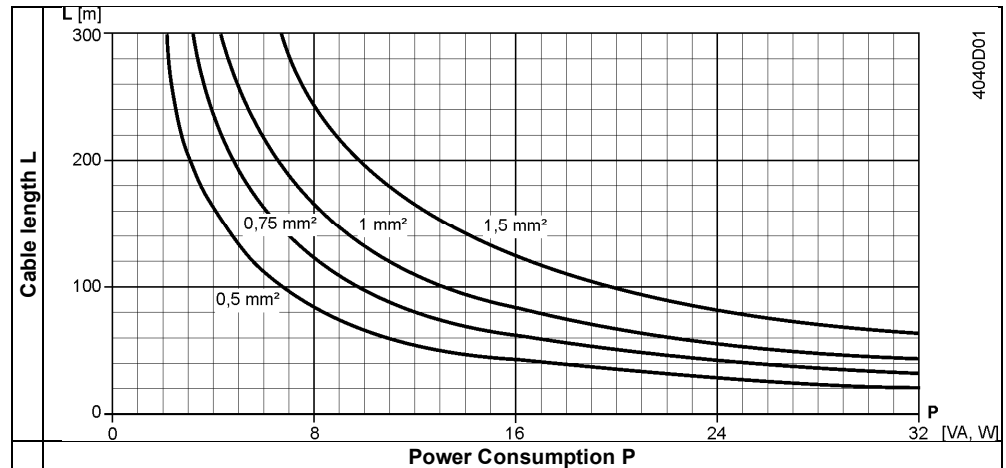
- With modulating control, the permissible positioning signal error must not exceed 1%, the reason being the voltage drop on the G0 wire.
- The voltage drop, caused by charging current peaks in the actuator's DC circuit, must not exceed 2 Vpp.
- If the G0 line is not correctly sized, load changes of 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	$L = 46 \cdot \frac{1313 \cdot A}{P} \text{ [m]}$
AC/DC 24 V	4% of AC 24 V	$L = \frac{1313 \cdot A}{P} \text{ [m]}$
	1% of DC 10 V	$L = \frac{5.47 \cdot A}{I(\text{DC})} \text{ [m]}$

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 10) 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.