ACVATIX^{TM}

Electromotoric actuators

SQL321B..
SQL361B..
SQL351B..

For VKF42.. butterfly valves

- SQL321B.. Operating voltage AC 220 V, 2-position (SPDT) control signal
- SQL361B.. Operating voltage AC 220 V, DC 0…10 V, 4…20 mA control signal
- SQL351B.. Operating voltage AC 220 V, 4…20 mA control signal, fail-in position
- Optional auxiliary switch for SQL361/SQL351B150…B2650
- Nominal angle of rotation 90°
- Handwheel and position indicator
- Built-in heating element to avoid condensation
- Compatible with EN ISO 5211 flanges

Use

For operation of VKF42.. butterfly valves as shutoff and control valves in heating, ventilation and air conditioning plants.

Type summary

Product No.	Stock No.	Operating Voltage	Positioning Signal	Position Feedback Signal	Positioning Time for 90° at 50 Hz [s]	Nominal Torque [Nm]	Flange Connection EN ISO 5211
SQL321B25	S55164-A100	AC 220 V	2-position (SPDT)	Dual auxiliary switch	11	25	F07
SQL361B25	S55164-A113	AC 220 V	DC 0…10 V, 4…20 mA	DC 0…10 V, 4…20 mA Dual auxiliary switch	11	25	F07
SQL351B25	S55164-A114	AC 220 V	4…20 mA	4…20 mA Dual auxiliary switch	11	25	F07
SQL321B50	S55164-A101	AC 220 V	2-position (SPDT)	Dual auxiliary switch	22	50	F07
SQL361B50	S55164-A102	AC 220 V	DC 0…10 V, 4…20 mA	DC 0…10 V, 4…20 mA Dual auxiliary switch	22	50	F07
SQL351B50	S55164-A115	AC 220 V	4…20 mA	4…20 mA Dual auxiliary switch	22	50	F07
SQL321B150	S55164-A103	AC 220 V	2-position (SPDT)	Dual auxiliary switch	39	150	F07
SQL361B150	S55164-A104	AC 220 V	DC 0…10 V, 4…20 mA	DC 0…10 V, 4…20 mA	39	150	F07
SQL351B150	S55164-A116	AC 220 V	4…20 mA	4…20 mA	39	150	F07
SQL321B270	S55164-A105	AC 220 V	2-position (SPDT)	Dual auxiliary switch	39	270	F10
SQL361B270	S55164-A106	AC 220 V	DC 0…10 V, 4…20 mA	DC 0…10 V, 4…20 mA	39	270	F10
SQL351B270	S55164-A117	AC 220 V	4…20 mA	4…20 mA	39	270	F10
SQL321B570	S55164-A107	AC 220 V	2-position (SPDT)	Dual auxiliary switch	47	570	F12/F10
SQL361B570	S55164-A108	AC 220 V	DC 0…10 V, 4…20 mA	DC 0…10 V, 4…20 mA	47	570	F12/F10
SQL351B570	S55164-A118	AC 220 V	4…20 mA	4…20 mA	47	570	F12/F10
SQL321B1400	S55164-A109	AC 220 V	2-position (SPDT)	Dual auxiliary switch	47	1400	F14
SQL361B1400	S55164-A110	AC 220 V	DC 0…10 V, 4…20 mA	DC 0…10 V, 4…20 mA	47	1400	F14
SQL351B1400	S55164-A119	AC 220 V	4…20 mA	4…20 mA	47	1400	F14
SQL321B2650	S55164-A111	AC 220 V	2-position (SPDT)	Dual auxiliary switch	105	2650	F16
SQL361B2650	S55164-A112	AC 220 V	DC 0…10 V, 4…20 mA	DC 0…10 V, 4…20 mA	105	2650	F16
SQL351B2650	S55164-A120	AC 220 V	4…20 mA	4…20 mA	105	2650	F16

Ordering

The actuator, butterfly valve and any accessories must be ordered separately.

When ordering, specify the quantity, product name and product number.

Example

Product No.	Stock No.	Description	Quantity
SQL361B150	S55164-A104	Electromotoric actuator	1
ASC10.21	S55845-Z122	Double auxiliary switch	1

Delivery

The actuator, accessory and butterfly valve are packed separately and delivered as individual items.

Rev. No.

See chapter "Rev. No." on page 13.

Equipment combinations

Butterfly Valve	Electromotoric Actuators [1]						
	SQL321B25 SQL361B25 SQL351B25	SQL321B50 SQL361B50 SQL351B50	SQL321B150 SQL361B150 SQL351B150	SQL321B270 SQL361B270 SQL351B270	SQL321B570 SQL361B570 SQL351B570	SQL321B1400 SQL361B1400 SQL351B1400	SQL321B2650 SQL361B2650 SQL351B2650
	Δp_s [kPa]						
VKF42.50	700						
VKF42.65	700						
VKF42.80	700						
VKF42.100		700					
VKF42.125		700					
VKF42.150		700					
VKF42.200			700				
VKF42.250				700			
VKF42.300				700			
VKF42.350					700		
VKF42.400					700		
VKF42.450						700	
VKF42.500						700	
VKF42.600							700

[1] SQL321B.., SQL361B.. SQL351B.. electromotoric actuators can be mounted directly on VKF42.. butterfly valves.

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

Mechanical design

The actuator is driven by a 2-position (SPDT) or DC 0…10 V, 4…20 mA control signal from the controller and generates a rotary motion which is transferred to the butterfly valve via a driver.

These electromotoric actuators require no maintenance. They have a reversible asynchronous motor which drives the main shaft via gear train, which accommodates the diagonal square head of the butterfly valve. For SQL321B25, the coil spring is fitted with handwheel shaft, handwheel is engaged when pushed in. For others, the worm shaft is fitted with a direct-acting handwheel.

The actuators are 90° rotated so as to work with Siemens VKF42.. butterfly valves. During automatic operation, rotation is stopped by two built-in end-switches.

To prevent the temperature inside the housing from falling below the dew point temperature, the actuators are equipped with a built-in heating element.
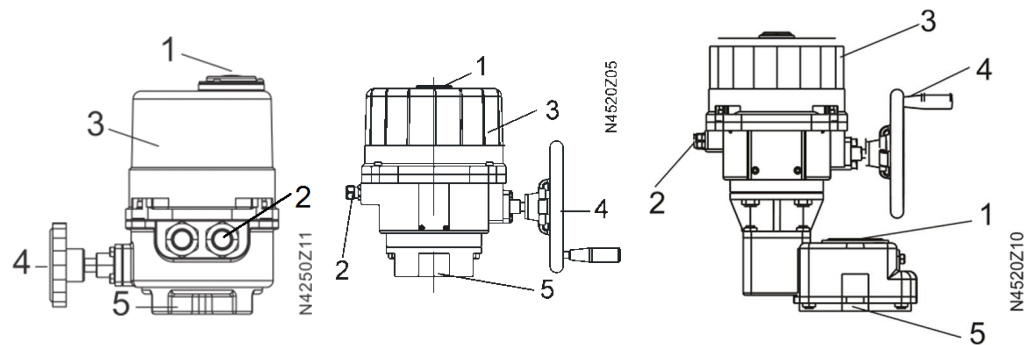
1 Position indication
2 Terminal compartment
3 Cover (motor inside)
4 Handwheel
5 EN ISO 5211 flange connection

3 / 14

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CB1N4520en
2019-10-16

**Calibration
SQL361B.. , SQL351B..**

In order to determine the disc position fully closed "0%" or fully open "100%", calibration is recommended on initial commissioning of modulating type actuator.

Prerequisites
• Actuator is mounted on butterfly valve
• Rotate the actuator to the half-open position using the handwheel
• Housing cover is removed

SQL351/361B25..B50

Calibration	
1. Press button S3 for 5 seconds to start calibration 2. Actuator moves to «100 %» stroke position (valve opened) automatically 3. Actuator moves to «0 %» stroke position (valve closed) automatically 4. Measured values will be saved in microprocessor	Blue LED (D4) turns dark during calibration, the Green LED (D6) with short lit on when reach to «100 %» and the Red LED (D7) with short lit on when reach to «0 %» stroke position
Normal operation	
5. Actuator moves to the position as indicated by Y signals 6. Under the condition of Y signals not connected, actuator moves to «0 %» stroke position (valve closed)	Blue LED (D4) flashes permanently

The calibration can be repeated any number of times.

SQL351/361B150..2650

Prerequisites
• Actuator is mounted on butterfly valve
• Rotate the actuator to the half-open position using the handwheel
• Housing cover is removed

Calibration	
1. Press button S5 for 5 seconds to start calibration 2. Actuator moves to «100 %» stroke position (valve opened) automatically 3. Actuator moves to «0 %» stroke position (valve closed) automatically 4. Measured values will be saved in microprocessor	Red LED turns dark during calibration, with short lit on when reach to «100 %» and «0 %» stroke position
Normal operation	
5. Actuator moves to the position as indicated by Y signals 6. Under the condition of Y signals not connected, actuator moves to «0 %» stroke position (valve closed)	Red LED lit permanently

The calibration can be repeated any number of times.
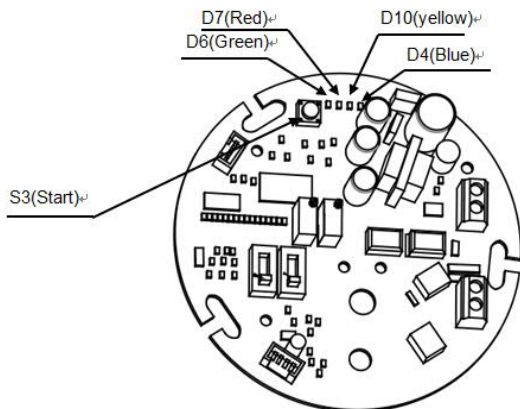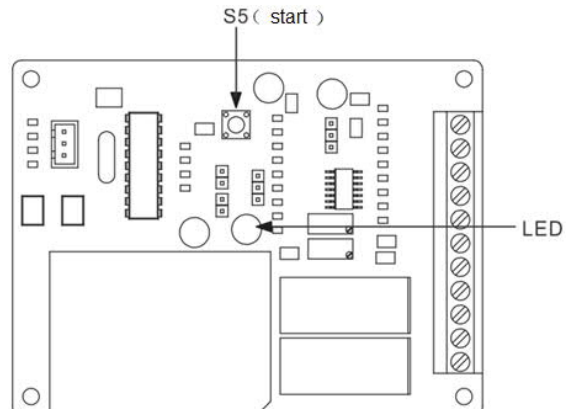

SQL351/361B25..B50   SQL351/361B150..2650

Indication of operating state SQL361B.., SQL351B..

SQL351/361B25..50

The LED display indicating operating status can be viewed by opening the cover of the electronics module.

Function	LED Indication		Remarks, troubleshooting
	D10	**D4**	
Calibration mode	OFF ○	ON ☀	Run calibration, everything ok.[1]
	ON ☀	Flashing ◑	Calibration error.
Control mode	OFF ○	Flashing ◑	Automatic operation; everything o.k.[1],[2]
	ON ☀	Flashing ◑	Internal error, troubleshooting
	OFF ○	OFF ○	No power Troubleshooting, eventually replace actuator

As a general rule, the LED can assume only the states shown above (continuously red, flashing, or off).

[1] The Green LED (D6) with short lit on when reach to «100 %» and the Red LED (D7) with short lit on when reach to «0 %» stroke position.

[2] When power supply to actuator but no Y control signal and also calibration not started, LED will be continuously red too.

SQL351/361B150..2650

Function	LED Indication		Remarks, troubleshooting
Calibration	Off	○	Run calibration, everything o.k.
	Flashing	◑	Calibration error
Control mode	Lit	☀	Automatic operation; everything o.k.[1]
	Flashing	◑	Internal error, troubleshooting
	Off	○	No power Troubleshooting, eventually replace actuator
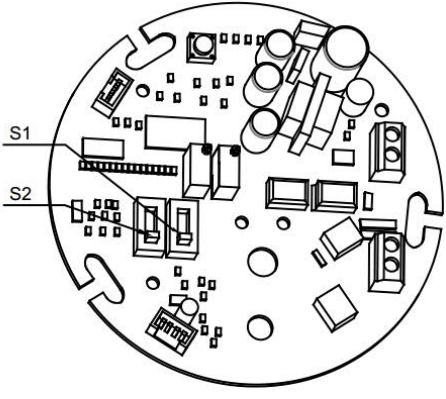
As a general rule, the LED can assume only the states shown above (continuously red, flashing, or off).

[1] When power supply to actuator but no Y control signal and also calibration not started, LED will be continuously red too.

0..10V and 4..20 mA signal SQL361B.., SQL351B..

- Factory setting for input and output signal in SQL361B.. is 0..10 V.
- Factory setting for input and output signal in SQL351B.. is 4..20 mA
  *Fail-in position not available at input signal 0..10 V.
- Select switch as below description.

SQL351/361B25..50

Signal	Input	Output	
	S1	**S2**	
0…10 V	▣	▣	
4…20 mA	▣	▣	

SQL351/361B150..2650

Input signal	S2	S1
0…10 V*	0…10 V	plug
4…20 mA	4…20 mA	unplug

Output signal	S3	S4
0…10 V*	0…10 V	unplug
4…20 mA	4...20 mA	unplug

* Factory setting

Accessories

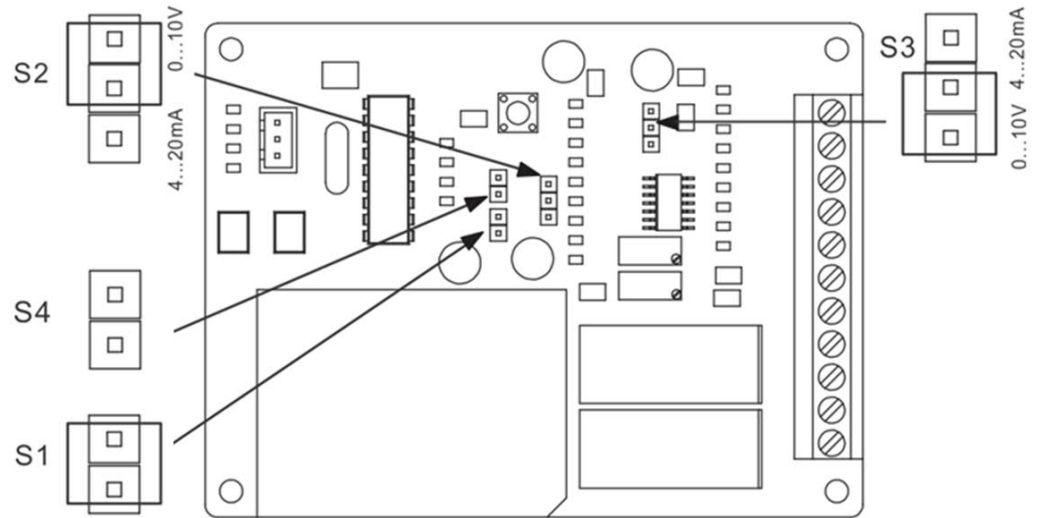| Product No.	Stock No.	Figure	Description	For Actuators
ASC10.21	S55845-Z122	N4520Z01	Double auxiliary switch	SQL361B150
				SQL361B270
				SQL361B570
				SQL361B1400
				SQL361B2650
				SQL351B150
				SQL351B270
				SQL351B570
				SQL351B1400
				SQL351B2650

Engineering notes

Electrical installation

The actuators must be electrically connected in accordance with local regulations and with the connection diagrams.

Warning ⚠ **Regulations and requirements to ensure the safety of people and property must be always observed.**

Mounting notes

Mounting instructions

Product No.	Documentation No.
VKF42..	74 319 0808 0 (M4119)
SQL321B.. / SQL361B../SQL351..	74 319 0809 0 (M4520)
ASC10..	74 319 0810 0 (M4520.1)

SQL321B..,
SQL361B..,
SQL351B..

These actuators can be mounted directly on type VKF42.. butterfly valves.
The butterfly valves have to be closed "0%" when the actuators are mounted onto the valves.

| **Orientation** | The valve and actuator can be assembled on site. There is no need for special tools. |
| | |
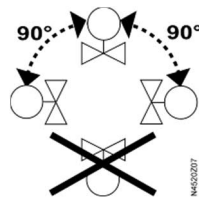
Upright to horizontal

Commissioning notes

| **Warning** ⚠ | When commissioning the motorized butterfly valves, always check wiring and test the functions. This also applies to any additional components fitted, e.g. auxiliary switch.

To avoid pressure shocks on the butterfly valve, the VKF42.. must be driven to its fully open position either manually or via positioning signal prior to activating the pump(s).

The flow rate can be adjusted either by operating the electric actuators when necessary, or by operating the handwheel. |

Operating notes

Manual operation mode	SQL321B25…B50 SQL361B25…B50 SQL351B25…B50	Handwheel is engaged by pushing the handwheel in.
	SQL321B150…B2650 SQL361B150…B2650 SQL351B150…B2650	The handwheel is always engaged.

Reversing the direction of rotation	If the direction of rotation needs to be reversed, simply exchange the connections Y12 and Y14.
Setting the angle of rotation	The 0...90° angle of rotation for the mechanical limit switches is factory-set and cannot be changed.

The potential-free auxiliary switches are equipped with adjustable switching points. |

Maintenance notes

| **Warning** ⚠ | The actuators and butterfly valves require no maintenance.

Before performing any service work on the valve or actuator:
- Switch off the pump and power supply
- Close the main shut-off valves in the pipe work
- Release pressure in the pipes and allow them to cool down completely
If necessary, disconnect electrical connections from terminals.

The valve must be re-commissioned only with the handwheel or the actuator correctly assembled. |

Disposal

The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive 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.

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

Technical data

		SQL321B25 SQL361B25 SQL351B25	SQL321B50 SQL361B50 SQL351B50	SQL321B150 SQL361B150 SQL351B150	SQL321B270 SQL361B270 SQL351B270	SQL321B570 SQL361B570 SQL351B570	SQL321B1400 SQL361B1400 SQL351B1400	SQL321B2650 SQL361B2650 SQL351B2650
Power supply	Operating voltage Voltage tolerance			AC 220 V / 1 phase +/- 10%				
	Frequency			50 / 60 Hz				
	Power consumption [1]	45 VA	45 VA	91 VA	165 VA	194 VA	390 VA	436 VA
Signal inputs	Positioning signal SQL321.. SQL361.. SQL351..			2-position (SPDT) DC 0…10 V / 4…20 Ma 4…20 mA				
	Parallel operation			For SQL321B.., it is not possible for electrical parallel operation of several actuators. For SQL361B.., SQL351B.., electrical parallel operation of several actuators is possible, and the specific quantity of actuator depends on the controller output.				
	Position feedback SQL321.. SQL361.. B25..B50 B150.., B2650 SQL351.. B25..B50 B150.., B2650			Dual auxiliary switch (built-in) DC 0…10 V / 4…20 mA , Dual auxiliary switch (built-in) DC 0…10 V / 4…20 mA 4…20 mA , Dual auxiliary switch (built-in) 4…20 mA				
Operating data	Positioning time for 90° at 50 Hz	11 s	22 s	39 s	39 s	47 s	47 s	105 s
	Angle of rotation			90° ± 1° (factory setting)				
	Nominal Torque [1]	25 Nm	50 Nm	150 Nm	270 Nm	570 Nm	1400 Nm	2650 Nm
	Switching capacity	AC 250 V, 5 A resistive		AC 250 V, 10 A resistive				
	Heating element (built-in)	220 V 2.0 W		220 V 7.5 W	220 V 8.5 W			
	Max. permissible medium temperature			-10…80 °C				
Degree of protection	Housing upright to horizontal			IP67 as per EN 60529				
	Insulation class			Class I as per EN 60730				
Standards	EU conformity (CE)			A5W90000890*				
	RCM conformity			A5W90000886*				
Environmental compatibility				The product environmental declaration CB1E4520en* contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).				
	Flange / shaft connection types to valve (top flange)	EN ISO 5211						
		F07			F10	F12/F10	F14	F16
Dimension weight	Dimensions			see "Dimensions", page 11, 12				
	Weight			see "Dimensions", page 11, 12				
	Cable glands	2 x Pg 13.5			2 x Pg 16			
Materials	Housing base, yoke	Die-cast aluminum alloy						Housing: Die-cast aluminum alloy Gear box: Cast Iron
	Cover			Die-cast aluminum alloy				

[1]   These values apply at nominal voltage, ambient temperature of 20 °C and at nominal running time.

*   The documents can be downloaded from http://siemens.com/bt/download.

General ambient conditions

	Operation EN 60721-3-4	Transport EN 60721-3-2	Storage EN 60721-3-1
Environmental conditions	Class 4K1	Class 2K2	Class 1K3
Temperature	-20...65 °C	-30...65 °C	-5...55 °C
Humidity	15...100% r. h.	<95% r. h.	0...95% r. h.

Internal diagrams

SQL321..
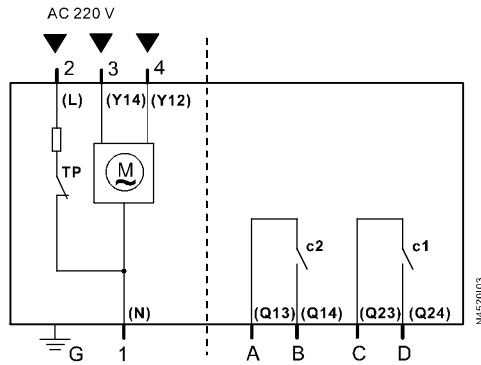
Pin	Terminal no.	Code	Meaning
Actuator AC 220 V	G	-	Grounding
	1	N	System neutral
	2	L	System potential, AC 220 V
	3	Y14	AC 220 V, control signal (open)
	4	Y12	AC 220 V, control signal (closed)
Auxiliary signal feedback	A	Q13	Auxiliary switch c2, open
	B	Q14	Auxiliary switch c2, open
	C	Q23	Auxiliary switch c1, close
	D	Q24	Auxiliary switch c1, close

SQL361B25
SQL361B50
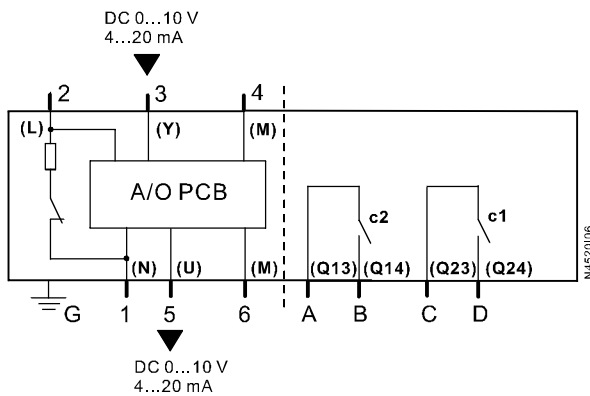
SQL351B25
SQL351B50
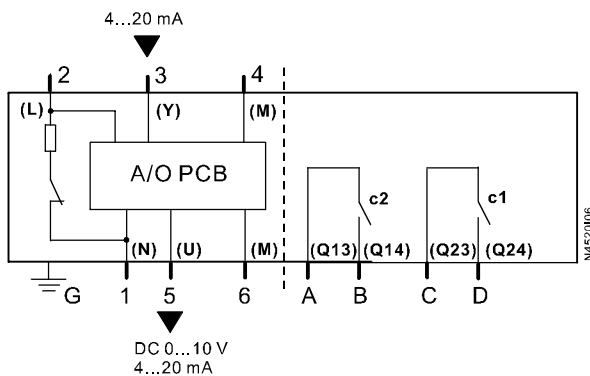
SQL361B150…
B2650

Accessory

ASC10.21

DC 0…10 V
4…20 mA

DC 0…10 V
4…20 mA

SQL351B150…

B2650

4…20 mA

DC 0…10 V
4…20 mA
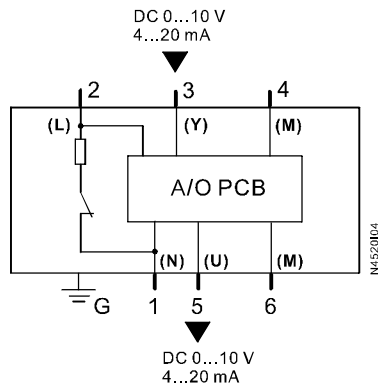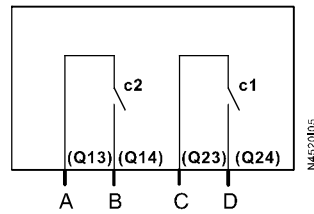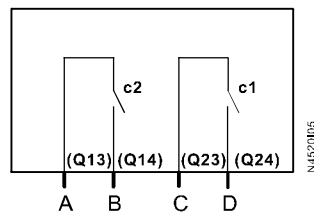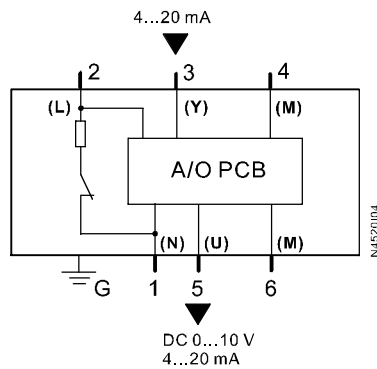
Pin	Terminal no.	Code	Meaning
Actuator AC 220 V	G	-	Protective earth
	1	N	Neutral
	2	L	System potential, AC 220 V
	3	Y	Positioning signal, DC 0…10 V, 4…20 mA (SQL361B..) Positioning signal, 4…20 mA (SQL351B..)
	4, 6	M	Measuring neutral
	5	U	Position feedback, DC 0…10 V, 4…20 mA
Auxiliary signal feedback	A	Q13	Auxiliary switch c2, open
	B	Q14	Auxiliary switch c2, open
	C	Q23	Auxiliary switch c1, close
	D	Q24	Auxiliary switch c1, close

Connection diagrams

SQL321B..
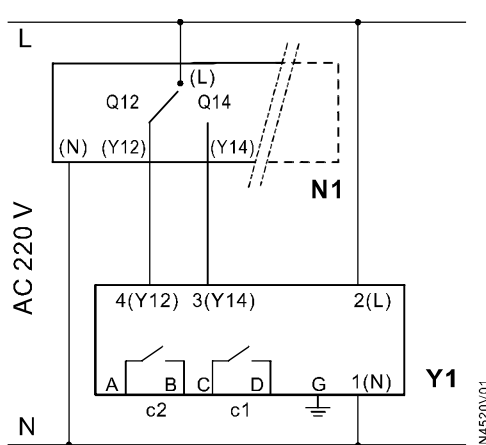
N1	Controller
Y1	Actuator
L	1 phase AC 220 V
N	Neutral
Q12, Q14	Controller contacts
Y12	Positioning signal (Closed)
Y14	Positioning signal (Open)
c1	Auxiliary dry contact switch, close
c2	Auxiliary dry contact switch, open

SQL361B..,
SQL351B..
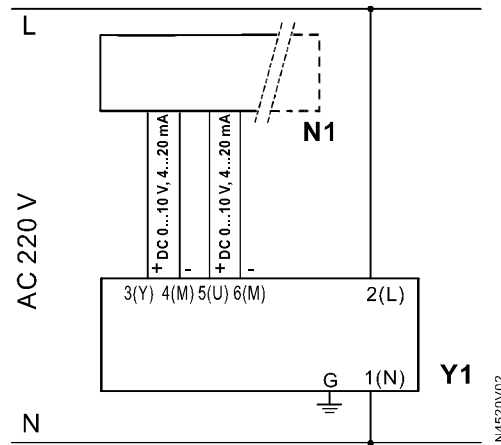
N1	Controller
Y1	Actuator
L	1 phase AC 220 V
N	Neutral
Y	Positioning signal DC 0...10 V, 4…20 mA (SQL361B..) Positioning signal 4…20 mA (SQL351B..)
M	Measuring neutral
U	Position feedback signal DC 0…10 V, 4…20 mA (SQL361B..) Position feedback signal 4…20 mA (SQL351B..)

Diagram labels:

L

N1

AC 220 V

DC 0...10 V, 4...20 mA   DC 0...10 V, 4...20 mA

3(Y) 4(M) 5(U) 6(M)   2(L)

G   1(N)   Y1

N

N4520V02

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Electromotoric actuators

Dimensions (mm)
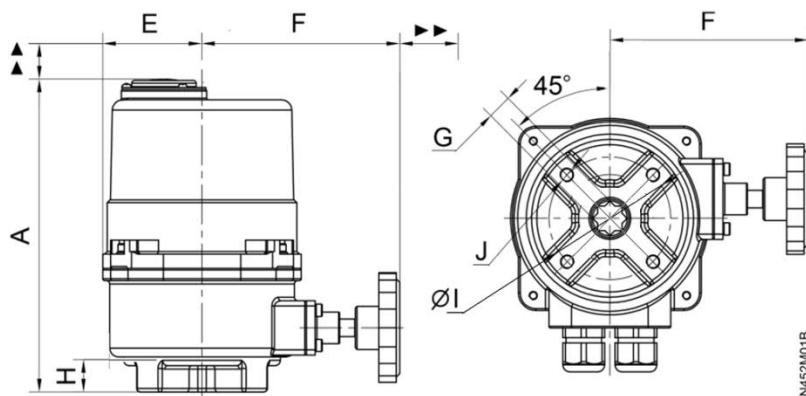
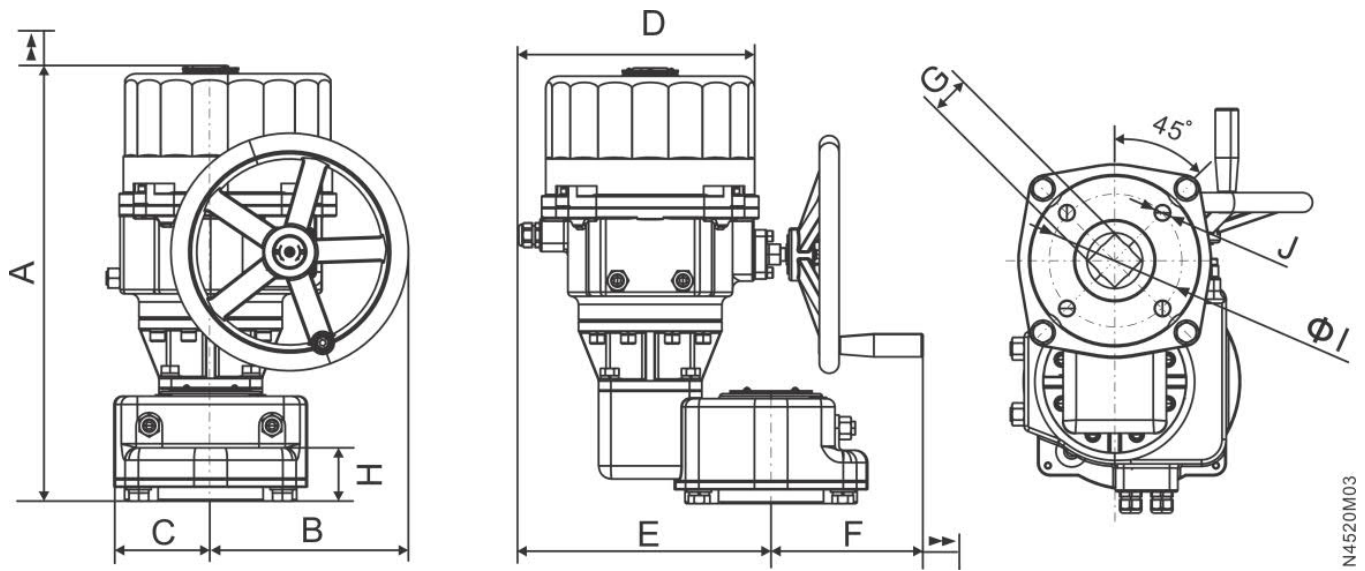| Product No.	A	E	F	H	G □	Ø I	J	Weight [kg]	EN ISO 5211
SQL321B25	179	57	114	20	11	70	4-M8	3.6	F07
SQL361B25	209	57	114	20	11	70	4-M8	3.8	F07
SQL351B25	209	57	114	20	11	70	4-M8	3.8	F07
SQL321B50	179	57	114	20	17	70	4-M8	3.6	F07
SQL361B50	209	57	114	20	17	70	4-M8	3.8	F07
SQL351B50	209	57	114	20	17	70	4-M8	3.8	F07
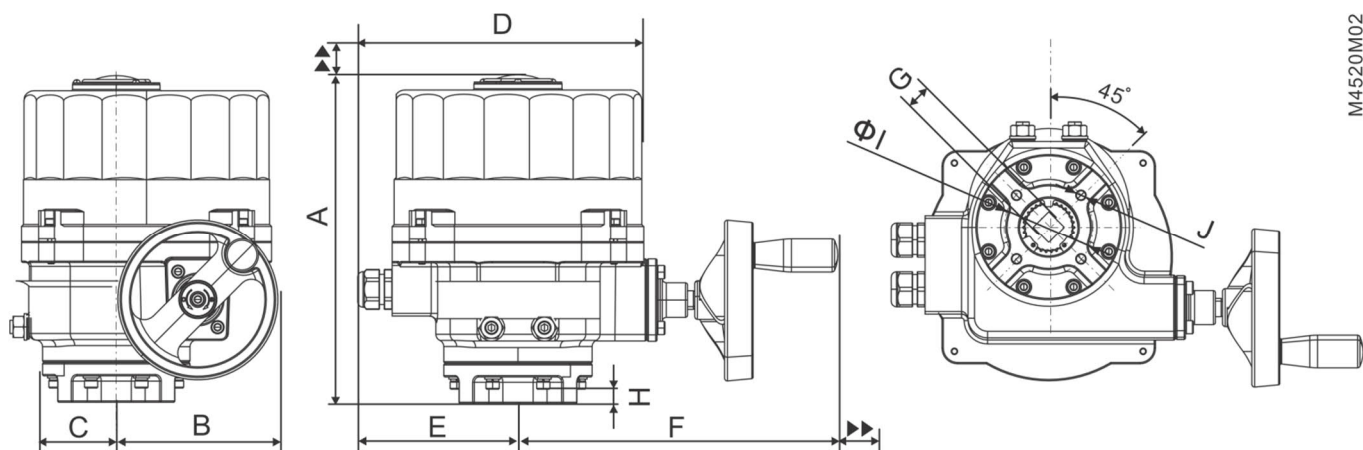
Product No.	A	B	C	D	E	F	G	H	Ø I	J	Weight [kg]	EN ISO 5211
SQL321B150 SQL361B150 SQL351B150	250	125	77	216	120	240	17	35	70	4-M8	11	F07
SQL321B270 SQL361B270 SQL351B270	307	187	105	260	145	280	22	55	102	4-M10	22	F10
SQL321B570 SQL361B570 SQL351B570	307	187	105	260	145	280	27	55	125 102	4-M12 4-M10	22	F12/F10
SQL321B1400 SQL361B1400 SQL351B1400	310	242	119	293	161	346	36	65	140	4-M16	36	F14

Product No.	A	B	C	D	E	F	G	H	Ø I	J	Weight [kg]	EN ISO 5211
SQL321B2650 SQL361B2650 SQL351B2650	532	118	242	295	308	186	46	85	165	4-M20	76	F16

▲▲ ►►   ⩾ 200 mm: For mounting, connection, operation, service, etc.

Revision numbers

Product No.	Valid from Rev. No.	Product No.	Valid from Rev. No.
SQL321B25	..D	SQL361B25	..A
SQL321B50	..E	SQL361B50	..E
SQL321B150	..D	SQL361B150	..D
SQL321B270	..D	SQL361B270	..D
SQL321B570	..D	SQL361B570	..D
SQL321B1400	..D	SQL361B1400	..D
SQL321B2650	..D	SQL361B2650	..D
SQL351B25	..A		
SQL351B50	..A		
SQL351B150	..A		
SQL351B270	..A		
SQL351B570	..A		
SQL351B1400	..A		
SQL351B2650	..A		

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