



Electromotoric Actuators

for valves with 20 mm stroke

SQX32...
SQX82...
SQX62

- **SQX32...** operating voltage AC 230 V, 3-position control signal
- **SQX82...** operating voltage AC 24 V, 3-position control signal
- **SQX62** operating voltage AC 24 V, DC 0...10 V and / or 0...1000 Ω, DC 4...20 mA control signal
- **Positioning force 700 N**
- **Direct mounting on valve, no adjustments required**
- **Optional auxiliary switch or potentiometer**
- **Manual adjustment and position indication**
- **SQX82...U and SQX62U are UL approved**

Use

For operation of Siemens 2-port and 3-port valves of type series VVF..., VVG41..., VXF... and VXG41... with 20 mm stroke for water-side control of chilled water, low-temperature hot water and high-temperature hot water in heating, ventilation and air conditioning systems.

Type summary

Type reference	Operating voltage	Positioning signal	Positioning time (opening and closing)
SQX32.00	AC 230 V	3-position	150 s
SQX32.03			35 s
SQX82.00	AC 24 V		150 s
SQX82.03			35 s
SQX62		DC 0...10 V and / or 0...1000 Ω , DC 4...20 mA	35 s

Special UL approved versions of SQX82... and SQX62 available, type suffix U (e.g. SQX62U)

Accessories

Type reference	Description	For actuators	Mounting location ¹⁾
ASC9.5	Auxiliary switch	SQX32..., SQX82...	1 x ASC9.5 or
ASC9.4	Auxiliary switch pair		1 x ASZ7.4 or
ASZ7.4	Auxiliary switch and potentiometer 1000 Ω		1 x ASC9.4
ASZ6.5	Stem heating AC 24 V	SQX32..., SQX82..., SQX62	1 x ASZ6.5

¹⁾ Only 1 accessory can be built into the actuator at a time.
Exception: ASZ6.5 stem heating which is integrated between the actuator and the valve.

Order

When ordering, please give the quantity, product name, type reference, and any accessories required.

Example: 20 actuators SQX32.00 and
20 auxiliary switches ASC9.5

Delivery

Actuators, valves and accessories are supplied in separate packages.

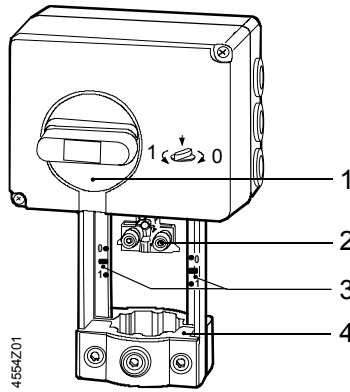
Equipment combinations

The actuators are suitable for operation of the following Siemens two-port and three-port valves:

Type reference		DN	PN class	k_{vs} [m ³ /h]	Data sheet
2-port valves VV... (control or safety shutoff valves)					
VVF21...	flange	25...80	6	1.9...78	N4310
VVF31...	flange		10	5...78	N4320
VVF40...	flange	15...80	16	1.9...78	N4330
VVF41...	flange	50		19 / 31	N4340
VVG41...	thread	15...50		0.63...40	N4363
VVF52...	flange	15...40	25	0.16...25	N4373
3-port valves VX... (control valves for «mixing» and «diverting» functions)					
VXF21...	flange	25...80	6	1.9...78	N4410
VXF31...	flange		10	5...78	N4420
VXF40...	flange	15...80	16	1.9...78	N4430
VXF41...	flange	15...50		1.9...31	N4440
VXG41...	thread			1.6...40	N4463

See the associated valve data sheets for permissible differential and close-off pressures Δp_{max} and Δp_s of the complete valve-actuator-unit.

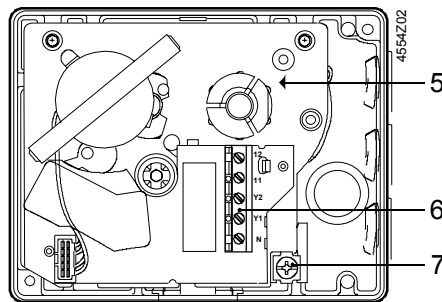
Design



SQX32..., SQX82..., SQX62:

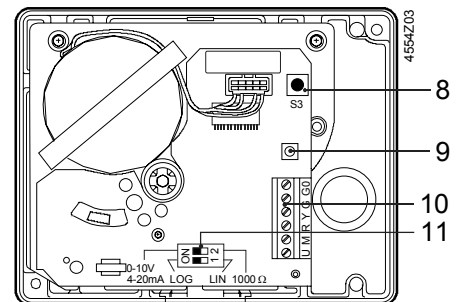
- 1 Manual adjuster
- 2 Coupling to valve stem
- 3 Position indication (from 0 to 1)
- 4 Console

SQX32..., SQX82...:



- 5 Mounting position for auxiliary switch or auxiliary switch pair or auxiliary switch and potentiometer
- 6 Terminal strip
- 7 Bonding screw (for SQX32...)

SQX62:



- 8 Button S3 (calibration)
- 9 LED, red / green (operating status indication)
- 10 Terminal strip
- 11 DIL switches
switch S1: change-over flow characteristic «LOG» / «LIN» *)
switch S2: change-over signal R «0-10 V, 4-20 mA» / «1000 Ω» *)
*) bold print = factory setting

SQX32..., SQX82...
3-position control signal

The reversible synchronous motor is controlled by a 3-position signal either via terminals Y1 or Y2 and generates the desired stroke by means of a blocking-proof gear train and a gear rack.

- Voltage on Y1: actuator stem extends, valve opens
- Voltage on Y2: actuator stem retracts, valve closes
- No voltage on Y1 and Y2: actuator stem remains in the respective position

SQX62
Y, R signals:
DC 0...10 V and/or
0...1000 Ω, DC 4...20 mA

The SQX62 is either controlled via terminals Y and/or R. The recorded positioning signals control the synchronous motor by means of microprocessor electronics. This motor generates the desired stroke via a blocking-proof gear train and gear rack.

- Signal Y, R increasing: actuator stem extends, valve opens
- Signal Y, R decreasing: actuator stem retracts, valve closes
- Signal Y, R constant: actuator stem remains in the respective position

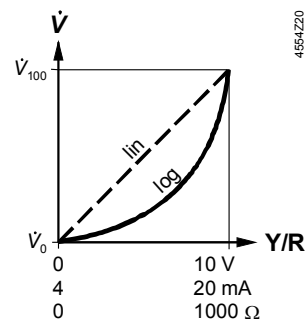
Selection of flow characteristic (S1)

Via DIL switch S1 the flow characteristics can be changed from «equal percentage» (factory setting, S1 = ON) to «linear».





DIL switch S1	factory setting	4554Z21	4554Z22
	«equal percentage»	log	«linear» lin

Relationship between the Y, R signals and the volumetric flow:



Selection of positioning signals (S2)



DIL switch S2	factory setting		
Positioning signal Y	DC 0...10 V	DC 0...10 V	
Signal R		0...1000 Ω	DC 4...20 mA 0...1000 Ω
Position / stroke	The Y positioning signal is valued.	Maximum selection of signals Y and R, i.e. the higher signal is valued.	The R signal is valued. The R signal is valued.
Position feedback U	DC 0...10 V	DC 0...10 V	DC 4...20 mA DC 0...10 V

Calibration SQX62

In order to determine the stroke positions 0 % and 100 % in the valve, calibration is required on initial commissioning:

Prerequisites

- Mechanical coupling of the actuator SQX62 with valve
- AC 24 V supply
- Housing cover removed

Calibration

1. Pressing button S3 starts calibration 2. Actuator moves to «0 %» stroke position (valve closed) 3. Actuator moves to «100 %» stroke position (valve open) 4. Measured values saved in microprocessor	green LED flashes position feedback U inactive
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Normal operation

5. Actuator moves to the position as indicated by signals Y or R	green LED is lit permanently, position feedback U active, the values correspond to the actual positions
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A flashing red LED indicates a calibration error.
The calibration can be repeated any number of times.

Indication of operating state SQX62

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

LED	Indication	Function	Remarks, troubleshooting
Green	Lit 	Control mode	Automatic operation; everything o.k.
	Flashing 	Calibration	Wait until calibration is finished (green or red LED will be lit)
Red	Lit 	Internal error	Troubleshooting, ev. replace actuator
	Flashing 	Calibration error	Troubleshooting, recalibrate (operate button S3 1x)
Both	Dark 	No power supply Electronics faulty	Check mains network, check wiring Replace actuator

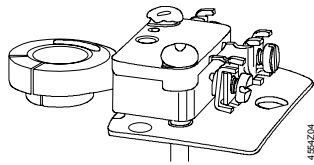
As a general rule, the LED can assume only the states shown above (continuously red or green, flashing red or green, or off).

Features and advantages SQX...

- Maintenance-free, electromotoric actuator
- Reversible synchronous motor
- Blocking-proof gear train with self-lubricating porous bearings
- Load-dependent switch-off in stroke limit positions
- Manual adjustment with automatic reset to control mode

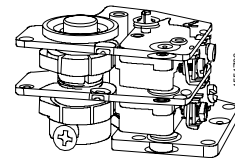
Accessories

Auxiliary switch **ASC9.5:**



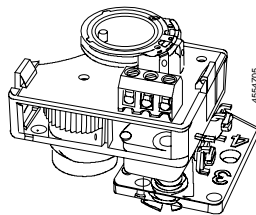
Adjustable switching point

Auxiliary switch pair **ASC9.4:**



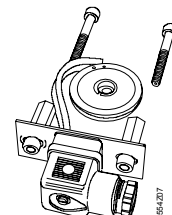
Adjustable switching point

Auxiliary switch with potentiometer **ASZ7.4:**



Adjustable switching point

Stem heating **ASZ6.5:**



For media below 0 °C.
Mounting between valve and actuator

See section «Technical data» for more information.

Engineering notes

Conduct the electric connections in accordance with local regulations on electric installations as well as the internal or connecting diagrams.

Caution ⚠

Safety regulations and restrictions designed to ensure the safety of people and property must be observed at all times!

Caution ⚠

For media below 0 °C the ASZ6.5 stem heating is required to keep the valve from freezing. For safety reasons the stem heating is designed for an operating voltage of AC 24 V / 30 W.

For this case, do not insulate the actuator console and the valve stem, as air circulation must be ensured. Do not touch the hot parts without prior protective measures to avoid burns.

Non-observance of the above may result in accidents and fires!

Admissible temperatures, refer to «Technical data»

If an auxiliary switch is required, its switching point should be indicated on the plant schematic.

3-position control

Every actuator must be driven by a dedicated controller (refer to «Connection diagrams»).

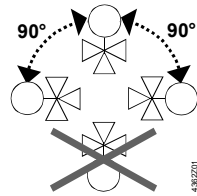
Mounting notes

The mounting/operating instructions are printed on the rear of the actuator housing. Accessory instructions are located in the respective accessory's packaging.

Accessories	Installation instructions	
ASC9.5	G4506.7	4 319 5557 0
ASC9.4	G4506.5	4 319 5537 0
ASZ7.4	G4506.6	4 319 5538 0

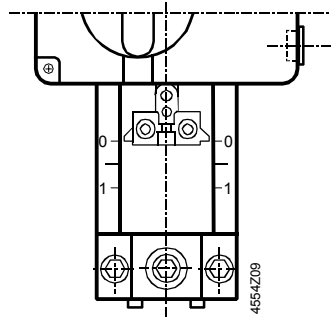
Accessory	Mounting instructions	
ASZ6.5	M4563.7	4 319 5564 0

Orientation

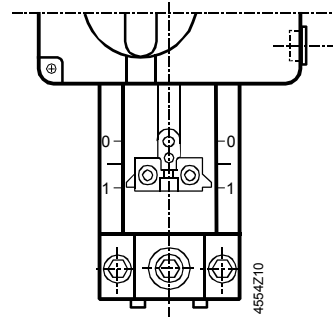


Commissioning notes

During commissioning, check the wiring, conduct a functional check and calibration (SQX62, refer to page 4). Additionally, check or make the required settings at the auxiliary switch or the auxiliary switch pair.



Coupling fully retracted



Coupling fully extended

Manual adjustment

Switch off positioning signal. If the manual adjuster is turned clockwise to the end position, the valve is closed (stroke = 0 %).

On pending controller signals, the actuator always moves to the preselected position as soon as the manual adjustment button is released.

Maintenance notes

The SQX... actuators are maintenance-free.

When servicing the actuator:

- Switch off pump and power supply
- Close the main shutoff valve in the pipework
- Release pressure in the pipes and allow them to cool down completely
- If necessary, disconnect electrical connections from the terminals

The actuator must be correctly fitted to the valve before recommissioning.

Recommendation: trigger calibration (SQX62, refer to page 4).

Repair

The actuator can not be repaired. It has to be replaced as a complete unit.

Disposal



The device contains electrical and electronic components and must not be disposed of together with domestic waste. This applies in particular to the PCB.

Legislation may demand special handling of certain components, or it may be sensible from an ecological point of view.

Current local legislation must be observed.

Warranty

The technical data relating to specific applications are valid only in conjunction with the valves listed in this Data Sheet under «Equipment combinations».

The use of the actuators in conjunction with third-party valves invalidates all claims under Siemens Switzerland Ltd / HVAC Products warranty.

Technical data

		SQX32.00 SQX32.03	SQX82.00 SQX82.03	SQX62
Power supply	Operating voltage	AC 230 V ± 15 %	AC 24 V ± 20 %	
	Frequency	50 / 60 Hz		
	Power consumption at 50 Hz	SQX32.00: 3.5 VA SQX32.03: 6.5 VA	6.5 VA	8 VA
	End switches switching capacity, terminals 11 or 12	AC 250 V, 6 A resistive, 2.5 A inductive	AC 24 V, 5 A resistive, 0.75 A inductive	
Signal inputs	Terminals Y1, Y2	3-position		
	Terminal Y ¹⁾		Voltage Current	DC 0...10 V max. 0.1 mA / 5 nF
	Terminal R ¹⁾		Current Max. impedance Resistance	DC 4...20 mA 250 Ω / 5 nF 0...1000 Ω
Position feedback	Terminal U ²⁾		Voltage Current	DC 0...10 V, max. 9.7 V ± 0,2 V DC 4...20 mA, max. 20 mA
	Parallel operation of actuators			max. 10
Operating data	Positioning time at 50 Hz	SQX32.00: 150 s SQX32.03: 35 s	SQX82.00: 150 s SQX82.03: 35 s	35 s
	Positioning force	700 N		
	Nominal stroke	20 mm		
	Admissible medium temperature	in assembled valve -25...140 °C (180 °C)		
	Cable entry	3 openings Ø20.5 mm (for M20)		
Electrical connections	CE-conformity	EMC directive		89/336/EEC
	Norms and standards	Low-voltage directive		73/23/EEC
UL conformity declaration		UL873		
Housing protection standard		IP 54 to EN 60529		
Dimensions / Weight	Dimensions	refer to «Dimensions»		
	Weight with packaging	1.7 kg		
Materials	Actuator housing and console	Die-cast aluminium		
	Housing box and manual adjuster	Plastic		
Accessories				
ASC9.5 auxiliary switch	Switching capacity	AC 250 V, 10 A resistive, 3 A inductive		
ASC9.4 auxiliary switch pair	Switching output of one auxiliary switch			
ASZ7.4 auxiliary switch and potentiometer (as one unit)	Switching output of auxiliary switch			
	Change of overall resistance of the potentiometer at nominal stroke 20 mm	0...1000 Ω (corresponds to 0...100 % stroke)		
ASZ6.5 stem heating	Operating voltage	AC 24 V		
	Power consumption	30 W		

Caution

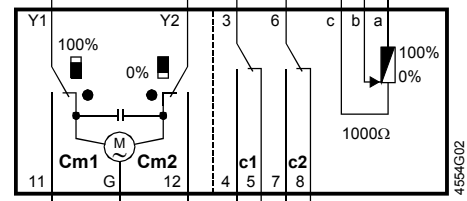
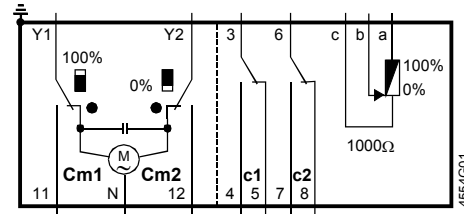
- ¹⁾ If a DC 4...20 mA control signal is switched to terminal R, terminal Y cannot be used simultaneously! Maximum selection of signals Y and R for positioning.
- ²⁾ The position feedback U corresponds to the stroke position.

General environmental conditions

	Operation EN 60721-3-3	Transport EN 60721-3-2	Storage EN 60721-3-1
Environmental conditions	Class 3K5	Class 2K3	Class 1K3
Temperature	-15...+50 °C	-30...+65 °C	-15...+50 °C
Humidity	5...95 % r.F.	< 95 % r.F.	5...95 % r.F.

Internal diagrams

**SQX32...
SQX82...**



SQX32...
AC 230 V, 3-position

- Cm1 end switch 100 %
- Cm2 end switch 0 %
- c1 auxiliary switch ASC9.5
- c1 } [auxiliary switch
- c2 } [pair ASC9.4
- c1 } [auxiliary switch and potentiometer (1000 Ω) ASZ7.4

SQX82...
AC 24 V, 3-position

- Possible mounting location for SQX32..., SQX82... accessories:
- 1 auxiliary switch ASC9.5 **or**
 - 1 auxiliary switch pair ASC9.4 **or**
 - 1 auxiliary switch and potentiometer (as one unit) ASZ7.4 **and**
 - 1 **additional** stem heating ASZ6.5

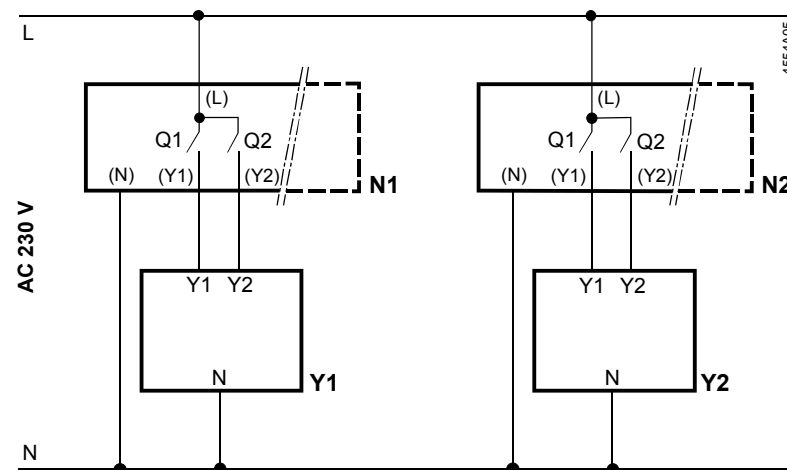
Connection terminals SQX62

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

- G0** System neutral (SN)
- G** System potential (SP)
- Y** Positioning signal for DC 0...10 V signal
- R** Signal for DC 4...20 mA signal or 0...1000 Ω (signal type is defined at DIL switch S2!)
- M** Measuring neutral
- U** Position feedback U = DC 0...10 V when Y = DC 0...10 V resp. R = 0...1000 Ω or U = DC 4...20 mA when R = DC 4...20 mA

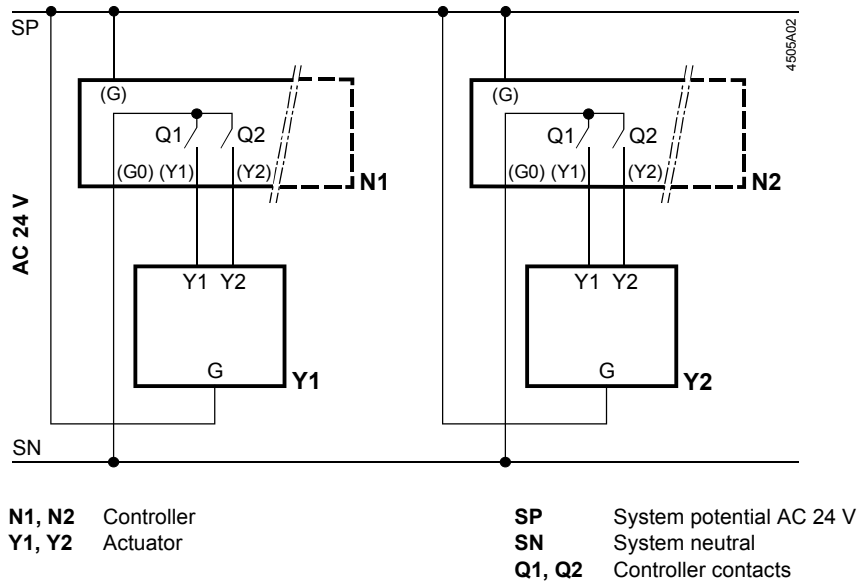
Connection diagrams

SQX32...



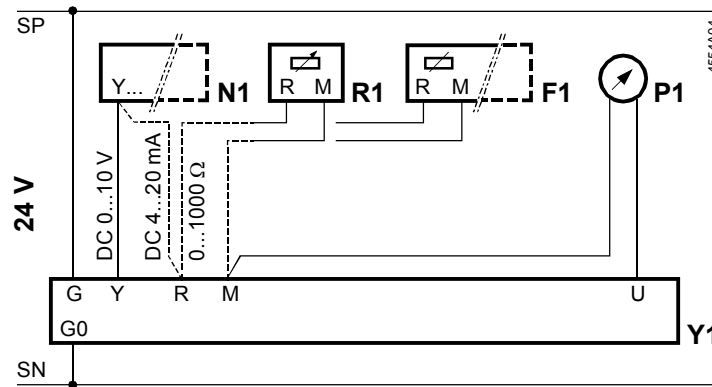
- N1, N2** Controller
- Y1, Y2** Actuator
- L** System potential AC 230 V
- N** System neutral
- Q1, Q2** Controller contacts

SQX82...



SQX62

The connection diagram shows all possible connections. The amount and type of connection depends on the plant.

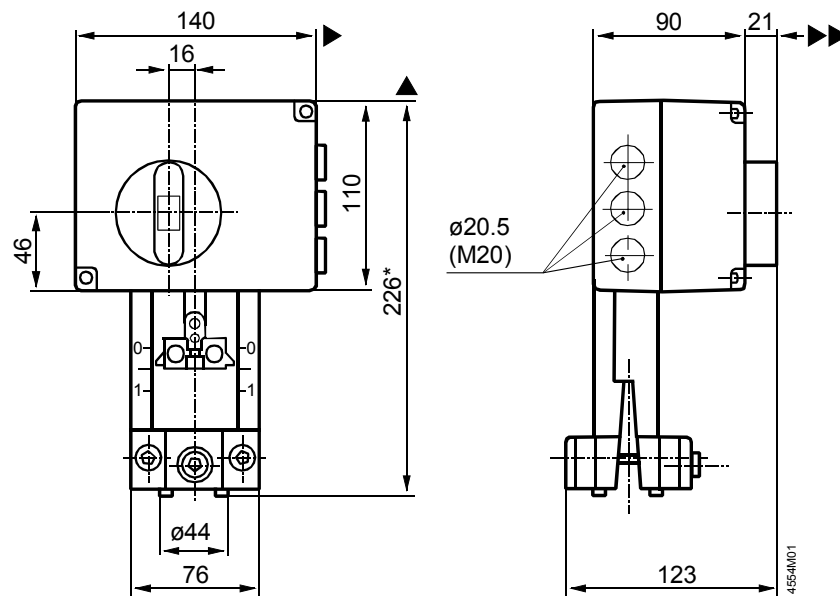


DIL switch S2				
Positioning signal Y	DC 0...10 V	DC 0...10 V		
Signal R		0...1000 Ω ¹⁾	DC 4...20 mA	0...1000 Ω
Position feedback U	DC 0...10 V	DC 0...10 V	DC 4...20 mA	DC 0...10 V

¹⁾ Use with frost protection monitor

Dimensions

Dimensions in mm



* Actuator height from valve

▶ > 100 mm

▶▶ > 200 mm

Minimum mounting distance to wall or ceiling, for mounting, connection, operation, maintenance etc.