



## Electro-hydraulic actuators for valves

with 20 mm stroke

**SKD32..E**  
**SKD62E**  
**SKD329.51**

- **SKD32..E** Operating voltage AC 230 V, 3-position control signal
- **SKD329.51** Operating voltage AC 230V, 3-position control signal
- **SKD62E** Operating voltage AC 24 V, control signal DC 0...10 V, 4...20 mA or 0...1000 Ω
- **SKD62E** Choice of flow characteristic, position feedback, stroke calibration, LED status indication, override control
- **Positioning force 1000 N**
- **Actuator versions with or without spring-return function**
- **For direct mounting on valves; no adjustments required**
- **Manual adjuster and position indicator**
- **Optional functions with auxiliary switches, potentiometer, stem heater and mechanical stroke inverter**

### Use

For the operation of Siemens 2-port and 3-port valves of type series VVF..., VVG..., VXF.. and VXG.. with 20 mm stroke as control and safety shut-off valves in heating, ventilation and air conditioning systems.

## Types

Type	Operating voltage	Positioning signal	Spring-return		Positioning time	
			Function	Time	Opening	Closing
<b>SKD32.50E</b>	AC 230 V	3-position			120 s	120 s
<b>SKD32.21E</b>			yes	8 s	30 s	10 s
<b>SKD329.51</b>					120 s	120 s
<b>SKD62E</b>	AC 24 V	DC 0...10 V, 4...20 mA or 0...1000 Ω	yes	15 s	30 s	15 s

## Accessories

Type	Description	For actuator	Mounting location
<b>ASC1.6</b>	Auxiliary switch	SKD62E	1 x ASC 1.6 or 1 x ASC9.3 or
<b>ASC9.3</b>	Dual auxiliary switches		
<b>ASZ7.3</b>	Potentiometer 1000 Ω	SKD32..E	1 x ASZ7.3 or 1 x ASZ7.31 or 1 x ASZ7.32
<b>ASZ7.31</b>	Potentiometer 135 Ω	SKD329.51	
<b>ASZ7.32</b>	Potentiometer 200 Ω		
<b>ASZ6.5</b>	Stem heater AC 24 V	SKD..E	1 x ASZ6.5
<b>ASK50</b>	Mechanical stroke inverter	SKD329.51	1 x ASK50

## Ordering

When ordering please specify the quantity, product name and type code.

*Example: 1 actuator, type SKD32.21E and  
1 potentiometer, 135 Ω, type ASZ7.31*



## Delivery

The actuator, valve and accessories are supplied in separate packaging and not assembled prior to delivery.

## Spare parts

See overview, section «Replacement parts», page 13.

## Equipment combinations

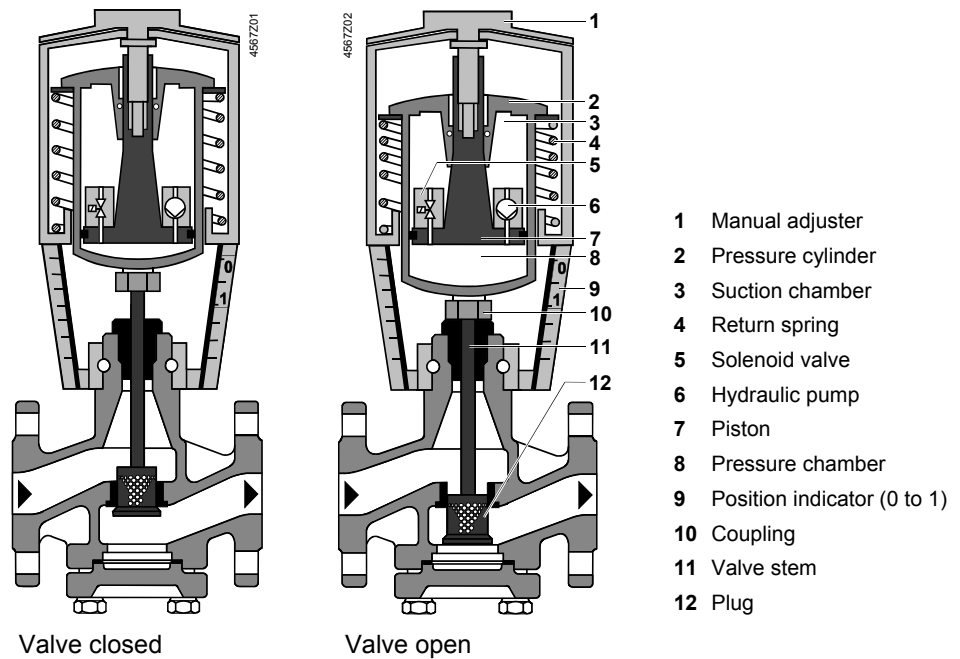
Valve type	DN	PN-class	$k_{vs}$ [m <sup>3</sup> /h]	data sheet
 <b>Two-port valves VV...</b> (control valves or safety shut-off valves):				
<b>VVF21..</b> Flange	25...80	6	1.9...100	N4310
<b>VVF31..</b> Flange	15...80	10	2.5...100	N4320
<b>VVF40..</b> Flange	15...80	16	1.9...100	N4330
<b>VVF41..</b> Flange	50	16	19...31	N4340
<b>VVG41..</b> Threaded	15...50	16	0.63...40	N4363
<b>VVF52..</b> Flange	15...40	25	0.16...25	N4373
<b>VVF61..</b> Flange	15...25	40	0.19...7.5	N4382
 <b>Three-port valves VX...</b> (control valves for «mixing» and «diverting»):				
<b>VXF21..</b> Flange	25...80	6	1.9...100	N4410
<b>VXF31..</b> Flange	15...80	10	2.5...100	N4420
<b>VXF40..</b> Flange	15...80	16	1.9...100	N4430
<b>VXF41..</b> Flange	15...50	16	1.9...31	N4440
<b>VXG41..</b> Threaded	15...50	16	1.6...40	N4463
<b>VXF61..</b> Flange	15...25	40	1.9...7.5	N4482

For admissible differential pressures  $\Delta p_{max}$  and closing pressures  $\Delta p_s$ , refer to the relevant valve data sheets.

## Rev. no.

Overview table, see page 13.

**Principle of electro-hydraulic actuators**



Opening the valve

The hydraulic pump (6) forces oil from the suction chamber (3) to the pressure chamber (8) and thereby moving the pressure cylinder (2) downwards. The valve stem (11) retracts and the valve opens. Simultaneously the return spring (4) is compressed.

Closing the valve

Activating the solenoid valve (5) allows the oil in the pressure chamber to flow back into the suction chamber. The compressed return spring moves the pressure cylinder upwards. The valve stem extends and the valve closes

Manual operation mode

Turning the manual adjuster (1) clockwise moves the pressure cylinder downwards and opens the valve. Simultaneously the return spring is compressed. In the manual operation mode the control signals Y and Z can further open the valve but cannot move to the «0%» stroke position of the valve. To retain the manually set position, switch off the power supply or disconnect the control signals Y and Z. The red indicator marked «MAN» is visible.

Note: Controller in manual operation

When setting the controller for a longer time period to manual operation, we recommend adjusting the actuator with the manual adjuster to the desired position. This guarantees that the actuator remains in this position for that time period. Attention: Do not forget to switch back to automatic operation after the controller is set back to automatic control.

Automatic mode

Turn the manual adjuster counterclockwise to the end stop. The pressure cylinder moves upward to the «0%» stroke position of the valve. The red indicator marked «MAN» is no longer visible.

Minimal volumetric flow

The actuator can manually be adjusted to a stroke position > 0 % allowing its use in applications requiring constantly a minimal volumetric flow.

**Spring-return facility**

The SKD32.21E, SKD329.51 and SKD62E actuators, which feature a spring-return function, incorporate an additional solenoid valve which opens if the control signal or power fails. The return spring causes the actuator to move to the «0 %» stroke position and closes the valve.

**SKD32..E/SKD329.51**  
3-position control signal

The valve is controlled by a 3-position signal either via terminals Y1 or Y2 and generates the desired stroke by means of above described principle of operation.

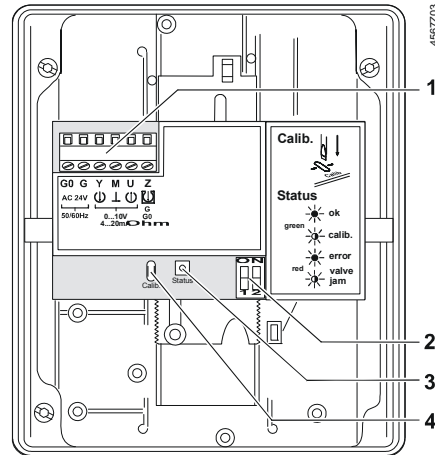
- Voltage on Y1                      piston extends                      valve opens
- Voltage on Y2                      piston retracts                      valve closes
- No voltage on Y1 and Y2      piston / valve stem remain in the respective position

**SKD62E**  
Y control signal  
DC 0...10 V and/or  
DC 4...20 mA, 0...1000 Ω

The valve is either controlled via terminal Y or override control Z. The positioning signal Y generates the desired stroke by means of above described principle of operation.





- Signal Y increasing:              piston extends                      valve opens
- Signal Y decreasing:              piston retracts                      valve closes
- Signal Y constant:                piston / valve stem remain in the respective position
- Override control Z                see description of override control input, page 6

**Standard electronics**  
SKD62E



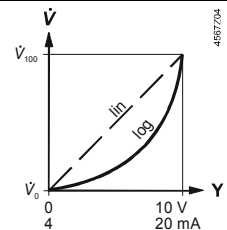
- 1 Connection terminals
- 2 Mode DIL switches
- 3 LED status indication
- 4 Slot for calibration

**DIL switches**  
SKD62E

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


\*) Factory setting:  
All switches OFF

Relationship  
between control  
signal Y and  
volumetric flow



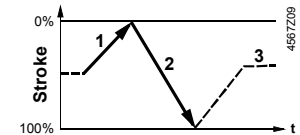
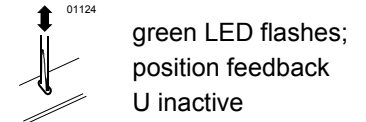
In order to determine the stroke positions 0 % and 100 % in the valve, calibration is required on initial commissioning:

**Prerequisites**

- Mechanical coupling of the actuator SKD6.. with a Siemens valve
-  **Actuator must be in «Automatic operation» enabling stroke calibration to capture the effective 0 % and 100 % values**
- AC 24 V power supply
- Housing cover removed

**Calibration**

1. Short-circuit contacts in calibration slot (e.g. with a screwdriver)
2. Actuator moves to «0 %» stroke position (1) (valve closed)
3. Actuator moves to «100 %» stroke position (2) (valve open)
4. Measured values are stored








**Normal operation**

- |                                                                                                                        |                                                                                                            |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>5. Actuator moves to the position (3) as indicated by signals Y or Z</li> </ol> | green LED is lit permanently;<br>position feedback U active, the values correspond to the actual positions |
|------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|

A lit red LED indicates a calibration error.  
 The calibration can be repeated any number of times.

**Indication of operating state**  
SKD62E

The LED status indication indicates operational status with dual-colored LED and is visible with removed cover.

LED	Indication	Function	Remarks, troubleshooting
<b>Green</b>	Lit 	Normal operation	Automatic operation; everything o.k.
	Flashing 	Calibration in progress	Wait until calibration is finished (LED stops flashing, green or red LED will be lit)
<b>Red</b>	Lit 	Faulty stroke calibration	Check mounting Restart stroke calibration (by short-circuiting calibration slot)
	Flashing 	Internal error Inner valve jammed	Replace electronics Check valve
<b>Both</b>	Dark 	No power supply Electronics faulty	Check mains network, check wiring Replace electronics

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

**Override control  
input Z**  
SKD62E

Override control input can be operated in following different modes of operation

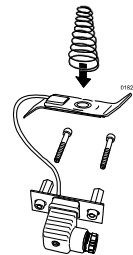
		<b>Z-mode</b>			
		<b>no function</b>	<b>fully open</b>	<b>closed</b>	<b>override with 0...1000 Ω</b>
<b>Connections</b>					
	<b>Transfer</b>				
		linear or equal-percentage			linear or equal-percentage
		<ul style="list-style-type: none"> <li>• Z-contact not connected</li> <li>• Valve stroke follows Y-input</li> </ul>	<ul style="list-style-type: none"> <li>• Z-contact connected directly to G</li> <li>• Y-input has no effect</li> </ul>	<ul style="list-style-type: none"> <li>• Z-contact connected directly to G0</li> <li>• Y-input has no effect</li> </ul>	<ul style="list-style-type: none"> <li>• Z-contact connected to M via resistor R</li> <li>• Starting position at 50 Ω / end position at 900 Ω</li> <li>• Y-input has no effect</li> </ul>

Note Shown operation modes are based on the factory setting «direct acting»  
Y-input has no effect in Z-mode.

**Accessories**

**SKD..E, SKD329.51**

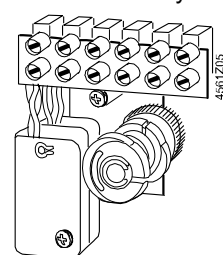
**ASZ6.5**  
stem heater



for media below 0 °C; mount between valve and actuator

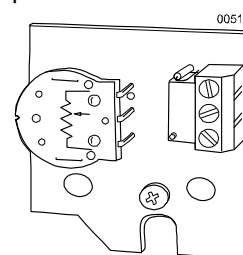
**SKD32..E, SKD329.51**

**ASC9.3**  
double auxiliary switch



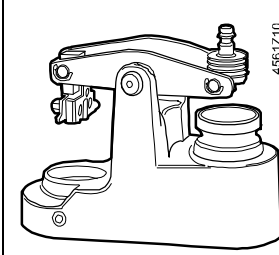
adjustable switching points

**ASZ7.3..**  
potentiometer



ASZ7.3: 0...1000 Ω  
ASZ7.31: 0...135 Ω  
ASZ7.32: 0...200 Ω

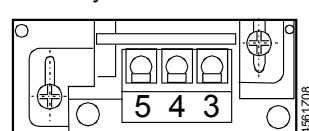
**ASK50**  
stroke inverter



0 % actuator stroke corresponds to 100 % valve stroke; mount between valve and actuator

**SKD62E**

**ASC1.6**  
auxiliary switch



switching point 0...5 % stroke

See section «Technical data» on page 9 for more information.

## Engineering notes

Caution 

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

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

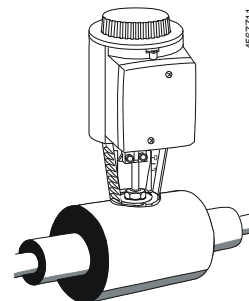
Caution 

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

**For this case, do not insulate the actuator bracket 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!**

**Recommendation: Above 140 °C insulating the valves is strictly recommended.**



Observe admissible temperatures, refer to «Use» on page 1 and «Technical data» on page 9.

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

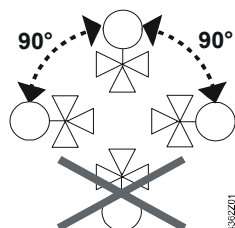
Every actuator must be driven by a dedicated controller (refer to «Connection diagrams», page 11).

## Mounting instructions

Mounting Instruction 74 319 0325 0 for fitting the actuator to the valve are by packed in the actuator packaging. The instructions for accessories are enclosed with the accessories themselves.

Accessories	Installation instructions	Accessory	Mounting instructions
ASC1.6	G4563.3	ASZ6.5	M4563.7
ASC9.3	G4561.3	ASK50	M4561.5
SKD..		ASZ7.3..	
		SKD..	M3250
	4 319 5544 0		4 319 5564 0
	4 319 5545 0		4 319 5549 0
	74 319 0326 0		74 319 0247 0
			74 319 0325 0

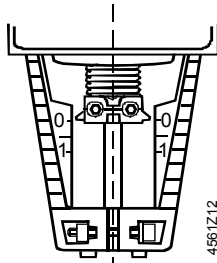
Orientation



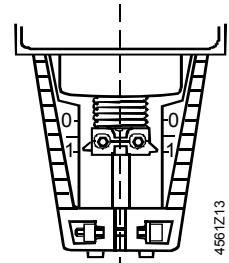
## Commissioning notes

When commissioning the system, check the wiring and functions, and set any auxiliary switches and potentiometers as necessary, or check the existing settings.

Coupling fully retracted  
→ stroke = 0%

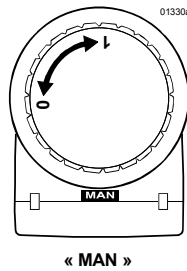


Coupling fully extended  
→ stroke = 100 %

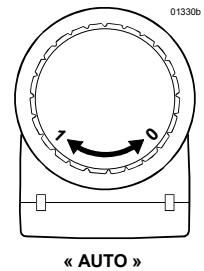


The manual adjuster must be rotated counterclockwise to the end stop, i.e. until the red indicator marked «MAN» is no longer visible. This causes the Siemens valves, types VVF..., VVG..., VXF.. and VXG.. to close (stroke = 0%).

Manual operation



Automatic operation



## Maintenance notes

The SKD..E and SKD329.51 actuators are maintenance-free.



When servicing the actuator:

- Switch off pump of the hydronic loop
  - Interrupt the power supply to the actuator
  - Close the main shutoff valves in the system
  - 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 SKD62E: trigger stroke calibration.

Repair

«Replacement parts», see page 13.



**Warning**

**A damaged housing or cover represents an injury risk**

- **NEVER** uninstall an actuator from the valve
- **Uninstall the valve-actuator combination (actuating device) as a complete device**
- **Use only properly trained technicians to uninstall the unit**
- **Send the actuating device together with an error report to your local Siemens representative for analysis and disposal**
- **Properly mount the new actuating device (valve and actuator)**

Parts could fly ultimately resulting in injuries from uninstalling an actuator with a damaged valve housing due to the tensioned return spring.

## 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», page 2.



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

## Technical data

		SKD32..E	SKD329.51	SKD62E
Power supply	Operating voltage	AC 230 V		AC 24 V
	Voltage tolerance	± 15 %		-20 % / +30 %
				SELV / PELV
Frequency		50 or 60 Hz		
Max. Power consumption At 50 Hz	SKD32.21E:	20 VA / 13 W	SKD329.51 21 VA / 13 W	17 VA / 12 W
	SKD32.50E:	16 VA / 11 W		
External supply cable fuse		min. 0.5 A, slow max. 0.6 A, slow		min. 1 A, slow max. 10 A, slow
Signal inputs	Control signal	3-position		DC 0...10 V, DC 4...20 mA or 0...1000 Ω
	Terminal Y	Voltage Input impedance Current Input impedance Signal resolution Hysteresis		DC 0...10 V 100 kΩ DC 4...20 mA 240 Ω < 1% 1 %
	Terminal Z Override control	Resistor Z not connected  Z connected directly to G Z connected directly to G0 Z connected to M via 0...1000 Ω		1000 Ω No function, priority terminal Y max. stroke 100 % min. stroke 0 % stroke proportional to R
Position feedback	Terminal U	voltage load impedance current load impedance		DC 0...9,8 V ±2 % > 10 kΩ DC 4...19,6 mA ±2 % < 500 Ω
Operating data	Positioning time at 50 Hz opening	SKD32.50E 120 s	120 s	30 s
		SKD32.21E 30 s		
	closing	SKD32.50E 120 s	120 s	15 s
		SKD32.21E 10 s		
Spring-return time (closing)	SKD32.21E 8 s	8 s	15 s	
	SKD32.50 -			
Positioning force		1000 N		
Nominal stroke		20 mm		
Max. permissible medium temperature		-25...150 °C < 0 °C: requires stem heater ASZ6.5		
Electrical connections	Cable entry	4 x M20 (Ø 20.5 mm)		
Norms and standards	CE-conformity EMC-directive	2004/108/EC		
	Immunity	EN 61000-6-2	Industrial	
	Emission	EN 61000-6-3	Residential	
Low voltage directive		2006/95/EC		
Electrical safety		EN 60730-1		

	SKD32..E	SKD329.51	SKD62E
Product standards for automatic electric controls	EN 60730-2-14		
Protection standard EN 60730	I		III
Housing protection standard Upright to horizontal	IP54 to EN 60529		
Conform with C-tick			C-tick N474
Environmental compatibility	ISO 14001 (Environment) ISO 9001 (Quality) SN 36350 (Environmentally compatible products) RL 2002/95/EG (RoHS)		
Dimensions / weight	Dimensions	refer to «Dimensions», page 12	
	Weight	3.60 kg	
	ASK50 stroke inverter	1.10 kg	
Materials	Actuator housing, bracket	Die-cast aluminum	
	Housing box and manual adjuster	Plastic	

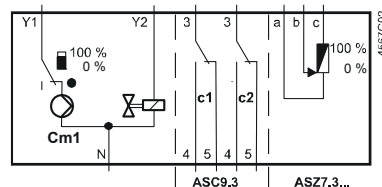
Accessories		SKD32..E, SKD329.51	SKD62E
ASC1.6 Auxiliary switch	Switching capacity		AC 24 V, 10 mA...4 A resistive, 2 A inductive
ASC9.3 double auxiliary switch	Switching capacity per auxiliary switch	AC 250 V, 6 A resistive, 2.5 A inductive	
ASZ7.3 Potentiometer	Change in overall resistance of potentiometer at nominal stroke	ASZ7.3	0...1000 Ω
		ASZ7.31	0...135 Ω
		ASZ7.32	0...200 Ω
	min. current in sliding contact	0,05 mA	
	expected lifetime	250'000 full lifts	
ASZ6.5 stem heater	max. current in sliding contact	2,5 mA	
	expected lifetime	100'000 full lifts	
	Operating voltage	AC 24 V ± 20 %	
	Power consumption	30 VA	

### General ambient 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.h.	< 95 % r.h.	5...95 % r.h.

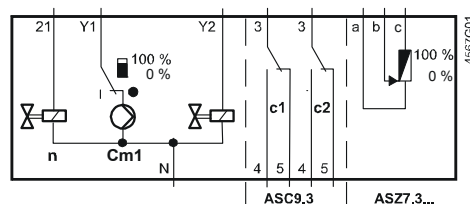
### Internal diagrams

#### SKD32... AC 230 V, 3-Position



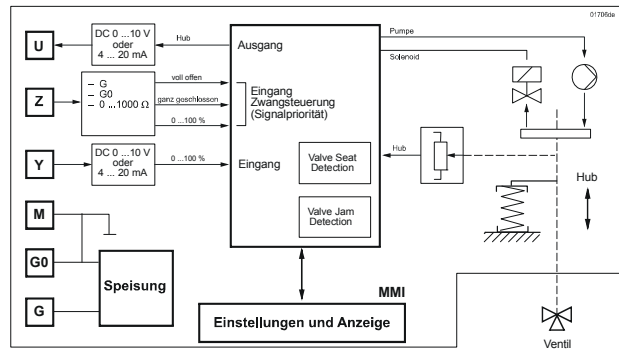
- Cm1** end switch
- n** solenoid valve for spring-return
- c1, c2** ASC9.3 double auxiliary switch
- a, b, c** ASZ7.. potentiometer
- Y1** Positioning signal «open»
- Y2** Positioning signal «close»
- 21** spring-return function
- N** neutral conductor

#### SKD32.21E, SKD329.51 AC 230 V, 3-Position



## SKD62E

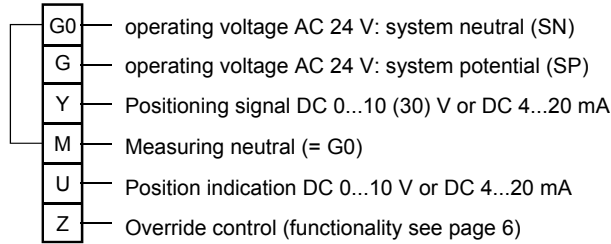
AC 24 V, DC 0...10 V,  
4...20 mA, 0...1000 Ω



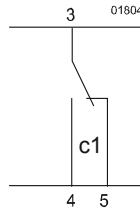
**U** position indication  
**Z** override control  
**Y** positioning signal  
**M** measuring neutral  
**G0** operating voltage AC 24 V:  
system neutral (SN)  
**G** operating voltage AC 24 V:  
system potential (SP)

## Connection terminals

### SKD62E



### Auxiliary switch ASC1.6



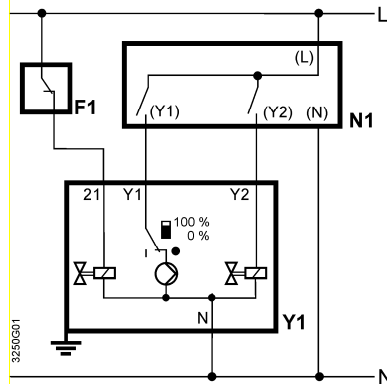
## Connection diagrams

### SKD32..E

AC 230 V  
3-Position

#### SKD32.21E, SKD329.51

AC 230 V

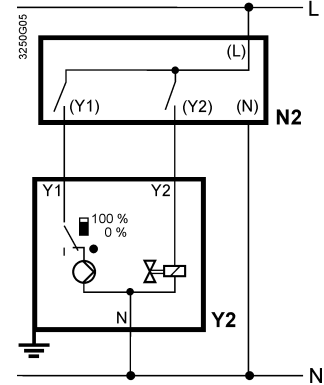


**F1** temperature limiter  
**N1, N2** controller  
**Y1, Y2** actuators

**L** Phase  
**N** neutral

#### SKD32.50E

AC 230 V

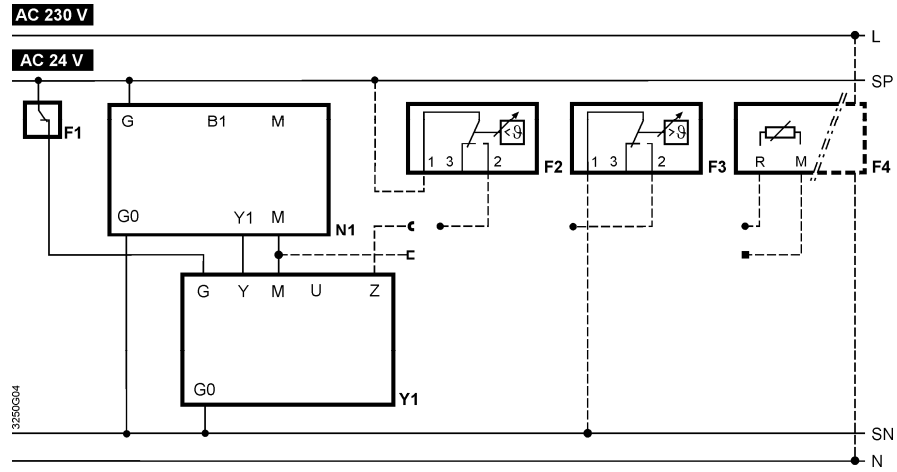


**Y1** Positioning signal «open»  
**Y2** Positioning signal «close»  
**21** Spring-return function

**SKD62E**

AC 24 V

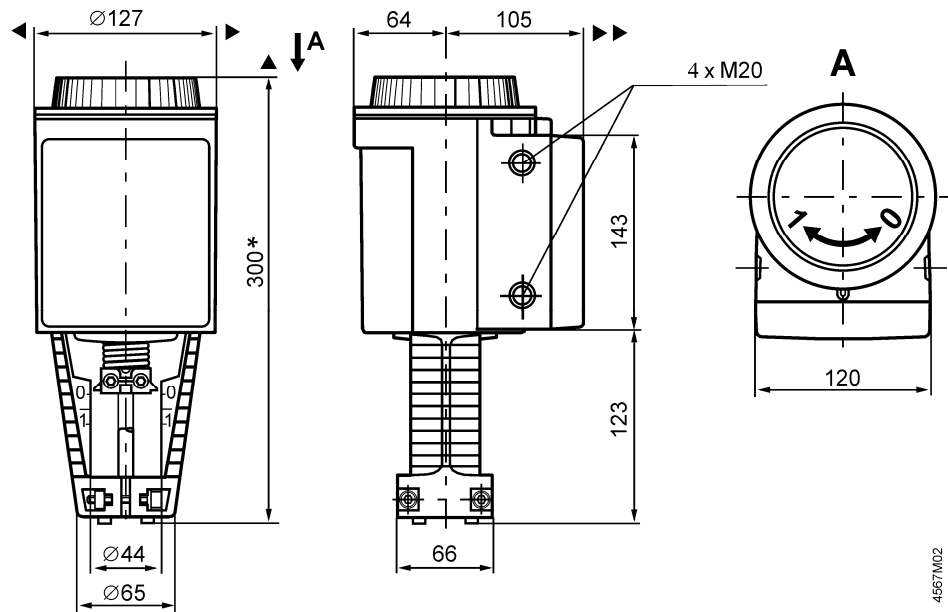
DC 0...10 V, 4...20 mA,  
0...1000 Ω



- Y1** actuator
- N1** controller
- F1** temperature limiter
- F2** frost protection thermostat  
terminals: 1 – 2 frost hazard / sensor is interrupted (thermostat closes with frost)  
1 – 3 normal operation
- F3** Temperature detector
- F4** Frost protection monitor with 0...1000 Ω signal output
- G (SP)** System potential AC 24 V
- G0 (SN)** System neutral

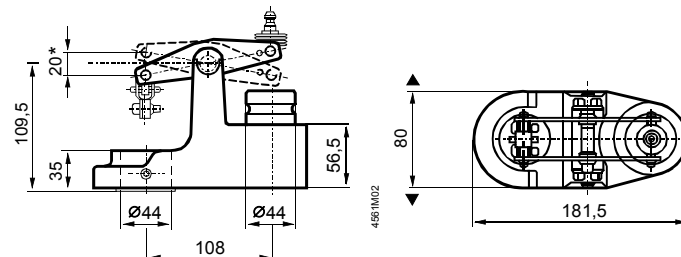
**Dimensions**

All dimensions in mm



- \* Height of actuator from valve plate without stroke inverter **ASK50 = 300 mm**  
Height of actuator from plate with stroke inverter **ASK50 = 357 mm**
- ▶ = > 100 mm | Minimum clearance from ceiling or wall for mounting,
- ▶▶ = > 200 mm | connection, operation, maintenance etc.

**ASK50 stroke inverter**



\* Maximum stroke = 20 mm

## Replacement parts

Order numbers for replacement parts

	Cover	Hand control <sup>1)</sup>	Control unit
<b>Actuator type</b>			
<b>SKD32.50E</b>	410456348	426855048	
<b>SKD32.21E</b>	410456348	426855048	
<b>SKD329.51</b>	410456348	426855048	
<b>SKD62E</b>	410456348	426855048	466857488

<sup>1)</sup> hand control with mechanical parts

## Revision numbers

Type reference	Valid from rev. No.	Type reference	Valid from rev. No.
SKD32.50E	..D	SKD62E	..F
SKD32.21E	..D		
SKD329.51	..D		

