Electro-hydraulic actuators for valves

with 20 or 40 mm stroke

SKB32..., SKC32...
SKB82..., SKC82...
SKB62..., SKC62...

- **SKB32...,SKC32...: AC 230 V operating voltage, 3-position signal**
- **SKB82...,SKC82...: AC 24 V operating voltage, 3-position signal**
- **SKB62,SKC62 : AC 24 V operating voltage, DC 0…10 V positioning signal**
- **SKB62U,SKC62U : AC 24 V operating voltage, pos. signal DC 0...10 V/4...20 mA**
- **The unit comes with or without spring return as per DIN 32 730**
- **Function enhancement by means of auxiliary switch, potentiometer, stroke limiter, stem heating element, and stroke inverter**
- **Positioning force 2800 N**
- **For direct valve mounting without additional setting tasks**
- **With manual stroke adjustment**
- **SKB82...U, SKC82...U, SKB62, and SKC62U are UL approved**

Use

To actuate two-port and three-port valves of type series VVF... and VXF... with 20 or 40 mm stroke

- Field of use as per IEC 721-3-3 Class 3K5
- Ambient temperatures: −15…+55 °C
- Medium temperature inside the valve: −25...+220 °C

  >220 °C...350 °C: use special extension on valve

  <0 °C: **ASZ6.5** stem heating element required

Functions

SKB32..., SKC32..., SKB82..., SKC82...
3-position signal

- Voltage on Y1: The pump delivers hydraulic oil from the suction chamber to the pressure chamber and thereby generates the stroke: the valve stem retracts, the through-port opens
- Voltage on Y2: The bypass valve opens and enables the hydraulic oil to return from the pressure chamber to the suction chamber via the tensioned return spring in the actuator: the valve stem extends, the through-port closes
- No voltage on Y1/Y2: Both actuator and valve remain in the respective stroke position.
- The **SKB32.51..., SKB82.51..., SKC32.61...**, and **SKC82.61** actuators with spring return feature a second bypass valve that opens on voltage failure. The actuator returns to 0 % stroke via the return spring and closes the valve as per the DIN 32 730 safety requirements.

SKB62..., SKC62...
Positioning signal
DC 0...10 V or DC 4...20 mA

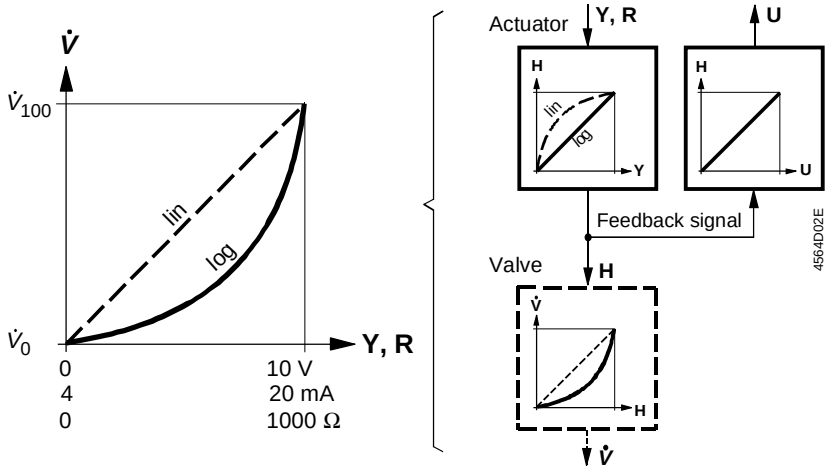
The "open" or "close" functions largely match those of actuators with 3-position signals, but feature an intermediary electronic circuit with AC 24 V operating voltage and a DC 0...10 V or DC 4...20 mA positioning signal.
The **SKB62**, **SKB62U**, **SKC62** and **SKC62U** actuators have a factory-installed spring return, i.e., on interruption of the positioning signal or the operating voltage, the actuator returns to the "0 %" stroke position.
The **SKB62U** and **SKC62U** actuators can either be driven via a DC 0...10 V or a DC 4...20 mA positioning signal. Additionally, they are UL approved.

Selection of flow characteristic

Via a selector plug on the circuit board, the flow characteristics for the VVF... and VXF... valves can be changed from "equal percentage" to "linear".
On delivery, the actuator with the above listed L&S valves generates an equal-percentage flow characteristic.

Flow characteristics

Relationship between the DC 0…10 V or DC 4…20 mA positioning signal and volumetric flow:



Legend

Y = DC 0...10 V
R = 0...1000 Ω *or*
DC 4...20 mA (only for **SKB62U** and **SKC62U**)
U = DC 0 ... 10 V *or* DC 4 ... 20 mA
H = Stroke (valve)

$\dot{V}$ = Air volume
$\dot{V}_{100}$ = Volumetric flow 100 %
$\dot{V}_0$ = Volumetric flow 0 %
log = Equal-percentage valve characteristic (factory setting)
lin = Linear valve characteristic

Type summary

Actuators

Standard version:

Type	**Stroke** [mm]	**Operating voltage**	**Control type** (Positioning signal)	**Spring return function**	**Spring return time** [s]	**Runtime** [s] Open	Close
SKB32.50	20	AC 230 V	3-position	No	---	120	120
SKB32.51				Yes	10		
SKB82.50		AC 24 V		No	---		
SKB82.51				Yes	10		
SKB62			DC 0...10 V	Yes	15		15
SKC32.60	40	AC 230 V	3-position	No	---		120
SKC32.61				Yes	18		
SKC82.60		AC 24 V		No	---		
SKC82.61				Yes	18		
SKC62			DC 0...10 V	Yes	20		20

Special, UL approved version:

SKB82.50U	20	AC 24 V	3-position	No	---	120	120
SKB82.51U				Yes	10		
SKB62U			DC 0...10 V or DC 4...20 mA	Yes	15		15
SKC82.60U	40		3-position	No	---		120
SKC82.61U				Yes	18		
SKC62U			DC 0...10 V or DC 4...20 mA	Yes	20		20

Accessories

Name	**Type**	**For actuators**	**Mounting location**
Double auxiliary switch	**ASC9.3**	SKB32..., SKB82...	1 x ASC9.3
Potentiometer 1000 Ω	**ASZ7.3**	SKC32..., SKC82...	1 x ASZ7.3
AC 24 V stem heating	**ASZ6.5**	SKB32..., SKB82..., SKB62... SKC32..., SKC82..., SKC62...	ASZ6.5 **or** ASK51 *)
Stroke inverter for 20 mm stroke	**ASK51**	SKB32..., SKB82..., SKB62...	
Auxiliary switch AC 24 V	**ASC1.6**	SKB62...	1 x ASC1.6
Stroke limiter **)	**ASZ62.6**	SKC62...	1 x ASZ62.6

*) Only one accessory may be mounted between the valve and the actuator
**) Can only be driven by a DC 0...10 V signal

Ordering and delivery

On ordering, indicate the actuator type and, where required, the accessory type; for example: **SKC32.60**

Actuator, valve and accessories are packed and delivered separately and are not mounted on delivery.

Equipment combinations

The **SKB...** or **SKC…** actuators allow for actuating two-port and three-port valves of type series VVF... and VXF... with 20 or 40 mm stroke:

Type	**DN** [mm]	**PN** [bar]	**Data sheet**
Two-port valves VV... (control or safety shutoff valves)			
VVF21... (Flange)	25...100	6	**4310**
VVF31... (Flange)	25...150	10	**4320**
VVF41... (Flange)	50...150	16	**4340**
VVF45... (Flange)	50...150	16	**4345**
VVF52... (Flange)	15...40	25	**4373**
VVF61... (Flange)	15...150	40	**4382**
Three-port valves VX... (control valves for "mixing" and "diverting" functions)			
VXF21... (Flange)	25...100	6	**4410**
VXF31... (Flange)	25...150	10	**4420**
VXF41... (Flange)	15...150	16	**4440**
VXF61... (Flange)	DN15...150	40	**4482**

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

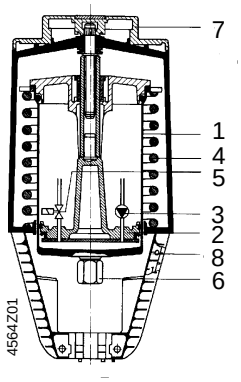
Mechanical design

Actuators

- Maintenance-free, electro-hydraulic actuators
- Pump, pressure cylinder and piston to open the valve
- Return spring and bypass valve to close the valve
- The **SKB32..., SKC32...**, **SKB82... and SKC82...** actuators are equipped with or without spring return as per DIN 32 730
- **SKB62**... and **SKC62** actuators have a spring return as a serial standard
- Mounting spaces for double auxiliary switches and potentiometer with **SKB32..., SKC32...**, **SKB82... and SKC82...**
- Mounting spaces for auxiliary switch and stroke limiter with **SKB62...** and **SKC62**
- Integration of stem heating planned for all actuators
- Manual stroke adjustment; integrated as a series standard with manual adjustment knob and position indication
- The **SKB82...U, SKC82...U**, **SKB62U and SKC62U** actuators are UL approved

Princible of the electro-hydraulic actuators

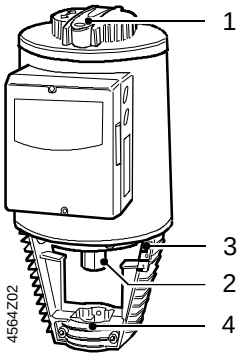
SKB32..., SKB82..., SKB62..., SKC32..., SKC82..., SKC62...



1	Pressure cylinder
2	Piston
3	Pump
4	Return spring
5	Bypass valve
6	Coupling
7	Manual adjustment
8	Position indication (0 to 1)

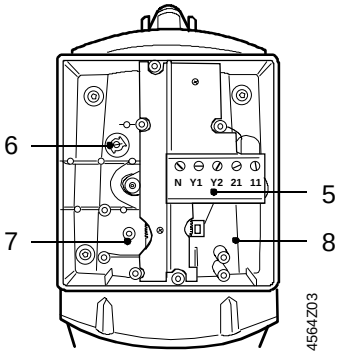
Operating and connecting elements

SKB32..., SKB82..., SKB62..., SKC32..., SKC82..., SKC62...



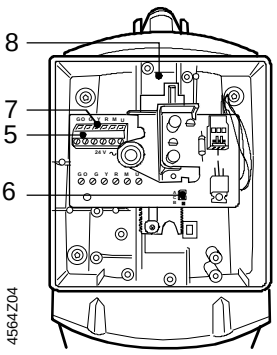
1	Manual adjustment
2	Coupling to valve stem
3	Position indication (0 to 1)
4	Console

SKB32..., SKB82..., SKC32..., SKC82...



5	Terminal strip
6	Earthing screw
7	Mounting space for **ASC9.3** auxiliary switch
8	Mounting space for **ASZ7.3** potentiometer

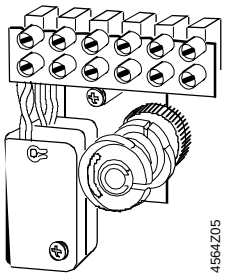
SKB62... SKC62...



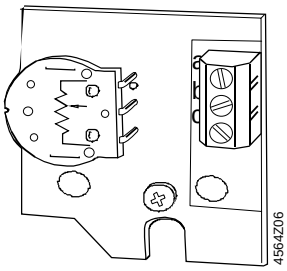
5	Terminal strip
6	Selector plug for flow characteristic "**lin**"/ "**log**"
7	Mounting space for **ASZ62.6** stroke limiter
8	Mounting space for **ASC1.6** auxiliary switch

Accessories

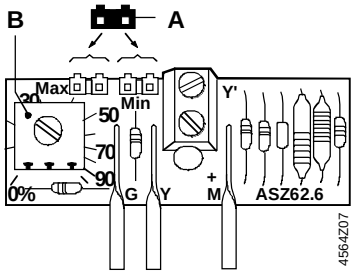
Double auxiliary switch **ASC9.3**
Adjustable switching points



Potentiometer **ASZ7.3**
0...1000 Ω

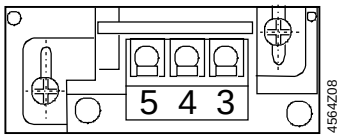


ASZ62.6 stroke limiter

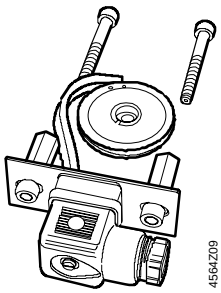


A Plug to select minimum or maximum limitation
B Potentiometer to set desired limitation variable

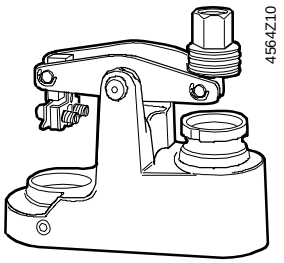
ASC1 auxiliary switch **6**



ASZ6.5 stem heating
– for media below 0 °C
– mounting between valve and actuator *)



ASK51 stroke inverter
– 0 % stroke on the actuator corresponds to 100 % stroke on the valve
– mounting between valve and actuator *)



*) Only one accessory may be mounted between the valve and the actuator.

See section "Technical data" for more information.

Disposal

The various material types used require that you disassemble the unit and sort the components prior to disposal.

Engineering notes

Conduct the electric connections in accordance with local regulations on electric installations as well as the internal or connection diagrams on pages 10 and 11.

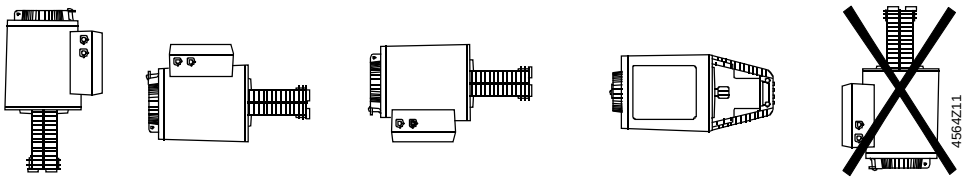
⚠ **Observe all safety-related requirements and restrictions to prevent injuries and damages to goods.**

⚠ **The ASZ6.5 stem heating has a heating output of 30 VA and must keep the valve stem from freezing when used in a cooling range of 0 °C ... –25 °C.**
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 !

Additionally, pay attention to permissible temperatures as listed in sections "Use" and "Technical data". If an auxiliary switch is required, indicate its switching point on the plant schematic.

Mounting notes

Mounting positions



Permissible Not permissible

The valve mounting instructions are supplied with the actuator. Accessory instructions are located in the respective accessory's packaging.

Commissioning notes

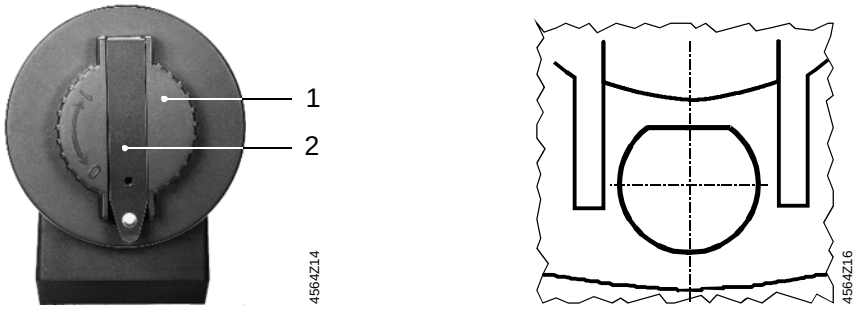
During commissioning, check the wiring and conduct a functional check. Additionally, check or make the required settings at the auxiliary switch, the potentiometer, and the stroke limiter.

Coupling fully retracted Coupling fully extended

⚠ **If the manual adjustment knob is turned clockwise to the end position, the Landis & Staefa valves of type series VVF... and VXF... are closed (stroke = 0 %).**

Automatic operation

For automatic operation, the crank (2) on the manual adjustment knob (1) must be engaged. If not engaged, turn the crank counter-clockwise until the display window (3) neither shows the scale (4) nor the crank engagement bar.

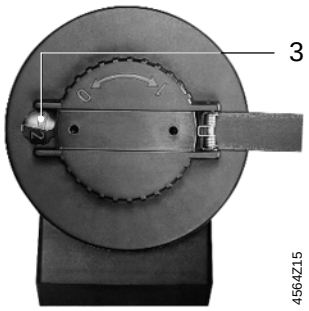


Engaged crank (2) on the manual adjustment knob (1)

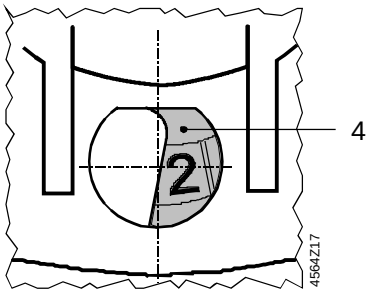
Display window with invisible scale dial and crank engagement bar

Manual operation

For manual operation, swing out the crank (2) so that the display window (3) becomes visible. By rotating the crank or the manual adjustment knob (1), the display window shows the engagement bar and/or the scale dial with stroke indication.



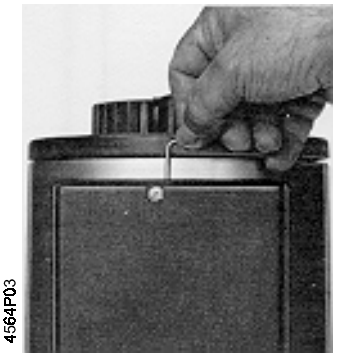
Swung-out crank (2), display window (3)

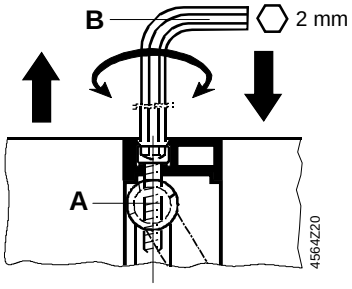


Display window with scale dial (4) and stroke indication

Position potentiometer

Only for **SKB62, SKB62U, SKC62** and **SKC62U**.
Adjustments at the position potentiometer serve to balance the measuring voltage to the stroke position of the valve. Adjustments are necessary only if voltage is required on terminal U, e.g., for an indicating device, management system or position-dependent switching.
Stroke position 0 %: permissible measuring voltage on terminal U = min. DC 0.03... max. 0.4 V.





Legend

A Adjustment screw
B Allen key 2 mm

Characteristic flow factory setting ⚠

Only for **SKB62, SKB62U, SKC62 and SKC62U: equal percentage**

Maintenance notes

⚠

For actuator service work:

- **Turn off the pump and the operating voltage, close the shutoff valves, depressurize the pipes and allow them to cool down. Disconnect the electrical connections from the terminals, where required.**
- **Re-commission the val ve only if the actuator has been mounted correctly.**

Warranty

Landis & Staefa actuators guarantee the technical data (Δp_{max}, Δp_s, leakage rate, noise level and life) only when used together with the Landis & Staefa valves as listed in "Equipment combinations".

⚠ **Use with third-party valves expressly voids any warranty claims.**

Technical data

Actuators

Power supply

Operating voltage	
SKB32..., SKC32...	AC 230 V ±15%
SKB82..., SKC82..., SKB62, SKC62	AC 24 V ±20%
Frequency	50 Hz or 60 Hz
Power consumption	
SKB32.50	10 VA
SKB82.50, SKB82.50U	13 VA
SKB32.51	15 VA
SKB82.51, SKB82.51U	18 VA
SKC32.60, SKC82.60, SKC82.60U	19 VA
SKC32.61, SKC82.61, SKC82.61U	24 VA
SKB62, SKB62U	18 VA
SKC62, SKC62U	28 VA
Switching output of end switch	
SKB32..., SKC32...	AC 250 V, 6 A res., 2.5 A ind.
SKB82..., SKC82...	AC 24 V, 5 A res., 0.75 A ind.

Function data

Control type	
SKB32..., SKB82..., SKB82...U	
SKC32..., SKC82..., SKC82...U	3-position
SKB62, SKC62	DC 0...10 V (proportional)
SKB62U, SKC62U	DC 0...10 V or DC 4...20 mA (proportional)
Runtime at 50 Hz	
SKB32.50, SKB82.50, SKB82.50U	
SKC32.60, SKC82.60, SKC82.60U	
SKB62, SKB62U, SKC62, SKC62U	
Open	120 s
Close	120 s
Spring return time (close)	
SKB32.51, SKB82.51, SKB82.51U	
SKB62, SKB62U	15 s
SKC32.61, SKC82.61, SKC82.61U	
SKC62, SKC62U	20 s
Positioning force	2800 N
Stroke	
SKB...	20 mm
SKC...	40 mm

Signal inputs
SKB62, SKB62U,
SKC62, SKC62U

Terminal Y *)	
Voltage	DC 0 ... 10 V
Current	max. 0.1 mA
Terminal R *)	
SKB62, SKC62	
Resistance **)	0...1000 Ω
SKB62U, SKC62U	
Resistance **)	0...1000 Ω
Current	DC 4...20 mA
max. impedance	250 Ω

*) Y and R cannot simultaneously be used for **SKB62U** and **SKC62U** !

**) If a 0...1000 Ω signal is supplied to input R, the serially integrated wire jumper labelled R – M on the circuit board must be separated.

Signal outputs
SKB62, SKB62U,
SKC62, SKC62U

Output terminal U *)	
SKB62, SKC62	
Voltage	DC 0...10 V
SKB62U, SKC62U	
Voltage	DC 0...10 V
Current	DC 4...20 mA

*) With **SKB62U** and **SKC62U**, U corresponds to input signal Y (DC 0...10 V) or to input signal R (DC 4...20 mA)

Housing protection

Housing protection	IP54 as per EN 60529
Cable entry glands	
SKB32..., SKB82..., SKB62	
SKC32..., SKC82..., SKC62	Pg11 (4x)

	SKB82...U, SKC82...U SKB62U, SKC62U	 Pg16 (4x)
Environmental conditions	Maximum permissible medium temperature inside the valve	220 °C
	Operation	as per IEC 721-3-3
	Climatic conditions	Class 3K5
	Temperature	−15 ... +55 °C
	Humidity	5...95 % r.h.
	Transport	as per IEC 721-2-3
	Climatic conditions	Class 3K2
	Temperature	−30 ... +65 °C
	Humidity	< 95 % r.h.
	Storage	as per IEC 721-1-3
	Climatic conditions	Class 3K1
	Temperature	−15 ... +55 °C
	Humidity	0 ... 95 % r.h.
Standards	CE conformity as per	
	EMC directive	89/336/EEC
	Low voltage guideline	73/23/EEC
	UL approval	UL 873
Dimensions	Actuators SKB..., SKC... and stroke inverter ASK51	 see "Dimensions"
Weight	**Actuators**	
	SKB...	
	Without packaging	8.4 kg
	With packaging	8.7 kg
	SKC...	
	Without packaging	9.7 kg
	With packaging	10.0 kg
	ASK51 stroke inverter	
	Without packaging	0.95 kg
	With packaging	1.10 kg
Materials	Actuator housing and console	Die-cast aluminium
	Housing box and manual adjustment knob	Plastic

Accessories

Double auxiliary switch ASC9.3 for SKB32.., SKC32..., SKB82..., SKC82...	Switching output of one auxiliary switch	AC 250 V, 6 A res., 2.5 A ind.
Auxiliary switch ASC1.6 for SKB62…, SKC62…	Switching output of auxiliary switch	AC 24 V, 10 mA...4 A res., 2 A ind.
Potentiometer ASZ7.3 for SKB32..., SKC32..., SKB82..., SKC82...	Change of overall resistance of the potentiometer at nominal stroke 20 mm	 0...1000 Ω (corresponds to 0…100 % stroke)
Stroke limiter ASZ62.6 *) for SKB62..., SKC62...	Possible settings – maximum stroke limitation for valves with less than 20 mm stroke – minimum stroke limitation for valves that must not fully close in a controlled throughput	 6...20 mm (30...100 %) **) 0...14 mm (0...70 %) **)
Stem heating ASZ6.5 **for all actuators**	Operating voltage Power consumption (heating output)	AC 24 V ±20 % 30 VA

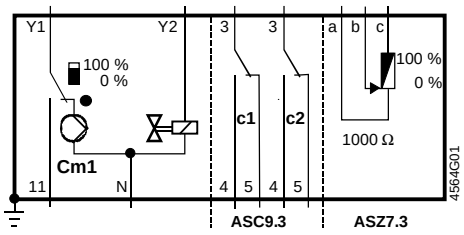
*) Can only be driven by a DC 0...10 V signal

**) The reference point for limitation is the 0 % stroke position of the actuator (coupling of the actuator fully retracted)

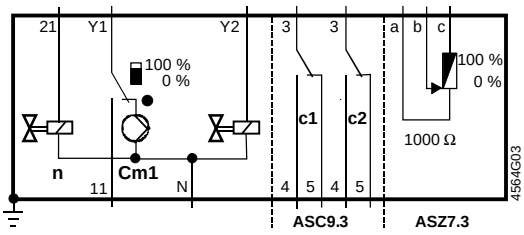
Diagrams

Internal diagrams

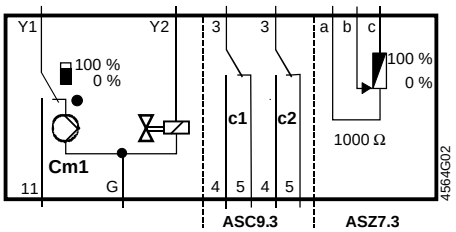
Actuators
SKB32..., SKB82...,
SKC32..., SKC82...



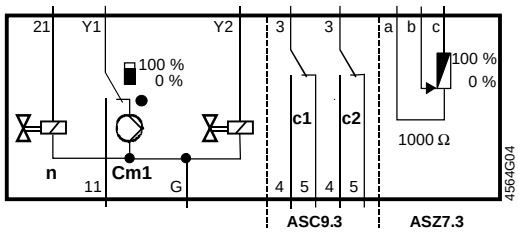
SKB32.50, SKC32.60
without spring return
AC 230 V, 3-position



SKB32.51, SKC32.61
with spring return
AC 230 V, 3-position



SKB82.50, SKB82.50U
SKC82.60, SKC82.60U
without spring return
AC 24 V, 3-position



SKB82.51, SKB82.51U
SKC82.61, SKC82.61U
with spring return
AC 24 V, 3-position

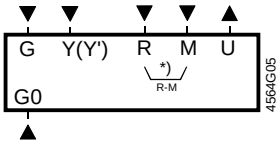
Legend

Y1	Open control valve
Y2	Close control valve
11	Output of Y1 at 100 % stroke for sequence switching
21	Spring return (no voltage = 0 % stroke = valve closed)
Cm1	Limit switch for 100 % stroke
c1, c2	Double auxiliary switch **ASC9.3**
1000 Ω	Potentiometer **ASZ7.3**

Possible mounting spaces for **SKB32..., SKB82..., SKC32...** and **SKC82...** :

1 Double auxiliary switch **ASC9.3**
1 Potentiometer **ASZ7.3**
1 Stem heating **ASZ6.5**
The **ASC9.3, ASZ7.3** and **ASZ6.5** can be integrated together.

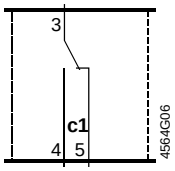
Actuators
SKB62, SKC62
SKB62U, SKC62U



Legend

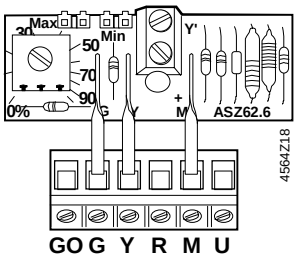
G, G0	AC 24 V operating voltage G System potential (SP) G0 System neutral (SN)
Y'	Control signal input for DC 0...10 V signal
Y'	Control signal input for DC 0...10 V signal (only for integrated stroke limiter **ASZ62.6)**
R	Signal input for positioner or frost monitor with 0...1000 Ω signal (for **SKB62, SKC62, SKB62U** and **SKC62U**) or DC 4...20 mA signal (for **SKB62U** and **SKC62U**)
M	Measuring neutral
U	DC 0...10 V measuring signal output (at Y = DC 0...10 V and/or R = 0...1000 Ω) or DC 4...20 mA measuring signal output (at R = DC 4...20 mA)
*)	Wire jumper with label R – M on circuit board. This jumper must be separated when a 0...1000 Ω input signal is supplied to terminal R.

Auxiliary switch **ASC1.6**
for **SKD62...**



Switching states related to 100 % stroke of the actuator:
– Contact on opening (coupling extension):
Switchover of terminals 3 and 4 to terminals 3 and 5
– Contact on closing (coupling retraction):
Switchover of terminals 3 and 4 to terminals 3 and 5

Stroke limiter **ASZ62.6**
for **SKB62...** and **SKC62...**



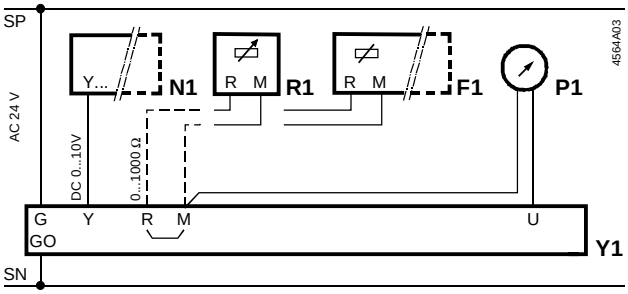
Electric plug connection with terminal lugs that are connected directly to the terminal strip of an **SKB62...** or **SKC62**.
When a stroke limiter is mounted, the control signal
DC 0...10 V on terminal Y' must be activated on the stroke limiter.

Connection diagrams

The connection diagrams show examples for connection possibilities with actuators **SKB62...** and **SKC62...**. The number and type of connections depend on the plant.

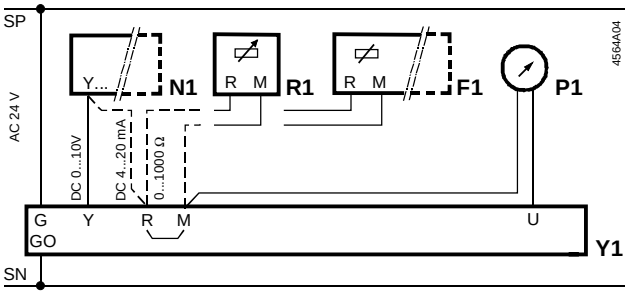
Connection diagram 1

SKB62 and **SKC62:** AC 24 V, DC 0...10 V and/or 0...1000 Ω



Connection diagram 2

SKB62U and **SKC62U:** AC 24 V, DC 4...20 mA or DC 0...10 V and/or 0...1000 Ω



Legend for connection diagrams 1 and 2

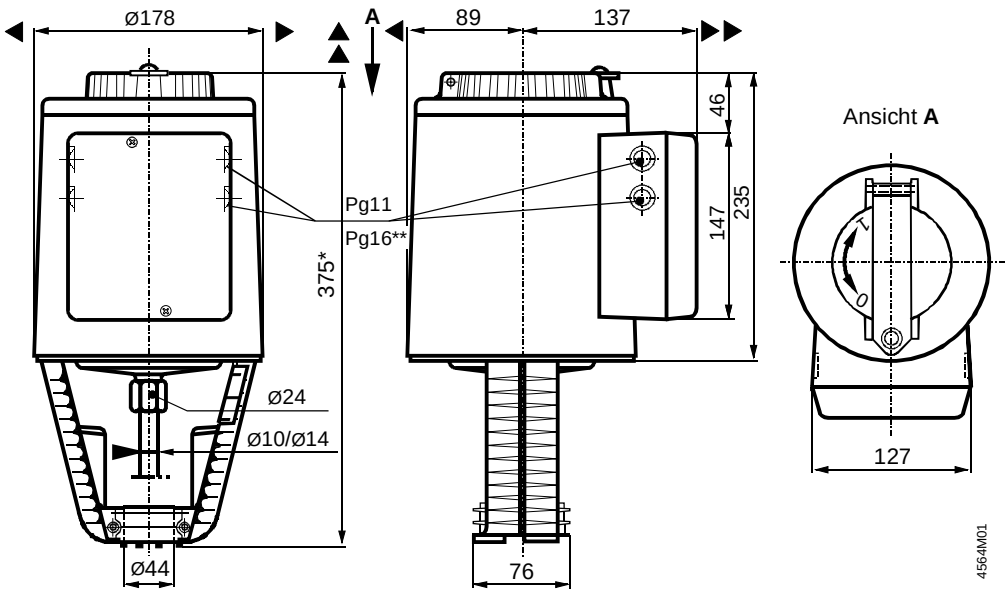
N1	Controller with DC 0...10 V or DC 4...20 mA output signal	F1	Frost monitor
Y1	Actuator SKB62... or SKC62...	P1	Position indicator
R1	Positioner		

If a 0...1000 Ω signal is supplied to input R, the serially integrated wire jumper labelled R – M on the circuit board must be separated.

On using the **ASZ62.6** stroke limiter, input R cannot be used.

Dimensions

Actuators
SKB..., SKC...

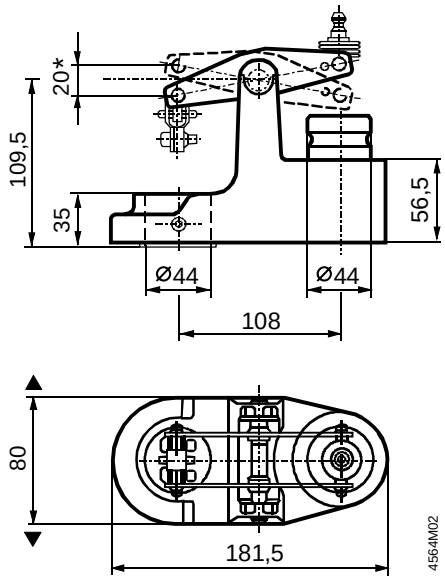


* Actuator height from valve plate **without stroke inverter ASK51 = 375 mm**
Actuator height from valve plate **with stroke inverter ASK51 = 432 mm**

** For the SKB82...U, SKB62U, SKC82...U, and SKC62U actuators, the plug hole diameter corresponds to the cable entry glands Pg16

▲ >100 mm ⌈ Minimum mounting distance to wall or ceiling,
▲▲ > 200 mm ⌊ Connection, operation, maintenance, etc.

ASK51 stroke inverter



* maximum stroke = 20 mm

Dimensions in mm

Replaces CE1N4564E
Replaces CE1N4565E
Replaces CE1N4566E