SC30-Q56ZRW-465
Operating Instructions

Original Operating Instructions

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1 Foreword

This operating manual is intended for installers and operators and should be retained for future reference. Read this operating manual carefully and ensure that you fully understand its contents before installing or operating the SC30-Q56ZRW-465. The operator is responsible for validating the entire safety system.

2 Safety

2.1 Notes and Symbols Used

Warnings regarding personal injury or property damage are designed according to the “SAFE” principle. This means they include information on the nature and source of the hazard, possible consequences, and how to avoid or mitigate the hazard. The following hazard classifications apply to the safety instructions:

⚠ DANGER

DANGER indicates a hazardous situation; failure to comply will result in death or serious injury. The symbol preceding the warning indicates the nature and source of the hazard graphically.

⚠ WARNING

Warning indicates a dangerous situation; failure to observe it may result in death or serious injury. The symbol preceding the warning indicates the type and source of the hazard graphically.

⚠ CAUTION

"Caution" indicates a hazardous situation; failure to observe this warning may result in injury. The symbol preceding the warning indicates the nature and source of the hazard.

NOTE

Note indicates a situation; failure to observe this may result in property damage and impair the product’s function.

TIP

Tip provides additional and useful information on how to use the product.

Symbol	Meaning
▸	Avoiding and preventing the hazard described in the warning
▶	Instructions All instructions for a procedure are always listed in chronological order.
▪	List

2.2 General Safety

All work on electrical systems or equipment may only be performed by a qualified electrician in accordance with applicable electrical regulations.

The operator is responsible for the safety of the system in which the SC30-Q56ZRW-465 is integrated.

⚠ WARNING

Dangerous machine movements
The functioning two-hand control system only protects the operator from the machine's dangerous movement.
- Protect the machine's danger zone against unauthorized entry with additional safety devices.

2.3 Personnel Qualifications

A qualified electrician is a person with appropriate technical training, knowledge, and experience, as well as knowledge of relevant standards, who can properly assess the work assigned to them and identify potential hazards.

The following general safety instructions for working with electrical energy must be followed:

⚠ WARNING

Improper work on electrical systems!
Electric shock can cause fatal or life-threatening injuries.
- Before working on electrical systems, disconnect them from the power supply and secure them against being switched back on.
- Wear appropriate personal protective equipment.
- Have any identified defects, such as damaged or loose cables, repaired immediately.

2.4 Intended use

safeCAP SC30, in combination with safety relays, is used for the safety-related enabling and disabling of a safety circuit. safeCAP SC30 is used to protect persons from machinery with hazardous closing movements. safeCAP SC30 has been tested with the following safety relays: MCR 225 and PNOZ s6. The safety-related enabling and disabling of a safety circuit is the responsibility of the operator.

⚠ WARNING

safeCAP SC30 is not suitable for machine processes that require the activation and deactivation of a safety circuit for a period longer than 2 minutes.

2.5 Reasonably foreseeable misuse

Any use other than that specified in the section "Intended Use" or exceeding the scope of that section is considered improper.

The pushbutton is not suitable for:

- use as a two-hand control without the aforementioned relays or when using an equivalent circuit without independently calculating the Performance Level in accordance with EN ISO 13849-1:2023.
- Enabling machine processes for a duration of longer than 2 minutes.
- use as a two-hand control without validation of the entire system.
- the use of cables longer than 30 m between the SC30 and the safety relay.
- Use as a two-hand control in combination with any other pushbutton.
- Use as an EMERGENCY STOP control device.
- Use in potentially explosive atmospheres.
- Outdoor use.

2.6 Service life determination and validation of the entire system

The following steps are mandatory.

- Determine the actual parameters of the system.
  - Required performance level
  - d_{op}
  - h_{op}
  - t_{cycle}
- The operator must demonstrate that the service life T_M is not exceeded.
- Validate the entire system.
- Follow the safety instructions in the safety relay's operating manual.

2.7 Example of the calculation

The following values are only examples and must be replaced with your own values.

- Performance Level e must be achieved.
- d_{op} = 250 d
- h_{op} = 24 h
- t_{cycle} = 10 s

n_{op} [cycles/year]

$n_{op} = (d_{op} * h_{op} * 3600\ s) / t_{cycle}$

n_{op} = 250 days/year * 24 hours/day * 3,600 seconds/hour * 10 seconds/cycle = 2,160,000 cycles/year

According to the operating instructions, the relay has a service life of approximately 20 million cycles before a dangerous failure occurs.

$T_M = 20{,}000{,}000 / n_{op}$

T_M = 20,000,000 / 2,160,000 = 9.3 years

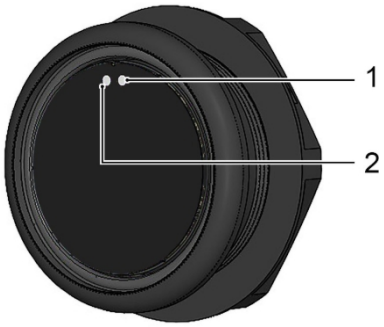
According to the calculation, the relay must be replaced after 9.3 years.

For other relays, different values such as B_{10D} or T_{10D} may need to be used, yielding a different result.

3 General Description

3.1 SC30-Q56ZRW-465

The SC30-Q56ZRW-465 is equipped with two LEDs. The green LED (1) lights up when the device is ready for operation.
The yellow LED (2) lights up when the relay is activated.



4 Storage

	Conditions
SC30-Q56ZRW-465	-30°C (-22°F) to 80°C (176°F)

5 Installation

⚠ WARNING

Improper work on electrical systems!
Electric shock can cause fatal or life-threatening injuries.
- Before working on electrical systems, disconnect them from the power supply and secure them against being switched back on.
- Work on electrical systems must be performed only by qualified personnel in accordance with local and national electrical codes and regulations.

⚠ WARNING

Improper installation of safeCAP SC30!
A two-hand control system that is not installed in accordance with standards or is not functioning properly can cause fatal or life-threatening injuries.
- Select the mounting surfaces for the safeCAP SC30 according to the prescribed dimensions and distances specified in DIN EN ISO 13851:2019.
- Protect the safeCAP SC30 against unintended activation, for example with SCP-x
- Before working on the machine, check that the safeCAP SC30 is functioning properly.

The safety distance between the machine and the two-hand control is calculated using the following formula.

$$S = K (t1 + t2) + C$$

- **(S)** Safety distance

- **(K)** Assumed approach speed of the human body or body parts. According to EN ISO 13855:2010
  - Walking speed 1600 mm/s
  - Reaching speed 2000 mm/s
- **(t1)** Time required for the entire protective device to respond.
- (**t2)** Time required for the machine to stop after receiving the signal from the protective device.
- **(C)** Additional horizontal distance to the hazard zone in mm according to EN ISO 13855:2010

5.1 Install SC30-Q56ZRW-465

► Turn off the power to the system and secure it against being turned back on.

► Clean the area under the pushbutton.

► Unscrew the knurled nut from the pushbutton.

► Insert the pushbutton into the prepared Ø 50.5 mm hole and screw the knurled nut back on.

► Align the SC30-Q56ZREW-465 and tighten the knurled nut.

The wiring outside enclosed installation spaces must be protected against mechanical damage (including, for example, vibration or bending).

6 Operation

6.1 Operating the safeCAP SC30

► Touch both safeCAP SC30 buttons simultaneously (within 0.5 s).

► The machine operation is triggered.

7 Maintenance

7.1 Maintenance tasks

Perform the following maintenance tasks at the specified intervals.

Maintenance task	As needed	Annually	Test interval
Clean the button surface	X		
Check safety function			X
Check cable for damage and secure fit		X	
Check that screw connections are tight		X	

7.2 Check the SC30 safety function

To ensure the safety function of the SC30, the safety function must be checked according to the following points.

- During commissioning
- After the test interval has elapsed
- After maintenance and cleaning work The result must be recorded.

► Disconnect the safety relay from the machine.

► Connect the measuring device to the contacts of the safety relay that enable machine operation.

► Activate the SC30 units one after the other (not within 0,5sec.).

✔ The LEDs must be lit in green and yellow.

✔ The safety relay must not activate either the normally open or normally closed contacts.
Power-up must be verified using a measuring device at the output contacts of the safety relay and shall not exceed the safety time values (here 0.5 seconds).

► Disconnect the SC30 from the power supply.

► Leave both SC30 pressed

► Reconnect power supply.

✔ Only green LEDs must light up .

✔ The safety relay must not release either the normally open or normally closed contacts.

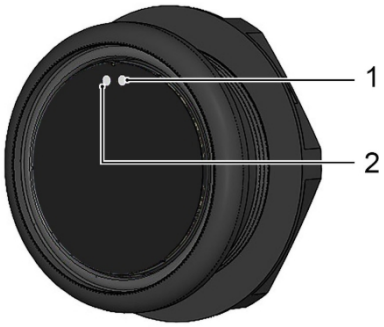
7.3 Troubleshooting

Green LED (1) is not lit.

► Check the connector on the back for a secure fit and for damage.

► Check the cable for damage.

► Check the power supply.



The yellow LED (2) does not light up when the button is pressed.

► The button was pressed too slowly.

► The button was pressed too quickly.

► The button was pressed while wearing gloves that were too thick.

► The button surface is too dirty.

The green LED (1) and yellow LED (2) are lit. The machine operation is not triggered.

- Have the system checked for proper connection.

8 Disassembly

⚠ WARNING

Improper work on electrical systems!
Electric shock can cause fatal or life-threatening injuries.

- Before working on electrical systems, disconnect them from the power supply and secure them against being switched back on.
- Work on electrical systems must be performed only by qualified personnel in accordance with local and national electrical codes and regulations.

- De-energize the system and secure it against re-energization.
- Disconnect the electrical connection between the SC30-Q56ZRW-465 and the safety relay.
- Remove the nut and pull out the SC30-Q56ZRW-465.

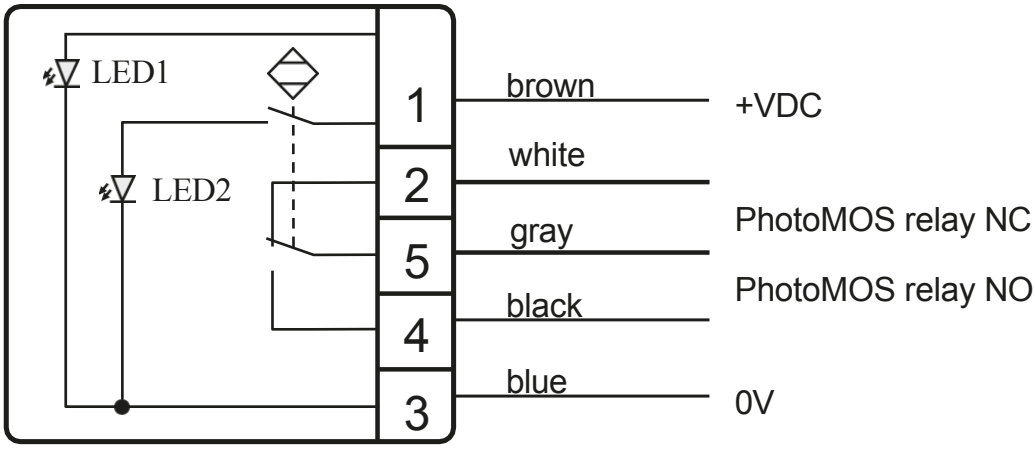
9 Disposal

Sort electrical and electronic components of various types and send them for recycling. In doing so, comply fully with all applicable state, federal, and local laws and regulations.

10 Technical Data

10.1 Pin assignment SC30-Q56ZRW-465

Connector



10.2 Connection options

Connector

M8 connector, 5-pin

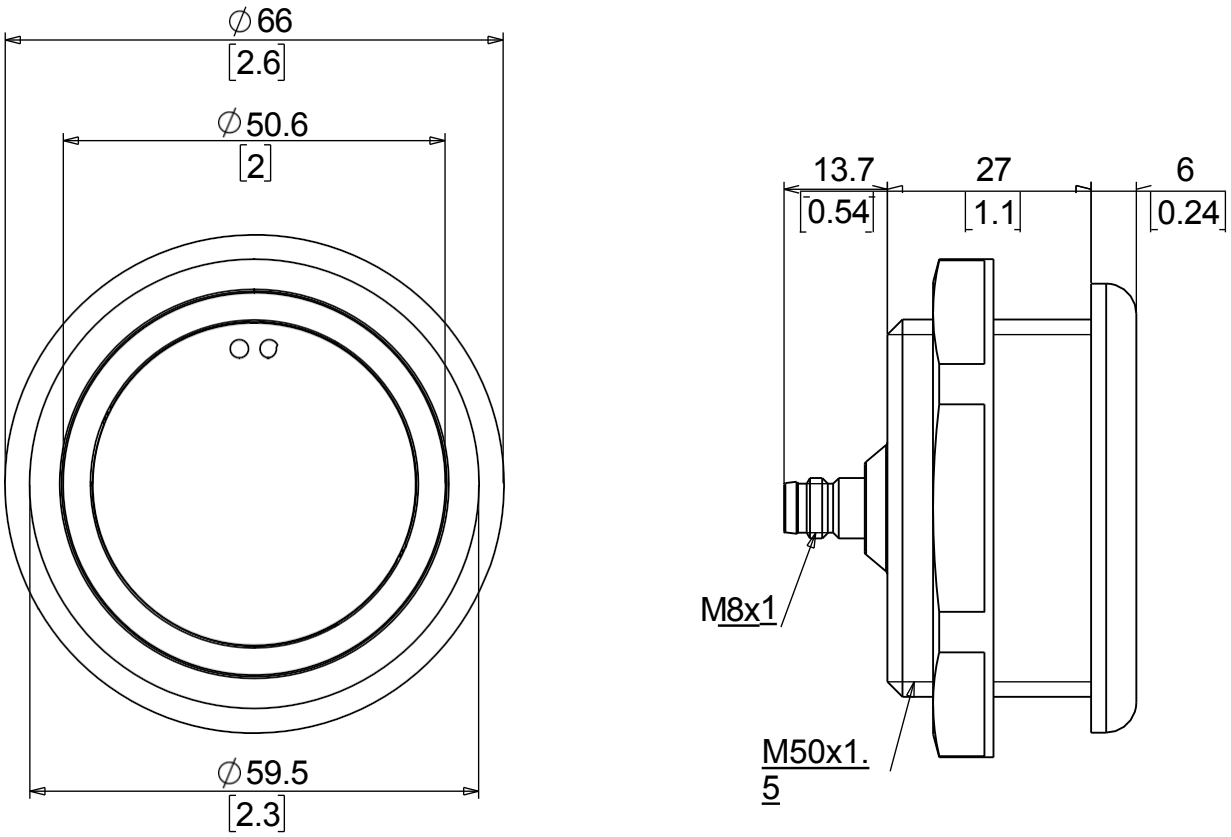
10.3 Technical Data SC30-Q56ZRW-465

Operating voltage	⎓ 24 V (19.2…28.8 V)
Contact rating	100 mA (70 mA at 75 °C)
Output	PhotoMOS relay: normally open, normally closed
Output pulse	Continuous signal upon actuation
LED 1	Green LED
LED 2	Yellow LED
Reverse polarity protection	Yes
Short-circuit protection	Normally open contact yes, normally closed contact no
Current consumption	Max. 20 mA at 24 V
Operating temperature	-25°C (-13°F) … +75 °C (167 °F)
IP rating	Front panel IP68, connector IP67 [1)]
Actuation type	Capacitive
Actuation force	No operating force required
Rated insulation voltage	32 V
Turn-off delay T_a	Max. 50 ms
Turn-on delay	Max. 30 ms
$MTTF_d$	1,123 years
PFH[h^{-1}]	2.47E-10
Category (DIN EN 13849-1)	up to 4 [2)]
Performance level	up to PLe [2)]
DCavg	0%, up to 99% [2)]
Service lifeTM	20 years

1) IP67 at the connector end when the cable is properly connected

2) In conjunction with a safety logic unit in accordance with DIN EN 13849-1, -2, DIN EN 13851, with a DC of at least 99% and an $MTTF_d$ > 31 years or a PFH_d < 9* 10^{-8}

10.4 Dimensional drawing SC30-Q56ZRW-465



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