

MAYSER®

Polymer Electric



Operating Instructions



Control Unit SG-SLE X4-0X1

Version 1

PCB in plastic housing

1000305	SG-SLE 04-051	24 V=
1000786	SG-SLE 04-061	24 V~
7500100	SG-SLE 04-041	115 V~
1000303	SG-SLE 04-021	230 V~

PCB without plastic housing

1000309	SG-SLE 14-051	24 V=
1001156	SG-SLE 14-061	24 V~
1004034	SG-SLE 14-041	115 V~
1000307	SG-SLE 14-021	230 V~

MAYSER® GmbH & Co. KG

Polymer Electric
Örlinger Straße 1–3
89073 Ulm
GERMANY
Tel.: +49 731 2061-0
Fax: +49 731 2061-222
E-Mail: info.ulm@mayser.de
Internet: www.mayser.com

Original instructions

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About these operating instructions

These operating instructions are part of the product.

Mayser Polymer Electric accepts no responsibility or warranty claims for damage and consequential damage due to failure to observe the operating instructions.

- ➔ Read operating instructions carefully before use.
- ➔ Keep operating instructions for the complete service life of the product.
- ➔ Pass operating instructions on to every subsequent owner or user of the product.
- ➔ Add any supplement received from the manufacturer to the operating instructions.

Validity

These operating instructions are only valid for the products specified on the title page.

Target group

The target group of these operating instructions are operators and trained specialist personnel who are familiar with installation and commissioning.




Other applicable documents

- ➔ In addition to the operating instructions, observe the following documents:
 - Drawing of the sensor system (optional)
 - Wiring diagram (optional)
 - Installation instructions of the sensors used

Symbols used

Symbol	Meaning
➔ ...	Action with one step or with more than one step where the order is not relevant.
1. ... 2. ... 3. ...	Action with more than one step where the order is relevant.
• ...	Bullets first level
- ...	Bullets second level
(see <i>Assembly</i>)	Cross-reference

Danger symbols and information

Symbol	Meaning
DANGER 	Immediate danger leading to death or serious injury.
CAUTION 	Possible danger which may lead to slight injury or damage to property.
	Information on easier and safer working practices.

Intended use

The Control Unit is designed for signal processing of a pressure-sensitive protective device (PSPD). It evaluates the output signals of sensors with monitoring resistor 22k Ω . The integrated output signal switching device (OSSD) transmits the evaluated safety signals directly to the downstream machine controls.

The Control Unit complies with ISO 13849-1:2006 Category 3 PL e. So that the safety classification is retained, the forwarding control must be of the same or a higher category.

Safety instructions

- ➔ **Do not modify Control Unit**
Never manipulate or modify the Control Unit.
- ➔ **Check supply voltage**
Check supply voltage. It must correspond with the connecting voltage U_s on the type plate.
- ➔ **Maintain distance**
When installing in the switch cabinet, ensure sufficient distance from heat sources (at least 2 cm).

➔ **Protect from sunlight**

In the case of surface installation, ensure that the Control Unit is protected from direct sunlight.

➔ **Observe pin assignment**

Observe pin assignment when connecting the supply voltage.

➔ **Insulate contact surfaces**

Ensure that contact surfaces not connected to the protective earth are disconnected from the power pack and the output circuit by double or reinforced insulation.

➔ **SG-SLE 14-0X1 observe protection class**

Only use the Control Unit in rooms with a minimum degree of protection of IP54 (e.g. switch cabinet).

➔ **Protect relay contacts**

Risk of welding: Protect the relay contacts externally.

➔ **Fit spark absorbers**

When connecting inductive loads, fit spark absorbers (RC modules) to the consumer.

➔ **Continue redundancy**

Make sure you wire the unit directly in the control circuit or that the downstream control is also in dual channel mode.

➔ **Do not overload Control Unit**

Ensure that the specified switching current is not exceeded.

➔ **Do not cross link Control Unit**

Do not cross link the Control Unit with other Control Units.

Terminals 14, 15 and 16, 17 and 18, 19 and 20, 21 are not voltage free.

➔ **In the event of a fault, put out of operation**

In the event of malfunctions and visible damage, put the Control Unit out of operation.

➔ **Do not use in ATEX zones**

Do not use the Control Unit in potentially explosive environments (ATEX). The Control Unit is not authorised for use in these zones.

Parts supplied

Control Unit SLE 04-0X1

1× Control Unit

Enclosure with electronics module

1× Operating Instructions

1× Declaration of Conformity

Control Unit SLE 14-0X1

1× Control Unit

PCB with 4× screws M4 and 4× spacers

1× Operating Instructions

1× Declaration of Conformity

Check the scope of supply for completeness and the perfect condition of the product immediately after receipt.

Transport and storage

Packaging and transport

The Control Units are packed individually in cardboard boxes. Several Control Units are stacked in one large cardboard box.

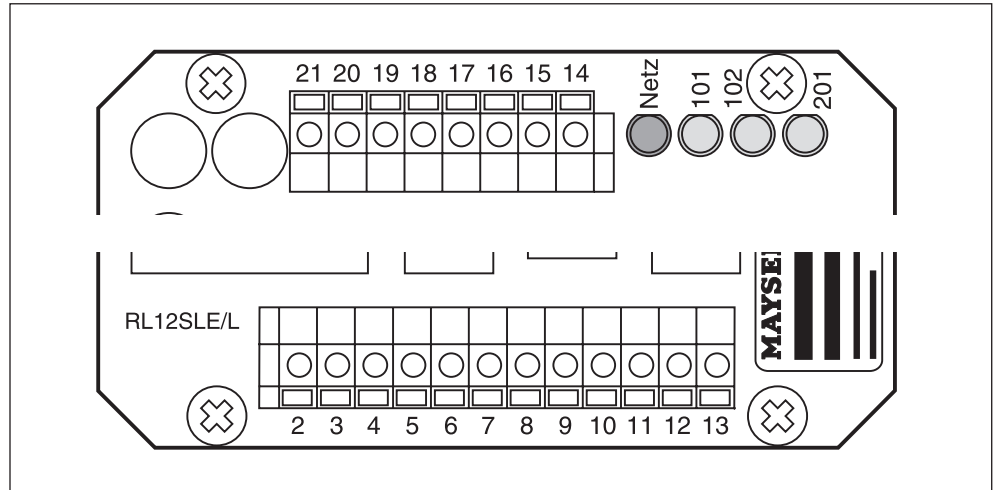
The documents are enclosed separately.

Storage

- ➔ Store the Control Units in the original packaging in a dry place.
- ➔ Observe the storage temperatures given in the technical specifications.

Product overview

Connections



Connections:

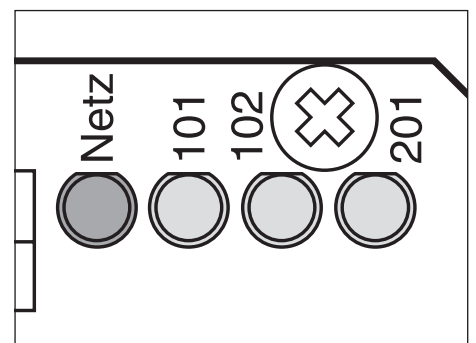
Supply voltage
Switching channel 1
Switching channel 2
Reverse travel
Sensor 1
Sensor 2
Sensor 3
Sensor 4

Terminals:

2 or 3, 4
12, 13, (11)
6, 7, (5)
8, 9, 10
14, 15
16, 17
18, 19
20, 21

LEDs information

- green LED "Netz":
supply voltage connected
- yellow LED "101"
sensor not activated
- yellow LED "102"
sensor not activated
- yellow LED "201"
reverse travel activated



Operation, installation and commissioning

Operation

The single-fault-safe electronics module has dual channels (redundant). Each channel controls a forceguided relay and additionally monitors the relay of the other channel. The electronic system monitors the electrical resistance of the sensor with a defined zero signal current.

The Control Unit is operated with AC/DC 24 V, AC 115 V or AC 230 V. If the supply voltage is connected, the green LED "Netz" is lit. If the sensor is not activated, relay K101 and K201 are energised. The yellow LEDs "101" and "201" light up, the switch channels 1 and 2 are closed and relay K102 is de-energised.

When the sensor is actuated, the K101 and K201 relays are de-energised. The yellow LEDs "101" and "201" go out and the switch channels 1 and 2 are open. The relays remain de-energised and switching channels 1 and 2 remain open until the sensor is enabled and a delay t_w of approx. 1.8 s has expired there after

Reverse travel

Approx. 0.8 s following de-energisation of relay K101 and K201 the reverse travel relay energises for approx. 2 s.

Installation

DANGER



Danger of injury due to electrocution!

- ➔ Disconnect all devices and live parts in the immediate environment of the power supply and protect them against being switched on again (see relevant operating instructions)
 - ➔ Check that all devices and parts are disconnected from the power supply
-

CAUTION



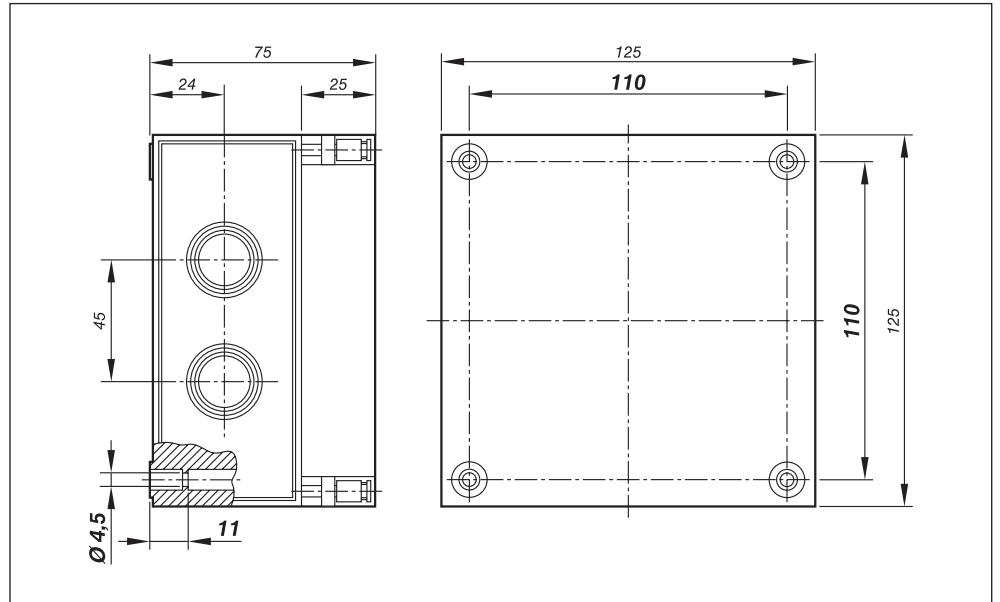
Impaired operation due to overheating

The operation of the protective device may be impaired due to overheating of the Control Unit.

- ➔ When installing in the switch cabinet, ensure sufficient distance from heat sources (at least 2 cm)
 - ➔ In the case of surface installation, ensure that the Control Unit is protected from direct sunlight.
-

Control Unit SLE 04-0X1

1. Mount the Control Unit in any position with screws \varnothing 4 mm. For this, remove the enclosure cover.



CAUTION



Overall safety endangered

The quality and reliability of the interface between the protective device and the machine influences the overall safety.

- ➔ Install the interface very carefully

2. Wire the sensors, relay contacts and supply voltage to the terminals.

Control Unit SLE 14-0X1

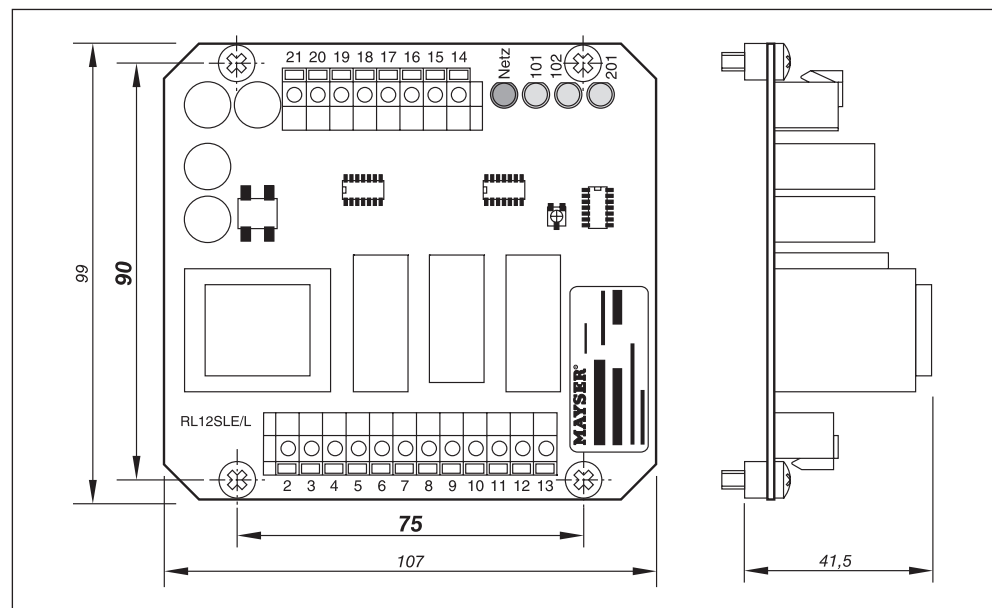
DANGER



Danger of injury due to electrocution!

➔ Only mount the Control Unit in switchgear with a minimum degree of protection of IP 54 (IEC 60529).

1. Using the screws and spacers, mount the PCB in any position.



DANGER



Overall safety endangered

The quality and reliability of the interface between the protective device and the machine influences the overall safety.

➔ Install the interface very carefully

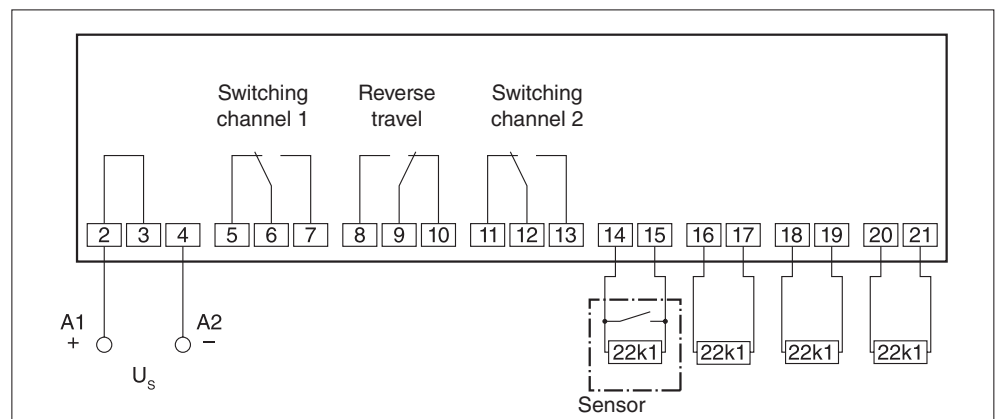
2. Wire the sensors, relay contacts and supply voltage to the terminals.

Inputs

The Control Unit SG-SLE has 4 sensor inputs.

Single terminating sensors or appropriate combinations of terminating and through sensors are connected here.

➔ Check that unused sensor inputs are bridged with a 22k1 resistor.



Commissioning

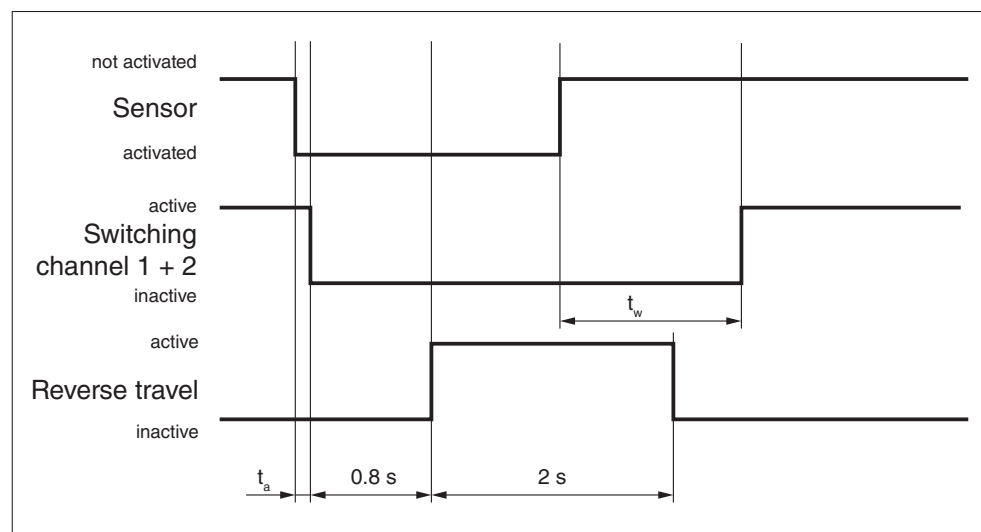
1. Reinstall the enclosure cover (does not apply to SG-SLE 14-0X4).
2. Connect the supply voltage.

Check operation

1. Ensure that no sensor is activated
 - yellow LEDs "101" and "201" are on.
 - contacts of switch channels 1 and 2 closed.
 - contact 9, 10 of the reverse travel closed (contact 8, 9 open).
2. Activate the sensor.
 - yellow LEDs "101" and "201" go off.
 - yellow LED "102" light up for approx. 2sec.
 - contacts of switch channels 1 and 2 open.
 - contact 9, 10 of the reverse travel open following 0.8 s for a period of 2 s, (contact 8, 9 remain closed so long).
3. Enable sensor or the sensors
 - yellow LEDs "101" and "201" light up again after approx. 1.8 s
 - yellow LED "102" is not on.
 - contact of switching channel 1 and 2 close again following approx. 1.8 s
 - contact 9, 10 of the reverse travel is closed (contact 8, 9 is open).

4. Disconnect a sensor
 - yellow LEDs "101" and "201" go off.
 - yellow LED "102" light up for 2 s and then goes off.
 - contacts of switch channels 1 and 2 open
 - contact 9, 10 of reverse travel opens following 0.8 s for a period of 2 s, (contact 8, 9 closed so long).

Flowchart



Recommissioning

DANGER



Danger of injury!

➔ Never start your machine as long as the danger remains.

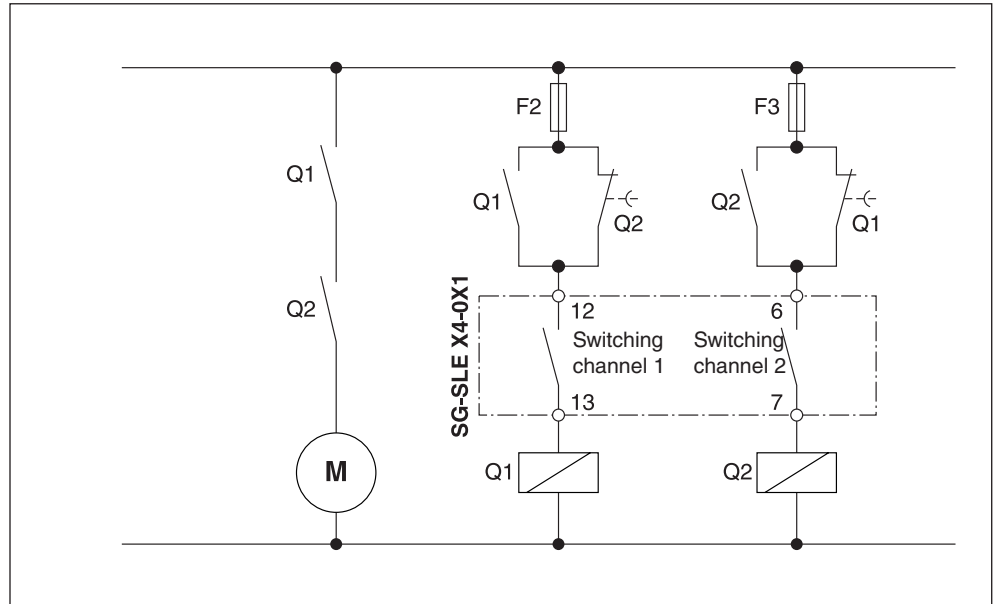
Automatic reset

The Control Unit has no reset command. If the sensor is released after actuation, relay K101 and K201 are energised again with a delay of t_w .

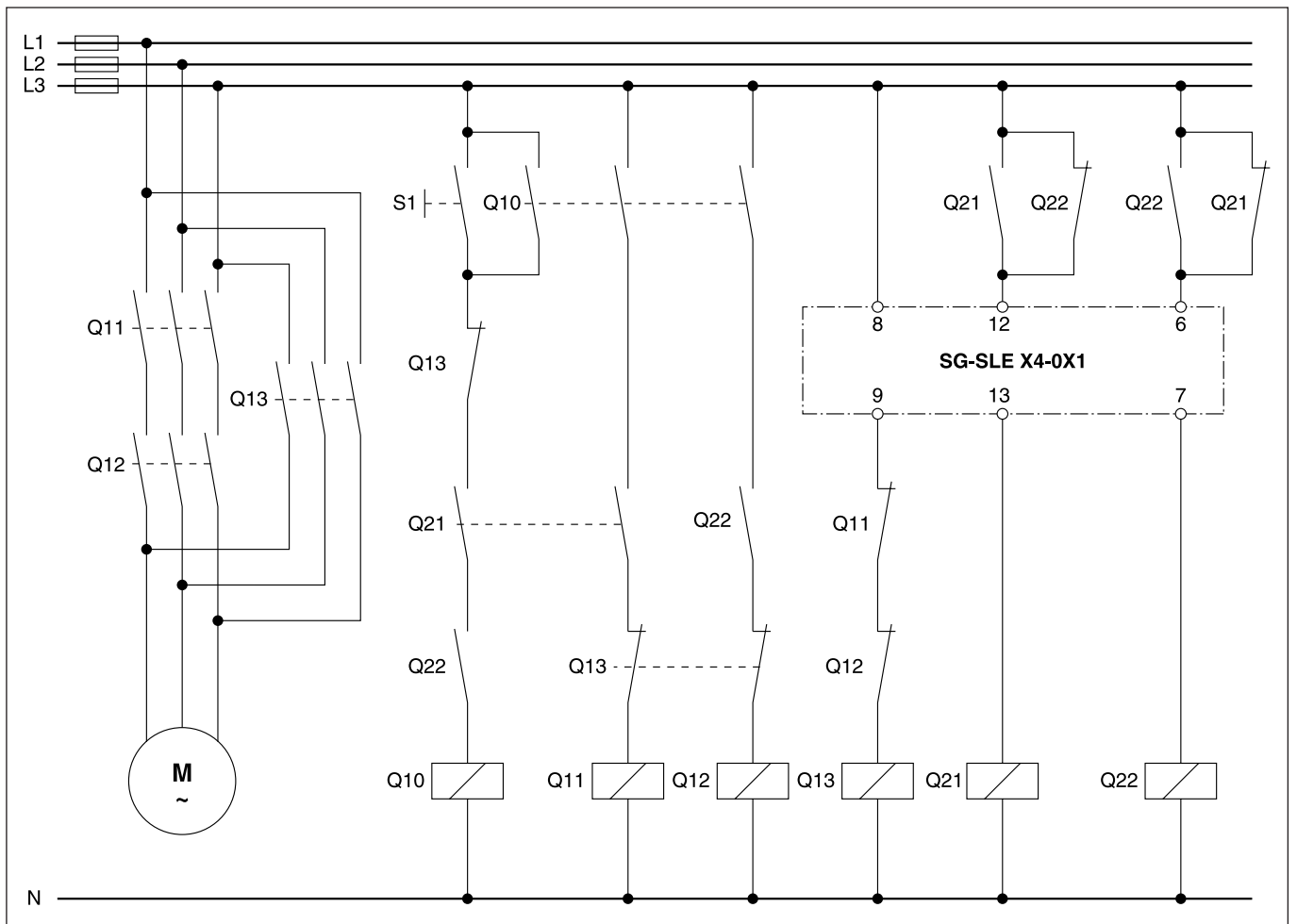
➔ Check for proper functioning after recommissioning (see section Commissioning)

Connection examples

Contacts continued in two-channel mode



Excerpt from connection schematics of a gate



Maintenance and cleaning

Maintenance

The Control Unit is maintenance-free.

- ➔ Repeat the operational test monthly.

Cleaning

DANGER



Danger of injury due to electrocution!

- ➔ Disconnect the Control Unit as well as all devices and live parts in the immediate environment of the power supply and protect them against being switched on again (see relevant operating instructions).
 - ➔ Check that all devices and parts are disconnected from the power supply.
-

SG-SLE 04-0X1

- ➔ Clean the outside of the enclosure with conventional cleaning products.
- ➔ Allow the enclosure to dry before recommissioning.

SG-SLE 14-0X1

Cleaning of the PCB is forbidden!

Troubleshooting and remedies

Prerequisite: The Control Unit is connected to the supply voltage and sensor. The sensor is not activated.

Fault display	Possible cause	remedy
green LED "Netz" is not on.	No or incorrect supply voltage	1. Check supply voltage, compare with type plate 2. Check terminal connections
	With correctly connected supply voltage: Control Unit faulty.	➔ Replace Control Unit
yellow LED "101" and "201" are not on.	Incorrect monitoring resistor on sensor	➔ Connect sensor to monitoring resistor 22k1
	With correct monitoring resistor: sensor faulty	➔ Replace sensor
	No sensor connected	➔ Connect sensor
	Sensor incorrectly connected	➔ Check terminal connections
	Cable break	➔ Replace sensor
only one yellow LED "101" or "201" lights up	Control Unit is faulty	➔ Replace Control Unit
yellow LED "102" permanently on	Control Unit is faulty	➔ Replace Control Unit

Fault can still not be detected?

➔ Contact Mayser-Support: Tel. +49 731 2061-0.

Replacement parts

CAUTION



Overall safety endangered

If the sensor and Control Unit are not replaced with original parts from Mayser, operation of the protective device may be impaired.

➔ Only use original parts from Mayser.

Disposal

The Control Units produced by Mayser are professional electronic tools exclusively intended for commercial use (so-called B2B devices). Unlike devices mainly used in private households (B2C), they may not be disposed of at the collection centres of public sector disposal organisations (e.g. municipal recycling depots). At the end of their useful life, the devices may be returned to us for disposal.

WEEE reg. no. DE 39141253

Conformity



Il tipo costruttivo del prodotto risponde alle richieste essenziali delle seguenti direttive:

- 2006/42/CE (Sicurezza delle macchine)
- 2004/108/CE (CEM - Elettromagnetismo)

The Declaration of Conformity is available in the Downloads section of the website:
www.mayser-sicherheitstechnik.de/english/index.asp

EC Design Test

The product was tested by an independent institute.
An EC design type test certificate confirms conformity.

The EC design type test certificate is available in the Downloads section of the website:
www.mayser-sicherheitstechnik.de/english/index.asp

Technical Data

SG-SLE X4-0X1	AC 24 V / DC 24 V	AC 115 / AC 230 V
Test principles	EN 1760-2, EN 12978 , ISO 13849-1	
Connecting voltage U_s		
Voltage tolerance	-15% to + 10%	-15% to +10%
Nominal current	210 mA / 90 mA	42 mA / 21 mA
Nominal frequency	48 to 62 Hz / -	48 to 62 Hz
External protection	250 mA slow-acting	125 mA slow-acting
Power consumption	< 5 VA / < 3 W	< 5 VA / 5 VA
Times		
Reaction time t _a	< 14 ms	< 14 ms
Re-start-time t _w	< 1.8 s	< 1.8 s
Safety classifications		
EN 1760-2: Reset	without	without
ISO 13849-1:2006	Category 3 PL e	Category 3 PL e
MTTF _d	279 Years	279 Years
DC _{avg}	90%	90%
B _{10d} (Load: DC 24 V / 2 A)	2x 10 ⁶	2x 10 ⁶
n _{op} (estimate)	52560/a	52560/a
CCF	Requirements fulfilled	Requirements fulfilled
EN 60664-1: Creep distance and air gap	soiling degree 2, overvoltage category II / 230 V	soiling degree 2, overvoltage category II / 230 V
IEC 61140:2001+A1:2004		
SLE 04-0X1	protection class II	protection class II
SLE 14-0X1	–	–
ControlUnit Inputs		
Sensor	14,15 / 16, 17 / 18, 19 / 20, 21	14,15 / 16, 17 / 18, 19 / 20, 21
Monitoring resistor	22k1 Ohm	22k1 Ohm
Short-circuit resistance	≤ 400 Ohm	≤ 400 Ohm
Line resistance	≤ 100 Ohm	≤ 100 Ohm
Line length (max.)	100 m	100 m
Switching thresholds		
Sensor activated	< 5.2 kOhm	< 5.2 kOhm
Cable break	> 150 kOhm	> 150 kOhm

SG-SLE X4-0X1	AC 24 V / DC 24 V	AC 115 / AC 230 V
Control Unit Outputs		
Switching channel 1 and 2 (NC contact)	12, 13 und 6, 7	12, 13 und 6, 7
Utilization category as per EN 60947-5-1	AC-12: 250 V / 2 A DC-12: 24 V / 2 A	AC-12: 250 V / 2 A DC-12: 24 V / 2 A
Switching voltage (max.)	AC 250 V DC 24 V	AC 250 V DC 24 V
Switching current (max.)	2 A 2 A	2 A 2 A
Switching current (min.)	10 mA 10 mA	10 mA 10 mA
Switching capacity (max.)	500 VA 48 W	500 VA 48 W
Switching operations, mechanical	> 5× 10 ⁷	> 5× 10 ⁷
Switching operations, electrical	> 3× 10 ⁵ (AC 250 V)	> 3× 10 ⁵ (AC 250 V)
Contact fuse protection external	2 A quick-acting	2 A quick-acting
Reverse travel (two-way contact)	8, 9, 10	8, 9, 10
Utilization category as per EN 60947-5-1	AC-12: 250 V / 2 A DC-12: 24 V / 2 A	AC-12: 250 V / 2 A DC-12: 24 V / 2 A
Switching voltage (max.)	AC 250 V DC 24 V	AC 250 V DC 24 V
Switching current (max.)	2 A 2 A	2 A 2 A
Switching current (min.)	100 mA 100 mA	100 mA 100 mA
Switching capacity (max.)	500 VA 48 W	500 VA 48 W
Switching operations, mechanical	> 5× 10 ⁶	> 5× 10 ⁶
Switching operations, electrical	> 8× 10 ⁵ (AC 250 V / 2 A)	> 8× 10 ⁵ (AC 250 V / 2 A)
Contact fuse protection external	2 A quick-acting	2 A quick-acting
Mechanical operating conditions		
Cable terminals		
solid wire	1× 1.5 mm ²	1× 1.5 mm ²
strand without sheath	1× 1.5 mm ²	1× 1.5 mm ²
strand with sheath	1× 0.75 mm ²	1× 0.75 mm ²
Degree of protection as per IEC 60529		
SLE 04-0X1	IP65	IP65
SLE 14-0X1	IP00	IP00
max. humidity (23 °C)	95%	95%
Operating temperature	-20 to +55 °C	-20 to +55 °C
Storage temperature	-20 to +55 °C	-20 to +55 °C
Impact resistance in operation	2.5 g	2.5 g
Impact resistance in transport	10 g	10 g
Dimensions (W × H × D)		
SLE 04-0X1	125 × 125 × 75 mm	125 × 125 × 75 mm
SLE 14-041 / SLE 14-021		107 × 99 × 41.5 mm
SLE 14-051	107 × 99 × 33 mm	
SLE 14-061	107 × 99 × 41.5 mm	
Weight		
SG-SLE 04-0X1	520 g / 420 g	540 g / 560 g
SG-SLE 14-0X1	240 g / 140 g	260 g / 280 g