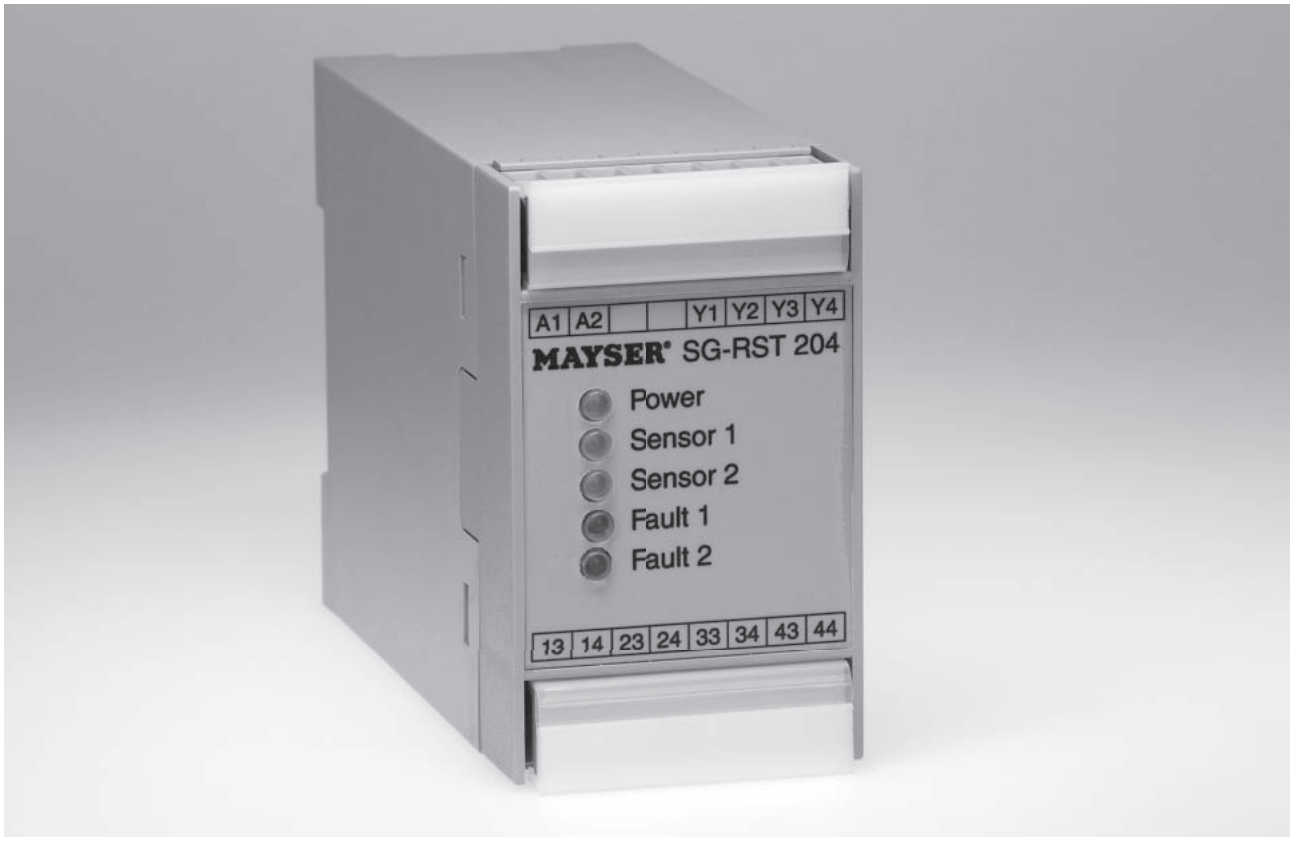
MAYSER®
Polymer Electric

Operating Instructions



Control Unit SG-RST 204

Version 1.0

1006265 SG-RST 204 24 V=

Original instructions

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.com
Internet: www.mayser.com

Contents

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 section *Installation*)	Cross-reference

Danger symbols and information

Symbol	Meaning
DANGER 	Immediate danger leading to death or serious injury.
WARNING 	Imminent danger which may lead to death or serious injury.
CAUTION 	Possible danger which may lead to minor or moderate injuries.
	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 8k2. The integrated output signal switching device (OSSD) transmits the evaluated safety signals directly to the downstream control.

The Control Unit has two input circuits, each of which independently activates two output circuits.
The Control Unit complies with ISO 13849-1:2006 Category 3 PL e. So that the safety classification is retained, the downstream control must be of the same or a higher category.

Safety instructions

➔ **Do not open the Control Unit**
Never open, tamper with or alter the Control Unit.

➔ **Check supply voltage**
Check supply voltage. It must correspond with the connecting voltage U_S on the type plate.

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

➔ **Maintain distance**
When installing in the switch cabinet, ensure sufficient distance from heat sources (at least 2 cm).

➔ **Observe pin assignment**
Observe pin assignment when connecting the supply voltage.

➔ **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.

➔ **Do not cross link Control Unit**
Do not cross link the Control Unit with other Control Units.
Terminals Y1, Y2, Y3 and Y4 are not voltage free.

➔ **Do not overload Control Unit**
Ensure that the specified switching current is not exceeded.

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

➔ **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

1× Control Unit
Enclosure with electronics module and plug connections with lift-up lock release.
1× Operating Instructions
1× Declaration of Conformity
Upon receipt of the parts supplied, check immediately for completeness and good condition.

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

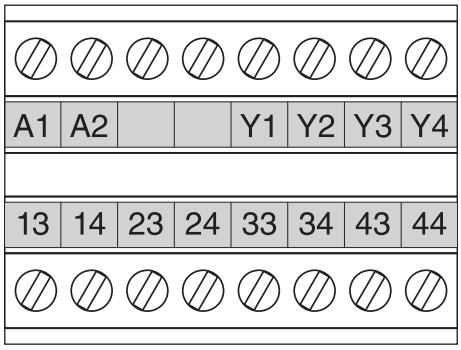
➔ Store the Control Units in the original packaging in a dry place.

➔ Observe the storage temperatures given in the technical specifications.

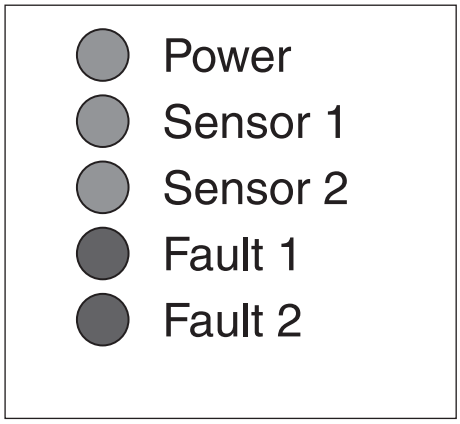
Product overview

Connections

Connections:	**Terminals:**
Supply voltage	A1, A2
Sensor 1 (8k2)	Y1, Y2
Sensor 2 (8k2)	Y3, Y4
Switching channel 1.1 (K1)	13, 14
Switching channel 1.2 (K2)	23, 24
Switching channel 2.1 (K3)	33, 34
Switching channel 2.2 (K4)	43, 44



LEDs information



- green LED “Power”:
  supply voltage connected
- green LED “Sensor 1”:
  sensor 1 not activated
- green LED “Sensor 2”:
  sensor 2 not activated
- red LED “Fault 1”:
  faulty sensor 1
- red LED “Fault 2”:
  faulty sensor 2

Function, installation and commissioning

Function

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 DC 24 V. If the supply voltage is connected, the green LED “Power“ is on.
When the sensors are not actuated and after a reset, relays K1, K2, K3 and K4 are energised. The green LEDs “Sensor 1“ and “Sensor 2“ are on.
When sensor 1 is actuated or the sensor 1 cable breaks, relays K1 and K2 are de-energised. The green LED “Sensor 1“ goes out, switching channels 1.1 and 1.2 are open.
When sensor 2 is actuated or the sensor 2 cable breaks, relays K3 and K4 are de-energised. The green LED “Sensor 2“ goes out, switching channels 2.1 and 2.2 are open.

Installation

WARNING

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.

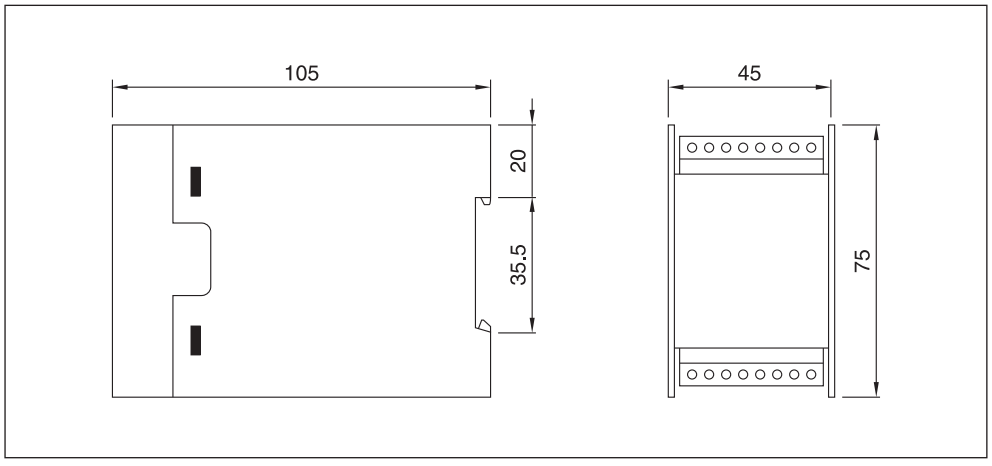
CAUTION

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 hest sources (at least 2 cm)

➔ Only use the Control Unit in zones that have a min. protection class of IP54 (eg. switch cabinet)



1. The enclosure of the Control Unit can be mounted in any position on a 35 mm IEC 60715 rail.

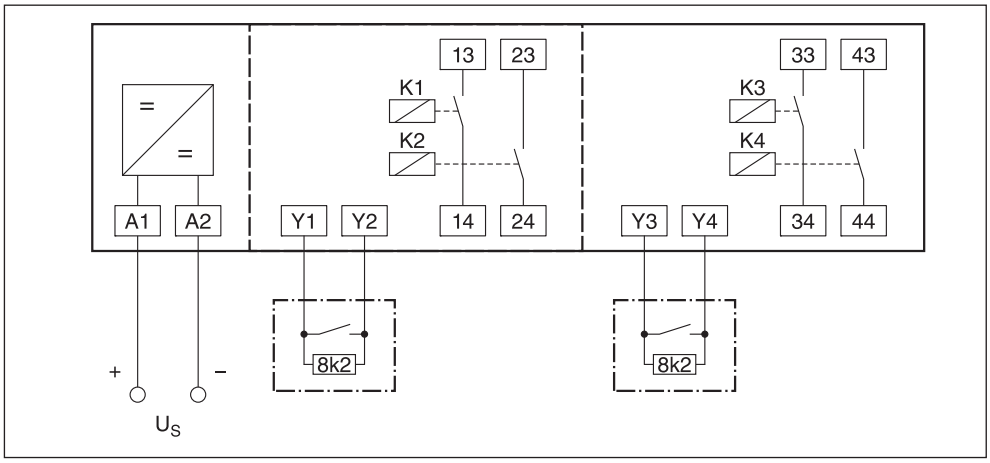
CAUTION

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 cable terminals.



Correlation

LEDs					Outputs		Remedy
Power green	Sensor 1 green	Sensor 2 green	Fault 1 red	Fault 2 red	13, 14 23, 24	33, 34 43, 44	LED off: ○ LED on: ☀
○	○	○	○	○	open	open	Supply voltage off
☀	☀	☀	○	○	closed	closed	Control unit ready
☀	☀	○	○	○	closed	open	Sensor 1 not activated; Sensor 2 activated
☀	○	☀	○	○	open	closed	Sensor 1 activated; Sensor 2 not activated
☀	○	○	○	○	open	open	Sensor 1 and Sensor 2 activated
☀	○	☀	☀	○	open	closed	Faulty sensor 1 (cable break); Sensor 2 not activated
☀	☀	○	○	☀	closed	open	Sensor 1 not activated; Faulty sensor 2 (cable break)
☀	○	○	☀	☀	open	open	Faulty sensor 1 and faulty sensor 2 (cable break)

Commissioning

1. Make sure the plug connections are firmly attached.

2. Connect the supply voltage.

WARNING

Danger of injury due to electrocution!

➔ Never disconnect terminals with the power on.

➔ Never unplug plug connections with the power on.

Test function

1. Make sure no sensors are activated.
   - green LEDs “Power”, “Sensor 1” and “Sensor 2” are on
   - contacts of switching channels 1.1, 1.2, 2.1 and 2.2 closed

2. Activate sensor 1.
   - green LED “Sensor 1” goes off
   - contacts of switching channels 1.1 and 1.2 open
   - contacts of switching channels 2.1 and 2.2 closed

3. Repeat step 1.

4. Activate sensor 2.
   - green LED “Sensor 2” goes off
   - contacts of switching channels 1.1 and 1.2 closed
   - contacts of switching channels 2.1 and 2.2 open

5. Repeat step 1.

6. Disconnect sensor 1.
   - green LED “Sensor 1” goes off
   - red LED “Fault 1” is on
   - contacts of switching channels 1.1 and 1.2 open
   - contacts of switching channels 2.1 and 2.2 closed

7. Repeat step 1.

8. Disconnect sensor 2.
   - green LED “Sensor 2” goes off
   - red LED “Fault 2” is on
   - contacts of switching channels 1.1 and 1.2 closed
   - contacts of switching channels 2.1 and 2.2 open

9. Repeat step 1.

Recommissioning

WARNING

Danger of injury!

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

Automatic reset

The Control Unit works without a reset function.
It has no re-start inhibit interlock.

If sensor 1 is enabled after actuation, relays K1 and K2 re-energise after a delay t_w.
If sensor 2 is enabled after actuation, relays K3 and K4 re-energise after a delay t_w.

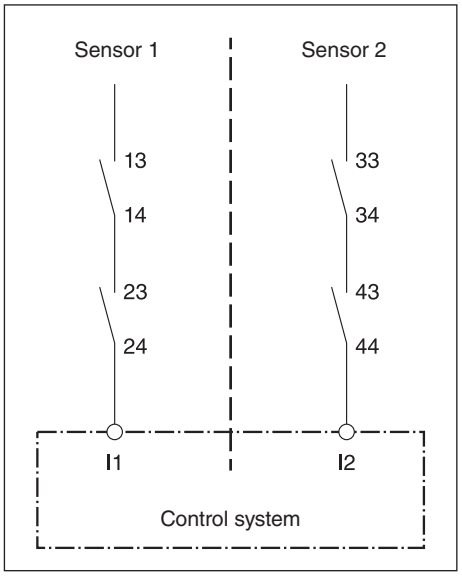
If a new sensor 1 is connected after cable break, relays K1 and K2 re-energise after a delay t_w.
If a new sensor 2 is connected after cable break, relays K3 and K4 re-energise after a delay t_w.

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

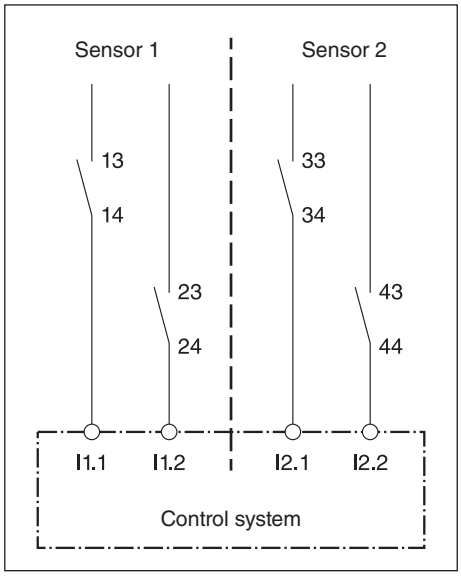
Connection examples

Contacts continued in two-channel mode

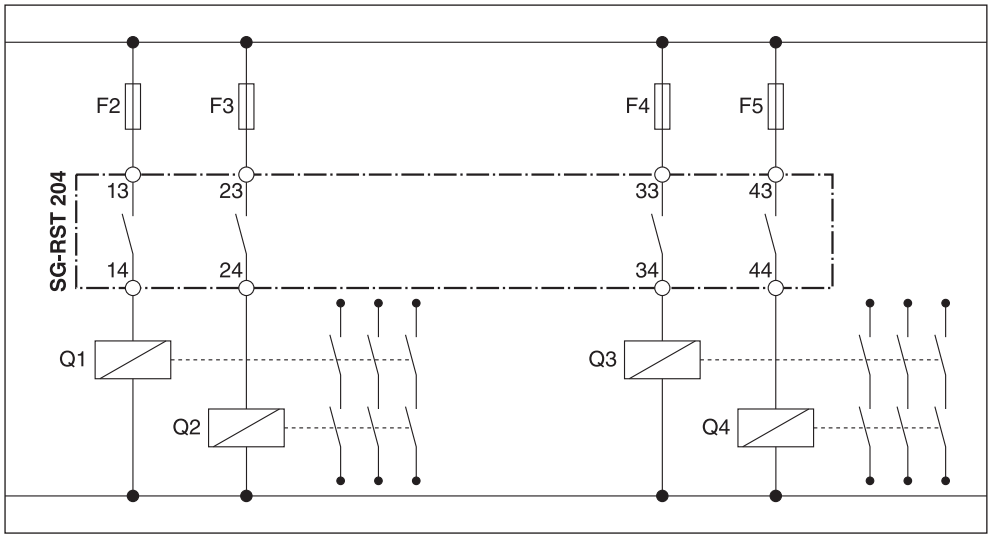
For control with 2 inputs



For control with 4 inputs



Contact duplication



Maintenance and cleaning

Maintenance

The Control Unit is maintenance-free.

➔ Repeat the operational test monthly.

Cleaning

WARNING

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.

➔ Clean the outside of the enclosure with a dry cloth.

Troubleshooting and remedies

Prerequisite: the Control Unit is connected to the supply voltage and sensor. No sensor is activated.

Fault display	Possible cause	Remedy
green LED “Power” off	No or incorrect supply voltage	1. Check supply voltage, compare with type plate 2. Check terminal connections
	With correctly connected supply voltage: Control Unit is faulty	➔ Replace Control Unit
green LED “Sensor 1” off	Incorrect monitoring resistor on sensor 1	➔ Connect sensor 1 with monitoring resistor 8k2
	Sensor 1 incorrectly connected	➔ Check terminal connections ➔ Sensor 1 with 8k2 connected to Y1 and Y2?
	With correct monitoring resistor: Control Unit is faulty	➔ Replace Control Unit
green LED “Sensor 2” off	Incorrect monitoring resistor on sensor 2	➔ Connect sensor 2 with monitoring resistor 8k2
	Sensor 2 incorrectly connected	➔ Check terminal connections ➔ Sensor 2 with 8k2 connected to Y3 and Y4?
	With correct monitoring resistor: Control Unit is faulty	➔ Replace Control Unit
green LEDs “Power” and “Sensor 1” are on and switching channels 1.1 and 1.2 are open	Control Unit is faulty	➔ Replace Control Unit
green LEDs “Power” and “Sensor 2” are on and switching channels 2.1 and 2.2 are open	Control Unit is faulty	➔ Replace Control Unit
red LED “Fault 1” is on	No sensor 1 connected	➔ Connect sensor 1
	Incorrect monitoring resistor on sensor 1	➔ Connect sensor 1 with monitoring resistor 8k2
	Sensor 1 incorrectly connected	➔ Check terminal connections ➔ Sensor 1 with 8k2 connected to Y1 and Y2?
	Cable break	➔ Replace sensor 1

Fault display	Possible cause	Remedy
red LED “Fault 2” is on	No sensor 2 connected	➔ Connect sensor 2
	Incorrect monitoring resistor on sensor 2	➔ Connect sensor 2 with monitoring resistor 8k2
	Sensor 2 incorrectly connected	➔ Check terminal connections ➔ Sensor 2 with 8k2 connected to Y3 and Y4?
	Cable break	➔ Replace sensor 2

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 devices 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

CE

The design type of the product complies with the basic requirements of the following directives:

- 2006/42/EC (Safety of Machinery)
- 2004/108/EC (EMC)

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

Technical Data

SG-RST 204	DC 24 V	
Testing basis	EN 12978, ISO 13849-1, ISO 13856-1, ISO 13856-2, ISO 13856-3	
Connecting voltage U_S		
Nominal voltage	DC 24 V	
Voltage tolerance	-10% to +10%	
Nominal current	100 mA	
Nominal frequency	–	
Protection external	200 mA slow-acting	
Power consumption	< 5 W	
Times		
Reaction time t_a	< 20 ms	
Re-start time t_w	< 50 ms	
Safety classifications		
ISO 13856: Reset	without	
ISO 13849-1:2006	Category 3 PL e	
$MTTF_d$	306 years	
DC_{avg}	90%	
B_{10d} (Load: DC 24 V / 1 A)	2×10^6	
n_{op} (estimate)	52560 per year	
CCF	Requirements fulfilled	
IEC 60664-1: Creep distance and air gap	soiling degree 2, overvoltage category III / 250 V, basic insulation	
Inputs		
Sensor	1: Y1, Y2	2: Y3, Y4
Monitoring resistor	8k2 Ohm	8k2 Ohm
Short-circuit resistance	≤ 400 Ohm	≤ 400 Ohm
Line resistance	≤ 10 Ohm	≤ 10 Ohm
Line length (max.)	100 m	100 m
Switching thresholds		
Sensor activated	< 4 kOhm	< 4 kOhm
Cable break	> 13 kOhm	> 13 kOhm
Outputs		
Switching channel 1.1, 1.2, 2.1 and 2.2 (NO contact)	13, 14 / 23, 24 / 33, 34 and 43, 44	
Utilization category	AC-12: 250 V / 2 A	
as per EN 60947-5-1	DC-12: 24 V / 2 A	
Switching voltage (max.)	AC 250 V	DC 24 V
Switching current (max.)	2 A	2 A
Switching capacity (max.)	500 VA	48 W
Switching operations, mechanical	$> 1\times 10^7$	
Switching operations, electrical	$> 2\times 10^6$ (DC 24 V / 2 A)	
Contact fuse protection external	3 A quick-acting	
Line length (max.)	30 m	

SG-RST 204	DC 24 V
Mechanical operating conditions	
Cable terminals	2× 8-pin
solid wire	1× 2,5 mm^2 or 2× 1,0 mm^2
strand without sheath	1× 2,5 mm^2 or 2× 1,5 mm^2
strand with sheath	1× 2,5 mm^2 or 2× 1,0 mm^2
Degree of protection as per IEC 60529	IP20
max. humidity (23 °C)	95%
Operating temperature	-25 to +55 °C
Storage temperature	-25 to +55 °C
Impact resistance in operation	2,5 g
Impact resistance transport	10 g
Dimensions (W × H × D)	45 × 75 × 105 mm
Weight	230 g