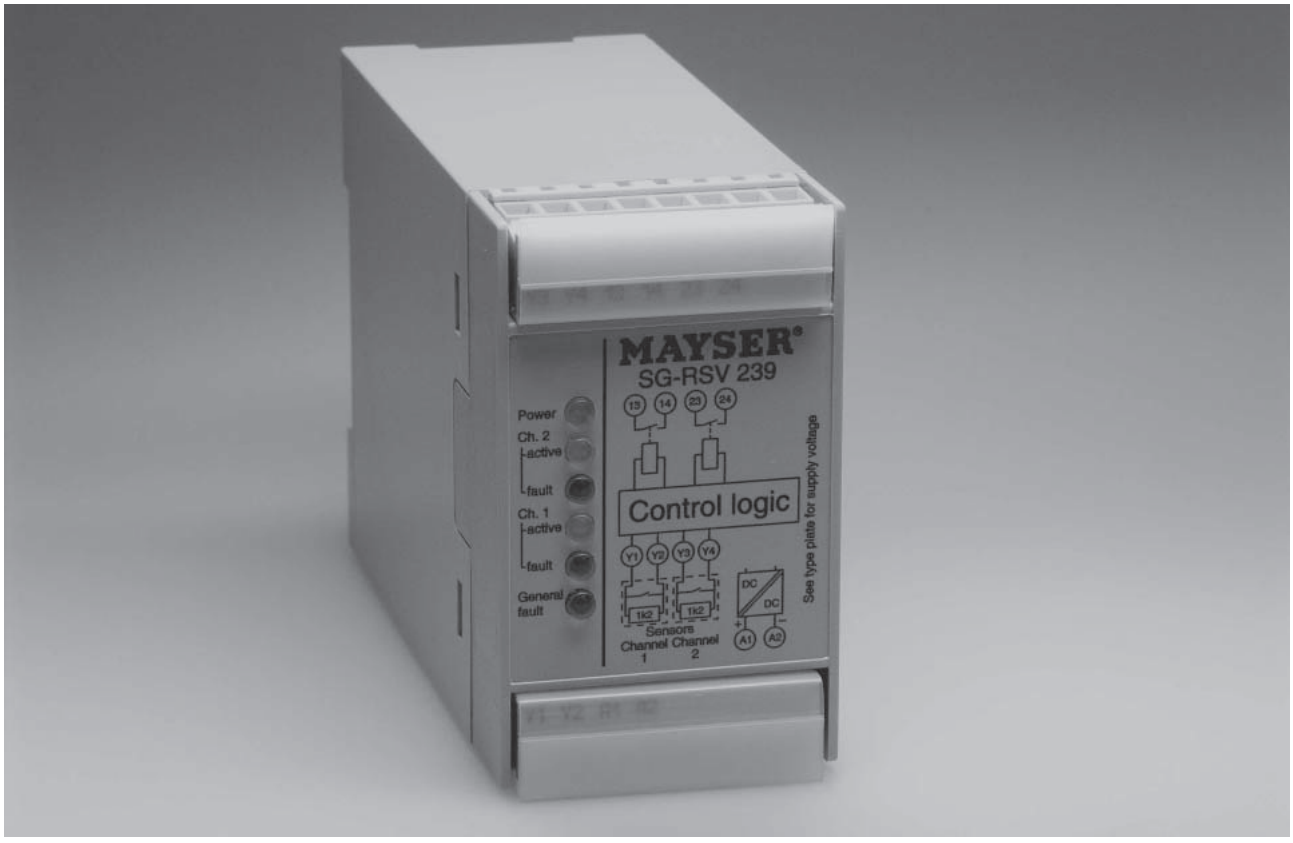
MAYSER®

Innovative by tradition.

Operating Instructions



Control Unit SG-RSV 239

Version 1

1003986	SG-RSV 239/24	24 V=
1005372	SG-RSV 239/36	36 V=
1003271	SG-RSV 239	50-150 V=

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Original instructions

MAYSER®

Contents

About these operating instructions

These operating instructions are part of the product.
Mayser 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 sensor. It evaluates the output signals of sensors with monitoring resistor 1k2. The integrated output signal switching device (OSSD) transmits the evaluated signals directly to the downstream control.

A system consisting of Control Unit SG-RSV 239 and sensors is not suitable for use as a protective device as defined by EN ISO 13856 or EN 12978.

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 and Y3, Y4 are not voltage free.

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

➔ **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

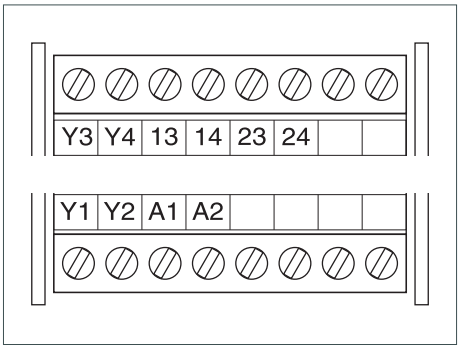
➔ Store the Control Units in the original packaging in a dry place.

➔ Observe the storage temperatures given in the technical specifications.

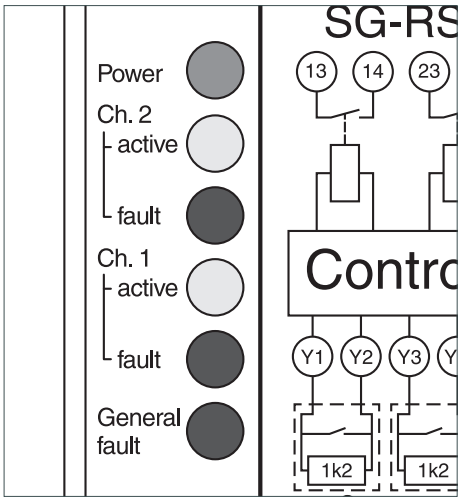
Product overview

Connections

Connections:	**Terminals:**
Supply voltage	A1, A2
Input sensor:	
“Sensor Channel 1”	Y1, Y2
“Sensor Channel 2”	Y3, Y4
Output switching channel:	
“Fault”	13, 14
“Activated”	23, 24



LEDs information



- green LED “Power”: supply voltage connected
- yellow LED “Ch. 2 active”: channel 2 activated
- red LED “Ch. 2 fault”: channel 2 fault
- yellow LED “Ch. 1 active”: channel 2 activated
- red LED “Ch. 1 fault”: channel 1 fault
- red LED “General fault”: internal error

Function, installation and commissioning

Function

The electronic system monitors the electrical resistance of the connected sensors with a defined zero signal current.
The Control Unit is powered with DC 24 V (1003986) or DC 36 V (1005372) or DC 50-150 V (1003271). When the supply voltage is connected, the green LED "Power" is on.
When the sensors are not activated the relays are energised, the switching channels "Activated" and "Fault" are closed.
If one of the sensors is activated the relay is de-energised. The yellow LED „Ch. 1 active" or/and the yellow LED „Ch. 2 active" is on, the switching channel "Activated" is open.
If the sensor cable breaks the relay is de-energised. The red LED "Ch. 1 fault" or/and the red LED "Ch. 2 fault" is on, the switching channel "Fault" is open. If a functioning sensor is connected instead, the device remains in fault mode. The red LED "Ch. 1 fault" or/and the red LED „Ch. 2 fault" is on, the switching channel "Fault" stays open. An interruption of at least 500 ms to the supply voltage will reset the fault mode.
Input "Sensor Channel 2" can be bridged with a resistor 1k2 if it is not required.

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

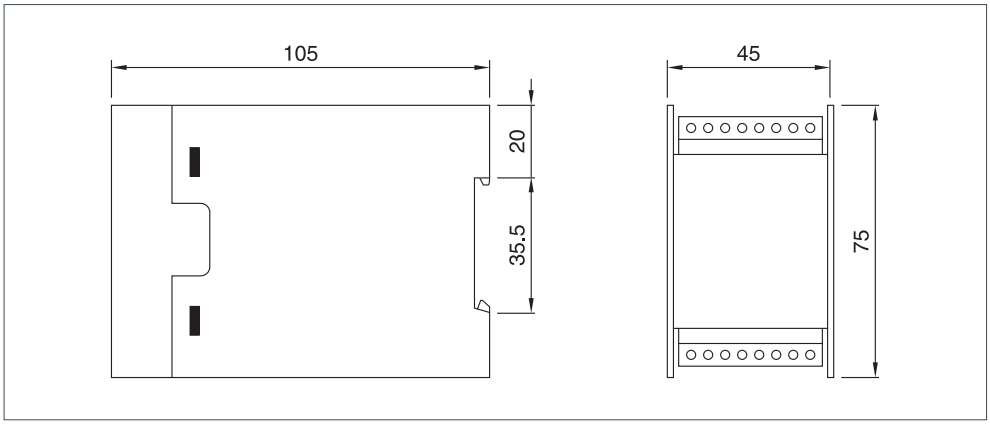
Impaired operation due to overheating or incorrect degree of protection

The operation of the device may be impaired due to overheating of the Control Unit or due to incorrect choice of degree of protection.

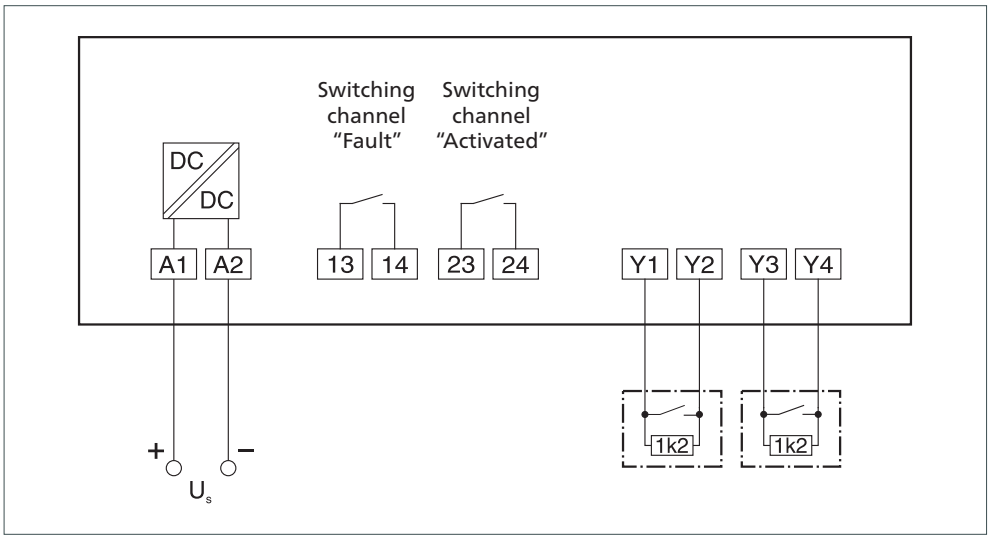
➔ When installing in the switch cabinet, ensure sufficient distance from heat sources (at least 2 cm)

➔ 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.



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



Commissioning

1. Make sure the plug connections are firmly attached.

2. Connect the supply voltage.

WARNING

Danger of injury due to electrocution!

➔ Never unplug plug connections with the power on.

Testing the function

1. Make sure all is connected and no sensors are activated.
   - green LED “Power” is on
   - contacts of switching channels “Fault” and “Activated” closed

2. Activate sensor 1.
   - yellow LED “Ch. 1 active” is on
   - contact of switching channel “Activated” open

3. Repeat step 1.

4. Activate sensor 2.
   - yellow LED “Ch. 2 active” is on
   - contact of switching channel “Activated” open

5. Repeat step 1.

6. Disconnect sensor 1.
   - red LED “Ch. 1 fault” is on
   - contact of switching channel “Fault” open

7. Connect the sensor again.

8. Interrupt the power supply for at least 500 ms.
   - the Control Unit will restart.

9. Repeat step 1.

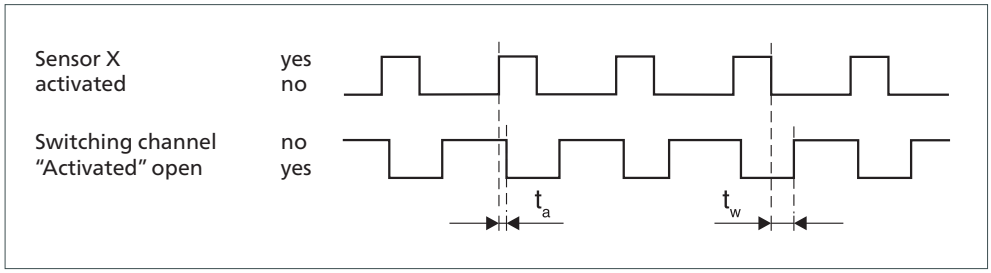
10. Disconnect sensor 2.
    - red LED “Ch. 2 fault” is on
    - contact of switching channel “Fault” open

11. Connect the sensor again.

12. Interrupt the power supply for at least 500 ms.
    - the Control Unit will restart.

13. Repeat step 1.

Flowchart



	Control Unit SG-RSV	239/24	239/36	239
t_a	Reaction time	15 ms	15 ms	15 ms
t_w	Re-start time	125 ms	125 ms	125 ms

Correlation

LED						Bedeutung
Power green	Ch. 2 active yellow	Ch. 2 fault red	Ch.1 active yellow	Ch. 1 fault red	General fault red	LED off: ○ LED on: ☀
☀	○	○	○	○	○	Supply voltage on, Control Unit ready
☀	○	○	☀	○	○	Sensor 1 activated, switching channel "Activated" open
☀	☀	○	○	○	○	Sensor 2 activated, switching channel "Activated" open
☀	☀	○	☀	○	○	Sensors 1 and 2 activated, switching channel "Activated" open

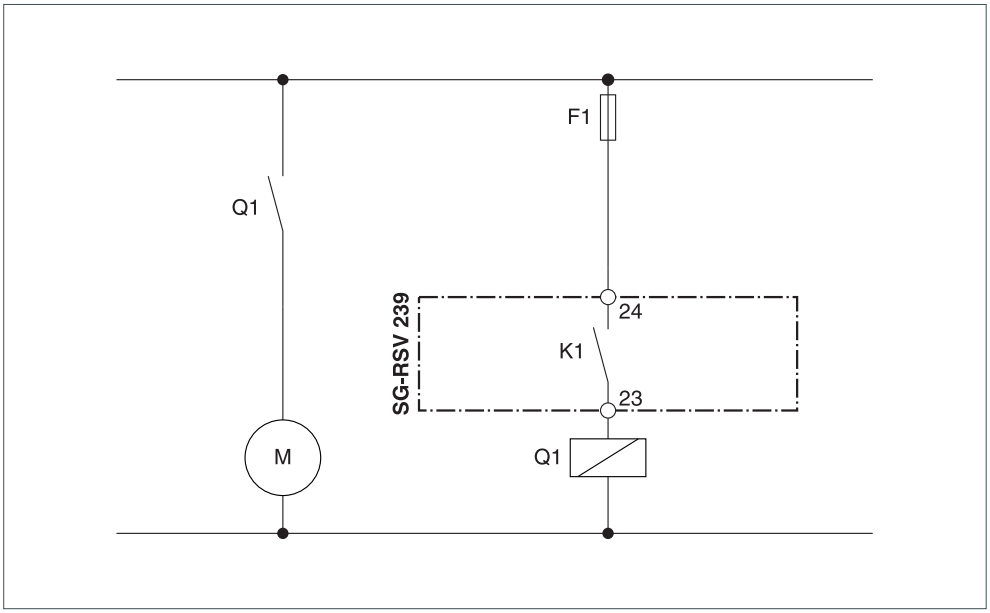
Recommissioning

Automatic reset

The Control Unit works without reset. If the sensor is enabled after actuation, the relay re-energises after a delay t_w

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

Connection example



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.

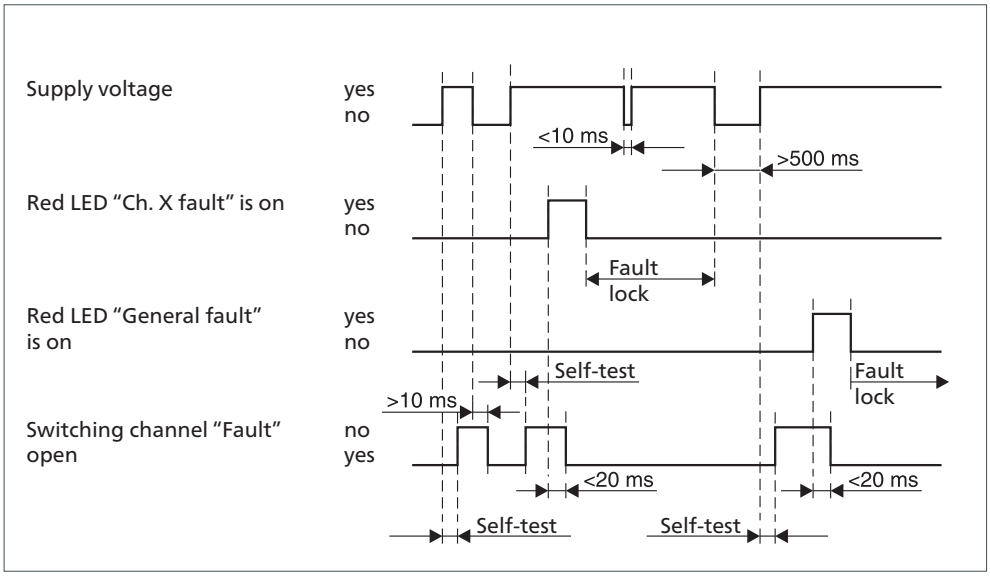
Fault display	Possible cause	Remedy
green LED “POWER” off	No or incorrect supply voltage	1. Check supply voltage, compare with type plate 2. Check terminal connections
	With correctly connected supply voltage: Control Unit is faulty	➔ Replace Control Unit
yellow LED “Ch. X active” is on, although sensor X not activated	Sensor or supply line is faulty (short-circuit)	1. Check resistance of sensor X: set value = 1k2 ±5% 2. Actual value ≠ set value: replace sensor X 3. Connect resistor 1k2 instead of sensor X 4. Disconnect supply voltage for min. 500 ms 5. Fault no longer exists: replace sensor X 6. Fault still exists: Replace Control Unit
yellow LED “Ch. X active” off and switching channel “Activated” open	Control Unit is faulty	➔ Replace Control Unit

Fault display	Possible cause	Remedy
yellow LED “Ch. X active” off, sensor X activated, switching channel “Activated” is closed	Sensor or supply line is faulty (Resistance change too low)	1. Check resistance of activated sensor X: set value < 300 Ohm 2. Actual value > 300 Ohm: replace sensor X 3. Fault still exists: replace Control Unit
red LED “Ch. X fault” is on	Sensors or supply lines are faulty (cable break)	1. Check resistance of sensor X: set value = 1k2 ±5% 2. Actual value ≠ set value: replace sensor X 3. Connect resistor 1k2 instead of senor X 4. Disconnect supply voltage for min. 500 ms 5. Fault no longer exists: replace sensor X and supply lines 6. Fault still exists: Replace Control Unit
red LED “Ch. X fault” is on and switching channel “Fault” open	Sensors or supply lines are faulty (cable break)	1. Check resistance of sensor X: set value = 1k2 ±5% 2. Actual value ≠ set value: replace sensor X 3. Connect resistor 1k2 instead of senor X 4. Disconnect supply voltage for min. 500 ms 5. Fault no longer exists: replace sensor X and supply lines 6. Fault still exists: Replace Control Unit
neither red LED “Ch. X fault” nor red LED “General fault” are on, although switching channel “fault” is open	Control Unit is faulty	➔ Replace Control Unit
red LED “General fault” is on	Control Unit is faulty	➔ Replace Control Unit
Sensor X interrupted and switching channel “fault” closed	Control Unit is faulty	1. Connect resistor 1k2 instead of sensor X 2. Disconnect supply voltage for min. 500 ms 3. Fault no longer exists: replace sensor X 4. Fault still exists: replace Control Unit

Fault can still not be detected?

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

Flowchart



Correlation

LEDs						Remedy
Power green	Ch. 2 active yellow	Ch. 2 fault red	Ch. 1 active yellow	Ch. 1 fault red	General fault red	LED off: ○ LED on: ☀
☀	○	○	○	☀	○	Sensor 1: cable break, switching channel "Fault" open
☀	☀	○	○	☀	○	Circuit "Sensor 1": internal error, switching channel "Fault" open; sensor 2 activated, switching channel "Activated" open
☀	○	○	☀	☀	○	Circuit "Sensor 1": internal error, switching channel "Fault" open; sensor 1 activated, switching channel "Activated" open
☀	○	○	☀	☀	☀	Circuit "Sensor 1": internal error, switching channel "Fault" open
☀	○	☀	○	○	○	Sensor 2: cable break, switching channel "Fault" open
☀	☀	☀	○	○	○	Circuit "Sensor 2": internal error, switching channel "Fault" open; sensor 2 activated, switching channel "Activated" open
☀	○	☀	☀	○	○	Circuit "Sensor 2": internal error, switching channel "Fault" open; sensor 1 activated, switching channel "Activated" open
☀	☀	☀	○	○	☀	Circuit "Sensor 2": internal error, switching channel "Fault" open

Replacement parts

CAUTION

Impaired operation

If the sensor and Control Unit are not replaced with original parts from Mayser, operation of the system 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:

- 2004/108/EC (EMC)

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

Technical Data

SG-RSV 239	DC 24 V (S2)	DC 36 V (S2)	DC 50-150 V (S2)
Testing basis	EN 50121-3-2, EN 50155, ISO 13849-1		
Connecting voltage U_s			
Nominal voltage	DC 24 V	DC 36 V	DC 50-150 V
Voltage tolerance	-30% to +30%	-30% to +25%	–
Nominal current	38 mA	25 mA	8-20 mA
Protection external	250 mA slow-acting	250 mA slow-acting	250 mA slow-acting
Power consumption	< 2 W	< 2 W	< 2 W
Times			
Reaction time t_a	< 15 ms		
Re-start time t_w	< 125 ms		
Safety classifications			
ISO 13856: reset	without		
ISO 13849-1:2006	Category B PL b		
$MTTF_d$	38 a		
DC_{avg}	–		
B_{10d} (Load: DC 110 V / 0,2 A)	1×10^5		
n_{op} (estimate)	100,000/a		
CCF	–		
EN 50155: interrupts (U_s)	Class S2		
Inputs			
Sensor 1 and 2	Y1, Y2 and Y3, Y4		
Monitoring resistor	1k2 Ohm		
Input voltage (max.)	DC 5 V		
Switching thresholds			
Sensor activated	< 340 Ohm		
Cable break	> 2k7 Ohm		
Outputs			
Switching channel (NO contact) “Fault” / “Activated”	13, 14 / 23, 24		
Utilization category	AC-12: 250 V / 1 A		
as per EN 60947-5-1	DC-12: 150 V / 1 A		
Switching voltage (max.)	AC 250 V	DC 150 V	
Switching voltage (min.)	AC 10 V	DC 10 V	
Switching current (max.)	1 A	1 A	
Switching current (min)	10 mA	10 mA	
Switching capacity (max.)	250 VA	30 W	
Switching operations			
mechanical	$> 2\times 10^7$		
electrical	$> 1\times 10^7$ (DC 24 V / 10 mA)		
	$> 1\times 10^5$ (DC 110 V / 0.2 A)		
Contact fuse protection external	1 A slow-acting		

SG-RSV 239	DC 24 V (S2)	DC 36 V (S2)	DC 50-150 V (S2)
Mechanical operating conditions			
Cable terminals	2× 8-pin		
solide wire	1× 2.5 mm^2 or 2× 1 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 mm^2		
IEC 60529: degree of protection	IP20		
max. humidity (23 °C)	95%		
Operating temperature	-40 to +70 °C		
Storage temperature	-40 to +70 °C		
EN 50155: temperature class	TX		
Vibration fatigue limit			
Frequency range	5 to 150 Hz		
Excursion amplitude	± 2 mm		
Acceleration amplitude	5 g in all 3 levels		
Dimensions (W × H × D)	45 × 75 × 105 mm		
Weight	175 g		