



## Operating Instructions



## Control Unit SG-CSL 102

Version 1

1005993 SG-CSL 102 24 V=

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Original instructions

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## About these operating instructions

These operating instructions are part of the product. Mayer accepts no responsibility or warranty claims for damage and consequential damage due to failure to observe the operating instructions.

- ➔ Read the operating instructions carefully before use.
- ➔ Keep the operating instructions for the complete service life of the product.
- ➔ Pass the 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 <i>Installation</i> )	Cross-reference

## Danger symbols and information

Symbol	Meaning
<p><b>DANGER</b></p> 	Immediate danger leading to death or serious injury.
<p><b>WARNING</b></p> 	Imminent danger which may lead to death or serious injury.
<p><b>CAUTION</b></p> 	Possible danger which may lead to minor or moderate injuries.
	Information on easier and safer working practices.

## Intended use

The Control Unit is designed as signal processing of non-contact collision protection on bus and train doors. It evaluates change in the capacitive field present around the sensor. The integrated output signal switching device transmits the evaluation of the capacitive field to the door control.

The collision protection system consists of the Control Unit SG-CSL 102 and sensor(s) C-SL. It is not suitable for operational safety per EN 50128 and EN 50129.

## 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 to heat sources (at least 2 cm).

➔ **Observe pin assignment**

Observe pin assignment when connecting the supply voltage.

➔ **Do not cross link control unit**

Do not cross link the control unit with other control units.

The terminals OUT, Y1, Y2, Y3, Y4, Y5 and Y6 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

**1x Control Unit**

Enclosure with electronics module and plug connections with lift-up lock release.

**1x Operating Instructions**

**1x 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

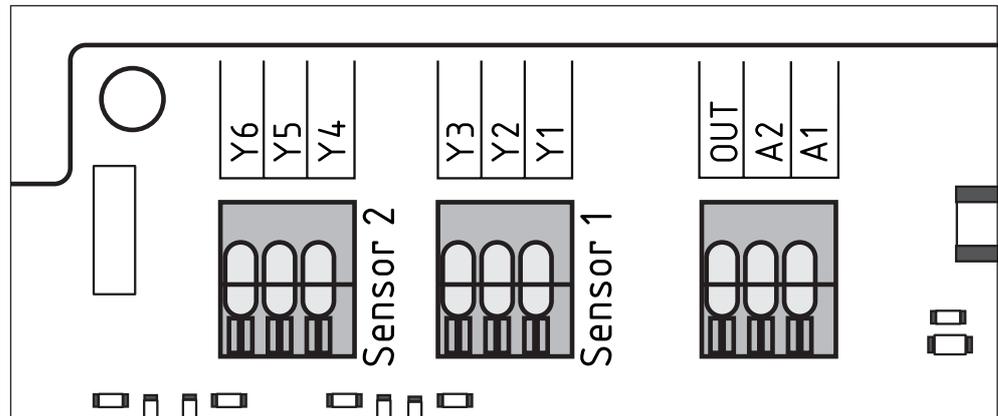
➔ Store the control units in the original packaging in a dry place.

➔ Observe the storage temperatures given in the technical specifications.

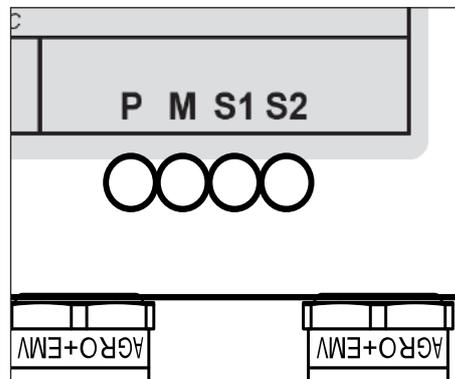
## Product overview

### Connections

Connections:	Terminals:
Supply voltage	A1, A2
Input sensor:	
Sensor 1	Y1, Y2, Y3
Sensor 2	Y4, Y5, Y6
Output:	OUT

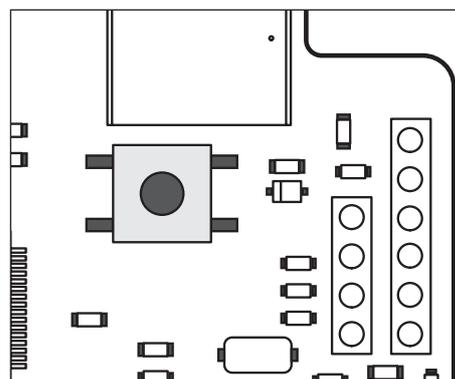


### LEDs information



- green LED P: Control Unit ready
- yellow LED M: Output "OUT" is switched to "LOW-Active"
- yellow LED S1: sensor 1 activated
- yellow LED S2: sensor 2 activated

### Button



Button for teach-in

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## Function, installation and commissioning

### Function

The electronic system constantly monitors the electrical field between the sensor and the ground or between the sensor and the vehicle chassis. The system readjusts gradual changes in temperature or humidity. This has no effect on the field.

If bodies or parts of body enter the electrical field of the sensor, these affect the field. The Control Unit detects the change in the field, evaluates it and transmits the result to the door control via the semiconductor output "OUT". When the supply voltage is connected, the green LED P (Power) is on. If the field of the two sensors is not affected, the semiconductor output "OUT" is set to LOW. The LEDs S1 (sensor 1 activated) and S2 (sensor 2 activated) are off. If a body enters the field of 1 of the 2 sensors, the output "OUT" changes to "HIGH". The yellow LED S1 or/and the yellow LED S2 are on.

The semiconductor outputs can be used as "HIGH-Active" (activated = logical 1) or as "LOW-Active" (activated = logical 0).

The system is designed in such a way that the two closing doors do not detect each other. It is always active. This means that after closing and when opening, the door control must ignore the output signal of the collision protection system.

The range of the electrical field depends on the size of the body detected. In unfavourable conditions, physical contact may occur despite the collision protection system, e.g. in the event of slow signal processing of the door control or too high a door speed.

The unit only displays faults which have occurred after the next re-start. The "OUT" output switches to "HIGH" and the LEDs display the code. The unit thus contributes to fault-free operation of the vehicle.

### Installation

#### Mounting the Enclosure

#### 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

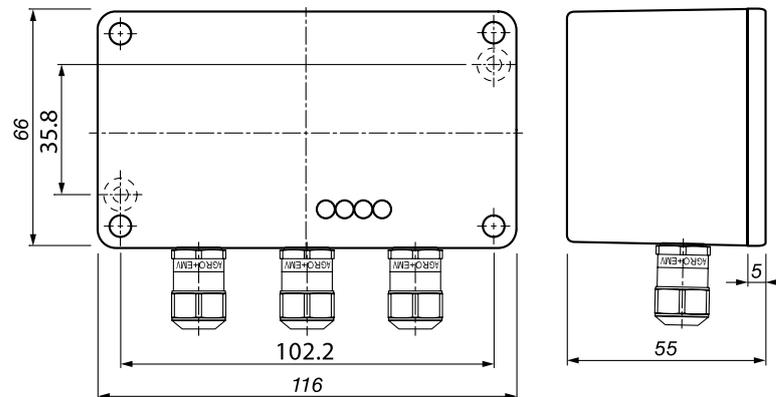


#### Impaired operation due to overheating

Operation 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).

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



## CAUTION



### Impaired operation due to lack of earthing!

- ➔ Carefully check the earthing of the Control Unit and the door panel.
- ➔ Only use the Control Unit in PELV power circuits.

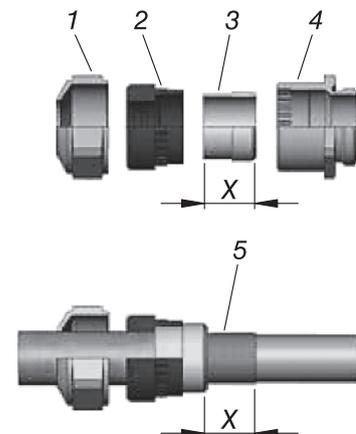
The Control Unit has functional earthing.

- ➔ Install the housing on an earthed installation surface.
- ➔ Select screws that ensure low Ohm connection between the enclosure and the installation surface.

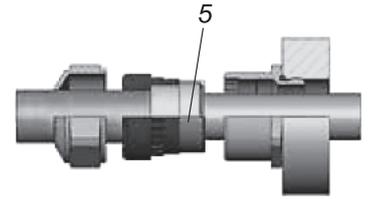
### Wiring the unit cable

#### How to install the cable screw connection:

1. Undo pressure nut (1), sealing insert (2) and contact sleeve (3) from lower section (4) and pull over the cable.
2. Strip outer sheath of cable to 70 mm.
3. Shorten shielding braid or shielding film to length of contact sleeve (X = approx. 8 mm).
4. Push contact sleeve, sealing insert and pressure nut up to the end of the sheath.

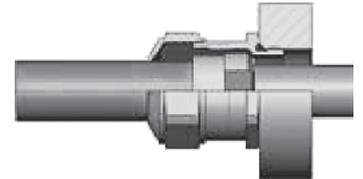


5. Place shielding braid (5) or shielding film over contact sleeve and cut off protruding shielding material.



6. Feed cable through the assembled lower section of the cable screw connection.

7. Place sealing insert and contact sleeve flush into the lower section.



8. Screw pressure nut to the lower section until the sealing set forms a small bulge between the sealing nut and the cable.

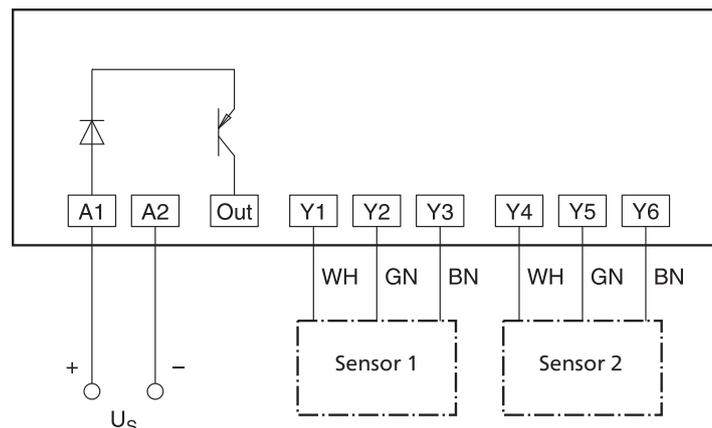


### Operation endangered

The quality and reliability of the interfaces influence operation.

- ➔ Configure the interfaces very carefully.
- ➔ When performing these actions, avoid touching and soiling the electronics.
- ➔ Check the shielding.
- ➔ Ensure the correct seat of the seal in the lid.

➔ Wire the sensors, semi-conductor contact and supply voltage to the cable terminals.



### Colour coding:

- WH white
- GN green
- BN brown

## Commissioning

➔ Connect the supply voltage.

WARNING



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### Danger of injury due to electrocution

➔ Never disconnect terminals with the power on.

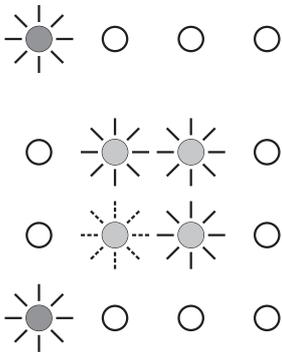
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### Carry out teach-in

To adapt the collision protection system to the installation environment, a teach-in has to be carried out after connecting the supply voltage. Fault-free operation cannot be ensured without a teach-in.

### Carry out a teach-in as follows:

Prerequisite: the enclosure cover is removed, supply voltage is connected.



1. Open the door(s).
2. Make sure that there is nothing in the detection field – minimum distance 25 cm (this includes you and your limbs!).
3. Keep the button pressed until only LEDs M and S1 are still on. Shortly thereafter, LED M begins to flash irregularly. LED S1 is on.

The system is now in teach-in mode for approx. 10 secs.  
If thereafter only LED P is on, teach-in was successful. If not, repeat the teach-in.

4. Close the door(s).
5. Open the door(s).
6. Carry out a functional test (see chapter *Testing the Function*).
7. Reinstall the enclosure cover.

### Testing the function

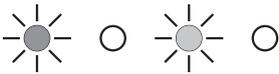
Prerequisite: the enclosure cover is removed, supply voltage is connected.

1. Carry out a teach-in (see chapter *Carry out teach-in*)



2. If the sensors are not activated, test the LEDs and output "OUT":

- LED P is on
- Output "OUT" = LOW



3. If sensor 1 is activated, test the LEDs and output "OUT":

- LED S1 (sensor 1) is on
- Output "OUT" = HIGH



4. If sensor 2 is activated, test the LEDs and output "OUT":

- LED S2 (sensor 2) is on
- Output "OUT" = HIGH

5. If the functional test is faulty, repeat the teach-in.

6. Reinstall the enclosure cover.

### Change output "OUT"

When delivered, the semi-conductor output "OUT" is pre-set to "High-Active".

#### How to change output "OUT":

Prerequisite: the enclosure cover is removed, supply voltage is connected.

1. Hold the button pressed for 5 secs. until the LED M is on.

The output is inverted.

2. Reinstall the enclosure cover.

If output "OUT" is switched to "LOW-Active", the output modes in the chapter *Check function* are to be regarded as inverted.

Any further change of output "OUT" inverts the operating condition.

## Recommissioning

### Automatic reset

The Control Unit works without a reset function. If the sensor is released after actuation, the output "OUT" returns to "LOW".

- ➔ Check for proper functioning after recommissioning (see Section *Commissioning*).

## Maintenance and cleaning

### Maintenance

The control unit is maintenance-free.

- ➔ Repeat the operational test monthly.

### Cleaning

#### WARNING



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#### 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.
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- ➔ 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.

LEDs				Sequence	Meaning	
LED P green	LED M yellow	LED S1 yellow	LED S2 yellow		LED off: ○ LED on: 	
				Start	Fault 1	
○	○	○	○			
	○		○	1x		
○	○	○	○			
				Start		Fault 2
○	○	○	○			
	○		○	2x		
○	○	○	○			
				Start	Fault 3	
○	○	○	○			
	○		○	3x		
○	○	○	○			
• • •						
				Start		Fault n
○	○	○	○			
	○		○	nx		
○	○	○	○			

Fault display	Possible cause	Elimination
Green LED P is off	No or incorrect supply voltage	1. Check supply voltage, compare with type plate 2. Check terminal connections
	internal overcurrent protection has triggered	➔ Disconnect the control unit from the supply voltage for 5 mins.
	Fault still exists	➔ Replace Control Unit
Fault 1	Sensor 1 and sensor 2 or their supply lines defective (cable break)	1. Replace sensor 1 and sensor 2 2. Carry out a teach-in
	Fault still exists	➔ Replace control unit
Fault 2	Sensor 1 or supply line faulty (short-circuit)	1. Replace sensor 1 2. Carry out a teach-in
	Sensor 1 faulty (sensor electronics defective)	1. Replace sensor 1 2. Carry out a teach-in
	Fault still exists	➔ Replace Control Unit
Fault 3	Sensor 2 or supply line faulty (short-circuit)	1. Replace sensor 2 2. Carry out a teach-in
	Sensor 2 faulty (sensor electronics defective)	1. Replace sensor 2 2. Carry out a teach-in
	Fault still exists	➔ Replace Control Unit
Fault 4	Sensor 1 and sensor 2 or their supply line faulty (short-circuit)	1. Replace sensor 1 and sensor 2 2. Carry out a teach-in
	Sensor 1 and sensor 2 faulty (sensor electronics defective)	1. Replace sensor 1 and sensor 2 2. Carry out a teach-in
	Fault still exists	➔ Replace Control Unit
Faults 5 to 15	Internal error	➔ Disconnect the control unit from the supply voltage for 10 secs.
	Fault still exists	➔ Replace Control Unit

The fault can still not be removed?

➔ Contact the Mayser support: Phone +49 731 2061-0.

## Replacement parts

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CAUTION



### Overall safety endangered

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

➔ Only use original parts from Mayser.

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## 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



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

- 2014/30/EU (EMC)

The Declaration of Conformity is available in the download section of the website: [www.mayser.com/en/downloads](http://www.mayser.com/en/downloads)

## Technical data

SG-CSL 102	DC 24 V PELV
Testing basis	EN 45545-5, EN 50121-3-2, EN 50124, EN 50125-1, EN 50153, EN 50155
<b>Connecting voltage <math>U_s</math></b>	
Nominal voltage	DC 24 V PELV
Voltage tolerance	-30% to +25%
Nominal current	< 150 mA
Nominal frequency	-
Power consumption	< 5 W
<b>Times</b>	
Reaction time $t_a$	< 500 $\mu$ s
Re-start time $t_w$	< 15 s
<b>Inputs</b>	
Sensor 1	Y1, Y2, Y3
Sensor 2	Y4, Y5, Y6
Operation principle	Capacitive sensor
Line length (max.)	5 m
<b>Outputs</b>	
Semi-conductor output	OUT
Switching voltage (max.)	$U_s - 0.7$ V
Switching current (max.)	100 mA
Line length (max.)	30 m
<b>Mechanical operating conditions</b>	
Door speed (typ.)	200 mm/s
Cable terminals	3x 3-pin
Solid wire	0.25 to 0.5 mm <sup>2</sup>
Strand without sheath	0.25 to 0.5 mm <sup>2</sup>
Strand with sheath	0.25 mm <sup>2</sup>
IEC 60529: protection class	IP20
max. humidity (23 °C)	95%
Operating temperature	-40 to +70 °C
Storage temperature	-40 to +70 °C
EN 50125-1: elevation	A1 (AX on request)
EN 50155:	
Temperature class	TX
Interrupt class	S2
Switch-over class	C1
Dimensions (W x H x D)	116 x 83 x 55 mm
Weight	370 g