



## Normally closed safety edges SL NC II



EN | Installation instructions

### Mayser GmbH & Co. KG

Örlinger Straße 1-3

89073 Ulm

GERMANY

Phone: +49 731 2061-0

Fax: +49 731 2061-222

E-mail: [info.ulm@mayser.com](mailto:info.ulm@mayser.com)

Internet: [www.mayser.com](http://www.mayser.com)

Original instructions

## Safety first!



- Read the manual carefully before use.
- Warning signs in the manual warn of unexpected dangers. Always observe warning signs.
- Retain the manual throughout the service life of the product.
- Pass the manual on to every subsequent owner or user of the product.
- Insert every supplement received from the manufacturer into the manual.
- **Observe chapter on Safety starting on page 5.**

## Conformity



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

- 2006/42/EC (Safety of machinery)
- 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)

### Copyright

The reproduction, distribution and utilization of this document as well as the communication of its contents without express authorization are prohibited. Offenders will be held liable for the payment of damages. All rights reserved in the event of the grant of a patent, utility model or design.

© Mayser Ulm 2020

---

## Contents

<b>About this manual .....</b>	<b>4</b>
<b>Safety.....</b>	<b>5</b>
Intended use .....	5
Safety instructions.....	5
Residual dangers .....	6
<b>Parts supplied .....</b>	<b>6</b>
<b>Storage .....</b>	<b>6</b>
<b>Installation.....</b>	<b>7</b>
Preparing the installation .....	7
Unpacking the product.....	7
Separate the aluminium profile from the rubber profile.....	8
Mount aluminium profile.....	8
Clip in rubber profile.....	9
Laying cables .....	9
Sensor system check.....	11
<b>Commissioning.....</b>	<b>11</b>
Testing.....	11
Safety edge connected directly to a machine controller .....	11
Safety edge in combination with a control unit (optional) .....	11
Decommissioning .....	12
Recommissioning .....	12
<b>Maintenance and cleaning.....</b>	<b>12</b>
Maintenance .....	12
Cleaning .....	13
<b>Troubleshooting and remedies .....</b>	<b>13</b>
<b>Replacement parts .....</b>	<b>13</b>
<b>Disposal .....</b>	<b>14</b>
<b>Technical data.....</b>	<b>14</b>

## About this manual

This manual is an integral part of the product.  
 Mayser will assume no liability and provide no guarantee whatsoever for damages and consequential damages resulting from failure to comply with the manual.

**Validity**

This manual is valid only for the product specified on the title page.

**Target group**

This manual is intended for the owner and electricians. The electrician must be familiar with the installation and commissioning.

**Other applicable documents**

- ➔ Also observe the following documents:
  - Product information
  - Drawing of the sensor system (optional)
  - Wiring diagram (optional)
  - Operating manual for the switching device used (optional)

**Symbols used**

Symbol	Meaning
➔ ...	Action with one or more steps whose order is not relevant.
1. ...	Action with several steps whose order is relevant.
• ... - ...	Bullets first level Bullets second level
(see Section <i>Installation</i> )	Cross-reference

**Danger symbols and information**

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

**Dimensions in drawings**

Unless otherwise indicated, all dimensions are stated in millimetres (mm).

## Safety

### Intended use

This product is designed as a linear pressure-sensitive protective device for hazardous closing edges. The sensor is activated by pressure on the actuation area. In the idle state, no pressure must be applied to the sensor.

#### Limits

A maximum of 10 sensors may be operated in series.

### Safety instructions

For your **own safety** the following safety instructions apply.

#### → Prevent electric shock

When working on electrical systems, always disconnect them from the power supply and secure them against being switched on again, to prevent injuries from electric shock.

#### → Install cables permanently in a protected manner

To prevent short circuits, install cables permanently (stable) so that they are protected against external damage.

#### → Ensure careful configuration of interface

The quality and reliability of the interface between the safety device and the machine affects the overall safety. Take special care when setting up this interface.

#### → Do not enclose or cover the sensors

Outer profiles and covers have a negative effect on the sensor functions. Take measures to ensure that the sensors are never pulled into an outer profile or covered by other elements.

#### → Disable in case of error

Disable the safety device in case of malfunctions or visible damage.

To prevent irreparable damage to the **product**, the following safety instructions apply.

#### → Protect sensors against sharp edges

Sharp edges can cause permanent damage to the sensors. Protect the sensors against sharp-edged objects.

#### → Prevent permanent damage

The sensors are not suitable for performing a closing function. Constant actuation of sensors can result in permanent damage.

#### → Avoid kinks in cables

Avoid extreme cable kinking.

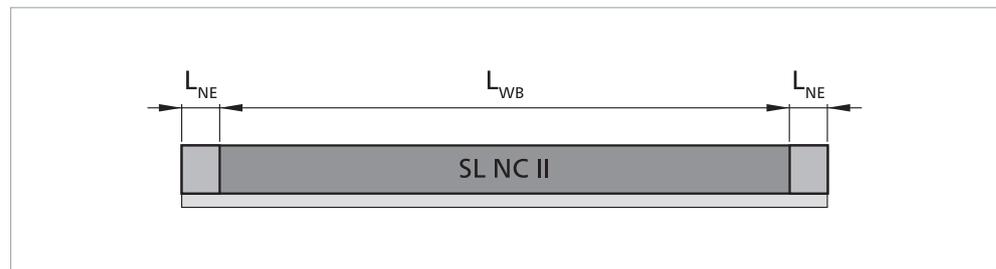
➔ **Observe minimum bend radius thresholds**

Never exceed the lower minimum bending radius thresholds specified in the Technical Data.

## Residual dangers

### Non-sensitive areas

The edge areas of the sensor are not sensitive. Actuation of non-sensitive areas disables the safety function of the sensor.



SL NC II	GP 48-2	GP 65-2	GP 100-2
$L_{NE}$	50 mm	50 mm	40 mm
$L_{NE}$ = non-sensitive edges			
$L_{WB}$ = effective actuation length			

- ➔ Always protect the closing edge with a single sensor.
- ➔ Do not assemble sensors across corners.

## Parts supplied

The scope of supply is listed in the delivery note.

- ➔ Upon receipt of the parts supplied, check immediately for completeness and good condition.

## Storage

- ➔ Store the sensors in the original package, in a dry place.
- ➔ Do not stack packaging materials or allow them to be subjected to pressure.
- ➔ Store cardboard tube packaging horizontally.
- ➔ Comply with the storage temperature specified in the technical data.

## Installation

- ➔ Prior to installation, check on the basis of the technical data whether the product is suitable for your particular application (see *Technical data*).

### Overview

Depending on the choice of aluminium profile there will be differences in the order of the assembly steps.

Aluminium profile used: C 26M, C 36M, C 36L, C 36S	Step	Aluminium profile used: C 26, C 36
Preparing the installation site.	1	Preparing the installation site.
Unpacking the product.	2	Unpacking the product.
–	3	Separate aluminium profile from the rubber profile.
Mount aluminium profile.	4	Mount aluminium profile.
–	5	Clip in the rubber profile.
Laying cables.	6	Laying cables.
Check sensor system.	7	Check sensor system.

## Preparing the installation

- ➔ Prepare the installation surface as follows:
- Remove any dirt particles from the installation surface.
  - Make sure that the installation surface is level and firm.
  - Make sure that cable bushings have been deburred.
- ➔ Have the necessary tools ready for installation.

## Unpacking the product

Follow the handling instructions in the chapter *Safety instructions*.

1. Place the sensors and the installation accessories next to each other at the installation location.
2. Check whether all needed parts are present and in perfect condition.

## Separate the aluminium profile from the rubber profile

When delivered, the rubber profiles are clipped into the aluminium profiles. To mount the C 26 or C 36 aluminium profile it must first be separated from the rubber profile.

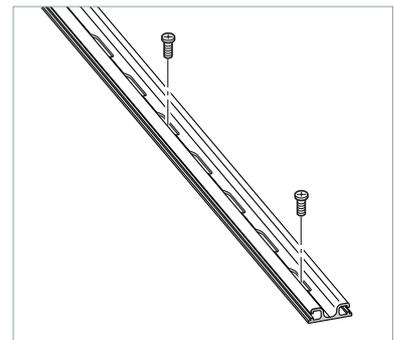
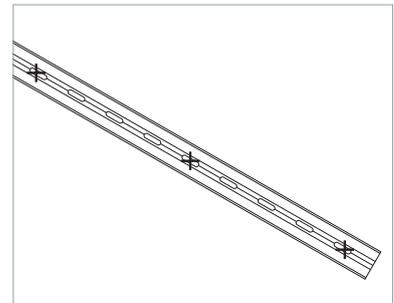
- ➔ Release the two clips from the aluminium profile.
- ➔ If necessary, use a flat tip screwdriver or a putty knife. To prevent damage to the clip, do not use sharp-edged tools.
- ➔ In case of damage to the clip exceeding 10 cm, replace the rubber profile and dispose of the old profile.

### NOTICE

Severe bowing or bending of the sensor can damage the NC chain. When sensors are not clipped in, always keep them flat.

## Mount aluminium profile

1. Align the aluminium profile with the closing edge:
  - Have the non-sensitive ends been taken into account?
  - Are the cable bushings freely accessible?
2. Mark the drill holes by means of the aluminium profile:
  - at the first and last oblong hole.
  - additionally at the fourth or fifth oblong hole.
  - if not yet present, for cable bushings.
3. Remove the aluminium profile again.
4. Drill holes for M5 on the marks.
5. Deburr the holes and remove the chips.
6. Fasten the aluminium profile at the oblong holes by means of countersunk screws or cheese-head screws M5.



Alternatively, you can also fasten the aluminium profile with rivets.

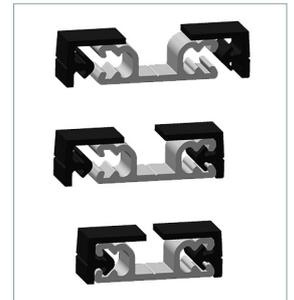
For sensors with S1 or S2 cable exit:

- ➔ Guide the cables through the prepared cable bushings before refastening the rubber profile.

## Clip in rubber profile

After mounting the aluminium profile, the rubber profile must be clipped in.

1. Inspect the rubber profile for damage. In case of damage to the clip exceeding 10 cm, replace the rubber profile and dispose of the old profile
2. First clip in one of the two clips over the entire length of the aluminium profile.
3. Then clip in the other clip over the entire length.



Tip 1: Brush the aluminium profile and clip bars or T-foot with a volatilizing **lubricant** (e.g. water with washing up liquid).

Tip 2: Use a **seam roller** for pressing in.

## Laying cables

### ⚠ **Warning: Failure of the safety function**

In case of line termination the sensor will lose its safety function.

- ➔ Install cables permanently (in a fixed manner) and protect against external damage.

The type of cabling depends on the operation principle of your system.

1. Wire the sensors together according to the wiring diagram (optional) or using the wiring methods described below. Observe the following:
  - Connect the cables of the sensor to the wire ends.
  - Double insulate the solder spots and seal them with heat-shrinkable sleeves.
  - Extend cables using only double-insulated cables with short-circuit protection, which are suitable for a test voltage of at least 500 V AC for a duration of 5 min.

### **NOTICE**

Cables can be damaged from incorrect installation.

- ➔ Take measures to prevent cables from being kinked or crushed.
- ➔ Ensure that cables are installed without tension.

2. Lay the cables all the way to the machine controller permanently and so they are protected against external damage, e.g. in cable conduits or armoured conduits.

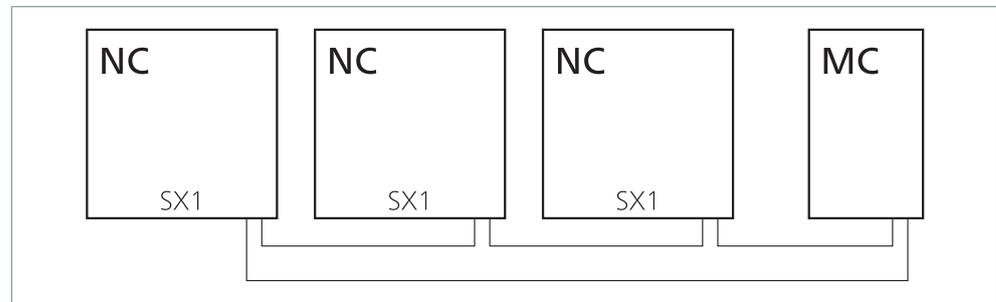
**Key to the following wiring diagrams**

- NC Normally closed safety edge SL NC II
- MC Machine controller
- SX1 Sensor with 1 wire (cable exit S1, SL, SR or ST1)
- SX2 Sensor with 2 wires (cable exit S2, SR2 or ST2)

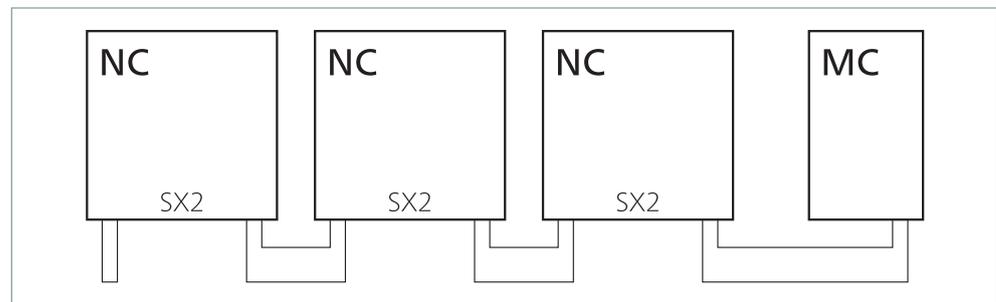
**Colour coding**

The colour marking is not relevant for the wiring.

**Sensor with 1 wire:  
sensor directly con-  
nected to the machine  
controller**



**Sensor with 2 wires:  
sensor directly con-  
nected to the machine  
controller**



## Sensor system check

Carry out the following steps for each cable of the safety edge system:

1. Set the ohmmeter to a high resistance range for the measurement.
2. Connect the ohmmeter to the two wires of the cable.
3. Measure the electrical resistance between the wire ends, with the sensor both actuated and not actuated.

The measured resistance must have the following values:

- Sensor system actuated: > 1 MOhm
- Sensor system non actuated: < 150 Ohm

## Commissioning

➔ Connect the supply voltage.

## Testing

### Safety edge connected directly to a machine controller

1. Make sure that everything is connected and no sensor is actuated.
  - Machine controller signals release for operation
2. Actuate the sensor.
  - Machine controller reverses dangerous movement and blocks further operation
3. Repeat step 1 and 2 for each additional connected sensor.
4. Disconnect sensor 1.
  - Machine controller blocks operation
5. Repeat step 4 for each additional connected sensor.

### Safety edge in combination with a control unit (optional)

Commissioning is described in the operating manual for the control unit.

## Decommissioning

- ➔ Switch off the pressure-sensitive protection device and safeguard it from being switched back on unintentionally.
- ➔ Affix a clear warning on the pressure-sensitive protection device warning that states it is temporarily or definitively decommissioned.

Decommissioning in connection with a connection is described in the operating manual for the control unit.

## Recommissioning

- ➔ Carry out commissioning (see chapter *Commissioning*).

Re-commissioning in combination with a control unit is described in the operating manual for the control unit.

# Maintenance and cleaning

## Maintenance

The sensors are virtually maintenance-free.

### **WARNING Failure of the safety function**

Damage to the sensor can result in failure of the safety function.

- ➔ Discontinue use of the safety device immediately if you detect damage that could affect safe operation.

Depending on the utilisation, sensors must be inspected at regular intervals (at least monthly). The inspection interval must be defined by the owner in accordance with the applicable national regulations.

- ➔ Check the safety function by actuating it or attaching the respective test piece.
- ➔ Conduct a visual inspection of the sensor for signs of damage.
- ➔ Conduct a visual inspection of the sensor to ensure it is properly mounted.

## Cleaning

- ➔ Clean dirty sensors with a mild cleaning product.
- ➔ After cleaning, wipe dry to remove any remaining moisture.

## Troubleshooting and remedies

If the resistance measurement does not produce the specified values, this may have the following causes:

- The cables of the individual safety edges are incorrectly connected
- The cables are bent or damaged
- The safety edge is not adequately fastened or is sagging
- The distance between the safety edge and the closing edge is too small in the end position, causing the safety edge to actuate.

The fault can still not be removed?

- ➔ Contact Mayser support: Phone +49 731 2061-0.
- ➔ In case of queries, have the information on the type plate at hand.

### Type plate

A type plate stating the sensor type is affixed to the bottom of the aluminium profile at the cable exit.

## Replacement parts

### ⚠ CAUTION Overall safety endangered

If the sensor is not replaced with original Mayser parts, operation of the protective device may be impaired.

- ➔ Only use original parts from Mayser.

## Disposal

The products included in the scope of supply contain the following materials:

- Sensor**
- Plastics
  - Copper (sensor-internal, cable)
  - Silver (sensor-internal)
  - Steel

- Installation accessories**
- steel (screws)
  - aluminium (aluminium profile)

- Packaging**
- Wood, cardboard, plastics

- ➔ Observe the following with respect to disposal:
- Comply with the relevant national disposal regulations and legal stipulations for these materials.
  - If you engage a disposal firm, make sure that a list of the above materials is included.
  - Materials should be recycled or disposed of in an eco-friendly manner.

## Technical data

Normally closed safety edge	SL NC II
IEC 60529: Degree of protection	IP67
ISO 13856-2: Actuation force	< 150 N
Finger detection	no
Behaviour in the event of a fault	ISO 13849-1:2015 Category 3 PL d
Switching current	0.2 A
switching voltage PELV (max.)	DC: 48 V AC: 48 V 50/60 Hz
Protection class	III
Operating temperature: GP XX NBR GP XX EPDM	+5 to +55 °C -10 to +55 °C
Storage temperature	-20 to +80 °C
Max. load (signal)	600 N
2006/42/EG: Emission sound pressure level	< 70 dB(A)
Weight: GP 48-2 incl. C 26 GP 65-2 incl. C 36 GP 100-2 incl. C 36	1.0 kg/m 1.9 kg/m 2.1 kg/m