TR10 Lock

Safety locking device
Described product
TR10 Lock

Manufacturer
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Original document
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## Contents

1. **About this document**
   - 1.1 Function of this document
   - 1.2 Scope
   - 1.3 Additional information
   - 1.4 Symbols and document conventions

2. **Safety information**
   - 2.1 General safety notes
   - 2.2 Intended use
   - 2.3 Improper use
   - 2.4 Requirements for the qualification of personnel

3. **Product description**
   - 3.1 Setup and function
   - 3.2 Product characteristics
   - 3.3 Manual deactivation

4. **Project planning**
   - 4.1 Manufacturer of the machine
   - 4.2 Operator of the machine
   - 4.3 Assembly
   - 4.4 Integrating into the electrical control
   - 4.5 Testing plan

5. **Mounting**
   - 5.1 Safety
   - 5.2 Installation

6. **Electrical installation**
   - 6.1 Safety
   - 6.2 Notes on cULus
   - 6.3 Device connection (M12, 8-pin)
   - 6.4 Device connection (flying lead)
   - 6.5 Connecting a cascade

7. **Commissioning**
   - 7.1 Switching on
   - 7.2 Teach-in
   - 7.3 Testing

8. **Troubleshooting**
   - 8.1 Safety
   - 8.2 Diagnostic LEDs

9. **Technical data**

### Subject to change without notice
1 About this document

1.1 Function of this document

These operating instructions contain the information needed during the life cycle of the safety locking device.

These operating instructions must be made available to all people who work with the safety locking device.

1.2 Scope

These operating instructions only apply to the TR10 Lock safety locking device.

1.3 Additional information

www.sick.com

The following information is available on the Internet:

- This document in other languages
- Data sheets and application examples
- CAD data of drawings and dimensional drawings
- Certificates (e.g. EU declaration of conformity)
- Guide for Safe Machinery Six steps to a safe machine

1.4 Symbols and document conventions

The following symbols and conventions are used in this document:

Safety notes and other notes

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="DANGER" /></td>
<td>Indicates a situation presenting imminent danger, which will lead to death or serious injuries if not prevented.</td>
</tr>
<tr>
<td><img src="image" alt="WARNING" /></td>
<td>Indicates a situation presenting possible danger, which may lead to death or serious injuries if not prevented.</td>
</tr>
<tr>
<td><img src="image" alt="CAUTION" /></td>
<td>Indicates a situation presenting possible danger, which may lead to moderate or minor injuries if not prevented.</td>
</tr>
<tr>
<td><img src="image" alt="NOTICE" /></td>
<td>Indicates a situation presenting possible danger, which may lead to property damage if not prevented.</td>
</tr>
<tr>
<td><img src="image" alt="NOTE" /></td>
<td>Indicates useful tips and recommendations.</td>
</tr>
</tbody>
</table>

Instructions to action

- The arrow denotes instructions to action.
1. The sequence of instructions for action is numbered.
2. Follow the order in which the numbered instructions are given.
✓ The check mark denotes the result of an instruction.

LED symbols

These symbols indicate the status of an LED:

- The LED is off.
- The LED is flashing.
- The LED is illuminated continuously.

Terminology

Dangerous state

A dangerous state is a status of the machine or facility, where people may be injured. Protective devices prevent this risk if the machine is operated within its intended use.

The figures in this document always show the dangerous state of the machine as movement of a machine part. In practice, there are different dangerous states, such as:

- Machine movements
- Electrical parts
- Visible and invisible beam
- A combination of multiple hazards
2 Safety information

2.1 General safety notes

The safety locking device must be configured and operated correctly by qualified safety personnel according to the machine requirements.

2.2 Intended use

When used in conjunction with a movable physical guard and the machine controller, the safety locking device prevents the protective device from being opened while a dangerous machine function is being executed.

The safety locking device may only be used on the machine on which it was configured, mounted, installed, and commissioned by qualified safety personnel in accordance with these operating instructions.

Incorrect use, improper modification of or tampering with the safety locking device will invalidate any warranty from SICK AG; in addition, any responsibility and liability of SICK AG for damage and secondary damage caused by this is excluded.

NOTE
The safety locking device is also suitable for process protection.

2.3 Improper use

Among others, the safety locking device is not suitable for the following applications:

- Radioactivity (exception: natural radioactivity)
- Vacuum or high pressure
- High UV load
- In the vicinity of low-frequency RFID devices
- In the vicinity of magnetic fields
- Ferromagnetic background

Among others, the safety locking device is only suitable for the following applications with restrictions:

- In the vicinity of flying metal particles (see "Mounting near metal particles", page 15).

2.4 Requirements for the qualification of personnel

The safety locking device must be configured, installed, connected, commissioned, and serviced only by qualified safety personnel.

Project planning

For project planning, a person is considered competent when he/she has expertise and experience in the selection and use of protective devices on machines and is familiar with the relevant technical rules and national work safety regulations.

Mechanical mounting, electrical installation, and commissioning

For the task, a person is considered qualified when he/she has the expertise and experience in the relevant field and is sufficiently familiar with the application of the protective device on the machine to be able to assess whether it is in an operationally safe state.
Operation and maintenance

For operation and maintenance, a person is considered competent when he/she has the expertise and experience in the relevant field and is sufficiently familiar with the application of the protective device on the machine and has been instructed by the machine operator in its operation.
3 Product description

3.1 Setup and function

The safety locking device is an interlocking device with a lock consisting of a non-con tact safety switch and a coded actuator. Depending on the product variant, the actuator either has a low (universally coded) or high (unique coded) coding level.

If the protective device is closed, the actuator is led to the safety switch. If the actuation field is reached, the actuator code is read out and evaluated by RFID. If the code is valid, the application diagnostic output switches to the OFF state. When a locking command is active, the locking pin in extended. Not until the locking pin is detected in the correct position in the actuator by the integrated proximity sensor is the locking successful and the safe output signal switching device (OSSD) are switched in the ON state.

The safety locking device can only be locked when the protective device is closed.

The guard locking pin is actuated by a bistable solenoid. This means that the safety locking device consumes little electricity and does not produce any heat. Nevertheless, the function of a safety locking device is executed via the electronics according to the “power to release” or “power to lock” principle.

3.2 Product characteristics

3.2.1 Product variants

The safety locking device is delivered in different variants. An overview of important distinguishing features between the variants is provided below.

- Designed according to “power to release” or “power to lock” principle
- Versions for universally coded or unique coded actuators
- Cable with M12 plug connector (0.2 m) or flying leads (3 or 10 m)

Complete overview of all variants: see "Ordering information for TR10 Lock", page 38

Variant according to “power to release” principle

- Activate lock: no voltage at lock input
- Deactivate lock: voltage at lock input

If voltage is interrupted, the locking device remains locked and the protective device cannot be opened immediately.

Variant according to “power to lock” principle

- Activate lock: voltage at lock input
- Deactivate lock: no voltage at lock input

When the voltage is interrupted, the lock is deactivated and the protective device can be opened immediately.

DANGER

Hazard due to lack of effectiveness of the protective device

If the voltage drops, the safety locking device deactivates regardless of whether the dangerous state of the machine has ended

- Assess the accident risk. The device must be configured correctly in order to be used for protection of personnel.
Variant for universally coded actuators

All universally coded actuators are accepted. No teach-in is required.

Variant for unique coded actuators

A unique coded actuator must be taught in during commissioning. Up to 8 actuators can be taught in one after another. Only the most recently taught-in actuator is valid.

When teaching in an actuator, the safety locking device can be permanently coded (optional). If the safety locking device is permanently coded, no further actuators can be taught in. This cannot be undone.

3.2.2 OSSD

Output signal switching device: signal output for the protective device, which is used for stopping the dangerous movement.

An OSSD is a safety switching output. The functionality of each OSSD is tested periodically. OSSDs are always connected in pairs and must undergo dual-channel analysis for safety reasons. An OSSD pair is formed from 2 OSSDs that are connected and analyzed together.

3.3 Manual deactivation

In some situations, it may be necessary to deactivate the lock manually (e.g., in the event of faults). A functional test must be carried out after the lock has been deactivated.

Mechanical unlocking mechanism

In the event of functional faults, the safety locking device can be deactivated with the mechanical unlocking mechanism regardless of the state of the electromagnet. The mechanical unlocking mechanism is not suitable for emergency release or escape release.

When the mechanical unlocking mechanism is actuated, the lock is deactivated and the OSSDs switch off. This must generate a stop command.

Actuating the mechanical unlocking mechanism

- Guide a screwdriver with a max. diameter of 2.5 mm through the actuator and push the guard locking pin into the safety locking device.
- The lock is deactivated. The safety locking device switches to the fault state (DIAG light emitting diodes flash red).

After using the mechanical unlocking mechanism, disconnect the voltage supply from the safety locking device and then reconnect. The safety locking device restarts.
Figure 1: Mechanical unlocking mechanism
4 Project planning

4.1 Manufacturer of the machine

DANGER
Failure to comply with manufacturer’s obligations
Hazard due to lack of effectiveness of the protective device

- Carry out a risk assessment before using the safety locking device.
- Do not tamper with, open, or modify the components of the safety locking device.
- Make sure that the safety locking device is only repaired by the manufacturer or by someone authorized by the manufacturer. Improper repair can lead to a loss of the protective function.
- Make sure that switch-on commands which bring about a dangerous state of the machine are not enabled until the protective device is closed and the lock is activated.
- Make sure that the lock is not deactivated until the dangerous state of the machine has stopped.
- Make sure that closing a protective device and activating the lock does not cause a dangerous machine function to start by itself. This must be controlled by a separate start command.
- The safety locking device must not be bypassed (contacts jumped, turned away, removed, or rendered ineffective in any other way. Take measures to reduce bypassing options as necessary.

The safety locking device is designed in such a way as to eliminate internal faults according to ISO 13849–2, Table A4.

Observe EN ISO 14119 on the use of interlocking devices in conjunction with physical guards.

4.2 Operator of the machine

DANGER
Failure to observe operator obligations
Hazard due to lack of effectiveness of the protective device

- Changes to the machine and changes to the mechanical mounting of the safety locking device necessitate a new risk assessment. The results of this risk assessment may require the operator of the machine to meet a manufacturer’s obligations.
- Apart from the procedures described in this document, the components of the safety locking device must not be opened or modified.
- Do not carry out any repair work on components. Improper repair of the safety locking device can lead to a loss of the protective function.
- Make sure that replacement actuators are not used for bypassing. Restrict access to actuators.
4.3 Assembly

DANGER
Bypassing the protective device
Hazard due to lack of effectiveness of the protective device
- Prevent any incentives to tamper with the safety locking device; for example, with the following measures:
  - Variant for universally coded actuators only:
    - Cover the safety switch and the actuator with additional equipment or protect them against access.

Actuation direction
The safety locking device can be actuated from all 4 horizontal directions.

![Possible actuation directions](image)

Figure 2: Possible actuation directions
1. From front
2. From left
3. From rear
4. From right

The safety locking device is not suitable for vertical actuation. The lock does not prevent the actuator being moved upward out of the response range.

![No vertical lock](image)

Figure 3: No vertical lock

Distance
When several safety locking devices are mounted to the machine, they must be mounted at a distance of at least 200 mm to one another.
Alignment

The safety locking device can be mounted in any alignment.

Mounting of switch and actuator on the same level

If the switch and actuator are mounted on the same level, it must be ensured that there is 6 mm of deviation between the mounting levels of the safety switch and the mounting bracket of the actuator.
Mounting at CIP (Clean-In-Place)

The enclosure rating of the safety locking device is classified with IP69 in accordance with IEC 60529. The standard stipulates a short thorough check with 80 °C water under high pressure. The IP69 enclosure rating guarantees neither protection from liquids other than water nor durability at regular and ongoing exposure.

However, this safety locking device is designed for CIP applications, e.g. through the use of materials resistant to common alkaline cleaning agents.

For maximum service life, the safety locking device must be mounted upside down and the plug must be removed from the actuator. This ensures the best possible discharge of liquids and protects the locking pin mechanics.

![Figure 7: Ideal mounting direction for CIP applications](image)

Mounting near metal particles

Metal particles (chips or dust) can impair the safety locking device. When metal particles collect on the locking pin, it can lead to locking pin blockage and to failure of the safety locking device in the long term. Ferromagnetic particles from permanent magnets in particular are drawn to the locking pin. Observe the following when using the safety locking device near metal particles:

- Protect the safety locking device from metal particles with constructive measures, e.g.:
  - Shielding with protective plates
  - Select the mounting site so that the safety locking device is not exposed to metal particles, e.g. at some distance to the source of metal particles or outside the room.

- If constructive measures cannot prevent the safety locking device from coming into contact with metal particles, the safety locking device must be checked and cleaned regularly before metal particles can collect on the locking pin.

4.4 Integrating into the electrical control

Switch-on commands which bring about a dangerous state of the machine must not be enabled until the protective device is closed and the lock is activated. The lock must not be deactivated until the dangerous state has ended. Depending on the safety concept, the signal is analyzed by, e.g., safety relays or a safety controller.

4.4.1 Lock

The logic to generate a locking command with the control changes depending on the product variant selected.

Variant according to “power to release” principle

To lock, make sure there is no voltage at the “lock input” contact (locking command active).
To unlock, apply 24 V DC voltage at the “lock input” contact (locking command inactive).

**For variants according to “power to lock” principle**

To lock, apply 24 V DC voltage at the “lock input” contact (locking command active).

To unlock, make sure there is no voltage at the “lock input” contact (locking command inactive).

### 4.4.2 OSSDs

Safety locking devices with local inputs and outputs can be directly integrated into the machine controller.

**DANGER**

Hazard due to lack of effectiveness of the protective device

In the case of non-compliance, it is possible that the dangerous state of the machine may not be stopped or not stopped in a timely manner.

- Make sure that the following control and electrical requirements are met so the protective function can be fulfilled.

- The output signals from an OSSD pair must not be connected to each other.
- In the machine controller, both signals from an OSSD pair must be processed separately.

*Figure 8: Dual-channel and isolated connection of OSSD 1 and OSSD 2*

- The machine must switch to the safe state at any time if at least one OSSD in an OSSD pair switches to the OFF state.
- Prevent the formation of a potential difference between the load and the protective device. If you connect loads to the OSSDs (safety outputs) that also switch if controlled with negative voltage (e.g., electro-mechanical contactor without reverse polarity protection diode), you must connect the 0 V connections of these loads and those of the corresponding protective device individually and directly to the same 0 V terminal strip. In the event of a fault, this is the only way to ensure that there can be no potential difference between the 0 V connections of the loads and those of the corresponding protective device.

![Figure 9: No potential difference between load and protective device](image)

**DANGER**

Hazard due to lack of effectiveness of the protective device

In the case of non-compliance, it is possible that the dangerous state of the machine may not be stopped or not stopped in a timely manner.

Downstream contactors must be positively guided and monitored depending on applicable national regulations or required reliability of the safety function.

- Make sure that downstream contactors are monitored (external device monitoring, EDM).

### Requirements for the electrical control of the machine

The OSSDs are short-circuit protected to 24 V DC and 0 V. When the safety locking device is locked, the OSSDs signal the ON state with the HIGH signal level (non-isolated). If the safety locking device is unlocked or there is a device fault, the OSSDs signal the OFF state with the LOW signal level.

#### 4.4.3 Application diagnostic output

The application diagnostic output signal changes as soon as the actuator is moved into or leaves the response range of the safety switch. In other words, it does so when the moving protective device is opened and closed. This is not a safety output.

*Table 1: Application diagnostic output switching behavior*

<table>
<thead>
<tr>
<th>Actuator</th>
<th>Application diagnostic output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actuator not in response area or safety locking device in a faulty state</td>
<td>ON</td>
</tr>
<tr>
<td>Actuator in response area</td>
<td>OFF</td>
</tr>
</tbody>
</table>

#### 4.4.4 Cascading

Cascading can be used to connect multiple safety locking devices. The connected devices will provide the combined safety outputs and therefore act outwardly like one device.
The maximum number of safety locking devices depends on the following factors:

- Supply voltage applied
- Length of cables used
- Cross-section of cables used
- Load current

The voltage drop in the cascade must be checked to ensure that the defined minimum voltage is still present at the last safety locking device.

The number of safety locking devices in a cascade influences the response time (see "Response time", page 35).

The cascade can be implemented using special T-connectors and an end connector (see "Connecting a cascade", page 24).

NOTE

In the case of safety switches cascaded using T-connectors, it is not possible to evaluate the application diagnostic output.

4.5 Testing plan

The safety locking device must be tested by appropriately qualified safety personnel when commissioning, after modifications, and at regular intervals.

The regular thorough checks serve to investigate the effectiveness of the safety locking device and discover defects because of modifications or external influences (such as damage or tampering).

The manufacturer and user must define the type and frequency of the thorough checks on the machine on the basis of the application conditions and the risk assessment. Determination of the thorough checks must be documented in a traceable manner.
5 Mounting

5.1 Safety

DANGER
Hazard due to unexpected starting of the machine
Death or severe injury

- Make sure that the dangerous state of the machine is and remains switched off.

DANGER
Bypassing the protective device
Hazard due to lack of effectiveness of the protective device

- Prevent any incentives to tamper with the safety locking device with at least one of the following measures:
  - Variant for universally coded actuators only:
    - Cover the safety switch and the actuator with additional equipment or protect them against access.
    - If possible, use non-detachable mounting methods for actuators (such as welding, gluing, safety screws, or rivets).

NOTICE
Incorrect mounting and unsuitable ambient conditions may damage the safety switch.

- Arrange the sensor and actuator in a way that prevents damage from foreseeable external influences.
- Do not use the sensor and actuator as a stop.
- The holder and mounting method for the sensor and actuator must be stable enough to ensure that correct operation can take place.
- Always use reliable mounting elements that can only be removed using tools.
- If misalignment results in an opening on the physical guard, this must not impair the protection that is provided.

5.2 Installation

Mounting the actuator

1. Mount the actuator to the mounting bracket with 2 TX10 Torx wrench screws.
   When doing so, note the following:
   - The guard locking pin must first pass through the mounting bracket.
Figure 10: The guard locking pin must first pass through the mounting bracket

- The alignment triangles on the actuator and safety switch must point to one another.

Figure 11: Correct alignment between safety switch and actuator

2. Depending on the alignment and environmental influences, dirt may accumulate in the actuator. In this case, use a screwdriver to pry the sealing plug out of the actuator. This will prevent dirt from accumulating in the actuator.

Figure 12: Remove sealing plug if necessary

3. Install mounting bracket to the movable protective device with at least 2 M5 screws. Make sure that at least 1 screw uses a drill hole near the actuator (see figure 14).

Figure 13: Fasten mounting bracket in place with at least 2 M5 screws
Mounting the safety switch

- Mount the safety switch with 3 M5 screws. You can ensure correct alignment of the safety switch and actuator in two ways.
  - Use supplied alignment aid.
  
  ![Figure 15: Alignment of safety switch and actuator, variant 1](image)

  - Use 4 ... 9 mm for distance “H”.

  ![Figure 16: Alignment of safety switch and actuator, variant 2](image)

  - Use 1 ... 5 mm for distance “G”.

Figure 14: Correct and incorrect screw connection options for the mounting bracket
DANGER
Hazard due to lack of effectiveness of the protective device

In the case of non-compliance, it is possible that the dangerous state of the machine may not be stopped or not stopped in a timely manner.

- After mounting, make sure that the actuator cannot be raised above the extended guard locking pin.
- After mounting, make sure that the safety switch and actuator do not collide when opening or closing.

Figure 17: No raising above guard locking pin
Figure 18: No collisions between safety switch and actuator
6 Electrical installation

6.1 Safety

DANGER
Hazard due to electrical voltage
Hazard due to unexpected starting of the machine
- Make sure that the machine is and remains disconnected from the power supply during electrical installation.
- Make sure that the dangerous state of the machine is and remains switched off during electrical installation.
- Make sure that the outputs of the safety locking device have no effect on the machine during electrical installation.

DANGER
Incorrect connection of the safety locking device
Loss of safety function
- In the case of insulating material/connection strands, observe the necessary temperature resistance and mechanical load capability.
- Only use safe contacts for safety functions.

6.2 Notes on cULus

The following conditions must also be fulfilled in order to use and apply the equipment in accordance with UL 508 requirements:

- The voltage supply must conform to Class 2 according to UL 508.
- Connections In 1 and In 2 must conform to Class 2 according to UL 508.
- The device must have 1 A fuse protection.

6.3 Device connection (M12, 8-pin)

Figure 19: Device connection (male connector, M12, 8-pin, A-coded)

Table 2: Pin assignment for device connection (male connector, M12, 8-pin, A-coded)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire color</th>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>White</td>
<td>Out AUX</td>
<td>Application diagnostic output (not secure)</td>
</tr>
<tr>
<td>2</td>
<td>Brown</td>
<td>+24 V DC</td>
<td>Voltage supply 24 V DC</td>
</tr>
<tr>
<td>3</td>
<td>Green</td>
<td>Lock</td>
<td>Lock input</td>
</tr>
<tr>
<td>4</td>
<td>Yellow</td>
<td>In 2</td>
<td>OSSD 2 input</td>
</tr>
<tr>
<td>5</td>
<td>Gray</td>
<td>Output signal switching device (OSSD) 1</td>
<td>Output OSSD 1</td>
</tr>
<tr>
<td>6</td>
<td>Pink</td>
<td>Output signal switching device (OSSD) 2</td>
<td>Output OSSD 2</td>
</tr>
<tr>
<td>7</td>
<td>Blue</td>
<td>0 V</td>
<td>0 V DC voltage supply</td>
</tr>
</tbody>
</table>
6.4 Device connection (flying lead)

Table 3: Cable assignment for device connection

<table>
<thead>
<tr>
<th>Wire color</th>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Out AUX</td>
<td>Application diagnostic output (not secure)</td>
</tr>
<tr>
<td>Brown</td>
<td>+24 V DC</td>
<td>Voltage supply 24 V DC</td>
</tr>
<tr>
<td>Green</td>
<td>Lock</td>
<td>Lock input</td>
</tr>
<tr>
<td>Yellow</td>
<td>In 2 OSSD 2 input</td>
<td>OSSD 2 input 1)</td>
</tr>
<tr>
<td>Gray</td>
<td>Output signal switching device (OSSD) 1</td>
<td>Output OSSD 1</td>
</tr>
<tr>
<td>Pink</td>
<td>Output signal switching device (OSSD) 2</td>
<td>Output OSSD 2</td>
</tr>
<tr>
<td>Blue</td>
<td>0 V</td>
<td>Voltage supply 0 V DC</td>
</tr>
<tr>
<td>Red</td>
<td>In 1 OSSD 1 input</td>
<td>OSSD 1 input 1)</td>
</tr>
</tbody>
</table>

1) Applies to the extension cables recommended as accessories.
2) When used as an individual safety locking device or as the first safety locking device in a cascade: Apply 24 V DC (see "Connecting a cascade", page 24).

- Make sure that the plug connector is tight.

6.5 Connecting a cascade

Setting up a cascade

The cascade can be created using special T-connectors and an end connector (see "Accessories", page 39).
5  M12 connection cable, 5-pin
6  M12 connecting cable, 5-pin
7  Safe evaluation unit

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**Figure 21: Internal circuitry: T-connector for cascade**

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**Figure 22: Internal circuitry: Terminator plug for cascade**

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**DANGER**

Bypassing the protective device

The dangerous state may not be stopped in the event of non-compliance.

If T-connectors are used for the cascade, mount connecting cables in such a way that a single T-connector (and therefore a safety locking device) cannot be jumpered easily.

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**NOTE**

In the case of safety locking devices cascaded with T-connectors, the application diagnostic output cannot be analyzed.

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**Cascade connection (M12, 5-pin)**

The 5-pin male connector of the last T-connector before the safe evaluation unit is the interface between the cascade and the safe evaluation unit.

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**Figure 23: Cascade connection (M12, 5-pin, A-coded, male connector)**
Table 4: Pin assignment for cascade connection (male connector, M12, 5-pin, A-coded)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Wire color</th>
<th>Designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
<td>+24 V DC</td>
<td>Voltage supply 24 V DC</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
<td>Output signal switching device (OSSD) 1</td>
<td>Output OSSD 1</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
<td>0 V</td>
<td>Voltage supply 0 V DC</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
<td>Output signal switching device (OSSD) 2</td>
<td>Output OSSD 2</td>
</tr>
<tr>
<td>5</td>
<td>Gray</td>
<td>Lock</td>
<td>Lock input</td>
</tr>
</tbody>
</table>

1) Applies to the extension cables recommended as accessories.
7 Commissioning

7.1 Switching on

The device initializes after switch-on. During this process, the output signal switching devices are in the OFF state and the light emitting diodes flash green 6 times.

7.2 Teach-in

Variant for universally coded actuators

No teach-in is required.

Variant for uniquely coded actuators

A unique coded actuator must be taught in during commissioning. Up to 8 actuators can be taught in one after another. Only the most recently taught-in actuator is valid.

Permanent coding

Permanent coding is only possible for the variant for uniquely coded actuators.

When teaching in an actuator, the safety locking device can be permanently coded (optional). If the safety locking device is permanently coded, no further actuators can be taught in. This cannot be undone.

7.2.1 Teaching in actuators without permanent coding

1. Open physical guard.
2. Connect safety locking device to voltage supply (see "Electrical installation", page 23). ✓
   The start sequence is executed. The STATUS LEDs flash 6 times.
   ✓ The STATUS LEDs then flash 8 times in the new status. This signal is repeated.
3. Close the physical guard and keep closed.

.byte

NOTICE

The physical guard must not be opened until the teach-in sequence is complete.

✓ If the protective device is closed and the actuator has reached the respective position, the safety locking device automatically starts the teach-in sequence. The individual teach-in sequences are displayed via the STATUS and DIAG LEDs.

Table 5: Displays of the teach-in sequences

<table>
<thead>
<tr>
<th>STATUS LEDs (green)</th>
<th>DIAG LEDs (red)</th>
<th>Teach-in sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>●: 1 Hz</td>
<td></td>
<td>Actuator in response area</td>
</tr>
<tr>
<td>●: 1 Hz, duration 15 s</td>
<td>●: 1 Hz, duration 15 s</td>
<td>Verifying actuator</td>
</tr>
<tr>
<td>●: 4 Hz, duration 15 s</td>
<td>●: 4 Hz, duration 15 s</td>
<td>Programming safety locking device</td>
</tr>
<tr>
<td>●: Flashes once for every remaining teach-in process, is repeated for 15 s</td>
<td>●</td>
<td>Programming complete</td>
</tr>
</tbody>
</table>

✓ The teach-in process is complete. The locking device is now locked for when a locking command is active. Previously taught-in actuators can no longer be used and cannot be taught in again. Other actuators can be taught in in the same way.
7.2.2 Teaching in actuators with permanent coding

Important information

NOTE
The safety locking device can only be permanently coded during teach-in in a time window of 15 s. When the safety locking device is to be permanently coded, read the instructions in their entirety.

Approach

1. Open physical guard.
2. Connect safety locking device to voltage supply (see "Electrical installation", page 23).
   ✓ The start sequence is executed. The STATUS LEDs flash 6 times.
   ✓ The STATUS LEDs then flash 8 times in the new status. This signal is repeated.
3. Close physical guard.
   ✓ If the protective device is closed and the actuator has reached the respective position, the safety locking device automatically starts the teach-in sequence. The individual teach-in sequences are displayed via the STATUS and DIAG LEDs.
4. Open the protective device in order to permanently code the safety locking device during the last “Programming complete” teach-in sequence.

Table 6: Displays of the teach-in sequences

<table>
<thead>
<tr>
<th>STATUS LEDs (green)</th>
<th>DIAG LEDs (red)</th>
<th>Teach-in sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>●: 1 Hz</td>
<td>○</td>
<td>Actuator in response area</td>
</tr>
<tr>
<td>●: 1 Hz, duration 15 s</td>
<td>●: 1 Hz, duration 15 s</td>
<td>Verifying actuator</td>
</tr>
<tr>
<td>●: 4 Hz, duration 15 s</td>
<td>●: 4 Hz, duration 15 s</td>
<td>Programming safety locking device</td>
</tr>
<tr>
<td>●: Flashes once for every remaining teach-in process, is repeated for 15 s</td>
<td>○</td>
<td>Programming complete Time window for permanent coding</td>
</tr>
</tbody>
</table>

✓ The DIAG LEDs light up red.
5. Close the protective device. The complete process must be executed within the 15 second continuous “Programming complete” teach-in sequence. Permanent coding with the actuator is then no longer possible.
✓ The STATUS LEDs flash green (1 Hz). The teach-in process is complete. The locking device is now locked for when a locking command is active. Previously taught-in actuators can no longer be used and cannot be taught in again.

7.3 Testing

DANGER
Hazard due to unexpected starting of the machine
Death or severe injury
▶ Before carrying out the functional test, make sure that there are no people in the hazardous area.

Check that the device is functioning properly after installation and after every fault. To do this, proceed as follows:

Mechanical functional test
Open the protective device and close it again. The components of the safety locking device must not collide with other parts. When the protective device is closed, the actuator must be in a position which enables the lock to be actuated.

**Electrical functional test**

1. Switch on the supply voltage.
2. Close all protective devices and activate the locks. The machine must not start up on its own.
3. Check the lock. It must not be possible to open the protective device.
4. Start the machine function.
5. Make sure that the lock cannot be deactivated as long as the dangerous machine function is active.
6. Stop the machine function and deactivate the lock.
7. Check whether the protective device is kept locked until there is no more risk of injury (e.g., due to run-on movements).
8. Check the restart interlock. The machine function must not start while the lock is deactivated.
9. Repeat steps 3 to 8 individually for each protective device.

**NOTE**

In the case of the “power to lock” version, an active locking command can be simulated by applying a 24 V DC voltage at the “lock input” contact.
8 Troubleshooting

8.1 Safety

DANGER Hazard due to lack of effectiveness of the protective device
In the case of non-compliance, it is possible that the dangerous state of the machine may not be stopped or not stopped in a timely manner.

- Immediately shut the machine down if the behavior of the machine cannot be clearly identified.
- If a machine fault cannot be definitively determined or safely rectified, immediately shut the machine down.
- Secure the machine so that it cannot switch on unintentionally.

DANGER Hazard due to unexpected starting of the machine

- When any work is taking place, use the protective device to secure the machine or to ensure that the machine is not switched on unintentionally.

DANGER Hazard due to lack of effectiveness of the protective device
In the case of non-compliance, it is possible that the dangerous state of the machine may not be stopped or not stopped in a timely manner.

- Do not carry out any repairs on the device components.
- Do not modify or manipulate device components.
- Apart from during the procedures described in this document, the device components must not be opened.

NOTE If you cannot remedy the fault with the help of the information provided in this chapter, please contact your respective SICK subsidiary.

8.2 Diagnostic LEDs

8.2.1 Fault indicators during teach-in

<table>
<thead>
<tr>
<th>DIAG light emitting diode (red, 4 Hz)</th>
<th>STATUS light emitting diodes (green, 4 Hz)</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>●: Flashes three times</td>
<td>○: Flashes once</td>
<td>A universally coded actuator is to be taught in. This is not possible.</td>
</tr>
<tr>
<td>●: Flashes three times</td>
<td>○: Flashes twice</td>
<td>An actuator that has already been taught in is to be taught in again. This is not possible.</td>
</tr>
<tr>
<td>●: Flashes three times</td>
<td>○: Flashes three times</td>
<td>The actuator was moved outside of the scanning range (RFID signal interrupted).</td>
</tr>
<tr>
<td>●: Flashes three times</td>
<td>○: Flashes four times</td>
<td>8 actuators have been taught in. No further teach-in processes are possible.</td>
</tr>
<tr>
<td>●: Flashes three times</td>
<td>○: Flashes five times</td>
<td>The safety locking device is permanently coded. No further teach-in processes are possible.</td>
</tr>
</tbody>
</table>
Fault indicators are repeated until a reset is performed.

- To perform a reset, interrupt the voltage supply for at least 3 s.

### 8.2.2 Fault indicators in the case of cascading

If a fault occurs on a device in a cascade, the relevant device displays the fault and switches the output signal switching devices off (DIAG light emitting diodes flash red). All downstream devices switch their output signal switching devices off (STATUS light emitting diodes flash green).

![Image of fault indicators for cascaded devices]

Figure 24: Fault indicators for cascaded safety locking devices. In the example: internal fault on safety locking device 3

### Table 8: Light emitting diode displays in the case of cascading

<table>
<thead>
<tr>
<th>Device</th>
<th>Device 1</th>
<th>Device 2</th>
<th>Device 3</th>
<th>Device 4</th>
<th>Device 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATUS light emitting diodes (green)</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>DIAG light emitting diodes (red)</td>
<td></td>
<td></td>
<td>●</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault in device</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Protective device closed and lock activated</td>
<td>Yes</td>
<td>Yes</td>
<td>No statement possible</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>State of OSSD signal at inputs</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>OSSD output state</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
</tbody>
</table>

### 8.2.3 Fault indicators

#### Table 9: Fault indicators

<table>
<thead>
<tr>
<th>STATUS light emitting diodes (green)</th>
<th>DIAG light emitting diodes (red)</th>
<th>Possible cause</th>
<th>OSSD state</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>No supply voltage</td>
<td>OFF</td>
</tr>
<tr>
<td>●: Flashes three times</td>
<td>●: Flashes three times</td>
<td>Start sequence with self-test</td>
<td>OFF</td>
</tr>
<tr>
<td>●</td>
<td>○</td>
<td>Protective device closed and lock activated</td>
<td>ON</td>
</tr>
<tr>
<td>STATUS light emitting diodes (green)</td>
<td>DIAG light emitting diodes (red)</td>
<td>Possible cause</td>
<td>OSSD state</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>----------------------------------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>○</td>
<td>●</td>
<td>Locking command inactive</td>
<td>OFF</td>
</tr>
<tr>
<td><img src="image1" alt="Status light" /> 4 Hz</td>
<td>○</td>
<td>Locking command active, but the actuator is not in scanning range or the actuator is invalid in the scanning range.</td>
<td>OFF</td>
</tr>
<tr>
<td><img src="image2" alt="Status light" /> 1 Hz</td>
<td>○</td>
<td>Protective device closed and lock activated, output signal switching device signal at inputs In 1 and In 2 invalid or not present</td>
<td>OFF</td>
</tr>
<tr>
<td><img src="image3" alt="Status light" /> Flash three times</td>
<td><img src="image4" alt="Status light" /> Flashes once</td>
<td>Lock cannot be activated or deactivated because actuator is not aligned correctly</td>
<td>OFF</td>
</tr>
<tr>
<td>○</td>
<td><img src="image5" alt="Status light" /> 1 Hz</td>
<td>Fault at output signal switching devices. When fault is eliminated, perform reset by interrupting the voltage supply.</td>
<td>OFF</td>
</tr>
</tbody>
</table>
| ○                                    | ![Status light](image6) 4 Hz      | Fault when activating or deactivating lock. Align actuator correctly and perform reset by interrupting the voltage supply.  
General fault. Perform reset by interrupting the voltage supply. If the reset does not rectify the fault, replace the device. | OFF        |
9 Technical data

9.1 Technical data

Table 10: Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. actuation speed</td>
<td>2 mm/s</td>
</tr>
<tr>
<td>Insertion path for guard locking pin</td>
<td>5 mm ... 10 mm</td>
</tr>
<tr>
<td>and specified locking force</td>
<td></td>
</tr>
<tr>
<td>Alignment tolerance for lock</td>
<td>±2.5 mm</td>
</tr>
<tr>
<td>Max. actuation frequency</td>
<td>0.2 Hz</td>
</tr>
<tr>
<td>Dwell time between interlocking and</td>
<td>2.5 s</td>
</tr>
<tr>
<td>unlocking (or vice versa)</td>
<td></td>
</tr>
<tr>
<td>Locking force $F_{\text{max}}$</td>
<td>1690 N (EN ISO 14119)</td>
</tr>
<tr>
<td>Retaining force $F_{\text{zh}}$</td>
<td>1300 N (EN ISO 14119)</td>
</tr>
<tr>
<td>($F_{\text{zh}} = F_{\text{max}} / 1.3$)</td>
<td></td>
</tr>
</tbody>
</table>

Table 11: Safety-related parameters

<table>
<thead>
<tr>
<th>Safety-related parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance level 1)</td>
<td>PL e (EN ISO 13849-1)</td>
</tr>
<tr>
<td>Category 2)</td>
<td>4 (EN ISO 13849-1)</td>
</tr>
<tr>
<td>Safety integrity level 1)</td>
<td>SIL 3 (EN 61508)</td>
</tr>
<tr>
<td>SIL claim limit 1)</td>
<td>SILCL 3 (EN 62061)</td>
</tr>
<tr>
<td>PFHd (mean probability of a dangerous</td>
<td>$9.1 \times 10^{-10}$</td>
</tr>
<tr>
<td>failure per hour)</td>
<td></td>
</tr>
<tr>
<td>$T_M$ (mission time)</td>
<td>20 years (EN ISO 13849-1)</td>
</tr>
<tr>
<td>Response time (response to locking</td>
<td>$\leq$ 100 ms</td>
</tr>
<tr>
<td>command dropping out)</td>
<td></td>
</tr>
<tr>
<td>Release time (response time to locking</td>
<td>$\leq$ 600 ms</td>
</tr>
<tr>
<td>command)</td>
<td></td>
</tr>
<tr>
<td>Risk time 1)</td>
<td>$\leq$ 100 ms</td>
</tr>
<tr>
<td>Type 2)</td>
<td>Type 4 (EN ISO 14119)</td>
</tr>
<tr>
<td>Coding level</td>
<td></td>
</tr>
<tr>
<td>Universally coded</td>
<td>Low coding level (EN ISO 14119)</td>
</tr>
<tr>
<td>Unique coded</td>
<td>High coding level (EN ISO 14119)</td>
</tr>
<tr>
<td>Safe state when a fault occurs</td>
<td>At least one output signal switching</td>
</tr>
<tr>
<td></td>
<td>device is in the OFF state</td>
</tr>
</tbody>
</table>

1) Applies for monitoring of the door position (interlocking monitoring) and locking monitoring
2) At least one of the two output signal switching device outputs is switched off safely within the response time.
3) The risk time is the fault detection time for internal or external faults. External faults concern the output signal switching devices (short-circuit to an OSSD or cross-circuit between the two OSSDs). At least one of the two output signal switching devices is switched off safely within the risk time.

Table 12: Interfaces

<table>
<thead>
<tr>
<th>Interfaces</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>System connection</td>
<td></td>
</tr>
</tbody>
</table>
## Interfaces

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage supply</td>
<td>Cable with male connector, M12, 8-pin, A-coded (common male connector for voltage supply and inputs and outputs) or Flying leads</td>
</tr>
<tr>
<td>Local inputs and outputs</td>
<td></td>
</tr>
<tr>
<td>Length of connecting cable</td>
<td>3 m or 10 m</td>
</tr>
</tbody>
</table>

## Table 13: Electrical data

### Electrical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage $U_v$</td>
<td>24 V DC (20.4 V ... 26.4 V) (SELV)</td>
</tr>
<tr>
<td>Protection class</td>
<td>II (EN 61140/IEC 61140)</td>
</tr>
<tr>
<td>Locking principle</td>
<td></td>
</tr>
<tr>
<td>TR10-SRxxxx</td>
<td>“Power to release” principle</td>
</tr>
<tr>
<td>TR10-SLxxxx</td>
<td>“Power to lock” principle</td>
</tr>
<tr>
<td>Power consumption in passive state</td>
<td>2.5 W</td>
</tr>
<tr>
<td>Usage category</td>
<td>DC-13: 24 V, 200 mA (IEC 60947-5-2)</td>
</tr>
<tr>
<td>Max. output current (per output)</td>
<td>200 mA</td>
</tr>
<tr>
<td>Peak current (when activating, deactivating, or switching on)</td>
<td>400 mA, 100 ms</td>
</tr>
<tr>
<td>Rated insulation voltage $U_i$</td>
<td>70 V DC (IEC 60947-1)</td>
</tr>
<tr>
<td>Rated impulse withstand voltage $U_{imp}$</td>
<td>1,000 V (IEC 60947-5-1)</td>
</tr>
<tr>
<td>Power-up delay after applying supply voltage</td>
<td>8 s time delay before availability</td>
</tr>
<tr>
<td>Thermal current $I_{th}$</td>
<td>0.2 A</td>
</tr>
<tr>
<td>Contamination rating</td>
<td>3 (EN 60947-1)</td>
</tr>
</tbody>
</table>

1) At 10 mA.

## Table 14: Mechanical data

### Mechanical data

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (W x H x D)</td>
<td>45 mm x 140 mm x 50 mm</td>
</tr>
<tr>
<td>Safety switch</td>
<td>40 mm x 65 mm x 51.5 mm</td>
</tr>
<tr>
<td>Actuator with mounting bracket</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>Acrylonitrile butadiene styrene (ABS)</td>
</tr>
<tr>
<td>Guard locking pin</td>
<td>Stainless steel (304)</td>
</tr>
<tr>
<td>Cable</td>
<td>PVC</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td>Safety locking device</td>
<td>400 g</td>
</tr>
<tr>
<td>Actuator</td>
<td>22 g</td>
</tr>
<tr>
<td>Mounting bracket</td>
<td>60 g</td>
</tr>
<tr>
<td>Mechanical service life</td>
<td>$5 \times 10^5$ Switching operations</td>
</tr>
</tbody>
</table>
Table 15: Ambient data

<table>
<thead>
<tr>
<th>Ambient data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure rating</td>
</tr>
<tr>
<td>IP 66 (IEC 60529)</td>
</tr>
<tr>
<td>IP 67 (IEC 60529)</td>
</tr>
<tr>
<td>IP 69K (IEC 60529)</td>
</tr>
<tr>
<td>Ambient operating temperature</td>
</tr>
<tr>
<td>0 °C … +55 °C</td>
</tr>
<tr>
<td>Storage temperature</td>
</tr>
<tr>
<td>-25 °C … +75 °C</td>
</tr>
<tr>
<td>Relative humidity</td>
</tr>
<tr>
<td>5 … 95%</td>
</tr>
<tr>
<td>Shock resistance</td>
</tr>
<tr>
<td>30 g, 11 ms (IEC 60068-2-27)</td>
</tr>
</tbody>
</table>

9.2 Response time

The response time is subject to the following parameters

- Switching safety outputs on or off
- Number of cascaded devices

**Response time for switching off the safety outputs**

- Response time for single safety locking device: 100 ms
- Response time for cascade: 50 ms + 50 ms * number of safety locking devices in cascade

**Response time for switching on the safety outputs**

- Response time for single safety locking device: 600 ms
- Response time for cascade: 575 ms + 25 ms * number of safety locking devices in cascade

9.3 Course of the output signal switching device test over time

The safety locking device tests the OSSDs for self-diagnosis at regular intervals. To do this, the safety locking device switches each output signal switching device briefly (for max. 600 μs) to the OFF state and checks whether this channel is voltage-free during this time. Make sure that the machine’s control does not react to these test pulses and the machine does not switch off.

![Diagram](image)

1. Every 22 ms
2. Every 11 s
9.4 Dimensional drawings

Safety switch

![Dimensional drawing of safety switch](image1)

**Figure 25:** Dimensional drawing of safety switch

with M12 male connector

![Dimensional drawing of safety switch](image2)

**Figure 26:** Dimensional drawing of safety switch

with flying leads

Actuator with mounting bracket

![Dimensional drawing of actuator with mounting bracket](image3)

**Figure 27:** Dimensional drawing of actuator with mounting bracket
Mounting bracket for safety switch (accessories)

Figure 28: Dimensional drawing of mounting bracket for safety switch
10 Ordering information

10.1 Scope of delivery

- Safety switch
- Actuator
- Mounting bracket
- Fixing screws for mounting the actuator on the mounting bracket: 2 * T10 Torx wrench screws
- Alignment aid
- Safety note
- Mounting instructions
- Operating instructions for download: www.sick.com

10.2 Ordering information for TR10 Lock

Table 16: Ordering information for TR10 Lock, universally coded

<table>
<thead>
<tr>
<th>Principle</th>
<th>Connection technology</th>
<th>Length</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Power to release” principle</td>
<td>Cable</td>
<td>3 m</td>
<td>TR10-SRM03P</td>
<td>6054756</td>
</tr>
<tr>
<td></td>
<td>Cable</td>
<td>10 m</td>
<td>TR10-SRM10P</td>
<td>6054757</td>
</tr>
<tr>
<td></td>
<td>M12 (8-pin)</td>
<td>0.2 m</td>
<td>TR10-SRM01C</td>
<td>6054758</td>
</tr>
<tr>
<td>“Power to lock” principle</td>
<td>Cable</td>
<td>3 m</td>
<td>TR10-SLM03P</td>
<td>6054759</td>
</tr>
<tr>
<td></td>
<td>Cable</td>
<td>10 m</td>
<td>TR10-SLM10P</td>
<td>6054760</td>
</tr>
<tr>
<td></td>
<td>M12 (8-pin)</td>
<td>0.2 m</td>
<td>TR10-SLM01C</td>
<td>6054761</td>
</tr>
</tbody>
</table>

Table 17: Ordering information for TR10 Lock, unique coded

<table>
<thead>
<tr>
<th>Principle</th>
<th>Connection technology</th>
<th>Length</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Power to release” principle</td>
<td>Cable</td>
<td>3 m</td>
<td>TR10-SRU03P</td>
<td>6054762</td>
</tr>
<tr>
<td></td>
<td>Cable</td>
<td>10 m</td>
<td>TR10-SRU10P</td>
<td>6054763</td>
</tr>
<tr>
<td></td>
<td>M12 (8-pin)</td>
<td>0.2 m</td>
<td>TR10-SRU01C</td>
<td>6054764</td>
</tr>
<tr>
<td>“Power to lock” principle</td>
<td>Cable</td>
<td>3 m</td>
<td>TR10-SLU03P</td>
<td>6054766</td>
</tr>
<tr>
<td></td>
<td>Cable</td>
<td>10 m</td>
<td>TR10-SLU10P</td>
<td>6054767</td>
</tr>
<tr>
<td></td>
<td>M12 (8-pin)</td>
<td>0.2 m</td>
<td>TR10-SLU01C</td>
<td>6054768</td>
</tr>
</tbody>
</table>
11 Accessories

11.1 Actuator

Table 18: Actuator

<table>
<thead>
<tr>
<th>Coding</th>
<th>Principle</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Universally coded</td>
<td>“Power to release” principle</td>
<td>TR10-RRM000</td>
<td>5329548</td>
</tr>
<tr>
<td></td>
<td>“Power to lock” principle</td>
<td>TR10-RLM000</td>
<td>5329549</td>
</tr>
<tr>
<td>Unique coded</td>
<td>“Power to release” principle</td>
<td>TR10-RRU000</td>
<td>5329550</td>
</tr>
<tr>
<td></td>
<td>“Power to lock” principle</td>
<td>TR10-RLU000</td>
<td>5329551</td>
</tr>
</tbody>
</table>

11.2 Connectivity

M12 connecting cable, 5-pin (0.34 mm²)

Table 19: Ordering information for M12 connecting cable, 5-pin (0.34 mm²) ¹)

<table>
<thead>
<tr>
<th>Part</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female connector, straight, 2 m cable, open end</td>
<td>DOL-1205-G02MC</td>
<td>6025906</td>
</tr>
<tr>
<td>Female connector, straight, 5 m cable, open end</td>
<td>DOL-1205-G05MC</td>
<td>6025907</td>
</tr>
<tr>
<td>Female connector, straight, 10 m cable, open end</td>
<td>DOL-1205-G10MC</td>
<td>6025908</td>
</tr>
<tr>
<td>Female connector, straight, 15 m cable, open end</td>
<td>DOL-1205-G15MC</td>
<td>6051946</td>
</tr>
<tr>
<td>Female connector, straight, 20 m cable, open end</td>
<td>DOL-1205-G20MC</td>
<td>6050247</td>
</tr>
<tr>
<td>Female connector, straight, 30 m cable, open end</td>
<td>DOL-1205-G30MC</td>
<td>6050248</td>
</tr>
<tr>
<td>Female connector, angled, 2 m cable, open end</td>
<td>DOL-1205-W02MC</td>
<td>6025909</td>
</tr>
<tr>
<td>Female connector, angled, 5 m cable, open end</td>
<td>DOL-1205-W05MC</td>
<td>6025910</td>
</tr>
<tr>
<td>Female connector, angled, 10 m cable, open end</td>
<td>DOL-1205-W10MC</td>
<td>6025911</td>
</tr>
</tbody>
</table>

M12 connecting cable, 8-pin (0.25 mm²)

Table 20: Ordering information for M12 connecting cable, 8-pin (0.25 mm²) ²)

<table>
<thead>
<tr>
<th>Part</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female connector, straight, 2.5 m cable, open end</td>
<td>DOL-1208-G2M5C</td>
<td>6058863</td>
</tr>
<tr>
<td>Female connector, straight, 5 m cable, open end</td>
<td>DOL-1208-G05MC</td>
<td>6035621</td>
</tr>
<tr>
<td>Female connector, straight, 7.5 m cable, open end</td>
<td>DOL-1208-G7M5C</td>
<td>6058864</td>
</tr>
<tr>
<td>Female connector, straight, 10 m cable, open end</td>
<td>DOL-1208-G10MC</td>
<td>6035622</td>
</tr>
</tbody>
</table>

¹) Ambient operating temperature: Down to -30 °C with fixed installation.
²) Ambient operating temperature: Down to -30 °C with fixed installation.
<table>
<thead>
<tr>
<th>Part</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female connector, straight, 15 m cable, open end</td>
<td>DOL-1208-G15MC</td>
<td>6038559</td>
</tr>
<tr>
<td>Female connector, straight, 20 m cable, open end</td>
<td>DOL-1208-G20MC</td>
<td>6038560</td>
</tr>
<tr>
<td>Female connector, straight, 30 m cable, open end</td>
<td>DOL-1208-G30MC</td>
<td>6058865</td>
</tr>
<tr>
<td>Female connector, angled, 2 m cable, open end</td>
<td>DOL-1208-W02MC</td>
<td>6035623</td>
</tr>
<tr>
<td>Female connector, angled, 5 m cable, open end</td>
<td>DOL-1208-W05MC</td>
<td>6035624</td>
</tr>
<tr>
<td>Female connector, angled, 10 m cable, open end</td>
<td>DOL-1208-W10MC</td>
<td>6035625</td>
</tr>
</tbody>
</table>

**M12 connection cable, 5-pin (0.34 mm²)**

*Table 21: Ordering information for M12 connection cable, 5-pin (0.34 mm²)*

<table>
<thead>
<tr>
<th>Part</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female connector, straight, 0.6 m cable, male connector, straight</td>
<td>DSL-1205-G0M6C</td>
<td>6025930</td>
</tr>
<tr>
<td>Female connector, straight, 1 m cable, male connector, straight</td>
<td>DSL-1205-G01MC</td>
<td>6029280</td>
</tr>
<tr>
<td>Female connector, straight, 2 m cable, male connector, straight</td>
<td>DSL-1205-G02MC</td>
<td>6025931</td>
</tr>
<tr>
<td>Female connector, straight, 5 m cable, male connector, straight</td>
<td>DSL-1205-G05MC</td>
<td>6029282</td>
</tr>
<tr>
<td>Female connector, straight, 10 m cable, male connector, straight</td>
<td>DSL-1205-G10MC</td>
<td>6038954</td>
</tr>
<tr>
<td>Female connector, straight, 15 m cable, male connector, straight</td>
<td>DSL-1205-G15MC</td>
<td>6038956</td>
</tr>
</tbody>
</table>

**M12 connection cable, 8-pin (0.25 mm²)**

*Table 22: Ordering information for M12 connection cable, 8-pin (0.25 mm²)*

<table>
<thead>
<tr>
<th>Part</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female connector, straight, 0.6 m cable, male connector, straight</td>
<td>DSL-1208-G0M6C</td>
<td>6044991</td>
</tr>
<tr>
<td>Female connector, straight, 1 m cable, male connector, straight</td>
<td>DSL-1208-G01MC</td>
<td>6051940</td>
</tr>
<tr>
<td>Female connector, straight, 2 m cable, male connector, straight</td>
<td>DSL-1208-G02MC</td>
<td>6051942</td>
</tr>
<tr>
<td>Female connector, straight, 5 m cable, male connector, straight</td>
<td>DSL-1208-G05MC</td>
<td>6051943</td>
</tr>
<tr>
<td>Female connector, straight, 10 m cable, male connector, straight</td>
<td>DSL-1208-G10MC</td>
<td>6051944</td>
</tr>
</tbody>
</table>

**Distributor**

*Table 23: Ordering information for distributor*

<table>
<thead>
<tr>
<th>Part</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-connector</td>
<td>TR4-AK004C</td>
<td>5325889</td>
</tr>
</tbody>
</table>

3) Ambient operating temperature: Down to -30 °C with fixed installation.
4) Ambient operating temperature: Down to -30 °C with fixed installation.
### Terminator plug

*Table 24: Ordering information for terminator plug*

<table>
<thead>
<tr>
<th>Part</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>End connector for series connection</td>
<td>TR4-AL002C</td>
<td>5325890</td>
</tr>
</tbody>
</table>

### Mounting bracket

*Table 25: Ordering information for mounting bracket*

<table>
<thead>
<tr>
<th>Part</th>
<th>Type code</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting bracket for actuator</td>
<td>TR10-MA0000</td>
<td>5329552</td>
</tr>
<tr>
<td>Mounting bracket for safety switch</td>
<td>TR10-MS0000</td>
<td>5329553</td>
</tr>
</tbody>
</table>

### Mounting accessories

<table>
<thead>
<tr>
<th>Part</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M5 x 10 safety screws for actuator mounting bracket</td>
<td>5334497</td>
</tr>
</tbody>
</table>
12  Annex

12.1  Compliance with EU directives

EU declaration of conformity (excerpt)

The undersigned, who represents the manufacturer below, hereby declares that the product complies with the regulations of the EU directive(s) below (including all relevant changes), and that it is based on the relevant standards and/or technical specifications.

Complete EU declaration of conformity for download

You can call up the EU declaration of conformity and the current operating instructions for the protective device by entering the part number in the search field at www.sick.com (part number: see the type label entry in the “Ident. no.” field).
12.2 FCC and IC radio approval

The device fulfills the EMC requirements for use in the USA and Canada, in accordance with the following extracts from the relevant approvals:

**FCC § 15.19**

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

**FCC §15.21 (warning statement)**

[Any] changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

**IC**

This device complies with Industry Canada’s licence-exempt RSSs. Operation is subject to the following two conditions:

- This device may not cause interference; and
- This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes :

- l’appareil ne doit pas produire de brouillage;
- l’utilisateur de l’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.
Further locations at www.sick.com

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1800 334 802 – tollfree
E-Mail sales@sick.com.au

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E-Mail office@sick.at

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