Correct Use
Safety switches series TL4019 are electromagnetic interlock devices with guard lockings. In combination with a separating safety guard and the machine control, this safety component prevents the safety guard from being opened while a dangerous machine movement is being performed. For the control system, this means that:
- starting commands which cause hazardous situations must become active only when the safety guard is in protective position and the guard locking is in locked position.
- The locked position of the guard locking must be released only when the hazardous situation is no longer present.

Before safety switches are used, a risk assessment must be performed on the machine in accordance with:
- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design

Correct use includes compliance with the relevant requirements for installation and operation, particularly:
- EN ISO 13849-1, Safety of machinery. Safety related parts of control systems. General principles for design
- EN 1088, Safety of machinery. Interlocking devices associated with guards. Principles for design and selection
- EN 60204-1, electrical equipment of machines

Important:
The user is responsible for safe integration of the device in a safe overall system. For this purpose the overall system must be validated, e.g. in accordance with EN ISO 13849-2. If the simplified method according to section 6.3 EN ISO 13849-1:2008 is used for validation, the Performance Level (PL) may be reduced if several devices are connected one after the other.
If a product data sheet is included with the product, the information on the data sheet applies in case of discrepancies with the operating instructions.

Safety Precautions
Safety switches fulfill a personal protection function. Incorrect installation or tampering can lead to severe injuries to personnel.
- Safety components must not be bypassed (bridging of contacts) or removed or otherwise rendered ineffective.
- On this topic pay attention in particular to the measures for reducing the possibility of bypassing according to EN 1088:1995.A2:2008, sec. 5.7.
- The switching operation may only be triggered by actuators specially provided for this purpose which are permanently connected to the protective guard.
- Mounting, electrical connection and setup only by authorized personnel.

Function
The safety switch permits the locking of movable safety guards.
- In the switch head is a rotating cam that is blocked/released by the guard locking pin. The guard locking pin is moved on the insertion / removal of the actuator and on the activation / deactivation of the guard locking. During this process the switching contacts are actuated.
- If the cam is blocked, the actuator cannot be pulled out of the switch head, guard locking active.

Version TL4019-1, TL4019-3 and TL4019-5 (Guard locking by spring force)
The guard locking pin is held in the locked position by spring force and unlocked by electromagnetic actuation. The spring interlock guard locking functions in accordance with the closed-circuit current principle. The safety guard cannot be opened immediately in the event of interruption of the solenoid power supply.

Versions TL4019-2 and TL4019-4 (Guard locking by solenoid force)
This type must be used only in special cases after strict assessment of the accident risk! The safety guard can be opened immediately in the event of interruption of the solenoid power supply!
- The guard locking pin is held in the locked position by electromagnetic force and released by spring force. The guard locking operates in accordance with the open-circuit current principle.
- Close safety guard and activate guard locking
- The guard locking pin is released by insertion of the actuator into the safety switch.

Mechanical Release
In the event of malfunctions, the guard locking can be deactivated using the mechanical release, irrespective of the state of the solenoid (see Figure 2).
- Unscrew locking screw.
- Using a screwdriver, turn the mechanical release by approx. 180° in the direction of the arrow.

Lock and Escape Release
On the actuation of the lock or the escape release, the actuator must not be under tension.
- The contacts 21-22 and 41-42 are opened and the switch mechanically unlocked. The state of contacts 1x-1x and 3x-3x can vary.

Mounting
- Safety switches and actuators must not be used as an end stop.
- Mount the safety switch only in assembled condition!
- Caution! Risk of burns due to high surface temperature at ambient temperatures above 40°C! Protect switch against touching by personnel or contact with inflammable material.

Protection Against Environmental Influences
A lasting and correct safety function requires that the actuating head must be protected against the penetration of foreign bodies such as swarf, sand, blasting shot etc.
- Cover the actuating slot with the enclosed non-removable screws, rivets or welding.
- Cover the unused actuating slot with the enclosed slot cover.

Changing the Actuating Direction
- Remove the screws from the actuating head.
- Set the required direction.
- Tighten the screws with a torque of 0.6Nm.
- Cover the used actuating slot with the enclosed slot cover.

Fig. 1: Changing the actuating direction
- Door request (TL4019-5)
When the actuator is in the locked state positively driven contact 21-22 is opened by pulling the safety guard (8 mm actuator stroke) as a result of which a signal is forwarded to the higher-order control system. Depending on the control concept, the safety guard can be unlocked automatically - when machine components which were still running have stopped.
Excursion of Liability under the Following Conditions
- if the unit is not used for its intended purpose
- non-compliance with safety regulations
- non-compliance with safety regulations
- failure to perform functional checks.

Technical Data

- Rated insulation voltage \( U = 250 \) V
- Rated impulse withstand voltage \( U_{imp} = 2.5 \) kV
- Rated short-circuit current \( 100 \) A
- Switching voltage, min. at 10 mA 12 V
- Utilization category to EN 60947-5-1

- AC-15 4 A 230 V
- DC-13 4 A 24 V
- Switching current, min. \( \leq 24 \) V1 mA
- Short circuit protection to IEC 60269-1

- 4 A gG
- Con. thermal current In

- 4 A
- Solenoid operating voltage/solenoid power consumption

- AC/DC 24 V (+10%/-15%)8 W
- 110 AC 110 V (+10%/-15%)10 W
- Duty cycle 100 %
- Reliability figures according to EN ISO 13849-1

- B10d 3 x 10 6

The signed EC Declaration of Conformity is included with the product.
Operating Instructions for TL4019 Series Safety Switches

Fig. 2: Switching elements and functions

Fig. 3: Minimum travel + overtravel

Fig. 4: Dimension drawing

Actuator removed
Switching position:

<table>
<thead>
<tr>
<th>Type</th>
<th>E1</th>
<th>E2</th>
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<tbody>
<tr>
<td>TL4019-1-..1</td>
<td>41</td>
<td>32</td>
</tr>
<tr>
<td>TL4019-2-..1</td>
<td>41</td>
<td>32</td>
</tr>
<tr>
<td>TL4019-3-..1</td>
<td>41</td>
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<td>41</td>
<td>32</td>
</tr>
<tr>
<td>TL4019-3-..2</td>
<td>41</td>
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<tr>
<td>TL4019-3-..3</td>
<td>41</td>
<td>32</td>
</tr>
<tr>
<td>TL4019-4-..3</td>
<td>41</td>
<td>32</td>
</tr>
</tbody>
</table>

Actuator switched position:

Completely inserted
Request
Unlocked
Completely removed
Opened

Approached direction
Standard actuator
Overtravel actuator

<table>
<thead>
<tr>
<th></th>
<th>horizontal (H)</th>
<th>vertical (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28 + 2</td>
<td>29.5 + 1.5</td>
</tr>
<tr>
<td>Flex 1</td>
<td>28 + 7</td>
<td>-</td>
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</tbody>
</table>

Flex 2 Actuator
Flex 1 Actuator

Figure 4: Min. door radii

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