

T4016

Operating Instructions for T4016 Series Safety Switches

Correct Use

Safety switches series T4016 are interlocking devices without guard locking.

In combination with a separating safety guard, this safety component prevents dangerous machine movements from being performed for as long as the safety guard is open. A stop command is triggered if the safety guard is opened during the dangerous machine function.

The safety switches series T4016 comply with the regulations of EN 60947-5-1 (incl. Annex K) and comply with the requirements of the employers' liability insurance associations for machines, installations and personnel protection.

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
- ▶ EN ISO 14121, Safety of machinery. Risk assessment. Principles
- ▶ IEC 62061, Safety of machinery – Functional safety of safety-related electrical, electronic and programmable electronic control systems.

Correct use includes compliance with the relevant requirements for installation and operation, in particular

- ▶ 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, Safety of machinery. Electrical equipment of machines. General requirements.

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), turned away, 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 signals that the safety guard is closed. The switch does not perform guard locking!

- ▶ Closing
The safety contacts are closed by inserting the actuator.
- ▶ Opening
The safety contacts are positively opened by withdrawing the actuator.

Mounting

- ⚠ Safety switches and actuators must not be used as an end stop.
- ⚠ Mount the safety switch only in assembled condition!

Assemble the safety switch so that:

- ▶ access to the switch is difficult for operating personnel when the safety guard is open.
- ▶ maintenance and replacement are possible.
- ▶ address programming, inspection and replacement by authorized personnel are possible.
- ▶ Insert the actuator in the actuating head.
- ▶ Mount the safety switch positively.
- ▶ Permanently connect the actuator to the safety guard so that it cannot be detached, e.g. using the enclosed non-removable screws, rivets or welding.
- ▶ Fit an additional stop for the movable part of the safety guard.

Changing the actuating direction

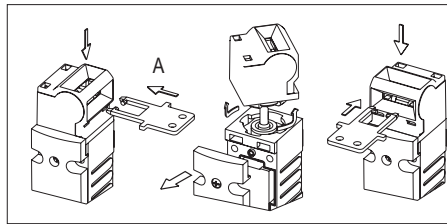


Fig. 1: Changing the actuating direction

- ▶ Unscrew and open switch cover.
- ▶ Remove actuating head from the switch by turning and refit in the required position (bayonet fastening).
- ▶ Fit locking pins for protection against twisting (Figure 2). It is then not possible to change the actuating direction again.

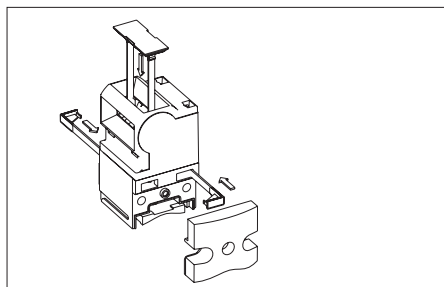


Figure 2: Fitting the locking pins and the slot cover

- ▶ Close the cover and screw in position.
- ▶ Cover the unused actuating slot with the enclosed slot covers (Figure 2).

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 unused actuating slot with the slot cover.

Cover the actuating slot, the actuator and the rating plate during painting work!

Only use solvent-free cleaning agents to clean the switch!

Electrical connection

- ⚠ When choosing the insulation material and wire for the connections, pay attention to the over-temperature in the housing (depending on the operating conditions)!

For use and applications as per the requirements of Cu , copper wire 60/75 °C is to be used.

Version T4016 (cable entry M20x1.5/NPT 1/2", see rating plate)

- ▶ Unscrew locking screw for the required insertion opening.
- ▶ Fit cable gland M20x1.5 or NPT 1/2" (see product designation) with appropriate degree of protection.
- ▶ The maximum conductor cross-section is 1.5 mm². For pin assignment see Figure 3. Tighten the screws with a torque of 0.6 Nm.
- ▶ Check that the cable entry is sealed.
- ▶ Close the cover and screw in position.

Optional LED module L024

- ▶ Max. outer diameter that can be connected 1.0 mm.
- ▶ For pin assignment see Figure 4.

Due to the restricted space for wiring, use wires as thin as possible (recommendation 0.25 mm²)! Observe current rating of the wire!

Functional check

- ⚠ Warning! Danger of fatal injury as a result of faults in installation and functional check. Before carrying out the functional check, make sure that there are no persons in the danger area. Observe the valid accident prevention regulations.

After installation and any fault, the safety function must be fully checked. Proceed as follows:

- ▶ Mechanical function test

The actuator must slide easily into the actuating head. Close the safety guard several times to check the function.

- ▶ Electrical function test

1. Switch on operating voltage.

2. Close all safety guards.

The machine must not start automatically.

3. Enable operation in the control system.

4. Open the safety guard.

The machine must switch off and it must not be possible to start it as long as the safety guard is open.

Repeat steps 2 - 4 for each safety guard.

Inspection and service

- ⚠ If damage or wear is found, the complete switch and actuator assembly must be replaced. Replacement of individual parts or assemblies is not permitted!

No servicing is required, but regular inspection of the following is necessary to ensure trouble-free long-term operation:

- ▶ correct switching function
- ▶ secure mounting of components
- ▶ dirt and wear
- ▶ sealing of cable entry
- ▶ loose cable connections or plug connectors.

Note: The year of manufacture can be seen in the bottom, right corner of the rating plate.

Exclusion of liability under the following circumstances

- ▶ incorrect use
- ▶ non-compliance with safety regulations
- ▶ installation and electrical connection not performed by authorized personnel.
- ▶ failure to perform functional checks.

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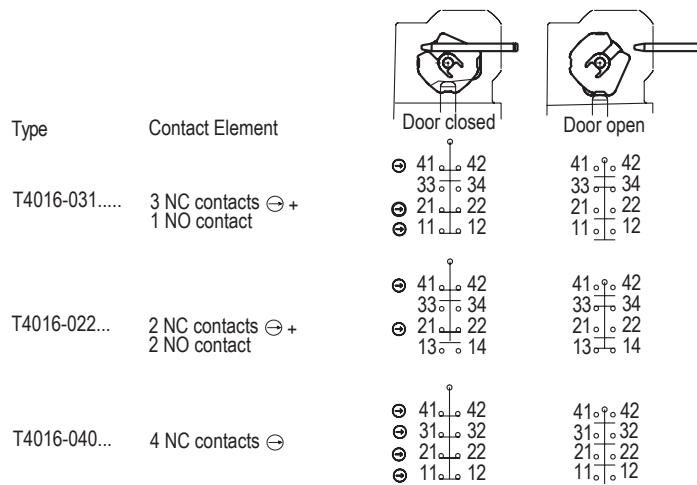


Figure 3: Switching elements and switching functions

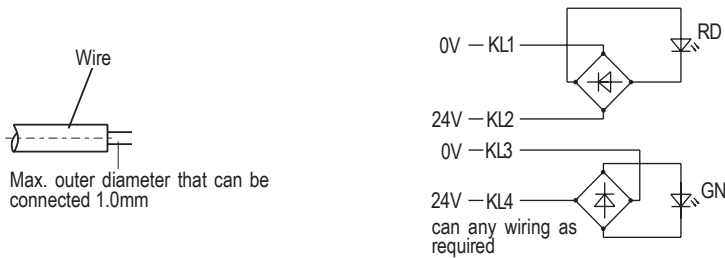


Figure 4: Pin assignment optional LED module TL4016

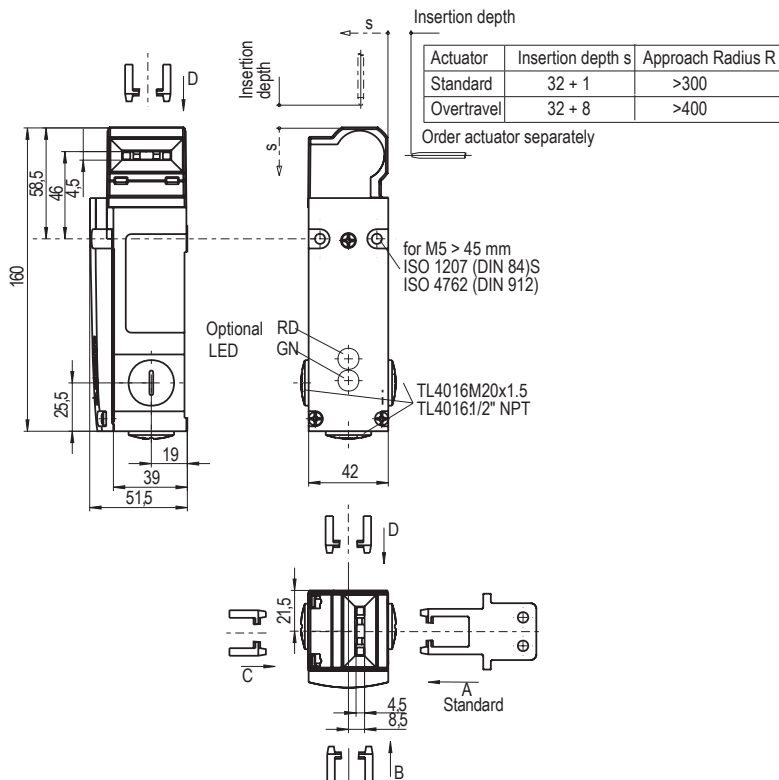
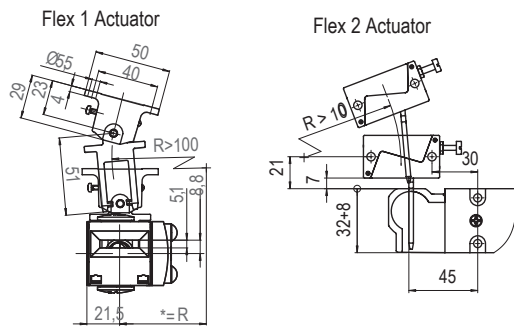


Figure 5: Dimension drawing T4016, insertion depth and approach radius

Technical Data

Parameters	Value
Housing material	Die-cast alloy, cathodically dipped
Degree of protection according to IEC60529	IP67
Mech. life	2x10 ⁶ operations
Ambient temperature	-20...+80°C
Degree of contamination (external, according to EN 60947-1)	3 (industrial)
Installation position	Any
Approach speed, max.	20 m/mi n
Actuating force, max.	40 N
Actuation frequency, max.	6700/ h
Extraction force	50 N
Retention force	10 N
Switching principle	Slow-action switching contact
Contact material	Silver alloy, gold flashed
Type of connection T4016	Screw terminal
Conductor cross-section	0.34mm 2...1.5mm 2
Operating voltage for optional LED display	L024 AC/DC 24V +10%, -15%
Switching voltage, min. at 10 mA	12 V
Switching current, min., at 24 V	1 mA
Short-circuit protection (control circuit fuse to IEC 60269-1)	4 A gG
Conventional thermal current	4 A
Utilization category according to EN60947-5-1	AC-15 4 A 230V DC-13 4 A 24V
Rated impulse withstand voltage U _{imp}	= 2.5 kV
Rated insulation voltage U _i	= 250 V
Conditional short-circuit current	100A
Reliability figures according to EN ISO 13849-1	
B10d	4.5 x 10 ⁶

EC declaration of conformity

The manufacturer named below herewith declares that the product fulfills the provisions of the directive(s) listed below and that the related standards have been applied.

OMRON Scientific Technologies Inc.
6550 Dumbarton Circle
Fremont, CA 94555, U.S.A.

Directives applied:
Machinery directive 2006/42/EC

Standards applied:
EN 60947-5-1:2004 + Cor.:2005 + A1:2009
EN 1088:1995+A2:2008

Fremont, March 2013

Marty Krikorian
Director, Quality Control

Representative in EU: J. J. P. W. Vogelaar
European Quality & Environment Operation Manager
Omron Europe B.V.
Zilverenberg 2, 5234 GM,
's-Hertogenbosch,
The Netherlands

The signed EC Declaration of Conformity is included with the product.



OMRON SCIENTIFIC TECHNOLOGIES, INC.
6550 Dumbarton Circle, Fremont CA 94555-3605 USA

U.S.A: 800.556.6766
Canada: 866.986.6766
Mexico and South America: 847.843.7900
All other countries: 510.608.3400
www.sti.com/info

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Manual P/N 99925-0010 Rev.B
Drawing number 095519-04-10/13
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