

Operating Instructions for T4012 Series Safety Switches

Correct Use

Safety switches series T4012 are electromagnetic interlock devices with guard locking.

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
- ▶ 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, 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), 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.
- ▶ Insert the actuator in the actuating head.
- ▶ Mount the safety switch positively.
- ▶ For safety-related applications (fixed position), mount switch with M5x30 screws.
- ▶ 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

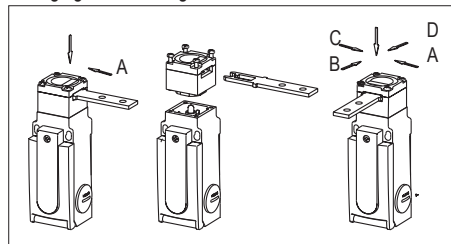


Fig. 1: Changing the actuating direction

- Remove the screws from the actuating head.
- ▶ Set the required direction.
- ▶ Tighten the screws with a torque of 0.6 Nm.
- ▶ Cover the unused actuating slots with the enclosed slot covers.

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 copper wire 60/75°C is to be used.

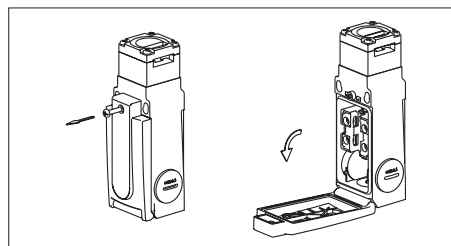


Fig. 2: Opening the safety switch

- ▶ Break out the required entry 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 terminal 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.

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.

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, August 2012

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.

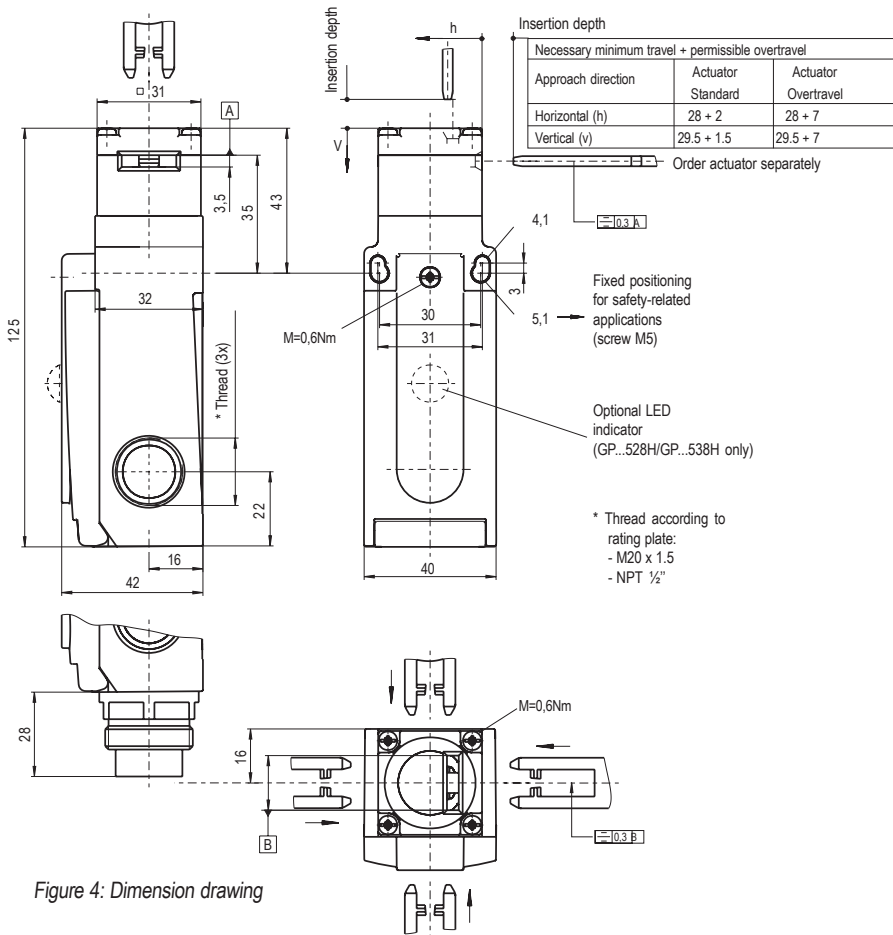


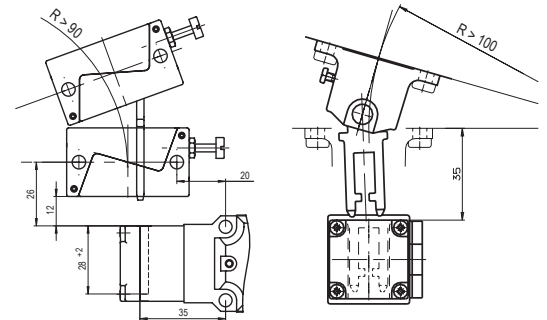
Figure 4: Dimension drawing

Technical data

Parameter	Value
Housing material	Reinforced thermoplastic
Degree of protection according to IEC 60529	IP67
Mechanical life	2x10 ⁶ operations
Ambient temperature	-20°C ... +80°C
Degree of contamination (external, according to EN 60947-1)	3 (industrial)
Installation position	Any
Approach speed, max.	20 m/min
Actuating force	10 N
Actuation frequency, max.	6700 / h
Extraction force	20 N
Retention force	2 N
Switching principle	Slow-action switching contact
Contact material	Silver alloy, gold flashed
Connection type	Screw terminal
Conductor cross-section (rigid/flexible)	max. 1.5 mm ²
Switching voltage min. at 10 mA	12 V
Switching current, min., at 24 V	1 mA
Short circuit protection (control circuit fuse) acc. to IEC 60269-1	4 A gG
Conv. thermal current I _{th}	4 A
Utilization category according to EN 60947-1-5	AC-15 4 A 230 V DC-13 4 A 24 V
Rated impulse withstand voltage U _{imp}	= 2.5 kV
Rated insulation voltage	U _i = 250 V
Rated short-circuit current	100 A
Reliability figures according to EN ISO 13849-1	B10d
	3 x 10 ⁶

Flex 2 Actuator

Flex 1 Actuator



Actuator type	Door radius min. [mm]
Flat	1000
90 Degree	1000
Flex 2	90
Flex 1	100

Figure 5: Min. door radii

Type	Contact elements	Actuator inserted	Actuator removed
T4012-011...	1 NC contact + 1 NO contact	21 22 13 14	21 22 13 14
T4012-020...	2 NC contacts	21 22 11 12	21 22 11 12
T4012-040...	4 NC contacts	41 42 33 34 21 22 11 12	41 42 33 34 21 22 11 12
T4012-031...	3 NC contact + 1 NO contact	41 42 33 34 21 22 11 12	41 42 33 34 21 22 11 12
T4012-022...	2 NC contact + 2 NO contact	41 42 33 34 21 22 11 12	41 42 33 34 21 22 11 12

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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OMRON ELECTRONICS DE MEXICO • HEAD OFFICE

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