

Correct use

Safety switches series NZ...AS are operated as slaves on the safety bus AS-Interface Safety at Work and function as interlocking devices without guard locking (type 1). The actuator is uncoded (e.g. dog). In combination with a movable guard and the machine control, this safety component prevents dangerous machine functions from occurring while the guard is open. A stop command is triggered if the guard is opened during the dangerous machine function.

This means:

- ▶ Starting commands that cause a dangerous machine function must become active only when the guard is closed.
- ▶ Opening the guard triggers a stop command.
- ▶ Closing a guard must not cause automatic starting of a dangerous machine function. A separate start command must be issued. For exceptions, refer to EN ISO 12100 or relevant C-standards.

Before the device is used, a risk assessment must be performed on the machine, e.g. in accordance with the following standards:

- ▶ EN ISO 13849-1
- ▶ EN ISO 12100
- ▶ IEC 62061

Correct use includes observing the relevant requirements for installation and operation, particularly based on the following standards:

- ▶ EN ISO 13849-1
- ▶ EN ISO 14119
- ▶ EN 60204-1

Important!

- ▶ The user is responsible for the proper integration of the device into 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 of EN ISO 13849-1:2015 is used for determining the Performance Level (PL), the PL might be reduced if several devices are connected in series.
- ▶ Logical series connection of safe contacts is possible up to PL d in certain circumstances. More information about this is available in ISO TR 24119.
- ▶ 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

⚠ WARNING

Danger to life due to improper installation or due to bypassing (tampering). Safety components perform a personnel protection function.

- ▶ Safety components must not be bypassed, 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 ISO 14119:2013, section 7.
- ▶ Mounting, electrical connection and setup only by authorized personnel possessing special knowledge about handling safety components.

Function

The safety switch monitors the position of movable guards.

When the guard is closed, each NZ...AS transmits a switch-specific, unique safety code sequence with 8 x 4 bits via the AS-Interface bus. This code sequence is evaluated by an AS-Interface safety monitor.

The first positively driven contact is represented by the AS-Interface input bits D0 and D1, while the second positively driven contact is represented by D2 and D3.

The safety switch must be correspondingly configured in the AS-Interface safety monitor (refer to the operating instructions of the AS-Interface safety monitor used and the status table).

Mounting

NOTICE

Device damage due to improper mounting and unsuitable ambient conditions

- ▶ Safety switches and actuators must not be used as an end stop.
- ▶ Observe EN ISO 14119:2013, sections 5.2 and 5.3, for information about mounting the safety switch and the actuator.
- ▶ Observe EN ISO 14119:2013, section 7, for information about reducing the possibilities for bypassing an interlocking device.
- ▶ Protect the switch head against damage.
- ▶ The specified IP degree of protection is applicable only if the housing screws, cable entries and plug connectors are properly tightened. Observe the tightening torques.

Changing the actuating direction

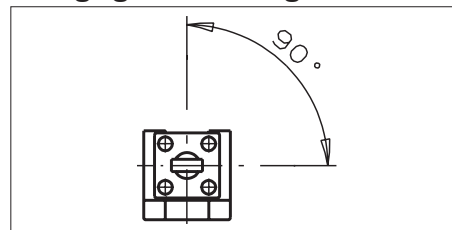


Fig. 1: Changing the actuating direction

1. Remove the screws from the actuating head.
2. Set the required direction.
3. Tighten the screws with a torque of 1.2 Nm.

Electrical connection

The safety switch is connected to the bus system with a 4-pin connecting cable with M12 plug connector via a passive AS-Interface distribution box with a yellow and black AS-Interface cable.

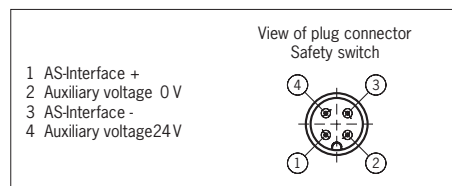


Fig. 2: Terminal assignment of M12 plug connector

The following information applies to devices with plug connector:

- ▶ Check that the plug connector is sealed.

Setup

Setting the AS-Interface address

The address can be set prior to or after mounting. The AS-Interface address of the safety switch is set using an AS-Interface programming device. Addresses 1 to 31 are valid.

The unit is programmed by connecting the programming device to the M12 plug connector of the safety switch with a programming cable.

Address 0 is the default setting on delivery (the AS-Interface *Fault* LED is lit during operation).

Configuration in the AS-Interface safety monitor

(see operating instructions for the AS-Interface safety monitor and status table)

The safety switch is configured in the AS-Interface safety monitor with the AS-Interface address set as follows, for example:

- ▶ Dual-channel dependent
- ▶ Synchronization time: typ. 3 s
It may be necessary to set the synchronization time to higher values. This depends on the application and the approach speed of the actuator.
- ▶ With start-up test (corresponding to risk analysis)

In this operating mode, the guard must be opened each time prior to restarting in order to perform the start-up test.

LED displays

The AS-Interface bus status is indicated by two LEDs (Power, Fault) behind the lock cover on the safety switch.

Function test

⚠ WARNING

- Fatal injury due to faults during the function test.
- ▶ Before carrying out the function test, make sure that there are no persons in the danger zone.
- ▶ Observe the valid accident prevention regulations.

Check the device for correct function after installation and after every fault.

Proceed as follows:

Mechanical function test

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

Electrical function test

1. Switch on operating voltage.
 2. Close all guards.
 - ➔ The machine must not start automatically.
 3. Start the machine function.
 4. Open the guard.
 - ➔ The machine must switch off and it must not be possible to start it as long as the guard is open.
- Repeat steps 2 - 4 for each guard.



Inspection and service

⚠ WARNING

Danger of severe injuries due to the loss of the safety function.

- ▶ If damage or wear is found, the complete switch and actuator assembly must be replaced. Replacement of individual parts or assemblies is not permitted.
- ▶ Check the device for proper function at regular intervals and after every fault. For information about possible time intervals, refer to EN ISO 14119:2013, section 8.2.

Inspection of the following is necessary to ensure trouble-free long-term operation:

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

Info: The year of manufacture can be seen in the bottom, right corner of the type label.

Exclusion of liability and warranty

In case of failure to comply with the conditions for correct use stated above, or if the safety regulations are not followed, or if any servicing is not performed as required, liability will be excluded and the warranty void.

EU declaration of conformity

The declaration of conformity is part of the operating instructions, and it is included as a separate sheet with the device.

The original EU declaration of conformity can also be found at: www.euchner.com

Service

If servicing is required, please contact:

EUCHNER GmbH + Co. KG
 Kohlhammerstraße 16
 70771 Leinfelden-Echterdingen
 Germany

Service telephone:
 +49 711 7597-500

E-mail:
support@euchner.de

Internet:
www.euchner.com

Technical data

Parameter	Value
Housing material	Anodized die-cast alloy
Degree of protection	IP67, mating connector inserted
Mechanical life	30 x 10 ⁶ operating cycles
Ambient temperature	-25 ... +70 °C
Degree of contamination (external, acc. to EN 60947-1)	3 (industrial)
Installation orientation	Any
Approach speed, max.	
Actuator	
DO/WO	10 m/min
RG/RS/RL	20 m/min
RK	50 m/min
Approach speed, min.	0.1 m/min
Actuating force, min.	30 N
Actuation frequency	6,700/h
Switching principle	2 positively driven contacts, slow-action switching contact
Connection	Plug connector M12, 4-pin
Weight	Approx. 0.35 kg
AS-Interface data acc. to AS-Interface specification 2.1	EA code: 7 ID code: B
Operating voltage, AS-Interface	DC 22.5 ... 31.6 V
Total current consumption, max.	45 mA
Valid AS-Interface addresses	1 - 31
AS-Interface inputs	Acc. to AS-Interface Safety at Work
Positively driven contact 1	D0, D1
Positively driven contact 2	D2, D3
AS-Interface outputs	
D1	Red LED, 1 = LED on
D2	Green LED, 1 = LED on
AS-Interface Power LED	Green, AS-Interface voltage present
AS-Interface Fault LED	Red, offline phase or address 0
Reliability values acc. to EN ISO 13849-1	
B _{10D}	2 x 10 ⁷

Status table

Programming	State	D0, D1	D2, D3	Monitor diagnostics
Dual-channel dependent Synchronization time 3 s	Guard closed	Code sequence		Green If start-up test selected: yellow flashing on start-up
	Intermediate state during opening or closing of the guard. Switch S1 (internal) open	Half-sequence	00	On opening: yellow flashing On closing: red After expiration of the synchronization time: yellow flashing
	Intermediate state during opening or closing of the guard. Switch S2 (internal) open	00	Half-sequence	
	Guard open	00	00	Red
	Address 0 or communication disrupted			Gray

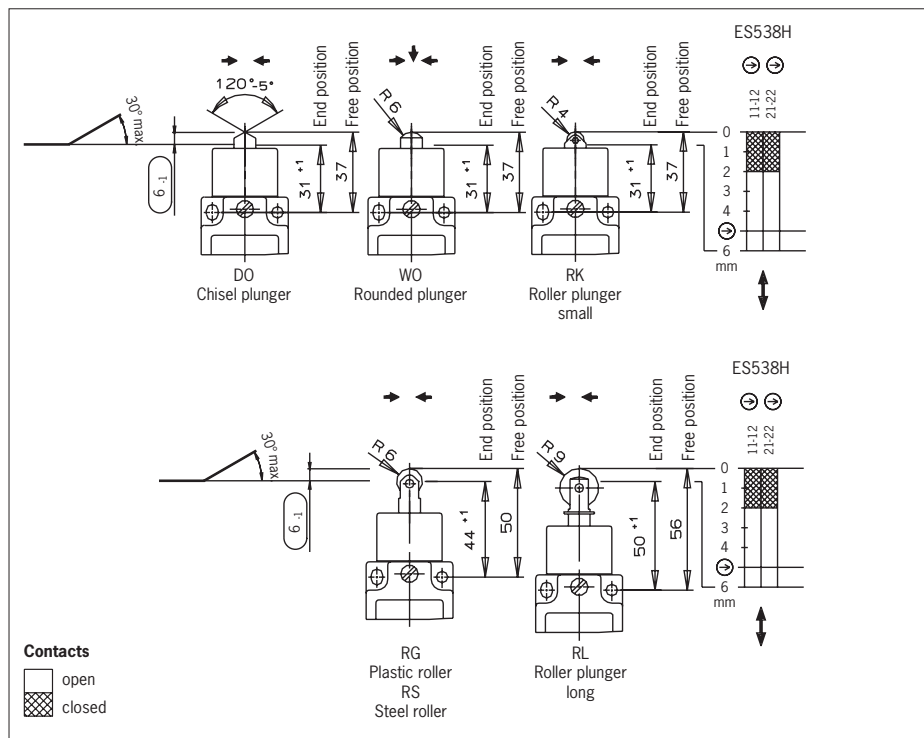


Fig. 4: Travel diagrams, actuator and approach directions

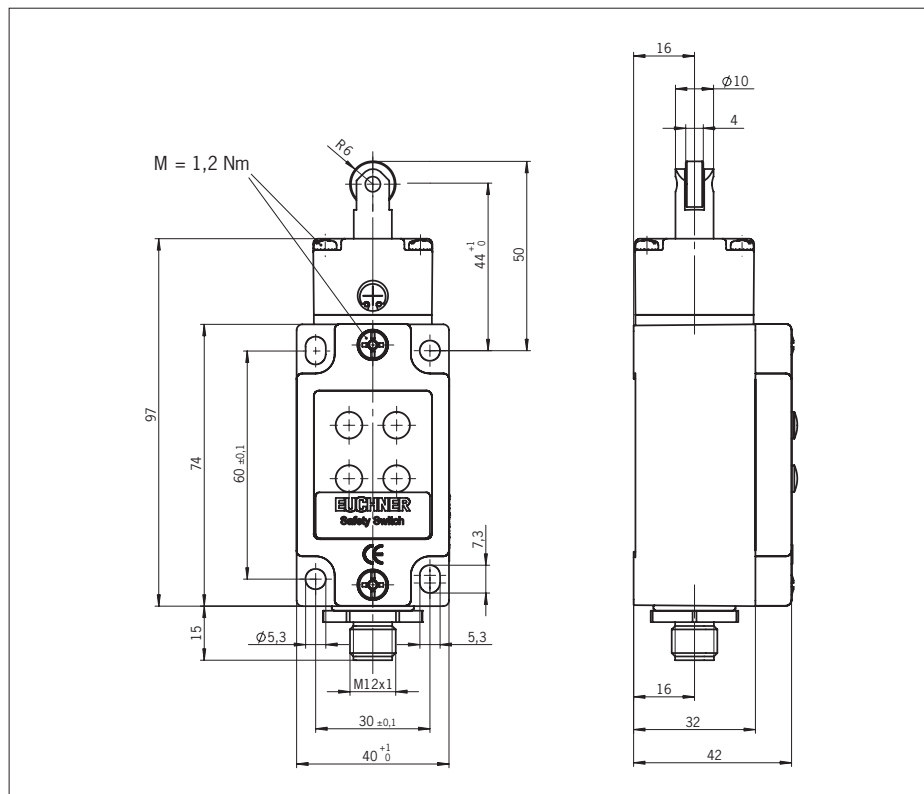


Fig. 3: Dimension drawing for NZ2RS...AS1