

ELMON

Sicherheitsschaltgerät / Safety Relais / Relais de sécurité / Relè di sicurezza / Veiligheidsrelais

ASO Safety
Solutions

ELMON classic 41-312 ELMON classic 41-812



Betriebsanleitung (Original, Gültigkeit siehe letzte Seite)
ELMON *classic* 41-312 / 41-812 Sicherheitsschaltgerät

Seite 3-12

Deutsch

Operating Manual (see last page for validity)
ELMON *classic* 41-312 / 41-812 Safety Relais

Page 13-21

English

Manuel d'utilisation (Validité voir la dernière page)
ELMON *classic* 41-312 / 41-812 Relais de sécurité

Page 22-31

Français

14. EG Konformitätserklärung

Hiermit erklären wir, dass die nachfolgend bezeichneten Produkte der Baureihe:

ELMON rail 41-312

(Artikelnummer 1114-0060, Format Seriennummer yymmnnnn)

ELMON rail 41-812

(Artikelnummer 1114-0130, Format Seriennummer yymmnnnn)

Sicherheitsschaltgerät zur Kombination mit Schaltleisten, Schaltmatten und Schalterpuffern zur Vermeidung von Gefahren an Quetsch- und Scherstellen aufgrund ihrer Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung, den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der nachfolgenden EG-Richtlinien entspricht:

EG - Maschinenrichtlinie 2006/42/EG

EN ISO 13849-1:2008

EN ISO 13849-2:2013

EN 62061:2013-09

EN 60947-5-1:2010-04

EN 61000-6-2:2005

EN 61000-6-3:2007

Deutsch

EG - Baumusterprüfung

Notified Body 0044

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EG Baumusterprüfbescheinigung Nr.: 44 205 13176203

Diese Konformitätserklärung entbindet den Konstrukteur/Hersteller der Maschine nicht von seiner Pflicht, die Konformität der gesamten Maschine, an der dieses Produkt angebracht wird, entsprechend der EG-Richtlinie sicherzustellen.

Hersteller und Dokumentenbevollmächtigter:

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1. Table of Contents

1. Table of Contents	14
2. General safety regulations and protection measures	15
3. General and function description	16
4. Intended use	17
5. Application example	17
6. Device overview	18
6.1 Versions	18
6.2 Signal indicators	18
6.3 Connection terminals	18
6.4 DIP switch for configuring the operating mode	19
7. Operating modes	19
7.1 Safety output	19
7.2 Automatic reset	19
7.3 Fault self-retaining – manual reset	19
7.4 Signaling output without any delay (RLU)	19
7.5 Signaling output delayed (RL)	19
8. Mechanical mounting	20
9. Electrical connection	20
9.1 Supply voltage	20
9.2 Connection of sensor	20
9.3 Connection of multiple sensors per sensor circuit.	20
9.4 Connection of control circuits.	21
9.5 Connection Reset.	21
9.6 Connection of signaling contact.	21
10. Commissioning and function testing.	22
11. Fault diagnosis	22
12. Decommissioning and disposal.	22
13. Technical data	23
14. EC Declaration of Conformity.	24

All rights reserved to implement technical and operationally relevant changes of the products and devices shown in this documentation at any time without prior notice.

2. General safety regulations and protection measures

- The manufacturer and user of the system/machine on which the protection system is used are responsible for coordinating and adhering to all applicable safety rules and regulations under their own responsibility.
- The protection system guarantees functional safety in combination with the superordinate control system, but not the safety of the entire system/machine. Thus, a safety review of the entire system/machine in accordance with machine directive 2006/42/EC or relevant product standards is necessary prior to use of the device.
- The operating instructions must be permanently available at the operating location of the protection device. They must be thoroughly read and applied by every person who is tasked with the operation, maintenance or repair of the protection device.
- The installation and start-up of the protection device may only be conducted by specialized personnel who are familiar with these operating instructions and the applicable regulations on job safety and accident prevention. The instructions in these operating instructions must be followed and adhered to unconditionally.
- Electrical work may only be carried out by skilled electricians. Safety regulations for electrical engineering and from the professional association must be followed.
- In case work has to be carried out on the switching device, it must be switched to a voltage-free position and checked for freedom from any voltage and secured against being switched back on again.
- If the potential-free connections of the safety switching contacts are supplied with a hazardous voltage from an external source, it must be ensured that these are also switched off when working on the switching device.
- The switching device does not contain any components that the user must service. Any warranty or liability on the part of the manufacturer is forfeited in the event of any unauthorized modifications or repairs to the switching device.
- Auxiliary outputs must not execute any safety-orientated functions. They are not fail-safe and are not checked by testing either.



The system must be checked for correct function in suitable intervals by qualified persons for the standard-conform design of the safety system.
The check must be documented in a way that allows it to be traced at any time.

English

In the case of non-compliance or deliberate abuse, the manufacturer's liability will cease.

3. General and function description

The ELMON classic 41-312 switching device is used to evaluate sensors such as safety contact mats, safety contact strips and safety bumpers for securing crush and shear locations.

An ASO sensor can be connected to the switching device. The steady-state current monitoring of the sensor is made possible by an integrated terminating resistor in the sensor.

If the desired steady-state current flows, the safety relays are driven and the switching contacts closed.

If the sensor is operated or the sensor circuit is interrupted, the relay switching contacts open.

A signal output with potential-free switching contacts is available. An operation of the sensor causes a reaction of the signal output in accordance with the DIP switch configuration. The signal output must not execute any safety-orientated functions. It is not fail-safe and not checked by testing either.

The switching device has been designed and type-approved in accordance with EN ISO 13849-1 "Safety-related parts of control systems" for category 3 Performance Level e. For compliance with category 3, the safety output is set up redundantly with two independent switching elements.

In addition the device has been type-approved according to EN 62061 "Functional safety of safety-related electrical, electronic and programmable electronic control systems" and can meet a safety function up to SIL 3.

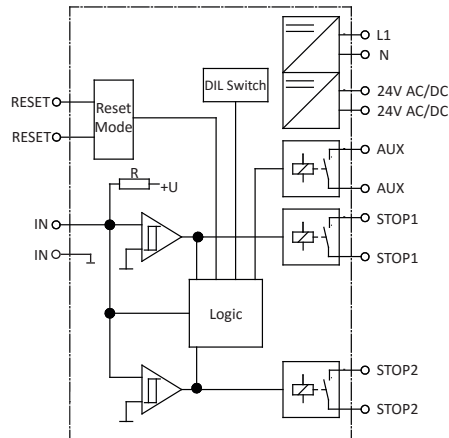
The monitoring state of the sensor and the applied operating voltage are indicated by LED.

If there is a fault alarm, all safety outputs are inactive.



The unit can be used in a household environment as well as in an industrial environment up to an altitude of 2000m above mean sea level. The unit must not be operated in areas with major temperature changes.

English



Functional circuit diagram

4. Intended use

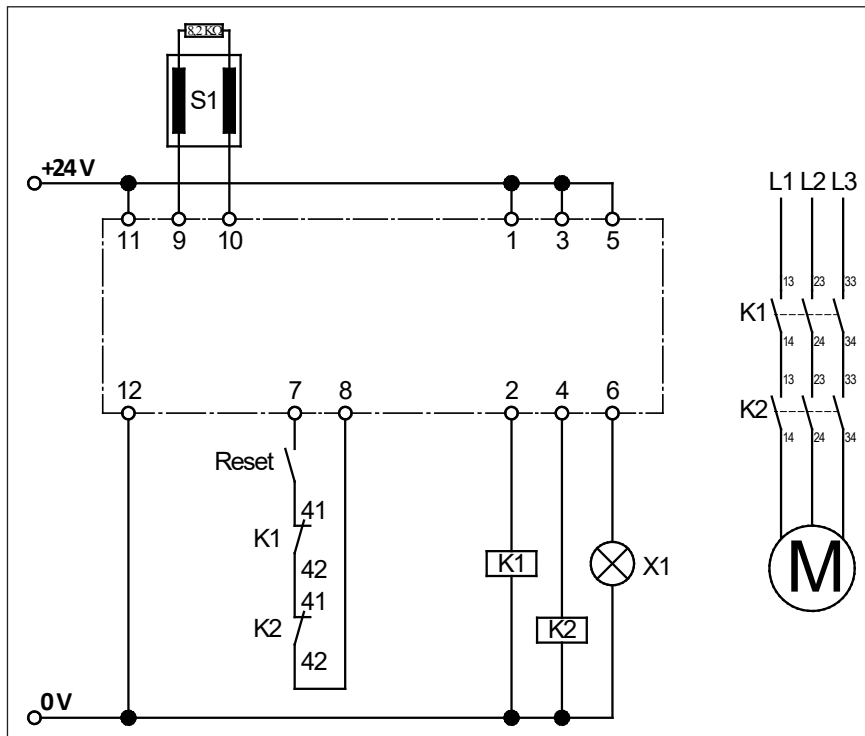
The switching device can only fulfill its safety-relevant task, if it is used as intended within specifications.

The intended use of the switching device is the use as a protection system in connection with safety contact mats, safety bumpers and safety contact edges with 8.2 kΩ resistance for steady-state current monitoring.

A different use or any use going beyond the intended use is not within specifications. The manufacturer does not accept any liability for any damage arising from use not within specifications.

Any use for special applications requires prior release by the manufacturer.

5. Application example



Safety-orientated monitoring of a safety contact strip with start release via release pushbutton and separate continuation of the control circuits (category 3 compliant application according to EN ISO 13849-1).

In order to check the functionality of the load breaking K1 and K2 relays the break contacts of these contactors are integrated into the start circuit (RESET).

The signaling relay output is used to visualize the switching state of the safety contact edge.

Circuit diagram in voltage-free state. Sensor not operated.

1 Sensor (edge, mat or bumper)

2 Release key

6. Device overview

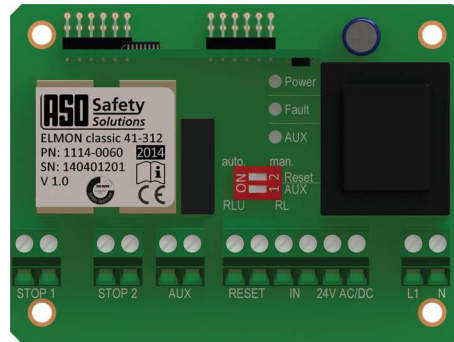
6.1 Versions

Polycarbonate housing with boltings for surface installation in a rough environment.

Version	Supply voltage
ELMON classic 41-312	230 V 50/60 Hz und 24 V AC/DC
ELMON classic 41-812	115 V 50/60 Hz und 24 V AC/DC

6.2 Signal indicators

LED Power (green) Operating state (on) Fault alarm (pulse)
LED Fault (red) Sensor operated (on) Sensor power circuit interrupted (fast flashing) Fault self-retaining (slow flashing)
LED AUX (yellow) Signal output switched



If there is no fault alarm, the operating state is shown via the **Power** LED (on). When a fault alarm is issued, the number of pulses output indicates the fault:

Pulse	Fault alarm
1	Voltage supply outside the valid value range
2	Fault when testing signal input
3	Output control relay faulty
4	Data transmission between micro-controllers faulty

English

6.3 Connection terminals

L1 N	ELMON classic 41-312: Supply voltage 230 V 50/60 Hz ELMON classic 41-812: Supply voltage 115 V 50/60 Hz
24V AC/DC	Supply voltage 24 V AC/DC
IN	Connection sensor
STOP 1	Switching contact safety relay 1
STOP 2	Switching contact safety relay 2
AUX	Switching contact signaling relay
RESET	Connection manual reset /re-start (key NO; optional)

6.4 DIP switch for configuring the operating mode

S1 (AUX)

„ON“: AUX Mode signal output: RLU
 „OFF“: AUX Mode signal output: RL (factory setting)

S2 (Reset)

„ON“: Automatic reset
 „OFF“: Fault self-retaining – manual reset (factory setting)

7. Operating modes

7.1 Safety output

Separate or combined use of the control circuits (redundant continuation of the switching contacts). In order to make joint use of the switching contacts of both relays, a bridge must be set between the **STOP1** and **STOP2** connections .

7.2 Automatic reset

(S2 = „ON“)

After removing a fault in a sensor circuit or after a voltage failure, the switching unit will automatically release output again.

7.3 Fault self-retaining – manual reset

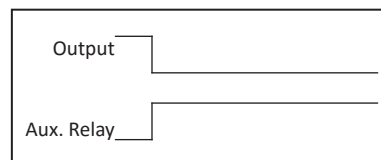
(S2 = „OFF“)

After removing a fault in a sensor circuit or after a voltage failure, the switching unit will only release the output(s) again, if the **RESET** contacts, 500 ms after the elimination of the disruption are closed by means of a pushbutton. This completely prevents any automatic re-start. A permanent bridging of the **RESET** contacts does not cause an automatic reset.

7.4 Signaling output without any delay (RLU)

(S1 = „ON“)

In this mode of operation the corresponding **AUX** signaling output is activated without delay, if any fault is signaled on the corresponding channel. The output is always inactive in the de-energized state of the switching device.

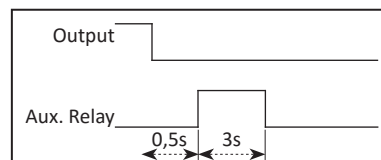


Safety output (symbolic)
 Signaling output (symbolic)

7.5 Signaling output delayed (RL)

(S1 = „OFF“)

In this operating mode the AUX signaling output is activated with a delay of 0.5 seconds and then remains active for a maximum of 3 seconds, if a fault is signaled.



Safety output (symbolic)
 Signaling output (symbolic)

English

8. Mechanical mounting

Polycarbonate housing with boltings for surface installation in a rough environment.



- The switching device must be mounted properly in a suitable mounting location. After the lid has been removed, the casing can be mounted by means of four bolts.
- Do not install in the immediate vicinity of an intense heat source.
- The unit must not be operated in areas with major temperature changes.

The switching unit can be installed in any position, but in order to protect against any ingress of humidity it should be fitted such that the cable entries point downwards.

9. Electrical connection



- The switching unit can be destroyed by connection to the incorrect terminals.
- Flexible connection leads must be secured against any shifting. The mains infeed wires must be additionally insulated by means of insulation tubes.
- Lines that are routed in the open air or outside the switch cabinet must be protected accordingly. For the unprotected external area only an appropriately approved cable may be used (for example: rubber lead).
- The limit values stated in the "Technical Data" for the supply voltage and the switching capability of the relay must be observed.

9.1 Supply voltage



The supply voltage can optionally be effected by means of a mains voltage of 230 V AC 50/60 Hz (ELMON rail 41-822: 115 V AC 50/60 Hz) or a low voltage of 24 V AC/DC. For a supply with 24 V AC/DC the voltage must correspond to the requirements for protective low voltages (SELV). The supply line to the switching device must be protected by means of a suitable fuse.

Never apply both voltages simultaneously !

The 230 V supply voltage must be applied to the **L1 N** terminals. For operation with 24 V, the supply voltage must be connected to the **24 V AC/DC** terminals.

For a fixed installation a separating device must be available (for example, a main switch for the system). A mains plug is sufficient as a separating device, if it is freely accessible.

9.2 Connection of sensor

The sensor with a terminating resistor of 8.2 k Ω must be connected to the **IN** terminals.

9.3 Connection of several sensors per sensor circuit



ASO sensors must not be connected in parallel.

One or several sensors can be connected to the signal transmitter input. For this purpose, the individual sensors are connected in series in accordance with Figure 1.

Safety contact edge SENTIR edge:

A maximum of 5 SENTIR edge devices can be connected in series. The maximum total length of the SENTIR edge must not exceed 100 m.

The length of a SENTIR edge can be up to 25 m.

The total line length of the series-connected SENTIR edge must not exceed 25 m.

Safety contact bumper SENTIR bumper:

A maximum of 5 SENTIR bumper devices can be connected in series. The maximum total length of the SENTIR bumpers must not exceed 15 m.

The length of a SENTIR bumper may be up to 3 m.

The total line length of the series-connected SENTIR bumpers must not exceed 25 m.

Safety contact mat SENTIR mat:

A maximum of 10 SENTIR mats can be connected in series. The maximum total surface area must not exceed 10 m².

The size of a SENTIR mat can be up to 1350 x 2350 mm.

The total line length of the series-connected SENTIR mat must not exceed 25 m.

Before connecting the series-connected sensors, it is recommended to measure the resistance value of the wiring. In the case of non-operated sensors the resistance must be $8.2 \text{ k}\Omega \pm 500 \Omega$. If the sensor is operated, the resistance must not exceed 500Ω .

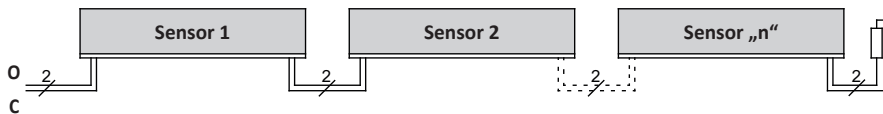


Fig. 1: Interconnecting several sensors, here using the example of the safety contact edge

9.4 Connection of control circuits

The control circuits to be monitored are to be connected to the **STOP 1** and **STOP 2** terminals. If a redundant continuation of the switching contacts is not desired, a bridge can be inserted between **STOP1** and **STOP2**.



In the event of any redundant use of the switching contacts only voltages with the same potential may be connected. The use of different voltage potentials does not correspond to any intended use within specifications.

English

Depending on the nominal current, the control circuits are to be protected by a corresponding fuse or the nominal current on the control circuits must be limited to the maximum value by means of other measures.

9.5 Connection Reset

For the operating mode "manual reset" the necessary reset switch must be connected to the **RESET** terminals.

9.6 Connection of signaling contact

The signaling **AUX** contact only serves as an auxiliary contact (signaling, display etc.) and must not be integrated into the safety circuit.