

Safety Control Unit SG-EFS 104/4L

Option: with or without reset function



Operating Instructions

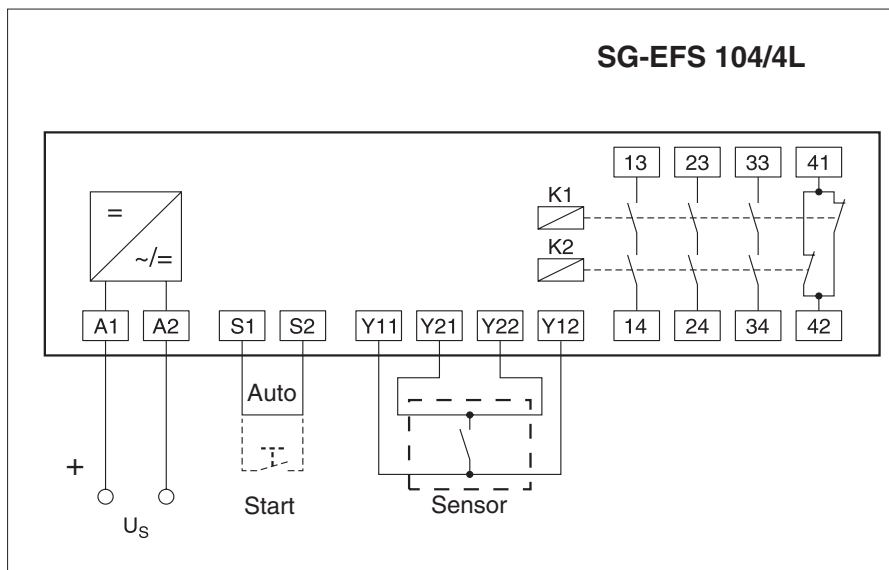
Safety Control Unit EEC-type-examination certificate

EN 954 category 3
SIL2 in accordance with IEC 61508

with forceguided contacts for increased safety requirements; for BK type sensors.

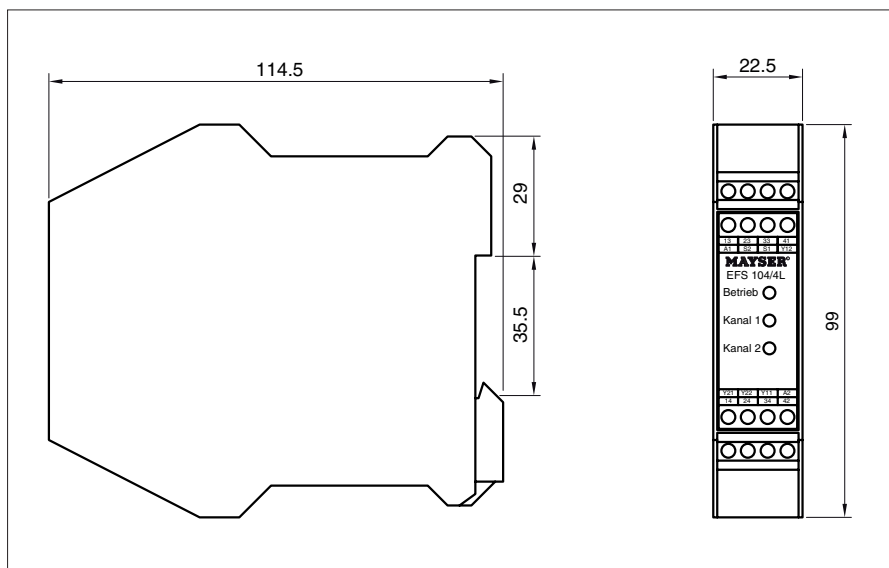
These operating instructions apply to the following Control Unit:

SG-EFS 104/4L 24 V =/-



Control system

The single-fault-safe electronics module has two channels (redundant). Each channel triggers a forceguided relay. The relays self-test by contact return after each switching cycle. The electronic system monitors the connected BK type sensor. When the sensors are not activated, both output relays are energised and both green LEDs light. If the sensor is activated, or a break occurs in the supply to the Control Unit, relays K1 and K2 deenergise and the LEDs go out.



Enclosure

W x H x D (mm)	22.5 x 114.5 x 99
Protection class	IP20
Terminals, fixed	4x 4-pin
Cable clamps	
Solid wire	1x 2.5 mm ²
Strand with sheath	1x 2.5 mm ²
Solid wire	2x 1.5 mm ²
Strand with sheath	2x 1.5 mm ²
Weight	approx. 180 g

Parts supplied

- Control Unit
 Enclosure with electronic part
- Operating Instructions

Safety Control Unit SG-EFS 104/4L

SAFETY INSTRUCTIONS!

- This unit is designed and tested in accordance with EN 60947-1 and left the factory in a perfectly safe condition. To maintain this condition, you must observe the safety regulations marked "WARNING!" in these operating instructions. Failure to observe the safety regulations can lead to death, injury to personnel, or damage to the unit and other systems and equipment.
- To ensure correct and safe operation of the unit, it must be properly transported and stored, properly installed and commissioned, and operated in accordance with its intended use.

Please read!

- Only persons familiar with the installation, commissioning and operation, and with the corresponding qualifications to prove their skills, may work on the units. They must observe the contents of these operating instructions, the information stated on the unit and the relevant safety regulations for the installation and operation of electrical systems.
- Repairs, in particular opening the enclosure, may only be carried out by the manufacturer or a person appointed by the manufacturer. Otherwise all warranty claims become null and void.
- When using the device outside the

European Union, you must observe the relevant regulations valid for the country of use.

- Should the information given in these operating instructions be inadequate in any way, please contact your local technical centre, subsidiary or representative.

Technical Data

Connecting voltage U_s

SG-EFS 104/4L	AC 24 V	DC 24 V
Voltage tolerance	-10% to +10%	-10% to +10%
Nominal frequency	50 - 60 Hz	
Power consumption	< 5 VA	< 3 W

Sensor

Short-circuit resistance	$\leq 400 \Omega$
Line resistance	$\leq 10 \Omega$
Line length	max. 100 m per connection

Control Unit outputs

Safety circuits	13/14, 23/24, 33/34; normally open contact
Signal circuit	41/42; normally closed contact
Switching voltage	max. AC 250 V max. DC 24 V
Switching current	max. 5 A max. 5 A
Switching capacity according to EN 60947-5-1	1,250 VA (AC 15) 120 W (DC13)
Switching operations	
mechanical	$> 1 \times 10^7$
electrical	$> 1 \times 10^5$ (DC 24 V / 2A)
Creep distance and air gap according to EN 50178	for soiling degree 2, overvoltage category 3 / 250 V
Contact fuse protection external	
Normally open contact	6.3 A quick-acting
Normally closed contact	4 A Neozed gL/gG
PFD _L Value according to IEC 61508	4.57×10^{-5}
PFH _L Value according to IEC 61508	1.08×10^{-8} 1/h

Operating behaviour

Reactivation time	< 1 s
Response time	< 30 ms

Operating conditions

Permissible ambient temperature	-25 °C to +55 °C
rel. humidity	max. 95%
Impact resistance transport	10 g
Impact resistance in operation	2.5 g

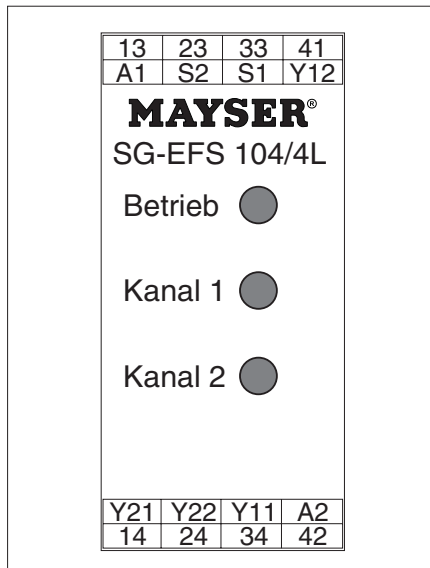
Important notes:

- **Supply voltage**
must be in accordance with the connecting voltage U_s indicated on the type plate.
- **Permissible ambient temperature range**
If installing into a cabinet, maintain sufficient distance from heat sources (min. 2 cm).
- **Wiring**
Wire direct to the control circuit or continue two-channel mode to the next circuit.
- **Fuse relay contacts externally**
due to risk of fusion
- **Protection class**
The units may only be used in locations with a minimum protection class of IP54 (e.g. cabinet).

Note:

When switching inductive loads the user must be fitted out with spark absorbers.

Installation and Operation



Installation

The enclosure of the Control Unit can be mounted in any position:
 - on 35 mm standard rail EN 50022.
 Wiring carried out in cable clamps:

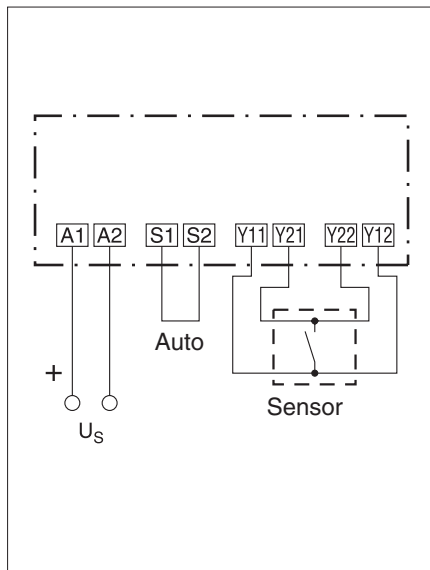
Sensor	Y11, Y12; Y21, Y22
Supply voltage	A1, A2
Switching channel 1	13, 14
Switching channel 2	23, 24
Switching channel 3	33, 34
Signal circuit	41, 42
Reset button or bridge	S1, S2

WARNING!

Do not release terminals with power on.

Connecting the sensor(s)

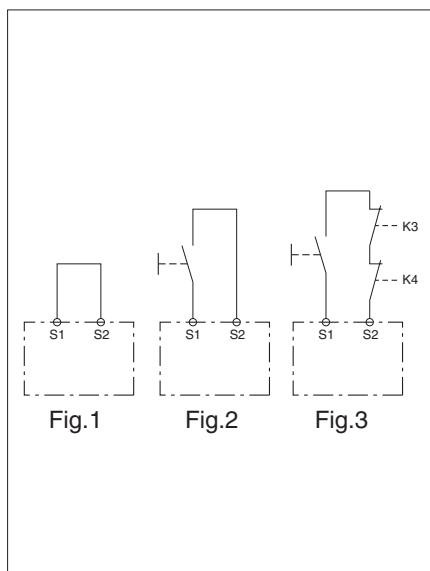
BK type sensor – with check for cable breakage: Bridge the inputs Y11, Y12 and Y21, Y22 with the two signal lines of the same contact surface in each case. The resistance between two signal lines of the same contact surface should not be more than 10Ω and the short-circuit resistance between the two contact surfaces (after activating the sensor) not more than 400Ω.



2 connection variants:

- SG-EFS 104/4L without reset function (automatic reset)

☞ Bridge between terminals S1, S2 must be set. The unit is reactivated as soon as the sensor is no longer activated (Fig.1).



Commissioning

After connecting up sensors, relay contacts and power, carry out a function test in the following order:

automatic start with set bridge or start Control Unit with reset button

Sensor(s) not activated

- bright green LED "Betrieb" (Power) is lit
- both green LEDs "Kanal 1" (Channel 1) and "Kanal 2" (Channel 2) are lit
- Contacts of switching channels 1, 2 and 3 closed
- Signal circuit open

☞ Activate sensor(s)

- bright green LED "Betrieb" (Power) is lit
- both green LEDs "Kanal 1" (Channel 1) and "Kanal 2" (Channel 2) go out
- contacts of switching channels 1, 2 and 3 open
- signal circuit closed

WARNING!

Do not cross link control units:

- Clamps Y11, Y12 and Y21, Y22 as well as S1, S2 are not voltage-free and thus may not be cross linked with further control units.

- SG-EFS 104/4L with reset function (manual reset)

☞ Connect external reset button to terminals S1, S2. After deactivation of the unit by the sensor it must be reactivated by means of an external reset button (Fig.2).

☞ Connect normally closed contact of external contactors (K3, K4) in series with reset button to terminals S1, S2. As above! In addition, the release circuit must have switched through, i.e. external contactors are deenergised.(Fig.3)

Maintenance, troubleshooting and disposal

Maintenance

The Control Unit is maintenance-free.

- ☞ Test safety system monthly by activating the sensors if shorter testing intervals are not specified.

Sensor not activated

Switching channels 1, 2 and 3 must be closed. All LEDs are lit

☞ Activate sensor

Switching channels 1, 2 and 3 must be open. LEDs "Kanal 1" (Channel 1) and "Kanal 2" (Channel 2) go out.

Reactivate Control Unit

Sensor inactive again. With auto-reset: Control Unit is reactivated after 1 sec. With manual reset: Reactivate Control Unit with reset button.

Troubleshooting and fault elimination

Prerequisite: SG-EFS 104/4L connected to power supply and sensor. Sensor inactive and unit activated.

green LED "Betrieb" (Power) not lit:

- > supply voltage off or incorrect
 - ☞ Check supply voltage, compare with type plate.
 - ☞ Observe correct polarity.
- > Fault not remedied, Control Unit faulty.
 - ☞ Replace Control Unit

green LED "Betrieb" (Power) lit, LEDs "Kanal 1" (Channel 1) and "Kanal 2" (Channel 2) not lit:

- > manual reset faulty; connection interrupted or fault in reset button.
 - ☞ Replace manual reset circuit with bridge on S1, S2.
 - > Fault not remedied, Control Unit faulty.
 - ☞ Replace Control Unit.
- > Faulty sensor or supply lines (break in connection)
 - ☞ Disconnect sensor.
 - ☞ Bridge terminals Y11, Y12 and Y21, Y22. With manual reset, press reset button.
 - > If LEDs "Kanal 1" (Channel 1) and "Kanal 2" (Channel 2) are not lit, Control Unit faulty.
 - ☞ Replace Control Unit.

only one LED "Kanal 1" (Channel 1) or "Kanal 2" (Channel 2) lit:

- > Fault in Control Unit
 - > Control Unit faulty
 - ☞ Replace Control Unit.

Fault can still not be detected? – Mayser Support will help:
tel. +49 731 2061-0

Return & Disposal

The Control Units produced by Mayser are professional electronic tools exclusively intended for commercial use (so-called B2B devices). In contrast to units mainly used in private households (B2C), they may not be disposed of at collection centres of public waste disposal authorities (e.g. municipal recycling centres). At the end of their service life, the devices can be returned to us for disposal.

WEEE-Reg.-Nr DE 39141253