

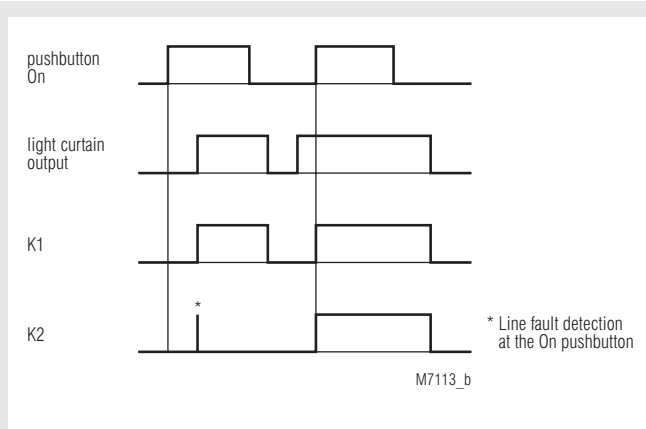
SAFEMASTER Light Curtain Controller BG 5925.__/900



0233217

- According to
 - Performance Level (PL) e and category 4 to EN ISO 13849-1: 2008
 - SIL Claimed Level (SIL CL) 3 to IEC/EN 62061
 - Safety Integrity Level (SIL) 3 to IEC/EN 61508
- Output: max. 3 NO contacts, see contacts
- Single and 2-channel operation
- Line fault detection on On-button
- Manual restart or automatic restart, switch S2
- For light curtains with symmetric or asymmetric outputs, selection via S1
- Option: fast auto start
- LED indicator for channel 1 and 2 an power
- Removable terminal strips
- Wire connection: also 2 x 1.5 mm² stranded ferruled (isolated), DIN 46 228-1/-2/-3/-4 or 2 x 2.5 mm² stranded ferruled DIN 46 228-1/-2/-3
- Width 22.5 mm

Function Diagram



M7113_b

Approvals and Markings



Applications

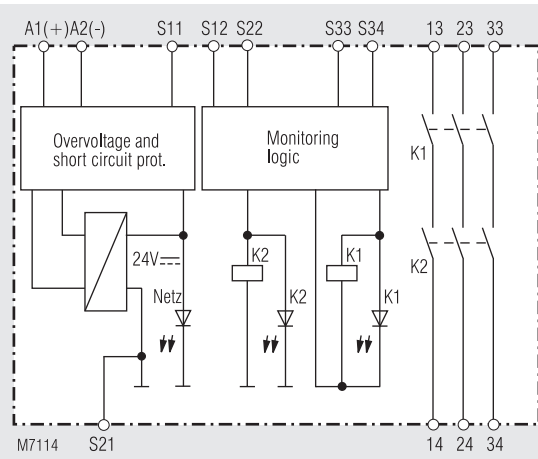
Protection of people and machines

- switch gear (FSD) for light bars with selftest (type 4) according to IEC/EN 61 496-1

Indicators

upper LED: on when supply connected
lower LEDs: on when relay K1 and K2 energized

Block Diagram

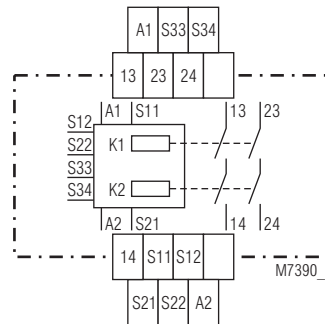


M7114

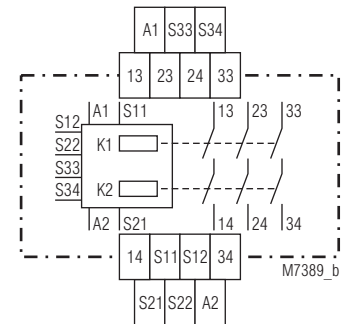
Connection Terminals

| Terminal designation | Signal designation |
|------------------------|---|
| A1 (+) | + / L |
| A2 (-) | - / N |
| S12, S22, S34 | Inputs |
| S11, S21, S33 | Outputs |
| 13, 14, 23, 24, 33, 34 | Forcibly guided NO contacts for release circuit |
| 21, 22, 31, 32 | Forcibly guided indicator output |

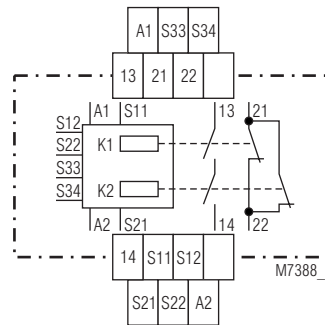
Circuit Diagrams



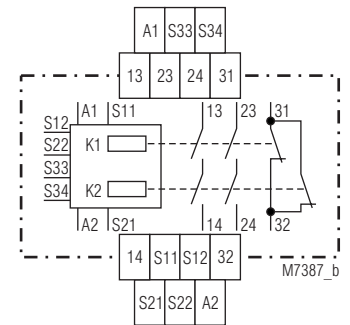
BG 5925.02/900



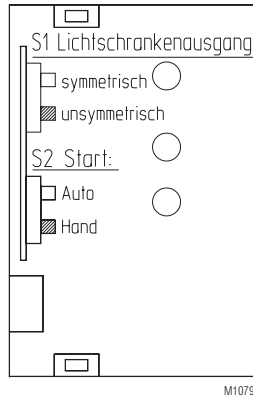
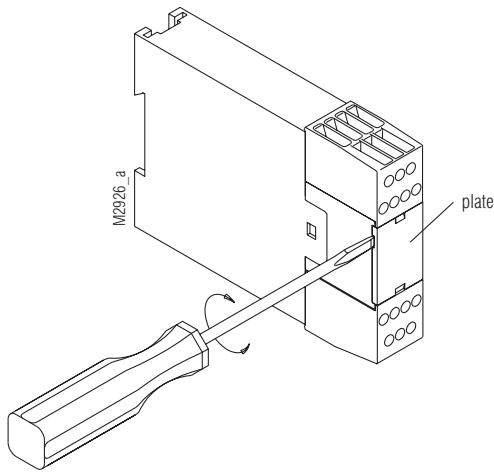
BG 5925.03/900



BG 5925.16/900



BG 5925.22/900



symmetric:
Light bars with symmetric outputs

asymmetric:
Light bars with asymmetric outputs

Drawing shows setting at the state of delivery

Notes

Line fault detection on On-button:

The line fault detection is only active when S12 and S22 are switched simultaneously. If The On-button is closed before S12, S22 is connected to voltage (also when line fault across On-Button), the output contacts will not close. A line fault across the On-button which occurred after activation of the relay, will be detected with the next activation and the output contacts will not close. If a line fault occurs after the voltage has been connected to S12, S22, the unit will be activated because this line fault is similar to the normal On-function.

When using light curtains with asymmetric outputs (one output + switching, one output - switching) the MINUS switching output has to be connected to S22 and the Plus switching to S12.

The gold plated contacts of the BG 5925 mean that this module is also suitable for switching small loads of 1 mVA - 7 VA, 1 mW - 7 W in the range 0.1 - 60 V, 1 - 300 mA. The contacts also permit the maximum switching current. However since the gold plating will be burnt off at this current level, the device is no longer suitable for switching small loads after this.

Technical Data

Input circuit

| | |
|---|---|
| Nominal Voltage U_N: | DC 24 V |
| Voltage range | DC |
| at 10% residual ripple: | 0.9 ... 1.1 U_N |
| Nominal consumption: | approx. 2,5 W |
| Min. Off-time: | 250 ms |
| Control voltage on S11: | DC 23 V at U_N |
| Control current over S12, S22: | approx. 55 mA at U_N |
| Min. voltage between terminals S12, S22 and S21: | DC 21 V when relay activated and U_N on A1 - A2 |
| Short-circuit protection: | Internal PTC |
| Overvoltage protection: | Internal VDR |

Output

| | |
|-----------------|--------------------|
| Contacts | |
| BG 5925.02: | 2 NO contacts |
| BG 5925.03: | 3 NO contact |
| BG 5925.16: | 1 NO, 1 NC contact |
| BG 5925.22: | 2 NO, 1 NC contact |

The NO contacts are safety contacts.
ATTENTION! The NC contacts 21-22 or 31-32 can only be used for monitoring.

| | |
|--|--|
| Operate delay typ. at U_N: | |
| Manual start: | 40 ms |
| automatic start: | 250 ms |
| BG 5925.__/901: | 100 ms |
| Release delay typ. at U_N: | |
| Disconnecting S12, S22: | 15 ms |
| In the case that S22 is not disconnected because of fault: | ≤ 200 ms |
| Contact type: | forcibly guided |
| Nominal output voltage: | AC 250 V |
| | DC: see limit curve for arc-free operation |
| Switching of low loads: | ≥ 100 mV |
| (contact 5 μ Au) | ≥ 1 mA |
| Thermal current I_{th}: | max. 5 A |
| | see current limit curve |

| | | |
|---------------------------|----------------|-------------------|
| Switching capacity | | |
| to AC 15: | | IEC/EN 60 947-5-1 |
| NO contact: | AC 3 A / 230 V | |
| NC contact: | AC 2 A / 230 V | IEC/EN 60 947-5-1 |
| to DC 13: | | |
| NO contacts: | 1 A / DC 24 V | IEC/EN 60 947-5-1 |
| NC contacts: | 1 A / DC 24 V | IEC/EN 60 947-5-1 |

Electrical contact life
to AC 15 at 2 A, AC 230 V: 10⁵ switching cycles IEC/EN 60 947-5-1
to DC 13 at 1 A, DC 24 V: > 150 x 10³ switching cycles

Permissible operating frequency: max. 1 200 operating cycles / h

Short circuit strength
max. fuse rating: 6 A general-purpose IEC/EN 60 947-5-1
line circuit breaker: C 8 A

Mechanical life: 10 x 10⁶ switching cycles

Technical Data

General Data

| | | |
|--|--|-------------------|
| Operating mode: | Continuous operation | |
| Temperature range | | |
| operation: | - 15 ... + 55 °C | |
| storage : | - 25 ... + 85 °C | |
| altitude: | < 2.000 m | |
| Clearance and creepage distances | | |
| rated impuls voltage / pollution degree: | 4 kV / 2 (basis insulation) IEC 60 664-1 | |
| EMC | | |
| Electrostatic discharge: | 8 kV (air) | IEC/EN 61 000-4-2 |
| HF irradiation: | 10 V / m | IEC/EN 61 000-4-3 |
| Fast transients: | 2 kV | IEC/EN 61 000-4-4 |
| Surge voltages between wires for power supply: | 1 kV | IEC/EN 61 000-4-5 |
| between wire and ground: | 2 kV | IEC/EN 61 000-4-5 |
| Interference suppression: | Limit value class B | EN 55 011 |
| Degree of protection | | |
| Housing: | IP 40 | IEC/EN 60 529 |
| Terminals: | IP 20 | IEC/EN 60 529 |
| Housing: | Thermoplastic with V0 behaviour according to UL subject 94 | |
| Vibration resistance: | Amplitude 0.35 mm IEC/EN 60 068-2-6 frequency 10 ... 55 Hz | |
| Climate resistance: | 15 / 055 / 04 | IEC/EN 60 068-1 |
| Terminal designation: | EN 50 005 | |
| Wire connection: | 1 x 4 mm ² solid or 1 x 2.5 mm ² stranded ferruled (isolated) or 2 x 1.5 mm ² stranded ferruled (isolated) DIN 46 228-1/-2/-3/-4 or 2 x 2.5 mm ² stranded ferruled DIN 46 228-1/-2/-3 | |
| Wire fixing: | Box terminal with wire protection, removable terminal strips | |
| Mounting: | DIN rail | IEC/EN 60 715 |
| Weight: | 220 g | |

Dimensions

Width x height x depth: 22.5 x 84 x 121 mm

Safety Related Data

Values according to EN ISO 13849-1:

| | | |
|--------------------------|----------|-----------------|
| Category: | 4 | |
| PL: | e | |
| MTTF _d : | 236,3 | a |
| DC / DC _{avg} : | 99.0 | % |
| d _{op} : | 365 | d/a (days/year) |
| h _{op} : | 24 | h/d (hours/day) |
| t _{Zyklus} : | 3.60E+03 | s/Zyklus |
| | ≅ 1 | /h (hour) |

Values according to IEC/EN 62061 / IEC/EN 61508:

| | | |
|--------------------------|----------|-----------------|
| SIL CL: | 3 | IEC/EN 62061 |
| SIL: | 3 | IEC/EN 61508 |
| HFT: | 1 | |
| DC / DC _{avg} : | 99.0 | % |
| SFF: | 99.7 | % |
| PFH _D : | 1.97E-10 | h ⁻¹ |
| T _r : | 20 | a (year) |

*) HFT = Hardware-Failure Tolerance



The values stated above are valid for the standard type. Safety data for other variants are available on request.

The safety relevant data of the complete system has to be determined by the manufacturer of the system.

UL-Data

The safety functions were not evaluated by UL. Listing is accomplished according to requirements of Standard UL 508, "general use applications"

Nominal voltage U_N:

BG 5925/900, /901: DC 24 V

Ambient temperature:

-15 ... +55°C

Switching capacity:

Ambient temperature 45°C Pilot duty B300
5A 250Vac Resistive
5A 24Vdc Resistive or G.P.

Ambient temperature 55°C:

Pilot duty B300
4A 250Vac Resistive
4A 24Vdc Resistive or G.P.

Wire connection:

60°C / 75°C copper conductors only
AWG 20 - 12 Sol Torque 0.8 Nm
AWG 20 - 14 Str Torque 0.8 Nm



Technical data that is not stated in the UL-Data, can be found in the technical data section.

Standard Type

BG 5925.02/900/61 DC 24 V

Article number:

0050918

- Output: 2 NO contacts
- Nominal voltage U_N: DC 24 V
- Width: 22.5 mm

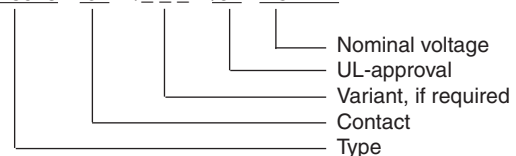
Variant

BG 5925.___/901/61:

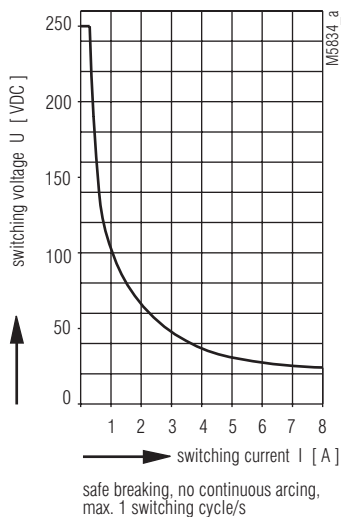
unit with fast autostart, switch 2 on "Autostart".
Without line fault detection on ON-button when S2 on "Handstart"

Ordering example for variant

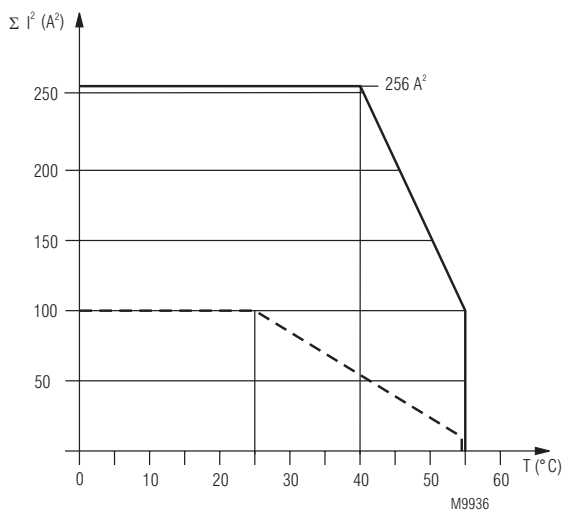
BG 5925 .02 / _ _ _ /61 DC 24 V



Characteristics



Arc limit curve under resistive load



— device mounted on distance with air circulation.
max. current at 55°C over
4 contactrows = 5A $\hat{=}$ 4x5²A²=100A²

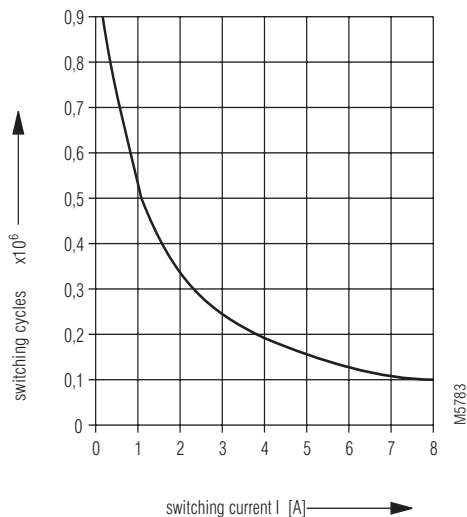
- - - device mounted without distance heated by
devices with same load,
max current at 55°C over
4 contactrows = 1A $\hat{=}$ 4x1²A²=4A²

$$\Sigma I^2 = I_1^2 + I_2^2 + I_3^2 + I_4^2$$

I_1, I_2, I_3, I_4 - current in contactrows

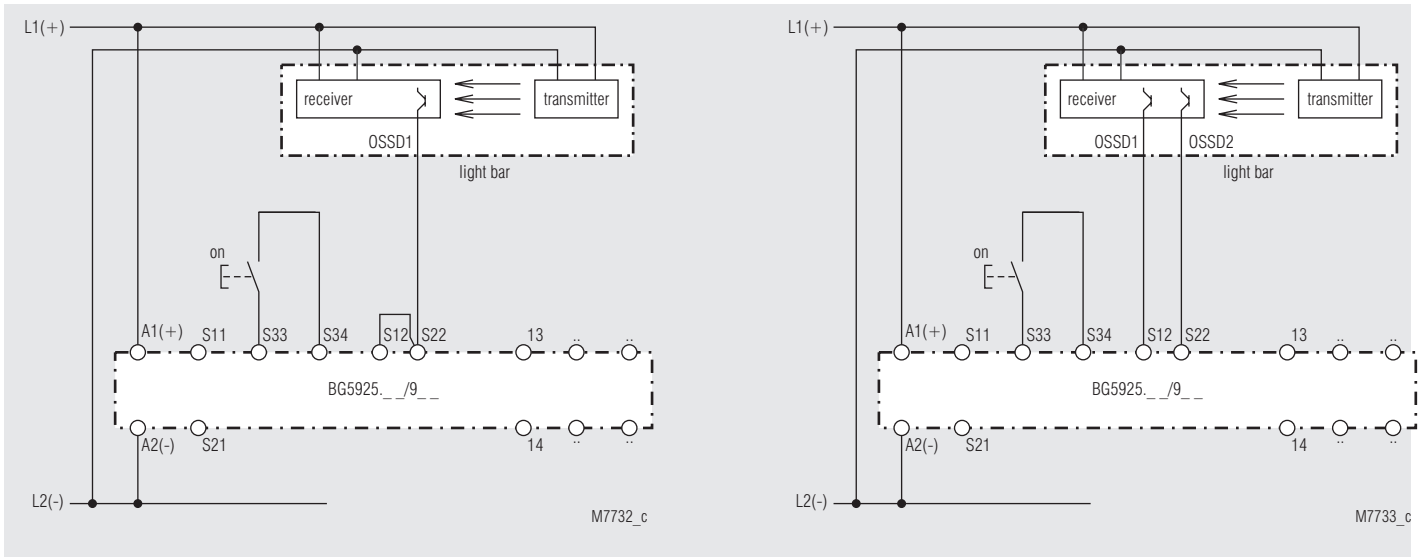
Quadratic total current limit curve

electric life DC13 24V DC / t_{on} 0,4s; t_{off} 9,6s
2 contacts in series



Contact service life

Application Examples



1-channel control by light bar with selftest according to EN 61 496-1

Note: Refer to "Unit programming"!

Switches in pos.: S1: "symmetric"
S2: manual start

Suited up to SIL2, Performance Level d, Cat. 2

2-channel control by light bar with selftest according to EN 61 496-1.
Crossfault monitoring by light bar.

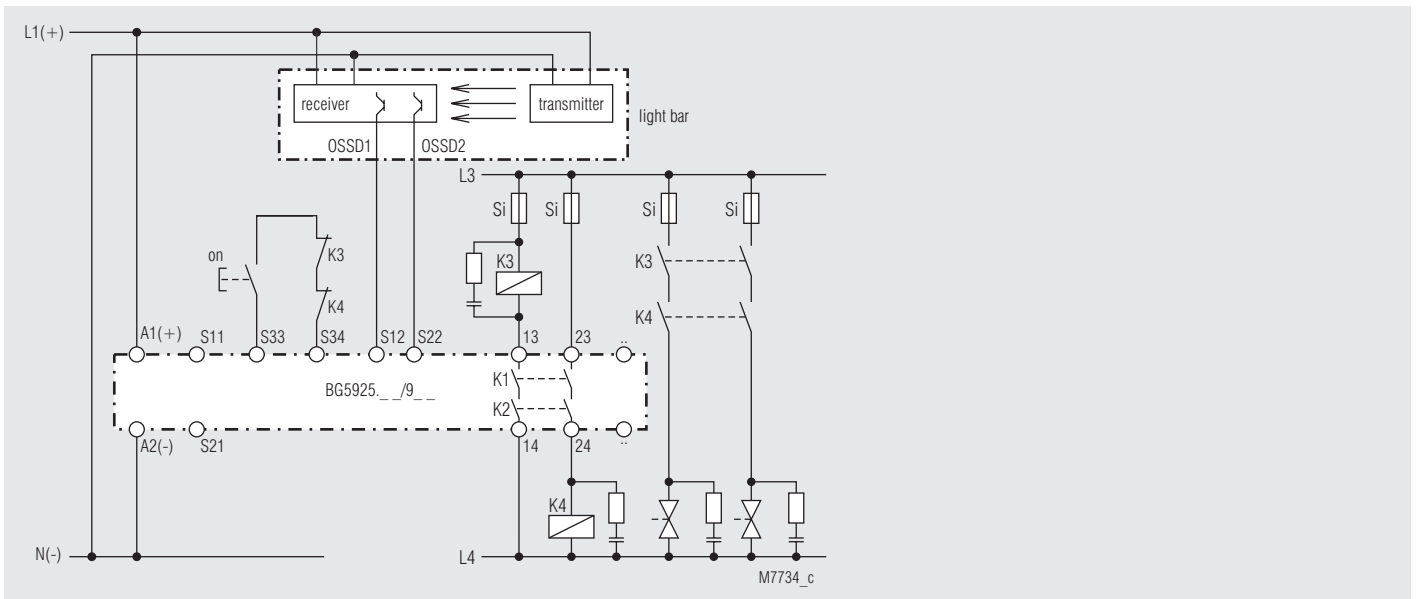
Note: Refer to "Unit programming"!

Switches in pos.:

S1: On light curtains with symmetric outputs S1 in upper position
"symmetric".
On light curtains with asymmetric outputs S1 in lower position
"asymmetric".

S2: manual start

Suited up to SIL3, Performance Level e, Cat. 4



Reinforcement and multiplication of contacts by external contactors

Note: Refer to "Unit programming"!

Switches in pos.:

S1: On line curtains with symmetric outputs S1 in upper position
"symmetric".
On line curtains with asymmetric outputs S1 in lower position
"asymmetric".

S2: manual start

Suited up to SIL3, Performance Level e, Cat. 4

