## Safety Technique

## SAFEMASTER

Light Curtain Controller
LG 5925/900


Function Diagram


## Block Diagram



- 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
- Category 4 to EN 954-1
- For light curtains with symmetric or asymmetric outputs adjustment with switch S1
- Output: max. 4 NO contacts, see contacts
- Single and 2-channel operation
- Line fault detection on On-button
- Manual restart or automatic restart, switch S2
- LED indicator for state of operation
- LED indicator for channel 1 and 2 and power
- Removable terminal strips
- Wire connection: also $2 \times 1.5 \mathrm{~mm}^{2}$ stranded ferruled, or $2 \times 2.5 \mathrm{~mm}^{2}$ solid DIN 46 228-1/-2/-3/-4
- As option with pluggable terminal blocks for easy exchange of devices
- with screw terminals
- or with cage clamp terminals
- Width 22.5 mm


## Approvals and Markings



## Applications

Protection of people and machines

- Light curtain controller for light curtains with selftesting (Type 4) according to IEC/EN 61 496-1


## Indicators

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

## 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.
ATTENTION ! If a line fault occurs after the voltage has been connected to $S 12, S 22$, 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.

## Circuit Diagrams



LG 5925/900.48


LG 5925/900.04


LG 5925/900.02
Connection Terminals

| Terminal designation | Signal designation |
| :--- | :--- |
| A1+ | $+/ \mathrm{L}$ |
| A2 | $-/ \mathrm{N}$ |
| S12, S22, S33, S34 | Inputs |
| S11, S21 | Outputs |
| $13,14,23,24,33,34,43,44$ | Forcibly guided NO contacts for <br> release circuit |
| 41,42 | Forcibly guided indicator output |



Disconnect unit before setting of S1 Drawing shows setting at the state of delivery

## Technical Data

Input circuit

| Nominal Voltage $\mathrm{U}_{\mathrm{N}}:$ | DC 24 V |
| :--- | :--- |
| Voltage range: | $0.9 \ldots 1.1 \mathrm{U}_{\mathrm{N}}$ |
| Nominal consumption: | DC approx. 1.7 W |
| Min. Off-time: | 250 ms |
| Control voltage on S11 at $\mathrm{U}_{\mathrm{N}}:$ | DC 22.5 V |
| Control current typ. over |  |
| S12, S22: | 35 mA at $\mathrm{U}_{\mathrm{N}}$ |
| Min. voltage on S12, S22 <br> when relay activated: <br> Short-circuit protection: <br> Overvoltage protection: | DC 21 |

## Output

## Contacts

| Contacts |  |
| :--- | :--- |
| LG 5925.02: | 2 NO contacts |
| LG 5925.04: | 4 NO contact |
|  | 3 NO, 1 NC contact |

The NO contacts are safety contacts.
ATTENTION! The NC contacts 41-42 can only be used for monitoring
Operate delay typ. at $\mathrm{U}_{\mathrm{N}}$ :

Manual start:
automatic start:
Release delay typ. at $U_{N}$ : Disconnecting the supply: Disconnecting S12, S22:
Contact type:
Nominal output voltage:
Thermal current $\mathrm{I}_{\text {th }}$ :
Switching capacity
to AC 15:
NO contacts:
NC contacts:
to DC 13:
NO contacts:
NC contacts:
Electrical contact life
to $5 \mathrm{~A}, \mathrm{AC} 230 \mathrm{~V} \cos \varphi=1$ : Permissible operating frequency:

## Short circuit strength

 max. fuse rating: line circuit breaker:Mechanical life:

## General Data

Operating mode: Temperature range operation:
storage :
altitude:
Clearance and creepage distances
Rated impuls voltage / pollution degree:
EMC
Electrostatic discharge:
HF irradiation:
Fast transients:
Surge voltages
between
wires for power supply:
between wire and ground:
Interference suppression:
Degree of protection
Housing:
Terminals:
Housing:
Vibration resistance:
Climate resistance:

20 ms
350 ms

20 ms
15 ms
forcibly guided
AC 250 V
DC: see limit curve for arc-free operation
max. 8 A per contact
see current limit curve

3 A / AC 230 V
IEC/EN 60 947-5-1
IEC/EN 60 947-5-1
2 A / DC 24 V
IEC/EN 60 947-5-1
2 A / DC 24 V
IEC/EN 60 947-5-1
$>2.2 \times 10^{5}$ switching cycles
max. 1200 operating cycles / h

## 10 A gL

IEC/EN 60 947-5-1
B 6 A
$>20 \times 10^{6}$ switching cycles

Continuous operation
$-15 \ldots+55^{\circ} \mathrm{C}$
$-40 \ldots+85^{\circ} \mathrm{C}$
< 2.000 m

4 kV / 2 (basis insulation) IEC 60 664-1

8 kV (air)
$10 \mathrm{~V} / \mathrm{m}$
2 kV
0.5 kV

2 kV
, 000-4-5

Limit value class B
IP $40 \quad$ IEC/EN 60529

P 20
IEC/EN 60529
Thermoplastic with V0 behaviour
according to UL subject 94
Amplitude 0.35 mm IEC/EN 60 068-2-6
frequency 10 ... 55 Hz
15/055/04
IEC/EN 60 068-1

## Technical Data

Terminal designation:
Wire connection
Screw terminals (integrated):

Wire stripping length:
Plug in with screw terminals
max. cross section for connection:

Wire stripping length:
Plug in with cage clamp terminals
max. cross section for connection:
min. cross section for connection: Wire stripping length:
Wire fixing:

Mounting:
Weight:

## Dimensions

## Width x height x depth

LG 5925:
LG 5925 PC:
$22.5 \times 90 \times 121 \mathrm{~mm}$
$22.5 \times 111 \times 121 \mathrm{~mm}$
LG 5925 PS:
$22.5 \times 104 \times 121 \mathrm{~mm}$

## Safety Related Data

Values according to EN ISO 13849-1:

## Category:

PL:

| MTTF $_{\mathrm{d}}:$ | 584.5 | a (year) |
| :--- | :--- | :--- |
| DC $_{\text {avg: }}:$ | 99.0 | \% |
| $\mathrm{d}_{\text {op }}:$ | 220 | d/a (days/year) |
| $\mathrm{h}_{\text {op }}:$ | 12 | h/d (hours/day) |
| $\mathrm{t}_{\text {zyklus }}:$ | 3600 | s/Zyklus |
|  | $\hat{=} 1$ | /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 $_{\text {avg }}:$ | 99.0 | $\%$ |
| SFF $^{\text {PFH }}:$ | 99.7 | $\%$ |
| $\mathrm{~T}_{1}:$ | $2,66 \mathrm{E}-10$ | $\mathrm{~h}^{-1}$ |
|  | 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.

EN 50005 DIN 46 228-1/-2/-3/-4
$\times 4 \mathrm{~mm}^{2}$ solid or
$1 \times 2.5 \mathrm{~mm}^{2}$ stranded ferruled (isolated) or $2 \times 1.5 \mathrm{~mm}^{2}$ stranded ferruled (isolated) or
$2 \times 2.5 \mathrm{~mm}^{2}$ solid 8 mm

## 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 $\mathbf{U}_{\mathrm{N}}$ :
Ambient temperature:

## Switching capacity

LG 5925.04/900
Ambient temperature $35^{\circ} \mathrm{C}$ : Pilot duty B300
8A 250Vac Resistive
8A 24Vdc Resistive or G.P
Pilot duty B300
4A 250Vac Resistive
4A 24Vdc Resistive or G.P
LG 5925.02/900, LG 5925.48/900
Ambient temperature $45^{\circ} \mathrm{C}$ : Pilot duty B300
8A 250Vac Resistive
8A 24Vdc Resistive or G.P.
Pilot duty B300
6A 250Vac Resistive
6A 24Vdc Resistive or G.P.
Wire connection:
Screw terminals fixed:
Plug in screw:
Plug in cage clamp:

DC 24 V
$-15 \ldots+55^{\circ} \mathrm{C}$
$1 \times 2.5 \mathrm{~mm}^{2}$ solid or
$1 \times 2.5 \mathrm{~mm}^{2}$ stranded ferruled (isolated) 8 mm
$1 \times 4 \mathrm{~mm}^{2}$ solid or
$1 \times 2.5 \mathrm{~mm}^{2}$ stranded ferruled (isolated)
$0.5 \mathrm{~mm}^{2}$
$12^{ \pm 0.5} \mathrm{~mm}$
Plus-minus terminal screws M 3.5
box terminals with wire protection or cage clamp terminals
DIN rail IEC/EN 60715
220 g (DC unit)

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

## Standard type

LG 5925.48/900/61 DC 24 V
Article number: 0063278

- Output: 3 NO contacts, 1 NC contact
- Nominal voltage $\mathrm{U}_{\mathrm{N}}$ : DC 24 V
- Width: 22.5 mm



## Options with Pluggable Terminal Blocks



Screw terminal (PS/plugin screw)


Cage clamp terminal (PC/plugin cage clamp)

## Notes

Removing the terminal blocks with cage clamp terminals

1. The unit has to be disconnected.
2. Insert a screwdriver in the side recess of the front plate.
3. Turn the screwdriver to the right and left.
4. Please note that the terminal blocks have to be mounted on the belonging plug in terminations.


## Characteristics


safe breaking, no continuous arcing, max. 1 switching cycle/s
Arc limit curve under resistive load


## Application Examples



Single channel connection of light curtains with selftest according to EN 61 496-1.

## Note: Refer to "Unit programming"!

## Switches in pos.: <br> S1 "symmetrical" S2 "manual"

With autostart link S33-S34 set to "automatic".
Suited up to SIL2, Performance Level d, Cat. 2


2channel connection of light curtains with selfttest
according to EN 61 496-1.
Cross fault detection in the light curtain.
Note: Refer to "Unit programming"!
Switches in pos.:
S1: With symmetric outputs on light curtain switch S1 in position "symmetrical" with asymmetric outputs on light curtains switch S1 in position "asymmetric".
S2: "manual"
Suited up to SIL3, Performance Level e, Cat. 4


Contact reinforcement and contact extension by external contactors
Note: Refer to "Unit programming"!
Switches in pos.:
Switches in pos.:
S1: With symmetric outputs on light curtain switch S1 in position "symmetrical" with asymmetric outputs on light curtains switch S1 in position "asymmetric".
S2: "manual"
Suited up to SIL3, Performance Level e, Cat. 4

