

SAFEMASTER Delay Module, On Delayed LG 7927



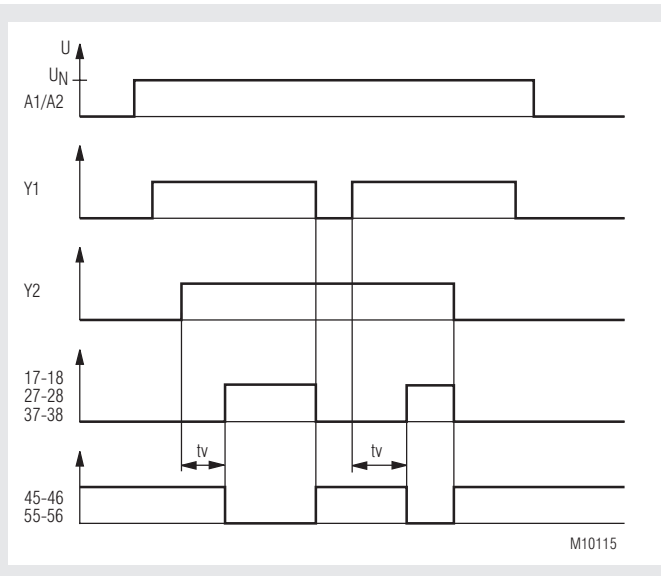
Your advantage

- Easy to realise safe timing circuits
- 4 forcibly guided output contacts at only 22.5 mm width

Features

- **According to**
 - Performance Level (PL) d and category 3 to EN ISO 13849-1: 2008
 - SIL Claimed Level (SIL CL) 2 to IEC/EN 62061
 - Safety Integrity Level (SIL) 2 to IEC/EN 61508 and IEC/EN 61511 when connected to a suitable safety module
- Adjustable time delay
- As option fixed time delay
- High long life stability due to digital time base
- Adjustable with or without cross fault detection
- Output: 3 NO contacts + 1 NC contact + 1 forcibly guided feedback contact or 4 NO contacts + 1 forcibly guided feedback contact
- LED indicator for channel 1, 2 and operation voltage
- Wire connection: also 2 x 1.5 mm² stranded ferruled, or 2 x 2.5 mm² 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

Function Diagram



Approvals and Markings



Application

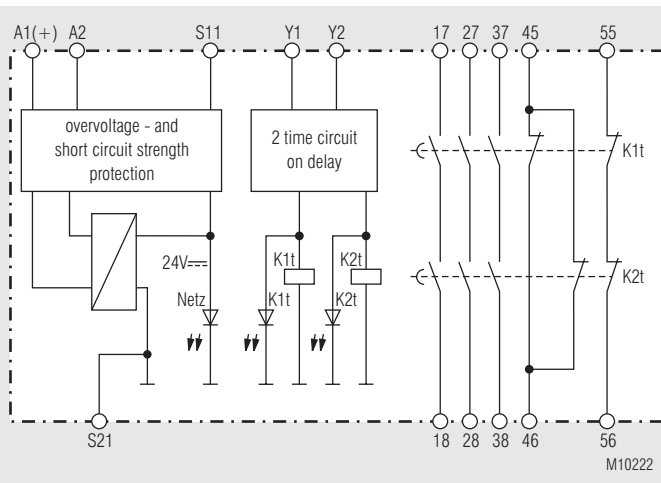
- Delayed start or enabling of a movement.
- Delayed enabling of a solenoid lock, e.g. SAFEMASTER STS

Attention!



To achieve the safety levels stated under features, a supervising control must check the NC contact 55/56 before starting to make sure that both relays (K1t and K2t) are switched off.

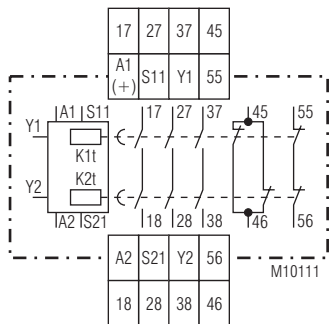
Block Diagram



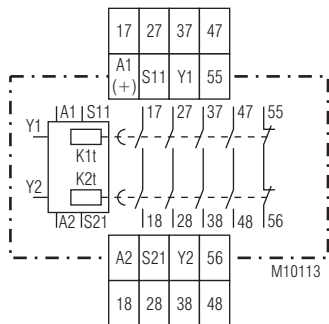
Indication

- upper LED: on, when supply connected
- lower LED: on, when relay K1t and K2t energized

Circuit Diagrams



LG 7927.97

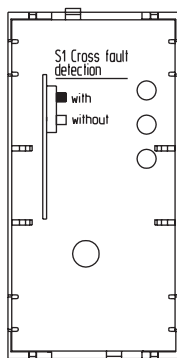
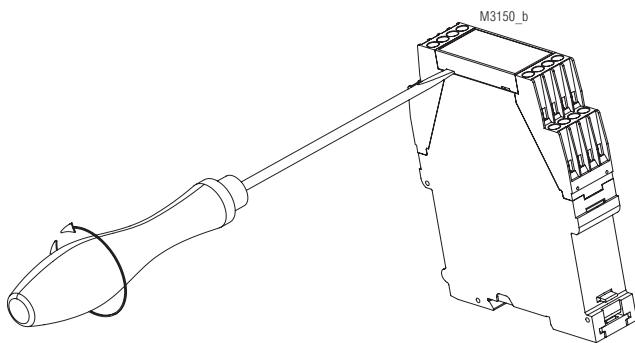


LG 7927.98

Connection Terminals

Terminal designation	Signal designation
A1 (+)	+ / L
A2 (-)	- / N
S11, S21	Inputs
Y1, Y2	Outputs
17, 18, 27, 28, 37, 38, 47, 48	Positive driven NO contacts for release circuit
45, 46	Positive guided indicator output
55, 56	Positive guided feedback circuit

Unit Programming



M10121



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

To alter the operation mode with or without crossfault monitoring the switch S1 is used. It is located behind the front cover. The adjustment of the operating mode must be selected before the adjustment of the time as the time potentiometer has to be set fully anti-clock-wise before removing the front plate. After selecting the operating mode the front plate is remounted. Please make sure that the setting knob is also in left position while mounting the front plate. For safety please check after finishing if a setting of the complete range is still possible.

Technical Data

Input

Nominal voltage U_N:	DC 24 V AC/DC 24 V
Voltage range:	0.9 ... 1.1 U_N
Nominal frequency:	50 / 60 Hz
Nominal consumption:	typ. DC 2.0 W typ. AC 3.5 VA
Control voltage on S11:	min. DC 20 V at U_N
Control current in Y1, Y2:	typ. DC 2,2 mA at U_N typ. AC 3,1 mA at U_N
Short-circuit protection:	Internal with PTC
Überspannungsschutz:	Internal with VDR

Output

Contacts	
LG 7927.97:	3 NO contacts, 2 NC contacts
LG 7927.98:	4 NO contacts, 1 NC contacts

ATTENTION! The NC contacts 45-46 can only be used for monitoring.

Contact type:	forcibly guided	
Release delay typ. at U_N:	35 ms	
Disconnecting the supply:	40 ms	
Disconnecting Y1, Y2:		
Time delay t_v:	adjustable	fixed
	0.1 ... 1 s	1 s
	0.3 ... 3 s	3 s
	0.5 ... 5 s	5 s
	1.0 ... 10 s	10 s
	3.0 ... 30 s	30 s
	6.0 ... 60 s	60 s
	30.0 ... 300 s	300 s

Other time ranges on request
 $\pm 1\%$ of setting value
max. 5 A (see quadratic total current limit curve)

Repeat accuracy:
Thermal current I_{th} :
Switching capacity

to AC 15		
NO contact:	3 A / AC 230 V	IEC/EN 60 947-5-1
NC contact:	2 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13		
NO contact:	2 A / DC 24 V	IEC/EN 60 947-5-1
NC contact:	2 A / DC 24 V	IEC/EN 60 947-5-1
to DC 13		
NO contact:	4 A / 24 V at 0.1 Hz	
NC contact:	4 A / 24 V at 0.1 Hz	

Electrical life:
at 5 A, AC 230 V cos. $\varphi = 1$:
> 2.2 x 10⁵ switch. cycl. IEC/EN 60 947-5-1

Permissible switching frequency:
max. 2000 switching cycles / h
with manual restart and short release delay time

Short circuit strength
Max. fuse rating: 6 A gL IEC/EN 60 947-5-1
Mechanical life: 20 x 10⁶ switching cycles

Technical Data**General Data****Nominal operating mode:** continuous operation**Temperature range**

Operation: - 15 ... + 55°C

Storage: - 25 ... + 85°C

Altitude: < 2.000 m**Clearance and creepage distance**

rated impulse voltage /

pollution degree: 4 kV / 2 IEC 60 664-1

EMC

Electrostatic discharge (ESD): 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 voltage
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

HF-wire guided: 10 V IEC/EN 61 000-4-6

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 VO behaviour
according to UL subject 94**Vibration resistance:**

Amplitude 0.35 mm

Frequency 10 ... 55 Hz, IEC/EN 60 068-2-6

15 / 055 / 04 IEC/EN 60 068-1

EN 50 005

Climate resistance:**Terminal designation:****Wire connection****Screw terminals****(integrated):**1 x 4 mm² solid or
1 x 2.5 mm² stranded ferruled or
2 x 1.5 mm² stranded ferruled or
2 x 2.5 mm² solid

Insulation of wires

or sleeve length:

8 mm

Plug in with screw terminals

max. cross section

for connection:

1 x 2.5 mm² solid or
1 x 2.5 mm² stranded ferruled

Insulation of wires

or sleeve length:

8 mm

**Plug in with cage
clamp terminals**

max. cross section

for connection:

1 x 4 mm² solid or
1 x 2.5 mm² stranded ferruled

min. cross section

for connection:

0.5 mm²

Insulation of wires

or sleeve length:

12 ±0.5 mm

Wire fixing:Plus-minus terminal screws M 3.5
box terminals with wire protection or
cage clamp terminals**Mounting:****Weight:**DIN rail IEC/EN 60 715
approx. 190 g**Dimensions****Width x height x depth:**

LG 7927: 22.5 x 90 x 121 mm

LG 7927 PC: 22.5 x 111 x 121 mm

LG 7927 PS: 22.5 x 104 x 121 mm

Technical Data**Safety Related Data****Values according to EN ISO 13849-1:**

Category: 3

PL: d

MTTF^d: 172,3 aDC^{avg}: 99,0 %d_{op}: 365 d/a (days/year)h_{op}: 24 h/d (hours/day)t_{Zyklus}: 3600 s/Zyklus

≈ 1 /h (hour)

Values according to IEC/EN 62061 / IEC/EN 61508 / IEC/EN 61511:

SIL CL: 2 IEC/EN 62061

SIL: 2 IEC/EN 61508 /

IEC/EN 61511

HFT¹⁾: 1DC^{avg}: 99,0 %

SFF: 99,7 %

PFH_D: 2,95E-10 h⁻¹

PFD: 2,50E-05

T_i: 20 a (year)¹⁾ 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:** AC/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

Screw terminals fixed: AWG 20 - 12 Sol/Str Torque 0.8 Nm

Plug in screw: AWG 20 - 14 Sol Torque 0.8 Nm

AWG 20 - 16 Str Torque 0.8 Nm

Plug in cage clamp: AWG 20 - 12 Sol/Str

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

Standard Type

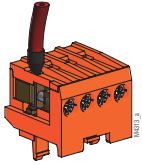
LG 7927.97/61 DC 24 V 1 ... 10 s
 Article number: 0062790
 • Output: 3 NO contacts, 2 NC contacts
 • Nominal voltage U_N : DC 24 V
 • Time delay t_v : 1 ... 10 s
 • Width: 22.5 mm

Ordering Example

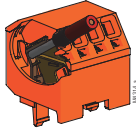
LG 7927 . . . /61 AC/DC 24 V

Nominal voltage
 UL approval
 Type of terminals
 without indication:
 terminal blocks fixed,
 with screw terminals
 PC (plug in cage clamp):
 pluggable terminal blocks
 with cage clamp terminals
 PS (plug in screw):
 pluggable terminal blocks
 with screw terminals
 Contacts
 Type

Options with Pluggable Terminal Blocks



Screw terminal
 (PS/plugin screw)

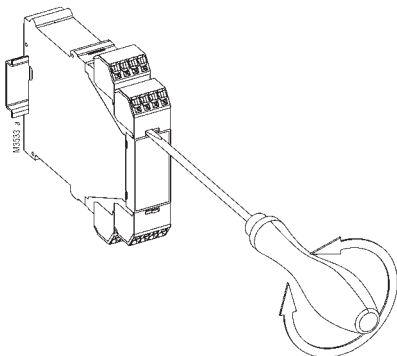


Cage clamp terminal
 (PC/plugin cage clamp)

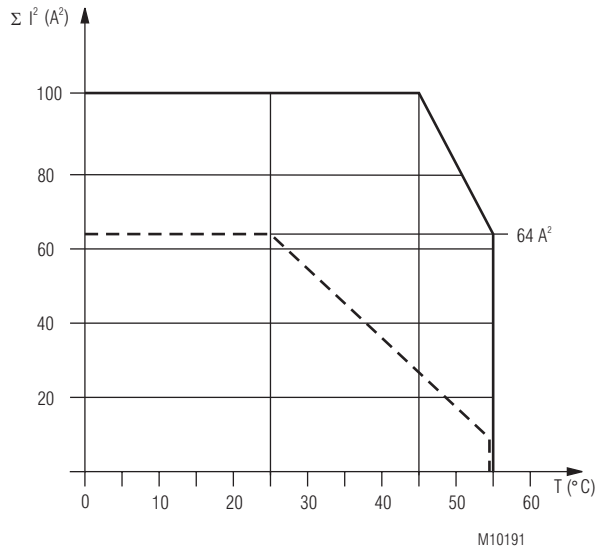
Notes

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.



Characteristic



— AC/DC 24V device mounted on distance with air circulation.
 max. current at 55°C over
 4 contactrows = $4A \cong 4 \times 4^2 A^2 = 64 A^2$

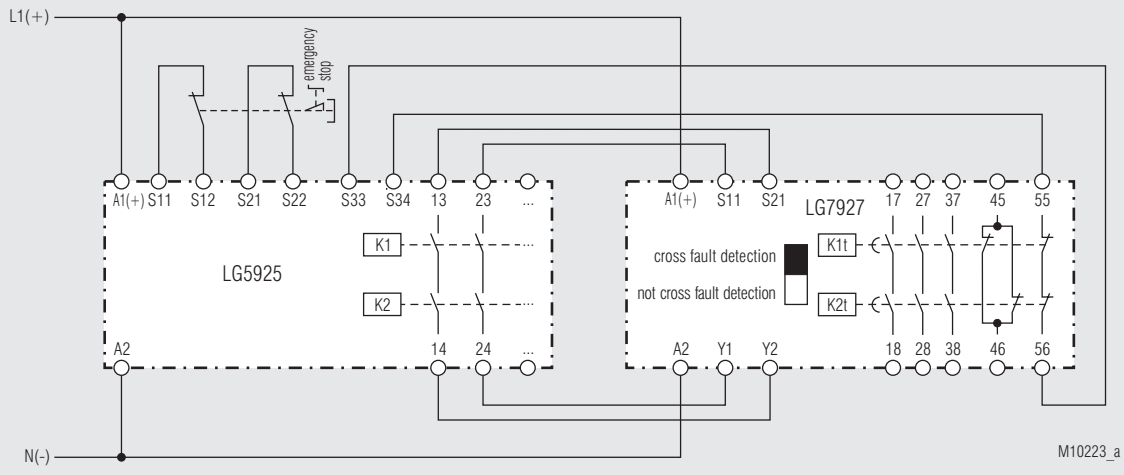
- - - AC/DC 24V device mounted without distance heated by
 devices with same load,
 max current at 55°C over
 4 contactrows = $1,5A \cong 4 \times 1,5^2 A^2 = 9 A^2$

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

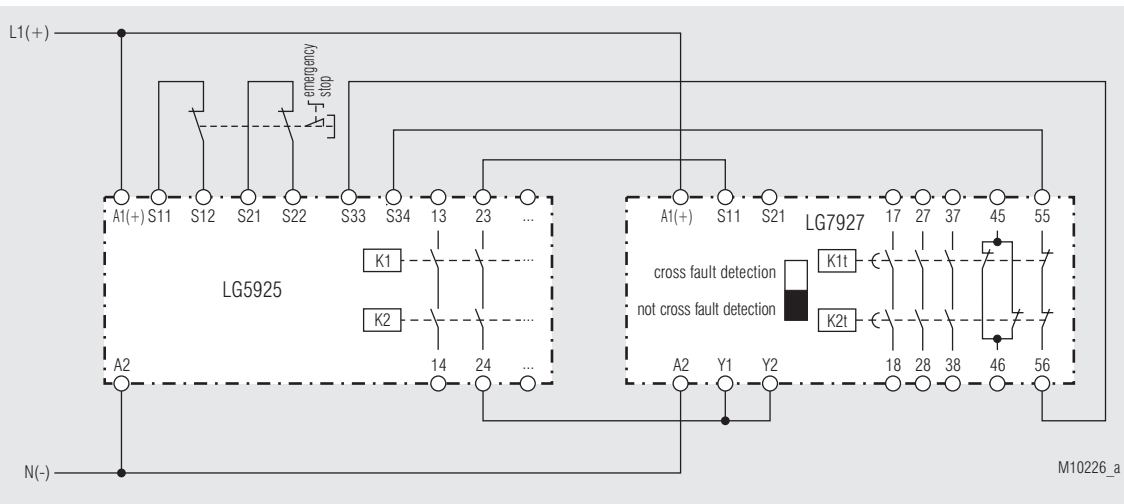
I_1, I_2, I_3, I_4 - current in contact paths

quadratic total current limit curve

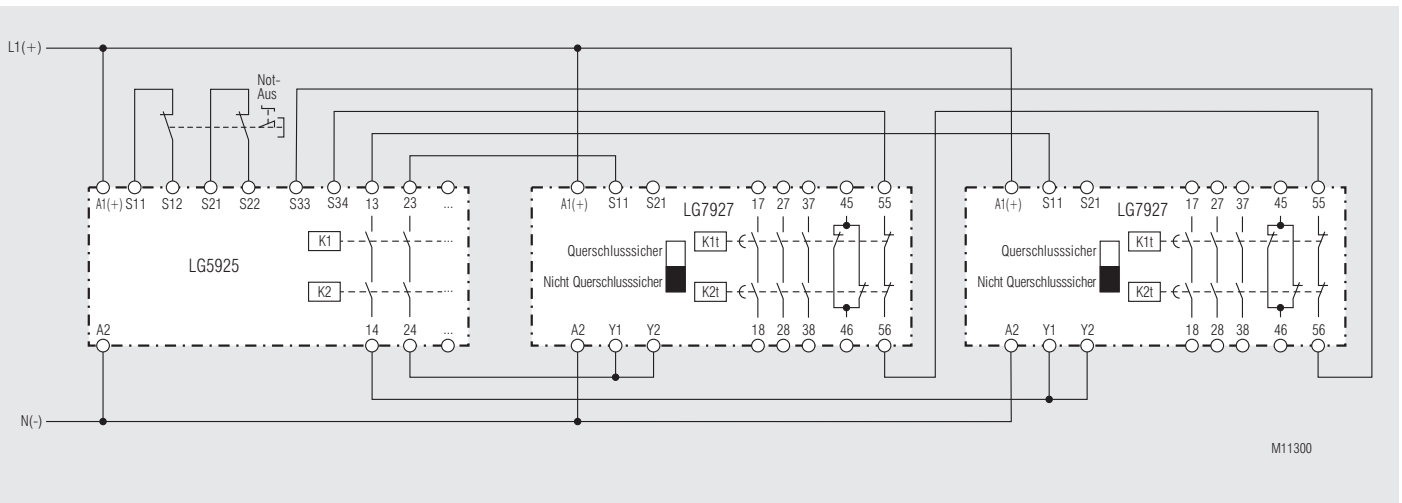
Application Examples



LG 5925 with LG 7927, cross fault detection, suitable up to SIL2, Performance Level d, Cat. 3



LG 5925 with LG 7927, non cross fault detection, suitable up to SIL2, Performance Level d, Cat. 3



LG 5925 with two LG 7927, non cross fault detection, suitable up to SIL2, Performance Level d, Cat. 3

