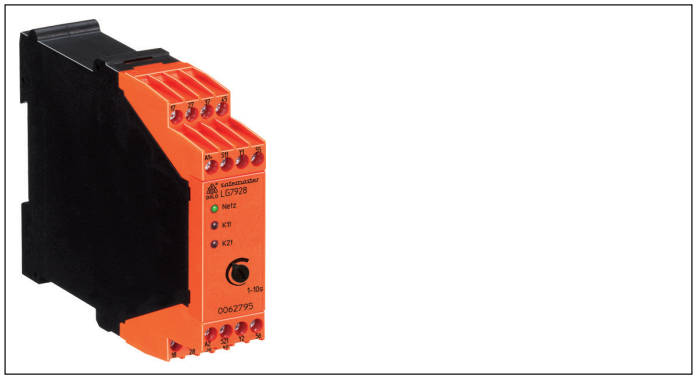
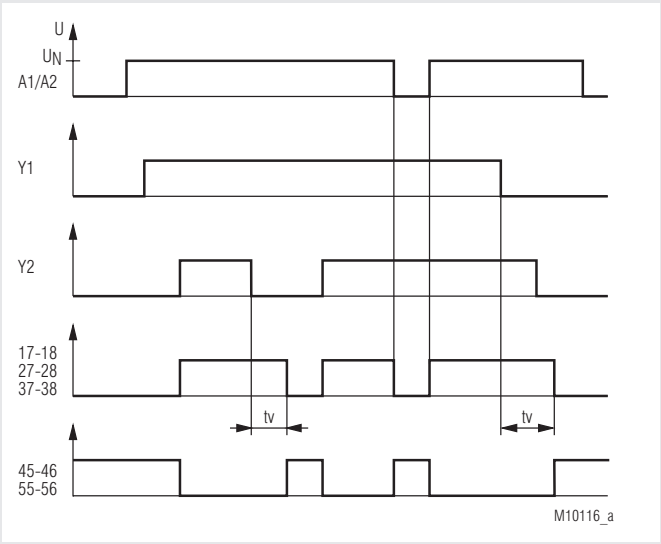
SAFEMASTER
Delay Module, Release Delayed
LG 7928

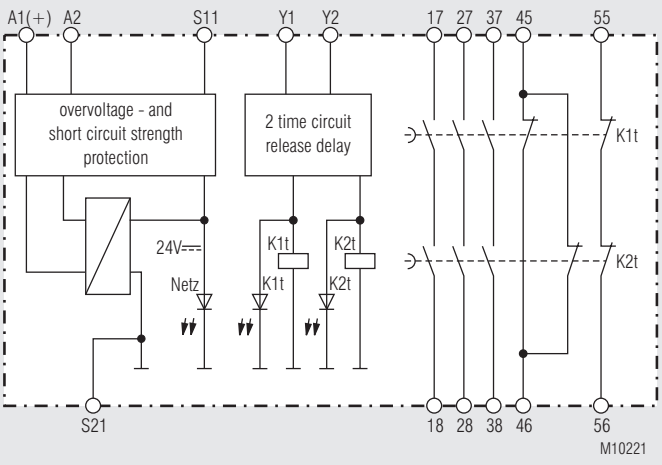
0261960



Function Diagram



Block Diagram



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 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

Approvals and Markings

Canada / USA

A025518

Application

- Delayed disconnection with the possibility for status check of the safety relays, stop category 1 according to DIN EN 60204-1
- Controlled stop of system parts

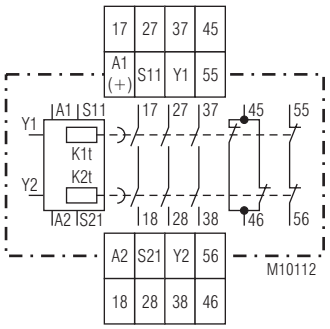
Attention!

To achieve the safety levels stated under features, a the supervising control must check the NC contact 55/56 before starting to make sure that both relays (Kt1 and Kt2) are switched off.

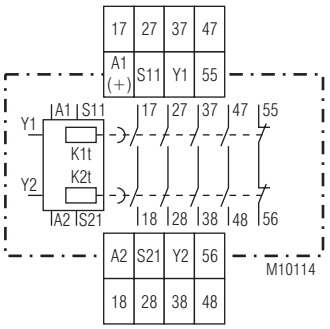
Indication

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

Circuit Diagrams



LG 7928.97

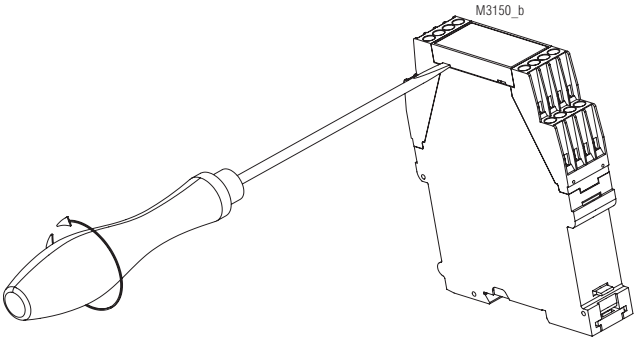


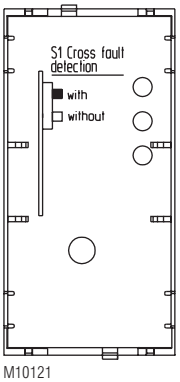
LG 7928.98

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 7928.97: 3 NO contacts, 2 NC contacts
LG 7928.98: 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:
Disconnecting the supply: 35 ms
Disconnecting Y1, Y2: 40 ms
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
Repeat accuracy: ± 1% of setting value
Thermal current I_{th}: max. 5 A (see quadratic total current limit curve)
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
Electrcal life:
at 5 A, AC 230 V cos. φ = 1: > 2.2 x 10^5 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 10^6 switching cycles

General Data

Technical Data

Nominal operating mode:	continuous operation	
Temperaturr range		
Operation:	- 15 ... + 55°C	
Strorage:	- 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
Climate resistance:	15 / 055 / 04	IEC/EN 60 068-1
Terminal designation:	EN 50 005	
Wire connection		DIN 46 228-1/-2/-3/-4
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 $^{\pm 0.5}$ mm	
Wire fixing:	Plus-minus terminal screws M 3.5 box terminals with wire protection or cage clamp terminals	
Mounting:	DIN rail	IEC/EN 60 715
Weight:	approx. 190 g	

Dimensions

Width x height x depth:	
LG 7928:	22.5 x 90 x 121 mm
LG 7928 PC:	22.5 x 111 x 121 mm
LG 7928 PS:	22.5 x 104 x 121 mm

Safety Related Data

Technical Data

Values according to EN ISO 13849-1:

Category:	3	
PL:	d	
$MTTF_d$:	172.3	a
DC_{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
HFT*):	1	
DC_{avg}:	99.0	%
SFF	99.7	%
PFH_D:	2.95E-10	h^{-1}
PFD:	2.50E-05	
T_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.

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 7928.97/61 DC 24 V 1 ... 10 s

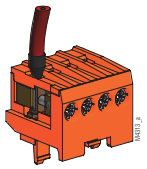
Article number:	0062795
• Output:	3 NO contacts, 2 NC contacts
• Nominal voltage U_N:	DC 24 V
• Time delay t_v:	1 ... 10 s
• Width:	22.5 mm

Ordering Example

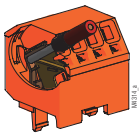
LG 7928 . _ _ _ _ /61 AC/DC 24 V

- 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)

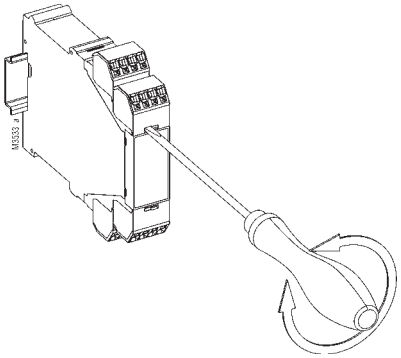


Cage clamp terminal
(PC/plugin cage clamp)

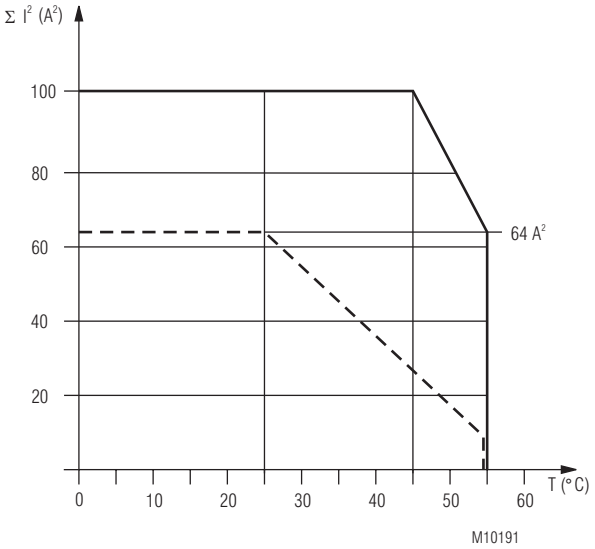
Notes

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



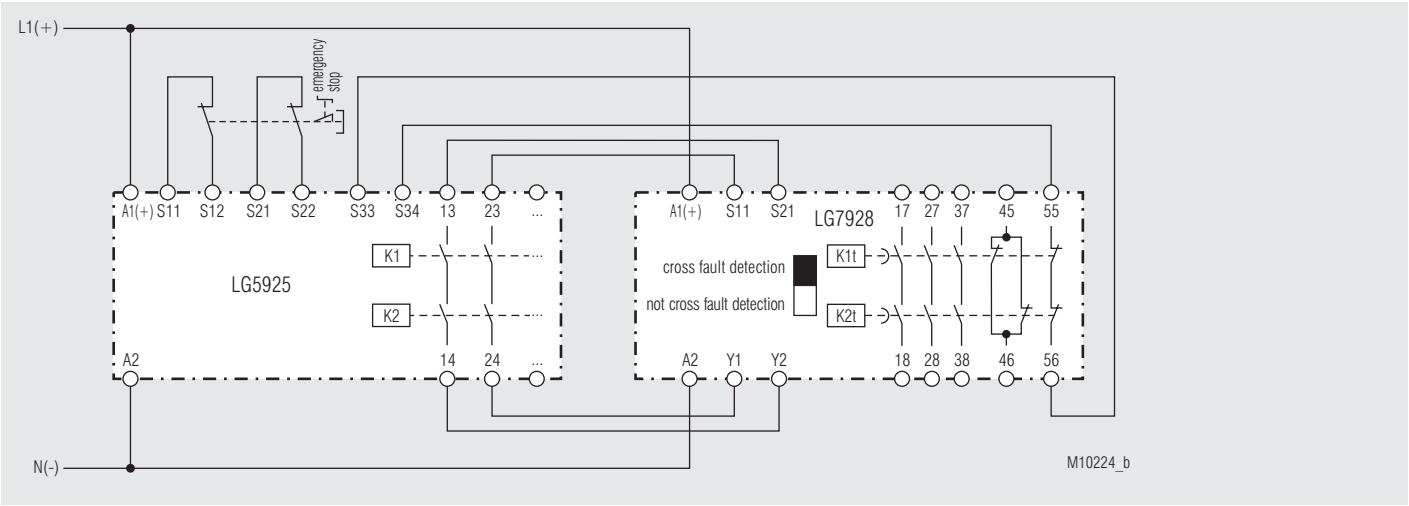
AC/DC 24V device mounted on distance with air circulation.
max. current at 55°C over
4 contactrows = 4A ≙ $4x4^2A^2=64A^2$

AC/DC 24V device mounted without distance heated by devices with same load,
max current at 55°C over
4 contactrows = 1,5A ≙ $4x1,5^2A^2=9A^2$

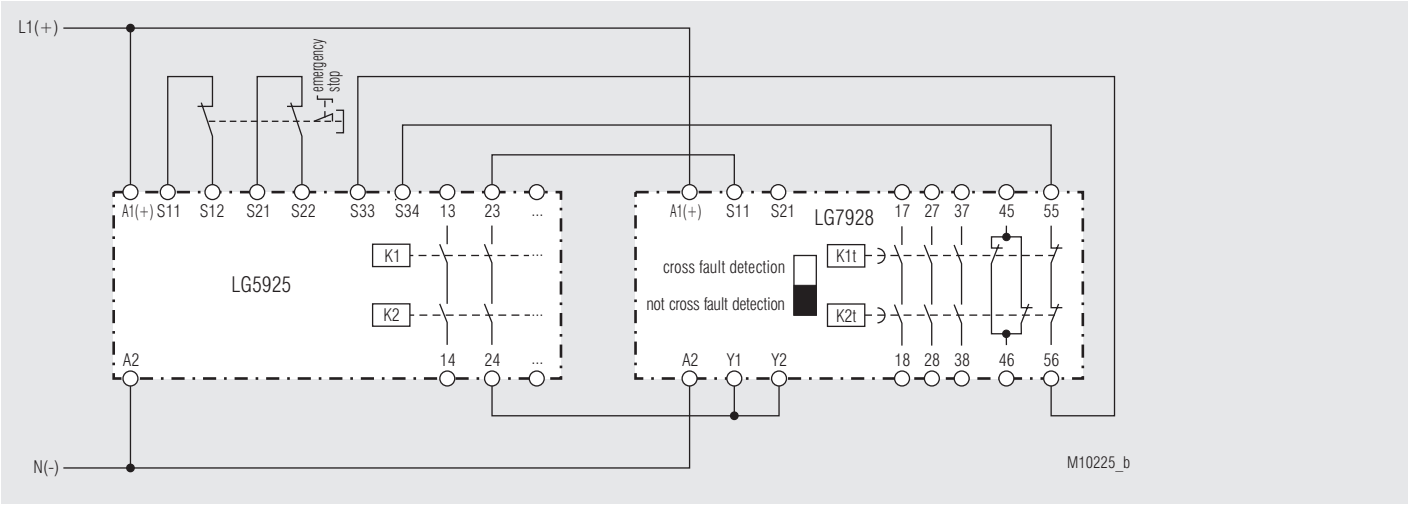
$$\Sigma I^2 = I_1^2 + I_2^2 + I_3^2 + I_4^2$$

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

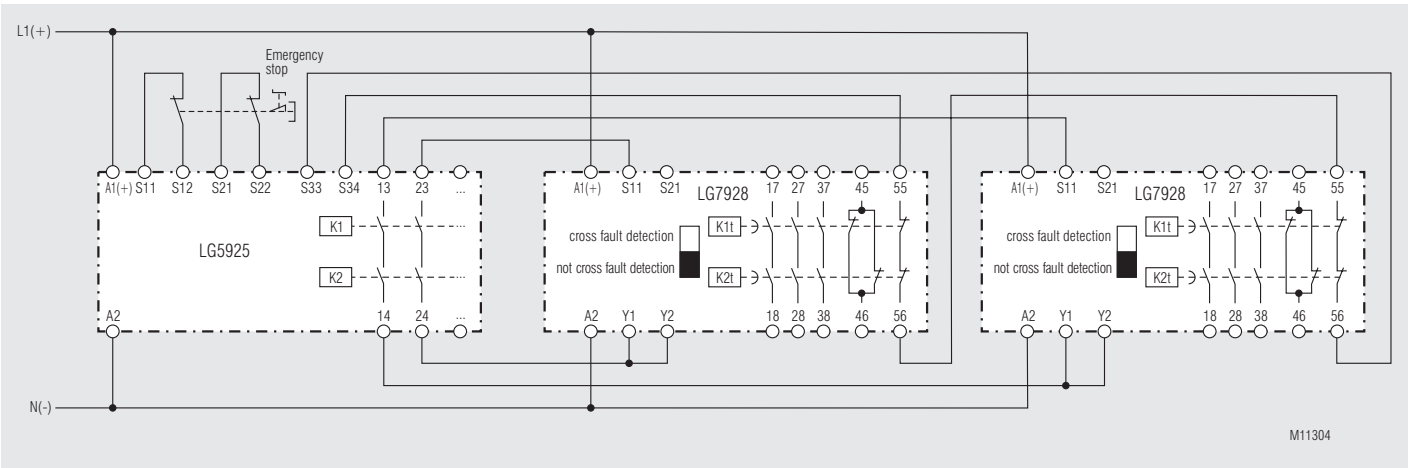
quadratic total current limit curve



LG 5925 with LG 7928, cross fault detection, suitable up to SIL2, Performance Level d, Cat. 3



LG 5925 with LG 7928, non cross fault detection, suitable up to SIL2, Performance Level d, Cat. 3



LG 5925 with 2 LG 7928, non cross fault detection, suitable up to SIL2, Performance Level d, Cat. 3