



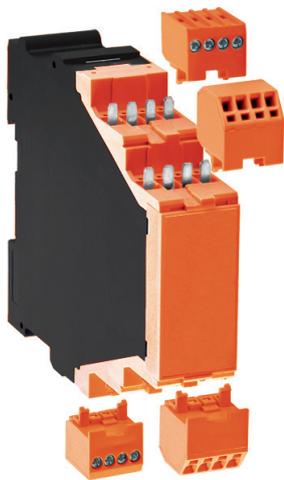
Your advantage

- Compact, flexible and safe
- Short response time
- Ideal for designs according to the new safety standards

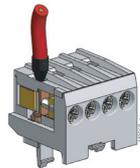
Features

- **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
- Output: 2 NO instantaneous contacts and 1 release delay contact
- For instantaneous and delayed output contacts
- Output: 2 NO instantaneous contacts and 1 release delay contact
- 1- or 2-channel connection
- Line fault detection at the ON pushbuttons at connection on terminals S33-S34
- Manual restart with button on S33-S34 or automatic restart with bridge between S13-S34
- With or without cross fault monitoring in the E-stop loop
- Interruption of the time delay via Y39/Y40 (only LG 5928.40)
- Indication for released time circuit
- LED indication for supply, channel 1/2 and release delayed contacts
- 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
- As option with pluggable terminal blocks for easy exchange of devices
 - with screw terminals
 - or with cage clamp terminals
- Width 22.5 mm

Options with pluggable terminal blocks



Terminal block with cage clamp terminals (PC / plugin cage clamp)



Terminal block with screw terminals (PS / plugin screw)

LG _ _ _ _ P _

Approval and marking



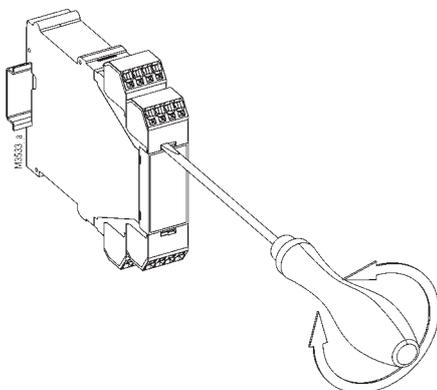
Application

- Protection of people and machines
- Emergency stop circuits on machines, Stop category 1 can be realised
 - Monitoring of safety gates

Notes

Removing the terminal blocks with cage clamp terminals

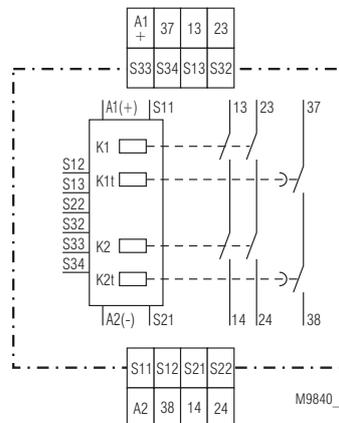
1. The unit has to be disconnected.
2. Insert a screwdriver in the side recess of the front plate.
3. Turn the screwdriver to the right and left.
4. Please note that the terminal blocks have to be mounted on the belonging plug in terminations.



Indication

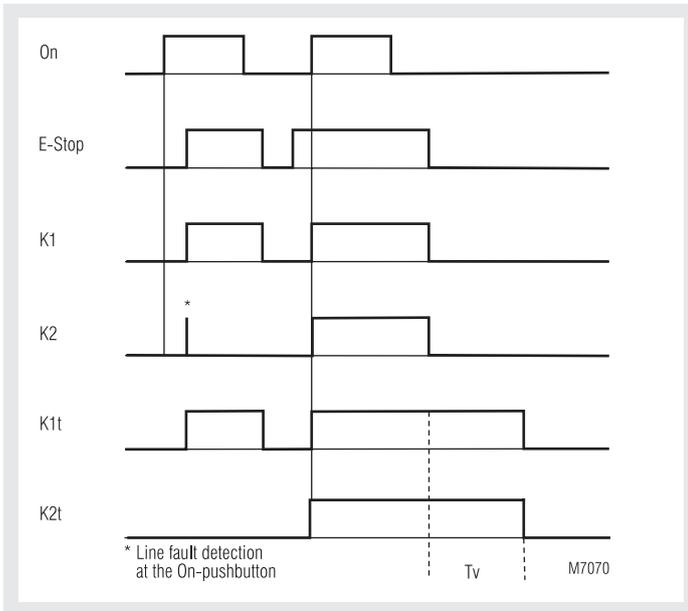
- | | |
|-------------|--|
| upper LED: | on when supply connected |
| lower LEDs: | on, when relay K1 and K2 resp. K1 _i and K2 _i energized |

Circuit diagram

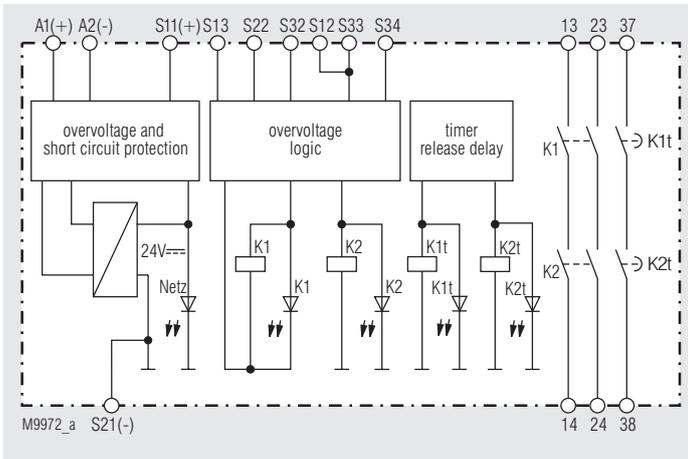


LG5928.41

Function diagram



Block diagram



Notes

To select automatic restart terminals S13 - S34 must be bridged, S33 - S34 must be opened. Open terminals S13 - S34 select manual restart, the On-button must then be connected to S33 - S34.

Line fault detection on On-button:

The line fault detection is only active when the time delayed relays K1, and K2, have released and then S12 (channel A) and S32 (channel B) are switched simultaneously. If the On-button is closed before S12, S32 is connected to voltage (also when line fault across On-button), the output contacts will not close. The unit will not restart before the time delay is finished.

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, S32, the unit will be activated because this line fault is similar to the normal On-function.

The unit can be operated with single channel and 2-channel operation with cross fault monitoring. For connection please refer to application examples.

Notes

The terminal S21 permits the operation of the device in IT-systems with insulation monitoring, serves as a reference point for testing the control voltage and is used to connect the E-stop loop when cross fault monitoring is selected.

Connecting the terminal S21 to the protective ground bridges the internal short-circuit protection of Line A2(-). The short-circuit protection of line A1(+) remains active.

ATTENTION - AUTOMATIC START!



According to IEC/EN 60 204-1 part 9.2.5.4.2 it is not allowed to restart automatically after emergency stop. Therefore the machine control has to disable the automatic start after emergency stop.

Technical Data

Input

Nominal voltage U_N:	DC 24 V
Voltage range:	0.9 ... 1.1 U_N
Nominal consumption:	approx. 3.5 W
Min. Off-time:	1 s
Control voltage S11:	DC 23 V at U_N device not activated
Control current via S12, S32:	each 40 mA at U_N
Min. voltage to terminals S12, S32:	DC 19 V device not activated
Short-circuit protection:	Internal PTC
Overvoltage protection:	Internal VDR

Output

Contacts: 2 NO contacts instantaneous, and 1 contact release delay
The not delayed NO contacts are safety contacts.

ATTENTION! The delayed NO contact can only be used at time delay up to 30 s as safety contact with modul LG 5928.41 LG 5928.41/001

Operating time t_{op} at U_N :

manual start: 25 ms
automatic start at U_N : 100 ms

Release delay t_{rel} at U_N :

in case of break of supply voltage: 20 ms
in case of break of S12, S22 and S32: 10 ms

Time delay t_v

(release delayed):

Auxiliary supply must be connected for time delay

Time ranges:

0.1 ... 1 s	3.0 ... 30 s
0.3 ... 3 s	6.0 ... 60 s
0.5 ... 5 s	30 ... 300 s
1.0 ... 10 s	

Other ranges or values on request

± 1 % of setting value

positive guided

AC 250 V

DC: see limit curve for arc-free operation

DC: see limit curve for arc-free operation

Repeat accuracy:

Contact type:

Nominal output voltage:

Max switching current:

Thermal current I_{th} :

in 1 contact path:

13 / 14 or 23 / 24:

37 / 38:

max. 8 A (see quadratic total current limit curve)

max. 6 A (see quadratic total current limit curve)

Technical Data

Switching capacity

AC 15		
NO contact:	AC 3 A / 230V	IEC/EN 60 947-5-1
DC 13		
NO contacts:	DC 3 A / 24 V	
	ON: 0.4 s, OFF: 9.6 s	

Electrical life

to AC 15 at 2 A, AC 230 V: 10⁵ switching cycles IEC/EN 60 947-5-1

Permissible operating frequency:

max. 360 switching cycles / h
with short release delay time

Short circuit strength

max. fuse rating		
13 / 14 or 23 / 24:	10 A gL	IEC/EN 60 947-5-1
37 / 38:	4 A gL	IEC/EN 60 947-5-1
Line circuit breaker:	B 6 A	
	(max. short circuit current + 300 A)	

Mechanical life: 10 x 10⁶ switching cycles

General Data

Operating mode: Continuous operation

Temperature range: - 15 ... + 55 °C

Clearance and creepage distances

rated impuls voltage /
pollution degree: 4 kV / 2 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
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 V0 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

Terminal designation: EN 50 005

**Wire connection
screw terminal
(fixed):** DIN 46 228-1/-2/-3/-4

1 x 4 mm² solid or
1 x 2.5 mm² stranded ferruled (isolated) or
2 x 1.5 mm² stranded ferruled (isolated) or
2 x 2.5 mm² solid

Insulation of wires
or sleeve length: 8 mm

Terminal blocks with screw terminals

Max. cross section: 1 x 2.5 mm² solid or
1 x 2.5 mm² stranded ferruled (isolated)

Insulation of wires
or sleeve length: 8 mm

Terminal blocks with cage clamp terminals

Max. cross section: 1 x 4 mm² solid or
1 x 2.5 mm² stranded ferruled (isolated)

Min. cross section: 0.5 mm²

Insulation of wires
or sleeve length: 12 ±0.5 mm

Wire fixing: Plus-minus terminal screws M3.5 box
terminals with wire protection

**Insulation of wires
or sleeve length:** 8 mm

Mounting: DIN rail IEC/EN 60 715

Weight: approx. 210 g

Dimensions

Width x height x depth:

LG 5928:	22.5 x 90 x 121 mm
LG 5928PC:	22.5 x 111 x 121 mm
LG 5928PS:	22.5 x 104 x 121 mm

Technical Data

Safety related data

Values according to EN ISO 13849-1:

Category:	4	
PL:	e	
MTTF _d :	215.1	a
DC / 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:

SIL CL:	3	IEC/EN 62061
SIL	3	IEC/EN 61508
HFT:	1	
DC / DC _{avg} :	99.0	%
SFF	99.7	%
PFH _D :	2.17E-10	h ⁻¹

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.

Standard type

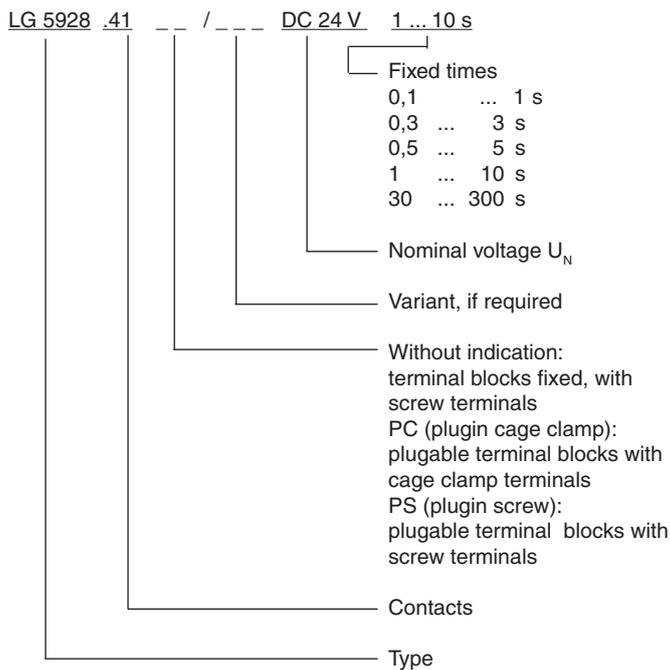
LG 5928.41 DC 24 V 1 ... 10 s

Article number:	0061683
• Output:	2 NO contacts instantaneous and 1 NO contacts release delayed
• Nominal voltage U _N :	DC 24 V
• Time delay tv:	1 ... 10 s
• Width:	22.5 mm

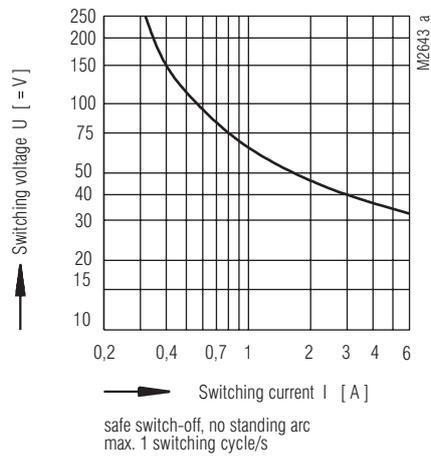
Variants

LG 5928.41:	with redundant time circuits to disconnect K1t and K2t, adjustable time. Each time circuit operates one output relay
LG 5928.41/001:	as LG 5928.41, but with fixed time delay Fixed times: 1 s, 3 s, 5 s, 10 s, 300 s other values on request
LG 5928.41/100:	as LG 5928.41, but deactivation of the first time relay deactivates the second time relay i. e. both relays switch off simultaneously
LG 5928.41/101:	as LG 5928.41/100, but with fixed time delay Fixed times: 1 s, 3 s, 5 s, 10 s, 300 s other times on request

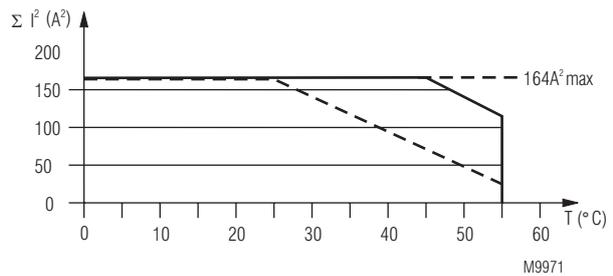
Ordering example for variants:



Characteristics



Limit curve for arc-free operation



— device mounted on distance with air circulation.
max. current at 55°C over
3 contactrows = $2 \times (7A)^2 + (5A)^2 = 123A^2$

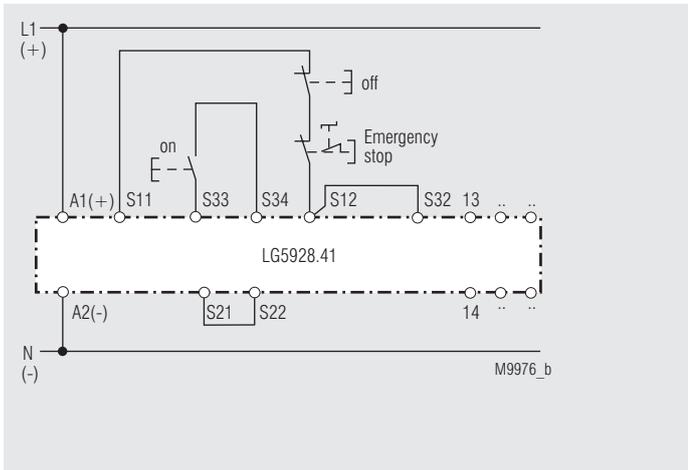
- - - device mounted without distance heated by
devices with same load.
max current at 55°C over
3 contactrows = $3 \times (3A)^2 = 27A^2$

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

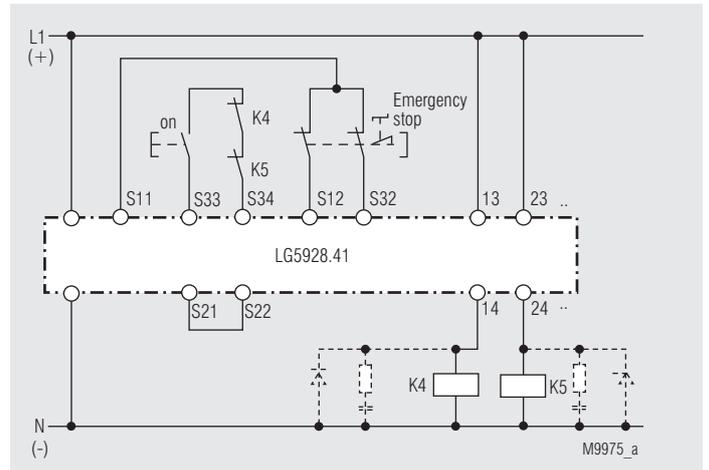
I_1, I_2, I_3 - current in contactrows

Quadratic total current limit curve

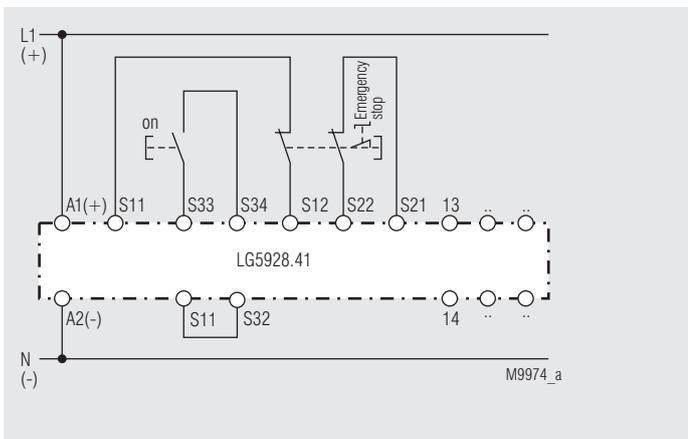
Application examples



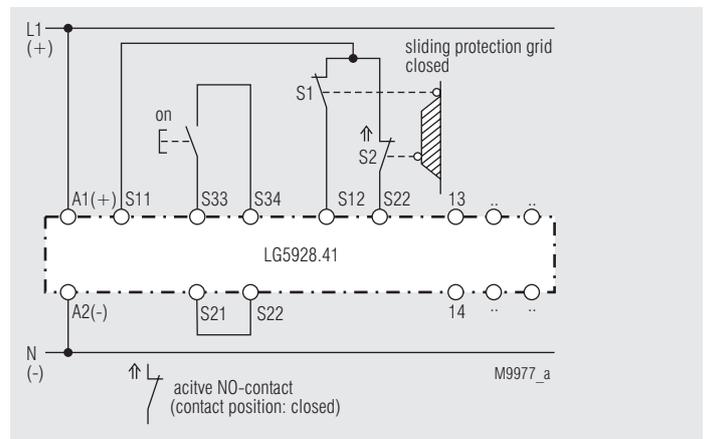
Single channel emergency stop circuit. This circuit does not have any redundancy in the emergency-stop control circuit.



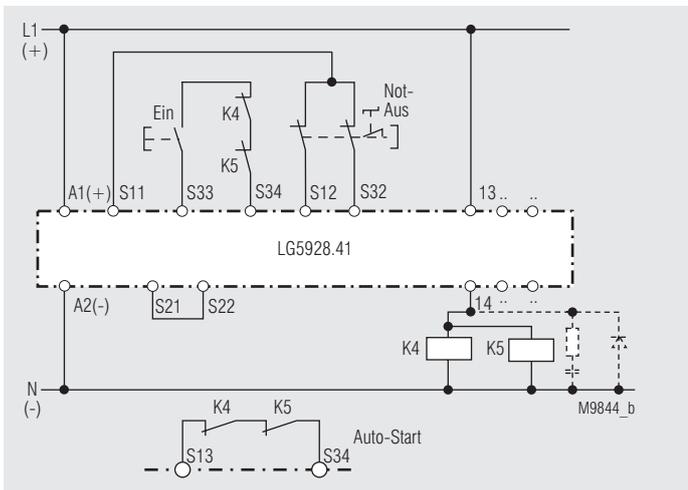
Contact reinforcement by external contactors, 2-channel controlled. The output contacts can be reinforced by external contactors with positive guided contacts for switching currents > 5 A. Functioning of the external contactors is monitored by looping the NC contacts into the closing circuit (terminals S13-S34 or S33-S34).



2-channel emergency stop circuit with cross fault monitoring.



2-channel safety gate monitoring.



Contact reinforcement by external contactors controlled by one contact path. S33 - S34 must stay open on auto start.

