Dold LG5928 Series
Dual Channel Safety Relay with Delay

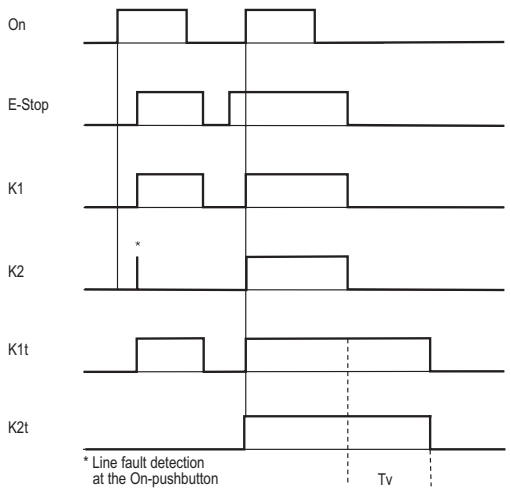
Designed to protect people and machines in applications with E-stop buttons and safety gates. One or two channels can be monitored with time-delay function.

- Compact, flexible and safe
- Short response time
- LED indicators for power and state of operation
- 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 and IEC/EN 61511
- Output: 2 N.O. instantaneous contacts and 1 N.O. Release-Delayed 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
- Indication for released time circuit
- LED indication for supply, channel 1/2 and Release-Delayed contacts

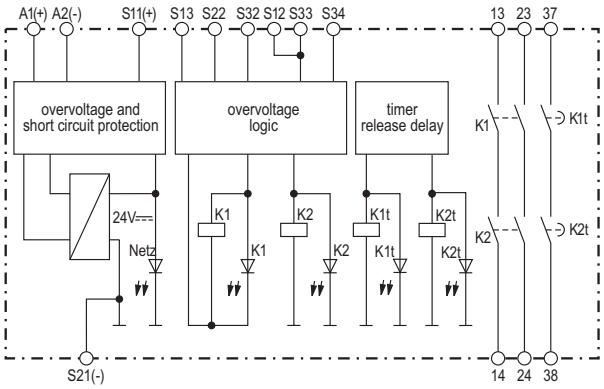
Safety Relays					
Part Number	**Price**	**Marking Type**	**Voltage**	**Outputs**	**Time Delay**
LG5928-41-61-3	$279.00	Dual safety relay module	24VDC	2 N.O. instantaneous positive guided safety contact(s), 1 N.O. time delay positive guided safety contact(s)	0.3 to 3 second
LG5928-41-61-10	$279.00		24VDC	2 N.O. instantaneous positive guided safety contact(s), 1 N.O. time delay positive guided safety contact(s)	1 to 10 second

Safety Data – Values per EN ISO 13849-1		
	Non-Delayed Contacts	**Delayed Contacts**
Category	4	3
Performance level	PLe	PLd
$MTTF_d$	351.8 years	495.4 years
DC_{avg}	99%	97.3%
Safety Data – Values per IEC/EN 62061 /IEC/EN 61508		
SIL CL	3	2
SIL	3	2
HFT (Hardware Failure Tolerance)	1	1
DC_{avg}	99%	97.3%
SFF	99.9%	99.1%
PFH_D	$1.37E^{-10}$ h^{-1}	$2.76E^{-10}$ h^{-1}

Function Diagram



Block Diagram



Dold LG5928 Series
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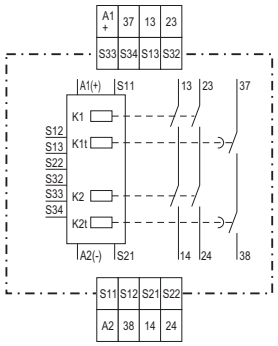
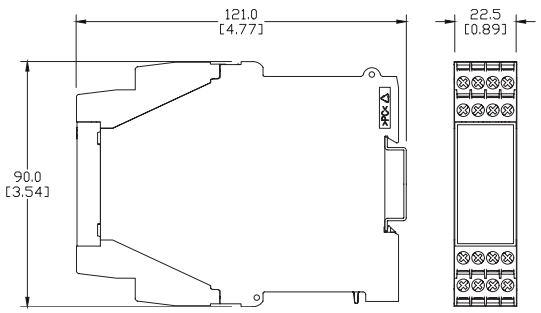
Dual Channel Safety Relay with Delay Specification Table	
General Specifications	
Temperature	Storage: -25°C to 85°C (-13°F to 185°F) Operating: -15°C to 55°C (5°F to 131°F)
Altitude	< 2,000 meters
Vibration Resistance	Amplitude: 0.35mm, Frequency: 10 to 55 Hz (IEC/EN 60-068-2-6)
Degree of Protection	Per IEC/EN 60 529. Housing: IP40; Terminals IP20
Housing	UL 94V-0 Thermoplastic; Din mount 35 mm x 7.5 mm
Weight	210 g (7.41 oz.)
Agency Approvals and Standards	cULus file E107778, CE, RoHS
Terminal Designation per EN 50 005 Wire Connections	1x4 mm^2 solid or 2 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 ferrruled DIN 46 228-1/-2/-3
Wire Fixing	Box terminal with wire protection
Wire Connection	60degC/75degC Copper conductors only; AWG20-12 Sol/Str Torque 0.8NM
Input Specifications	
Nominal Voltage	24VDC
Voltage Range	At 10% residual ripple: DC: 0.9 to 1.1 UN At 48% residual ripple: DC: 0.8 to 1.1 UN
Maximum Consumption	DC approx. 3.5W
Minimum Off-time	1.0 second
Short Circuit Protection	Internal with PTC (Positive Temperature Coefficient resistor)
Overvoltage Protection	Internal VDR (Voltage Dependent Resistor)
Output Specifications	
Electrical Contact Life	To DC 13 at 2A, DC 24V: >1.5 x 10^5 switching cycles To AC 15 at 2A, 230VAC: 10^5 switching cycles IEC/EN 60 947-5-1
Mechanical Life	10 x 10^6 switching cycles
Contact Type	2 N.O. contacts instantaneous and 1 contact release delay
Operate Delay	Operate delay typ at UN: manual start: 25 ms; automatic start: 100ms;
Release Delay	Release delay typ at UN: Disconnecting supply: 20 ms; Disconnecting S12, S22, S31 and S32: 10ms
Repeat Accuracy	±1% of setting value
Nominal Output Voltage	AC: 250V; DC: See continuous current limit curve in manual.
Thermal Current (Ith)	Max. 8A/6A, See quadratic total current curve in manual.
Switching of Low Loads	M100 mV; (contacts with 5µ Au) M 1 mA
Short Circuit Strength	Max. fuse rating: 10 A gL (IEC/EN 60 947-5-1); Line circuit breaker B 6 A
Switching Capacity	AC 15: N.O. contacts: 3A/230V; DC 13: N.O. contacts: 2A/24VDC
Switching Frequency	Max. 360 switching cycles/hr, with short release delay time
Indicator Contact	DC 13: N.C. contact: 2A/24VDC
Agency Approvals and Standards	cULus file E107778, CE, RoHS

To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at www.automationdirect.com

Connection Terminals



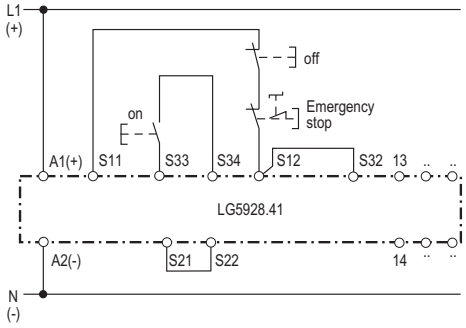
Dimensions mm(in)



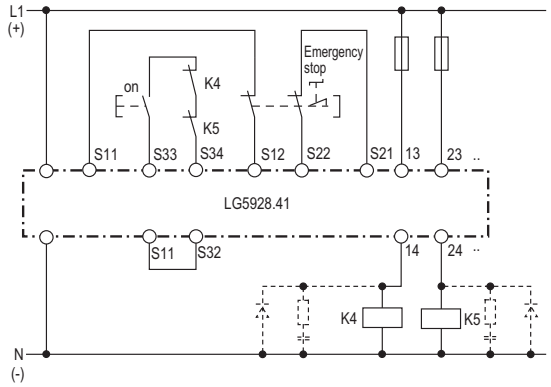
See our website: www.AutomationDirect.com for complete Engineering Drawings.

Dold LG5928 Series
Dual Channel Safety Relay with Delay

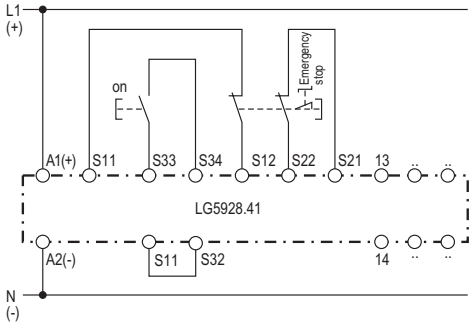
Application Examples



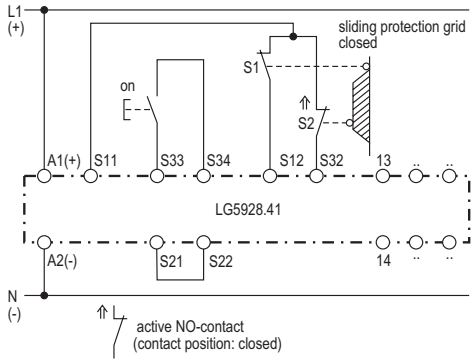
Single channel emergency stop circuit. This circuit does not have any redundancy in the emergency-stop control circuit.
Suited up to SIL2, Performance Level d, Cat. 3



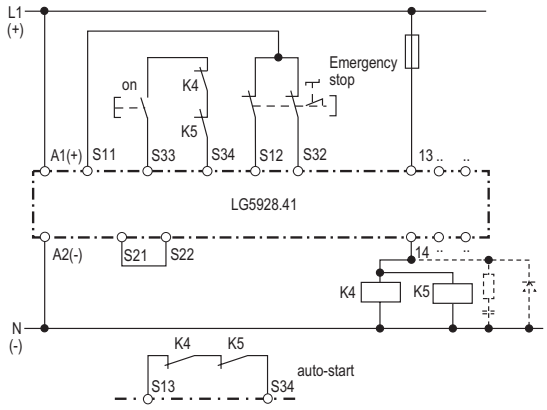
Contact reinforcement by external contactors, 2-channel controlled. The output contacts can be reinforced by external contactors with forcibly guided contacts for switching currents > 8 A e.g. 6 A.
Functioning of the external contactors is monitored by looping the NC contacts into the closing circuit (terminals S13-S34 or S33-S34).
Suited up to SIL3, Performance Level e, Cat. 4



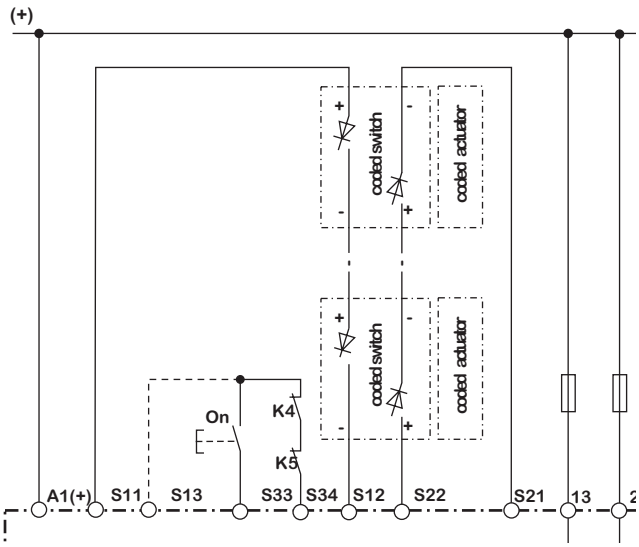
2-channel emergency stop circuit with cross fault monitoring.
Suited up to SIL3, Performance Level e, Cat. 4



2-channel safety gate monitoring.
Suited up to SIL3, Performance Level e, Cat. 4

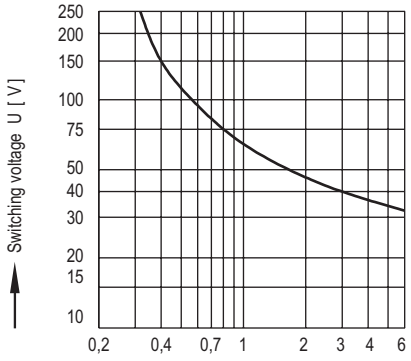


Contact reinforcement by external contactors controlled by one contact path. S33 - S34 must stay open on auto start.
Suited up to SIL3, Performance Level e, Cat 4, if the external contactors are in the same cabinet and the wiring is short circuit and crossfault prove.

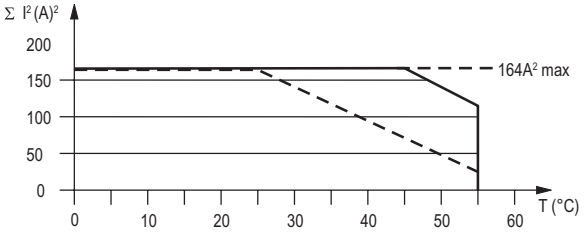


Dold LG5928 Series
Dual Channel Safety Relay with Delay

Curves



safe switch-off, no standing arc
max 1 switching cycle/s



device mounted on distance with air circulation.
max. current at 55°C over
3 contact rows = 2 x $(7A)^2$ + $(5A)^2$ = $123A^2$

device mounted without distance heated by
devices with same load,
max. current at 55°C over
3 contact rows = 3 x $(3A)^2$ = $27A^2$

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

I_1, I_2, I_3 - current in contact rows

Quadratic total current limit curve

Dold LG5929 Extension Module

Additional contacts for emergency-stop modules and safety gate monitors.

- 1-channel or 2-channel connection
- LED indication for operation
- Output: 5 N.O. and 1 N.C. contacts

Safety Relays Selection Chart

Part Number	Price	Marking Type	Voltage	Outputs
LG5929-60-100-61	$136.00	Safety relay extension module	24 VAC/VDC	5 N.O./1 N.C.

Safety Data – Values per EN ISO 13849-1

Category	4 according to EN 954-1
Performance level	PLe according to EN 13849-1
$MTTF_d$	>100 years
DC_{avg}	99%

Safety Data – Values per IEC/EN 62061 /IEC/EN 61508

SIL CL	3 per IEC/EN 62061
SIL	3 per IEC/EN 61508
HFT (Hardware Failure Tolerance)	1
DC_{avg}	99%
SFF	99.7%
PFH_D	$4.68E^{-10}$ h^{-1}

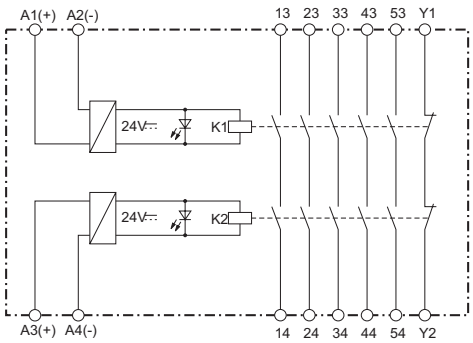
Safety Relay Extenson Module Specification Table

General Specifications	
Temperature	Storage: -25°C to 85°C (-13°F to 185°F) Operating: -15°C to 55°C (5°F to 131°F)
Altitude	< 2,000 meters
Vibration Resistance	Amplitude: 0.35mm, Frequency: 10 to 55 Hz (IEC/EN 60-068-2-6)
Degree of Protection	Per IEC/EN 60 529. Housing: IP40; Terminals IP20
Housing	UL 94V-0 Thermoplastic; Din mount 35 mm x 7.5 mm
Weight	205g (7.23 oz.)
Agency Approvals and Standards	CSA, cULus file E107778, CE, RoHS, TUV
Terminal Designation per EN 50 005 Wire Connections	1x4 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 solid per DIN 46 228-1/-2/-3 /-4
Wire Fixing	Plus-minus terminal screws M3.5 box terminals with wire protection or cage clamp terminals.
Input Specifications	
Nominal Voltage	24V AC/DC
Voltage Range	AC: 0.85 to 1.1 U_N At 10% residual ripple: 0.9 to 1.1 U_N; At 48% residual ripple: 0.85 to 1.1 U_N
Maximum Consumption	24VAC/DC: 1.8VA
Nominal Frequency	50 to 60 Hz
Control Current	Control current typ. at 24V over 2 relays: 75 mA
Overvoltage Protection	Internal VDR (Voltage Dependent Resistor)
Output Specifications	
Electrical Contact Life	To AC15 at 2 A,230V: 10^5 switching cycles IEC/EN 60 947-5-1
Mechanical Life	20 x 10^6 switching cycles
Contact Type	5 N.O. positively driven and 1 N.C. relay contacts (N.O. contacts are safety contacts)
Operate/Release Time	Operate typ at U_N: 20 m.; Release typ at U_N: 35 ms.
Nominal Output Voltage	250VAC
Thermal Current (I_{th})	Max. 5A per contact. See continuous current limit curve in installation manual.
Short Circuit Strength	Max fuse rating:10A gl (IEC/EN 60 9470-5-1); Line circuit breaker: B6A
Switching Capacity IEC/EN 60 947-5-1	AC 15: N.O. contacts: 3A/230V; N.C. contacts: 2A/230VAC DC 13: N.O. contacts: 4A/24V; N.C. contacts: 4A/24VDC; N.O. contact: 8A/24V >25x10^3 ON: 0.4s, OFF: 9.6s
Switching Frequency	Max. 1,200 switching cycles/hr

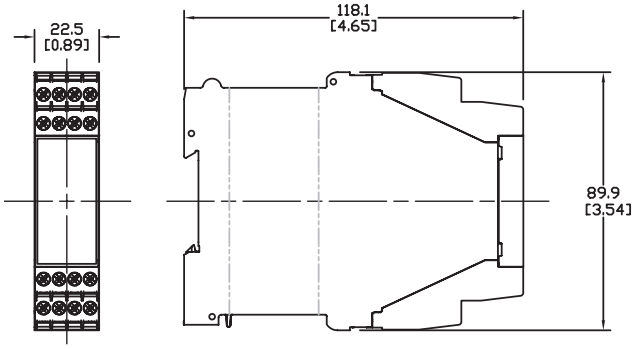
Dold LG5929 Extension Module

Wiring

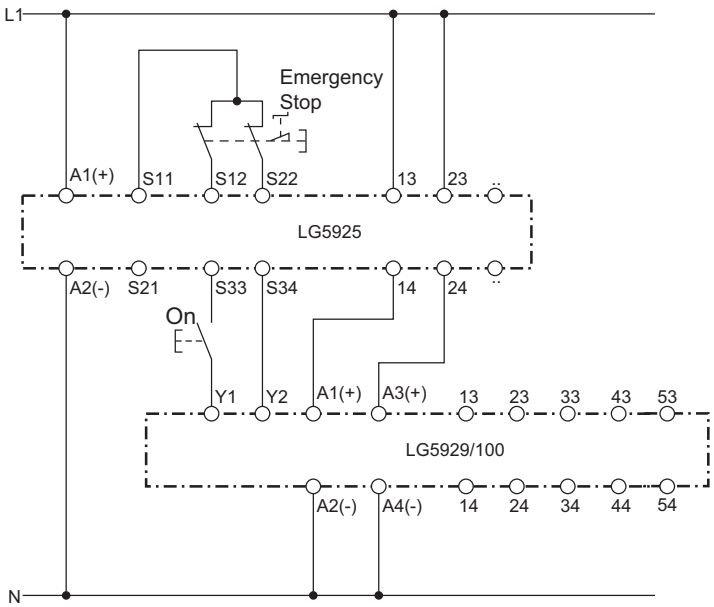
LG5929 Block Diagram



Dimensions mm [in]



Applications



Contact multiplication with LG 5929/100

Note: This is a representative drawing. Depending on the LG5925 safety relay you select, different voltage sources may be required.

***Note: When switching inductive loads, surge suppressors are recommended.**

Safety Products

Warning: Safety products sold by AutomationDirect are Safety components only. The purchaser/installer is solely responsible for the application of these components and ensuring all necessary steps have been taken to assure each application and use meets all performance and applicable safety requirements and/or local, national and/or international safety codes as required by the application. AutomationDirect cannot certify that our products, used solely or in conjunction with other AutomationDirect or other vendors' products, will assure safety for any application. Any person using or applying any products sold by AutomationDirect is responsible for learning the safety requirements for their individual application and applying them, and therefore assumes all risks, and accepts full and complete responsibility, for the selection and suitability of the product for their respective application.

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