

Dold UG6960 Series Dual Channel Emergency Stop with Adjustable Delay



Designed to protect people and machines in applications with E-stop buttons and safety gates.

- Various delay functions adjustable at device (power off before selecting the desired function):
 - Release delay
 - Release delay retriggerable
 - On delay
 - Fleeting on make / break
 - Delay function settable via potentiometer

Note: See Delay Functions for more information.

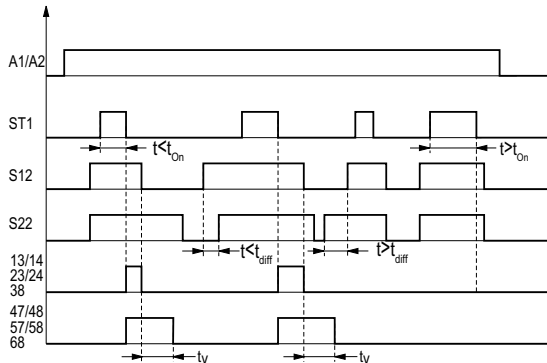
- According to:
 - Performance Level (PL) e and category 4 to EN ISO 13849-1: 2008
 - SIL Claimed Level (SIL CL) 3 to IEC/EN 62061
 - Safety Integrity Level (SIL) 3 to IEC/EN 61508 and IEC/EN 61511
 - Acc. to EN 50156-1 for furnaces
- Line fault detection at the ON pushbutton:
- Manual restart or automatic restart
- With cross fault monitoring
- 2-channel
- Forcibly guided output contacts
- Output: 2 N.O. instantaneous contact and 2 N.O. delayed contacts
- 1 semiconductor monitoring output for instantaneous contacts, 1 semiconductor monitoring output for delayed contacts
- LED indicator for operation, safety function, time delay and failure
- Width: 22.5 mm



| Safety Data – Values per EN ISO 13849-1 | |
|--|--------------------------|
| Category | 4 |
| Performance level | PLe |
| MTTF _d | >100 years |
| DC _{avg} | 99% |
| Safety Data – Values per IEC/EN 62061 / IEC/EN 61508 | |
| SIL CL | 3 |
| SIL | 3 |
| HFT (Hardware Failure Tolerance) | 1 |
| DC _{avg} | 99% |
| SFF | 99,7% |
| PFH _D | 3.59E-10 h ⁻¹ |

| Safety Relays Selection Chart | | | | |
|-------------------------------|----------|---------------------|---------|---|
| Part Number | Price | Marking Type | Voltage | Outputs |
| UG6960-04PS100-300 | \$235.00 | Safety relay module | 24VDC | 2 N.O. instantaneous positive guided safety contact(s), 2 N.O. time delay (selectable) positive guided safety contact(s), 1 N.O. instantaneous monitoring contact, 1 N.O. time delay monitoring contact |

Function Diagram

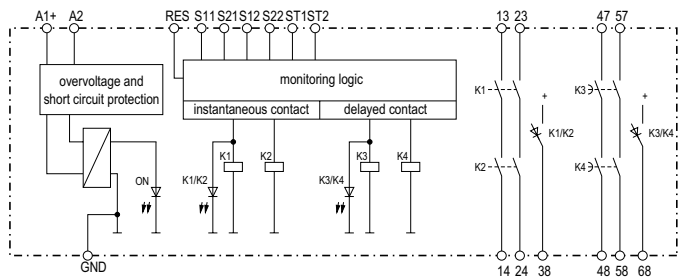


t_{diff} : max. time delay for simultaneity demand dependent on selected safety function
 E-Stop, safety gate, safety mat t_{diff} : max. 3s
 Light curtains t_{diff} : max. 1s
 Two-hand control t_{diff} : max. 0,5s
 other times on request

t_{On} : max. actuation time of start button
 Standard t_{On} : max. 3s
 other times on request

t_v : Time delay
 Example: release delay

Block Diagram



Dold UG6960 Series Dual Channel Emergency Stop with Adjustable Delay

| Dold UG6960 Series Dual Channel Emergency Stop with Adjustable 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 |
| Weight | 250g (8.82 oz.) |
| Terminal Designation per EN 50 005 | 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 |
| Wire Connections | or 2 x 2.5 mm ² solid DIN 46 228-1/-2/-3/-4 |
| Wire Fixing | Terminal screws M3.5 box terminals with wire protection. |
| Wire Connection | 60degC/75degC Copper conductors only; AWG20-12 Sol/Str Torque 0.5NM |
| Input Specifications | |
| Nominal Voltage | 24VDC |
| Voltage Range | At 10% residual ripple: AC/DC: 0.9 to 1.1 U _N ; AC: 0.85 to 1.1 U _N |
| Maximum Consumption | DC approx. 3.2 W |
| Nominal Frequency | Not applicable |
| Minimum Off-time | 250 ms |
| Control Voltage on S11 At U_N | 22VDC |
| Control Current Typ. Over S12, S22 | 8mA at U _N |
| Min. Voltage on S12, S22 (relay activated) | 20VDC |
| Short Circuit Protection | Internal with PTC (Positive Temperature Coefficient resistor) |
| Overvoltage Protection | Internal VDR (Voltage Dependent Resistor) |
| Output Specifications | |
| Electrical Contact Life | AC 15 at 5A, 230VAC: > 1.5x10 ⁶ switching cycles |
| Mechanical Life | > 10x10 ⁶ switching cycles |
| Contact Type | 2 N.O. instantaneous contacts 2 N.O. delayed contacts(N.O. contacts are safety contacts) |
| Operate Delay | Manual start: 30 ms; automatic start: 350 ms. |
| Release Delay | E-Stop (1) (6), Safety gate (2) (7), Exclusive or contacts (5): Start up at U : < 65 ms Release delay at U and disconnecting the supply: < 40 ms Release delay at U and disconnecting S12,S22: < 60 ms |
| Nominal Output Voltage | 24VDC: See continuous current limit curve in installation manual. |
| Thermal Current (I_{th}) | Max. 8A. See continuous current limit curve in installation manual. |
| Short Circuit Strength | Max. fuse rating: 6A gL (IEC/EN 60 947-5-1); Line circuit breaker: B 6A |
| Switching Capacity (IEC/EN 60 947-5-1) | AC 15: N.O. contacts: 3A/230V DC 13: N.O. contacts: 2A/DC24V. |
| Switching Frequency | instantaneous: Max. 1800 switching cycles/hr delayed: Max. 360 switching cycles/hr |
| Agency Approvals and Standards | CSA, cULus file E107778, CE, RoHS, TUV |

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

Release Delay: When disconnecting the signal the contacts remain closed and only open after the time is finished. Restarting the unit during time delay has no influence. The time has to run down fully before you can restart the unit.

Release Delay Retriggerable: Same as above, but you can restart the unit while the time is running and before the contacts open.

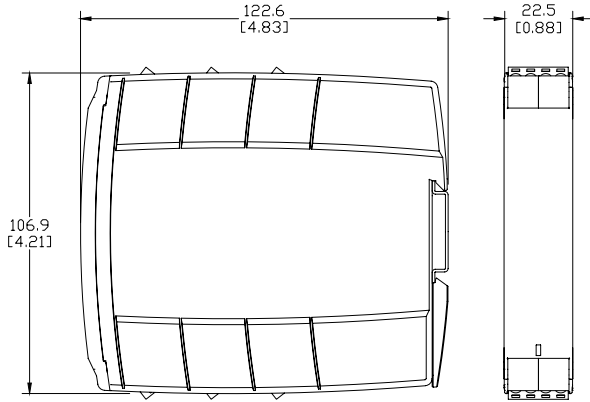
On Delay: The output contacts are energized after the adjusted time after restarting the unit.

Fleeting on Make: The output contacts are energized after restarting the unit for the adjusted time, and then go off again.

Fleeting on Break: The output contacts are energized for the adjusted time after disconnecting the signal, and then go off again.

Dold UG6960 Series Dual Channel Emergency Stop with Adjustable Delay

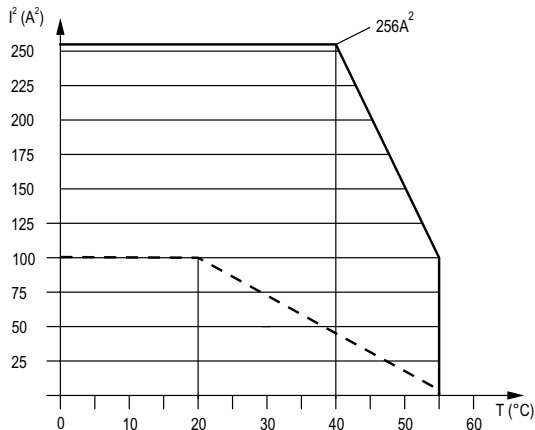
Dimensions mm(in)



Connection Terminals

| Terminal designation | Signal designation |
|-------------------------|---|
| A1 + | DC 24 V |
| A2 | 0 V |
| 13, 14, 23, 24 | Forcibly guided NO contacts for release circuit |
| 47, 48, 57, 58 | Forcibly guided NO contacts for delayed contacts |
| 38, 68 | Semiconductor monitoring output |
| GND | Reference potential for Semiconductor monitoring output |
| S11, S21 | Control output |
| S12, S22, ST1, ST2, RES | Control input |

Characteristic Curves



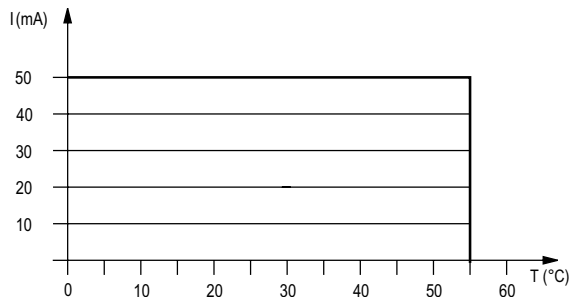
— device free-standing
max. current at 55 $^{\circ}C$ over
4 contact path = 5A $\hat{=}$ 4x5 2 A 2 = 100A 2

- - - device mounted without distance heated by
devices with same load,
max. current at 55 $^{\circ}C$ over
4 contact path = 1A $\hat{=}$ 4x1 2 A 2 = 4A 2

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

I_1, I_2, I_3 - current in contact paths

Quadratic total current limit curve output contacts



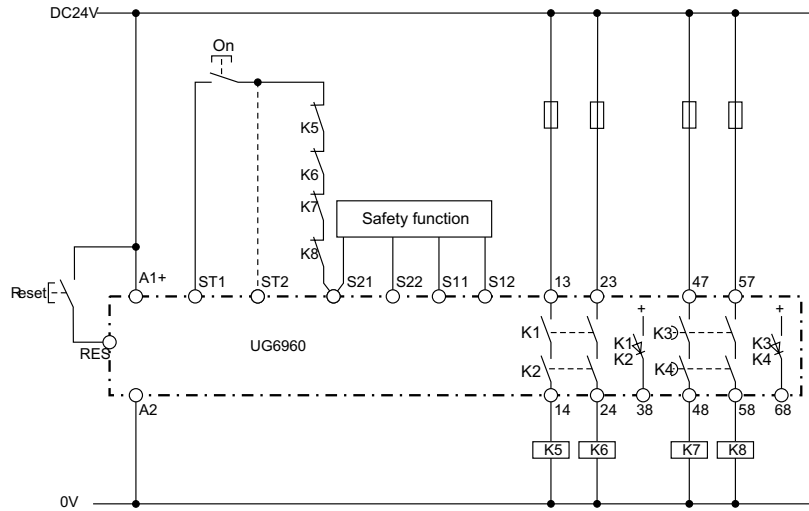
$$\sum I = I_{38} + I_{68}$$

z.B. : $\sum I = 35mA + 15mA = 50mA$
 I_{38} - current semiconductor output 38
 I_{68} - current semiconductor output 68

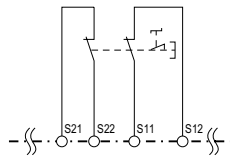
Quadratic total current limit curve semiconductor monitoring outputs

Dold UG6960 Series Dual Channel Emergency Stop with Adjustable Delay

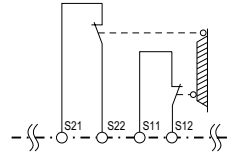
Application Examples



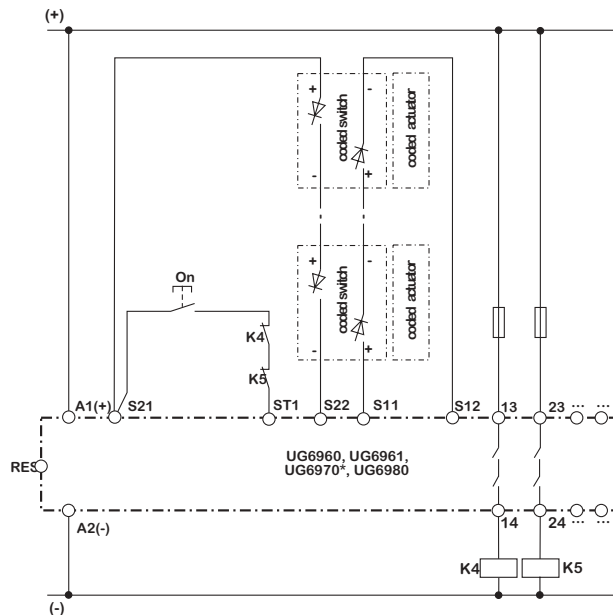
Safety function: see below, Manual-Start (for automatic start make a bridge to ST2 instead of ON button).
 Delay function: release delay (1)
 K1/K2 instantaneous contact, K3/K4 delayed contact



Fct.: E-stop (1),
 with cross fault detection
 3, PL e, Cat. 4



Fct.: Safety gate (2),
 with cross fault detection
 SIL 3, PL e, Cat. 4



*UG6970: The safety function 2 is connected as well as safety function 1, but
 S11' = S31, S12' = S32, S21 = S41, S22 = S42 and ST1 = ST2

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 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% |
| PFFH _D | 4.68E-10 h ⁻¹ |

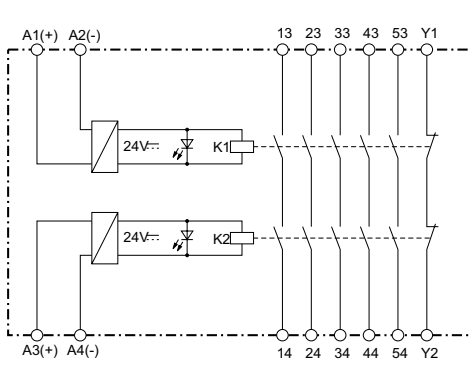
| Safety Relays Selection Chart | | | | |
|-------------------------------|---------|-------------------------------|------------|---------------|
| Part Number | Price | Marking Type | Voltage | Outputs |
| LG5929-60-100-61 | \$95.00 | Safety relay extension module | 24 VAC/VDC | 5 N.O./1 N.C. |

| Safety Relay Extension 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 ms.; 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 |

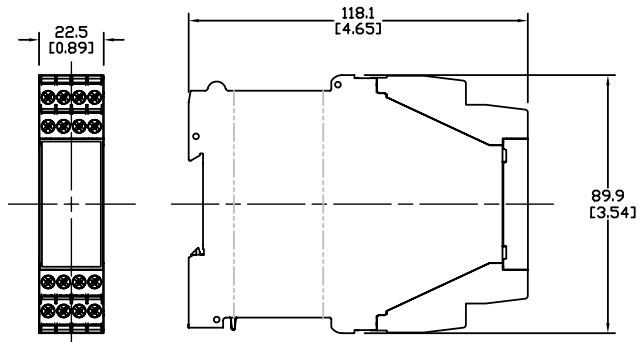
Dold LG5929 Extension Module

Wiring

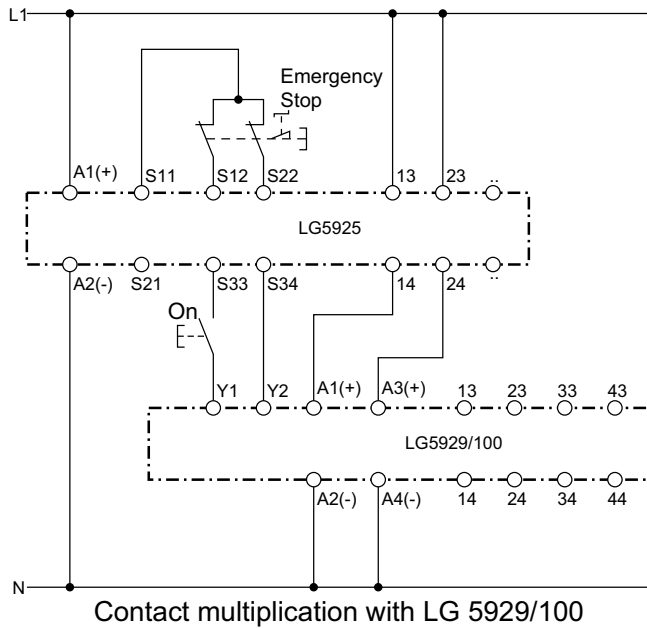
LG5929 Block Diagram



Dimensions mm [in]



Applications



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. AutomationDirect does not provide design or consulting services, and cannot advise whether any specific application or use of our products would ensure compliance with the safety requirements for any application.