Dold Safety Relays – Multi-Function Light Curtain Controller

Designed to protect people and machinery in applications with light curtains; can be operated in protection, muting and stepping modes.
- Connect up to 3 light curtains
- Broken wire detection on light curtain input
- Multifunction device - different functions selectable by rotational switches: protective, muting, stepping
- Suitable to connect light curtains of type 4 or self-testing light curtains type 2 according to IEC/EN 61 496-1, cross-fault monitoring in the light curtain
- Undervoltage and overvoltage detection and indication
- LED indicators for RUN and Status Outputs 1 and 2
- Two PNP sensor inputs only

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<th>Selection Chart</th>
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2-Channel Light Curtain Controller Specification Table

### General Specifications
- **Temperature**
  - Storage: -25°C to 85°C (-13°F to 185°F)
  - Operating: 0°C to 50°C (32°F to 122°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**: 320 g (11.29 oz.)
- **Agency Approvals and Standards**: cULus file E10778, CE, RoHS, TUV

### Input Specifications
- **Nominal Voltage**: 24V DC
- **Voltage Range**: At 5% residual ripple: 0.85 to 1.15 UN
- **Maximum Consumption**: 170 mA (no load on semiconductor outputs)
- **Control Voltage - S21, S23, S31, S33, S41, S43, S48, S58**: 23V DC at UN
- **Control Current on S12, S14, S22, S24, S32, S34, S42, S44**: each 4.5 mA at UN
- **Minimum Voltage on Terminals S12, S14, S22, S24, S32, S34, S42, S44**: 16V DC
- **Minimum Current on M1, M2**: 25 mA with active lamp
- **Short Circuit Protection**: Internal with PTC (Positive Temperature Coefficient Resistor)
- **Overvoltage Protection**: Internal VDR (Voltage Dependent Resistor)

### Output Specifications
- **Contact Type**: 2 N.O., positively driven and 1 N.C relay contacts; (N.O. contacts are safety contacts)
- **Operate Delay**: Operate delay typ. at UN: manual start 50 ms; automatic start: 1.5 s.; automatic restart: max. 55 ms.;
- **Release Delay**: Release delay typ at UN: Max: 30 ms (max 50 ms when failure on LC and only one input channel de-energizes)
- **Nominal Output Voltage**: AC: 250V; DC. See continuous current limit curve in manual.
- **Thermal Current (Ith)**: Max. 5A. See continuous current limit curve in manual.
- **Switching of Low Loads**: AC 15: N.O. contacts: 3A/230V; N.C. contacts: 2A/230V AC
- **Switching Frequency**: Max. 1,200 switching cycles/hr
- **Semi-conductor Output Type (over-temperature and overload protected)**: Transistor plus switching, max 100 mA continuous; 400mA for 0.5 sec.
Dold Safety Relays – Multi-Function Light Curtain Controller

Wiring

BH5902-22-01MF2-61 Block Diagram

Note: All drawings are for a 3 N.O. configuration. The units will actually have a 2 N.O. and 1 N.C. configuration.

Dimensions mm [in]

Applications

Protective operation with 3 Light Curtains, manual or auto start, setting without feedback input

*Note: When switching inductive loads, surge suppressors are recommended.
Dold Safety Relays – Multi-Function
Light Curtain Controller

Applications

Protective operation with 3 Light Curtains, manual or autostart, setting with contact reinforcement and feedback input

Protective operation with muting a light curtain via 2 muting sensors, 2 light curtains

*Note: When switching inductive loads, surge suppressors are recommended.
Dold Safety Relays – Multi-Function
Light Curtain Controller

Applications

Protective operation with muting, 1 light curtain, 4 muting sensors

Protective operation with muting via 4 muting sensor contacts

Contact reinforcement
If external relays or contactors are used to reinforce or multiply the contacts of the safety relays, these must be monitored by feeding back one N.C. contact from each relay/contactor into the feedback inputs.

*Note: When switching inductive loads, surge suppressors are recommended.
Dold Safety Relays – Multi-Function
Light Curtain Controller

Applications

Stepping operation with 3 light curtains

Stepping operation with key switch

*Note: When switching inductive loads, surge suppressors are recommended.
Dold Safety Relays – Multi-Function
Light Curtain Controller

Applications

Stepping operation with 3 light curtains and contact reinforcement by external contactors, 2-channel operation (switching of feedback input can also be used at protective operation with muting)

The feedback circuit of the external relays is only tested when the module is started by pressing the pushbutton. When using this circuit, the safe function has to be tested at regular intervals. This can be done by interrupting a light curtain so that a reset requires activation of the START button. Activating the module is only possible when all external relays are de-energized.

Stepping operation with one light curtain (with all operating modes, unused inputs must be jumpered).

*Note: When switching inductive loads, surge suppressors are recommended.
## 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: 0.35 mm
  - Frequency: 10 to 55 Hz (IEC/EN 60068-2-6)
- **Degree of Protection**
  - Per IEC/EN 60529: 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**
  - 1 x 4 mm² solid or 1 x 2.5 mm² stranded ferruled (isolated)
  - or 2 x 1.5 mm² stranded ferruled (isolated) DIN 46 228-1/-2/-3/-4
  - or 2 x 2.5 mm² 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**
  - 24 V AC/DC
- **Voltage Range**
  - AC: 0.85 to 1.1 Ue
  - At 10% residual ripple: 0.9 to 1.1 Ue
  - At 48% residual ripple: 0.85 to 1.1 Ue
- **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; 240V; 108 switching cycles; IEC/EN 60 947-5-1
- **Mechanical Life**
  - 20 x 10⁸ 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 Ue = 20 ms; Release typ at Ue = 35 ms
- **Nominal Output Voltage**
  - 250VAC
- **Thermal Current (Ith)**
  - Max. 5A per contact. See continuous current limit curve in installation manual.
- **Short Circuit Strength**
  - Max fuse rating 10A (IEC/EN 60 947-5-1); Line circuit breaker: B6A
  - AC 15: N.O. contacts: 3A; 250V; 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 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
- **Switching Frequency**
  - Max. 1,200 switching cycles/hf
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.
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