

# Dold BG5933 and BH5933 Series Two-Hand Controllers

**BH5933-48-61-110**

Designed to protect people and machines in applications with two-hand buttons or production machinery with dangerous closing movements.

- Inputs for 2 pushbuttons, each with 1 N.C. and 1 N.O. contact.
- Output options: 2 N.O. contacts and 1 N.C. contact, or 3 N.O. contacts and 1 N.C. contact
- Feedback circuit Y1 - Y2 to monitor external contactors used for reinforcement of contacts
- Overvoltage and short-circuit protection
- LED indicators for power and state of operation

## Two-Hand Controllers Selection Chart

| Part Number             | Price    | Marking Type        | Voltage | Outputs           |
|-------------------------|----------|---------------------|---------|-------------------|
| <b>BG5933-22-61-24</b>  | \$194.00 | Two-hand controller | 24VDC   | 2 N.O. and 1 N.C. |
| <b>BH5933-48-61-110</b> | \$285.00 | Two-hand controller | 110VAC  | 3 N.O. and 1 N.C. |

Note: Output contacts will be switched if both pushbuttons are operated within m0.5s. If both buttons are pressed while switching on the operating voltage (e.g. after voltage functions), the output contacts do not energize.

## Safety Data – Values per EN ISO 13849-1

| Category          | 4 according to EN 954-1                 |
|-------------------|-----------------------------------------|
| Performance level | PL <sub>e</sub> according to EN 13849-1 |
| MTTF <sub>d</sub> | 30.7 years                              |
| DC <sub>avg</sub> | 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 <sub>avg</sub>                | 99%                                 |
| SFF                              | 99.7%                               |
| PFH <sub>D</sub>                 | 7.51E <sup>-9</sup> h <sup>-1</sup> |

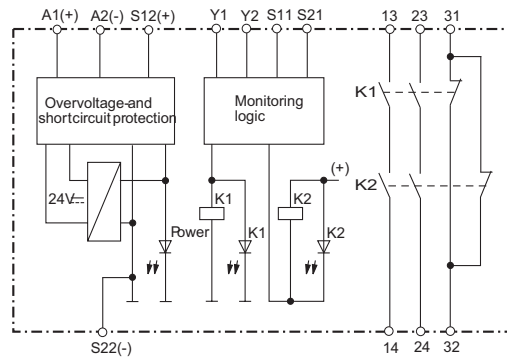
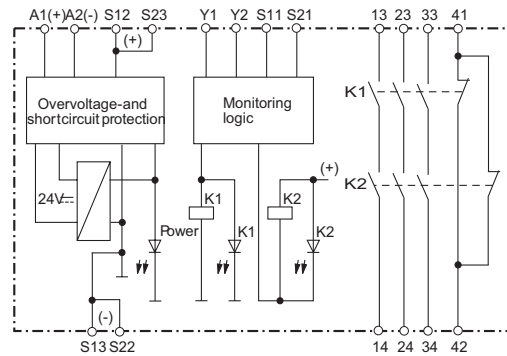
## Two-Hand Controllers Safety Relay Specification Table

| Part Numbers                                        | BG5933-22-61-24                                                                                                                                                                                                                    | BH5933-48-61-110                                   |
|-----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| 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                                              | 200g (7.05 oz.)                                                                                                                                                                                                                    | 400g (14.11 oz.)                                   |
| Agency Approvals and Standards                      | cULus file E107778, CE, RoHS, TUV                                                                                                                                                                                                  |                                                    |
| Terminal Designation per EN 50 005 Wire Connections | 1x4 mm <sup>2</sup> solid or 1 x 2.5 mm <sup>2</sup> stranded ferruled (isolated) or 2 x 1.5 mm <sup>2</sup> stranded ferruled (isolated) DIN 46 228-1/-2/-3/-4<br>or 2 x 2.5 mm <sup>2</sup> stranded ferruled DIN 46 228-1/-2/-3 |                                                    |
| Wire Fixing                                         | Terminal screws M3.5. Box terminals with self-lifting wire protection                                                                                                                                                              |                                                    |
| Input Specifications                                |                                                                                                                                                                                                                                    |                                                    |
| Nominal Voltage                                     | 24V DC                                                                                                                                                                                                                             | 110V AC, 230V AC                                   |
| Voltage Range                                       | At 10% residual ripple: DC: 0.9 to 1.1 UN                                                                                                                                                                                          | At 10% residual ripple: AC: 0.85 to 1.1 UN         |
| Maximum Consumption                                 | DC approx. 2.3 W                                                                                                                                                                                                                   | AC approx. 4 VA                                    |
| Nominal Frequency                                   |                                                                                                                                                                                                                                    | 50 to 60 Hz                                        |
| Time Delay for Simultaneous Demand                  | 0.5 sec max                                                                                                                                                                                                                        |                                                    |
| Recovery time                                       | 1 second                                                                                                                                                                                                                           |                                                    |
| Control Contacts                                    | 2 x (1 N.O. and 1 N.C. contacts)                                                                                                                                                                                                   |                                                    |
| Current via Control Contacts with 24VDC             | N.O. contact: typ. 50mA; N.C. contact: typ. 20mA                                                                                                                                                                                   |                                                    |
| 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 <sup>5</sup> switching cycles<br>To AC 15 at 2A, 230 VAC : 10 <sup>5</sup> switching cycles IEC/EN 60 947-5-1                                                                                    |                                                    |
| Mechanical Life                                     | 10 x 10 <sup>6</sup> switching cycles                                                                                                                                                                                              |                                                    |
| Contact Type (N.O. are safety contacts)             | 2 N.O. positively driven and 1 N.C. relay contacts                                                                                                                                                                                 | 3 positively driven N.O. and 1 N.C. relay contacts |
| Operate Time                                        | Operate time: typ. 40ms                                                                                                                                                                                                            |                                                    |
| Release Time                                        | Release time: typ. 15ms                                                                                                                                                                                                            |                                                    |
| Nominal Output Voltage                              | AC: 250V; DC: See continuous current limit curve in manual.                                                                                                                                                                        |                                                    |
| Thermal Current (I <sub>th</sub> )                  | Max. 5A See continuous current limit curve in manual.                                                                                                                                                                              |                                                    |
| Switching of Low Loads                              | M100 mV; (contacts with 5µ Au) M 1mA                                                                                                                                                                                               |                                                    |
| Short Circuit Strength                              | Max. fuse rating: 6 A gl (IEC/EN 60 947-5-1); line circuit breaker C 6 K                                                                                                                                                           |                                                    |
| Switching Capacity                                  | AC 15: N.O. contacts: 3A/230V; N.C. contacts: 2A/230VAC<br>DC 13: N.C. contacts: 2A/24VDC<br>2 N. O. contacts in series; 8 A/24V >105. ON: 0.4s, OFF: 9.6 s                                                                        |                                                    |
| Switching Frequency                                 | Max. 1800 switching cycles/hr                                                                                                                                                                                                      |                                                    |

# Dold BG5933 and BH5933 Series Two-Hand Controllers

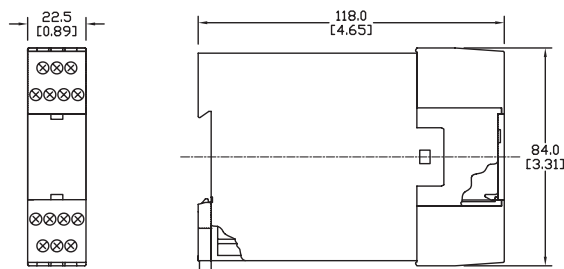
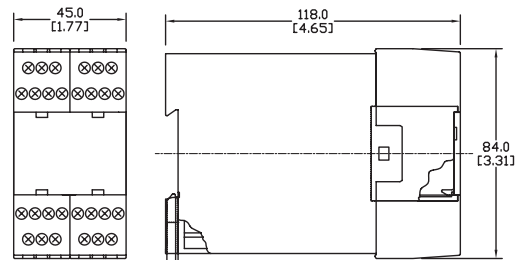


## Wiring

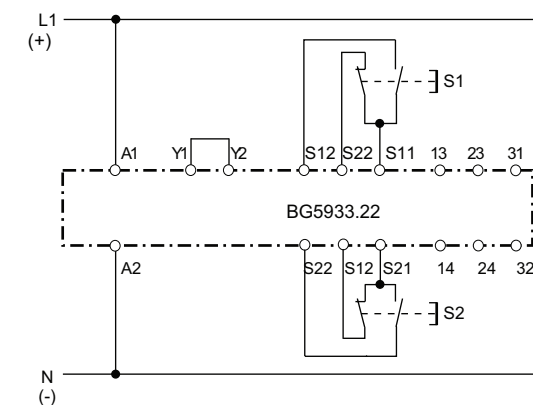
**BG5933 Block Diagram**

**BH5933 Block Diagram**


## Dimensions

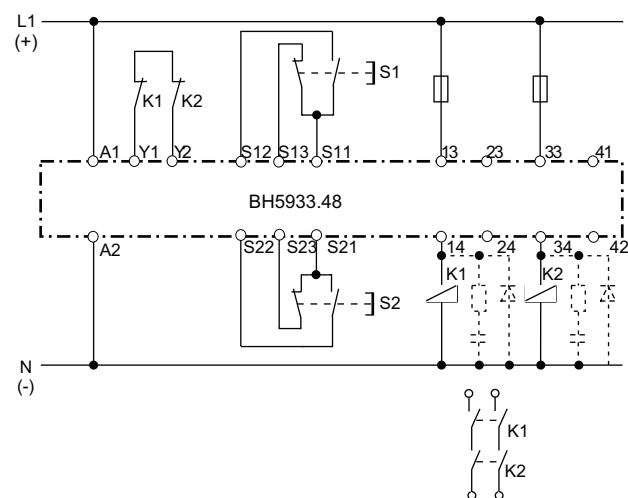
mm [in]

**BG5933**

**BH5933**


## Applications



Two-hand control



Two-hand control with contact reinforcement via external positively-driven contactors

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

# 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

|                          |                                         |
|--------------------------|-----------------------------------------|
| <b>Category</b>          | <b>4 according to EN 954-1</b>          |
| <b>Performance level</b> | PL <sub>e</sub> according to EN 13849-1 |
| <b>MTTF<sub>d</sub></b>  | >100 years                              |
| <b>DC<sub>avg</sub></b>  | 99%                                     |

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

|                                         |                                      |
|-----------------------------------------|--------------------------------------|
| <b>SIL CL</b>                           | 3 per IEC/EN 62061                   |
| <b>SIL</b>                              | 3 per IEC/EN 61508                   |
| <b>HFT (Hardware Failure Tolerance)</b> | 1                                    |
| <b>DC<sub>avg</sub></b>                 | 99%                                  |
| <b>SFF</b>                              | 99.7%                                |
| <b>PFH<sub>D</sub></b>                  | 4.68E <sup>-10</sup> h <sup>-1</sup> |

## Safety Relays Selection Chart

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

## Safety Relay Extension Module Specification Table

|                                                            |                                                                                                                                                                                                                             |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>General Specifications</b>                              |                                                                                                                                                                                                                             |
| <b>Temperature</b>                                         | Storage: -25°C to 85°C (-13°F to 185°F) Operating: -15°C to 55°C (5°F to 131°F)                                                                                                                                             |
| <b>Altitude</b>                                            | < 2,000 meters                                                                                                                                                                                                              |
| <b>Vibration Resistance</b>                                | Amplitude: 0.35mm, Frequency: 10 to 55 Hz (IEC/EN 60-068-2-6)                                                                                                                                                               |
| <b>Degree of Protection</b>                                | Per IEC/EN 60 529. Housing: IP40; Terminals IP20                                                                                                                                                                            |
| <b>Housing</b>                                             | UL 94V-0 Thermoplastic; Din mount 35 mm x 7.5 mm                                                                                                                                                                            |
| <b>Weight</b>                                              | 205g (7.23 oz.)                                                                                                                                                                                                             |
| <b>Agency Approvals and Standards</b>                      | CSA, cULus file E107778, CE, RoHS, TUV                                                                                                                                                                                      |
| <b>Terminal Designation per EN 50 005 Wire Connections</b> | 1x4 mm <sup>2</sup> solid or 1 x 2.5 mm <sup>2</sup> stranded ferruled (isolated) or 2 x 1.5 mm <sup>2</sup> stranded ferruled (isolated) DIN 46 228-1/-2/-3/-4 or 2 x 2.5 mm <sup>2</sup> solid per DIN 46 228-1/-2/-3 /-4 |
| <b>Wire Fixing</b>                                         | Plus-minus terminal screws M3.5 box terminals with wire protection or cage clamp terminals.                                                                                                                                 |
| <b>Input Specifications</b>                                |                                                                                                                                                                                                                             |
| <b>Nominal Voltage</b>                                     | 24V AC/DC                                                                                                                                                                                                                   |
| <b>Voltage Range</b>                                       | AC: 0.85 to 1.1 U <sub>N</sub><br>At 10% residual ripple: 0.9 to 1.1 U <sub>N</sub> ; At 48% residual ripple: 0.85 to 1.1 U <sub>N</sub>                                                                                    |
| <b>Maximum Consumption</b>                                 | 24VAC/DC: 1.8VA                                                                                                                                                                                                             |
| <b>Nominal Frequency</b>                                   | 50 to 60 Hz                                                                                                                                                                                                                 |
| <b>Control Current</b>                                     | Control current typ. at 24V over 2 relays: 75 mA                                                                                                                                                                            |
| <b>Overvoltage Protection</b>                              | Internal VDR (Voltage Dependent Resistor)                                                                                                                                                                                   |
| <b>Output Specifications</b>                               |                                                                                                                                                                                                                             |
| <b>Electrical Contact Life</b>                             | To AC15 at 2 A,230V: 10 <sup>5</sup> switching cycles IEC/EN 60 947-5-1                                                                                                                                                     |
| <b>Mechanical Life</b>                                     | 20 x 10 <sup>6</sup> switching cycles                                                                                                                                                                                       |
| <b>Contact Type</b>                                        | 5 N.O. positively driven and 1 N.C. relay contacts (N.O. contacts are safety contacts)                                                                                                                                      |
| <b>Operate/Release Time</b>                                | Operate typ at U <sub>N</sub> : 20 ms.; Release typ at U <sub>N</sub> : 35 ms.                                                                                                                                              |
| <b>Nominal Output Voltage</b>                              | 250VAC                                                                                                                                                                                                                      |
| <b>Thermal Current (I<sub>th</sub>)</b>                    | Max. 5A per contact. See continuous current limit curve in installation manual.                                                                                                                                             |
| <b>Short Circuit Strength</b>                              | Max fuse rating:10A gl (IEC/EN 60 9470-5-1); Line circuit breaker: B6A                                                                                                                                                      |
| <b>Switching Capacity IEC/EN 60 947-5-1</b>                | AC 15: N.O. contacts: 3A/230V; N.C. contacts: 2A/230VAC<br>DC 13: N.O. contacts: 4A/24V; N.C. contacts: 4A/24VDC; N.O. contact: 8A/24V >25x10 <sup>3</sup><br>ON: 0.4s, OFF: 9.6s                                           |
| <b>Switching Frequency</b>                                 | Max. 1,200 switching cycles/hr                                                                                                                                                                                              |

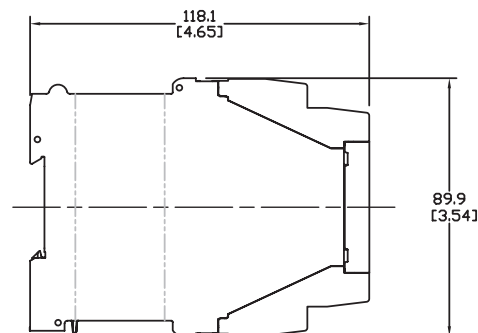
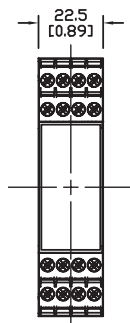
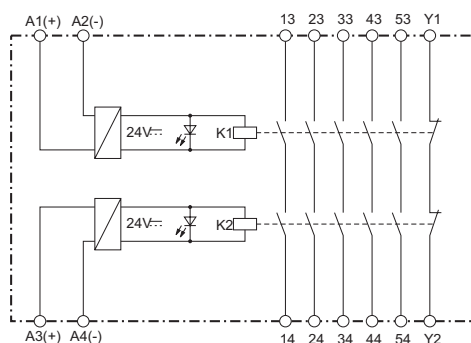
# Dold LG5929 Extension Module



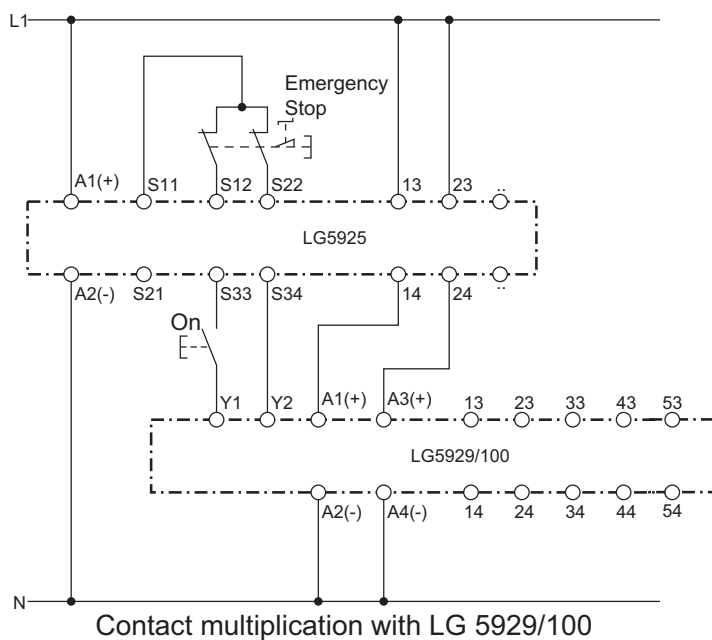
## Wiring

## Dimensions mm [in]

**LG5929 Block Diagram**



## 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.*