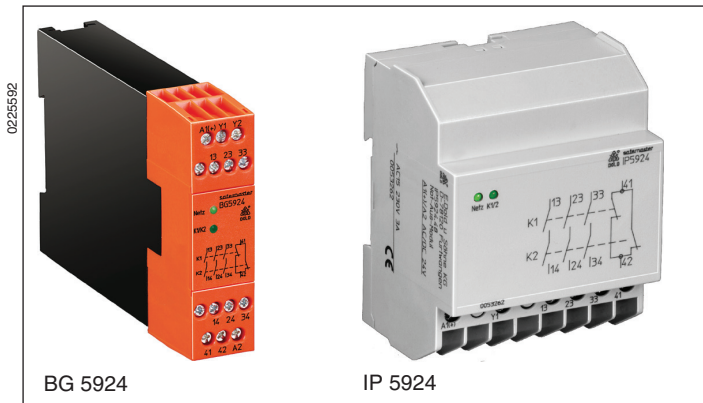
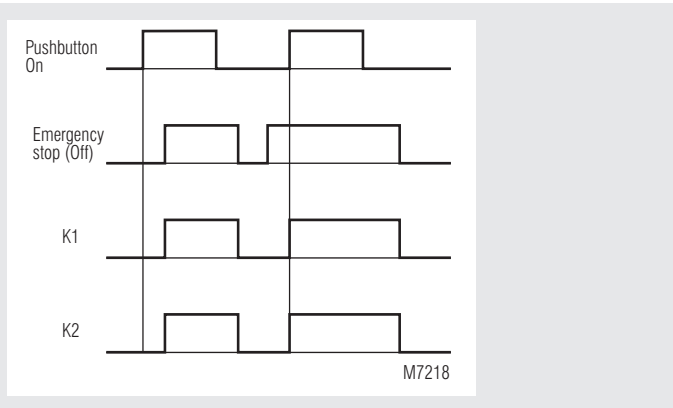


SAFEMASTER Emergency Stop Module BG 5924, IP 5924



- According to
 - Performance Level (PL) d and category 3 to EN ISO 13849-1: 2008
 - SIL Claimed Level (SIL CL) 2 to IEC/EN 62061
 - Safety Integrity Level (SIL 2) to IEC/EN 61508
- BG-Approval
BG 5924: Category 4 to EN 954-1
- Single channel operation
- Output: max. 4 NO contacts
- AC 230 V model with galvanic separation
- For thermal currents to 7 A
- LED indicator for channel 1 / 2 and state of operation
- Short circuit detection between terminal Y1 and common
- BG 5924 with:
 - Removable terminal strips
 - 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
- BG 5924: width 22.5 mm
- IP 5924: width 70 mm

Function Diagram



Approvals and Marking



* see variants

Applications

- Protection of people and machines
- Emergency stop circuits on machines

Indicators

LED Netz: on, when supply connected
LED K1/K2: on, when relay K1 and K2 energized

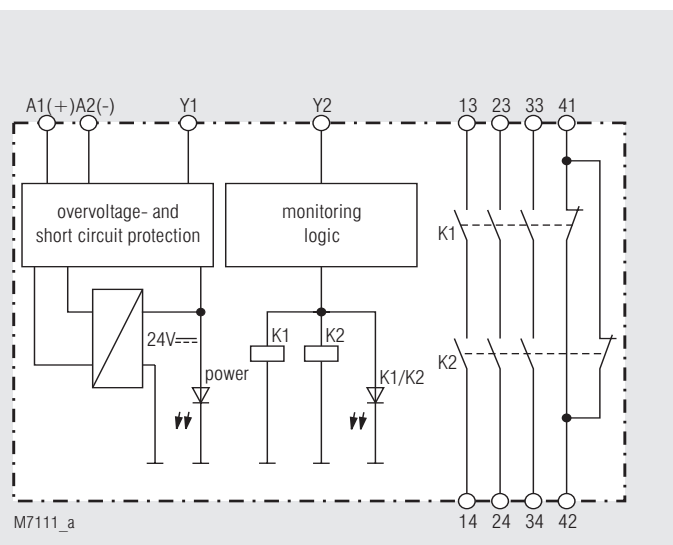
Indicators

ATTENTION - AUTOMATIC START!

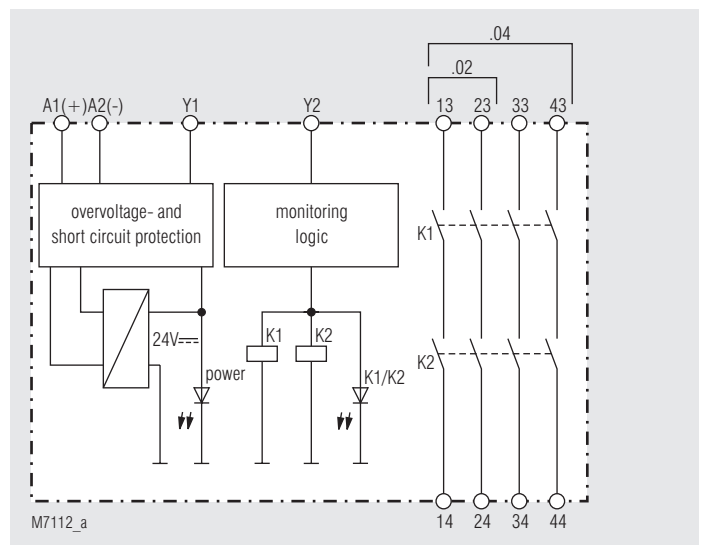


According to IEC/EN 60 204-1 part 9.2.5.4.2 and 10.8.3 it is not allowed to restart automatically after emergency stop. Therefore the machine control has to disable the automatic start after emergency stop.

Block Diagrams

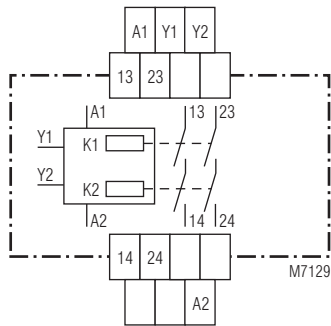


BG 5924.48, BG 5924.48/207, IP 5924.48

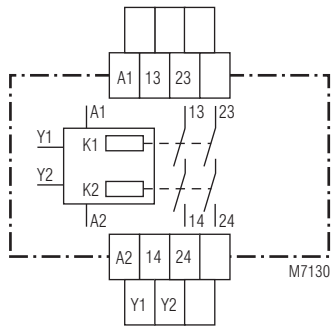


BG 5924.02, BG 5924.02/110, BG 5924.02/207,
BG 5924.04, BG 5924.04/100, BG 5924.04/207,
IP 5924.02, IP 5924.04

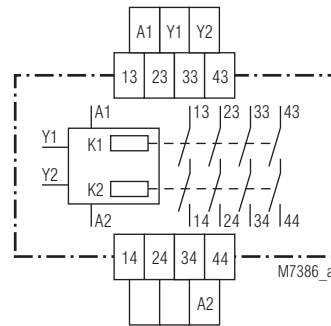
Circuit Diagrams



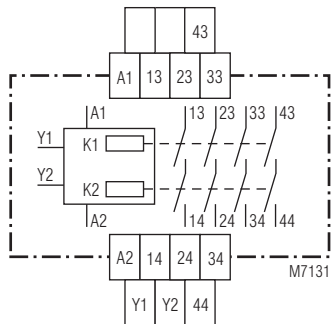
BG 5924.02, BG 5924.02/110



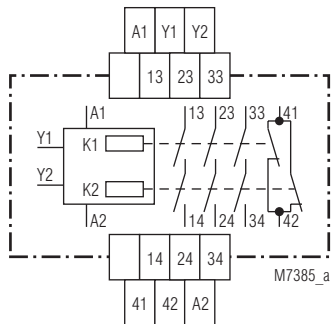
BG 5924.02/207



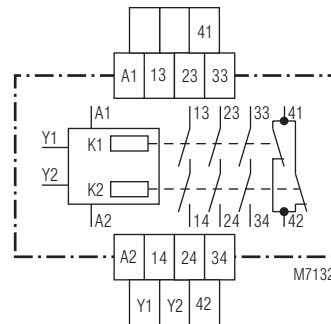
BG 5924.04, BG 5924.04/100



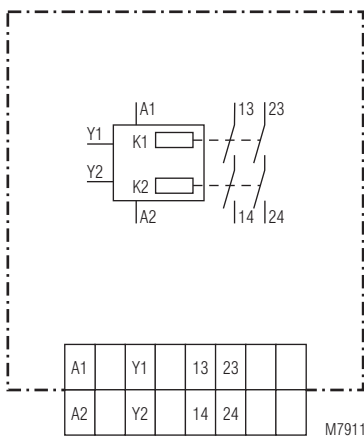
BG 5924.04/207



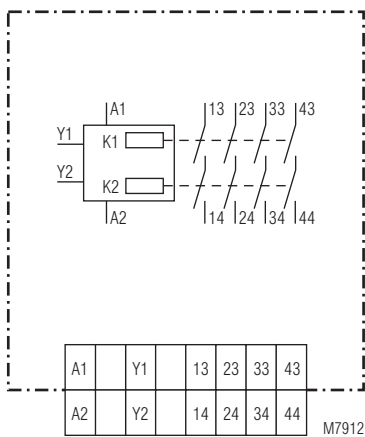
BG 5924.48



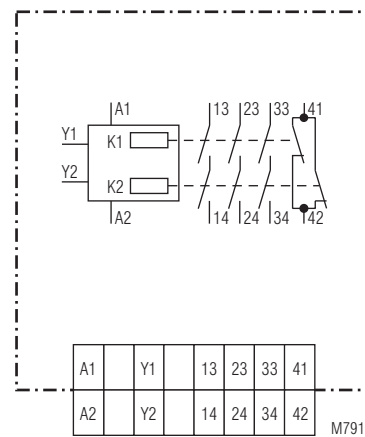
BG 5924.48/207



IP 5924.02



IP 5924.04



IP 5924.48

Connection Terminals

| Terminal designation | Signal designation |
|--------------------------------|---|
| A1(+) | + / L |
| A2 (-) | - / N |
| S12, S22, S33, S34 | Inputs |
| 13, 14, 23, 24, 33, 34, 43, 44 | Forcibly guided NO contacts for release circuit |
| 41, 42 | Forcibly guided indicator output |

Technical Data

Input

| | |
|---|---|
| Nominal voltage U_N: BG 5924: | DC 24 V (only for variant /110) AC/DC 24, 48 V AC 110, 115, 230 V |
| IP 5924: | AC/DC 24, 48 V AC 110, 230 V |
| Nominal frequency: | 50 / 60 Hz |
| Voltage range: at 10 % residual ripple: at 48 % residual ripple: | AC 0.8 ... 1.1 U_N DC 0.9 ... 1.1 U_N DC 0.8 ... 1.1 U_N |
| Nominal consumption AC/DC 24 V: AC 230 V: | DC 1.2 W AC 2 VA 3.5 VA |
| Control voltage on Y1 AC/DC 24 V: AC 230 V: | typ. DC 23 V max. 45 V short pulse |
| Control current: | typ. DC 45 mA |
| Recovery time: | 0.5 s |

Output

Contacts

| | |
|-------------------------|---------------------|
| BG 5924.02, IP 5924.02: | 2 NO contacts |
| BG 5924.04, IP 5924.04: | 4 NO contacts |
| BG 5924.48, IP 5924.48: | 3 NO, 1 NC contacts |

The NO contacts are safety contacts.

ATTENTION! The NC contacts 41-42 can only be used for monitoring.

| | |
|---|--|
| Operate delay: | max. 100 ms |
| Release delay: | max. 35 ms |
| Contact type: | forcibly guided |
| Thermal current I_{th}: | max. 5 A (see limit curve) |
| Nominal output voltage: | AC 250 V |
| Switching capacity to AC 15 | |
| NO contact: | 3 A / AC 230 V IEC/EN 60 947-5-1 |
| NC contact: to DC 13 | 2 A / AC 230 V IEC/EN 60 947-5-1 |
| NO contact: | 1 A / DC 24 V IEC/EN 60 947-5-1 |
| NC contact: to DC 13 | 1 A / DC 24 V IEC/EN 60 947-5-1 |
| NO contact: | 4 A / 24 V at 0.1 Hz |
| NC contact: | 4 A / 24 V at 0.1 Hz |
| Electrical life to AC 15 at 2 A, AC 230 V: | 10 ⁵ switching cycles IEC/EN 60 947-5-1 |
| Permissible operating frequency: | 600 switching cycles / h |
| Short circuit strength max. fuse rating: line circuit breaker: | 4 A gL IEC/EN 60 947-5-1 C 8 A |
| Mechanical life: | 10 x 10 ⁶ switching cycles |

General Data

| | |
|--|--|
| Operating mode: | Continuous operation |
| Temperature range operation: storage : | - 15 ... + 55 °C - 25 ... + 85 °C |
| altitude: | < 2.000 m |
| Clearance and creepage distances rated impuls voltage / pollution degree | 4 kV / 2 (basis insulation) IEC 60 664-1 |
| EMC Electrostatic discharge: HF irradiation: Fast transients: Surge voltages between wires for power supply: between wire and ground: HF wire guided: Interference suppression | 8 kV (air) IEC/EN 61 000-4-2 10 V / m IEC/EN 61 000-4-3 2 kV IEC/EN 61 000-4-4 1 kV IEC/EN 61 000-4-5 2 kV IEC/EN 61 000-4-5 10 V IEC/EN 61 000-4-6 Limit value class B EN 55011 |
| Degree of protection Housing: Terminals: | IP 40 IEC/EN 60 529 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 |

Technical Data

| | | |
|--|---|-----------------|
| Climate resistance: | 15 / 055 / 04 | IEC/EN 60 068-1 |
| Terminal designation: | EN 50 005 | |
| Wire connection: BG 5924: | 1 x 4 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 stranded ferruled DIN 46 228-1/-2/-3 | |
| IP 5924: | 2 x 2.5 mm ² solid or 2 x 1.5 mm ² stranded ferruled DIN 46 228-1/-2/-3/-4 | |
| Wire fixing: | Box terminal with wire protection, removable terminal strips DIN rail | IEC/EN 60 715 |
| Mounting: | | |
| Weight: BG 5924: IP 5924: | 210 g 206 g | |

Dimensions

Width x height x depth:

| | |
|----------|--------------------|
| BG 5924: | 22.5 x 84 x 121 mm |
| IP 5924: | 70 x 90 x 59 mm |

Safety Related Data

Values according to EN ISO 13849-1:

| | | |
|--------------------------|-------------|-----------------------|
| Category: | 3 | |
| PL: | d | |
| MTTF _d : | 180.3 | a |
| DC / DC _{avg} : | 99.0 | % |
| d _{op} : | 365 | d/a (days/year) |
| h _{op} : | 24 | h/d (hours/day) |
| t _{Zyklus} : | 3600 ≅ 1 | s/Zyklus /h (hour) |

Values according to IEC/EN 62061 / IEC/EN 61508:

| | | |
|--------------------------|-------------------------|--------------|
| SIL CL: | 2 | IEC/EN 62061 |
| SIL | 2 | IEC/EN 61508 |
| HFT: | 1 | |
| DC / DC _{avg} : | 99.0 | % |
| SFF | 99.7 | % |
| PFH _D : | 2,60E-10h ⁻¹ | |
| T _i : | 20 | a (year) |

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.

UL-Data

The safety functions were not evaluated by UL. Listing is accomplished according to requirements of Standard UL 508, "general use applications"

Nominal voltage U_N : AC/DC 24 V

Ambient temperature: -15 ... +55°C

Switching capacity:

NO contact: Pilot duty B300
5A 250Vac G.P.
5A 24Vdc

NC contact:: 5A 250Vac G.P.
5A 24Vdc

Wire connection: 60°C / 75°C copper conductors only
AWG 20 - 12 Sol Torque 0.8 Nm
AWG 20 - 14 Str Torque 0.8 Nm



Technical data that is not stated in the UL-Data, can be found in the technical data section.

CSA-Data

Nominal voltage U_N : AC/DC 24, AC/DC48V, AC110V, AC230V

Ambient temperature: -15 ... +55°C

Switching capacity: 3A 240Vac

Wire connection: 60°C / 75°C copper conductors only
AWG 20 - 12 Sol Torque 0.8 Nm
AWG 20 - 14 Str Torque 0.8 Nm



Technical data that is not stated in the CSA-Data, can be found in the technical data section.

Standard Type

BG 5924.48 AC/DC 24 V

Article number: 0050982
• Output: 3 NO, 1 NC contacts
• Nominal voltage U_N : AC/DC 24 V
• Width: 22.5 mm

IP 5924.48 AC/DC 24 V 50/60 Hz

Article number: 0053262
• Output: 3 NO, 1 NC contacts
• Nominal voltage U_N : AC/DC 24 V
• Width: 70 mm

Variants

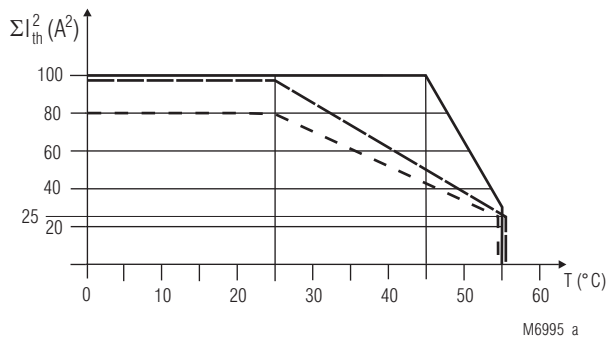
BG 5924.../60: with CSA approval
BG 5924.../61: with UL approval
BG 5924.../100: with fast auto-start
BG 5924.../110: voltage range with expandable tolerance 0.85 ... 1.15 U_N
BG 5924.../207: special terminal arrangement, (see Circuit Diagrams), for AC/DC 24 V or AC 230 V

Ordering example for Variant

BG 5924 .48 / - - AC/DC 24 V
Nominal voltage
Variant, if required
Contact
Type

IP 5924 .48 AC 230 V
Nominal voltage
Contact
Type

Characteristics



— AC / DC 24 V device mounted on distance with aircondition
- - - AC 230 V device mounted on distance with aircondition
- · - AC / DC 24 V und AC 230 V device mounted without distances heated by devices with same load

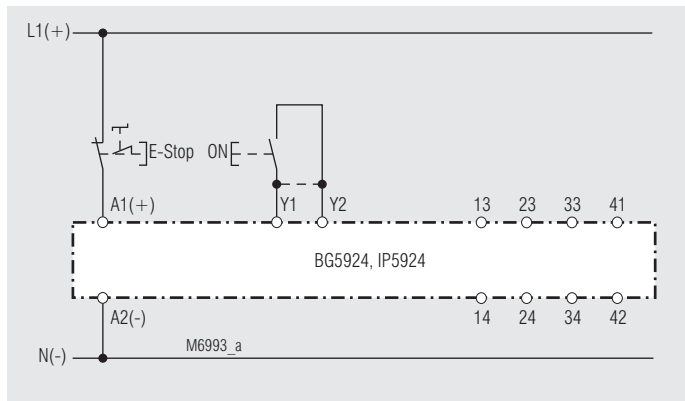
quadratic total current

$$\Sigma I_{th}^2 = I_{th1}^2 + I_{th2}^2 + I_{th3}^2 + I_{th4}^2$$

$I_{th1}, I_{th2}, I_{th3}, I_{th4}$: thermal current I_{th} on contact rows

Total current limit curve

Application Examples

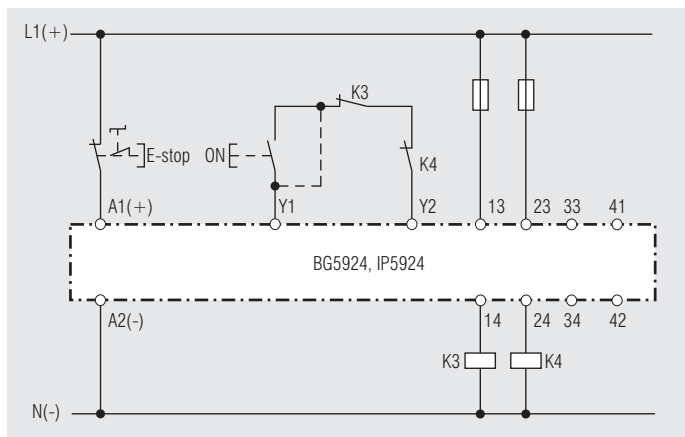


Single channel emergency-stop circuit without feed back loop, with or without automatic restart.

For automatic restart terminals Y1-Y2 must be linked.

No ON-push button necessary.

Suited up to SIL2, Performance Level d, Cat. 3



Contact reinforcement by external contactors, 2-channel controlled. For currents > 5 A the output contacts can be reinforced by external contactors. Functioning of the external contactors is monitored by looping the NC contacts into the start circuit (Y1-Y2).

Suited up to SIL2, Performance Level d, Cat. 3