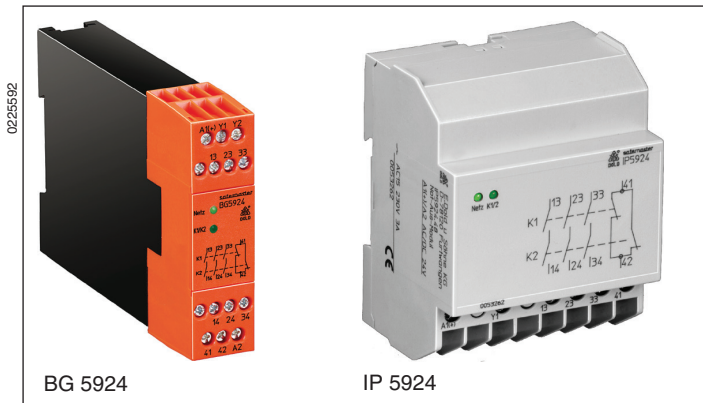


SAFEMASTER Emergency Stop Module BG 5924, IP 5924



Your Advantages

- For safety application up to PL e / Cat. 4 e.g. SIL 3
- Manual or automatic start

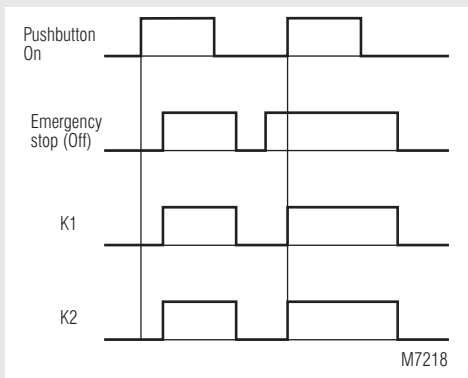
Features

- **According to**
 - Performance Level (PL) e and category 4 to EN ISO 13849-1
 - SIL Claimed Level (SIL CL) 3 to IEC/EN 62061
 - Safety Integrity Level (SIL) 3 to IEC/EN 61508
- According to EN 50156-1 for furnaces
- Single channel or two-channel operation
- Output: max. 4 NO contacts
- AC 230 V model with galvanic separation
- 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

Product Description

The emergency stop modules BG 5924 and IP 5924 can be used to protect people and machines by interrupting a safety circuit in a safe way.

Function Diagram



Approvals and Markings



* see variants

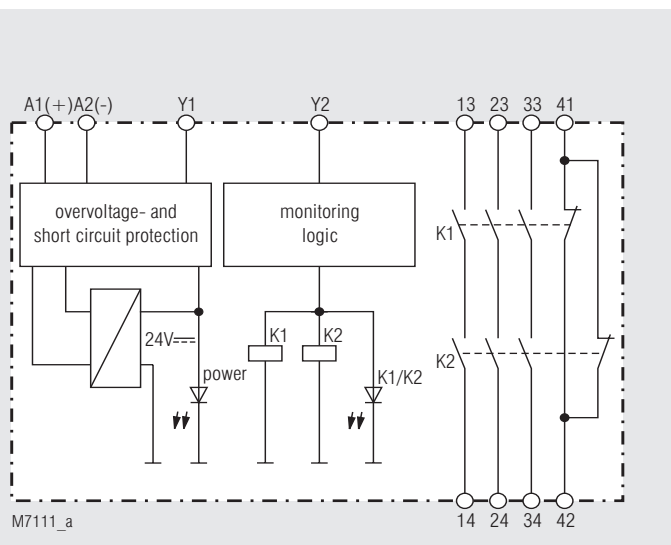
Applications

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

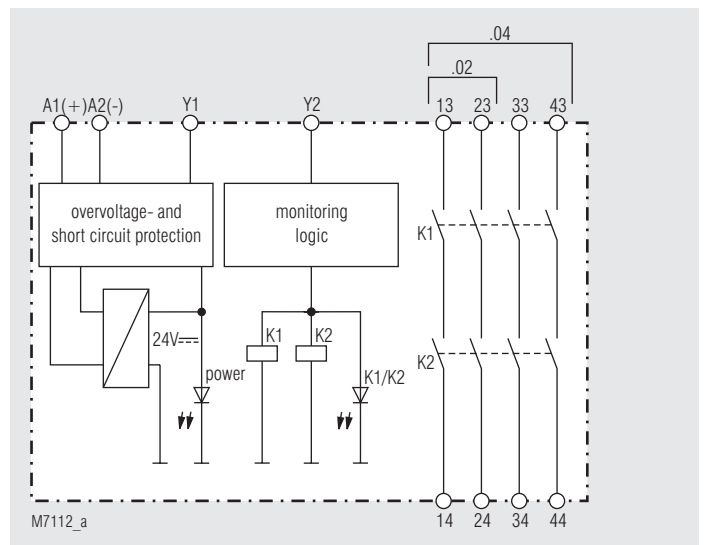
Indicators

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

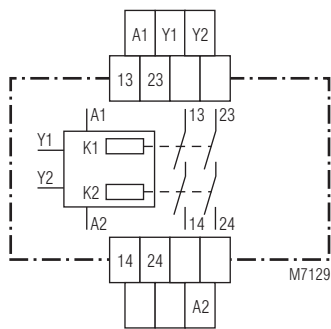
Block Diagrams



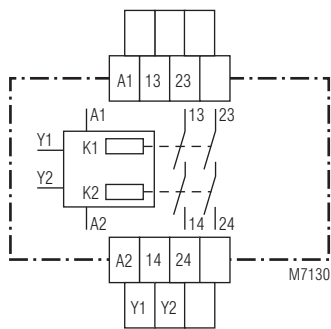
BG 5924.48, BG 5924.48/207, IP 5924.48



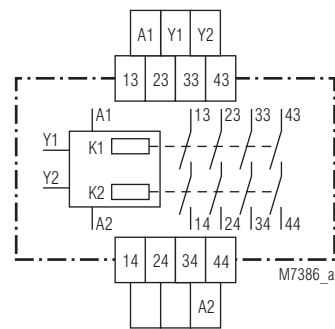
BG 5924.02, BG 5924.02/110, BG 5924.02/207,
BG 5924.04, BG 5924.04/100, BG 5924.04/207,
IP 5924.02, IP 5924.04



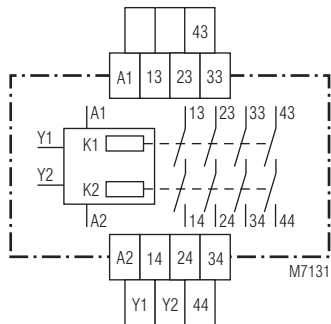
BG 5924.02, BG 5924.02/110



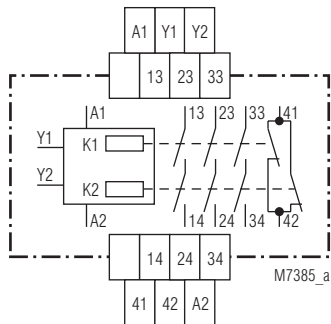
BG 5924.02/207



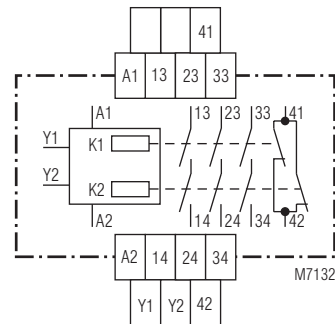
BG 5924.04, BG 5924.04/100



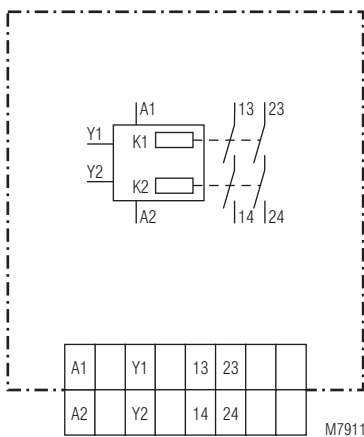
BG 5924.04/207



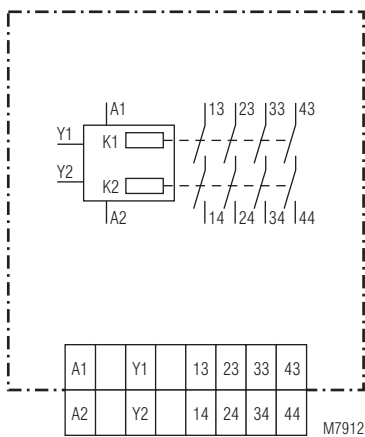
BG 5924.48



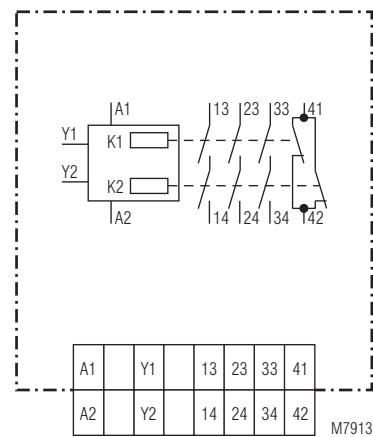
BG 5924.48/207



IP 5924.02



IP 5924.04



IP 5924.48

Connection Terminals

Terminal designation	Signal designation
A1(+)	+ / L
A2 (-)	- / N
Y1, Y2	Inputs
13, 14, 23, 24, 33, 34, 43, 44	Forcibly guided NO contacts for release circuit
41, 42	Forcibly guided indicator output

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.

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 :	- 25 ... + 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 Interference suppression	IEC/EN 62 061 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
Climate resistance:	25 / 055 / 04 IEC/EN 60 068-1

Technical Data

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
Fixing torque:	0.8 Nm
Mounting:	DIN rail IEC/EN 60 715
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:	4
PL:	e
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 s/Zyklus ≅ 1 /h (hour)

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

SIL CL:	3 IEC/EN 62061
SIL	3 IEC/EN 61508
HFT:	1
DC / DC _{avg} :	99.0 %
SFF	99.7 %
PFH _D :	2,80E-10h ⁻¹
T _i :	20 a (year)

^{*)} 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 230Vac

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 Types

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

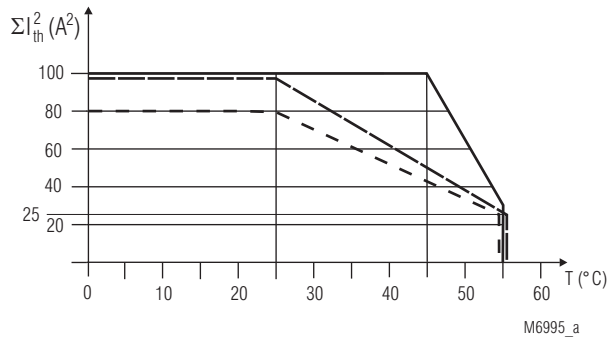
IP 5924 .48 AC 230 V

_____ 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

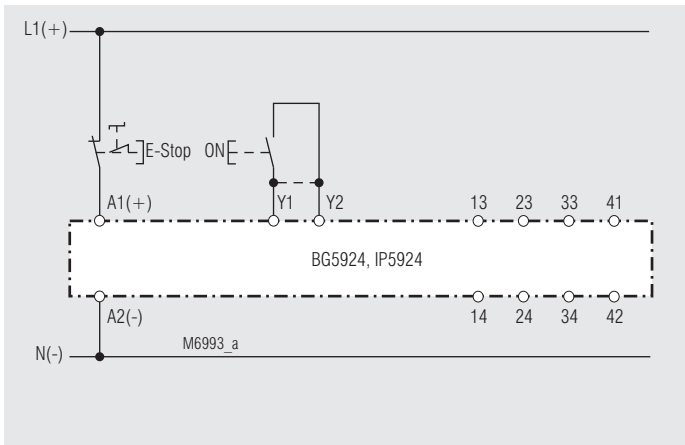
quadratic total current

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

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

Total current limit curve

Application Examples

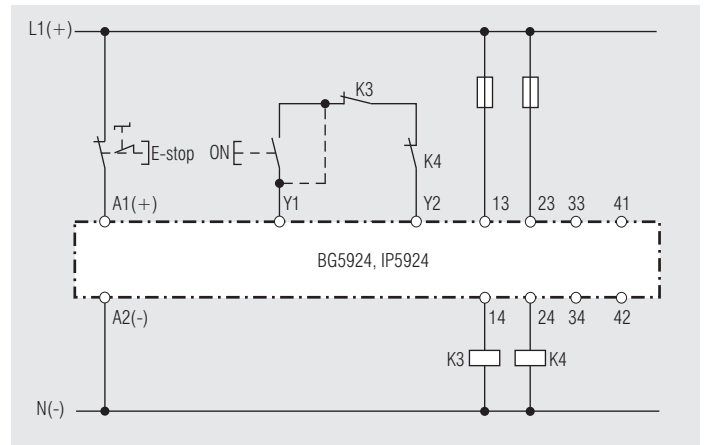


Single channel emergency-stop circuit without feed back loop, with or without automatic restart.

For automatic restart terminals Y1-Y2 must be linked.

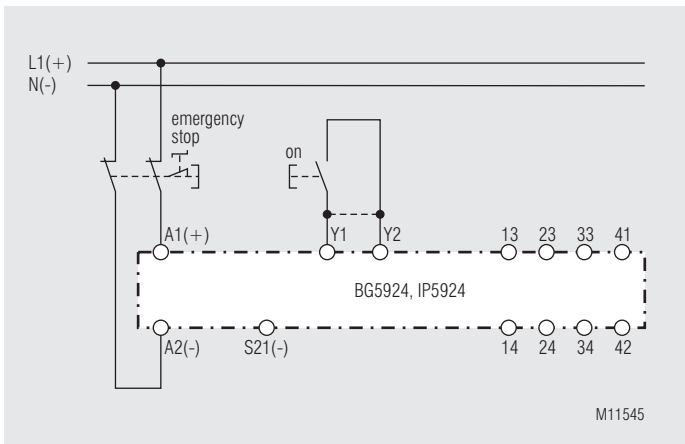
No ON-push button necessary.

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*



Two-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 SIL3, Performance Level e, Cat. 4

* Suited up to SIL3, Performance Level e, Cat. 4 for E-stop systems according to IEC 60947-5-5, under the following conditions:

- A maximum number of operations for the E-stop button is observed
- The E-stop button and the E-stop module are installed in the same cabinet

