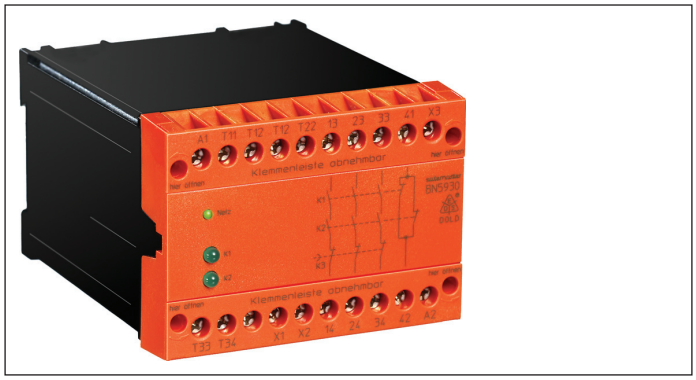
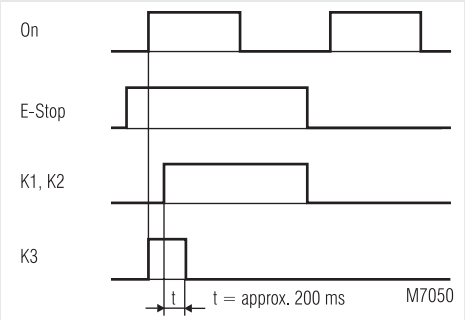
SAFEMASTER
Emergency Stop Module
BN 5930.48/203, BN 5930.48/204

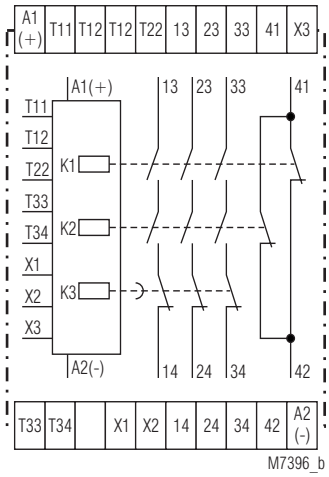
0221559



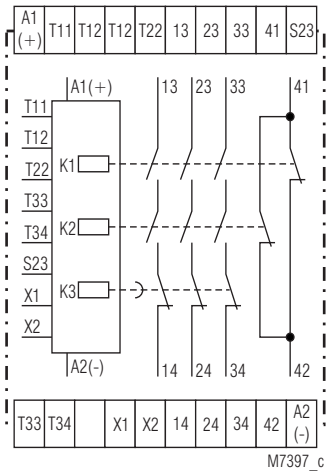
Function Diagram



Circuit Diagrams



BN 5930.48/203



BN 5930.48/204

- **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**
  - **Category 4 to EN 954-1**
- BN 5930.48/203 with cross fault detection by connecting 2 different phases, max. 400 V, BN 5930.48/204 with cross fault detection by connecting phase and neutral, max. 230 V
- Dual voltage version
- Emergency-stop circuit T12, T22: optionally for AC 110 V / DC 60 V or AC 230 V / DC 110 V
- Output: 3 NO, 1 NC contacts for AC 400 V
- 1-channel or 2-channel circuit
- LED displays for channel 1, 2 and mains
- Feedback circuit X1 - X2 for monitoring external contactors
- Removable terminal strips
- Width 100 mm

Approvals and Marking

CE

Applications

Protection of persons and machines
- Emergency stop circuits on machines
- Monitoring safety gates

Indication

LED power supply:	on when operating voltage present
LED K1:	on when supply on relay K1
LED K2:	on when supply on relay K2

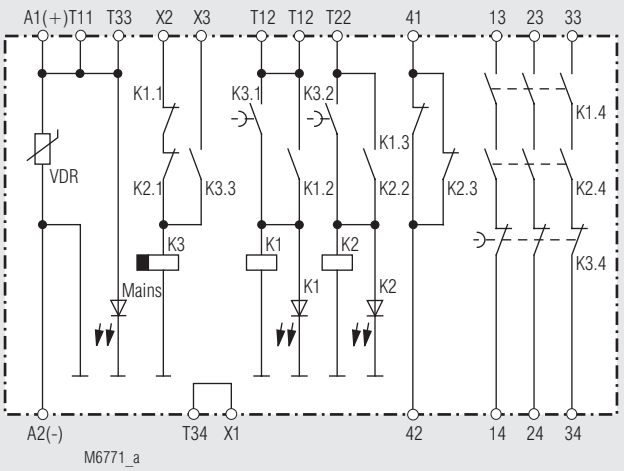
Notes

One or more BN3081 extension modules or external contators with positively driven contacts can be used for contact multiplication of the emergency stop module BN 5930.

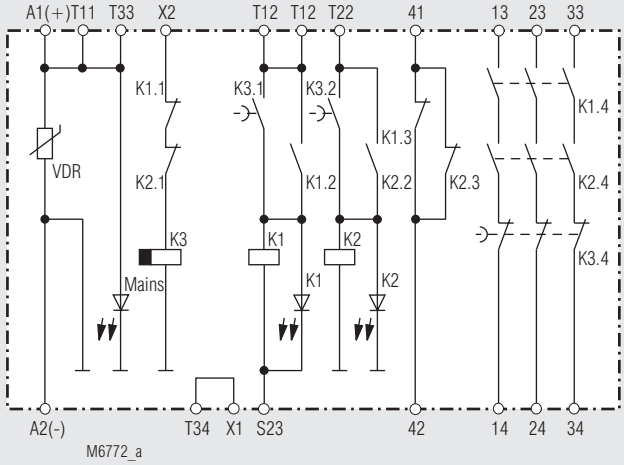
ATTENTION - AUTOMATIC START!

According to IEC/EN 60 204-1 part 9.2.5.4.2 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



BN 5930.48/203



BN 5930.48/204 (with cross fault detection)

Technical Data

Input

Nominal voltage U_N:	AC 110 V* / DC 60 V* or AC 230 V* / DC 110 V* over terminal A1 - A2 other voltages on request
Voltage range:	AC 0.85 ... 1.1 U_N
at 10% residual ripple:	DC 0.9 ... 1.1 U_N
at 48% residual ripple:	DC 0.85 ... 1.1 U_N
Nominal consumption:	approx. 3.9 VA at AC 230 V
Nominal frequency:	50 / 60 Hz
Control voltage T12, T22:	same as nominal voltage
Control current:	approx. 12 mA for K1 and K2 at AC 230 V
Fusing of the device:	internal with PTC

Output

Contacts		
BN 5930.48:	3 NO, 1 NC contacts The contacts 13...33 / 14...34 are safety contacts. **ATTENTION! The contact 41-42 can only be used for monitoring.**	
Response / release time of K1 and K2:	35 ms / 35 ms	
Release delay of K3:	approx. 250 ms	
Contact type:	relay, forcibly guided	
Output nominal voltage:	AC 400 V / DC 230 V	
Thermal current I_{th}:	see continuous current limit curve (max. 10 A in one contact path)	
Switching capacity		
to AC 15:		
NO contact:	5 A / AC 230 V	IEC/EN 60 947-5-1
NC contact:	2 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13:		
NO contact:	4 A / DC 24 V	IEC/EN 60 947-5-1
NC contact:	4 A / DC 24 V	IEC/EN 60 947-5-1
Electrical life:		
to AC 15 at 2 A, AC 230 V	10^5 switching cycles	IEC/EN 60 947-5-1
Permissible switching frequency:	6000 switching cycles / h	
Short circuit strength		
max. fuse rating:	6 A gL	IEC/EN 60 947-5-1
max. line circuit breaker:	C 10 A	
Mechanical life:	10 x 10^6 switching cycles	

General Data

Operating mode:	Continuous operation	
Temperature range		
operation:	- 15 ... + 55°C at max. 90 % air humidity	
storage :	- 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

Technical Data

EMC		
Electrostatic discharge:	8 kV (air)	IEC/EN 61 000-4-2
HF irradiation:	10 V / m	IEC/EN 61 000-4-3
Fast transients:	2 kV	IEC/EN 61 000-4-4
Surge voltages		
between		
wires for power supply:	1 kV	IEC/EN 61 000-4-5
between wire and ground:	2 kV	IEC/EN 61 000-4-5
Interference suppression:	Limit value class B	EN 55 011
Degree of protection:	Housing: IP 40	IEC/EN 60 529
	Terminals: IP 20	IEC/EN 60 529
Housing:	Thermoplast 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:	15 / 055 / 04	IEC/EN 60 068-1
Terminal designation:	EN 50 005	
Wire connection:	2 x 2.5 mm² solid or 2 x 1.5 mm² stranded ferruled DIN 46 228-1/-2/-3/-4	
Wire fixing:	Flat terminals with self-lifting clamping piece Removable terminal strip	IEC/EN 60 999-1
Mounting:	DIN rail	IEC/EN 60 715
Weight:	590 g	

Dimensions

Width x heigth x depth:	100 x 74 x 121 mm

Safety Related Data

Values according to EN ISO 13849-1:		
Category:	4	
PL:	e	
$MTTF_d$:	> 100	a (year)
DC_{avg}:	99.0	%
d_{op}:	365	d/a (days/year)
h_{op}:	24	h/d (hours/day)
t_{Zyklus}:	2.60E+06	s/Zyklus
	≙ 1	/mth (month)

Values according to IEC/EN 62061 / IEC/EN 61508:		
SIL CL:	3	IEC/EN 62061
SIL	3	IEC/EN 61508
HFT*):	1	
DC_{avg}:	99.0	%
SFF	99.8	%
PFH_D:	2.75E-10	h^{-1}
T_1:	20	a (year)

*) HFT = Hardware-Failure Tolerance

Info 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.

Standard Type

BN 5930.48/204 AC 230 V 50/60 Hz
Article number: 0045350

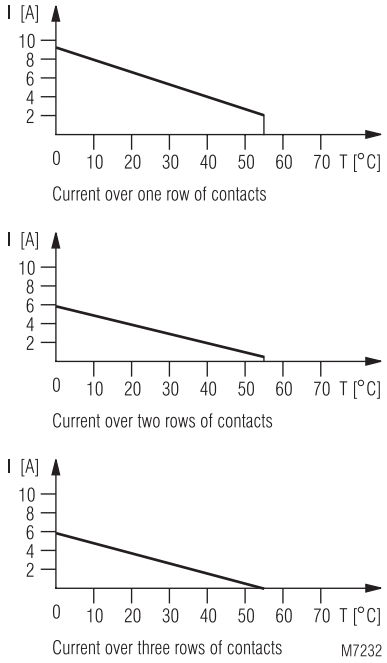
- With cross fault detection
  by connecting to phase and neutral, max. 230 V
- Output:3 NO, 1 NC contacts
- Nominal voltage U_N: AC 230 V / DC 110 V
- Width: 100 mm

Ordering Example

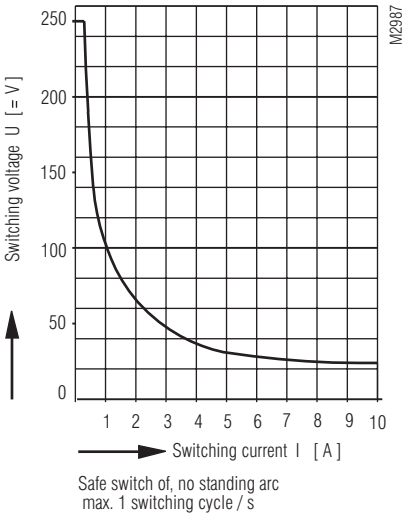
BN 5930 .48 /_ _ _ AC 230 V 50/60 Hz

- 50/60 Hz — Nominal frequency
- AC 230 V — Nominal voltage
- /_ _ _ — Variant, if required
- .48 — Contacts
- BN 5930 — Type

Characteristics

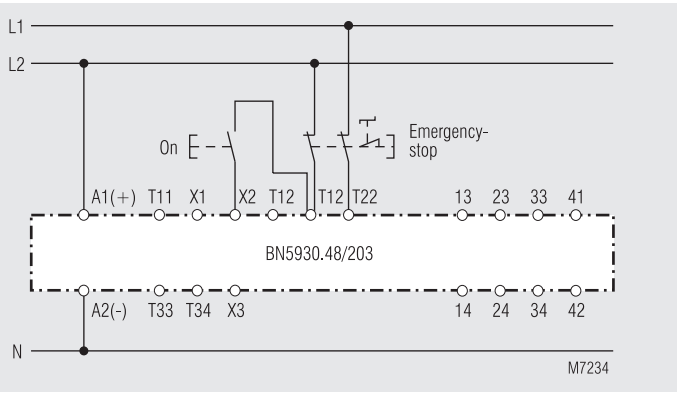


Continuous current limit curves depend on the ambient temperature

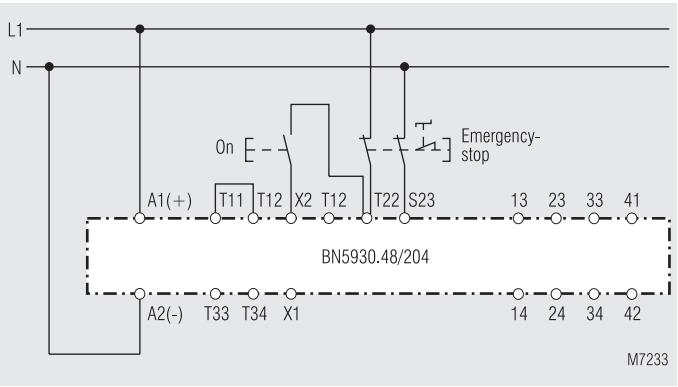


Limit curve for arc-free operation

Application Examples



Two-channel emergency stop circuit. "Emergency stop" connected at two different phases, thereby giving "Cross fault detection".
Suited up to SIL3, Performance Level e, Cat. 4



Two-channel emergency stop circuit with "Cross fault detection" in the alternating current network.
Suited up to SIL3, Performance Level e, Cat. 4