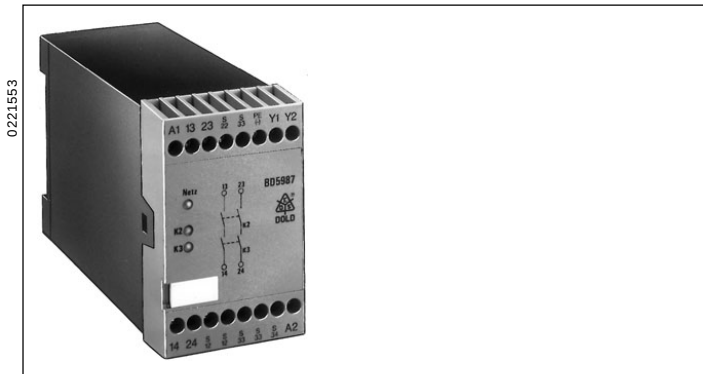
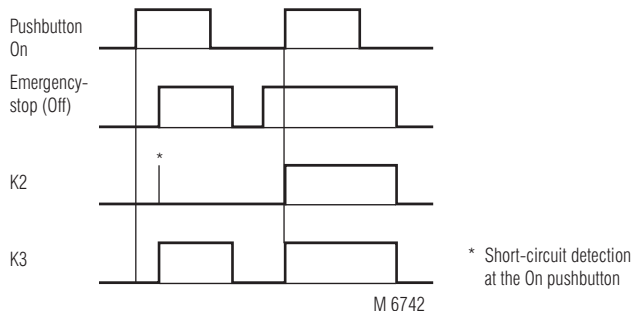




BD 5987.02:

- According to EC Directive for machines 98/37/EG
- According to IEC/EN 60204-1
- Safety category 4 according to EN 954-1
- Output: 2 NO contacts for AC 250 V
- Gold-plated contacts to switch small loads (input for PLC)
- 1-channel or 2-channel connection
- Line fault detection at On pushbutton
- Operating state display
- LED displays for channels 1 and 2
- Overvoltage and short circuit protection
- 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
- Width 45 mm

Function diagram



BD 5987.--/001: as BD 5987.02 but

- Optionally automatic On function when operating voltage is applied or after activation by the On pushbutton
- Optionally cross fault detection in emergency stop circuit

Approvals and marking



* see variants

Applications

Protection of people and machines

- Emergency stop circuits on machines
- Monitoring of safety gates

Indication

LED power supply:	on when operating voltage present
LED K2:	on when supply on K2
LED K3:	on when supply on K3

Notes

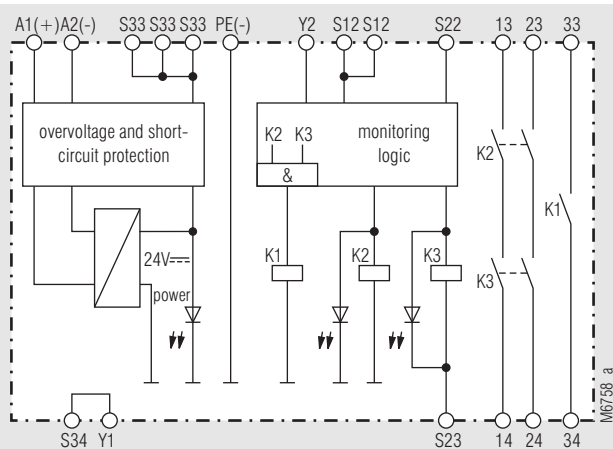
Line fault detection at the On pushbutton:

The output contacts cannot be closed if the On pushbutton is already closed before the voltage is applied to S12, S22 (also in the event of a line fault at the On pushbutton).

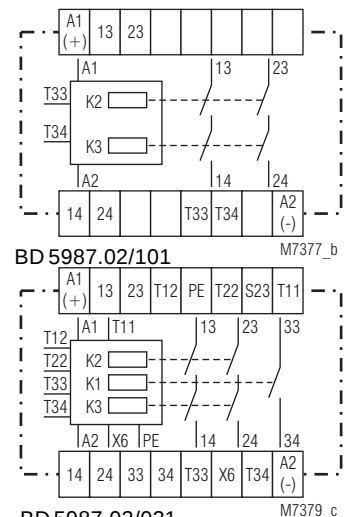
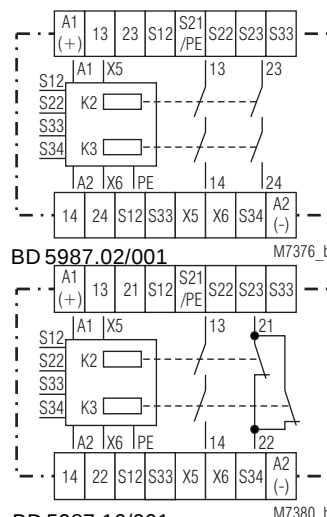
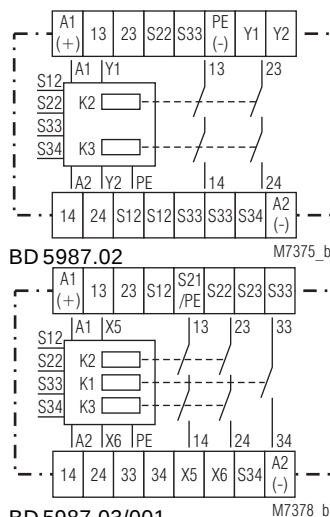
A line fault at the On pushbutton which occurs after activation of the device is recognized when switching-on takes place again and closing of the output contacts is then prevented.

If a line fault occurs at the On pushbutton after the voltage is already present at S12, S22 undesired activation will take place, because this line fault does not differ from the normal closing function.

Block diagram



Circuit diagrams



BD 5987.03/001

BD 5987.16/001

BD 5987.03/021

Notes

The gold-plated contacts of the BD 5987 mean that this module is also suitable for switching small loads of 1 mVA ... 7 VA, 1 mW ... 7 W in the range 0,1 ... 60 V, 1 ... 300 mA. The contacts also permit the maximum switching current. However, since the gold plating will be burnt off at this current level, the device is no longer suitable for switching small loads after this.

The PE terminal permits operation of the device in IT systems with insulation monitoring and also serves as a reference point for testing the control voltage. The internal short-circuit protection will be bridged on DC devices, if the protective ground is connected to terminal PE.

One or more extension modules BN 5989 or external contactors with positively-driven contacts may be used to multiply the number of contacts of the emergency stop module BD 5987.

For automatic restart:

S22 must be connected before S12. S12 initiates the automatic restart.

With manual restart it is not necessary to follow this order.

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.

Technical data

Input

Nominal voltage U_N:	AC 24, 48, 110, 127, 230, 240 V DC 24 V
Voltage range:	AC 0,8 ... 1,1 U_N DC 0,9 ... 1,2 U_N
at 10% residual ripple:	DC 0,9 ... 1,2 U_N
at 48% residual ripple:	DC 0,8 ... 1,1 U_N
Nominal consumption:	approx. 5,5 VA
Nominal frequency:	50 / 60 Hz
Control voltage at S33:	DC 24 V
Control current	
BD 5987.02:	typ. DC 55 mA
BD 5987.02/001:	typ. DC 45 mA
Minimum voltage at terminals S12, S22:	DC 21 V with activated device
Recovery time:	0,5 s after release of the emergency stop pushbutton

Output

Contacts	
BD 5987.02:	2 NO contacts
BD 5987.16:	1 NO contact, 1 NC contact
	The NO contacts are safety contacts.
	ATTENTION! The NC contacts 21-22 and the NO contact 33-34 can only be used for monitoring.
Operate time:	max. 100 ms
BD 5987.02/001:	with automatic restart approx. 1 s
Release time	
Opening in secondary circuit (S12-S22):	50 ms $\pm$ 25 %
Opening in supply circuit	
BD 5987.02:	350 ms $\pm$ 50 %
BD 5987.02/001:	120 ms $\pm$ 50 %
Contact type:	relay, positively-driven
Nominal output voltage:	AC 250 V DC: see limit curve for arc-free operation
Thermal current I_m:	see continuous current limit curve (max. 10 A in one contact path)
Switching capacity	
to AC 15:	5 A / AC 230 V IEC/EN 60 947-5-1 for NO contact 2 A / AC 230 V IEC/EN 60 947-5-1 for NC contact
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:	6 A gL IEC/EN 60 947-5-1

Technical data

Mechanical life:	10 x 10 ⁶ switching cycles
General data	
Operating mode:	Continuous operation
Temperature range:	- 15 ... + 55°C at max. 90 % humidity
Clearance and creepage distances	
overvoltage category / contamination level:	4 kV / 2 IEC 60 664-1
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:	Thermoplastic with V0 behaviour according to UL subject 94
Vibration resistance:	Amplitude 0,35 mm IEC/EN 60 068-2-6 frequency 10 ... 55 Hz
Climate resistance:	15 / 055 / 04 IEC/EN 60 068-1
Terminal designation:	EN 50 005
Wire connection:	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
Wire fixing:	Plus-minus terminal screws M3.5 box terminal with wire protection
Mounting:	DIN rail IEC/EN 60 715
Weight:	450 g

Dimensions

Width x height x depth:	45 x 74 x 121 mm
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Standard type

BD 5987.02/001	DC 24 V	
Article number:	0040954	stock item
• Output:	2 NO contacts	
• Optionally automatic On function when operating voltage is applied or after activation by the On pushbutton		
• Nominal voltage U_N :	DC 24 V	
• Width 45 mm		

Variants

BD 5987.02/60: with CSA approval
BD 5987.02/61: with UL approval (Canada/USA)
BD 5987.02/001: Optionally cross fault monitoring on the emergency stop loop (see application M6749)

Jumper assignment for functions:

Activation via On pushbutton / or automatic On function

On pushbutton S12-S34 or S33-S34	Jumper X5 - X6	Function
		The output contacts are switched only after operation of the On push-button. Line fault monitoring at the On push-button.
		Automatic On function for operating voltage Off/On or after emergency-stop release

BD 5987.03/001: with 2 NO contacts,
1 signalling contact AC/DC 0,1 ... 1 A / 10 ... 120 V
BD 5987.16/001: with 1 NO contact, 1 NC contact
BD 5987.02/101: see BD 5987.02/001,
but with special terminal arrangement
BD 5987.03/201: see BD 5987.03/001,
but with special terminal designation

Jumper assignment for functions:

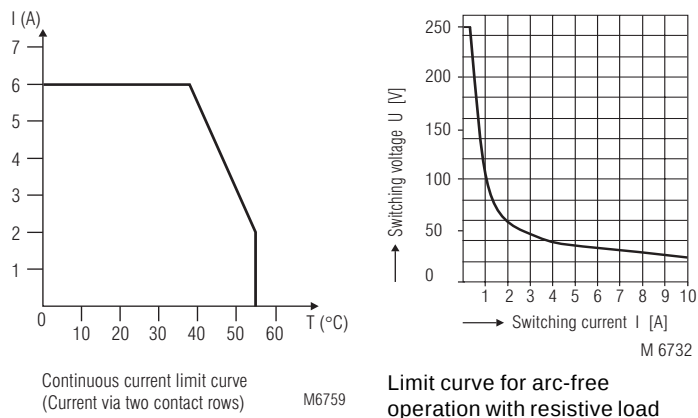
Activation via On pushbutton / or automatic On function

On pushbutton T11-T34 or T12-T34	Jumper T33-X6	Function
		The output contacts are switched only after operation of the On push-button. Line fault monitoring at the On push-button.
		Automatic On function for operating voltage Off/On or after emergency-stop release

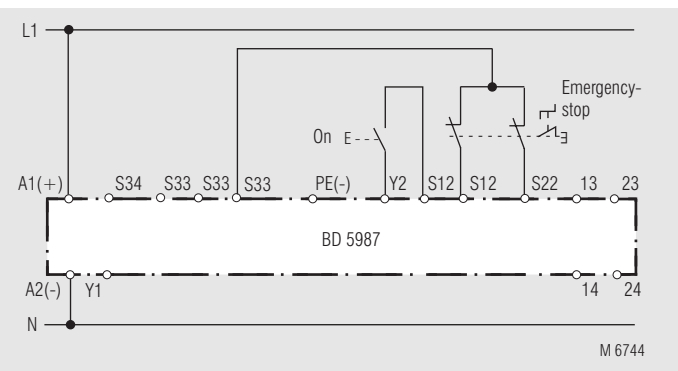
Ordering example for Variants

BD 5987 .02 / - AC 230 V 50/60 Hz
 ———— Nominal frequency
 ———— Nominal voltage
 ———— Variant, if required
 ———— Contacts
 ———— Type

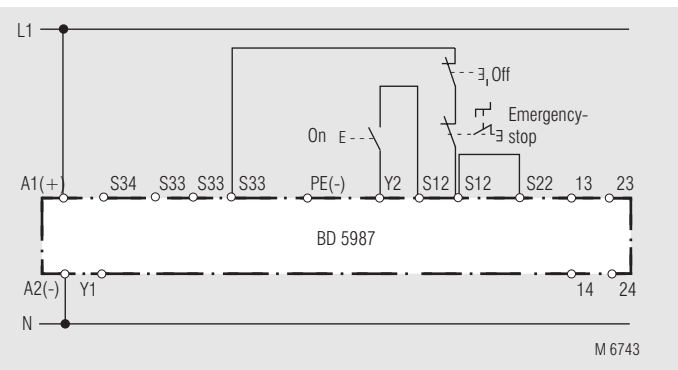
Characteristics



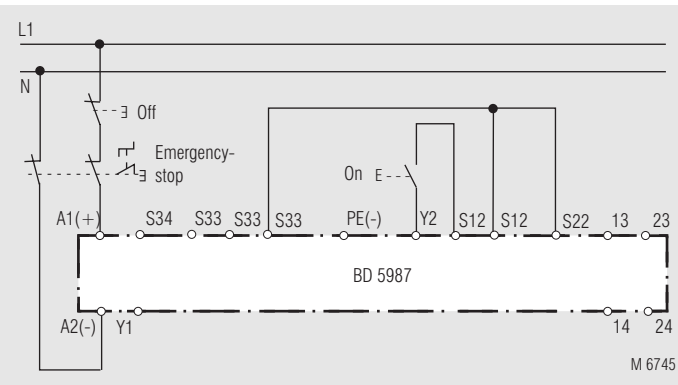
Application examples



Two-channel emergency stop circuit



One-channel emergency stop circuit. This circuit does not have any redundancy in the emergency stop control circuit

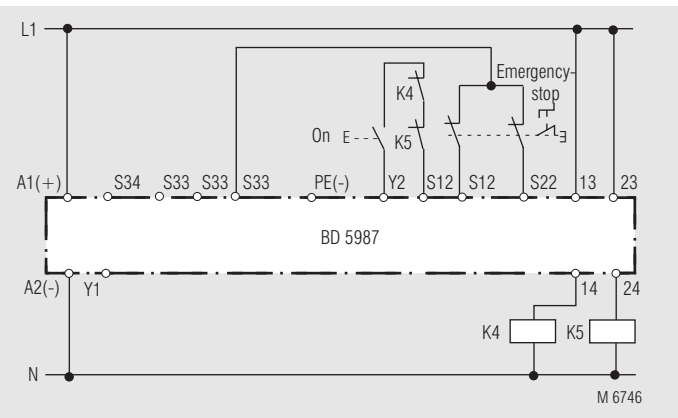


Two-pole emergency stop circuit with emergency stop control device in supply circuit.

Application for long emergency stop loops where the control voltage drops below the minimum voltage of 21 V.

Attention:

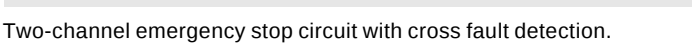
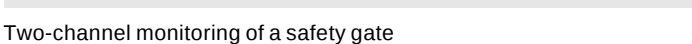
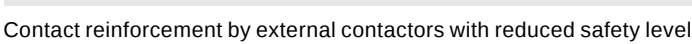
Single faults (e.g. line faults at the emergency stop control device) are not detected with this external circuit configuration



Contact reinforcement by external contactors, 2-channel.

The output contacts can be reinforced by external contactors with positively-driven contacts for switching currents > 10 A. Functioning of the external contactors is monitored by looping the NC contacts into the closing circuit (terminals Y2 - S12).

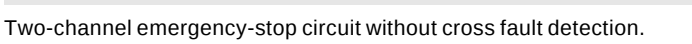
Application examples



Activation via On pushbutton. ---- Jumper X5 -X6:

Jumper X5 - X6 must be fitted for the automatic On function.

The On pushbutton is not required



Activation via On pushbutton. ---- Jumper X5 - X6:

Jumper X5 - X6 must be fitted for the automatic On function.

The On pushbutton is not required