



## SAFEMASTER Emergency Stop Module BN 5983

Translation  
of the original instructions

0262922

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Before installing, operating or maintaining this device, these instructions must be carefully read and understood.



The installation must only be done by a qualified electrician!



Do not dispose of household garbage!

The device must be disposed of in compliance with nationally applicable rules and requirements.



Storage for future reference!

To help you understand and find specific text passages and notes in the operating instructions, we have important information and information marked with symbols.

### Symbol and Notes Statement



#### DANGER:

Indicates that death or severe personal injury will result if proper precautions are not taken.



#### WARNING:

Indicates that death or severe personal injury can result if proper precautions are not taken.



#### CAUTION:

Indicates that a minor personal injury can result if proper precautions are not taken.



#### INFO:

Referred information to help you make best use of the product.



#### ATTENTION:

Warns against actions that can cause damage or malfunction of the device, the device environment or the hardware / software result.

### General Notes

The product hereby described was developed to perform safety functions as a part of a whole installation or machine. A complete safety system normally includes sensors, evaluation units, signals and logical modules for safe disconnections. The manufacturer of the installation or machine is responsible for ensuring proper functioning of the whole system. DOLD cannot guarantee all the specifications of an installation or machine that was not designed by DOLD. The total concept of the control system into which the device is integrated must be validated by the user. DOLD also takes over no liability for recommendations which are given or implied in the following description. The following description implies no modification of the general DOLD terms of delivery, warranty or liability claims.

### Designated Use

The BN 5983 is used to interrupt a safety circuit in a safe way. It can be used to protect people and machines in applications with e-stop buttons and safety gates.

When used in accordance with its intended purpose and following these operating instructions, this device presents no known residual risks. Non-observance may lead to personal injuries and damages to property.

### Safety Notes



#### Risk of electrocution!

WARNING Danger to life or risk of serious injuries.

- Disconnect the system and device from the power supply and ensure they remain disconnected during electrical installation.
- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- The contact protection of the elements connected and the insulation of the supply cables must be designed in accordance with the requirements in the operating instructions / data sheet.
- Note the VDE and local regulations, particularly those related to protective measures.



#### Risk of fire or other thermal hazards!

WARNING Danger to life, risk of serious injuries or property damage.

- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed. In particular, the current limit curve must be heeded.
- The device may only be installed and put into operation by experts who are familiar with this technical documentation and the applicable health and safety and accident prevention regulations.



#### Functional error!

WARNING Danger to life, risk of serious injuries or property damage.

- The device may only be used for the applications described in the mutually applicable operating instructions / data sheet. The notes in the respective documentation must be heeded. The permissible ambient conditions must be observed.
- The device may only be installed and put into operation by experts who are familiar with this technical documentation and the applicable health and safety and accident prevention regulations.
- The unit should be panel mounted in an enclosure rated at IP 54 or superior. Dust and dampness may lead to malfunction.



#### Installation fault!

WARNING Danger to life, risk of serious injuries or property damage.

- Make sure of sufficient protection circuitry at all output contacts for capacitive and inductive loads.



#### Attention!

- The safety function must be triggered during commissioning.
- 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.
- Opening the device or implementing unauthorized changes voids any warranty

# Safety Technique

## SAFEMASTER Emergency Stop Module BN 5983

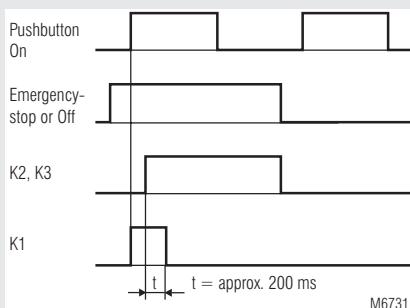
**DOLD** 

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- 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
- Output: 3 NO, 1 NC contacts for AC 400 V
- Optionally gold-plated contacts to switch small loads (input for PLC)
- 1-channel or 2-channel connection
- LED displays for channels 1 and 2
- Feedback circuit X3 - X4 for monitoring external contactors
- Removable terminal strips
- Overvoltage and short circuit protection
- Width 100 mm

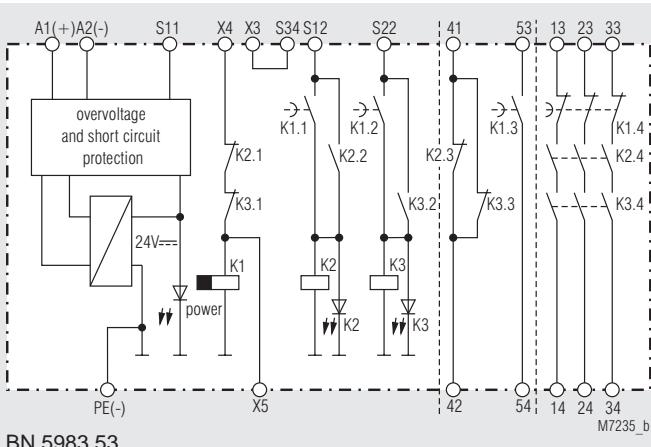
### Function Diagram



### Approvals and Markings



### Block Diagrams



### Applications

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

### Indicators

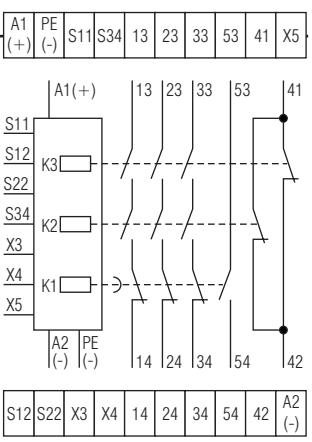
- LED power supply: on when operating voltage present  
LED S12 / K2: on when supply on relay K2  
LED S22 / K3: on when supply on relay K3

### Notes

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 3081 or external contactors with forcibly guided contacts may be used to multiply the number of contacts of the emergency-stop module BN 5983.

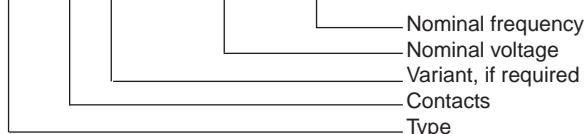
### Circuit Diagrams



BN 5983.53, \_/104, \_/110, \_/200

### Connection Terminals

Terminal designation	Signal designation
A1 (+)	+ / L
A2 (-)	- / N
S12, S22, S34, X3, X4, X5	Inputs
S11, PE(-)	Outputs
13, 14, 23, 24, 33, 34	Forcibly guided NO contacts for release circuit
41, 42, 53, 54	Forcibly guided indicator output

Technical Data		UL-Data	
<b>Input</b>			
<b>Nominal voltage <math>U_N</math>:</b>	AC 24, 42, 48, 110, 127, 230, 240 V DC 24, 48, 110 V	<b>Nominal voltage <math>U_N</math>:</b>	AC 110, 127, 230 V DC 24 V
<b>Voltage range:</b> at 10 % residual ripple: at 48 % residual ripple:	AC 0.8 ... 1.1 $U_N$ DC 0.9 ... 1.2 $U_N$ DC 0.8 ... 1.1 $U_N$	<b>Ambient temperature:</b>	- 15 ... + 55 °C
<b>Nominal consumption:</b>	5 VA ± 30 %	<b>Switching capacity:</b>	3 A, 250 Vac G.P.
<b>Nominal frequency:</b>	50 / 60 Hz	<b>Wire connection:</b>	60°C / 75°C copper conductors only AWG 16 - 14 Torque 7 lb in
<b>Control voltage S11:</b>	DC 24 V		
<b>Control current:</b>	max. DC 100 mA		
<b>Minimum voltage at terminals S12, S22:</b>	DC 21 V with activated device		
<b>Output</b>		 Technical data that is not stated in the UL-Data, can be found in the technical data section.	
<b>Contacts</b>		<b>CCC-Data</b>	
BN 5983.53:	3 NO, 1 NC contacts 1 delay-release NO contact (K1.3)	<b>Nominal voltage <math>U_N</math>:</b>	AC 24, 42, 48, 110, 127, 230 V DC 24, 48, 110 V
The NO contacts 13...33 / 14...34 are safety contacts. <b>The NC contact 41-42 and the NO contact 53-54 can only be used for monitoring.</b>		<b>Thermal current <math>I_{th}</math>:</b>	see continuous current limit curve (max. 5 A in one contact path)
<b>Operate time:</b>	35 ms		
<b>Release time</b> opening in secondary circuit (S12-S22):	30 ms ± 25 %		
opening in supply circuit:	100 ms ± 50 %		
<b>Release delay of K1:</b>	approx. 200 ms		
<b>Contact type:</b>	Relay, forcibly guided		
<b>Nominal output voltage:</b>	AC 400 V / DC 230 V		
<b>Thermal current <math>I_{th}</math>:</b>	see continuous current limit curve (max. 10 A in one contact path)		
<b>Switching capacity</b>		<b>Standard Type</b>	
to AC 15:		BN 5983.53 DC 24 V	
NO contacts :	5 A / AC 230 V	Article number:	0032155
NC contacts:	2 A / AC 230 V	• Output:	3 NO, 1 NC contacts
to DC 13:		• Nominal voltage $U_N$ :	DC 24 V
NO contacts :	4 A / DC 24 V	• Width:	100 mm
NC contacts:	4 A / DC 24 V		
<b>Electrical life</b> to AC 15 at 2 A, AC 230 V:	10 <sup>5</sup> switching cycles		
to DC 13 at 2 A, DC 24 V:	> 240 x 10 <sup>3</sup> switching cycles		
<b>Permissible operating frequency:</b>	IEC/EN 60 947-5-1		
<b>Short circuit strength</b> max. fuse rating	6 000 switching cycles / h		
NO contact:	10 A gL		
NC contact:	6 A gL		
<b>Mechanical life:</b>	IEC/EN 60 947-5-1		
10 x 10 <sup>6</sup> switching cycles			
<b>General Data</b>		<b>Variants</b>	
<b>Operating mode:</b>	Continuous operation	<b>BN 5983.53/104:</b>	For switching small loads of 1 mVA ... 7 VA or 1 mW ... 7 W in the ranges 0.1 ... 60 V and 1 ... 300 mA.
<b>Temperature range</b> operation:		The device is also suitable for switching the maximum switching current. However, this will burn off the gold plating of the contacts, so that switching of small loads is no longer possible afterwards.	
storage :	- 15 ... + 55°C	<b>BN 5983.53/110:</b>	To avoid latching problems in the case of short voltage drops K2 and K3 are switched definitely off before reset.
<b>altitude:</b>	at max. 90 % humidity	<b>BN 5983.53/200:</b>	Redundant switching off with device diversity. Device diversity means that safety relays from different production batches or from different manufacturers are used.
<b>Clearance and creepage distances</b> rated impuls voltage / pollution degree:	- 25 ... + 85 °C < 2.000 m		
<b>EMC</b> Interference suppression:	4 kV / 2 (basis insulation) IEC 60 664-1 IEC/EN 61 326-3-1, IEC/EN 62 061 Limit value class B EN 55 011		
<b>Degree of protection</b> Housing:	IP 40 IEC/EN 60 529		
Terminals:	IP 20 IEC/EN 60 529		
<b>Housing:</b>	Thermoplastic with V0 behaviour according to UL subject 94		
<b>Vibration resistance:</b>	Amplitude 0.35 mm IEC/EN 60 068-2-6 frequency: 10 ... 55 Hz		
<b>Climate resistance:</b>	15 / 055 / 04 IEC/EN 60 068-1		
<b>Terminal designation:</b>	EN 50 005		
<b>Wire fixing:</b>	Flat terminals with self-lifting clamping piece IEC/EN 60 999-1 Removable terminal strip		
<b>Mounting:</b>	DIN rail IEC/EN 60 715		
<b>Weight:</b>	840 g		
<b>Dimensions</b>		<b>Ordering example for Variants</b>	
Width x height x depth:	100 x 74 x 121 mm	BN 5983 .53 / _ _ _ AC 230 V 50/60 Hz	
			

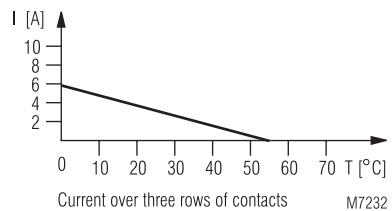
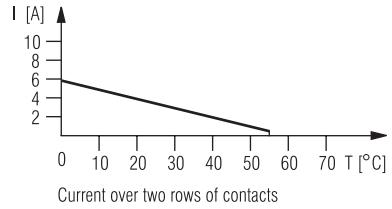
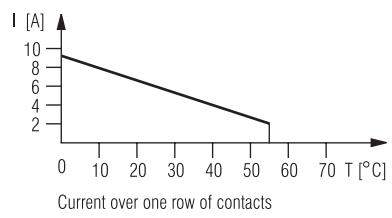
## Troubleshooting

Failure	Potential cause
LED "Power" does not light up	Power supply not connected
LED "S22/K3" lights up, but "S12/K2" remains off	- Safety relay K3 is welded (replace device) - A 1-channel switch-off occurred on S12 (switch channel off on S22)
LED "S12/K2" lights up, but "S22/K3" remains off	- Safety relay K2 is welded (replace device) - A 1-channel switch-off occurred on S22 (switch channel off on S12)
Device cannot be activated	- Safety relay is welded (replace device) - Safety relay K1 via X5 energized

## Maintenance and repairs

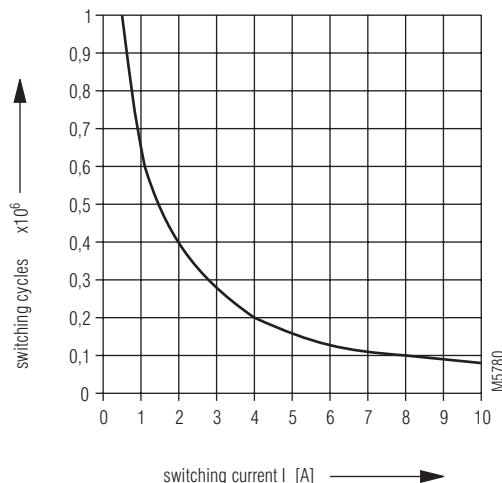
- The device contains no parts that require maintenance.
- In case of failure, do not open the device but send it to manufacturer for repair.

## Characteristics

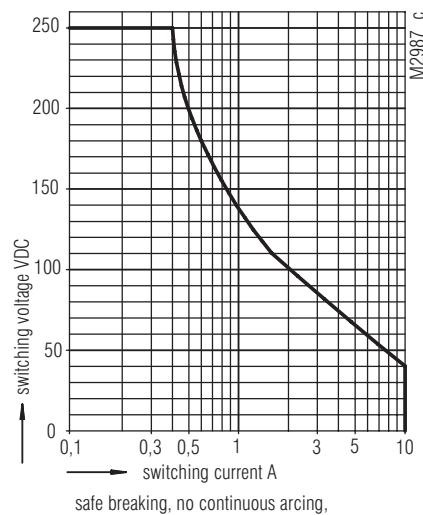


Continuous current limit curves  
as a function of ambient temperature

electric life DC13 24V DC /  $t_{on}$  0,4s;  $t_{off}$  9,6s  
2 contacts in series



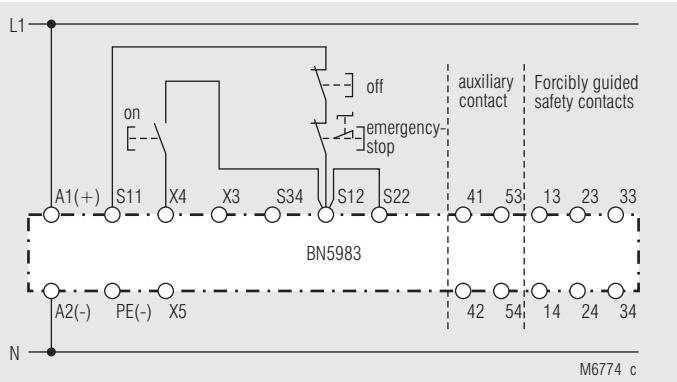
Contact service life



safe breaking, no continuous arcing,  
max. 1 switching cycle / s

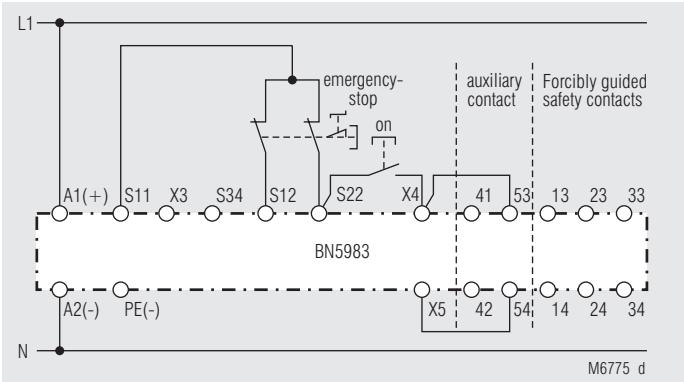
Limit curve for arc-free operation with resistive load

## Application Examples



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

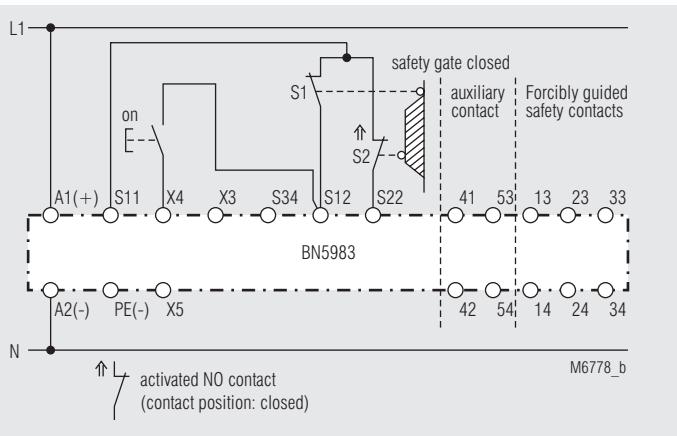
Suited up to SIL2, Performance Level d, Cat. 3



Two-channel emergency stop circuit with line fault detection on start button. The unit starts with the negative edge of the start signal (contrary to the function diagram).

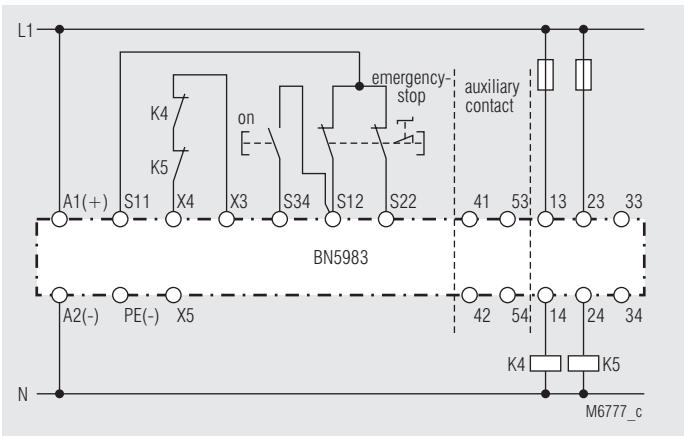
If line fault detection is not necessary the links X4-53 and X5-54 can be removed.

Suited up to SIL3, Performance Level e, Cat. 4



Two-channel monitoring of a safety gate.

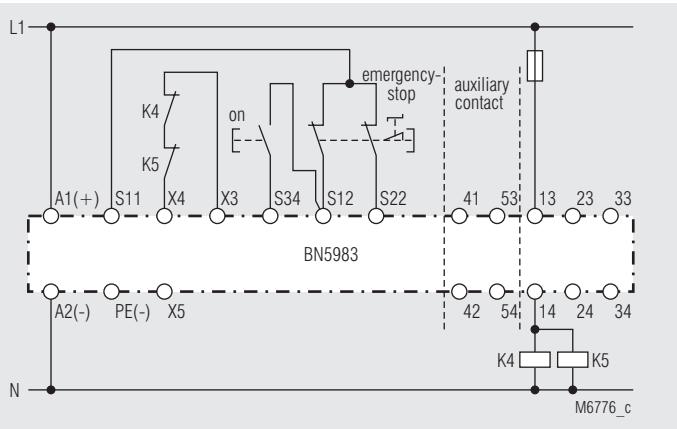
Suited up to SIL3, Performance Level e, Cat. 4



Contact reinforcement by external contactors, 2-channel.

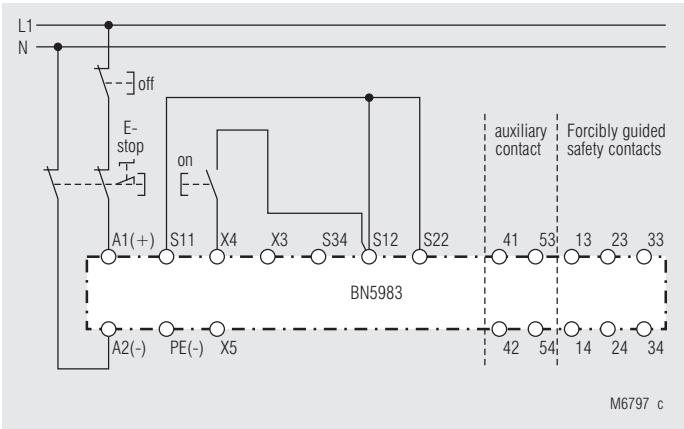
The output contacts can be reinforced by external contactors with forcibly guided contacts for switching currents > 10 A. Functioning of the external contactors is monitored by looping the NC contacts into the closing circuit (terminals X3 - X4).

Suited up to SIL3, Performance Level e, Cat. 4



Contact reinforcement by external contactors with reduced safety level.

Suited up to SIL3, Performance Level e, Cat. 4



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.

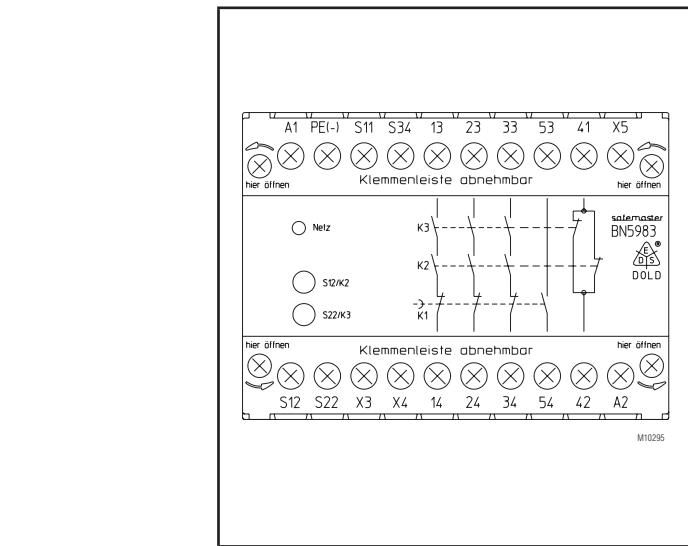
### Attention:

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

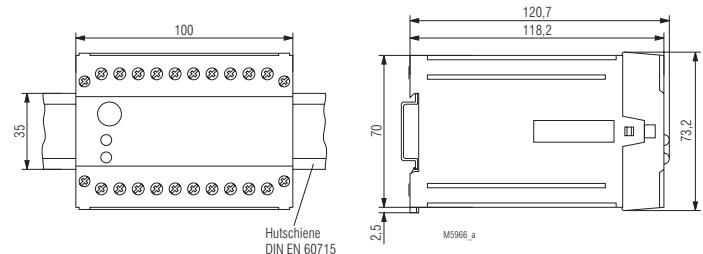
Suited up to SIL3, Performance Level e, Cat. 4

DE	<b>Beschriftung und Anschlüsse</b>
EN	<b>Labeling and connections</b>
FR	<b>Marquage et raccordements</b>
IT	<b>Marcatura e collegamenti</b>

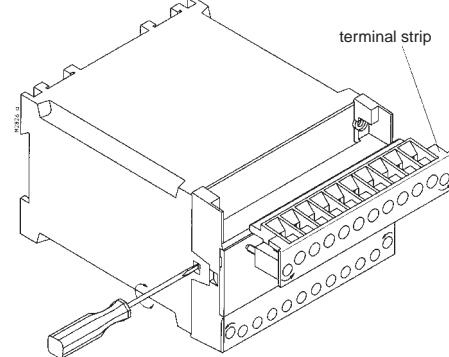
DE	<b>Maßbild (Maße in mm)</b>
EN	<b>Dimensions (dimensions in mm)</b>
FR	<b>Dimensions (dimensions en mm)</b>
IT	<b>Dimensioni (dimensione in mm)</b>



	$\varnothing 6 \text{ mm} / \text{PZ } 2$ 0,8 Nm 7 LB. IN
	A = 10 mm 1 x 0,5 ... 2,5 mm <sup>2</sup> 1 x AWG 20 to 14 2 x 0,5 ... 2,5 mm <sup>2</sup> 2 x AWG 20 to 14
	A = 10 mm 1 x 0,5 ... 1,5 mm <sup>2</sup> 1 x AWG 20 to 16 2 x 0,5 ... 1,5 mm <sup>2</sup> 2 x AWG 20 to 16
	A = 10 mm 1 x 0,5 ... 2,5 mm <sup>2</sup> 1 x AWG 20 to 14 2 x 0,5 ... 2,5 mm <sup>2</sup> 2 x AWG 20 to 14



DE	<b>Montage / Demontage Klemmenleiste</b>
EN	<b>Mounting / disassembly of the terminal strip</b>
FR	<b>Montage / Démontage des borniers</b>
IT	<b>Montaggio / Smontaggio di morsettiera</b>



DE	Sicherheitstechnische Kenndaten
EN	Safety Related Data
FR	Données techniques sécuritaires
IT	I dati di sicurezza

EN ISO 13849-1:		
Kategorie / Category:	4	
PL:	e	
MTTF <sub>d</sub> :	240,5	a (year)
DC <sub>avg</sub> :	99,0	%
d <sub>op</sub> :	365	d/a (days/year)
h <sub>op</sub> :	24	h/d (hours/day)
t <sub>cycle</sub> :	3600	s/cycle
	≈ 1	/h (hour)

IEC/EN 62061 IEC/EN 61508:		
SIL CL:	3	IEC/EN 62061
SIL	3	IEC/EN 61508
HFT <sup>1)</sup> :	1	
DC:	99,0	%
PFH <sub>D</sub> :	2,05E-10	h <sup>-1</sup>
T <sub>1</sub> :	20	a (year)

<sup>1)</sup> HFT = Hardware-Fehlertoleranz  
Hardware failure tolerance  
Tolérance défauts Hardware  
Tolleranza ai guasti hardware

Anforderung seitens der Sicherheitsfunktion an das Gerät	Intervall für zyklische Überprüfung der Sicherheitsfunktion
Demand to our device based on the evaluated necessary safety level of the application.	Intervall for cyclic test of the safety function
Consigne résultant de la fonction sécuritaire de l'appareil	Interval du contrôle cyclique de la fonction sécuritaire
Richiesta al nostro dispositivo basato sul livello di sicurezza necessary valutata dell'applicazione	Intervall per test ciclico della funzione di securezzia
nach; acc. to; selon; conformi a EN ISO 13849-1	einmal pro Monat once per month mensuel una volta al mese
	PL d with Cat. 3
	einmal pro Jahr once per year annuel una volta al mese
nach; acc. to; selon; conformi a IEC/EN 62061, IEC/EN 61508	einmal pro Monat once per month mensuel una volta al mese
	SIL CL 2, SIL 2 with HFT = 1
	einmal pro Jahr once per year annuel una volta al mese



DE	<p>Die angeführten Kenndaten gelten für die Standardtype. Sicherheitstechnische Kenndaten für andere Geräteausführungen erhalten Sie auf Anfrage.</p> <p>Die sicherheitstechnischen Kenndaten der kompletten Anlage müssen vom Anwender bestimmt werden.</p>
EN	<p>The values stated above are valid for the standard type. Safety data for other variants are available on request.</p> <p>The safety relevant data of the complete system has to be determined by the manufacturer of the system.</p>
FR	<p>Les valeurs données sont valables pour les produits standards. Les valeurs techniques sécuritaires pour d'autres produits spéciaux sont disponibles sur simple demande.</p> <p>Les données techniques sécuritaires de l'installation complète doivent être définies par l'utilisateur.</p>
IT	<p>I rating sopra si applicano al tipo standard. Dati di sicurezza per gli altri modelli sono disponibili su richiesta. I dati caratteristici relativi alla sicurezza per l'intero sistema deve essere determinato dall'utente.</p>

DE	<b>EG-Konformitätserklärung</b>
EN	<b>CE-Declaration of Conformity</b>
FR	<b>Déclaration de conformité européenne</b>
IT	<b>Dichiarazione di conformità CE</b>

**EG-Konformitätserklärung**  
**Declaration of Conformity**  
**Déclaration de conformité européenne**

**DOLD**



Hersteller:  
 Manufacturer:  
 Fabricant:  
 E. Dold & Söhne KG  
 78120 Furtwangen  
 Bregstr. 18  
 Germany

Produktbezeichnung:	<b>SAFEMASTER Not-Aus-Modul</b>	<b>BN5983.53</b>	<b>BN5983.53/110</b>
Product description:	Emergency-stop-module	BN5983.53/104	BN5983.53/200
Désignation du produit:	Module arrêt d'urgence		
Optional/optionnel:		/60... /69	

Das bezeichnete Produkt stimmt mit den Vorschriften folgender Europäischer Richtlinien überein:  
 The indicated product is in conformance with the regulations of the following european directives:  
 Le produit désigné est conforme aux instructions des directives européennes:

Maschinenrichtlinie: 2006/42/EG  
 Machinery directive:/ Directives Machines:

EMV-Richtlinie: 2014/30/EU  
 EMC-Directive:/ Directives-CEM:

Prüfgrundlagen:	ISO 13849-1:2015	EN 50178:1997
Basis of Testing:	IEC 62061:2015	ISO 13850:2015
Lignes de contrôle:	EN 60204-1:2006 + A1:2009 + AC:2010 (in extracts)	EN 61508 Part1-7:2010
	EN 60947-5-1:2004 + A1:2009	
	EN 61000-6-1:2007	EN 61000-6-2:2005
	EN 61000-6-3:2007 + A1:2011	EN 61000-6-4:2007 + A1:2011

Die Übereinstimmung eines Baumusters des bezeichneten Produktes mit der oben genannten Maschinen-Richtlinie wurde bescheinigt durch:

Consistency of a production sample with the marked product in accordance to the above machines directiv has been certified by:  
 La conformité d'un échantillon du produit désigné aux directives machine susmentionnées a été certifiée par :

TÜV Rheinland Industrie Service GmbH  
 Alboinstraße 56  
 12103 Berlin

Nummer der benannten Stelle : NB0035  
 Number of certification office/ Numéro de l'organisme notifié

Nummer der Bescheinigung: 01/205/5038.01/16 Ausstell datum: 24.02.2016  
 Certification number:/ Numéro de certificat Date of issue:/ Date de délivrance

Für die Zusammenstellung der technischen Unterlagen ist bevollmächtigt:  
 For the compilation of technical documents is authorized:/ Pour la composition des documents techniques est autorisé

Gamal Hagar - Entwicklungsleiter / R&D Manager  
 Firma E. Dold & Söhne KG, Bregstr. 18  
 78120 Furtwangen

Rechtsverbindliche Unterschrift:  
 Signature of authorized person:/ Signature du PDG:

ppa.....  
 Christian Dold - Produktmanagement -

Ort, Datum: Furtwangen, 01.06.2016  
 Place, Date: / Lieu, date:

Diese Original - Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der Produktddokumentation sind zu beachten.  
 This original declaration confirms the conformity of the mentioned directives but does not comprise any guarantee of the product characteristics. The safety directives of the product documentation are to be considered.  
 Cette déclaration originale certifie la conformité des directives nommées mais ne comprend aucune garantie des caractéristiques du produit. Les directives de sécurité de la documentation du produit sont à considérer.