SAFEMASTER
Emergency Stop Module
BN 5983

Translation
of the original instructions

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Contents

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

Keep instructions for future reference

The installation must only be done by a qualified electrican!

Do not dispose of household garbage!
The device must be disposed of in compliance with nationally applicable rules and requirements.

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

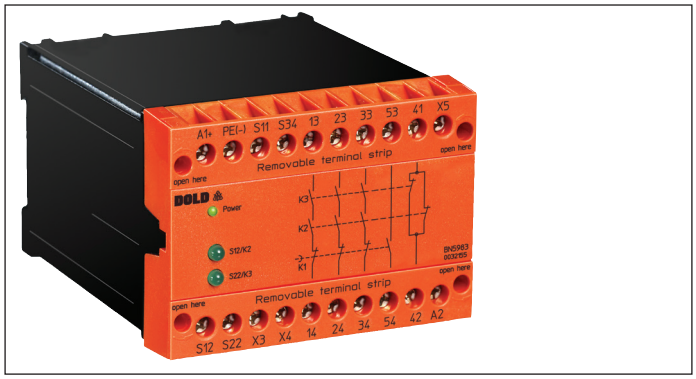
- Make sure of sufficient protection circuitry at all output contacts for capacitive and inductive loads.

Attention!

- The safety function must be triggered during commissioning.
- AUTOMATIC START !
  According to IEC/EN 60204-1 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

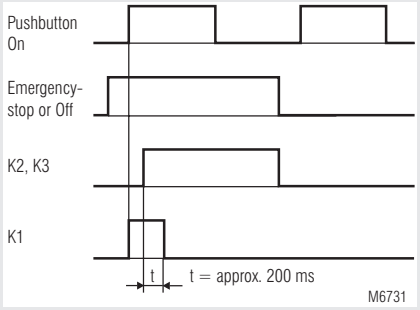
SAFEMASTER
Emergency Stop Module
BN 5983

0221560



- **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



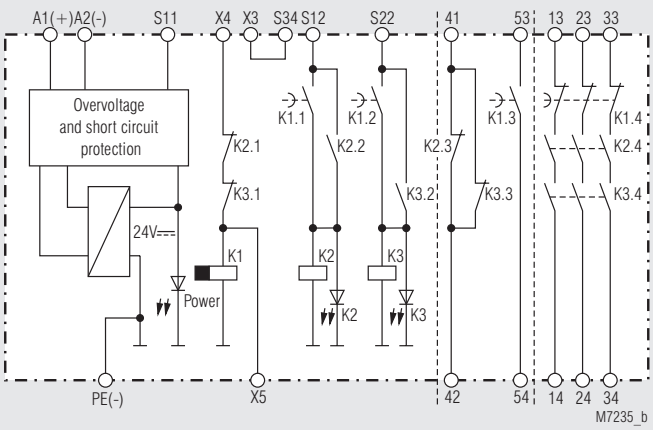
Approvals and Markings

Canada / USA

Applications

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

Block Diagrams



BN 5983.53

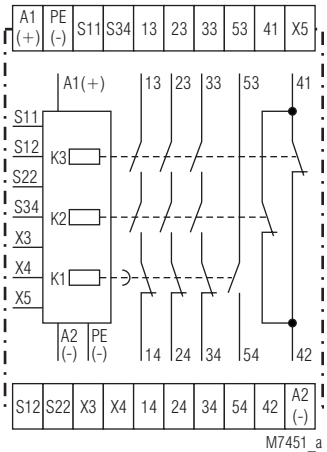
Indicators

LED Power:	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, _

Connection Terminals

Terminal designation	Signal description
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

Input

Nominal voltage U_N:	AC 24, 42, 48, 110, 127, 230, 240 V DC 24, 48, 110 V
Voltage range:	AC 0.8 ... 1.1 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:	5 VA ± 30 %
Nominal frequency:	50 / 60 Hz
Control voltage S11:	DC 24 V
Control current:	Max. DC 100 mA
Minimum voltage at terminals S12, S22:	DC 21 V with activated device

Output

Contacts

BN 5983.53:	3 NO, 1 NC contacts 1 delay-release NO contact (K1.3)

The NO contacts 13...33 / 14...34 are safety contacts.
The NC contact 41-42 and the NO contact 53-54 can only be used for monitoring.

Operate time:	35 ms
Release time	
opening in secondary circuit (S12-S22):	30 ms ± 25 %
opening in supply circuit:	100 ms ± 50 %
Release delay of K1:	Approx. 200 ms
Contact type:	Relay, forcibly guided
Nominal output 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:	3 A / AC 250 V	IEC/EN 60947-5-1
NC contact:	2 A / AC 250 V	IEC/EN 60947-5-1
to AC 15		
NO contact:	6 A / AC 230 V at 0.25 Hz	
NC contact:	2 A / AC 230 V at 0.25 Hz	
to DC 13		
NO contact:	2 A / DC 24 V	IEC/EN 60947-5-1
NC contact:	2 A / DC 24 V	IEC/EN 60947-5-1
to DC 13		
NO contact:	6 A / DC 24 V at 0.1 Hz	
NC contact:	6 A / DC 24 V at 0.1 Hz	

Electrical life	
at AC 230 V, 6 A cos φ = 1:	> 5 x 10^5 switching cycles
Permissible operating frequency:	6000 switching cycles / h
Short circuit strength	
max. fuse rating	

NO contact:	10 A gG / gL	IEC/EN 60947-5-1
NC contact:	6 A gG / gL	IEC/EN 60947-5-1

Mechanical life:	10 x 10^6 switching cycles

General Data

Operating mode:	Continuous operation	
Temperature range		
Operation:	- 15 ... + 55°C at max. 90 % humidity	
Storage :	- 25 ... + 85 °C	
altitude:	≤ 2000 m	
Clearance and creepage distances		
Rated impuls voltage / pollution degree:	4 kV / 2 (basis insulation)	IEC 60664-1
EMC	IEC/EN 61326-3-1	
Interference suppression:	Limit value class B	EN 55 011
Degree of protection		
Housing:	IP 40	IEC/EN 60529
Terminals:	IP 20	IEC/EN 60529
Housing:	Thermoplastic with V0 behaviour according to UL subject 94	
Vibration resistance:	Amplitude 0.35 mm frequency: 10 ... 55 Hz	IEC/EN 60068-2-6
Climate resistance:	15 / 055 / 04	IEC/EN 60068-1
Terminal designation:	EN 50 005	
Wire fixing:	Flat terminals with self-lifting clamping piece Removable terminal strip	IEC/EN 60999-1
Mounting:	DIN rail	IEC/EN 60715
Weight:	840 g	

Dimensions

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

UL-Data

Nominal voltage U_N:	AC 110, 127, 230 V DC 24 V
Ambient temperature:	- 15 … + 55 °C
Switching capacity:	3 A, 250 Vac G.P.
Wire connection:	60°C / 75°C copper conductors only AWG 16 - 14 Torque 7 lb in

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

CCC-Data

Nominal voltage U_N:	AC 24, 42, 48, 110, 127, 230 V DC 24, 48, 110 V
Thermal current I_{th}:	See continuous current limit curve (max. 5 A in one contact path)

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

Standard Type

BN 5983.53 DC 24 V

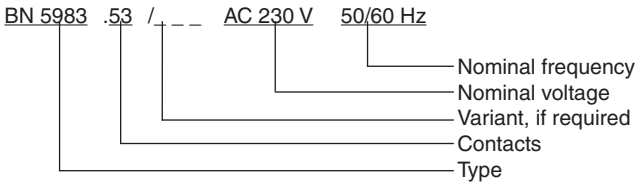
Article number:	0032155
• Output:	3 NO, 1 NC contacts
• Nominal voltage U_N:	DC 24 V
• Width:	100 mm

Variants

BN 5983._ _/61: With UL approval

BN 5983.53/104:
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.
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.

Ordering example for Variants



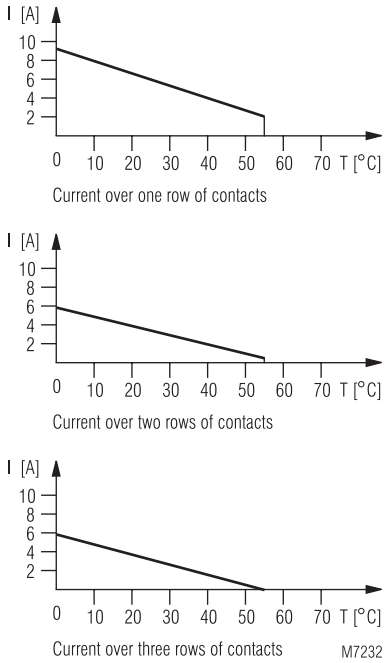
Troubleshooting

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

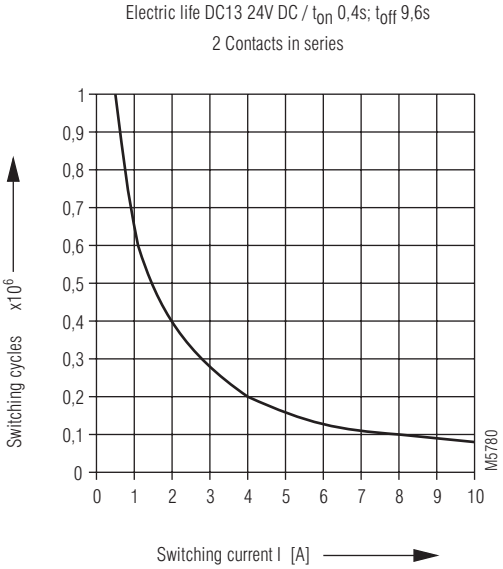
Maintenance and repairs

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

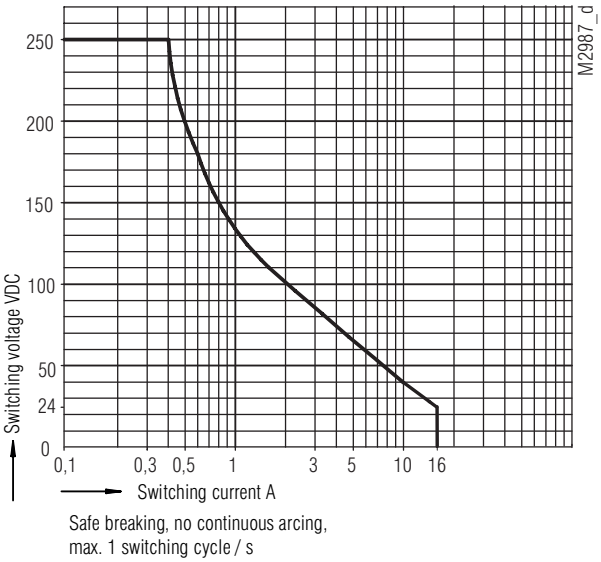
Characteristics



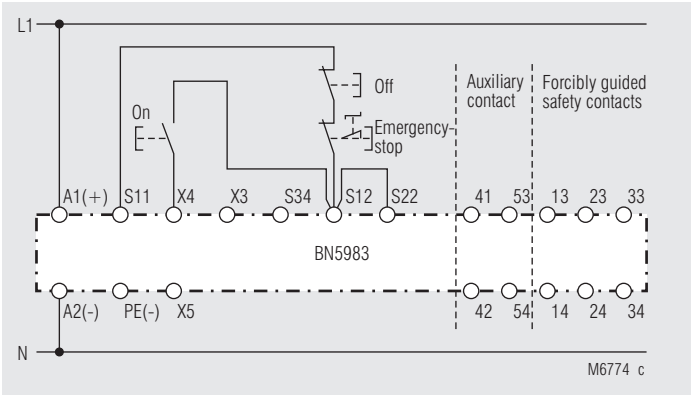
Continuous current limit curves
as a function of ambient temperature



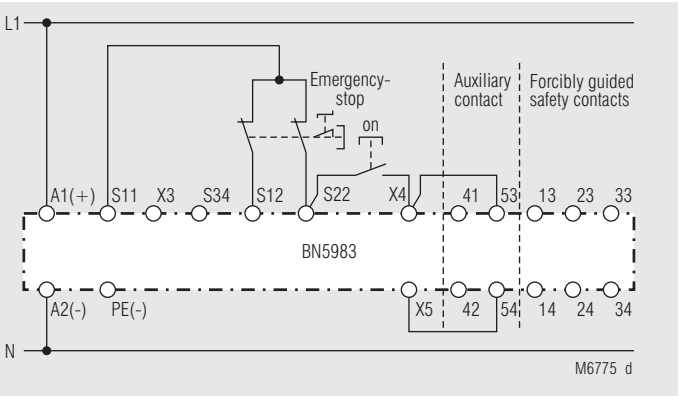
Contact service life



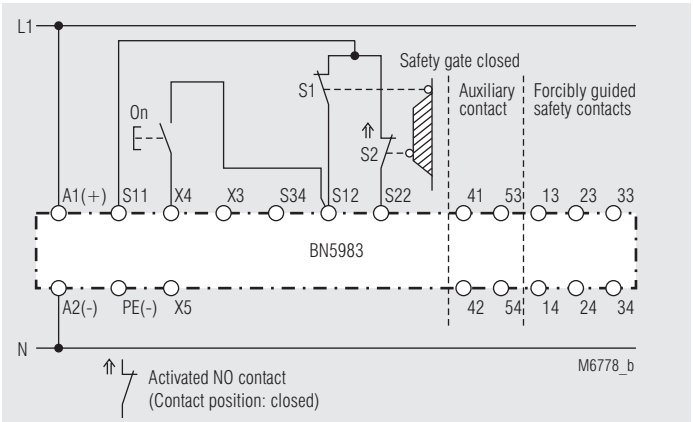
Arc limit curve with resistive load



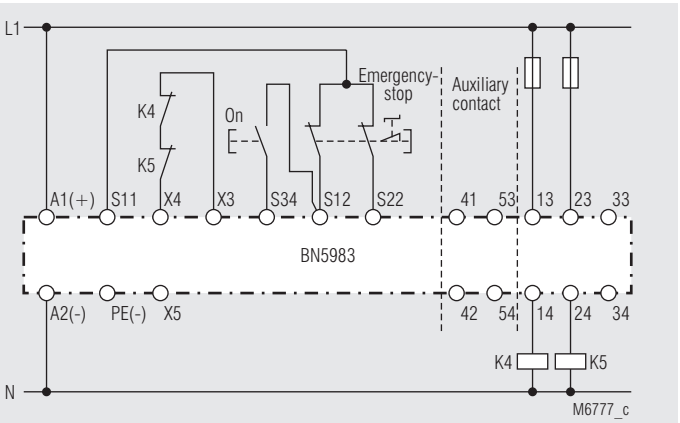
One-channel emergency-stop circuit. This circuit does not have any redundancy in the emergency-stop control circuit.
Suited up to SIL2, Performance Level d, Cat. 3



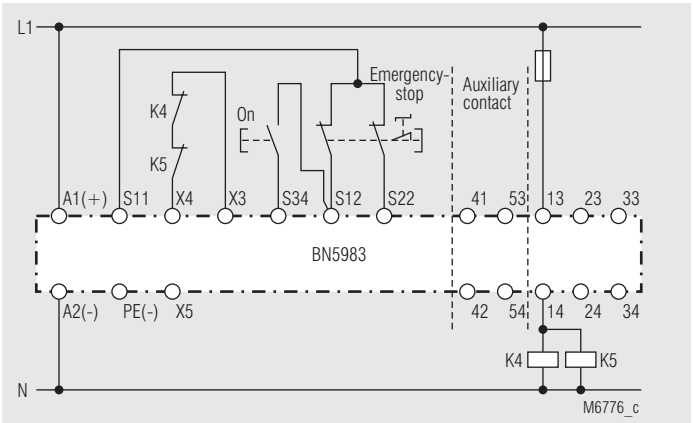
Two-channel emergency stop circuit with line fault detection on start button. The unit starts with the negative edge of the start signal (contrary to the function diagram).
If line fault detection is not necessary the links X4-53 and X5-54 can be removed.
Suited up to SIL3, Performance Level e, Cat. 4



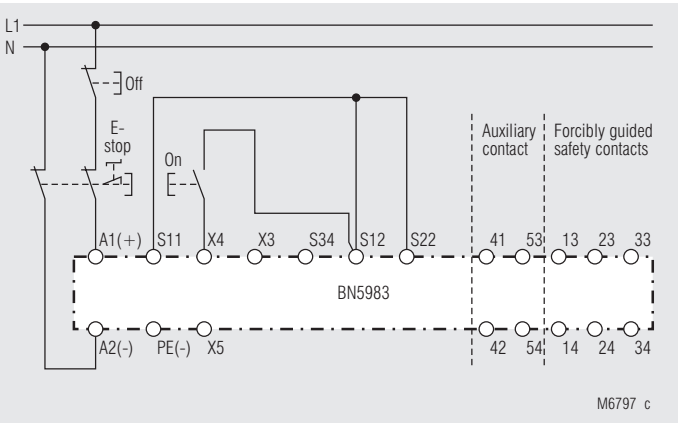
Two-channel monitoring of a safety gate.
Suited up to SIL3, Performance Level e, Cat. 4



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

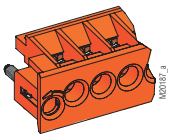
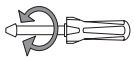
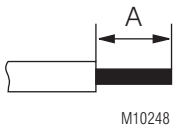
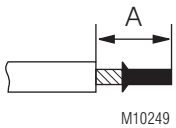
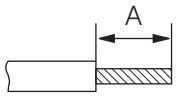


Contact reinforcement by external contactors with reduced safety level.
Suited up to SIL3, Performance Level e, Cat. 4

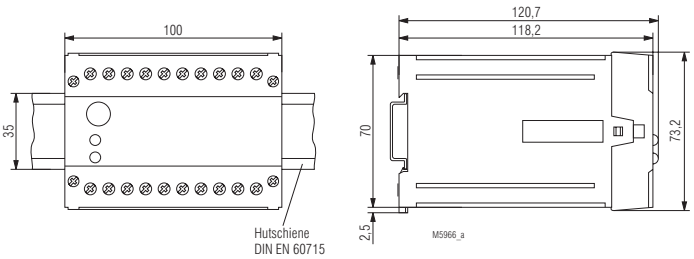


Two-pole emergency-stop circuit with emergency stop control device in supply circuit.
Application for long emergency stop loops where the control voltage drops below the minimum voltage of 21 V.
Attention:
Single faults (e.g. line faults at the emergency stop control device) are not detected with this external circuit configuration.
Suited up to SIL3, Performance Level e, Cat. 4

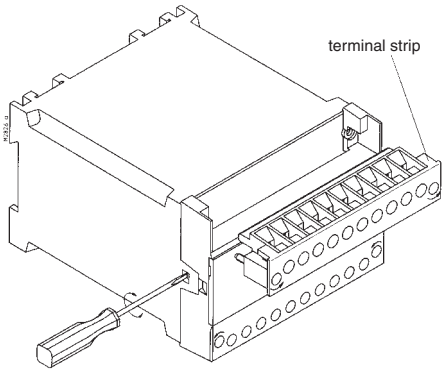
DE	**Anschlusstechnik**
EN	**Connection Technology**
FR	**Technologie de connexion**
IT	**Technologia di connessione**

	Klemmenleiste, abnehmbar Terminal strip, pluggable Bornier, amovibles Morsettiere smontabili
	
	ø 6 mm / PZ 2 0,8 Nm 7 LB. IN
 M10248	A = 10 mm 1 x 0,5 ... 2,5 mm² 1 x AWG 20 to 14 2 x 0,5 ... 2,5 mm² 2 x AWG 20 to 14
 M10249	A = 10 mm 1 x 0,5 ... 1,5 mm² 1 x AWG 20 to 16 2 x 0,5 ... 1,5 mm² 2 x AWG 20 to 16
 M10250	A = 10 mm 1 x 0,5 ... 2,5 mm² 1 x AWG 20 to 14 2 x 0,5 ... 2,5 mm² 2 x AWG 20 to 14

DE	**Maßbild (Maße in mm)**
EN	**Dimensions (dimensions in mm)**
FR	**Dimensions (dimensions en mm)**
IT	**Dimensioni (dimensione in mm)**



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



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	
$MTTF_d$:	240,5	a (year)
DC_{avg}:	99,0	%
d_{op}:	365	d/a (days/year)
h_{op}:	24	h/d (hours/day)
t_{cycle}:	3600	s/cycle
	≙ 1	/h (hour)

IEC/EN 62061 IEC/EN 61508:		
SIL CL:	3	IEC/EN 62061
SIL	3	IEC/EN 61508
HFT*):	1	
DC:	99,0	%
PFH_D:	2,05E-10	h^{-1}
T_1:	20	a (year)

*) HFT = Hardware-Fehlertoleranz
Hardware failure tolerance
Tolérance défauts Hardware
Tolleranza ai guasti hardware

Anforderung seitens der Sicherheits-funktion an das Gerät		Intervall für zyklische Überprüfung der Sicherheitsfunktion
Demand to our device based on the evaluated neccessary 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 neccessary valutata dell'applicazione		Intervall per test ciclico della funzio-ne di securezzia
nach; acc. to; selon; conformi a EN ISO 13849-1	PL e with Cat. 3 or Cat. 4	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	SIL CL 3, SIL 3 with HFT = 1	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

Info

DE	Die angeführten Kenndaten gelten für die Standardtype. Sicherheitstechnische Kenndaten für andere Geräteausführungen erhalten Sie auf Anfrage. Die sicherheitstechnischen Kenndaten der kompletten Anlage müssen vom Anwender bestimmt werden.
EN	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.
FR	Les valeurs données sont valables pour les produits standards. Les valeurs techniques sécuritaires pour d'autres produits spéciaux sont disponibles sur simple demande. Les données techniques sécuritaires de l'installation complète doivent être définies par l'utilisateur.
IT	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.

DE	**EG-Konformitätserklärung**
EN	**CE-Declaration of Conformity**
FR	**Déclaration de conformité européenne**
IT	**Dichiarazione di conformità CE**

EG - Konformitätserklärung
Declaration of Conformity
Déclaration de conformité européenne

Hersteller:
Manufacturer: / Fabricant:
E. Dold & Söhne GmbH & Co. KG

Anschrift:
Address: / Adresse:
Bregstraße 18
78120 Furtwangen
Germany

Produktbezeichnung: Not-Aus-Modul
Product description: *Emergency Stop Module*
Désignation du produit: *Module d'arrêt d'urgence*

BN5983.kkccc
BN5983.kk/vvvccc
mit: kk = 53
vvv = 104
with: optional ccc = /60 ... /69
avec:

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: *Machinery directive: / Directives Machines:*	2006/42/EG	EU-Abl. L157/24, 09.06.2006
EMV - Richtlinie: *EMC - Directive: / Directives- CEM::*	2014/30/EU	EU-Abl. L96/79, 29.03.2014
RoHS - Richtlinie *RoHS -Directive: / Directives - RoHS:*	2011/65/EU	EU-Abl. L174/88, 01.07.2011

Prüfgrundsätze:
Basis of Testing:
Lignes de contrôle:

EN ISO 13849-1:2015
EN IEC 62061:2021
EN IEC 60664-1:2020 + AC:2020
EN 61000-6-1:2007
EN 61000-6-3:2007 + A1:2011 + AC:2012
EN 61000-6-7:2015
EN 61326-3-1:2017
EN 61508 Parts 1-7:2010
EN 60664-1:2007
EN 61000-6-2:2005 + AC:2005
EN 61000-6-4:2007 + A1:2011
EN 61326-1:2013

Die Übereinstimmung eines Baumusters des bezeichneten Produktes mit der oben genannten Maschinenrichtlinie wurde bescheinigt durch:
Consistency of a production sample with the marked product in accordance to the above machiney directive has been certified by:
La conformité d'un échantillon du produit désigné aux directives machines susmentionnées a été certifiée par:

Benannte Stelle:
Certification office: / l'organisme notifié:
TÜV Rheinland Industrie Service GmbH
Am Grauen Stein, 51105 Köln

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

Nummer der Bescheinigung:
Certification number: / Numéro de certificat:
01/205/5038.02/22

Ausstelldatum :
Date of issue: / Date de délivrance:
25.05.2022

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

Rechtsverbindliche Unterschrift:
Signature of authorized person:
Signature autorisée :

ppa. Ch. Dold

Christian Dold, Produktmanagement / Productmanagement

Ort, Datum : Furtwangen, 08.06.2022
Place, Date: / Lieu, date:

Diese Original - Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die Sicherheitshinweise der Produktdokumentation 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.