



SAFEMASTER
Safety Mat Switch Gear
BG 5925._ _/910

Translation
of the original instructions

0262949



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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 BG 5925/910 is used to interrupt a safety circuit in a safe way. It can be used to protect people and machines in applications with safety mats, safety edges and tape switches with a max. current of 100 mA. When used in accordance with its intended purpose and following these operating instructions, this device presents no known residual risks. Nonobservance 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.



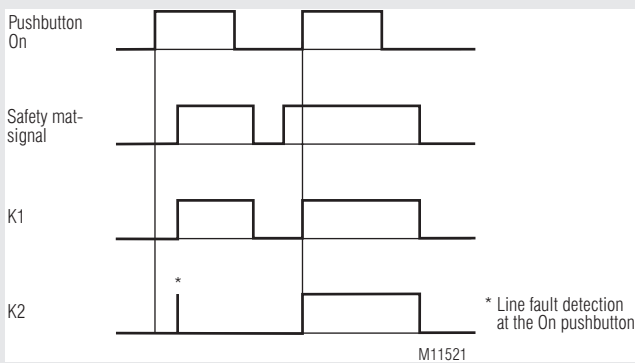
Attention!

- The safety function must be triggered during commissioning.
- The line fault detection is only active when S12 and S22 are switched simultaneously.
- If a line fault occurs after the voltage has been connected to S12, S22, the unit will be activated because this line fault is similar to the normal On-function.
- Switch S1 must not be set while device is under supply voltage.
- Opening the device or implementing unauthorized changes voids any warranty

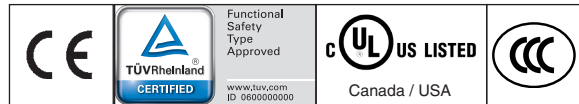


- According to
 - Performance Level (PL) e and category 4 to EN ISO 13849-1
 - SIL Claimed Level (SIL CL) 3 to IEC/EN 62061
 - Safety Integrity Level (SIL) 3 to IEC/EN 61508
- Safety-mat switch gear with manual or automatic restart
- Can also be used for safety edges
- Output: Max. 3 NO contacts
- Line fault detection on On-button
- Manual restart or automatic restart when connecting the supply voltage, switch S2
- LED indicator for state of operation
- Indicator for status of switching element
- LED indicator for channel 1 and 2
- Removable terminal strips
- Wire connection: Also 2 x 1,5 mm² stranded ferruled (isolated), DIN 46228-1/-2/-3/-4 or 2 x 2,5 mm² stranded ferruled DIN 46228-1/-2/-3/-4
- Width 22,5 mm

Function Diagram



Approvals and Markings



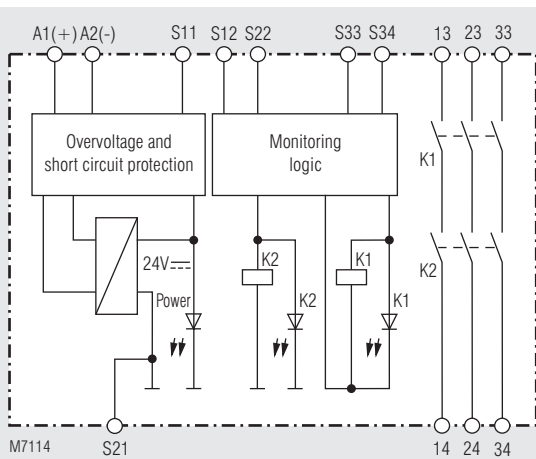
Applications

- Protection of people and machines
- Emergency stop circuits on machines
- Monitoring of safety gates
- Switch gear for lightbars
- Switch gear for safety mats and safety edges

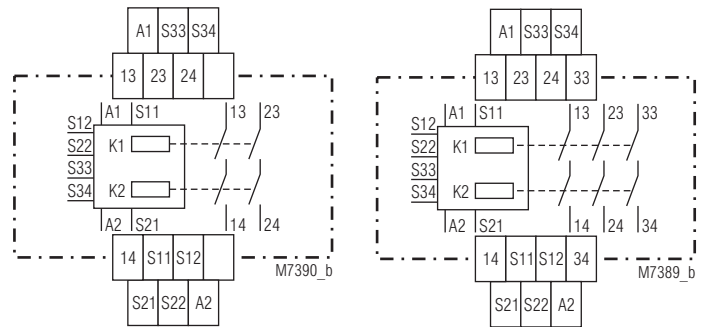
Indicators

- Upper LED: ON when supply connected
- Lower LEDs: ON when relay K1 and K2 energized

Block Diagram



Circuit Diagrams

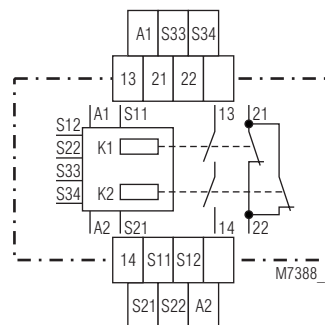


BG 5925.02/910

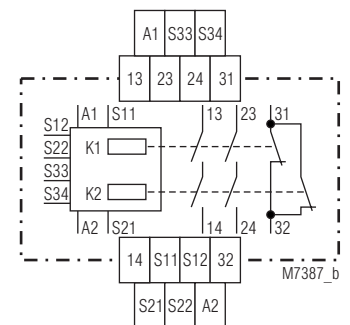
BG 5925.03/910

Connection Terminals

Terminal designation	Signal description
A1 (+)	+ / L
A2 (-)	- / N
S12, S22, S34	Inputs
S11, S21, S33	Outputs
13, 14, 23, 24, 33, 34	Positive driven NO contacts for release circuit
21, 22, 31, 32	Positive guided indicator output



BG 5925.16/910



BG 5925.22/910

Notes

Line fault detection on On-button:

The line fault detection is only active when S12 and S22 are switched simultaneously. If The On-button is closed before S12, S22 is connected to voltage (also when line fault across On-Button), the output contacts will not close.

A line fault across the On-button which occurred after activation of the relay, will be detected with the next activation and the output contacts will not close. If a line fault occurs after the voltage has been connected to S12, S22, the unit will be activated because this line fault is similar to the normal On-function. The gold plated contacts of the BG 5925 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 terminal S21 permits the operation of the device in IT-systems with insulation monitoring, serves as a reference point for testing the control voltage.

Connecting the terminal S21 to the protective ground bridges the internal short-circuit protection of Line A2 (-). The short-circuit protection of line A1 (+) remains active.

With the model BG 5925/910 control unit for safety mats, the switch S1 must always be set to cross fault monitoring. Depending on the operation of the machine, the switch S2 is set to automatic or manual restart.

Technical Data

Input circuit

Nominal Voltage U_N:	DC 24 V
Voltage range	
at 10% residual ripple:	0,9 ... 1,1 U_N
Nominal consumption:	DC approx. 2 W
Min. Off-time:	1 s
Control voltage on S11:	Approx. DC 23 V at U_N
Max. permissible contact resistance of safety mat:	30 Ω
Cross fault current	
between line S11-S12 and line S21-S22 with active safety mat or safety edge start-up:	Max. 0,4 A for approx. 2 ms
Continuously:	40 mA at U_N
Control current over S12, S22:	40 mA at U_N
Min. voltage between terminals S12, S22 and S21:	DC 21 V when relay activated and U_N on A1 - A2
Short-circuit protection:	Internal fuse rating
Overvoltage protection:	Internal VDR

Output

Contacts

BG 5925.02/910:	2 NO contacts
BG 5925.03/910:	3 NO contact
BG 5925.16/910:	1 NO, 1 NC contact
BG 5925.22/910:	2 NO, 1 NC contact

The NO contacts are safety contacts.

The NC contacts 21-22 or 31-32 can only be used for monitoring.

Operate delay typ. at U_N :

Manual start:	80 ms
Automatic start:	170 ms

Release delay typ. at U_N :

Disconnecting the supply:	50 ms
Disconnecting S12, S22:	15 ms

Contact type:

Forcibly guided

Nominal output voltage:

AC 250 V
DC: See arc limit curve operation

Switching of low loads:

(contact 5 μ Au) ≥ 100 mV

≥ 1 mA

Thermal current I_{th} :

5 A
(see current limit curve)

Technical Data

Switching capacity

to AC 15

NO contact: 3 A / AC 230 V IEC/EN 60947-5-1

NC contact: 1 A / AC 230 V IEC/EN 60947-5-1

To DC 13

NO contact: 1 A / DC 24 V IEC/EN 60947-5-1

NC contact: 1 A / DC 24 V IEC/EN 60947-5-1

To DC 13

NO contact: 4 A / 24 V at 0.1 Hz

NC contact: 4 A / 24 V at 0.1 Hz

Electrical contact life

to AC 15 at 2 A, AC 230 V: 10^5 switching cycles IEC/EN 60947-5-1

To DC 13 at 1 A, DC 24 V: $> 150 \times 10^3$ switching cycles

Permissible operating frequency:

Max. 1200 operating cycles / h

Short circuit strength

max. fuse rating: 6 A gG / gL IEC/EN 60947-5-1

Line circuit breaker: C 8 A

Mechanical life:

10×10^6 switching cycles

General Data

Operating mode:

Continuous operation

Temperature range

Operation:

- 15 ... + 55 °C

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

Interference suppression: Limit value class B IEC/EN 62061

Degree of protection EN 55011

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 IEC/EN 60068-2-6

frequency 10 ... 55 Hz

Climate resistance: 15 / 055 / 04 IEC/EN 60068-1

Terminal designation: EN 50005

Wire fixing: Box terminal with wire protection,

removable terminal strips

Mounting: DIN rail IEC/EN 60715

Weight: 220 g

Dimensions

Width x height x depth: 22,5 x 84 x 121 mm

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 : DC 24 V

Ambient temperature: - 15 ... + 55 °C

Switching capacity:

Ambient temperature 25 °C Pilot duty B300
5A 250Vac Resistive
5A 24Vdc Resistive or G.P.

Ambient temperature 55 °C: Pilot duty B300
3A 250Vac Resistive
3A 24Vdc Resistive or G.P.

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.

Standard Type

BG 5925.02/910/61 DC 24 V

Article number: 0049869
• Output: 2 NO contacts
• Nominal voltage U_N : DC 24 V
• Width: 22,5 mm

Ordering Example

BG 5925 . . . /910 /61 DC 24 V



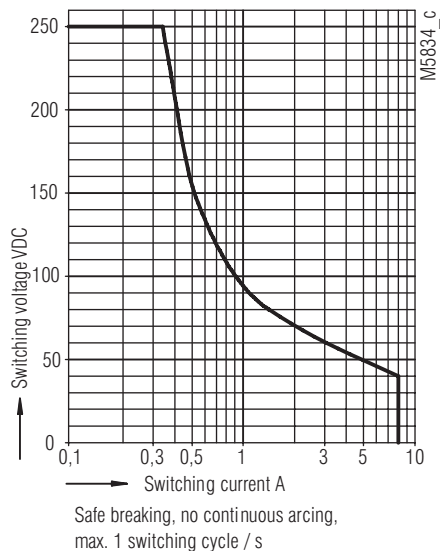
Troubleshooting

Failure	Potential cause
LED "Power" does not light up	Power supply not connected
LED "K1" lights up, but "K2" remains off	- Safety relay K1 is welded (replace device) - A 1-channel switch-off occurred on S12 (switch channel off on S22)
LED "K2" lights up, but "K1" 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 K2 is welded (replace device) - Incorrect setting of switch S2 - Manual start mode: Line fault on start-button (disconnect power supply and remove fault) - Automatic start mode: S33-S34 not bridged

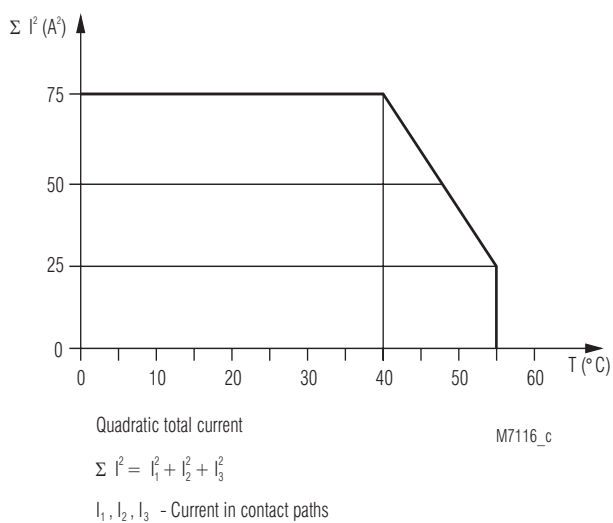
Maintenance and repairs

- 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

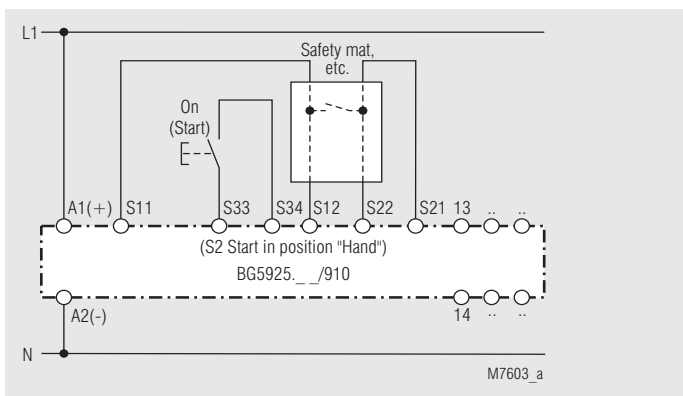


Arc limit curve



Quadratic total current limit curve

Application Examples

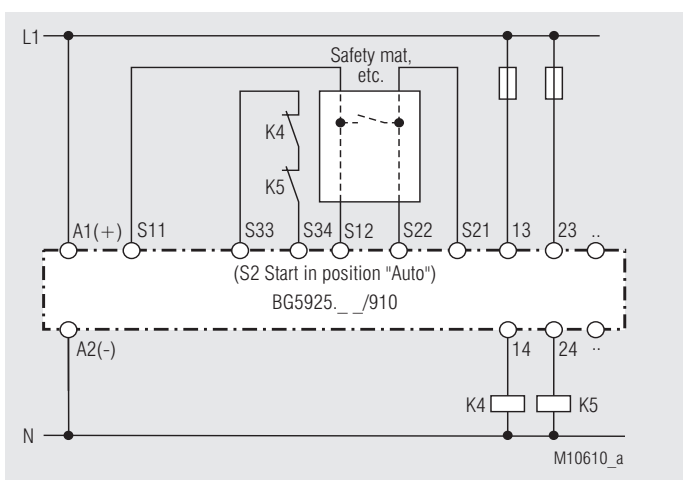


Switch gear for safety mats and edges

switch S2 position: Manual start

(For automatic restart S2 in position Autostart and link on S33-S34)

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



Switch gear for safety mats and edges

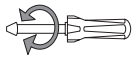
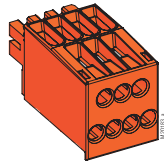
Contact reinforcement by external contactors, 2-channel.

switch S2 position: Auto start

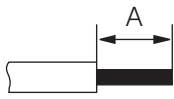
Suited up to SIL3, Performance Level e, Cat. 4

DE	Anschlussstechnik
EN	Labeling and connections
FR	Marquage et raccordements
IT	Marcatura e collegamenti

Schraubklemme, abnehmbar
Screw terminal, removable
Borne à vis, amovible

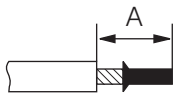


ø 4 mm / PZ 1
0,8 Nm
7 LB. IN



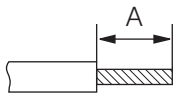
M10248

A = 10 mm
1 x 0,5 ... 4 mm²
1 x AWG 20 to 12
2 x 0,5 ... 1,5 mm²
2 x AWG 20 to 16



M10249

A = 10 mm
1 x 0,5 ... 2,5 mm²
1 x AWG 20 to 14
2 x 0,5 ... 1,5 mm²
2 x AWG 20 to 16

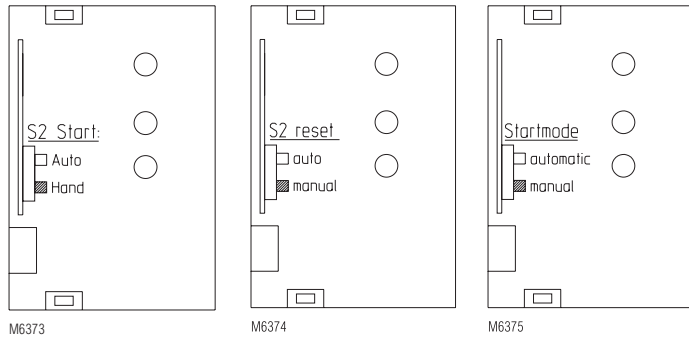
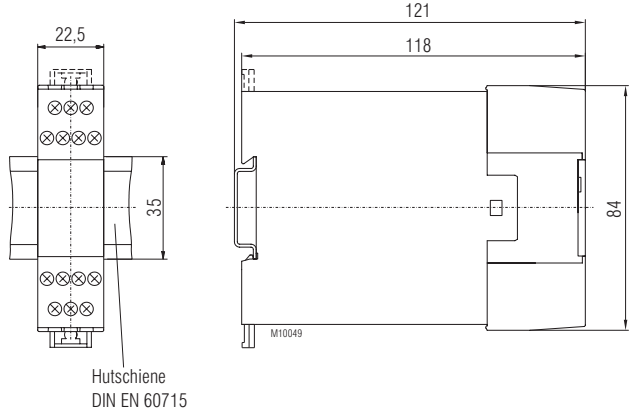
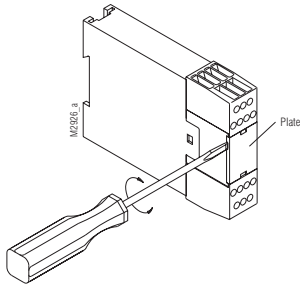


M10250

A = 10 mm
1 x 0,5 ... 4 mm²
1 x AWG 20 to 12
2 x 0,5 ... 1,5 mm²
2 x AWG 20 to 16

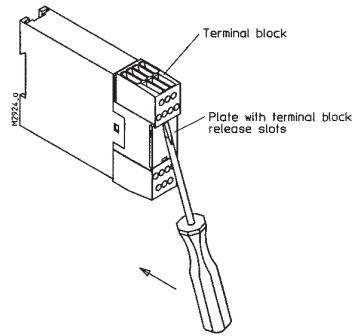
DE	Geräteprogrammierung
EN	Setting
FR	Programmation de l'appareil
IT	Impostazione del modulo

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



DE	Montage / Demontage der Klemmenblöcke
EN	Mounting / disassembly of the terminal blocks
FR	Montage / Démontage des borniers amovibles
IT	Montaggio / Smontaggio di morsetti estraibili

DE	S2 Start <input type="checkbox"/> Auto <input checked="" type="checkbox"/> Hand
FR	S2 Reset <input type="checkbox"/> Auto <input checked="" type="checkbox"/> Manu
IT	S2 Start <input type="checkbox"/> automatico <input checked="" type="checkbox"/> manuale



DE	Die Schalterstellung zeigt den Lieferzustand.
EN	Drawing shows setting at the state of delivery
FR	Appareil livré tel que sur le schéma.
IT	La figura mostra l'impostazione al momento della consegna.

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 :	236,3	a (year)
DC _{avg} :	99,0	%
d _{op} :	365	d/a (days/year)
h _{op} :	24	h/d (hours/day)
t _{cycle} :	3,60E+03	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 :	2,09E-10	h ⁻¹
T ₁ :	20	a (year)
*) 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 sicurezza
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 annual 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 annual una volta al mese



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.

