



EN Operating instructions.pages 1 to 6
Original

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1. About this document

1.1 Function

This operating instructions manual provides all the information you need for the mounting, set-up and commissioning to ensure the safe operation and disassembly of the safety switchgear. The operating instructions must be available in a legible condition and a complete version in the vicinity of the device.

1.2 Target group: authorised qualified personnel

All operations described in this operating instructions manual must be carried out by trained specialist personnel, authorised by the plant operator only.

Please make sure that you have read and understood these operating instructions and that you know all applicable legislations regarding occupational safety and accident prevention prior to installation and putting the component into operation.

The machine builder must carefully select the harmonised standards to be complied with as well as other technical specifications for the selection, mounting and integration of the components.

1.3 Explanation of the symbols used



Information, hint, note:

This symbol is used for identifying useful additional information.



Caution: Failure to comply with this warning notice could lead to failures or malfunctions.

Warning: Failure to comply with this warning notice could lead to physical injury and/or damage to the machine.

1.4 Appropriate use

The products described in these operating instructions are developed to execute safety-related functions as part of an entire plant or machine. It is the responsibility of the manufacturer of a machine or plant to ensure the correct functionality of the entire machine or plant.

The safety switchgear must be exclusively used in accordance with the versions listed below or for the applications authorised by the manufacturer. Detailed information regarding the range of applications can be found in the chapter "Product description".

1.5 General safety instructions

The user must observe the safety instructions in this operating instructions manual, the country specific installation standards as well as all prevailing safety regulations and accident prevention rules.



Further technical information can be found in the Schmersal catalogues or in the online catalogue on the Internet: www.schmersal.net.

The information contained in this operating instructions manual is provided without liability and is subject to technical modifications.



If multiple safety components are wired in series, the Performance Level to EN ISO 13849-1 will be reduced due to the restricted error detection under certain circumstances. The entire concept of the control system, in which the safety component is integrated, must be validated to EN ISO 13849-2.

There are no residual risks, provided that the safety instructions as well as the instructions regarding mounting, commissioning, operation and maintenance are observed.

1.6 Warning about misuse



In case of improper use or manipulation of the safety switchgear, personal hazards or damages to machinery or plant components cannot be excluded. The relevant requirements of the standard EN 1088 must be observed.

1.7 Exclusion of liability

We shall accept no liability for damages and malfunctions resulting from defective mounting or failure to comply with this operating instructions manual. The manufacturer shall accept no liability for damages resulting from the use of unauthorised spare parts or accessories.

For safety reasons, invasive work on the device as well as arbitrary repairs, conversions and modifications to the device are strictly forbidden; the manufacturer shall accept no liability for damages resulting from such invasive work, arbitrary repairs, conversions and/or modifications to the device.

2. Product description

2.1 Ordering code

This operating instructions manual applies to the following types:

TK① / ② ③ ④ / ⑤ / 90⑥

No.	Option	Description
①	M	Power to lock
	F	Power to unlock
②	S	without mechanical interlock
		with mechanical interlock (protection against incorrect locking)
③	.S	Manual release
	.N	Emergency release
④		Device heads in series, only for sliding guards
	.L	Device heads LHS parallel, for hinged and sliding guards
	.R	Device heads RHS parallel, for hinged and sliding guards
⑤		Slow action switch
		Magnet
		Actuator
		1 NC / 1 NO
		1 NC / 1 NO
2TOE		2 NC
	4NC	2 NC
		Snap action switch
		Magnet
92		Actuator
		1 NC / 1 NO
		1 NC/1 NO
⑥	24 VDC	U _s 24 VDC
	115 VAC	U _s 115 VAC
	230 VAC	U _s 230 VAC

Not all component variants, which are possible according to this order code, are available.



Only if the information described in this operating instructions manual are realised correctly, the safety function and therefore the compliance with the Machinery Directive is maintained.

2.2 Special versions

For special versions, which are not listed in the order code below 2.1, these specifications apply accordingly, provided that they correspond to the standard version.

2.3 Purpose

The solenoid interlock TKM.../TKF... has been designed to prevent, in conjunction with the control part of a machine, movable safety guards from being opened before hazardous conditions have been eliminated.

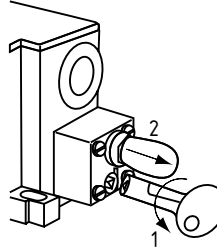


Solenoid interlocks with power to lock principle may only be used in special cases after a thorough evaluation of the risk of accident, since the safety guard can be opened immediately on failure of the power supply or upon activation of the main switch.

TKF..S manual release (during set-up, maintenance, etc.)

The manual release is realised by turning the triangular key (included in delivery) to the left (1) and by pulling simultaneously the release bar (2), so that the locking bolt is pulled into the release position. After the triangular key (1) has been turned back to the left, the release bar (2) returns to its position and the normal locking function is restored. The manual release must be sealed after being put into operation (e.g. sealant etc.). The manual release must not be actuated when loaded by the safety guard.

Manual release TKF..S



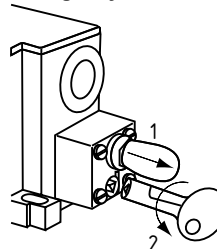
Emergency release TKF..N

(mounting only on the outside of the safety guard)

To realise an emergency release, the release button (1) must be pulled. In this position, the safety guard can be opened. The release button latches. The blocked condition is cancelled by turning the triangular key (2) to the left; the release bar returns to its position and the normal locking function is restored.

The released condition may only be cancelled by an authorised person. The emergency release must not be used when the machinery/plant is in operation.

Emergency release TKF..N



2.4 Technical data

Standards:	IEC 60947-5-1; EN ISO 13849-1; EN 1088; BG-GS-ET-19
Enclosure:	Die-cast aluminium
Actuator and locking bolt:	Galvanised steel / chromated steel
Contact material:	Silver
Protection class:	IP67
Contact type:	change-over with double break Zb, or 2 NC contacts, galvanically separated contact bridges
Switching system:	⊖ IEC 60947-5-1; slow action or snap action, positive break NC contact
Connection:	screw terminals
Cable type:	solid and stranded wire
Cable section:	2 × 2.5 mm ² (incl. conductor ferrules)
Cable entry:	M20 × 1,5
U _{imp} :	2.5 kV
U _i :	400 V
I _{the} :	10 A
Utilisation category:	AC-15, DC-13
I _e /U _e :	8 A / 230 VAC; 5 A / 24 VDC
Max. fuse rating:	10 A gG D-fuse
Magnet:	100% ED
U _s :	24 VAC/DC 110 VAC 230 VAC
Power consumption:	max. 10 W
Ambient temperature:	0 °C ... +50 °C
Mechanical life:	2 million operations
F _{max} :	4000 N
Latching force:	20 N

2.5 Safety classification

Standards:	EN ISO 13849-1
B _{10d} (NC contact):	2.000.000
B _{10d} NO contact at 10% ohmic contact load:	1,000,000
Service life:	20 years

$$MTTF_D = \frac{B_{10D}}{0,1 \times n_{op}} \quad n_{op} = \frac{d_{op} \times h_{op} \times 3600 \text{ s/h}}{t_{cycle}}$$

3. Mounting

3.1 General mounting instructions

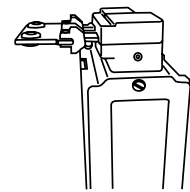
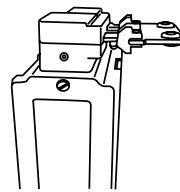
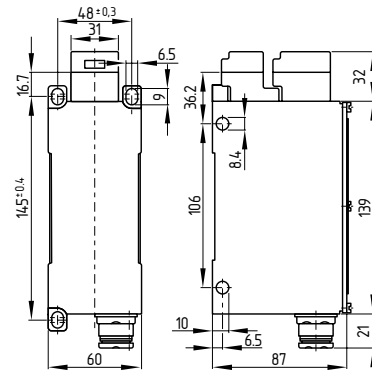
3/2 mounting holes are provided for fixing the switch. The safety switch must not be used as end stop. Any mounting position. The mounting position however must be chosen so that the components are protected against soiling and damage. In case of painting activities, the components must be covered. The supplied fixing material must be used. If another actuating direction is desired, the four screws of the actuating and locking head must be loosened. Turn the actuating and locking head in the desired direction and retighten the screws (tightening torque 0.5 Nm). The default screws installed in the actuating head can be replaced with the supplied tamperproof screws.



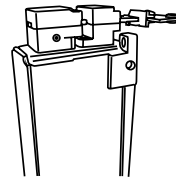
Please observe the remarks of the standards EN ISO 12100, EN 953 and EN 1088.

3.2 Dimensions

All measurements in mm.



Actuator inserted on right-hand side Actuator inserted on left-hand side



Actuator inserted at the rear

4. Rear side Electrical connection

4.1 General information for electrical connection



The electrical connection may only be carried out by authorised personnel in a de-energised condition. At least one magnetic contact with positive break must be integrated in the safety circuit. For the cable entry, suitable cable glands with an appropriate degree of protection must be used.

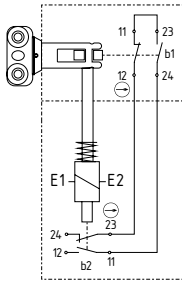
After wiring, the wiring compartment must be cleaned (i.e. remove excess cables etc.). The fixing screws of the wiring compartment cover must be tightened with 0.8 Nm tightening torque.

4.2 Contact variants

Contacts are shown with safety guard closed.

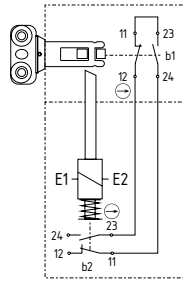
Power to unlock

TKF...

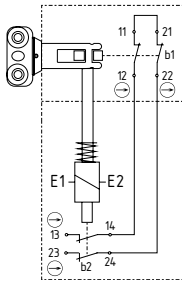


Power to lock

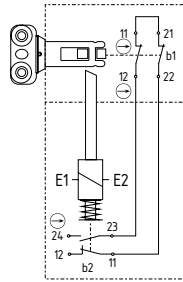
TKM...



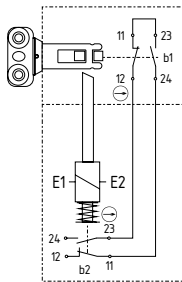
TKF...4Ö



TKM...2TOE



TKM...92



Key

⊖ positive break

5. Set-up and maintenance

5.1 Functional testing

The safety function of the safety components must be tested. The following conditions must be previously checked and met:

1. Fitting of the solenoid interlock and the actuator.
2. Check the integrity of the cable entry and connections.
3. Check the switch enclosure for damage.

5.2 Maintenance

A regular visual inspection and functional test, including the following steps, is recommended:

1. Check for tight installation of the actuator and the switch.
2. Remove particles of dust and soiling.
3. Check cable entry and connections.

Damaged or defective components must be replaced.

6. Disassembly and disposal

6.1 Disassembly

The safety switchgear must be disassembled in a de-energised condition only.

6.2 Disposal

The safety switchgear must be disposed of in an appropriate manner in accordance with the national prescriptions and legislations.

7. EU Declaration of conformity

EU Declaration of conformity



Original
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We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.

Name of the component: TKM / TKF

Type: See ordering code

Description of the component: Interlocking device with electromagnetic interlock for safety functions

Relevant Directives: Machinery Directive 2006/42/EC
RoHS-Directive 2011/65/EU

Applied standards: DIN EN 60947-5-1:2010,
DIN EN ISO 14119:2014

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Place and date of issue: Wuppertal, november 6, 2017

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TKM_TKF-D_EN



The currently valid declaration of conformity can be downloaded from the internet at www.schmersal.net.



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