



**EN** Operating instructions. . . . .pages 1 to 6  
Original

**Content**

**1 About this document**

1.1 Function . . . . . 1

1.2 Target group: authorised qualified personnel. . . . . 1

1.3 Explanation of the symbols used . . . . . 1

1.4 Appropriate use . . . . . 1

1.5 General safety instructions . . . . . 1

1.6 Warning about misuse . . . . . 1

1.7 Exclusion of liability . . . . . 2

**2 Product description**

2.1 Ordering code . . . . . 2

2.2 Special versions. . . . . 2

2.3 Purpose . . . . . 2

2.4 Technical data . . . . . 3

2.5 Safety classification . . . . . 3

**3 Mounting**

3.1 General mounting instructions . . . . . 4

3.2 Dimensions . . . . . 4

**4 Rear side Electrical connection**

4.1 General information for electrical connection. . . . . 4

4.2 Contact variants. . . . . 5

**5 Set-up and maintenance**

5.1 Functional testing. . . . . 5

5.2 Maintenance . . . . . 5

**6 Disassembly and disposal**

6.1 Disassembly. . . . . 5

6.2 Disposal. . . . . 5

**7 EU Declaration of conformity**

**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](http://www.schmersal.net).

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

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 ISO 14119 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:

TZ①②③④⑤⑥⑦

No.	Option	Description
①	M	Power to lock
	F	Power to unlock
②		<b>Magnet</b> <b>Actuator</b>
		1 NC                              1 NC 1 NO
		Both NC contacts wired in series
	W	1 NC                              1 NC / 1 NO
③	S	Manual release
	N	Emergency release N
	.NN	Emergency release .NN
	.NE	Manual release .NE
	.NEM	Manual release .NEM
④	L	with LED indication (only 24 VDC)
⑤	.CHI	actuating head higher and rotated 180°
⑥		<b>Magnet</b> <b>Actuator</b>
	3NC	1 NC                              2 NC / 1 NO
	4NC	2 NC                              2 NC
	.2MOE	2 NC                              1 NC / 1 NO
⑦	24 VDC	U <sub>s</sub> 24 VDC
	24 VAC	U <sub>s</sub> 24 VAC
	115 VAC	U <sub>s</sub> 115 VAC
	230 VAC	U <sub>s</sub> 230 VAC

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



The releases ...N, ...NE and ...NEM mentioned in the order code below 2.1, are not compliant with the test principle GS-ET-19. These versions as well as the .CHI, 4Ö and .2MOE version are not included in the prototype test of the IFA.



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



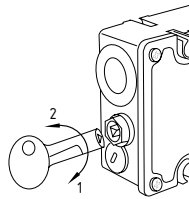
Solenoid interlocks with power to lock principle may only be used in special cases after a thorough evaluation of the risk of accident, since the safety guard can be opened immediately on failure of the power supply or upon activation of the main switch.



The safety switchgears are classified according to ISO 14119 as type 2 interlocking devices.

### Manual release TZF..S (for set-up, maintenance, etc.)

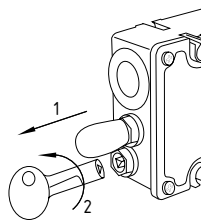
The manual release is realised by turning the triangular key (included in delivery) to the right (1), so that the locking bolt is pulled into the release position. The normal locking function is only restored after the triangular key has been returned to its original position (2). The manual release must be sealed after being put into operation (e.g. sealant etc.) to prevent its utilisation during operation. The manual release must not be actuated when loaded by the safety guard.



### Emergency release TZFN

#### (mounting only on the outside of the safety guard)

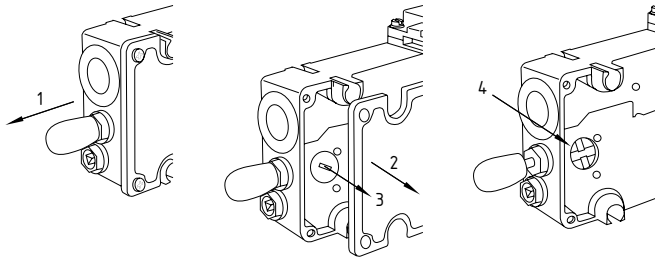
To realise an emergency release, the release button (1) must be pulled. The release button latches. In this position, the safety guard can be opened. To neutralise the blocked condition, use the triangular key (2) (included in delivery) to turn the triangular screw to the left until the release button returns to its original position. 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 TZF.NN

#### (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. To neutralise the blocked condition, the cover of the enclosure (2) must be opened. The power supply of the machinery/plant must be switched off prior to opening the cover. Unscrew the blanking plug (3) and use a screwdriver to push the blocking lever (4) until the release button returns to its original position. Re-tighten the blanking plug and put back the cover of the enclosure (tightening torque for the screw 0.8 Nm). 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.



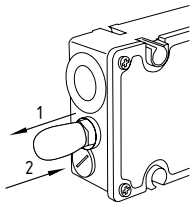
The emergency release should only be used in an emergency.  
The solenoid interlock should be installed and/or protected so that an inadvertent opening of the interlock by an emergency release can be prevented.

The emergency release must be clearly labelled that it should only be used in an emergency. The label can be used that was included in the delivery.

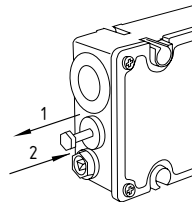
**Manual release TZF...NE / TZF...NEM**  
**(concealed mounting only)**

To realise an emergency release, the release button (1) must be pulled. The release button latches. In this position, the safety guard can be opened. To neutralise the blocked condition, push the release button once more (2). The release operation and cancelling the released condition may only be realised by an authorised person. The manual release must not be used when the machinery/plant is in operation.

**TZF...NE**



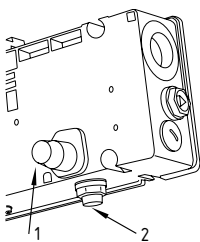
**TZF...NEM**



**Emergency exit TZFS.NF**

**(fitting and actuation only from within the hazardous area)**

To release an emergency exit, the release button (1) must be pressed. In this position, the safety guard can be opened. The release button latches. To neutralise the release, the reset button (2) must be pressed. In the unlocked condition, the safety guard is protected against unintentional locking.



The user must evaluate and design the safety chain in accordance with the relevant standards and the required safety level.



The entire concept of the control system, in which the safety component is integrated, must be validated to the relevant standards.

**2.4 Technical data**

Standards:	IEC 60947-5-1; ISO 14119
Enclosure:	glass-fibre reinforced thermoplastic, self-extinguishing
Actuator and locking bolt:	Galvanised steel / zinc die-cast
Contact material:	Silver
Coding level according to ISO 14119:	low
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, NC contacts with positive break
Connection:	screw terminals
Cable type:	solid and stranded wire
Cable section:	max. 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Cable entry:	M20
Rated impulse withstand voltage U <sub>imp</sub> :	2.5 kV
Rated insulation voltage U <sub>i</sub> :	320 V
Thermal test current I <sub>the</sub> :	4 A
Utilisation category:	AC-15, DC-13
Rated operating current/voltage I <sub>e</sub> /U <sub>e</sub> :	4 A / 230 VAC; 4 A / 24 VDC
Max. fuse rating:	4 A gG D-fuse
Required rated short-circuit current:	1000 A
Positive break travel:	2 × 3.5 mm
Positive break force:	20 N
Magnet:	100% ED
Rated control voltage U <sub>s</sub> :	24 VDC, 110 VAC: 50 / 60 Hz 230 VAC: 50 / 60 Hz
Power consumption:	max. 8.5 W
Ambient temperature:	0 °C ... +50 °C
Mechanical life:	1 million operations
Holding force F:	1,500 N
Latching force:	20 N



Listed 15 HA. Industrial Control Equipment. Enclosure Type I. Use Copper Wire Only. Use 60/75° Wire Only. Tightening Torque 0.8 Nm. For use in NFPA 79 Applications with Listed or Recognized cable glands.

**2.5 Safety classification**

Standards:	ISO 13849-1
Envisaged structure:	
- Basically:	applicable up to Cat. 1 / PL c
- With 2-channel usage and fault exclusion mechanism*:	applicable up to Cat. 3 / PL d with suitable logic unit
B <sub>10D</sub> NC contact:	2,000,000
B <sub>10D</sub> NO contact at 10% ohmic contact load:	1,000,000
Service life:	20 years

\* If a fault exclusion to the 1-channel mechanics is authorised.

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

(Determined values can vary depending on the application-specific parameters h<sub>op</sub>, d<sub>op</sub> and t<sub>cycle</sub> as well as the load.)

If multiple safety components are wired in series, the Performance Level to ISO 13849-1 will be reduced due to the restricted error detection under certain circumstances.

### 3. Mounting

#### 3.1 General mounting instructions

Three mounting holes are provided for fixing the enclosure. The solenoid interlock is double insulated. The use of an earth wire is not authorised. The solenoid interlock must not be used as an end stop. Any mounting position. The components however must be mounted so that the opening of the actuating head is protected against the penetration of dirt (e.g. sand, dust, chips). In case of painting activities, the components must be covered.



In all ...CHI versions, the factory set actuating direction must not be changed. If the actuating direction of these versions is modified, the holding force  $F$  no longer is guaranteed.

If another actuating direction is desired, the four screws of the actuating head must be loosened. Turn the actuating 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.



For power-to-unlock devices (TZF...), the actuator must be inserted when the actuating head is turned. Any non-observance of this prescription could result in the components being damaged.



The safety component and the actuator must be permanently fitted to the safety guards and protected against displacement by suitable measures (tamperproof screws, gluing, drilling, pinning).



Please observe the remarks of the standards ISO 12100, EN 953 and ISO 14119.

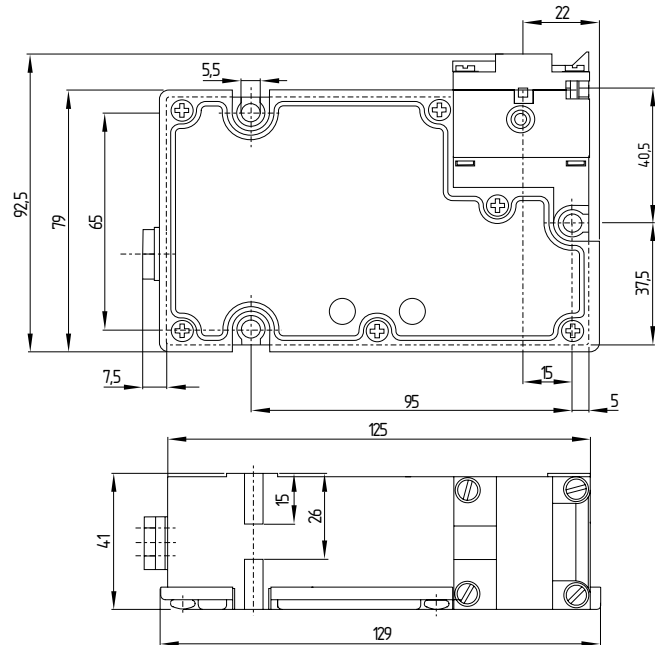


When used in ambient temperatures  $> 40^{\circ}\text{C}$ , the solenoid interlock must be protected against contact with inflammable materials or inadvertent personal contact.

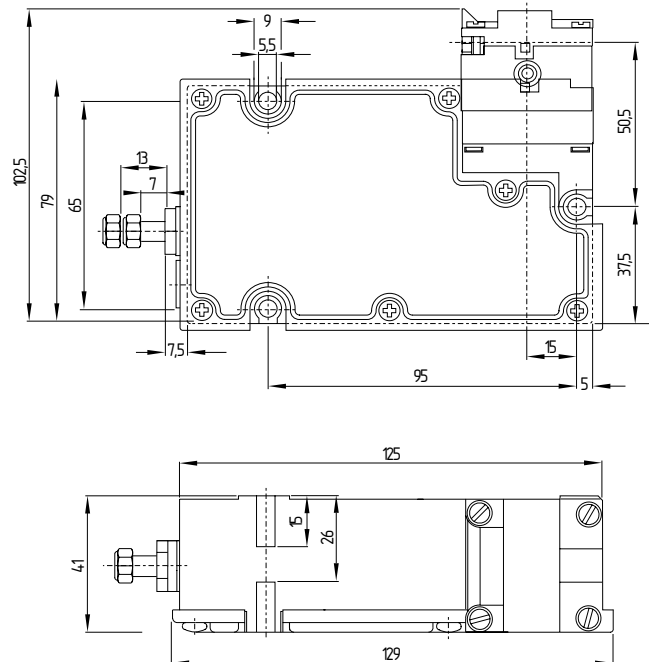
#### 3.2 Dimensions

All measurements in mm.

##### TZ...



##### TZ...CHI



### 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.



If the risk analysis indicates the use of a monitored interlock they are to be connected in the safety circuit with the contacts indicated with the symbol



Components with LED indication only for 24VDC. The monitoring contacts of the LED versions are not potential-free. In combination with these devices, only sequential circuits can be used, in which both channels are controlled with positive potential.

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

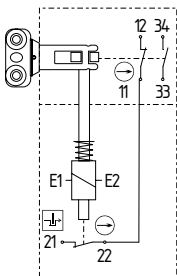
Contact variants are shown in a de-energised condition with actuator inserted.



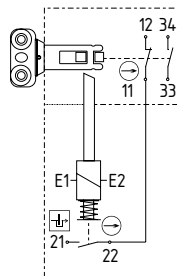
#### LED display:

- 1) Safety guard closed
- 2) Safety guard closed and locked

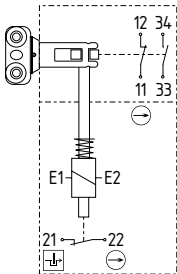
#### Power to unlock TZF...



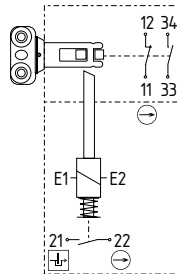
#### Power to lock TZM...



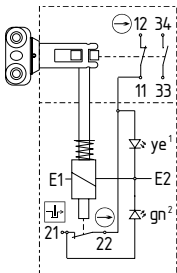
#### TZFW...



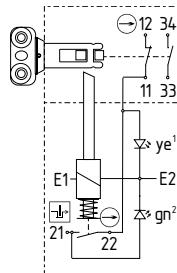
#### TZMW...



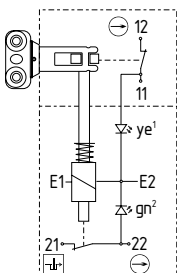
#### TZFL



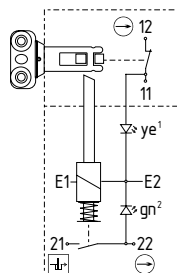
#### TZML



#### TZFWL



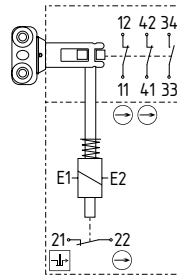
#### TZMWL



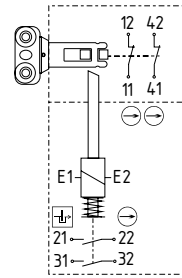
#### TZFW...3NC

#### TZMW4Ö

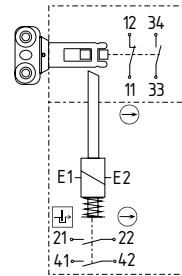
#### Power to unlock



#### Power to lock



#### TZMW...2MOE



#### Key

- positive break NC contact
- Monitoring the interlock according to ISO 14119

## 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.



Adequate measures must be taken to ensure protection against tampering either to prevent tampering of the safety guard, for instance by means of replacement actuators.

**Damaged or defective components must be replaced.**

## 6. Disassembly and disposal


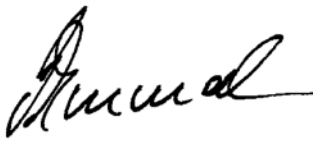
### 6.1 Disassembly

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

<b>EU Declaration of conformity</b>		
Original	K.A. Schmersal GmbH & Co. KG Möddinghofe 30 42279 Wuppertal Germany Internet: www.schmersal.com	
We hereby certify that the hereafter described components both in their basic design and construction conform to the applicable European Directives.		
<b>Name of the component:</b>	TZM / TZF	
<b>Type:</b>	See ordering code	
<b>Description of the component:</b>	Interlocking device with electromagnetic interlock for safety functions	
<b>Relevant Directives:</b>	Machinery Directive RoHS-Directive	2006/42/EC 2011/65/EU
<b>Applied standards:</b>	DIN EN 60947-5-1:2010, DIN EN ISO 14119:2014	
<b>Person authorised for the compilation of the technical documentation:</b>	Oliver Wacker Möddinghofe 30 42279 Wuppertal	
<b>Place and date of issue:</b>	Wuppertal, November 6, 2017	
		
	Authorised signature <b>Philip Schmersal</b> Managing Director	

TZM\_TZF-E-EN



The currently valid declaration of conformity can be downloaded from the internet at [www.schmersal.net](http://www.schmersal.net).



**K. A. Schmersal GmbH & Co. KG**  
Möddinghofe 30, D - 42279 Wuppertal  
Postfach 24 02 63, D - 42232 Wuppertal

Phone: +49 - (0)2 02 - 64 74 - 0  
Telefax: +49 - (0)2 02 - 64 74 - 1 00  
E-Mail: [info@schmersal.com](mailto:info@schmersal.com)  
Internet: <http://www.schmersal.com>