



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.

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 switch-gear, personal hazards or damages to machinery or plant components cannot be excluded. The relevant requirements of the standard EN ISO 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:

TFH 232 ①-AS ②③④

No.	Option	Description
①	ST	Connector plug M 12
②	UE	Overlapping contacts
③	D	With pressure point
④	R	With latching



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

These robust safety foot switches are particularly suitable for industrial applications. All safety foot switches are mounted with a shield to protect against unintentional operation. When the foot pedal is actuated to as far as the pressure point, the NO contact is closed. If, in case of danger, the pedal is actuated beyond the pressure point, then the positive break NC contact is opened and mechanically latched.

The mechanical latching is realised through a slider and a spring, which are mounted in an enclosure. The reset operation is carried out by means of the blue pushbutton, which is located in the top of the cover. This button pushes on the slider, which is returned to its original position due to this action. The reset button is covered with a rubber cap, which protects the inside of the foot switch enclosure against humidity and soiling.

Design/operating principle

The following functionality is not set in the TFH 232 AS safety foot switch:

Representation:	Condition:	Function
0	Not actuated	No authorised operation
1	Actuated up to pressure point	Safety release
0	Pushed-through	No authorised operation
0 → 0	Unlock	No authorised operation

An AS-Interface Safety at Work component functions on the basis of an individual code generator (8 x 4 bit). This safety code is cyclically transmitted over the AS-i network and monitored by the ASM safety monitor.

The component status can be evaluated through a PLC with AS-Interface master. The safety-related functions are enabled by means of the AS-i safety monitor.



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

2.4 Technical data

General data

Standards:	EN 50295, EN 60947-5-1, EN 60947-5-5, IEC 61508, EN ISO 13849-1
Operating principle:	electromechanical
Material Enclosure/cap/cover:	Aluminium die-cast
Enclosure coating:	powder-coated thermoplastic
Material of the pedal:	Plastic, glass-fibre reinforced thermoplastic, self-extinguishing
Response time:	< 100 ms

Mechanical data

Switching principle:	slow action, 1 NO and 1 NC, positive break ⊖
Execution of the electrical connection:	M12 connector plug, 5 poles
Mechanical life:	> 200,000 operations
Switching frequency:	max. 1/s
Resistance to shock:	30 g / 11 ms
Resistance to vibration:	10 ... 150 Hz (0.35 mm / 5 g)

Ambient conditions

Ambient temperature:	-25 °C ... +60 °C
Storage and transport temperature:	-25 °C ... +85 °C
Relative humidity:	30 ... 95%, no condensation, no icing
Protection class:	IP65

Insulation values to IEC/EN 60664-1:

Rated impulse withstand voltage U_{imp} :	0.8 kV
Rated insulation voltage U_i :	32 VDC
Overvoltage category:	III
Degree of pollution:	3

Electrical data - AS-Interface

AS-i supply voltage:	18.0 ... 31.6 VDC, protection against polarity reversal (stabilised PELV units)
AS-I power consumption:	≤ 0.05 A
AS-i device insulation:	internal short-circuit proof
AS-i specification:	Safety-Slave
Version:	V 3.0
Profile:	S-0.B.F.F

AS-i inputs:

- Channel 1: Data bits DI 0/DI 1 = dynamic code transmission
- Channel 2: Data bits DI 2/DI 3 = dynamic code transmission

AS-i Outputs:

DO 0 ... DO 3: no Function

AS-i Parameter bits:

P0: Channel 2 switched;
 P1 ... P3: no function
 Input module address: 0, preset to address 0,
 can be changed through AS-interface bus master
 or hand-held programming device

LED switching conditions display (internal)

LED yellow: Channel 1, SaW-Bit 0.1
 LED green-red (AS-i Duo LED): AS-Interface supply voltage /
 AS-Interface communication error /
 slave address = 0 or
 periphery error detected
 LED yellow: Channel 2, SaW-Bit 2.3



Only for use in Pollution Degree 2 Environment.
 For use in NFPA 79 Applications only.
 Adapters providing field wiring means are available from
 the manufacturer. Refer to manufacturer's information

2.5 Safety classification

Standards: EN ISO 13849-1, IEC 61508
 PL: up to
 Control category: up to 1
 PFH-value: $\leq 1.14 \times 10^{-6}/h$
 up to max. 36,500 switching cycles/year
 PFH-value: $\leq 2.94 \times 10^{-6}/h$
 up to max. 100,000 switching cycles/year
 SIL: up to 1
 Service life: 20 years

3. Mounting

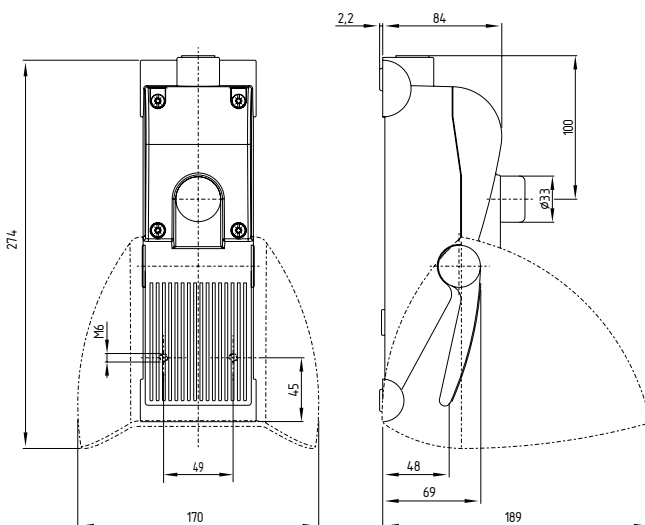
3.1 General mounting instructions



The installation may only be carried out by authorised personnel.

3.2 Dimensions

All measurements in mm.



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.

The connection to the AS-Interface system is realised through an M12 connector. The connector is A- coded, the wiring configuration is determined as follows (to EN 50295).

Pin assignment M12 connector

5-pole



PIN 1: AS-i +
 PIN 2: spare
 PIN 3: AS-i -
 PIN 4: spare
 PIN 5: FE (functional earth connection)

5. Functions and configuration

5.1 Programming the slave address

The slave address is programmed through the AS-i connector. Any address from 1 to 31 can be set by means of the AS-i bus master or a hand-held programming device.

5.2 Configuration of the safety monitor

The safety switch can be configured in the ASIMON configuration software with the following monitoring devices (refer to ASIMON manual):

Double channel independent

- Optionally with startup test



The configuration of the safety monitor must be tested and confirmed by a qualified and authorised safety expert/safety engineer.

5.3 Status signal "safety release"

The "safety release" status signal from a Safety at Work slave can be cyclically queried by the control system through the AS-i master. To this effect, the 4 input bits with the varying SaW code of a Safety at Work slave are evaluated through an OR operation with 4 inputs in the control system.

6. Diagnostic

6.1 Internal LED indications

The LED's have the following meaning (to EN 50295):

LED yellow	Channel 1 / AS-i SaW-Bit 0,1
LED green/red (AS-i duo LED):	AS-Interface supply voltage/ AS-Interface communication error or slave address = 0 or periphery error
LED yellow	Channel 2 / AS-i SaW-Bit 2,3

6.2 Read-out of the parameter ports

The parameter port P0 to P3 of an AS-i slave can be read out through the control interface of the AS-i master (see component description) by means of the "Write parameter" instruction (with hexadecimal value F). This (non-safe) diagnostic information from the reflected parameters or the answer to a "Write parameter instruction" can be used by the user for diagnostic purposes or for the control programme.

Table 3: diagnostic information (P0 ... P3)

Parameter bit	Condition = 1	Condition = 0
0	Channel 2 activated	Channel 2 disabled
1	—	—
2	—	—
3	—	—

7. Set-up and maintenance

7.1 Functional testing

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

1. Check the integrity of the cables and connections
2. Check the switch enclosure for damage
3. Check the functionality of the switch by actuating the safety foot switch

7.2 Maintenance

The safety function of the safety foot switch must be tested at regular intervals.

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

- Check of the safety function
- Check the switch enclosure for damages
- Possible soiling accumulated below the foot pedal must be removed.
- Check the integrity of the cables and connections

Damaged or defective components must be replaced.

8. Disassembly and disposal

8.1 Disassembly

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

8.2 Disposal

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

9. 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: TFH 232 AS

Type: See ordering code

Description of the component: Safety foot switch with integrated AS-i Safety at Work

Relevant Directives:
Machinery Directive 2006/42/EC
EMC-Directive 2014/30/EU
RoHS-Directive 2011/65/EU

Applied standards: DIN EN 60947-5-1:2010,
DIN EN 60947-5-5:2015,
DIN EN ISO 13849-1:2016,
IEC 61508 parts 1-7:2010

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TFH232AS-B-EN



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



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