SCHMERSAL

EN Operating instructions. . . . . .pages 1 to 6
Translation of the original operating instructions

Content

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

101214802-EN / B / 2012-07-12 / AE-Nr. 1664

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.

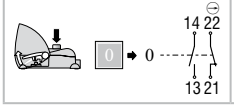
2.3 Destination and use

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.

All safety foot switches are mounted with a shield to protect against unintentional operation. When the foot pedal is actuated to as far as 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 by means of a locking device and a spring in the housing. Reset operation is carried out by means of the blue push button located on the topside of the enclosure. This button pushes the locking device back to its original position. The unlocking button is equipped with a rubber cap, protecting the inner compartment of the foot switch enclosure against moisture and dirt.

Design/operating principle

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

Representation:	Condition:	Function
	not actuated	No authorised operation
	actuated up to pressure point	Safety release
	pushed-through	No authorised operation
	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 Uimp:	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 c
Control category:	up to 1
PFH-value:	≤ 1,14 × 10^{-6}/h up to max. 36.500 switching cycles/year
PFH-value:	≤ 2,94 × 10^{-6}/h up to max. 36.500 switching cycles/year
SIL:	up to 1
Service life:	20 years

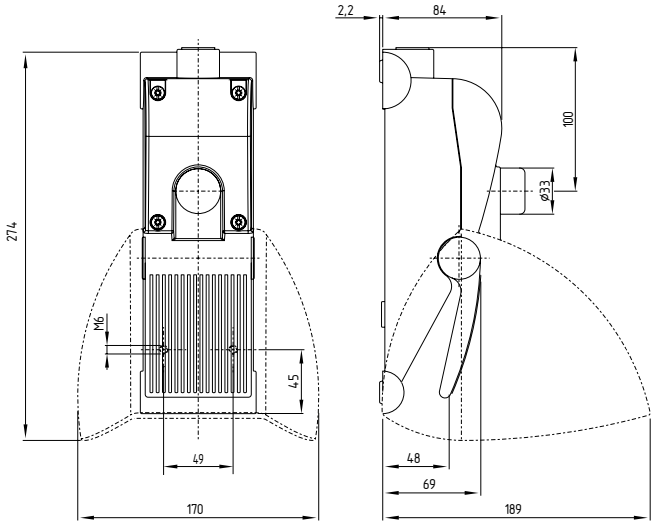
3. Mounting

3.1 General mounting instructions

The fitting may only be carried out by authorised personnel.

3.2 Dimensions

All measurements in mm.



4. 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 that 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):

Yellow LED:	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
Yellow LED:	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. Appendix

9.1 EC Declaration of conformity

SCHMERSAL

EC Declaration of conformity

Translation of the original declaration of conformity

K.A. Schmersal GmbH
Industrielle Sicherheitsschaltsysteme
Möddinghofe 30, 42279 Wuppertal
Germany
Internet: www.schmersal.com

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

Name of the safety component:	TFH 232 AS
Type:	Refer to ordering code
Description of the safety component:	Safety foot switch with integrated AS-i Safety at Work
Harmonised EC-Directives:	2006/42/EC - EC-Machinery Directive 2004/108/EC - EMC-Directive
Person authorized for the compilation of the technical documentation:	Ulrich Loss Möddinghofe 30 42279 Wuppertal
Place and date of issue:	Wuppertal, January 10, 2011

Authorised signature
Heinz Schmersal
Managing Director

TFH 232 AS-A-EN

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

CE

K. A. Schmersal GmbH
Industrielle Sicherheitsschaltsysteme
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
Internet: http://www.schmersal.com