



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 for the safe operation and disassembly of the safety-monitoring module. 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 Schmersal range of products is not intended for private consumers.

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-monitoring module 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: [products.schmersal.com](http://products.schmersal.com).

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-monitoring module, personal hazards or damages to machinery or plant components cannot be excluded.

### 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:

#### FWS 1205<sup>①</sup>

No.	Option	Description
①		Standstill frequencies of the inputs X1/X2:
	A	1 Hz/2 Hz
	B	2 Hz/2 Hz
	C	1 Hz/1 Hz



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.

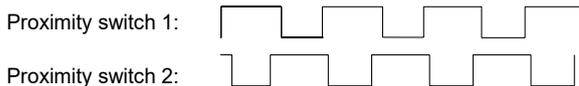
### 2.2 Special versions

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 fail-safe standstill monitor is designed for control cabinet mounting. Standstill monitors serve for the fail-safe detection of the machine standstill and control of solenoid interlocks. As soon as the fail-safe monitor has detected the standstill, the solenoid interlock is controlled through the potential-free contacts of two safety relays. For the standstill detection, the signals of two proximity switches are evaluated.

It is recommended to install the proximity switches on a disc cam so that at least one proximity switch is always actuated. This can be realised by a minimum 1:1 division of the disc cam. When the proximity switches are correctly installed, the following unique signal sequence should be obtained by the utilisation of the switching hysteresis of the proximity switches during the rotation of the disc cam.



The adjustment of the proximity switches is facilitated, when the cam has a 2:1 division (or higher).

### Design

The fail-safe standstill monitor has a dual-channel structure. It includes two safety relays with monitored positive guided contacts, which are controlled by two microprocessors, which are independent from one another. The series-wired NO contacts of the relays build the enabling path.

The feed cables of both proximity switches (power supply) must be laid so that in case of a wire breakage only one proximity switch is dead (star-shaped routing).



To determine the Performance Level (PL) to EN ISO 13849-1 of the entire safety function (e.g. sensor, logic, actuator), an assessment of all relevant components is required.



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: EN 60947-5-1, EN ISO 13849-1, EN ISO 13849-2

Enclosure: glass-fibre reinforced thermoplastic, ventilated

Feedback circuit (Y/N): no

Standstill frequency: Version A: X1/X2: 1 Hz / 2 Hz

Version B: X1/X2: 2 Hz / 2 Hz

Version C: X1/X2: 1 Hz / 1 Hz

Rated operating voltage  $U_e$ : 24 VDC  $\pm$  15%

Rated operating current  $I_e$ : 0.2 A

Rated insulation voltage  $U_i$ : 250 V

Internal electronic protection (Y/N): no

Power consumption: < 5 W

Readiness after switching on voltage: < 1.5 s

#### Inputs monit:

Short-circuit recognition: no

Wire breakage detection: yes

Earth connection detection: yes

Hysteresis: 10% of the standstill frequency

Max. input frequency: 4000 Hz

Min. impulse duration: 125  $\mu$ s

Input resistance: 4 k $\Omega$  against GND

Input signal „1“: 10 ... 30 VDC

Input signal „0“: 0 ... 2 VDC

Max. cable length: 100 m of 0.75 mm<sup>2</sup> conductor

#### Outputs:

Stop category 0: 2

Stop category 1: 0

Number of safety contacts: 2

Number of auxiliary contacts: 0

Number of signalling outputs: 2

Max. switching capacity of the safety contacts: 6 A

Required short-circuit current: 1000 A

Utilisation category to EN 60947-5-1: AC-15: 230 V / 3 A;

DC-13: 24 V / 2 A

Rated impulse withstand voltage  $U_{imp}$ : 4 kV

Thermal test current  $I_{me}$ : 6 A

Contact load capacity: max. 250 VAC, max. 6 A (cos  $\varphi$ =1)

Max. fuse rating: 6 A gG D-fuse

Mechanical life: 20 million operations

LED display: ISD

#### Ambient conditions:

EMC rating: to EMC-Directive

Overvoltage category: III

Degree of pollution: 2

Resistance to vibration: 10 ... 55 Hz / amplitude 0.35 mm

Resistance to shock: 30 g / 11 ms

Environmental temperature: 0 °C ... +55 °C

Storage and transport temperature: -25 °C ... +70 °C

Degree of protection: Enclosure: IP40,

Terminals: IP20,

Clearance: IP54

Mounting: snaps onto standard rail to EN 60715

Connection type: Screw connection

Cable type:	solid strand or multi-strand lead
Cable section:	0.2 ... 2.5 mm <sup>2</sup> (incl. conductor ferrules)
Tightening torque:	0.6 Nm
Weight:	190 g

### 2.5 Classification

Standards:	EN ISO 13849-1
PL:	up to d
Category:	up to 3
PFH-value:	1.0 x 10 <sup>-7</sup> / h Applicable for applications with up to max. 50,000 switching cycles / year and max. 80 % contact load. Diverging applications upon request.
Mission time:	20 years

## 3. Mounting

### 3.1 General mounting instructions

Mounting: snaps onto standard rails to EN 60715.

### 3.2 Dimensions

Device dimensions (H/W/D): 100 x 22.5 x 121 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.

Settle length  $x$  of the conductor: 8 mm



Wiring examples: see appendix



To avoid EMC disturbances, the physical ambient and operational conditions at the place where the product is installed, must meet the provisions laid down in the paragraph "Electromagnetic Compatibility (EMC)" of EN 60204-1.

## 5. Operating principle and settings

### 5.1 Operating principle after the operating voltage is switched on

After the operating voltage has been applied, the internal functions and the condition of the safety relays will be tested by the fail-safe standstill monitor during the initialization phase. After this check, the inputs of the fail-safe standstill monitor will be evaluated. The cyclic frequency of the connected proximity switches is compared to a programmed limit frequency. If the value drops below the programmed frequency at both inputs, both safety relays are actuated and the enabling path is closed. If the limit frequency is exceeded at least at one input, the safety relays are disabled.

If the programmed upper or lower limit frequency is exceeded, the frequencies of both proximity switches are compared. A divergence of over 30% will be considered faulty and signalled. The LED flashes yellow (refer to ISD table).

### Inputs

X1: input for proximity switch 1

X2: input for proximity switch 2

X3: input for reset switch

A rising (0/1) edge at X3 deletes all ascertained errors of the fail-safe monitor and causes the relays to be switched off.

### Outputs

(13/14, 23/24): NO contacts for safety functions (enabling paths)

### Additional transistor outputs Y1/Y2

Y1: Authorized operation; the enabling path is closed

Y2: "Error"; if the fail-safe standstill monitor detects an error, Y2 is switched.

### Notice

The additional outputs Y1 and Y2 must not be integrated in the safety circuit.

The feed cables of both proximity switches (power supply) must be laid so that in case of a wire breakage only one proximity switch is dead (star-shaped routing). According to EN ISO 13849-1, category 3, an individual fault must not lead to a loss of safety.

## 6. Set-up and maintenance

### 6.1 Functional testing

The safety function of the safety-monitoring module must be tested.

The following conditions must be previously checked and met:

1. Correct fitting of the safety-monitoring module.
2. Fitting and integrity of the power cable.

### 6.2 Maintenance

In the case of correct installation and adequate use, the safety-monitoring module features maintenance-free functionality.

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

- Check the correct fixing of the safety monitoring module
- Check the cable for damage.

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

## 7. Disassembly and disposal

### 7.1 Disassembly

The safety monitoring module must be disassembled in the de-energised condition only.

### 7.2 Disposal

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

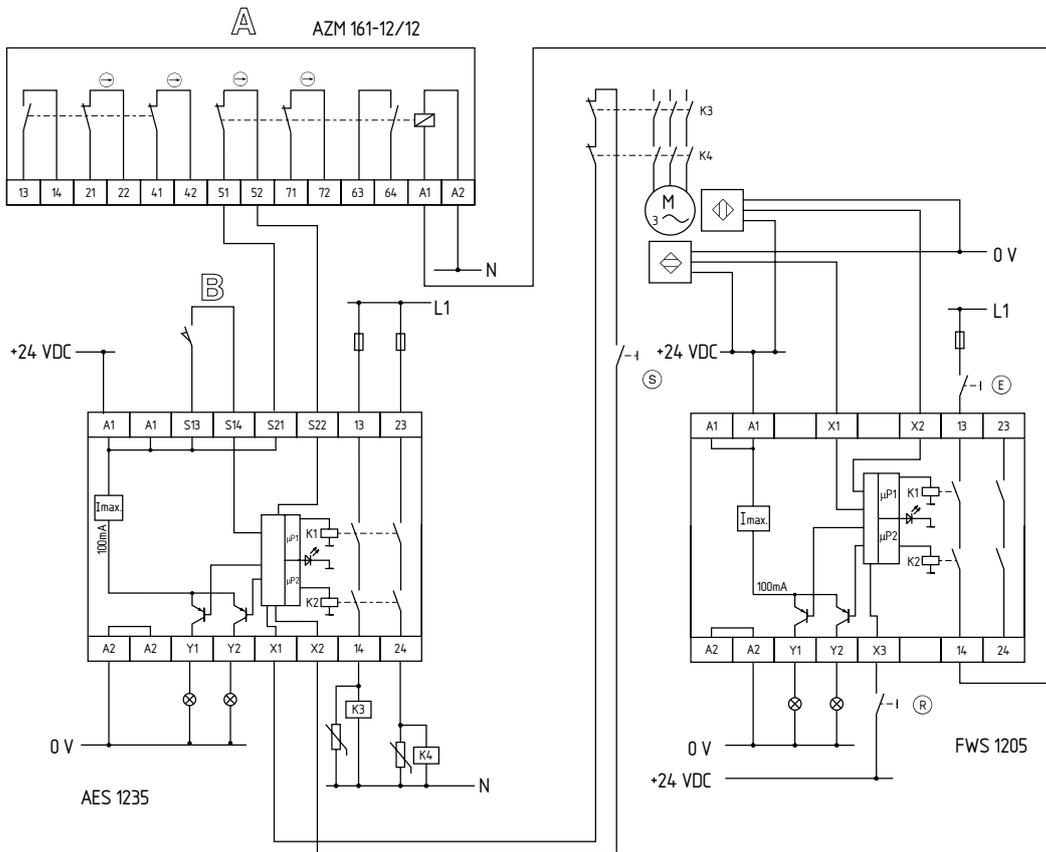
## 8. Appendix

### 8.1 Wiring examples

The application examples shown are suggestions. They however do not release the user from carefully checking whether the switchgear and its set-up are suitable for the individual application.

The wiring diagram is shown with guard doors closed and in a de-energised condition. Inductive loads (e.g. contactors, relays, etc.) are to be provided with suitable interference suppression circuitry.

Avoid laying proximity switch connection cables in areas where strong interference signals are present (e.g. frequency converters or cable leads from powerful electric motors); the utilisation of shielded cables may be necessary.



**Key**

- Ⓢ Start button (optional)
- ⓔ Release button (optional)
- Ⓡ Reset button
- ⚡ Inductive proximity switch
- A Solenoid interlock
- B Safety switches

**8.2 Integral System Diagnostics (ISD)**

The safety monitoring modules LED display to show the different switching conditions and faults. The following tables show the different switching conditions.

**Tables switching condition indication**

Diagnostic LED	System condition
The LED is green.	Enabling paths closed
LED flashes yellow (0.5 Hz)	When two proximity switches are connected, only one switch has exceeded the lower limit frequency, the enabling paths are open
LED flashes yellow (2 Hz)	The motor is running, the limit frequency has been exceeded. The enabling paths are open

In case of error messages, the LED lights orange intermittently. During these intermissions, the LED flashes with short pulses.

**Table error indications**

Indication (orange) LED	Error	Cause
1 impulse 	Frequency sensor 1 too low, Error input X1	Defective lead Defective proximity switch
2 impulses 	Frequency sensor 2 too low, Error input X2	Defective lead Defective proximity switch
4 impulses 	Interference at inputs, no safe evaluation	Too high capacitive or inductive interference at the inputs or the supply voltage lead
5 impulses 	One or both relays did not close within the monitoring time	Too low operating voltage $U_e$ , Defective relay
6 impulses 	Relay not disabled upon the actuation of the switch	Welded relay contact
7 impulses 	Malfunction of internal data lines	Interruption of the internal data transfer due to a high capacitive or inductive interference on the internal data lines

**Deleting the error message**

The error message is deleted, when the error cause is eliminated and the FWS can check all functions.

9. EU Declaration of conformity

EU Declaration of conformity



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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:** FWS 1205

**Type:** See ordering code

**Description of the component:** Fail-safe standstill monitor

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

**Applied standards:**  
EN 60947-5-1:2017 + AC:2020  
EN ISO 13849-1: 2015  
EN ISO 13849-2: 2012

**Notified body, which approved the full quality assurance system, referred to in Appendix X, 2006/42/EC:**  
TÜV Rheinland Industrie Service GmbH  
Am Grauen Stein, 51105 Köln  
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**Place and date of issue:** Wuppertal, August 4, 2023

Authorised signature  
**Philip Schmersal**  
Managing Director

FWS1205-F-DE



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



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