Operating instructions
Safety Contact Expansion ESM-TE3..

EUCHNER

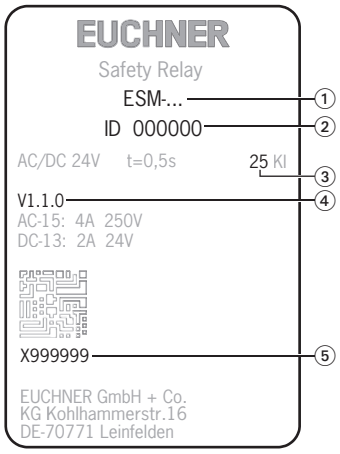
Scope

These operating instructions apply to all safety contact expansions ESM-TE3...V1.1.X. These operating instructions, the document *Safety information* and any available data sheet form the complete user information for your device.

Important!

Make sure to use the operating instructions valid for your product version. The version numbers can be found on the type label of your product. Please contact the EUCHNER service team if you have any questions.

Type label



① Item designation
② Item number
③ Year of manufacture
④ Version
⑤ Serial number

Supplementary documents

The overall documentation for this device consists of the following documents:

Document title (document number)	Contents	
Safety information (2525460)	Basic safety information	
Operating instructions (2090075)	(this document)	
Declaration of conformity	Declaration of conformity	
Any additions to the operating instructions	Take any associated additions to the operating instructions or data sheets into account.	

Important!

Always read all documents to gain a complete overview of safe installation, setup and use of the device. The documents can be downloaded from www.euchner.com. For this purpose, enter the doc. no. or the order number for the device in the search box.

Notes about the EU Data Act

During operation, this product produces data that are available to the user in accordance with EU Data Act 2023/2854. The corresponding chapters in these operating instructions explain what these data are and how you can access and use them.

Correct use

The ESM-TE3.. is a contact expansion that can be operated with any basic module from the EUCHNER ESM series, e.g. ESM-BA2.. or ESM-BA3.., in order to permit delayed switch-off of machine parts.

This could be the case if it is safer to return a tool to its initial position first instead of stopping operation immediately, for example. The ESM-TE3.. was designed as a component for a modular system: any combination of ESM-TE3.. units and non-time-delayed contact expansions ESM-ES3.. can be interconnected with just a few lines, permitting realization of an overall system with different times and the specific number of safety contacts required.

Before the device is used, a risk assessment must be performed on the machine, e.g. in accordance with the following standards:

- EN ISO 13849-1
- EN ISO 12100
- EN IEC 62061.

Correct use includes observing the relevant requirements for installation and operation, particularly based on the following standards:

- EN ISO 13849-1
- EN IEC 60204-1
- EN IEC 62061.

Important!

- The user is responsible for the integration of the device in a safe overall system. For this purpose, the overall system must be validated, e.g. in accordance with EN ISO 13849-1.
- The device user must assess and document remaining risks.
- If a data sheet is included with the product, the information on the data sheet applies.

Safety precautions

⚠ WARNING

- Installation and setup of the device must be performed only by authorized personnel.

- Observe the country-specific regulations when installing the device.
- The electrical connection of the device is only allowed to be made with the device isolated.
- The wiring of the device must comply with the instructions in these operating instructions, otherwise there is a risk that the safety function will be lost.
- It is not allowed to open the device, tamper with the device or bypass the safety devices.
- All relevant safety regulations and standards are to be observed.
- The overall concept of the control system in which the device is incorporated must be validated by the user.
- Failure to observe the safety regulations can result in death, severe injuries and serious damage.
- Note down the version of the device (see type label *Vx.x.x*) and check it each time prior to setup. If the version changes, the use of the device in the overall application must be validated again.

Features

- 3 safe, redundant, time-delayed relay outputs 1 auxiliary contact (error monitoring)
- Control via basic module from the EUCHNER ESM series
- Continuously adjustable time delay (1 … 30 s) or fixed time delay (ESM-TE3...-05S)
- Modular, freely configurable safety system
- Error monitoring by basic module
- Indication of the switching state via LED
- Up to PL d, category 3, SILCL 2

Function

The time-delayed safe contact expansion ESM-TE3.. in combination with a basic module from the EUCHNER ESM series is designed for the safe isolation of safety circuits according to EN IEC 60204-1 and can be used up to safety category 3, PL d according to EN ISO 13849-1.

The ESM-TE3.. *provides a control voltage of DC 24 V at terminal* S11. In order for the ESM-TE3.. to switch together with the connected basic module, the control voltage at *S11* is connected to terminals *S15* and *S16* of the ESM-TE3.. via one of the safety contacts of the basic module (see Fig. 5 and Fig. 6). The safety contacts of the basic module close when the basic module is activated, and the DC 24 V control voltage from terminal *S11* is then at terminals *S15* and *S16* of the ESM-TE3... The safety contacts of the ESM-TE3.. switch immediately.

The basic module disconnects the control voltage and the safety contacts in the ESM-TE3.. open after the time set on the ESM-TE3.. elapses (the power supply must be available during this time) if there is demand for the safety function from the emergency stop circuit (e.g. safety door opened).

If a fault occurs in the ESM-TE3.., this is detected by the basic module via terminals *S25* and *S26*.

Independent operation without a basic module is not possible.

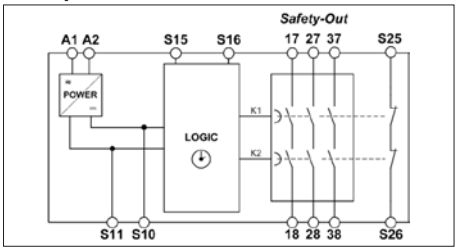


Fig. 1: Block diagram for ESM-TE3..

Mounting

As per EN IEC 60204-1, the device is intended for installation in control cabinets with a minimum degree of protection of IP54. It is mounted on a 35 mm mounting rail according to EN IEC 60715 TH35.

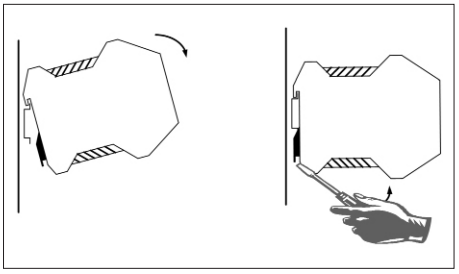
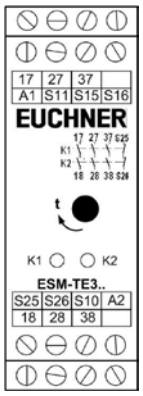


Fig. 2: Mounting/removing

Electrical connection

- When the 24 V version is used, a safety transformer according to EN IEC 61558-2-6 or a power supply unit with electrical isolation from the mains must be connected.
- External fusing of the safety contacts must be provided.
- A maximum length of the control lines of 1,000 m with a conductor cross-section of 0.75 mm² must not be exceeded.
- The conductor cross-section must not exceed 2.5 mm².
- If the device does not function after setup, it must be returned to the manufacturer unopened. Opening the device will void the warranty.
- A suppressor circuit suitable for inductive loads (e.g. free-wheeling diode) is to be provided.



A1	Power supply
A2	Power supply
S11	DC 24 V control voltage
S10	Control line
S15	Control line
S16	Control line
S25	Error monitoring
S26	Error monitoring
17-18	Time-delayed safety contact 1
27-28	Time-delayed safety contact 2
37-38	Time-delayed safety contact 3

Fig. 3: Connections

Setup procedure

Notice

The items listed under *Electrical connection* must be observed during setup.

1. Wiring ESM-TE3..:

Wire the ESM-TE3.. with the EUCHNER basic module according to your application (see Fig. 5 and Fig. 6).

2. Wiring basic module:

Wire the basic module according to the required Performance Level determined (see operating instructions for the basic module).

3. Wiring feedback loop:

Wire the feedback loop as shown in the examples in Fig. 7 and Fig. 8.

4. Wiring power supply:

Connect the power supply to terminals *A1* and *A2* (see Fig. 9).

Attention: Wiring only in de-energized state.

5. Setting time delay:

Set the desired time delay on the rotary knob and seal the knob with the supplied sticker. (For fixed time variant ESM-TE3..-05S this step is not required because a fixed time delay of 0.5 seconds is set).

Attention: Tick marks should be regarded only as a setting aid. Always make sure to measure the time delay.

6. Starting the device:

Switch the operating voltage on.

Attention: If the *Automatic start* behavior is set on the basic module, the safety contacts will close immediately.

If the *Monitored manual start* behavior is set, close the start button to close the safety contacts.

The LEDs *K1* and *K2* on the basic module and on the ESM-TE3.. illuminate.

7. Activating safety function:

Open the emergency stop circuit by actuating the connected safety switch. The safety contacts of the basic module open immediately; the safety contacts of the ESM-TE3.. open after the time set on the rotary knob elapses.

Attention: Measure the time delay.

8. Reactivating:

Close the emergency stop circuit. If *Automatic start* is selected on the basic module, the safety contacts will close immediately.

If the *Monitored manual start* behavior is set, close the start button on the basic module to close the safety contacts of the basic module and the ESM-TE3...

What to do in case of a fault?

Device does not switch on:

- Check the wiring of the ESM-TE3.. and the basic module by comparing it with the wiring diagrams (also see operating instructions for the basic module).
- Check the safety switch used on the basic module for correct function and adjustment.
- Check whether the emergency stop circuit of the basic module is closed.
- Check whether the start button on the basic module (with manual start) is closed.
- Check the operating voltage at *A1* and *A2* on the basic module and on the ESM-TE3...
- Is the feedback loop closed?

Device cannot be switched on again after an emergency stop:

- Check whether the emergency stop circuit was closed again.
- Was the start button opened before closing of the emergency stop circuit (with manual start)?
- Is the feedback loop closed?
- Is the power supply present during the time sequence?

If the fault persists, perform the steps listed under *Setup procedure*.

If these steps do not remedy the fault either, return the device to the manufacturer for examination.

Opening the device is impermissible and will void the warranty.

Maintenance

The device must be checked once per month for proper function and for signs of tampering and bypassing of the safety function. Check the wiring of the device and activate the emergency stop function. Check the time delay.

The device is otherwise maintenance-free, provided that it was installed properly.

Disposal

Pay attention to the applicable national regulations and laws during disposal.

Notes about UL requirements

This device is intended to be used with a Class 2 power source in accordance with UL1310. Connecting cables for safety switches installed at the place of use must be separated from all moving and permanently installed cables and un-insulated active elements of other parts of the system that operate at a voltage of over 150 V. A constant clearance of 50.8 mm must be maintained. This does not apply if the moving cables are equipped with suitable insulation materials that possess an identical or higher dielectric strength compared to the other relevant parts of the system.

Declaration of conformity

The product complies with the requirements according to

- Machinery Directive 2006/42/EC (until January 19, 2027)
- Machinery Regulation (EU) 2023/1230 (from January 20, 2027)

The EU declaration of conformity can be found at www.euchner.com. Enter the order number of your device in the search box. The document is available under *Downloads*.

Service

If servicing is required, please contact:

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Germany

Service telephone:
+49 711 7597-500

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Technical data

Parameter	Value		
Version	**ESM-TE301**	**ESM-TE302**	**ESM-TE303**
Operating voltage	AC/DC 24 V	AC 115 V	AC 230 V
Rated supply frequency	50 - 60 Hz		
Permissible deviation	± 10%		
Power consumption	DC 24 V Approx. 1.5 W	AC 230 V Approx. 4.0 VA	
Time delay ESM-TE3.. ESM-TE3..-05S	 1 … 30 s, continuously adjustable 0.5 s, fixed		
Control voltage at S11	DC 24 V		
Control current S11 … S14	Approx. 40 mA		
Safety contacts	3 NO contacts		
Monitoring contacts	1 NC contact (monitoring contact for basic module)		
Max. switching voltage	AC 250 V		
Safety contact breaking capacity (17-18, 27-28, 37-38)	AC: 230 V, 1,500 VA, 6 A for ohm resistive load 230V, 4A for AC-15		
	DC: 24 V, 30 W, 1.25 A for ohm resistive load 24V, 2A, for DC-13		
Max. cumulative current of all safety contacts	10.5 A		
Minimum contact load	24 V, 20 mA		
Contact fuses	6 A gG		
Conductor cross-section	0.14 - 2.5 mm²		
Tightening torque (min./max.)	0.5 Nm/0.6 Nm		
Typ. switch-on delay/switch-off delay for the normally open contacts upon demand from the safety circuit	< 60 ms/< 50 ms		
Max. length of control line	1,000 m with 0.75 mm²		
Contact material	AgNi		
Mech. contact life	Approx. 1 x 10^7		
Test voltage	2.5 kV (control voltage/contacts)		
Rated impulse withstand voltage, leakage paths/air gaps	4 kV (DIN VDE 0110-1)		
Rated insulation voltage	250 V		
Degree of protection	IP20		
Temperature range	DC 24 V: -15 °C to +60 °C		
	AC 230 V/115 V/24 V: -15 °C to +40 °C		
Installation altitude	≤ 2000 m (above sea level)		
Degree of contamination	2 (DIN VDE 0110-1)		
Overvoltage category	3 (DIN VDE 0110-1)		
Weight	Approx. 230 g		
Mounting	Mounting rail acc. to EN IEC 60715 TH35		
Characteristics according to EN ISO 13849-1 for all variants of the series ESM-TE3 [1]			
Load (DC-13; 24 V)	**≤ 0.1 A**	**≤ 1 A**	**≤ 2 A**
n_{op}	≤ 400,000 cycles	≤ 73,000 cycles	≤ 17,000 cycles
T_{10D}	20 years		
Category	3		
PL	d		
PFH	1.03 x 10^{-7} 1/h		

1) Additional data can be requested from the manufacturer for applications that deviate from these conditions.

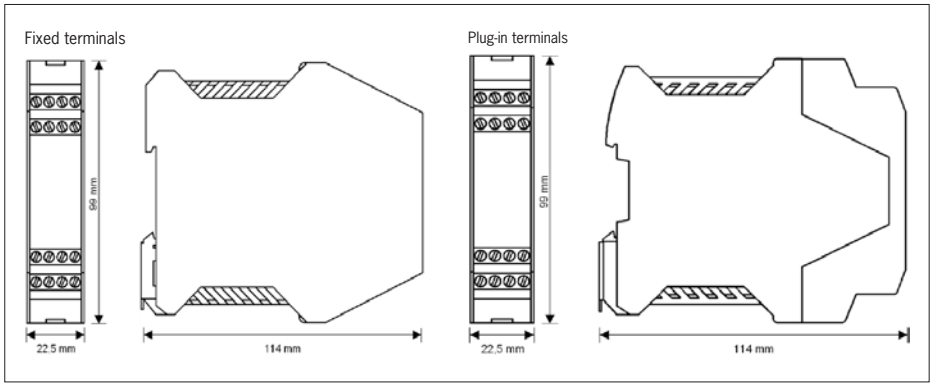

Fig. 4: Dimension drawing for ESM-TE3..

Applications

Depending on the application, the device must be wired with an EUCHNER basic module as shown in Fig. 5 and Fig. 6.

Wiring

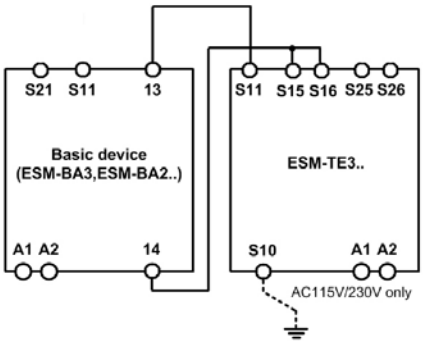

Fig. 5: Connection of ESM-TE3.. to basic module

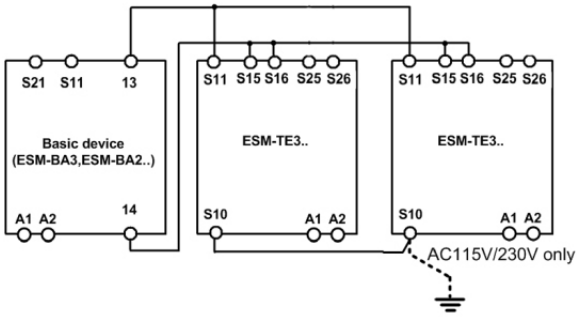

Fig. 6: Connection of several ESM-TE3.. *units to basic module*

Wiring of the ESM-TE3.. via only 4 lines:

A safety contact of the basic module (e.g. *13 - 14*) activates the relays of the ESM-TE3.. (*S11* and *S15/S16*).

Two lines on *S25* and *S26* are required for feedback/error monitoring. This is to be wired, depending on the application, as per Fig. 7 or Fig. 8.

An error in the ESM-TE3.. thereby prevents the entire safety chain from restarting. Ground faults in the control lines are detected in addition to internal faults.

If further ESM-TE3.. units are to be integrated into the system, terminals *S11* must be connected in parallel on all ESM-TE3.. units. This also applies to terminals *S10* and terminals *S15/S16*.

The feedback loops (*S25 - S26*) for the individual expansion devices must be connected in series with the start for the basic module (cf. Fig. 7 or Fig. 8).

Notice:

In order to activate ground fault monitoring, *S10* must be connected to PE (protective earth) on the AC115/230 V devices. With AC/DC 24 V, connect PE only to the power supply unit according to EN IEC 60204-1.

Feedback loop

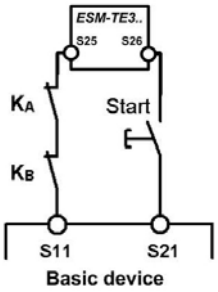

Fig. 7: Feedback loop with monitored manual start. Monitoring of externally connected contactors or expansion modules.

Contactors connected to the ESM-TE3.. or the basic module are monitored via the feedback loop of the basic module. *KA* and *KB* are the positively driven contacts of the connected contactor or expansion module.

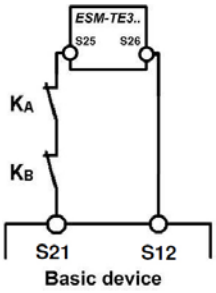

Fig. 8: Feedback loop with automatic start.

Contactors connected to the ESM-TE3.. or the basic module are monitored via the feedback loop of the basic module. *KA* and *KB* are the positively driven contacts of the connected contactor or expansion module.

Power supply and safety contacts

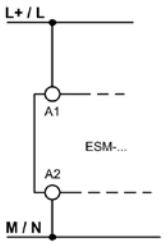

Fig. 9: Connection of the power supply to terminals A1 and A2 (power supply according to the technical data).

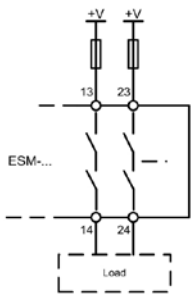

Fig. 10: Connection to switching loads on safety contacts (example contact configuration. Differing according to device type. Switching voltages +V corresponding to technical data).