

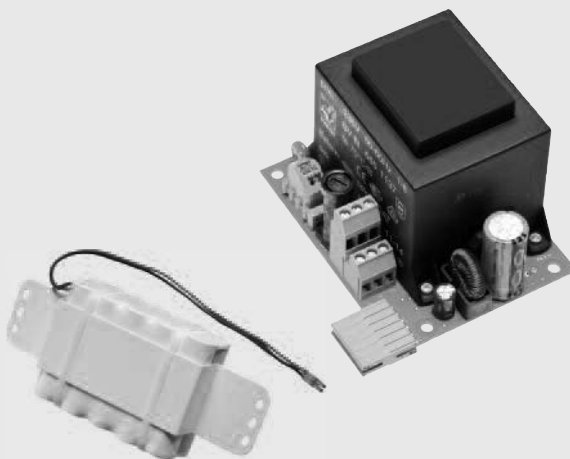
## Operating and Installation Manual

### **EASYLAB Expansion modules Type EM-TRF**

for 230 V AC mains voltage

### **Type EM-TRF-USV**

for 230 V AC mains voltage;  
provides uninterruptible power supply (UPS)



**TROX<sup>®</sup> TECHNIK**

The art of handling air

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# 1 General information

This operating and installation manual describes the EM-TRF and EM-TRF-USV expansion modules that are used to connect TCU 3 EASYLAB controllers and TAM adapter modules to a 230 V AC supply voltage.

To ensure complete functioning of the expansion modules it is essential to read this operating and installation manual before starting any work, and to comply with it. The manual must be given to the facilities manager when handing over the system. The facilities manager must include the manual with the system documentation.

The manufacturer does not accept any liability for any malfunction or damage resulting from non-compliance with the manual or non-compliance with relevant statutory regulations.

## Other applicable documentation

In addition to this manual, the following documents apply:

- Control Systems catalogue
  - EASYLAB EM-TRF, EM-TRF-USV expansion modules
  - EASYLAB TCU3 controller
  - EASYLAB TAM adapter module
- EASYLAB TCU3 controller Operating and Installation Manual (M375EV0)
- Project-specific wiring documents

## Symbols used in this manual



### **Danger!**

Designates danger to life and limb due to electrical voltage.



### **Warning!**

Designates danger to life and limb.



### **Important!**

Designates danger that can cause minor personal injury or damage to property.

## 2 Safety and correct use

### General information regarding safety

Only skilled qualified personnel are allowed to perform the described work on the expansion modules.

Only skilled qualified electricians are allowed to work on the electrical system.

For all work performed on the EASYLAB components, the following regulations and guidelines must be complied with. This applies in particular to the following German country specific regulations or as appropriate in the country where the installation is taking place:

- Equipment and Product Safety Laws (GPSG)
- Industrial Health and Safety Regulations (BetrSichV)
- Accident Prevention Regulations (BGV A1, BGV A3)

### General safety measures

#### • Large temperature differences

Condensation can damage the electronics beyond repair. If the expansion module has been kept in an unheated area, wait at least two hours before switching on the supply voltage for commissioning.

#### • Electrostatic charge

Electrostatic charge can damage the electronics. To avoid this, first touch an equipotentially bonded metal surface, e.g. a water pipe, for electrical earthing before you remove the expansion module from its protective wrapping. Avoid skin contact with any components or printed circuits on the expansion module or the main PCB.

#### • Weight

The expansion PCB is equipped with a transformer that has a comparatively high weight. To avoid injury and damage, be sure to grip the PCB properly and to handle it with care.

#### • Installing the PCB

Tighten the mounting screws only hand-tight to avoid damage to the PCB or to the fixing points in the casing.

#### • Foreign matter and liquids

If liquid gets onto the PCB or inside the expansion module, let the expansion module completely dry before commissioning. Remove foreign matter, if any.

If the device emits a smell or smoke, have it checked by the manufacturer.

### Correct use

The EM-TRF and EM-TRF-USV expansion modules are used to connect TCU 3 EASYLAB controllers and TAM adapter modules to a 230 V AC supply voltage.

- Use the expansion module only with a TCU3 EASYLAB controller or a TAM adapter module.
- Do not connect EASYLAB controllers with an EM-TRF or EM-TRF-USV expansion module to a 24 V power supply.
- Only connect the expansion module to the dedicated socket on the main PCB of the TCU3 or TAM.
- Observe the technical data of the expansion module.

### Incorrect use

Do not use the expansion module outdoors, in wet areas, or in potentially explosive atmospheres.

### Residual risks

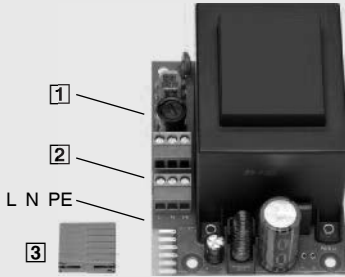
Uninterruptible power supply is provided only with the EM-TRF-USV being connected to a fully charged battery pack. For maximum operating times with uninterrupted power supply refer to the technical data.

# 3 Product description

## Product overview and functional description

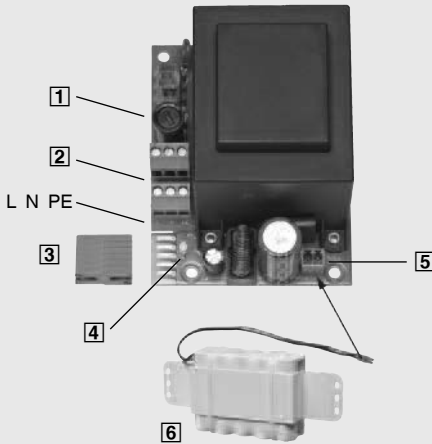
### Product overview

#### EM-TRF



- 1 Micro fuse  
F 500 mA T, 250 V
- 2 Terminal block for supply voltage
- 3 PCB connection plug

#### EM-TRF-USV



- 4 Operating state indicator light
- 5 Socket for battery pack
- 6 Battery pack

### Functional description

Once the expansion module has been connected to the 230 V AC supply voltage (mains voltage), the transformer reduces this voltage to 24 V AC to be supplied to the controller and its modules. An LED indicates whether voltage is being supplied.

### Additional function of the EM-TRF-USV

If the supply voltage (mains voltage) fails, the battery pack takes over and supplies voltage to the controller and any connected components. The alarm function is always maintained; if the emergency voltage supply covers also the air conditioning system, that function is also maintained.

### 3 Product description

#### Technical data

EM-TRF · EM-TRF-USV	
Supply voltage	230 V AC ±10 %, 50-60 Hz
Power consumption	up to 40 VA for a controller with all expansion modules up to 35 VA for a fume cupboard controller with control panel up to 33 VA for a room controller with room control panel up to 29 VA for a room controller without room control panel up to 9 VA for an EASYLAB TAM adapter module
Primary fuse	500 mA, slow blow, 250 V
Terminal block	Cable cross-section up to 2.5 mm <sup>2</sup>
Acceptable temperature range	for storage –10 to +70 °C for operation 0 to +50 °C
Protection level	IP 20
Dimensions	B × H × T: 78 × 65 × 100 mm
Weight	1,3 kg

#### Additional data for the EM-TRF-USV

USP operation One controller (TCU3 or TAM) with a control panel	Approx. 4.5 h for maintaining normal operation Approx. 6 h for a defined blade position and indication of mains voltage interruption
Shelf life	6 months from delivery to commissioning
Service life	Up to 4 years
Weight	2,4 kg (incl. Battery pack 1,1 kg)

# 4 Transport, storage and packaging

## Delivery check

Check delivered items immediately after arrival for transport damage and completeness. In case of any damage or an incomplete shipment, inform the shipping company and your TROX contact person immediately.

A complete shipment includes:

- Expansion module PCB
- PCB connection plug
- Safety latch
- Fixing screws
- Operating and installation manual

Additionally for the EM-TRF-USV expansion module:

- Battery pack with connecting cable and plug
- Fixing bracket
- Fixing screws

## Transport on site

- If possible, take the expansion module in the transport packaging up to the installation location.
- Do not remove the protective wrapping until just before installation.

## Storage

If you need to store the expansion module temporarily, make sure that the following conditions apply:

- Leave the unit in its packaging and do not expose it to the effects of weather.
- Store the unit in a dry place and away from direct sunlight.
- Temperature:  $-10^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$   
Maximum humidity: 90% (non-condensing)

## Packaging

Properly dispose of packaging material.

# 5 Installation

For installation, wiring, and commissioning observe the recognised technical regulations, especially safety and accident prevention regulations.

For any wiring work follow the national and local regulations and guidelines for electrical installation.



### Danger!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.



### Important!

Danger of injury or damage to electronic parts from the weight of the transformer.

To avoid injury and damage, be sure to grip the PCB properly and to handle it with care.

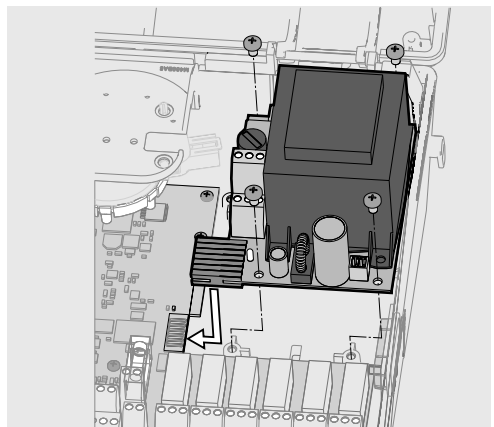
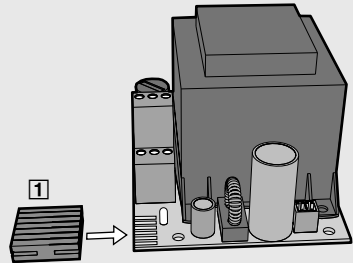
## Installing the EM-TRF and EM-TRF-USV

### Step 1

1. Interrupt the voltage supply to the TCU3 controller or TAM adapter module.
2. Open the lid.
3. Slide the 6-pin PCB connection plug **1** onto the expansion module PCB. The tiny plastic bridge on the plug fits into the cut-out of the expansion module PCB. Make sure that the plug locks into place.

### Step 2

1. Lower the expansion module with the connection plug into the casing of the TCU3 or TAM and place it in such a way that the connection plug is aligned with the appropriate cut-out of the main PCB.
2. Push the expansion module towards the main PCB until the connection plug has been firmly placed in the cut-out, and the fixing points (holes) of the expansion module PCB and the main PCB are aligned.
3. Fix the expansion module with the supplied four fixing screws.





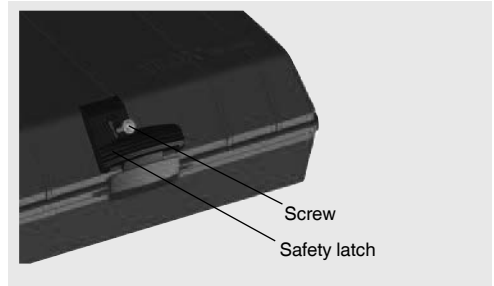
# 5 Installation

## Fitting the safety latch

For safety reasons the TCU3 casing must be locked in such a way that it can only be opened with a tool when a 230 V power supply is connected.

1. Place the supplied safety latch on the casing.
2. Drill a hole into the casing ( $\varnothing$  3mm).
3. Fix the latch with the supplied screw to the lid of the casing.

The casing can now only be opened with a tool.



## Installing the EM-TRF-USV - contd.

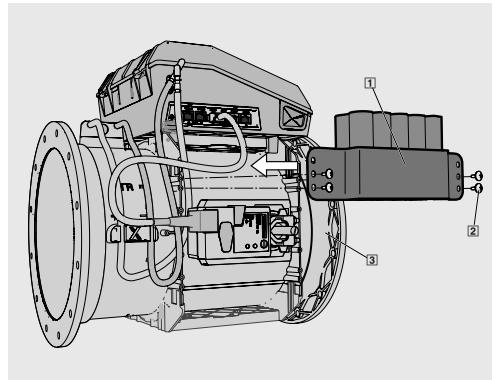
### Step 3

Mounting the battery pack.

1. Mount the battery pack on the VAV terminal unit as shown.

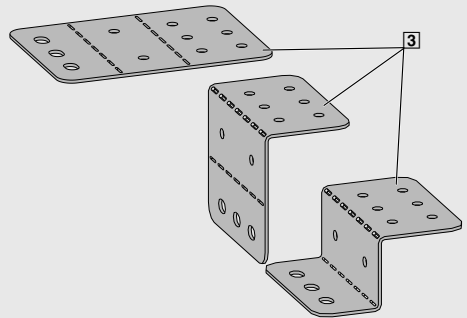
Mounting on the TVLK

- 1 Battery pack
- 2 Screw
- 3 VAV terminal unit



# 5 Installation

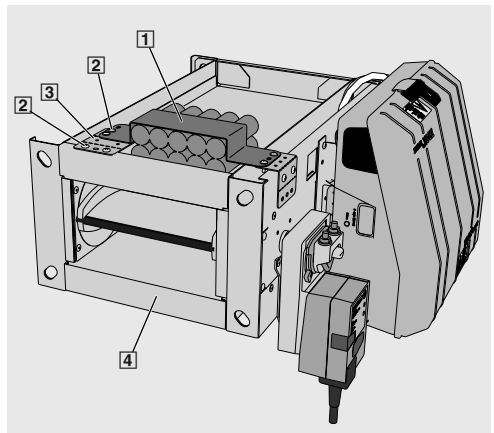
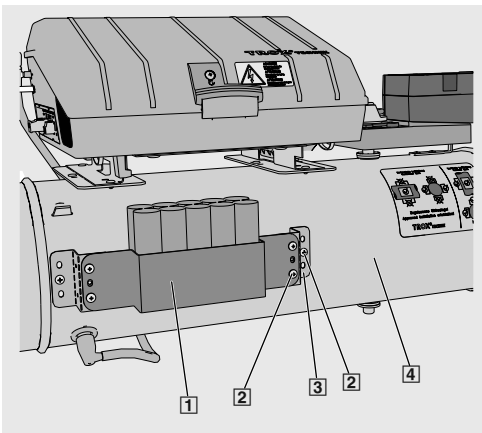
If necessary, the bracket [3] can be bent for fixing it to the control unit.



## Installation examples

- [1] Battery pack
- [2] Screw
- [3] Bracket
- [4] VAV terminal unit

**Important:** Be careful when fixing the brackets to the casing - the movement of the damper blade must not be restricted in any way.



# 6 Wiring

For installation, wiring, and commissioning observe the recognised technical regulations, especially safety and accident prevention regulations.

For any wiring work follow the national and local regulations and guidelines for electrical installation.

**Danger!**  
⚡ Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

## Wiring the EM-TRF and EM-TRF-USV

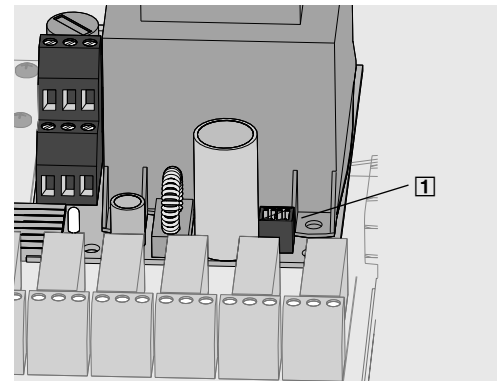
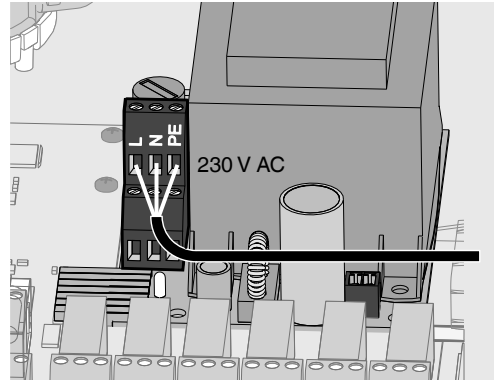
- Never connect two voltages!  
When the expansion module for 230 V AC is used, do not connect a 24 V AC/DC voltage to the main PCB.
- Connect the 230 V AC supply voltage to the upper terminals.
- Use the lower terminals to connect the supply voltage for the next controller or for the fume cupboard lighting control (EM-LIGHT expansion module).
- Fix all connection cables to the wire clamping bracket in the casing.

The terminals for the supply voltage carry a code that identifies their application:

- L: 230 V AC, live wire
- N: 230 V AC, neutral conductor
- PE: protective earth

## Wiring the EM-TRF-USV - contd.

- Connect the cable of the battery pack to the 2-pole socket **1**.
- Be careful when connecting any cables so as to not disconnect inadvertently the measuring tubes of the volume flow controller.



## Commissioning

No special commissioning steps are required.

### EM-TRF-USV

The preferred function in case of a power failure can be configured. With the standard settings (as delivered) the essential functions for operation will be maintained. The EasyConnect configuration software provides a commissioning wizard that guides users in making project-specific adjustments.

- Maintain standard operation, i.e. control function (factory setting)
- Close the control damper
- Open the control damper
- Hold the last damper blade position

## Diagnosis

An LED indicates the operating state of the EM-TRF-USV expansion module.

## Maintenance

The EM-TRF and EM-TRF-USV expansion modules do not require any maintenance.

## Disposal of the battery pack

The battery pack of the EASYLAB system is a rechargeable Ni-Cd battery pack. Only dispose of batteries in an environmentally sound manner and in compliance with national and local laws and regulations.

Batteries as well as rechargeable battery packs must not be disposed of with household waste. Consumers are required by law to return them for recycling.

### EM-TRF-USV – Operating status

LED	Operating status
<b>Green, permanent</b>	Mains operation; the battery pack remains fully charged
<b>Green, flashing</b>	Mains operation; the battery pack is being charged
<b>Green-red, flashing</b>	USP operation; the battery pack is being used (discharged)
<b>Red</b>	Mains operation; the battery pack is defective or not connected

