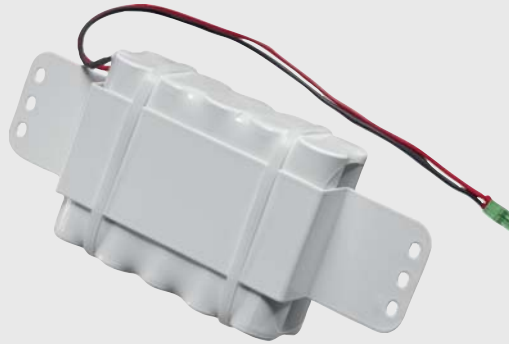
# Operating and Installation Manual

## Battery pack

for EASYLAB expansion modules
EM-TRF and EM-TRF-USV



TROX® TECHNIK

The art of handling air

# Contents




TROX® TECHNIK

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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 TCU3 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 these instructions 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 and EM-TRF-USV expansion modules
  - EASYLAB TCU3 controller
  - EASYLAB TAM adapter module
- EASYLAB Battery Pack Operating and Installation Manual (M375EV1)
- 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 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. For this reason, first touch an equipotentially bonded metal surface, e.g. a water pipe, for electrical earthing before you remove the unit from its protective wrapping. Avoid skin contact with any components or printed circuits on the expansion module or the main PCB.
- **Weight**

  The expansion module 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 into 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 for an EASYLAB TCU3 controller or a TAM adapter module.
- Do not additionally 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 control panel.

## Incorrect use

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

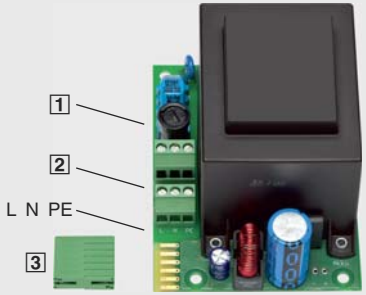
## Residual risks

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

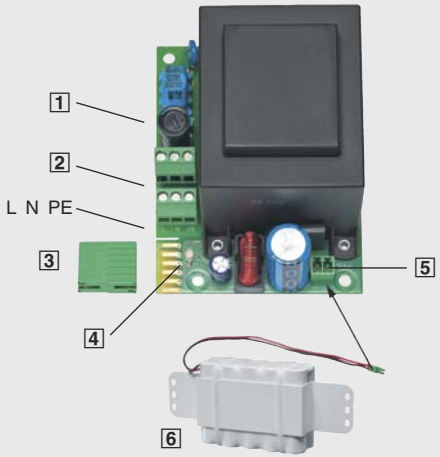
## Product overview and functional description

### Product overview
### EM-TRF




1 Micro fuse F 500 mA T, 250 V
2 3-way double-stack terminals 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

The expansion module is connected to the 230 V AC supply voltage (mains voltage). The transformer reduces this voltage to 24 V AC and supplies the controller and other components. An indicator light 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<br>up to 35 VA for a fume cupboard controller with control panel<br>up to 33 VA for a room controller with room control panel<br>up to 29 VA for a room controller without room control panel<br>up to 9 VA for an EASYLAB adapter module |
| **Primary fuse** | 500 mA slow blow, 250 V |
| **Double-stack terminals** | Cable cross-section up to 2.5 $mm^2$ |
| **Acceptable temperature range** | for storage –10 to +70 °C<br>for operation 0 to +50 °C |
| **Protection level** | IP 20 |
| **Dimensions** | B × H × T 78 × 65 × 100 mm |

| Additional data for the EM-TRF-USV | |
|---|---|
| **USP operation**<br>**One controller (TCU3 or TAM) with a control panel** | Approx. 4.5 h for maintaining normal operation<br>Approx. 6 h for defined blade position and indication of mains voltage interruption |
| **Shelf life** | 6 months from delivery to commissioning |
| **Service life** | Up to 4 years |

# 4 Transport, storage and packaging
# 5 Installation

### 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
- Fixing material
- Operating and installation manual
- Battery pack (only for EM-TRF-USV)

### 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 device 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°C to +70°C
  Maximum humidity: 90% (non-condensing)

### Packaging

Properly dispose of packaging material.

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 during operation.

- 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! The tubes of the EASYLAB TCU3 controller contain hollow needles.

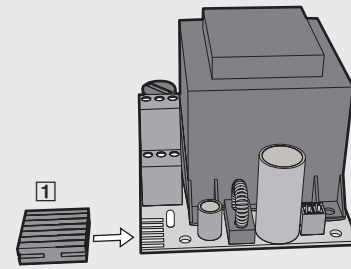
Always wear protective gloves.

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

#### Step 1

Fitting the PCB connection plug.

1. Interrupt the voltage supply to the TCU3 controller.
2. Open the lid.
3. Fit the 6-pole PCB connection plug [1] to the expansion module PCB.

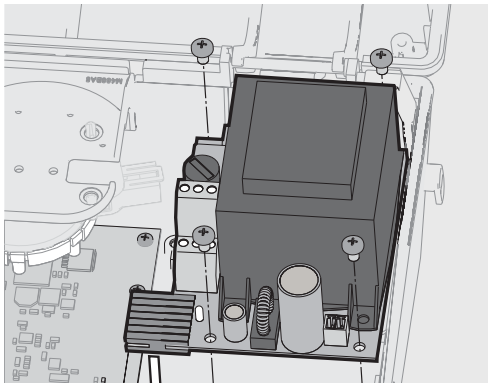


**Step 2**

Installing the expansion module

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 using the four fixing screws. Tighten the screws only hand-tight.

The EM-TRF expansion module is now ready for wiring, and the warning sticker can be attached.

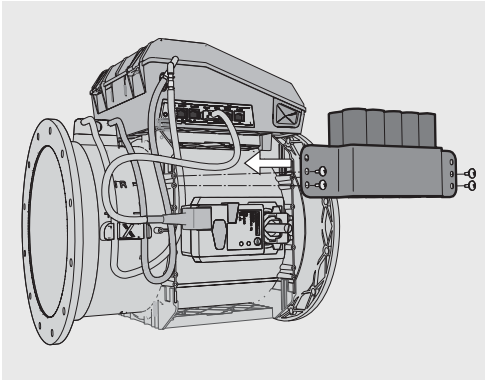


## Installing the EM-TRF-USV - contd.

### Step 3

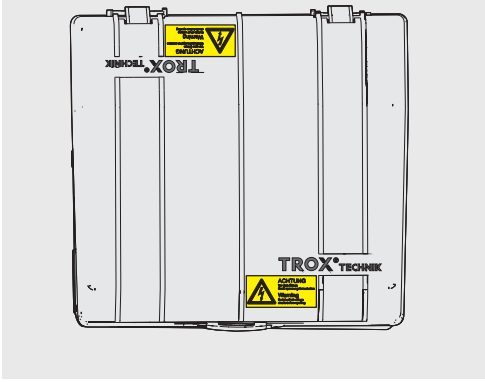
Mounting the battery pack.

1. Position the battery pack on the TVLK such that the fixing holes of the bracket are aligned with the fixing holes on the TVLK. Tighten the screws only hand-tight.



### Attaching the warning stickers

It is a legal requirement to designate danger to life and limb due to electrical voltage. To comply with this requirement, apply two warning stickers to the controller casing below the name TROX TECHNIK.




# 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 during operation.

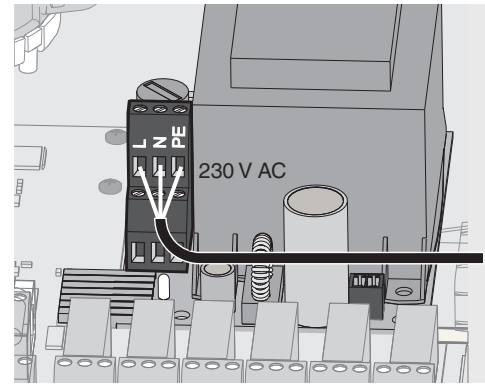
- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

## 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.

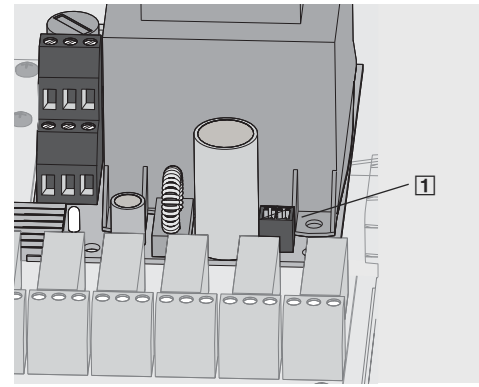
The terminals for the supply voltage carry a code that identifies their application:

- 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.
- Be careful when connecting any cables so as to not disconnect inadvertently the measuring tubes of the volume flow controller.



# 7 Commissioning
# 8 Maintenance
# 9 Decommissioning

## 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 (factory set) 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)
- Shut-off
- Open
- Hold the last damper blade position

## Maintenance

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

## Disposal of the battery pack

Please note that batteries and rechargeable battery packs or devices that contain batteries or rechargeable battery packs have to be disposed of in an environmentally sound manner and in compliance with the local laws and regulations (in Germany: BattV and BattG):

The battery pack of the EASYLAB system is a rechargeable Ni-Cd battery pack. 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.

## Diagnosis

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

**EM-TRF-USV – Operating status**

| Indicator light | Operating status |
|---|---|
| **Green** | Mains operation; the battery pack remains fully charged |
| **Green, blinking** | Mains operation; the battery pack is being charged |
| **Green-red, blinking** | USP operation; the battery pack is being used (discharged) |
| **Red** | Mains operation; the battery pack is defective or not connected |