TRIO Expansion Unit

Installation Manual

# TRIO Expansion

## Controller Relays

Ag/MIS/ImEN-2806-04/21 Rev 1.5
P/N: 116846

Munters

# TRIO Expansion Unit

## Installation Manual

Rev 1.5, 09/2024

Product Software: N/A

This manual for use and maintenance is an integral part of the apparatus together with the attached technical documentation.

# Index

# 1 Introduction

## 1.1 Disclaimer

Munters reserves the right to make alterations to specifications, quantities, dimensions etc. for production or other reasons, subsequent to publication. The information contained herein has been prepared by qualified experts within Munters. While we believe the information is accurate and complete, we make no warranty or representation for any particular purposes. The information is offered in good faith and with the understanding that any use of the units or accessories in breach of the directions and warnings in this document is at the sole discretion and risk of the user.

## 1.2 Introduction

Congratulations on your excellent choice of purchasing a TRIO 10 or Trio 20 Expansion!

In order to realize the full benefit from this product it is important that it is installed, commissioned and operated correctly. Before installation or using the controller, this manual should be studied carefully. It is also recommended that it is kept safely for future reference. The manual is intended as a reference for installation, commissioning and day-to-day operation of the Munters Controllers.

## 1.3 Notes

Date of release: May 2021

Munters cannot guarantee to inform users about the changes or to distribute new manuals to them.

# 2 Precautions

The following sections detail how to mount and wire the TRIO Expansion Unit.

*CAUTION Protection provided by the equipment can be impaired if the equipment is used in a manner not specified by the manufacturer!*

*CAUTION Munters recommends that a trained technician perform the following operations.*

- Protection Against Corrosion
- Electrical Guidelines
- Grounding
- Reducing Interference
- Filtering
- Checking the Battery Level
- Safety Precautions - Details

## 2.1 Protection Against Corrosion

**To prevent against corrosion of electrical components:**

- Installation location: If possible, install the Trio in a well-ventilated area.
- Keep the Trio closed at all times when a litter or passel is present in the building. In situations where maintenance or repairs are required, close the controller when you finish the work.
- After running the cables through the knockouts, seal the holes with a silicon sealant. If you use silicon sealant with acetic acid cure, keep the controller open and ventilated until cured. Otherwise, the acetic acid will attack metal components, including circuitry.

## 2.2 Electrical Guidelines

- Munters strongly recommends that only panel mount controllers be installed directly in an electrical closet.
- If the plastic enclosure is installed in an electrical closet, ensure that no contactors are in that closet. Placing this unit in proximity to contactors results in severe signal interference.
- Keep the Expansion Unit as far as possible from heavy contactor boxes and other sources of electrical interference.

## 2.3 Grounding

- Always connect temperature and sensor shields to earth ground. Avoid mixing high voltage wiring with sensor and low voltage wiring.

## 2.4 Reducing Interference

- Keep the controller as far as possible from heavy contactor boxes and other sources of electrical interference.
- Do not connect communication wire shields, which go from one house to another at both ends. Connect them at one end only. Connection at both ends can cause ground loop currents to flow, which reduce reliability.
- The COM connection for communications is not the shield wire. The COM, RX and TX wires must connect to each other at all controllers.
- Refer to Safety Precautions - Details, page 8 for more information.

## 2.5 Filtering

If this installation includes a power inverter to drive variable speed fans, install an EMI filter in front of the inverter, according to the specifications provided by the inverter manufacturer. Refer to the inverter documentation.

Frequency inverters can cause severe electrical and electromagnetic interference. Therefore, when employing a frequency inverter, it is critical that you carefully follow the manufacturer's installation instructions. In particular verify:

- That the cable shielding between the inverter and any motor meets industry standards
- Proper grounding of the inverter's chassis and motor power cable
- Proper grounding of low voltage cable shield wire
- That the controller and inverter cables are kept in separate conduits or wire bundles

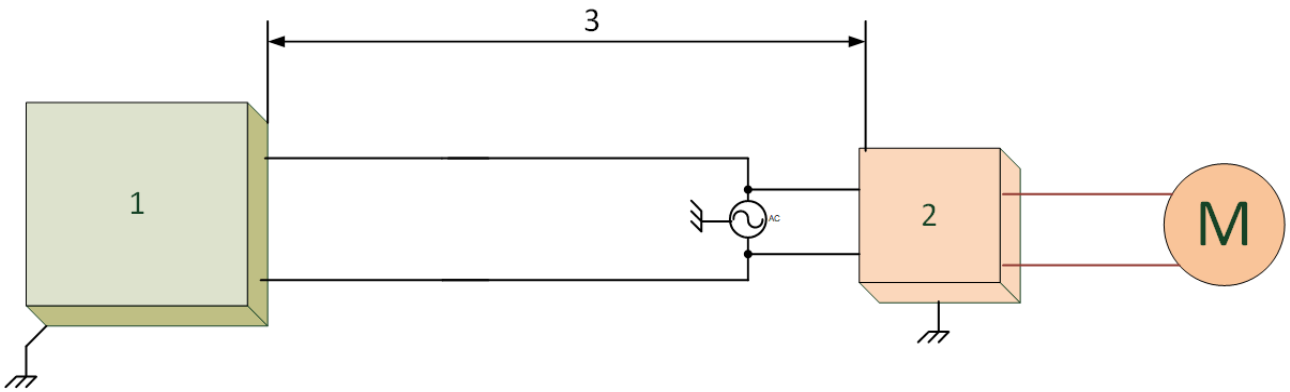



*Figure 1: Inverter Placement*

1. Controller
2. Inverter
3. Place the controller at least five meters from the inverter.

## 2.6 Checking the Battery Level

Check the battery once a year. The output must be 2.7 volts (minimum). Authorized personnel only must replace the battery if the output is below the minimum required level or every five years.

## 2.7 Safety Precautions - Details

*CAUTION* *An authorized electrician must install these units. Disconnect the power to avoid electrical shock and damage.*

*NOTE Installation Category (Over voltage Category) II*

- The power supply to the controller should be protected by a 10 amp circuit breaker.
- All electrical connections should comply with National Electrical code (NEC).

### 2.7.1 Grounding and Shielded Wiring

- ***From the ground terminal, run a heavy wire directly to the ground rod. If necessary, run a heavy ground wire to the electrical service grounding system rather than directly to the ground rod.***
- Do not use light wires for these ground connections. They must carry heavy lightning currents, sometimes exceeding thousands of amperes. Certainly, do not use the shielding of sensor and low voltage wiring for this purpose.
- When splicing sensors to longer wires, ensure that the splice is **waterproof**. Use adhesive lined heat shrink (marine grade) to make waterproof connections.
- Every low power device (digital, analog, or communication) must have a shield cable connected to the unit ground strip.

### 2.7.2 Installation and Electrical Connections

- Install computerized electronic controls at least three feet (one meter) away from interference sources such as high voltage wiring to motors, variable speed, light dimmers, relays.
- Install electronic controls in a separate ventilated control room that is protected from extreme temperatures and dirty environments. Place the controls so that the operators can conveniently use the control and read indicators and displays.
- Keep low voltage wires separate from high voltage wires.
- Use shielded wiring for low level signals. For buried wiring (building to building runs) use high grade jell filled cables that are impervious to moisture.
- Seal cable entry points and control boxes to prevent contamination and corrosion. If you use silicon sealant with acetic acid cure, keep the control open and ventilated until cured. Otherwise, the acetic acid will attack the metal parts, including circuitry.

### 2.7.3 KEY

Ensure that the units remains locked to prevent unauthorized access to internal components.

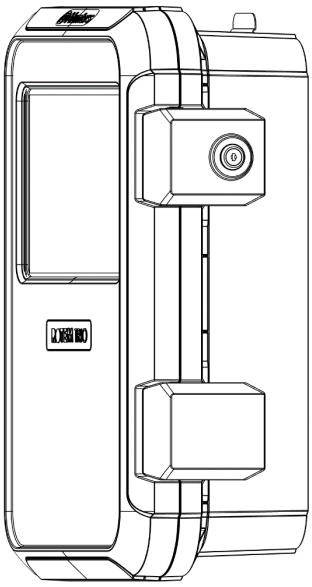


*Figure 2: Trio Lock*

### 2.7.4 PRODUCT SYMBOLS

The following labels appear on your controller:

 : Caution! Hazardous voltage

 : Caution: Refer to the manual

 : Main Protective Earthing Terminal

***CAUTION*** *IF THE UNIT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE EQUIPMENT MAY BE IMPAIRED.*

# 3 Unit Installation

The following sections detail how to mount and wire the TRIO.

*NOTE Munters recommends that a trained technician perform the following operations.*

- What Comes in the Package
- Mounting the Unit

## 3.1 What Comes in the Package

- One Expansion unit
- One hanging panel
- Four screws
- Two keys

## 3.2 Mounting the Unit

- Knockouts
- Hanging the Unit

### 3.2.1 KNOCKOUTS

1. Using the supplied clips and screws, mount the TRIO Expansion.
2. On the bottom the unit are knockouts used to route the low and high voltage cables.

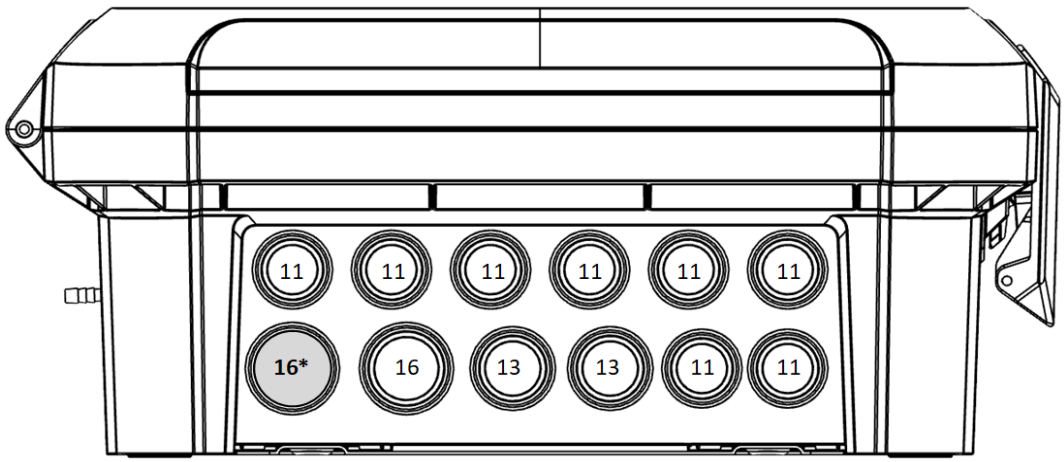
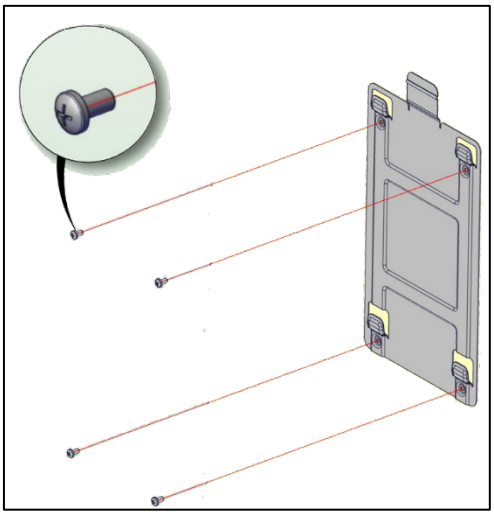
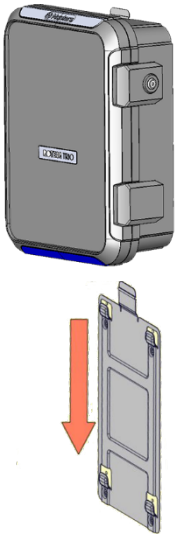



*Figure 3: Expansion Knockouts and PG Size*

   - Using a screwdriver and a hammer, gently apply pressure to the knockouts.
   - **Only open up the holes that you require.**
   - Munters recommends removing the knockouts before mounting the unit.
3. Place the required cables through the cable holders at the bottom of the unit.

### 3.2.2 HANGING THE UNIT

| 1. Attach the bracket to the wall (customer supplies the screws). | 2. Hang the TRIO on the bracket. |
|---|---|
|  |  |
| *Figure 4: Attaching the bracket* | *Figure 5: Hanging the Unit* |

3. Close the TRIO enclosure lid carefully and tightly. Use RTV silicon or equivalent sealant to seal the cable holders.

***CAUTION*** *Munters strongly recommends that you seal all entry spots with RTV silicon. Failure to do so can lead to damage to the unit.*

4. After installation is completed, operate the TRIO Expansion for a few hours and re- check for proper operation.

# 4 Trio 10

- Trio 10 Layout
- TRIO to TRIO Expansion Wiring
- High Voltage Relays
- Power

## 4.1 Trio 10 Layout

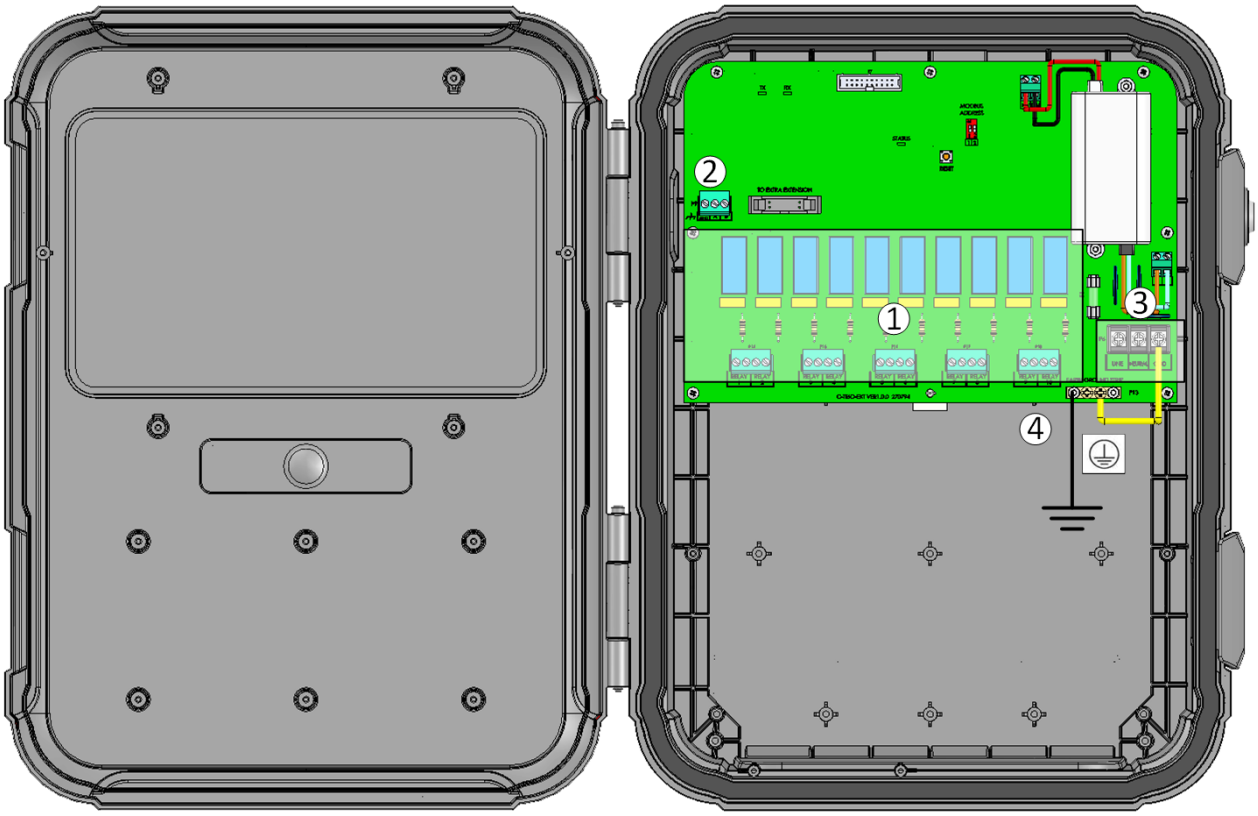



*Figure 6: Board layout*

| | |
|---|---|
| 1 | 10 relays |
| 2 | RS-485 ports |
| 3 | Power ports |
| 4 | Ground strip |

## 4.2 TRIO to TRIO Expansion Wiring

Connecting Trio to its Expansion Unit consists of three steps:

- Wiring
- Address
- Restart

### 4.2.1 WIRING

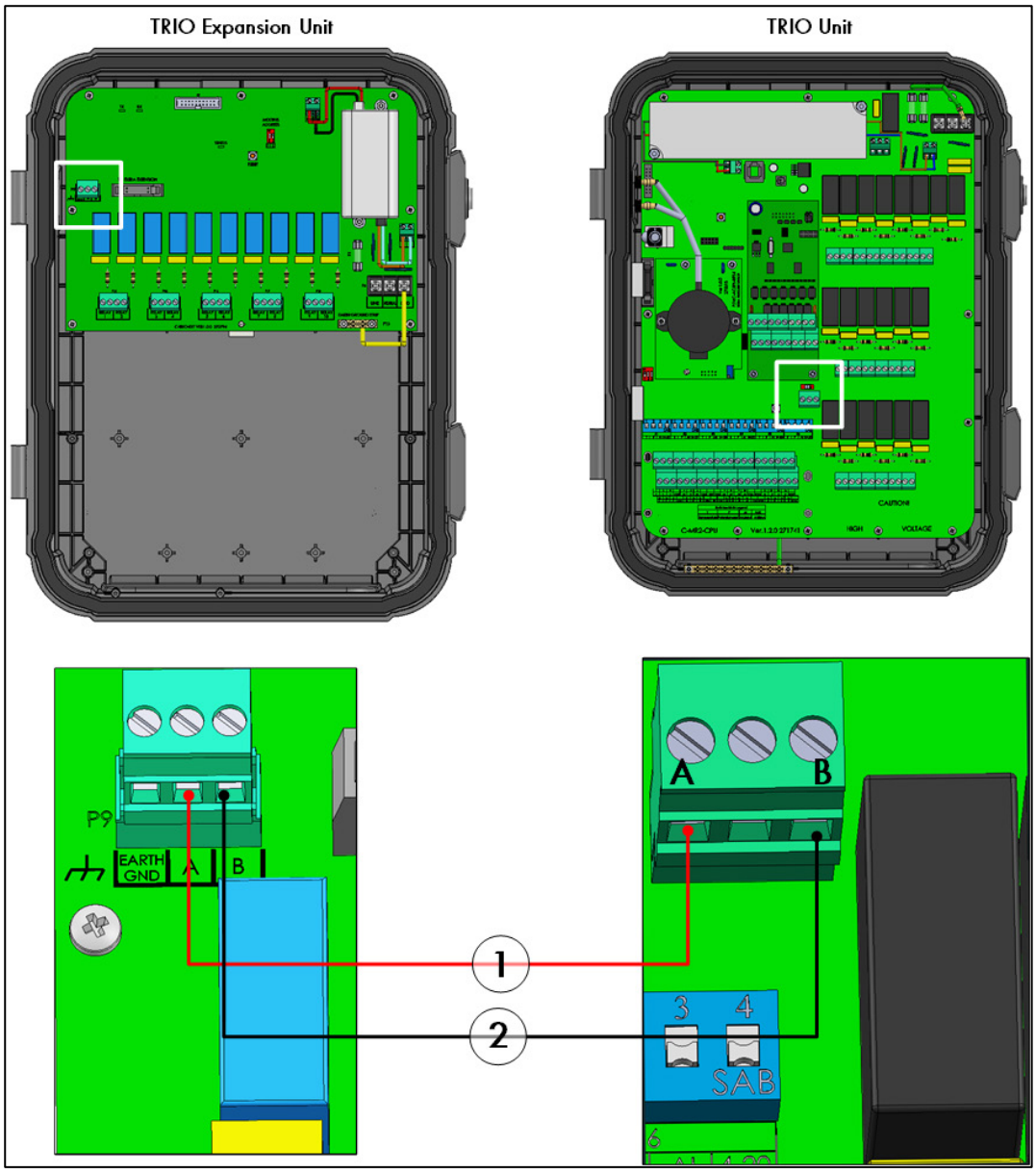



*Figure 7: Wiring diagram*

- The cable between the controller and the expansion unit should be a 4 wire twisted shielded cable (22 or 24 AWG).
- 1: Red wire
- 2: Black wire

### 4.2.2 ADDRESS

The Trio can support one expansion unit. Verify that both dipswitches in the Modbus Address are set to **ON**.

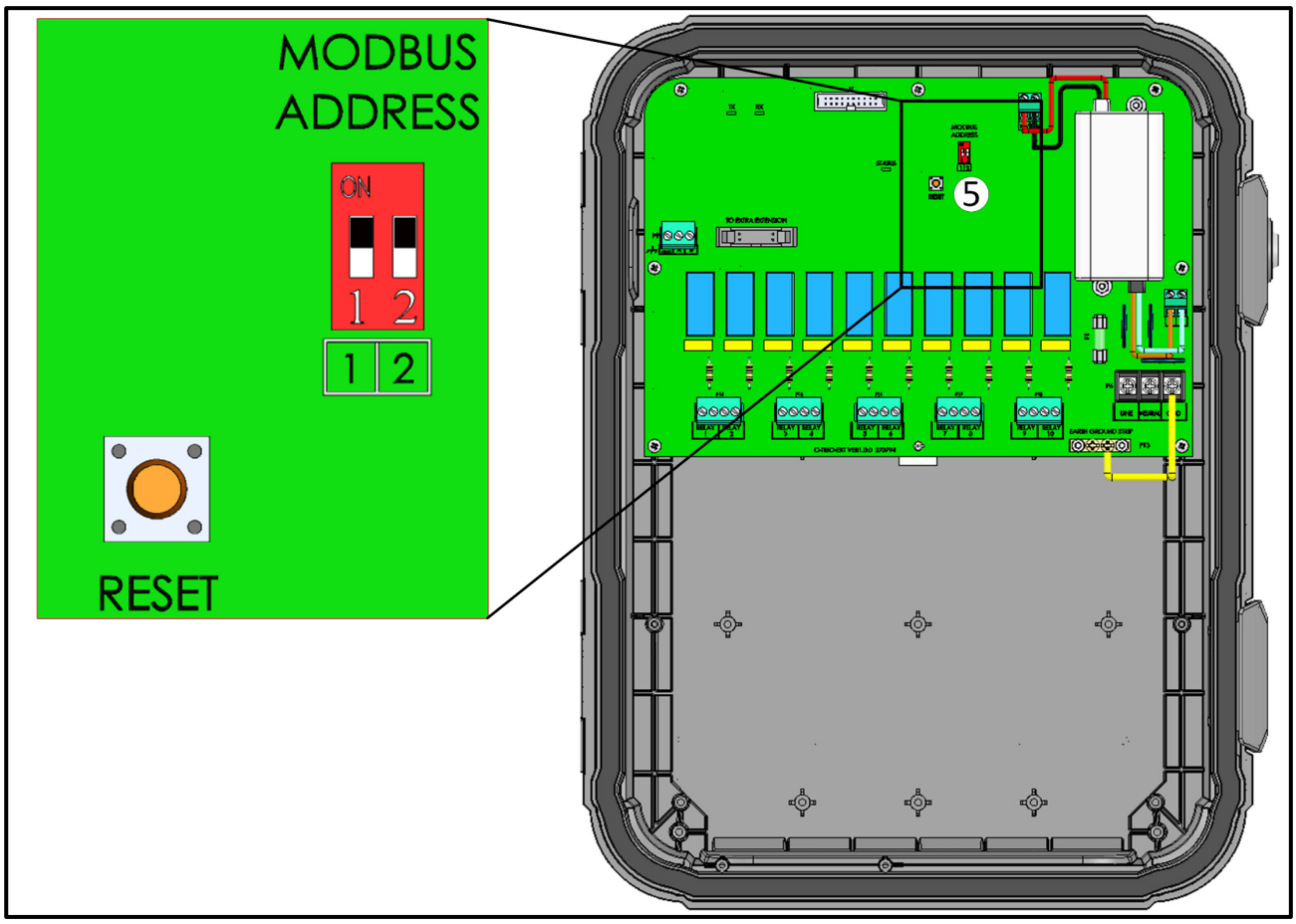



*Figure 8: Expansion Address*

### 4.2.3 RESTART

After connecting the units and verifying the Modbus address, reset the factory settings.

1. Go to System › General Settings ›  .
2. Click 

.
3. Follow the on-line instructions. You have the option of backing up the settings. Refer to the User Manual for more information.

## 4.3 High Voltage Relays

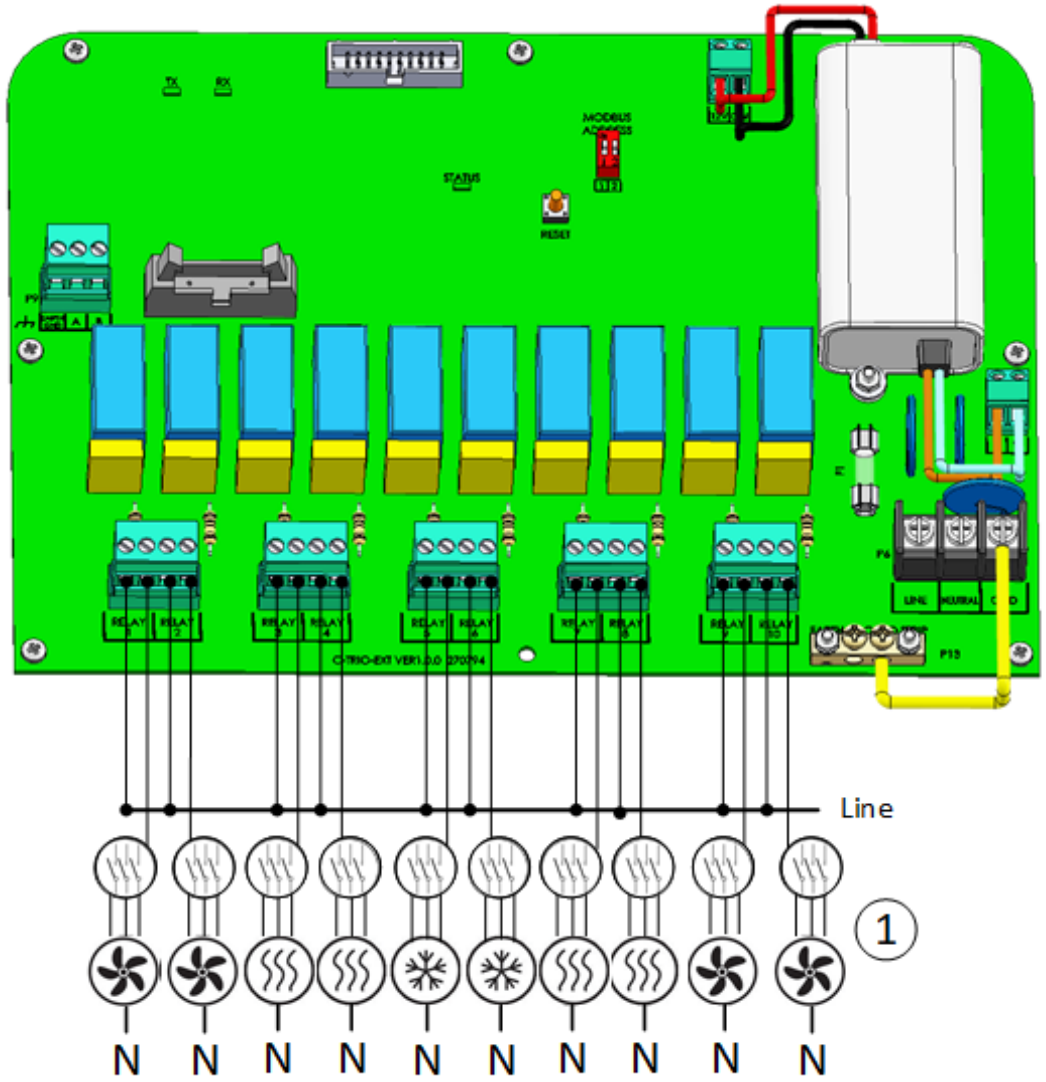



*Figure 9: High voltage devices (examples)*

| | |
|---|---|
| 1 | Example of devices |

*NOTE The relays control motors and heating devices via contactors, not directly.*

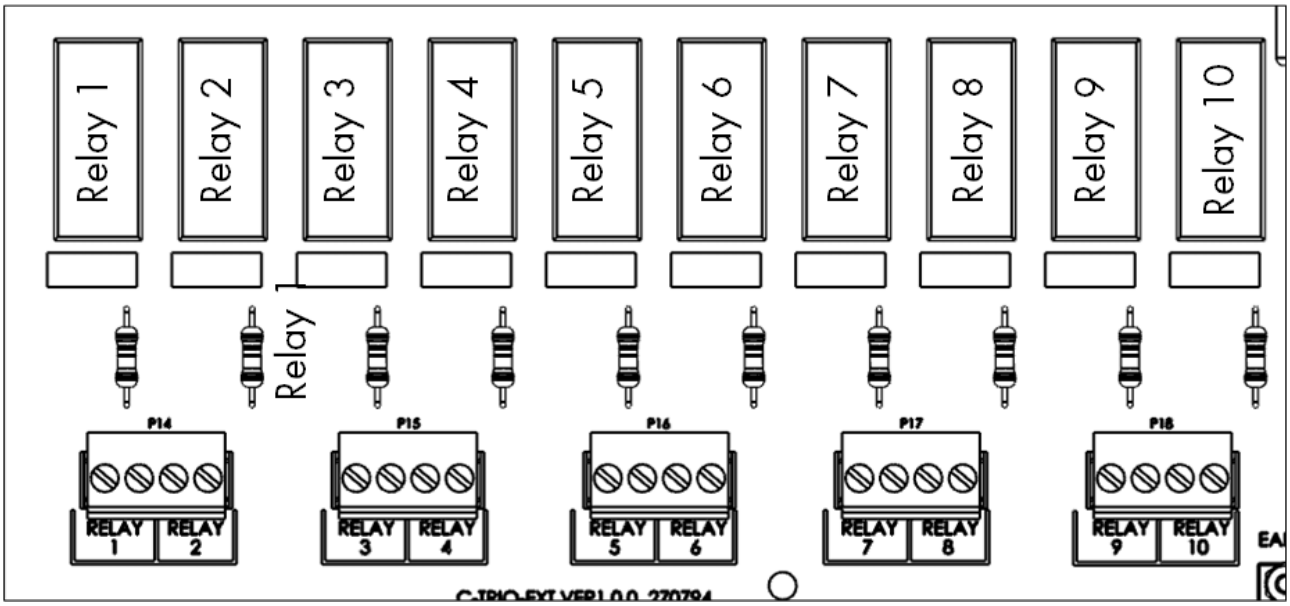



*Figure 10: Relay and port numbering*

## 4.4 Power

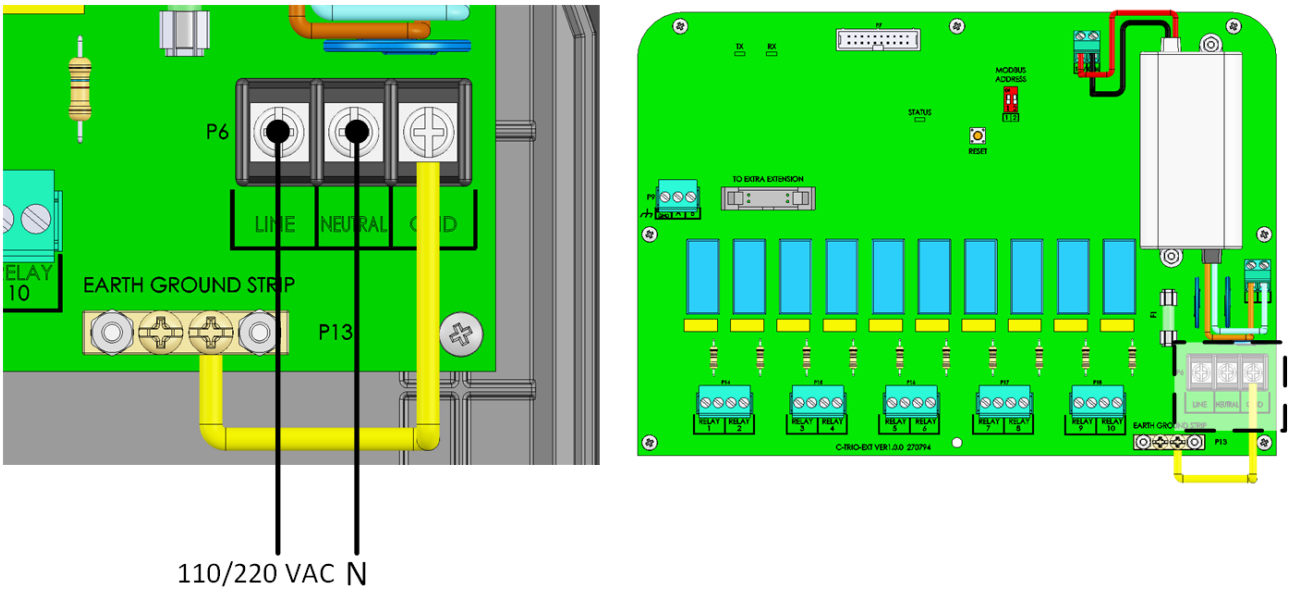



*Figure 11: Power ports*

# 5 Trio 20

- Trio 20 Layout
- TRIO to TRIO Expansion Wiring
- High Voltage Relays
- Power

## 5.1 Trio 20 Layout

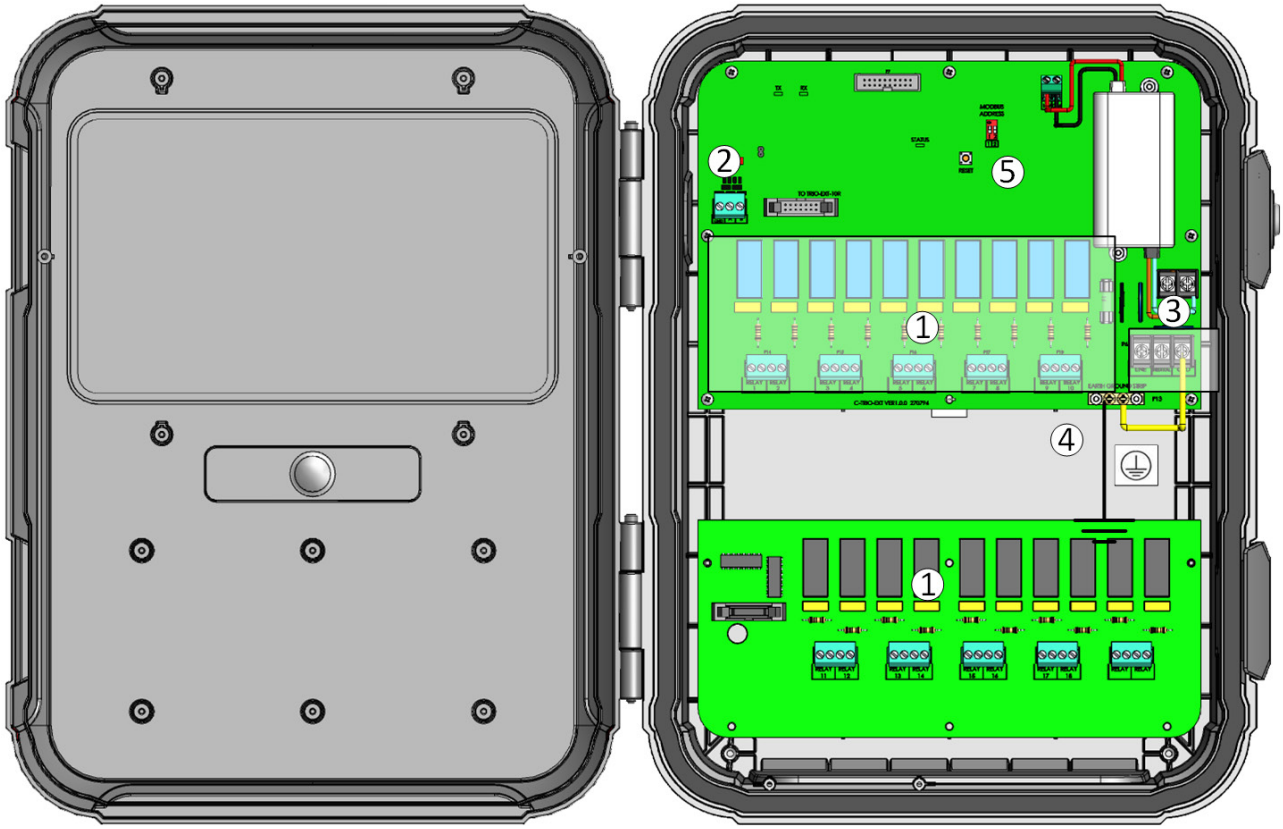



*Figure 12: Board layout*

| | |
|---|---|
| 1 | 20 relays |
| 2 | RS-485 ports |
| 3 | Power ports |
| 4 | Ground strip |
| 5 | Address dipswitch |

## 5.2 TRIO to TRIO Expansion Wiring

Connecting Trio to its Expansion Unit consists of three steps:

- Wiring
- Address
- Restart

### 5.2.1 WIRING

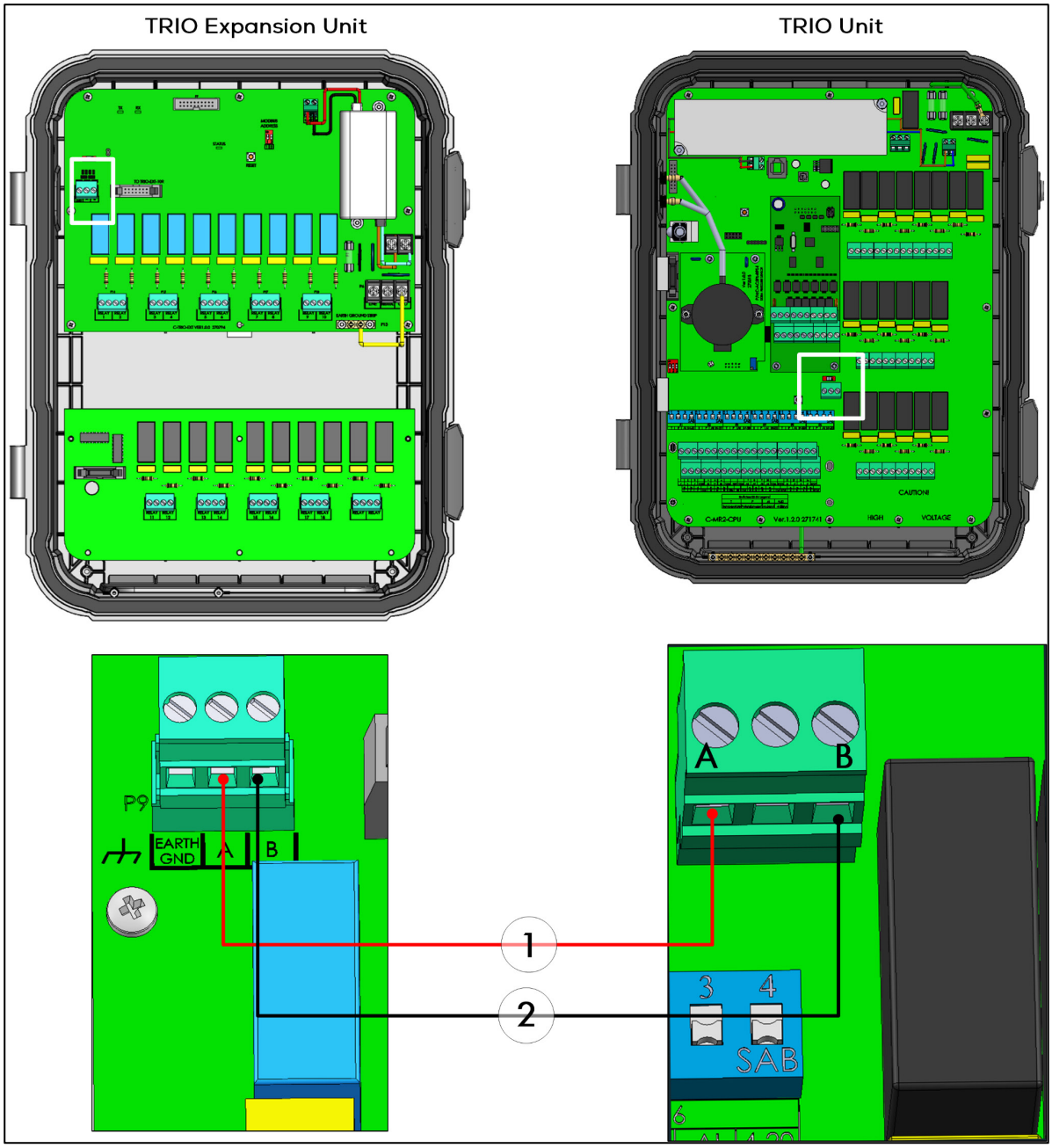



*Figure 13: Wiring diagram*

- The cable between the controller and the expansion unit should be a 4 wire twisted shielded cable (22 or 24 AWG).
- 1 – red wire
- 2 – black wire

### 5.2.2 ADDRESS

The Trio can support one expansion unit. Verify that both dipswitches in the Modbus Address are set to **ON**.

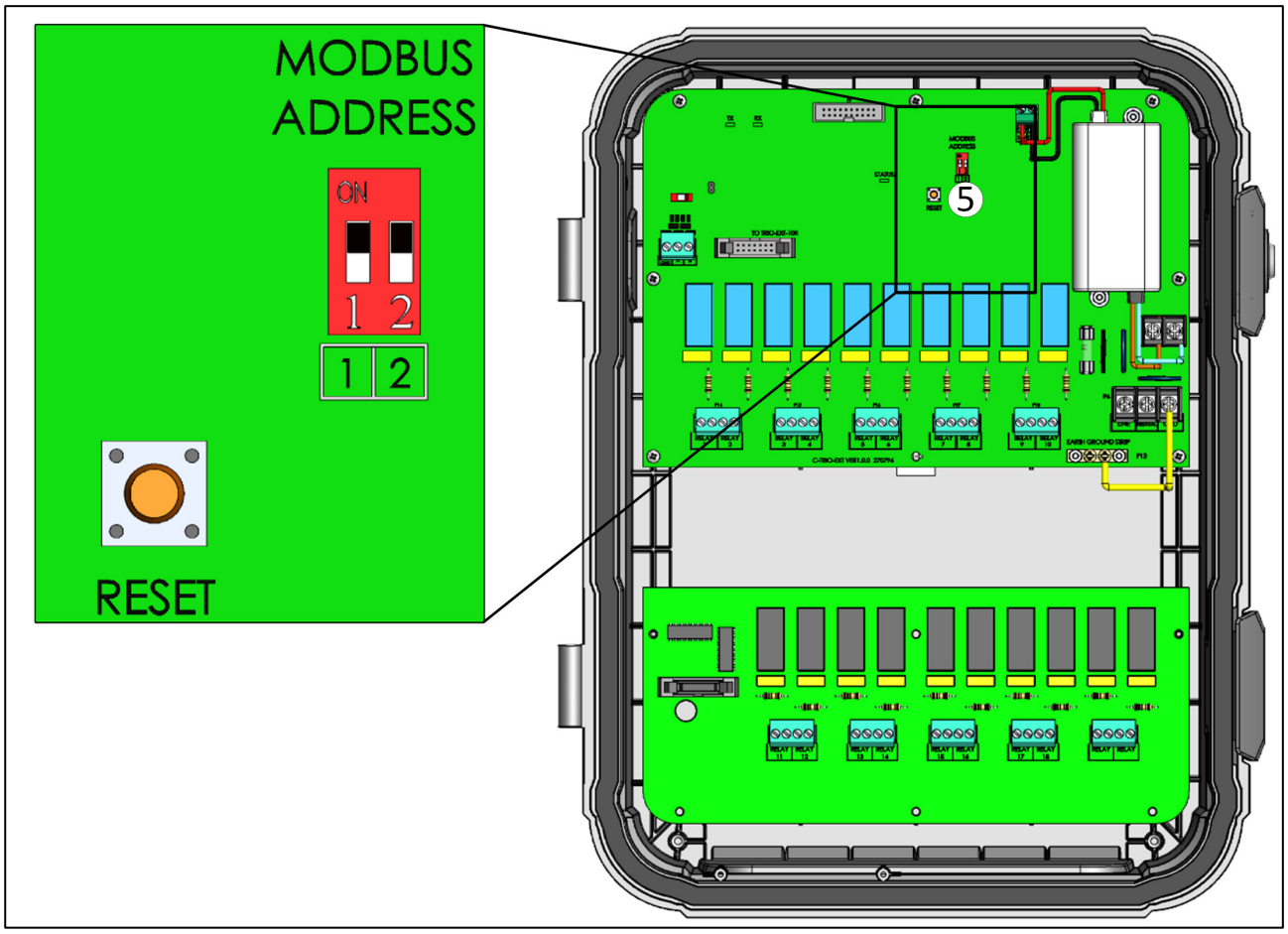



*Figure 14: Expansion Address*

### 5.2.3 RESTART

After connecting the two units and verifying the Modbus address, reset the factory settings.

1. Go to System › General Settings ›  .
2. Click 

.
3. Follow the on-line instructions. You have the option of backing up the settings. Refer to the User Manual for more information.

## 5.3 High Voltage Relays

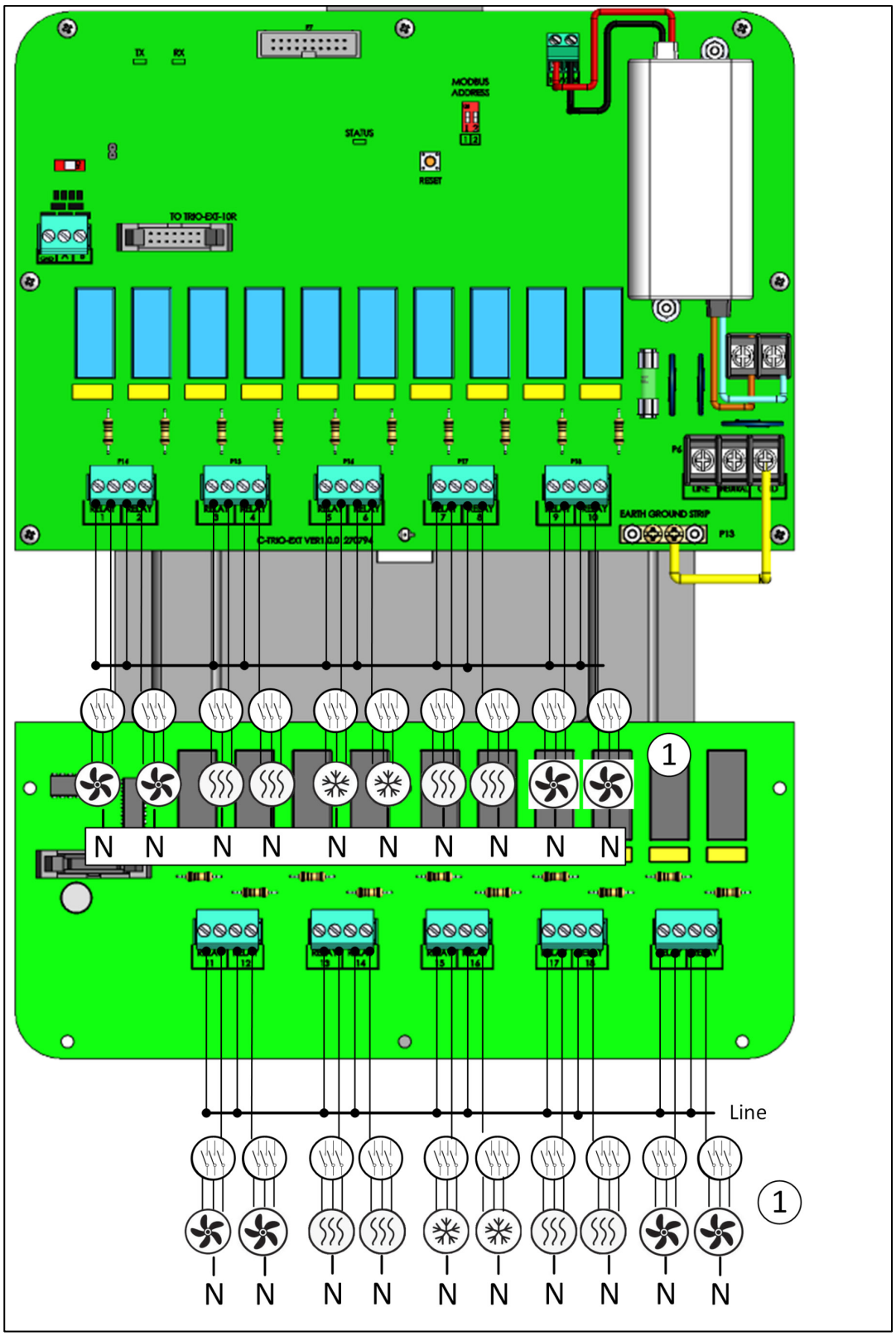



*Figure 15: High voltage devices (examples)*

| | |
|---|---|
| 1 | Example of devices |

*NOTE The relays control motors and heating devices via contactors, not directly.*

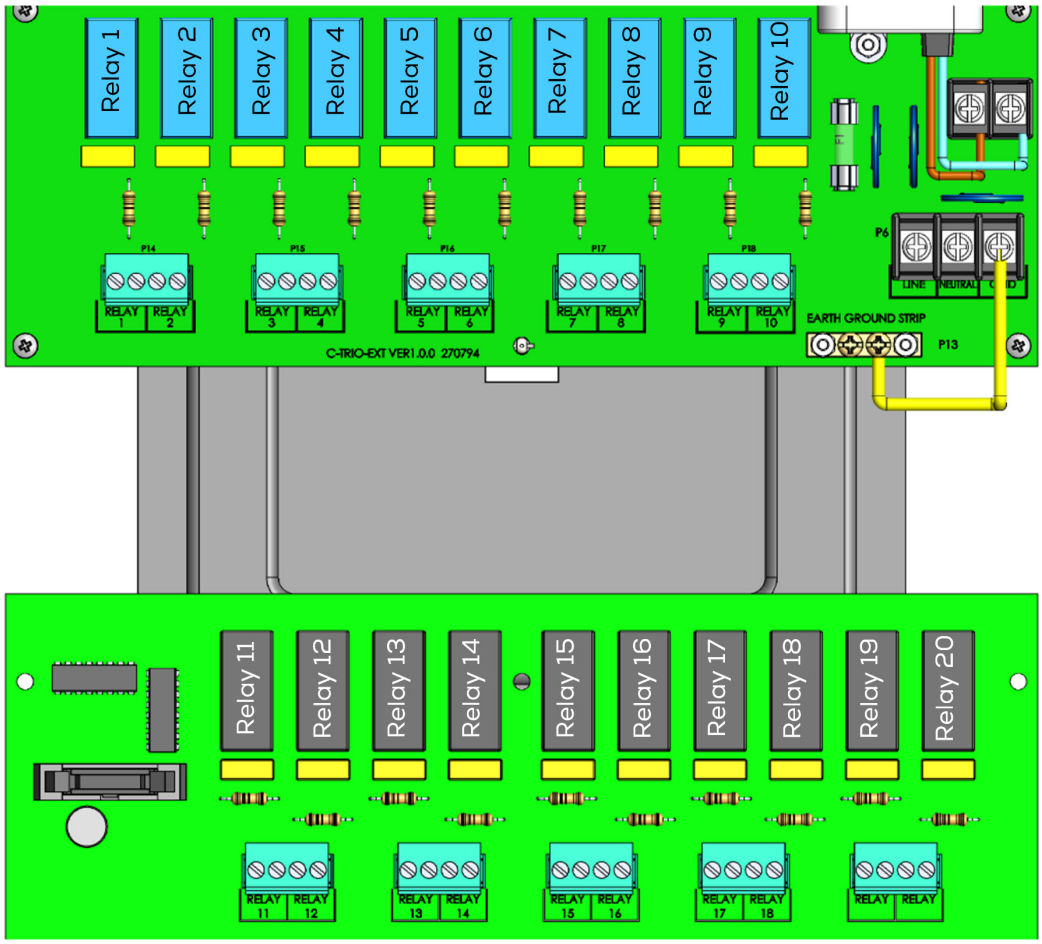



*Figure 16: Relay and port numbering*

## 5.4 Power

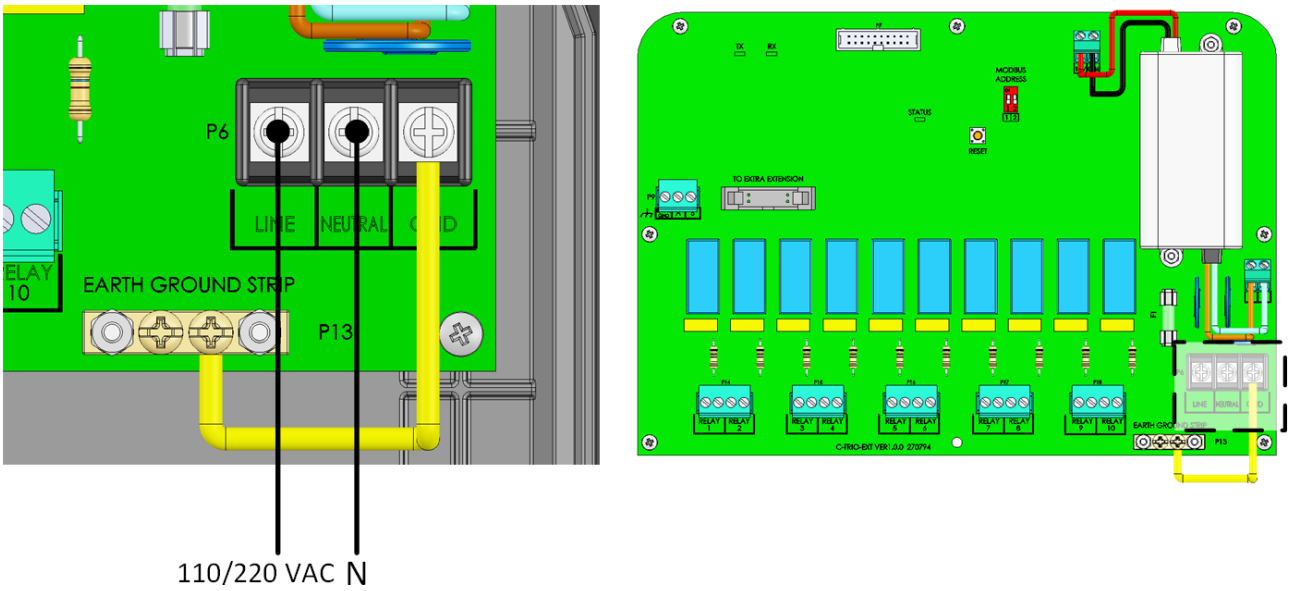



*Figure 17: Power ports*

# 6 Mapping Devices

- Install and wire the Expansion unit to the TRIO and to the external devices before beginning.

- After wiring the Expansion unit to TRIO, go to System › General Settings › Info  and click 

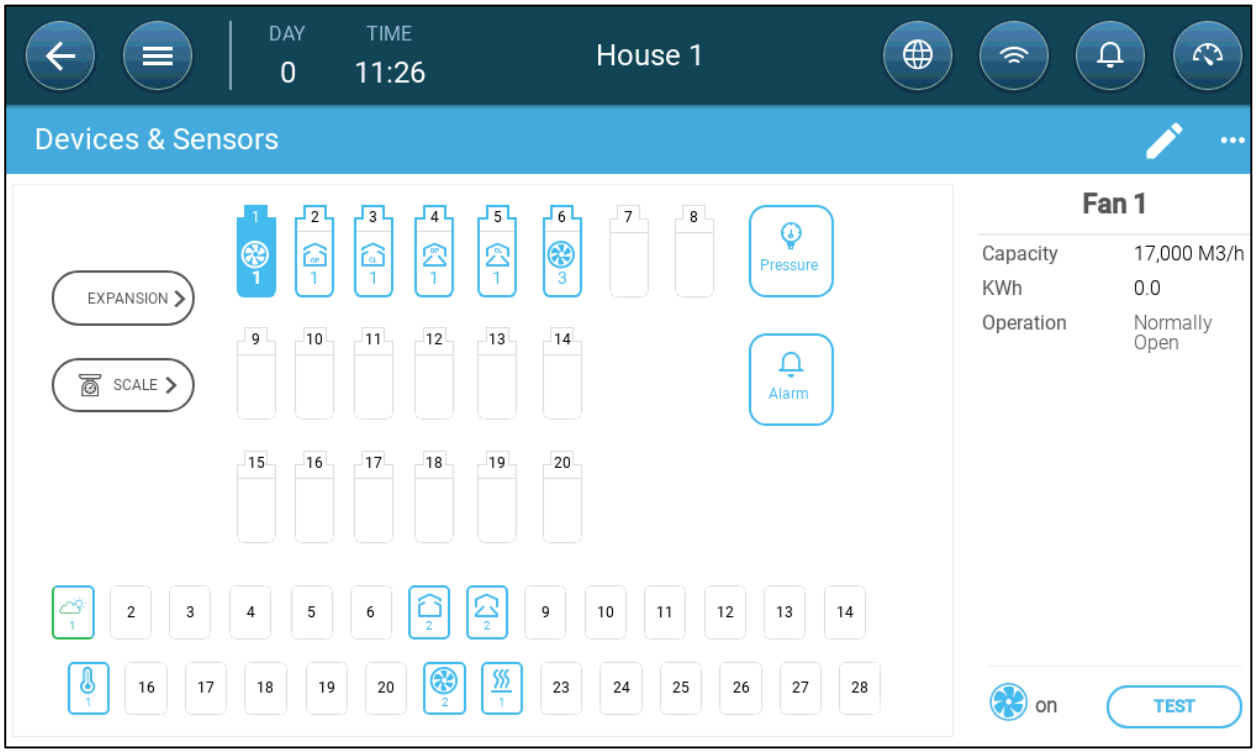
. Follow the online instructions. TRIO will not recognize the Expansion until this step is performed.

After wiring devices to the TRIO Expansion Unit, each device must be mapped and then defined. Mapping and defining devices enables the system software to control each device's functionality.

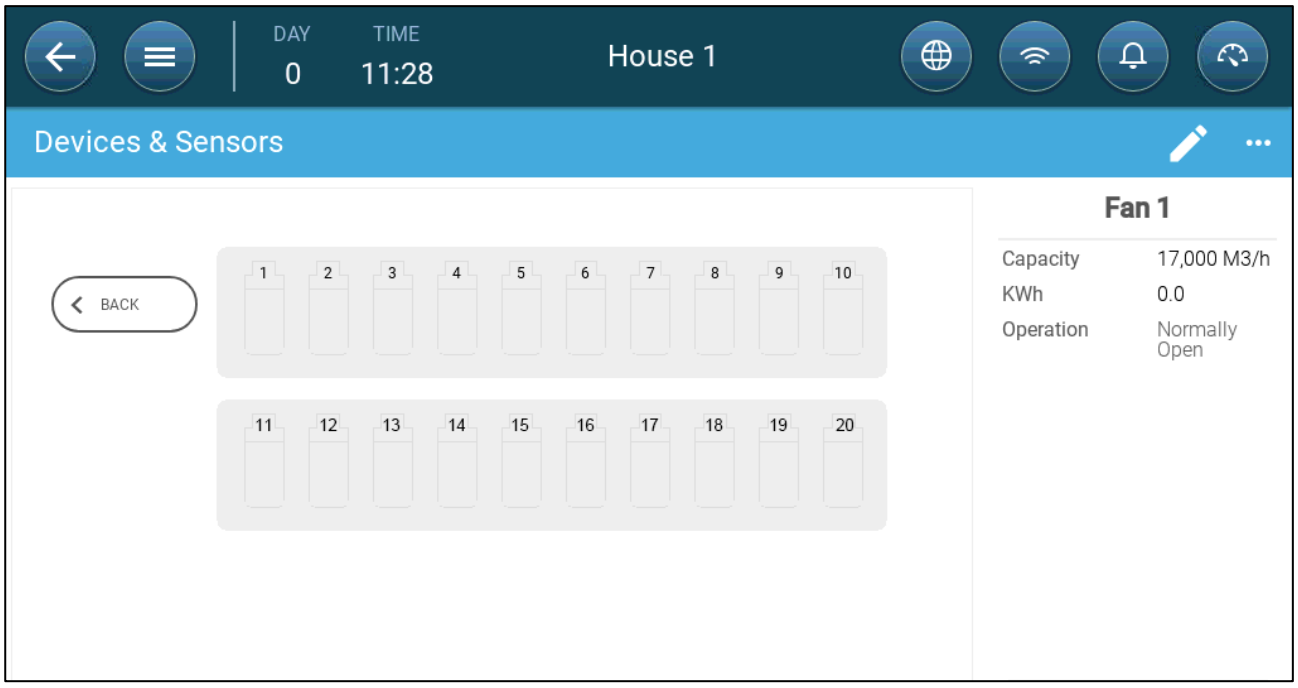
*CAUTION* *Mapping MUST match the physical wiring! An error message appears if the physical device is not wired to the relay or port as defined on the mapping screen..*

**To map the devices:**

1. Go to System › Device and Sensors.




2. Click **Expansion**.




3. Map the devices as detailed in the TRIO manual. Refer to the manual for more information.

# 7 Specifications

## 7.1 Trio 10 Specifications

| | |
|---|---|
| Input Power Voltage | 115/230 VAC, 50/60 Hz |
| Input AC Power | 0.2A |
| Maximum number of relays operating simultaneously | 10 |
| *Note: Running relays at the above current levels provides between 50,000 – 100,000 switching operations.* | |
| Communication | RS-485: 115 Kbps, 8 bit, even parity |
| Operating Temperature Range | -10° to +50° C (+14° to +125° F) |
| Storage Temperature Range | -20° to +80° C (-4° to +176° F) |
| Environmental Specifications | • Altitude: -400 m to 2000 m<br>• Relative Humidity: 20% - 90%<br>• Main supply voltage fluctuation up to +10 - 20%<br>• Overvoltage category II |
| Enclosure | • Water and dust tight<br>• Indoor use only |
| Dimensions (H/W/D) | 403 x 324 x 141 mm/16 x 13 x 5.6 inches |
| Fuses | Fuse F2 on PS card: 3.15A, 250V |
| Certification | |

## 7.2 Trio 20 Specifications

| | |
|---|---|
| Input Power Voltage | 100 – 240V, 50/60 Hz |
| Input AC Power | 500 mA |
| Maximum number of relays operating simultaneously | 15 |
| *Note: Running relays at the above current levels provides between 50,000 – 100,000 switching operations.* | |
| Communication | RS-485: 115 Kbps, 8 bit, even parity |
| Operating Temperature Range | -10° to +50° C (+14° to +125° F) |

| | |
|---|---|
| Storage Temperature Range | -20° to +80° C (-4° to +176° F) |
| Environmental Specifications | • Altitude: -400 m to 2000 m<br>• Relative Humidity: 20% - 90%<br>• Main supply voltage fluctuation up to +10 - 20%<br>• Overvoltage category II<br>• PD:2 |
| Enclosure | • IP: 52<br>• Indoor use only |
| Dimensions (H/W/D) | 403 x 324 x 141 mm/16 x 13 x 5.6 inches |
| Fuses | Fuse F1 on PS card:  3.15A, 250V |
| Certification |  |

## 7.3 Specifications Details

- **Disconnection device/overcurrent protection**: In the building installation, use a certified 2-pole circuit breaker rated 10A, certified in accordance with the IEC standard 60947-2 (in the US and Canada use a Listed Brach Circuit protective circuit breaker). This step is required to provide overcurrent protection and mains disconnection. The circuit breaker must be easily accessible and marked as the controller disconnect device.
- **Main supply voltage**: Permanently connect the controller to the mains in accordance with the relevant national code. Relays must be suitably protected against overcurrent, using a circuit breaker rated at 10A.
- **Keep the units closed and locked. Only authorized personnel should open and close the units.**

# 8 Spare Parts

- Preliminary Information
- Trio Expansion 10 Spare Parts
- Trio Expansion 20 Spare Parts
- Additional OptionsCards

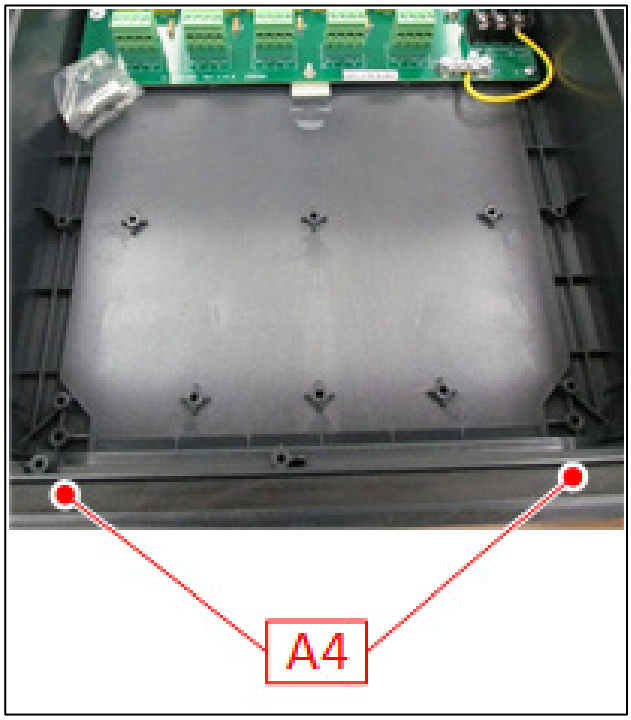
## 8.1 Preliminary Information

| | TRIO EXP 10 | TRIO EXP 20 |
|---|---|---|
| Container | A | C |
| Main Container Cards | B | D |
| Cables and Harnesses | N/A | E |
| MPN | Munters Part Number | |
| DPN | Distributor Part Number | |

## 8.2 Trio Expansion 10 Spare Parts

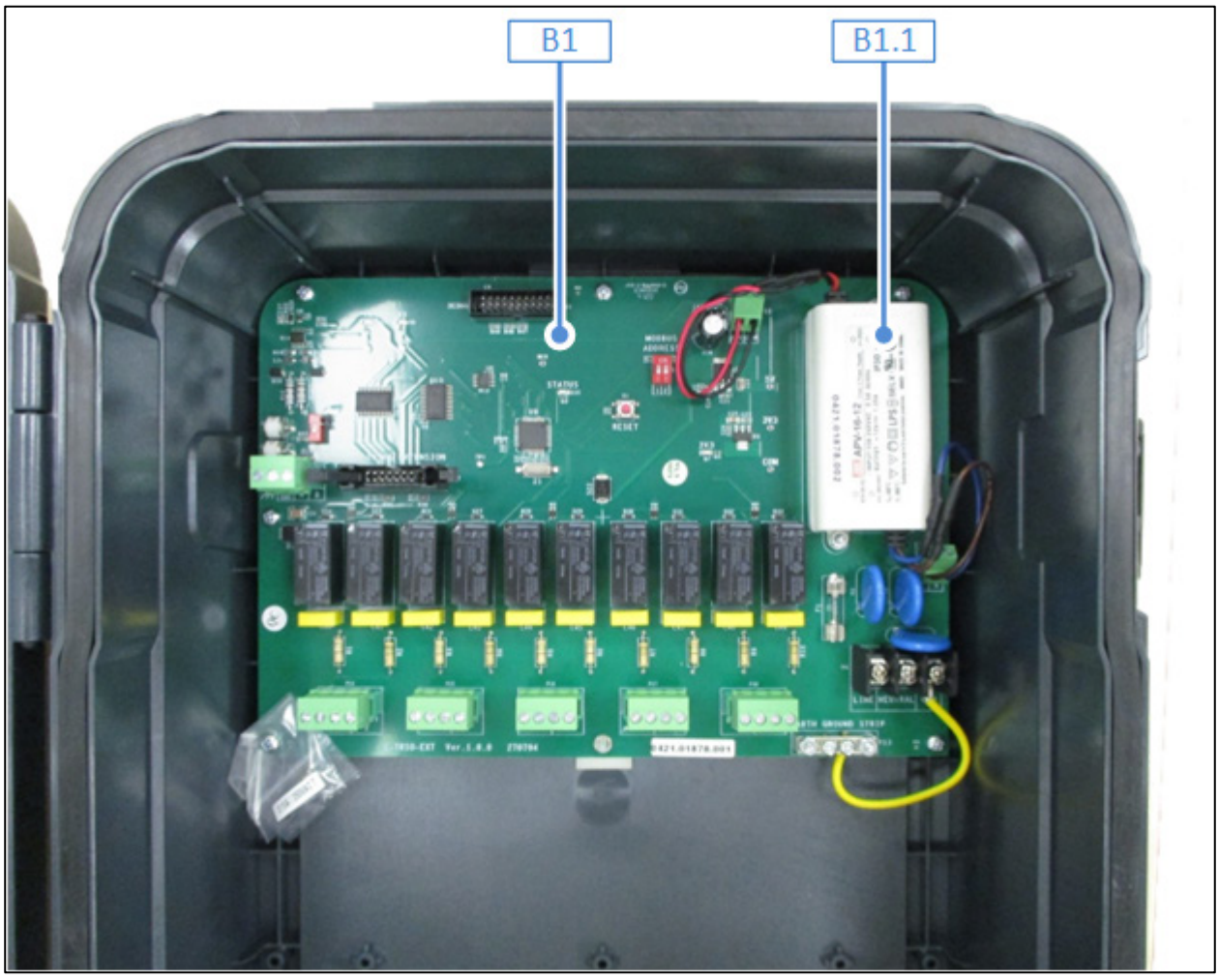
- Trio Expansion 10 Container Spare Parts
- Trio Expansion 10 Main Container Spare Parts

### 8.2.1 TRIO EXPANSION 10 CONTAINER SPARE PARTS

| ID No. | Description | Order Catalog Number | Note |
|---|---|---|---|
| A1.1 | TRIO FRONT DOOR EXP PLASTIC PART V1.0.0 (SP: 207129) | MPN: 940-99-00028 | |
| | | DPN: | |
| A1.2 | TRIO-20 PLASTIC BOX BASE (SP: 207124) | MPN: 940-99-00112 | |
| | | DPN: | |
| A1.3 | TRIO HINGE PLASTIC PIN V1.0.0 (SP-207128) | MPN: 940-99-00019 | |
| | | DPN: | |
| A2.1 | TRIO-20 PANEL PLASTIC PART BLUE LOGO MUNTERS + PART BLUE | MPN: 940-99-00001 | OR |
| | | DPN: | |
| A2.2 | TRIO PANEL PLASTIC PART RED RAL 3020 NO LOGO (SP-207138) | MPN: 940-99-00045 | |
| | | DPN: | |
| A3.1 | GENERAL PLASTIC LATCH | MPN: 900-99-00216 | |
| | | DPN: | |
| A3.2 | ONE/ONE PRO LATCH GENERAL LOCK PLASTIC PART + LOCK FOR LATCH | MPN: 900-99-00217 | |
| | | DPN: | |
| A4 | MID-RANGE MAIN GASKET V1.0.0 (SP-207122) | MPN: 940-99-00021 | |
| | | DPN: | |

### 8.2.2 TRIO EXPANSION 10 MAIN CONTAINER SPARE PARTS

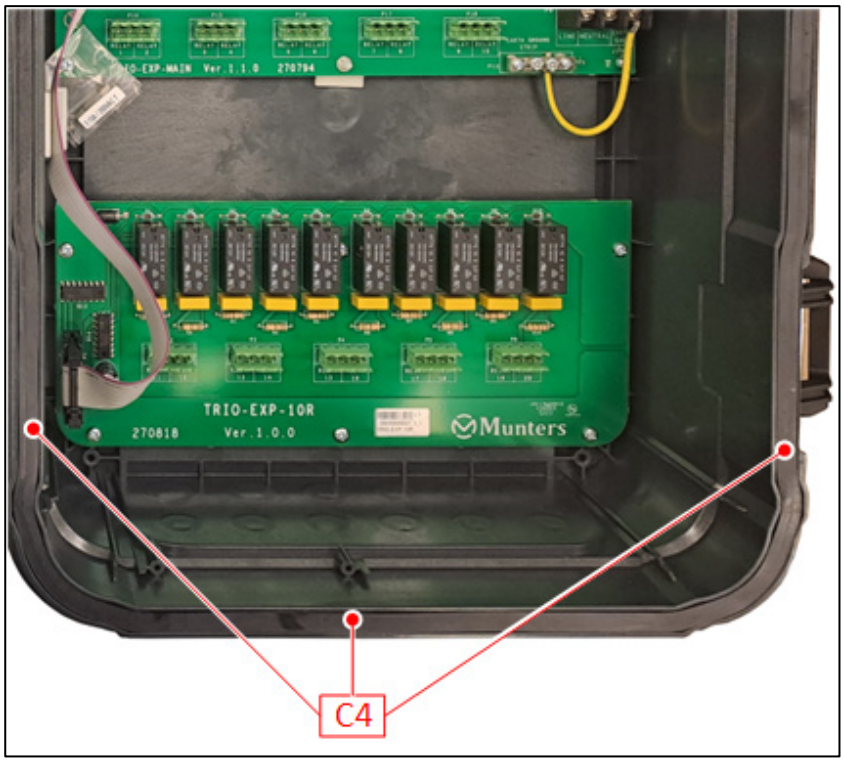


| ID No. | Description | Order Catalog Number |
|---|---|---|
| B1 | TRIO-EXP 10 CARD (SP: R-TRIO-EXP10) | MPN: 940-99-00029 |
| | | DPN: |
| B1.1 | SWPS APV-16-12 Mean Well 115V/230V 12V 16W (SP: 370153) | MPN: 999-99-00338 |
| | | DPN: |

## 8.3 Trio Expansion 20 Spare Parts

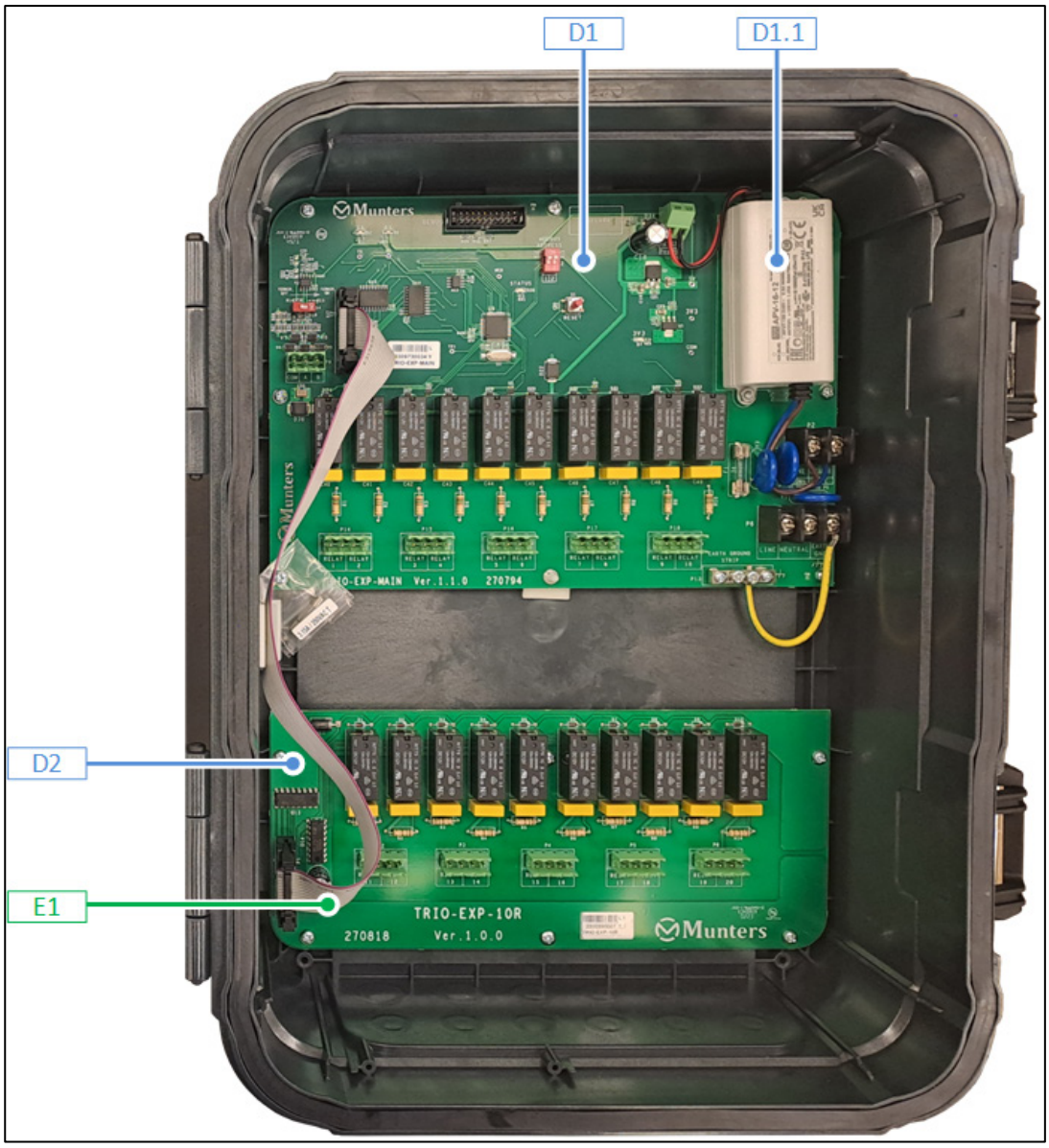
- Trio Expansion 20 Container Spare Parts
- Trio Expansion 20 Main Container Spare Parts

### 8.3.1 TRIO EXPANSION 20 CONTAINER SPARE PARTS




| ID No. | Description | Order Catalog Number | Note |
|---|---|---|---|
| C1.1 | TRIO FRONT DOOR EXP PLASTIC PART V1.0.0 (SP: 207129) | MPN: 940-99-00028 | |
| | | DPN: | |
| C1.2 | TRIO-20 PLASTIC BOX BASE (SP: 207124) | MPN: 940-99-00112 | |
| | | DPN: | |
| C1.3 | TRIO HINGE PLASTIC PIN V1.0.0 (SP-207128) | MPN: 940-99-00019 | |
| | | DPN: | |
| C2.1 | TRIO-20 PANEL PLASTIC PART BLUE LOGO MUNTERS + PART BLUE | MPN: 940-99-00001 | OR |
| | | DPN: | |
| C2.2 | TRIO PANEL PLASTIC PART RED RAL 3020 NO LOGO (SP-207138) | MPN: 940-99-00045 | |
| | | DPN: | |
| C3.1 | GENERAL PLASTIC LATCH | MPN: 900-99-00216 | |
| | | DPN: | |
| C3.2 | ONE/ONE PRO LATCH GENERAL LOCK PLASTIC PART + LOCK FOR LATCH | MPN: 900-99-00217 | |
| | | DPN: | |
| C4 | MID-RANGE MAIN GASKET V1.0.0 (SP-207122) | MPN: 940-99-00021 | |
| | | DPN: | |

## 8.3.2 TRIO EXPANSION 20 MAIN CONTAINER SPARE PARTS



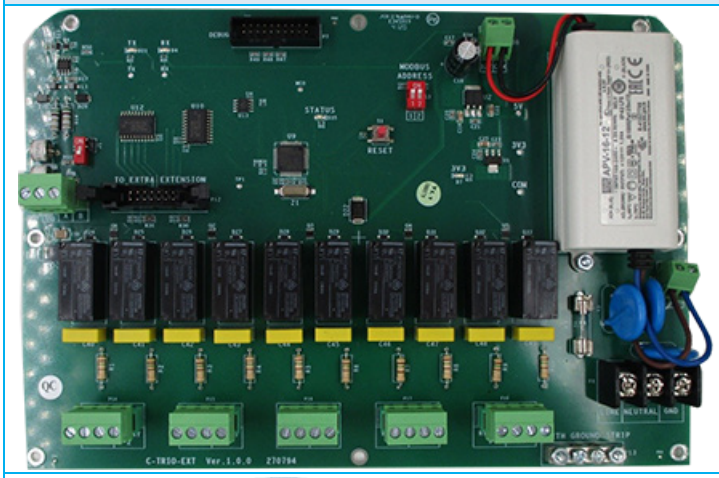
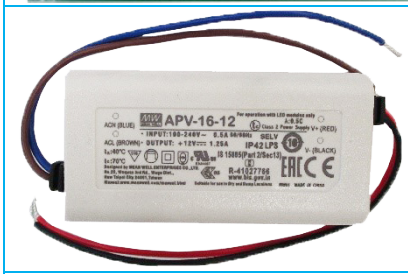

| ID No. | Description | Order Catalog Number |
|---|---|---|
| D1 | TRIO-EXP 10 CARD (SP: R-TRIO-EXP10) | MPN: 940-99-00029 |
| | | DPN: |
| D1.1 | SWPS APV-16-12 Mean Well 115V/230V 12V 16W (SP: 370153) | MPN: 999-99-00338 |
| | | DPN: |
| D2 | TRIO EXP 10 RELAY ADDIT CARD (TRIO-EXP-10R) | MPN: 940-99-00159 |
| | | DPN: |

| ID No. | Description | Order Catalog Number |
|---|---|---|
| E1 | FLAT FF14P 34cm (TRIO EXP)‹F"D_F"D› (SP-141201) | MPN: 940-99-00168 |
| | | DPN: |

## 8.4 Additional Options

| ID No. | Description | Order Catalog Number |
|---|---|---|
| ADO 1 | Trio Expansion: 10 Relays To 20 Relays Upgrade Kit | MPN: 940-99-00169 |
| | | DPN: |

## 8.5 Cards

| Card | Description | Munters Ordering Number |
|---|---|---|
|  | R-TRIO-EXP10: TRIO EXP 10 CARD | 940-99-00029 |
|  | 370153: SWPS APV-16-12 Mean Well 115V/230V 12V 16W | 999-99-00338 |
|  | R-TRIO-EXP-10R: CARD EXP RLY ADDIT 10 TRIO | 940-99-00159 |

# 9 Warranty

Warranty and technical assistance

Munters products are designed and built to provide reliable and satisfactory performance but cannot be guaranteed free of faults; although they are reliable products they can develop unforeseenable defects and the user must take this into account and arrange adequate emergency or alarm systems if failure to operate could cause damage to the articles for which the Munters plant was required: if this is not done, the user is fully responsible for the damage which they could suffer.

Munters extends this limited warranty to the first purchaser and guarantees its products to be free from defects originating in manufacture or materials for one year from the date of delivery, provided that suitable transport, storage, installation and maintenance terms are complied with. The warranty does not apply if the products have been repaired without express authorisation from Munters, or repaired in such a way that, in Munters' judgement, their performance and reliability have been impaired, or incorrectly installed, or subjected to improper use. The user accepts total responsibility for incorrect use of the products.

The warranty on products from outside suppliers fitted to the Expansion Unit, (for example antennas, power supplies, cables, etc.) is limited to the conditions stated by the supplier: all claims must be made in writing within eight days of the discovery of the defect and within 12 months of the delivery of the defective product. Munters has thirty days from the date of receipt in which to take action, and has the right to examine the product at the customer's premises or at its own plant (carriage cost to be borne by the customer).

Munters at its sole discretion has the option of replacing or repairing, free of charge, products which it considers defective, and will arrange for their despatch back to the customer carriage paid. In the case of faulty parts of small commercial value which are widely available (such as bolts, etc.) for urgent despatch, where the cost of carriage would exceed the value of the parts, Munters may authorise the customer exclusively to purchase the replacement parts locally; Munters will reimburse the value of the product at its cost price.

Munters will not be liable for costs incurred in demounting the defective part, or the time required to travel to site and the associated travel costs. No agent, employee or dealer is authorised to give any further guarantees or to accept any other liability on Munters' behalf in connection with other Munters products, except in writing with the signature of one of the Company's Managers.

WARNING: In the interests of improving the quality of its products and services, Munters reserves the right at any time and without prior notice to alter the specifications in this manual.

The liability of the manufacturer Munters ceases in the event of:

- dismantling the safety devices;
- use of unauthorised materials;
- inadequate maintenance;
- use of non-original spare parts and accessories.

Barring specific contractual terms, the following are directly at the user's expense:

- preparing installation sites;
- providing an electricity supply (including the protective equipotential bonding (PE) conductor, in accordance with CEI EN 60204-1, paragraph 8.2), for correctly connecting the equipment to the mains electricity supply;
- providing ancillary services appropriate to the requirements of the plant on the basis of the information supplied with regard to installation;
- tools and consumables required for fitting and installation;
- lubricants necessary for commissioning and maintenance.

It is mandatory to purchase and use only original spare parts or those recommended by the manufacturer.

Dismantling and assembly must be performed by qualified technicians and according to the manufacturer's instructions.

The use of non-original spare parts or incorrect assembly exonerates the manufacturer from all liability.

Requests for technical assistance and spare parts can be made directly to the nearest Munters office. A full list of contact details can be found on the back page of this manual.

Ag/MIS/ImEN-2806-04/21 Rev 1.5