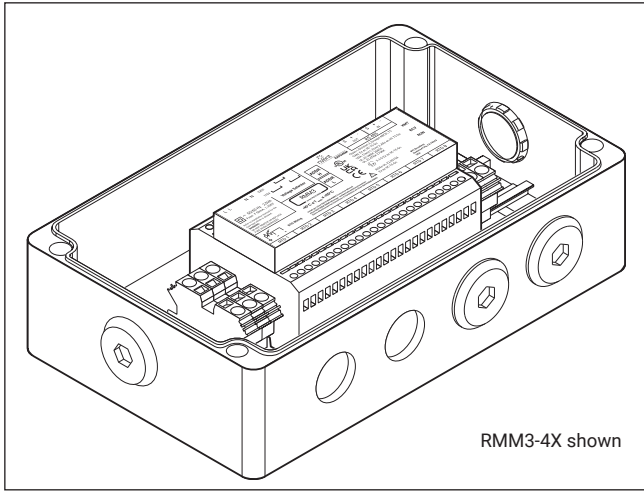


# RMM3-4X / RMM3-24VDC-4X Installation Manual

Remote Monitoring Module RMM3 in a Type 4X-Enclosure for the  
nVent RAYCHEM Control System



RMM3-4X shown

## TOOLS REQUIRED

3/8 hex key (for RMM3-4X enclosure)

## APPROVALS



Class I Division 2, Groups ABCD; T5  
 $T_{amb}$ : -40°C to +60°C

## MONITORING SYSTEM COMPONENTS AND ACCESSORIES

The RMM3-4X and RMM3-24VDC-4X will contain the following items:

Item	Quantity	Description
A	1	RMM3 / RMM3-24VDC module
B	2	Spare fuses
C	1	Jumpers
D	1	Product label (for user supplied enclosures only)
	1	Type 4X Enclosure

Additional materials required

### Extension wire

MONI-RTD-WIRE	Shielded cable with three 22 AWG wires; PVC insulation; for use as RTD lead wire. 1000 ft reel
MONI-RS485-WIRE	Shielded cable with twisted pair of 22 AWG wires; PVC insulation; for use as RS-485 bus. 1000 ft reel.

### Conduit drain

JB-DRAIN-PLUG-3/4IN	PN 278621 (recommended for Division 2 locations)
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## SPECIFICATION

RMM3-4X Supply voltage (nominal): 115/230 Vac, jumper selectable, 50/60 Hz

RMM3-24VDC-4X supply voltage (nom.): 24 Vdc nominal, min 10Vdc, max 30 Vdc

Power consumption: 2.5 VA

Ambient operating range  $T_{amb}$ : -40°C to +60°C

Relative humidity: 5 to 95%, noncondensing

Altitude: Up to 2000 m

Environment: Pollution Degree 2, Overvoltage Category II

Protection: Type 4X or better enclosure when installed outdoor

Temperature sensors: 3-wire RTD (Pt 100)

Temperature coefficient: per IEC 751-1983 (100  $\Omega$  at 0°C)

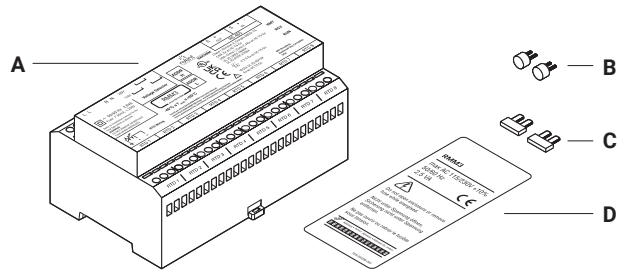
Sensor connections: Can be extended with a 3-core shielded cable of 20  $\Omega$  max. per conductor, advised maximum length 150 m (can differ on proper installation, insulation and cable shielding)

Sensor input wire connections: 3 x 1.5 mm<sup>2</sup> cable

RS-485 connections: Shielded, single twisted pair, max. 1200 m

Temperature measurement range: -100°C to +700°C (the range can differ when used in combination with NGC-30 or NGC-40)

Replaceable fuse:  
 1) F 50 mA/250 V for RMM3: Littlefuse Series 372 TR5 50 mA  
 Part number 37200500001  
 2) F 200 mA/250 V for RMM3-24VDC: Wickmann  
 Part number 19370-034-K (FAST BLOW)



## **WARNING / AVERTISSEMENT:**

This is an electrical device that must be installed correctly to ensure proper operation and to prevent shock or fire. Read these important warnings and carefully follow all of the installation instructions.

- Component approvals and performance are based on the use of nVent -specified parts only. Do not use substitute parts. Substitution of components and false installation may impair safety
- Keep components dry before and during installation
- **Note:** Leave these instructions with the end user for reference and future use

For RMM3 field wiring use copper wire only with minimum temperature rating 70°C. Use 20-14 AWG for the power inputs. For the RMM-24VDC field wiring use copper wire only with the minimum temperature rating of 70°C. Use 24-14 AWG for the power inputs.

Il s'agit d'un appareil électrique qui doit être installé correctement pour garantir son bon fonctionnement et pour éviter tout choc électrique ou incendie. Lisez ces avertissements importants et suivez attentivement toutes les instructions d'installation.

- Les approbations et les performances du produit sont basées sur l'utilisation de composants spécifiées par nVent. Ne pas utiliser d'autres composants. La substitution de composants différents à ceux spécifiées par nVent et une fausse installation peuvent nuire à la sécurité
- Gardez les composants au sec avant et pendant l'installation.
- **REMARQUE :** Veuillez laisser ces instructions à l'utilisateur final pour référence et futur utilisation

Pour le câblage utilisez uniquement du fil avec une âme en cuivre avec une température de service minimale de 70 °C. Utilisez du câble 20-14 AWG pour l'alimentation. Utilisez des câbles 30-12 AWG pour les autres bornes. Couple maximal 0,7 Nm.

### **CONDITIONS OF SAFE USE:**

Provisions shall be made to prevent the rated voltage from being exceeded by transient disturbances of more than 140%.

### **BRANCH CIRCUIT PROTECTION:**

For AC versions RMM3-4X only: The RMM3-4X must be protected by a branch circuit breaker with a rating that does not exceed 20 A.

### **MOUNTING RMM3 / RMM3-24VDC IN ENCLOSURE:**

The RMM3 attaches to a DIN 35 rail in the 4X enclosure. The RMM3 is powered with line voltage OR 24 Vdc in appropriate enclosure. Use agency-approved glands and fittings to maintain Type rating of enclosure.

The enclosure noted in the previous paragraph is configured specifically for the RMM3. If a different enclosure is used for Division 2 locations and typical Industrial environments, it must be fitted with the following hardware to mount the RMM3:

- DIN 35 rail to which to attach the RMM3. The rail should fit the enclosure and be at least 6-½ in. (180 mm) long.
- Grounding hardware.
- Rail end stops to hold the RMM3 in position may be needed.

The RMM3 is an electronic device that could be damaged by filings or other debris. The RMM3-4X comes supplied with six ¾ inch conduit entries for installation of power wiring, RS-485 cables, and RTDs. The enclosure will need entries for the following connections:

- Each RTD to be connected (up to 8)
- RS-485 bus (incoming and outgoing)
- Power and ground wiring (incoming and outgoing).

### **DISCONNECT DEVICE:**

For AC versions RMM3-4X only: A disconnect device shall be provided in a location that is easily reached, and marked as the disconnect device for the equipment.

To help determine the best entry arrangement, see the illustration on page 2, which shows the terminal arrangement on the RMM3. Typically, power wiring is run in one entry, RS-485 cables in another entry, and RTDs in the remaining 4 entries.

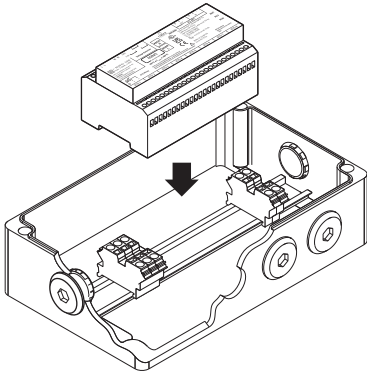
- Mounting RMM3 in electrical enclosure
- Mount the enclosure so that the RMM3 will not be exposed to abuse or damage.
- Do not attach the enclosure to pipes or equipment that could subject the unit to continued vibration.

**Important:** Do not locate the enclosure where the RMM3 could be subjected to temperatures inside the enclosure of greater than 140°F (60°C) (e.g. directly exposed to sunlight in hot climates).

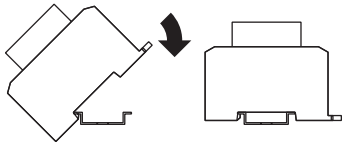
Use mounting hardware suitable for the Type rating of the enclosure.

## ATTACHING RMM3 TO DIN RAIL

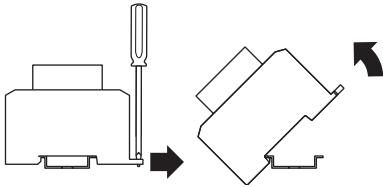
Position the RMM3 with RTD connections on the same side as conduit entry holes in enclosure.



Slip the green tabs on the underside of the RMM3 under one side of the DIN 35 rail. Pivot the RMM3 towards the DIN rail until the orange tab makes contact with the rail. Press the RMM3 towards the rail until the orange tab (10) snaps over the rail. Do not use excessive force.



To remove the RMM3 from the DIN rail, slip a small slotted screwdriver into the rectangular slot in the orange tab, push the tab away from the DIN rail, and pivot the RMM3 away from the rail.



### Connect power and ground wiring and select voltage operating range

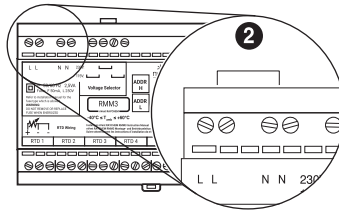
**Warning:** Shock Hazard. Shut off power to power cable before proceeding

**Note:** For hazardous area installations, input and output (I/O) wiring and conduit seals must be installed in accordance with applicable Division 2 requirements.

### Connect wiring from the power source to designated terminals on RMM3

Use only copper conductors. Connect power wires to the terminals marked L1 and L2 on the RMM3. If power is being daisy chained, be sure to maintain polarity of L1 and L2 wiring for incoming and outgoing wires. Connect the ground wire(s) to the grounding terminals mounted on the DIN rail.

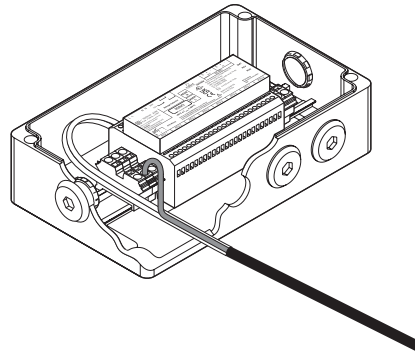
The terminals can accept wires from 24 to 12 AWG. We recommend 12 AWG flexible stranded wire with branch circuit protection sized accordingly. Cable should have a minimum temperature rating of 149°F (65°C).



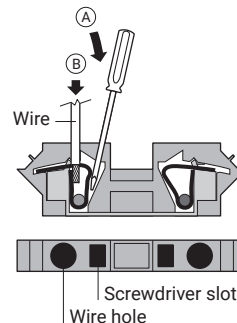
### Connect ground wiring

Use only copper conductors. Connect ground wires to ground terminals in the enclosure.

**Note:** If a ground wire is part of the power cable, it must be longer than the other two conductors for strain relief.

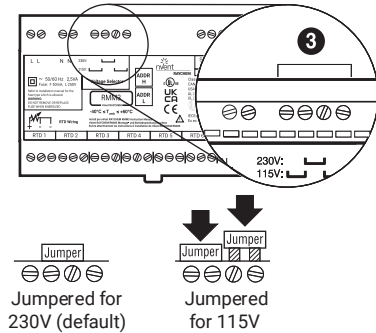


The RMM3-4X uses spring clamp terminals. These terminals have a steel spring that clamps the wire to a copper bus bar. This provides improved vibration resistance, reduced maintenance and faster installation. To connect wires, firmly insert a flat-blade screwdriver (A) into the square hole to open the spring. When fully inserted, the screwdriver will lock into place, allowing you to remove your hand and insert the wire into the round hole (B). Remove the screwdriver to clamp the wire. The wire is held securely against the bus bar for low contact resistance over time without the need to periodically retighten screws



### RMM3 only: Select the voltage operating range

Connect the supplied jumpers to the appropriate terminals (3) to select input voltage. The RMM3 comes supplied jumpered for 230 volts. The RMM3 has terminals for 8 three-wire, 100  $\Omega$  platinum RTDs; do not use other types of RTDs. Select RTDs appropriate for the usage and temperature requirements.



### Connect lead wires from each RTD to the selected RMM3 terminals

The RMM3 accepts up to 8 RTDs. Each RTD connection is numbered; the number identifies the RTD, and determines the order in which the NGC controller displays the RTD measurement. Therefore, order and group the RTD connections in a manner that makes the NGC controller display most meaningful.

The RMM3 cover shows the correct wiring arrangement for the RTD wires. Connect the two RTD lead wires of the same color to the terminals marked “-” (on the right in the illustration below); connect the RTD lead wire that is a different color to the “+” terminal. If RTD shields are not grounded elsewhere, connect shield to ground terminal in enclosure.

### Record the location / identification for each RTD

Because the RMM3 terminal connection number identifies the RTD in the nVent RAYCHEM NGC control system, it is important to record the location of each RTD. Use the table on page 7 to record the connections, and label the RMM3 or its enclosure with this RTD identification information.

### Connect RTD wires to the RMM3

Install each RTD in accordance with the installation instructions shipped with it, and run the RTD lead wires to the RMM3.

**Note:** Each of the three lead wires from each RTD must have a resistance of 20  $\Omega$  or less

## SELECT RS485 ADDRESS AND CONNECT THE RS485 BUS

### Select the RS485 address for the RMM3

Each RMM3 connected to an NGC controller must have a unique address; if two RMM3s are assigned the same address, communication faults will result. To ensure that you assign a unique address to each RMM3, do the following:

- Review the control system layout; if a layout document does not exist, create one. If it has not already been done, assign an RS485 address to each RMM3 (up to 247) connected to the controllers. Record the RS485 address assignments and save for future reference.
- If you are adding one or more RMM3 to an existing control system network, confirm that the RS485 addresses for existing RMM3s correspond to the system layout. You can do so by observing the Elexant/NGC controller display. When the controller displays a temperature it identifies the RTD with a two-part tag; the prefix indicates the RMM3 address, and the suffix indicates the terminal number to which the RTD is connected. For example, RTD 33-7 identifies an RTD connected to the RMM3 with RS-485 address 33, RTD terminal 7.

By checking the RS485 addresses on an existing system, you can avoid potential conflicts that would be confusing and time consuming to troubleshoot otherwise. Record the RS485 address selected for the RMM3 you are currently installing, and label the exterior of the enclosure with the address assigned to the RMM3.

### Set the RS485 address for the RMM3 using the rotary switch provided

Note the orientation of the clear plastic cover, then remove the cover. Use a slotted screwdriver to rotate the selector switches to the appropriate positions to select the RS485 address. The single character visible on the switch indicates the R-485 address assigned. See for further details the RMM3 installation manual.

### Connect the RS485 Bus

**Note:** Do not make connections to the RS-485 bus while it is connected to an operating NGC controller, or damage and/or alarms could result.

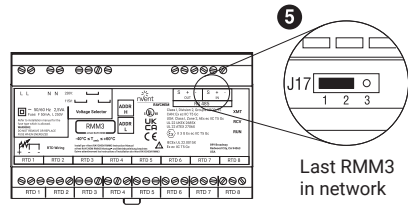
The RS485 bus allows units with unique addresses to be daisy chained together along a common bus. To add a new unit to the network, simply daisy-chain the RS-485 bus from the last unit to the new one – or insert the new unit between two existing units on the bus. The order in which units are attached to the RS485 bus does not matter. There are just two constraints on the RS485 network:

- Each RMM3 must be assigned a unique address.
- The RS485 bus must be a continuous string from the NGC controller to the last RMM3 in the system.

**Note:** The RS485 bus operates at 5 V, and equipment connected to it could be damaged by exposure to higher voltages. Take precautions to avoid exposing the RS485 wiring to discharge of static electricity or other sources of high voltage potential; in particular, avoid contact with the power supply wiring.

**Important:** Do not connect the shield of the RS485 cables to the enclosure's grounding terminal. Connect the shield only to the RMM3 terminals provided. To avoid the potential for spurious ground loops, the RS485 cable shield should be connected to ground only in the NGC controller.

For the last RMM3 in the network, terminate the RS-485 bus by removing the shorting block on jumper location J17 from 2–3 and placing it across pins 1–2. Replace the clear plastic cover in its original orientation.



Default position  
(for all RMM3 units  
in network except  
the last one)



Termination mode  
(last RMM3 in network)

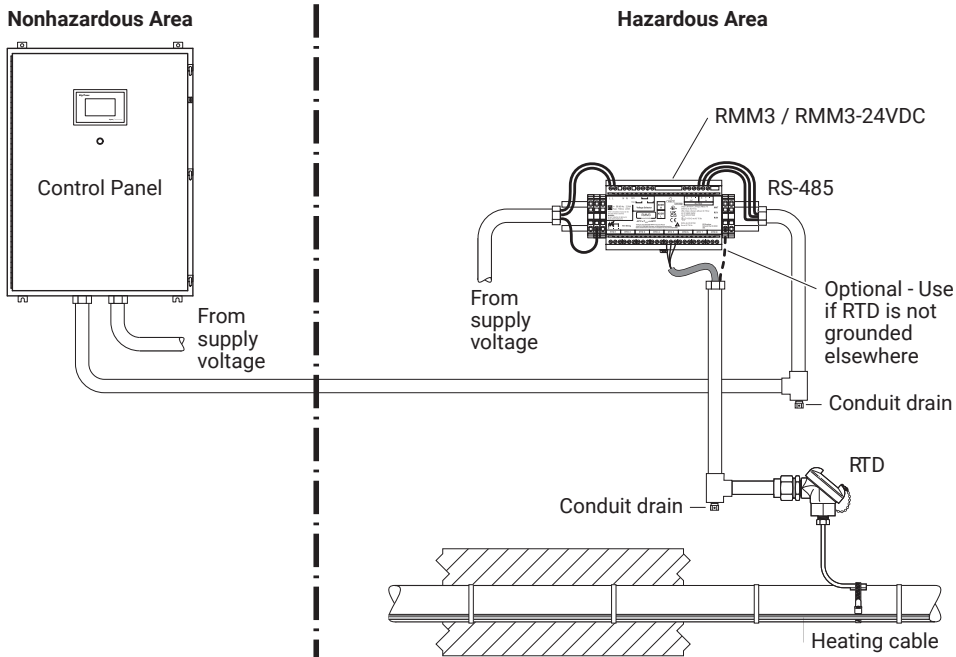


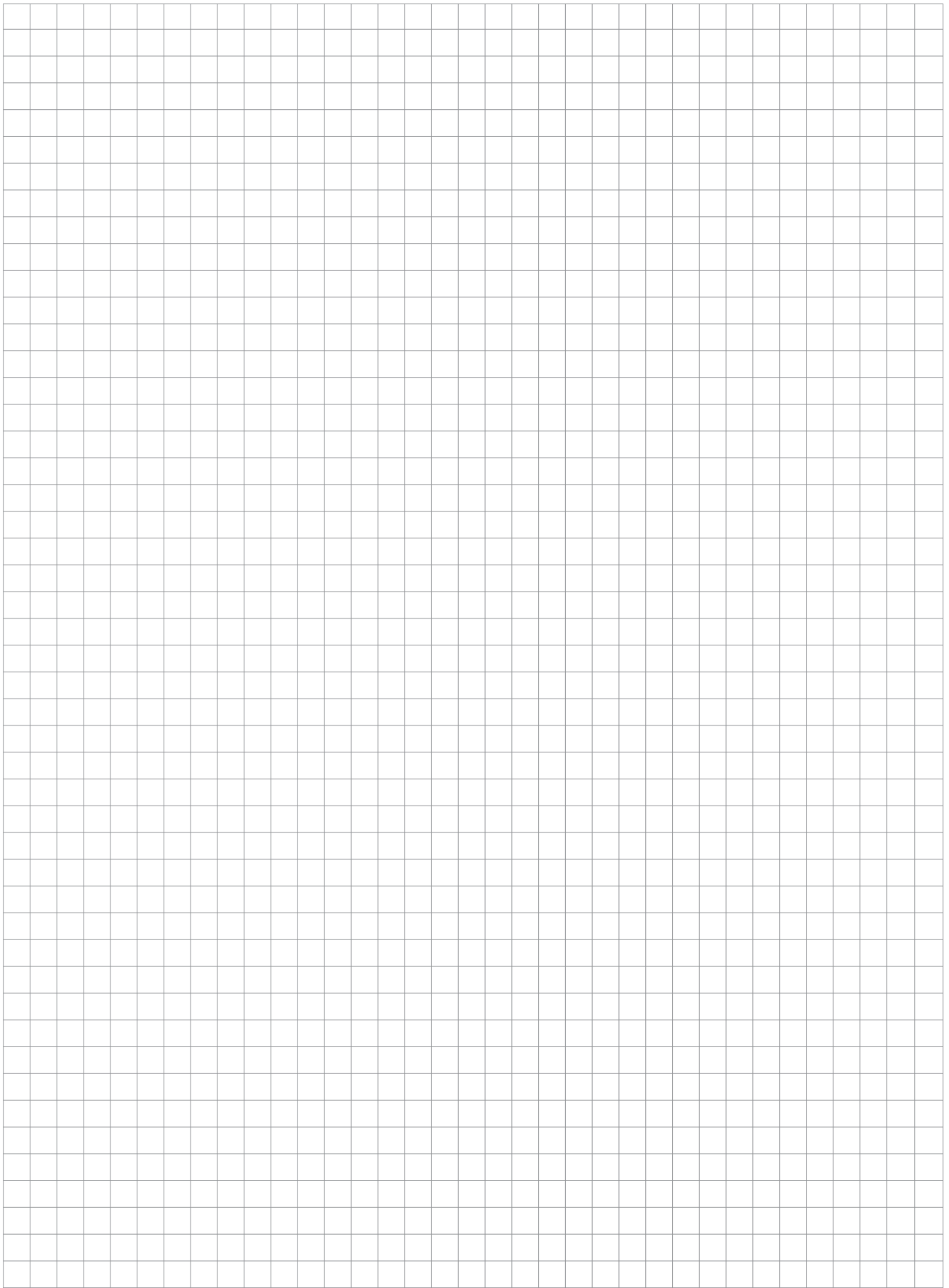
## FUSE REPLACEMENT

**Important:** Disconnect power before replacing a fuse.

- Pry off the clear plastic cover using a small slotted screwdriver.
- Use needle nose pliers to remove the fuse marked F50mA 250 V / 200 mA for 24 VDC.
- Install a replacement fuse (supplied with the RMM3 / RMM3-24VDC).
- Align "RTD1" on the clear plastic cover with "RTD1" on the RMM3. Press firmly on cover until it is fully engaged.

## Typical installation





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