



# RTM – 75kW Installation Manual

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# Important safety instructions

### **SAVE THESE INSTRUCTIONS**

This manual contains important instructions for the RTM-75kW DC electric vehicle fast charger user unit.

Read the installation and operating instructions before installing and commissioning the equipment.

These instructions must be followed during installation, operation, and maintenance of the unit.



### CAUTION

The RTM-75kW user unit must be installed and serviced only by qualified electrical personnel.

#### **Grounding instructions**

This unit must be connected to a grounded, metal, permanent wiring system. An equipment-grounding conductor must be run with circuit conductors and connected to the equipment-grounding terminal or lead on the electric vehicle charger.

Connections to the RTM-75kW user unit must comply with all local codes and ordinances.

Observe all pertinent national, regional, and local safety laws and regulations when installing and commissioning the RTM-75kW user unit.

### Identifying symbols



CRITICAL



CAUTION



RISK OF ELECTRIC SHOCK

Alternating Current Supply



Equipment Grounding

Conductor Symbol



Phase Symbol

Symbol

 $\sim$ 

### Wiring

Tritium recommends the use of copper cables.

Take care to observe local regulations regarding wiring different circuits in the same conduit, including the ethernet link if used. In general, all conductors occupying the same conduit must have an insulation rating equal to at least the maximum circuit voltage applied to any conductor within the conduit.



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## Important safety instructions

### **SAVE THESE INSTRUCTIONS**

### Warning

Installation must not be made in a commercial garage (repair facility) or closer than 20 feet (6096 mm) of an outdoor motor fuel dispensing device.

#### Input

400-480Vac 50-60 Hz (+/- 10%) 3 phase AC, no neutral

Nominal current at nominal voltage level Worldwide: 114A, US: 95A

Maximum current at low line level (Nominal voltage - 10% and PF>0.99) Worldwide: 114A, US: 105A

Recommended over-current protection device required (OCPD) in site distribution board

Worldwide: 125A breaker, US: 125A breaker

The RTM-75kW user unit must be connected to a circuit provided with appropriate over-current protection in accordance with the national, regional and local regulations in the country of installation.

#### **Tightening torque**

Wiring and earth terminals 20Nm

#### Weather rating

**IP65 Electronics Enclosure** 

#### Usage limitations

Cord extension sets or second cable assemblies must not be used in addition to the cable assembly for the connection of the vehicle to the charger.

Adaptors must not be used to connect a vehicle connector to a vehicle inlet.



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## Packaging, handling, & receipt

Read these instructions carefully to become familiar with the RTM-75kW user unit packaging and handling procedures prior to unpacking and installation.

In all cases, the RTM-75kW user unit must be transported to the installation site in its original packaging and only unpacked at the installation site.

Installation, commissioning, and servicing of the RTM-75kW user unit should only be carried out by qualified personnel.

#### Materials

The RTM-75kW user unit is transported in a reinforced cardboard crate.

Please respect the environment and recycle/reuse the materials.

#### Storage

Store in the original packaging, in a horizontal position.

Store in a dry location, protected from the weather (warehouse conditions).

Storage temperature: -35°C to 70°C / -31° to 158°F

#### Handling

Only lift the RTM-75kW user unit packaging in its horizontal orientation using a forklift, pallet jack, or with lifting straps and forklift or crane. Check the weight on the delivery documents, and ensure the lifting apparatus used is compatible.

#### Receipt

Check that the crate packaging is in good condition and that the RTM-75kW user unit is not damaged.

If any problems are noted, make a formal complaint to the carrier and notify your supplier.

Packed crate weight

Up to 360kg

Crate size (in mm)

1190 (W) x 2135 (L) x 685 (H)

**RTM-75kW** weight

300kg



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### Site configuration

#### Site survey

A qualified engineer must survey the installation site to determine the correct ground preparation for the size and weight of the RTM-75kW user unit, in accordance with local regulations. The RTM-75kW user unit is best installed following the recommended site configuration requirements.

#### **Ground fixing**

The RTM-75kW user unit is to be fixed to the ground through the baseplate fixing holes with 4 x M16 fasteners. Fasteners are not supplied, because the type required depends on the foundation used and must be chosen by the installer accordingly.

The fasteners should fix the RTM-75kW user unit securely to the foundation through the baseplate in accordance with the dimensions and fixing points shown in Base plate dimensions.

**Note:** Keep the plastic inserts from the bolts for use in the baseplate holes.

#### **Conduit requirement**

Up to  $\emptyset$  110mm OD conduit maximum.  $\emptyset$ 50 and  $\emptyset$ 25mm conduit standard.

#### **Foundation requirements**

The foundation must be flat, even, and have the appropriate density for the weight of the user unit.

Check the flatness and level of the foundation and level of the RTM-75kW user unit baseplate prior to fixing.

#### Communications

Wired ethernet or 3G/4G network capability.

#### **Power supply**

The RTM-75kW user unit is designed to accommodate input wiring from either an underground foundation or above ground.

#### High power (HP) input wiring

High power input wiring can be provided to the charger in three different scenarios:

1. A single multi-conductor cable  $\emptyset$ 27-38mm to suit the supplied M50 cable gland.

2. Running the wiring in a 50mm conduit and installing using the provided M50 conduit adaptor and seal.

3. Individual wires can be used with the provided alternate gland plate and 4x M32 cable glands. Each individual cable must be Ø13-18mm.

#### Auxiliary field wiring

The auxiliary field wire must be a single multi-conductor cable  $\emptyset 10 - 14$ mm, to use the supplied M25 cable gland. If the auxiliary wire is smaller than  $\emptyset 10$  the 25mm conduit installation must be used.



### CRITICAL

It is critical to product safety and warranty that IP65 is achieved for all input wiring.

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### Site configuration

#### Servicing distance



**Note:** The grey areas shown in the image must be kept clear of all obstructions. This allows the user unit to be serviced and provides clearance when the front door of the User Unit is opened.





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### **Baseplate dimensions**

- 125mm Wiring in hole
- 50mm Grounding conductor hole
- Fixing point holes (Retro fit over Veefil-RT 50kW installation)
- Fixing point holes new installation



#### **CHARGER FRONT**



#### Notes:

- Fixing point holes (shown in red) are only to be used when retrofitting over an existing Veefil-RT 50kW installation.
- If installing on an existing foundation with above ground power, check that the right rear fixing point hole (shown in red and circled in black) measures a maximum of 40mm from the foundation surface.
- A lower wind load rating will apply in retrofit installation.

Do not scale. All dimensions shown in mm. A mounting stencil may be supplied by Tritium at customer request.



## Site preparation - Underground wiring

#### Power supply preparation

When preparing the foundation, allow approximately 1 metre of conduit and wiring from the foundation surface.



#### Large conduit installation

If the conduit used is greater than Ø50mm, cut the conduit 20mm from the foundation surface. Cut the wiring as shown below.



**Note:** Use expanding foam to fill in or around the conduit, to avoid it filling with water and debris.

### 50 & 25mm conduit installation

If using conduit fittings, cut the conduit 390mm from the foundation surface. Cut the wiring as shown below. **Note:** This installation is not suited to route ethernet wiring.



#### Cable gland installation

If the installation is using a 50mm cable gland, cut the conduit 200mm from the foundation surface. Cut the wiring as shown below.



**Note:** Use expanding foam to fill in or around the conduit, to avoid it filling with water and debris.

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### Site preparation - Underground wiring

Prior to installation of the RTM-75kW, cut the wiring as per this diagram and crimp on lugs and bootlace ferrules.

**Note:** Drawing is not to scale. Measure and cut on site.

#### **HP INPUT & GROUND WIRING AUX FIELD WIRING** Trim back auxiliary field wires to suit L3 🕁 bootlace ferrules (not supplied) $\bigcirc$ С L1 L2 D Ø Trim back all HP input wires and $\bigcirc$ Cut auxiliary $\bigcirc$ grounding wires field wires D to suit M8 lugs (EU) 470mm from OR M10 lugs (US) sheath cut and crimp on lugs Cut L3 & (not supplied) grounding wire 205mm Cut Input from sheath wiring L1 & L2 cut 185mm from sheath cut Cut wiring sheath **ETHERNET** 400mm from Trim to suit foundation

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## Site preparation - Above ground wiring

#### Power supply preparation

Use 50mm flexible conduit for providing power above ground.

Leave a minimum of 1500mm of conduit and wiring from the right rear foundation hole. Prior to installation, the conduit and wiring will require trimming.



Charger front

#### Full conduit installation

Cut the conduit 400mm from the right rear foundation hole. Cut the wiring as shown below.

**Note:** This installation is not suited to route ethernet wiring.



#### **Cable gland installation**

Cut the conduit 100mm from the right rear foundation hole. Cut the wiring as shown below.



**Note:** Use expanding foam to fill in the conduit to avoid it filling with water and debris.

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### Site preparation - Above ground wiring

Prior to installation of the RTM-75kW, cut the wiring as per this diagram and crimp on lugs and bootlace ferrules. **Note:** Drawing is not to scale. Measure and cut on site.

### HP INPUT WIRING & GROUND WIRING

AUX FIELD WIRING



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# Site preparation - Local earth

Secondary point for connecting local earth to the chassis.

Attach the bandeizen or earth stake to the stud on the chassis. Follow local regulation regarding lightning protection and local earth bonding.

**Note:** This does not remove the need to attach the Protective Earth conductor at the charger input terminals.





## Installation requirements & equipment



These instructions provide a systematic guide for installing and commissioning the RTM-75kW user unit.

The RTM-75kW user unit must be installed and serviced by qualified electrical personnel.

Observe all pertinent national, regional, and local safety regulations when you install and commission the RTM-75kW user unit.

The RTM-75kW user unit has an IP65 electronics enclosure rating. However, because it must be opened for installation, this is best done in dry weather or under cover to avoid moisture or debris ingress.

The RTM-75kW user unit must be properly installed, assembled, and commissioned according to these instructions before it is used. Prior to installation, contact your supplier to organise commissioning information.

## Supplied with RTM-75kW user unit:

- 5mm pin hex tool
- 1x 50mm conduit fitting and seal
- 1x 25mm conduit fitting and seal
- Alternative gland plate with 4x M32 cable glands
- External Ethernet connector
- Ferrite
- Conduit clamp
- 2x M5x12mm Screws
- 2x M5 flange nuts
- Warranty documentation
- Baseplate template

## Required equipment (not supplied):

- Lifting apparatus. See page 3 for weights. Ensure lifting apparatus is sufficiently rated.
- 110mm OD Conduit
- 4x M8 lugs and crimping tool (EU)
- 1x M8 lug and 3x M10 lugs and crimping tool (USA)
- Bootlace Ferrules 20AWG 0.5mm<sup>2</sup>. Quantity dependant on field wiring requirements. Refer to the Auxiliary field wiring section.
- 4x site specific fasteners. Fasteners are not supplied, because the type required depends on the foundation used and must be chosen by the installer accordingly.
- Socket set & ratchet
- Torque wrench



### CAUTION

Do not work under suspended loads. Two people may be required, because the unit could swing.

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### Unpacking

#### **DOCUMENT KEY:**

Items shown in orange are parts that require action for that step.

#### 1. Open crate

Move the crate as close to the prepared installation site as possible. Ensure there is enough room to manoeuvre the lifting apparatus.

Remove the cardboard crate lid and slide out the crate end.

### 2. Lift the RTM-75kW user unit to vertical

Securely attach the lifting straps at the top of RTM-75kW to the lifting apparatus and gently raise to a standing position on the shipping baseplate.

**Note:** The RTM-75kW user unit is 2030mm tall on the shipping baseplate.

When the user unit is upright, remove all wrapping. Ensure the connection to the lifting apparatus is secure at all times.







### Unpacking

**Important:** To protect the cable plugs from damage during installation, ensure the cable plugs are not sitting in the holsters.



Take care while installing to ensure the charging cables are not damaged by placing them out of the way.



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### Installation

#### 1. Remove radiator panels

Fixing points for the front and rear radiator panels are located behind 4x hex holes as shown.

Use the 5mm pin hex tool to unscrew the 4x security screws, which will disengage the radiator panels. Pull the radiator panels forward to reove, and safely store.



#### 2. Remove shipping bolts

Unscrew the 4x bolts from the shipping baseplate, located at the front and rear of the radiator.



3. Secure to foundation

Review section: Site preparation to ensure the correct wiring and conduit preparation.

Lift the RTM-75kW user unit and place over the prepared foundation.

If wiring is provided from underground, feed it through the power-in hole and secure the RTM-75kW user unit to the foundation fixing points. (Fasteners not supplied.)

If the power is provided above ground, secure the RTM-75kW user unit to the foundation and proceed with the installtion instructions.

**Note:** Use the plastic inserts in the holes of the baseplate.



**Important:** Before proceeding to the next step, check the cable plugs have been removed from the holsters. Opening the unit with the cable plugs sitting in the holsters will damage the plugs.





4. Remove side panel security screws

If the RTM-75kW has cable management, apply the instruction to both side panels. If there is no cable management, open the left hand side panel only.

Use the 5mm pin hex tool to unscrew the 2x security screws on each side panel. Remove the security screws and washers. Open the side panels.

#### 5. Open hinged side panels

Open both side panels if the RTM-75kW has cable management. Open only the left hand side if there is no cable managment.

Unhook the cable cord from the cut-out in the top of the side panel when opening.





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### Installation

#### 6. Open door

The front door has 4x latches that seal the door to the enclosure. If a lock is fitted, unlock to unlatch. Starting with the two latches in the centre, follow the instructions shown for opening the latches. Once all latches are disengaged, open the hinged door.



#### **OPENING THE LATCHES**











TURN THE LATCH HANDLE ANTI CLOCKWISE TO SLIDE THE LATCH AWAY FROM THE HOOK



7. Remove escutcheon

Remove the 6x M8 hex bolts and escutcheon.





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### Installation

#### 8. Remove terminal covers

Pull the terminal covers away from the mounting to disengage.



#### 9. Remove fasteners

Remove the 3x bolts and nuts on the wiring terminals and the nut on the grounding stud.



#### 10. Adjust terminal covers

Check the wiring size against the terminal covers and punch out the blanks.







## Wiring in - Underground gland and conduit

#### Gland installation

Prepare conduit and wiring as per section: Site preparation - Underground wiring, cable gland.

Loosen the M50 cable gland, and feed the HP input wiring and grounding wire through. Ensure the wiring sheath is sitting above the gland plate. Tighten the cable gland and pull on the wiring to ensure it will not slip.



### **CRITICAL**

If using an auxiliary field wire, the wire must be a single multi-conductor cable Ø10 - 14mm to suit the M25 cable gland.

If the auxiliary wire is smaller than Ø10, the conduit installation must be used.

Loosen the M25 cable gland, and feed the auxiliary field wire through. Ensure 470mm of internal auxiliary wire from the gland plate. Tighten the cable gland and pull on the wire to ensure it will not slip.



### Conduit installation

Prepare conduit and wiring as per section: Site preparation - Underground wiring, conduit.

Remove the M50 cable gland from the input plate, keeping the lock nut.

Fit the provided 50mm conduit fitting and seal over the input wiring and glue to the 50mm conduit with an appropriate sealant to ensure IP65.

Feed the wiring and conduit fitting through the 50mm gland plate hole, and secure the conduit fitting to the gland plate with the lock nut.

If using auxiliary wiring in the conduit, repeat these steps with the fitted M25 gland and 25mm conduit fitting and seal. Ensure 470mm of internal auxiliary wire from the gland plate.



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# Wiring in - Underground gland and conduit



### CRITICAL

To continue to achieve the IP65 rating, the power cabling must be fitted correctly into the cable gland or conduit.

Ensure the cable is sitting correctly in the gland or conduit and tighten to ensure no water or debris can enter. If in doubt, use an appropriate outdoor rated sealant.

When the cable gland has been tightened, pull on the cable to ensure it doesn't slip.



### Wiring in - Above ground with conduit

When providing wiring above ground, all HP input, grounding, and auxiliary field wires are routed inside a flexible 50mm conduit.

Prepare conduit and wiring as per section: Site preparation - Above ground, Full conduit installation.

Ensure the correct length of conduit from the rear installation point. Fasten the 50mm conduit to the rear left hand side of the chassis using the supplied conduit clamp and M5 fasteners.



Remove the M50 cable gland from the input plate, keeping the lock nut.

Fit the provided 50mm conduit fitting and seal over the wiring and glue to the 50mm conduit with an appropriate sealant to ensure IP65.

Feed the wiring and conduit fitting through the 50mm gland plate hole, and secure the conduit fitting to the gland plate with the lock nut. Do not remove the M25 cable gland or gland blocker.





### CRITICAL

To continue to achieve the IP65 rating the power cabling must be fitted correctly into the conduit.

Ensure the conduit is sufficiently sealed so no water or debris can enter.



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## Wiring in - Above ground with cable glands

When providing wiring above ground, all HP input, grounding, and auxiliary field wires are routed inside a flexible 50mm conduit.

Prepare conduit and wiring as per section: Site preparation - Above ground Cable gland installation.



If using an auxiliary field wire, the wire must be a single multi-conductor cable Ø10 - 14mm to suit the M25 cable gland.

If the auxiliary wire is not Ø10 - 14mm, the conduit installation must be followed.

Loosen the M50 cable gland, and feed the HP input wiring and grounding wire through. Ensure the wiring sheath is sitting above the gland plate. Tighten the cable gland and pull on the wiring to ensure it will not slip.

Loosen the M25 cable gland and feed the auxiliary field wire through ensuring there is 470mm of internal wire from the gland plate.





### CRITICAL

To continue to achieve the IP65 rating the power cabling must be fitted correctly into the cable gland.

Ensure the cable is sitting correctly in the gland and tighten to ensure no water or debris can enter. If in doubt, use an appropriate outdoor rated sealant.

When the cable gland has been tightened, pull on the cable to ensure it doesn't slip.

## Wiring in - Alternative gland plate

The alternative gland plate is required when individual HP input wiring is used.

Prepare all wiring as per underground or above ground gland installation. Note that each scenario has different wiring trim lengths.

1. Remove existing gland plate

The gland plate is fixed under the RTM-75kW chassis. Unscrew the 6x M5 nuts and remove the existing gland plate. Keep the nuts.



2. Prepare alternative gland plate

Assemble the 4x M32 and 1x M25 onto the alternative gland plate with the nuts on the gasket side. Torque to 2Nm.



3. Install alternative gland plate

Use the 6x M5 nuts and install the alternative gland plate under the RTM-75kW chassis. Torque to 6Nm.





### CRITICAL

To continue to achieve the IP65 rating the power cabling must be fitted correctly into the cable gland.

Ensure the cable is sitting correctly in the gland and tighten to ensure no water or debris can enter. If in doubt, use an appropriate outdoor rated sealant.

When the cable gland has been tightened, pull on the cable to ensure it doesn't slip.



### Wire termination



Wiring of the charger is to be done by qualified electrical personnel only.

If a cable with neutral is used (i.e. when doing a Veefil-RT 50kW replacement), ensure the appropriate regulations are followed to safely terminate the un-used neutral cable. This must be done by qualified electrical personnel only.

#### AC Input wiring

Ensure that the lugs and connection points are clean and free of dirt before you make the connections.

Place the supplied Ferrite over the HP Input wiring only, and bend the wiring as shown to ensure the terminal covers can be re-attached.



Check the terminal cover fits. Adjust wiring if necessary.

Fix the HP Input wiring to the terminals with the supplied fasteners.

**Note:** Bolts must sit on top of the lugs facing to the back of the charger with the nut at the back of the terminal to enable the terminal covers to fit correctly.

Fix the grounding wire to the M8 earth terminal and secure with supplied M8 nut.

For auxiliary field wiring termination go to the appropriate section.

The wiring in label is located on the inside of the left hand hinged side panel.



You must use a torque wrench to tighten to the specified tightening torque, and you must apply a torque mark to the stud and nut.

#### Tightening Torque

Terminal connections: 20Nm Earth wire: 20Nm

Auxiliary field wiring

Refer to the Auxiliary field wiring section for information regarding adding optional safety features to the RTM-75kW.



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### Ethernet port

The Ethernet port is situated under the front of the chassis.

Remove the ethernet cap.

Wire on the supplied ethernet adaptor and fit on the ethernet port.

Alternatively use 3G/4G connectivity.





A Cat 6a shielded ethernet cable is recommended for high signal integrity. The shield should be earthed at the building end, because the shield will not be connected at the charger end.



### SIM card installation

The SIM card is fitted to the 4G modem card, inside the door on the HMI Module.

Remove the M3 screw and tilt the 4G modem card 45 degrees upwards to release the spring finger from the slot and remove.

**Note:** The antenna should remain attached during this operation. If the antenna is detatched, refit to the connector marked MAIN (closest to the mounting screw).

Insert the SIM on the underside of the card.

Reinsert the 4G modem card back into the slot on a 45 degree angle to engage the spring finger. Fix with the M3 screw.



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Follow these steps in order to ready the unit for commissioning:

1. Remove lifting straps

Carefully remove the lifting straps from the lifting devices.

2. Check glands or conduit fitting



### CRITICAL

To continue to achieve the IP65 rating, the power cabling must be fitted correctly into the cable gland or conduit.

Ensure the cable is sitting correctly in the gland or conduit and tighten to ensure no water or debris can enter. If in doubt, use an appropriate outdoor-rated sealant.

When the cable gland has been tightened, pull on the cable to ensure it doesn't slip. Check all glands are tight and the cable doesn't slip. Alternatively, check the conduit fitting is attached and that the conduit is tightly fitted with appropriate sealing.

3. Reinstall terminal covers



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#### 4. Attach escutcheon cover

Replace the esctucheon, and secure with 6x M8 hex bolts.





If using a power drill to fasten the nuts, ensure the torque is set to no greater than 10 Nm.

If using a hand tool, fasten until resistance is felt. Do not over tighten.

5. Fuse-disconnect switch

Turn the fuse-disconnect switch to the vertical position.



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#### 6. Close and seal the front door

The front door has 4x latches that seal the door to the enclosure. **Note:** Begin with the two latches in the centre and follow the instructions shown for closing the latches.

If a lock was fitted, reattach and lock.



### **CRITICAL**

These latches provide the IP rating for the charger. Check each latch is engaged with the door hook and firmly sealed.



#### **CLOSING THE LATCHES**





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7. Lower the cable management weights on both sides

**Note:** If the charger has no cable management, proceed to step 8.

Pull the cable cord down (not shown) to raise the weight above the latch. Slide the latch towards the door and gently let the weight lower to it's natural resting position, inside the lower panel. Hook the cord into the cut-out in the top of the side panel and close the panel.

#### Hook cable



8. Secure the side panels

Fasten with 2x nylon washers and security screws, using the 5mm Pin Hex tool. Do not over tighten.





#### 9. Mount radiator panels

Align the fasteners with the brackets on the enclosure box. Use the 5mm Pin Hex tool to fix into position.

Do not over tighten.



Repeat for rear panel if underground wiring is used. If above ground wiring is used see section 10.

10. Mount rear radiator panel with above ground power

Using the 5mm Hex bit, remove the 2x security screws and rear infill panel.



Slot the rear radiator panel over the conduit. Align the fasteners with the brackets on the enclosure box. Use the 5mm Pin Hex tool to fix into position. Do not over tighten.



The infill panel is made from 2mm Aluminium. Cut the infill panel as shown, and break apart into three sections. Disgard the centre section with hex holes and remove any sharp edges from the remaining two pieces.



Fit the two infill panel pieces under the conduit, and secure with 2x M8 security screws.





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## Auxiliary field wiring terminals

#### Auxiliary field wiring terminals

FW1-UPS.24V+ FW2-UPS.24V GND FW3-SHUNT TRIP FW4-SHUNT TRIP COM FW5-UV TRIP FW6-UV TRIP COM FW7-ESTOP FW8-ESTOP COM FW9-CHASSIS REF FW10-GMI REF

Auxiliary field wiring must be routed behind the HP input wiring and switch plate as shown.





### Auxiliary field wiring - Safety loop

RTM-75kW has an internal safety system that can detect safety events and shut off supply power to the unit.

As shown in the following Safety Loop Trips diagram, there are two types of trips within the safety loop:  Software controlled trip via a micro-controller unit.
Hardware controlled trip via a hard-wired component in a series loop.

Faults detected on the safety loop not only de-energise the 3Ø input contactor but also trigger external Undervoltage trip and Shunt trip relays.



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## Auxiliary field wiring - Undervoltage trip

An Under Voltage Relay (UVR) module can be used to turn off the upstream circuit breaker when the charger detects a safety fault. It is a fail-safe method of protection, break/failure in the control voltage isolates 3Ø supply power from the charger. An external 24V power source should be supplied to the charger when using the Undervoltage detection function in order to bootstrap the turn on process, because an unpowered charger will not close the trip relay.

#### FW1–UPS 24V+ and FW2–UPS 24V

**GND** facilitates the connection of an external 24V DC backup power supply, which is essential to bootstrap the charger at power-up. The external un-interrupted power supply should be rated to supply 24VDC and 5 Amps.



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## Auxiliary field wiring - Undervoltage trip

#### FW5–UV TRIP and FW6–UV TRIP

**COM** provides connection points to the safety system undervoltage trip as a normally open clean contact relay. A break in the safety loop de-energises the Under Voltage normally open relay, thus removing the control voltage from upstream Under Voltage trip coil and isolating all supply power from the charger. Contact specifications for the normally open clean contact relay are listed in Appendix: Datasheet for TE Connectivity Potter & Brumfield Relays (V23105A5405A201).



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### Auxiliary wiring - Shunt trip

A Shunt Trip module can be used to turn off the upstream circuit breaker when the charger detects a safety fault. The shunt trip causes a breaker to open when a control voltage is applied to the shunt trip coil. An external power supply is not required in the shunt trip protection method, because absence of control voltage is a normal state for the shunt trip coil. Shunt trip is delayed by 1 sec after a break in safety loop is detected. This delay is used to bootstrap the charger at power-up. **FW3 – SHUNT TRIP and FW4 – SHUNT TRIP COM** provides connection points to the safety system shunt trip output as a normally open clean contact relay. A break in the safety loop will close the shunt trip relay after a 1 second delay, thus returning the control voltage to an upstream shunt trip coil and isolating all supply power from the charger.

Contact specifications for the normally open clean contact relay are listed in Appendix: Datasheet for TE Connectivity Potter & Brumfield Relays (V23105A5405A201).





### Auxiliary wiring - Emergency stop

An emergency stop (Estop) input is provided on the charger that can be used to trigger a fault in the charger safety system. This will open the main input contactor in the charger, and trip the undervoltage and shunt trip relays. It is a fail-safe method of protection, break/ failure in the control voltage will trip the internal 3Ø supply power of the charger.

#### FW7 – ESTOP and FW8 – ESTOP COM

provides connection points to the safety system Estop input. A continuity break between FW7 and FW8 induces an Undervoltage trip, shunt trip and opens the internal 3Ø input contactor. Multiple devices (normally closed-circuit) can be placed in series connections. E.g. Estop followed by a vapour sensor. Break/open circuit in any of the devices will trigger Estop.

**Note:** Jumper connector between FW7 and FW8 needs to be removed before using this feature. Isolated 24VDC @ 20 mA is supplied by the charger to facilitate the connection of Estop.



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### Auxiliary wiring - GMI

The Ground Monitoring Instrument (GMI) trip feature can be used to shut off the charger supply power if the Protective Earth conductor is not connected to the charger chassis. This safety feature monitors continuity between the Protective Earth and the GMI ground reference, thus ensuring the charger chassis remains connected to Protective Earth.

**FW9 – Chassis REF** is an accessible reference point to Chassis, enabling a jumper between FW9 and FW10 to

disable the feature.

**FW10 – GMI REF** allows a user to supply a GMI ground reference from the site earth point, enabling the charger to detect any discontinuity between the site Protective Earth and the charger chassis. A continuity break between FW9 and FW10 induces an Undervoltage trip, shunt trip and de-energise 3Ø input contactor.

**Note:** The jumper connector between FW9 and FW10 needs to be removed before using this feature.







Contact Data for TE Connectivity Potter & Brumfield Relays (V23105A5405A201)

Contact Data	
Contact arrangement	2 form C (CO)
Max. switching voltage	220VDC, 250VAC
Rated current	ЗA
Limiting continuous current, 85°C	ЗА
Contact material	AgNi, gold-covered
Min. recommended contact load	10mA at 20mV
Minimum switching voltage	100µV
Initial contact resistance	<100mΩ at 10mA, 20mV
Frequency of operation without load	max. 50 operations/s
Operate / release time max.	6ms/4ms
Bounce time max.	5 ms
Electrical endurance	
at 230VAC/0.5A	typ. 3x10 <sup>5</sup> operations
at 6VDC/0.1A	typ. 2x10 <sup>6</sup> operations
at 30VDC/1A	typ. 5x10 <sup>5</sup> operations
at 30VDC/2A	typ. 1x10 <sup>5</sup> operations
UL contact ratings	60 VDC, 0.3 A
	30 VDC, 1 A
	24 VDC, 1.25 A
	42.4 V peak, 50/60 Hz, 0.5 A



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