PROTRXion™
Quick Start Guide

M-24V60-TRX

PROTRXion™ Quick Start Guide

Applicable Models

Model	Part No. (CANopen)
M-24V60-TRX (without heater)	58692-103

Document Information

Release Date	Revision	Scope of Change
2023-07-28	V2.3	Minor edits to version 2 release

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Technical Support

If you have any technical questions regarding the PROTRXion™ battery, please contact our technical support team at:

Phone: +1.877.423.4242

E-mail: tech_support@inventuspower.com
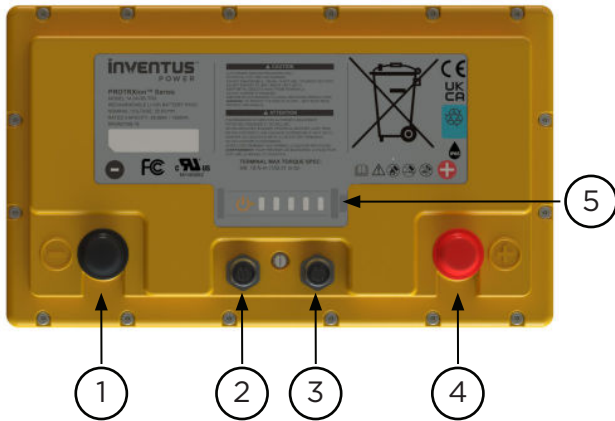
Quick Start Guide

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Please read the detailed User Manual first and refer to this guide as another quick resource.

⚠️ **Before installation or maintenance of your batteries, the following equipment is required:**

- Rubber gloves
- Safety goggles or other eye protection
- Insulated Torque Wrench / Philips Screwdriver
- Voltmeter

Mechanical Features

#	Description
1	Negative Terminal
2	Signal Connector #1
3	Signal Connector #2
4	Positive Terminal
5	Battery State of Charge Indicator

If in doubt, please consult with **Inventus Power Technical Support (tech_support@inventuspower.com)** on further instructions on the signal cable connections to the host system.
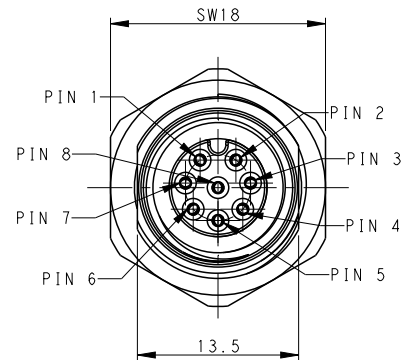
TE Connector P/N: T4131012081-000

## Battery Terminal Torque Rating

Model	Terminal Type	Wrench Size	Torque (Nm)
M-24V60-TRX	ISO M8 x 1.25 x 12mm Bolt	13mm	17 ± 1
	ISO M8 x 1.25 x 16mm Spare Bolt (Use for multiple stacked ring terminal connections)		

Wake-Up & Ship Mode

TO **WAKE UP** THE BATTERY

Press the SOC button for 5 seconds

We recommend to place the battery in Ship Mode when it is not used to prevent self-consumption current drain and extend storage life.
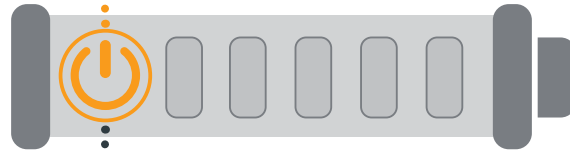
TO PLACE IN **SHIP MODE**

Press the SOC button for 20 seconds

Battery can also receive a wake up signal from the signal connector by shorting pin 4 (VGND) to pin 5 (VINTLK) to wake up battery from Ship Mode.

Wake-Up

1 2 3 **4 5** 6 7 8

Connect pins 4 & 5 to exit Ship Mode

Pin 1
Pin 3 VWAKE
Pin 4 VGND
Pin 5 VINTLK
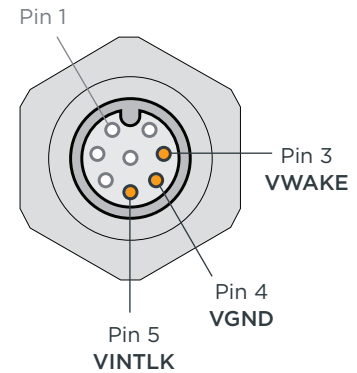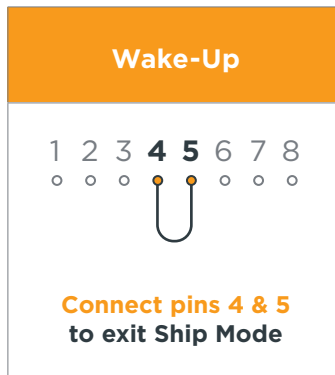
Power Cables

Power cables are not included with the battery unless a integration kit is purchased. Choose the appropriate power cable size based on the system load requirements. When connected in parallel configuration, it is preferable for all cables to be the same length size. Refer to ampacity table in User Manual when selecting power cables.

Communication Cables

Communication cables are not included with the battery unless a integration kit is purchased. If your application requires communication, please connect a CAN cable to the battery signal connector and respective system or chargers.

Item	Mfg Part No.	Cable Length	Where to Purchase
Pack to Host	T4161120008-001	0.5 meter (1.64')	Digikey
Pack to Pack	903-09458-001	0.6 meter (1.97')	Inventus Power

Charging

Many types of lead acid chargers are compatible with our PROTRXion™ batteries and safely charge in temperature ranges as shown in the table below. When choosing an intelligent charger, please discuss with Inventus Technical Support on suitable off-the-shelf charger solutions. Charger datasheets can be provided upon request.

Charge Voltage / Current

Model	M-24V60-TRX
Charge Voltage	28.0 VDC
Charge Current	30A (0.5C)
Max Charge Current	60A (1.0C)
Charge Temperature *(without heater)*	0°C to 55°C (32°F to 131°F)

Pin Definition

Pin Definition (M-24V60-TRX)

Pin #	Symbol	Description
1	VCANH	CAN High for communication to the vehicle/machine
2	VCANL	CAN Low for communication to the vehicle/machine
3	VWAKE	Wake up input pin – active low to enable discharging
4	VGND	Pack signal ground used to pull Wake up and Interlock low
5	VINTLK	Interlock input pin – active low to enable charging
6	PACK_S_ID	Pack series configuration ID, leave floating (Connections of M-24V60-TRX battery are parallel only)
7	VCANL_BATT	CAN Low for module to module communications
8	VCANH_BATT	CAN High for module to module communications

Note: CAN lines in the battery pack DO NOT have internal termination resistance. It is recommended to properly terminate the system and battery CAN Bus lines following the CAN Bus termination standards. For any technical questions about properly adding termination resistance, please contact technical support at tech_support@inventuspower.com.
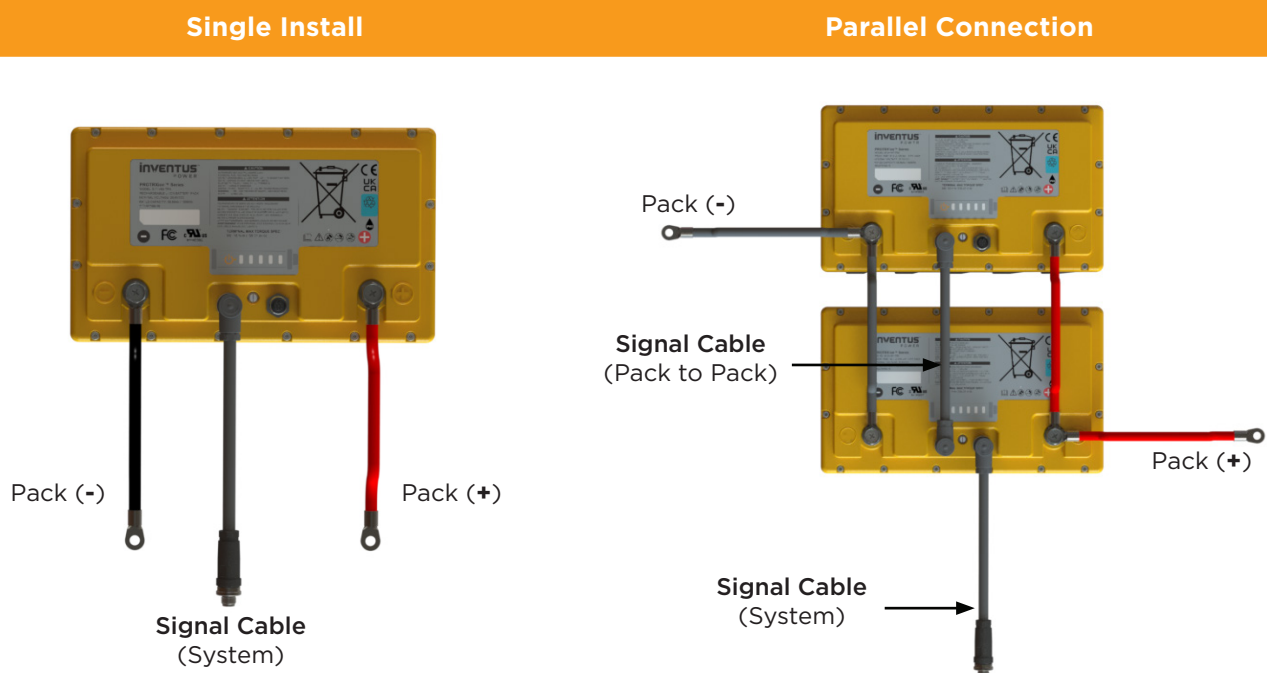
Connecting the Battery

1. Remove power to the vehicle/device prior to installation of the PROTRXion™ battery.

2. Remove all other batteries from the system prior to replacing them with PROTRXion™ batteries.

3. Remove the protective battery terminal covers from the terminals. Retain these covers in the event that you need to remove or move the battery at some future time.

4. Attach the negative cable from the device to the negative terminal on the battery.

5. Attach the positive cable from the device to the positive terminal on the battery.

6. Attach M12 communication cables between batteries if more than one battery and from battery to host system if the host system requires CANbus communication. Connect communication cables to the TE M12 connector on the battery with 0.60 Nm [6.1 kgfcm] or less torque in order to maintain good connection and avoid damaging the battery. DO NOT rotate the mating connector or loosen the nut on the battery M12 connectors to avoid damaging the battery.

7. If the battery charger is integrated with the device drawing power from the PROTRXion™ battery, then please follow manufacturers recommended sequence for each battery connection.

8. It is recommended to fully charge and fully discharge the battery system upon initial connection to properly calibrate the SOC.

Please contact Inventus Technical Support if the system requires more than 10 batteries.

Parallel connections

The M-24V60-TRX battery can be connected in parallel to increase your energy requirements. You may connect up to 10 batteries in parallel for the M-24V60-TRX battery.

Single Install	Parallel Connection

Single Install: Pack (-), Signal Cable (System), Pack (+)

Parallel Connection: Pack (-), Signal Cable (Pack to Pack), Pack (+), Signal Cable (System)

Battery Modes

Sleep Mode	Charge Mode	Discharge Mode
1 2 **3 4 5** 6 7 8	1 2 3 **4 5** 6 7 8	1 2 **3 4** 5 6 7 8
Disconnect pins 3, 4 & 5 to put into Sleep Mode	Connect pins 4 & 5 to enter Charge Mode	Connect pins 3 & 4 to enter Discharge Mode
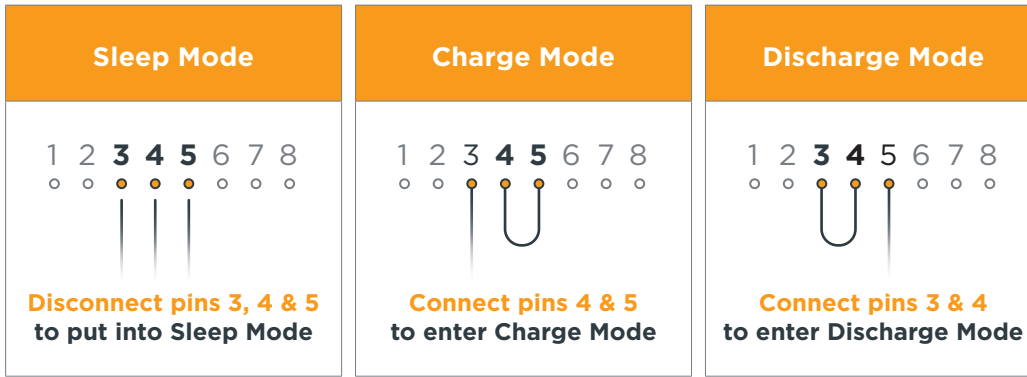
Mode Name	VWAKE	VINTLK	Action	Mode Description
Sleep	Off (Open)	Off (Open)	Disconnect pins 3, 4, and 5 to enter Sleep Mode	Low power mode, MOSFETs open
Charge	Off (Open)	**On (Low)**	Connect pins 4 and 5 to enable charging	Charge allowed, MOSFETs closed
Charge	**On (Low)**	**On (Low)**	Connect pin 4 to pins 5 and 3 to enable charging	Charge allowed, MOSFETs closed
Discharge	**On (Low)**	Off (Open)	Connect pins 3 and 4 to allow discharging	Discharge allowed, MOSFETs closed
Ship	Off (Open)	N/A	Press the SOC button and hold for 20 sec	Low power mode, MOSFETs open
Shutdown	N/A	N/A	Apply charge voltage to exit Shutdown	Lowest power mode, MOSFETs open

LED Status

LED Indicator Status	SOC
	80 – 100%
	60 – 79%
	40 – 59%
	20 – 39%
	10 – 19%
	<10%