

# PROTRXion™

Quick Start Guide

**inVENTUS™**  
POWER

S-24V80-TRX

S-24V90-TRX

S-36V80-TRX

S-48V60-TRX



Designed & Manufactured by

**inVENTUS™**  
POWER

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## Applicable Models

Model	Part No. (CANopen)
S-24V80-TRX (w/out heater)	58571-201
S-24V90-TRX (w/out heater)	57481-201
S-36V80-TRX (w/out heater)	58946-301
S-48V60-TRX (w/out heater)	58560-501

## Document Information

Release Date	Revision	Scope of Change
2023-07-28	V2.7	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](mailto:tech_support@inventuspower.com)**

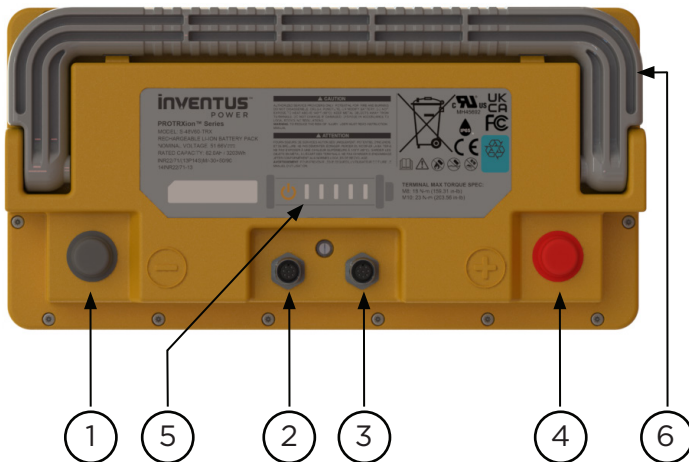
Please read the detailed User Manual first and refer to this guide as another quick resource.

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



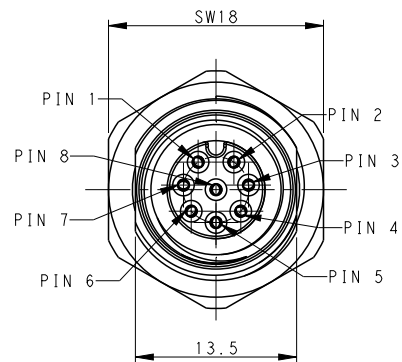
- Rubber gloves
- Safety goggles or other eye protection
- Insulated Torque Wrench / Philips Screwdriver
- Voltmeter

## Mechanical Features



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

If in doubt, please consult with **Inventus Power Technical Support** ([tech\\_support@inventuspower.com](mailto: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

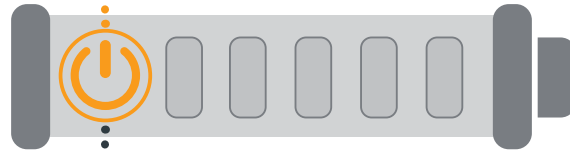
Model	Terminal Type	Wrench Size	Torque (Nm)
S-24V80-TRX S-24V90-TRX	ISO M8 x 1.25 x 20mm Bolt (Negative Terminal)	13mm	17 ± 1
S-36V80-TRX S-48V60-TRX	ISO M10 x 1.5 x 20mm Bolt (Positive Terminal)	17mm	22 ± 1

## Wake-Up & Ship Mode

### TO WAKE UP THE BATTERY

Press the SOC button  
for 5 seconds

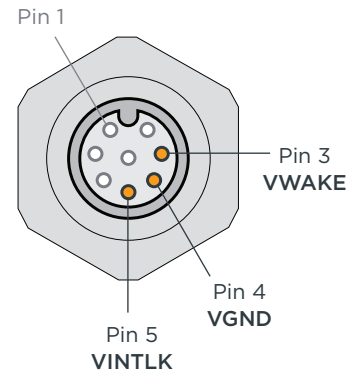
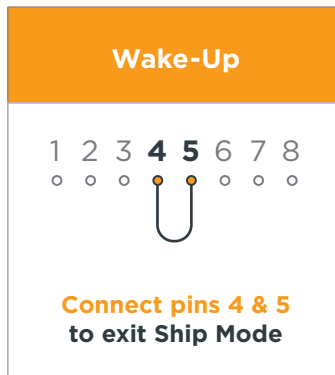
We recommend to place the battery in Ship Mode when it is not used to prevent self-consumption current drain and extend storage life.



### 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.



## 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 and wire gauge. 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')	<a href="#">Digikey</a>
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	S-24V80-TRX	S-24V90-TRX	S-36V80-TRX	S-48V60-TRX
Max Charge Voltage	28.0 VDC	28.0 VDC	41.0 VDC	58.1 VDC
Charge Current	40A (0.5C)	45A (0.5C)	26.4A (0.33C)	18A (0.3C)
Max Charge Current	80A (1.0C)	90A (1.0C)	40A (0.5C)	20A (0.33C)
Charge Temperature (without heater)	0°C to 55°C (32°F to 131°F)		0°C to 45°C (32°F to 113°F)	

## Pin Definition

### Pin Definition (S-24V80-TRX / S-24V90-TRX / S-36V80-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	VCANH_BATT	CAN High for module to module communications
7	VCANL_BATT	CAN Low for module to module communications
8	VSUPPLY	Unregulated 24V/36V output - 2A continuous max.

### Pin Definition (S-48V60-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	VCANH_BATT	CAN High for module to module communications
7	VCANL_BATT	CAN Low for module to module communications
8	VSUPPLY	Aux Power Supply (15V, <15mA current limit)

Note: Pins 6 and 8 are swapped for S-48V60-TRX models manufactured prior to March 1st, 2023.

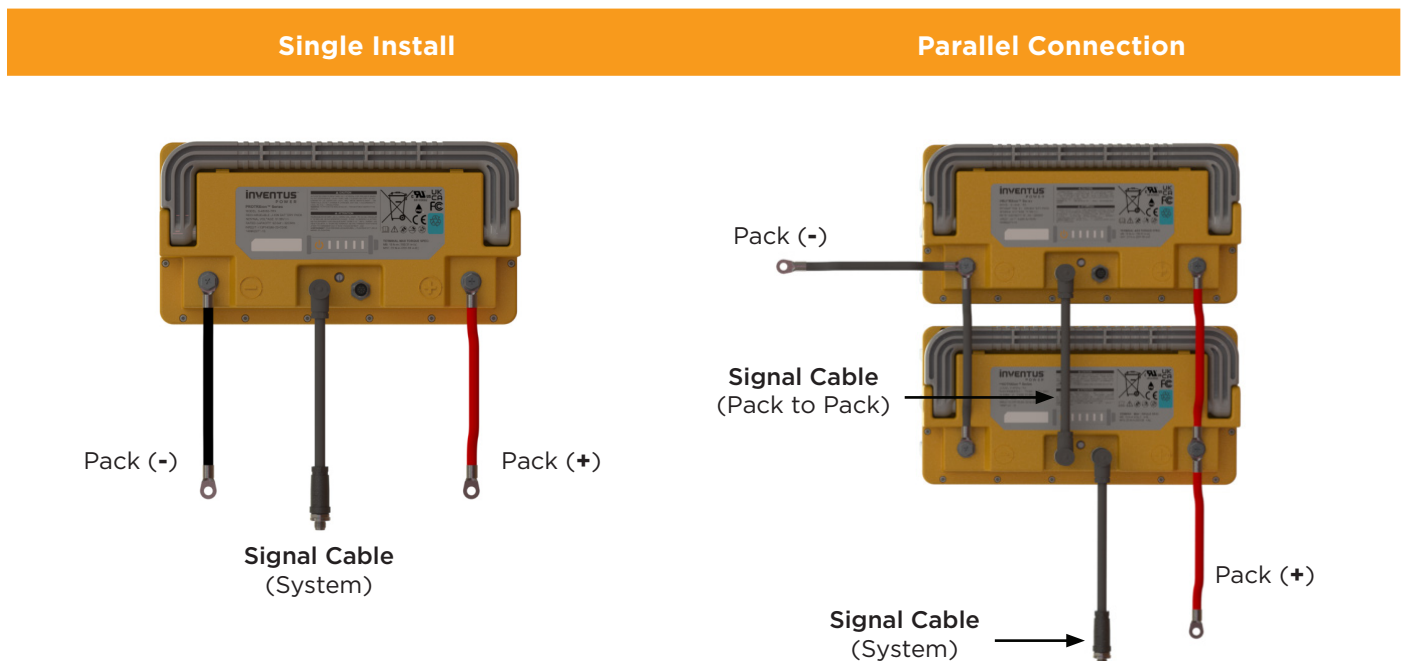
## Connecting the Battery

1. Remove power to the vehicle/device prior to installation of the PROTRXion<sup>™</sup> battery.
2. Remove all other batteries from the system prior to replacing them with PROTRXion<sup>™</sup> 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<sup>™</sup> 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 6 batteries.

## Parallel connections

The PROformance batteries can be connected in parallel to increase your energy requirements. You may connect up to 6 batteries for the S-24V80-TRX, S-24V90-TRX, S-36V80-TRX, & S-48V60-TRX. These batteries cannot be connected in series. Refer to wiring diagram below.



# Battery Modes

Sleep Mode (Terminals ON)	Charge Mode	Discharge Mode
<p>Disable pin 3 &amp; wait 5 min to enter Sleep Mode</p>	<p>Charge Current <math>\geq 500\text{mA}</math> to enter Charge Mode</p>	<p>Discharge Current <math>&gt; 500\text{mA}</math> to enter Discharge Mode</p>

Mode Name	VWAKE	VINTLK	Action	Mode Description
Sleep (Terminals ON)	Off (Open)	Off (Open)	Disable pin 3 and wait 5 minutes to enter Sleep Mode	Sleep, Terminals ON, MOSFETs closed
Charge	N/A	N/A	Charge current $\geq 500\text{mA}$ to enter charge mode	Charge allowed, MOSFETs closed
Discharge	N/A	N/A	Discharge current $> 500\text{mA}$ to enter discharge mode	Discharge allowed, MOSFETs closed
Ship	N/A	N/A	Press the SOC button and hold for 20 sec to place in Ship Mode	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%

**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](mailto:tech_support@inventuspower.com).**