

**TITAN**®

# **USER MANUAL**

**12V & 24V  
LiFePO<sup>4</sup> Batteries**

*Please read & familiarise yourself with this manual before  
installing your battery*

# THANK YOU FOR YOUR PURCHASE

You have just invested in industry-leading power architecture, designed and supported right here by our family-run team in the UK.

We engineer our batteries to the highest possible standards because we know that when you are off-grid, on the water, or on the road, your power system is your lifeline.

We hope your new battery will be one of the last you'll ever need to buy. Please take a few minutes to read through this manual to ensure you get the absolute best performance and longevity out of your new system.

TITAN® Lithium proudly powers and sponsors Ocean Revival, who have raised funds for Fisher House Charity, by completing a 8,500km ocean row with two TITAN® Lithium 120Ah batteries on board - surviving capsizes, rough seas and setting a new World Record

Find out more @oceanrevivaladventures

OCEAN  
REVIVAL

TITAN® Lithium also powers and sponsors engineering students from DTU, who are a university team of students exploring the future of sustainable marine engines by competing in the Monaco Energy Boat Challenge.

As a sponsor, TITAN® Lithium supplied four 12V 180Ah lithium batteries that formed the heart of the boat's 10 kWh power system, enabling clean, high-performance propulsion throughout the event.

The team continues their development with our batteries and plan to attend the challenge annually. Find out more @dtufloatforward



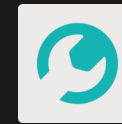
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# TERMINOLOGY

| TERM  | MEANING                   | EXPLANATION  |
|-------|---------------------------|--|
| BMS   | Battery Management System | An in-built computer with pre-set parameters that monitors and controls the battery                                  |
| SOC   | State Of Charge           | The charged % of battery capacity  |
| Cell  |                           | The battery itself; normally 4 to 12 cells connected together per battery to create the operating voltage & capacity |
| V     | Volts                     | A measurement of potential difference and can be used as a simple form of battery capacity measurement               |
| A     | Amps                      | A measurement of current flow in Amps  |
| W     | Watts                     | A unit of power  |
| Cycle |                           | 1 cycle = 1 full discharge + 1 full charge   |

# 1. BATTERY BASICS



On delivery, your new battery will arrive half charged and in hibernation.

## Before you install your new battery, please:

- △ Check for any shipping damage & notify us right away if there is any
- △ Download our app by searching for 'TITAN Lithium' in your app store
- △ Remove plastic terminal covers before installing
- △ Charge the battery to 100% before its first outing (this can be done on the connected vehicle or vessel)
- △ Keep the delivery box and packing materials in case of returns/repairs

## Good to know:

- △ Due to our quality, our cells can achieve up to 10% over their rated capacity when fully charged; you can see the real-time capacity of your battery via our free app
- △ Charge fully at least once every 3 months, preferably with a mains charger to keep the BMS and app data accurate
- △ **If the battery ever gets to 0%, please recharge as soon as possible - do not leave the battery in a fully discharged state**
- △ For the best possible lifespan, use the battery between 10% and 90% with general, everyday use
- △ Charging and discharging at 0.5A or less can be missed by the internal shunt (a device that measures current). Over long periods with this low current activity, the BMS may miscalculate the battery's SOC - to avoid this, please charge to 100% every 3 months
- △ Your battery will self hibernate at 13.2V / 26.4V (~70% capacity) *and* there has been less than 0.6A of activity within 72 hours. To wake, simply connect to a charger or connect to the battery via the app. These settings can be modified in the app.
- △ The recommendations in this manual are made by TITAN and our experience gained over the years - they are given to help you achieve the longest possible lifespan, but are by no means a limitation of what you can do with your battery, **unless specified in red**

# 2. BATTERY INSTALLATION

When installing your battery, please take care when handling old lead-acid batteries and live electrical connections.

Your battery will arrive with hibernation turned on - depress the case button (if present) or connect to the battery's Bluetooth to wake.



If any existing acid/water from a lead-acid battery is present in the battery box/tray, please ensure you wear gloves and remove before installing the new battery. Acid can be soaked up with disposable tissue or washed away with plenty of plain water and corrosion can be nullified with boiling water. Allow the area to dry before installing your new battery.

- 1. If replacing your old battery** (if freshly installing, skip to step 2):
  - 1.1. Switch off any connected devices
  - 1.2. If a solar charger is present, either switch off or pull the fuse. If this is not possible, please remember that your positive connection will remain live, so avoid contacting it with any metalwork. We recommend covering the positive connection with tape or a rubber glove so it does not short out
  - 1.3. Disconnect your existing battery - negative off first, then positive
- 2. Ensure your battery box/bay is free from any dirt, corrosion and sharp protrusions**
- 3. Double check your cables (see section 4) and terminals to ensure they are clean from corrosion, and split/crack free**
- 4. Ensure the battery location has some ventilation/airflow**
- 5. Install your new TITAN Lithium battery**
  - 5.1. Positive on first, then negative last
  - 5.2. If using round terminal connections, ensure the vehicle-side terminal 'collar' is pushed all the way down the round battery terminal - round battery terminals are tapered and are larger at the base; terminals installed too high will result in a loose terminal and potential over-tightening
  - 5.3. If using eyelets/bolt connections, please ensure you exclusively use the bolts supplied with your battery, and not existing bolts - any deviation in size/spec can lead to connection issues
  - 5.4. Bolts should be tightened to a maximum of 12nm (8.85ft-lb) - you should not be able to move the tightened terminal/cables with your hand

## 6. Ensure the battery has any base clamps/strapping re-secured

- 6.1. It may be easier to re-secure before attaching terminals depending on how the cables are situated
- 6.2. It is important that your battery does not move freely if connected within a vehicle or vessel
- 6.3. Note: Large-capacity metal-cased batteries (e.g., 260Ah/520Ah) cannot use standard base clamps and should be secured using TITAN heavy-duty over-top strap kits.

## 7. Switch on connected devices & test to ensure everything is working

- 7.1. When connecting terminals, some devices may demand a current and create a spark when re-attaching terminals, even if switched off. This spike in current may blow connected fuses; if you have no power after connecting, please check your fuses

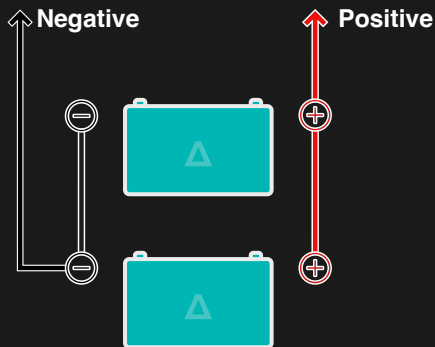


# 3. PARALLEL / SERIES

For users who are installing multiple batteries together. For individual battery installations, please skip to [section 4](#).

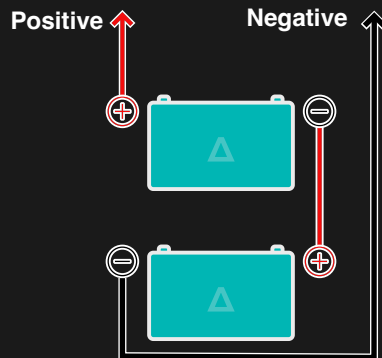
1. Ensure the batteries are charged fully, and show the same voltage before connecting together - aim for a maximum difference of 0.05V between the batteries
  - 1.1. Battery voltages can be accurately checked via the TITAN Lithium app
2. For optimal battery balance, you should use the first battery's positive, and the last battery's negative as the output
  - 2.1. See below wiring diagrams as examples:

### For 1 parallel connection:

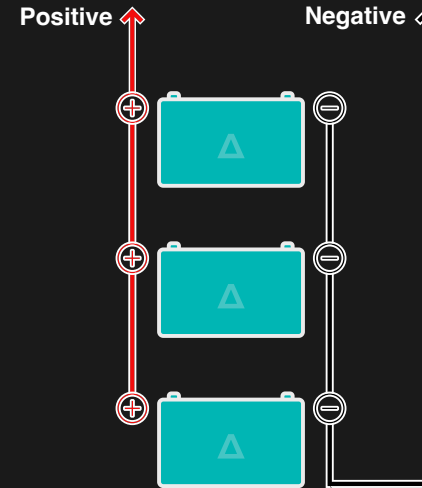


### For 24V series connections:

(Using 12V batteries)

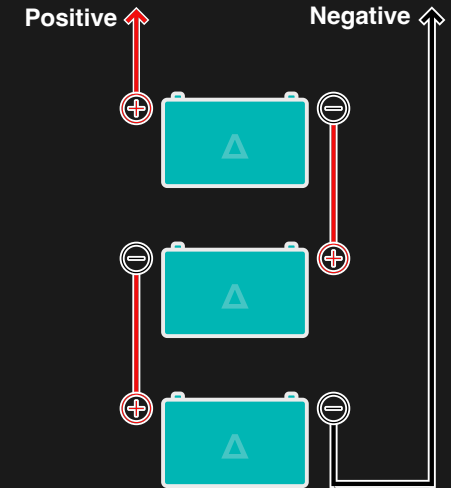


### For 2 parallel connections:

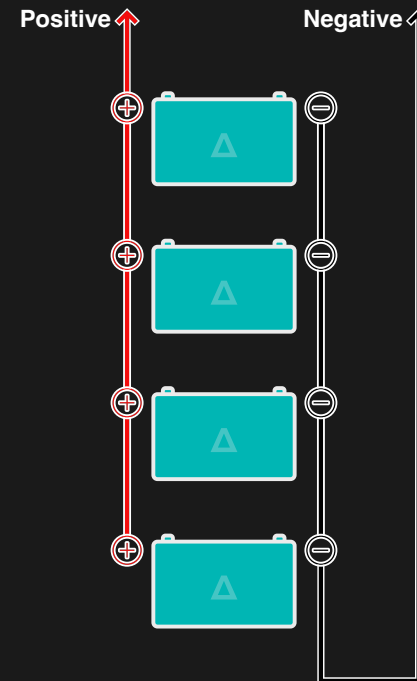


### For 36V series connections:

(Using 12V batteries)

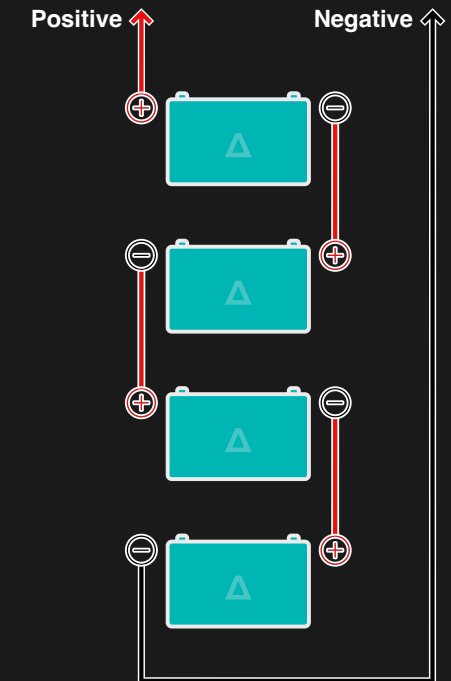


### For 3 parallel connections:



### For 48V series connections:

(Using 12V batteries)



### MAXIMUM NUMBER OF PARALLEL & SERIES CONNECTIONS:

| Battery Voltage | Series Maximum | Parallel Maximum |
|-----------------|----------------|------------------|
| 12V             | 4 (48V)        | 8                |
| 24V             | 2 (48V)        | 8                |

### 3. Adding batteries in parallel will increase the BMS current allowance

- 3.1. For example, our 12V 150Ah battery can output 200A consistently, adding a second in parallel to make a 12V 300Ah bank, will increase the consistent current allowance up to 400A.
- 3.2. This does not happen with batteries in series; your BMS parameters will stay the same as an individual battery BMS across the battery bank
  - 3.2.1. Due to the increased operating voltage, current demands will be lower when comparing to 12V

### 4. Please note that it is normal for individual batteries to be charged and discharged at slightly different rates while in a parallel bank

- 4.1. If an imbalance occurs i.e. there is more than a 20% difference between batteries, please re-balance the batteries by charging them all to 100% - this can be done individually or while connected together

### BALANCING:

5. All batteries should be balanced (i.e. fully charged to the same level with a maximum difference of 0.05V) at least once a year to ensure optimal performance and equal wear. For heavy duty use/industrial applications, balancing should take place multiple times a year

### ADDING BATTERIES IN THE FUTURE:

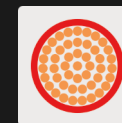
6. You can add more batteries to an existing bank ideally within 2-3 years (depending on use) of the original bank's installation

- 6.1. To give the best performance, ideally all batteries should be of a similar age but due to how resistant LiFePO4 cells are to ageing, you can add additional batteries down the line without issue
- 6.2. Should you wish to add more batteries to your existing setup that is more than 3 years old, please feel free to contact us with the cycle count of your existing battery so we may confirm if adding a new battery will be suitable

### REMEMBER:

**ALL BATTERIES IN PARALLEL, SERIES OR SERIES/PARALLEL CONNECTIONS MUST BE FROM THE SAME MANUFACTURER AND MUST BE IDENTICAL IN CAPACITY AND BMS PARAMETERS**

**Mixing battery sizes and makes when connected can cause wear and safety issues, plus will void your warranty**



## 4. CABLES

Sizing the correct cable diameter for your demands is extremely important for performance and safety. Cables that are too small can impact your performance, potentially heat up and melt.

TITAN Lithium recommends using flexible battery starter cable, at a minimum cable rating of **100A consistent current, 6AWG or 16mm<sup>2</sup>**. You should double check, measure and change your cables if needed at the time of installation, or whenever a new piece of equipment is added. Ratings/measurements will differ between manufacturers, so we recommend going for a reputable manufacturer - TITAN Lithium recommends Durite.

The table below shows some examples of common battery starter cable size and current ratings:

| Cable Size        | AWG   | Cable Diameter | Current Rating | Max. Inverter Size (@ 12V) |
|-------------------|-------|----------------|----------------|----------------------------|
| 16mm <sup>2</sup> | 6 AWG | 8mm            | 110A           | 1,400W                     |
| 25mm <sup>2</sup> | 4 AWG | 10mm           | 170A           | 2,100W                     |
| 35mm <sup>2</sup> | 2 AWG | 12mm           | 240A           | 3,000W                     |
| 50mm <sup>2</sup> | 1 AWG | 13mm           | 345A           | 4,400W                     |

For **parallel** and **series** battery link leads, we recommend a **minimum cable size of 25mm<sup>2</sup>** - the larger, the better. Ensure all link leads are the same in length and current rating.

### Good to know:

24V systems will half the current demand compared to 12V, and 48V will half it again e.g. 3,000W at 12V is 234A, at 24V it is 125A and 48V it is 63A.

### To calculate Amps:

Watts ÷ battery voltage = Amps

Voltage will drop over longer cable distances; size your cable accordingly and seek professional advice - larger sized cables have less of a drop.



## 5. CHARGING

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**TITAN Lithium batteries are compatible with CCCV, IuU\*, split charge relays and DC to DC chargers; almost all chargers on the market.**

\*IuU chargers (i.e. normal lead-acid chargers) are only fully compatible when switched to a AGM or Sealed mode (bulk at ~14.4V and float/storage at 13.8V) - some single-mode chargers can charge at the correct voltages. Contact us if you need us to double check the charger details.

### 1. Charger details will normally be on the reverse of your existing charger, or in the user manual

1.1. Most chargers will have switchable battery types/modes - Lithium, Li-ion or LiFePO4 modes are the best, with AGM or Sealed\* are also ideal to use

1.1.1. \*Some manufactures will vary in their terminology - some will use Sealed, AGM and Gel to describe the same charge profile. If in doubt, look for a maximum setting of 14.4V for charging lithium, or contact us so we can double check

1.2. If using AGM, Sealed or a Gel setting, please turn the charger off when it has finished charging within 2 weeks *and* the battery is not in use

1.2.1. Some chargers will go through higher voltage recondition/trickle phases that may trigger the battery's over voltage protection

1.3. If using AGM, Sealed or a Gel setting on a MPPT/solar controller, we recommend to keep the battery in use (take energy from the battery) rather than keep it fully charged for long periods (more than 3 months)

**1.4. Do not use chargers that have 'recondition' stages in them or are for flooded lead-acid batteries only (i.e. old chargers with dials/non-smart chargers)**

### 2. For motorhomes/caravans - almost all on-board mains chargers/hook-ups are compatible with TITAN Lithium batteries

2.1. On-board chargers normally have switchable battery modes

2.2. Some on-board chargers will output a maximum of 13.8V (some older CBE chargers) - this will only charge the battery up to ~80%, so it is recommended that you have an additional source of charging, either via solar or dedicated mains charger, so the battery can be charged to 100% when needed

### 3. You cannot overcharge your battery - TITAN BMS has several layers of over voltage protections in place, but constant charging over long periods can cause wear

3.1. We recommend against leaving chargers on for long periods while the battery is fully charged so the charger and the BMS voltage protections are not unnecessarily overused; keeping them in their ideal working conditions for decades to come

4. Lithium batteries do not like to be kept at 100% SOC for long periods without use (more than 2/3 months) - it can cause extra wear and tear on the cells over the battery's lifespan

### 5. For batteries subject to seasonal use:

5.1. When put into storage, charge or discharge the battery to 80% SOC

5.2. If the battery will be without use for 3 months or more, you may wish to ensure it does not get charged by solar panels

5.2.1. Solar chargers can be switched off by a on/off button, via Bluetooth connection (depending on the model), removing the fuse or by disconnecting the negative terminal, or:

5.2.2. Turn the battery hibernation function on via the included cable or built-in hibernation button (more details in [section 7](#)) to increase the storage life and prevent charging

5.2.3. If power is required throughout the storage period (e.g. for alarms trackers), keep the terminals in place and keep the solar charger on - discharge activity on the battery will help with 100% SOC wear. We'd recommend checking in on the battery every few months to ensure it is not getting discharged or charged too much; every vehicle and setup will have different energy consumption

5.3. Fully charge the battery before putting it back into normal use

### 6. Lithium batteries prefer CCCV charging; Consistent Current, Consistent Voltage

6.1. You can trickle charge, but regular full charges is recommended

### 7. If your battery reaches 0%, please recharge as soon as possible

7.1. Nearing 0%, your battery will have some capacity left, but should not be used unless absolutely necessary

7.2. If the battery is used past 0%, the BMS low voltage protections will trigger, resulting in a battery shut down - your battery will not allow any further energy to be taken until charged

7.3. If the battery shuts down, it will show 8-10V (or 16-20V for 24V units) at the terminals. This is to enable chargers to 'see' a battery voltage in order to start their charge program

7.4. Leaving any lithium battery at 0% can result in cell damage, and eventually reach a voltage level where it is not enough to power the BMS which can lead to a permanent shutdown

7.5. TITAN Lithium recommends creating a habit or reminder on your phone to check your battery every 3-4 months, and charge if necessary - especially with seasonal use

### 8. The 'Cell overvoltage' and 'Pack overvoltage' protections in the app will count up when the cells and battery reaches 100% SOC

#### 8.1. Triggering these protections is normal and to be expected

8.2. These protections are stopping overcharging from occurring - they do not impact battery output activity

## 9. TITAN Lithium batteries are compatible with split charge relays

- 9.1. Due to voltage fluctuations of alternators, charging via a split charge relay may not be the most efficient charge method, but will normally charge the battery to at least 70-80%; depending on travel time and vehicle type
- 9.2. If the alternator is the sole charge source for the battery, you may wish to add a solar panel and/or upgrade to a DC to DC charger down the line to ensure the battery is fully charged when you arrive at your destinations

## 10. TITAN Lithium does not recommend charging directly via an alternator i.e. with no split charge relay or DC to DC charger connected

- 10.1. Almost all caravan tow hitches, motorhomes, conversions and marine craft will have a split charger installed from the factory

## 11. DC to DC chargers will give the best charge performance when charging via alternator

- 11.1. TITAN Lithium recommends Victron Orion DC to DC chargers, set on the in-built 'Li-ion' mode. Other brands can be set to Lithium, LiFePO4 or AGM

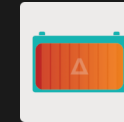
If you are able to set your own charger parameters, the table below includes our recommended settings (some settings may not be present on your charger):

| Charger Setting                 | Voltage 12V / 24V    | Duration    |
|---------------------------------|----------------------|-------------|
| <b>Bulk</b>                     | 14.4V / 28.8V        | -           |
| <b>Absorption</b>               | 14.4V / 28.8V        | 2 Hours     |
| <b>Float/Storage</b>            | 13.8V / 27.6V        | -           |
| Charge Limit                    | 14.6V / 29.2V        | -           |
| Over Voltage Disconnect Voltage | 14.6V / 29.2V        | -           |
| Over Voltage Reconnect Voltage  | 14.0V / 28.0V        | -           |
| Equalise Charging Voltage       | Off or 14.4V / 28.8V | 0 Minutes   |
| Boost Charging Voltage          | 14.4V / 28.8V        | 180 Minutes |
| Low Voltage Reconnect Voltage   | 11.0V / 22.0V        | -           |
| Low Voltage Disconnect Voltage  | 10.0V / 20.0V        | -           |
| Discharging Limit Voltage       | 10.5V / 21.0V        | -           |

## Good to know:

Very small constant charge and discharge currents can be missed by the BMS shunt (a device that calculates current flow) and over long periods, can effect how the BMS calculates the SOC of the battery, leading to inaccurate SOC information through the app (SOC Drift). If in doubt, please check the app when the battery is in use; if less than 0.5A charge/discharge current is present for more than a month at a time, you may wish to occasionally charge the battery fully to avoid miscalculations.

- △ Solar panels that are 100W or smaller in the winter/shade can result in a low charge current less than 0.5A
- △ Device standby power can also result in low discharge current less than 0.5A
- △ Fully charging the battery to 99%-100% will cure any miscalculations. Miscalculations will not damage your battery; it will only show inaccurate battery SOC information via the app



## 5.1. CHARGING HEATER

All TITAN Lithium batteries are fitted with an internal heater mat that helps keep the battery above 0°C when on charge. Lithium batteries can experience stress, wear and tear when charged below freezing. Without a heater, the BMS would prevent charging altogether at this temperature.

- △ The heating function is fully automatic and will only trigger when the internal battery temperature is 0°C or lower, *and* the battery has an incoming charge current
- △ Your battery can still output energy down to -20°C. The heater has no effect on battery performance
- △ The heater will target an internal temperature of 5°C to 10°C before switching off
- △ The heater takes its power from the charger first. Power consumption differs dependant on the battery model:

△ 105Ah - 5.6A / 80W

△ 120Ah, 150Ah, 180Ah & 260Ah - 6.8A / 100W

△ 230Ah, 280Ah & 330Ah - 5.8A / 85W

△ 24V 230Ah - 2.8A / 85W

△ 460Ah & 520Ah - 10A / 160W

- △ If the incoming charge current is lower than the rated heater power consumption and depending on the deficit:
  - △ the BMS will allow up to a maximum of 3.5A from the battery capacity to make up the difference and will power the heater fully
  - △ or, if the charge current is lower and requires more than 3.5A to make up the difference, the heater will run at a lower current which will take a little longer to heat the battery to the target temperature
- △ Heat up time is dependant on environmental factors and charge current, but on average will add 20-30 minutes to your charge time
- △ When the heater is active, no charge current will enter the battery until the target temperature is reached

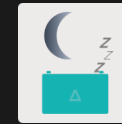


## 6. ACTIVE BALANCE

All TITAN Lithium batteries come with an active balance system installed. Active balancing is where the internal cells are automatically balanced with each other to ensure all are working equally when discharged and charged by actively monitoring each cell and directing energy to a cell that is lower in voltage than the others, or pulling from a cell that is higher. This system helps avoid over working a single cell; potentially leading to an early failure.

Passive balance is when the cells are simply connected to each other without actively allocating energy. This method can allow higher voltage differences between the cells and can put more stress on a single cell.

- △ The active balance system is fully automatic and controlled by the BMS
- △ Active balancing helps keep all cells healthy for longer compared to passive balancing
- △ TITAN exclusively uses the most premium quality, batch tracked cells available and in theory, active balancing is not required at this quality level. However as all batteries operate via chemical reaction, tiny material differences can make a difference over time; we include active balancing to ensure the longevity of all TITAN batteries
- △ Active balancing takes place more often when the battery is charging
  - △ This is denoted by the battery background changing colour to blue on the Monitor page, and flashing cells on the battery info tab in the TITAN app
  - △ Balancing takes full effect when the battery is between 95-100% SOC



## 7. HIBERNATION

All TITAN Lithium batteries come with two hibernation functions that will shut down various active parts of the BMS to help keep the battery's self-discharge rate as low as possible while the battery is not in active use. One function will trigger automatically when the battery is inactive and at a half-charged SOC to prevent the battery self-discharging past a critical level over time, allowing users more time to notice and recharge.

- △ All batteries have the automatic low voltage hibernation function:
  - △ Automatic hibernation occurs when the battery reaches 13.2V/26.4V (which is approximately 70% SOC) *and* less than 0.6A of charge/discharge activity has been seen by the BMS within 72 hours
    - △ While active, the battery will not output any energy and will show 0.4V/0.8V at the terminals
    - △ The Bluetooth module will stay live to allow for app connection (will wake the battery from hibernation)
    - △ While in hibernation, users will have at least 6 months (depending on battery size and storage conditions) of capacity before the battery voltage reaches a critical state
- △ All batteries also have user controlled full and light hibernation methods:
  - △ Light hibernation is controlled via the Bluetooth app; the BMS stays semi-active, but will not allow any connected devices to draw power
    - △ This is intended for when the battery is connected to a vehicle going into storage and power to devices is not required for the storage period. All electronic devices will still use some energy, even when turned off
    - △ Light hibernation is turned off by either connecting to the battery's Bluetooth, or by an incoming charge current/voltage
  - △ Full user controlled hibernation is controlled by pressing the hibernation button; either built into the case, or via the hibernation cable in comms port 1 (RJ45-1)
    - △ While the full user controlled hibernation is active, the BMS will shut down; the battery will not charge or discharge, the Bluetooth module will be live but no data will update and other BMS functions will be switched off
    - △ A fully charged battery can last for years in storage while the full hibernation function is on

| Battery Model | Low Voltage Automatic Hibernation | User Controlled Hibernation |
|---------------|-----------------------------------|-----------------------------|
| 80Ah          | Yes                               | Light - Via app only        |
| 105Ah         | Yes                               | Full - via cable in RJ45-1  |
| 120Ah         | Yes                               | Full - via cable in RJ45-1  |
| 150Ah         | Yes                               | Full - via cable in RJ45-1  |
| 180Ah         | Yes                               | Full - via cable in RJ45-1  |
| 230Ah         | Yes                               | Full - via case button      |
| 260Ah         | Yes                               | Full - via case button      |
| 280Ah         | Yes                               | Full - via case button      |
| 330Ah         | Yes                               | Full - via case button      |
| 460Ah         | Yes                               | Full - via case button      |
| 520Ah         | Yes                               | Full - via case button      |
| 24V 230Ah     | Yes                               | Full - via case button      |

△ Batteries with automatic low voltage hibernation active can be woken up by connecting to the battery via Bluetooth, or by connecting to a charger

△ Batteries with built-in hibernation buttons will not have a live Bluetooth connection while the function is turned on; to wake, turn off the hibernation mode via the button

△ While the storage life can exceed 12 months in hibernation modes, we still recommend to check and charge your battery every 3-6 months

△ Automatic hibernation will not activate if:

△ The battery has an active Bluetooth connection

△ **Be aware that connecting to a battery with the low voltage protection active will wake the BMS. While active, the BMS will consume more energy to keep the dataflow live; doing so will risk lowering the voltage to critical levels over time. If your battery has triggered the low voltage protection and you have connected via Bluetooth to check, please avoid further Bluetooth connection attempts and ensure you recharge as a matter of urgency**

△ Two or more batteries are connected together in a parallel or series connection

△ The battery is connected to a device via comms



## 8. TITAN APP

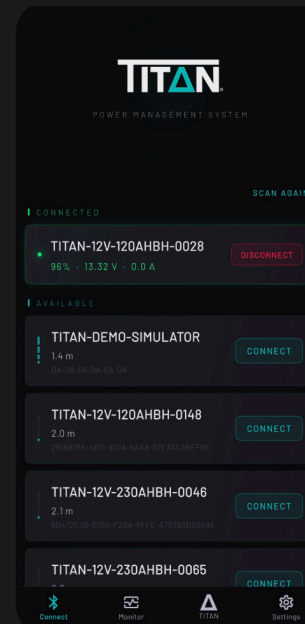
All TITAN Lithium batteries have Bluetooth built-in for live and accurate monitoring. Our app is free of charge, available on both iOS and Android.

△ To use, download the app via your device app store and allow the app to use your device's network settings - this will allow the app to use the device's Bluetooth connection in order to connect to your battery.

△ Once downloaded, open the app and search for your TITAN battery; the list estimates the distance between the device and battery and will show the closest battery first

△ The app will close the connection if left running in the background for over 10 minutes

△ If the app does not show any local batteries, please force close the app and restart



## 8.1. CONNECT

The app will default to the Connect page when opened.

△ Allow the app to refresh the local connections, then tap your battery

△ Each battery has a unique Bluetooth ID which is shown both on the shipping box and on the silver sticker on the back of the battery

△ Once connected, the selected battery will be highlighted as shown on the left

△ The TITAN app can handle multiple battery connections at one time for those using parallel and series connections. On the next page, tap which connection type you are using for accurate monitoring

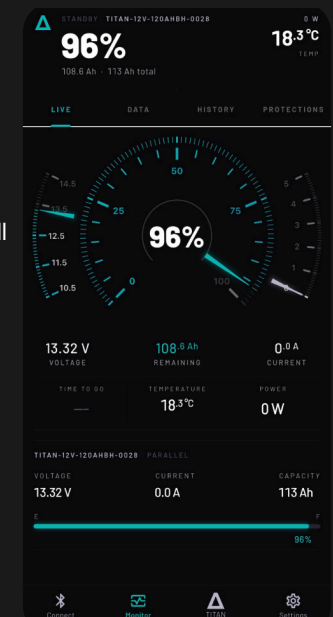
## 8.2. MONITOR

△ The monitor page includes all the useful information you will need on one page

△ You can monitor live voltage, Amps, Watts, Ah capacity, SOC capacity (in %) and internal temperature on this page

△ This page also includes a live time calculation when the battery is getting charged and discharged

△ Active BMS functions are displayed below the main SOC dial



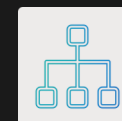
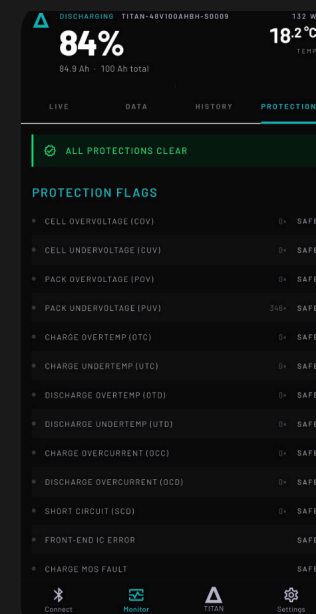
## 8.3. BATTERY INFO

- △ The Battery Info tab includes all the cell information
- △ The Cell Voltage tab shows the voltages of individual cells as well as their differences



## 8.5. PROTECTION

- △ This tab shows a list of BMS parameters and a live counter that will increase with each triggered protection
- △ Should the battery cut out suddenly or not accept charge, please view this page to see if the BMS is preventing the activity
- △ Pack overvoltage (POV) and Cell overvoltage (COV) will trigger often as the battery is charged to 100% SOC - these protections are designed to trigger often in order to prevent overcharging the battery



## 9. COMMUNICATIONS

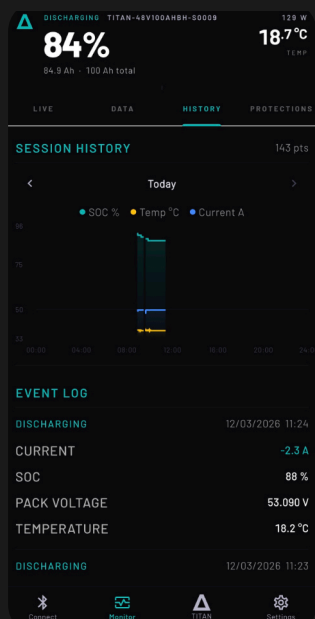
All TITAN Lithium batteries (apart from the 12V 80Ah) have communication (comms) ports built into either the top or side of the battery case. These ports are for users who are connecting batteries to a compatible data-enabled device. Connecting to an inverter allows the parameters and live BMS data to be pushed to the inverter for a more efficient setup.

By default, comms has one CANBUS and one RS485 output per port. The defaulted CANBUS output is VE.CAN protocol for Victron GX devices.

- △ Ports accept Ethernet (for parallel batteries connected to external devices), RS485, NMEA2000 and CANBUS
  - △ TITAN recommends using standard CAT5 ethernet cable for parallel connections
  - △ CANBUS, RS485 & NMEA2000 cables are available from TITAN Lithium
- △ The included 'Terminator' is to be used on the last battery's free port in order to complete the comms circuit in inverter setups - this allows individual IP addresses to be read by inverters and BMS data to correctly sync - it is not needed for single battery installs

## 8.4. HISTORY

- △ This tab shows a history log of the battery's activity
- △ This data only updates when the app is connected and data streaming is live - the battery does not have internal storage for this data so is stored on your phone



△ Use of comms is not a requirement for use with inverters, but is recommended due to higher system efficiency and ease of data syncing

△ By connecting to compatible inverters, remote battery monitoring is possible (i.e. Victron VRM)

△ Different battery models have different comms outputs:

| Battery Model | Number Of Comms Ports | Note  |
|---------------|-----------------------|---|
| 105Ah         | 3                     | <b>RJ45-1</b> is for the included hibernation cable |
| 120Ah         | 3                     |   |
| 150Ah         | 3                     |   |
| 180Ah         | 3                     |   |
| 230Ah         | 2                     | <b>Both ports</b> are for data output               |
| 260Ah         | 2                     |   |
| 280Ah         | 2                     |   |
| 330Ah         | 2                     |   |
| 460Ah         | 2                     |   |
| 520Ah         | 2                     |   |
| 24V 230Ah     | 2                     |   |

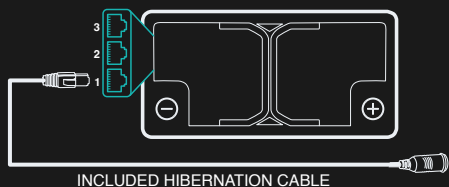
△ Below are some wiring examples:

△ For batteries connected in parallel and with devices, the first battery is regarded as the 'master', which will communicate with the inverter, while the other batteries are regarded as 'slave' units

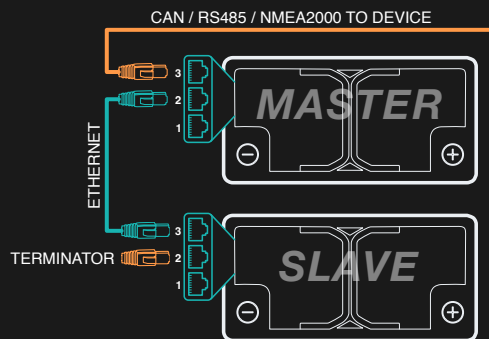
△ The included Terminator should be used on the last slave's free port. The Terminator is required only for inverter comms with multiple batteries in parallel

### Batteries with 3 ports:

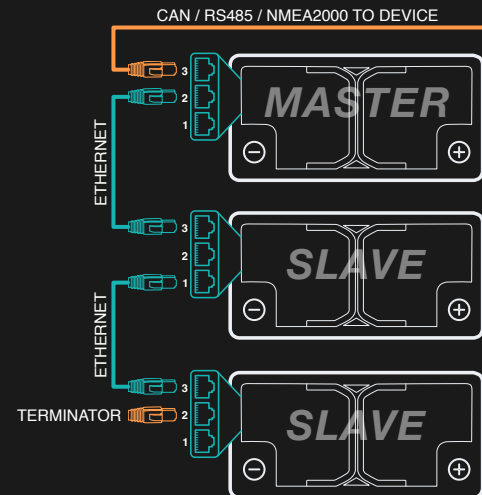
#### HIBERNATION SWITCH



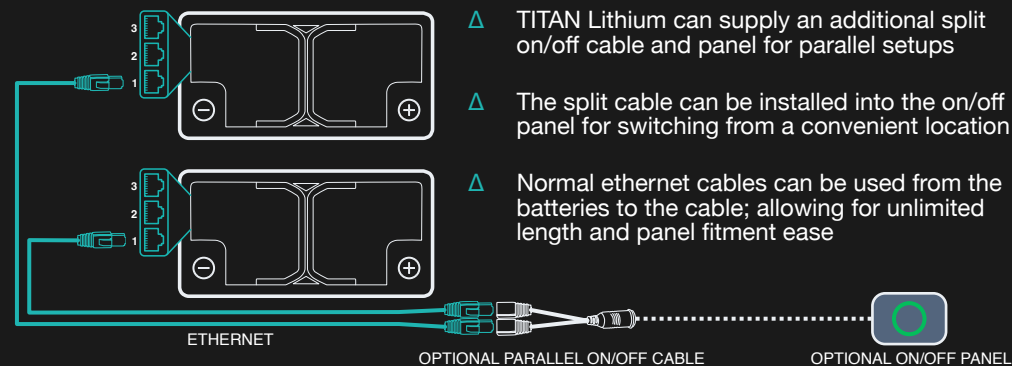
#### PARALLEL & DEVICE COMMS



### PARALLEL & DEVICE COMMS



#### DUAL ON/OFF CABLE & PANEL



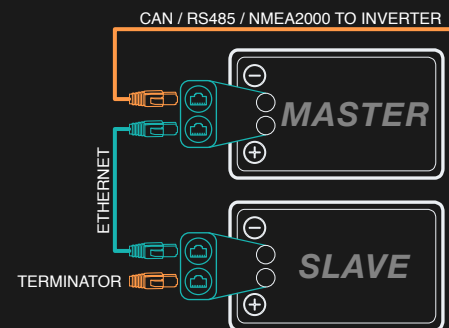
△ TITAN Lithium can supply an additional split on/off cable and panel for parallel setups

△ The split cable can be installed into the on/off panel for switching from a convenient location

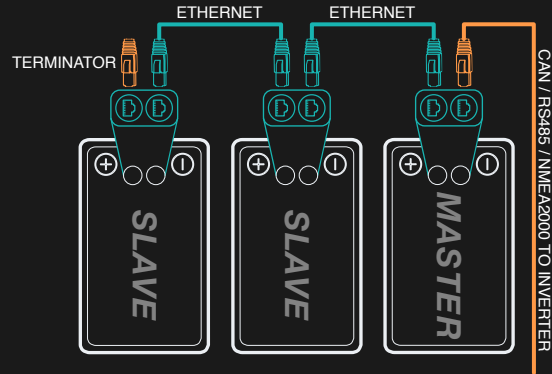
△ Normal ethernet cables can be used from the batteries to the cable; allowing for unlimited length and panel fitment ease

### Batteries with 2 ports:

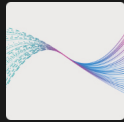
#### PARALLEL & DEVICE COMMS



## PARALLEL & DEVICE COMMS



- △ Batteries with 2 ports do not have an included hibernation cable as the on/off function is switched via the in-built case button



## 9.1. INVERTERS

- △ If your inverter has CANBUS, NMEA2000 or RS485 inputs for batteries, TITAN BMS will be able to communicate and sync battery data to the inverter for a more efficient system
  - △ See your inverter user guide for more information
  - △ The level of data synced will depend on the inverter and communication protocol type
- △ For Victron GX inverters and GX enabled devices (i.e. Cerbo):
  - △ TITAN BMS is compatible as default
  - △ For older devices, use the VE.CAN input and for newer devices, use VE.BMS (ensure VE.Can port setting is set to CAN-bus BMS LV (500 kbit/s) via Victron settings)
    - △ Using VE.BMS allows the user to enable DVCC, which allows the GX device to receive a Charge Voltage Limit (CVL), Charge Current Limit (CCL) and Discharge Current Limit (DCL) from TITAN BMS and relays that to the connected inverter/chargers, solar chargers and Orion XS. These then disable their internal charging algorithms and do what they're told by the battery.
  - △ Once successfully connected, the Victron system will automatically update data to show how many batteries are detected (referred to as modules) and will update CVL, CCL and DCL figures

- △ TITAN BMS is compatible with:

| Inverter Brand     | Communication Protocol |
|--------------------|------------------------|
| Victron (Default)  | CAN                    |
| Growatt            | CAN                    |
| Sacolar            | CAN                    |
| Goodwe             | CAN                    |
| Voltronic Power    | RS485                  |
| Sofar              | CAN                    |
| Sorotec            | CAN or RS485           |
| Deye / SunSynk     | CAN or RS485           |
| Solis              | CAN                    |
| Luxpower           | CAN                    |
| Pylon Tech         | CAN or RS485           |
| Sol-Ark            | CAN                    |
| SRNE               | RS485                  |
| MUST               | CAN                    |
| SMA                | CAN                    |
| MEGAREVO           | CAN                    |
| MPP Solar          | RS485                  |
| TBB Power          | CAN                    |
| Senergy            | CAN                    |
| Schneider Electric | CAN                    |
| Aiswei             | CAN                    |
| SMK                | RS485                  |
| Foxess             | CAN                    |
| SunGrow            | CAN                    |

- △ Protocol type (different inverters use different data types and rates) is pre-set in TITAN BMS and can be changed on request to match your requirements
  - △ Different protocols may require different communication cables - these cables are available from TITAN Lithium
  - △ Data communication is only available for parallel batteries currently (not for batteries in series)
- △ Please contact us should you need any assistance with inverter setup



## 10. WARRANTY

Unless otherwise specified, your TITAN Lithium battery has a full lifetime warranty that lasts for the life of the battery. This covers manufacturing faults, but does not include wear and tear, or user abuse; things like under charging, extreme operating conditions, damage, etc.

Full details about our warranty and stipulations are displayed on our website. Please visit [titanlithium.co.uk/lifetime-warranty](https://titanlithium.co.uk/lifetime-warranty) for more information.

**Thank you for taking the time to read this manual**

**Should you need any help, have any questions or concerns, please give us a call or email as we would be delighted to be of assistance**

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