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THE ULTIMATE LiFePO₄ LEISURE BATTERY
USER MANUAL

THANK YOU FOR PURCHASING A FOGSTAR DRIFT PRO



Here at Fogstar, we've made it our mission to make Lithium Iron Phosphate batteries affordable and accessible to everyone. We've also made the manufacturing process a transparent one.

You can rest assured that your PRO leisure battery contains quality products, including EVE Grade A LiFePO4 Prismatic Cells and a specially customised 300A Fogstar/JBD BMS. We've also included heating, Bluetooth, Active Balancing and an App as standard.

As a relatively small business based in Worcestershire, we've set our sights on providing customers with the very best product and customer service experience.

In this manual you'll find lots of useful information about your Fogstar Drift PRO. Of course, if you don't find the answers to your questions, you can always get in contact with our friendly team and we will always be happy to help.

The Fogstar Team

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customerservice@fogstar.co.uk



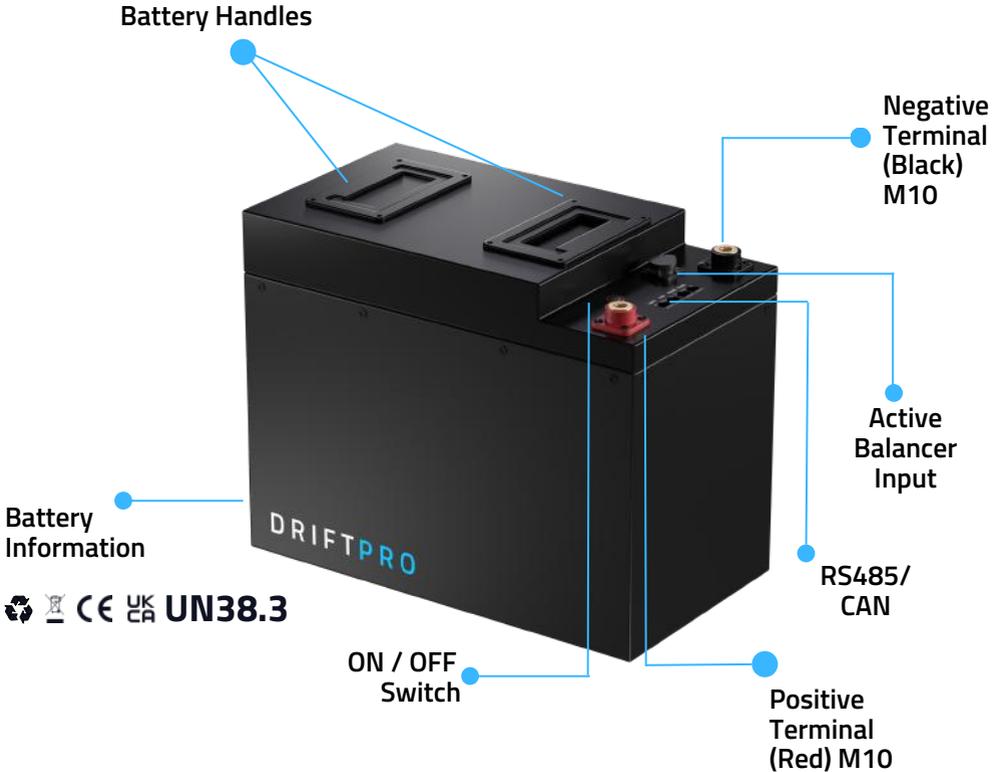
@FogstarDrift



/FogstarUK



@FogstarUK



ARRIVAL CONDITION (SHIPPING MODE)

Due to UN38.3 shipping regulations, your battery will arrive with a state of charge of approximately 30% or less. Although the battery's state of charge is below the recommended safe storage level of 50%, this recommendation considers the parasitic drain of appliances that may be connected to the battery in real-world storage situations.

To enable discharge, depress the button on the front of the battery until the blue light is illuminated. There may be a fairly loud, internal click from the internal relay. Discharge is disabled by default in shipping mode. Please be advised that the discharge control significantly impacts the voltage at the terminals, if you are only reading 0-2V at the terminals, it is likely that discharge is turned off.



| SPECIFICATIONS | | | | | |
|--------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Battery | Drift PRO 12V 280Ah | Drift PRO 12V 300Ah | Drift PRO 12V 460Ah | Drift PRO 12V 560Ah | Drift PRO 24V 280Ah |
| Cell Type | LF280K- 72174/3.2V/280ah | LF304K- 72174/3.2V/304h | LF230K- 54174/3.2V | LF280K- 72174/3.2V/280Ah | LF280K- 72174/3.2V/280Ah |
| Cell Configuration | 4S1P | 4S1P | 4S1P | 4S2P | 8S1P |
| Nominal Capacity | 280Ah | 300Ah | 460Ah | 560Ah | 280Ah |
| Energy | 3584WH | 3840WH | 5888wh | 7168WH | 7168WH |
| Cell Chemistry | Lithium Iron Phosphate |
| Cell Nominal Voltage | 3.2V *4 (12.8V) | 3.2V *4 (12.8V) | 3.2V *4 (12.8V) | 3.2V *8 (12.8V) | 3.2V *8 (12.8V) |
| Cycle Life | 6000 Cycles @ 80% DOD | 4500 Cycles @ 80% DOD | 4500 Cycles @ 80% DOD | 6000 Cycles @ 80% DOD | 6000 Cycles @ 80% DOD |
| Maximum Discharge | 300A | 300A | 300A | 300A | 300A |
| Max Charge Current | 140A (0.5C) | 150A (0.5C) | 230A (0.5c) | 280A (0.5c) | 140A (0.5c) |
| Nominal Voltage | 12.8V | 12.8V | 12.8V | 12.8V | 25.6V |
| Discharge Cut Off Voltage | 10V | 10V | 10V | 10V | 20V |
| Discharge Temperature Range | -20C to 60C |
| Charge Temperature Range | -20C to 60C (Heater Enabled) | -20 to 60C (Heater Enabled) | -20 to 60C (Heater Enabled) | -20 to 60C (Heater Enabled) | -20 to 60C (Heater Enabled) |
| Storage | 10C to 35C @ 50% SOC |
| Measurements (HxLxW) in mm | H 280mm x L 390mm x W 205mm | H 280mm x L 390mm x W 205mm | H 280mm x L 531mm x W 205mm | H 280mm x L 698mm x W 205mm | H 280mm x L 698mm x W 205mm |
| Weight | 33.28kg | 33.5kg | 47.3kg | 60.23kg | 60.6kg |
| Housing Material | Metal | Metal | Metal | Metal | Metal |

All Drift PRO batteries contain a 300A, customised JBD BMS - capable of working with Inverters up to 3500W in size. Our JBD BMS contain a wide range of protective features, ensuring optimal charging and battery health throughout the lifecycle of the cells. Some of these protective features include;



LOW TEMPERATURE CHARGING (UTC)

The battery has detected that you are trying to charge whilst the temperature is around 0°C. This warning is normal, and it is used to trigger the heating pads in your battery. Incoming charge current will heat the pads first, and then the battery will allow charge through when it reaches 5°C.

HIGH TEMPERATURE DISCHARGING (OTD)

The battery has detected that you are trying to discharge whilst the internal temperature is above 75°C. Discharging has been disabled until the temperature falls within an acceptable range.

LOW TEMPERATURE DISCHARGING (UTD)

The battery has detected that you are trying to discharge whilst the temperature is below -20°C. Discharging has been disabled.

PACK OVER-VOLTAGE (POV)

The total voltage of the pack has exceeded the maximum voltage. The BMS has turned off charging so that you do not overcharge the battery. Please discharge the battery.

PACK UNDER-VOLTAGE (PUV)

The total voltage of the pack has reached the minimum allowed voltage. Discharge has been disabled. Please charge the battery.

SHORT CIRCUIT (SCD)

A short circuit has been detected, and the BMS has protected you, and your battery. Please stop using the battery, and check your system thoroughly for anywhere a short circuit could have occurred. This could also be caused by an extremely large inverter charging its capacitors. If this is the case, disconnect the load and use a pre-charge resistor.

OVER CURRENT CHARGING (OCC)

You have exceeded the 300A charging limit. The BMS has disabled charging.

OVER CURRENT DISCHARGING (OCD)

You have exceeded the 300A discharging limit. The BMS has disabled discharging.

CELL UNDER-VOLTAGE (CUV)

A cell has hit the minimum voltage and the BMS has disabled discharging to protect the cell. Please charge the battery.

HIGH TEMPERATURE CHARGING (OTC)

The battery has detected that you are trying to charge whilst the internal temperature is above 55°C. Charging has been disabled until the temperature falls within an acceptable range.

| JBD BMS | JBD-SP04S060 V1.1 | JBD-AP21S002 |
|---------------------------|---|---|
| MAXIMUM DISCHARGE | 300A | 300A |
| MAX CHARGING CURRENT | 300A | 300A |
| CELL VOLTAGE RANGE | 2.20~3.75V | 2.2~3.75V |
| CONT. CHARGING CURRENT | 300A | 300A |
| CONT. DISCHARGING CURRENT | 300A | 300A |
| RUNNING CONSUMPTION | ≤20MA | ≤30MA |
| SLEEP CONSUMPTION | ≤500UA | ≤1000UA |
| SLEEP CONDITIONS | DELAY 1MIN±30S UNDER NO COMMUNICATIVE STATE | DELAY 1MIN±30S UNDER NO COMMUNICATIVE STATE |
| CIRCUIT RESISTANCE | ≤10mR | ≤10mR |
| OPERATING TEMPERATURE | -20°C~75°C | -20°C~75°C |
| USED WITH | 4S CONFIGURATIONS | 8S CONFIGURATIONS |

BATTERY HEATING

The DriftPro relies on LiFePO₄ chemistry, which allows it to be discharged in temperatures as low as -20°C without any adverse effects. However, the charging process can pose problems as charging a LiFePO₄ battery below freezing temperatures can cause irreversible damage, leading to a shorter lifespan. To mitigate this issue, we've incorporated heating pads into the battery to maintain optimal charging temperatures.

To avoid charging the battery under freezing conditions, the battery management system will disable charging and activate the protective state (LTC) when a temperature of 0°C is detected. This action initiates the activation of the heat pads. The BMS will utilize the incoming charge current to energize the 36W heating pads until the temperature reaches 5°C. After achieving 5°C, the protective state will be terminated, and the charging process will resume.

For optimal heating, the heating pads necessitate an incoming charge current of no less than 0.5A. These pads have undergone testing at -20°C, but their rating extends down to -40°C.

Similarly, if you're taking your Drift PRO to warmer climates - the maximum operating temperature is 75°C. In the unlikely event that your battery should go into high-temperature protection, please contact a member of our Customer Service team immediately.

The Fogstar Drift App enables you to see all of your battery statistics, and our App has been custom built to connect directly with the Fogstar Drift battery management system (BMS), allowing you to manage and maintain the health of your battery at all times.

ABOUT THE APP

The Fogstar Drift app works on all models of Android and iPhone and is available to download from the App Store and Google Play for free. We've made our app as simple as possible to use. It only contains the information you really need.

The user-friendly interface is perfect for even the most hardened technophobes, and the simple navigation is deliberately designed to make for a simplistic user experience.

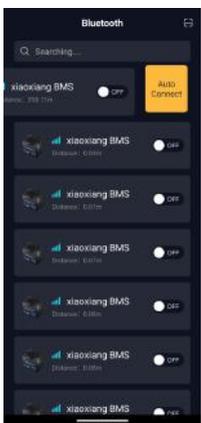
Our App has been custom built to connect directly with the Fogstar Drift battery management system (BMS), allowing you to manage and maintain the health of your battery at all times.

DOWNLOAD THE APP

Download the Fogstar Drift App from iOS or Android.

Scan the QR codes opposite to find the Fogstar Drift App, or visit our www.fogstar-drift.co.uk website to learn more.

It is important to note, the app can only be connected to one battery at a time.



Connecting your battery via Bluetooth

Ensure your phone's Bluetooth and Location services are switched on 

Open the Fogstar Drift App to search via Bluetooth

Locate your Fogstar Drift Battery on the Menu

Slide the dot to turn the Bluetooth on 

Wait a few moments for your phone and battery to establish a connection. You will then be directed to the Battery Dashboard.



Slide left on the battery to 'Auto-connect'. This will keep your battery connected to the App at all times.

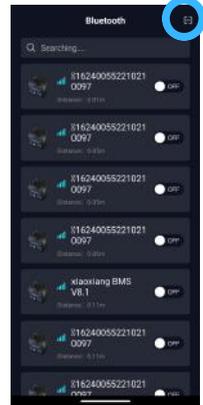
Connecting your battery by QR Code

You can also connect your Fogstar Drift battery to the App via the QR Code located on your battery.

The scannable QR code is located on the top of the battery, between the two terminals.

Simply open the app and click the scan icon on the top right-hand side of the connect screen (as shown in the image).

Your camera will load, allowing you to scan and connect the battery via QR Code.



THE BATTERY DASHBOARD

When you open the Drift App, you'll land on the main screen allowing you to view the Battery Dashboard.

At a glance you'll be able to see:

- State of Charge (SOC) %
- Battery voltage
- Battery current
- Temperature detection, and
- Cycle time.

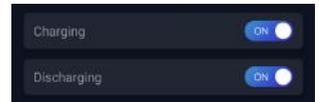
Using the navigation at the bottom of the page, you'll be able to move between the various sections of the App including the page displaying individual cell voltages.



CHARGE AND DISCHARGE BUTTONS

On the main dashboard of the App, you'll also find the 'Charging' and 'Discharging' buttons.

Toggleing these buttons to 'OFF' will turn the charge and discharge functions of the battery OFF. Setting the Discharge button to 'OFF' will effectively put the battery into storage mode.



Your Drift PRO also contains an ON/OFF switch. You can use this to turn the Discharging ON and OFF without navigating the App.

BATTERY PARAMETERS

All battery parameters are locked by a password. We lock down the battery parameters to ensure your BMS settings remain protected and unable to be unchanged.

Changing the BMS parameters can permanently damage your unit. The set-up and configuration of these technical specifications are done so by the manufacturers, adapting them could result in a significant cell imbalance or errors in the BMS.

Should you wish to reconfigure the BMS for a hybrid set-up, please contact a member of our team at customerservice@fogstar.co.uk to obtain the password, discuss your set-up and reconfiguration prior to altering any of the BMS vitals.

CHANGING THE NAME OF YOUR BATTERY

It's really simple to alter the name of your battery.

Simply open your Battery Dashboard and click the name at the top of the screen, change the name of the battery, the BMS will register this as a 'success', then simply wait 15 seconds for the change to register with the BMS.



APP FUNCTIONALITY

1. Displays real-time voltage, current, power, internal resistance and other parameter values in the form of dashboard and digital display
2. Displays the real-time voltage and alarm status of all single cells. If the reported parameter triggers the alarm value or protection value, an alarm will be prompted
3. Compares the data of each cell, including the voltage difference, maximum cell voltage, minimum cell voltage, and overall balancing of the cells
4. Creates a cell temperature warning for; over-temperature, short-circuit, over-voltage, under-voltage real-time alarms and keeps a record of all alarms that occur.



It will take between 4-5 cycles for the BMS to fully calibrate - the SOC% will be incorrect during this period. Make sure you charge your battery to the full 14.4v during the first few cycles. Discharging the battery below 80% counts as 1 cycle.

An Active Balancer is a component that redistributes the current from the cells with a higher SOC, to cells with a lower SOC, thus creating an even distribution of current across the cells.

In our Drift PRO we've made the decision to use an external Jikong (JK) Active Balancer (one you plug in manually) not a permanent in-built one, this gives our customers the best of both worlds - the option to use an Active Balancer should they need to.

Because your Drift leisure battery contains matched and balanced Grade A EVE cells, you should not have to use your Active Balancer often. We recommend plugging the device in every three (3) to six (6) months, for two (2) to three (3) cycles (depending upon levels of cell disparity).



To connect the active balancer simply remove the protective bung, and plug the balancer directly into the battery.

ACTIVE BALANCER SPECIFICATIONS

There are two variants of Active Balancer:

- JK- DZ13-B2A4S
(suitable for use with 12V batteries)
- JK-B2A16S
(suitable for use with 24V batteries)

It is important you use the correct balancer with the correct voltage.

| | JK- DZ13-B2A4S | JK-B2A16S |
|-----------------|----------------|---------------|
| BALANCE CURRENT | 0.1 - 2A | 0.1 - 2A |
| ACCURACY | ± 3mV | ± 3mV |
| STRINGS | 4S | 2 - 16S |
| VOLTAGE | 8 - 20v | 20 - 100v |
| BATTERY TYPE | 12V BATTERIES | 24V BATTERIES |

VICTRON INTEGRATION

The BMS has the ability to communicate with the Victron Cerbo GX, removing the need for a Victron BMS or SmartShunt. The BMS can communicate the following:

- Voltage, State Of Charge, and Current
- Temperatures
- Cell Voltages
- 10 BMS Alarms including high voltage, cell imbalance, low voltage etc
- Current Limit
- Charging Voltage Limit

The package includes the necessary cable, but if you need a longer one, a standard Cat7e cable can be used instead. The Cable should go from the CAN port on the battery to the BMS-Can port on the Cerbo GX or GX-enabled inverter.

Connecting Multiple Batteries

It's possible to link more than one battery and monitor them using the Cerbo GX. However, the process of adding an extra battery varies from the initial connection. Although the same cable is used, it should be connected to the CAN port on the battery, and the VE-CAN (not BMS-CAN, which was used for the first battery). Once the connection is established, the following steps should be taken on the Cerbo GX;

- Navigate to Settings > Services
- VE CAN Port > Select CAN-BUS profile and CAN-BUS 500Kbit/s.



STORING YOUR BATTERY

We strongly suggest your batteries are stored at room temperature, charged to between 30% to 50% of their capacity. We recommend that batteries be charged once every three months to prevent over discharge.

BATTERY PERFORMANCE

Because Lithium Iron Phosphate batteries utilise a chemical reaction, battery performance will deteriorate over time even if stored for long periods without regular use.

If the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges, the life expectancy of the battery may be shortened, or the device in which the battery is used may be damaged by electrolyte leakage.

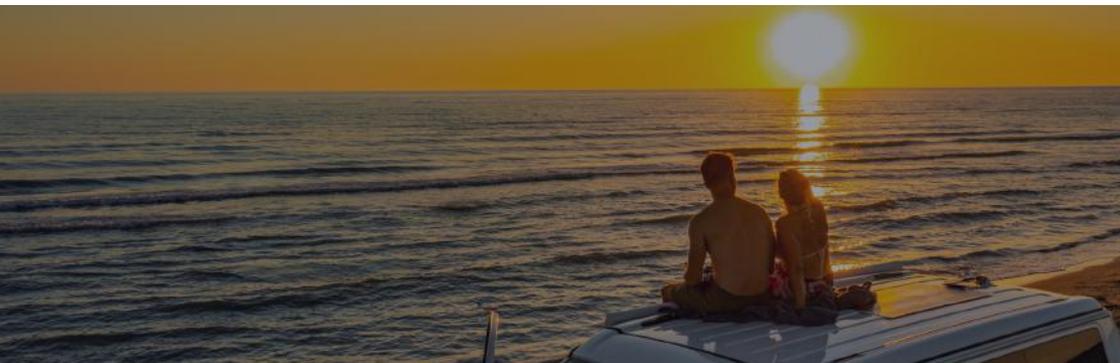
If the batteries cannot maintain a charge for long periods of time, even when they are charged correctly, this may indicate that it is time to change the battery.

BATTERY SERIES AND PARALLEL MODE

Batteries can be connected simultaneously with a maximum of four (4) in series OR (4) in parallel.

BATTERY SAFETY

- Do not disassemble your battery
- Do not short the battery
- Do not store your batteries in direct sunlight.
- Store the battery in a cool and well ventilated area
- Keep batteries away from flammable objects and materials
- Keep batteries away from static electric charges
- Keep out of reach from animals and children
- Do not immerse your battery in water
- Do not crush, incinerate or modify your battery
- Only use batteries within the manufacturers specifications
- Recycle your batteries correctly.





We offer a 10 Year Warranty on our Drift PRO lithium leisure batteries.

There are stipulations to this warranty of course, for example warranties can only be registered to the original owner and not transferred.

It should also be noted that our warranty does not cover items that have been damaged due to gross negligence, normal wear and tear, damage due to accident or collision, abuse or incorrect installation.

We're confident you'll get many, many cycles of use out of your leisure battery - we're also confident we've created a superb product containing some of the best components around.

When you receive your Fogstar Drift, don't forget to register for your 10 Year Warranty. This ensures your battery is on our database should any issues arise over the coming years.

WARRANTY CONDITIONS

- Fogstar offers a 10 year warranty on all Fogstar Drift Leisure batteries.
- Warranties only apply to the original owner and are non-transferrable.
- Fogstar will verify your purchase prior to processing any warranty claims or returns.
- If it is determined that the product is faulty, we will ship a new product to you immediately, you will only be asked to cover the cost of the shipping.
- Our warranty does not cover items that have been damaged due to gross negligence, normal wear and tear, damage due to accident or collision, abuse or incorrect installation.

You can register your 10 year Fogstar Drift Warranty at; <https://www.fogstar-drift.co.uk/pages/warranty-registration>.

REPORTING AN ISSUE WITH YOUR DRIFT

Should you encounter a problem with your Drift PRO it important you contact our Customer Services team first and foremost. This gives us an opportunity to help you resolve the issue before any problems arise.

If possible, please send screenshots of your App pages, including the %SOC page, cells voltages, and protect history along with a description of your issue to customerservice@fogstar.co.uk.

CAN I SERIES CONNECT MY BATTERIES?

Yes, you can connect up to 4 Fogstar Drift PRO batteries in either series OR parallel - we've had our JBD BMS specially programmed to allow for this.

WHAT SIZE TERMINALS/POSTS ARE THE FOGSTAR DRIFT LEISURE BATTERIES?

The Fogstar Drift PRO terminals are M10 in size. All of our Drift Leisure batteries come with bolts as standard.

WHAT ARE THE CHARGING PARAMETERS OF THE DRIFT PRO?

12V = 14.4V Bulk/13.6V Float

24V = 28.8V Bulk/27.2V Float

48V = 57.6V Bulk/54.4V Float

IS IT POSSIBLE TO CONNECT YOUR LEISURE BATTERIES IN PARALLEL IF THEY ARE DIFFERENT CAPACITIES (CONNECTING A 280AH IN PARALLEL WITH A 300AH)?

No, all batteries connected in series and/or parallel must be the same capacity rating, same make and same model.

COULD YOU TELL ME IF YOUR FOGSTAR DRIFT 12V LEISURE BATTERIES ARE SUITABLE FOR SERIES CONNECTION AT 24 OR 48 VOLTS PLEASE?

Yes - we modified the JBD BMS at the manufacturing stage to add series or parallel support up to 4S and 4P. Units cannot be connected in series-parallel.

WHERE CAN I SIGN-UP TO REGISTER MY FOGSTAR DRIFT WARRANTY?

You can register your 10 year Fogstar Drift Warranty at

<https://www.fogstar-drift.co.uk/pages/warranty-registration>.

WHY DOES MY DRIFT ONLY SHOW TEMPERATURES ON THREE OF THE CELLS?

It is perfectly normal for cell 4 not to be showing a temperature. Temp 1 is the BMS temperature, Temp 2 is 'battery bank 1' temperature, and Temp 3 is 'battery bank 2' temperature.

WHAT CHARGER SHALL I USE WITH MY DRIFT PRO?

The recommended charging current for a lithium leisure battery is typically around 20-30% of the battery's capacity. For example, if the battery has a capacity of 200Ah, the recommended charging current would be around 40 amps. It's important to check the specifications of your particular battery to ensure you are using the correct charging current.

We sell a range of Fogstar Drift chargers, please get in touch with our team for more information.



CAN I LAY MY DRIFT ON IT'S SIDE?

Yes, your Drift battery can be lay on it's side, in fact, you can lie a Drift battery in any configuration you wish. All we recommend is that you keep the terminals clear and clean.

WHAT IS THE MAXIMUM INVERTER SIZE I CAN USE WITH MY DRIFT PRO?

The Drift PRO contains a 300A JBD BMS - this enables you to use your battery with inverters up to 3500W.

A CELL OVERVOLTAGE (COV) WARNING JUST FLAGGED ON MY BATTERY, WHAT CAN I DO?

This is nothing to worry about, it's just your battery telling you it is fully charged.

You may have noticed some COV's already registered on your battery - this is only due to our quality process and our team testing the BMS response at manufacture.

If you begin to flag multiple COV warnings suddenly, we can rectify this by altering the Cell OVP parameters - just contact us at [Customer Service](#).

WHAT SETTINGS DO I USE ON MY CHARGER?

Most chargers have profiles for various different battery parameters (Lead Acid/AGM), you should choose one that fits as close as possible to 14.4V bulk and 13.5-13.6V float. However, an acceptable charging range for the Drift batteries is 14.2V-14.6V bulk and 13.3-13.6V float. For Victron systems, please use a 14.2V bulk and 13.6v float.

WHAT SETTINGS DO I USE FOR MY VICTRON EQUIPMENT?

First and foremost, it is important you consult your Victron Manual for specific set-up instructions. However we do have some settings to help you configure your equipment if using the 'User Defined' settings;

- **Absorption voltage:** 14.2V
- **Absorption time:** The recommended setting is half an hour per 100ah of LiFePO4 battery (for example if you have x2 105ah batteries select 1 hour).
- **Float Voltage:** 13.6V or lower is acceptable for LiFePO4 batteries.
- **Equalisation voltage:** 14.2V (you do not need to equalise Lithium, so you can turn this off, but in-case it ever runs a cycle the batteries will be ok at this voltage).
- **Temperature compensation:** should be disabled on Lithium batteries.
- **Low Temperature cut-off:** The Drift PRO batteries have low temperature charging protection built into the battery. You can leave this off.
- **Discharge Floor:** 0%
- **Tail Current:** 4%
- **Peukert Exponent:** Not required - this is for Lead Acid batteries.



Had a great experience with Fogstar Drift PRO?

We would love to hear your feedback on our Drift product. If you have any photos, videos or clips of our product in action - we'd love to see them. Use the hashtag #fogstardrift to engage with us.

Follow us on Instagram (@FogstarDrift) or join our Facebook Group, just search 'Fogstar Drift - Owners Group' on Facebook and ask to join.



@FogstarDrift