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**WARNING**

All batteries store high current. Be careful not to short across the terminals with anything, including jewellery such as rings, wrist watches, and necklaces, tools etc. You can wrap insulation tape around a ring if you can't remove it, or around the exposed area of a spanner, socket etc.

Aside from your lithium battery and all the cables and connectors that join it all together, there are several components that are an essential part of that system that will also give you information about how much power is coming into your battery and how much power you are using.

If we have used your existing battery monitor or solar regulator, the following information will probably still be available, but how you get to it will be different – you'll need to look up your own user manual.

Lithium batteries like to work

You're probably used to keeping a close eye on your lead acid batteries and trying to keep them as charged as possible. Those days are gone.

Lithium batteries don't like to be kept fully charged. That's not to say you should stop your battery from *being* fully charged. But day to day, your lithium battery *wants* to work. It wants you to use the power you have available and let your solar panels do their job and charge the battery up again. Some or possibly all of the power you use during the day will come directly from your solar. Any excess solar harvest will go into your battery. Don't be concerned if your battery doesn't reach 100% state of charge at the end of the day. Use your power anyway.



About your T1 Lithium system

Your T1 Lithium control system will sound an alarm if your battery reaches 20% state of charge, and it will automatically disconnect it if it reaches 5% state of charge. But while your state of charge is between 20% and 100%, use that power. You'll eventually get used to the fact that you don't have to keep an eagle eye on your battery.

BUT (there's always a "but"), it is important to bring your battery up to fully charged (note that this is not necessarily the same as the Victron battery monitor showing 100% state of charge) **at least once a month** or so if you are using it full time OR if your system has had a disconnect, whether manually or automatically. The reason for this is so that the Victron battery monitor can recalibrate what 100% state of charge actually is. To bring the battery up to full charge, apply whatever charging system you have available – solar, DC to DC or mains – and allow the T1 Lithium control system to stop the charging when the battery is full. When this has happened, you can turn off your charging source, particularly your mains charger.

The battery is considered fully charged when all the cells read 3.45V or higher.

The short story

If you aren't interested in too many numbers and just want to know how your battery is doing, there are really only three that you need to know:

Reading	Where you'll find it	Unit of measurement	What it should be
State of Charge	Victron BMV battery monitor	%	From 20% - 100%
Voltage Differential	Junsi cell logger	mV (milli volts)	Less than 150mV
Cell voltage	Junsi cell logger	V (volts)	3.45v or more when the Victron reads 100% SOC and no more than 3.6v and no less than 2.8V.

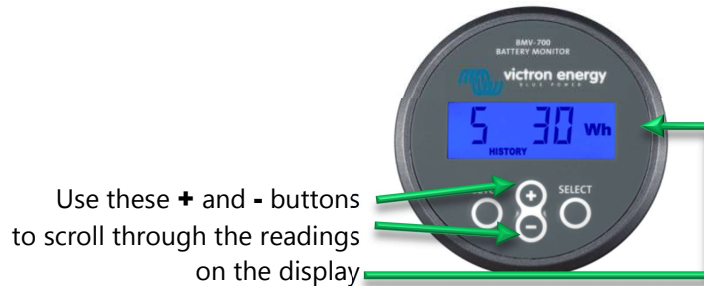
Victron™ BMV battery monitor

The **Victron™ BMV battery monitor** will tell you what charge has flowed in and out of your battery and the current state of charge (SOC) of your battery. The Victron™ is a very thorough history recorder but it will only tell you what flowed in or out of the battery - it won't differentiate between the charge coming in from solar panels, the charge coming from DC to DC charging or the charge coming in from a mains charger. Some of that input may have been used directly by the loads and so never got to the battery to be logged by the Victron™.








About your T1 Lithium system

So the Victron™ will only tell you the nett amount of power coming in to the battery, but it is probably the most frequently referred to part of your control system.



If the Victron™ is 'asleep', press either the plus or minus button to wake it up, then use these buttons to cycle through the different readings.

Below are the readings and what they mean (Please note that the examples are taken from the Victron™ BMV manual and are not indicative of lithium settings):

Symbol	Example	Measurement	Explanation
V		Battery Voltage	The voltage of your battery.
A		Current	The nett amount of current flowing out of the battery (if a minus figure) or flowing into the battery (if a positive figure).
W		Power	The nett amount of watts flowing out of the battery (if a minus figure) or flowing into the battery (if a positive figure).
Ah		Consumed Amp Hours	If this figure is negative, it indicates the amount of Ah used from the battery. If it is positive, it indicates how much charge you have put into the battery.
%		State of Charge	The percentage of charge left in the battery.



About your T1 Lithium system

H		Time To Go	An estimate of the number of hours remaining at the current discharge rate, before the battery will need recharging.*
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* NOTE: in most systems we have turned this **Time to Go** display off, as it causes a lot of panicked phone calls. This number is a reflection of the *current* rate of discharge. If you're using something with a big current draw such as a microwave or hair dryer, this number will drastically lower for the time you're using that appliance (which is usually a fairly short time), giving you a false notion that your battery is about to go flat.

Your T1 Lithium control box

The T1 Lithium control box is an integral part of your T1 Lithium installation. It orchestrates the control and protection of your lithium battery.

The only parts of this system that will ever require your attention are a black 3-way toggle switch and a red push-button switch on the side of this box.

For information on when you might need to use these switches, see these information sheets included in your T1 Lithium pack:

- **T1 Lithium - Resetting your system if the battery has been shut down due to low power**
- **T1 Lithium - Preparing your system for storage**





About your T1 Lithium system

Your T1 Lithium control system is set up to automatically prevent your battery from overcharging and also prevent it from over discharging. Below are warnings you will get, when you will get them and what you need to do.

What happens	When it happens	What you should do
Alarm	State of Charge (SOC) reaches 20% (Victron™)	You will need to press the + or the - button the Victron™ to stop the alarm, but the light on the display will still flash. It's time to think of getting some charge, either from mains/generator or going for a drive/running your vehicle to let your DC to DC charger put some power in. If you're expecting some good solar weather soon (how soon will depend on how hungry for power your 24/7 appliances are), there's no need to do anything. Everything is still running, but won't be if you don't get some charge in.
Alarm then shut down of your battery	State of Charge (SOC) has reached 5% or the voltage of any one cell has reached 2.8V (Junsi) or the voltage of whole battery has reached 11.8V (Junsi)	You need to get some charge into your battery urgently. You can override this automatic cut off if you really have to. Refer to T1 Lithium - Resetting your system if the battery has been shut down due to low power.

Junsi™ 8S cell logger

The Junsi™ cell logger gives you information about the voltage of each cell of your battery as well as the overall voltage of your battery.





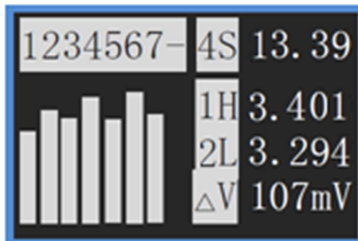
About your T1 Lithium system

The Junsi™ has four screens which are navigated by pressing the ▲ or ▼ key.

Screen

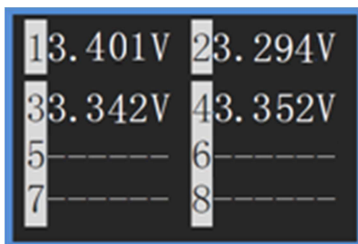
What it tells you

1



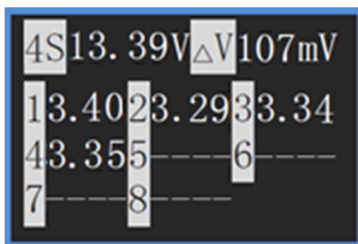
- Graphical representation of the voltage of each cell
- The overall voltage right now [13.39] from all cells
- The highest voltage right now [3.401]
- The lowest voltage right now [3.294]
- The difference between highest and lowest voltages (this is known as the differential) 107mV

2



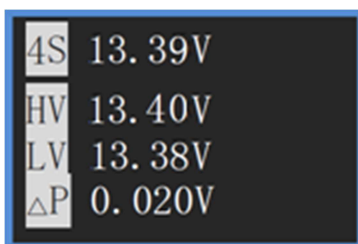
- The voltage of each cell to 3 decimal places shown in table format
- Cell 1 is 3.401V
Cell 2 is 3.294V
Cell 3 is 3.342V
Cell 4 is 3.352V

3



- How many cells [4S]
- The overall voltage of all cells [13.39]
- The differential [107mV]
- The voltage of each cell to 2 decimal places shown in table format
- Cell 1 is 3.40V
Cell 2 is 3.29V
Cell 3 is 3.34V
Cell 4 is 3.35V

4



- Number of cells [4S]
- The overall voltage of all cells [13.39]
- Highest voltage ever been seen from these cells [13.40]
- Lowest voltage ever been seen from these cells [13.38]
- The highest differential ever seen [0.20]

All the above screens and their values will reset when the logger is unplugged and plugged back in again.

For information on when you might need to check the Junsi™, see

- **T1 Lithium - Correcting an out of balance cell**



Dim the display on the Junsli logger

For some people, the light from the Junsli is annoying. These instructions tell you how to change the intensity of that light. When you are at the Brightness or Contrast settings, the screen will show the difference as you press the up or down arrow to adjust each setting.

1. Long press the **Menu** button
2. Arrow down to **System...**
3. Short press the **Menu** button
4. Arrow down to **LCD screen**
5. Short press the **Menu** button
6. The **Brightness** setting will already be highlighted. Use the up or down arrow to adjust.
7. Short press the **Menu** button to select the **Contrast** setting and adjust up or down
8. Long press the Men button three times to back out of the system settings and return to the voltage display.