SCOTTY 1500 & 3000

INSTALLATION & OPERATION MANUAL

SCOTTY 1500 12-24V, 12-36V 12-48V

SCOTTY 3000 12-24V, 12-36V 12-48V

SCOTTY 3000 24-48V

ALL Bidirectional with 3 CAN Ports

Tomorrow's Technology, Today

RoHS UK CA CE

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Version 6

CONTENT

SAFETY

- This manual contains important instructions that shall be followed during installation and maintenance.
- Danger of explosion from sparking and danger of electric shock.

GENERAL SAFETY REGULATIONS

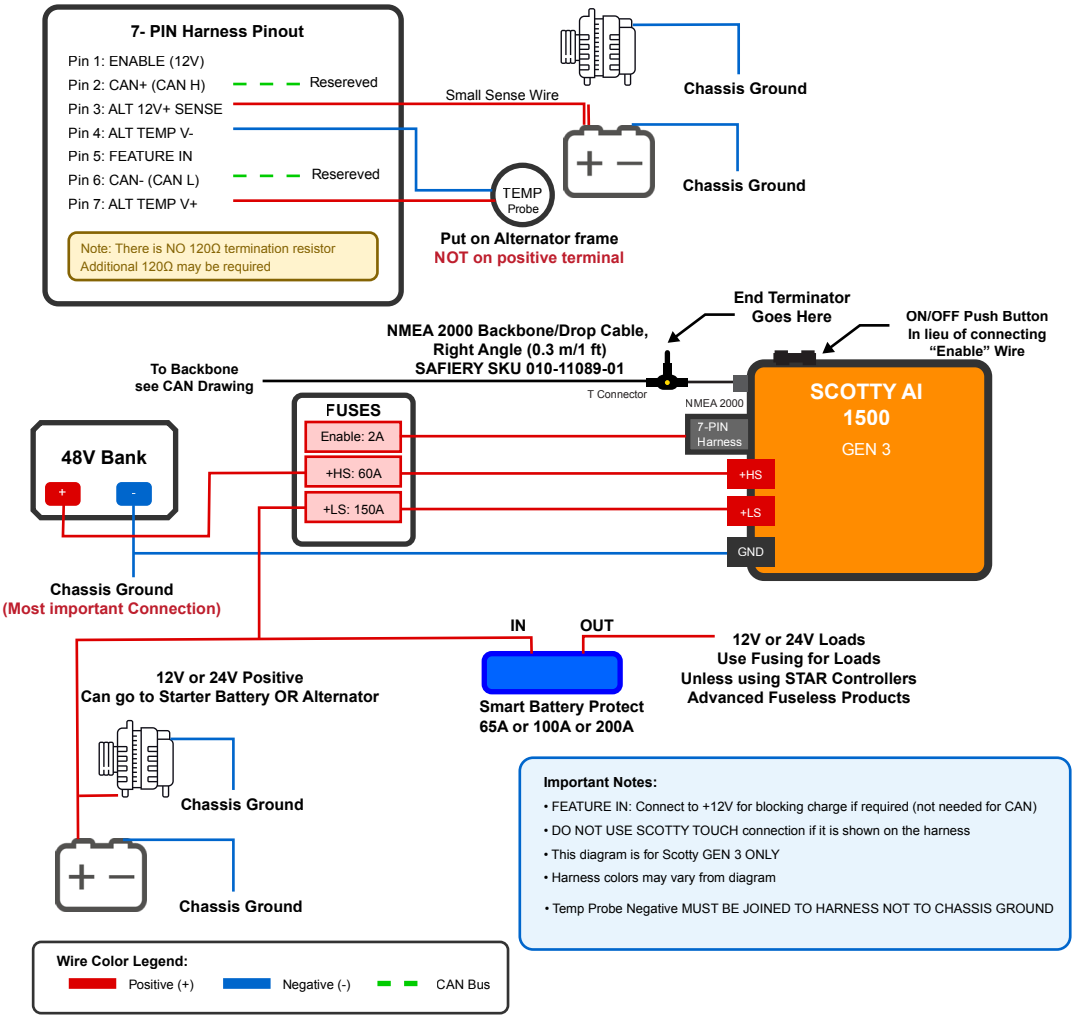
- Please read the safety instructions below before installing and using the Scotty AI 1500/3000 to avoid risks of fire, electric shocks, personal injuries or equipment damage.
- This product is designed and tested in accordance with international standards.The equipment should be used for its designated application only and in accordance with the specified operating parameters.

REGULATIONS FOR SAFE INSTALLATION

- For electrical work, follow the local national wiring standards, regulations and these installation instructions.
- Install the product in a heatproof environment. Ensure therefore that there are no chemicals, plastic parts, curtains or other textiles, etc. in the immediate vicinity of the equipment.
- It is normal for the Scotty AI 1500/3000 to get hot during operation. Keep any objects that are heat-sensitive away.
- Never install or use the product at sites where gas or dust explosions could occur.
- Use flexible multi-stranded copper cables for the connections (UL: Class I; IEC: Class 5).
- The installation must include a fuse in accordance with the recommendations in the table Cable type recommendations.
- Always remove all dirt and paint from chassis connection points. Apply the correct torque when fastening the connection bolts.
- Please make installation less than 2m from the floor.

Scotty AI 1500/3000 contains sharp edges and should not be touched without taking care.

SCOTTY AI 1500 WIRING DIAGRAM “A”



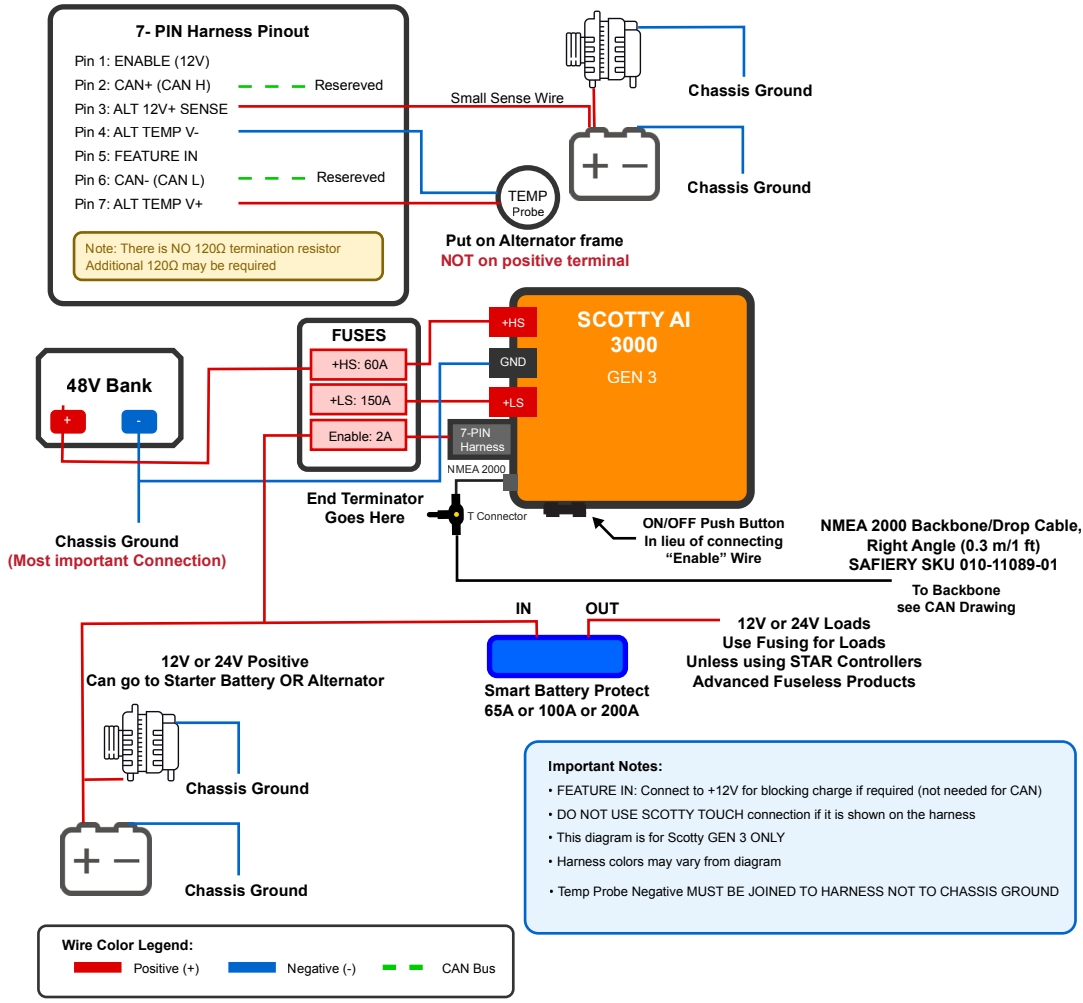
WHEN TO USE THIS WIRING DIAGRAM “A”

Straight connection of Scotty in a Canopy (not Jack Off)
Straight connection of Scotty in a Van like Sprinter /VW Crafter Etc
Straight connection of Scotty in a Truck with 12V or 24V on Low Side.

RULE No. 1:

ALWAYS CONNECT NEGATIVE FIRST and NEVER DISCONNECT THE NEGATIVE - NEVER

SCOTTY AI 3000 WIRING DIAGRAM “A”



Important Notes:

- FEATURE IN: Connect to +12V for blocking charge if required (not needed for CAN)
- DO NOT USE SCOTTY TOUCH connection if it is shown on the harness
- This diagram is for Scotty GEN 3 ONLY
- Harness colors may vary from diagram
- Temp Probe Negative MUST BE JOINED TO HARNESS NOT TO CHASSIS GROUND

WHEN TO USE THIS WIRING DIAGRAM “A”

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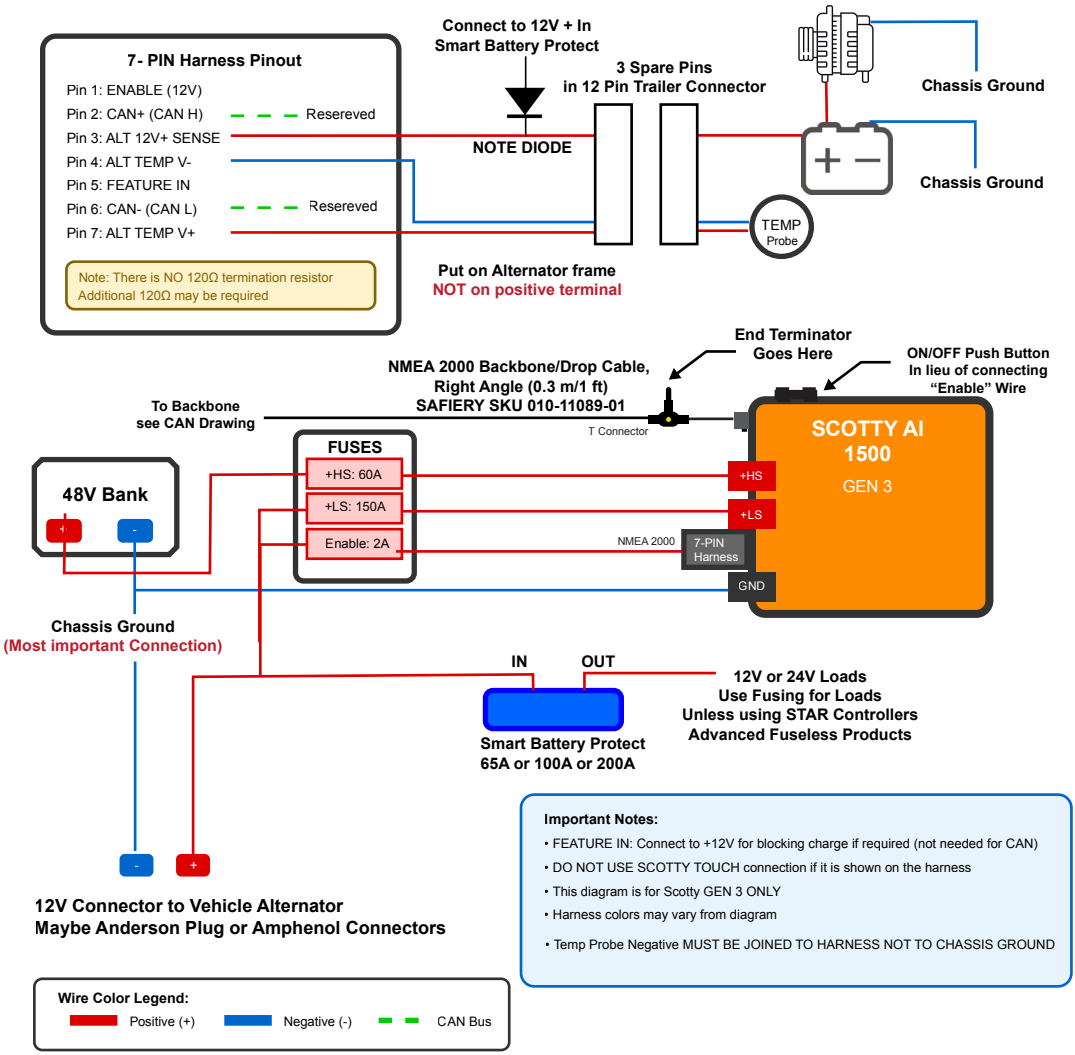
RULE No. 1:

ALWAYS CONNECT NEGATIVE FIRST and NEVER DISCONNECT THE NEGATIVE - NEVER

SCOTTY AI 1500 WIRING DIAGRAM “B”



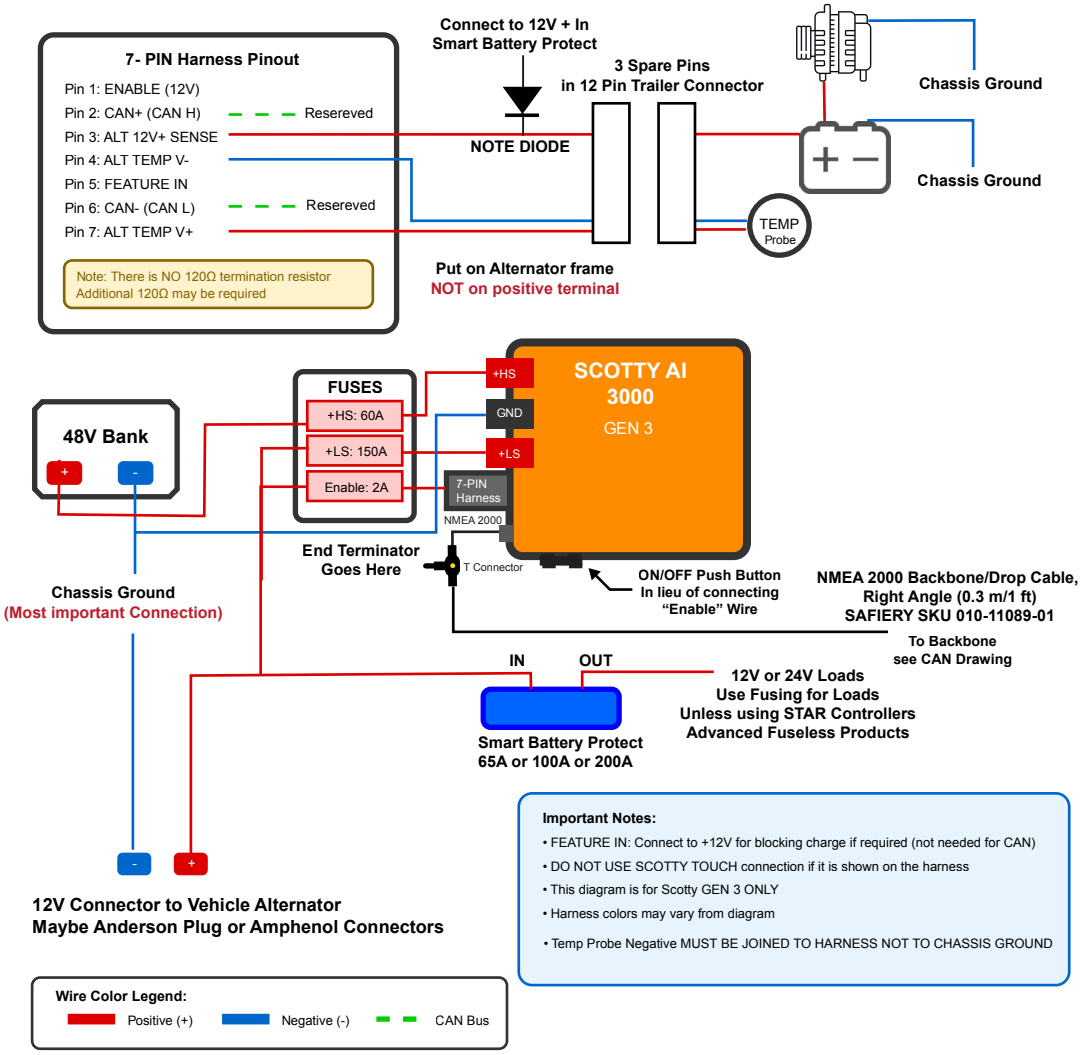
WHEN TO USE THIS WIRING DIAGRAM “B”

Straight connection of Scotty in a Canopy Jack Off with 12V power still required after jack
Straight connection of Scotty in a Caravan with an Anderson Plug for Vehicle Charging

RULE No. 1:

ALWAYS CONNECT NEGATIVE FIRST and NEVER DISCONNECT THE NEGATIVE - NEVER

SCOTTY AI 3000 WIRING DIAGRAM “B”



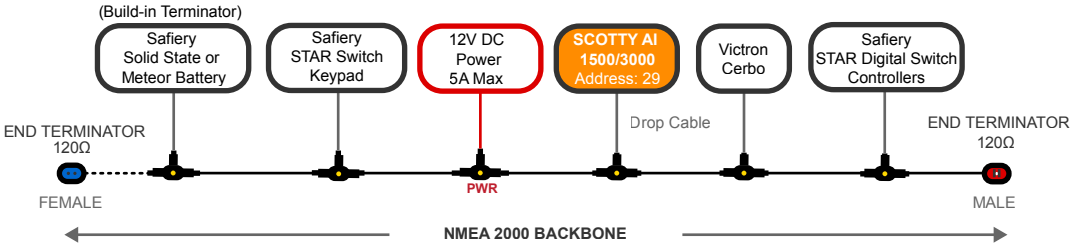
WHEN TO USE THIS WIRING DIAGRAM “B”

Straight connection of Scotty in a Canopy Jack Off with 12V power still required after jack
Straight connection of Scotty in a Caravan with an Anderson Plug for Vehicle Charging

RULE No. 1:

ALWAYS CONNECT NEGATIVE FIRST and NEVER DISCONNECT THE NEGATIVE - NEVER

SCOTTY AI 1500 / 3000 WIRING DIAGRAM “B”



NMEA 2000 Network Rules

Backbone:
- Maximum length: 200m (656 ft)
- Minimum length between T's: 0.5m
- Cable type: Safiery NMEA 2000 Compliant

Drop Cables:
- Maximum length: 2m each
- For longer lengths:
  Run longer ~ 20m cable with terminator at T piece at endLorem ipsum

Power Requirements

Network Power:
- Voltage: 12V DC (9-16V range)
- Current: 3A typical, 5A maximum
- Insert Power towards cetre of backbone or network

Termination Requirements

Terminators:
- Exactly 2 required (one at each end)
- Resistance: 120Ω ± 6Ω
- Male on one end, Female on other
- Safiery Solid State and meteor Batteries have a Terminator inbuilt. Which means place these at end of line in drawing above and do not user a separate terminator on that end.

Connector Types:
- Safiery NMEA 2000 Compliant Micro-C (M12) 5-pin standard

Data Cabling Component Summary - First Line is SKU Descriptor

NMEA 2000 Backbone 4 port
Connect up to 4 cables
and two Terminators

NMEA 2000 Terminators,
1 Male and 1 Female as Pair
Comes individually in kit

NMEA 2000
T-connector,
1 Male 2 Female

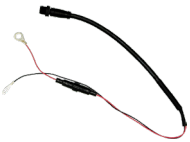
NMEA Female
to Female Connector
2 female

NMEA 2000 Drop Cable
1m, 2m, 5m
Males one end female other

BMG Plug to NMEA and Power
NMEA Male out plus
12V Power and ground Wires

VE.Can to NMEA2000 Round Male
Victron Cerbo Connecting Cable
STAR and Scotty AI Devices

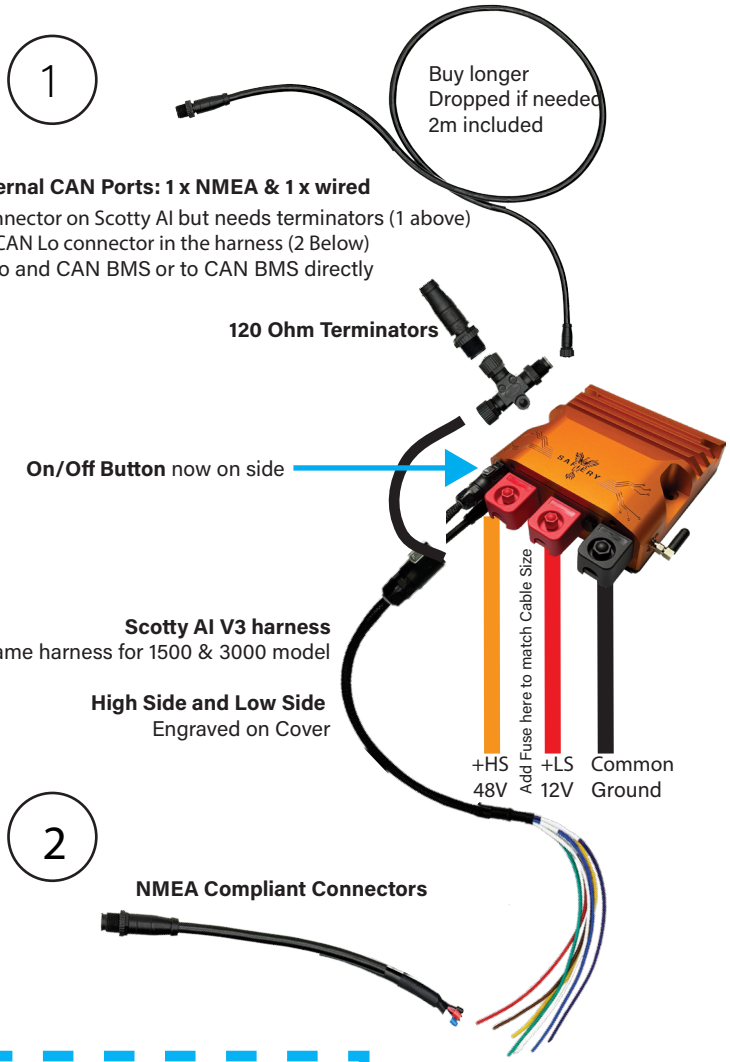
NMEA to STAR-Power Connecting Cable
STAR-Power Only
Males one end CAN wires other



NMEA 2000 Power Injector
NMEA 12V Required
For CAN keypads

NMEA to STAR-Switch
SP8 CABLE Kit Short 1m
Included with Keypards

WIRING DIAGRAM & DATA CABLING KIT



Not Included in BMG NMEA Kit for Victron Cerbo Connection
Needs Female/Female Joiner
VE.CAN to NMEA

Use second RJ port to Battery BMS

CAN Hi and CAN Lo joined
(There is only one NMEA outlet)
So for second CAN it is wired.

Use **Feature in** for "Stop Charge" if needed.

Temp Sensor Pos. & Neg. joins at harness
DO NOT PUT Temp -ve to Ground

Enable is redundant with switch on unit, but can be used as remote.

Scotty not visible on WiFi and is not Charging

Important to follow this before you call Safiery:

1. What colour light is on under Scotty
- [ ] A: No Light
- [ ] B Red Light
- [ ] C Green Light

RULE No. 1:
NEVER DISCONNECT THE NEGATIVE - NEVER

If A: Check power to Scotty, check fuse to breaker switch and check it is turned on.
If there is to power to Scotty and no light on > very unusual > RMA back to Safiery

If B: Turn Scotty Off at the breaker so there is no LED, then turn back on.
Log into App and then read the error code on the screen. This tells you what problem is.
Refer manual to log in if unsure. If still unsure send screenshots to our chatbot with your details.

If C: Turn Scotty Off at the breaker so there is no LED, then turn back on.
If still green, Scotty is running fine. Check other items for the problem.

Has main power fuse gone?
Are the batteries full?

Scotty AI will not charge under these conditions:

1. The batteries are nearly full and the Charge Current Limit is Zero or a very small number.
2. The battery temperature is around 5C or less.
3. *There is a fault with the batteries.*
4. The batteries have been fully charged and have reduced SOC to say 95% but Scotty is still not charge. This is perfectly normal for many battery systems which have to see a reasonable SOC% drop of more than 5% (sometimes 10%) before they will accept charge again.
5. The Batteries are extremely low at 5% SOC. The batteries may only accept a small charge when recovering from a low voltage. See comment below on recovering a flat battery.

Recovering Flat High Side Batteries with Scotty AI:

1. When the batteries are absolutely flat, use solar to recover. If you dont have solar or it is at night time: Scotty AI will try to pre-charge the high side to get the voltage up enough to operate. This may take some time and may appear as small pulses of power. Patiently wait if you see this. Progress means the High Sde voltage is slowly increasing.

2. If Scotty Ai has a CAN connection to the batteries, the CAN needs to be “reset” if it stopped running of very low voltage. Reset this and check Scotty is running. If it still doesnt run or if there is no CAN connection, go to next step.

3. SET THE ALTERNATOR CHARGE LIMIT VERY LOW TO SAY 5A ON THE HIGH SIDE.

4. Start the vehicle and watch the very slow charging. Once the battery SOC%> 5%, increase the Alternator charge Limit to 60A Max. Once the battery SOC%> 20%, increase the Alternator charge Limit to its maximum. Completely fully charge the batteries to 98-1005 SOC.

Trouble Shooting continues AFTER the Auto-tuning and Setup Section

Scotty AI 3.0 or Scotty GEN 3 can be identifed through its lable (SCOTTY AI 3.0) or its version number (V3.x.x.x).

Scotty AI 2.0 is labled as SCOTTY AI 2.0 and its version starts with V2.x.x.x. This guide can be used for tuning a SCOTTY AI 2.0. There are a few different you need to know:

- An interface may be slightly different
- Scotty AI 2.0 does not have a **Low Side Charging Algorithm**
- For Scotty 1500 (1.5kW) harness do not have **ALT TEMP** V- wire, you need to connect temprature sense negative cable direclty to Scotty negative terminal

I. Quick check:

I. GND Scotty terminal is connected to ground

II. + LS Scotty terminal is connected to alternator (+12V or +24V)

III. +HS Scotty terminal is connected to a battery bank (+24V or +36V or +48V)

IV. Enable is connected either to +LS or +HS
(Please note that only Scotty AI 3.0 Enable can be connected to +HS)

V. ALT SENSE 12V+ is connected to alternator (+12V or +24V)

VI. ALT TEMP V+ is connected to a temprature sense positive (red cable)

VII. ALT TEMP V- is connected to a temprature sense negative (black cable)

VIII. CAN communication is connected to a CAN system (optional)

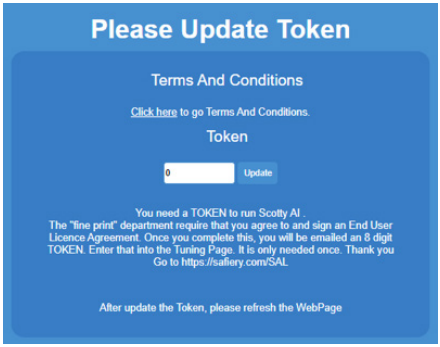
II. Scotty Wifi Access

We recommend to turn off auto connect function of a wifi network that your

Go to wifi, select a Scotty wifi

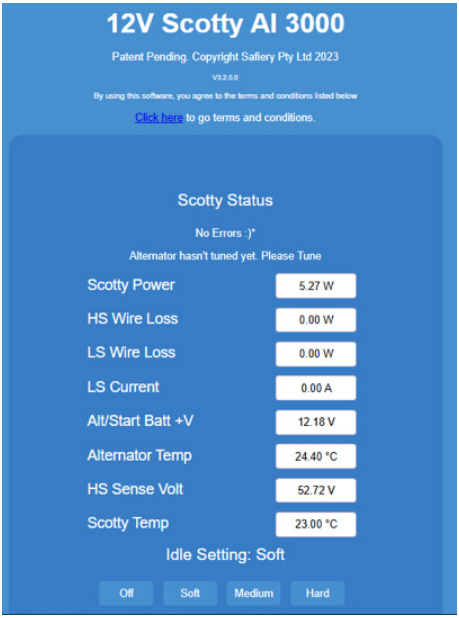
Enter a Scotty wifi password: Scottyai@0

Go to a web browser: http://172.24.24.1



A token for scotty is: 11337777 (if required), refresh a web page after you update a token.

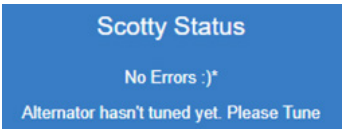
III. Scotty Main Page



In a Scotty main page, you can see information about **Scotty Status, Idle Setting, Parameters, CAN BATTERY, BATTERY WITHOUT CAN, and Diagnostic Info.**

a, Scotty Status

For a Scotty is ready to tune, you can look at the Scotty Status in a Scotty main page via the following indicators:



There is no error and Scotty is ready for tuning.

Indicate a Scotty power. Please note that a Scotty consumes a few W while it is at a Camping mode (ready to change a direction either charging or discharging).

A negative number means that Scotty charges from +LS to +HS.
A positive number means that a Scotty discharge from +HS to maintain +LS at Camping Set Point.

Indicate a voltage of alternator or LS battery bank (for instance, 12.18V).

If you do not see a LS voltage (around 12V, 24V for 12V, 24V respectively alternator), please check an ALT SENSE 12V+ wire to make sure it is connected to either alternator or LS battery bank and battery presents voltage. In some case, LS battery bank may go flat.

ALT SENSE 12V+ wire must be connected to +LS alternator or +LS battery bank for a Scotty to be fully function.

Indicate a alternator temprature.

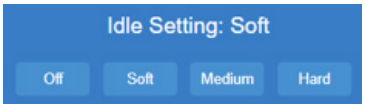
If you see a huge number, or any unreasonable number, you should check a temperature wiring, either it is not wired correctly or temperature sense may damage during an installation.

Indicate a +HS voltage, for instance 52.69V.

If you do not see any +HS voltage is presented, please check whether you +HS is connected to a +HS battery bank or a HS battery bank is turned on.

Indicate an Internal Scotty Temperature.

b, Idle Setting

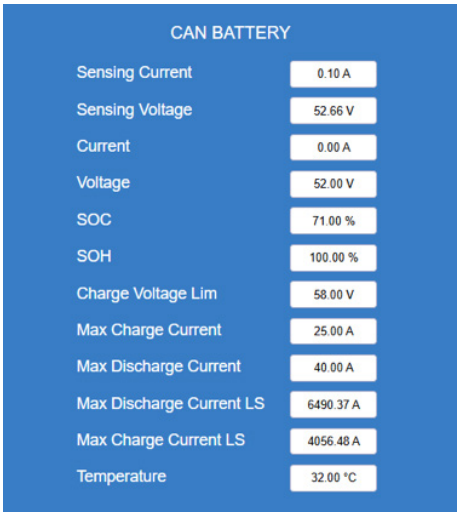


Indicate a charging mode of Scotty. You can either select a Soft, Medium, or Hard mode.

A Hard mode means a Scotty take as much as power available from alternator.
A Medium mode means a Scotty take a fair bit of power available from alternator.
A Soft mode means a Scotty take a little bit of power available from alternator.

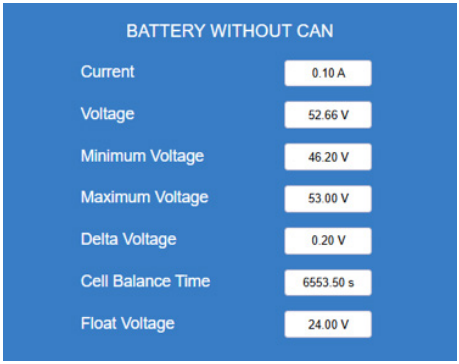
c, CAN BATTERY

All battery information can be seen though Scotty via Scotty main page, at CAN BATTERY section.
If you do not see battery information, please check your CAN communication network.



d, Battery without CAN

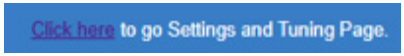
These information shows +HS voltage and some parameter that set up in a tunning page, like minimum discharge voltage, maximum charge voltage, floating voltage.



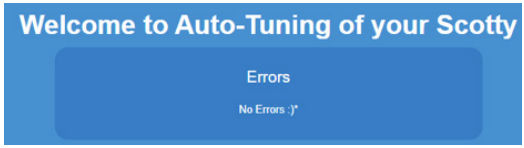
IV. Scotty Tuning Page

We recommend to turn off auto connect function of a wifi network that your device is connected to.

After cheking key parameters, Scotty is ready for tuning.
To access a tunning page, click a link at the end of Scotty Status section in the main page.



Or access: http://172.24.24.1/tune

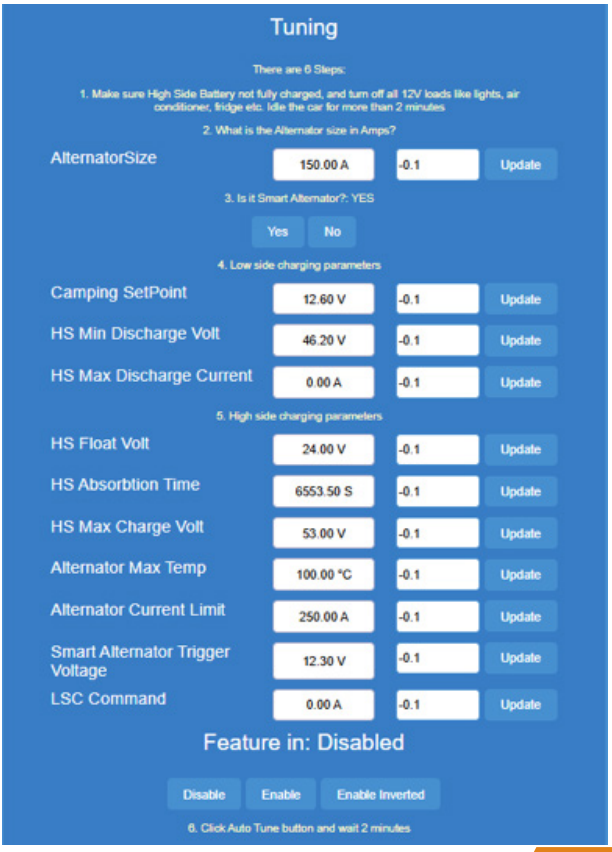


If Scotty is wired corrected, you should see a No Errors :)* message.

Parameter Setting:

To change a parameter,
click on a a right box,

delete it, type a new **number**,
and click **Update**.



a) Alternator Size

Put a LS alternator size, if you do not know exact number, enter 150 for Scotty 1.5kW and 250 for Scotty 3kW.

b) Camping set point

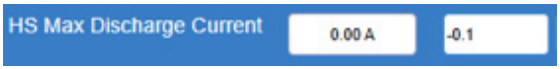
Camping set point is a voltage that Scotty will maintain for +LS battery when it discharge from +HS to +LS.

We recommend set it at 12.6V and 25.2V for 12V and 24V battery, respectively.
You may lift up a camping set point higher, however, do not make it higher than 13.0V and 26.0V with 12V and 24V battery, respectively. Only increase it when necessary (some devices need a certain voltage for normal operation).

c) High side minimum discharge voltage

High side minimum discharge voltage is voltage that Scotty will stop discharge from +HS to +LS if +HS voltage get lower to this point. Please check a battery parameter for this set up.
For lithium battery, we recommeded to put at a norminal volatge (24V, 36V, 48V).
For sodium battery, please check with battery provider or battery parameter.

d) High side maximum discharge current



It is a maximum discharge current from +HS to +LS.
You can turn off a discharge function from Scotty by put a zero (0) current.

Maximum set up for Scotty

Scotty Type	Maximum +HS current
1.5kW: 12V-24V	40A
1.5kW: 12-36V	40A
1.5kW: 12-48V	30A
3kW: 12V-24V	80A
3kW: 12V-36V	80A
3kW: 12V-48V	60A
3kW: 24V-48V	60A

e) High side floating voltage

It is a floating voltage while Scotty charge from +LS to +HS.

Please carefully check a set up parameter for your battery. Different batteries have different float voltage. You can not enter a **HS Float Volt** is higher than a **HS Max Charge Volt**

f) High side maximum charge voltage

It is a maximum charge (obsorbtion) voltage for your +HS battery.

Wrong set up can cause a damage to HS battery!

g) Alternator Maximum Temprature

If your alternator temprature is higher than a set up number, Scotty will stop taking power from +LS to +HS to prevent a heating up alternator. When temprature of alternator is lower, Scotty will operate as normal.

Recommend set up is 100C but can be set at 120C for those vehicles that run very hot in the engine bay. RAM 2500/3500 run at 105C so need a maximum set point of 120C

h) Alternator current limit

This set up allows to limit a maximum power that Scotty can charge from +LS to +HS.

Recommend maximum set up for alternator current limit:

Scotty Type	Maximum +HS current
1.5kW: 12V-24V	75A
1.5kW: 12-36V	120A
1.5kW: 12-48V	120A
3kW: 12V-24V	150A
3kW: 12V-36V	220A
3kW: 12V-48V	220A
3kW: 24V-48V	110A

Note there is a power limit of either 125A on 12V side OR 1500W which ever is the reat for Scotty 1500. Some larger alternators can produce 125A at 13.5V = 1,688W. This exceeds the power limit. In these cases reduce the max current to 110A.

Likewise the Scotty 3000 has a limit of 250A on the 12V side, 125A on the 24V Side when it is the low side and an overall power limit of 3000W. When the low side alternator power is big the charge voltage will increase and you will need to reduce the maximum current.

Please note a current limit set up can be varied depend on +LS voltage, however, do not set it up for Scotty work at higher than its rated power, 1.5kW for 1500 Scotty and 3kW for 3000 Scotty.

For charging from +LS to +HS, maximum current for Scotty +HS is 30A for Scotty 1500 and 60A for Scotty 3000.

For 12V-24V Scotty used, please bare in mind the maximum +HS current while calculating a alternator current limit (+LS).

For example:

Scotty 1.5kW: 12-24V
+HS voltage at 26V
+ LS voltage at 12.8V
+LS current limit can be calculated: 26(V)*40(A)/12.8(V) = 81.25(A)

Please note while Scotty is running, +LS and +HS are varied.

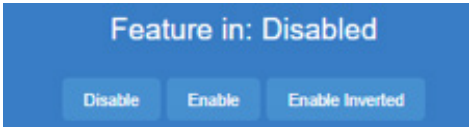
i) Smart Alternator Trigger Voltage

Recommend seting for this parameter is 12.3V and 24.9V for 12V and 24V +LS Scotty, respectively.

However, keep this set up **0.3V** lower than a **Camping SetPoint.**
So if a camping voltage os 12.6 is used, dont set the trigger voltage above 12.3V

j) Feature in

Keep feature in disable if you do not control a Scotty through a “Stop Charge” wire



If **Feature In** wire is connected to control Scotty working

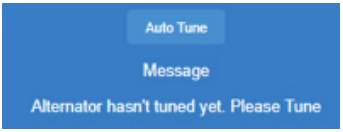
Enable need to be selected if you want Scotty to charge the high side battery by a positive control (+12V or +24V only) on the feature in wire;
Enable Inverted need to be selected if you want Scotty to charge the high side battery by a negative control (GND) signal.

g) Auto Tune

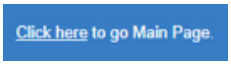
After all parameters have been set up. Turn on a engine.

And Click **Auto Tune**

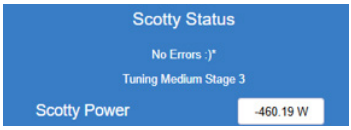
Tuning process goes through 04 steps: Initiating Tuning State, Tuning Soft Stage, Tuning Medium Stage, Tuning Hard Stage.



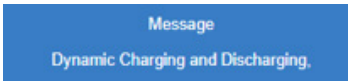
You may would like to come back a Scotty Main Page to keep an eye on how much power Scotty charge from +LS to +HS buy click a link at the bottom of the Tunning page.



Below is a screenshot of Scotty while it is tuning at Medium Stage.



When tuning is successfully, you will se a message **Dynamic Charging and Discharging**



V. Scotty Advanced Page

You only need to access a Scotty advance page for setting up a master and slave Scotty.
A master and slave set up is required when a system that have two Scotty working together with a single LS battery bank (two alternators is joined with a single battery bank). CAN connection between two Scotties is required for this set up.

Please contact us for IP address to access Scotty Advance Page.

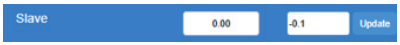
Do not change any other parameters than the following parameters: **Master**, and **Slave**.

Before seting a master and slave Scotty, you need to tune Scotty individualy as above procedure. After completing tune both Scotties individually, you need to access Scotty Advanced Page to set up a master and slave Scotty.

For master Scotty: Enter number **10** into a **Master** and click **Update**

Please note keep a **Slave** as default.

For slave Scotty: Enter number **10** into a **Slave** and click **Update**

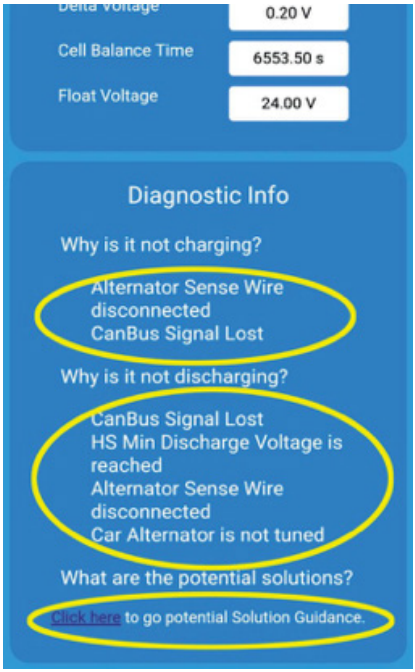


Please note keep a **Master** as default.

DIAGNOSIC PROCEDURE

RULE No. 1:
NEVER DISCONNECT THE NEGATIVE - NEVER

When Scotty AI is not charging or performing as expected, scroll to the bottom of the main page and read the reported fault.



The figure shows a list of failures on the main page.

- After reading, go to: Potential Solutions Guidance to understand what the fault means.
- The following text shows an Enumeration list of Fault Problems and possible Solutions.

‘Feature In’ Activated:

The designed feature allows the receipt of stop charge requests from the house battery when the CanBus connection from the battery management system (BMS) is not in use.

- It is recommended to verify the condition of the house battery;
- If this feature is not required, you can disable it from the system settings.

‘Inverted Feature In’ Activated:

This functionality is similar to the 'Feature In' feature but with an inverted operation.

- It activates when it detects a 0 V signal in the 'Feature In' wire.
- It is recommended to verify the condition of the house battery; if this feature is not required, you can disable it from the system settings.

If this is selected and nothing is connected to the feature-in, Scotty will naturally stop!

HS (High Side) battery preventing charge:

A high-side battery preventing charge means that the house battery BMS is not accepting a charge, which may suggest that the Battery is already fully charged.

- However, it is also possible that there may be underlying issues with the Battery's health.
- Therefore, we recommend thoroughly checking the house battery's condition to ensure optimal functionality.

Alternator current limit is configured to 0:

The alternator current limit pertains to the maximum current drawn from the alternator.

- The limit is currently set to zero, indicating that no charging is taking place.
- To modify this setting, please navigate to the 'Tuning page' where you can adjust the alternator current limit to the desired level.

Alternator temperature protection is active:

The current indication is that the alternator is overheated, so you cannot use it now.

- If the alternator's temperature is not high, there is a possibility that the temperature probe may have become disconnected. Therefore, we recommend checking the wiring to ensure it is properly connected.
- Most Engines run around 90ºC under the engine bay, but some vehicles go as high as 105ºC.
- We recommend increasing it to 120ºC in this case.

HS Charge Voltage is reached:

Based on current readings, the high-side battery voltage has reached the maximum allowable charge voltage.

- To modify this setting, please access the designated 'Tuning page.'
- However, we strongly advise referring to the battery manufac- turer's specifications before making any changes.

An Error Occurred:

We suggest checking for error messages, which may indicate that the HS or LS terminal is not adequately connected to the Battery.

- To begin troubleshooting, we recommend inspecting the fuses and isolators and ensuring they function correctly.

Voltage Sense Wire disconnected:

The current indication suggests that the sense wire is not detecting sufficient voltage.

- It may be due to a disconnected wire or a depleted starter battery.
- If the cause of insufficient voltage is a depleted starter battery, it may not be possible to charge it via the current system. In this case, we recommend connecting an external charger to increase the starter battery voltage to an acceptable level.

CAN Bus Signal Lost:

The current indication suggests that the system may have lost its connection, as it requires a functioning CanBus system to operate even when not connected to a CAN Bus battery.

- We recommend checking the CAN-H and CAN-L cables and performing a power cycle to resolve this issue.

HS Battery is in Float Mode:

- Based on current readings, it appears that the high-side battery float charge mode. To modify this setting, please access the designated 'setting page.'
- However, we strongly advise referring to the battery manufac- turer's specifications before making any changes.

Idle Setting Off:

The current configuration appears to be in the Prevent charging mode because Scotty AI is turned off.

- To modify this parameter, please access the main page and adjust the 'Idle' settings accordingly.

The Car Engine is Off:

The system thinks the car engine is off, so there is no charge.

- Please note that the system has a less-than-minute delay in changing states.

HS Battery Preventing Discharge:

High Battery-preventing discharge means that the house battery BMS is not accepting a discharge, which may suggest that the Battery is already fully discharged.

- However, it is also possible that there may be underlying issues with the Battery's health.
- Therefore, we recommend thoroughly checking the house battery's condition to ensure optimal functionality.

The Car Engine is On:

The system thinks the car engine is on, which means no discharge.

- Please note that the system has a less-than-minute delay in changing states.

HS Min Discharge Voltage is reached:

Based on current readings, the high-side battery voltage appears to have reached the minimum allowable discharge voltage.

- To modify this setting, please access the designated 'setting page.'
- However, we strongly advise referring to the battery manufac- turer's specifications before making any changes.

LS (Low Side) Load is Low:

Based on the current readings, there is an insufficient load connected.

- We recommend checking the camping voltage and LS voltage to ensure the system's proper functioning.

SCOTTY DIAGNOSTIC PROCEDURE IN CASE OF INSUFFICIENT POWER

At first do the Auto-Tune:

- Check the Tuning Page
  - Ensure that the Alternator Size is Correct?
  - Ensure that max Alternator Current is Correct?
- Check the Status Page.
- Ensure that Scotty AI is set to ’Hard’?

If all the above is correct, do the following:

- Run the engine at cruising speed.

- Watch the data on the Status Page.

- Note the LS alternator Voltage sense.
  If it is above 12.8 V, then the alternator is producing power to match the load.

  Take a screenshot of this status page to keep a record of the LS alternator Voltage sense.
- Go to the Starter battery.

- Measure the voltage on the starter battery accurately.

- Compare this to the Voltage on the screenshot.
  The voltage difference x the current in A is the cable loss.
  So 13.2 V at the battery, and 12.8 V on the Scotty AI Status Page, means 0.4 V at, so say 100 A = 40 W. It is far too high, and you check the Negative path at first for a good connection. A good loss is 10-15 W.

- Look at the Scotty Status page screenshot.
  If the number it shows is less than the above calculation, then the problem is the negative connection.

- The negative wire from the Starter battery to the chassis in the engine bay must be bolted to and paint-free and clean metal surface.

- The negative wire from the Target Auxiliary battery to the chassis must be bolted to an paint-free and clean metal surface on the chassis.

- We do not recommend laying a separate negative wire, unless there is no chassis for example on a boat. The negative wire is generally the problem in 95% of all circumstances.

If all the above is correct, do the following:

1. The starter battery MUST be AGM or Lead/Acid.

If it is Lithium, remove it and return it to the factory standard.

2. The alternator can not deliver enough power.

3. Engine or vehicle loads on a 12 V alternator are high. (Nissan Patrol has electric power steering and takes a lot of power, leaving little powerfor Scotty AI. Scotty AI takes power AFTER the vehicle loads, so they are not compromised.

4. Cable sizes are too small (both positive and or negative).

5. Target Battery(s) can not accept charging at a higher rate, either because they are high SOC or, the temperature has limited BMS, or the Lithium battery just has a lower charging rate (less expensive Lithium batteries.)

6. If charging a caravan from a vehicle with Scotty AI in it and a 7-10 m run at 48 V from Scotty AI to Lithium in the Van, then
especially when solar is running, the voltage differential will not be as high and an expected charge rate is 1000 W at caravan 49-50 V and 2000 W when the expected caravan charge rate is 47-48 V.

7. Note that Scotty AI does not use the State of Charge in any calculation.We only use voltage for control.

8. State of Charge is a ‘Calculated concept’ and does not exist in any measured form.
It is a calculation that may be reasonable after the batteries are 100% for 2 hours or so.
If batteries operate in the 20-85% band repeatedly over a 1-2 week period, they will likely be around 50% max of their capacity, because the cells have not balanced.
Safiery’s 48 V batteries actively balance between 90-95% SOC calc value.They are only fully charged when the calculation shows 100% SOC.

NEVER DISCONNECT THE NEGATIVE - NEVER

WARRANTY

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