



Battery to Battery Charger (Caravan Model) USERS MANUAL.

► The Wildside BBC

- Designed specifically for caravan operation.
- Fast charges your caravan battery and runs fridge while towing. 10-20 times charging improvement.
- At least 2 times more useful power available from you batteries due to correct 4 step battery charging
- Increases battery life again due to correct battery charging curves employed
- Combats the inherently high voltage drop across long and poor cable runs.
- Prevents current back feeding from caravan battery to the towing vehicle's starter battery when driving Euro 6.
- No need to upgrade your existing charging cables or plug and socket from your towing vehicle.
- Ideal use with the new Euro 6+ alternator's voltage characteristic, fixes all problems associated with Euro 6.
- Charges your caravan / mover battery when driving.
- BBC works down to 8V on the input and shall still maintain 14-15V output charging profile at your caravan batteries (dependent on battery type selected).

► Pre-installation checks

- What is the running current of your onboard fridge? Is the instantaneous current different from the hourly capacity average.
- typically - 2-4Ah for compressor fridge per hour.
- typically - 10-16Ah for absorption fridge per hour.

If you have a compressor fridge or an absorption fridge about 10-12A then the BBC1225 will be more than enough to supplement the fridge and provide a good charge to your caravan batteries.

The BBC1240 shall likely be better suited for those with absorption fridges over 12 - 18A as the demand is higher. What is the lowest voltage your fridge operates at?

Can the fridge operate down to 11V?

Does it work via a voltage sensitive relay (at 13.3V) and only when the caravan is being towed?

For off site camping you need to ensure your compressor fridge operates down to 11V - It needs to be able to operate from the caravan battery.

Do not use absorption fridges for off site camping (wildside) if you are running the fridge from the battery electrics.

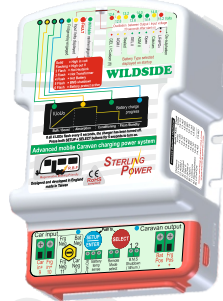
► Fridge determines model selection

BBC1225 model suitable for fridges up to about 12A

BBC1240 model suitable for fridges up to about 18A

The above recommendations are assuming you also want sufficient surplus power to charge the battery.

The higher the fridge consumption the less effective the battery charging will be.



battery temp sensor (optional)
Part No: TSAY



Euro 6+ compatible

Code:
BBC1225
BBC1240

► 2 operational modes

- **Battery bias mode** (default) - initially charges domestic battery only. then the fridge comes online whilst also charging domestic - it continues like this provided domestic battery keeps topped up.
- **Fridge bias mode** - allows fridge to come online immediately but reduces domestic battery charging. *(read manual for additional information)*

► Realistic BBC performance

Many variables affect the BBC's performance:

- Cable thickness, thicker the better.
- Quality of connectors across the entire length from tower's starter battery to the caravan battery (cleaner and newer the better).
- Alternator's voltage, highly variable with Euro 6.
- Standard caravan towing cables are 1.5 mm² for vehicle running lights and 2.5 mm² for caravan power cables.

BBC1225 performance table

Input Current	Alternator Voltage	BBC input Voltage	BBC total output voltage current
25A	12.4V *	10.7V	14.4V @15.5A
25A	14.0V	12.4V	14.4V @17.6A
25A	15.0V *	13.4V	14.4V @ 19.0A

* Voltages under regen. braking system

BBC1240 performance table

Input Current	Alternator Voltage	BBC input Voltage	BBC total output voltage current
40A	12.4V *	9.7V	14.4V @ 24.8A
40A	14.0V	11.3V	14.4V @ 28.2A
40A	15.0V *	12.5V	14.4V @ 30.4A

* 12.4V and 15V are typical Euro 6 (regen. braking) alternator voltage swings. The performance figures are worse at lower input voltage. This is only an immediate problem - the BBC charging shall apply an additional load on the alternator / starter and shall 'kick' the alternator's voltage up to 14-15V.

BBC's quiescent current is 1mA (unit on sleep mode)

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- Page 11 - Troubleshooting / warranty information

▶ Legal and Safety

Using the Instruction Manual

This manual must be read throughout before installing this electronic device. Do not lose these instructions - keep them safe. The most up to date instructions can be found on the Sterling Power website. Please refer to the latest instruction manual before contacting Sterling. At Sterling, we endeavour to include all of the product information that we can think of into the manual.

Installation of the electronic device must be carried out by a qualified and trained personnel only. The personnel must be familiar with the locally accepted guidelines and safety measures.

Sterling Power's warranty statement

A comprehensive warranty statement is provide at the back of the instruction manual. A comprehensive warranty statement can also be found on sterling-power.com.

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Liability

Sterling Power can not accept liability for:

- consequential damage due to use of this device
- possible errors in the manuals and the results thereof

Device modification

Please do not modify the device unless you have been instructed to do so by Sterling Power, directly. Product modification shall be done at Sterling, when needed. Warranty shall be voided if personal attempts are made to modify the device, without Sterling's approval.

Use the battery to battery charger only:

- For DC to DC conversion.
- For DC current limiting.
- With fuses protecting the DC cables.
- In a well ventilated, dry, dust-free and condensation free environment.
- When instruction manual has been read through.

Safety Symbols



CAUTION
WARNING



EXPLOSION

- **Example - WARNING.** Never use the device in situations where there is danger of gas / dust EXPLOSION or potentially flammable products.

General maintenance and repair

The device must be switched off during maintenance. It must also be protected against unexpected switching off. Remove battery connections and ensure unit is off. If repair is required, only use original parts.

General safety and installation precautions

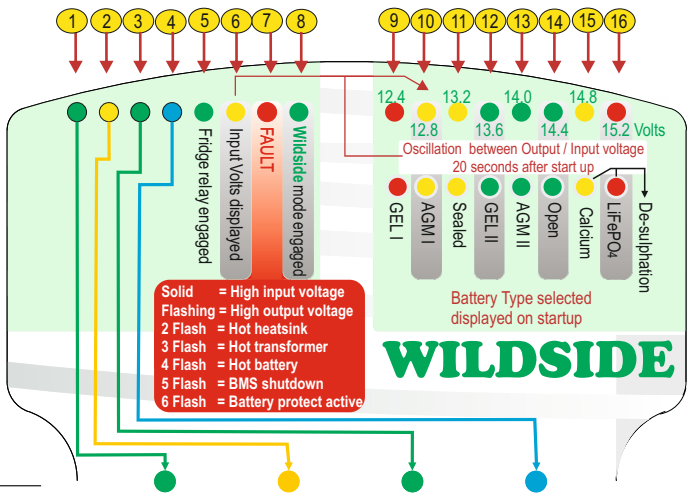
- Install device in well ventilated space. Do not expose device to: Rain, snow, spray, moisture, pollution, condensation. Do not cover or obstruct ventilation openings.
- Device connects to common negative. Common negative must be earthed.
- In case of fire use a fire extinguisher.
- Ensure reverse polarity and short circuiting is avoided - to prevent damage to battery.
- Protect DC wires with the appropriate sized fuse.
- Check cabling annually- fix where needed.
- Avoid contact with device with damp hands.
- Ensure the device is adequately and securely mounted to prevent the unit from displacement.
- Use a professional to install device.

Battery safety

Excessive charge or discharge and high voltages can cause serious damage to batteries. Never exceed the recommended limits. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters the eye(s), immediately flood the eye(s) with running cold water for 20 minutes and seek medical attention.

Give extra care to not drop metal tools or jewellery on to the battery terminals as short circuiting can take place. Refrain from charging battery up to 4 hours prior of installation to avoid the formation of explosive gases.

Never smoke / generate a spark around batteries.



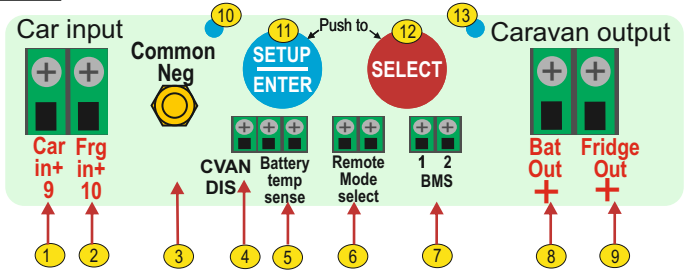
Front Panel

- 1) Bulk / boost LED - if on, charger is in first stage of charging cycle. Constant current - voltage not yet met.
- 2) Absorption LED - if on, charger is in the second stage of the charging cycle. Constant voltage - voltage met.
- 3) Conditioning LED - if on, charger is in the third stage of the charging cycle. Constant lower voltage.
- 4) Float LED - if on, charger is in the fourth stage of the charging cycle. Constant even lower voltage.
- 5) Fridge relay engaged. If LED on, fridge connector is on.
- 6) Input Volts displayed. If this yellow LED is on the voltmeter (9-16) displays input voltage. When this LED is off, the voltmeter is displaying output voltage.

- 7) **FAULT RED LED:** Unit Trips off,
 Solid = input voltage, too high (must be <19.5V)
 Flashing = high output voltage (must be <15.5V)
 2 flash = Hot heatsink (exceeded 90 Deg C)
 3 flash = Hot transformer (exceeded 90 Deg C)
 4 flash = Hot battery (exceeded 55 Deg C)
 5 flash = BMS shutdown (refer to page 9 for trip status)
 6 flash = Battery protect active (caravan battery's voltage has dropped below 10.5V, charge caravan battery to above 12.6V).

- 8) **WILDSIDE mode engaged LED.** If on, fridge shall be connected even when towing vehicle is off / disconnected. 9-16) Voltmeter - toggles between input and output voltmeter. On start up for first few seconds these LEDs double up as battery chemistry types, as depicted. They also have multiple functions during advanced forms of customisation.

Under the lid

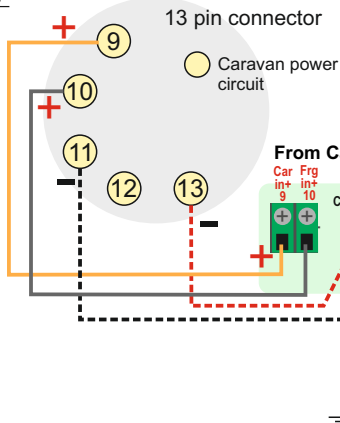


- 1) Car positive from car tow cable (port 9)
- 2) Fridge positive from car tow cable (port 10)
- 3) Common Negative: Connection for Fridge negative, Car negative connector, battery negative, chassis connection, caravan battery.
- 4) CVAN DIS: **Caravan power Disconnect**, this gives a 12V signal to the onboard caravan DC power relay - If the caravan's DC power requires to be disconnected when the towing when the vehicle engine is on.
- 5) Battery temperature sensor (optional extra - TSAY)

- 6) Remote option select mode (if required) see instructions, 99% installations not used.
- 7) BMS, lithium shut down connectors, if required. BMS 1 - if your BMS trips to ground (0V) use this. BMS 2 - if your BMS trips to +ve voltage (2-18V) use.
- 8) Caravan domestic battery output.
- 9) Fridge positive output
- 10) Blue LED denoting SETUP button activity.
- 11) SETUP button for adjusting functions.
- 12) SELECT button for adjusting functions.
- 13) Blue LED denoting SELECT button activity.

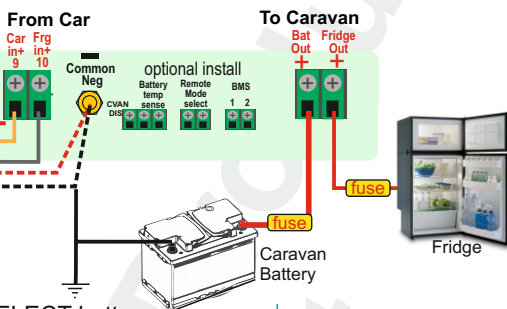
Quick installation guide

Basic wiring



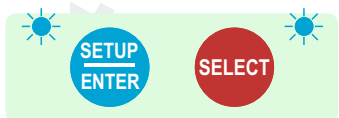
Fuses and Cables

Model	Bat Out + Fuse	Fridge Out + Fuse
BBC1225	5mm2 30A	2.5mm2 30A
BBC1240	5mm2 50A	2.5mm2 30A



Guide to features using SETUP and SELECT buttons

SETUP / ENTER + SELECT BUTTONS	
Press length (s)	Action
5+	Set battery chemistry type
10+	Switch to Fridge Bias Mode
30+	Reset to default - press both buttons again to confirm



Blinking blue LED denotes 1 second of button pressing time.

Apply a factory reset by holding down both buttons for over 30 seconds and then press both buttons again to confirm. The unit shall then restart with default features.

SETUP / ENTER	
Press length (s)	Action
5+	Force charging to float mode
30+	*OEM lock mode

SELECT	
Press length (s)	Action
5+	Display software version
15+	switch unit on / off

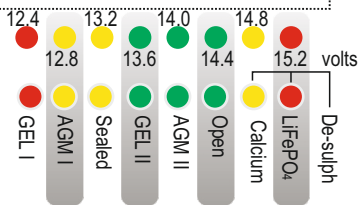
***OEM lock:** This features disables users from modifying / tampering with the BBC's features. The only features available are reset to default and display software version. 3 red LEDs flash to confirm lock is in place. To unlock, repeat procedure.

Battery Chemistry Setup (default sealed lead acid)

90% of applications require no setup, as the default is 14.4V.

In the event you want to adjust the battery chemistry type press and hold the SETUP + SELECT buttons together for 5+ seconds. This row (->) of LEDs shall flash and settle on the LED which denotes the existing charging profile. Using either SETUP or SELECT buttons toggle across the row of profiles, stop on the desired profile and press and hold both to confirm.

The battery chemistry can also be changed on initial startup. When the BBC starts, up the chemistry is displayed by the relevant LED, this can be adjusted using both buttons to toggle through the presets denoted by the LED. When content, press and hold both buttons.



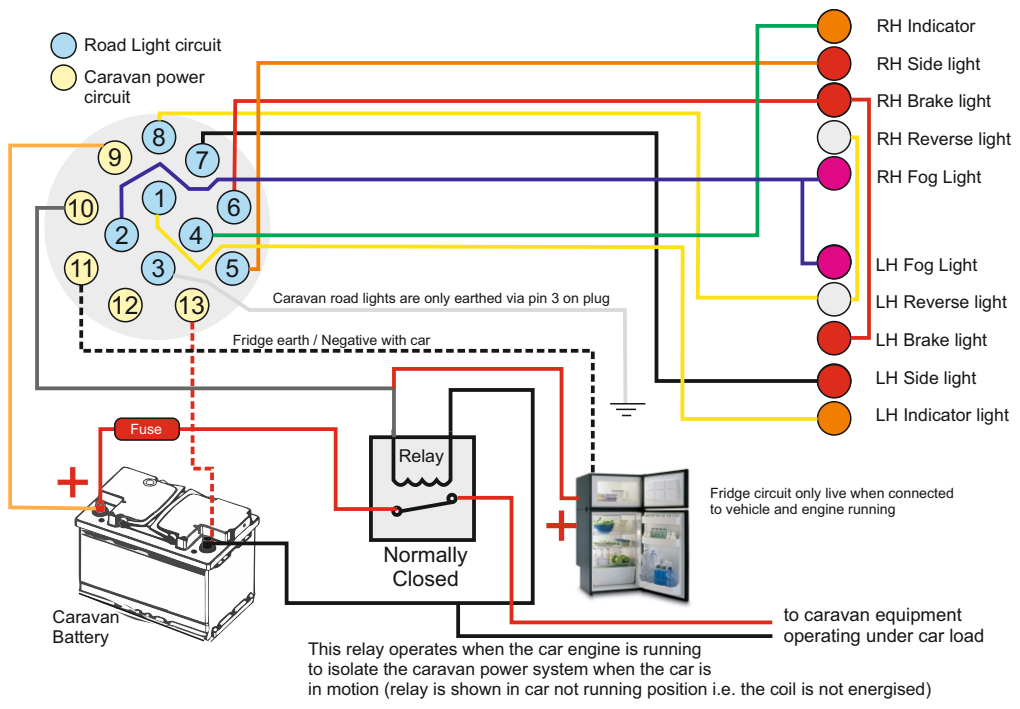
If battery temperature sensor is connected then all voltages are based on 20 Deg C. If sensor senses less than 20DegC = increased voltage. Higher than 20DegC = decrease voltage. The further from 20DegC in either direction leads to proportional variation in the voltage.

Options	Bulk / Abs. Volts	Cond. Volts	Float Volts	Min Mins	Abs. Mins	Max Mins
1) Gel I	14.00	13.85	13.70	60	600	600
2) AGM I	14.10	13.75	13.40	60	480	480
3) Sealed	14.40	14.15	13.60	120	480	480
4) Gel II	14.40	14.00	13.80	720	1440	1440
5) AGM II	14.60	14.10	13.70	60	480	480
6) Open	14.80	14.00	13.30	60	480	480
7) Calcium	15.10	14.30	13.60	60	360	360
8) De-sulphation	15.50	-----	-----	240	240	240
9) LiFePO4	14.40	13.80	13.80	30	30	30

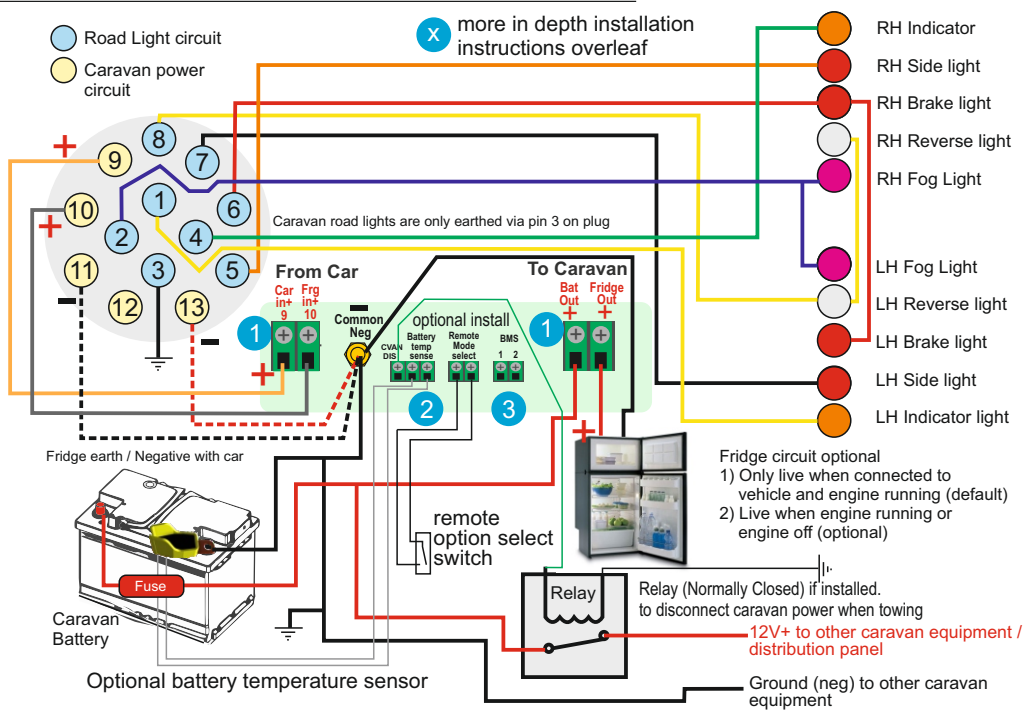
*Lithium profile has reverse polarity protection disabled. **All voltages shall be 0.1V higher for the first 3 minutes of the chargers operation.

Remember, it is the voltages which are more important than our battery types. After installation, test that the voltage from the unit is the desired voltage. Ensure you remove at least 1 wire from the battery temperature sensor as the product voltage may be higher (if in cold climate) or lower (if in warm climate) than the preconceived voltage. The voltage requirements of the battery company will override our recommendations as it is them who are supporting the battery warranty.

▶ Conventional caravan wiring (before BBC Wildside)



▶ **WILDSIDE** installation with 13 pin connector

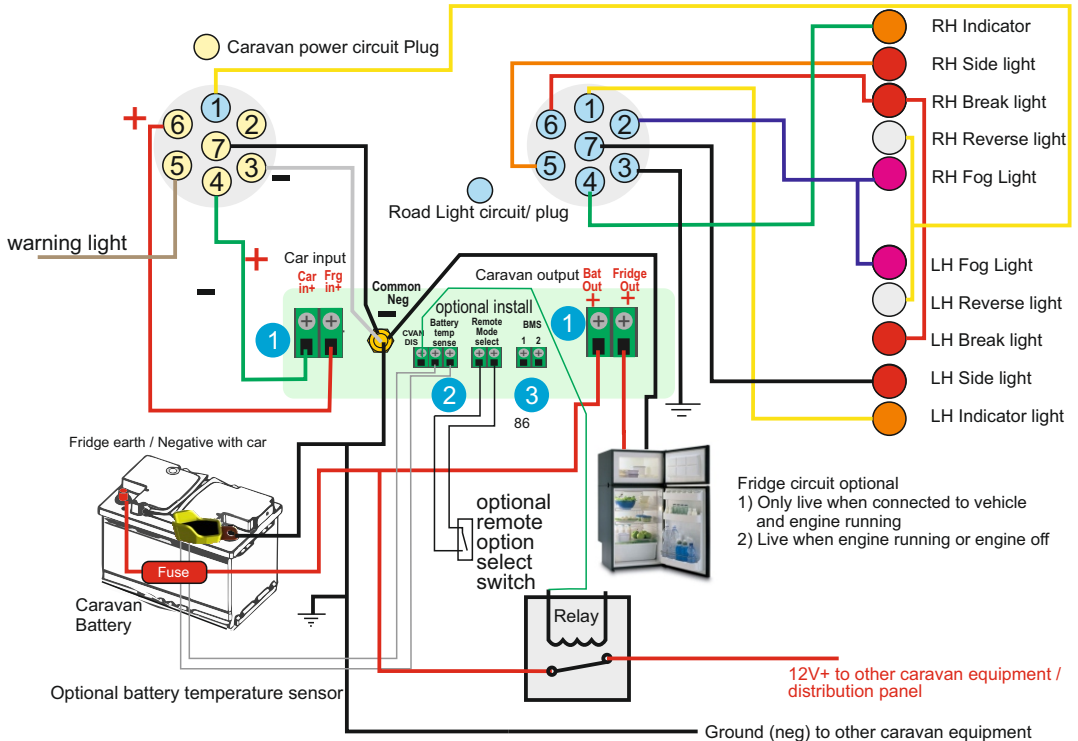


▶ The 13 pins and what they do.

Standard caravan tow cable, normally 12 core cable.
Pin 12 (white with blue stripes) not used in caravan connections
as such the cable is normally only 12 core.

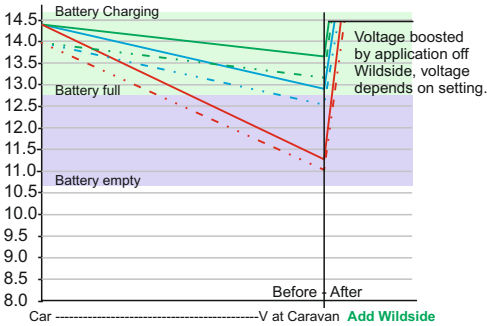
Pin.	Colour.	Function.	Cable size.	Max current
1	Yellow	Left hand Indicator	1.5 mm ²	15 A
2	Blue	Fog lights	1.5 mm ²	15 A
3	White	Negative Earth	2.5 mm ²	25 A
4	Green	Right hand side indicator	1.5 mm ²	15 A
5	Brown	Right hand side light	1.5 mm ²	15 A
6	Red	Brake Lights	1.5 mm ²	15 A
7	Black	Left hand side light	1.5 mm ²	15 A
8	Pink	Reversing Light	1.5 mm ²	15 A
9	Orange	Permanent	2.5 mm ²	25 A
10	Gray	Ignition Live	2.5 mm ²	25 A
11	Black/White	Negative/Earth	2.5 mm ²	25 A
12	Blue/White	Spare	1.5 mm ²	15 A
13	Red/White	Negative/Earth	2.5 mm ²	25 A

▶ WILDSIDE installation with Twin 7 pin plug

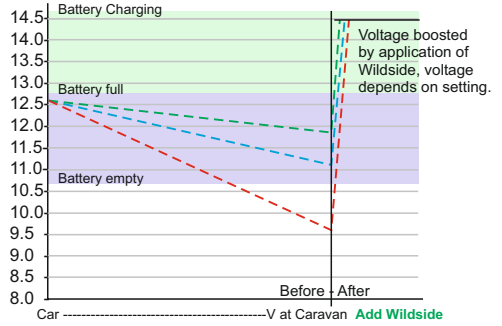


Voltage drop associated with caravan towing cable

2.5 mm² 8m Pos and 8m Neg copper cable.
Conventional vehicle at **14V or 14.4V** input.

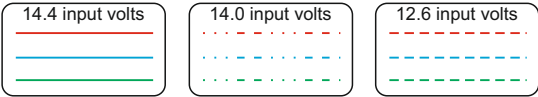


2.5 mm² 8m Pos and 8m Neg copper cable.
Input voltage **12.6V** (lower Euro 6+ alternator volts).



Volts required to charge the caravan battery Volts where you are discharging your battery

Red = 0.5 Ohm load approx 22A
Blue = 1.0 Ohm load approx 12A
Green = 2.0 Ohm load approx 6A

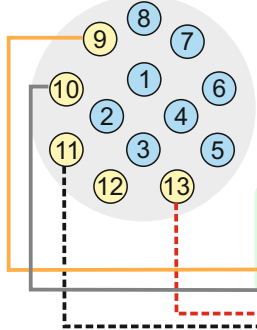


Installation Instructions

The BBC should be installed in the caravan in a convenient, cool, dry and well ventilated space. Position between the tow cable entry and the caravan's domestic battery. Orient the BBC in a way that the LEDs are legible as the LEDs are helpful in displaying functionality and faults.

If you are using twin 7 pin connectors please refer to the previous page.

13 pin connector from car

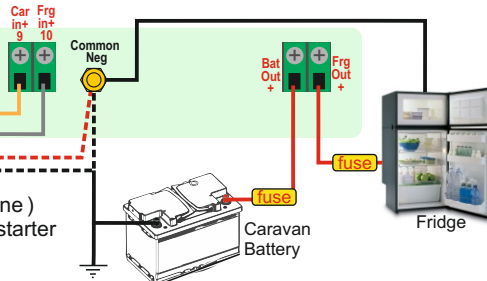


On the 13 pin tow cable connector, connect number 9 to the 'Car in+ 9' positive terminal and connect number 10 to the 'Frg in+ 10' positive terminal.

Connect number 13 and number 11 to the common negative terminal. Other negatives should be connected here, such as the caravan domestic battery's negative and other onboard DC appliance negatives.

Connector **9** (direct battery line) is a direct connection to the starter battery of the towing vehicle.

Connector **10** (fridge power line) is connected to the starter battery of the tow vehicle via an ignition fed relay. This relay is open when not towing, thus isolating the starter from connector 10. When the towing vehicle's ignition is on then the vehicle's relay engages providing a direct link to the starter battery.



Please continue overleaf...

› Installation Instructions (continued)

When **Frg in+ 10** receives a voltage signal, from pin connector 10, of 8V-19V the BBC shall start charging. When the signal goes below 8V the BBC stops charging.

Car in+9, is fed from connector 9 that is a straight connection to the towing vehicles starter battery.

› BBC operation - what does the BBC do?

If wired as above, under towing.

The unit activation signal comes from the car fridge power line (pin 10). **When there is 12V on the fridge power line the product activates.** Power is then drawn from pin 10 and pin 9. The BBC on startup does a brief fan and LED test and shall begin charging within 10 seconds. It shall start charging the caravan battery and an internal relay in the BBC closes circuit. This connects the power to run the fridge. At substantial current levels there will be large voltage drops down the long power cable runs. The BBC shall operate at voltages down to 8V on the input and up to 19V on the input.

If you switch off your engine and ignition.

By removing the power on the car fridge circuit (pin 10), the BBC shall turn off. Subsequently, the internal relay that provides power to the fridge will switch off the fridge and stop charging the caravan battery. This will also send a signal to the caravan power circuit to re-engage. If you wish to run your fridge from your caravan battery (after car engine is off) - you can apply **Wildside** mode. Please refer to the next page.

› Operational Modes

1 Battery bias mode (default).

As absorption fridges are very inefficient, they waste a lot of valuable power that could be used to charge your domestic battery / mover battery. Out of the 18A being supplied by the BBC, 13A may be being used for running the fridge, leaving only 5A for charging. Fridges really only needs to be powered 50% of the time to retain their chill. In battery bias mode, we initially focus all the BBC's power to charge the domestic battery, for 15 minutes (fridge line disengaged). If your domestic battery is nearly full (or full) this time shall be much less. After the 15 minutes (or less), the fridge will come online whilst charging your domestic battery (albeit at a lower rate). The fridge shall come on and remain on provided the domestic battery's charge level is kept high. If, when the fridge is online and/or the demand from the fridge or a domestic battery load exceeds what the BBC can supply (e.g. 20A+) then the BBC shall prematurely go back to solely charging the domestic battery, thus disconnecting the fridge line. This 15 minutes on and off cycling shall continue thereafter. The 'fridge relay engaged' LED shall light when the fridge is online, shall be off during sole domestic charge.

Summary - BBC initially charges solely the domestic battery for 15 minutes or until nearly full. The fridge line is then brought online, whilst maintaining charge to domestic. The fridge remains online indefinitely provided the domestic battery capacity is kept high (14V+). The proviso is that the fridge load does not exceed that of what the BBC can provide. If it does a 15 minute timer begins - then the domestic battery gets sole charge and so on and so forth. Therefore, provided the domestic battery is kept topped up the fridge shall remain online throughout the duration of the trip. If you find that your fridge comes online then trips immediately our algorithm has deemed that the domestic battery has not had sufficient charge, please wait up to another 15 minutes.

2 Fridge bias mode (press both **SETUP** and **SELECT** buttons together for 10 - 30 seconds to engage)

If you want your fridge operating constantly from the BBC supply, then put the BBC into fridge bias mode. The fridge line is constantly online, any surplus current shall be directed to charge up your domestic battery. The 'fridge relay engaged' LED shall be on solid as the fridge shall be online. To restore battery bias mode press and hold both buttons down for 10-30 seconds (i.e. repeat procedure).

› Optional fits

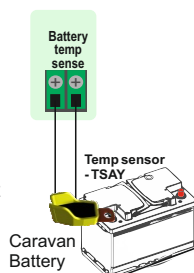
Temperature sensor (not required). Sterling part number: TSAY

If you wish to install, connect the temp sensor to the negative of the domestic battery.

When the temperature sensor senses the temperature lower than 20 Deg C (the unit default) the voltage algorithm shall reduce the charge voltage and when the temperature is higher than 20 Deg C the voltage shall reduce accordingly.

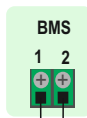
Voltage changes approximately 18mV (0.018V) per 1 deg C from 20 Deg C.

Sensor shall trip the charger if the temperature of battery >55DegC.



Battery Management System (BMS) -for lithium battery users only.

Only use one of these 2 ports, **do not use both.**



5 red LED Flashes
= BMS Shutdown

Use BMS 1 - if your BMS trips and provides a 0V (ground signal), then use BMS 1. This shall result in the BBC turning off. Once the BMS removes this trip status, i.e. the 0V signal goes back to a +ve signal, the BBC shall start charging again.

BMS 1 status:
operational: 2-17V
trip voltage: 0V

BMS 2 status:
operational: 0V
trip voltage: 2V-17V

Use BMS 2 - if your BMS trips to a +ve voltage (2V-17V), then use BMS 2. This shall result in the BBC turning off when this voltage is received. Once the BMS removes this trip status, i.e. the +ve signal goes back to 0V signal, the BBC shall start charging again.

Normal fridge operation mode (default).

Background: When the BBC charger is operational (under towing) the BBC's internal fridge relay is closed. This allows current to flow from the towing vehicle to the caravan battery and to operate the fridge. When the BBC charger is off (tow vehicle engine off) the BBC's internal relay open circuits. This isolates the power feed to the fridge.

Wildside fridge operation mode - (works when engine is off).

If you wish to run your fridge from your battery (when tow vehicle's engine is off) apply the circuit, as depicted - with a simple on/off switch. Turning the switch on engages the BBC's internal relay, connecting the **Bat Out +** and **Fridge Out+**. Therefore, you can essentially connect the fridge directly to caravan battery when you are not towing the vehicle. When the remote switch is on (closed) it may take up to 60 seconds for the BBC's internal relay to engage. The **Wildside** LED shall turn on to show the mode is active.

Turning the switch off open circuits the BBC's internal fridge relay, thus reverting to the default mode and isolating the fridge from the caravan battery.

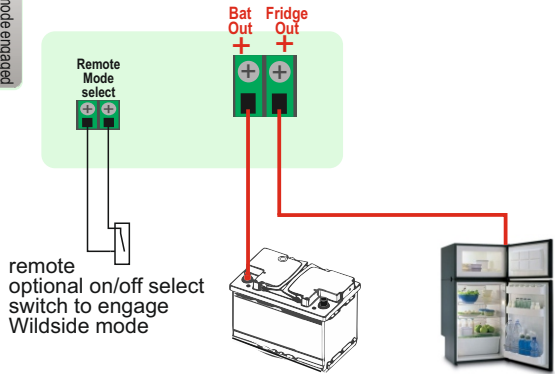
Under normal towing / charging operation the remote switch has no use, as the BBC's internal relay is closed anyway.



Both of these LEDs shall be active when in **Wildside** mode.



BBC's internal fridge relay activated via vehicle's fridge relay.



remote optional on/off select switch to engage Wildside mode

Wildside caravan battery protection (only relevant if you use the Wildside mode).

Due to the risk of draining the caravan battery, the BBC's internal fridge relay shall open circuit when the caravan battery goes below 10.5V. It shall only close circuit when the caravan battery's voltage elevates above 12.6V to prevent fridge totally draining the battery.



6 red LED Flashes
= Battery protect active
caravan battery must exceed 12.6V to remove FAULT.

Caravan Disconnect (CVAN DIS)

Currently, when towing, there should be an internal relay in you caravan that open circuits to isolate your DC appliances from your caravan battery when being towed. When the tow vehicle's engine is stopped and the fridge power line is disconnected then the relay closes circuit. This then re connects your DC appliances to the caravan battery.

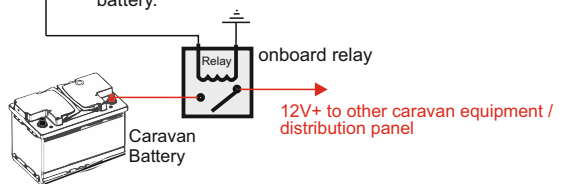
To preserve this operation, you must wire a cable from the CVAN DIS to the relay signal terminal, as depicted.

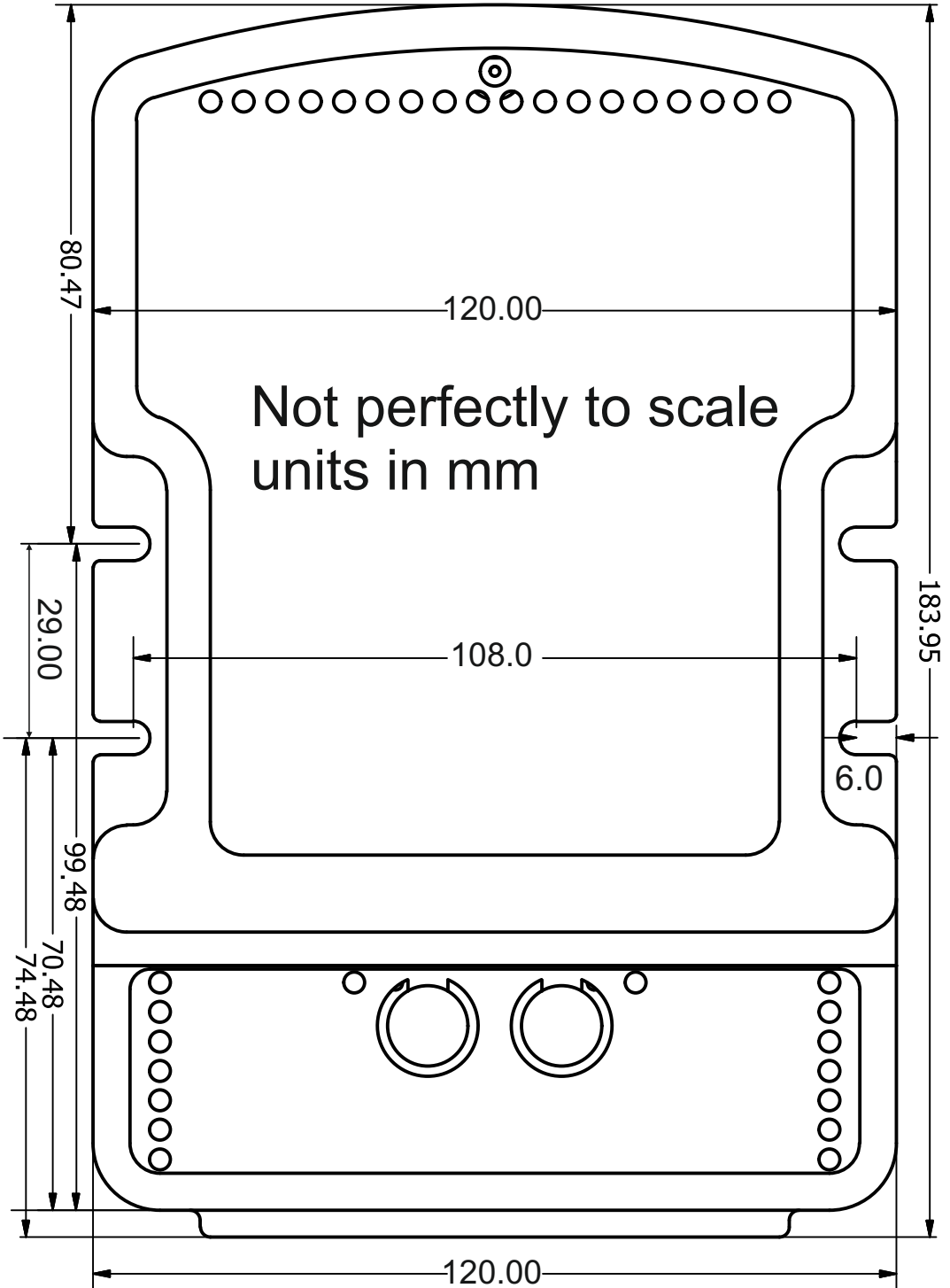
As the onboard relay is normally closed, no CVAN DIS -> Relay connection shall result in the relay staying permanently closed when towing.



When the BBC is operational a +ve voltage (the BBC's input voltage) is provided at the CVAN DIS connector, at about 2A. If this signal is fed to the caravans onboard power disconnect relay, as depicted, the relay shall open circuit. This isolates the DC equipment from the caravan battery. Therefore, when driving along, the caravan battery is isolated from the DC appliances.

Turning the BBC off by stopping the engine, the relay closes, reconnecting the DC appliances to the caravan battery.





► Fault Finding | Troubleshooting

Firstly, ensure the Wildside BBC is wired up as per page 5/6. Ensure negatives are common and the BB charger's negative is connected to the starter battery's negative - avoid connecting to chassis negative. Voltages between common negatives should be ~0V.

Secondly, to test the BBC, remove (or turn off) any secondary charging source like AC to DC battery chargers or solar chargers going to the battery banks. Leave the primary charger connected (alternator) - ensure alternator is working. We also recommend turning off any loads (inverters etc.).

How to test if the BBC is charging:

With vehicle engine running (alternator charging), what is the voltage on the input terminals of the BBC? What is the voltage on the output terminals of the BBC? Measure these voltages at the BBC's terminals, not at the battery's terminals.

Note there must be a voltage on pin 10 (the fridge power circuit) from the car, this is the voltage which activates the unit.

Even though, by default, the BBC can work down at 8.0V on the input; it still requires 8.0V+ to turn on and get going (on fridge input connector). If you are getting alternator voltage at the input terminal (10-14V) and 14V+ on the output terminal the chances are your BBC is working fine. If little to no current is passing through the charger at these voltages then the batteries are either full or they are deceased. If the output voltage is between 13V-14V (but rising) then you could have a situation where the output batteries were very low in charge (or large in capacity) and the charger shall be charging at maximum current. Or you could be applying a load on the battery. Provided the voltage continues rising the BBC is charging.

If your output voltage is less than 13V and your input voltage is healthy, it could be three things:

- 1) You have a large load on your output bank - turn load off.
- 2) Very empty battery or large battery that needs heavy charging.
- 3) The BBC has been turned off - hold SELECT button for 15 seconds and let go, to turn on again.
- 4) The BBC is not working.

If your input voltage is less than 8V, it could be several things:

Caravan: Your alternator's voltage is at less than 13V (the alt. is regenerative braking mode - sometimes expected on modern Euro 5/6+ engines) - take vehicle for drive and measure alternator's voltage and set up the BB to suit these needs. All vehicle manufactures have their own software /

characteristics for regen. braking.

Automotive or Marine: If your alternator's voltage is ~14V then check continuity between the alternator's B+ terminal and the starter battery. If you are getting ~14V on starter battery then check continuity between starter battery and BBC input terminal.

Check if you have the temperature sensor connected. If so, no problems leaving it there, it is simply voltage compensating for when the temperature at the sensor is lower or higher than the benchmark 20DegC (69F). If lower, then the voltage shall rise and vice versa. The further from 20DegC in either direction leads to proportional increase or decrease in the voltage.

Possible, voltage drop across long cabling / fuse holder / diode. Use our remote sense connection on the unit.

LED 7 solid red - over voltage on input. This LED comes on if there is over 19V for more than 3 seconds on the input terminal. Check the voltage at the input. Possible regulator fault, or alternatively, charger's voltage is too high.

LED 7 single flash red - Over voltage output. There is 16V+ for more than 3 seconds on output terminal. Check the voltage at the output. Turn charger off, if voltage drops when off and rises again when turned on the possible charger fault. If 16V+ irrespective of charger being on then check alternative charging source.

LED 7, 2 flash red - over temperature. Heat sink over temp (90C+). Unit has become too hot and switches off. Possible defective fan. Or, high ambient temperature, ensure good ventilation or the charger's vents may be blocked.

LED 7, 3 flash red - over temperature. Transformer over temp (90C+). Unit has become too hot and switches off. Possible defective fan. Or, high ambient temperature, ensure good ventilation or the charger's vents may be blocked.

LED 7, 4 flash red - battery over temperature. If temperature sensor is installed on negative terminal of battery. Sensor has picked up 55DegC+ on the battery terminal. BBC shall trip. Possibly over charging battery. More like, loose connection / poor connections on battery terminal, thus, over heats. Check connections.

LED 7, 5 flash red - BMS shutdown. Your BMS has sent a signal to turn off the charger. If you are not using a BMS, the BMS connectors on the BBC's circuit board may be accidentally connected to a voltage signal.

LED 7, 6 flash red - caravan battery protect. When in **Wildside** mode and the caravan's battery drops below 10.5V the red LED shall flash 6 times. This then disables **Wildside** mode until your caravan's battery exceeds 12.6V.

► Customer Service & Warranty

Your 100 % satisfaction is our goal. We realise that every customer and circumstance is unique. If you have a problem, question, or comment please do not hesitate to contact us. We welcome you to contact us even after the warranty and return time has passed.

Product Warranty:

Each product manufactured by Sterling Power comes with at least a 2 year limited factory warranty. Certain Products have a warranty period of time greater than 2 years. Each product is guaranteed against defects in material or workmanship from the date of purchase. At our discretion, we will repair or replace free of charge any defects in material or workmanship that fall within the warranty period of the Sterling Power product. The following conditions do apply:

- The original receipt or proof of purchase must be submitted to claim warranty. If proof cannot be located a warranty is calculated from the date of manufacture.
- Our warranty covers manufacture and material defects. Damages caused by abuse, neglect, accident, alterations and improper use are not covered under our warranty.
- Warranty is null and void if damage occurs due to negligent repairs.
- Customer is responsible for inbound shipping costs of the product to Sterling Power either in the USA or England.
- Sterling Power will ship the repaired or warranty replacement product back to the purchaser at their cost.

If your order was damaged in transit or arrives with an error, please contact us ASAP so we may take care of the matter promptly and at no expense to you. This only applies for shipping which was undertaken by our company and

does not apply for shipping organised by yourself. Please do not throw out any shipping or packaging materials.

All returns for any reason will require a proof of purchase with the purchase date. The proof of purchase must be sent with the returned shipment. If you have no proof of purchase call the vendor who supplied you and acquire the appropriate documentation.

To make a claim under warranty, call our customer care line at (USA 1-(207)-226-3500, England 01905 771771). We will make the best effort to repair or replace the product, if found to be defective within the terms of the warranty. Sterling Power will ship the repaired or warranty replacement product back to the purchaser, if purchased from us.

Please review the documentation included with your purchase. Our warranty only covers orders purchased from Sterling Power. We cannot accept warranty claims from any other Sterling Power distributor. Purchase or other acceptance of the product shall be on the condition and agreement that Sterling Power USA LLC and Sterling Power LTD shall not be liable for incidental or consequential damages of any kind. Some states may not allow the exclusion or limitation of consequential damages, so, the above limitations may not apply to you. Additionally, Sterling Power USA and Sterling Power LTD neither assumes nor authorizes any person for any obligation or liability in connection with the sale of this product. This warranty is made in lieu of all other obligations or liabilities. This warranty provides you specific legal rights and you may also have other rights, which vary from state to state. This warranty is in lieu of all other, expressed or implied.

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