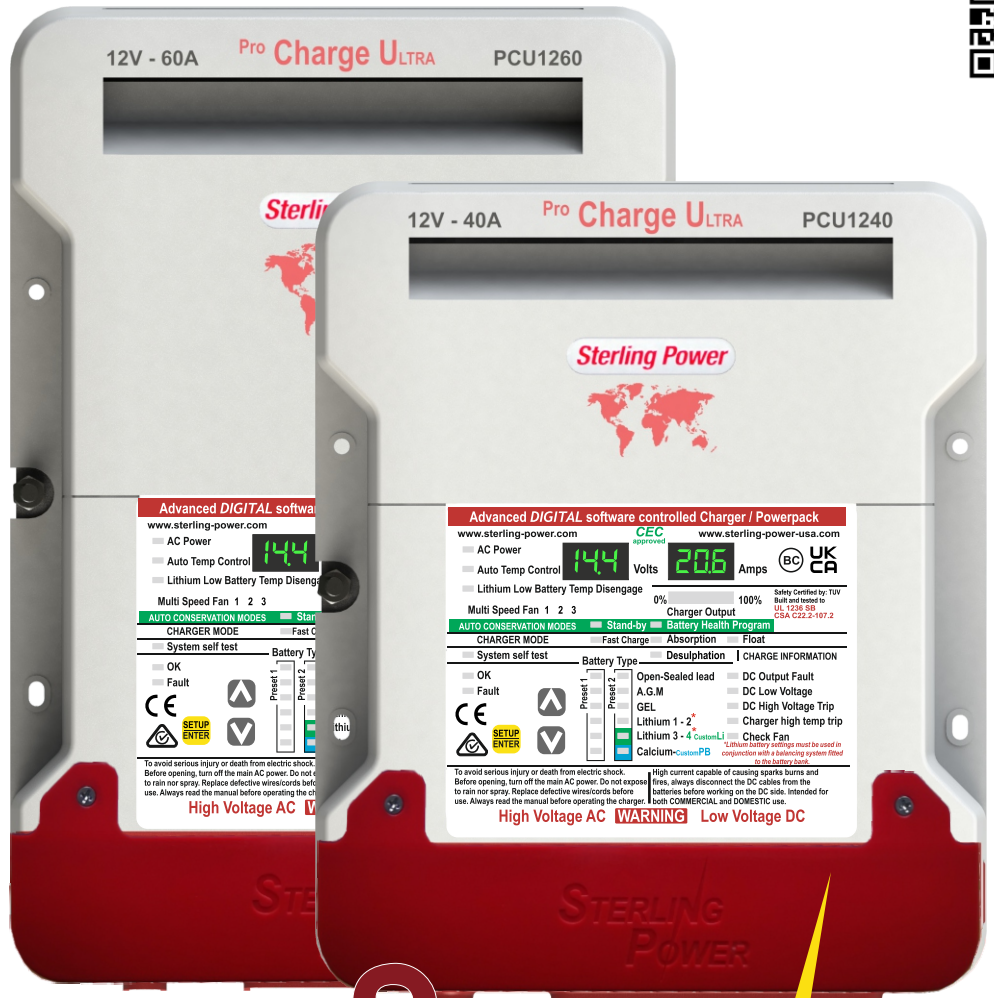




Part No:
 PCU1210
 PCU1220
 PCU1230
 PCU1240
 PCU1250
 PCU1260
 PCU2420
 PCU2430
 PCU3220
 PCU3620
 PCU4815

Optional
 Remote control
 with 10m cable
 (Part No **PCUR**)



STERLING POWER



To Standards:
 UL 1236 SB
 CSA C22.2-107.2

Tested to CE standards
 EN 55014-1:2017
 EN 55014-2:2015
 EN 61000-3-2:2014
 EN61000-3-3:2013
 EN 60335-1:2019
 EN 60335-2-29:2018
 EN 62233:2008
 EN ISO 13297
 Small Craft Directive

Sterling Power Products Pro Charge Ultra PCU Series Handbook

Global input AC/DC battery charger
 Marine grade



www.sterling-power.com
 www.sterling-power-usa.com
Warranty (5 years return to factory)
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INTRODUCTION WELCOME

Welcome Welcome to the Sterling Power Products Owners Handbook for the product series 'PCU', shorthand for 'Pro Charge Ultra'. This is our flagship global input AC/DC battery charger, with many variants available.

Please take your time to read and fully understand the contents of this Handbook. These guidelines are developed with your safety and the products performance in mind and failure to follow or understand these guidelines may lead to voiding the product warranty or even leading to damage or injury for you or your setup.

If you are unsure of any step or guideline then please consider reaching out to Sterling via our web contact form or our phone service and we shall offer our support.

Thank you for joining the Sterling family and we hope to serve your travels well.

12V, 24V, 36V, 48V Throughout this manual we will make reference to this PCU as a 12V unit. We have a variety of PCU voltage variants in the 24V, 32V, 36V, and 48V regions. Please ensure your charger is correct for your battery voltage, and please adjust our readings accordingly. For example, if we talk about 14.4V on our 12V unit, the equivalent at 24V will be 28.8V. The equivalent at 36V will be 43.2V. The equivalent at 48V will be 57.6V.

Using this Handbook 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 qualified and trained personnel only. The personnel must be familiar with the locally accepted guidelines and safety measures.

Safety Your safety is Sterling's top priority. Please follow all precautions to keep yourself safe. If you believe your unit requires repair then please contact Sterling or your distributor. Do not attempt to service the unit yourself.

Specifications Using a PCU1260 as flagship reference, all other variants pro-rata:

12V / 60A model, all other units pro rata.

Input voltage range	90-270V 45-65 Hz
AC Low Voltage Protection	<85V +/-5V
Power Factor at 230V	0.976
Efficiency	90.4%
Full load current (110/230V)	9.8/4.6A
Total Harmonic Distortion	2.4% voltage
Total Harmonic Distortion	2.4% current
Load Regulation (10%-100%)	3%
Ripple noise (R.M.S.)	50mV
Ground leakage	0.5 mA
Current Drain	5 mA
High DC Voltage Protection	16.2-17V

Generator/ mains power (watts), Continuous

12V 20A	approx 350W
12V 30A	approx 500W
12V 40A	approx 600W
12V 50A	approx 750W
12V 60A	approx 900W
24V 20A	approx 600W
24V 30A	approx 900W
32V 20A	approx 900W
36V 20A	approx 900W
48V 15A	approx 900W

Requested power may be up to double for startup.

Voltmeter accuracy	+/- 1%
Ammeter accuracy	+/- 1%



SAFETY AND LEGAL LEGAL GUIDELINES

Warranty and Terms

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.

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 check telephone numbers on www.sterling-power.com or www.sterling-power-usa.com. 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.

Copyright and Plagiarism

Copyright © 2021 Sterling Power. All rights reserved. Reproduction, transfer, distribution or storage of part or all of the contents of this document is strictly prohibited. If you wish to use all of this document, or excerpts from it, Sterling Power must be contacted.

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.



STERLING
POWER

SAFETY AND LEGAL SAFETY GUIDELINES

Product Guidelines Your Sterling Power product should only be utilised for its designated purpose. Use the Sterling Power Pro Charge Ultra ONLY :

- For AC to DC power conversion
- With fuses protecting both the AC/DC cables
- In a well ventilated, dry, dust-free and condensation free environment
- When the Owners Handbook has been read and wholly understood

Transport and Storage Ensure that the mains supply and battery leads are disconnected before transporting or moving the unit. No liability can be accepted for damage in transit once equipment has been unpackaged. Store the product in a dry environment, between -20°C to 60°C .

Refer to the battery manufacturer's manual for information on transportation, stowage, charge rates, recharging and battery disposal for your battery care.

General Maintenance The device must be switched off during maintenance and all cables removed from the direct feed to or from the unit. 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. Unauthorised attempts to repair Sterling units will lead to the warranty being voided. Only someone with adequate understanding of electronics and the unit itself should attempt a repair.

Ensure your connections are good and clean and aim to protect your unit from humidity and water ingress.

Safety Precautions Electrical appliances can be heavy. Please do not lift heavy units unassisted. Ensure that your product is correct for your intent. 110V/240V, 12V/24V/48V. Incorrect use can lead to damage. Orientation is not critical to unit function, however may affect water ingress rating. Isolate AC wires during install. Connect AC to a Residual Circuit Breaker (RCD) and current overload trips. Sterling recommend Multi Core Tri Rated AC cable. Install device in a well ventilated space for cooling purposes. Do not expose the unit to snow, rain, water, spray, condensation, pollution etc, unless it is a waterproof unit. If it is a waterproof unit, only expose it to situations it is correctly rated for. Do not cover or obstruct the ventilation. Device connects to common negative. Common negatives must be earthed. In case of fire, use fire extinguisher equipment suitable for electrical fires. Avoid all possibilities of reverse polarity or short circuiting. Check cabling and connections frequently and ensure the connections are sufficient. Always protect DC and AC cabling with the appropriate fusing. Ensure the unit is adequately and safely mounted to prevent displacement and damage. Always use a professional to install electrical products. Ensure the product is correctly set up for your battery. Keep out of reach of children

WARNING : All electrical appliances carry the risk of electrical shock. This equipment is designed to be used in combination with a permanent energy source (the battery). Always turn the AC power off and disconnect the battery before performing any maintenance or inspection.

Do NOT remove the panelling to inspect the internals unless expressly told to by Sterling. This is not a product designed to be user-serviced.

Do NOT use the device in situations where there is danger of gas / dust / vapour explosions, or around potentially flammable produce.



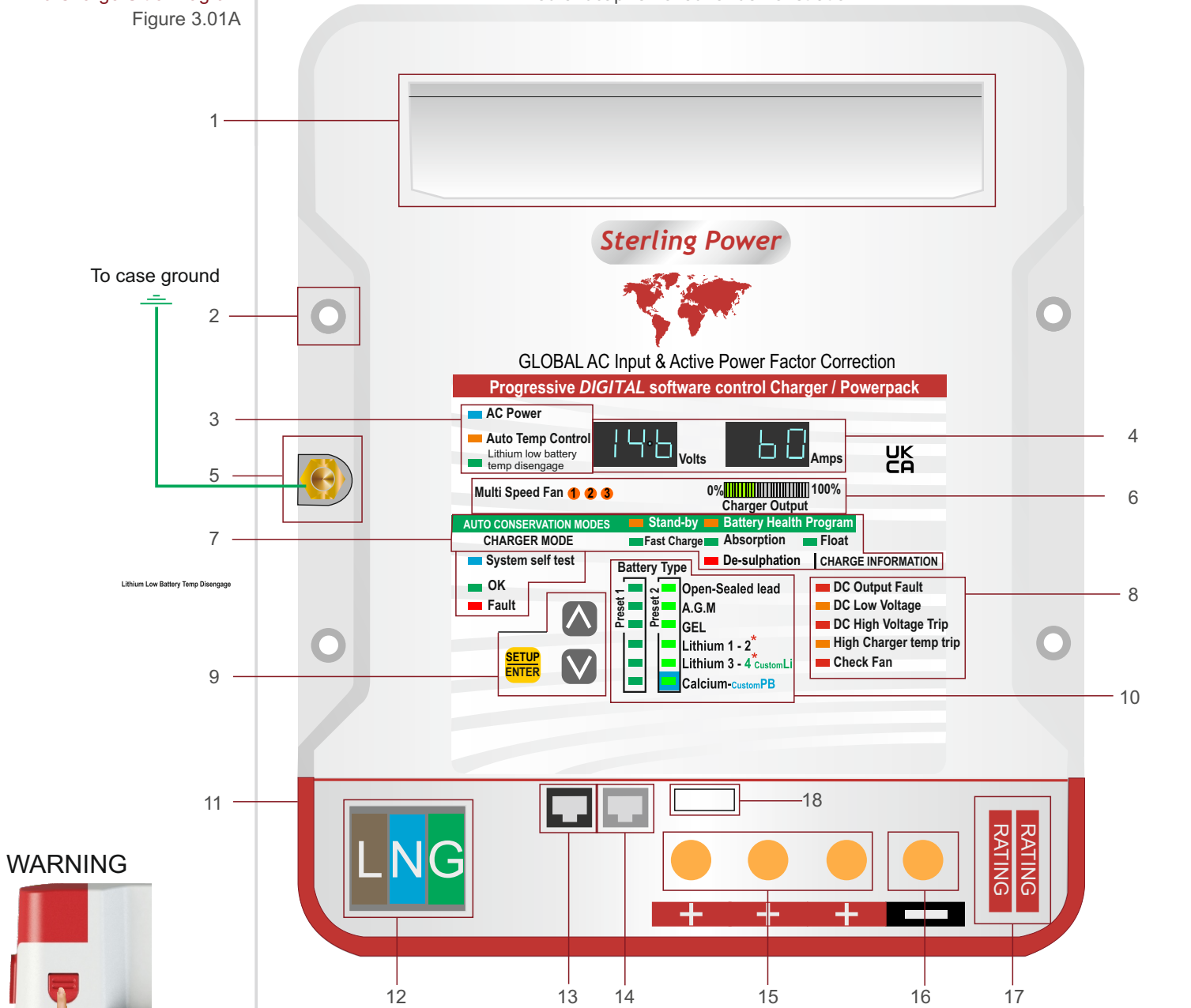
WARNING

when pressing in the tabs on either side, press gently and only by 2mm or so. Do not depress too far as you may damage the plastic. Once depressed, slide the lid upwards.

FRONT PANEL UNDERSTANDING YOUR PCU, PT.1

Pro Charge Ultra Diagram
Figure 3.01A

**Label simplified for clarity,
**Red endcap removed for demonstration.



WARNING



when pressing in the tabs on either side, press gently and only by 2mm or so. Do not depress too far as you may damage the plastic. Once depressed, slide the lid upwards.

1. The top vent on the PCU is the hot air exhaust. The PCU is a self-cooling product with a powerful fan that keeps the internal electronics cool and safe. The flow of air enters through by the red end-cap and is exhausted out of the top vent.
2. The PCU has four screw mount positions. Use these to mount your unit securely to a stable support.
3. Section three has three LEDs. AC Power, Auto Temp Control and Active PFC.
 - The AC power LED shows when AC power is connected. The LED will be illuminated solidly when AC is live and the unit is ONLINE. The LED will flash intermittently (One second ON, one second OFF) if AC is live but the unit is OFF. Push SETUP + Enter to turn the unit ONLINE again
 - The Auto Temp Control LED will be illuminated if the battery temperature sensor is installed and correctly fitted to the PCU. If this is not illuminated, either your battery temperature sensor is not fitted or it is not fitted correctly. If no sensor is detected the unit will default to a 20 deg.C charge curve.
 - Lithium low battery temperature disengage. If the PCU is in a lithium charge profile and has tripped because the temperature at the temperature sensor is 0DegC or lower. This LED shall come on.

FRONT PANEL UNDERSTANDING YOUR PCU, PT.2

4. Section 4 is comprised of two screens. The 'Volts' screen will display the average voltage being produced by the charger, as felt on the output terminals. The 'Amps' screen will display the total current being produced by the charger.
5. This is the grounding terminal and connects to the rear grounding panel of the PCU. This should be connected to your vehicles chassis to maximise safety.
6. Section 6 covers the 'Multi Speed Fan' and the 'Charger Output' LEDs.
 - Multi Speed Fan LEDs will display to communicate the fan speed control. This will vary depending on temperature and has three speeds.
 - Charger Output LEDs will display the percentage power output of the PCU. If it is displaying at 50%, the unit is only outputting 50% of its rating. At 100% it is outputting 100% of its rating.
7. Section 7 covers the Auto Conservation Modes and Charge Modes.
 - The Stand-By LED will be illuminated when the unit has AC power input, but is not needed to charge any batteries. This may happen due to no batteries being connected for a long period of time or all of the batteries attached are sufficiently full and have been on float for long periods of time.
 - The Battery Health Program LED will illuminate if the charger is in Open Lead Acid maintenance, and will cause it to run a desulphation cycle once every 21 days.
 - The Fast Charge, Absorption, Float and De-sulphation LEDs will illuminate to display which stage of the charging cycle the PCU is presently in. These tell you what your charger is presently attempting to do.
8. Section 8 covers the Fault LED section. These LEDs will illuminate to display when a fault is ongoing with your unit, and what the likely culprit will be. Please consult the troubleshooting section of this handbook, or consider contacting Sterling support.
9. Section 9 covers the Setup/Enter, Up arrow and Down arrow buttons. This is the main user interface and these buttons are how you will control and customise your PCU.
10. Section 10 highlights the available battery types, and the battery type presently selected. This is useful for choosing battery types and to know what charge profile you are presently using. The battery types translate to the following voltages.

Battery Types	Preset-1		Preset-2		
	Charging DC Voltage	Float DC Voltage	Charging DC Voltage	Float DC Voltage	
Open Sealed lead	14.8 VDC	13.6 VDC	14.4 VDC	13.6 VDC	
AGM	14.3 VDC	13.3 VDC	14.6 VDC	13.6 VDC	
GEL	14.0 VDC	13.7 VDC	14.4 VDC	13.8 VDC	
Lithium 0 deg C **	14.25VDC	13.5 VDC	14.6 VDC	14.0 VDC	x2 for 24V
Lithium 0 deg C **	14.4 VDC	13.8 VDC	CUSTOM - Li		x2.67 for 32V
Calcium / Custom	15.1 VDC	13.6 VDC	CUSTOM - Pb		x3 for 36V
Desulphation	15.5 VDC	15.5 VDC	15.5 VDC	15.5 VDC	x4 for 48V

11. Section 11 indicates the PCU endcap, typically red in colour, or grey for older units. It has been 'removed' in this demonstration to help with clarity and to show you what is underneath.
12. This area is for the 3 core AC connection. Left to right is for Live, Neutral and Ground/Earth. Accessible by removing the white cover. Only connect AC wires when the AC connection is isolated. When cables are connected, replace the white cover.
13. The black port is for the Pro Charge Ultra Remote, product code : PCUR.
14. The grey port is for the TEMP1 temperature sensor. This allows the PCU to give you your battery temperature readings. It also causes the PCU output voltage to vary by 0.018V per degree Celsius either side of 20C. If your batteries are warmer, we decrease the charge voltage. If they are colder, we increase the voltage. This connects to the negative battery stud. This will also cause the PCU to trip to OFF if the battery terminal reaches 50degC.
15. This area is for the positive line DC connections.
16. This is the negative line DC connection.
17. These fuses are for the negative line of the PCU. Inspect these if the PCU is unresponsive.
18. Auxiliary control cable connector - connect the cable bundle here - optional fit.

PRODUCT INFORMATION INSTALLATION

Installation Preface

All electrical installations should be carried out by a professional electrician. Electricity does have the potential to kill you. Ensure your input and output voltage needs are correct for the model you have before continuing.

Sterling do not provide, by default, the cable necessary for your installation. We are of the belief that every install is unique to the client and as such we cannot presume. Ensure that your cable thickness is sufficient and safe for the current expected to move through it and ensure that you fuse your cable, to the rating of the cable when connecting to a battery.

This product has a high heat tolerance and can be installed in an engine room. The PCU should be installed vertically for efficient convection air-flow and also to ensure that it keeps its drip-proof rating. The PCU can work from any position or angle, however the main benefits arise from vertical installs.

This product is ignition protected and can be installed near the batteries, however, always ensure general safety when in a work or power environment.

Mounting

Ensure, when wall mounting, that the screws are correctly sized and sufficiently strong to support the unit. Ensure the unit is firmly mounted and ensure the structure the unit is mounted to is strong enough to support the unit for extended periods of time.

Ensure that, when mounted, you do not obstruct the cooling vents.

Installation Instructions

Ensure your AC input is isolated/disconnected until the installation is complete.

AC Install

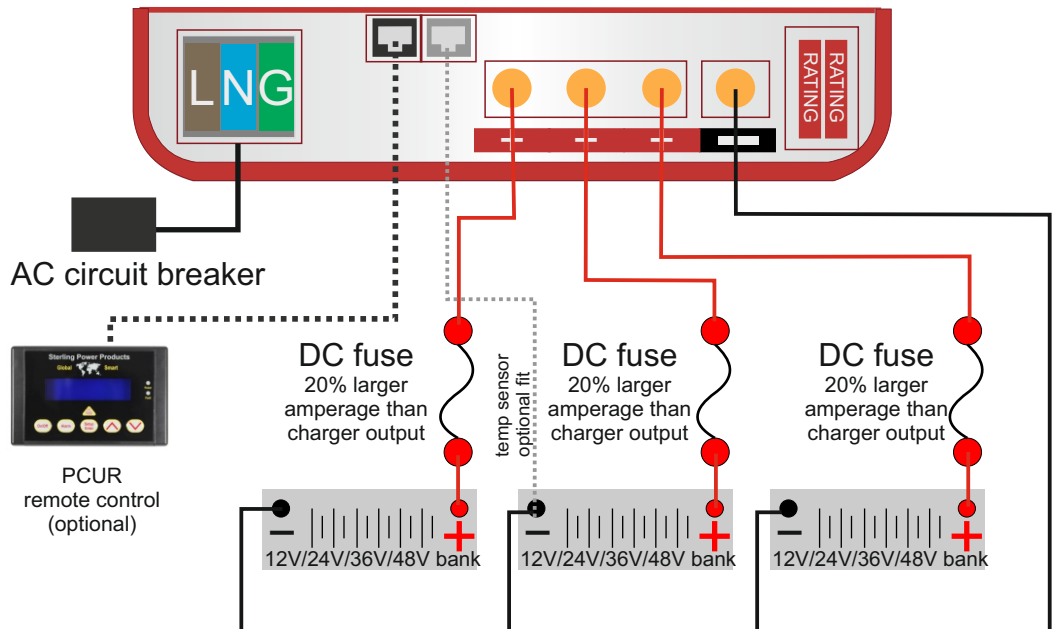
- 1) Unscrew the PCU endcap to get access to the cable connections and place aside.
- 2) Unscrew and remove the left hand side AC protection cover.
- 3) Using either ring or spade connections connect your AC cable. The live (Brown/Black) wire connects into the left hand connection point, the neutral (Blue/White) connects to the middle connection point, the ground (Green) connects to the right hand connection point.
- 4) Return the AC protection cover and screw it securely in to protect the connections and any future users from accidental AC shock.

DC Install

Red cable refers to positive (+) cable, black cable refers to negative (-) cable. Utilise 6mm ring terminals for these connections on the bolt terminal PCUs, ferrules or neat copper for the screw terminals on the 10A variant.

- 1) Ensure the AC input to the PCU is OFF.
- 2) Connect the positive terminals from your batteries to their chosen positive output from the PCU using correctly sized red cable.
- 3) Connect the common negative cable to the negative terminal of the PCU
- 4) Ensure all connections are firm, tight and secure. Loose connections can lead to a gradual build-up of heat and cause damage to cables or the PCU itself. A buildup of heat at a connection point is indicative of a bad connection or termination.

Figure 3.03A



Removing Red end cap on 2022+ model.

Unscrew the 2x screws apply minimal pressure on the tabs either side of the cap. Ensure you do not exceed 2-3mm when pressing tabs in.





STERLING
POWER

PRODUCT INFORMATION FIRST START-UP, BATTERY TYPE SELECT

First Start-Up

Upon powering up the Pro Charge Ultra (PCU) for the first time the default settings to take note of are:
1) The PCU will be in the Californian Energy Commission compliant 'bc' mode and
2) The PCU battery type will be set to 'Sealed Lead Acid'.

Charge Modes

bc Mode

By default the PCU will be in 'bc' mode, battery charger mode. This mode is standard as it complies with the CEC regulations on battery chargers and makes the PCU legal to be sold in California and other territories with similar rulings. The 'bc' charge mode will only output a charge voltage when a 11V DC signal is detected at the terminals.

The bc charge mode also ensures that the unit goes to sleep if the batteries it is charging are full (float stage of charging with very low, under 5A, current draws from the battery) for 72 hours, to preserve power. This should lower electricity costs and ensure healthy long term care for your batteries.

PS Mode

The alternative is PS mode, power supply mode. Power supply mode has the output terminals consistently 'live', turning the PCU into a power pack, even without having a battery bank connected. The charger will still maintain its multi stage charge performance, even in PS mode (IE, Fast charge, absorption, float, etc).

To put the PCU into PS mode, turn the PCU on and, after displaying 888 on the displays to show that it has completed its startup sequence correctly, the screens will display 'bc'. Simply press the up or down arrow while 'bc' is shown and the screen should then show 'PS'. Press setup/enter to confirm.

Battery Types

If the Sealed Lead Acid default charge profile is unsuitable for your batteries please consider changing the charge profile to the closest recommended charge profile, or setting up your own custom charge profile.

Our charge profiles are solely averages based on research done at the time. Not all sealed lead acid batteries will want our 'Sealed' profile. Not all AGM batteries will want our AGM profiles. Cross reference our available profiles with your battery specification sheet and choose the most suitable.

Charging a battery at an incorrect voltage could cause damage or degradation to your system. If you are unsure, please consult your battery manufacturer. If you are charging multiple battery banks that all have different chemistries and recommended charge voltages, please charge all banks at the lowest common charge voltages.

This is a lithium safe charger, HOWEVER, ensure that your lithium cells are protected by a battery management system (BMS) either internally or externally.

Auxiliary control cable

The Auxiliary control cable bundle comes with each PCU to enhance functionality and flexibility. The connector plugs into the complementary socket on the PCU under the red end cap - marked 18 on page 6. This is an optional fit. If not required, leave in the PCU box.

What does each cable do?

Red cable - off control. This cable, when brought to ground (0V) shall turn the PCU off. The screen shall turn off and charge current shall go to 0A. This could be used with a BMS trip circuit, for example. Once released from ground the PCU shall resume charging and the screen shall turn on.

Black cable is negative of red cable. If this is shorted to the red cable, PCU shall turn off.

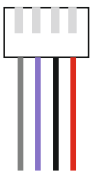
Purple cable - is a 0.25A maximum positive output cable. Can be used as a signal feed to engage a relay or function (example). Very small load / small charge. Mimics PCU's voltage.

White cable is negative of purple cable.

Temperature sensor - TEMP1

The temperature sensor comes with the PCU. The sensors plugs into the complementary socket on the PCU under the red end cap - marked 14 on page 6. This is an optional fit. If not required, leave in the PCU box.

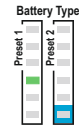
Connect the ring terminal to the negative terminal of the battery - typically the leisure / service battery.
- High battery temperature protection. Helps to diagnose damaged battery and/or poor contacts at terminals.
- 18mV voltage compensation per DegC from 20DegC. Lower than 20DegC = high voltage and vice versa.
- 0DegC cutoff when charging lithium batteries.



BATTERY PROFILE BATTERY TYPE SELECT



Press and hold SETUP button for 7 seconds and let go



use the cursor keys to move the green LED up and down the Preset columns. Cross reference table with the preset columns. Press SETUP to confirm.

Battery Type Select

To change the existing charge profile;

- 1) Press and hold the Setup/Enter button for 7 seconds before releasing the button.
- 2) The current battery type and the Voltage and Amperage displays will all flash. The Voltage screen is now displaying the High Voltage (absorption voltage) for the chosen profile, the Amperage screen is showing the Low Voltage (float voltage) for the chosen profile.
- 3) Using the up and down arrows, cycle through the available charge profiles until your target profile is selected.
- 4) To confirm this profile either press the Setup/Enter button or leave the device for 30 seconds.

Battery Type Profiles

**Lithium battery charging must be used in conjunction with a battery balancer

Battery Types	Preset-1		Preset-2		
	Charging DC Voltage	Float DC Voltage	Charging DC Voltage	Float DC Voltage	
Open Sealed lead	14.8 VDC	13.6 VDC	14.4 VDC	13.6 VDC	
AGM	14.3 VDC	13.3 VDC	14.6 VDC	13.6 VDC	
GEL	14.0 VDC	13.7 VDC	14.4 VDC	13.8 VDC	
Lithium 0 deg C **	14.25VDC	13.5 VDC	14.6 VDC	14.0 VDC	x2 for 24V
Lithium 0 deg C **	14.4 VDC	13.8 VDC	CUSTOM - Li		x2.67 for 32V
Calcium / Custom	15.1 VDC	13.6 VDC	CUSTOM - Pb		x3 for 36V
Desulphation	15.5 VDC	15.5 VDC	15.5 VDC	15.5 VDC	x4 for 48V

Custom Battery Type Select

In the instance that an existing battery type profile is unsuitable;

- 1) Follow the instructions above to choose a battery type and select the CustomPB (for lead acid) or CustomLi (for lithium) options as your battery type.
- 2) The fast charge and absorption LEDs will flash to indicate the unit is in custom / adjustment mode.
- 3) The left display will flash, and the right hand display will go blank. Press the up and down arrows to adjust the displayed voltage on the left screen from 12.6V to 15.1V to choose your target high voltage/absorption voltage. Press Setup/Enter to confirm.
- 4) The left display will then go blank and the right display will begin flashing. Press the up and down arrows to adjust the displayed voltage on the right screen from 12.6V to 15.1V to choose your target low voltage/float voltage. Press Setup/Enter to confirm.
- 5) More information below.



Custom Battery Profile - Lead Acid



The left LCD screen allows you to set the absorption voltage. You can go as low as 13.1V and as high as 15.1V (prorate for 24, 36, 48V) at 0.1V increments. Use the cursor keys to go up and down the values. When you are happy with the selected voltage press ENTER to move to the right screen to set float.



The right screen allows you to set the float voltage. You can go as low as 13.1V and as high as 15.1V (prorate for 24, 36, 48V). Use the cursor keys to go up and down the values. When you are happy with the selected voltage press ENTER.

BATTERY PROFILE BATTERY TYPE SELECT -Lithium Custom



This section is about customising the charge profile for lithium batteries.

Scroll down the column during battery type select and choose Custom Li. Press enter.

Then follow the flow diagram. The flow in order is from left to right and top to bottom.

To jump between sections press the SETUP / ENTER button

If you have made the wrong choice, simply let go and wait 30 seconds and the PCU shall go back to normal operation. Or, turn the power off / on.

absorption



The left LCD screen allows you to set the absorption voltage. You can go as low as 13.1V and as high as 15.1V (prorate for 24, 36, 48V) at 0.1V increments. Use the cursor keys to go up and down the values. When you are happy with the selected voltage press ENTER to move to the right screen to set float.

float



The right screen allows you to set the float voltage. You can go as low as 13.1V and as high as 15.1V (prorate for 24, 36, 48V). Use the cursor keys to go up and down the values. When you are happy with the selected voltage press ENTER.

If you do not require float but wish for the PCU to maintain power supply status, set the float voltage to below the surface voltage of your full battery.



Absorption Time Length

After the absorption voltage has been reached by the charger, how many minutes thereafter do you wish the charger to maintain that absorption voltage for - until going into float? The number displayed is in minutes, the default is 60 minutes. Press up and down arrows to change it by 20 minute increments. Set to 0 minutes, if you wish for the charger to go immediately to float, after the absorption voltage has been met.

This feature is important as lithium chemistries are multitudinous and forever changing. This feature allows the PCU to be flexible. 0-600 mins.



Low temperature protection LtP. 0DegC trip.

This mode is only relevant if you have the temperature sensor connected. Connect the temperature sensor to the negative terminal of your lithium battery bank. If no temperature sensor is connected, this mode has no effect.

It is imperative to not charge lithium batteries at 0DegC or lower. A good lithium BMS should disable the charge circuit at 0DegC or lower, anyway. However, there are some that do not trip below 0DegC.

There are multiple ways to interpret the LtP on/off mode. If you are in doubt, we recommend turning LtP on.

When to turn LtP on?

If your lithium battery's BMS does not trip the charging circuit at 0DegC or lower. Or, if you do not know - to be on the safe side. Some BMSs may not be setup up correctly and require a 0DegC trip from their chargers.

When to turn LtP off?

If your lithium battery's BMS does trip the charging circuit at 0DegC or lower. The BMS's temperature shall be more accurate than that of the PCU's external temperature sensor. Also, turning LtP off allows the PCU to operate at sub zero temperatures so you still have a DC power supply to run DC equipment.

If you have a thermal lithium battery that has heating elements inside to warm the battery up, you must have LtP off. This is because the heating elements require power from the PCU to warm the battery up.

PRODUCT INFORMATION COMMANDS, REMOTE PT.1

Desulphation / Equalisation

WARNING, HIGH VOLTAGE

Desulphation/Equalisation can only be activated from the open lead acid battery type. Only use this mode if your batteries are safe to be desulphated. Running this cycle on most battery types will cause serious damage.

- 1) While in the open lead acid battery type, hold Setup/Enter for five seconds and push the up/down arrows until the 'De-sulphation' LED is flashing
- 2) Once the 'De-sulphation' LED is flashing, hold the up and down arrows together for 3 seconds.
- 3) The desulphation phase will begin and will last for 240 minutes. During this phase the batteries will be charged at 15.5V. When the phase is complete it will return to the open lead acid battery type.

Power Level Adjustment

To adjust the output power of the PCU in increments of 25%;

- 1) Hold down the up and down arrow for >20 seconds,
 - 2) The left hand display will show 'PL' for Power Level, and the right hand display will show 100, for 100%.
 - 3) Press the up or down arrows to adjust this power level to your target, then press enter to confirm.
- If no selection is made within 15 seconds, the PCU will default to 100% power.

Self-Test Sequence

To run the PCU through an auto-diagnosis;

- 1) Press and hold all face buttons simultaneously for ten seconds and then release (Setup/Enter, Up, Down)
- 2) The 'System self test' LED will flash intermittently until the test is complete.
- 3) 'OK' or fault LEDs will display. Cross reference with troubleshooting section if unit displays fault.

Factory Reset

To return your PCU to factory default settings;

- 1) Enter the battery type select setting by holding down Setup/Enter for >6S
- 2) Press the down arrow all the way to the custom setting, and then press down once more. 'FAC DEF' will display on the two screens for Factory Default.
- 3) Press Setup/Enter to confirm. The charger will then restart.

PCU Remote, PCUR



Pro Charge Ultra Remote : PCUR

PCUR

The PCUR is the PCU remote control, allowing greater access to information and superior control over the PCU and its functions.

It is made up of four individual loose parts. 1x housing plate, 2x wing plates and 1x main remote.

It connects to the PCU via the 'Remote' port, utilising an Rj12 connector. Standard remote length of cable is 10M and can be adjusted at the users discretion.

Commands for the PCUR follow on the next page.

PRODUCT INFORMATION REMOTE PT.2

PCU Remote Commands	The following commands are exclusively for the PCU remote (PCUR);
First Start-up	If the PCU has valid AC input and is online, the PCUR should turn on as soon as it is connected to the PCU via the remote lead. It will then display the Sterling Power website and the PCU product code it is connected to. It will then display the Charger Status screen until changed further.
Backlight On/Off	To toggle the back-light on and off, press the On/Off button for about one second.
PCU Output On/Off	To toggle the power of the PCU on and off, hold the On/Off button for >4 seconds. While 'off', the PCU will display 0.0 and 0.0, and the PCUR will display 'Standby'.
Alarm On/Off	To toggle the audible alarm on and off, press the 'Alarm' button for one second.
Screen Options	By pressing the Setup/Enter button you will enter 'Screen Select', which begins with the 'Scrolling' option. Pressing the up or down arrows will allow you to cycle through these following screens. Press enter to confirm.
Scrolling	Automatically scrolls through all of the below screens, showing each screen for four seconds at a time.
Charger Name	Displays the charger product code.
Charger Status	Displays what charge mode the unit is in (Charge, Conditioning or Ready), the output voltage and the output current.
Bat Type Select	Displays the currently chosen battery type.
Time to Absorb	Displays the time left to complete the 'Absorption' stage.
Run Time	Displays the recorded run time for this charge session.
Power Level	Displays the chosen power level (25%, 50%, 75%, 100%), and the expected max current/voltage for absorption.
Bat Temperature	With a battery temperature sensor fitted (product code TEMP1), displays the battery temperature.
Charger Temp.	Displays the PCU hardware temperature, in Fahrenheit and Celsius.
Transformer Temp.	Displays the PCU transformer temperature, in Fahrenheit and Celsius.
Faults	Identifies faults, from 'Over Voltage', 'Under Voltage' or 'Battery Over Temperature'.
Company Informat	Displays the Sterling Power website, www.Sterling-Power.com .
Total Run Time	Displays the overall unit run-time.
SoftwareRevision	Displays what software version is presently running on the unit.
Force to Float	If you wish to force the PCU into float mode, hold the down arrow for ten seconds. The charger will remain in float mode until the PCU is restarted or until the battery voltage connected drops to 12.35V, for 12V batteries.
Power Level Adjust	To adjust the power level of the PCU remotely, 1) Hold down both the up and down arrows for 15+ seconds 2) The remote will display the power level customisation screen. Press the up and down arrows to change the output level displayed and then press the Setup/Enter key to confirm. If no decision is made within 15 seconds, the PCU will return to 100% output. 3) Once confirmed, the remote will display the 'Power Level' screen from above, until changed.
System Self Test Remote	To run a PCU Self Test from the remote, hold down the Setup, Up and Down keys for over five seconds and then release. The PCUR will beep to signify the start of the test, and show the results in a few seconds.
PCU Factory Reset	To return the PCU to factory default settings, hold down the Alarm, Setup, Up and Down keys for over three seconds and release. The remote will show a confirmation and the PCU will reset to factory default settings.



PRODUCT INFORMATION TROUBLESHOOTING, MAINTENANCE

Troubleshooting

In the instance that your fault light is displaying, please cross reference the fault LED with the following list, and hopefully the problem can be isolated and ideally solved.

DC Output Fault : RED

This indicates a potential reverse polarity situation. Please check your DC fuses are intact and correctly installed, and ensure that the positive (RED+) and negative (BLACK-) cables are correctly installed, particularly the correct way around.

DC Low Voltage : AMBER

This indicates your DC system voltage is lower than the PCU requires in order to engage on BC mode. At 12V the low voltage trip is 11V. At 24V it is 22V, and so on. Please charge your batteries to over 11V using another charge source, or put the PCU into power supply mode. If your batteries refuse to hold charge, consider replacing your batteries.

DC High Voltage Trip : RED

This indicates a high DC voltage on the output, independent from the PCU. This could be caused by a failed alternator, solar panels, wind generators etc. A DC voltage above 16.2V (for 12V) is at risk of tripping this fault. Please use a voltmeter and the process of gradually isolating your charge sources to isolate exactly what is causing this high voltage output, and then please either remove this from your system, or repair it.

Charger High Temp Trip : AMBER

This indicates that the charger has shut down due to an over-temperature situation. This unit will conform and operate comfortably at up to an ambient temperature of ~50degC. Operation at higher temperatures will still occur, but at a reduced efficiency. Please ensure that the PCU cooling ventilation is unobstructed and that the fan itself is running. If the fan is obstructed, please solve the obstruction. If the fan is not running, contact Sterling. If the room is over 50degC please consider improving ventilation or cooling.

Check Fan : RED

This implies a potential fan failure. Please ensure that the cooling fan is unobstructed. The fan should perform a self test during the startup sequence. Persistent or recurring fan problems may indicate a servicing requirement.

Fault : RED

This implies general faults, including a possibility that the internal DC fuse has blown. Please contact Sterling for servicing options.

Auto Temp Control : RED

This LED implies that the PCU is scaling back performance due to the high internal or ambient temperature. Thermal control. Please see 'Charger High Temp Trip' above for reference on how to improve this.

OTHER

If the above tests do not lead to a solution, or your unit continues to display faults, please contact Sterling for a review of your unit.

Maintenance

This unit is solid state software controlled and designed with longevity and performance in mind, it does not require constant adjustment or attention - however - the following items should be checked in order to encourage the greatest long term performance of the unit.

Fault Check

On startup, ensure the front panel shows no fault LEDs.

Fuse Check

Occasionally and procedurally ensure that the fuses (DC fuses next to the negative terminal on the PCU, and your own installed fuses) are intact, and check their condition regarding discolouration and corrosion.

Fan Check

On startup, the PCU cooling fan will run a self test. Ensure that it is not obstructed or impeded by debris, the sound should be obvious if something is in the way.

Water Check

Occasionally check for signs of liquids that may have been running down your unit. Water stains, streaks, oil etc. If evidence of liquids are found, please find the leak and fix the leak or move the charger to a safer place away from the source of the liquid.

Terminal Inspection

Check the battery charger terminals and battery terminals for corrosion monthly, clean as required. Also ensure that all connections are tight and sufficient, and that there are no signs of heat-buildup over time. Loose connections lead to a heat buildup due to inefficiency of contact, and this can rapidly lead to damage or fire risks.

Battery Maintenance

Ensure your batteries are maintained as according to your battery manufacturers directions.

Wire Inspection

Check your wires for any burning, chafing or movement monthly. Degraded wires can become a fire risk, or even an electrical hazard.

Battery Temperature Check

During the charge process, please monitor the temperature of your batteries. They should not ever be noticeably hotter than the surrounding ambient temperature (unless they are heated batteries). If the batteries are hot to the touch, they need immediate investigation and attention. Ensure the batteries are being charged at a safe voltage. If the charge voltage is safe, the batteries are likely defective. Never walk away from warm/hot batteries until a solution has been found, as there is a major problem. Turn the charge sources OFF.



MISCELLANEOUS CABLE RECOMMENDATIONS

Cable Recommendations
AC CABLE, 230V

Europe Model	AC cable size (mm ²) for cable length up to 15 m			
	110 volt fuse/breaker		230 volt fuse/breaker	
PCU1210	3 core 0.75 mm ²	6 A	3 core 0.75 mm ²	4 A
PCU1220	3 core 0.75 mm ²	8 A	3 core 0.75 mm ²	6 A
PCU1230	3 core 1.5 mm ²	11 A	3 core 1.5 mm ²	7 A
PCU1240	3 core 1.5 mm ²	14 A	3 core 1.5 mm ²	7 A
PCU1250	3 core 1.5 mm ²	16 A	3 core 1.5 mm ²	8 A
PCU1260	3 core 1.5 mm ²	16 A	3 core 1.5 mm ²	8 A
PCU2420	3 core 1.5 mm ²	14 A	3 core 1.5 mm ²	7 A
PCU2430	3 core 1.5 mm ²	16 A	3 core 1.5 mm ²	10 A
PCU32/36	3 core 1.5 mm ²	16 A	3 core 1.5 mm ²	10 A
PCU4815	3 core 1.5 mm ²	16 A	3 core 1.5 mm ²	10 A

AC CABLE, 110V

USA Model	AC cable size (AGM) for cable length up to 50ft			
	110 volt fuse/breaker		230 volt fuse/breaker	
PCU1210	3 core 16 AWG	6 A	3 core 18 AWG	4 A
PCU1220	3 core 16 AWG	8 A	3 core 18 AWG	6 A
PCU1230	3 core 14 AWG	11 A	3 core 16 AWG	7 A
PCU1240	3 core 14 AWG	14 A	3 core 16 AWG	7 A
PCU1250	3 core 12 AWG	16 A	3 core 14 AWG	8 A
PCU1260	3 core 12 AWG	16 A	3 core 14 AWG	8 A
PCU2420	3 core 14 AWG	14 A	3 core 16 AWG	7 A
PCU2430	3 core 12 AWG	16 A	3 core 12 AWG	8 A
PCU32/36	3 core 12 AWG	16 A	3 core 14 AWG	8 A
PCU4815	3 core 12 AWG	16 A	3 core 14 AWG	8 A

DC CABLE When choosing DC cable we must be aware that voltage drop is far more significant in long runs than it is with AC cable. Ensure you only use high quality fire retardant cable.

The closer you install the charger to your batteries, the better your performance. You will save money on cable and also see significantly improved charge performance, as the PCU will be able to maintain the charge voltage to a superior degree. Do not use solid cable or speaker wire.

DC CABLE, m TO mm²

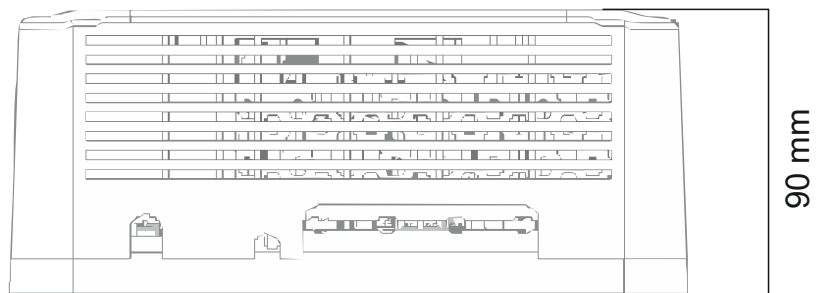
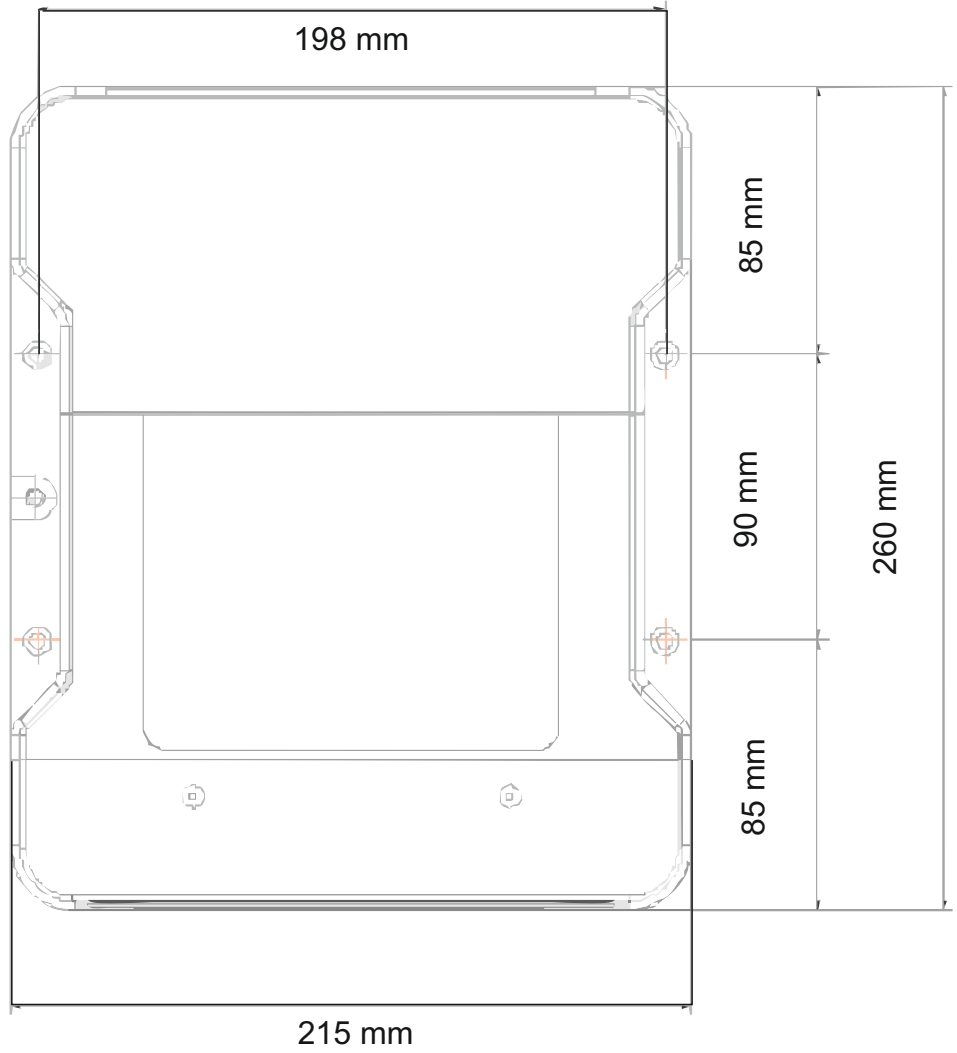
Europe Model	DC Charge cable size (mm ²) for cable length						Fuse
	1m	2m	3m	4m	5m	6m	
PCU1210	2.5 mm ²	4 mm ²	6 mm ²	10 mm ²	10 mm ²	16 mm ²	15A
PCU1220	4 mm ²	10 mm ²	16 mm ²	16 mm ²	25 mm ²	25 mm ²	30A
PCU1230	6 mm ²	6 mm ²	25 mm ²	35 mm ²	50 mm ²	50 mm ²	40A
PCU1240	10 mm ²	16 mm ²	25 mm ²	35 mm ²	50 mm ²	50 mm ²	50A
PCU1250	10 mm ²	25 mm ²	35 mm ²	50 mm ²	50 mm ²	n/a	60A
PCU1260	16 mm ²	25 mm ²	50 mm ²	50 mm ²	n/a	n/a	80A
PCU2420	4 mm ²	10 mm ²	16 mm ²	16 mm ²	25 mm ²	25 mm ²	30A
PCU2430	6 mm ²	6 mm ²	25 mm ²	35 mm ²	50 mm ²	50 mm ²	40A
PCU32/36	4 mm ²	10 mm ²	16 mm ²	16 mm ²	25 mm ²	25 mm ²	30A
PCU4815	4 mm ²	10 mm ²	16 mm ²	16 mm ²	25 mm ²	25 mm ²	20A

DC CABLE, ft TO AWG

USA Model	DC Charge cable size (AWG) for cable length						Fuse
	5 ft	10 ft	15 ft	20 ft	25 ft	30 ft	
PCU1210	16 AWG	14 AWG	12 AWG	10 AWG	10 AWG	10 AWG	15A
PCU1220	14 AWG	10 AWG	10 AWG	8 AWG	6 AWG	6 AWG	30A
PCU1230	12 AWG	10 AWG	8 AWG	6 AWG	6 AWG	4 AWG	40A
PCU1240	10 AWG	8 AWG	6 AWG	6 AWG	4 AWG	4 AWG	50A
PCU1250	8 AWG	6 AWG	6 AWG	6 AWG	4 AWG	2 AWG	60A
PCU1260	8 AWG	6 AWG	4 AWG	4 AWG	2 AWG	2 AWG	80A
PCU2420	14 AWG	10 AWG	10 AWG	8 AWG	6 AWG	6 AWG	30A
PCU2430	12 AWG	10 AWG	8 AWG	6 AWG	6 AWG	4 AWG	40A
PCU32/36	14 AWG	10 AWG	10 AWG	8 AWG	6 AWG	6 AWG	30A
PCU4815	16 AWG	14 AWG	12 AWG	8 AWG	6 AWG	6 AWG	20A

MISCELLANEOUS DIMENSIONS / SMALL

Unit Dimensions
PCU1210
PCU1220
PCU1230
PCU1240
PCU2420

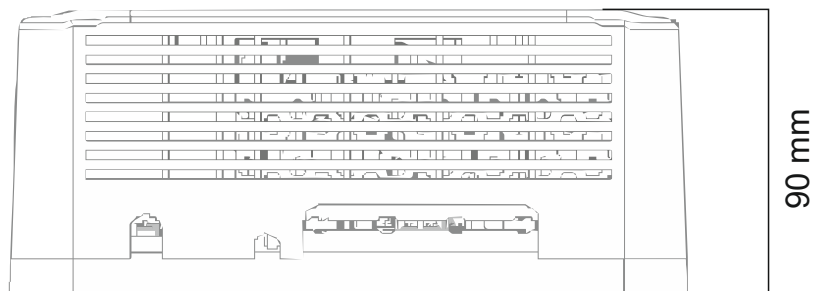
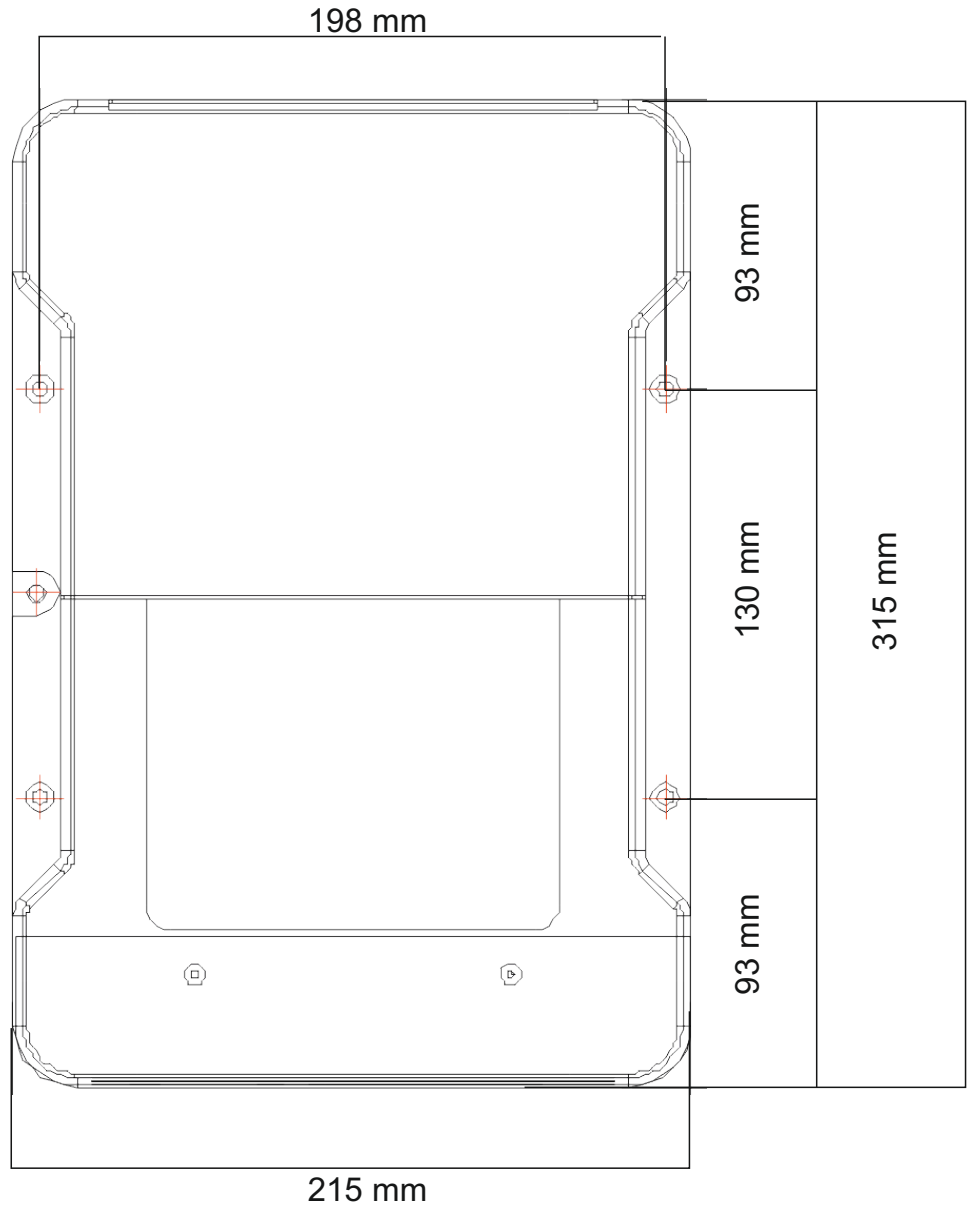




STERLING
POWER

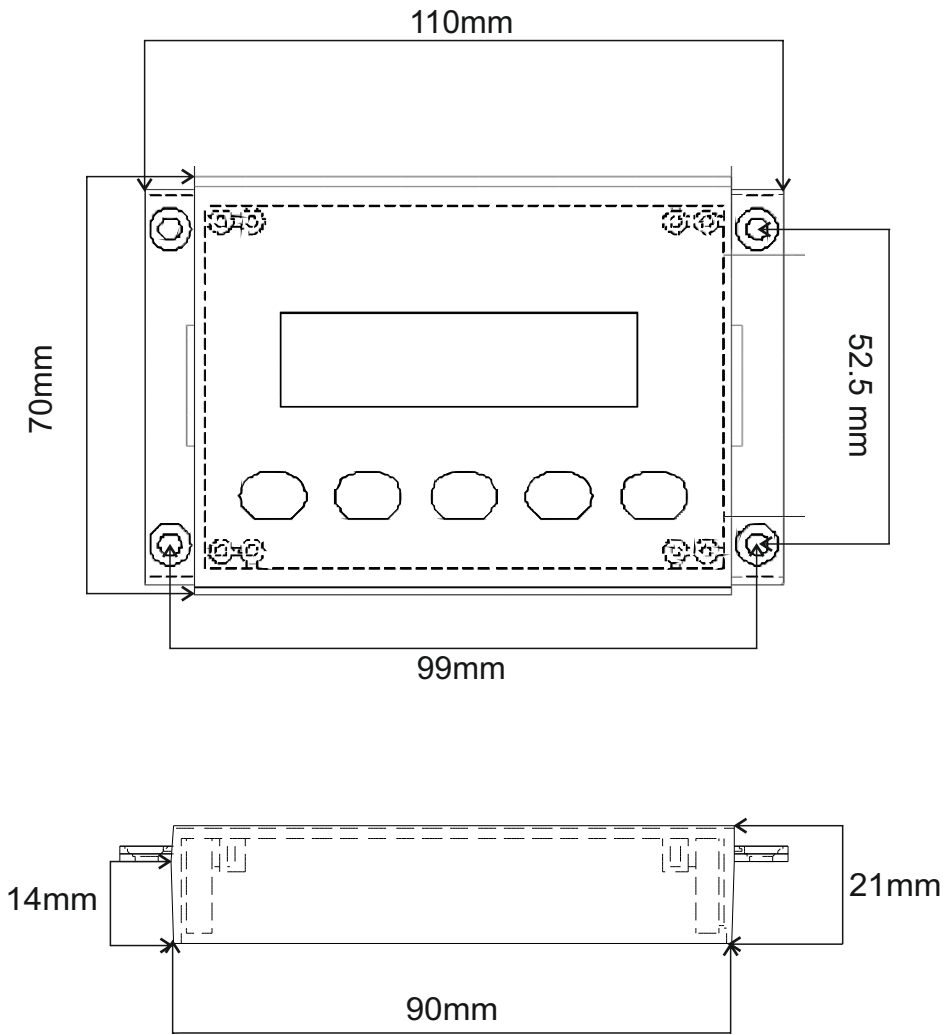
MISCELLANEOUS DIMENSIONS / LARGE

Unit Dimensions
PCU1250
PCU1260
PCU2430
PCU3220
PCU3620
PCU4815



MISCELLANEOUS DIMENSIONS / REMOTE

Unit Dimensions
PCUR





MISCELLANEOUS NOTES

