USERS/INSTALLATION MANUAL

WP-DC Powercube

4.5 kW / 150A (24V)
4.5 kW / 80A (48V)

High Power automatic battery charger

WhisperPower generator powered automatic battery charger

Heavy-duty battery charger for Lithium, GEL, AGM or open-cell lead acid batteries. For domestic, maritime, recreational vehicle, residential or industrial use. Fully automatic, 3-step charge characteristic with temperature compensation. Variable speed generator control with switch off. Wide input global grid range.

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1 Use of this manual

This manual contains important safety and operating instructions for the safe and effective operation, maintenance and possible correction of minor malfunctions of the WhisperPower DC PowerCube Battery Charger. It is therefore obligatory that every person who works on or with the WP-DC Battery Charger is completely familiar with the contents of this manual, and that he/she carefully follows the instructions and important safety instructions contained herein.

1.2 Applicability of this manual

All of the specifications, provisions and instructions contained in this manual apply solely to standard versions of the WP-DC PowerCube Battery Charger delivered by WhisperPower.

This manual is valid for the following models:

Part no.	Model
60202002	WP-DC PowerCube 24/150 battery charger
60202003	WP-DC PowerCube 48/80 battery charger

These models are referred to as "WP-DC Powercube"
For other models see other manuals available on our website: www.whisperpower.com

1.3 Use of pictograms

Throughout this manual, safety instructions and warnings are marked by pictograms.

WARNING
A WARNING refers to possible injury to the user or significant material damage to the WP-DC PowerCube Charger if the user does not (carefully) follow the procedures.

CAUTION!
Special data, restrictions and rules with regard to preventing damage. A procedure, circumstance, etc. which deserves extra attention.

1.4 Identification label

The identification label is located at the side of the WP-DC PowerCube Charger (see figure 1). Important technical information required for service, maintenance & secondary delivery of parts can be derived from the identification label.

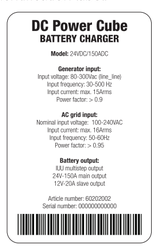

Figure 1: Identification label

CAUTION!
Never remove the identification label.

1.5 Liability

WhisperPower can accept no liability for consequential damage due to use of the WP-DC Powercube, possible errors in the manuals and their results.

2. IMPORTANT SAFETY INSTRUCTIONS READ AND SAVE THESE INSTRUCTIONS

WARNING
This chapter describes important safety and operating instructions for use of a WP-DC PowerCube Charger in residential, recreational vehicle (RV) and marine applications.

2.1 General

1 Before operating this Battery Charger, read all instructions and cautionary markings on the WP-DC PowerCube Charger, the batteries, and all appropriate sections of the manual.
2 To reduce the risk of electric shock – Do not expose WP-DC PowerCube Charger to rain, snow, spray, moisture, excessive pollution and condensing circumstances. To reduce risk of fire hazard, do not cover or obstruct the ventilation openings. Do not install the WP-DC PowerCube Charger in a non-ventilated room, overheating may result.
3 This product has been designed and tested in accordance with international standards. Only use the equipment for the intended purpose of application. Use of an attachment or spare part not recommended or sold by WhisperPower may result in a risk of fire, electric shock, or injury to persons.
4 The WP-DC PowerCube Charger is designed to be permanently connected to an AC and DC electrical system. Installation of, and work on the WP-DC PowerCube Charger, may be carried out only by a qualified, authorized and trained technician or electrician, consistent with the locally applicable standards and regulations.
5 Make sure that all wiring is properly installed and in good electrical condition; and that wire size is large enough for AC ampere rating of the WP-DC PowerCube Charger. Check the wiring on a regular base, at least once a year. Do not use the WP-DC PowerCube Charger when the wiring is undersized or damaged.
6 Do not operate the WP-DC PowerCube Charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.
7 Except for the connection compartment, see chapter 4, the WP-DC PowerCube may not be opened or disassembled. There are no serviceable parts inside the cabinet. Take it to a qualified, authorized and trained serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire. Only qualified, electrician installers are authorized to open the connection compartment.
8 To reduce risk of electric shock, disconnect the WP-DC PowerCube Charger from both AC and DC electrical system before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
9 The WP-DC PowerCube Charger must be provided with an equipment-grounding conductor to the AC-input ground terminal. Grounding and all other wiring must comply with local codes and ordinances.
10 Short circuiting or reversing polarity will lead to serious damage to batteries, WP-DC PowerCube Charger, wiring as well as accessories. Fuses will not prevent damage caused by reversed polarity and the warranty will be void.
11 In case of fire, you must use the fire extinguisher that is appropriate for electrical equipment.
12 If applied in a marine application in the United States, external connections to the WP-DC Powercube Charger shall comply with the United States Coast Guard Electrical Regulations (33CFR183, Sub part I).

2.2 Explosive gases

1 WARNING *– risk of explosive gases. Working in vicinity of a lead-acid battery is dangerous. Batteries generate explosive gases during normal battery operation. For this reason, it is of utmost importance that each time before using the WP-DC PowerCube Charger, you read this manual and follow the instructions exactly.*

2 To reduce risk of battery explosion, follow these instructions and those published by battery manufacturer and manufacturer of any equipment you intend to use in vicinity of the battery. Review cautionary marking on these products.

3 DANGER *– To reduce the risk of explosion, never use the WP-DC PowerCube Charger in situations where there is danger of gas or dust explosion or in an area in which ignition-protected equipment is required.*

2.3 Warnings regarding the use of Batteries

1 Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
2 Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
3 Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
4 If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
5 NEVER smoke or allow a spark or flame in vicinity of a battery or engine.
6 Do not short circuit batteries, as this may result in explosion and fire hazard! Be extra cautious to reduce risk of dropping a metal tool onto a battery. It might spark or short-circuit the battery or other electrical part and may cause explosion.
7 Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short-circuit current high enough to weld a ring or the like to metal, causing a severe burn.
8 Only use the WP-DC PowerCube Charger for charging Lead-acid and Li-ion batteries and the supply of consumers attached to these batteries, in permanent connected systems. Do not use the WP-DC PowerCube Charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
9 NEVER charge a frozen battery.
10 Excessive battery discharge and/or high charging voltages can cause serious damage to batteries. Do not exceed the recommended limits of discharge level of your batteries.
11 If it is necessary to remove a battery, always remove the grounded terminal from the battery first. Make sure all accessories are off, so as not to cause an arc.
12 Be sure that the area around the battery is well ventilated while the battery is being charged. Refer to the recommendations of the battery manufacturer.
13 Batteries are heavy! It may become a projectile if it is involved in an accident! Ensure adequate and secure mounting and always use suitable handling equipment for transportation.

2.4 Warning regarding life support Applications

The WP-DC PowerCube Charger is not sold for applications in any medical equipment intended for use as a component of any life support system unless a specific written agreement pertaining to such intended use is executed between the manufacturer and WhisperPower.

Such agreement will require the equipment manufacturer either to contract additional reliability testing of the WP-DC PowerCube Charger and/or to commit to undertake such testing as a part of the manufacturing process. In addition the manufacturer must agree to indemnify and not hold WhisperPower responsible for any claims arising from the use of the WP-DC PowerCube Charger in the life support equipment.

2.5 Guarantee specifications

WhisperPower guarantees that this unit has been built according to the legally applicable standards and specifications. Should work take place, which is not in accordance with the guidelines, instructions and specifications contained in this user's manual, then damage may occur and/or the unit may not fulfil its specifications. All of these matters may mean that the guarantee becomes invalid. The guarantee is limited to the costs of repair and/or replacement of the product. Costs for installation labour or shipping of the defective parts are not covered by this guarantee.

3. OPERATION

3.1 Introduction

The WP-DC PowerCube Charger is a fully automatic high efficiency battery charger/rectifier, developed and produced by WhisperPower. The WP-DC Powercube series features a family of advanced quality battery chargers. The WP-DC PowerCube Charger not only charges batteries rapidly and safely, it supplies energy to the connected consumers at the same time. In addition, the WP-DC PowerCube Charger is secured against short circuit, overload and high temperatures in an industrial environment.

CAUTION – *Before switching on the first time, the equipment must be installed properly (see section 4) and the correct charging curves for your connected batteries must be set.*

Please be aware, and familiarize yourselves with the following provided features and properties.

Fully automatic mode
The DC PowerCube can be programmed to work fully automatic in combination with a diesel generator. In case the grid AC input connection fails -to keep the batteries fully charged- the diesel generator can be started to charge the batteries fast and efficient. When the batteries are full, the diesel generator can be automatically switched off.

Wide range inputs
The DC PowerCube has two wide range power inputs, ready to charge the batteries from any place all over the world, and suitable to work from a variable speed generator. Regardless of the input voltage of either source, the DC PowerCube is given a maximal input current, and will charge the batteries as fast as possible without overloading the inputs.

Multi stage charger
Fitted with the 3+ step charging algorithm, the charger of the DC PowerCube is designed to charge batteries fast. This charge algorithm guarantees the optimal charging for batteries

Battery temperature compensation
Battery temperature compensation is very important for correct charging, the charge voltage must be adjusted according to the actual battery temperature to ensure that batteries are fully charged. All charging voltages recommended by battery manufacturers are in fact ONLY applied at 25ºC.
The WP-BTS (battery temperature sensor) supplied with the DC PowerCube measures the temperature of the battery and automatically adjusts the charge voltage at a compensation rate of -5mV/ºC/cell. In case the WP-BTS is not present, the DC PowerCube will use 25ºC as a default setting.

Maximum charger current
On the front panel of the DC PowerCube the maximum charging current can be adjusted on the fly. With this function the charging current can be adjusted from 5%, 25%, 50%, 75% or 100%. Where 100% is the maximal allowed charging current. (see programmable parameters)

Multi battery chemicals available
Commonly encountered battery chemicals include Lithium, AGM, GEL, Open lead acid and traction. The voltage required for a proper charging of different batteries vary. The battery type can be selected in the connection compartment by a dip switch setting.

Slave charger
The DC PowerCube features a 12V slave charger to charge a small (engine starting) battery. The output is a 20A slave charge output and is also equipped with the 3+ step charging algorithm. The slave charger is standard configured to stop charging when no AC inputs are available. With a dip switch the 'cont. slave' function can be selected. Then the slave charger will use the service battery to charge the slave battery (this function automatically switches off when the service battery is drained to below 26.5V (24/150) or 53V (48/80).

3.2 Quick set-up

Normal operation only involves providing generator and/or shore AC power and switching the device on. After that all functions operate automatically and keep your battery in top condition while DC loads may also be powered on.

However, more information is readily available on the Led display on the front panel, in combination with the pushbutton switches below it. Understanding these gives full insight in the features of the product. Details of advanced operation are given in 3.3 below.

3.2.1 Switching on

The battery charger will be switched on by pushing the Power switch on the display to I= ON with a connected generator- or grid supply. The corresponding 'State of charge' leds will light up now and charging of connected batteries start immediately.
When leaving a ship, you do not want to operate a generator, and for that reason a 'Grid only' position of the power switch is provided. Only shore power (if available) will charge up your batteries in that position II of the power switch.

3.2.2 Switching off

The battery charger will be switched off by pushing the Power switch to the middle (0= OFF) position. During normal operation, however, it is not necessary to power down. As long as batteries remain electrically connected to the charger, charge settings and conditions remain unchanged. Power drainage from the batteries is minimized within an hour, and in this way the system can be switched down for elongated periods of time (e.g. winter) when an AC source may not be available but the product switched on.

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WARNING
Switching off the power switch, the WP-DC PowerCube Charger does not cut off the connection to the batteries or the AC sources. This means that dangerous high voltages are still available inside the apparatus.

3.3 User control options

Three pushbutton controls are provided on the front panel through which charging current may be limited. This may be required as a temporary measure to limit current from a source (e.g. power post in harbour) or into an undersized battery.
Note: these controls are only active for the time that power is on, they reset to maximum value during power-up. When permanent settings need to be made, parameters can be set by the installer, using the USB connection.

3.3.1 Grid input current limit

By pressing the AC current limit button for 3 seconds: the AC input current limiting setting can be selected. The selectable values are 4A, 8A, 10A, 12A and 16A.
Note: Reducing maximum grid current may also be performed from the remote panel.

3.3.2 Generator input current limit

By pressing the GEN current limit button for 3 seconds: the limiting current drawn from the PM generator can be controlled from 20%, 40%, 60%, 80% and 100%. 100% is the maximum current that the PM generator can deliver, or the maximum current that the DC PowerCube can draw.

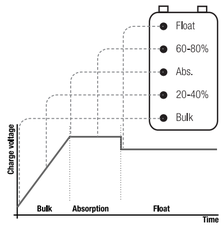
3.3.3 Charging current limit

By pressing the DC charge limit button for 3 seconds: the maximum charging current can be set from 5%, 20%, 50%, 75% to 100%

WARNING *– Reducing charging current through front-panel push button operation is not adequate when an undersized main battery is permanently connected. Always use batteries that match the max. charging current of the DC PowerCube.*

3.4 Multi-stage charging algorithm

The DC PowerCube is fitted with a multi stage charging algorithm (IUoUo). With this algorithm the batteries are charged in a fast and safe way, resulting in a longer lifetime of the batteries.
The charging states are represented by the different indication lights in the charging status bar on the WP-DC PowerCube. When the PowerCube is charging, the bulk light will always illuminate.
The 20-40% indicator will illuminate when the charging voltage is higher than Float voltage. When the charger reaches the bulk voltage setting (depending on the battery type), the charger will go into the absorption mode indicated by the Abs. indicator. When the charging current drops below the return amps limit, the 60-80% indicator will illuminate. After 15 minutes, the charger will go into the float mode.
When the battery drops below minimum value, the charger will switch from float to bulk mode again.



4. INSTALLATION

During installation and commissioning of the WP-DC PowerCube Charger, the important safety instructions are applicable at all times. See chapter 2 of this manual.

4.1 Preparation

Please check the contents of the box before you start with the installation.
The contents of the box need to be:

- The WP-DC PowerCube of correct model and type; confirm serial number on labels.
- WP-RCP Remote Control Panel (incl. 5 mtr cable);
- WP-BTS Battery temperature sensor (incl. 6 mtr cable);
- This users and installation manual; If one of these items is missing, please contact your supplier.

4.2 DIP switch settings

Setting of characteristics and options via DIP switches may only be performed by a qualified installer.
Identify the batteries that will be connected to the WP-DC PowerCube, ensuring that capacity and type matches the product. Please refer to charging voltages in Technical Specifications at the end of this manual.
Now, you need to set the correct parameters by means of the DIP switch inside the product.

- Undo the 4 screws of the connection compartment and remove the panel
- Locate the DIP switch; from the factory, all switches are set to the default OFF position

***DIP switch explanation**

Switch	1	2	3	4	5	6	7	8
Lead-Acid	■							
AGM/GEL		■						
Traction	■	■						
Lithium			■					
User setting	■		■					
Diode comp.		■	■					
Continuous Slave	■	■	■					
Forced to Float				■				
Gen. limit	■			■				

■ = ON
□ = OFF

Battery Type

The battery type is selected with the DIP switch 1-4. Refer to technical data for characteristic charging voltages. Note that none of DIP switch 1-4 selects the default lead-acid settings.
When deviating voltages, currents and/or phase timings are required for a battery, all specific values must be written to the 'settings' text file using a pc at the USB connection, and DIP switch 4 needs to be set. Unless a dedicated charging profile is set by uploading from USB, avoid the 'User setting' on position 4 of the DIP switch.

Diode splitter

When multiple main batteries are connected via a splitter with conventional diodes, DIP switch on position 5 shall be switched on. This causes a higher output voltage at the main output to compensate for the diode voltage drop.

Slave charger behavior

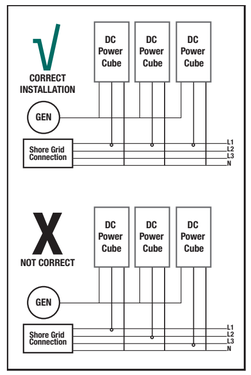
When the DC PowerCube has no input from the grid or the PM generator, the charging current to the main battery connection will be zero. The slave charger also will stop charging. By switching DIP switch number 6 ON, the slave charger is continuously switched on, powering the slave charger output from either the AC inputs or from the service battery. The slave charger is automatically switched off when the service battery reaches 26.5 V. (switch on at 27 V, values can be changed by USB)

Charge algorithm

Standard the DC PowerCube uses the 3+ step charging algorithm. If in some application the charging algorithm should be changed to continuously float, this can be switched on by DIP switch number 7. The charging algorithm is explained in chapter 3.4

Use on smaller generator

The purpose of this adjustment is to avoid overload on the installed generator. DIP switch number 8 is set by the installer when the rating of a connected generator is below the maximum input power of the DC PowerCube. This limits generator input current to typically 7A on each phase.
This current limit is also available, when programmed and set, from a digital input. Note that the setting may be adjusted to dif-ferent current values (without setting DIP switch 8) from USB.



4.3 Installation Environment

Choosing a location to install:

- Install the WP-DC PowerCube in a well ventilated room protected against rain, snow, spray, vapour, bilge, moisture and dust.
- Ambient temperature: 0 ... 60°C / 32°F ... 140°F; (power derating above 40°C / 104 °F to decrease the internal heat sink temperature).
- Humidity: 0-95% non-condensing.
- Never use the WP-DC PowerCube at a location where there is danger of gas or dust explosions.
- Mount the WP-DC PowerCube in such a way that obstruction of the airflow through the ventilation openings is prevented. No objects must be located within a distance of 20 cm / 8 inch around the WP-DC PowerCube.
- Mount the WP-DC PowerCube vertically, with the connecting cables downwards.
- Do not install the WP-DC PowerCube in the same compartment as the batteries. Do not mount the WP-DC PowerCube straight above the batteries. Do not mount the WP-DC PowerCube straight above the batteries because of possible corrosive sulphur fumes.

CAUTION! *Before making the connection between the battery charger and the system, be sure that the AC and DC system are switched off. Remove the fuses in order to protect yourself against unexpected start up.*

4.4 Mounting

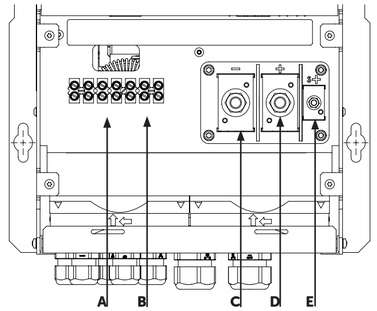
- Once the location for the WP-DC PowerCube is known and verified, unscrew the Torx screws of the lid covering the wiring compartment.
- Locate the dimensioning drawing of your model elsewhere on this sheet and mark the two top mounting positions on the wall. Predrill where necessary.
- Mount the unit by fixing the top bolts.
  Note: Mounting screws are not provided as the requirement differs per installation. Choose a flat surface and 4x M8 bolts to fix the unit securely.
- Now locate the bottom mounting hole positions from within the wiring compartment. Predrill and mount by using a nutdriver with a shaft length of at least 160 mm.

4.5 Power Cable Wiring

CAUTION! *The wire and fuse sizes stated in this manual are given as example only. Prescribed wire and fuse sizes may be different due to local applicable regulations and standards.*

DC Power Cube	AC wiring 230V	Generator	DC wiring
24/150	2.5 mm²	2.5 mm²	50-90 mm²
48/80	2.5 mm²	2.5 mm²	35-50 mm²

Power Connection overview



A PM generator input	**B** Grid AC input	**C** Main charger output (minus)
D Main charger output (plus)	**E** Slave charger output 12V (plus)	

NOTE: Given wire colours are preferred but may differ for country standards and regulations.

PM generator input

- The PM generator input is a 3 phase connection without Neutral, but with PE, 4 wires.
- A neutral conductor cannot be connected.
- The input voltage range for the AC input is 90-300 VAC.

Exceeding this voltage range will damage the DC PowerCube and warranty will be void.

- Open up the left-most cable gland, straight under the Generator connection block, and fit the flexible multi-stranded 2.5 mm² generator cable through the cable gland
- Cut the cable to correct length, strip outer insulation, and strip the 4 wire ends, and preferably fit ferrules
- Using a flat screwdriver, connect as follows
  Ground: mandatory green/yellow, to PE
  Phase 1: Brown, to L1
  Phase 2: Black, to L2
  Phase 3: Gray, to L3
- Tighten cable gland

Grid AC input

The grid input connection has 3 wires (L, N, and PE). The input voltage range for the AC input is 90-264VAC.

- Locate the cable gland under the grid connection block and open it
- Fit the flexible multi-stranded 2.5 mm² mains cable through the cable gland
- Cut cable, strip outer insulation and wire ends to correct lengths; fit ferrules on stripped wires
- Using a flat screwdriver, connect as follows
  Brown to Phase L
  Blue to Neutral N
  Green/Yellow Earth to PE / GND
- Tighten cable gland

AC safety grounding

WARNING!
The ground wire offers protection only if the cabinet of the WP-DC PowerCube is connected to the safety ground. Connect the provided M6 grounding terminal (PE / GND) to the hull or the chassis.

CAUTION!
For safe installation it is necessary to insert a Residual Current Device (earth leakage switch) in the AC input circuit of the WP-DC PowerCube.

Battery connection

Ensure that the WP-DC PowerCube has the correct DC voltage and charging current for your battery system. Install the WP-DC PowerCube as close to the batteries as possible reducing the voltage drop on cable for the better performance of the equipment.

We recommend connecting a DC fuse corresponding to the conductor between battery and WP-DC PowerCube, which will offer protection to the battery cable.

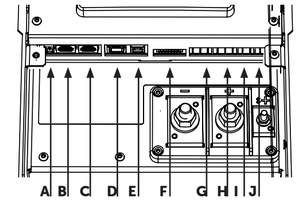
DC PowerCube	Recommended fuse
24/150	200A
48/80	125A

The battery connection has two M10 bolts to connect the plus and minus of the battery. The slave charger S+ has a M5 connection, the minus is common with the service battery.
Keep the cable connection between charger and batteries as short as possible. If available, use coloured battery cables. If this is not possible, mark the plus and the minus cables with coloured insulating tape, e.g. red for plus and blue/black for minus. Use cable diameters as given in the table, or thicker.

- Pull the cables through the cable glands of the WP-DC PowerCube Charger and cut to correct length
- Crimp on ring terminals to the cables:
  ring M10 for main battery cables;
  ring M5 for starter slave battery cables.
- Connect the cables to the terminals of the WP-DC PowerCube.
  Pay attention to the polarity, positive on positive / negative on negative.
  The minus (-) terminal of the starter battery should be connected to the minus (-) terminal of the main battery connection.
- Integrate a suitable fuse (charger fuse) in the positive cable.
  When using a DC distribution with fuses, no additional fuse is necessary.
  Connect the cable to the DC distribution or batteries.
- Fasten the cable glands

CAUTION!
Reversing the positive and negative battery poles will severely damage the WP-DC PowerCube Charger. Too thin cables and/or loose connections can cause dangerous overheating of the cables and/or terminals. Lay the positive and negative cables next to each other to limit the electromagnetic field around the cables. The negative cable should be connected directly to the negative post of the battery bank or the ground side of a current shunt. Do not use the hull or chassis frame as the negative conductor

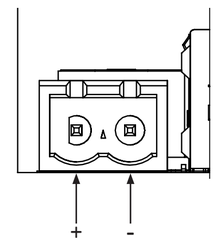
4.6 Interface Cable Wiring



A Voltage sense
B Battery temperature sensor
C Remote control panel
D Whisper Connect (CAN)
E USB connection
F DIP switch 1-8
G Free programmable relay nr 1 (30V - 1A)
H Free programmable relay nr 2 (30V - 1A)
I Free programmable input nr 1
J Free programmable input nr 2

Voltage sense

The voltage sense can be used to compensate cable losses or the voltage loss which is introduced when battery isolators (e.g. diode blocks) are used.



- Use 0,75 mm², preferably red and black wire and secure these with fuses of 2A slow blow.
- Connect the wires with the two upper terminals of the green connector at the left side of the cabinet. Pay good attention to the polarity of the wires, red on +Sense(4) and black on –Sense(3).
- Now connect the other side of the wires: black on the minus of the battery and red on the main battery side of the WP-DC PowerCube Charger fuse.

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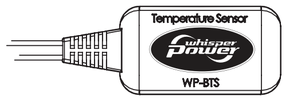
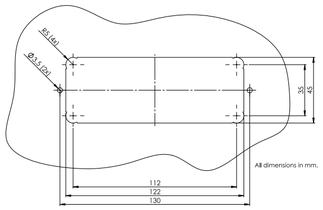
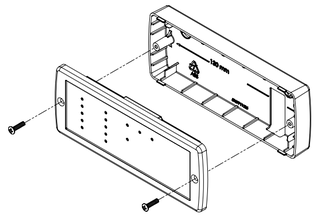
Battery temperature sensor
The WP-BTS should be placed on the service batteries



- Glue the temperature sensor on the side of the battery or in the same room and secure the attachment
- Route the cable to the WP-DC PowerCube and connect to WP-BTS input

Remote control panel
The DC PowerCube is delivered with the WP-RCP and a connection cable.
The remote control panel could be mounted either on, or in the dashboard. The cutout for mounting in the dashboard is:





When the remote control is mounted on the dashboard, the back cover can be used as drill guide.

WhisperConnect
The DC PowerCube may be connected to a WhisperConnect CanBus at one of the two provided RJ45 connectors. Use the other connector to route to the next WhisperConnect device, or use a terminator in this position. Refer to chapter 5.

USB connection
The USB connection can be used to update the software of the DC PowerCube or to change parameters.
A software upgrade is done by a procedure, initiated by WhisperPower. Bootloading and provision of the firmware file is described in documentation that will be provided separately, for an update.
Also, the USB connection is used to change settings for WhisperConnect, charging parameters of main and slave batteries, generator properties including start/ stop parameters, digital inputs and digital outputs conditions. A personal computer with preconfigured data file is to be connected for uploading this information.

Free programmable outputs nr 1 and 2
- These two outputs are two potential free relay outputs. The maximal voltage and current allowed is (30V, 1A).
- Output number 1 is standard configured as "ON" in case AC input is present.
- Output number 2 is standard configured as "ON" when a failure condition is true. (e.g. overtemperature, OVP, missing phase PM generator input, and so on)
- Changing the behavior of these outputs can be done by USB.

Output functions:
[0] = Grid Present (default Output 1)
[1] = Generator Present
[2] = AC State
[3] = Failure (default Output 2)
[4] = Battery Status
[5] = Bulk State
[6] = Absorption State
[7] = Float State
[8] = AutoStart

Free programmable inputs 1 and 2
- The two inputs may each be connected to a potential free contact.
  Standard behavior of input number 1 is On/off remote switch, overriding the front-panel ON switch.
  Contact "closed" is DC PowerCube disabled.
  Standard behavior of input number 2 is Grid-only remote input, overriding the front-panel switch.
  Contact "closed" is PM generator input disabled.
- Changing the behavior of these inputs can be done by USB.
- Please be aware that these inputs are referenced to GND potential (which is isolated from Battery negative), and if a DC voltage is connected than this source must be able to sink current to GND.

Input functions:
[0] = Charger Disable (default for Input 1)
[1] = Generator Disable (default for Input 2)
[2] = Force to Float
[3] = Start new cycle
[4] = Limit generator current to 7A

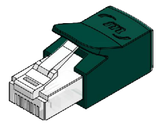
5 What is WhisperConnect CanBus?
WhisperConnect CanBus is a fully decentralized data network for communication between the different WhisperPower system devices. It is CANbus based which has proven itself as a reliable bussystem in automotive applications. WhisperConnect CanBus is used as power management system for all connected devices, such as the inverter, battery charger, generator and many more. This enables communication between the connected devices, for instance to start the generator when the batteries are low. WhisperConnect CanBus reduces complexity of electrical systems by using UTP patch cables. All devices that are suitable for WhisperConnect CanBus are marked by the WhisperConnect CanBus symbol. All system components are simply chained together.

Therefore each device is equipped with two WhisperConnect CanBus data ports. As only a few WhisperConnect CanBus cables are needed, installation and material costs are reduced importantly.
New devices can be added to the existing network easily.

Consequently the WhisperConnect CanBus network is highly flexible for extended system configuration. WhisperPower also offers several interfaces like NMEA2000 interface, making even non-WhisperConnect CanBus devices suitable to operate in the WhisperConnect CanBus network.

CAUTION!
Never connect a non-WhisperConnect CanBus device to the WhisperConnect CanBus network directly! This will void warranty of all WhisperConnect CanBus devices connected.

5.1 How to set up a WhisperConnect CanBus Network
Every WhisperConnect CanBus device is equipped with two data ports. When two or more devices are connected via these ports, a local data network calSegment on the WhisperConnect CanBus is formed. Keep the following rules in mind: Place a terminating device on both network ends. Connections between the devices are made by standard straight UTP patch cables. For central monitoring and control, one of the WP-Touch series of remote panels is required. Contact your installer of whisperpower.com for details of available panels.
For more detailed information on the installation of a WhisperConnect CAN bus, refer to the WhisperConnect manual.



CAN terminator

6. TROUBLE SHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
The overtemp light burns	The ambient temperature is too high	Place the DC PowerCube in a colder environment, or reduce the load
	The ventilation is blocked	Place the DC PowerCube on a better position or remove the blocking structure
The DC PowerCube does not charge from the grid	AC-input is out of input range	Check AC input voltage and frequency
The PowerCube does not charge from the PM generator	AC-input is out of input range	Check AC input voltage and frequency
The PowerCube does not switch on and does not charge	Battery was depleted or empty	Switch power OFF and back ON again
RPM of the engine does not correspond with RPM on DC PowerCube	The PM generator parameters are incorrect	Use the USB connection to set the correct PM generator parameters

7. EC DECLARATION OF CONFORMITY
Manufacturer: WhisperPower BV
Address: Kelvinlaan 82, 9207 JB Drachten, The Netherlands.
Hereby WhisperPower declares under our responsibility that;
Product: WP-DC PowerCube Charger
Model: 4.5kW/ 150A (24V), 4.5kW/ 80A (48V)
Is in conformity with the provisions of the following EC directives, for which mentioned harmonized standards have been applied:

2014/35/EU (Low Voltage Directive, LVD)
EN 60950-1:2001+ A11:2004 Safety of Information technology equipment EN 60335-2-29: 2004 Safety of household and similar electrical appliances

2014/30/EU (Electromagnetic Compatibility Directive, EMC)
EN 55022: 2006, Class B Information technology equipment - Radio disturbance characteristics
EN 55024 Information technology equipment - Immunity characteristics
EN 61000-6-3: 2007+A1:2011+AC:2012 Emission for residential, commercial and light-industrial environments
EN 61000-6-2: 2007 Immunity for industrial environments
IEC 61000-3-2 Limits for harmonic current emissions ≤16 A per phase
IEC 61000-3-3 Voltage dip & flicker

2011/65/EU (RoHS directive)
EN 50581:2012

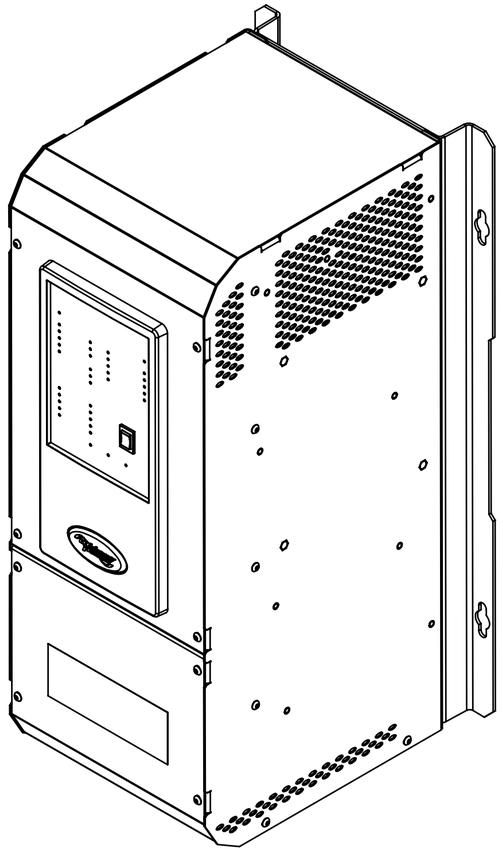
M.B. Favot WhisperPower Product Manager
Drachten, 25 Mei 2018

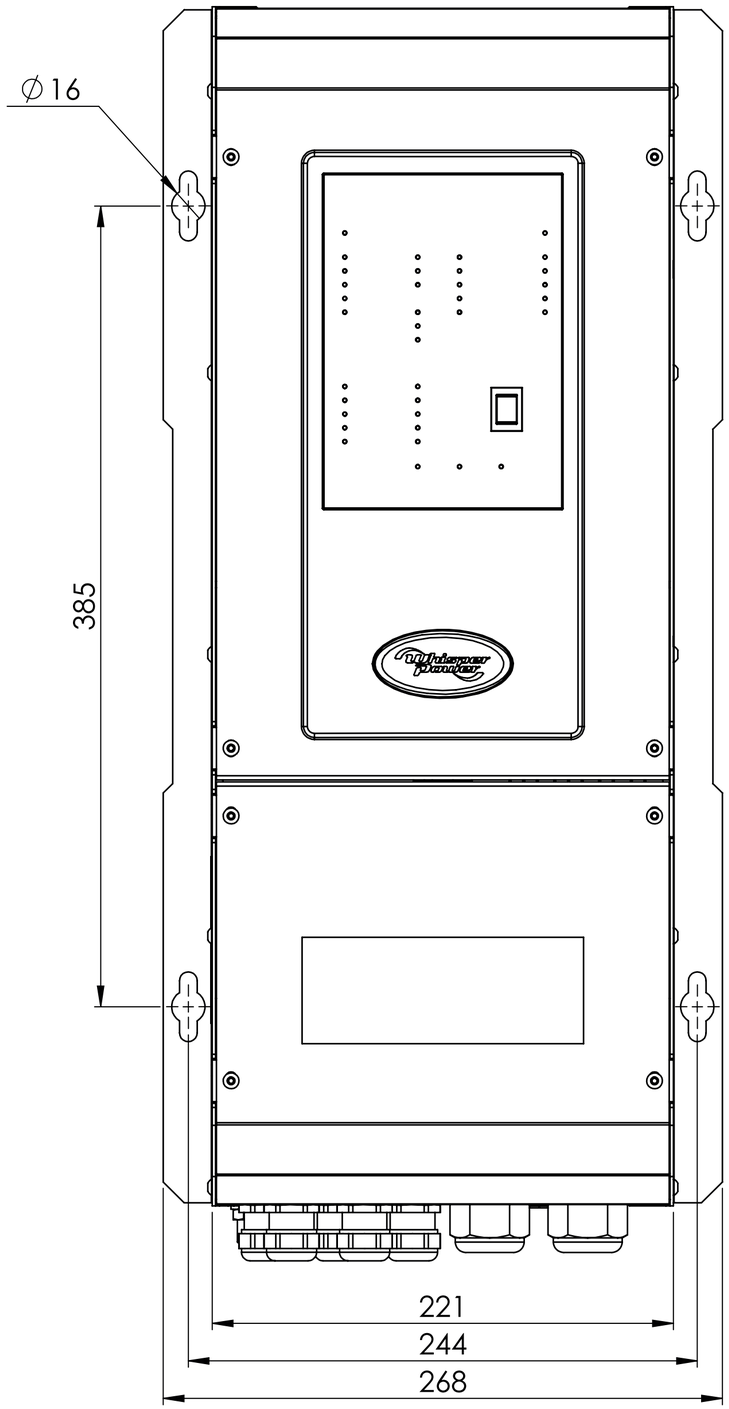
8. TECHNICAL DATA

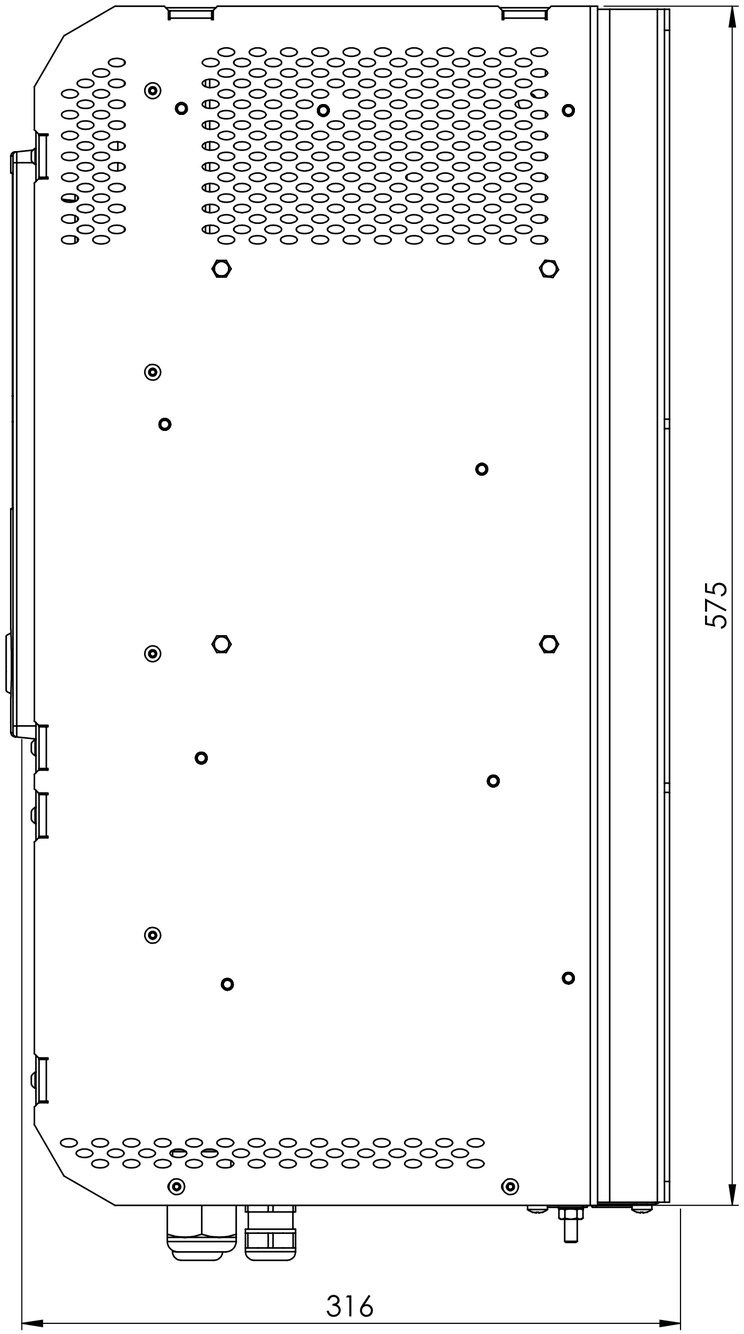
	WP-DC PowerCube 24/150	WP-DC PowerCube 48/80
	60202002	60202003
BATTERY CHARGER GENERAL SPECIFICATIONS		
Nominal battery voltage	24 VDC	48 VDC
Output current	0-150A adjustable (short circuit protected)	0-80A adjustable (short circuit protected)
Output voltage	26.5/28.5 VDC	53.0/57.0 VDC
Recommended battery capacity	300 to 1500 Ah	200 to 800 Ah
Charge characteristic	3+ step charge characteristic, IUoUo	3+ step charge characteristic, IUoUo
Slave charger	12 V- 20 A maximum, short circuit protected Return conductor common with main battery	
Slave charger characteristic	3+ step charge characteristic 13.25/ 14.25Vdc	3+ step charge characteristic 13.25/ 14.25Vdc
INPUT SPECIFICATIONS		
Grid input voltage range	90-264VAC (45-65Hz) (3 wire connection)	90-264VAC (45-65Hz) (3 wire connection)
Grid input current	Adjustable, from 2A to 16A	Adjustable, from 2A to 16A
Power factor (cos phi)	> 0.9	> 0.9
PM generator input range	80-300VAC delta (30-500Hz) (3 wire plus PE connection)	46-173VAC star (30-500Hz) (3 wire plus PE connection)
PM input current	Adjustable, from 2A to 14.5A	Adjustable, from 2A to 14.5A
Power factor (cos phi)	> 0.85	> 0.85
Power Factor Correction (PFC)	EN 61000-3-2 (PFC)	EN 61000-3-2 (PFC)
Temperature compensation	-60 mV/°C	-120 mV/°C
Supported battery types	Open and sealed lead acid: GEL / Traction/ AGM / Spiral and Lithium	Open and sealed lead acid: GEL / Traction/ AGM / Spiral and Lithium
Battery leakage current	<5mA per battery	<5mA per battery
Charge voltages	Bulk, Absorption, Float	Bulk, Absorption, Float
Charge voltage AGM / GEL at 25°C	28.50 VDC, 28.50 VDC, 27.60 VDC	57.00 VDC, 57.00 VDC, 55.20 VDC
Charge voltage Traction at 25°C	29.20 VDC, 28.90 VDC, 27.60 VDC	58.20 VDC, 57.80 VDC, 55.20 VDC
Charge voltage Open lead acid at 25°C (factory setting)	28.50 VDC, 28.50 VDC, 26.50 VDC	57.00 VDC, 57.00 VDC, 53.00 VDC
Charge voltage Lithium at 25°C	28.80 VDC, 28.80 VDC, 27.60 VDC	57.60 VDC, 57.60 VDC, 55.20 VDC
Return current from absorption to float	6% of Imax	6% of Imax
Power Cube charging status on/off	Digital output (relay, two-way contact)	Digital output (relay, two-way contact)
Failure condition present	Digital output (relay, two-way contact)	Digital output (relay, two-way contact)
DC PowerCube disabled	Digital input (potential free input, closed is disabled)	Digital input (potential free input, closed is disabled)
PM input disabled	Digital input (potential free input, closed is disabled)	Digital input (potential free input, closed is disabled)
Conformity	Directives for CE: LVD, EMC and RoHS-II	Directives for CE: LVD, EMC and RoHS-II
PROTECTIONS		
Over temperature protection	Yes, derating above 40°C, shutdown at high temperatures. (with automatic restart after cooling down)	
Over voltage protection (manual restart needed)	36 VDC+/- 0.5 VDC	68 VDC+/- 0.5 VDC
Ingress Protection index	IP21	IP21
MECHANICAL SPECIFICATIONS		
Main battery connection	2 x M10 studs	2 x M10 studs
Slave battery connection	1 x M5 stud	1 x M5 stud
Earth grounding lug	1 x M6 stud	1 x M6 stud
AC grid input	3 x M3 screw terminal block	3 x M3 screw terminal block
PM grid input	4 x M3 screw terminal block	4 x M3 screw terminal block
Remote control panel	RJ12	RJ12
Battery temperature sensor	RJ12	RJ12
Whisper Connect CANbus	RJ45	RJ45
Voltage sense	Phoenix MSTB 2.5/2-ST-5.08	Phoenix MSTB 2.5/2-ST-5.08
Digital outputs	6 x fastons (6.3x0.8)	6 x fastons (6.3x0.8)
Digital inputs	4 x fastons (6.3x0.8)	4 x fastons (6.3x0.8)
Dimension hxwxd [mm]	575 x 268 x 316	575 x 268 x 316
Operating temperature range	-20 to 55°C (derating above 40°C)	-20 to 55°C (derating above 40°C)
Relative humidity in operation	up to 95% without condensation	up to 95% without condensation
Ventilation	Combined cooling (convection and forced by variable speed fan)	Combined cooling (convection and forced by variable speed fan)
Weight	26 kg	26 kg
Acoustic level	<52dB	<52dB
Warranty	2 years	2 years
Accessories supplied	Battery temperature sensor and remote control panel	Battery temperature sensor and remote control panel

6019 Manual WP-DC Powercube 17-01-2022

WhisperPower BV | Kelvinlaan 82, 9207 JB Drachten, The Netherlands | Tel: +31 (0) 512 571 550 | sales@whisperpower.com | **www.whisperpower.com**







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