

DCCHARGE30



DC/DC Battery Smart Charger RSCDC30



Instructions

Retain these instructions for future reference



www.ringautomotive.co.uk

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1 Safety

- Explosive gasses may escape from battery during the charging process. Prevent flames and sparks and provide adequate ventilation during charging
- Do not expose to excessive heat, moisture and dust
- Not suitable for use with non-rechargeable batteries
- Do not connect energy sources other than a solar panel to the solar (PV) inputs
- Do not operate if there is damage to the unit or connected cables
- Always follow charging instructions of the battery manufacturer

2 Installation

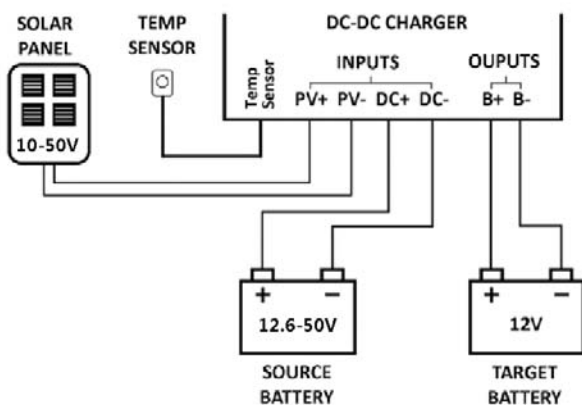


FIG.1 Installation diagram

1. Choose a suitable location for the unit that will allow adequate ventilation and not be subject to excessive heat, moisture and dust
2. Mount the unit horizontally or vertically and fix using mounting lugs
3. Connect Source Battery (main vehicle battery) to DC+ and DC- Inputs
4. Connect Target Battery (auxiliary vehicle battery) to B+ and B- outputs
Note:- Target battery can only be 12 volt
5. Suggested cable size for battery connections is 4.0mm²(min)
6. If required, connect Solar Panel to PV+ and PV- inputs
7. Attach temperature compensation sensor to Target Battery, then plug other end into connector marked Temp Sensor (supplied)
8. Once the Target battery is connected, the Power Indicator will illuminate Green to show the system is active and charging
9. If no connection can be detected from the PV or DC inputs the Fault Indicator will illuminate Red and an error will be displayed (see section 5). Before proceeding the connections should be checked

3 Initial Setup



The unit can be optimised to suit the charging requirements of various battery types, as shown in the table below

Battery Type	BULK (Absorption) Voltage	FLOAT Voltage
Flooded (Pb/Pb)	14.4	13.7
Calcium (Ca/Ca)	14.8	13.7
Gel	14.1	13.2
AGM	14.6	13.6
Lead Crystal	14.8	13.7

Note:- This table is only a guide, always consult battery manufacturers specification for the most suitable charge voltage settings

3.1 BULK charge voltage

Available Range: 14.2–14.8V (Default 14.2V)




1. Press and hold MENU button  for 2 seconds, the display will show BULK voltage setting
2. Press Enter button, the value will then flash
3. Use  keys to adjust voltage



4. Press MENU  button to save setting

3.2 FLOAT charge voltage setup

Available Range: 13.2-13.8V (Default 13.2V)

1. Press and hold MENU button  for 2 seconds, the display will show BULK voltage setting
2. Press  key to change to FLOAT voltage setting
3. Press Enter button, the value will then flash
4. Use  keys to adjust voltage



5. Press MENU button  to save setting

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3 Initial Setup

3.3 Temperature compensation

With the sensor fitted the Float Charging voltage will be adjusted depending on how much the battery temperature varies from 25°C. This helps avoid overcharging in hot conditions and allows faster charging in colder conditions

For every $\pm 1^\circ\text{C}$ variation in temperature the float voltage will be adjusted by $\pm 20\text{mV}$
e.g. If battery temperature is 20°C then for a Float voltage setting of 13.6V

Output voltage = $13.6\text{V} + (5 \times 20\text{mV} = 100\text{mV}) = 13.7\text{V}$


3.4 Battery over-discharge protection

If the input voltage to the unit becomes too low, for example if the vehicles main battery becomes discharged, then the unit will cut-off to avoid problems starting the vehicle. Once the battery voltage has recovered the unit will switch back on and re-commence charging

Cut-off voltage	12.6 volts
Recover voltage	13.1 volts

3.5 Solar Priority mode

If required, the system can be configured so priority is always given to the solar panel (PV) input. To do this follow the procedure below

1. Press and hold MENU button  for 2 seconds, the display will show BULK voltage setting
2. Press \blacktriangledown key to change to FLOAT voltage setting
3. Press \blacktriangledown key to change to **Solar Priority** setting
4. Press Enter button, the value will then flash
5. Use \blacktriangle keys to adjust setting as shown below



6. Press MENU button  to save setting

4 Operation

Once the unit has been installed and setup, the operation is fully automatic. The Target battery will be charged from the Source battery using multi-stage charging, whenever sufficient power is available. If insufficient power is available the unit will enter standby followed by sleep mode to reduce current draw to a minimum

4.1 Multi-stage charging modes

- Bulk:** A constant current mode applied when the battery is in a low charge state. During this stage the controller delivers all of the available solar or DC power to the Target Battery
- Absorption:** A constant voltage stage during which the current required to charge the battery is gradually decreasing. This stage is complete when battery charge current reduces to below 3 Amps
- Float:** After the battery is fully charged, the controller reduces to a lower level constant voltage setting to maintain the Battery (also known as a trickle charge).
- MPPT:** This special PV mode called Maximum Power Point Tracking allows the unit to harvest the maximum possible power from your solar panel by tracking the most efficient operating point

4.2 Display & controls

A following section explains how information is displayed and controlled using the keypad and LCD screen

FIG.2 Keypad controls



FIG.3 LCD Display



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4 Operation

Power Indicator	Indicates system is active
Fault Indicator	Indicates a fault, error mode will also be displayed
Source Power	Indicates source of input power on = power is from PV input off = power is from DC input
Charge Indicator	Illuminates when the target battery is receiving charge
MPPT Indicator	Indicates MPPT mode is active for Solar input
Target Battery	Indicates the battery capacity
Charge Level	Indicates the battery charging current
BULK	Charging currently in Bulk/Absorption mode
FLOAT	Charging currently in Float mode


4.3 Display Selection

1. The display will default to show the voltage and charge level of the Target battery



2. Press MENU button  once to check Target Battery charging current



3. Press MENU button  once to check PV/DC input voltage



4. Press MENU button  once to check PV/DC input current



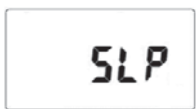
4.4 Standby mode

When insufficient input power is detected at the PV or DC inputs, the Charge indicator will switch off and the system will enter Standby mode



4.5 Sleep mode

If the unit remains in Standby mode for more than 5 minutes, it will enter sleep mode in order to reduce current draw on the target battery. At this point the Screen will display 'SLP'













Note: It may take up to 1 minute for the unit to re-initialise from sleep mode



5 Error Messages

Whenever an error has occurred the Fault LED will illuminate and one of the following error codes will be displayed.

-  **Problem:** PV/DC input voltage is too low or no PV/DC input
 **Solution:** Check connections of PV/DC inputs
-  **Problem:** Charging current is too high
 **Solution:** Reduce the input current to less than 30Amps
-  **Problem:** Target Battery voltage above 16V
 **Solution:** Disconnect the solar panel and stop the charging
-  **Problem:** PV/DC input voltage too high
 **Solution:** Reduce input voltage to less than 55V
-  **Problem:** Temperature is too high for the unit
 **Solution:** Stop charging and allow the unit to cool. Check ventilation

6 Specification

Input Voltage	PV: 10 - 50V; DC: 12.6 - 50V
Max Output Voltage	14.8V
Max Output Current	30A
Sleep Mode Current	20mA
MPPT	Yes
Temp Compensation	25°C ±20mV/°C
Operating Temp	-10°C to 45°C
Dimensions (LxWxH)	236 x 203 x 87mm
Weight	1.8 kg



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