



BBC-3140

USER MANUAL

DC-DC CHARGER / VOLTAGE REDUCER / CHARGE EQUALIZER

Introduction

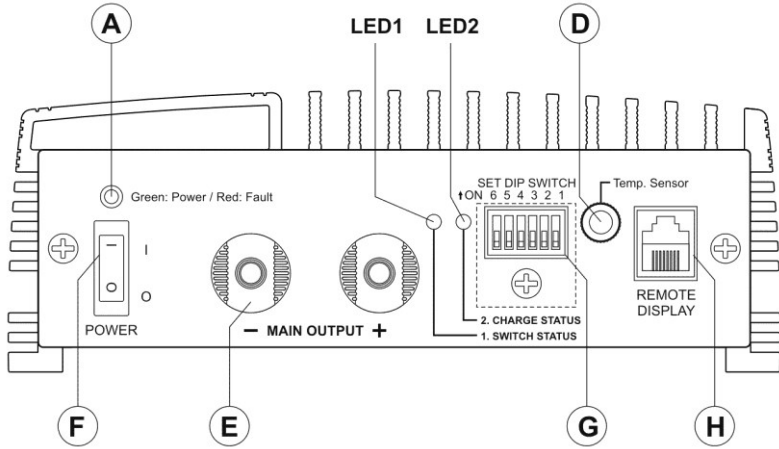
BBC-3140 is a Processor Controlled 3 Stage DC-DC Charger for charging 12V lead acid batteries from a 24V DC source. It can also be used as a regulated 13.8V DC Voltage Reducer or a constant 50% voltage reducer.

There are 3 standard charging profile selections: Wet, AGM & Gel and Calcium-Calcium lead acid battery. There are also two user defined charging profiles in which user can set: Absorption, Float Voltage and Absorption time via the optional Remote Display Module. Extensive protections are designed in to ensure years of trouble free use.

Features

- 24 to 12V DC 40A 3 stage Battery Charger
- Micro-Processor Control, unit can be used as a regulated 13.8 V DC output or as Half Input Voltage reducer ($V_{out}=1/2V_{in}$).
- Charging profile Selections for Wet, AGM & GEL and Cal-Cal batteries.
- 2 users defined charging profile must be programmed using the optional Remote Display Module.
- Car ignition connection is available to enable operation only when the car is operating
- Socket for Remote Temperature Sensor to the battery for precise compensated charging at high and low ambient temperature.
- Cooling fan with variable speed thermo control.
- Following Protections :
 1. Output Short Circuit (constant current)
 2. Output Over Current
 3. Input Over Voltage and Under Voltage
 4. Output Over Voltage
 5. Over Temperature
 6. Output reversed polarity (thermal fuse)
 7. Battery Over Temperature Protection when connected with remote temperature sensor.

Front Panel Operation



LED 2 Charging Status: BLINKS = Charging ON = Full

SWITCH	SWITCH TO ↑ ON	LED1
1	AGM / GEL	OFF
2	WET	OFF
3	CALCIUM-CALCIUM	OFF
4	User Defined Charge A	ON
5	User Defined Charge B	ON

6	Output V = ½ Input V	LED1 OFF , LED2 OFF
All switches to OFF : Output = 13.8VDC		LED1 OFF , LED2 OFF
2 or more switches to ↑ ON : NO OUTPUT		LED1 BLINKS , LED2 OFF

A. LED operation status:

Green: Unit in normal operation and power on.

Red: Unit is not operating and is in protection mode or wrong dip switch selection.

LED1. Battery type / DIP Switches status.

OFF: Indicates one of the three standard battery type is selected.

Orange blinking: Error in setting of DIP switches.
More than one switch set to "ON".

Orange solid: User defined charge profile selected.
Must be used with the optional Remote Panel

LED 2. Charging status:

Green blinking: Charging in progress.

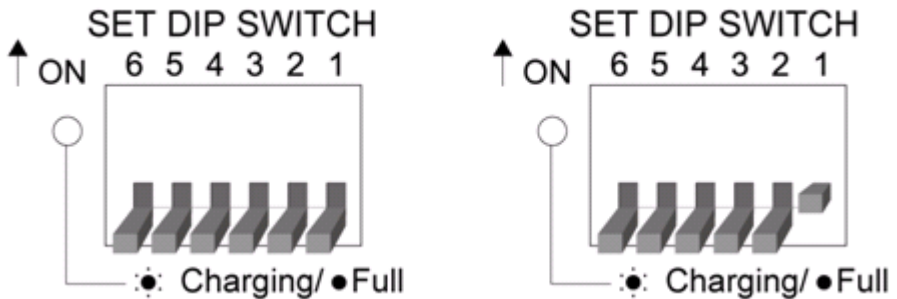
Green solid: Charging stop / Battery full.

D. Remote Temperature sensor socket for battery

E. Output to battery or load.

F. Power ON / OFF switch.

G. Explanation of the DIP switches settings for Battery Type or charge profile selection.



There are 6 DIP switches Up position is the On or Selected position.

Caution

Only one switch is allowed to be set to ON (up position) at any one time. If more than one switch set to ON, output will shut down and the orange B LED will blink until selection has been corrected.

DIP 1 UP: AGM/GEL battery type. Absorption 14.1V, Float 13.2V.

DIP 2 UP: Wet battery type. Absorption 14.4V, Float 13.5V.

DIP 3 UP: Calcium-Calcium type. Absorption 15.5V, Float 13.8V.

DIP 4 UP: User defined 1 in which Absorption, Float Voltages and Absorption time are set via Remote Display Module.

DIP 5 UP: User defined 2 in which Absorption, Float Voltages and Absorption time are set via Remote Display Module.

DIP 6 UP: DC voltage reducer with output voltage at half input voltage.

All 6 DIP switches DOWN: Unit becomes a DC Voltage Reducer with regulated 13.8V output.

H. Remote Display connecting / connector is RJ12.

Installation and operation

Charger Mode:

Mount the charger as close as possible to the battery banks to avoid voltage drop lost due to long cable. The cables must have proper sized lugs with heat-shrunk insulation. Make sure you have correct fuses installed at the positive terminals of both batteries. The output cable should be large enough to handle 50 Amp current for its length.

It is important to double check correct polarity for output and input with the right type of color, red for positive all the way

Please double check tightness of terminal nuts by wriggling joining cable a few times.

1. Turn the power switch **F** to OFF position.
2. For ignition control, connect the red cable from back of unit to the car's ignition switch. The unit will operate when the ignition is switched ON and the power switch **F** is in ON position
3. For continuous operation connect the red wire from the back of the unit to the positive 24V DC source such as battery
4. Double check again for correct polarity before turning the Switch **F** to on position.

Protection

Input Low Voltage Disconnect (LVD) protection:

This is to protect the input DC source (usually starting battery) from over drawn by the output which can be an auxiliary battery or a load. When the input voltage is less than 23V for 3 second, LVD protection is triggered and output is shut down. LED A turns to red. When input voltage is back up to above 25.5V for 10 second, the unit will return to normal operation and LED A will turn to green again.

Battery Over Temperature Protection (OTP):

When battery temperature is detected by the remote temperature sensor to be over 60°C, the output will shut down and LED A will turn to red.

Input Over Voltage Protection (OVP):

When input voltage to unit is higher than 32V, output will shut down and LED A will turn to red. When Input voltage drops down to less than 30V, unit will return to normal operation and LED A will return to green.

Output Over Voltage Protection (OVP):

When output voltage is higher than 17.5V, output will shut down.

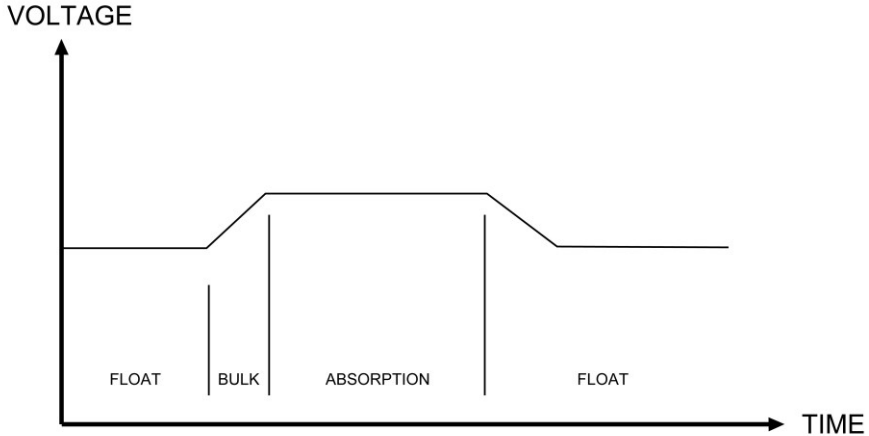
Unit needs to be switched OFF and then ON manually to restore normal operation.

Output Over Current Protection (OCP):

When output current goes over 40 Amps, the unit will operate in Constant Current Mode condition.

Caution: It is advisable to check connections, input, output loading and etc before restoring operation

Charging Profiles



FLOAT:

When unit is switched ON and current is less than 10Amps, the charger will keep at the Float Mode at 13.2V to 13.8V. If the current drawn is larger than 10 Amps or battery voltage lower than 12.5V for 5 minutes charger will enter into Bulk Charge mode.

BULK:

In Bulk Charge Mode the charger will supply maximum up to 40Amps until battery voltage rises to selected Absorption voltage level, unit will then enter into Absorption Mode.

ABSORPTION:

In Absorption Charge Mode the charging voltage is kept constant. The charger will go from Absorption into Float when the charging current drops to 4Amps or after 3 hours in Absorption mode.

Voltage Reducer Mode:

When used as a Voltage Reducer, set all the Dip switches to down OFF position. The output will give a regulated DC voltage of 13.8V and a maximum 40 Amps DC current.

All the protections are applicable in this mode as in the charger mode.

Note: LED1 and LED2 are both off in the Voltage Reducer Mode

50% Voltage Reducer Mode:

When used as a 50% Voltage Reducer, Output V= 1/2 Input V.
set the Dip Switch 6 in up (On) position .

Remote Display Module BBR-3100 (optional)

I. Introduction

The Remote Display Module is an optional module which has two functions:

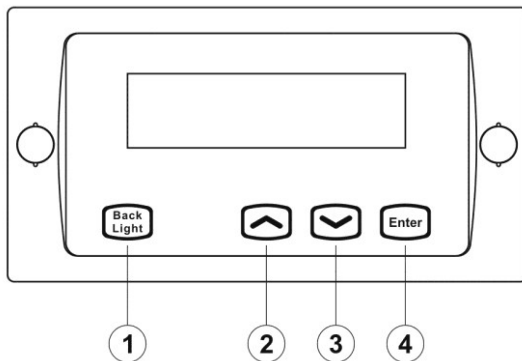
1. Displays real time key information of the BBC-3140.
2. Sets charging parameters of the two user defined charging profiles.

II. Connection



1. 10 Meters Phone Cable
2. In Line Coupler 6P6C
3. BBR-3100 Remote Display Module

III. Panel Buttons Operation



1. To switch ON LED backlight.
2. Scroll up display of the real time information of main unit BBC-3140.
3. Scroll down display of the real time information of main unit BBC-3140.
4. Enter input of charging parameters for the User Defined Charge Profiles.

IV. Indications

When Remote Display Module is connected to BBC-3140, it displays the “Initialization”, “Version of software”, “Brand or Make” and then scrolls cyclically to show all the real time information according to the mode selected in the main unit .

Following is displayed when in charger mode:

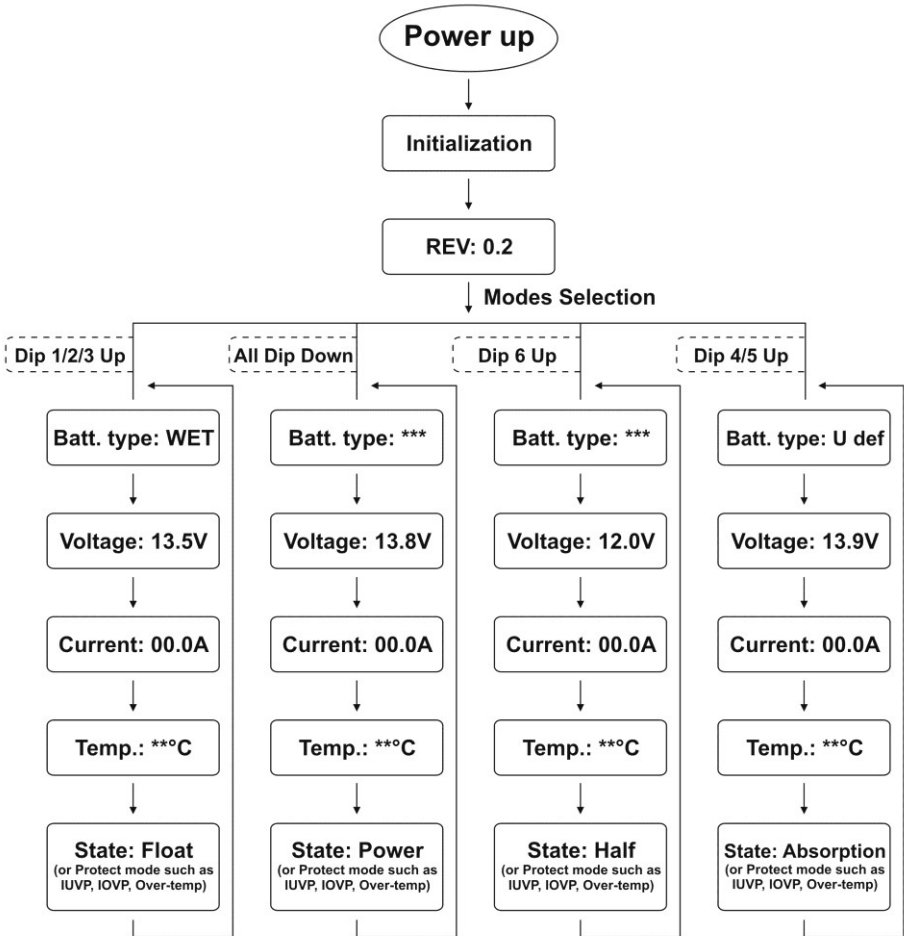
- Battery type selected.
- Charging voltage.
- Charging current.
- Temperature of the battery.
- State of charging (bulk, absorption, float).
- Type of fault if unit is in fault mode.

Following is displayed when in user defined charging mode:

Batt type shows: “U def” and so on.

When in Voltage Reducer Mode, no battery type is shown, and the “State” displays “Power” or “Half” depending on the selection.





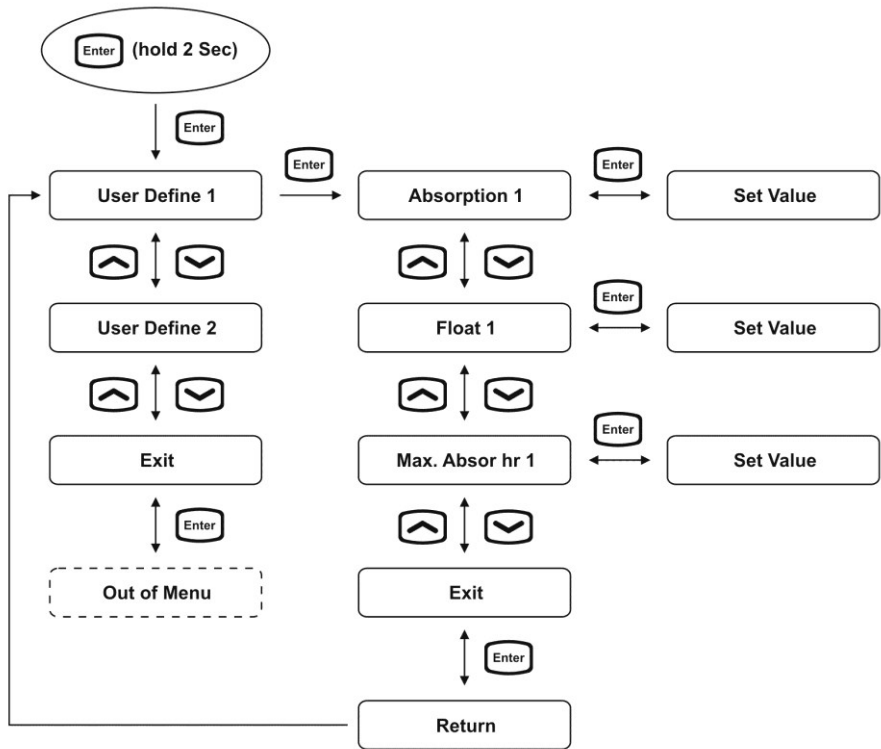
Decoding the indications of the display.

1. IUVP: Input Under Voltage Protection
2. IOVP: Input Over Voltage Protection
3. Over-temp: Battery Over Temperature protection
4. Power: unit is set at 13.8V Voltage Reducer Mode
5. Half: Output = Half the Input voltage

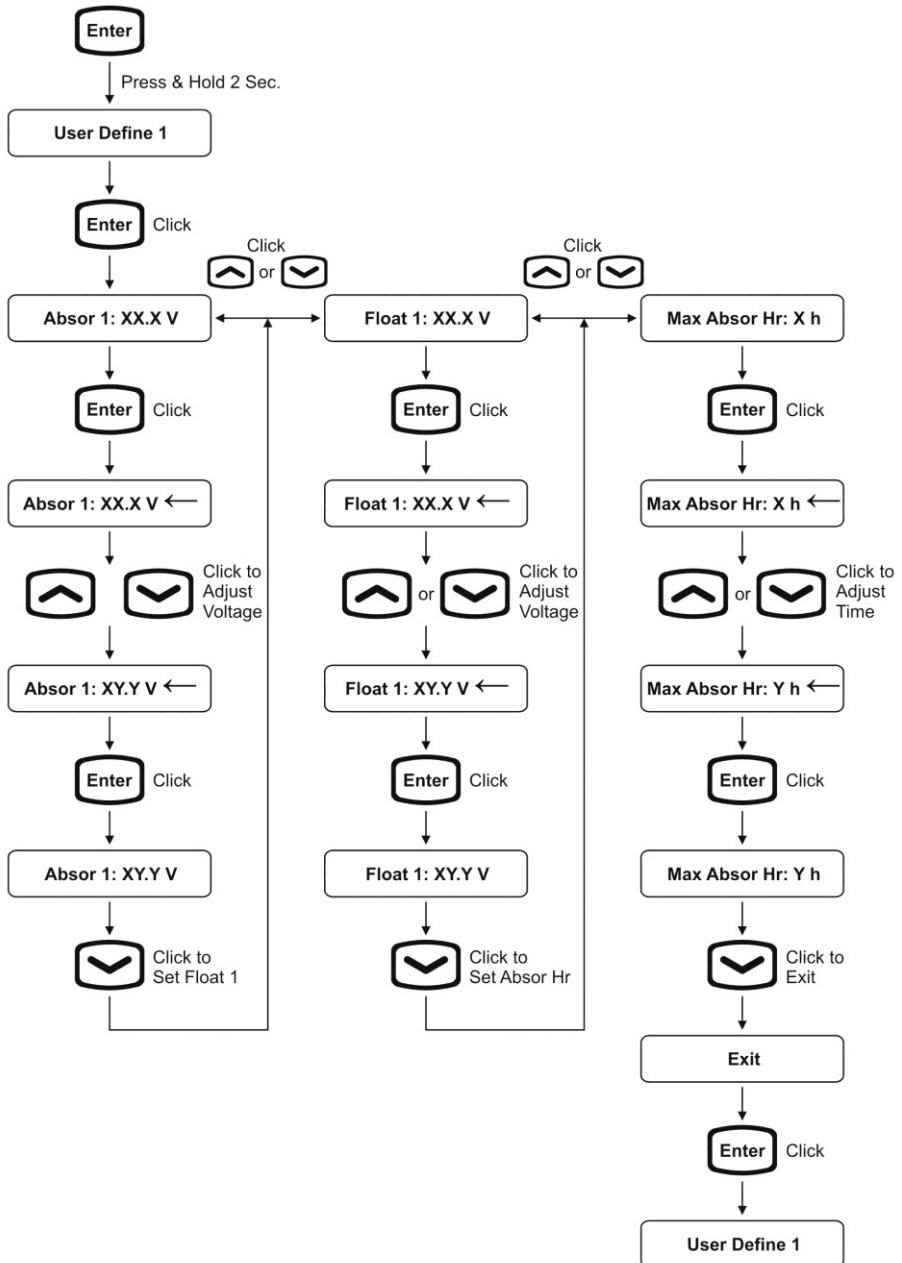
V. Setting the User Defined Charging Parameters

The Absorption voltage (13.0V to 15.5V), float voltage (12.6 to 14.0V) and the maximum absorption time (1 to 6 hour) can be set in the User Defined Charging Modes .

VI. Flow Chart of Value Setting Instruction



An example of setting the values in user defined charging profile.



Specifications

Rated Output Power	40A at 13.8V
Efficiency	86%
Input Voltage Range	24 – 30VDC
Output Voltage Range	See operation mode
DC-DC Battery Charger Mode	
Float (GEL/AGM)	13.2V
Float (WET)	13.5V
Float (Calcium-Calcium)	13.8V
Absorption (GEL/AGM)	14.1V
Absorption (WET)	14.4V
Absorption (Calcium-Calcium)	15.5V
User Defined Float Voltage Range	12.6V ~ 14.0V
User Defined Absorption Voltage Range	13.0V ~ 15.5V
User Defined Absorption Time Range	1 ~ 6hours
DC Voltage Reducer Mode	
Regulated Output Voltage	13.8V
Charge Equalizer: Output V = Half Input V	11 ~ 15V
Moving Output Voltage tolerance of Charge Equalizer	Half Input Voltage $\pm 0.5V$
Voltage Regulation:	
Load	200mV
Line	80mV
Ripple & Noise	35mVrms
DC Input Current	
No Load Input Current (Standby)	170mA
Full Load Input Current (at output 13.8V / 40A)	26.5A
Input Current Level when Output Short Circuit	2.5A
Protections	
Input Low Voltage Disconnect (Auto reset)	21V
Input Over Voltage (Auto shut down)	32V
Output Over Voltage (Auto shut down)	17.5V
Output Over Current / Short Circuit (Auto reset)	41A
Battery Over Temp. (with remote temp. sensor)(Auto shut down)	60°C
Unit Over Temperature Protection	Yes
Reverse Polarity (Output)	30A x 2 Fuses
Approval	CE EMC EN55014
Dimensions (L x W x H) mm	243 x 156 x 61
Weight	Approx. 2.4kg