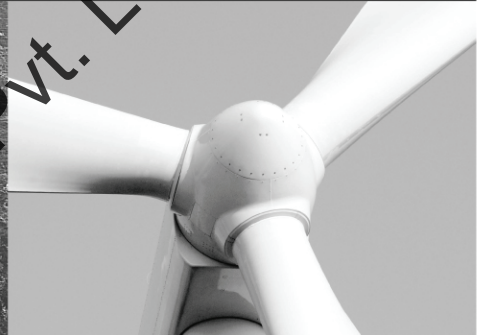




Control Electric Co. Pvt. Ltd.  
Tel No: (+91)120-4217189, 09818689117  
sales@plcpanel.com, www.plcpanel.com



## Battery Charger



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# 1. General information

## 1.1 Application and advantages

### 1.1.1 Application

The DBC-1 can be applied as a battery charger. As a battery charger, the DBC1 is applied to charge and to maintain the full-charge condition of closed or gastight 12 V or 24 V Pb (Lead-Acid) and gel type batteries. They can be used in parallel operation with other chargers of the same type, and with the same voltage rating. DBC-1 can also operate in parallel with a charge alternator.

### 1.1.2 Advantages

- DIN-rail and base-mounting (with 4 fixing holes)
- Overvoltage protection
- Led indicators for power OK, boost-charging and for alarm indication
- Alarm relay output contacts
- Equalisation (boost) charging
- Convection cooling. No moving parts
- Output short-circuit-protected
- High temperature-protected (power derating over-temperature)
- Reverse polarity-protected (automatically with mosfet)
- Low output ripple and noise level
- Lower volume and weight compared to similar alternatives
- Galvanically isolated input and output, typically 4 kV
- Low cost
- High efficiency
- High reliability (MTBF>60.000 hours. @ 70°C/Full load)
- Low failure rates, long life
- SMD technology.

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## 2. Technical information

### 2.1 Description of functions

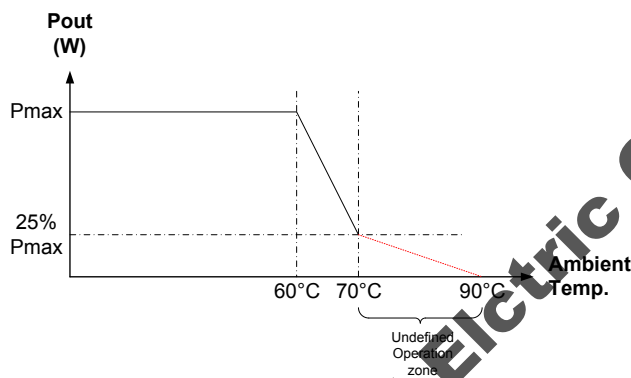
#### 2.1.1 Protections

- Protected against continuous short-circuit and no-load operation
- Protected against reverse battery polarity connection, and automatically restarts operation after the fault is removed
- Protected against over-temperature
- Protected against undervoltage on line input
- Protected against overvoltage on output. The unit shuts itself down when an overvoltage on output terminals arises.

**An alarm condition occurs in any of the above cases.**

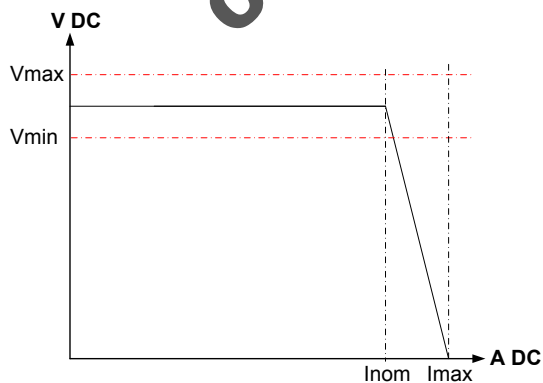
#### 2.1.2 Power derating

The DBC-1 series has a high temperature protection designed to allow safe operation at all times. The power output de-rates above 60°C of ambient temperature on a linear curve, see figure below. An ambient temperature above 70°C will cause the power to de-rate further towards a voltage output at 0V DC. In this area, the operation zone is undefined.



#### 2.1.3 Charge characteristic

The output voltage is held constant as long as the load does not exceed the nominal current. A load exceeding the current limitation will automatically reduce the output voltage according to IU-characteristic line of DIN41772/DIN41773 power limited as shown in the figure below.



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#### 2.1.4 Charger Failure Alarm

These units have a dry contact alarm output which is closed (energised) under normal operating conditions (no failure).

The alarm contact is steady open when:

- Failure on the line input or input fuse
- No output voltage.

The alarm contact will work intermittent when:

- Failure caused by battery reverse polarity connection
- Overvoltage condition on output terminals.

(Note: when overvoltage is detected while battery is connected, the alarm relay is open and locked in this position until the battery is disconnected)

#### 2.1.5 LED indications

##### Alarm functions

The LED will be steady red when:

- Failure on the line input or input fuse
- No output voltage.

The LED will flash between red and green when:

- Failure caused by battery reverse polarity connection
- Overvoltage condition on output terminals.

##### Boost-charge indicator

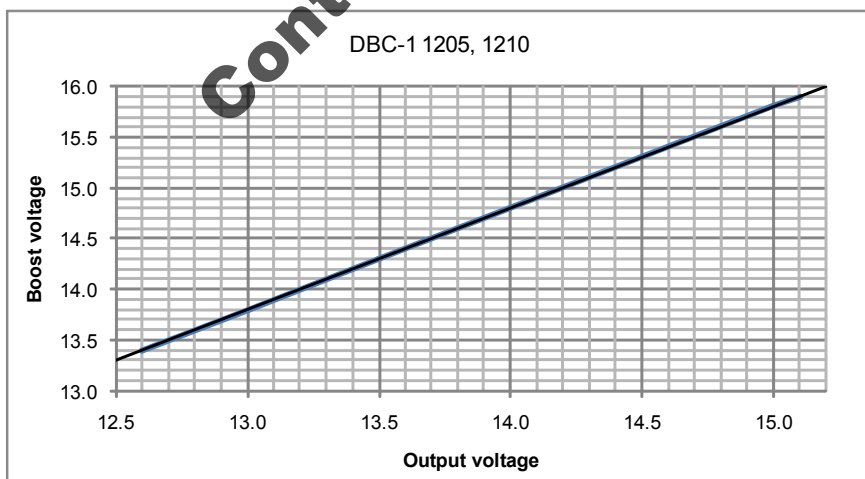
The LED indicator will turn blue when the boost-charge mode is activated.

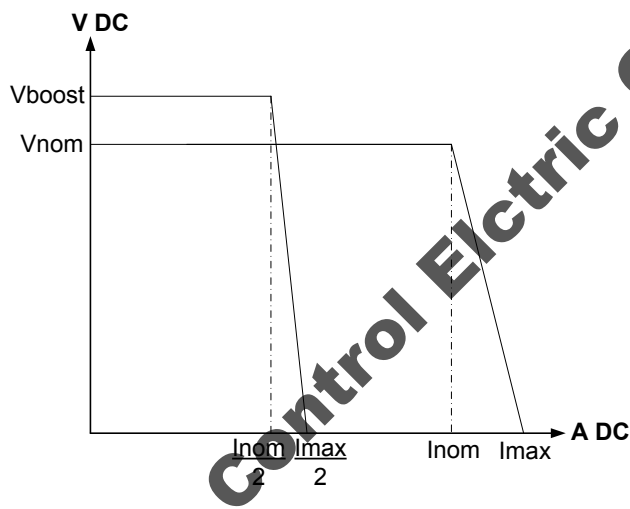
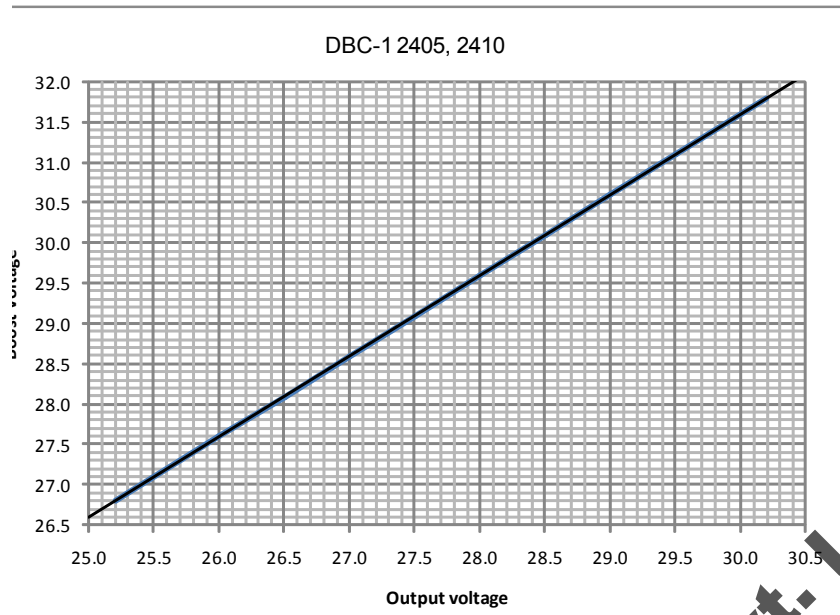
##### Input power OK

The LED indicator will be steady green when there is healthy voltage on the output terminals

#### 2.1.6 Equalisation/Boost-charging

Equalisation is activated by making a short circuit between the terminals "minus" and "boost". When the equalisation is activated, the output voltage is increased by 0.8V DC at 12 V versions and 1.6V DC at 24 V versions. The current will be reduced by approx. 50%.





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## 2.2 Technical specifications

### 2.2.1 General data

<b>Duty ratio</b>	Continuous duty is allowed
<b>Cooling</b>	Convection
<b>Maintenance</b>	None
<b>Short-circuit</b>	Protected against continuous short-circuit
<b>No-load operation</b>	Protected against continuous no-load operation
<b>Mounting</b>	DIN-rail, EN 50022-35 or 4 pcs. Ø4.5 mm holes for screw mounting. To obtain optimum cooling, it is imperative to comply with the specified installation position, where the terminals are at the bottom. If the mounting differs from this, a reduction in output must be expected, depending on the ambient temperature. If placed in conditions with vibrations, it might be necessary to use base-mounting instead of din-rail mounting.
<b>Distance for convection</b>	100 mm above and below the DBC-1 30 mm to each side

### 2.2.2 Indication

<b>Functionality</b>	<b>LED</b>	<b>Alarm relay</b>
Normal operation	Green	Closed/energised
No load operation	Green	Closed/energised
Short-circuit on output	Off	Open/deenergised
Reverse polarity connection	Green-Red *)	Switching open/closed *)
High temperature/power derating	Green	Closed/energised
No input voltage with battery connected	Red	Open/deenergised
No input voltage without battery	Off	Open/deenergised
Undervoltage on input	Red	Open/deenergised
Overvoltage on output with battery connected	Red	Open/deenergised
Overvoltage on output without battery	Green-Red *)	Switching open/closed *)
Boost mode	Blue	Closed/energised

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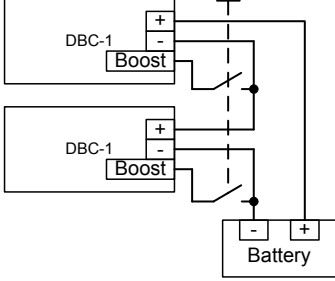
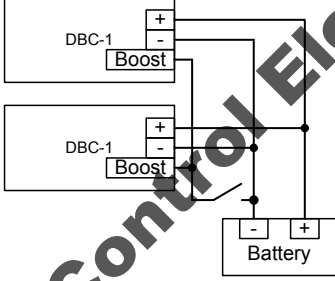
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### 2.2.3 Input specifications

<b>Input voltage</b>	115V AC models: 115V AC +/- 15% 230V AC models: 230V AC +/- 15%
<b>Maximum input current</b>	1205 115V AC: 1.20 A 1210 115V AC: 2.40 A 2405 115V AC: 2.40 A 2410 115V AC: 4.40 A  1205 230V AC: 0.60 A 1210 230V AC: 1.20 A 2405 230V AC: 1.20 A 2410 230V AC: 2.20 A
<b>Peak inrush current</b>	Cold conditions: max. 20 A Warm conditions: max. 100 A
<b>Frequency range</b>	47...63 Hz (supply)
<b>Power factor (Cos <math>\varphi</math>)</b>	1205 115V AC: 0.46 capacitive 1210 115V AC: 0.46 capacitive 2405 115V AC: 0.46 capacitive 2410 115V AC: 0.46 capacitive  1205 230V AC: 0.43 capacitive 1210 230V AC: 0.43 capacitive 2405 230V AC: 0.55 capacitive 2410 230V AC: 0.54 capacitive
<b>Fuse</b>	Input fuse: internal safety fuse (not exchangeable). If blown, it will cause the charger to stop working. Can only be exchanged by DEIF.

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## 2.2.4 Output specifications

<b>Output voltage</b>	<p>For 1205 and 1210 versions:  Factory setting 13.8V DC +/-1%  Adjustable 12.6...15.1V DC</p> <p>For 2405 and 2410 versions:  Factory setting 27.6V DC +/-1%  Adjustable 25.2...30.2V DC</p> <p>(Can be adjusted with a trimmer potentiometer at the front)</p>
<b>Series operation</b>	<p>12 V + 12 V = 24V DC: Possible  12 V + 24 V = 36V DC: Not possible  24 V + 24 V = 48V DC: Possible</p> 
<b>Parallel operation</b>	<p>5 A + 5 A = 10A DC Possible  5 A + 10 A = 15A DC Possible  10 A + 10 A = 20A DC Possible</p> 
<b>Output current</b>	<p>For 1205 and 2405 versions:  Nominal current: 5.0 A  Maximum current (short cct.): 6.0 A</p> <p>For 1210 and 2410 versions:  Nominal current: 10.0 A  Maximum current (short cct.): 12.0 A</p>
<b>Reflux current</b>	<p>In case the battery is connected without the input voltage connected, a current will go backwards from the battery to the charger. This current is max 8 mA for 12 V models and max 5 mA for 24 V models.</p>
<b>Output ripple</b>	<p>&lt;1.3% of nominal output voltage @ 10 Hz-100 kHz.</p>