1600W Intelligent Single Output Battery Charger

**RPB-1600 series**

**Features**
- Charger for lead-acid batteries (Gel, flooded and AGM) and Li-ion batteries (lithium iron and lithium manganese)
- Built-in default 3 stage charging curves and programmable curve
- Built-in I²C interface, PMBus protocol (Optional CANBus protocol)
- Universal AC input / Full range (Withstand 300VAC surge input for 5 seconds)
- Built-in active PFC function
- Forced air cooling by built-in DC fan
- Output voltage and current programmable
- Built-in OR-ing FET
- Active current sharing up to 4800W(2+1)
- Protections: Battery under voltage / Battery no connection / Short circuit / Over voltage / Over temperature
- Optional conformal coating
- 5 years warranty

**Description**
RPB-1600 is a 1.6KW single output AC/DC charger with a high power density up to 25W/inch³. Three embedded charging curves, specifically for the lead-acid batteries, are built into each model. Thanks to the communication protocol, PMBus, and CANBus one spare curve can be further accommodated to fit other types of batteries such as the Li-ion batteries. Each model is cooled by the thermostatically controlled fan. Moreover, RPB-1600 provides various protection mechanisms, offering the best safety for diversified types of applications.

**Model Encoding**

<table>
<thead>
<tr>
<th>Type</th>
<th>Communication Protocol</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>blank</td>
<td>PMBus protocol</td>
<td>In Stock</td>
</tr>
<tr>
<td>CAN</td>
<td>CANBus protocol</td>
<td>By request</td>
</tr>
</tbody>
</table>

**Applications**
- Large scale DC UPS or emergency backup system
- Marine battery charger module
- Electric scooter or vehicle charger station
- Wastewater treatment system
- Electrolysis system

**GTIN CODE**
MW Search: [https://www.meanwell.com/serviceGTIN.aspx](https://www.meanwell.com/serviceGTIN.aspx)

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File Name: RPB-1600-SPEC 2024-02-02
# 1600W Intelligent Single Output Battery Charger

## RPB-1600 Series

### SPECIFICATION

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RPB-1600-12</th>
<th>RPB-1600-24</th>
<th>RPB-1600-48</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OUTPUT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOOST CHARGE VOLTAGE (Typ.)</td>
<td>14.4V</td>
<td>28.8V</td>
<td>57.6V</td>
</tr>
<tr>
<td>FLOAT CHARGE VOLTAGE (Typ.)</td>
<td>13.8V</td>
<td>27.6V</td>
<td>55.2V</td>
</tr>
<tr>
<td>CONSTANT VOLTAGE/CC (Typ.)</td>
<td>160A</td>
<td>55A</td>
<td>27.5A</td>
</tr>
<tr>
<td>VOLTAGE ADJUST RANGE Note 5</td>
<td>11.5 ~ 15V</td>
<td>23.5 ~ 30V</td>
<td>47.5 ~ 58.8V</td>
</tr>
<tr>
<td><strong>RECOMMENDED BATTERY CAPACITY (AMP HOURS) Note 5</strong></td>
<td>330 ~ 1000Ah</td>
<td>180 ~ 550Ah</td>
<td>90 ~ 270Ah</td>
</tr>
<tr>
<td>LEAKAGE CURRENT FROM BATTERY (Typ.) Note 5</td>
<td>&lt;45mA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>INPUT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOLTAGE RANGE Note 5</td>
<td>90 ~ 264VDC</td>
<td>250 ~ 370VDC</td>
<td></td>
</tr>
<tr>
<td>FREQUENCY RANGE</td>
<td>47 ~ 63Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POWER FACTOR (Typ.)</td>
<td>0.97/230VAC at full load</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFFICIENCY (Typ.)</td>
<td>91%</td>
<td>92.5%</td>
<td>93.5%</td>
</tr>
<tr>
<td>AC CURRENT (Typ.) Note 6</td>
<td>14A/115VAC</td>
<td>8A/230VAC</td>
<td>15A/115VAC</td>
</tr>
<tr>
<td>INRUSH CURRENT (Typ.)</td>
<td>COLD START 35A/230VAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEAKAGE CURRENT</td>
<td>&lt;2mA/240VAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PROTECTION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OVER VOLTAGE</td>
<td>15.75 ~ 18.75V</td>
<td>31.5 ~ 37.5V</td>
<td>63 ~ 79V</td>
</tr>
<tr>
<td>OVER TEMPERATURE</td>
<td>Shut down o/p voltage, re-power on to recover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUXILIARY POWER</td>
<td>5V @ 0.3A, 12V @ 0.8A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUTPUT VOLTAGE PROGRAMMABLE (PV) Note 5</td>
<td>Adjustment of output voltage is allowable to 75 ~ 125% of nominal output voltage</td>
<td>Please refer to the Function Manual.</td>
<td></td>
</tr>
<tr>
<td>OUTPUT CURRENT PROGRAMMABLE (PC) Note 5</td>
<td>Adjustment of output current is allowable to 20 ~ 100% of rated current</td>
<td>Please refer to the Function Manual.</td>
<td></td>
</tr>
<tr>
<td>TEMPERATURE COMPENSATION</td>
<td>-3mV/℃/cell (12V = 6 cells; 24V = 12 cells; 48V = 24 cells)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALARM SIGNAL</td>
<td>Isolated signal output for T-alarm and DC OK</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ENVIRONMENT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WORKING TEMP.</td>
<td>-30 ~ +70℃ (Refer to &quot;Derating Curve&quot;)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WORKING HUMIDITY</td>
<td>20 ~ 90% RH non-condensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STORAGE TEMP., HUMIDITY</td>
<td>-40 ~ +85℃, 10 ~ 95% RH non-condensing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEMP. COEFFICIENT</td>
<td>± 0.03%/℃ (0 ~ 50℃)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VIBRATION</td>
<td>10 ~ 500Hz, 2G 10min./cycle, 60min. each along X, Y, Z axes</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SAFETY &amp; EMC (Note 6)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAFETY STANDARDS</td>
<td>UL62368-1, TUV EN/EN62368-1, EAC TP TC 004 approved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WITHSTAND VOLTAGE</td>
<td>I/P-O/P: 3kVAC / I/P-FG: 2kVAC / O-P-FG: 1.5kVAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISOLATION RESISTANCE</td>
<td>I/P-O/P, I/P-FG, O-P-FG: 100M Ohms / 500VDC / 25℃ / 70% RH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMC EMISSION</td>
<td>Compliance to BS EN/EN55032 (CISPR32) Conduction Class B, Radiation Class A; BS EN/EN61000-3-2,-3, EAC TP TC 020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EMC IMMUNITY</td>
<td>Compliance to BS EN/EN55035, EAC TP TC 020</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OTHERS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTBF</td>
<td>457.7K hrs min. Telcordia SR-332 (Belcore); 100.3K hrs min. MIL-HDBK-217F (25℃)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIMENSION</td>
<td>300<em>65</em>41mm (L<em>W</em>H)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACKING</td>
<td>2.1Kg,6pcs/13.6Kg/1.25CUFT</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NOTE</strong></td>
<td>1. Modification for charger specification may be required for different battery specification. Please contact battery vendor and MEAN WELL for details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. This is MEAN WELL’s suggested range. Please consult your battery manufacturer for their suggestions about maximum charging current limitation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Derating may be needed under low input voltages. Please check the derating curve for more details.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. PV/PC functions when users are not operating on PMBus/CANbus. SVR functions when users are not operating on PMBus/CANbus or using PV/PC.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. The charger is considered a component which will be installed into a final equipment. All the EMC tests are being executed by mounting the unit on a 720mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.” (as available on <a href="https://www.meanwell.com/upload/pdf/EMI_statement_en.pdf">https://www.meanwell.com/upload/pdf/EMI_statement_en.pdf</a>)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7. The ambient temperature derating of 3.5℃/1000m with fanless models and of 5℃/1000m with fan models for operating altitude higher than 2000m(6560ft).</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. When charging lead acid battery or battery without BMS, use breaker to disconnect charger and battery after fully charged.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

File Name: RPB-1600-SPEC 2024-02-02
**Block Diagram**

**Derating Curve**

**Static Characteristics**

**Ambient Temperature (°C)**

-30 -25 0 -10 15 30 60 70 (Horizontal)

**Load (%)**

20 40 60 80 100

**Input Voltage (VAC) 60Hz**

90 100 115 180 264

**PFC fosc : 90KHz**

**PWM fosc : 70KHz**
1. PMBus Communication Interface
   ※ RPB-1600 supports PMBus Rev. 1.1 with maximum 100KHz bus speed, allowing information reading, status monitoring, output trimming, etc. For details, please refer to the Installation Manual.

2. Charging Curve
   ※ By factory default, this charger performs the default curve which can be programmed via PMBus and CANBus. PIN10 and PIN14 on CN1 are thus shorted by default.
   ※ To disable/enable the charging curve, change to a 2 stage curve, a different curve frequently used for certain types of batteries in the industry, switch to PMBus, CANBus, PV/PC or SVR control instead and so on, please refer to the Installation Manual.
   ※ To program the parameters of the charging curve, SBP-001, the smart battery charging programmer designed by MEAN WELL, and a personal computer are needed. Please contact MEAN WELL for details.

3. Front Panel LED Indicators & Corresponding Signal at Function Pins

4. Output Voltage Programming (or, PV / remote voltage programming / remote adjust / margin programming / dynamic voltage trim)
   ※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed by applying EXTERNAL VOLTAGE.
5. Output Current Programming (or, PC / remote current programming / dynamic current trim)

※ The output current can be trimmed to 20~100% of the rated current by applying EXTERNAL VOLTAGE.

6. Remote ON-OFF Control

The power supply can be turned ON/OFF individually or along with other units in parallel by using the "Remote ON-OFF" function.

7. Temperature Compensation

To exploit the temperature compensation function, please attach the temperature sensor, NTC, which is enclosed with the charger, to the battery or the battery’s vicinity.

The charger is able to work normally without the NTC.

When multiple chargers are connected in parallel, please configure with the NTC as exhibited in the diagram.

If the temperature compensation is not required, RTH+ (PIN15) and RTH- (PIN16) from each unit still need to be connected.

8. Alarm Signal Output

※ There are 2 alarm signals, DC OK and T-ALARM, in TTL signal form, on CN1. These signals are isolated from output. The maximum sink current is 10mA.
9. Current Sharing

RPB-1600 has the built-in active current sharing function and can be connected in parallel, up to 3 units, to provide higher output power as exhibited below:

- The power supplies should be paralleled using short and large diameter wiring and then connected to the load.
- Difference of output voltages among parallel units should be less than 0.2V.
- The total output current must not exceed the value determined by the following equation:
  \[ \text{Maximum output current at parallel operation} = \text{(Rated current per unit)} \times \text{(Number of unit)} \times 0.9 \]
- When the total output current is less than 5% of the total rated current, or say (5% of Rated current per unit) \times (Number of unit), the current shared among units may not be balanced.

※ CN500/SW1 Function pin connection

<table>
<thead>
<tr>
<th>Parallel</th>
<th>PSU1</th>
<th>PSU2</th>
<th>PSU3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 unit</td>
<td>CN500</td>
<td>CN500</td>
<td>CN500</td>
</tr>
<tr>
<td>2 unit</td>
<td>OFF</td>
<td>ON</td>
<td>SW1</td>
</tr>
<tr>
<td>3 unit</td>
<td>OFF</td>
<td>VON</td>
<td>SW1</td>
</tr>
</tbody>
</table>

(V: CN500 connected ; X: CN500 not connected.)

If the lines of CN500 are too long, they should be twisted in pairs to avoid the noise.

◎ DA, DB and -V(signal) are connected mutually in parallel.
1600W Intelligent Single Output Battery Charger

RPB-1600 series

Mechanical Specification

Case No.250  Unit:mm

Mounting Instruction

Hole No.  Recommended Screw Size  MAX. Penetration Depth  Recommended mounting torque

1  M3  4mm  6-8Kgf-cm
2  M4  5mm  7-10Kgf-cm

Control Pin No. Assignment(CN1) : HRS DF11-16DP-2DS or equivalent

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+12V-AUX</td>
<td>Auxiliary voltage output, 10.6~13.2V, referenced to GND-AUX (pin2). The maximum load current is 0.8A. This output has the built-in &quot;Oring diodes&quot; and is not controlled by &quot;Remote ON-OFF&quot;.</td>
</tr>
<tr>
<td>2</td>
<td>GND-AUX</td>
<td>Auxiliary voltage output GND. The signal return is isolated from the output terminals (+V &amp; -V).</td>
</tr>
<tr>
<td>3</td>
<td>+5V-AUX</td>
<td>Auxiliary voltage output, 4.5~5.5V, referenced to GND-AUX (pin2). The maximum load current is 0.3A. This output has the built-in &quot;Oring diodes&quot; and is not controlled by &quot;Remote ON-OFF&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Remote ON-OFF</td>
<td>The unit can turn the output ON/OFF by electrical signal or dry contact between Remote ON/OFF and +5V-AUX. (Note.2) Short (4.5 ~ 5.5V) : Power ON ; Open (~ 0.5 ~ 0.5V) : Power OFF. The maximum input voltage is 5.5V.</td>
</tr>
<tr>
<td>5</td>
<td>DC-OK</td>
<td>High (3.5 ~ 5.5V) : When the Vout ≥8V/16V/32V ± 1V. Low (~ 0.5 ~ 0.5V) : When Vout ≥8V/16V/32V ± 1V. The maximum sourcing current is 10mA and only for output. (Note.2) DC-OK is associated with battery low protection.</td>
</tr>
<tr>
<td>6</td>
<td>T-ALARM</td>
<td>High (3.5 ~ 5.5V) : When the internal temperature exceeds the limit of temperature alarm, or when Fan fails. Low (~ 0.5 ~ 0.5V) : When the internal temperature is normal, and when Fan normally works. The maximum sourcing current is 10mA and only for output(Note.2)</td>
</tr>
<tr>
<td>7,8,9</td>
<td>A0,A1,A2</td>
<td>PMBus / CANBus interface address lines. (Note.1)</td>
</tr>
<tr>
<td>10</td>
<td>D0</td>
<td>Charging mechanism control. This pin determines, for charging operation, whether charging curve is used, or control over PMBus, PV/PC or SVR is used. Please refer to the installation Manual. (Note.1)</td>
</tr>
<tr>
<td>11</td>
<td>PC</td>
<td>Connection for output current programming. (Note.1)</td>
</tr>
<tr>
<td>12</td>
<td>PV</td>
<td>Connection for output voltage programming. (Note.1)</td>
</tr>
<tr>
<td>13</td>
<td>+V (Signal)</td>
<td>Positive output voltage signal. It cannot be connected directly to the load.</td>
</tr>
<tr>
<td>14</td>
<td>-V (Signal)</td>
<td>Negative output voltage signal. It is for certain function reference; it cannot be connected directly to the load.</td>
</tr>
<tr>
<td>15</td>
<td>RTH+</td>
<td>Temperature sensor(NTC, 5KOhm) comes along with the charger can be connected to the unit to allow temperature compensation of the charging voltage.</td>
</tr>
<tr>
<td>16</td>
<td>RTH-</td>
<td>Temperature sensor(NTC, 5KOhm) comes along with the charger can be connected to the unit to allow temperature compensation of the charging voltage.</td>
</tr>
</tbody>
</table>

Note1: Non-isolated signal, referenced to the [+V(signal)].
Note2: Isolated signal, referenced to GND-AUX.
### AC Input Terminal Pin No. Assignment

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Assignment</th>
<th>Diagram</th>
<th>Maximum mounting torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FG</td>
<td><img src="image1" alt="Diagram" /></td>
<td>8Kgf·cm</td>
</tr>
<tr>
<td>2</td>
<td>AC/N</td>
<td><img src="image2" alt="Diagram" /></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>AC/L</td>
<td><img src="image3" alt="Diagram" /></td>
<td></td>
</tr>
</tbody>
</table>

### Control Pin No. Assignment (CN500) : HRS DF11-8DP-2DS or equivalent

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Description</th>
<th>Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2</td>
<td>DA</td>
<td>HRS DF11-8DS or equivalent</td>
</tr>
<tr>
<td>3,4</td>
<td>DB</td>
<td>HRS DF11-**SC or equivalent</td>
</tr>
<tr>
<td>5,6</td>
<td>-V (Signal)</td>
<td>Negative output voltage signal. It is for certain function reference; it cannot be connected directly to the load.</td>
</tr>
<tr>
<td>7</td>
<td>SDA</td>
<td>For PMBus model: Serial Data used in the PMBus interface. (Note.2)</td>
</tr>
<tr>
<td></td>
<td>CANH</td>
<td>For CANBus model: Data line used in CANBus interface. (Note.2)</td>
</tr>
<tr>
<td>8</td>
<td>SCL</td>
<td>For PMBus model: Serial Clock used in the PMBus interface. (Note.2)</td>
</tr>
<tr>
<td></td>
<td>CANL</td>
<td>For CANBus model: Data line used in CANBus interface. (Note.2)</td>
</tr>
</tbody>
</table>

Note1: Non-isolated signal, referenced to [-V(signal)].
Note2: Isolated signal, referenced to GND-AUX.

### Control Pin No. Assignment (SW1)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,2</td>
<td>Terminal resistance</td>
<td>SW1 is the selector of terminal resistor that is designed for DA/DB signals and parallel control function.</td>
</tr>
</tbody>
</table>